SPECIFICATIONS FOR:

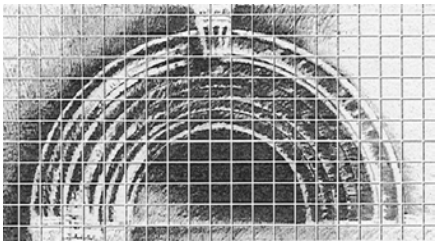
RIVER STREET SENIOR HOUSING

30 RIVER STREET
CORTLAND, NEW YORK

18 JULY 2025

Prepared for:
River Street Senior Apartments, LLC.
36 Taylor Street
Cortland, NY 13045

HKK JOB #22050
SHARS #20240329



HOLMES ▪ KING ▪ KALLQUIST
& Associates, Architects, LLP

575 North Salina Street, Syracuse, NY 13208
www.hkkarchitects.com

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RIVER STREET SENIOR HOUSING
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Cortland, New York

HKK JOB #22050
SHARS #20240329

DATE:
18 JULY 2025

OWNER:
RIVER STREET SENIOR APARTMENTS, LLC.
36 TAYLOR STREET
CORTLAND, NEW YORK 13045

ARCHITECT:
HOLMES▪KING▪KALLQUIST & ASSOCIATES, ARCHITECTS, LLP
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STRUCTURAL ENGINEER:
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5711 WEST GENESEE STREET
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MECHANICAL/ELECTRICAL ENGINEER:
ARGUS ENGINEERING
200 BOSS ROAD
SYRACUSE, NEW YORK 13211

LANDSCAPE ARCHITECTS:
KEPLINGER FREEMAN ASSOCIATES, PLLC
6320 FLY ROAD, SUITE 109
EAST SYRACUSE, NEW YORK 13057

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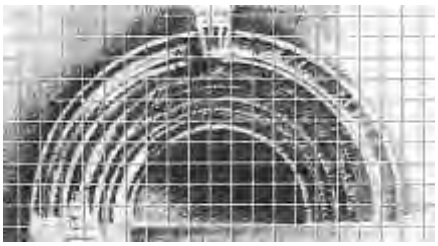
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REVISED 07 JANUARY 2026

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SECTION 008000 - SUPPLEMENTARY GENERAL CONDITIONS – A201 - 2017

I. ARTICLE 1 - GENERAL PROVISIONS

1) 1.0 GENERAL

A. This Section modifies, adds to and otherwise supplements the General Conditions of the Contract. AIA Document A-201, 2017 Edition.

B. Where any articles of the General Conditions for Contract are supplemented herein, the provisions of such articles shall remain in effect. All supplemental provisions shall be considered as added thereto.

C. Where portions of any articles of the General Conditions of the Contract are amended, voided, or suspended herein, the provisions of such articles not so specifically amended, voided or suspended shall remain in effect.

2) 1.1 BASIC DEFINITIONS

A. Article 1.1 of Document A-201 is supplemented as follows:

Owner: RIVER STREET SENIOR APARTMENTS, LLC.
Architect: Holmes King Kallquist & Associates, Architects, LLP
575 North Salina Street
Syracuse, New York 13208

3) 1.2 CORRELATION AND INTENT OF THE CONTRACT DOCUMENTS

A. Article 1.2, subparagraph 1.2.1 of Document A-201 is supplemented as follows:

1.2.1.2 This specification is written in abbreviated form for convenience and brevity; its instructions are mandatory as if written in full.

1.2.1.3 No responsibility, direct or implied, is assumed by the Owner, or the Architect for omissions or duplications by a Contractor due to real or alleged errors in arrangement of material of these specifications.

1.2.1.4 Dimensions on the Construction Drawings govern all work regardless of what they may scale on the drawings. In the event that there is a conflict between the various parts of the Contract Documents, i.e. Agreement, General Conditions, Supplementary Conditions, Specifications, and Drawings, then the contractor shall bring such conflict to the attention of the Owner and Architect for resolution before proceeding.

Large-scale details on drawings shall take precedence over scale measurements.

1.2.1.5 All Contractors shall verify all bench marks, lines, levels and measurements necessary for perfect and complete installation.

1.2.1.6 Inadvertent discrepancies, omissions of details, figures or notes on one drawing in conflict with notes on another, shall be no basis for added claims or charges.

1.2.1.7 If any print is superseded by another of later date, the Contractor concerned shall remove old print promptly and place the new print in the hands of his Superintendent or Foreman. In the case of amending instructions from the Architect, the same procedure shall be followed.

1.2.1.8 Anyone concerned shall report alleged errors in the documents in writing to the Architect. Failure to file written notice prior to proceeding with the work shall hold delinquent Contractor responsible for the results and the cost correction.

4) 1.5 OWNERSHIP AND USE OF DRAWINGS, SPECIFICATIONS, AND OTHER INSTRUMENTS OF SERVICE

A. Article 1.5 of Document A-201, add the following new subparagraph:

1.5.3 The General Contractor shall receive as part of his Contract, without cost, six (6) copies of the drawings, and six (6) printed copies of the specifications. The Contractor may make copies of these documents as required for distribution at his own cost. Any additional copies will be furnished to the Contractor at the cost of reproduction.

II. ARTICLE 2 – OWNER

1) 2.3 INFORMATION AND SERVICES REQUIRED OF THE OWNER

A. Article 2.3.6 of Document A-201: Change to read, "…the Owner shall furnish to the Contractor six copies of the contract document…"

III ARTICLE 3 – CONTRACTOR

1) 3.4 LABOR AND MATERIALS

A. Article 3.4 subparagraph 3.4.1 of Document A-201 is supplemented as follows:

3.4.1.1 The phrases "approved by," "satisfactory to," "as directed by," "submitted to," "inspected by," and similar phrases mean presentation to and approval by the Architect.

3.4.1.2 Each Contractor is responsible for the proper care and protection of all his materials, equipment, etc., on site.

3.4.1.3 Contractor is responsible for all damage including theft, to his work and material from the date of the Agreement until final acceptance, making any repairs, or cleaning required.

2) 3.5 WARRANTY

A. Article 3.5 warranty of Document A-201 is supplemented as follows:

"In addition to all other guarantees and warranties set forth in the Contract Documents, the Contractor warrants and guarantees to the Owner and Architect that all work will be in accordance with the Contract Documents and will not be defective. If within one (1) year after the date of Substantial Completion or such longer period as may be prescribed by laws or regulations or by the terms of any applicable special guarantee required by the Contract Documents or by any specific provision of the Contract Documents, any work is found to be defective, the Contractor shall promptly without cost of Owner and in accordance with Owner's written instructions, either correct such defective work, or, if it has been rejected by Owner, remove it from the site and replace it with non-defective work. If Contractor does not promptly comply with the terms of such instructions, or in an emergency where a delay would cause serious risk of loss or damage, Owner may have the defective work corrected or the rejected work removed and replaced, and all direct, indirect and consequential costs of such removal and replacement (including but not limited to fees and charges of the architect, engineers, attorneys and other professionals) will be paid by Contractor. In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the work, the correction period for that item may start to run from an earlier date if so provided in the specifications or by written amendment."

3) 3.7 PERMITS, FEES, NOTICES AND COMPLIANCE WITH LAWS

A. Article 3.7, Subparagraph 3.74 of Document A-201: change "14 days" to "10 calendar days."

4) 3.15 CLEANING UP

A. Article 3.15, Subparagraph 3.15.1 of Document A-201 is supplemented as follows:

1. Contractor shall clean up all accumulated debris and rubbish daily during construction and remove the accumulation from the building and the premises.

IV. ARTICLE 7 – CHANGES IN THE WORK

1) 7.1 GENERAL

A. Article 7.1, subparagraph 7.1.1 of Document A-201 is supplemented as follows:

1. Changes, additional work, or deletion of work, involving an addition or subtraction to the Contract sum, shall not be done until Contractor submits to the Owner, the cost of the added or deleted work with a completed and detailed listing of all subcontractors, all materials, labor, overhead and profit, and the Owner has issued an appropriate work order.

2) 7.3 CONSTRUCTION CHANGE DIRECTIVES

A. Article 7.3, Subparagraph 7.3.3 of Document A-201 is supplemented as follows:

7.3.3.5 For additional work ordered in accordance with subparagraph 7.3.1, allowance for overhead and profit shall not exceed:

a) On work done by the Prime Contractor - 10% overhead and labor and material, plus 10% profit.
b) On work done by a subcontractor - 5% overhead on labor and material, plus 10% subcontractor's profit. To this amount, the Prime Contractor may add 10% combined overhead and profit.

IV. ARTICLE 9 – PAYMENTS AND COMPLETION

1) 9.3 APPLICATIONS FOR PAYMENT

A. Article 9.3, Subparagraph 9.3.1 of Document A-201:

9.3.1 Change to read "At least thirty (30) days before the date for each progress payment..."

B. Article 9.3, Subparagraph 9.3.1 of Document A-201 is supplemented as follows:

1. If any of the work performed by the Contractor is on a unit price basis, the Contractor understands that quantities of work performed as reflected on Contractor's Certificate must agree with Owner's computations of the quantities of work performed. If there is disagreement regarding quantities of work performed, the lower quantity will be paid pending resolution of the difference.

2. Retainage to be indicated on all payment applications is 10% of the Completed Work.

2) 9.6 PROGRESS PAYMENTS

A. Article 9.6, Subparagraph 9.6.4 of Document A-201 is supplemented as follows:

9.6.4.1 Before any payment shall be made by Owner and as a condition thereof, the Contractor shall submit to Owner a Payment Receipt and Waiver of Right to File Lien with respect to labor performed and materials furnished through the date of Contractor's current payment requisition, and Contractor shall submit to Owner satisfactory evidence of the payment by Contractor of all bills for labor, materials and other expenses or indebtedness incurred by Contractor in the carrying on of the work.

9.6.4.2 In the event there are any unpaid bills or indebtedness for such labor, materials, or other expenses, Owner may, at its

discretion, withhold from any payment otherwise due to Contractor an amount sufficient to pay such indebtedness or expenses, issue payment jointly to the Contractor and any unpaid sub-contractor or supplier or material or labor, or make payment for such expenses or indebtedness for the account of the Contractor.

9.6.4.3 If required by Owner, the Contractor shall give Owner sufficient evidence that the Project is free from all liens and claims arising out of the Contractor's work.

3) 9.8 SUBSTANTIAL COMPLETION

A. Article 9.8, Subparagraph 9.8.3 of Document A-201 is supplemented as follows:

1. Contractor's Certificate for retainage may be submitted no sooner than thirty (30) days after final completion (including completing of punch list and submittal of as-built drawings) and acceptance of the work.

4) 9.10 FINAL COMPLETION AND FINAL PAYMENT

A. Article 9.10, Subparagraph 9.10.4 of Document A-201 is supplemented as follows:

9.10.4.5 The acceptance of the final payment for the work shall constitute a complete release and discharge of Owner from all claims and of all liability to the Contractor for all things done or furnished in connection with the work and every act or neglect of Owner or his agents relating to or arising out of this Contract. No payment, however, final or otherwise, shall operate to release the Contractor or his surety from any obligation under this Contract, nor shall any payment be construed to be an acceptance of defective work or improper materials.

9.10.4.6 At time of "Request for Final Payment" the Contractor shall submit on A.I.A. Form G706 and G706A (and G707, if required), latest editions, Contractor's Affidavit or Release of Liens and Payment of Debts and Claims, certifying that all Subcontractors, material suppliers and all others who might have any claim for services or materials furnished on this project, have been Paid In Full and that there are no outstanding obligations against the project.

VI. ARTICLE 10 – PROTECTION OF PERSONS AND PROPERTY

1) 10.2 SAFETY OF PERSONS AND PROPERTY

A. Article 10.2 subparagraph 10.2.1 of Document A-201 is supplemented as follows:

10.2.1.4 If during the construction, public or private property is damaged or destroyed, the responsible Contractor shall, at his own expense, restore such property to a condition similar or equal to that existing before such damage or injury was done; by

repairing, rebuilding, or replacing it, or otherwise making good such damage or destruction in an acceptable manner.

VII. ARTICLE 11 – INSURANCE AND BONDS

1) 11.1 CONTRACTOR'S INSURANCE AND BONDS

A. Article 11.1, add the following subparagraphs to Document A-201 as follows:

11.1.5 Contractor agrees to provide evidence of insurance with limits as shown in the attached sample Certificate of Insurance through a solvent New York admitted carrier with a Best rating of A+12. The coverage shall include premises operations, explosion collapse hazard, completed operations, contractual, independent contractors, broad form property damage and personal injury. The certificate shall also disclose automobile liability insurance and workers' compensation and employers' liability insurance. In addition, **"New Branch Facility Canandaigua National Bank & Trust"** shall be named as additional insureds.

B. Article 11.1, add the following Subparagraphs to Document A-201 as follows:

11.1.5.1 The Contractor shall be solely responsible for all physical injury, including death, to any persons and for damage to any property of any person resulting from or claimed to result from, relating to or arising out of the work or any neglect, fault, omission, commission or default of Contractor, his agents or employees.

11.1.5.2 The Contractor shall fully protect, defend, indemnify and save harmless the Owner and Agent against all liability, judgments, damages, cost and expense, including attorney's fees and costs, arising from any and all such claims relating to the work performed hereunder. The provisions of this paragraph shall not inure to the benefit of anyone not a party to the Contract.

11.1.5.3 In the event of the failure of the Contractor to furnish and maintain the required insurance, Owner shall have the right to take out and maintain such insurance for and in the name of the Contractor, and the Contractor agrees to pay the cost thereof and to furnish all necessary information to permit Owner to take out and maintain such insurance for the account of the Contractor. Compliance by the Contractor with the foregoing requirements to carry insurance and furnish certificates shall not relieve the Contractor from liability under any provision of this Contract.

11.1.5.4 The Owner and the Contractor waive all subrogation rights against each other for damages caused by fire or all other perils covered by insurance except such rights as they may have

to the proceeds of such insurance held by Owner as Trustee. The Contractor shall require similar waivers by subcontractors.

VIII. ARTICLE 12 – UNCOVERING AND CORRECTION OF WORK

1) 12.2 CORRECTION OF WORK

A. Article 12.2 of Document A-201 is supplemented with the following new subparagraphs:

12.2.6 Before final payment is made on the Contract, the Contractor shall deliver to the Owner and to the Tenant a written Warranty on his own letterhead in accordance with the attached form, properly signed and sworn to by a responsible officer of the Contractor's firm, warranting all work and materials included in his Contract against all defects not due to ordinary wear and use for a period of one year from the date of substantial completion.

12.2.7 In addition to the Warranty specified in subparagraph 12.2.6, the Contractor shall provide to the Owner and to the Tenant all warranties of greater periods than one year required by the specifications.

12.2.8 The Contractor shall also provide to the Owner and to the Tenant all manufacturers' warranties, whether of one year or greater. Such warranties shall identify the equipment name, manufacturer, service representative, model number, and serial number.

IX. ARTICLE 13 – MISCELLANEOUS PROVISIONS

1) Article 13, Subparagraph 13.1 Governing Law of Document A-201, is supplemented with the following new subparagraphs:

13.1.2 The Contractor hereby agrees and understands that it is responsible for complying with all the requirements of the New York Labor Law and other applicable statutes, including but not limited to Sections 220 Subdivision 2, 220 Subdivision 3, 220.c, 220.d, and 222.e. In the event a person is injured and claims damages under New York Labor Law or other applicable statutes, the Contractor agrees to indemnify and hold the Owner and the Tenant, their employees, agents and consultants harmless for all such claims for personal injury, including but not limited to any settlements, judgments, court costs and attorney's fees.

13.1.3 The Contractor hereby agrees and understands that he is responsible for complying with all the requirements of the New York State General Municipal Law, including but not limited to Sections 101, 103, 103.d, 106.d, 108, and 109.

X. ARTICLE 14 – TERMINATION OR SUSPENSION OF THE CONTRACT

1) 14.2 TERMINATION BY THE OWNER FOR CAUSE

A. Article 14.2 of Document A-201 is supplemented with the following new subparagraphs:

14.2.1.5 The Owner by two (2) days written notice to the Contractor and without prejudice to any other rights or remedies it may have may terminate this Contract in the event of any of the following:

14.2.1.6 If the Contractor or Sub-contractor shall refuse or fail to supply a sufficiency of properly skilled workmen or of materials of the proper quality or to perform any of his obligations hereunder with sufficient diligence to insure its completion within the time specified or shall fail to perform the work within the said period.

14.2.1.7 If the Contractor shall fail to obey any laws or ordinances or orders from the Architect or fail to obtain licenses or permits or otherwise substantially violate any provisions of his Contract.

14.2.1.8 If the Contractor be adjudicated bankrupt or make an assignment for the benefit of creditors.

14.2.1.9 If a receiver or liquidator shall be appointed for the Contractor or any of his property and shall not be dismissed within twenty (20) days after such appointment or the proceedings in connection therewith shall not be stayed upon appeal within the said twenty (20) days.

14.2.1.10 If the Owner becomes dissatisfied for just cause with the manner in which the Contractor is doing the work.

14.2.1.11 If the Owner so terminates, the Contractor shall not be entitled to receive any further payment except as provided herein.

1. If the unpaid balance of moneys to be paid the Contractor shall exceed the cost of completing the work, including the cost of additional administrative, managerial, attorney's fees and costs, and inspection services and any damages for delays, such excess shall be paid to the Contractor.
2. If such costs exceed the unpaid balance, the Contractor shall be liable to the Owner for the excess.

14.2.1.12 Upon termination, the Owner shall be entitled to enter upon the site and take possession of all materials and equipment of the Contractor and to complete the work in such manner as the Owner in his sole and absolute discretion may determine.

2) ARTICLE 14.2 – TERMINATION BY OWNER FOR CAUSE

A. Article 14.2 of Document A-201, is supplemented as follows:

14.2.5 Defaults by Subcontractor

"If Subcontractor fails to commence or to prosecute the work required hereunder promptly and diligently, or to make the progress required by Owner or Contractor or fails in any way to perform the conditions hereof, or shall become insolvent or shall make an assignment for the benefit of creditors or be subject to any proceeding in bankruptcy, or shall become involved in labor difficulties, Owner and/or Contractor shall have the right if it so elects and without prejudice to any other rights it may have, by giving 24 hours written notice of its election to Subcontractor, to take over all work, or any part thereof, and all tools, equipment, materials and supplies and finish the work by whatever method it deems expedient. In such event Subcontractor shall not be entitled to receive any further payment until the work is finished. If the unpaid balance of the expense of finishing the work, including all legal and court fees and expenses incurred in connection therewith, such excess shall be paid to Subcontractor. If such expense exceeds such unpaid balance, Subcontractor shall promptly pay the difference to Contractor on demand. The expense of completion, including all legal and court fees and expenses incurred in connection therewith, shall be certified to by Contractor and shall be binding on the parties. If Subcontractor fails to furnish or supply sufficient skilled workmen, suitable materials or adequate equipment, Owner and/or Contractor may, as an alternative to the foregoing remedy, and upon giving the notice above provided, furnish such labor materials or equipment and charge the entire cost of furnishing the same, including all legal and court fees and expenses incurred in connection therewith to Subcontractor and deduct such costs from any amount payable to Subcontractor."

XI. DISCRIMINATION

A. Add the following new paragraph to Document A-201 as follows:

"The Contractor agrees, in accordance with the applicable provisions of the Labor Law of the State of New York, to the following:

1. That in the hiring of employees for their performance of work under this Contract or any subcontract hereinunder, no contractor, subcontractor, nor any person acting on behalf of such contractor or subcontractor, shall by reason of race, creed, color, 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. That no contractor, subcontractor, nor any person on his behalf shall, in any manner, discriminate against or intimidate any employee hired for their performance of work under this contract on account of race, creed, color or national origin.
3. That there may be deducted from the amount payable to the contractor by the Owner under this contract, a penalty of five dollars ($5.00) for each person for each calendar day during which such person was discriminated against or intimidated in violation of the provisions of the contract.
4. That this contract may be canceled or terminated by the Owner and all moneys due or to become due hereunder may be forfeited, for a second or any subsequent violation of the terms or conditions of this section of the contract.

XIII. TESTING AND SPECIAL INSPECTIONS

A. Add the following new paragraph to Document A-201 as follows:

"The contractor shall be responsible for the timely scheduling of testing and special inspections as required by the International Building Code as adopted by New York State. The owner shall be responsible for all costs related to the required testing and inspections as required and applicable per the Building Code of New York State."

PART 2 – (Not Used)

PART 3 – (Not Used)

END OF SECTION 008000

SECTION 008000 - SUPPLEMENTARY GENERAL CONDITIONS – A201 - 2017

I. ARTICLE 1 - GENERAL PROVISIONS

1) 1.0 GENERAL

A. This Section modifies, adds to and otherwise supplements the General Conditions of the Contract. AIA Document A-201, 2017 Edition.

B. Where any articles of the General Conditions for Contract are supplemented herein, the provisions of such articles shall remain in effect. All supplemental provisions shall be considered as added thereto.

C. Where portions of any articles of the General Conditions of the Contract are amended, voided, or suspended herein, the provisions of such articles not so specifically amended, voided or suspended shall remain in effect.

2) 1.1 BASIC DEFINITIONS

A. Article 1.1 of Document A-201 is supplemented as follows:

Owner: RIVER STREET SENIOR APARTMENTS, LLC.
Architect: Holmes King Kallquist & Associates, Architects, LLP
575 North Salina Street
Syracuse, New York 13208

3) 1.2 CORRELATION AND INTENT OF THE CONTRACT DOCUMENTS

A. Article 1.2, subparagraph 1.2.1 of Document A-201 is supplemented as follows:

1.2.1.2 This specification is written in abbreviated form for convenience and brevity; its instructions are mandatory as if written in full.

1.2.1.3 No responsibility, direct or implied, is assumed by the Owner, or the Architect for omissions or duplications by a Contractor due to real or alleged errors in arrangement of material of these specifications.

1.2.1.4 Dimensions on the Construction Drawings govern all work regardless of what they may scale on the drawings. In the event that there is a conflict between the various parts of the Contract Documents, i.e. Agreement, General Conditions, Supplementary Conditions, Specifications, and Drawings, then the contractor shall bring such conflict to the attention of the Owner and Architect for resolution before proceeding.

Large-scale details on drawings shall take precedence over scale measurements.

1.2.1.5 All Contractors shall verify all bench marks, lines, levels and measurements necessary for perfect and complete installation.

1.2.1.6 Inadvertent discrepancies, omissions of details, figures or notes on one drawing in conflict with notes on another, shall be no basis for added claims or charges.

1.2.1.7 If any print is superseded by another of later date, the Contractor concerned shall remove old print promptly and place the new print in the hands of his Superintendent or Foreman. In the case of amending instructions from the Architect, the same procedure shall be followed.

1.2.1.8 Anyone concerned shall report alleged errors in the documents in writing to the Architect. Failure to file written notice prior to proceeding with the work shall hold delinquent Contractor responsible for the results and the cost correction.

4) 1.5 OWNERSHIP AND USE OF DRAWINGS, SPECIFICATIONS, AND OTHER INSTRUMENTS OF SERVICE

A. Article 1.5 of Document A-201, add the following new subparagraph:

1.5.3 The General Contractor shall receive as part of his Contract, without cost, six (6) copies of the drawings, and six (6) printed copies of the specifications. The Contractor may make copies of these documents as required for distribution at his own cost. Any additional copies will be furnished to the Contractor at the cost of reproduction.

II. ARTICLE 2 – OWNER

1) 2.3 INFORMATION AND SERVICES REQUIRED OF THE OWNER

A. Article 2.3.6 of Document A-201: Change to read, "…the Owner shall furnish to the Contractor six copies of the contract document…"

III ARTICLE 3 – CONTRACTOR

1) 3.4 LABOR AND MATERIALS

A. Article 3.4 subparagraph 3.4.1 of Document A-201 is supplemented as follows:

3.4.1.1 The phrases "approved by," "satisfactory to," "as directed by," "submitted to," "inspected by," and similar phrases mean presentation to and approval by the Architect.

3.4.1.2 Each Contractor is responsible for the proper care and protection of all his materials, equipment, etc., on site.

3.4.1.3 Contractor is responsible for all damage including theft, to his work and material from the date of the Agreement until final acceptance, making any repairs, or cleaning required.

2) 3.5 WARRANTY

A. Article 3.5 warranty of Document A-201 is supplemented as follows:

"In addition to all other guarantees and warranties set forth in the Contract Documents, the Contractor warrants and guarantees to the Owner and Architect that all work will be in accordance with the Contract Documents and will not be defective. If within one (1) year after the date of Substantial Completion or such longer period as may be prescribed by laws or regulations or by the terms of any applicable special guarantee required by the Contract Documents or by any specific provision of the Contract Documents, any work is found to be defective, the Contractor shall promptly without cost of Owner and in accordance with Owner's written instructions, either correct such defective work, or, if it has been rejected by Owner, remove it from the site and replace it with non-defective work. If Contractor does not promptly comply with the terms of such instructions, or in an emergency where a delay would cause serious risk of loss or damage, Owner may have the defective work corrected or the rejected work removed and replaced, and all direct, indirect and consequential costs of such removal and replacement (including but not limited to fees and charges of the architect, engineers, attorneys and other professionals) will be paid by Contractor. In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the work, the correction period for that item may start to run from an earlier date if so provided in the specifications or by written amendment."

3) 3.7 PERMITS, FEES, NOTICES AND COMPLIANCE WITH LAWS

A. Article 3.7, Subparagraph 3.74 of Document A-201: change "14 days" to "10 calendar days."

4) 3.15 CLEANING UP

A. Article 3.15, Subparagraph 3.15.1 of Document A-201 is supplemented as follows:

1. Contractor shall clean up all accumulated debris and rubbish daily during construction and remove the accumulation from the building and the premises.

IV. ARTICLE 7 – CHANGES IN THE WORK

1) 7.1 GENERAL

A. Article 7.1, subparagraph 7.1.1 of Document A-201 is supplemented as follows:

1. Changes, additional work, or deletion of work, involving an addition or subtraction to the Contract sum, shall not be done until Contractor submits to the Owner, the cost of the added or deleted work with a completed and detailed listing of all subcontractors, all materials, labor, overhead and profit, and the Owner has issued an appropriate work order.

2) 7.3 CONSTRUCTION CHANGE DIRECTIVES

A. Article 7.3, Subparagraph 7.3.3 of Document A-201 is supplemented as follows:

7.3.3.5 For additional work ordered in accordance with subparagraph 7.3.1, allowance for overhead and profit shall not exceed:

a) On work done by the Prime Contractor - 10% overhead and labor and material, plus 10% profit.
b) On work done by a subcontractor - 5% overhead on labor and material, plus 10% subcontractor's profit. To this amount, the Prime Contractor may add 10% combined overhead and profit.

IV. ARTICLE 9 – PAYMENTS AND COMPLETION

1) 9.3 APPLICATIONS FOR PAYMENT

A. Article 9.3, Subparagraph 9.3.1 of Document A-201:

9.3.1 Change to read "At least thirty (30) days before the date for each progress payment..."

B. Article 9.3, Subparagraph 9.3.1 of Document A-201 is supplemented as follows:

1. If any of the work performed by the Contractor is on a unit price basis, the Contractor understands that quantities of work performed as reflected on Contractor's Certificate must agree with Owner's computations of the quantities of work performed. If there is disagreement regarding quantities of work performed, the lower quantity will be paid pending resolution of the difference.

2. Retainage to be indicated on all payment applications is 10% of the Completed Work.

2) 9.6 PROGRESS PAYMENTS

A. Article 9.6, Subparagraph 9.6.4 of Document A-201 is supplemented as follows:

9.6.4.1 Before any payment shall be made by Owner and as a condition thereof, the Contractor shall submit to Owner a Payment Receipt and Waiver of Right to File Lien with respect to labor performed and materials furnished through the date of Contractor's current payment requisition, and Contractor shall submit to Owner satisfactory evidence of the payment by Contractor of all bills for labor, materials and other expenses or indebtedness incurred by Contractor in the carrying on of the work.

9.6.4.2 In the event there are any unpaid bills or indebtedness for such labor, materials, or other expenses, Owner may, at its

discretion, withhold from any payment otherwise due to Contractor an amount sufficient to pay such indebtedness or expenses, issue payment jointly to the Contractor and any unpaid sub-contractor or supplier or material or labor, or make payment for such expenses or indebtedness for the account of the Contractor.

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4) 9.10 FINAL COMPLETION AND FINAL PAYMENT

A. Article 9.10, Subparagraph 9.10.4 of Document A-201 is supplemented as follows:

9.10.4.5 The acceptance of the final payment for the work shall constitute a complete release and discharge of Owner from all claims and of all liability to the Contractor for all things done or furnished in connection with the work and every act or neglect of Owner or his agents relating to or arising out of this Contract. No payment, however, final or otherwise, shall operate to release the Contractor or his surety from any obligation under this Contract, nor shall any payment be construed to be an acceptance of defective work or improper materials.

9.10.4.6 At time of "Request for Final Payment" the Contractor shall submit on A.I.A. Form G706 and G706A (and G707, if required), latest editions, Contractor's Affidavit or Release of Liens and Payment of Debts and Claims, certifying that all Subcontractors, material suppliers and all others who might have any claim for services or materials furnished on this project, have been Paid In Full and that there are no outstanding obligations against the project.

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14.2.1.6 If the Contractor or Sub-contractor shall refuse or fail to supply a sufficiency of properly skilled workmen or of materials of the proper quality or to perform any of his obligations hereunder with sufficient diligence to insure its completion within the time specified or shall fail to perform the work within the said period.

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14.2.1.10 If the Owner becomes dissatisfied for just cause with the manner in which the Contractor is doing the work.

14.2.1.11 If the Owner so terminates, the Contractor shall not be entitled to receive any further payment except as provided herein.

1. If the unpaid balance of moneys to be paid the Contractor shall exceed the cost of completing the work, including the cost of additional administrative, managerial, attorney's fees and costs, and inspection services and any damages for delays, such excess shall be paid to the Contractor.
2. If such costs exceed the unpaid balance, the Contractor shall be liable to the Owner for the excess.

14.2.1.12 Upon termination, the Owner shall be entitled to enter upon the site and take possession of all materials and equipment of the Contractor and to complete the work in such manner as the Owner in his sole and absolute discretion may determine.

2) ARTICLE 14.2 – TERMINATION BY OWNER FOR CAUSE

A. Article 14.2 of Document A-201, is supplemented as follows:

14.2.5 Defaults by Subcontractor

"If Subcontractor fails to commence or to prosecute the work required hereunder promptly and diligently, or to make the progress required by Owner or Contractor or fails in any way to perform the conditions hereof, or shall become insolvent or shall make an assignment for the benefit of creditors or be subject to any proceeding in bankruptcy, or shall become involved in labor difficulties, Owner and/or Contractor shall have the right if it so elects and without prejudice to any other rights it may have, by giving 24 hours written notice of its election to Subcontractor, to take over all work, or any part thereof, and all tools, equipment, materials and supplies and finish the work by whatever method it deems expedient. In such event Subcontractor shall not be entitled to receive any further payment until the work is finished. If the unpaid balance of the expense of finishing the work, including all legal and court fees and expenses incurred in connection therewith, such excess shall be paid to Subcontractor. If such expense exceeds such unpaid balance, Subcontractor shall promptly pay the difference to Contractor on demand. The expense of completion, including all legal and court fees and expenses incurred in connection therewith, shall be certified to by Contractor and shall be binding on the parties. If Subcontractor fails to furnish or supply sufficient skilled workmen, suitable materials or adequate equipment, Owner and/or Contractor may, as an alternative to the foregoing remedy, and upon giving the notice above provided, furnish such labor materials or equipment and charge the entire cost of furnishing the same, including all legal and court fees and expenses incurred in connection therewith to Subcontractor and deduct such costs from any amount payable to Subcontractor."

XI. DISCRIMINATION

A. Add the following new paragraph to Document A-201 as follows:

"The Contractor agrees, in accordance with the applicable provisions of the Labor Law of the State of New York, to the following:

1. That in the hiring of employees for their performance of work under this Contract or any subcontract hereinunder, no contractor, subcontractor, nor any person acting on behalf of such contractor or subcontractor, shall by reason of race, creed, color, 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. That no contractor, subcontractor, nor any person on his behalf shall, in any manner, discriminate against or intimidate any employee hired for their performance of work under this contract on account of race, creed, color or national origin.
3. That there may be deducted from the amount payable to the contractor by the Owner under this contract, a penalty of five dollars ($5.00) for each person for each calendar day during which such person was discriminated against or intimidated in violation of the provisions of the contract.
4. That this contract may be canceled or terminated by the Owner and all moneys due or to become due hereunder may be forfeited, for a second or any subsequent violation of the terms or conditions of this section of the contract.

XIII. TESTING AND SPECIAL INSPECTIONS

A. Add the following new paragraph to Document A-201 as follows:

"The contractor shall be responsible for the timely scheduling of testing and special inspections as required by the International Building Code as adopted by New York State. The owner shall be responsible for all costs related to the required testing and inspections as required and applicable per the Building Code of New York State."

PART 2 – (Not Used)

PART 3 – (Not Used)

END OF SECTION 008000

Kenney Geotechnical Services

Kenney Geotechnical Engineering Services PLLC

Geotechnical Evaluation Report

Cortland Senior Housing
31 River St.
Cortland, New York



C. M. Kenney PE
1-11-2023

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INTRODUCTION

This report presents the results of the geotechnical investigation performed for the proposed Cortland Senior Housing project. This geotechnical report presents the data developed during the subsurface investigation and provides analysis and recommendations for the proposed construction.

No environmental services are included in this study. No conclusions have been drawn regarding environmental conditions of the site, potential contaminants, potential special treatment or disposal of site materials, or other environmental considerations.

AUTHORIZATION

The scope of our services for this project was presented in a proposal dated November 11, 2022. Our services were authorized by Shawna Grinnell, Executive Director of the Cortland Housing Assistance Council.

PROJECT DESCRIPTION

It is our understanding that the proposed project will be a three-story wood-framed, slab-on-grade structure. The following figure illustrates the proposed building footprint:



DESIGN CRITERIA

Column and wall loading information were not known prior to the completion of this report. We assumed a maximum column load of 150 kips and a maximum wall load of 3 kips/l.f. to facilitate our analysis. We have assumed a tolerable total settlement of up to one inch.

The following ASTM Standards were utilized during this study:

- ASTM D1586 "Penetration Test and Split-Barrel Sampling of Soils"
- ASTM D2487 "Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)"
- ASTM D5434 "Standard Guide for Field Logging of Subsurface Exploration of Soil and Rock"

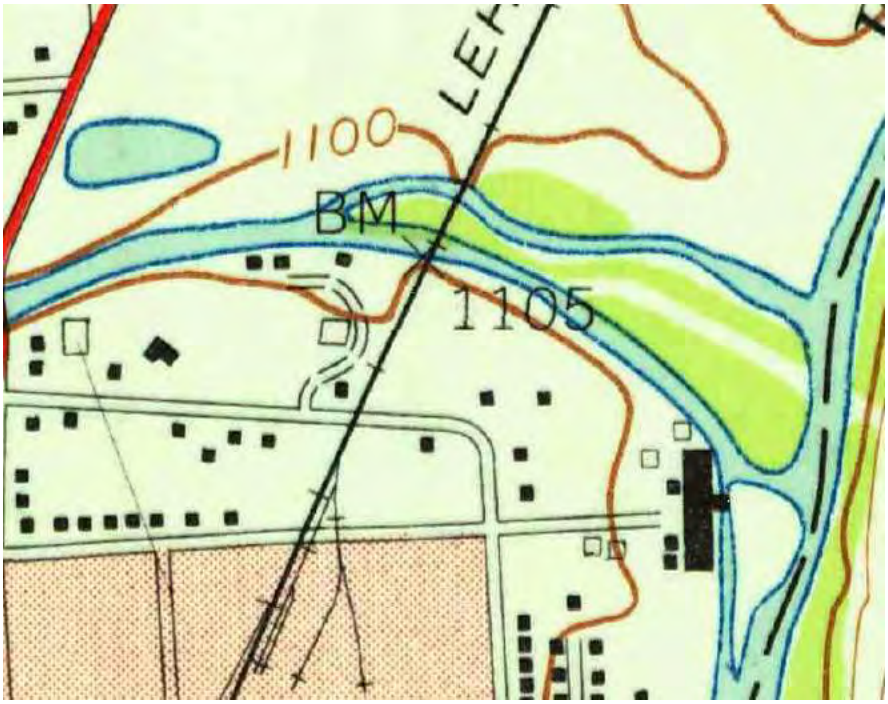
Local geotechnical practice was followed in the performance of this study. Frost depth was assumed to be 48 inches.

SITE CONDITIONS

The site is located between the West Branch of the Tioughnioga River and River Street in the City of Cortand. The project area was unoccupied but covered with brush and small trees at the time of the subsurface investigation. Site topography is illustrated in the following figure excerpted from 2019 USGS mapping:



USGS topographic mapping from 1955 suggests the site may have been previously occupied by small structures:



Cortland is located on a plain formed by the convergence of seven valleys with the Allegheny Plateau physiographic province. Major topographic and geologic features in this area were formed during the last glacial advance and retreat, which ended approximately 12,000 years ago. Regional surficial geologic mapping suggests that natural soils in the site vicinity generally consist of outwash sand and gravel. Bedrock mapping suggests that shale and sandstone underlies soil in the area.

FIELD STUDY

The subsurface investigation for this project consisted of eleven test borings (designated as B-1 to B-11) and two infiltration tests (IT-1 to IT-2). The test borings were performed using a track-mounted Geoprobe 7822DT drill rig. Hollow stem augering techniques were utilized to advance the borings to a depth of up to 25 feet below the ground surface (bgs) unless auger refusal was encountered at a shallower depth. Standard penetration testing (ASTM D1586) was performed with an automatic hammer to obtain soil samples. Boring locations were selected by others and field-located by Kenney Geotechnical Services personnel using mapping provided in the RFP.

Soil samples obtained during the subsurface investigation were classified by a Geotechnical Engineer using the Unified Soil Classification System. Boring logs documenting the subsurface conditions encountered are attached. The boring logs and related information depict subsurface conditions only at the specific locations and times indicated. Subsurface conditions and water levels at other locations may differ from conditions at the locations where sampling was conducted. The passage of time also may result in changes in the conditions interpreted to exist at the locations where sampling was performed.

LABORATORY TESTING

Laboratory testing performed for this project included Natural Moisture Content Testing (ASTM D-2216) and Particle Size Analysis (ASTM D-422). Testing was performed in Kenney Geotechnical Services laboratory. Test results are attached to this report.

SUBSURFACE CONDITIONS ENCOUNTERED

The following interpretation of subsurface conditions is based on our review of the recovered samples, the boring logs, drilling observations, and our professional experience.

The subsurface conditions encountered are organized into the following strata for discussion:

- **Stratum A** –Organic Soil
- **Stratum B** – Outwash Sand and/or Gravel

All depths discussed below are referenced to the ground surface at the time of drilling (bgs).

Stratum A – Organic Soil

Silt, clay, sand and gravel mixed with organic matter was encountered at the ground surface and extended to depths of up to approximately five feet at the test boring locations. In general the organic soil depth was generally approximately six inches.

Stratum B –Outwash Sand and Gravel

Outwash sand and gravel was generally encountered throughout the site from below the surficial organic layer to the limit of exploration at a depth of 25 feet. The sand

and gravel was generally very loose above a depth of approximately 4 feet and medium dense to very dense below. Cobbles and boulders appear to be present within the stratum.

GROUNDWATER CONDITIONS ENCOUNTERED

Water levels were measured within the augers during advancement and from the open borehole after the augers were removed. The following table summarizes the water level measurements at the time of the subsurface investigation.

Boring Location	Depth to Water While Advancing Augers (feet)	Depth to Water at End of Drilling (ft)	Depth to Water After Augers Removed (ft)	Depth to Borehole Cave-In (ft)
B-1	13.0	15.4	DRY	7.7
B-2	13.0	15.4	DRY	6.1
B-3	13.0	16.4	DRY	8.4
B-4	13.0	11.7	DRY	9.5
B-5	13.0	14.7	DRY	5.9
B-6	13.0	12.6	DRY	9.3
B-7	13.0	16.1	DRY	7.6
B-8	18.0	17.2	DRY	7.7
B-9	DRY	DRY	DRY	5.1
B-10	8.0	DRY	DRY	8.4
B-11	DRY	DRY	DRY	4.3

Groundwater depths and seepage rates will vary with the seasons and changes in precipitation patterns and may be higher during the wetter seasons.

RECOMMENDATIONS AND CONCLUSIONS

The sand and gravel encountered is suitable for supporting a conventional shallow foundation system. Surficial organic soil will need to be removed from below pavements, slabs and bearing grade. Additional recommendations are provided in the following sections.

A. Foundations

An allowable bearing pressure of 4,000 pounds per square foot (psf) is recommended for the design of shallow foundations provided that the bearing grade consists of undisturbed natural sand and gravel as verified by geotechnical

personnel. Any disturbed or saturated soil must be removed from below foundation bearing grade. Proper management of the soil will be critical during foundation construction and earthwork. All exterior footings should bear at least 48 inches below finished exterior grade for frost protection unless an insulated frost protection system is installed. Foundation bearing grade must be protected from saturation, freezing, or disturbance throughout construction.

We estimate that foundations designed as recommended herein and properly managed during construction will undergo total settlements of less than one inch and differential settlements of up to 0.75 inches.

B. Temporary Excavations

Temporary excavation slopes must be evaluated by the Contractor's on-site Responsible Person. We anticipate on-site soil will be classified as Type C. Type C materials must be graded to slopes no greater than 1.5:1 (horizontal to vertical). The Contractors on-site Responsible Person should periodically review excavations for signs of movement or distress. Excavation sidewalls should be periodically raked to remove loose particles.

C. Utility Trenches

In utility trenches, or other confined areas, small compaction equipment may be necessary such as a vibratory plate, jumping jack or walk-behind vibratory roller. In-place density testing should be performed at a frequency of one test per 25 feet per lift in trenches. Utility trench fill should be placed in level lifts no greater than 8 inches in thickness and should be compacted to at least 95%the Modified Proctor (ASTM D-1557) maximum dry density. Structural fill should consist of imported granular material such as NYSDOT Subbase (2'' minus) or approved equal. Adequate frost cover and protection must be provided during winter weather construction. Earthwork cannot be performed with frozen material.

D. Earthwork

Earthwork must be performed using methods that will result in a stable excavations and fills. Typical temporary earthwork measures such as temporary drainage swales, stabilized haul roads, and the use of protective layers of crushed stone can be employed at this site. It is recommended that earthwork is observed by

geotechnical personnel to ensure that all organic material is removed from the structural and pavement site. Additional recommendations are as follows:

- Strip existing topsoil, pavement, roots and organics as directed by geotechnical personnel from all areas that will receive new construction to establish subgrade.
- Proof-roll exposed slab-on-grade subgrade with a fully loaded dump truck, or accepted alternative equipment, under the observation of geotechnical personnel. Excessive organic matter and areas that rut, weave, or deflect should be over-excavated and replaced with compacted structural fill as directed by geotechnical personnel (see below for structural fill characteristic requirements).
- Utilize structural fill to raise site grades. Structural fill should consist of imported granular material conforming to NYSDOT Subbase Course (2" minus) or approved equal. In-situ sand and gravel can potentially be utilized as structural fill pending field approval by geotechnical personnel. Segregation of over-sized material (greater than 4 inches in diameter/width) will likely be necessary if on-site soil is re-utilized.
- Field moisture contents for structural fill should be maintained within 2 percentage points of the optimum moisture content established by laboratory testing to provide adequate compaction. All fill should be placed in level lifts having a loose thickness no greater than 12 inches and should be compacted to at least the following minimum percentages of the Modified Proctor (ASTM D-1557) maximum dry density:

    - Below footings: 95%
    - Beneath slab-on-grade or pavements: 95%
    - Utility trench backfill: 95%
    - Beneath landscape areas: 90%
    - Beneath sidewalks and exterior slabs: 95%

    Bulk samples of proposed structural fill materials should be delivered to our testing laboratory at least two weeks prior to the initiation of earthwork. In-place density testing should be performed at a frequency of one test per 500 square feet per lift in open areas and one test per 25 feet per lift in trenches.

- If the structure is to be constructed during the winter months, or if the building interiors will be subjected to freezing temperatures after footer construction, adequate frost cover and protection must be provided. Earthwork cannot be performed with frozen material.
- Permanent slopes should be graded no steeper than 3 horizontal: 1 vertical.

E. Groundwater Seepage and Management

Groundwater was encountered at a depth of 13 feet during the subsurface investigation. Storm events and other factors can affect groundwater and seepage during construction. All dewatering discharge should be transported to a temporary dewatering basin constructed consistent with NYDEC construction stormwater and/or dewatering treatment Best Management Practices (BMPs).

F. Interior Concrete Slabs

Subgrade areas should be prepared as discussed in the Earthwork recommendations. A preliminary subgrade modulus of 225 pci is suggested for design and assumes compacted structural fill is installed over stripped subgrade to achieve new floor slab elevations. Structural fill placed to establish floor slab subgrade should conform to the recommendations for materials and compaction presented in the Earthwork recommendations.

The subbase for the slab-on-grade should consist of a minimum of 6 inches of gravel or crushed stone conforming to NYSDOT specifications for Item 304-2.02 Type 2 or 4. Follow compaction requirements presented for earthwork.

G. Lateral Earth Pressures

Design of subsurface walls subjected to lateral earth pressure must consider the type of wall, degree of restraint against wall rotation, and other factors. The sliding resistance of soils should also be considered during excavation. The following lateral earth pressure parameters of an approved imported granular fill are recommended for this project. The following earth pressure and sliding parameters are recommended for the soil encountered on this project.

- Ka = 0.33
- Kp = 3.0

- Ko = 0.5
- Unit weight of imported soil 140 pcf
- Coefficient of sliding = 0.4

It is recommended that drainage is provided for all walls to reduce hydrostatic wall loading and possible frost action. Backfill against any walls should consist of a relatively well-graded free-draining granular material having no more than 10% passing the No. 200 sieve. The granular backfill zone behind walls should be at least one foot wide as measured horizontally from the face of the wall. Backfill against walls should be placed in loose lifts no greater than 6 inches in thickness. A nonwoven geotextile filter should be placed between the granular backfill and insitu soil to prevent the migration of fine grained soil.

I. Seismic Hazard Concerns, Liquefaction, Seismicity, and Faulting

Correlations with Standard Penetration Testing "N" values recorded during the subsurface investigation suggest that seismic **Site Class C** is appropriate for this site**.** The estimated design spectral response acceleration parameters are as follows:

Design Code Reference:	ASCE 7-16
Assumed Risk Category:	II
Site Class:	D
S_{DS}	0.108g
S_{D1}	0.047g

Liquefaction, surface rupture from faulting or lateral spreading is estimated to have a low probability of occurrence given typical regional seismicity.

LIMITATIONS

The recommendations presented in this report are predicated on the performance of construction observation and testing by qualified geotechnical personnel. We request continued involvement with this project so that we may assess subsurface conditions exposed during construction to determine if modifications to our recommendations are necessary. This report should not be considered as direction to the Contractor.

REFERENCES

"Surficial Geologic Map of New York – Finger Lakes Sheet", New York State Museum, 1986.

"Bedrock Map of New York – Finger Lakes Sheet", New York State Museum, 1970.

ATTACHMENTS

BORING LOGS



STAMP

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EAST SYRACUSE, NY 13057
PH: 315.472.7289

PB SUBMISSION
10/14/2022

REV No	DATE:	DRAWN BY:	DESCRIPTION:

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JOB NO: 41080
DATE: 10/14/2022
DRAWN BY: EK
SCALE: SEE DRAWING

CORTLAND SENIOR HOUSING
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SCHEMATIC SITE PLAN

L1.0

@PLTDATE @DWGFULLNAMEEXT

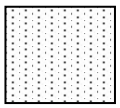
Kenney Geotechnical Services

Key to Symbols

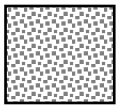
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Client:	Cortland Housing Assistance Council

Project Number:	2022-204
Location:	Cortland, NY

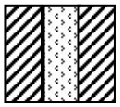
LITHOLOGIC SYMBOLS
(UNIFIED SOIL CLASSIFICATION SYSTEM)



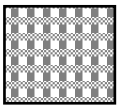
SP/SW: POORLY GRADED/WELL-GRADED SAND



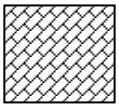
GW/GP: WELL-GRADED GRAVEL AND POORLY GRADED GRAVEL



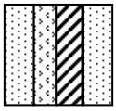
CL-ML: SILTY CLAY OR SANDY SILTY CLAY



GM/GC: SILTY GRAVEL OR CLAYEY GRAVEL



FILL/OL



SC-SM: SILTY CLAYEY SAND

Project: Cortland Senior Housing
Project Location: Cortland, NY
Project Number: 2022-204

Key to Soil Symbols and Terms

TERMS DESCRIBING CONSISTENCY OR CONDITION

COARSE-GRAINED SOILS (major portions retained on No. 200 sieve): includes (1) clean gravel and sands and (2) silty or clayey gravels and sands. Condition is rated according to relative density as determined by laboratory tests or standard penetration resistance tests.

Descriptive Terms	Relative Density	SPT Blow Count
Very loose	0 to 15 %	< 4
Loose	15 to 35 %	4 to 10
Medium dense	35 to 65 %	10 to 30
Dense	65 to 85 %	30 to 50
Very dense	85 to 100 %	> 50

FINE-GRAINED SOILS (major portions passing on No. 200 sieve): includes (1) inorganic and organic silts and clays, (2) gravelly, sandy, or silty clays, and (3) clayey silts. Consistency is rated according to shearing strength, as indicated by penetrometer readings, SPT blow count, or unconfined compression tests.

Descriptive Terms	Unconfined Compressive Strength kPa	SPT Blow Count
Very soft	< 25	< 2
Soft	25 to 50	2 to 4
Medium stiff	50 to 100	4 to 8
Stiff	100 to 200	8 to 15
Very stiff	200 to 400	15 to 30
Hard	> 400	> 30

GENERAL NOTES

1. Classifications are based on the United Soil Classification System and include consistency, moisture, and color. Field descriptions have been modified to reflect results of laboratory tests where deemed appropriate.

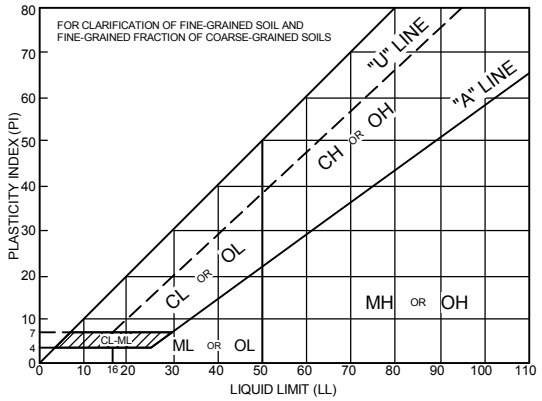
2. Surface elevations are based on topographic maps and estimated locations.

3. Descriptions on these boring logs apply only at the specific boring locations and at the time the borings were made. They are not guaranteed to be representative of subsurface conditions at other locations or times.

Major Divisions			Group Symbols	Typical Names	Laboratory Classification Criteria
Coarse-Grained soils (More than half the material is larger than No. 200 sieve size)	Gravels (More than half of coarse fraction is larger than No. 4 sieve size)	Clean gravel (Little or no fines)	GW	Well-graded gravels, gravel-sand mixtures, little or no fines	Determine percentages of sand and gravel from grain size curve, Depending on percentage of fines (fraction smaller than No. 200 sieve) coarse-grained soils are classified as follows: Less than 5 percent..... GW, GP, SW, SP; More than 12 percent..... GM, GC, SM, SC; 6 to 12 percent..... Borderline case4s requiring dual symbols**
			GP	Poorly-graded gravels, gravel-sand mixtures, little or no fines	
		Gravel with fines (Appreciable amount of fines)	GM* d / u	Silty gravels, gravel-sand-silt mixtures	
			GC	Clayey gravels, gravel-sand-silt mixtures	
	Sands (More than half of coarse fraction is smaller than No. 4 sieve size)	Clean sands (Little or no fines)	SW	Well-graded sands, gravelly sands, little or no fines	
			SP	Poorly-graded sands, gravelly sands, little or no fines	
		Sands with fines (Appreciable amount of fines)	SM* d / u	Silty sands, sand-silt mixtures	
			SC	Clayey sands, sand-clay mixtures	
Fine-Grained soils (More than half the material is smaller than No. 200 sieve size)	Silts and Clays (Liquid limit less than 60)		ML	Inorganic silts and very fine sands, rock floor, 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 and Clays (Liquid limit greater than 60)		MH	Inorganic silts, micaceous or disto-maceous fine sandy or silty soils, organic silts	
			CH	Inorganic clays of high plasticity, fat clays	
			OH	Organic clays of medium to high plasticity, organic silts	
	Highly Organic Soils		Pt	Peat and other highly organic soils	

Laboratory Classification Criteria:

- $C_U = \frac{D_{60}}{D_{10}}$ greater than 4; $C_C = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ between 1 and 3
- Not meeting all gradation requirements for GW
- Atterberg limits below "A" line or P.I. less than 4 / Atterberg limits above "A" line or P.I. greater than 7 — Above "A" line with P.I. between 4 and 7 are borderline cases requiring use of dual symbols
- $C_U = \frac{D_{60}}{D_{10}}$ greater than 6; $C_C = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ between 1 and 3
- Not meeting all gradation requirements for SW
- Atterberg limits below "A" line or P.I. less than 4 / Atterberg limits above "A" line or P.I. greater than 7 — Above "A" line with P.I. between 4 and 7 are borderline cases requiring use of dual symbols



Plasticity Chart

Particle Size		Material
Sieve sizes	mm	
< #200	< 0.074	Silt or clay
#200 to #40	0.074 to 0.42	Sand, Fine
#40 to #10	0.42 to 2.00	Medium
#10 to #4	2.00 to 4.76	Coarse

Particle Size		Material
Sieve	mm	
#4 to 3/4 in.	4.76 to 19.1	Gravel, Fine
3/4 in. to 3 in.	19.1 to 76.2	Coarse
3 in. to 12 in.	76.2 to 304.8	Cobble
12 in. to 36 in.	304.8 to 914.4	Boulders

* Division of GM and SM groups into subdivisions of d and u are for roads and airfields only. Subdivision is based on Atterberg Limits: suffix d used when L.L. is 23 or less and the P.I. is 6 or less; the suffix is used when L.L. is greater than 26.

** Borderline classifications used for soils possessing characteristics of two groups are designated by combinations of groups symbols. For example; GW-GC, well-graded gravel-sand mixture with clay binder.

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Kenney Geotechnical Services

INFILTRATION TEST RESULTS

Project Name:		Cortland Senior Housing	
Project Number:		2022-204	
Location		Cortland, NY	
Date of Test:		12/19/2022	
Test	Depth	Stabilized Rate	Soil Conditions Encountered
-	(ft)	in/hr	USCS
IT-1	5.0	24	Well-Graded Gravel with Sand
IT-2	5.0	20	Well-Graded Gravel with Sand

HOURLY MEASURED INFILTRATION RATES

Test	Hour 1	Hour 2	Hour 3	Hour 4	Stabilized Rate (in/hr)
IT-1	24	24	24	24	24
IT-2	21	21	21	21	20

Kenney Geotechnical Services

Geotechnical Boring Log

Project Name:	Cortland Senior Housing	**Project Number:**	2022-204	**Logged By:**	NM	**Boring Number**	B-1
Client:	Cortland Housing Assistance Council	**Ground Elevation:**		**Checked By:**	CMK	**Sheet:**	1 of 2
Location:	31 River Street, Cortland NY	**Drill Rig:**	7822DT	**Depth To Groundwater While Drilling:**			13.0
Started:	12/14/2022	**Drill Method:**	3.25" HSA	**Depth To Groundwater Before Auger Removal:**			15.4
Completed:	12/14/2022	**Driller:**	D. Green	**Depth To Groundwater After Auger Removal:**			DRY

Depth (ft)	Sample Type	Recovery (inch)	Blow Count Per 6 inches	Graphic Log	N (bpf)	USCS Material Description	Strata Change Depth (ft.)	Pocket Penet. (tsf)	Moisture Content (%)
			1			**TOPSOIL**	0.5		
1	SPT	10	8		16	**(GM) MEDIUM DENSE, BROWN SILTY GRAVEL WITH SAND, MOIST**			
			8						
2			7				2.0		
	SPT	0	3		4	**NO RECOVERY COBBLES/BOULDERS OBSERVED WHILE DRILLING BEGINNING AT 3.0 FT**			
3			2						
			2						
4			1				4.0		
	SPT	12	2		5	**(GW) LOOSE, BROWN WELL GRADED GRAVEL WITH SAND AND SILT, MOIST**			
5			2						
			3						
6			10						
	SPT	11	14		68	**SIMILAR SOIL, VERY DENSE, MOIST**			
7			38						
			30						
8			24						
	SPT	15	25		73	**SIMILAR SOIL, VERY DENSE, MOIST**			
9			35						
			38						
10			40						
11									
12									
13							13.0		
	SPT	12	6		52	**(GW) VERY DENSE, GREY WELL GRADED GRAVEL WITH SAND, WET**			
14			22						
			30						
15			20						
16									
17									
18									
	SPT	9	23		100	**SIMILAR SOIL, VERY DENSE, WET**			
19			35			**(CONTINUED ONTO NEXT SHEET)**			
			50/0.3						
20									

Kenney Geotechnical Services

Geotechnical Boring Log

Project Name:	Cortland Senior Housing	**Project Number:**	2022-204	**Logged By:**	NM	**Boring Number**	B-1
Client:	Cortland Housing Assistance Council	**Ground Elevation:**		**Checked By:**	CMK	**Sheet:**	2 of 2
Location:	31 River Street, Cortland NY	**Drill Rig:**	7822DT	**Depth To Groundwater While Drilling:**			13.0
Started:	12/14/2022	**Drill Method:**	3.25" HSA	**Depth To Groundwater Before Auger Removal:**			15.4
Completed:	12/14/2022	**Driller:**	D. Green	**Depth To Groundwater After Auger Removal:**			DRY

Depth (ft)	Sample Type	Recovery (inch)	Blow Count Per 6 inches	Graphic Log	N (bpf)	USCS Material Description	Strata Change Depth (ft.)	Pocket Penet. (tsf)	Moisture Content (%)
21									
22									
23									
	SPT	4	50/0.4		100	**SIMILAR SOIL, VERY DENSE WET**			

Bottom of Boring: 23.4 FT | Cave Depth: 7.7 FT

Kenney Geotechnical Services

Geotechnical Boring Log

Project Name:	Cortland Senior Housing	**Project Number:**	2022-204	**Logged By:**	NM	**Boring Number**	B-2
Client:	Cortland Housing Assistance Council	**Ground Elevation:**		**Checked By:**	CMK	**Sheet:**	1 of 2
Location:	31 River Street, Cortland NY	**Drill Rig:**	7822DT	**Depth To Groundwater While Drilling:**			13.0
Started:	12/14/2022	**Drill Method:**	3.25" HSA	**Depth To Groundwater Before Auger Removal:**			15.4
Completed:	12/14/2022	**Driller:**	D. Green	**Depth To Groundwater After Auger Removal:**			DRY

Depth (ft)	Sample Type	Recovery (inch)	Blow Count Per 6 inches	Graphic Log	N (bpf)	USCS Material Description	Strata Change Depth (ft.)	Pocket Penet. (tsf)	Moisture Content (%)
			2			**TOPSOIL**	0.5		
1	SPT	6	3		6	**(SC-SM) LOOSE, BROWN SILTY CLAYEY SAND WITH GRAVEL, MOIST**			
			3						
2			4				2.0		
			3			**AUGER CUTTINGS FROM SAMPLE 0'-4'**			
3	SPT	0	2		3	**NO RECOVERY**			
			1						
4			2				4.0		
			9						
5	SPT	10	16		29	**(GW) MEDIUM DENSE, GREY/BROWN WELL-GRADED GRAVEL WITH SAND, MOIST**			
			13						
6			15						
			10						
7	SPT	11	12		24	**COBBLES/BOULDERS ENCOUNTERED AROUND 1.5 FT SIMILAR SOIL, MEDIUM DENSE, MOIST**			
			12						
8			12						
	SPT	3	50/.3		100	**BOULDER AT 8.5 FT**			
9									
10									
11									
12									
13									
			9						
14	SPT	10	24		44	**SIMILAR SOIL, DENSE, WET**			
			20						
15			16						
16									
17									
18									
			16						
19	SPT	20	24		42	**GREY SIMILAR SOIL, DENSE, WET**			
			18			**(CONTINUED ONTO NEXT SHEET)**			
20			20						

Kenney Geotechnical Services

Geotechnical Boring Log

Project Name:	Cortland Senior Housing	**Project Number:**	2022-204	**Logged By:**	NM	**Boring Number**	B-2
Client:	Cortland Housing Assistance Council	**Ground Elevation:**		**Checked By:**	CMK	**Sheet:**	2 of 2
Location:	31 River Street, Cortland NY	**Drill Rig:**	7822DT	**Depth To Groundwater While Drilling:**			13.0
Started:	12/14/2022	**Drill Method:**	3.25" HSA	**Depth To Groundwater Before Auger Removal:**			15.4
Completed:	12/14/2022	**Driller:**	D. Green	**Depth To Groundwater After Auger Removal:**			DRY

Depth (ft)	Sample Type	Recovery (inch)	Blow Count Per 6 inches	Graphic Log	N (bpf)	USCS Material Description	Strata Change Depth (ft.)	Pocket Penet. (tsf)	Moisture Content (%)
21									
22									
23									
	SPT	4	45		100	**SIMILAR SOIL WITH SILT, VERY DENSE, WET**			
24			50/.2						

Bottom of Boring: 23.7 FT

Cave Depth: 6.1 FT

Kenney Geotechnical Services

Geotechnical Boring Log

Project Name:	Cortland Senior Housing	**Project Number:**	2022-204	**Logged By:**	NM	**Boring Number**	B-3
Client:	Cortland Housing Assistance Council	**Ground Elevation:**		**Checked By:**	CMK	**Sheet:**	1 of 2
Location:	31 River Street, Cortland NY	**Drill Rig:**	7822DT	**Depth To Groundwater While Drilling:**			13.0
Started:	12/14/2022	**Drill Method:**	3.25" HSA	**Depth To Groundwater Before Auger Removal:**			16.4
Completed:	12/14/2022	**Driller:**	D. Green	**Depth To Groundwater After Auger Removal:**			DRY

Depth (ft)	Sample Type	Recovery (inch)	Blow Count Per 6 inches	Graphic Log	N (bpf)	USCS Material Description	Strata Change Depth (ft.)	Pocket Penet. (tsf)	Moisture Content (%)
			3			**TOPSOIL**	0.4		
1	SPT	11	4		8	**(GM) LOOSE, BROWN SILTY GRAVEL WITH SAND, MOIST**			13.7
			4						
2			3						
	SPT	6	3		5	**SIMILAR SOIL, LOOSE, MOIST**			9.1
3			3						
			2						
4			1				4.0		
	SPT	6	4		37	**(GW) DENSE, GREY/BROWN WELL-GRADED GRAVEL WITH SAND, MOIST**			7.4
5			16						
			21						
6			15						
	SPT	12	15		33	**SIMILAR SOIL, DENSE, MOIST**			4.1
7			19						
			14						
8			10						
	SPT	15	15		68	**SIMILAR SOIL, VERY DENSE, MOIST**			5.3
9			24						
			44						
10			50/.4						
11									
12									
13									
	SPT	9	12		34	**SIMILAR SOIL, DENSE, WET**			7.9
14			14						
			20						
15			16						
16									
17									
18									
	SPT	15	50/.4		100	**SIMILAR SOIL, VERY DENSE, WET**			7.1
19						**(CONTINUED ONTO NEXT SHEET)**			
20									

Kenney Geotechnical Services

Geotechnical Boring Log

Project Name:	Cortland Senior Housing	**Project Number:**	2022-204	**Logged By:**	NM	**Boring Number**	B-3
Client:	Cortland Housing Assistance Council	**Ground Elevation:**		**Checked By:**	CMK	**Sheet:**	2 of 2
Location:	31 River Street, Cortland NY	**Drill Rig:**	7822DT	**Depth To Groundwater While Drilling:**			13.0
Started:	12/14/2022	**Drill Method:**	3.25" HSA	**Depth To Groundwater Before Auger Removal:**			16.4
Completed:	12/14/2022	**Driller:**	D. Green	**Depth To Groundwater After Auger Removal:**			DRY

Depth (ft)	Sample Type	Recovery (inch)	Blow Count Per 6 inches	Graphic Log	N (bpf)	USCS Material Description	Strata Change Depth (ft.)	Pocket Penet. (tsf)	Moisture Content (%)
21									
22									
23									
	SPT	4	50/.1		100	**SIMILAR SOIL, VERY DENSE, WET**			8.9
						Bottom of Boring: 23.4 FT	Cave Depth: 8.4 FT		

Kenney Geotechnical Services

Geotechnical Boring Log

Project Name:	Cortland Senior Housing	**Project Number:**	2022-204	**Logged By:**	NM	**Boring Number**	B-4
Client:	Cortland Housing Assistance Council	**Ground Elevation:**		**Checked By:**	CMK	**Sheet:**	1 of 1
Location:	31 River Street, Cortland NY	**Drill Rig:**	7822DT	**Depth To Groundwater While Drilling:**			13.0
Started:	12/15/2022	**Drill Method:**	3.25" HSA	**Depth To Groundwater Before Auger Removal:**			11.7
Completed:	12/15/2022	**Driller:**	D. Green	**Depth To Groundwater After Auger Removal:**			DRY

Depth (ft)	Sample Type	Recovery (inch)	Blow Count Per 6 inches	Graphic Log	N (bpf)	USCS Material Description	Strata Change Depth (ft.)	Pocket Penet. (tsf)	Moisture Content (%)
			2			**TOPSOIL**	0.5		
1	SPT	6	2		5	**(GM) LOOSE, BROWN SILTY GRAVEL WITH SAND, MOIST**			
			3						
2			3						
	SPT	7	3		8				
3			3			**SIMILAR SOIL, LOOSE, MOIST**			
			5						
4			8				4.0		
	SPT	0	4		24	**NO RECOVERY**			
5			15			**COBBLES AND BOULDERS OBSERVED WHILE DRILLING AT 4 FT**			
			9						
6			7				6.0		
	SPT	11	7		11	**(GW) MEDIUM DENSE, BROWN/GREY WELL-GRADED GRAVEL WITH SAND AND SILT, MOIST**			
7			5						
			6						
8			12				8.0		
	SPT	0	50/.3		100	**NO RECOVERY**			
9						**AUGERED THROUGH BOULDER 8-11 FT**			
10									
11									
12									
13							13.0		
	SPT	3	27		60	**(SW) VERY DENSE, GREY WELL-GRADED SAND, WET**			
14			30						
			30						
15			35						
16									
17									
18							18.0		
	SPT	16	39		61	**(GW) VERY DENSE, GREY WELL-GRADED GRAVEL WITH SAND, WET**			
19			30						
			31						
20			35				20.0		
	SPT	0	50/.2		100	**NO RECOVERY, AUGER REFUSAL AT 20.0 FT**			

Bottom of Boring: 20.2 FT | Cave Depth: 9.5 FT

Kenney Geotechnical Services

Geotechnical Boring Log

Project Name:	Cortland Senior Housing	**Project Number:**	2022-204	**Logged By:**	NM	**Boring Number**	B-5
Client:	Cortland Housing Assistance Council	**Ground Elevation:**		**Checked By:**	CMK	**Sheet:**	1 of 2
Location:	31 River Street, Cortland NY	**Drill Rig:**	7822DT	**Depth To Groundwater While Drilling:**			13.0
Started:	12/15/2022	**Drill Method:**	3.25" HSA	**Depth To Groundwater Before Auger Removal:**			14.7
Completed:	12/15/2022	**Driller:**	D. Green	**Depth To Groundwater After Auger Removal:**			DRY

Depth (ft)	Sample Type	Recovery (inch)	Blow Count Per 6 inches	Graphic Log	N (bpf)	USCS Material Description	Strata Change Depth (ft.)	Pocket Penet. (tsf)	Moisture Content (%)
			2			**TOPSOIL**	0.4		
1	SPT	11	4		9	**(GW) LOOSE, BROWN WELL-GRADED GRAVEL WITH SAND AND SILT, MOIST**			
			5						
2			6						
	SPT	8	8		15	**SIMILAR SOIL, MEDIUM DENSE, MOIST**			
3			8						
			7						
4			6						
	SPT	5	10		21	**SIMILAR SOIL, MEDIUM DENSE, MOIST**			
5			7						
			14						
6			14				6.0		
	SPT	9	10		19	**(GW) MEDIUM DENSE, BROWN/GREY WELL-GRADED GRAVEL WITH SAND, MOIST**			
7			9						
			10						
8			26						
	SPT	6	35		100	**SIMILAR SOIL, VERY DENSE, MOIST**			
9			50/.4						
10									
11									
12									
13									
	SPT	15	26		49	**GREY SIMILAR SOIL, DENSE, WET**			
14			33						
			16						
15			37						
16									
17									
18									
	SPT	13	12		44	**GREY SIMILAR SOIL, DENSE, WET**			
19			22			**(CONTINUED ONTO NEXT SHEET)**			
			22						
20			30						

Kenney Geotechnical Services

Geotechnical Boring Log

Project Name:	Cortland Senior Housing	**Project Number:**	2022-204	**Logged By:**	NM	**Boring Number**	B-5
Client:	Cortland Housing Assistance Council	**Ground Elevation:**		**Checked By:**	CMK	**Sheet:**	2 of 2
Location:	31 River Street, Cortland NY	**Drill Rig:**	7822DT	**Depth To Groundwater While Drilling:**			13.0
Started:	12/15/2022	**Drill Method:**	3.25" HSA	**Depth To Groundwater Before Auger Removal:**			14.7
Completed:	12/15/2022	**Driller:**	D. Green	**Depth To Groundwater After Auger Removal:**			DRY

Depth (ft)	Sample Type	Recovery (inch)	Blow Count Per 6 inches	Graphic Log	N (bpf)	USCS Material Description	Strata Change Depth (ft.)	Pocket Penet. (tsf)	Moisture Content (%)
21									
22									
23									
			18						
24	SPT	7	39		100	**SIMILAR SOIL, VERY DENSE, WET**			
			50/.3						

Bottom of Boring: 24.3 FT | Cave Depth: 5.9 FT

Kenney Geotechnical Services

Geotechnical Boring Log

Project Name:	Cortland Senior Housing	**Project Number:**	2022-204	**Logged By:**	NM	**Boring Number**	B-6
Client:	Cortland Housing Assistance Council	**Ground Elevation:**		**Checked By:**	CMK	**Sheet:**	1 of 2
Location:	31 River Street, Cortland NY	**Drill Rig:**	7822DT	**Depth To Groundwater While Drilling:**			13.0
Started:	12/15/2022	**Drill Method:**	3.25" HSA	**Depth To Groundwater Before Auger Removal:**			12.6
Completed:	12/15/2022	**Driller:**	D. Green	**Depth To Groundwater After Auger Removal:**			DRY

Depth (ft)	Sample Type	Recovery (inch)	Blow Count Per 6 inches	Graphic Log	N (bpf)	USCS Material Description	Strata Change Depth (ft.)	Pocket Penet. (tsf)	Moisture Content (%)
			3			**TOPSOIL**	0.5		
1	SPT	6	4		9	**OL: (GC-GM) LOOSE, BROWN CLAYEY SILTY GRAVEL WITH ORGANICS, MOIST**			
			5						
2			6				2.0		
			4						
3	SPT	3	4		6	**SIMILAR SOIL WITH NO ORGANICS, LOOSE, MOIST**			
			2						
4			5				4.0		
			4						
5	SPT	13	10		22	**(GW) MEDIUM DENSE, BROWN WELL-GRADED GRAVEL WITH SAND, MOIST**			
			12						
6			16						
			48						
7	SPT	15	19		36	**SIMILAR SOIL, DENSE, MOIST**			
			17						
8			25						
			18						
9	SPT	12	21		51	**SIMILAR SOIL, VERY DENSE, MOIST**			
			30						
10			32						
11									
12									
13							13.0		
			42						
14	SPT	15	16		33	**(GW) DENSE, GREY WELL-GRADED GRAVEL, WET**			
			17						
15			40						
16									
17									
18							18.0		
			16						
19	SPT	0	12		24	**NO RECOVERY**			
			12			**(CONTINUED ONTO NEXT SHEET)**			
20			14				20.0		

Kenney Geotechnical Services

Geotechnical Boring Log

Project Name:	Cortland Senior Housing	**Project Number:**	2022-204	**Logged By:**	NM	**Boring Number**	B-6
Client:	Cortland Housing Assistance Council	**Ground Elevation:**		**Checked By:**	CMK	**Sheet:**	2 of 2
Location:	31 River Street, Cortland NY	**Drill Rig:**	7822DT	**Depth To Groundwater While Drilling:**			13.0
Started:	12/15/2022	**Drill Method:**	3.25" HSA	**Depth To Groundwater Before Auger Removal:**			12.6
Completed:	12/15/2022	**Driller:**	D. Green	**Depth To Groundwater After Auger Removal:**			DRY

Depth (ft)	Sample Type	Recovery (inch)	Blow Count Per 6 inches	Graphic Log	N (bpf)	USCS Material Description	Strata Change Depth (ft.)	Pocket Penet. (tsf)	Moisture Content (%)
21									
22									
23									
			30						
24	SPT	10	21		41	**(GW) DENSE, GREY WELL-GRADED GRAVEL, WET**			
			20						
25			20						

Bottom of Boring: 25.0 FT

Cave Depth: 9.3 FT

Kenney Geotechnical Services

Geotechnical Boring Log

Project Name:	Cortland Senior Housing	**Project Number:**	2022-204	**Logged By:**	NM	**Boring Number**	B-7
Client:	Cortland Housing Assistance Council	**Ground Elevation:**		**Checked By:**	CMK	**Sheet:**	1 of 2
Location:	31 River Street, Cortland NY	**Drill Rig:**	7822DT	**Depth To Groundwater While Drilling:**			13.0
Started:	12/15/2022	**Drill Method:**	3.25" HSA	**Depth To Groundwater Before Auger Removal:**			16.1
Completed:	12/15/2022	**Driller:**	D. Green	**Depth To Groundwater After Auger Removal:**			DRY

Depth (ft)	Sample Type	Recovery (inch)	Blow Count Per 6 inches	Graphic Log	N (bpf)	USCS Material Description	Strata Change Depth (ft.)	Pocket Penet. (tsf)	Moisture Content (%)
			2			**TOPSOIL**	0.3		
1	SPT	3	2		4	**(SC-SM) VERY LOOSE, CLAYEY SILTY SAND WITH GRAVEL, MOIST**			
			2						
2			2						
	SPT	6	4		6				
3			4			**SIMILAR SOIL, LOOSE, MOIST**			
			2						
4			2				4.0		
	SPT	0			5	**NO RECOVERY**			
5			1						
			4						
6			1/12"				6.0		
	SPT	13	2		42	**(GW) DENSE, GREY/BROWN WELL-GRADED GRAVEL WITH SAND, MOIST**			
7			20						
			22						
8			24						
	SPT	7	44		100	**SIMILAR SOIL, VERY DENSE, MOIST**			
9			50/.4						
10									
11									
12									
13							13.0		
	SPT	15	28		48	**(GW) DENSE, GREY WELL-GRADED GRAVEL WITH SAND, WET**			
14			24						
			24						
15			16						
16									
17									
18									
	SPT	14	36		72	**SIMILAR SOIL, VERY DENSE, WET**			
19			44			**(CONTINUED ONTO NEXT SHEET)**			
			28						
20			16						

Kenney Geotechnical Services

Geotechnical Boring Log

Project Name:	Cortland Senior Housing	Project Number:	2022-204	Logged By:	NM	Boring Number	B-7
Client:	Cortland Housing Assistance Council	Ground Elevation:		Checked By:	CMK	Sheet:	2 of 2
Location:	31 River Street, Cortland NY	Drill Rig:	7822DT	Depth To Groundwater While Drilling:			13.0
Started:	12/15/2022	Drill Method:	3.25" HSA	Depth To Groundwater Before Auger Removal:			16.1
Completed:	12/15/2022	Driller:	D. Green	Depth To Groundwater After Auger Removal:			DRY

Depth (ft)	Sample Type	Recovery (inch)	Blow Count Per 6 inches	Graphic Log	N (bpf)	USCS Material Description	Strata Change Depth (ft.)	Pocket Penet. (tsf)	Moisture Content (%)
21									
22									
23									
			15						
24	SPT	11	15		40	SIMILAR SOIL, DENSE, WET			
			25						
25			21						

Bottom of Boring: 25.0 FT

Cave Depth: 7.6 FT

Kenney Geotechnical Services

Geotechnical Boring Log

Project Name:	Cortland Senior Housing	**Project Number:**	2022-204	**Logged By:**	NM	**Boring Number**	B-8
Client:	Cortland Housing Assistance Council	**Ground Elevation:**		**Checked By:**	CMK	**Sheet:**	1 of 2
Location:	31 River Street, Cortland NY	**Drill Rig:**	7822DT	**Depth To Groundwater While Drilling:**			18.0
Started:	12/15/2022	**Drill Method:**	3.25" HSA	**Depth To Groundwater Before Auger Removal:**			17.2
Completed:	12/15/2022	**Driller:**	D. Green	**Depth To Groundwater After Auger Removal:**			DRY

Depth (ft)	Sample Type	Recovery (inch)	Blow Count Per 6 inches	Graphic Log	N (bpf)	USCS Material Description	Strata Change Depth (ft.)	Pocket Penet. (tsf)	Moisture Content (%)
			1			**TOPSOIL**	0.5		
1	SPT	8	3		7	**(CL-ML) MEDIUM STIFF, BROWN GRAVELLY SILTY CLAY WITH SAND, MOIST**			
			4						
2			4						
			4						
3	SPT	2	5		11	**SIMILAR SOIL, STIFF, MOIST**			15.3
			6						
4			5						
			6			**SIMILAR SOIL, STIFF, MOIST**			
5	SPT	15	4		10		5.0		
			6			**(GW) LOOSE, BROWN WELL-GRADED GRAVEL WITH SAND AND SILT, MOIST**			
6			10						
			25						
7	SPT	4	50/.4		100	**SIMILAR SOIL, VERY DENSE, MOIST**			6.4
			16						
8			32						
	SPT	13	40		72	**SIMILAR SOIL, VERY DENSE, MOIST**			
9			50/.3						4.7
10									
11									
12									
13									
	SPT	10	27		50	**SIMILAR SOIL, DENSE, WET**			
14			30						
			20						
15			25						
16									
17									
18									
	SPT	10	10		100	**SIMILAR SOIL, VERY DENSE, WET**			
19			50/.3			**(CONTINUED ONTO NEXT SHEET)**			6.9
20									

Kenney Geotechnical Services

Geotechnical Boring Log

Project Name:	Cortland Senior Housing	**Project Number:**	2022-204	**Logged By:**	NM	**Boring Number**	B-8
Client:	Cortland Housing Assistance Council	**Ground Elevation:**		**Checked By:**	CMK	**Sheet:**	2 of 2
Location:	31 River Street, Cortland NY	**Drill Rig:**	7822DT	**Depth To Groundwater While Drilling:**			18.0
Started:	12/15/2022	**Drill Method:**	3.25" HSA	**Depth To Groundwater Before Auger Removal:**			17.2
Completed:	12/15/2022	**Driller:**	D. Green	**Depth To Groundwater After Auger Removal:**			DRY

Depth (ft)	Sample Type	Recovery (inch)	Blow Count Per 6 inches	Graphic Log	N (bpf)	USCS Material Description	Strata Change Depth (ft.)	Pocket Penet. (tsf)	Moisture Content (%)
21									
22									
23									
	SPT	3	50/.4		100	**SIMILAR SOIL, VERY DENSE, WET**			
						Bottom of Boring: 23.4 FT	Cave Depth: 7.7 FT		

Kenney Geotechnical Services

Geotechnical Boring Log

Project Name:	Cortland Senior Housing	**Project Number:**	2022-204	**Logged By:**	NM	**Boring Number**	B-9
Client:	Cortland Housing Assistance Council	**Ground Elevation:**		**Checked By:**	CMK	**Sheet:**	1 of 1
Location:	31 River Street, Cortland NY	**Drill Rig:**	7822DT	**Depth To Groundwater While Drilling:**			DRY
Started:	12/15/2022	**Drill Method:**	3.25" HSA	**Depth To Groundwater Before Auger Removal:**			DRY
Completed:	12/15/2022	**Driller:**	D. Green	**Depth To Groundwater After Auger Removal:**			DRY

Depth (ft)	Sample Type	Recovery (inch)	Blow Count Per 6 inches	Graphic Log	N (bpf)	USCS Material Description	Strata Change Depth (ft.)	Pocket Penet. (tsf)	Moisture Content (%)
			2			**TOPSOIL**	0.7		
1	SPT	8	2		5	**(GC-GM) LOOSE, BROWN CLAYEY SILTY GRAVEL WITH SAND, MOIST**			
			3						
2			2						
			1						
3	SPT	3	2		4	**SIMILAR SOIL, VERY LOOSE, MOIST**			
			2						
4			1						
			1			**SIMILAR SOIL, LOOSE, MOIST**			
5	SPT	9	1		6		5.0		
			5			**(GW) LOOSE, WELL-GRADED GRAVEL WITH SAND, MOIST**			
6			6						
			16			**SIMILAR SOIL, DENSE, MOIST**			
7	SPT	15	25		50				
			25						
8			30						

Bottom of Boring: 8.0 FT | Cave Depth: 4.7 FT

Kenney Geotechnical Services

Geotechnical Boring Log

Project Name:	Cortland Senior Housing	**Project Number:**	2022-204	**Logged By:**	NM	**Boring Number**	B-10
Client:	Cortland Housing Assistance Council	**Ground Elevation:**		**Checked By:**	CMK	**Sheet:**	1 of 1
Location:	31 River Street, Cortland NY	**Drill Rig:**	7822DT	**Depth To Groundwater While Drilling:**			DRY
Started:	12/15/2022	**Drill Method:**	3.25" HSA	**Depth To Groundwater Before Auger Removal:**			DRY
Completed:	12/15/2022	**Driller:**	D. Green	**Depth To Groundwater After Auger Removal:**			DRY

Depth (ft)	Sample Type	Recovery (inch)	Blow Count Per 6 inches	Graphic Log	N (bpf)	USCS Material Description	Strata Change Depth (ft.)	Pocket Penet. (tsf)	Moisture Content (%)
			WH			**TOPSOIL**	0.8		
1	SPT	9	1		2	**(CL-ML) VERY SOFT, BROWN SANDY SILTY CLAY WITH ROOT HAIRS, MOIST**			
			1						
2			2						
			3			**SIMILAR SOIL, MEDIUM STIFF, MOIST**	2.5		
3	SPT	7	4		8	**(GC-GM) LOOSE, BROWN CLAYEY SILTY GRAVEL WITH SAND, MOIST**			
			4						
4			2						
	SPT	12	3		10				
5			4			**SIMILAR SOIL, LOOSE, MOIST**			
			6						
6			12						
	SPT	15	50/.4		100	**SIMILAR SOIL, VERY DENSE, MOIST**			

Bottom of Boring: 6.4 FT | Cave Depth: 4.7 FT

Kenney Geotechnical Services

Geotechnical Boring Log

Project Name:	Cortland Senior Housing	**Project Number:**	2022-204	**Logged By:**	NM	**Boring Number**	B-11
Client:	Cortland Housing Assistance Council	**Ground Elevation:**		**Checked By:**	CMK	**Sheet:**	1 of 1
Location:	31 River Street, Cortland NY	**Drill Rig:**	7822DT	**Depth To Groundwater While Drilling:**			DRY
Started:	12/15/2022	**Drill Method:**	3.25" HSA	**Depth To Groundwater Before Auger Removal:**			DRY
Completed:	12/15/2022	**Driller:**	D. Green	**Depth To Groundwater After Auger Removal:**			DRY

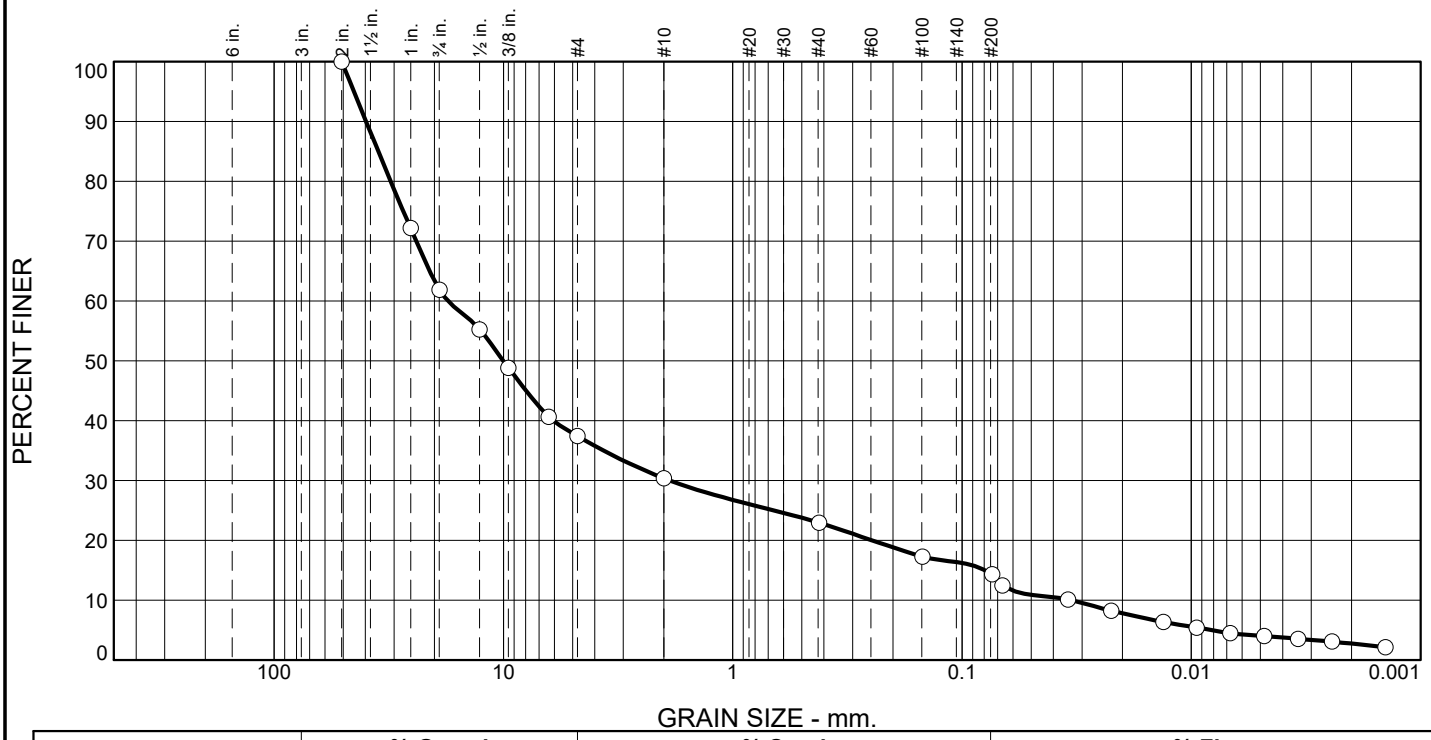
Depth (ft)	Sample Type	Recovery (inch)	Blow Count Per 6 inches	Graphic Log	N (bpf)	USCS Material Description	Strata Change Depth (ft.)	Pocket Penet. (tsf)	Moisture Content (%)
	SPT	9	1		4	**TOPSOIL - OL: (CL-ML) SOFT, BROWN GRAVELLY SILTY CLAY WITH ORGANICS, MOIST**	0.8		
1			2						
			2			**(GC-GM) VERY LOOSE, BROWN CLAYEY SILTY GRAVEL WITH SAND, MOIST**			
2			2						
	SPT	7	3		10				
3			5			**SIMILAR SOIL, LOOSE, MOIST**			
			5						
4			6						
	SPT	12	3		34	**SIMILAR SOIL, DENSE, MOIST**	4.5		
5			14			**(GW) DENSE, GREY/BROWN WELL-GRADED GRAVEL WITH SAND, MOIST**			
			20						
6			30						
	SPT	15	20		70	**SIMILAR SOIL, VERY DENSE, MOIST**			
7			32						
			38						
8			45						

Bottom of Boring: 8.0 FT | Cave Depth: 4.3 FT

LABORATORY TESTING RESULTS

Particle Size Distribution Report

ASTM D422 & D1140



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0	38	25	7	7	9	10	4

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_C	C_U
○			35.1396	17.4432	10.0345	1.8823	0.0795	0.0333	6.09	523.23

	Material Description	USCS	AASHTO
○	Clayey Silty Gravel with Sand	GC-GM	

Project No. 2022-204 **Client:** Cortland Housing Assistance Council

Project: Cortland Senior Housing

○ **Source of Sample:** B-1 **Depth:** 5.0' **Sample Number:** 4.0'-6.0'

Remarks:

○ Kenney Geotechnical
Engineering Services, PLLC
6901 Herman Road
Syracuse, NY 13209
(315) 638-2706

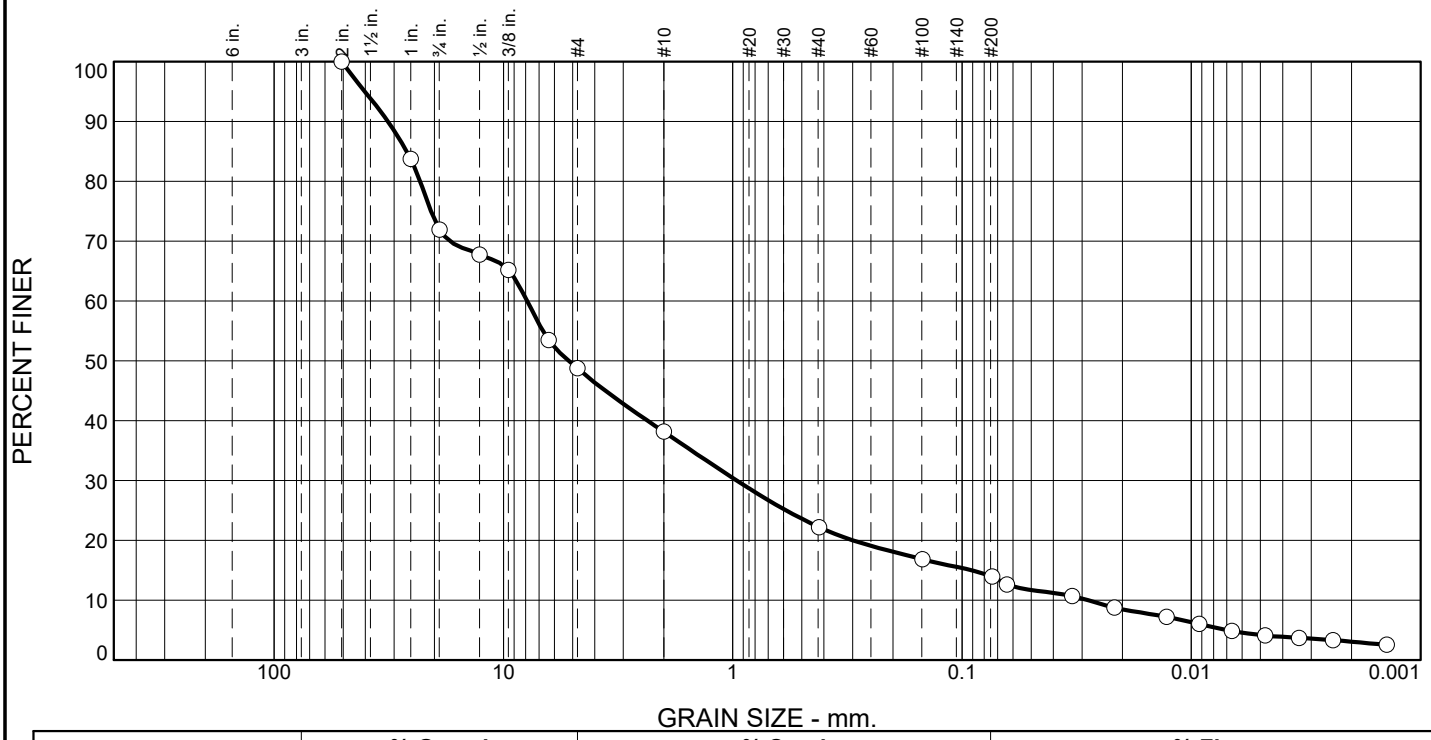
Kenney Geotechnical Services

Figure

Tested By: BE **Checked By:** CMK

Particle Size Distribution Report

ASTM D422 & D1140



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0	28	23	11	16	8	10	4

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_C	C_U
○			26.4292	7.8844	5.1962	0.9619	0.0906	0.0283	4.15	278.87

Material Description	USCS	AASHTO
○ Clayey Silty Gravel with Sand	GC-GM	

Project No. 2022-204 **Client:** Cortland Housing Assistance Council

Project: Cortland Senior Housing

○ **Source of Sample:** B-7 **Depth:** 7.0' **Sample Number:** 6.0'-8.0'

Remarks:

○ Kenney Geotechnical
Engineering Services, PLLC
6901 Herman Road
Syracuse, NY 13209
(315) 638-2706

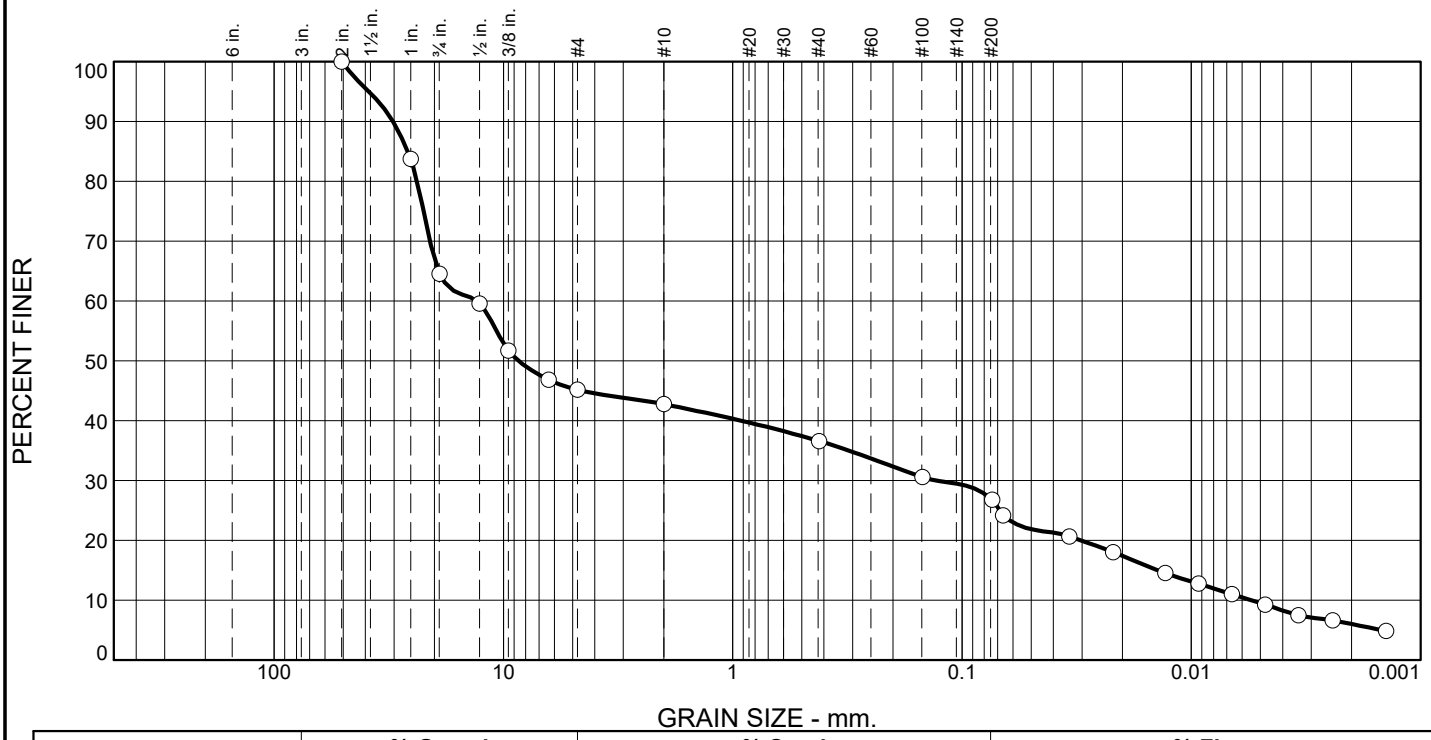
Kenney Geotechnical Services

Figure

Tested By: BE **Checked By:** CMK

Particle Size Distribution Report

ASTM D422 & D1140



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0	35	20	2	6	10	17	10

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_C	C_u
○			26.1578	13.0865	8.5828	0.1293	0.0140	0.0055	0.23	2383.38

Material Description	USCS	AASHTO
○ Clayey Silty Gravel with Sand	GC-GM	

Project No. 2022-204 **Client:** Cortland Housing Assistance Council

Project: Cortland Senior Housing

○ **Source of Sample:** B-9 **Depth:** 3.0' **Sample Number:** 2.0'-4.0'

Remarks:

○ Kenney Geotechnical
Engineering Services, PLLC
6901 Herman Road
Syracuse, NY 13209
(315) 638-2706

Kenney Geotechnical Services

Figure

Tested By: BE **Checked By:** CMK

Kenney Geotechnical Engineering Services, PLLC
Office: 6901 Herman Road, Syracuse, NY 13209
Mail :P.O. Box 117 Warners, NY 13164
Phone: (315) 638-2706 Fax: (315) 638-1544

Project No.:	**2022-204**	**Date:**	**12/22/2022**
Project Name:	**Cortland Senior Housing**		

Natural Moisture Content
ASTM D2216

Sample:	**B-3, 0'-2'**	**B-3, 2'-4'**	**B-3, 4'-6'**	**B-3, 6'-8'**	**B-3, 8'-10'**	**B-3, 13'-15'**	**B-3, 18'-20'**	**B-3, 23'-25'**
Tare Name:	Fish	WLAP	Pike	Larry	MAX	REX	Duck	Link
Tare Weight:	14.15	13.66	14.18	14.5	13.63	14.37	14.3	14.38
Tare + Wet Sample Wt.:	53.79	68.3	51.55	62.55	54.97	70.57	68.19	66.52
Tare + Dry Sample Wt.:	49	63.74	48.96	60.67	52.89	66.44	64.61	62.25
H20 Wt.:	4.8	4.6	2.6	1.9	2.1	4.1	3.6	4.3
Dry Sample Wt.:	34.9	50.1	34.8	46.2	39.3	52.1	50.3	47.9
MC = (H20 Wt. / Dry Sample Wt.) x 100:	13.7	9.1	7.4	4.1	5.3	7.9	7.1	8.9

Sample:	**B-8, 2'-4'**	**B-8, 6'-8'**	**B-8, 8'-10'**	**B-8, 18'-20'**
Tare Name:	A99	NCIS	Zebra	Gas
Tare Weight:	14.16	14.25	14.77	13.93
Tare + Wet Sample Wt.:	59.52	49.99	65.59	64.43
Tare + Dry Sample Wt.:	53.5	47.84	63.32	61.18
H20 Wt.:	6.0	2.2	2.3	3.3
Dry Sample Wt.:	39.3	33.6	48.6	47.3
MC = (H20 Wt. / Dry Sample Wt.) x 100:	15.3	6.4	4.7	6.9

SECTION 008300 – GEOTECHNICAL INVESTIGATIVE REPORT

1.1 GEOTECHNICAL DATA

A. This Document with its referenced attachments is part of the Procurement and Contracting Requirements for Project. They provide Owner's information for Bidders' convenience and are intended to supplement rather than serve in lieu of Bidders' own investigations. They are made available for Bidders' convenience and information but are not a warranty of existing conditions. This Document and its attachments are not part of the Contract Documents.

B. Foundation Report for Project, obtained by Holmes King Kallquist & Associates, Architects, LLP, prepared by Kenney Geotechnical Engineering Services, Inc., dated January 11, 2023, is available for viewing as appended to this Document.

Kenney Geotechnical Services

Kenney Geotechnical Engineering Services PLLC

Geotechnical Evaluation Report

Cortland Senior Housing
31 River St.
Cortland, New York



C. M. Kenney PE
1-11-2023

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INTRODUCTION

This report presents the results of the geotechnical investigation performed for the proposed Cortland Senior Housing project. This geotechnical report presents the data developed during the subsurface investigation and provides analysis and recommendations for the proposed construction.

No environmental services are included in this study. No conclusions have been drawn regarding environmental conditions of the site, potential contaminants, potential special treatment or disposal of site materials, or other environmental considerations.

AUTHORIZATION

The scope of our services for this project was presented in a proposal dated November 11, 2022. Our services were authorized by Shawna Grinnell, Executive Director of the Cortland Housing Assistance Council.

PROJECT DESCRIPTION

It is our understanding that the proposed project will be a three-story wood-framed, slab-on-grade structure. The following figure illustrates the proposed building footprint:



DESIGN CRITERIA

Column and wall loading information were not known prior to the completion of this report. We assumed a maximum column load of 150 kips and a maximum wall load of 3 kips/l.f. to facilitate our analysis. We have assumed a tolerable total settlement of up to one inch.

The following ASTM Standards were utilized during this study:

- ASTM D1586 "Penetration Test and Split-Barrel Sampling of Soils"
- ASTM D2487 "Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)"
- ASTM D5434 "Standard Guide for Field Logging of Subsurface Exploration of Soil and Rock"

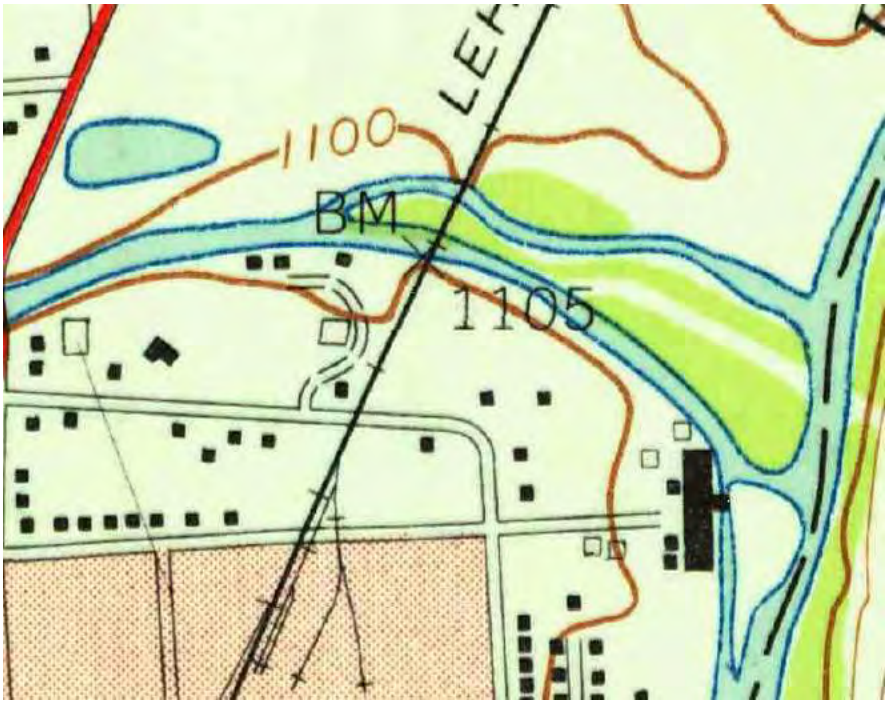
Local geotechnical practice was followed in the performance of this study. Frost depth was assumed to be 48 inches.

SITE CONDITIONS

The site is located between the West Branch of the Tioughnioga River and River Street in the City of Cortand. The project area was unoccupied but covered with brush and small trees at the time of the subsurface investigation. Site topography is illustrated in the following figure excerpted from 2019 USGS mapping:



USGS topographic mapping from 1955 suggests the site may have been previously occupied by small structures:



Cortland is located on a plain formed by the convergence of seven valleys with the Allegheny Plateau physiographic province. Major topographic and geologic features in this area were formed during the last glacial advance and retreat, which ended approximately 12,000 years ago. Regional surficial geologic mapping suggests that natural soils in the site vicinity generally consist of outwash sand and gravel. Bedrock mapping suggests that shale and sandstone underlies soil in the area.

FIELD STUDY

The subsurface investigation for this project consisted of eleven test borings (designated as B-1 to B-11) and two infiltration tests (IT-1 to IT-2). The test borings were performed using a track-mounted Geoprobe 7822DT drill rig. Hollow stem augering techniques were utilized to advance the borings to a depth of up to 25 feet below the ground surface (bgs) unless auger refusal was encountered at a shallower depth. Standard penetration testing (ASTM D1586) was performed with an automatic hammer to obtain soil samples. Boring locations were selected by others and field-located by Kenney Geotechnical Services personnel using mapping provided in the RFP.

Soil samples obtained during the subsurface investigation were classified by a Geotechnical Engineer using the Unified Soil Classification System. Boring logs documenting the subsurface conditions encountered are attached. The boring logs and related information depict subsurface conditions only at the specific locations and times indicated. Subsurface conditions and water levels at other locations may differ from conditions at the locations where sampling was conducted. The passage of time also may result in changes in the conditions interpreted to exist at the locations where sampling was performed.

LABORATORY TESTING

Laboratory testing performed for this project included Natural Moisture Content Testing (ASTM D-2216) and Particle Size Analysis (ASTM D-422). Testing was performed in Kenney Geotechnical Services laboratory. Test results are attached to this report.

SUBSURFACE CONDITIONS ENCOUNTERED

The following interpretation of subsurface conditions is based on our review of the recovered samples, the boring logs, drilling observations, and our professional experience.

The subsurface conditions encountered are organized into the following strata for discussion:

- **Stratum A** –Organic Soil
- **Stratum B** – Outwash Sand and/or Gravel

All depths discussed below are referenced to the ground surface at the time of drilling (bgs).

Stratum A – Organic Soil

Silt, clay, sand and gravel mixed with organic matter was encountered at the ground surface and extended to depths of up to approximately five feet at the test boring locations. In general the organic soil depth was generally approximately six inches.

Stratum B –Outwash Sand and Gravel

Outwash sand and gravel was generally encountered throughout the site from below the surficial organic layer to the limit of exploration at a depth of 25 feet. The sand

and gravel was generally very loose above a depth of approximately 4 feet and medium dense to very dense below. Cobbles and boulders appear to be present within the stratum.

GROUNDWATER CONDITIONS ENCOUNTERED

Water levels were measured within the augers during advancement and from the open borehole after the augers were removed. The following table summarizes the water level measurements at the time of the subsurface investigation.

Boring Location	Depth to Water While Advancing Augers (feet)	Depth to Water at End of Drilling (ft)	Depth to Water After Augers Removed (ft)	Depth to Borehole Cave-In (ft)
B-1	13.0	15.4	DRY	7.7
B-2	13.0	15.4	DRY	6.1
B-3	13.0	16.4	DRY	8.4
B-4	13.0	11.7	DRY	9.5
B-5	13.0	14.7	DRY	5.9
B-6	13.0	12.6	DRY	9.3
B-7	13.0	16.1	DRY	7.6
B-8	18.0	17.2	DRY	7.7
B-9	DRY	DRY	DRY	5.1
B-10	8.0	DRY	DRY	8.4
B-11	DRY	DRY	DRY	4.3

Groundwater depths and seepage rates will vary with the seasons and changes in precipitation patterns and may be higher during the wetter seasons.

RECOMMENDATIONS AND CONCLUSIONS

The sand and gravel encountered is suitable for supporting a conventional shallow foundation system. Surficial organic soil will need to be removed from below pavements, slabs and bearing grade. Additional recommendations are provided in the following sections.

A. Foundations

An allowable bearing pressure of 4,000 pounds per square foot (psf) is recommended for the design of shallow foundations provided that the bearing grade consists of undisturbed natural sand and gravel as verified by geotechnical

personnel. Any disturbed or saturated soil must be removed from below foundation bearing grade. Proper management of the soil will be critical during foundation construction and earthwork. All exterior footings should bear at least 48 inches below finished exterior grade for frost protection unless an insulated frost protection system is installed. Foundation bearing grade must be protected from saturation, freezing, or disturbance throughout construction.

We estimate that foundations designed as recommended herein and properly managed during construction will undergo total settlements of less than one inch and differential settlements of up to 0.75 inches.

B. Temporary Excavations

Temporary excavation slopes must be evaluated by the Contractor's on-site Responsible Person. We anticipate on-site soil will be classified as Type C. Type C materials must be graded to slopes no greater than 1.5:1 (horizontal to vertical). The Contractors on-site Responsible Person should periodically review excavations for signs of movement or distress. Excavation sidewalls should be periodically raked to remove loose particles.

C. Utility Trenches

In utility trenches, or other confined areas, small compaction equipment may be necessary such as a vibratory plate, jumping jack or walk-behind vibratory roller. In-place density testing should be performed at a frequency of one test per 25 feet per lift in trenches. Utility trench fill should be placed in level lifts no greater than 8 inches in thickness and should be compacted to at least 95%the Modified Proctor (ASTM D-1557) maximum dry density. Structural fill should consist of imported granular material such as NYSDOT Subbase (2'' minus) or approved equal. Adequate frost cover and protection must be provided during winter weather construction. Earthwork cannot be performed with frozen material.

D. Earthwork

Earthwork must be performed using methods that will result in a stable excavations and fills. Typical temporary earthwork measures such as temporary drainage swales, stabilized haul roads, and the use of protective layers of crushed stone can be employed at this site. It is recommended that earthwork is observed by

geotechnical personnel to ensure that all organic material is removed from the structural and pavement site. Additional recommendations are as follows:

- Strip existing topsoil, pavement, roots and organics as directed by geotechnical personnel from all areas that will receive new construction to establish subgrade.
- Proof-roll exposed slab-on-grade subgrade with a fully loaded dump truck, or accepted alternative equipment, under the observation of geotechnical personnel. Excessive organic matter and areas that rut, weave, or deflect should be over-excavated and replaced with compacted structural fill as directed by geotechnical personnel (see below for structural fill characteristic requirements).
- Utilize structural fill to raise site grades. Structural fill should consist of imported granular material conforming to NYSDOT Subbase Course (2" minus) or approved equal. In-situ sand and gravel can potentially be utilized as structural fill pending field approval by geotechnical personnel. Segregation of over-sized material (greater than 4 inches in diameter/width) will likely be necessary if on-site soil is re-utilized.
- Field moisture contents for structural fill should be maintained within 2 percentage points of the optimum moisture content established by laboratory testing to provide adequate compaction. All fill should be placed in level lifts having a loose thickness no greater than 12 inches and should be compacted to at least the following minimum percentages of the Modified Proctor (ASTM D-1557) maximum dry density:

    - Below footings: 95%
    - Beneath slab-on-grade or pavements: 95%
    - Utility trench backfill: 95%
    - Beneath landscape areas: 90%
    - Beneath sidewalks and exterior slabs: 95%

    Bulk samples of proposed structural fill materials should be delivered to our testing laboratory at least two weeks prior to the initiation of earthwork. In-place density testing should be performed at a frequency of one test per 500 square feet per lift in open areas and one test per 25 feet per lift in trenches.

- If the structure is to be constructed during the winter months, or if the building interiors will be subjected to freezing temperatures after footer construction, adequate frost cover and protection must be provided. Earthwork cannot be performed with frozen material.
- Permanent slopes should be graded no steeper than 3 horizontal: 1 vertical.

E. Groundwater Seepage and Management

Groundwater was encountered at a depth of 13 feet during the subsurface investigation. Storm events and other factors can affect groundwater and seepage during construction. All dewatering discharge should be transported to a temporary dewatering basin constructed consistent with NYDEC construction stormwater and/or dewatering treatment Best Management Practices (BMPs).

F. Interior Concrete Slabs

Subgrade areas should be prepared as discussed in the Earthwork recommendations. A preliminary subgrade modulus of 225 pci is suggested for design and assumes compacted structural fill is installed over stripped subgrade to achieve new floor slab elevations. Structural fill placed to establish floor slab subgrade should conform to the recommendations for materials and compaction presented in the Earthwork recommendations.

The subbase for the slab-on-grade should consist of a minimum of 6 inches of gravel or crushed stone conforming to NYSDOT specifications for Item 304-2.02 Type 2 or 4. Follow compaction requirements presented for earthwork.

G. Lateral Earth Pressures

Design of subsurface walls subjected to lateral earth pressure must consider the type of wall, degree of restraint against wall rotation, and other factors. The sliding resistance of soils should also be considered during excavation. The following lateral earth pressure parameters of an approved imported granular fill are recommended for this project. The following earth pressure and sliding parameters are recommended for the soil encountered on this project.

- Ka = 0.33
- Kp = 3.0

- Ko = 0.5
- Unit weight of imported soil 140 pcf
- Coefficient of sliding = 0.4

It is recommended that drainage is provided for all walls to reduce hydrostatic wall loading and possible frost action. Backfill against any walls should consist of a relatively well-graded free-draining granular material having no more than 10% passing the No. 200 sieve. The granular backfill zone behind walls should be at least one foot wide as measured horizontally from the face of the wall. Backfill against walls should be placed in loose lifts no greater than 6 inches in thickness. A nonwoven geotextile filter should be placed between the granular backfill and insitu soil to prevent the migration of fine grained soil.

I. Seismic Hazard Concerns, Liquefaction, Seismicity, and Faulting

Correlations with Standard Penetration Testing "N" values recorded during the subsurface investigation suggest that seismic **Site Class C** is appropriate for this site**.** The estimated design spectral response acceleration parameters are as follows:

Design Code Reference:	ASCE 7-16
Assumed Risk Category:	II
Site Class:	D
S_{DS}	0.108g
S_{D1}	0.047g

Liquefaction, surface rupture from faulting or lateral spreading is estimated to have a low probability of occurrence given typical regional seismicity.

LIMITATIONS

The recommendations presented in this report are predicated on the performance of construction observation and testing by qualified geotechnical personnel. We request continued involvement with this project so that we may assess subsurface conditions exposed during construction to determine if modifications to our recommendations are necessary. This report should not be considered as direction to the Contractor.

REFERENCES

"Surficial Geologic Map of New York – Finger Lakes Sheet", New York State Museum, 1986.

"Bedrock Map of New York – Finger Lakes Sheet", New York State Museum, 1970.

ATTACHMENTS

BORING LOGS



STAMP

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6320 FLY ROAD SUITE 109
EAST SYRACUSE, NY 13057
PH: 315.472.7289

PB SUBMISSION
10/14/2022

REV No	DATE:	DRAWN BY:	DESCRIPTION:

ALL DRAWINGS AND SPECIFICATIONS ARE THE PROPERTY OF THE ARCHITECT, AND SHALL BE USED ONLY ON THE JOB DESIGNATED. COPYRIGHT ©
THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS AT THE SITE AND PROMPTLY NOTIFY THE ARCHITECT IN WRITING OF ANY DISCREPANCIES.

JOB NO: 41080
DATE: 10/14/2022
DRAWN BY: EK
SCALE: SEE DRAWING

CORTLAND SENIOR HOUSING
31 RIVER STREET, CORTLAND, NY 13045

HOLMES ▪ KING ▪ KALLQUIST
& Associates, Architects, LLP
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SCHEMATIC SITE PLAN

L1.0

@PLTDATE @DWGFULLNAMEEXT

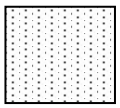
Kenney Geotechnical Services

Key to Symbols

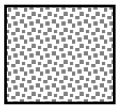
Project Name:	Cortland Senior Housing
Client:	Cortland Housing Assistance Council

Project Number:	2022-204
Location:	Cortland, NY

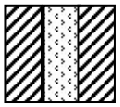
LITHOLOGIC SYMBOLS
(UNIFIED SOIL CLASSIFICATION SYSTEM)



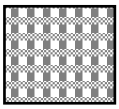
SP/SW: POORLY GRADED/WELL-GRADED SAND



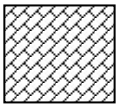
GW/GP: WELL-GRADED GRAVEL AND POORLY GRADED GRAVEL



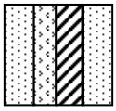
CL-ML: SILTY CLAY OR SANDY SILTY CLAY



GM/GC: SILTY GRAVEL OR CLAYEY GRAVEL



FILL/OL



SC-SM: SILTY CLAYEY SAND

Project: Cortland Senior Housing
Project Location: Cortland, NY
Project Number: 2022-204

Key to Soil Symbols and Terms

TERMS DESCRIBING CONSISTENCY OR CONDITION

COARSE-GRAINED SOILS (major portions retained on No. 200 sieve): includes (1) clean gravel and sands and (2) silty or clayey gravels and sands. Condition is rated according to relative density as determined by laboratory tests or standard penetration resistance tests.

Descriptive Terms	Relative Density	SPT Blow Count
Very loose	0 to 15 %	< 4
Loose	15 to 35 %	4 to 10
Medium dense	35 to 65 %	10 to 30
Dense	65 to 85 %	30 to 50
Very dense	85 to 100 %	> 50

FINE-GRAINED SOILS (major portions passing on No. 200 sieve): includes (1) inorganic and organic silts and clays, (2) gravelly, sandy, or silty clays, and (3) clayey silts. Consistency is rated according to shearing strength, as indicated by penetrometer readings, SPT blow count, or unconfined compression tests.

Descriptive Terms	Unconfined Compressive Strength kPa	SPT Blow Count
Very soft	< 25	< 2
Soft	25 to 50	2 to 4
Medium stiff	50 to 100	4 to 8
Stiff	100 to 200	8 to 15
Very stiff	200 to 400	15 to 30
Hard	> 400	> 30

GENERAL NOTES

1. Classifications are based on the United Soil Classification System and include consistency, moisture, and color. Field descriptions have been modified to reflect results of laboratory tests where deemed appropriate.

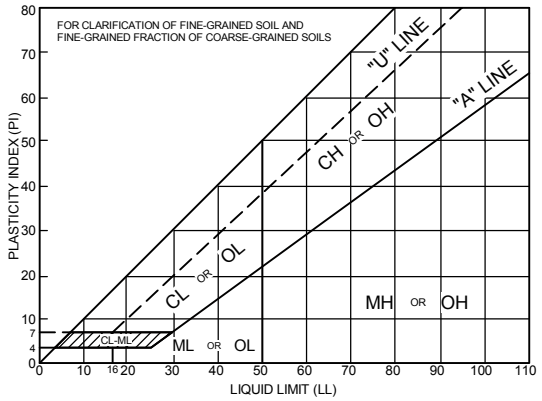
2. Surface elevations are based on topographic maps and estimated locations.

3. Descriptions on these boring logs apply only at the specific boring locations and at the time the borings were made. They are not guaranteed to be representative of subsurface conditions at other locations or times.

Major Divisions			Group Symbols	Typical Names	Laboratory Classification Criteria
Coarse-Grained soils (More than half the material is larger than No. 200 sieve size)	Gravels (More than half of coarse fraction is larger than No. 4 sieve size)	Clean gravel (Little or no fines)	GW	Well-graded gravels, gravel-sand mixtures, little or no fines	Determine percentages of sand and gravel from grain size curve, Depending on percentage of fines (fraction smaller than No. 200 sieve) coarse-grained soils are classified as follows: Less than 5 percent..... GW, GP, SW, SP; More than 12 percent..... GM, GC, SM, SC; 6 to 12 percent..... Borderline case4s requiring dual symbols**
			GP	Poorly-graded gravels, gravel-sand mixtures, little or no fines	
		Gravel with fines (Appreciable amount of fines)	GM* d / u	Silty gravels, gravel-sand-silt mixtures	
			GC	Clayey gravels, gravel-sand-silt mixtures	
	Sands (More than half of coarse fraction is smaller than No. 4 sieve size)	Clean sands (Little or no fines)	SW	Well-graded sands, gravelly sands, little or no fines	
			SP	Poorly-graded sands, gravelly sands, little or no fines	
		Sands with fines (Appreciable amount of fines)	SM* d / u	Silty sands, sand-silt mixtures	
			SC	Clayey sands, sand-clay mixtures	
Fine-Grained soils (More than half the material is smaller than No. 200 sieve size)	Silts and Clays (Liquid limit less than 60)		ML	Inorganic silts and very fine sands, rock floor, 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 and Clays (Liquid limit greater than 60)		MH	Inorganic silts, micaceous or disto-maceous fine sandy or silty soils, organic silts	
			CH	Inorganic clays of high plasticity, fat clays	
			OH	Organic clays of medium to high plasticity, organic silts	
	Highly Organic Soils		Pt	Peat and other highly organic soils	

Laboratory Classification Criteria:

- $C_U = \frac{D_{60}}{D_{10}}$ greater than 4; $C_C = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ between 1 and 3
- Not meeting all gradation requirements for GW
- Atterberg limits below "A" line or P.I. less than 4 / Atterberg limits above "A" line or P.I. greater than 7 — Above "A" line with P.I. between 4 and 7 are borderline cases requiring use of dual symbols
- $C_U = \frac{D_{60}}{D_{10}}$ greater than 6; $C_C = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ between 1 and 3
- Not meeting all gradation requirements for SW
- Atterberg limits below "A" line or P.I. less than 4 / Atterberg limits above "A" line or P.I. greater than 7 — Above "A" line with P.I. between 4 and 7 are borderline cases requiring use of dual symbols



Plasticity Chart

Particle Size		Material
Sieve sizes	mm	
< #200	< 0.074	Silt or clay
#200 to #40	0.074 to 0.42	Sand, Fine
#40 to #10	0.42 to 2.00	Medium
#10 to #4	2.00 to 4.76	Coarse

Particle Size		Material
Sieve	mm	
#4 to 3/4 in.	4.76 to 19.1	Gravel, Fine
3/4 in. to 3 in.	19.1 to 76.2	Coarse
3 in. to 12 in.	76.2 to 304.8	Cobble
12 in. to 36 in.	304.8 to 914.4	Boulders

* Division of GM and SM groups into subdivisions of d and u are for roads and airfields only. Subdivision is based on Atterberg Limits: suffix d used when L.L. is 23 or less and the P.I. is 6 or less; the suffix is used when L.L. is greater than 26.

** Borderline classifications used for soils possessing characteristics of two groups are designated by combinations of groups symbols. For example; GW-GC, well-graded gravel-sand mixture with clay binder.

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Kenney Geotechnical Services

INFILTRATION TEST RESULTS

Project Name:		Cortland Senior Housing	
Project Number:		2022-204	
Location		Cortland, NY	
Date of Test:		12/19/2022	
Test	Depth	Stabilized Rate	Soil Conditions Encountered
-	(ft)	in/hr	USCS
IT-1	5.0	24	Well-Graded Gravel with Sand
IT-2	5.0	20	Well-Graded Gravel with Sand

HOURLY MEASURED INFILTRATION RATES

Test	Hour 1	Hour 2	Hour 3	Hour 4	Stabilized Rate (in/hr)
IT-1	24	24	24	24	24
IT-2	21	21	21	21	20

Kenney Geotechnical Services

Geotechnical Boring Log

Project Name:	Cortland Senior Housing	**Project Number:**	2022-204	**Logged By:**	NM	**Boring Number**	B-1
Client:	Cortland Housing Assistance Council	**Ground Elevation:**		**Checked By:**	CMK	**Sheet:**	1 of 2
Location:	31 River Street, Cortland NY	**Drill Rig:**	7822DT	**Depth To Groundwater While Drilling:**			13.0
Started:	12/14/2022	**Drill Method:**	3.25" HSA	**Depth To Groundwater Before Auger Removal:**			15.4
Completed:	12/14/2022	**Driller:**	D. Green	**Depth To Groundwater After Auger Removal:**			DRY

Depth (ft)	Sample Type	Recovery (inch)	Blow Count Per 6 inches	Graphic Log	N (bpf)	USCS Material Description	Strata Change Depth (ft.)	Pocket Penet. (tsf)	Moisture Content (%)
			1			**TOPSOIL**	0.5		
1	SPT	10	8		16	**(GM) MEDIUM DENSE, BROWN SILTY GRAVEL WITH SAND, MOIST**			
			8						
2			7				2.0		
	SPT	0	3		4	**NO RECOVERY COBBLES/BOULDERS OBSERVED WHILE DRILLING BEGINNING AT 3.0 FT**			
3			2						
			2						
4			1				4.0		
	SPT	12	2		5	**(GW) LOOSE, BROWN WELL GRADED GRAVEL WITH SAND AND SILT, MOIST**			
5			2						
			3						
6			10						
	SPT	11	14		68	**SIMILAR SOIL, VERY DENSE, MOIST**			
7			38						
			30						
8			24						
	SPT	15	25		73	**SIMILAR SOIL, VERY DENSE, MOIST**			
9			35						
			38						
10			40						
11									
12									
13							13.0		
	SPT	12	6		52	**(GW) VERY DENSE, GREY WELL GRADED GRAVEL WITH SAND, WET**			
14			22						
			30						
15			20						
16									
17									
18									
	SPT	9	23		100	**SIMILAR SOIL, VERY DENSE, WET**			
19			35			**(CONTINUED ONTO NEXT SHEET)**			
			50/0.3						
20									

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Geotechnical Boring Log

Project Name:	Cortland Senior Housing	**Project Number:**	2022-204	**Logged By:**	NM	**Boring Number**	B-1
Client:	Cortland Housing Assistance Council	**Ground Elevation:**		**Checked By:**	CMK	**Sheet:**	2 of 2
Location:	31 River Street, Cortland NY	**Drill Rig:**	7822DT	**Depth To Groundwater While Drilling:**			13.0
Started:	12/14/2022	**Drill Method:**	3.25" HSA	**Depth To Groundwater Before Auger Removal:**			15.4
Completed:	12/14/2022	**Driller:**	D. Green	**Depth To Groundwater After Auger Removal:**			DRY

Depth (ft)	Sample Type	Recovery (inch)	Blow Count Per 6 inches	Graphic Log	N (bpf)	USCS Material Description	Strata Change Depth (ft.)	Pocket Penet. (tsf)	Moisture Content (%)
21									
22									
23									
	SPT	4	50/0.4		100	**SIMILAR SOIL, VERY DENSE WET**			

Bottom of Boring: 23.4 FT | Cave Depth: 7.7 FT

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Geotechnical Boring Log

Project Name:	Cortland Senior Housing	**Project Number:**	2022-204	**Logged By:**	NM	**Boring Number**	B-2
Client:	Cortland Housing Assistance Council	**Ground Elevation:**		**Checked By:**	CMK	**Sheet:**	1 of 2
Location:	31 River Street, Cortland NY	**Drill Rig:**	7822DT	**Depth To Groundwater While Drilling:**			13.0
Started:	12/14/2022	**Drill Method:**	3.25" HSA	**Depth To Groundwater Before Auger Removal:**			15.4
Completed:	12/14/2022	**Driller:**	D. Green	**Depth To Groundwater After Auger Removal:**			DRY

Depth (ft)	Sample Type	Recovery (inch)	Blow Count Per 6 inches	Graphic Log	N (bpf)	USCS Material Description	Strata Change Depth (ft.)	Pocket Penet. (tsf)	Moisture Content (%)
			2			**TOPSOIL**	0.5		
1	SPT	6	3		6	**(SC-SM) LOOSE, BROWN SILTY CLAYEY SAND WITH GRAVEL, MOIST**			
			3						
2			4				2.0		
			3			**AUGER CUTTINGS FROM SAMPLE 0'-4'**			
3	SPT	0	2		3	**NO RECOVERY**			
			1						
4			2				4.0		
			9						
5	SPT	10	16		29	**(GW) MEDIUM DENSE, GREY/BROWN WELL-GRADED GRAVEL WITH SAND, MOIST**			
			13						
6			15						
			10						
7	SPT	11	12		24	**COBBLES/BOULDERS ENCOUNTERED AROUND 1.5 FT SIMILAR SOIL, MEDIUM DENSE, MOIST**			
			12						
8			12						
	SPT	3	50/.3		100	**BOULDER AT 8.5 FT**			
9									
10									
11									
12									
13									
			9						
14	SPT	10	24		44	**SIMILAR SOIL, DENSE, WET**			
			20						
15			16						
16									
17									
18									
			16						
19	SPT	20	24		42	**GREY SIMILAR SOIL, DENSE, WET**			
			18			**(CONTINUED ONTO NEXT SHEET)**			
20			20						

Kenney Geotechnical Services

Geotechnical Boring Log

Project Name:	Cortland Senior Housing	**Project Number:**	2022-204	**Logged By:**	NM	**Boring Number**	B-2
Client:	Cortland Housing Assistance Council	**Ground Elevation:**		**Checked By:**	CMK	**Sheet:**	2 of 2
Location:	31 River Street, Cortland NY	**Drill Rig:**	7822DT	**Depth To Groundwater While Drilling:**			13.0
Started:	12/14/2022	**Drill Method:**	3.25" HSA	**Depth To Groundwater Before Auger Removal:**			15.4
Completed:	12/14/2022	**Driller:**	D. Green	**Depth To Groundwater After Auger Removal:**			DRY

Depth (ft)	Sample Type	Recovery (inch)	Blow Count Per 6 inches	Graphic Log	N (bpf)	USCS Material Description	Strata Change Depth (ft.)	Pocket Penet. (tsf)	Moisture Content (%)
21									
22									
23									
	SPT	4	45		100	**SIMILAR SOIL WITH SILT, VERY DENSE, WET**			
24			50/.2						

Bottom of Boring: 23.7 FT

Cave Depth: 6.1 FT

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Geotechnical Boring Log

Project Name:	Cortland Senior Housing	**Project Number:**	2022-204	**Logged By:**	NM	**Boring Number**	B-3
Client:	Cortland Housing Assistance Council	**Ground Elevation:**		**Checked By:**	CMK	**Sheet:**	1 of 2
Location:	31 River Street, Cortland NY	**Drill Rig:**	7822DT	**Depth To Groundwater While Drilling:**			13.0
Started:	12/14/2022	**Drill Method:**	3.25" HSA	**Depth To Groundwater Before Auger Removal:**			16.4
Completed:	12/14/2022	**Driller:**	D. Green	**Depth To Groundwater After Auger Removal:**			DRY

Depth (ft)	Sample Type	Recovery (inch)	Blow Count Per 6 inches	Graphic Log	N (bpf)	USCS Material Description	Strata Change Depth (ft.)	Pocket Penet. (tsf)	Moisture Content (%)
			3			**TOPSOIL**	0.4		
1	SPT	11	4		8	**(GM) LOOSE, BROWN SILTY GRAVEL WITH SAND, MOIST**			13.7
			4						
2			3						
	SPT	6	3		5	**SIMILAR SOIL, LOOSE, MOIST**			9.1
3			3						
			2						
4			1				4.0		
	SPT	6	4		37	**(GW) DENSE, GREY/BROWN WELL-GRADED GRAVEL WITH SAND, MOIST**			7.4
5			16						
			21						
6			15						
	SPT	12	15		33	**SIMILAR SOIL, DENSE, MOIST**			4.1
7			19						
			14						
8			10						
	SPT	15	15		68	**SIMILAR SOIL, VERY DENSE, MOIST**			5.3
9			24						
			44						
10			50/.4						
11									
12									
13									
	SPT	9	12		34	**SIMILAR SOIL, DENSE, WET**			7.9
14			14						
			20						
15			16						
16									
17									
18									
	SPT	15	50/.4		100	**SIMILAR SOIL, VERY DENSE, WET**			7.1
19						**(CONTINUED ONTO NEXT SHEET)**			
20									

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Geotechnical Boring Log

Project Name:	Cortland Senior Housing	**Project Number:**	2022-204	**Logged By:**	NM	**Boring Number**	B-3
Client:	Cortland Housing Assistance Council	**Ground Elevation:**		**Checked By:**	CMK	**Sheet:**	2 of 2
Location:	31 River Street, Cortland NY	**Drill Rig:**	7822DT	**Depth To Groundwater While Drilling:**			13.0
Started:	12/14/2022	**Drill Method:**	3.25" HSA	**Depth To Groundwater Before Auger Removal:**			16.4
Completed:	12/14/2022	**Driller:**	D. Green	**Depth To Groundwater After Auger Removal:**			DRY

Depth (ft)	Sample Type	Recovery (inch)	Blow Count Per 6 inches	Graphic Log	N (bpf)	USCS Material Description	Strata Change Depth (ft.)	Pocket Penet. (tsf)	Moisture Content (%)
21									
22									
23									
	SPT	4	50/.1		100	**SIMILAR SOIL, VERY DENSE, WET**			8.9
						Bottom of Boring: 23.4 FT	Cave Depth: 8.4 FT		

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Geotechnical Boring Log

Project Name:	Cortland Senior Housing	**Project Number:**	2022-204	**Logged By:**	NM	**Boring Number**	B-4
Client:	Cortland Housing Assistance Council	**Ground Elevation:**		**Checked By:**	CMK	**Sheet:**	1 of 1
Location:	31 River Street, Cortland NY	**Drill Rig:**	7822DT	**Depth To Groundwater While Drilling:**			13.0
Started:	12/15/2022	**Drill Method:**	3.25" HSA	**Depth To Groundwater Before Auger Removal:**			11.7
Completed:	12/15/2022	**Driller:**	D. Green	**Depth To Groundwater After Auger Removal:**			DRY

Depth (ft)	Sample Type	Recovery (inch)	Blow Count Per 6 inches	Graphic Log	N (bpf)	USCS Material Description	Strata Change Depth (ft.)	Pocket Penet. (tsf)	Moisture Content (%)
			2			**TOPSOIL**	0.5		
1	SPT	6	2		5	**(GM) LOOSE, BROWN SILTY GRAVEL WITH SAND, MOIST**			
			3						
2			3						
	SPT	7	3		8				
3			3			**SIMILAR SOIL, LOOSE, MOIST**			
			5						
4			8				4.0		
	SPT	0	4		24	**NO RECOVERY**			
5			15			**COBBLES AND BOULDERS OBSERVED WHILE DRILLING AT 4 FT**			
			9						
6			7				6.0		
	SPT	11	7		11	**(GW) MEDIUM DENSE, BROWN/GREY WELL-GRADED GRAVEL WITH SAND AND SILT, MOIST**			
7			5						
			6						
8			12				8.0		
	SPT	0	50/.3		100	**NO RECOVERY**			
9						**AUGERED THROUGH BOULDER 8-11 FT**			
10									
11									
12									
13							13.0		
	SPT	3	27		60	**(SW) VERY DENSE, GREY WELL-GRADED SAND, WET**			
14			30						
			30						
15			35						
16									
17									
18							18.0		
	SPT	16	39		61	**(GW) VERY DENSE, GREY WELL-GRADED GRAVEL WITH SAND, WET**			
19			30						
			31						
20			35				20.0		
	SPT	0	50/.2		100	**NO RECOVERY, AUGER REFUSAL AT 20.0 FT**			

Bottom of Boring: 20.2 FT | Cave Depth: 9.5 FT

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Geotechnical Boring Log

Project Name:	Cortland Senior Housing	**Project Number:**	2022-204	**Logged By:**	NM	**Boring Number**	B-5
Client:	Cortland Housing Assistance Council	**Ground Elevation:**		**Checked By:**	CMK	**Sheet:**	1 of 2
Location:	31 River Street, Cortland NY	**Drill Rig:**	7822DT	**Depth To Groundwater While Drilling:**			13.0
Started:	12/15/2022	**Drill Method:**	3.25" HSA	**Depth To Groundwater Before Auger Removal:**			14.7
Completed:	12/15/2022	**Driller:**	D. Green	**Depth To Groundwater After Auger Removal:**			DRY

Depth (ft)	Sample Type	Recovery (inch)	Blow Count Per 6 inches	Graphic Log	N (bpf)	USCS Material Description	Strata Change Depth (ft.)	Pocket Penet. (tsf)	Moisture Content (%)
			2			**TOPSOIL**	0.4		
1	SPT	11	4		9	**(GW) LOOSE, BROWN WELL-GRADED GRAVEL WITH SAND AND SILT, MOIST**			
			5						
2			6						
	SPT	8	8		15	**SIMILAR SOIL, MEDIUM DENSE, MOIST**			
3			8						
			7						
4			6						
	SPT	5	10		21	**SIMILAR SOIL, MEDIUM DENSE, MOIST**			
5			7						
			14						
6			14				6.0		
	SPT	9	10		19	**(GW) MEDIUM DENSE, BROWN/GREY WELL-GRADED GRAVEL WITH SAND, MOIST**			
7			9						
			10						
8			26						
	SPT	6	35		100	**SIMILAR SOIL, VERY DENSE, MOIST**			
9			50/.4						
10									
11									
12									
13									
	SPT	15	26		49	**GREY SIMILAR SOIL, DENSE, WET**			
14			33						
			16						
15			37						
16									
17									
18									
	SPT	13	12		44	**GREY SIMILAR SOIL, DENSE, WET**			
19			22			**(CONTINUED ONTO NEXT SHEET)**			
			22						
20			30						

Kenney Geotechnical Services

Geotechnical Boring Log

Project Name:	Cortland Senior Housing	**Project Number:**	2022-204	**Logged By:**	NM	**Boring Number**	B-5
Client:	Cortland Housing Assistance Council	**Ground Elevation:**		**Checked By:**	CMK	**Sheet:**	2 of 2
Location:	31 River Street, Cortland NY	**Drill Rig:**	7822DT	**Depth To Groundwater While Drilling:**			13.0
Started:	12/15/2022	**Drill Method:**	3.25" HSA	**Depth To Groundwater Before Auger Removal:**			14.7
Completed:	12/15/2022	**Driller:**	D. Green	**Depth To Groundwater After Auger Removal:**			DRY

Depth (ft)	Sample Type	Recovery (inch)	Blow Count Per 6 inches	Graphic Log	N (bpf)	USCS Material Description	Strata Change Depth (ft.)	Pocket Penet. (tsf)	Moisture Content (%)
21									
22									
23									
			18						
24	SPT	7	39		100	**SIMILAR SOIL, VERY DENSE, WET**			
			50/.3						

Bottom of Boring: 24.3 FT | Cave Depth: 5.9 FT

Kenney Geotechnical Services

Geotechnical Boring Log

Project Name:	Cortland Senior Housing	**Project Number:**	2022-204	**Logged By:**	NM	**Boring Number**	B-6
Client:	Cortland Housing Assistance Council	**Ground Elevation:**		**Checked By:**	CMK	**Sheet:**	1 of 2
Location:	31 River Street, Cortland NY	**Drill Rig:**	7822DT	**Depth To Groundwater While Drilling:**			13.0
Started:	12/15/2022	**Drill Method:**	3.25" HSA	**Depth To Groundwater Before Auger Removal:**			12.6
Completed:	12/15/2022	**Driller:**	D. Green	**Depth To Groundwater After Auger Removal:**			DRY

Depth (ft)	Sample Type	Recovery (inch)	Blow Count Per 6 inches	Graphic Log	N (bpf)	USCS Material Description	Strata Change Depth (ft.)	Pocket Penet. (tsf)	Moisture Content (%)
			3			**TOPSOIL**	0.5		
1	SPT	6	4		9	**OL: (GC-GM) LOOSE, BROWN CLAYEY SILTY GRAVEL WITH ORGANICS, MOIST**			
			5						
2			6				2.0		
			4						
3	SPT	3	4		6	**SIMILAR SOIL WITH NO ORGANICS, LOOSE, MOIST**			
			2						
4			5				4.0		
			4						
5	SPT	13	10		22	**(GW) MEDIUM DENSE, BROWN WELL-GRADED GRAVEL WITH SAND, MOIST**			
			12						
6			16						
			48						
7	SPT	15	19		36	**SIMILAR SOIL, DENSE, MOIST**			
			17						
8			25						
			18						
9	SPT	12	21		51	**SIMILAR SOIL, VERY DENSE, MOIST**			
			30						
10			32						
11									
12									
13							13.0		
			42						
14	SPT	15	16		33	**(GW) DENSE, GREY WELL-GRADED GRAVEL, WET**			
			17						
15			40						
16									
17									
18							18.0		
			16						
19	SPT	0	12		24	**NO RECOVERY**			
			12			**(CONTINUED ONTO NEXT SHEET)**			
20			14				20.0		

Kenney Geotechnical Services

Geotechnical Boring Log

Project Name:	Cortland Senior Housing	**Project Number:**	2022-204	**Logged By:**	NM	**Boring Number**	B-6
Client:	Cortland Housing Assistance Council	**Ground Elevation:**		**Checked By:**	CMK	**Sheet:**	2 of 2
Location:	31 River Street, Cortland NY	**Drill Rig:**	7822DT	**Depth To Groundwater While Drilling:**			13.0
Started:	12/15/2022	**Drill Method:**	3.25" HSA	**Depth To Groundwater Before Auger Removal:**			12.6
Completed:	12/15/2022	**Driller:**	D. Green	**Depth To Groundwater After Auger Removal:**			DRY

Depth (ft)	Sample Type	Recovery (inch)	Blow Count Per 6 inches	Graphic Log	N (bpf)	USCS Material Description	Strata Change Depth (ft.)	Pocket Penet. (tsf)	Moisture Content (%)
21									
22									
23									
			30						
24	SPT	10	21		41	**(GW) DENSE, GREY WELL-GRADED GRAVEL, WET**			
			20						
25			20						

Bottom of Boring: 25.0 FT

Cave Depth: 9.3 FT

Kenney Geotechnical Services

Geotechnical Boring Log

Project Name:	Cortland Senior Housing	**Project Number:**	2022-204	**Logged By:**	NM	**Boring Number**	B-7
Client:	Cortland Housing Assistance Council	**Ground Elevation:**		**Checked By:**	CMK	**Sheet:**	1 of 2
Location:	31 River Street, Cortland NY	**Drill Rig:**	7822DT	**Depth To Groundwater While Drilling:**			13.0
Started:	12/15/2022	**Drill Method:**	3.25" HSA	**Depth To Groundwater Before Auger Removal:**			16.1
Completed:	12/15/2022	**Driller:**	D. Green	**Depth To Groundwater After Auger Removal:**			DRY

Depth (ft)	Sample Type	Recovery (inch)	Blow Count Per 6 inches	Graphic Log	N (bpf)	USCS Material Description	Strata Change Depth (ft.)	Pocket Penet. (tsf)	Moisture Content (%)
			2			**TOPSOIL**	0.3		
1	SPT	3	2		4	**(SC-SM) VERY LOOSE, CLAYEY SILTY SAND WITH GRAVEL, MOIST**			
			2						
2			2						
	SPT	6	4		6				
3			4			**SIMILAR SOIL, LOOSE, MOIST**			
			2						
4			2				4.0		
	SPT	0			5	**NO RECOVERY**			
5			1						
			4						
6			1/12"				6.0		
	SPT	13	2		42	**(GW) DENSE, GREY/BROWN WELL-GRADED GRAVEL WITH SAND, MOIST**			
7			20						
			22						
8			24						
	SPT	7	44		100	**SIMILAR SOIL, VERY DENSE, MOIST**			
9			50/.4						
10									
11									
12									
13							13.0		
	SPT	15	28		48	**(GW) DENSE, GREY WELL-GRADED GRAVEL WITH SAND, WET**			
14			24						
			24						
15			16						
16									
17									
18									
	SPT	14	36		72	**SIMILAR SOIL, VERY DENSE, WET**			
19			44			**(CONTINUED ONTO NEXT SHEET)**			
			28						
20			16						

Kenney Geotechnical Services

Geotechnical Boring Log

Project Name:	Cortland Senior Housing	Project Number:	2022-204	Logged By:	NM	Boring Number	B-7
Client:	Cortland Housing Assistance Council	Ground Elevation:		Checked By:	CMK	Sheet:	2 of 2
Location:	31 River Street, Cortland NY	Drill Rig:	7822DT	Depth To Groundwater While Drilling:			13.0
Started:	12/15/2022	Drill Method:	3.25" HSA	Depth To Groundwater Before Auger Removal:			16.1
Completed:	12/15/2022	Driller:	D. Green	Depth To Groundwater After Auger Removal:			DRY

Depth (ft)	Sample Type	Recovery (inch)	Blow Count Per 6 inches	Graphic Log	N (bpf)	USCS Material Description	Strata Change Depth (ft.)	Pocket Penet. (tsf)	Moisture Content (%)
21									
22									
23									
			15						
24	SPT	11	15		40	SIMILAR SOIL, DENSE, WET			
			25						
25			21						

Bottom of Boring: 25.0 FT

Cave Depth: 7.6 FT

Kenney Geotechnical Services

Geotechnical Boring Log

Project Name:	Cortland Senior Housing	**Project Number:**	2022-204	**Logged By:**	NM	**Boring Number**	B-8
Client:	Cortland Housing Assistance Council	**Ground Elevation:**		**Checked By:**	CMK	**Sheet:**	1 of 2
Location:	31 River Street, Cortland NY	**Drill Rig:**	7822DT	**Depth To Groundwater While Drilling:**			18.0
Started:	12/15/2022	**Drill Method:**	3.25" HSA	**Depth To Groundwater Before Auger Removal:**			17.2
Completed:	12/15/2022	**Driller:**	D. Green	**Depth To Groundwater After Auger Removal:**			DRY

Depth (ft)	Sample Type	Recovery (inch)	Blow Count Per 6 inches	Graphic Log	N (bpf)	USCS Material Description	Strata Change Depth (ft.)	Pocket Penet. (tsf)	Moisture Content (%)
			1			**TOPSOIL**	0.5		
1	SPT	8	3		7	**(CL-ML) MEDIUM STIFF, BROWN GRAVELLY SILTY CLAY WITH SAND, MOIST**			
			4						
2			4						
			4						
3	SPT	2	5		11	**SIMILAR SOIL, STIFF, MOIST**			15.3
			6						
4			5						
			6			**SIMILAR SOIL, STIFF, MOIST**			
5	SPT	15	4		10		5.0		
			6			**(GW) LOOSE, BROWN WELL-GRADED GRAVEL WITH SAND AND SILT, MOIST**			
6			10						
			25						
7	SPT	4	50/.4		100	**SIMILAR SOIL, VERY DENSE, MOIST**			6.4
			16						
8			32						
	SPT	13	40		72	**SIMILAR SOIL, VERY DENSE, MOIST**			
9			50/.3						4.7
10									
11									
12									
13									
	SPT	10	27		50	**SIMILAR SOIL, DENSE, WET**			
14			30						
			20						
15			25						
16									
17									
18									
	SPT	10	10		100	**SIMILAR SOIL, VERY DENSE, WET**			
19			50/.3			**(CONTINUED ONTO NEXT SHEET)**			6.9
20									

Kenney Geotechnical Services

Geotechnical Boring Log

Project Name:	Cortland Senior Housing	**Project Number:**	2022-204	**Logged By:**	NM	**Boring Number**	B-8
Client:	Cortland Housing Assistance Council	**Ground Elevation:**		**Checked By:**	CMK	**Sheet:**	2 of 2
Location:	31 River Street, Cortland NY	**Drill Rig:**	7822DT	**Depth To Groundwater While Drilling:**			18.0
Started:	12/15/2022	**Drill Method:**	3.25" HSA	**Depth To Groundwater Before Auger Removal:**			17.2
Completed:	12/15/2022	**Driller:**	D. Green	**Depth To Groundwater After Auger Removal:**			DRY

Depth (ft)	Sample Type	Recovery (inch)	Blow Count Per 6 inches	Graphic Log	N (bpf)	USCS Material Description	Strata Change Depth (ft.)	Pocket Penet. (tsf)	Moisture Content (%)
21									
22									
23									
	SPT	3	50/.4		100	**SIMILAR SOIL, VERY DENSE, WET**			
						Bottom of Boring: 23.4 FT	Cave Depth: 7.7 FT		

Kenney Geotechnical Services

Geotechnical Boring Log

Project Name:	Cortland Senior Housing	**Project Number:**	2022-204	**Logged By:**	NM	**Boring Number**	B-9
Client:	Cortland Housing Assistance Council	**Ground Elevation:**		**Checked By:**	CMK	**Sheet:**	1 of 1
Location:	31 River Street, Cortland NY	**Drill Rig:**	7822DT	**Depth To Groundwater While Drilling:**			DRY
Started:	12/15/2022	**Drill Method:**	3.25" HSA	**Depth To Groundwater Before Auger Removal:**			DRY
Completed:	12/15/2022	**Driller:**	D. Green	**Depth To Groundwater After Auger Removal:**			DRY

Depth (ft)	Sample Type	Recovery (inch)	Blow Count Per 6 inches	Graphic Log	N (bpf)	USCS Material Description	Strata Change Depth (ft.)	Pocket Penet. (tsf)	Moisture Content (%)
			2			**TOPSOIL**	0.7		
1	SPT	8	2		5	**(GC-GM) LOOSE, BROWN CLAYEY SILTY GRAVEL WITH SAND, MOIST**			
			3						
2			2						
			1						
3	SPT	3	2		4	**SIMILAR SOIL, VERY LOOSE, MOIST**			
			2						
4			1						
			1			**SIMILAR SOIL, LOOSE, MOIST**			
5	SPT	9	1		6		5.0		
			5			**(GW) LOOSE, WELL-GRADED GRAVEL WITH SAND, MOIST**			
6			6						
			16			**SIMILAR SOIL, DENSE, MOIST**			
7	SPT	15	25		50				
			25						
8			30						

Bottom of Boring: 8.0 FT | Cave Depth: 4.7 FT

Kenney Geotechnical Services

Geotechnical Boring Log

Project Name:	Cortland Senior Housing	**Project Number:**	2022-204	**Logged By:**	NM	**Boring Number**	B-10
Client:	Cortland Housing Assistance Council	**Ground Elevation:**		**Checked By:**	CMK	**Sheet:**	1 of 1
Location:	31 River Street, Cortland NY	**Drill Rig:**	7822DT	**Depth To Groundwater While Drilling:**			DRY
Started:	12/15/2022	**Drill Method:**	3.25" HSA	**Depth To Groundwater Before Auger Removal:**			DRY
Completed:	12/15/2022	**Driller:**	D. Green	**Depth To Groundwater After Auger Removal:**			DRY

Depth (ft)	Sample Type	Recovery (inch)	Blow Count Per 6 inches	Graphic Log	N (bpf)	USCS Material Description	Strata Change Depth (ft.)	Pocket Penet. (tsf)	Moisture Content (%)
			WH			**TOPSOIL**	0.8		
1	SPT	9	1		2	**(CL-ML) VERY SOFT, BROWN SANDY SILTY CLAY WITH ROOT HAIRS, MOIST**			
			1						
2			2						
			3			**SIMILAR SOIL, MEDIUM STIFF, MOIST**	2.5		
3	SPT	7	4		8	**(GC-GM) LOOSE, BROWN CLAYEY SILTY GRAVEL WITH SAND, MOIST**			
			4						
4			2						
	SPT	12	3		10				
5			4			**SIMILAR SOIL, LOOSE, MOIST**			
			6						
6			12						
	SPT	15	50/.4		100	**SIMILAR SOIL, VERY DENSE, MOIST**			

Bottom of Boring: 6.4 FT | Cave Depth: 4.7 FT

Kenney Geotechnical Services

Geotechnical Boring Log

Project Name:	Cortland Senior Housing	**Project Number:**	2022-204	**Logged By:**	NM	**Boring Number**	B-11
Client:	Cortland Housing Assistance Council	**Ground Elevation:**		**Checked By:**	CMK	**Sheet:**	1 of 1
Location:	31 River Street, Cortland NY	**Drill Rig:**	7822DT	**Depth To Groundwater While Drilling:**			DRY
Started:	12/15/2022	**Drill Method:**	3.25" HSA	**Depth To Groundwater Before Auger Removal:**			DRY
Completed:	12/15/2022	**Driller:**	D. Green	**Depth To Groundwater After Auger Removal:**			DRY

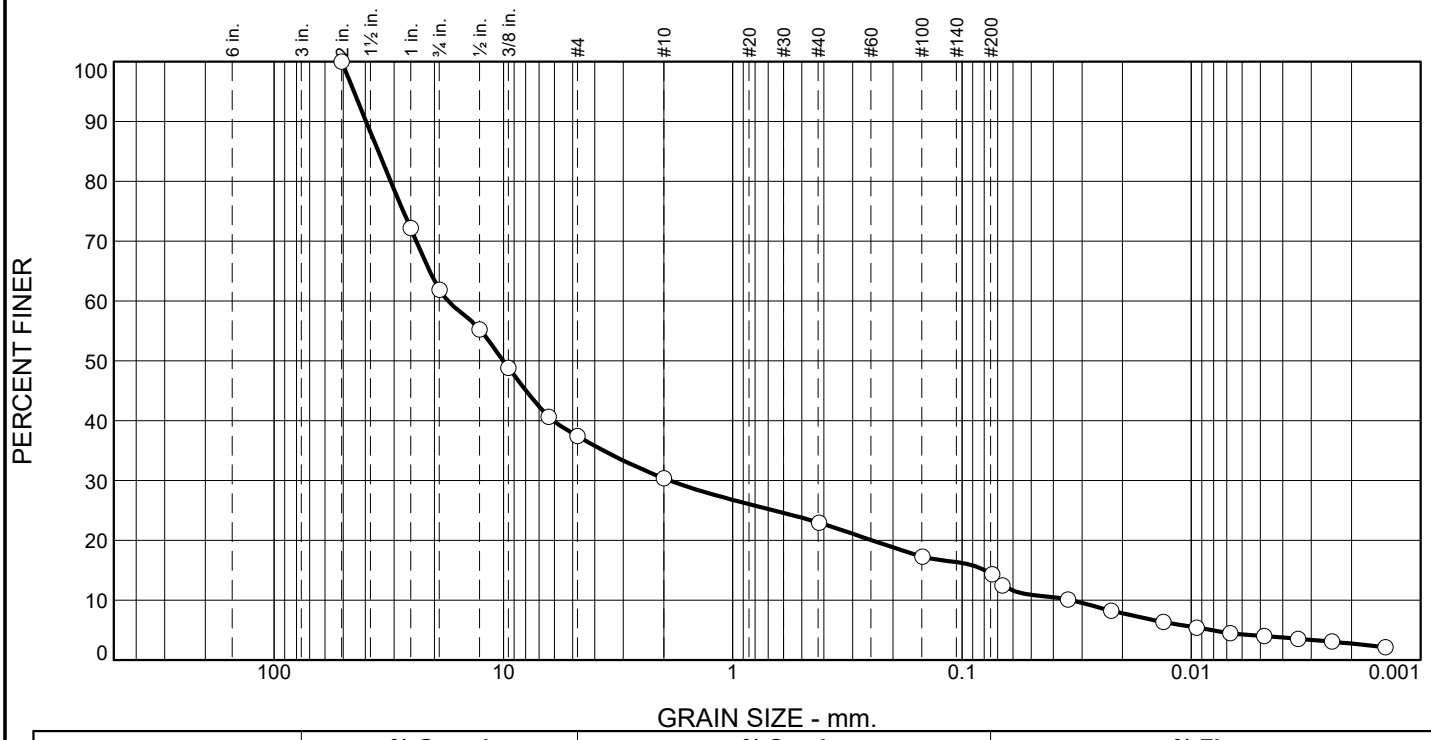
Depth (ft)	Sample Type	Recovery (inch)	Blow Count Per 6 inches	Graphic Log	N (bpf)	USCS Material Description	Strata Change Depth (ft.)	Pocket Penet. (tsf)	Moisture Content (%)
	SPT	9	1		4	**TOPSOIL - OL: (CL-ML) SOFT, BROWN GRAVELLY SILTY CLAY WITH ORGANICS, MOIST**	0.8		
1			2						
			2			**(GC-GM) VERY LOOSE, BROWN CLAYEY SILTY GRAVEL WITH SAND, MOIST**			
2			2						
	SPT	7	3		10				
3			5			**SIMILAR SOIL, LOOSE, MOIST**			
			5						
4			6						
	SPT	12	3		34	**SIMILAR SOIL, DENSE, MOIST**	4.5		
5			14			**(GW) DENSE, GREY/BROWN WELL-GRADED GRAVEL WITH SAND, MOIST**			
			20						
6			30						
	SPT	15	20		70	**SIMILAR SOIL, VERY DENSE, MOIST**			
7			32						
			38						
8			45						

Bottom of Boring: 8.0 FT | Cave Depth: 4.3 FT

LABORATORY TESTING RESULTS

Particle Size Distribution Report

ASTM D422 & D1140



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0	38	25	7	7	9	10	4

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_C	C_U
○			35.1396	17.4432	10.0345	1.8823	0.0795	0.0333	6.09	523.23

	Material Description	USCS	AASHTO
○	Clayey Silty Gravel with Sand	GC-GM	

Project No. 2022-204 **Client:** Cortland Housing Assistance Council

Project: Cortland Senior Housing

○ **Source of Sample:** B-1 **Depth:** 5.0' **Sample Number:** 4.0'-6.0'

Remarks:

○ Kenney Geotechnical
Engineering Services, PLLC
6901 Herman Road
Syracuse, NY 13209
(315) 638-2706

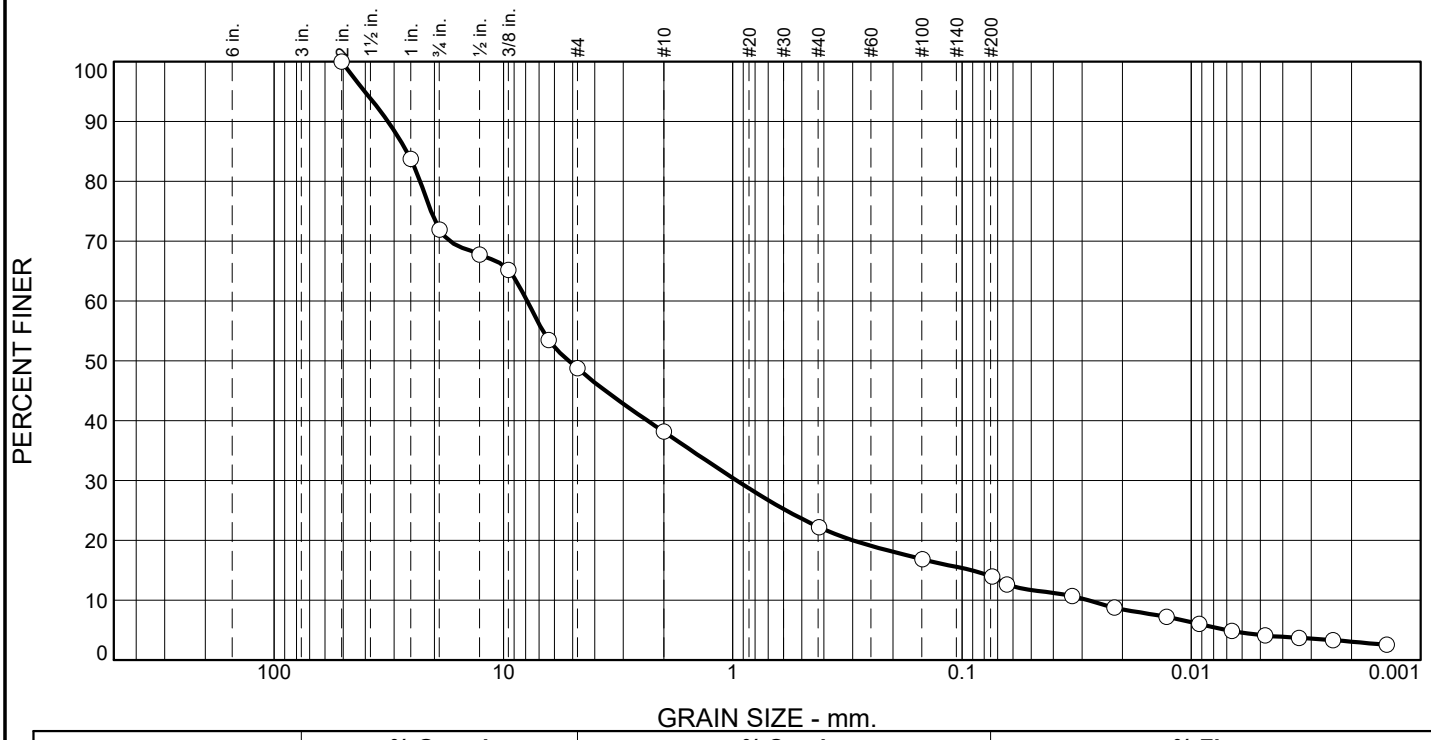
Kenney Geotechnical Services

Figure

Tested By: BE **Checked By:** CMK

Particle Size Distribution Report

ASTM D422 & D1140



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0	28	23	11	16	8	10	4

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_C	C_U
○			26.4292	7.8844	5.1962	0.9619	0.0906	0.0283	4.15	278.87

Material Description	USCS	AASHTO
○ Clayey Silty Gravel with Sand	GC-GM	

Project No. 2022-204 **Client:** Cortland Housing Assistance Council

Project: Cortland Senior Housing

○ **Source of Sample:** B-7 **Depth:** 7.0' **Sample Number:** 6.0'-8.0'

Remarks:

○ Kenney Geotechnical
Engineering Services, PLLC
6901 Herman Road
Syracuse, NY 13209
(315) 638-2706

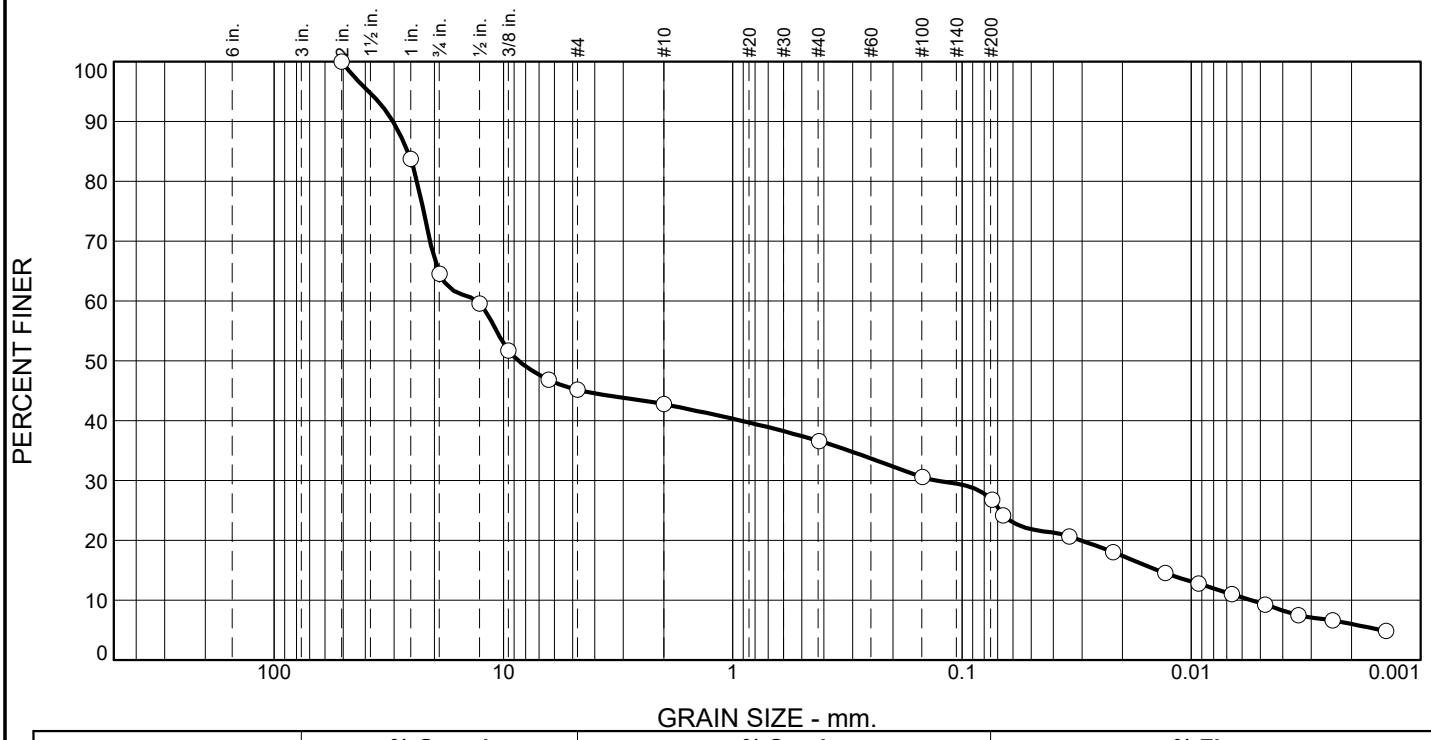
Kenney Geotechnical Services

Figure

Tested By: BE **Checked By:** CMK

Particle Size Distribution Report

ASTM D422 & D1140



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0	35	20	2	6	10	17	10

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_C	C_u
○			26.1578	13.0865	8.5828	0.1293	0.0140	0.0055	0.23	2383.38

Material Description	USCS	AASHTO
○ Clayey Silty Gravel with Sand	GC-GM	

Project No. 2022-204 **Client:** Cortland Housing Assistance Council

Project: Cortland Senior Housing

○ **Source of Sample:** B-9 **Depth:** 3.0' **Sample Number:** 2.0'-4.0'

Remarks:

○ Kenney Geotechnical
Engineering Services, PLLC
6901 Herman Road
Syracuse, NY 13209
(315) 638-2706

Kenney Geotechnical Services

Figure

Tested By: BE **Checked By:** CMK

Kenney Geotechnical Engineering Services, PLLC
Office: 6901 Herman Road, Syracuse, NY 13209
Mail :P.O. Box 117 Warners, NY 13164
Phone: (315) 638-2706 Fax: (315) 638-1544

Project No.:	**2022-204**	**Date:**	**12/22/2022**
Project Name:	**Cortland Senior Housing**		

Natural Moisture Content
ASTM D2216

Sample:	**B-3, 0'-2'**	**B-3, 2'-4'**	**B-3, 4'-6'**	**B-3, 6'-8'**	**B-3, 8'-10'**	**B-3, 13'-15'**	**B-3, 18'-20'**	**B-3, 23'-25'**
Tare Name:	Fish	WLAP	Pike	Larry	MAX	REX	Duck	Link
Tare Weight:	14.15	13.66	14.18	14.5	13.63	14.37	14.3	14.38
Tare + Wet Sample Wt.:	53.79	68.3	51.55	62.55	54.97	70.57	68.19	66.52
Tare + Dry Sample Wt.:	49	63.74	48.96	60.67	52.89	66.44	64.61	62.25
H20 Wt.:	4.8	4.6	2.6	1.9	2.1	4.1	3.6	4.3
Dry Sample Wt.:	34.9	50.1	34.8	46.2	39.3	52.1	50.3	47.9
MC = (H20 Wt. / Dry Sample Wt.) x 100:	13.7	9.1	7.4	4.1	5.3	7.9	7.1	8.9

Sample:	**B-8, 2'-4'**	**B-8, 6'-8'**	**B-8, 8'-10'**	**B-8, 18'-20'**
Tare Name:	A99	NCIS	Zebra	Gas
Tare Weight:	14.16	14.25	14.77	13.93
Tare + Wet Sample Wt.:	59.52	49.99	65.59	64.43
Tare + Dry Sample Wt.:	53.5	47.84	63.32	61.18
H20 Wt.:	6.0	2.2	2.3	3.3
Dry Sample Wt.:	39.3	33.6	48.6	47.3
MC = (H20 Wt. / Dry Sample Wt.) x 100:	15.3	6.4	4.7	6.9

Riverview Apartments

31 River Street

City of Cortland, Cortland County, NY

TAX ID: 87.39-01-04.100

RZE #25024

SWPPP

07/01/2025



Prepared for:

Shawna Grinnell
Cortland Housing
Assistance Council, Inc.
36 Taylor Street
Cortland, NY 13045
Cortland County, NY

RZ Engineering, PLLC
STORMWATER SANITARY WATER ENVIRONMENTAL TRANSPORTATION
6320 FLY ROAD SUITE 109
EAST SYRACUSE, NY 13057
PH (315) 432-1089
FAX (315) 445-7981

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1.0 – SUMMARY

Cortland Housing Assistance Council, Inc. proposes development of a site located at 31 River Street in the City of Cortland, Cortland County, NY. The proposed development will include a parcel of 3.542 ± acres. Currently existing on the site of the proposed parcel is vacant farmland, meadow, grass and wooded areas. Total existing impervious surface coverage of the site is 0.097 ± acres, see Section 3.0. Proposed for development of the site is a 3-story apartment building and associated drives and parking totaling 1.29 ± acres of impervious surface coverage. The proposed site improvements to the 3.542 ± acre parcel will include disturbance of approximately 1.41 ± acres. It should also be noted per Appendix M, the site discharges directly to a fifth order stream. Therefore, per Chapter 4 of the 2015 NYS Stormwater Design Manual, CPv requirements, overbank flood control requirement, and the 100-yr storm control requirement are waived and do not need to be provided in the proposed stormwater design, see Section 6.0. Site improvements within the project will also include parking areas, stormwater facilities, general utilities, and general site landscaping. This report has been prepared with supporting documentation and calculations for the stormwater design.

2.0 – OBJECTIVE

The purpose of this report is to describe the additional stormwater management and erosion control measures for the site and the rationale for their use. This Report has been prepared in accordance with the United States Department of Agriculture (USDA) - Soil Conservation Service (SCS) “NYS Standards and Specifications for Erosion and Sediment Control,” the New York State Department of Environmental Conservation (NYSDEC) “NYS Stormwater Management Design Manual,” and the NYSDEC “SPDES General Permit for Stormwater Discharges from Construction Activities.”

This report will provide a narrative description of the proposed site improvements including stormwater management structures and erosion control methods to be temporarily or permanently employed at the site.

A copy of this SWPPP shall be maintained on site by the owner/contractor for the duration of the construction process.

3.0 – EXISTING SITE CONDITIONS

Existing Site Use

Cortland Housing Assitance Council, Inc. proposes to develop a 3.542 ± acre site located at 31 River Street, City of Cortland, Cortland County, NY. Currently existing on the site of the proposed parcel is vacant farmland, meadow, grass and wooded areas. Total existing impervious surface coverage of the site is 0.097 ± acres. The location of the site in relation to major roads and other points of reference are presented in Figures 1-3 along with an aerial photo of the site, general environmental mapping, and general vicinity.

For the purposes of analysis, two watersheds were delineated for existing conditions, EXDA-1B and EXDA-1A. EXDA-1A is approximately 1.238 ± acres and consists of wooded and meadow/brush areas. Stormwater within EXDA-1A ultimately discharges to the Tioughnioga River on the northern side of the site. The conditions of EXDA-1A and its included areas are described below:

- Woods, CN 30, Good, HSG A – 0.401 ± ac
- Brush, CN 30, Good, HSG A – 0.676 ± ac
- Medow, CN 30, Good, HSG A – 0.161 ± ac

EXDA-1B is approximately 2.711 ± acres and includes wooded and brush areas, grass cover, concrete and a portion of River Street. Stormwater within EXDA-1B discharges to the Tioughnioga River on the northern portion of the site upstream of where EXDA-1A discharges. The conditions of EXDA-1B and its included areas are described below:

- Woods, CN 30, Good, HSG A – 0.747 ± ac
- Brush, CN 30, Good, HSG A – 0.825 ± ac
- Grass, CN 39, Good, HSG A – 1.042 ± ac
- Concrete, CN 98, HSG A – 0.028 ± ac
- Paved Roads, CN 98, HSG A – 0.069 ± ac

According to soil information provided by the National Cooperative Soil Survey the site soils consist of Palmyra gravelly silt loam, 0 to 3 percent slopes – HSG Type A. Soil infiltration tests were performed by Kenney Geotechnical Engineering Services PLLC on 12/19/2022. According to a geotechnical report from the same company, testing revealed satisfactory rates for stormwater infiltration measures in the vicinity of the stormwater management area, see Appendix A.

4.0 – PROPOSED SITE USE AND IMPROVEMENTS

Proposed Site Use

For the purpose of analysis, two proposed watersheds, PRDA-1A and PRDA-1B were delineated. PRDA-1A is approximately 0.893 +/- acres. Stormwater within PRDA-1A discharges to the Tioughnioga River on the northern side of the site. The proposed land-surface cover descriptions and totals for this site within the PRDA-1A watershed are described as follows:

- Woods, Good, HSG A – 0.377 ± ac
- Grass, Good, Cn 39, HSG A – 0.422 ± ac
- Concrete, CN 98, HSG A – 0.091 ± ac
- Roofs, CN 98, HSG A – 0.003 ± ac

PRDA-1B is approximately 3.03 +/- acres. Stormwater runoff within PRDA-1B

discharges to the Tioughnioga River. Four drywells, an I-2 infiltration basin, and a forebay for the basin were used for the purpose of treating water quality volumes. For the purpose of analysis, a contributing area watershed was delineated for each of these stormwater management practices within PRDA-1B. Stormwater analysis details for PRDA-1B are shown in appendix D.

The proposed land-surface cover descriptions and totals for this site within the PRDA-1B watershed are described as follows:

- Grass, Good, CN 39, HSG A – 1.072 ± ac
- Roofs, CN 98, HSG A – 0.438 ± ac
- Concrete, CN 98, HSG A – 0.117 ± ac
- Parking, CN 98, HSG A – 0.825 ± ac
- Woods, Good, CN 30, HSG A – 0.577 ± ac

The site disturbed area watersheds were analyzed under pre- and post-conditions to determine peak runoff conditions associated with the design of the stormwater control facilities. Further discussion of the analysis is discussed in the next few report sections. The site is proposed for connection to public water and sanitary sewer systems. Access to the site during construction will be made via a temporary construction entrance off of River Street.

Site Improvements

The proposed grading and drainage plan for the site is designed to meet the stormwater quality requirements. Stormwater runoff from site development will flow to the proposed stormwater BMP's via sheet flow, shallow concentrated flow, and pipe channel flow through the proposed drainage system. All stormwater runoff from the subject site eventually discharges to the Tioughnioga River.

5.0 – STORMWATER RUNOFF COMPUTATIONS

Stormwater runoff calculations for this site are available upon request. Per Chapter 4 of the 2015 NYS Stormwater Design Manual, CPv requirements, overbank flood control requirement, and the 100-yr storm control requirement are waived and do not need to be provided in the proposed stormwater design, see Section 6.0. Water quality requirements must still be satisfied, see section 8.0 for water quality calculations.

6.0 – STORMWATER MITIGATION AND BMP'S

Proposed infiltration techniques will be utilized at this site for all watersheds. Calculations can be found in Appendix E.

Stormwater runoff quantity control is again waived for the same reasons discussed previously. However, water quality requirements must be met. An I-2 Infiltration Basin will be utilized for WQv at this site for the DA-1A proposed watershed.

DA-1B I-2 Infiltration Basin

The I-2 Infiltration Basin for DA-1B contains 20,903 ± cubic feet of the total storage to treat WQv. The basin has side slopes of 3:1. Infiltration testing performed by Kenney Geotechnical Services, PLLC on 12/19/2022 resulted in a stabilized infiltration rate of 24 in/hr. The bottom of the infiltration basin is proposed at 1097.00' and 24 in/hr has been utilized in modeling. A concrete outlet structure has been proposed for the northeastern end of the basin. The concrete structure will have a circular culvert outlet with a diameter of 12" at invert 1097.00. The rim of this outlet structure is at 1102.45'. Additionally, there is a proposed orifice with a diameter of 3 inches set at 1100.55' invert. This invert is at the elevation at which the total WQv plus an extra 899 cf is stored. This extra 899 cf is equal to the additional WQv from PRDA-1A which discharges directly to the Tioughnioga River. A 20-foot wide, trapezoidal, spillway is proposed at an invert of 1102.50' to allow for extreme storm passage. Stormwater runoff that flows over this spillway is directed to the Tioughnioga River via a designated swale. The water quality volume for this watershed is 0.229 ac-ft. The WQv provided within the infiltration basin below the emergency spillway is 0.409 ac-ft. Therefore, the basin is successful in meeting WQv requirements. The required pretreatment volume for DA-1 is 50% of the required WQv, or 0.115 ac-ft. The required pretreatment has been provided via 4 separate drywells throughout the site and one forebay located on the south side of the proposed parking lot, see contract drawings. The total pretreatment volume is .115 ac-ft, or 50%.

Per the NYS Stormwater Design Manual, the WQv must be drained from the infiltration basin within 48 hours as shown in the following calculations.

Percolation Rate = 2.5 min. / inch.
Total inches percolation per hour = 60/2.5 = 24 inches / hour
Total inches percolation per 48 hours = 24 x 48 = 1152 inches = 96 feet
Total Basin Basal Area at bottom elevation = 738 sf
Total Volume capable of being discharged by percolation=
96 ft x 738 sf = 70,848 cf
Total WQv/CPv storage volume required= 5,7004.00 cf
Check ----------5,704.00 cf < 70,848.00 cf ----------ok

Required Basal Area:
$A_{Basal}\ (sf) = V_w\ (cf) \div d_b\ (ft)$
$A_{Basal}\ (sf) = 9{,}975\ cf \div 5.0\ ft = 1995\ sf$
Provided Basal Area = 1998 sf

Per Section 4.6 Stream Channel Protection Volume Requirements (CPV) the Channel Protection Volume requirement is waived since this is an infiltration system and because the 1-yr post-development peak discharge is less than 2.0 cfs.

7.0 – PROPOSED STORMWATER DRAINAGE FACILITIES

All on site drainage facilities are designed to transmit flows from a 10 year storm event to downstream stormwater Best Management Practices. The location, size and type of all pipes and structures are provided on the contract drawings. The calculations and basis for analysis of these systems are present in Appendix F.

8.0 – STORMWATER QUALITY VOLUME

Typically, the water quality volume (denoted as WQV) is designed to improve water quality, sized to capture and treat 90% of the average annual stormwater runoff volume. However, due to this site being in the Chesepeake Bay TMDL Watershed for MS4 GP, the WQv is defined as the volume from the 24-hour 1 year design storm. Per Chapter 4 Section 4.3 the following equation for enhanced phosphorus removal watersheds is used to estimate water quality storage volume WQ_V in acre feet of storage:

$$\boldsymbol{WQv = \frac{(P_1)(R_v)(A)}{12}}$$

Where:

WQ_V = water quality volume (in acre-feet)
P_1 = 1-yr 24 hr design storm
R_V = 0.05 + 0.009(I), where I is the percent of impervious cover
A = site area in acres

It is assumed that by meeting the WQ_V requirements through the employment practices outlined in Table 5.1 of the "New York State Stormwater Management Design Manual", a project will, by default, meet water quality objectives. Calculations of water quality volume can be found in Appendix G.

- PRDA-1A 100% New Impervious TMBL WQ volume = 0.021 ac-ft
  - WQv Provided = **0.021 ac-ft**

- PRDA-1B 100% New Impervious TMDL WQv volume = 0.229 ac-ft
  - WQv Provided = **0.251 ± ac-ft**

As previosuly noted above, the 0.021 ac-ft of WQv for PRDA-1A was accounted for with an additional 0.021 ac-ft of storage in the I-2 infiltration basin.

9.0 – PHOSPHORUS REMOVAL

Chapter 10 of the NYS Stormwater Design Manual outlines the requirements for treatment of phosphorus in stormwater. Enhanced Phosphorus Removal requires calculation of the 1 year, 24 hour design storm in the post development watershed. The site is in a TMDL Phosphorous watershed and therefore, additional phosphorus treatment volume for the 1-year storm event has been provided. As outlined in Section

8.0, the proposed BMP measure in PRDA-1B is sized to detain the WQv. Therefore, the proposed BMP measure is successful in meeting the WQv requirements per the NYSDEC Stormwater Manual.

10.0 – RUNOFF REDUCTION VOLUME AND GREEN PRACTICES

Since a standard infiltration practice is being employed on this site, 100% of the water quality volume may be taken as RRv. As a result, no additional RRv/Green Infrastructure practices are required for this site. RRv calculations are provided in Appendix L.

11.0 – Climate Change Considerations

As required per Part III.A.2 of the SPDES General Permit, GP-0-25-001, the SWPPP must make considerations regarding the potential future physical risks due to climate change pursuant to the Community Risk and Resiliency Act (CRRA), 6 NYCRR Part 490, and associated guidance. The following physical risks have been considered in regards to overall site planning as well as location elevation and sizing of control measures and practices, conveyance systems, and detention systems.

1. Increasing Temperature:

   Consideration – Tree plantings were placed along the parking lot and entrance drive to provide shade and reduce the amount of sunlight reaching the parking lot.

2. Increasing Precipitation:

   Consideration – Infiltration stormwater facilities are proposed to treat and detain runoff generated from the proposed development and will likely mitigate increases in precipitation on downstream drainageways.

3. Increasing Variability in Precipitation, Including Chance of Drought:

   Consideration – The change of land cover from woods/meadow to impervious/grass areas can increase the variability of precipitation since it changes how precipitation is distributed and managed.

4. Increasing Frequency of Flooding:

   Consideration – The property is located in and near a 100-year and 500-year floodplain. Stormwater management practices proposed for this site reduce the water quantity volumes in these flood events.

5. Rising Sea Level:

   Consideration – This project will not have any direct impact on rising sea level as the site is not located along a coastline.

6. Increasing Storm Surge:

   Consideration – This project will not have any direct impact on storm surge as the site is not located along a coastline.

7. Shifting Ecology:

   Consideration – This site will implement erosion and sediment control practices in order to mitigate impacts to undisturbed areas and habitats.

Soil Restoration Requirements **

According to Section 5 of the NYS Stormwater Design Manual, soil restoration practices must be applied across the site in areas of soil disturbance. This is necessary to reclaim the origional properties and porosity of the soil before construction. The benefits of soil restoration include but are not limited to:

- Less stormwater runoff
- Increased porosity on redevelopment sites where impervious cover is converted to pervious
- Achieves performance standards on runoff reduction practices
- Healthier, asthetically pleasing landscapes
- Enhances direct groundwater recharge
- Promotes sucessful long term revegitation by restoring soil organic matter, permeability, drainage and water holding capacity for healthy root system development of trees, shrubs and deep-rooted ground covers, minimizing lawn chemical requirements, plant drowning during wet periods, and burnout durring dry periods

Table 5.3 Soil Restoration Requirements			
Type of Soil Disturbance	**Soil Restoration Requirement**		**Comments/Examples**
No soil disturbance	Restoration not permitted		Preservation of Natural Features
Minimal soil disturbance	Restoration not required		Clearing and grubbing
Areas where topsoil is stripped only - no change in grade	HSG A &B	HSG C&D	Protect area from any ongoing construction activities.
	apply 6 inches of topsoil	Aerate* and apply 6 inches of topsoil	
Areas of cut or fill	HSG A &B	HSG C & D	
	Aerate and apply 6 inches of topsoil	Apply full Soil Restoration **	
Heavy traffic areas on site (especially in a zone 5-25 feet around buildings but not within a 5 foot perimeter around foundation walls)	Apply full Soil Restoration (de-compaction and compost enhancement)		
Areas where Runoff Reduction and/or Infiltration practices are applied	Restoration not required, but may be applied to enhance the reduction specified for appropriate practices.		Keep construction equipment from crossing these areas. To protect newly installed practice from any ongoing construction activities construct a single phase operation fence area
Redevelopment projects	Soil Restoration is required on redevelopment projects in areas where existing impervious area will be converted to pervious area.		

*Aeration includes the use of machines such as tractor-drawn implements with coulters making a narrow slit in the soil, a roller with many spikes making indentations in the soil, or prongs which function like a mini-subsoiler.
** Per "Deep Ripping and De-compaction, DEC 2008".

** taken from the NYS Stormwater Management Manual (version 2010)

Many of the Runoff Reduction practices will require soil restoration measures applied in and around the practice inorder to reach the desired runoff reduction performance. Table 5.13 on page 5-22 of the NYS Stormwater Design Manual has been included below that higlights these requirements and provides guidance on when to implement soil restoration techniques. Also included is the NYS Stormwater Design Manual section on Practice implimentation, Maintenece and Inspection.

Soil Restoration Practice Implementation:

During periods of relatively low to moderate subsoil moisture, the disturbed subsoils are returned to rough grade and the following Soil Restoration steps applied:

1. Apply 3 inches of compost over subsoil
2. Till compost into subsoil to a depth of at least 12 inches using a cat-mounted ripper, tractormounted disc, or tiller, mixing, and circulating air and compost into subsoils
3. Rock-pick until uplifted stone/rock materials of four inches and larger size are cleaned off the site
4. Apply topsoil to a depth of 6 inches
5. Vegetate as required by approved plan.

Figure 5. 16 Soil aerator implement



Figure 5. 17 Soil aerator implement



Figures 5.16 and 5.17 above show two attachments used for soil decompaction. Tilling (step 2 above) should not be performed within the drip line of any existing trees or over utility installations that are within 24 inches of the surface.

Soil Restoration Inspection:

At the end of the project an inspector should be able to push a 3/8” metal bar 12 inches into the soil just with body weight.

Compost Specifications

Compost shall be aged, from plant derived materials, free of viable weed seeds, have no visible free water or dust produced when handling, pass through a half inch screen and have a pH suitable to grow desired plants.

Soil Restoration Maintenance:

The maintenance agreement with the town should identify where Soil Restoration has been applied (in addition to already being shown on the contract documents), where newly restored areas are/cannot be cleared, who the responsible parties are to ensure that routine vegetation improvements are made (i.e., thinning, invasive plant removal, etc.). Soil compost amendments within a filter strip or grass channel should be located in public right of way, or within a dedicated stormwater or drainage easement.

First Year Maintenance Operations Includes:

• Initial inspections for the first six months (once after each storm greater than half- inch)
• Reseeding to repair bare or eroding areas to assure grass stabilization
• Water once every three days for first month, and then provide a half inch of water per week during first year. Irrigation plan may be adjusted according to the rain event.
• Fertilization may be needed in the fall after the first growing season to increase plant vigor

Ongoing Maintenance:

Two points help ensure lasting results of decompaction:

1. Planting the appropriate ground cover with deep roots to maintain the soil structure
2. Keeping the site free of vehicular and foot traffic or other weight loads. Consider pedestrian footpaths. (Sometimes it may be necessary to de-thatch the turf every few years)

12.0 – POSSIBLE CONTAMINANTS FROM CONSTRUCTION ACTIVITIES

During construction contaminants from materials and equipment could enter the stormwater drainage system unintentionally. The contractor should store construction materials and equipment in the designated staging area and all possible contaminants should be stored to prevent damage.

This particular project will require construction equipment such as a backhoe, drum roller, dump trucks, a grader, and bull dozer. These vehicles use oil and petroleum products which if not treated carefully could enter the storm drainage system. Accidental spills should be reported to the Department of Environmental Conservation 24 hour spill response hotline at 1-800-457-7362. On site fueling of construction equipment shall be limited to a bermed/ diked area located within the project staging area. The table below provides a guide for quantities that should be reported. Should a spill incident occur, the

employee or party responsible for the spill should contain the spill, start cleanup and report the spill to his/ her superiors. The spill should be reported to the appropriate governing agency should the spill exceed the reportable quantity or enter surface waters.

Examples of Reportable Quantities		
Material	*Media Released To*	*Reportable Quantity*
Engine oil, fuel, hydraulic and brake fluid	Land Water	25 gallons Visible Sheen
Antifreeze	Land	100 lbs (13 gal.)
Battery Acid	Land, Water	100 lbs.
Refrigerant	Air	1 lb.
Gasoline	Air, Land, Water	100 lbs.
Engine Degreasers	Air, Land, Water	100 lbs.

All construction waste material such as housing materials and utility installation materials shall be disposed of as required by law.

Wastewater from concrete washout areas is prohibited from discharging directly to any site areas not managed by an appropriate stormwater control measure. Also prohibited are washouts from stucco, paint, form release oils, curing compounds, and other construction materials. Soaps, solvents, fuels, oils, or other pollutants used in vehicle operations or maintenance shall also be controlled by an appropriate stormwater control measure. Staging areas are designated on the plans for storage of equipment and vehicles. Locations subject to the above contaminants outside the staging area shall require additional measures and should be reviewed with the SWPPP inspector and MS4 representative prior to commencement of activities that may result in contamination.

13.0 – EROSION CONTROL MEASURES

Structural erosion and sediment control measures are classified as either temporary or permanent, according to how they are used. Temporary structural measures shall be used during construction of the site to prevent off-site sedimentation. Permanent structural measures shall be utilized following construction and shall be implemented to convey surface water safely to the existing drainage ways present in the pre-development condition. The permanent structural measures shall remain in-place and continue to function after the completion of construction. General construction notes and maintenance plan for implementing the temporary and permanent stormwater and erosion control structures during and after construction have been developed for the project.

Erosion control measures shall be inspected twice weekly by a Licensed Professional

Engineer or Erosion Control Specialist until the site is completely stabilized. Inspections and maintenance of erosion control structures shall be in accordance with the NYS Pollution Discharge Elimination System for Construction Activities GP-0-20-001 (SPDES) program. The owner shall file a Notice of Intent (NOI) with the NYS DEC prior to commencement of further construction activities. The NOI shall be sent to:

NYSDEC- Notice of Intent
Bureau of Water Permits
625 Broadway
Albany, NY 12233-3505

Temporary Structural Measures

This subsection will describe the specific temporary control measures to be implemented to reduce and/or eliminate erosion and sedimentation during the construction phase of this project. Example details of the following erosion control measures are presented in Appendix I. As construction progresses more site areas may be opened after already constructed areas are permanently stabilized in accordance with the New York State Standards and Specifications for Erosion and Sediment Control.

Silt Fence

A temporary barrier of geotextile fabric (filter cloth) fence shall be used to intercept sediment-laden runoff along the borders of disturbed site areas during construction. A geotextile fabric fence shall also be placed around all permanent stormwater drainage structures, in the absence of straw bale dikes, (catch basins and manholes) to intercept sediment and protect the structure during construction. The geotextile filter fabric fence requires periodic maintenance and should be checked for tears or clogging with silt or debris. Silt can be removed from the woven filter cloth with a stiff brush if clogging occurs.

Stabilized Construction Entrance

A stabilized pad of aggregate underlain with filter cloth shall be positioned at points where traffic will be entering or leaving the construction site area onto public roads. This measure will reduce the tracking of soils onto public roads or streets.

Dust Control

Construction activities should be scheduled to minimize the amount of disturbed area at a single time. If vegetated areas can be left in tact to serve as a buffer zone these areas should be maintained where practical. During dry conditions, open soil areas may require hosing down with water to prevent excessive dust. Spray adhesives may be utilized as outlined in the NYS Standards and Specifications for Erosion and Sediment Control. Fences or vegetation may be required to minimize dust pollution to adjacent

properties and should be incorporated into the site erosion control plan as required.

Drop Inlet Protection

A temporary, somewhat permeable barrier shall be installed around inlets in the form of a fence, berm, or excavation around an opening, trapping water and to prevent heavily sediment laden water from entering a storm drain system through inlets. The barrier should be inspected after each rain event and repairs shall be made as necessary. Upon stabilization of the drainage area, remove all materials and unstable sediment and dispose of properly. Bring the area around the drop inlet to grade, smooth and compact and stabilize in the appropriate manner to the site.

Maintenance of Temporary and Permanent Control Structures

Temporary and Permanent Stormwater Facilities during Construction

Temporary stormwater and erosion control structures must be constructed in accordance with their design intent and maintained to prevent sediment-laden runoff from leaving the site during construction. In general, the temporary structures during construction should be inspected on a routine basis and maintained as follows:

- Temporary silt fences, straw bale dikes, and sediment interceptors shall be installed prior to earth disturbance to reduce runoff velocity and transportation of sediment. The stabilization structures shall be inspected weekly and after every rainfall; and the structures cleaned, repaired, or replaced as required. Temporary stabilization structures shall be removed when their contributory drainage area is stabilized.

- Temporary storm drain inlet protection shall be installed to prevent heavily sediment laden water from entering a storm drain through inlets. Inspections shall be bi-weekly and after major storms to insure that sediment is not being allowed into the storm system. The inlet protection shall be cleaned, repaired, and or replaced as required until the contributing drainage area is stabilized. When this occurs, the devices shall be removed and the area around the inlet shall be stabilized in the manner appropriate the site.

- All permanent drainage structures, installed as part of the site improvements, shall be inspected weekly and after every rainfall to insure structural integrity, detect vandalism and damage, and for cleaning. Permanent drainage structures shall be repaired or replaced, as required.

- All disturbed soil areas, upon final grading of topsoil, shall be seeded, and mulched. All seeded areas shall be inspected monthly and after every rainfall and the areas repaired and re-seeded, as required.

- Stabilized construction entrance shall be installed to control erosion at location

where traffic will be entering or leaving the construction area. The temporary construction entrance shall be inspected periodically and after each rainfall; and the entrance cleaned, repaired, or replaced, as required. The temporary construction entrance shall be removed when construction is completed and all disturbed areas are stabilized.

Permanent Stormwater Facilities after Construction

Permanent stormwater control structures must be constructed in accordance with their design intent and maintained on a routine basis to remain effective. This site has employed stormwater management facilities. Prior to submission of the Notice of Termination to NYSDEC the contractor shall provide as built drawings of all stormwater best management practices and facilities to allow verification of construction in compliance with this SWPPP and the contract drawings. **It is the responsibility of the owner to maintain these facilities as required by the NYS Stormwater Design Manual. Maintenance requirements and design information is included in Appendix K of this report.**

In general, the structures after construction should be inspected periodically and maintained as follows:

- Permanent stormwater drainage structures shall be inspected semi-annually and after every 0.5 inches of rainfall to insure structural integrity, detect vandalism and damage, and for cleaning. The structures shall be repaired or replaced, as required.

- Permanent lawns and grassed areas shall be inspected and maintained on a regular basis, consistent with favorable plant growth, soil, and climatic conditions to insure soil protection and structural integrity of the site's plant cover. Maintenance involves regular seasonal work for mowing, fertilizing, liming, watering, pruning, fire controls, weed, and pest control, re-seeding, and timely repairs, as required. Maintenance of vegetative areas shall also include removal of debris and protection from unintended uses or traffic.

- **Stormwater Best Management Practices used on this site; their design intents and inspection and maintenance punch list forms have been included in Appendix K.**

Site Stabilization

The Owner/Contractor shall initiate stabilization measures as soon as practicable in a portion of the site where construction activities have temporarily or permanently ceased, but in no case more than 7 days after the construction activity in that portion of the site has temporarily or permanently ceased. This requirement does not apply in the following instances:

a. Where the initiation of stabilization measures by the 7th day after construction activity temporarily or permanently ceased is precluded by snow cover or frozen ground conditions, stabilization measures shall be initiated as soon as possible;
b. Where disturbed area is 5 acres or more, stabilization measures must be employed no more than 7 days after construction activities have temporarily or permanently ceased.

Site Assessment and Inspection

Initial Inspection

The Owner shall have a qualified professional conduct an assessment of the site prior to the commencement of construction. The qualified professional shall certify that the appropriate erosion and sediment controls described in this SWPPP and required by the permit have been adequately installed or implemented to ensure overall preparedness of the site for commencement of construction. The “qualified professional” shall meet the requirements of the SPDES General Permit for Stormwater Runoff from Construction Activity, GP-0-20-001.

Post Construction Inspection

The Owner shall have a qualified professional conduct an assessment of the site after construction is complete. The qualified professional shall be a Licensed Professional Engineer or possess the appropriate certifications for inspection. The qualified professional shall certify that the appropriate erosion and sediment controls and stormwater BMP’s described in this SWPPP and required by the permit have been adequately installed or implemented to ensure overall preparedness of the site for commencement of construction. The “qualified professional” shall meet the requirements of the SPDES General Permit for Stormwater Runoff from Construction Activity, GP-0-25-001. If the site is located in an area governed by a traditional MS4, the MS4 must also make a final inspection and sign the Notice of Termination.

In addition, the owner must ensure that a properly qualified inspector is performing inspections of post construction stormwater practices as outlined in the NYS Stormwater Design Manual. The owner shall ensure that a binding maintenance agreement is in place for inspection and maintenance of all stormwater practices and ensure that the inspection and maintenance is performed by a qualified professional. The owner must then identify the responsible party for these inspections and maintenance on the Notice of Termination.

As-Builts

Prior to Submission of the Notice of Termination by a Licensed Professional Engineer and upon completion of the site, a surveyor or appropriate inspector shall be required to produce an Autocad or paper as-built map to the design engineer for verification that stormwater items and BMP’s were installed as per the approved plans.

Stormwater BMP Inspection and maintenance punch list forms are provided behind the appropriate design intent page in Appendix K.

Inspections and Records during Construction

Inspection Frequency

After commencement of construction, site inspections shall be conducted by the qualified professional at least once per week if under 5 acres disturbance or twice per week if above 5 acres of disturbance. Two consecutive working days shall be given between site inspections per week. Prior to filing a Notice of Termination (NOT) or at the end of the permit term, the owner shall have the qualified professional perform a final site inspection.

Records during Inspection

A site map shall be maintained on site indicating the extent of all disturbed onsite areas and drainageways throughout the duration of construction. The site map shall contain all areas expected to undergo initial disturbance or significant site work within every 7-day period. The map shall indicate all areas of the site that have undergone temporary or permanent stabilization. All disturbed areas that have not undergone active site work during the previous 7-day inspection period shall be noted on the map. All sediment control measures shall be inspected and the degree of accumulation as a percentage of the sediment storage volume shall be recorded. Inspector must describe and inspect all points of discharge to natural surface water bodies located within, or immediately adjacent to property boundaries. Photographic record of inspections and any deficiencies shall be included in the inspection reports and photos of corrective action must be recorded upon compliance. Any maintenance required for installed erosion and sediment control structures shall be noted, and documentation of areas where adjustments are needed to those measures shall be provided. Any deficiencies identified with the implementation of the SWPPP shall be recorded. Erosion control measures shall be inspected weekly by a Licensed Professional Engineer or Erosion Control Specialist until the site is completely stabilized. Inspections and maintenance of erosion control structures shall be in accordance with the NYS Pollution Discharge Elimination System for Construction Activities GP-0-20-001 (SPDES) program. These inspection reports should be in compliance with the requirements set forth under part IV.C-4 of the general permit. A copy of the general permit is included in Appendix J.

Inspection Log Book

The Owner/ contractor shall maintain an inspection logbook which shall contain a record of all inspection reports. The site logbook shall be maintained on site and shall be made available to the permitting authority upon request. The Owner shall post at the site, in a publicly accessible location, a summary of the site inspection activities on a monthly basis.

Certifications

At the final site inspection, the qualified professional shall certify that the site has undergone final stabilization using either vegetative or structural stabilization methods, and that all temporary erosion and sedimentation measures have been removed. Final certification requires completion of the Notice of Termination form. The Notice of Termination shall be signed by the qualified professional. The owner shall provide the qualified professional with as built drawings in AutoCAD format so that the qualified professional can verify that all stormwater practices have been installed in accordance with the approved plans, SWPPP and the General Permit. The owner shall certify that the requirements of the permit have been satisfied within 48 hours of actually meeting such requirements and sign the Notice of Termination.

RELIANCE

Engineer's Certification

The undersigned agrees that this SWPPP has been prepared in accordance with all applicable standards outlined in this report. The undersigned understands that the owner intends to use this SWPPP to support his application for a New York State Pollutant Discharge Elimination System (SPDES) General Permit for Stormwater Runoff from Construction Activity, GP-0-20-001.

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that false statements made herein are punishable as a class A misdemeanor pursuant to Section 210.45 of the Penal Law."

Prepared By: Daniel Benetti Date: 07/01/25

Daniel Benetti, E.I.T.
RZ Engineering, PLLC
6320 Fly Road, Suite 201
East Syracuse, NY 13057
(315) 432.1089

Reviewed By: _____ Date: 07/01/25

Rudy L. Zona, P.E.
RZ Engineering, PLLC
6320 Fly Road, Suite 201
East Syracuse, NY 13057
(315) 432.1089

Owner's Certification

I certify that I have read and understand the requirements outlined in this SWPPP report. The undersigned agrees that I have employed the above professional to prepare this SWPPP and that the recommendations within this Report and accompanying documents support the requirements set forth by the New York State Pollutant Discharge Elimination System (SPDES) General Permit for Stormwater Runoff from Construction Activity, GP-0-20-001. I certify that I intend to employ a contractor who will follow the recommendations of this SWPPP and any requirements set forth by the New York State SPDES General Permit for Stormwater Runoff from Construction Activity, GP-0-20-001.

Owner: _____

Owner's Representative: _____ Date: _____

Title: _____

Contractor's / Sub-Contractor's Certification

Contractor's/Sub-Contractor's Certification "I hereby certify that I understand and agree to comply with the terms and conditions of the SWPPP and agree to implement any corrective actions identified by the qualified inspector during a site inspection. I also understand that the owner or operator must comply with the terms and conditions of the New York State Pollution Discharge Elimination System (SPDES) general permit for stormwater discharges from construction activities and that it is unlawful for any person to cause or contribute to a violation of water quality standards. Furthermore, I understand that certifying false, incorrect or inaccurate information is a violation of the referenced permit and the laws of State of New York and could subject me to criminal, civil and/or administrative proceedings."

Contractor: _____

Contractor's Representative: _____ Date:_____

Title: _____

Signature: _____ Date:_____

Contractor's "trained contractor":_____Date:_____
(must have DEC 4 hr training, responsible for the daily implementation of SWPPP)
Contractor is responsible for SWPPP components identified:

SWPPP Inspections _____

_____

_____

Address: _____

_____

Phone: _____

Fax: _____

Sub-Contractor: _____

Sub-Contractor's Representative: _____ Date:_____

Title: _____

Signature: _____ Date:_____

Sub-Contractor's "trained contractor":_____Date:_____
(must have DEC 4 hr training, responsible for the daily implementation of SWPPP)
Sub-Contractor is responsible for SWPPP components identified:

_____
_____
_____

Address: _____

_____

Phone: _____

Fax: _____

Sub-Contractor: _____

Sub-Contractor's Representative: _____ Date:_____

Title: _____

Signature: _____ Date:_____

Sub-Contractor's "trained contractor":_____Date:_____
(must have DEC 4 hr training, responsible for the daily implementation of SWPPP)
Sub-Contractor is responsible for SWPPP components identified:

_____
_____
_____

Address: _____

_____

Phone: _____

Fax: _____

Sub-Contractor: _____

Sub-Contractor's Representative: _____ Date:_____

Title: _____

Signature: _____ Date:_____

Sub-Contractor's "trained contractor":_____Date:_____
(must have DEC 4 hr training, responsible for the daily implementation of SWPPP)
Sub-Contractor is responsible for SWPPP components identified:
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Address: _____

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Phone: _____

Fax: _____

Sub-Contractor: _____

Sub-Contractor's Representative: _____ Date:_____

Title: _____

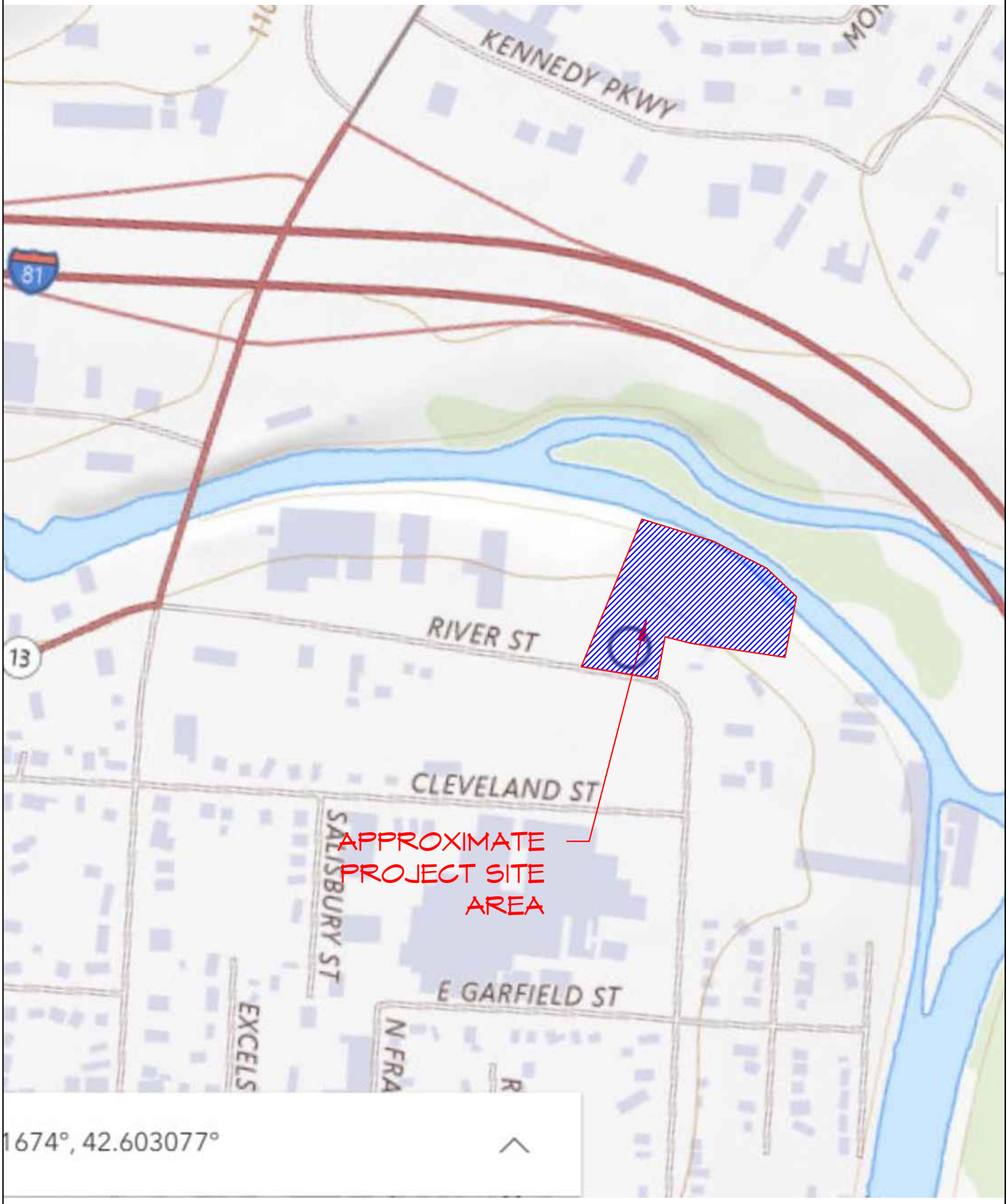
Signature: _____ Date:_____

Sub-Contractor's "trained contractor":_____Date:_____
(must have DEC 4 hr training, responsible for the daily implementation of SWPPP)
Sub-Contractor is responsible for SWPPP components identified:
_____
_____
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Address: _____

_____

Phone: _____

Fax: _____



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RIVERVIEW APARTMENTS
USGS MAP
SCALE 1:400

FIGURE 1



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RIVERVIEW APARTMENTS
AERIAL MAP
SCALE 1:200

FIGURE 2

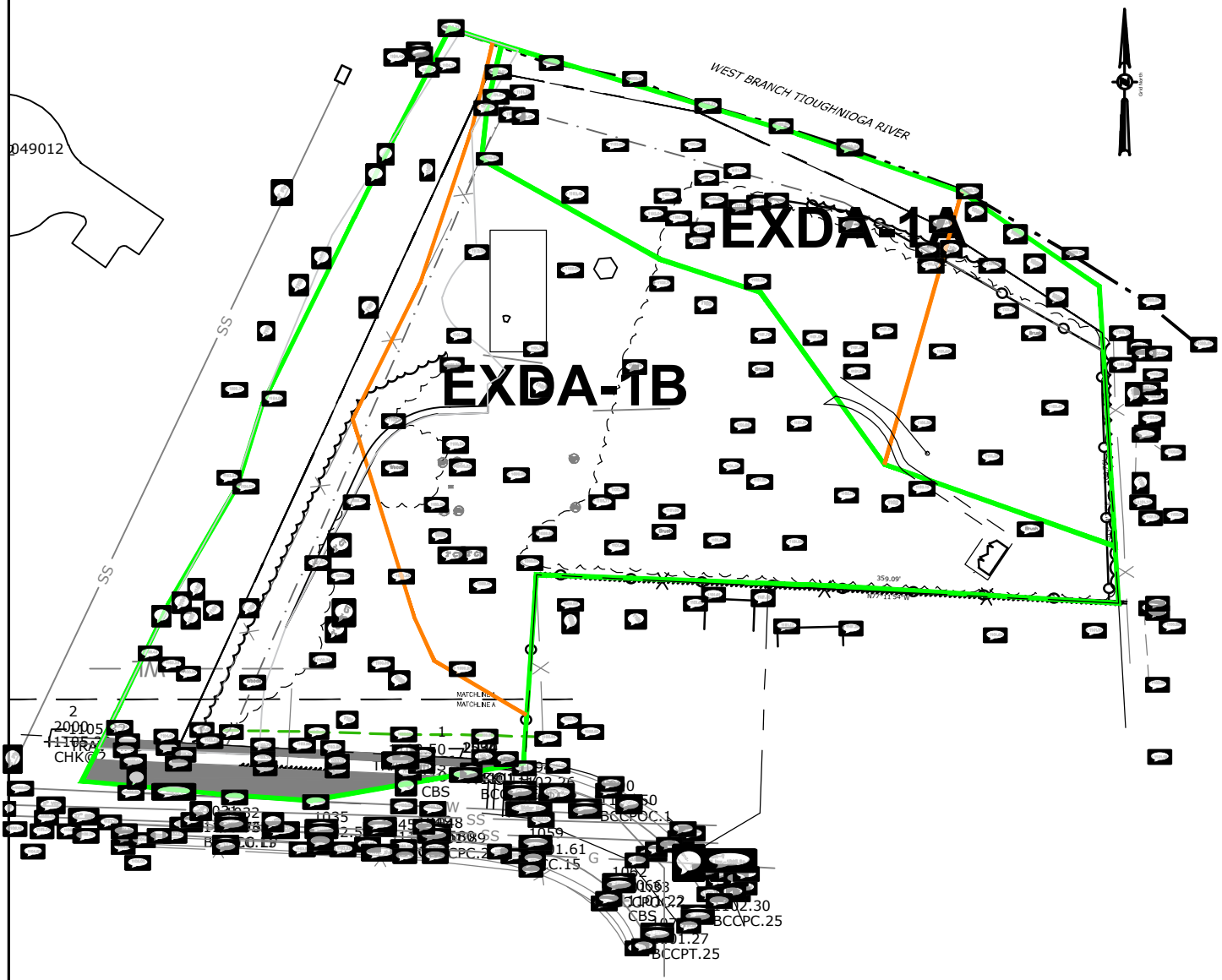


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RIVERVIEW APARTMENTS
SOILS MAP
SCALE 1:100

FIGURE 3

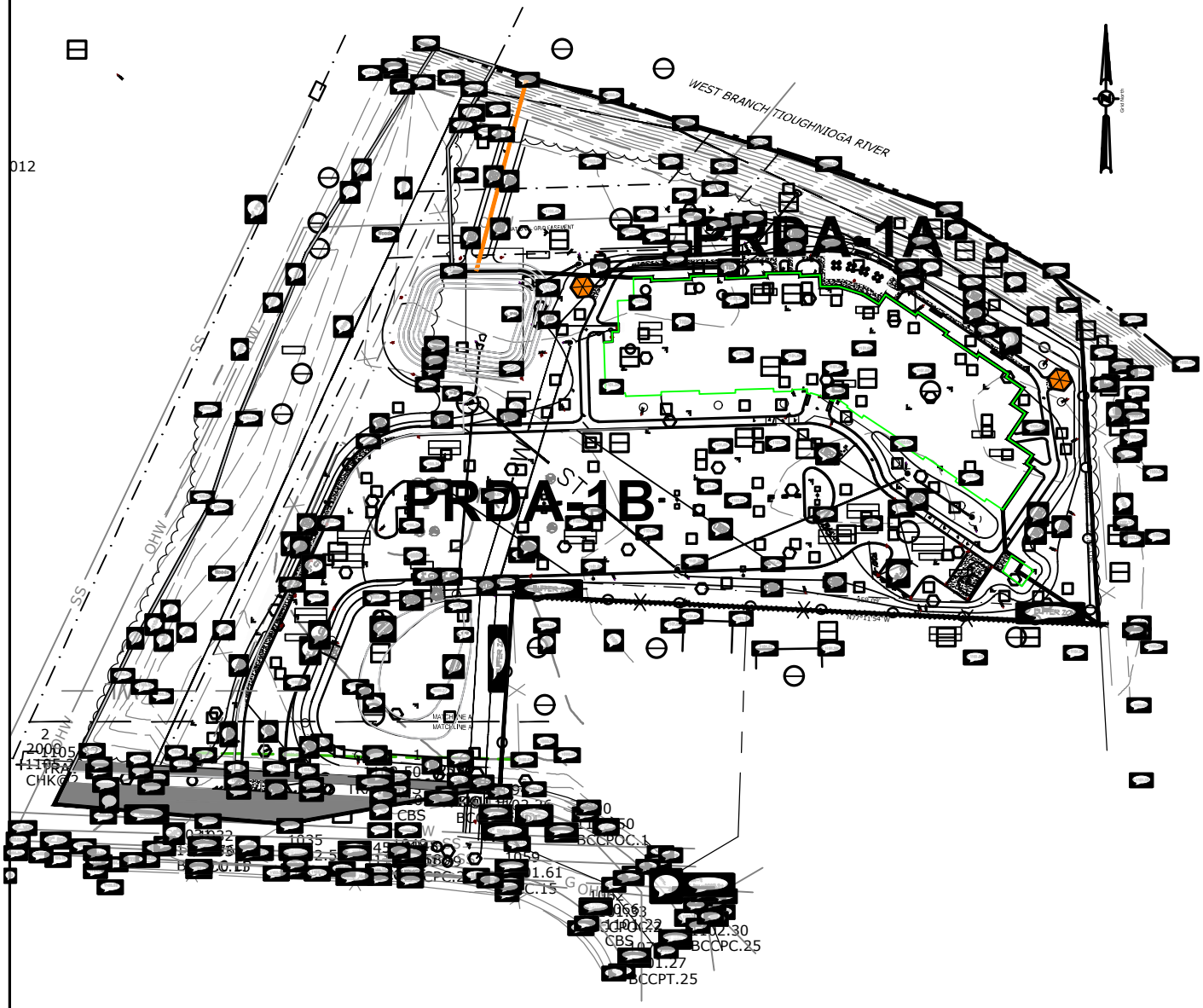


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N

RIVERVIEW APARTMENTS
EXISTING WATERSHEDS
SCALE 1:100

FIGURE 4

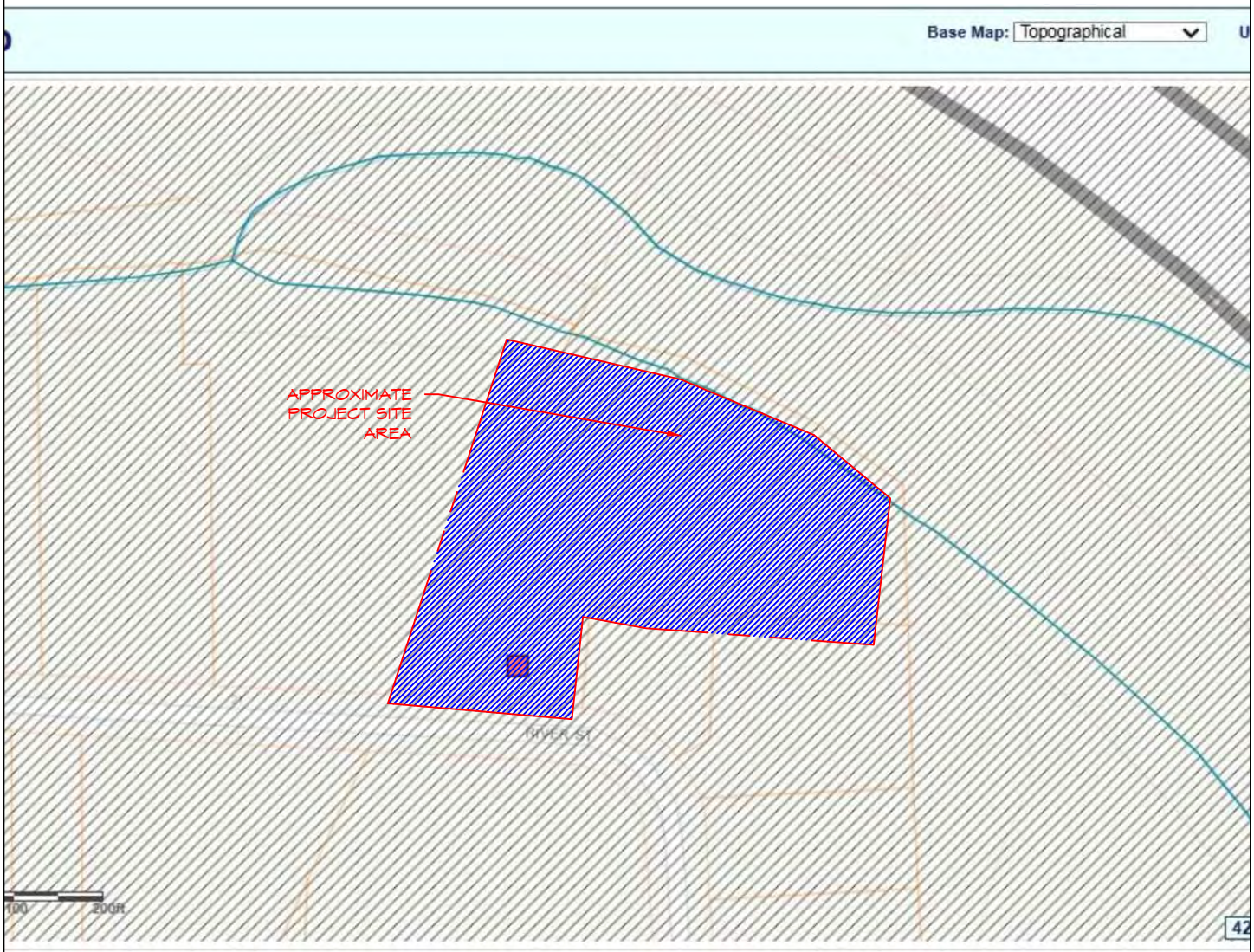


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RIVERVIEW APARTMENTS
PROPOSED WATERSHEDS
SCALE 1:100

FIGURE 5

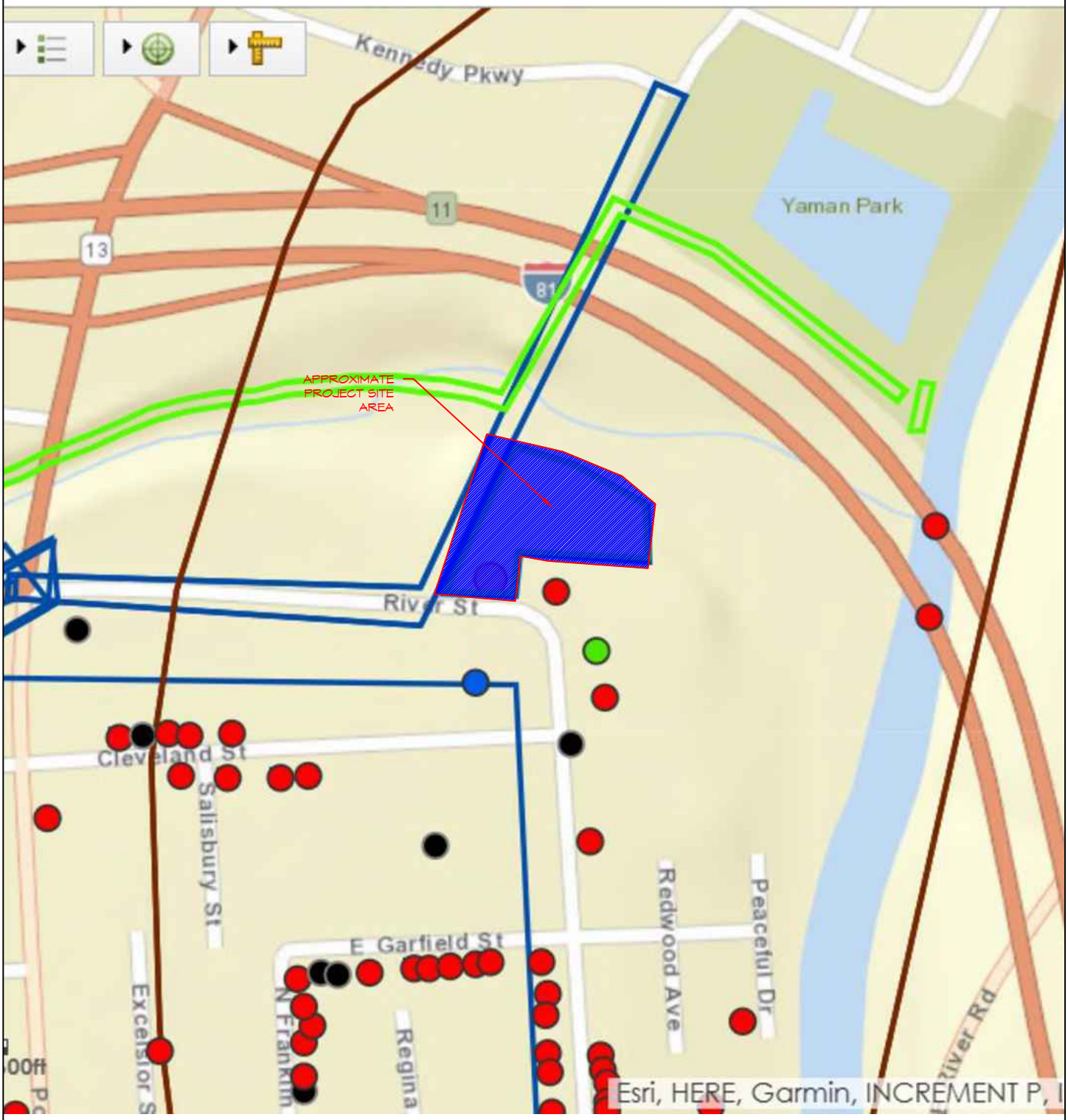


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RIVERVIEW APARTMENTS
NYSDEC STORMWATER MAP
SCALE 1:200

FIGURE 6



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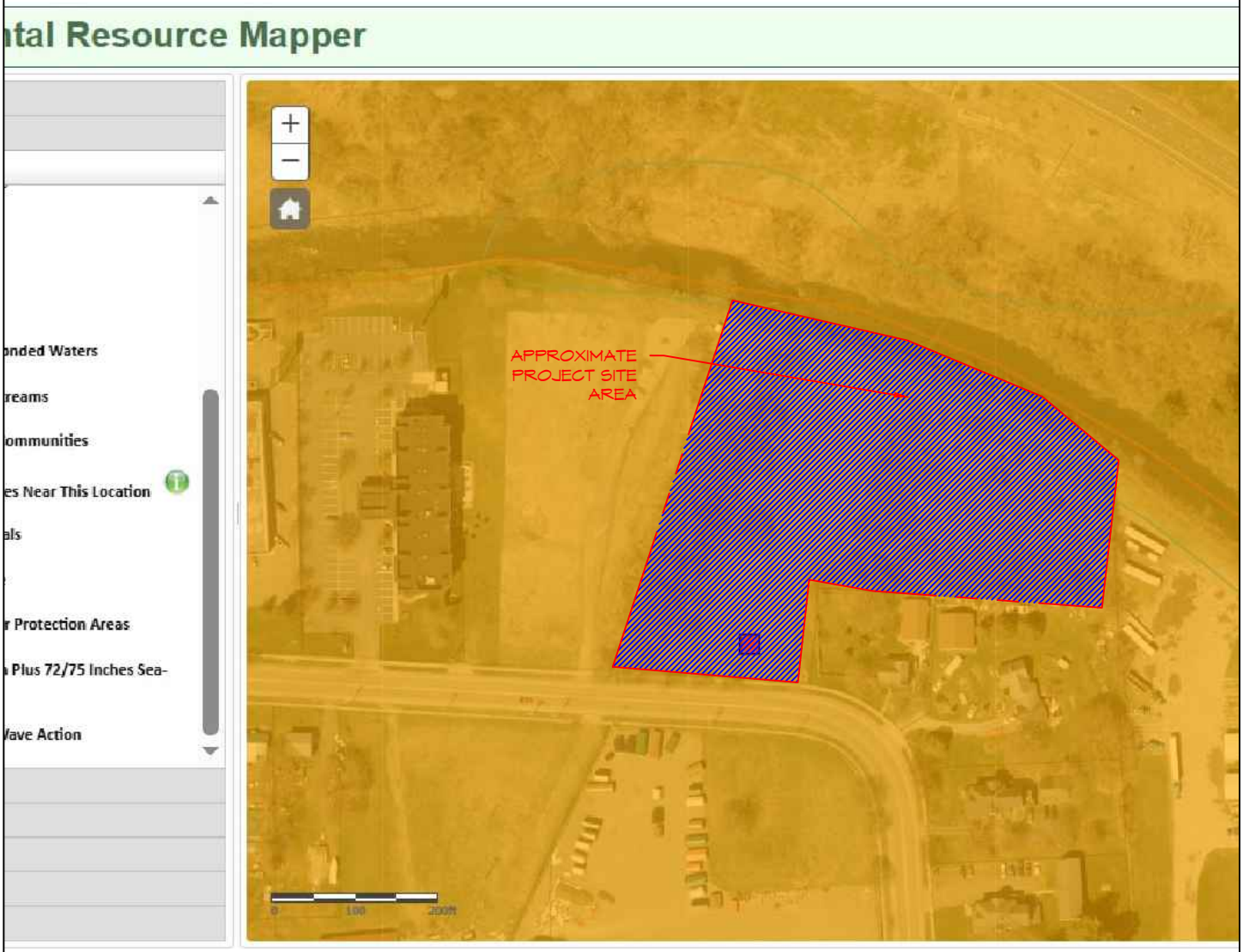
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RIVERVIEW APARTMENTS
SHPO MAP
SCALE 1:400

FIGURE 8



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N

RIVERVIEW APARTMENTS
NYSDEC WETLANDS AND
ENDANGERED SPECIES MAP
SCALE 1:200

FIGURE 9

Wildlife Service

Wetlands Inventory

Wetlands



Freshwater Emergent Wetland
Freshwater Forested/Shrub Wetland
Freshwater Pond
Lake
Other
Riverine

Deepwater
Wetland

This map is for general reference only. The U
Service is not responsible for the accuracy or
base data shown on this map. All wetlands re
be used in accordance with the layer metadat
Wetlands Mapper web site.

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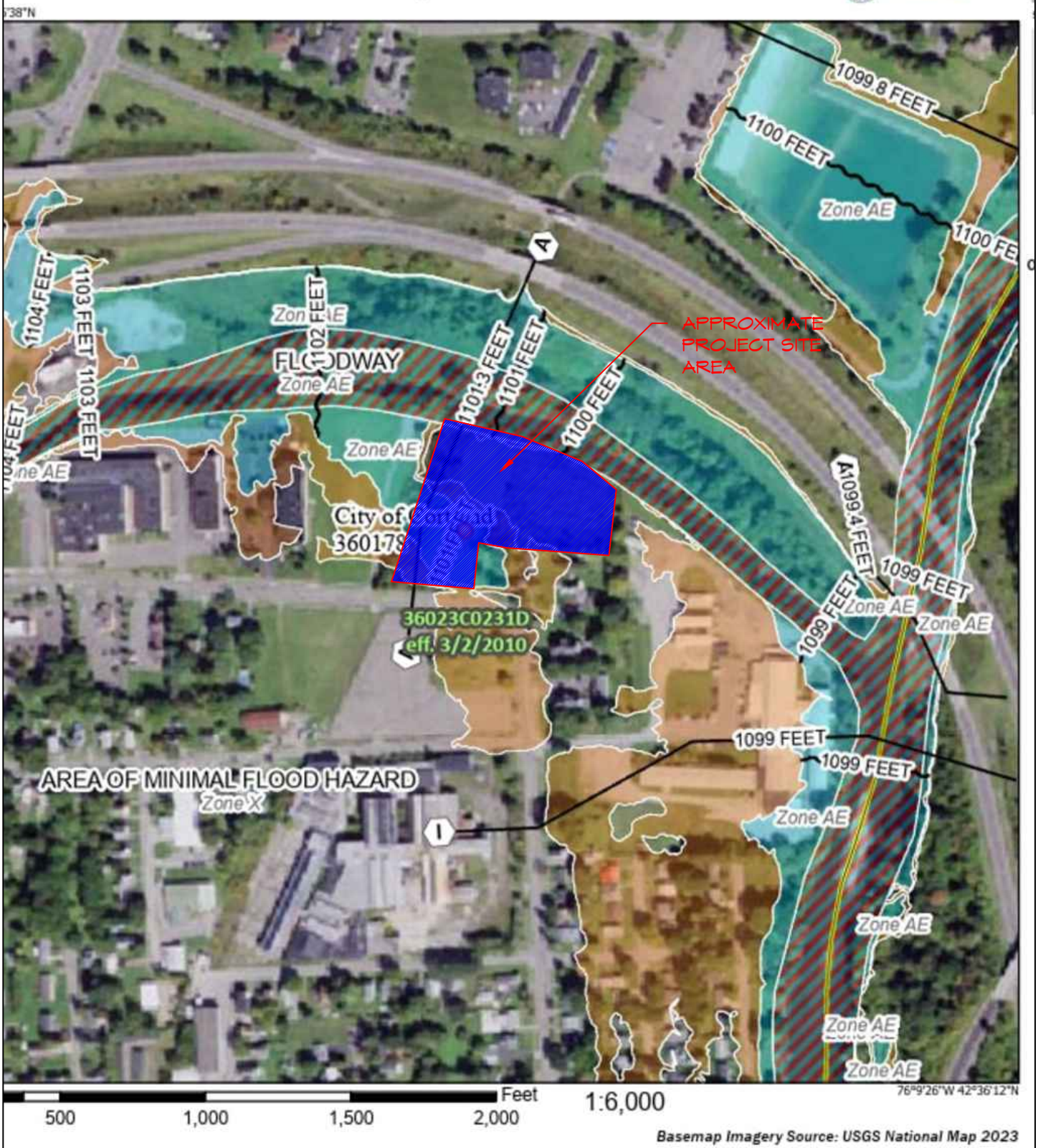
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RIVERVIEW APARTMENTS
FEDERAL WETLANDS MAP
SCALE 1:200

FIGURE 10

onal Flood Hazard Layer FIRMette

FEMA



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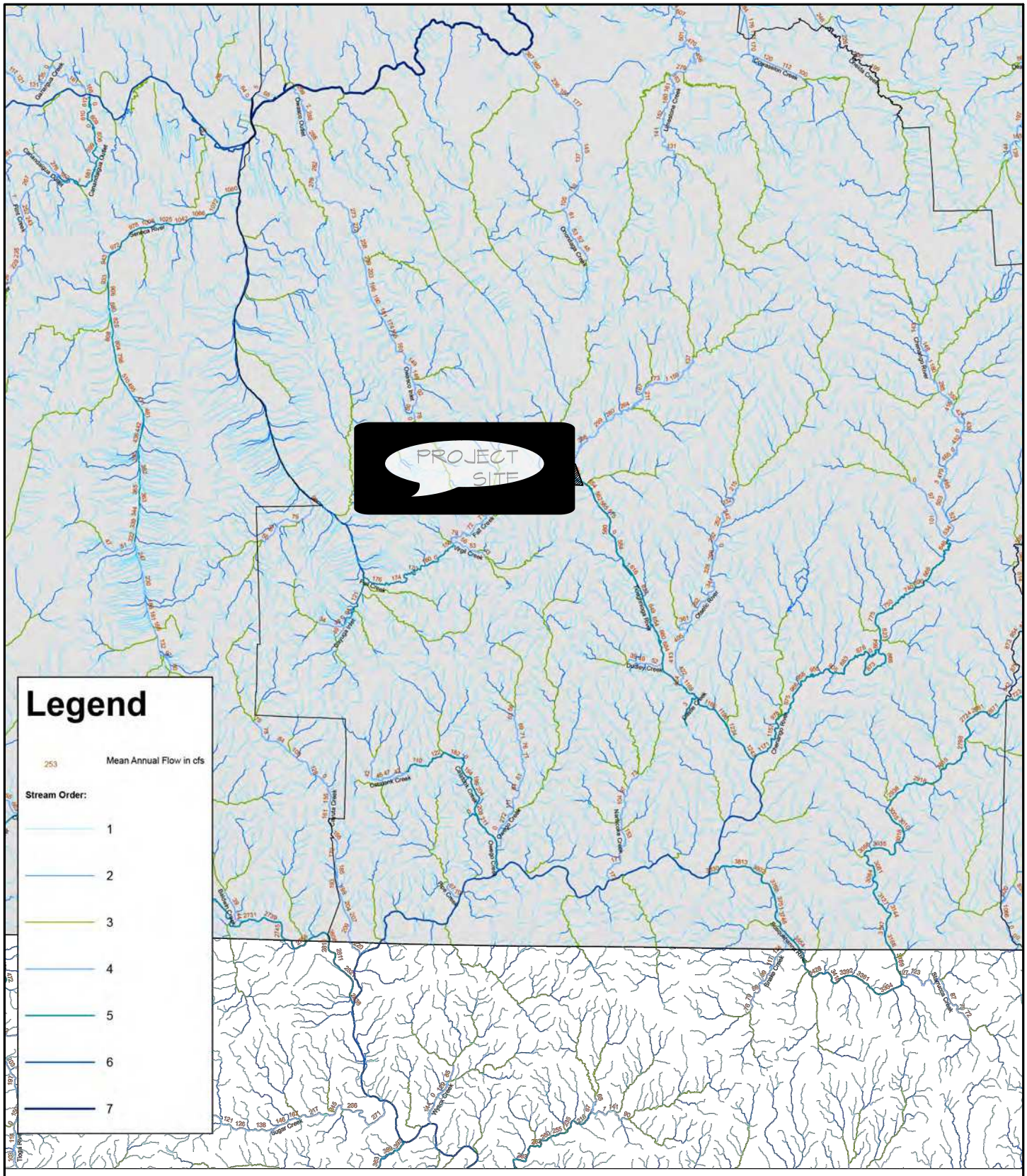
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EAST SYRACUSE, NY 13057
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FAX (315) 445-7981

N

RIVERVIEW APARTMENTS
NATIONAL FLOOD INSURANCE MAP
SCALE 1:400

FIGURE 11



N
W E
S

Region 7
Stream Order Classifications

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N

RIVERVIEW APARTMENTS
REGION 7 STREAM ORDER CLASSIFICATIONS
SCALE 1:5000

FIGURE 12

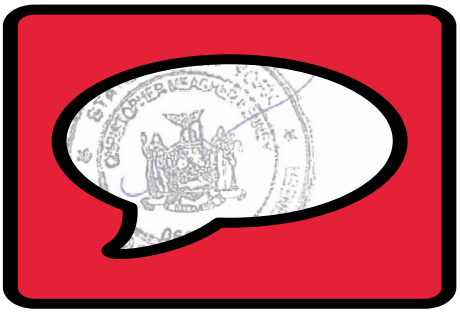
APPENDIX A

Kenney Geotechnical Services

Kenney Geotechnical Engineering Services PLLC

Geotechnical Evaluation Report

Cortland Senior Housing
31 River St.
Cortland, New York



C. M. Kenney PE
1-11-2023

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PROJECT DESCRIPTION....2
DESIGN CRITERIA....3
SITE CONDITIONS....3
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INTRODUCTION

This report presents the results of the geotechnical investigation performed for the proposed Cortland Senior Housing project. This geotechnical report presents the data developed during the subsurface investigation and provides analysis and recommendations for the proposed construction.

No environmental services are included in this study. No conclusions have been drawn regarding environmental conditions of the site, potential contaminants, potential special treatment or disposal of site materials, or other environmental considerations.

AUTHORIZATION

The scope of our services for this project was presented in a proposal dated November 11, 2022. Our services were authorized by Shawna Grinnell, Executive Director of the Cortland Housing Assistance Council.

PROJECT DESCRIPTION

It is our understanding that the proposed project will be a three-story wood-framed, slab-on-grade structure. The following figure illustrates the proposed building footprint:



DESIGN CRITERIA

Column and wall loading information were not known prior to the completion of this report. We assumed a maximum column load of 150 kips and a maximum wall load of 3 kips/l.f. to facilitate our analysis. We have assumed a tolerable total settlement of up to one inch.

The following ASTM Standards were utilized during this study:

- ASTM D1586 "Penetration Test and Split-Barrel Sampling of Soils"
- ASTM D2487 "Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)"
- ASTM D5434 "Standard Guide for Field Logging of Subsurface Exploration of Soil and Rock"

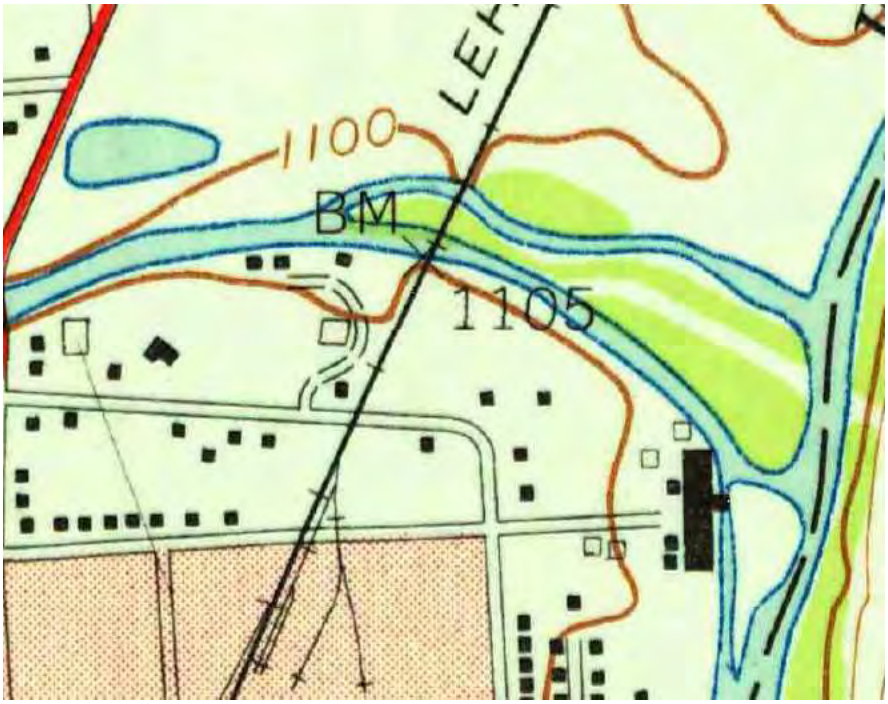
Local geotechnical practice was followed in the performance of this study. Frost depth was assumed to be 48 inches.

SITE CONDITIONS

The site is located between the West Branch of the Tioughnioga River and River Street in the City of Cortand. The project area was unoccupied but covered with brush and small trees at the time of the subsurface investigation. Site topography is illustrated in the following figure excerpted from 2019 USGS mapping:



USGS topographic mapping from 1955 suggests the site may have been previously occupied by small structures:



Cortland is located on a plain formed by the convergence of seven valleys with the Allegheny Plateau physiographic province. Major topographic and geologic features in this area were formed during the last glacial advance and retreat, which ended approximately 12,000 years ago. Regional surficial geologic mapping suggests that natural soils in the site vicinity generally consist of outwash sand and gravel. Bedrock mapping suggests that shale and sandstone underlies soil in the area.

FIELD STUDY

The subsurface investigation for this project consisted of eleven test borings (designated as B-1 to B-11) and two infiltration tests (IT-1 to IT-2). The test borings were performed using a track-mounted Geoprobe 7822DT drill rig. Hollow stem augering techniques were utilized to advance the borings to a depth of up to 25 feet below the ground surface (bgs) unless auger refusal was encountered at a shallower depth. Standard penetration testing (ASTM D1586) was performed with an automatic hammer to obtain soil samples. Boring locations were selected by others and field-located by Kenney Geotechnical Services personnel using mapping provided in the RFP.

Soil samples obtained during the subsurface investigation were classified by a Geotechnical Engineer using the Unified Soil Classification System. Boring logs documenting the subsurface conditions encountered are attached. The boring logs and related information depict subsurface conditions only at the specific locations and times indicated. Subsurface conditions and water levels at other locations may differ from conditions at the locations where sampling was conducted. The passage of time also may result in changes in the conditions interpreted to exist at the locations where sampling was performed.

LABORATORY TESTING

Laboratory testing performed for this project included Natural Moisture Content Testing (ASTM D-2216) and Particle Size Analysis (ASTM D-422). Testing was performed in Kenney Geotechnical Services laboratory. Test results are attached to this report.

SUBSURFACE CONDITIONS ENCOUNTERED

The following interpretation of subsurface conditions is based on our review of the recovered samples, the boring logs, drilling observations, and our professional experience.

The subsurface conditions encountered are organized into the following strata for discussion:

- **Stratum A** –Organic Soil
- **Stratum B** – Outwash Sand and/or Gravel

All depths discussed below are referenced to the ground surface at the time of drilling (bgs).

Stratum A – Organic Soil

Silt, clay, sand and gravel mixed with organic matter was encountered at the ground surface and extended to depths of up to approximately five feet at the test boring locations. In general the organic soil depth was generally approximately six inches.

Stratum B –Outwash Sand and Gravel

Outwash sand and gravel was generally encountered throughout the site from below the surficial organic layer to the limit of exploration at a depth of 25 feet. The sand

and gravel was generally very loose above a depth of approximately 4 feet and medium dense to very dense below. Cobbles and boulders appear to be present within the stratum.

GROUNDWATER CONDITIONS ENCOUNTERED

Water levels were measured within the augers during advancement and from the open borehole after the augers were removed. The following table summarizes the water level measurements at the time of the subsurface investigation.

Boring Location	Depth to Water While Advancing Augers (feet)	Depth to Water at End of Drilling (ft)	Depth to Water After Augers Removed (ft)	Depth to Borehole Cave-In (ft)
B-1	13.0	15.4	DRY	7.7
B-2	13.0	15.4	DRY	6.1
B-3	13.0	16.4	DRY	8.4
B-4	13.0	11.7	DRY	9.5
B-5	13.0	14.7	DRY	5.9
B-6	13.0	12.6	DRY	9.3
B-7	13.0	16.1	DRY	7.6
B-8	18.0	17.2	DRY	7.7
B-9	DRY	DRY	DRY	5.1
B-10	8.0	DRY	DRY	8.4
B-11	DRY	DRY	DRY	4.3

Groundwater depths and seepage rates will vary with the seasons and changes in precipitation patterns and may be higher during the wetter seasons.

RECOMMENDATIONS AND CONCLUSIONS

The sand and gravel encountered is suitable for supporting a conventional shallow foundation system. Surficial organic soil will need to be removed from below pavements, slabs and bearing grade. Additional recommendations are provided in the following sections.

A. Foundations

An allowable bearing pressure of 4,000 pounds per square foot (psf) is recommended for the design of shallow foundations provided that the bearing grade consists of undisturbed natural sand and gravel as verified by geotechnical

personnel. Any disturbed or saturated soil must be removed from below foundation bearing grade. Proper management of the soil will be critical during foundation construction and earthwork. All exterior footings should bear at least 48 inches below finished exterior grade for frost protection unless an insulated frost protection system is installed. Foundation bearing grade must be protected from saturation, freezing, or disturbance throughout construction.

We estimate that foundations designed as recommended herein and properly managed during construction will undergo total settlements of less than one inch and differential settlements of up to 0.75 inches.

B. Temporary Excavations

Temporary excavation slopes must be evaluated by the Contractor's on-site Responsible Person. We anticipate on-site soil will be classified as Type C. Type C materials must be graded to slopes no greater than 1.5:1 (horizontal to vertical). The Contractors on-site Responsible Person should periodically review excavations for signs of movement or distress. Excavation sidewalls should be periodically raked to remove loose particles.

C. Utility Trenches

In utility trenches, or other confined areas, small compaction equipment may be necessary such as a vibratory plate, jumping jack or walk-behind vibratory roller. In-place density testing should be performed at a frequency of one test per 25 feet per lift in trenches. Utility trench fill should be placed in level lifts no greater than 8 inches in thickness and should be compacted to at least 95%the Modified Proctor (ASTM D-1557) maximum dry density. Structural fill should consist of imported granular material such as NYSDOT Subbase (2'' minus) or approved equal. Adequate frost cover and protection must be provided during winter weather construction. Earthwork cannot be performed with frozen material.

D. Earthwork

Earthwork must be performed using methods that will result in a stable excavations and fills. Typical temporary earthwork measures such as temporary drainage swales, stabilized haul roads, and the use of protective layers of crushed stone can be employed at this site. It is recommended that earthwork is observed by

geotechnical personnel to ensure that all organic material is removed from the structural and pavement site. Additional recommendations are as follows:

- Strip existing topsoil, pavement, roots and organics as directed by geotechnical personnel from all areas that will receive new construction to establish subgrade.
- Proof-roll exposed slab-on-grade subgrade with a fully loaded dump truck, or accepted alternative equipment, under the observation of geotechnical personnel. Excessive organic matter and areas that rut, weave, or deflect should be over-excavated and replaced with compacted structural fill as directed by geotechnical personnel (see below for structural fill characteristic requirements).
- Utilize structural fill to raise site grades. Structural fill should consist of imported granular material conforming to NYSDOT Subbase Course (2" minus) or approved equal. In-situ sand and gravel can potentially be utilized as structural fill pending field approval by geotechnical personnel. Segregation of over-sized material (greater than 4 inches in diameter/width) will likely be necessary if on-site soil is re-utilized.
- Field moisture contents for structural fill should be maintained within 2 percentage points of the optimum moisture content established by laboratory testing to provide adequate compaction. All fill should be placed in level lifts having a loose thickness no greater than 12 inches and should be compacted to at least the following minimum percentages of the Modified Proctor (ASTM D-1557) maximum dry density:

    - Below footings: 95%
    - Beneath slab-on-grade or pavements: 95%
    - Utility trench backfill: 95%
    - Beneath landscape areas: 90%
    - Beneath sidewalks and exterior slabs: 95%

    Bulk samples of proposed structural fill materials should be delivered to our testing laboratory at least two weeks prior to the initiation of earthwork. In-place density testing should be performed at a frequency of one test per 500 square feet per lift in open areas and one test per 25 feet per lift in trenches.

- If the structure is to be constructed during the winter months, or if the building interiors will be subjected to freezing temperatures after footer construction, adequate frost cover and protection must be provided. Earthwork cannot be performed with frozen material.
- Permanent slopes should be graded no steeper than 3 horizontal: 1 vertical.

E. Groundwater Seepage and Management

Groundwater was encountered at a depth of 13 feet during the subsurface investigation. Storm events and other factors can affect groundwater and seepage during construction. All dewatering discharge should be transported to a temporary dewatering basin constructed consistent with NYDEC construction stormwater and/or dewatering treatment Best Management Practices (BMPs).

F. Interior Concrete Slabs

Subgrade areas should be prepared as discussed in the Earthwork recommendations. A preliminary subgrade modulus of 225 pci is suggested for design and assumes compacted structural fill is installed over stripped subgrade to achieve new floor slab elevations. Structural fill placed to establish floor slab subgrade should conform to the recommendations for materials and compaction presented in the Earthwork recommendations.

The subbase for the slab-on-grade should consist of a minimum of 6 inches of gravel or crushed stone conforming to NYSDOT specifications for Item 304-2.02 Type 2 or 4. Follow compaction requirements presented for earthwork.

G. Lateral Earth Pressures

Design of subsurface walls subjected to lateral earth pressure must consider the type of wall, degree of restraint against wall rotation, and other factors. The sliding resistance of soils should also be considered during excavation. The following lateral earth pressure parameters of an approved imported granular fill are recommended for this project. The following earth pressure and sliding parameters are recommended for the soil encountered on this project.

- Ka = 0.33
- Kp = 3.0

- Ko = 0.5
- Unit weight of imported soil 140 pcf
- Coefficient of sliding = 0.4

It is recommended that drainage is provided for all walls to reduce hydrostatic wall loading and possible frost action. Backfill against any walls should consist of a relatively well-graded free-draining granular material having no more than 10% passing the No. 200 sieve. The granular backfill zone behind walls should be at least one foot wide as measured horizontally from the face of the wall. Backfill against walls should be placed in loose lifts no greater than 6 inches in thickness. A nonwoven geotextile filter should be placed between the granular backfill and insitu soil to prevent the migration of fine grained soil.

I. Seismic Hazard Concerns, Liquefaction, Seismicity, and Faulting

Correlations with Standard Penetration Testing "N" values recorded during the subsurface investigation suggest that seismic **Site Class C** is appropriate for this site. The estimated design spectral response acceleration parameters are as follows:

Design Code Reference:	ASCE 7-16
Assumed Risk Category:	II
Site Class:	D
S_{DS}	0.108g
S_{D1}	0.047g

Liquefaction, surface rupture from faulting or lateral spreading is estimated to have a low probability of occurrence given typical regional seismicity.

LIMITATIONS

The recommendations presented in this report are predicated on the performance of construction observation and testing by qualified geotechnical personnel. We request continued involvement with this project so that we may assess subsurface conditions exposed during construction to determine if modifications to our recommendations are necessary. This report should not be considered as direction to the Contractor.

REFERENCES

"Surficial Geologic Map of New York – Finger Lakes Sheet", New York State Museum, 1986.

"Bedrock Map of New York – Finger Lakes Sheet", New York State Museum, 1970.

ATTACHMENTS

BORING LOGS



STAMP

KEPLINGER FREEMAN ASSOCIATES
LANDSCAPE ARCHITECTURE & LAND PLANNING
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PHONE: (315) 445-7680 FAX: (315) 445-7681

RZ Engineering, PLLC
6320 FLY ROAD SUITE 109
EAST SYRACUSE, NY 13057
PH: 315.470.7099

PB
SUBMISSION
10/14/2022

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SCALE: SEE DRAWING

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31 RIVER STREET, CORTLAND, NY 13045

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L1.0

@PLTDATE @DWGFULLNAMEEXT

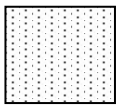
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Key to Symbols

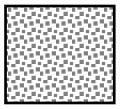
Project Name:	Cortland Senior Housing
Client:	Cortland Housing Assistance Council

Project Number:	2022-204
Location:	Cortland, NY

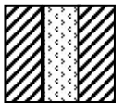
LITHOLOGIC SYMBOLS
(UNIFIED SOIL CLASSIFICATION SYSTEM)



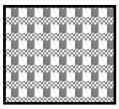
SP/SW: POORLY GRADED/WELL-GRADED SAND



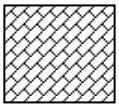
GW/GP: WELL-GRADED GRAVEL AND POORLY GRADED GRAVEL



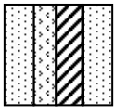
CL-ML: SILTY CLAY OR SANDY SILTY CLAY



GM/GC: SILTY GRAVEL OR CLAYEY GRAVEL



FILL/OL



SC-SM: SILTY CLAYEY SAND

Location: Cortland, NY
2022-204

Key to Soil Symbols and Terms

TERMS DESCRIBING CONSISTENCY OR CONDITION

COARSE-GRAINED SOILS (major portions retained on No. 200 sieve): includes (1) clean gravel and sands and (2) silty or clayey gravels and sands. Condition is rated according to relative density as determined by laboratory tests or standard penetration resistance tests.

Descriptive Terms	Relative Density	SPT Blow Count
Very loose	0 to 15 %	< 4
Loose	15 to 35 %	4 to 10
Medium dense	35 to 65 %	10 to 30
Dense	65 to 85 %	30 to 50
Very dense	85 to 100 %	> 50

FINE-GRAINED SOILS (major portions passing on No. 200 sieve): includes (1) inorganic and organic silts and clays, (2) gravelly, sandy, or silty clays, and (3) clayey silts. Consistency is rated according to shearing strength, as indicated by penetrometer readings, SPT blow count, or unconfined compression tests.

Descriptive Terms	Unconfined Compressive Strength kPa	SPT Blow Count
Very soft	< 25	< 2
Soft	25 to 50	2 to 4
Medium stiff	50 to 100	4 to 8
Stiff	100 to 200	8 to 15
Very stiff	200 to 400	15 to 30
Hard	> 400	> 30

GENERAL NOTES

1. Classifications are based on the United Soil Classification System and include consistency, moisture, and color. Field descriptions have been modified to reflect results of laboratory tests where deemed appropriate.

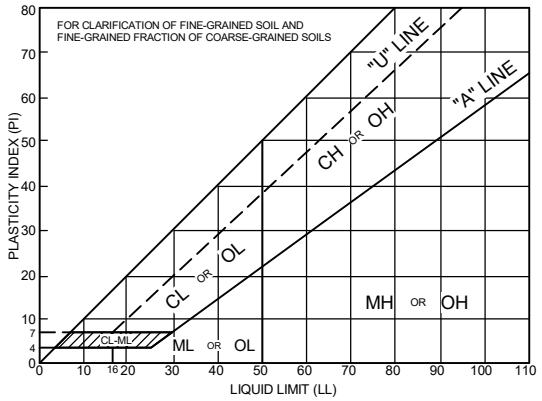
2. Surface elevations are based on topographic maps and estimated locations.

3. Descriptions on these boring logs apply only at the specific boring locations and at the time the borings were made. They are not guaranteed to be representative of subsurface conditions at other locations or times.

Major Divisions			Group Symbols	Typical Names	Laboratory Classification Criteria
Coarse-Grained soils (More than half the material is larger than No. 200 sieve size)	Gravels (More than half of coarse fraction is larger than No. 4 sieve size)	Clean gravel (Little or no fines)	GW	Well-graded gravels, gravel-sand mixtures, little or no fines	Determine percentages of sand and gravel from grain size curve, Depending on percentage of fines (fraction smaller than No. 200 sieve) coarse-grained soils are classified as follows: Less than 5 percent..... GW, GP, SW, SP; More than 12 percent..... GM, GC, SM, SC; 6 to 12 percent..... Borderline case4s requiring dual symbols**
			GP	Poorly-graded gravels, gravel-sand mixtures, little or no fines	
		Gravel with fines (Appreciable amount of fines)	GM* d / u	Silty gravels, gravel-sand-silt mixtures	
			GC	Clayey gravels, gravel-sand-silt mixtures	
	Sands (More than half of coarse fraction is smaller than No. 4 sieve size)	Clean sands (Little or no fines)	SW	Well-graded sands, gravelly sands, little or no fines	
			SP	Poorly-graded sands, gravelly sands, little or no fines	
		Sands with fines (Appreciable amount of fines)	SM* d / u	Silty sands, sand-silt mixtures	
			SC	Clayey sands, sand-clay mixtures	
Fine-Grained soils (More than half the material is smaller than No. 200 sieve size)	Silts and Clays (Liquid limit less than 60)		ML	Inorganic silts and very fine sands, rock floor, 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 and Clays (Liquid limit greater than 60)		MH	Inorganic silts, micaceous or disto-maceous fine sandy or silty soils, organic silts	
			CH	Inorganic clays of high plasticity, fat clays	
			OH	Organic clays of medium to high plasticity, organic silts	
	Highly Organic Soils		Pt	Peat and other highly organic soils	

Laboratory Classification Criteria:

- $C_U = \frac{D_{60}}{D_{10}}$ greater than 4; $C_C = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ between 1 and 3
- Not meeting all gradation requirements for GW
- Atterberg limits below "A" line or P.I. less than 4
- Atterberg limits above "A" line or P.I. greater than 7
- Above "A" line with P.I. between 4 and 7 are borderline cases requiring use of dual symbols
- $C_U = \frac{D_{60}}{D_{10}}$ greater than 6; $C_C = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ between 1 and 3
- Not meeting all gradation requirements for SW
- Atterberg limits below "A" line or P.I. less than 4
- Atterberg limits above "A" line or P.I. greater than 7
- Above "A" line with P.I. between 4 and 7 are borderline cases requiring use of dual symbols



Plasticity Chart

Material	Particle Size mm	Particle Size Sieve
Gravel	4.76 to 19.1	#4 to 3/4 in.
Fine		
Coarse	19.1 to 76.2	3/4 in. to 3 in.
Cobble	76.2 to 304.8	3 in. to 12 in.
Boulders	304.8 to 914.4	12 in. to 36 in.

Material	Particle Size mm	Particle Size Sieve sizes
Silt or clay	< 0.074	< #200
Sand		
Fine	0.074 to 0.42	#200 to #40
Medium	0.42 to 2.00	#40 to #10
Coarse	2.00 to 4.76	#10 to #4

* Division of GM and SM groups into subdivisions of d and u are for roads and airfields only. Subdivision is based on Atterberg Limits: suffix d used when L.L. is 23 or less and the P.I. is 6 or less; the suffix is used when L.L. is greater than 26.

** Borderline classifications used for soils possessing characteristics of two groups are designated by combinations of groups symbols. For example; GW-GC, well-graded gravel-sand mixture with clay binder.

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INFILTRATION TEST RESULTS

Project Name:		Cortland Senior Housing	
Project Number:		2022-204	
Location		Cortland, NY	
Date of Test:		12/19/2022	
Test	Depth	Stabilized Rate	Soil Conditions Encountered
-	(ft)	in/hr	USCS
IT-1	5.0	24	Well-Graded Gravel with Sand
IT-2	5.0	20	Well-Graded Gravel with Sand

HOURLY MEASURED INFILTRATION RATES

Test	Hour 1	Hour 2	Hour 3	Hour 4	Stabilized Rate (in/hr)
IT-1	24	24	24	24	24
IT-2	21	21	21	21	20

Kenney Geotechnical Services

Geotechnical Boring Log

Project Name:	Cortland Senior Housing	**Project Number:**	2022-204	**Logged By:**	NM	**Boring Number**	B-1
Client:	Cortland Housing Assistance Council	**Ground Elevation:**		**Checked By:**	CMK	**Sheet:**	1 of 2
Location:	31 River Street, Cortland NY	**Drill Rig:**	7822DT	**Depth To Groundwater While Drilling:**			13.0
Started:	12/14/2022	**Drill Method:**	3.25" HSA	**Depth To Groundwater Before Auger Removal:**			15.4
Completed:	12/14/2022	**Driller:**	D. Green	**Depth To Groundwater After Auger Removal:**			DRY

Depth (ft)	Sample Type	Recovery (inch)	Blow Count Per 6 inches	Graphic Log	N (bpf)	USCS Material Description	Strata Change Depth (ft.)	Pocket Penet. (tsf)	Moisture Content (%)
			1			**TOPSOIL**	0.5		
1	SPT	10	8		16	**(GM) MEDIUM DENSE, BROWN SILTY GRAVEL WITH SAND, MOIST**			
			8						
2			7				2.0		
	SPT	0	3		4	**NO RECOVERY COBBLES/BOULDERS OBSERVED WHILE DRILLING BEGINNING AT 3.0 FT**			
3			2						
			2						
4			1				4.0		
	SPT	12	2		5	**(GW) LOOSE, BROWN WELL GRADED GRAVEL WITH SAND AND SILT, MOIST**			
5			2						
			3						
6			10						
	SPT	11	14		68	**SIMILAR SOIL, VERY DENSE, MOIST**			
7			38						
			30						
8			24						
	SPT	15	25		73	**SIMILAR SOIL, VERY DENSE, MOIST**			
9			35						
			38						
10			40						
11									
12									
13							13.0		
	SPT	12	6		52	**(GW) VERY DENSE, GREY WELL GRADED GRAVEL WITH SAND, WET**			
14			22						
			30						
15			20						
16									
17									
18									
	SPT	9	23		100	**SIMILAR SOIL, VERY DENSE, WET**			
19			35			**(CONTINUED ONTO NEXT SHEET)**			
			50/0.3						
20									

Kenney Geotechnical Services

Geotechnical Boring Log

Project Name:	Cortland Senior Housing	**Project Number:**	2022-204	**Logged By:**	NM	**Boring Number**	B-1
Client:	Cortland Housing Assistance Council	**Ground Elevation:**		**Checked By:**	CMK	**Sheet:**	2 of 2
Location:	31 River Street, Cortland NY	**Drill Rig:**	7822DT	**Depth To Groundwater While Drilling:**			13.0
Started:	12/14/2022	**Drill Method:**	3.25" HSA	**Depth To Groundwater Before Auger Removal:**			15.4
Completed:	12/14/2022	**Driller:**	D. Green	**Depth To Groundwater After Auger Removal:**			DRY

Depth (ft)	Sample Type	Recovery (inch)	Blow Count Per 6 inches	Graphic Log	N (bpf)	USCS Material Description	Strata Change Depth (ft.)	Pocket Penet. (tsf)	Moisture Content (%)
21									
22									
23									
	SPT	4	50/0.4		100	**SIMILAR SOIL, VERY DENSE WET**			

Bottom of Boring: 23.4 FT | Cave Depth: 7.7 FT

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Geotechnical Boring Log

Project Name:	Cortland Senior Housing	**Project Number:**	2022-204	**Logged By:**	NM	**Boring Number**	B-2
Client:	Cortland Housing Assistance Council	**Ground Elevation:**		**Checked By:**	CMK	**Sheet:**	1 of 2
Location:	31 River Street, Cortland NY	**Drill Rig:**	7822DT	**Depth To Groundwater While Drilling:**			13.0
Started:	12/14/2022	**Drill Method:**	3.25" HSA	**Depth To Groundwater Before Auger Removal:**			15.4
Completed:	12/14/2022	**Driller:**	D. Green	**Depth To Groundwater After Auger Removal:**			DRY

Depth (ft)	Sample Type	Recovery (inch)	Blow Count Per 6 inches	Graphic Log	N (bpf)	USCS Material Description	Strata Change Depth (ft.)	Pocket Penet. (tsf)	Moisture Content (%)
			2			**TOPSOIL**	0.5		
1	SPT	6	3		6	**(SC-SM) LOOSE, BROWN SILTY CLAYEY SAND WITH GRAVEL, MOIST**			
			3						
2			4				2.0		
			3						
3	SPT	0	2		3	**AUGER CUTTINGS FROM SAMPLE 0'-4' NO RECOVERY**			
			1						
4			2				4.0		
			9						
5	SPT	10	16		29	**(GW) MEDIUM DENSE, GREY/BROWN WELL-GRADED GRAVEL WITH SAND, MOIST**			
			13						
6			15						
			10						
7	SPT	11	12		24	**COBBLES/BOULDERS ENCOUNTERED AROUND 1.5 FT SIMILAR SOIL, MEDIUM DENSE, MOIST**			
			12						
8			12						
	SPT	3	50/.3		100	**BOULDER AT 8.5 FT**			
9									
10									
11									
12									
13									
			9						
14	SPT	10	24		44	**SIMILAR SOIL, DENSE, WET**			
			20						
15			16						
16									
17									
18									
			16						
19	SPT	20	24		42	**GREY SIMILAR SOIL, DENSE, WET**			
			18			**(CONTINUED ONTO NEXT SHEET)**			
20			20						

Kenney Geotechnical Services

Geotechnical Boring Log

Project Name:	Cortland Senior Housing	**Project Number:**	2022-204	**Logged By:**	NM	**Boring Number**	B-2
Client:	Cortland Housing Assistance Council	**Ground Elevation:**		**Checked By:**	CMK	**Sheet:**	2 of 2
Location:	31 River Street, Cortland NY	**Drill Rig:**	7822DT	**Depth To Groundwater While Drilling:**			13.0
Started:	12/14/2022	**Drill Method:**	3.25" HSA	**Depth To Groundwater Before Auger Removal:**			15.4
Completed:	12/14/2022	**Driller:**	D. Green	**Depth To Groundwater After Auger Removal:**			DRY

Depth (ft)	Sample Type	Recovery (inch)	Blow Count Per 6 inches	Graphic Log	N (bpf)	USCS Material Description	Strata Change Depth (ft.)	Pocket Penet. (tsf)	Moisture Content (%)
21									
22									
23									
	SPT	4	45		100	**SIMILAR SOIL WITH SILT, VERY DENSE, WET**			
24			50/.2						

Bottom of Boring: 23.7 FT | Cave Depth: 6.1 FT

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Geotechnical Boring Log

Project Name:	Cortland Senior Housing	**Project Number:**	2022-204	**Logged By:**	NM	**Boring Number**	B-3
Client:	Cortland Housing Assistance Council	**Ground Elevation:**		**Checked By:**	CMK	**Sheet:**	1 of 2
Location:	31 River Street, Cortland NY	**Drill Rig:**	7822DT	**Depth To Groundwater While Drilling:**			13.0
Started:	12/14/2022	**Drill Method:**	3.25" HSA	**Depth To Groundwater Before Auger Removal:**			16.4
Completed:	12/14/2022	**Driller:**	D. Green	**Depth To Groundwater After Auger Removal:**			DRY

Depth (ft)	Sample Type	Recovery (inch)	Blow Count Per 6 inches	Graphic Log	N (bpf)	USCS Material Description	Strata Change Depth (ft.)	Pocket Penet. (tsf)	Moisture Content (%)
			3			**TOPSOIL**	0.4		
1	SPT	11	4		8	**(GM) LOOSE, BROWN SILTY GRAVEL WITH SAND, MOIST**			13.7
			4						
2			3						
	SPT	6	3		5	**SIMILAR SOIL, LOOSE, MOIST**			9.1
3			3						
			2						
4			1				4.0		
	SPT	6	4		37	**(GW) DENSE, GREY/BROWN WELL-GRADED GRAVEL WITH SAND, MOIST**			7.4
5			16						
			21						
6			15						
	SPT	12	15		33	**SIMILAR SOIL, DENSE, MOIST**			4.1
7			19						
			14						
8			10						
	SPT	15	15		68	**SIMILAR SOIL, VERY DENSE, MOIST**			5.3
9			24						
			44						
10			50/.4						
11									
12									
13									
	SPT	9	12		34	**SIMILAR SOIL, DENSE, WET**			7.9
14			14						
			20						
15			16						
16									
17									
18									
	SPT	15	50/.4		100	**SIMILAR SOIL, VERY DENSE, WET**			7.1
19						**(CONTINUED ONTO NEXT SHEET)**			
20									

Kenney Geotechnical Services

Geotechnical Boring Log

Project Name:	Cortland Senior Housing	**Project Number:**	2022-204	**Logged By:**	NM	**Boring Number**	B-3
Client:	Cortland Housing Assistance Council	**Ground Elevation:**		**Checked By:**	CMK	**Sheet:**	2 of 2
Location:	31 River Street, Cortland NY	**Drill Rig:**	7822DT	**Depth To Groundwater While Drilling:**			13.0
Started:	12/14/2022	**Drill Method:**	3.25" HSA	**Depth To Groundwater Before Auger Removal:**			16.4
Completed:	12/14/2022	**Driller:**	D. Green	**Depth To Groundwater After Auger Removal:**			DRY

Depth (ft)	Sample Type	Recovery (inch)	Blow Count Per 6 inches	Graphic Log	N (bpf)	USCS Material Description	Strata Change Depth (ft.)	Pocket Penet. (tsf)	Moisture Content (%)
21									
22									
23									
	SPT	4	50/.1		100	**SIMILAR SOIL, VERY DENSE, WET**			8.9

Bottom of Boring: 23.4 FT | Cave Depth: 8.4 FT

Kenney Geotechnical Services

Geotechnical Boring Log

Project Name:	Cortland Senior Housing	**Project Number:**	2022-204	**Logged By:**	NM	**Boring Number**	B-4
Client:	Cortland Housing Assistance Council	**Ground Elevation:**		**Checked By:**	CMK	**Sheet:**	1 of 1
Location:	31 River Street, Cortland NY	**Drill Rig:**	7822DT	**Depth To Groundwater While Drilling:**			13.0
Started:	12/15/2022	**Drill Method:**	3.25" HSA	**Depth To Groundwater Before Auger Removal:**			11.7
Completed:	12/15/2022	**Driller:**	D. Green	**Depth To Groundwater After Auger Removal:**			DRY

Depth (ft)	Sample Type	Recovery (inch)	Blow Count Per 6 inches	Graphic Log	N (bpf)	USCS Material Description	Strata Change Depth (ft.)	Pocket Penet. (tsf)	Moisture Content (%)
			2			**TOPSOIL**	0.5		
1	SPT	6	2		5	**(GM) LOOSE, BROWN SILTY GRAVEL WITH SAND, MOIST**			
			3						
2			3						
	SPT	7	3		8				
3			3			**SIMILAR SOIL, LOOSE, MOIST**			
			5						
4			8				4.0		
	SPT	0	4		24	**NO RECOVERY**			
5			15			**COBBLES AND BOULDERS OBSERVED WHILE DRILLING AT 4 FT**			
			9						
6			7				6.0		
	SPT	11	7		11	**(GW) MEDIUM DENSE, BROWN/GREY WELL-GRADED GRAVEL WITH SAND AND SILT, MOIST**			
7			5						
			6						
8			12				8.0		
	SPT	0	50/.3		100	**NO RECOVERY**			
9						**AUGERED THROUGH BOULDER 8-11 FT**			
10									
11									
12									
13							13.0		
	SPT	3	27		60	**(SW) VERY DENSE, GREY WELL-GRADED SAND, WET**			
14			30						
			30						
15			35						
16									
17									
18							18.0		
	SPT	16	39		61	**(GW) VERY DENSE, GREY WELL-GRADED GRAVEL WITH SAND, WET**			
19			30						
			31						
20			35				20.0		
	SPT	0	50/.2		100	**NO RECOVERY, AUGER REFUSAL AT 20.0 FT**			

Bottom of Boring: 20.2 FT | Cave Depth: 9.5 FT

Kenney Geotechnical Services

Geotechnical Boring Log

Project Name:	Cortland Senior Housing	**Project Number:**	2022-204	**Logged By:**	NM	**Boring Number**	B-5
Client:	Cortland Housing Assistance Council	**Ground Elevation:**		**Checked By:**	CMK	**Sheet:**	1 of 2
Location:	31 River Street, Cortland NY	**Drill Rig:**	7822DT	**Depth To Groundwater While Drilling:**			13.0
Started:	12/15/2022	**Drill Method:**	3.25" HSA	**Depth To Groundwater Before Auger Removal:**			14.7
Completed:	12/15/2022	**Driller:**	D. Green	**Depth To Groundwater After Auger Removal:**			DRY

Depth (ft)	Sample Type	Recovery (inch)	Blow Count Per 6 inches	Graphic Log	N (bpf)	USCS Material Description	Strata Change Depth (ft.)	Pocket Penet. (tsf)	Moisture Content (%)
			2			**TOPSOIL**	0.4		
1	SPT	11	4		9	**(GW) LOOSE, BROWN WELL-GRADED GRAVEL WITH SAND AND SILT, MOIST**			
			5						
2			6						
	SPT	8	8		15	**SIMILAR SOIL, MEDIUM DENSE, MOIST**			
3			8						
			7						
4			6						
	SPT	5	10		21	**SIMILAR SOIL, MEDIUM DENSE, MOIST**			
5			7						
			14						
6			14				6.0		
	SPT	9	10		19	**(GW) MEDIUM DENSE, BROWN/GREY WELL-GRADED GRAVEL WITH SAND, MOIST**			
7			9						
			10						
8			26						
	SPT	6	35		100	**SIMILAR SOIL, VERY DENSE, MOIST**			
9			50/.4						
10									
11									
12									
13									
	SPT	15	26		49	**GREY SIMILAR SOIL, DENSE, WET**			
14			33						
			16						
15			37						
16									
17									
18									
	SPT	13	12		44	**GREY SIMILAR SOIL, DENSE, WET**			
19			22						
			22						
20			30						

(CONTINUED ONTO NEXT SHEET)

Kenney Geotechnical Services

Geotechnical Boring Log

Project Name:	Cortland Senior Housing	**Project Number:**	2022-204	**Logged By:**	NM	**Boring Number**	B-5
Client:	Cortland Housing Assistance Council	**Ground Elevation:**		**Checked By:**	CMK	**Sheet:**	2 of 2
Location:	31 River Street, Cortland NY	**Drill Rig:**	7822DT	**Depth To Groundwater While Drilling:**			13.0
Started:	12/15/2022	**Drill Method:**	3.25" HSA	**Depth To Groundwater Before Auger Removal:**			14.7
Completed:	12/15/2022	**Driller:**	D. Green	**Depth To Groundwater After Auger Removal:**			DRY

Depth (ft)	Sample Type	Recovery (inch)	Blow Count Per 6 inches	Graphic Log	N (bpf)	USCS Material Description	Strata Change Depth (ft.)	Pocket Penet. (tsf)	Moisture Content (%)
21									
22									
23									
			18						
24	SPT	7	39		100	**SIMILAR SOIL, VERY DENSE, WET**			
			50/.3						

Bottom of Boring: 24.3 FT | Cave Depth: 5.9 FT

Kenney Geotechnical Services

Geotechnical Boring Log

Project Name:	Cortland Senior Housing	**Project Number:**	2022-204	**Logged By:**	NM	**Boring Number**	B-6
Client:	Cortland Housing Assistance Council	**Ground Elevation:**		**Checked By:**	CMK	**Sheet:**	1 of 2
Location:	31 River Street, Cortland NY	**Drill Rig:**	7822DT	**Depth To Groundwater While Drilling:**			13.0
Started:	12/15/2022	**Drill Method:**	3.25" HSA	**Depth To Groundwater Before Auger Removal:**			12.6
Completed:	12/15/2022	**Driller:**	D. Green	**Depth To Groundwater After Auger Removal:**			DRY

Depth (ft)	Sample Type	Recovery (inch)	Blow Count Per 6 inches	Graphic Log	N (bpf)	USCS Material Description	Strata Change Depth (ft.)	Pocket Penet. (tsf)	Moisture Content (%)
			3			**TOPSOIL**	0.5		
1	SPT	6	4		9	**OL: (GC-GM) LOOSE, BROWN CLAYEY SILTY GRAVEL WITH ORGANICS, MOIST**			
			5						
2			6				2.0		
			4						
3	SPT	3	4		6	**SIMILAR SOIL WITH NO ORGANICS, LOOSE, MOIST**			
			2						
4			5				4.0		
			4						
5	SPT	13	10		22	**(GW) MEDIUM DENSE, BROWN WELL-GRADED GRAVEL WITH SAND, MOIST**			
			12						
6			16						
			48						
7	SPT	15	19		36	**SIMILAR SOIL, DENSE, MOIST**			
			17						
8			25						
			18						
9	SPT	12	21		51	**SIMILAR SOIL, VERY DENSE, MOIST**			
			30						
10			32						
11									
12									
13							13.0		
			42						
14	SPT	15	16		33	**(GW) DENSE, GREY WELL-GRADED GRAVEL, WET**			
			17						
15			40						
16									
17									
18							18.0		
			16						
19	SPT	0	12		24	**NO RECOVERY**			
			12			**(CONTINUED ONTO NEXT SHEET)**			
20			14				20.0		

Kenney Geotechnical Services

Geotechnical Boring Log

Project Name:	Cortland Senior Housing	**Project Number:**	2022-204	**Logged By:**	NM	**Boring Number**	B-6
Client:	Cortland Housing Assistance Council	**Ground Elevation:**		**Checked By:**	CMK	**Sheet:**	2 of 2
Location:	31 River Street, Cortland NY	**Drill Rig:**	7822DT	**Depth To Groundwater While Drilling:**			13.0
Started:	12/15/2022	**Drill Method:**	3.25" HSA	**Depth To Groundwater Before Auger Removal:**			12.6
Completed:	12/15/2022	**Driller:**	D. Green	**Depth To Groundwater After Auger Removal:**			DRY

Depth (ft)	Sample Type	Recovery (inch)	Blow Count Per 6 inches	Graphic Log	N (bpf)	USCS Material Description	Strata Change Depth (ft.)	Pocket Penet. (tsf)	Moisture Content (%)
21									
22									
23									
			30						
24	SPT	10	21		41	**(GW) DENSE, GREY WELL-GRADED GRAVEL, WET**			
			20						
25			20						

Bottom of Boring: 25.0 FT

Cave Depth: 9.3 FT

Kenney Geotechnical Services

Geotechnical Boring Log

Project Name:	Cortland Senior Housing	**Project Number:**	2022-204	**Logged By:**	NM	**Boring Number**	B-7
Client:	Cortland Housing Assistance Council	**Ground Elevation:**		**Checked By:**	CMK	**Sheet:**	1 of 2
Location:	31 River Street, Cortland NY	**Drill Rig:**	7822DT	**Depth To Groundwater While Drilling:**			13.0
Started:	12/15/2022	**Drill Method:**	3.25" HSA	**Depth To Groundwater Before Auger Removal:**			16.1
Completed:	12/15/2022	**Driller:**	D. Green	**Depth To Groundwater After Auger Removal:**			DRY

Depth (ft)	Sample Type	Recovery (inch)	Blow Count Per 6 inches	Graphic Log	N (bpf)	USCS Material Description	Strata Change Depth (ft.)	Pocket Penet. (tsf)	Moisture Content (%)
			2			**TOPSOIL**	0.3		
1	SPT	3	2		4	**(SC-SM) VERY LOOSE, CLAYEY SILTY SAND WITH GRAVEL, MOIST**			
			2						
2			2						
	SPT	6	4		6				
3			4			**SIMILAR SOIL, LOOSE, MOIST**			
			2						
4			2				4.0		
	SPT	0			5	**NO RECOVERY**			
5			1						
			4						
6			1/12"				6.0		
	SPT	13	2		42	**(GW) DENSE, GREY/BROWN WELL-GRADED GRAVEL WITH SAND, MOIST**			
7			20						
			22						
8			24						
	SPT	7	44		100	**SIMILAR SOIL, VERY DENSE, MOIST**			
9			50/.4						
10									
11									
12									
13							13.0		
	SPT	15	28		48	**(GW) DENSE, GREY WELL-GRADED GRAVEL WITH SAND, WET**			
14			24						
			24						
15			16						
16									
17									
18									
	SPT	14	36		72	**SIMILAR SOIL, VERY DENSE, WET**			
19			44			**(CONTINUED ONTO NEXT SHEET)**			
			28						
20			16						

Kenney Geotechnical Services

Geotechnical Boring Log

Project Name:	Cortland Senior Housing	**Project Number:**	2022-204	**Logged By:**	NM	**Boring Number**	B-7
Client:	Cortland Housing Assistance Council	**Ground Elevation:**		**Checked By:**	CMK	**Sheet:**	2 of 2
Location:	31 River Street, Cortland NY	**Drill Rig:**	7822DT	**Depth To Groundwater While Drilling:**			13.0
Started:	12/15/2022	**Drill Method:**	3.25" HSA	**Depth To Groundwater Before Auger Removal:**			16.1
Completed:	12/15/2022	**Driller:**	D. Green	**Depth To Groundwater After Auger Removal:**			DRY

Depth (ft)	Sample Type	Recovery (inch)	Blow Count Per 6 inches	Graphic Log	N (bpf)	USCS Material Description	Strata Change Depth (ft.)	Pocket Penet. (tsf)	Moisture Content (%)
21									
22									
23									
			15						
24	SPT	11	15		40	**SIMILAR SOIL, DENSE, WET**			
			25						
25			21						

Bottom of Boring: 25.0 FT

Cave Depth: 7.6 FT

Kenney Geotechnical Services

Geotechnical Boring Log

Project Name:	Cortland Senior Housing	**Project Number:**	2022-204	**Logged By:**	NM	**Boring Number**	B-8
Client:	Cortland Housing Assistance Council	**Ground Elevation:**		**Checked By:**	CMK	**Sheet:**	1 of 2
Location:	31 River Street, Cortland NY	**Drill Rig:**	7822DT	**Depth To Groundwater While Drilling:**			18.0
Started:	12/15/2022	**Drill Method:**	3.25" HSA	**Depth To Groundwater Before Auger Removal:**			17.2
Completed:	12/15/2022	**Driller:**	D. Green	**Depth To Groundwater After Auger Removal:**			DRY

Depth (ft)	Sample Type	Recovery (inch)	Blow Count Per 6 inches	Graphic Log	N (bpf)	USCS Material Description	Strata Change Depth (ft.)	Pocket Penet. (tsf)	Moisture Content (%)
			1			**TOPSOIL**	0.5		
1	SPT	8	3		7	**(CL-ML) MEDIUM STIFF, BROWN GRAVELLY SILTY CLAY WITH SAND, MOIST**			
			4						
2			4						
			4						
3	SPT	2	5		11	**SIMILAR SOIL, STIFF, MOIST**			15.3
			6						
4			5						
			6			**SIMILAR SOIL, STIFF, MOIST**			
5	SPT	15	4		10		5.0		
			6			**(GW) LOOSE, BROWN WELL-GRADED GRAVEL WITH SAND AND SILT, MOIST**			
6			10						
			25						
7	SPT	4	50/.4		100	**SIMILAR SOIL, VERY DENSE, MOIST**			6.4
			16						
8			32						
	SPT	13	40		72	**SIMILAR SOIL, VERY DENSE, MOIST**			
9			50/.3						4.7
10									
11									
12									
13									
	SPT	10	27		50	**SIMILAR SOIL, DENSE, WET**			
14			30						
			20						
15			25						
16									
17									
18									
	SPT	10	10		100	**SIMILAR SOIL, VERY DENSE, WET**			
19			50/.3			**(CONTINUED ONTO NEXT SHEET)**			6.9
20									

Kenney Geotechnical Services

Geotechnical Boring Log

Project Name:	Cortland Senior Housing	**Project Number:**	2022-204	**Logged By:**	NM	**Boring Number**	B-8
Client:	Cortland Housing Assistance Council	**Ground Elevation:**		**Checked By:**	CMK	**Sheet:**	2 of 2
Location:	31 River Street, Cortland NY	**Drill Rig:**	7822DT	**Depth To Groundwater While Drilling:**			18.0
Started:	12/15/2022	**Drill Method:**	3.25" HSA	**Depth To Groundwater Before Auger Removal:**			17.2
Completed:	12/15/2022	**Driller:**	D. Green	**Depth To Groundwater After Auger Removal:**			DRY

Depth (ft)	Sample Type	Recovery (inch)	Blow Count Per 6 inches	Graphic Log	N (bpf)	USCS Material Description	Strata Change Depth (ft.)	Pocket Penet. (tsf)	Moisture Content (%)
21									
22									
23									
	SPT	3	50/.4		100	**SIMILAR SOIL, VERY DENSE, WET**			
						Bottom of Boring: 23.4 FT	Cave Depth: 7.7 FT		

Kenney Geotechnical Services

Geotechnical Boring Log

Project Name:	Cortland Senior Housing	**Project Number:**	2022-204	**Logged By:**	NM	**Boring Number**	B-9
Client:	Cortland Housing Assistance Council	**Ground Elevation:**		**Checked By:**	CMK	**Sheet:**	1 of 1
Location:	31 River Street, Cortland NY	**Drill Rig:**	7822DT	**Depth To Groundwater While Drilling:**			DRY
Started:	12/15/2022	**Drill Method:**	3.25" HSA	**Depth To Groundwater Before Auger Removal:**			DRY
Completed:	12/15/2022	**Driller:**	D. Green	**Depth To Groundwater After Auger Removal:**			DRY

Depth (ft)	Sample Type	Recovery (inch)	Blow Count Per 6 inches	Graphic Log	N (bpf)	USCS Material Description	Strata Change Depth (ft.)	Pocket Penet. (tsf)	Moisture Content (%)
			2			**TOPSOIL**	0.7		
1	SPT	8	2		5	**(GC-GM) LOOSE, BROWN CLAYEY SILTY GRAVEL WITH SAND, MOIST**			
			3						
2			2						
			1						
3	SPT	3	2		4	**SIMILAR SOIL, VERY LOOSE, MOIST**			
			2						
4			1						
			1			**SIMILAR SOIL, LOOSE, MOIST**			
5	SPT	9	1		6		5.0		
			5			**(GW) LOOSE, WELL-GRADED GRAVEL WITH SAND, MOIST**			
6			6						
			16			**SIMILAR SOIL, DENSE, MOIST**			
7	SPT	15	25		50				
			25						
8			30						

Bottom of Boring: 8.0 FT | Cave Depth: 4.7 FT

Kenney Geotechnical Services

Geotechnical Boring Log

Project Name:	Cortland Senior Housing	**Project Number:**	2022-204	**Logged By:**	NM	**Boring Number**	B-10
Client:	Cortland Housing Assistance Council	**Ground Elevation:**		**Checked By:**	CMK	**Sheet:**	1 of 1
Location:	31 River Street, Cortland NY	**Drill Rig:**	7822DT	**Depth To Groundwater While Drilling:**			DRY
Started:	12/15/2022	**Drill Method:**	3.25" HSA	**Depth To Groundwater Before Auger Removal:**			DRY
Completed:	12/15/2022	**Driller:**	D. Green	**Depth To Groundwater After Auger Removal:**			DRY

Depth (ft)	Sample Type	Recovery (inch)	Blow Count Per 6 inches	Graphic Log	N (bpf)	USCS Material Description	Strata Change Depth (ft.)	Pocket Penet. (tsf)	Moisture Content (%)
			WH			**TOPSOIL**	0.8		
1	SPT	9	1		2	**(CL-ML) VERY SOFT, BROWN SANDY SILTY CLAY WITH ROOT HAIRS, MOIST**			
			1						
2			2						
	SPT	7	3		8	**SIMILAR SOIL, MEDIUM STIFF, MOIST**	2.5		
3			4			**(GC-GM) LOOSE, BROWN CLAYEY SILTY GRAVEL WITH SAND, MOIST**			
			4						
4			2						
	SPT	12	3		10	**SIMILAR SOIL, LOOSE, MOIST**			
5			4						
			6						
6			12						
	SPT	15	50/.4		100	**SIMILAR SOIL, VERY DENSE, MOIST**			

Bottom of Boring: 6.4 FT | Cave Depth: 4.7 FT

Kenney Geotechnical Services

Geotechnical Boring Log

Project Name:	Cortland Senior Housing	**Project Number:**	2022-204	**Logged By:**	NM	**Boring Number**	B-11
Client:	Cortland Housing Assistance Council	**Ground Elevation:**		**Checked By:**	CMK	**Sheet:**	1 of 1
Location:	31 River Street, Cortland NY	**Drill Rig:**	7822DT	**Depth To Groundwater While Drilling:**			DRY
Started:	12/15/2022	**Drill Method:**	3.25" HSA	**Depth To Groundwater Before Auger Removal:**			DRY
Completed:	12/15/2022	**Driller:**	D. Green	**Depth To Groundwater After Auger Removal:**			DRY

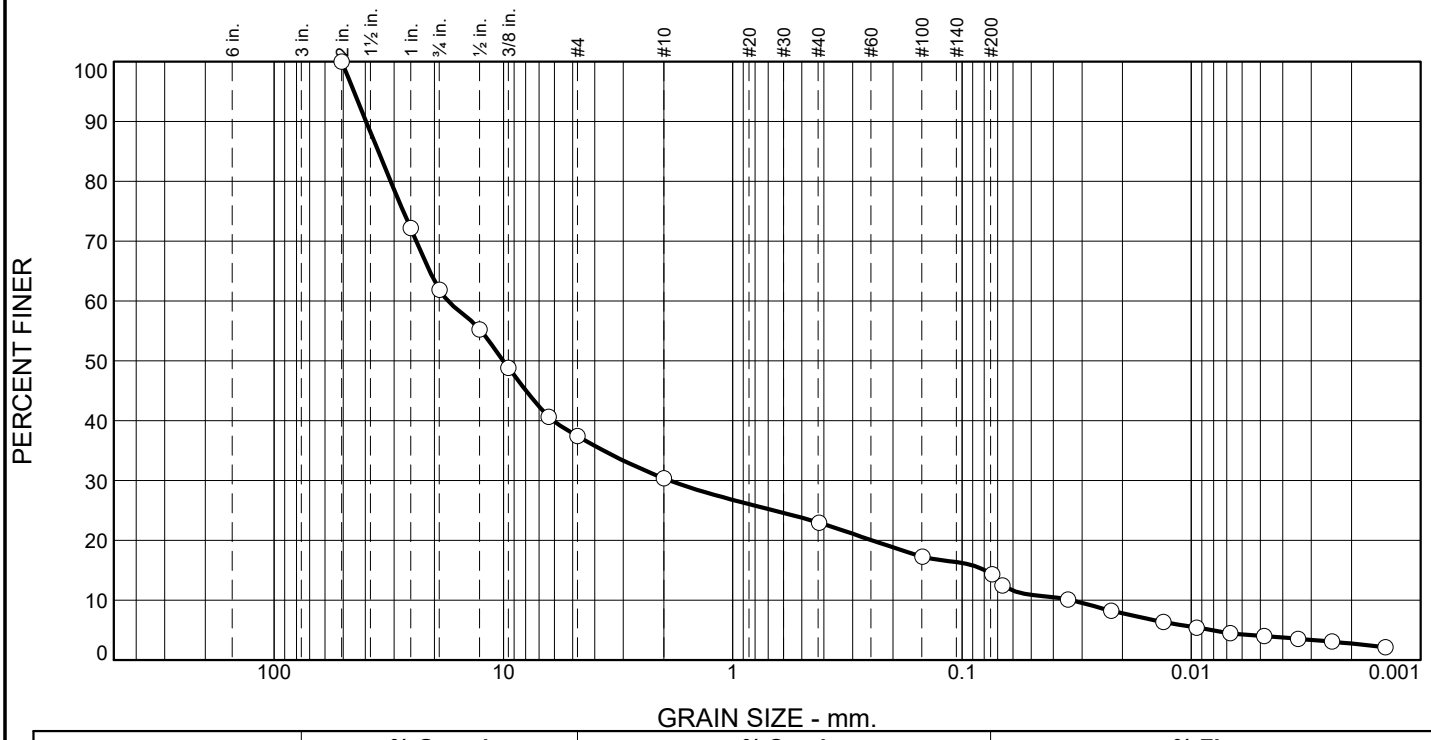
Depth (ft)	Sample Type	Recovery (inch)	Blow Count Per 6 inches	Graphic Log	N (bpf)	USCS Material Description	Strata Change Depth (ft.)	Pocket Penet. (tsf)	Moisture Content (%)
	SPT	9	1		4	**TOPSOIL - OL: (CL-ML) SOFT, BROWN GRAVELLY SILTY CLAY WITH ORGANICS, MOIST**	0.8		
1			2						
			2			**(GC-GM) VERY LOOSE, BROWN CLAYEY SILTY GRAVEL WITH SAND, MOIST**			
2			2						
	SPT	7	3		10				
3			5			**SIMILAR SOIL, LOOSE, MOIST**			
			5						
4			6						
	SPT	12	3		34	**SIMILAR SOIL, DENSE, MOIST**	4.5		
5			14			**(GW) DENSE, GREY/BROWN WELL-GRADED GRAVEL WITH SAND, MOIST**			
			20						
6			30						
	SPT	15	20		70	**SIMILAR SOIL, VERY DENSE, MOIST**			
7			32						
			38						
8			45						

Bottom of Boring: 8.0 FT | Cave Depth: 4.3 FT

LABORATORY TESTING RESULTS

Particle Size Distribution Report

ASTM D422 & D1140



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0	38	25	7	7	9	10	4

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_C	C_U
○			35.1396	17.4432	10.0345	1.8823	0.0795	0.0333	6.09	523.23

	Material Description	USCS	AASHTO
○	Clayey Silty Gravel with Sand	GC-GM	

Project No. 2022-204 **Client:** Cortland Housing Assistance Council

Project: Cortland Senior Housing

○ **Source of Sample:** B-1 **Depth:** 5.0' **Sample Number:** 4.0'-6.0'

Remarks:

○ Kenney Geotechnical
Engineering Services, PLLC
6901 Herman Road
Syracuse, NY 13209
(315) 638-2706

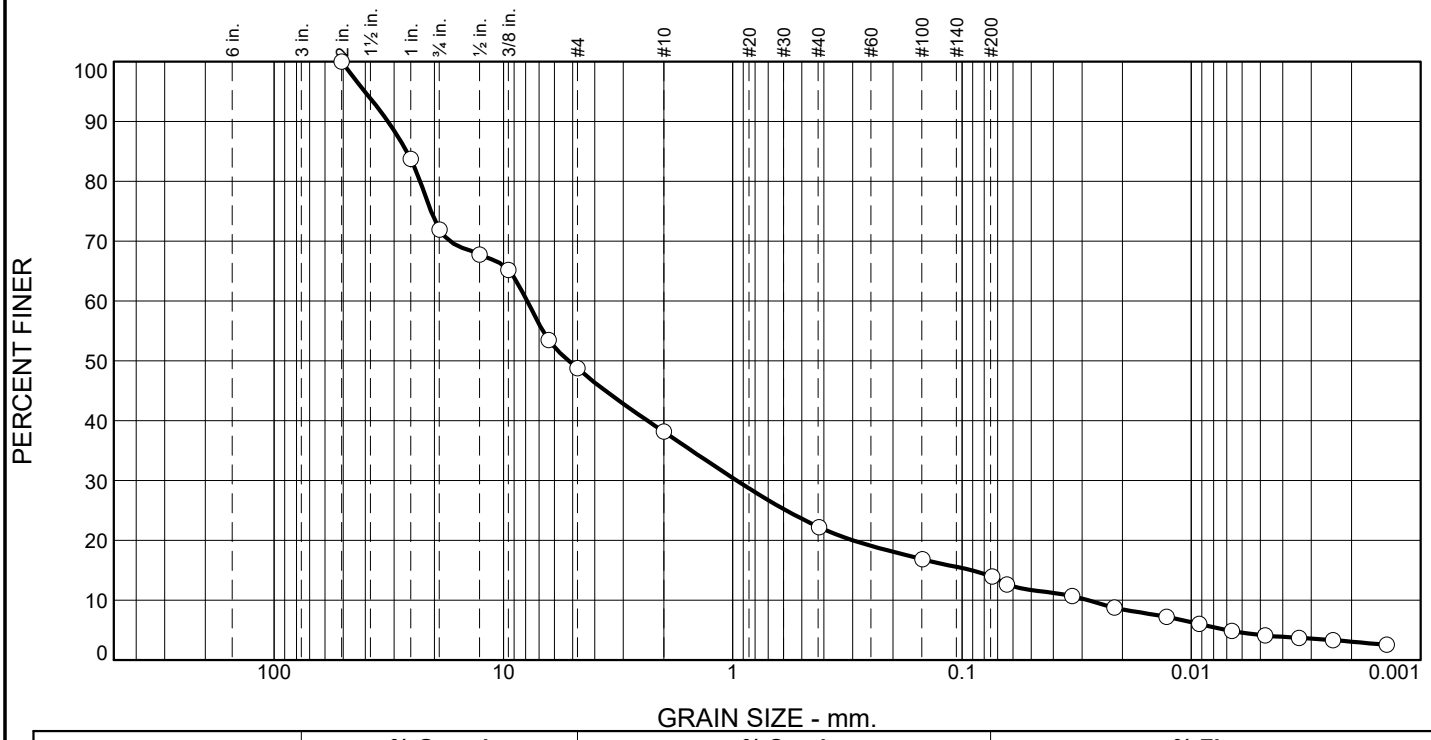
Kenney Geotechnical Services

Figure

Tested By: BE **Checked By:** CMK

Particle Size Distribution Report

ASTM D422 & D1140



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0	28	23	11	16	8	10	4

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_C	C_U
○			26.4292	7.8844	5.1962	0.9619	0.0906	0.0283	4.15	278.87

Material Description	USCS	AASHTO
○ Clayey Silty Gravel with Sand	GC-GM	

Project No. 2022-204 **Client:** Cortland Housing Assistance Council

Project: Cortland Senior Housing

○ **Source of Sample:** B-7 **Depth:** 7.0' **Sample Number:** 6.0'-8.0'

Remarks:

○ Kenney Geotechnical
Engineering Services, PLLC
6901 Herman Road
Syracuse, NY 13209
(315) 638-2706

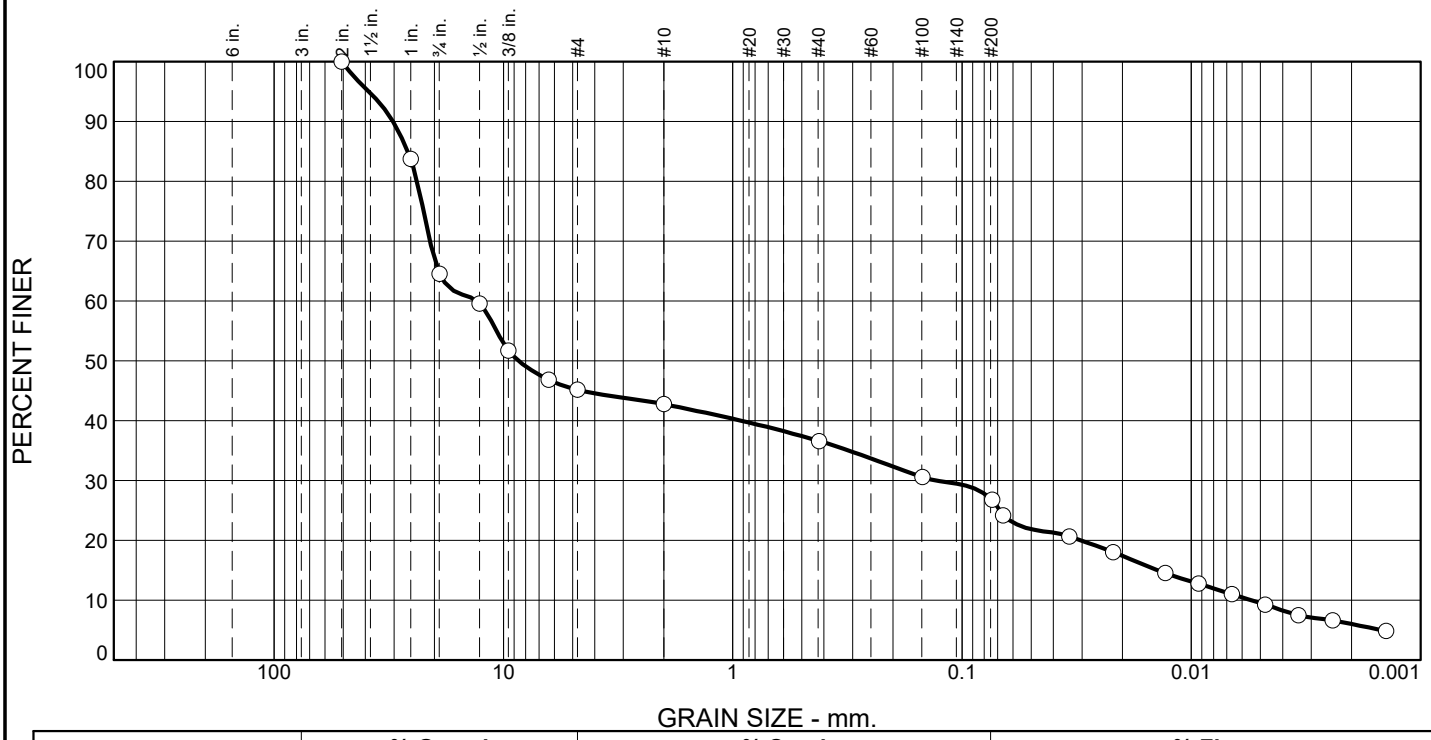
Kenney Geotechnical Services

Figure

Tested By: BE **Checked By:** CMK

Particle Size Distribution Report

ASTM D422 & D1140



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0	35	20	2	6	10	17	10

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_C	C_U
○			26.1578	13.0865	8.5828	0.1293	0.0140	0.0055	0.23	2383.38

Material Description	USCS	AASHTO
○ Clayey Silty Gravel with Sand	GC-GM	

Project No. 2022-204 **Client:** Cortland Housing Assistance Council

Project: Cortland Senior Housing

○ **Source of Sample:** B-9 **Depth:** 3.0' **Sample Number:** 2.0'-4.0'

Remarks:

○ Kenney Geotechnical
Engineering Services, PLLC
6901 Herman Road
Syracuse, NY 13209
(315) 638-2706

Kenney Geotechnical Services

Figure

Tested By: BE **Checked By:** CMK

Kenney Geotechnical Engineering Services, PLLC
Office: 6901 Herman Road, Syracuse, NY 13209
Mail :P.O. Box 117 Warners, NY 13164
Phone: (315) 638-2706 Fax: (315) 638-1544

Project No.:	**2022-204**	**Date:**	**12/22/2022**
Project Name:	**Cortland Senior Housing**		

Natural Moisture Content
ASTM D2216

Sample:	**B-3, 0'-2'**	**B-3, 2'-4'**	**B-3, 4'-6'**	**B-3, 6'-8'**	**B-3, 8'-10'**	**B-3, 13'-15'**	**B-3, 18'-20'**	**B-3, 23'-25'**
Tare Name:	Fish	WLAP	Pike	Larry	MAX	REX	Duck	Link
Tare Weight:	14.15	13.66	14.18	14.5	13.63	14.37	14.3	14.38
Tare + Wet Sample Wt.:	53.79	68.3	51.55	62.55	54.97	70.57	68.19	66.52
Tare + Dry Sample Wt.:	49	63.74	48.96	60.67	52.89	66.44	64.61	62.25
H20 Wt.:	4.8	4.6	2.6	1.9	2.1	4.1	3.6	4.3
Dry Sample Wt.:	34.9	50.1	34.8	46.2	39.3	52.1	50.3	47.9
MC = (H20 Wt. / Dry Sample Wt.) x 100:	13.7	9.1	7.4	4.1	5.3	7.9	7.1	8.9

Sample:	**B-8, 2'-4'**	**B-8, 6'-8'**	**B-8, 8'-10'**	**B-8, 18'-20'**
Tare Name:	A99	NCIS	Zebra	Gas
Tare Weight:	14.16	14.25	14.77	13.93
Tare + Wet Sample Wt.:	59.52	49.99	65.59	64.43
Tare + Dry Sample Wt.:	53.5	47.84	63.32	61.18
H20 Wt.:	6.0	2.2	2.3	3.3
Dry Sample Wt.:	39.3	33.6	48.6	47.3
MC = (H20 Wt. / Dry Sample Wt.) x 100:	15.3	6.4	4.7	6.9

APPENDIX B

Extreme Precipitation Tables

Northeast Regional Climate Center

Data represents point estimates calculated from partial duration series. All precipitation amounts are displayed in inches.

Metadata for Point

Smoothing
No

State
New York

Location
New York, United States

Latitude
42.607 degrees North

Longitude
76.162 degrees West

Elevation
330 feet

Date/Time
Thu Jun 26 2025 10:22:10 GMT-0400 (Eastern Daylight Time)

Extreme Precipitation Estimates

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.28	0.43	0.52	0.70	0.86	0.98	1yr	0.74	0.95	1.09	1.36	1.67	1.97	2.25	1yr	1.74	2.17	2.61	3.17	3.63	1yr
2yr	0.32	0.50	0.61	0.83	1.03	1.16	2yr	0.89	1.13	1.28	1.59	1.94	2.35	2.64	2yr	2.08	2.54	2.97	3.56	4.10	2yr
5yr	0.38	0.59	0.73	1.00	1.28	1.44	5yr	1.10	1.41	1.58	1.94	2.39	2.88	3.22	5yr	2.55	3.10	3.61	4.26	4.87	5yr
10yr	0.44	0.67	0.84	1.17	1.51	1.70	10yr	1.30	1.66	1.87	2.25	2.80	3.36	3.75	10yr	2.97	3.60	4.18	4.88	5.55	10yr
25yr	0.53	0.81	1.00	1.43	1.89	2.12	25yr	1.63	2.07	2.32	2.75	3.46	4.12	4.58	25yr	3.65	4.41	5.09	5.84	6.61	25yr
50yr	0.61	0.93	1.15	1.66	2.23	2.51	50yr	1.93	2.45	2.73	3.20	4.06	4.81	5.34	50yr	4.26	5.14	5.91	6.69	7.54	50yr
100yr	0.71	1.07	1.34	1.93	2.65	2.97	100yr	2.29	2.91	3.22	3.72	4.77	5.62	6.23	100yr	4.98	5.99	6.87	7.66	8.61	100yr
200yr	0.82	1.23	1.56	2.26	3.15	3.53	200yr	2.71	3.45	3.81	4.34	5.61	6.57	7.28	200yr	5.82	7.00	7.99	8.78	9.84	200yr
500yr	1.00	1.48	1.91	2.78	3.95	4.43	500yr	3.41	4.33	4.75	5.31	6.94	8.09	8.94	500yr	7.16	8.60	9.77	10.52	11.73	500yr

Lower Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.25	0.39	0.47	0.63	0.78	0.88	1yr	0.67	0.86	0.99	1.15	1.50	1.87	2.12	1yr	1.65	2.04	2.49	2.97	3.44	1yr
2yr	0.31	0.49	0.60	0.81	1.00	1.11	2yr	0.86	1.09	1.24	1.53	1.87	2.29	2.57	2yr	2.03	2.47	2.90	3.48	4.02	2yr
5yr	0.35	0.54	0.67	0.92	1.18	1.33	5yr	1.02	1.30	1.46	1.80	2.22	2.71	3.03	5yr	2.40	2.91	3.40	4.05	4.61	5yr
10yr	0.39	0.60	0.74	1.03	1.33	1.51	10yr	1.15	1.48	1.66	2.01	2.51	3.07	3.42	10yr	2.72	3.29	3.80	4.53	5.13	10yr
25yr	0.44	0.67	0.83	1.18	1.55	1.79	25yr	1.34	1.75	1.96	2.32	2.91	3.63	4.02	25yr	3.21	3.87	4.44	5.25	5.90	25yr

50yr	0.48	0.73	0.91	1.30	1.75	2.04	50yr	1.51	1.99	2.21	2.58	3.25	4.11	4.54	50yr	3.64	4.37	4.98	5.88	6.55	50yr
100yr	0.53	0.80	1.00	1.44	1.98	2.31	100yr	1.71	2.26	2.50	2.88	3.63	4.66	5.13	100yr	4.13	4.93	5.58	6.59	7.27	100yr
200yr	0.58	0.88	1.11	1.61	2.24	2.63	200yr	1.93	2.57	2.84	3.19	4.05	5.28	5.80	200yr	4.67	5.57	6.24	7.38	8.07	200yr
500yr	0.82	1.22	1.57	2.28	3.25	3.13	500yr	2.80	3.06	3.35	3.67	4.69	6.22	6.82	500yr	5.50	6.55	7.24	8.56	9.27	500yr

Upper Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.30	0.46	0.56	0.75	0.92	1.04	1yr	0.80	1.02	1.19	1.50	1.81	2.07	2.37	1yr	1.83	2.28	2.78	3.34	3.79	1yr
2yr	0.34	0.53	0.65	0.88	1.08	1.20	2yr	0.93	1.18	1.33	1.65	2.02	2.42	2.71	2yr	2.14	2.61	3.04	3.65	4.20	2yr
5yr	0.41	0.63	0.78	1.08	1.37	1.57	5yr	1.18	1.54	1.71	2.10	2.57	3.06	3.41	5yr	2.71	3.28	3.81	4.50	5.16	5yr
10yr	0.48	0.74	0.92	1.29	1.67	1.94	10yr	1.44	1.90	2.07	2.53	3.14	3.67	4.06	10yr	3.24	3.91	4.53	5.27	6.02	10yr
25yr	0.61	0.92	1.15	1.64	2.15	2.58	25yr	1.86	2.52	2.69	3.26	4.07	4.67	5.15	25yr	4.13	4.95	5.70	6.50	7.43	25yr
50yr	0.72	1.09	1.36	1.95	2.62	3.19	50yr	2.26	3.12	3.27	3.96	4.97	5.62	6.18	50yr	4.97	5.94	6.79	7.62	8.71	50yr
100yr	0.85	1.29	1.61	2.33	3.19	3.96	100yr	2.76	3.87	3.97	4.82	6.07	6.76	7.41	100yr	5.98	7.12	8.11	8.95	10.21	100yr
200yr	1.01	1.52	1.93	2.79	3.89	4.90	200yr	3.35	4.79	4.83	5.86	7.42	8.13	8.90	200yr	7.20	8.56	9.69	10.50	11.99	200yr
500yr	1.18	1.75	2.26	3.28	4.66	6.53	500yr	4.02	6.39	6.26	7.60	9.69	10.42	11.34	500yr	9.22	10.90	12.31	12.96	14.82	500yr

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APPENDIX C



EXDA-1A



EXDA-1B

Subcat Reach Pond Link

Routing Diagram for Riverview
Prepared by R Z Engineering, PLLC, Printed 6/30/2025
HydroCAD® 10.20-6a s/n 05023 © 2024 HydroCAD Software Solutions LLC

Summary for Subcatchment 25S: EXDA-1B

Runoff = 0.08 cfs @ 13.59 hrs, Volume= 0.035 af, Depth> 0.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Rainfall=5.62"

	Area (sf)	CN	Description
	32,521	30	Woods, Good, HSG A
	45,370	39	>75% Grass cover, Good, HSG A
	35,953	30	Brush, Good, HSG A
*	1,235	98	Unconnected CONCRETE, HSG A
	3,023	98	Paved roads w/curbs & sewers, HSG A
	118,102	36	Weighted Average
	113,844		96.39% Pervious Area
	4,258		3.61% Impervious Area
	1,235		29.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
54.3	150	0.0260	0.05		**Sheet Flow, EXDA-1-TC1-SHEET WOODS** Woods: Dense underbrush n= 0.800 P2= 2.35"
2.6	250	0.0100	1.61		**Shallow Concentrated Flow, EXDA-1-TC2-SHALLOW WOODS & G** Unpaved Kv= 16.1 fps
56.9	400	Total			

Summary for Subcatchment 26S: EXDA-1A

Runoff = 0.01 cfs @ 18.96 hrs, Volume= 0.002 af, Depth> 0.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Rainfall=5.62"

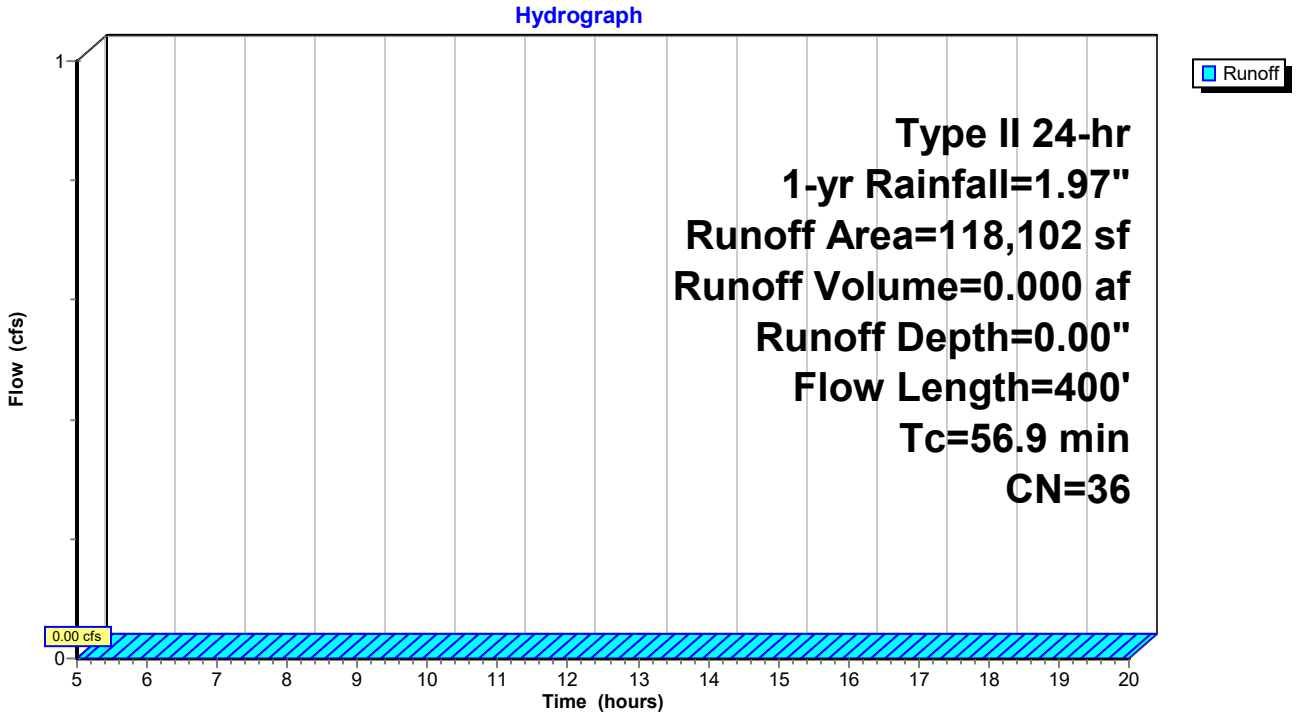
Area (sf)	CN	Description
6,995	30	Meadow, non-grazed, HSG A
17,478	30	Woods, Good, HSG A
29,435	30	Brush, Good, HSG A
53,908	30	Weighted Average
53,908		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.8	100	0.0050	0.09		**Sheet Flow, EXDA-2-TC1-SHEET BRUSH** Range n= 0.130 P2= 2.35"
0.4	25	0.0050	1.14		**Shallow Concentrated Flow, EXDA-2-TC2-SHALLOW BRUSH** Unpaved Kv= 16.1 fps
0.1	47	0.2780	8.49		**Shallow Concentrated Flow, EXDA-2-TC3-SHALLOW WOODS** Unpaved Kv= 16.1 fps
18.3	172	Total			

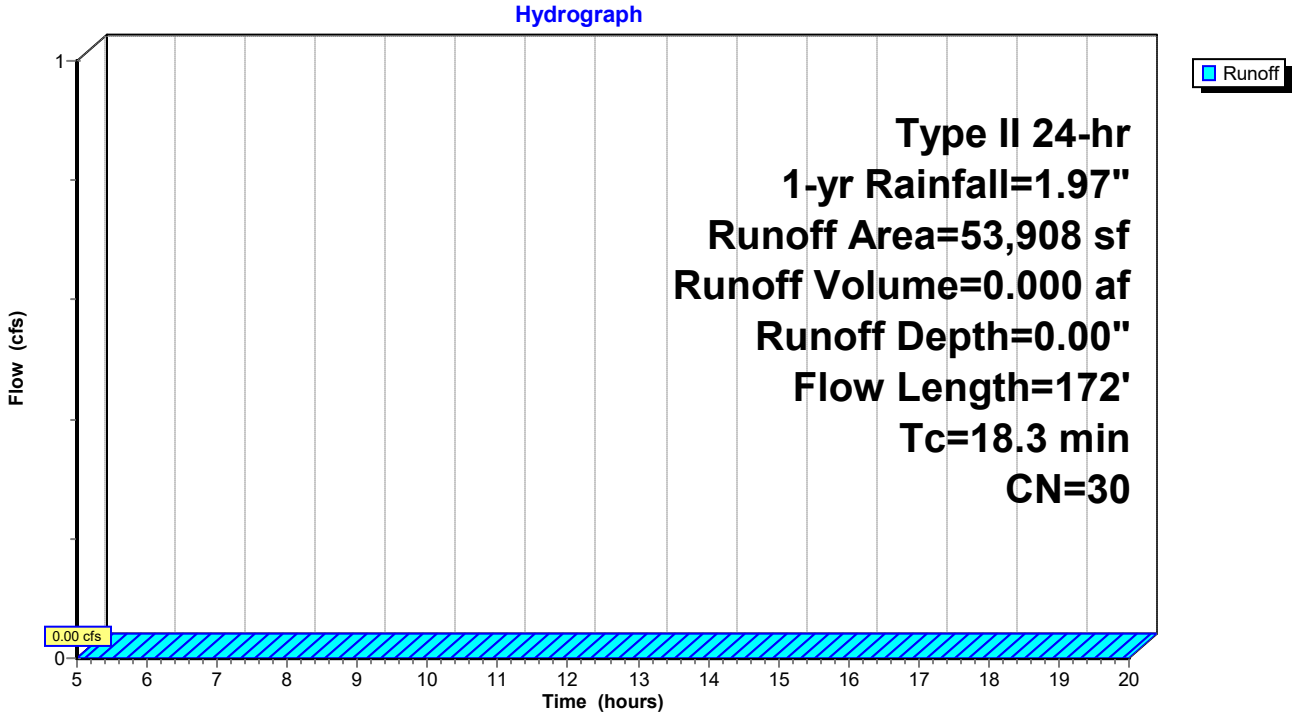
Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	1-yr	Type II 24-hr		Default	24.00	1	1.97	2
2	2-yr	Type II 24-hr		Default	24.00	1	2.35	2
3	5-yr	Type II 24-hr		Default	24.00	1	2.88	2
4	10-yr	Type II 24-hr		Default	24.00	1	3.36	2
5	25-yr	Type II 24-hr		Default	24.00	1	4.12	2
6	50-yr	Type II 24-hr		Default	24.00	1	4.81	2
7	100-yr	Type II 24-hr		Default	24.00	1	5.62	2

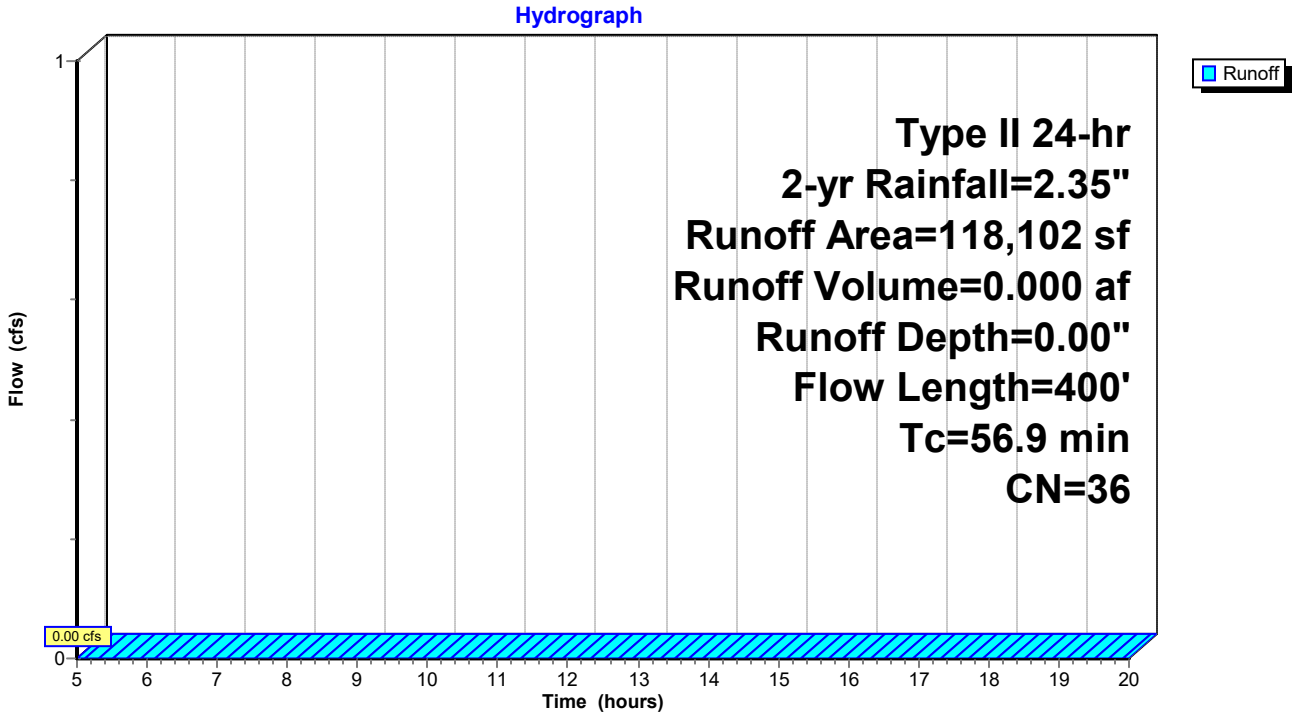
Subcatchment 25S: EXDA-1B



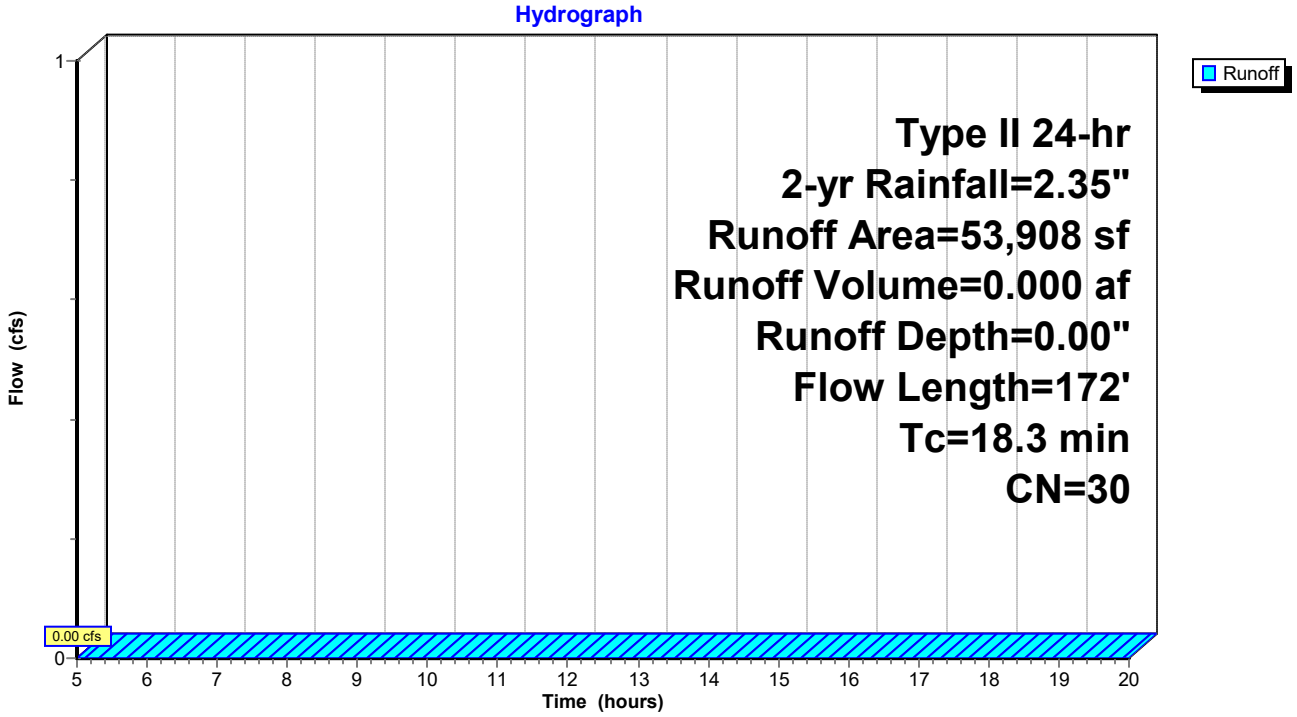
Subcatchment 26S: EXDA-1A



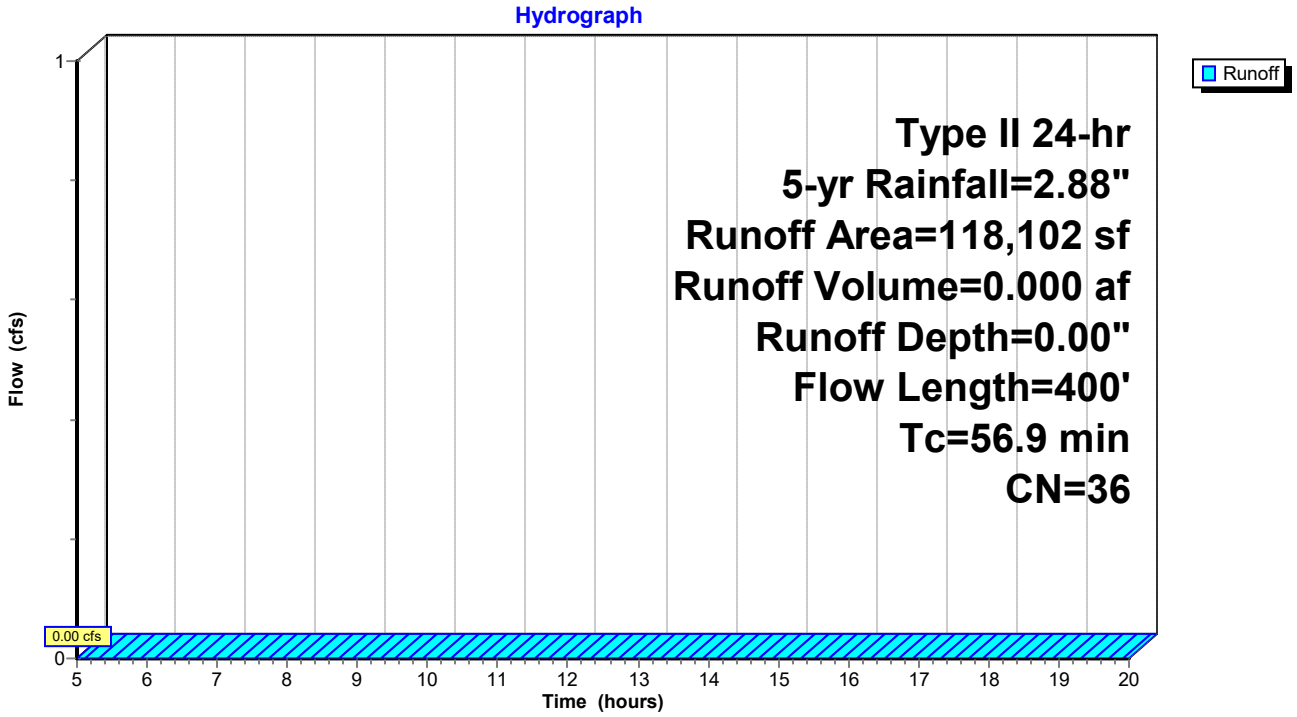
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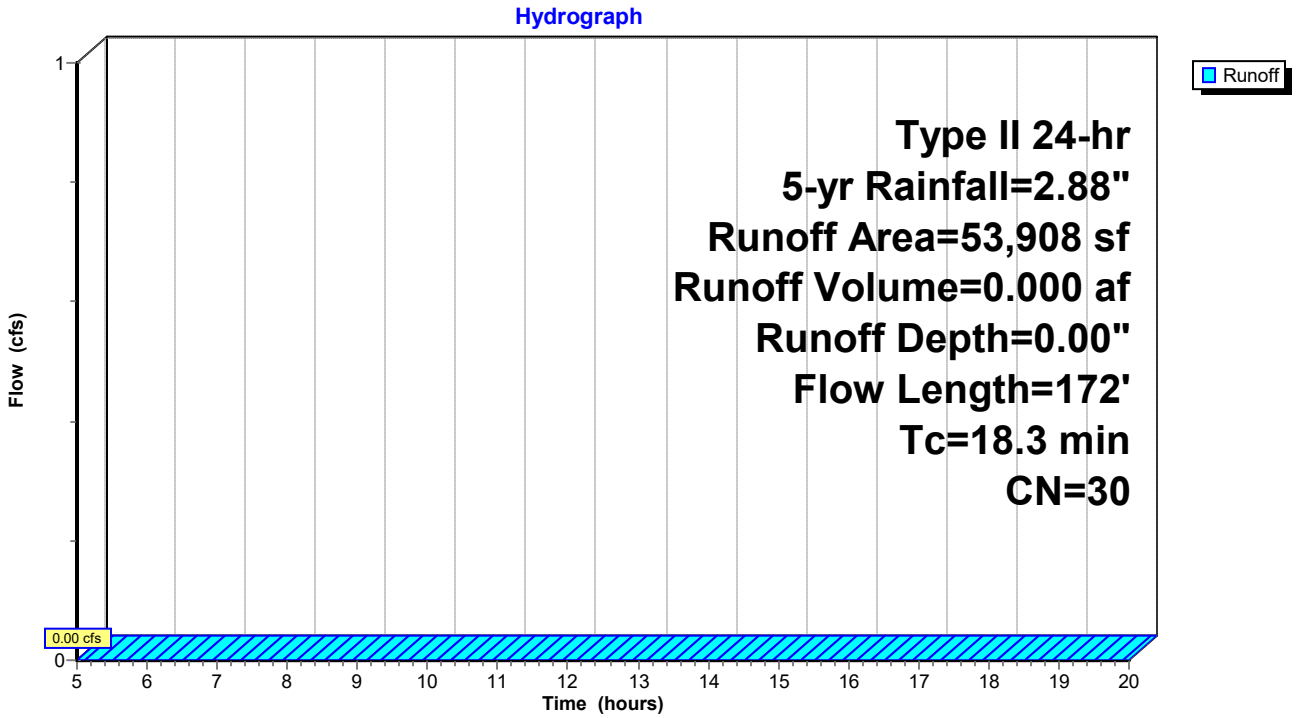
Subcatchment 26S: EXDA-1A



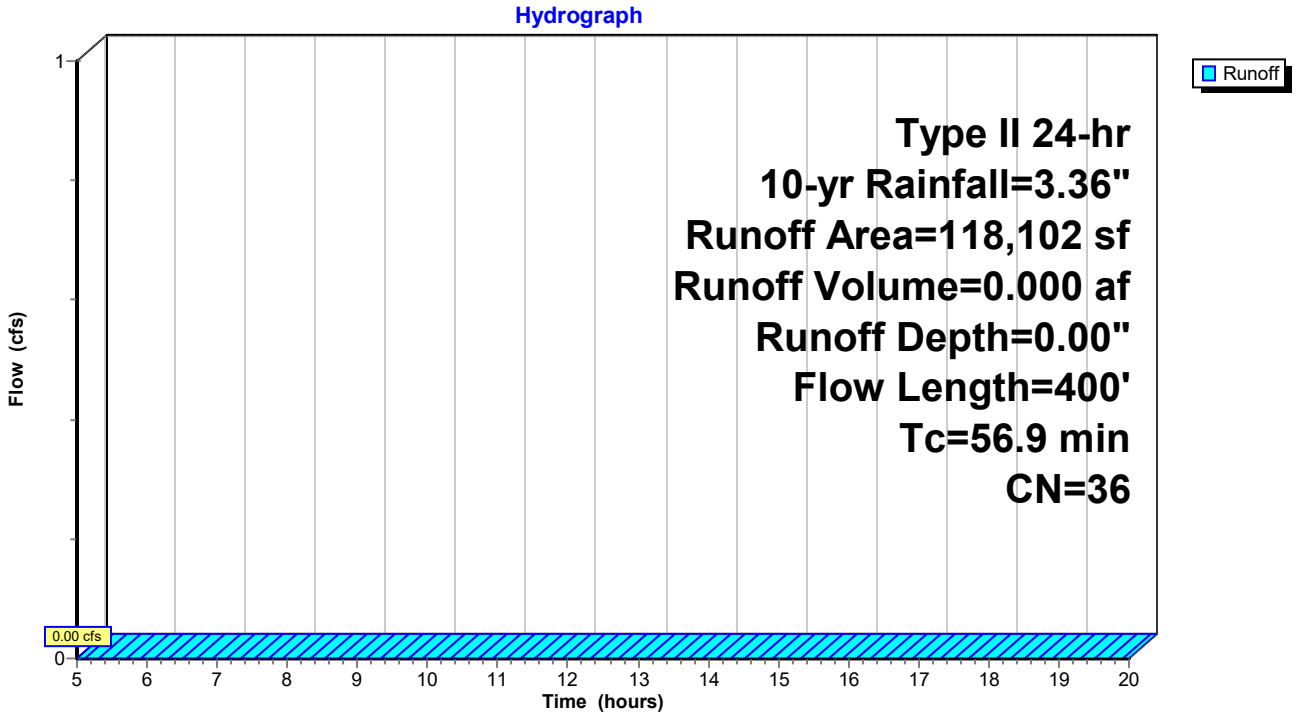
Subcatchment 25S: EXDA-1B



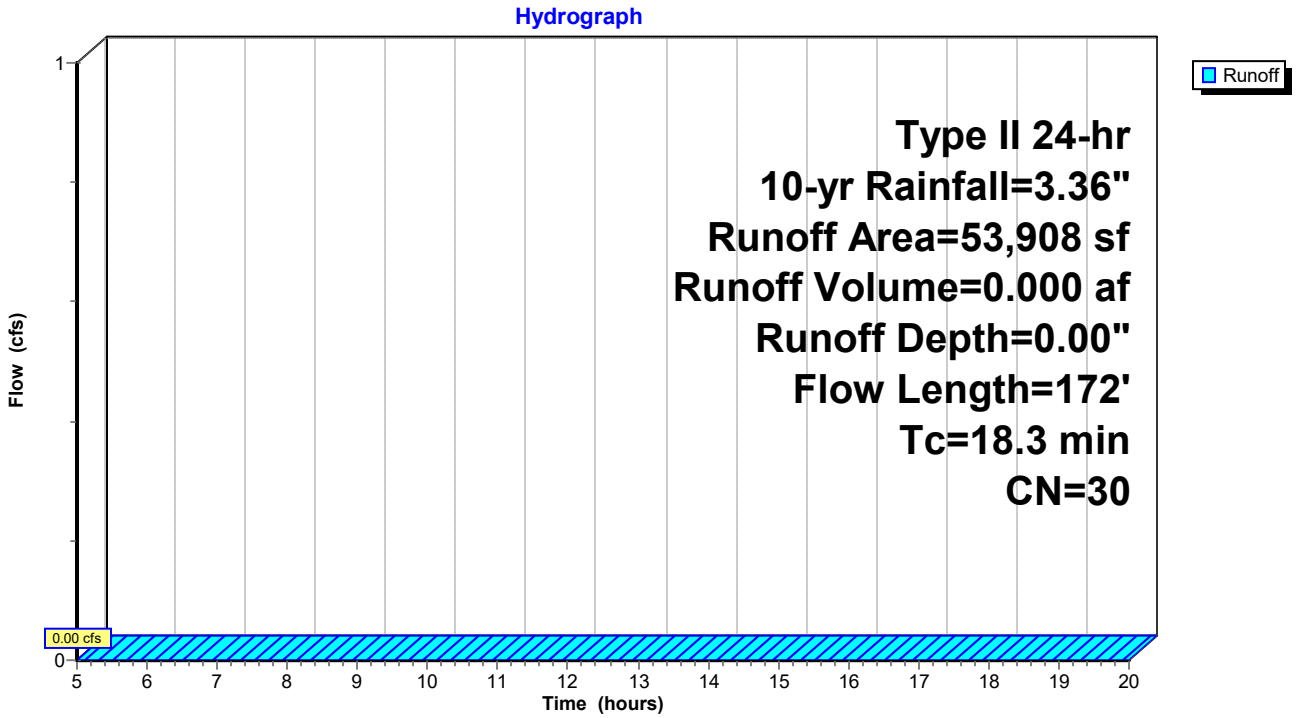
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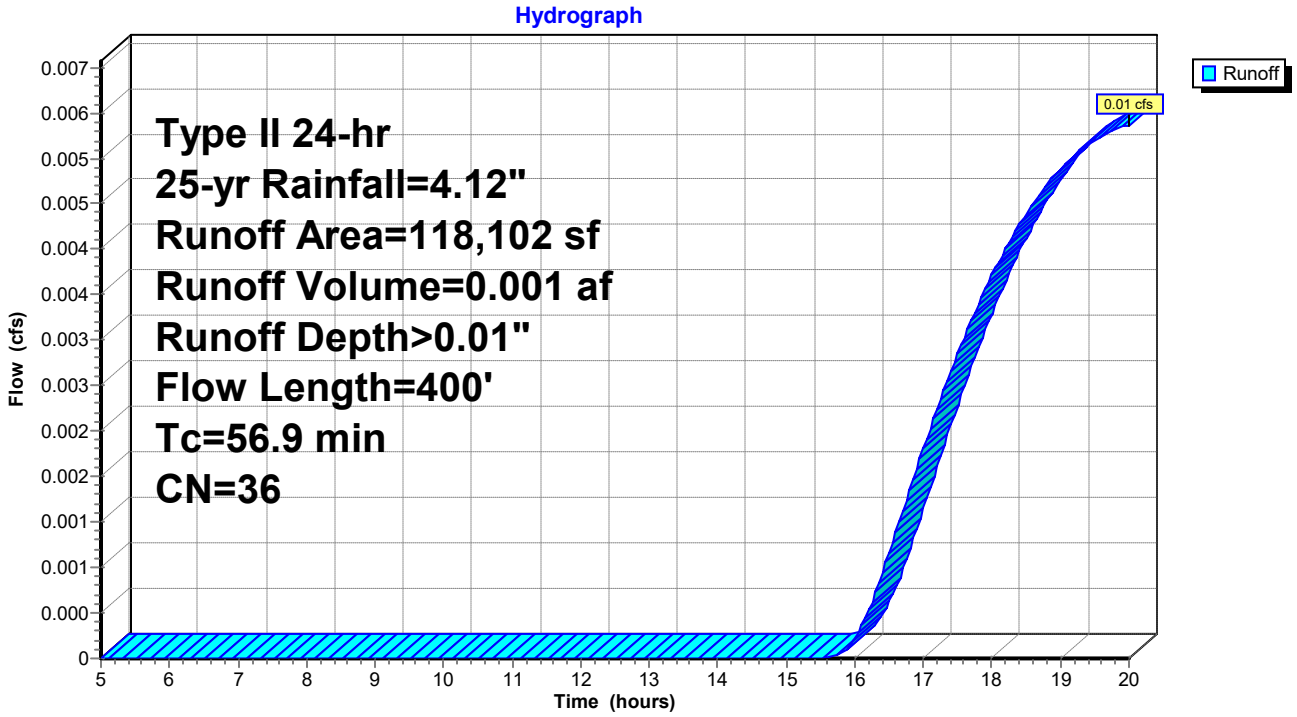
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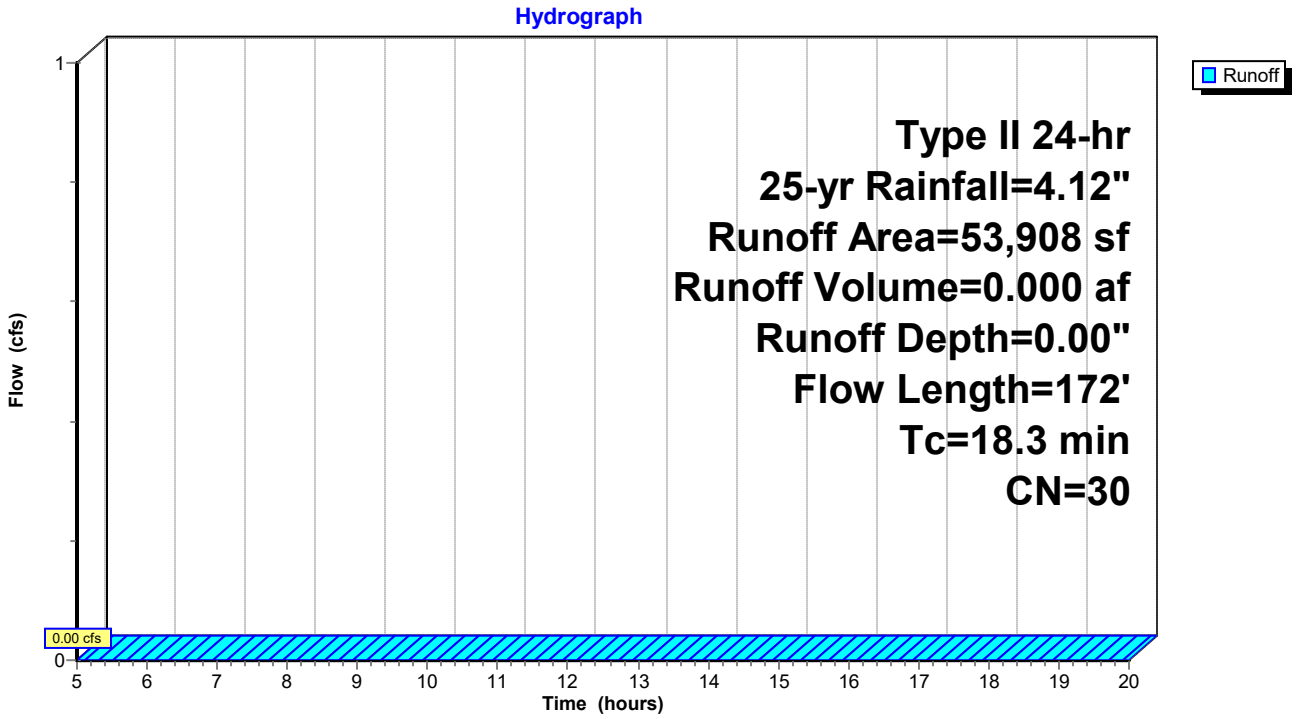
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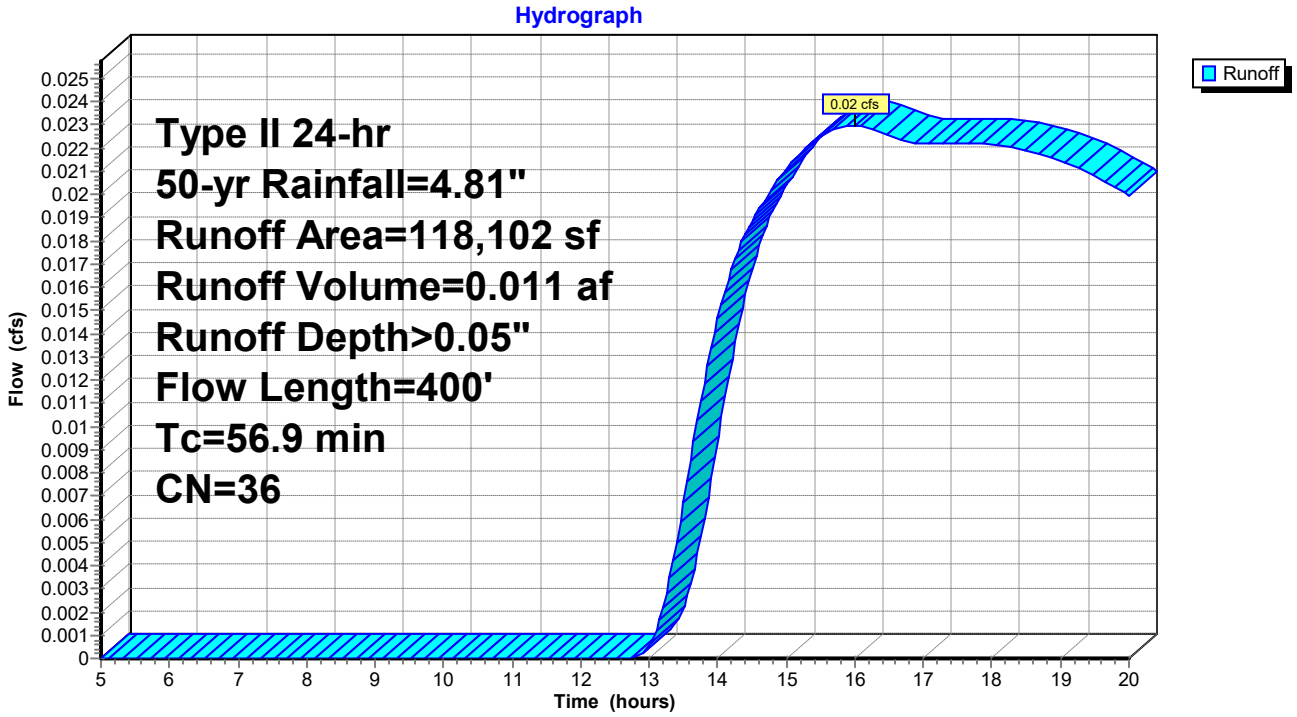
Subcatchment 25S: EXDA-1B



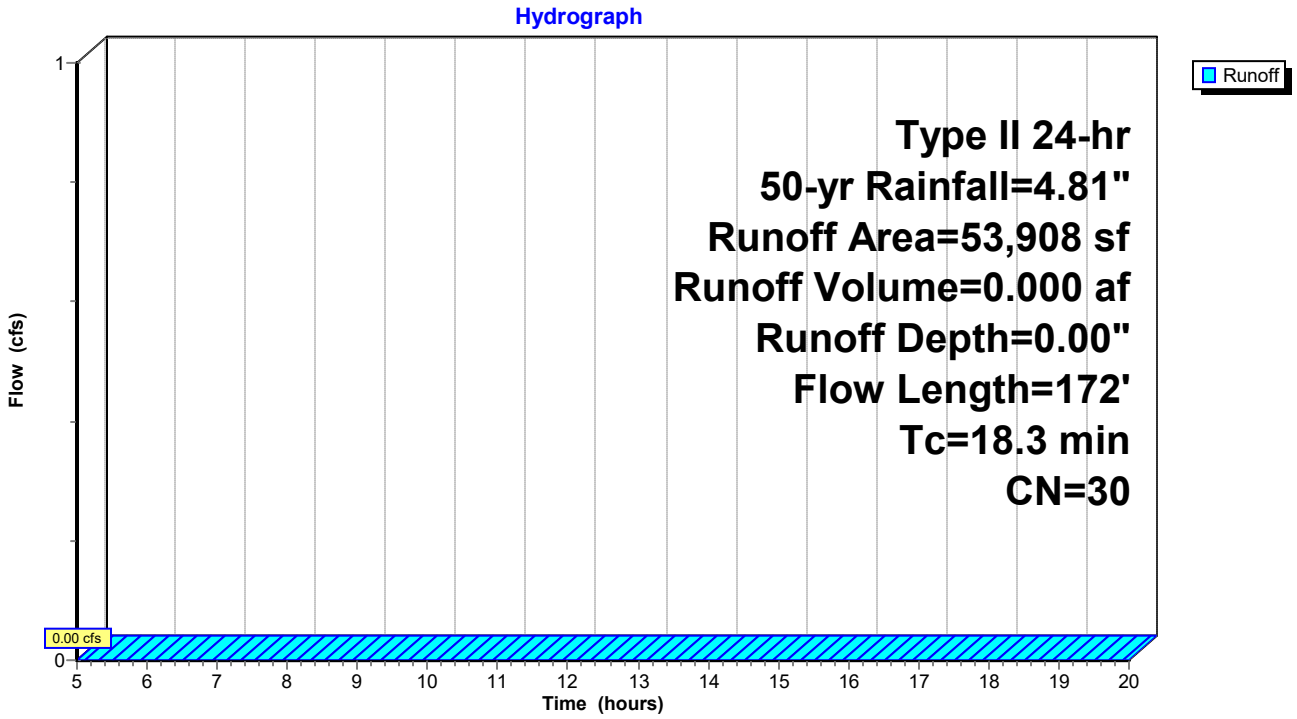
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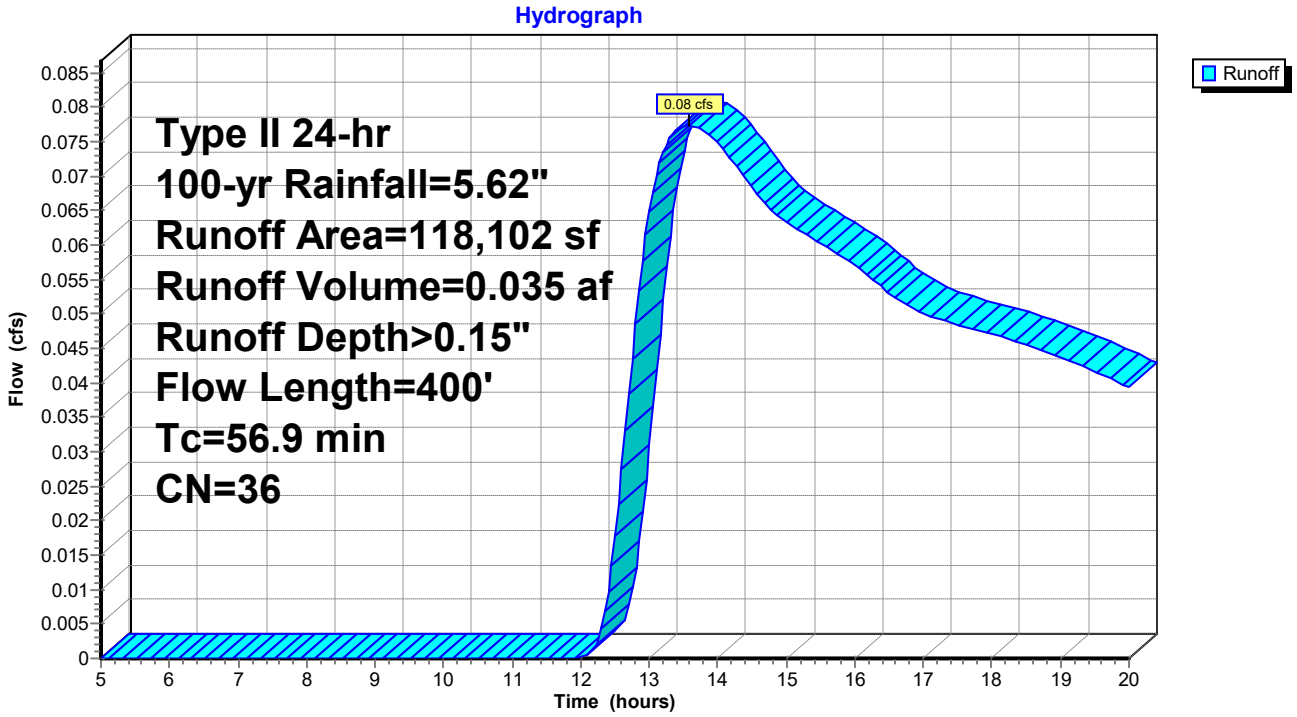
Subcatchment 25S: EXDA-1B



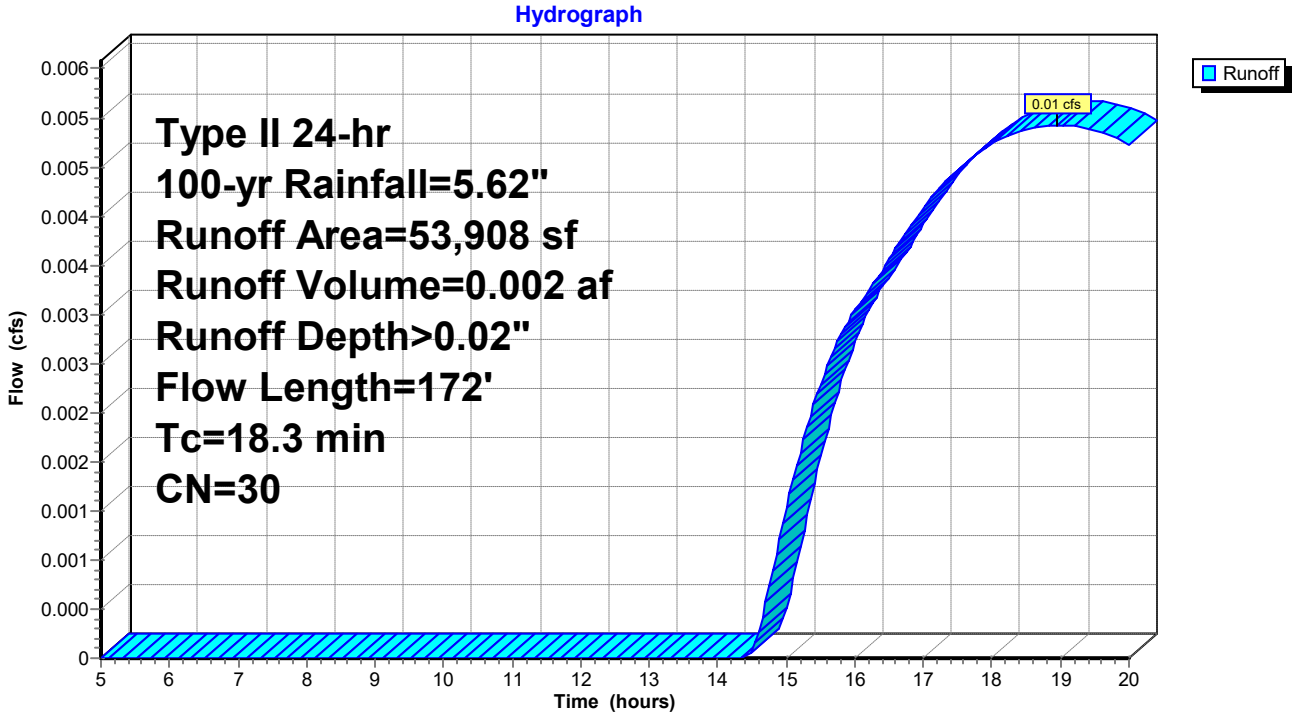
Subcatchment 26S: EXDA-1A



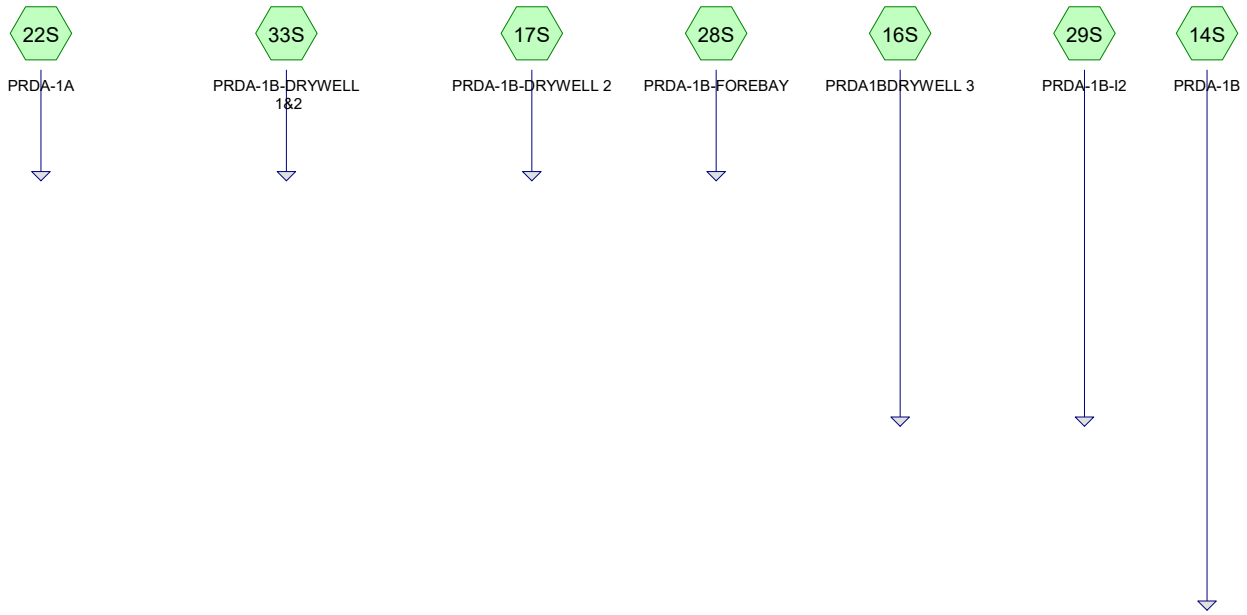
Subcatchment 25S: EXDA-1B



Subcatchment 26S: EXDA-1A



APPENDIX D



Subcat Reach Pond Link

Routing Diagram for Riverview
Prepared by R Z Engineering, PLLC, Printed 6/30/2025
HydroCAD® 10.20-6a s/n 05023 © 2024 HydroCAD Software Solutions LLC

Summary for Subcatchment 14S: PRDA-1B

Runoff = 0.01 cfs @ 14.90 hrs, Volume= 0.006 af, Depth> 0.08"
Routed to Reach 19R : TIOUGHNIOGA RIVER

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Rainfall=5.62"

Area (sf)	CN	Description
25,113	30	Woods, Good, HSG A
15,567	39	>75% Grass cover, Good, HSG A
40,680	33	Weighted Average
40,680		100.00% Pervious Area

Summary for Subcatchment 16S: PRDA1BDRYWELL 3

Runoff = 0.00 cfs @ 11.95 hrs, Volume= 0.000 af, Depth> 0.28"
Routed to Pond 31P : DRYWELL 4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Rainfall=5.62"

Area (sf)	CN	Description
367	39	>75% Grass cover, Good, HSG A
367		100.00% Pervious Area

Summary for Subcatchment 17S: PRDA-1B-DRYWELL 2

Runoff = 2.47 cfs @ 11.91 hrs, Volume= 0.115 af, Depth> 4.60"
Routed to Pond 29P : DRYWELL 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Rainfall=5.62"

	Area (sf)	CN	Description
*	1,187	98	CONCRETE, HSG A
	11,084	98	Paved parking, HSG A
	776	39	>75% Grass cover, Good, HSG A
	13,047	94	Weighted Average
	776		5.95% Pervious Area
	12,271		94.05% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.3	100	0.0267	1.32		**Sheet Flow, PRTCDW3-1** Smooth surfaces n= 0.011 P2= 2.35"
0.7	135	0.0260	3.27		**Shallow Concentrated Flow, PRTC-D23 SHALLOW** Paved Kv= 20.3 fps
2.0	235	Total			

Summary for Subcatchment 22S: PRDA-1A

Runoff = 0.08 cfs @ 12.09 hrs, Volume= 0.017 af, Depth> 0.23"
Routed to Reach 34R : RIVER (DOWNSTREAM)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Rainfall=5.62"

	Area (sf)	CN	Adj	Description
	16,401	30		Woods, Good, HSG A
	18,362	39		>75% Grass cover, Good, HSG A
*	3,985	98		Unconnected concrete, HSG A
*	115	98		Unconnected roofs, HSG A
	38,863	41	38	Weighted Average, UI Adjusted
	34,763			89.45% Pervious Area
	4,100			10.55% Impervious Area
	4,100			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.7	100	0.0400	0.19		**Sheet Flow, PRDA-2B-TC1-SHEET** Grass: Short n= 0.150 P2= 2.35"
0.0	20	0.4500	10.80		**Shallow Concentrated Flow, tc2** Unpaved Kv= 16.1 fps
8.7	120	Total			

Summary for Subcatchment 28S: PRDA-1B-FOREBAY

Runoff = 6.02 cfs @ 11.93 hrs, Volume= 0.239 af, Depth> 2.65"
Routed to Pond 18P : FOREBAY

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Rainfall=5.62"

	Area (sf)	CN	Description
	24,888	98	Paved parking, HSG A
	19,000	39	>75% Grass cover, Good, HSG A
*	3,316	98	CONCRETE, HSG A
	47,204	74	Weighted Average
	19,000		40.25% Pervious Area
	28,204		59.75% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.4	100	0.0200	1.18		**Sheet Flow, PRTC4-SHEETDW4** Smooth surfaces n= 0.011 P2= 2.35"
0.9	152	0.0200	2.87		**Shallow Concentrated Flow, PRTC4-DW4** Paved Kv= 20.3 fps
2.3	252	Total			

Summary for Subcatchment 29S: PRDA-1B-I2

Runoff = 3.65 cfs @ 11.98 hrs, Volume= 0.169 af, Depth> 3.20"
Routed to Pond 30P : I-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Rainfall=5.62"

	Area (sf)	CN	Description
	8,246	39	>75% Grass cover, Good, HSG A
*	591	98	Unconnected concrete, HSG A
	18,776	98	Unconnected roofs, HSG A
	27,613	80	Weighted Average
	8,246		29.86% Pervious Area
	19,367		70.14% Impervious Area
	19,367		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	140		0.47		**Direct Entry, ROOF**
0.6	50	0.0010	1.43	1.13	**Pipe Channel, TCP1** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior
0.1	22	0.1800	6.83		**Shallow Concentrated Flow, TC3 SHALLOW GRASS** Unpaved Kv= 16.1 fps
0.2	36	0.0050	3.21	2.52	**Pipe Channel, TCP4** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior
0.5	100	0.0050	3.21	2.52	**Pipe Channel, TCP5** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior
0.3	50	0.0050	3.21	2.52	**Pipe Channel, TCP6** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior
6.7	398	Total			

Summary for Subcatchment 33S: PRDA-1B-DRYWELL 1&2

Runoff = 0.02 cfs @ 12.14 hrs, Volume= 0.002 af, Depth> 0.40"
Routed to Pond 52P : DRYWELL 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Rainfall=5.62"

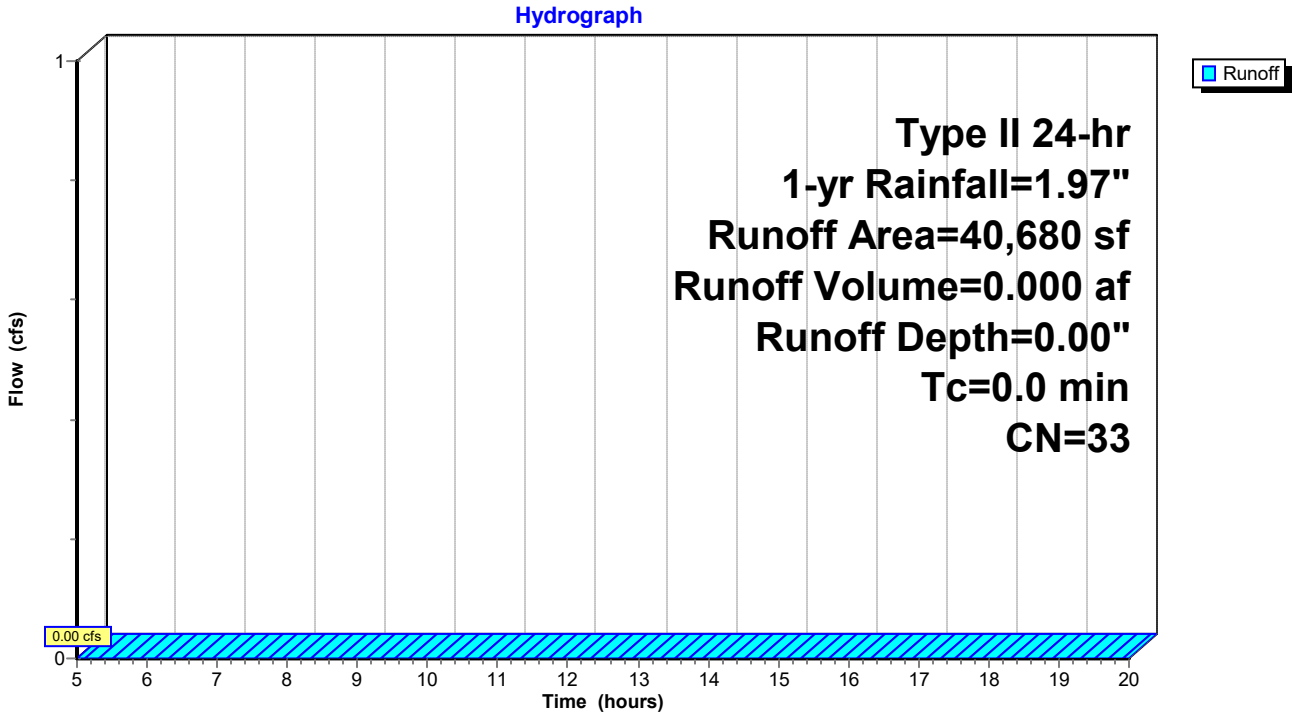
Area (sf)	CN	Adj	Description
325	98		Unconnected roofs, HSG A
2,760	39		>75% Grass cover, Good, HSG A
3,085	45	42	Weighted Average, UI Adjusted
2,760			89.47% Pervious Area
325			10.53% Impervious Area
325			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.1	100	0.0100	0.11		**Sheet Flow, tc1**
					Grass: Short n= 0.150 P2= 2.35"

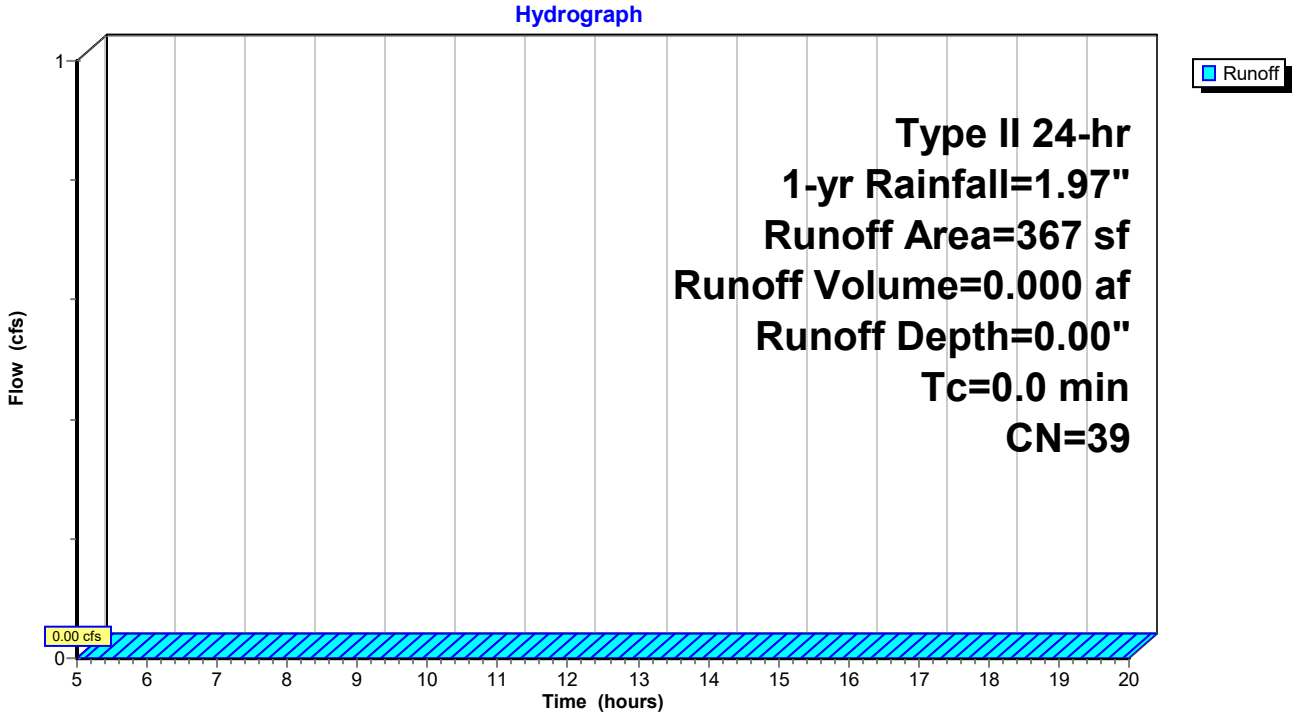
Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	1-yr	Type II 24-hr		Default	24.00	1	1.97	2
2	2-yr	Type II 24-hr		Default	24.00	1	2.35	2
3	5-yr	Type II 24-hr		Default	24.00	1	2.88	2
4	10-yr	Type II 24-hr		Default	24.00	1	3.36	2
5	25-yr	Type II 24-hr		Default	24.00	1	4.12	2
6	50-yr	Type II 24-hr		Default	24.00	1	4.81	2
7	100-yr	Type II 24-hr		Default	24.00	1	5.62	2

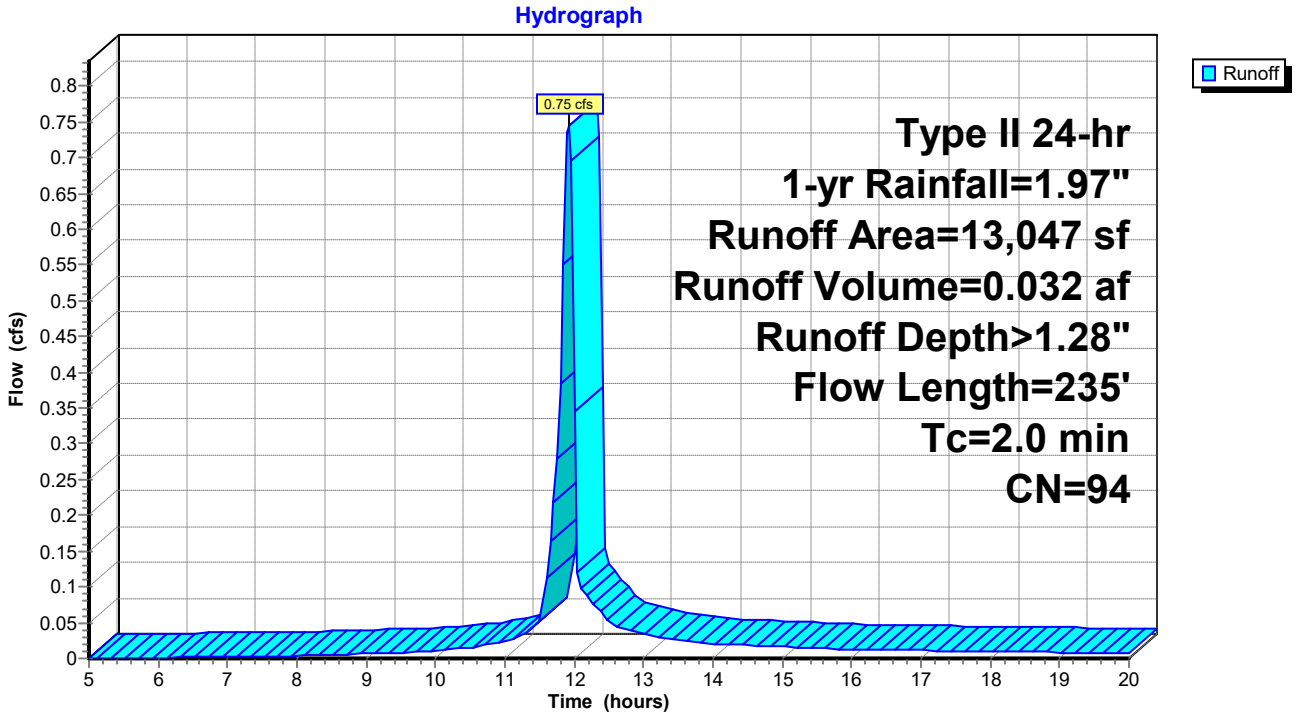
Subcatchment 14S: PRDA-1B



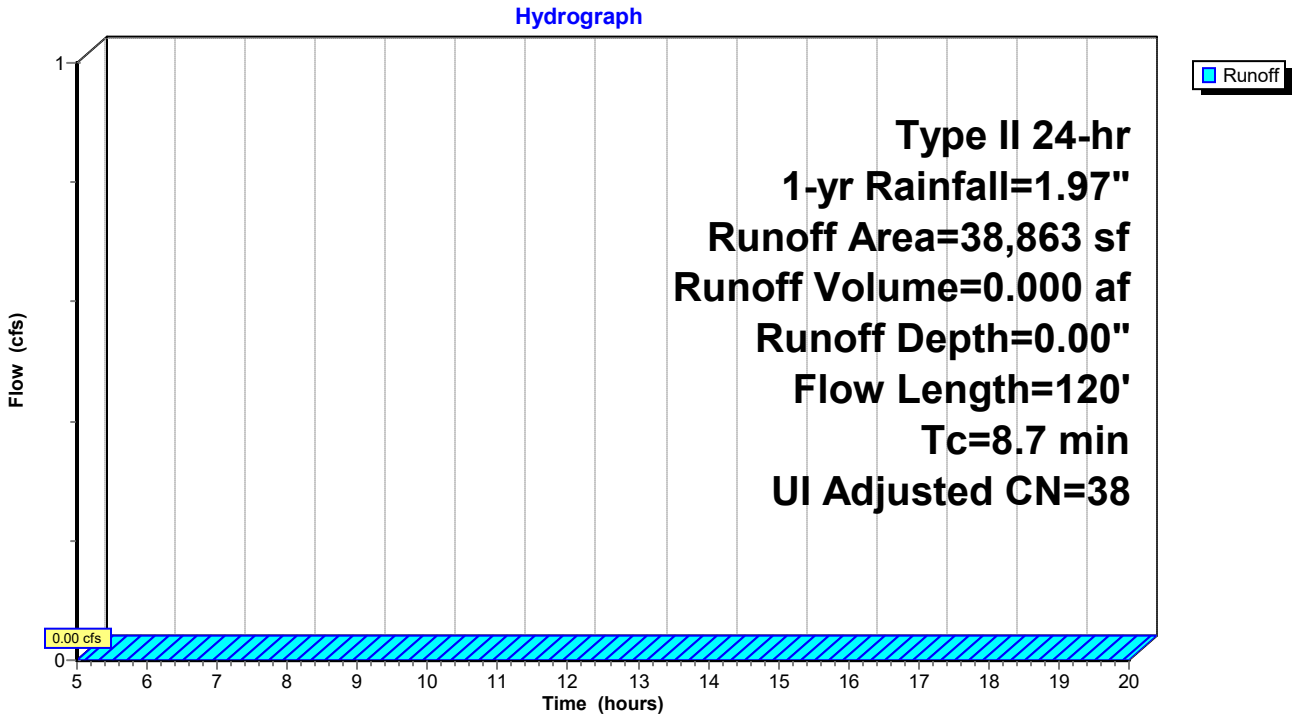
Subcatchment 16S: PRDA1BDRYWELL 3



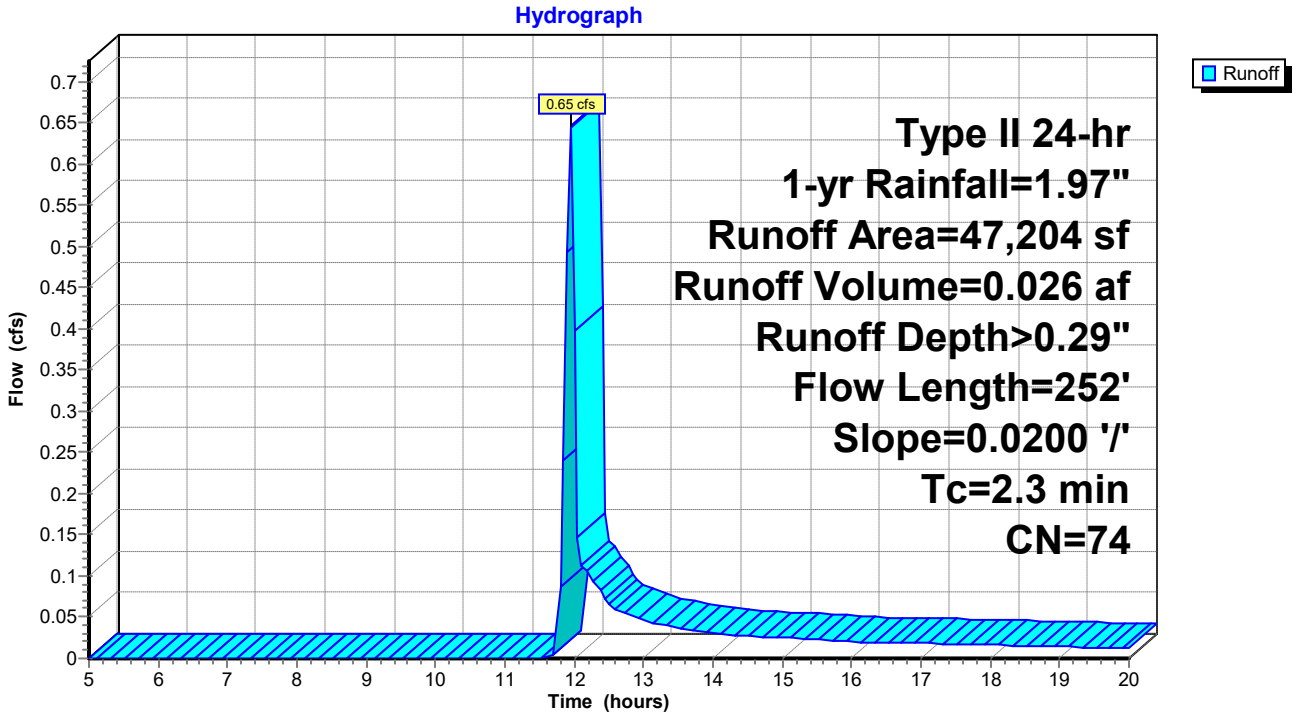
Subcatchment 17S: PRDA-1B-DRYWELL 2



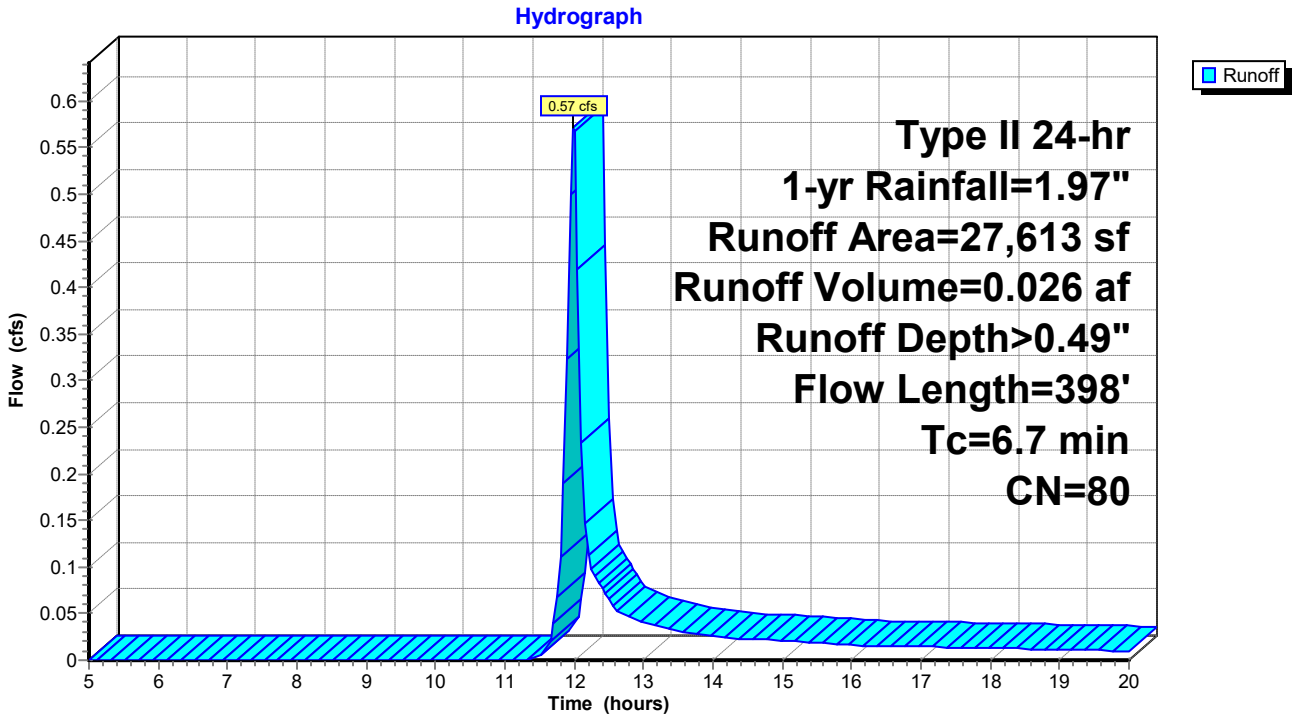
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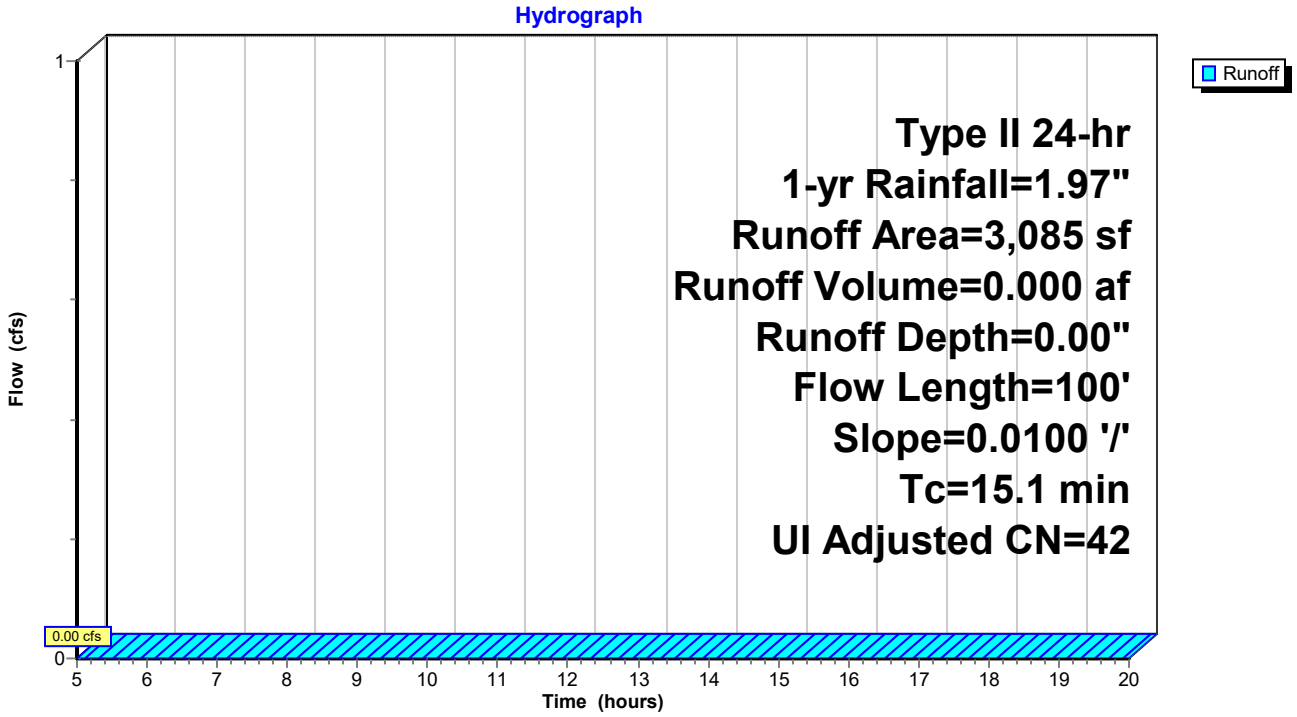
Subcatchment 28S: PRDA-1B-FOREBAY



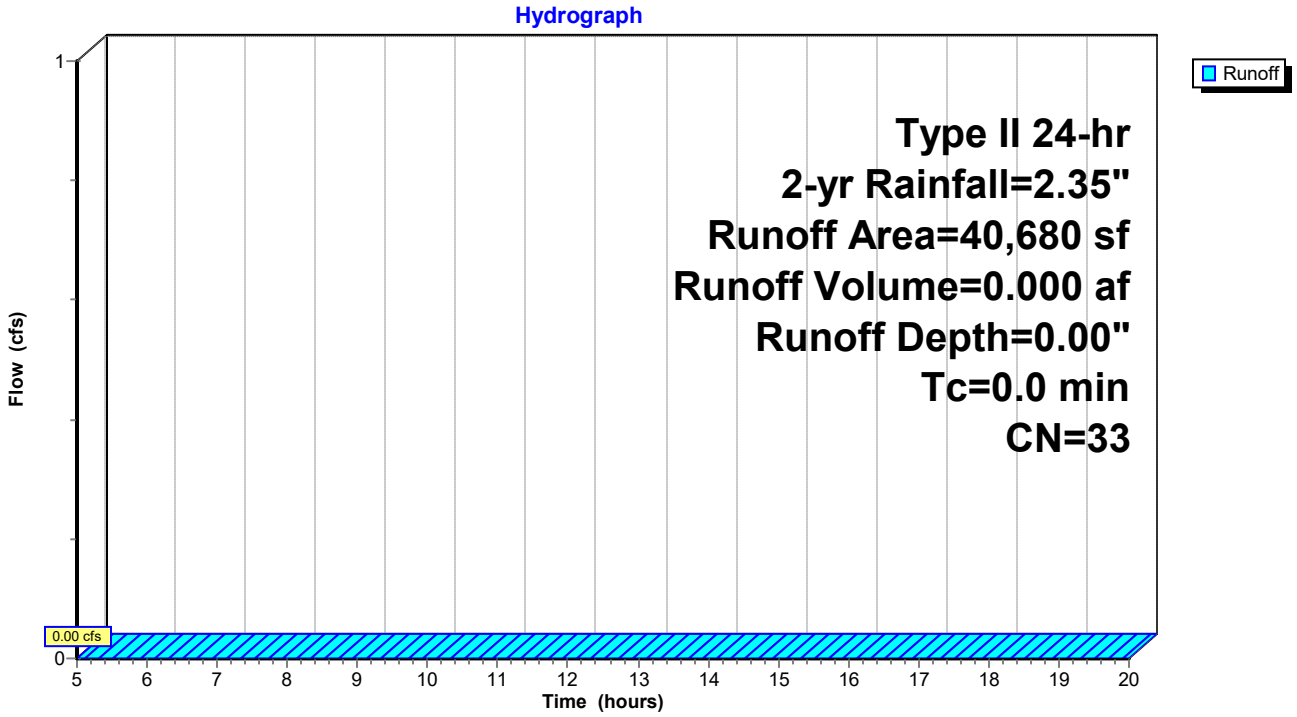
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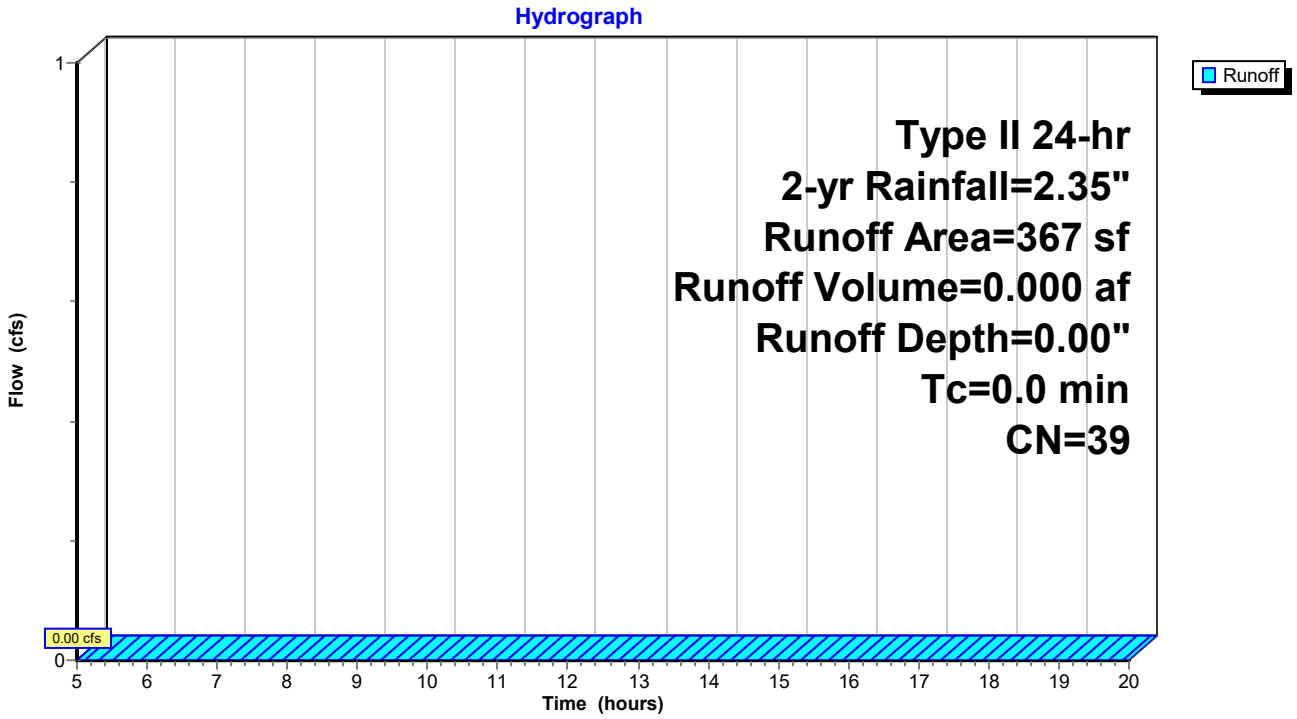
Subcatchment 33S: PRDA-1B-DRYWELL 1&2



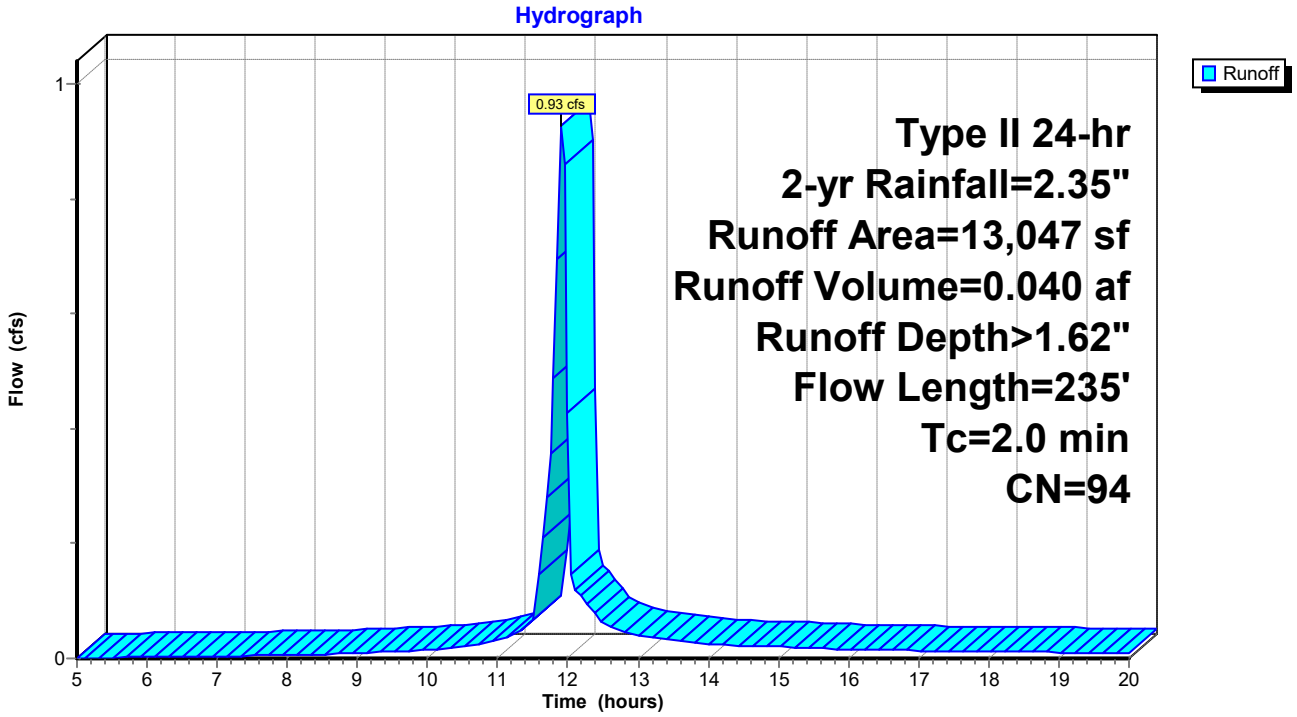
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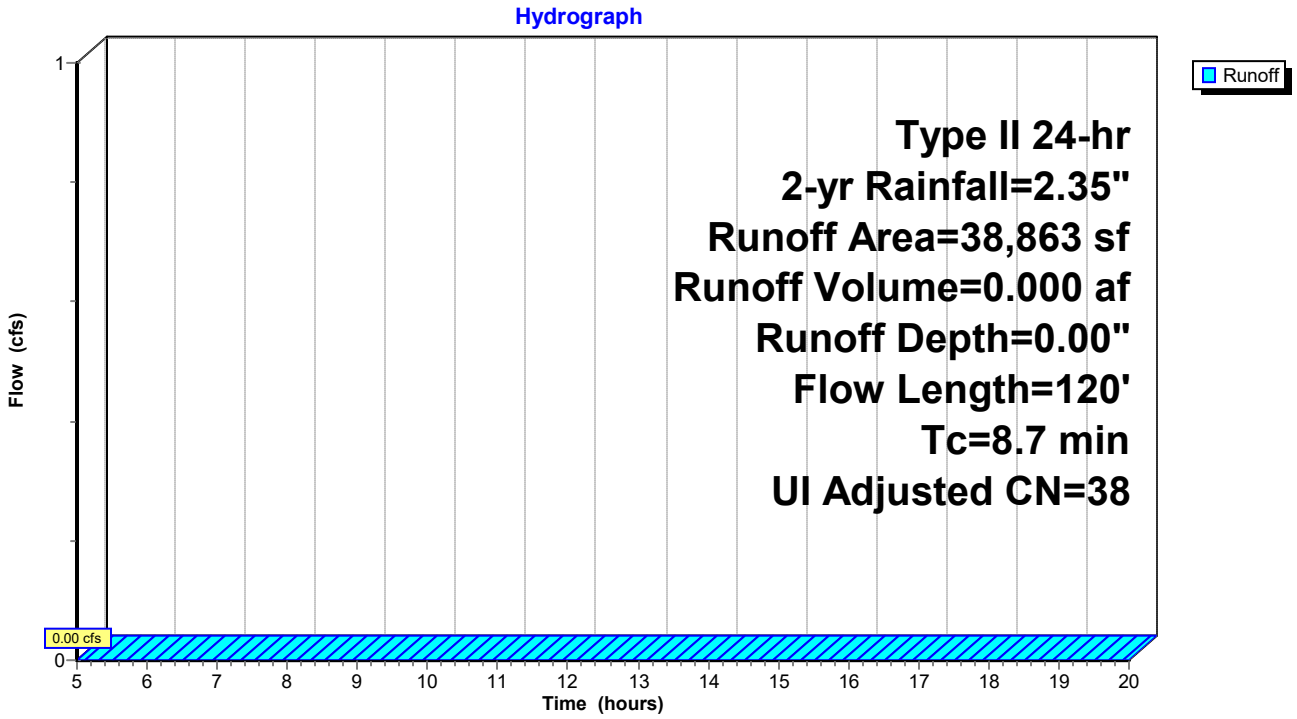
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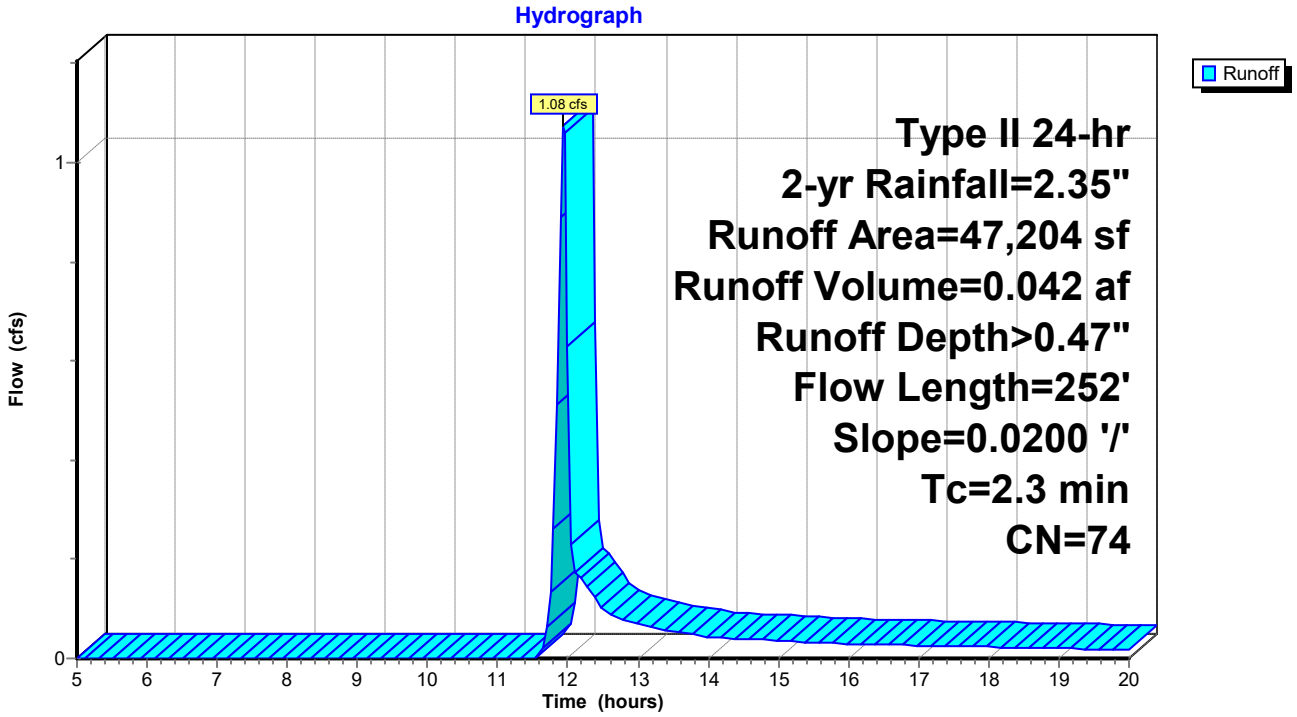
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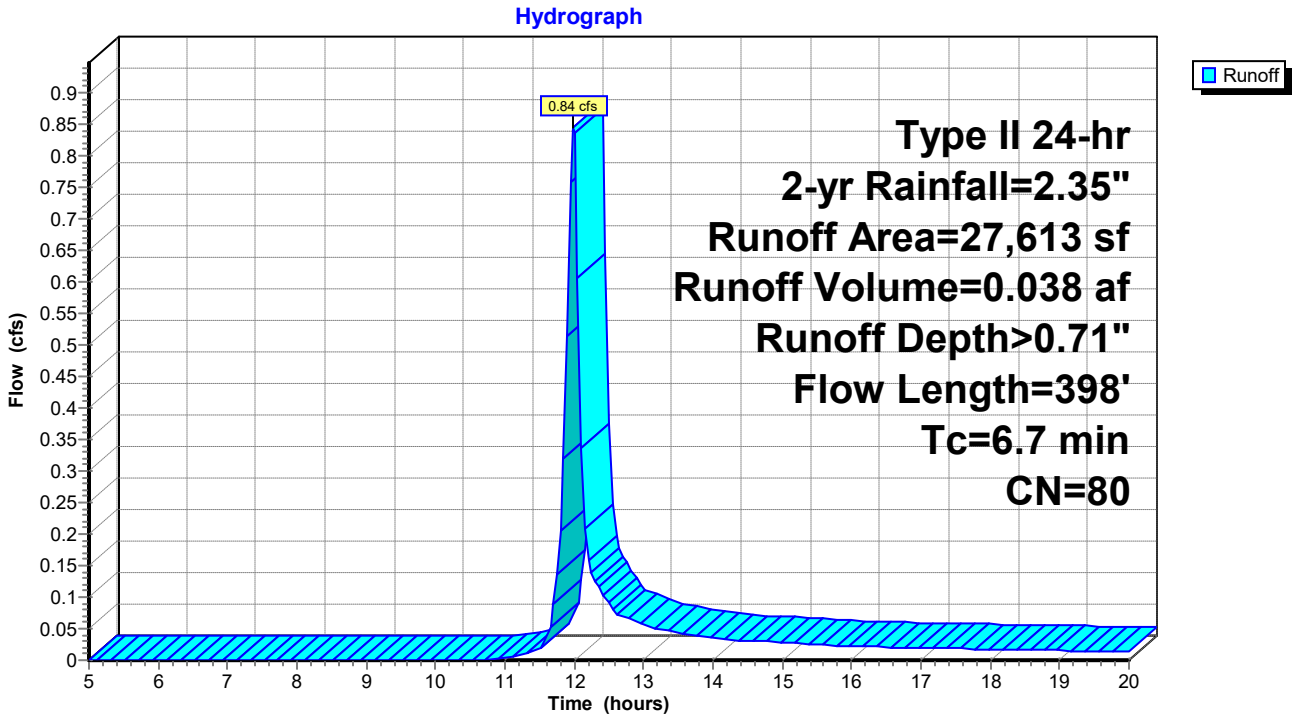
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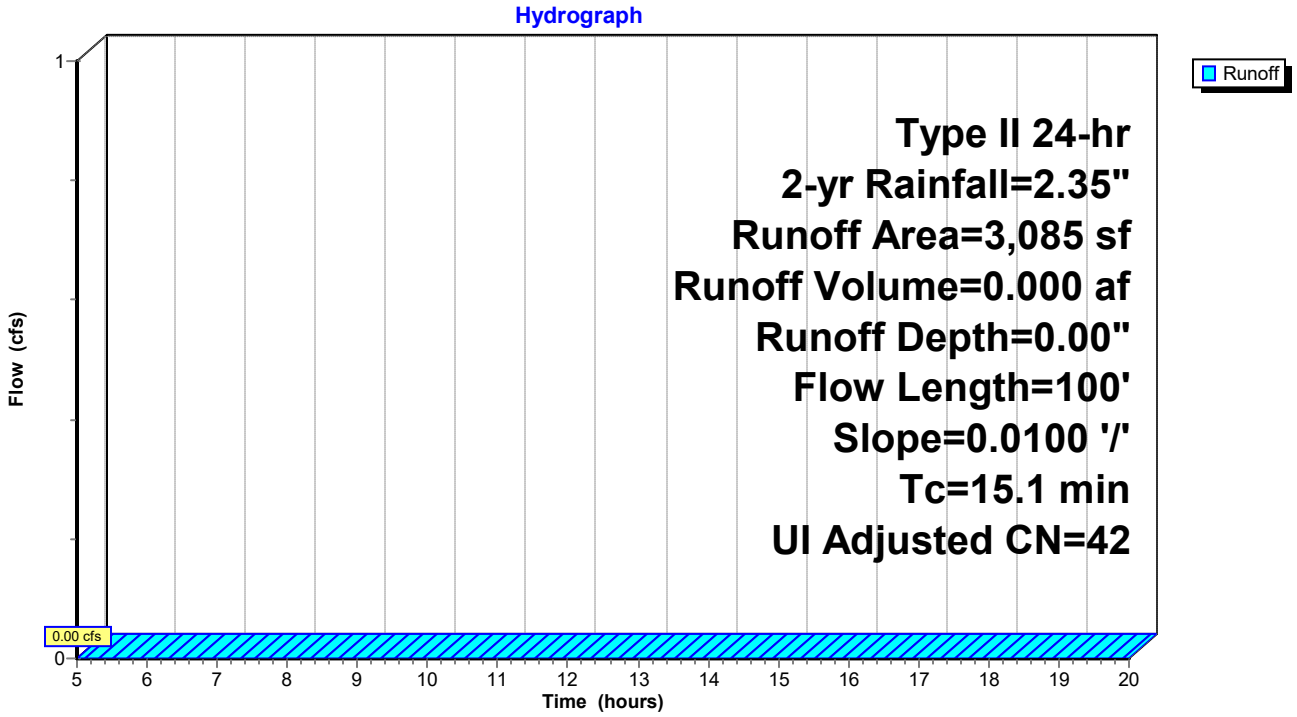
Subcatchment 28S: PRDA-1B-FOREBAY



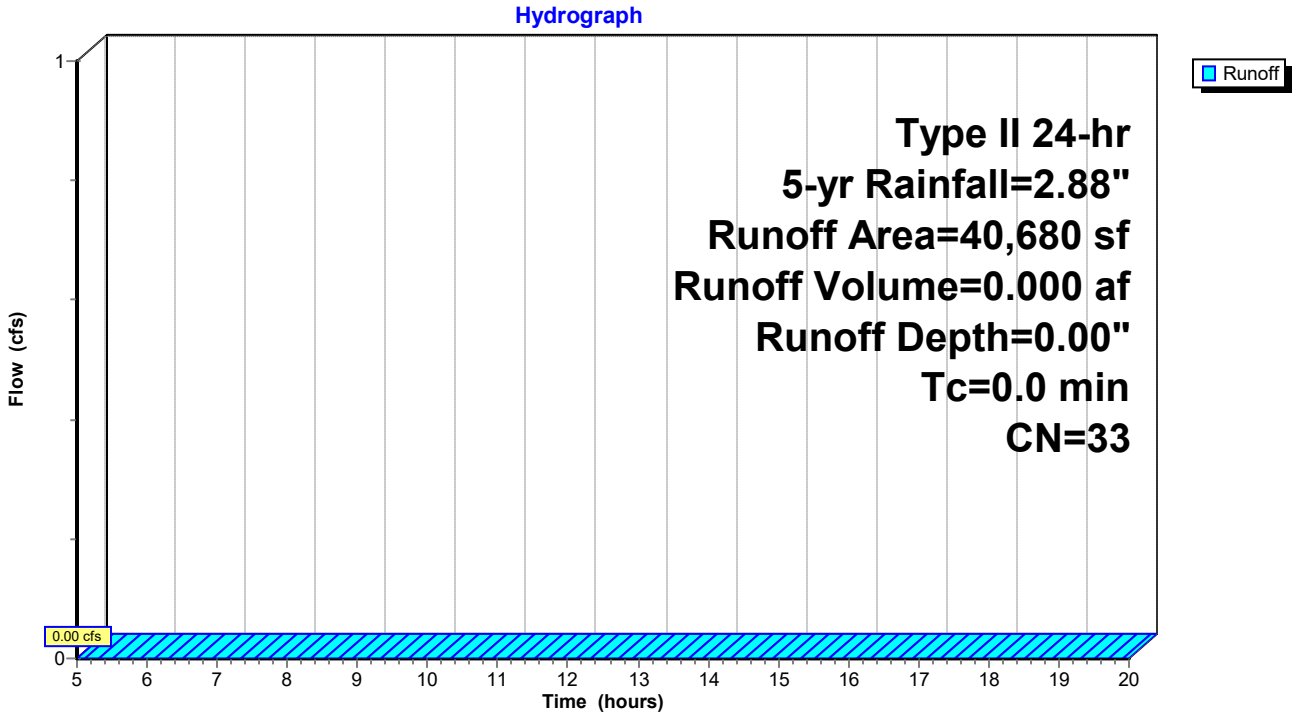
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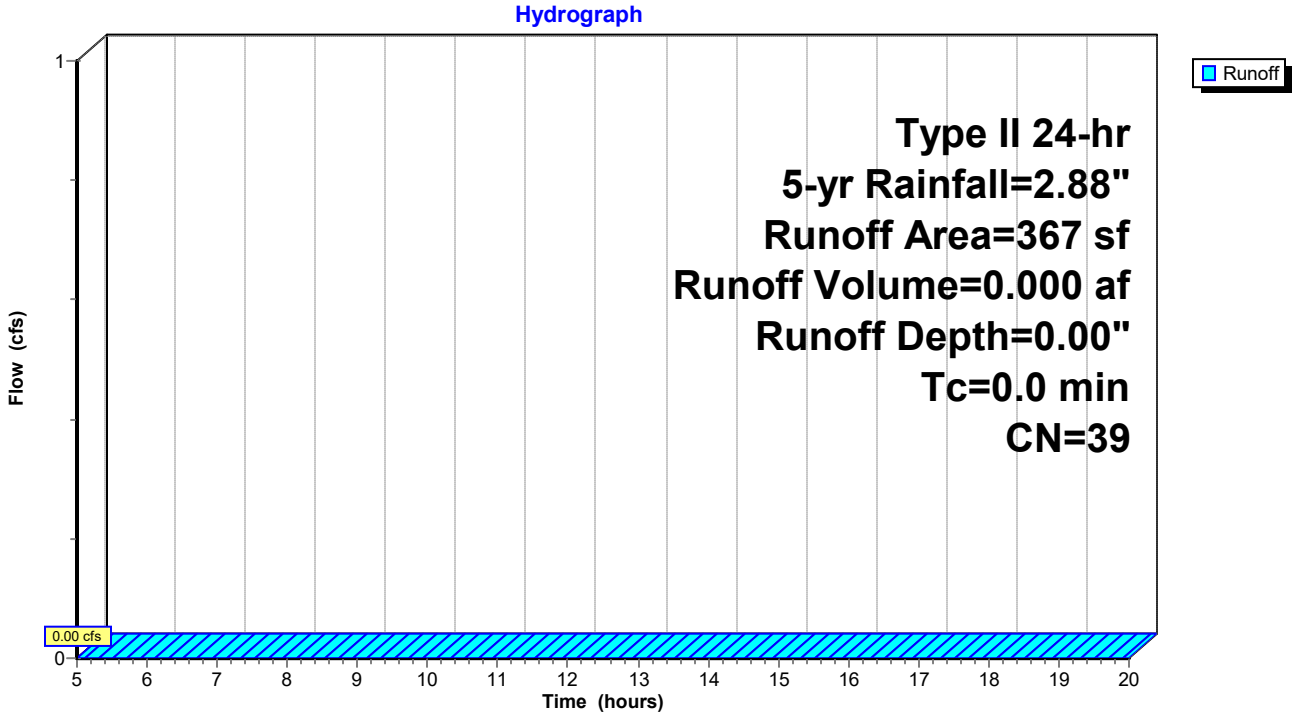
Subcatchment 33S: PRDA-1B-DRYWELL 1&2



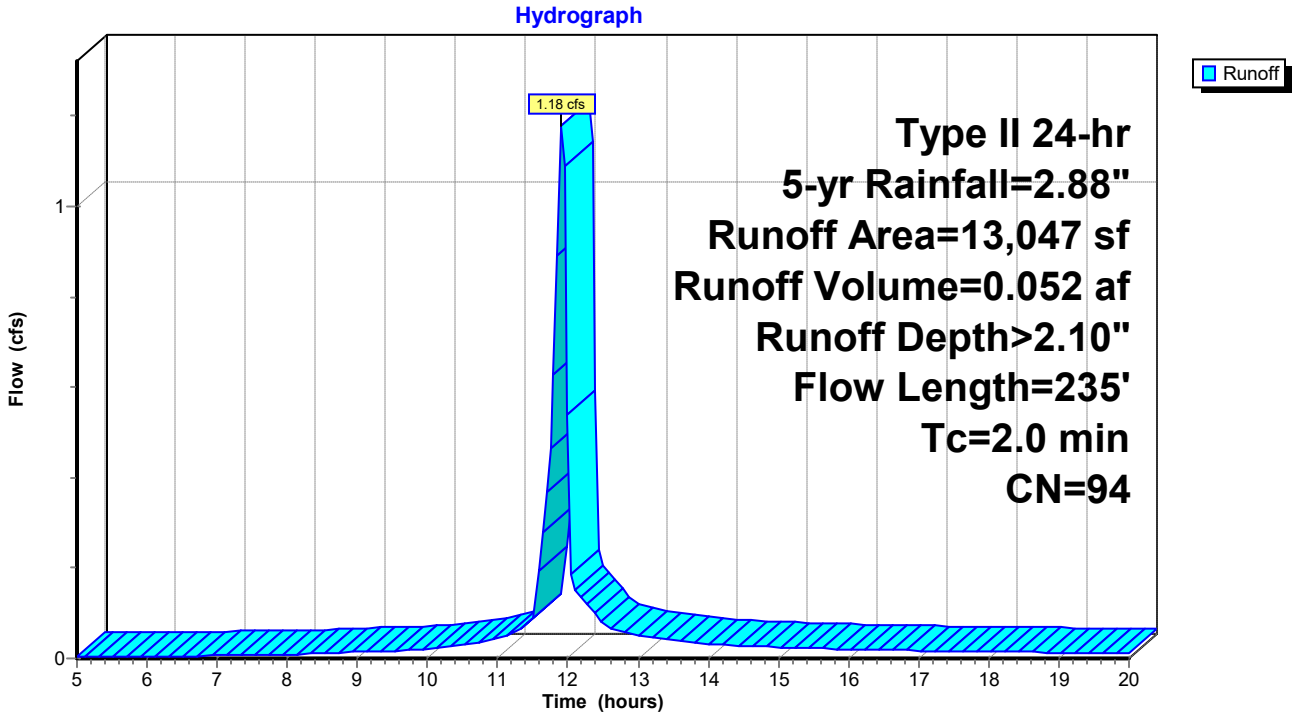
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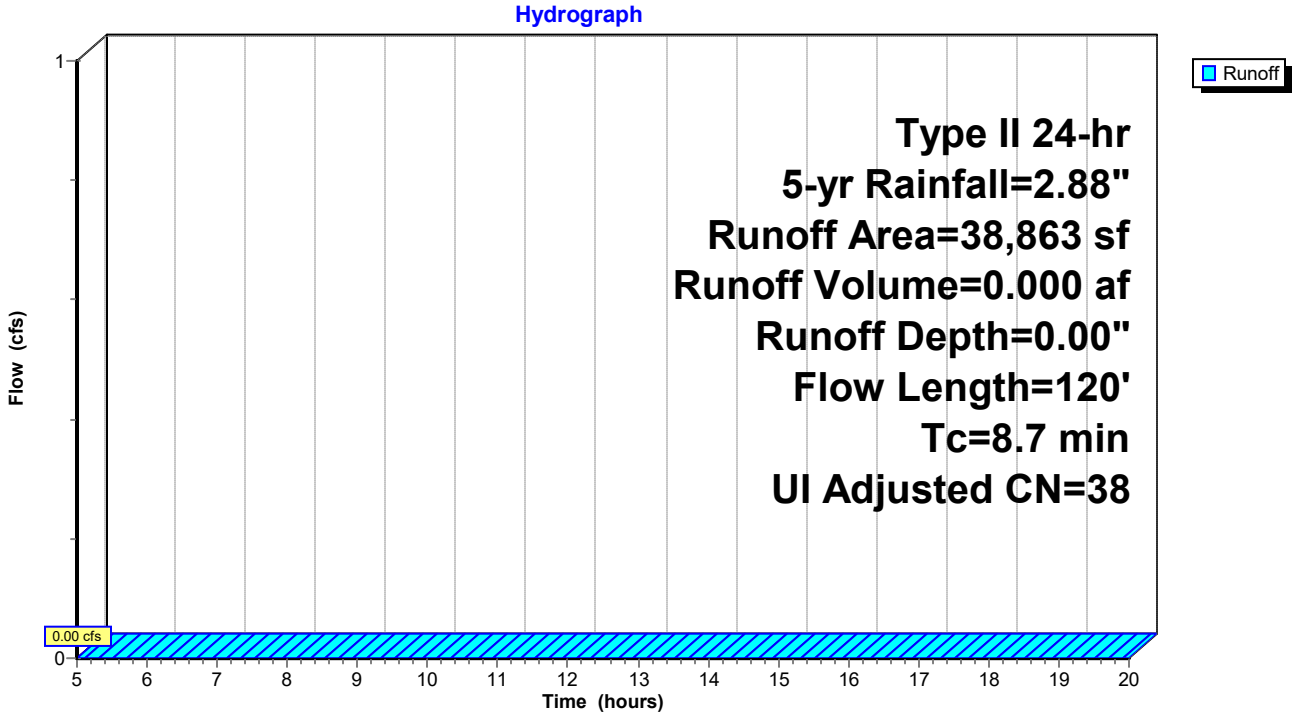
Subcatchment 16S: PRDA1BDRYWELL 3



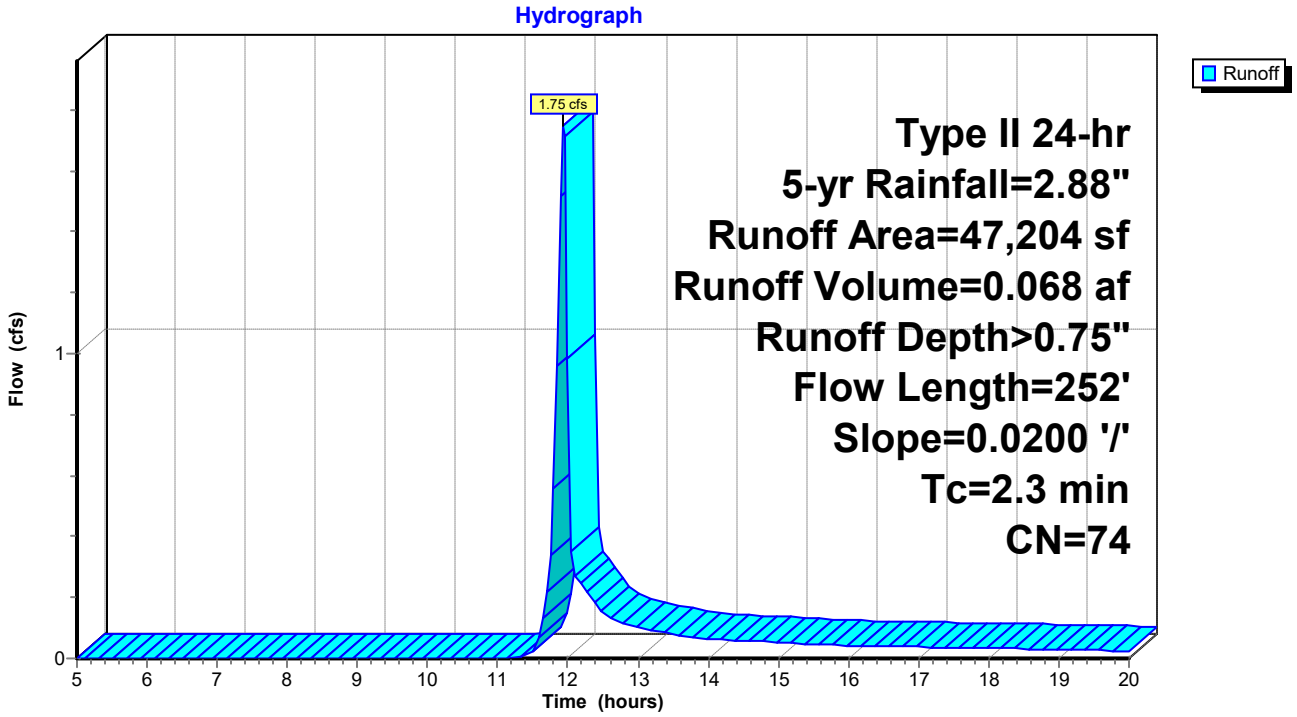
Subcatchment 17S: PRDA-1B-DRYWELL 2



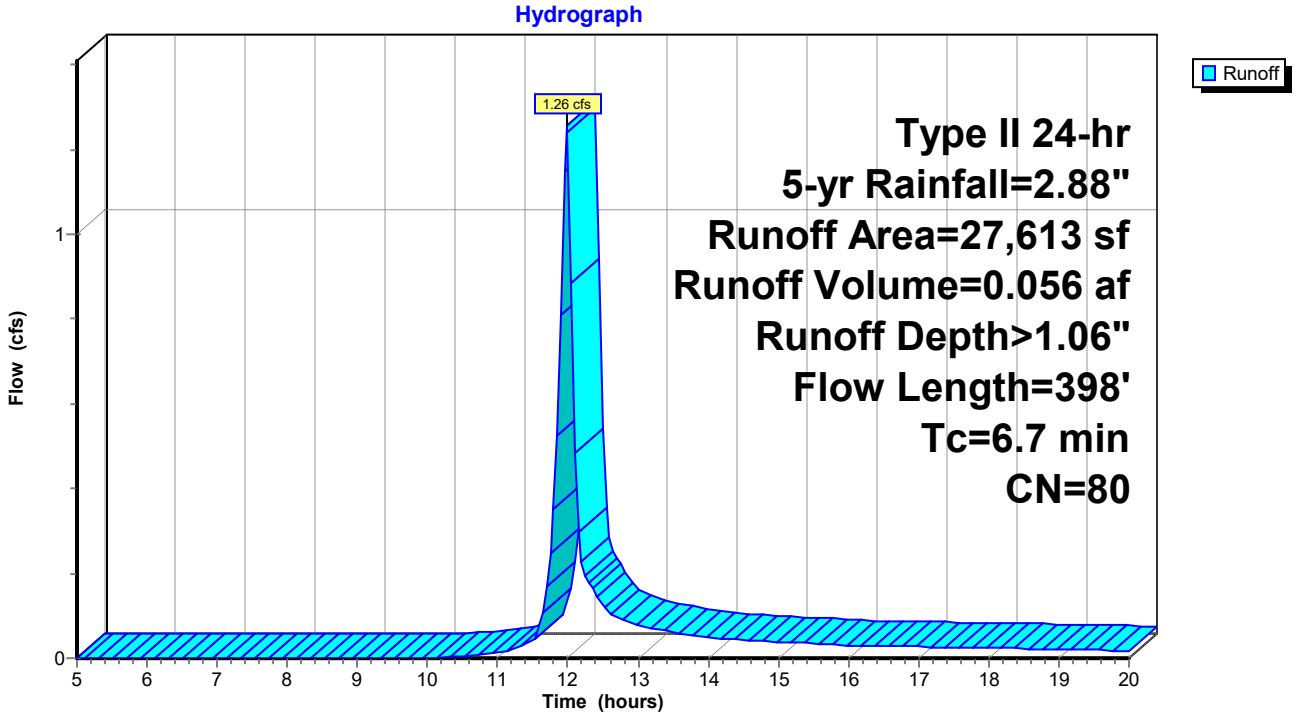
Subcatchment 22S: PRDA-1A



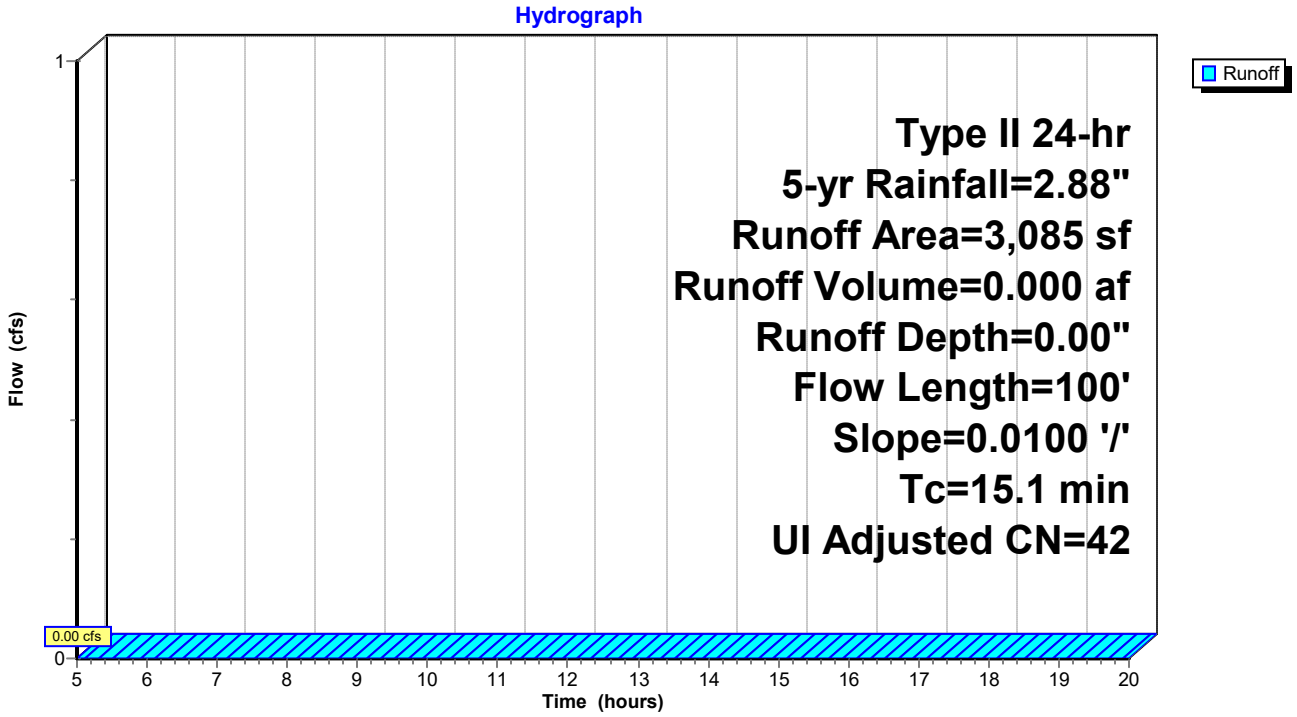
Subcatchment 28S: PRDA-1B-FOREBAY



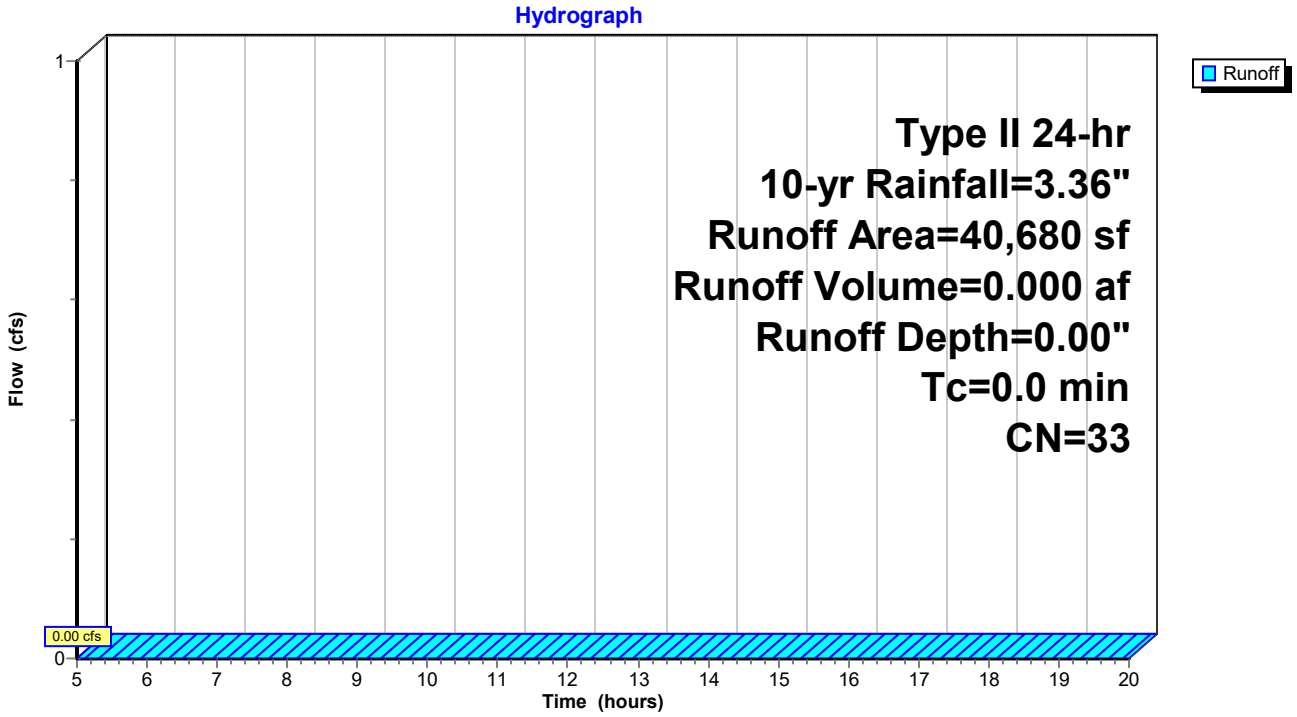
Subcatchment 29S: PRDA-1B-I2



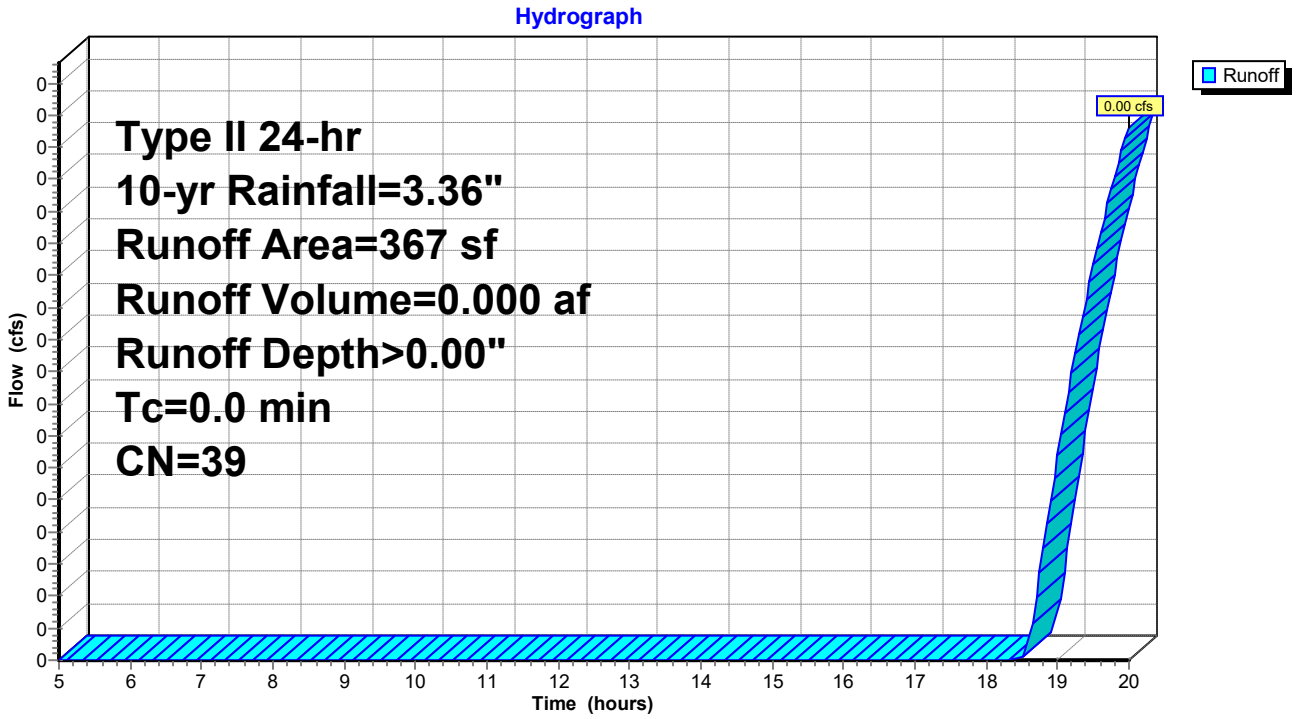
Subcatchment 33S: PRDA-1B-DRYWELL 1&2



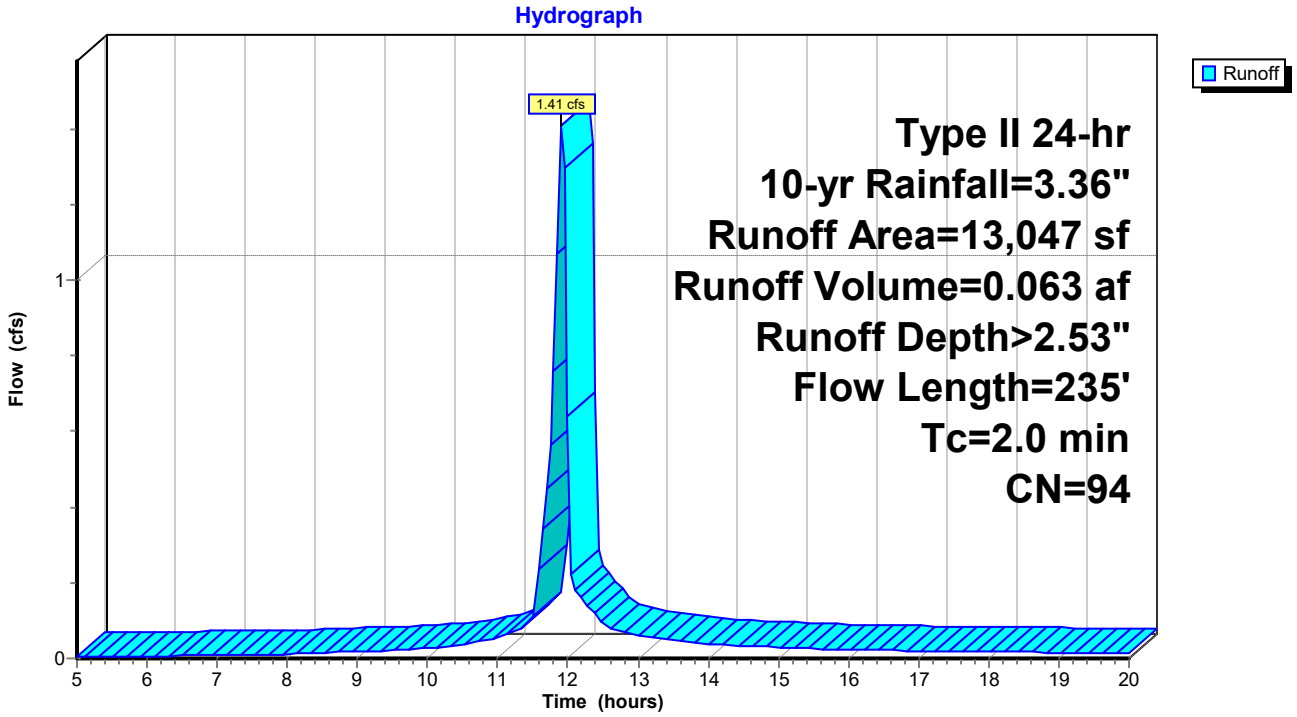
Subcatchment 14S: PRDA-1B



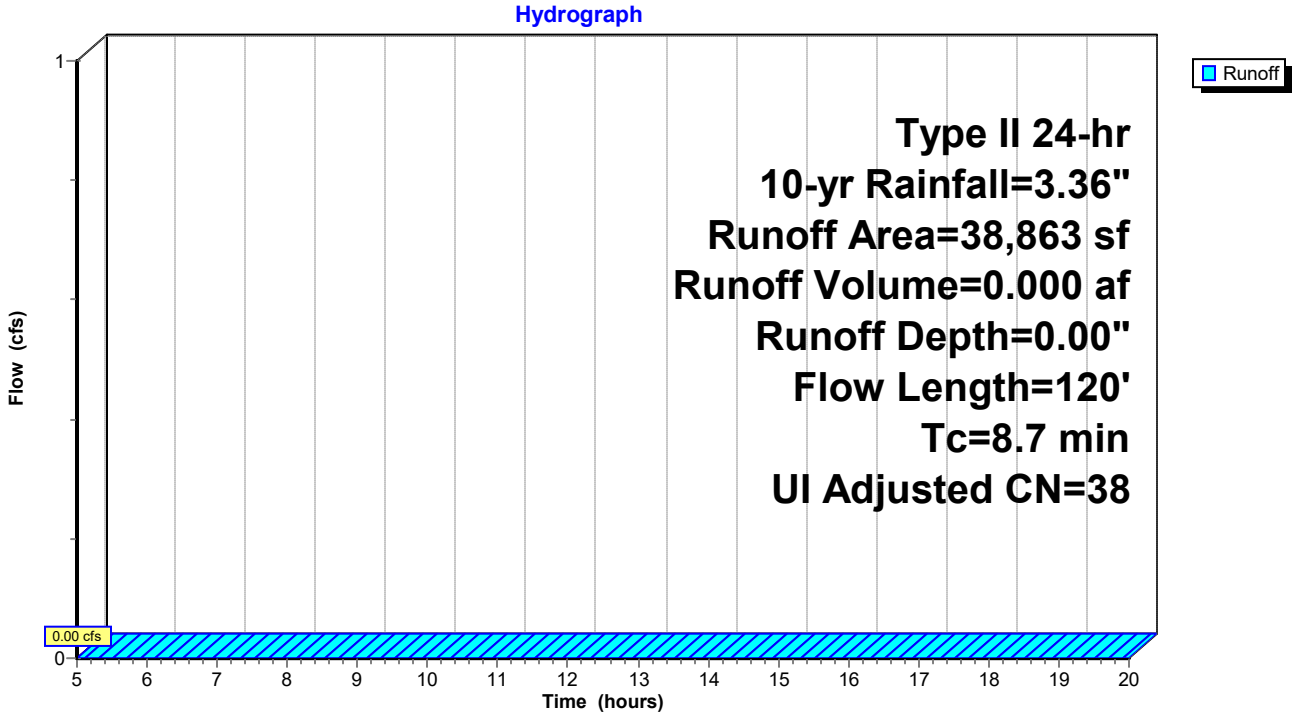
Subcatchment 16S: PRDA1BDRYWELL 3



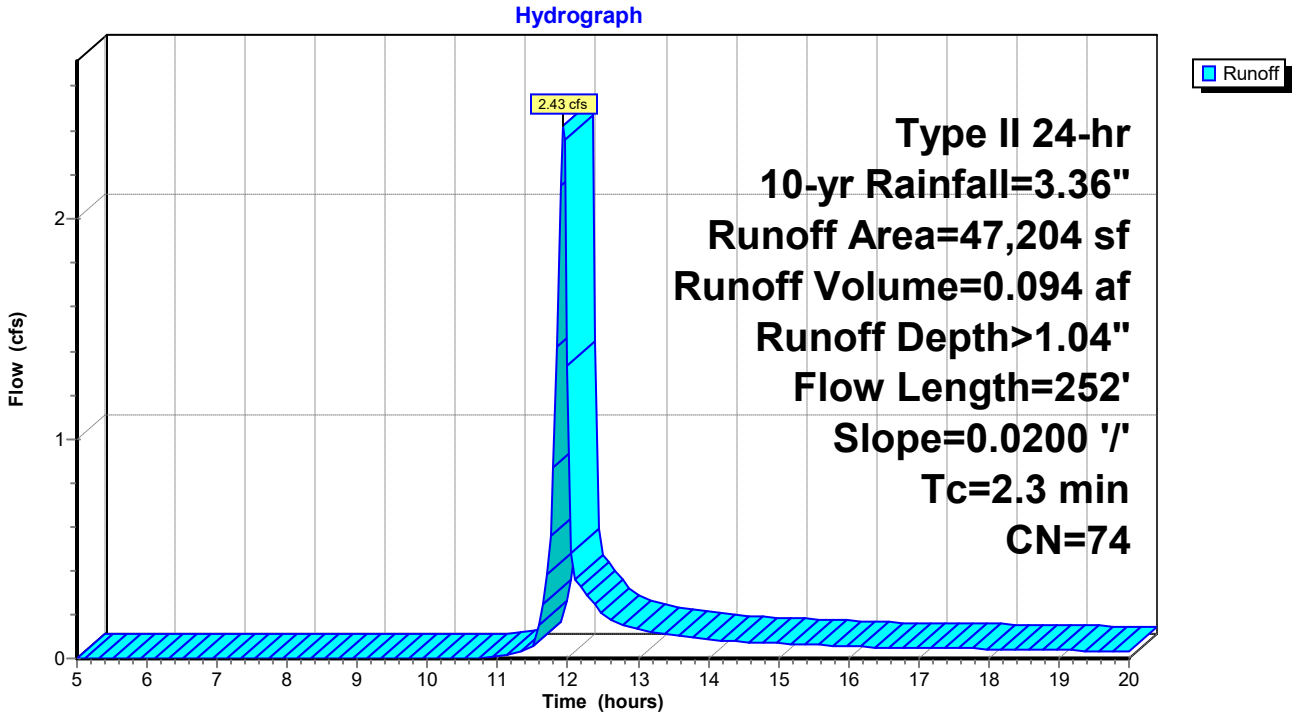
Subcatchment 17S: PRDA-1B-DRYWELL 2



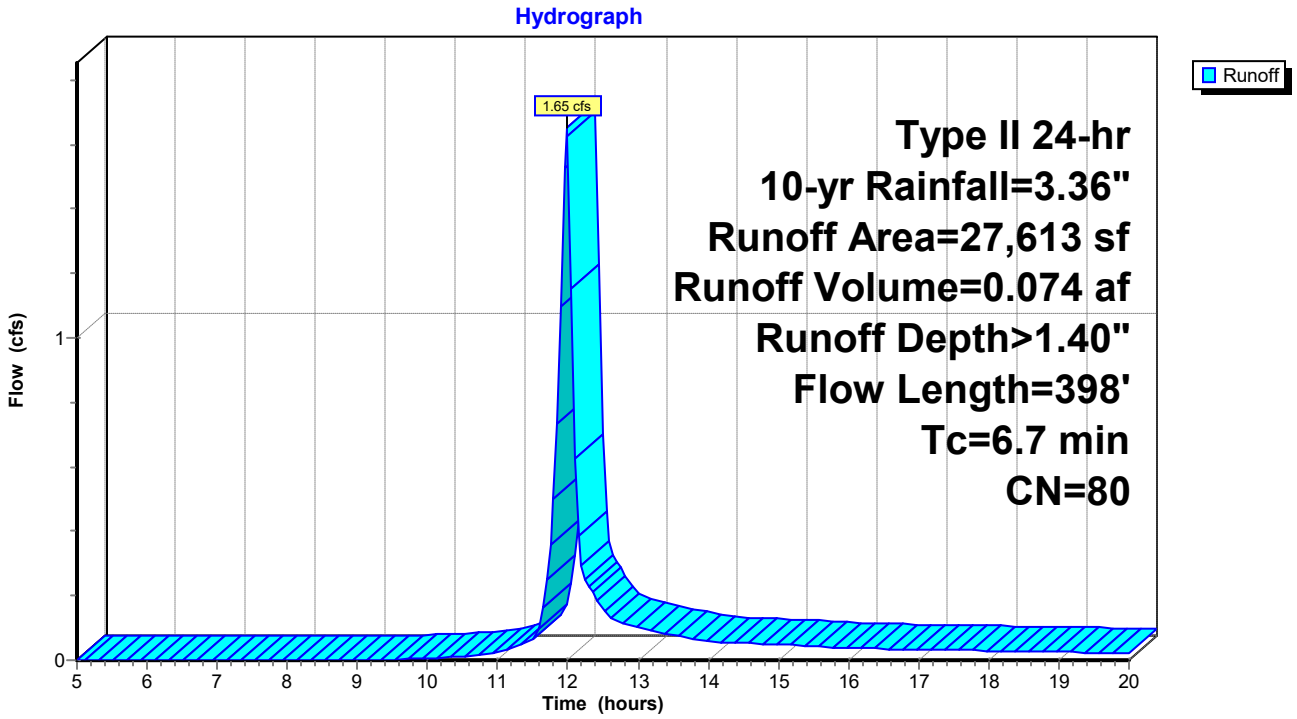
Subcatchment 22S: PRDA-1A



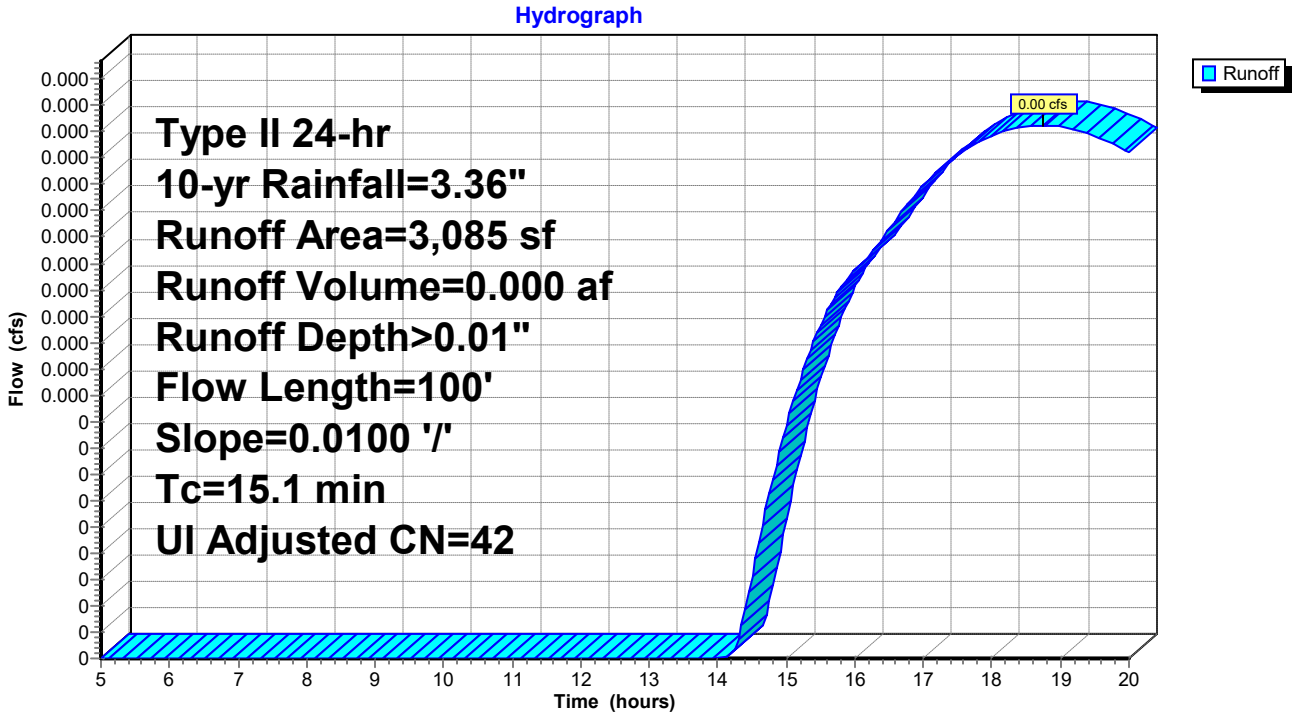
Subcatchment 28S: PRDA-1B-FOREBAY



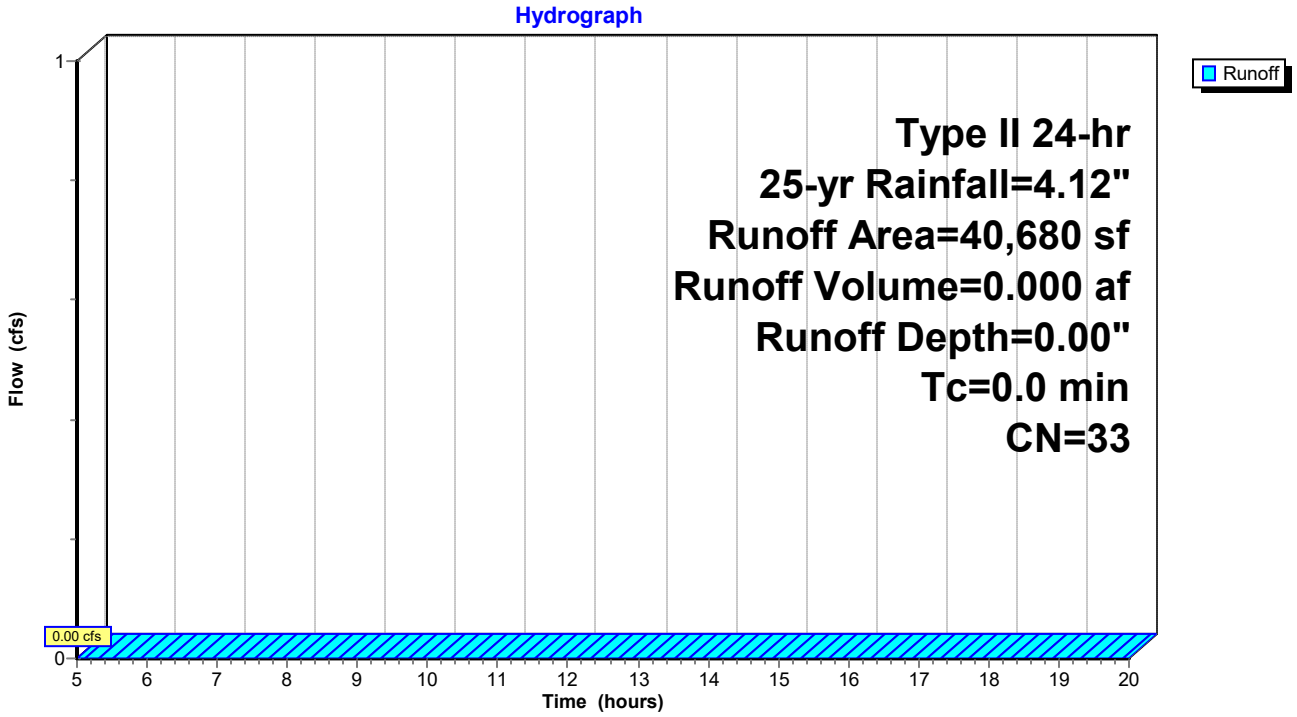
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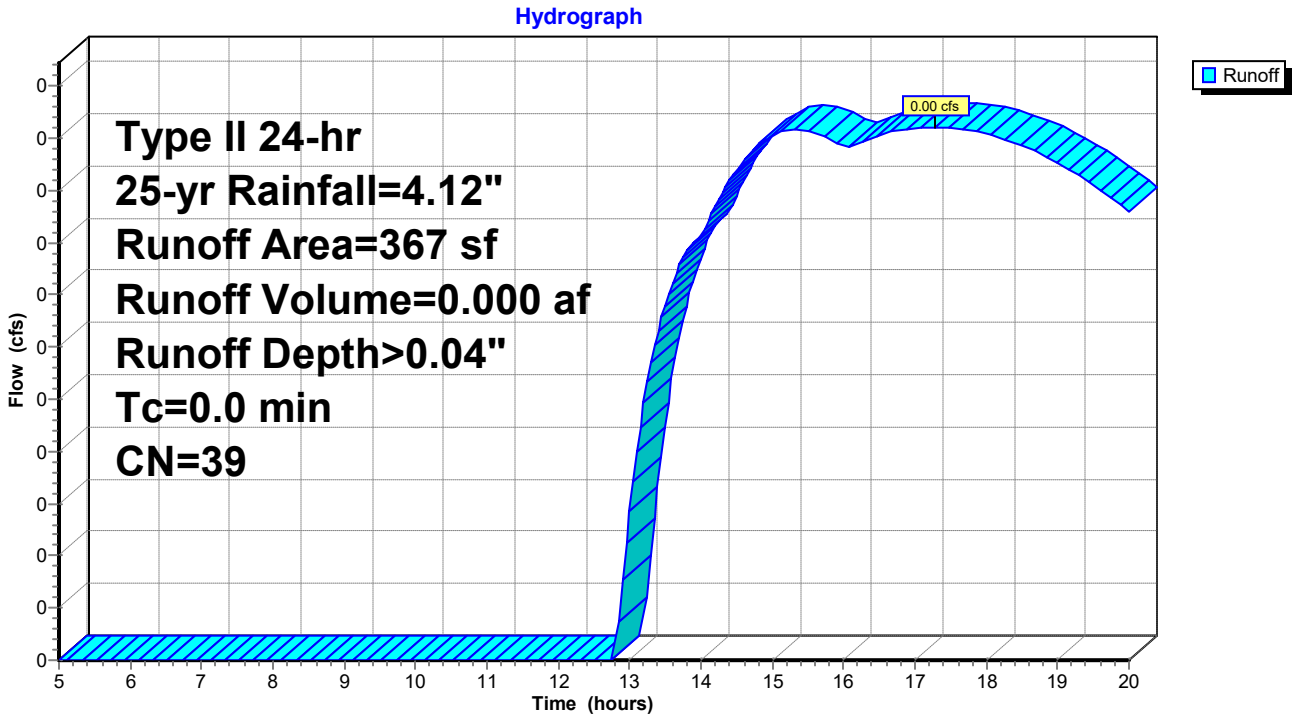
Subcatchment 33S: PRDA-1B-DRYWELL 1&2



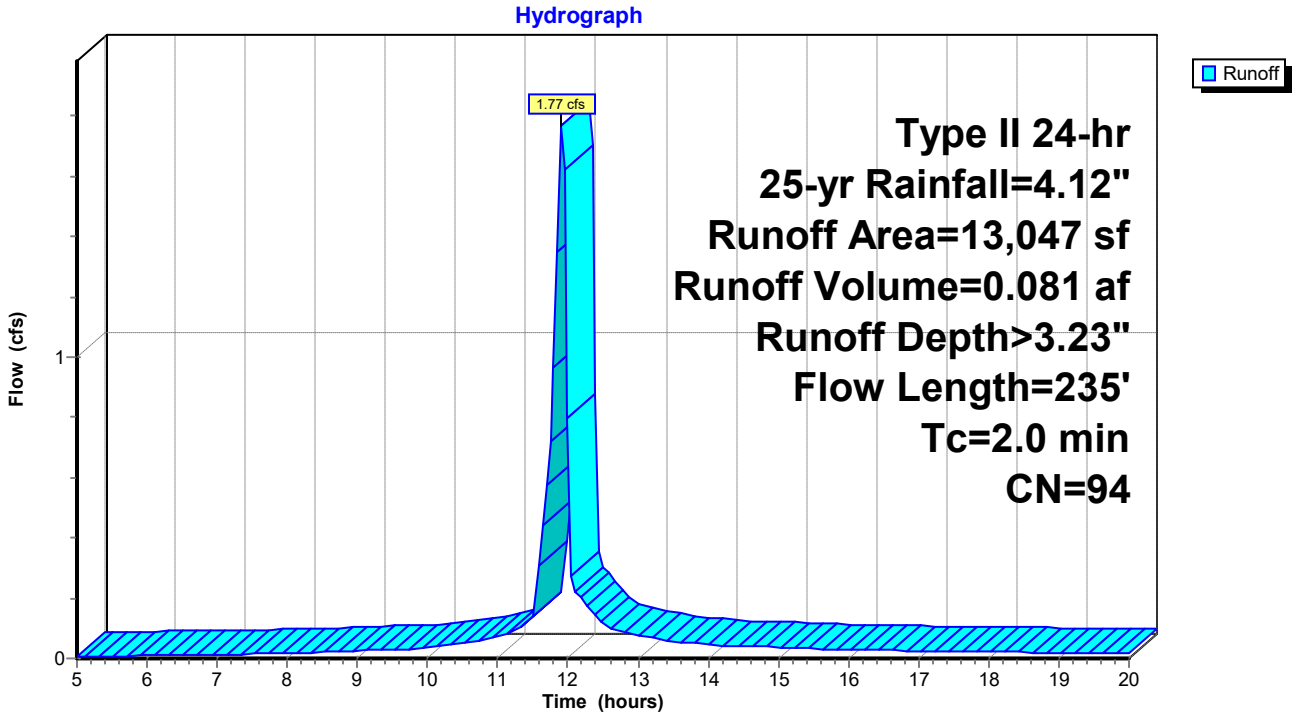
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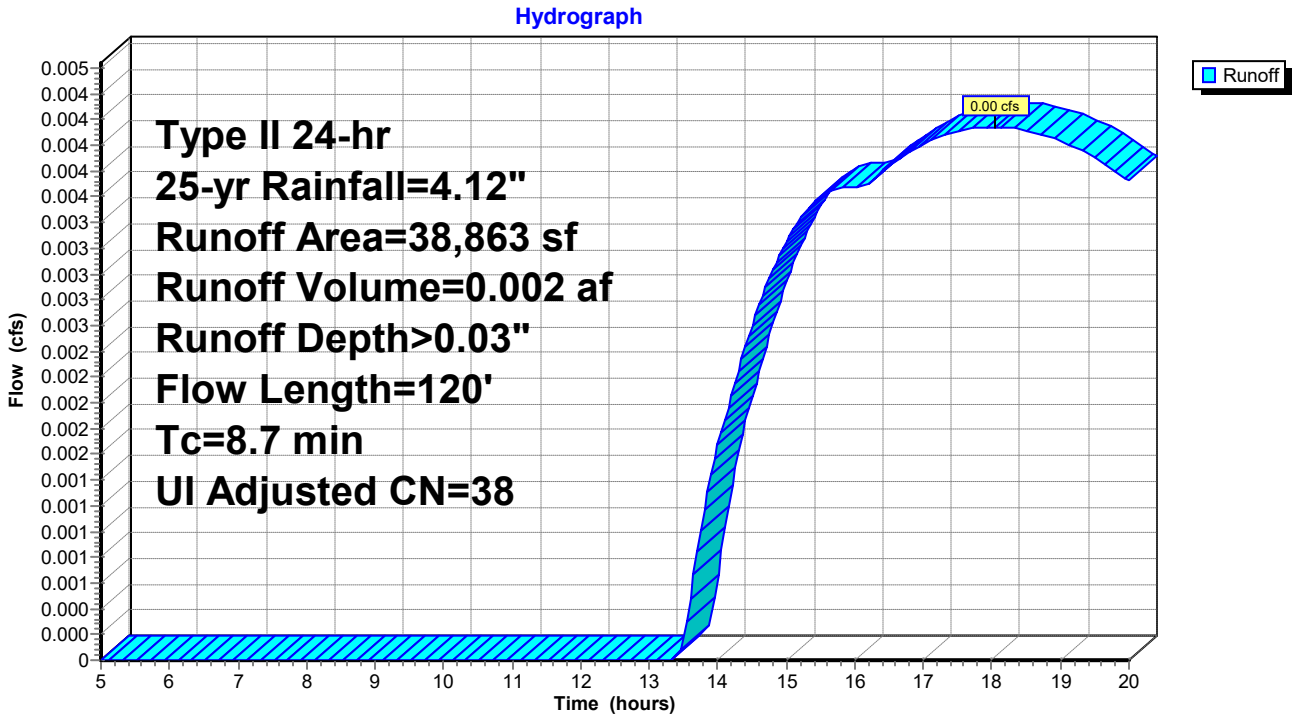
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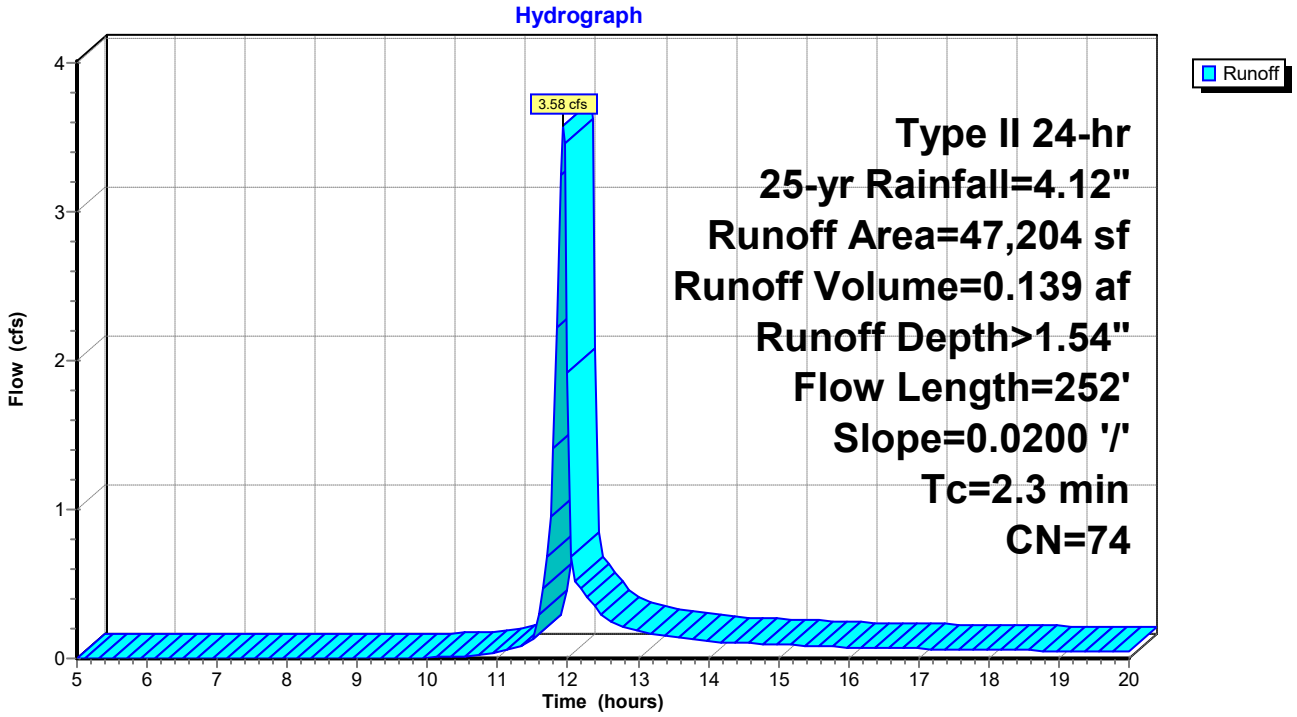
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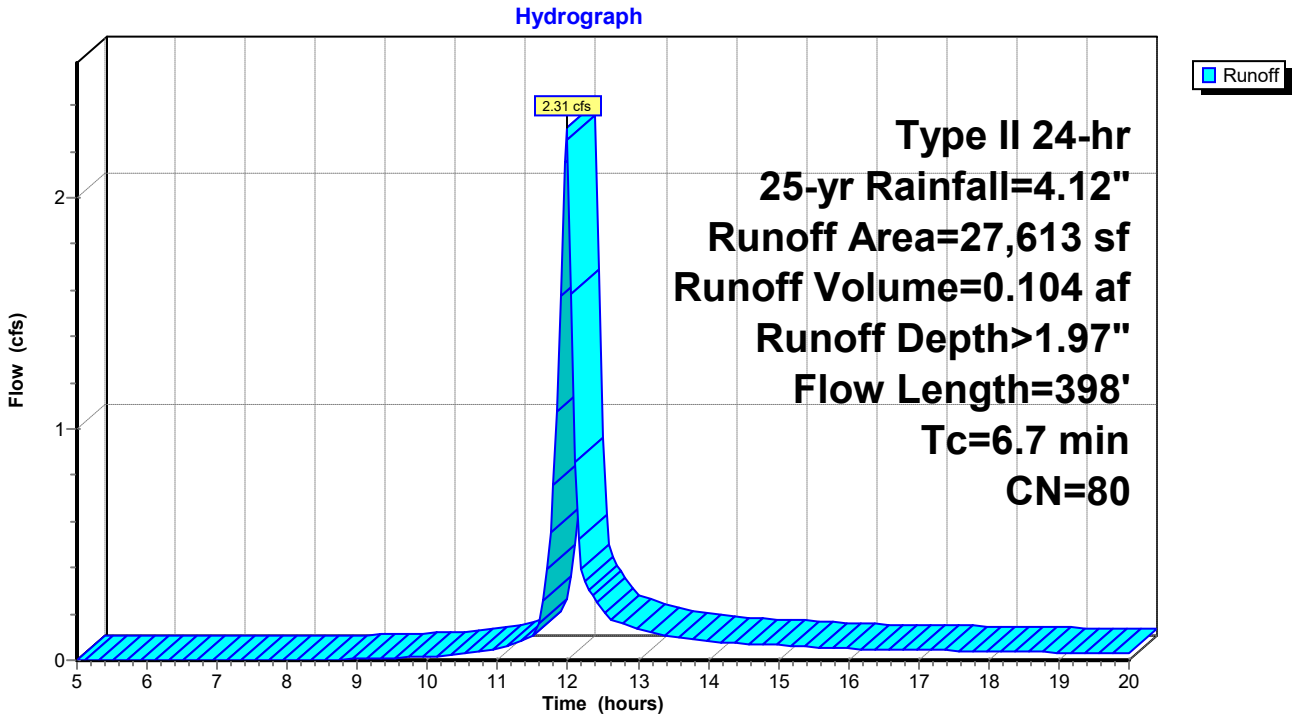
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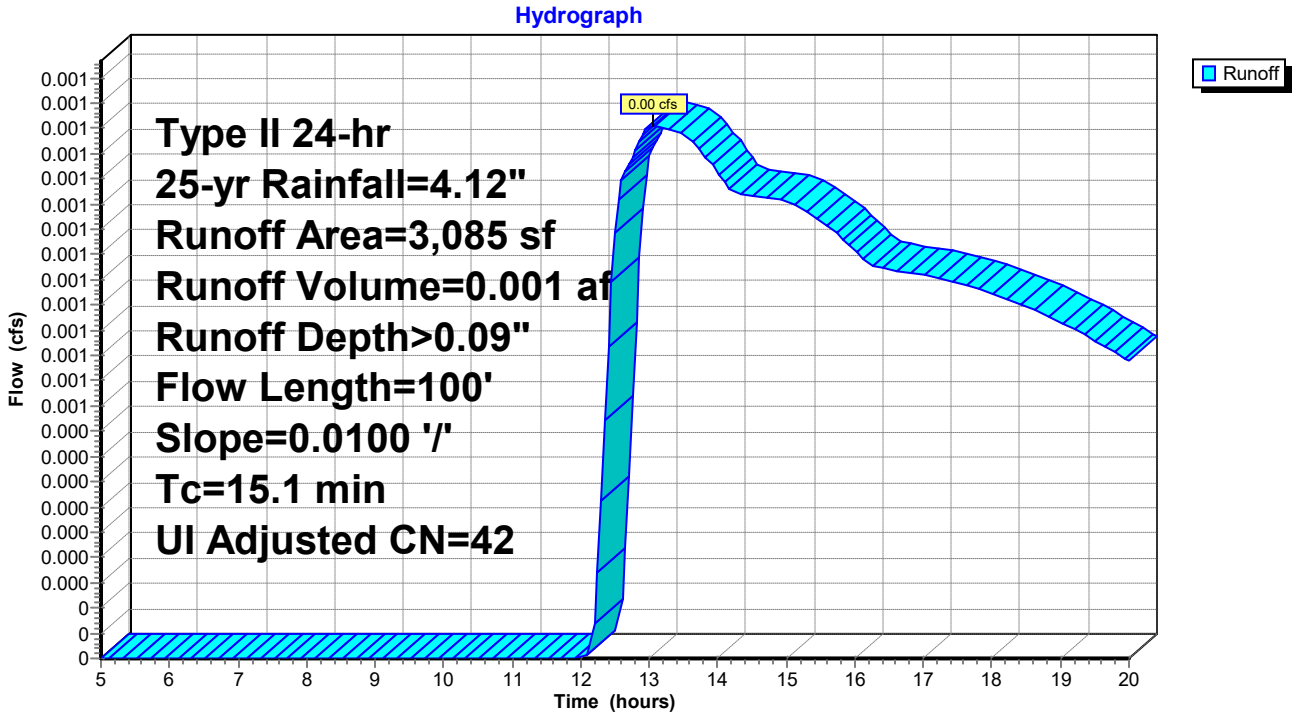
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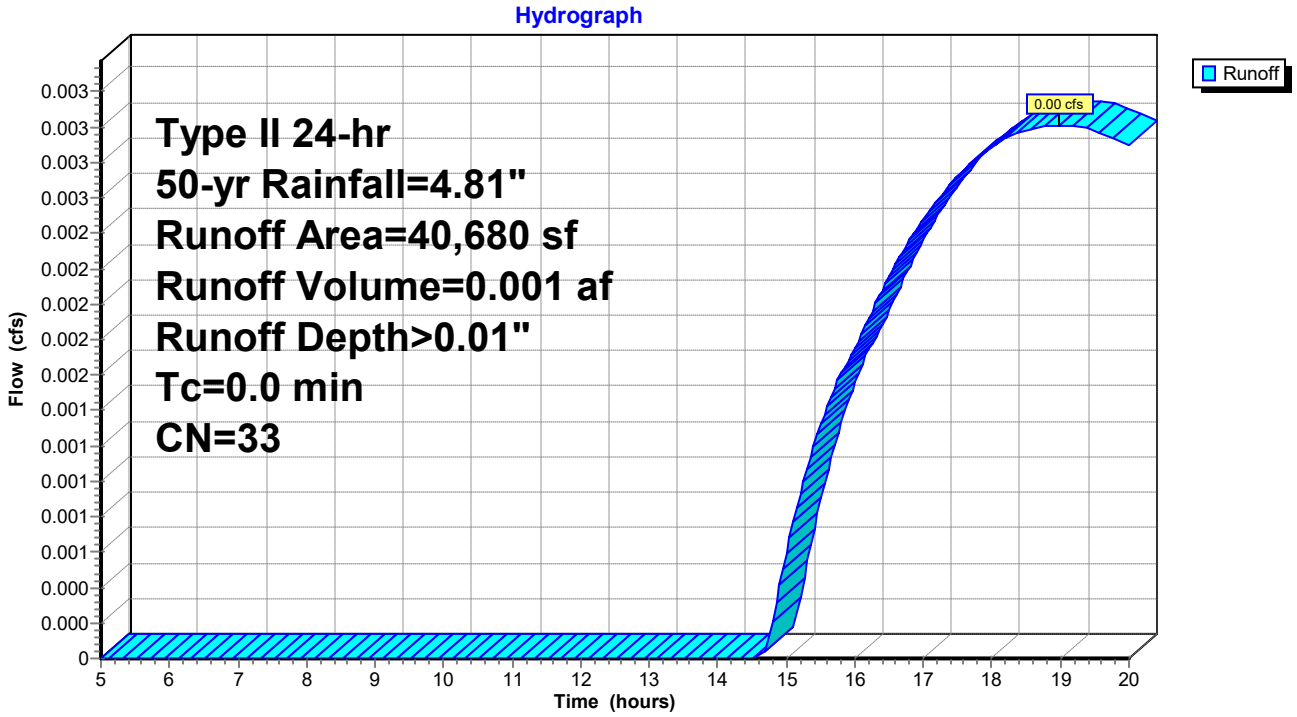
Subcatchment 29S: PRDA-1B-I2



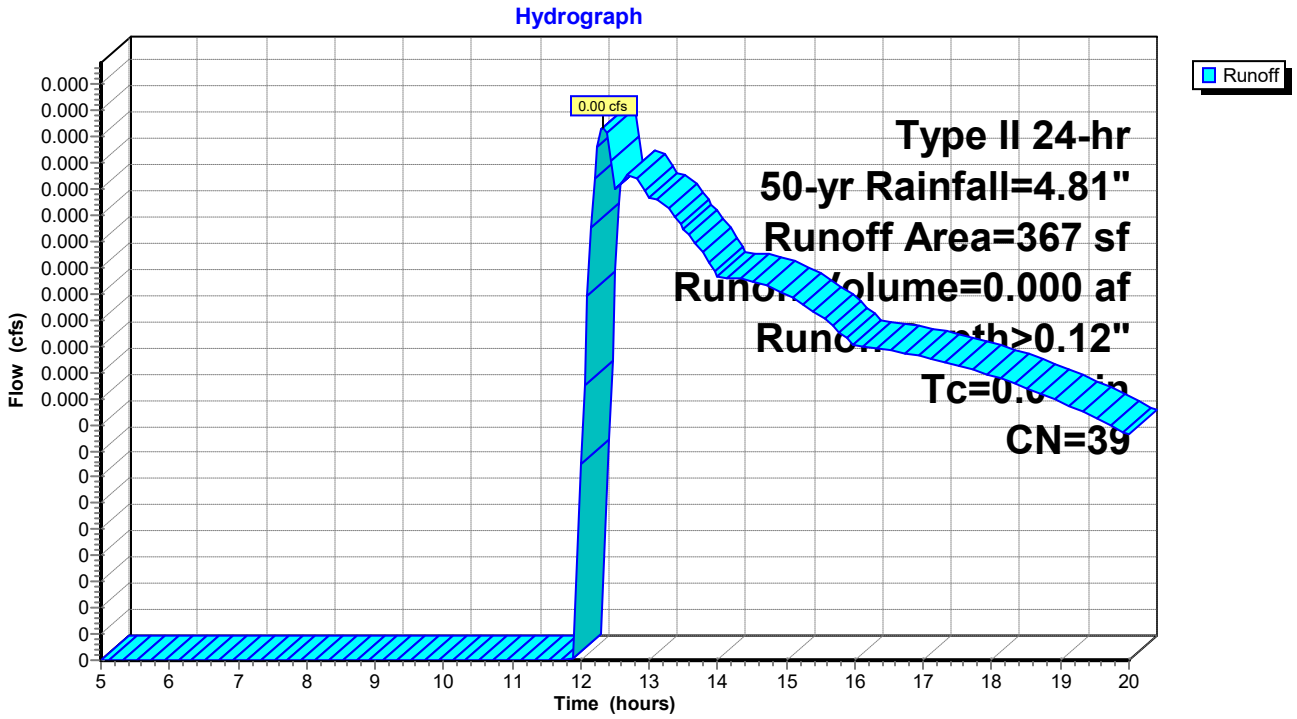
Subcatchment 33S: PRDA-1B-DRYWELL 1&2



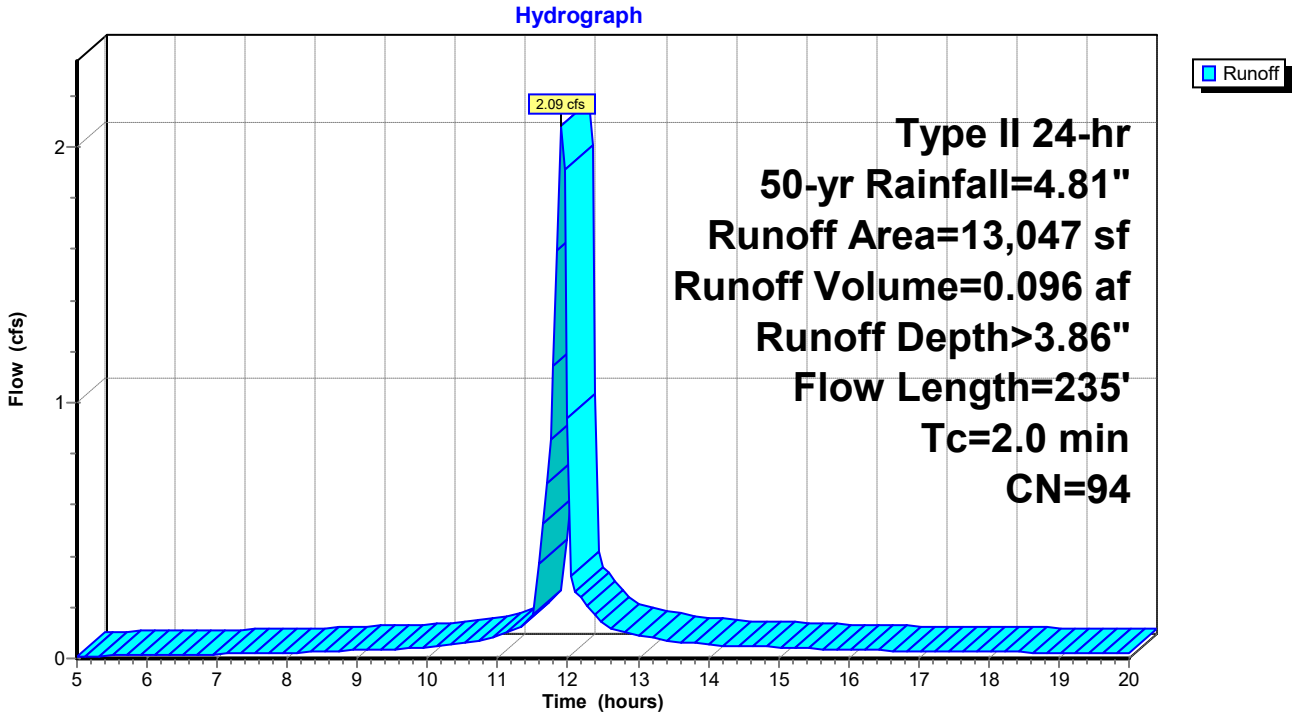
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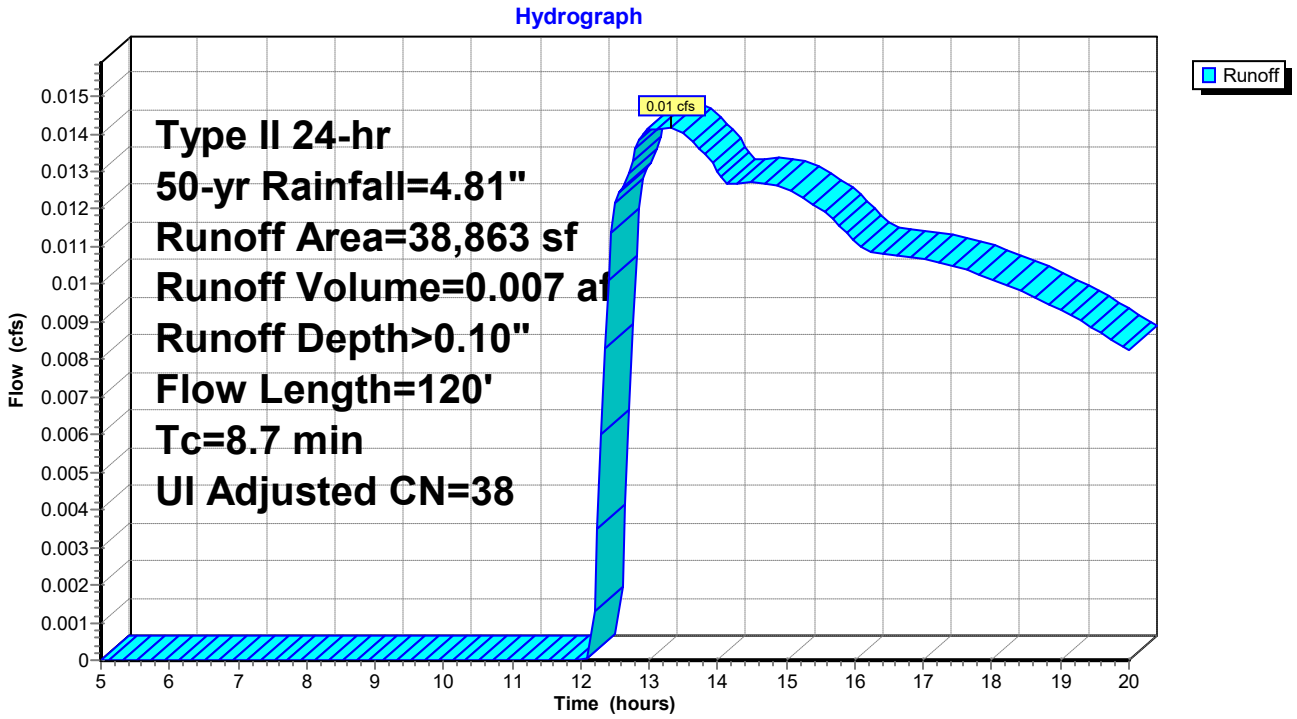
Subcatchment 16S: PRDA1BDRYWELL 3



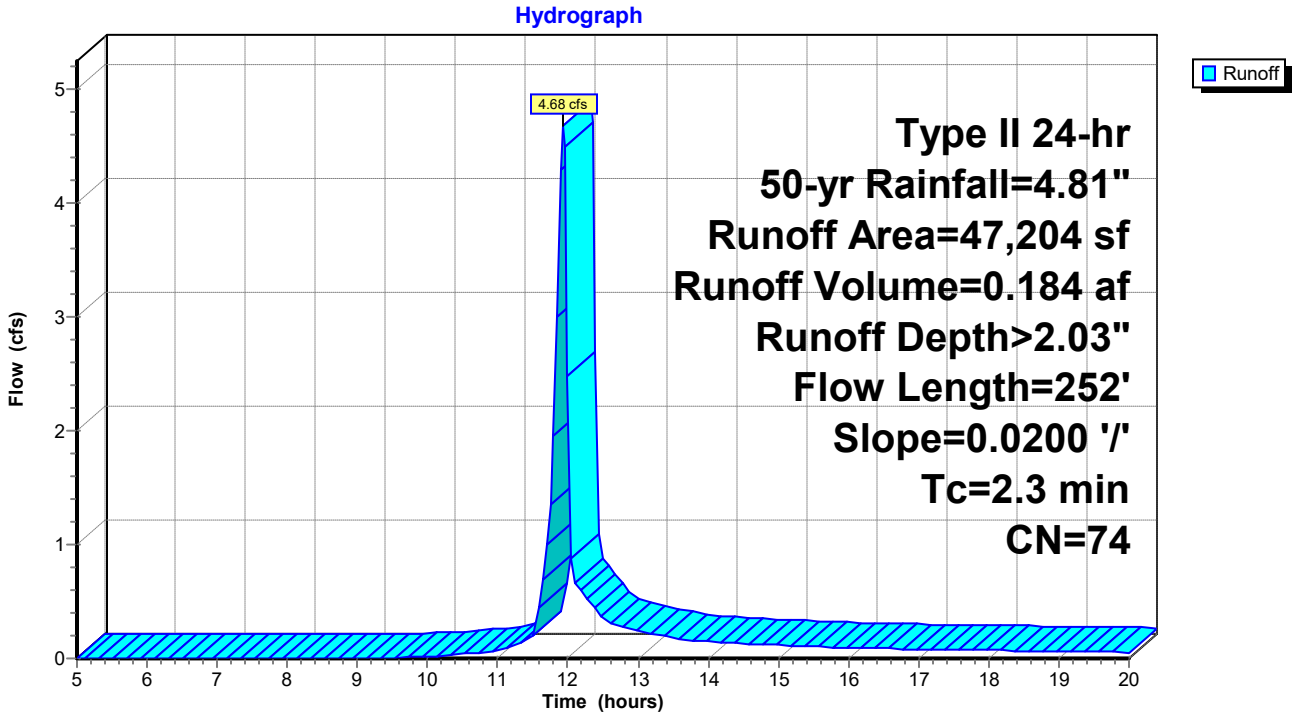
Subcatchment 17S: PRDA-1B-DRYWELL 2



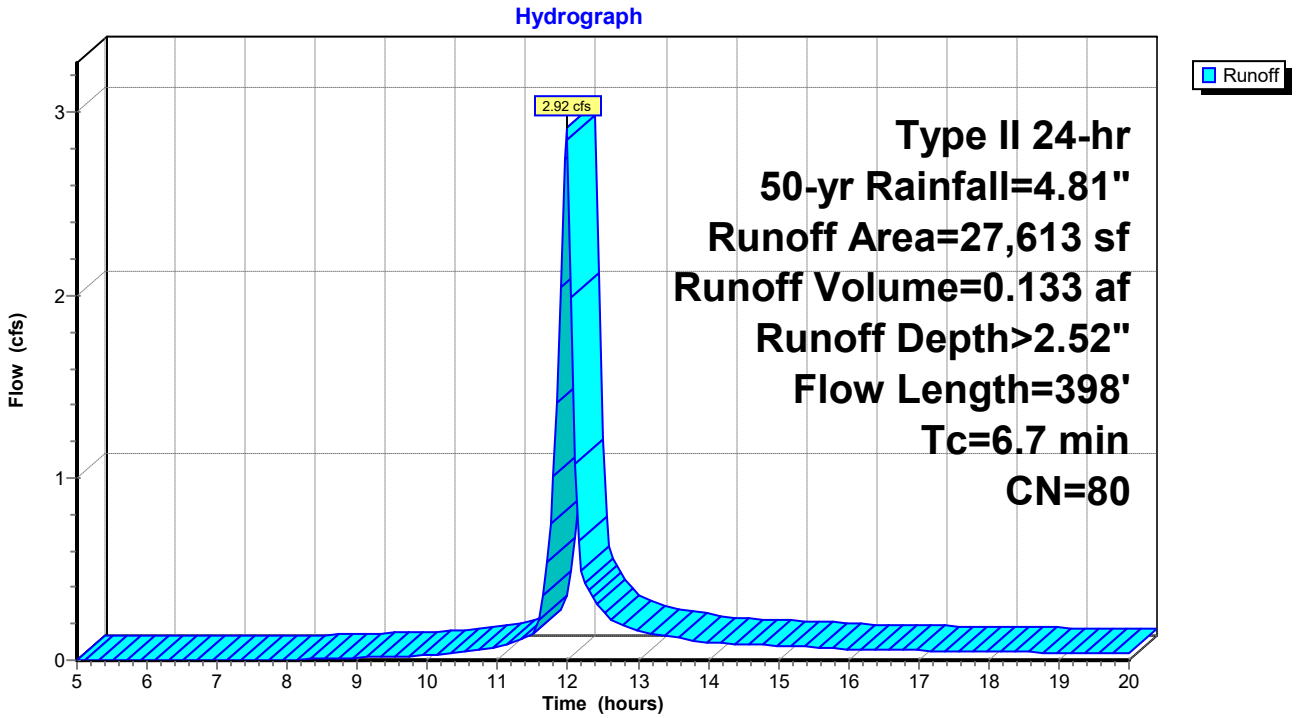
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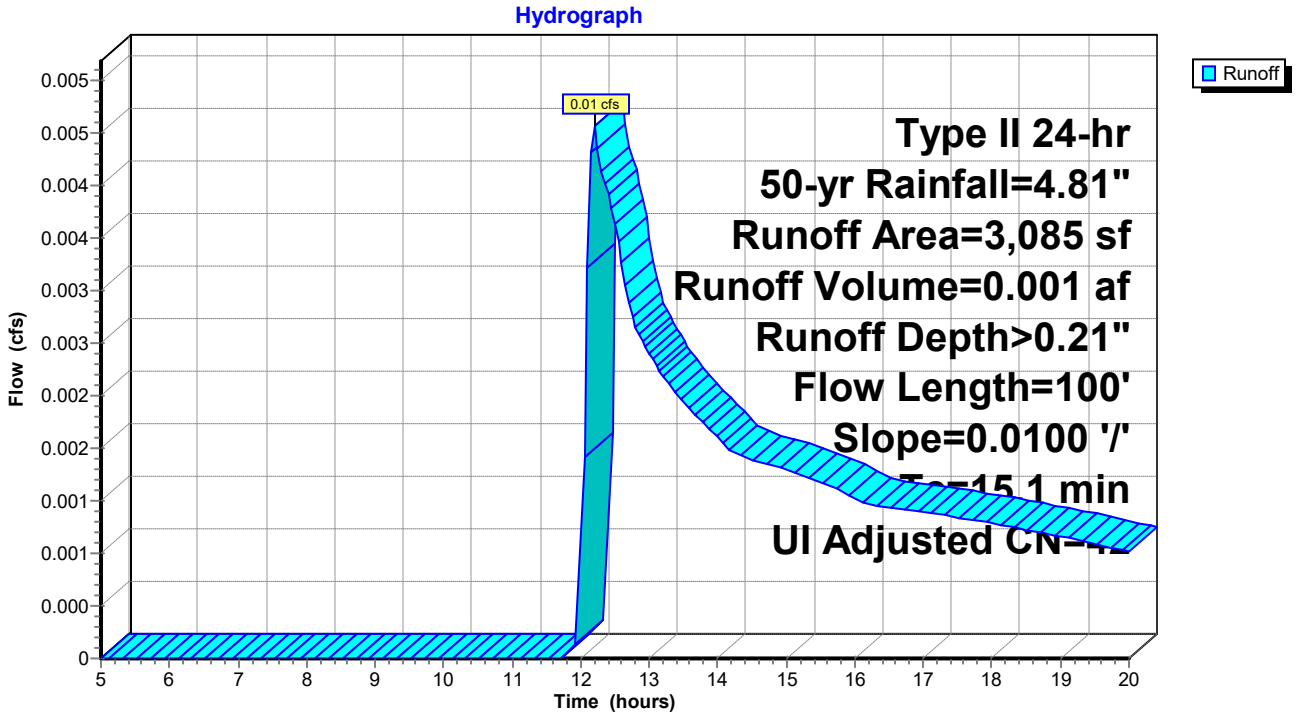
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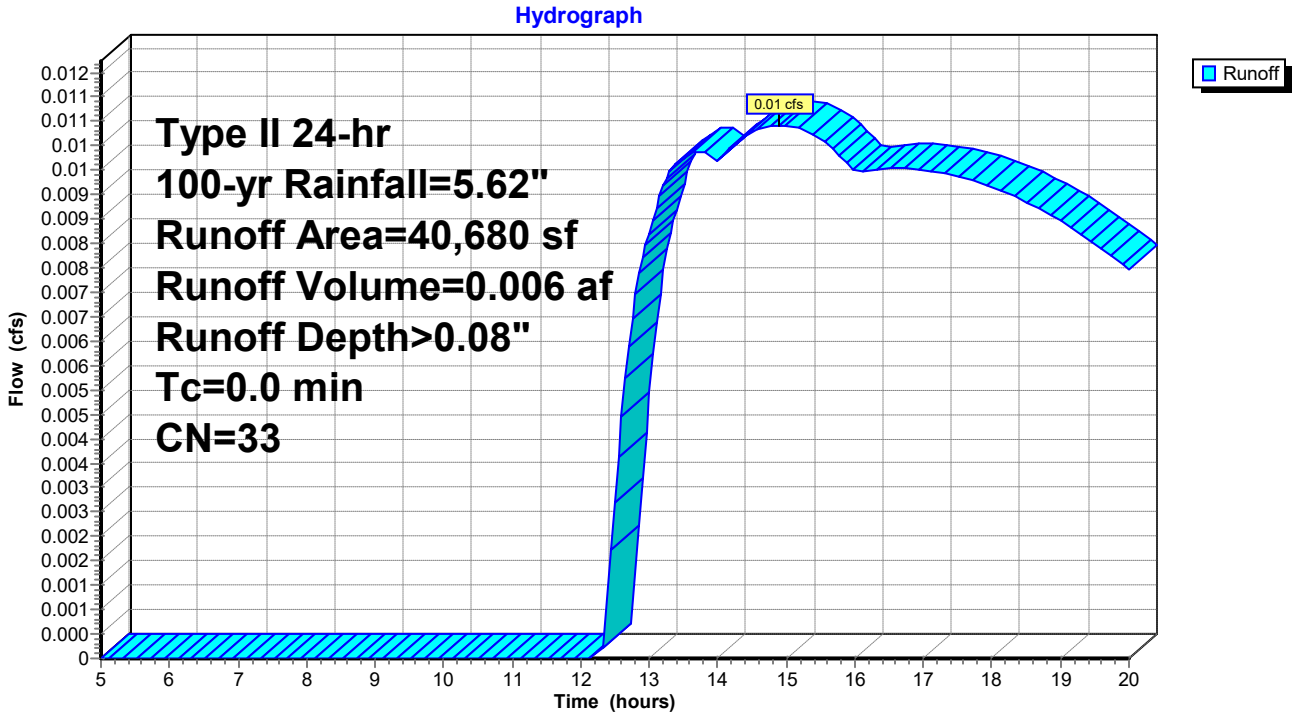
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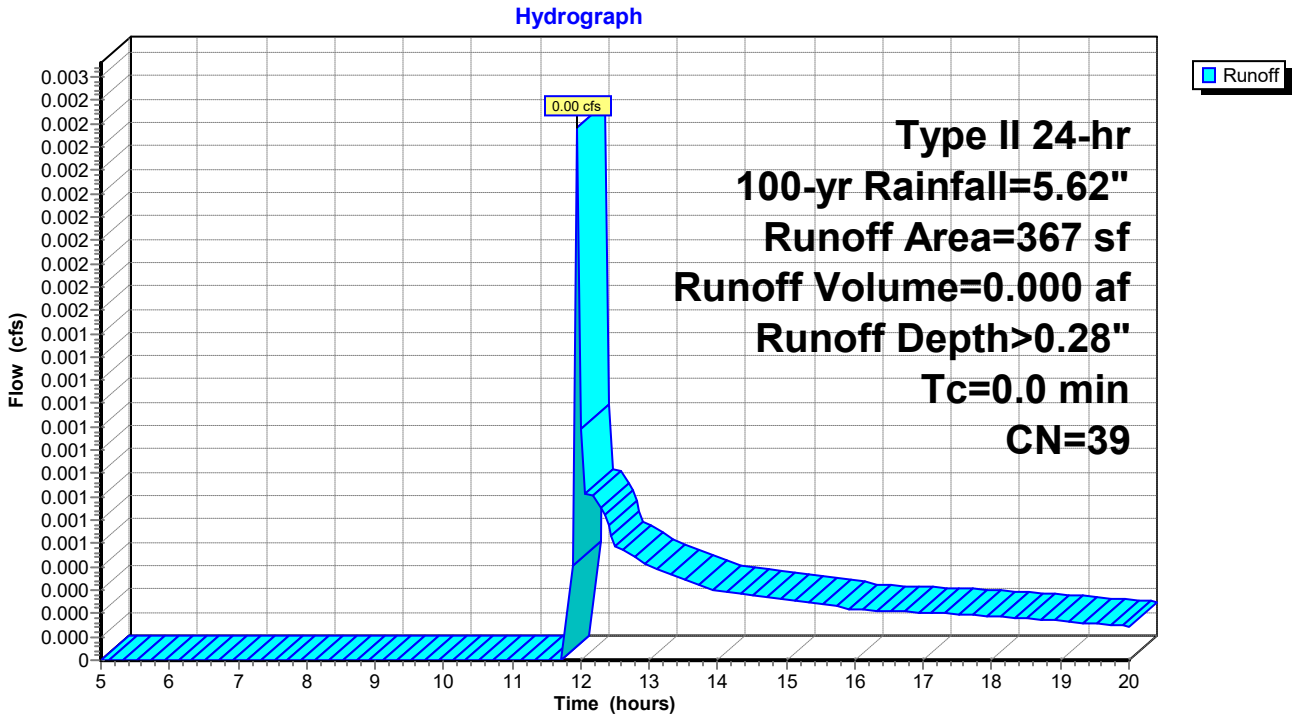
Subcatchment 33S: PRDA-1B-DRYWELL 1&2



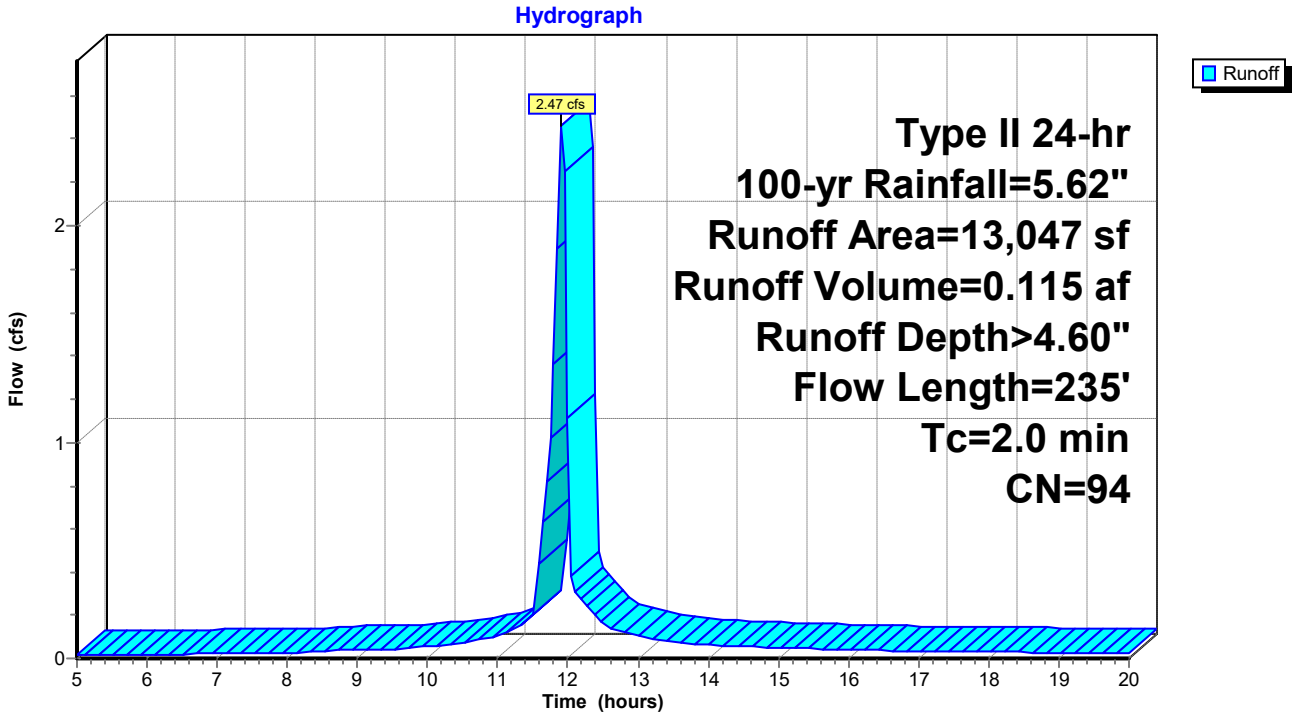
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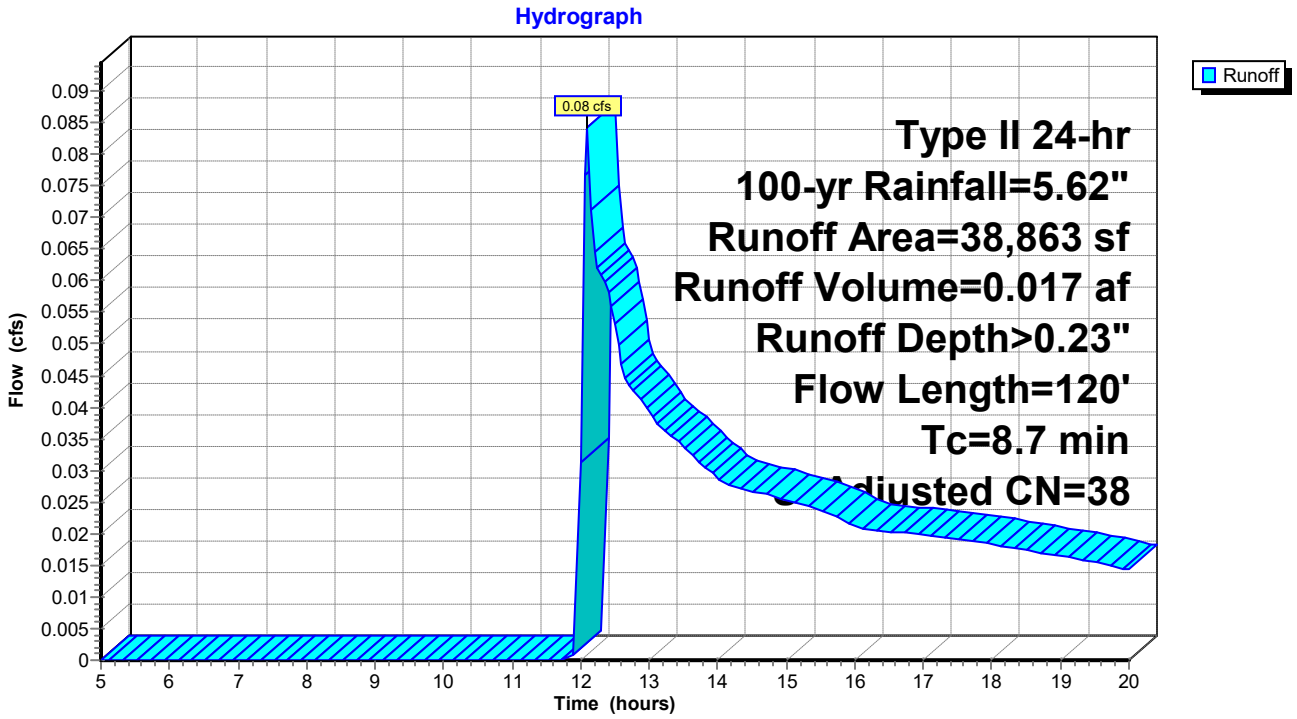
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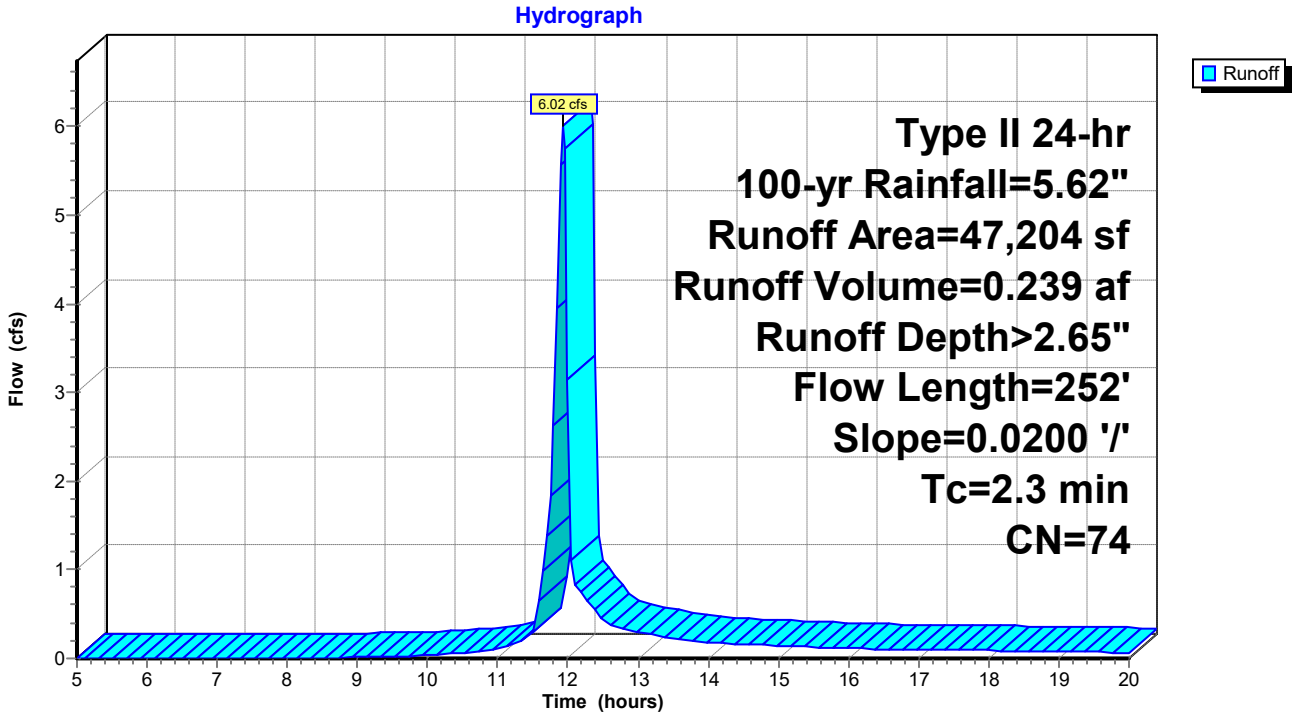
Subcatchment 17S: PRDA-1B-DRYWELL 2



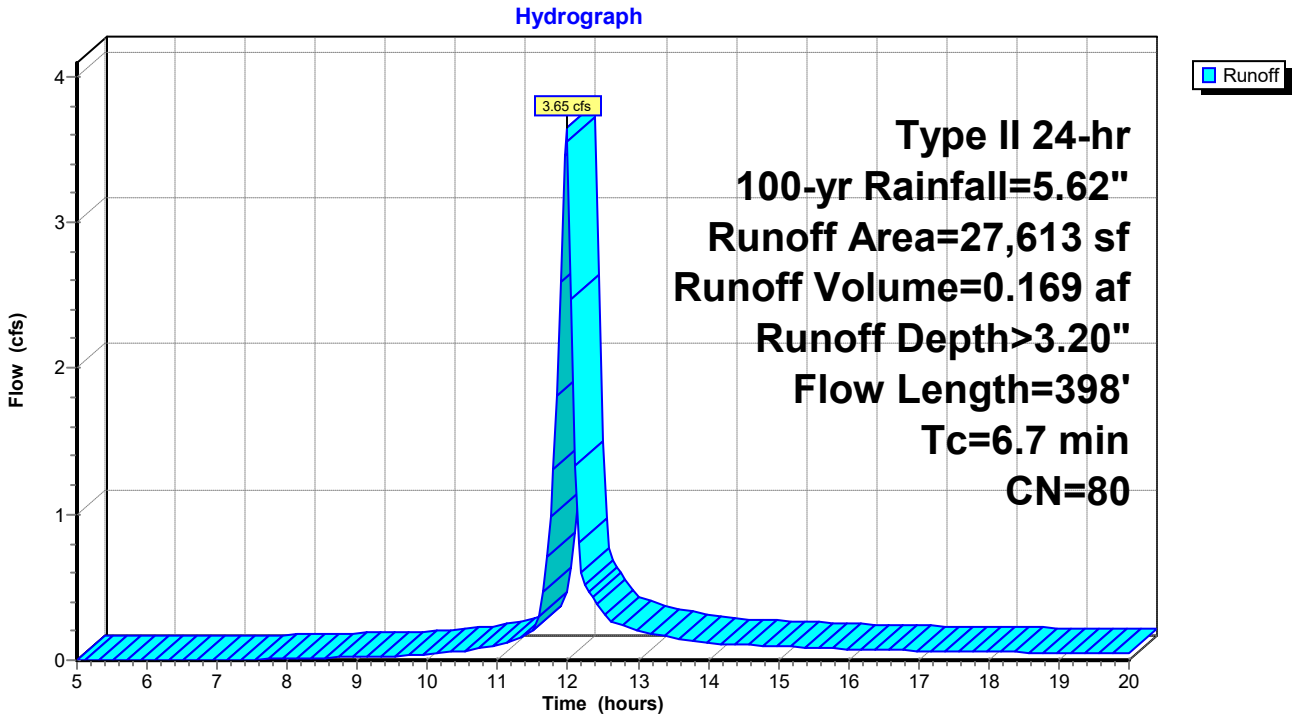
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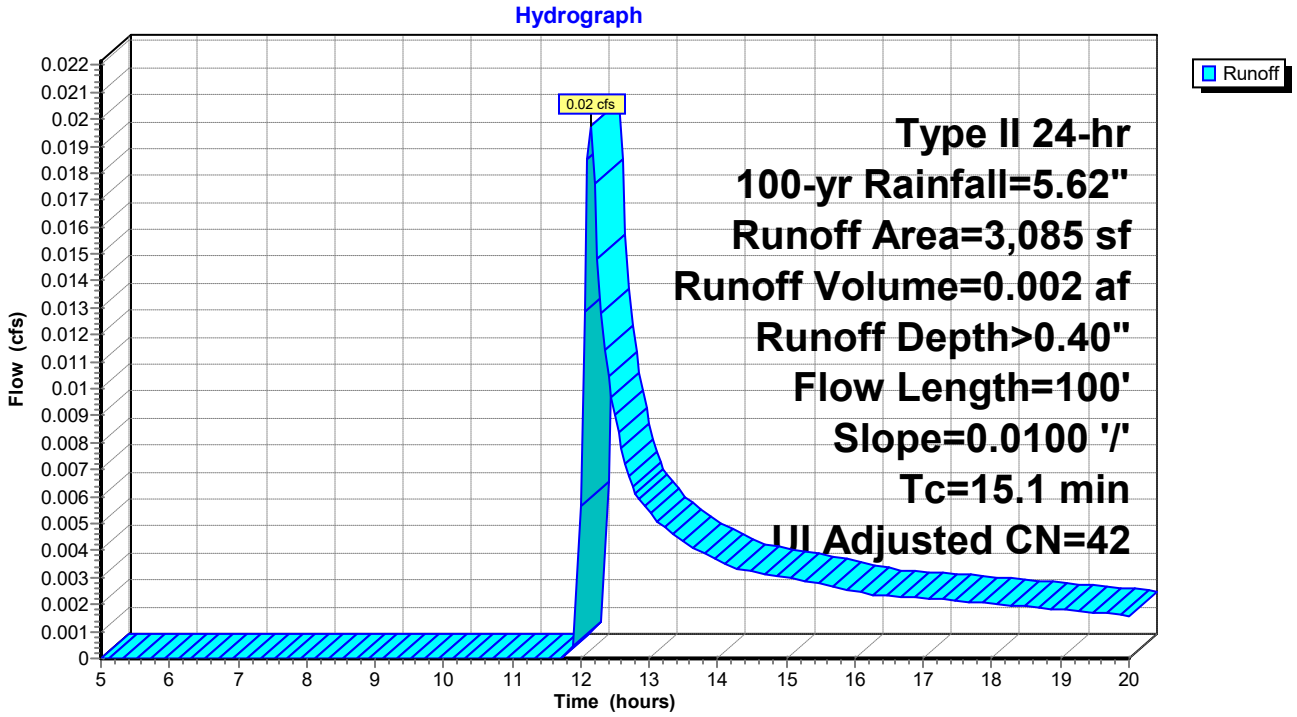
Subcatchment 28S: PRDA-1B-FOREBAY



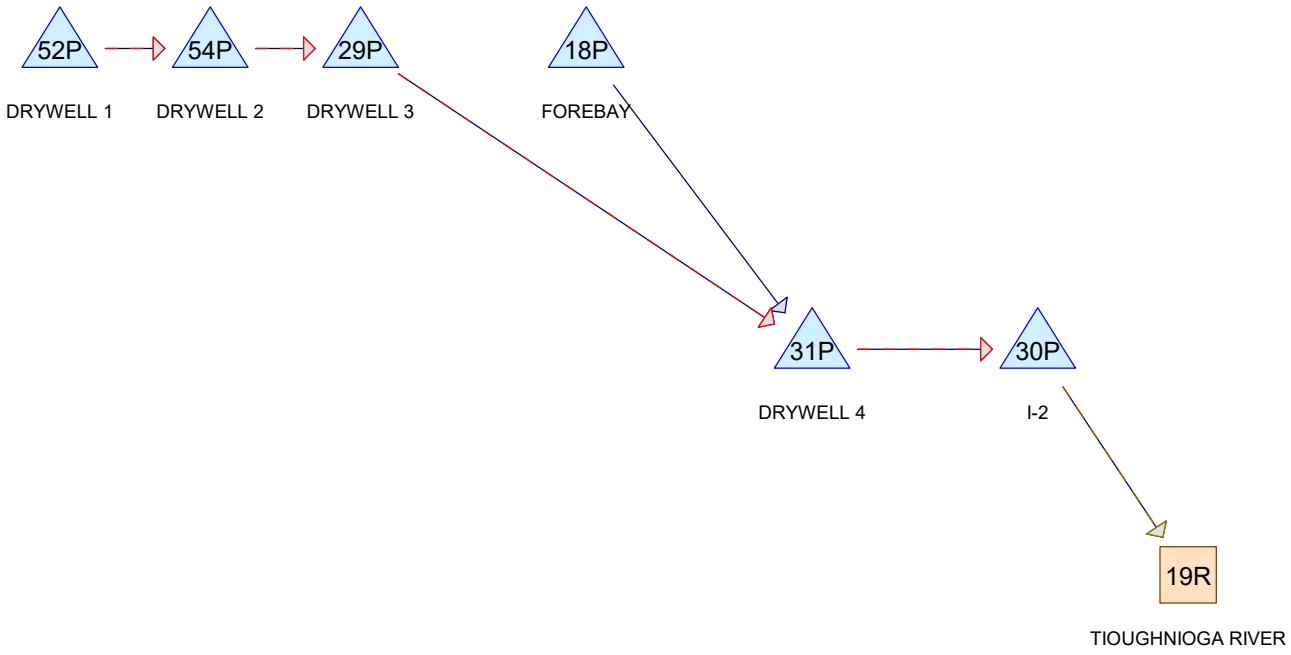
Subcatchment 29S: PRDA-1B-I2



Subcatchment 33S: PRDA-1B-DRYWELL 1&2



APPENDIX E



Subcat Reach Pond Link

Routing Diagram for Riverview
Prepared by R Z Engineering, PLLC, Printed 6/30/2025
HydroCAD® 10.20-6a s/n 05023 © 2024 HydroCAD Software Solutions LLC

Summary for Reach 19R: TIOUGHNIOGA RIVER

Inflow Area = 3.030 ac, 45.58% Impervious, Inflow Depth > 0.57" for 100-yr event
Inflow = 0.25 cfs @ 16.44 hrs, Volume= 0.145 af
Outflow = 0.25 cfs @ 16.44 hrs, Volume= 0.145 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Pond 18P: FOREBAY

Inflow Area = 1.084 ac, 59.75% Impervious, Inflow Depth > 2.65" for 100-yr event
Inflow = 6.02 cfs @ 11.93 hrs, Volume= 0.239 af
Outflow = 6.95 cfs @ 11.91 hrs, Volume= 0.229 af, Atten= 0%, Lag= 0.0 min
Primary = 6.95 cfs @ 11.91 hrs, Volume= 0.229 af
Routed to Pond 31P : DRYWELL 4

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 1,106.05' @ 11.90 hrs Surf.Area= 4,601 sf Storage= 1,765 cf

Plug-Flow detention time= 41.2 min calculated for 0.228 af (95% of inflow)
Center-of-Mass det. time= 25.1 min (808.9 - 783.8)

Volume	Invert	Avail.Storage	Storage Description
#1	1,099.00'	1,765 cf	**I-2 FOREBAY (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,099.00	2,460	0	0
1,099.50	4,601	1,765	1,765

Device	Routing	Invert	Outlet Devices
#1	Primary	1,099.00'	**12.0" Round Culvert** L= 115.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 1,099.00' / 1,098.42' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=6.62 cfs @ 11.91 hrs HW=1,105.50' (Free Discharge)
1=Culvert (Barrel Controls 6.62 cfs @ 8.43 fps)

Summary for Pond 29P: DRYWELL 3

Inflow Area = 0.370 ac, 78.08% Impervious, Inflow Depth > 3.72" for 100-yr event
Inflow = 2.47 cfs @ 11.91 hrs, Volume= 0.115 af
Outflow = 2.25 cfs @ 11.94 hrs, Volume= 0.107 af, Atten= 9%, Lag= 1.8 min
Primary = 2.25 cfs @ 11.94 hrs, Volume= 0.107 af
Routed to Pond 31P : DRYWELL 4
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Routed to Pond 31P : DRYWELL 4

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 1,100.27' @ 11.94 hrs Surf.Area= 365 sf Storage= 681 cf

Plug-Flow detention time= 49.6 min calculated for 0.107 af (93% of inflow)
Center-of-Mass det. time= 24.2 min (761.4 - 737.2)

Volume	Invert	Avail.Storage	Storage Description
#1	1,097.00'	302 cf	**8.00'D x 6.00'H Vertical Cone/Cylinder** Inside #2
#2	1,096.00'	248 cf	**10.00'D x 7.00'H Vertical Cone/Cylinder Stone** 550 cf Overall - 302 cf Embedded = 248 cf
#3	1,099.20'	112 cf	**12.0" Round Pipe Storage** Inside #4 L= 143.0' S= 0.0050 '/'
#4	1,098.70'	460 cf	**24.0" W x 24.0" H Box Pipe Stone** L= 143.0' S= 0.0050 '/' 572 cf Overall - 112 cf Embedded = 460 cf
		1,122 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	1,099.20'	**12.0" Round Culvert** L= 154.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 1,099.20' / 1,098.43' S= 0.0050 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 0.79 sf
#2	Device 3	1,103.00'	**24.0" Horiz. Rim** C= 0.600 Limited to weir flow at low heads
#3	Secondary	1,100.00'	**Flood Route, Cv= 2.62 (C= 3.28)** Head (feet) 0.00 0.50 Width (feet) 6.00 8.00

Primary OutFlow Max=2.21 cfs @ 11.94 hrs HW=1,100.25' (Free Discharge)
└**1=Culvert** (Inlet Controls 2.21 cfs @ 2.82 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=1,096.01' (Free Discharge)
└**3=Flood Route** (Controls 0.00 cfs)
└**2=Rim** (Controls 0.00 cfs)

Summary for Pond 30P: I-2

Inflow Area = 2.096 ac, 65.89% Impervious, Inflow Depth > 2.84" for 100-yr event
Inflow = 12.32 cfs @ 11.95 hrs, Volume= 0.495 af
Outflow = 0.24 cfs @ 16.42 hrs, Volume= 0.139 af, Atten= 98%, Lag= 268.4 min
Primary = 0.24 cfs @ 16.42 hrs, Volume= 0.139 af
Routed to Reach 19R : TIOUGHNIOGA RIVER
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Routed to Reach 19R : TIOUGHNIOGA RIVER

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 1,101.67' @ 16.42 hrs Surf.Area= 5,107 sf Storage= 16,110 cf

Plug-Flow detention time= 281.3 min calculated for 0.139 af (28% of inflow)
Center-of-Mass det. time= 188.5 min (981.3 - 792.8)

Volume	Invert	Avail.Storage	Storage Description
#1	1,097.00'	20,903 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,097.00	1,998	0	0
1,098.00	2,553	2,276	2,276
1,099.00	3,165	2,859	5,135
1,100.00	3,855	3,510	8,645
1,101.00	4,582	4,219	12,863
1,102.00	5,366	4,974	17,837
1,102.50	6,898	3,066	20,903

Device	Routing	Invert	Outlet Devices
#1	Device 2	1,102.45'	**24.0" Horiz. RIM** C= 0.600 Limited to weir flow at low heads
#2	Primary	1,097.00'	**12.0" Round OUTLET** L= 30.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 1,097.00' / 1,096.85' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#3	Device 2	1,100.55'	**3.0" Vert. ORFICE** C= 0.600 Limited to weir flow at low heads
#4	Secondary	1,102.50'	**Spillway, Cv= 2.62 (C= 3.28)** Head (feet) 0.00 1.00 Width (feet) 10.00 20.00

Primary OutFlow Max=0.24 cfs @ 16.42 hrs HW=1,101.67' (Free Discharge)
└─**2=OUTLET** (Passes 0.24 cfs of 6.10 cfs potential flow)
  ├─**1=RIM** (Controls 0.00 cfs)
  └─**3=ORFICE** (Orifice Controls 0.24 cfs @ 4.80 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=1,097.00' (Free Discharge)
└─**4=Spillway** (Controls 0.00 cfs)

Summary for Pond 31P: DRYWELL 4

Inflow Area = 1.462 ac, 64.05% Impervious, Inflow Depth > 2.76" for 100-yr event
Inflow = 9.04 cfs @ 11.91 hrs, Volume= 0.336 af
Outflow = 8.93 cfs @ 11.94 hrs, Volume= 0.327 af, Atten= 1%, Lag= 1.9 min
Primary = 5.13 cfs @ 11.93 hrs, Volume= 0.304 af
  Routed to Pond 30P : I-2
Secondary = 3.81 cfs @ 11.94 hrs, Volume= 0.023 af
  Routed to Pond 30P : I-2

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 1,101.87' @ 11.93 hrs Surf.Area= 387 sf Storage= 1,166 cf

Plug-Flow detention time= 18.5 min calculated for 0.325 af (97% of inflow)
Center-of-Mass det. time= 7.9 min (801.7 - 793.8)

Volume	Invert	Avail.Storage	Storage Description
#1	1,095.50'	302 cf	**8.00'D x 6.00'H Vertical Cone/Cylinder** Inside #2
#2	1,094.50'	248 cf	**10.00'D x 7.00'H Vertical Cone/Cylinder Stone** 550 cf Overall - 302 cf Embedded = 248 cf
#3	1,098.42'	121 cf	**12.0" Round Pipe Storage** Inside #4 L= 154.0' S= 0.0050 '/'
#4	1,097.92'	495 cf	**24.0" W x 24.0" H Box Pipe Stone** L= 154.0' S= 0.0050 '/' 616 cf Overall - 121 cf Embedded = 495 cf
		1,166 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Secondary	1,101.50'	**24.0" Horiz. Rim** C= 0.600 Limited to weir flow at low heads
#2	Primary	1,098.42'	**12.0" Round Culvert** L= 28.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 1,098.42' / 1,098.28' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=5.05 cfs @ 11.93 hrs HW=1,101.78' (Free Discharge)
↑—**2=Culvert** (Inlet Controls 5.05 cfs @ 6.43 fps)

Secondary OutFlow Max=3.39 cfs @ 11.94 hrs HW=1,101.80' (Free Discharge)
↑—**1=Rim** (Weir Controls 3.39 cfs @ 1.79 fps)

Summary for Pond 52P: DRYWELL 1

Inflow Area = 0.071 ac, 10.53% Impervious, Inflow Depth > 0.40" for 100-yr event
Inflow = 0.02 cfs @ 12.14 hrs, Volume= 0.002 af
Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Routed to Pond 54P : DRYWELL 2
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Routed to Pond 54P : DRYWELL 2

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 1,098.17' @ 20.00 hrs Surf.Area= 79 sf Storage= 104 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1	1,097.00'	302 cf	**8.00'D x 6.00'H Vertical Cone/Cylinder** Inside #2
#2	1,096.00'	99 cf	**10.00'D x 7.00'H stone** 550 cf Overall - 302 cf Embedded = 248 cf x 40.0% Voids
#3	1,103.00'	693 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)
		1,094 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,103.00	8	0	0
1,104.00	1,378	693	693

Device	Routing	Invert	Outlet Devices
#1	Device 3	1,103.00'	**24.0" Horiz. Rim X 2.00** C= 0.600 Limited to weir flow at low heads
#2	Primary	1,099.90'	**12.0" Round Culvert** L= 40.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 1,099.90' / 1,099.90' S= 0.0000 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#3	Secondary	1,104.50'	**Flood Route, Cv= 2.62 (C= 3.28)** Head (feet) 0.00 0.50 Width (feet) 10.00 40.00

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=1,096.00' (Free Discharge)
└**2=Culvert** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=1,096.00' (Free Discharge)
└**3=Flood Route** (Controls 0.00 cfs)
└**1=Rim** (Controls 0.00 cfs)

Summary for Pond 54P: DRYWELL 2

Inflow Area = 0.071 ac, 10.53% Impervious, Inflow Depth = 0.00" for 100-yr event
Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Routed to Pond 29P : DRYWELL 3
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Routed to Pond 29P : DRYWELL 3

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 1,096.00' @ 5.00 hrs Surf.Area= 79 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no inflow)

Volume	Invert	Avail.Storage	Storage Description
#1	1,097.00'	302 cf	**8.00'D x 6.00'H Vertical Cone/Cylinder** Inside #2
#2	1,096.00'	99 cf	**10.00'D x 7.00'H stone** 550 cf Overall - 302 cf Embedded = 248 cf x 40.0% Voids
#3	1,103.00'	693 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)
#4	1,099.90'	31 cf	**12.0" Round Pipe Storage** Inside #5 L= 40.0'
#5	1,099.40'	129 cf	**24.0" W x 24.0" H Box Pipe Storage** L= 40.0' 160 cf Overall - 31 cf Embedded = 129 cf
		1,254 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,103.00	8	0	0
1,104.00	1,378	693	693

Device	Routing	Invert	Outlet Devices
#1	Device 3	1,103.00'	**24.0" Horiz. Rim X 2.00** C= 0.600 Limited to weir flow at low heads
#2	Primary	1,099.20'	**8.0" Round Culvert** L= 140.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 1,099.20' / 1,099.20' S= 0.0000 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#3	Secondary	1,104.50'	**Flood Route, Cv= 2.62 (C= 3.28)** Head (feet) 0.00 0.50 Width (feet) 10.00 40.00

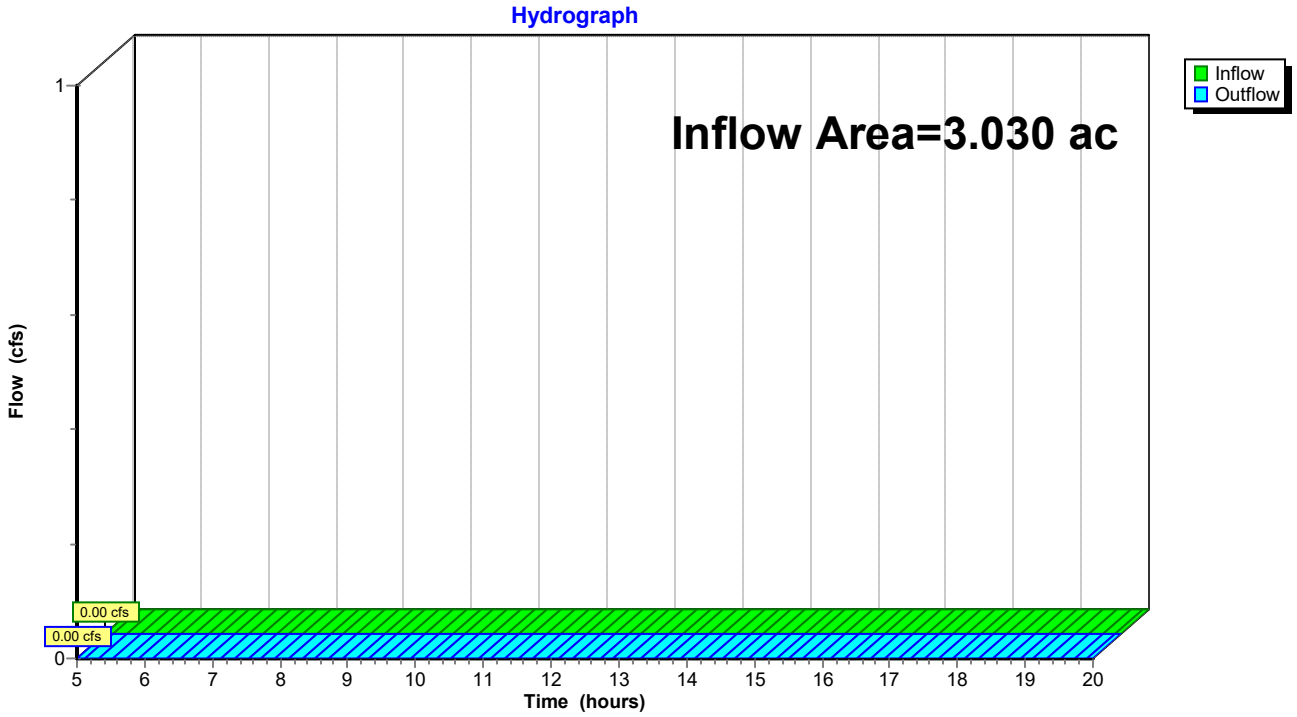
Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=1,096.00' (Free Discharge)
└─**2=Culvert** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=1,096.00' (Free Discharge)
└─**3=Flood Route** (Controls 0.00 cfs)
└─**1=Rim** (Controls 0.00 cfs)

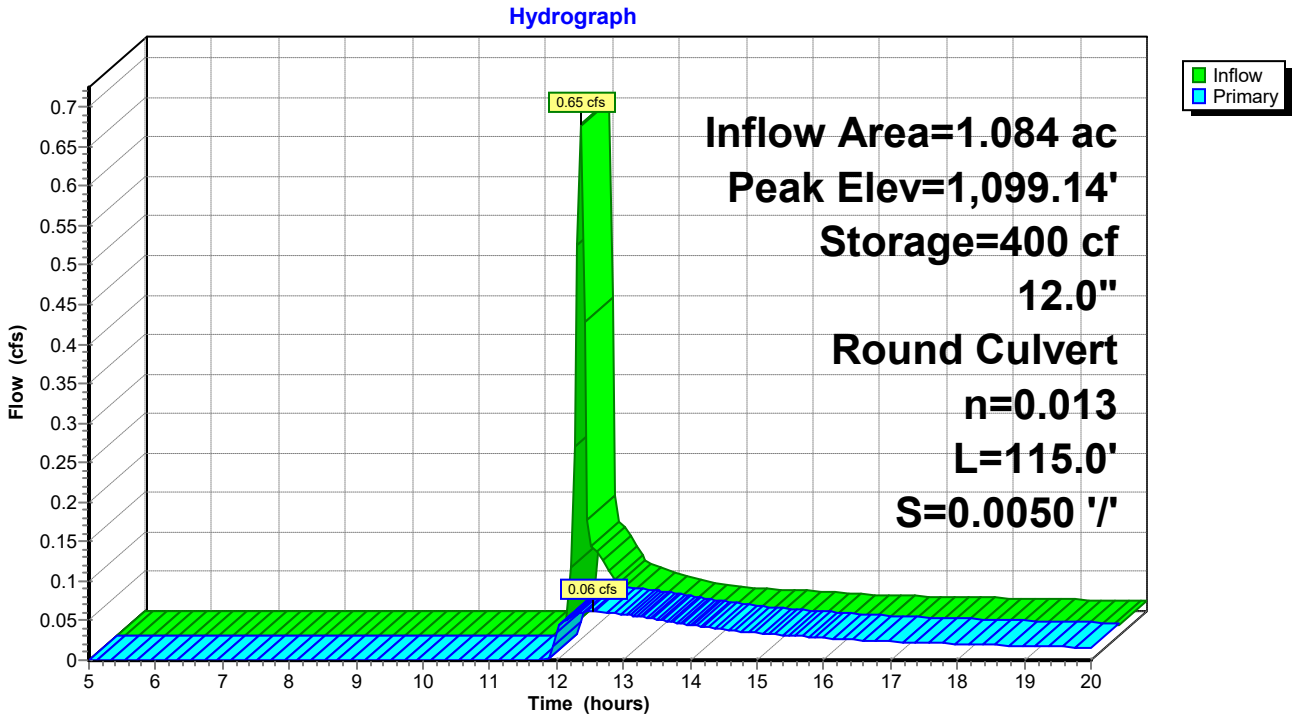
Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	1-yr	Type II 24-hr		Default	24.00	1	1.97	2
2	2-yr	Type II 24-hr		Default	24.00	1	2.35	2
3	5-yr	Type II 24-hr		Default	24.00	1	2.88	2
4	10-yr	Type II 24-hr		Default	24.00	1	3.36	2
5	25-yr	Type II 24-hr		Default	24.00	1	4.12	2
6	50-yr	Type II 24-hr		Default	24.00	1	4.81	2
7	100-yr	Type II 24-hr		Default	24.00	1	5.62	2

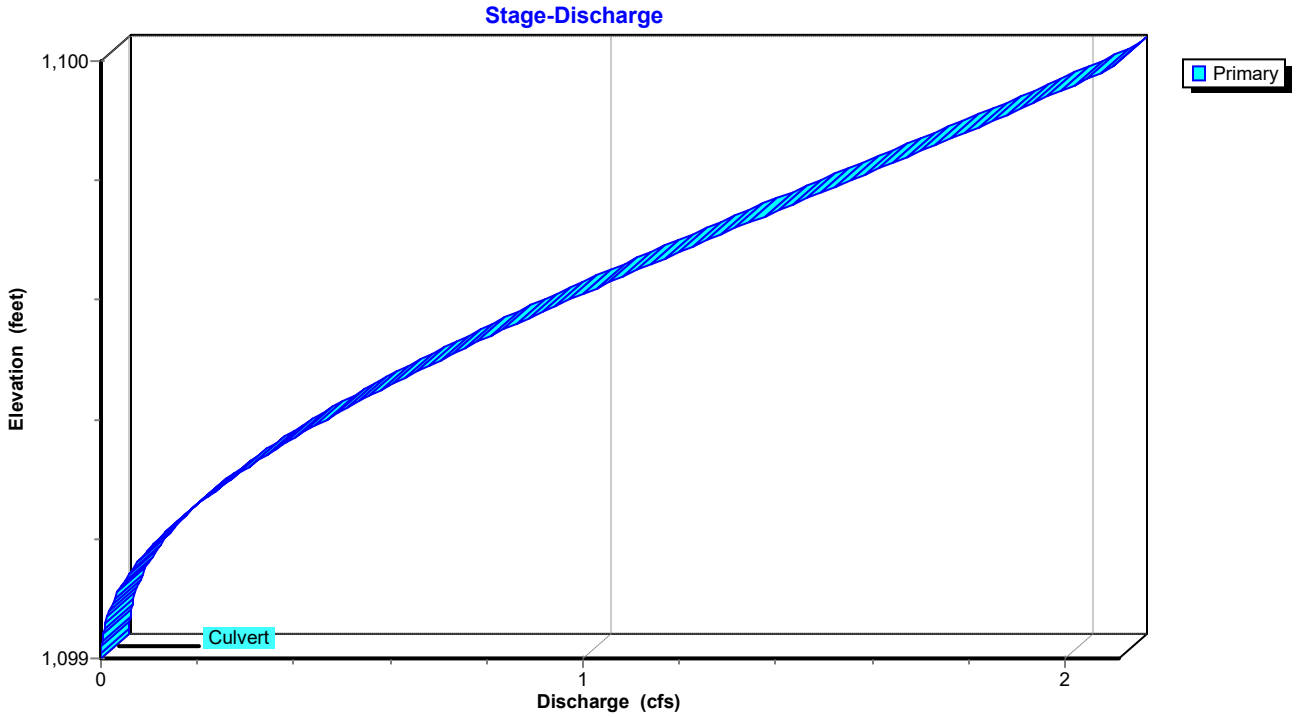
Reach 19R: TIOUGHNIOGA RIVER



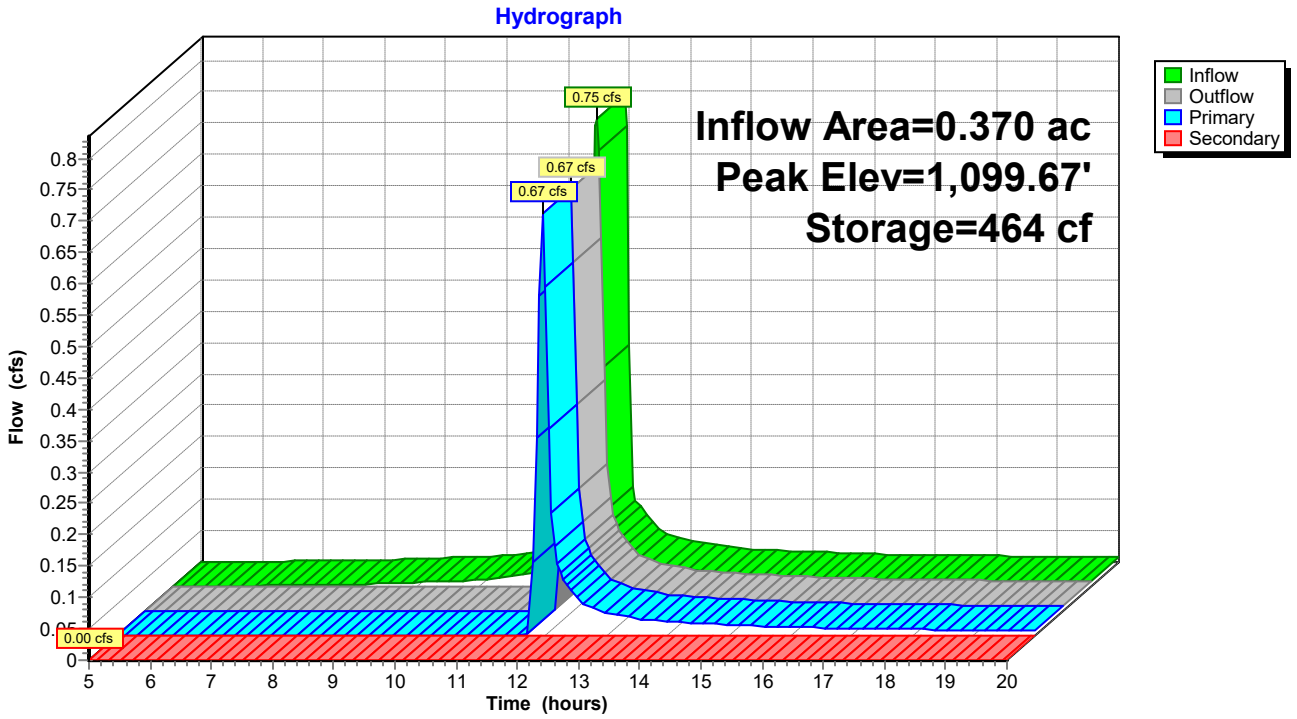
Pond 18P: FOREBAY



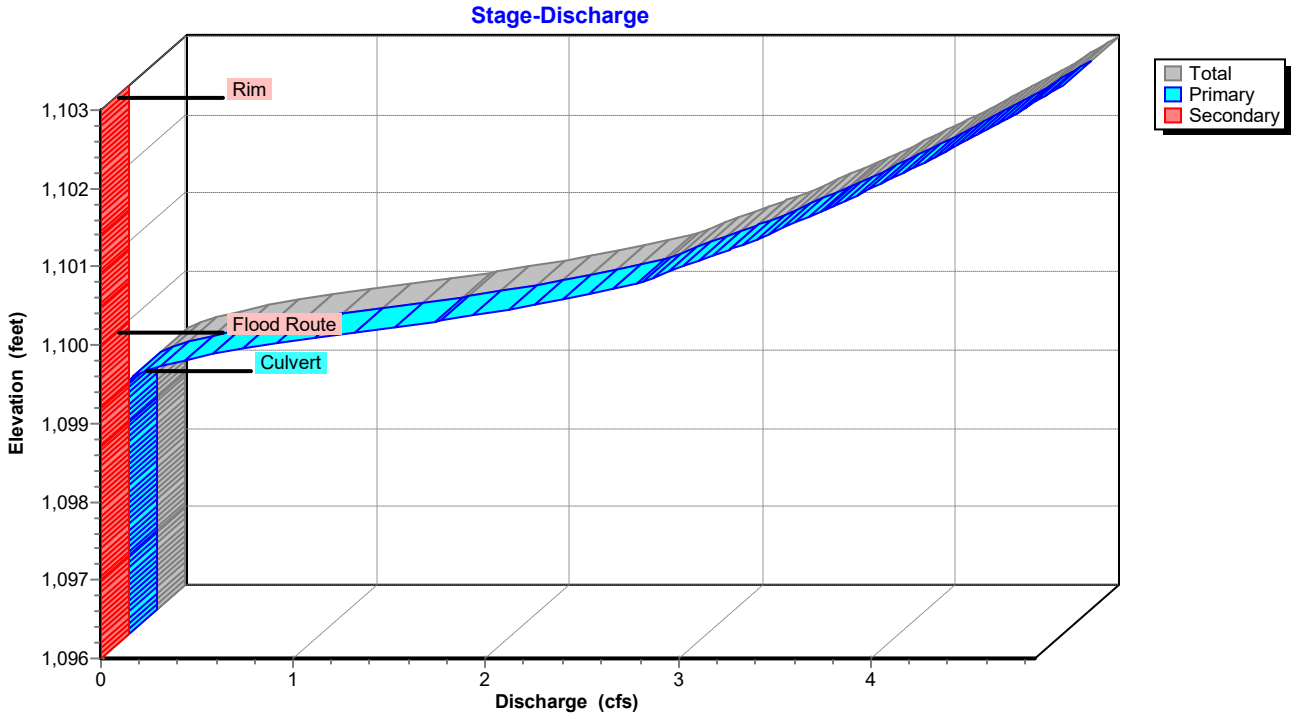
Pond 18P: FOREBAY



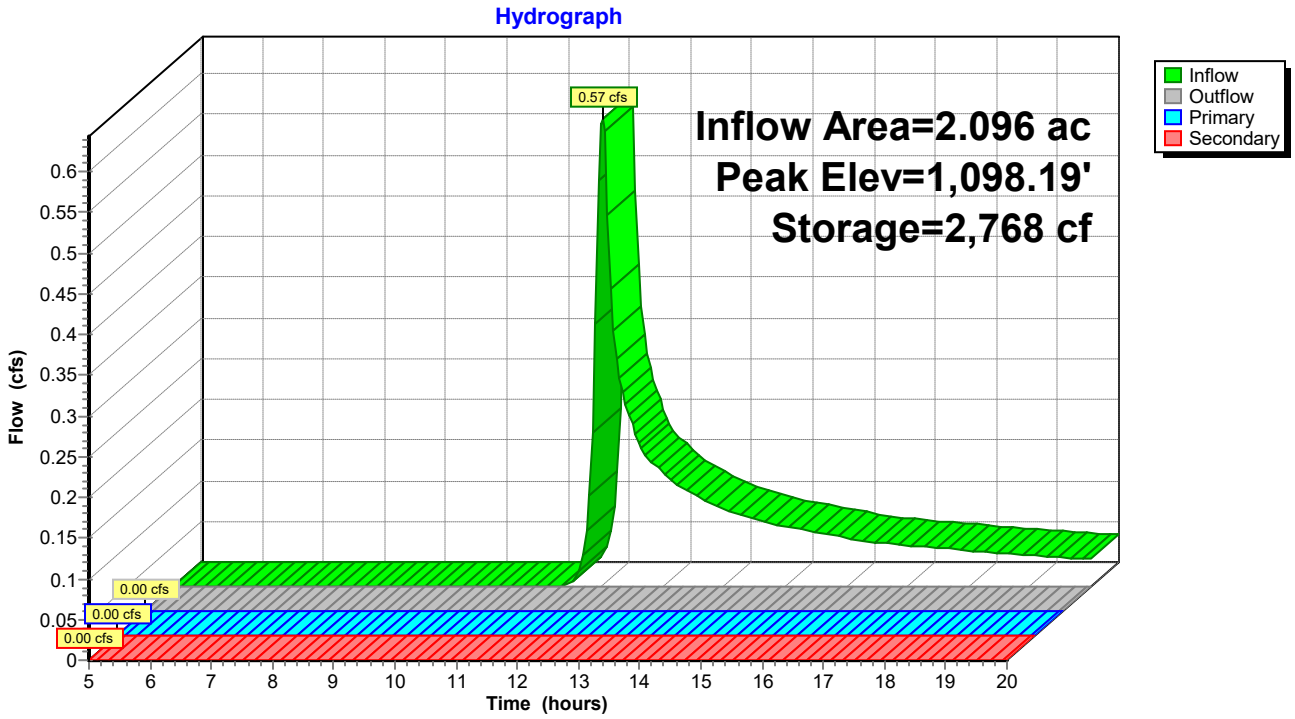
Pond 29P: DRYWELL 3



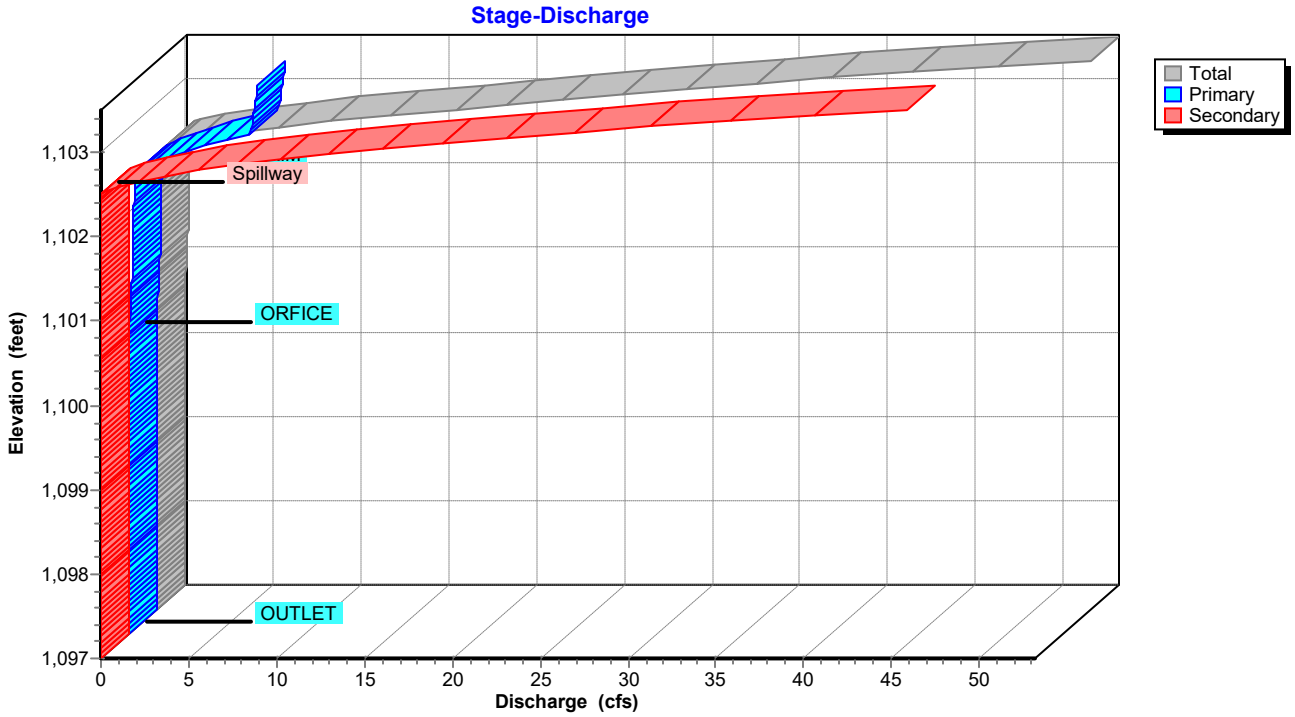
Pond 29P: DRYWELL 3



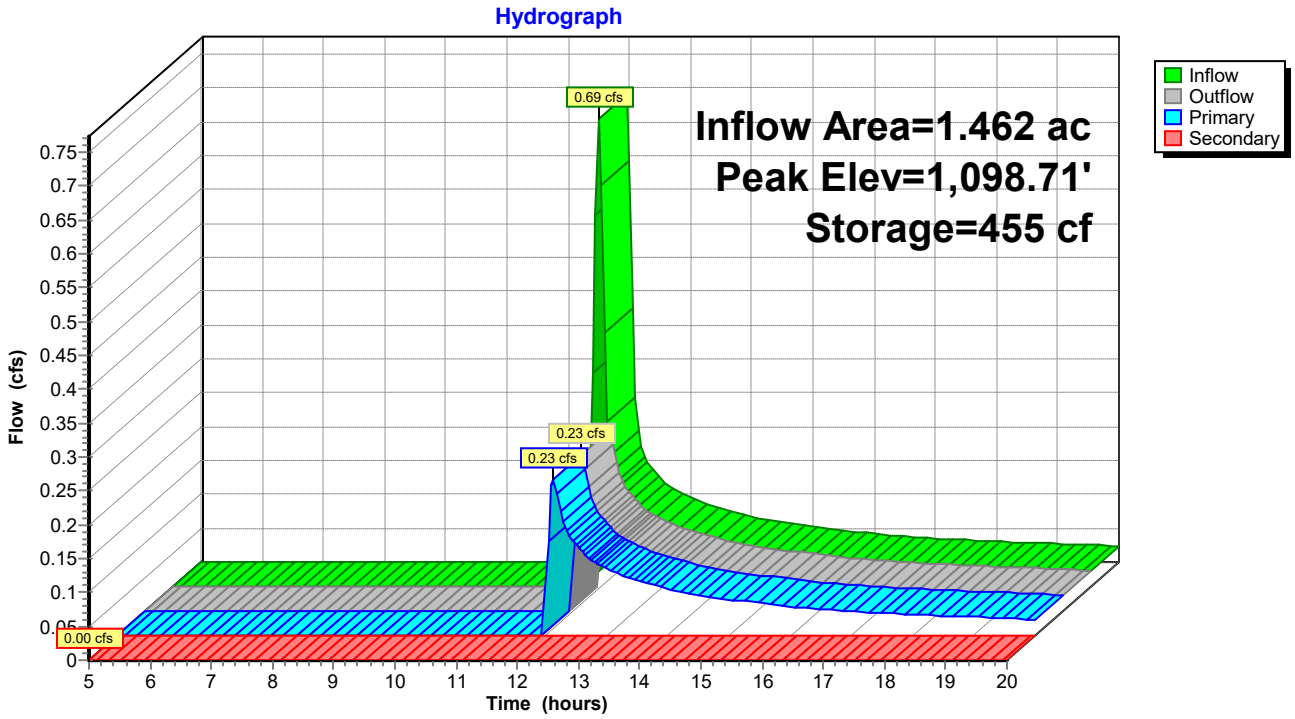
Pond 30P: I-2



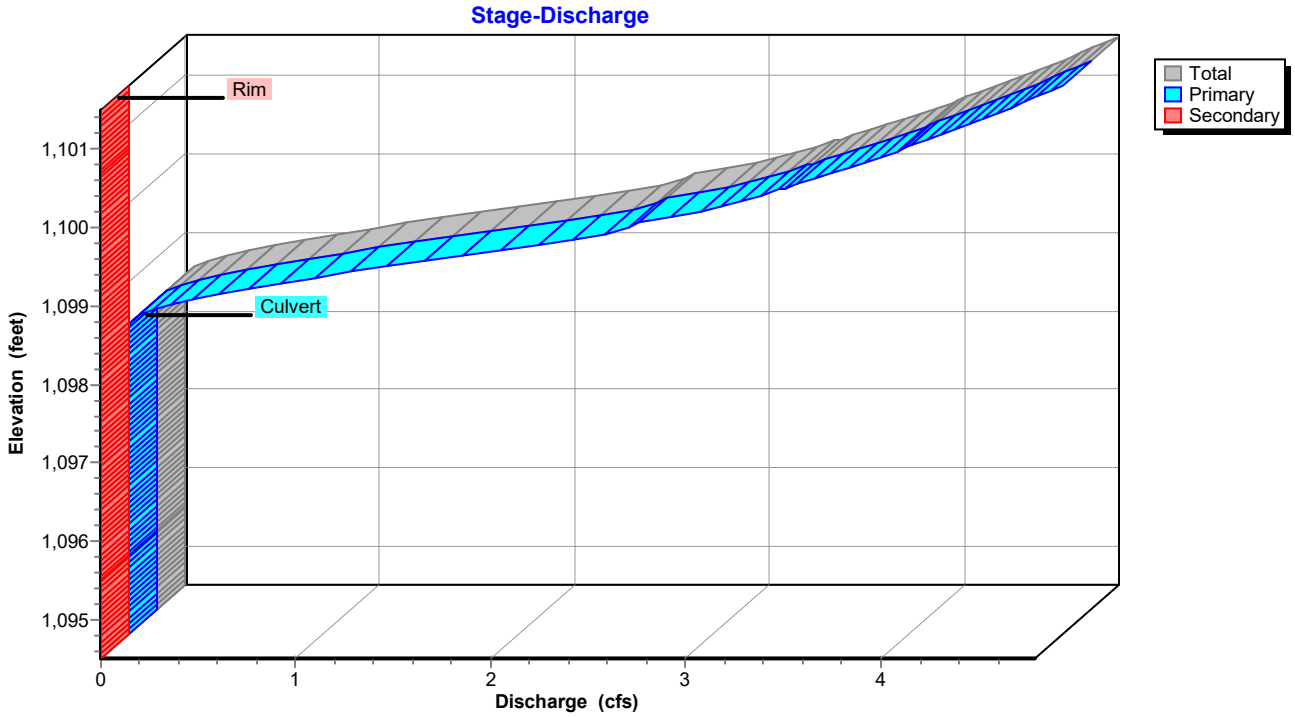
Pond 30P: I-2



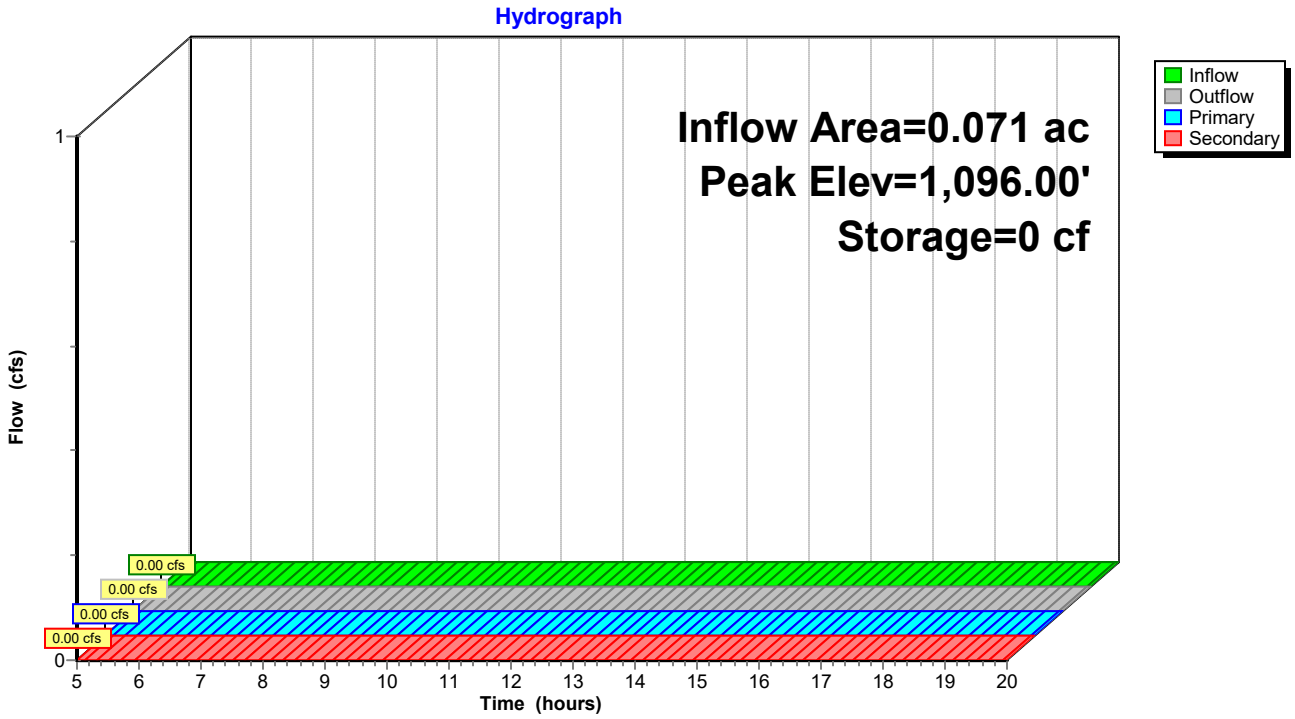
Pond 31P: DRYWELL 4



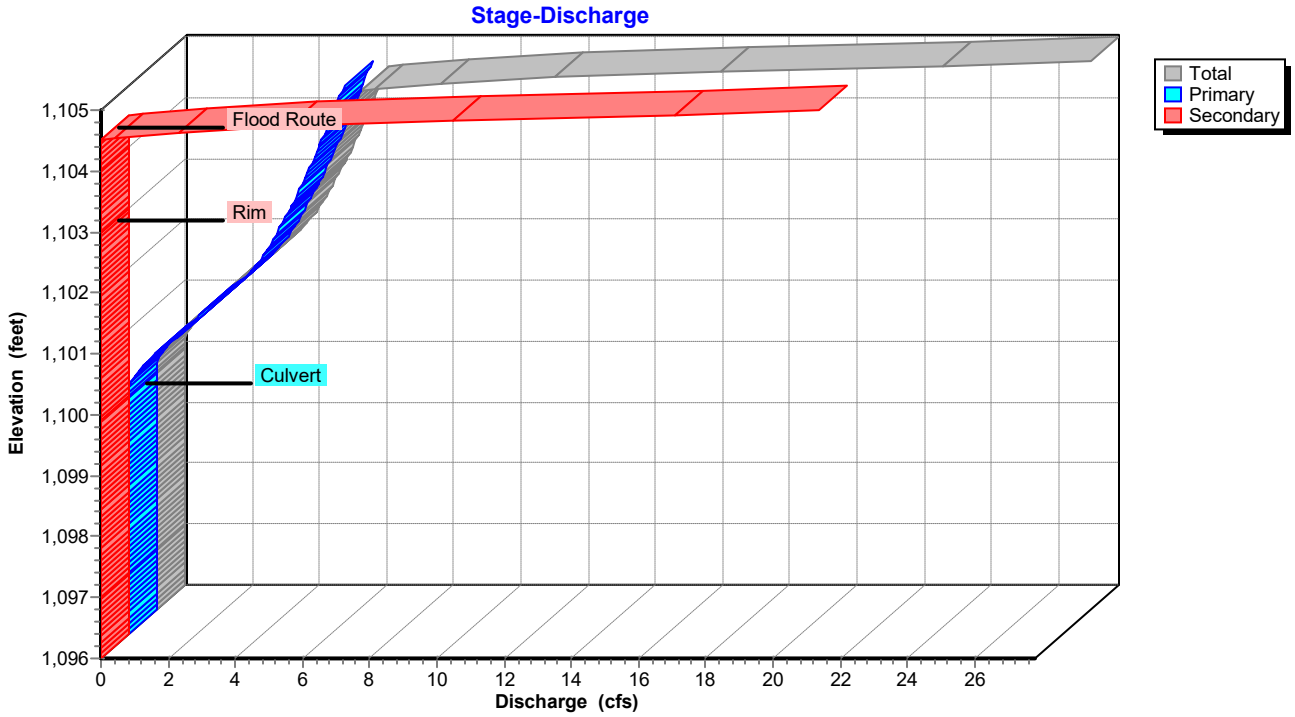
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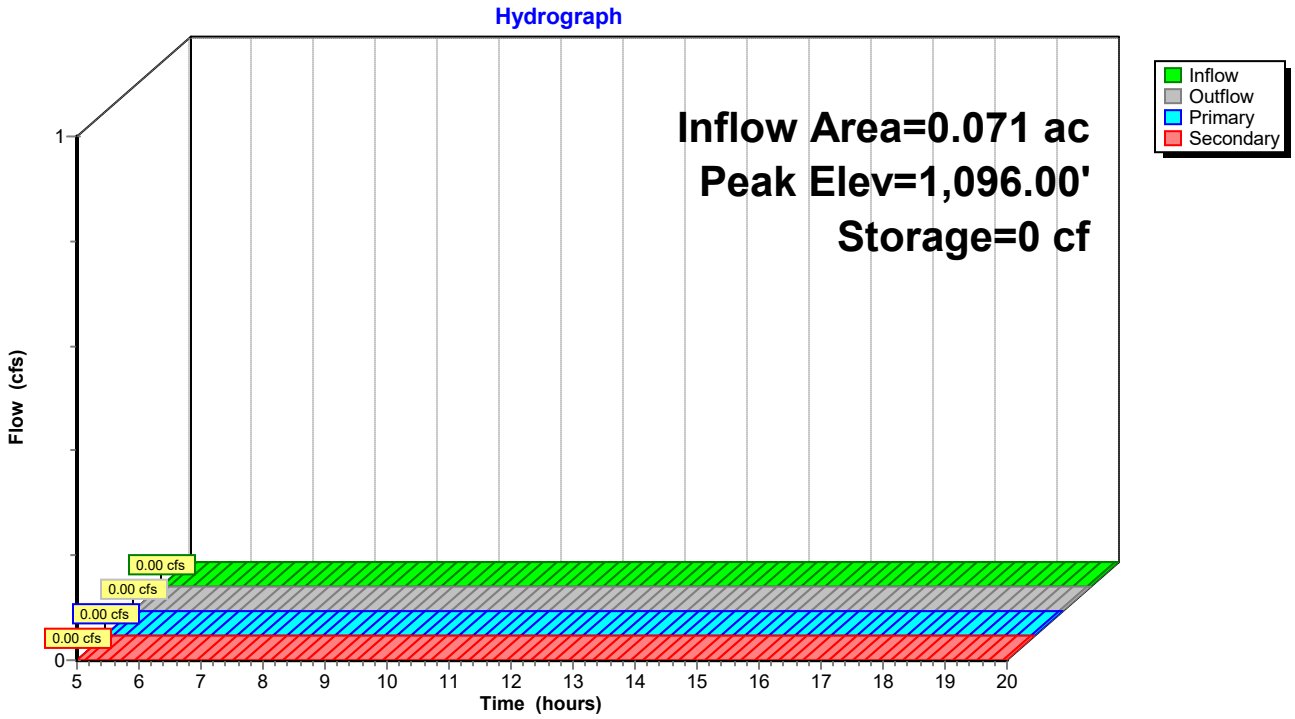
Pond 52P: DRYWELL 1



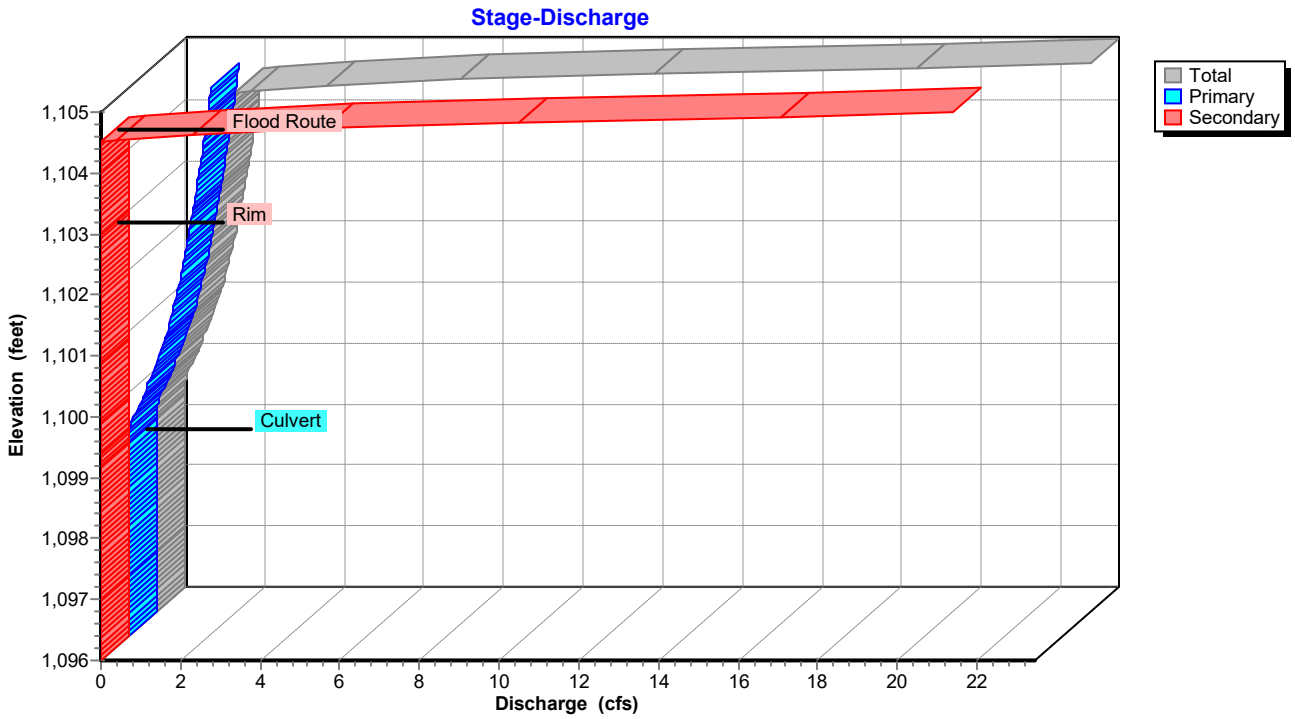
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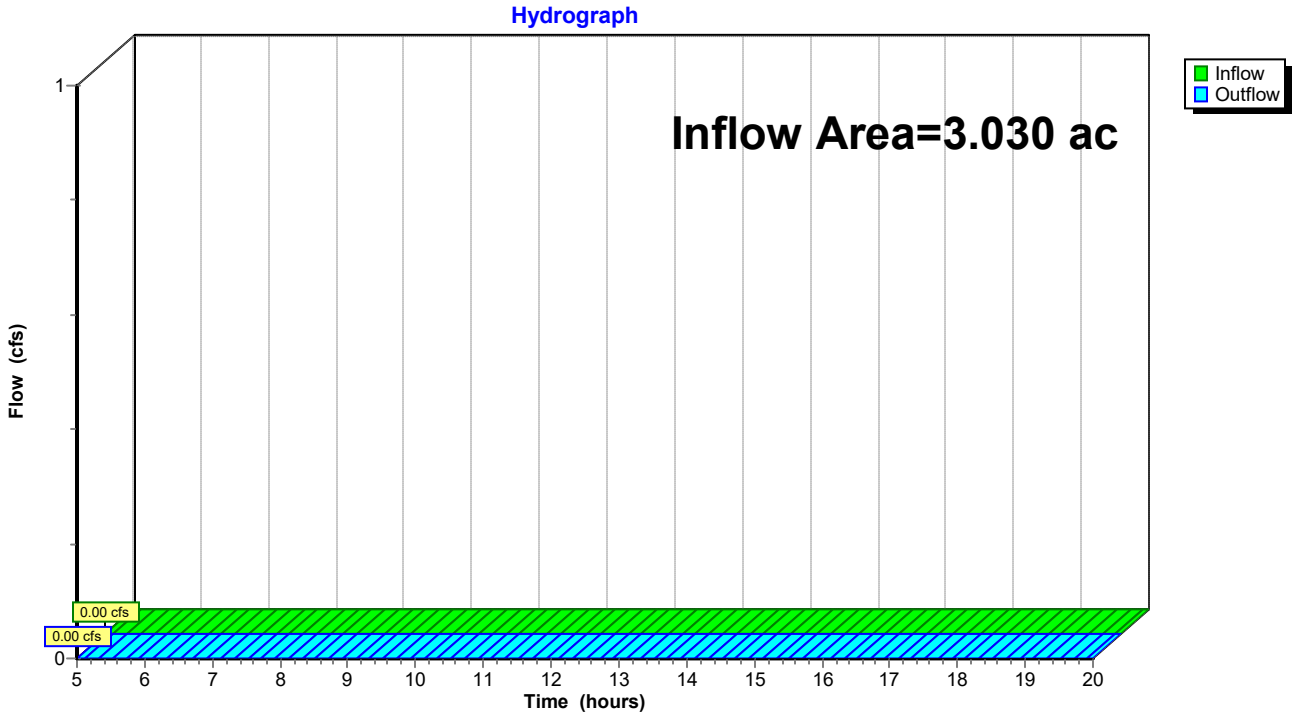
Pond 54P: DRYWELL 2



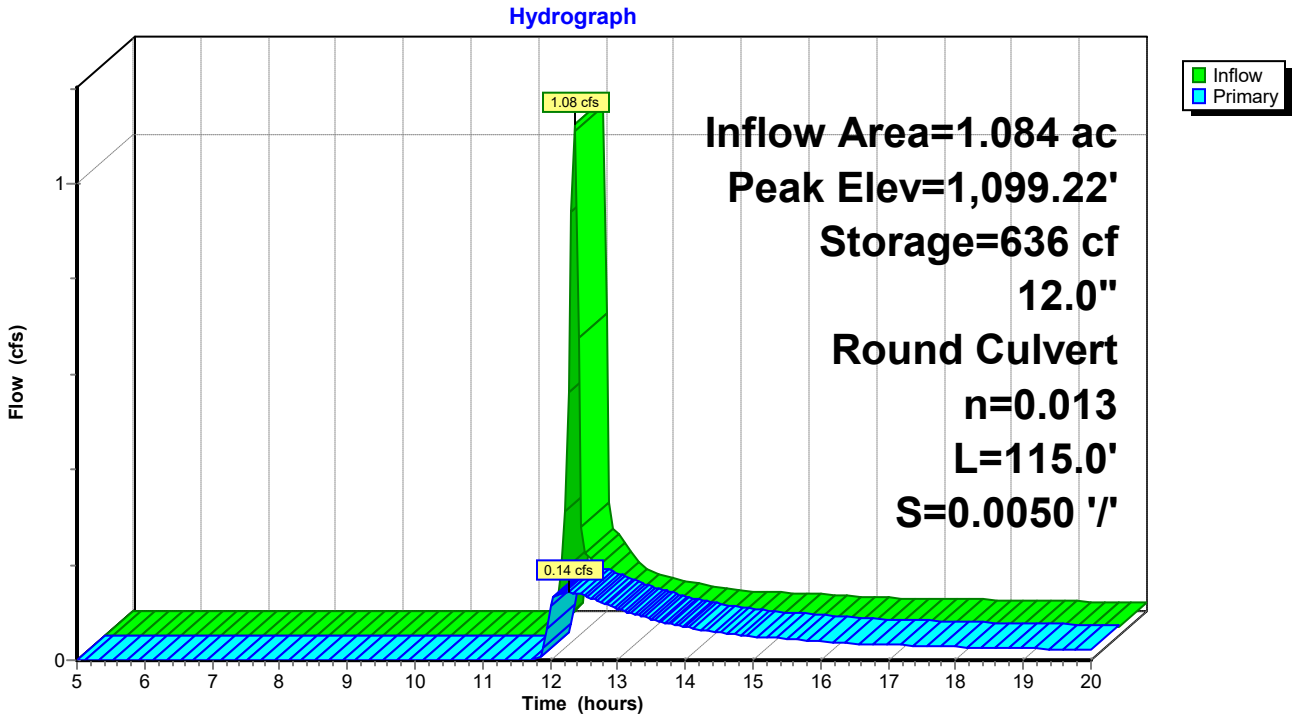
Pond 54P: DRYWELL 2



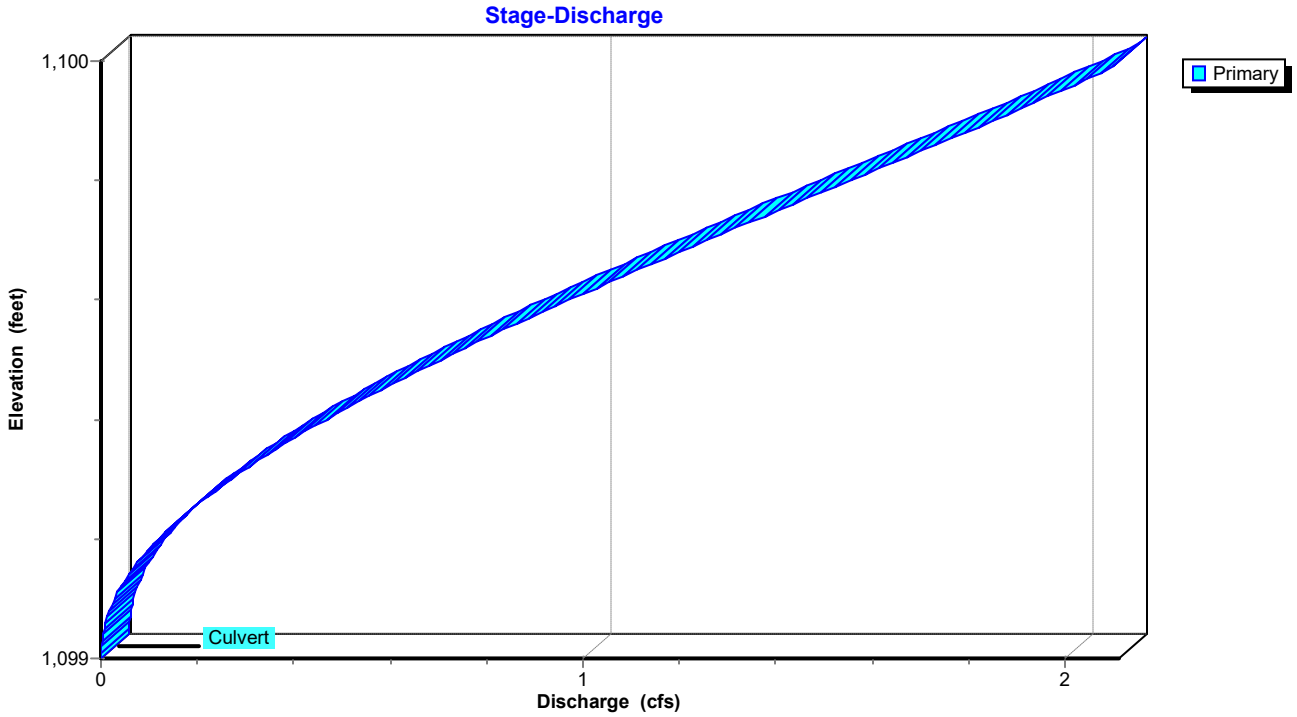
Reach 19R: TIOUGHNIOGA RIVER



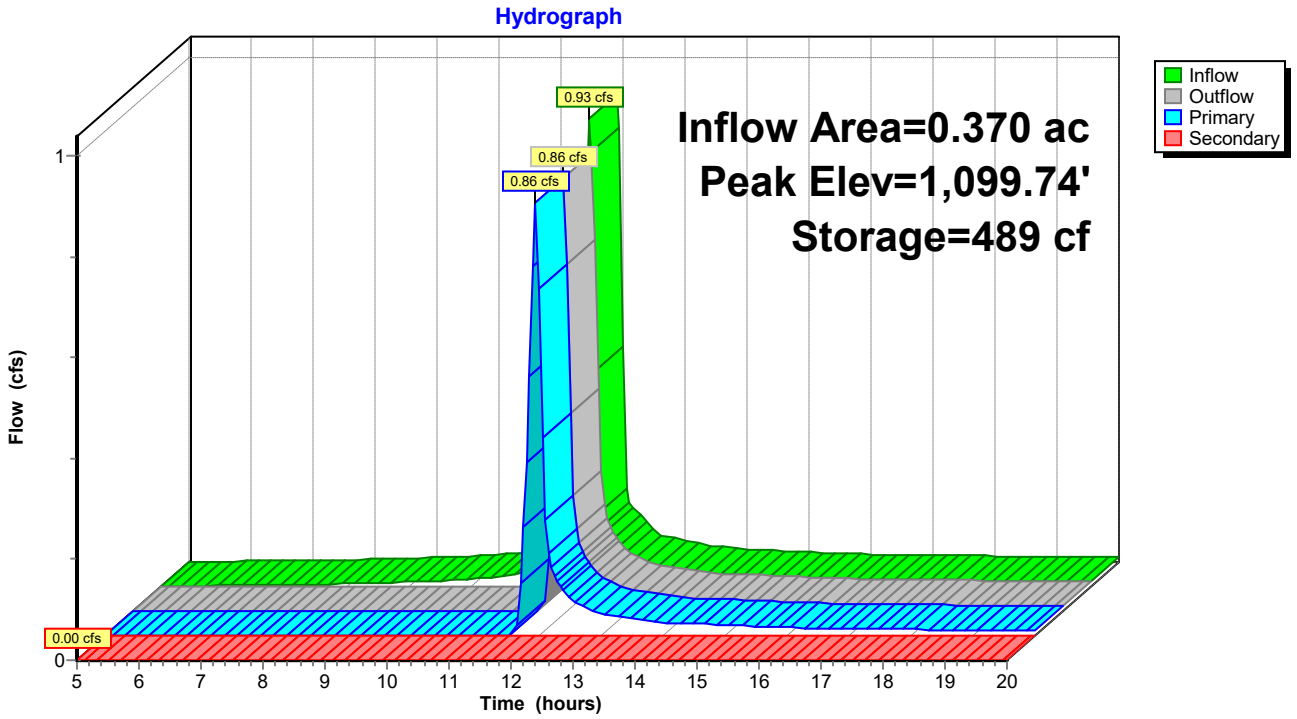
Pond 18P: FOREBAY



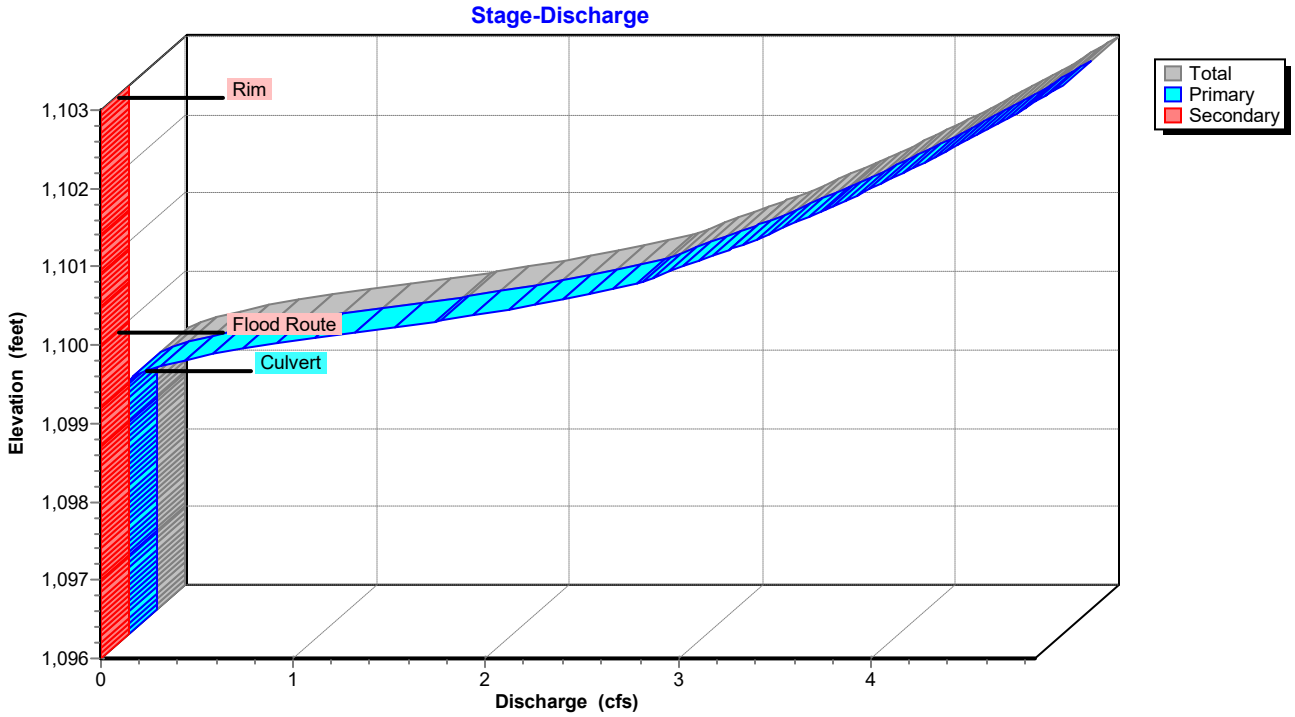
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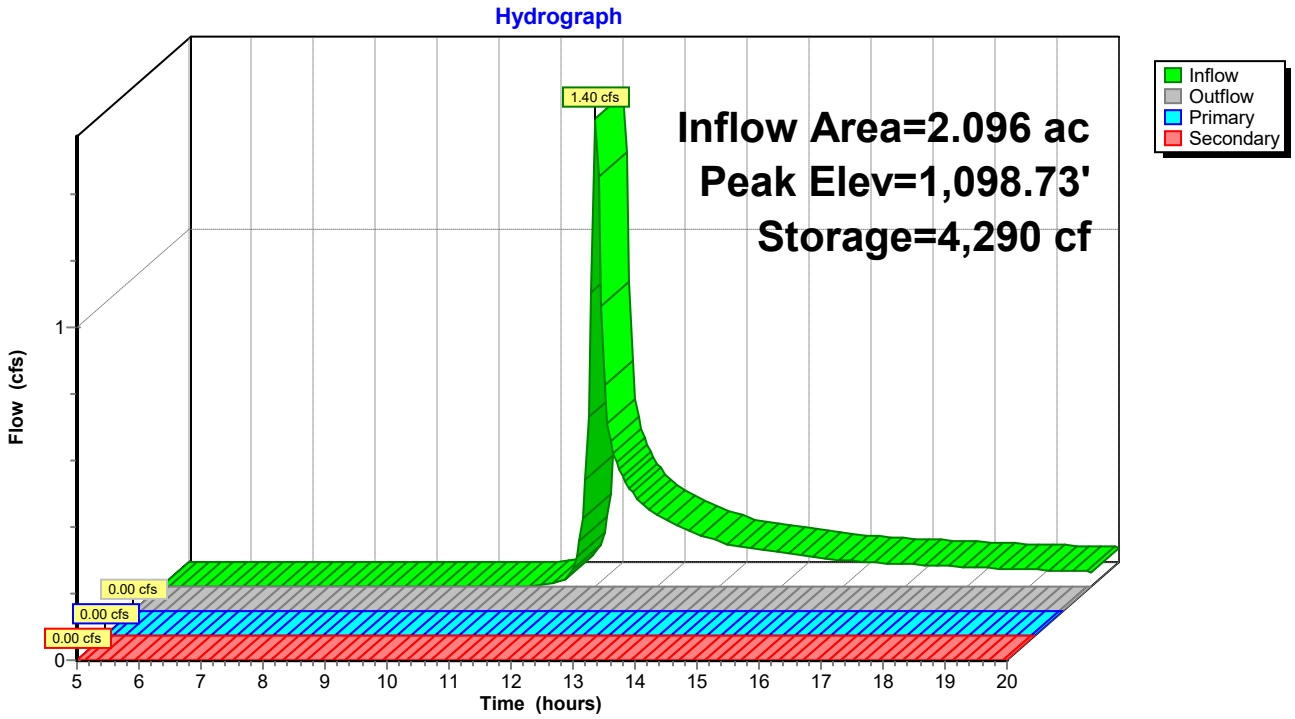
Pond 29P: DRYWELL 3



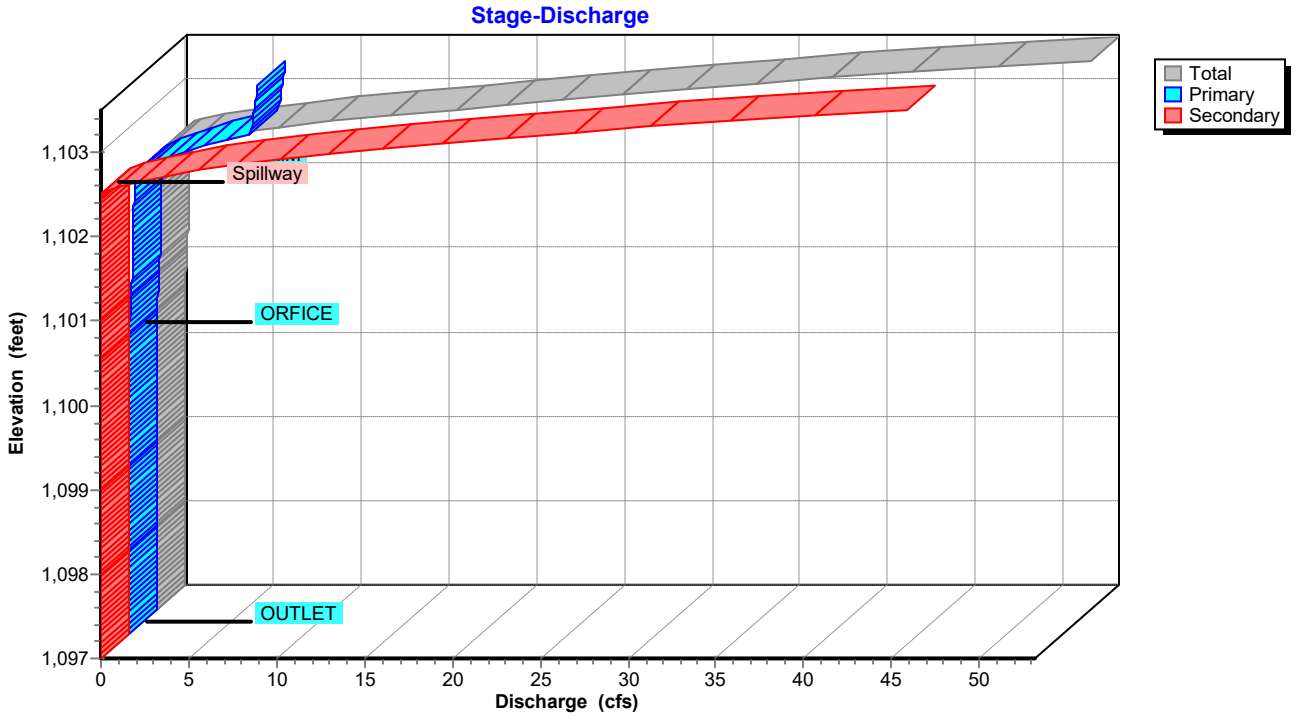
Pond 29P: DRYWELL 3



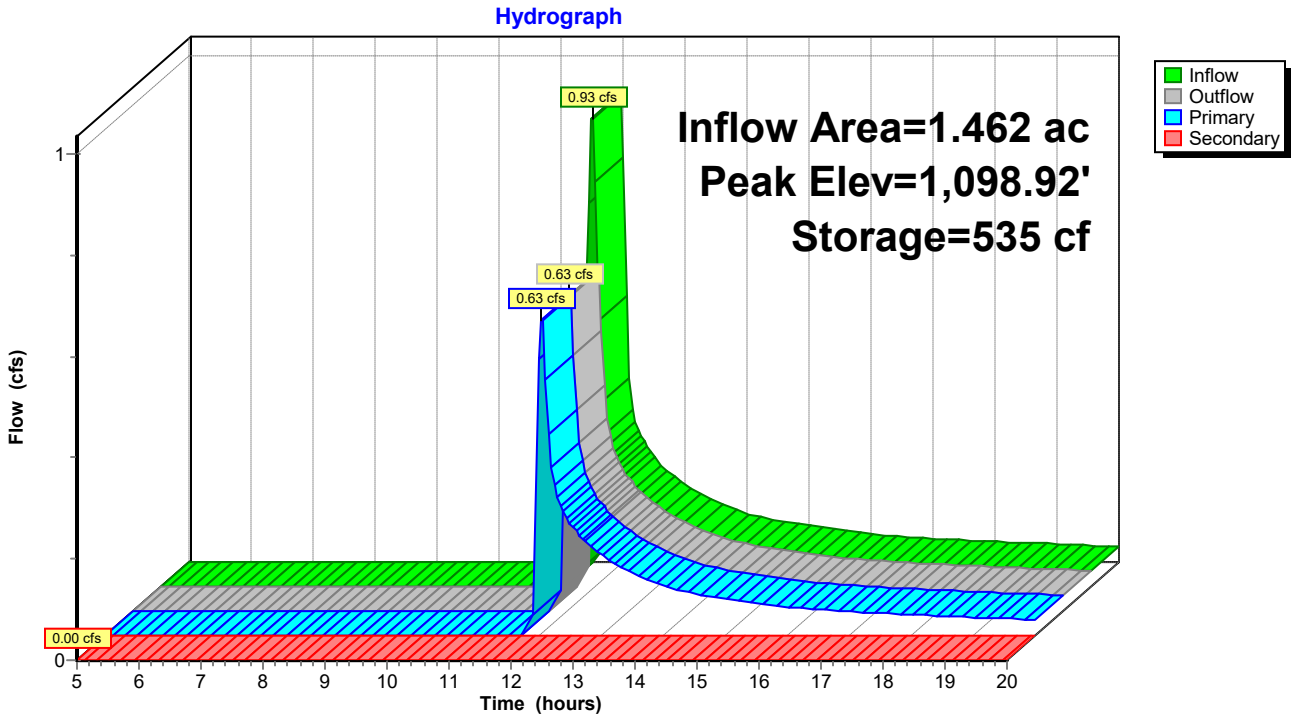
Pond 30P: I-2



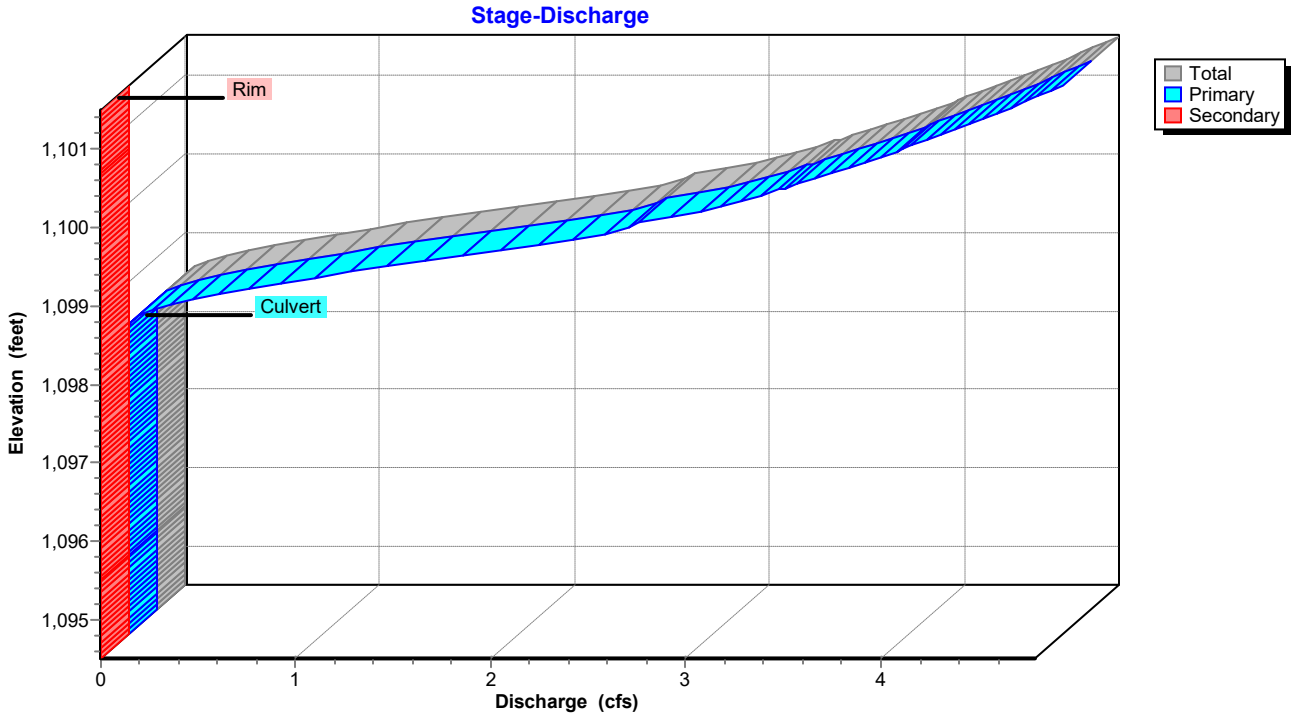
Pond 30P: I-2



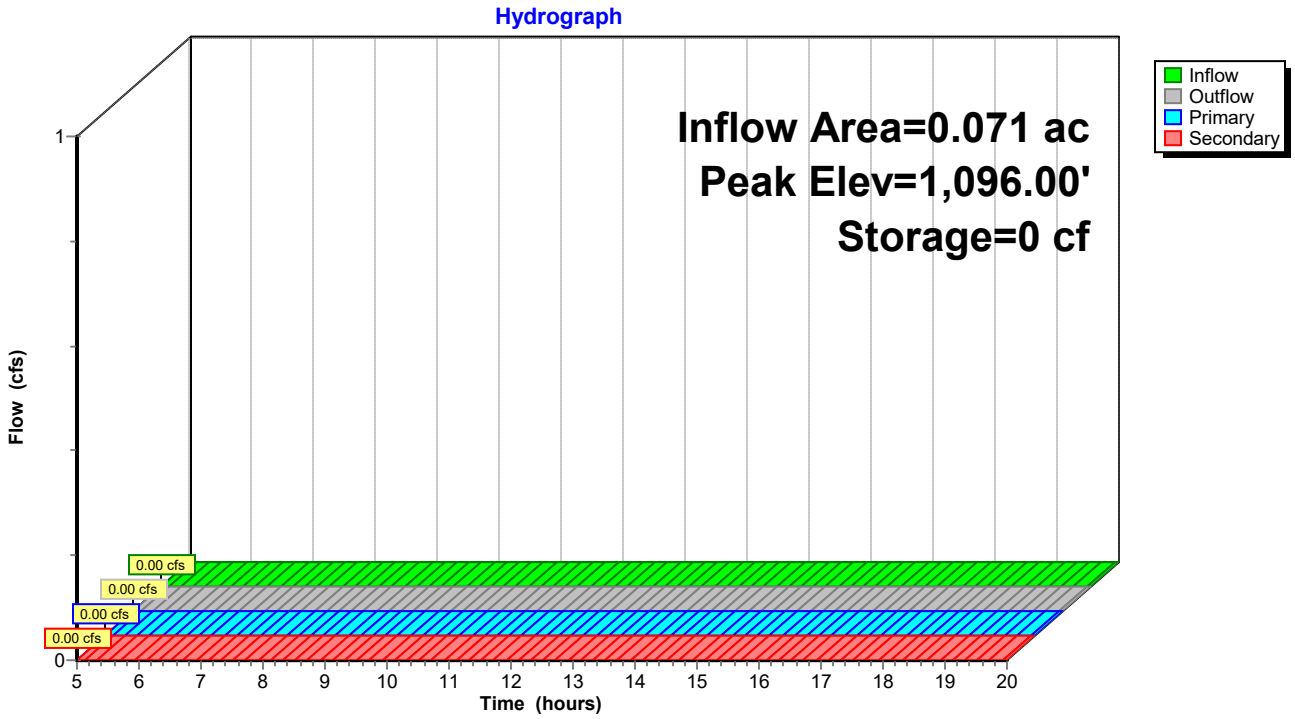
Pond 31P: DRYWELL 4



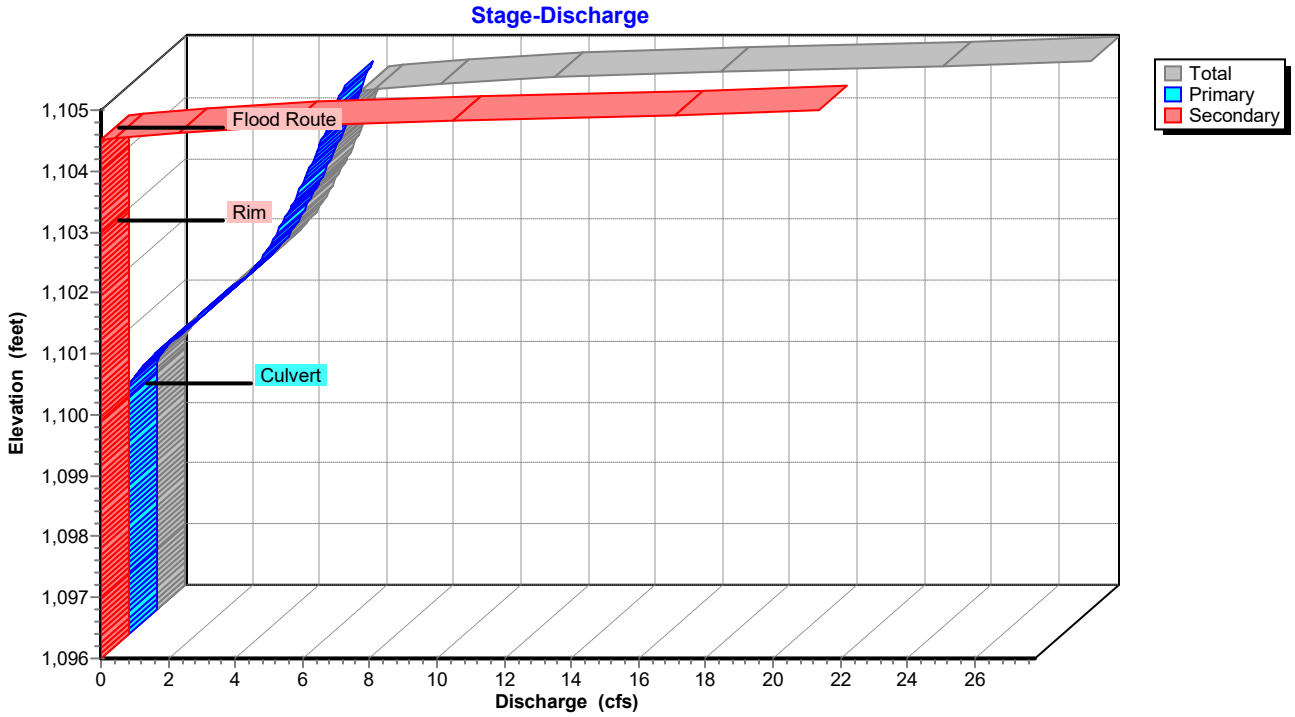
Pond 31P: DRYWELL 4



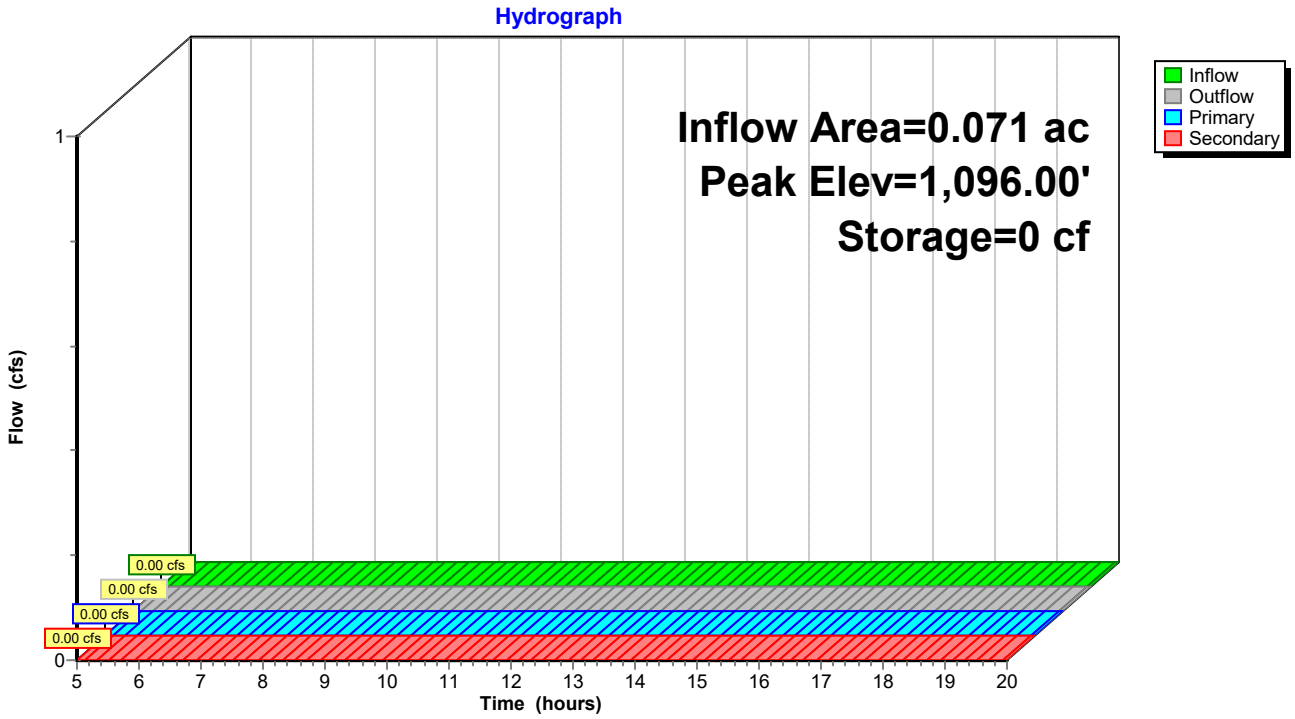
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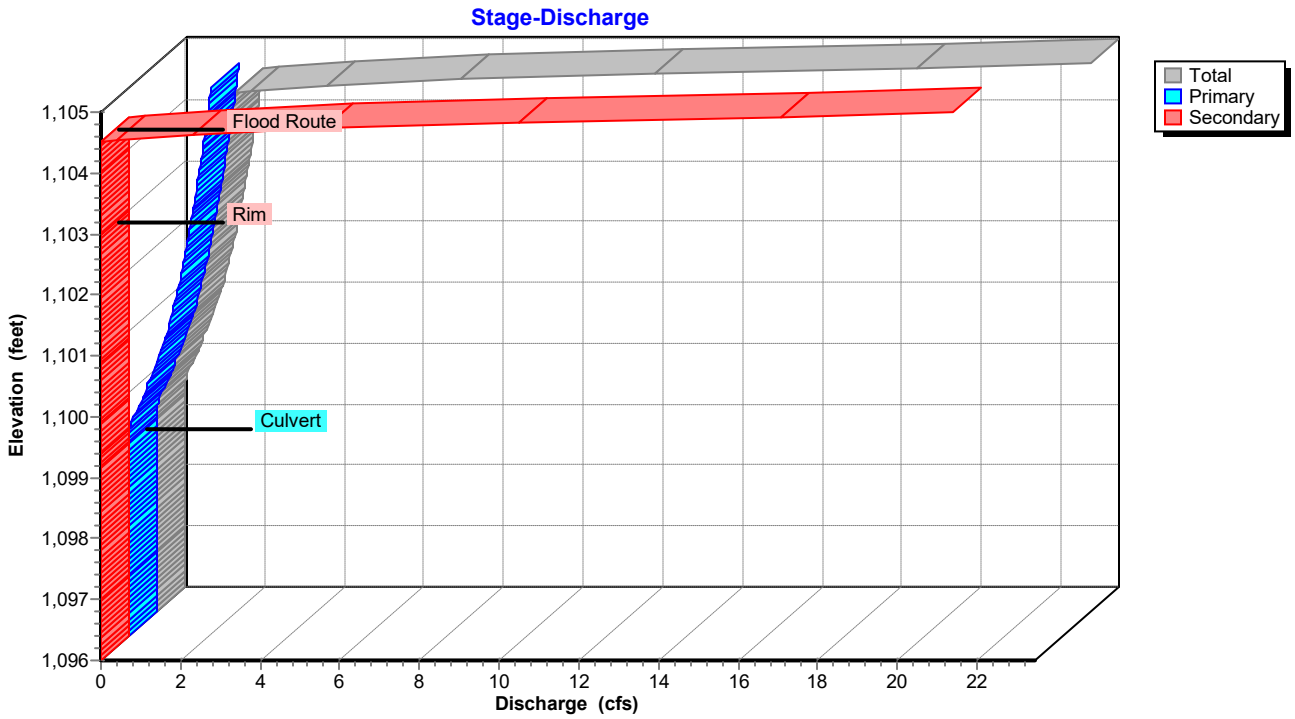
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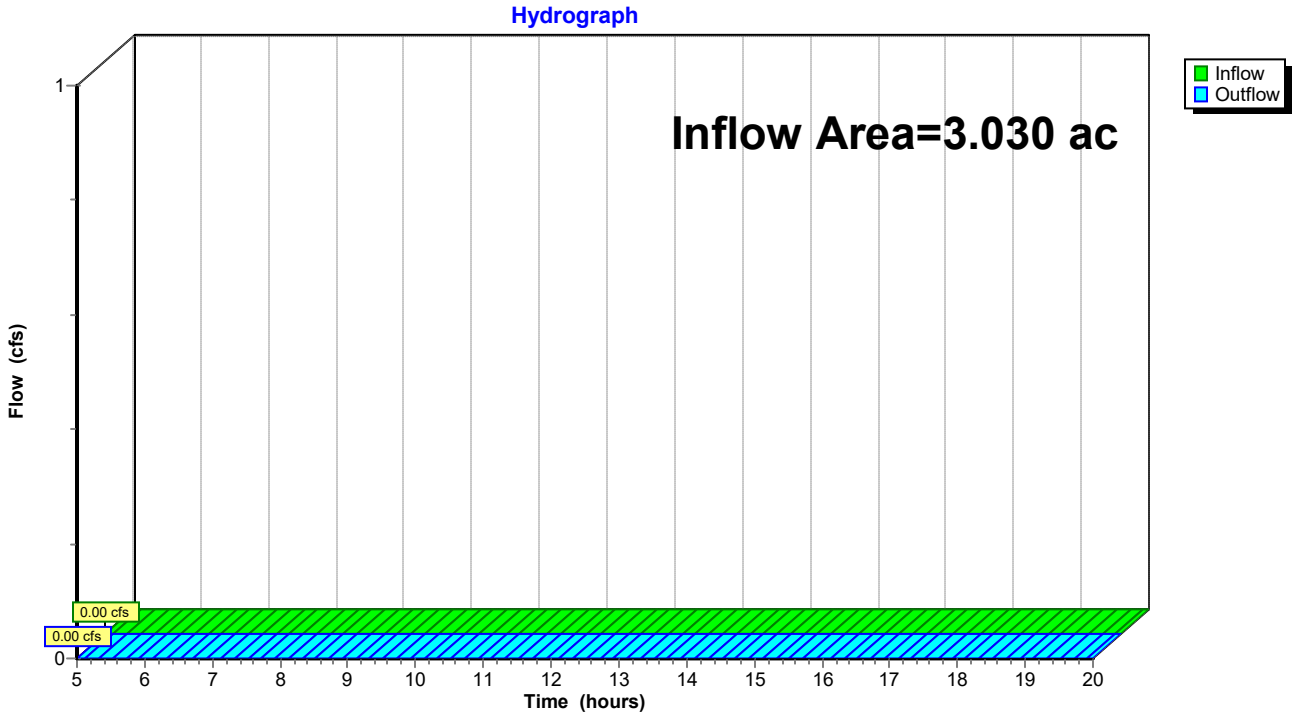
Pond 54P: DRYWELL 2



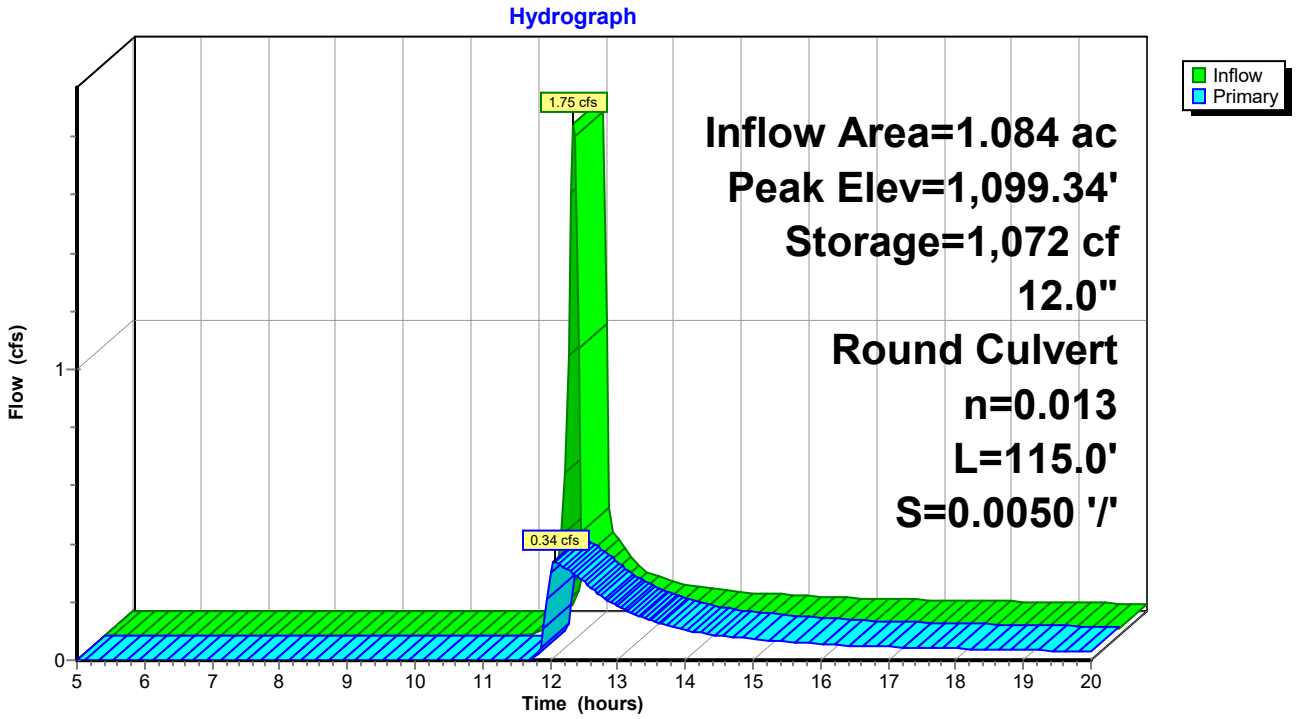
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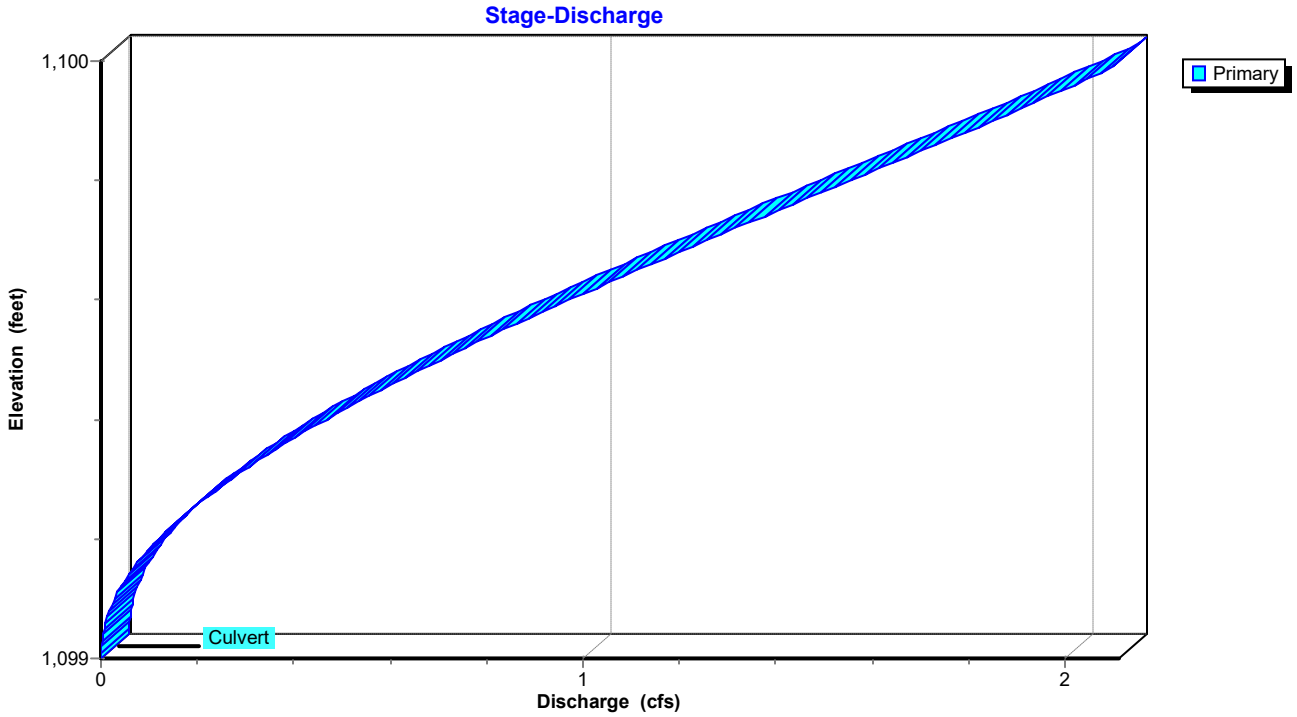
Reach 19R: TIOUGHNIOGA RIVER



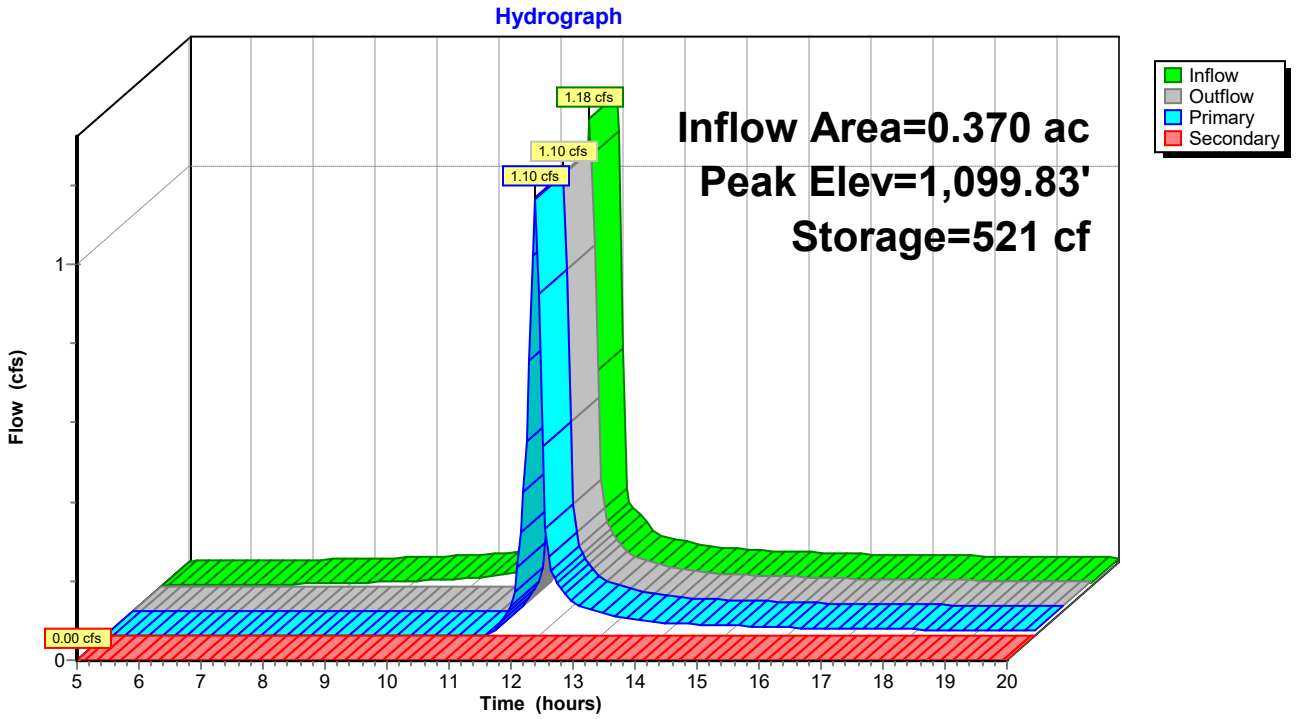
Pond 18P: FOREBAY



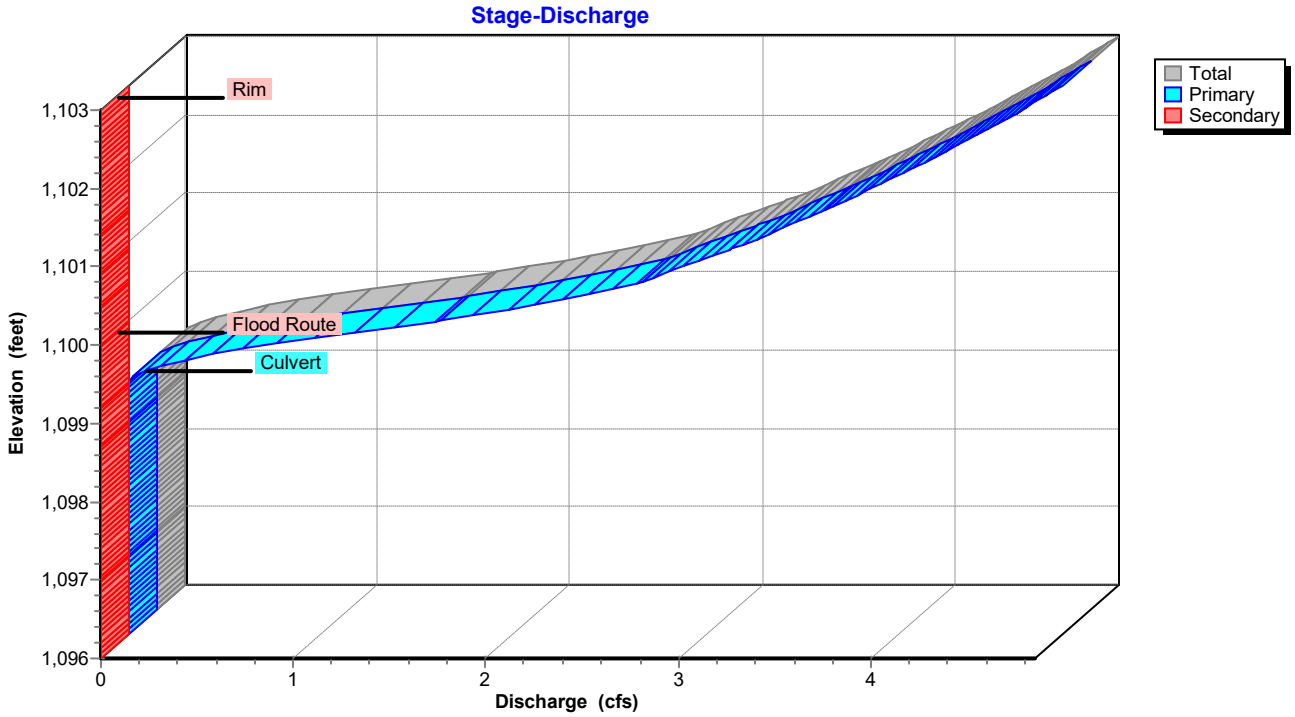
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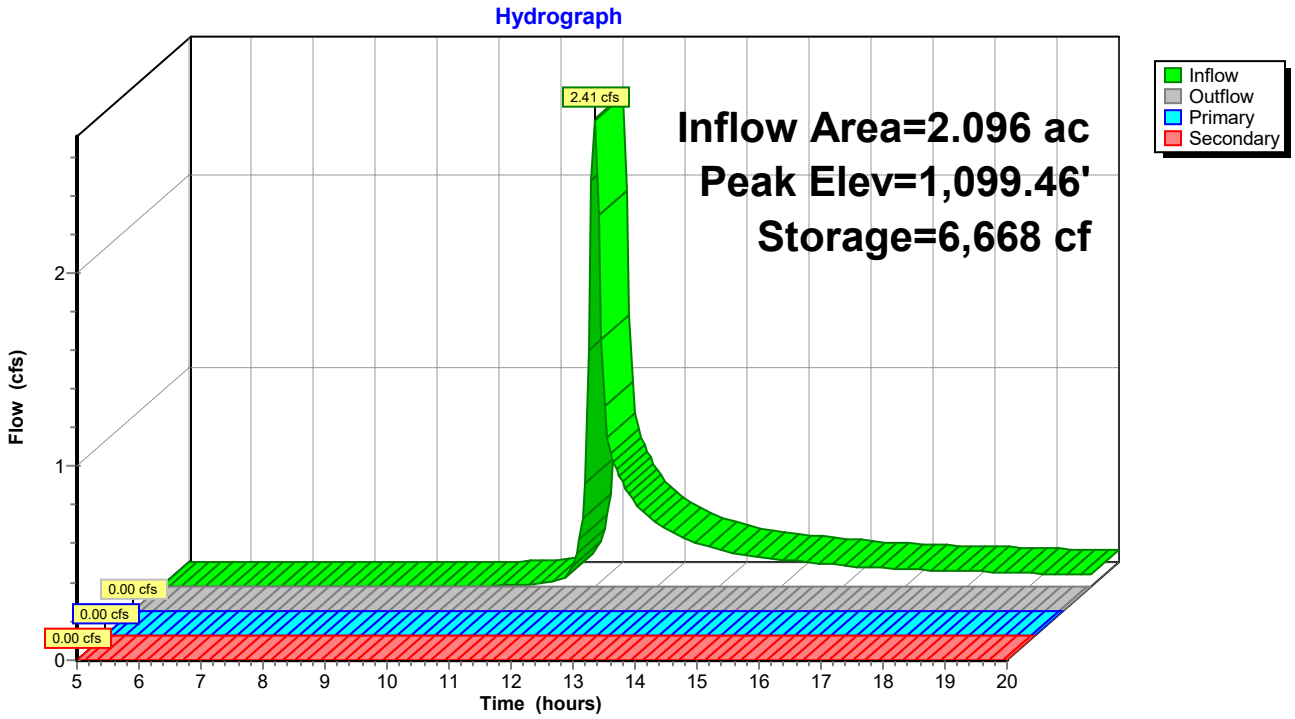
Pond 29P: DRYWELL 3



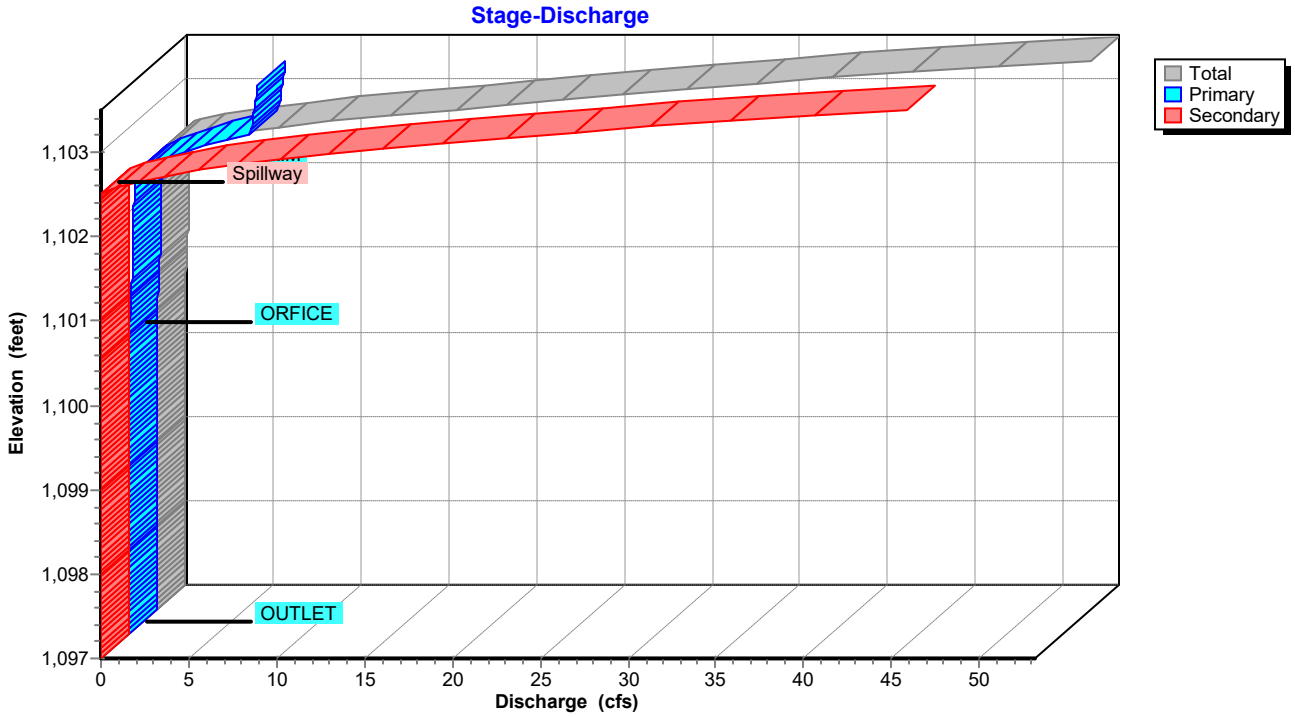
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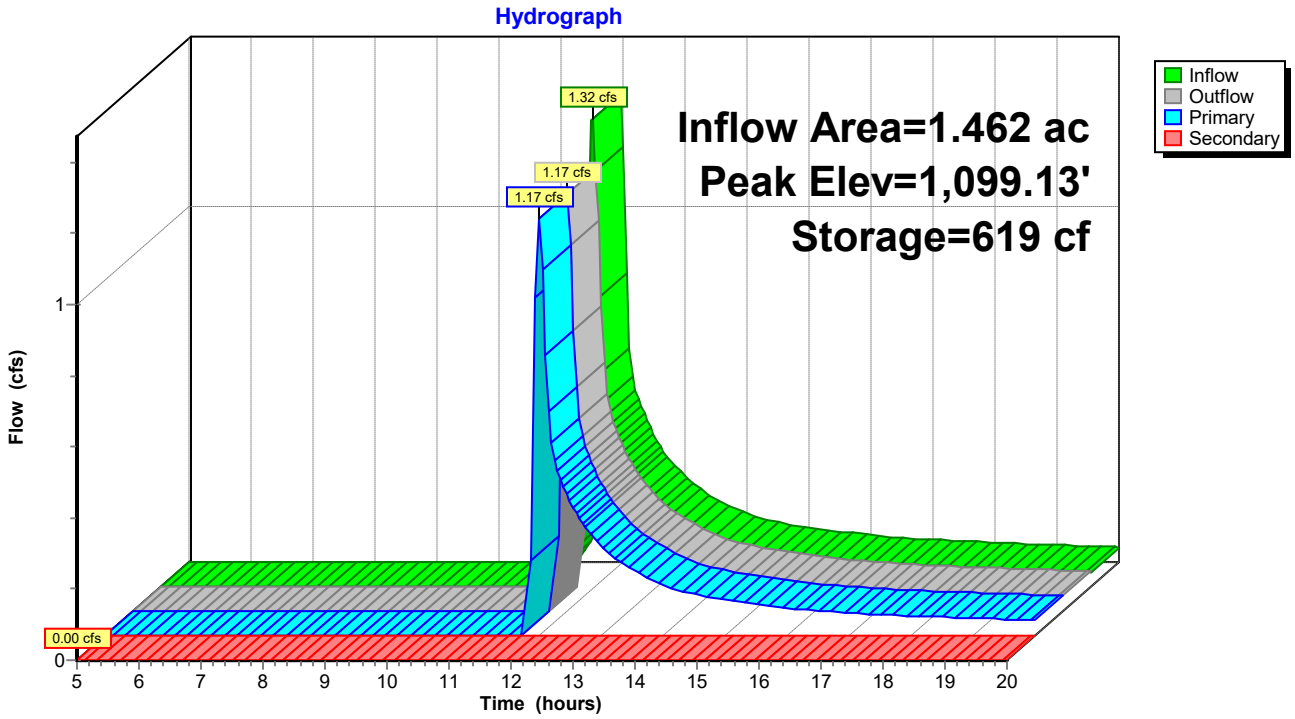
Pond 30P: I-2



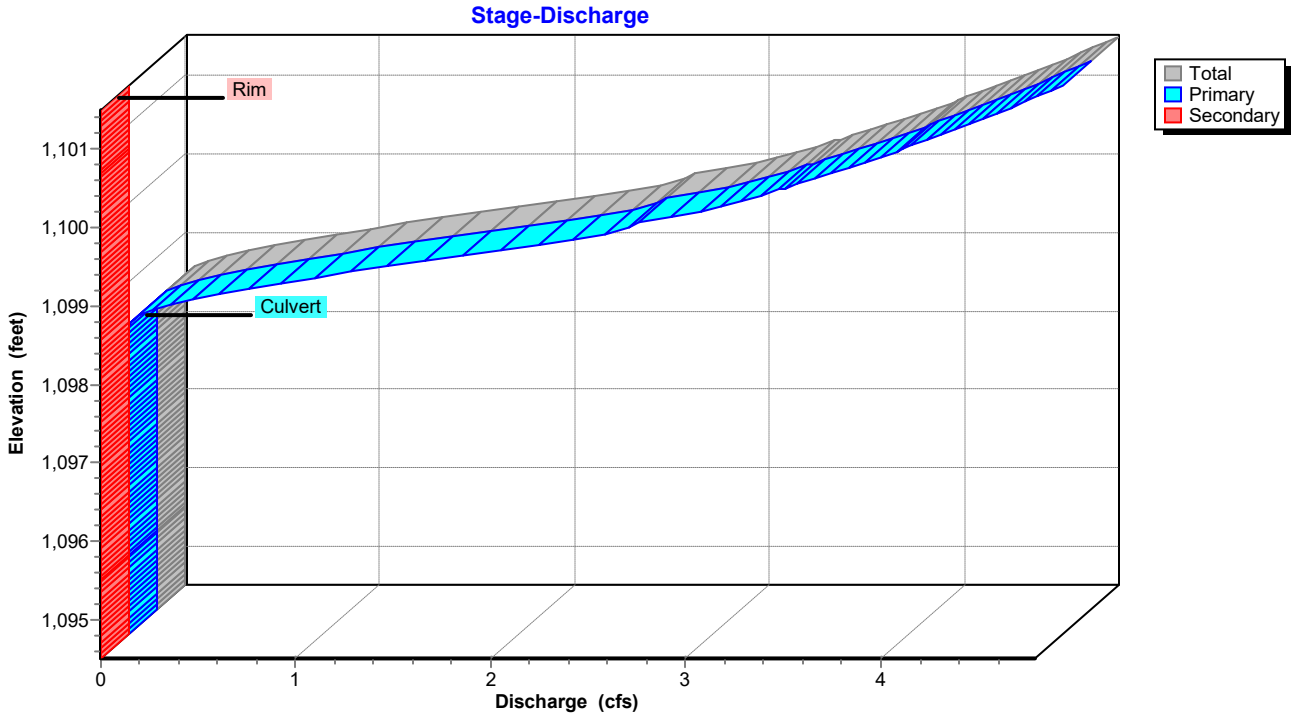
Pond 30P: I-2



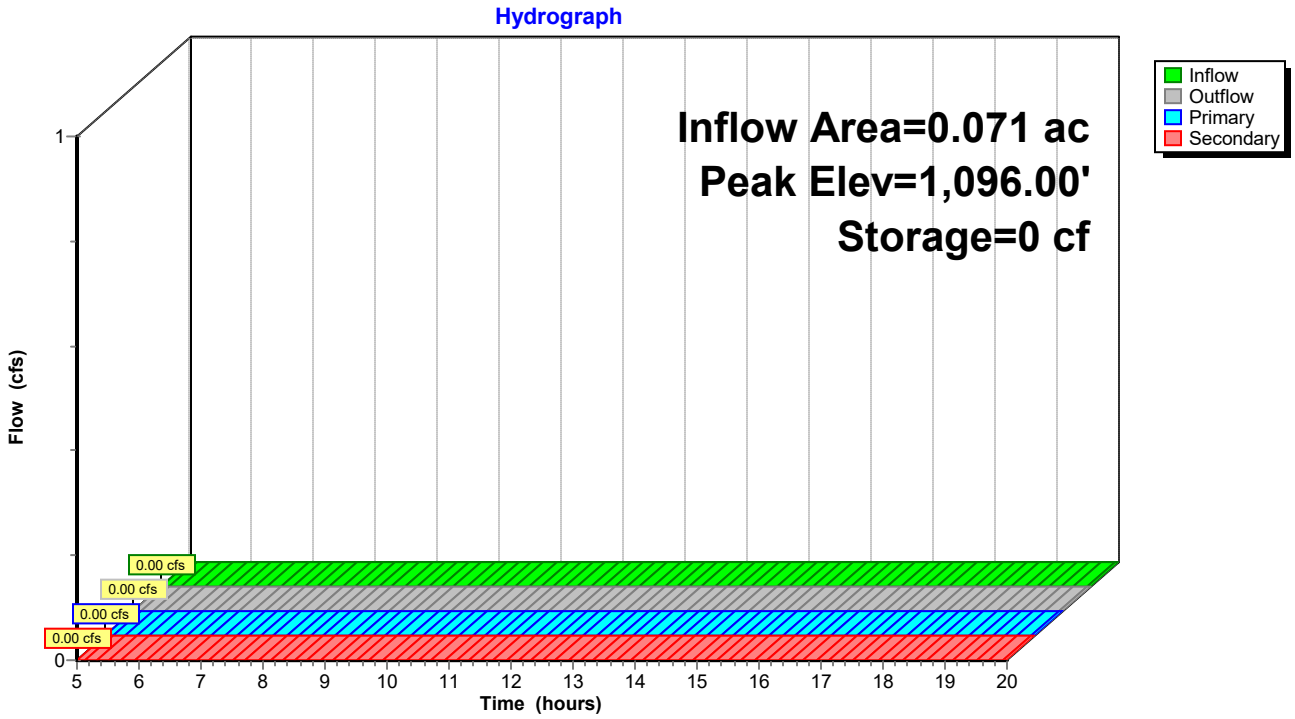
Pond 31P: DRYWELL 4



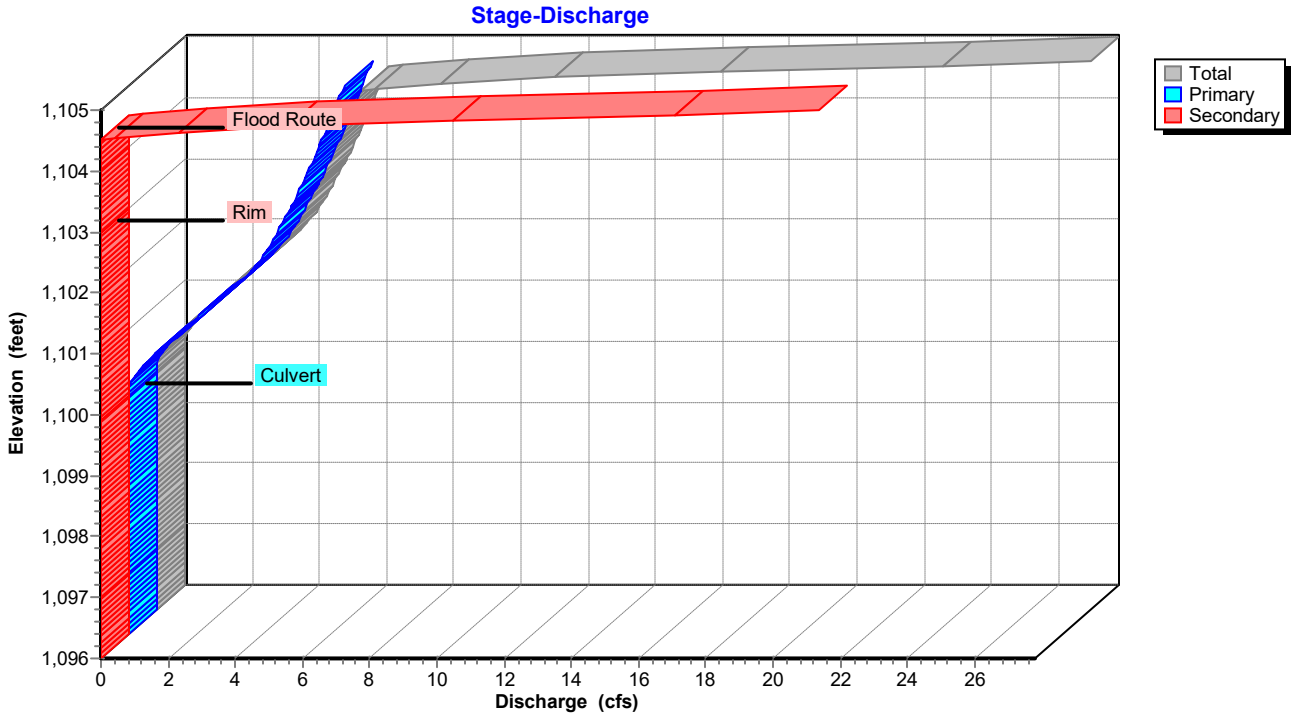
Pond 31P: DRYWELL 4



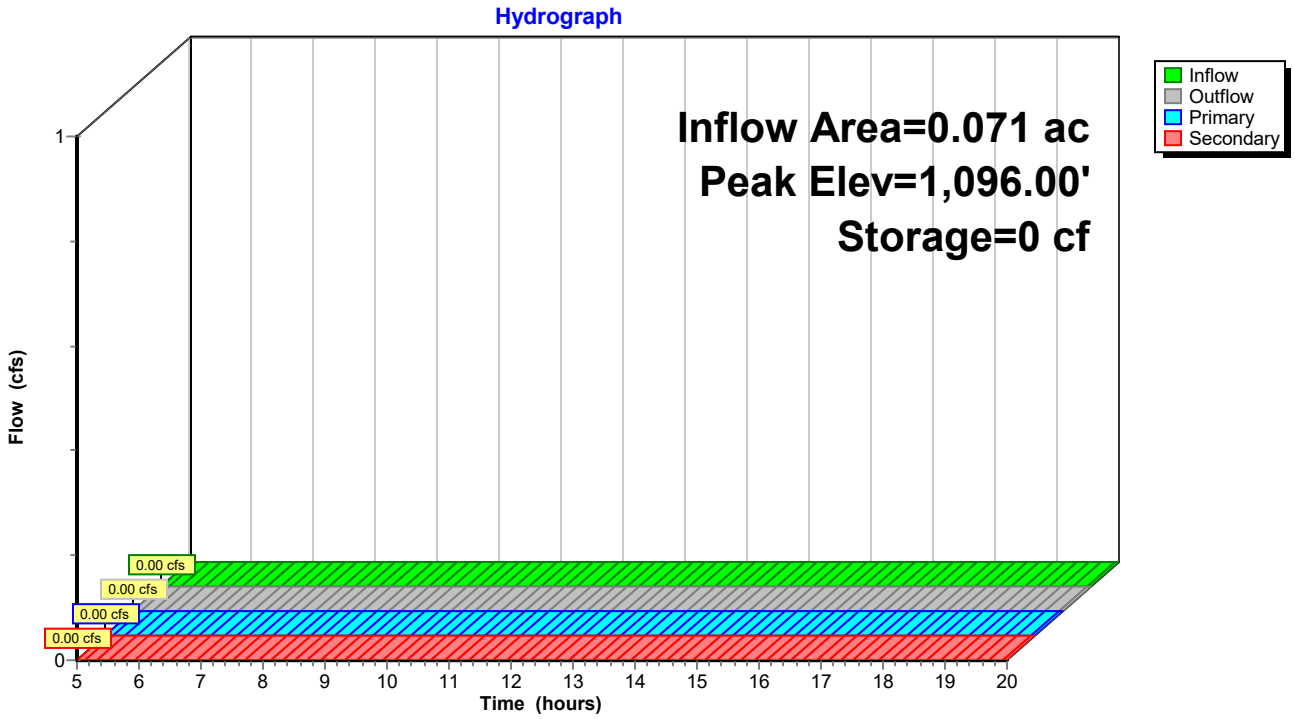
Pond 52P: DRYWELL 1



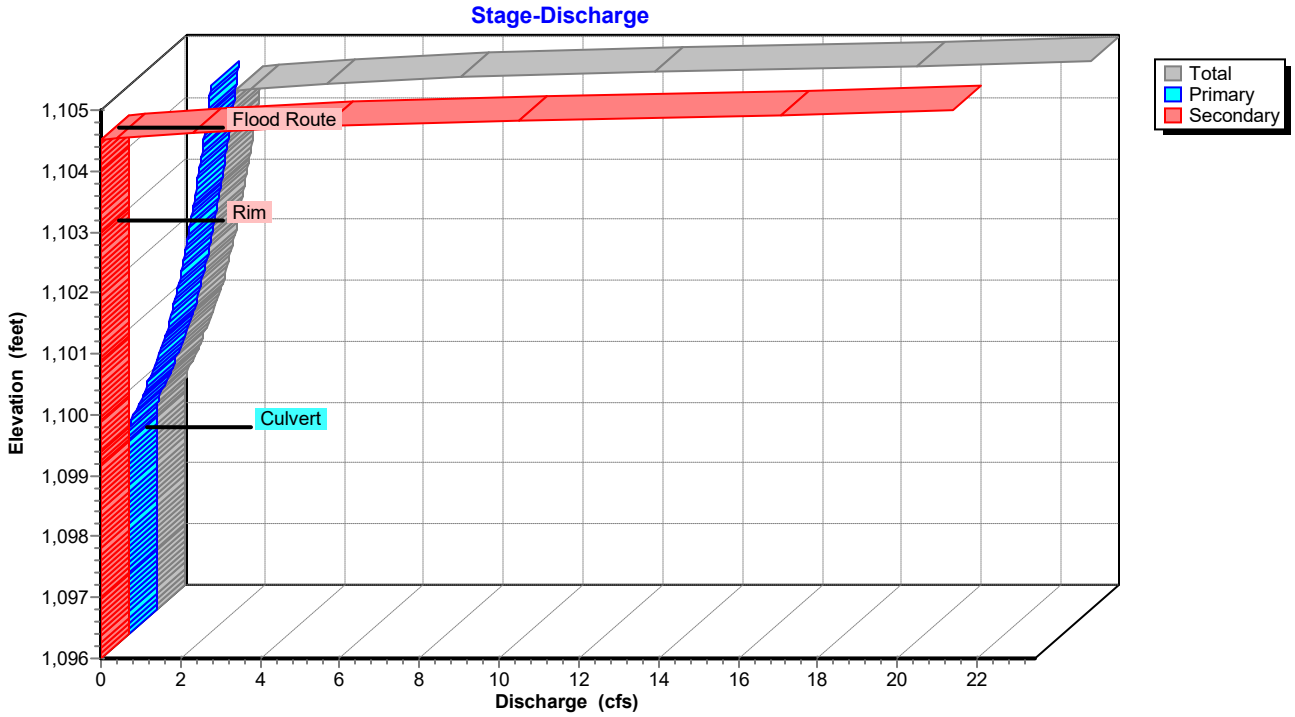
Pond 52P: DRYWELL 1



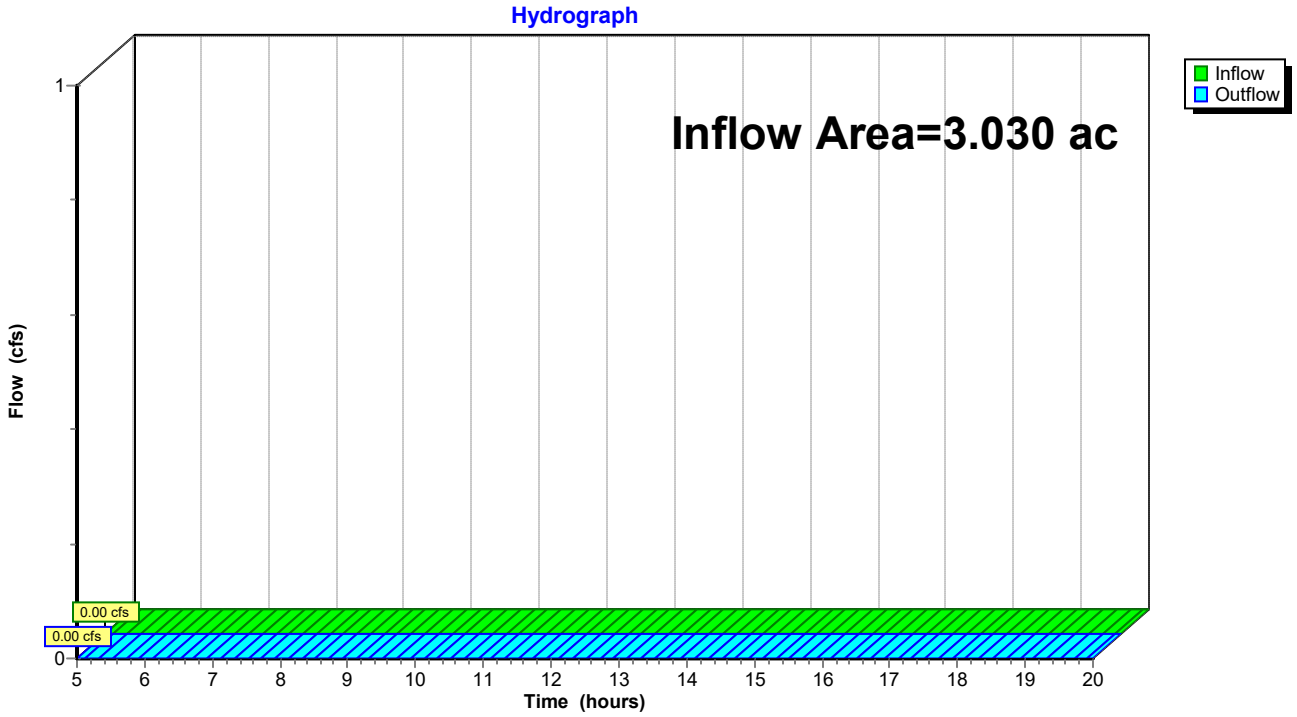
Pond 54P: DRYWELL 2



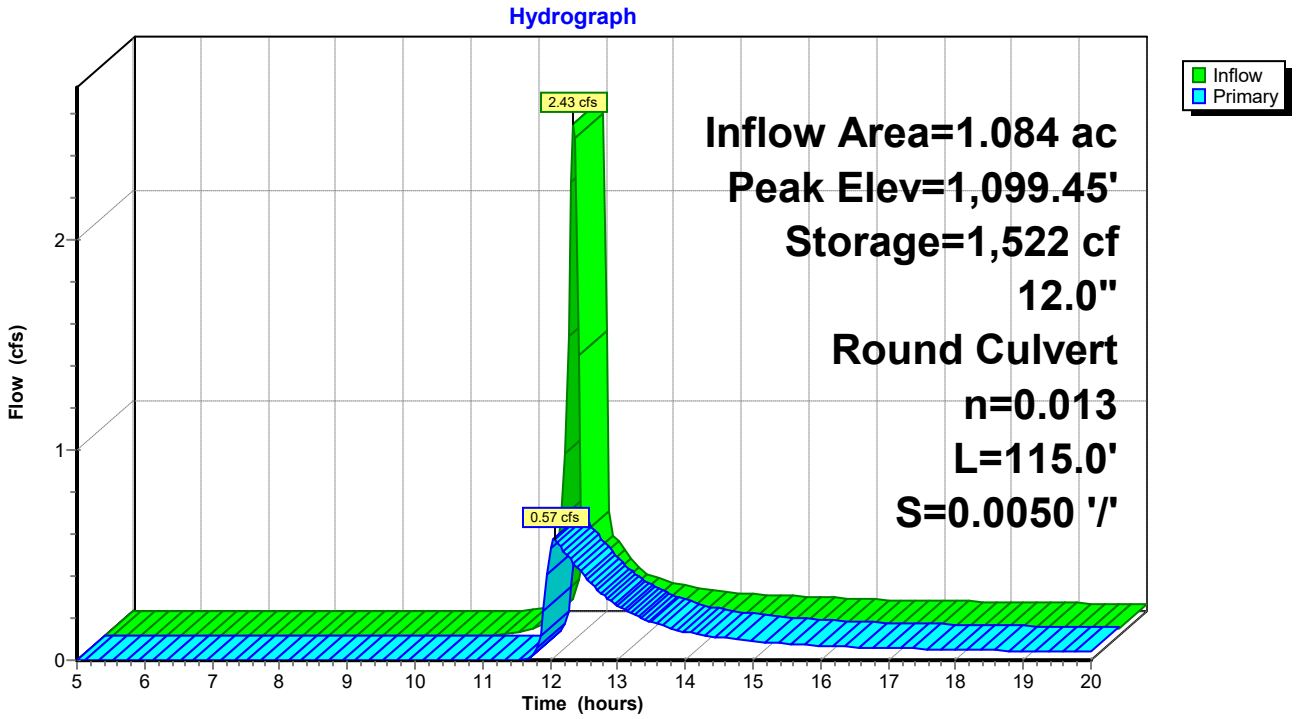
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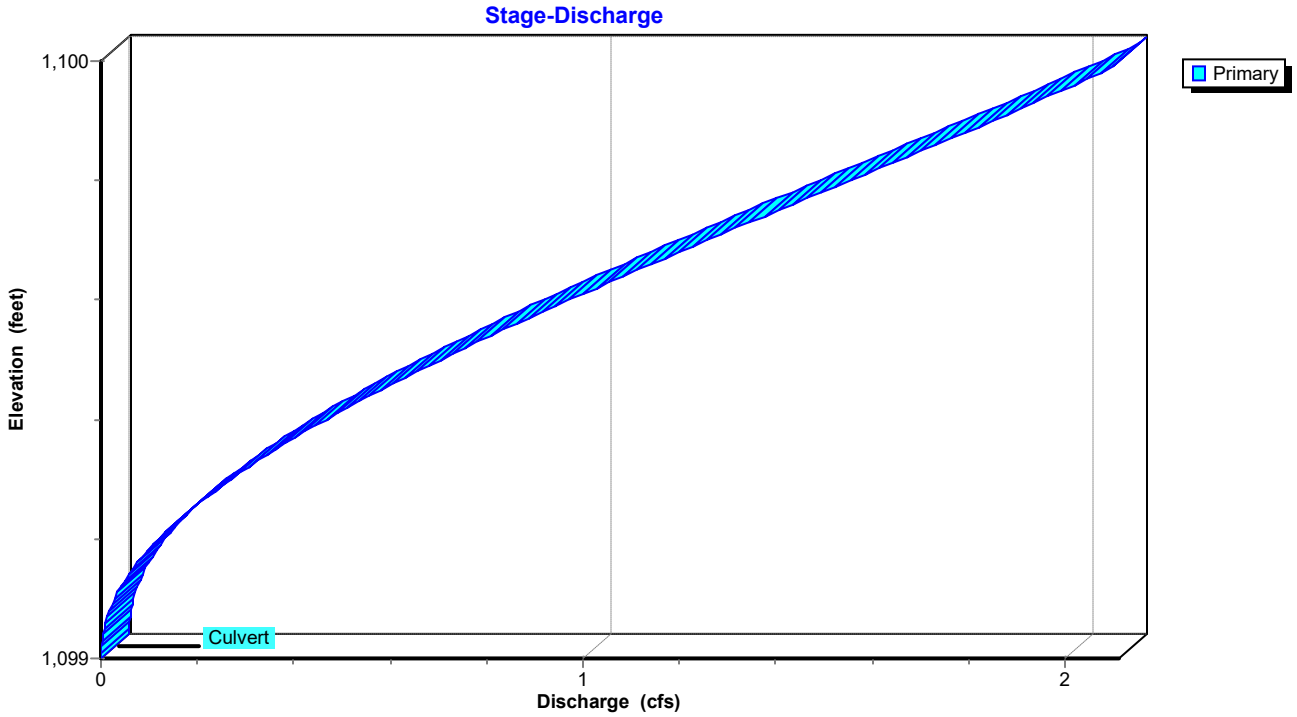
Reach 19R: TIOUGHNIOGA RIVER



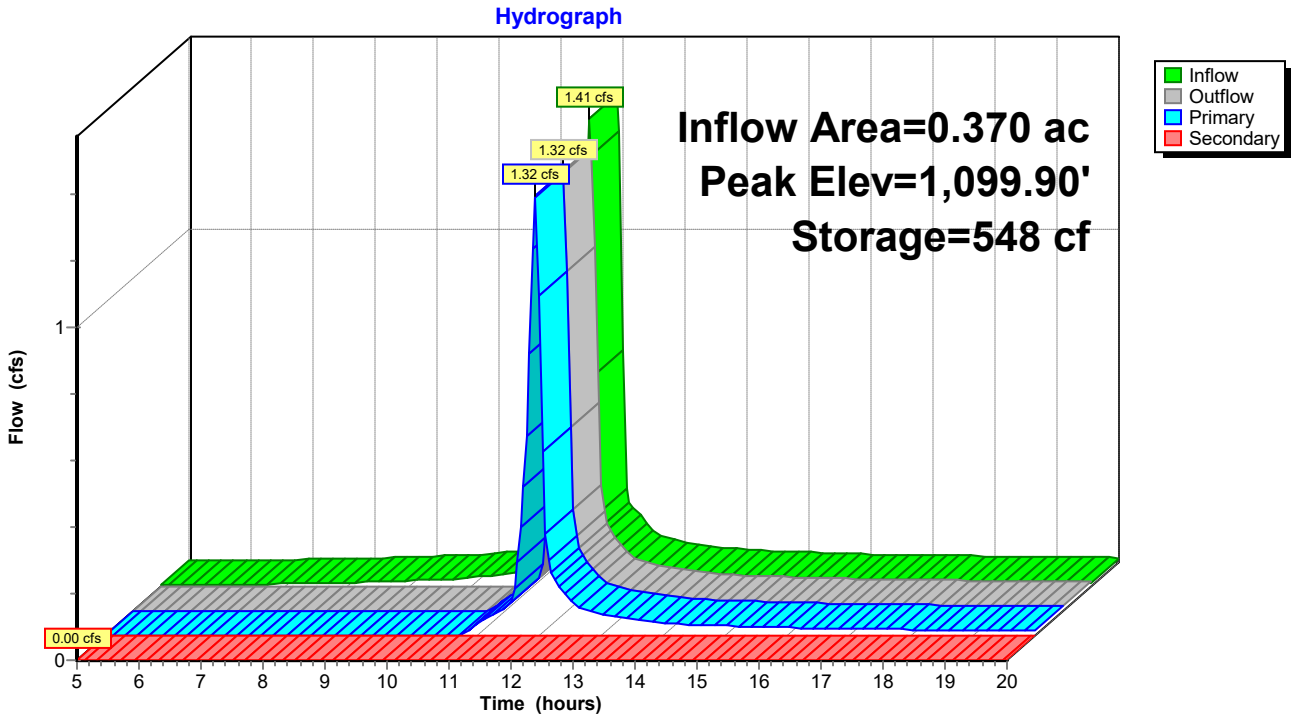
Pond 18P: FOREBAY



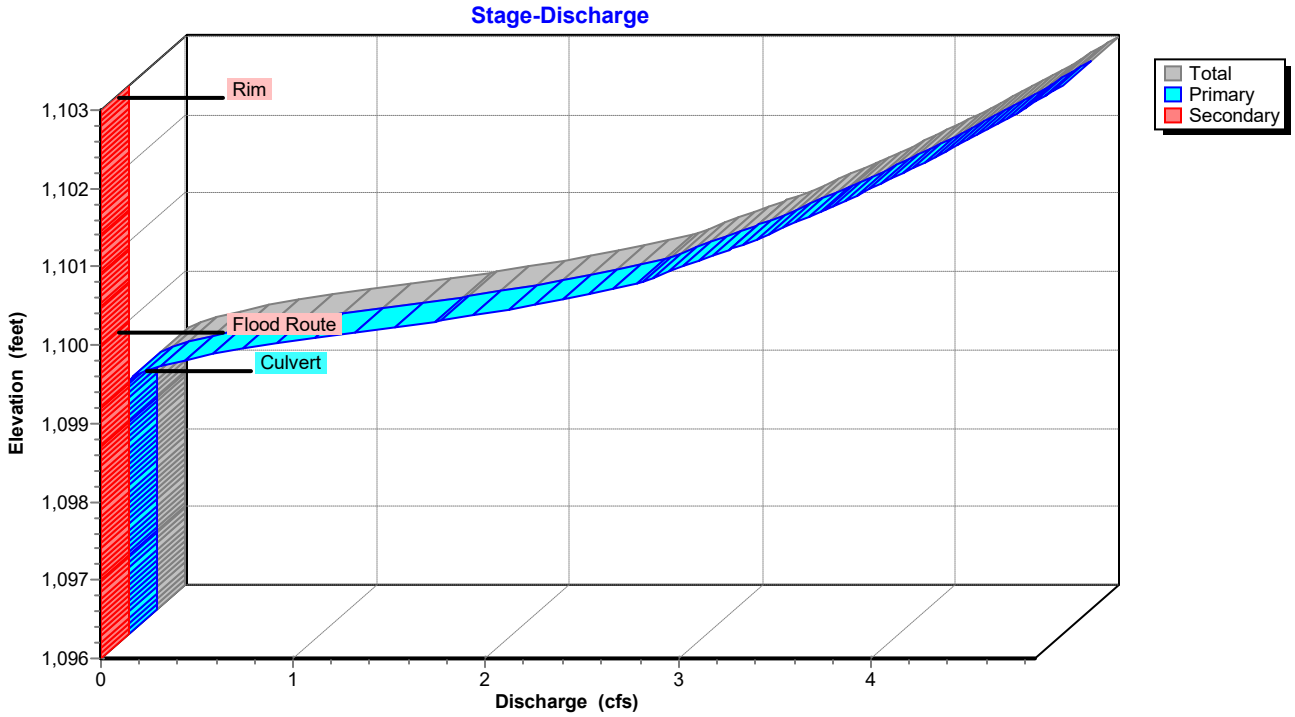
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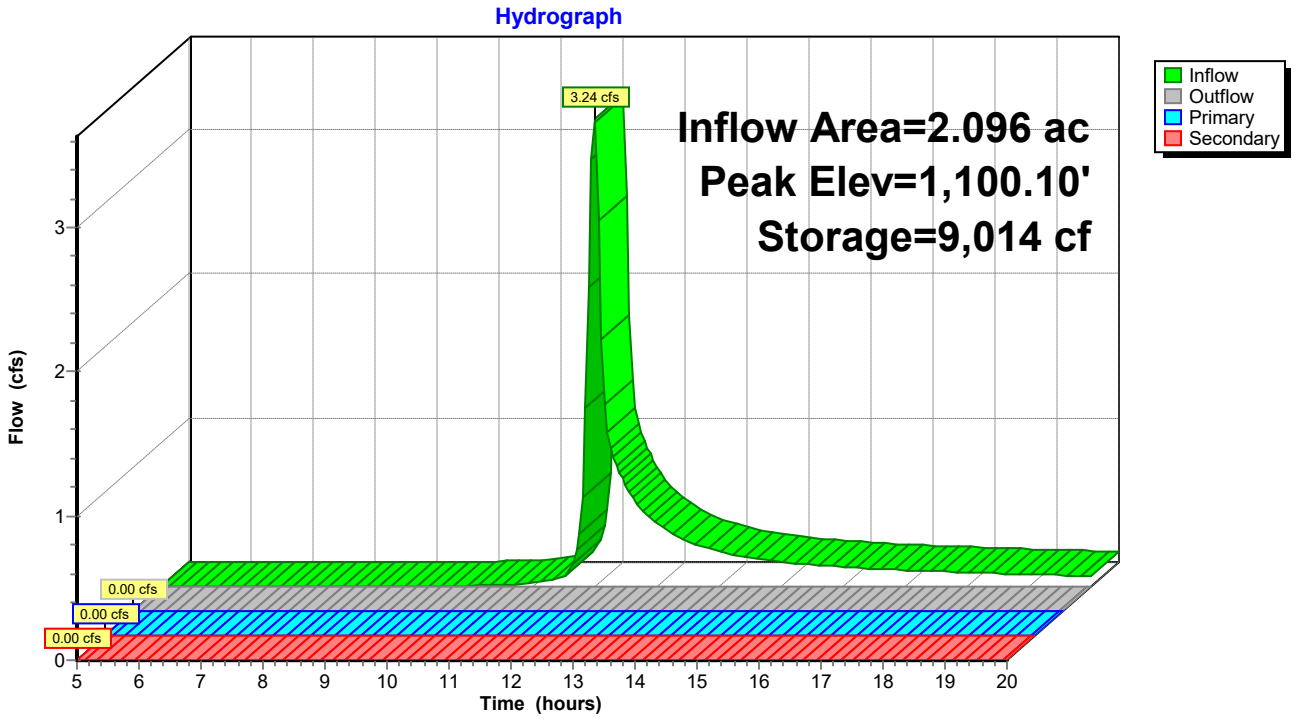
Pond 29P: DRYWELL 3



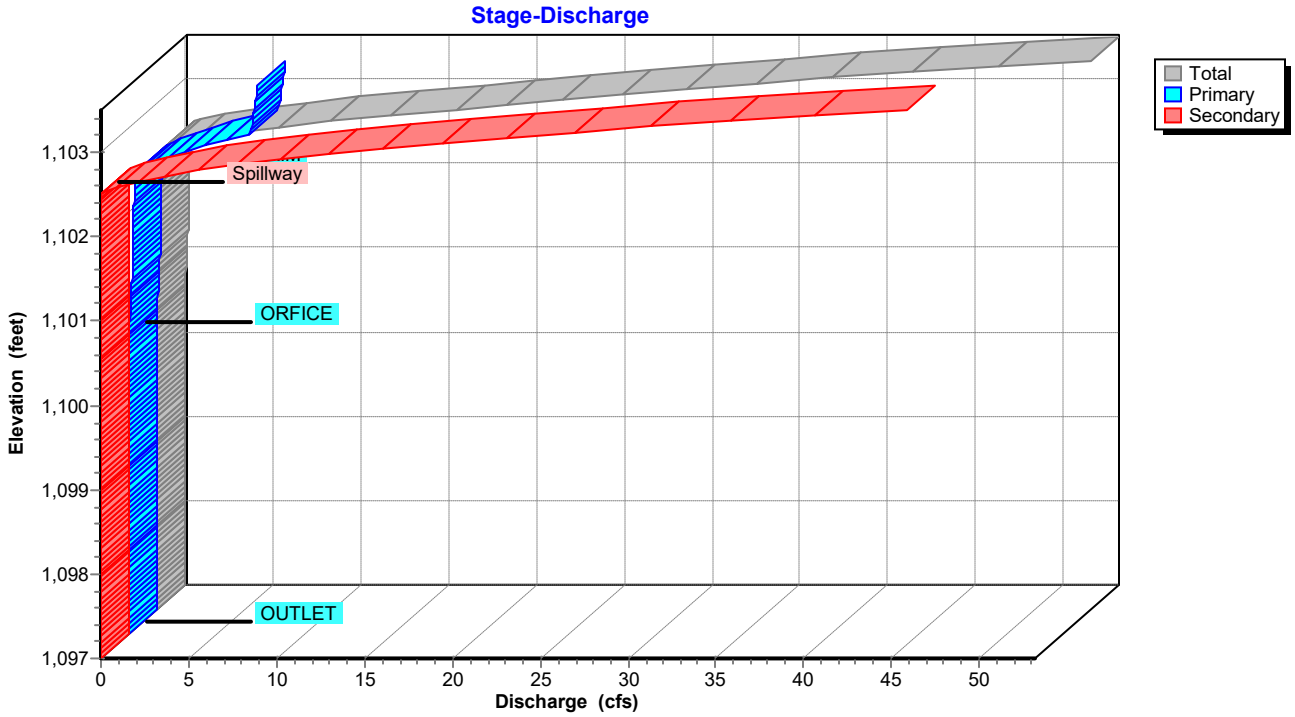
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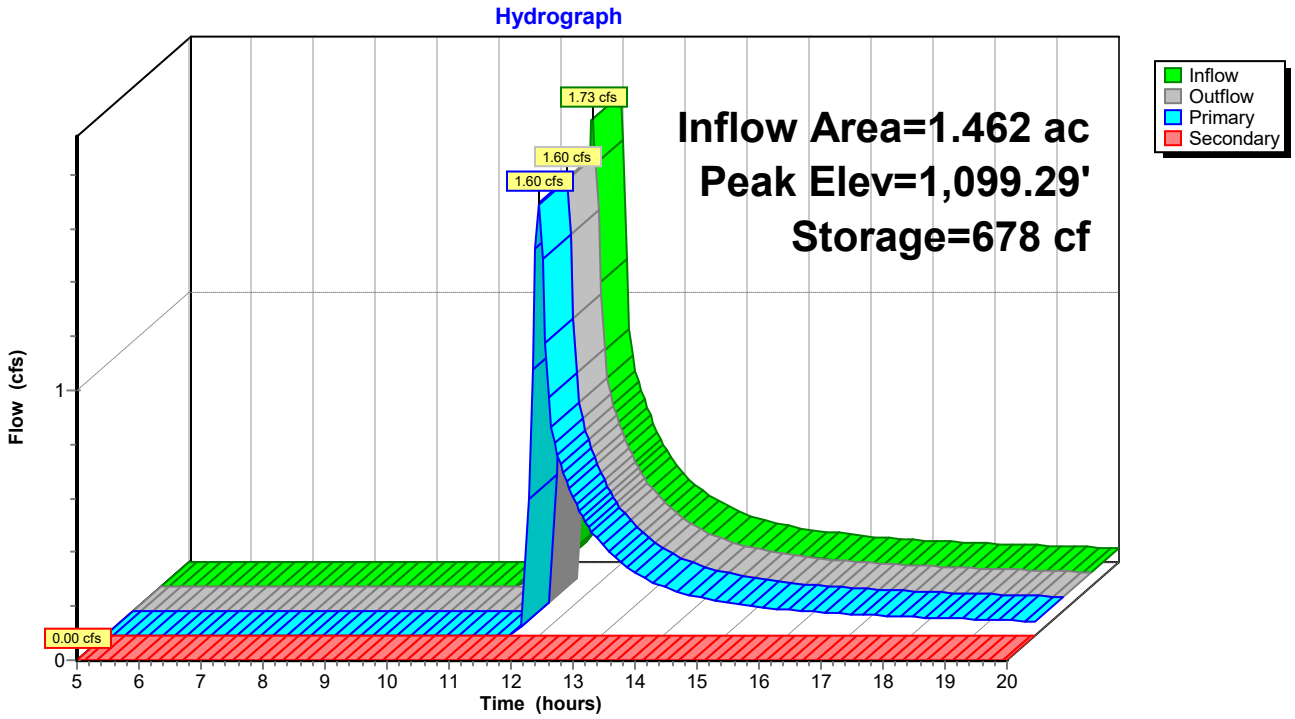
Pond 30P: I-2



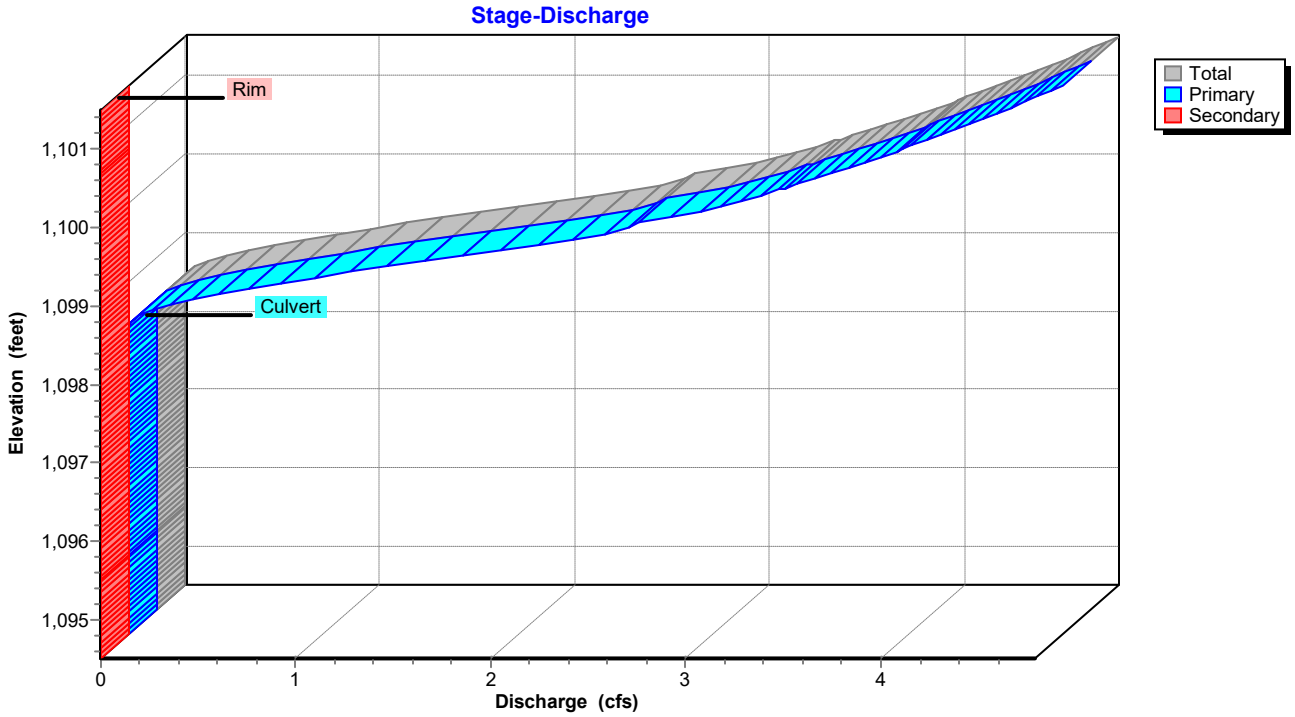
Pond 30P: I-2



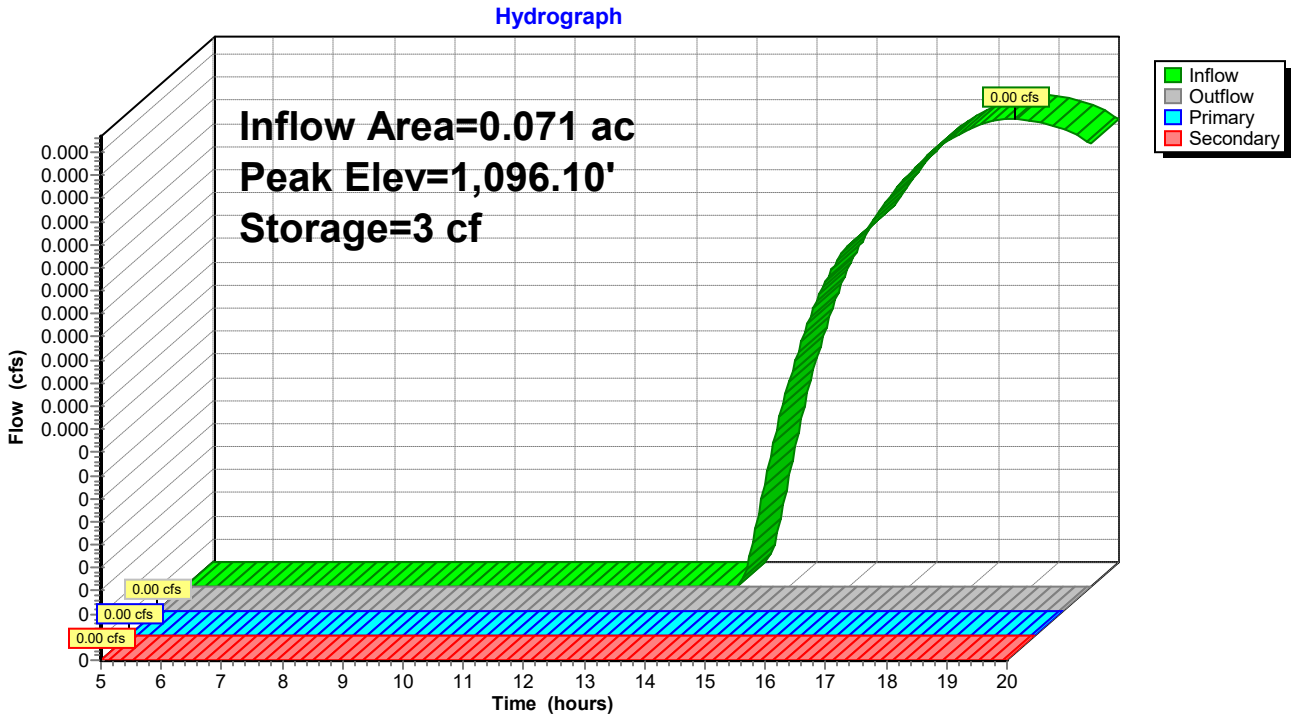
Pond 31P: DRYWELL 4



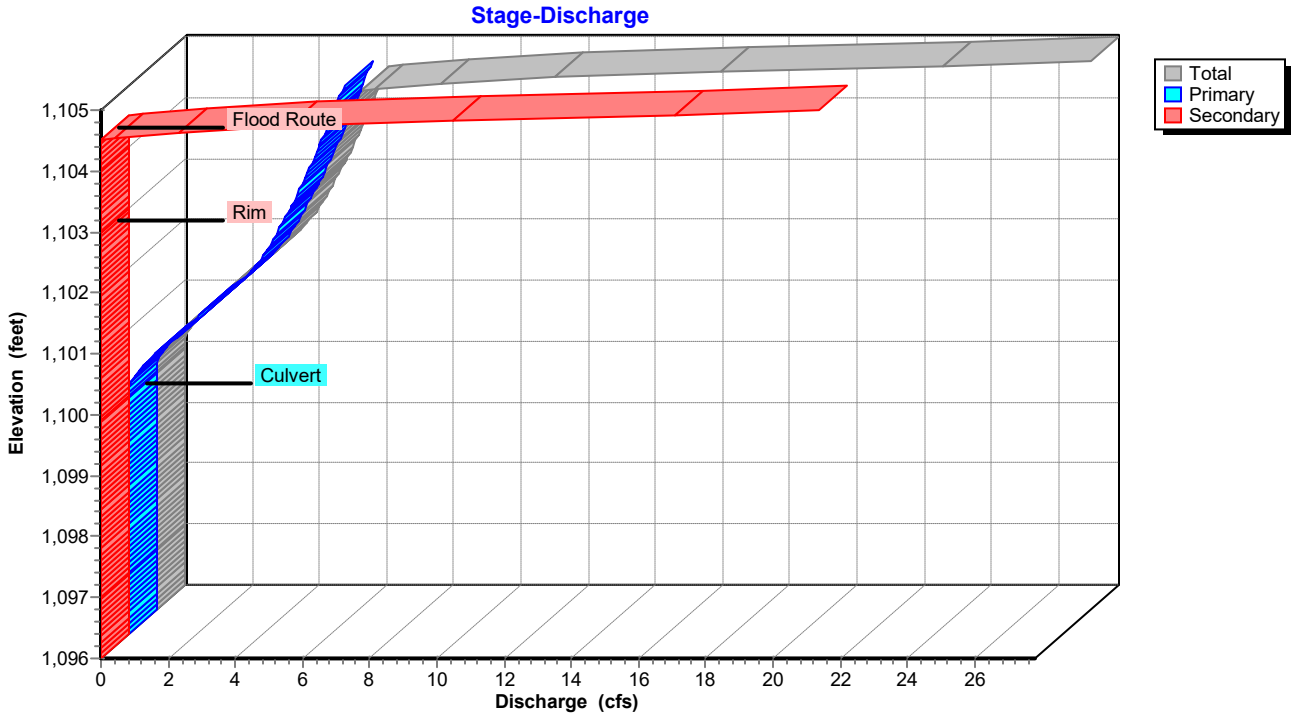
Pond 31P: DRYWELL 4



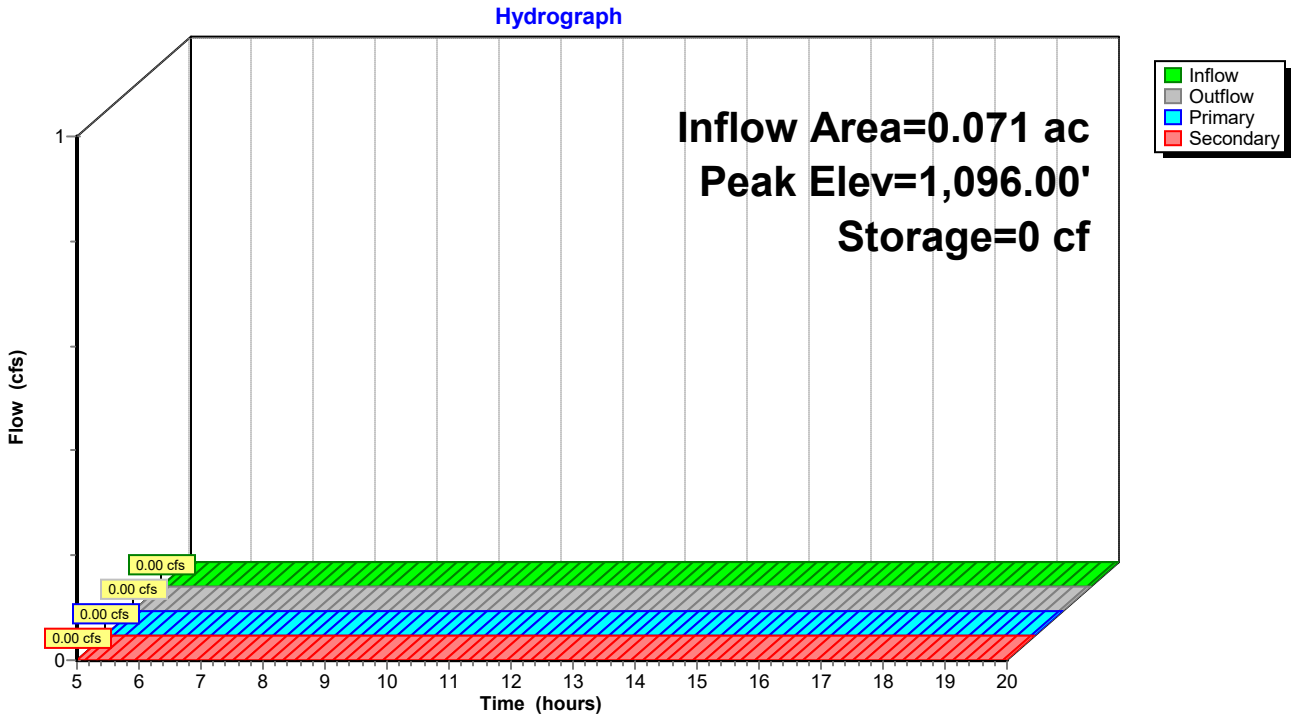
Pond 52P: DRYWELL 1



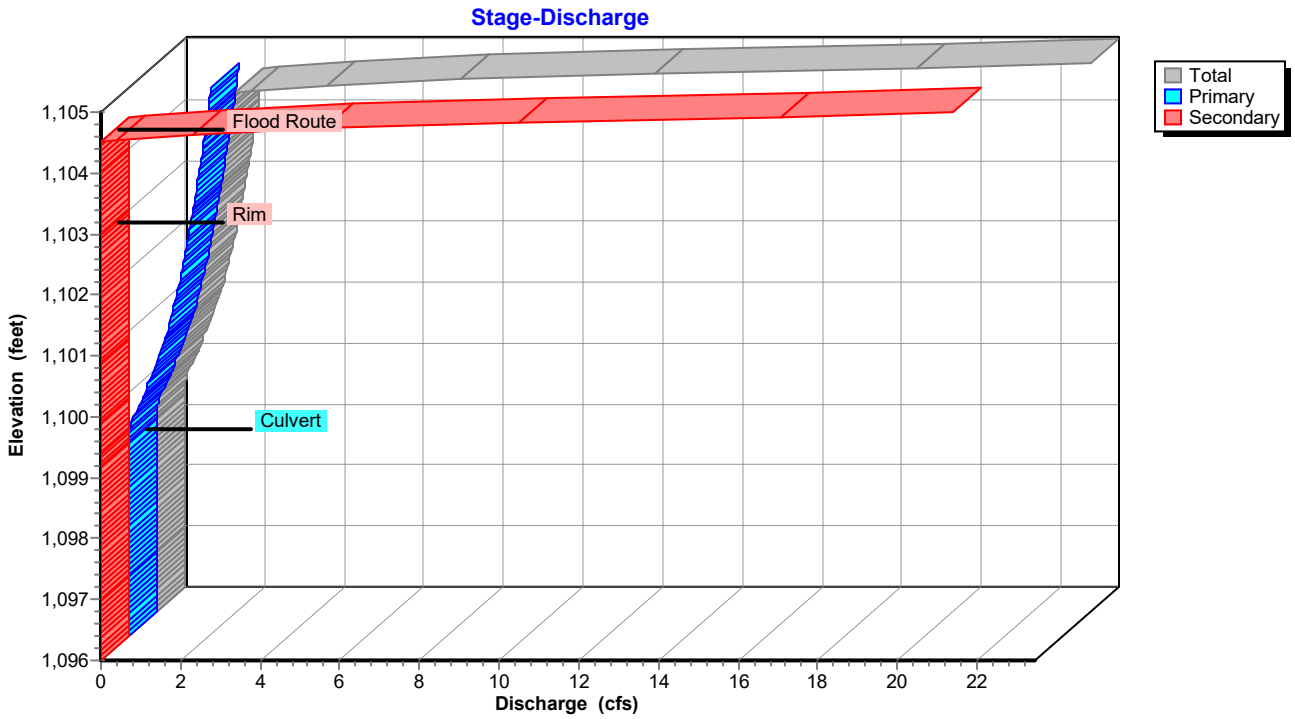
Pond 52P: DRYWELL 1



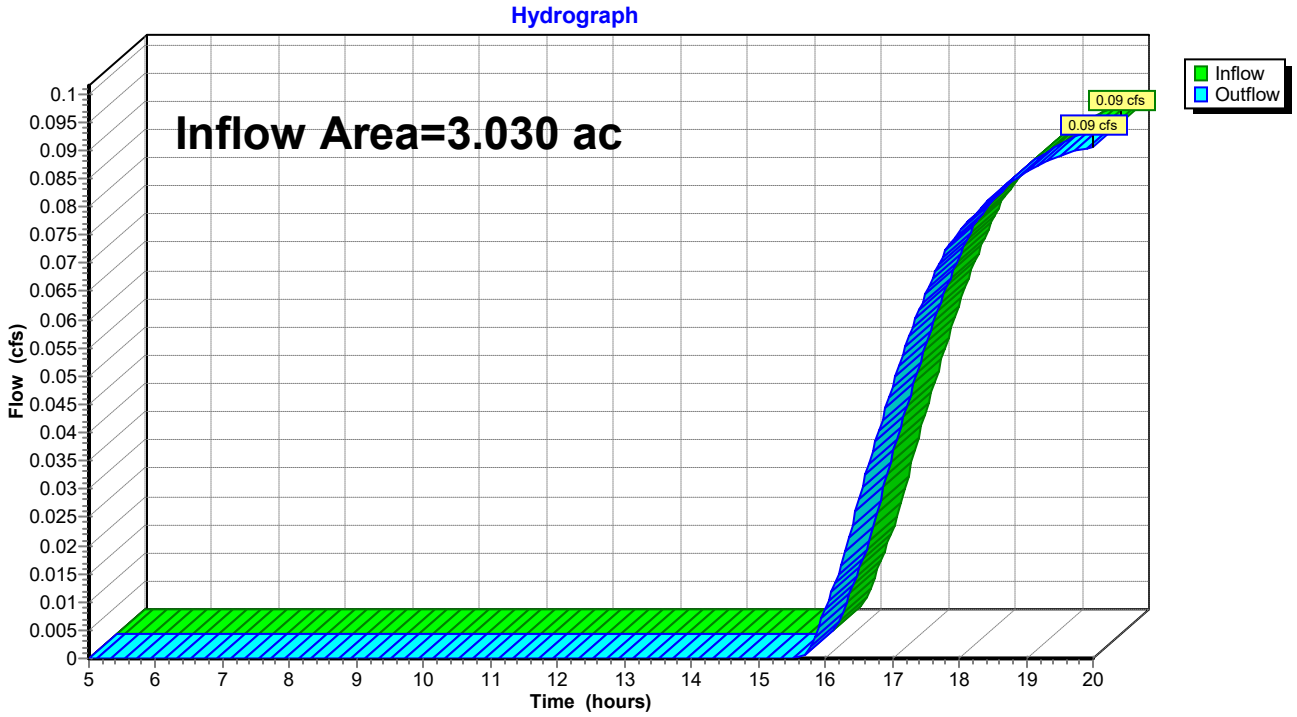
Pond 54P: DRYWELL 2



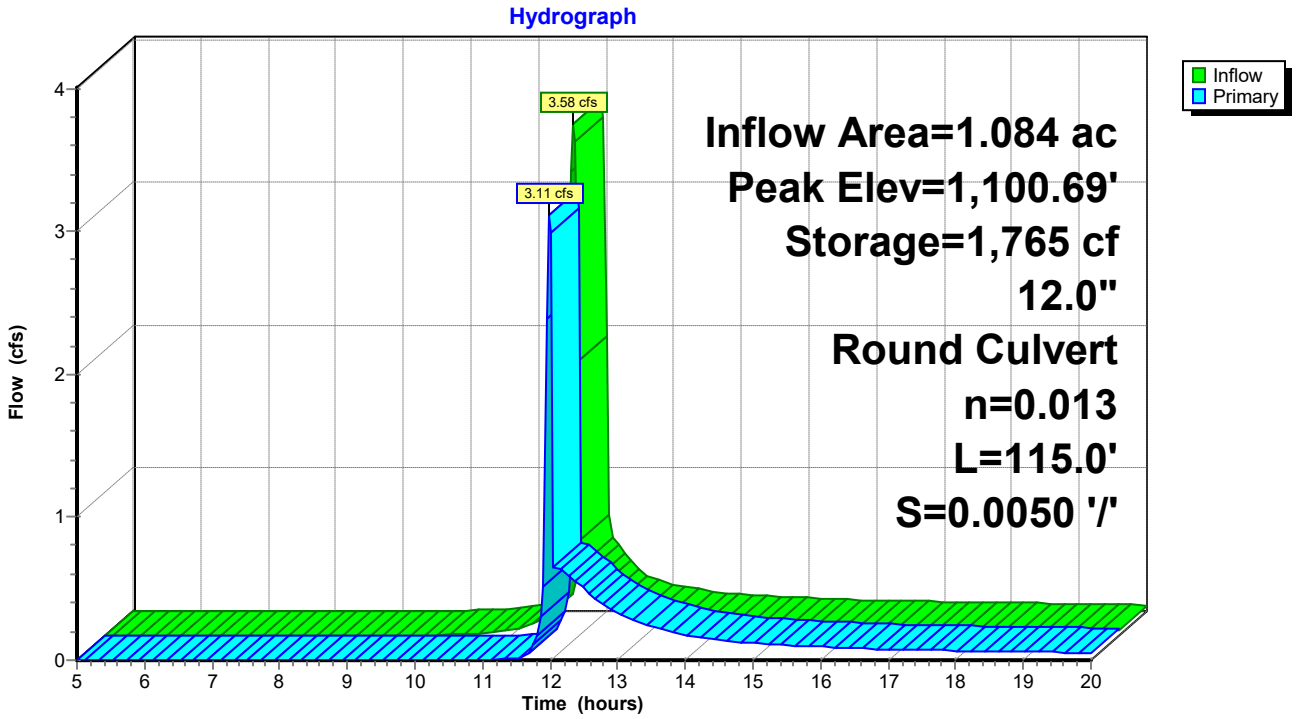
Pond 54P: DRYWELL 2



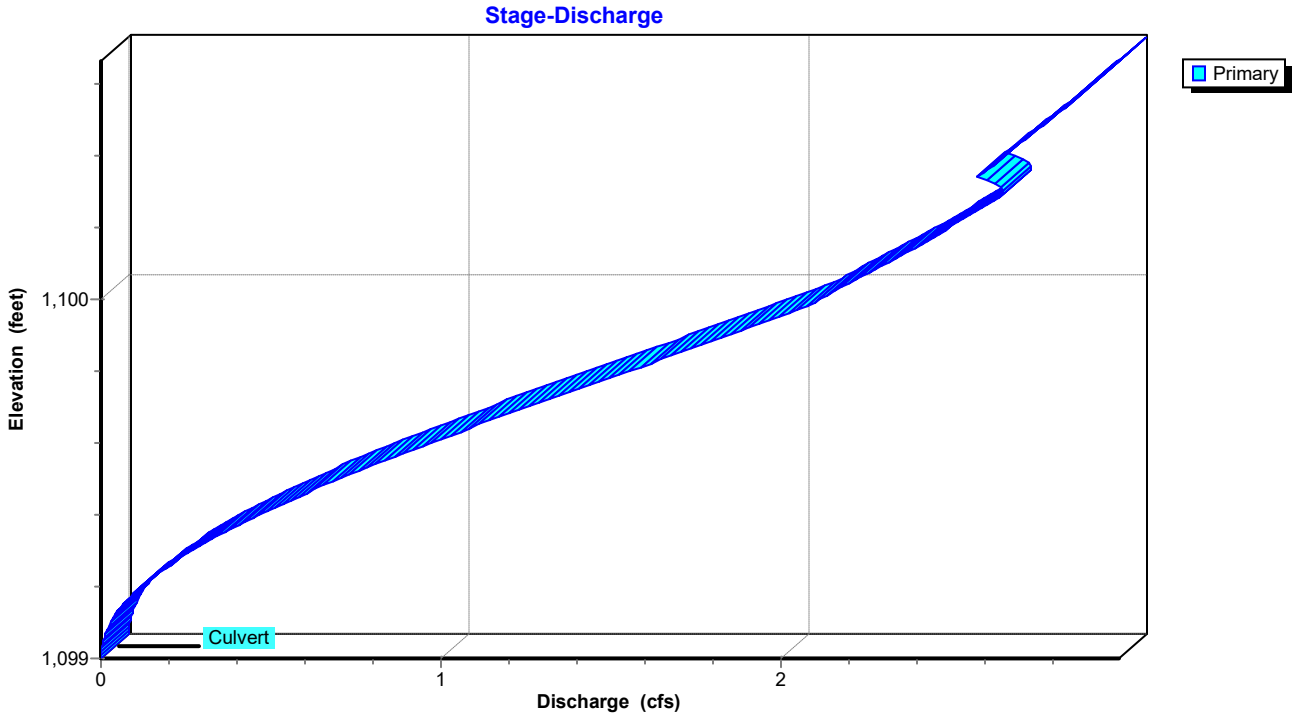
Reach 19R: TIOUGHNIOGA RIVER



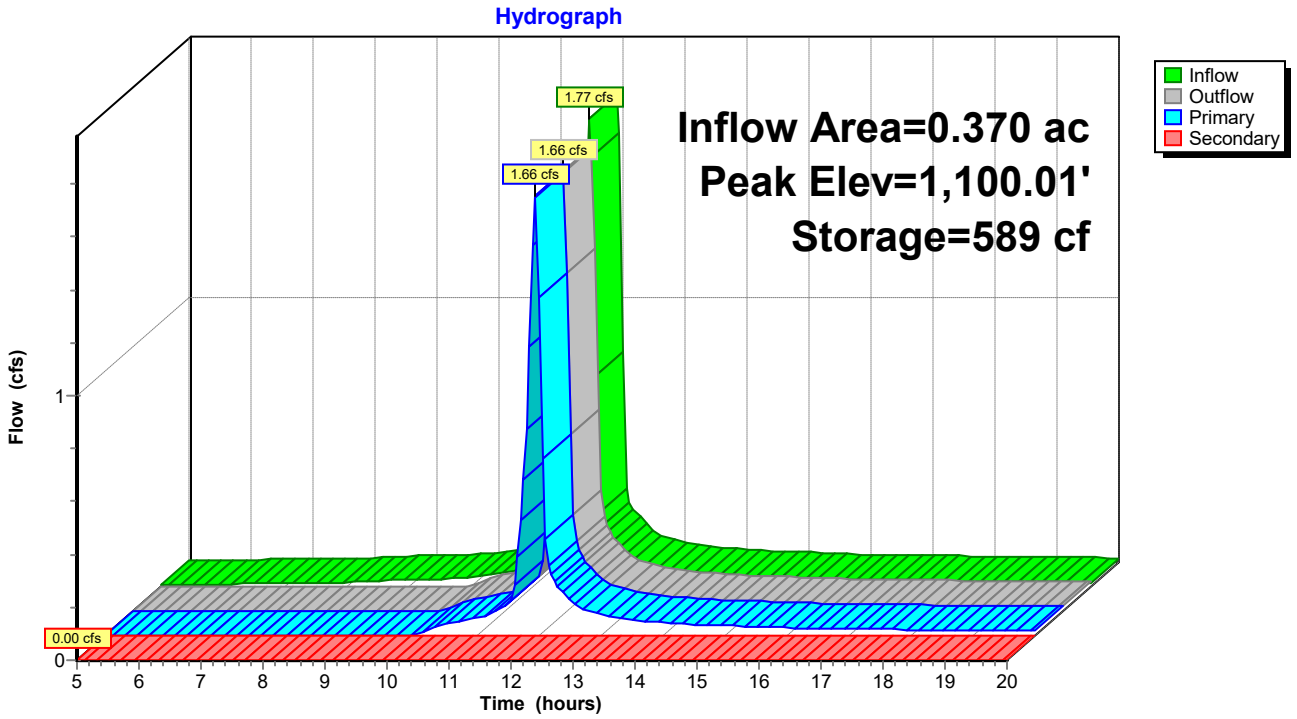
Pond 18P: FOREBAY



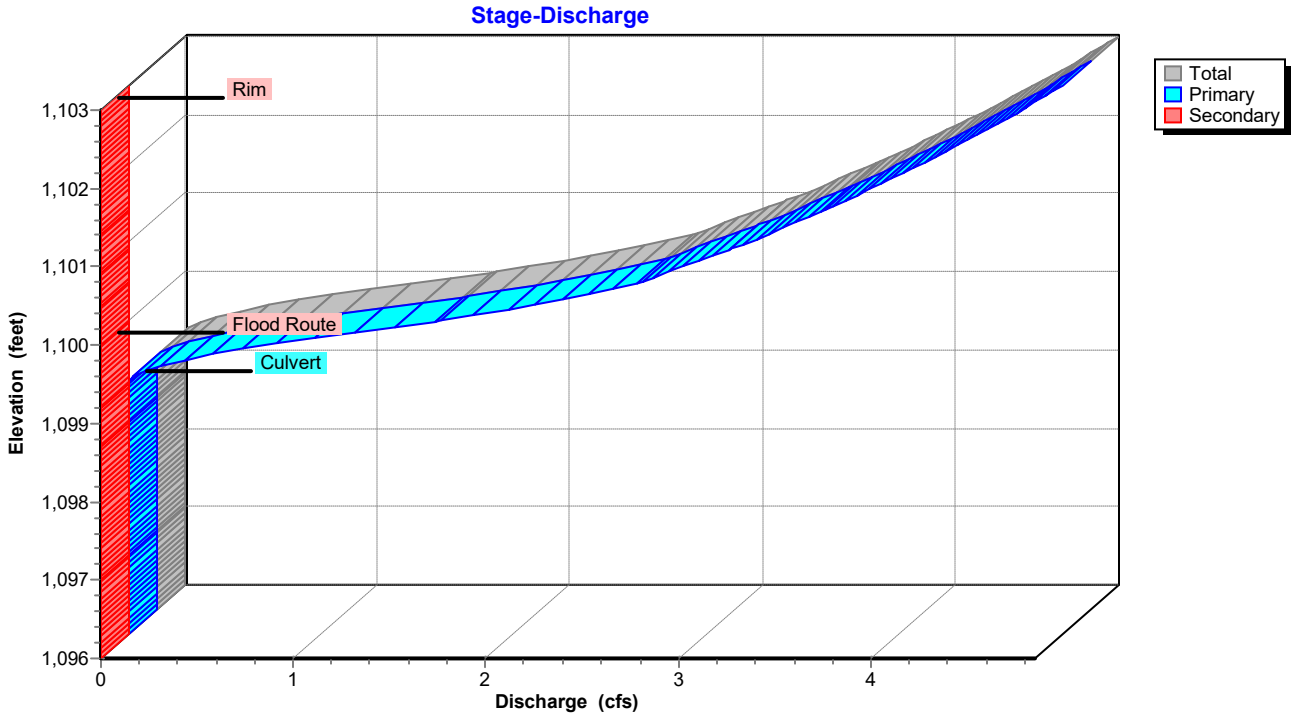
Pond 18P: FOREBAY



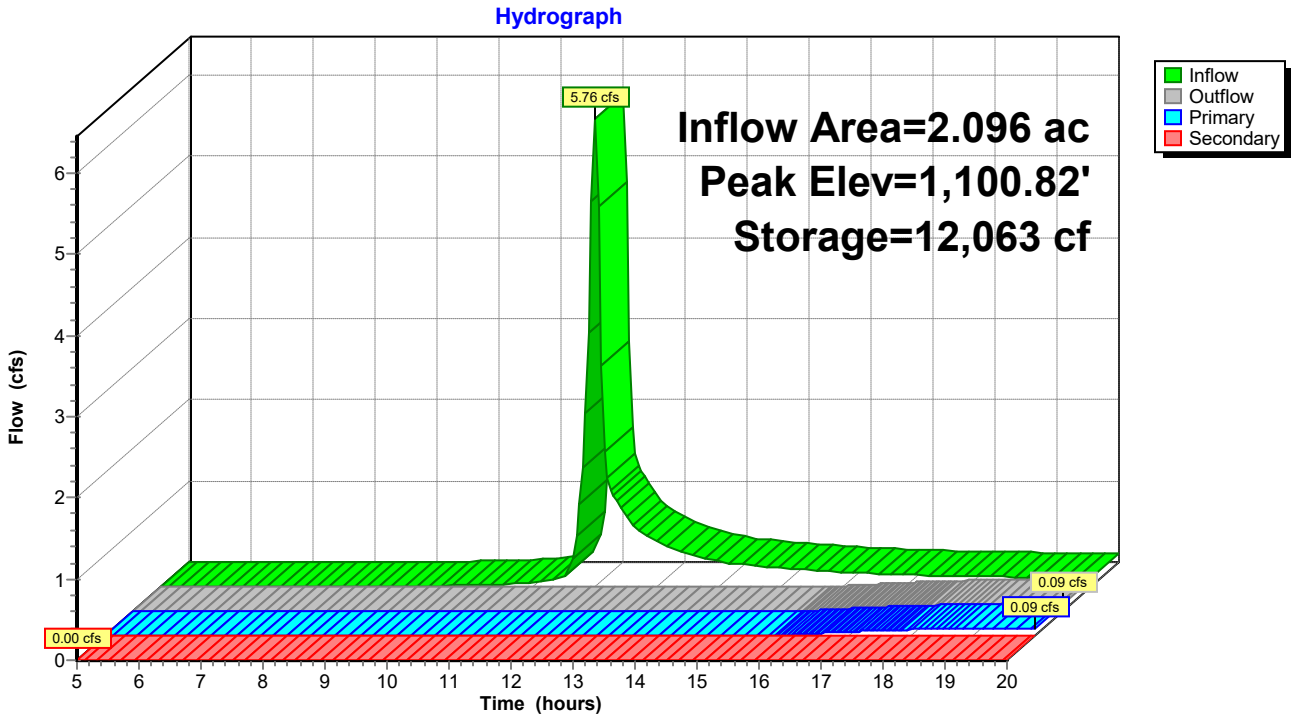
Pond 29P: DRYWELL 3



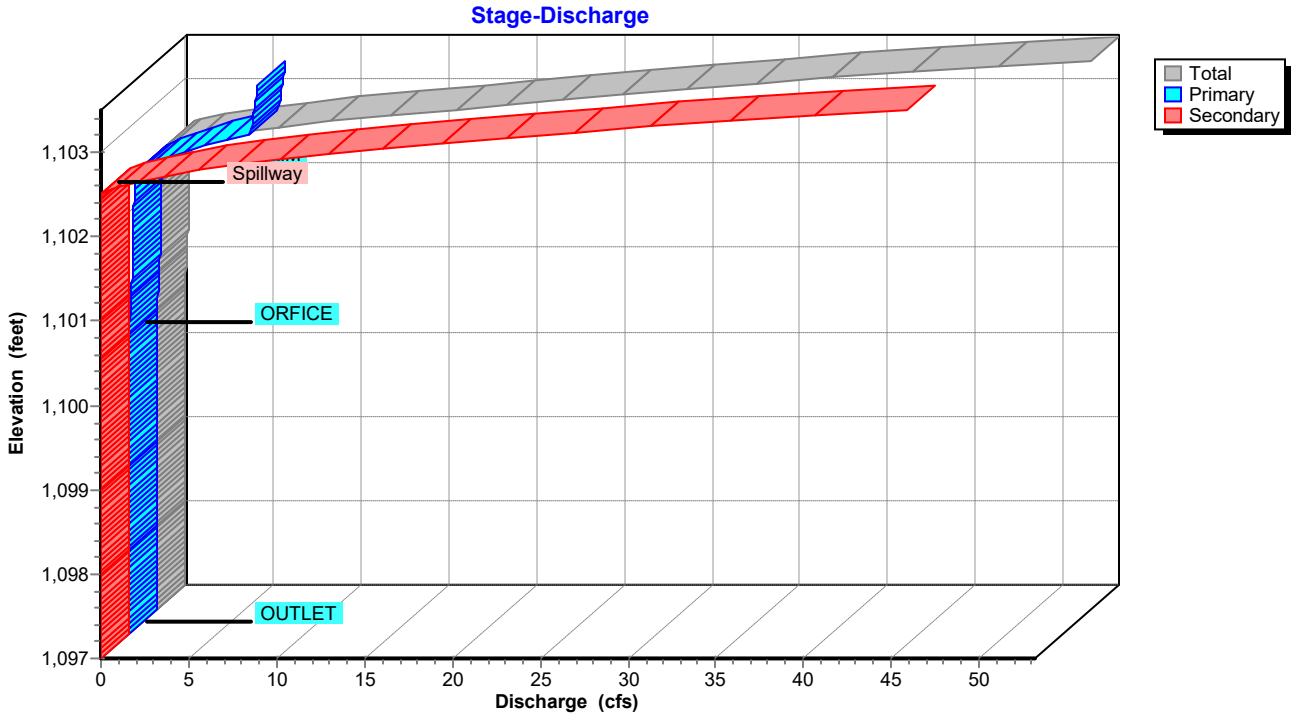
Pond 29P: DRYWELL 3



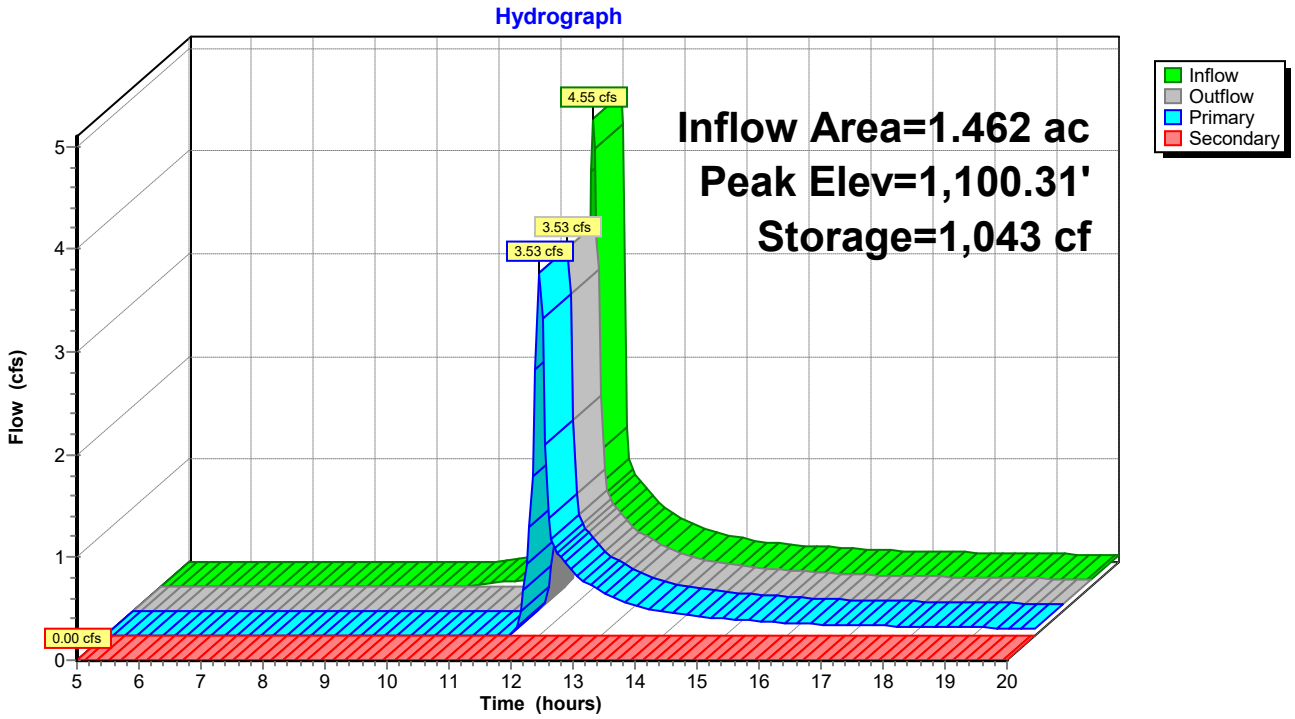
Pond 30P: I-2



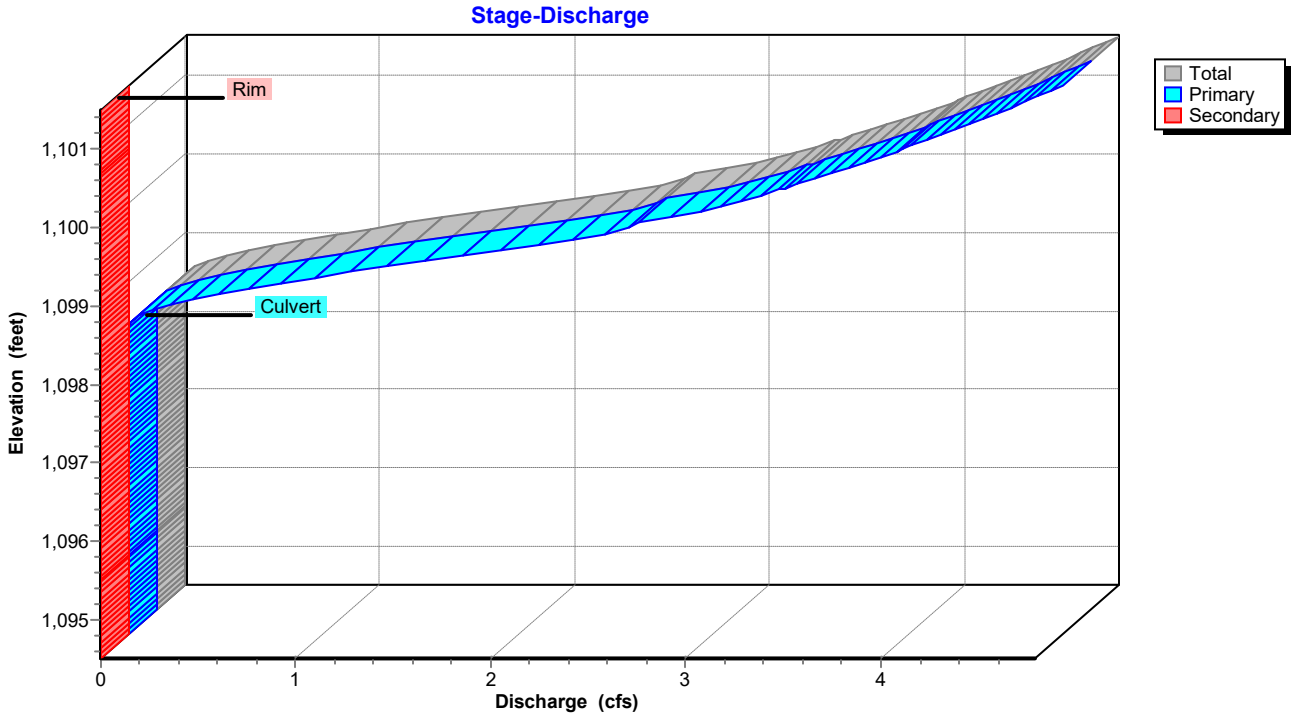
Pond 30P: I-2



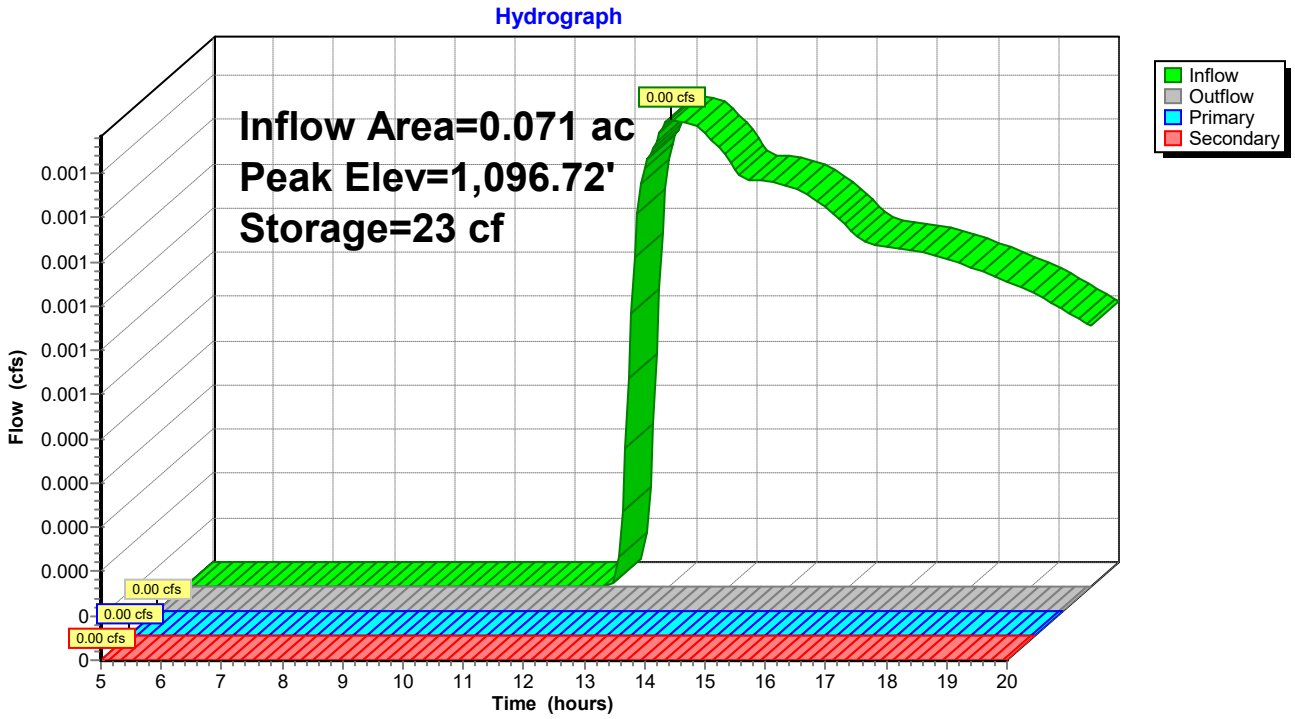
Pond 31P: DRYWELL 4



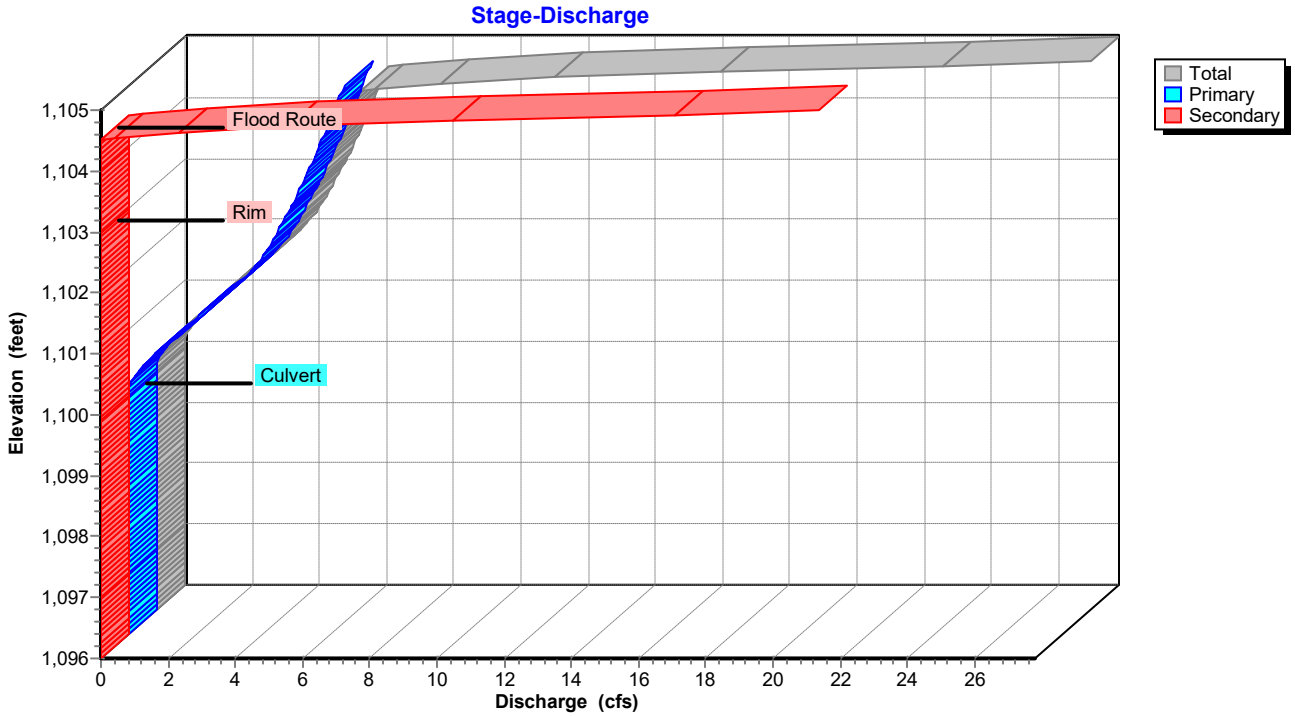
Pond 31P: DRYWELL 4



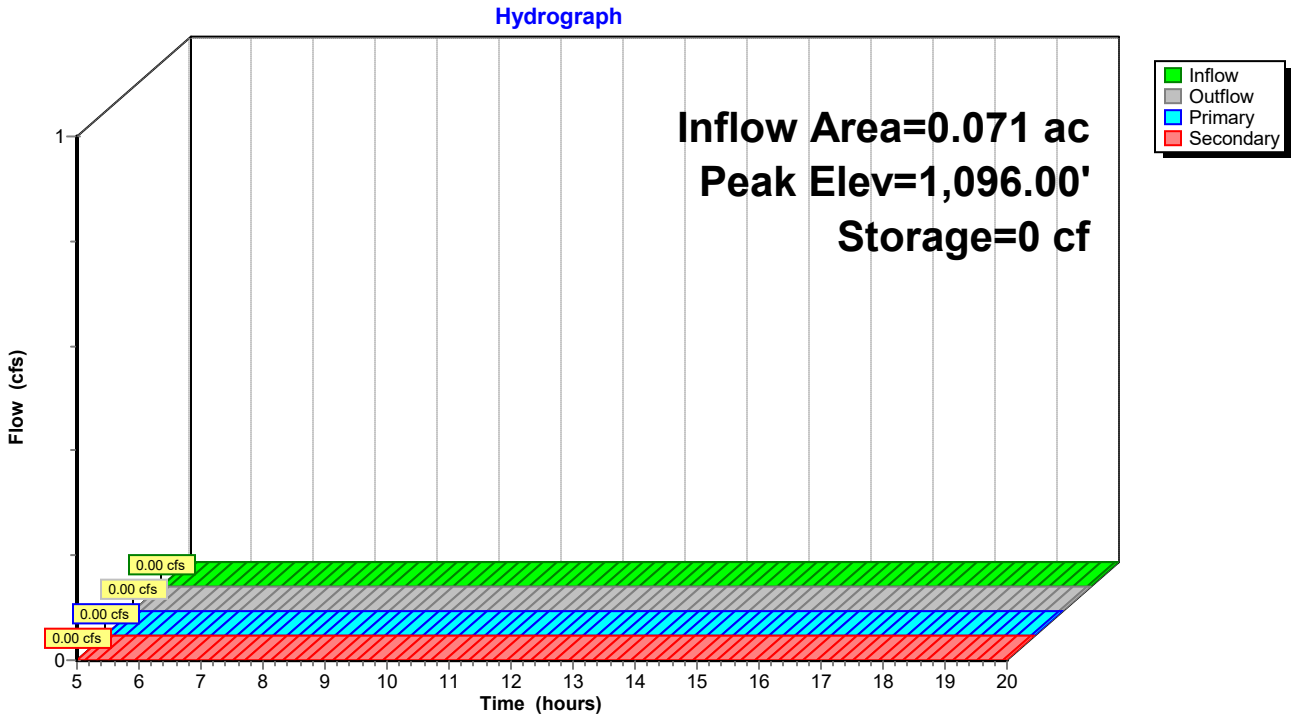
Pond 52P: DRYWELL 1



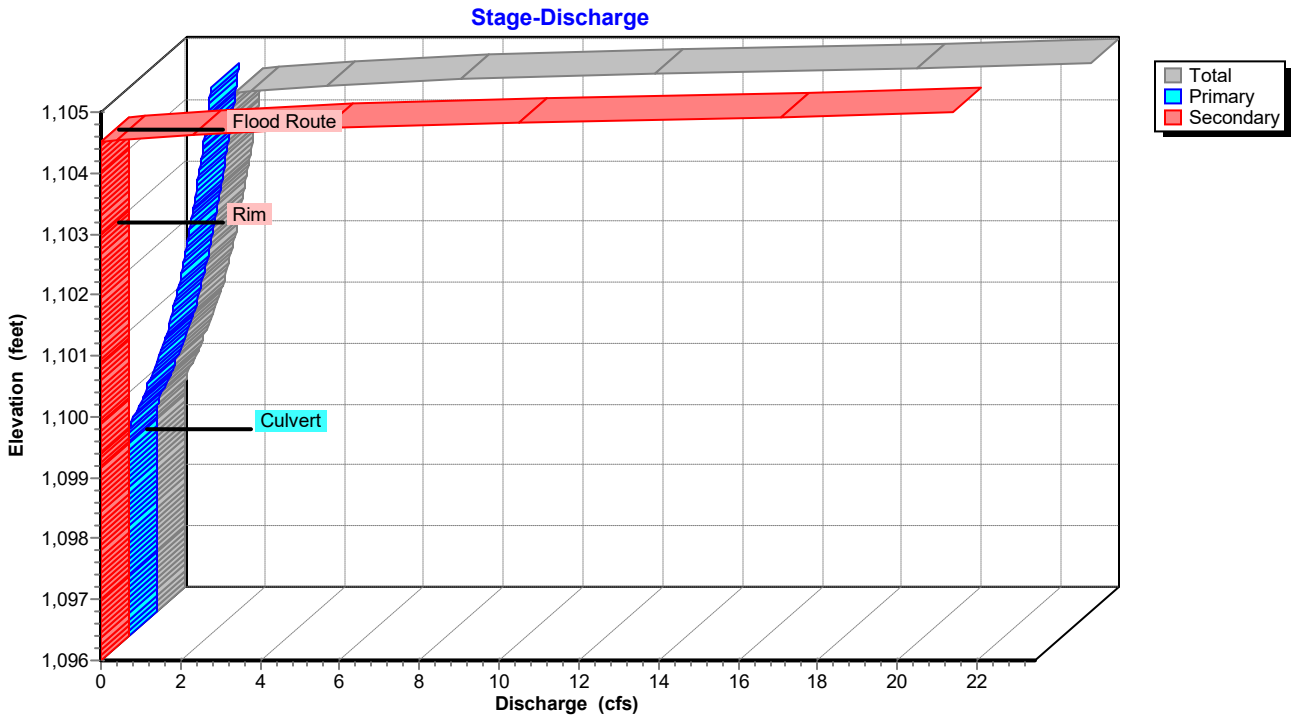
Pond 52P: DRYWELL 1



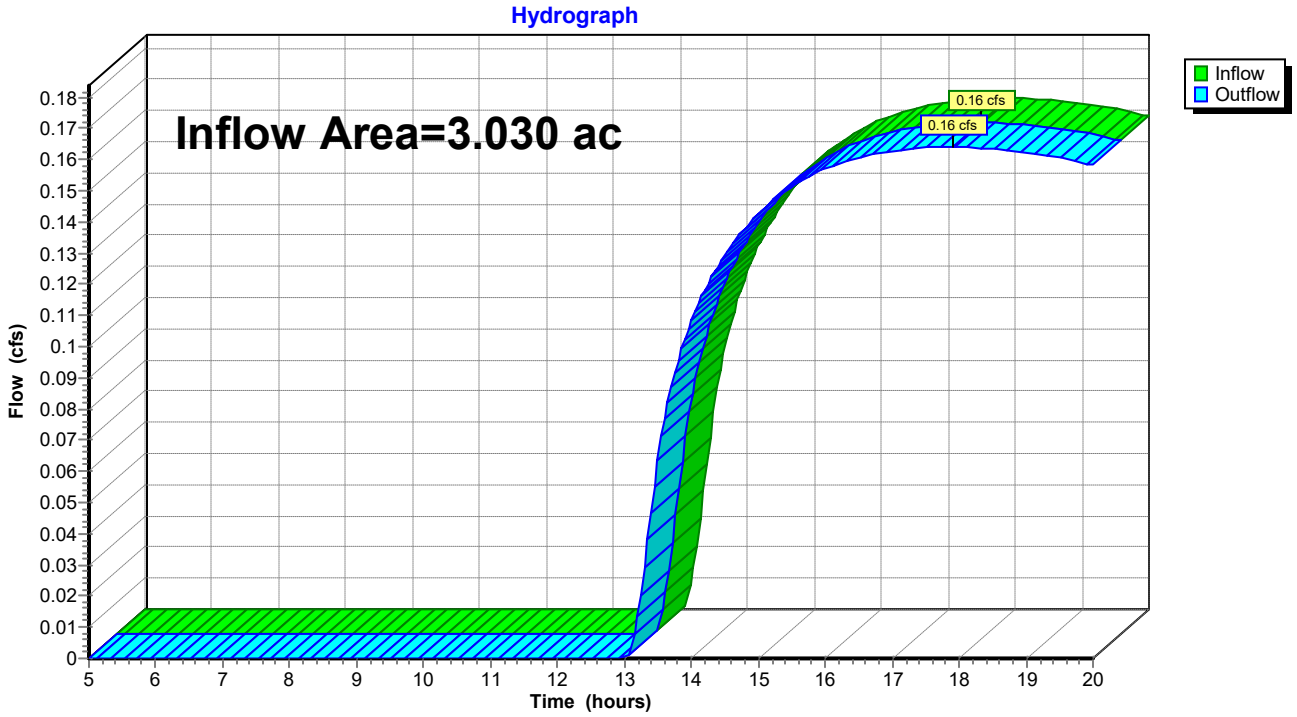
Pond 54P: DRYWELL 2



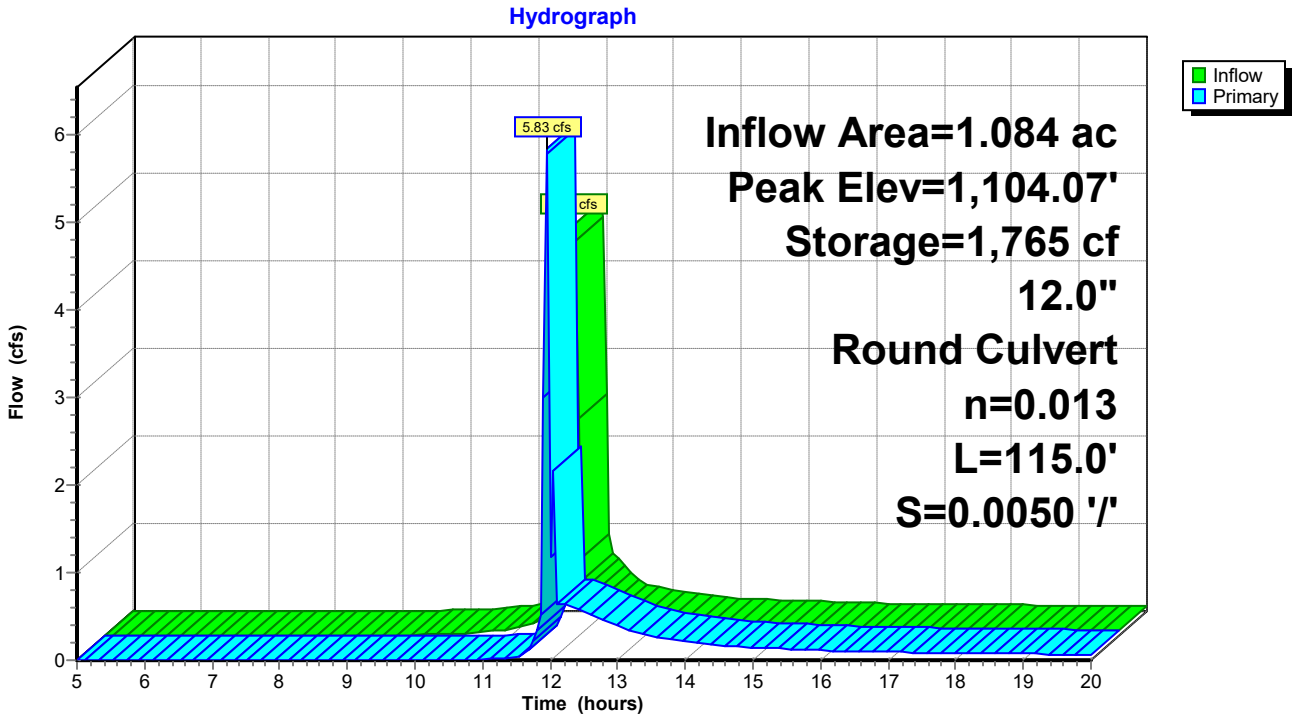
Pond 54P: DRYWELL 2



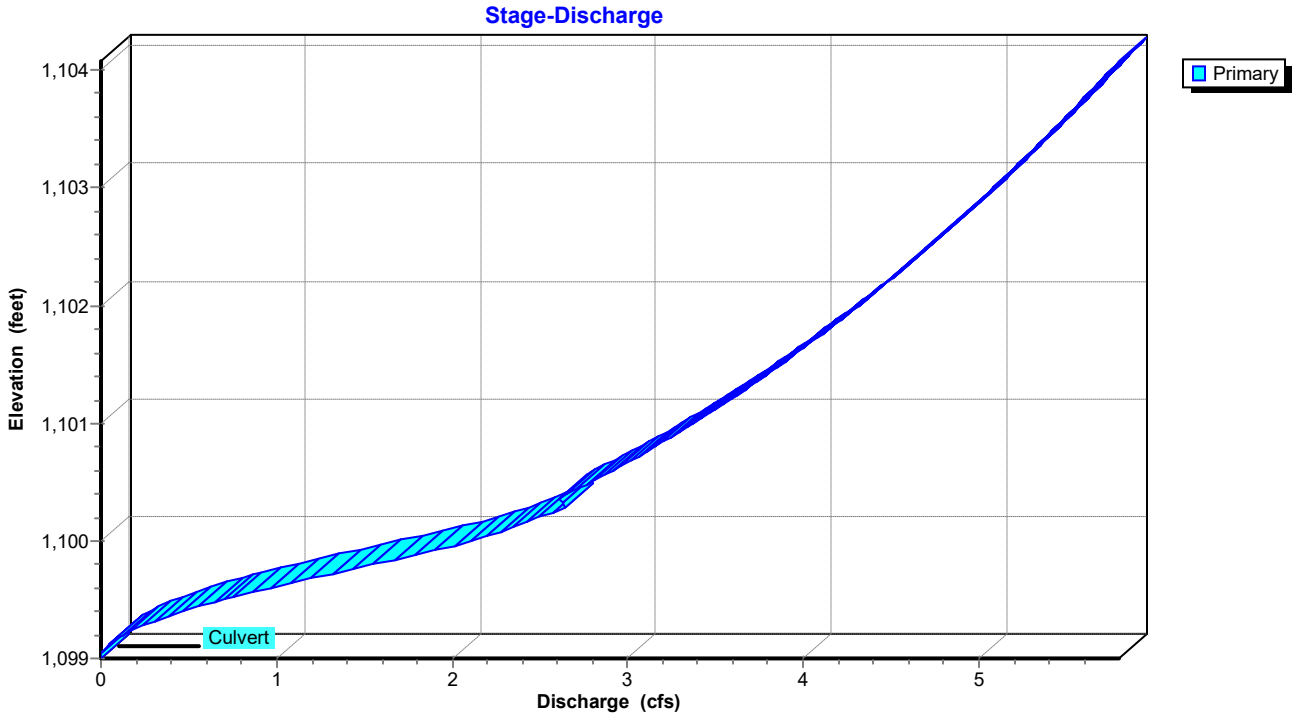
Reach 19R: TIOUGHNIOGA RIVER



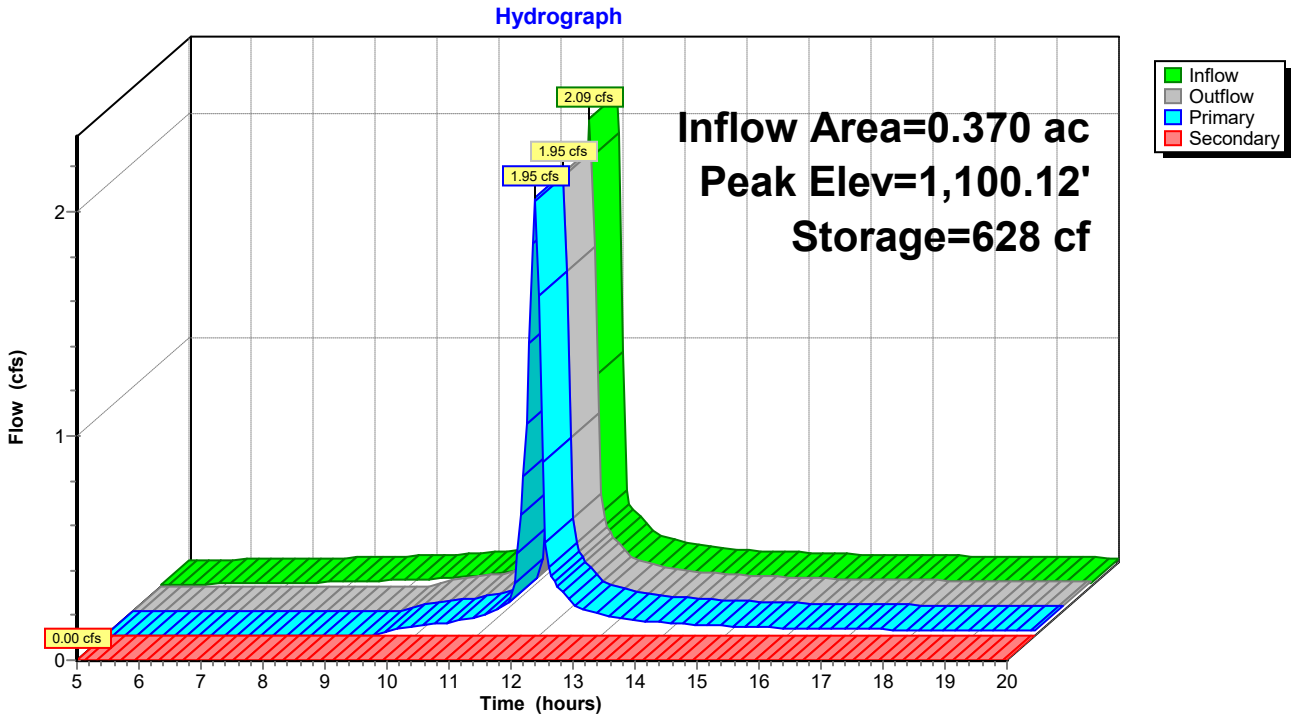
Pond 18P: FOREBAY



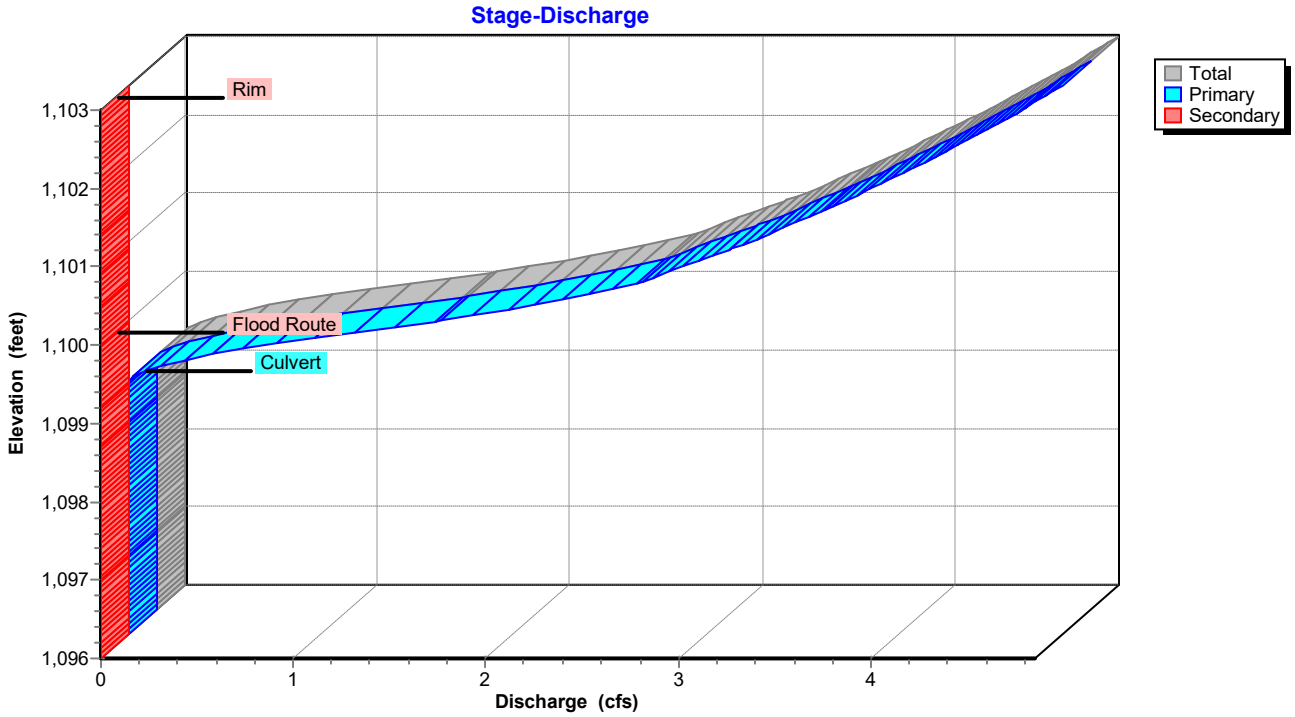
Pond 18P: FOREBAY



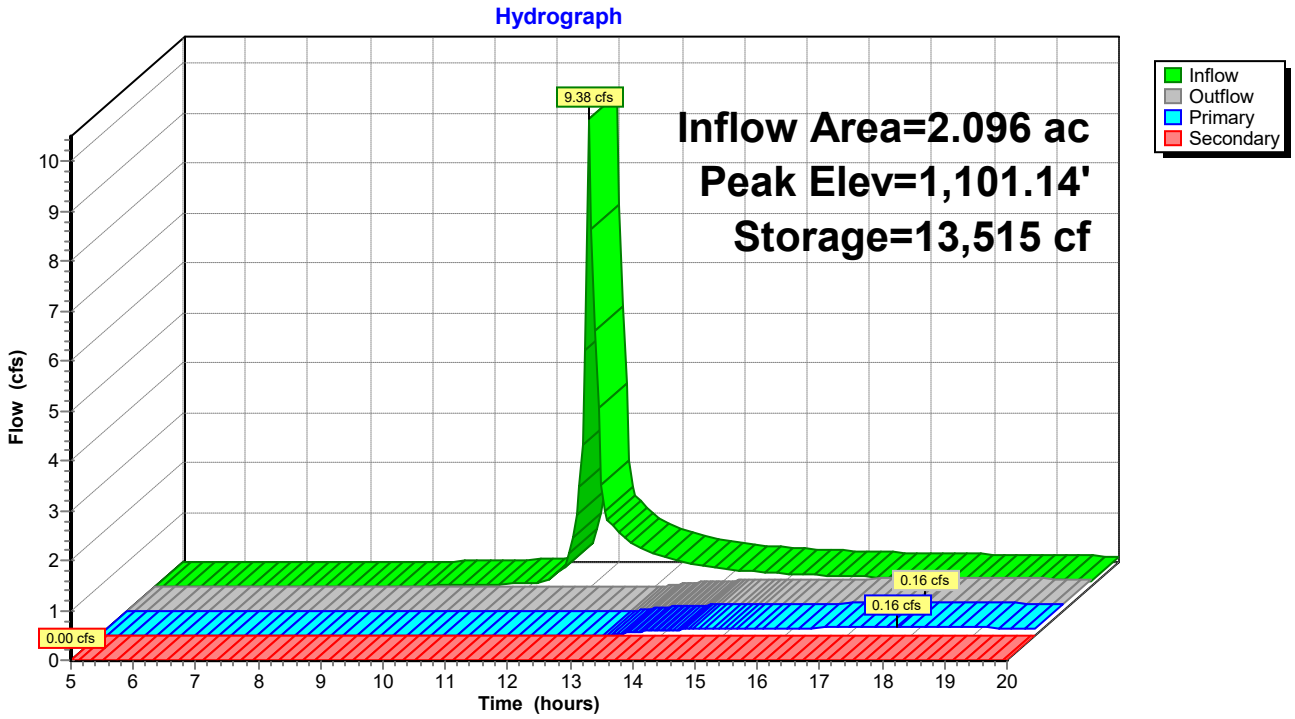
Pond 29P: DRYWELL 3



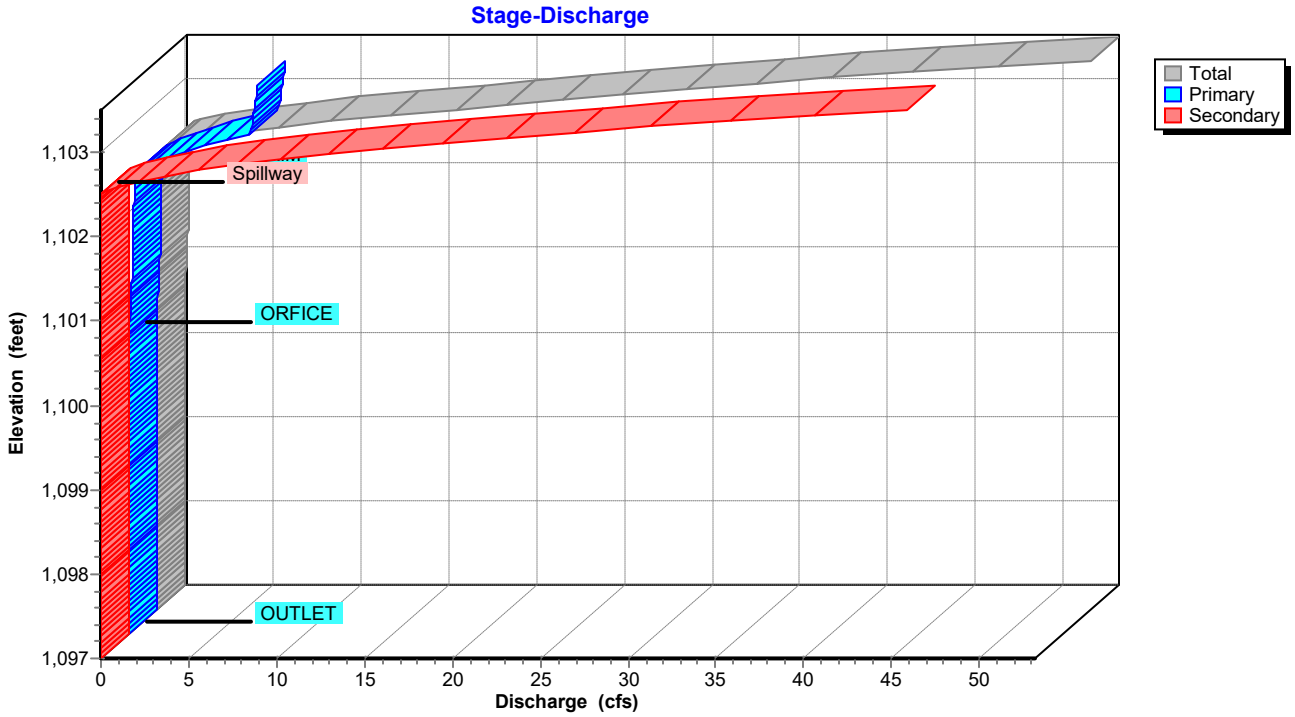
Pond 29P: DRYWELL 3



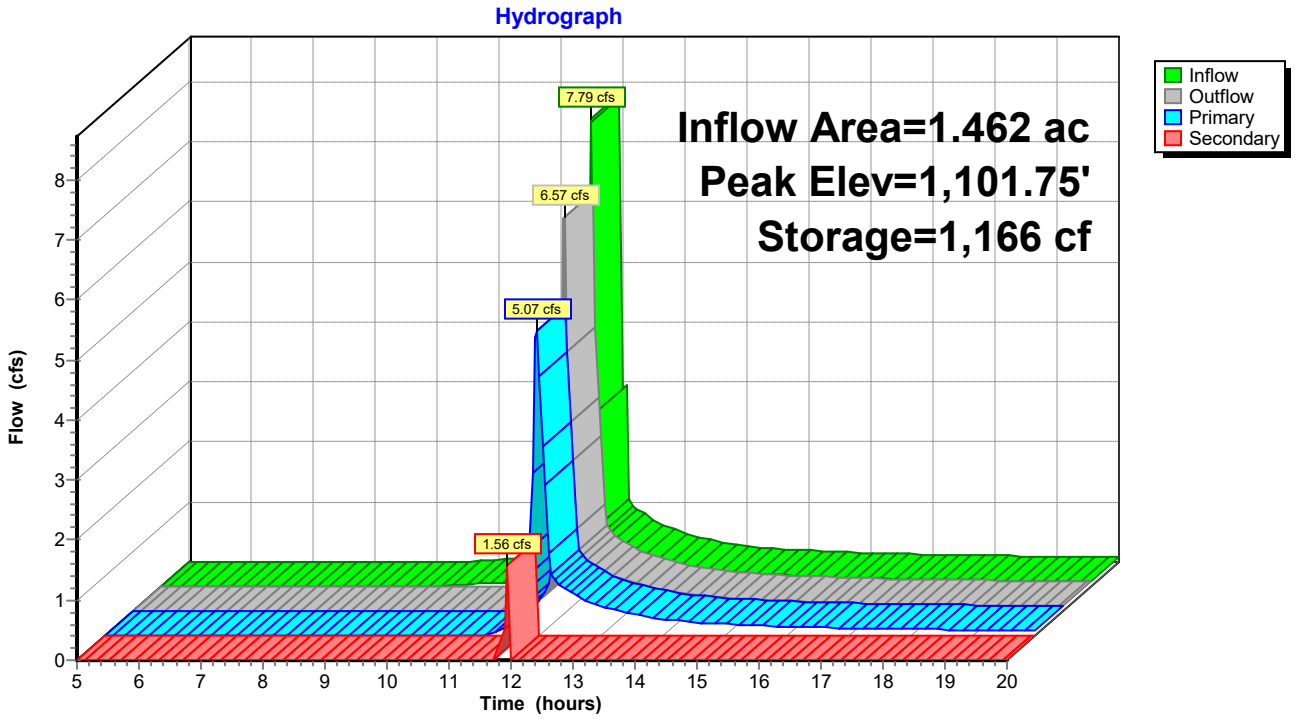
Pond 30P: I-2



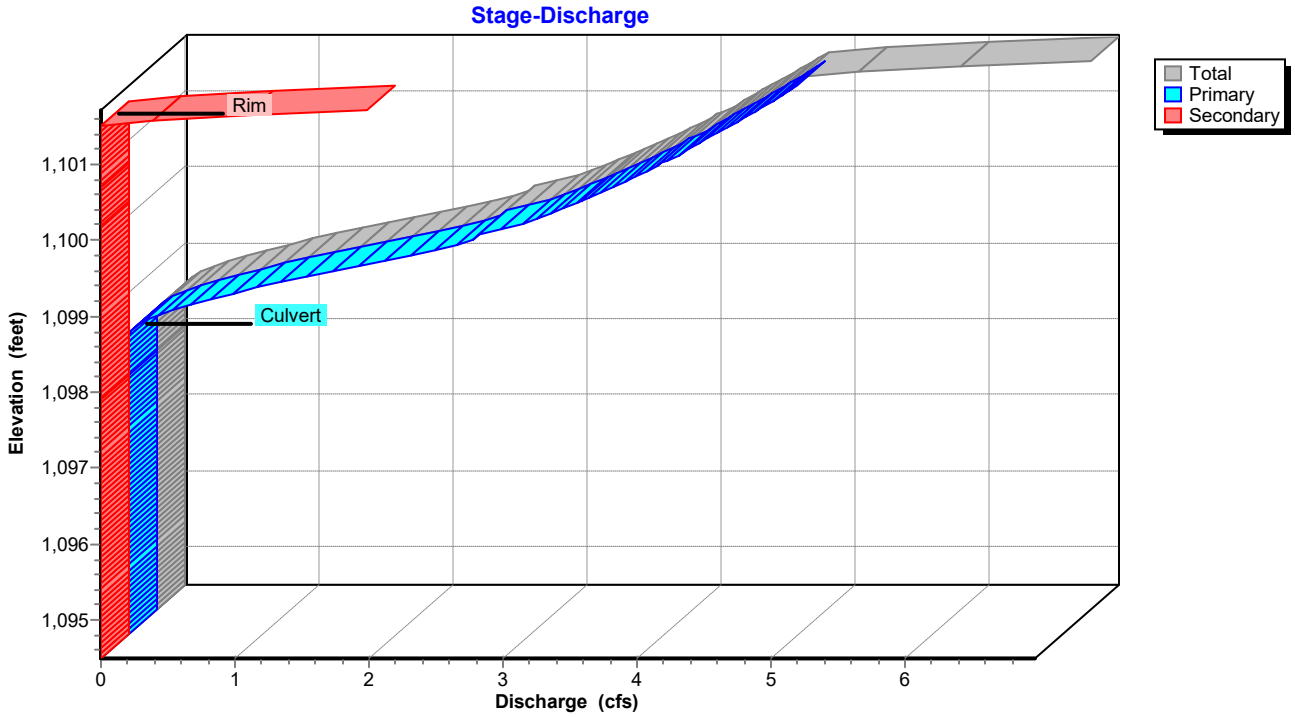
Pond 30P: I-2



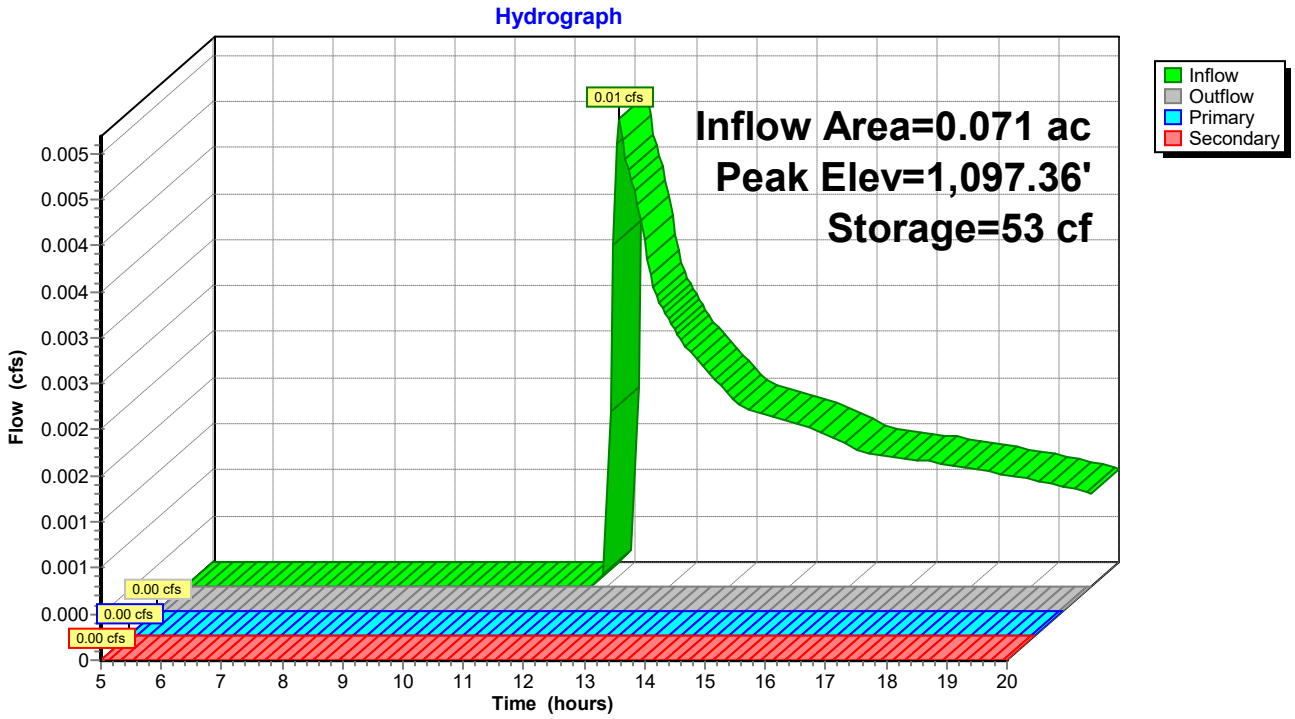
Pond 31P: DRYWELL 4



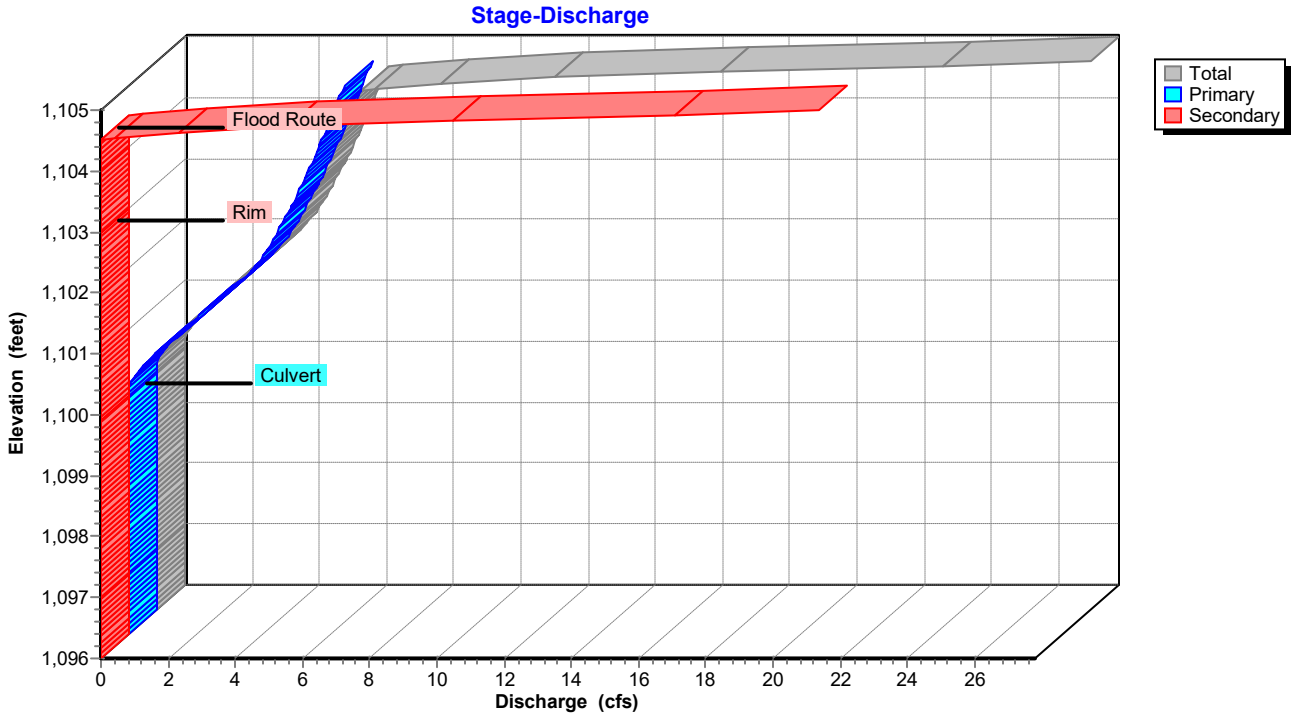
Pond 31P: DRYWELL 4



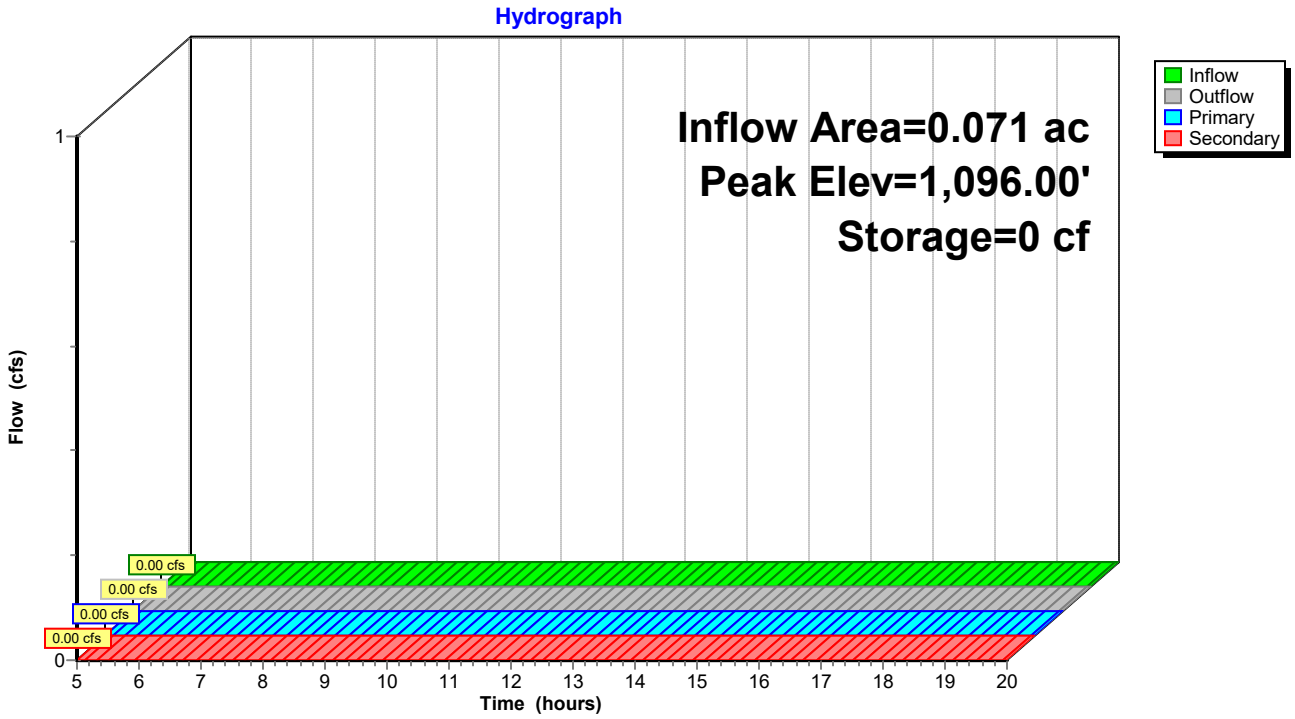
Pond 52P: DRYWELL 1



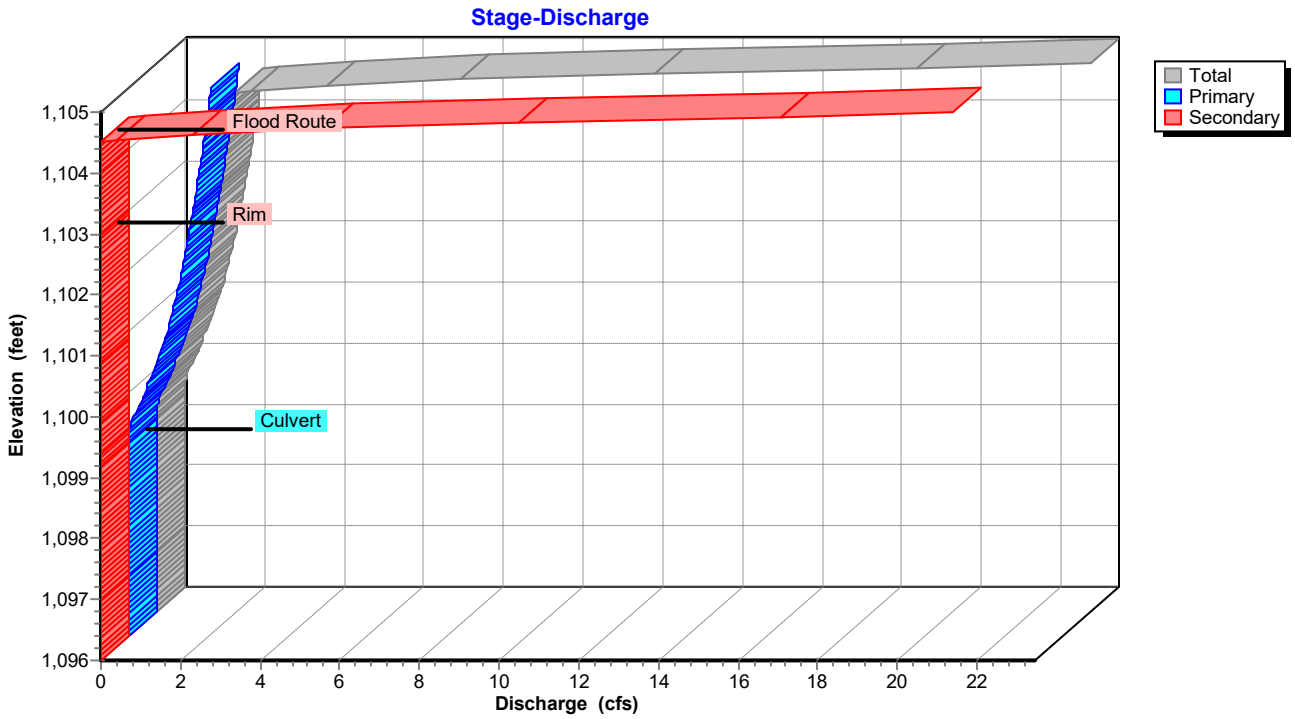
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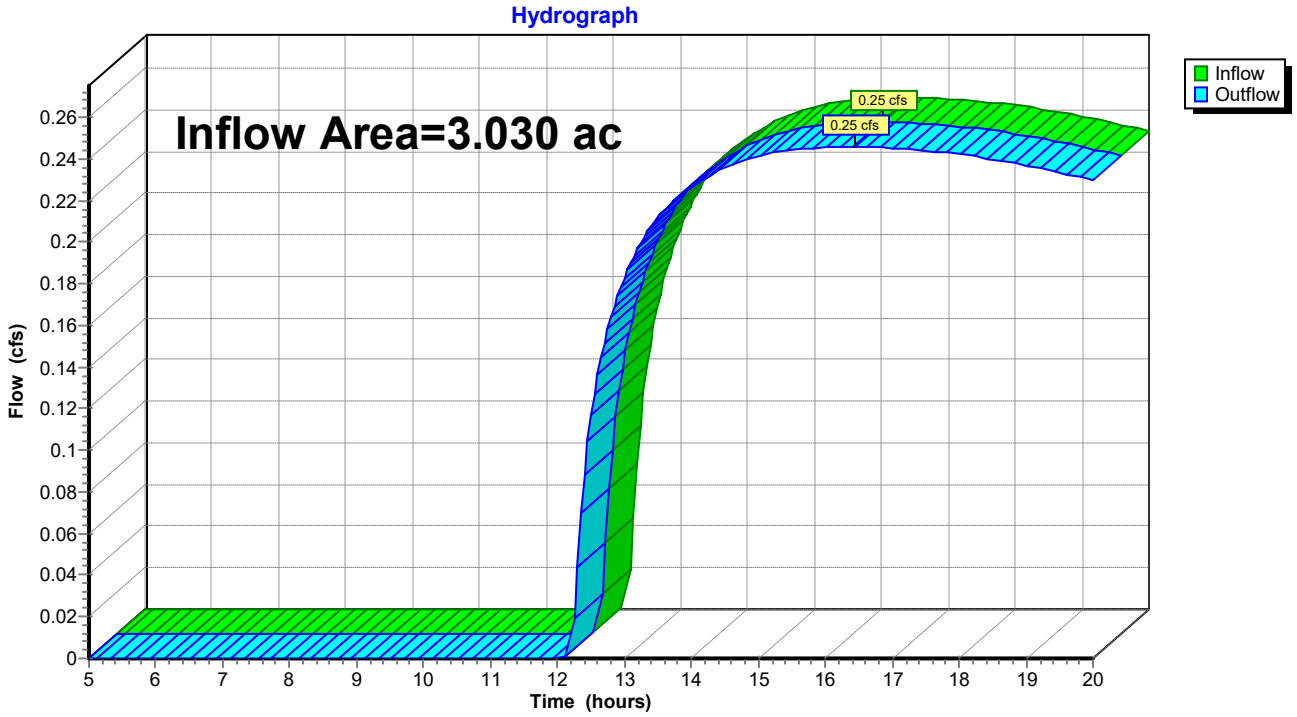
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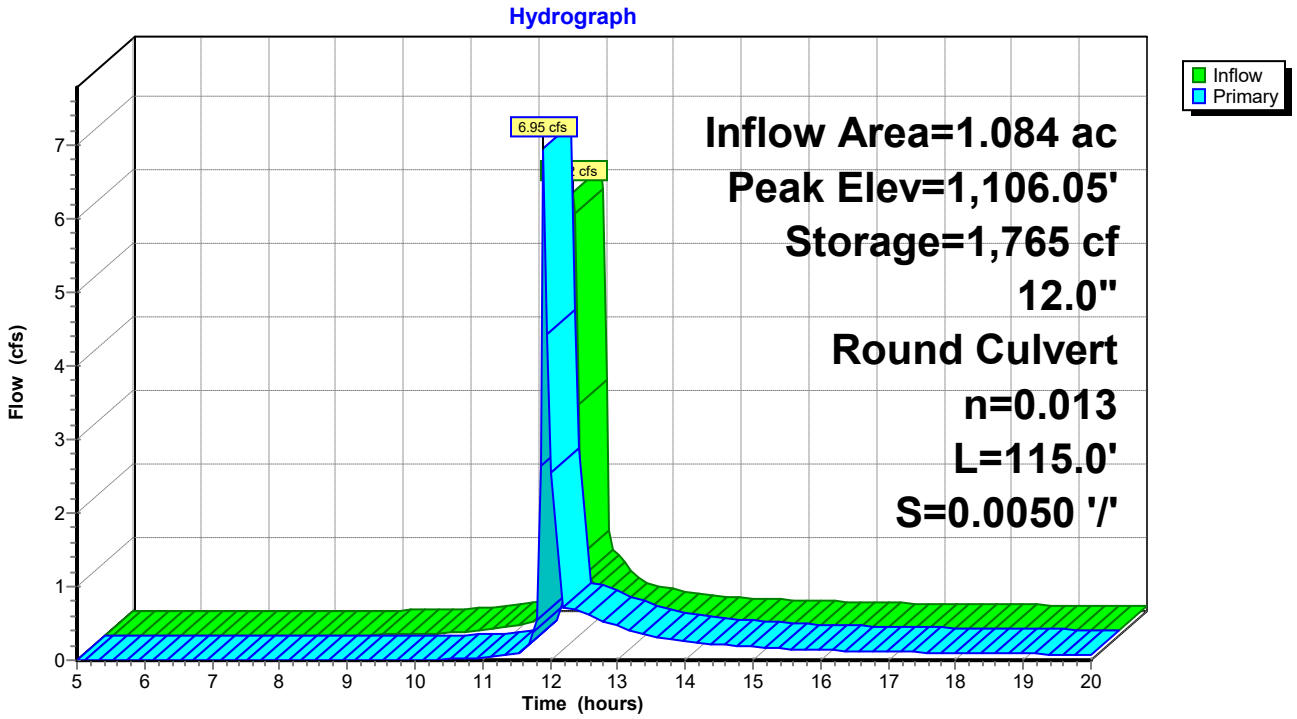
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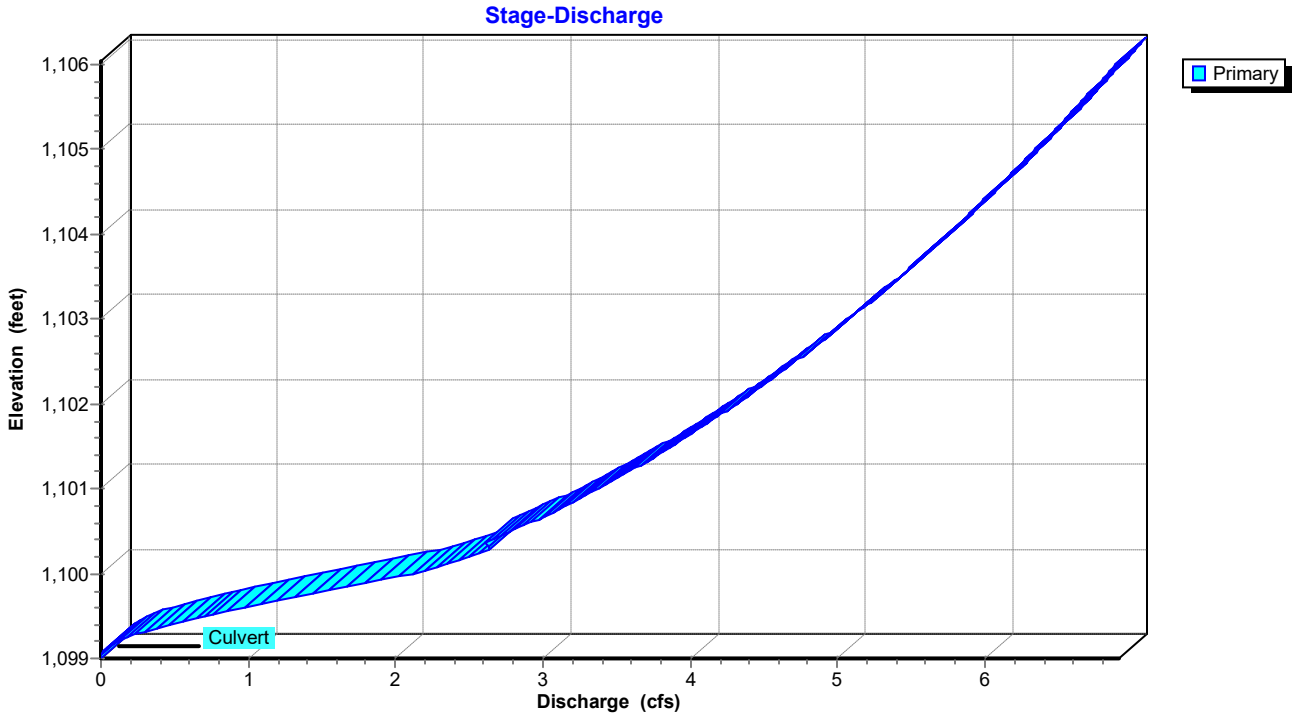
Reach 19R: TIOUGHNIOGA RIVER



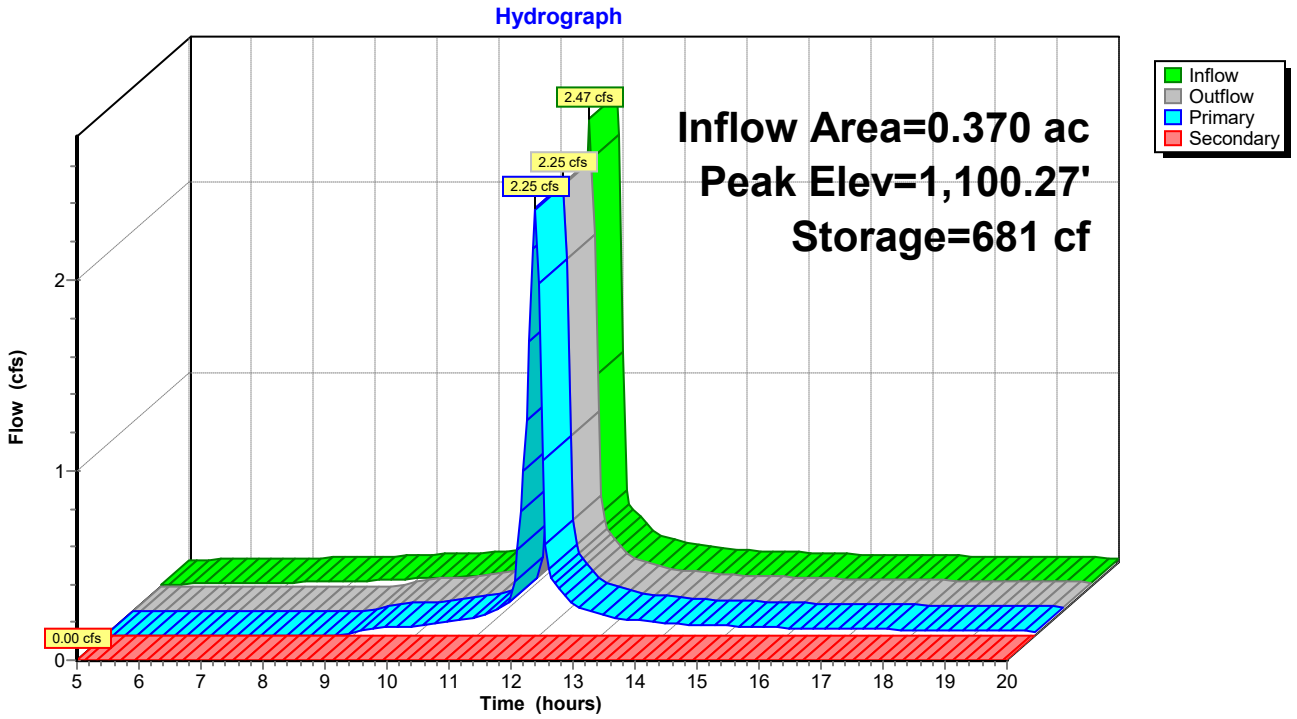
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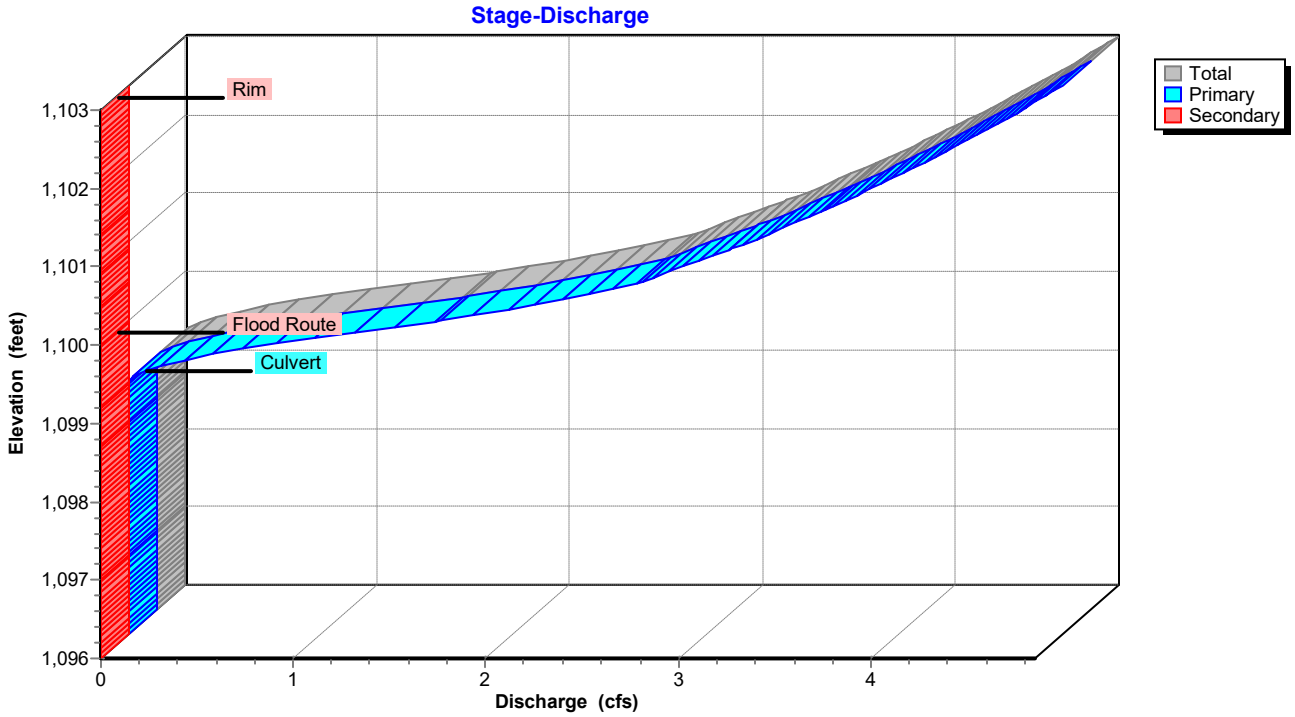
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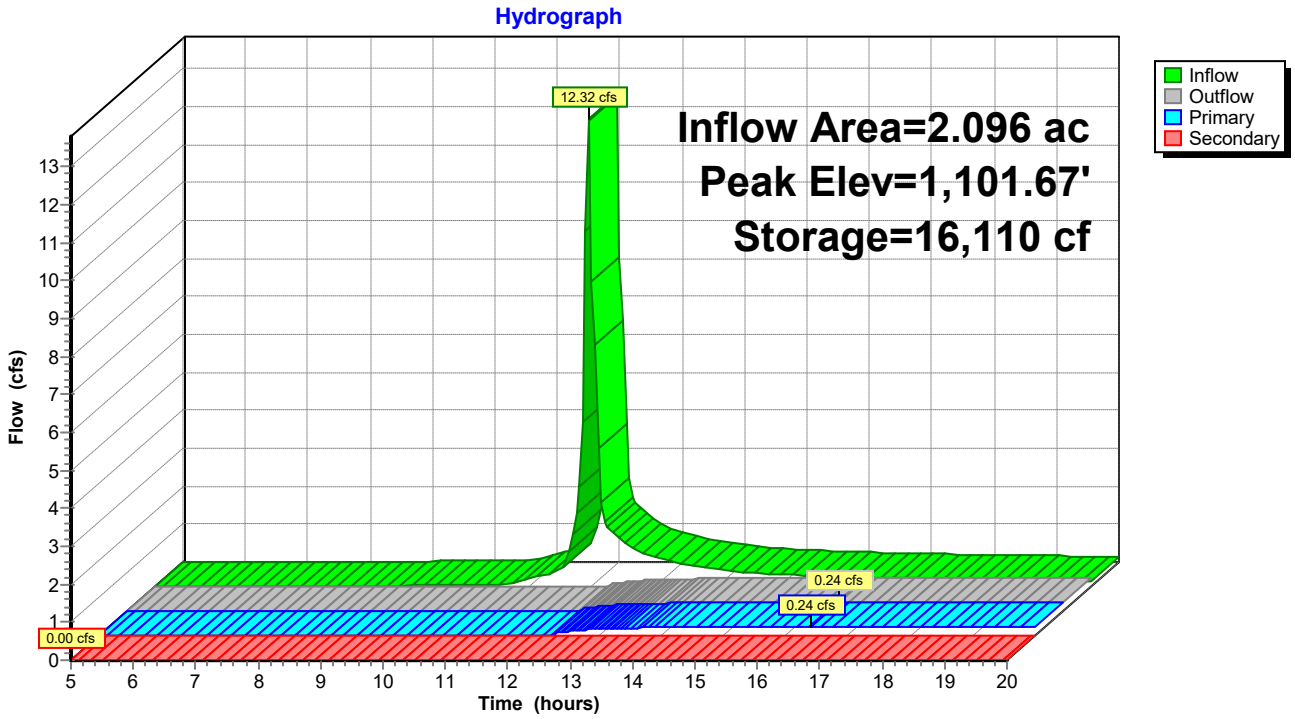
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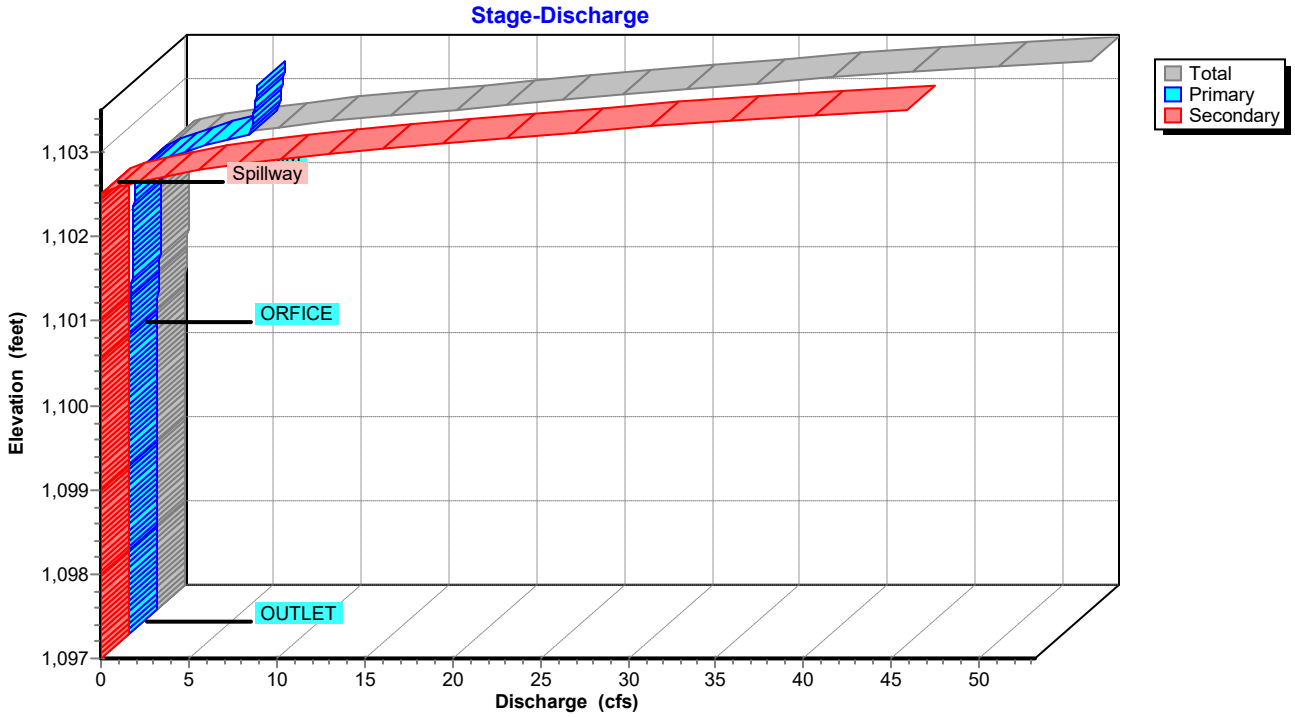
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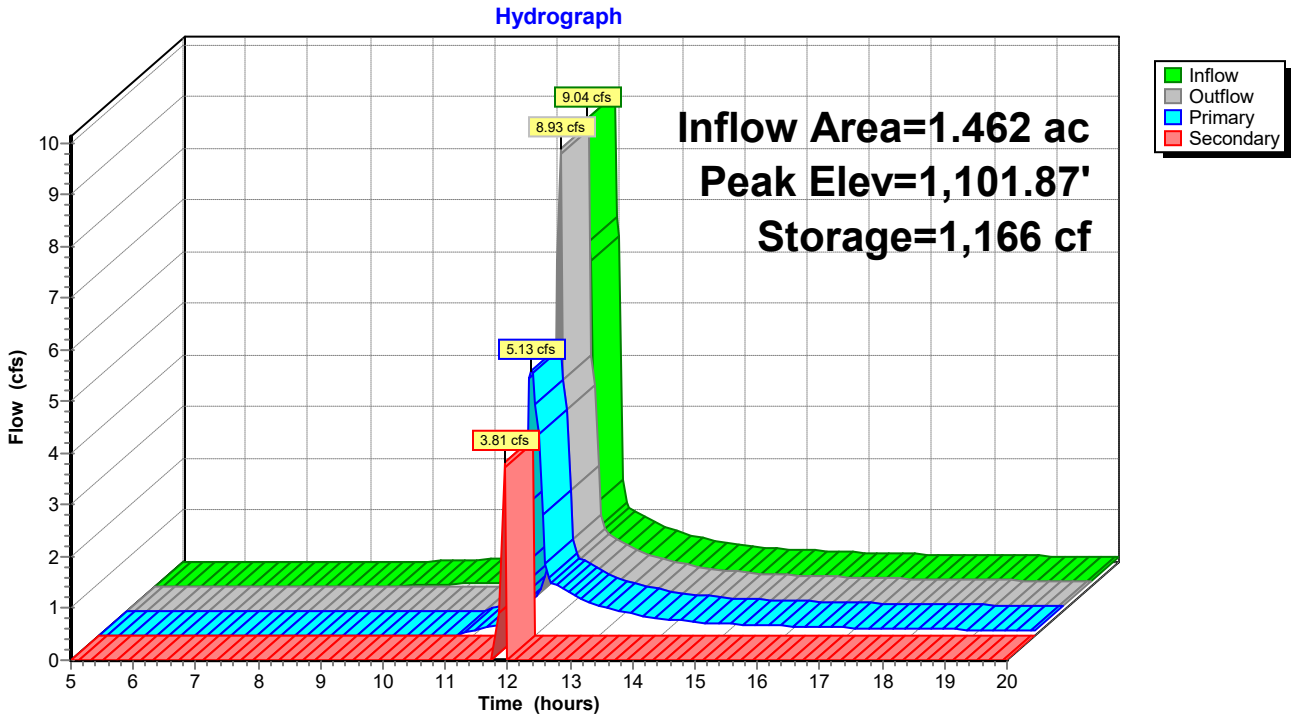
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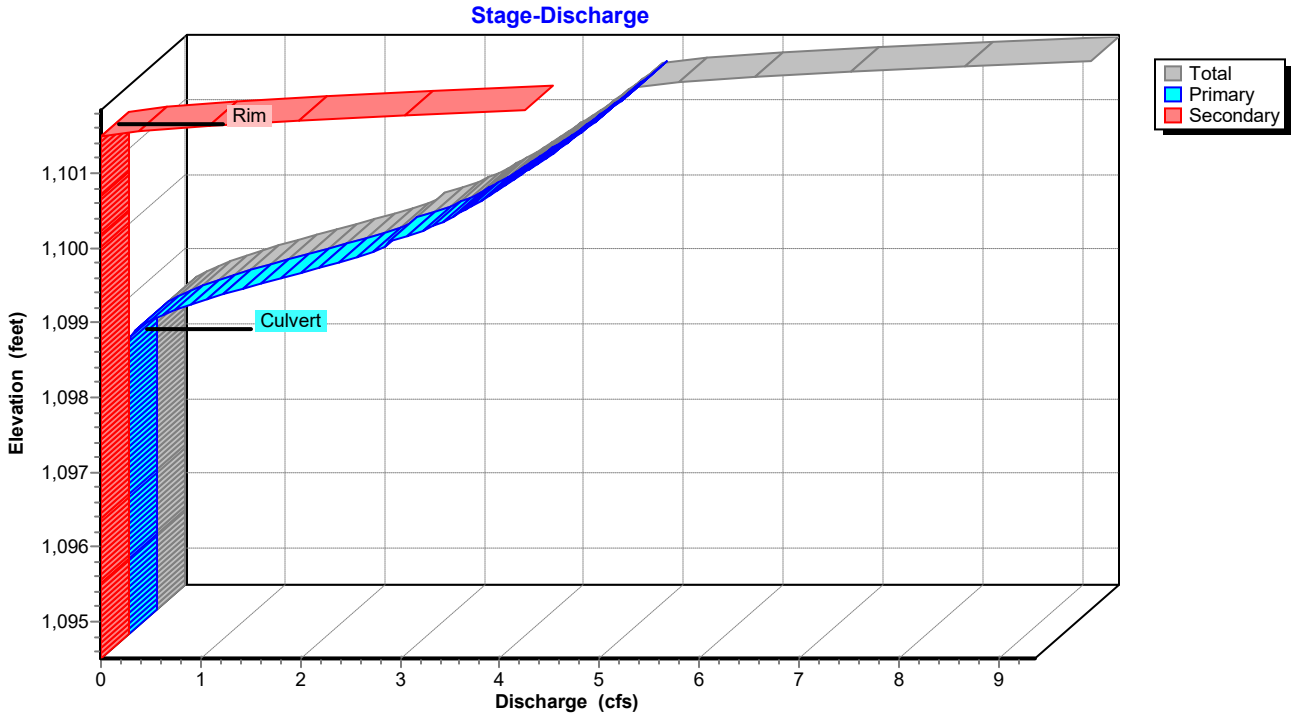
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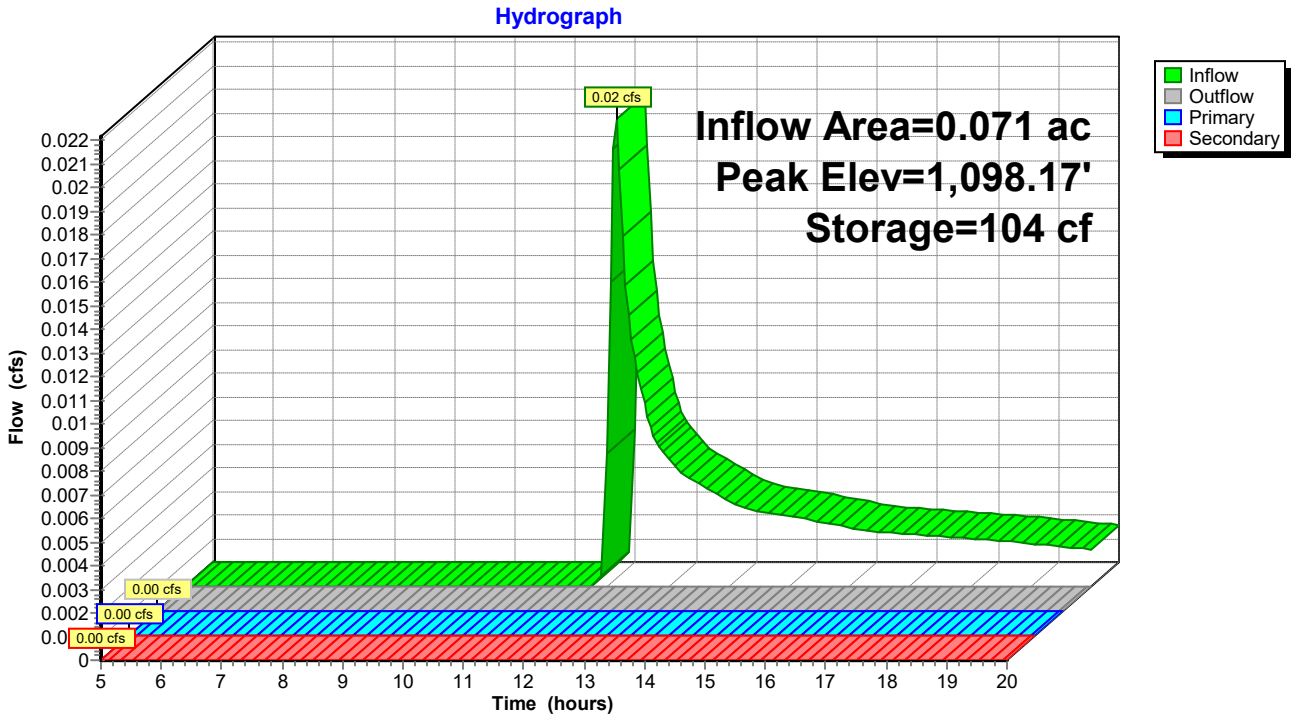
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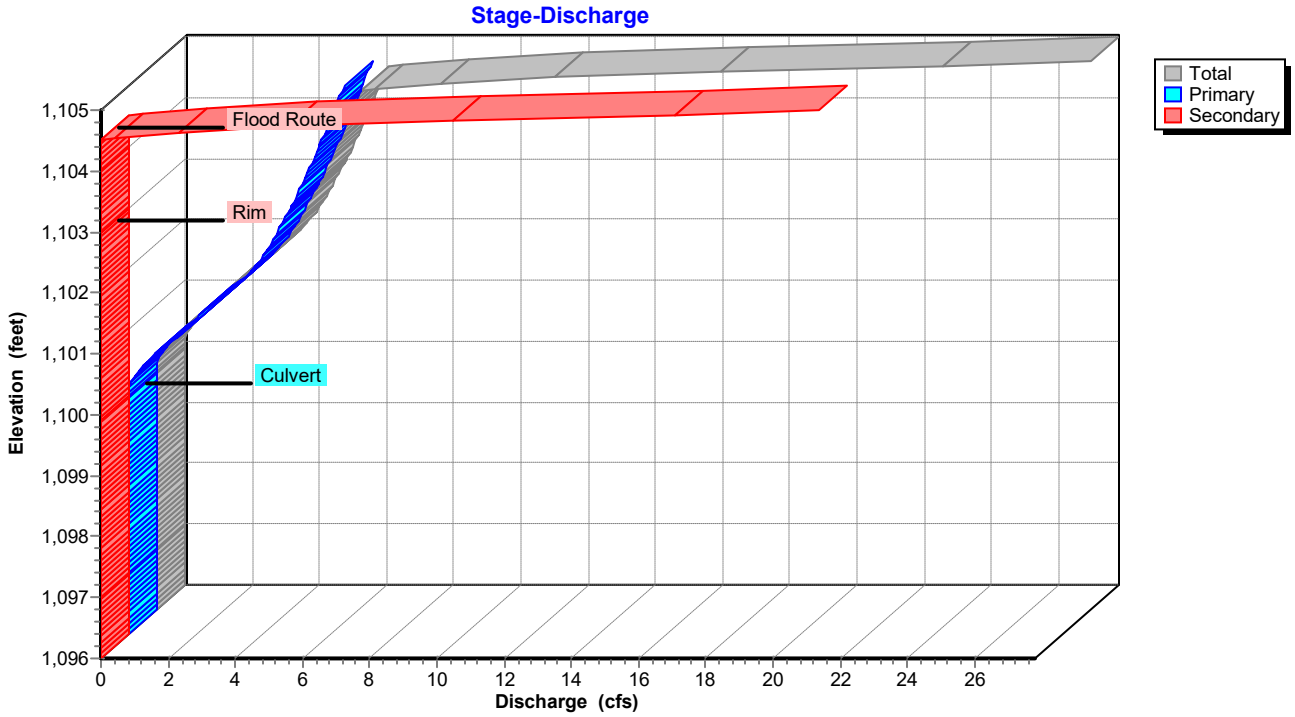
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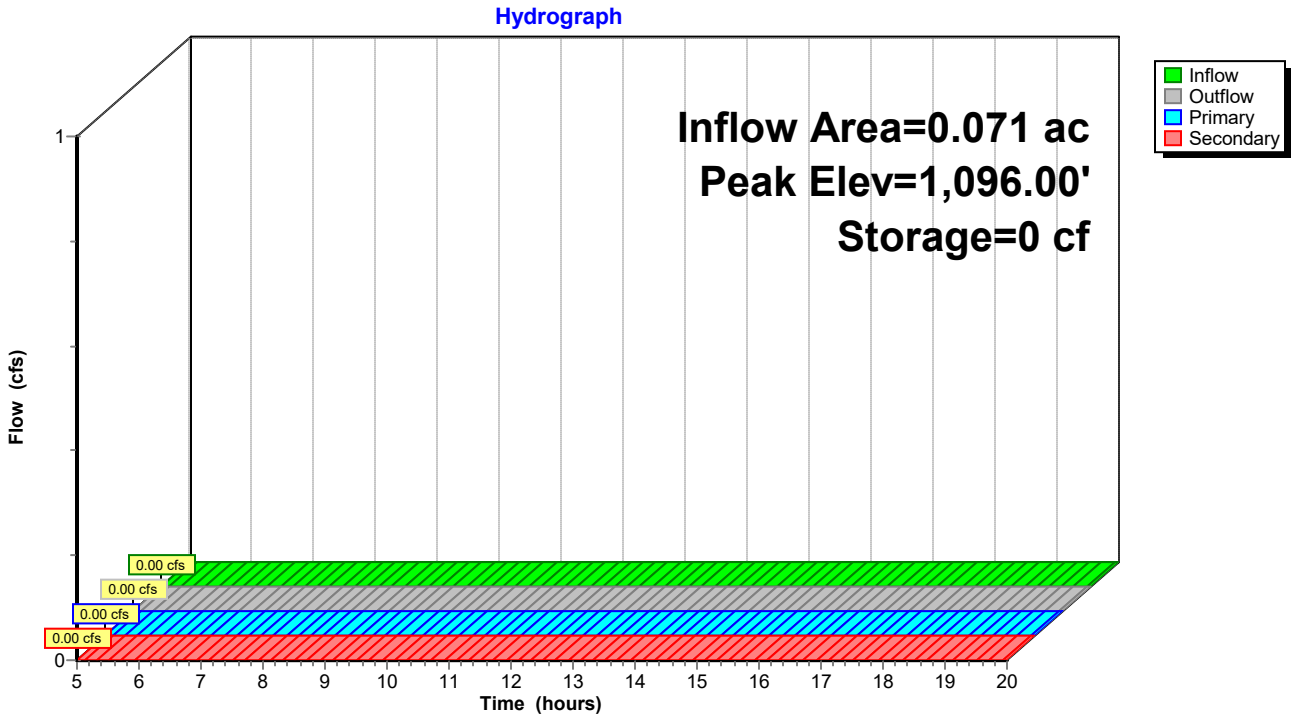
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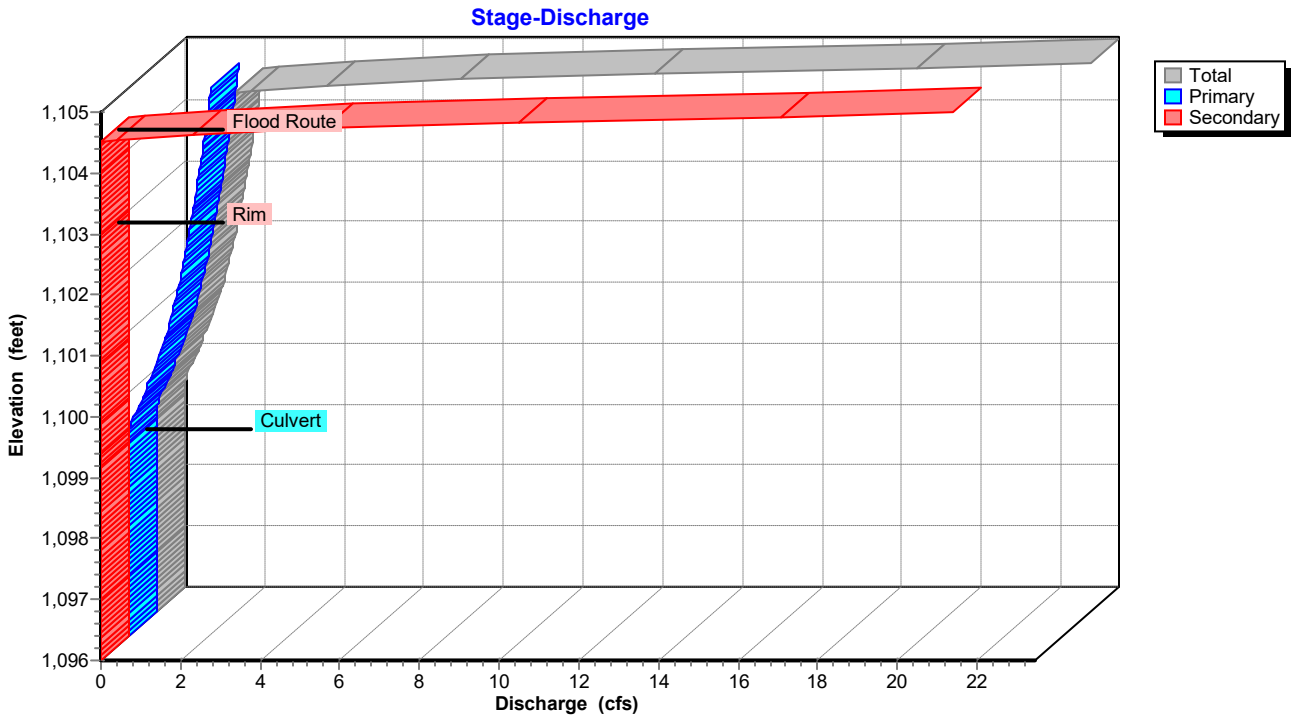
Pond 52P: DRYWELL 1



Pond 54P: DRYWELL 2



Pond 54P: DRYWELL 2



APPENDIX F

WATER & POLLUTION CONTROL FEDERATION (6) C-VALUES

storm, is common. The range of coefficients, classified with respect to the general character of the tributary area reported in use, is:

Description of Area	Runoff Coefficients
Business	
Downtown	0.70 to 0.95
Neighborhood	0.50 to 0.70
Residential	
Single-family	0.30 to 0.50
Multi-units, detached	0.40 to 0.60
Multi-units, attached	0.60 to 0.75
Residential (suburban)	0.25 to 0.40
Apartment	0.50 to 0.70
Industrial	
Light	0.50 to 0.80
Heavy	0.60 to 0.90
Parks, cemeteries	0.10 to 0.25
Playgrounds	0.20 to 0.35
Railroad yard	0.20 to 0.35
Unimproved	0.10 to 0.30

Downtown .95

Residential = 0.40

It often is desirable to develop a composite runoff coefficient based on the percentage of different types of surface in the drainage area. This procedure often is applied to typical "sample" blocks as a guide to selection of reasonable values of the coefficient for an entire area. Coefficients with respect to surface type currently in use are:

Character of Surface	Runoff Coefficients
Pavement	
Asphaltic and Concrete	0.70 to 0.95
Brick	0.70 to 0.85
Roofs	0.75 to 0.95
Lawns, sandy soil	
Flat, 2 percent	0.05 to 0.10
Average, 2 to 7 percent	0.10 to 0.15
Steep, 7 percent	0.15 to 0.20
Lawns, heavy soil	
Flat, 2 percent	0.13 to 0.17
Average, 2 to 7 percent	0.18 to 0.22
Steep, 7 percent	0.25 to 0.35

The coefficients in these two tabulations are applicable for storms of 5- to 10-yr frequencies. Less frequent, higher intensity storms will require the use of higher coefficients because infiltration and other losses have a proportionally smaller effect on runoff. The coefficients are based on the assumption that the design storm does not occur when the ground surface is frozen.

(c) Coefficients Varying with Time.—Figure 11 shows the variation of the runoff coefficient with respect to length of time of prior wetting,

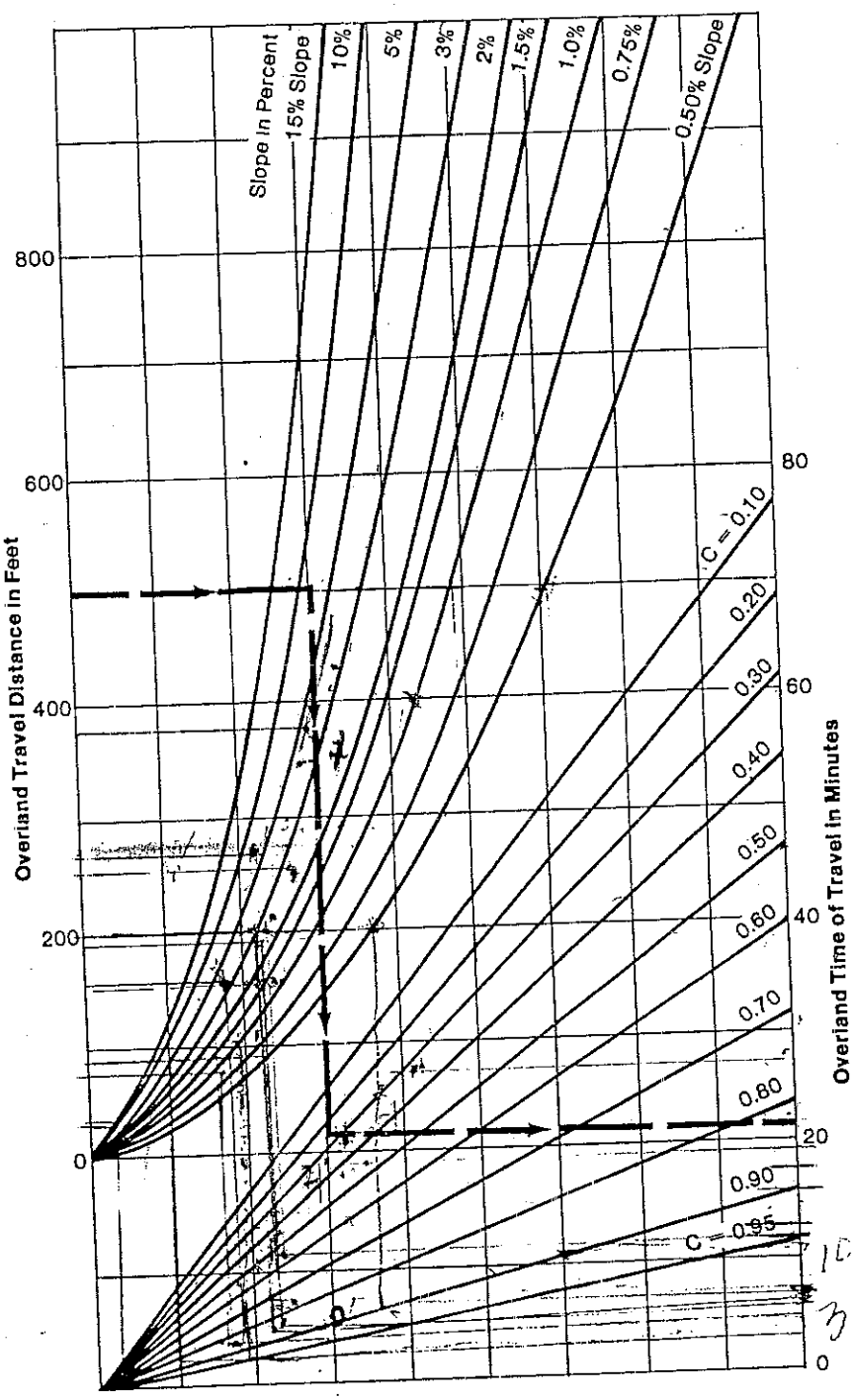
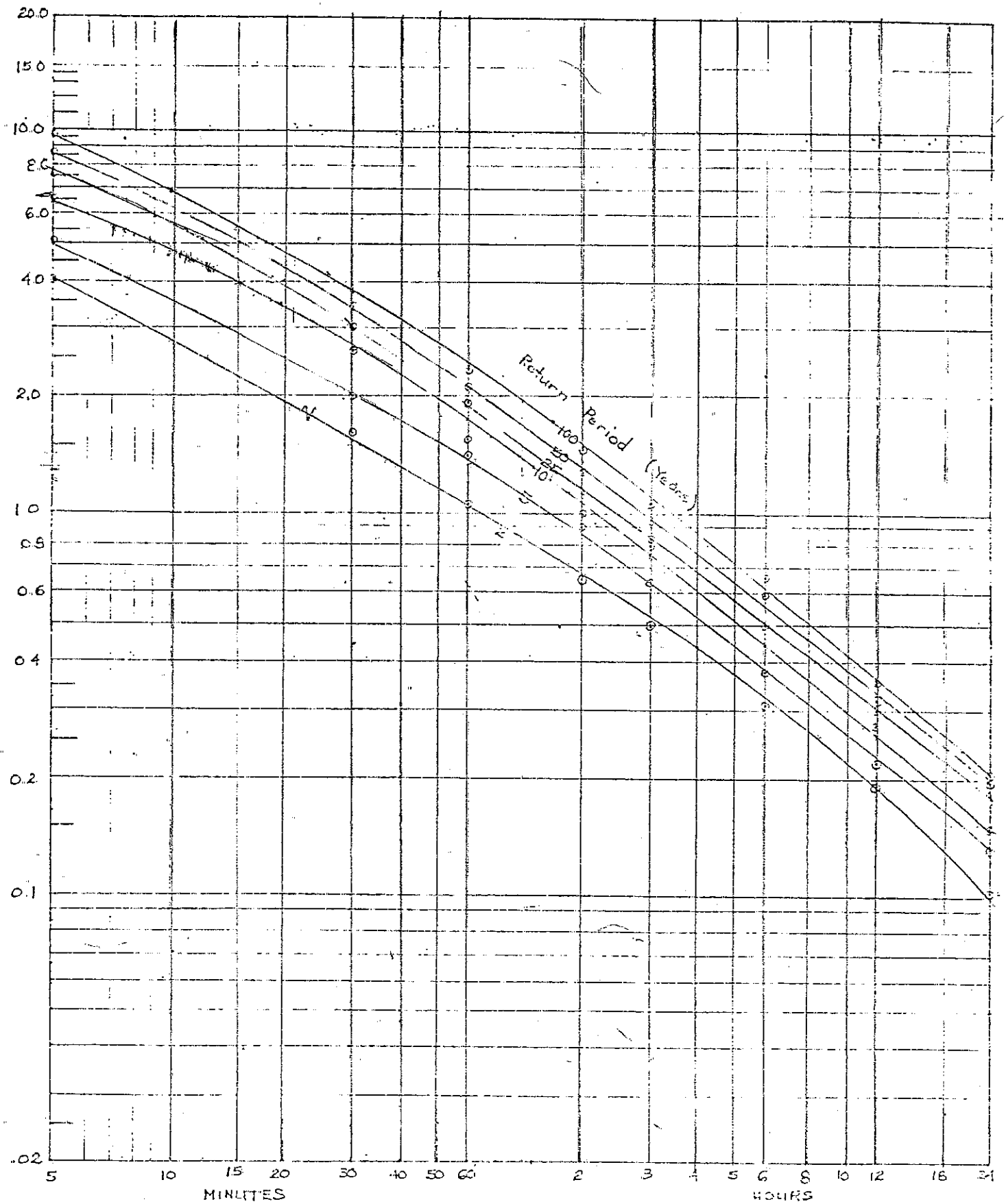


Figure 3-10 Overland time of flow graph

Syracuse, New York 1903-1970



APPENDIX G

RZ Engineering, PLLC

STORMWATER SANITARY WATER ENVIRONMENTAL TRANSPORTATION

Project: **Riverview** Date: **6/27/2025**

Water Quality Calculations

Owner: Project No.: **25024**

Location: **Cortland**

Drawings: **Grading and Site Plans** Estimated By: **DJB** **PRDA-2B FOREBAY**

WQv = (P)(Rv)(A)/12

P1= 1-yr 24 hr design storm (inches) = **1.10**

Rv= 0.05 + 0.009(I)

Where I = % Impervious

100% New Impervious Areas =	0.094	Acres
Total Site Area =	0.906	Acres
% Impervious=	0.104	

Therefore Rv =0.05 + 0.009(10.38 %)

Rv = 0.143

A= Total Site Area = 0.91 Acres

Therefore Water Quality Volume WQv =

WQv = [(P)(Rv)(A)]/12

= **0.012 acre feet**

or

= **518.69 cubic feet**

Provided Water Quality Volume =

= **0.000 acre feet**

= **0.00 cubic feet**

RZ Engineering, PLLC

STORMWATER SANITARY WATER ENVIRONMENTAL TRANSPORTATION

Project: **Riverview** Date: **6/27/2025**

Water Quality Calculations

Owner: Project No.: **25024**

Location: **Cortland**

Drawings: **Grading and Site Plans** Estimated By: **DJB** **PRDA-1B**

WQv = (P)(Rv)(A)/12

P1= 1-yr 24 hr design storm (inches) = **1.97**

Rv= 0.05 + 0.009(I)

Where I = % Impervious

100% New Impervious Areas =	1.380	Acres
Total Site Area =	3.030	Acres
% Impervious=	0.455	

Therefore Rv =0.05 + 0.009(45.54 %)

Rv = **0.460**

A= Total Site Area = **3.03 Acres**

Therefore Water Quality Volume WQv =

WQv = [(P)(Rv)(A)]/12

= **0.229 acre feet**

or

= **9965.06 cubic feet**

Provided Water Quality Volume =

= **0.251 acre feet**

= **10933.56 cubic feet**

APPENDIX H

ATTACHMENT 1

Construction Stormwater Compliance Inspection Report

Project Name and Location:	Date:	Page 1 of 2
	Permit # (if any): **NYR**	
Municipality: County:	Entry Time:	Exit Time:
On-site Representative(s) and contact information:	Weather Conditions:	
Name and Address of SPDES Permittee/Title/Phone/Fax Numbers: Contacted: Yes ☐ No ☐		

INSPECTION CHECKLIST

SPDES Authority

	Yes	No	N/A		Law, rule or permit citation
1.	☐	☐	☐	Is a copy of the NOI posted at the construction site for public viewing?	
2.	☐	☐	☐	Is an up-to-date copy of the signed SWPPP retained at the construction site?	
3.	☐	☐	☐	Is a copy of the SPDES General Permit retained at the construction site?	

SWPPP Content

	Yes	No	N/A		Law, rule or permit citation
4.	☐	☐	☐	Does the SWPPP describe and identify the erosion & sediment control measures to be employed?	
5.	☐	☐	☐	Does the SWPPP provide a maintenance schedule for the erosion & sediment control measures?	
6.	☐	☐	☐	Does the SWPPP describe and identify the post-construction SW control measures to be employed?	
7.	☐	☐	☐	Does the SWPPP identify the contractor(s) and subcontractor(s) responsible for each measure?	
8.	☐	☐	☐	Does the SWPPP include all the necessary 'CONTRACTOR CERTIFICATION' statements?	
9.	☐	☐	☐	Is the SWPPP signed/certified by the permittee?	

Recordkeeping

	Yes	No	N/A		Law, rule or permit citation
10.	☐	☐	☐	Are inspections performed as required by the permit (every 7 days and after ½" rain event)?	
11.	☐	☐	☐	Are the site inspections performed by a qualified professional?	
12.	☐	☐	☐	Are all required reports properly signed/certified?	
13.	☐	☐	☐	Does the SWPPP include copies of the monthly/quarterly written summaries of compliance status?	

Visual Observations

	Yes	No	N/A		Law, rule or permit citation
14.	☐	☐	☐	Are all erosion and sediment control measures installed/constructed?	
15.	☐	☐	☐	Are all erosion and sediment control measures maintained properly?	
16.	☐	☐	☐	Have all disturbances of 5 acres or more been approved prior to the disturbance?	
17.	☐	☐	☐	Are stabilization measures initiated in inactive areas?	
18.	☐	☐	☐	Are permanent stormwater control measures implemented?	
19.	☐	☐	☐	Was there a discharge into the receiving water on the day of inspection?	
20.	☐	☐	☐	Are receiving waters free of there evidence of turbidity, sedimentation, or oil ? (If no , complete Page 2)	

Overall Inspection Rating: ❑ Satisfactory ❑ Marginal ❑ Unsatisfactory	
Name/Agency of Lead Inspector:	**Signature of Lead Inspector:**
Names/Agencies of Other Inspectors:	

Water Quality Observations

Describe the discharge(s) [source(s), impact on receiving water(s), etc.] _____

_____

_____

_____

_____

Describe the quality of the receiving water(s) both upstream and downstream of the discharge_____

_____

_____

_____

_____

Describe any other water quality standards or permit violations _____

_____

_____

Additional Comments:_____

_____

_____

_____

_____

SITE PLAN/SKETCH

_____	_____
Inspector (print name)	**Date of Inspection**
_____	_____
Qualified Professional (print name)	**Qualified Professional Signature**

The above signed acknowledges that, to the best of his/her knowledge, all information provided on the forms is accurate and complete.

Maintaining Water Quality

Yes No NA
[ ] [ ] [ ] Is there an increase in turbidity causing a substantial visible contrast to natural conditions?
[ ] [ ] [ ] Is there residue from oil and floating substances, visible oil film, or globules or grease?
[ ] [ ] [ ] All disturbance is within the limits of the approved plans.
[ ] [ ] [ ] Have receiving lake/bay, stream, and/or wetland been impacted by silt from project?

Housekeeping

1. General Site Conditions
Yes No NA
[ ] [ ] [ ] Is construction site litter and debris appropriately managed?
[ ] [ ] [ ] Are facilities and equipment necessary for implementation of erosion and sediment control in working order and/or properly maintained?
[ ] [ ] [ ] Is construction impacting the adjacent property?
[ ] [ ] [ ] Is dust adequately controlled?

2. Temporary Stream Crossing
Yes No NA
[ ] [ ] [ ] Maximum diameter pipes necessary to span creek without dredging are installed.
[ ] [ ] [ ] Installed non-woven geotextile fabric beneath approaches.
[ ] [ ] [ ] Is fill composed of aggregate (no earth or soil)?
[ ] [ ] [ ] Rock on approaches is clean enough to remove mud from vehicles & prevent sediment from entering stream during high flow.

Runoff Control Practices

1. Excavation Dewatering
Yes No NA
[ ] [ ] [ ] Upstream and downstream berms (sandbags, inflatable dams, etc.) are installed per plan.
[ ] [ ] [ ] Clean water from upstream pool is being pumped to the downstream pool.
[ ] [ ] [ ] Sediment laden water from work area is being discharged to a silt-trapping device.
[ ] [ ] [ ] Constructed upstream berm with one-foot minimum freeboard.

2. Level Spreader
Yes No NA
[ ] [ ] [ ] Installed per plan.
[ ] [ ] [ ] Constructed on undisturbed soil, not on fill, receiving only clear, non-sediment laden flow.
[ ] [ ] [ ] Flow sheets out of level spreader without erosion on downstream edge.

3. Interceptor Dikes and Swales
Yes No NA
[ ] [ ] [ ] Installed per plan with minimum side slopes 2H:1V or flatter.
[ ] [ ] [ ] Stabilized by geotextile fabric, seed, or mulch with no erosion occurring.
[ ] [ ] [ ] Sediment-laden runoff directed to sediment trapping structure

Runoff Control Practices (continued)

4. Stone Check Dam
Yes No NA
[ ] [ ] [ ] Is channel stable? (flow is not eroding soil underneath or around the structure).
[ ] [ ] [ ] Check is in good condition (rocks in place and no permanent pools behind the structure).
[ ] [ ] [ ] Has accumulated sediment been removed?.

5. Rock Outlet Protection
Yes No NA
[ ] [ ] [ ] Installed per plan.
[ ] [ ] [ ] Installed concurrently with pipe installation.

Soil Stabilization

1. Topsoil and Spoil Stockpiles
Yes No NA
[ ] [ ] [ ] Stockpiles are stabilized with vegetation and/or mulch.
[ ] [ ] [ ] Sediment control is installed at the toe of the slope.

2. Revegetation
Yes No NA
[ ] [ ] [ ] Temporary seedings and mulch have been applied to idle areas.
[ ] [ ] [ ] 4 inches minimum of topsoil has been applied under permanent seedings

Sediment Control Practices

1. Stabilized Construction Entrance
Yes No NA
[ ] [ ] [ ] Stone is clean enough to effectively remove mud from vehicles.
[ ] [ ] [ ] Installed per standards and specifications?
[ ] [ ] [ ] Does all traffic use the stabilized entrance to enter and leave site?
[ ] [ ] [ ] Is adequate drainage provided to prevent ponding at entrance?

2. Silt Fence
Yes No NA
[ ] [ ] [ ] Installed on Contour, 10 feet from toe of slope (not across conveyance channels).
[ ] [ ] [ ] Joints constructed by wrapping the two ends together for continuous support.
[ ] [ ] [ ] Fabric buried 6 inches minimum.
[ ] [ ] [ ] Posts are stable, fabric is tight and without rips or frayed areas.
Sediment accumulation is ___% of design capacity.

Sediment Control Practices (continued)

3. Storm Drain Inlet Protection (Use for Stone & Block; Filter Fabric; Curb; or, Excavated practices)

Yes No NA

[ ] [ ] [ ] Installed concrete blocks lengthwise so open ends face outward, not upward.
[ ] [ ] [ ] Placed wire screen between No. 3 crushed stone and concrete blocks.
[ ] [ ] [ ] Drainage area is 1acre or less.
[ ] [ ] [ ] Excavated area is 900 cubic feet.
[ ] [ ] [ ] Excavated side slopes should be 2:1.
[ ] [ ] [ ] 2" x 4" frame is constructed and structurally sound.
[ ] [ ] [ ] Posts 3-foot maximum spacing between posts.
[ ] [ ] [ ] Fabric is embedded 1 to 1.5 feet below ground and secured to frame/posts with staples at max 8-inch spacing.
[ ] [ ] [ ] Posts are stable, fabric is tight and without rips or frayed areas.

Sediment accumulation ___% of design capacity.

4. Temporary Sediment Trap

Yes No NA

[ ] [ ] [ ] Outlet structure is constructed per the approved plan or drawing.
[ ] [ ] [ ] Geotextile fabric has been placed beneath rock fill.

Sediment accumulation is ___% of design capacity.

5. Temporary Sediment Basin

Yes No NA

[ ] [ ] [ ] Basin and outlet structure constructed per the approved plan.
[ ] [ ] [ ] Basin side slopes are stabilized with seed/mulch.
[ ] [ ] [ ] Drainage structure flushed and basin surface restored upon removal of sediment basin facility.

Sediment accumulation is ___% of design capacity.

Note: Not all erosion and sediment control practices are included in this listing. Add additional pages to this list as required by site specific design.
Construction inspection checklists for post-development stormwater management practices can be found in Appendix F of the New York Stormwater Management Design Manual.

APPENDIX I

STANDARD AND SPECIFICATIONS FOR STABILIZED CONSTRUCTION ACCESS



Definition & Scope

A stabilized pad of aggregate underlain with geotextile located at any point where traffic will be entering or leaving a construction site to or from a public right-of-way, street, alley, sidewalk, or parking area. The purpose of stabilized construction access is to reduce or eliminate the tracking of sediment onto public rights-of-way or streets.

Conditions Where Practice Applies

A stabilized construction access shall be used at all points of construction ingress and egress.

Design Criteria

See Figure 2.1 on page 2.31 for details.

Aggregate Size: Use a matrix of 1-4 inch stone, or reclaimed or recycled concrete equivalent.

Thickness: Not less than six (6) inches.

Width: 12-foot minimum but not less than the full width of points where ingress or egress occurs. 24-foot minimum if there is only one access to the site.

Length: As required, but not less than 50 feet (except on a single residence lot where a 30 foot minimum would apply).

Geotextile: To be placed over the entire area to be covered with aggregate. Filter cloth will not be required on a single-family residence lot. Piping of surface water under entrance shall be provided as required. If piping is impossible, a mountable berm with 5:1 slopes will be permitted.

Criteria for Geotextile: The geotextile shall be woven or nonwoven fabric consisting only of continuous chain polymeric filaments or yarns of polyester. The fabric shall be inert to commonly encountered chemicals, hydro-carbons, mildew, rot resistant, and conform to the fabric properties as shown:

Fabric Properties[3]	Light Duty[1] Roads Grade Subgrade	Heavy Duty[2] Haul Roads Rough Graded	Test Method
Grab Tensile Strength (lbs)	200	220	ASTM D1682
Elongation at Failure (%)	50	60	ASTM D1682
Mullen Burst Strength (lbs)	190	430	ASTM D3786
Puncture Strength (lbs)	40	125	ASTM D751 Modified
Equivalent	40-80	40-80	US Std Sieve
Opening Size			CW-02215
Aggregate Depth	6	10	-

[1]Light Duty Road: Area sites that have been graded to subgrade and where most travel would be single axle vehicles and an occasional multi-axle truck. Acceptable materials are Trevira Spunbond 1115, Mirafi 100X, Typar 3401, or equivalent.

[2]Heavy Duty Road: Area sites with only rough grading, and where most travel would be multi-axle vehicles. Acceptable materials are Trevira Spunbond 1135, Mirafi 600X, or equivalent.

[3]Fabrics not meeting these specifications may be used only when design procedure and supporting documentation are supplied to determine aggregate depth and fabric strength.

Maintenance

The access shall be maintained in a condition which will prevent tracking of sediment onto public rights-of-way or streets. This may require periodic top dressing with additional aggregate. All sediment spilled, dropped, or washed onto public rights-of-way must be removed immediately.

When necessary, wheels must be cleaned to remove sediment prior to entrance onto public rights-of-way. When washing is required, it shall be done on an area stabilized with aggregate, which drains into an approved sediment-trapping device. All sediment shall be prevented from entering storm drains, ditches, or watercourses.

STANDARD AND SPECIFICATIONS FOR CONSTRUCTION ROAD STABILIZATION



Definition & Scope

The stabilization of temporary construction access routes, on-site vehicle transportation routes, and construction parking areas to control erosion on temporary construction routes and parking areas.

Conditions Where Practice Applies

All traffic routes and parking areas for temporary use by construction traffic.

Design Criteria

Construction roads should be located to reduce erosion potential, minimize impact on existing site resources, and maintain operations in a safe manner. Highly erosive soils, wet or rocky areas, and steep slopes should be avoided. Roads should be routed where seasonal water tables are deeper than 18 inches. Surface runoff and control should be in accordance with other standards.

Road Grade – A maximum grade of 12% is recommended, although grades up to 15% are possible for short distances.

Road Width – 12 foot minimum for one-way traffic or 24 foot minimum for two-way traffic.

Side Slope of Road Embankment – 2:1 or flatter.

Ditch Capacity – On-site roadside ditch and culvert capacities shall be the 10 yr. peak runoff.

Composition – Use a 6-inch layer of NYS DOT sub-base Types 1,2,3, 4 or equivalent as specified in NYSDOT Standard Specifications.

Construction Specifications

1. Clear and strip roadbed and parking areas of all vegetation, roots, and other objectionable material.

2. Locate parking areas on naturally flat areas as available. Keep grades sufficient for drainage, but not more than 2 to 3 percent.

3. Provide surface drainage and divert excess runoff to stabilized areas.

4. Maintain cut and fill slopes to 2:1 or flatter and stabilized with vegetation as soon as grading is accomplished.

5. Spread 6-inch layer of sub-base material evenly over the full width of the road and smooth to avoid depressions.

6. Provide appropriate sediment control measures to prevent offsite sedimentation.

Maintenance

Inspect construction roads and parking areas periodically for condition of surface. Top dress with new gravel as needed. Check ditches for erosion and sedimentation after rainfall events. Maintain vegetation in a healthy, vigorous condition. Areas producing sediment should be treated immediately.

New York State
DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Division of Water

Deep-Ripping and Decompaction

April 2008

New York State
Department of Environmental Conservation

Document Prepared by:

John E. Lacey,
Land Resource Consultant and Environmental Compliance Monitor
(Formerly with the Division of Agricultural Protection and Development Services,
NYS Dept. of Agriculture & Markets)

Alternative Stormwater Management
Deep-Ripping and Decompaction

Description

The two-phase practice of 1) "Deep Ripping;" and 2) "Decompaction" (deep subsoiling), of the soil material as a step in the cleanup and restoration/landscaping of a construction site, helps mitigate the physically induced impacts of soil compression; i.e.: soil compaction or the substantial increase in the bulk density of the soil material.

Deep Ripping and Decompaction are key factors which help in restoring soil pore space and permeability for water infiltration. Conversely, the physical actions of cut-and-fill work, land grading, the ongoing movement of construction equipment and the transport of building materials throughout a site alter the architecture and structure of the soil, resulting in: the mixing of layers (horizons) of soil materials, compression of those materials and diminished soil porosity which, if left unchecked, severely impairs the soil's water holding capacity and vertical drainage (rainfall infiltration), from the surface downward.

In a humid climate region, compaction damage on a site is virtually guaranteed over the duration of a project. Soil in very moist to wet condition when compacted, will have severely reduced permeability. Figure 1 displays the early stage of the deep-ripping phase (Note that all topsoil was stripped prior to construction access, and it remains stockpiled until the next phase – decompaction – is complete). A heavy-duty tractor is pulling a three-shank ripper on the first of several series of incrementally deepening passes through the construction access corridor's densely compressed subsoil material. Figure 2 illustrates the approximate volumetric composition of a loam surface soil when conditions are good for plant growth, with adequate natural pore space for fluctuating moisture conditions.



Fig. 1. A typical deep ripping phase of this practice, during the first in a series of progressively deeper "rips" through severely compressed subsoil.

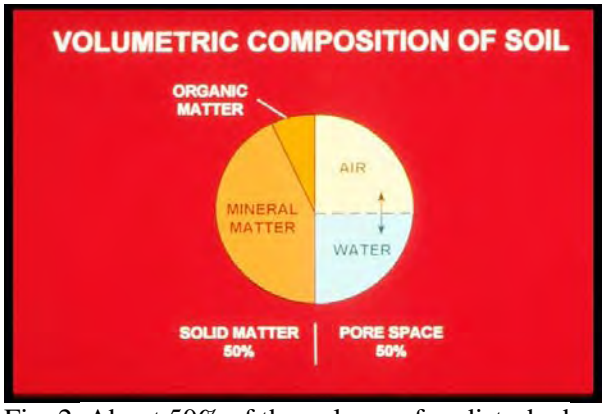


Fig. 2. About 50% of the volume of undisturbed loam surface soil is pore space, when soil is in good condition for plant growth. Brady, 2002.

Recommended Application of Practice

The objective of Deep Ripping and Decompaction is to effectively fracture (vertically and laterallly) through the thickness of the physically compressed subsoil material (see Figure 3), restoring soil porosity and permeability and aiding infiltration to help reduce runoff. Together with topsoil stripping, the "two-phase" practice of Deep Ripping and Decompaction first became established as a "best management practice" through ongoing success on commercial farmlands affected by heavy utility construction right-of-way projects (transmission pipelines and large power lines).



Fig. 3. Construction site with significant compaction of the deep basal till subsoil extends 24 inches below this exposed cut-and-fill work surface.

Soil permeability, soil drainage and cropland productivity were restored. For broader construction application, the two-phase practice of Deep Ripping and Decompaction is best adapted to areas impacted with significant soil compaction, on contiguous open portions of large construction sites and inside long, open construction corridors used as temporary access over the duration of construction. Each mitigation area should have minimal above-and-below-ground obstructions for the easy avoidance and maneuvering of a large tractor and ripping/decompacting implements. Conversely, the complete two-phase practice is not recommended in congested or obstructed areas due to the limitations on tractor and implement movement.

Benefits

Aggressive "deep ripping" through the compressed thickness of exposed subsoil before the replacement/respreading of the topsoil layer, followed by "decompaction," i.e.: "sub-soiling," through the restored topsoil layer down into the subsoil, offers the following benefits:

- Increases the project (larger size) area's direct surface infiltration of rainfall by providing the open site's mitigated soil condition and lowers the demand on concentrated runoff control structures

- Enhances direct groundwater recharge through greater dispersion across and through a broader surface than afforded by some runoff-control structural measures

- Decreases runoff volume generated and provides hydrologic source control

- May be planned for application in feasible open locations either alone or in

conjunction with plans for structural practices (e.g., subsurface drain line or infiltration basin) serving the same or contiguous areas

- Promotes successful long-term revegetation by restoring soil permeability, drainage and water holding capacity for healthy (rather than restricted) root-system development of trees, shrubs and deep rooted ground cover, minimizing plant drowning during wet periods and burnout during dry periods.

Feasibility/ Limitations

The effectiveness of Deep Ripping and Decompaction is governed mostly by site factors such as: the original (undisturbed) soil's hydrologic characteristics; the general slope; local weather/timing (soil moisture) for implementation; the space-related freedom of equipment/implement maneuverability (noted above in **Recommended Application of Practice**), and by the proper selection and operation of tractor and implements (explained below in **Design Guidance**). The more notable site-related factors include:

Soil

In the undisturbed condition, each identified soil type comprising a site is grouped into one of four categories of soil hydrology, Hydrologic Soil Group A, B, C or D, determined primarily by a range of characteristics including soil texture, drainage capability when thoroughly wet, and depth to water table. The natural rates of infiltration and transmission of soil-water through the undisturbed soil layers for Group A is "high" with a low runoff potential while soils in Group B are moderate in infiltration and the transmission of soil-water with a moderate runoff potential, depending somewhat on slope. Soils in Group C have slow rates of infiltration and transmission of soil-water and a moderately high runoff potential influenced by soil texture and slope; while soils in Group D have exceptionally slow rates of infiltration and transmission of soil-water, and high runoff potential.

In Figure 4, the profile displays the undisturbed horizons of a soil in Hydrologic Soil Group C and the naturally slow rate of infiltration through the subsoil. The slow rate of infiltration begins immediately below the topsoil horizon (30 cm), due to the limited amount of macro pores, e.g.: natural subsoil fractures, worm holes and root channels. Infiltration after the construction-induced mixing and compression of such subsoil material is virtually absent; but can be restored back to this natural level with the two-phase practice of deep ripping and decompaction, followed by the permanent establishment of an appropriate, deep taproot

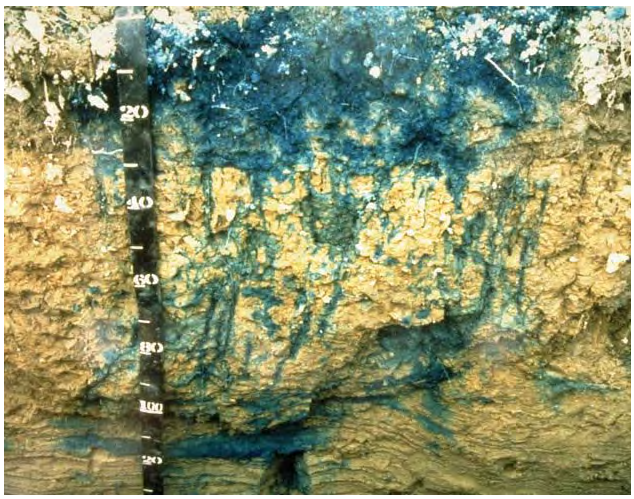


Fig. 4. Profile (in centimeters) displaying the infiltration test result of the natural undisturbed horizons of a soil in Hydrologic Soil Group C.

lawn/ground cover to help maintain the restored subsoil structure. Infiltration after construction-induced mixing and compression of such subsoil material can be notably rehabilitated with the Deep Ripping and Decompaction practice, which prepares the site for the appropriate long-term lawn/ground cover mix including deep taproot plants such as clover, fescue or trefoil, etc. needed for all rehabilitated soils.

Generally, soils in Hydrologic Soil Groups A and B, which respectively may include deep, well-drained, sandy-gravelly materials or deep, moderately well-drained basal till materials, are among the easier ones to restore permeability and infiltration, by deep ripping and decompaction. Among the many different soils in Hydrologic Soil Group C are those unique glacial tills having a natural fragipan zone, beginning about 12 to 18 inches (30 – 45cm), below surface. Although soils in Hydrologic Soil Group C do require a somewhat more carefully applied level of the Deep Ripping and Decompaction practice, it can greatly benefit such affected areas by reducing the runoff and fostering infiltration to a level equal to that of pre-disturbance.

Soils in Hydrologic Soil Group D typically have a permanent high water table close to the surface, influenced by a clay or other highly impervious layer of material. In many locations with clay subsoil material, the bulk density is so naturally high that heavy trafficking has little or no added impact on infiltration; and structural runoff control practices rather than Deep Ripping and Decompaction should be considered.

The information about Hydrologic Soil Groups is merely a general guideline. Site-specific data such as limited depths of cut-and-fill grading with minimal removal or translocation of the inherent subsoil materials (as analyzed in the county soil survey) or, conversely, the excavation and translocation of deeper, unconsolidated substratum or consolidated bedrock materials (unlike the analyzed subsoil horizons' materials referred to in the county soil survey) should always be taken into account.

Sites made up with significant quantities of large rocks, or having a very shallow depth to bedrock, are not conducive to deep ripping and decompation (subsoiling); and other measures may be more practical.

Slope

The two-phase application of 1) deep ripping and 2) decompaction (deep subsoiling), is most practical on flat, gentle and moderate slopes. In some situations, such as but not limited to temporary construction access corridors, inclusion areas that are moderately steep along a project's otherwise gentle or moderate slope may also be deep ripped and decompacted. For limited instances of moderate steepness on other projects, however, the post-construction land use and the relative alignment of the potential ripping and decompaction work in relation to the lay of the slope should be reviewed for safety and practicality. In broad construction areas predominated by moderately steep or steep slopes, the practice is generally not used.

Local Weather/Timing/Soil Moisture

Effective fracturing of compressed subsoil material from the exposed work surface, laterally and vertically down through the affected zone is achieved only when the soil material is moderately dry to moderately moist. Neither one of the two-phases, deep ripping nor decompaction (deep

subsoiling), can be effectively conducted when the soil material (subsoil or replaced topsoil) is in either a "plastic" or "liquid" state of soil consistency. Pulling the respective implements legs through the soil when it is overly moist only results in the "slicing and smearing" of the material or added "squeezing and compression" instead of the necessary fracturing. Ample drying time is needed for a "rippable" soil condition not merely in the material close to the surface, but throughout the material located down to the bottom of the physically compressed zone of the subsoil.

The "poor man's Atterberg field test" for soil plasticity is a simple "hand-roll" method used for quick, on-site determination of whether or not the moisture level of the affected soil material is low enough for: effective deep ripping of subsoil; respreading of topsoil in a friable state; and final decompaction (deep subsoiling). Using a sample of soil material obtained from the planned bottom depth of ripping, e.g.: 20 - 24 inches below exposed subsoil surface, the sample is hand rolled between the palms down to a 1/8-inch diameter thread. (Use the same test for stored topsoil material before respreading on the site.) If the respective soil sample crumbles apart in segments no greater than 3/8 of an inch long, by the time it is rolled down to 1/8 inch diameter, it is low enough in moisture for deep ripping (or topsoil replacement), and decompaction. Conversely, as shown in Figure 5, if the rolled sample stretches out in increments greater than 3/8 of an inch long before crumbling, it is in a "plastic" state of soil consistency and is too wet for subsoil ripping (as well as topsoil replacement) and final decompaction.



Fig. 5. Augered from a depth of 19 inches below the surface of the replaced topsoil, this subsoil sample was hand rolled to a 1/8-inch diameter. The test shows the soil at this site stretches out too far without crumbling; it indicates the material is in a plastic state of consistence, too wet for final decompaction (deep subsoiling) at this time.

Design Guidance

Beyond the above-noted site factors, a vital requirement for the effective Deep Ripping and Decompaction (deep subsoiling), is implementing the practice in its distinct, two-phase process:

1) Deep rip the affected thickness of exposed subsoil material (see Figure 10 and 11), aggressively fracturing it before the protected topsoil is reapplied on the site (see Figure 12); and

2) Decompact (deep subsoil), simultaneously through the restored topsoil layer and the upper half of the affected subsoil (Figure 13). The second phase, "decompaction," mitigates the partial recompaction which occurs during the heavy process of topsoil spreading/grading. Prior to deep ripping and decompacting the site, all construction activity, including construction equipment and material storage, site cleanup and trafficking (Figure 14), should be finished; and the site closed off to further disturbance. Likewise, once the practice is underway and the area's soil permeability and

rainfall infiltration are being restored, a policy limiting all further traffic to permanent travel lanes is maintained.

The other critical elements, outlined below, are: using the proper implements (deep, heavy-duty rippers and subsoilers), and ample pulling-power equipment (tractors); and conducting the practice at the appropriate speed, depth and pattern(s) of movement.

Note that an appropriate plan for the separate practice of establishing a healthy perennial ground cover, with deep rooting to help maintain the restored soil structure, should be developed in advance. This may require the assistance of an agronomist or landscape horticulturist.

Implements

Avoid the use of all undersize implements. The small-to-medium, light-duty tool will, at best, only "scarify" the uppermost surface portion of the mass of compacted subsoil material. The term "chisel plow" is commonly but incorrectly applied to a broad range of implements. While a few may be adapted for the moderate subsoiling of non-impacted soils, the majority are less durable and used for only lighter land-fitting (see Figure 6).



Fig. 6. A light duty chisel implement, not adequate for either the deep ripping or decompaction (deep subsoiling) phase.



Fig. 7. One of several variations of an agricultural ripper. This unit has long, rugged shanks mounted on a steel V-frame for deep, aggressive fracturing through Phase 1.

Use a "heavy duty" agricultural-grade, deep ripper (see Figures 7,9,10 and 11) for the first phase: the lateral and vertical fracturing of the mass of exposed and compressed subsoil, down and through, to the bottom of impact, prior to the replacement of the topsoil layer. (Any oversize rocks which are uplifted to the subsoil surface during the deep ripping phase are picked and removed.) Like the heavy-duty class of implement for the first phase, the decompaction (deep subsoiling) of Phase 2 is conducted with the heavy-duty version of the deep subsoiler. More preferable is the angled-leg variety of deep subsoiler (shown in Figures 8 and 13). It minimizes the inversion of the subsoil and topsoil layers while laterally and vertically fracturing the upper half of the previously ripped subsoil layer and all of the topsoil layer by delivering a momentary, wave-like "lifting and shattering" action up through the soil layers as it is pulled.

Pulling-Power of Equipment

Use the following rule of thumb for tractor horsepower (hp) whenever deep ripping and decompacting a significantly impacted site: For both types of implement, have at least 40 hp of tractor pull available for each mounted shank/ leg.

Using the examples of a 3-shank and a 5-shank implement, the respective tractors should have 120 and 200 hp available for fracturing down to the final depth of 20-to-24 inches per phase. Final depth for the deep ripping in Phase 1 is achieved incrementally by a progressive series of passes (see Depth and Patterns of Movement, below); while for Phase 2, the full operating depth of the deep subsoiler is applied from the beginning.

The operating speed for pulling both types of implement should not exceed 2 to 3 mph. At this slow and managed rate of operating speed, maximum functional performance is sustained by the tractor and the implement performing the soil fracturing. Referring to Figure 8, the implement is the 6-leg version of the deep angled-leg subsoiler. Its two outside legs are "chained up" so that only four legs will be engaged (at the maximum depth), requiring no less than 160 hp, (rather than 240 hp) of pull. The 4-wheel drive, articulated-frame tractor in Figure 8 is 174 hp. It will be decompacting this unobstructed, former construction access area simultaneously through 11 inches of replaced topsoil and the upper 12 inches of the previously deep-ripped subsoil. In constricted areas of Phase 1) Deep Ripping, a medium-size tractor with adequate hp, such as the one in Figure 9 pulling a 3-shank deep ripper, may be more maneuverable.



Fig. 8. A deep, angled-leg subsoiler, ideal for Phase 2 decompaction of after the topsoil layer is graded on top of the ripped subsoil.



Fig. 9. This medium tractor is pulling a 3-shank deep ripper. The severely compacted construction access corridor is narrow, and the 120 hp tractor is more maneuverable for Phase 1 deep ripping (subsoil fracturing), here.

Some industrial-grade variations of ripping implements are attached to power graders and bulldozers. Although highly durable, they are generally not recommended. Typically, the shanks or "teeth" of these rippers are too short and stout; and they are mounted too far apart to achieve the well-distributed type of lateral and vertical fracturing of the soil materials necessary to restore soil permeability and infiltration. In addition, the power graders and bulldozers, as pullers, are far less maneuverable for turns and patterns than the tractor.

Depth and Patterns of Movement

As previously noted both Phase 1 Deep Ripping through significantly compressed, exposed subsoil and Phase 2 Decompaction (deep subsoiling) through the replaced topsoil and upper subsoil need to be performed at maximum capable depth of each implement. With an implement's guide wheels attached, some have a "normal" maximum operating depth of 18 inches, while others may go deeper. In many situations, however, the tractor/implement operator must first remove the guide wheels and other non essential elements from the implement. This adapts the ripper or the deep subsoiler for skillful pulling with its frame only a few inches above surface, while the shanks or legs, fracture the soil material 20-to-24 inches deep.

There may be construction sites where the depth of the exposed subsoil's compression is moderate, e.g.: 12 inches, rather than deep. This can be verified by using a ¾ inch cone penetrometer and a shovel to test the subsoil for its level of compaction, incrementally, every three inches of increasing depth. Once the full thickness of the subsoil's compacted zone is finally "pieced" and there is a significant drop in the psi measurements of the soil penetrometer, the depth/thickness of compaction is determined. This is repeated at several representative locations of the construction site. If the thickness of the site's subsoil compaction is verified as, for example, ten inches, then the Phase 1 Deep Ripping can be correspondingly reduced to the implement's minimum operable depth of 12 inches. However, the Phase 2 simultaneous Decompation (subsoiling) of an 11 inch thick layer of replaced topsoil and the upper subsoil should run at the subsoiling implements full operating depth.



Fig. 10. An early pass with a 3-shank deep ripper penetrating only 8 inches into this worksite's severely compressed subsoil.



Fig. 11. A repeat run of the 3-shank ripper along the same patterned pass area as Fig. 9; here, incrementally reaching 18 of the needed 22 inches of subsoil fracture.

Typically, three separate series (patterns) are used for both the Phase 1 Deep Ripping and the Phase 2 Decompaction on significantly compacted sites. For Phase 1, each series begins with a moderate depth of rip and, by repeat-pass, continues until full depth is reached. Phase 2 applies the full depth of Decompation (subsoiling), from the beginning.

Every separate series (pattern) consists of parallel, forward-and-return runs, with each progressive

pass of the implement's legs or shanks evenly staggered between those from the previous pass. This compensates for the shank or leg-spacing on the implement, e.g., with 24-to-30 inches between each shank or leg. The staggered return pass ensures lateral and vertical fracturing actuated every 12 to 15 inches across the densely compressed soil mass.

Large, Unobstructed Areas

For larger easy areas, use the standard patterns of movement:

- The first series (pattern) of passes is applied lengthwise, parallel with the longest spread of the site; gradually progressing across the site's width, with each successive pass.

- The second series runs obliquely, crossing the first series at an angle of about 45 degrees.

- The third series runs at right angle (or 90 degrees), to the first series to complete the fracturing and shattering on severely compacted sites, and avoid leaving large unbroken blocks of compressed soil material. (In certain instances, the third series may be optional, depending on how thoroughly the first two series loosen the material and eliminate large chunks/blocks of material as verified by tests with a ¾-inch cone penetrometer.)



Fig. 12. Moderately dry topsoil is being replaced on the affected site now that Phase 1 deep ripping of the compressed subsoil is complete.



Fig. 13. The same deep, angled-leg subsoiler shown in Fig. 7 is engaged at maximum depth for Phase 2, decompaction (deep soiling), of the replaced topsoil and the upper subsoil materials.

Corridors

In long corridors of limited width and less maneuverability than larger sites, e.g.: along compacted areas used as temporary construction access, a modified series of pattern passes are used.

- First, apply the same initial lengthwise, parallel series of passes described above.

● A second series of passes makes a broad “S” shaped pattern of rips, continually and gradually alternating the “S” curves between opposite edges inside the compacted corridor.

● The third and final series again uses the broad, alternating S pattern, but it is “flip-flopped” to continually cross the previous S pattern along the corridor’s centerline. This final series of the S pattern curves back along the edge areas skipped by the second series.

Maintenance and Cost

Once the two-phase practice of Deep Ripping and Decompation is completed, two items are essential for maintaining a site’s soil porosity and permeability for infiltration. They are: planting and maintaining the appropriate ground cover with deep roots to maintain the soil structure (see Figure 15); and keeping the site free of traffic or other weight loads.

Note that site-specific choice of an appropriate vegetative ground-cover seed mix, including the proper seeding ratio of one or more perennial species with a deep taproot system and the proper amount of lime and soil nutrients (fertilizer mix) adapted to the soil-needs, are basic to the final practice of landscaping, i.e: surface tillage, seeding/planting/fertilizing and culti-packing or mulching is applied. The "maintenance" of an effectively deep-ripped and decompacted area is generally limited to the successful perennial (long-term) landscape ground cover; as long as no weight-bearing force of soil compaction is applied.



Fig. 14. The severely compacted soil of a temporary construction yard used daily by heavy equipment for four months; shown before deep ripping, topsoil replacement, and decompaction.



Fig. 15. The same site as Fig. 14 after deep ripping of the exposed subsoil, topsoil replacement, decompaction through the topsoil and upper subsoil and final surface tillage and revegetation to maintain soil permeability and infiltration.

The Deep Ripping and Decompaction practice is, by necessity, more extensive than periodic subsoiling of farmland.The cost of deep ripping and decompacting (deep subsoiling), will vary according to the depth and severity of soil-material compression and the relative amount of tractor and implement time that is required. In some instances, depending on open maneuverability, two-to-three acres of compacted project area may be deep-ripped in one day. In other situations of more severe compaction and - or less maneuverability, as little as one acre may be fully ripped in a day. Generally, if the Phase 1) Deep Ripping is fully effective, the Phase 2) Decompaction should be completed in 2/3 to 3/4 of the time required for Phase 1.

Using the example of two acres of Phase 1) Deep Ripping in one day, at $1800 per day, the net cost is $900 per acre. If the Phase 2) Decompacting or deep subsoiling takes 3/4 the time as Phase 1, it costs $675 per acre for a combined total of $1575 per acre to complete the practice (these figures do not include the cost of the separate practice of topsoil stripping and replacement). Due to the many variables, it must be recognized that cost will be determined by the specific conditions or constraints of the site and the availability of proper equipment.

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- Examples of implements:

V-Rippers. Access by internet search of *John Deere Ag -New Equipment for 915* (larger-frame model) *V-Rippe*; and, *for 913* (smaller-frame model) *V-Ripper*. Deep, angled-leg subsoiler. Access by internet search of: B*igham Brothers Shear Bolt Paratill-Subsoiler.* http://salesmanual.deere.com/sales/salesmanual/en_NA/primary_tillage/2008/feature/rippers/915v_pattern_frame.html?sbu=ag&link=prodcat Last visited March 08.

- Soils data of USDA Natural Resources Conservation Service. *NRCS Web Soil Survey.* http://websoilsurvey.nrcs.usda.gov/app/ and *USDA-NRCS Official Soil Series Descriptions; View by Name.* http://ortho.ftw.nrcs.usda.gov/cgi-bin/osd/osdname.cgi . *Last visited Jan. 08.*

- Soil penetrometer information. Access by internet searches of: *Diagnosing Soil Compaction using a Penetrometer (soil compaction tester), PSU Extension;* as well as *Dickey-john Soil Compaction Tester*. http://www.dickey-johnproducts.com/pdf/SoilCompactionTest.pdf and http://cropsoil.psu.edu/Extension/Facts/uc178pdf Last visited Sept. 07

STANDARD AND SPECIFICATIONS FOR DIVERSION



Definition & Scope

A drainage way of parabolic or trapezoidal cross-section with a supporting ridge on the lower side that is constructed across the slope to intercept and convey runoff to stable outlets at non-erosive velocities.

Conditions Where Practice Applies

Diversions are used where:

1. Runoff from higher areas has potential for damaging properties, causing erosion, or interfering with, or preventing the establishment of, vegetation on lower areas.

2. Surface and/or shallow subsurface flow is damaging sloping upland.

3. The length of slopes needs to be reduced so that soil loss will be kept to a minimum.

Diversions are only applicable below stabilized or protected areas. Avoid establishment on slopes greater than fifteen percent. Diversions should be used with caution on soils subject to slippage. Construction of diversions shall be in compliance with state and local drainage and water laws.

Design Criteria

Location

Diversion location shall be determined by considering outlet conditions, topography, land use, soil type, length of slope, seep planes (when seepage is a problem), and the development layout.

Capacity

Peak rates of runoff values used in determining the capacity requirements shall be calculated using the most current hydrologic data from the Northeast Regional Climate Center in an appropriate model.

The constructed diversion shall have capacity to carry, as a minimum, the peak discharge from a 10 year frequency rainfall event with freeboard of not less than 0.3 feet.

Diversions designed to protect homes, schools, industrial buildings, roads, parking lots, and comparable high-risk areas, and those designed to function in connection with other structures, shall have sufficient capacity to carry peak runoff expected from a storm frequency consistent with the hazard involved.

Cross Section

The diversion channel shall be parabolic or trapezoidal in shape. Parabolic Diversion design charts are provided in Tables 3.2, 3.3 and 3.4 on pages 3.10, 3.12 and 3.13**.** The diversion shall be designed to have stable side slopes. The side slopes shall not be steeper than 2:1 and shall be flat enough to ensure ease of maintenance of the diversion and its protective vegetative cover.

The ridge shall have a minimum width of four feet at the design water elevation; a minimum of 0.3 feet freeboard and a reasonable settlement factor shall be provided.

Velocity and Grade

The permissible velocity for the specified method of stabilization will determine the maximum grade. Maximum permissible velocities of flow for the stated conditions of stabilization shall be as shown in Table 3.1 on page 3.10 of this standard.

Diversions are not usually applicable below high sediment producing areas unless land treatment practices or structural measures, designed to prevent damaging accumulations of sediment in the channels, are installed with, or before, the diversions.

Outlets

Each diversion must have an adequate outlet. The outlet may be a grassed waterway, vegetated or paved area, grade stabilization structure, flow spreader, flow diffuser, stable watercourse, or subsurface drain outlet. In all cases, the outlet must convey runoff to a point where outflow will not cause damage. Vegetated outlets shall be installed before diversion construction, if needed, to ensure establishment of

vegetative cover in the outlet channel.

The design elevation of the water surface in the diversion shall not be lower than the design elevation of the water surface in the outlet at their junction when both are operating at design flow.

Stabilization

Vegetated diversions shall be stabilized in accordance with the following tables.

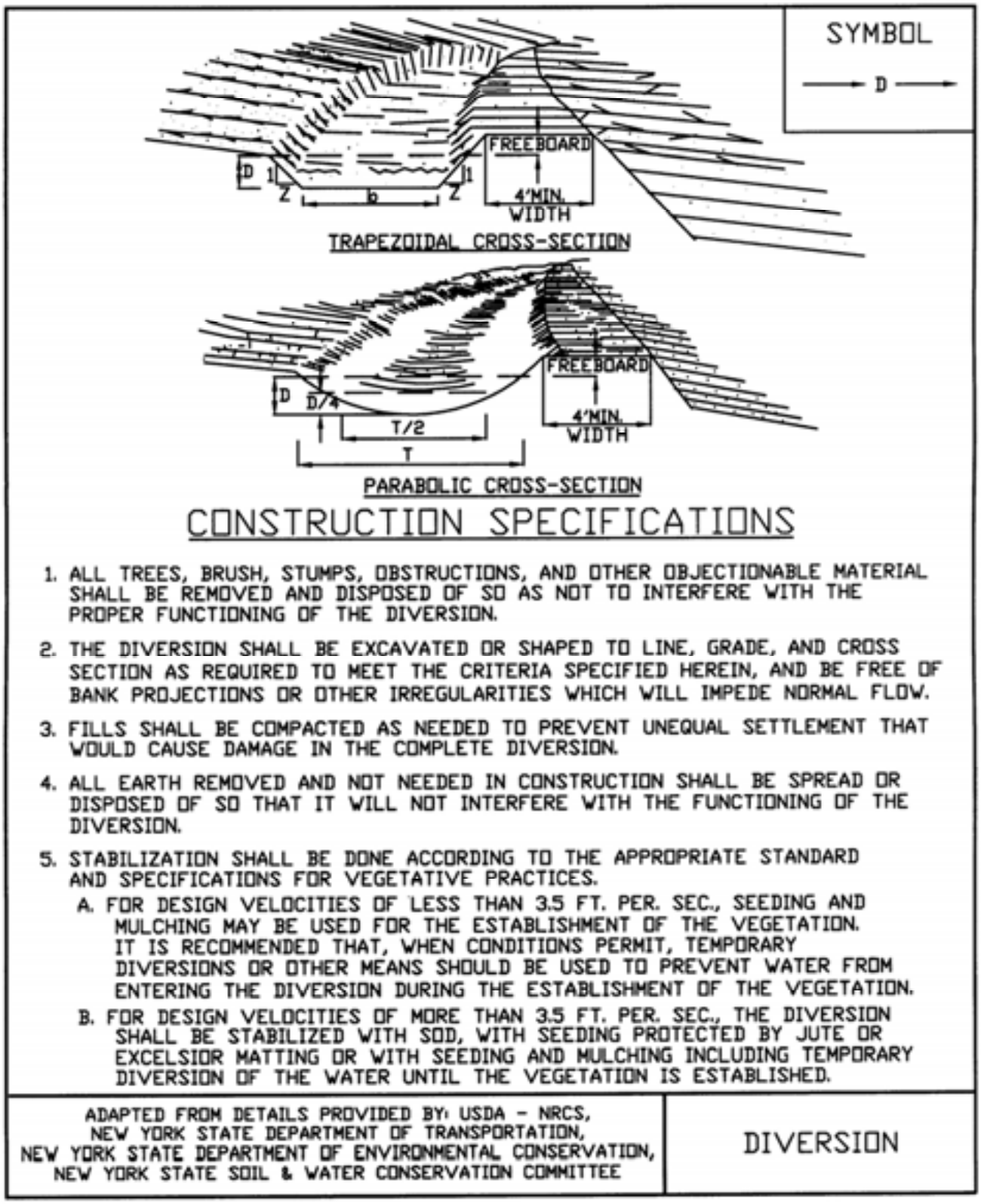
Table 3.1
Diversion Maximum Permissible Design Velocities Table

Soil Texture	Retardance and Cover	Permissible Velocity (ft / second) for Selected Channel Vegetation
Sand, Silt, Sandy loam, silty loam, loamy sand (ML, SM, SP, SW)	C-Kentucky 31 tall fescue and Kentucky bluegrass	3.0
	D-Annuals[1] Small grain (rye, oats, barley, millet) Ryegrass	2.5
Silty clay loam, Sandy clay loam (ML-CL, SC)	C-Kentucky 31 tall fescue and Kentucky bluegrass	4.0
	D-Annuals[1] Small grain (rye, oats, barley, millet) Ryegrass	3.5
Clay (CL)	C-Kentucky 31 tall fescue and Kentucky bluegrass	5.0
	D-Annuals[1] Small grain (rye, oats, barley, millet) Ryegrass	4.0
[1] Annuals—Use only as temporary protection until permanent vegetation is established.		

Table 3.2 - Retardance Factors for Various Grasses and Legumes Table

Retardance	Cover	Condition
A	Reed canarygrass	Excellent stand, tall (average 36 inches)
B	Smooth bromegrass	Good stand, mowed (average 12 to 15 inches)
	Tall fescue	Good stand, unmowed (average 18 inches)
	Grass-legume mixture—Timothy, smooth bromegrass, or Orchard grass with birdsfoot trefoil	Good stand, uncut (average 20 inches)
	Reed canarygrass	Good stand, mowed (average 12 to 15 inches)
	Tall fescue, with birdsfoot trefoil or ladino clover	Good stand, uncut (average 18 inches)
C	Redtop	Good stand, headed (15 to 20 inches)
	Grass-legume mixture—summer (Orchard grass, redtop, Annual ryegrass, and ladino or white clover)	Good stand, uncut (6 to 8 inches)
	Kentucky bluegrass	Good stand, headed (6 to 12 inches)
D	Red fescue	Good stand, headed (12 to 18 inches)
	Grass-legume mixture—fall, spring (Orchard grass, redtop, Annual ryegrass, and white or ladino clover)	Good stand, uncut (4 to 5 inches)

Figure 3.4
Diversion Detail



CONSTRUCTION SPECIFICATIONS

1. ALL TREES, BRUSH, STUMPS, OBSTRUCTIONS, AND OTHER OBJECTIONABLE MATERIAL SHALL BE REMOVED AND DISPOSED OF SO AS NOT TO INTERFERE WITH THE PROPER FUNCTIONING OF THE DIVERSION.
2. THE DIVERSION SHALL BE EXCAVATED OR SHAPED TO LINE, GRADE, AND CROSS SECTION AS REQUIRED TO MEET THE CRITERIA SPECIFIED HEREIN, AND BE FREE OF BANK PROJECTIONS OR OTHER IRREGULARITIES WHICH WILL IMPEDE NORMAL FLOW.
3. FILLS SHALL BE COMPACTED AS NEEDED TO PREVENT UNEQUAL SETTLEMENT THAT WOULD CAUSE DAMAGE IN THE COMPLETE DIVERSION.
4. ALL EARTH REMOVED AND NOT NEEDED IN CONSTRUCTION SHALL BE SPREAD OR DISPOSED OF SO THAT IT WILL NOT INTERFERE WITH THE FUNCTIONING OF THE DIVERSION.
5. STABILIZATION SHALL BE DONE ACCORDING TO THE APPROPRIATE STANDARD AND SPECIFICATIONS FOR VEGETATIVE PRACTICES.
   A. FOR DESIGN VELOCITIES OF LESS THAN 3.5 FT. PER. SEC., SEEDING AND MULCHING MAY BE USED FOR THE ESTABLISHMENT OF THE VEGETATION. IT IS RECOMMENDED THAT, WHEN CONDITIONS PERMIT, TEMPORARY DIVERSIONS OR OTHER MEANS SHOULD BE USED TO PREVENT WATER FROM ENTERING THE DIVERSION DURING THE ESTABLISHMENT OF THE VEGETATION.
   B. FOR DESIGN VELOCITIES OF MORE THAN 3.5 FT. PER. SEC., THE DIVERSION SHALL BE STABILIZED WITH SOD, WITH SEEDING PROTECTED BY JUTE OR EXCELSIOR MATTING OR WITH SEEDING AND MULCHING INCLUDING TEMPORARY DIVERSION OF THE WATER UNTIL THE VEGETATION IS ESTABLISHED.

ADAPTED FROM DETAILS PROVIDED BY: USDA – NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE

DIVERSION

Table 3.3
Parabolic Diversion Design, Without Freeboard Tables - 1 (USDA– NRCS)

PARABOLIC DIVERSION DESIGN, WITHOUT FREEBOARD | RETARDANCE - D & C GRADE, % - 0.50

V_1 Based on Permissible Velocity of the Soil With Retardance "D"
Top Width, Depth & V_2 Based on Retardance "C"

Q	V_1 = 2.0			V_1 = 2.5			V_1 = 3.0			V_1 = 3.5			V_1 = 4.0			V_1 = 4.5			V_1 = 5.0			V_1 = 5.5			V_1 = 6.0		
cfs	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2
15	9	1.6	1.6																								
20	11	1.6	1.7																								
25	14	1.6	1.7	9	1.9	2.1																					
30	17	1.6	1.7	11	1.9	2.2	8	2.2	2.5																		
35	20	1.6	1.7	12	1.9	2.3	9	2.1	2.6																		
40	22	1.6	1.7	14	1.8	2.3	11	2.1	2.7																		
45	25	1.5	1.7	16	1.8	2.3	12	2.0	2.8																		
50	28	1.5	1.7	18	1.8	2.4	13	2.0	2.8	10	2.4	3.2															
55	31	1.5	1.7	19	1.8	2.4	15	2.0	2.8	11	2.4	3.3															
60	33	1.5	1.7	21	1.8	2.4	16	2.0	2.8	11	2.4	3.3															
65	36	1.5	1.8	23	1.8	2.4	17	2.0	2.9	12	2.4	3.3															
70	39	1.5	1.7	24	1.8	2.4	18	2.0	2.9	13	2.3	3.4															
75	42	1.5	1.8	26	1.8	2.4	19	2.0	2.9	14	2.3	3.4	11	2.7	3.7												
80	44	1.5	1.8	28	1.8	2.4	21	2.0	2.9	15	2.3	3.4	12	2.7	3.8												
90	50	1.5	1.8	31	1.8	2.4	24	2.0	2.9	17	2.3	3.4	13	2.7	3.8												
100	55	1.5	1.8	35	1.8	2.4	26	2.0	2.9	19	2.3	3.5	15	2.6	3.9	12	3.0	4.1									

PARABOLIC DIVERSION DESIGN, WITHOUT FREEBOARD | RETARDANCE - D & C GRADE, % - 1.0

V_1 based on Permissible Velocity of the Soil With Retardance "D"
Top Width, Depth & V_2 Based on Retardance "C"

Q	V_1 = 2.0			V_1 = 2.5			V_1 = 3.0			V_1 = 3.5			V_1 = 4.0			V_1 = 4.5			V_1 = 5.0			V_1 = 5.5			V_1 = 6.0		
cfs	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2
15	13	1.1	1.5	8	1.3	2.0																					
20	18	1.1	1.5	11	1.3	2.1	8	1.5	2.6																		
25	22	1.1	1.5	14	1.3	2.1	9	1.5	2.6	8	1.6	3.0															
30	27	1.1	1.5	17	1.3	2.1	11	1.5	2.7	9	1.6	3.0															
35	31	1.1	1.5	19	1.3	2.2	13	1.5	2.8	11	1.6	3.1	8	1.8	3.6												
40	35	1.1	1.5	22	1.3	2.1	15	1.4	2.8	12	1.5	3.1	9	1.8	3.7												
45	40	1.1	1.5	25	1.3	2.2	17	1.5	2.8	13	1.6	3.2	10	1.8	3.7												
50	44	1.1	1.5	28	1.3	2.2	19	1.4	2.8	15	1.6	3.2	11	1.8	3.7	9	2.0	4.2									
55	46	1.1	1.5	30	1.3	2.2	20	1.4	2.8	16	1.5	3.3	12	1.8	3.8	10	2.0	4.3									
60	53	1.1	1.5	33	1.3	2.2	22	1.4	2.8	18	1.5	3.3	14	1.7	3.8	10	2.0	4.3									
65	57	1.1	1.5	36	1.3	2.2	24	1.4	2.8	19	1.5	3.3	15	1.7	3.8	11	2.0	4.3	9	2.2	4.7						
70	61	1.1	1.5	38	1.3	2.2	26	1.4	2.8	21	1.5	3.3	16	1.7	3.9	12	2.0	4.4	10	2.2	4.7						
75	66	1.1	1.5	41	1.3	2.2	28	1.4	2.9	22	1.5	3.3	17	1.7	3.9	13	2.0	4.5	11	2.2	4.7						
80	70	1.1	1.5	44	1.3	2.2	29	1.4	2.9	24	1.5	3.3	18	1.7	3.9	14	2.0	4.4	11	2.2	4.9						
90	79	1.1	1.5	49	1.3	2.2	33	1.4	2.9	27	1.5	3.3	20	1.7	3.9	15	1.9	4.5	13	2.2	4.9	11	2.4	5.2			
100	87	1.1	1.5	55	1.3	2.2	37	1.4	2.9	29	1.5	3.3	22	1.7	3.9	17	1.9	4.5	14	2.2	4.9	12	2.4	5.3			

Table 3.4
Parabolic Diversion Design, Without Freeboard Tables - 2 (USDA– NRCS)

PARABOLIC DIVERSION DESIGN, WITHOUT FREEBOARD

RETARDANCE - D & C
GRADE, % - 1.5

V_1 Based on Permissible Velocity of the Soil With Retardance "D"
Top Width, Depth & V_2 Based on Retardance "C"

Q	V_1 - 2.0			V_1 - 2.5			V_1 - 3.0			V_1 - 3.5			V_1 - 4.0			V_1 - 4.5			V_1 - 5.0			V_1 - 5.5			V_1 - 6.0		
cfs	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2
15	17	0.9	1.4	11	1.1	1.9	8	1.2	2.4																		
20	23	0.9	1.4	15	1.0	1.9	10	1.2	2.5	7	1.4	3.0	5	1.5	3.4												
25	28	0.9	1.4	19	1.0	1.9	12	1.2	2.6	8	1.4	3.2	7	1.5	3.6												
30	34	0.9	1.4	22	1.0	1.9	15	1.2	2.6	10	1.3	3.2	8	1.5	3.6	7	1.6	4.0									
35	40	0.9	1.4	26	1.0	2.0	17	1.1	2.6	12	1.3	3.3	10	1.4	3.7	8	1.6	4.1									
40	45	0.9	1.4	30	1.0	1.9	20	1.2	2.6	14	1.3	3.3	11	1.4	3.7	9	1.6	4.2	7	1.8	4.6						
45	51	0.9	1.4	33	1.0	2.0	22	1.1	2.6	15	1.3	3.4	12	1.4	3.8	10	1.5	4.3	8	1.8	4.6						
50	56	0.9	1.4	37	1.0	2.0	25	1.1	2.7	17	1.3	3.4	14	1.4	3.9	11	1.5	4.3	9	1.8	4.8						
55	62	0.9	1.5	41	1.0	2.0	27	1.1	2.6	19	1.3	3.4	15	1.4	3.9	12	1.5	4.3	10	1.7	4.9	8	1.9	5.1			
60	67	0.9	1.5	44	1.0	2.0	30	1.1	2.7	20	1.3	3.4	16	1.4	3.9	14	1.5	4.4	11	1.7	4.9	9	1.9	5.2			
65	73	0.9	1.5	48	1.0	2.0	32	1.1	2.7	22	1.3	3.4	18	1.4	3.9	15	1.5	4.4	11	1.7	5.0	10	1.9	5.3			
70	78	0.9	1.5	51	1.0	2.0	34	1.1	2.7	24	1.3	3.4	19	1.4	3.9	16	1.5	4.4	12	1.7	4.9	10	1.9	5.4	9	2.1	5.6
75	83	0.9	1.5	55	1.0	2.0	37	1.1	2.7	25	1.3	3.4	21	1.4	3.9	17	1.5	4.4	13	1.7	5.0	11	1.9	5.4	9	2.1	5.6
80	89	0.9	1.5	59	1.0	2.0	39	1.1	2.7	27	1.3	3.4	22	1.4	3.9	18	1.5	4.4	14	1.7	5.0	12	1.9	5.5	10	2.1	5.8
90	100	0.9	1.5	66	1.0	2.0	44	1.1	2.7	30	1.3	3.5	25	1.4	3.9	20	1.5	4.4	15	1.7	5.0	13	1.9	5.4	11	2.0	5.9
100				73	1.0	2.0	49	1.1	2.7	33	1.3	3.5	27	1.4	3.9	22	1.5	4.5	17	1.7	5.1	15	1.9	5.5	12	2.0	6.0

PARABOLIC DIVERSION DESIGN, WITHOUT FREEBOARD

RETARDANCE - D & C
GRADE, % - 2.0

V_1 Based on Permissible Velocity of the Soil With Retardance "D"
Top Width, Depth & V_2 Based on Retardance "C"

Q	V_1 - 2.0			V_1 - 2.5			V_1 - 3.0			V_1 - 3.5			V_1 - 4.0			V_1 - 4.5			V_1 - 5.0			V_1 - 5.5			V_1 - 6.0		
cfs	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2
15	21	0.8	1.3	13	0.9	1.9	9	1.0	2.4	7	1.2	2.9															
20	28	0.8	1.3	17	0.9	1.9	12	1.0	2.4	9	1.1	3.0	7	1.3	3.5	5	1.4	3.8									
25	35	0.8	1.3	21	0.9	1.9	15	1.0	2.4	11	1.1	3.0	8	1.3	3.7	7	1.4	4.0									
30	41	0.8	1.3	26	0.9	1.9	18	1.0	2.5	13	1.1	3.0	10	1.2	3.7	8	1.3	4.2	7	1.5	4.5						
35	48	0.8	1.4	30	0.9	1.9	22	1.0	2.4	15	1.1	3.1	11	1.2	3.8	9	1.3	4.2	8	1.5	4.7						
40	55	0.8	1.3	34	0.9	1.9	25	1.0	2.5	18	1.1	3.1	13	1.2	3.8	11	1.3	4.3	9	1.5	4.7	7	1.7	5.0			
45	62	0.8	1.4	38	0.9	1.9	28	1.0	2.5	20	1.1	3.1	14	1.2	3.8	12	1.3	4.3	10	1.4	4.8	8	1.6	5.2			
50	68	0.8	1.4	42	0.9	1.9	31	1.0	2.5	22	1.1	3.1	16	1.2	3.9	13	1.3	4.3	11	1.4	4.8	9	1.6	5.3	8	1.7	5.6
55	75	0.8	1.4	46	0.9	1.9	34	1.0	2.5	24	1.1	3.1	17	1.2	3.8	14	1.3	4.3	12	1.4	4.9	10	1.6	5.3	8	1.7	5.8
60	82	0.8	1.4	51	0.9	1.9	37	1.0	2.5	26	1.1	3.1	19	1.2	3.9	16	1.3	4.4	13	1.4	4.8	11	1.6	5.3	9	1.7	5.7
65	88	0.8	1.4	55	0.9	1.9	40	1.0	2.5	28	1.1	3.1	21	1.2	3.9	17	1.3	4.4	14	1.4	4.9	11	1.6	5.4	10	1.7	5.7
70	95	0.8	1.4	59	0.9	1.9	43	1.0	2.5	30	1.1	3.1	22	1.2	3.9	18	1.3	4.4	15	1.4	4.9	12	1.6	5.4	10	1.7	5.8
75				63	0.9	1.9	46	1.0	2.5	32	1.1	3.2	24	1.2	3.9	20	1.3	4.4	16	1.4	5.0	13	1.6	5.5	11	1.7	5.9
80				67	0.9	2.0	48	1.0	2.5	35	1.1	3.2	25	1.2	3.9	21	1.3	4.4	17	1.4	4.9	14	1.6	5.4	12	1.7	6.0
90				75	0.9	2.0	54	1.0	2.5	39	1.1	3.2	28	1.2	3.9	23	1.3	4.4	19	1.4	4.9	16	1.6	5.5	13	1.7	5.9
100				83	0.9	2.0	60	1.0	2.5	43	1.1	3.2	31	1.2	3.9	26	1.3	4.4	21	1.4	5.0	17	1.6	5.5	15	1.7	6.0

STANDARD AND SPECIFICATIONS FOR DUST CONTROL



Definition & Scope

The control of dust resulting from land-disturbing activities, to prevent surface and air movement of dust from disturbed soil surfaces that may cause off-site damage, health hazards, and traffic safety problems.

Conditions Where Practice Applies

On construction roads, access points, and other disturbed areas subject to surface dust movement and dust blowing where off-site damage may occur if dust is not controlled.

Design Criteria

Construction operations should be scheduled to minimize the amount of area disturbed at one time. Buffer areas of vegetation should be left where practical. Temporary or permanent stabilization measures shall be installed. No specific design criteria is given; see construction specifications below for common methods of dust control.

Water quality must be considered when materials are selected for dust control. Where there is a potential for the material to wash off to a stream, ingredient information must be provided to the NYSDEC.

No polymer application shall take place without written approval from the NYSDEC.

Construction Specifications

A. **Non-driving Areas** – These areas use products and materials applied or placed on soil surfaces to prevent airborne migration of soil particles.

Vegetative Cover – For disturbed areas not subject to traffic, vegetation provides the most practical method of dust control (see Section 3).

Mulch (including gravel mulch) – Mulch offers a fast effective means of controlling dust. This can also include rolled erosion control blankets.

Spray adhesives – These are products generally composed of polymers in a liquid or solid form that are mixed with water to form an emulsion that is sprayed on the soil surface with typical hydroseeding equipment. The mixing ratios and application rates will be in accordance with the manufacturer's recommendations for the specific soils on the site. In no case should the application of these adhesives be made on wet soils or if there is a probability of precipitation within 48 hours of its proposed use. Material Safety Data Sheets will be provided to all applicators and others working with the material.

B. **Driving Areas** – These areas utilize water, polymer emulsions, and barriers to prevent dust movement from the traffic surface into the air.

Sprinkling – The site may be sprayed with water until the surface is wet. This is especially effective on haul roads and access route to provide short term limited dust control.

Polymer Additives – These polymers are mixed with water and applied to the driving surface by a water truck with a gravity feed drip bar, spray bar or automated distributor truck. The mixing ratios and application rates will be in accordance with the manufacturer's recommendations. Incorporation of the emulsion into the soil will be done to the appropriate depth based on expected traffic. Compaction after incorporation will be by vibratory roller to a minimum of 95%. The prepared surface shall be moist and no application of the polymer will be made if there is a probability of precipitation within 48 hours of its proposed use. Material Safety Data Sheets will be provided to all applicators working with the material.

Barriers – Woven geo-textiles can be placed on the driving surface to effectively reduce dust throw and particle migration on haul roads. Stone can also be used for construction roads for effective dust control.

Windbreak – A silt fence or similar barrier can control air currents at intervals equal to ten times the barrier height. Preserve existing wind barrier vegetation as much as practical.

Maintenance

Maintain dust control measures through dry weather periods until all disturbed areas are stabilized.

STANDARD AND SPECIFICATIONS FOR LANDGRADING



Definition & Scope

Permanent reshaping of the existing land surface by grading in accordance with an engineering topographic plan and specification to provide for erosion control and vegetative establishment on disturbed, reshaped areas.

Design Criteria

The grading plan should be based upon the incorporation of building designs and street layouts that fit and utilize existing topography and desirable natural surrounding to avoid extreme grade modifications. Information submitted must provide sufficient topographic surveys and soil investigations to determine limitations that must be imposed on the grading operation related to slope stability, effect on adjacent properties and drainage patterns, measures for drainage and water removal, and vegetative treatment, etc.

Many municipalities and counties have regulations and design procedures already established for land grading and cut and fill slopes. Where these requirements exist, they shall be followed.

The plan must show existing and proposed contours of the area(s) to be graded. The plan shall also include practices for erosion control, slope stabilization, safe disposal of runoff water and drainage, such as waterways, lined ditches, reverse slope benches (include grade and cross section), grade stabilization structures, retaining walls, and surface and subsurface drains. The plan shall also include phasing of these practices. The following shall be incorporated into the plan:

1. Provisions shall be made to safely convey surface runoff to storm drains, protected outlets, or to stable water courses to ensure that surface runoff will not damage slopes or other graded areas; see standards and specifications for Grassed Waterway, Diversion, or Grade Stabilization Structure.

2. Cut and fill slopes that are to be stabilized with grasses shall not be steeper than 2:1. When slopes exceed 2:1, special design and stabilization consideration are required and shall be adequately shown on the plans. (Note: Where the slope is to be mowed, the slope should be no steeper than 3:1, although 4:1 is preferred because of safety factors related to mowing steep slopes.)

3. Reverse slope benches or diversion shall be provided whenever the vertical interval (height) of any 2:1 slope exceeds 20 feet; for 3:1 slope it shall be increased to 30 feet and for 4:1 to 40 feet. Benches shall be located to divide the slope face as equally as possible and shall convey the water to a stable outlet. Soils, seeps, rock outcrops, etc., shall also be taken into consideration when designing benches.

   A. Benches shall be a minimum of six feet wide to provide for ease of maintenance.

   B. Benches shall be designed with a reverse slope of 6:1 or flatter to the toe of the upper slope and with a minimum of one foot in depth. Bench gradient to the outlet shall be between 2 percent and 3 percent, unless accompanied by appropriate design and computations.

   C. The flow length within a bench shall not exceed 800 feet unless accompanied by appropriate design and computations; see Standard and Specifications for Diversion on page 3.9

4. Surface water shall be diverted from the face of all cut and/or fill slopes by the use of diversions, ditches and swales or conveyed downslope by the use of a designed structure, except where:

   A. The face of the slope is or shall be stabilized and the face of all graded slopes shall be protected from surface runoff until they are stabilized.

   B. The face of the slope shall not be subject to any concentrated flows of surface water such as from natural drainage ways, graded ditches, downspouts, etc.

   C. The face of the slope will be protected by anchored stabilization matting, sod, gravel, riprap, or other stabilization method.

5. Cut slopes occurring in ripable rock shall be serrated as shown in Figure 4.9 on page 4.26. The serrations shall be made with conventional equipment as the excavation is made. Each step or serration shall be constructed on the contour and will have steps cut at nominal two-foot intervals with nominal three-foot horizontal shelves. These steps will vary depending on the slope ratio or the cut slope. The nominal slope line is 1 ½: 1. These steps will weather and act to hold moisture, lime, fertilizer, and seed thus producing a much quicker and longer-lived vegetative cover and better slope stabilization. Overland flow shall be diverted from the top of all serrated cut slopes and carried to a suitable outlet.

6. Subsurface drainage shall be provided where necessary to intercept seepage that would otherwise adversely affect slope stability or create excessively wet site conditions.

7. Slopes shall not be created so close to property lines as to endanger adjoining properties without adequately protecting such properties against sedimentation, erosion, slippage, settlement, subsidence, or other related damages.

8. Fill material shall be free of brush, rubbish, rocks, logs, stumps, building debris, and other objectionable material. It should be free of stones over two (2) inches in diameter where compacted by hand or mechanical tampers or over eight (8) inches in diameter where compacted by rollers or other equipment. Frozen material shall not be placed in the fill nor shall the fill material be placed on a frozen foundation.

9. Stockpiles, borrow areas, and spoil shall be shown on the plans and shall be subject to the provisions of this Standard and Specifications.

10. All disturbed areas shall be stabilized structurally or vegetatively in compliance with the Permanent Construction Area Planting Standard on page 4.42.

Construction Specifications

See Figures 4.9 and 4.10 for details.

1. All graded or disturbed areas, including slopes, shall be protected during clearing and construction in accordance with the erosion and sediment control plan until they are adequately stabilized.

2. All erosion and sediment control practices and measures shall be constructed, applied and maintained in accordance with the erosion and sediment control plan and these standards.

3. Topsoil required for the establishment of vegetation shall be stockpiled in amount necessary to complete finished grading of all exposed areas.

4. Areas to be filled shall be cleared, grubbed, and stripped of topsoil to remove trees, vegetation, roots, or other objectionable material.

5. Areas that are to be topsoiled shall be scarified to a minimum depth of four inches prior to placement of topsoil.

6. All fills shall be compacted as required to reduce erosion, slippage, settlement, subsidence, or other related problems. Fill intended to support buildings, structures, and conduits, etc., shall be compacted in accordance with local requirements or codes.

7. All fill shall be placed and compacted in layers not to exceed 9 inches in thickness.

8. Except for approved landfills or nonstructural fills, fill material shall be free of frozen particles, brush, roots, sod, or other foreign objectionable materials that would interfere with, or prevent, construction of satisfactory fills.

9. Frozen material or soft, mucky or highly compressible materials shall not be incorporated into fill slopes or structural fills.

10. Fill shall not be placed on saturated or frozen surfaces.

11. All benches shall be kept free of sediment during all phases of development.

12. Seeps or springs encountered during construction shall be handled in accordance with the Standard and Specification for Subsurface Drain on page 3.48 or other approved methods.

13. All graded areas shall be permanently stabilized immediately following finished grading.

14. Stockpiles, borrow areas, and spoil areas shall be shown on the plans and shall be subject to the provisions of this Standard and Specifications.



Figure 4.9
Typical Section of Serrated Cut Slope

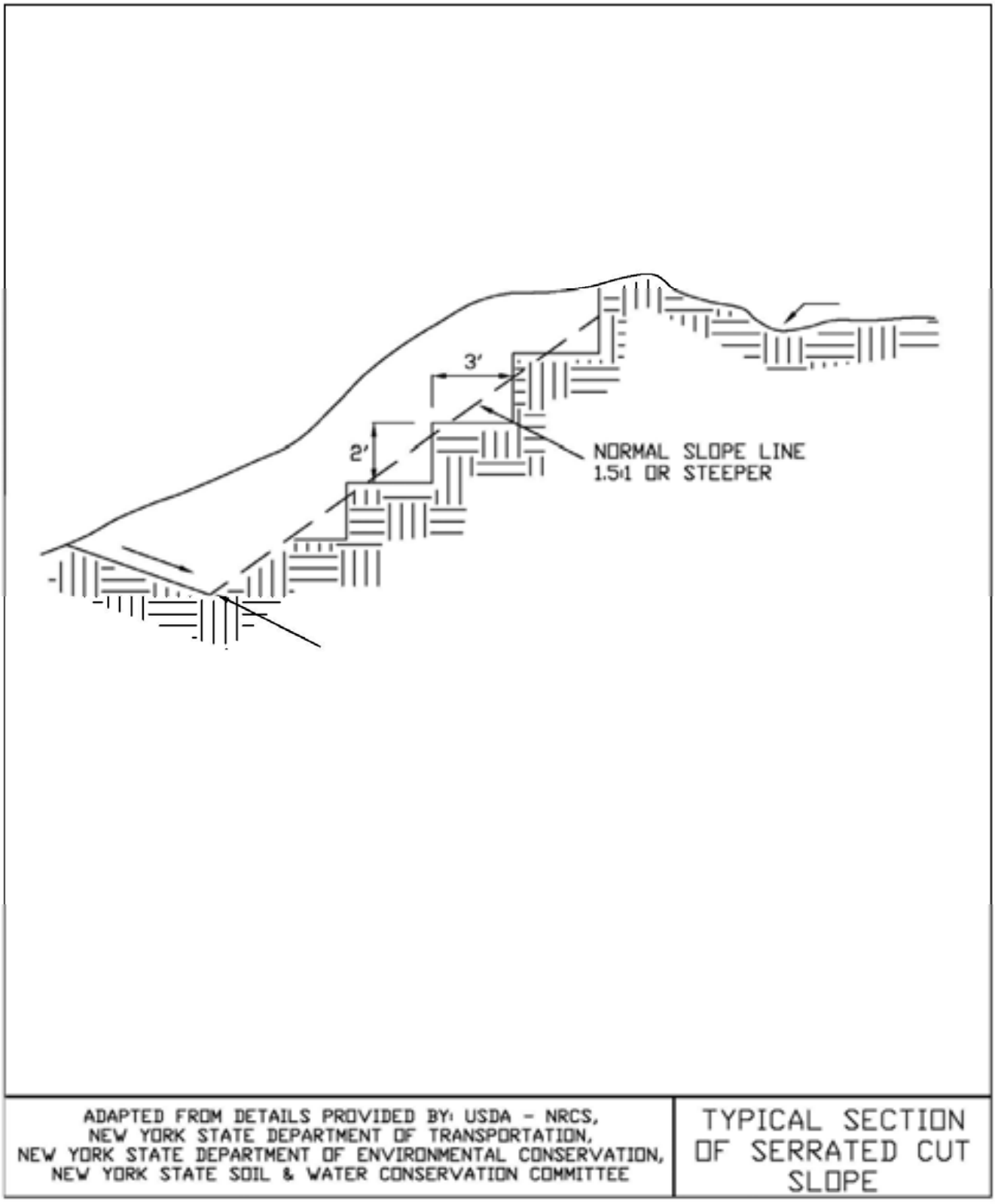


Figure 4.10
Landgrading

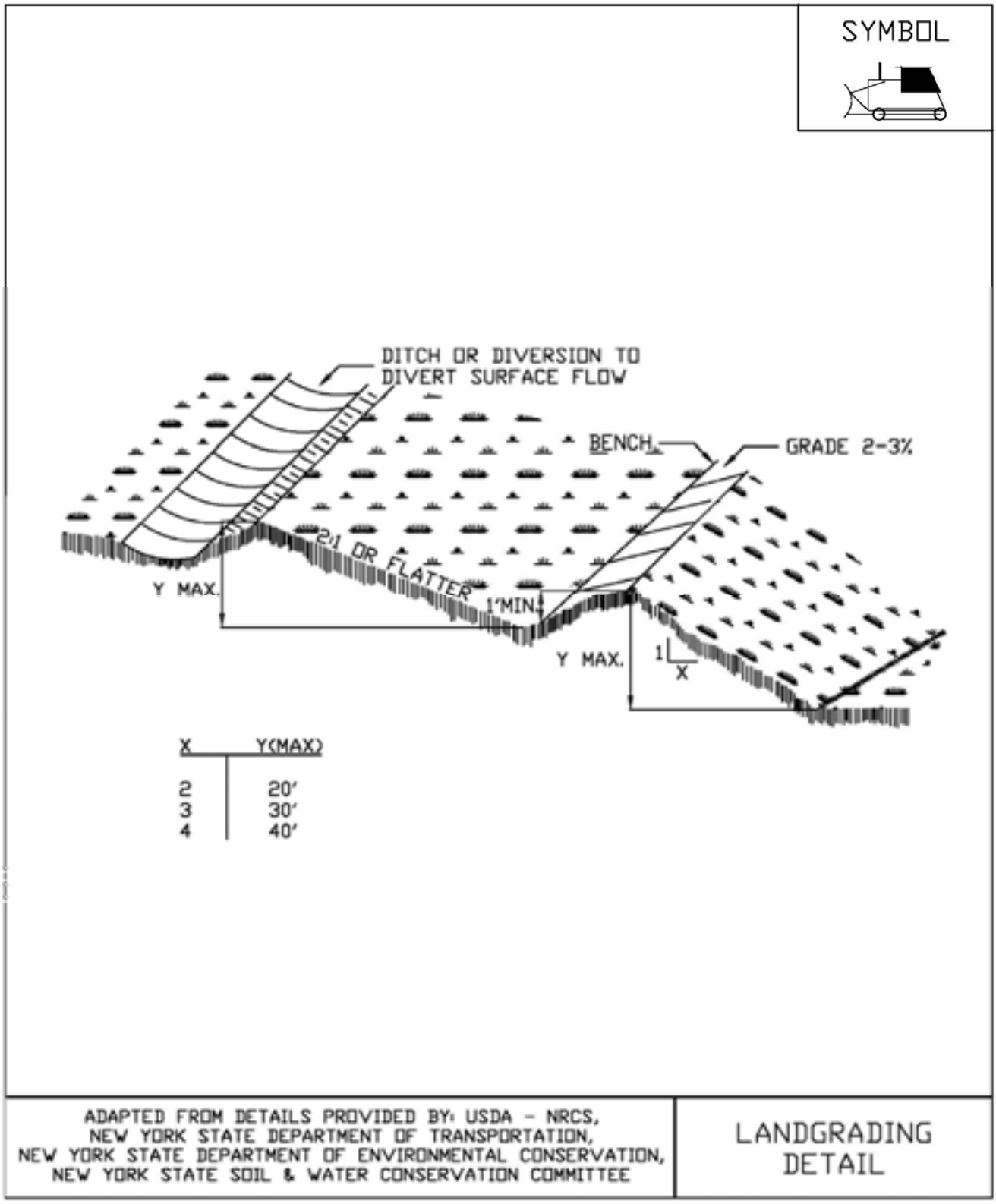
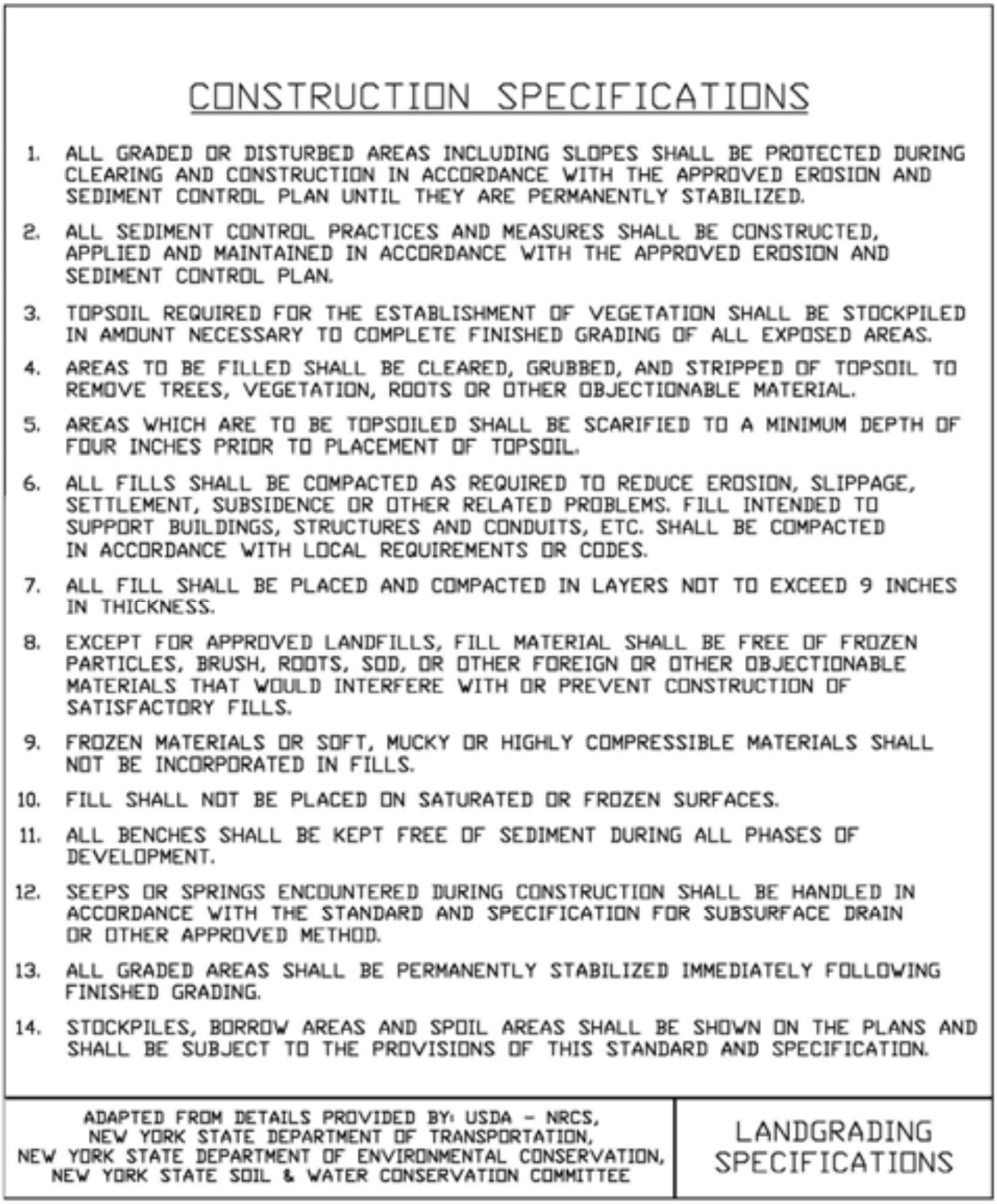


Figure 4.11
Landgrading - Construction Specifications



CONSTRUCTION SPECIFICATIONS

1. ALL GRADED OR DISTURBED AREAS INCLUDING SLOPES SHALL BE PROTECTED DURING CLEARING AND CONSTRUCTION IN ACCORDANCE WITH THE APPROVED EROSION AND SEDIMENT CONTROL PLAN UNTIL THEY ARE PERMANENTLY STABILIZED.
2. ALL SEDIMENT CONTROL PRACTICES AND MEASURES SHALL BE CONSTRUCTED, APPLIED AND MAINTAINED IN ACCORDANCE WITH THE APPROVED EROSION AND SEDIMENT CONTROL PLAN.
3. TOPSOIL REQUIRED FOR THE ESTABLISHMENT OF VEGETATION SHALL BE STOCKPILED IN AMOUNT NECESSARY TO COMPLETE FINISHED GRADING OF ALL EXPOSED AREAS.
4. AREAS TO BE FILLED SHALL BE CLEARED, GRUBBED, AND STRIPPED OF TOPSOIL TO REMOVE TREES, VEGETATION, ROOTS OR OTHER OBJECTIONABLE MATERIAL.
5. AREAS WHICH ARE TO BE TOPSOILED SHALL BE SCARIFIED TO A MINIMUM DEPTH OF FOUR INCHES PRIOR TO PLACEMENT OF TOPSOIL.
6. ALL FILLS SHALL BE COMPACTED AS REQUIRED TO REDUCE EROSION, SLIPPAGE, SETTLEMENT, SUBSIDENCE OR OTHER RELATED PROBLEMS. FILL INTENDED TO SUPPORT BUILDINGS, STRUCTURES AND CONDUITS, ETC. SHALL BE COMPACTED IN ACCORDANCE WITH LOCAL REQUIREMENTS OR CODES.
7. ALL FILL SHALL BE PLACED AND COMPACTED IN LAYERS NOT TO EXCEED 9 INCHES IN THICKNESS.
8. EXCEPT FOR APPROVED LANDFILLS, FILL MATERIAL SHALL BE FREE OF FROZEN PARTICLES, BRUSH, ROOTS, SOD, OR OTHER FOREIGN OR OTHER OBJECTIONABLE MATERIALS THAT WOULD INTERFERE WITH OR PREVENT CONSTRUCTION OF SATISFACTORY FILLS.
9. FROZEN MATERIALS OR SOFT, MUCKY OR HIGHLY COMPRESSIBLE MATERIALS SHALL NOT BE INCORPORATED IN FILLS.
10. FILL SHALL NOT BE PLACED ON SATURATED OR FROZEN SURFACES.
11. ALL BENCHES SHALL BE KEPT FREE OF SEDIMENT DURING ALL PHASES OF DEVELOPMENT.
12. SEEPS OR SPRINGS ENCOUNTERED DURING CONSTRUCTION SHALL BE HANDLED IN ACCORDANCE WITH THE STANDARD AND SPECIFICATION FOR SUBSURFACE DRAIN OR OTHER APPROVED METHOD.
13. ALL GRADED AREAS SHALL BE PERMANENTLY STABILIZED IMMEDIATELY FOLLOWING FINISHED GRADING.
14. STOCKPILES, BORROW AREAS AND SPOIL AREAS SHALL BE SHOWN ON THE PLANS AND SHALL BE SUBJECT TO THE PROVISIONS OF THIS STANDARD AND SPECIFICATION.

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS,
NEW YORK STATE DEPARTMENT OF TRANSPORTATION,
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION,
NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE

LANDGRADING
SPECIFICATIONS

STANDARD AND SPECIFICATIONS FOR MULCHING



Definition and Scope

Applying coarse plant residue or chips, or other suitable materials, to cover the soil surface to provide initial erosion control while a seeding or shrub planting is establishing. Mulch will conserve moisture and modify the surface soil temperature and reduce fluctuation of both. Mulch will prevent soil surface crusting and aid in weed control. Mulch can also be used alone for temporary stabilization in non-growing months. Use of stone as a mulch could be more permanent and should not be limited to non-growing months.

Conditions Where Practice Applies

On soils subject to erosion and on new seedings and shrub plantings. Mulch is useful on soils with low infiltration rates by retarding runoff.

Criteria

Site preparation prior to mulching requires the installation of necessary erosion control or water management practices and drainage systems.

Slope, grade and smooth the site to fit needs of selected mulch products.

Remove all undesirable stones and other debris to meet the needs of the anticipated land use and maintenance required.

Apply mulch after soil amendments and planting is accomplished or simultaneously if hydroseeding is used.

Select appropriate mulch material and application rate or material needs. Hay mulch shall not be used in wetlands or in areas of permanent seeding. Clean straw mulch is preferred alternative in wetland application. Determine local availability.

Select appropriate mulch anchoring material.

NOTE: The best combination for grass/legume establishment is straw (cereal grain) mulch applied at 2 ton/ acre (90 lbs./1000sq.ft.) and anchored with wood fiber mulch (hydromulch) at 500 – 750 lbs./acre (11 – 17 lbs./1000 sq. ft.). The wood fiber mulch must be applied through a hydroseeder immediately after mulching.



Table 4.2
Guide to Mulch Materials, Rates, and Uses

Mulch Material	Quality Standards	per 1000 Sq. Ft.	per Acre	Depth of Application	Remarks
Wood chips or shavings	Air-dried. Free of objectionable coarse material	500-900 lbs.	10-20 tons	2-7"	Used primarily around shrub and tree plantings and recreation trails to inhibit weed competition. Resistant to wind blowing. Decomposes slowly.
Wood fiber cellulose (partly digested wood fibers)	Made from natural wood usually with green dye and dispersing agent	50 lbs.	2,000 lbs.	—	Apply with hydromulcher. No tie down required. Less erosion control provided than 2 tons of hay or straw.
Gravel, Crushed Stone or Slag	Washed; Size 2B or 3A—1 1/2"	9 cu. yds.	405 cu. yds.	3"	Excellent mulch for short slopes and around plants and ornamentals. Use 2B where subject to traffic. (Approximately 2,000 lbs./cu. yd.). Frequently used over filter fabric for better weed control.
Hay or Straw	Air-dried; free of undesirable seeds & coarse materials	90-100 lbs. 2-3 bales	2 tons (100-120 bales)	cover about 90% surface	Use small grain straw where mulch is maintained for more than three months. Subject to wind blowing unless anchored. Most commonly used mulching material. Provides the best micro-environment for germinating seeds.
Jute twisted yarn	Undyed, unbleached plain weave. Warp 78 ends/yd., Weft 41 ends/ yd. 60-90 lbs./roll	48" x 50 yds. or 48" x 75 yds.	—	—	Use without additional mulch. Tie down as per manufacturers specifications. Good for center line of concentrated water flow.
Excelsior wood fiber mats	Interlocking web of excelsior fibers with photodegradable plastic netting	4' x 112.5' or 8' x 112.5'.	—	—	Use without additional mulch. Excellent for seeding establishment. Anchor as per manufacturers specifications. Approximately 72 lbs./roll for excelsior with plastic on both sides. Use two sided plastic for centerline of waterways.
Straw or coconut fiber, or combination	Photodegradable plastic net on one or two sides	Most are 6.5 ft. x 3.5 ft.	81 rolls	—	Designed to tolerate higher velocity water flow, centerlines of waterways, 60 sq. yds. per roll.

Table 4.3
Mulch Anchoring Guide

Anchoring Method or Material	Kind of Mulch to be Anchored	How to Apply
1. Peg and Twine	Hay or straw	After mulching, divide areas into blocks approximately 1 sq. yd. in size. Drive 4-6 pegs per block to within 2" to 3" of soil surface. Secure mulch to surface by stretching twine between pegs in criss-cross pattern on each block. Secure twine around each peg with 2 or more tight turns. Drive pegs flush with soil. Driving stakes into ground tightens the twine.
2. Mulch netting	Hay or straw	Staple the light-weight paper, jute, wood fiber, or plastic nettings to soil surface according to manufacturer's recommendations. Should be biodegradable. Most products are not suitable for foot traffic.
3. Wood cellulose fiber	Hay or straw	Apply with hydroseeder immediately after mulching. Use 500 lbs. wood fiber per acre. Some products contain an adhesive material ("tackifier"), possibly advantageous.
4. Mulch anchoring tool	Hay or straw	Apply mulch and pull a mulch anchoring tool (blunt, straight discs) over mulch as near to the contour as possible. Mulch material should be "tucked" into soil surface about 3".
5. Tackifier	Hay or straw	Mix and apply polymeric and gum tackifiers according to manufacturer's instructions. Avoid application during rain. A 24-hour curing period and a soil temperature higher than 45^0 Fahrenheit are required.

STANDARD AND SPECIFICATIONS FOR ROCK OUTLET PROTECTION



Definition & Scope

A **permanent** section of rock protection placed at the outlet end of the culverts, conduits, or channels to reduce the depth, velocity, and energy of water, such that the flow will not erode the receiving downstream reach.

Conditions Where Practice Applies

This practice applies where discharge velocities and energies at the outlets of culverts, conduits, or channels are sufficient to erode the next downstream reach. This applies to:

1. Culvert outlets of all types.
2. Pipe conduits from all sediment basins, dry storm water ponds, and permanent type ponds.
3. New channels constructed as outlets for culverts and conduits.

Design Criteria

The design of rock outlet protection depends entirely on the location. Pipe outlet at the top of cuts or on slopes steeper than 10 percent, cannot be protected by rock aprons or riprap sections due to re-concentration of flows and high velocities encountered after the flow leaves the apron.

Many counties and state agencies have regulations and design procedures already established for dimensions, type and size of materials, and locations where outlet protection is required. Where these requirements exist, they shall be followed.

Tailwater Depth

The depth of tailwater immediately below the pipe outlet must be determined for the design capacity of the pipe. If the tailwater depth is less than half the diameter of the outlet pipe, and the receiving stream is wide enough to accept divergence of the flow, it shall be classified as a Minimum Tailwater Condition; see Figure 3.16 on page 3.42 as an example. If the tailwater depth is greater than half the pipe diameter and the receiving stream will continue to confine the flow, it shall be classified as a Maximum Tailwater Condition; see Figure 3.17 on page 3.43 as an example. Pipes which outlet onto flat areas with no defined channel may be assumed to have a Minimum Tailwater Condition; see Figure 3.16 on page 3.42 as an example.

Apron Size

The apron length and width shall be determined from the curves according to the tailwater conditions:

Minimum Tailwater – Use Figure 3.16 on page 3.42
Maximum Tailwater – Use Figure 3.17 on page 3.43

If the pipe discharges directly into a well defined channel, the apron shall extend across the channel bottom and up the channel banks to an elevation one foot above the maximum tailwater depth or to the top of the bank, whichever is less.

The upstream end of the apron, adjacent to the pipe, shall have a width two (2) times the diameter of the outlet pipe, or conform to pipe end section if used.

Bottom Grade

The outlet protection apron shall be constructed with no slope along its length. There shall be no overfall at the end of the apron. The elevation of the downstream end of the apron shall be equal to the elevation of the receiving channel or adjacent ground.

Alignment

The outlet protection apron shall be located so that there are no bends in the horizontal alignment.

Materials

The outlet protection may be done using rock riprap, grouted riprap, or gabions. Outlets constructed on the bank of a stream or wetland shall not use grouted rip-rap, gabions or concrete.

Riprap shall be composed of a well-graded mixture of rock size so that 50 percent of the pieces, by weight, shall be larger than the d_{50} size determined by using the charts. A

well-graded mixture, as used herein, is defined as a mixture composed primarily of larger rock sizes, but with a sufficient mixture of other sizes to fill the smaller voids between the rocks. The diameter of the largest rock size in such a mixture shall be 1.5 times the d_{50} size.

Thickness

The minimum thickness of the riprap layer shall be 1.5 times the maximum rock diameter for d_{50} of 15 inches or less; and 1.2 times the maximum rock size for d_{50} greater than 15 inches. The following chart lists some examples:

D_{50} (inches)	d_{max} (inches)	Minimum Blanket Thickness (inches)
4	6	9
6	9	14
9	14	20
12	18	27
15	22	32
18	27	32
21	32	38
24	36	43

Rock Quality

Rock for riprap shall consist of field rock or rough unhewn quarry rock. The rock shall be hard and angular and of a quality that will not disintegrate on exposure to water or weathering. The specific gravity of the individual rocks shall be at least 2.5.

Filter

A filter is a layer of material placed between the riprap and the underlying soil surface to prevent soil movement into and through the riprap. Riprap shall have a filter placed under it in all cases.

A filter can be of two general forms: a gravel layer or a plastic filter cloth. The plastic filter cloth can be woven or non-woven monofilament yarns, and shall meet these base requirements: thickness 20-60 mils, grab strength 90-120 lbs; and shall conform to ASTM D-1777 and ASTM D-1682.

Gravel filter blanket, when used, shall be designed by comparing particle sizes of the overlying material and the base material. Design criteria are available in Standard and Specification for Anchored Slope and Channel Stabilization on page 4.7.

Gabions

Gabions shall be made of hexagonal triple twist mesh with heavily galvanized steel wire. The maximum linear dimension of the mesh opening shall not exceed 4 ½ inches and the area of the mesh opening shall not exceed 10 square inches.

Gabions shall be fabricated in such a manner that the sides, ends, and lid can be assembled at the construction site into a rectangular basket of the specified sizes. Gabions shall be of single unit construction and shall be installed according to manufacturer's recommendations.

The area on which the gabion is to be installed shall be graded as shown on the drawings. Foundation conditions shall be the same as for placing rock riprap, and filter cloth shall be placed under all gabions. Where necessary, key, or tie, the structure into the bank to prevent undermining of the main gabion structure.

Maintenance

Once a riprap outlet has been installed, the maintenance needs are very low. It should be inspected after high flows for evidence of scour beneath the riprap or for dislodged rocks. Repairs should be made immediately.

Design Procedure

1. Investigate the downstream channel to assure that nonerosive velocities can be maintained.

2. Determine the tailwater condition at the outlet to establish which curve to use.

3. Use the appropriate chart with the design discharge to determine the riprap size and apron length required. It is noted that references to pipe diameters in the charts are based on full flow. For other than full pipe flow, the parameters of depth of flow and velocity must be used to adjust the design discharges.

4. Calculate apron width at the downstream end if a flare section is to be employed.

Design Examples are demonstrated in Appendix B.

Construction Specifications

1. The subgrade for the filter, riprap, or gabion shall be prepared to the required lines and grades. Any fill required in the subgrade shall be compacted to a density of approximately that of the surrounding undisturbed material.

2. The rock or gravel shall conform to the specified grad-

ing limits when installed respectively in the riprap or filter.

3. Filter cloth shall be protected from punching, cutting, or tearing. Any damage other than an occasional small hole shall be repaired by placing another piece of cloth over the damaged part or by completely replacing the cloth. All overlaps, whether for repairs or for joining two pieces of cloth shall be a minimum of one foot.

4. Rock for the riprap or gabion outlets may be placed by equipment. Both shall each be constructed to the full course thickness in one operation and in such a manner as to avoid displacement of underlying materials. The rock for riprap or gabion outlets shall be delivered and placed in a manner that will ensure that it is reasonably homogenous with the smaller rocks and spalls filling the voids between the larger rocks. Riprap shall be placed in a manner to prevent damage to the filter blanket or filter cloth. Hand placement will be required to the extent necessary to prevent damage to the permanent works.

Figure 3.16
Outlet Protection Design—Minimum Tailwater Condition Chart (Design of Outlet Protection from a Round Pipe Flowing Full, Minimum Tailwater Condition: $T_w < 0.5D_o$) (USDA - NRCS)

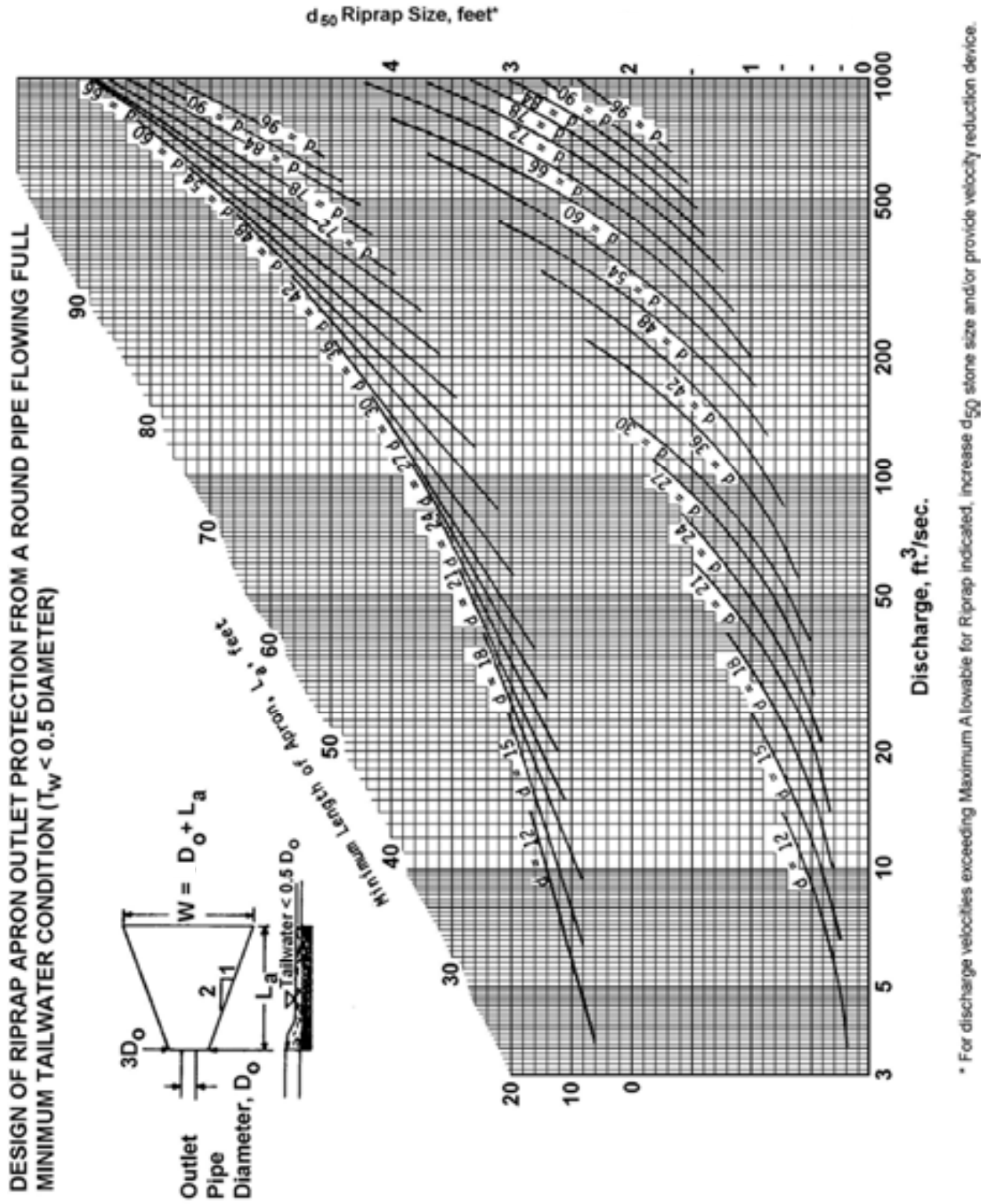


Figure 3.17
Outlet Protection Design—Maximum Tailwater Condition Chart (Design of Outlet Protection from a Round Pipe Flowing Full, Maximum Tailwater Condition: $T_w \geq 0.5D_o$) (USDA - NRCS)

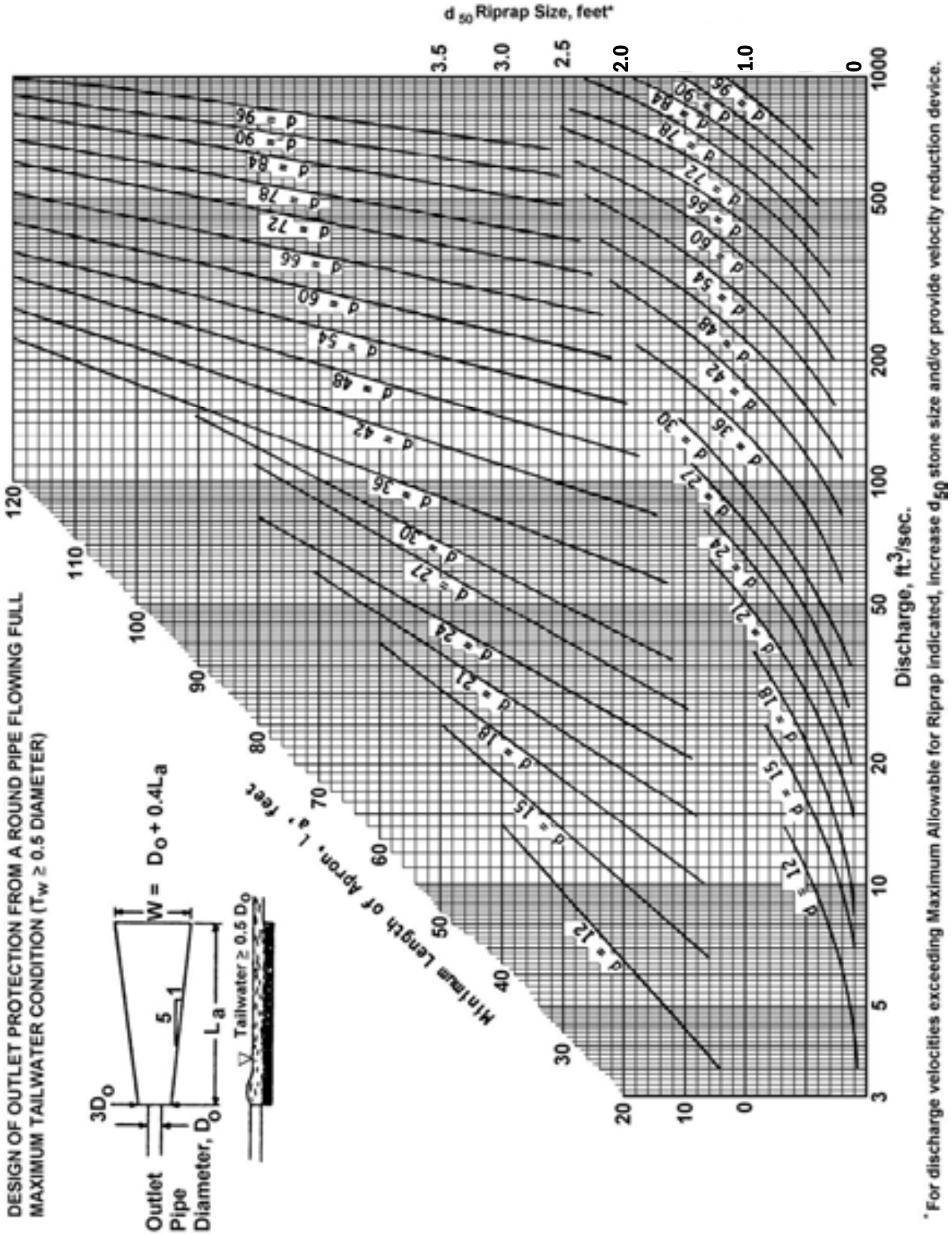


Figure 3.18
Riprap Outlet Protection Detail (1)

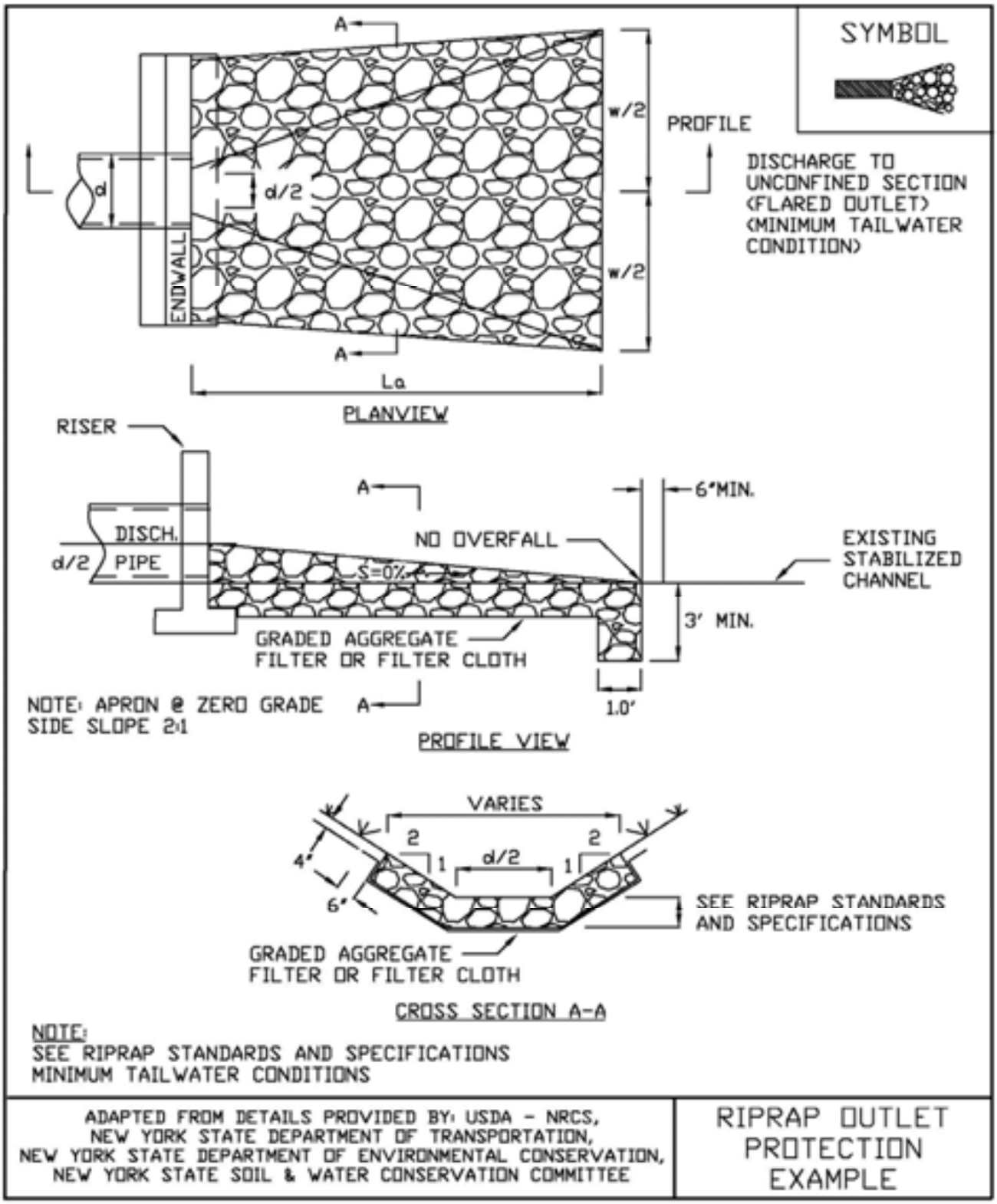


Figure 3.19
Riprap Outlet Protection Detail (2)

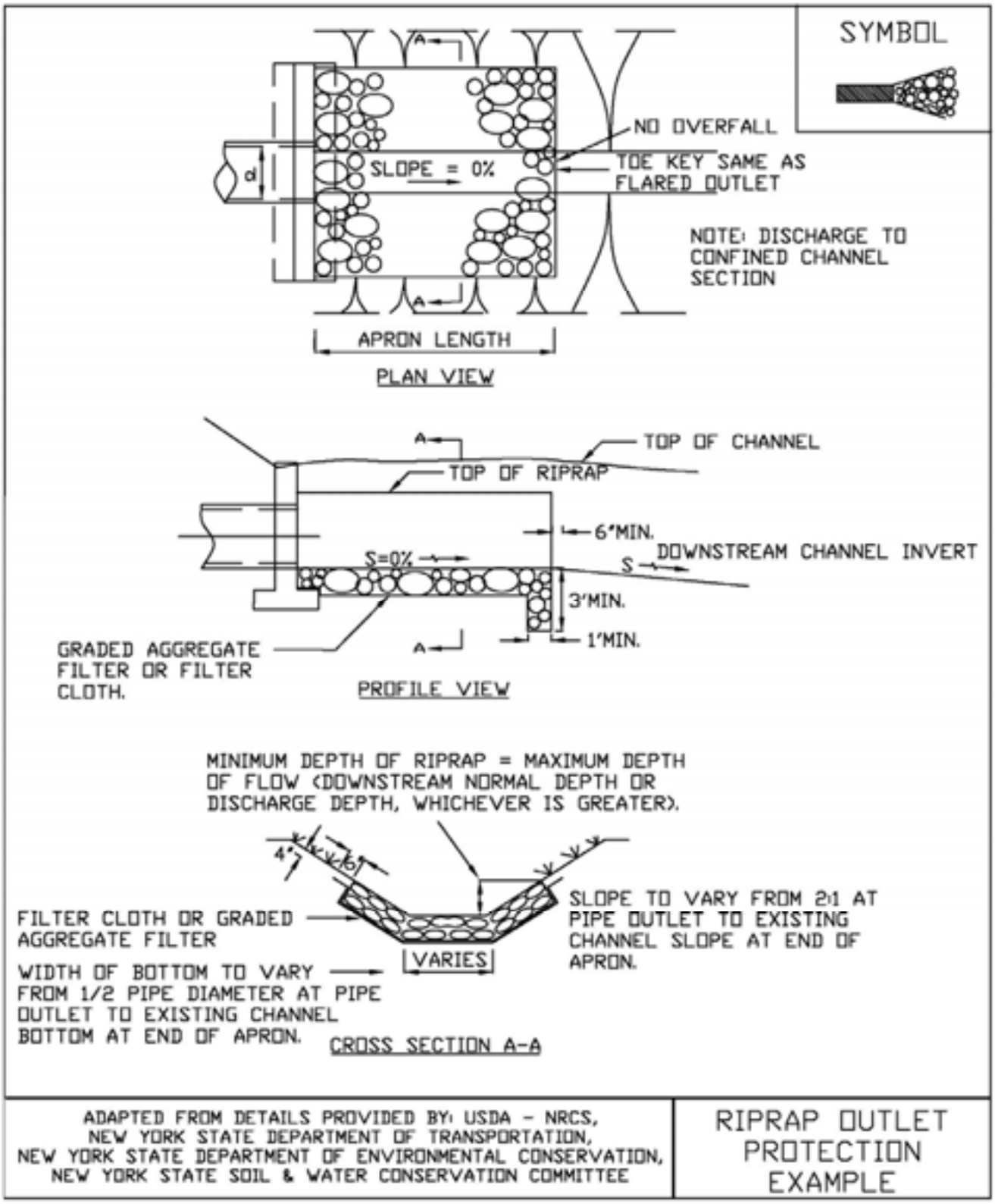
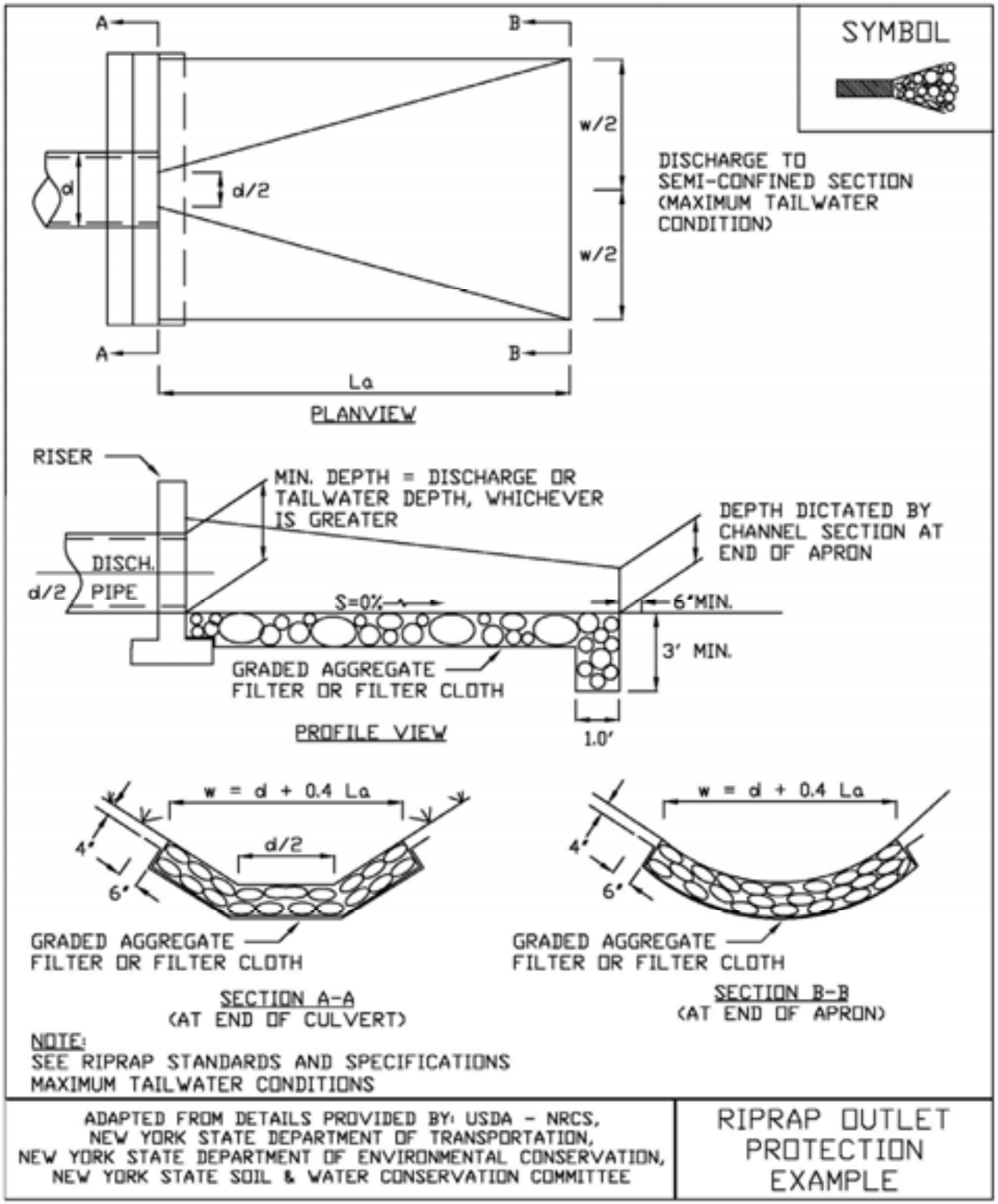


Figure 3.20
Riprap Outlet Protection Detail (3)



STANDARD AND SPECIFICATIONS FOR SEDIMENT BASIN



Definition & Scope

A **temporary** basin with a barrier or dam constructed across a drainage way or at other suitable locations to intercept sediment-laden runoff and reduce the amount of sediment leaving the disturbed area in order to protect drainageways, properties, and rights-of-way below the sediment basin.

Conditions Where Practice Applies

A sediment basin is appropriate where physical site conditions or land ownership restrictions preclude the installation of other control measures to adequately control runoff, erosion, and sedimentation. However, it is required that other erosion control measures be used with the sediment basin. The basin may be used below construction operations which expose critical areas to soil erosion. The basin shall be maintained until the disturbed area is protected against erosion by permanent stabilization.

This standard applies to the installation of temporary sediment basins on sites where: (a) failure of the structure would not result in loss of life, damage to homes or buildings, or interruption of use or service of public roads or utilities; (b) the drainage area does not exceed 50 acres; and (c) the basin is to be removed within 36 months after the beginning of construction of the basin.

Permanent (to function more than 36 months) sediment basins, or structures that temporarily function as a sediment basin but are intended for use as a permanent pool shall be classified as **permanent** structures and shall conform to criteria appropriate for permanent structures. These structures shall be designed and constructed to conform to NRCS Standard And Specification No. 378 for Ponds in the National Handbook of Conservation Practices and the New York State Department of Environmental Conservation, "Guidelines for the Design of Dams."

Design Criteria

Compliance with Laws and Regulations

Design and construction shall comply with state and local laws, ordinances, rules and regulations, including permits.

Location - Maximum Drainage Area = 50 acres

The sediment basin should be located to obtain the maximum storage benefit from the terrain and for ease of cleanout of the trapped sediment. It should be located to minimize interference with construction activities and construction of utilities. Whenever possible, sediment basins should be located so that storm drains may outfall or be diverted into the basin. **Do not locate basins in perennial streams.**

Size and Shape of the Basin

The sediment basin will contain two separate zones. The lowest zone is the sediment storage zone. This zone is sized for a volume equal to 1,000 cubic feet per disturbed acre over the course of the life of the project, contributing to the basin as measured from the bottom of the basin to the bottom of the dewatering zone. It shall have a minimum depth of 1 foot. Layered above this zone is the dewatering zone. This zone is sized for a minimum volume equal to 3,600 cubic feet per each acre draining to the basin. This volume is temporarily stored between the sediment storage zone and the crest of the principal spillway. This zone should be a minimum of 3 feet deep. See Figures 5.8 and 5.9 on pages 5.26 and 5.27. This 3,600 cubic feet per acre is equivalent to one inch of sediment per acre of drainage area. The entire drainage area is used for this computation, rather than the disturbed area above, to maximize trapping efficiency. The length to width ratio shall be 2:1 or greater, where length is the distance between the inlet and outlet. A wedge shape shall be used with the inlet located at the narrow end. See Figure 5.22 on page 5.41.

Surface Area

Research studies (Barfield and Clar 1985; Pitt, 2003) indicate that the following relationship between surface area and peak inflow rate gives a trapping efficiency of 75% for silt loam soils, and greater than 90% for loamy sand soils:

$A = 0.01\ Qp$ or, $A = 0.015x$ D.A. (whichever is greater)

where,

A = the basin surface area, acres, measured at the service spillway crest; and

Qp = the peak inflow rate for the design storm. (The minimum design storm will be a 10 year, 24 hour storm under construction conditions).

D.A. = contributing drainage area.

Sediment basins shall be cleaned out when the sediment storage zone volume described above is reduced by 50 percent, except in no case shall the sediment level be permitted to build up higher than one foot below the bottom of the dewatering zone. At this elevation, cleanout shall be performed to restore the original design volume to the sediment storage zone.

The elevation corresponding to the maximum allowable sediment level shall be determined and shall be stated in the design data as a distance below the top of the riser and shall be clearly marked on the riser.

The basin dimensions necessary to obtain the required basin volume as stated above shall be clearly shown on the plans to facilitate plan review, construction, and inspection.

Spillway Design

Runoff shall be computed by standard accepted hydrologic methods noted previously in this book of standards. **Runoff computations shall be based upon the worst soil cover conditions expected to prevail in the contributing drainage area during the anticipated effective life of the structure.** The combined capacities of the principal and emergency spillway shall be sufficient to pass the peak rate of runoff from a ten (10) year frequency, 24 hour duration storm.

1. Principal spillway: A spillway consisting of a vertical pipe or box type riser joined (watertight connection) to a pipe (barrel) which shall extend through the embankment and outlet beyond the downstream toe of the fill. The minimum capacity of the principal spillway shall be 0.2 cfs per acre of drainage area when the water surface is at the emergency spillway crest elevation. For those basins with no emergency spillway, the principal spillway shall have the capacity to handle the peak flow from a ten-year frequency rainfall event. The minimum size of the barrel shall be 8 inches in diameter. See Figures 5.10, 5.11 and 5.12 on pages 5.28, 5.29, and 5.30 for principal spillway sizes and capacities.

   A. Crest elevation: When used in combination with an emergency spillway, the crest elevation of the riser shall be a minimum one foot below the elevation of the control section of the emergency spillway.

   B. Watertight riser and barrel assembly: The riser and all pipe connections shall be completely watertight except for the inlet opening at the top, or a dewatering opening. There shall not be other holes, leaks, rips, or perforations in the structure.

   C. Dewatering the basin:

      1) Preferred Method- The preferred method for dewatering sediment basins is by using surface skimmers to decant the cleaner top surface water from the basin as the sediment settles out. See Dewatering Device Standard, page 5.10.

      2) Alternative Method– A fixed vertical riser pipe configured with perforations and filter fabric with a cone of pea gravel or small crushed stone is an alternative option for use. See Figure 5.5 on page 5.14.

      The sediment basin dewatering system shall be designed to release the dewatering zone volume between 2 to 7 days in watersheds not impaired by sediment, and 4-7 days in sediment impaired watersheds (check the NYSDEC Waterbody Inventory/Priority Waterbody List - **http://www.dec.ny.gov/chemical/36730.html**, to see if your site is in an impaired watershed). The design performance range will depend on the percent of silt and clay in the soils tributary to the basin. If the performance of the basin does not meet water quality objectives after 7 days, chemical treatment may be necessary.

   D. Anti-vortex device and trash rack:

      An anti-vortex device and trash rack shall be securely installed on top of the riser and shall be the concentric type as shown in Figure 5.13 and 5.14 on pages 5.31 and 5.32.

   E. Base:

      The riser shall have a base attached with a watertight connection and shall have sufficient weight to prevent flotation of the riser. Two approved bases for risers ten feet or less in height are: 1) a concrete base 18 in. thick with the riser embedded 9 in. in the base, and 2) a ¼" minimum thickness steel plate attached to the riser by a continuous weld around the circumference of the riser to form a watertight connection. The plate shall have 2.5 feet of stone, gravel, or compacted earth placed on it to prevent flotation. In either case, each side of the square base shall be twice the riser diameter.

      For risers greater than ten feet high, computations

shall be made to design a base which will prevent flotation. The minimum factor of safety shall be 1.20 (Downward forces = 1.20 x upward forces). See Figure 5.15 on page 5.33 for details.

F. Anti-Seep Collars: Anti-seep collars shall be installed around all conduits through earth fills of impoundment structures according to the following criteria:

1) Collars shall be placed to increase the seepage length along the conduit by a minimum of 15 percent of the pipe length located within the saturation zone.

2) Collar spacing shall be between 5 and 14 times the vertical projection of each collar.

3) All collars shall be placed within the saturation zone.

4) The assumed normal saturation zone (phreatic line) shall be determined by projecting a line at a slope of 4 horizontal to 1 vertical from the point where the normal water (riser crest) elevation touches the upstream slope of the fill to a point where this line intersects the invert of the pipe conduit. All fill located within this line may be assumed as saturated.

$$2(N)(P) = 1.15(L_s) \qquad N = (0.075)(L_s)/P$$

When anti-seep collars are used, the equation for revised seepage length becomes:

Where: Ls = Saturated length is length, in feet, of pipe between riser and intersection of phreatic line and pipe invert.

N = number of anti-seep collars.

P = vertical projection of collar from pipe, in feet.

5) All anti-seep collars and their connections shall be watertight. See Figures 5.16 and 5.17 on pages 5.34 and 5.35 for anti-seep collar design and Figure 5.18 on page 5.36 for construction details. Seepage diaphragms may be used in lieu of anti-seep collars. They shall be designed in accordance to USDA NRCS Pond Standard 378.

G. Outlet: An outlet shall be provided, including a means of conveying the discharge in an erosion free manner to an existing stable channel. Where discharge occurs at the property line, drainage easements will be obtained in accordance with local ordinances. Adequate notes and references will be shown on the erosion and sediment control plan.

Protection against scour at the discharge end of the pipe spillway shall be provided. Measures may include basin, riprap, revetment, excavated plunge pools, or other approved methods. See Standard and Specification for Rock Outlet Protection, Section 3, page 3.39.

2. Emergency Spillways: The entire flow area of the emergency spillway shall be constructed in undisturbed ground (not fill). The emergency spillway cross-section shall be trapezoidal with a minimum bottom width of eight feet. This spillway channel shall have a straight control section of at least 20 feet in length; and a straight outlet section for a minimum distance equal to 25 feet.

A. Capacity: The minimum capacity of the emergency spillway shall be that required to pass the peak rate of runoff from the 10 year 24-hour frequency storm, less any reduction due to flow in the pipe spillway. Emergency spillway dimensions may be determined by using the method described in Figure 5.19 on page 5.37 and the Design Tables in Figures 5.20 and 5.21 on pages 5.38 and 5.39.

B. Velocities: The velocity of flow in the exit channel shall not exceed 5 feet per second for vegetated channels. For channels with erosion protection other than vegetation, velocities shall be within the non-erosive range for the type of protection used.

C. Erosion Protection: Erosion protection shall be provided for by vegetation as prescribed in this publication or by other suitable means such as riprap, asphalt or concrete.

D. Freeboard: Freeboard is the difference between the design high water elevation in the emergency spillway and the top of the settled embankment. If there is no emergency spillway, it is the difference between the water surface elevation required to pass the design flow through the pipe and the top of the settled embankment. Freeboard shall be at least one foot.

Embankment Cross-Section

1. The maximum height of dam = 15 feet (measured from the low point of original ground at the downstream toe to the top of the dam).

2. Minimum top width of dam = 10 feet.

3. Side slopes shall be 2.5 to 1 or flatter.

Entrance of Runoff into Basin

Points of entrance of surface runoff into excavated sediment basins shall be protected to prevent erosion. Considerable care should be given to the major points of inflow into basins. In many cases the difference in elevation of the inflow and the bottom of the basin is considerable, thus creating a potential for severe gullying and sediment generation. Often a riprap drop at major points of inflow would eliminate gullying and sediment generation.

Diversions, grade stabilization structures or other water control devices shall be installed as necessary to ensure direction of runoff and protect points of entry into the basin. Points of entry should be located so as to ensure maximum travel distance of entering runoff to point of exit (the riser) from the basin.

Disposal

The sediment basin plans shall indicate the method (s) of disposing of the sediment removed from the basin. The sediment shall be placed in such a manner that it will not erode from the site. The sediment shall not be deposited downstream from the basin, adjacent to a stream or floodplain. Disposal sites will be covered by an approved sediment control plan.

The sediment basins plans shall also show the method of disposing of the sediment basin after the drainage area is stabilized, and shall include the stabilization of the sediment basin site. Water contained within the storage areas shall be removed from the basin by pumping, cutting the top of the riser, or other appropriate method prior to removing or breaching the embankment. **Sediment shall not be allowed to flush into a stream or drainageway.**

Chemical Treatment

Precipitation of sediment is enhanced with the use of specific chemical flocculants that can be applied to the sediment basin in liquid, powder, or solid form. Flocculants include anionic polyelectrolytes such as polyacrylimides, aluminum sulfate (alum), polyaluminum chloride and chitosan. Cationic polyelectrolytes have a greater toxicity to fish and other aquatic organisms than anionic polyelectrolytes because they bind to the gills of fish resulting in respiratory failure (Pitt, 2003).

Chemical treatment shall not be substituted for proper erosion and sediment control. To reduce the need for flocculants, proper controls include planning, phasing, sequencing and practice design in accordance to NY Standards. **Chemical applications shall not be applied without written approval from the NYSDEC.**

Safety

Sediment basins are attractive to children and can be very dangerous. Local ordinances and regulations must be adhered to regarding health and safety. The developer or owner shall check with local building officials on applicable safety requirements. If fencing of sediment basins is required, the location of and type of fence shall be shown on the plans.

Construction Specifications

Site Preparation

Areas under the embankment shall be cleared, grubbed, and stripped of topsoil to remove trees, vegetation, roots, or other objectionable material. In order to facilitate cleanout and restoration, the pool area (measured at the top of the pipe spillway) will be cleared of all brush, trees, and other objectionable materials.

Cutoff-Trench

A cutoff trench shall be excavated along the centerline of earth fill embankments. The minimum depth shall be two feet. The cutoff trench shall extend up both abutments to the riser crest elevation. The minimum bottom width shall be four feet, but wide enough to permit operation of excavation and compaction equipment. The side slopes shall be no steeper than 1:1. Compaction requirements shall be the same as those for embankment. The trench shall be dewatered during the back-filling/compaction operations.

Embankment

The fill material shall be taken from approved areas shown on the plans. It shall be clean mineral soil free of roots, woody vegetation, oversized stones, rocks, or other objectionable material. Relatively pervious materials such as sand or gravel (Unified Soil Classes GW, GP, SW & SP) shall not be placed in the embankment. Areas on which fill is to be placed shall be scarified prior to placement of fill. The fill material shall contain sufficient moisture so that it can be formed by hand into a ball without crumbling. If water can be squeezed out of a ball, it is too wet for proper compaction. Fill material shall be placed in six to eight-inch thick continuous layers over the entire length of the fill. Compaction shall be obtained by routing and hauling the construction equipment over the fill so that the entire surface of each layer of the fill is traversed by at least one

wheel or tread track of the equipment or by the use of a compactor. The embankment shall be constructed to an elevation 10 percent higher than the design height to allow for settlement.

Pipe Spillway

The riser shall be securely attached to the barrel or barrel stub by welding the full circumference making a watertight structural connection. The barrel stub must be attached to the riser at the same percent (angle) of grade as the outlet conduit. The connection between the riser and the riser base shall be watertight. All connections between barrel sections must be achieved by approved watertight bank assemblies. The barrel and riser shall be placed on a firm, smooth foundation of impervious soil. Pervious materials such as sand, gravel, or crushed stone shall not be used as backfill around the pipe or anti-seep collars. The fill material around the pipe spillway shall be placed in four-inch layers and compacted under and around the pipe to at least the same density as the adjacent embankment.

A minimum depth of two feet of hand compacted backfill shall be placed over the pipe spillway before crossing it with construction equipment. Steel base plates on risers shall have at least 2 ½ feet of compacted earth, stone, or gravel placed over it to prevent flotation.

Emergency Spillway

The emergency spillway shall be installed in undisturbed ground. The achievement of planned elevations, grades, design width, entrance and exit channel slopes are critical to the successful operation of the emergency spillway and must be constructed within a tolerance of +/- 0.2 feet.

Vegetative Treatment

Stabilize the embankment and emergency spillway in accordance with the appropriate vegetative standard and specification immediately following construction. In no case shall the embankment remain unstabilized for more than three (3) days.

Erosion and Pollution Control

Construction operations shall be carried out in such a manner that erosion and water pollution will be minimized. State and local laws shall be complied with concerning pollution abatement.

Safety

State and local requirements shall be met concerning fencing and signs, warning the public of hazards of soft sediment and floodwater.

Maintenance

1. Repair all damages caused by soil erosion and construction equipment at or before the end of each working day.

2. Sediment shall be removed from the basin when it reaches the specified depth for cleanout noted on the plans which will not exceed 50% of the capacity of the sediment storage zone. This sediment shall be placed in such a manner that it will not erode from the site. The sediment shall not be deposited downstream from the embankment, adjacent to a stream or floodplain.

Final Disposal

When temporary structures have served their intended purpose and the contributing drainage area has been properly stabilized, the embankment and resulting sediment deposits are to be leveled or otherwise disposed of in accordance with the approved sediment control plan. The proposed use of a sediment basin site will often dictate final disposition of the basin and any sediment contained therein. If the site is scheduled for future construction, then the basin material and trapped sediments must be removed, safely disposed of, and backfilled with a structural fill. When the basin area is to remain open space, the pond may be pumped dry, graded, and backfilled.

Information to be Submitted

Sediment basin designs and construction plans submitted for review to a local municipality, New York State DEC, New York City DEP, Soil and Water Conservation District, or other agency shall include the following:

1. Specific location of the basin.

2. Plan view of the storage basin and emergency spillway, showing existing and proposed contours.

3. Cross section of dam, principal spillway, emergency spillway, and profile of emergency spillway.

4. Details of pipe connections, riser to pipe connections, riser base, anti-seep control, trash rack cleanout elevation, and anti-vortex device.

5. Runoff calculations for 1 and 10-year frequency storms, if required.

6. Storage Computations

    A. Zones total required

    B. Zones total Available

    C. Elevation of sediment at which cleanout shall be required; also stated as a distance from the riser

TEMPORARY SEDIMENT BASIN DESIGN DATA SHEET

Computed by _____ Date _____Checked by _____Date _____
Project_____Basin #_____
Location _____ Total Area draining to basin (≤50 Ac.) _____Acres

BASIN SIZE DESIGN

1. Sediment storage zone volume = 1,000 cu. ft. x number of disturbed acres = _____ cu. ft., Top of Zone Elev. _____
2. Dewatering zone volume = 3,600 cu. ft. x number of drainage area acres = _____cu. ft., Top of Zone Elev. _____
3. Length to width ratio = _____
4. A. Cleanout at 50% of sediment storage zone volume, Elev. _____
   B. Distance below top of riser _____ feet
5. Minimum surface area is larger of 0.01 $Q_{(10)}$ _____or, 0.015 DA = _____ use _____acres

DESIGN OF SPILLWAYS & ELEVATIONS

Runoff

6. $Q_{p(10)}$ = _____cfs (Attach runoff computation sheets)

Pipe Spillway (Q_{ps})

7. Min. pipe spillway cap., Q_{ps} = 0.2 x _____Drainage Area, acres = _____cfs
   Note: If there is no emergency spillway, then required $Q_{ps} = Q_{p(10)}$ = _____cfs.
8. H, head = _____ft. Barrel length = _____ft
9. Barrel: Diam. _____inches; Q_{ps} = (Q) _____x (cor.fac.)_____=_____cfs.
10. Riser: Diam. _____inches; Length _____ft.; h = _____ft. Crest Elev. _____
11. Trash Rack: Diameter = _____inches; H, height = _____inches

Emergency Spillway Design

12. Emergency Spillway Flow, $Q_{es} = Q_p - Q_{ps}$ = _____ - _____ = _____cfs.
13. Width _____ft.; H_p _____ft Crest elevation _____; Design High Water Elev. _____
    Entrance channel slope_____% ; Top of Dam Elev. _____
    Exit channel slope _____%

ANTI-SEEP COLLAR/SEEPAGE DIAPHRAGM DESIGN

Collars:

14. y = _____ft.; z = _____:1; pipe slope = _____%, L_s = _____ft.
    Use _____ collars, _____ - _____inches square; projection = _____ft.

Diaphragms:

#_____ width_____ ft. height _____ft.

DEWATERING ORIFICE SIZING

(Determined from the Dewatering Device Standard)

15. Dewatering orifice diameter = _____ inches. Skimmer ___ or Riser ____ (check one)
16. Design dewatering time _____ days (Min. 2 days required)

TEMPORARY SEDIMENT BASIN DESIGN DATA SHEET INSTRUCTIONS FOR USE OF FORM

1. Minimum required sediment storage zone volume is 1,000 cubic feet per acre from each disturbed acre within the total drainage area. Minimum required dewatering zone volume is 3,600 cubic feet per total area draining to the basin.

2. The volume of a naturally shaped basin (no excavation in basin) may be approximated by the formula V = (0.4)(A)(d), where V is in cubic feet, A is the surface area of the basin, in square feet, and d is the maximum depth of the basin, in feet. Volume may be computed from contour information or other suitable methods.

3. If volume of basin is not adequate for required storage, excavate to obtain the required zone volumes.

4. The minimum surface area of the basin pool at the storage volume elevation will be the larger of the two elevations shown.

5. Use of the NRCC hydrologic data at www.precip.net with an appropriate hydrologic model, is the preferred process for runoff computation. Runoff curve numbers will be computed for the drainage area that reflects the maximum construction condition.

6. Required minimum discharge from pipe spillway equals 0.2 cfs/ac. times total drainage area. (This is equivalent to a uniform runoff of 5 in. per 24 hours). The pipe shall be designed to carry Q_p if site conditions preclude installation of an emergency spillway to protect the structure.

7. Determine value of "H" from field conditions; "H" is the interval between the centerline of the outlet pipe and the emergency spillway crest, or if there is no emergency spillway, to the design high water.

8. See Pipe Flow Charts, Figures 5.11 and 5.12 on pages 5.29 and 5.30.

9. See Riser Inflow Curves, Figure 5.10 on page 5.28.

10. Compute the orifice size required to dewater the basin over a minimum 48 hour period. See the Dewatering Device Standard on page 5.10.

11. See Trash Rack and Anti-Vortex Device Design, Figures 5.13 and 5.14 on pages 5.31 and 5.32.

12. Compute Q_{es} by subtracting actual flow carried by the pipe spillway from the total inflow, Q_p.

13. Use appropriate tables to obtain values of H_p, bottom width, and actual Q_{es}. If no emergency spillway is to be used, so state, giving reason (s).

14. See Anti-Seep Collar / Seepage Diaphragm Design (see figures 5.16, 5.17 and 5.18 on pages 5.34, 5.35 and 5.36).

15. Fill in design elevations. The emergency spillway crest must be set no closer to riser crest than value of h, which causes pipe spillway to carry the minimum, required Q. Therefore, the elevation difference between spillways shall be equal to the value of h, or one foot, whichever is greater. Design high water is the elevation of the emergency spillway crest plus the value of H_p, or if there is no emergency spillway, it is the elevation of the riser crest plus h required to handle the 10-year storm. Minimum top of dam elevation requires 1.0 ft. of freeboard above design high water.

To use charts for pipe spillway design:

1. Enter chart, Figures 5.11 or 5.12 on pages 5.29 and 5.30 with H and required discharge.

2. Find diameter of pipe conduit that provides equal or greater discharge

3. Enter chart, Figure 5.10 on page 5.28 with actual pipe discharge. Read across to select smallest riser that provides discharge within weir flow portion of rating curve. Read down to find corresponding h required. This h must be 1 foot or less.

Figure 5.8
Pipe Spillway Design

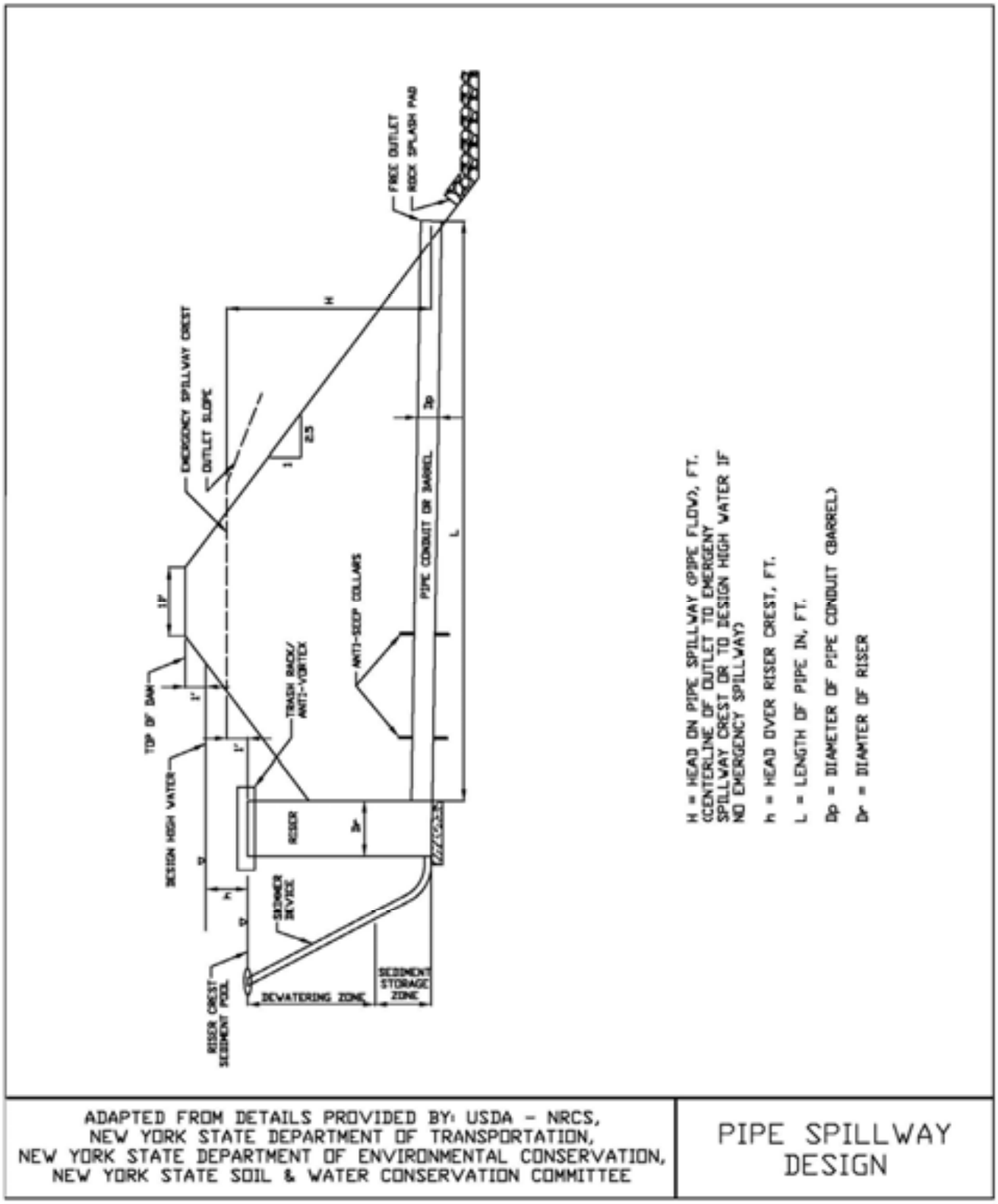
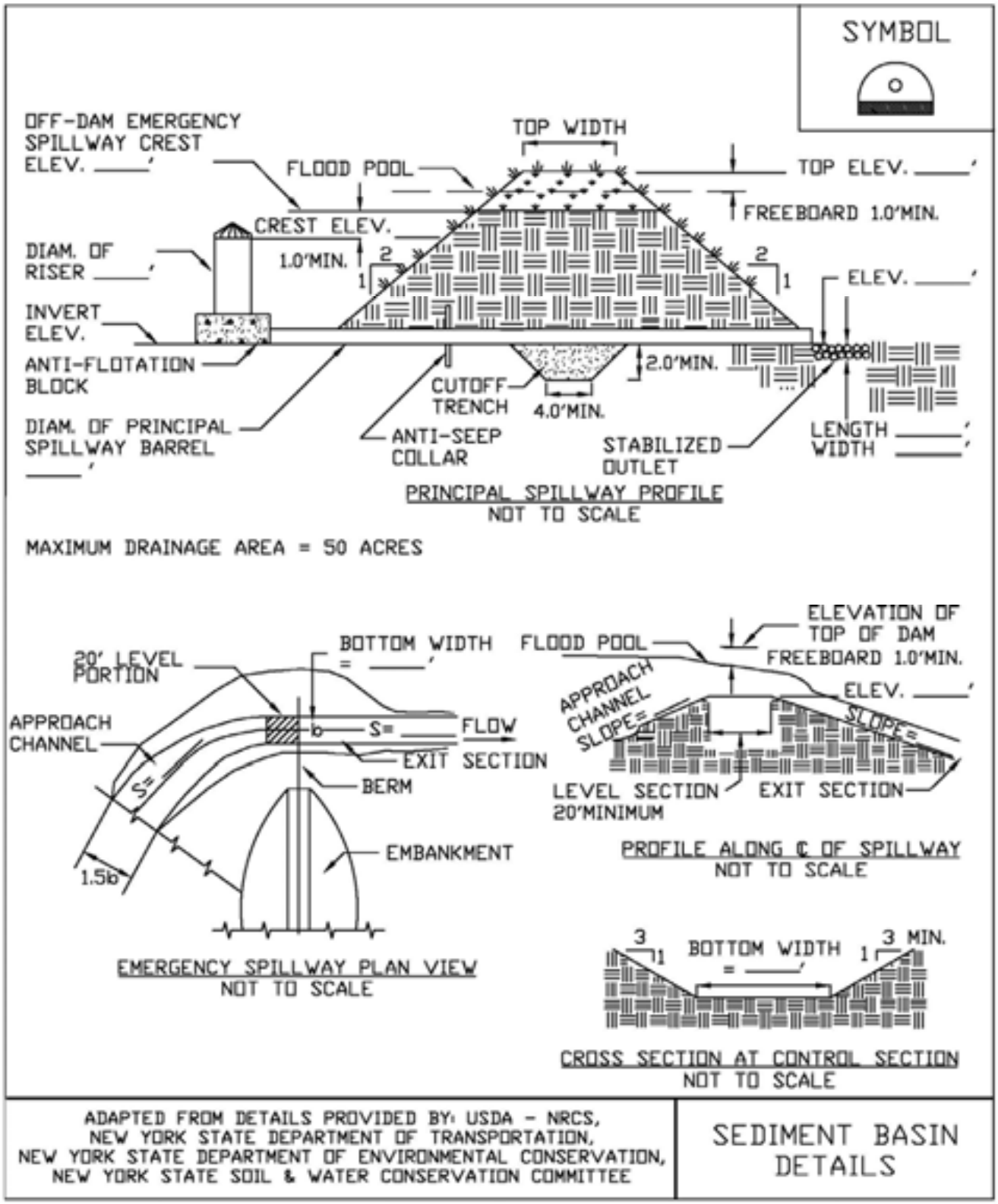


Figure 5.9
Sediment Basin



STANDARD AND SPECIFICATIONS FOR SILT FENCE



Definition & Scope

A **temporary** barrier of geotextile fabric installed on the contours across a slope used to intercept sediment laden runoff from small drainage areas of disturbed soil by temporarily ponding the sediment laden runoff allowing settling to occur. The maximum period of use is limited by the ultraviolet stability of the fabric (approximately one year).

Conditions Where Practice Applies

A silt fence may be used subject to the following conditions:

1. Maximum allowable slope length and fence length will not exceed the limits shown in the Design Criteria for the specific type of silt fence used ; and
2. Maximum ponding depth of 1.5 feet behind the fence; and
3. Erosion would occur in the form of sheet erosion; and
4. There is no concentration of water flowing to the barrier; and
5. Soil conditions allow for proper keying of fabric, or other anchorage, to prevent blowouts.

Design Criteria

1. Design computations are not required for installations of 1 month or less. Longer installation periods should be designed for expected runoff.
2. All silt fences shall be placed as close to the disturbed area as possible, but at least 10 feet from the toe of a slope steeper than 3H:1V, to allow for maintenance and roll down. The area beyond the fence must be undisturbed or stabilized.
3. The type of silt fence specified for each location on the plan shall not exceed the maximum slope length and maximum fence length requirements shown in the following table:

		Slope Length/Fence Length (ft.)		
Slope	Steepness	Standard	Reinforced	Super
<2%	< 50:1	300/1500	N/A	N/A
2-10%	50:1 to 10:1	125/1000	250/2000	300/2500
10-20%	10:1 to 5:1	100/750	150/1000	200/1000
20-33%	5:1 to 3:1	60/500	80/750	100/1000
33-50%	3:1 to 2:1	40/250	70/350	100/500
>50%	> 2:1	20/125	30/175	50/250

Standard Silt Fence (SF) is fabric rolls stapled to wooden stakes driven 16 inches in the ground.
Reinforced Silt Fence (RSF) is fabric placed against welded wire fabric with anchored steel posts driven 16 inches in the ground.
Super Silt Fence (SSF) is fabric placed against chain link fence as support backing with posts driven 3 feet in the ground.

4. Silt fence shall be removed as soon as the disturbed area has achieved final stabilization.

The silt fence shall be installed in accordance with the appropriate details. Where ends of filter cloth come together, they shall be overlapped, folded and stapled to prevent sediment bypass. Butt joints are not acceptable. A detail of the silt fence shall be shown on the plan. See Figure 5.30 on page 5.56 for Reinforced Silt Fence as an example of details to be provided.

Criteria for Silt Fence Materials

1. Silt Fence Fabric: The fabric shall meet the following specifications unless otherwise approved by the appropriate erosion and sediment control plan approval authority. Such approval shall not constitute statewide acceptance.

Fabric Properties	Minimum Acceptable Value	Test Method
Grab Tensile Strength (lbs)	110	ASTM D 4632
Elongation at Failure (%)	20	ASTM D 4632
Mullen Burst Strength (PSI)	300	ASTM D 3786
Puncture Strength (lbs)	60	ASTM D 4833
Minimum Trapezoidal Tear Strength (lbs)	50	ASTM D 4533
Flow Through Rate (gal/ min/sf)	25	ASTM D 4491
Equivalent Opening Size	40-80	US Std Sieve ASTM D 4751
Minimum UV Residual (%)	70	ASTM D 4355

2. Fence Posts (for fabricated units): The length shall be a minimum of 36 inches long. Wood posts will be of sound quality hardwood with a minimum cross sectional area of 3.5 square inches. Steel posts will be standard T and U section weighing not less than 1.00 pound per linear foot. Posts for super silt fence shall be standard chain link fence posts.

3. Wire Fence for reinforced silt fence: Wire fencing shall be a minimum 14 gage with a maximum 6 in. mesh opening, or as approved.

4. Prefabricated silt fence is acceptable as long as all material specifications are met.

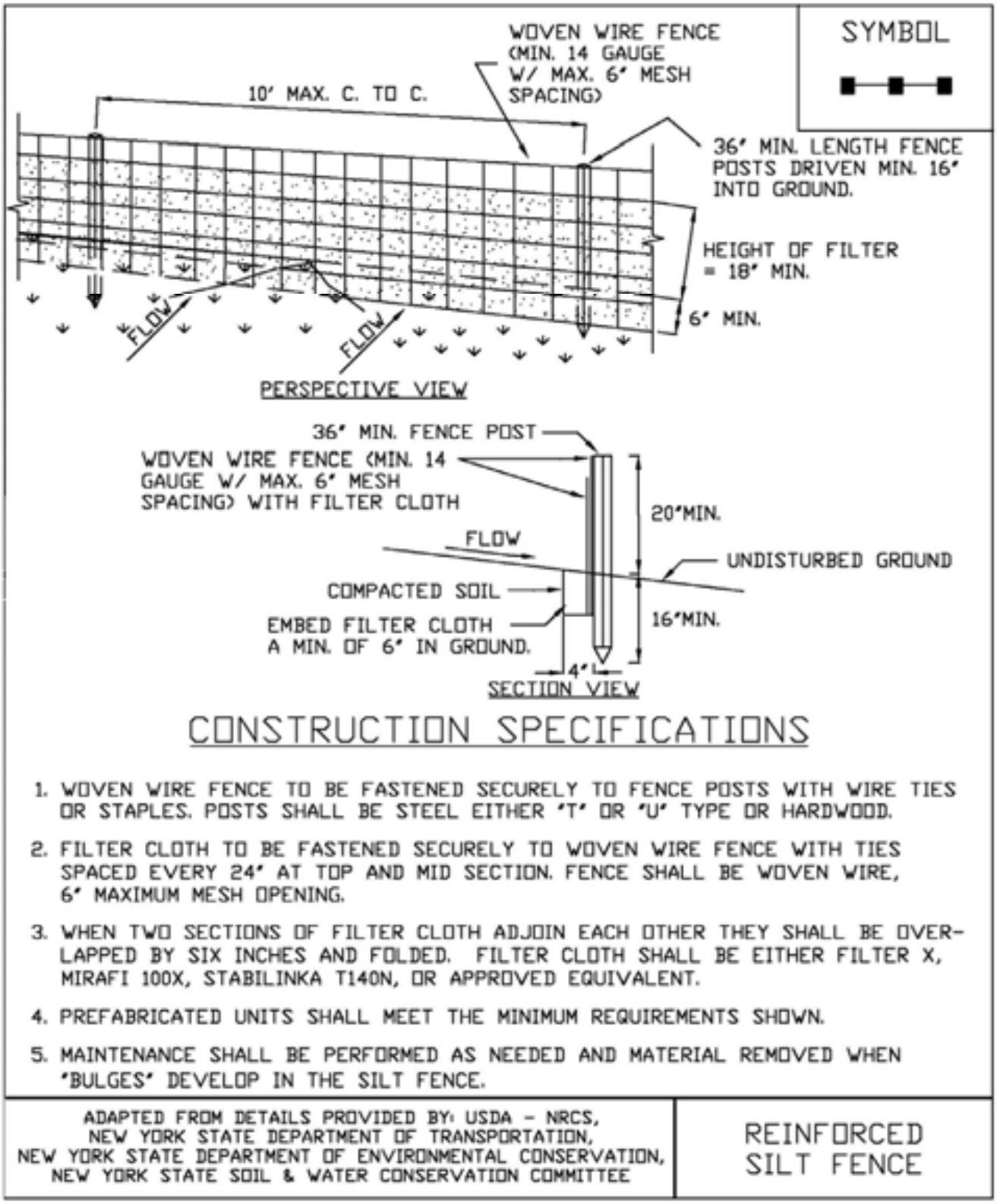
Super Silt Fence



Reinforced Silt Fence



Figure 5.30
Reinforced Silt Fence



STANDARD AND SPECIFICATIONS FOR SOIL RESTORATION



Definition & Scope

The decompaction of areas of a development site or construction project where soils have been disturbed to recover the original properties and porosity of the soil; thus providing a sustainable growth medium for vegetation, reduction of runoff and filtering of pollutants from stormwater runoff.

Conditions Where Practice Applies

Soil restoration is to be applied to areas whose heavy construction traffic is done and final stabilization is to begin. This is generally applied in the cleanup, site restoration, and landscaping phase of construction followed by the permanent establishment of an appropriate ground cover to maintain the soil structure. Soil restoration measures should be applied over and adjacent to any runoff reduction practices to achieve design performance.



Design Criteria

1. Soil restoration areas will be designated on the plan views of areas to be disturbed.
2. Soil restoration will be completed in accordance with Table 4.6 on page 4.53.

Specification for Full Soil Restoration

During periods of relatively low to moderate subsoil moisture, the disturbed subsoils are returned to rough grade and the following Soil Restoration steps applied:

1. Apply 3 inches of compost over subsoil. The compost shall be well decomposed (matured at least 3 months), weed-free, organic matter. It shall be aerobically composted, possess no objectionable odors, and contain less than 1%, by dry weight, of man-made foreign matter. The physical parameters of the compost shall meet the standards listed in Table 5.2 - Compost Standards Table, except for "Particle Size" 100% will pass the 1/2" sieve. **Note: All biosolids compost produced in New York State (or approved for importation) must meet NYS DEC's 6 NYCRR Part 360 (Solid Waste Management Facilities) requirements. The Part 360 requirements are equal to or more stringent than 40 CFR Part 503 which ensure safe standards for pathogen reduction and heavy metals content.**



2. Till compost into subsoil to a depth of at least 12 inches using a cat-mounted ripper, tractor mounted disc, or tiller, to mix and circulate air and compost into the subsoil.
3. Rock-pick until uplifted stone/rock materials of four inches and larger size are cleaned off the site.
4. Apply topsoil to a depth of 6 inches.
5. Vegetate as required by the seeding plan. Use appropriate ground cover with deep roots to maintain the soil structure.
6. Topsoil may be manufactured as a mixture or a mineral component and organic material such as compost.

At the end of the project an inspector should be able to push a 3/8" metal bar 12 inches into the soil just with body weight. This should not be performed within the drip line of any existing trees or over utility installations that are within 24 inches of the surface.

Maintenance

Keep the site free of vehicular and foot traffic or other weight loads. Consider pedestrian footpaths.

Table 4.6
Soil Restoration Requirements

Type of Soil Disturbance	Soil Restoration Requirement		Comments/Examples
No soil disturbance	Restoration not permitted		Preservation of Natural Features
Minimal soil disturbance	Restoration not required		Clearing and grubbing
Areas where topsoil is stripped only - no change in grade	HSG A&B	HSG C&D	Protect area from any ongoing construction activities.
	Apply 6 inches of topsoil	Aerate* and apply 6 inches of topsoil	
Areas of cut or fill	HSG A&B	HSG C&D	
	Aerate* and apply 6 inches of topsoil	Apply full Soil Restoration**	
Heavy traffic areas on site (especially in a zone 5-25 feet around buildings but not within a 5 foot perimeter around foundation walls)	Apply full Soil Restoration (decompaction and compost enhancement)		
Areas where Runoff Reduction and/or Infiltration practices are applied	Restoration not required, but may be applied to enhance the reduction specified for appropriate practices.		Keep construction equipment from crossing these areas. To protect newly installed practice from any ongoing construction activities construct a single phase operation fence area
Redevelopment projects	Soil Restoration is required on redevelopment projects in areas where existing impervious area will be converted to pervious area.		

* Aeration includes the use of machines such as tractor-drawn implements with coulters making a narrow slit in the soil, a roller with many spikes making indentations in the soil, or prongs which function like a mini-subsoiler.
** Per "Deep Ripping and De-compaction, DEC 2008".

STANDARD AND SPECIFICATIONS FOR STABILIZATION WITH SOD



Definition & Scope

Stabilizing restored, exposed soil surfaces by establishing long term stands of grass with sod to reduce damage from sediment and runoff to downstream areas and enhance natural beauty.

Conditions Where Practice Applies

On exposed soils that have a potential for causing off site environmental damage where a quick vegetative cover is desired. Moisture, either applied or natural, is essential to success.

Design Criteria

1. Sod shall be bluegrass or a bluegrass/red fescue mixture or a perennial ryegrass for average sites. (CAUTION: Perennial ryegrass has limited cold tolerance and may winter kill.) Use turf type cultivars of tall fescue for shady, droughty, or otherwise more critical areas. For variety selection, contact Cornell Cooperative Extension Turf Specialist.

2. Sod shall be machine cut at a uniform soil thickness of 3/4 inch, plus or minus 1/4 inch. Measurement for thickness shall exclude top growth and thatch.

3. Standard size sections of sod shall be strong enough to support their own weight and retain their size and shape when suspended vertically from a firm grasp on the upper 10 percent of the section.

4. Sod shall be free of weeds and undesirable coarse weedy grasses. Wild native or pasture grass sod shall not be used unless specified.

5. Sod shall not be harvested or transplanted when moisture content (excessively dry or wet) may adversely affect its survival.

6. Sod shall be harvested, delivered, and installed within a period of 36 hours. Sod not transplanted within this period shall be inspected and approved by the contracting officer or his designated representative prior to its installation.

Site Preparation

Fertilizer and lime application rates shall be determined by soil tests. Under unusual circumstances where there is insufficient time for a complete soil test and the contracting officer agrees, fertilizer and lime materials may be applied in amounts shown in subsection 2 below. Slope land such as to provide good surface water drainage. Avoid depressions or pockets.

1. Prior to sodding, the surface shall be smoothed and cleared of all trash, debris, and of all roots, brush, wire, grade stakes and other objects that would interfere with planting, fertilizing or maintenance operations.

2. **The soil should be tested to determine the amounts of amendments needed.** Where the soil is acid or composed of heavy clays, ground limestone shall be spread to raise the pH to 6.5. If the soil must be fertilized before results of a soil test can be obtained to determine fertilizer needs, apply commercial fertilizer at 20 lbs. of 5-5-10 (or equivalent) and mix into the top 3 inches of soil with the required lime for every 1,000 square feet. Soil should be moist prior to sodding. Arrange for temporary storage of sod to keep it shaded and cool.

Sod Installation

1. For the operation of laying, tamping, and irrigating for any areas, sod shall be completed within eight hours. During periods of excessively high temperature, the soil shall be lightly moistened immediately prior to laying the sod.

2. The first row of sod shall be laid in a straight line with subsequent rows placed parallel to, and tightly wedged against, each other. Lateral joints shall be staggered to promote more uniform growth and strength. Ensure that sod is not stretched or overlapped and that all joints are butted tight in order to prevent voids which would cause air drying of the roots. On sloping areas where erosion may be a problem, sod shall be laid with the long edges parallel to the contour and with

staggered joints.

3. Secure the sod by tamping and pegging, or other approved methods. As sodding is completed in any one section, the entire area shall be rolled or tamped to ensure solid contact of roots with the soil surface.

4. Sod shall be watered immediately after rolling or tamping until the underside of the new sod pad and soil surface below the sod are thoroughly wet. Keep sod moist for at least two weeks.

Sod Maintenance

1. In the absence of adequate rainfall, watering shall be performed daily, or as often as deemed necessary by the inspector, during the first week and in sufficient quantities to maintain moist soil to a depth of 4 inches. Watering should be done in the morning. Avoid excessive watering during applications.

2. After the first week, sod shall be watered as necessary to maintain adequate moisture and ensure establishment.

3. The first mowing should not be attempted until sod is firmly rooted. No more than 1/3 of the grass leaf shall be removed by the initial cutting or subsequent cuttings. Grass height shall be maintained between 2 and 3 inches unless otherwise specified. Avoid heavy mowing equipment for several weeks to prevent rutting.

4. If the soil must be fertilized before results of a soil test can be obtained to determine fertilizer needs, apply fertilizer three to four weeks after sodding, at a rate of 1 pound nitrogen/1,000 sq.ft. Use a complete fertilizer with a 2-1-1 ratio.

5. Weed Control: Target herbicides for weeds present. Consult current Cornell Pest Control Recommendations for Commercial Turfgrass Management or consult the local office of Cornell Cooperative Extension.

6. Disease Control: Consult the local office of the Cornell Cooperative Extension.

Additional References

1. Home Lawns, Establishment and Maintenance, CCE Information Bulletin 185, Revised November 1994. Cornell University, Ithaca, NY.

2. Installing a Sod Lawn. CCE Suffolk County, NY. Thomas Kowalsick February 1994, Revised January 1999. www.cce.cornell.edu/counties/suffolk/grownet

STANDARD AND SPECIFICATIONS FOR CONCRETE TRUCK WASHOUT



Definition & Scope

A temporary excavated or above ground lined constructed pit where concrete truck mixers and equipment can be washed after their loads have been discharged, to prevent highly alkaline runoff from entering storm drainage systems or leaching into soil.

Conditions Where Practice Applies

Washout facilities shall be provided for every project where concrete will be poured or otherwise formed on the site. This facility will receive highly alkaline wash water from the cleaning of chutes, mixers, hoppers, vibrators, placing equipment, trowels, and screeds. Under no circumstances will wash water from these operations be allowed to infiltrate into the soil or enter surface waters.

Design Criteria

Capacity: The washout facility should be sized to contain solids, wash water, and rainfall and sized to allow for the evaporation of the wash water and rainfall. Wash water shall be estimated at 7 gallons per chute and 50 gallons per hopper of the concrete pump truck and/or discharging drum. The minimum size shall be 8 feet by 8 feet at the bottom and 2 feet deep. If excavated, the side slopes shall be 2 horizontal to 1 vertical.

Location: Locate the facility a minimum of 100 feet from drainage swales, storm drain inlets, wetlands, streams and other surface waters. Prevent surface water from entering the structure except for the access road. Provide appropriate access with a gravel access road sloped down to the structure. Signs shall be placed to direct drivers to the facility after their load is discharged.

Liner: All washout facilities will be lined to prevent leaching of liquids into the ground. The liner shall be plastic sheeting with a minimum thickness of 10 mils with no holes or tears, and anchored beyond the top of the pit with an earthen berm, sand bags, stone, or other structural appurtenance except at the access point.

If pre-fabricated washouts are used they must ensure the capture and containment of the concrete wash and be sized based on the expected frequency of concrete pours. They shall be sited as noted in the location criteria.

Maintenance

- All concrete washout facilities shall be inspected daily. Damaged or leaking facilities shall be deactivated and repaired or replaced immediately. Excess rainwater that has accumulated over hardened concrete should be pumped to a stabilized area, such as a grass filter strip.
- Accumulated hardened material shall be removed when 75% of the storage capacity of the structure is filled. Any excess wash water shall be pumped into a containment vessel and properly disposed of off site.
- Dispose of the hardened material off-site in a construction/demolition landfill. On-site disposal may be allowed if this has been approved and accepted as part of the projects SWPPP. In that case, the material should be recycled as specified, or buried and covered with a minimum of 2 feet of clean compacted earthfill that is permanently stabilized to prevent erosion.
- The plastic liner shall be replaced with each cleaning of the washout facility.
- Inspect the project site frequently to ensure that no concrete discharges are taking place in non-designated areas.

APPENDIX J

NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL
CONSERVATION (NYSDEC)

SPDES GENERAL PERMIT
FOR STORMWATER DISCHARGES

From

CONSTRUCTION ACTIVITY

Permit No. GP-0-25-001

Construction General Permit (CGP)

Issued Pursuant to Article 17, Titles 7, 8 and Article 70

of the Environmental Conservation Law

Effective Date: January 29, 2025 Expiration Date: January 28, 2030

Scott E. Sheeley

Chief Permit Administrator

Scott E. Sheeley JAN. 29, 2025

Authorized Signature Date

Address: NYSDEC
Division of Environmental Permits
625 Broadway, 4th Floor
Albany, N.Y. 12233-1750

PREFACE

Pursuant to Section 402 of the Clean Water Act (CWA), and 40 CFR 122.26(b)(14)(x), (15)(i), and (15)(ii), *stormwater discharges* from certain *construction activities* are unlawful unless they are authorized by a National Pollutant Discharge Elimination System (NPDES) permit or by a state permit program. New York State administers the approved State Pollutant Discharge Elimination System (SPDES) program with permits issued in accordance with the New York State Environmental Conservation Law (ECL) Article 17, Titles 7 and 8, and Article 70, as well as 6 NYCRR Parts 621 and 750.

C*onstruction activities* constitute construction of a *point source* and, therefore, pursuant to ECL sections 17-0505, 17-0701, and 17-0803, the *owner or operator* must have coverage under a SPDES permit prior to *commencement of construction activities*. The *owner or operator* cannot wait until there is an actual *discharge* from the *construction site* to obtain permit coverage.

***Note: The italicized words/phrases within this permit are defined in Appendix A.**

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
SPDES CONSTRUCTION GENERAL PERMIT (CGP) GP-0-25-001
FOR STORMWATER DISCHARGES FROM CONSTRUCTION ACTIVITIES

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Part I. How to Obtain Coverage and General Requirements

To be covered under this permit, the *owner or operator* must meet all eligibility requirements in Part I.A. and follow the requirements for obtaining permit coverage in Part I.D., F., or G.

A. Eligibility Requirements

For a *common plan of development or sale*, the *phase(s)* that meet the eligibility requirements in Part I.A. may obtain coverage under this permit even if other *phase(s)* of the same *common plan of development or sale* do not meet the eligibility requirements and require an individual SPDES permit.

1. The *owner's or operator's construction activities* involve soil disturbances of:

    a. one or more acres; or

    b. less than one acre which are part of a *common plan of development or sale* that will ultimately disturb one or more acres; or

    c. less than one acre where NYSDEC has determined that a SPDES permit is required for *stormwater discharges* based on the potential for contribution to a violation of a *water quality standard* or for significant contribution of pollutants to *surface waters of the State*.

        i. 5,000 square feet or more, but less than one acre, and are in the New York City Watershed located east of the Hudson River, Appendix C Figure 1; or

        ii. 20,000 square feet or more, but less than one acre, within the municipal boundaries of the City of New York (NYC); or

        iii. less than 20,000 square feet which are part of a *common plan of development or sale* that will ultimately disturb 20,000 square feet or more, but less than one acre, within the municipal boundaries of NYC; or

        iv. that creates 5,000 square feet or more of *impervious area* within the municipal boundaries of NYC.

2. *Discharges* from the *owner's or operator's construction activities* are/were not:

    a. already covered by a different SPDES permit; or

    b. covered under a different SPDES permit that was denied, terminated, or revoked; or

    c. identified in an expired individual SPDES permit that was not renewed; or

    d. required to obtain an individual SPDES permit or another general SPDES permit in accordance with Part VII.K.

3. If *construction activities* may adversely affect a species that is endangered or threatened, the *owner or operator* must obtain a:

    a. permit issued pursuant to 6 NYCRR Part 182 for the project; or

    b. letter issued by NYSDEC of non-jurisdiction pursuant to 6 NYCRR Part 182 for the project.

4. If *construction activities* have the potential to affect an *historic property*, the *owner or operator* must obtain one of the following:

    a. documentation that the *construction activity* is not within an archeological buffer area indicated on the sensitivity map, and that the *construction activity* is not located on or immediately adjacent to a property listed or determined to be eligible for listing on the National or State Registers of Historic Places, and that there is no new permanent building on the *construction site* within the following distances from a building, structure, or object that is more than 50 years old, or if there is such a new permanent building on the *construction site* within those parameters that NYS Office of Parks, Recreation and Historic Preservation (OPRHP), a Historic Preservation Commission of a Certified Local Government, or a qualified preservation professional has determined that the building, structure, or object more than 50 years old is not historically/archeologically significant:

        i. 1-5 acres of disturbance - 20 feet; or

        ii. 5-20 acres of disturbance - 50 feet; or

iii. 20+ acres of disturbance - 100 feet.

b. NYSDEC consultation form sent to OPRHP,[1] and copied to NYSDEC's Agency Historic Preservation Officer (APO), and

i. the State Environmental Quality Review Act (SEQR) Environmental Assessment Form (EAF) with a negative declaration or the Findings Statement, with documentation of OPRHP's agreement with the resolution; or

ii. documentation from OPRHP that the *construction activity* will result in No Impact; or

iii. documentation from OPRHP providing a determination of No Adverse Impact; or

iv. a Letter of Resolution signed by the *owner or operator*, OPRHP and the DEC APO which allows for this *construction activity* to be eligible for coverage under the general permit in terms of the State Historic Preservation Act (SHPA).

c. documentation of satisfactory compliance with Section 106 of the National Historic Preservation Act for a coterminous project area:

i. No Affect; or

ii. No Adverse Affect; or

iii. Executed Memorandum of Agreement.

d. documentation that SHPA Section 14.09 has been completed by NYSDEC or another state agency.

5. If *construction activities* are subject to SEQR, the *owner or operator* must obtain documentation that SEQR has been satisfied.

6. If *construction activities* are not subject to SEQR, but subject to the equivalent environmental review from another New York State or federal agency, the

[1] The consultation form can be submitted, along with other project information, through OPRHP's Cultural Resource Information System (CRIS) portal. If submitted through CRIS, paper copies of the consultation form need not be mailed.

owner or operator must obtain documentation that project review, pursuant to a process equivalent to SEQR from another New York State or federal agency, has been satisfied.

7. If *construction activities* require Uniform Procedures Act (UPA) Permits (see 6 NYCRR Part 621) from NYSDEC, or the equivalent from another New York State or federal agency, the *owner or operator* must:

    a. obtain all such necessary permits; or

    b. receive notification from NYSDEC pursuant to 6 NYCRR 621.3(a)(4) excepting Part I.A.7.a.

8. *Construction activities* are not eligible if they meet the following criteria in Part I.A.8.a. or b.:

    a. For linear transportation and linear utility project types, the *construction activities*:

        i. are within the watershed of *surface waters of the State* classified as AA or AA-S identified utilizing the Stormwater Interactive Map on NYSDEC's website; and

        ii. are undertaken on land with no existing *impervious cover*; and

        iii. disturb two or more acres of *steep slope*.

    b. For all other project types, the *construction activities*:

        i. are within the watershed of *surface waters of the State* classified as AA or AA-S identified utilizing the Stormwater Interactive Map on NYSDEC's website; and

        ii. are undertaken on land with no existing *impervious cover*; and

        iii. disturb one or more acres of *steep slope*.

B. Types of *Discharges* Authorized

1. The following *stormwater discharges* are authorized under this permit:

   a. *Stormwater discharges*, including *stormwater* runoff, snowmelt runoff, and surface runoff and drainage, associated with *construction activity*, are authorized under this permit provided that appropriate *stormwater* controls are designed, installed, and maintained in accordance with Part II. and Part III.

   b. *Stormwater discharges* from construction support activities at the *construction site* (including concrete or asphalt batch plants, equipment staging yards, material storage areas, excavated material disposal areas, and borrow areas) if the following requirements are met:

      i. The support activity is directly related to the *construction site* required to have permit coverage for *stormwater discharges*; and

      ii. The support activity is not a commercial operation, nor does it serve multiple unrelated *construction sites*; and

      iii. The support activity does not continue to operate beyond the completion of the *construction activity* at the site it supports; and

      iv. *Stormwater* controls are implemented in accordance with Part II. and Part III. for *discharges* from the support activity areas.

2. The following non-*stormwater discharges* associated with *construction activity* are authorized under this permit:

   a. Non-*stormwater discharges* listed in 6 NYCRR 750-1.2(a)(29)(vi), with the following exception: "*Discharges* from firefighting activities are authorized only when the firefighting activities are emergencies/unplanned"; and

   b. Non-*stormwater discharges* of waters to which other components have not been added that are used in accordance with the *SWPPP* to control dust or irrigate vegetation in stabilized areas; and

   c. Uncontaminated *discharges* from *dewatering* operations

3. Authorized *discharges* of *stormwater* or authorized *discharges* of non-*stormwater*, commingled with a *discharge* authorized by a different SPDES permit and/or a *discharge* that does not require SPDES permit authorization, are also authorized under this permit.

C. Prohibited *Discharges*

1. Non-*stormwater discharges* prohibited under this permit include but are not limited to:

    a. Wastewater from washout of concrete; and

    b. Wastewater from washout and cleanout of stucco, paint, form release oils, curing compounds, and other construction materials; and

    c. Fuels, oils, or other *pollutants* used in vehicle and equipment operation and maintenance; and

    d. Soaps, solvents, or detergents used in vehicle and equipment washing or external building washdown; and

    e. Toxic or hazardous substances from a spill or other release.

D. Electronic Notice of Intent (eNOI) Submittal

To receive authorization in accordance with Part I.D.3.b., the *owner or operator* must submit a complete eNOI in accordance with the requirements in Part I.D. The eNOI contains questions to: ensure eligibility requirements in Part I.A. have been met; obtain *owner or operator* contact information; obtain the total area to be disturbed and the existing/future *impervious areas* (rounded to the nearest tenth of an acre); confirm *Traditional Land Use Control MS4 Operator* jurisdiction over construction projects; satisfy the EPA eRule requirements; confirm that the Water Quality-Based Effluent Limitations in Part II. have been met; demonstrate consideration of the future risks due to climate change in accordance with Part III.A.2.; and confirm that the other *Stormwater Pollution Prevention Plan (SWPPP)* requirements in Part III. have been met.

1. An eNOI may be submitted for:

    a. *construction activities* that are not part of a *common plan of development or sale*; or

b. an entire *common plan of development or sale*; or

c. separate *phase(s)* of a *common plan of development or sale* if the following requirements are met:

    i. the *common plan of development or sale* meets the eligibility requirements of Part I.A.5. or 6.; and

    ii. the *phase(s)* meet(s) all other eligibility requirements of Part I.A.; and

    iii. Part III.C. Required *SWPPP* Components by Project Type is based on the *common plan of development or sale*, not the *phase(s)*; or

d. *tree clearing* that is associated with, or will support, a *renewable energy* generation, transmission, or storage project that meets Part I.A.5. and 6., if the *tree clearing*:

    i. meets all other eligibility requirements of Part I.A.; and

    ii. will occur in NYSDEC's Regions 3-9; and

    iii. is not within ¼ mile of a bat hibernaculum protected pursuant to 6 NYCRR Part 182; and

    iv. will occur between November 1st and March 31st.

2. As prerequisites for submitting an eNOI, the *owner or operator* must:

    a. prepare a *SWPPP* for Part I.D.1.a., b., c., or d. in accordance with Part III.; and

    b. based on the following criteria, upload the following signature forms signed in accordance with Part VII.J. to the eNOI prior to submission:

        i. for all eNOIs:

            1. the SWPPP Preparer Certification Form, Appendix F, signed by the *SWPPP* preparer; and

2. the Owner/Operator Certification Form, Appendix J, signed by the *owner or operator*; and

ii. if an eNOI includes *construction activities* within the municipal boundary(ies) of *Traditional Land Use Control MS4 Operator(s)* that will *discharge* to the *MS4(s)*:

1. determine if the *Traditional Land Use Control MS4 Operator(s)* have review authority. A *Traditional Land Use Control MS4 Operator* does not have review authority where:

a. the *owner or operator* of the *construction activities* in Part I.D.2.b.ii. is the same entity as the *Traditional Land Use Control MS4 Operator* identified in Part I.D.2.b.ii.; or

b. there is a statute exempting the *owner or operator* from zoning review by the *Traditional Land Use Control MS4 Operator*; or

c. there is no such statute per Part I.D.2.b.ii.1.b., the *Traditional Land Use Control MS4 Operator* concludes, after public hearing, that it does not have zoning review authority in accordance with Legal Memorandum LU14 Updated January 2020 “Governmental Immunity from Zoning and Other Legislation”; and

2. if the *Traditional Land Use Control MS4 Operator(s)* have review authority, submit the *SWPPP* to the *Traditional Land Use Control MS4 Operator(s)* for review and have:

a. if outside the municipal boundaries of NYC: the MS4 SWPPP Acceptance Form, Appendix G, signed by the principal executive officer or ranking elected official from the *Traditional Land Use Control MS4 Operator,* or by a duly authorized representative of that person in accordance with Part VII.J.2.; or

b. if within the municipal boundaries of NYC: The City of New York Department of Environmental Protection (NYCDEP) SWPPP Acceptance/Approval Form, Appendix H, signed by the principal executive officer or ranking elected official from the Traditional Land Use Control MS4 Operator, or by a duly authorized representative of that person in accordance with Part VII.J.2.; and

3. if the *Traditional Land Use Control MS4 Operator* does not have review authority, have the MS4 No Jurisdiction Form, Appendix I, signed by the principal executive officer or ranking elected official from the *Traditional Land Use Control MS4 Operator,* or by a duly authorized representative of that person in accordance with Part VII.J.2.

3. Submitting an eNOI:

a. The *owner or operator* must submit a complete Notice of Intent electronically using a NYSDEC approved form.[2]

b. The *owner or operator* is authorized to *commence construction activity* as of the authorization date indicated in the Letter of Authorization (LOA), which is sent by NYSDEC after a complete eNOI is submitted.

i. If an eNOI is received for a *SWPPP* that deviates from one of the technical standards but demonstrates *equivalence* in accordance with Part III.B.1.a.ii. or Part III.B.2.b.ii., if the *SWPPP* includes *construction activities* that are not within the municipal boundary(ies) of *Traditional Land Use Control MS4 Operator(s)*, and/or if the *SWPPP* includes *construction activities* within the municipal boundary(ies) of *Traditional Land Use Control MS4 Operator(s)* that do not have review authority in accordance with Part I.D.2.b.ii.1., the authorization date indicated in the LOA will be 60 business days after the eNOI submission date.

[2] Unless NYSDEC grants a waiver in accordance with 40 CFR 127.15(c) or (d). All waiver requests must be submitted to Stormwater_info@dec.ny.gov or NYSDEC, Bureau of Water Permits, 625 Broadway, 4th Floor, Albany, New York 12233-3505.

c. If *Traditional Land Use Control MS4 Operator(s)* have review authority in accordance with Part I.D.2.b.ii.2., the *owner or operator* must, within five business days of receipt of the LOA, send an electronic copy of the LOA to the *Traditional Land Use Control MS4 Operator(s)* with review authority.

E. General Requirements for *Owners or Operators* with Permit Coverage

1. As of the date the LOA is received, the *owner or operator* must make the eNOI, *SWPPP*, and LOA available for review and copying in accordance with the requirements in Part VII.H. When applicable, as of the date an updated LOA is received, the *owner or operator* must make the updated LOA available for review and copying in accordance with the requirements in Part VII.H.

2. The *owner or operator* must ensure compliance with all requirements of this permit and that the provisions of the *SWPPP*, including any changes made to the *SWPPP* in accordance with Part III.A.5., are properly implemented and maintained from the *commencement of construction activity* until:

   a. all areas of disturbance have achieved *final stabilization;* and

   b. the owner's or operator's coverage under this permit is terminated in accordance with Part V.A.5.a.

3. As of the date of the *commencement of construction activities* until Part I.E.2.a. and b. have been met, the *owner or operator* must maintain at the *construction site*, a copy of:

   a. all documentation necessary to demonstrate eligibility with this permit; and

   b. this permit; and

   c. the *SWPPP*; and

   d. the signed SWPPP Preparer Certification Form; and

   e. the signed MS4 SWPPP Acceptance Form or signed NYCDEP SWPPP Acceptance/Approval Form or signed MS4 No Jurisdiction Form (when applicable); and

   f. the signed Owner/Operator Certification Form; and

g. the eNOI; and

h. the LOA; and

i. the LOA transmittal to the Traditional Land Use Control MS4 Operator in accordance with Part I.D.3.c. (when applicable).

4. The *owner or operator* must maintain at the *construction site*, until Part I.E.2.a. and b. have been met, as of the date the documents become final or are received, a copy of the:

   a. responsible contractor's or subcontractor's certification statement(s) in accordance with Part III.A.7.; and

   b. inspection reports in accordance with Part IV.C.4. and 6.; and

   c. Request to Disturb Greater Than Five Acres and the Authorization Letter to Disturb Greater Than Five Acres in accordance with Part I.E.6. (when applicable); and

   d. Request to Continue Coverage and the Letter of Continued Coverage (LOCC) in accordance with Part I.F.2. and 4. (when applicable); and

   e. The updated LOA(s) in accordance with Part I.E.9. (when applicable).

5. The *owner or operator* must maintain the documents in Part I.E.3. and 4. in a secure location, such as a job trailer, on-site construction office, or mailbox with lock. The secure location must be accessible during normal business hours to an individual performing a compliance inspection. The documents must be paper documents unless electronic documents are accessible to the inspector during an inspection to the same extent as a paper copy stored at the site would be. If electronic documents are kept on site, the *owner or operator* must maintain functional equipment on site available to an inspector during normal hours of operation such that an inspector may view the electronic documents in a format that can be read in a similar manner as a paper record and in a legally dependable format with no less evidentiary value than their paper equivalent.

6. The *owner or operator* must meet the following requirements prior to disturbing greater than five acres of soil at any one time:

   a. The *owner or operator* must submit a written Request to Disturb Greater Than Five Acres to:

i. NYSDEC's Regional Office Division of Water staff based on the project location, Appendix E, if a *Traditional Land Use Control MS4 Operator* does not have review authority in accordance with Part I.D.2.b.ii.1.; or

ii. the *Traditional Land Use Control MS4 Operator*, if a *Traditional Land Use Control MS4 Operator* has review authority in accordance with Part I.D.2.b.ii.1.; or

iii. NYSDEC's Regional Office Division of Water staff based on the project location, Appendix E, and each involved *Traditional Land Use Control MS4 Operator*, if the project spans multiple municipalities with more than one *Traditional Land Use Control MS4 Operator* involved with review authority in accordance with Part I.D.2.b.ii.1.

b. The written Request to Disturb Greater Than Five Acres must include:

i. The SPDES permit identification number (Permit ID); and

ii. Full technical justification demonstrating why alternative methods of construction that would result in five acres of soil disturbance or less at any one time are not feasible; and

iii. The phasing plan for the project and sequencing plans for all *phases* from the *SWPPP* in accordance with Part III.B.1.d.; and

iv. Plans with locations and details of erosion and sediment control practices such that the heightened concern for erosion when disturbing greater than five acres at one time has been addressed; and

v. Acknowledgment that "the *owner or operator* will comply with the requirements in Part IV.C.2.b."; and

vi. Acknowledgment that "the *owner or operator* will comply with the requirements in Part II.B.1.b."

c. The *owner or operator* must be in receipt of an Authorization Letter to Disturb Greater Than Five Acres, which will include when the

authorization begins and ends and indicate a maximum area (acres) of soil disturbance allowed at any one time, from:

i. NYSDEC, if Part I.E.6.a.i. or iii. apply; or

ii. the *Traditional Land Use Control MS4 Operator*, if Part I.E.6.a.ii. applies.

7. Upon a finding of significant non-compliance with the practices described in the *SWPPP* or violation of this permit, NYSDEC may order an immediate stop to all *construction activity* at the site until the non-compliance is remedied. The stop work order must be in writing, describe the non-compliance in detail, and be sent to the *owner or operator*.

8. If any human remains or archaeological remains are encountered during excavation, the *owner or operator* must immediately cease, or cause to cease, all *construction activity* in the area of the remains and notify the appropriate Regional Water Engineer (RWE).[3] *Construction activity* shall not resume until written permission to do so has been received from the RWE.

9. To be authorized to implement modifications to the information previously submitted in the eNOI, the *owner or operator* must:

   a. notify NYSDEC via email at Stormwater_info@dec.ny.gov requesting access to update the eNOI; and

   b. update the eNOI to reflect the modifications and resubmit the eNOI in accordance with Part I.D.; and

   c. receive an updated LOA.

10. The eNOI, *SWPPP*, LOA, updated LOAs (when applicable), and inspection reports required by this permit are public documents that the *owner or operator* must make available for review and copying by any person within five business days of the *owner or operator* receiving a written request by any such person to review these documents. Copying of documents will be done at the requester's expense.

[3] The Regional Water Manager where a DEC Region does not have a RWE.

F. Permit Coverage for *Discharges* Authorized Under GP-0-20-001

When applicable:

1. Upon the effective date of this permit, an *owner or operator* of *a construction activity*, with coverage under GP-0-20-001, will have interim coverage under GP-0-25-001 for 45 calendar days starting on the effective date of GP-0-25-001 so long as the *owner or operator* maintains compliance with all applicable requirements of this permit.

2. Within 30 calendar days of the effective date of this permit, the *owner or operator*, with coverage under GP-0-20-001, must submit a complete Request to Continue Coverage electronically using a NYSDEC approved form,[4] which contains the information identified in Part I.F.3. below, if:

   a. the *owner or operator* continues to implement the SMP component in conformance with the technical standards in place at the time of initial project authorization; and

   b. the *owner or operator* will comply with all non-design requirements of GP-0-25-001.

3. The Request to Continue Coverage form contains questions to: ensure eligibility requirements in Part I.A. have been met; verify *owner or operator* contact information; verify the permit identification number; verify the original eNOI submission ID, if applicable; verify Part I.F.2.a. and b.; verify the version of the Design Manual that the technical/design components conform to; and receive an updated Owner/Operator Certification Form, Appendix I.

4. The *owner or operator* has obtained continued coverage under GP-0-25-001 as of the date indicated in the LOCC, which is sent by NYSDEC after a complete Request to Continue Coverage form is submitted.

5. If the owner or operator does not submit the Request to Continue Coverage form in accordance with Part I.F.2. and 3., coverage under this permit is automatically terminated after interim coverage expires.

[4] Unless NYSDEC grants a waiver in accordance with 40 CFR 127.15(c) or (d). All waiver requests must be submitted to Stormwater_info@dec.ny.gov or NYSDEC, Bureau of Water Permits, 625 Broadway, 4th Floor, Albany, New York 12233-3505.

G. Change of *Owner or Operator*

When applicable:

1. When property ownership changes, or when there is a change in operational control over the construction plans and specifications, the following process applies:

    a. The new *owner or operator* must meet the applicable prerequisites for submitting an eNOI in accordance with Part I.D.2.; and

    b. The new *owner or operator* must submit an eNOI in accordance with Part I.D.3.; and

    c. Permit coverage for the new *owner or operator* will be effective upon receipt of the LOA in accordance with Part I.D.3.b.; and

    d. The new *owner or operator*, upon receipt of their LOA, must provide their Permit ID to the original *owner or operator*; and

    e. If the original *owner or operator* will no longer be the *owner or operator* of the *construction activity* identified in the original *owner's or operator's* eNOI, the original *owner or operator*, upon receipt of the new *owner's or operator's* Permit ID in accordance with Part I.G.1.d., must submit to NYSDEC a completed eNOT in accordance with Part V. that includes the name and Permit ID of the new *owner or operator*; or

    f. If the original *owner or operator* maintains ownership of a portion of the *construction activity*, the original *owner or operator* must maintain their coverage under the permit by modifying their eNOI; modifications to the eNOI must include:

        i. the revised area of disturbance and/or *impervious area(s)*; and

        ii. the revised SMP information, if applicable; and

        iii. a narrative description of what has changed; and

        iv. the new *owner's or operator's* Permit ID for the portion of the project removed from the eNOI.

    Owners or operators must follow Part I.E.9. to modify the eNOI.

Part II. Water Quality-Based Effluent Limitations

A. Maintaining Water Quality

NYSDEC expects that compliance with the requirements of this permit will control *discharge*s necessary to meet applicable *water quality standard*s. It shall be a violation of the *ECL* for any *discharge* to either cause or contribute to a violation of the following *water quality standards* as contained in Parts 700 through 705 of Title 6 of the Official Compilation of Codes, Rules and Regulations of the State of New York:

1. There must be no increase in turbidity that will cause a substantial visible contrast to natural conditions; and

2. There must be no increase in suspended, colloidal or settleable solids that will cause deposition or impair the waters for their best usages; and

3. There must be no residue from oil and floating substances, nor visible oil film, nor globules of grease.

If there is evidence indicating that the *stormwater discharge*s authorized by this permit are causing, have the reasonable potential to cause, or are contributing to a violation of the *water quality standard,* the *owner or operator* must take appropriate corrective action in accordance with Part IV.C.5. of this permit and document in accordance with Part IV.C.4. of this permit. To address the *water quality standard* violation the *owner or operator* must include and implement appropriate controls in the *SWPPP* to correct the problem or obtain an individual SPDES permit.

If, despite compliance with the requirements of this permit, it is demonstrated that the *stormwater discharge*s authorized by this permit are causing or contributing to a violation of *water quality standards*, or if NYSDEC determines that a modification of this permit is necessary to prevent a violation of *water quality standards*, the authorized *discharge*s will no longer be eligible for coverage under this permit, and the *owner or operator* must obtain an individual SPDES permit prior to further *discharges* from the *construction site*.

B. Effluent Limitations Applicable to *Discharges* from *Construction Activities*

*Discharge*s authorized by this permit must achieve, at a minimum, the effluent limitations in Part II.B.1.a., b., c., d., and e. These limitations represent the

degree of effluent reduction attainable by the application of best practicable technology currently available.

1. Erosion and Sediment Control Requirements - The *owner or operator* must select, design, install, implement, and maintain control measures to *minimize* the *discharge* of *pollutants* and prevent a violation of the *water quality standards*. The selection, design, installation, implementation, and maintenance of these control measures must meet the non-numeric effluent limitations in Part II.B.1.a., b., c., d., and e. and be in accordance with the New York State Standards and Specifications for Erosion and Sediment Control (BB), dated November 2016, using sound engineering judgment. Where control measures are not designed in conformance with the design criteria included in the technical standard, the *owner or operator* must include in *SWPPP* the reason(s) for the deviation, or alternative design, and provide information in the *SWPPP* demonstrating that the deviation or alternative design is *equivalent* to the technical standard.

    a. **Erosion and Sediment Controls.** At a minimum, erosion and sediment controls must be selected, designed, installed, implemented, and maintained to:

        i. *Minimize* soil erosion through application of runoff control and soil stabilization control measure to *minimize pollutant discharge*s; and

        ii. Control *stormwater discharge*s, including both peak flow rates and total *stormwater* volume, to *minimize* channel and *streambank* erosion and scour in the immediate vicinity of the *discharge* points; and

        iii. *Minimize* the amount of soil exposed during *construction activity*; and

        iv. *Minimize* the disturbance of *steep slope*; and

        v. *Minimize* sediment *discharge*s from the site; and

        vi. Provide and maintain *natural buffers* around surface waters, direct *stormwater* to vegetated areas and maximize *stormwater* infiltration to reduce *pollutant discharge*s, unless *infeasible*; and

        vii. *Minimize* soil compaction. *Minimizing* soil compaction is not required

where the intended function of a specific area of the site dictates that it be compacted; and

viii. Unless *infeasible*, preserve a sufficient amount of topsoil to complete soil restoration and establish a uniform, dense vegetative cover; and

ix. *Minimize* dust. On areas of exposed soil, *minimize* dust through the appropriate application of water or other dust suppression techniques to control the generation of *pollutants* that could be discharged from the site.

b. **Soil Stabilization**. In areas where soil disturbance activity has ceased, whether permanently or *temporarily ceased*, the application of soil stabilization measures must be initiated by the end of the next business day and completed within 14 calendar days from the date the current soil disturbance activity ceased. For *construction sites* that *directly discharge* to one of the 303(d) segments listed in Appendix D, or are located in one of the watersheds listed in Appendix C, or are authorized to disturb greater than five acres in accordance with Part I.E.5.a.viii., the application of soil stabilization measures must be initiated by the end of the next business day and completed within seven calendar days from the date the soil disturbance activity ceased.

c. **Dewatering**. *Discharge*s from *dewatering* activities, including *discharge*s from *dewatering* of trenches and excavations, must be managed by appropriate control measures.

d. **Pollution Prevention Measures**. Select, design, install, implement, and maintain effective pollution prevention measures to *minimize* the *discharge* of *pollutants* and prevent a violation of the *water quality standards*. At a minimum, such measures must be selected, designed, installed, implemented, and maintained to:

i. *Minimize* the *discharge* of *pollutants* from equipment and vehicle washing, wheel wash water, and other wash waters. Soaps, detergents and solvents cannot be used; and

ii. *Minimize* the exposure of building materials, building products, construction wastes, trash, landscape materials, fertilizers, pesticides, herbicides, detergents, sanitary waste, hazardous and toxic waste, and other materials present on the site to precipitation

and to *stormwater*. *Minimization* of exposure is not required in cases where the exposure to precipitation and to *stormwater* will not result in a *discharge* of *pollutants*, or where exposure of a specific material or product poses little risk of *stormwater* contamination (such as final products and materials intended for outdoor use); and

iii. Prevent the *discharge* of *pollutants* from spills and leaks and implement chemical spill and leak prevention and response procedures.

e. **Surface Outlets.** When discharging from basins and impoundments, the surface outlets must be designed, constructed, and maintained in such a manner that sediment does not leave the basin or impoundment and that erosion at or below the outlet does not occur.

C. Post-Construction Stormwater Management Practice (SMP) Requirements

1. The *owner or operator* of a *construction activity* that requires post-construction SMPs, in accordance with Part III.C., must select, design, install, implement, and maintain the SMPs to meet the *performance criteria* in the New York State Stormwater Management Design Manual, dated July 31, 2024 (DM), using sound engineering judgment. Where SMPs are not designed in conformance with the *performance criteria* in the DM, the *owner or operator* must include in the *SWPPP* the reason(s) for the deviation or alternative design and provide information which demonstrates that the deviation or alternative design is *equivalent* to the technical standard.

2. The *owner or operator* of a *construction activity*, that requires SMPs in accordance with Part III.C., must design the practices to meet the applicable *sizing criteria* in Part II.C.2.a., b., c., or d.

a. Sizing Criteria for *New Development*

i. Runoff Reduction Volume (RRv) and Water Quality Volume (WQv):

1. Reduce the total WQv by application of RR techniques and standard SMPs with RRv capacity. The total WQv must be calculated in accordance with the criteria in Section 4.2 of the DM; or

2. Minimum RRv and Treatment of Remaining Total WQv: *Construction activities* that cannot meet the requirements in Part II.C.2.a.i.1. due to *site limitations* must direct runoff from all newly constructed *impervious areas* to a RR technique or standard SMP with RRv capacity unless *infeasible*. The specific *site limitations* that prevent the reduction of 100% of the WQv must be documented in the *SWPPP*. For each *impervious area* that is not directed to a RR technique or standard SMP with RRv capacity, the *SWPPP* must include documentation which demonstrates that all options were considered and for each option explains why it is considered *infeasible*.

   In no case shall the runoff reduction achieved from the newly constructed *impervious areas* be less than the Minimum RRv as calculated using the criteria in Section 4.4 of the DM. The remaining portion of the total WQv that cannot be reduced must be treated by application of standard SMPs.

ii. Channel Protection Volume (CPv): Provide 24 hour extended detention of the post-developed 1-year, 24-hour storm event, remaining after runoff reduction. Where a CPv control orifice is provided, the minimum orifice size must be 3 inches, with acceptable external trash rack or orifice protection. The CPv requirement does not apply when:

   1. Reduction of the entire CPv is achieved by application of runoff reduction techniques or infiltration systems; or

   2. The 1-year post-development peak *discharge* is less than or equal to 2.0 cfs without detention or velocity controls; or

   3. The site *directly discharges* into a fifth order or larger water body (stream, river, or lake), or tidal waters, where the increase in smaller flows will not impact the stream bank or channel integrity. However, the point of *discharge* must be adequately protected against scour and erosion by the increased peak *discharge*.

iii. *Overbank* Flood Control Criteria (Qp): Requires storage to attenuate the post-development 10-year, 24-hour peak *discharge* rate (Qp) to predevelopment rates. The Qp requirement does not apply when:

1. the site *directly discharges* to tidal waters or fifth order or larger streams, or

2. A downstream analysis reveals that *overbank* control is not required.

iv. Extreme Flood Control Criteria (Qf): Requires storage to attenuate the post-development 100-year, 24-hour peak *discharge* rate (Qf) to predevelopment rates. The Qf requirement does not apply when:

1. the site *directly discharges* to tidal waters or fifth order or larger streams, or

2. A downstream analysis reveals that *overbank* control is not required.

b. *Sizing Criteria* for *New Development* in Enhanced Phosphorus Removal Watersheds

i. Runoff Reduction Volume (RRv) and Water Quality Volume (WQv):

1. Reduce the WQv by application of RR techniques and standard SMPs with RRv capacity. The total WQv is the runoff volume from the 1-year, 24-hour design storm over the post-developed watershed and must be calculated in accordance with the criteria in Section 4.3 of the DM; or

2. Minimum RRv and Treatment of Remaining Total WQv: *Construction activities* that cannot meet the criteria in Part II.C.2.b.i.1. due to *site limitations* must direct runoff from all newly constructed *impervious areas* to a RR technique or standard SMP with RRv capacity unless *infeasible*. The specific *site limitations* that prevent the reduction of 100% of the WQv must be documented in the *SWPPP*. For each *impervious area* that is not directed to a RR technique or standard SMP with RRv capacity, the *SWPPP* must include

documentation which demonstrates that all options were considered and for each option explains why it is considered *infeasible.*

In no case shall the runoff reduction achieved from the newly constructed *impervious areas* be less than the Minimum RRv as calculated using the criteria in Section 4.5 of the DM. The remaining portion of the total WQv that cannot be reduced must be treated by application of standard SMPs.

ii. Channel Protection Volume (CPv): Provide 24 hour extended detention of the post-developed 1-year, 24-hour storm event, remaining after runoff reduction. Where a CPv control orifice is provided, the minimum orifice size must be 3 inches, with acceptable external trash rack or orifice protection. The CPv requirement does not apply when:

1. Reduction of the entire CPv is achieved by application of runoff reduction techniques or infiltration systems; or

2. The 1-year post-development peak *discharge* is less than or equal to 2.0 cfs; or

3. The site *directly discharges* to tidal waters, or a fifth order or larger water body (stream, river, or lake) where the increase in smaller flows will not impact the stream bank or channel integrity. However, the point of *discharge* must be adequately protected against scour and erosion by the increased peak *discharge*.

iii. *Overbank* Flood Control Criteria (Qp): Requires storage to attenuate the post-development 10-year, 24-hour peak *discharge* rate (Qp) to predevelopment rates. The Qp requirement does not apply when:

1. the site *directly discharges* to tidal waters or fifth order or larger streams; or

2. A downstream analysis reveals that *overbank* control is not required.

iv. Extreme Flood Control Criteria (Qf): Requires storage to attenuate the post-development 100-year, 24-hour peak *discharge* rate (Qf) to predevelopment rates. The Qf requirement does not apply when:

1. the site *directly discharges* to tidal waters or fifth order or larger streams; or

2. A downstream analysis reveals that *overbank* control is not required.

c. *Sizing Criteria* for *Redevelopment Activity*

i. Water Quality Volume (WQv): The WQv treatment objective for *redevelopment activity* must be addressed by one of the following options, as outlined in Section 9.2.1. *Redevelopment activities* located in an Enhanced Phosphorus Removal Watershed (see Part III.B.3. and Appendix C) must calculate the WQv in accordance with Section 4.3 of the DM. All other *redevelopment activities* must calculate the WQv in accordance with Section 4.2 of the DM.

1. Reduce the existing *impervious cover* by a minimum of 25% of the total disturbed, *impervious area*. The Soil Restoration criteria in Section 5.1.6 of the DM must be applied to all newly created pervious areas; or

2. Capture and treat 100% of the required WQv, for a minimum of 25% of the disturbed redevelopment *impervious area*, by implementation of standard SMPs or reduced by application of runoff reduction techniques; or

3. Capture and treat 100% of the required WQv, for a minimum of 75% of the disturbed redevelopment *impervious area*, by implementation of a volume-based alternative SMP, as defined in Section 9.4 of the DM; or

4. Capture and treat 100% of the required WQv, for a minimum of 75% of the disturbed redevelopment *impervious area*, by implementation of a flow-through alternative SMP sized to treat the peak rate of runoff from the WQv design storm; or

5. Application of a combination of 1 through 4 above that provide a weighted average of at least two of the above methods. Application of this method must be in accordance with the criteria in Section 9.2.1(A)(V) of the DM; or

6. If there is an existing SMP located on the site that captures and treats runoff from the *impervious area* that is being disturbed, the WQv treatment option selected must, at a minimum, provide treatment equal to the treatment that was being provided by the existing practice(s) if that treatment is greater than the treatment required by options 1 through 5 above.

ii. Channel Protection Volume (CPv) is not required if there is 0% change to hydrology that increases the *discharge* rate and volume from the project site.

iii. *Overbank* Flood Control (Qp) is not required if there is 0% change to hydrology that increases the *discharge* rate from the project site.

iv. Extreme Flood Control (Qf) is not required if there is 0% change to hydrology that increases the *discharge* rate from the project site.

d. *Sizing Criteria* for Combination of *Redevelopment Activity* and *New Development*

Construction projects, that include both *new development* and *redevelopment activity*, must use SMPs that meet the *sizing criteria* calculated as an aggregate of the *sizing criteria* in Part II.C.2.a. or b. for the *new development* portion of the project and Part II.C.2.c. for the *redevelopment activity* portion of the project.

Part III. Stormwater Pollution Prevention Plan (SWPPP)

A. General *SWPPP* Requirements

1. A *SWPPP* must be prepared and implemented by the *owner or operator* of all *construction activity* covered by this permit. All authorized *discharges* must be identified in the *SWPPP*. The *SWPPP* must document the selection, design, installation, implementation and maintenance of the control measures and

practices that will be used to meet the effluent limitations in Part II.B. and, where applicable, the SMP requirements in Part II.C.

2. The *SWPPP* must demonstrate consideration in narrative format of the future physical risks due to climate change pursuant to the Community Risk and Resiliency Act (CRRA), 6 NYCRR Part 490, and associated guidance.

    a. The owner or operator must consider:

        i. the following physical risks due to climate change:

            (i) increasing temperature; and

            (ii) increasing precipitation; and

            (iii) increasing variability in precipitation, including chance of drought; and

            (iv) increasing frequency and severity of flooding; and

            (v) rising sea level; and

            (vi) increasing storm surge; and

            (vii) shifting ecology.

        ii. for each of the following:

            (i) overall site planning; and

            (ii) location, elevation, and sizing of:

                a. control measures and practices; and

                b. conveyance system(s); and

                c. detention system(s).

3. The *SWPPP* must describe the erosion and sediment control practices and where required, SMPs that will be used and/or constructed to reduce the *pollutants* in *stormwater discharges* and to assure compliance with the

requirements of this permit. In addition, the *SWPPP* must identify potential sources of pollution which may reasonably be expected to affect the quality of *stormwater discharges*.

4. All *SWPPPs*, that require the SMP component in accordance with Part III.B.2., must be prepared by a *qualified professional*.

5. The *owner or operator* must keep the *SWPPP* current so that, at all times, it accurately documents the erosion and sediment control practices that are being used or will be used during construction, and all SMPs that will be constructed on the site. At a minimum, the *owner or operator* must modify the *SWPPP*, including construction drawings:

   a. whenever the current provisions prove to be ineffective in *minimizing pollutants* in *stormwater discharges* from the site; and

   b. whenever there is a change in design, construction, or operation at the *construction site* that has or could have an effect on the *discharge* of *pollutants*; and

   c. to address issues or deficiencies identified during an inspection by the *qualified inspector,* NYSDEC, or other regulatory authority; and

   d. to document the final construction conditions in an as-built drawing.

6. NYSDEC may notify the *owner or operator* at any time that the *SWPPP* does not meet one or more of the minimum requirements of this permit. The notification must be in writing and identify the provisions of the *SWPPP* that require modification. Within fourteen (14) calendar days of such notification, or as otherwise indicated by NYSDEC, the *owner or operator* must make the required changes to the *SWPPP* and submit written notification to NYSDEC that the changes have been made. If the *owner or operator* does not respond to NYSDEC's comments in the specified time frame, NYSDEC may suspend the *owner's or operator's* coverage under this permit or require the *owner or operator* to obtain coverage under an individual SPDES permit in accordance with Part II.D.4.

7. Prior to the *commencement of construction activity*, the *owner or operator* must identify the contractor(s) and subcontractor(s) that will be responsible for installing, constructing, repairing, replacing, inspecting, and maintaining the erosion and sediment control practices included in the *SWPPP* and the

contractor(s) and subcontractor(s) that will be responsible for constructing the SMPs included in the *SWPPP*. The *owner or operator* must have each of the contractors and subcontractors identify at least one person from their company to be *trained contractor* that will be responsible for implementation of the *SWPPP*. The *owner or operator* must ensure that at least one *trained contractor* is on site daily when soil disturbance activities are being performed.

The *owner or operator* must have each of the contractors and subcontractors identified above sign a copy of the following certification statement below before the *commencement of construction activities*:

> "I hereby certify under penalty of law that I understand and agree to comply with the requirements of the *SWPPP* and agree to implement any corrective actions identified by the *qualified inspector* during a site inspection. I also understand that the *owner or operator* must comply with the requirements of the most current version of the New York State Pollutant Discharge Elimination System (SPDES) Construction General Permit (CGP) for Stormwater Discharges from Construction Activities and that it is unlawful for any person to cause or contribute to a violation of *water quality standards*. Furthermore, I am aware that there are significant penalties for submitting false information, that I do not believe to be true, including the possibility of fine and imprisonment for knowing violations"

In addition to providing the certification statement above, the certification page must also identify the specific elements of the *SWPPP* that each contractor and subcontractor will be responsible for and include the name and title of the person providing the signature; the name and title of the *trained contractor* responsible for *SWPPP* implementation; the name, address and telephone number of the contracting firm; the address (or other identifying description) of the site; and the date the certification statement is signed. The *owner or operator* must attach the certification statement(s) to the copy of the *SWPPP* that is maintained at the *construction site*. If new or additional contractors are hired to implement measures identified in the *SWPPP* after the *commencement of construction activities*, they must also sign the certification statement and provide the information listed above prior to performing *construction activities*.

B. Required *SWPPP* Contents

1. Erosion and sediment control component - The *owner or operator* must prepare a *SWPPP* that includes erosion and sediment control practices.

    a. Erosion and sediment control practices must be designed:

        i. in conformance with the BB; or

        ii. *equivalent* to the BB if deviating from Part III.B.1.a.i.

    b. If the erosion and sediment control practices are designed in conformance with Part III.B.1.a.ii., the *SWPPP* must include a demonstration of *equivalence* to the BB.

    c. At a minimum, the erosion and sediment control component of the *SWPPP* must include the following:

        i. Background information about the scope of the project, including the location, type and size of project; and

        ii. A site map/construction drawing(s) with north arrows for the project, including a general location map. At a minimum, the site map must show the total site area; all improvements; areas of disturbance; areas that will not be disturbed; existing vegetation; on-site and adjacent off-site surface water(s); floodplain/floodway boundaries; wetlands and drainage patterns that could be affected by the *construction activity*; existing and final contours; locations of different soil types with boundaries; material, waste, borrow or equipment storage areas located on adjacent properties; and location(s) of the *stormwater discharge*(s) and receiving surface water(s); and

        iii. A description of the soil(s) present at the site, including an identification of the Hydrologic Soil Group (HSG); and

        iv. A phasing plan for the project and sequencing plans for all *phases*, both of which must address clearing and grubbing, excavation and grading, utility and infrastructure installation, *final stabilization*,

and any other *construction activity* at the site that will result in soil disturbance.

1. The phasing plan must include:

    a. a map delineating and labeling the limits of soil disturbance for all *phases* of a project; and

    b. a table identifying the order and intended schedule of when each *phase* will begin and end its sequencing plan. The table must identify the total disturbed area for each *phase* at any one time and the total disturbed area for the overall project at any one time all on one timeline showing all overlapping quantities of disturbed area at any one time; and

2. A sequencing plan for a specific *phase* must include:

    a. a table indicating the order and intended schedule of *construction activities* within a *phase*, and corresponding construction drawings with a description of the work to be performed; and

    b. all permanent and *temporary stabilization* measures; and

v. A description of the minimum erosion and sediment control practices to be installed or implemented for each *construction activity* that will result in soil disturbance. Include a schedule that identifies the timing of initial placement or implementation of each erosion and sediment control practice and the minimum time frames that each practice should remain in place or be implemented; and

vi. A site map/construction drawing(s) showing the specific location(s), size(s), and length(s) of each erosion and sediment control practice; and

vii. The dimensions, material specifications, installation details, and operation and maintenance requirements for all erosion and sediment control practices. Include the location and sizing of any

temporary sediment basins and structural practices that will be used to divert flows from exposed soils; and

viii. A maintenance inspection schedule for the contractor(s) and subcontractor(s) identified in Part III.A.7. to ensure continuous and effective operation of the erosion and sediment control practices. The maintenance inspection schedule must be in accordance with the requirements in the BB technical standard; and

ix. A description of the pollution prevention measures that will be used to control litter, construction chemicals and construction debris from becoming a *pollutant* source in the *stormwater discharges*; and

x. A description and location of any *stormwater discharges* associated with industrial activity other than construction at the site, including, but not limited to, *stormwater discharges* from asphalt plants and concrete plants located on the *construction site*; and

xi. Identification of any elements of the design that are not in conformance with the design criteria in the BB technical standard. Include the reason for the deviation or alternative design and provide information which demonstrates that the deviation or alternative design is *equivalent* to the technical standard.

2. SMP component – The *owner or operator* of *construction activity* identified in Table 2 of Appendix B must prepare a *SWPPP* that includes SMPs.

   a. SMPs must be designed in conformance with the applicable *sizing criteria* in Part II.C.2.a., c., or d.; and

   b. SMPs must be designed in conformance with the *performance criteria*:

      i. in the DM; or

      ii. *equivalent* to the DM if deviating from Part III.B.2.b.i.; or

      iii. in the New York State Stormwater Management Design Manual, dated January 2015 (2015 Design Manual), or *equivalent* to it, if the following criteria are met:

1. The eNOI is submitted in accordance with Part I.D. before January 29, 2027 for *construction activities* that are either:

    a. subject to governmental review and approval:

        i. where the *owner or operator* made any application to that governmental entity prior to the effective date of this permit; and

        ii. such application included a *SWPPP* developed using the 2015 Design Manual or *equivalent* to it; or

    b. not subject to governmental review and approval:

        i. where a fiscal allocation for the *construction activities* has been developed and approved by a governmental entity; and

        ii. the *SWPPP* was developed using the 2015 Design Manual or *equivalent* to it; and

c. If SMPs are designed in conformance with Part III.B.2.b.ii., the *SWPPP* must include the reason(s) for the deviation or alternative design and a demonstration of *equivalence* to the DM; and

d. If SMPs are designed in conformance with Part III.B.2.b.iii., the *SWPPP* must include supporting information or documentation demonstrating that Part III.B.2.b.iii.1.a. or b. apply; and

e. The SMP component of the *SWPPP* must include the following:

    i. Identification of all SMPs to be constructed as part of the project, including which option the SMP designs conform to, either Part III.B.2.b.i., ii., or iii. Include the dimensions, material specifications and installation details for each SMP; and

    ii. A site map/construction drawing(s) showing the specific location and size of each SMP; and

iii. A Stormwater Modeling and Analysis Report that includes:

(i) Map(s) showing pre-development conditions, including watershed/subcatchments boundaries, flow paths/routing, and design points; and

(ii) Map(s) showing post-development conditions, including watershed/subcatchments boundaries, flow paths/routing, design points and SMPs; and

(iii) Results of *stormwater* modeling (i.e. hydrology and hydraulic analysis) for the required storm events. Include supporting calculations (model runs), methodology, and a summary table that compares pre- and post-development runoff rates and volumes for the different storm events; and

(iv) Summary table, with supporting calculations, which demonstrates that each SMP has been designed in conformance with the *sizing criteria* included in the DM; and

(v) Identification of any *sizing criteria* that is not required based on the requirements included in Part II.C.; and

(vi) Identification of any elements of the design that are not in conformance with the *performance criteria* in the DM. Include the reason(s) for the deviation or alternative design and provide information which demonstrates that the deviation or alternative design is *equivalent* to the DM.

iv. Soil testing results and locations (test pits, borings); and

v. Infiltration test results, when required in accordance with Part III.B.2.a.; and

vi. An operations and maintenance plan that includes inspection and maintenance schedules and actions to ensure continuous and effective operation of each SMP. The plan must identify the entity

that will be responsible for the long-term operation and maintenance of each practice; and

3. Enhanced Phosphorus Removal Standards - The *owner or operator* of *construction activity* identified in Table 2 of Appendix B that is located in a watershed identified in Appendix C must prepare a *SWPPP* that includes SMPs designed in conformance with the applicable *sizing criteria* in Part II.C.2.b., c., or d. and the *performance criteria* Enhanced Phosphorus Removal Standards included in the DM. At a minimum, the SMP component of the *SWPPP* must meet the requirements of Part III.B.2.

C. Required *SWPPP* Components by Project Type

Owners or operators of *construction activities*, identified in Table 1 of Appendix B, are required to prepare a *SWPPP* that only includes erosion and sediment control practices designed in accordance with Part III.B.1. *Owners or operators* of the *construction activities*, identified in Table 2 of Appendix B, must prepare a *SWPPP* that also includes SMPs designed in accordance with Part III.B.2 or 3.

For the entire area of disturbance, including the entire *common plan of development or sale* if applicable, the owner or operator must evaluate every bullet from Appendix B Table 1 and Table 2 separately. If bullets from both Table 1 and Table 2 apply, the *SWPPP* must include erosion and sediment control practices for all *construction activities* but SMPs for only those portions of the *construction activities* that fall under Table 2 bullet(s).

Part IV. Inspection and Maintenance Requirements

A. General Construction Site Inspection and Maintenance Requirements

1. The *owner or operator* must ensure that all erosion and sediment control practices (including pollution prevention measures), and all SMPs identified in the *SWPPP*, are inspected and maintained in accordance with Part IV.B. and C.

B. Contractor Maintenance Inspection Requirements

1. The *owner or operator* of each *construction activity*, identified in Tables 1 and 2 of Appendix B, must have a *trained contractor* inspect the erosion and sediment control practices and pollution prevention measures being

implemented within the active work area daily to ensure that they are being maintained in effective operating condition at all times. If deficiencies are identified, the contractor must:

a. if the corrective action does not require engineering design:

    i. begin implementing corrective actions within one business day; and

    ii. complete the corrective actions within five business days; or

b. if the corrective action requires engineering design:

    i. begin the engineering design process within five business days; and

    ii. complete the corrective action in a reasonable time frame but no later than within 60 calendar days.

2. For *construction sites* where soil disturbance activities have been temporarily suspended (e.g. winter shutdown) and *temporary stabilization* measures have been applied to all disturbed areas, the *trained contractor* can stop conducting the maintenance inspections in accordance with Part IV.B.1. The *trained contractor* must begin conducting the maintenance inspections in accordance with Part IV.B.1. as soon as soil disturbance activities resume.

3. For *construction sites* where soil disturbance activities have been shut down with partial project completion, the *trained contractor* can stop conducting the maintenance inspections in accordance with Part IV.B.1. if all areas disturbed as of the project shutdown date have achieved *final stabilization* and all SMPs required for the completed portion of the project have been constructed in conformance with the *SWPPP* and are operational.

C. *Qualified Inspector* Inspection Requirements

1. With the exception of the following *construction activities* identified in Tables 1 and 2 of Appendix B, a *qualified inspector* must conduct site inspections for all other *construction activities* identified in Tables 1 and 2 of Appendix B:

    a. the construction of a single-family residential subdivision with 25% or less *impervious cover* at total site build-out that involves a soil disturbance of one (1) or more acres of land but less than or equal to five (5) acres and is

not located in one of the watersheds listed in Appendix C and not *directly discharging* to one of the 303(d) segments listed in Appendix D; and

b. the construction of a single-family home that involves soil disturbances of one (1) or more acres but less than or equal to five (5) acres and is not located in one of the watersheds listed in Appendix C and not *directly discharging* to one of the 303(d) segments listed in Appendix D; and

c. construction on *agricultural property* that involves soil disturbances of one (1) or more acres but less than five (5) acres; and

d. *construction activities* located in the New York City Watershed located east of the Hudson River, see Appendix C Figure 1, that involve soil disturbances of 5,000 square feet or more, but less than one acre.

2. The *qualified inspector* must conduct site inspections in accordance with the following timetable:

a. For *construction sites* where soil disturbance activities are on-going, the *qualified inspector* must conduct a site inspection at least once every seven (7) calendar days; or

b. For *construction sites* where soil disturbance activities are on-going and the *owner or operator* has received authorization in accordance with Part I.E.6. to disturb greater than five (5) acres of soil at any one time, the *qualified inspector* must conduct at least two (2) site inspections every seven (7) calendar days. The two (2) inspections must be separated by a minimum of two (2) full calendar days; or

c. For *construction sites* where soil disturbance activities have been temporarily suspended (e.g. winter shutdown) and *temporary stabilization* measures have been applied to all disturbed areas, the *qualified inspector* must conduct a site inspection at least once every thirty (30) calendar days. The *owner or operator* must notify the DOW Water (SPDES) Program contact at the Regional Office (see contact information in Appendix E) or, in areas under the jurisdiction of a *Traditional Land Use Control MS4 Operator,* the *Traditional Land Use Control MS4 Operator* (provided the *Traditional Land Use Control MS4 Operator* is not the *owner or operator* of the *construction activity*) by hard copy or email prior to reducing the inspections to this frequency and again by hard copy or email prior to re-commencing construction; or

d. For *construction sites* where soil disturbance activities have been shut down with partial project completion, the requirement to have the *qualified inspector* conduct inspections ceases if all areas disturbed as of the project shutdown date have achieved *final stabilization* and all SMPs required for the completed portion of the project have been constructed in conformance with the *SWPPP* and are operational. The *owner or operator* must notify the DOW Water (SPDES) Program contact at the Regional Office (see contact information in Appendix E) or, in areas subject to the review authority of *Traditional Land Use Control MS4 Operator(s)* in accordance with Part I.D.2.b.ii.1., the *Traditional Land Use Control MS4 Operator(s)* (provided the *Traditional Land Use Control MS4 Operator(s)* are not the *owners or operators* of the *construction activity*) in writing prior to the shutdown and again in writing prior to resuming *construction activity*. If soil disturbance activities are not resumed within 2 years from the date of shutdown, the *owner or operator* must terminate coverage by meeting the requirements of Part V; or

e. For *construction sites* involving soil disturbance of one (1) or more acres that *directly discharge* to one of the 303(d) segments listed in Appendix D or is located in one of the watersheds listed in Appendix C, the *qualified inspector* must conduct at least two (2) site inspections every seven (7) calendar days. The two (2) inspections must be separated by a minimum of two (2) full calendar days.

3. At a minimum, the *qualified inspector* must inspect:

   a. all erosion and sediment control practices and pollution prevention measures to ensure integrity and effectiveness; and

   b. all SMPs under construction to ensure that they are constructed in conformance with the *SWPPP*; and

   c. all areas of disturbance that have not achieved *final stabilization*; and

   d. all points of *discharge* to *surface waters of the State* located within, or immediately adjacent to, the property boundaries of the *construction site*; and

   e. all points of *discharge* from the *construction site*.

4. The *qualified inspector* must prepare an inspection report subsequent to each and every inspection. At a minimum, the inspection report must include and/or address all of the following, for all *construction activities* except those listed in Part IV.C.1.:

   a. Permit identification number; and

   b. Date and time of inspection; and

   c. Name and title of person(s) performing inspection; and

   d. A description of the weather and soil conditions (e.g. dry, wet, saturated) at the time of the inspection, including the temperature at the time of the inspection; and

   e. A description of the condition of the runoff at all points of *discharge* from the *construction site*. This must include identification of any *discharges* of sediment from the *construction site*. Include *discharges* from conveyance systems (i.e. pipes, culverts, ditches, etc.) and overland flow; and

   f. A description of the condition of all *surface waters of the State* located within, or immediately adjacent to, the property boundaries of the *construction site* which receive runoff from disturbed areas. This must include identification of any *discharges* of sediment to the *surface waters of the State*; and

   g. Identification of all erosion and sediment control practices and pollution prevention measures that need repair or maintenance; and

   h. Identification of all erosion and sediment control practices and pollution prevention measures that were not installed properly or are not functioning as designed and need to be reinstalled or replaced; and

   i. Description and sketch (map) of areas with active soil disturbance activity, areas that have been disturbed but are inactive at the time of the inspection, and areas that have been stabilized (temporary and/or final) since the last inspection; and

   j. Estimates, in square feet or acres, of the following areas:

i. Total area with active soil disturbance (not requiring either *temporary stabilization* or *final stabilization*); and

ii. Total area with inactive soil disturbance (requiring either *temporary stabilization* or *final stabilization*); and

iii. Total area that has achieved *temporary stabilization*; and

iv. Total area that has achieved *final stabilization*; and

k. Current stage of construction of all SMPs and identification of all *construction activity* on site that is not in conformance with the *SWPPP* and technical standards; and

l. Corrective action(s) that must be taken to install, repair, replace or maintain erosion and sediment control practices and pollution prevention measures; and to correct deficiencies identified with the construction of the SMP(s); and

m. Identification and status of all corrective actions that were required by previous inspection; and

n. Digital photographs, with date stamp, that clearly show the condition of all practices that have been identified as needing corrective actions. The *qualified inspector* must attach color copies of the digital photographs to the inspection report being maintained onsite within seven (7) calendar days of the date of the inspection. The *qualified inspector* must also take digital photographs, with date stamp, that clearly show the condition of the practice(s) after the corrective action has been completed. The *qualified inspector* must attach paper color copies of the digital photographs to the inspection report that documents the completion of the corrective action work within seven (7) calendar days of that inspection.

5. Within one business day of the completion of an inspection, the *qualified inspector* must notify the *owner or operator*, and appropriate contractor or subcontractor identified in Part III.A.7., of any corrective actions that need to be taken. The contractor or subcontractor must:

a. if the corrective action does not require engineering design:

i. begin implementing corrective actions within one business day; and

ii. complete the corrective actions within five business days; or

b. if the corrective action requires engineering design:

i. begin the engineering design process within five business days; and

ii. complete the corrective action in a reasonable time frame but no later than within 60 calendar days.

6. All inspection reports must be signed by the *qualified inspector.* In accordance with Part I.E.3., the inspection reports must be maintained on site with the *SWPPP*.

Part V. How to Terminate CGP Coverage

A. Electronic Notice of Termination (eNOT) Submittal

The eNOT contains questions to ensure requirements in Part V.A. have been met.

1. An *owner or operator* must terminate coverage when one or more of the following requirements have been met:

a. Total project completion:

i. all *construction activity* identified in the *SWPPP* has been completed; and

ii. all areas of disturbance have achieved *final stabilization*; and

iii. all temporary, structural erosion and sediment control measures have been removed; and

iv. all SMPs have been constructed in conformance with the *SWPPP* and are operational; and

v. an as-built drawing has been prepared; or

b. Planned shutdown with partial project completion:

   i. all soil disturbance activities have ceased; and

   ii. all areas disturbed as of the project shutdown date have achieved *final stabilization*; and

   iii. all temporary, structural erosion and sediment control measures have been removed; and

   iv. all SMPs required for the completed portion of the project have been constructed in conformance with the *SWPPP* and are operational; and

   v. an as-built drawing has been prepared; or

c. In accordance with Part I.G. Change of Owner or Operator; or

d. The *owner or operator* has obtained coverage under an alternative general SPDES permit or an individual SPDES permit.

2. For *construction activities* that require *qualified inspector* inspections in accordance with Part IV.C.1. and have met Part V.A.1.a. or b., the *owner or operator* must have the *qualified inspector* perform a final site inspection prior to submitting the eNOT. The *qualified inspector* must, by signing the "Final Stabilization" and "Post-Construction Stormwater Management Practice(s)" certification statements on the eNOT, certify that all the requirements in Part V.A.1.a. or b. have been achieved.

3. For *construction activities* that are subject to the review authority of *Traditional Land Use Control MS4 Operator(s)* in accordance with Part I.D.2.b.ii.1. and meet Part V.A.1.a. or b., the *owner or operator* must have the *Traditional Land Use Control MS4 Operator(s)* sign the "MS4 Acceptance" statement on the eNOT in accordance with the requirements in Part VII.J. A *Traditional Land Use Control MS4 Operator* official, by signing this statement, determined that it is acceptable for the *owner or operator* to submit the eNOT in accordance with the requirements of this Part. A *Traditional Land Use Control MS4 Operator* can make this determination by performing a final site inspection themselves or by accepting the *qualified inspector*'s final site inspection certification(s) when required in Part V.A.2.

4. For *construction activities* that require SMPs and meet Part V.A.1.a. or b., the *owner or operator* must, prior to submitting the eNOT, ensure one of the following:

    a. for SMP(s) that were constructed by a private entity, but will be owned, operated, and maintained by a public entity, the SMP(s) and any right-of-way(s) needed to operate and maintain such practice(s) have been deeded to the municipality in which the practice(s) is located; or

    b. for SMP(s) that are privately owned, but will be operated and maintained by a public entity, an executed operation and maintenance agreement is in place with the municipality that will operate and maintain the SMP(s); or

    c. for SMP(s) that are privately owned, the *owner or operator* has a mechanism in place that requires operation and maintenance of the practice(s) in accordance with the operation and maintenance plan, such as a deed covenant in the *owner or operator's* deed of record; or

    d. for SMP(s) that are owned by a public or private institution (e.g. school, university, hospital), government agency or authority, or public utility, the *owner or operator* has policies and procedures in place that ensure operation and maintenance of the practices in accordance with the operation and maintenance plan.

5. An *owner or operator* that has met the requirements of Part V.A.1., 2., 3., and 4. must request termination of coverage under this permit by submitting a complete Notice of Termination form electronically using a NYSDEC approved form.[5]

    a. The owner's or operator's coverage is terminated as of the termination date indicated in the Letter of Termination (LOT), which is sent by NYSDEC after a complete eNOT is submitted.

[5] Unless NYSDEC grants a waiver in accordance with 40 CFR 127.15(c) or (d). All waiver requests must be submitted to Stormwater_info@dec.ny.gov or NYSDEC, Bureau of Water Permits, 625 Broadway, 4th Floor, Albany, New York 12233-3505.

Part VI. Record Retention and Reporting

A. Record Retention

The *owner or operator* must retain a copy of the documents listed in Part I.E.3. and a copy of the LOT for a period of at least five years from the date that NYSDEC accepts a complete NOT submitted in accordance with Part V.

B. Reporting

Except for the eNOI, the signature forms associated with the eNOI, and the eNOT, all other written correspondence requested by NYSDEC, including individual permit applications, must be sent to the address of the appropriate DOW (SPDES) Program contact at the Regional Office listed in Appendix E.

Part VII. Standard Permit Requirements

For the purposes of this permit, examples of contractors and subcontractors include: third-party maintenance and construction contractors.

A. Duty to Comply

The *owner or operator*, and all contractors or subcontractors, must comply with all requirements of this permit. Any non-compliance with the requirements of this permit constitutes a violation of the New York State Environmental Conservation Law (ECL), and its implementing regulations, and is grounds for enforcement action. Filing of a request for termination of coverage under this permit, or a notification of planned changes or anticipated non-compliance, does not limit, diminish or stay compliance with any requirements of this permit.

B. Need to Halt or Reduce Activity Not a Defense

The necessity to halt or reduce the *construction activity* regulated by this permit, in order to maintain compliance with the requirements of this permit, must not be a defense in an enforcement action.

C. Penalties

There are substantial criminal, civil, and administrative penalties associated with violating the requirements of this permit. Fines of up to $37,500 per day for each

violation and imprisonment for up to 15 years may be assessed depending upon the nature and degree of the offense.

D. False Statements

Any person who knowingly makes any false material statement, representation, or certification in any application, record, report, or other document filed or required to be maintained under this permit, including monitoring reports or reports of compliance or noncompliance must, upon conviction, be punished in accordance with ECL §71-1933 and or New York State Penal Law Articles 175 and 210.

E. Re-Opener Clause

Upon issuance of this permit, a determination has been made on the basis of a submitted Notice of Intent, plans, or other available information, that compliance with the specified permit requirements will reasonably protect classified water use and assure compliance with applicable *water quality standards*. Satisfaction of the requirements of this permit notwithstanding, if operation pursuant to this permit causes or contributes to a condition in contravention of State *water quality standards* or guidance values, or if NYSDEC determines that a modification is necessary to prevent impairment of the best use of the waters or to assure maintenance of *water quality standards* or compliance with other provisions of ECL Article 17 or the Clean Water Act (CWA), or any regulations adopted pursuant thereto, NYSDEC may require such modification and the Commissioner may require abatement action to be taken by the *owner or operator* and may also prohibit such operation until the modification has been implemented.

F. Duty to Mitigate

The *owner or operator*, and its contractors and subcontractors, must take all reasonable steps to *minimize* or prevent any *discharge* in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment.

G. Requiring Another General Permit or Individual SPDES Permit

NYSDEC may require any *owner or operator* authorized to *discharge* in accordance with this permit to apply for and obtain an individual SPDES permit or apply for authorization to *discharge* in accordance with another general SPDES permit.

1. Cases where an individual SPDES permit or authorization to discharge in accordance with another general SPDES permit may be required include, but is not limited to the following:

a. the *owner or operator* is not in compliance with the conditions of this permit or does not meet the requirements for coverage under this permit; and

b. a change has occurred in the availability of demonstrated technology or practices for the control or abatement of *pollutants* applicable to the *point source*; and

c. new effluent limitation guidelines or new source performance standards are promulgated that are applicable to *point sources* authorized to *discharge* in accordance with this permit; and

d. existing effluent limitation guidelines or new source performance standards that are applicable to *point sources* authorized to *discharge* in accordance with this permit are modified; and

e. a water quality management plan containing requirements applicable to such *point sources* is approved by NYSDEC; and

f. circumstances have changed since the time of the request to be covered so that the *owner or operator* is no longer appropriately controlled under this permit, or either a temporary or permanent reduction or elimination of the authorized *discharge* is necessary; and

g. the *discharge* is in violation of section 17-0501 of the ECL; and

h. the *discharge(s)* is a significant contributor of *pollutants*. In making this determination, NYSDEC may consider the following factors:

   i. the location of the *discharge(s)* with respect to *surface waters of the State*; and

   ii. the size of the *discharge(s)*; and

   iii. the quantity and nature of the *pollutants discharged* to *surface waters of the State*; and

   iv. other relevant factors including compliance with other provisions of ECL Article 17, or the CWA.

2. When NYSDEC requires any *owner or operator* authorized by this permit to apply for an individual SPDES permit as provided for in this subdivision, it must notify the *owner or operator* in writing that a permit application is required. This notice must include a brief statement of the reasons for this decision, an application

form, a statement setting a time for the *owner or operator* to file the application for an individual SPDES permit, and a deadline, not sooner than 180 days from the *owner's or operator's* receipt of the notification letter, whereby the authorization to *discharge* under this permit must be terminated. NYSDEC may grant additional time upon demonstration, to the satisfaction of the RWE,[6] that additional time to apply for an alternative authorization is necessary or where NYSDEC has not provided a permit determination in accordance with 6 NYCRR Part 621.

3. When an individual SPDES permit is issued to an *owner or operator* authorized to *discharge* under this permit for the same *discharge(s)*, this permit authorization for *construction activities* authorized under the individual SPDES permit is automatically terminated on the effective date of the individual SPDES permit unless termination is earlier in accordance with 6 NYCRR Part 750.

H. Duty to Provide Information

The *owner or operator* must furnish to NYSDEC, within five business days, unless otherwise set forth by NYSDEC, any information that NYSDEC may request to determine whether cause exists to determine compliance with this permit or to determine whether cause exists for requiring an individual SPDES permit in accordance with 6 NYCRR 750-1.21(e) (see Part VII.G. Requiring Another General Permit or Individual Permit).

The *owner or operator* must make available to NYSDEC, for inspection and copying, or furnish to NYSDEC within 25 business days of receipt of a NYSDEC request for such information, any information retained in accordance with this permit.

Except for Part I.D.4. and 5. and Part I.G., the following applies: where the *owner or operator* becomes aware that it failed to submit any relevant facts on the Notice of Intent, or submitted incorrect information in a Notice of Intent or in any report to NYSDEC, the *owner or operator* must submit such facts or corrected information to NYSDEC within five business days.

I. Extension

In the event a new permit is not issued and effective prior to the expiration of this permit, and this permit is extended pursuant to the State Administrative Procedure Act and 6 NYCRR Part 621, then the *owner or operator* with coverage under this permit may continue to operate and *discharge* in accordance with the requirements of this permit until a new permit is issued and effective.

[6] The Regional Water Manager where a DEC Region does not have a RWE.

J. Signatories and Certification

The Notice of Intent, Notice of Termination, and reports required by this permit must be signed as provided in 40 CFR §122.22.

1. All Notices of Intent and Notices of Termination must be signed as follows:

    a. For a corporation. By a responsible corporate officer. For the purpose of this section, a responsible corporate officer means:

        (i) a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy- or decision-making functions for the corporation; or

        (ii) the manager of one or more manufacturing, production or operating facilities, provided, the manager is authorized to make management decisions which govern the operation of the regulated facility including having the explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive measures to assure long term environmental compliance with environmental laws and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for Notice of Intent or Notice of Termination requirements; and where authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.

        Note: NYSDEC does not require specific assignments or delegations of authority to responsible corporate officers identified in 40 CFR §122.22(a)(1)(i). NYSDEC will presume that these responsible corporate officers have the requisite authority to sign the Notice of Intent or Notice of Termination unless the corporation has notified NYSDEC to the contrary. Corporate procedures governing authority to sign a Notice of Intent or Notice of Termination may provide for assignment or delegation to applicable corporate positions under 40 CFR §122.22(a)(1)(ii) rather than to specific individuals.

    b. For a partnership or sole proprietorship. By a general partner or the proprietor, respectively.

c. For a municipality, State, Federal, or other public agency. By either a principal executive officer or ranking elected official. For purposes of this section, a principal executive officer of a Federal agency includes:

    1. the chief executive officer of the agency; or

    2. a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., Regional Administrators of EPA).

2. All reports required by this permit, and other information requested by NYSDEC, must be signed by a person described in Part VII.J.1., or by a duly authorized representative of that person. A person is a duly authorized representative only if:

    a. The authorization is made in writing by a person described in Part VII.J.1. or using the Duly Authorized Form, found on the DEC website; and

    b. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the company. (A duly authorized representative may thus be either a named individual or any individual occupying a named position); and

    c. The written authorization is submitted to NYSDEC.

3. Changes to authorization. If an authorization under Part VII.J.2. is no longer accurate because a different individual or position has responsibility for the overall operation of the *construction activity*, a new authorization satisfying the requirements of Part VII.J.2. must be submitted to NYSDEC prior to or together with any reports, information, or applications to be signed by an authorized representative.

4. Certification. Any person signing a document under Part VII.J.1. or 2. must make the following certification:

    I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who

manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

5. Electronic reporting. If documents described in Part VII.J.1. or 2. are submitted electronically by or on behalf of the *construction activity* with coverage under this permit, any person providing the electronic signature for such documents must meet all relevant requirements of this section, and must ensure that all of the relevant requirements of 40 CFR Part 3 (including, in all cases, subpart D to Part 3) (Cross-Media Electronic Reporting) and 40 CFR Part 127 (NPDES Electronic Reporting Requirements) are met for that submission.

K. Inspection and Entry

The *owner or operator* must allow NYSDEC, the USEPA Regional Administrator, the applicable county health department, or any authorized representatives of those entities, or, in the case of a *construction site* which *discharges* through an *MS4*, an authorized representative of the *MS4* receiving the *discharge*, upon the presentation of credentials and other documents as may be required by law, to:

1. enter upon the *owner's or operator's* premises where a regulated facility or activity is located or conducted or where records must be kept under the requirements of this permit; and

2. have access to and copy at reasonable times, any records that must be kept under the requirements of this permit, including records required to be maintained for purposes of operation and maintenance; and

3. inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices or operations regulated or required under this permit; and

4. sample or monitor at reasonable times, for the purposes of assuring general SPDES permit compliance or as otherwise authorized by the CWA or ECL, any substances or parameters at any location; and

5. enter upon the property of any contributor to the regulated facility or activity under authority of the *owner or operator*.

L. Confidentiality of Information

The following must not be held confidential: this permit, the fact sheet for this permit, the name and address of any *owner or operator*, effluent data, the Notice of Intent, and information regarding the need to obtain an individual permit or an alternative general SPDES permit. This includes information submitted on forms themselves and any attachments used to supply information required by the forms (except information submitted on usage of substances). Upon the request of the *owner or operator*, NYSDEC must make determinations of confidentiality in accordance with 6 NYCRR Part 616, except as set forth in the previous sentence. Any information accorded confidential status must be disclosed to the Regional Administrator upon his or her written request. Prior to disclosing such information to the Regional Administrator, NYSDEC will notify the Regional Administrator of the confidential status of such information.

M. Other Permits May Be Required

Nothing in this permit relieves the *owner or operator* from a requirement to obtain any other permits required by law.

N. NYSDEC Orders or Civil Decrees/Judgments

The issuance of this permit by the NYSDEC, and the coverage under this permit by the *owner or operator*, does not supersede, revoke, or rescind any existing order on consent or civil Decree/Judgment, or modification to any such documents or to any order issued by the Commissioner, or any of the terms, conditions, or requirements contained in such order or modification therefore, unless expressly noted.

O. Property Rights

Coverage under this permit does not convey any property rights in either real or personal property, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of Federal, State, or local laws or regulations, nor does it obviate the necessity of obtaining the assent of any other jurisdiction as required by law for the *discharge* authorized.

P. Compliance with Interstate Standards

If the *construction activity* covered by this permit originates within the jurisdiction of an interstate water pollution control agency, then the *construction activity* must also comply with any applicable effluent standards or *water quality standards* promulgated by that interstate agency and as set forth in this permit for such *construction activities*.

Q. Oil and Hazardous Substance Liability

Coverage under this permit does not affect the imposition of responsibilities upon, or the institution of any legal action against, the *owner or operator* under section 311 of the CWA, which must be in conformance with regulations promulgated pursuant to section 311 governing the applicability of section 311 of the CWA to *discharges* from facilities with *NPDES* permits, nor must such issuance preclude the institution of any legal action or relieve the *owner or operator* from any responsibilities, liabilities, or penalties to which the *owner or operator* is or may be subject pursuant to the Comprehensive Environmental Response, Compensation and Liability Act of 1980, 42 U.S.C. section 9601 et seq. (CERCLA).

R. Severability

The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit, must not be affected thereby.

S. NYSDEC Approved Forms

The *owner or operator* must provide all relevant information that is requested by NYSDEC, and required by this permit, on all NYSDEC approved forms.

APPENDIX A – Abbreviations and Definitions

Abbreviations

APO – Agency Preservation Officer
BB – New York State Standards and Specifications for Erosion and Sediment Control (Blue Book), dated November 2016
BMP – Best Management Practice
CPESC – Certified Professional in Erosion and Sediment Control
CPv – Channel Protection Volume
CWA – Clean Water Act (or the Federal Water Pollution Control Act, 33 U.S.C. §1251 et seq)
DM – New York State Stormwater Management Design Manual (Design Manual), dated July 31, 2024
DOW – Division of Water
EAF – Environmental Assessment Form
ECL – chapter 43-B of the Consolidated Laws of the State of New York, entitled the Environmental Conservation Law
EPA – U.S. Environmental Protection Agency
HSG – Hydrologic Soil Group
MS4 – Municipal Separate Storm Sewer System
NOI – Notice of Intent
NOT – Notice of Termination
NPDES – National Pollutant Discharge Elimination System
NYC – The City of New York
NYCDEP – The City of New York Department of Environmental Protection
NYSDEC – The New York State Department of Environmental Conservation
OPRHP – Office of Parks, Recreation and Historic Places
Qf – Extreme Flood
Qp – Overbank Flood
RR – Runoff Reduction
RRv – Runoff Reduction Volume
RWE – Regional Water Engineer
SEQR – State Environmental Quality Review Act
SHPA – State Historic Preservation Act
SMP – Post-Construction Stormwater Management Practice
SPDES – State Pollutant Discharge Elimination System
SWPPP – Stormwater Pollution Prevention Plan
TMDL – Total Maximum Daily Load
UPA – Uniform Procedures Act
USDA – United States Department of Agriculture
WQv – Water Quality Volume

Definitions

All definitions in this section are solely for the purposes of this permit. If a word is not italicized in the permit, use its common definition.

Agricultural Building – a structure designed and constructed to house farm implements, hay, grain, poultry, livestock or other horticultural products; excluding any structure designed, constructed or used, in whole or in part, for human habitation, as a place of employment where agricultural products are processed, treated or packaged, or as a place used by the public.

Agricultural Property – the land for construction of a barn, *agricultural building*, silo, stockyard, pen or other structural practices identified in Table II in the "Agricultural Best Management Practice Systems Catalogue" (dated June 2023).

Alter Hydrology from Pre- to Post-Development Conditions – the post-development peak flow rate(s) has increased by more than 5% of the pre-developed condition for the design storm of interest (e.g. 10 yr and 100 yr).

Combined Sewer System – a sewer system which conveys sewage and *stormwater* through a single pipe system to a publicly owned treatment works.

Commence (Commencement of) Construction Activities – the initial disturbance of soils associated with clearing, grading or excavation activities; or other construction related activities that disturb or expose soils such as demolition, stockpiling of fill material, and the initial installation of erosion and sediment control practices required in the *SWPPP*. See definition for "*Construction Activity(ies)*" also.

Common Plan of Development or Sale – a contiguous area where multiple separate and distinct *construction activities* are occurring, or may occur, under one plan. The "common plan" of development or sale is broadly defined as any announcement or piece of documentation (including a sign, public notice or hearing, marketing plan, advertisement, drawing, permit application, State Environmental Quality Review Act (SEQR) environmental assessment form or other documents, zoning request, computer design, etc.) or physical demarcation (including boundary signs, lot stakes, surveyor markings, etc.) indicating *construction activities* may occur on a specific plot. A *common plan of development or sale* is comprised of two or more *phases*.

Common plan of development or sale does not include separate and distinct *construction activities* that are occurring, or may occur, under one plan that are at least 1/4 mile apart provided any interconnecting road, pipeline or utility project that is part of the same "common plan" is not concurrently being disturbed.

Construction Activity(ies) – identified within 40 CFR 122.26(b)(14)(x), 122.26(b)(15)(i), and 122.26(b)(15)(ii), any clearing, grading, excavation, filling, demolition or stockpiling activities that result in soil disturbance. Clearing activities can include, but are not limited to, mechanized logging equipment operation, the cutting and skidding of trees, stump removal and/or brush root removal.

Construction activity does not include routine maintenance that is performed to maintain the original line and grade, hydraulic capacity, or original purpose of a facility, which is excluded from the calculation of the soil disturbance for a project. Routine maintenance includes, but is not limited to:

- Re-grading of gravel roads or parking lots; and
- Cleaning and shaping of existing roadside ditches and culverts that maintains the approximate original line and grade, and maintains or improves the hydraulic capacity of the ditch; and
- Replacement of existing culverts that maintains the approximate original line and grade, and maintains or improves the hydraulic capacity of a ditch; and
- Replacement of existing bridges that maintains the approximate original line and grade, and maintains or improves the hydraulic capacity beneath the bridges; and
- Cleaning and shaping of existing roadside ditches that does not maintain the approximate original grade, hydraulic capacity and purpose of the ditch if the changes to the line and grade, hydraulic capacity or purpose of the ditch are installed to improve water quality and quantity controls (e.g. installing grass lined ditch); and
- Placement of aggregate shoulder backing that stabilizes the transition between the road shoulder and the ditch or *embankment*; and
- Full depth milling and filling of existing asphalt pavements, replacement of concrete pavement slabs, and similar work that does not expose soil or disturb the bottom six (6) inches of subbase material; and
- Long-term use of equipment storage areas at or near highway maintenance facilities; and
- Removal of sediment from the edge of the highway to restore a previously existing sheet-flow drainage connection from the highway surface to the highway ditch or *embankment*; and
- Existing use of Canal Corp owned upland disposal sites for the canal, and
- Replacement of curbs, gutters, sidewalks and guide rail posts; and
- Maintenance of ski trails including brush hog use and mowing; and
- Above ground snowmaking pipe replacement; and
- Replacement of existing utility poles; etc.

Construction Site – the land area where *construction activity(ies)* will occur. See also the definitions for "*Commence (Commencement of) Construction Activities"* and "*Common Plan of Development or Sale."*

Dewatering – the act of draining rainwater and/or groundwater from building foundations, vaults or excavations/trenches.

Directly Discharge(s)(ing) (to a specific surface waterbody) – runoff flows from a *construction site* by overland flow and the first point of *discharge* is the specific surface waterbody, or runoff flows from a *construction site* to a separate storm sewer system and the first point of *discharge* from the separate storm sewer system is the specific surface waterbody.

Discharge(s)(d) – any addition of any *pollutant* to waters of the State through an outlet or *point source*.

Embankment – an earthen or rock slope that supports a road/highway.

Equivalent (Equivalence) – the practice or measure meets all the performance, longevity, maintenance, and safety objectives of the technical standard and will provide an equal or greater degree of water quality protection.

Final Stabilization – all soil disturbance activities have ceased and a uniform, perennial vegetative cover with a density of eighty (80) percent over the entire pervious surface has been established; or other *equivalent* stabilization measures, such as permanent landscape mulches, rock rip-rap or washed/crushed stone have been applied on all disturbed areas that are not covered by permanent structures, concrete or pavement.

Historic Property – any building, structure, site, object or district that is listed on the State or National Registers of Historic Places or is determined to be eligible for listing on the State or National Registers of Historic Places.

Impervious Area (Cover) – all impermeable surfaces that cannot effectively infiltrate rainfall. This includes paved, concrete and compacted gravel surfaces (i.e. parking lots, driveways, roads, runways and sidewalks); building rooftops and miscellaneous impermeable structures such as patios, pools, and sheds.

Infeasible – not technologically possible, or not economically practicable and achievable considering best industry practices.

Minimize(ing)(ation) – reduce and/or eliminate to the extent achievable using control measures (including best management practices) that are technologically available and economically practicable and achievable in light of best industry practices.

Municipal Separate Storm Sewer System (MS4) - a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains):

1. owned or operated by a State, city, town, village, borough, county, parish, district, association, or other public body (created by or pursuant to State law) having jurisdiction over disposal of sewage, industrial wastes, *stormwater*, or other wastes, including special districts under State law such as a sewer district, flood control district or drainage district, or similar entity, or an Indian tribe or an authorized Indian tribal organization, or a designated and approved management agency under section 208 of the CWA, that *discharges* to *surface waters of the State*; and

2. designed or used for collecting or conveying *stormwater*; and

3. which is not a *combined sewer system*; and

4. which is not part of a Publicly Owned Treatment Works (POTW) as defined at 40 CFR 122.2.

Natural Buffer(s) – an undisturbed area with natural cover running along a surface water (e.g. wetland, stream, river, lake, etc.).

New Development – any land disturbance that does not meet the definition of *Redevelopment Activity* included in this appendix.

New York State Erosion and Sediment Control Certificate Program – a certificate program that establishes and maintains a process to identify and recognize individuals who are capable of developing, designing, inspecting and maintaining erosion and sediment control plans on projects that disturb soils in New York State. The certificate program is administered by the New York State Conservation District Employees Association.

Nonpoint Source(s) – any source of water pollution or *pollutants* which is not a discrete conveyance or *point source* permitted pursuant to Title 7 or 8 of Article 17 of the Environmental Conservation Law (see ECL Section 17-1403).

Overbank – flow events that exceed the capacity of the stream channel and spill out into the adjacent floodplain.

Owner or Operator – the person, persons, or legal entity which owns or leases the property on which the *construction activity* is occurring; an entity that has operational control over the construction plans and specifications, including the ability to make modifications to the plans and specifications; and/or an entity that has day-to-day operational control of those activities at a project that are necessary to ensure compliance with the permit requirements.

Performance Criteria – the six performance criteria for each group of SMPs in Chapters 5 and 6 of the technical standard, New York State Stormwater Management Design Manual (DM), dated July 31, 2024. These include feasibility, conveyance, pretreatment, treatment, landscaping, and maintenance. It does not include the *Sizing Criteria* (i.e. WQv, RRv, CPv, Qp and Qf) in Part I.C.2. of the permit.

Phase – a defined area in which *construction activities* are occurring or will occur separate from other defined area(s).

Point Source – any discernible, confined, and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, vessel or other floating craft, or landfill leachate collection system from which *pollutants* are or may be *discharged*.

Pollutant(s) – dredged spoil, filter backwash, solid waste, incinerator residue, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand and industrial, municipal, agricultural waste and ballast *discharged* into water; which may cause or might reasonably be expected to cause pollution of the waters of the state in contravention of the standards or guidance values adopted as provided in 6 NYCRR Parts 700 et seq.

Qualified Inspector – a person that is knowledgeable in the principles and practices of erosion and sediment control, such as a licensed Professional Engineer, Certified Professional in Erosion and Sediment Control (CPESC), Registered Landscape Architect, *New York State Erosion and Sediment Control Certificate Program* holder or other NYSDEC endorsed individual(s).

It can also mean someone working under the direct supervision of, and at the same company as, the licensed Professional Engineer or Registered Landscape Architect, provided that person has training in the principles and practices of erosion and sediment control. Training in the principles and practices of erosion and sediment control means that the individual working under the direct supervision of the licensed Professional Engineer or Registered Landscape Architect has received four (4) hours of NYSDEC endorsed training in proper erosion and sediment control principles from a Soil and Water Conservation District, or other NYSDEC endorsed entity. After receiving the initial training, the individual working under the direct supervision of the licensed Professional Engineer or Registered Landscape Architect shall receive four (4) hours of training every three (3) years.

It can also mean a person that meets the *Qualified Professional* qualifications in addition to the *Qualified Inspector* qualifications.

Note: Inspections of any SMPs that include structural components, such as a dam for an impoundment, shall be performed by a licensed Professional Engineer.

Qualified Professional – a person that is knowledgeable in the principles and practices of *stormwater* management and treatment, such as a licensed Professional Engineer, Registered Landscape Architect or other NYSDEC endorsed individual(s). Individuals preparing *SWPPPs* that require the SMP component must have an understanding of the principles of hydrology, water quality management practice design, water quantity control design, and, in many cases, the principles of hydraulics. All components of the *SWPPP* that involve the practice of engineering, as defined by the NYS Education Law (see Article 145), shall be prepared by, or under the direct supervision of, a professional engineer licensed to practice in the State of New York.

Redevelopment Activity(ies) – the disturbance and reconstruction of existing *impervious area*, including *impervious areas* that were removed from a project site within five (5) years of preliminary project plan submission to the local government (i.e. site plan, subdivision, etc.).

Renewable Energy – electricity or thermal energy generated by renewable energy systems through use of the following technologies: solar thermal, photovoltaics, on land and offshore wind, hydroelectric, geothermal electric, geothermal ground source heat, tidal energy, wave energy, ocean thermal, and fuel cells which do not utilize a fossil fuel resource in the process of generating electricity.

Site Limitations – site conditions that prevent the use of an infiltration technique and or infiltration of the total WQv. Typical *site limitations* include: seasonal high groundwater, shallow depth to bedrock, and soils with an infiltration rate less than 0.5 inches/hour. The existence of *site limitations* shall be confirmed and documented using actual field testing (i.e. test pits, soil borings, and infiltration test) or using information from the most current United States Department of Agriculture (USDA) Soil Survey for the County where the project is located.

Sizing Criteria – the criteria included in Part I.C.2 of the permit that are used to size SMPs. The criteria include; Water Quality Volume (WQv), Runoff Reduction Volume (RRv), Channel Protection Volume (Cpv), *Overbank* Flood (Qp), and Extreme Flood (Qf).

Steep Slope – land area designated on the current United States Department of Agriculture (USDA) Soil Survey as Soil Slope Phase D, (provided the map unit name or description is inclusive of slopes greater than 25%), or Soil Slope Phase E or F, (regardless of the map unit name), or a combination of the three designations.

Stormwater – that portion of precipitation that, once having fallen to the ground, is in excess of the evaporative or infiltrative capacity of soils, or the retentive capacity of surface features, which flows or will flow off the land by surface runoff to waters of the State.

Streambank – the terrain alongside the bed of a creek or stream. The bank consists of the sides of the channel, between which the flow is confined.

Stormwater Pollution Prevention Plan (SWPPP) – a project specific report, including construction drawings, that among other things: describes the *construction activity(ies)*, identifies the potential sources of pollution at the *construction site*; describes and shows the *stormwater* controls that will be used to control the *pollutants* (i.e. erosion and sediment controls; for many projects, includes SMPs); and identifies procedures the *owner or operator* will implement to comply with the requirements of the permit. See Part III of the permit for a complete description of the information that must be included in the *SWPPP*.

Surface Waters of the State – shall be construed to include lakes, bays, sounds, ponds, impounding reservoirs, springs, rivers, streams, creeks, estuaries, marshes, inlets, canals, the Atlantic ocean within the territorial seas of the state of New York and all other bodies of surface water, natural or artificial, inland or coastal, fresh or salt, public or private (except those private waters that do not combine or effect a junction with natural surface waters), which are wholly or partially within or bordering the state or within its jurisdiction. Waters of the state are further defined in 6 NYCRR Parts 800 to 941.

Temporarily Ceased – an existing disturbed area will not be disturbed again within 14 calendar days of the previous soil disturbance.

Temporary Stabilization – exposed soil has been covered with material(s) as set forth in the technical standard, New York Standards and Specifications for Erosion and Sediment Control, to prevent the exposed soil from eroding. The materials can include, but are not limited to, mulch, seed and mulch, and erosion control mats (e.g. jute twisted yarn, excelsior wood fiber mats).

Total Maximum Daily Load (TMDL) – the sum of the allowable loads of a single *pollutant* from all contributing point and *nonpoint source*s. It is a calculation of the maximum amount of a *pollutant* that a waterbody can receive and still meet *water quality standards*, and an allocation of that amount to the *pollutant's* sources. A TMDL stipulates Waste Load Allocations (WLA) for *point source discharges*, Load Allocations (LA) for *nonpoint source*s, and a margin of safety (MOS).

Traditional Land Use Control MS4 Operator – a city, town, or village with land use control authority that is authorized to *discharge* under New York State DEC's SPDES General Permit For Stormwater Discharges from Municipal Separate Stormwater Sewer Systems (MS4s) or the City of New York's Individual SPDES Permit for their Municipal Separate Storm Sewer Systems (NY-0287890).

Trained Contractor – an employee from the contracting (construction) company, identified in Part III.A.7., that has received four (4) hours of NYSDEC endorsed training

in proper erosion and sediment control principles from a Soil and Water Conservation District, or other NYSDEC endorsed entity. After receiving the initial training, the *trained contractor* shall receive four (4) hours of training every three (3) years.

It can also mean an employee from the contracting (construction) company, identified in Part III.A.7., that meets the *qualified inspector* qualifications (e.g. licensed Professional Engineer, Certified Professional in Erosion and Sediment Control (CPESC), Registered Landscape Architect, *New York State Erosion and Sediment Control Certificate Program* holder, or someone working under the direct supervision of, and at the same company as, the licensed Professional Engineer or Registered Landscape Architect, provided they have received four (4) hours of NYSDEC endorsed training in proper erosion and sediment control principles from a Soil and Water Conservation District, or other NYSDEC endorsed entity).

The *trained contractor* is responsible for the day-to-day implementation of the *SWPPP*.

Tree Clearing – *construction activities* limited to felling and removal of trees.

Tree clearing does not include hand felling and leaving the trees in place with no support from mechanized equipment, which is not considered *construction activity* requiring coverage under this permit.

Water Quality Standard – such measures of purity or quality for any waters in relation to their reasonable and necessary use as promulgated in 6 NYCRR Part 700 et seq.

APPENDIX B – Required SWPPP Components by Project Type

Table 1
CONSTRUCTION ACTIVITIES THAT REQUIRE THE PREPARATION OF A *SWPPP* THAT ONLY INCLUDES EROSION AND SEDIMENT CONTROLS

The following *construction activities* that involve soil disturbances of one (1) or more acres of land, but less than five (5) acres:

- Single-family home not located in one of the watersheds listed in Appendix C and not *directly discharging* to one of the 303(d) segments listed in Appendix D
- Single-family residential subdivisions with 25% or less *impervious cover* at total site build-out and not located in one of the watersheds listed in Appendix C and not *directly discharging* to one of the 303(d) segments listed in Appendix D
- Construction of a barn or other *agricultural building*, silo, stock yard or pen.
- Structural agricultural conservation practices as identified in Table II in the "Agricultural Best Management Practice Systems Catalogue" (dated June 2023) that include construction or reconstruction of *impervious area* or *alter hydrology from pre- to post-development* conditions.

The following *construction activities* that involve soil disturbances between five thousand (5000) square feet and one (1) acre of land:

- All construction activities located in the New York City Watershed located east of the Hudson River, see Appendix C Figure 1, that involve soil disturbances between five thousand (5,000) square feet and one (1) acre of land.

Within the municipal boundaries of NYC:

- Stand-alone road reconstruction, where the total soil disturbance from only that road construction, is less than one (1) acre of land.

The following *construction activities*:

- Installation of underground linear utilities; such as gas lines, fiber-optic cable, cable TV, electric, telephone, sewer mains, and water mains
- Environmental enhancement projects, such as wetland mitigation, *stormwater* retrofits, stream restoration, and resiliency projects that reconstruct shoreline areas to address sea level rise
- Pond construction
- Linear bike paths running through areas with vegetative cover, including bike paths surfaced with an *impervious cover*
- Cross-country ski trails, walking/hiking trails, and mountain biking trails, including a de minimis parking lot (maximum 10 spaces total, sized for passenger cars) with 35 feet minimum preservation of undisturbed area downgradient from the parking lot
- Dam rehabilitation (the structure of the dam itself)
- Sidewalks, bike paths, or walking paths, surfaced with an *impervious cover*, that are not part of residential, commercial, or institutional development;
- Sidewalks, bike paths, or walking paths, surfaced with an *impervious cover*, that include incidental shoulder or curb work along an existing highway to support construction of the sidewalk, bike path, or walking path.

Table 1 (Continued)
CONSTRUCTION ACTIVITIES THAT REQUIRE THE PREPARATION OF A *SWPPP* THAT ONLY INCLUDES EROSION AND SEDIMENT CONTROLS

The following *construction activities*:

- Slope stabilization
- Slope flattening that changes the grade of the site, but does not significantly change the runoff characteristics
- Spoil areas that will be covered with vegetation
- Vegetated open space (i.e. recreational parks, lawns, meadows, fields, downhill ski trails) that do not *alter hydrology from pre- to post-development* conditions
- Athletic fields (natural grass) that do not include the construction or reconstruction of *impervious area* and do not *alter hydrology from pre- to post-development* conditions
- Demolition where vegetation will be established, and no *redevelopment activity* is planned[1]
- Installation or replacement of either an overhead electric transmission line or a ski lift tower that does not include the construction of permanent access roads or parking areas surfaced with *impervious cover*.
- Solar array field areas that have tables elevated off the ground, spaced one table width apart, do not *alter hydrology from pre- to post-development conditions*, and address water quality volume and runoff reduction volume by maintaining sheet flow on slopes less than 8%.
- Structural agricultural conservation practices as identified in Table II in the "Agricultural Best Management Practice Systems Catalogue" (dated June 2023) that do not include construction or reconstruction of *impervious area* and do not *alter hydrology from pre- to post-development* conditions.
- Temporary access roads, median crossovers, detour roads, lanes, or other temporary *impervious areas* that will be restored to pre-construction conditions once the *construction activity* is complete (in this context, "temporary" means the *impervious area* will be in place for two years or less)
- Other *construction activities* that do not include the construction or reconstruction of *impervious area*, and do not *alter hydrology from pre- to post-development* conditions, and are not listed in Table 2.

1. If the site is redeveloped in the future, a new eNOI must be submitted.

Table 2

CONSTRUCTION ACTIVITIES THAT REQUIRE THE PREPARATION OF A *SWPPP* THAT INCLUDES POST-CONSTRUCTION STORMWATER MANAGEMENT PRACTICES (SMPS)

The following *construction activities*:

- Single-family home located in one of the watersheds listed in Appendix C or *directly discharging* to one of the 303(d) segments listed in Appendix D
- Single-family home that disturbs five (5) or more acres of land
- Single-family residential subdivisions located in one of the watersheds listed in Appendix C or *directly discharging* to one of the 303(d) segments listed in Appendix D
- Single-family residential subdivisions that involve soil disturbances of between one (1) and five (5) acres of land with greater than 25% *impervious cover* at total site build-out
- Single-family residential subdivisions that involve soil disturbances of between 20,000 square feet and one (1) acre of land within the municipal boundaries of NYC with greater than 25% *impervious cover* at total site build-out
- Single-family residential subdivisions that involve soil disturbances of five (5) or more acres of land, and single-family residential subdivisions that involve soil disturbances of less than five (5) acres that are part of a *common plan of development or sale* that will ultimately disturb five (5) or more acres of land
- Multi-family residential developments; includes duplexes, townhomes, condominiums, senior housing complexes, apartment complexes, and mobile home parks
- Creation of 5,000 square feet or more of *impervious area* in the municipal boundaries of NYC
- Airports
- Amusement parks
- Breweries, cideries, and wineries, including establishments constructed on agricultural land
- Campgrounds
- Cemeteries that include the construction or reconstruction of *impervious area* (>5% of disturbed area) or *alter the hydrology from pre- to post-development* conditions
- Commercial developments
- Churches and other places of worship
- Construction of a barn or other *agricultural building* (e.g. silo) that involves soil disturbance greater than five acres.
- Structural agricultural conservation practices as identified in Table II in the “Agricultural Best Management Practice Systems Catalogue” (dated June 2023) that involves soil disturbance greater than five acres and include the construction or reconstruction of *impervious area* or *alter hydrology from pre- to post-development* conditions.
- Facility buildings, including ski lodges, restroom buildings, pumphouses, ski lift terminals, and maintenance and groomer garages
- Institutional development; includes hospitals, prisons, schools and colleges
- Industrial facilities; includes industrial parks
- Landfills; including creation of landfills or capping landfills.
- Municipal facilities; includes highway garages, transfer stations, office buildings, POTWs, water treatment plants, and water storage tanks
- Golf courses
- Office complexes

Table 2 (Continued)

CONSTRUCTION ACTIVITIES THAT REQUIRE THE PREPARATION OF A *SWPPP* THAT INCLUDES POST-CONSTRUCTION STORMWATER MANAGEMENT PRACTICES (SMPS)

The following *construction activities*:

- Permanent laydown yards and equipment storage lots
- Playgrounds that include the construction or reconstruction of *impervious area*
- Sports complexes
- Racetracks; includes racetracks with earthen (dirt) surfaces
- Road construction or reconstruction, outside the municipal boundaries of NYC
- Road construction within the municipal boundaries of NYC
- Stand-alone road reconstruction, within the municipal boundaries of NYC where the total soil disturbance from that road reconstruction involves soil disturbance of one (1) acre or more of land
- Parking lot construction or reconstruction (as with all Table 2 bullets, this includes parking lots constructed as part of the *construction activities* listed in Table 1, unless a Table 1 bullet specifies otherwise)
- Athletic fields (natural grass) that include the construction or reconstruction of *impervious area* (>5% of disturbed area) or *alter the hydrology from pre- to post-development* conditions
- Athletic fields with artificial turf
- Permanent access roads, parking areas, substations, compressor stations, and well drilling pads, surfaced with *impervious cover,* and constructed as part of an overhead electric transmission line, wind-power, cell tower, oil or gas well drilling, sewer or water main, ski lift, or other linear utility project
- Sidewalks, bike paths, or walking paths, surfaced with an *impervious cover*, that are part of a residential, commercial or institutional development
- Sidewalks, bike paths, or walking paths, surfaced with an *impervious cover*, that are part of highway construction or reconstruction
- Solar array field areas on slopes greater than 8% that cannot maintain sheet flow using management practices identified in the BB or the DM
- Solar array field areas on slopes less than 8% that will *alter the hydrology from pre- to post-development* conditions
- Solar array field areas with tables that are not elevated high enough to achieve *final stabilization* beneath the tables
- Traditional *impervious areas* associated with solar development (e.g. roads, buildings, transformers)
- Utility pads surfaced with *impervious cover*, including electric vehicle charging stations
- All other *construction activities* that include the construction or reconstruction of *impervious area* or *alter the hydrology from pre- to post-development* conditions, and are not listed in Table 1

APPENDIX C – Watersheds Requiring Enhanced Phosphorus Removal

Watersheds where *owners or operators* of *construction activities* identified in Table 2 of Appendix B must prepare a *SWPPP* that includes SMPs designed in conformance with the Enhanced Phosphorus Removal Standards included in the DM technical standard.

- Entire New York City Watershed located east of the Hudson River – Figure 1
- Onondaga Lake Watershed – Figure 2
- Greenwood Lake Watershed – Figure 3
- Oscawana Lake Watershed – Figure 4
- Kinderhook Lake Watershed – Figure 5

Figure 1 - New York City Watershed East of the Hudson

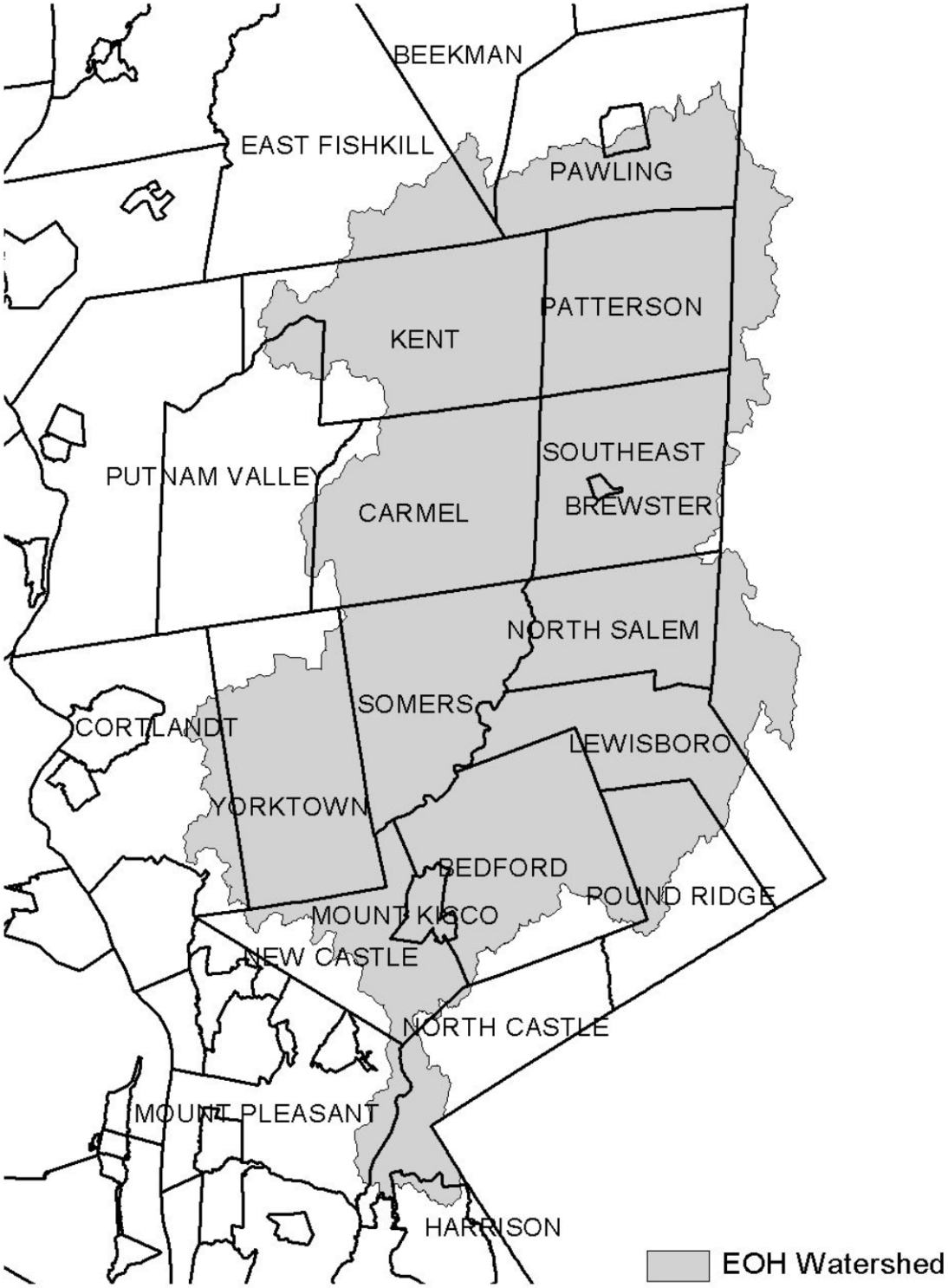


Figure 2 - Onondaga Lake Watershed



Figure 3 - Greenwood Lake Watershed

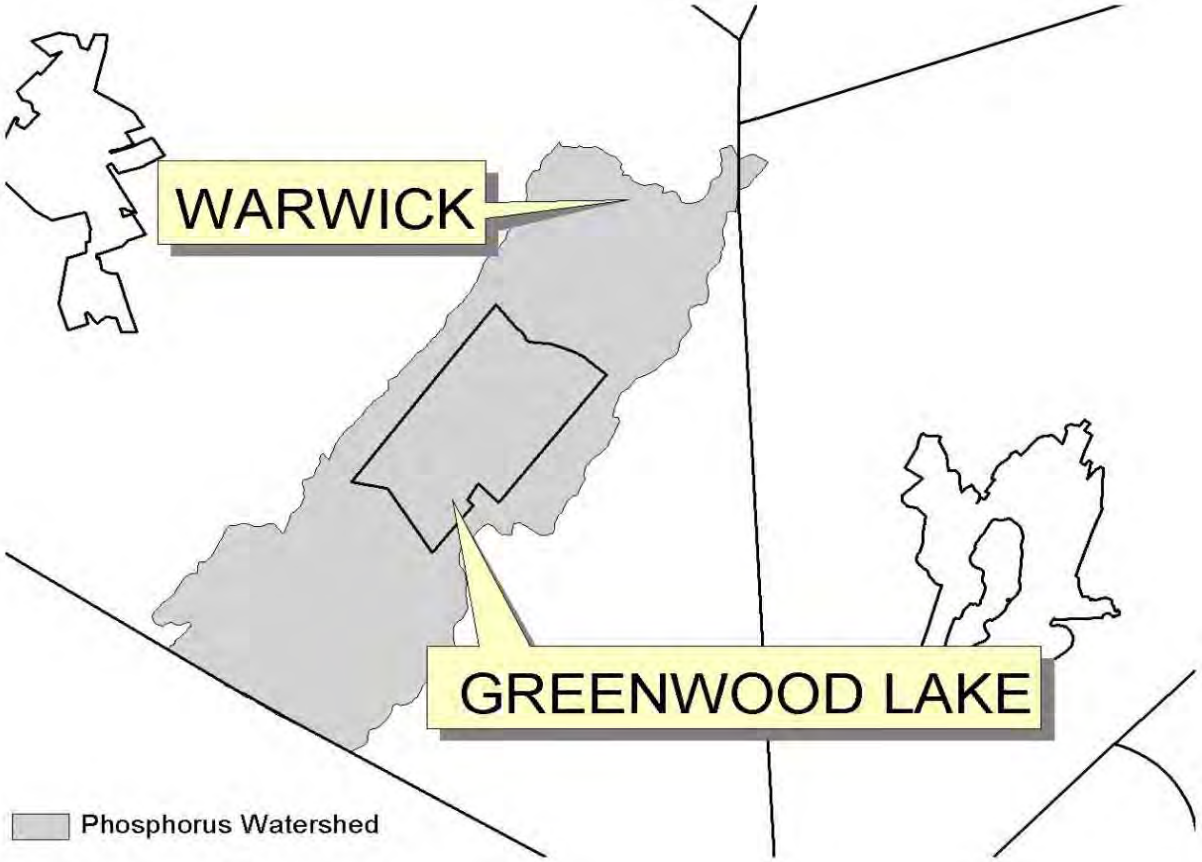


Figure 4 - Oscawana Lake Watershed

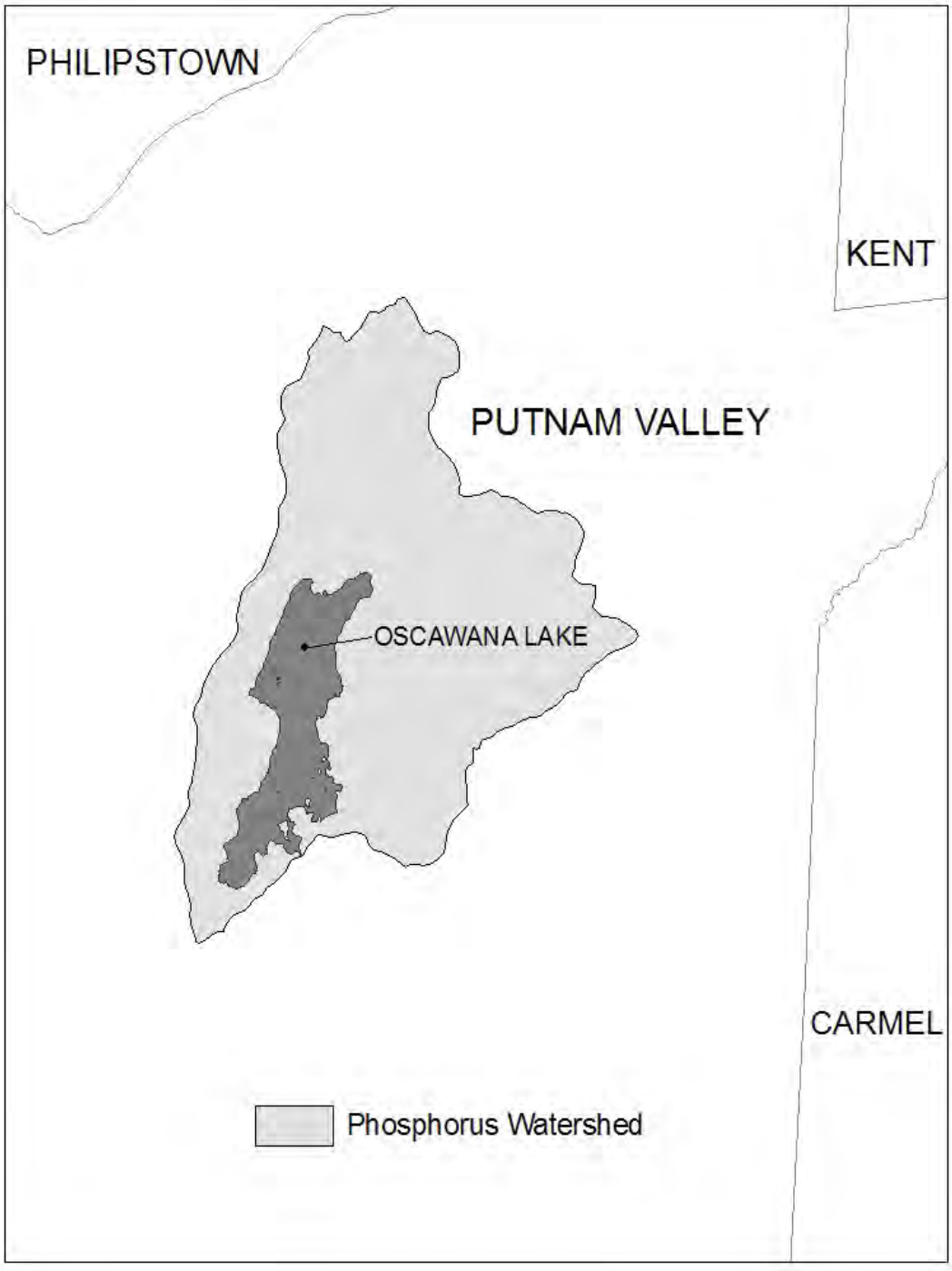
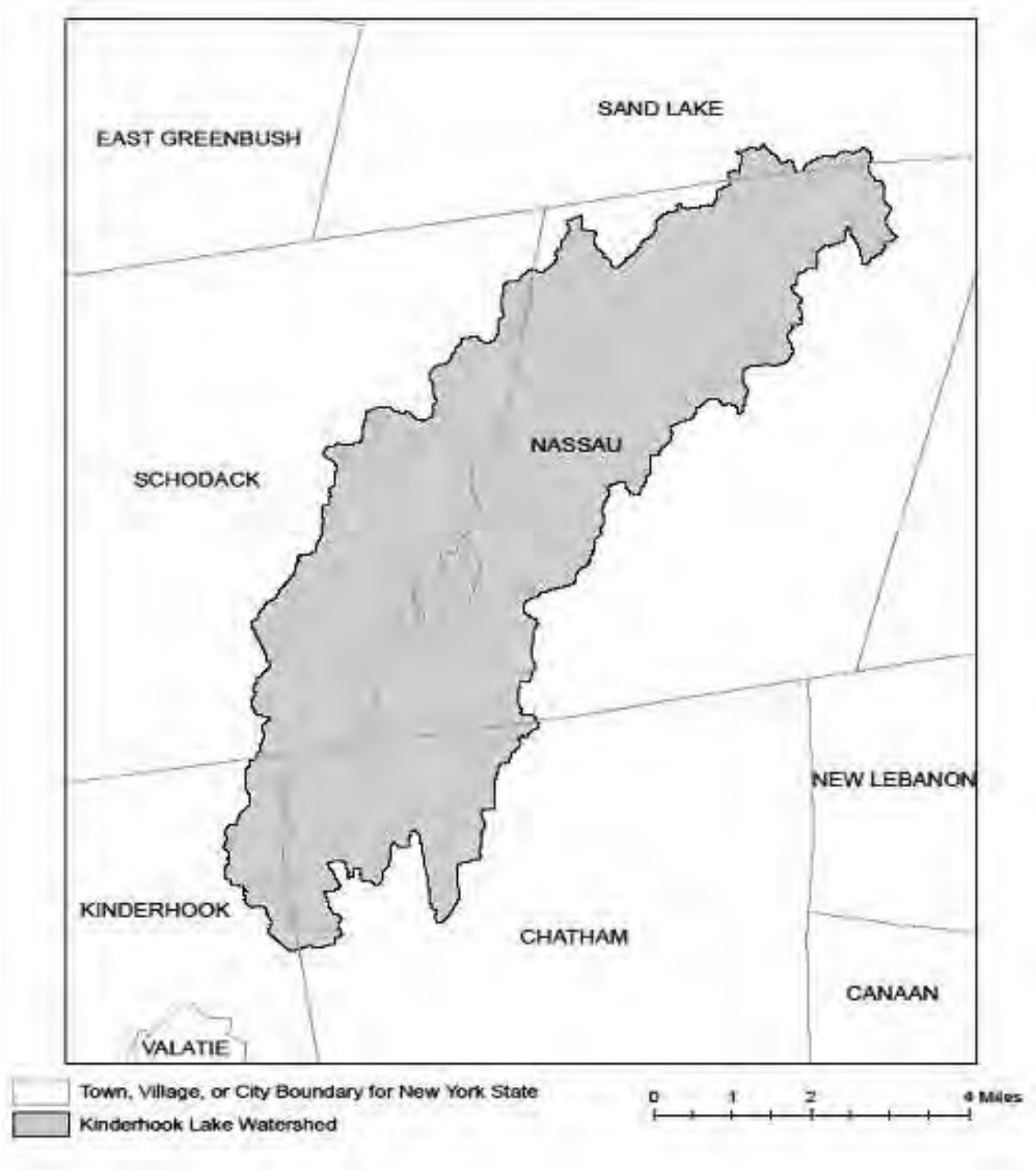


Figure 5 - Kinderhook Lake Watershed



APPENDIX D – Impaired Waterbodies (by Construction Related Pollutants)

List of waterbodies impaired by *pollutants* related to *construction activity*, including turbidity, silt/sediment, and nutrients (e.g. nitrogen, phosphorus). This list is a subset of "The Final New York State 2018 Section 303(d) List of Impaired Waters Requiring a TMDL" dated June 2020.

County	Waterbody	Pollutant
Albany	Ann Lee (Shakers) Pond, Stump Pond (1201-0096)	Phosphorus
Albany	Lawsons Lake (1301-0235)	Phosphorus
Allegany	Amity Lake, Saunders Pond (0403-0054)	Phosphorus
Allegany	Andover Pond (0403-0056)	Phosphorus
Bronx	Reservoir No.1/Lake Isle (1702-0075)	Phosphorus
Bronx	Van Cortlandt Lake (1702-0008)	Phosphorus
Broome	Blueberry, Laurel Lakes (1404-0033)	Phosphorus
Broome	Fly Pond, Deer Lake (1404-0038)	Phosphorus
Broome	Minor Tribs to Lower Susquehanna (0603-0044)	Phosphorus
Broome	Whitney Point Lake/Reservoir (0602-0004)	Phosphorus
Cattaraugus	Allegheny River/Reservoir (0201-0023)	Phosphorus
Cattaraugus	Beaver Lake/Alma Pond (0201-0073)	Phosphorus
Cattaraugus	Case Lake (0201-0020)	Phosphorus
Cattaraugus	Linlyco/Club Pond (0201-0035)	Phosphorus
Cayuga	Duck Lake (0704-0025)	Phosphorus
Cayuga	Owasco Inlet, Upper, and tribs (0706-0014)	Nutrients
Chautauqua	Chadakoin River and tribs (0202-0018)	Phosphorus
Chautauqua	Hulburt/Clymer Pond (0202-0079)	Phosphorus
Chautauqua	Middle Cassadaga Lake (0202-0002)	Phosphorus
Clinton	Great Chazy River, Lower, Main Stem (1002-0001)	Silt/Sediment
Columbia	Robinson Pond (1308-0003)	Phosphorus
Cortland	Dean Pond (0602-0077)	Phosphorus
Dutchess	Fallkill Creek (1301-0087)	Phosphorus
Dutchess	Hillside Lake (1304-0001)	Phosphorus
Dutchess	Wappingers Lake (1305-0001)	Phosphorus
Dutchess	Wappingers Lake (1305-0001)	Silt/Sediment
Erie	Beeman Creek and tribs (0102-0030)	Phosphorus
Erie	Delaware Park Pond (0101-0026)	Phosphorus
Erie	Ellicott Creek, Lower, and tribs (0102-0018)	Phosphorus
Erie	Ellicott Creek, Lower, and tribs (0102-0018)	Silt/Sediment
Erie	Green Lake (0101-0038)	Phosphorus
Erie	Little Sister Creek, Lower, and tribs (0104-0045)	Phosphorus
Erie	Murder Creek, Lower, and tribs (0102-0031)	Phosphorus

Erie	Rush Creek and tribs (0104-0018)	Phosphorus
Erie	Scajaquada Creek, Lower, and tribs (0101-0023)	Phosphorus
Erie	Scajaquada Creek, Middle, and tribs (0101-0033)	Phosphorus
Erie	Scajaquada Creek, Upper, and tribs (0101-0034)	Phosphorus
Erie	South Branch Smoke Cr, Lower, and tribs (0101-0036)	Phosphorus
Erie	South Branch Smoke Cr, Lower, and tribs (0101-0036)	Silt/Sediment
Genesee	Bigelow Creek and tribs (0402-0016)	Phosphorus
Genesee	Black Creek, Middle, and minor tribs (0402 0028)	Phosphorus
Genesee	Black Creek, Upper, and minor tribs (0402-0048)	Phosphorus
Genesee	Bowen Brook and tribs (0102-0036)	Phosphorus
Genesee	LeRoy Reservoir (0402-0003)	Phosphorus
Genesee	Mill Pond (0402-0050)	Phosphorus
Genesee	Oak Orchard Cr, Upper, and tribs (0301-0014)	Phosphorus
Genesee	Oatka Creek, Middle, and minor tribs (0402-0031)	Phosphorus
Genessee	Tonawanda Cr, Middle, Main Stem (0102-0002)	Phosphorus
Greene	Schoharie Reservoir (1202-0012)	Silt/Sediment
Greene	Sleepy Hollow Lake (1301-0059)	Silt/Sediment
Herkimer	Steele Creek tribs (1201-0197)	Phosphorus
Herkimer	Steele Creek tribs (1201-0197)	Silt/Sediment
Kings	Hendrix Creek (1701-0006) 18	Nitrogen
Kings	Prospect Park Lake (1701-0196)	Phosphorus
Lewis	Mill Creek/South Branch, and tribs (0801-0200)	Nutrients
Livingston	Christie Creek and tribs (0402-0060)	Phosphorus
Livingston	Conesus Lake (0402-0004)	Phosphorus
Livingston	Mill Creek and minor tribs (0404-0011)	Silt/Sediment
Monroe	Black Creek, Lower, and minor tribs (0402-0033)	Phosphorus
Monroe	Buck Pond (0301-0017)	Phosphorus
Monroe	Cranberry Pond (0301-0016)	Phosphorus
Monroe	Durand, Eastman Lakes (0302-0037)	Phosphorus
Monroe	Lake Ontario Shoreline, Western (0301-0069) 9	Phosphorus
Monroe	Long Pond (0301-0015)	Phosphorus
Monroe	Mill Creek and tribs (0302-0025)	Phosphorus 2
Monroe	Mill Creek/Blue Pond Outlet and tribs (0402-0049)	Phosphorus
Monroe	Minor Tribs to Irondequoit Bay (0302-0038)	Phosphorus
Monroe	Rochester Embayment - East (0302-0002) [9]	Phosphorus
Monroe	Rochester Embayment - West (0301-0068) 9	Phosphorus
Monroe	Shipbuilders Creek and tribs (0302-0026)	Phosphorus 2
Monroe	Thomas Creek/White Brook and tribs (0302-0023)	Phosphorus

Nassau	Bannister Creek/Bay (1701-0380)	Nitrogen
Nassau	Beaver Lake (1702-0152)	Phosphorus
Nassau	Browswere Bay (1701-0383)	Nitrogen
Nassau	Camaans Pond (1701-0052)	Phosphorus
Nassau	East Meadow Brook, Upper, and tribs (1701-0211)	Silt/Sediment
Nassau	East Rockaway Channel (1701-0381)	Nitrogen
Nassau	Glen Cove Creek, Lower, and tribs (1702-0146)	Silt/Sediment
Nassau	Grant Park Pond (1701-0054)	Phosphorus
Nassau	Hempstead Bay, Broad Channel (1701-0032)	Nitrogen
Nassau	Hempstead Lake (1701-0015)	Phosphorus
Nassau	Hewlett Bay (1701-0382)	Nitrogen
Nassau	Hog Island Channel (1701-0220)	Nitrogen
Nassau	Massapequa Creek, Upper, and tribs (1701-0174)	Phosphorus
Nassau	Milburn/Parsonage Creeks, Upp, and tribs (1701-0212)	Phosphorus
Nassau	Reynolds Channel, East (1701-0215) [12]	Nitrogen
Nassau	Reynolds Channel, West (1701-0216) 12	Nitrogen
Nassau	Tidal Tribs to Hempstead Bay (1701-0218)	Nitrogen
Nassau	Tribs (fresh) to East Bay (1701-0204)	Silt/Sediment
Nassau	Tribs (fresh) to East Bay (1701-0204)	Phosphorus
Nassau	Tribs to Smith Pond/Halls Pond (1701-0221)	Phosphorus
Nassau	Woodmere Channel (1701-0219)	Nitrogen
New York	Harlem Meer (1702-0103)	Phosphorus
New York	The Lake in Central Park (1702-0105)	Phosphorus
Niagara	Bergholtz Creek and tribs (0101-0004)	Phosphorus
Niagara	Hyde Park Lake (0101-0030)	Phosphorus
Niagara	Lake Ontario Shoreline, Western (0301-0053) 9	Phosphorus
Niagara	Lake Ontario Shoreline, Western (0301-0072) 9	Phosphorus
Oneida	Ballou, Nail Creeks (1201-0203)	Phosphorus
Onondaga	Ley Creek and tribs (0702-0001) 10	Nutrients (phosphorus)
Onondaga	Minor Tribs to Onondaga Lake (0702-0022) 10	Nutrients (phosphorus)
Onondaga	Minor Tribs to Onondaga Lake (0702-0022) 10	Nitrogen (NH3, NO2)
Onondaga	Onondaga Creek, Lower (0702-0023) 10	Nutrients (phosphorus)
Onondaga	Onondaga Creek, Lower, and tribs (0702-0023)	Turbidity
Onondaga	Onondaga Creek, Middle, and tribs (0702-0004)	Turbidity
Onondaga	Onondaga Creek, Upper, and tribs (0702-0024)	Turbidity
Ontario	Great Brook and minor tribs (0704-0034)	Phosphorus 2
Ontario	Great Brook and minor tribs (0704-0034)	Silt/Sediment

Ontario	Hemlock Lake Outlet and minor tribs (0402-0013)	Phosphorus
Ontario	Honeoye Lake (0402-0032)	Phosphorus
Orange	Brown Pond Reservoir (1303-0013)	Phosphorus
Orange	Lake Washington (1303-0012)	Phosphorus
Orange	Minor Tribs to Middle Wallkill (1306-0061)	Phosphorus
Orange	Monhagen Brook and tribs (1306-0074)	Phosphorus
Orange	Orange Lake (1301-0008) [16]	Phosphorus
Orange	Quaker Creek and tribs (1306-0025)	Phosphorus
Orange	Wallkill River, Middle, Main Stem (1306-0038)	Phosphorus
Orange	Wallkill River, Upper, and Minor tribs (1306-0017)	Phosphorus
Orleans	Glenvwood Lake (0301-0041)	Phosphorus
Orleans	Lake Ontario Shoreline, Western (0301-0070) 9	Phosphorus
Orleans	Lake Ontario Shoreline, Western (0301-0071) 9	Phosphorus
Oswego	Lake Neatahwanta (0701-0018)	Nutrients (phosphorus)
Oswego	Pleasant Lake (0703-0047)	Phosphorus
Putnam	Lost Lake, Putnam Lake (1302-0053)	Phosphorus
Putnam	Minor Tribs to Croton Falls Reservoir (1302-0001)	Phosphorus
Queens	Bergen Basin (1701-0009) 18	Nitrogen
Queens	Jamaica Bay, Eastern, and tribs, Queens (1701-0005) 18	Nitrogen
Queens	Kissena Lake (1702-0258)	Phosphorus
Queens	Meadow Lake (1702-0030)	Phosphorus
Queens	Shellbank Basin (1701-0001) 18	Nitrogen
Queens	Willow Lake (1702-0031)	Phosphorus
Rensselaer	Nassau Lake (1310-0001)	Phosphorus
Rensselaer	Snyders Lake (1301-0043)	Phosphorus
Richmond	Grassmere Lake/Bradys Pond (1701-0357)	Phosphorus
Rockland	Congers Lake, Swartout Lake (1501-0019)	Phosphorus
Rockland	Rockland Lake (1501-0021)	Phosphorus
Saratoga	Ballston Lake (1101-0036)	Phosphorus
Saratoga	Dwaas Kill and tribs (1101-0007)	Phosphorus
Saratoga	Dwaas Kill and tribs (1101-0007)	Silt/Sediment
Saratoga	Lake Lonely (1101-0034)	Phosphorus
Saratoga	Round Lake (1101-0060)	Phosphorus
Saratoga	Tribs to Lake Lonely (1101-0001)	Phosphorus
Schenectady	Collins Lake (1201-0077)	Phosphorus
Schenectady	Duane Lake (1311-0006)	Phosphorus
Schenectady Lake	Mariaville Lake (1201-0113)	Phosphorus
Schuyler	Cayuta Lake (0603-0005)	Phosphorus

Seneca	Reeder Creek and tribs (0705-0074)	Phosphorus
St.Lawrence	Black Lake Outlet, Black Lake (0906-0001)	Phosphorus
St.Lawrence	Fish Creek and minor tribs (0906-0026)	Phosphorus
Steuben	Smith Pond (0502-0012)	Phosphorus
Suffolk	Agawam Lake (1701-0117)	Phosphorus
Suffolk	Big/Little Fresh Ponds (1701-0125)	Phosphorus
Suffolk	Canaan Lake (1701-0018)	Phosphorus
Suffolk	Canaan Lake (1701-0018)	Silt/Sediment
Suffolk	Fresh Pond (1701-0241)	Phosphorus
Suffolk	Great South Bay, East (1701-0039)	Nitrogen
Suffolk	Great South Bay, Middle (1701-0040)	Nitrogen
Suffolk	Great South Bay, West (1701-0173)	Nitrogen
Suffolk	Lake Ronkonkoma (1701-0020)	Phosphorus
Suffolk	Mattituck/Marratooka Pond (1701-0129)	Phosphorus
Suffolk	Mill and Seven Ponds (1701-0113)	Phosphorus
Suffolk	Millers Pond (1702-0013)	Phosphorus
Suffolk	Moriches Bay, East (1701-0305)	Nitrogen
Suffolk	Moriches Bay, West (1701-0038)	Nitrogen
Suffolk	Quantuck Bay (1701-0042)	Nitrogen
Suffolk	Shinnecock Bay and Inlet (1701-0033)	Nitrogen
Suffolk	Tidal Tribs to West Moriches Bay (1701-0312)	Nitrogen
Sullivan	Bodine, Mongomery Lakes (1401-0091)	Phosphorus
Sullivan	Davies Lake (1402-0047)	Phosphorus
Sullivan	Evens Lake (1402-0004)	Phosphorus
Sullivan	Pleasure Lake (1402-0055)	Phosphorus
Sullivan	Swan Lake (1401-0063)	Phosphorus
Tompkins	Cayuga Lake, Southern End (0705-0040)	Phosphorus
Tompkins	Cayuga Lake, Southern End (0705-0040)	Silt/Sediment
Ulster	Ashokan Reservoir (1307-0004)	Silt/Sediment
Ulster	Esopus Creek, Lower, Main Stem (1307-0010) [17]	Turbidity
Ulster	Esopus Creek, Middle, Main Stem (1307-0003) 17	Turbidity
Ulster	Esopus Creek, Upper, and minor tribs (1307-0007)[3]	Silt/Sediment
Ulster	Wallkill River, Lower, Main Stem (1306-0027)	Phosphorus
Warren	Hague Brook and tribs (1006-0006)	Silt/Sediment
Warren	Huddle/Finkle Brooks and tribs (1006-0003)	Silt/Sediment
Warren	Indian Brook and tribs (1006-0002)	Silt/Sediment
Warren	Lake George (1006-0016) and tribs	Silt/Sediment
Warren	Tribs to Lake George, East Shore (1006-0020)	Silt/Sediment
Warren	Tribs to Lake George, Lk.George Village (1006-0008)	Silt/Sediment

Washington	Wood Cr/Champlain Canal and tribs (1005-0036)	Phosphorus
Westchester	Lake Katonah (1302-0136)	Phosphorus
Westchester	Lake Lincolndale (1302-0089)	Phosphorus
Westchester	Lake Meahagh (1301-0053)	Phosphorus
Westchester	Lake Mohegan (1301-0149)	Phosphorus
Westchester	Lake Shenorock (1302-0083)	Phosphorus
Westchester	Mamaroneck River, Lower (1702-0071)	Silt/Sediment
Westchester	Mamaroneck River, Upp, & minor tribs (1702-0123)	Silt/Sediment
Westchester	Saw Mill River (1301-0007)	Phosphorus
Westchester	Saw Mill River, Middle, and tribs (1301-0100)	Phosphorus
Westchester	Sheldrake River (1702-0069)	Phosphorus
Westchester	Sheldrake River (1702-0069)	Silt/Sedimnt
Westchester	Silver Lake (1702-0040)	Phosphorus
Westchester	Teatown Lake (1302-0150)	Phosphorus
Westchester	Truesdale Lake (1302-0054)	Phosphorus
Westchester	Wallace Pond (1301-0140)	Phosphorus

APPENDIX E – List of NYSDEC Regional Offices

Region	Covering the following counties:	DIVISION OF ENVIRONMENTAL PERMITS (DEP) Permit Administrators	DIVISION OF WATER (DOW) Water (SPDES) Program
1	Nassau and Suffolk	50 Circle Road Stony Brook, NY 11790 Tel. (631) 444-0365	50 Circle Road Stony Brook, NY 11790-3409 Tel. (631) 444-0405
2	Bronx, Kings, New York, Queens and Richmond	1 Hunters Point Plaza, 47-40 21st St. Long Island City, NY 11101-5407 Tel. (718) 482-4997	1 Hunters Point Plaza, 47-40 21st St. Long Island City, NY 11101-5407 Tel. (718) 482-4933
3	Dutchess, Orange, Putnam, Rockland, Sullivan, Ulster and Westchester	21 South Putt Corners Road New Paltz, NY 12561-1696 Tel. (845) 256-3059	220 White Plains Road, Suite 110 Tel. (914) 428 - 2505
4	Albany, Columbia, Delaware, Greene, Montgomery, Otsego, Rensselaer, Schenectady and Schoharie	1130 North Westcott Road Schenectady, NY 12306-2014 Tel. (518) 357-2069	1130 North Westcott Road Schenectady, NY 12306-2014 Tel. (518) 357-2045
5	Clinton, Essex, Franklin, Fulton, Hamilton, Saratoga, Warren and Washington	1115 State Route 86, Po Box 296 Ray Brook, NY 12977-0296 Tel. (518) 897-1234	232 Golf Course Road Warrensburg, NY 12885-1172 Tel. (518) 623-1200
6	HERKIMER, JEFFERSON, LEWIS, ONEIDA AND ST. LAWRENCE	STATE OFFICE BUILDING 317 WASHINGTON STREET WATERTOWN, NY 13601-3787 TEL. (315) 785-2245	STATE OFFICE BUILDING 207 GENESEE STREET UTICA, NY 13501-2885 TEL. (315) 793-2554
7	BROOME, CAYUGA, CHENANGO, CORTLAND, MADISON, ONONDAGA, OSWEGO, TIOGA AND TOMPKINS	5786 WIDEWATERS PARKWAY SYRACUSE, NY 13214-1867 TEL. (315) 426-7438	5786 WIDEWATERS PARKWAY SYRACUSE, NY 13214-1867 TEL. (315) 426-7500
8	CHEMUNG, GENESEE, LIVINGSTON, MONROE, ONTARIO, ORLEANS, SCHUYLER, SENECA, STEUBEN, WAYNE AND YATES	6274 EAST AVON-LIMA ROADAVON, NY 14414-9519 TEL. (585) 226-2466	6274 EAST AVON-LIMA RD. AVON, NY 14414-9519 TEL. (585) 226-2466
9	ALLEGANY, CATTARAUGUS, CHAUTAUQUA, ERIE, NIAGARA AND WYOMING	700 DELAWARE AVENUE BUFFALO, NY 14209-2999 TEL. (716) 851-7165	700 DELAWARE AVENUE BUFFALO, NY 14209-2999 TEL. (716) 851-7070

APPENDIX F – SWPPP Preparer Certification Form

The SWPPP Preparer Certification Form required by this permit begins on the following page.

SWPPP Preparer Certification Form

SPDES General Permit for Stormwater Discharges from Construction Activity, GP-0-25-001 (CGP)

(In accordance with CGP Part I.D.2.b., the completed form must be attached to the eNOI and submitted to NYSDEC electronically.)

Project/Site Name:

eNOI Submission ID:

Owner/Operator Name:

Certification Statement – SWPPP Preparer

I hereby certify that the Stormwater Pollution Prevention Plan (SWPPP) has been prepared in accordance with the requirements of GP-0-25-001. I certify under penalty of law that the SWPPP and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

SWPPP Preparer First Name | MI | SWPPP Preparer Last Name

Signature | Date

Revised: January 2025

APPENDIX G – MS4 SWPPP Acceptance Form

The MS4 SWPPP Acceptance Form required by this permit begins on the following page.

MS4 SWPPP Acceptance Form

for construction activities seeking authorization under the

SPDES General Permit for Stormwater Discharges from Construction Activity, GP-0-25-001 (CGP)

(In accordance with CGP Part I.D.2.b., the completed form must be attached to the eNOI and submitted to NYSDEC electronically.)

I. Project Owner/Operator Information
1. Owner/Operator Name:
2. Contact Person:
3. Street Address:
4. City/State/Zip:
II. Project Site Information
5. Project/Site Name:
6. Street Address:
7. City/State/Zip:
III. Stormwater Pollution Prevention Plan (SWPPP) Review and Acceptance Information
8. SWPPP Reviewed by:
9. Title/Position:
10. Date Final SWPPP Reviewed and Accepted:
IV. Regulated MS4 Information
11. Name of MS4 Operator:
12. MS4 SPDES Permit Identification Number: NYR20A
13. Street Address:
14. City/State/Zip:
15. Telephone Number:

MS4 SWPPP Acceptance Form - continued

V. Certification Statement - MS4 Official (principal executive officer or ranking elected official) or Duly Authorized Representative

I hereby certify that the final Stormwater Pollution Prevention Plan (SWPPP) for the construction project identified in section II. of this form has been reviewed and meets the substantive requirements in the SPDES General Permit for Stormwater Discharges from Construction Activity, GP-0-25-001 (CGP). Note: The MS4 Operator, through the acceptance of the SWPPP, assumes no responsibility for the accuracy and adequacy of the design included in the SWPPP. In addition, review and acceptance of the SWPPP by the MS4 Operator does not relieve the owner/operator or their SWPPP preparer of responsibility or liability for errors or omissions in the plan.

Printed Name[1]:

Title/Position:

Signature:

Date:

VI. Additional Information

[1] Printed name of the principal executive officer or ranking elected official for the MS4 Operator or their duly authorized representative in accordance with CGP Part VII.J.2.

APPENDIX H – NYCDEP SWPPP Acceptance/Approval Form

The City of New York Department of Environmental Protection (NYCDEP) SWPPP Acceptance/Approval form required by this permit begins on the following page.

THE CITY OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL PROTECTION
Bureau of Environmental Planning and Analysis
59-17 Junction Blvd., 9th Floor; Flushing, NY 11373

SWPPP Acceptance/Approval

Application Number:

I. Project Owner/Operator Information

1. Owner/Operator Name:
2. Contact Person:
3. Street Address:
4. City/State/Zip:

II. Project Site Information

5. Project/Site Name:
6. Street Address:
7. City/State/Zip:

III. Stormwater Pollution Prevention Plan (SWPPP) Review and Acceptance/Approval

8. SWPPP Reviewed by:
9. Title/Position: /
10. Date Final SWPPP Reviewed and Accepted:
11. Acceptance/Approval Expiration Date:

IV. Regulated MS4 Information for projects that require coverage under the NY State Pollution Discharge Elimination System General Permit for Stormwater Discharges from Construction Activity

12. Name of MS4: *CITY OF NEW YORK*
13. MS4 SPDES Permit Identification Number: *NY-0287890*
14. Contact Person:
15. Street Address: *59-17 Junction Blvd. 9th Floor*
16. City/State/Zip: *Flushing, NY 11373*
17. Telephone Number:

Projects in the MS4 area must submit a copy of this SWPPP Acceptance with a Notice of Intent for coverage under the NY SPDES General Permit for Stormwater Discharges from Construction Activity to: NYS Department of Environmental Conservation, Division of Water; 625 Broadway, 4th Floor; Albany, New York 12233-3505.

THE CITY OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL PROTECTION
Bureau of Environmental Planning and Analysis
59-17 Junction Blvd., 9th Floor; Flushing, NY 11373

V. Certification Statement - MS4 Official (principal executive officer or ranking elected official) or Duly Authorized Representative

I hereby certify that the final Stormwater Pollution Prevention Plan (SWPPP) for the construction project identified in question 5 has been reviewed and meets the substantive requirements in the SPDES General Permit For Stormwater Discharges from Municipal Separate Storm Sewer Systems (MS4s).

Note: The MS4, through the acceptance of the SWPPP, assumes no responsibility for the accuracy and adequacy of the design included in the SWPPP. In addition, review and acceptance of the SWPPP by the MS4 does not relieve the owner/operator or their SWPPP preparer of responsibility or liability for errors or omissions in the plan.

Printed Name:

Title/Position:

Signature:

Date:

VI. Conditions of Acceptance/Approval and Additional Information

Projects in the MS4 area must submit a copy of this SWPPP Acceptance with a Notice of Intent for coverage under the NY SPDES General Permit for Stormwater Discharges from Construction Activity to: NYS Department of Environmental Conservation, Division of Water; 625 Broadway, 4th Floor; Albany, New York 12233-3505.

APPENDIX I – MS4 No Jurisdiction Form

The MS4 No Jurisdiction Form required by this permit begins on the following page.

MS4 No Jurisdiction Form

for construction activities seeking authorization under the

SPDES General Permit for Stormwater Discharges from Construction Activity, GP-0-25-001 (CGP)

(In accordance with CGP Part I.D.2.b., the completed form must be attached to the eNOI and submitted to NYSDEC electronically.)

I. Project Owner/Operator Information

a. Owner/Operator Name:

b. Contact Person:

c. Street Address:

d. City/State/Zip:

II. Project Site Information

a. Project/Site Name:

b. Street Address:

c. City/State/Zip:

d. eNOI Submission ID:

III. Traditional Land Use Control MS4 Operator Information

a. Name of MS4 Operator:

b. MS4 SPDES Permit ID Number: NYR20A

c. Street Address:

d. City/State/Zip:

e. Telephone Number:

IV. Certification Statement

In accordance with CGP Part I.D.2.b.ii.3., I hereby certify that the Traditional Land Use Control MS4 Operator identified in section III. of this form does not have review authority over the construction project identified in section II. of this form, which is owned/operated by the entity identified in section I. of this form. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

a. Printed name of the principal executive officer or ranking elected official for the MS4 Operator or their duly authorized representative in accordance with CGP Part VII.J.2.:

b. Title/Position:

c. Signature:

d. Date:

APPENDIX J – Owner/Operator Certification Form

The Owner/Operator Certification Form required by this permit begins on the following page.

Owner/Operator Certification Form

SPDES General Permit for Stormwater Discharges from Construction Activity, GP-0-25-001 (CGP)

(In accordance with CGP Part I.D.2.b. or Part I.F.2. and 3., the completed form must be attached to the eNOI or the Request to Continue Coverage, and submitted to NYSDEC electronically.

Project/Site Name: _____

eNOI Submission ID: _____

eNOI Submitted by: ☐ **Owner/Operator** ☐ **SWPPP Preparer** ☐ **Other**

Certification Statement - Owner/Operator

I hereby certify that I read, and will comply with, the GP-0-25-001 permit requirements. I understand that authorization to discharge under the permit for the project/site named above is dependent on receipt of a Letter of Authorization (LOA) or a Letter of Continued Coverage (LOCC) from the New York State Department of Environmental Conservation (NYSDEC) in accordance with CGP Part I.D.3.b. or Part I.F.4. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Owner/Operator First Name MI Owner/Operator Last Name

_____

Signature

_____

Date

Revised: January 2025

APPENDIX K

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

Tree Planting Stormwater Management Practices Level 1 Inspection Checklist

SMP ID #		**SMP Owner**		☐ Private ☐ Public
SMP Location (Address; Latitude & Longitude)				
	Latitude		**Longitude**	

Party Responsible for Maintenance	**System Type**		**Type of Site**
☐ Same as SMP Owner ☐ Other _____	☐ Seasonal ☐ Continuous Use ☐ Other	☐ Above Ground ☐ Below Ground	☐ Commercial ☐ Industrial ☐ Residential ☐ State

Inspection Date		**Inspection Time**	
Inspector			
Date of Last Inspection			

TP Watering

Inspect the trees to determine whether they need watering.

Problem (Check if Present)	**Follow-Up Actions**
☐ Soil is not moist to the touch and/or it has not rained in a week, and leaves/needles are starting to appear wilted/dry.	☐ Water trees deeply and slowly near the base. Soaker hoses and drip irrigation work best for deep watering of trees and shrubs. ☐ Other:

TP Mulch

Mulch should be applied in the late spring and during leaf fall. Check the depth of mulch regularly. Rake the old mulch to break up any matted layers and to refresh the appearance.

Problem (Check if Present)	Follow-Up Actions
☐ Mulch is too thin or thick (should be approximately 3" deep) or does not extend to tree canopy (or 5' radius if tree has a larger than 10' canopy reach).	☐ Add or remove mulch around tree canopy to maximum 5' radius but not within 3" of the bark. ☐ If mulch is against the stems or tree trunks, pull it back several inches to expose the base of the trunk and root crown. ☐ Other:

TP Pruning

Examine the branches and tree shape.

Problem (Check if Present)	Follow-Up Actions
☐ Presence of suckers, dead or diseased branches, branches that interfere with pedestrian traffic	☐ Selective cutting ☐ Prune to make the tree more aesthetically pleasing and remove disease. ☐ Other:
	☐ Kick-Out to Level 2 Inspection: Use an arborist or landscaper for more extensive pruning jobs.

Additional Notes:

Inspector:_____ Date: _____

Complete the following if follow-up/corrective actions were identified during this inspection:

Certified Completion of Follow-Up Actions:

> "I hereby certify that the follow-up/corrective actions identified in the inspection performed on _____ (DATE) have been completed and any required maintenance deficiencies have been adequately corrected."

Inspector/Operator: _____ Date: _____

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

Tree Planting Stormwater Management Practices
Level 2 Inspection Checklist

SMP ID #		**SMP Owner**		☐ Private ☐ Public
SMP Location (Address; Latitude & Longitude)				
	Latitude		**Longitude**	

Party Responsible for Maintenance	**System Type**		**Type of Site**
☐ Same as SMP Owner ☐ Other _____	☐ Seasonal ☐ Continuous Use ☐ Other	☐ Above Ground ☐ Below Ground	☐ Commercial ☐ Industrial ☐ Residential ☐ State

Inspection Date		**Inspection Time**	
Inspector			
Date of Last Inspection			

Level 2 Inspection: TREE PLANTING	
Recommended Repairs	**Triggers for Level 3 Inspection**
Observed Condition: Appearance of fungus or pest damage	
☐ Condition 1: Fungus, discoloration, browning leaves or holes in leaves Check with arborist or other tree professional about the best way to proceed. This requires a Level 3 inspection. ☐ Condition 2: Burrowing insects, holes Check with arborist or other tree professional about the best way to proceed. This requires a Level 3 inspection.	• Any concerns about how to address infestation or disease ☐ Level 3 inspection necessary

Notes:

Inspector:_____ Date: _____

Complete the following if follow-up/corrective actions were identified during this inspection:

Certified Completion of Follow-Up Actions:

"I hereby certify that the follow-up/corrective actions identified in the inspection performed on _____ (DATE) have been completed and any required maintenance deficiencies have been adequately corrected."

Inspector/Operator: _____ Date: _____

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

Infiltration Stormwater Management Practices Level 1 Inspection Checklist

SMP ID #		**SMP Owner**		☐ Private ☐ Public
SMP Location (Address; Latitude & Longitude)				
	Latitude		**Longitude**	

Party Responsible for Maintenance	**System Type**		**Type of Site**
☐ Same as SMP Owner ☐ Other _____	☐ Seasonal ☐ Continuous Use ☐ Other	☐ Above Ground ☐ Below Ground	☐ Commercial ☐ Industrial ☐ Residential ☐ State

Inspection Date		**Inspection Time**	
Inspector			
Date of Last Inspection			

IN Drainage Area

Look for both pervious and impervious areas that are uphill from the Infiltration cell.

Problem (Check if Present)		**Follow-Up Actions**
	☐ Bare soil, erosion of the ground (rills washing out the dirt)	☐ Seed and straw areas of bare soil to establish vegetation. ☐ Fill in erosion areas with soil, compact, and seed and straw to get vegetation established. ☐ If a rill or small channel is forming, try to redirect water flowing to this area by creating a small berm or adding topsoil to areas that are heavily compacted. ☐ Other:

IN Drainage Area

Look for both pervious and impervious areas that are uphill from the Infiltration cell.

Problem (Check if Present)		Follow-Up Actions
		☐ Kick-Out to Level 2 Inspection: Large areas of soil have been eroded, or larger channels are forming. May require rerouting of flow paths.
☐ For Dry Wells: Leaves, sticks, or other debris in gutters and downspouts		☐ Remove all debris by hand. ☐ Other:
	☐ Piles of grass clippings, mulch, dirt, salt, or other materials	☐ Remove or cover piles of grass clippings, mulch, dirt, etc. ☐ Other:
	☐ Open containers of oil, grease, paint, or other substances	☐ Cover or properly dispose of materials; consult your local solid waste authority for guidance on materials that may be toxic or hazardous. ☐ Other:

IN Inlets

Look for all the places where water flows into the Infiltration practice.

Problem (Check if Present)	Follow-Up Actions
 ☐ Inlets are collecting grit and debris or grass/weeds are growing. Some water may not be getting into the Infiltration practice.	☐ Use a flat shovel to remove grit and debris (especially at curb inlets or openings). Parking lots generate fine grit that will accumulate at these spots. ☐ Pull out clumps of growing grass or weeds and scoop out the soil or grit that the plants are growing in. ☐ Remove any grass clippings, leaves, sticks, and other debris that is collecting at inlets. ☐ For pipes and ditches, remove sediment and debris that is partially blocking the pipe or ditch opening where it enters the Infiltration practice. ☐ Dispose of all material properly in an area where it will not re-enter the practice. ☐ Other: ☐ Kick-Out to Level 2 Inspection: Inlets are blocked to the extent that most of the water does not seem to be entering the Infiltration practice.
☐ Some or all of the inlets are eroding so that rills, gullies, and other erosion is present, or there is bare dirt that is washing into the Infiltration practice.	☐ For small areas of erosion, smooth out the eroded part and apply rock or stone (e.g., river cobble) to prevent further erosion. Usually, filter fabric is placed under the rock or stone. ☐ In some cases, reseeding and applying erosion-control matting can be used to prevent further erosion. Some of these materials may be available at a garden center, but it may be best to consult a landscape contractor. ☐ Other: ☐ Kick-Out to Level 2 Inspection: Erosion is occurring at most of the inlets and it looks like there is too much water that is concentrating at these points. The inlet design may have to be modified.

IN Infiltration Area

Examine the surface of the infiltration area and the observation well. Note: The following Problem and Follow-Up Actions apply to infiltration practice pretreatment areas also.

Problem (Check if Present)	Follow-Up Actions
 ☐ For grass-covered Infiltration practices: grass has grown very tall, *Photo credit: Stormwater Maintenance, LLC*	☐ Mow infiltration area at least twice per year. ☐ Other:
 ☐ For grass-covered Infiltration practices: sparse vegetation cover or bare spots	☐ Add topsoil (as needed), grass seed, straw, and water during the growing season to re-establish consistent grass coverage. ☐ Other: ☐ Kick-Out to Level 2 Inspection: Sparse vegetation cover can be a sign that the infiltration area is not infiltrating at the proper rate and water is standing too long after a storm. The surface may be saturated or squishy, and the conditions do not enable grass to grow. This situation should be evaluated by a Level 2 Inspection and likely corrected by a qualified contractor.
☐ Minor areas of sediment, grit, trash, or other debris are accumulating on the surface.	☐ Use a shovel to scoop out minor areas of sediment or grit, especially in the spring after winter sanding materials may wash in and accumulate. Dispose of the material where it cannot re-enter the Infiltration practice. ☐ If removing the material creates a hole or low area, rake the surface smooth and level. ☐ Remove trash, debris, and other undesirable materials. ☐ Other: ☐ Kick-Out to Level 2 Inspection: Sediment has accumulated more than 2-inches deep and covers 25% or more of the surface of the Infiltration area.

IN Infiltration Area

Examine the surface of the infiltration area and the observation well. Note: The following Problem and Follow-Up Actions apply to infiltration practice pretreatment areas also.

Problem (Check if Present)	Follow-Up Actions
 ☐ There is erosion on the surface; water seems to be carving out rills as it flows across the surface of the Infiltration area or sinkholes are forming in certain areas.	☐ For minor areas of erosion, try filling the eroded areas with clean topsoil, sand, or stone (whatever the existing cover is). ☐ If the problem recurs, you may have to use larger stone (e.g., river cobble) to fill in problem areas. ☐ Other: ☐ Kick-Out to Level 2 Inspection: The problem persists or the erosion is more than 3-inches deep and seems to be an issue with how water enters and moves through the infiltration area. ☐ Kick-Out to Level 2 Inspection: The problem does not seem to be caused by flowing water but a collapse or sinking of the surface (e.g., “sinkhole”) due to some underground problem.
 ☐ Observation well is damaged or cap is missing	☐ Kick-Out to Level 2 Inspection: Requires replacing pipes or caps.

IN Infiltration Area

Examine the surface of the infiltration area and the observation well. Note: The following Problem and Follow-Up Actions apply to infiltration practice pretreatment areas also.

Problem (Check if Present)	Follow-Up Actions
 ☐ Water still visible in the observation well more than 72 hours after a rain storm. The Infiltration practice does not appear to be draining properly.	☐ Kick-Out to Level 2 Inspection: This is generally a serious problem, and it will be necessary to activate a Level 2 Inspection.

IN Outlets

Locate and inspect all outlets.

Problem (Check if Present)	Follow-Up Actions
 ☐ Outlet obstructed with sediment, debris, trash, etc.	☐ Remove the debris and dispose of it where it cannot re-enter the infiltration area. ☐ Other:
	☐ Kick-Out to Level 2 Inspection: Outlet is completely obstructed; there is too much material to remove by hand or with simple hand tools.
☐ Rills or gullies are forming at outlet.	☐ For minor rills, fill in with soil, compact, and seed and straw to establish vegetation. ☐ Other:
	☐ Kick-Out to Level 2 Inspection: Rills are more than 2" to 3" deep and require more than just hand raking and re-seeding.

Additional Notes:

Inspector:_____ Date: _____

Complete the following if follow-up/corrective actions were identified during this inspection:

Certified Completion of Follow-Up Actions:

"I hereby certify that the follow-up/corrective actions identified in the inspection performed on _____ (DATE) have been completed and any required maintenance deficiencies have been adequately corrected."

Inspector/Operator: _____ Date: _____

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

Infiltration Stormwater Management Practices Level 2 Inspection Checklist

SMP ID #		**SMP Owner**		☐ Private ☐ Public
SMP Location (Address; Latitude & Longitude)				
	Latitude		**Longitude**	

Party Responsible for Maintenance	**System Type**		**Type of Site**
☐ Same as SMP Owner ☐ Other _____	☐ Seasonal ☐ Continuous Use ☐ Other	☐ Above Ground ☐ Below Ground	☐ Commercial ☐ Industrial ☐ Residential ☐ State

Inspection Date		**Inspection Time**	
Inspector			
Date of Last Inspection			

Level 2 Inspection: INFILTRATION

Recommended Repairs	Triggers for Level 3 Inspection
Observed Condition: Water Stands on Surface for More than 72 Hours after Storm	
☐ Condition 1: Small pockets of standing water For infiltration basins with soil, use a soil probe or auger to examine the soil profile. For gravel infiltration trenches or basins, use a shovel to dig into the gravel layer where the problem is occurring. If isolated areas have accumulated grit, fine silt, or vegetative debris or have bad soil or clogged gravel, try removing and replacing with clean material. If the practice is supposed to have grass cover, it will likely be necessary to replant once the problem is resolved. ☐ Condition 2: Standing water is widespread or covers entire surface Look in the observation well (if it exists) and use a tape measure to estimate the depth of water standing in the soil or gravel. Requires diagnosis and resolution of problem: ≠ Too much sediment/grit washing in from drainage area? ≠ Too much ponding depth? ≠ Improper infiltration media? ≠ Underlying soil not suitable for infiltration? As above, the resolution will likely require replanting and re-establishment of good grass cover if this is part of the design.	≠ Infiltration media is clogged and problem cannot be diagnosed from Level 2 inspection. ≠ Level 2 inspection identifies problem, but it cannot be resolved easily or it is associated with the original design of the practice. ☐ Level 3 Inspection necessary
Observed Condition: Severe erosion of infiltration bed, inlets, or around outlets	
☐ Condition 1: Erosion at inlets The lining (e.g., grass, matting, stone, rock) may not be adequate for the actual flow velocities coming through the inlets. First line of defense is to try a less erosive lining and/or extending the lining further down to where inlet slopes meet the infiltration surface. If problem persists, analysis by a Qualified Professional is warranted. ☐ Condition 2: Erosion of infiltration bed This is often caused by “preferential flow paths” along the surface. The source of flow should be analyzed and methods employed to dissipate energy and disperse the flow (e.g., check dams, rock splash pads).	≠ Erosion (rills, gullies) is more than 12 inches deep ≠ The issue is not caused by moving water but some sort of subsurface defect, which may manifest as a sinkhole or linear depression and be associated with problems with the underlying stone or soil. ☐ Level 3 Inspection necessary

Notes:

Inspector:_____ Date: _____

Complete the following if follow-up/corrective actions were identified during this inspection:

Certified Completion of Follow-Up Actions:

"I hereby certify that the follow-up/corrective actions identified in the inspection performed on _____ (DATE) have been completed and any required maintenance deficiencies have been adequately corrected."

Inspector/Operator: _____ Date: _____

APPENDIX L

Infiltration Basin (I-2)

Design Point:	

Enter Site Data For Drainage Area to be Treated by Practice							
Drainage Area Number	**Contributing Area** (Acres)	**Impervious Area** (Acres)	**Percent Impervious** %	**Rv**	**WQv** (cf)	**Precipitation** (in)	**Description**
2	3.03	1.38	46	0.46	9,965	1.97	Infiltration Basin

Design Criteria		
Enter underlying soil infiltration rate (based on geotechnical testing, refer to Appendix D)	24	
Is the contributing area to the practice an "Infiltration Restricted" stormwater hotspot?	No	
Is the contributing area to the practice an "Infiltration Prohibited" stormwater hotspot?	No	
Maximum contributing area (acres)	50	
Is the contributing area greater than the maximum allowed contributing area?	No	
Enter depth to seasonal high water table (ft)	13	
Enter depth to bedrock (ft)	25	
Enter pretreatment volume provided (cf)	5014	
Enter depth of freeboard (ft)	1	
Enter depth of basin (ft)	5.5	
Enter slope of maintenance access (%)	2	
Enter width of maintenance access (ft)	12	

Sizing Criteria				
		Value	Units	Notes
Water Quality Volume	WQv	9965	cf	
Basin depth	db	5.5	ft	
Required Surface Area	Ab	1,812	sf	
Enter Surface Area Provided	Ab	1998	sf	

Determine Runoff Reduction		
RRv Provided	**9,965**	***cf***

NOI QUESTIONS

#	NOI Question	Reported Value	
		cf	af
28	Total Water Quality Volume (WQv) Required	10864	0.249
30	Total RRV Provided	9965	0.229
31	Is RRv Provided ≥WQv Required?	No	
32	Minimum RRv	13242	0.304
32a	Is RRv Provided ≥ Minimum RRv Required?	No	
	Contact Regional DEC Office		
33a	Total WQv Treated	0	0.000
34	Sum of Volume Reduced & Treated	9965	0.229
35	Is Sum RRv Provided and WQv Provided ≥WQv Required?	No	

Step 3 - Evaluation of RR Techniques and Standard SMPs with RRv Capacity

	Practice	Description	Applicable	Project Specific Evaluation
RR Techniques	**Conservation of Natural Areas (RR-1)**	Retain the pre-development hydrologic and water quality characteristics of undisturbed natural areas by permanently conserving these areas on a site. Undisturbed natural areas include: forest retention areas; reforestation areas; stream and river corridors; shorelines; wetlands, vernal pools, and associated vegetated buffers; and undisturbed open space.	No	EXAMPLES - The project site does not contain any significant natural resources. **OR** As a Redevelopment Project, the proposed site layout has been designed to limit land disturbance to the greatest extent practical. **OR** Approximately XX+/- Acres will be placed into permanent conservation, which accounts for XX% of the total property. **OR** The project does not propose permanent conservation of these areas at this time.
	Sheet Flow to Riparian Buffer/Filter Strip (RR-2)	Undisturbed natural areas such as forested conservation areas and stream buffers or vegetated filter strips and riparian buffers can be used to treat and control stormwater runoff from some areas of a development project.	No	EXAMPLES - The project site does not contain any riparian buffers. **OR** Sheet flow to riparian buffers or grass filter strips is not proposed at this time. The project proposes treatment by RR techniques, Standard SMPs with RRv capacity, or Standard SMPs without RRv capacity. **OR** The project proposes sheet flow to riparian buffers to reduce runoff from XX. Calculations have been provided in the SWPPP. **OR** The project proposes sheet flow to grass filter strips to reduce runoff from XX. Calculations have been provided in the SWPPP.
	Tree Planting/Tree Pit/Tree Trench (RR-3)	Plant or conserve trees to reduce stormwater runoff, increase nutrient uptake, and provide bank stabilization. Trees can be used for applications such as landscaping, stormwater management practice areas, conservation areas and erosion and sediment control.	No	EXAMPLES - The project proposes the preservation of existing mature trees, as well as the planting of numerous trees throughout the site, in order to reduce stormwater runoff, increase nutrient uptake, and provide bank stabilization. **OR** The project proposes new tree plantings/tree pits/tree trenches, adjacent to impervious surfaces, Calculations have been provided in the SWPPP. **OR** Tree plantings/tree pits/tree trenches are proposed on site. However, credit for these trees will not be taken toward area reduction/volume reduction in the RRv calculations.
	Disconnection of Rooftop Runoff (RR-4)	Direct runoff from rooftop areas and upland overland runoff flow to designated pervious areas to reduce runoff volumes and rates.	No	EXAMPLES - The building roof(s) will be directed to downspouts with splash blocks and discharge over a grassed filter. Calculations have been provided in the SWPPP. **OR** The building roof(s) will be directed to downspouts with splash blocks and vegetated areas, which will promote sheet flow and filtering. However, credit for rooftop disconnect will not be taken toward an impervious area reduction in the RRv calculations. **OR** Due to the size/use/layout of the proposed building(s), rooftop disconnect is not proposed at this time.

Steps 3 and 5 - Apply RR Techniques and Standard SMPs

Runoff Reduction Volume and Treated Volumes						
	Runoff Reduction Techiques/Standard SMPs		**Total Contributing Area**	**Total Contributing Impervious Area**	**WQv Reduced (RRv)**	**WQv Treated**
			(acres)	**(acres)**	**(cf)**	**(cf)**
RR Techniques	Conservation of Natural Areas	RR-1	0.00		0	
	Sheet Flow to Riparian Buffer/Filter Strip	RR-2	0.00	0.00	0	
	Tree Planting/Tree Pit/Tree Trench	RR-3	0.00	0.00	0	
	Disconnection of Rooftop Runoff	RR-4		0.00	0	
	Vegetated Swale	RR-5	0.00	0.00	0	
	Rain Garden	RR-6	0.89	0.09	0	
	Stormwater Planter	RR-7	0.00	0.00	0	
	Rainwater Harvesting Systems	RR-8	0.00	0.00	0	
	Porous Pavement	RR-9	0.00	0.00	0	
	Green Roof (Extensive & Intensive)	RR-10	0.00	0.00	0	
	Stream Daylighting	RR-11				
Standard SMPs w/ RRv Capacity	Infiltration Trench	I-1	0.00	0.00	0	0
	Infiltration Basin	I-2	3.03	1.38	9,965	0
	Dry Well	I-3	0.00	0.00	0	0
	Underground Infiltration System	I-4	0.00	0.00	0	0
	Infiltration Bioretention	F-4	0.00	0.00	0	0
	Filtration Bioretention	F-5	0.00	0.00	0	0
	Bioslope	F-6	0.00	0.00	0	0
	Dry swale	O-1	0.00	0.00	0	0
Standard SMPs	Micropool Extended Detention	P-1	0.00	0.00		0
	Wet Pond	P-2	0.00	0.00		0
	Wet Extended Detention	P-3	0.00	0.00		0
	Multiple Pond System	P-4	0.00	0.00		0
	Shallow Wetland	W-1	0.00	0.00		0
	Extended Detention Shallow Wetland	W-2	0.00	0.00		0
	Pond/Wetland System	W-3	0.00	0.00		0
	Pocket Wetland	W-4	0.00	0.00		0
	Gravel Wetland	W-5	0.00	0.00		0
	Surface Sand Filter	F-1	0.00	0.00		0
	Underground Sand Filter	F-2	0.00	0.00		0
	Perimeter Sand Filter	F-3	0.00	0.00		0
	Wet Swale	O-2	0.00	0.00		0
Alt. SMPs	Flow Based Alternative Practice	-	0.00	0.00		0
	Volume Based Alternative Practice	-				
	Totals by RR Technique →		0.89	0.09	0	
	Totals by Standard SMP w/RRV →		3.03	1.38	9,965	0
	Totals by Standard SMP →		0.00	0.00		0
	Totals by Alternative SMP →		0.00	0.00		0
	Totals (RR Techniques + all SMPs) →		3.92	1.47	9,965	0

Step 1 - Site Planning

	Practice	Description	Applicable	Project Specific Evaluation
Preservation of Natural Features and Conservation Design	**Preservation of Undisturbed Areas**	Delineate and protect undisturbed forests, native vegetated areas, riparian corridors, water bodies, wetlands, and natural terrain.	No	EXAMPLES - Approximately XX+/- Acres of land will remain undisturbed, in its natural state, which accounts for XX% of the total project parcel. **OR** The project does not propose permanent conservation of this area at this time.
	Preservation of Buffers	Delineate and protect naturally vegetated buffers along perennial streams, rivers, shorelines, and wetlands.	No	EXAMPLES - There is a stream/river/shorline/wetland located on the project site. For the area adjacent to this water body, a XX-ft naturally vegetated buffer will be applied. No disturbance will occur within this buffer. **OR** The only disturbance that will occur within this buffer will include XX. This disturbance is necessary because XX. **OR** There are no water bodies located on or adjacent to the project site.
	Reduction of Clearing and Grading	Limit clearing and grading to the minimum amount needed for roads, driveways, foundations, utilities and stormwater management facilities.	Yes	EXAMPLES - Clearing and grading will be limited to the area of disturbance and will be minimized to the greatest extent practical. The limits of all proposed clearing will be demarcated in the field with orange construction fencing, prior to construction, to prevent unnecessary removal of trees.
	Locating Development in Less Sensitive Areas	Avoid sensitive resource areas such as floodplains, steep slopes, erodible soils, wetlands, mature forests and critical habitats by locating development to fit the terrain in areas that will create the least impact.	No	EXAMPLES - The site has been designed to avoid sensitive resource areas to the greatest extent practical. Include project specific information for the various sensitive resources. **OR** There are no floodplains, steep slopes, erodible soils, wetlands, mature forests or critical habitats located on the project site.
	Open Space Design	Use clustering, conservation design or open space design to reduce impervious cover, preserve more open space and protect water resources.	N/A	EXAMPLES - The site layout has been designed to maximize open space. Impervious surfaces have been minimized to the greatest extent practical and approximately XX+/- Acres will be maintained as vegetated open space.
	Soil Restoration	Restore the original properties and porosity of the soil by deep till and amendment with compost to reduce the generation of runoff and enhance the runoff reduction performance of post construction practices.	Yes	EXAMPLES - All disturbed areas will be restored in accordance with the Soil Restoration requirements in Table 5.3 of the Design Manual. **OR** Compacted areas were considered as impervious cover when calculating the WQv Required and the compacted areas were assigned a post-construction HSG designation that is one level less permeable than existing conditions for the hydrology analysis.

Step 1 - Site Planning

Reduction of Impervious Cover	**Roadway Reduction**	Minimize roadway widths and lengths, below local requirements, to reduce site impervious area	No	EXAMPLES - Proposed roadways will be constructed with a porous XX surface, in order to minimize the overall impervious surface. **OR** The project proposes to reduce the roadway width to XX-ft, from the required XX-ft. **OR** Reducing the roadway width is not feasible for the project's intended use. **OR** No new roadways are proposed as part of this project.
	Sidewalk Reduction	Minimize sidewalk lengths and widths, below local requirements, to reduce site impervious area	No	EXAMPLES - All pedestrian walkways will be constructed with a porous XX surface. **OR** Sidewalk widths have been minimized to X-ft and quantity of sidewalk has been reduced to that required to ensure safe pedestrian access throughout the site. **OR** Reducing the sidewalk width/length is not feasible for the project's intended use. **OR** No new sidewalks are proposed as part of this project.
	Driveway Reduction	Minimize driveway lengths and widths, below local requirements, to reduce site impervious area	N/A	EXAMPLES - All driveways on-site will be constructed with a permeable XX surface, where feasible, in order to minimize the overall impervious surface. **OR** The project proposes to reduce the driveway width to XX-ft, instead of the required XX-ft. **OR** Reducing the driveway width is not feasible for the intended use. **OR** No new driveways are proposed as part of this project.
	Cul-de-sac Reduction	Minimize the number of cul-de-sacs and incorporate landscaped areas to reduce their impervious cover.	N/A	EXAMPLES - Proposed cul-de-sacs will utilize a landscaped island to reduce impervious cover. **OR** No cul-de-sacs are proposed as part of this project.
	Building Footprint Reduction	Reduce the impervious footprint of residences and commercial buildings by using alternate or taller buildings while maintaining the same floor to area ratio.	Yes	EXAMPLES - All new building area has been allocated to efficiently implement the intended use. **OR** No new buildings are proposed as part of this project. **OR** The current proposal involves the renovation and reuse of XX existing buildings on-site.
	Parking Reduction	Reduce imperviousness on parking lots by eliminating unneeded spaces, providing compact car spaces and efficient parking lanes, reducing stall dimensions below local requirements, using porous pavement surfaces in overflow parking areas, and using multi-storied parking decks where appropriate.	No	EXAMPLES - All parking lots will be constructed of a porous XX surface, to reduce overall impervious surfaces. **OR** The project proposes to reduce the parking stall dimensions to X-ft wide by XX-ft long, instead of the required XX-ft by XX-ft stall. **OR** The project proposes to reduce the number of parking stalls proposed to XX, instead of the required XX, resulting in an approximate XX% reduction in impervious. **OR** Reducing the parking stall dimensions or number of stalls is not feasible for the intended use. **OR** No new parking stalls are proposed as part of this project.

Step 4 - Calcuate Minimum RRv Required

Enter the Soils Data for the site		
Hydrologic Soil Group	Acres	S
A	3.54	55%
B	0.00	40%
C	0.00	30%
D	0.00	20%
Total Area	3.542	

Calculate the Minimum RRv		
S =	**0.55**	
Impervious =	3.54	*acres*
Precipitation	1.97	*inches*
Rv	0.95	
Minimum RRv	**0.304**	***af***
	13242	cf

Step 2 - Calculate Water Quality Volume

Is this project subject to Section 4.3 of the NYS Design Manual for Enhanced Phosphorus Removal?	Yes
What is the nature of this construction project?	New Construction

Design Point:		
P=	1.97	inches

Enter 1 Year 24 Hour Design Storm as P

Calculate Required WQv

Drainage Area Number	Contributing Area (Acres)	Impervious Area (Acres)	Percent Impervious %	Rv	WQv (cf)	SMP Description
1	0.89	0.09	10	0.14	899	
2	3.03	1.38	46	0.46	9,965	Infiltration Basin
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						
Total	3.92	1.47	37	0.39	**10864**	**Required WQv**

APPENDIX M

WEST BRANCH TIOUGH RIVER AND MINOR TRIBS

(SEGMENT ID 0602-0060)

Waterbody Segment Assessment Factsheet

Factsheet Update: March 24, 2025
Integrated Reporting Cycle: 2022
NYSDEC CALM: 2021

NEEDS VERIFICATION

Introduction

This fact sheet contains the most recent water quality assessment information for this waterbody segment. The assessment is based on water quality data that meet the quality assurance requirements of NYSDEC's Division of Water (DOW). An outline of the process used to assess the quality of New York State waters is described in the NYSDEC's Consolidated Assessment and Listing Methodology (CALM). (https://extapps.dec.ny.gov/docs/water_pdf/calm.pdf)

WATERBODY INFORMATION

- **Water Index Number:** SR- 44-14-60
- **Segment Classification:** C
- **Waterbody Type:** River/Stream
- **Size:** 54.4 Miles
- **Drainage Basin:** Susquehanna River
- **Hydrologic Unit Code:** 0205010202
- **County:** Cortland
- **Segment Description:** Entire stream and selected tribs

Assessment of Best Use

Background

New York State waterbodies are classified to reflect their best use(s), and the assessment of a waterbody is based on the ability of waters to support those uses. This section lists whether this waterbody segment supports its best use(s).

Best Use	Use Assessment	Use Assessment Confirmation	Pollutant(s) Cause(s)	303(d) Year	Integrated Reporting Category
 Fishing	Stressed	Unconfirmed	pH	N/A	IR3

Best Use	Use Assessment	Use Assessment Confirmation	Pollutant(s) Cause(s)	303(d) Year	Integrated Reporting Category
Secondary Contact Recreation	Unassessed	—	No Data	N/A	IR3
Primary Contact Recreation	N/A for Waterbody Class	—	—	—	—
Source of Water Supply	N/A for Waterbody Class	—	—	—	—
Shellfishing	N/A for Waterbody Class	—	—	—	—

Water Quality Monitoring Data and Information

Background

Water quality monitoring data used for assessments may come from a variety of sources, including but not limited to NYSDEC's surface water monitoring and regulatory programs, and monitoring network partnerships on rivers, streams, lakes, reservoirs, estuaries, and coastal waters.

For access to current and historical DOW data collected by our stream and lake monitoring programs, please use the Division of Water Monitoring Data Portal (https://experience.arcgis.com/experience/301748017d7d40649bc5082fc1c5365e).

Data Source	Pollutant(s)
Division of Water's Stream Monitoring and Assessment Programs	pH

For more information, or to sign-up for email updates from NYSDEC, visit our website: https://dec.ny.gov/environmental-protection/water (https://dec.ny.gov/environmental-protection/water)

NEW YORK STATE | Department of Environmental Conservation

DOCUMENT 008302 – SWPPP REPORT

1.1 SWPPP REPORT

A. This Document with its referenced attachments is part of the Procurement and Contracting Requirements for Project. They provide Owner's information for Bidders' convenience and are intended to supplement rather than serve in lieu of Bidders' own investigations. They are made available for Bidders' convenience and information, but are not a warranty of existing conditions. This Document and its attachments are not part of the Contract Documents.

B. A SWPPP report for Project, prepared by RZ Engineering, PLLC, dated 07/01/2025, is available for viewing as appended to this Document.

END OF SECTION 008302

Riverview Apartments

31 River Street

City of Cortland, Cortland County, NY

TAX ID: 87.39-01-04.100

RZE #25024

SWPPP

07/01/2025



Prepared for:

Shawna Grinnell
Cortland Housing
Assistance Council, Inc.
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Cortland, NY 13045
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Figure 1 – Topographic Map – USGS
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1.0 – SUMMARY

Cortland Housing Assistance Council, Inc. proposes development of a site located at 31 River Street in the City of Cortland, Cortland County, NY. The proposed development will include a parcel of 3.542 ± acres. Currently existing on the site of the proposed parcel is vacant farmland, meadow, grass and wooded areas. Total existing impervious surface coverage of the site is 0.097 ± acres, see Section 3.0. Proposed for development of the site is a 3-story apartment building and associated drives and parking totaling 1.29 ± acres of impervious surface coverage. The proposed site improvements to the 3.542 ± acre parcel will include disturbance of approximately 1.41 ± acres. It should also be noted per Appendix M, the site discharges directly to a fifth order stream. Therefore, per Chapter 4 of the 2015 NYS Stormwater Design Manual, CPv requirements, overbank flood control requirement, and the 100-yr storm control requirement are waived and do not need to be provided in the proposed stormwater design, see Section 6.0. Site improvements within the project will also include parking areas, stormwater facilities, general utilities, and general site landscaping. This report has been prepared with supporting documentation and calculations for the stormwater design.

2.0 – OBJECTIVE

The purpose of this report is to describe the additional stormwater management and erosion control measures for the site and the rationale for their use. This Report has been prepared in accordance with the United States Department of Agriculture (USDA) - Soil Conservation Service (SCS) “NYS Standards and Specifications for Erosion and Sediment Control,” the New York State Department of Environmental Conservation (NYSDEC) “NYS Stormwater Management Design Manual,” and the NYSDEC “SPDES General Permit for Stormwater Discharges from Construction Activities.”

This report will provide a narrative description of the proposed site improvements including stormwater management structures and erosion control methods to be temporarily or permanently employed at the site.

A copy of this SWPPP shall be maintained on site by the owner/contractor for the duration of the construction process.

3.0 – EXISTING SITE CONDITIONS

Existing Site Use

Cortland Housing Assitance Council, Inc. proposes to develop a 3.542 ± acre site located at 31 River Street, City of Cortland, Cortland County, NY. Currently existing on the site of the proposed parcel is vacant farmland, meadow, grass and wooded areas. Total existing impervious surface coverage of the site is 0.097 ± acres. The location of the site in relation to major roads and other points of reference are presented in Figures 1-3 along with an aerial photo of the site, general environmental mapping, and general vicinity.

For the purposes of analysis, two watersheds were delineated for existing conditions, EXDA-1B and EXDA-1A. EXDA-1A is approximately 1.238 ± acres and consists of wooded and meadow/brush areas. Stormwater within EXDA-1A ultimately discharges to the Tioughnioga River on the northern side of the site. The conditions of EXDA-1A and its included areas are described below:

- Woods, CN 30, Good, HSG A – 0.401 ± ac
- Brush, CN 30, Good, HSG A – 0.676 ± ac
- Medow, CN 30, Good, HSG A – 0.161 ± ac

EXDA-1B is approximately 2.711 ± acres and includes wooded and brush areas, grass cover, concrete and a portion of River Street. Stormwater within EXDA-1B discharges to the Tioughnioga River on the northern portion of the site upstream of where EXDA-1A discharges. The conditions of EXDA-1B and its included areas are described below:

- Woods, CN 30, Good, HSG A – 0.747 ± ac
- Brush, CN 30, Good, HSG A – 0.825 ± ac
- Grass, CN 39, Good, HSG A – 1.042 ± ac
- Concrete, CN 98, HSG A – 0.028 ± ac
- Paved Roads, CN 98, HSG A – 0.069 ± ac

According to soil information provided by the National Cooperative Soil Survey the site soils consist of Palmyra gravelly silt loam, 0 to 3 percent slopes – HSG Type A. Soil infiltration tests were performed by Kenney Geotechnical Engineering Services PLLC on 12/19/2022. According to a geotechnical report from the same company, testing revealed satisfactory rates for stormwater infiltration measures in the vicinity of the stormwater management area, see Appendix A.

4.0 – PROPOSED SITE USE AND IMPROVEMENTS

Proposed Site Use

For the purpose of analysis, two proposed watersheds, PRDA-1A and PRDA-1B were delineated. PRDA-1A is approximately 0.893 +/- acres. Stormwater within PRDA-1A discharges to the Tioughnioga River on the northern side of the site. The proposed land-surface cover descriptions and totals for this site within the PRDA-1A watershed are described as follows:

- Woods, Good, HSG A – 0.377 ± ac
- Grass, Good, Cn 39, HSG A – 0.422 ± ac
- Concrete, CN 98, HSG A – 0.091 ± ac
- Roofs, CN 98, HSG A – 0.003 ± ac

PRDA-1B is approximately 3.03 +/- acres. Stormwater runoff within PRDA-1B

discharges to the Tioughnioga River. Four drywells, an I-2 infiltration basin, and a forebay for the basin were used for the purpose of treating water quality volumes. For the purpose of analysis, a contributing area watershed was delineated for each of these stormwater management practices within PRDA-1B. Stormwater analysis details for PRDA-1B are shown in appendix D.

The proposed land-surface cover descriptions and totals for this site within the PRDA-1B watershed are described as follows:

- Grass, Good, CN 39, HSG A – 1.072 ± ac
- Roofs, CN 98, HSG A – 0.438 ± ac
- Concrete, CN 98, HSG A – 0.117 ± ac
- Parking, CN 98, HSG A – 0.825 ± ac
- Woods, Good, CN 30, HSG A – 0.577 ± ac

The site disturbed area watersheds were analyzed under pre- and post-conditions to determine peak runoff conditions associated with the design of the stormwater control facilities. Further discussion of the analysis is discussed in the next few report sections. The site is proposed for connection to public water and sanitary sewer systems. Access to the site during construction will be made via a temporary construction entrance off of River Street.

Site Improvements

The proposed grading and drainage plan for the site is designed to meet the stormwater quality requirements. Stormwater runoff from site development will flow to the proposed stormwater BMP's via sheet flow, shallow concentrated flow, and pipe channel flow through the proposed drainage system. All stormwater runoff from the subject site eventually discharges to the Tioughnioga River.

5.0 – STORMWATER RUNOFF COMPUTATIONS

Stormwater runoff calculations for this site are available upon request. Per Chapter 4 of the 2015 NYS Stormwater Design Manual, CPv requirements, overbank flood control requirement, and the 100-yr storm control requirement are waived and do not need to be provided in the proposed stormwater design, see Section 6.0. Water quality requirements must still be satisfied, see section 8.0 for water quality calculations.

6.0 – STORMWATER MITIGATION AND BMP'S

Proposed infiltration techniques will be utilized at this site for all watersheds. Calculations can be found in Appendix E.

Stormwater runoff quantity control is again waived for the same reasons discussed previously. However, water quality requirements must be met. An I-2 Infiltration Basin will be utilized for WQv at this site for the DA-1A proposed watershed.

DA-1B I-2 Infiltration Basin

The I-2 Infiltration Basin for DA-1B contains 20,903 ± cubic feet of the total storage to treat WQv. The basin has side slopes of 3:1. Infiltration testing performed by Kenney Geotechnical Services, PLLC on 12/19/2022 resulted in a stabilized infiltration rate of 24 in/hr. The bottom of the infiltration basin is proposed at 1097.00' and 24 in/hr has been utilized in modeling. A concrete outlet structure has been proposed for the northeastern end of the basin. The concrete structure will have a circular culvert outlet with a diameter of 12" at invert 1097.00. The rim of this outlet structure is at 1102.45'. Additionally, there is a proposed orifice with a diameter of 3 inches set at 1100.55' invert. This invert is at the elevation at which the total WQv plus an extra 899 cf is stored. This extra 899 cf is equal to the additional WQv from PRDA-1A which discharges directly to the Tioughnioga River. A 20-foot wide, trapezoidal, spillway is proposed at an invert of 1102.50' to allow for extreme storm passage. Stormwater runoff that flows over this spillway is directed to the Tioughnioga River via a designated swale. The water quality volume for this watershed is 0.229 ac-ft. The WQv provided within the infiltration basin below the emergency spillway is 0.409 ac-ft. Therefore, the basin is successful in meeting WQv requirements. The required pretreatment volume for DA-1 is 50% of the required WQv, or 0.115 ac-ft. The required pretreatment has been provided via 4 separate drywells throughout the site and one forebay located on the south side of the proposed parking lot, see contract drawings. The total pretreatment volume is .115 ac-ft, or 50%.

Per the NYS Stormwater Design Manual, the WQv must be drained from the infiltration basin within 48 hours as shown in the following calculations.

Percolation Rate = 2.5 min. / inch.
Total inches percolation per hour = 60/2.5 = 24 inches / hour
Total inches percolation per 48 hours = 24 x 48 = 1152 inches = 96 feet
Total Basin Basal Area at bottom elevation = 738 sf
Total Volume capable of being discharged by percolation=
96 ft x 738 sf = 70,848 cf
Total WQv/CPv storage volume required= 5,7004.00 cf
Check ----------5,704.00 cf < 70,848.00 cf ----------ok

Required Basal Area:
$A_{Basal}\ (sf) = V_w\ (cf) \div d_b\ (ft)$
$A_{Basal}\ (sf) = 9{,}975\ cf \div 5.0\ ft = 1995\ sf$
Provided Basal Area = 1998 sf

Per Section 4.6 Stream Channel Protection Volume Requirements (CPV) the Channel Protection Volume requirement is waived since this is an infiltration system and because the 1-yr post-development peak discharge is less than 2.0 cfs.

7.0 – PROPOSED STORMWATER DRAINAGE FACILITIES

All on site drainage facilities are designed to transmit flows from a 10 year storm event to downstream stormwater Best Management Practices. The location, size and type of all pipes and structures are provided on the contract drawings. The calculations and basis for analysis of these systems are present in Appendix F.

8.0 – STORMWATER QUALITY VOLUME

Typically, the water quality volume (denoted as WQV) is designed to improve water quality, sized to capture and treat 90% of the average annual stormwater runoff volume. However, due to this site being in the Chesepeake Bay TMDL Watershed for MS4 GP, the WQv is defined as the volume from the 24-hour 1 year design storm. Per Chapter 4 Section 4.3 the following equation for enhanced phosphorus removal watersheds is used to estimate water quality storage volume WQ_V in acre feet of storage:

$$\boldsymbol{WQv = \frac{(P_1)(R_v)(A)}{12}}$$

Where:

WQ_V = water quality volume (in acre-feet)
P_1 = 1-yr 24 hr design storm
R_V = 0.05 + 0.009(I), where I is the percent of impervious cover
A = site area in acres

It is assumed that by meeting the WQ_V requirements through the employment practices outlined in Table 5.1 of the "New York State Stormwater Management Design Manual", a project will, by default, meet water quality objectives. Calculations of water quality volume can be found in Appendix G.

- PRDA-1A 100% New Impervious TMBL WQ volume = 0.021 ac-ft
  - WQv Provided = **0.021 ac-ft**

- PRDA-1B 100% New Impervious TMDL WQv volume = 0.229 ac-ft
  - WQv Provided = **0.251 ± ac-ft**

As previosuly noted above, the 0.021 ac-ft of WQv for PRDA-1A was accounted for with an additional 0.021 ac-ft of storage in the I-2 infiltration basin.

9.0 – PHOSPHORUS REMOVAL

Chapter 10 of the NYS Stormwater Design Manual outlines the requirements for treatment of phosphorus in stormwater. Enhanced Phosphorus Removal requires calculation of the 1 year, 24 hour design storm in the post development watershed. The site is in a TMDL Phosphorous watershed and therefore, additional phosphorus treatment volume for the 1-year storm event has been provided. As outlined in Section

8.0, the proposed BMP measure in PRDA-1B is sized to detain the WQv. Therefore, the proposed BMP measure is successful in meeting the WQv requirements per the NYSDEC Stormwater Manual.

10.0 – RUNOFF REDUCTION VOLUME AND GREEN PRACTICES

Since a standard infiltration practice is being employed on this site, 100% of the water quality volume may be taken as RRv. As a result, no additional RRv/Green Infrastructure practices are required for this site. RRv calculations are provided in Appendix L.

11.0 – Climate Change Considerations

As required per Part III.A.2 of the SPDES General Permit, GP-0-25-001, the SWPPP must make considerations regarding the potential future physical risks due to climate change pursuant to the Community Risk and Resiliency Act (CRRA), 6 NYCRR Part 490, and associated guidance. The following physical risks have been considered in regards to overall site planning as well as location elevation and sizing of control measures and practices, conveyance systems, and detention systems.

1. Increasing Temperature:

   Consideration – Tree plantings were placed along the parking lot and entrance drive to provide shade and reduce the amount of sunlight reaching the parking lot.

2. Increasing Precipitation:

   Consideration – Infiltration stormwater facilities are proposed to treat and detain runoff generated from the proposed development and will likely mitigate increases in precipitation on downstream drainageways.

3. Increasing Variability in Precipitation, Including Chance of Drought:

   Consideration – The change of land cover from woods/meadow to impervious/grass areas can increase the variability of precipitation since it changes how precipitation is distributed and managed.

4. Increasing Frequency of Flooding:

   Consideration – The property is located in and near a 100-year and 500-year floodplain. Stormwater management practices proposed for this site reduce the water quantity volumes in these flood events.

5. Rising Sea Level:

   Consideration – This project will not have any direct impact on rising sea level as the site is not located along a coastline.

6. Increasing Storm Surge:

   Consideration – This project will not have any direct impact on storm surge as the site is not located along a coastline.

7. Shifting Ecology:

   Consideration – This site will implement erosion and sediment control practices in order to mitigate impacts to undisturbed areas and habitats.

Soil Restoration Requirements **

According to Section 5 of the NYS Stormwater Design Manual, soil restoration practices must be applied across the site in areas of soil disturbance. This is necessary to reclaim the origional properties and porosity of the soil before construction. The benefits of soil restoration include but are not limited to:

- Less stormwater runoff
- Increased porosity on redevelopment sites where impervious cover is converted to pervious
- Achieves performance standards on runoff reduction practices
- Healthier, asthetically pleasing landscapes
- Enhances direct groundwater recharge
- Promotes sucessful long term revegitation by restoring soil organic matter, permeability, drainage and water holding capacity for healthy root system development of trees, shrubs and deep-rooted ground covers, minimizing lawn chemical requirements, plant drowning during wet periods, and burnout durring dry periods

Table 5.3 Soil Restoration Requirements			
Type of Soil Disturbance	**Soil Restoration Requirement**		**Comments/Examples**
No soil disturbance	Restoration not permitted		Preservation of Natural Features
Minimal soil disturbance	Restoration not required		Clearing and grubbing
Areas where topsoil is stripped only - no change in grade	HSG A &B	HSG C&D	Protect area from any ongoing construction activities.
	apply 6 inches of topsoil	Aerate* and apply 6 inches of topsoil	
Areas of cut or fill	HSG A &B	HSG C & D	
	Aerate and apply 6 inches of topsoil	Apply full Soil Restoration **	
Heavy traffic areas on site (especially in a zone 5-25 feet around buildings but not within a 5 foot perimeter around foundation walls)	Apply full Soil Restoration (de-compaction and compost enhancement)		
Areas where Runoff Reduction and/or Infiltration practices are applied	Restoration not required, but may be applied to enhance the reduction specified for appropriate practices.		Keep construction equipment from crossing these areas. To protect newly installed practice from any ongoing construction activities construct a single phase operation fence area
Redevelopment projects	Soil Restoration is required on redevelopment projects in areas where existing impervious area will be converted to pervious area.		

*Aeration includes the use of machines such as tractor-drawn implements with coulters making a narrow slit in the soil, a roller with many spikes making indentations in the soil, or prongs which function like a mini-subsoiler.
** Per "Deep Ripping and De-compaction, DEC 2008".

** taken from the NYS Stormwater Management Manual (version 2010)

Many of the Runoff Reduction practices will require soil restoration measures applied in and around the practice inorder to reach the desired runoff reduction performance. Table 5.13 on page 5-22 of the NYS Stormwater Design Manual has been included below that higlights these requirements and provides guidance on when to implement soil restoration techniques. Also included is the NYS Stormwater Design Manual section on Practice implimentation, Maintenece and Inspection.

Soil Restoration Practice Implementation:

During periods of relatively low to moderate subsoil moisture, the disturbed subsoils are returned to rough grade and the following Soil Restoration steps applied:

1. Apply 3 inches of compost over subsoil
2. Till compost into subsoil to a depth of at least 12 inches using a cat-mounted ripper, tractormounted disc, or tiller, mixing, and circulating air and compost into subsoils
3. Rock-pick until uplifted stone/rock materials of four inches and larger size are cleaned off the site
4. Apply topsoil to a depth of 6 inches
5. Vegetate as required by approved plan.

Figure 5. 16 Soil aerator implement



Figure 5. 17 Soil aerator implement



Figures 5.16 and 5.17 above show two attachments used for soil decompaction. Tilling (step 2 above) should not be performed within the drip line of any existing trees or over utility installations that are within 24 inches of the surface.

Soil Restoration Inspection:

At the end of the project an inspector should be able to push a 3/8” metal bar 12 inches into the soil just with body weight.

Compost Specifications

Compost shall be aged, from plant derived materials, free of viable weed seeds, have no visible free water or dust produced when handling, pass through a half inch screen and have a pH suitable to grow desired plants.

Soil Restoration Maintenance:

The maintenance agreement with the town should identify where Soil Restoration has been applied (in addition to already being shown on the contract documents), where newly restored areas are/cannot be cleared, who the responsible parties are to ensure that routine vegetation improvements are made (i.e., thinning, invasive plant removal, etc.). Soil compost amendments within a filter strip or grass channel should be located in public right of way, or within a dedicated stormwater or drainage easement.

First Year Maintenance Operations Includes:

• Initial inspections for the first six months (once after each storm greater than half- inch)
• Reseeding to repair bare or eroding areas to assure grass stabilization
• Water once every three days for first month, and then provide a half inch of water per week during first year. Irrigation plan may be adjusted according to the rain event.
• Fertilization may be needed in the fall after the first growing season to increase plant vigor

Ongoing Maintenance:

Two points help ensure lasting results of decompaction:

1. Planting the appropriate ground cover with deep roots to maintain the soil structure
2. Keeping the site free of vehicular and foot traffic or other weight loads. Consider pedestrian footpaths. (Sometimes it may be necessary to de-thatch the turf every few years)

12.0 – POSSIBLE CONTAMINANTS FROM CONSTRUCTION ACTIVITIES

During construction contaminants from materials and equipment could enter the stormwater drainage system unintentionally. The contractor should store construction materials and equipment in the designated staging area and all possible contaminants should be stored to prevent damage.

This particular project will require construction equipment such as a backhoe, drum roller, dump trucks, a grader, and bull dozer. These vehicles use oil and petroleum products which if not treated carefully could enter the storm drainage system. Accidental spills should be reported to the Department of Environmental Conservation 24 hour spill response hotline at 1-800-457-7362. On site fueling of construction equipment shall be limited to a bermed/ diked area located within the project staging area. The table below provides a guide for quantities that should be reported. Should a spill incident occur, the

employee or party responsible for the spill should contain the spill, start cleanup and report the spill to his/ her superiors. The spill should be reported to the appropriate governing agency should the spill exceed the reportable quantity or enter surface waters.

Examples of Reportable Quantities		
Material	*Media Released To*	*Reportable Quantity*
Engine oil, fuel, hydraulic and brake fluid	Land Water	25 gallons Visible Sheen
Antifreeze	Land	100 lbs (13 gal.)
Battery Acid	Land, Water	100 lbs.
Refrigerant	Air	1 lb.
Gasoline	Air, Land, Water	100 lbs.
Engine Degreasers	Air, Land, Water	100 lbs.

All construction waste material such as housing materials and utility installation materials shall be disposed of as required by law.

Wastewater from concrete washout areas is prohibited from discharging directly to any site areas not managed by an appropriate stormwater control measure. Also prohibited are washouts from stucco, paint, form release oils, curing compounds, and other construction materials. Soaps, solvents, fuels, oils, or other pollutants used in vehicle operations or maintenance shall also be controlled by an appropriate stormwater control measure. Staging areas are designated on the plans for storage of equipment and vehicles. Locations subject to the above contaminants outside the staging area shall require additional measures and should be reviewed with the SWPPP inspector and MS4 representative prior to commencement of activities that may result in contamination.

13.0 – EROSION CONTROL MEASURES

Structural erosion and sediment control measures are classified as either temporary or permanent, according to how they are used. Temporary structural measures shall be used during construction of the site to prevent off-site sedimentation. Permanent structural measures shall be utilized following construction and shall be implemented to convey surface water safely to the existing drainage ways present in the pre-development condition. The permanent structural measures shall remain in-place and continue to function after the completion of construction. General construction notes and maintenance plan for implementing the temporary and permanent stormwater and erosion control structures during and after construction have been developed for the project.

Erosion control measures shall be inspected twice weekly by a Licensed Professional

Engineer or Erosion Control Specialist until the site is completely stabilized. Inspections and maintenance of erosion control structures shall be in accordance with the NYS Pollution Discharge Elimination System for Construction Activities GP-0-20-001 (SPDES) program. The owner shall file a Notice of Intent (NOI) with the NYS DEC prior to commencement of further construction activities. The NOI shall be sent to:

NYSDEC- Notice of Intent
Bureau of Water Permits
625 Broadway
Albany, NY 12233-3505

Temporary Structural Measures

This subsection will describe the specific temporary control measures to be implemented to reduce and/or eliminate erosion and sedimentation during the construction phase of this project. Example details of the following erosion control measures are presented in Appendix I. As construction progresses more site areas may be opened after already constructed areas are permanently stabilized in accordance with the New York State Standards and Specifications for Erosion and Sediment Control.

Silt Fence

A temporary barrier of geotextile fabric (filter cloth) fence shall be used to intercept sediment-laden runoff along the borders of disturbed site areas during construction. A geotextile fabric fence shall also be placed around all permanent stormwater drainage structures, in the absence of straw bale dikes, (catch basins and manholes) to intercept sediment and protect the structure during construction. The geotextile filter fabric fence requires periodic maintenance and should be checked for tears or clogging with silt or debris. Silt can be removed from the woven filter cloth with a stiff brush if clogging occurs.

Stabilized Construction Entrance

A stabilized pad of aggregate underlain with filter cloth shall be positioned at points where traffic will be entering or leaving the construction site area onto public roads. This measure will reduce the tracking of soils onto public roads or streets.

Dust Control

Construction activities should be scheduled to minimize the amount of disturbed area at a single time. If vegetated areas can be left in tact to serve as a buffer zone these areas should be maintained where practical. During dry conditions, open soil areas may require hosing down with water to prevent excessive dust. Spray adhesives may be utilized as outlined in the NYS Standards and Specifications for Erosion and Sediment Control. Fences or vegetation may be required to minimize dust pollution to adjacent

properties and should be incorporated into the site erosion control plan as required.

Drop Inlet Protection

A temporary, somewhat permeable barrier shall be installed around inlets in the form of a fence, berm, or excavation around an opening, trapping water and to prevent heavily sediment laden water from entering a storm drain system through inlets. The barrier should be inspected after each rain event and repairs shall be made as necessary. Upon stabilization of the drainage area, remove all materials and unstable sediment and dispose of properly. Bring the area around the drop inlet to grade, smooth and compact and stabilize in the appropriate manner to the site.

Maintenance of Temporary and Permanent Control Structures

Temporary and Permanent Stormwater Facilities during Construction

Temporary stormwater and erosion control structures must be constructed in accordance with their design intent and maintained to prevent sediment-laden runoff from leaving the site during construction. In general, the temporary structures during construction should be inspected on a routine basis and maintained as follows:

- Temporary silt fences, straw bale dikes, and sediment interceptors shall be installed prior to earth disturbance to reduce runoff velocity and transportation of sediment. The stabilization structures shall be inspected weekly and after every rainfall; and the structures cleaned, repaired, or replaced as required. Temporary stabilization structures shall be removed when their contributory drainage area is stabilized.

- Temporary storm drain inlet protection shall be installed to prevent heavily sediment laden water from entering a storm drain through inlets. Inspections shall be bi-weekly and after major storms to insure that sediment is not being allowed into the storm system. The inlet protection shall be cleaned, repaired, and or replaced as required until the contributing drainage area is stabilized. When this occurs, the devices shall be removed and the area around the inlet shall be stabilized in the manner appropriate the site.

- All permanent drainage structures, installed as part of the site improvements, shall be inspected weekly and after every rainfall to insure structural integrity, detect vandalism and damage, and for cleaning. Permanent drainage structures shall be repaired or replaced, as required.

- All disturbed soil areas, upon final grading of topsoil, shall be seeded, and mulched. All seeded areas shall be inspected monthly and after every rainfall and the areas repaired and re-seeded, as required.

- Stabilized construction entrance shall be installed to control erosion at location

where traffic will be entering or leaving the construction area. The temporary construction entrance shall be inspected periodically and after each rainfall; and the entrance cleaned, repaired, or replaced, as required. The temporary construction entrance shall be removed when construction is completed and all disturbed areas are stabilized.

Permanent Stormwater Facilities after Construction

Permanent stormwater control structures must be constructed in accordance with their design intent and maintained on a routine basis to remain effective. This site has employed stormwater management facilities. Prior to submission of the Notice of Termination to NYSDEC the contractor shall provide as built drawings of all stormwater best management practices and facilities to allow verification of construction in compliance with this SWPPP and the contract drawings. **It is the responsibility of the owner to maintain these facilities as required by the NYS Stormwater Design Manual. Maintenance requirements and design information is included in Appendix K of this report.**

In general, the structures after construction should be inspected periodically and maintained as follows:

- Permanent stormwater drainage structures shall be inspected semi-annually and after every 0.5 inches of rainfall to insure structural integrity, detect vandalism and damage, and for cleaning. The structures shall be repaired or replaced, as required.

- Permanent lawns and grassed areas shall be inspected and maintained on a regular basis, consistent with favorable plant growth, soil, and climatic conditions to insure soil protection and structural integrity of the site's plant cover. Maintenance involves regular seasonal work for mowing, fertilizing, liming, watering, pruning, fire controls, weed, and pest control, re-seeding, and timely repairs, as required. Maintenance of vegetative areas shall also include removal of debris and protection from unintended uses or traffic.

- **Stormwater Best Management Practices used on this site; their design intents and inspection and maintenance punch list forms have been included in Appendix K.**

Site Stabilization

The Owner/Contractor shall initiate stabilization measures as soon as practicable in a portion of the site where construction activities have temporarily or permanently ceased, but in no case more than 7 days after the construction activity in that portion of the site has temporarily or permanently ceased. This requirement does not apply in the following instances:

a. Where the initiation of stabilization measures by the 7th day after construction activity temporarily or permanently ceased is precluded by snow cover or frozen ground conditions, stabilization measures shall be initiated as soon as possible;
b. Where disturbed area is 5 acres or more, stabilization measures must be employed no more than 7 days after construction activities have temporarily or permanently ceased.

Site Assessment and Inspection

Initial Inspection

The Owner shall have a qualified professional conduct an assessment of the site prior to the commencement of construction. The qualified professional shall certify that the appropriate erosion and sediment controls described in this SWPPP and required by the permit have been adequately installed or implemented to ensure overall preparedness of the site for commencement of construction. The “qualified professional” shall meet the requirements of the SPDES General Permit for Stormwater Runoff from Construction Activity, GP-0-20-001.

Post Construction Inspection

The Owner shall have a qualified professional conduct an assessment of the site after construction is complete. The qualified professional shall be a Licensed Professional Engineer or possess the appropriate certifications for inspection. The qualified professional shall certify that the appropriate erosion and sediment controls and stormwater BMP’s described in this SWPPP and required by the permit have been adequately installed or implemented to ensure overall preparedness of the site for commencement of construction. The “qualified professional” shall meet the requirements of the SPDES General Permit for Stormwater Runoff from Construction Activity, GP-0-25-001. If the site is located in an area governed by a traditional MS4, the MS4 must also make a final inspection and sign the Notice of Termination.

In addition, the owner must ensure that a properly qualified inspector is performing inspections of post construction stormwater practices as outlined in the NYS Stormwater Design Manual. The owner shall ensure that a binding maintenance agreement is in place for inspection and maintenance of all stormwater practices and ensure that the inspection and maintenance is performed by a qualified professional. The owner must then identify the responsible party for these inspections and maintenance on the Notice of Termination.

As-Builts

Prior to Submission of the Notice of Termination by a Licensed Professional Engineer and upon completion of the site, a surveyor or appropriate inspector shall be required to produce an Autocad or paper as-built map to the design engineer for verification that stormwater items and BMP’s were installed as per the approved plans.

Stormwater BMP Inspection and maintenance punch list forms are provided behind the appropriate design intent page in Appendix K.

Inspections and Records during Construction

Inspection Frequency

After commencement of construction, site inspections shall be conducted by the qualified professional at least once per week if under 5 acres disturbance or twice per week if above 5 acres of disturbance. Two consecutive working days shall be given between site inspections per week. Prior to filing a Notice of Termination (NOT) or at the end of the permit term, the owner shall have the qualified professional perform a final site inspection.

Records during Inspection

A site map shall be maintained on site indicating the extent of all disturbed onsite areas and drainageways throughout the duration of construction. The site map shall contain all areas expected to undergo initial disturbance or significant site work within every 7-day period. The map shall indicate all areas of the site that have undergone temporary or permanent stabilization. All disturbed areas that have not undergone active site work during the previous 7-day inspection period shall be noted on the map. All sediment control measures shall be inspected and the degree of accumulation as a percentage of the sediment storage volume shall be recorded. Inspector must describe and inspect all points of discharge to natural surface water bodies located within, or immediately adjacent to property boundaries. Photographic record of inspections and any deficiencies shall be included in the inspection reports and photos of corrective action must be recorded upon compliance. Any maintenance required for installed erosion and sediment control structures shall be noted, and documentation of areas where adjustments are needed to those measures shall be provided. Any deficiencies identified with the implementation of the SWPPP shall be recorded. Erosion control measures shall be inspected weekly by a Licensed Professional Engineer or Erosion Control Specialist until the site is completely stabilized. Inspections and maintenance of erosion control structures shall be in accordance with the NYS Pollution Discharge Elimination System for Construction Activities GP-0-20-001 (SPDES) program. These inspection reports should be in compliance with the requirements set forth under part IV.C-4 of the general permit. A copy of the general permit is included in Appendix J.

Inspection Log Book

The Owner/ contractor shall maintain an inspection logbook which shall contain a record of all inspection reports. The site logbook shall be maintained on site and shall be made available to the permitting authority upon request. The Owner shall post at the site, in a publicly accessible location, a summary of the site inspection activities on a monthly basis.

Certifications

At the final site inspection, the qualified professional shall certify that the site has undergone final stabilization using either vegetative or structural stabilization methods, and that all temporary erosion and sedimentation measures have been removed. Final certification requires completion of the Notice of Termination form. The Notice of Termination shall be signed by the qualified professional. The owner shall provide the qualified professional with as built drawings in AutoCAD format so that the qualified professional can verify that all stormwater practices have been installed in accordance with the approved plans, SWPPP and the General Permit. The owner shall certify that the requirements of the permit have been satisfied within 48 hours of actually meeting such requirements and sign the Notice of Termination.

RELIANCE

Engineer's Certification

The undersigned agrees that this SWPPP has been prepared in accordance with all applicable standards outlined in this report. The undersigned understands that the owner intends to use this SWPPP to support his application for a New York State Pollutant Discharge Elimination System (SPDES) General Permit for Stormwater Runoff from Construction Activity, GP-0-20-001.

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that false statements made herein are punishable as a class A misdemeanor pursuant to Section 210.45 of the Penal Law."

Prepared By: Daniel Benetti Date: 07/01/25

Daniel Benetti, E.I.T.
RZ Engineering, PLLC
6320 Fly Road, Suite 201
East Syracuse, NY 13057
(315) 432.1089

Reviewed By: _____ Date: 07/01/25

Rudy L. Zona, P.E.
RZ Engineering, PLLC
6320 Fly Road, Suite 201
East Syracuse, NY 13057
(315) 432.1089

Owner's Certification

I certify that I have read and understand the requirements outlined in this SWPPP report. The undersigned agrees that I have employed the above professional to prepare this SWPPP and that the recommendations within this Report and accompanying documents support the requirements set forth by the New York State Pollutant Discharge Elimination System (SPDES) General Permit for Stormwater Runoff from Construction Activity, GP-0-20-001. I certify that I intend to employ a contractor who will follow the recommendations of this SWPPP and any requirements set forth by the New York State SPDES General Permit for Stormwater Runoff from Construction Activity, GP-0-20-001.

Owner: _____

Owner's Representative: _____ Date: _____

Title: _____

Contractor's / Sub-Contractor's Certification

Contractor's/Sub-Contractor's Certification "I hereby certify that I understand and agree to comply with the terms and conditions of the SWPPP and agree to implement any corrective actions identified by the qualified inspector during a site inspection. I also understand that the owner or operator must comply with the terms and conditions of the New York State Pollution Discharge Elimination System (SPDES) general permit for stormwater discharges from construction activities and that it is unlawful for any person to cause or contribute to a violation of water quality standards. Furthermore, I understand that certifying false, incorrect or inaccurate information is a violation of the referenced permit and the laws of State of New York and could subject me to criminal, civil and/or administrative proceedings."

Contractor: _____

Contractor's Representative: _____ Date:_____

Title: _____

Signature: _____ Date:_____

Contractor's "trained contractor":_____Date:_____
(must have DEC 4 hr training, responsible for the daily implementation of SWPPP)
Contractor is responsible for SWPPP components identified:

SWPPP Inspections _____

_____

_____

Address: _____

_____

Phone: _____

Fax: _____

Sub-Contractor: _____

Sub-Contractor's Representative: _____ Date:_____

Title: _____

Signature: _____ Date:_____

Sub-Contractor's "trained contractor":_____Date:_____
(must have DEC 4 hr training, responsible for the daily implementation of SWPPP)
Sub-Contractor is responsible for SWPPP components identified:

_____
_____
_____

Address: _____

_____

Phone: _____

Fax: _____

Sub-Contractor: _____

Sub-Contractor's Representative: _____ Date:_____

Title: _____

Signature: _____ Date:_____

Sub-Contractor's "trained contractor":_____Date:_____
(must have DEC 4 hr training, responsible for the daily implementation of SWPPP)
Sub-Contractor is responsible for SWPPP components identified:

_____
_____
_____

Address: _____

_____

Phone: _____

Fax: _____

Sub-Contractor: _____

Sub-Contractor's Representative: _____ Date:_____

Title: _____

Signature: _____ Date:_____

Sub-Contractor's "trained contractor":_____Date:_____
(must have DEC 4 hr training, responsible for the daily implementation of SWPPP)
Sub-Contractor is responsible for SWPPP components identified:
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Address: _____

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Phone: _____

Fax: _____

Sub-Contractor: _____

Sub-Contractor's Representative: _____ Date:_____

Title: _____

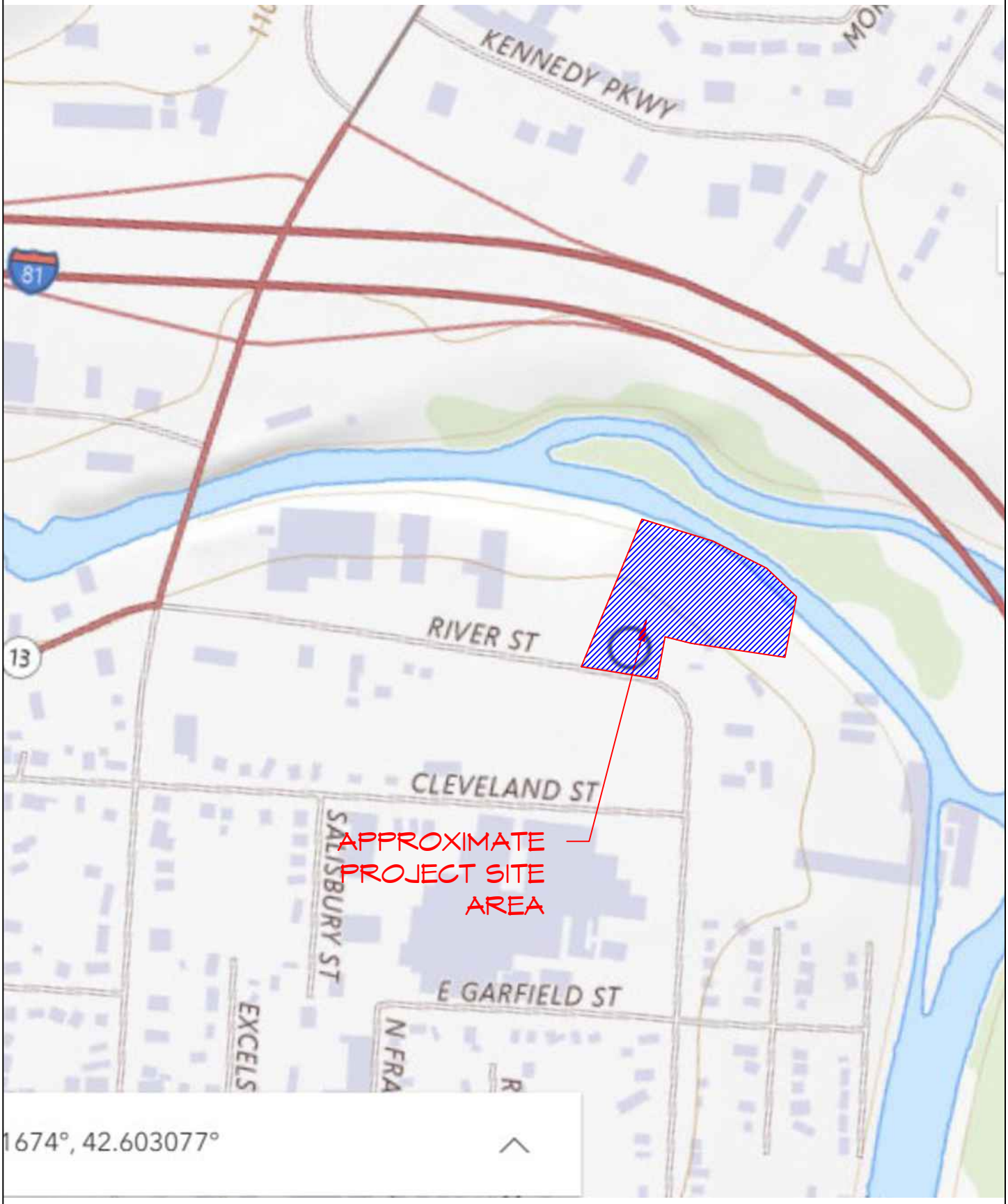
Signature: _____ Date:_____

Sub-Contractor's "trained contractor":_____Date:_____
(must have DEC 4 hr training, responsible for the daily implementation of SWPPP)
Sub-Contractor is responsible for SWPPP components identified:
_____
_____
_____
Address: _____

_____

Phone: _____

Fax: _____



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N

RIVERVIEW APARTMENTS
USGS MAP
SCALE 1:400

FIGURE 1



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RIVERVIEW APARTMENTS
AERIAL MAP
SCALE 1:200

FIGURE 2

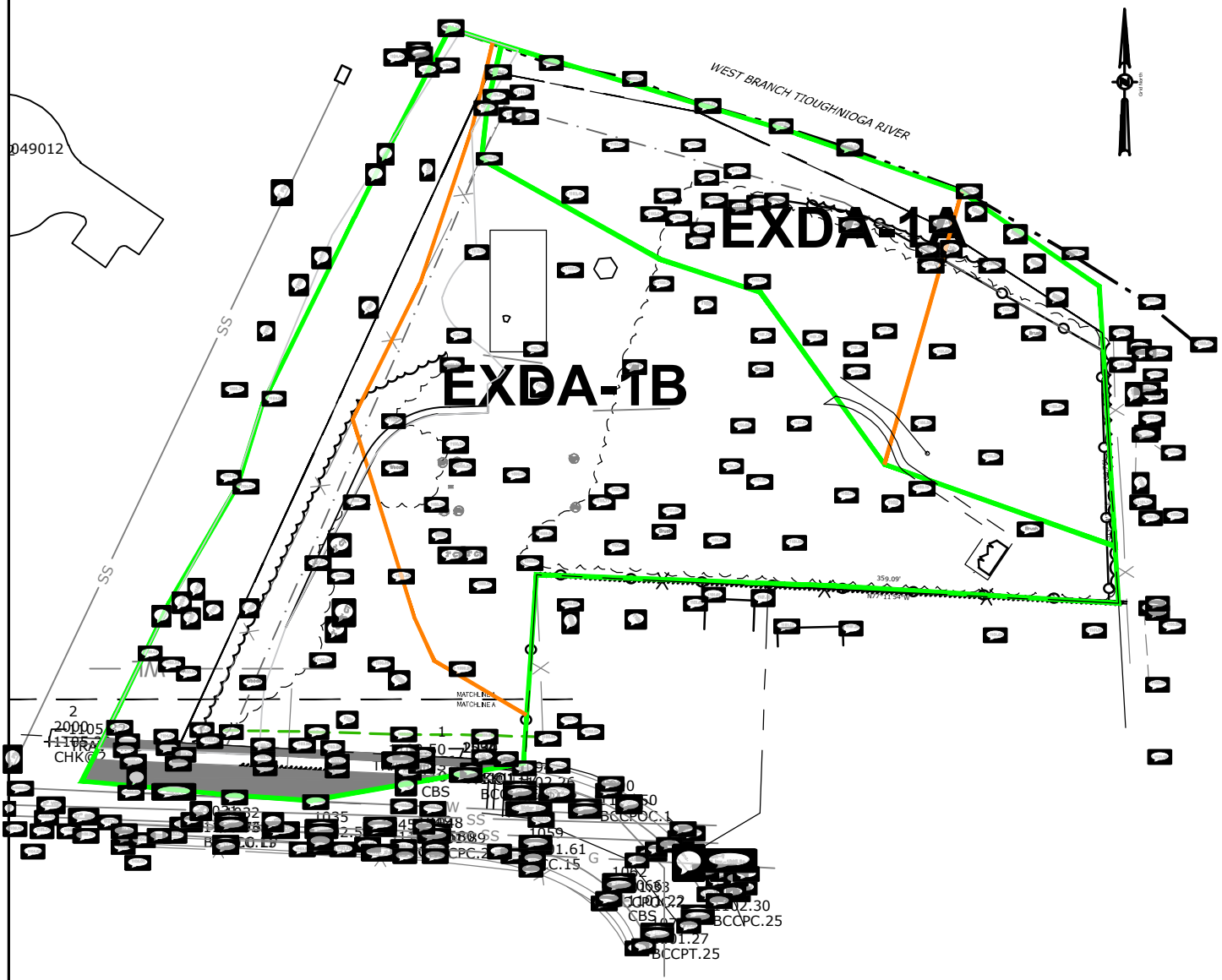


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RIVERVIEW APARTMENTS
SOILS MAP
SCALE 1:100

FIGURE 3

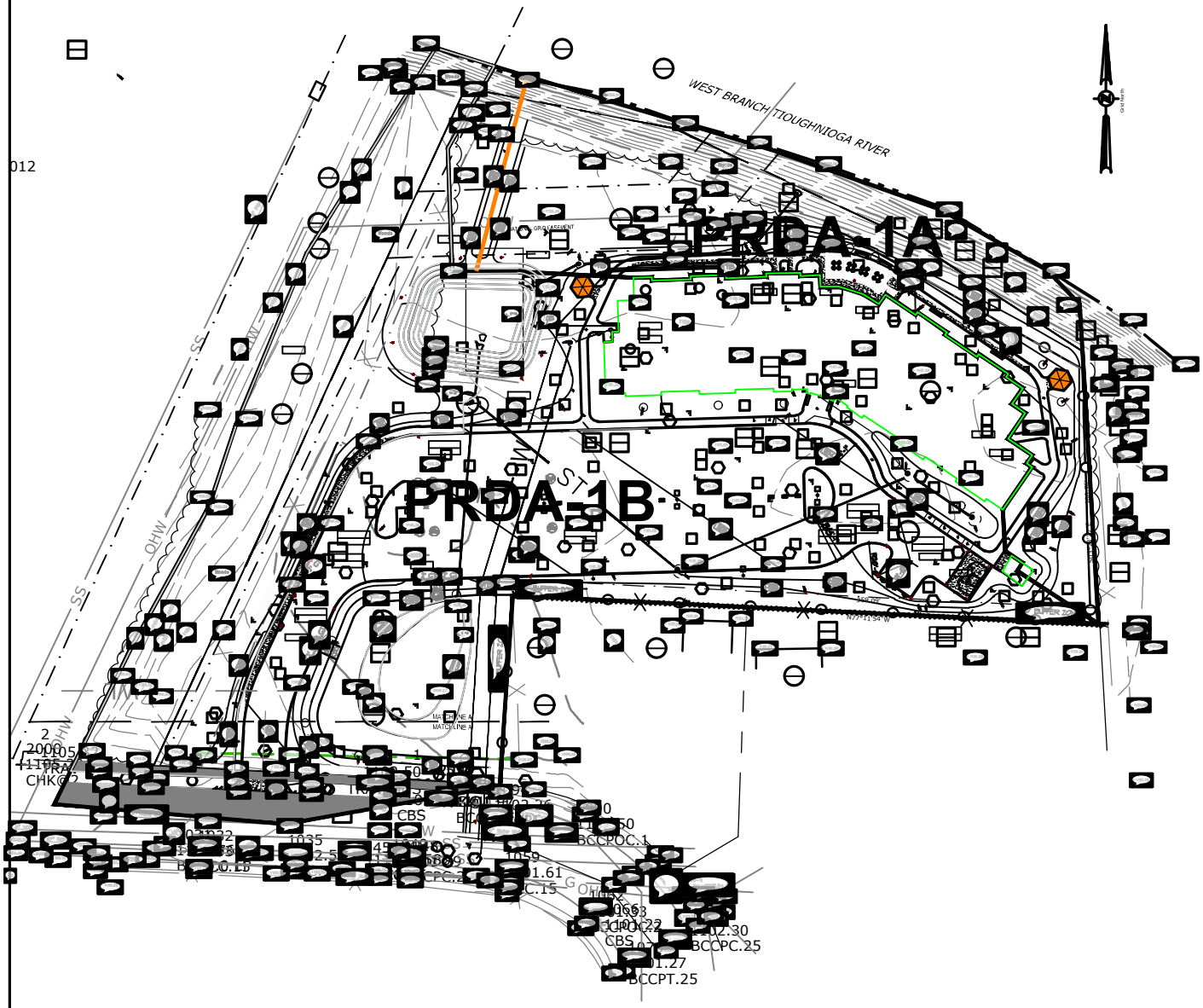


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N

RIVERVIEW APARTMENTS
EXISTING WATERSHEDS
SCALE 1:100

FIGURE 4

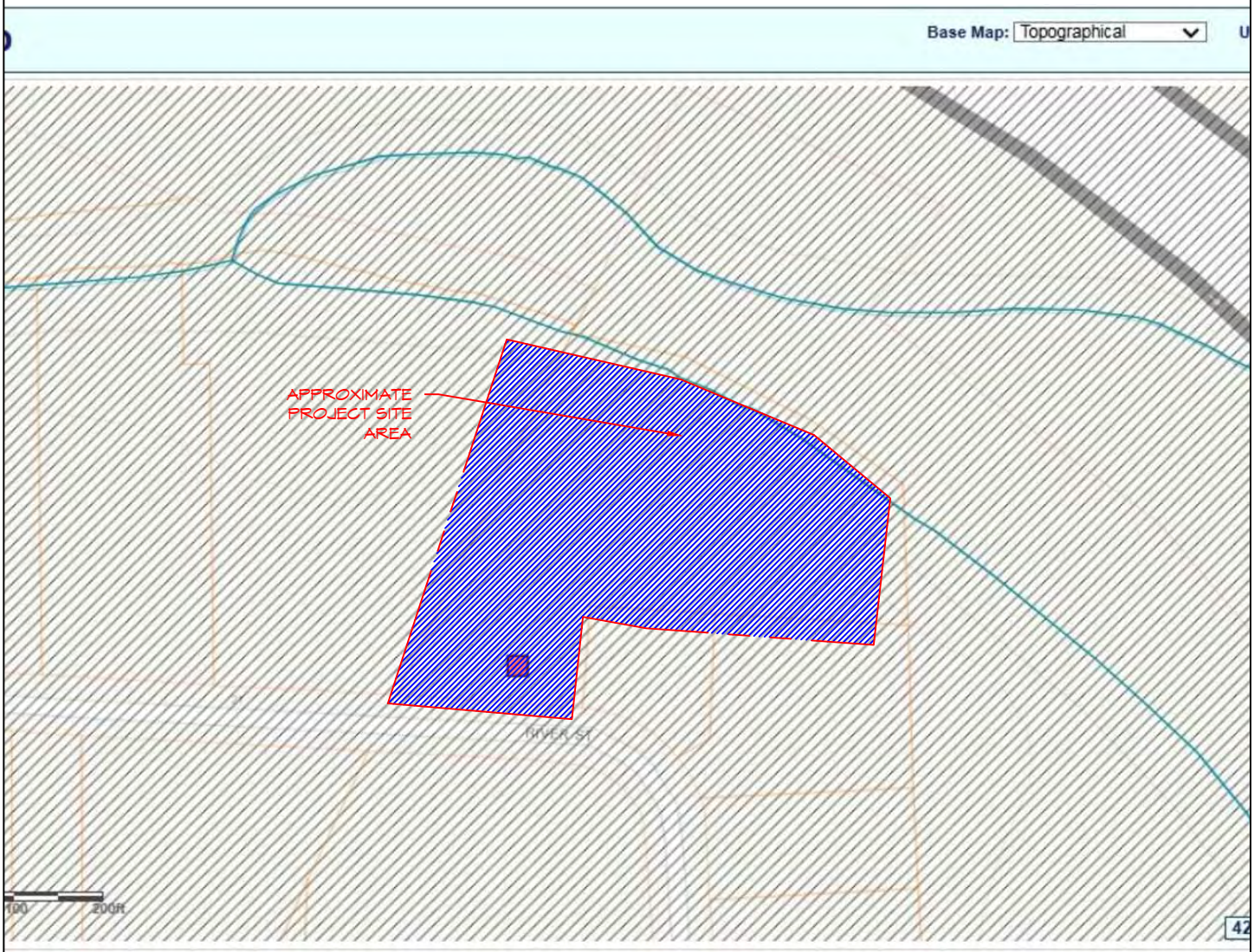


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N

RIVERVIEW APARTMENTS
PROPOSED WATERSHEDS
SCALE 1:100

FIGURE 5

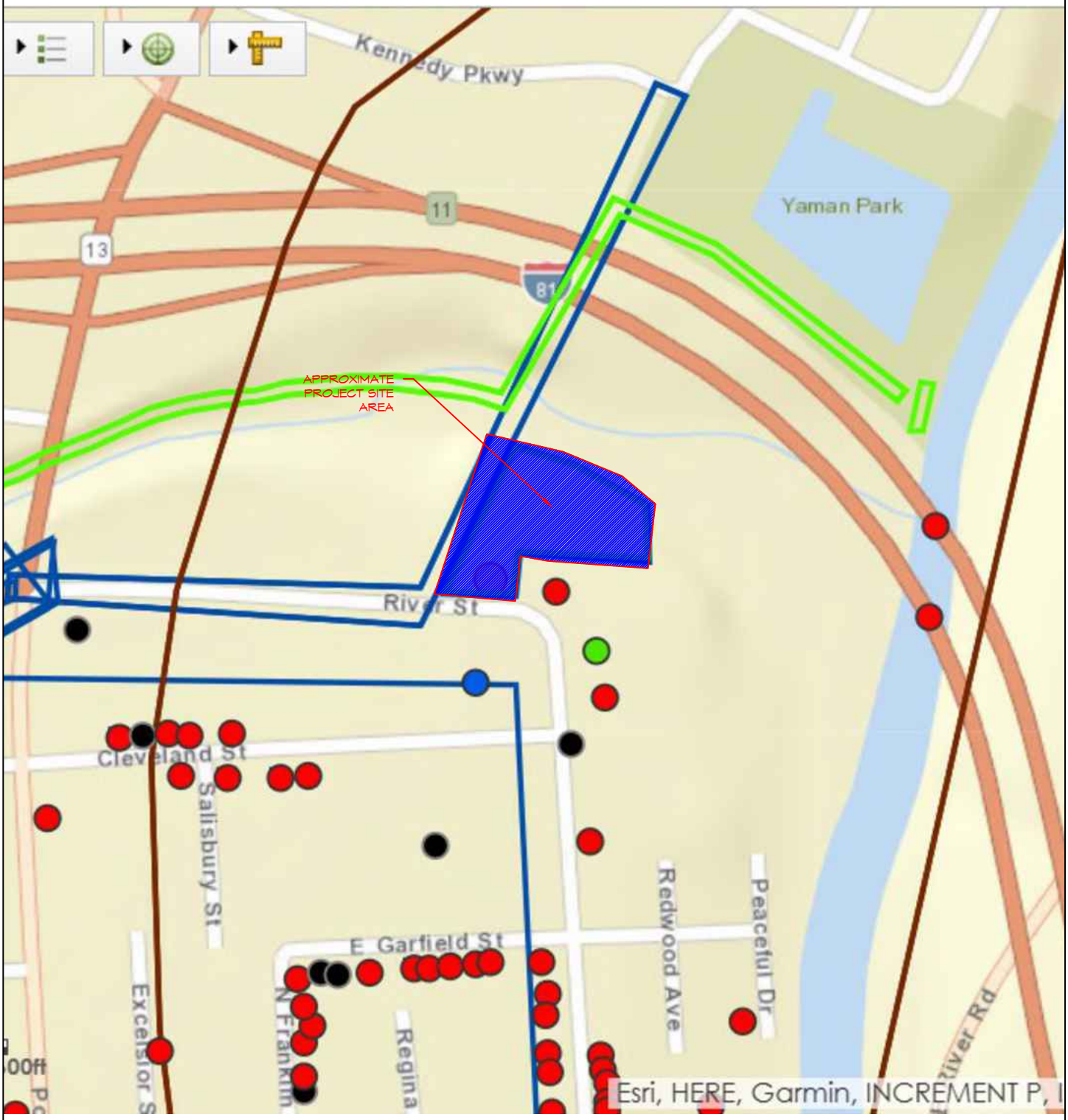


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RIVERVIEW APARTMENTS
NYSDEC STORMWATER MAP
SCALE 1:200

FIGURE 6



RZ Engineering, PLLC

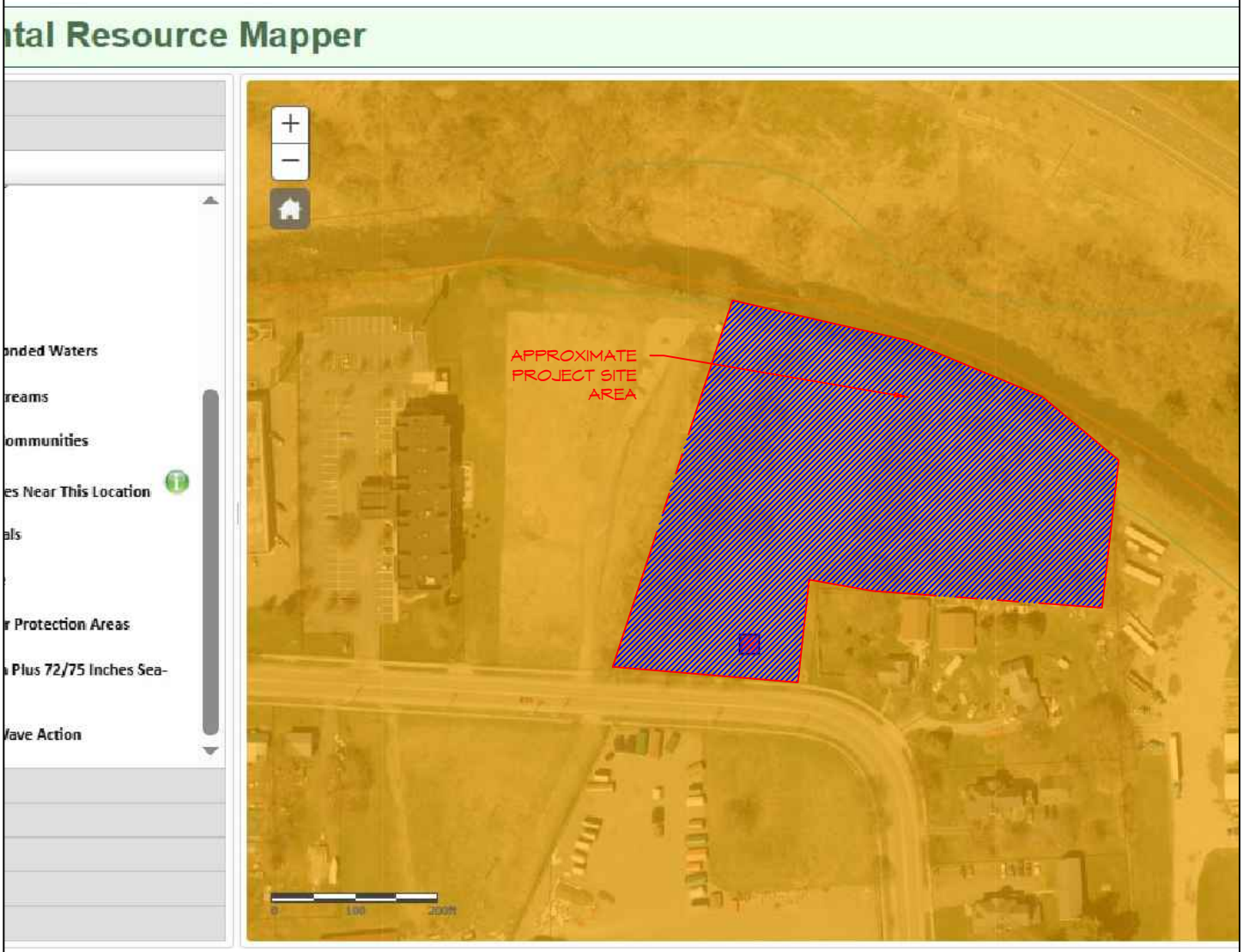
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RIVERVIEW APARTMENTS
SHPO MAP
SCALE 1:400

FIGURE 8



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N

RIVERVIEW APARTMENTS
NYSDEC WETLANDS AND
ENDANGERED SPECIES MAP
SCALE 1:200

FIGURE 9

Wildlife Service

Wetlands Inventory

Wetlands



Freshwater Emergent Wetland
Freshwater Forested/Shrub Wetland
Freshwater Pond
Lake
Other
Riverine

Deepwater
Wetland

This map is for general reference only. The U
Service is not responsible for the accuracy or
base data shown on this map. All wetlands re
be used in accordance with the layer metadat
Wetlands Mapper web site.

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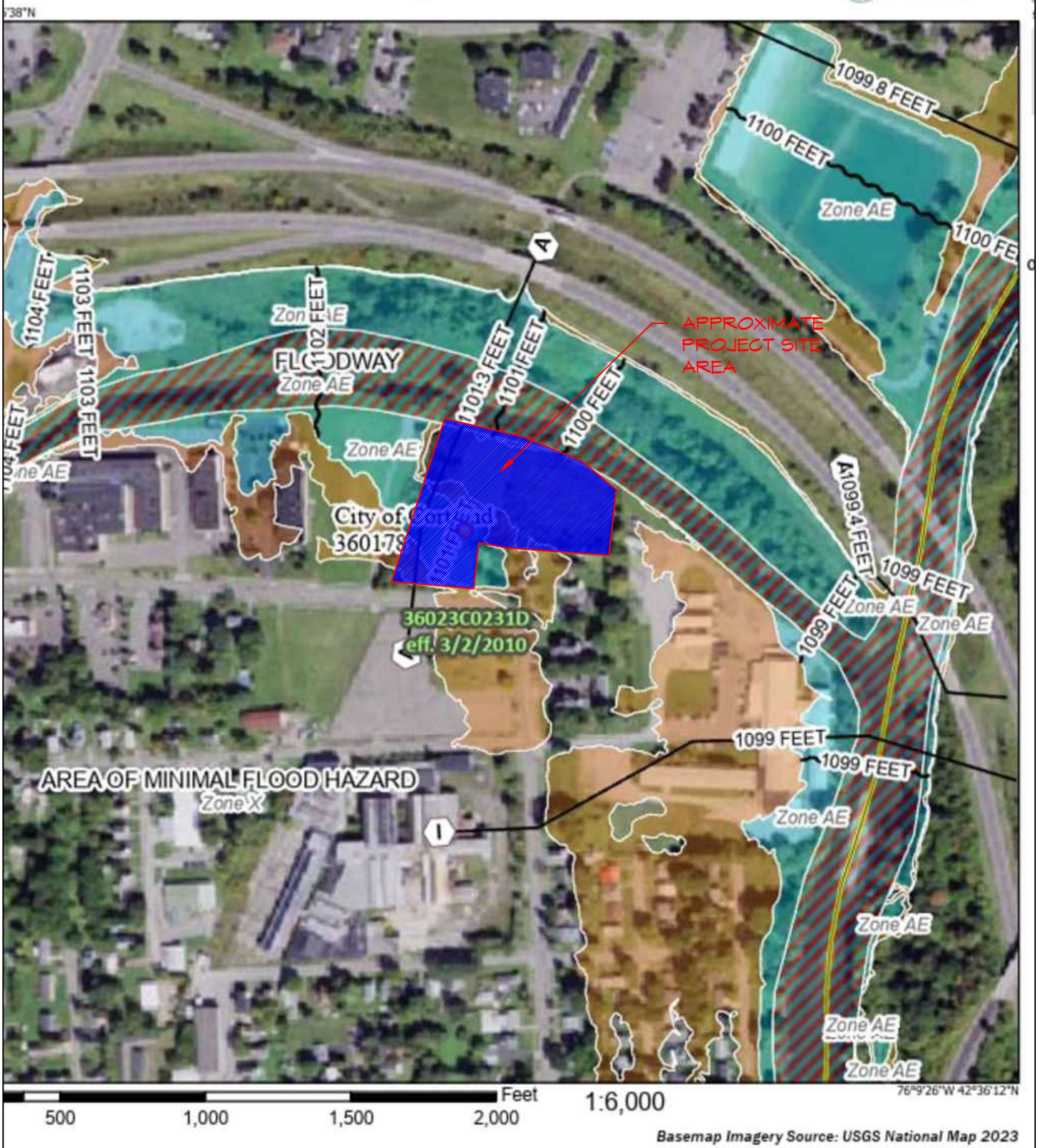
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RIVERVIEW APARTMENTS
FEDERAL WETLANDS MAP
SCALE 1:200

FIGURE 10

onal Flood Hazard Layer FIRMette

FEMA



RZ Engineering, PLLC

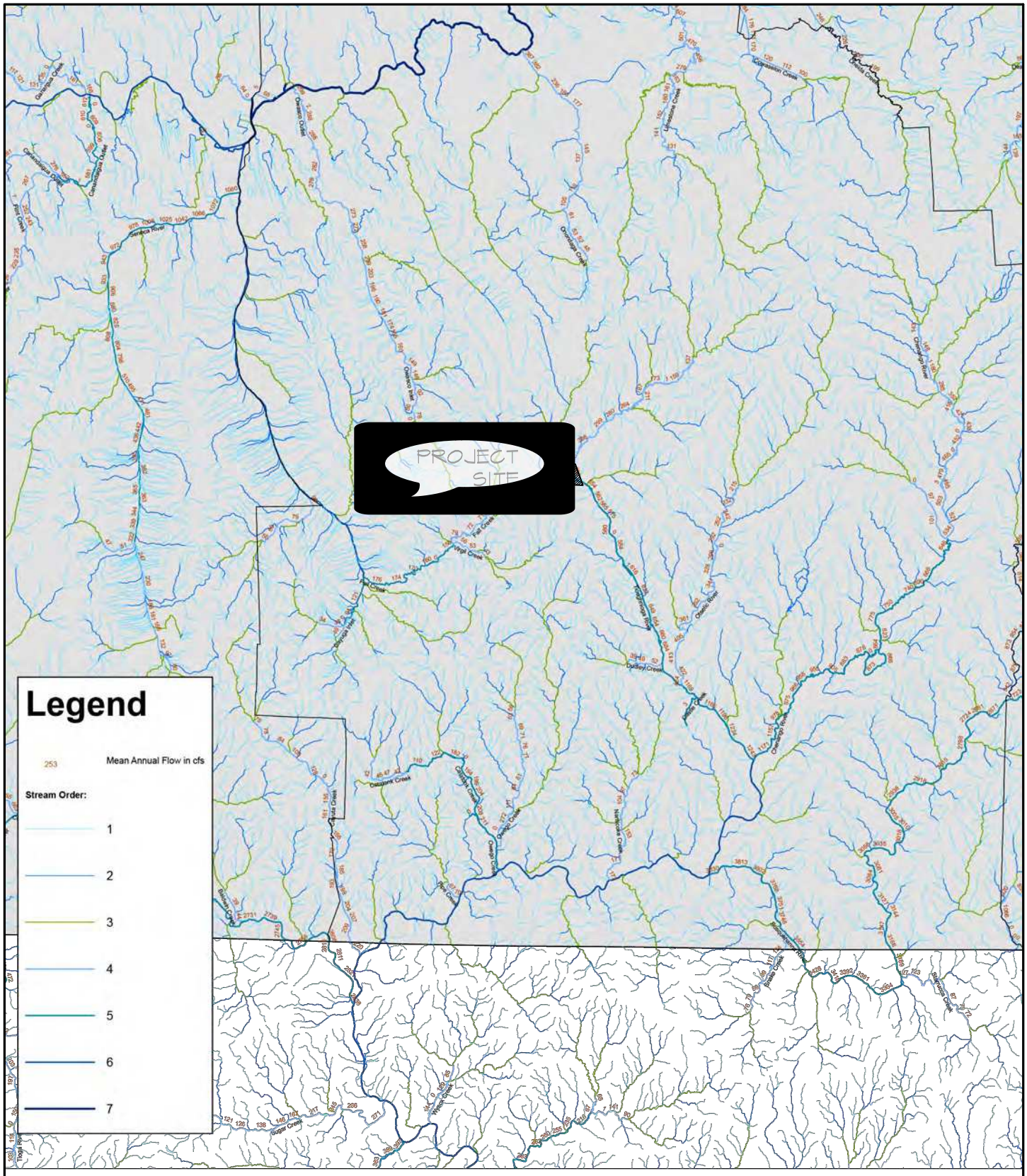
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EAST SYRACUSE, NY 13057
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FAX (315) 445-7981

N

RIVERVIEW APARTMENTS
NATIONAL FLOOD INSURANCE MAP
SCALE 1:400

FIGURE 11



N
W E
S

Region 7
Stream Order Classifications

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N

RIVERVIEW APARTMENTS
REGION 7 STREAM ORDER CLASSIFICATIONS
SCALE 1:5000

FIGURE 12

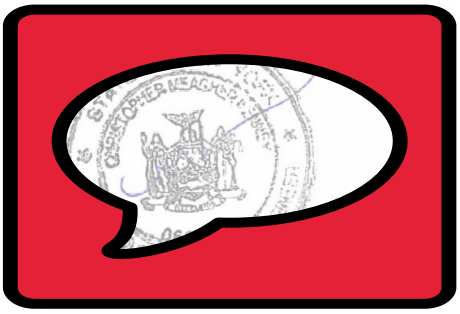
APPENDIX A

Kenney Geotechnical Services

Kenney Geotechnical Engineering Services PLLC

Geotechnical Evaluation Report

Cortland Senior Housing
31 River St.
Cortland, New York



C. M. Kenney PE
1-11-2023

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DESIGN CRITERIA....3
SITE CONDITIONS....3
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INTRODUCTION

This report presents the results of the geotechnical investigation performed for the proposed Cortland Senior Housing project. This geotechnical report presents the data developed during the subsurface investigation and provides analysis and recommendations for the proposed construction.

No environmental services are included in this study. No conclusions have been drawn regarding environmental conditions of the site, potential contaminants, potential special treatment or disposal of site materials, or other environmental considerations.

AUTHORIZATION

The scope of our services for this project was presented in a proposal dated November 11, 2022. Our services were authorized by Shawna Grinnell, Executive Director of the Cortland Housing Assistance Council.

PROJECT DESCRIPTION

It is our understanding that the proposed project will be a three-story wood-framed, slab-on-grade structure. The following figure illustrates the proposed building footprint:



DESIGN CRITERIA

Column and wall loading information were not known prior to the completion of this report. We assumed a maximum column load of 150 kips and a maximum wall load of 3 kips/l.f. to facilitate our analysis. We have assumed a tolerable total settlement of up to one inch.

The following ASTM Standards were utilized during this study:

- ASTM D1586 "Penetration Test and Split-Barrel Sampling of Soils"
- ASTM D2487 "Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)"
- ASTM D5434 "Standard Guide for Field Logging of Subsurface Exploration of Soil and Rock"

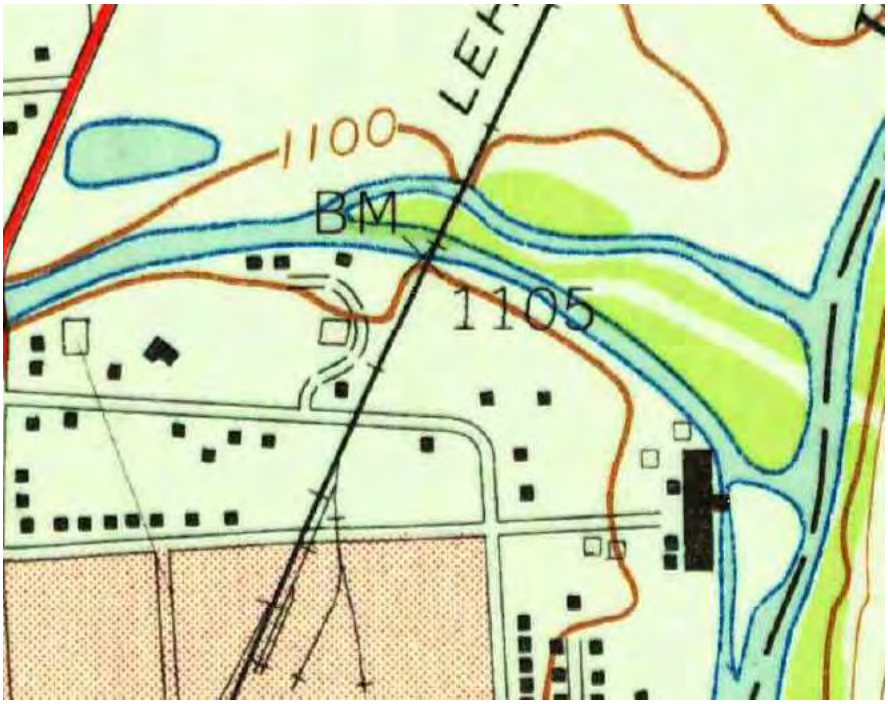
Local geotechnical practice was followed in the performance of this study. Frost depth was assumed to be 48 inches.

SITE CONDITIONS

The site is located between the West Branch of the Tioughnioga River and River Street in the City of Cortand. The project area was unoccupied but covered with brush and small trees at the time of the subsurface investigation. Site topography is illustrated in the following figure excerpted from 2019 USGS mapping:



USGS topographic mapping from 1955 suggests the site may have been previously occupied by small structures:



Cortland is located on a plain formed by the convergence of seven valleys with the Allegheny Plateau physiographic province. Major topographic and geologic features in this area were formed during the last glacial advance and retreat, which ended approximately 12,000 years ago. Regional surficial geologic mapping suggests that natural soils in the site vicinity generally consist of outwash sand and gravel. Bedrock mapping suggests that shale and sandstone underlies soil in the area.

FIELD STUDY

The subsurface investigation for this project consisted of eleven test borings (designated as B-1 to B-11) and two infiltration tests (IT-1 to IT-2). The test borings were performed using a track-mounted Geoprobe 7822DT drill rig. Hollow stem augering techniques were utilized to advance the borings to a depth of up to 25 feet below the ground surface (bgs) unless auger refusal was encountered at a shallower depth. Standard penetration testing (ASTM D1586) was performed with an automatic hammer to obtain soil samples. Boring locations were selected by others and field-located by Kenney Geotechnical Services personnel using mapping provided in the RFP.

Soil samples obtained during the subsurface investigation were classified by a Geotechnical Engineer using the Unified Soil Classification System. Boring logs documenting the subsurface conditions encountered are attached. The boring logs and related information depict subsurface conditions only at the specific locations and times indicated. Subsurface conditions and water levels at other locations may differ from conditions at the locations where sampling was conducted. The passage of time also may result in changes in the conditions interpreted to exist at the locations where sampling was performed.

LABORATORY TESTING

Laboratory testing performed for this project included Natural Moisture Content Testing (ASTM D-2216) and Particle Size Analysis (ASTM D-422). Testing was performed in Kenney Geotechnical Services laboratory. Test results are attached to this report.

SUBSURFACE CONDITIONS ENCOUNTERED

The following interpretation of subsurface conditions is based on our review of the recovered samples, the boring logs, drilling observations, and our professional experience.

The subsurface conditions encountered are organized into the following strata for discussion:

- **Stratum A** –Organic Soil
- **Stratum B** – Outwash Sand and/or Gravel

All depths discussed below are referenced to the ground surface at the time of drilling (bgs).

Stratum A – Organic Soil

Silt, clay, sand and gravel mixed with organic matter was encountered at the ground surface and extended to depths of up to approximately five feet at the test boring locations. In general the organic soil depth was generally approximately six inches.

Stratum B –Outwash Sand and Gravel

Outwash sand and gravel was generally encountered throughout the site from below the surficial organic layer to the limit of exploration at a depth of 25 feet. The sand

and gravel was generally very loose above a depth of approximately 4 feet and medium dense to very dense below. Cobbles and boulders appear to be present within the stratum.

GROUNDWATER CONDITIONS ENCOUNTERED

Water levels were measured within the augers during advancement and from the open borehole after the augers were removed. The following table summarizes the water level measurements at the time of the subsurface investigation.

Boring Location	Depth to Water While Advancing Augers (feet)	Depth to Water at End of Drilling (ft)	Depth to Water After Augers Removed (ft)	Depth to Borehole Cave-In (ft)
B-1	13.0	15.4	DRY	7.7
B-2	13.0	15.4	DRY	6.1
B-3	13.0	16.4	DRY	8.4
B-4	13.0	11.7	DRY	9.5
B-5	13.0	14.7	DRY	5.9
B-6	13.0	12.6	DRY	9.3
B-7	13.0	16.1	DRY	7.6
B-8	18.0	17.2	DRY	7.7
B-9	DRY	DRY	DRY	5.1
B-10	8.0	DRY	DRY	8.4
B-11	DRY	DRY	DRY	4.3

Groundwater depths and seepage rates will vary with the seasons and changes in precipitation patterns and may be higher during the wetter seasons.

RECOMMENDATIONS AND CONCLUSIONS

The sand and gravel encountered is suitable for supporting a conventional shallow foundation system. Surficial organic soil will need to be removed from below pavements, slabs and bearing grade. Additional recommendations are provided in the following sections.

A. Foundations

An allowable bearing pressure of 4,000 pounds per square foot (psf) is recommended for the design of shallow foundations provided that the bearing grade consists of undisturbed natural sand and gravel as verified by geotechnical

personnel. Any disturbed or saturated soil must be removed from below foundation bearing grade. Proper management of the soil will be critical during foundation construction and earthwork. All exterior footings should bear at least 48 inches below finished exterior grade for frost protection unless an insulated frost protection system is installed. Foundation bearing grade must be protected from saturation, freezing, or disturbance throughout construction.

We estimate that foundations designed as recommended herein and properly managed during construction will undergo total settlements of less than one inch and differential settlements of up to 0.75 inches.

B. Temporary Excavations

Temporary excavation slopes must be evaluated by the Contractor's on-site Responsible Person. We anticipate on-site soil will be classified as Type C. Type C materials must be graded to slopes no greater than 1.5:1 (horizontal to vertical). The Contractors on-site Responsible Person should periodically review excavations for signs of movement or distress. Excavation sidewalls should be periodically raked to remove loose particles.

C. Utility Trenches

In utility trenches, or other confined areas, small compaction equipment may be necessary such as a vibratory plate, jumping jack or walk-behind vibratory roller. In-place density testing should be performed at a frequency of one test per 25 feet per lift in trenches. Utility trench fill should be placed in level lifts no greater than 8 inches in thickness and should be compacted to at least 95%the Modified Proctor (ASTM D-1557) maximum dry density. Structural fill should consist of imported granular material such as NYSDOT Subbase (2'' minus) or approved equal. Adequate frost cover and protection must be provided during winter weather construction. Earthwork cannot be performed with frozen material.

D. Earthwork

Earthwork must be performed using methods that will result in a stable excavations and fills. Typical temporary earthwork measures such as temporary drainage swales, stabilized haul roads, and the use of protective layers of crushed stone can be employed at this site. It is recommended that earthwork is observed by

geotechnical personnel to ensure that all organic material is removed from the structural and pavement site. Additional recommendations are as follows:

- Strip existing topsoil, pavement, roots and organics as directed by geotechnical personnel from all areas that will receive new construction to establish subgrade.
- Proof-roll exposed slab-on-grade subgrade with a fully loaded dump truck, or accepted alternative equipment, under the observation of geotechnical personnel. Excessive organic matter and areas that rut, weave, or deflect should be over-excavated and replaced with compacted structural fill as directed by geotechnical personnel (see below for structural fill characteristic requirements).
- Utilize structural fill to raise site grades. Structural fill should consist of imported granular material conforming to NYSDOT Subbase Course (2" minus) or approved equal. In-situ sand and gravel can potentially be utilized as structural fill pending field approval by geotechnical personnel. Segregation of over-sized material (greater than 4 inches in diameter/width) will likely be necessary if on-site soil is re-utilized.
- Field moisture contents for structural fill should be maintained within 2 percentage points of the optimum moisture content established by laboratory testing to provide adequate compaction. All fill should be placed in level lifts having a loose thickness no greater than 12 inches and should be compacted to at least the following minimum percentages of the Modified Proctor (ASTM D-1557) maximum dry density:

    - Below footings: 95%
    - Beneath slab-on-grade or pavements: 95%
    - Utility trench backfill: 95%
    - Beneath landscape areas: 90%
    - Beneath sidewalks and exterior slabs: 95%

    Bulk samples of proposed structural fill materials should be delivered to our testing laboratory at least two weeks prior to the initiation of earthwork. In-place density testing should be performed at a frequency of one test per 500 square feet per lift in open areas and one test per 25 feet per lift in trenches.

- If the structure is to be constructed during the winter months, or if the building interiors will be subjected to freezing temperatures after footer construction, adequate frost cover and protection must be provided. Earthwork cannot be performed with frozen material.
- Permanent slopes should be graded no steeper than 3 horizontal: 1 vertical.

E. Groundwater Seepage and Management

Groundwater was encountered at a depth of 13 feet during the subsurface investigation. Storm events and other factors can affect groundwater and seepage during construction. All dewatering discharge should be transported to a temporary dewatering basin constructed consistent with NYDEC construction stormwater and/or dewatering treatment Best Management Practices (BMPs).

F. Interior Concrete Slabs

Subgrade areas should be prepared as discussed in the Earthwork recommendations. A preliminary subgrade modulus of 225 pci is suggested for design and assumes compacted structural fill is installed over stripped subgrade to achieve new floor slab elevations. Structural fill placed to establish floor slab subgrade should conform to the recommendations for materials and compaction presented in the Earthwork recommendations.

The subbase for the slab-on-grade should consist of a minimum of 6 inches of gravel or crushed stone conforming to NYSDOT specifications for Item 304-2.02 Type 2 or 4. Follow compaction requirements presented for earthwork.

G. Lateral Earth Pressures

Design of subsurface walls subjected to lateral earth pressure must consider the type of wall, degree of restraint against wall rotation, and other factors. The sliding resistance of soils should also be considered during excavation. The following lateral earth pressure parameters of an approved imported granular fill are recommended for this project. The following earth pressure and sliding parameters are recommended for the soil encountered on this project.

- Ka = 0.33
- Kp = 3.0

- Ko = 0.5
- Unit weight of imported soil 140 pcf
- Coefficient of sliding = 0.4

It is recommended that drainage is provided for all walls to reduce hydrostatic wall loading and possible frost action. Backfill against any walls should consist of a relatively well-graded free-draining granular material having no more than 10% passing the No. 200 sieve. The granular backfill zone behind walls should be at least one foot wide as measured horizontally from the face of the wall. Backfill against walls should be placed in loose lifts no greater than 6 inches in thickness. A nonwoven geotextile filter should be placed between the granular backfill and insitu soil to prevent the migration of fine grained soil.

I. Seismic Hazard Concerns, Liquefaction, Seismicity, and Faulting

Correlations with Standard Penetration Testing "N" values recorded during the subsurface investigation suggest that seismic **Site Class C** is appropriate for this site. The estimated design spectral response acceleration parameters are as follows:

Design Code Reference:	ASCE 7-16
Assumed Risk Category:	II
Site Class:	D
S_{DS}	0.108g
S_{D1}	0.047g

Liquefaction, surface rupture from faulting or lateral spreading is estimated to have a low probability of occurrence given typical regional seismicity.

LIMITATIONS

The recommendations presented in this report are predicated on the performance of construction observation and testing by qualified geotechnical personnel. We request continued involvement with this project so that we may assess subsurface conditions exposed during construction to determine if modifications to our recommendations are necessary. This report should not be considered as direction to the Contractor.

REFERENCES

"Surficial Geologic Map of New York – Finger Lakes Sheet", New York State Museum, 1986.

"Bedrock Map of New York – Finger Lakes Sheet", New York State Museum, 1970.

ATTACHMENTS

BORING LOGS



STAMP

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PH: 315.470.7099

PB
SUBMISSION
10/14/2022

REV No	DATE:	DRAWN BY:	DESCRIPTION:

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JOB NO: 41080
DATE: 10/14/2022
DRAWN BY: EK
SCALE: SEE DRAWING

CORTLAND SENIOR HOUSING
31 RIVER STREET, CORTLAND, NY 13045

HOLMES ▪ KING ▪ KALLQUIST
& Associates, Architects, LLP
575 NORTH SALINA STREET, SYRACUSE, NY 13208
PH: (315) 476-5400 FAX: (315) 476-5420
www.hkkarchitects.com

SCHEMATIC
SITE PLAN

L1.0

@PLTDATE @DWGFULLNAMEEXT

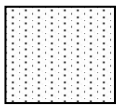
Kenney Geotechnical Services

Key to Symbols

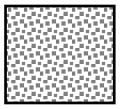
Project Name:	Cortland Senior Housing
Client:	Cortland Housing Assistance Council

Project Number:	2022-204
Location:	Cortland, NY

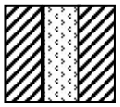
LITHOLOGIC SYMBOLS
(UNIFIED SOIL CLASSIFICATION SYSTEM)



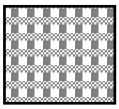
SP/SW: POORLY GRADED/WELL-GRADED SAND



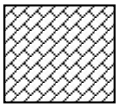
GW/GP: WELL-GRADED GRAVEL AND POORLY GRADED GRAVEL



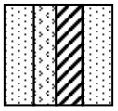
CL-ML: SILTY CLAY OR SANDY SILTY CLAY



GM/GC: SILTY GRAVEL OR CLAYEY GRAVEL



FILL/OL



SC-SM: SILTY CLAYEY SAND

Location: Cortland, NY
2022-204

Key to Soil Symbols and Terms

TERMS DESCRIBING CONSISTENCY OR CONDITION

COARSE-GRAINED SOILS (major portions retained on No. 200 sieve): includes (1) clean gravel and sands and (2) silty or clayey gravels and sands. Condition is rated according to relative density as determined by laboratory tests or standard penetration resistance tests.

Descriptive Terms	Relative Density	SPT Blow Count
Very loose	0 to 15 %	< 4
Loose	15 to 35 %	4 to 10
Medium dense	35 to 65 %	10 to 30
Dense	65 to 85 %	30 to 50
Very dense	85 to 100 %	> 50

FINE-GRAINED SOILS (major portions passing on No. 200 sieve): includes (1) inorganic and organic silts and clays, (2) gravelly, sandy, or silty clays, and (3) clayey silts. Consistency is rated according to shearing strength, as indicated by penetrometer readings, SPT blow count, or unconfined compression tests.

Descriptive Terms	Unconfined Compressive Strength kPa	SPT Blow Count
Very soft	< 25	< 2
Soft	25 to 50	2 to 4
Medium stiff	50 to 100	4 to 8
Stiff	100 to 200	8 to 15
Very stiff	200 to 400	15 to 30
Hard	> 400	> 30

GENERAL NOTES

1. Classifications are based on the United Soil Classification System and include consistency, moisture, and color. Field descriptions have been modified to reflect results of laboratory tests where deemed appropriate.

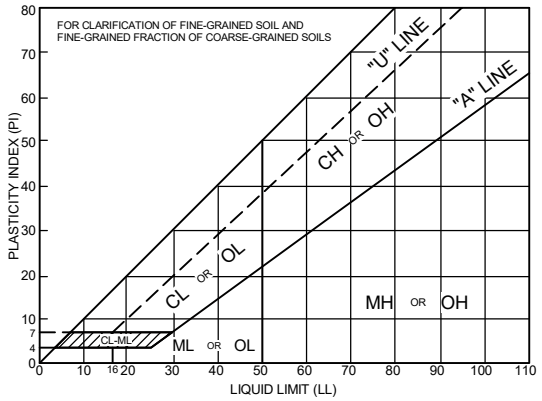
2. Surface elevations are based on topographic maps and estimated locations.

3. Descriptions on these boring logs apply only at the specific boring locations and at the time the borings were made. They are not guaranteed to be representative of subsurface conditions at other locations or times.

Major Divisions			Group Symbols	Typical Names	Laboratory Classification Criteria
Coarse-Grained soils (More than half the material is larger than No. 200 sieve size)	Gravels (More than half of coarse fraction is larger than No. 4 sieve size)	Clean gravel (Little or no fines)	GW	Well-graded gravels, gravel-sand mixtures, little or no fines	Determine percentages of sand and gravel from grain size curve, Depending on percentage of fines (fraction smaller than No. 200 sieve) coarse-grained soils are classified as follows: Less than 5 percent..... GW, GP, SW, SP; More than 12 percent..... GM, GC, SM, SC; 6 to 12 percent..... Borderline case4s requiring dual symbols**
			GP	Poorly-graded gravels, gravel-sand mixtures, little or no fines	
		Gravel with fines (Appreciable amount of fines)	GM* d / u	Silty gravels, gravel-sand-silt mixtures	
			GC	Clayey gravels, gravel-sand-silt mixtures	
	Sands (More than half of coarse fraction is smaller than No. 4 sieve size)	Clean sands (Little or no fines)	SW	Well-graded sands, gravelly sands, little or no fines	
			SP	Poorly-graded sands, gravelly sands, little or no fines	
		Sands with fines (Appreciable amount of fines)	SM* d / u	Silty sands, sand-silt mixtures	
			SC	Clayey sands, sand-clay mixtures	
Fine-Grained soils (More than half the material is smaller than No. 200 sieve size)	Silts and Clays (Liquid limit less than 60)		ML	Inorganic silts and very fine sands, rock floor, 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 and Clays (Liquid limit greater than 60)		MH	Inorganic silts, micaceous or disto-maceous fine sandy or silty soils, organic silts	
			CH	Inorganic clays of high plasticity, fat clays	
			OH	Organic clays of medium to high plasticity, organic silts	
	Highly Organic Soils		Pt	Peat and other highly organic soils	

Laboratory Classification Criteria:

- $C_U = \frac{D_{60}}{D_{10}}$ greater than 4; $C_C = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ between 1 and 3
- Not meeting all gradation requirements for GW
- Atterberg limits below "A" line or P.I. less than 4
- Atterberg limits above "A" line or P.I. greater than 7
- Above "A" line with P.I. between 4 and 7 are borderline cases requiring use of dual symbols
- $C_U = \frac{D_{60}}{D_{10}}$ greater than 6; $C_C = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ between 1 and 3
- Not meeting all gradation requirements for SW
- Atterberg limits below "A" line or P.I. less than 4
- Atterberg limits above "A" line or P.I. greater than 7
- Above "A" line with P.I. between 4 and 7 are borderline cases requiring use of dual symbols



Plasticity Chart

Particle Size		Material
Sieve sizes	mm	
< #200	< 0.074	Silt or clay
#200 to #40	0.074 to 0.42	Sand, Fine
#40 to #10	0.42 to 2.00	Medium
#10 to #4	2.00 to 4.76	Coarse
#4 to 3/4 in.	4.76 to 19.1	Gravel, Fine
3/4 in. to 3 in.	19.1 to 76.2	Coarse
3 in. to 12 in.	76.2 to 304.8	Cobble
12 in. to 36 in.	304.8 to 914.4	Boulders

* Division of GM and SM groups into subdivisions of d and u are for roads and airfields only. Subdivision is based on Atterberg Limits: suffix d used when L.L. is 23 or less and the P.I. is 6 or less; the suffix is used when L.L. is greater than 26.

** Borderline classifications used for soils possessing characteristics of two groups are designated by combinations of groups symbols. For example; GW-GC, well-graded gravel-sand mixture with clay binder.

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INFILTRATION TEST RESULTS

Project Name:		Cortland Senior Housing	
Project Number:		2022-204	
Location		Cortland, NY	
Date of Test:		12/19/2022	
Test	Depth	Stabilized Rate	Soil Conditions Encountered
-	(ft)	in/hr	USCS
IT-1	5.0	24	Well-Graded Gravel with Sand
IT-2	5.0	20	Well-Graded Gravel with Sand

HOURLY MEASURED INFILTRATION RATES

Test	Hour 1	Hour 2	Hour 3	Hour 4	Stabilized Rate (in/hr)
IT-1	24	24	24	24	24
IT-2	21	21	21	21	20

Kenney Geotechnical Services

Geotechnical Boring Log

Project Name:	Cortland Senior Housing	**Project Number:**	2022-204	**Logged By:**	NM	**Boring Number**	B-1
Client:	Cortland Housing Assistance Council	**Ground Elevation:**		**Checked By:**	CMK	**Sheet:**	1 of 2
Location:	31 River Street, Cortland NY	**Drill Rig:**	7822DT	**Depth To Groundwater While Drilling:**			13.0
Started:	12/14/2022	**Drill Method:**	3.25" HSA	**Depth To Groundwater Before Auger Removal:**			15.4
Completed:	12/14/2022	**Driller:**	D. Green	**Depth To Groundwater After Auger Removal:**			DRY

Depth (ft)	Sample Type	Recovery (inch)	Blow Count Per 6 inches	Graphic Log	N (bpf)	USCS Material Description	Strata Change Depth (ft.)	Pocket Penet. (tsf)	Moisture Content (%)
			1			**TOPSOIL**	0.5		
1	SPT	10	8		16	**(GM) MEDIUM DENSE, BROWN SILTY GRAVEL WITH SAND, MOIST**			
			8						
2			7				2.0		
	SPT	0	3		4	**NO RECOVERY COBBLES/BOULDERS OBSERVED WHILE DRILLING BEGINNING AT 3.0 FT**			
3			2						
			2						
4			1				4.0		
	SPT	12	2		5	**(GW) LOOSE, BROWN WELL GRADED GRAVEL WITH SAND AND SILT, MOIST**			
5			2						
			3						
6			10						
	SPT	11	14		68	**SIMILAR SOIL, VERY DENSE, MOIST**			
7			38						
			30						
8			24						
	SPT	15	25		73	**SIMILAR SOIL, VERY DENSE, MOIST**			
9			35						
			38						
10			40						
11									
12									
13							13.0		
	SPT	12	6		52	**(GW) VERY DENSE, GREY WELL GRADED GRAVEL WITH SAND, WET**			
14			22						
			30						
15			20						
16									
17									
18									
	SPT	9	23		100	**SIMILAR SOIL, VERY DENSE, WET**			
19			35			**(CONTINUED ONTO NEXT SHEET)**			
			50/0.3						
20									

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Geotechnical Boring Log

Project Name:	Cortland Senior Housing	**Project Number:**	2022-204	**Logged By:**	NM	**Boring Number**	B-1
Client:	Cortland Housing Assistance Council	**Ground Elevation:**		**Checked By:**	CMK	**Sheet:**	2 of 2
Location:	31 River Street, Cortland NY	**Drill Rig:**	7822DT	**Depth To Groundwater While Drilling:**			13.0
Started:	12/14/2022	**Drill Method:**	3.25" HSA	**Depth To Groundwater Before Auger Removal:**			15.4
Completed:	12/14/2022	**Driller:**	D. Green	**Depth To Groundwater After Auger Removal:**			DRY

Depth (ft)	Sample Type	Recovery (inch)	Blow Count Per 6 inches	Graphic Log	N (bpf)	USCS Material Description	Strata Change Depth (ft.)	Pocket Penet. (tsf)	Moisture Content (%)
21									
22									
23									
	SPT	4	50/0.4		100	**SIMILAR SOIL, VERY DENSE WET**			

Bottom of Boring: 23.4 FT | Cave Depth: 7.7 FT

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Geotechnical Boring Log

Project Name:	Cortland Senior Housing	**Project Number:**	2022-204	**Logged By:**	NM	**Boring Number**	B-2
Client:	Cortland Housing Assistance Council	**Ground Elevation:**		**Checked By:**	CMK	**Sheet:**	1 of 2
Location:	31 River Street, Cortland NY	**Drill Rig:**	7822DT	**Depth To Groundwater While Drilling:**			13.0
Started:	12/14/2022	**Drill Method:**	3.25" HSA	**Depth To Groundwater Before Auger Removal:**			15.4
Completed:	12/14/2022	**Driller:**	D. Green	**Depth To Groundwater After Auger Removal:**			DRY

Depth (ft)	Sample Type	Recovery (inch)	Blow Count Per 6 inches	Graphic Log	N (bpf)	USCS Material Description	Strata Change Depth (ft.)	Pocket Penet. (tsf)	Moisture Content (%)
			2			**TOPSOIL**	0.5		
1	SPT	6	3		6	**(SC-SM) LOOSE, BROWN SILTY CLAYEY SAND WITH GRAVEL, MOIST**			
			3						
2			4				2.0		
			3						
3	SPT	0	2		3	**AUGER CUTTINGS FROM SAMPLE 0'-4' NO RECOVERY**			
			1						
4			2				4.0		
			9						
5	SPT	10	16		29	**(GW) MEDIUM DENSE, GREY/BROWN WELL-GRADED GRAVEL WITH SAND, MOIST**			
			13						
6			15						
			10						
7	SPT	11	12		24	**COBBLES/BOULDERS ENCOUNTERED AROUND 1.5 FT SIMILAR SOIL, MEDIUM DENSE, MOIST**			
			12						
8			12						
	SPT	3	50/.3		100	**BOULDER AT 8.5 FT**			
9									
10									
11									
12									
13									
			9						
14	SPT	10	24		44	**SIMILAR SOIL, DENSE, WET**			
			20						
15			16						
16									
17									
18									
			16						
19	SPT	20	24		42	**GREY SIMILAR SOIL, DENSE, WET**			
			18			**(CONTINUED ONTO NEXT SHEET)**			
20			20						

Kenney Geotechnical Services

Geotechnical Boring Log

Project Name:	Cortland Senior Housing	**Project Number:**	2022-204	**Logged By:**	NM	**Boring Number**	B-2
Client:	Cortland Housing Assistance Council	**Ground Elevation:**		**Checked By:**	CMK	**Sheet:**	2 of 2
Location:	31 River Street, Cortland NY	**Drill Rig:**	7822DT	**Depth To Groundwater While Drilling:**			13.0
Started:	12/14/2022	**Drill Method:**	3.25" HSA	**Depth To Groundwater Before Auger Removal:**			15.4
Completed:	12/14/2022	**Driller:**	D. Green	**Depth To Groundwater After Auger Removal:**			DRY

Depth (ft)	Sample Type	Recovery (inch)	Blow Count Per 6 inches	Graphic Log	N (bpf)	USCS Material Description	Strata Change Depth (ft.)	Pocket Penet. (tsf)	Moisture Content (%)
21									
22									
23									
	SPT	4	45		100	**SIMILAR SOIL WITH SILT, VERY DENSE, WET**			
24			50/.2						

Bottom of Boring: 23.7 FT | Cave Depth: 6.1 FT

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Geotechnical Boring Log

Project Name:	Cortland Senior Housing	**Project Number:**	2022-204	**Logged By:**	NM	**Boring Number**	B-3
Client:	Cortland Housing Assistance Council	**Ground Elevation:**		**Checked By:**	CMK	**Sheet:**	1 of 2
Location:	31 River Street, Cortland NY	**Drill Rig:**	7822DT	**Depth To Groundwater While Drilling:**			13.0
Started:	12/14/2022	**Drill Method:**	3.25" HSA	**Depth To Groundwater Before Auger Removal:**			16.4
Completed:	12/14/2022	**Driller:**	D. Green	**Depth To Groundwater After Auger Removal:**			DRY

Depth (ft)	Sample Type	Recovery (inch)	Blow Count Per 6 inches	Graphic Log	N (bpf)	USCS Material Description	Strata Change Depth (ft.)	Pocket Penet. (tsf)	Moisture Content (%)
			3			**TOPSOIL**	0.4		
1	SPT	11	4		8	**(GM) LOOSE, BROWN SILTY GRAVEL WITH SAND, MOIST**			13.7
			4						
2			3						
	SPT	6	3		5	**SIMILAR SOIL, LOOSE, MOIST**			9.1
3			3						
			2						
4			1				4.0		
	SPT	6	4		37	**(GW) DENSE, GREY/BROWN WELL-GRADED GRAVEL WITH SAND, MOIST**			7.4
5			16						
			21						
6			15						
	SPT	12	15		33	**SIMILAR SOIL, DENSE, MOIST**			4.1
7			19						
			14						
8			10						
	SPT	15	15		68	**SIMILAR SOIL, VERY DENSE, MOIST**			5.3
9			24						
			44						
10			50/.4						
11									
12									
13									
	SPT	9	12		34	**SIMILAR SOIL, DENSE, WET**			7.9
14			14						
			20						
15			16						
16									
17									
18									
	SPT	15	50/.4		100	**SIMILAR SOIL, VERY DENSE, WET**			7.1
19						**(CONTINUED ONTO NEXT SHEET)**			
20									

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Geotechnical Boring Log

Project Name:	Cortland Senior Housing	**Project Number:**	2022-204	**Logged By:**	NM	**Boring Number**	B-3
Client:	Cortland Housing Assistance Council	**Ground Elevation:**		**Checked By:**	CMK	**Sheet:**	2 of 2
Location:	31 River Street, Cortland NY	**Drill Rig:**	7822DT	**Depth To Groundwater While Drilling:**			13.0
Started:	12/14/2022	**Drill Method:**	3.25" HSA	**Depth To Groundwater Before Auger Removal:**			16.4
Completed:	12/14/2022	**Driller:**	D. Green	**Depth To Groundwater After Auger Removal:**			DRY

Depth (ft)	Sample Type	Recovery (inch)	Blow Count Per 6 inches	Graphic Log	N (bpf)	USCS Material Description	Strata Change Depth (ft.)	Pocket Penet. (tsf)	Moisture Content (%)
21									
22									
23									
	SPT	4	50/.1		100	**SIMILAR SOIL, VERY DENSE, WET**			8.9

Bottom of Boring: 23.4 FT | Cave Depth: 8.4 FT

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Geotechnical Boring Log

Project Name:	Cortland Senior Housing	**Project Number:**	2022-204	**Logged By:**	NM	**Boring Number**	B-4
Client:	Cortland Housing Assistance Council	**Ground Elevation:**		**Checked By:**	CMK	**Sheet:**	1 of 1
Location:	31 River Street, Cortland NY	**Drill Rig:**	7822DT	**Depth To Groundwater While Drilling:**			13.0
Started:	12/15/2022	**Drill Method:**	3.25" HSA	**Depth To Groundwater Before Auger Removal:**			11.7
Completed:	12/15/2022	**Driller:**	D. Green	**Depth To Groundwater After Auger Removal:**			DRY

Depth (ft)	Sample Type	Recovery (inch)	Blow Count Per 6 inches	Graphic Log	N (bpf)	USCS Material Description	Strata Change Depth (ft.)	Pocket Penet. (tsf)	Moisture Content (%)
			2			**TOPSOIL**	0.5		
1	SPT	6	2		5	**(GM) LOOSE, BROWN SILTY GRAVEL WITH SAND, MOIST**			
			3						
2			3						
	SPT	7	3		8				
3			3			**SIMILAR SOIL, LOOSE, MOIST**			
			5						
4			8				4.0		
	SPT	0	4		24	**NO RECOVERY**			
5			15			**COBBLES AND BOULDERS OBSERVED WHILE DRILLING AT 4 FT**			
			9						
6			7				6.0		
	SPT	11	7		11	**(GW) MEDIUM DENSE, BROWN/GREY WELL-GRADED GRAVEL WITH SAND AND SILT, MOIST**			
7			5						
			6						
8			12				8.0		
	SPT	0	50/.3		100	**NO RECOVERY**			
9						**AUGERED THROUGH BOULDER 8-11 FT**			
10									
11									
12									
13							13.0		
	SPT	3	27		60	**(SW) VERY DENSE, GREY WELL-GRADED SAND, WET**			
14			30						
			30						
15			35						
16									
17									
18							18.0		
	SPT	16	39		61	**(GW) VERY DENSE, GREY WELL-GRADED GRAVEL WITH SAND, WET**			
19			30						
			31						
20			35				20.0		
	SPT	0	50/.2		100	**NO RECOVERY, AUGER REFUSAL AT 20.0 FT**			

Bottom of Boring: 20.2 FT | Cave Depth: 9.5 FT

Kenney Geotechnical Services

Geotechnical Boring Log

Project Name:	Cortland Senior Housing	**Project Number:**	2022-204	**Logged By:**	NM	**Boring Number**	B-5
Client:	Cortland Housing Assistance Council	**Ground Elevation:**		**Checked By:**	CMK	**Sheet:**	1 of 2
Location:	31 River Street, Cortland NY	**Drill Rig:**	7822DT	**Depth To Groundwater While Drilling:**			13.0
Started:	12/15/2022	**Drill Method:**	3.25" HSA	**Depth To Groundwater Before Auger Removal:**			14.7
Completed:	12/15/2022	**Driller:**	D. Green	**Depth To Groundwater After Auger Removal:**			DRY

Depth (ft)	Sample Type	Recovery (inch)	Blow Count Per 6 inches	Graphic Log	N (bpf)	USCS Material Description	Strata Change Depth (ft.)	Pocket Penet. (tsf)	Moisture Content (%)
			2			**TOPSOIL**	0.4		
1	SPT	11	4		9	**(GW) LOOSE, BROWN WELL-GRADED GRAVEL WITH SAND AND SILT, MOIST**			
			5						
2			6						
	SPT	8	8		15	**SIMILAR SOIL, MEDIUM DENSE, MOIST**			
3			8						
			7						
4			6						
	SPT	5	10		21	**SIMILAR SOIL, MEDIUM DENSE, MOIST**			
5			7						
			14						
6			14				6.0		
	SPT	9	10		19	**(GW) MEDIUM DENSE, BROWN/GREY WELL-GRADED GRAVEL WITH SAND, MOIST**			
7			9						
			10						
8			26						
	SPT	6	35		100	**SIMILAR SOIL, VERY DENSE, MOIST**			
9			50/.4						
10									
11									
12									
13									
	SPT	15	26		49	**GREY SIMILAR SOIL, DENSE, WET**			
14			33						
			16						
15			37						
16									
17									
18									
	SPT	13	12		44	**GREY SIMILAR SOIL, DENSE, WET**			
19			22						
			22						
20			30						

(CONTINUED ONTO NEXT SHEET)

Kenney Geotechnical Services

Geotechnical Boring Log

Project Name:	Cortland Senior Housing	**Project Number:**	2022-204	**Logged By:**	NM	**Boring Number**	B-5
Client:	Cortland Housing Assistance Council	**Ground Elevation:**		**Checked By:**	CMK	**Sheet:**	2 of 2
Location:	31 River Street, Cortland NY	**Drill Rig:**	7822DT	**Depth To Groundwater While Drilling:**			13.0
Started:	12/15/2022	**Drill Method:**	3.25" HSA	**Depth To Groundwater Before Auger Removal:**			14.7
Completed:	12/15/2022	**Driller:**	D. Green	**Depth To Groundwater After Auger Removal:**			DRY

Depth (ft)	Sample Type	Recovery (inch)	Blow Count Per 6 inches	Graphic Log	N (bpf)	USCS Material Description	Strata Change Depth (ft.)	Pocket Penet. (tsf)	Moisture Content (%)
21									
22									
23									
			18						
24	SPT	7	39		100	**SIMILAR SOIL, VERY DENSE, WET**			
			50/.3						

Bottom of Boring: 24.3 FT | Cave Depth: 5.9 FT

Kenney Geotechnical Services

Geotechnical Boring Log

Project Name:	Cortland Senior Housing	**Project Number:**	2022-204	**Logged By:**	NM	**Boring Number**	B-6
Client:	Cortland Housing Assistance Council	**Ground Elevation:**		**Checked By:**	CMK	**Sheet:**	1 of 2
Location:	31 River Street, Cortland NY	**Drill Rig:**	7822DT	**Depth To Groundwater While Drilling:**			13.0
Started:	12/15/2022	**Drill Method:**	3.25" HSA	**Depth To Groundwater Before Auger Removal:**			12.6
Completed:	12/15/2022	**Driller:**	D. Green	**Depth To Groundwater After Auger Removal:**			DRY

Depth (ft)	Sample Type	Recovery (inch)	Blow Count Per 6 inches	Graphic Log	N (bpf)	USCS Material Description	Strata Change Depth (ft.)	Pocket Penet. (tsf)	Moisture Content (%)
			3			**TOPSOIL**	0.5		
1	SPT	6	4		9	**OL: (GC-GM) LOOSE, BROWN CLAYEY SILTY GRAVEL WITH ORGANICS, MOIST**			
			5						
2			6				2.0		
			4						
3	SPT	3	4		6	**SIMILAR SOIL WITH NO ORGANICS, LOOSE, MOIST**			
			2						
4			5				4.0		
			4						
5	SPT	13	10		22	**(GW) MEDIUM DENSE, BROWN WELL-GRADED GRAVEL WITH SAND, MOIST**			
			12						
6			16						
			48						
7	SPT	15	19		36	**SIMILAR SOIL, DENSE, MOIST**			
			17						
8			25						
			18						
9	SPT	12	21		51	**SIMILAR SOIL, VERY DENSE, MOIST**			
			30						
10			32						
11									
12									
13							13.0		
			42						
14	SPT	15	16		33	**(GW) DENSE, GREY WELL-GRADED GRAVEL, WET**			
			17						
15			40						
16									
17									
18							18.0		
			16						
19	SPT	0	12		24	**NO RECOVERY**			
			12			**(CONTINUED ONTO NEXT SHEET)**			
20			14				20.0		

Kenney Geotechnical Services

Geotechnical Boring Log

Project Name:	Cortland Senior Housing	**Project Number:**	2022-204	**Logged By:**	NM	**Boring Number**	B-6
Client:	Cortland Housing Assistance Council	**Ground Elevation:**		**Checked By:**	CMK	**Sheet:**	2 of 2
Location:	31 River Street, Cortland NY	**Drill Rig:**	7822DT	**Depth To Groundwater While Drilling:**			13.0
Started:	12/15/2022	**Drill Method:**	3.25" HSA	**Depth To Groundwater Before Auger Removal:**			12.6
Completed:	12/15/2022	**Driller:**	D. Green	**Depth To Groundwater After Auger Removal:**			DRY

Depth (ft)	Sample Type	Recovery (inch)	Blow Count Per 6 inches	Graphic Log	N (bpf)	USCS Material Description	Strata Change Depth (ft.)	Pocket Penet. (tsf)	Moisture Content (%)
21									
22									
23									
			30						
24	SPT	10	21		41	**(GW) DENSE, GREY WELL-GRADED GRAVEL, WET**			
			20						
25			20						

Bottom of Boring: 25.0 FT

Cave Depth: 9.3 FT

Kenney Geotechnical Services

Geotechnical Boring Log

Project Name:	Cortland Senior Housing	**Project Number:**	2022-204	**Logged By:**	NM	**Boring Number**	B-7
Client:	Cortland Housing Assistance Council	**Ground Elevation:**		**Checked By:**	CMK	**Sheet:**	1 of 2
Location:	31 River Street, Cortland NY	**Drill Rig:**	7822DT	**Depth To Groundwater While Drilling:**			13.0
Started:	12/15/2022	**Drill Method:**	3.25" HSA	**Depth To Groundwater Before Auger Removal:**			16.1
Completed:	12/15/2022	**Driller:**	D. Green	**Depth To Groundwater After Auger Removal:**			DRY

Depth (ft)	Sample Type	Recovery (inch)	Blow Count Per 6 inches	Graphic Log	N (bpf)	USCS Material Description	Strata Change Depth (ft.)	Pocket Penet. (tsf)	Moisture Content (%)
			2			**TOPSOIL**	0.3		
1	SPT	3	2		4	**(SC-SM) VERY LOOSE, CLAYEY SILTY SAND WITH GRAVEL, MOIST**			
			2						
2			2						
	SPT	6	4		6				
3			4			**SIMILAR SOIL, LOOSE, MOIST**			
			2						
4			2				4.0		
	SPT	0			5	**NO RECOVERY**			
5			1						
			4						
6			1/12"				6.0		
	SPT	13	2		42	**(GW) DENSE, GREY/BROWN WELL-GRADED GRAVEL WITH SAND, MOIST**			
7			20						
			22						
8			24						
	SPT	7	44		100	**SIMILAR SOIL, VERY DENSE, MOIST**			
9			50/.4						
10									
11									
12									
13							13.0		
	SPT	15	28		48	**(GW) DENSE, GREY WELL-GRADED GRAVEL WITH SAND, WET**			
14			24						
			24						
15			16						
16									
17									
18									
	SPT	14	36		72	**SIMILAR SOIL, VERY DENSE, WET**			
19			44			**(CONTINUED ONTO NEXT SHEET)**			
			28						
20			16						

Kenney Geotechnical Services

Geotechnical Boring Log

Project Name:	Cortland Senior Housing	**Project Number:**	2022-204	**Logged By:**	NM	**Boring Number**	B-7
Client:	Cortland Housing Assistance Council	**Ground Elevation:**		**Checked By:**	CMK	**Sheet:**	2 of 2
Location:	31 River Street, Cortland NY	**Drill Rig:**	7822DT	**Depth To Groundwater While Drilling:**			13.0
Started:	12/15/2022	**Drill Method:**	3.25" HSA	**Depth To Groundwater Before Auger Removal:**			16.1
Completed:	12/15/2022	**Driller:**	D. Green	**Depth To Groundwater After Auger Removal:**			DRY

Depth (ft)	Sample Type	Recovery (inch)	Blow Count Per 6 inches	Graphic Log	N (bpf)	USCS Material Description	Strata Change Depth (ft.)	Pocket Penet. (tsf)	Moisture Content (%)
21									
22									
23									
			15						
24	SPT	11	15		40	**SIMILAR SOIL, DENSE, WET**			
			25						
25			21						

Bottom of Boring: 25.0 FT

Cave Depth: 7.6 FT

Kenney Geotechnical Services

Geotechnical Boring Log

Project Name:	Cortland Senior Housing	**Project Number:**	2022-204	**Logged By:**	NM	**Boring Number**	B-8
Client:	Cortland Housing Assistance Council	**Ground Elevation:**		**Checked By:**	CMK	**Sheet:**	1 of 2
Location:	31 River Street, Cortland NY	**Drill Rig:**	7822DT	**Depth To Groundwater While Drilling:**			18.0
Started:	12/15/2022	**Drill Method:**	3.25" HSA	**Depth To Groundwater Before Auger Removal:**			17.2
Completed:	12/15/2022	**Driller:**	D. Green	**Depth To Groundwater After Auger Removal:**			DRY

Depth (ft)	Sample Type	Recovery (inch)	Blow Count Per 6 inches	Graphic Log	N (bpf)	USCS Material Description	Strata Change Depth (ft.)	Pocket Penet. (tsf)	Moisture Content (%)
			1			**TOPSOIL**	0.5		
1	SPT	8	3		7	**(CL-ML) MEDIUM STIFF, BROWN GRAVELLY SILTY CLAY WITH SAND, MOIST**			
			4						
2			4						
			4						
3	SPT	2	5		11	**SIMILAR SOIL, STIFF, MOIST**			15.3
			6						
4			5						
			6			**SIMILAR SOIL, STIFF, MOIST**			
5	SPT	15	4		10		5.0		
			6			**(GW) LOOSE, BROWN WELL-GRADED GRAVEL WITH SAND AND SILT, MOIST**			
6			10						
			25						
7	SPT	4	50/.4		100	**SIMILAR SOIL, VERY DENSE, MOIST**			6.4
			16						
8			32						
	SPT	13	40		72	**SIMILAR SOIL, VERY DENSE, MOIST**			
9			50/.3						4.7
10									
11									
12									
13									
	SPT	10	27		50	**SIMILAR SOIL, DENSE, WET**			
14			30						
			20						
15			25						
16									
17									
18									
	SPT	10	10		100	**SIMILAR SOIL, VERY DENSE, WET**			
19			50/.3			**(CONTINUED ONTO NEXT SHEET)**			6.9
20									

Kenney Geotechnical Services

Geotechnical Boring Log

Project Name:	Cortland Senior Housing	**Project Number:**	2022-204	**Logged By:**	NM	**Boring Number**	B-8
Client:	Cortland Housing Assistance Council	**Ground Elevation:**		**Checked By:**	CMK	**Sheet:**	2 of 2
Location:	31 River Street, Cortland NY	**Drill Rig:**	7822DT	**Depth To Groundwater While Drilling:**			18.0
Started:	12/15/2022	**Drill Method:**	3.25" HSA	**Depth To Groundwater Before Auger Removal:**			17.2
Completed:	12/15/2022	**Driller:**	D. Green	**Depth To Groundwater After Auger Removal:**			DRY

Depth (ft)	Sample Type	Recovery (inch)	Blow Count Per 6 inches	Graphic Log	N (bpf)	USCS Material Description	Strata Change Depth (ft.)	Pocket Penet. (tsf)	Moisture Content (%)
21									
22									
23									
	SPT	3	50/.4		100	**SIMILAR SOIL, VERY DENSE, WET**			
						Bottom of Boring: 23.4 FT	Cave Depth: 7.7 FT		

Kenney Geotechnical Services

Geotechnical Boring Log

Project Name:	Cortland Senior Housing	**Project Number:**	2022-204	**Logged By:**	NM	**Boring Number**	B-9
Client:	Cortland Housing Assistance Council	**Ground Elevation:**		**Checked By:**	CMK	**Sheet:**	1 of 1
Location:	31 River Street, Cortland NY	**Drill Rig:**	7822DT	**Depth To Groundwater While Drilling:**			DRY
Started:	12/15/2022	**Drill Method:**	3.25" HSA	**Depth To Groundwater Before Auger Removal:**			DRY
Completed:	12/15/2022	**Driller:**	D. Green	**Depth To Groundwater After Auger Removal:**			DRY

Depth (ft)	Sample Type	Recovery (inch)	Blow Count Per 6 inches	Graphic Log	N (bpf)	USCS Material Description	Strata Change Depth (ft.)	Pocket Penet. (tsf)	Moisture Content (%)
			2			**TOPSOIL**	0.7		
1	SPT	8	2		5	**(GC-GM) LOOSE, BROWN CLAYEY SILTY GRAVEL WITH SAND, MOIST**			
			3						
2			2						
			1						
3	SPT	3	2		4	**SIMILAR SOIL, VERY LOOSE, MOIST**			
			2						
4			1						
			1			**SIMILAR SOIL, LOOSE, MOIST**			
5	SPT	9	1		6		5.0		
			5			**(GW) LOOSE, WELL-GRADED GRAVEL WITH SAND, MOIST**			
6			6						
			16			**SIMILAR SOIL, DENSE, MOIST**			
7	SPT	15	25		50				
			25						
8			30						

Bottom of Boring: 8.0 FT | Cave Depth: 4.7 FT

Kenney Geotechnical Services

Geotechnical Boring Log

Project Name:	Cortland Senior Housing	**Project Number:**	2022-204	**Logged By:**	NM	**Boring Number**	B-10
Client:	Cortland Housing Assistance Council	**Ground Elevation:**		**Checked By:**	CMK	**Sheet:**	1 of 1
Location:	31 River Street, Cortland NY	**Drill Rig:**	7822DT	**Depth To Groundwater While Drilling:**			DRY
Started:	12/15/2022	**Drill Method:**	3.25" HSA	**Depth To Groundwater Before Auger Removal:**			DRY
Completed:	12/15/2022	**Driller:**	D. Green	**Depth To Groundwater After Auger Removal:**			DRY

Depth (ft)	Sample Type	Recovery (inch)	Blow Count Per 6 inches	Graphic Log	N (bpf)	USCS Material Description	Strata Change Depth (ft.)	Pocket Penet. (tsf)	Moisture Content (%)
			WH			**TOPSOIL**	0.8		
1	SPT	9	1		2	**(CL-ML) VERY SOFT, BROWN SANDY SILTY CLAY WITH ROOT HAIRS, MOIST**			
			1						
2			2						
	SPT	7	3		8	**SIMILAR SOIL, MEDIUM STIFF, MOIST**	2.5		
3			4			**(GC-GM) LOOSE, BROWN CLAYEY SILTY GRAVEL WITH SAND, MOIST**			
			4						
4			2						
	SPT	12	3		10	**SIMILAR SOIL, LOOSE, MOIST**			
5			4						
			6						
6			12						
	SPT	15	50/.4		100	**SIMILAR SOIL, VERY DENSE, MOIST**			

Bottom of Boring: 6.4 FT | Cave Depth: 4.7 FT

Kenney Geotechnical Services

Geotechnical Boring Log

Project Name:	Cortland Senior Housing	**Project Number:**	2022-204	**Logged By:**	NM	**Boring Number**	B-11
Client:	Cortland Housing Assistance Council	**Ground Elevation:**		**Checked By:**	CMK	**Sheet:**	1 of 1
Location:	31 River Street, Cortland NY	**Drill Rig:**	7822DT	**Depth To Groundwater While Drilling:**			DRY
Started:	12/15/2022	**Drill Method:**	3.25" HSA	**Depth To Groundwater Before Auger Removal:**			DRY
Completed:	12/15/2022	**Driller:**	D. Green	**Depth To Groundwater After Auger Removal:**			DRY

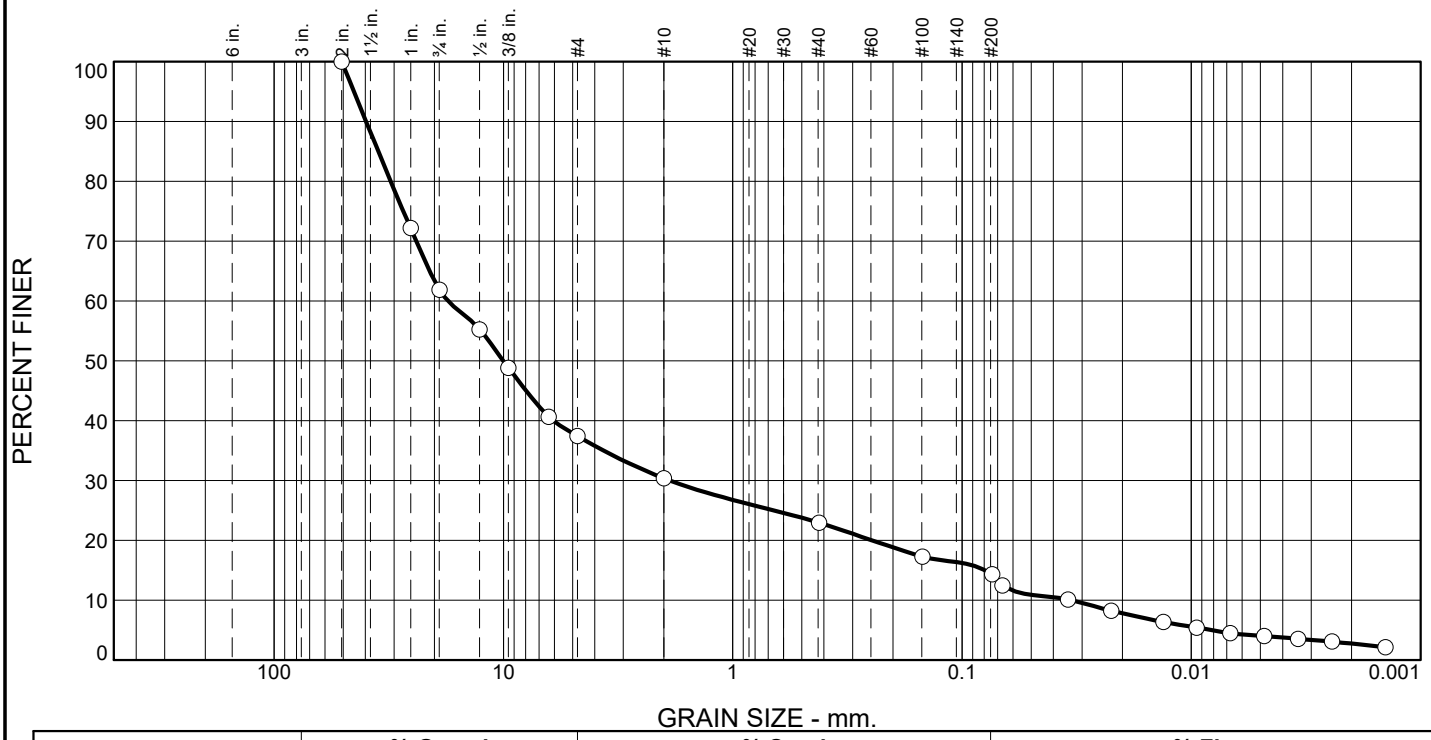
Depth (ft)	Sample Type	Recovery (inch)	Blow Count Per 6 inches	Graphic Log	N (bpf)	USCS Material Description	Strata Change Depth (ft.)	Pocket Penet. (tsf)	Moisture Content (%)
	SPT	9	1		4	**TOPSOIL - OL: (CL-ML) SOFT, BROWN GRAVELLY SILTY CLAY WITH ORGANICS, MOIST**	0.8		
1			2						
			2			**(GC-GM) VERY LOOSE, BROWN CLAYEY SILTY GRAVEL WITH SAND, MOIST**			
2			2						
	SPT	7	3		10				
3			5			**SIMILAR SOIL, LOOSE, MOIST**			
			5						
4			6						
	SPT	12	3		34	**SIMILAR SOIL, DENSE, MOIST**	4.5		
5			14			**(GW) DENSE, GREY/BROWN WELL-GRADED GRAVEL WITH SAND, MOIST**			
			20						
6			30						
	SPT	15	20		70	**SIMILAR SOIL, VERY DENSE, MOIST**			
7			32						
			38						
8			45						

Bottom of Boring: 8.0 FT | Cave Depth: 4.3 FT

LABORATORY TESTING RESULTS

Particle Size Distribution Report

ASTM D422 & D1140



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0	38	25	7	7	9	10	4

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_C	C_U
○			35.1396	17.4432	10.0345	1.8823	0.0795	0.0333	6.09	523.23

	Material Description	USCS	AASHTO
○	Clayey Silty Gravel with Sand	GC-GM	

Project No. 2022-204 **Client:** Cortland Housing Assistance Council

Project: Cortland Senior Housing

○ **Source of Sample:** B-1 **Depth:** 5.0' **Sample Number:** 4.0'-6.0'

Remarks:

○ Kenney Geotechnical
Engineering Services, PLLC
6901 Herman Road
Syracuse, NY 13209
(315) 638-2706

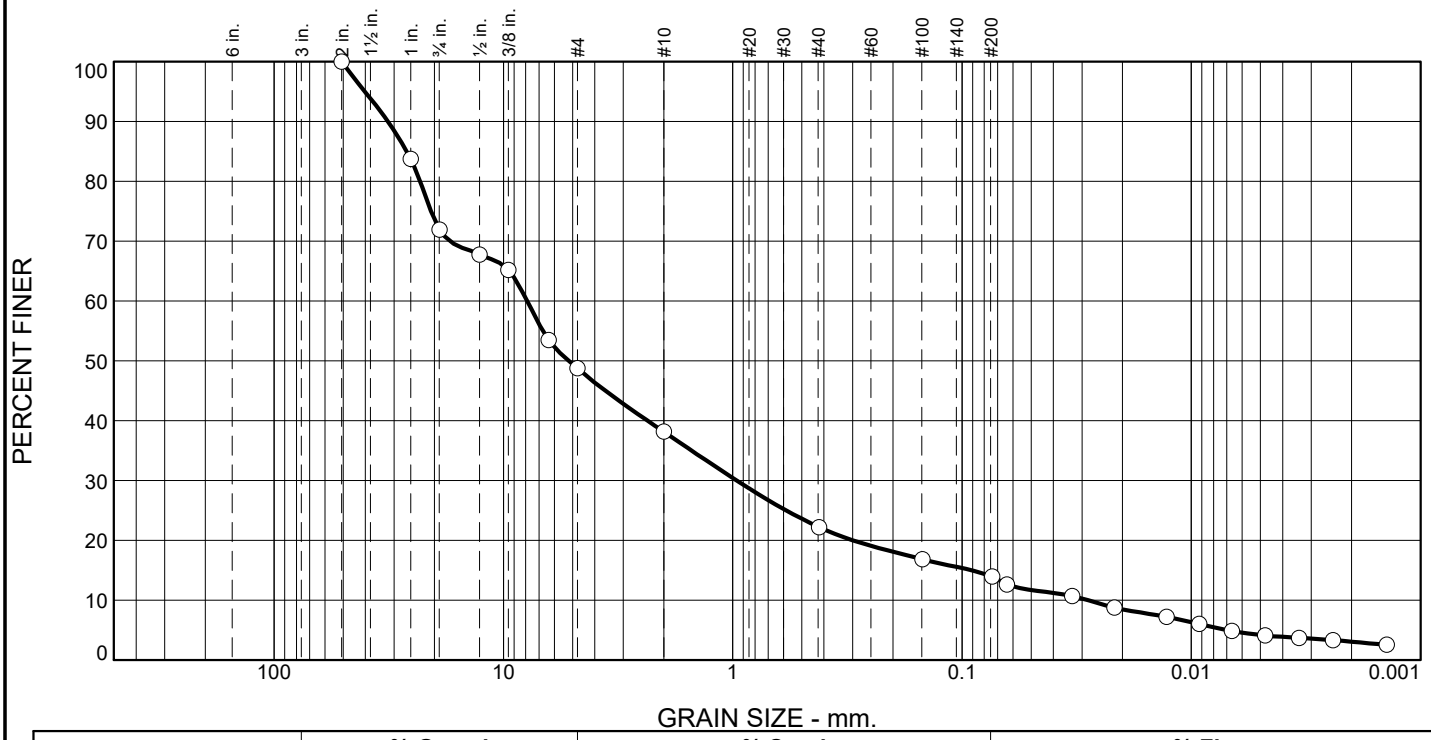
Kenney Geotechnical Services

Figure

Tested By: BE **Checked By:** CMK

Particle Size Distribution Report

ASTM D422 & D1140



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0	28	23	11	16	8	10	4

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_C	C_U
○			26.4292	7.8844	5.1962	0.9619	0.0906	0.0283	4.15	278.87

Material Description	USCS	AASHTO
○ Clayey Silty Gravel with Sand	GC-GM	

Project No. 2022-204 **Client:** Cortland Housing Assistance Council

Project: Cortland Senior Housing

○ **Source of Sample:** B-7 **Depth:** 7.0' **Sample Number:** 6.0'-8.0'

Remarks:

○ Kenney Geotechnical
Engineering Services, PLLC
6901 Herman Road
Syracuse, NY 13209
(315) 638-2706

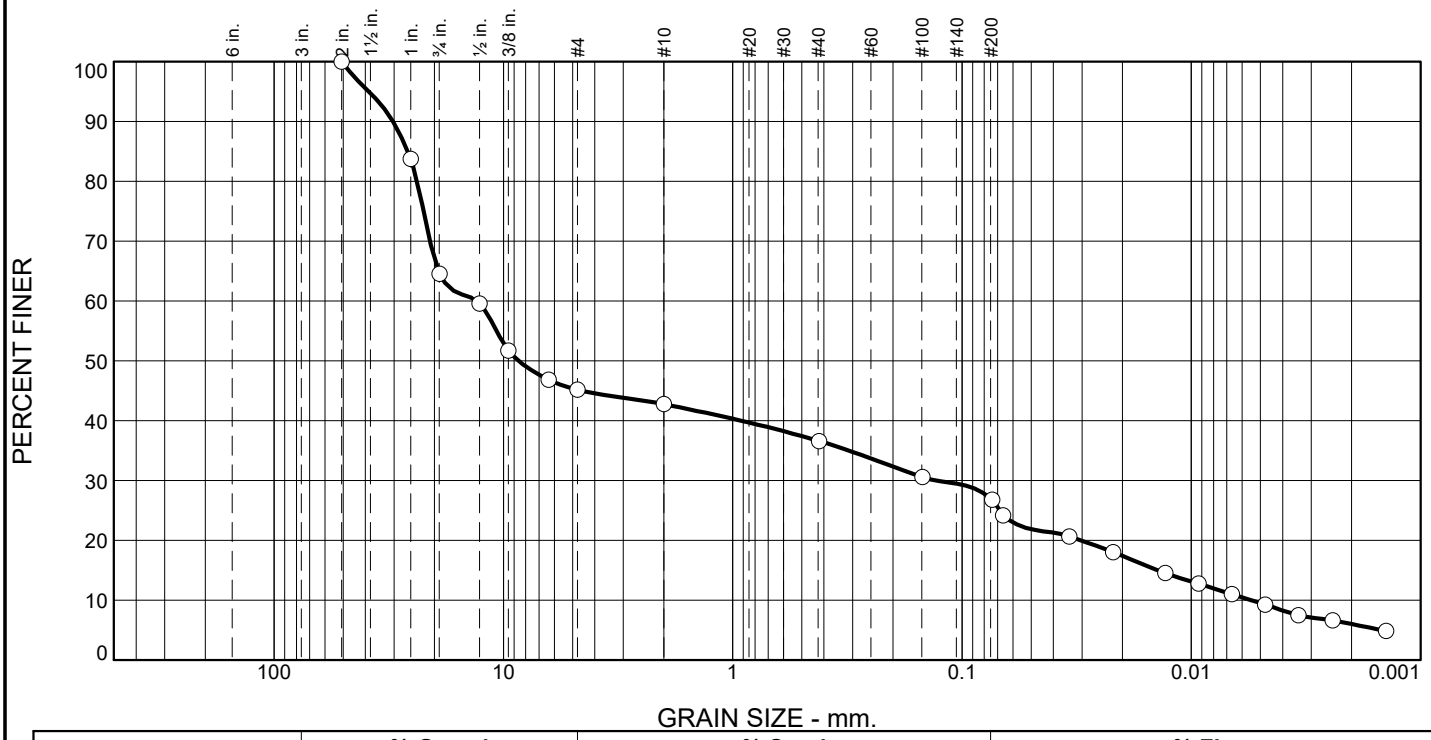
Kenney Geotechnical Services

Figure

Tested By: BE **Checked By:** CMK

Particle Size Distribution Report

ASTM D422 & D1140



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0	35	20	2	6	10	17	10

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_C	C_U
○			26.1578	13.0865	8.5828	0.1293	0.0140	0.0055	0.23	2383.38

Material Description	USCS	AASHTO
○ Clayey Silty Gravel with Sand	GC-GM	

Project No. 2022-204 **Client:** Cortland Housing Assistance Council

Project: Cortland Senior Housing

○ **Source of Sample:** B-9 **Depth:** 3.0' **Sample Number:** 2.0'-4.0'

Remarks:

○ Kenney Geotechnical
Engineering Services, PLLC
6901 Herman Road
Syracuse, NY 13209
(315) 638-2706

Kenney Geotechnical Services

Figure

Tested By: BE **Checked By:** CMK

Kenney Geotechnical Engineering Services, PLLC
Office: 6901 Herman Road, Syracuse, NY 13209
Mail :P.O. Box 117 Warners, NY 13164
Phone: (315) 638-2706 Fax: (315) 638-1544

Project No.:	**2022-204**	**Date:**	**12/22/2022**
Project Name:	**Cortland Senior Housing**		

Natural Moisture Content
ASTM D2216

Sample:	**B-3, 0'-2'**	**B-3, 2'-4'**	**B-3, 4'-6'**	**B-3, 6'-8'**	**B-3, 8'-10'**	**B-3, 13'-15'**	**B-3, 18'-20'**	**B-3, 23'-25'**
Tare Name:	Fish	WLAP	Pike	Larry	MAX	REX	Duck	Link
Tare Weight:	14.15	13.66	14.18	14.5	13.63	14.37	14.3	14.38
Tare + Wet Sample Wt.:	53.79	68.3	51.55	62.55	54.97	70.57	68.19	66.52
Tare + Dry Sample Wt.:	49	63.74	48.96	60.67	52.89	66.44	64.61	62.25
H20 Wt.:	4.8	4.6	2.6	1.9	2.1	4.1	3.6	4.3
Dry Sample Wt.:	34.9	50.1	34.8	46.2	39.3	52.1	50.3	47.9
MC = (H20 Wt. / Dry Sample Wt.) x 100:	13.7	9.1	7.4	4.1	5.3	7.9	7.1	8.9

Sample:	**B-8, 2'-4'**	**B-8, 6'-8'**	**B-8, 8'-10'**	**B-8, 18'-20'**
Tare Name:	A99	NCIS	Zebra	Gas
Tare Weight:	14.16	14.25	14.77	13.93
Tare + Wet Sample Wt.:	59.52	49.99	65.59	64.43
Tare + Dry Sample Wt.:	53.5	47.84	63.32	61.18
H20 Wt.:	6.0	2.2	2.3	3.3
Dry Sample Wt.:	39.3	33.6	48.6	47.3
MC = (H20 Wt. / Dry Sample Wt.) x 100:	15.3	6.4	4.7	6.9

APPENDIX B

Extreme Precipitation Tables

Northeast Regional Climate Center

Data represents point estimates calculated from partial duration series. All precipitation amounts are displayed in inches.

Metadata for Point

Smoothing
No

State
New York

Location
New York, United States

Latitude
42.607 degrees North

Longitude
76.162 degrees West

Elevation
330 feet

Date/Time
Thu Jun 26 2025 10:22:10 GMT-0400 (Eastern Daylight Time)

Extreme Precipitation Estimates

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.28	0.43	0.52	0.70	0.86	0.98	1yr	0.74	0.95	1.09	1.36	1.67	1.97	2.25	1yr	1.74	2.17	2.61	3.17	3.63	1yr
2yr	0.32	0.50	0.61	0.83	1.03	1.16	2yr	0.89	1.13	1.28	1.59	1.94	2.35	2.64	2yr	2.08	2.54	2.97	3.56	4.10	2yr
5yr	0.38	0.59	0.73	1.00	1.28	1.44	5yr	1.10	1.41	1.58	1.94	2.39	2.88	3.22	5yr	2.55	3.10	3.61	4.26	4.87	5yr
10yr	0.44	0.67	0.84	1.17	1.51	1.70	10yr	1.30	1.66	1.87	2.25	2.80	3.36	3.75	10yr	2.97	3.60	4.18	4.88	5.55	10yr
25yr	0.53	0.81	1.00	1.43	1.89	2.12	25yr	1.63	2.07	2.32	2.75	3.46	4.12	4.58	25yr	3.65	4.41	5.09	5.84	6.61	25yr
50yr	0.61	0.93	1.15	1.66	2.23	2.51	50yr	1.93	2.45	2.73	3.20	4.06	4.81	5.34	50yr	4.26	5.14	5.91	6.69	7.54	50yr
100yr	0.71	1.07	1.34	1.93	2.65	2.97	100yr	2.29	2.91	3.22	3.72	4.77	5.62	6.23	100yr	4.98	5.99	6.87	7.66	8.61	100yr
200yr	0.82	1.23	1.56	2.26	3.15	3.53	200yr	2.71	3.45	3.81	4.34	5.61	6.57	7.28	200yr	5.82	7.00	7.99	8.78	9.84	200yr
500yr	1.00	1.48	1.91	2.78	3.95	4.43	500yr	3.41	4.33	4.75	5.31	6.94	8.09	8.94	500yr	7.16	8.60	9.77	10.52	11.73	500yr

Lower Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.25	0.39	0.47	0.63	0.78	0.88	1yr	0.67	0.86	0.99	1.15	1.50	1.87	2.12	1yr	1.65	2.04	2.49	2.97	3.44	1yr
2yr	0.31	0.49	0.60	0.81	1.00	1.11	2yr	0.86	1.09	1.24	1.53	1.87	2.29	2.57	2yr	2.03	2.47	2.90	3.48	4.02	2yr
5yr	0.35	0.54	0.67	0.92	1.18	1.33	5yr	1.02	1.30	1.46	1.80	2.22	2.71	3.03	5yr	2.40	2.91	3.40	4.05	4.61	5yr
10yr	0.39	0.60	0.74	1.03	1.33	1.51	10yr	1.15	1.48	1.66	2.01	2.51	3.07	3.42	10yr	2.72	3.29	3.80	4.53	5.13	10yr
25yr	0.44	0.67	0.83	1.18	1.55	1.79	25yr	1.34	1.75	1.96	2.32	2.91	3.63	4.02	25yr	3.21	3.87	4.44	5.25	5.90	25yr

50yr	0.48	0.73	0.91	1.30	1.75	2.04	50yr	1.51	1.99	2.21	2.58	3.25	4.11	4.54	50yr	3.64	4.37	4.98	5.88	6.55	50yr
100yr	0.53	0.80	1.00	1.44	1.98	2.31	100yr	1.71	2.26	2.50	2.88	3.63	4.66	5.13	100yr	4.13	4.93	5.58	6.59	7.27	100yr
200yr	0.58	0.88	1.11	1.61	2.24	2.63	200yr	1.93	2.57	2.84	3.19	4.05	5.28	5.80	200yr	4.67	5.57	6.24	7.38	8.07	200yr
500yr	0.82	1.22	1.57	2.28	3.25	3.13	500yr	2.80	3.06	3.35	3.67	4.69	6.22	6.82	500yr	5.50	6.55	7.24	8.56	9.27	500yr

Upper Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.30	0.46	0.56	0.75	0.92	1.04	1yr	0.80	1.02	1.19	1.50	1.81	2.07	2.37	1yr	1.83	2.28	2.78	3.34	3.79	1yr
2yr	0.34	0.53	0.65	0.88	1.08	1.20	2yr	0.93	1.18	1.33	1.65	2.02	2.42	2.71	2yr	2.14	2.61	3.04	3.65	4.20	2yr
5yr	0.41	0.63	0.78	1.08	1.37	1.57	5yr	1.18	1.54	1.71	2.10	2.57	3.06	3.41	5yr	2.71	3.28	3.81	4.50	5.16	5yr
10yr	0.48	0.74	0.92	1.29	1.67	1.94	10yr	1.44	1.90	2.07	2.53	3.14	3.67	4.06	10yr	3.24	3.91	4.53	5.27	6.02	10yr
25yr	0.61	0.92	1.15	1.64	2.15	2.58	25yr	1.86	2.52	2.69	3.26	4.07	4.67	5.15	25yr	4.13	4.95	5.70	6.50	7.43	25yr
50yr	0.72	1.09	1.36	1.95	2.62	3.19	50yr	2.26	3.12	3.27	3.96	4.97	5.62	6.18	50yr	4.97	5.94	6.79	7.62	8.71	50yr
100yr	0.85	1.29	1.61	2.33	3.19	3.96	100yr	2.76	3.87	3.97	4.82	6.07	6.76	7.41	100yr	5.98	7.12	8.11	8.95	10.21	100yr
200yr	1.01	1.52	1.93	2.79	3.89	4.90	200yr	3.35	4.79	4.83	5.86	7.42	8.13	8.90	200yr	7.20	8.56	9.69	10.50	11.99	200yr
500yr	1.18	1.75	2.26	3.28	4.66	6.53	500yr	4.02	6.39	6.26	7.60	9.69	10.42	11.34	500yr	9.22	10.90	12.31	12.96	14.82	500yr

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APPENDIX C



EXDA-1A



EXDA-1B

Subcat Reach Pond Link

Routing Diagram for Riverview
Prepared by R Z Engineering, PLLC, Printed 6/30/2025
HydroCAD® 10.20-6a s/n 05023 © 2024 HydroCAD Software Solutions LLC

Summary for Subcatchment 25S: EXDA-1B

Runoff = 0.08 cfs @ 13.59 hrs, Volume= 0.035 af, Depth> 0.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Rainfall=5.62"

	Area (sf)	CN	Description
	32,521	30	Woods, Good, HSG A
	45,370	39	>75% Grass cover, Good, HSG A
	35,953	30	Brush, Good, HSG A
*	1,235	98	Unconnected CONCRETE, HSG A
	3,023	98	Paved roads w/curbs & sewers, HSG A
	118,102	36	Weighted Average
	113,844		96.39% Pervious Area
	4,258		3.61% Impervious Area
	1,235		29.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
54.3	150	0.0260	0.05		**Sheet Flow, EXDA-1-TC1-SHEET WOODS** Woods: Dense underbrush n= 0.800 P2= 2.35"
2.6	250	0.0100	1.61		**Shallow Concentrated Flow, EXDA-1-TC2-SHALLOW WOODS & G** Unpaved Kv= 16.1 fps
56.9	400	Total			

Summary for Subcatchment 26S: EXDA-1A

Runoff = 0.01 cfs @ 18.96 hrs, Volume= 0.002 af, Depth> 0.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Rainfall=5.62"

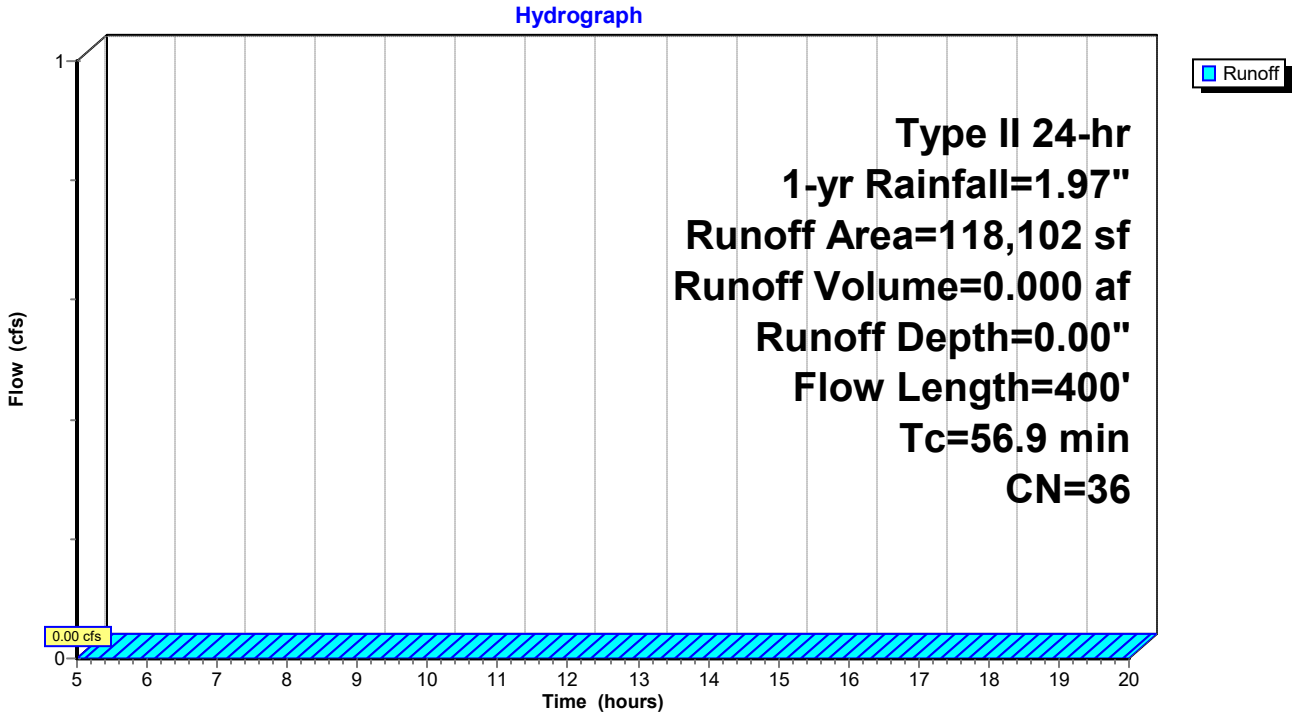
Area (sf)	CN	Description
6,995	30	Meadow, non-grazed, HSG A
17,478	30	Woods, Good, HSG A
29,435	30	Brush, Good, HSG A
53,908	30	Weighted Average
53,908		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.8	100	0.0050	0.09		**Sheet Flow, EXDA-2-TC1-SHEET BRUSH** Range n= 0.130 P2= 2.35"
0.4	25	0.0050	1.14		**Shallow Concentrated Flow, EXDA-2-TC2-SHALLOW BRUSH** Unpaved Kv= 16.1 fps
0.1	47	0.2780	8.49		**Shallow Concentrated Flow, EXDA-2-TC3-SHALLOW WOODS** Unpaved Kv= 16.1 fps
18.3	172	Total			

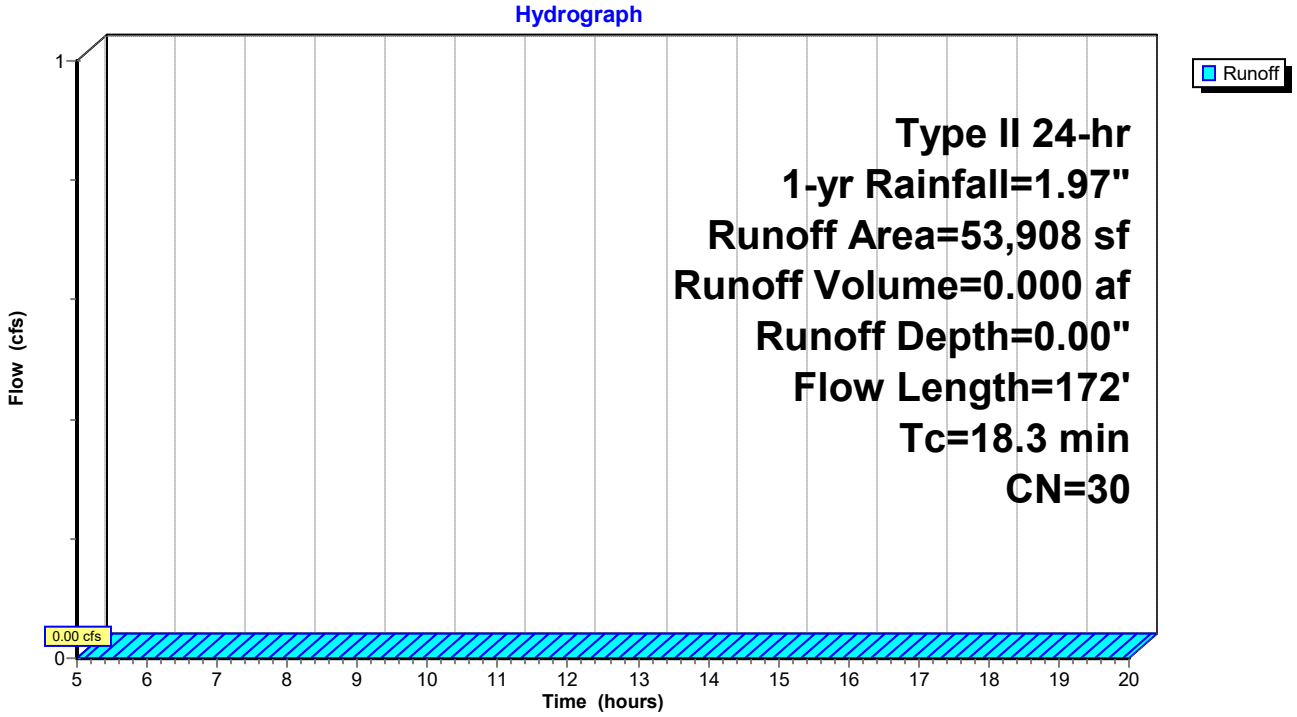
Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	1-yr	Type II 24-hr		Default	24.00	1	1.97	2
2	2-yr	Type II 24-hr		Default	24.00	1	2.35	2
3	5-yr	Type II 24-hr		Default	24.00	1	2.88	2
4	10-yr	Type II 24-hr		Default	24.00	1	3.36	2
5	25-yr	Type II 24-hr		Default	24.00	1	4.12	2
6	50-yr	Type II 24-hr		Default	24.00	1	4.81	2
7	100-yr	Type II 24-hr		Default	24.00	1	5.62	2

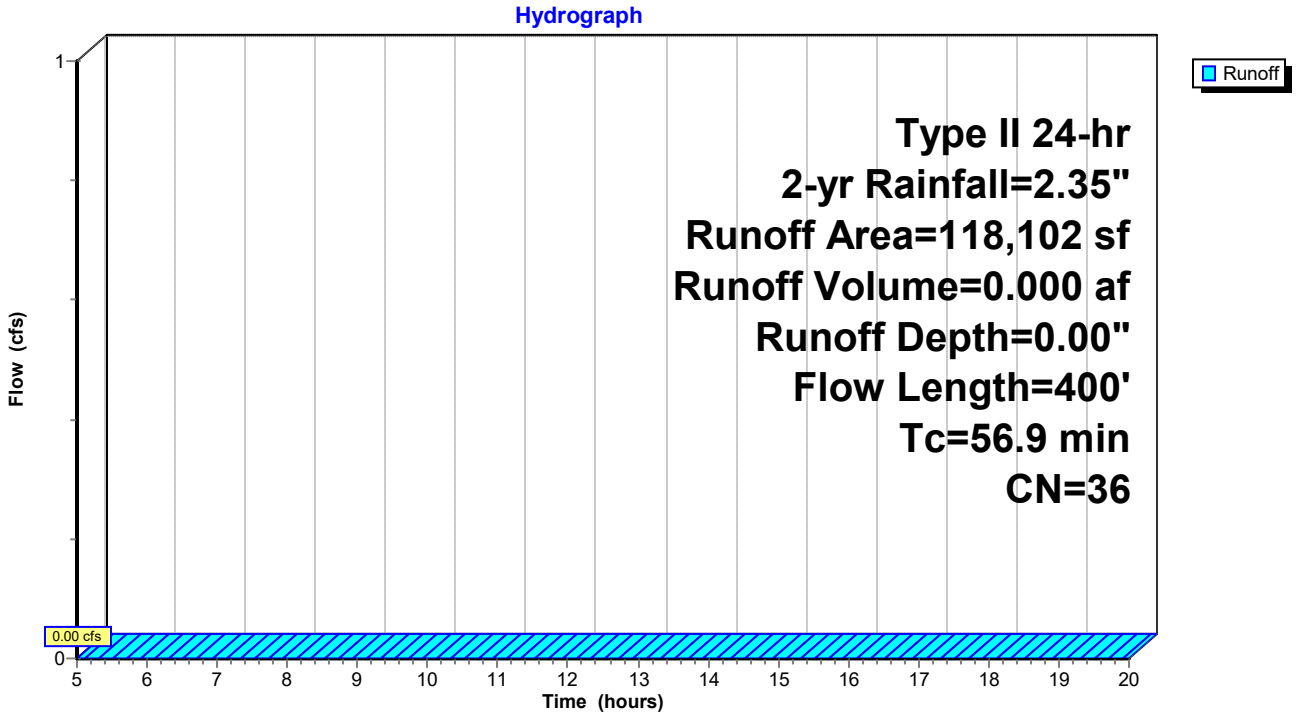
Subcatchment 25S: EXDA-1B



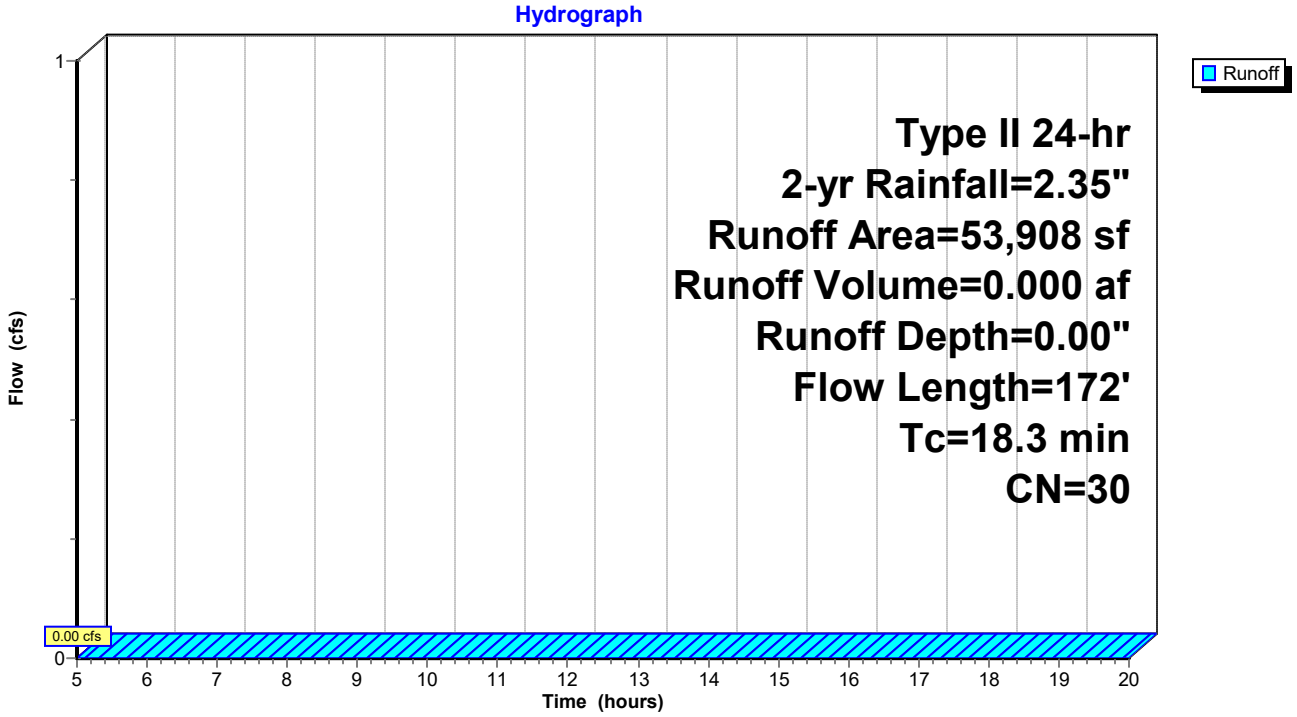
Subcatchment 26S: EXDA-1A



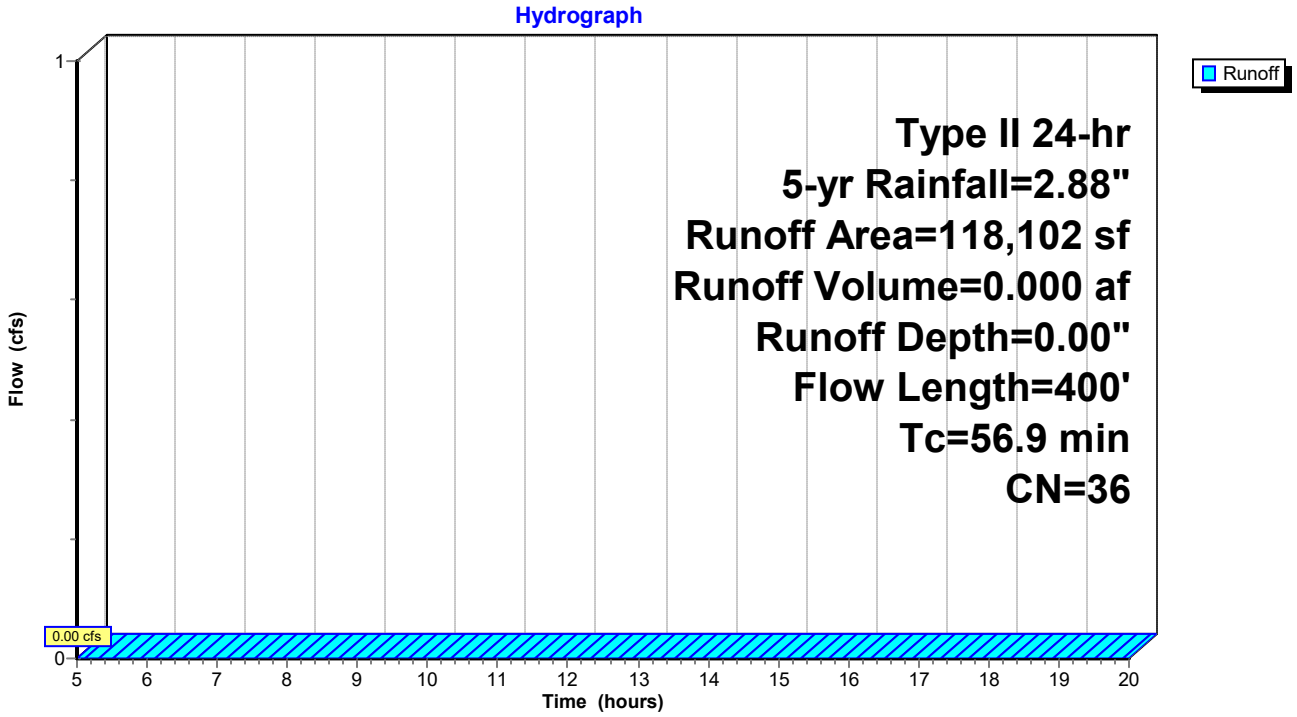
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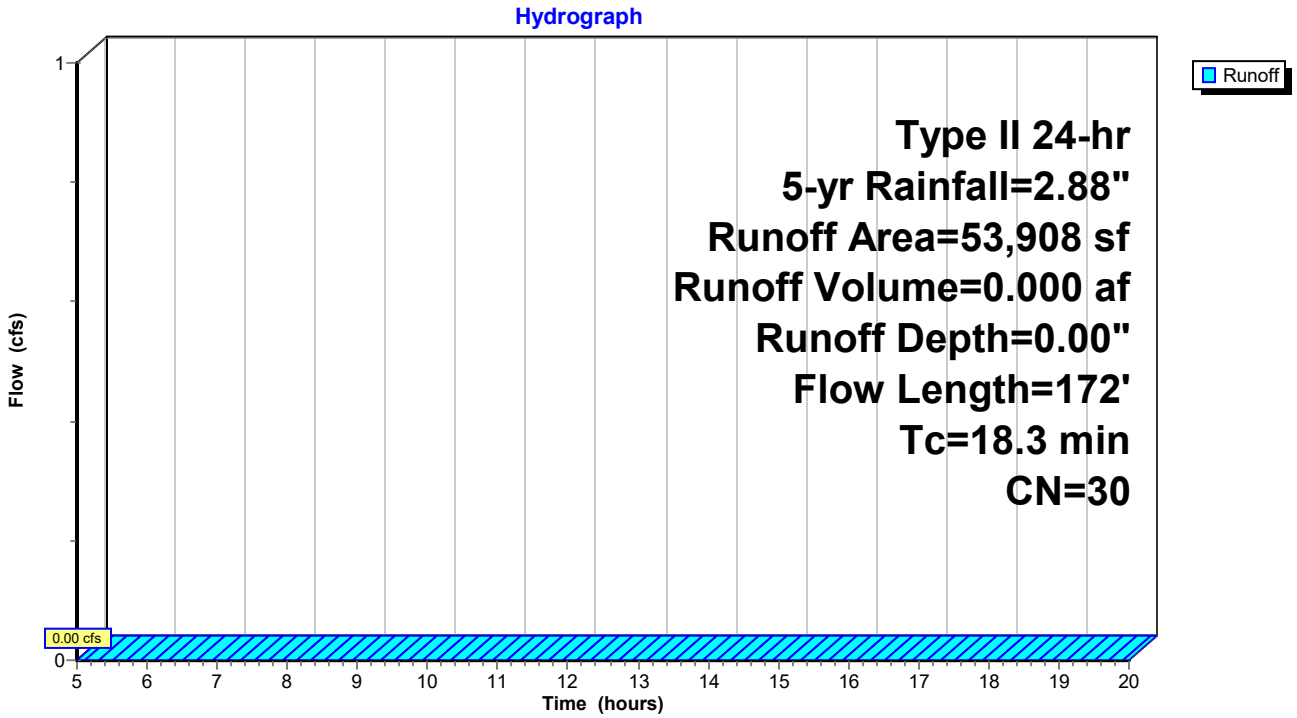
Subcatchment 26S: EXDA-1A



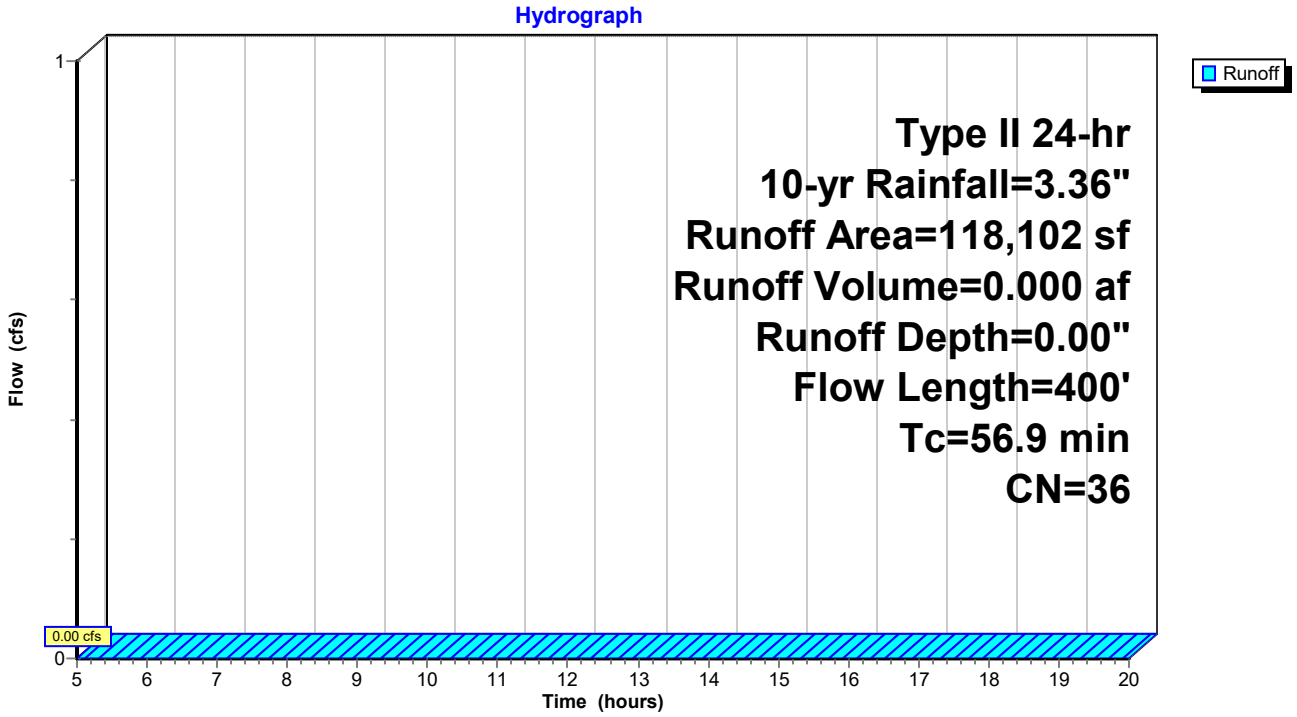
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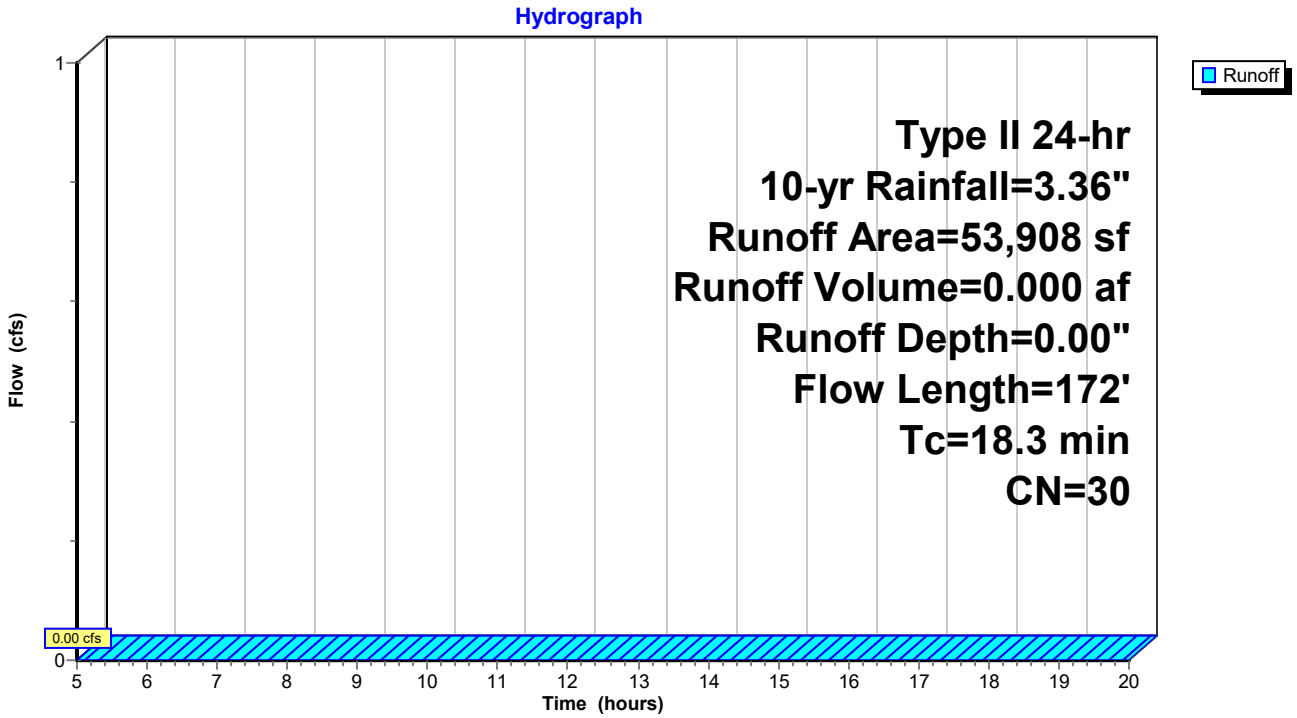
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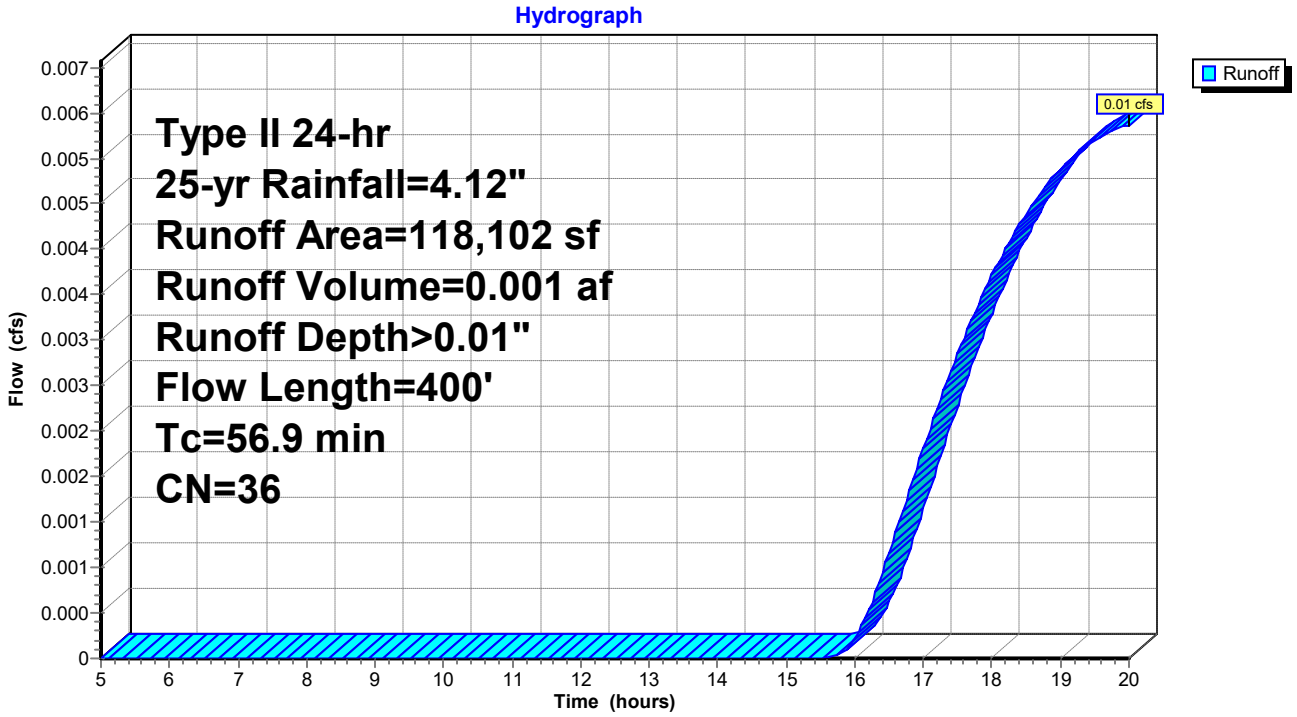
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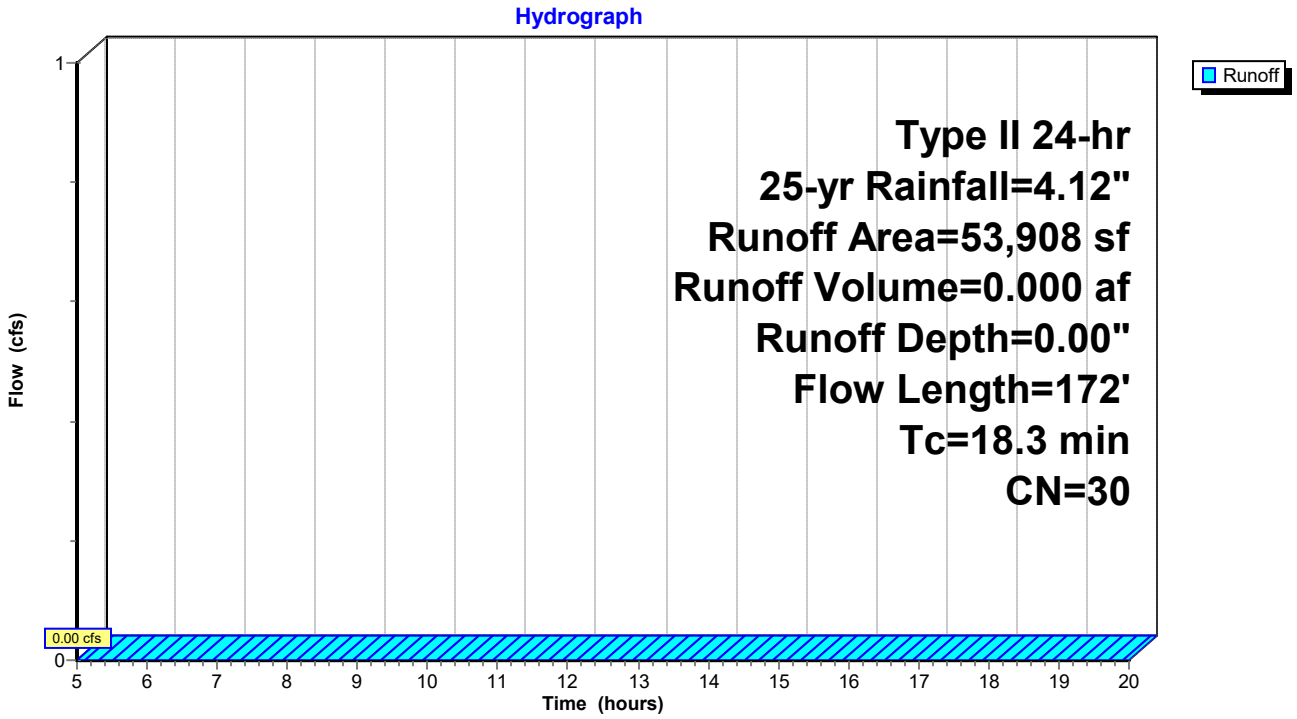
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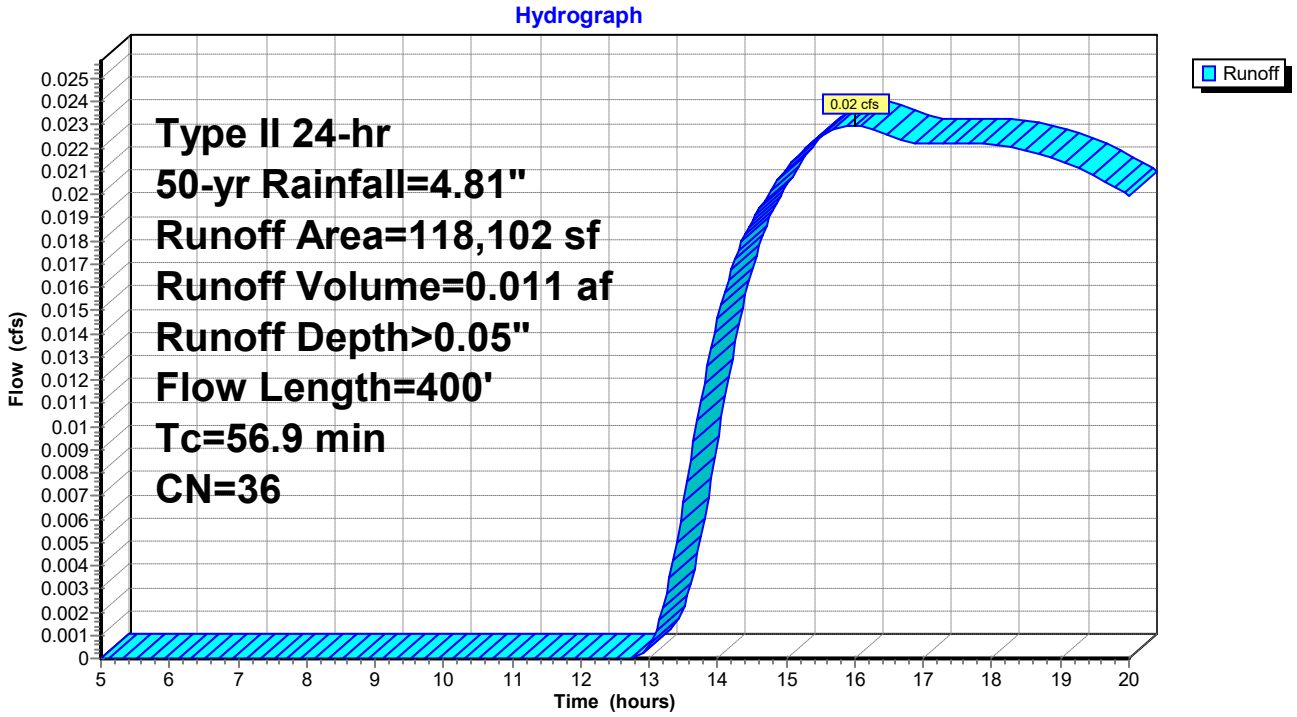
Subcatchment 25S: EXDA-1B



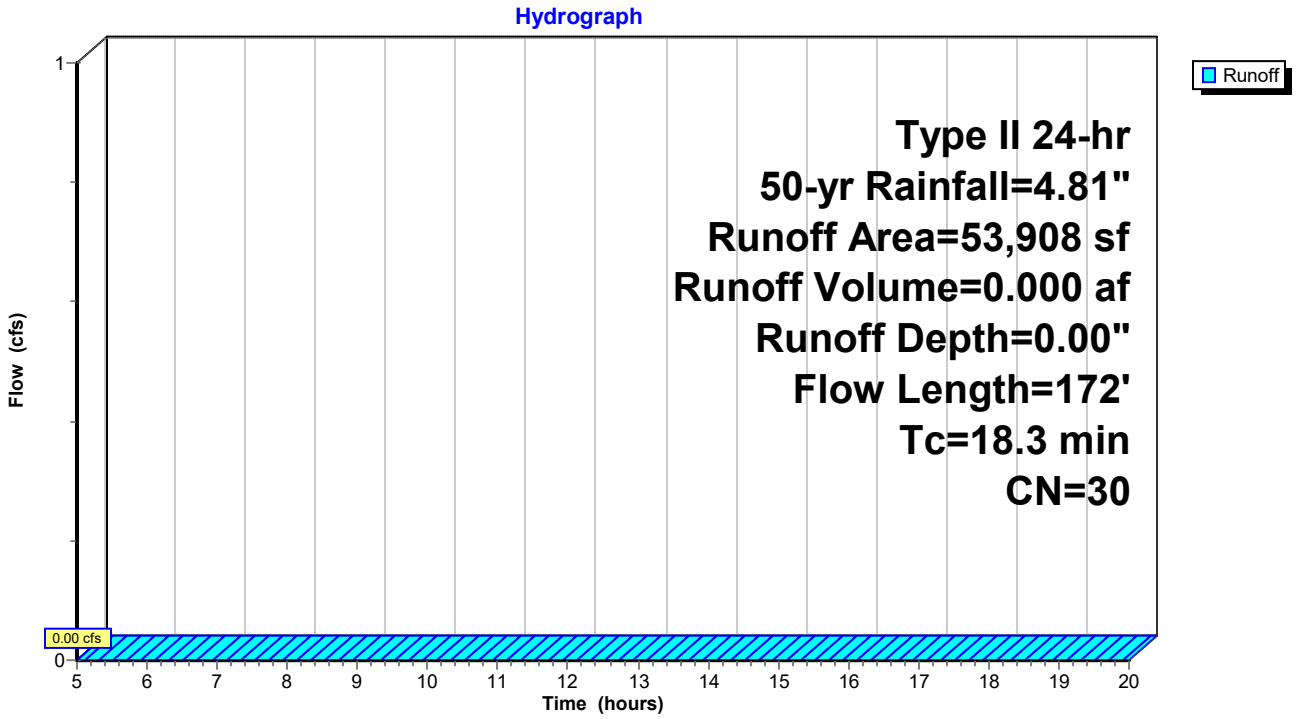
Subcatchment 26S: EXDA-1A



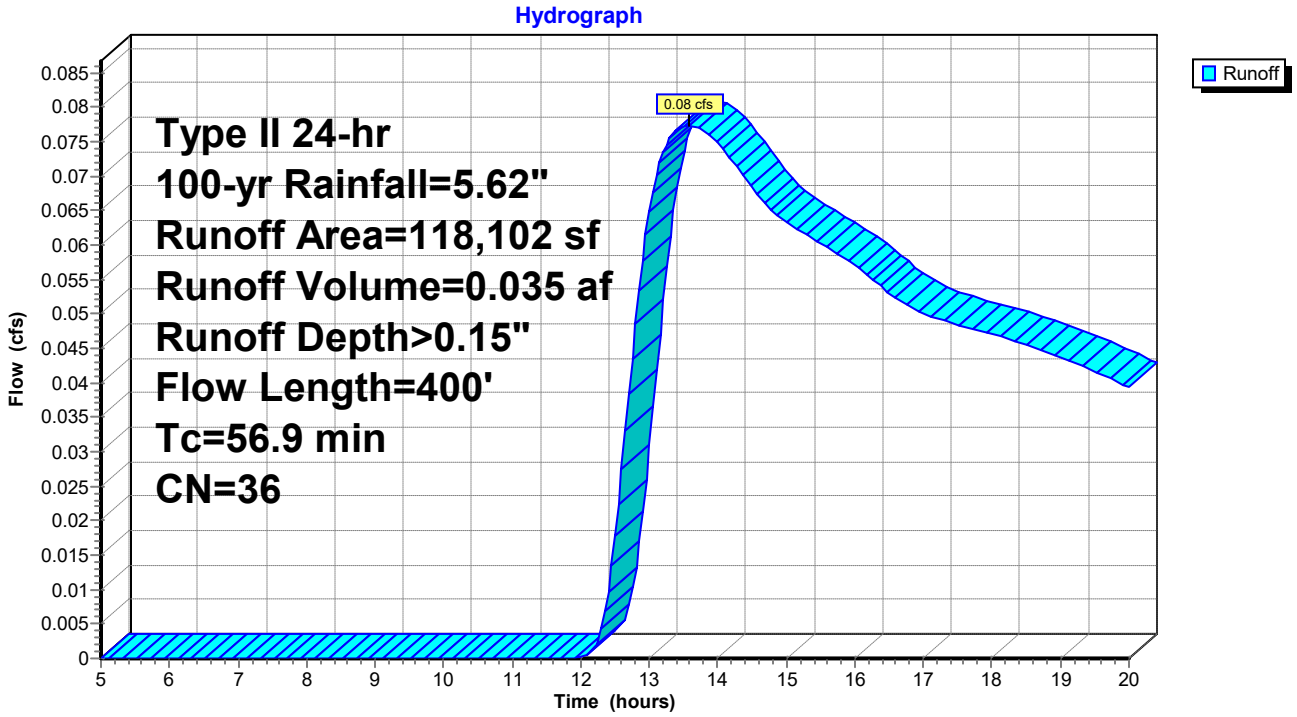
Subcatchment 25S: EXDA-1B



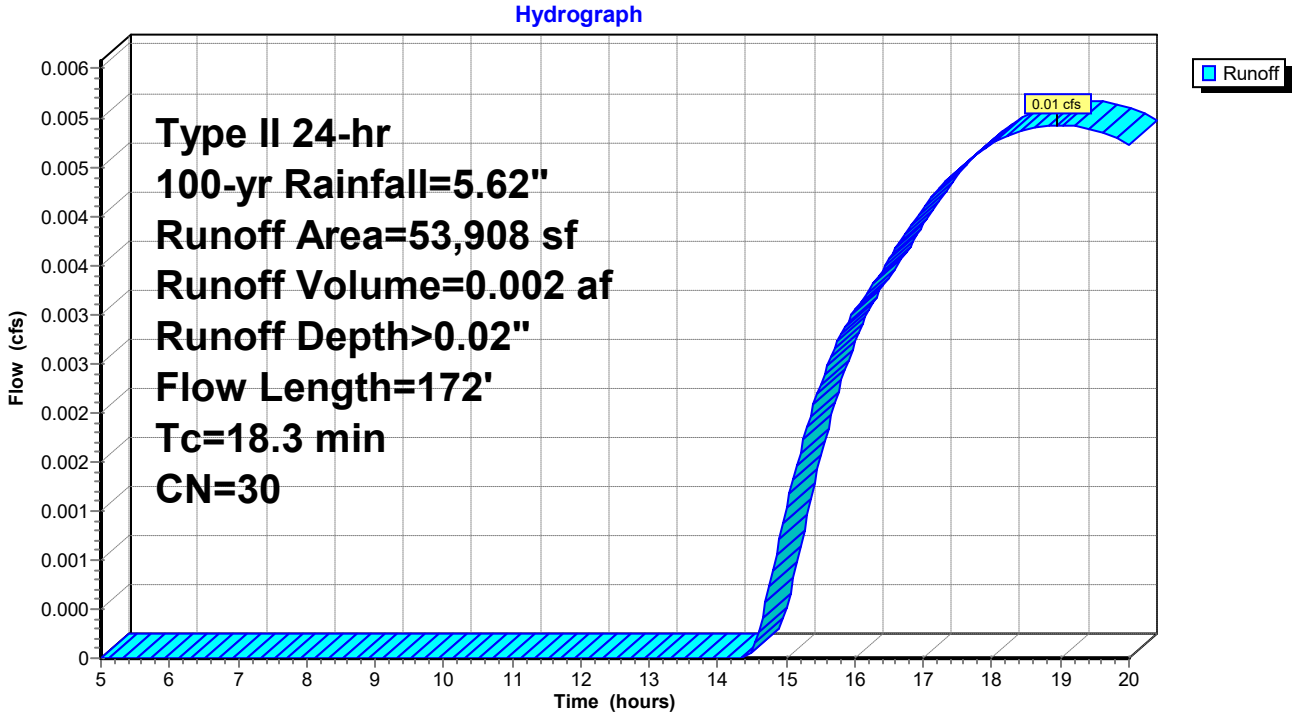
Subcatchment 26S: EXDA-1A



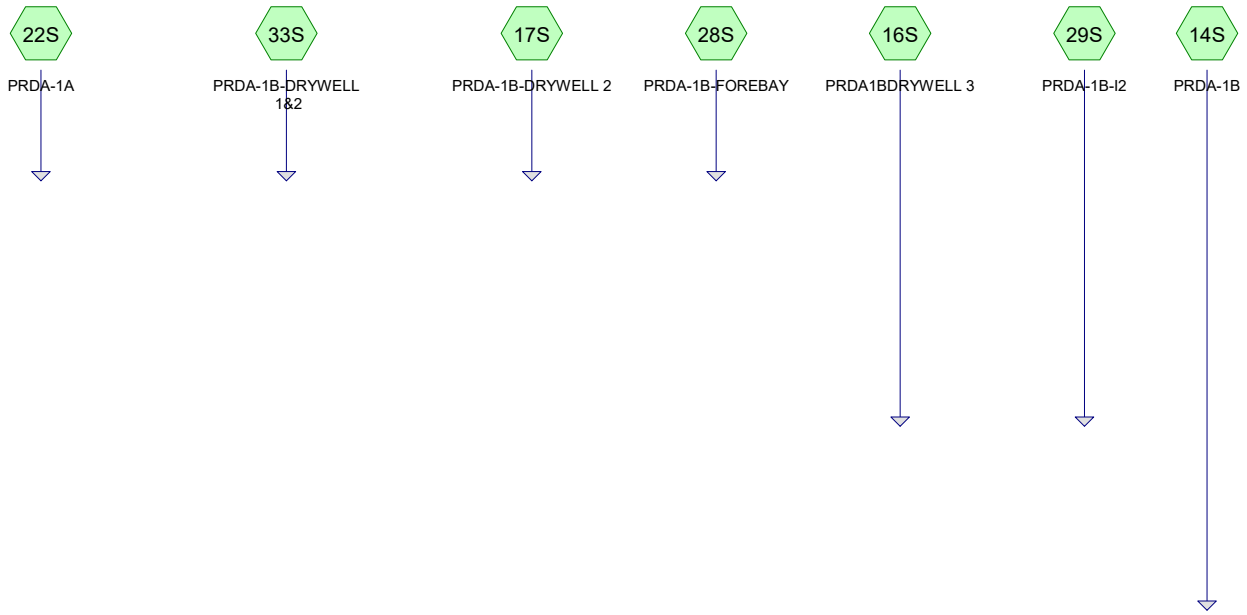
Subcatchment 25S: EXDA-1B



Subcatchment 26S: EXDA-1A



APPENDIX D



Subcat Reach Pond Link

Routing Diagram for Riverview
Prepared by R Z Engineering, PLLC, Printed 6/30/2025
HydroCAD® 10.20-6a s/n 05023 © 2024 HydroCAD Software Solutions LLC

Summary for Subcatchment 14S: PRDA-1B

Runoff = 0.01 cfs @ 14.90 hrs, Volume= 0.006 af, Depth> 0.08"
Routed to Reach 19R : TIOUGHNIOGA RIVER

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Rainfall=5.62"

Area (sf)	CN	Description
25,113	30	Woods, Good, HSG A
15,567	39	>75% Grass cover, Good, HSG A
40,680	33	Weighted Average
40,680		100.00% Pervious Area

Summary for Subcatchment 16S: PRDA1BDRYWELL 3

Runoff = 0.00 cfs @ 11.95 hrs, Volume= 0.000 af, Depth> 0.28"
Routed to Pond 31P : DRYWELL 4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Rainfall=5.62"

Area (sf)	CN	Description
367	39	>75% Grass cover, Good, HSG A
367		100.00% Pervious Area

Summary for Subcatchment 17S: PRDA-1B-DRYWELL 2

Runoff = 2.47 cfs @ 11.91 hrs, Volume= 0.115 af, Depth> 4.60"
Routed to Pond 29P : DRYWELL 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Rainfall=5.62"

	Area (sf)	CN	Description
*	1,187	98	CONCRETE, HSG A
	11,084	98	Paved parking, HSG A
	776	39	>75% Grass cover, Good, HSG A
	13,047	94	Weighted Average
	776		5.95% Pervious Area
	12,271		94.05% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.3	100	0.0267	1.32		**Sheet Flow, PRTCDW3-1** Smooth surfaces n= 0.011 P2= 2.35"
0.7	135	0.0260	3.27		**Shallow Concentrated Flow, PRTC-D23 SHALLOW** Paved Kv= 20.3 fps
2.0	235	Total			

Summary for Subcatchment 22S: PRDA-1A

Runoff = 0.08 cfs @ 12.09 hrs, Volume= 0.017 af, Depth> 0.23"
Routed to Reach 34R : RIVER (DOWNSTREAM)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Rainfall=5.62"

	Area (sf)	CN	Adj	Description
	16,401	30		Woods, Good, HSG A
	18,362	39		>75% Grass cover, Good, HSG A
*	3,985	98		Unconnected concrete, HSG A
*	115	98		Unconnected roofs, HSG A
	38,863	41	38	Weighted Average, UI Adjusted
	34,763			89.45% Pervious Area
	4,100			10.55% Impervious Area
	4,100			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.7	100	0.0400	0.19		**Sheet Flow, PRDA-2B-TC1-SHEET** Grass: Short n= 0.150 P2= 2.35"
0.0	20	0.4500	10.80		**Shallow Concentrated Flow, tc2** Unpaved Kv= 16.1 fps
8.7	120	Total			

Summary for Subcatchment 28S: PRDA-1B-FOREBAY

Runoff = 6.02 cfs @ 11.93 hrs, Volume= 0.239 af, Depth> 2.65"
Routed to Pond 18P : FOREBAY

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Rainfall=5.62"

	Area (sf)	CN	Description
	24,888	98	Paved parking, HSG A
	19,000	39	>75% Grass cover, Good, HSG A
*	3,316	98	CONCRETE, HSG A
	47,204	74	Weighted Average
	19,000		40.25% Pervious Area
	28,204		59.75% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.4	100	0.0200	1.18		**Sheet Flow, PRTC4-SHEETDW4** Smooth surfaces n= 0.011 P2= 2.35"
0.9	152	0.0200	2.87		**Shallow Concentrated Flow, PRTC4-DW4** Paved Kv= 20.3 fps
2.3	252	Total			

Summary for Subcatchment 29S: PRDA-1B-I2

Runoff = 3.65 cfs @ 11.98 hrs, Volume= 0.169 af, Depth> 3.20"
Routed to Pond 30P : I-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Rainfall=5.62"

	Area (sf)	CN	Description
	8,246	39	>75% Grass cover, Good, HSG A
*	591	98	Unconnected concrete, HSG A
	18,776	98	Unconnected roofs, HSG A
	27,613	80	Weighted Average
	8,246		29.86% Pervious Area
	19,367		70.14% Impervious Area
	19,367		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	140		0.47		**Direct Entry, ROOF**
0.6	50	0.0010	1.43	1.13	**Pipe Channel, TCP1** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior
0.1	22	0.1800	6.83		**Shallow Concentrated Flow, TC3 SHALLOW GRASS** Unpaved Kv= 16.1 fps
0.2	36	0.0050	3.21	2.52	**Pipe Channel, TCP4** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior
0.5	100	0.0050	3.21	2.52	**Pipe Channel, TCP5** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior
0.3	50	0.0050	3.21	2.52	**Pipe Channel, TCP6** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior
6.7	398	Total			

Summary for Subcatchment 33S: PRDA-1B-DRYWELL 1&2

Runoff = 0.02 cfs @ 12.14 hrs, Volume= 0.002 af, Depth> 0.40"
Routed to Pond 52P : DRYWELL 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Rainfall=5.62"

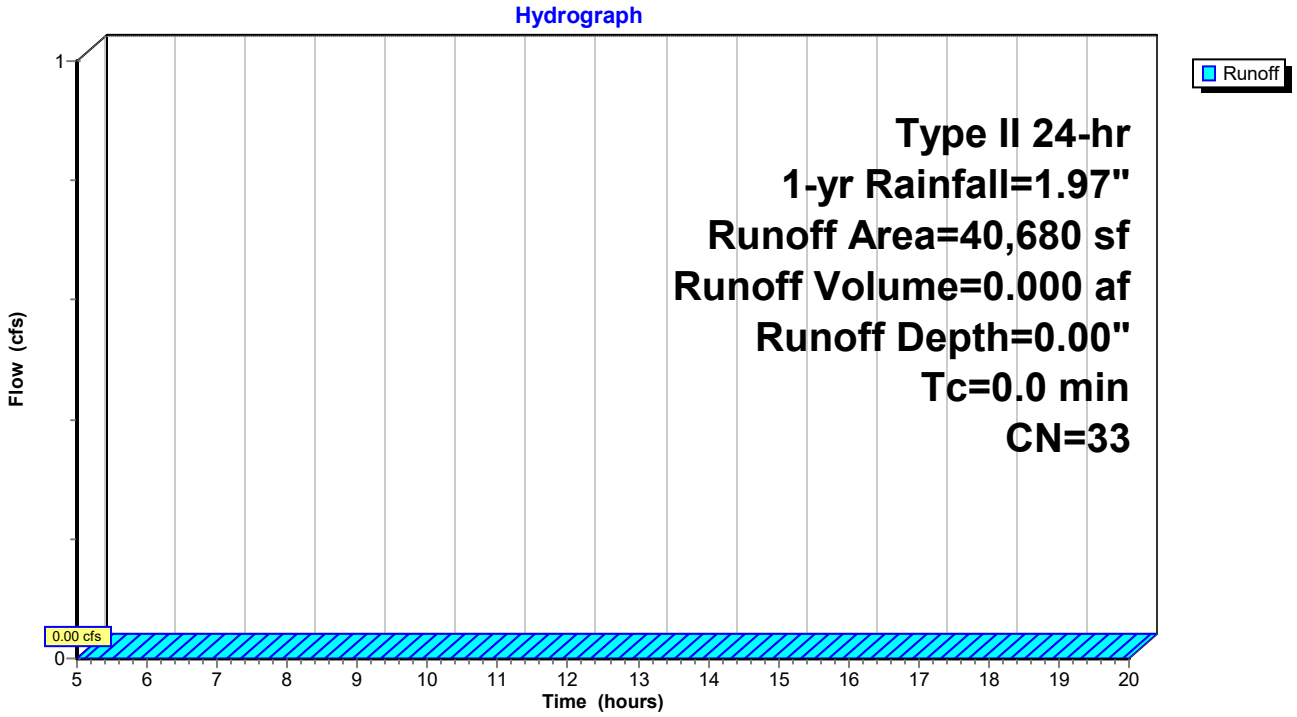
Area (sf)	CN	Adj	Description
325	98		Unconnected roofs, HSG A
2,760	39		>75% Grass cover, Good, HSG A
3,085	45	42	Weighted Average, UI Adjusted
2,760			89.47% Pervious Area
325			10.53% Impervious Area
325			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.1	100	0.0100	0.11		**Sheet Flow, tc1**
					Grass: Short n= 0.150 P2= 2.35"

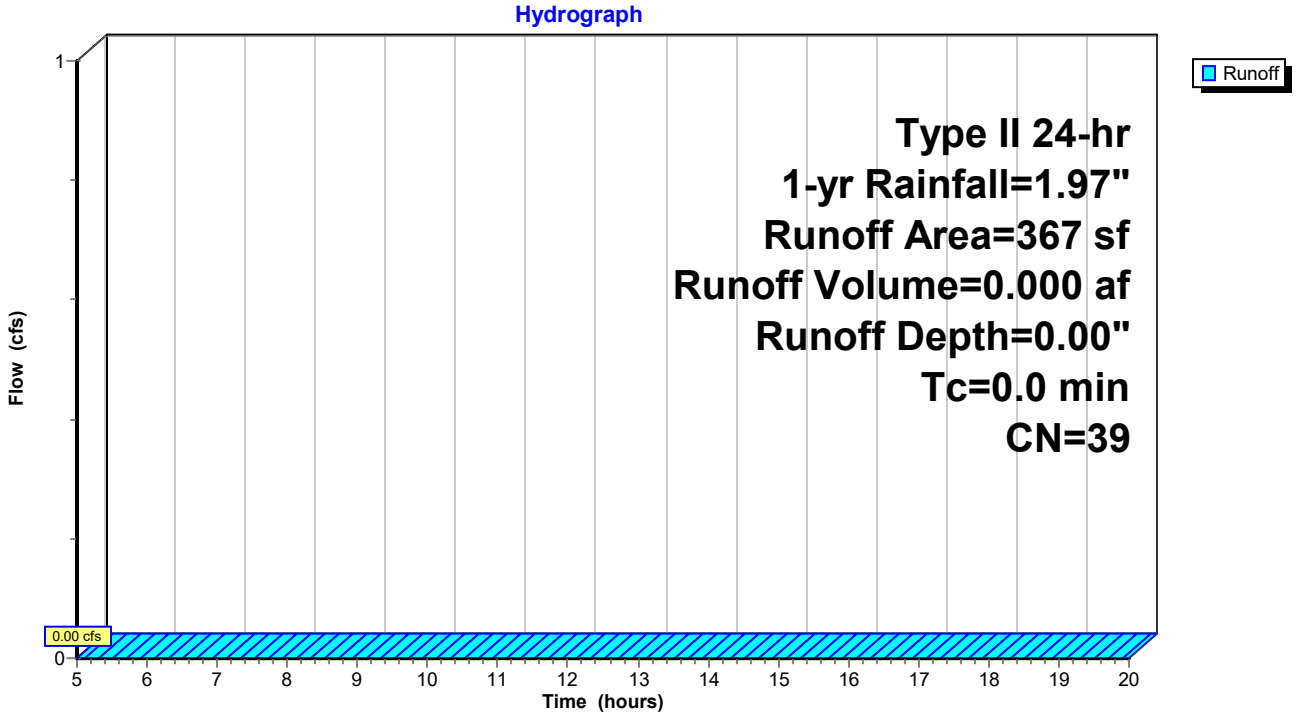
Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	1-yr	Type II 24-hr		Default	24.00	1	1.97	2
2	2-yr	Type II 24-hr		Default	24.00	1	2.35	2
3	5-yr	Type II 24-hr		Default	24.00	1	2.88	2
4	10-yr	Type II 24-hr		Default	24.00	1	3.36	2
5	25-yr	Type II 24-hr		Default	24.00	1	4.12	2
6	50-yr	Type II 24-hr		Default	24.00	1	4.81	2
7	100-yr	Type II 24-hr		Default	24.00	1	5.62	2

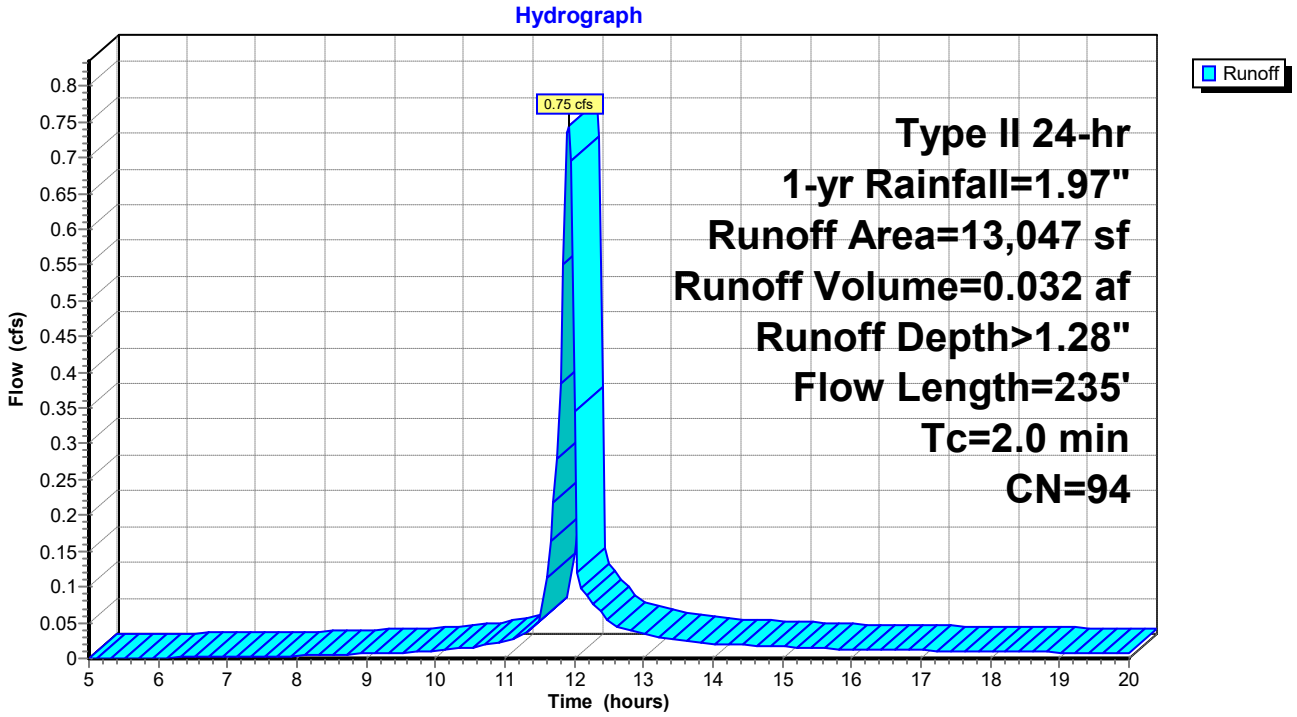
Subcatchment 14S: PRDA-1B



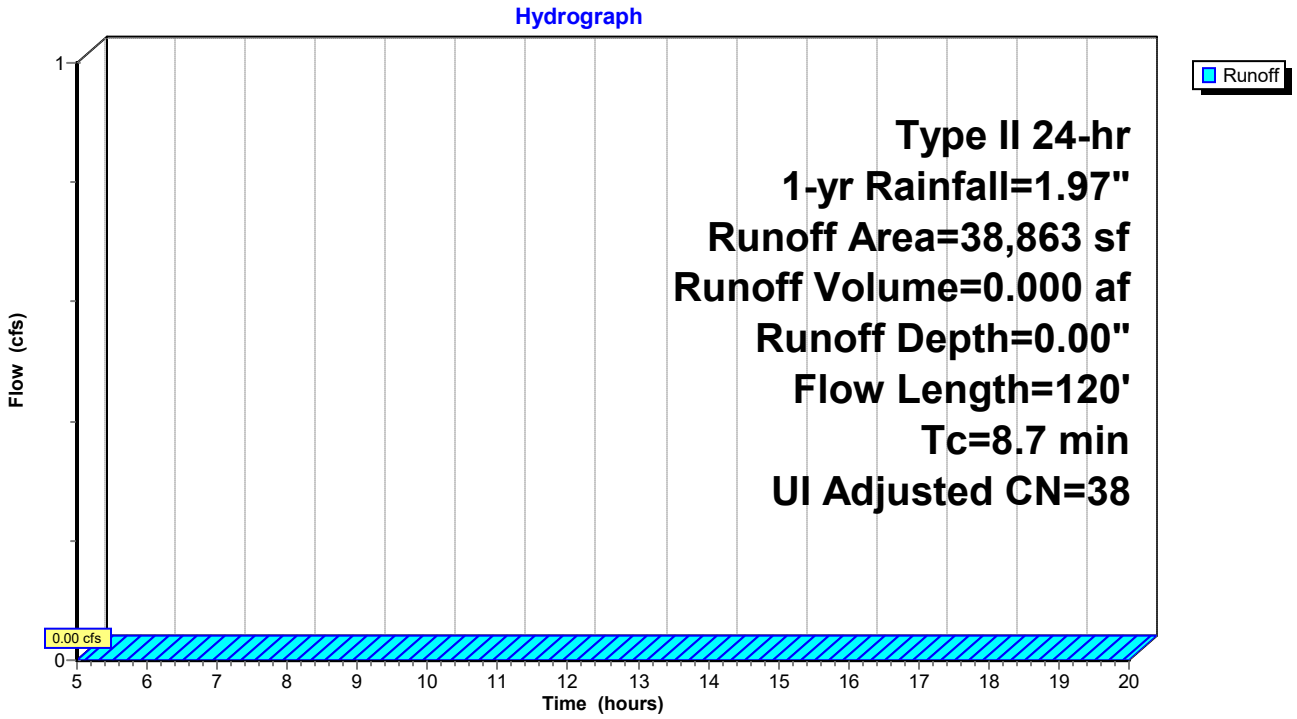
Subcatchment 16S: PRDA1BDRYWELL 3



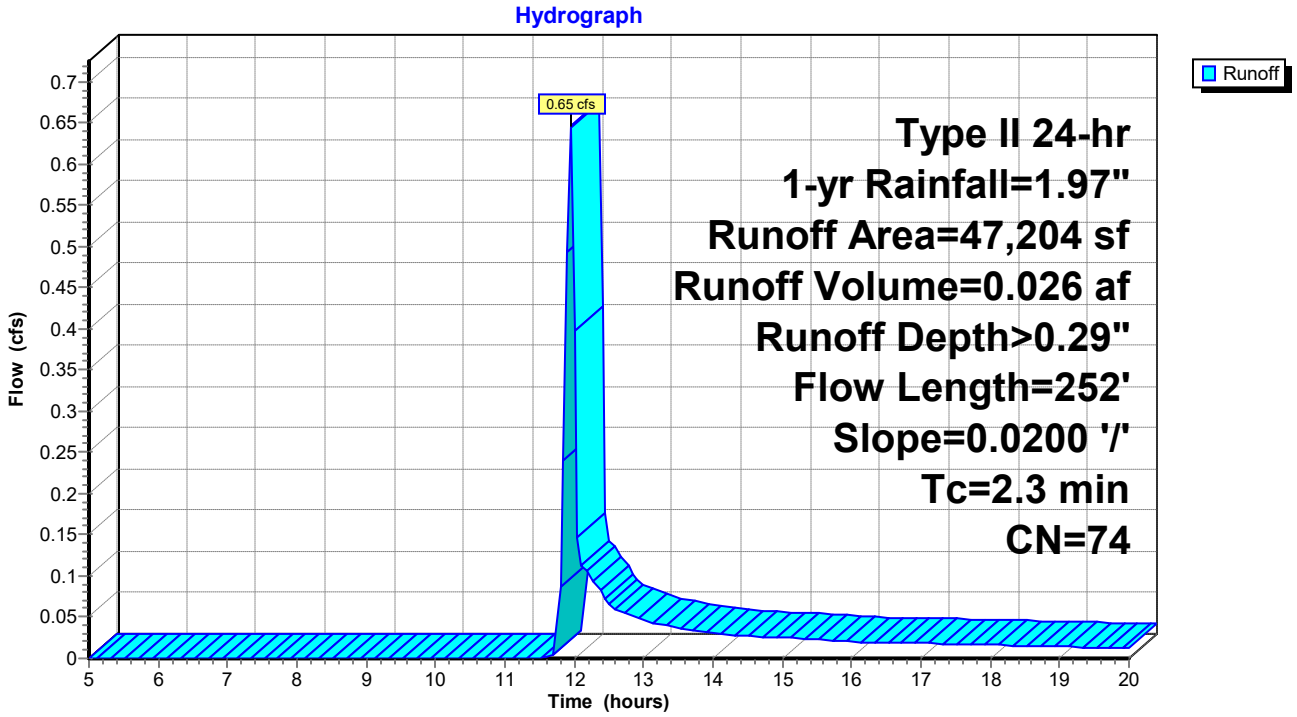
Subcatchment 17S: PRDA-1B-DRYWELL 2



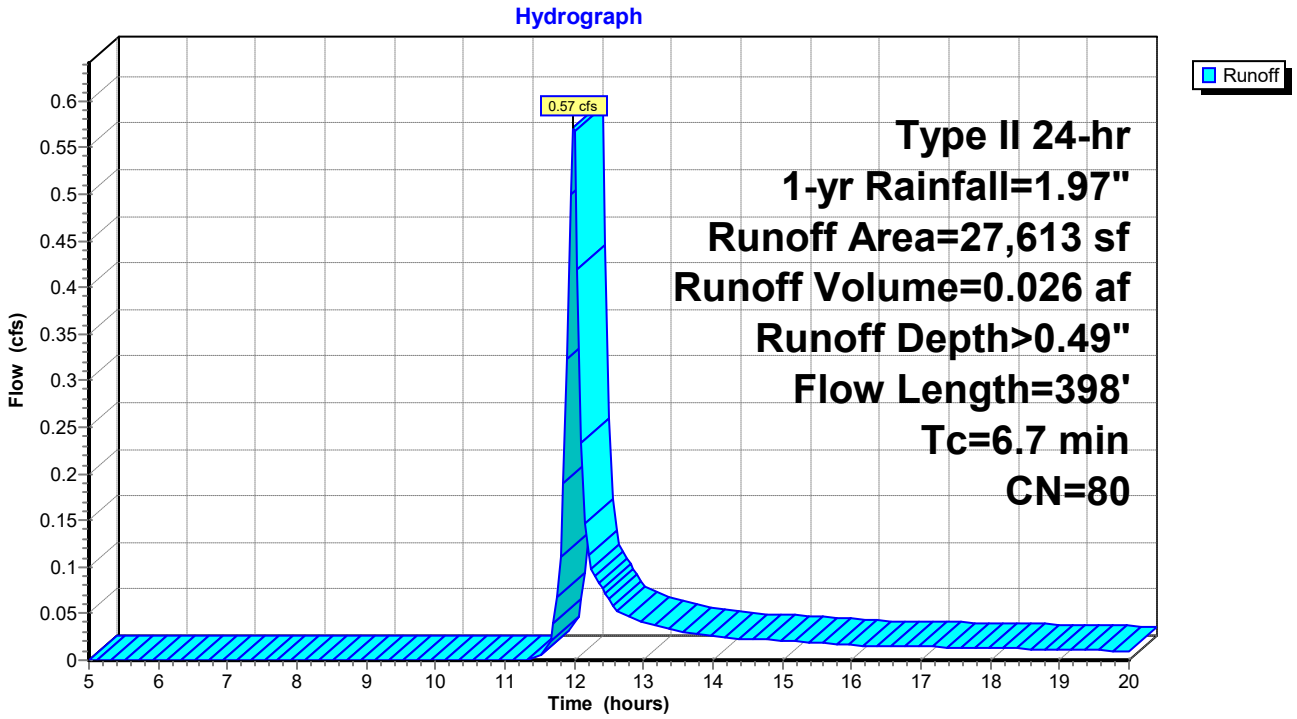
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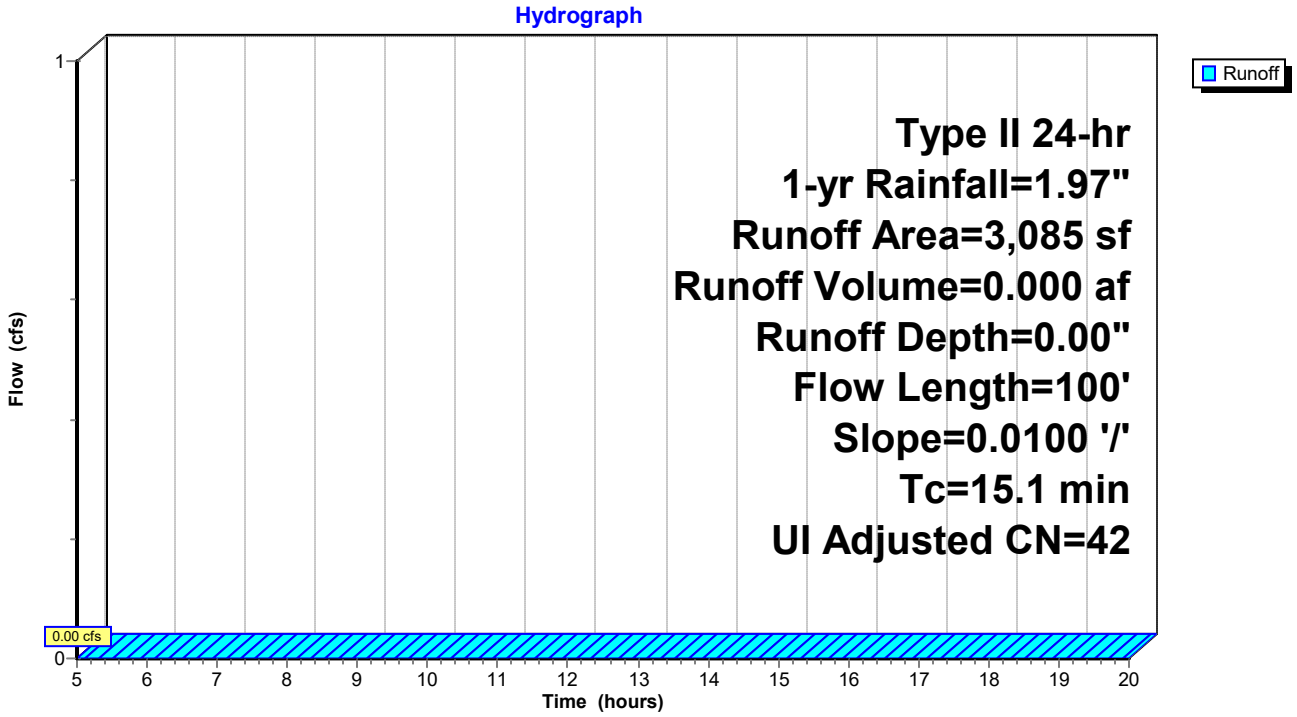
Subcatchment 28S: PRDA-1B-FOREBAY



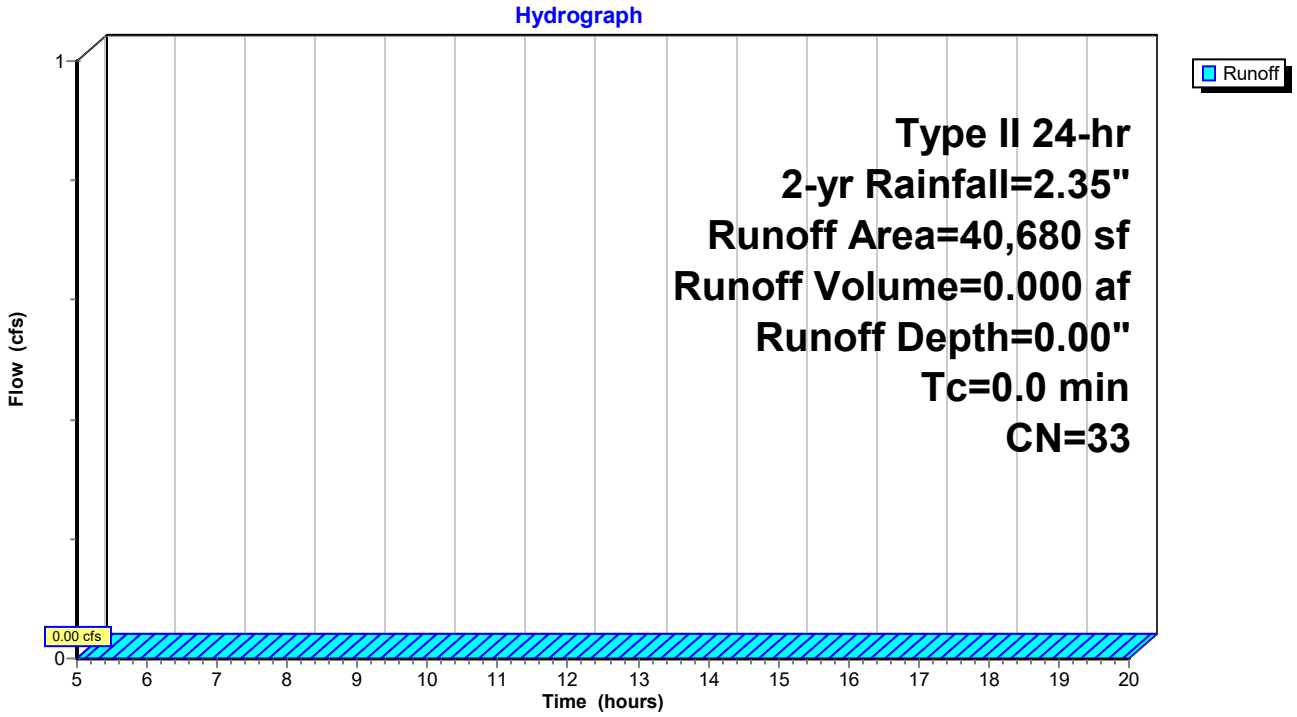
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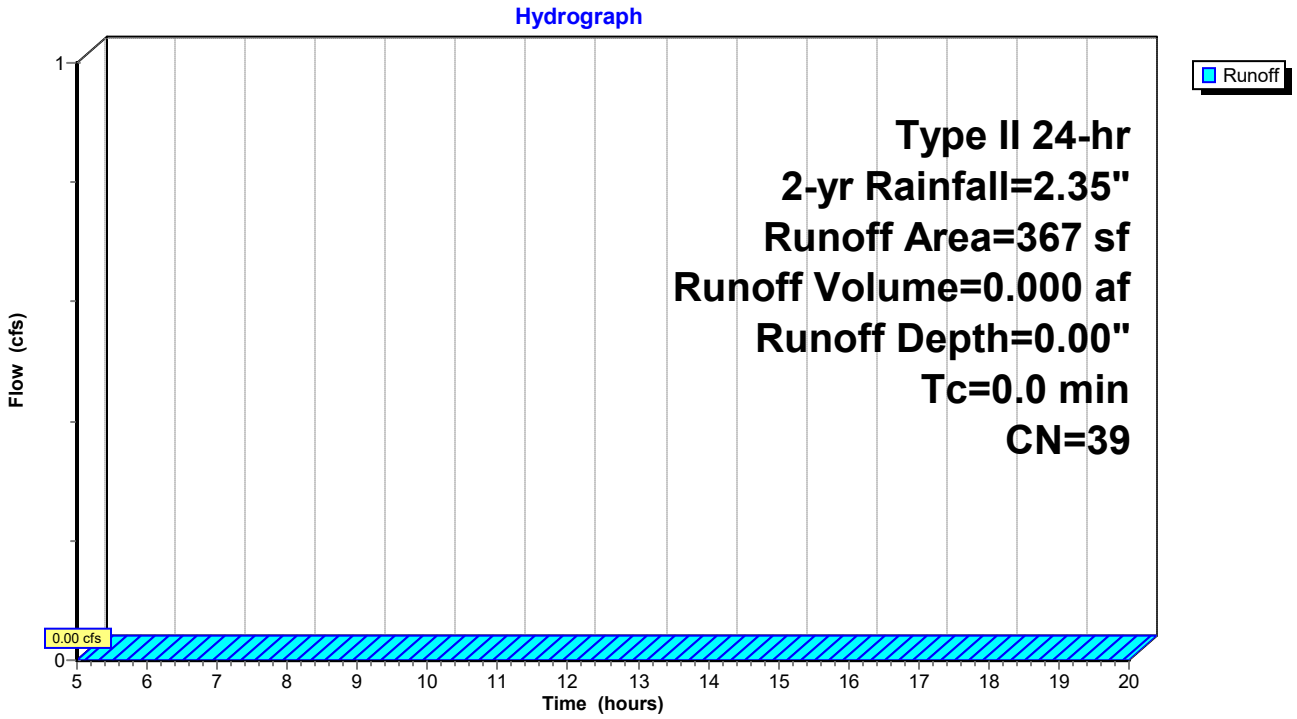
Subcatchment 33S: PRDA-1B-DRYWELL 1&2



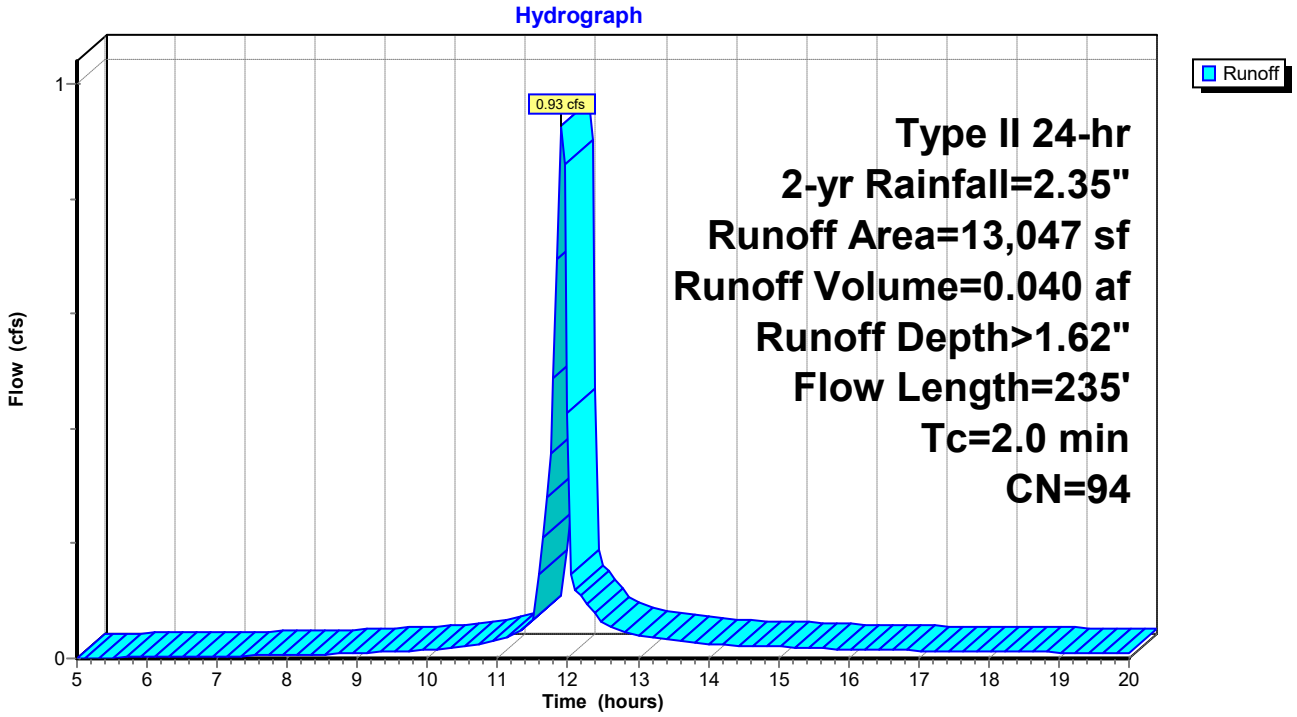
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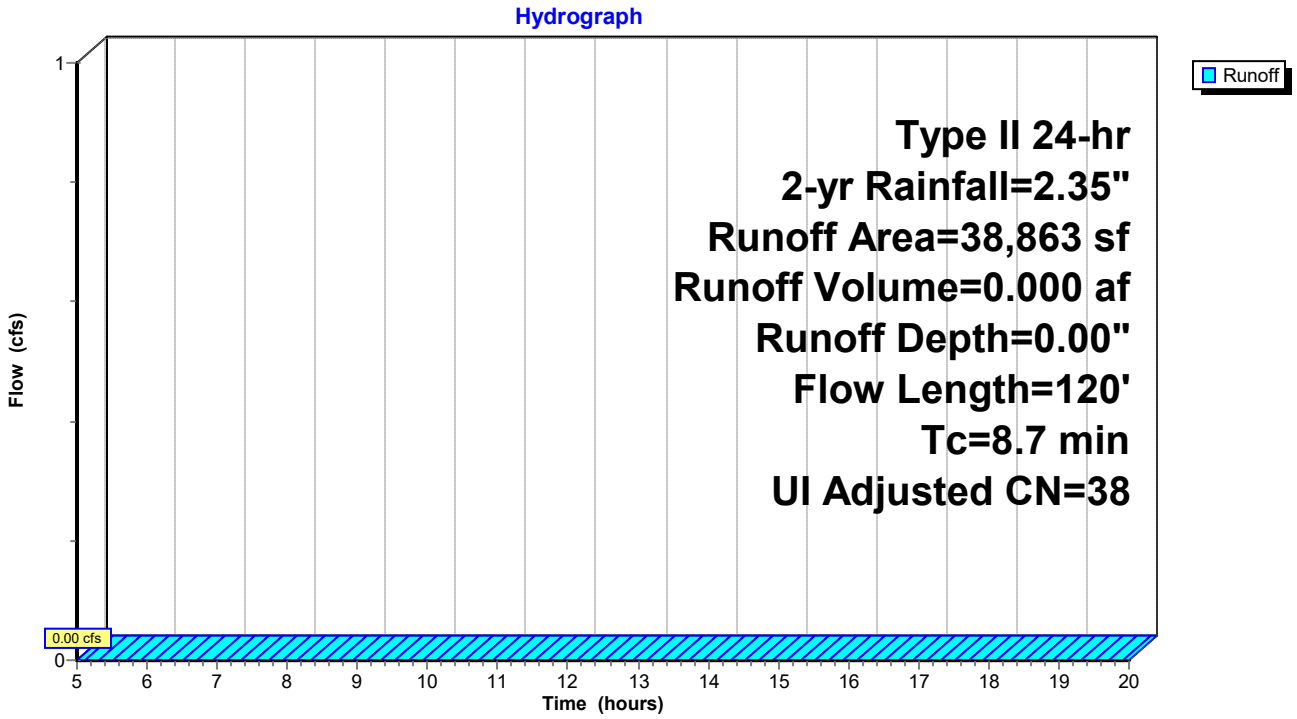
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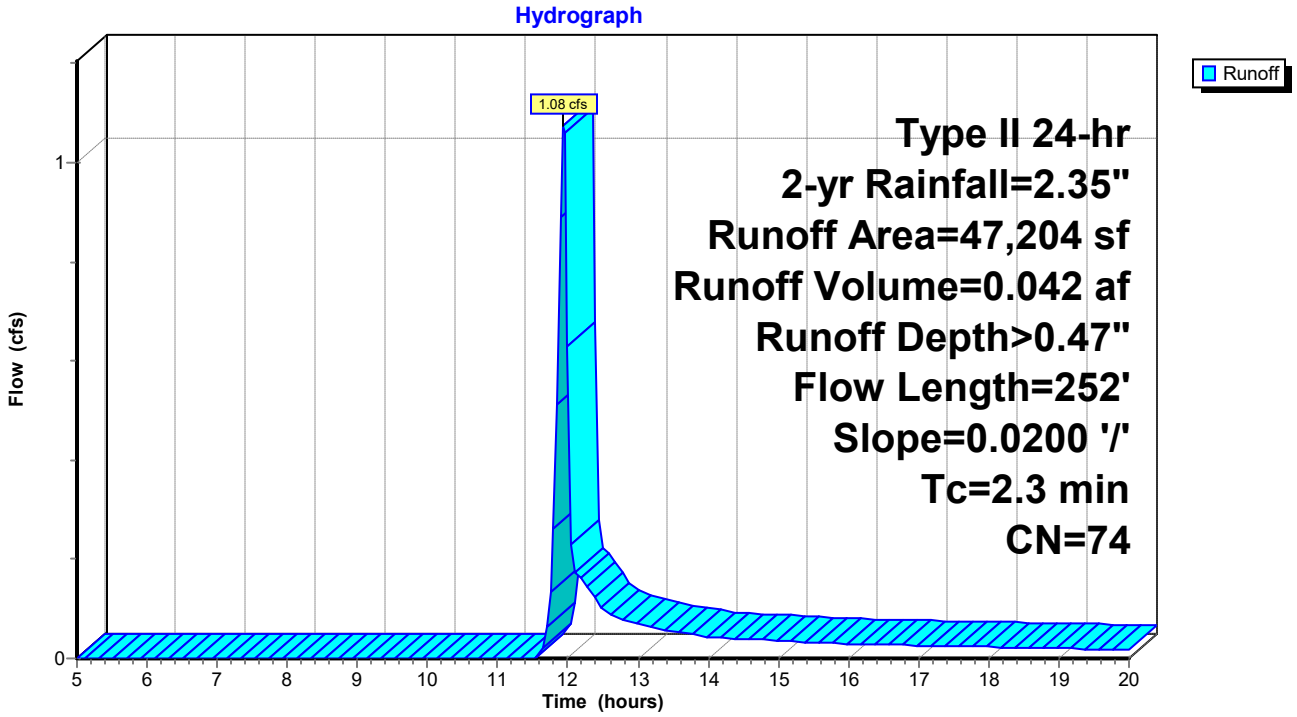
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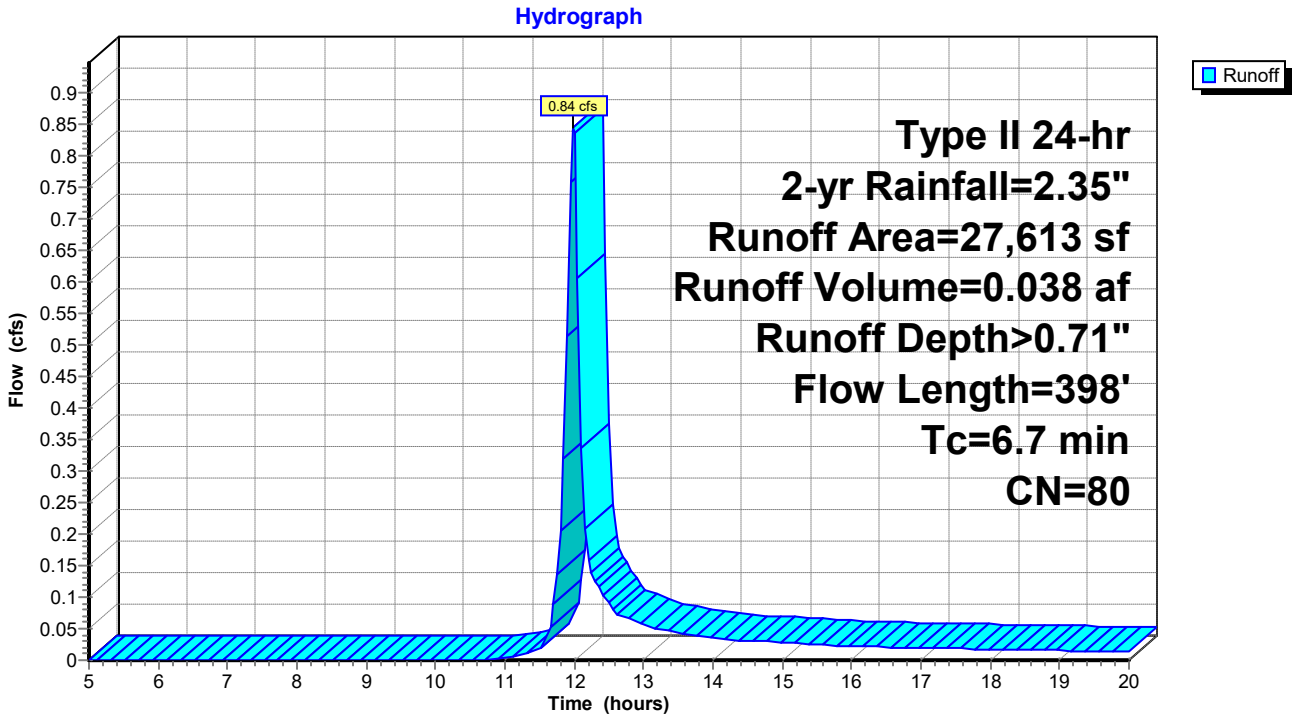
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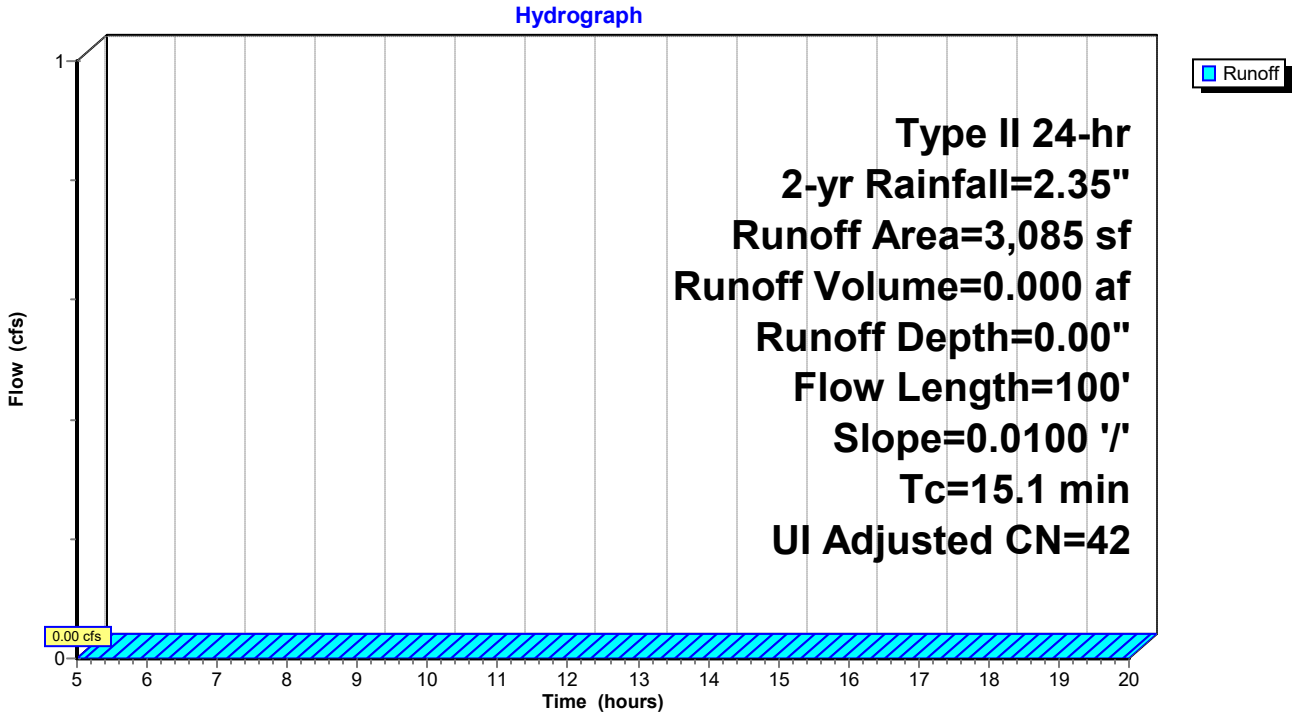
Subcatchment 28S: PRDA-1B-FOREBAY



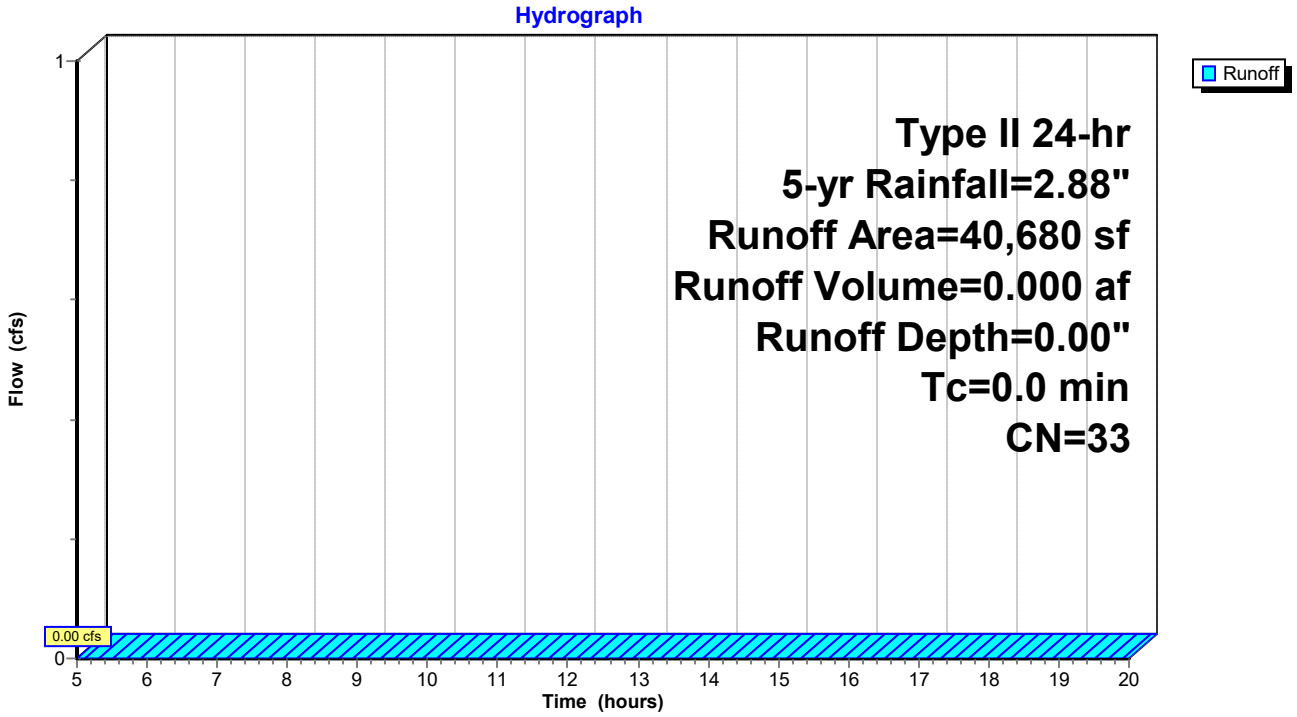
Subcatchment 29S: PRDA-1B-I2



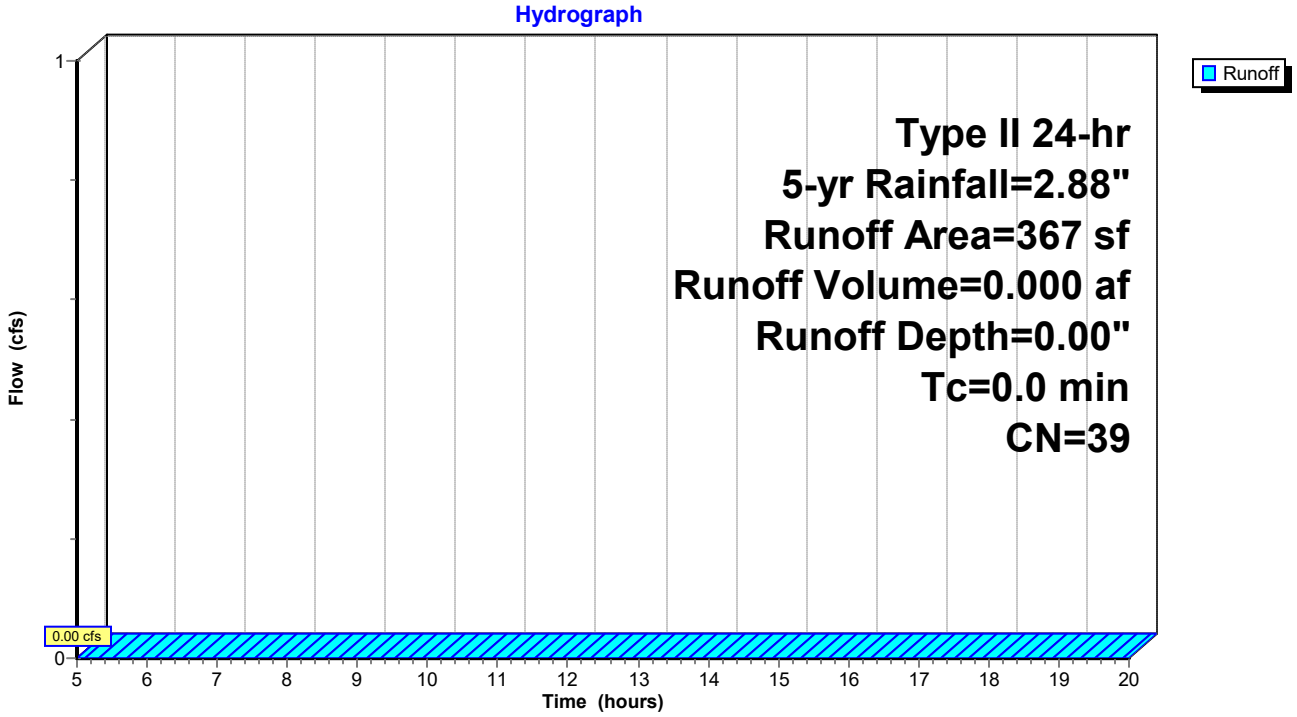
Subcatchment 33S: PRDA-1B-DRYWELL 1&2



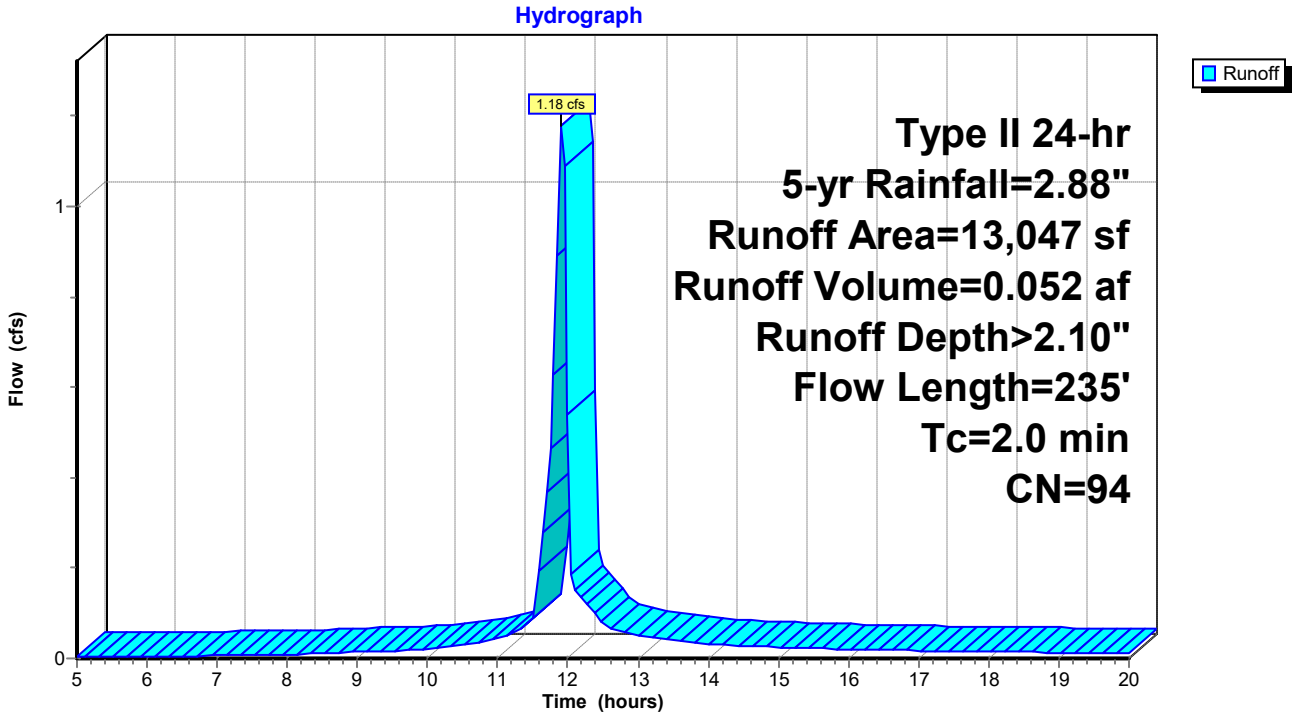
Subcatchment 14S: PRDA-1B



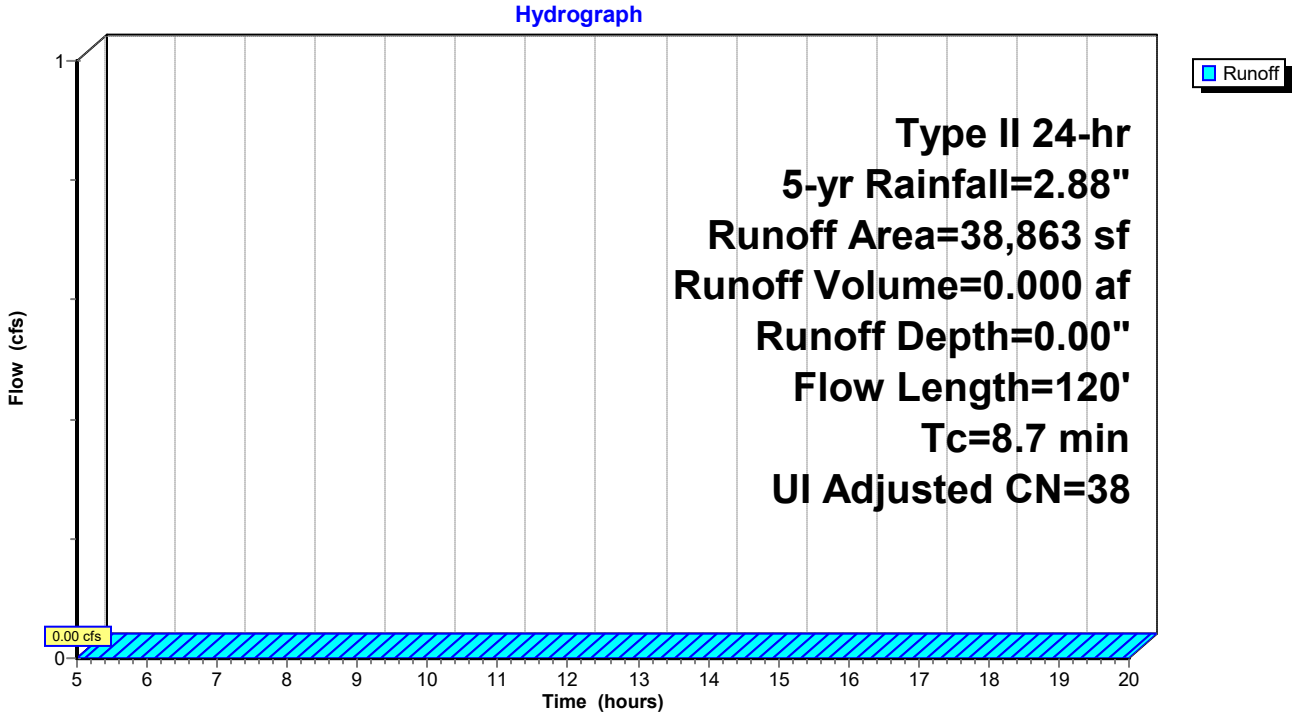
Subcatchment 16S: PRDA1BDRYWELL 3



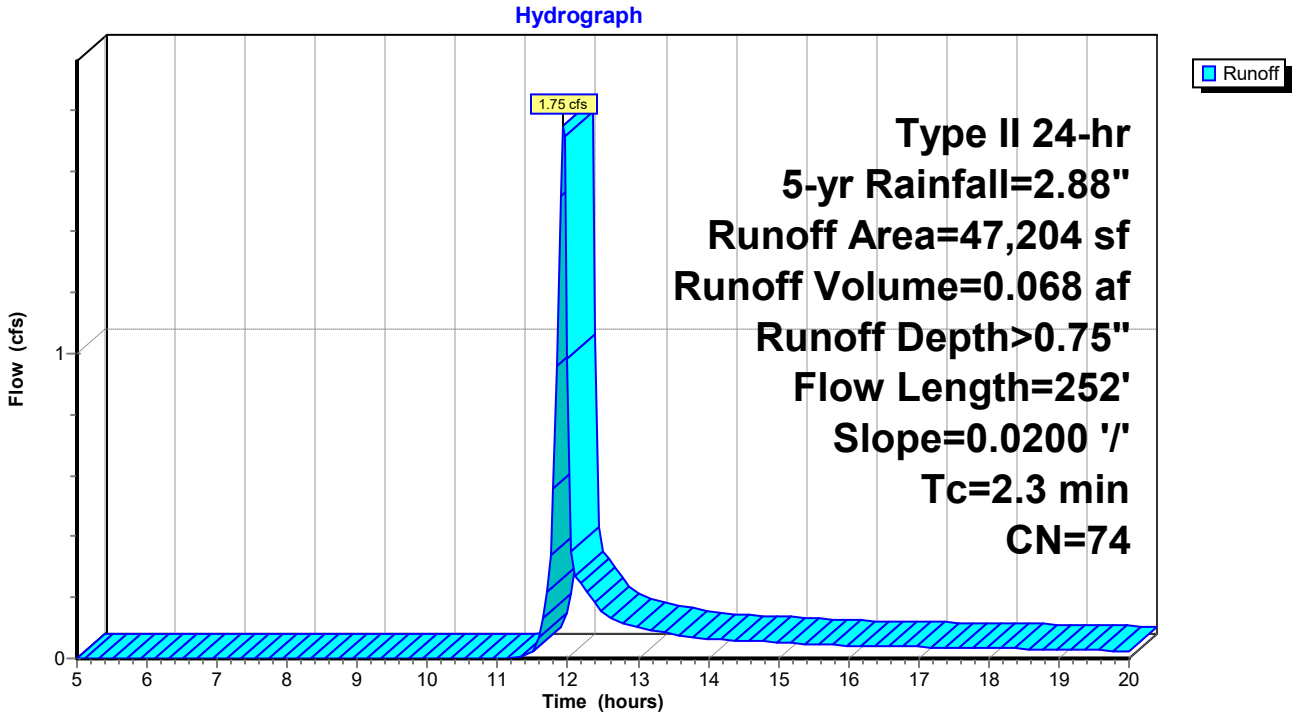
Subcatchment 17S: PRDA-1B-DRYWELL 2



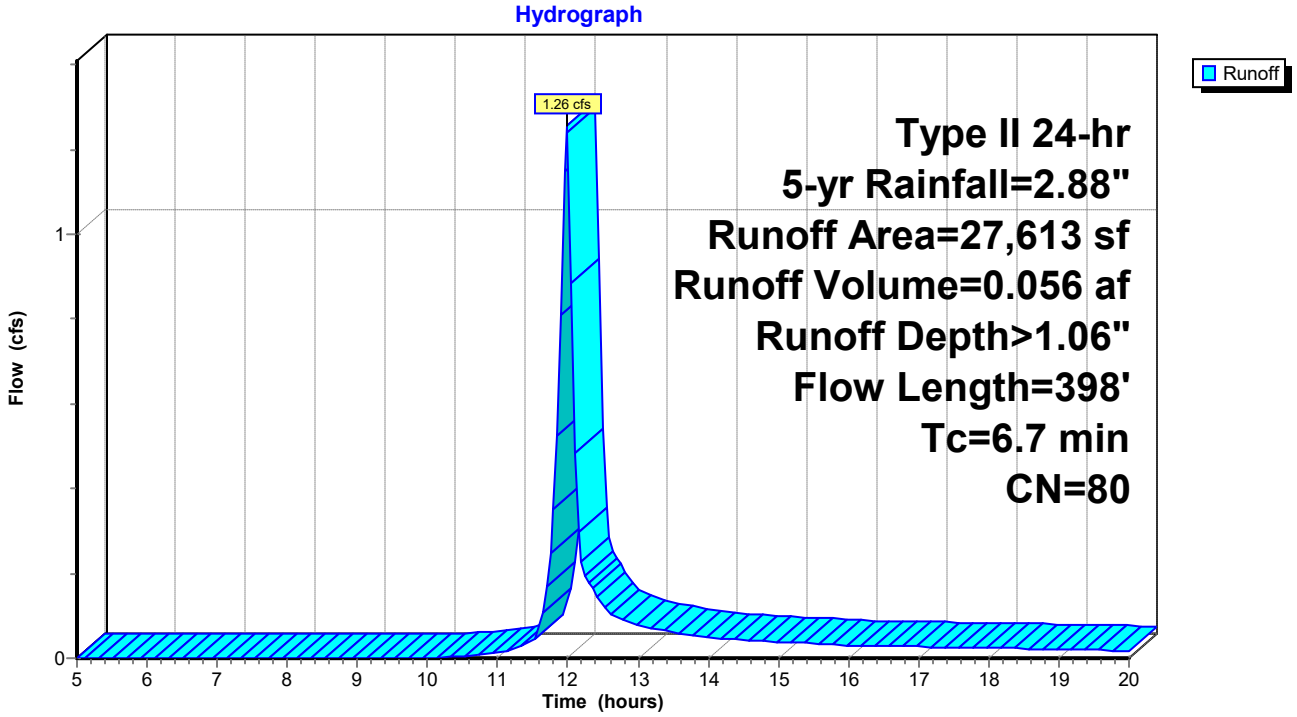
Subcatchment 22S: PRDA-1A



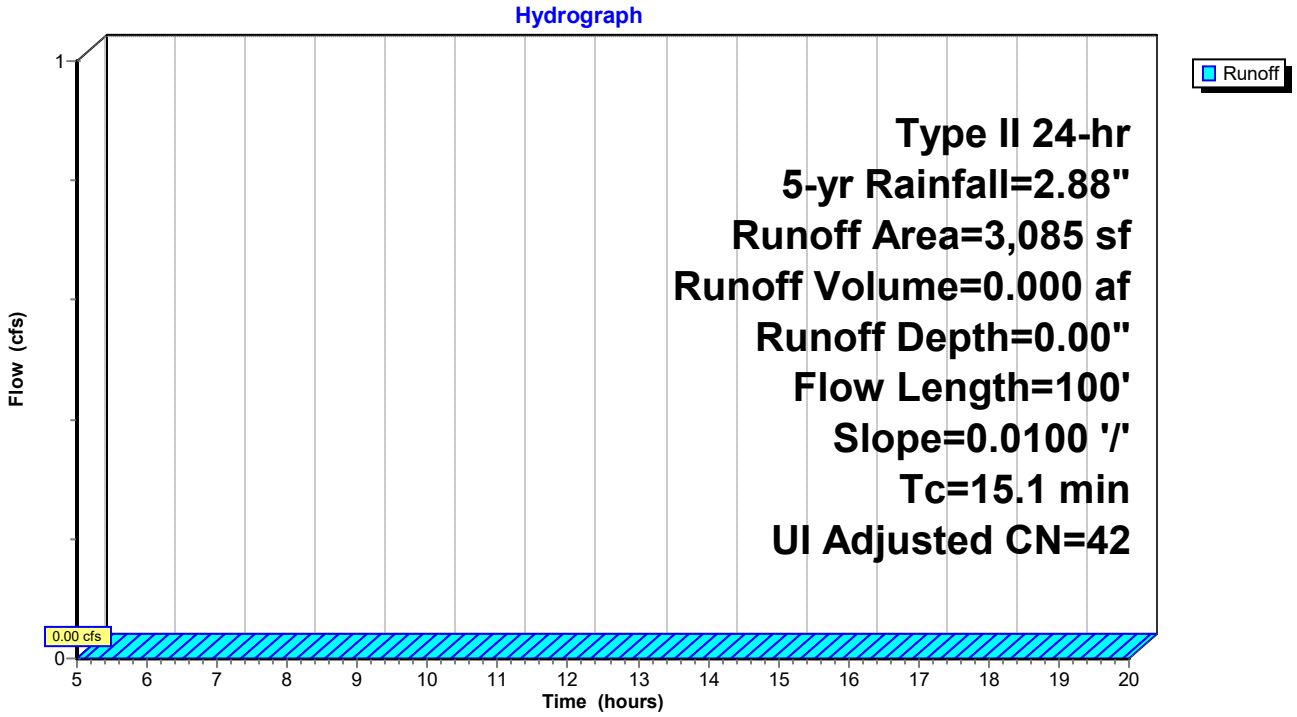
Subcatchment 28S: PRDA-1B-FOREBAY



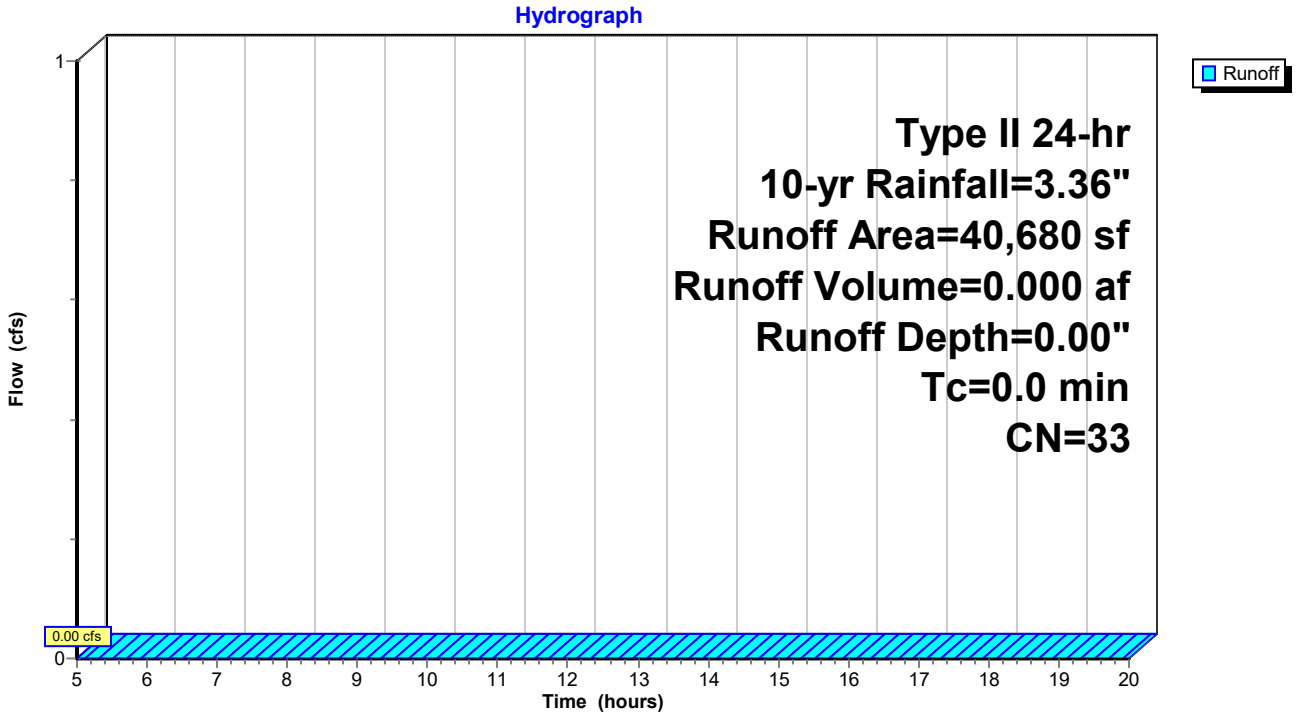
Subcatchment 29S: PRDA-1B-I2



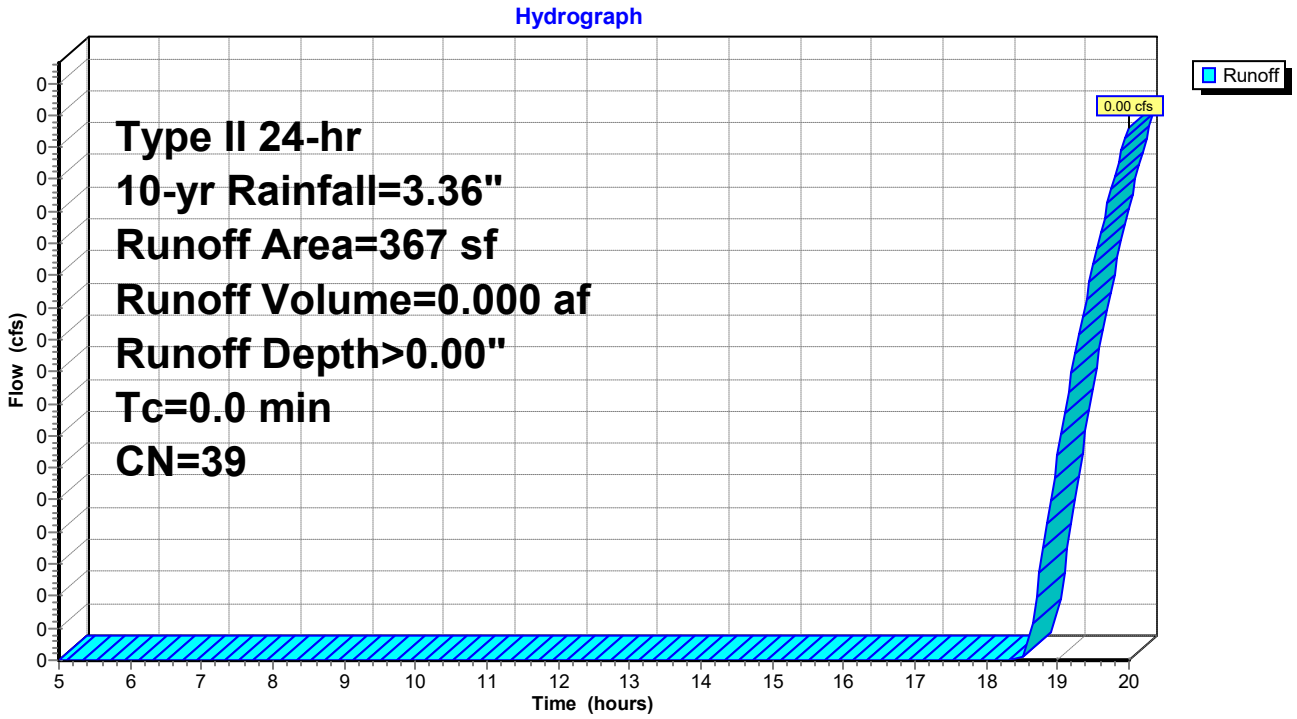
Subcatchment 33S: PRDA-1B-DRYWELL 1&2



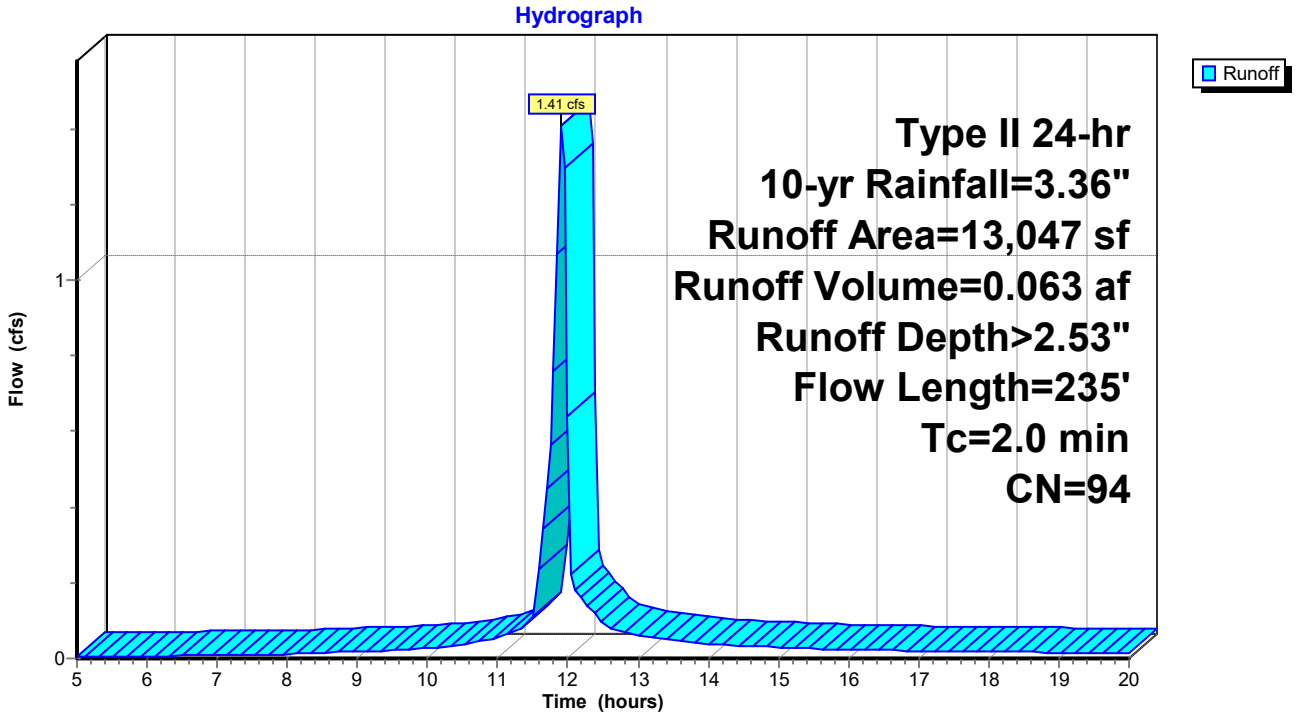
Subcatchment 14S: PRDA-1B



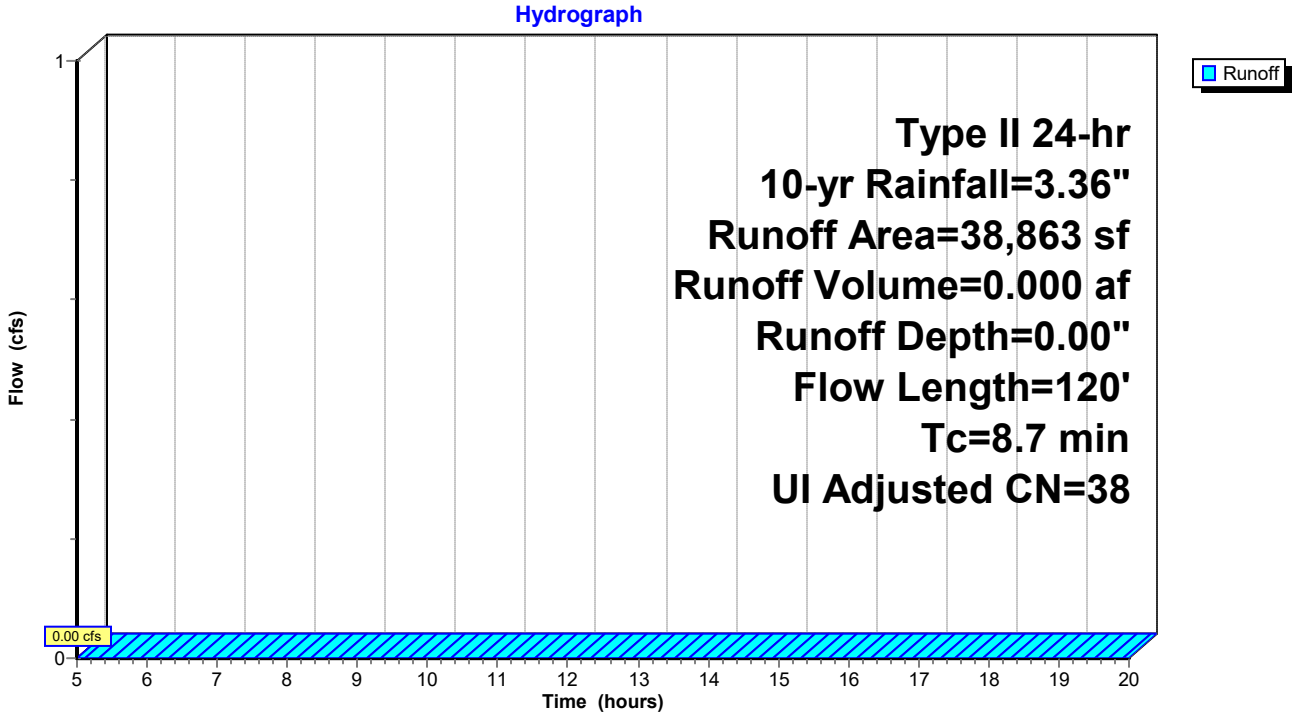
Subcatchment 16S: PRDA1BDRYWELL 3



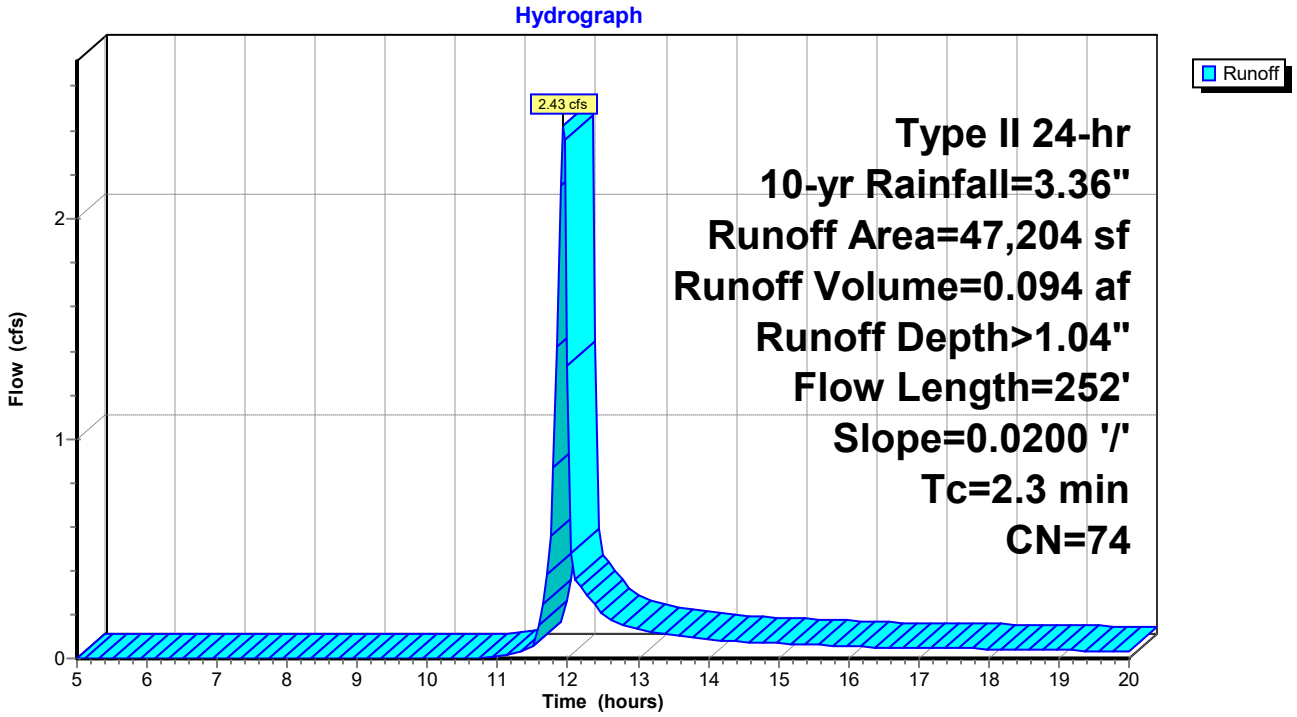
Subcatchment 17S: PRDA-1B-DRYWELL 2



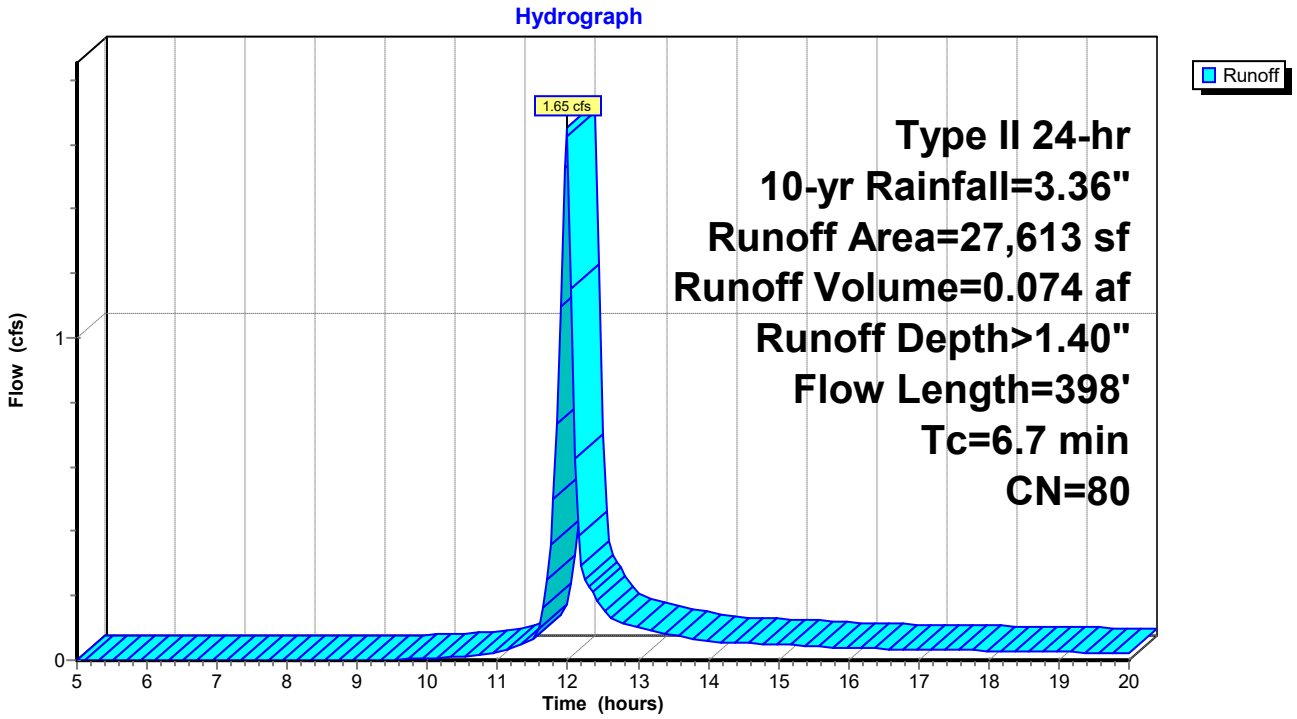
Subcatchment 22S: PRDA-1A



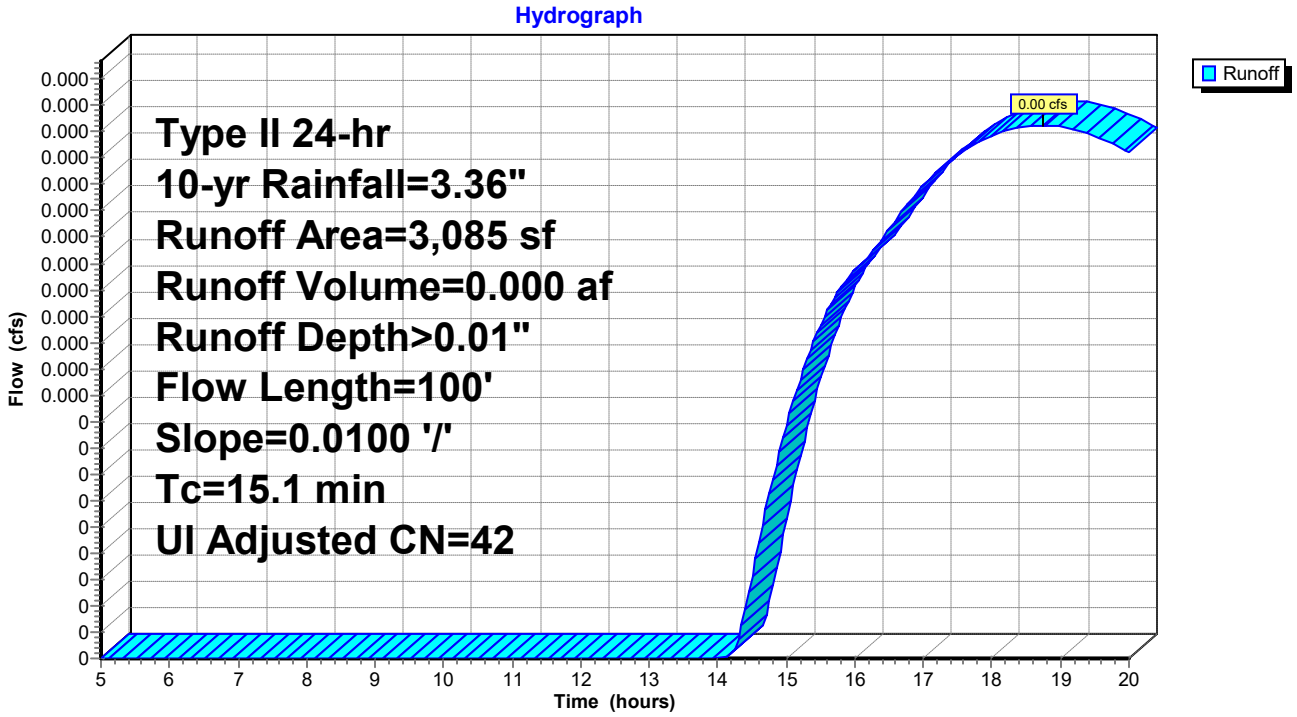
Subcatchment 28S: PRDA-1B-FOREBAY



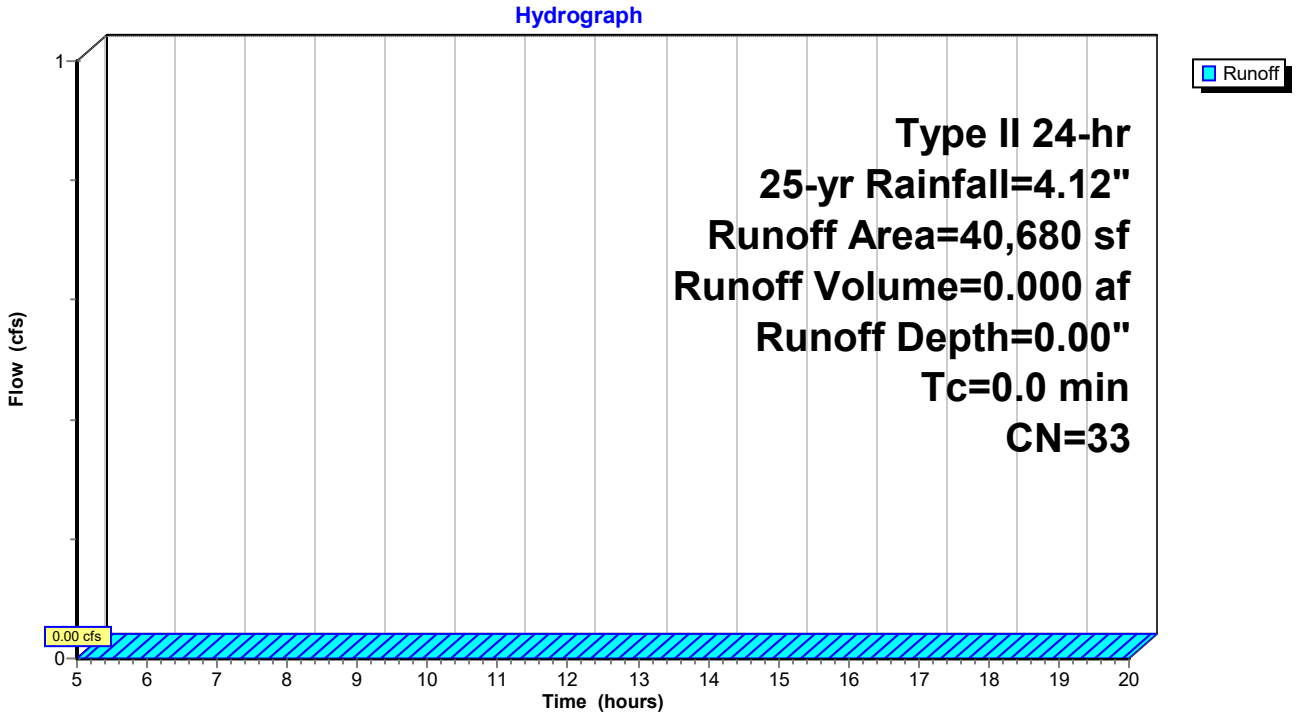
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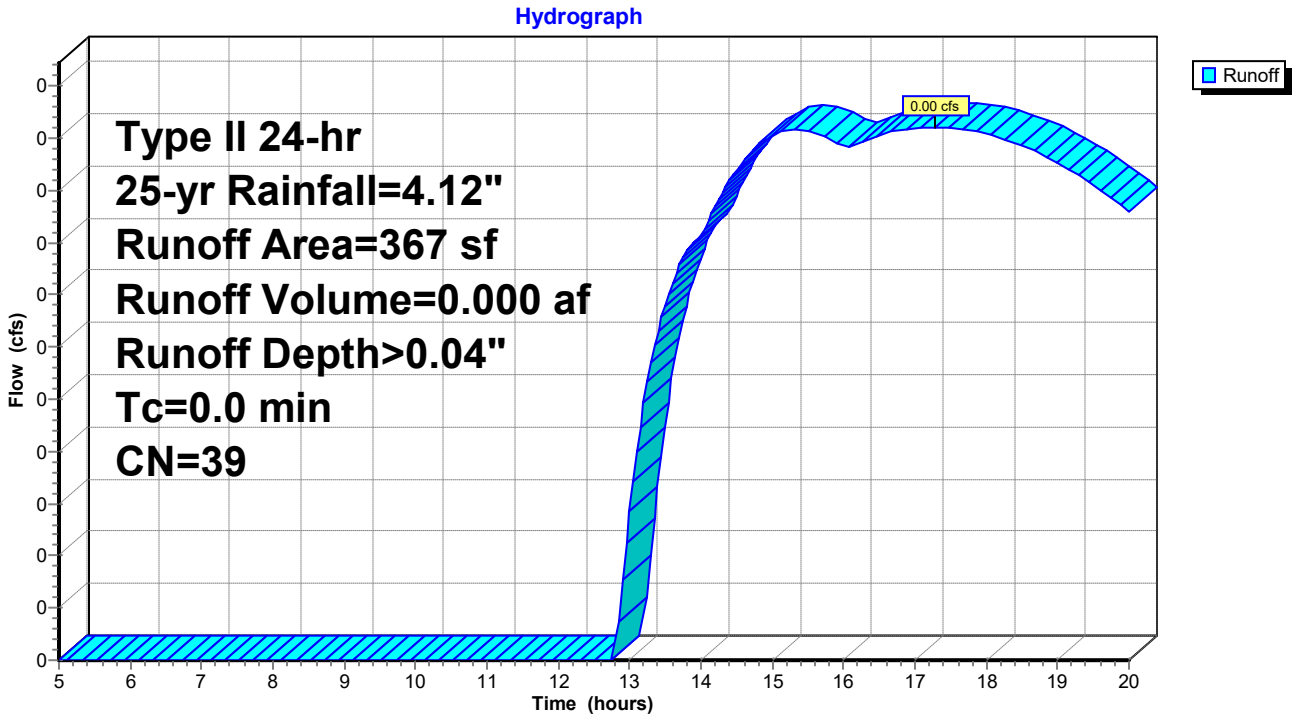
Subcatchment 33S: PRDA-1B-DRYWELL 1&2



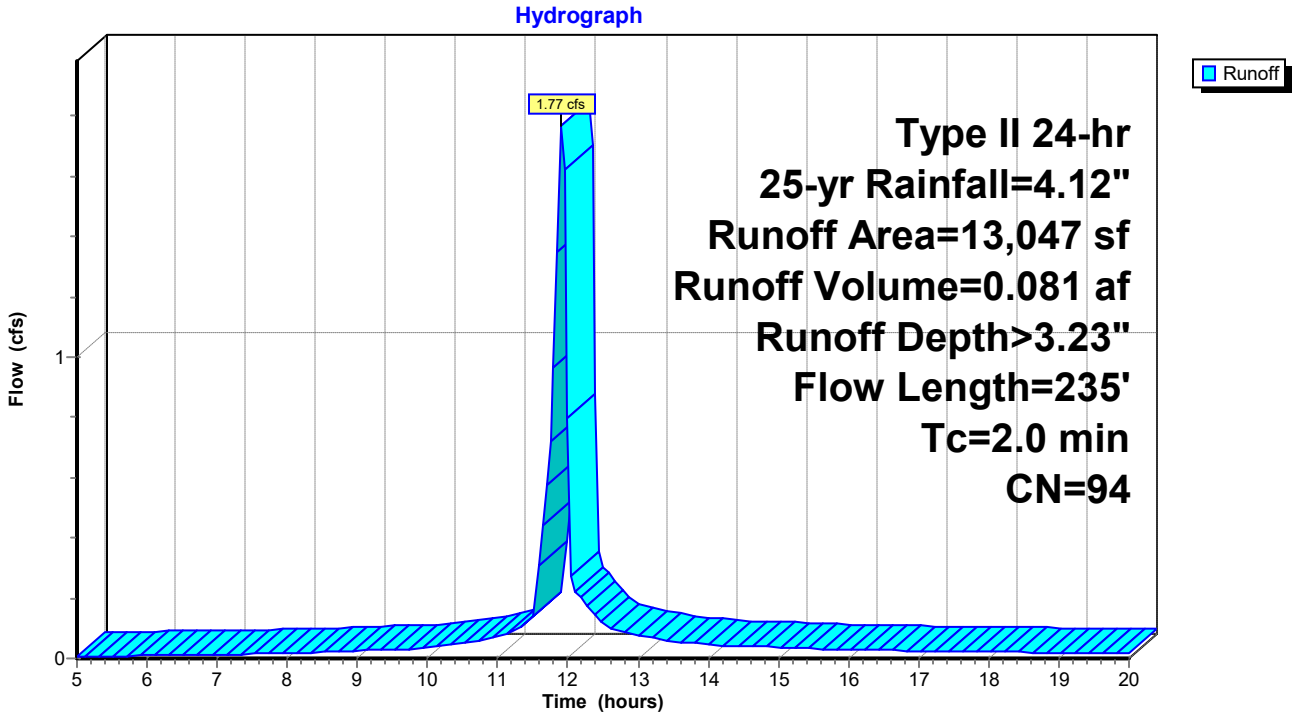
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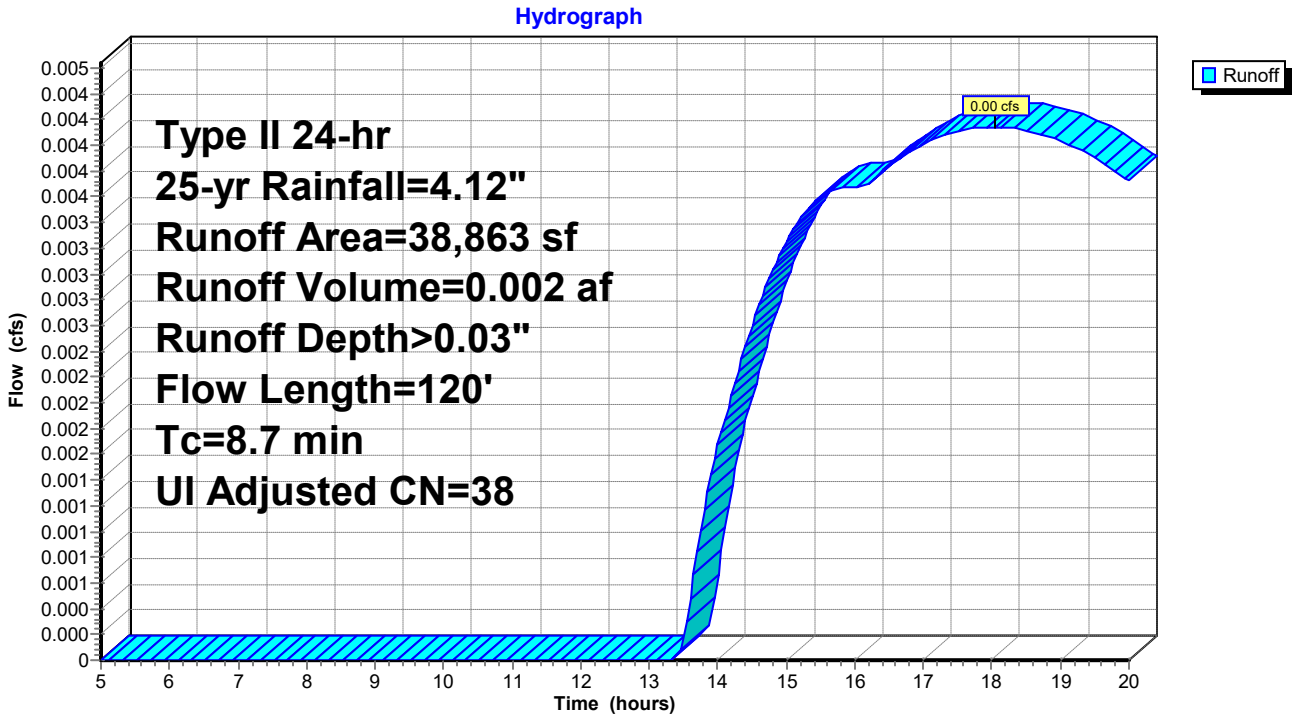
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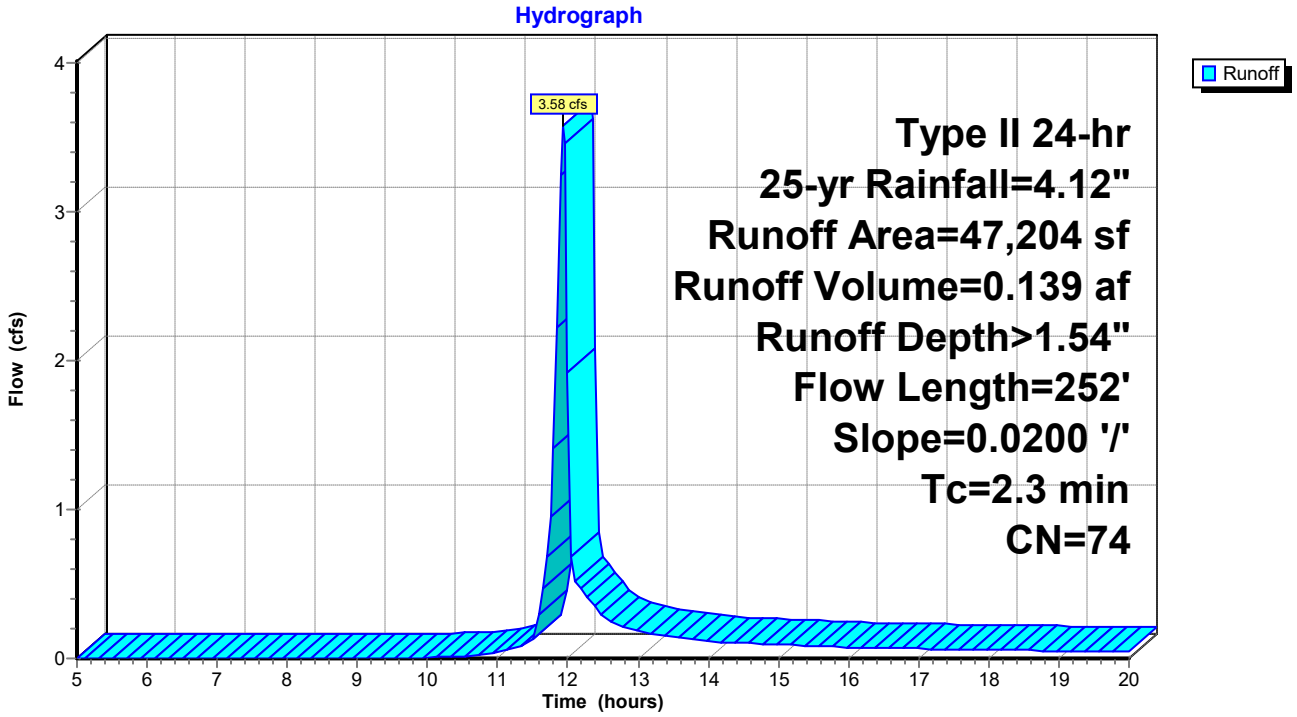
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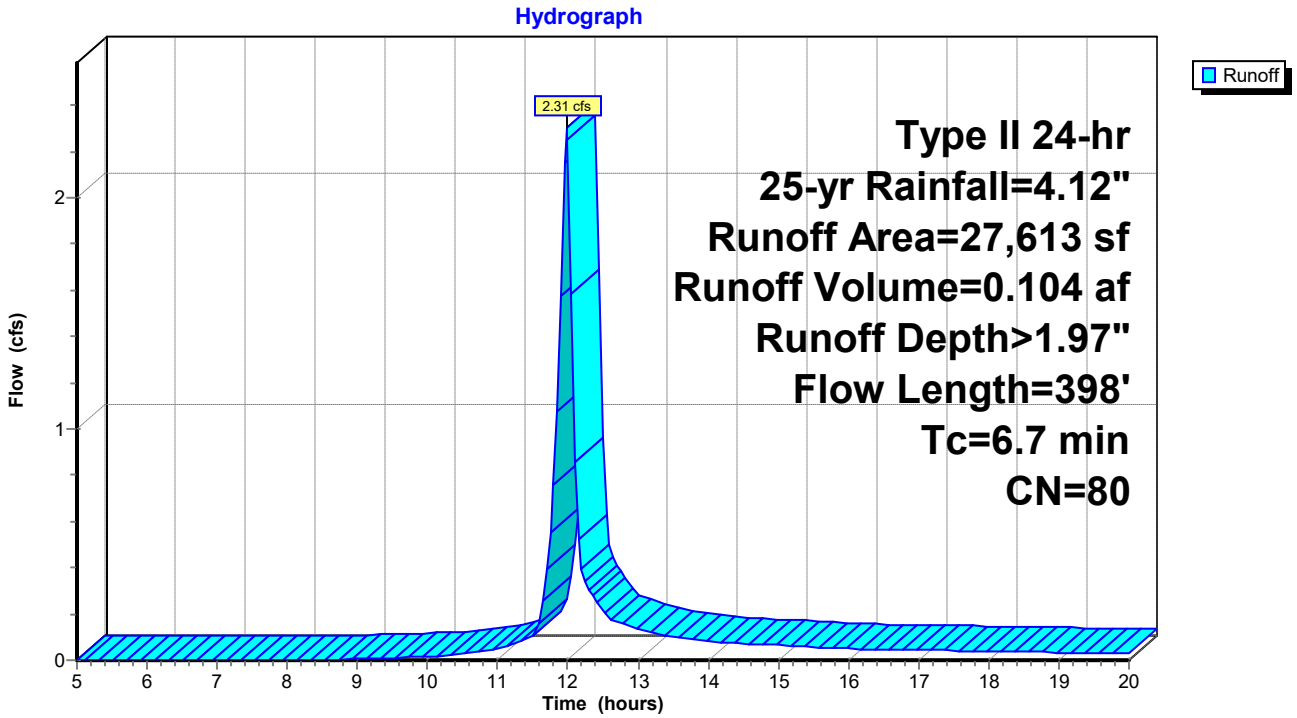
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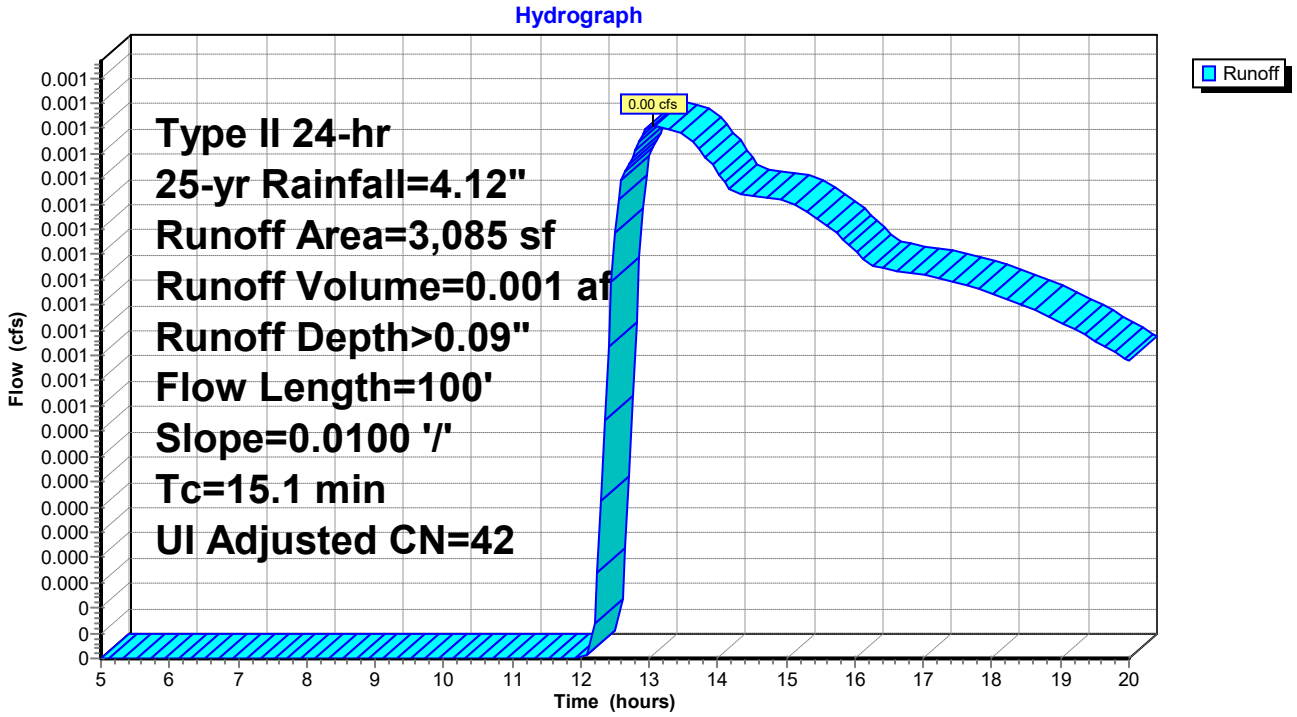
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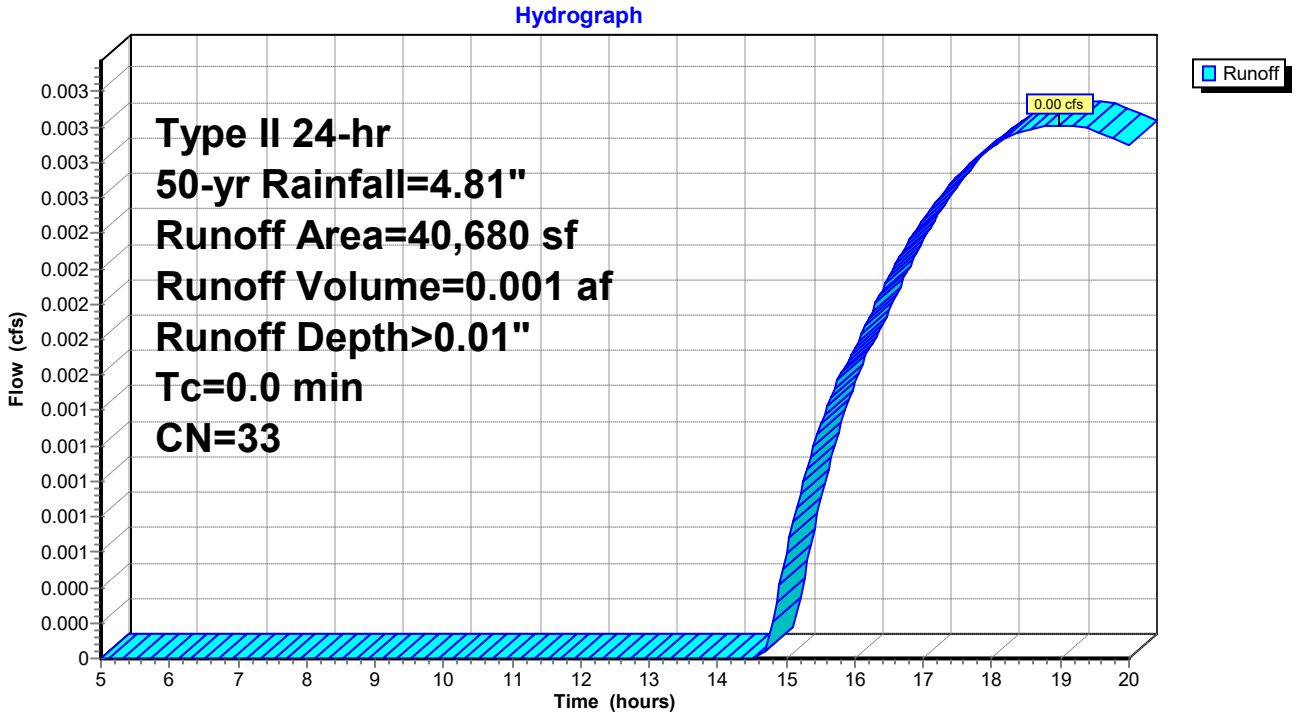
Subcatchment 29S: PRDA-1B-I2



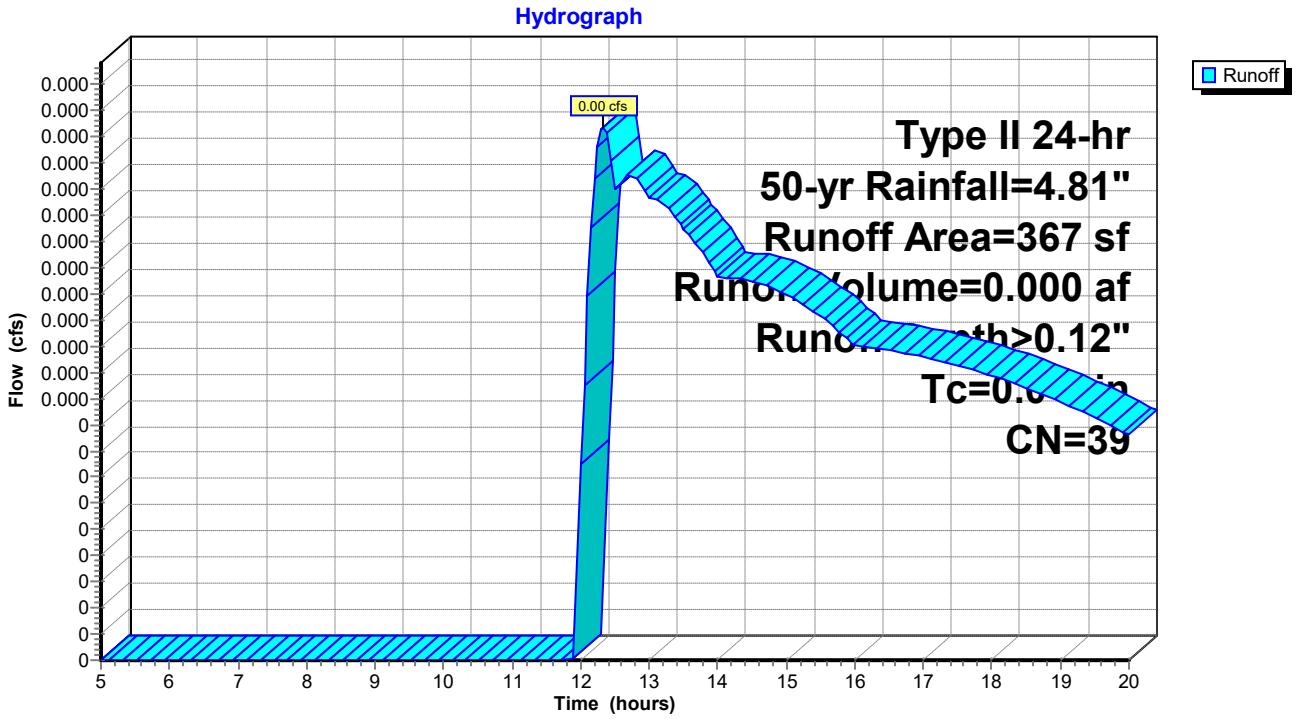
Subcatchment 33S: PRDA-1B-DRYWELL 1&2



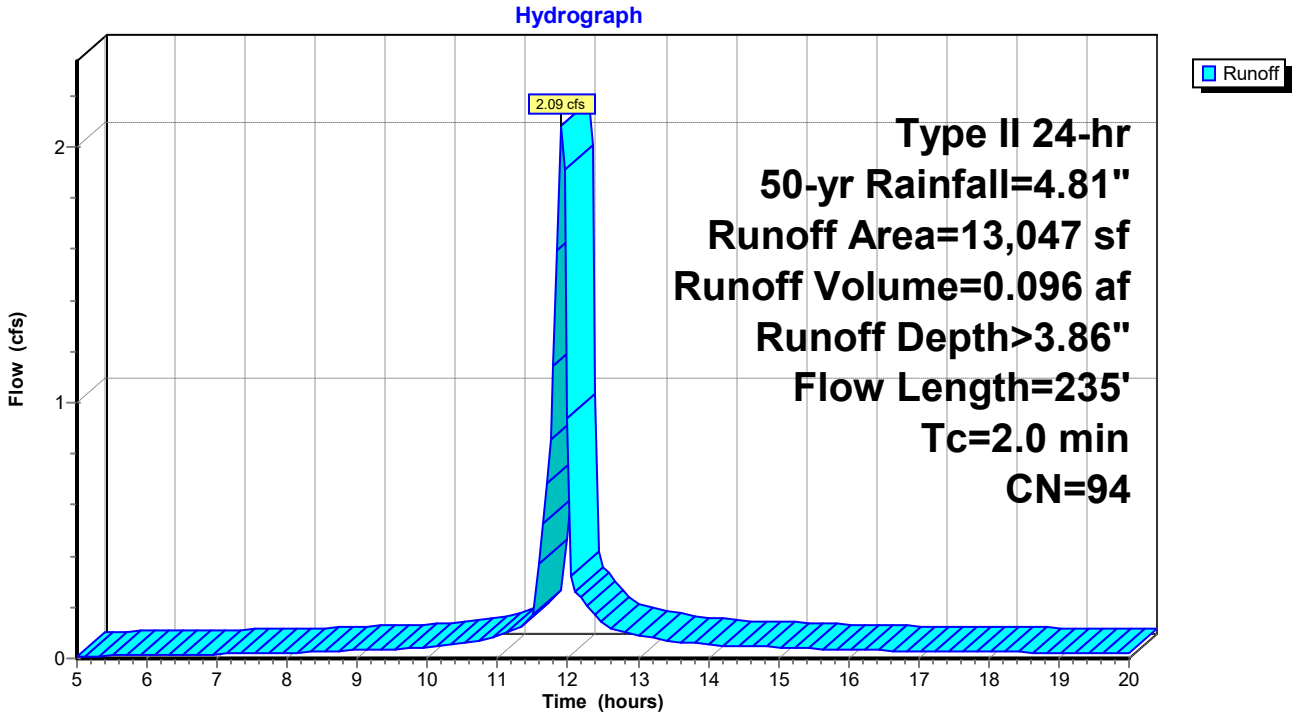
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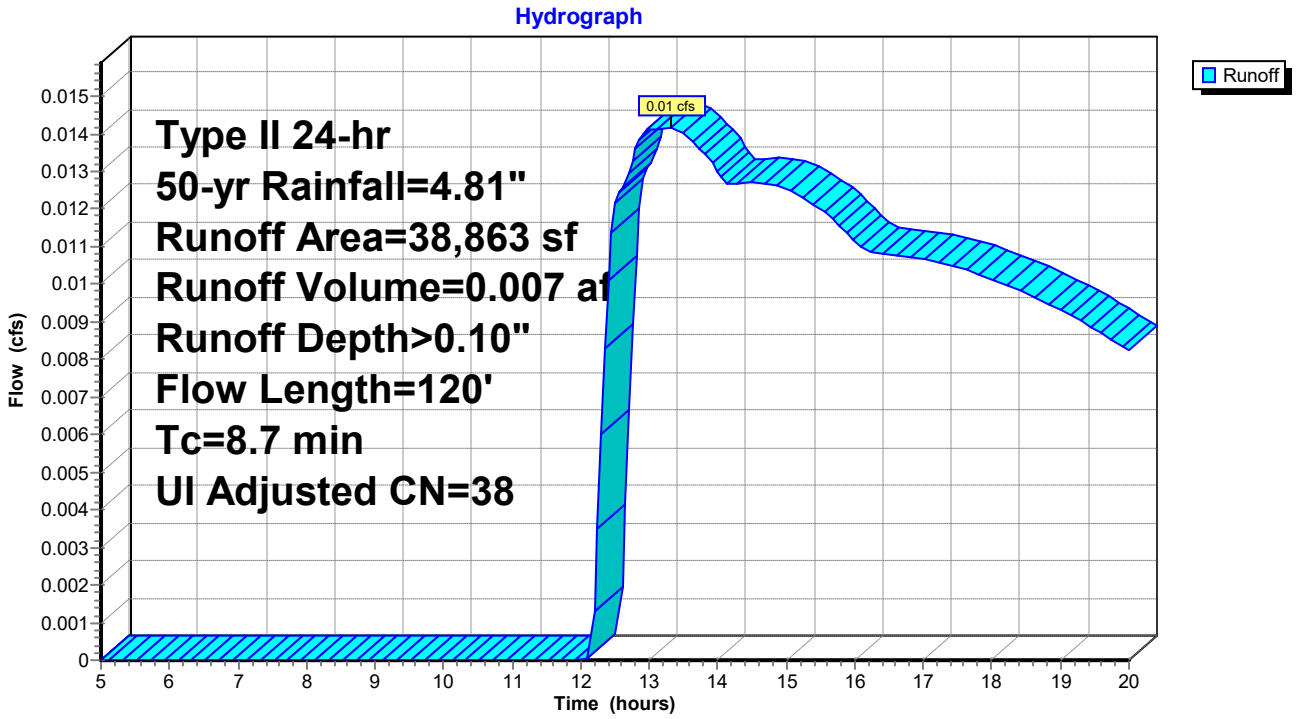
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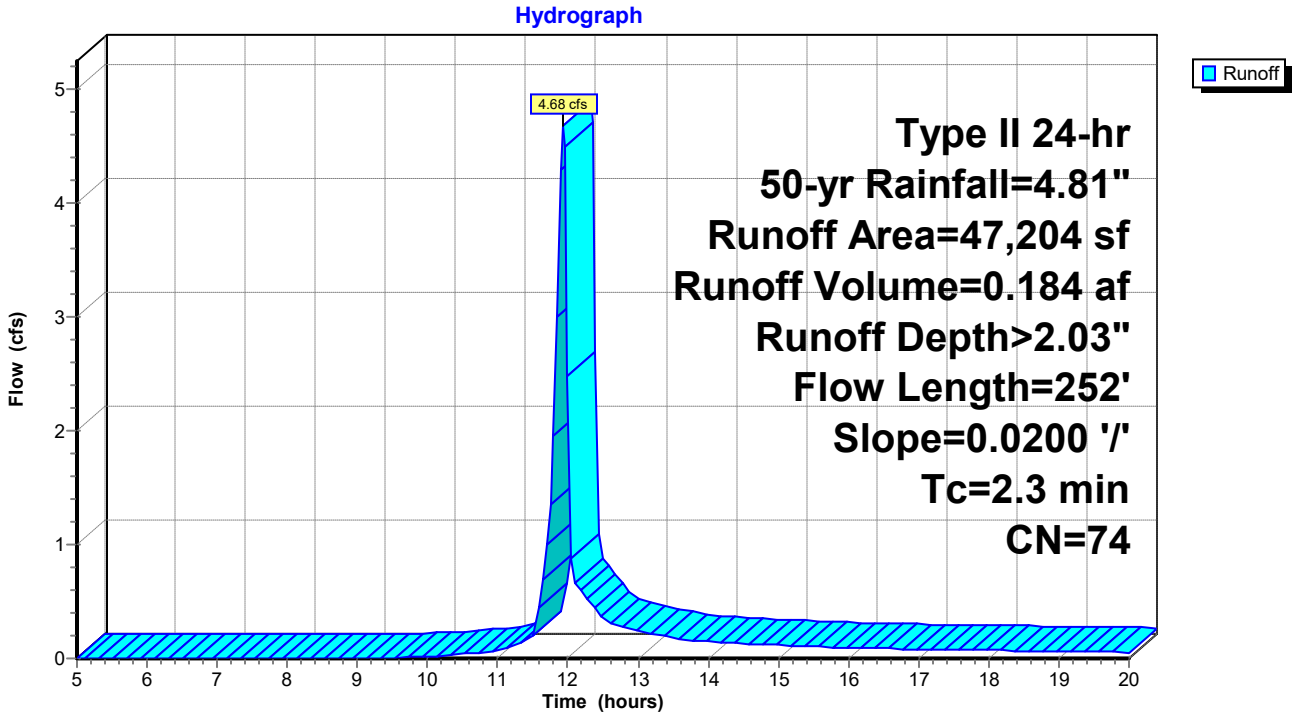
Subcatchment 17S: PRDA-1B-DRYWELL 2



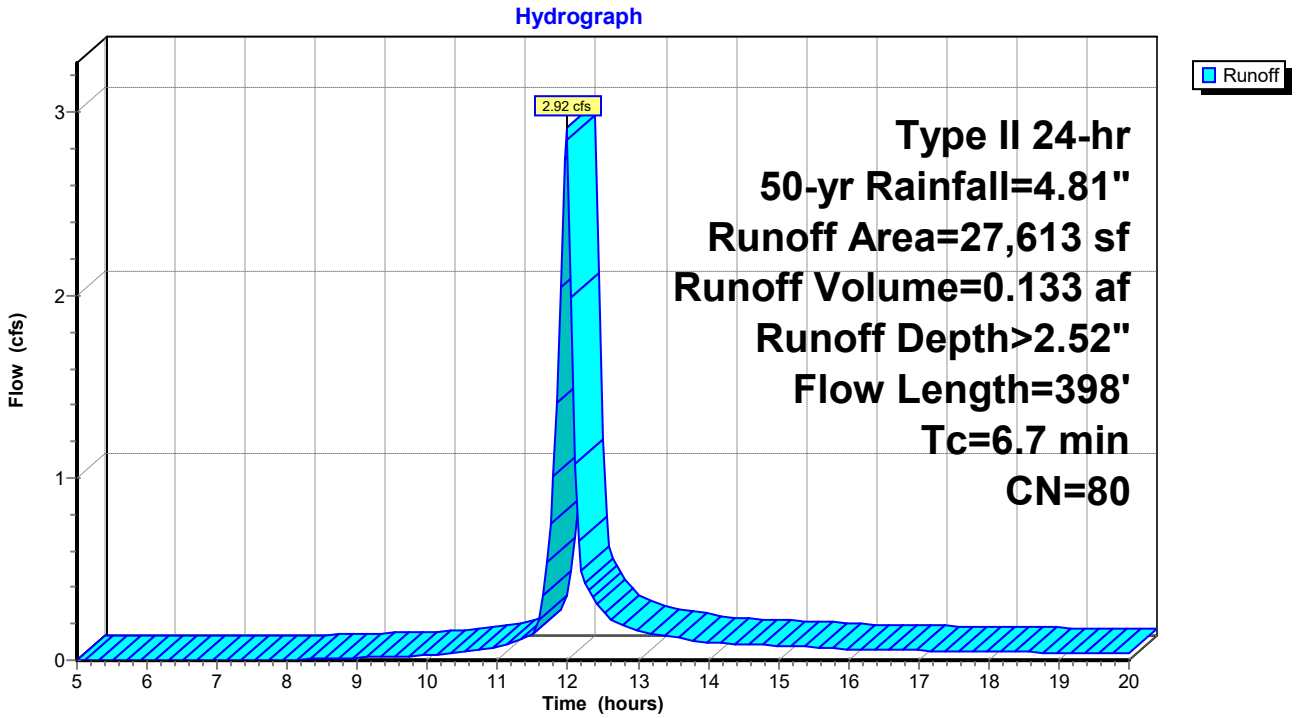
Subcatchment 22S: PRDA-1A



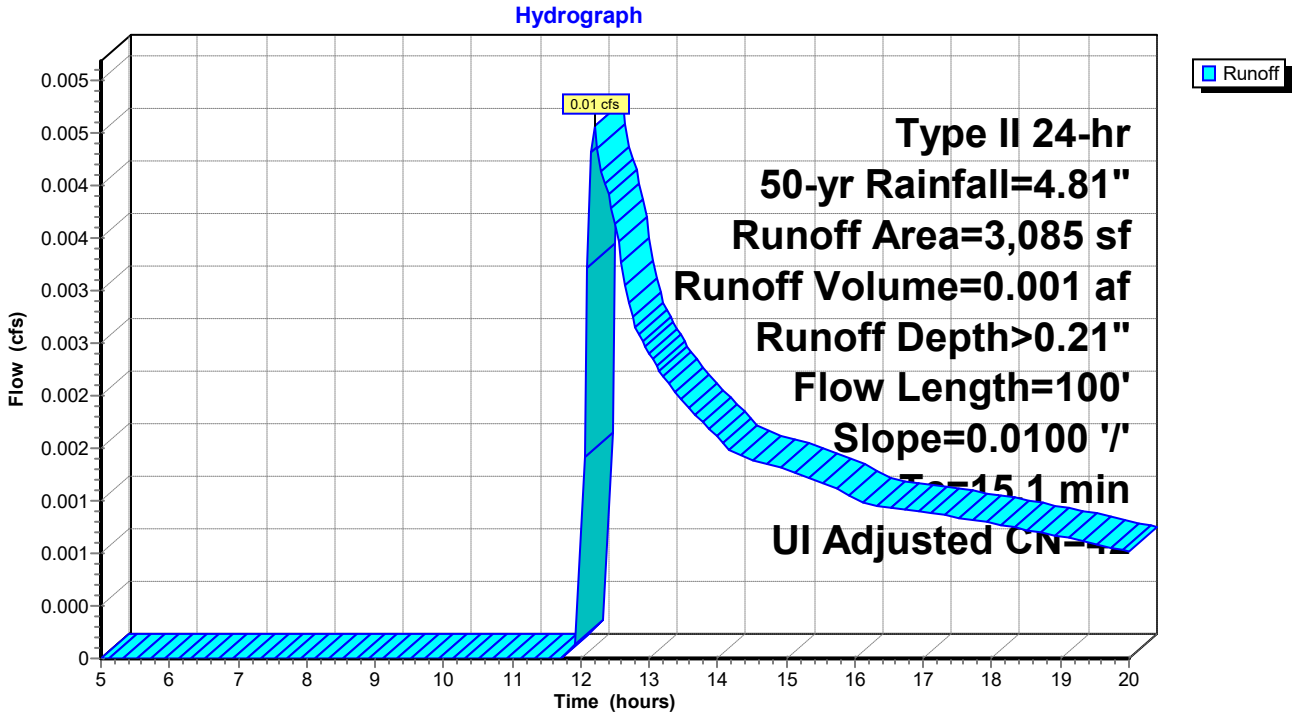
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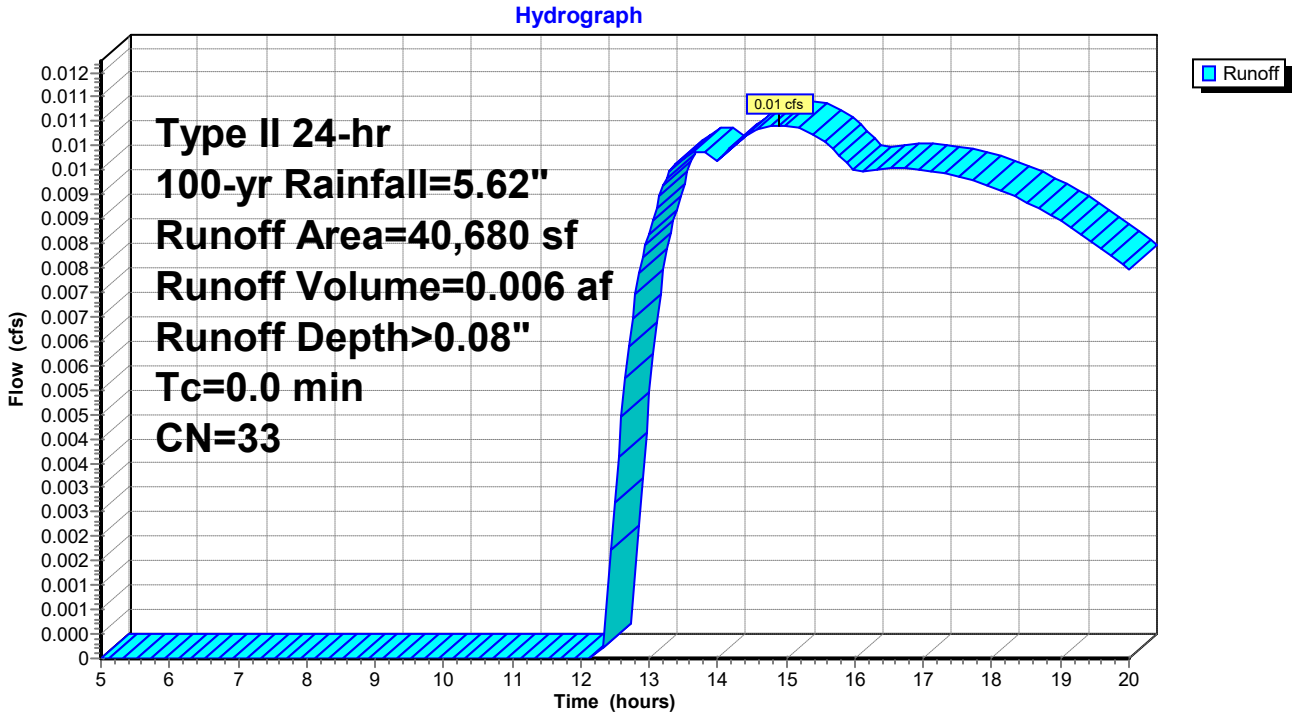
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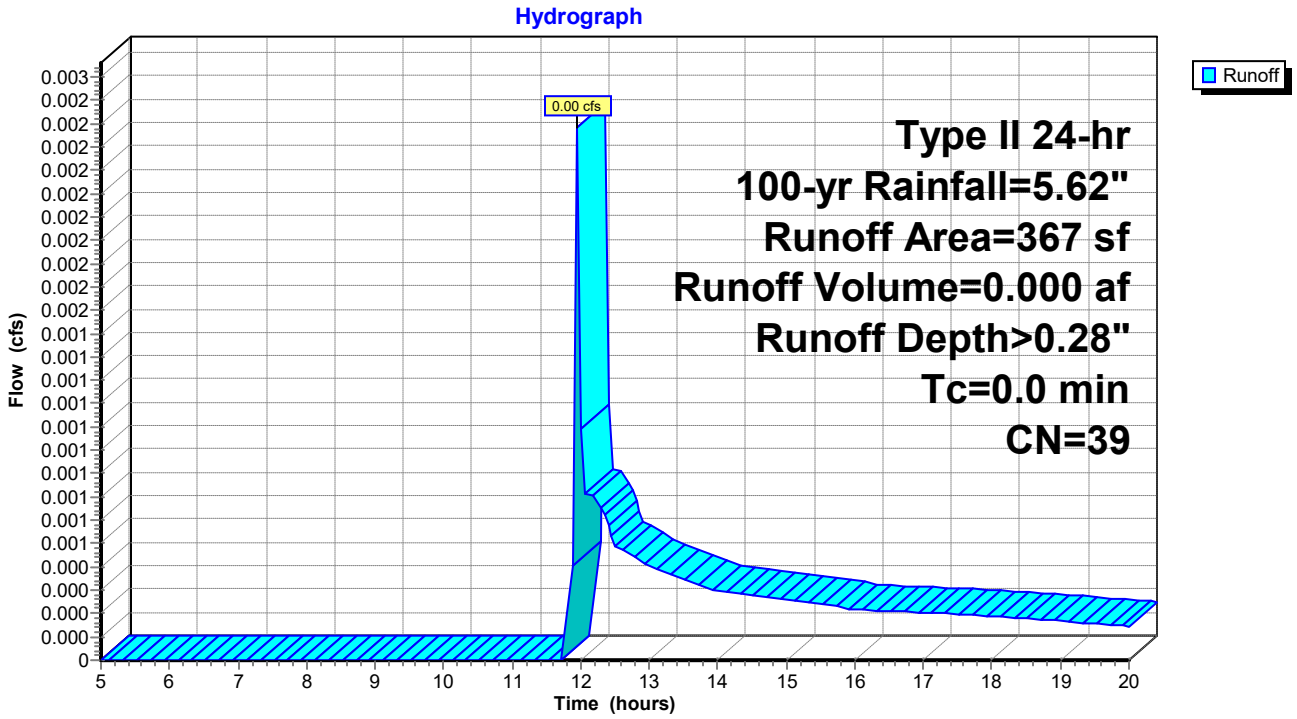
Subcatchment 33S: PRDA-1B-DRYWELL 1&2



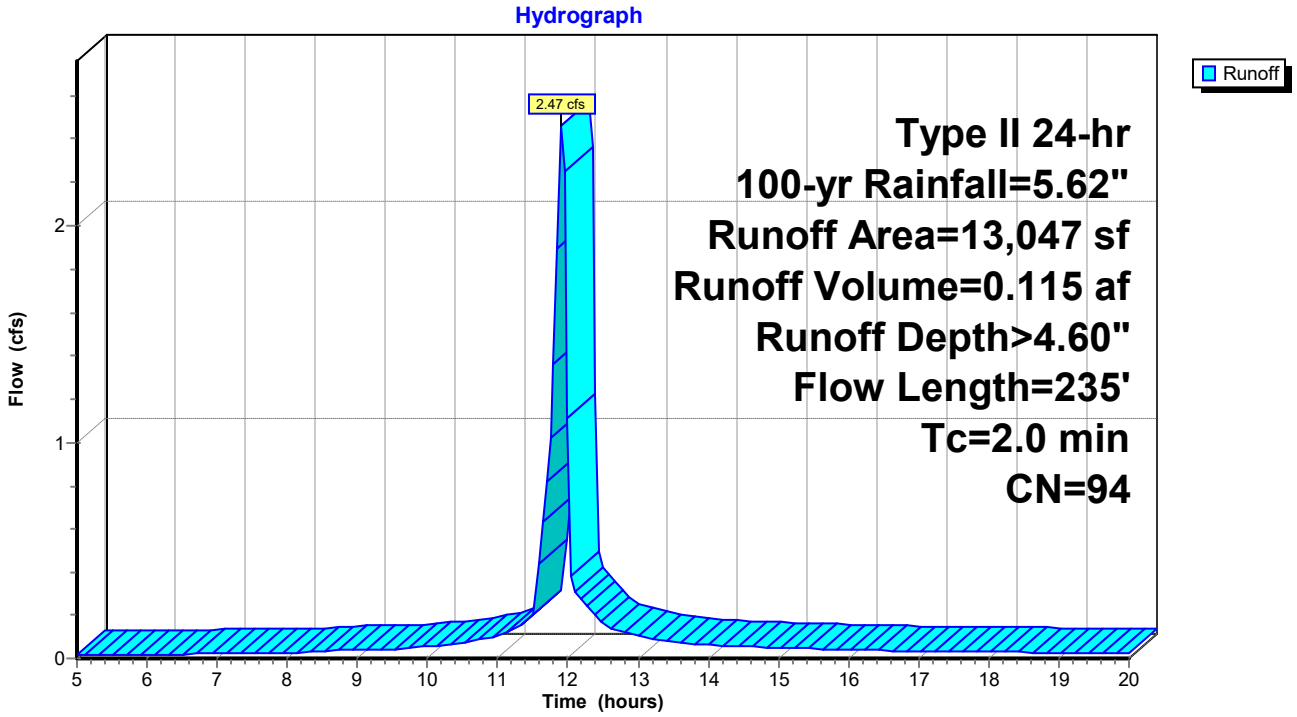
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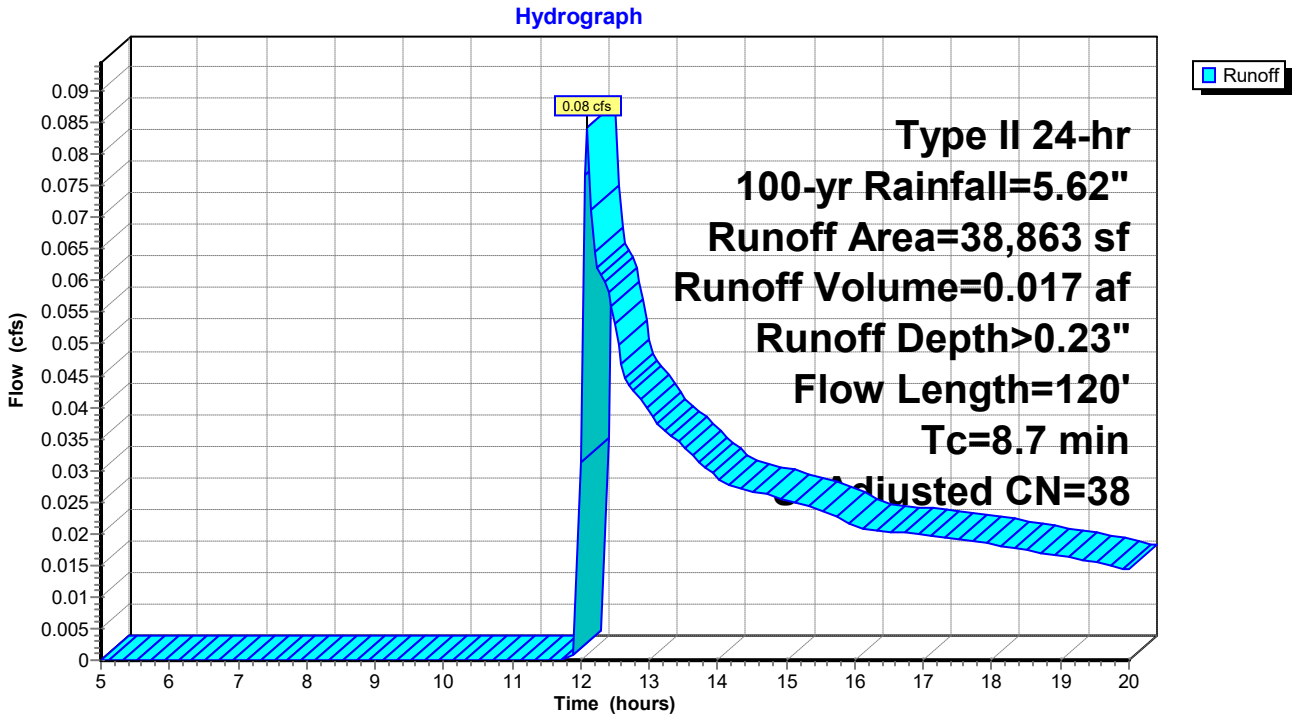
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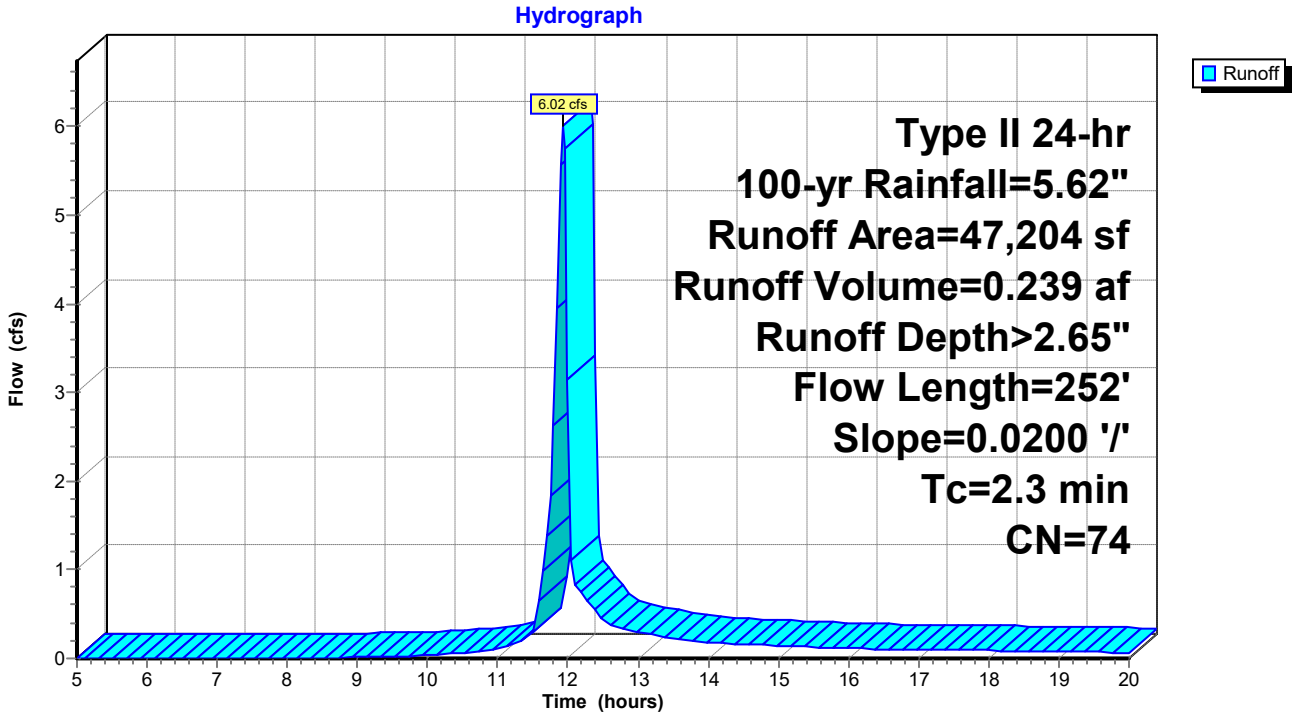
Subcatchment 17S: PRDA-1B-DRYWELL 2



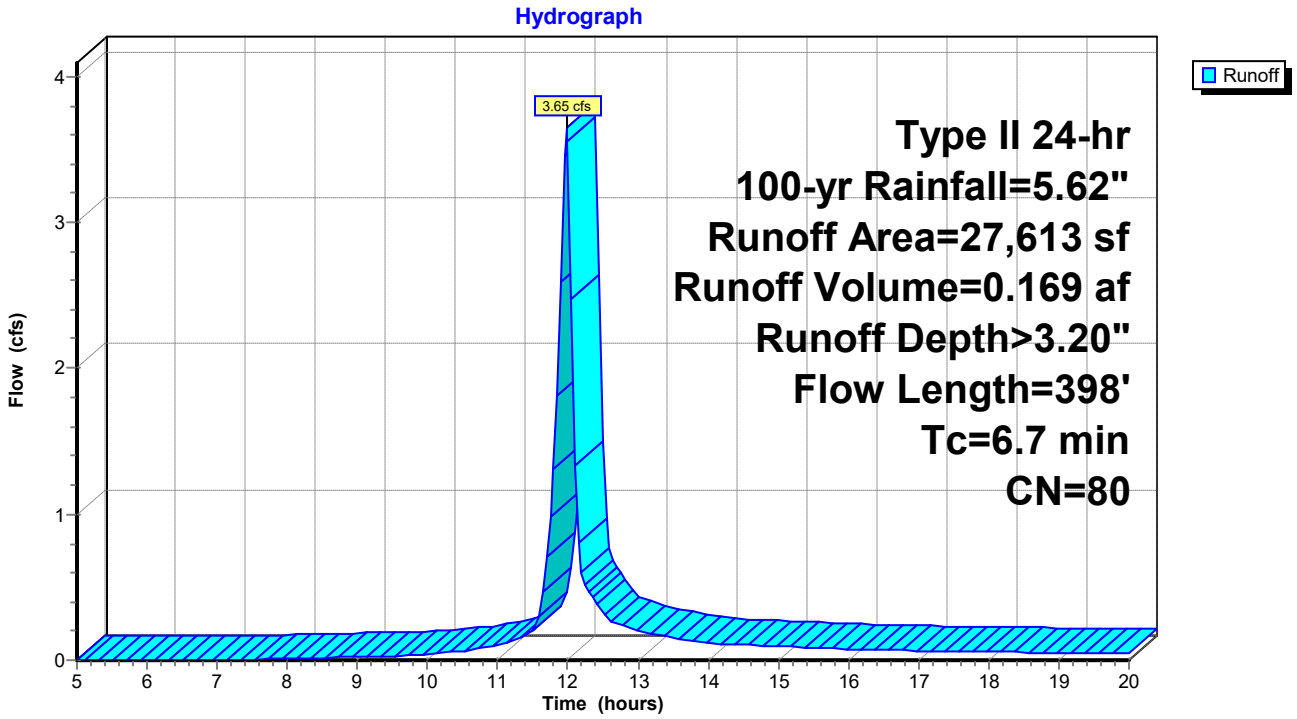
Subcatchment 22S: PRDA-1A



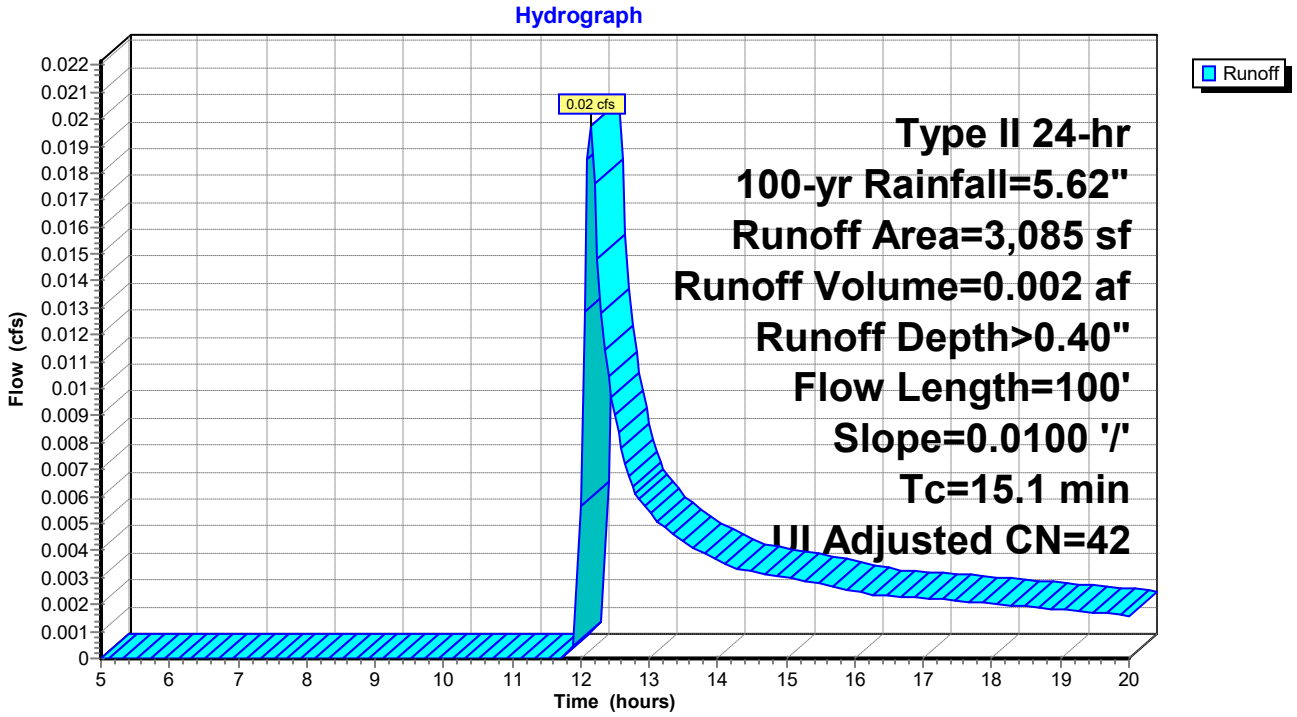
Subcatchment 28S: PRDA-1B-FOREBAY



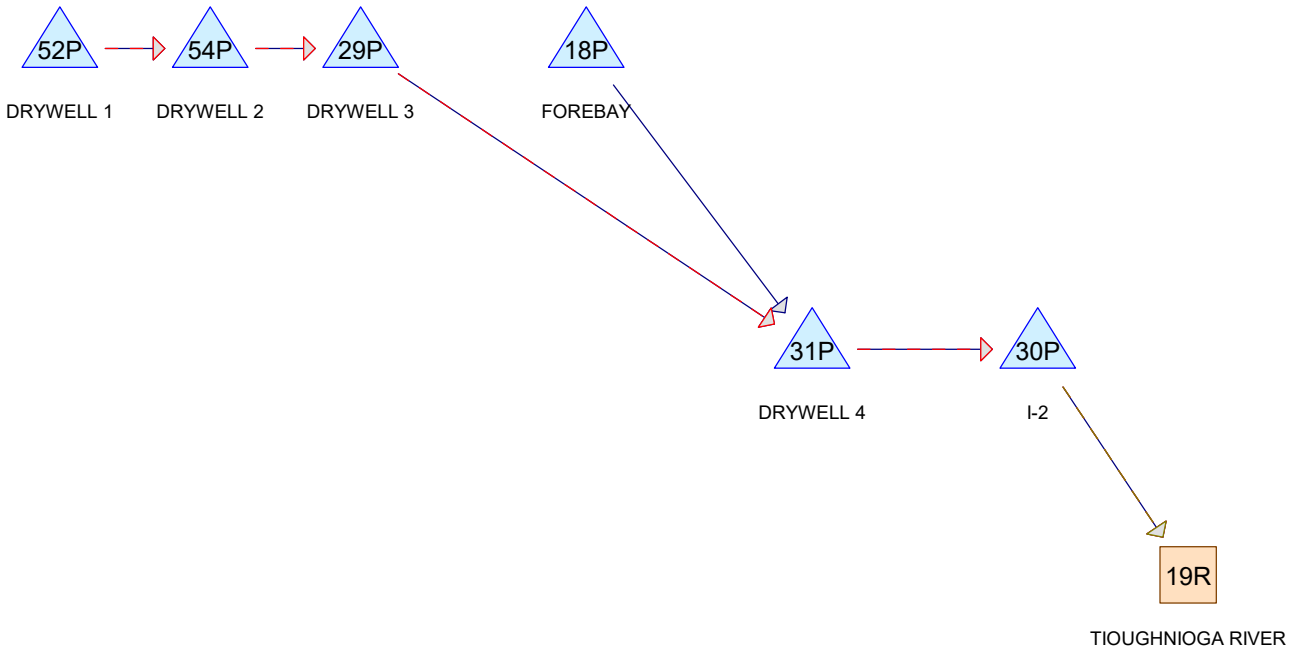
Subcatchment 29S: PRDA-1B-I2



Subcatchment 33S: PRDA-1B-DRYWELL 1&2



APPENDIX E



Subcat Reach Pond Link

Routing Diagram for Riverview
Prepared by R Z Engineering, PLLC, Printed 6/30/2025
HydroCAD® 10.20-6a s/n 05023 © 2024 HydroCAD Software Solutions LLC

Summary for Reach 19R: TIOUGHNIOGA RIVER

Inflow Area = 3.030 ac, 45.58% Impervious, Inflow Depth > 0.57" for 100-yr event
Inflow = 0.25 cfs @ 16.44 hrs, Volume= 0.145 af
Outflow = 0.25 cfs @ 16.44 hrs, Volume= 0.145 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Pond 18P: FOREBAY

Inflow Area = 1.084 ac, 59.75% Impervious, Inflow Depth > 2.65" for 100-yr event
Inflow = 6.02 cfs @ 11.93 hrs, Volume= 0.239 af
Outflow = 6.95 cfs @ 11.91 hrs, Volume= 0.229 af, Atten= 0%, Lag= 0.0 min
Primary = 6.95 cfs @ 11.91 hrs, Volume= 0.229 af
Routed to Pond 31P : DRYWELL 4

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 1,106.05' @ 11.90 hrs Surf.Area= 4,601 sf Storage= 1,765 cf

Plug-Flow detention time= 41.2 min calculated for 0.228 af (95% of inflow)
Center-of-Mass det. time= 25.1 min (808.9 - 783.8)

Volume	Invert	Avail.Storage	Storage Description
#1	1,099.00'	1,765 cf	**I-2 FOREBAY (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,099.00	2,460	0	0
1,099.50	4,601	1,765	1,765

Device	Routing	Invert	Outlet Devices
#1	Primary	1,099.00'	**12.0" Round Culvert** L= 115.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 1,099.00' / 1,098.42' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=6.62 cfs @ 11.91 hrs HW=1,105.50' (Free Discharge)
1=Culvert (Barrel Controls 6.62 cfs @ 8.43 fps)

Summary for Pond 29P: DRYWELL 3

Inflow Area = 0.370 ac, 78.08% Impervious, Inflow Depth > 3.72" for 100-yr event
Inflow = 2.47 cfs @ 11.91 hrs, Volume= 0.115 af
Outflow = 2.25 cfs @ 11.94 hrs, Volume= 0.107 af, Atten= 9%, Lag= 1.8 min
Primary = 2.25 cfs @ 11.94 hrs, Volume= 0.107 af
Routed to Pond 31P : DRYWELL 4
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Routed to Pond 31P : DRYWELL 4

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 1,100.27' @ 11.94 hrs Surf.Area= 365 sf Storage= 681 cf

Plug-Flow detention time= 49.6 min calculated for 0.107 af (93% of inflow)
Center-of-Mass det. time= 24.2 min (761.4 - 737.2)

Volume	Invert	Avail.Storage	Storage Description
#1	1,097.00'	302 cf	**8.00'D x 6.00'H Vertical Cone/Cylinder** Inside #2
#2	1,096.00'	248 cf	**10.00'D x 7.00'H Vertical Cone/Cylinder Stone** 550 cf Overall - 302 cf Embedded = 248 cf
#3	1,099.20'	112 cf	**12.0" Round Pipe Storage** Inside #4 L= 143.0' S= 0.0050 '/'
#4	1,098.70'	460 cf	**24.0" W x 24.0" H Box Pipe Stone** L= 143.0' S= 0.0050 '/' 572 cf Overall - 112 cf Embedded = 460 cf
		1,122 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	1,099.20'	**12.0" Round Culvert** L= 154.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 1,099.20' / 1,098.43' S= 0.0050 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 0.79 sf
#2	Device 3	1,103.00'	**24.0" Horiz. Rim** C= 0.600 Limited to weir flow at low heads
#3	Secondary	1,100.00'	**Flood Route, Cv= 2.62 (C= 3.28)** Head (feet) 0.00 0.50 Width (feet) 6.00 8.00

Primary OutFlow Max=2.21 cfs @ 11.94 hrs HW=1,100.25' (Free Discharge)
└**1=Culvert** (Inlet Controls 2.21 cfs @ 2.82 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=1,096.01' (Free Discharge)
└**3=Flood Route** (Controls 0.00 cfs)
└**2=Rim** (Controls 0.00 cfs)

Summary for Pond 30P: I-2

Inflow Area = 2.096 ac, 65.89% Impervious, Inflow Depth > 2.84" for 100-yr event
Inflow = 12.32 cfs @ 11.95 hrs, Volume= 0.495 af
Outflow = 0.24 cfs @ 16.42 hrs, Volume= 0.139 af, Atten= 98%, Lag= 268.4 min
Primary = 0.24 cfs @ 16.42 hrs, Volume= 0.139 af
Routed to Reach 19R : TIOUGHNIOGA RIVER
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Routed to Reach 19R : TIOUGHNIOGA RIVER

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 1,101.67' @ 16.42 hrs Surf.Area= 5,107 sf Storage= 16,110 cf

Plug-Flow detention time= 281.3 min calculated for 0.139 af (28% of inflow)
Center-of-Mass det. time= 188.5 min (981.3 - 792.8)

Volume	Invert	Avail.Storage	Storage Description
#1	1,097.00'	20,903 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,097.00	1,998	0	0
1,098.00	2,553	2,276	2,276
1,099.00	3,165	2,859	5,135
1,100.00	3,855	3,510	8,645
1,101.00	4,582	4,219	12,863
1,102.00	5,366	4,974	17,837
1,102.50	6,898	3,066	20,903

Device	Routing	Invert	Outlet Devices
#1	Device 2	1,102.45'	**24.0" Horiz. RIM** C= 0.600 Limited to weir flow at low heads
#2	Primary	1,097.00'	**12.0" Round OUTLET** L= 30.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 1,097.00' / 1,096.85' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#3	Device 2	1,100.55'	**3.0" Vert. ORFICE** C= 0.600 Limited to weir flow at low heads
#4	Secondary	1,102.50'	**Spillway, Cv= 2.62 (C= 3.28)** Head (feet) 0.00 1.00 Width (feet) 10.00 20.00

Primary OutFlow Max=0.24 cfs @ 16.42 hrs HW=1,101.67' (Free Discharge)
└─**2=OUTLET** (Passes 0.24 cfs of 6.10 cfs potential flow)
  ├─**1=RIM** (Controls 0.00 cfs)
  └─**3=ORFICE** (Orifice Controls 0.24 cfs @ 4.80 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=1,097.00' (Free Discharge)
└─**4=Spillway** (Controls 0.00 cfs)

Summary for Pond 31P: DRYWELL 4

Inflow Area = 1.462 ac, 64.05% Impervious, Inflow Depth > 2.76" for 100-yr event
Inflow = 9.04 cfs @ 11.91 hrs, Volume= 0.336 af
Outflow = 8.93 cfs @ 11.94 hrs, Volume= 0.327 af, Atten= 1%, Lag= 1.9 min
Primary = 5.13 cfs @ 11.93 hrs, Volume= 0.304 af
  Routed to Pond 30P : I-2
Secondary = 3.81 cfs @ 11.94 hrs, Volume= 0.023 af
  Routed to Pond 30P : I-2

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 1,101.87' @ 11.93 hrs Surf.Area= 387 sf Storage= 1,166 cf

Plug-Flow detention time= 18.5 min calculated for 0.325 af (97% of inflow)
Center-of-Mass det. time= 7.9 min (801.7 - 793.8)

Volume	Invert	Avail.Storage	Storage Description
#1	1,095.50'	302 cf	**8.00'D x 6.00'H Vertical Cone/Cylinder** Inside #2
#2	1,094.50'	248 cf	**10.00'D x 7.00'H Vertical Cone/Cylinder Stone** 550 cf Overall - 302 cf Embedded = 248 cf
#3	1,098.42'	121 cf	**12.0" Round Pipe Storage** Inside #4 L= 154.0' S= 0.0050 '/'
#4	1,097.92'	495 cf	**24.0" W x 24.0" H Box Pipe Stone** L= 154.0' S= 0.0050 '/' 616 cf Overall - 121 cf Embedded = 495 cf
		1,166 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Secondary	1,101.50'	**24.0" Horiz. Rim** C= 0.600 Limited to weir flow at low heads
#2	Primary	1,098.42'	**12.0" Round Culvert** L= 28.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 1,098.42' / 1,098.28' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=5.05 cfs @ 11.93 hrs HW=1,101.78' (Free Discharge)
↑—**2=Culvert** (Inlet Controls 5.05 cfs @ 6.43 fps)

Secondary OutFlow Max=3.39 cfs @ 11.94 hrs HW=1,101.80' (Free Discharge)
↑—**1=Rim** (Weir Controls 3.39 cfs @ 1.79 fps)

Summary for Pond 52P: DRYWELL 1

Inflow Area = 0.071 ac, 10.53% Impervious, Inflow Depth > 0.40" for 100-yr event
Inflow = 0.02 cfs @ 12.14 hrs, Volume= 0.002 af
Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Routed to Pond 54P : DRYWELL 2
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Routed to Pond 54P : DRYWELL 2

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 1,098.17' @ 20.00 hrs Surf.Area= 79 sf Storage= 104 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1	1,097.00'	302 cf	**8.00'D x 6.00'H Vertical Cone/Cylinder** Inside #2
#2	1,096.00'	99 cf	**10.00'D x 7.00'H stone** 550 cf Overall - 302 cf Embedded = 248 cf x 40.0% Voids
#3	1,103.00'	693 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)
		1,094 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,103.00	8	0	0
1,104.00	1,378	693	693

Device	Routing	Invert	Outlet Devices
#1	Device 3	1,103.00'	**24.0" Horiz. Rim X 2.00** C= 0.600 Limited to weir flow at low heads
#2	Primary	1,099.90'	**12.0" Round Culvert** L= 40.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 1,099.90' / 1,099.90' S= 0.0000 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#3	Secondary	1,104.50'	**Flood Route, Cv= 2.62 (C= 3.28)** Head (feet) 0.00 0.50 Width (feet) 10.00 40.00

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=1,096.00' (Free Discharge)
└**2=Culvert** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=1,096.00' (Free Discharge)
└**3=Flood Route** (Controls 0.00 cfs)
└**1=Rim** (Controls 0.00 cfs)

Summary for Pond 54P: DRYWELL 2

Inflow Area = 0.071 ac, 10.53% Impervious, Inflow Depth = 0.00" for 100-yr event
Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Routed to Pond 29P : DRYWELL 3
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Routed to Pond 29P : DRYWELL 3

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 1,096.00' @ 5.00 hrs Surf.Area= 79 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no inflow)

Volume	Invert	Avail.Storage	Storage Description
#1	1,097.00'	302 cf	**8.00'D x 6.00'H Vertical Cone/Cylinder** Inside #2
#2	1,096.00'	99 cf	**10.00'D x 7.00'H stone** 550 cf Overall - 302 cf Embedded = 248 cf x 40.0% Voids
#3	1,103.00'	693 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)
#4	1,099.90'	31 cf	**12.0" Round Pipe Storage** Inside #5 L= 40.0'
#5	1,099.40'	129 cf	**24.0" W x 24.0" H Box Pipe Storage** L= 40.0' 160 cf Overall - 31 cf Embedded = 129 cf
		1,254 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,103.00	8	0	0
1,104.00	1,378	693	693

Device	Routing	Invert	Outlet Devices
#1	Device 3	1,103.00'	**24.0" Horiz. Rim X 2.00** C= 0.600 Limited to weir flow at low heads
#2	Primary	1,099.20'	**8.0" Round Culvert** L= 140.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 1,099.20' / 1,099.20' S= 0.0000 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#3	Secondary	1,104.50'	**Flood Route, Cv= 2.62 (C= 3.28)** Head (feet) 0.00 0.50 Width (feet) 10.00 40.00

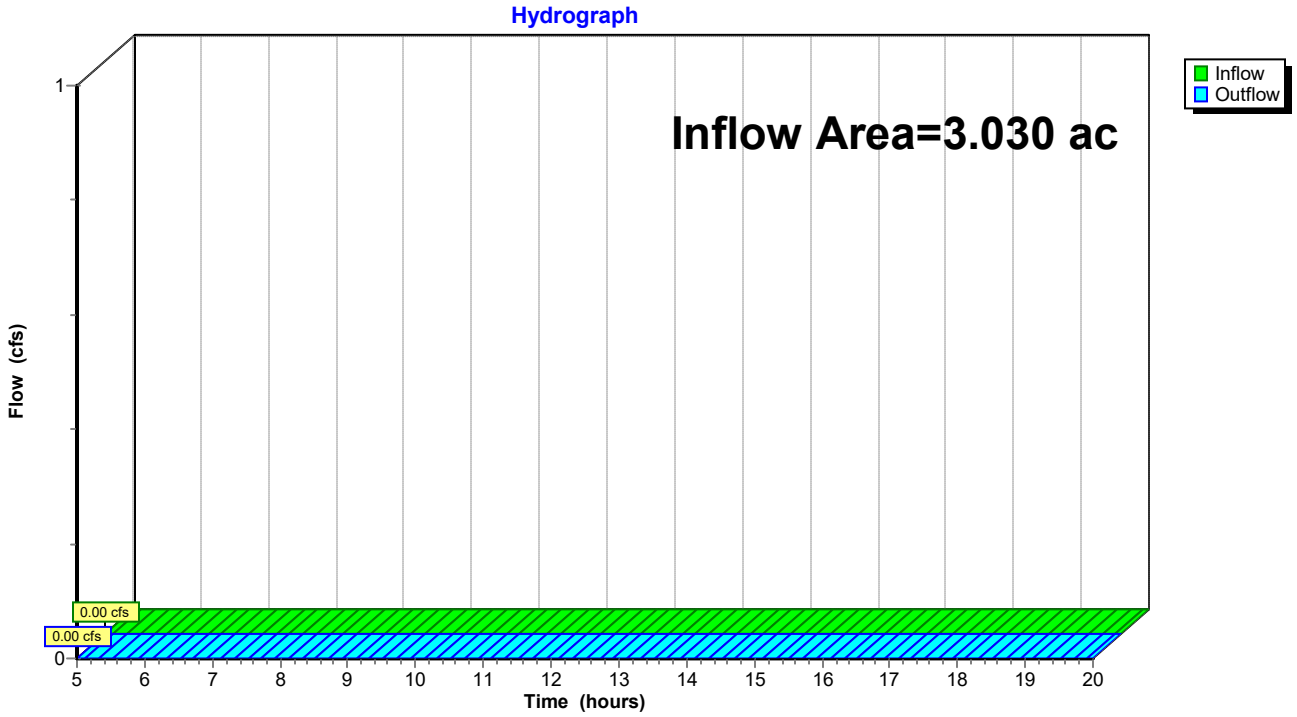
Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=1,096.00' (Free Discharge)
└─**2=Culvert** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=1,096.00' (Free Discharge)
└─**3=Flood Route** (Controls 0.00 cfs)
└─**1=Rim** (Controls 0.00 cfs)

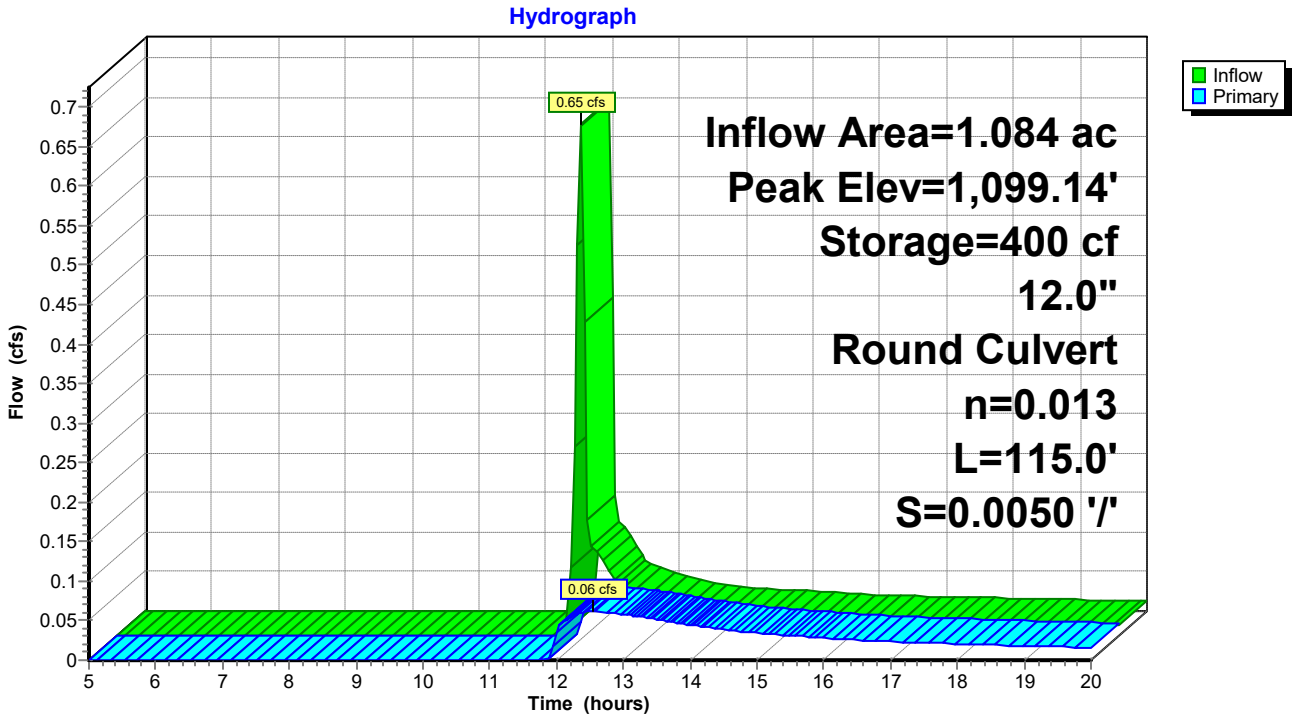
Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	1-yr	Type II 24-hr		Default	24.00	1	1.97	2
2	2-yr	Type II 24-hr		Default	24.00	1	2.35	2
3	5-yr	Type II 24-hr		Default	24.00	1	2.88	2
4	10-yr	Type II 24-hr		Default	24.00	1	3.36	2
5	25-yr	Type II 24-hr		Default	24.00	1	4.12	2
6	50-yr	Type II 24-hr		Default	24.00	1	4.81	2
7	100-yr	Type II 24-hr		Default	24.00	1	5.62	2

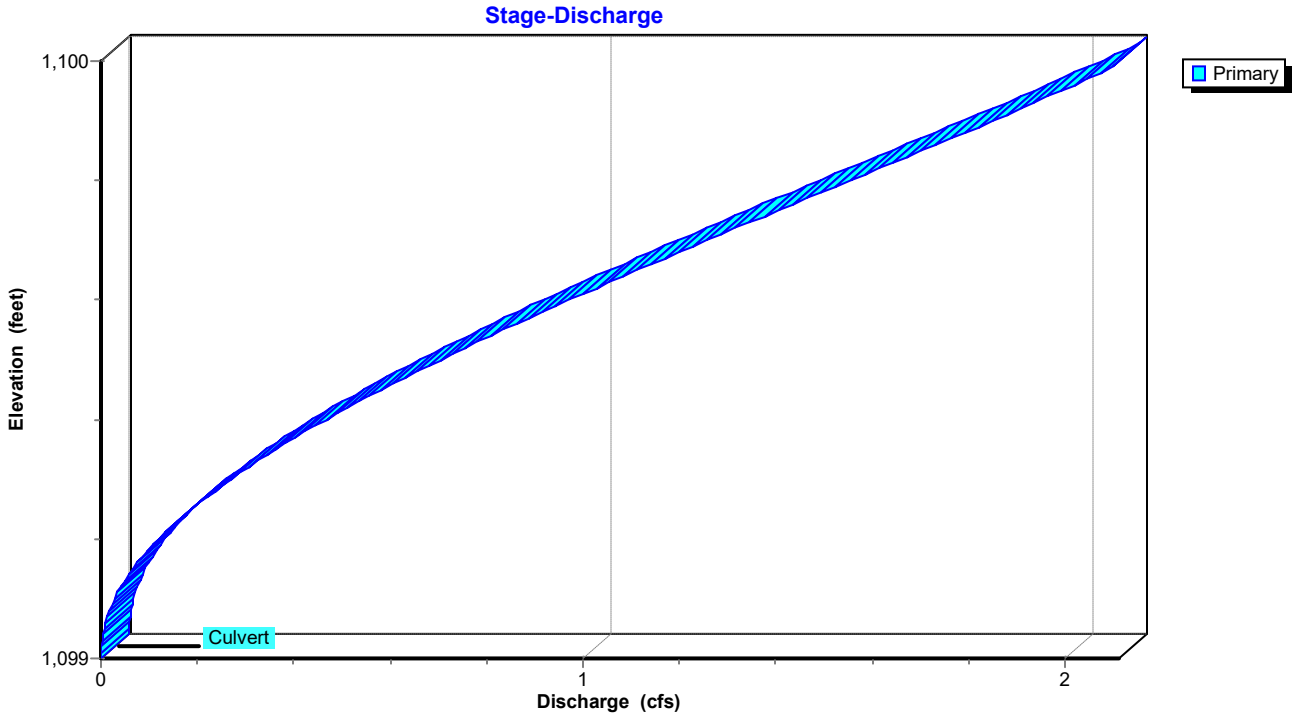
Reach 19R: TIOUGHNIOGA RIVER



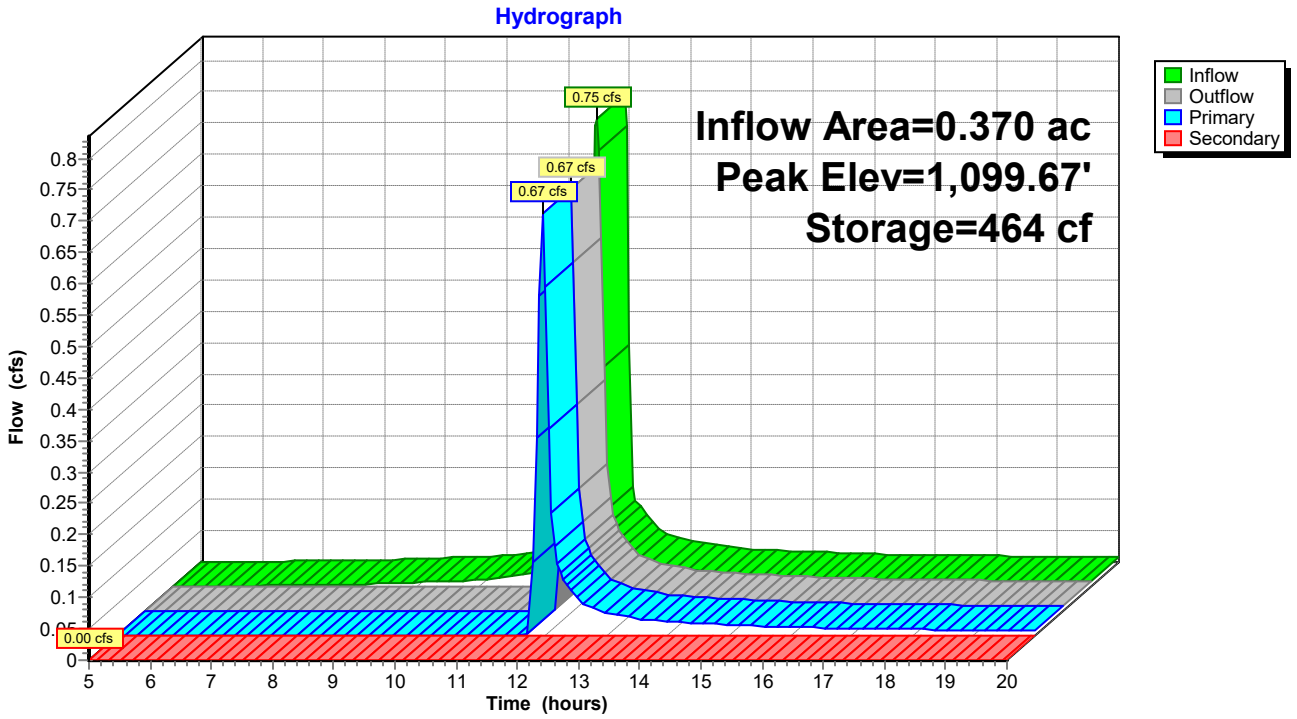
Pond 18P: FOREBAY



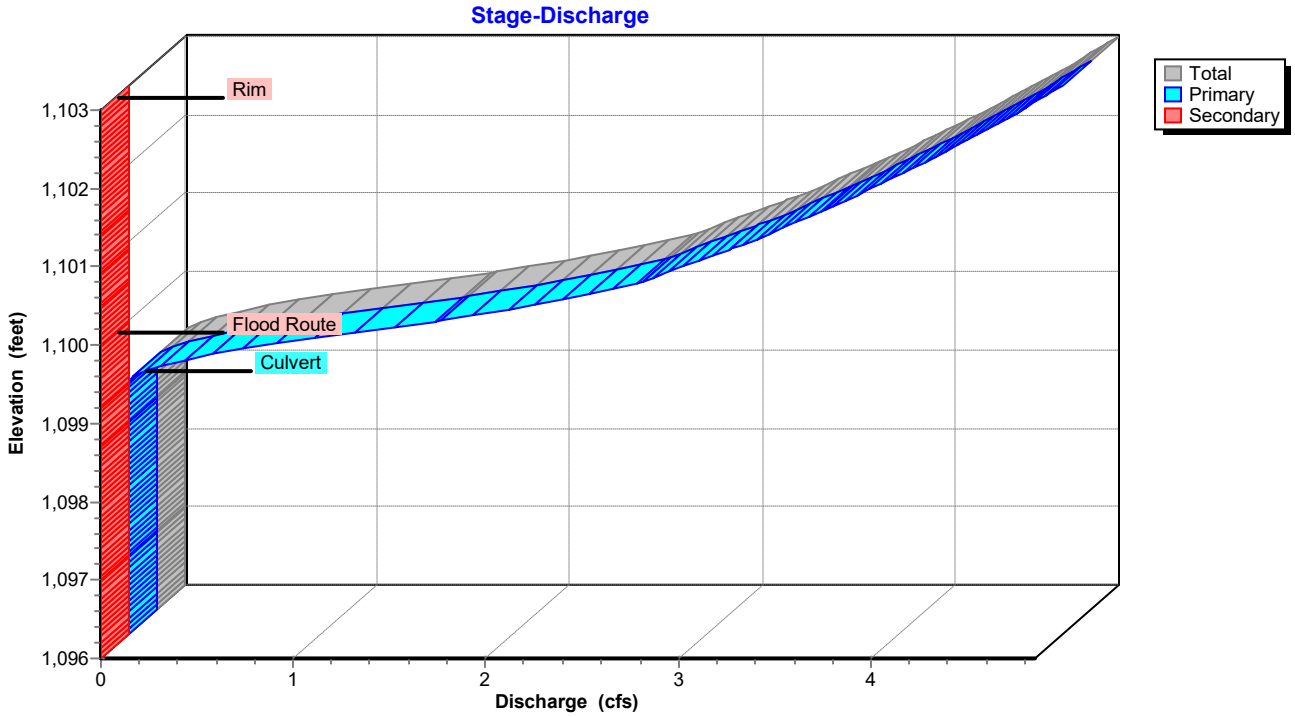
Pond 18P: FOREBAY



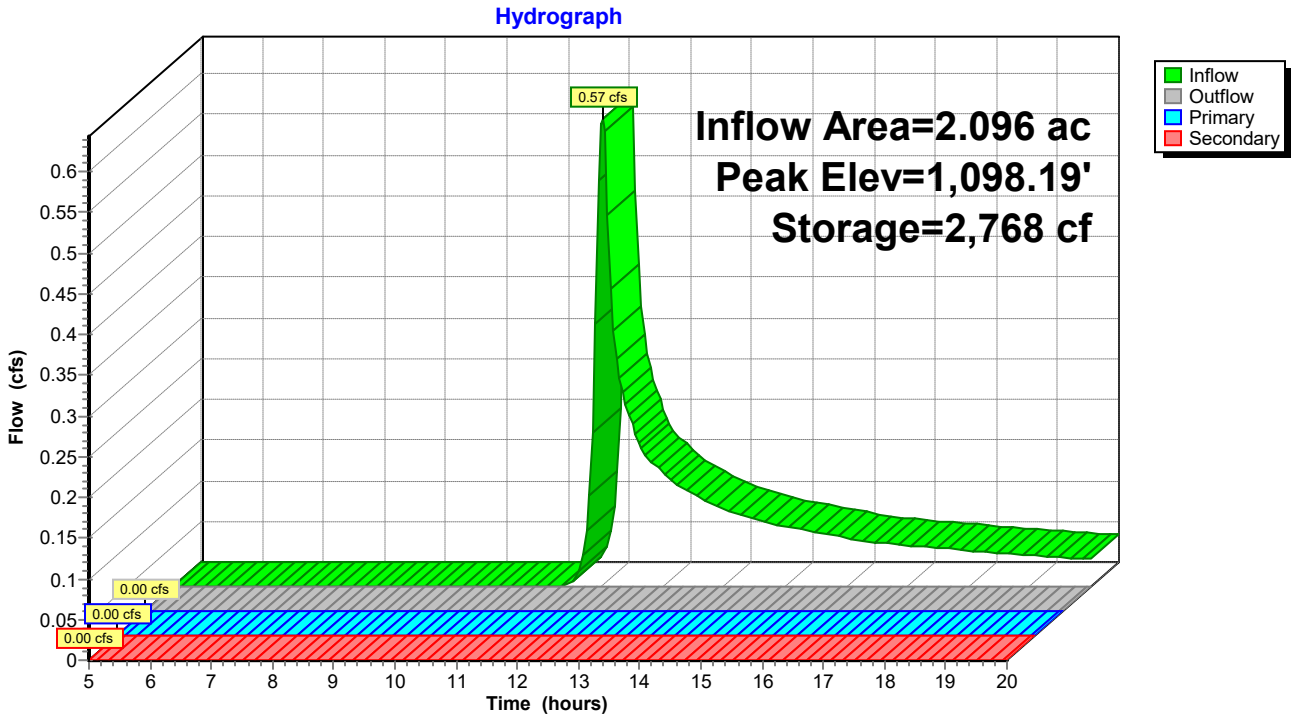
Pond 29P: DRYWELL 3



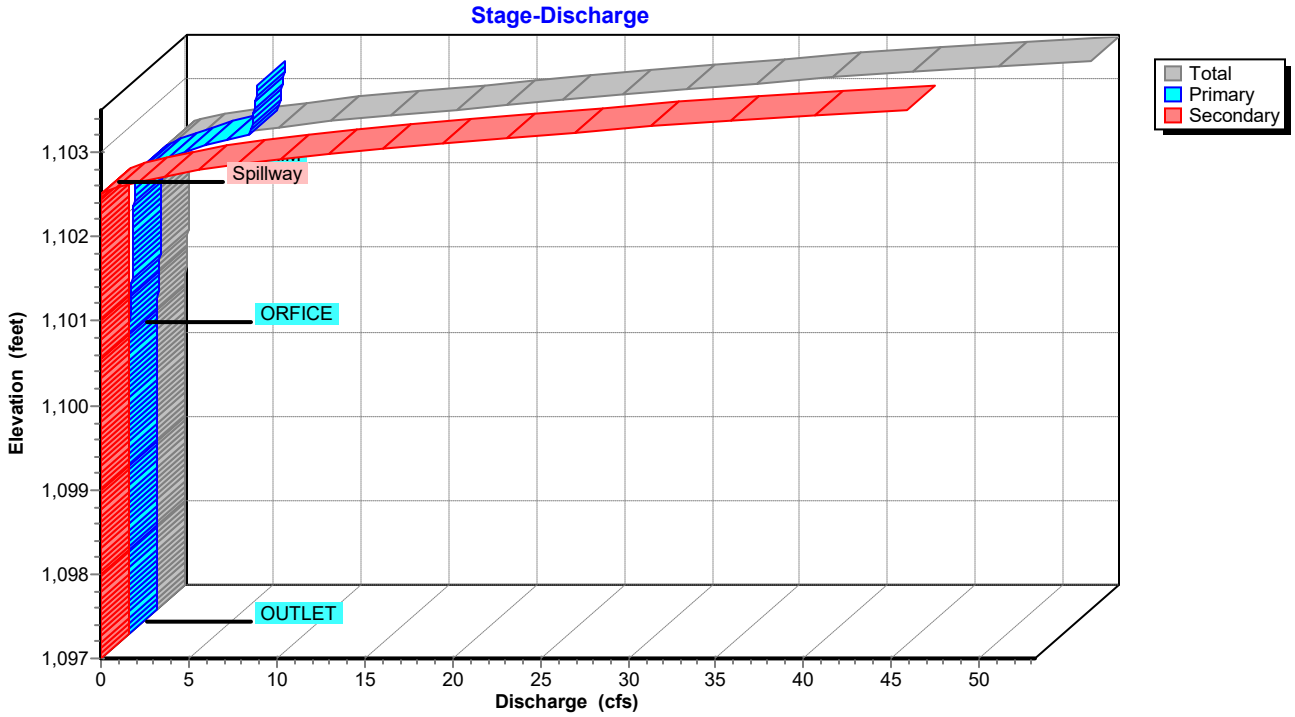
Pond 29P: DRYWELL 3



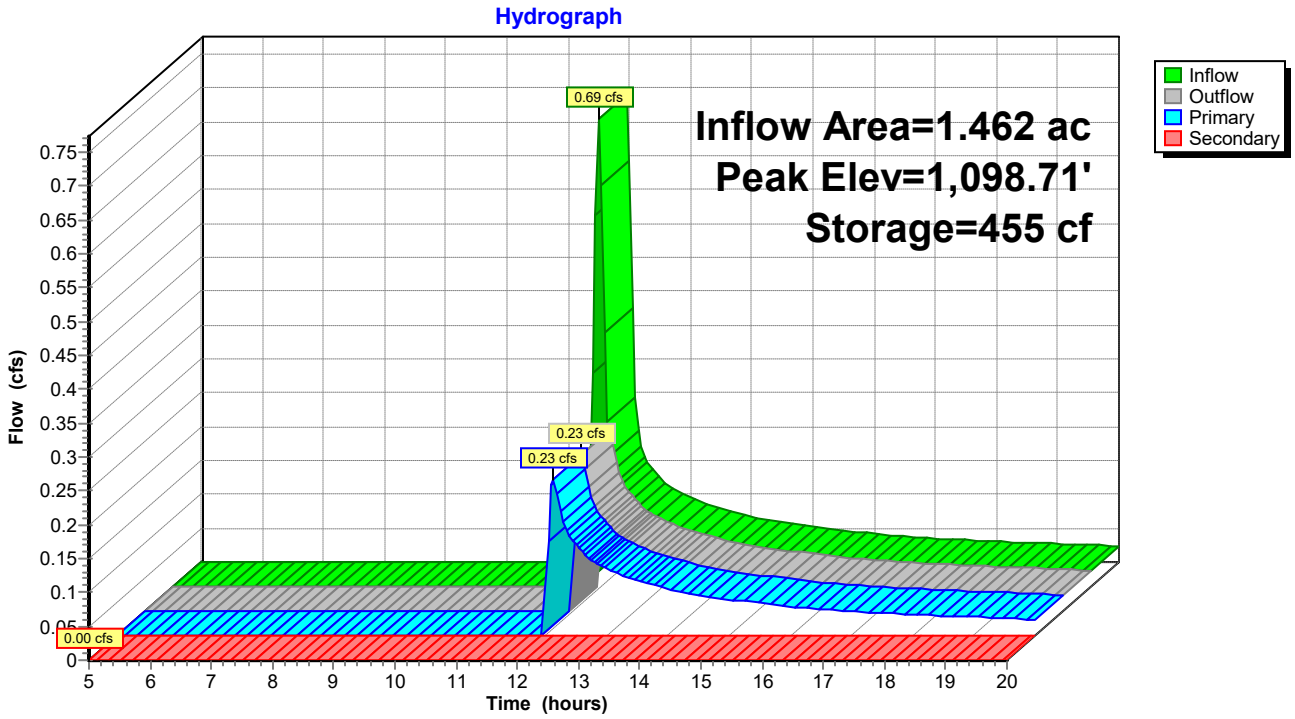
Pond 30P: I-2



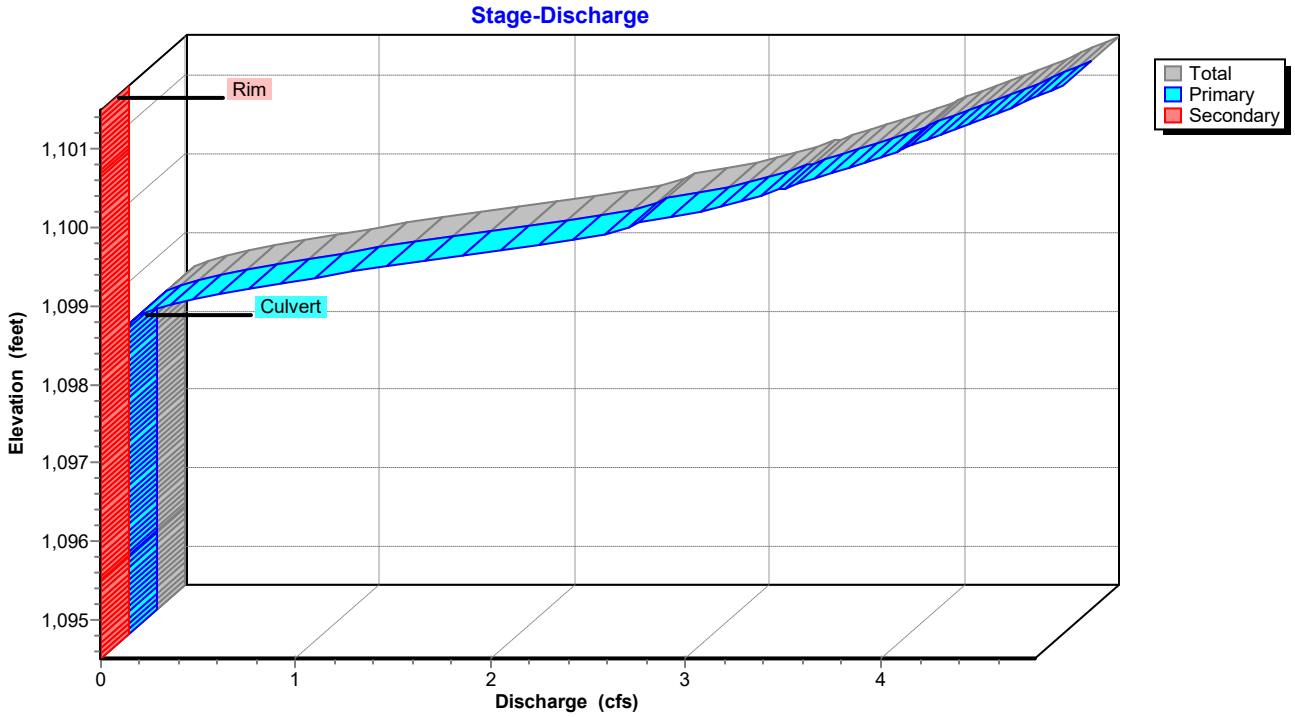
Pond 30P: I-2



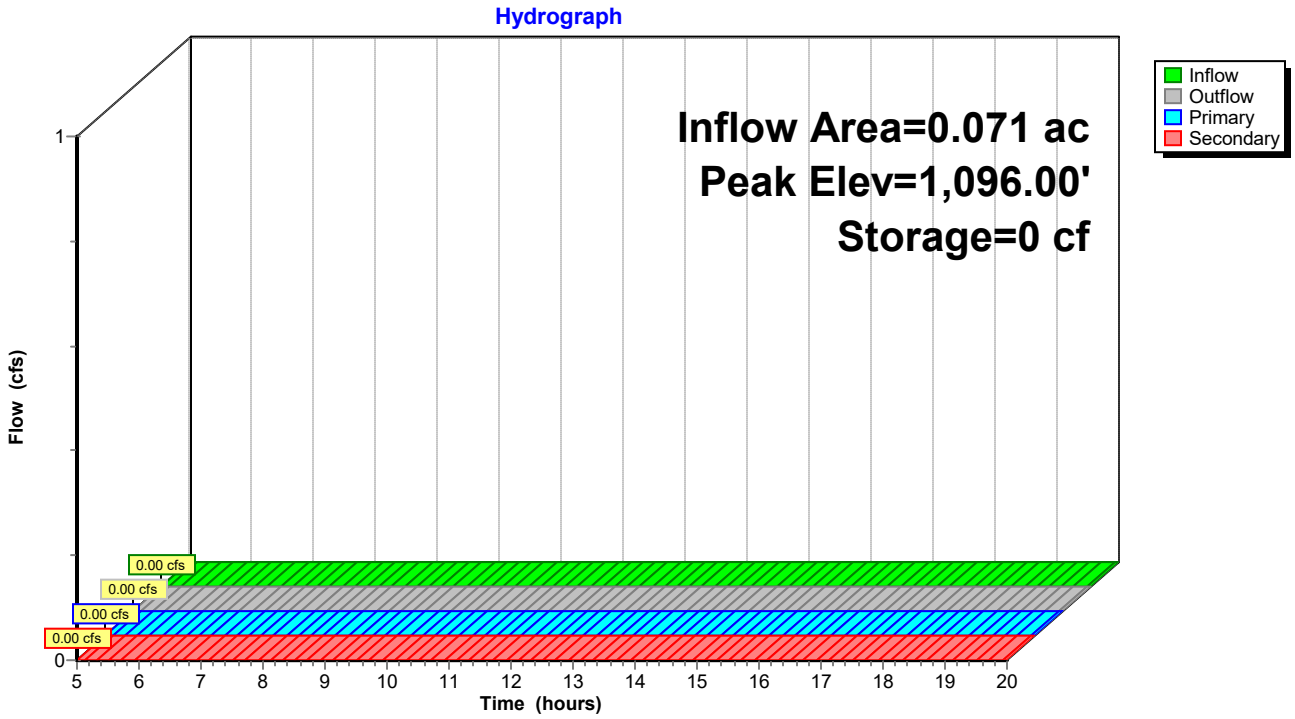
Pond 31P: DRYWELL 4



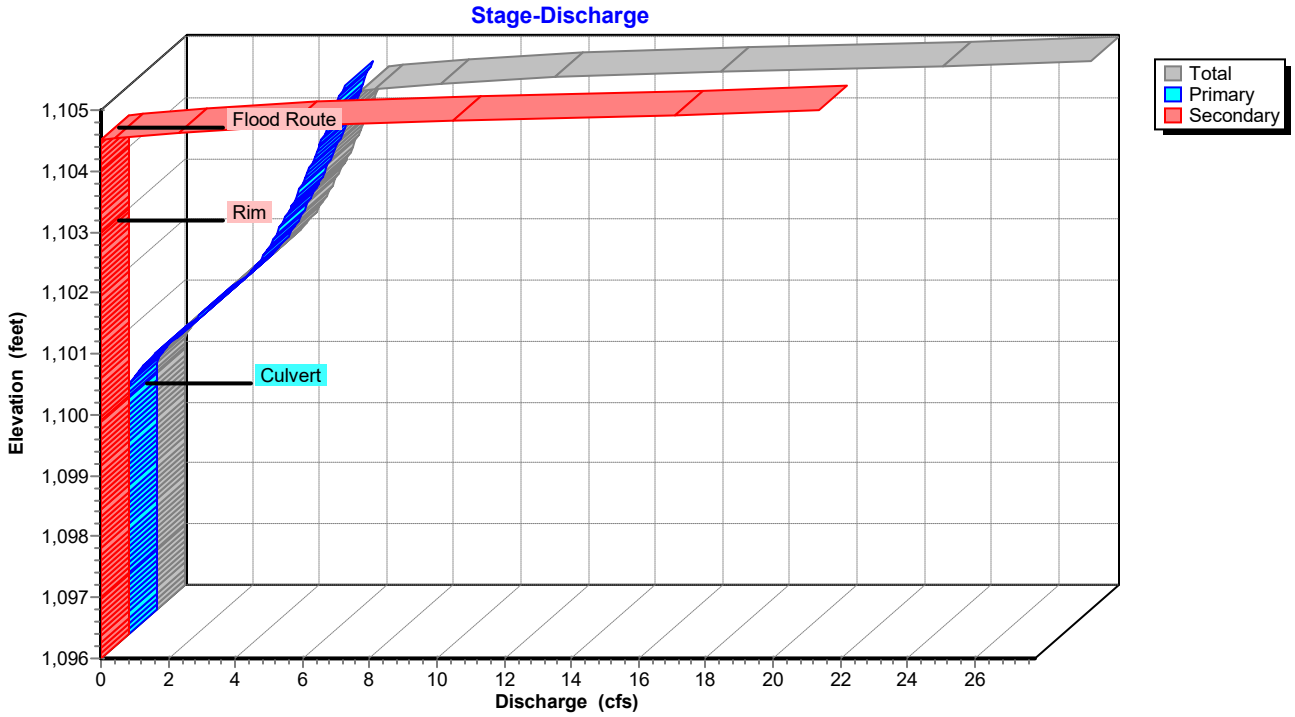
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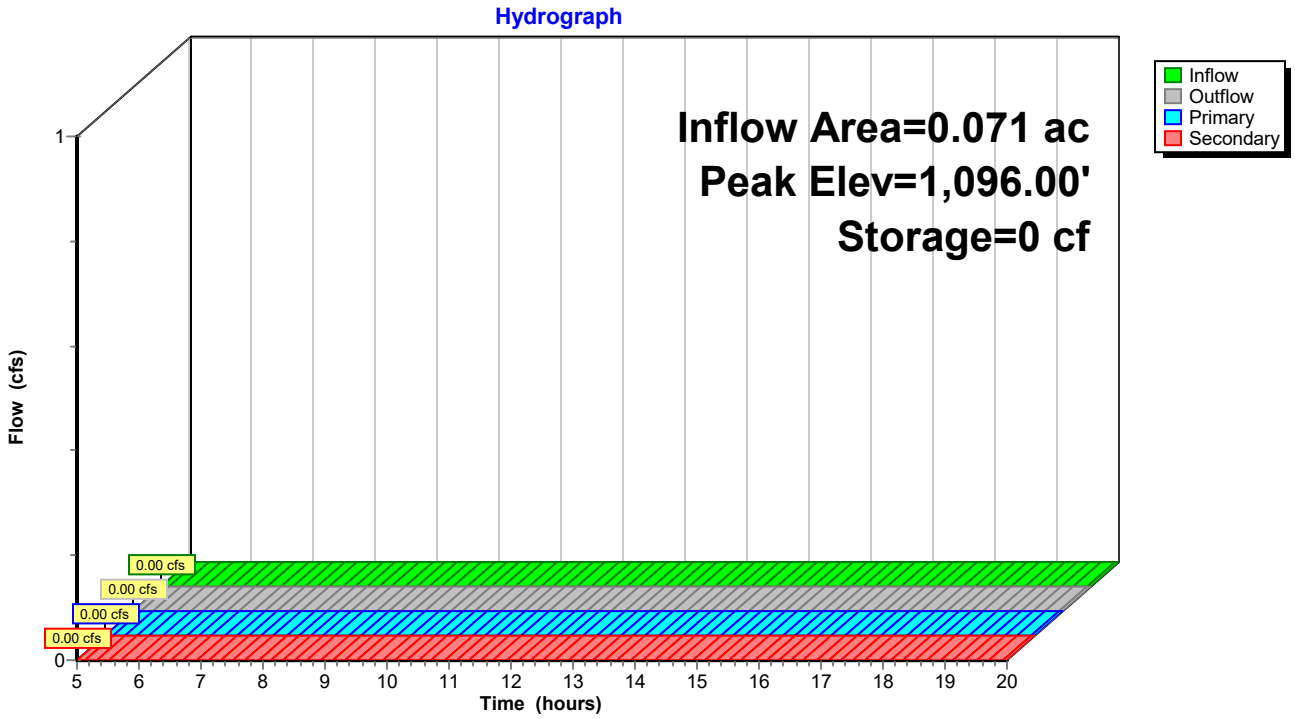
Pond 52P: DRYWELL 1



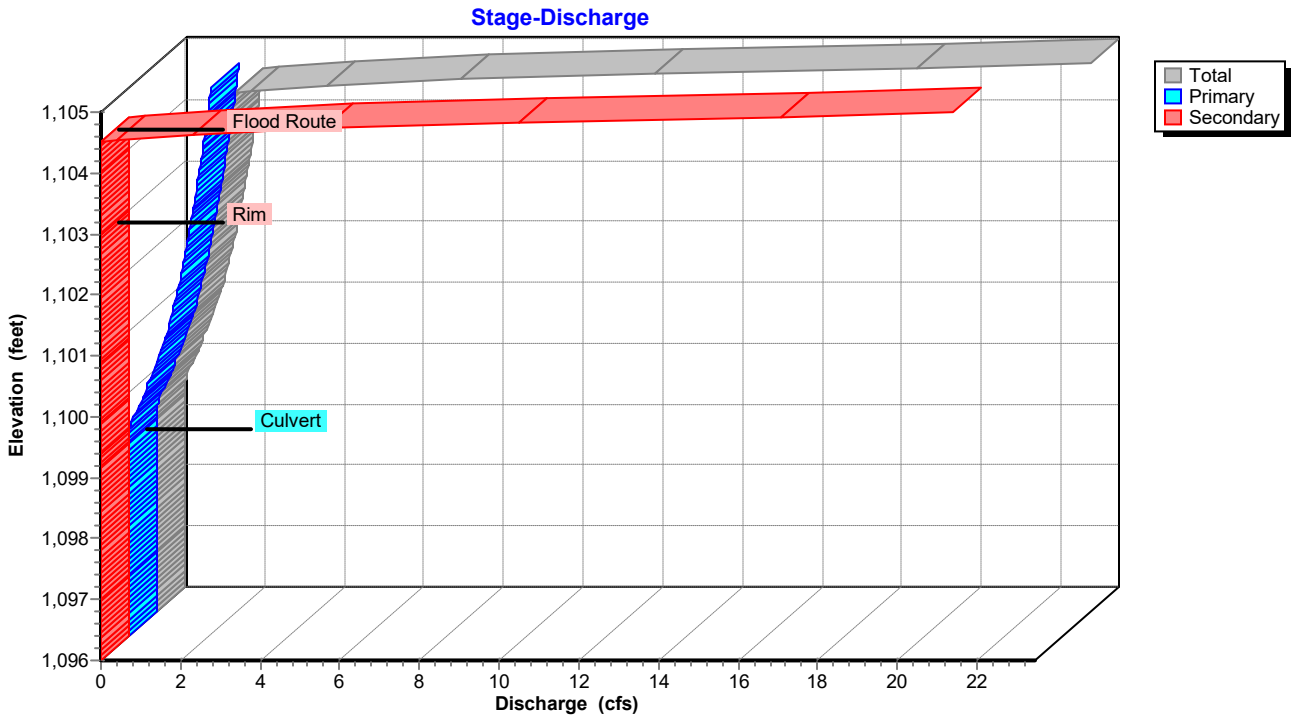
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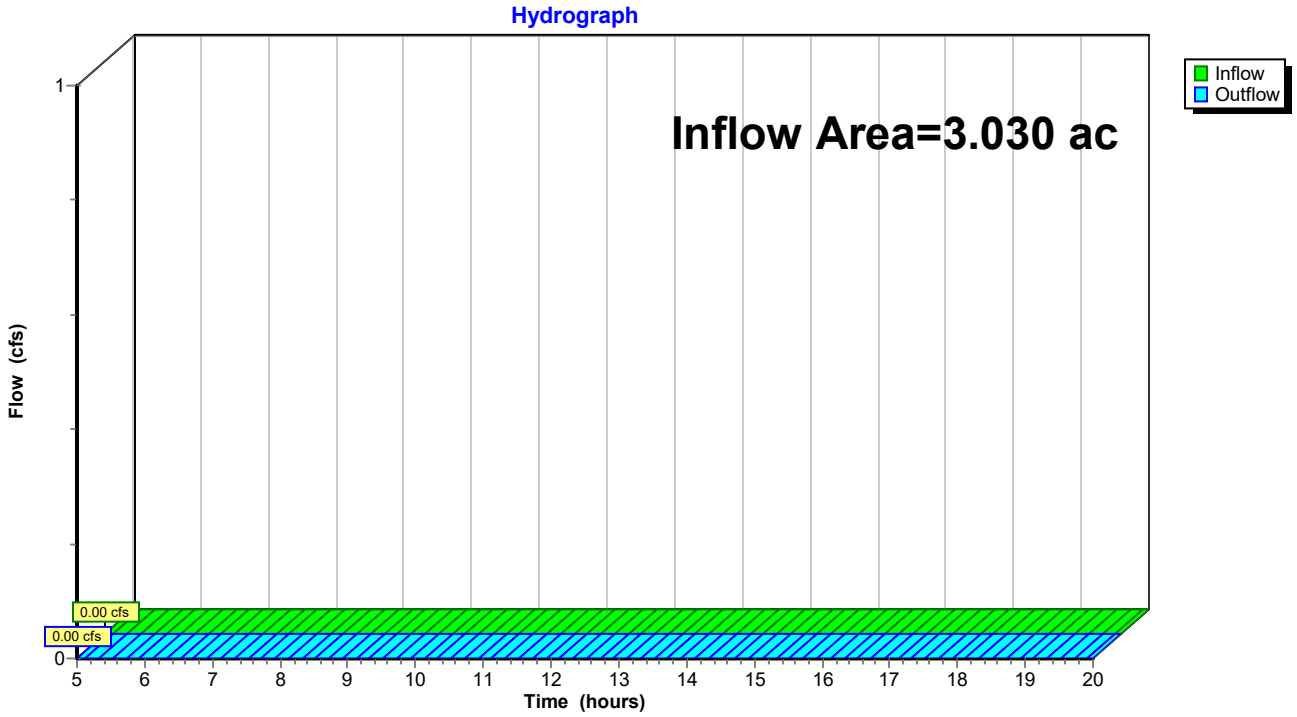
Pond 54P: DRYWELL 2



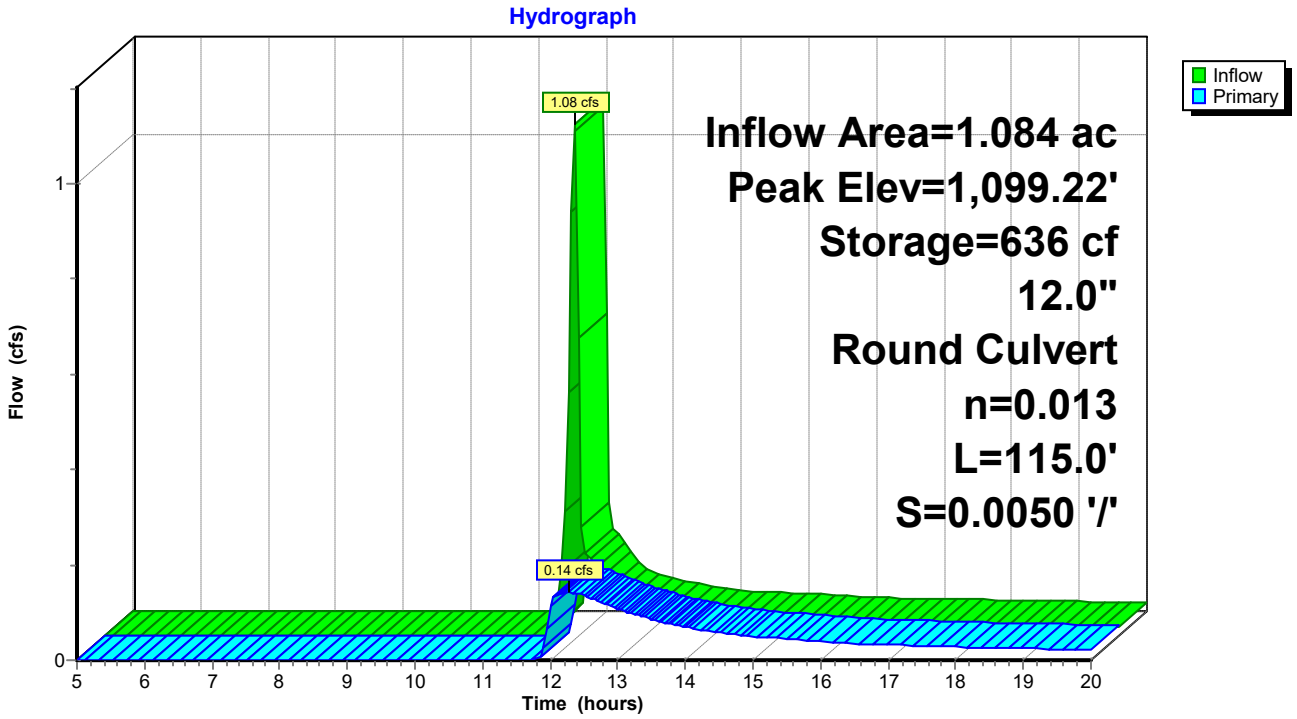
Pond 54P: DRYWELL 2



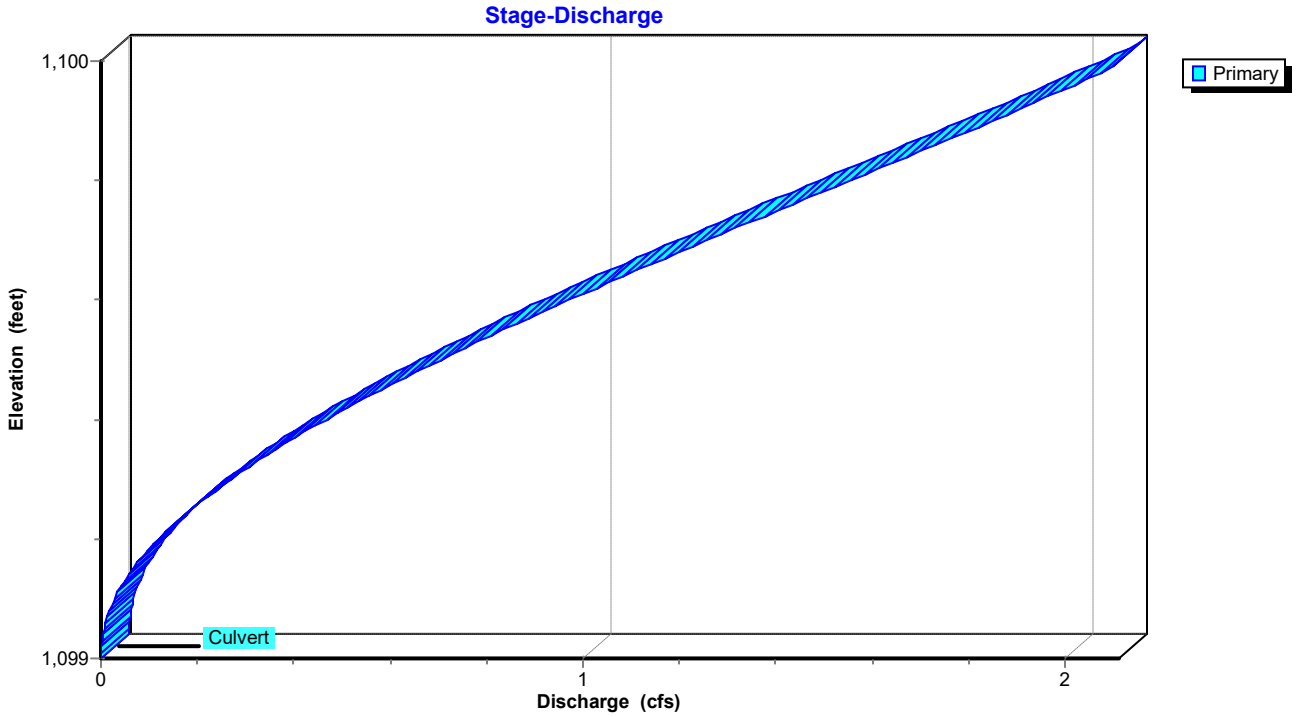
Reach 19R: TIOUGHNIOGA RIVER



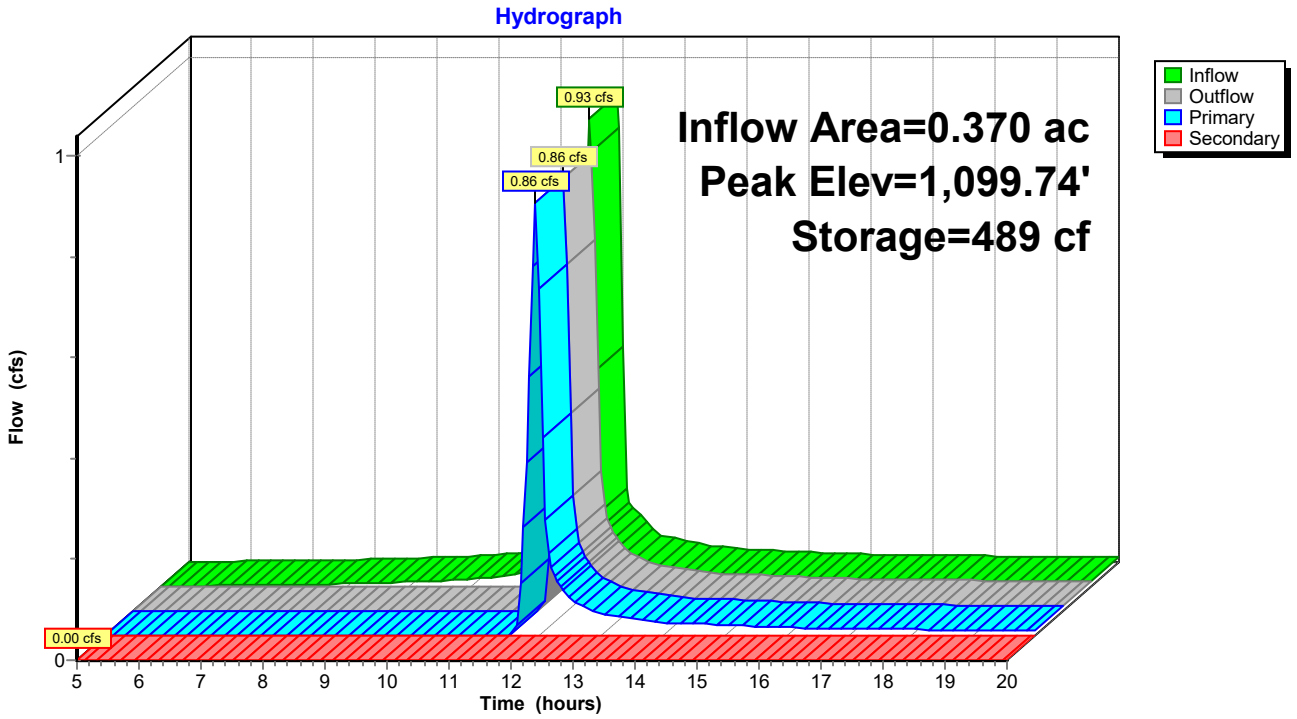
Pond 18P: FOREBAY



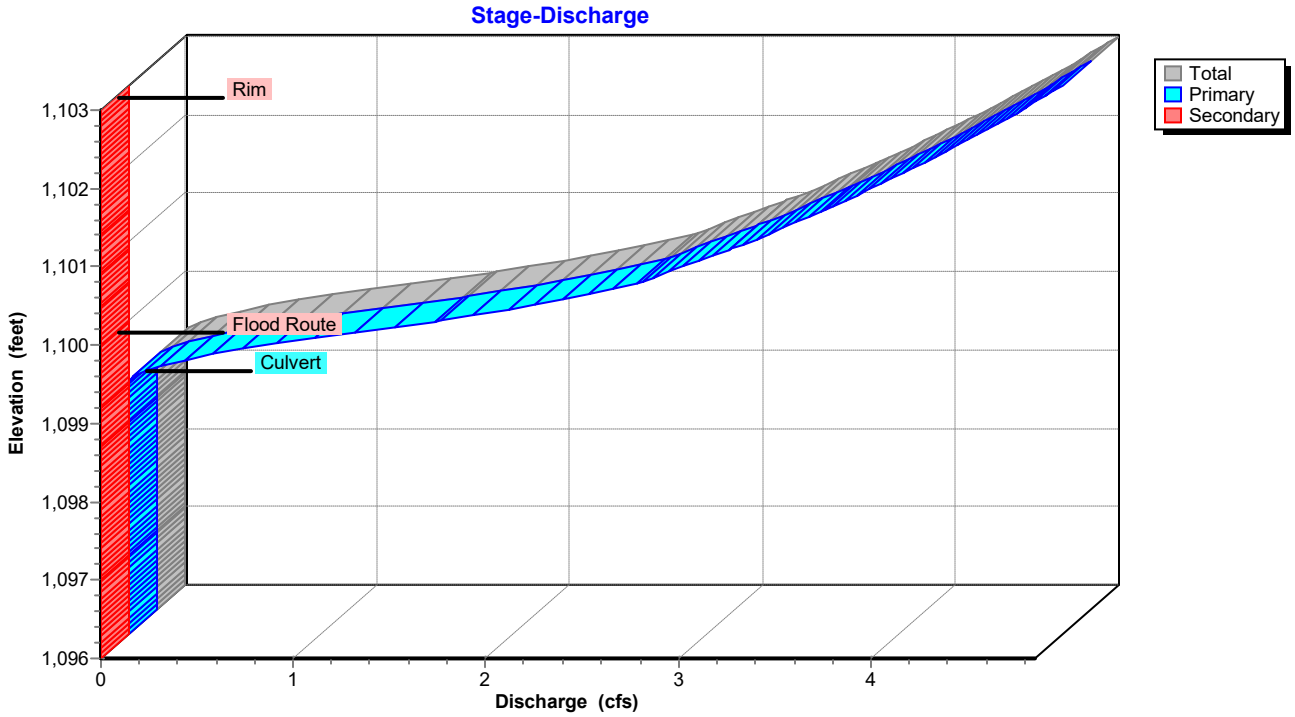
Pond 18P: FOREBAY



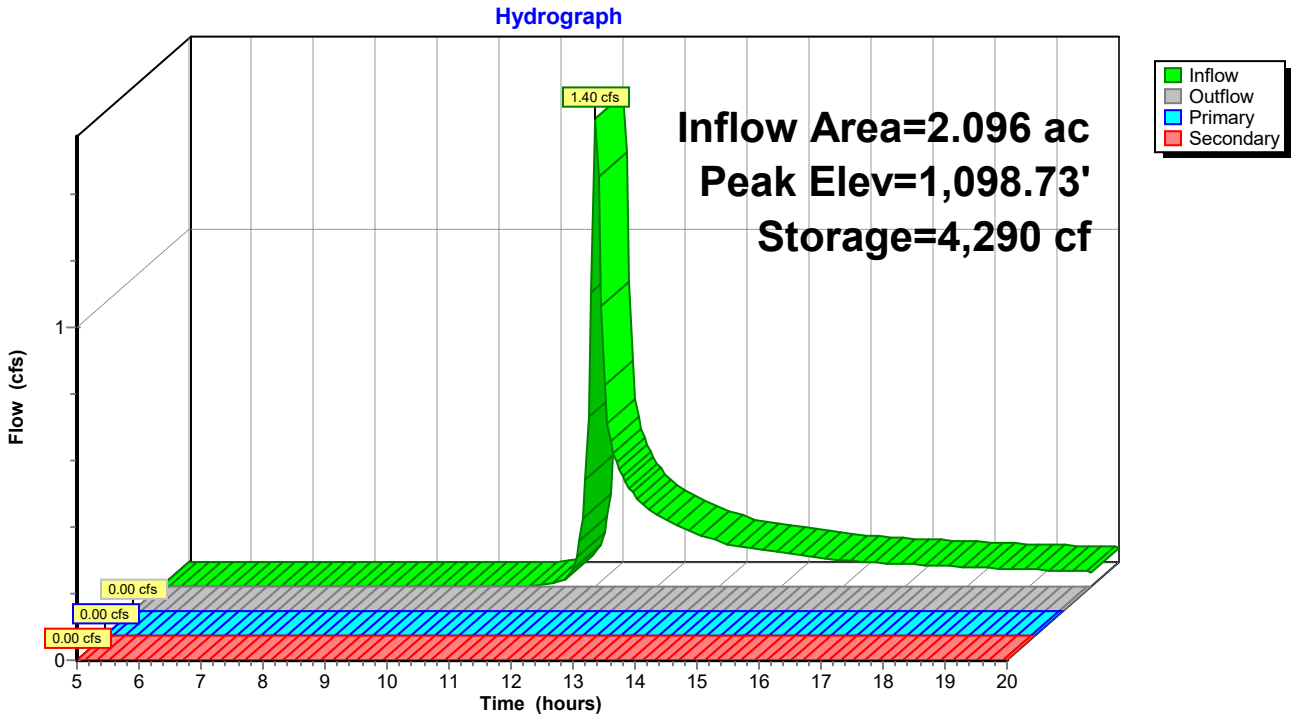
Pond 29P: DRYWELL 3



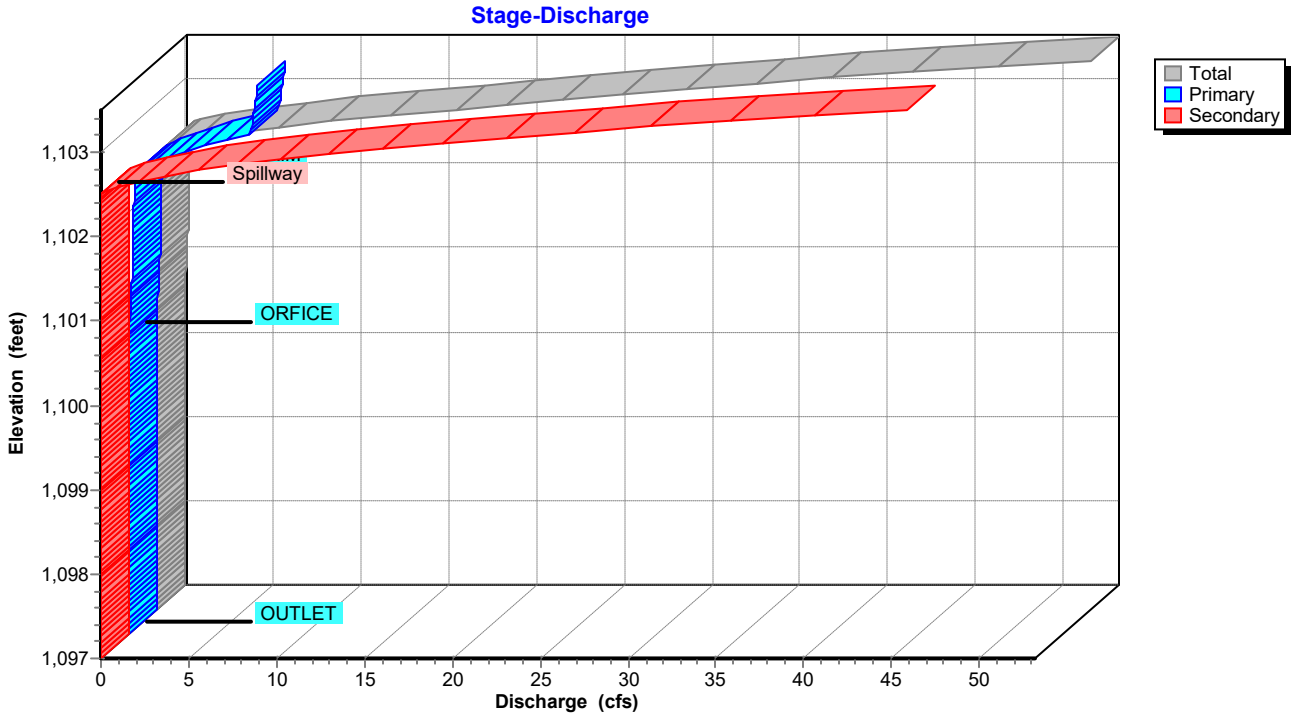
Pond 29P: DRYWELL 3



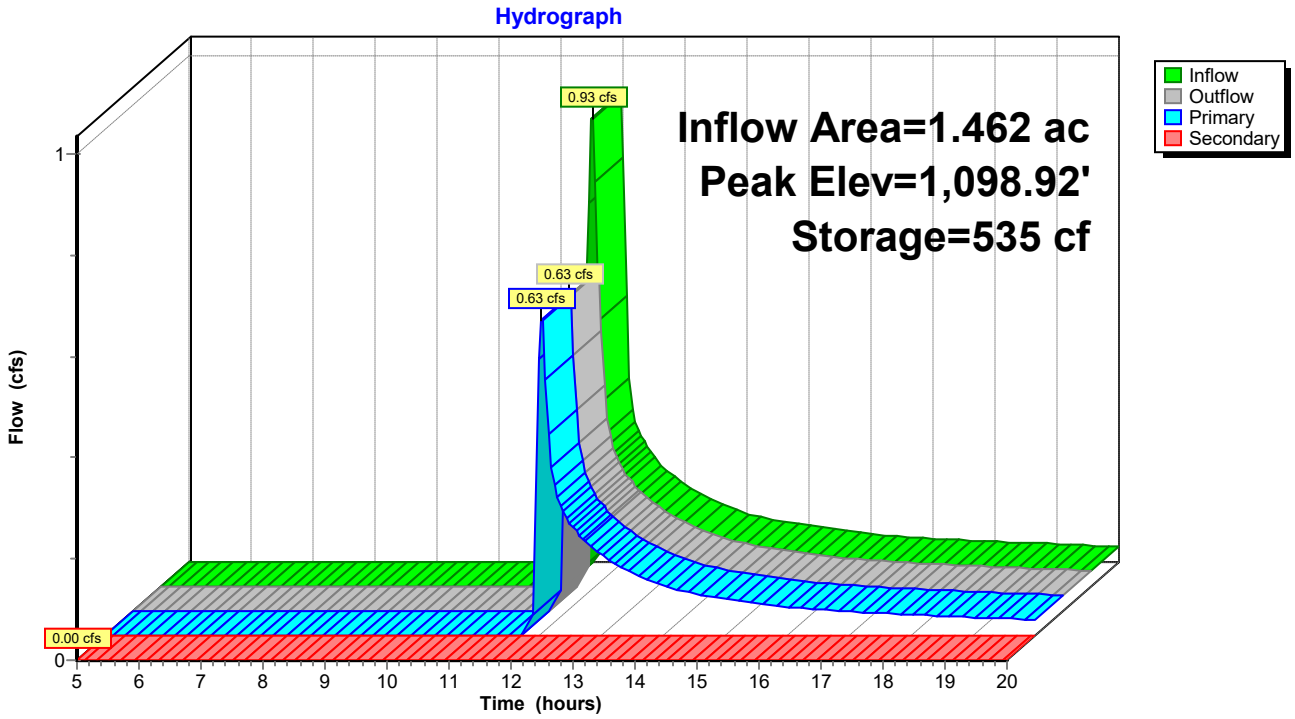
Pond 30P: I-2



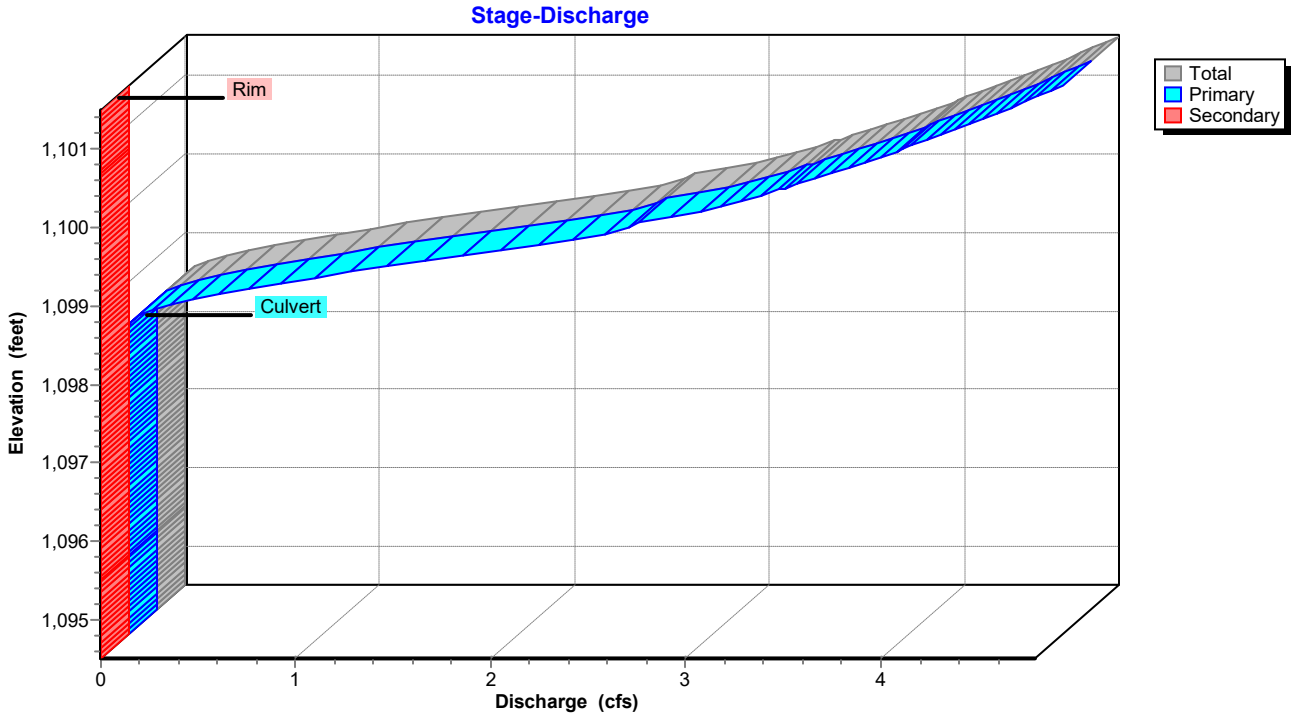
Pond 30P: I-2



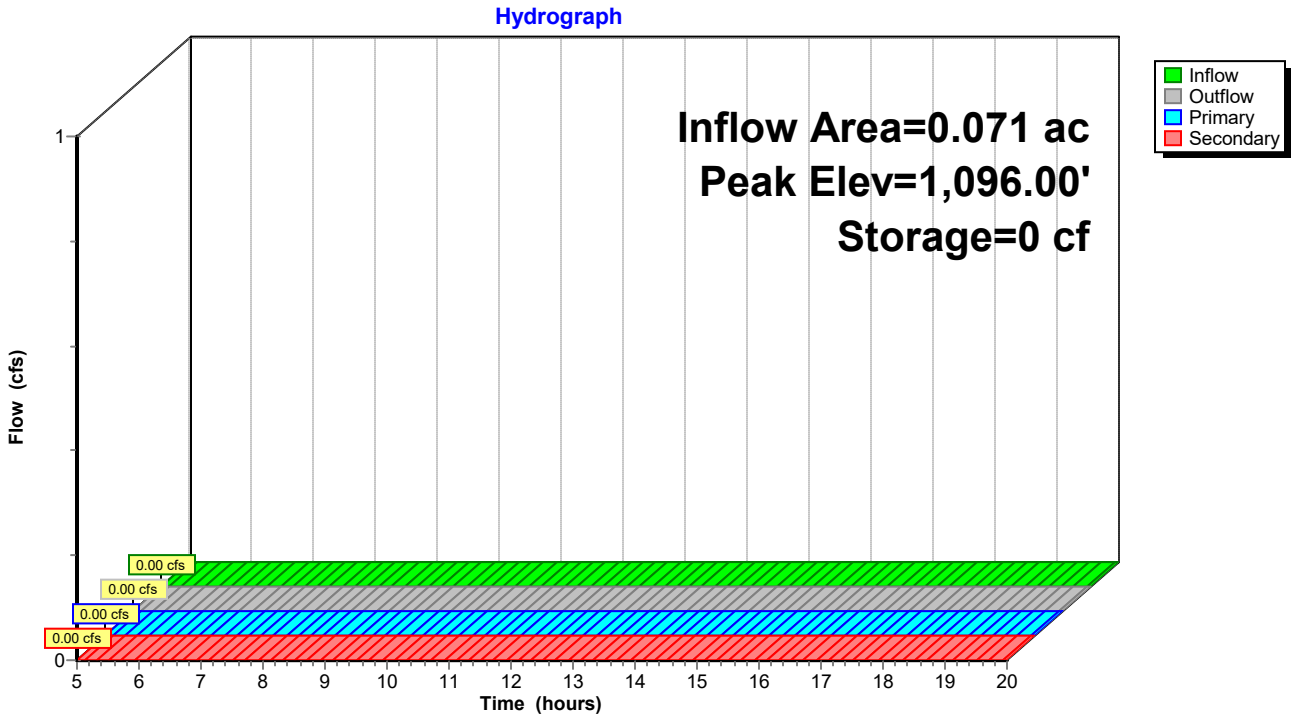
Pond 31P: DRYWELL 4



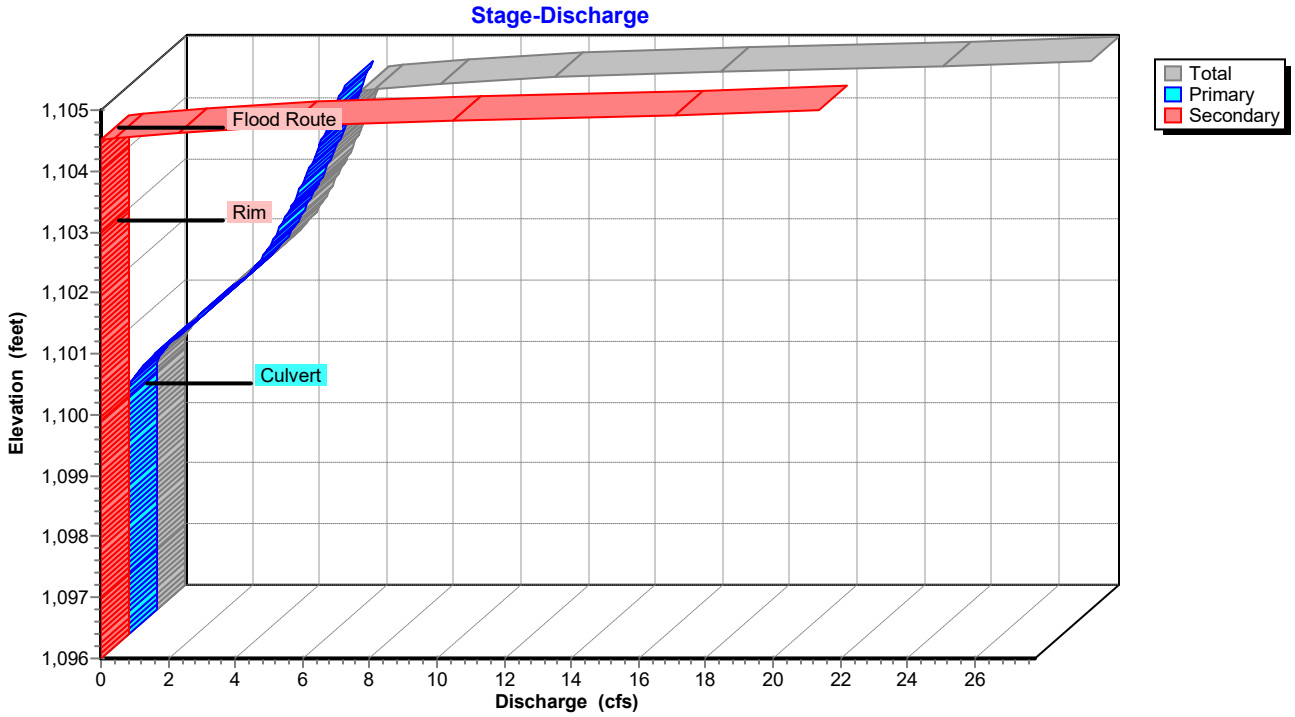
Pond 31P: DRYWELL 4



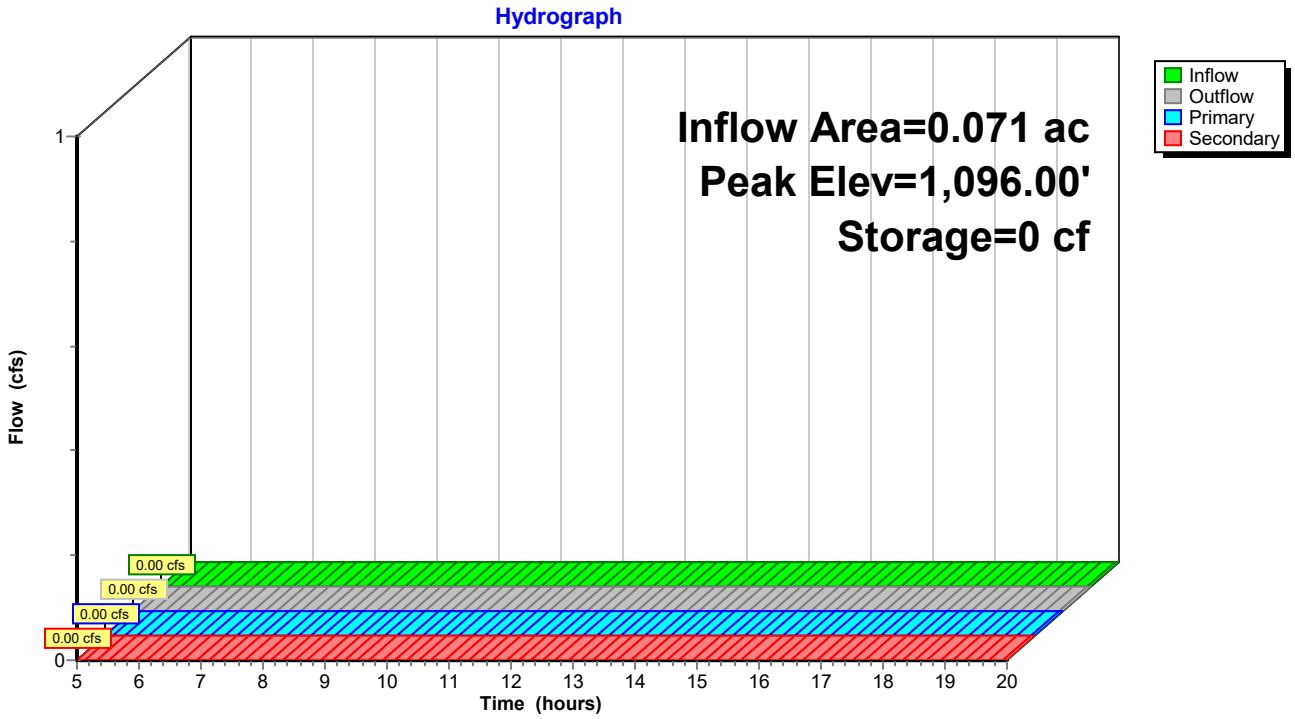
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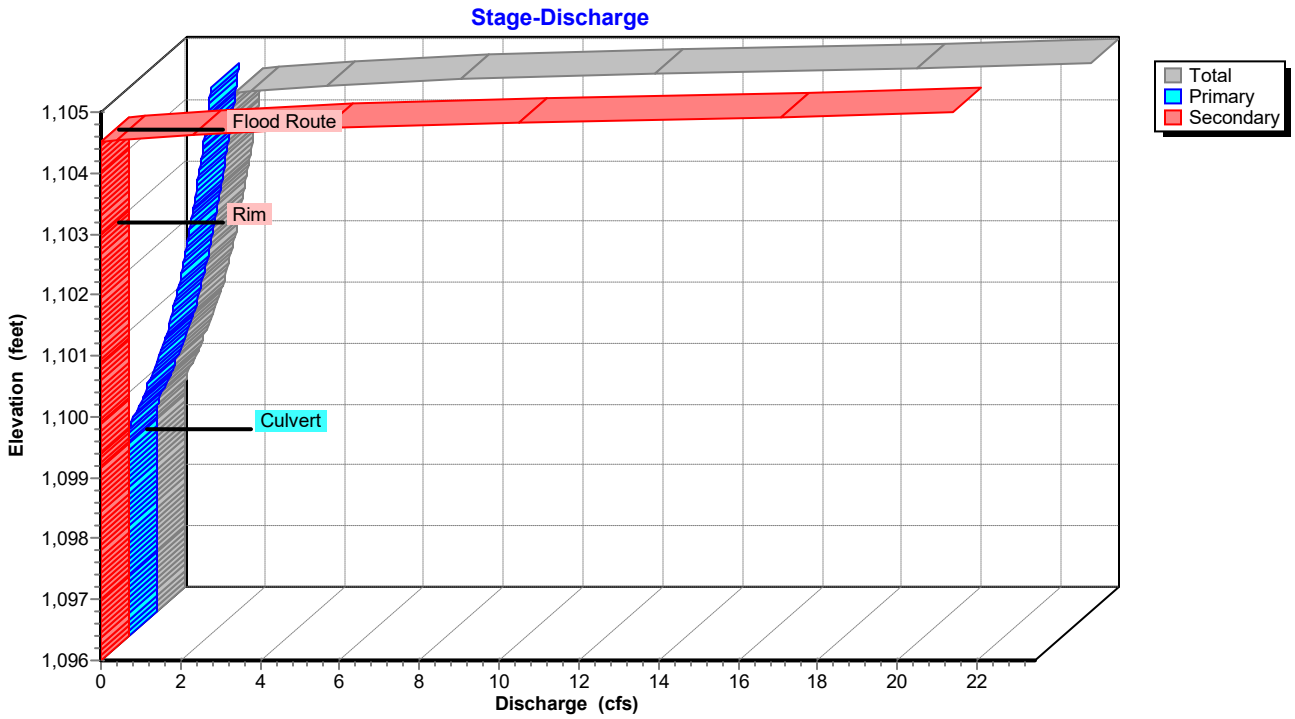
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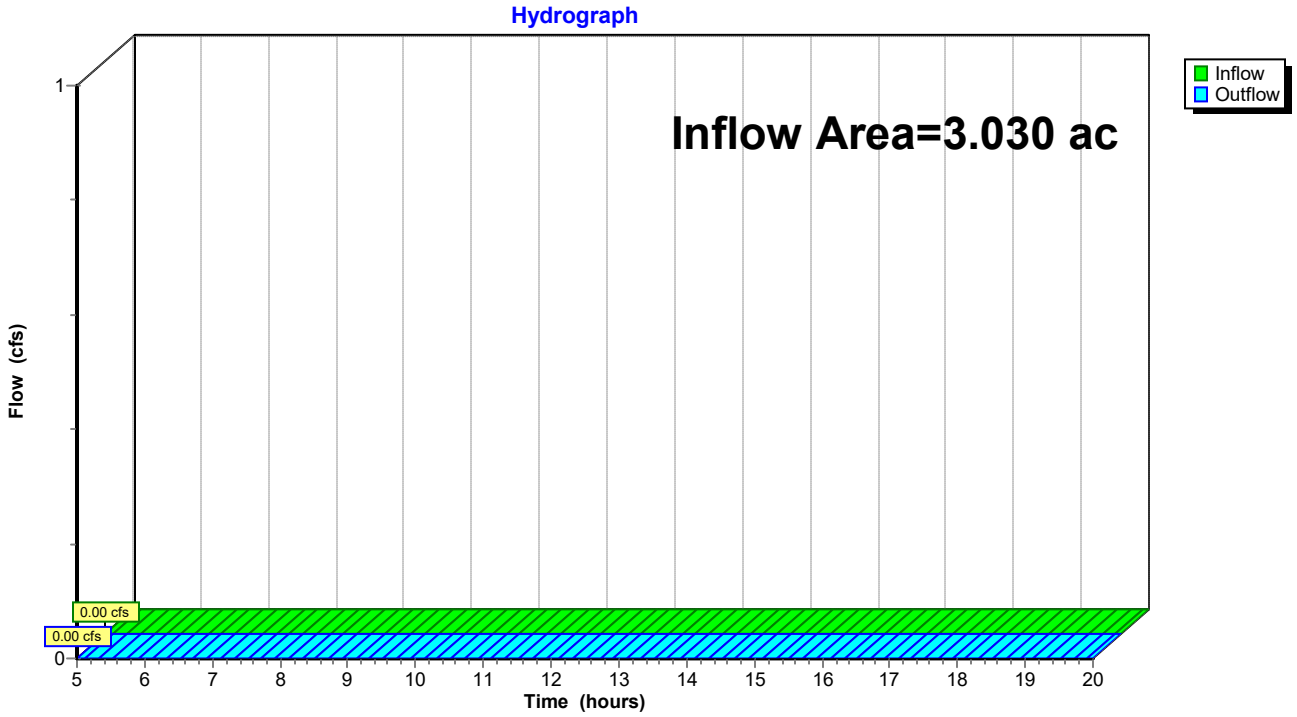
Pond 54P: DRYWELL 2



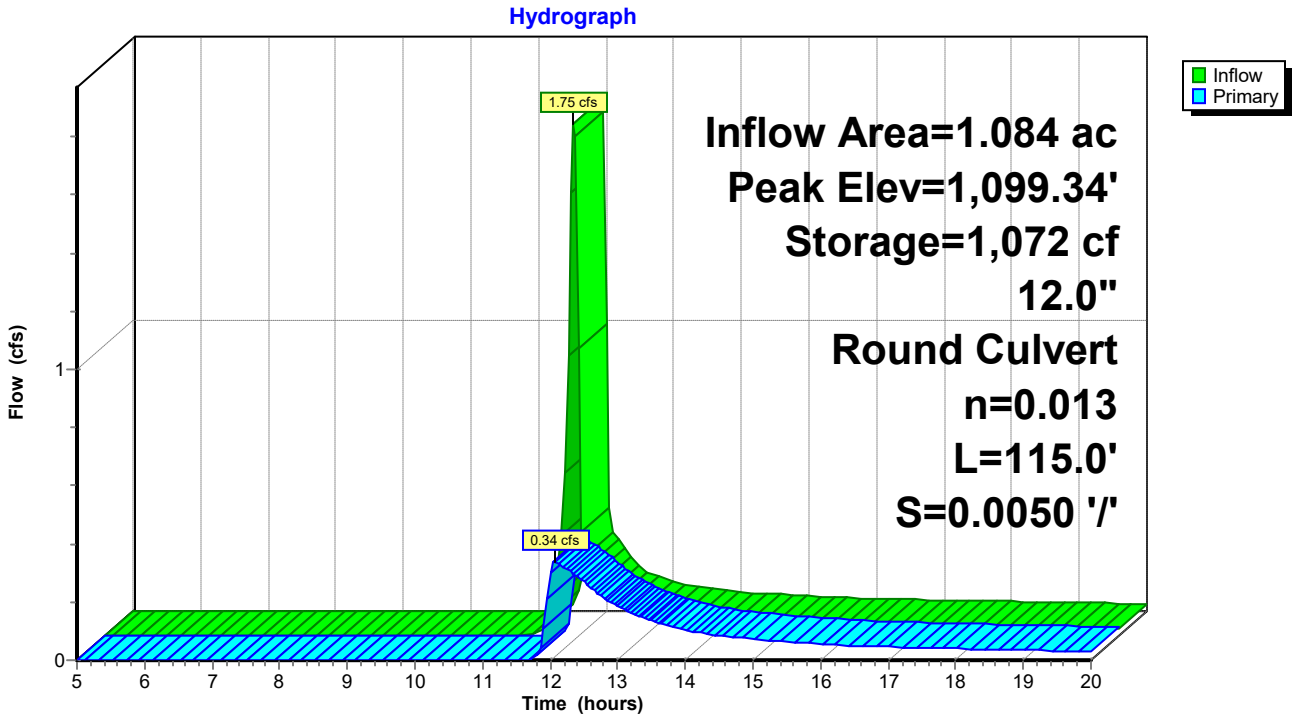
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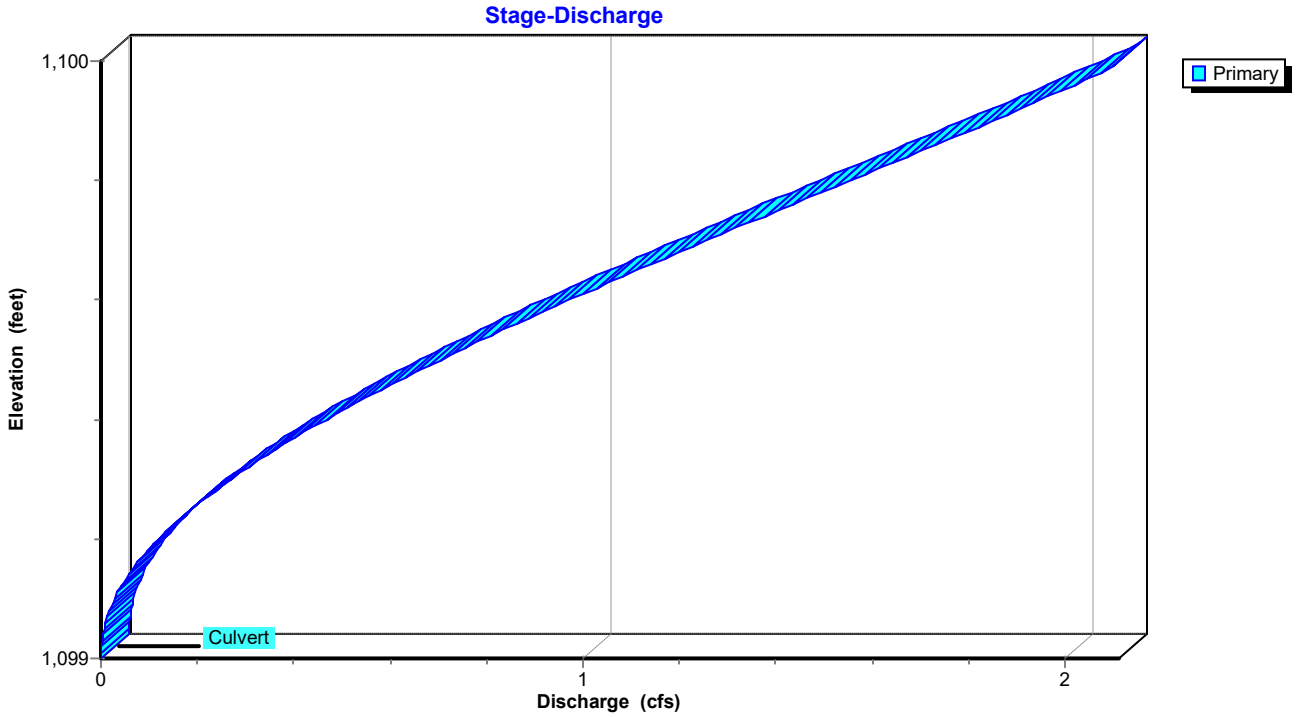
Reach 19R: TIOUGHNIOGA RIVER



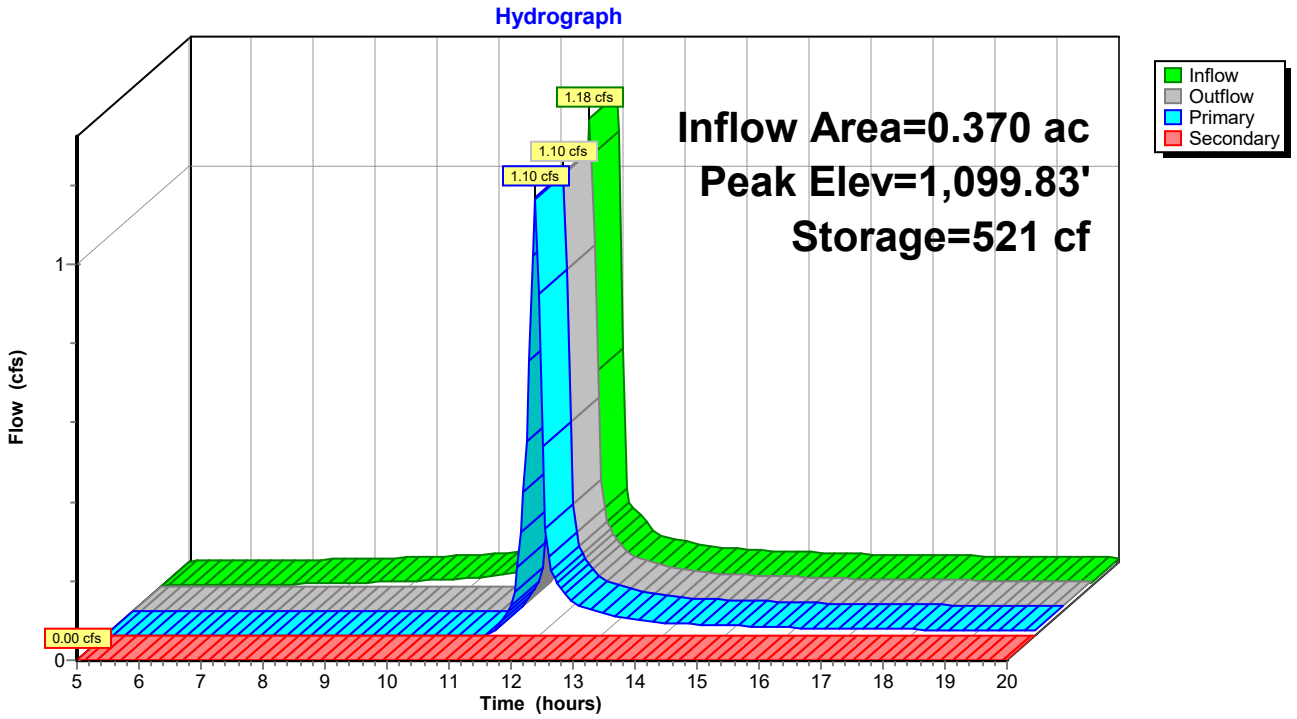
Pond 18P: FOREBAY



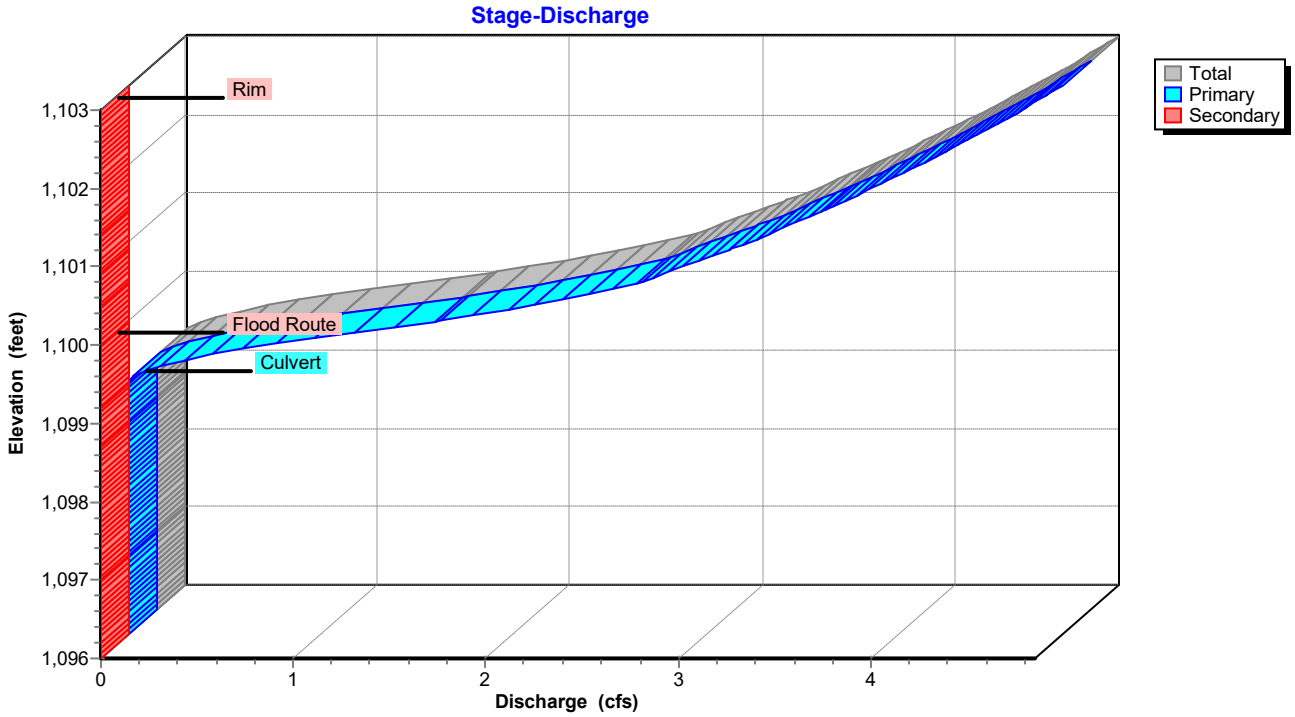
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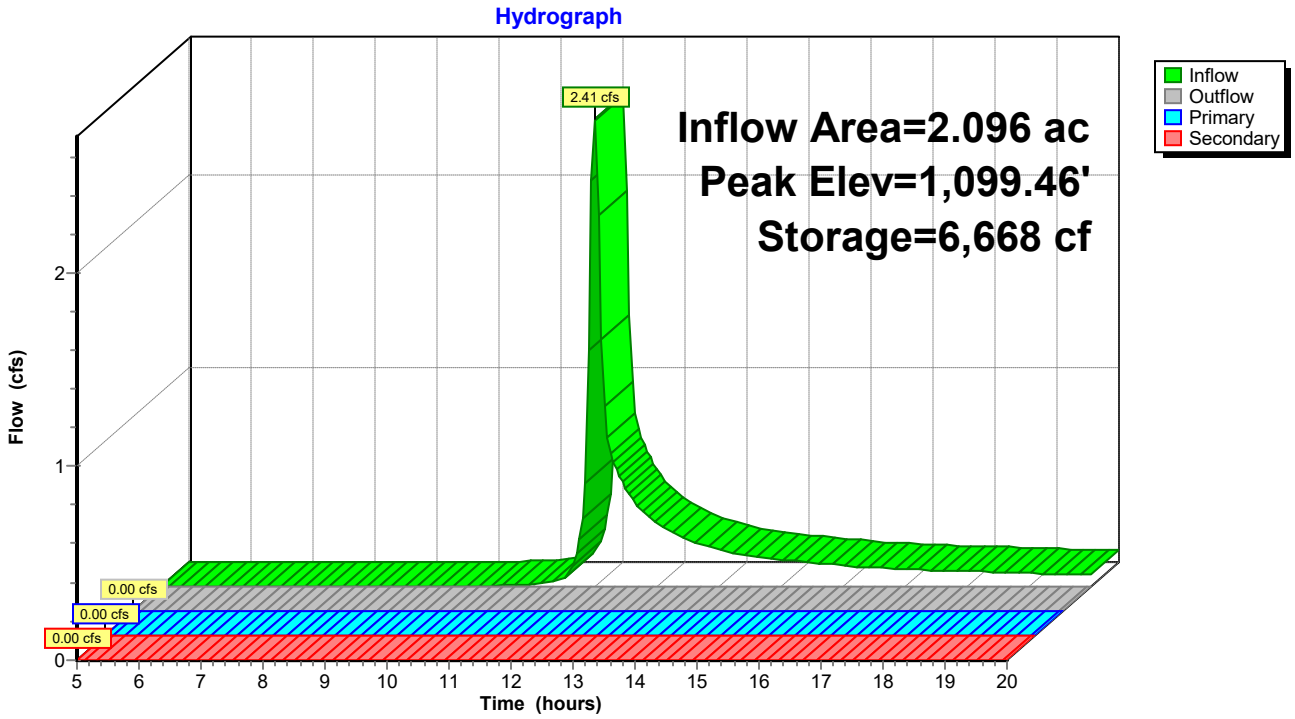
Pond 29P: DRYWELL 3



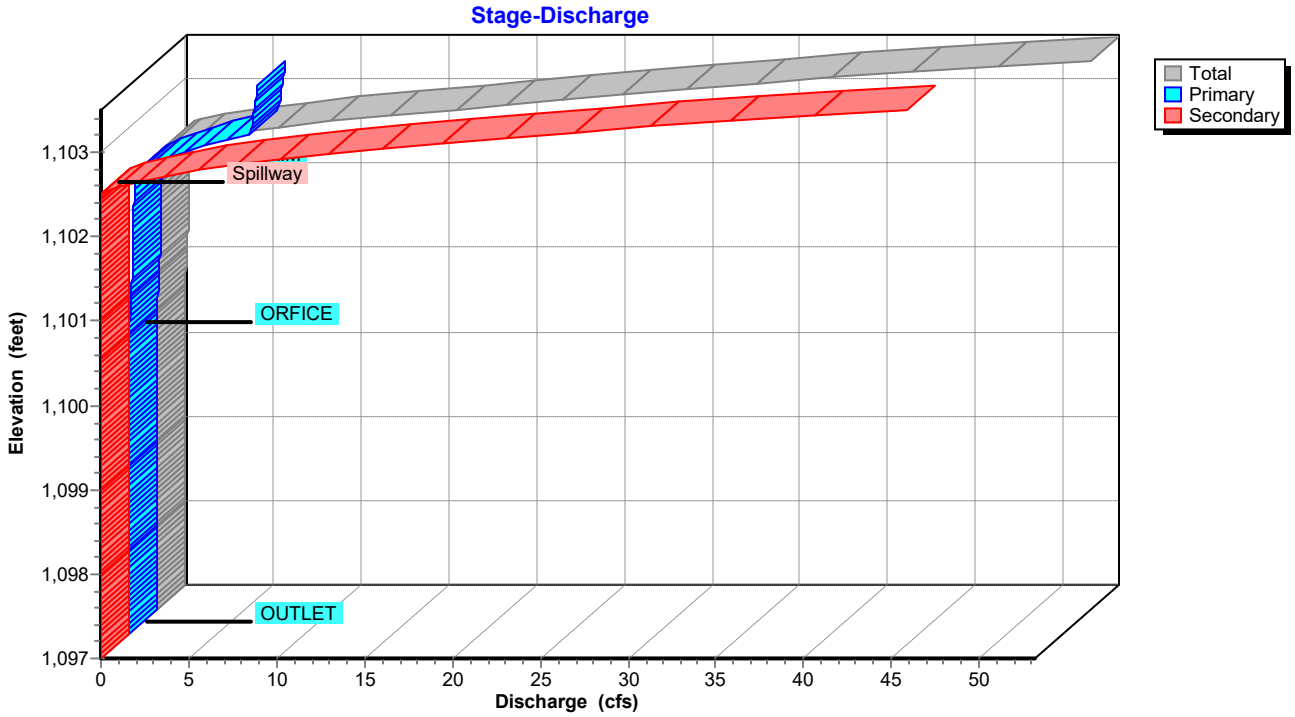
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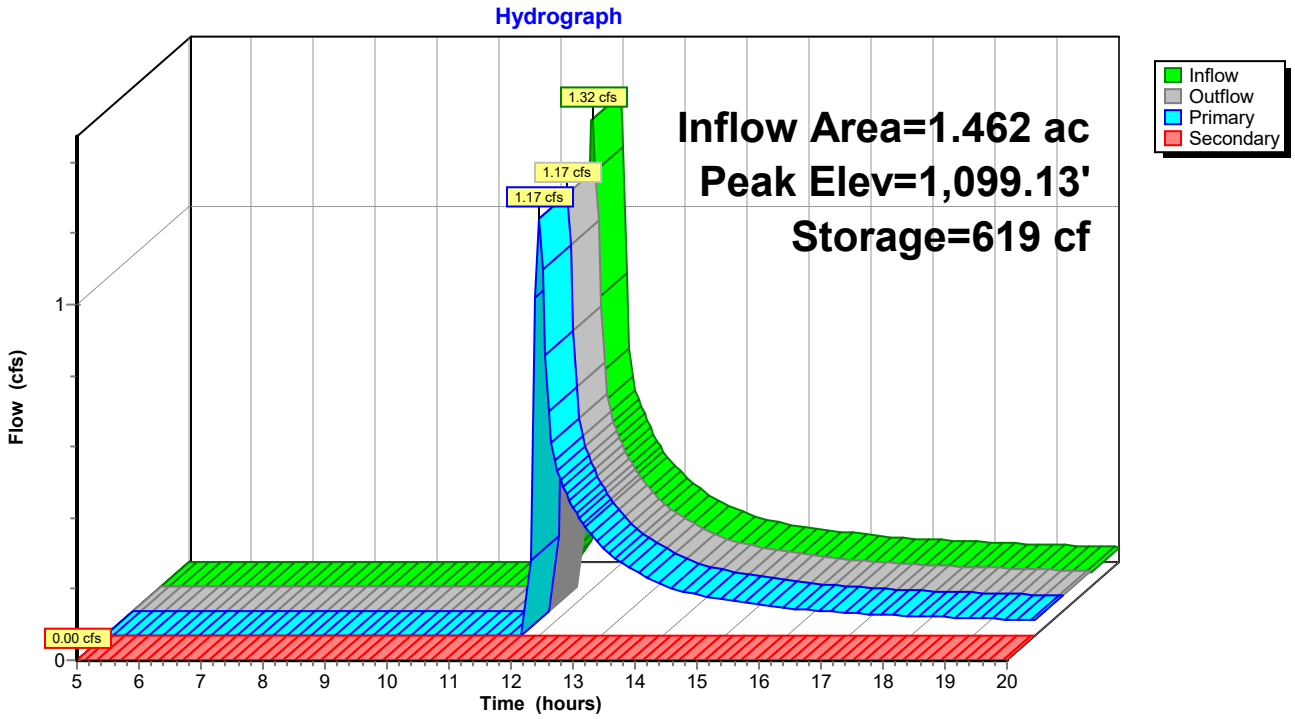
Pond 30P: I-2



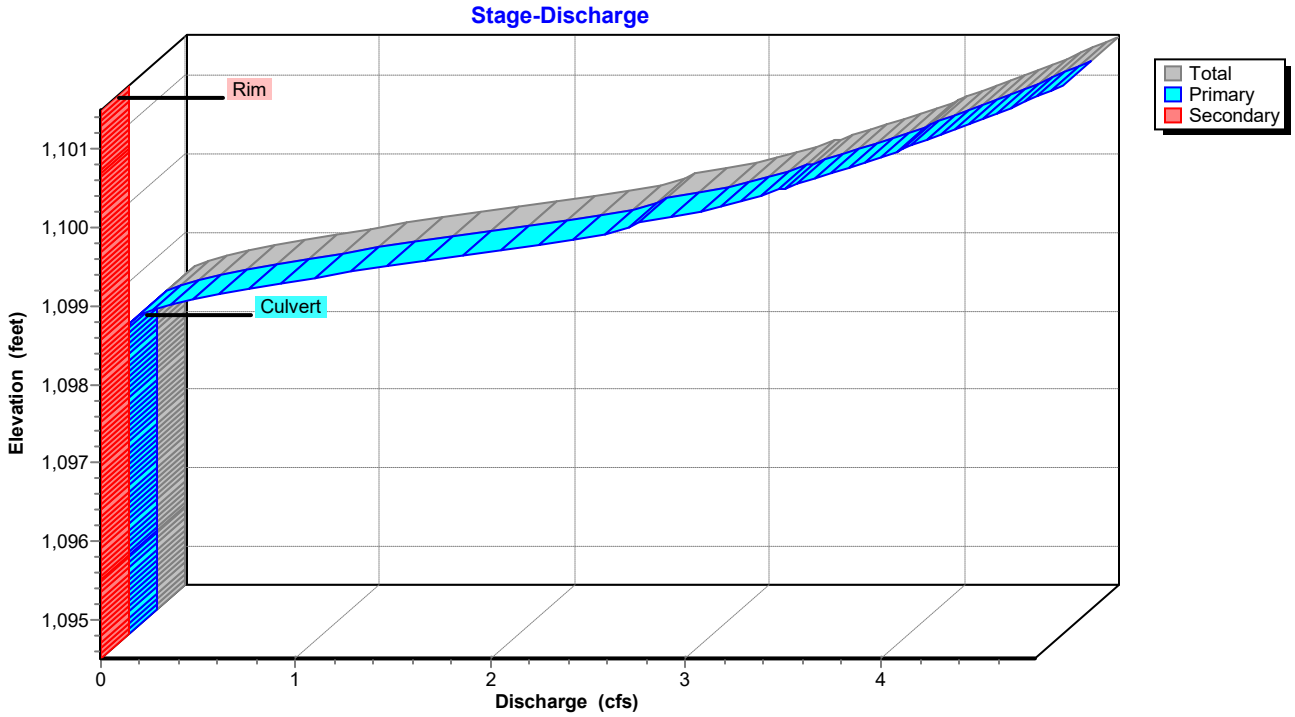
Pond 30P: I-2



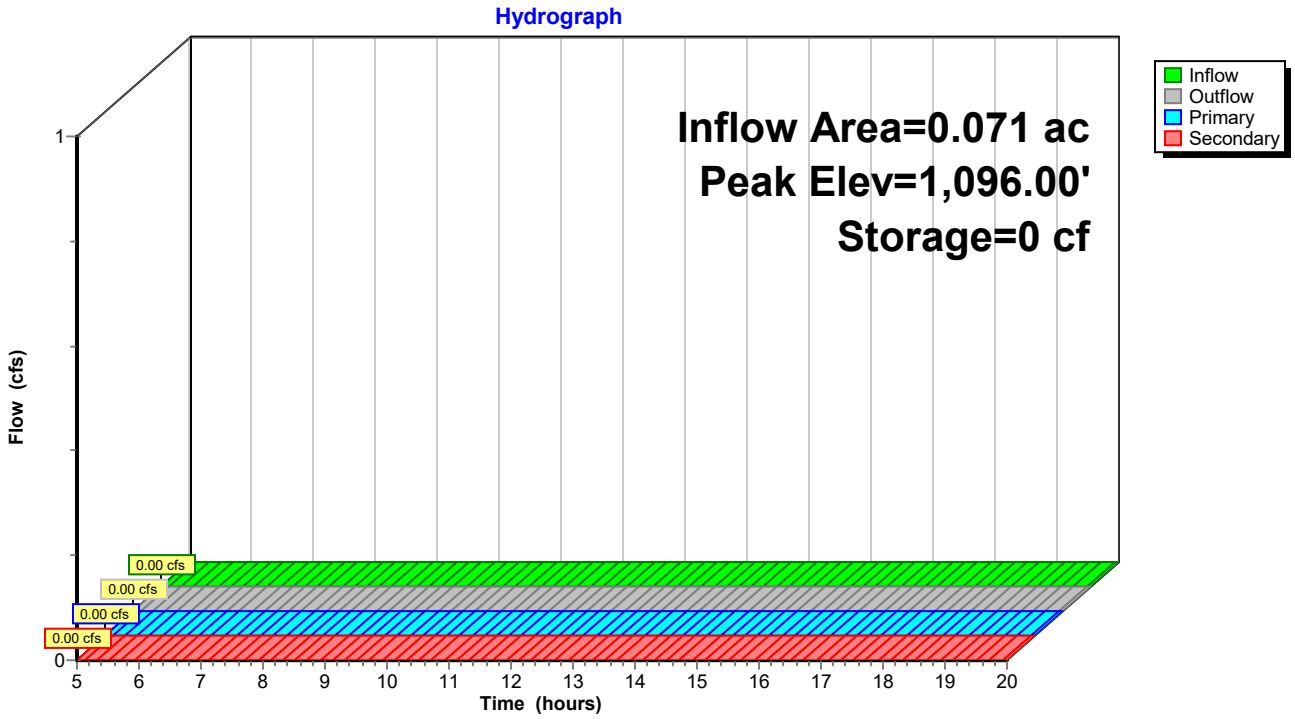
Pond 31P: DRYWELL 4



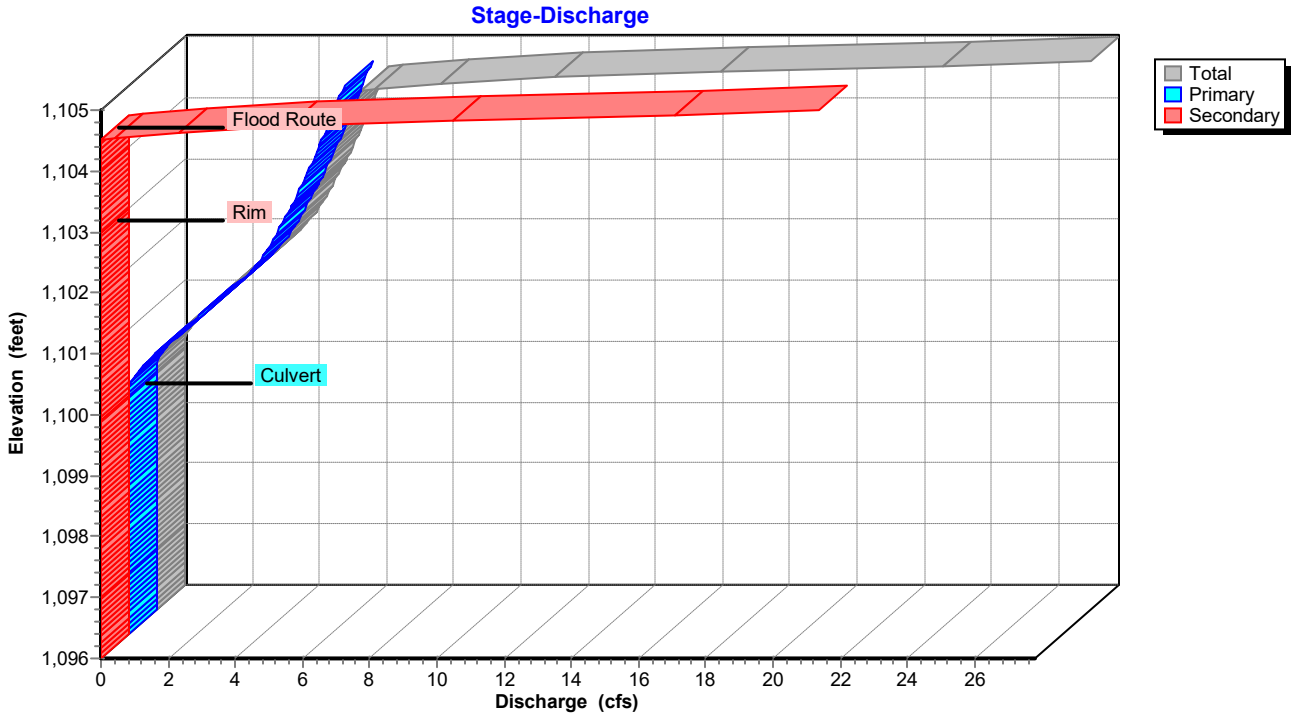
Pond 31P: DRYWELL 4



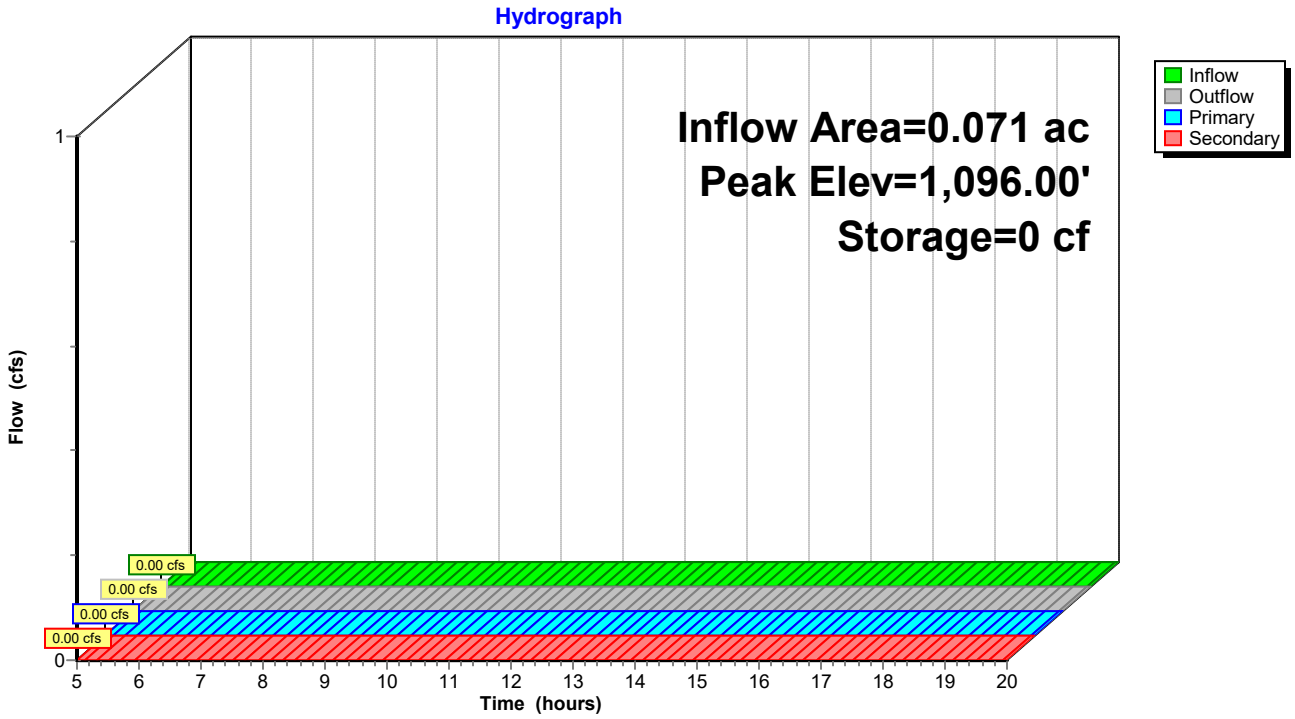
Pond 52P: DRYWELL 1



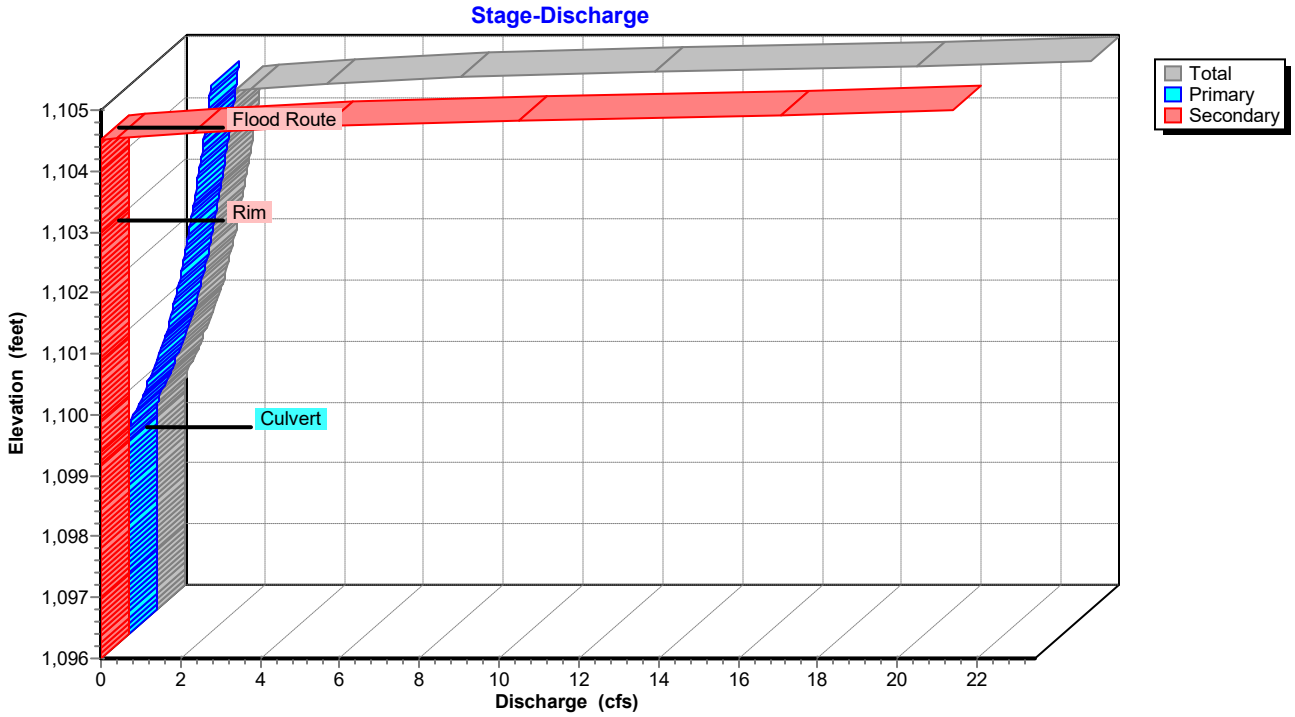
Pond 52P: DRYWELL 1



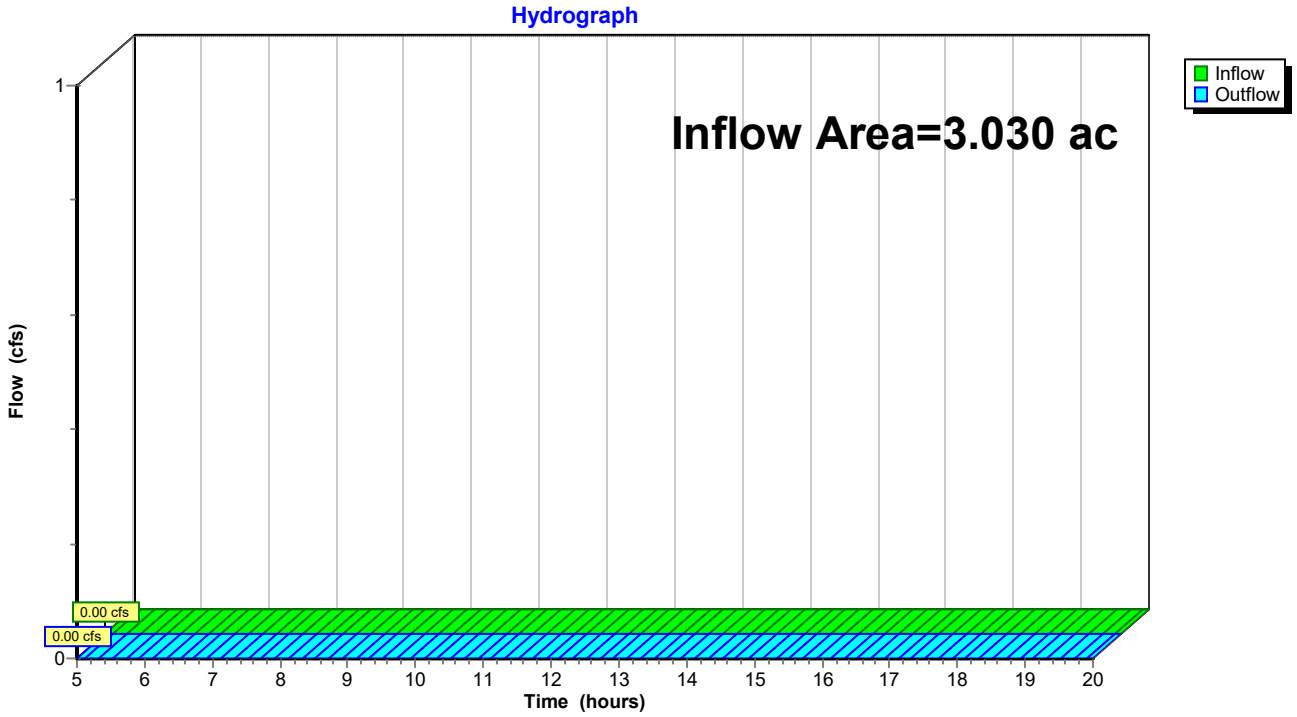
Pond 54P: DRYWELL 2



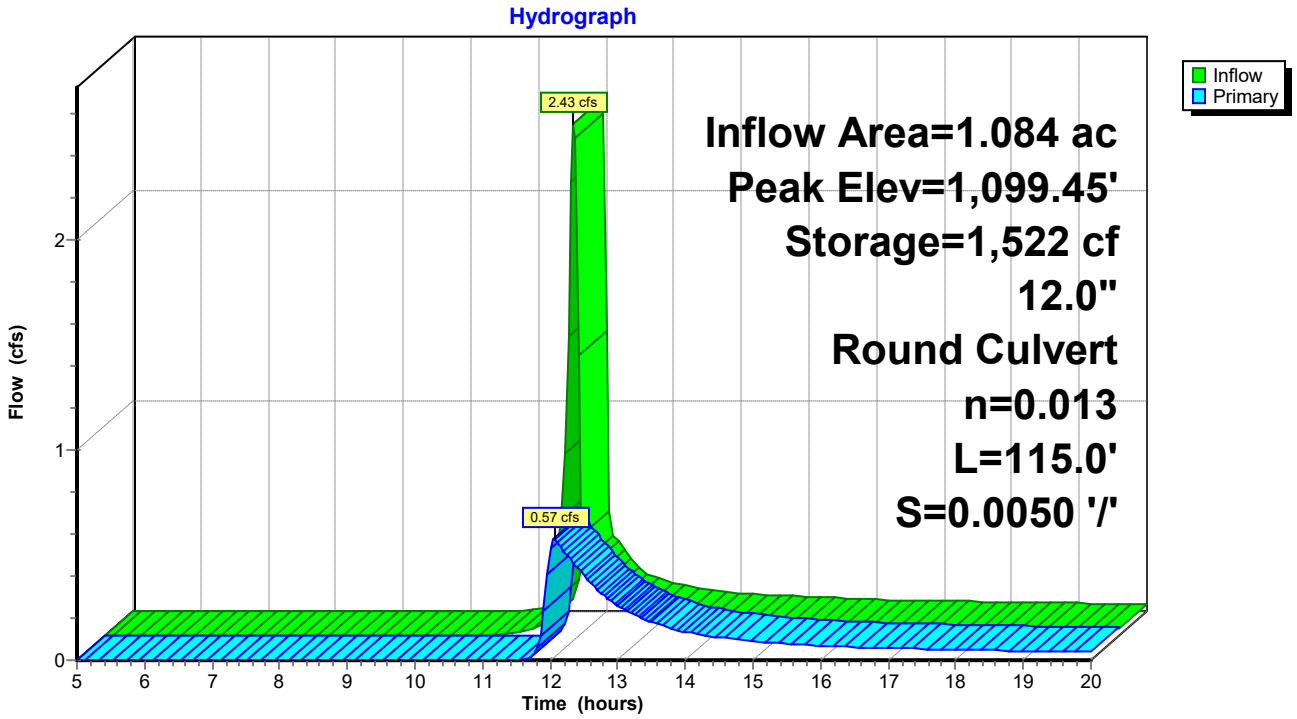
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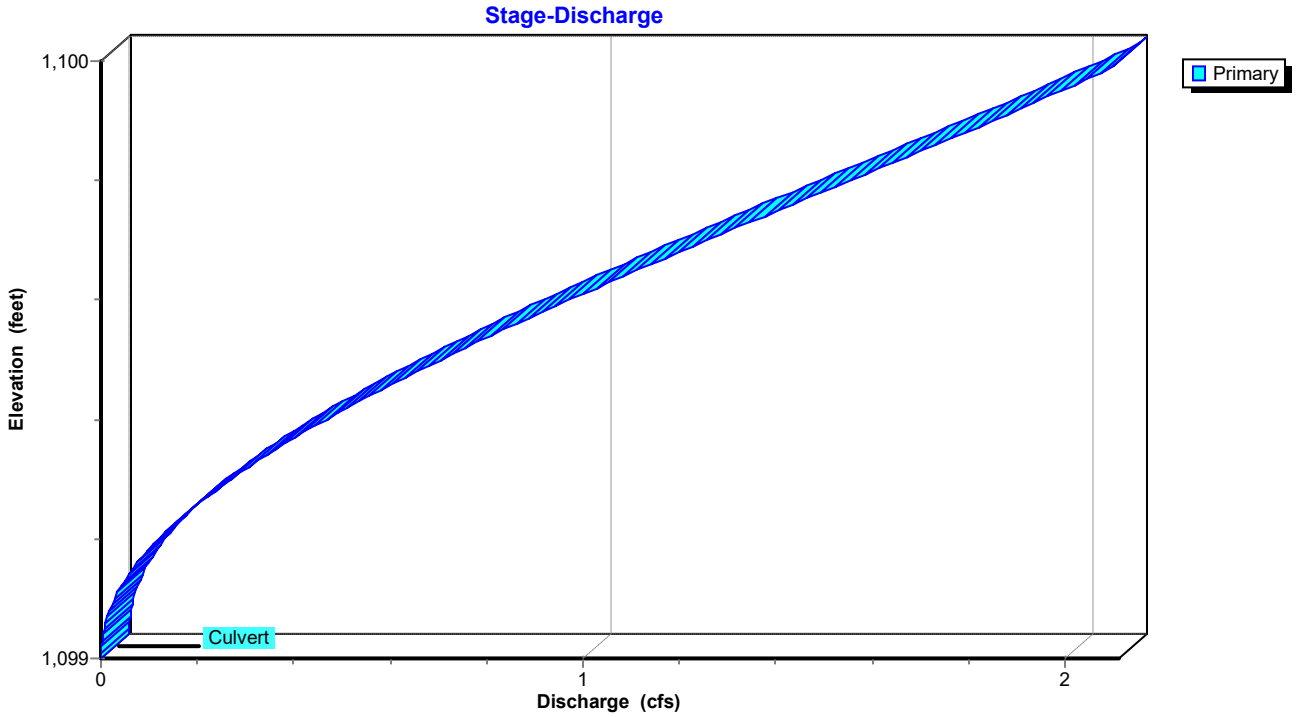
Reach 19R: TIOUGHNIOGA RIVER



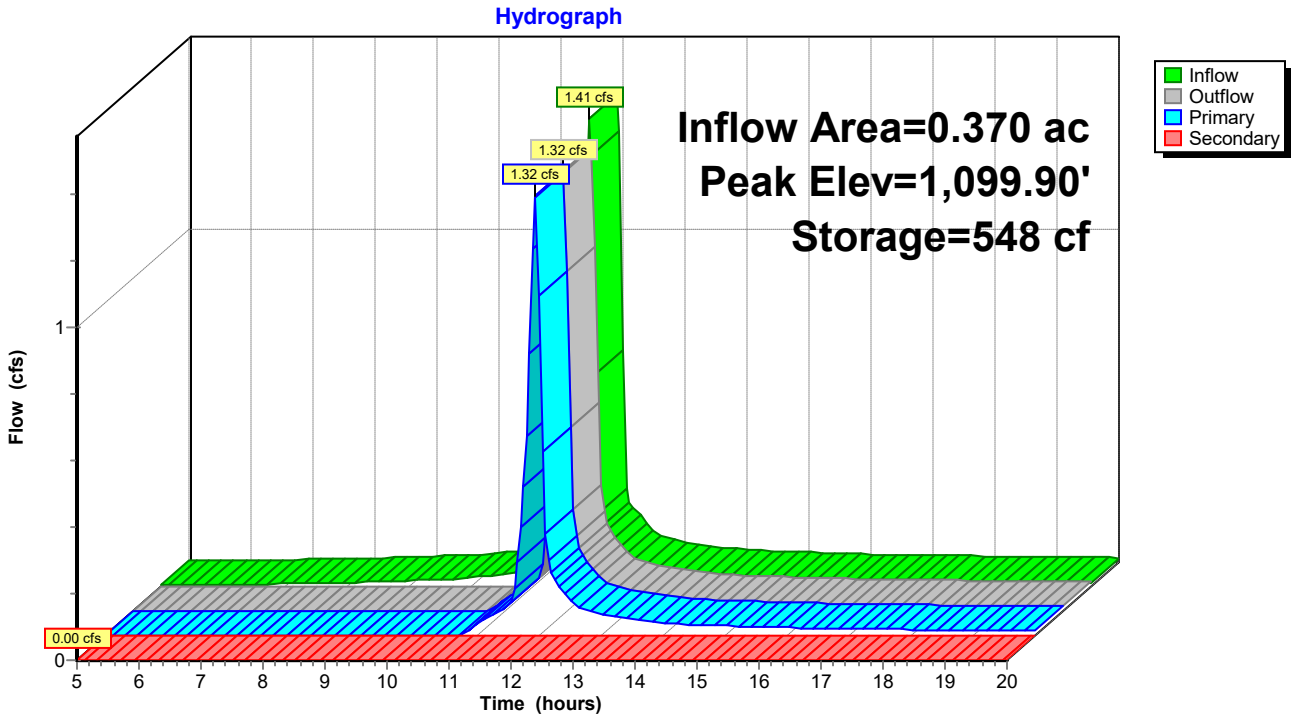
Pond 18P: FOREBAY



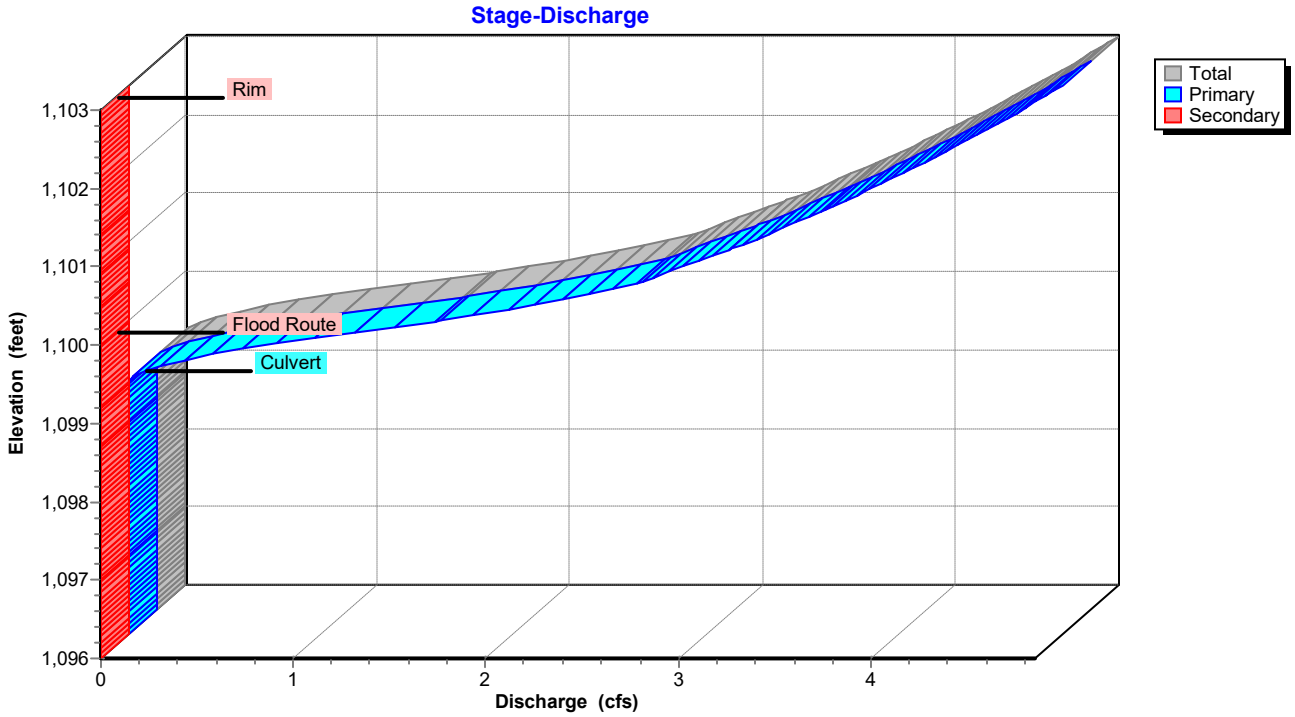
Pond 18P: FOREBAY



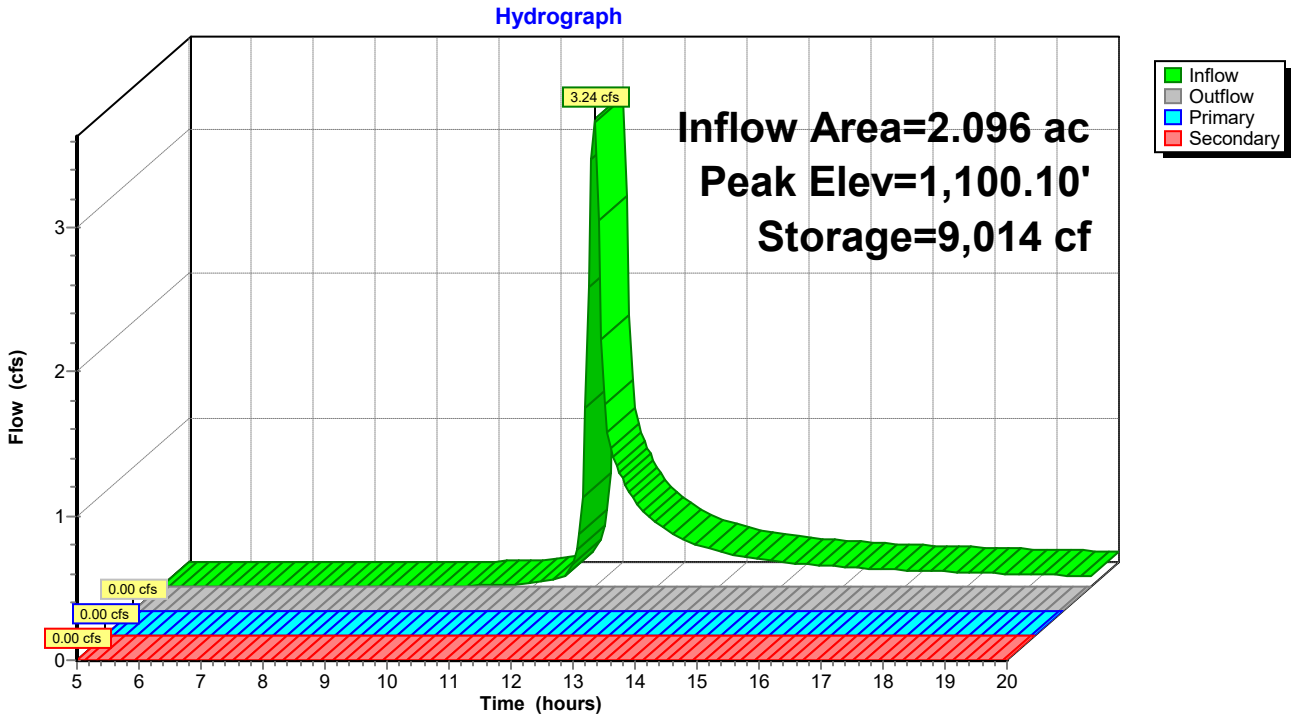
Pond 29P: DRYWELL 3



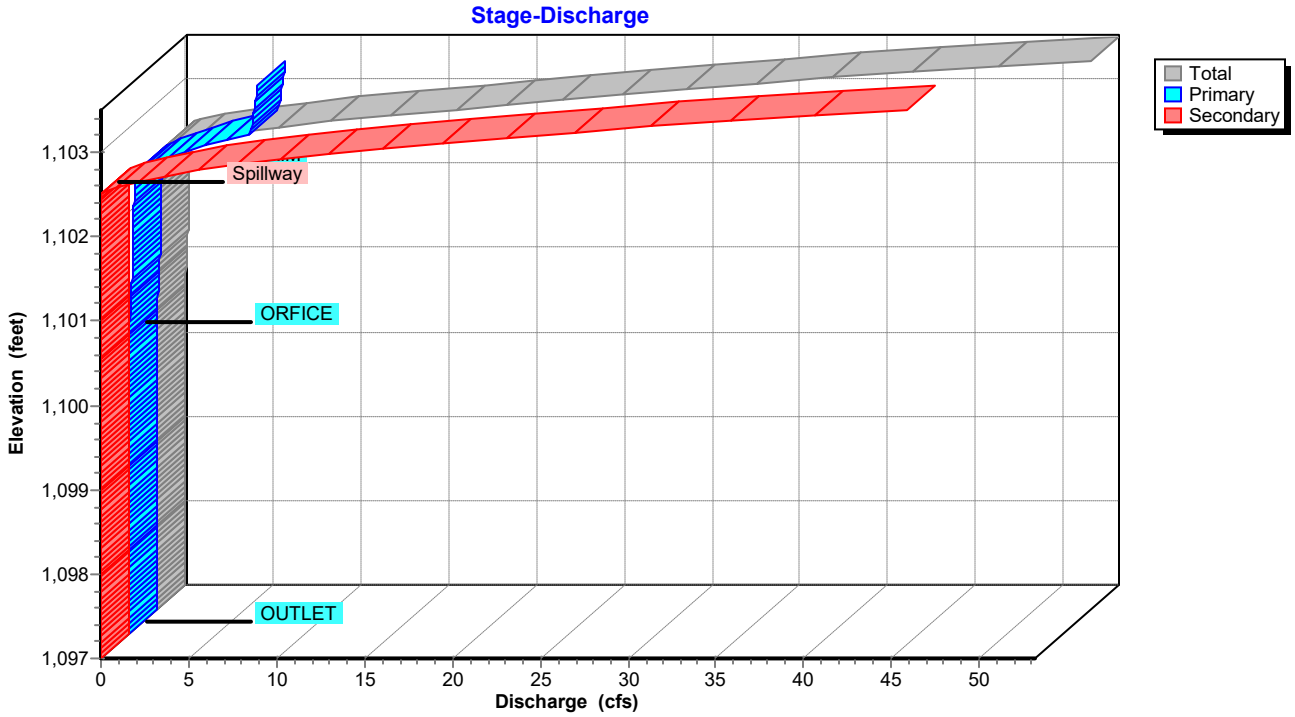
Pond 29P: DRYWELL 3



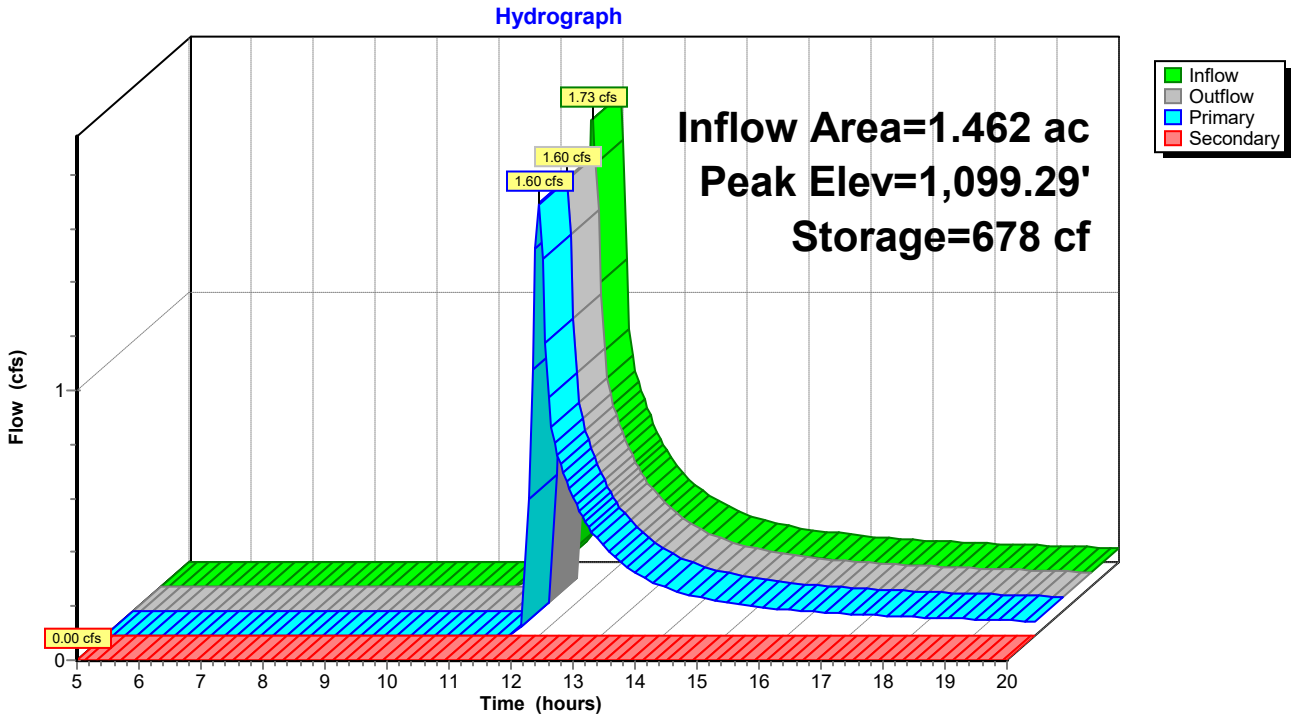
Pond 30P: I-2



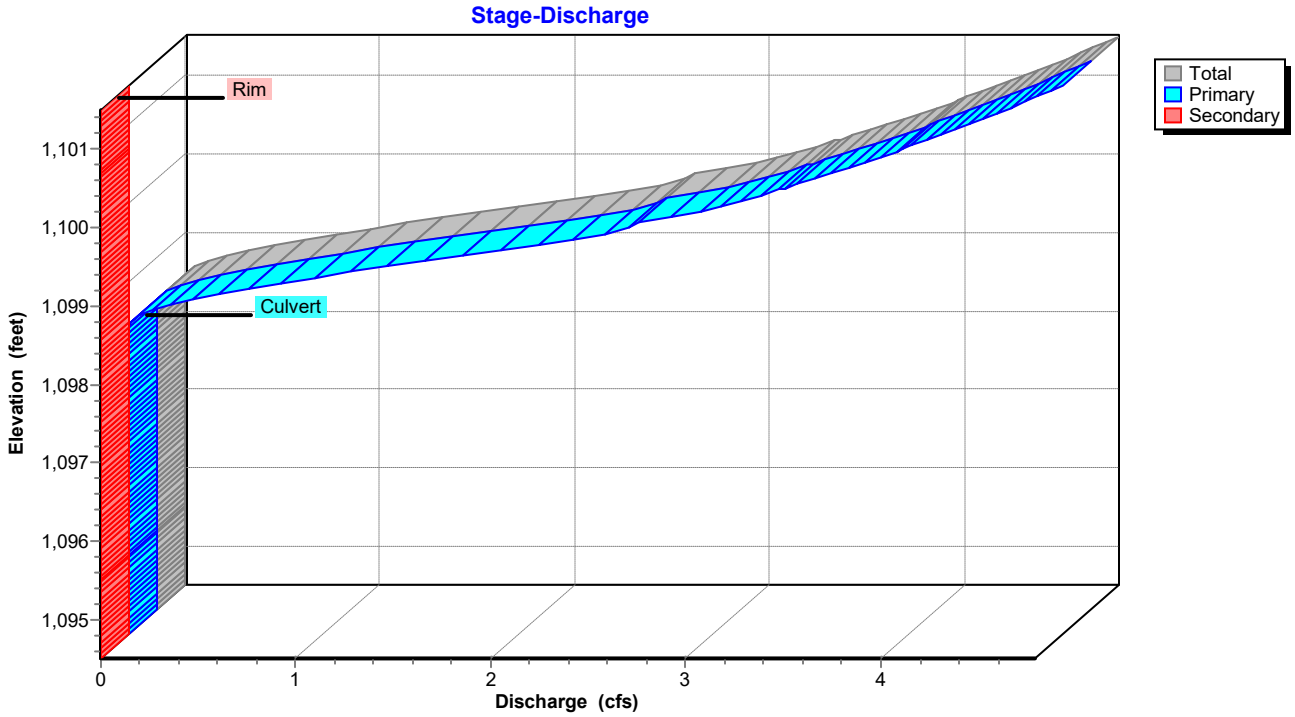
Pond 30P: I-2



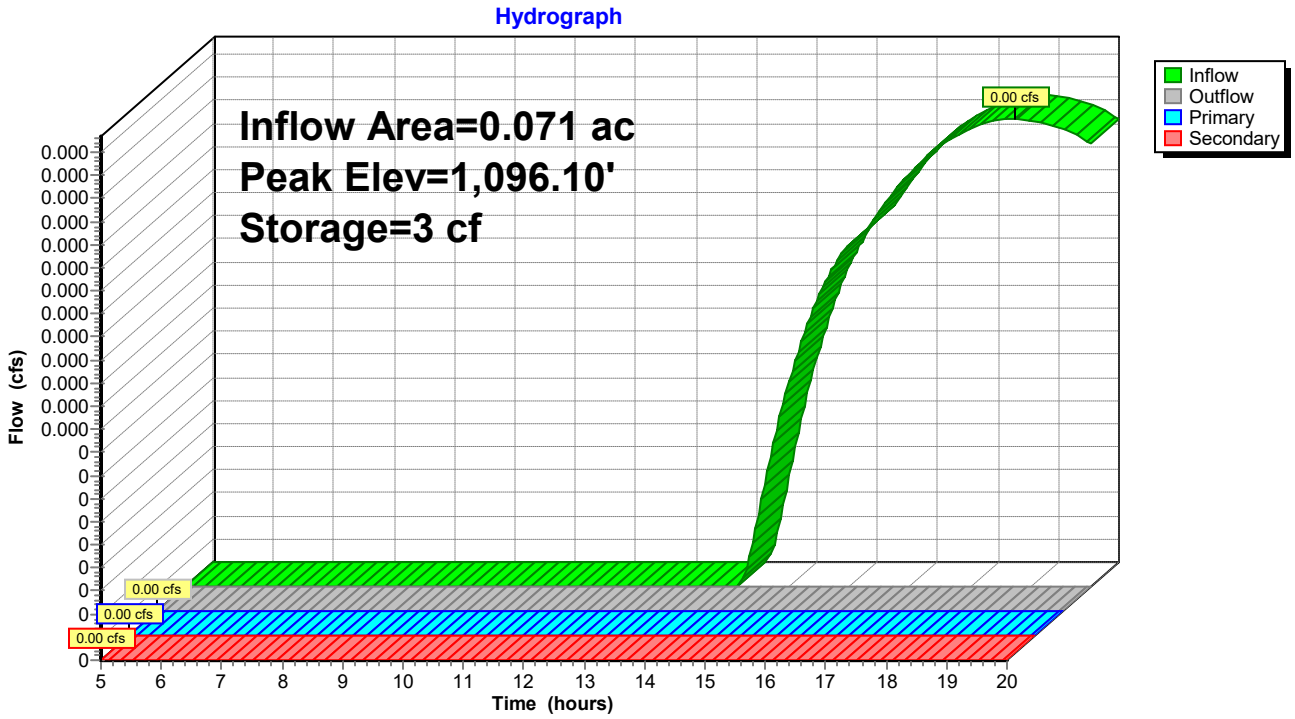
Pond 31P: DRYWELL 4



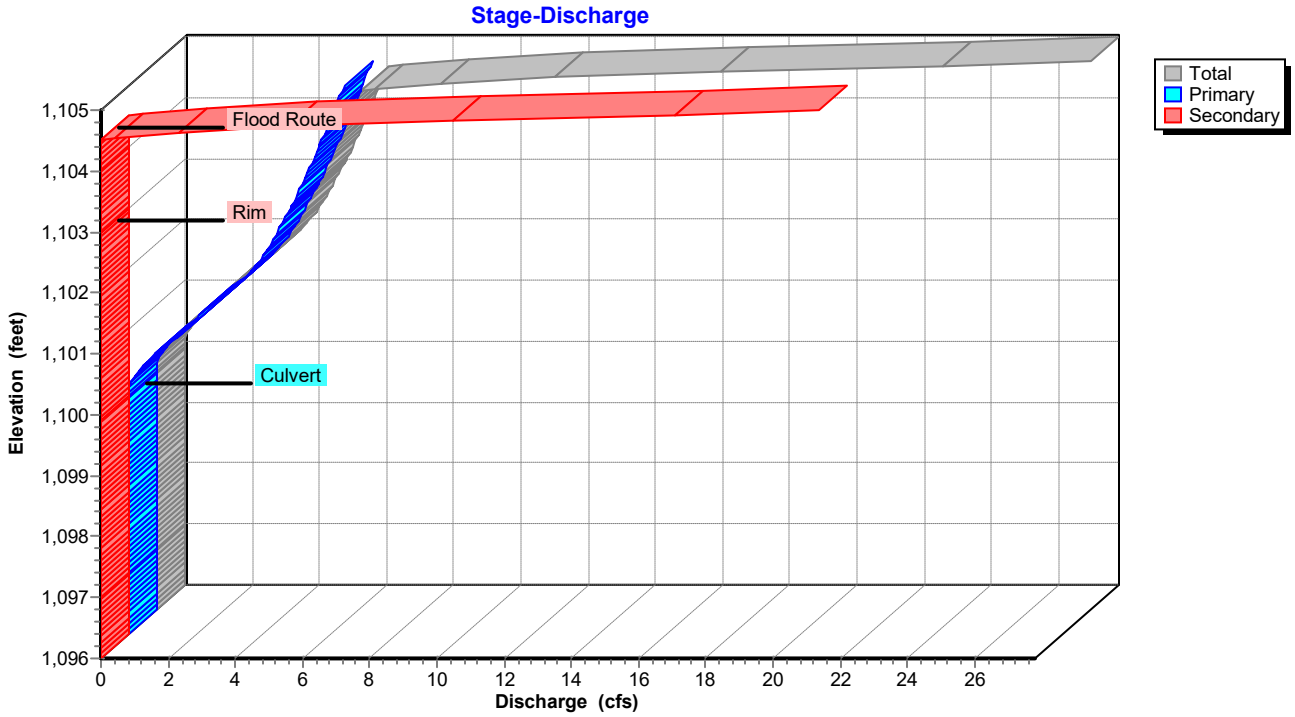
Pond 31P: DRYWELL 4



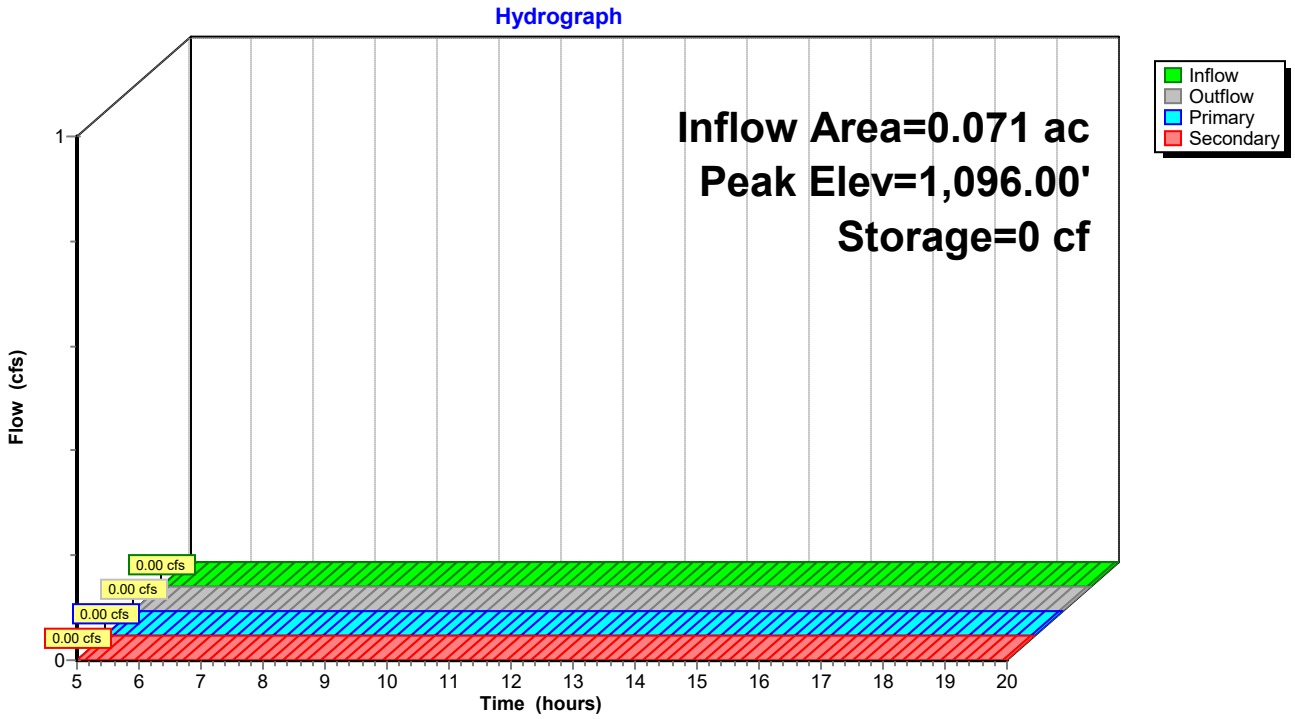
Pond 52P: DRYWELL 1



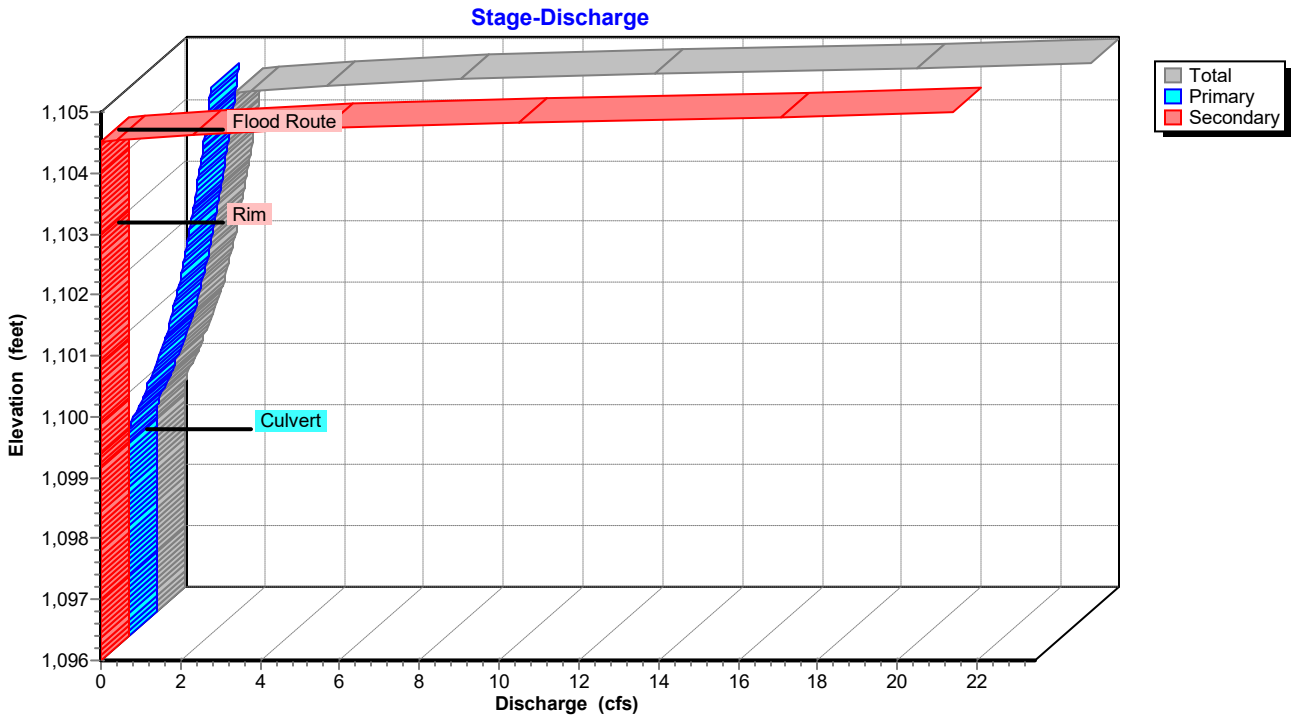
Pond 52P: DRYWELL 1



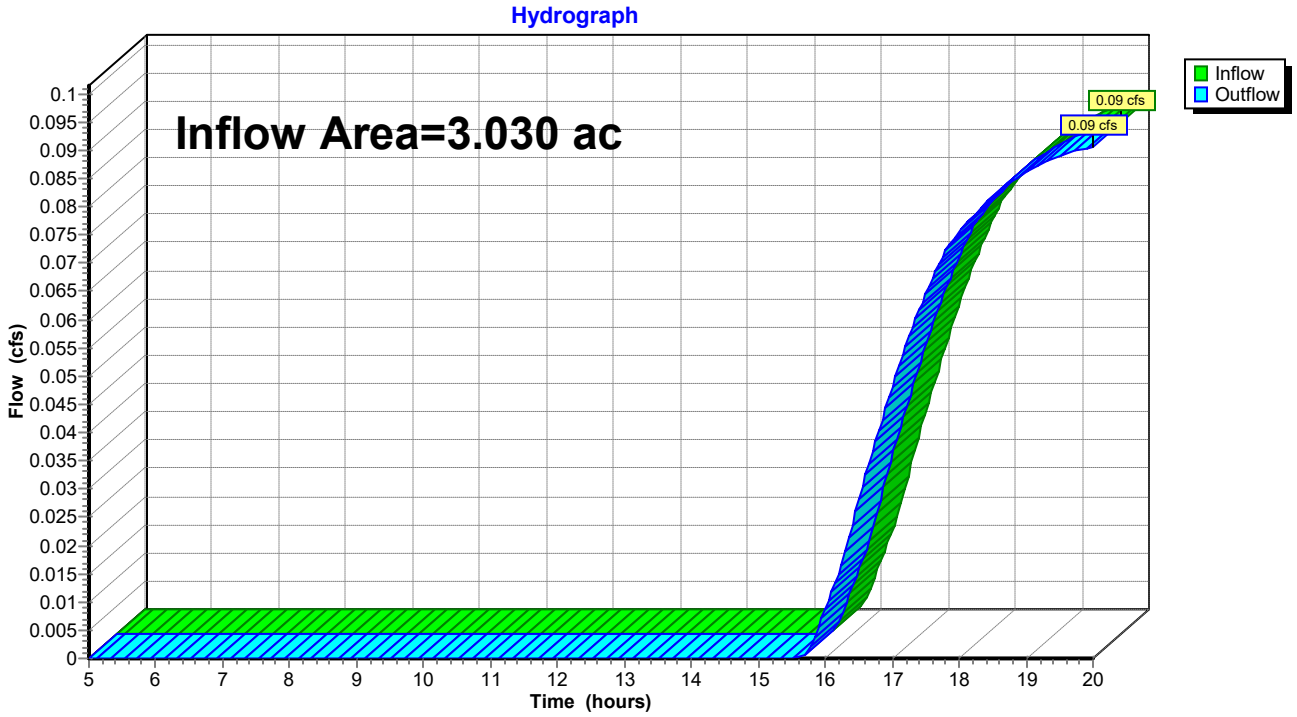
Pond 54P: DRYWELL 2



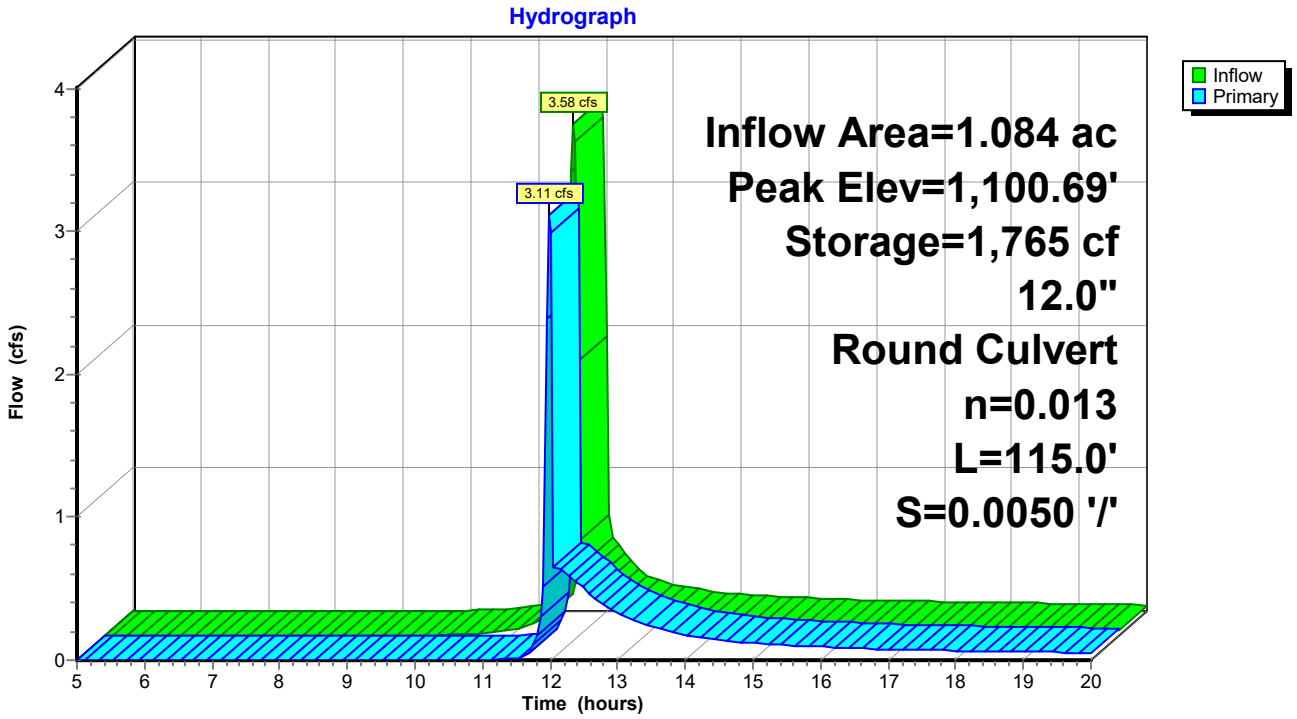
Pond 54P: DRYWELL 2



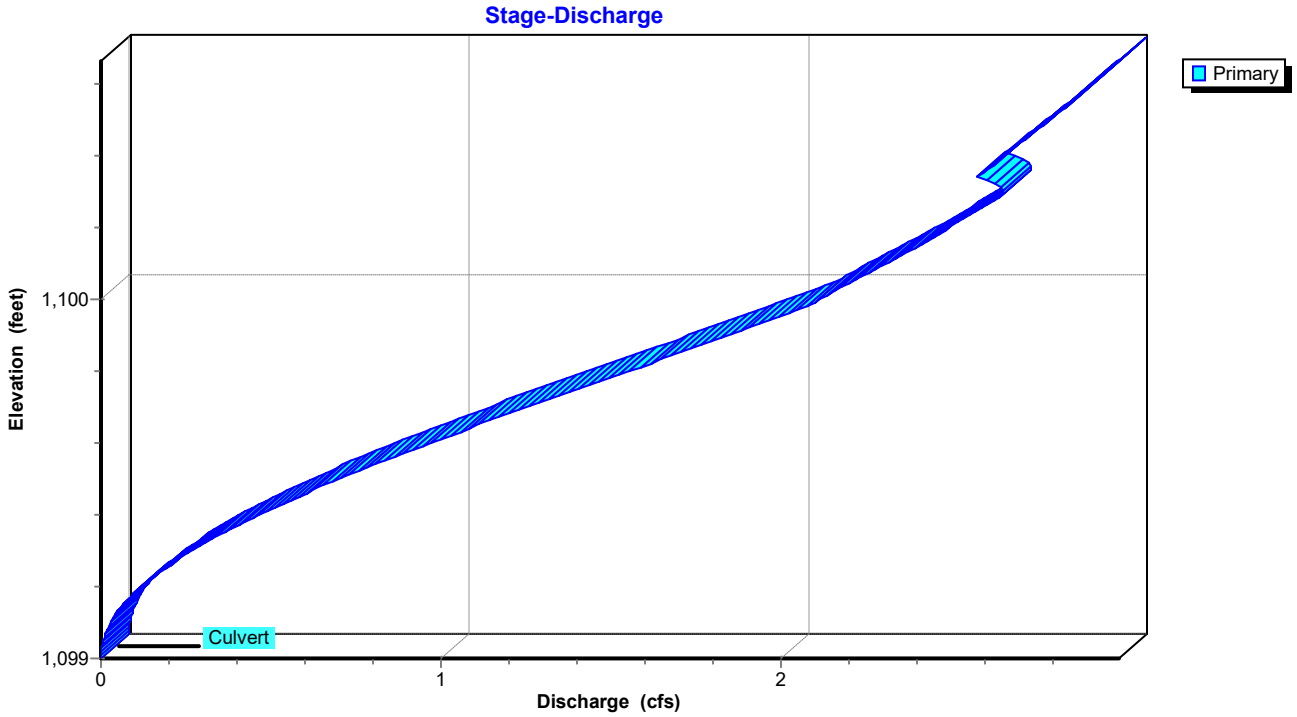
Reach 19R: TIOUGHNIOGA RIVER



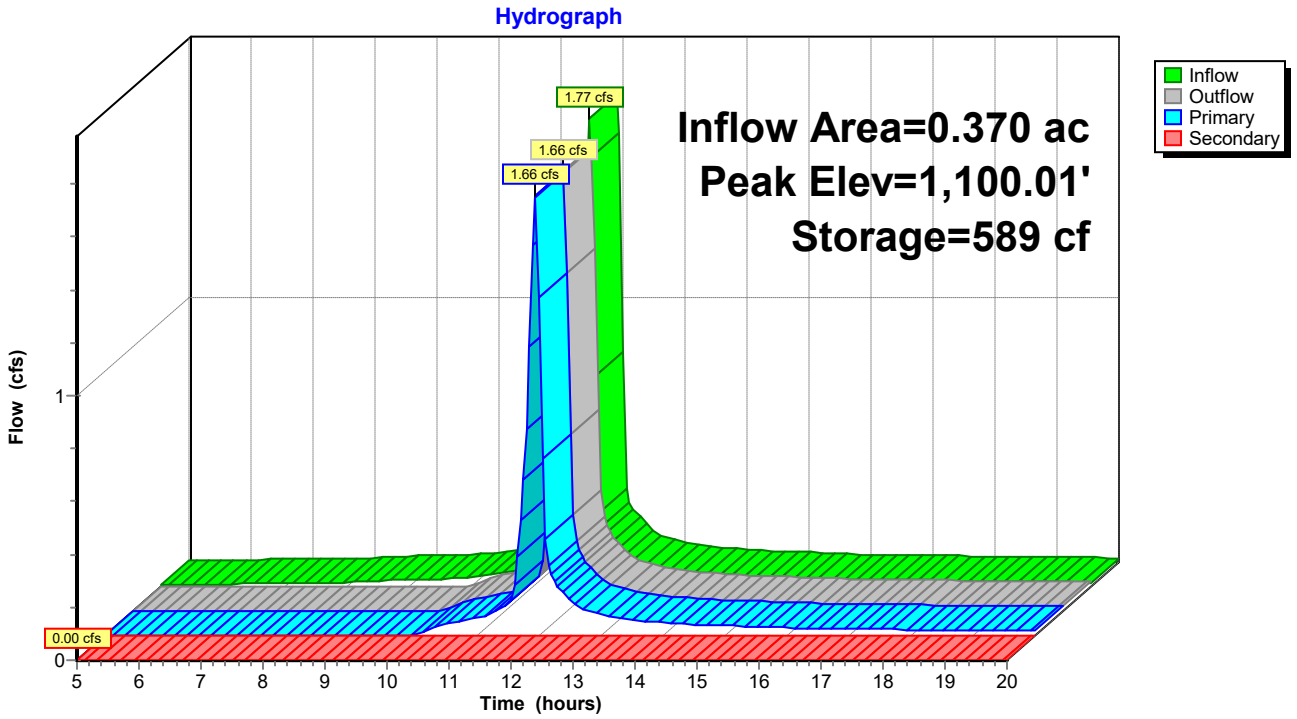
Pond 18P: FOREBAY



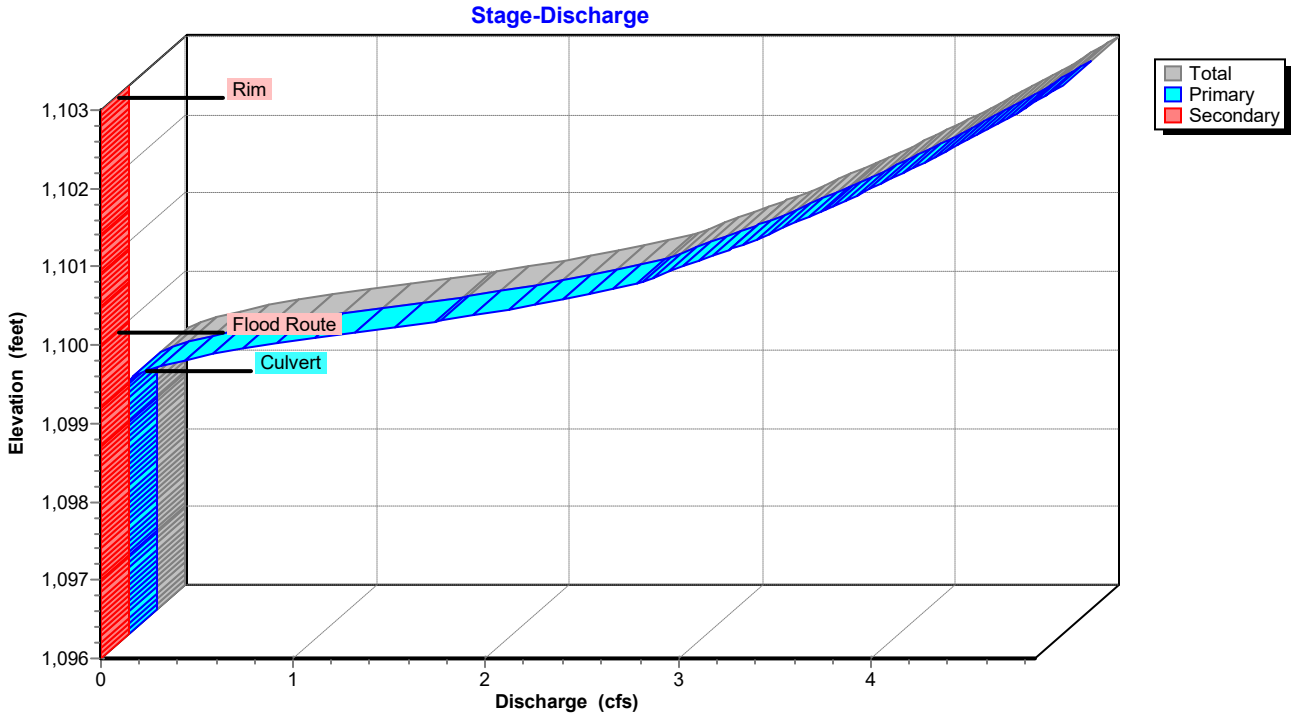
Pond 18P: FOREBAY



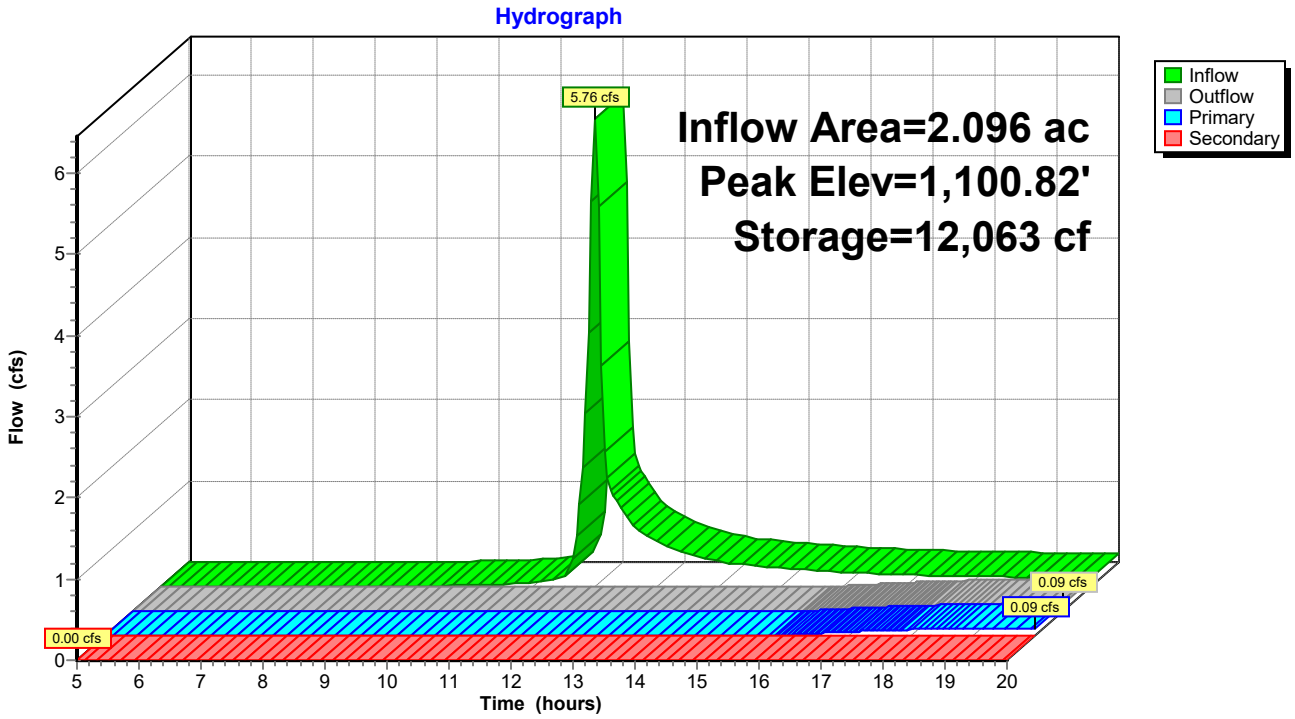
Pond 29P: DRYWELL 3



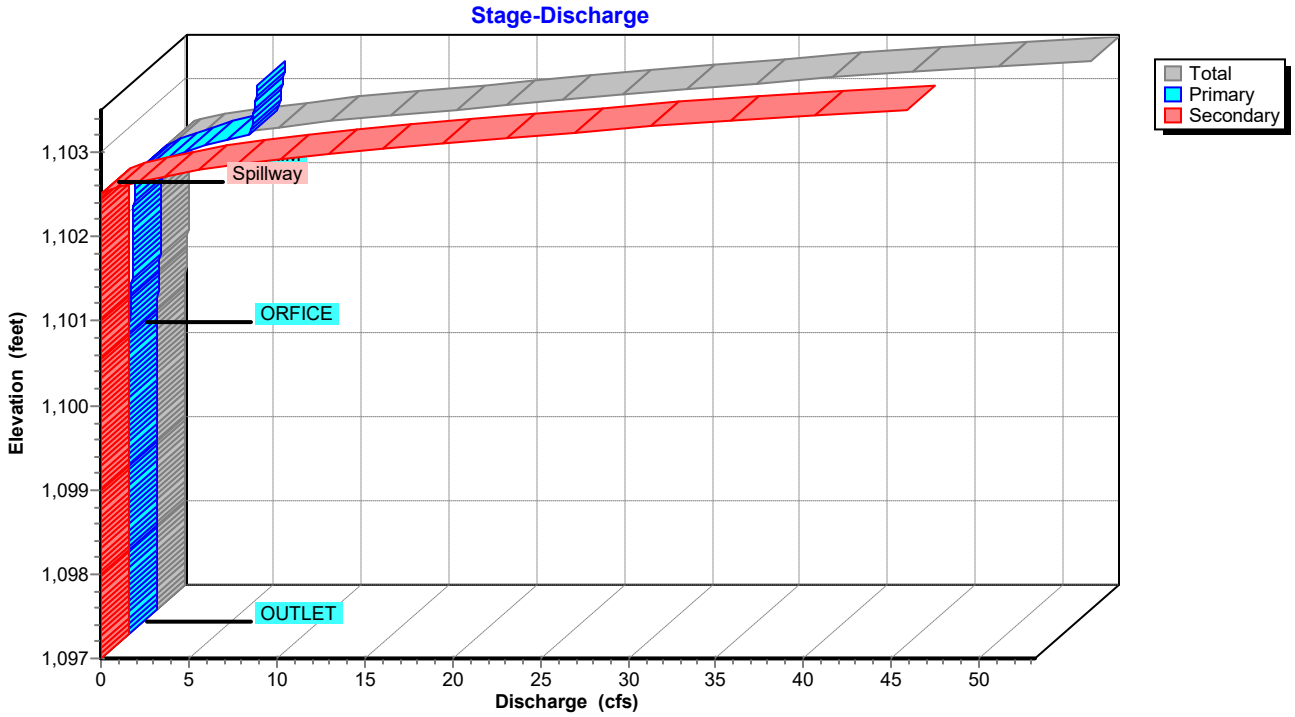
Pond 29P: DRYWELL 3



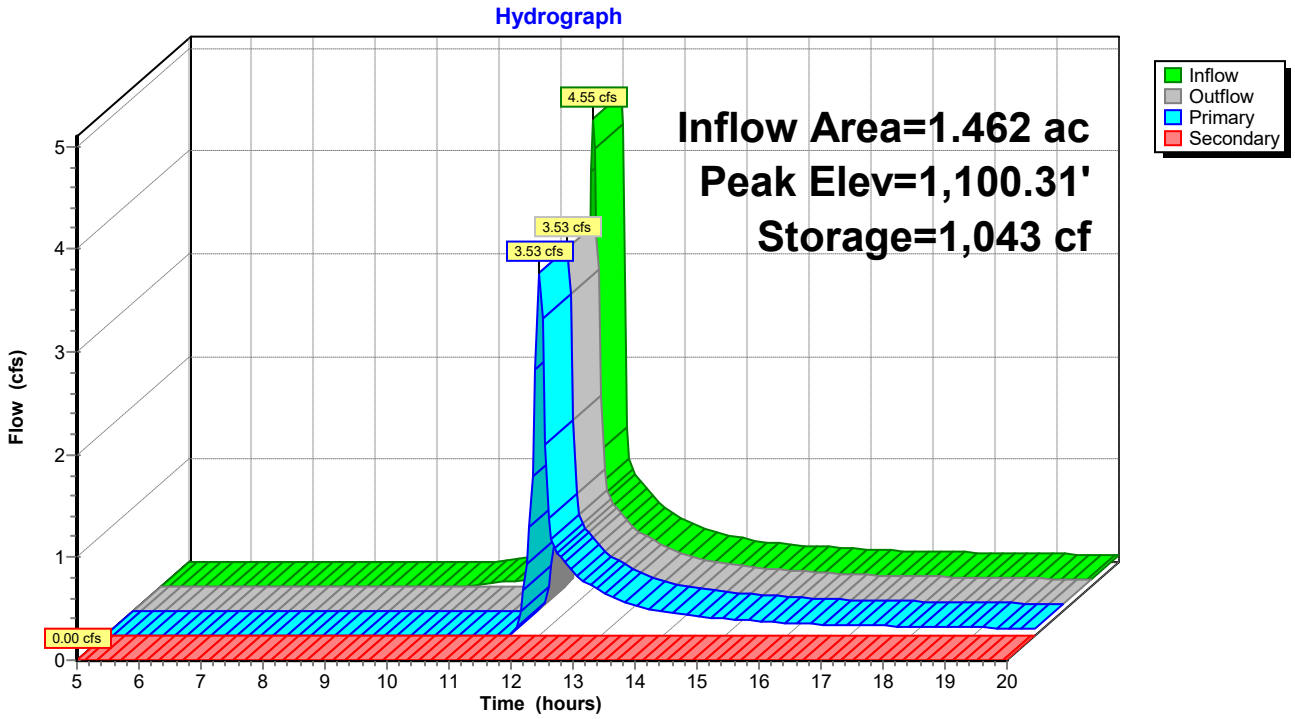
Pond 30P: I-2



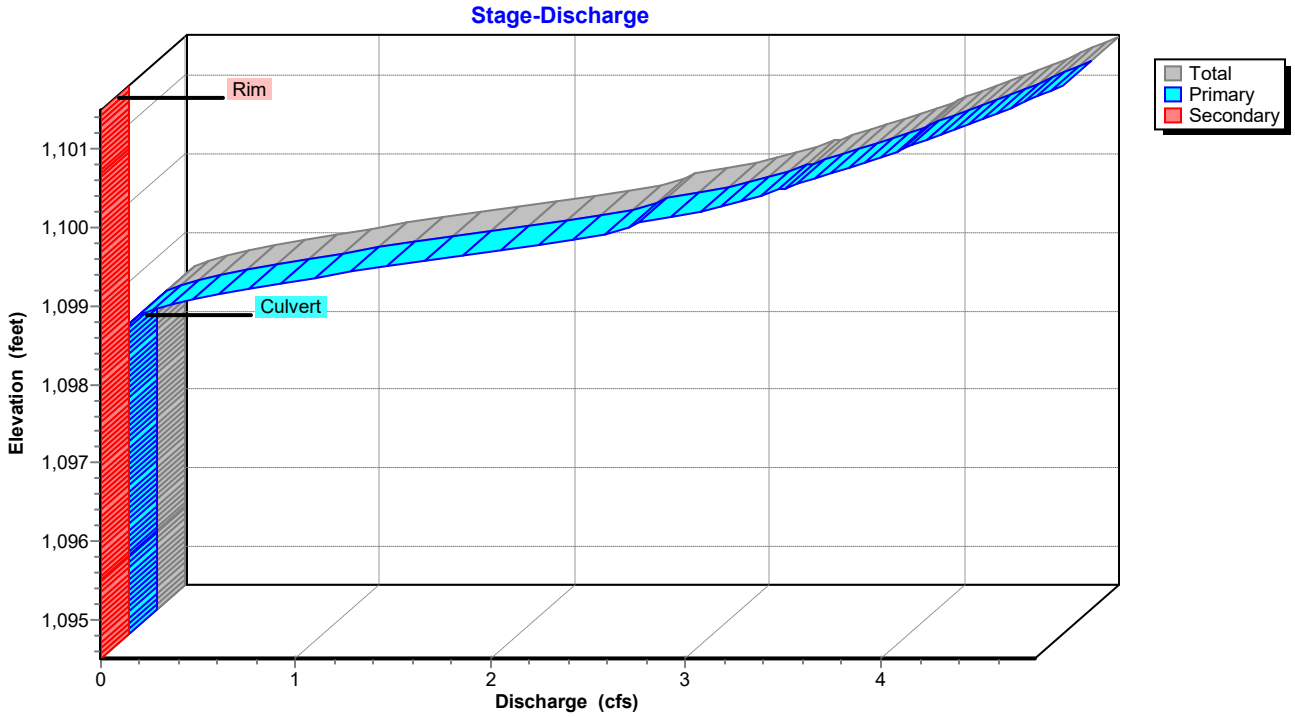
Pond 30P: I-2



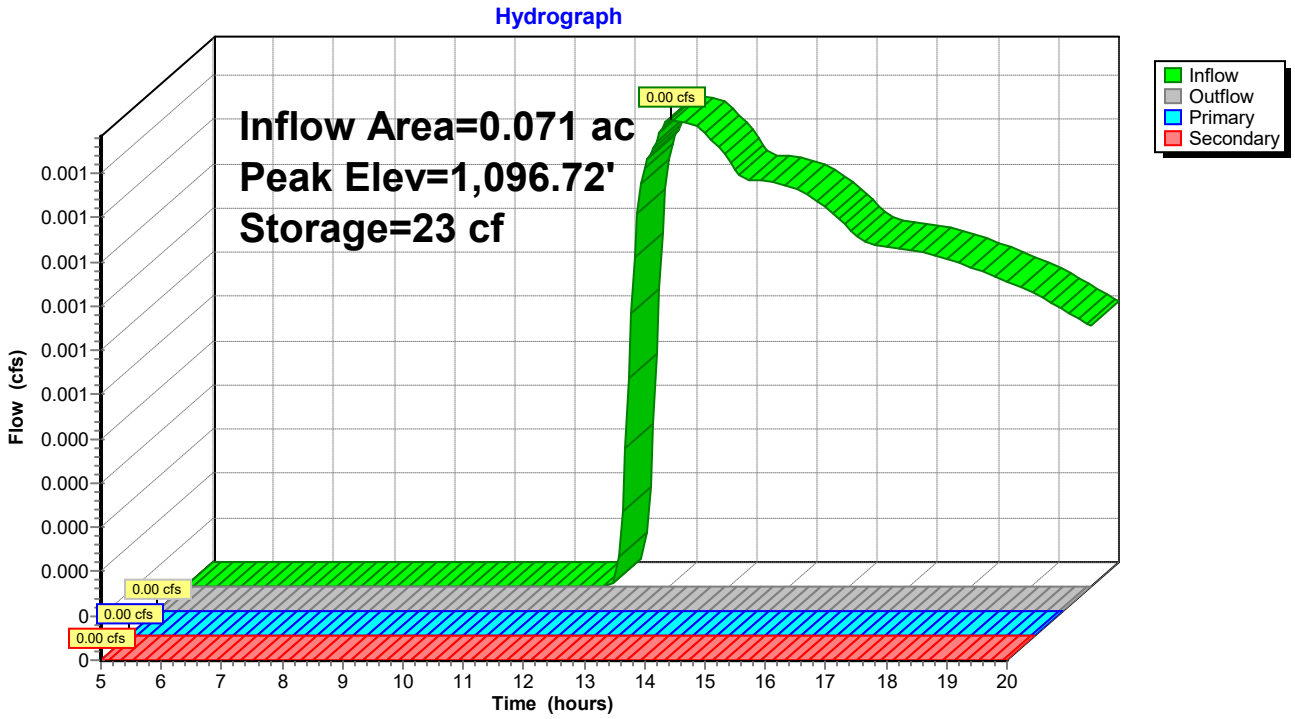
Pond 31P: DRYWELL 4



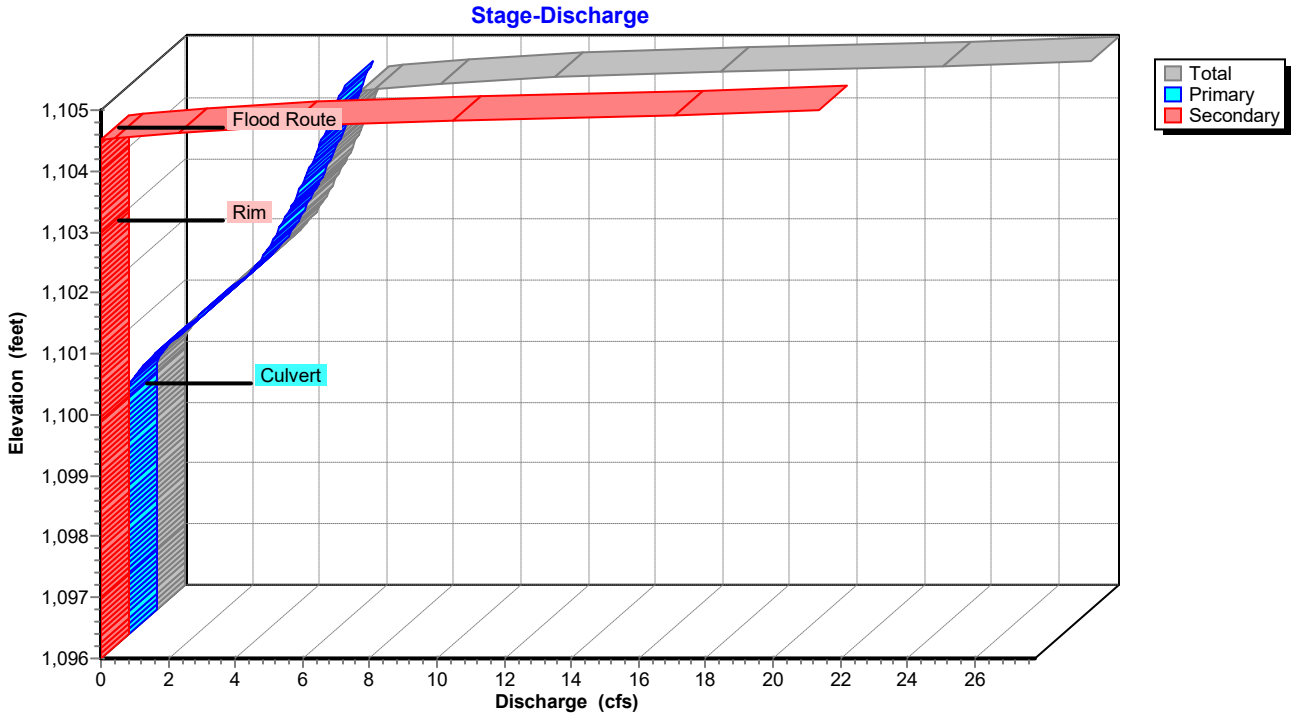
Pond 31P: DRYWELL 4



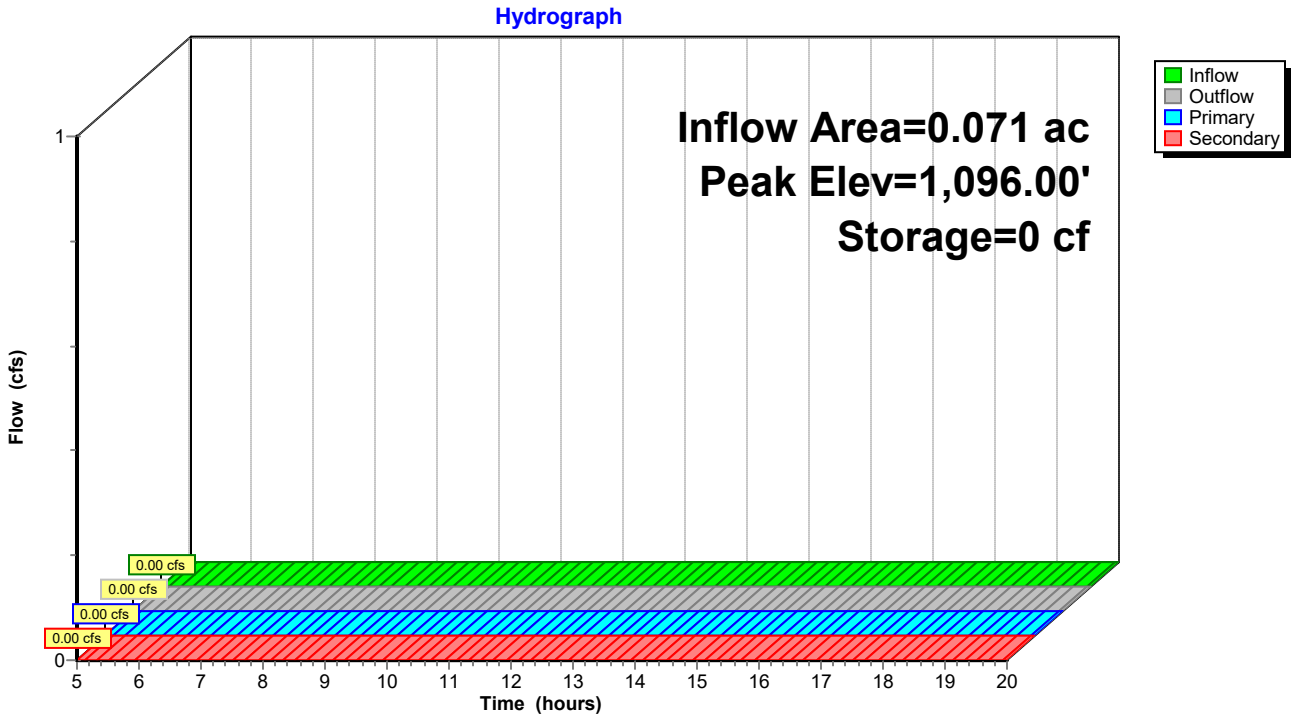
Pond 52P: DRYWELL 1



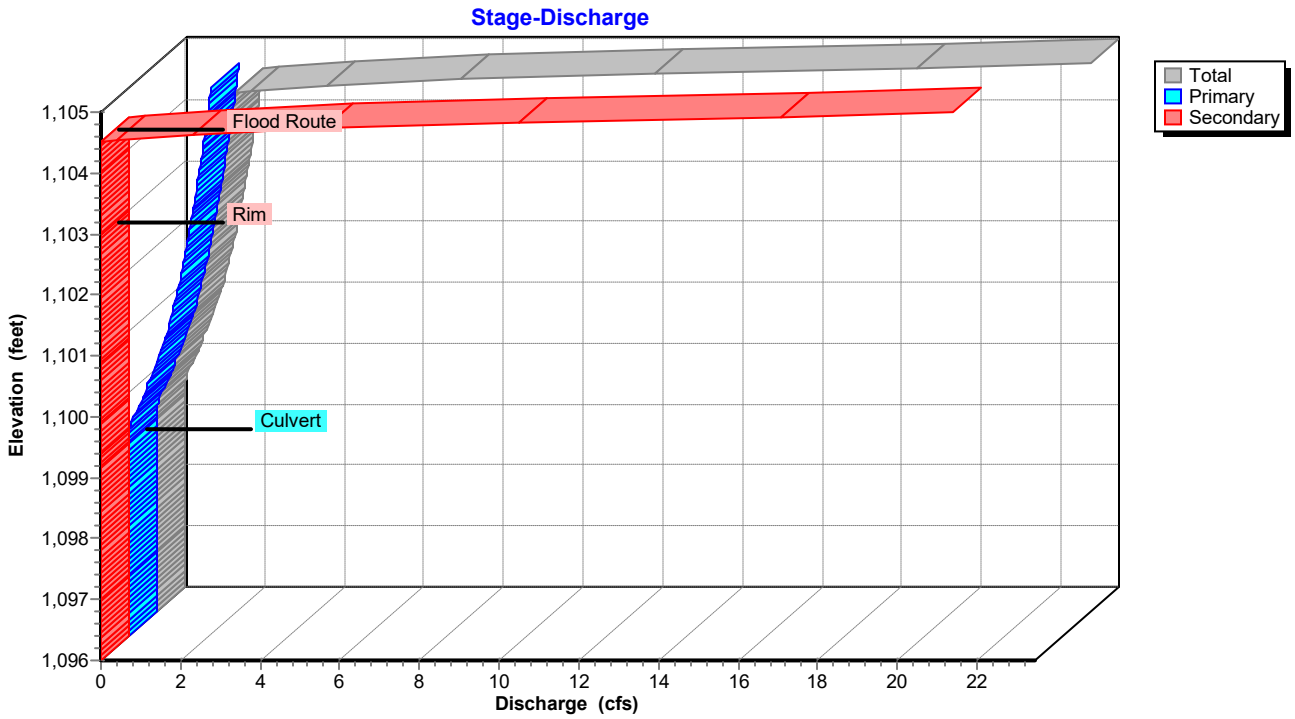
Pond 52P: DRYWELL 1



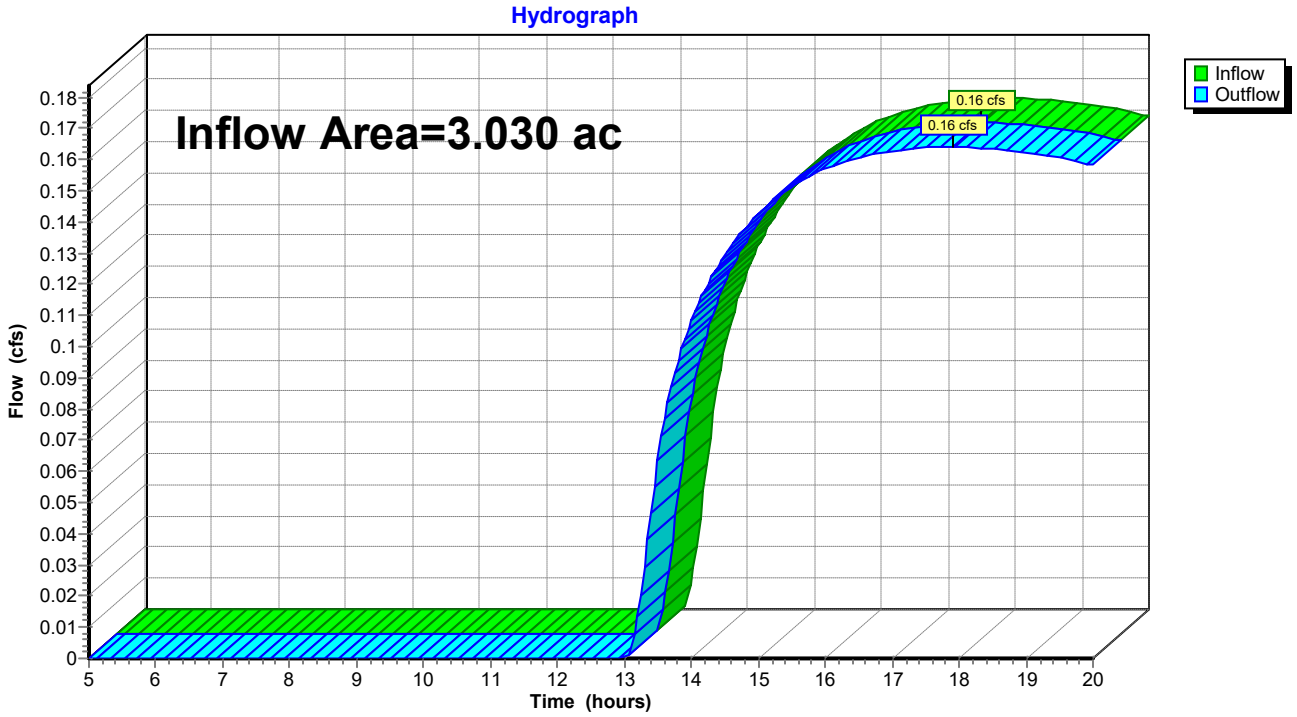
Pond 54P: DRYWELL 2



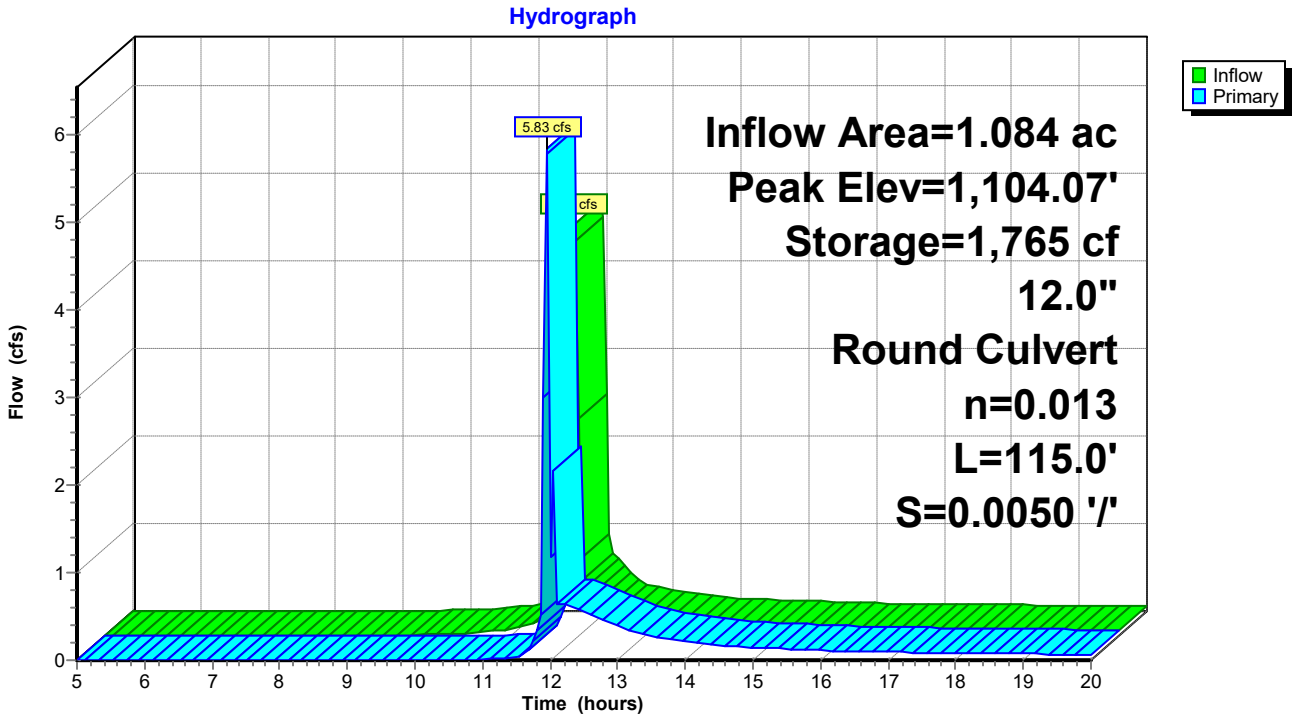
Pond 54P: DRYWELL 2



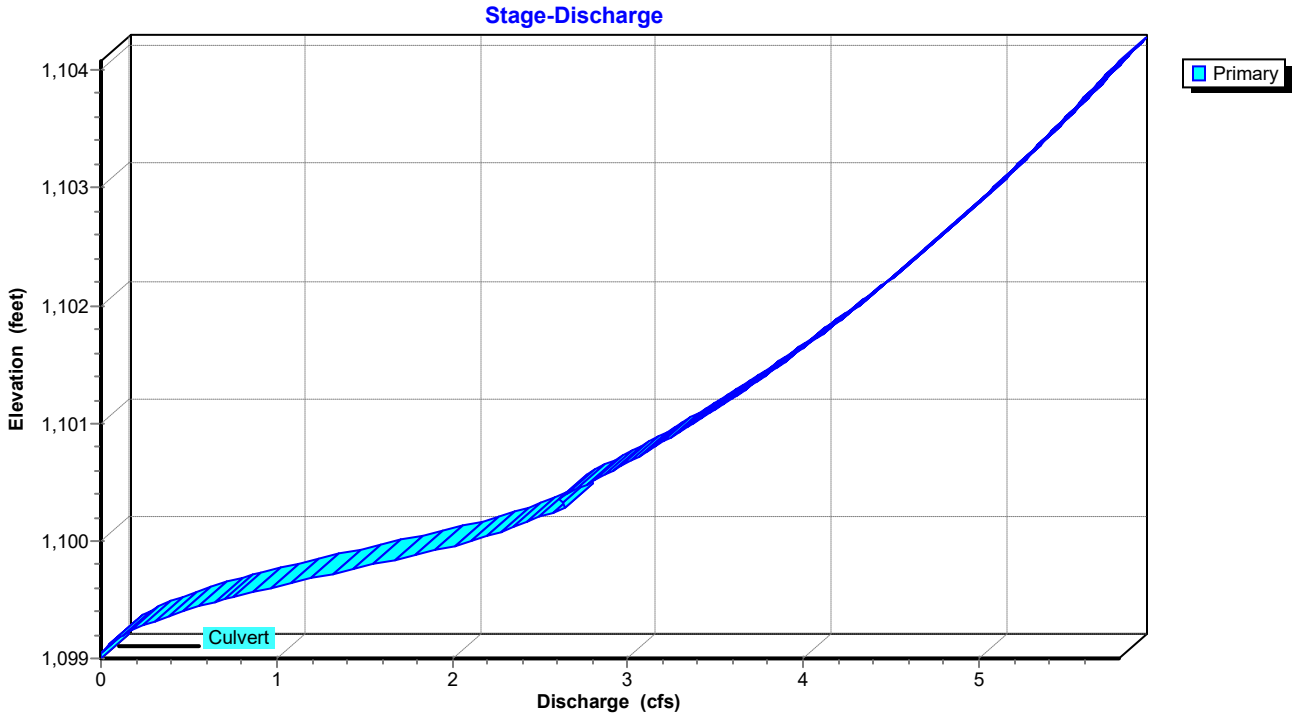
Reach 19R: TIOUGHNIOGA RIVER



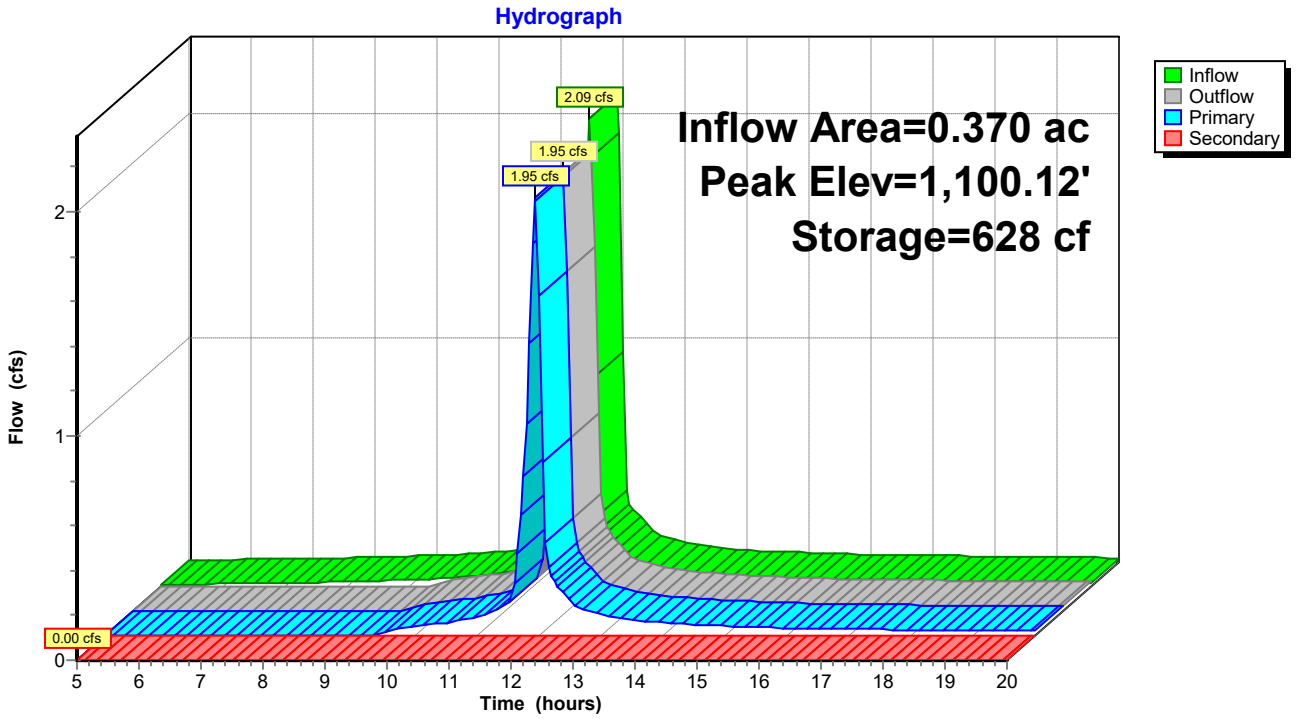
Pond 18P: FOREBAY



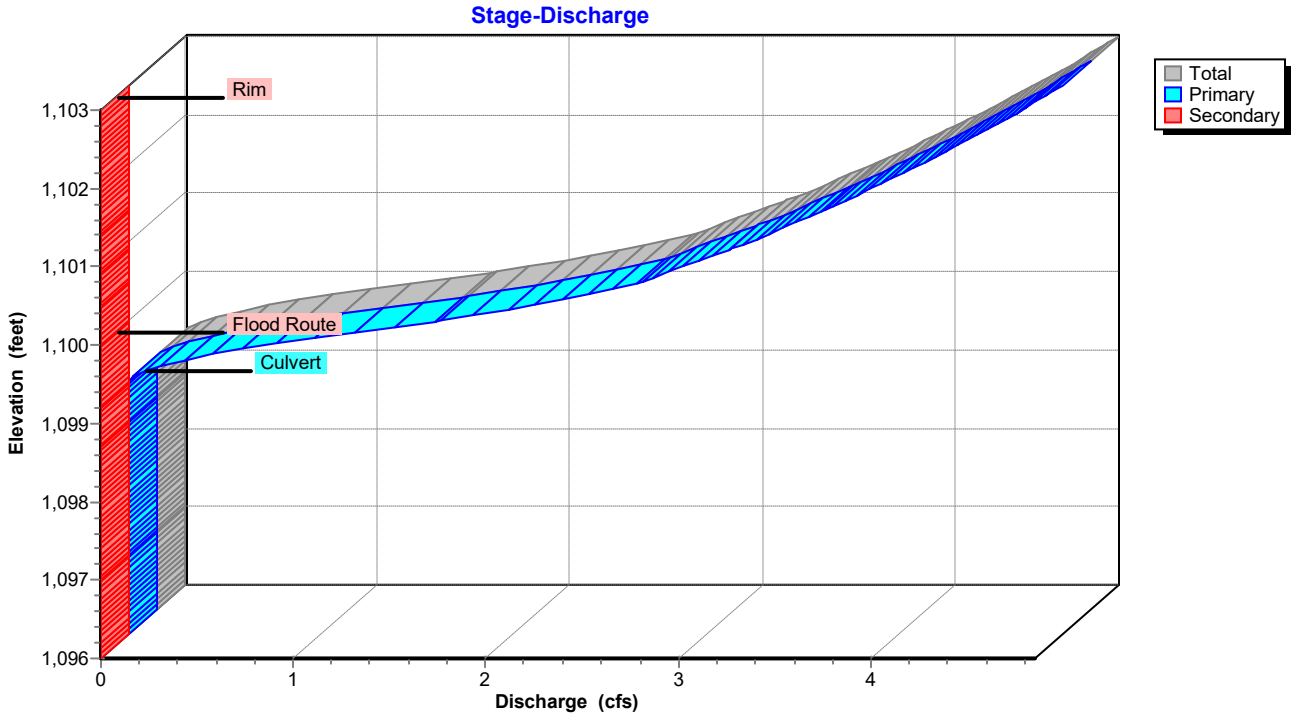
Pond 18P: FOREBAY



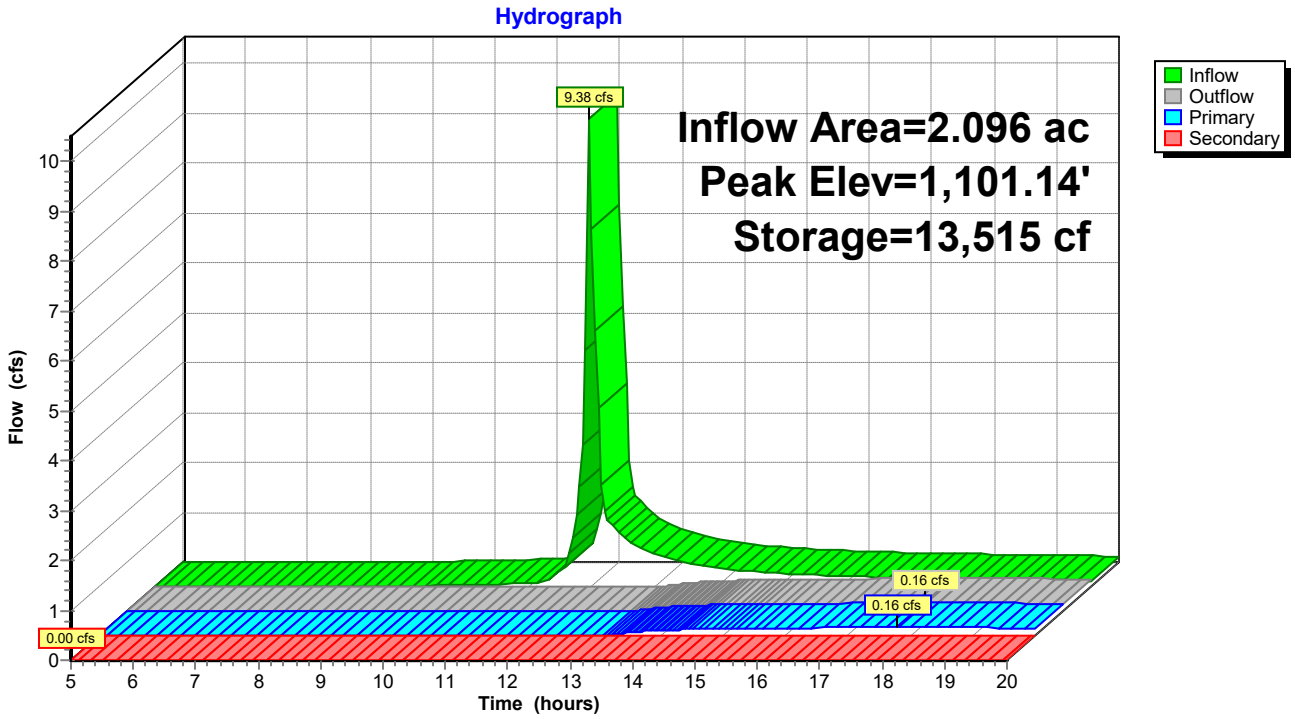
Pond 29P: DRYWELL 3



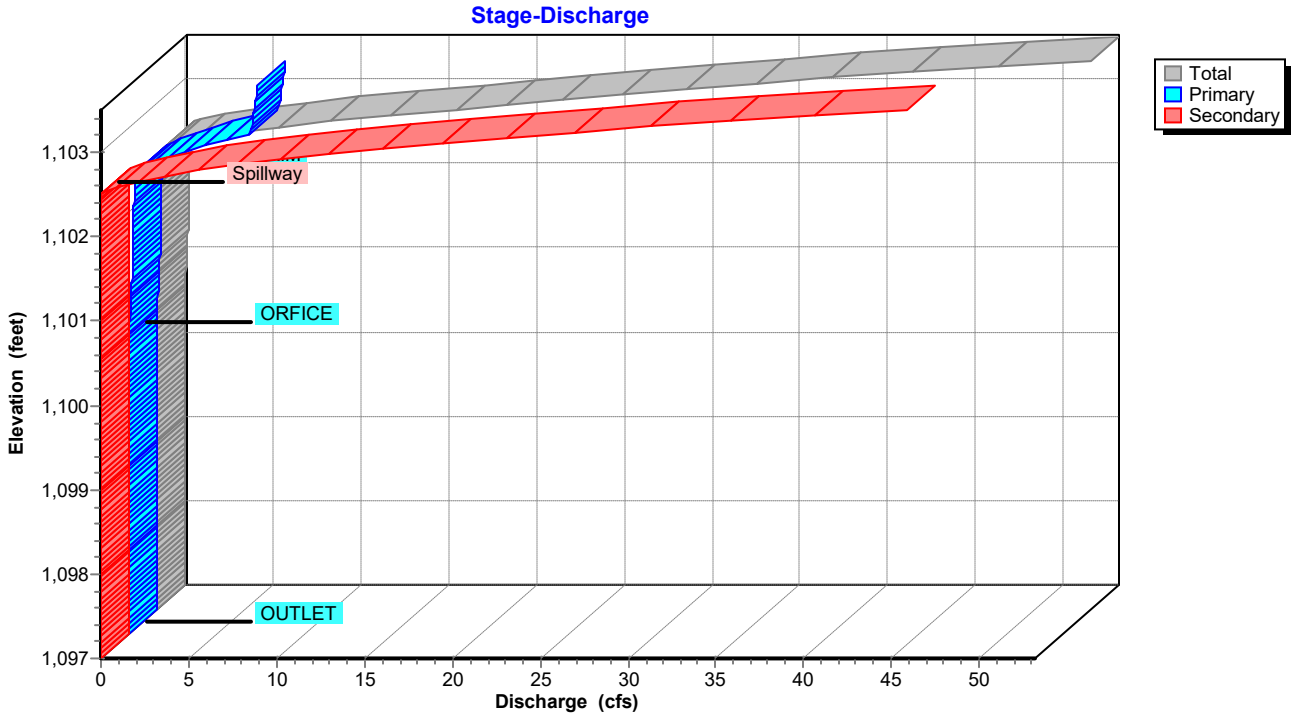
Pond 29P: DRYWELL 3



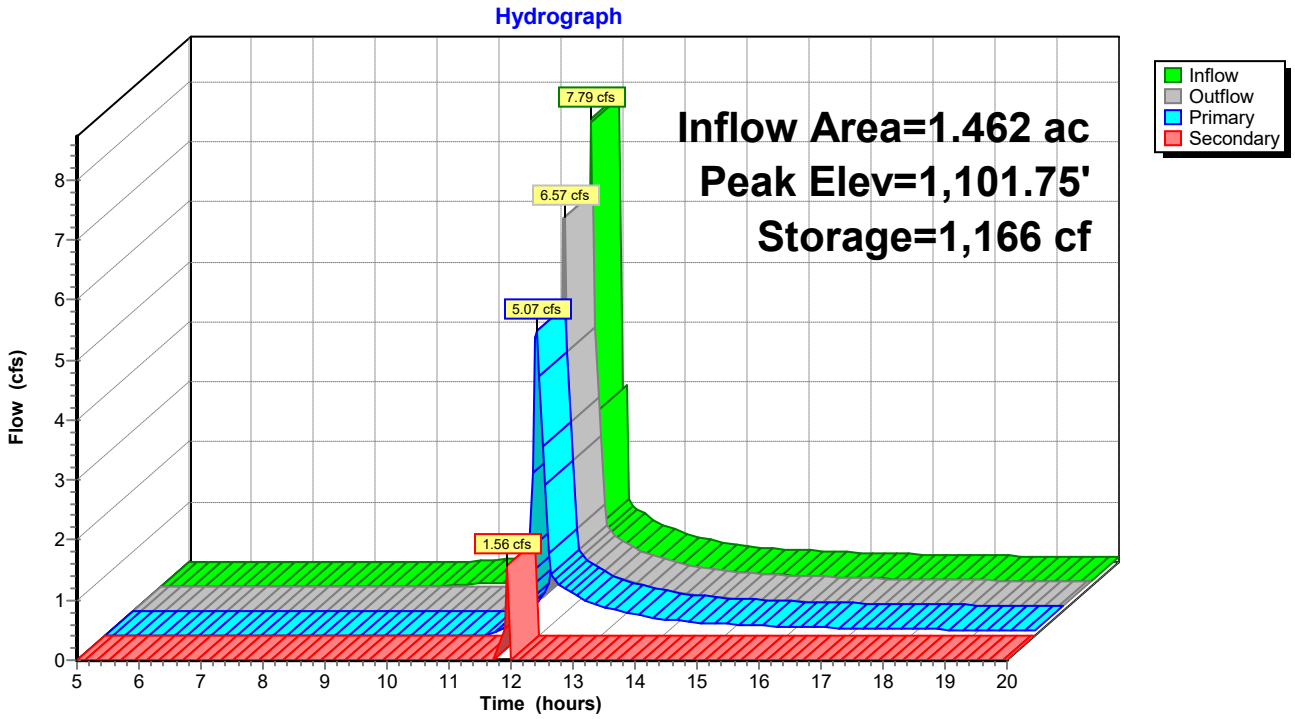
Pond 30P: I-2



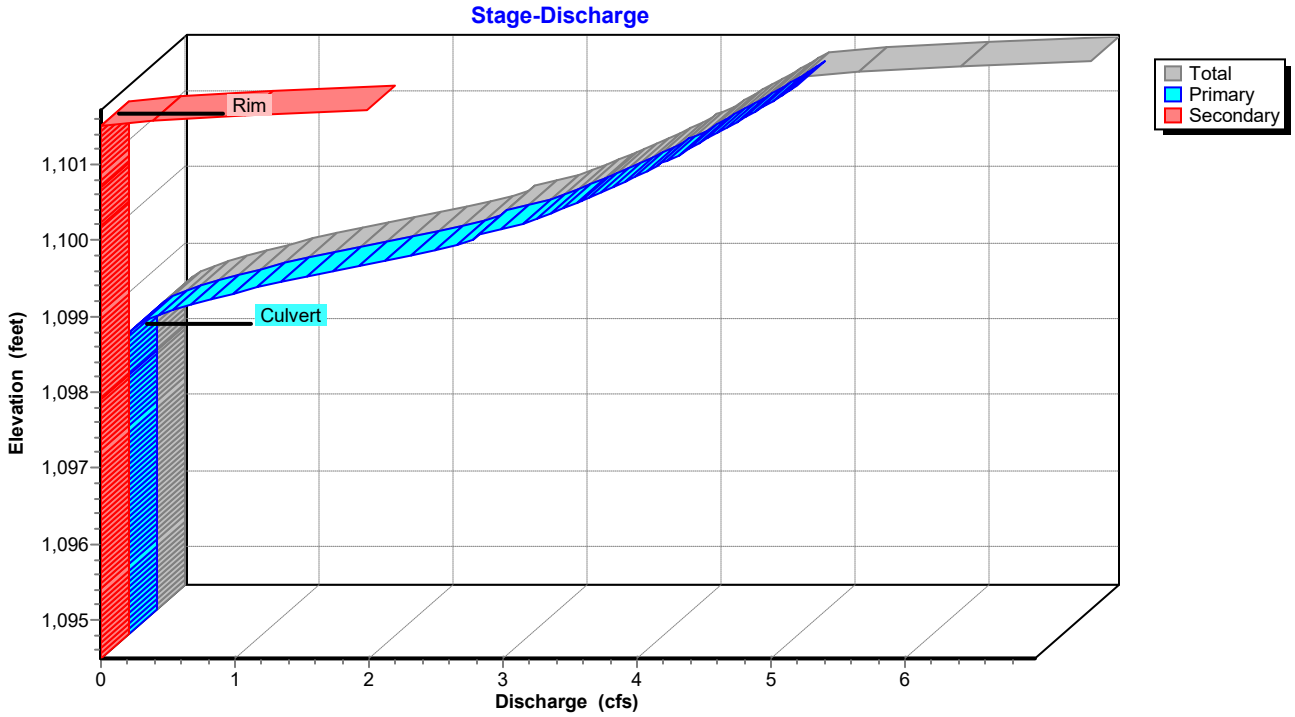
Pond 30P: I-2



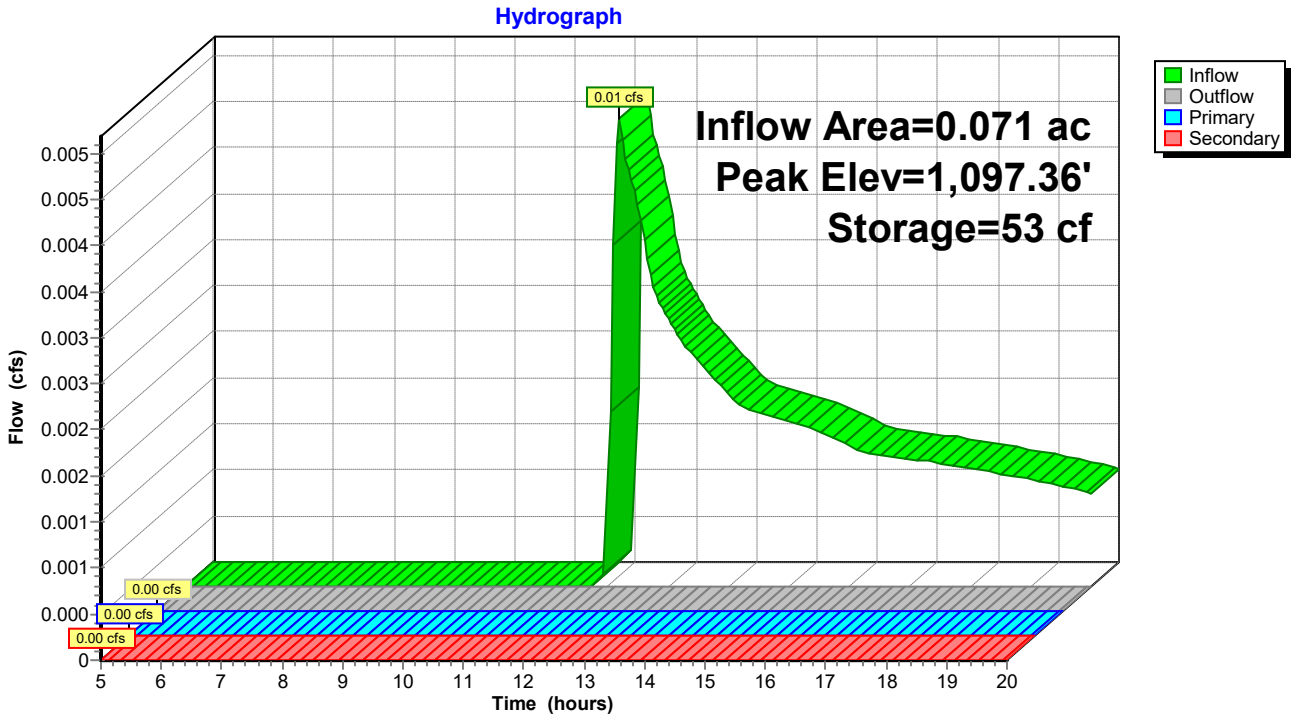
Pond 31P: DRYWELL 4



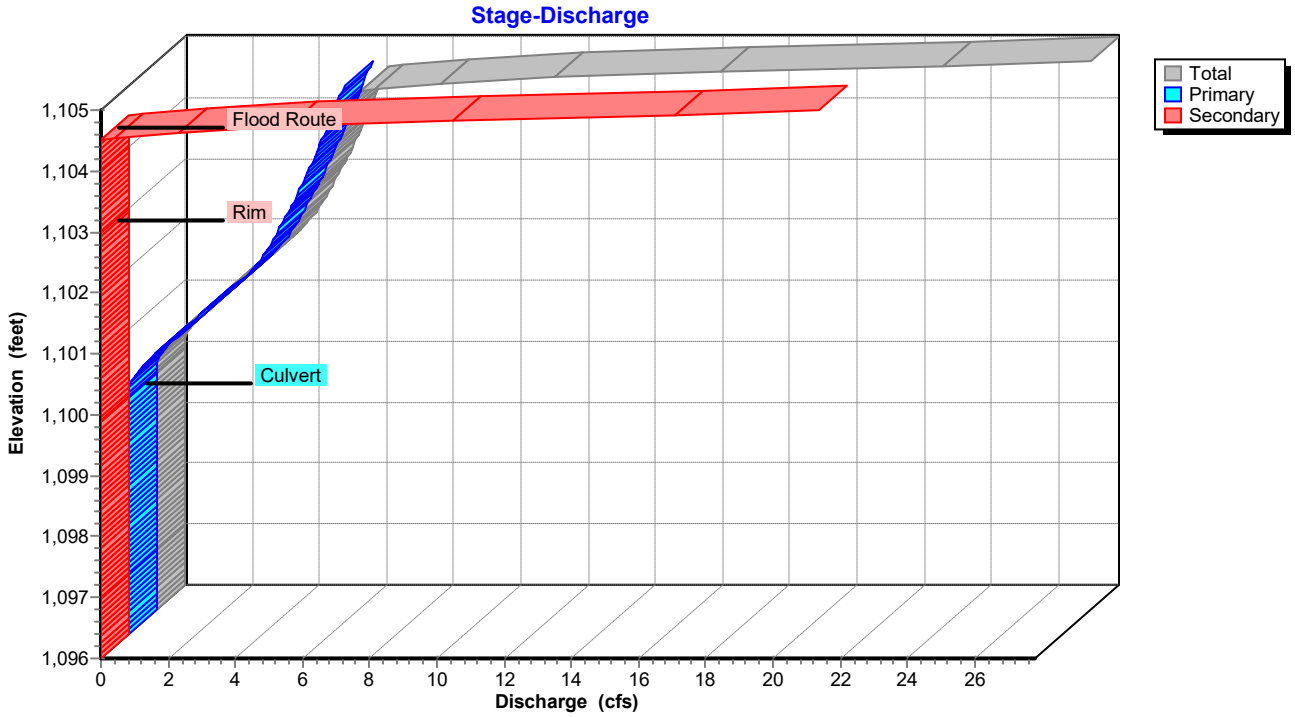
Pond 31P: DRYWELL 4



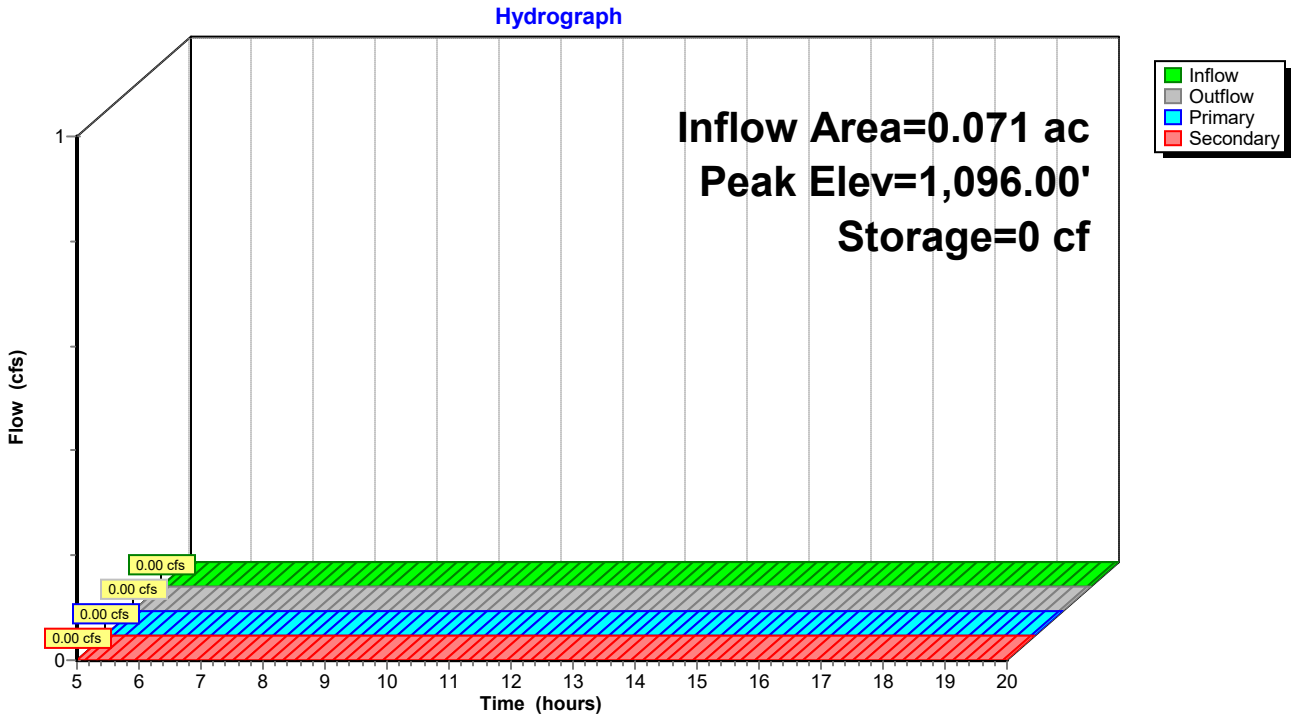
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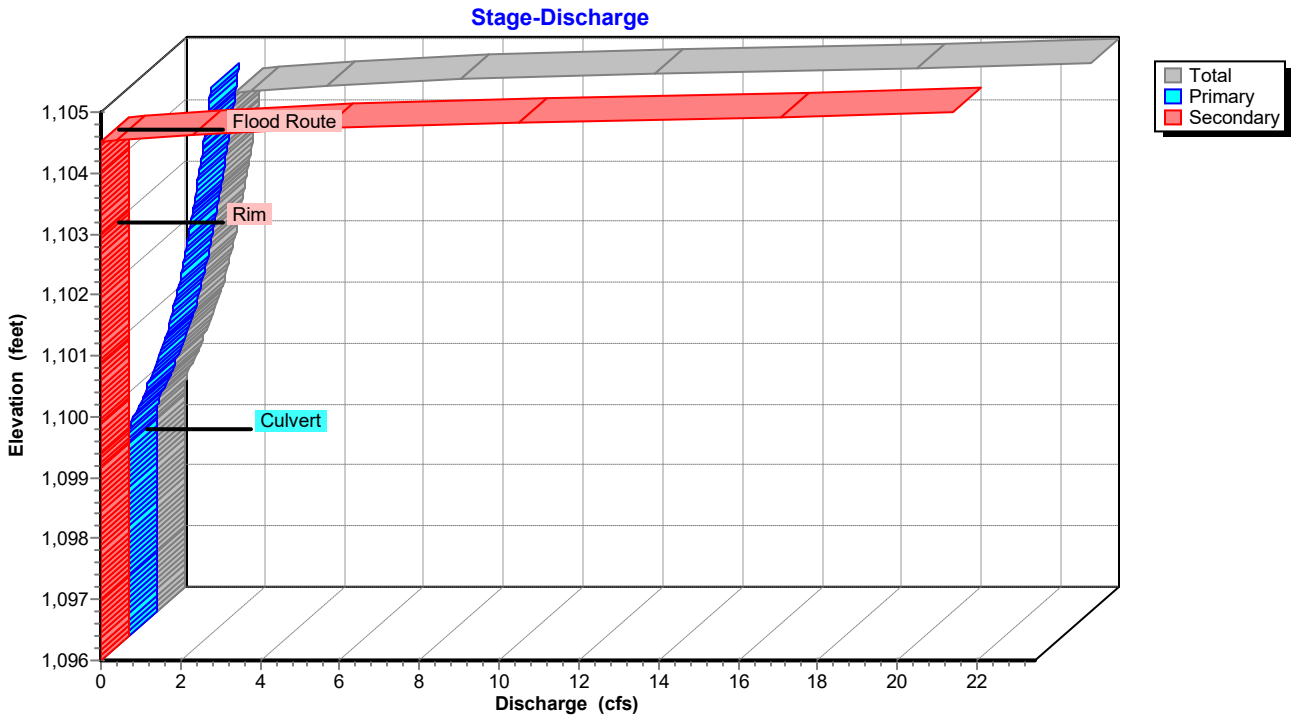
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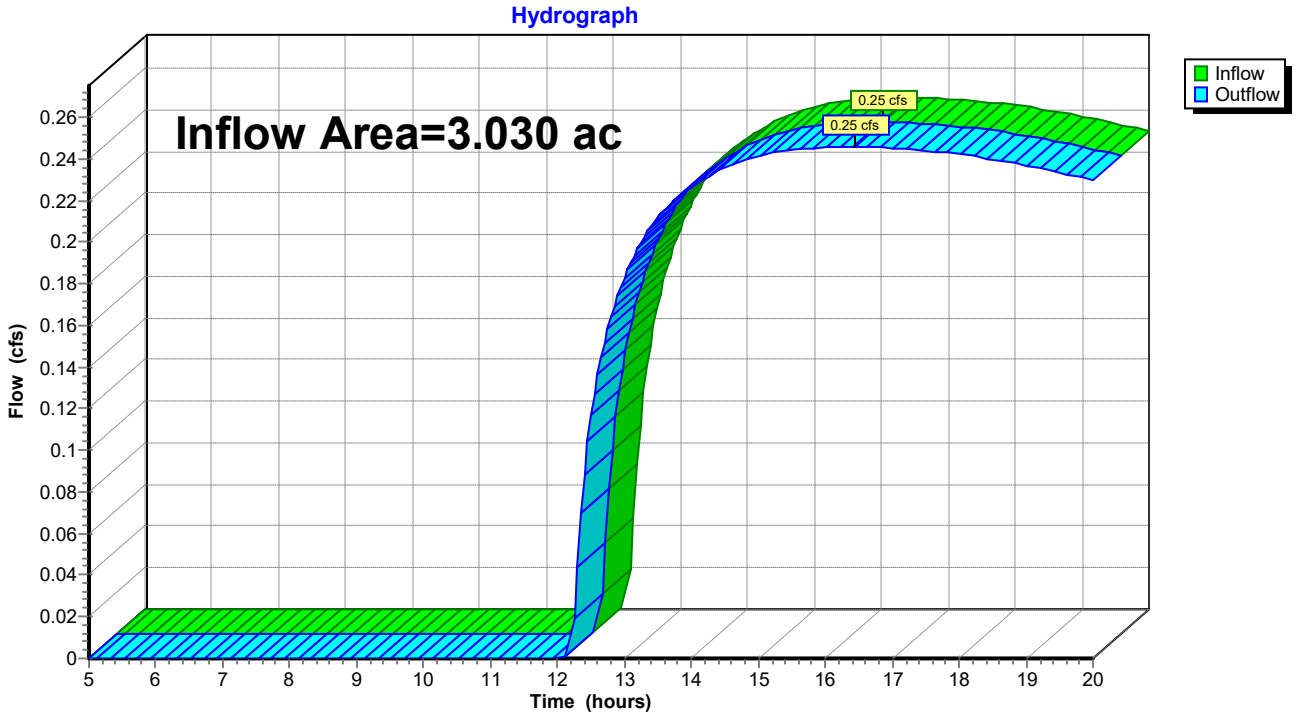
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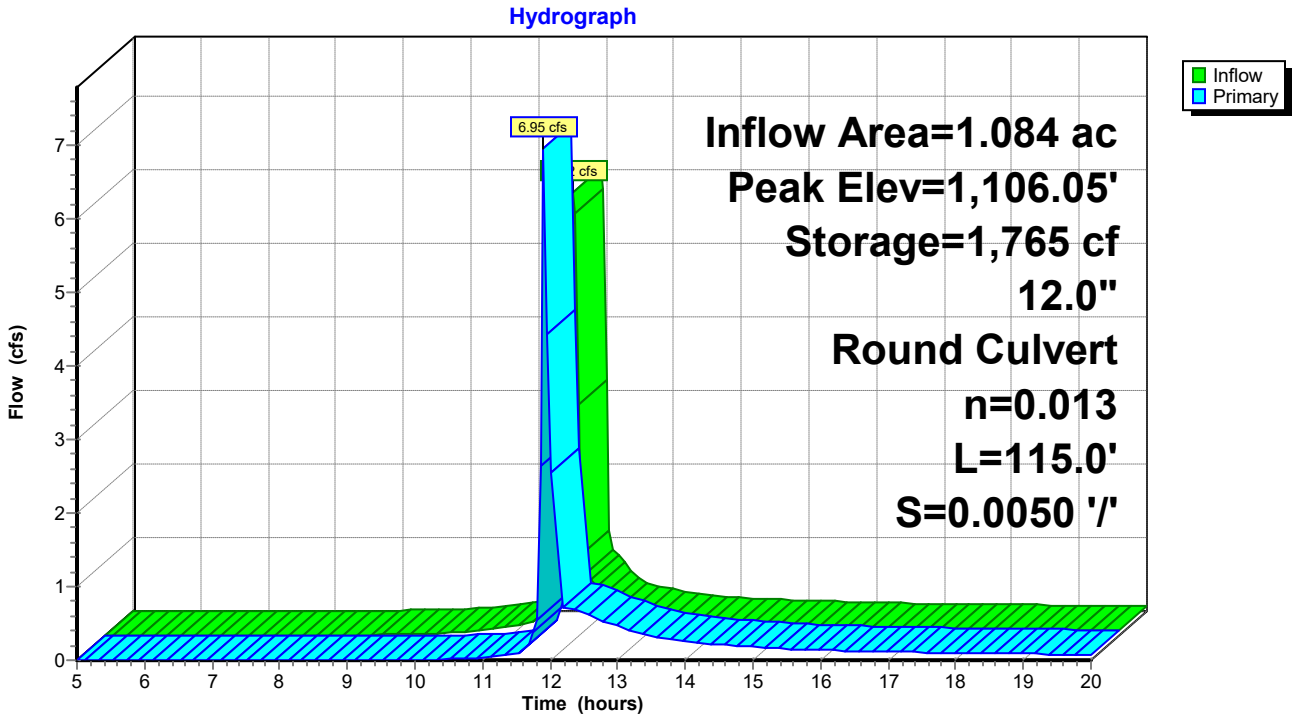
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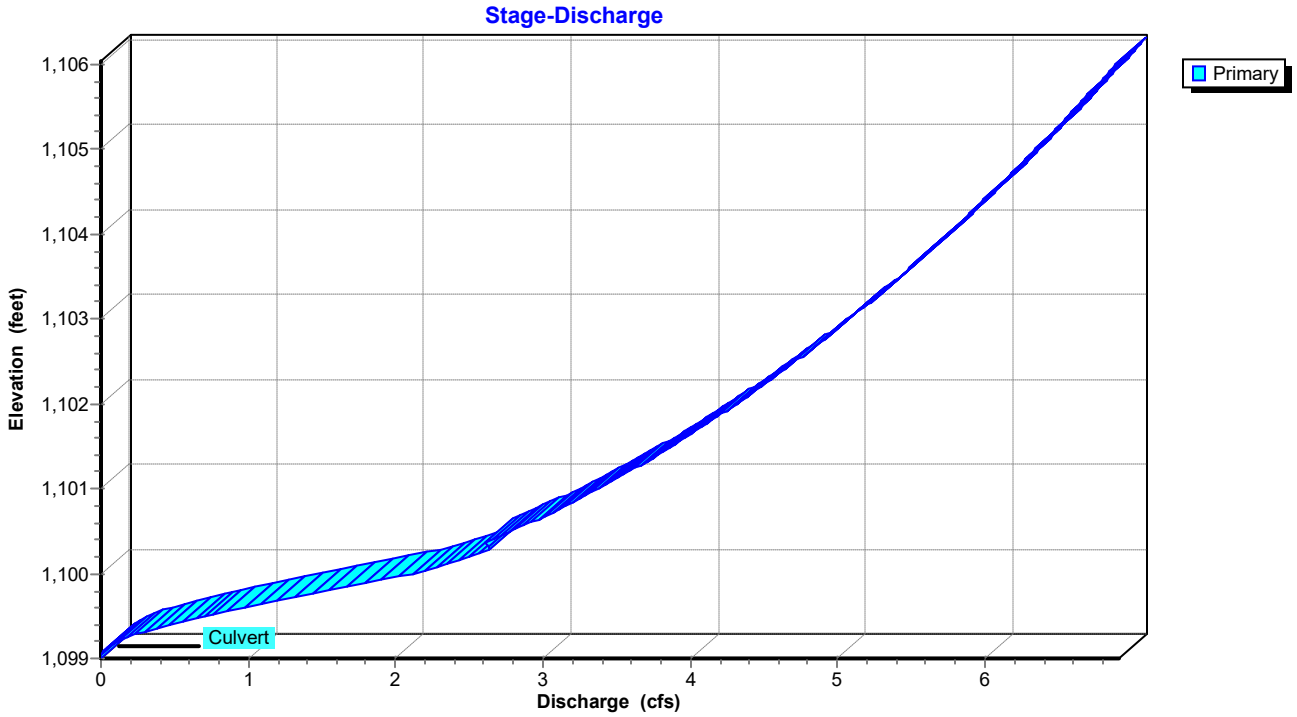
Reach 19R: TIOUGHNIOGA RIVER



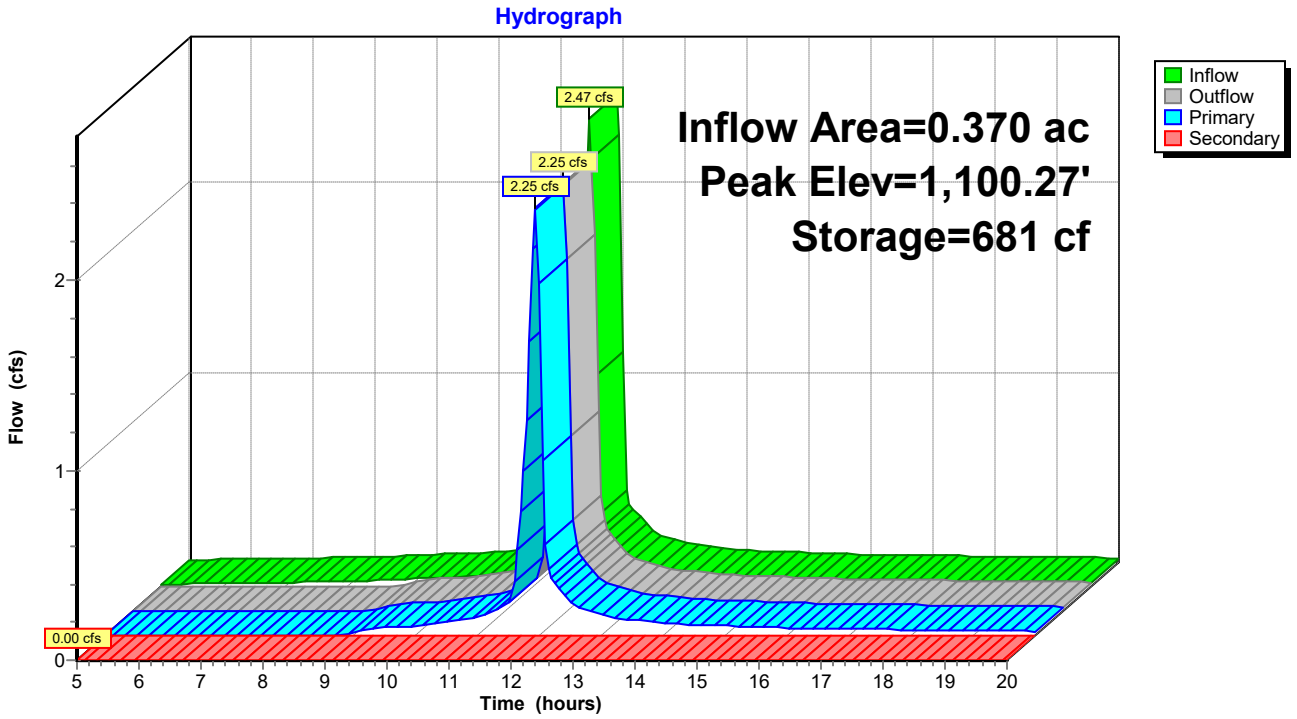
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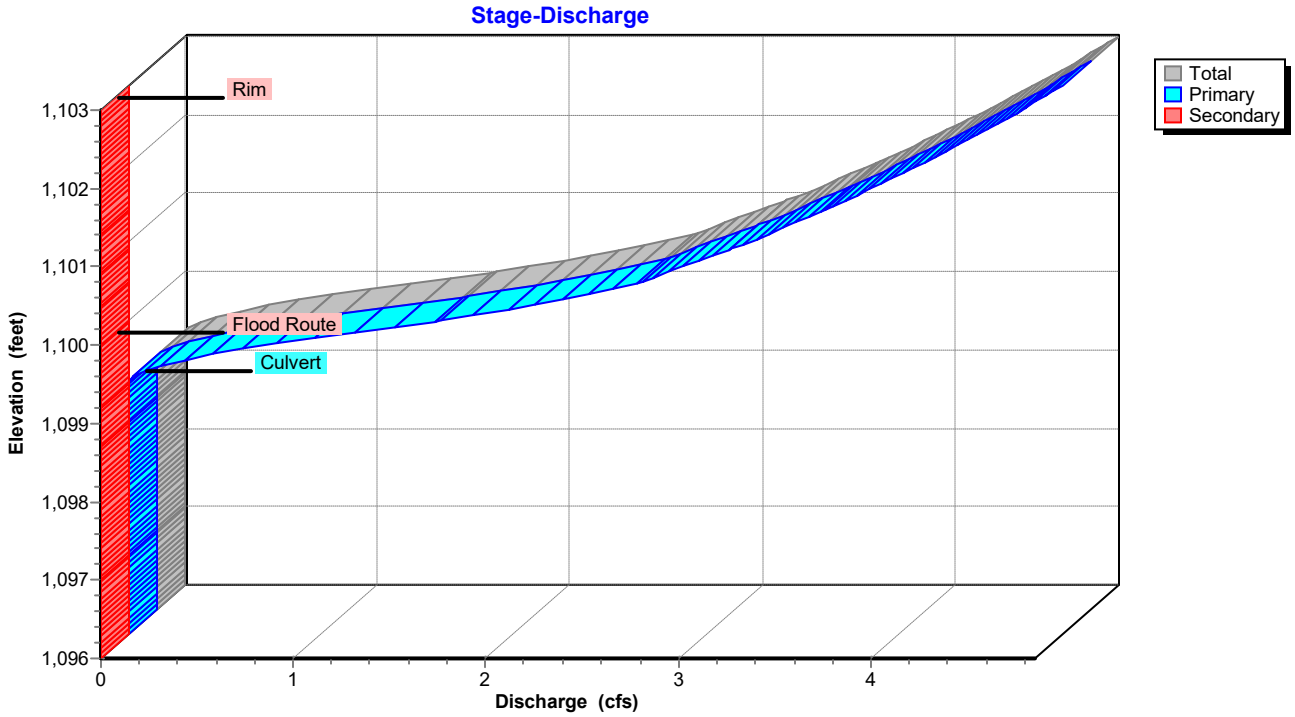
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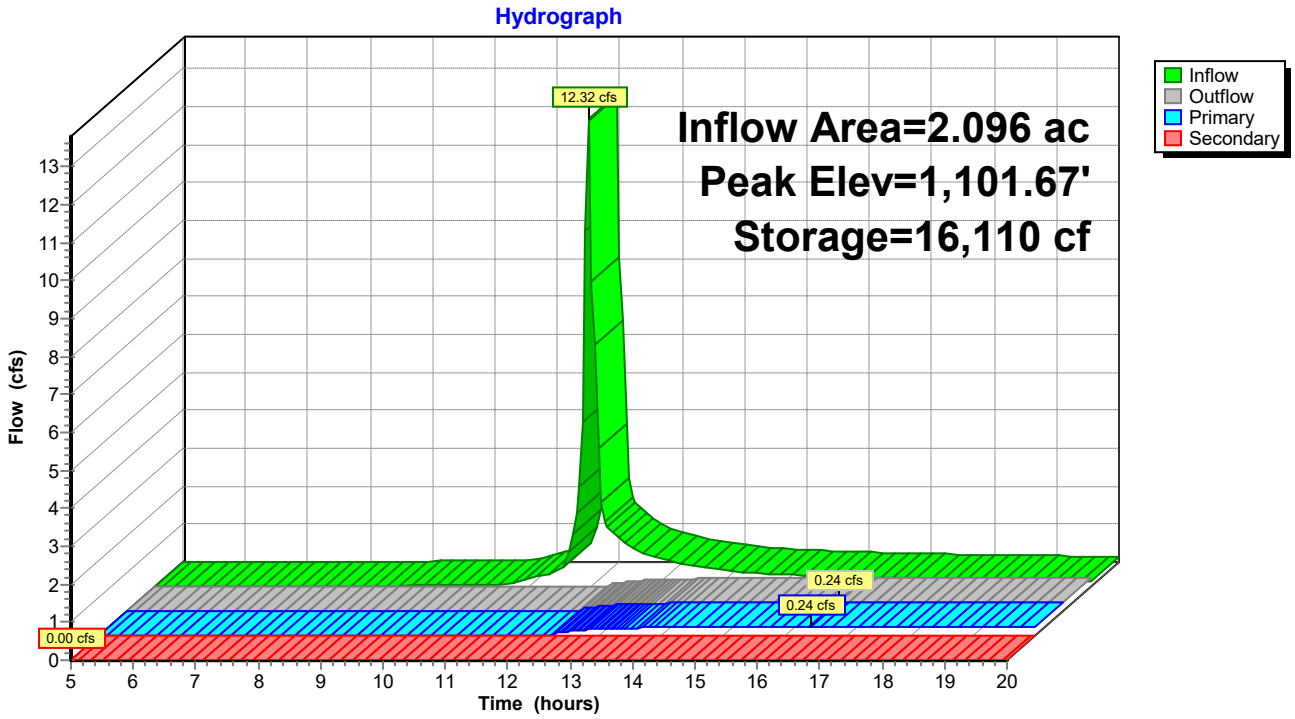
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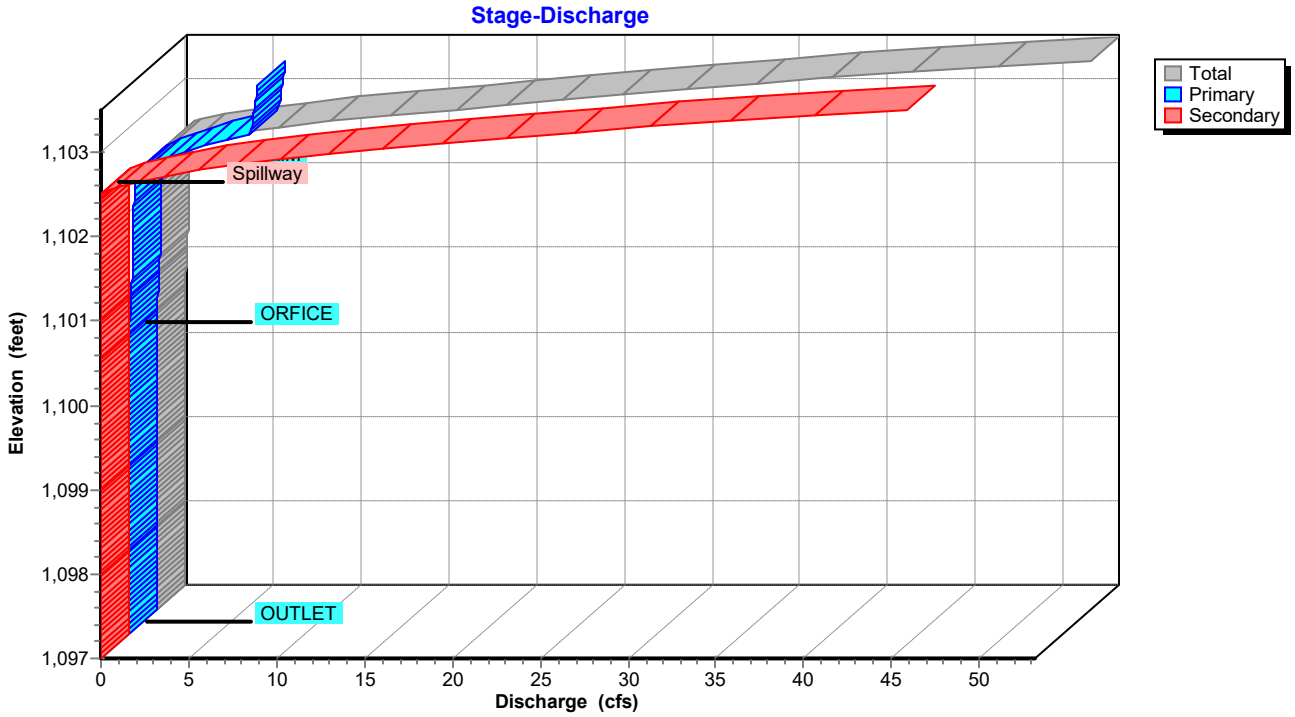
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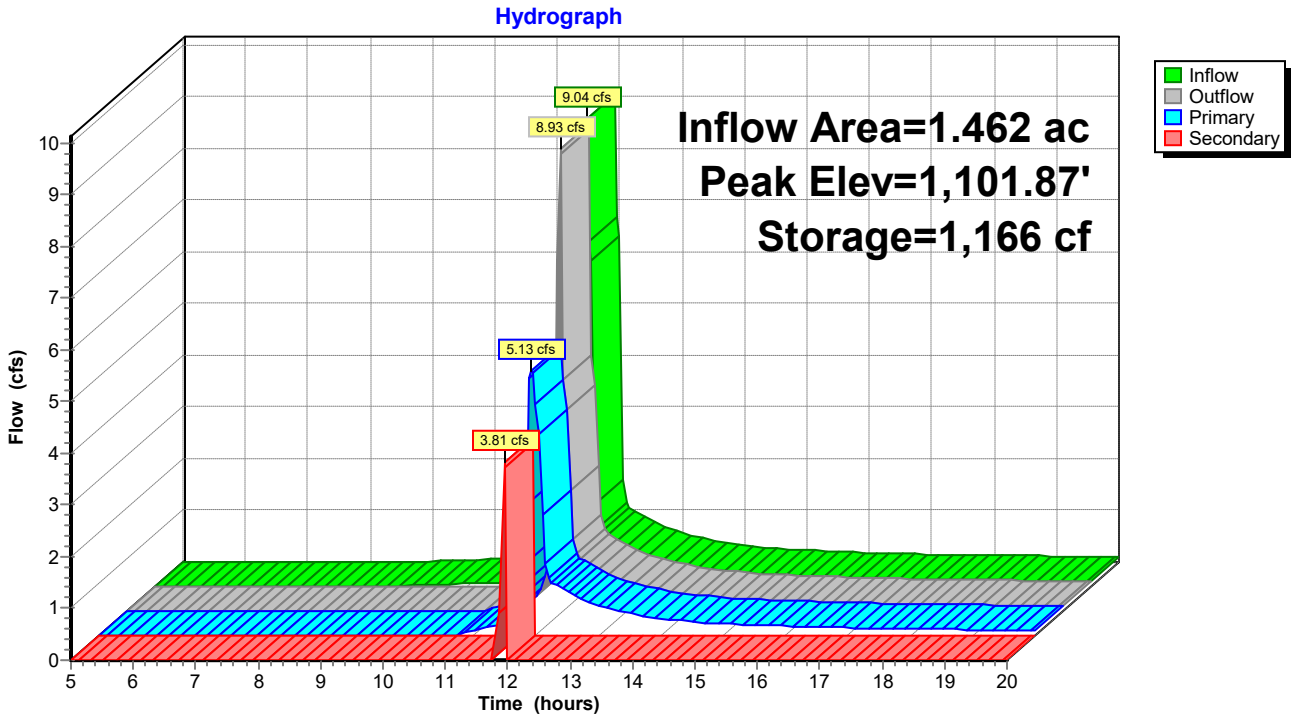
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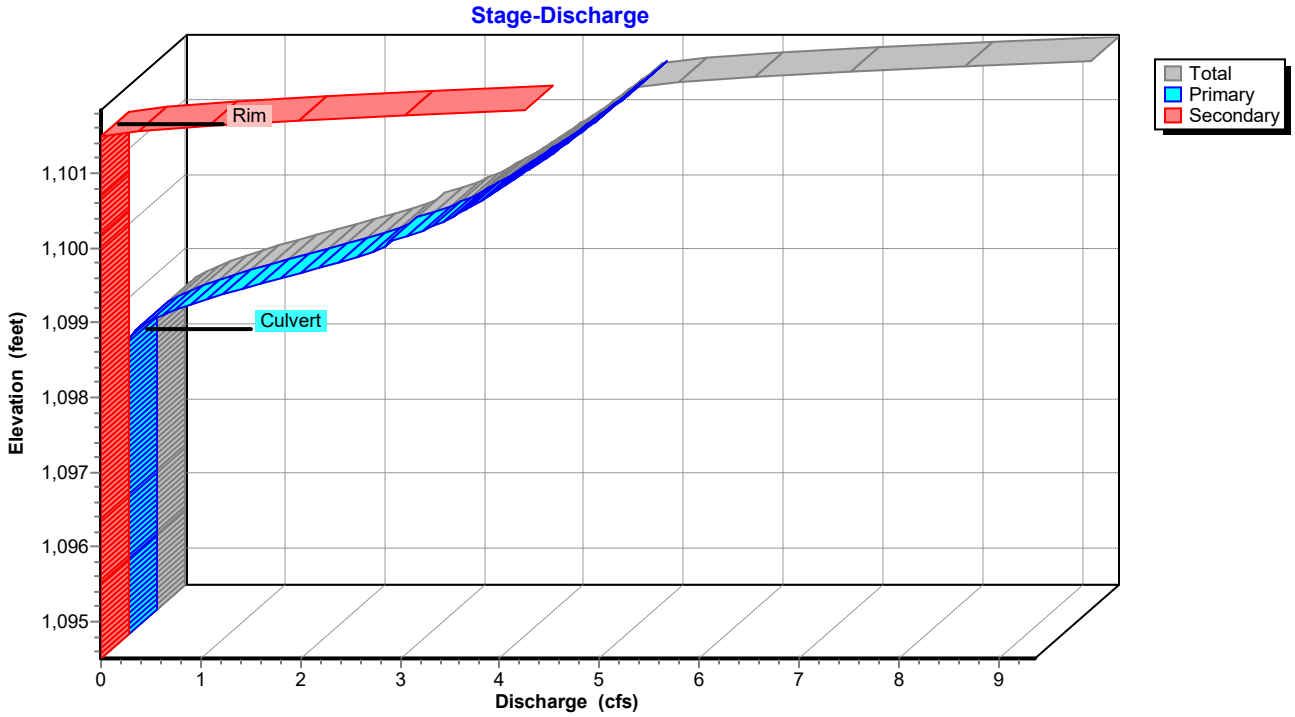
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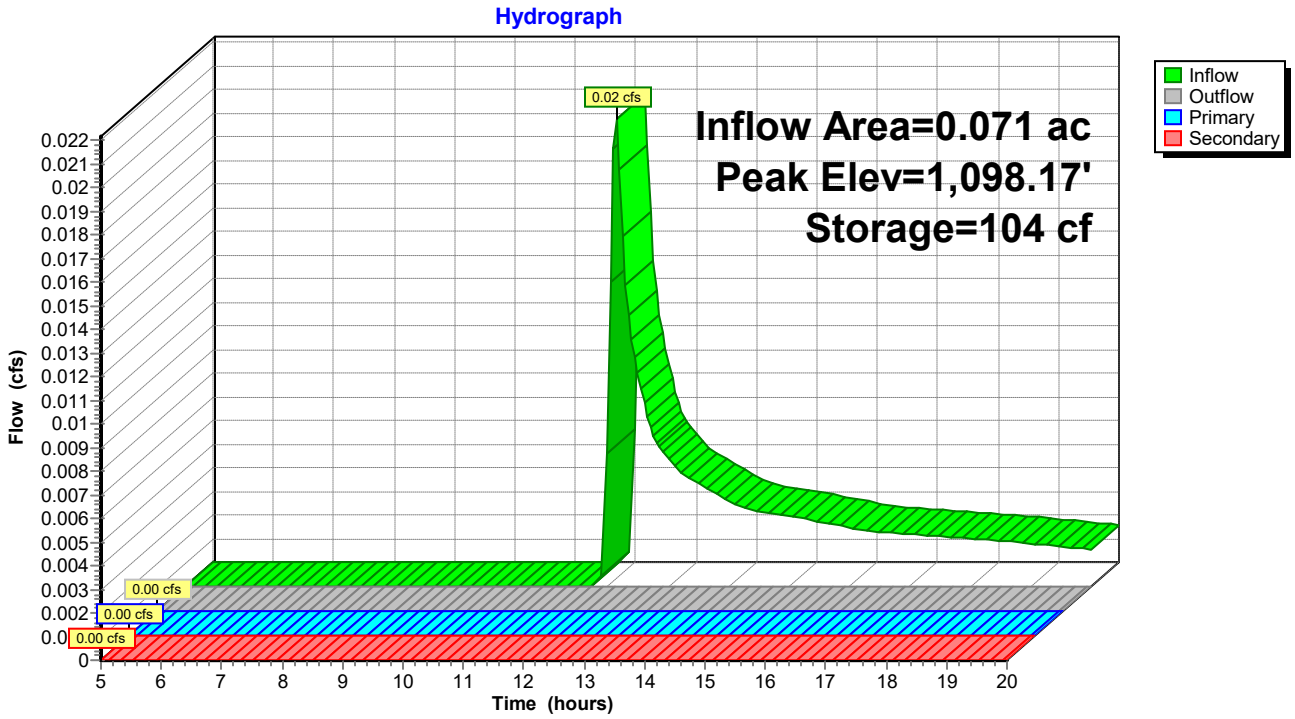
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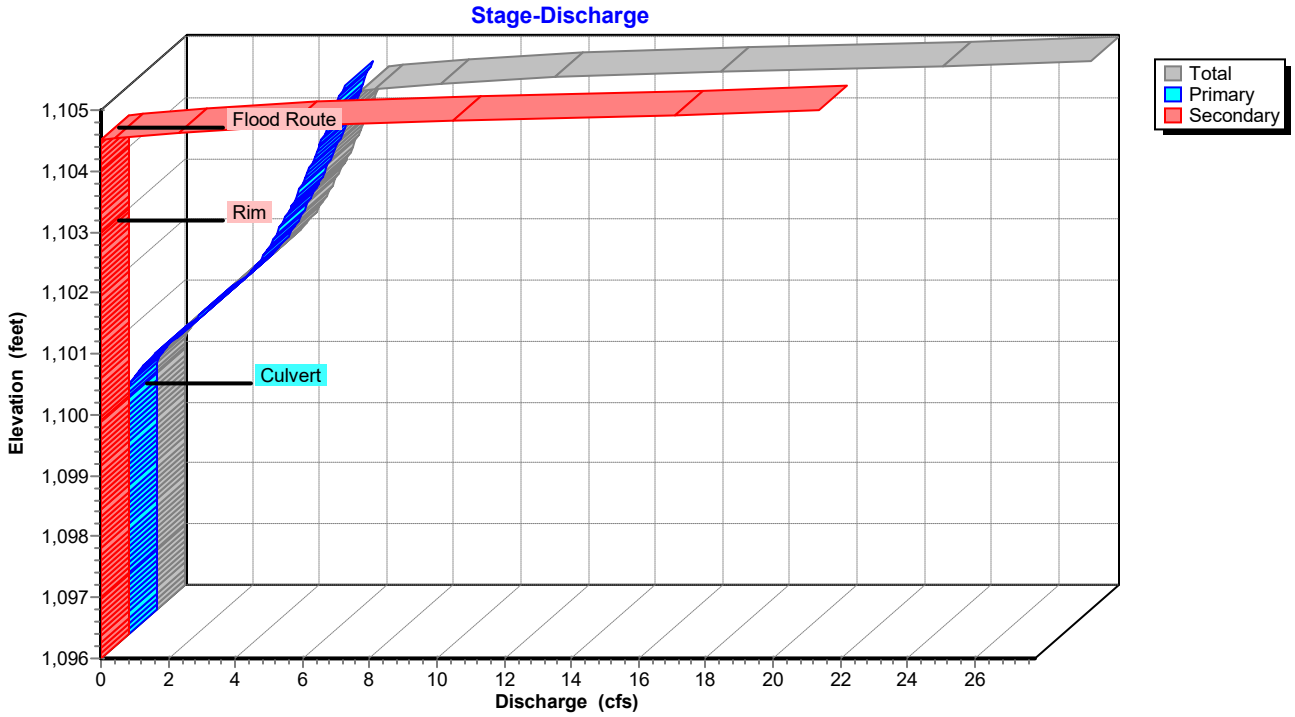
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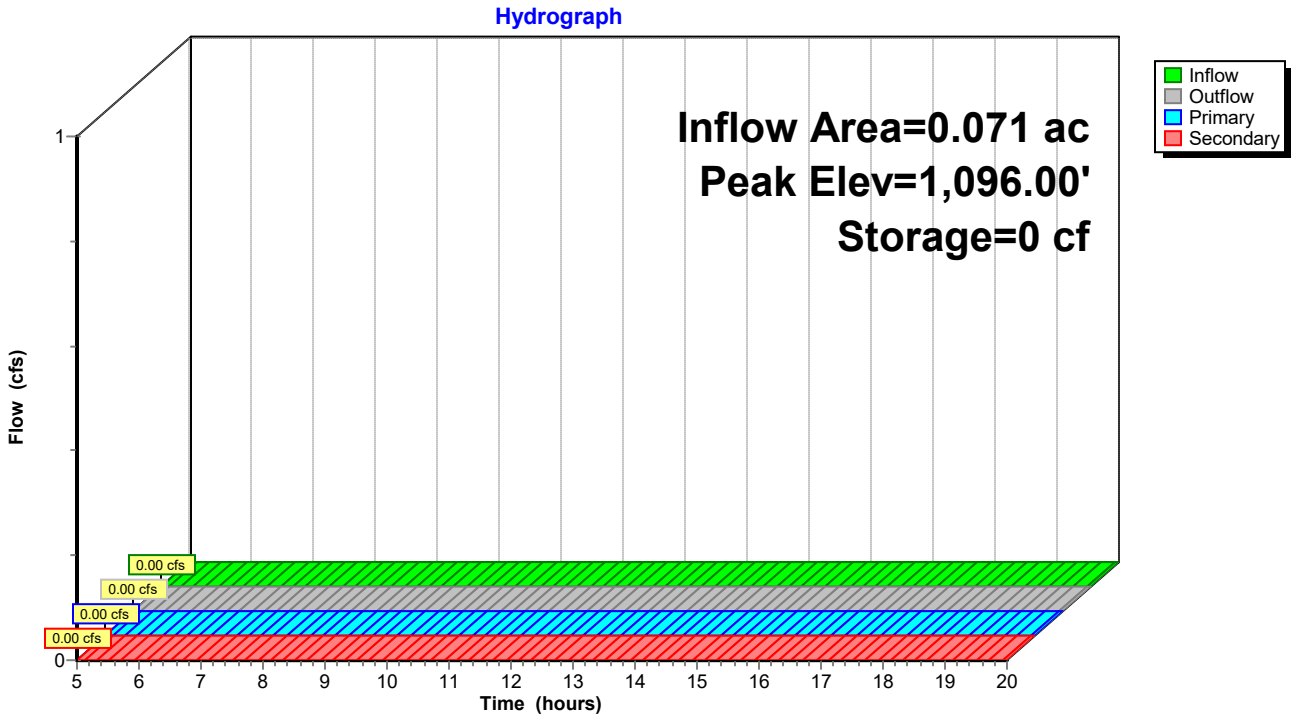
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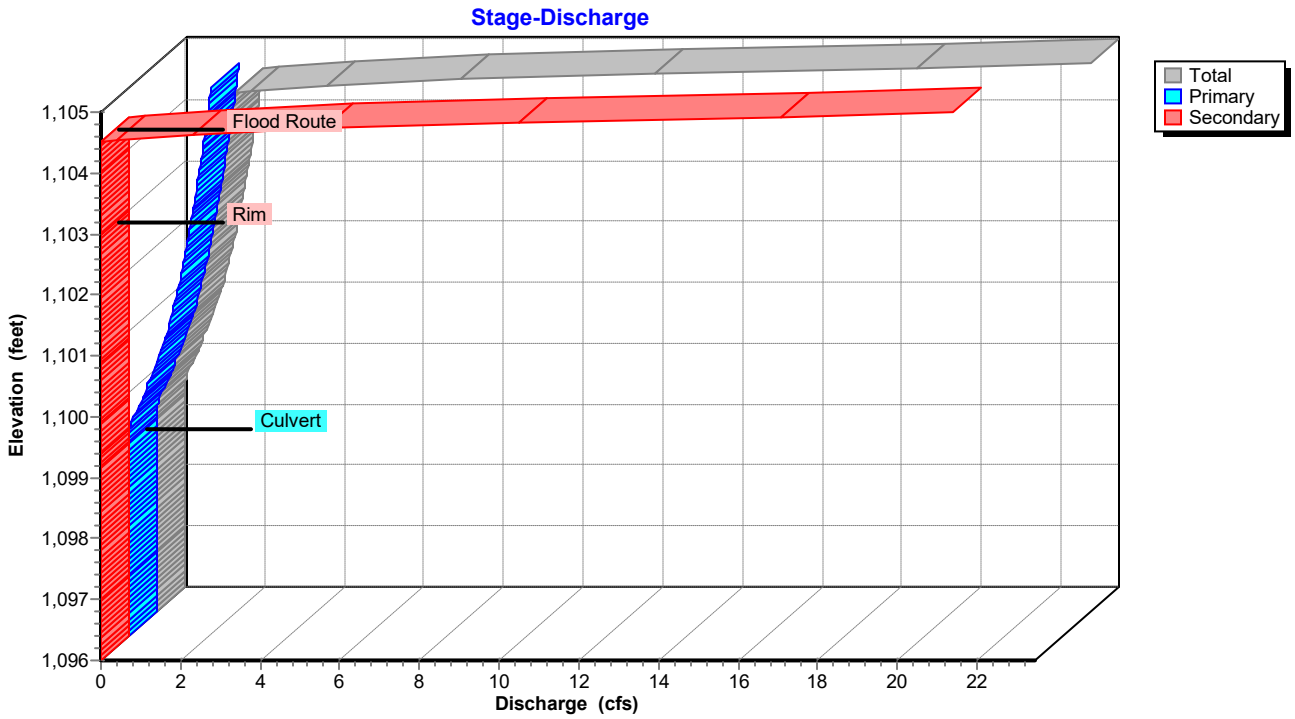
Pond 52P: DRYWELL 1



Pond 54P: DRYWELL 2



Pond 54P: DRYWELL 2



APPENDIX F

WATER & POLLUTION CONTROL FEDERATION (6) C-VALUES

storm, is common. The range of coefficients, classified with respect to the general character of the tributary area reported in use, is:

Description of Area	Runoff Coefficients
Business	
Downtown	0.70 to 0.95
Neighborhood	0.50 to 0.70
Residential	
Single-family	0.30 to 0.50
Multi-units, detached	0.40 to 0.60
Multi-units, attached	0.60 to 0.75
Residential (suburban)	0.25 to 0.40
Apartment	0.50 to 0.70
Industrial	
Light	0.50 to 0.80
Heavy	0.60 to 0.90
Parks, cemeteries	0.10 to 0.25
Playgrounds	0.20 to 0.35
Railroad yard	0.20 to 0.35
Unimproved	0.10 to 0.30

Downtown .95

Residential = 0.40

It often is desirable to develop a composite runoff coefficient based on the percentage of different types of surface in the drainage area. This procedure often is applied to typical "sample" blocks as a guide to selection of reasonable values of the coefficient for an entire area. Coefficients with respect to surface type currently in use are:

Character of Surface	Runoff Coefficients
Pavement	
Asphaltic and Concrete	0.70 to 0.95
Brick	0.70 to 0.85
Roofs	0.75 to 0.95
Lawns, sandy soil	
Flat, 2 percent	0.05 to 0.10
Average, 2 to 7 percent	0.10 to 0.15
Steep, 7 percent	0.15 to 0.20
Lawns, heavy soil	
Flat, 2 percent	0.13 to 0.17
Average, 2 to 7 percent	0.18 to 0.22
Steep, 7 percent	0.25 to 0.35

The coefficients in these two tabulations are applicable for storms of 5- to 10-yr frequencies. Less frequent, higher intensity storms will require the use of higher coefficients because infiltration and other losses have a proportionally smaller effect on runoff. The coefficients are based on the assumption that the design storm does not occur when the ground surface is frozen.

(c) Coefficients Varying with Time.—Figure 11 shows the variation of the runoff coefficient with respect to length of time of prior wetting,

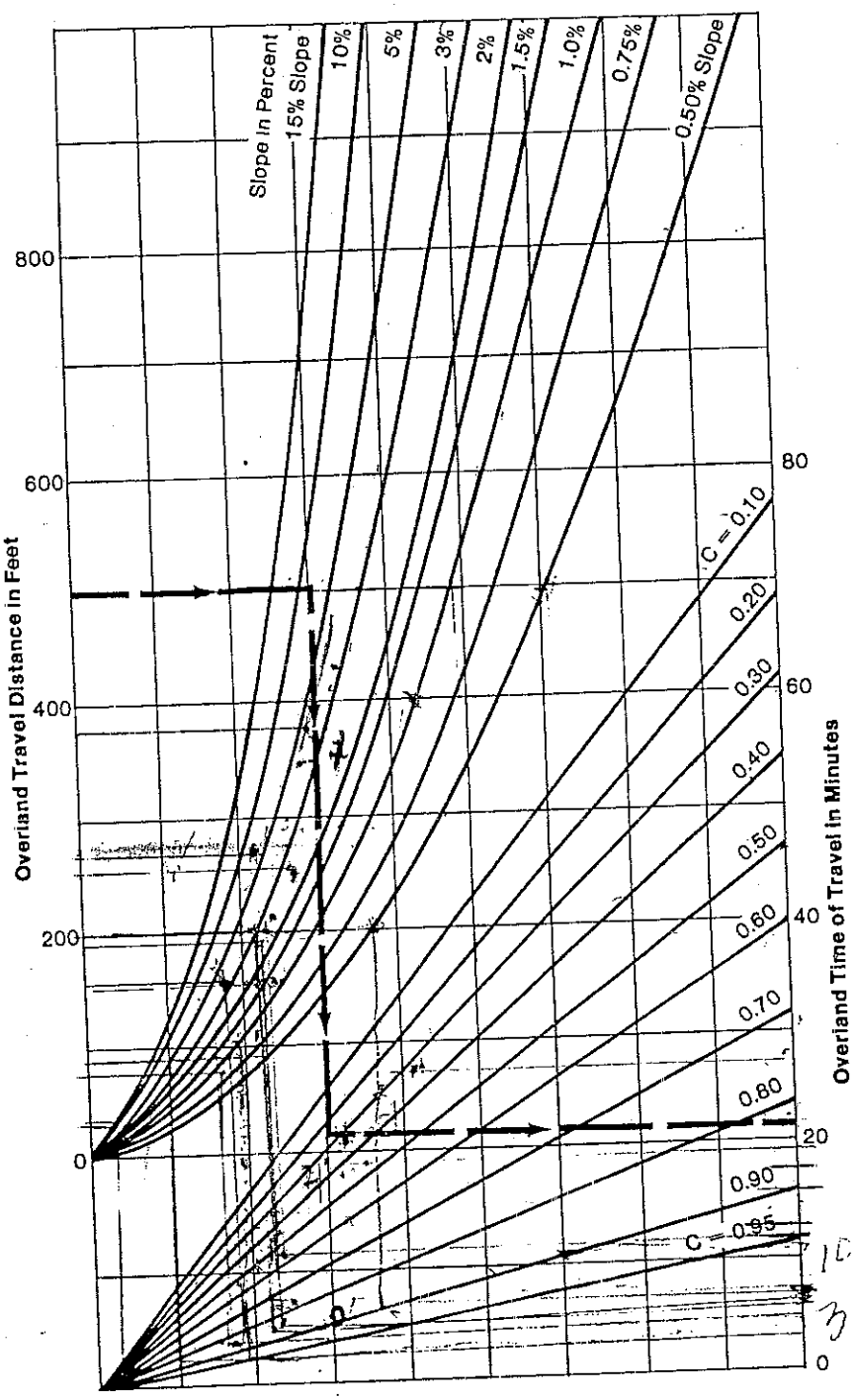
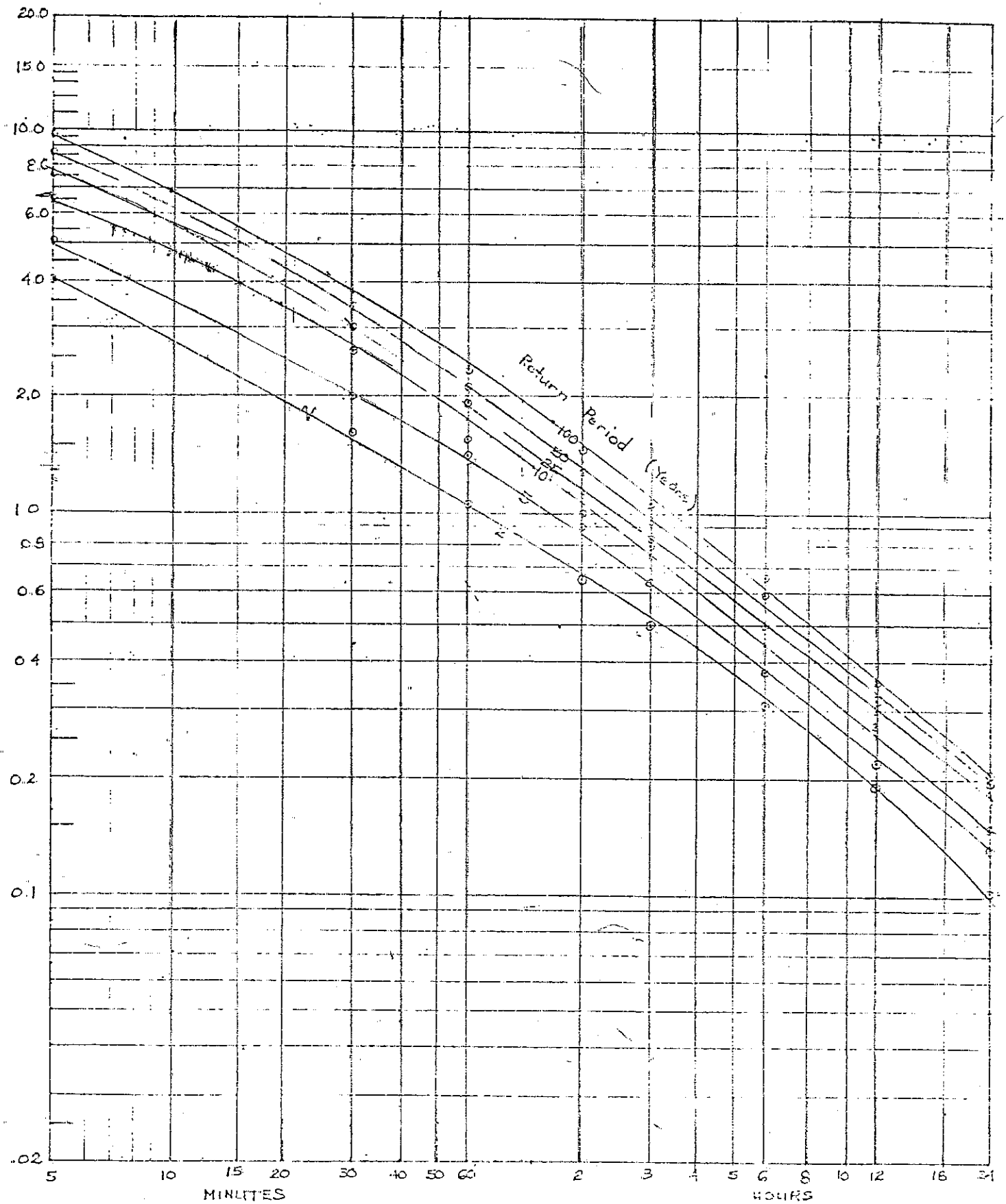


Figure 3-10 Overland time of flow graph

Syracuse, New York 1903-1970



APPENDIX G

RZ Engineering, PLLC

STORMWATER SANITARY WATER ENVIRONMENTAL TRANSPORTATION

Project: **Riverview** Date: **6/27/2025**

Water Quality Calculations

Owner: Project No.: **25024**

Location: **Cortland**

Drawings: **Grading and Site Plans** Estimated By: **DJB** **PRDA-2B FOREBAY**

WQv = (P)(Rv)(A)/12

P1= 1-yr 24 hr design storm (inches) = **1.10**

Rv= 0.05 + 0.009(I)

Where I = % Impervious

100% New Impervious Areas =	0.094	Acres
Total Site Area =	0.906	Acres
% Impervious=	0.104	

Therefore Rv =0.05 + 0.009(10.38 %)

Rv = 0.143

A= Total Site Area = 0.91 Acres

Therefore Water Quality Volume WQv =

WQv = [(P)(Rv)(A)]/12

= **0.012 acre feet**

or

= **518.69 cubic feet**

Provided Water Quality Volume =

= **0.000 acre feet**

= **0.00 cubic feet**

RZ Engineering, PLLC

STORMWATER SANITARY WATER ENVIRONMENTAL TRANSPORTATION

Project: **Riverview** Date: **6/27/2025**

Water Quality Calculations

Owner: Project No.: **25024**

Location: **Cortland**

Drawings: **Grading and Site Plans** Estimated By: **DJB** **PRDA-1B**

WQv = (P)(Rv)(A)/12

P1= 1-yr 24 hr design storm (inches) = **1.97**

Rv= 0.05 + 0.009(I)

Where I = % Impervious

100% New Impervious Areas =	1.380	Acres
Total Site Area =	3.030	Acres
% Impervious=	0.455	

Therefore Rv =0.05 + 0.009(45.54 %)

Rv = **0.460**

A= Total Site Area = **3.03 Acres**

Therefore Water Quality Volume WQv =

WQv = [(P)(Rv)(A)]/12

= **0.229 acre feet**

or

= **9965.06 cubic feet**

Provided Water Quality Volume =

= **0.251 acre feet**

= **10933.56 cubic feet**

APPENDIX H

ATTACHMENT 1

Construction Stormwater Compliance Inspection Report

Project Name and Location:	Date:	Page 1 of 2
	Permit # (if any): **NYR**	
Municipality: County:	Entry Time:	Exit Time:
On-site Representative(s) and contact information:	Weather Conditions:	
Name and Address of SPDES Permittee/Title/Phone/Fax Numbers: Contacted: Yes ☐ No ☐		

INSPECTION CHECKLIST

SPDES Authority

	Yes	No	N/A		Law, rule or permit citation
1.	☐	☐	☐	Is a copy of the NOI posted at the construction site for public viewing?	
2.	☐	☐	☐	Is an up-to-date copy of the signed SWPPP retained at the construction site?	
3.	☐	☐	☐	Is a copy of the SPDES General Permit retained at the construction site?	

SWPPP Content

	Yes	No	N/A		Law, rule or permit citation
4.	☐	☐	☐	Does the SWPPP describe and identify the erosion & sediment control measures to be employed?	
5.	☐	☐	☐	Does the SWPPP provide a maintenance schedule for the erosion & sediment control measures?	
6.	☐	☐	☐	Does the SWPPP describe and identify the post-construction SW control measures to be employed?	
7.	☐	☐	☐	Does the SWPPP identify the contractor(s) and subcontractor(s) responsible for each measure?	
8.	☐	☐	☐	Does the SWPPP include all the necessary 'CONTRACTOR CERTIFICATION' statements?	
9.	☐	☐	☐	Is the SWPPP signed/certified by the permittee?	

Recordkeeping

	Yes	No	N/A		Law, rule or permit citation
10.	☐	☐	☐	Are inspections performed as required by the permit (every 7 days and after ½" rain event)?	
11.	☐	☐	☐	Are the site inspections performed by a qualified professional?	
12.	☐	☐	☐	Are all required reports properly signed/certified?	
13.	☐	☐	☐	Does the SWPPP include copies of the monthly/quarterly written summaries of compliance status?	

Visual Observations

	Yes	No	N/A		Law, rule or permit citation
14.	☐	☐	☐	Are all erosion and sediment control measures installed/constructed?	
15.	☐	☐	☐	Are all erosion and sediment control measures maintained properly?	
16.	☐	☐	☐	Have all disturbances of 5 acres or more been approved prior to the disturbance?	
17.	☐	☐	☐	Are stabilization measures initiated in inactive areas?	
18.	☐	☐	☐	Are permanent stormwater control measures implemented?	
19.	☐	☐	☐	Was there a discharge into the receiving water on the day of inspection?	
20.	☐	☐	☐	Are receiving waters free of there evidence of turbidity, sedimentation, or oil ? (If no , complete Page 2)	

Overall Inspection Rating: ❑ Satisfactory ❑ Marginal ❑ Unsatisfactory	
Name/Agency of Lead Inspector:	**Signature of Lead Inspector:**
Names/Agencies of Other Inspectors:	

Water Quality Observations

Describe the discharge(s) [source(s), impact on receiving water(s), etc.] _____

_____

_____

_____

_____

Describe the quality of the receiving water(s) both upstream and downstream of the discharge_____

_____

_____

_____

_____

Describe any other water quality standards or permit violations _____

_____

_____

Additional Comments:_____

_____

_____

_____

_____

SITE PLAN/SKETCH

_____	_____
Inspector (print name)	**Date of Inspection**
_____	_____
Qualified Professional (print name)	**Qualified Professional Signature**

The above signed acknowledges that, to the best of his/her knowledge, all information provided on the forms is accurate and complete.

Maintaining Water Quality

Yes No NA
[ ] [ ] [ ] Is there an increase in turbidity causing a substantial visible contrast to natural conditions?
[ ] [ ] [ ] Is there residue from oil and floating substances, visible oil film, or globules or grease?
[ ] [ ] [ ] All disturbance is within the limits of the approved plans.
[ ] [ ] [ ] Have receiving lake/bay, stream, and/or wetland been impacted by silt from project?

Housekeeping

1. General Site Conditions
Yes No NA
[ ] [ ] [ ] Is construction site litter and debris appropriately managed?
[ ] [ ] [ ] Are facilities and equipment necessary for implementation of erosion and sediment control in working order and/or properly maintained?
[ ] [ ] [ ] Is construction impacting the adjacent property?
[ ] [ ] [ ] Is dust adequately controlled?

2. Temporary Stream Crossing
Yes No NA
[ ] [ ] [ ] Maximum diameter pipes necessary to span creek without dredging are installed.
[ ] [ ] [ ] Installed non-woven geotextile fabric beneath approaches.
[ ] [ ] [ ] Is fill composed of aggregate (no earth or soil)?
[ ] [ ] [ ] Rock on approaches is clean enough to remove mud from vehicles & prevent sediment from entering stream during high flow.

Runoff Control Practices

1. Excavation Dewatering
Yes No NA
[ ] [ ] [ ] Upstream and downstream berms (sandbags, inflatable dams, etc.) are installed per plan.
[ ] [ ] [ ] Clean water from upstream pool is being pumped to the downstream pool.
[ ] [ ] [ ] Sediment laden water from work area is being discharged to a silt-trapping device.
[ ] [ ] [ ] Constructed upstream berm with one-foot minimum freeboard.

2. Level Spreader
Yes No NA
[ ] [ ] [ ] Installed per plan.
[ ] [ ] [ ] Constructed on undisturbed soil, not on fill, receiving only clear, non-sediment laden flow.
[ ] [ ] [ ] Flow sheets out of level spreader without erosion on downstream edge.

3. Interceptor Dikes and Swales
Yes No NA
[ ] [ ] [ ] Installed per plan with minimum side slopes 2H:1V or flatter.
[ ] [ ] [ ] Stabilized by geotextile fabric, seed, or mulch with no erosion occurring.
[ ] [ ] [ ] Sediment-laden runoff directed to sediment trapping structure

Runoff Control Practices (continued)

4. Stone Check Dam
Yes No NA
[ ] [ ] [ ] Is channel stable? (flow is not eroding soil underneath or around the structure).
[ ] [ ] [ ] Check is in good condition (rocks in place and no permanent pools behind the structure).
[ ] [ ] [ ] Has accumulated sediment been removed?.

5. Rock Outlet Protection
Yes No NA
[ ] [ ] [ ] Installed per plan.
[ ] [ ] [ ] Installed concurrently with pipe installation.

Soil Stabilization

1. Topsoil and Spoil Stockpiles
Yes No NA
[ ] [ ] [ ] Stockpiles are stabilized with vegetation and/or mulch.
[ ] [ ] [ ] Sediment control is installed at the toe of the slope.

2. Revegetation
Yes No NA
[ ] [ ] [ ] Temporary seedings and mulch have been applied to idle areas.
[ ] [ ] [ ] 4 inches minimum of topsoil has been applied under permanent seedings

Sediment Control Practices

1. Stabilized Construction Entrance
Yes No NA
[ ] [ ] [ ] Stone is clean enough to effectively remove mud from vehicles.
[ ] [ ] [ ] Installed per standards and specifications?
[ ] [ ] [ ] Does all traffic use the stabilized entrance to enter and leave site?
[ ] [ ] [ ] Is adequate drainage provided to prevent ponding at entrance?

2. Silt Fence
Yes No NA
[ ] [ ] [ ] Installed on Contour, 10 feet from toe of slope (not across conveyance channels).
[ ] [ ] [ ] Joints constructed by wrapping the two ends together for continuous support.
[ ] [ ] [ ] Fabric buried 6 inches minimum.
[ ] [ ] [ ] Posts are stable, fabric is tight and without rips or frayed areas.
Sediment accumulation is ___% of design capacity.

Sediment Control Practices (continued)

3. Storm Drain Inlet Protection (Use for Stone & Block; Filter Fabric; Curb; or, Excavated practices)

Yes No NA

[ ] [ ] [ ] Installed concrete blocks lengthwise so open ends face outward, not upward.
[ ] [ ] [ ] Placed wire screen between No. 3 crushed stone and concrete blocks.
[ ] [ ] [ ] Drainage area is 1acre or less.
[ ] [ ] [ ] Excavated area is 900 cubic feet.
[ ] [ ] [ ] Excavated side slopes should be 2:1.
[ ] [ ] [ ] 2" x 4" frame is constructed and structurally sound.
[ ] [ ] [ ] Posts 3-foot maximum spacing between posts.
[ ] [ ] [ ] Fabric is embedded 1 to 1.5 feet below ground and secured to frame/posts with staples at max 8-inch spacing.
[ ] [ ] [ ] Posts are stable, fabric is tight and without rips or frayed areas.

Sediment accumulation ___% of design capacity.

4. Temporary Sediment Trap

Yes No NA

[ ] [ ] [ ] Outlet structure is constructed per the approved plan or drawing.
[ ] [ ] [ ] Geotextile fabric has been placed beneath rock fill.

Sediment accumulation is ___% of design capacity.

5. Temporary Sediment Basin

Yes No NA

[ ] [ ] [ ] Basin and outlet structure constructed per the approved plan.
[ ] [ ] [ ] Basin side slopes are stabilized with seed/mulch.
[ ] [ ] [ ] Drainage structure flushed and basin surface restored upon removal of sediment basin facility.

Sediment accumulation is ___% of design capacity.

Note: Not all erosion and sediment control practices are included in this listing. Add additional pages to this list as required by site specific design.
Construction inspection checklists for post-development stormwater management practices can be found in Appendix F of the New York Stormwater Management Design Manual.

APPENDIX I

STANDARD AND SPECIFICATIONS FOR STABILIZED CONSTRUCTION ACCESS



Definition & Scope

A stabilized pad of aggregate underlain with geotextile located at any point where traffic will be entering or leaving a construction site to or from a public right-of-way, street, alley, sidewalk, or parking area. The purpose of stabilized construction access is to reduce or eliminate the tracking of sediment onto public rights-of-way or streets.

Conditions Where Practice Applies

A stabilized construction access shall be used at all points of construction ingress and egress.

Design Criteria

See Figure 2.1 on page 2.31 for details.

Aggregate Size: Use a matrix of 1-4 inch stone, or reclaimed or recycled concrete equivalent.

Thickness: Not less than six (6) inches.

Width: 12-foot minimum but not less than the full width of points where ingress or egress occurs. 24-foot minimum if there is only one access to the site.

Length: As required, but not less than 50 feet (except on a single residence lot where a 30 foot minimum would apply).

Geotextile: To be placed over the entire area to be covered with aggregate. Filter cloth will not be required on a single-family residence lot. Piping of surface water under entrance shall be provided as required. If piping is impossible, a mountable berm with 5:1 slopes will be permitted.

Criteria for Geotextile: The geotextile shall be woven or nonwoven fabric consisting only of continuous chain polymeric filaments or yarns of polyester. The fabric shall be inert to commonly encountered chemicals, hydro-carbons, mildew, rot resistant, and conform to the fabric properties as shown:

Fabric Properties[3]	Light Duty[1] Roads Grade Subgrade	Heavy Duty[2] Haul Roads Rough Graded	Test Method
Grab Tensile Strength (lbs)	200	220	ASTM D1682
Elongation at Failure (%)	50	60	ASTM D1682
Mullen Burst Strength (lbs)	190	430	ASTM D3786
Puncture Strength (lbs)	40	125	ASTM D751 Modified
Equivalent	40-80	40-80	US Std Sieve
Opening Size			CW-02215
Aggregate Depth	6	10	-

[1]Light Duty Road: Area sites that have been graded to subgrade and where most travel would be single axle vehicles and an occasional multi-axle truck. Acceptable materials are Trevira Spunbond 1115, Mirafi 100X, Typar 3401, or equivalent.

[2]Heavy Duty Road: Area sites with only rough grading, and where most travel would be multi-axle vehicles. Acceptable materials are Trevira Spunbond 1135, Mirafi 600X, or equivalent.

[3]Fabrics not meeting these specifications may be used only when design procedure and supporting documentation are supplied to determine aggregate depth and fabric strength.

Maintenance

The access shall be maintained in a condition which will prevent tracking of sediment onto public rights-of-way or streets. This may require periodic top dressing with additional aggregate. All sediment spilled, dropped, or washed onto public rights-of-way must be removed immediately.

When necessary, wheels must be cleaned to remove sediment prior to entrance onto public rights-of-way. When washing is required, it shall be done on an area stabilized with aggregate, which drains into an approved sediment-trapping device. All sediment shall be prevented from entering storm drains, ditches, or watercourses.

STANDARD AND SPECIFICATIONS FOR CONSTRUCTION ROAD STABILIZATION



Definition & Scope

The stabilization of temporary construction access routes, on-site vehicle transportation routes, and construction parking areas to control erosion on temporary construction routes and parking areas.

Conditions Where Practice Applies

All traffic routes and parking areas for temporary use by construction traffic.

Design Criteria

Construction roads should be located to reduce erosion potential, minimize impact on existing site resources, and maintain operations in a safe manner. Highly erosive soils, wet or rocky areas, and steep slopes should be avoided. Roads should be routed where seasonal water tables are deeper than 18 inches. Surface runoff and control should be in accordance with other standards.

Road Grade – A maximum grade of 12% is recommended, although grades up to 15% are possible for short distances.

Road Width – 12 foot minimum for one-way traffic or 24 foot minimum for two-way traffic.

Side Slope of Road Embankment – 2:1 or flatter.

Ditch Capacity – On-site roadside ditch and culvert capacities shall be the 10 yr. peak runoff.

Composition – Use a 6-inch layer of NYS DOT sub-base Types 1,2,3, 4 or equivalent as specified in NYSDOT Standard Specifications.

Construction Specifications

1. Clear and strip roadbed and parking areas of all vegetation, roots, and other objectionable material.

2. Locate parking areas on naturally flat areas as available. Keep grades sufficient for drainage, but not more than 2 to 3 percent.

3. Provide surface drainage and divert excess runoff to stabilized areas.

4. Maintain cut and fill slopes to 2:1 or flatter and stabilized with vegetation as soon as grading is accomplished.

5. Spread 6-inch layer of sub-base material evenly over the full width of the road and smooth to avoid depressions.

6. Provide appropriate sediment control measures to prevent offsite sedimentation.

Maintenance

Inspect construction roads and parking areas periodically for condition of surface. Top dress with new gravel as needed. Check ditches for erosion and sedimentation after rainfall events. Maintain vegetation in a healthy, vigorous condition. Areas producing sediment should be treated immediately.

New York State
DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Division of Water

Deep-Ripping and Decompaction

April 2008

New York State
Department of Environmental Conservation

Document Prepared by:

John E. Lacey,
Land Resource Consultant and Environmental Compliance Monitor
(Formerly with the Division of Agricultural Protection and Development Services,
NYS Dept. of Agriculture & Markets)

Alternative Stormwater Management
Deep-Ripping and Decompaction

Description

The two-phase practice of 1) "Deep Ripping;" and 2) "Decompaction" (deep subsoiling), of the soil material as a step in the cleanup and restoration/landscaping of a construction site, helps mitigate the physically induced impacts of soil compression; i.e.: soil compaction or the substantial increase in the bulk density of the soil material.

Deep Ripping and Decompaction are key factors which help in restoring soil pore space and permeability for water infiltration. Conversely, the physical actions of cut-and-fill work, land grading, the ongoing movement of construction equipment and the transport of building materials throughout a site alter the architecture and structure of the soil, resulting in: the mixing of layers (horizons) of soil materials, compression of those materials and diminished soil porosity which, if left unchecked, severely impairs the soil's water holding capacity and vertical drainage (rainfall infiltration), from the surface downward.

In a humid climate region, compaction damage on a site is virtually guaranteed over the duration of a project. Soil in very moist to wet condition when compacted, will have severely reduced permeability. Figure 1 displays the early stage of the deep-ripping phase (Note that all topsoil was stripped prior to construction access, and it remains stockpiled until the next phase – decompaction – is complete). A heavy-duty tractor is pulling a three-shank ripper on the first of several series of incrementally deepening passes through the construction access corridor's densely compressed subsoil material. Figure 2 illustrates the approximate volumetric composition of a loam surface soil when conditions are good for plant growth, with adequate natural pore space for fluctuating moisture conditions.



Fig. 1. A typical deep ripping phase of this practice, during the first in a series of progressively deeper "rips" through severely compressed subsoil.

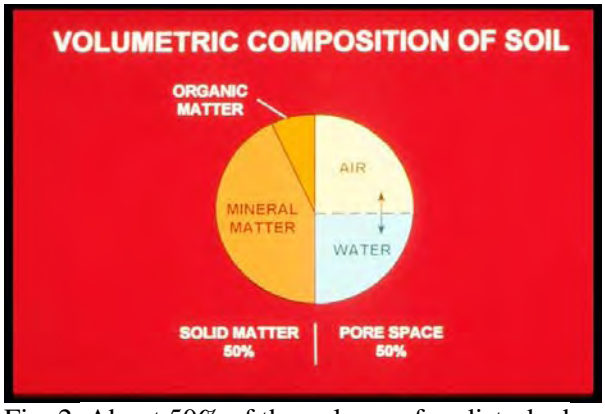


Fig. 2. About 50% of the volume of undisturbed loam surface soil is pore space, when soil is in good condition for plant growth. Brady, 2002.

Recommended Application of Practice

The objective of Deep Ripping and Decompaction is to effectively fracture (vertically and laterallly) through the thickness of the physically compressed subsoil material (see Figure 3), restoring soil porosity and permeability and aiding infiltration to help reduce runoff. Together with topsoil stripping, the "two-phase" practice of Deep Ripping and Decompaction first became established as a "best management practice" through ongoing success on commercial farmlands affected by heavy utility construction right-of-way projects (transmission pipelines and large power lines).



Fig. 3. Construction site with significant compaction of the deep basal till subsoil extends 24 inches below this exposed cut-and-fill work surface.

Soil permeability, soil drainage and cropland productivity were restored. For broader construction application, the two-phase practice of Deep Ripping and Decompaction is best adapted to areas impacted with significant soil compaction, on contiguous open portions of large construction sites and inside long, open construction corridors used as temporary access over the duration of construction. Each mitigation area should have minimal above-and-below-ground obstructions for the easy avoidance and maneuvering of a large tractor and ripping/decompacting implements. Conversely, the complete two-phase practice is not recommended in congested or obstructed areas due to the limitations on tractor and implement movement.

Benefits

Aggressive "deep ripping" through the compressed thickness of exposed subsoil before the replacement/respreading of the topsoil layer, followed by "decompaction," i.e.: "sub-soiling," through the restored topsoil layer down into the subsoil, offers the following benefits:

- Increases the project (larger size) area's direct surface infiltration of rainfall by providing the open site's mitigated soil condition and lowers the demand on concentrated runoff control structures

- Enhances direct groundwater recharge through greater dispersion across and through a broader surface than afforded by some runoff-control structural measures

- Decreases runoff volume generated and provides hydrologic source control

- May be planned for application in feasible open locations either alone or in

conjunction with plans for structural practices (e.g., subsurface drain line or infiltration basin) serving the same or contiguous areas

- Promotes successful long-term revegetation by restoring soil permeability, drainage and water holding capacity for healthy (rather than restricted) root-system development of trees, shrubs and deep rooted ground cover, minimizing plant drowning during wet periods and burnout during dry periods.

Feasibility/ Limitations

The effectiveness of Deep Ripping and Decompaction is governed mostly by site factors such as: the original (undisturbed) soil's hydrologic characteristics; the general slope; local weather/timing (soil moisture) for implementation; the space-related freedom of equipment/implement maneuverability (noted above in **Recommended Application of Practice**), and by the proper selection and operation of tractor and implements (explained below in **Design Guidance**). The more notable site-related factors include:

Soil

In the undisturbed condition, each identified soil type comprising a site is grouped into one of four categories of soil hydrology, Hydrologic Soil Group A, B, C or D, determined primarily by a range of characteristics including soil texture, drainage capability when thoroughly wet, and depth to water table. The natural rates of infiltration and transmission of soil-water through the undisturbed soil layers for Group A is "high" with a low runoff potential while soils in Group B are moderate in infiltration and the transmission of soil-water with a moderate runoff potential, depending somewhat on slope. Soils in Group C have slow rates of infiltration and transmission of soil-water and a moderately high runoff potential influenced by soil texture and slope; while soils in Group D have exceptionally slow rates of infiltration and transmission of soil-water, and high runoff potential.

In Figure 4, the profile displays the undisturbed horizons of a soil in Hydrologic Soil Group C and the naturally slow rate of infiltration through the subsoil. The slow rate of infiltration begins immediately below the topsoil horizon (30 cm), due to the limited amount of macro pores, e.g.: natural subsoil fractures, worm holes and root channels. Infiltration after the construction-induced mixing and compression of such subsoil material is virtually absent; but can be restored back to this natural level with the two-phase practice of deep ripping and decompaction, followed by the permanent establishment of an appropriate, deep taproot

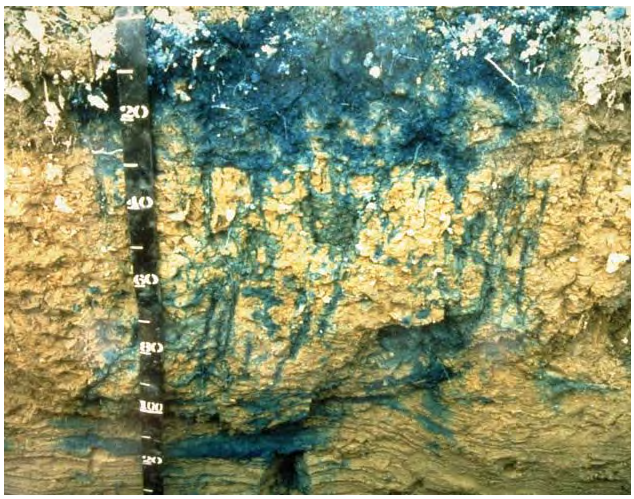


Fig. 4. Profile (in centimeters) displaying the infiltration test result of the natural undisturbed horizons of a soil in Hydrologic Soil Group C.

lawn/ground cover to help maintain the restored subsoil structure. Infiltration after construction-induced mixing and compression of such subsoil material can be notably rehabilitated with the Deep Ripping and Decompaction practice, which prepares the site for the appropriate long-term lawn/ground cover mix including deep taproot plants such as clover, fescue or trefoil, etc. needed for all rehabilitated soils.

Generally, soils in Hydrologic Soil Groups A and B, which respectively may include deep, well-drained, sandy-gravelly materials or deep, moderately well-drained basal till materials, are among the easier ones to restore permeability and infiltration, by deep ripping and decompaction. Among the many different soils in Hydrologic Soil Group C are those unique glacial tills having a natural fragipan zone, beginning about 12 to 18 inches (30 – 45cm), below surface. Although soils in Hydrologic Soil Group C do require a somewhat more carefully applied level of the Deep Ripping and Decompaction practice, it can greatly benefit such affected areas by reducing the runoff and fostering infiltration to a level equal to that of pre-disturbance.

Soils in Hydrologic Soil Group D typically have a permanent high water table close to the surface, influenced by a clay or other highly impervious layer of material. In many locations with clay subsoil material, the bulk density is so naturally high that heavy trafficking has little or no added impact on infiltration; and structural runoff control practices rather than Deep Ripping and Decompaction should be considered.

The information about Hydrologic Soil Groups is merely a general guideline. Site-specific data such as limited depths of cut-and-fill grading with minimal removal or translocation of the inherent subsoil materials (as analyzed in the county soil survey) or, conversely, the excavation and translocation of deeper, unconsolidated substratum or consolidated bedrock materials (unlike the analyzed subsoil horizons' materials referred to in the county soil survey) should always be taken into account.

Sites made up with significant quantities of large rocks, or having a very shallow depth to bedrock, are not conducive to deep ripping and decompation (subsoiling); and other measures may be more practical.

Slope

The two-phase application of 1) deep ripping and 2) decompaction (deep subsoiling), is most practical on flat, gentle and moderate slopes. In some situations, such as but not limited to temporary construction access corridors, inclusion areas that are moderately steep along a project's otherwise gentle or moderate slope may also be deep ripped and decompacted. For limited instances of moderate steepness on other projects, however, the post-construction land use and the relative alignment of the potential ripping and decompaction work in relation to the lay of the slope should be reviewed for safety and practicality. In broad construction areas predominated by moderately steep or steep slopes, the practice is generally not used.

Local Weather/Timing/Soil Moisture

Effective fracturing of compressed subsoil material from the exposed work surface, laterally and vertically down through the affected zone is achieved only when the soil material is moderately dry to moderately moist. Neither one of the two-phases, deep ripping nor decompaction (deep

subsoiling), can be effectively conducted when the soil material (subsoil or replaced topsoil) is in either a "plastic" or "liquid" state of soil consistency. Pulling the respective implements legs through the soil when it is overly moist only results in the "slicing and smearing" of the material or added "squeezing and compression" instead of the necessary fracturing. Ample drying time is needed for a "rippable" soil condition not merely in the material close to the surface, but throughout the material located down to the bottom of the physically compressed zone of the subsoil.

The "poor man's Atterberg field test" for soil plasticity is a simple "hand-roll" method used for quick, on-site determination of whether or not the moisture level of the affected soil material is low enough for: effective deep ripping of subsoil; respreading of topsoil in a friable state; and final decompaction (deep subsoiling). Using a sample of soil material obtained from the planned bottom depth of ripping, e.g.: 20 - 24 inches below exposed subsoil surface, the sample is hand rolled between the palms down to a 1/8-inch diameter thread. (Use the same test for stored topsoil material before respreading on the site.) If the respective soil sample crumbles apart in segments no greater than 3/8 of an inch long, by the time it is rolled down to 1/8 inch diameter, it is low enough in moisture for deep ripping (or topsoil replacement), and decompaction. Conversely, as shown in Figure 5, if the rolled sample stretches out in increments greater than 3/8 of an inch long before crumbling, it is in a "plastic" state of soil consistency and is too wet for subsoil ripping (as well as topsoil replacement) and final decompaction.



Fig. 5. Augered from a depth of 19 inches below the surface of the replaced topsoil, this subsoil sample was hand rolled to a 1/8-inch diameter. The test shows the soil at this site stretches out too far without crumbling; it indicates the material is in a plastic state of consistence, too wet for final decompaction (deep subsoiling) at this time.

Design Guidance

Beyond the above-noted site factors, a vital requirement for the effective Deep Ripping and Decompaction (deep subsoiling), is implementing the practice in its distinct, two-phase process:

1) Deep rip the affected thickness of exposed subsoil material (see Figure 10 and 11), aggressively fracturing it before the protected topsoil is reapplied on the site (see Figure 12); and

2) Decompact (deep subsoil), simultaneously through the restored topsoil layer and the upper half of the affected subsoil (Figure 13). The second phase, "decompaction," mitigates the partial recompaction which occurs during the heavy process of topsoil spreading/grading. Prior to deep ripping and decompacting the site, all construction activity, including construction equipment and material storage, site cleanup and trafficking (Figure 14), should be finished; and the site closed off to further disturbance. Likewise, once the practice is underway and the area's soil permeability and

rainfall infiltration are being restored, a policy limiting all further traffic to permanent travel lanes is maintained.

The other critical elements, outlined below, are: using the proper implements (deep, heavy-duty rippers and subsoilers), and ample pulling-power equipment (tractors); and conducting the practice at the appropriate speed, depth and pattern(s) of movement.

Note that an appropriate plan for the separate practice of establishing a healthy perennial ground cover, with deep rooting to help maintain the restored soil structure, should be developed in advance. This may require the assistance of an agronomist or landscape horticulturist.

Implements

Avoid the use of all undersize implements. The small-to-medium, light-duty tool will, at best, only "scarify" the uppermost surface portion of the mass of compacted subsoil material. The term "chisel plow" is commonly but incorrectly applied to a broad range of implements. While a few may be adapted for the moderate subsoiling of non-impacted soils, the majority are less durable and used for only lighter land-fitting (see Figure 6).



Fig. 6. A light duty chisel implement, not adequate for either the deep ripping or decompaction (deep subsoiling) phase.



Fig. 7. One of several variations of an agricultural ripper. This unit has long, rugged shanks mounted on a steel V-frame for deep, aggressive fracturing through Phase 1.

Use a "heavy duty" agricultural-grade, deep ripper (see Figures 7,9,10 and 11) for the first phase: the lateral and vertical fracturing of the mass of exposed and compressed subsoil, down and through, to the bottom of impact, prior to the replacement of the topsoil layer. (Any oversize rocks which are uplifted to the subsoil surface during the deep ripping phase are picked and removed.) Like the heavy-duty class of implement for the first phase, the decompaction (deep subsoiling) of Phase 2 is conducted with the heavy-duty version of the deep subsoiler. More preferable is the angled-leg variety of deep subsoiler (shown in Figures 8 and 13). It minimizes the inversion of the subsoil and topsoil layers while laterally and vertically fracturing the upper half of the previously ripped subsoil layer and all of the topsoil layer by delivering a momentary, wave-like "lifting and shattering" action up through the soil layers as it is pulled.

Pulling-Power of Equipment

Use the following rule of thumb for tractor horsepower (hp) whenever deep ripping and decompacting a significantly impacted site: For both types of implement, have at least 40 hp of tractor pull available for each mounted shank/ leg.

Using the examples of a 3-shank and a 5-shank implement, the respective tractors should have 120 and 200 hp available for fracturing down to the final depth of 20-to-24 inches per phase. Final depth for the deep ripping in Phase 1 is achieved incrementally by a progressive series of passes (see Depth and Patterns of Movement, below); while for Phase 2, the full operating depth of the deep subsoiler is applied from the beginning.

The operating speed for pulling both types of implement should not exceed 2 to 3 mph. At this slow and managed rate of operating speed, maximum functional performance is sustained by the tractor and the implement performing the soil fracturing. Referring to Figure 8, the implement is the 6-leg version of the deep angled-leg subsoiler. Its two outside legs are "chained up" so that only four legs will be engaged (at the maximum depth), requiring no less than 160 hp, (rather than 240 hp) of pull. The 4-wheel drive, articulated-frame tractor in Figure 8 is 174 hp. It will be decompacting this unobstructed, former construction access area simultaneously through 11 inches of replaced topsoil and the upper 12 inches of the previously deep-ripped subsoil. In constricted areas of Phase 1) Deep Ripping, a medium-size tractor with adequate hp, such as the one in Figure 9 pulling a 3-shank deep ripper, may be more maneuverable.



Fig. 8. A deep, angled-leg subsoiler, ideal for Phase 2 decompaction of after the topsoil layer is graded on top of the ripped subsoil.



Fig. 9. This medium tractor is pulling a 3-shank deep ripper. The severely compacted construction access corridor is narrow, and the 120 hp tractor is more maneuverable for Phase 1 deep ripping (subsoil fracturing), here.

Some industrial-grade variations of ripping implements are attached to power graders and bulldozers. Although highly durable, they are generally not recommended. Typically, the shanks or "teeth" of these rippers are too short and stout; and they are mounted too far apart to achieve the well-distributed type of lateral and vertical fracturing of the soil materials necessary to restore soil permeability and infiltration. In addition, the power graders and bulldozers, as pullers, are far less maneuverable for turns and patterns than the tractor.

Depth and Patterns of Movement

As previously noted both Phase 1 Deep Ripping through significantly compressed, exposed subsoil and Phase 2 Decompaction (deep subsoiling) through the replaced topsoil and upper subsoil need to be performed at maximum capable depth of each implement. With an implement's guide wheels attached, some have a "normal" maximum operating depth of 18 inches, while others may go deeper. In many situations, however, the tractor/implement operator must first remove the guide wheels and other non essential elements from the implement. This adapts the ripper or the deep subsoiler for skillful pulling with its frame only a few inches above surface, while the shanks or legs, fracture the soil material 20-to-24 inches deep.

There may be construction sites where the depth of the exposed subsoil's compression is moderate, e.g.: 12 inches, rather than deep. This can be verified by using a ¾ inch cone penetrometer and a shovel to test the subsoil for its level of compaction, incrementally, every three inches of increasing depth. Once the full thickness of the subsoil's compacted zone is finally "pieced" and there is a significant drop in the psi measurements of the soil penetrometer, the depth/thickness of compaction is determined. This is repeated at several representative locations of the construction site. If the thickness of the site's subsoil compaction is verified as, for example, ten inches, then the Phase 1 Deep Ripping can be correspondingly reduced to the implement's minimum operable depth of 12 inches. However, the Phase 2 simultaneous Decompation (subsoiling) of an 11 inch thick layer of replaced topsoil and the upper subsoil should run at the subsoiling implements full operating depth.



Fig. 10. An early pass with a 3-shank deep ripper penetrating only 8 inches into this worksite's severely compressed subsoil.



Fig. 11. A repeat run of the 3-shank ripper along the same patterned pass area as Fig. 9; here, incrementally reaching 18 of the needed 22 inches of subsoil fracture.

Typically, three separate series (patterns) are used for both the Phase 1 Deep Ripping and the Phase 2 Decompaction on significantly compacted sites. For Phase 1, each series begins with a moderate depth of rip and, by repeat-pass, continues until full depth is reached. Phase 2 applies the full depth of Decompation (subsoiling), from the beginning.

Every separate series (pattern) consists of parallel, forward-and-return runs, with each progressive

pass of the implement's legs or shanks evenly staggered between those from the previous pass. This compensates for the shank or leg-spacing on the implement, e.g., with 24-to-30 inches between each shank or leg. The staggered return pass ensures lateral and vertical fracturing actuated every 12 to 15 inches across the densely compressed soil mass.

Large, Unobstructed Areas

For larger easy areas, use the standard patterns of movement:

- The first series (pattern) of passes is applied lengthwise, parallel with the longest spread of the site; gradually progressing across the site's width, with each successive pass.

- The second series runs obliquely, crossing the first series at an angle of about 45 degrees.

- The third series runs at right angle (or 90 degrees), to the first series to complete the fracturing and shattering on severely compacted sites, and avoid leaving large unbroken blocks of compressed soil material. (In certain instances, the third series may be optional, depending on how thoroughly the first two series loosen the material and eliminate large chunks/blocks of material as verified by tests with a ¾-inch cone penetrometer.)



Fig. 12. Moderately dry topsoil is being replaced on the affected site now that Phase 1 deep ripping of the compressed subsoil is complete.



Fig. 13. The same deep, angled-leg subsoiler shown in Fig. 7 is engaged at maximum depth for Phase 2, decompaction (deep soiling), of the replaced topsoil and the upper subsoil materials.

Corridors

In long corridors of limited width and less maneuverability than larger sites, e.g.: along compacted areas used as temporary construction access, a modified series of pattern passes are used.

- First, apply the same initial lengthwise, parallel series of passes described above.

● A second series of passes makes a broad “S” shaped pattern of rips, continually and gradually alternating the “S” curves between opposite edges inside the compacted corridor.

● The third and final series again uses the broad, alternating S pattern, but it is “flip-flopped” to continually cross the previous S pattern along the corridor’s centerline. This final series of the S pattern curves back along the edge areas skipped by the second series.

Maintenance and Cost

Once the two-phase practice of Deep Ripping and Decompation is completed, two items are essential for maintaining a site’s soil porosity and permeability for infiltration. They are: planting and maintaining the appropriate ground cover with deep roots to maintain the soil structure (see Figure 15); and keeping the site free of traffic or other weight loads.

Note that site-specific choice of an appropriate vegetative ground-cover seed mix, including the proper seeding ratio of one or more perennial species with a deep taproot system and the proper amount of lime and soil nutrients (fertilizer mix) adapted to the soil-needs, are basic to the final practice of landscaping, i.e: surface tillage, seeding/planting/fertilizing and culti-packing or mulching is applied. The "maintenance" of an effectively deep-ripped and decompacted area is generally limited to the successful perennial (long-term) landscape ground cover; as long as no weight-bearing force of soil compaction is applied.



Fig. 14. The severely compacted soil of a temporary construction yard used daily by heavy equipment for four months; shown before deep ripping, topsoil replacement, and decompaction.



Fig. 15. The same site as Fig. 14 after deep ripping of the exposed subsoil, topsoil replacement, decompaction through the topsoil and upper subsoil and final surface tillage and revegetation to maintain soil permeability and infiltration.

The Deep Ripping and Decompaction practice is, by necessity, more extensive than periodic subsoiling of farmland.The cost of deep ripping and decompacting (deep subsoiling), will vary according to the depth and severity of soil-material compression and the relative amount of tractor and implement time that is required. In some instances, depending on open maneuverability, two-to-three acres of compacted project area may be deep-ripped in one day. In other situations of more severe compaction and - or less maneuverability, as little as one acre may be fully ripped in a day. Generally, if the Phase 1) Deep Ripping is fully effective, the Phase 2) Decompaction should be completed in 2/3 to 3/4 of the time required for Phase 1.

Using the example of two acres of Phase 1) Deep Ripping in one day, at $1800 per day, the net cost is $900 per acre. If the Phase 2) Decompacting or deep subsoiling takes 3/4 the time as Phase 1, it costs $675 per acre for a combined total of $1575 per acre to complete the practice (these figures do not include the cost of the separate practice of topsoil stripping and replacement). Due to the many variables, it must be recognized that cost will be determined by the specific conditions or constraints of the site and the availability of proper equipment.

Resources

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- Union Gas Limited, Ontario, Canada. 1984. *Rehabilitation of Agricultural Lands, Dawn-Kerwood Loop Pipeline; Technical Report*. Ecological Services for Planning, Ltd.; Robinson, Merritt & Devries, Ltd. and Smith, Hoffman Associates, Ltd.

- US Department of Agriculture in cooperation with Cornell University Agricultural Experiment Station. Various years. *Soil Survey of (various names) County, New York.* USDA.

Internet Access:

- Examples of implements:

V-Rippers. Access by internet search of *John Deere Ag -New Equipment for 915* (larger-frame model) *V-Rippe*; and, *for 913* (smaller-frame model) *V-Ripper*. Deep, angled-leg subsoiler. Access by internet search of: B*igham Brothers Shear Bolt Paratill-Subsoiler.* http://salesmanual.deere.com/sales/salesmanual/en_NA/primary_tillage/2008/feature/rippers/915v_pattern_frame.html?sbu=ag&link=prodcat Last visited March 08.

- Soils data of USDA Natural Resources Conservation Service. *NRCS Web Soil Survey.* http://websoilsurvey.nrcs.usda.gov/app/ and *USDA-NRCS Official Soil Series Descriptions; View by Name.* http://ortho.ftw.nrcs.usda.gov/cgi-bin/osd/osdname.cgi . *Last visited Jan. 08.*

- Soil penetrometer information. Access by internet searches of: *Diagnosing Soil Compaction using a Penetrometer (soil compaction tester), PSU Extension;* as well as *Dickey-john Soil Compaction Tester*. http://www.dickey-johnproducts.com/pdf/SoilCompactionTest.pdf and http://cropsoil.psu.edu/Extension/Facts/uc178pdf Last visited Sept. 07

STANDARD AND SPECIFICATIONS FOR DIVERSION



Definition & Scope

A drainage way of parabolic or trapezoidal cross-section with a supporting ridge on the lower side that is constructed across the slope to intercept and convey runoff to stable outlets at non-erosive velocities.

Conditions Where Practice Applies

Diversions are used where:

1. Runoff from higher areas has potential for damaging properties, causing erosion, or interfering with, or preventing the establishment of, vegetation on lower areas.

2. Surface and/or shallow subsurface flow is damaging sloping upland.

3. The length of slopes needs to be reduced so that soil loss will be kept to a minimum.

Diversions are only applicable below stabilized or protected areas. Avoid establishment on slopes greater than fifteen percent. Diversions should be used with caution on soils subject to slippage. Construction of diversions shall be in compliance with state and local drainage and water laws.

Design Criteria

Location

Diversion location shall be determined by considering outlet conditions, topography, land use, soil type, length of slope, seep planes (when seepage is a problem), and the development layout.

Capacity

Peak rates of runoff values used in determining the capacity requirements shall be calculated using the most current hydrologic data from the Northeast Regional Climate Center in an appropriate model.

The constructed diversion shall have capacity to carry, as a minimum, the peak discharge from a 10 year frequency rainfall event with freeboard of not less than 0.3 feet.

Diversions designed to protect homes, schools, industrial buildings, roads, parking lots, and comparable high-risk areas, and those designed to function in connection with other structures, shall have sufficient capacity to carry peak runoff expected from a storm frequency consistent with the hazard involved.

Cross Section

The diversion channel shall be parabolic or trapezoidal in shape. Parabolic Diversion design charts are provided in Tables 3.2, 3.3 and 3.4 on pages 3.10, 3.12 and 3.13**.** The diversion shall be designed to have stable side slopes. The side slopes shall not be steeper than 2:1 and shall be flat enough to ensure ease of maintenance of the diversion and its protective vegetative cover.

The ridge shall have a minimum width of four feet at the design water elevation; a minimum of 0.3 feet freeboard and a reasonable settlement factor shall be provided.

Velocity and Grade

The permissible velocity for the specified method of stabilization will determine the maximum grade. Maximum permissible velocities of flow for the stated conditions of stabilization shall be as shown in Table 3.1 on page 3.10 of this standard.

Diversions are not usually applicable below high sediment producing areas unless land treatment practices or structural measures, designed to prevent damaging accumulations of sediment in the channels, are installed with, or before, the diversions.

Outlets

Each diversion must have an adequate outlet. The outlet may be a grassed waterway, vegetated or paved area, grade stabilization structure, flow spreader, flow diffuser, stable watercourse, or subsurface drain outlet. In all cases, the outlet must convey runoff to a point where outflow will not cause damage. Vegetated outlets shall be installed before diversion construction, if needed, to ensure establishment of

vegetative cover in the outlet channel.

The design elevation of the water surface in the diversion shall not be lower than the design elevation of the water surface in the outlet at their junction when both are operating at design flow.

Stabilization

Vegetated diversions shall be stabilized in accordance with the following tables.

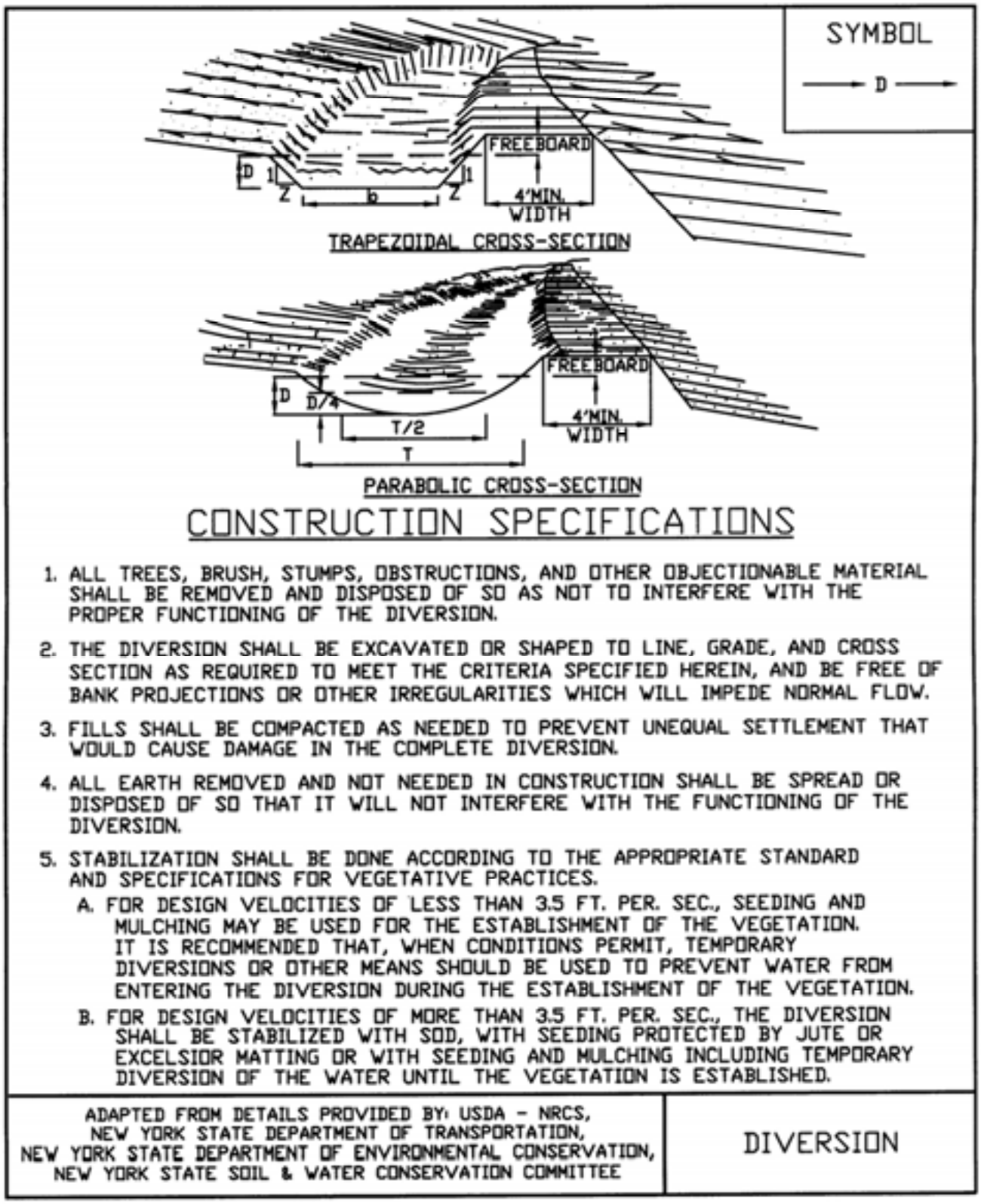
Table 3.1
Diversion Maximum Permissible Design Velocities Table

Soil Texture	Retardance and Cover	Permissible Velocity (ft / second) for Selected Channel Vegetation
Sand, Silt, Sandy loam, silty loam, loamy sand (ML, SM, SP, SW)	C-Kentucky 31 tall fescue and Kentucky bluegrass	3.0
	D-Annuals[1] Small grain (rye, oats, barley, millet) Ryegrass	2.5
Silty clay loam, Sandy clay loam (ML-CL, SC)	C-Kentucky 31 tall fescue and Kentucky bluegrass	4.0
	D-Annuals[1] Small grain (rye, oats, barley, millet) Ryegrass	3.5
Clay (CL)	C-Kentucky 31 tall fescue and Kentucky bluegrass	5.0
	D-Annuals[1] Small grain (rye, oats, barley, millet) Ryegrass	4.0
[1] Annuals—Use only as temporary protection until permanent vegetation is established.		

Table 3.2 - Retardance Factors for Various Grasses and Legumes Table

Retardance	Cover	Condition
A	Reed canarygrass	Excellent stand, tall (average 36 inches)
B	Smooth bromegrass	Good stand, mowed (average 12 to 15 inches)
	Tall fescue	Good stand, unmowed (average 18 inches)
	Grass-legume mixture—Timothy, smooth bromegrass, or Orchard grass with birdsfoot trefoil	Good stand, uncut (average 20 inches)
	Reed canarygrass	Good stand, mowed (average 12 to 15 inches)
	Tall fescue, with birdsfoot trefoil or ladino clover	Good stand, uncut (average 18 inches)
C	Redtop	Good stand, headed (15 to 20 inches)
	Grass-legume mixture—summer (Orchard grass, redtop, Annual ryegrass, and ladino or white clover)	Good stand, uncut (6 to 8 inches)
	Kentucky bluegrass	Good stand, headed (6 to 12 inches)
D	Red fescue	Good stand, headed (12 to 18 inches)
	Grass-legume mixture—fall, spring (Orchard grass, redtop, Annual ryegrass, and white or ladino clover)	Good stand, uncut (4 to 5 inches)

Figure 3.4
Diversion Detail



CONSTRUCTION SPECIFICATIONS

1. ALL TREES, BRUSH, STUMPS, OBSTRUCTIONS, AND OTHER OBJECTIONABLE MATERIAL SHALL BE REMOVED AND DISPOSED OF SO AS NOT TO INTERFERE WITH THE PROPER FUNCTIONING OF THE DIVERSION.
2. THE DIVERSION SHALL BE EXCAVATED OR SHAPED TO LINE, GRADE, AND CROSS SECTION AS REQUIRED TO MEET THE CRITERIA SPECIFIED HEREIN, AND BE FREE OF BANK PROJECTIONS OR OTHER IRREGULARITIES WHICH WILL IMPEDE NORMAL FLOW.
3. FILLS SHALL BE COMPACTED AS NEEDED TO PREVENT UNEQUAL SETTLEMENT THAT WOULD CAUSE DAMAGE IN THE COMPLETE DIVERSION.
4. ALL EARTH REMOVED AND NOT NEEDED IN CONSTRUCTION SHALL BE SPREAD OR DISPOSED OF SO THAT IT WILL NOT INTERFERE WITH THE FUNCTIONING OF THE DIVERSION.
5. STABILIZATION SHALL BE DONE ACCORDING TO THE APPROPRIATE STANDARD AND SPECIFICATIONS FOR VEGETATIVE PRACTICES.
   A. FOR DESIGN VELOCITIES OF LESS THAN 3.5 FT. PER. SEC., SEEDING AND MULCHING MAY BE USED FOR THE ESTABLISHMENT OF THE VEGETATION. IT IS RECOMMENDED THAT, WHEN CONDITIONS PERMIT, TEMPORARY DIVERSIONS OR OTHER MEANS SHOULD BE USED TO PREVENT WATER FROM ENTERING THE DIVERSION DURING THE ESTABLISHMENT OF THE VEGETATION.
   B. FOR DESIGN VELOCITIES OF MORE THAN 3.5 FT. PER. SEC., THE DIVERSION SHALL BE STABILIZED WITH SOD, WITH SEEDING PROTECTED BY JUTE OR EXCELSIOR MATTING OR WITH SEEDING AND MULCHING INCLUDING TEMPORARY DIVERSION OF THE WATER UNTIL THE VEGETATION IS ESTABLISHED.

ADAPTED FROM DETAILS PROVIDED BY: USDA – NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE

DIVERSION

Table 3.3
Parabolic Diversion Design, Without Freeboard Tables - 1 (USDA– NRCS)

PARABOLIC DIVERSION DESIGN, WITHOUT FREEBOARD | RETARDANCE - D & C GRADE, % - 0.50

V_1 Based on Permissible Velocity of the Soil With Retardance "D"
Top Width, Depth & V_2 Based on Retardance "C"

Q	V_1 = 2.0			V_1 = 2.5			V_1 = 3.0			V_1 = 3.5			V_1 = 4.0			V_1 = 4.5			V_1 = 5.0			V_1 = 5.5			V_1 = 6.0		
cfs	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2
15	9	1.6	1.6																								
20	11	1.6	1.7																								
25	14	1.6	1.7	9	1.9	2.1																					
30	17	1.6	1.7	11	1.9	2.2	8	2.2	2.5																		
35	20	1.6	1.7	12	1.9	2.3	9	2.1	2.6																		
40	22	1.6	1.7	14	1.8	2.3	11	2.1	2.7																		
45	25	1.5	1.7	16	1.8	2.3	12	2.0	2.8																		
50	28	1.5	1.7	18	1.8	2.4	13	2.0	2.8	10	2.4	3.2															
55	31	1.5	1.7	19	1.8	2.4	15	2.0	2.8	11	2.4	3.3															
60	33	1.5	1.7	21	1.8	2.4	16	2.0	2.8	11	2.4	3.3															
65	36	1.5	1.8	23	1.8	2.4	17	2.0	2.9	12	2.4	3.3															
70	39	1.5	1.7	24	1.8	2.4	18	2.0	2.9	13	2.3	3.4															
75	42	1.5	1.8	26	1.8	2.4	19	2.0	2.9	14	2.3	3.4	11	2.7	3.7												
80	44	1.5	1.8	28	1.8	2.4	21	2.0	2.9	15	2.3	3.4	12	2.7	3.8												
90	50	1.5	1.8	31	1.8	2.4	24	2.0	2.9	17	2.3	3.4	13	2.7	3.8												
100	55	1.5	1.8	35	1.8	2.4	26	2.0	2.9	19	2.3	3.5	15	2.6	3.9	12	3.0	4.1									

PARABOLIC DIVERSION DESIGN, WITHOUT FREEBOARD | RETARDANCE - D & C GRADE, % - 1.0

V_1 based on Permissible Velocity of the Soil With Retardance "D"
Top Width, Depth & V_2 Based on Retardance "C"

Q	V_1 = 2.0			V_1 = 2.5			V_1 = 3.0			V_1 = 3.5			V_1 = 4.0			V_1 = 4.5			V_1 = 5.0			V_1 = 5.5			V_1 = 6.0		
cfs	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2
15	13	1.1	1.5	8	1.3	2.0																					
20	18	1.1	1.5	11	1.3	2.1	8	1.5	2.6																		
25	22	1.1	1.5	14	1.3	2.1	9	1.5	2.6	8	1.6	3.0															
30	27	1.1	1.5	17	1.3	2.1	11	1.5	2.7	9	1.6	3.0															
35	31	1.1	1.5	19	1.3	2.2	13	1.5	2.8	11	1.6	3.1	8	1.8	3.6												
40	35	1.1	1.5	22	1.3	2.1	15	1.4	2.8	12	1.5	3.1	9	1.8	3.7												
45	40	1.1	1.5	25	1.3	2.2	17	1.5	2.8	13	1.6	3.2	10	1.8	3.7												
50	44	1.1	1.5	28	1.3	2.2	19	1.4	2.8	15	1.6	3.2	11	1.8	3.7	9	2.0	4.2									
55	46	1.1	1.5	30	1.3	2.2	20	1.4	2.8	16	1.5	3.3	12	1.8	3.8	10	2.0	4.3									
60	53	1.1	1.5	33	1.3	2.2	22	1.4	2.8	18	1.5	3.3	14	1.7	3.8	10	2.0	4.3									
65	57	1.1	1.5	36	1.3	2.2	24	1.4	2.8	19	1.5	3.3	15	1.7	3.8	11	2.0	4.3	9	2.2	4.7						
70	61	1.1	1.5	38	1.3	2.2	26	1.4	2.8	21	1.5	3.3	16	1.7	3.9	12	2.0	4.4	10	2.2	4.7						
75	66	1.1	1.5	41	1.3	2.2	28	1.4	2.9	22	1.5	3.3	17	1.7	3.9	13	2.0	4.5	11	2.2	4.7						
80	70	1.1	1.5	44	1.3	2.2	29	1.4	2.9	24	1.5	3.3	18	1.7	3.9	14	2.0	4.4	11	2.2	4.9						
90	79	1.1	1.5	49	1.3	2.2	33	1.4	2.9	27	1.5	3.3	20	1.7	3.9	15	1.9	4.5	13	2.2	4.9	11	2.4	5.2			
100	87	1.1	1.5	55	1.3	2.2	37	1.4	2.9	29	1.5	3.3	22	1.7	3.9	17	1.9	4.5	14	2.2	4.9	12	2.4	5.3			

Table 3.4
Parabolic Diversion Design, Without Freeboard Tables - 2 (USDA– NRCS)

PARABOLIC DIVERSION DESIGN, WITHOUT FREEBOARD

RETARDANCE - D & C
GRADE, % - 1.5

V_1 Based on Permissible Velocity of the Soil With Retardance "D"
Top Width, Depth & V_2 Based on Retardance "C"

Q	V_1 - 2.0			V_1 - 2.5			V_1 - 3.0			V_1 - 3.5			V_1 - 4.0			V_1 - 4.5			V_1 - 5.0			V_1 - 5.5			V_1 - 6.0		
cfs	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2
15	17	0.9	1.4	11	1.1	1.9	8	1.2	2.4																		
20	23	0.9	1.4	15	1.0	1.9	10	1.2	2.5	7	1.4	3.0	5	1.5	3.4												
25	28	0.9	1.4	19	1.0	1.9	12	1.2	2.6	8	1.4	3.2	7	1.5	3.6												
30	34	0.9	1.4	22	1.0	1.9	15	1.2	2.6	10	1.3	3.2	8	1.5	3.6	7	1.6	4.0									
35	40	0.9	1.4	26	1.0	2.0	17	1.1	2.6	12	1.3	3.3	10	1.4	3.7	8	1.6	4.1									
40	45	0.9	1.4	30	1.0	1.9	20	1.2	2.6	14	1.3	3.3	11	1.4	3.7	9	1.6	4.2	7	1.8	4.6						
45	51	0.9	1.4	33	1.0	2.0	22	1.1	2.6	15	1.3	3.4	12	1.4	3.8	10	1.5	4.3	8	1.8	4.6						
50	56	0.9	1.4	37	1.0	2.0	25	1.1	2.7	17	1.3	3.4	14	1.4	3.9	11	1.5	4.3	9	1.8	4.8						
55	62	0.9	1.5	41	1.0	2.0	27	1.1	2.6	19	1.3	3.4	15	1.4	3.9	12	1.5	4.3	10	1.7	4.9	8	1.9	5.1			
60	67	0.9	1.5	44	1.0	2.0	30	1.1	2.7	20	1.3	3.4	16	1.4	3.9	14	1.5	4.4	11	1.7	4.9	9	1.9	5.2			
65	73	0.9	1.5	48	1.0	2.0	32	1.1	2.7	22	1.3	3.4	18	1.4	3.9	15	1.5	4.4	11	1.7	5.0	10	1.9	5.3			
70	78	0.9	1.5	51	1.0	2.0	34	1.1	2.7	24	1.3	3.4	19	1.4	3.9	16	1.5	4.4	12	1.7	4.9	10	1.9	5.4	9	2.1	5.6
75	83	0.9	1.5	55	1.0	2.0	37	1.1	2.7	25	1.3	3.4	21	1.4	3.9	17	1.5	4.4	13	1.7	5.0	11	1.9	5.4	9	2.1	5.6
80	89	0.9	1.5	59	1.0	2.0	39	1.1	2.7	27	1.3	3.4	22	1.4	3.9	18	1.5	4.4	14	1.7	5.0	12	1.9	5.5	10	2.1	5.8
90	100	0.9	1.5	66	1.0	2.0	44	1.1	2.7	30	1.3	3.5	25	1.4	3.9	20	1.5	4.4	15	1.7	5.0	13	1.9	5.4	11	2.0	5.9
100				73	1.0	2.0	49	1.1	2.7	33	1.3	3.5	27	1.4	3.9	22	1.5	4.5	17	1.7	5.1	15	1.9	5.5	12	2.0	6.0

PARABOLIC DIVERSION DESIGN, WITHOUT FREEBOARD

RETARDANCE - D & C
GRADE, % - 2.0

V_1 Based on Permissible Velocity of the Soil With Retardance "D"
Top Width, Depth & V_2 Based on Retardance "C"

Q	V_1 - 2.0			V_1 - 2.5			V_1 - 3.0			V_1 - 3.5			V_1 - 4.0			V_1 - 4.5			V_1 - 5.0			V_1 - 5.5			V_1 - 6.0		
cfs	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2
15	21	0.8	1.3	13	0.9	1.9	9	1.0	2.4	7	1.2	2.9															
20	28	0.8	1.3	17	0.9	1.9	12	1.0	2.4	9	1.1	3.0	7	1.3	3.5	5	1.4	3.8									
25	35	0.8	1.3	21	0.9	1.9	15	1.0	2.4	11	1.1	3.0	8	1.3	3.7	7	1.4	4.0									
30	41	0.8	1.3	26	0.9	1.9	18	1.0	2.5	13	1.1	3.0	10	1.2	3.7	8	1.3	4.2	7	1.5	4.5						
35	48	0.8	1.4	30	0.9	1.9	22	1.0	2.4	15	1.1	3.1	11	1.2	3.8	9	1.3	4.2	8	1.5	4.7						
40	55	0.8	1.3	34	0.9	1.9	25	1.0	2.5	18	1.1	3.1	13	1.2	3.8	11	1.3	4.3	9	1.5	4.7	7	1.7	5.0			
45	62	0.8	1.4	38	0.9	1.9	28	1.0	2.5	20	1.1	3.1	14	1.2	3.8	12	1.3	4.3	10	1.4	4.8	8	1.6	5.2			
50	68	0.8	1.4	42	0.9	1.9	31	1.0	2.5	22	1.1	3.1	16	1.2	3.9	13	1.3	4.3	11	1.4	4.8	9	1.6	5.3	8	1.7	5.6
55	75	0.8	1.4	46	0.9	1.9	34	1.0	2.5	24	1.1	3.1	17	1.2	3.8	14	1.3	4.3	12	1.4	4.9	10	1.6	5.3	8	1.7	5.8
60	82	0.8	1.4	51	0.9	1.9	37	1.0	2.5	26	1.1	3.1	19	1.2	3.9	16	1.3	4.4	13	1.4	4.8	11	1.6	5.3	9	1.7	5.7
65	88	0.8	1.4	55	0.9	1.9	40	1.0	2.5	28	1.1	3.1	21	1.2	3.9	17	1.3	4.4	14	1.4	4.9	11	1.6	5.4	10	1.7	5.7
70	95	0.8	1.4	59	0.9	1.9	43	1.0	2.5	30	1.1	3.1	22	1.2	3.9	18	1.3	4.4	15	1.4	4.9	12	1.6	5.4	10	1.7	5.8
75				63	0.9	1.9	46	1.0	2.5	32	1.1	3.2	24	1.2	3.9	20	1.3	4.4	16	1.4	5.0	13	1.6	5.5	11	1.7	5.9
80				67	0.9	2.0	48	1.0	2.5	35	1.1	3.2	25	1.2	3.9	21	1.3	4.4	17	1.4	4.9	14	1.6	5.4	12	1.7	6.0
90				75	0.9	2.0	54	1.0	2.5	39	1.1	3.2	28	1.2	3.9	23	1.3	4.4	19	1.4	4.9	16	1.6	5.5	13	1.7	5.9
100				83	0.9	2.0	60	1.0	2.5	43	1.1	3.2	31	1.2	3.9	26	1.3	4.4	21	1.4	5.0	17	1.6	5.5	15	1.7	6.0

STANDARD AND SPECIFICATIONS FOR DUST CONTROL



Definition & Scope

The control of dust resulting from land-disturbing activities, to prevent surface and air movement of dust from disturbed soil surfaces that may cause off-site damage, health hazards, and traffic safety problems.

Conditions Where Practice Applies

On construction roads, access points, and other disturbed areas subject to surface dust movement and dust blowing where off-site damage may occur if dust is not controlled.

Design Criteria

Construction operations should be scheduled to minimize the amount of area disturbed at one time. Buffer areas of vegetation should be left where practical. Temporary or permanent stabilization measures shall be installed. No specific design criteria is given; see construction specifications below for common methods of dust control.

Water quality must be considered when materials are selected for dust control. Where there is a potential for the material to wash off to a stream, ingredient information must be provided to the NYSDEC.

No polymer application shall take place without written approval from the NYSDEC.

Construction Specifications

A. **Non-driving Areas** – These areas use products and materials applied or placed on soil surfaces to prevent airborne migration of soil particles.

Vegetative Cover – For disturbed areas not subject to traffic, vegetation provides the most practical method of dust control (see Section 3).

Mulch (including gravel mulch) – Mulch offers a fast effective means of controlling dust. This can also include rolled erosion control blankets.

Spray adhesives – These are products generally composed of polymers in a liquid or solid form that are mixed with water to form an emulsion that is sprayed on the soil surface with typical hydroseeding equipment. The mixing ratios and application rates will be in accordance with the manufacturer's recommendations for the specific soils on the site. In no case should the application of these adhesives be made on wet soils or if there is a probability of precipitation within 48 hours of its proposed use. Material Safety Data Sheets will be provided to all applicators and others working with the material.

B. **Driving Areas** – These areas utilize water, polymer emulsions, and barriers to prevent dust movement from the traffic surface into the air.

Sprinkling – The site may be sprayed with water until the surface is wet. This is especially effective on haul roads and access route to provide short term limited dust control.

Polymer Additives – These polymers are mixed with water and applied to the driving surface by a water truck with a gravity feed drip bar, spray bar or automated distributor truck. The mixing ratios and application rates will be in accordance with the manufacturer's recommendations. Incorporation of the emulsion into the soil will be done to the appropriate depth based on expected traffic. Compaction after incorporation will be by vibratory roller to a minimum of 95%. The prepared surface shall be moist and no application of the polymer will be made if there is a probability of precipitation within 48 hours of its proposed use. Material Safety Data Sheets will be provided to all applicators working with the material.

Barriers – Woven geo-textiles can be placed on the driving surface to effectively reduce dust throw and particle migration on haul roads. Stone can also be used for construction roads for effective dust control.

Windbreak – A silt fence or similar barrier can control air currents at intervals equal to ten times the barrier height. Preserve existing wind barrier vegetation as much as practical.

Maintenance

Maintain dust control measures through dry weather periods until all disturbed areas are stabilized.

STANDARD AND SPECIFICATIONS FOR LANDGRADING



Definition & Scope

Permanent reshaping of the existing land surface by grading in accordance with an engineering topographic plan and specification to provide for erosion control and vegetative establishment on disturbed, reshaped areas.

Design Criteria

The grading plan should be based upon the incorporation of building designs and street layouts that fit and utilize existing topography and desirable natural surrounding to avoid extreme grade modifications. Information submitted must provide sufficient topographic surveys and soil investigations to determine limitations that must be imposed on the grading operation related to slope stability, effect on adjacent properties and drainage patterns, measures for drainage and water removal, and vegetative treatment, etc.

Many municipalities and counties have regulations and design procedures already established for land grading and cut and fill slopes. Where these requirements exist, they shall be followed.

The plan must show existing and proposed contours of the area(s) to be graded. The plan shall also include practices for erosion control, slope stabilization, safe disposal of runoff water and drainage, such as waterways, lined ditches, reverse slope benches (include grade and cross section), grade stabilization structures, retaining walls, and surface and subsurface drains. The plan shall also include phasing of these practices. The following shall be incorporated into the plan:

1. Provisions shall be made to safely convey surface runoff to storm drains, protected outlets, or to stable water courses to ensure that surface runoff will not damage slopes or other graded areas; see standards and specifications for Grassed Waterway, Diversion, or Grade Stabilization Structure.

2. Cut and fill slopes that are to be stabilized with grasses shall not be steeper than 2:1. When slopes exceed 2:1, special design and stabilization consideration are required and shall be adequately shown on the plans. (Note: Where the slope is to be mowed, the slope should be no steeper than 3:1, although 4:1 is preferred because of safety factors related to mowing steep slopes.)

3. Reverse slope benches or diversion shall be provided whenever the vertical interval (height) of any 2:1 slope exceeds 20 feet; for 3:1 slope it shall be increased to 30 feet and for 4:1 to 40 feet. Benches shall be located to divide the slope face as equally as possible and shall convey the water to a stable outlet. Soils, seeps, rock outcrops, etc., shall also be taken into consideration when designing benches.

   A. Benches shall be a minimum of six feet wide to provide for ease of maintenance.

   B. Benches shall be designed with a reverse slope of 6:1 or flatter to the toe of the upper slope and with a minimum of one foot in depth. Bench gradient to the outlet shall be between 2 percent and 3 percent, unless accompanied by appropriate design and computations.

   C. The flow length within a bench shall not exceed 800 feet unless accompanied by appropriate design and computations; see Standard and Specifications for Diversion on page 3.9

4. Surface water shall be diverted from the face of all cut and/or fill slopes by the use of diversions, ditches and swales or conveyed downslope by the use of a designed structure, except where:

   A. The face of the slope is or shall be stabilized and the face of all graded slopes shall be protected from surface runoff until they are stabilized.

   B. The face of the slope shall not be subject to any concentrated flows of surface water such as from natural drainage ways, graded ditches, downspouts, etc.

   C. The face of the slope will be protected by anchored stabilization matting, sod, gravel, riprap, or other stabilization method.

5. Cut slopes occurring in ripable rock shall be serrated as shown in Figure 4.9 on page 4.26. The serrations shall be made with conventional equipment as the excavation is made. Each step or serration shall be constructed on the contour and will have steps cut at nominal two-foot intervals with nominal three-foot horizontal shelves. These steps will vary depending on the slope ratio or the cut slope. The nominal slope line is 1 ½: 1. These steps will weather and act to hold moisture, lime, fertilizer, and seed thus producing a much quicker and longer-lived vegetative cover and better slope stabilization. Overland flow shall be diverted from the top of all serrated cut slopes and carried to a suitable outlet.

6. Subsurface drainage shall be provided where necessary to intercept seepage that would otherwise adversely affect slope stability or create excessively wet site conditions.

7. Slopes shall not be created so close to property lines as to endanger adjoining properties without adequately protecting such properties against sedimentation, erosion, slippage, settlement, subsidence, or other related damages.

8. Fill material shall be free of brush, rubbish, rocks, logs, stumps, building debris, and other objectionable material. It should be free of stones over two (2) inches in diameter where compacted by hand or mechanical tampers or over eight (8) inches in diameter where compacted by rollers or other equipment. Frozen material shall not be placed in the fill nor shall the fill material be placed on a frozen foundation.

9. Stockpiles, borrow areas, and spoil shall be shown on the plans and shall be subject to the provisions of this Standard and Specifications.

10. All disturbed areas shall be stabilized structurally or vegetatively in compliance with the Permanent Construction Area Planting Standard on page 4.42.

Construction Specifications

See Figures 4.9 and 4.10 for details.

1. All graded or disturbed areas, including slopes, shall be protected during clearing and construction in accordance with the erosion and sediment control plan until they are adequately stabilized.

2. All erosion and sediment control practices and measures shall be constructed, applied and maintained in accordance with the erosion and sediment control plan and these standards.

3. Topsoil required for the establishment of vegetation shall be stockpiled in amount necessary to complete finished grading of all exposed areas.

4. Areas to be filled shall be cleared, grubbed, and stripped of topsoil to remove trees, vegetation, roots, or other objectionable material.

5. Areas that are to be topsoiled shall be scarified to a minimum depth of four inches prior to placement of topsoil.

6. All fills shall be compacted as required to reduce erosion, slippage, settlement, subsidence, or other related problems. Fill intended to support buildings, structures, and conduits, etc., shall be compacted in accordance with local requirements or codes.

7. All fill shall be placed and compacted in layers not to exceed 9 inches in thickness.

8. Except for approved landfills or nonstructural fills, fill material shall be free of frozen particles, brush, roots, sod, or other foreign objectionable materials that would interfere with, or prevent, construction of satisfactory fills.

9. Frozen material or soft, mucky or highly compressible materials shall not be incorporated into fill slopes or structural fills.

10. Fill shall not be placed on saturated or frozen surfaces.

11. All benches shall be kept free of sediment during all phases of development.

12. Seeps or springs encountered during construction shall be handled in accordance with the Standard and Specification for Subsurface Drain on page 3.48 or other approved methods.

13. All graded areas shall be permanently stabilized immediately following finished grading.

14. Stockpiles, borrow areas, and spoil areas shall be shown on the plans and shall be subject to the provisions of this Standard and Specifications.



Figure 4.9
Typical Section of Serrated Cut Slope

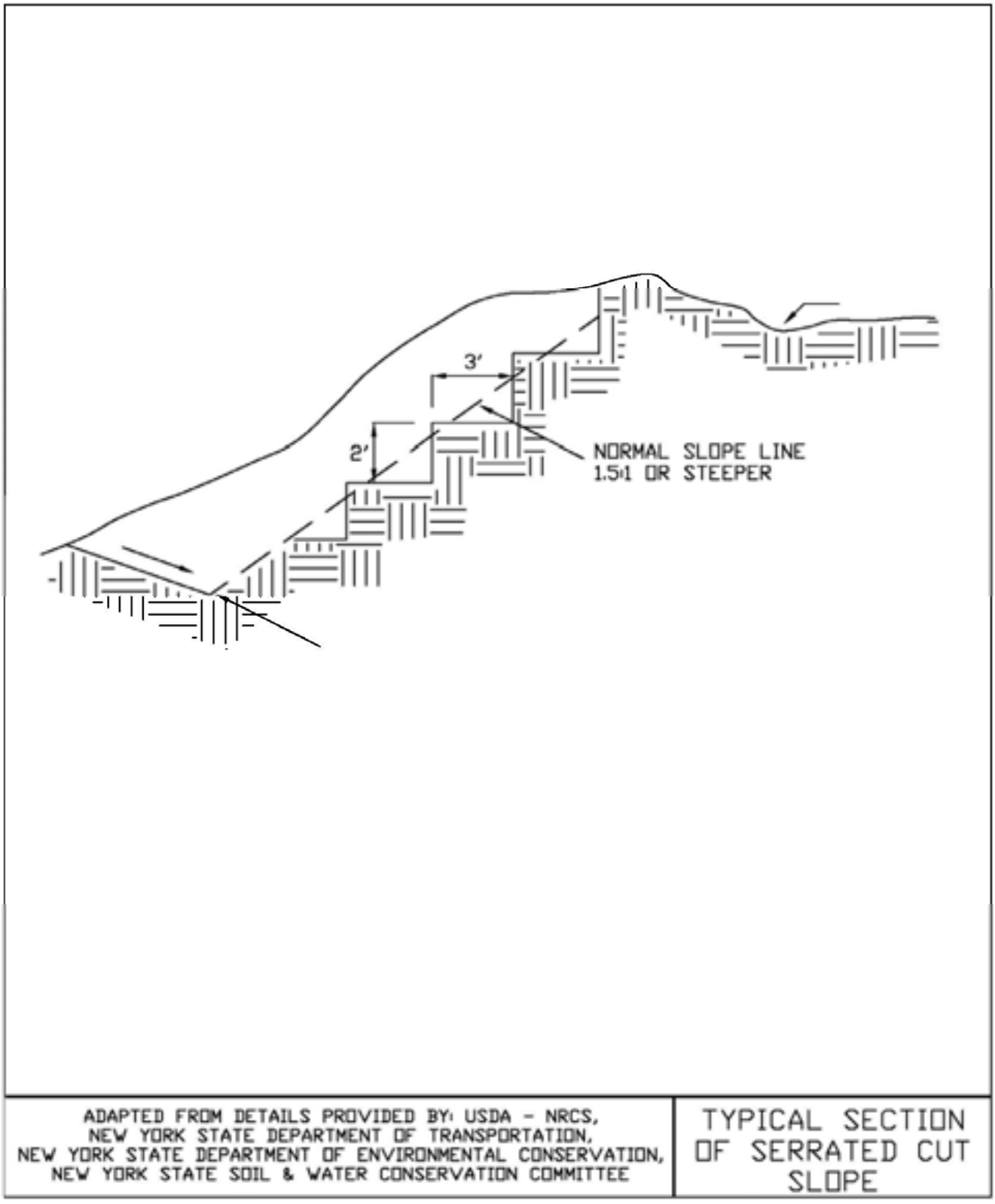


Figure 4.10
Landgrading

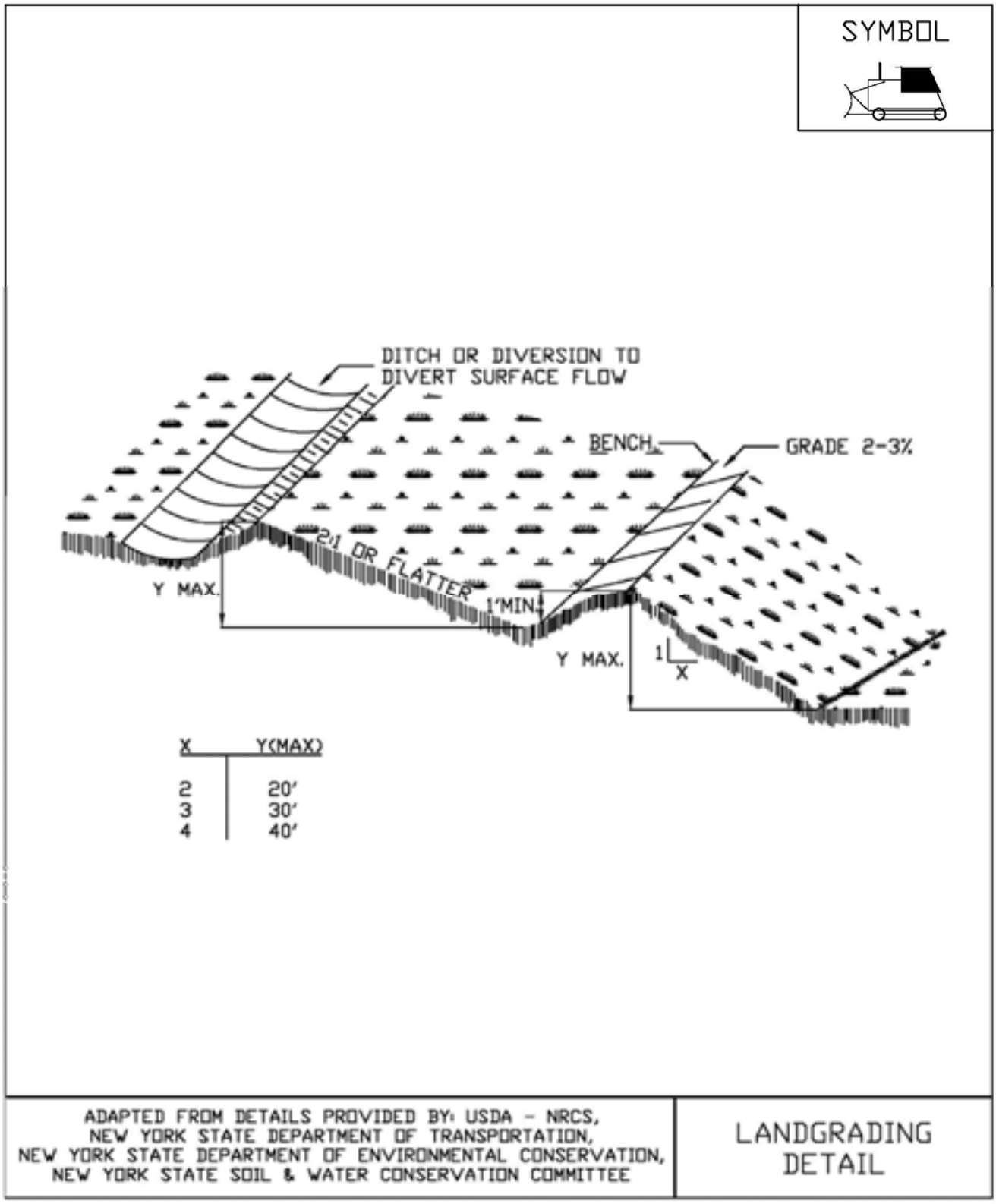
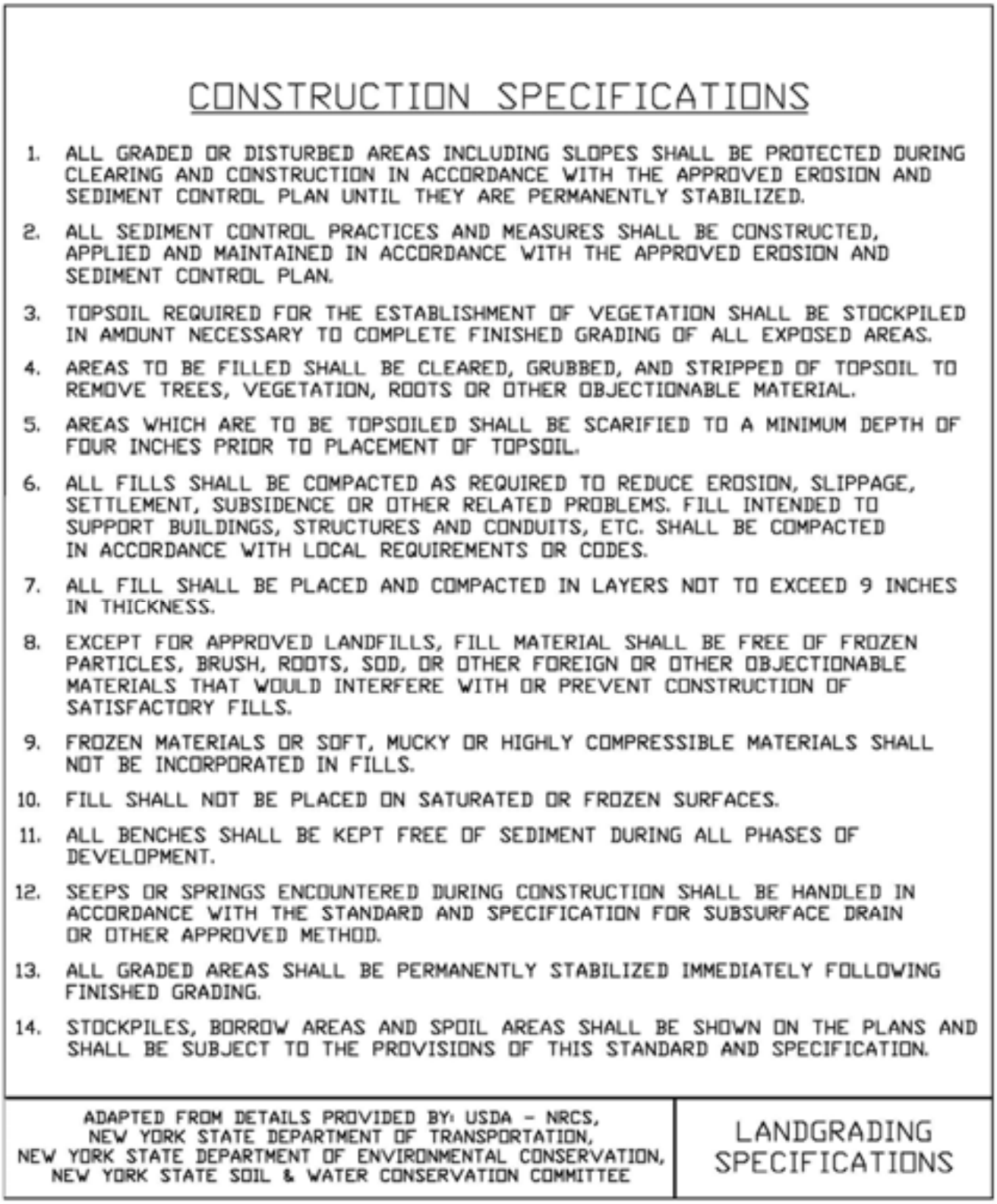


Figure 4.11
Landgrading - Construction Specifications



CONSTRUCTION SPECIFICATIONS

1. ALL GRADED OR DISTURBED AREAS INCLUDING SLOPES SHALL BE PROTECTED DURING CLEARING AND CONSTRUCTION IN ACCORDANCE WITH THE APPROVED EROSION AND SEDIMENT CONTROL PLAN UNTIL THEY ARE PERMANENTLY STABILIZED.
2. ALL SEDIMENT CONTROL PRACTICES AND MEASURES SHALL BE CONSTRUCTED, APPLIED AND MAINTAINED IN ACCORDANCE WITH THE APPROVED EROSION AND SEDIMENT CONTROL PLAN.
3. TOPSOIL REQUIRED FOR THE ESTABLISHMENT OF VEGETATION SHALL BE STOCKPILED IN AMOUNT NECESSARY TO COMPLETE FINISHED GRADING OF ALL EXPOSED AREAS.
4. AREAS TO BE FILLED SHALL BE CLEARED, GRUBBED, AND STRIPPED OF TOPSOIL TO REMOVE TREES, VEGETATION, ROOTS OR OTHER OBJECTIONABLE MATERIAL.
5. AREAS WHICH ARE TO BE TOPSOILED SHALL BE SCARIFIED TO A MINIMUM DEPTH OF FOUR INCHES PRIOR TO PLACEMENT OF TOPSOIL.
6. ALL FILLS SHALL BE COMPACTED AS REQUIRED TO REDUCE EROSION, SLIPPAGE, SETTLEMENT, SUBSIDENCE OR OTHER RELATED PROBLEMS. FILL INTENDED TO SUPPORT BUILDINGS, STRUCTURES AND CONDUITS, ETC. SHALL BE COMPACTED IN ACCORDANCE WITH LOCAL REQUIREMENTS OR CODES.
7. ALL FILL SHALL BE PLACED AND COMPACTED IN LAYERS NOT TO EXCEED 9 INCHES IN THICKNESS.
8. EXCEPT FOR APPROVED LANDFILLS, FILL MATERIAL SHALL BE FREE OF FROZEN PARTICLES, BRUSH, ROOTS, SOD, OR OTHER FOREIGN OR OTHER OBJECTIONABLE MATERIALS THAT WOULD INTERFERE WITH OR PREVENT CONSTRUCTION OF SATISFACTORY FILLS.
9. FROZEN MATERIALS OR SOFT, MUCKY OR HIGHLY COMPRESSIBLE MATERIALS SHALL NOT BE INCORPORATED IN FILLS.
10. FILL SHALL NOT BE PLACED ON SATURATED OR FROZEN SURFACES.
11. ALL BENCHES SHALL BE KEPT FREE OF SEDIMENT DURING ALL PHASES OF DEVELOPMENT.
12. SEEPS OR SPRINGS ENCOUNTERED DURING CONSTRUCTION SHALL BE HANDLED IN ACCORDANCE WITH THE STANDARD AND SPECIFICATION FOR SUBSURFACE DRAIN OR OTHER APPROVED METHOD.
13. ALL GRADED AREAS SHALL BE PERMANENTLY STABILIZED IMMEDIATELY FOLLOWING FINISHED GRADING.
14. STOCKPILES, BORROW AREAS AND SPOIL AREAS SHALL BE SHOWN ON THE PLANS AND SHALL BE SUBJECT TO THE PROVISIONS OF THIS STANDARD AND SPECIFICATION.

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS,
NEW YORK STATE DEPARTMENT OF TRANSPORTATION,
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION,
NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE

LANDGRADING
SPECIFICATIONS

STANDARD AND SPECIFICATIONS FOR MULCHING



Definition and Scope

Applying coarse plant residue or chips, or other suitable materials, to cover the soil surface to provide initial erosion control while a seeding or shrub planting is establishing. Mulch will conserve moisture and modify the surface soil temperature and reduce fluctuation of both. Mulch will prevent soil surface crusting and aid in weed control. Mulch can also be used alone for temporary stabilization in non-growing months. Use of stone as a mulch could be more permanent and should not be limited to non-growing months.

Conditions Where Practice Applies

On soils subject to erosion and on new seedings and shrub plantings. Mulch is useful on soils with low infiltration rates by retarding runoff.

Criteria

Site preparation prior to mulching requires the installation of necessary erosion control or water management practices and drainage systems.

Slope, grade and smooth the site to fit needs of selected mulch products.

Remove all undesirable stones and other debris to meet the needs of the anticipated land use and maintenance required.

Apply mulch after soil amendments and planting is accomplished or simultaneously if hydroseeding is used.

Select appropriate mulch material and application rate or material needs. Hay mulch shall not be used in wetlands or in areas of permanent seeding. Clean straw mulch is preferred alternative in wetland application. Determine local availability.

Select appropriate mulch anchoring material.

NOTE: The best combination for grass/legume establishment is straw (cereal grain) mulch applied at 2 ton/ acre (90 lbs./1000sq.ft.) and anchored with wood fiber mulch (hydromulch) at 500 – 750 lbs./acre (11 – 17 lbs./1000 sq. ft.). The wood fiber mulch must be applied through a hydroseeder immediately after mulching.



Table 4.2
Guide to Mulch Materials, Rates, and Uses

Mulch Material	Quality Standards	per 1000 Sq. Ft.	per Acre	Depth of Application	Remarks
Wood chips or shavings	Air-dried. Free of objectionable coarse material	500-900 lbs.	10-20 tons	2-7"	Used primarily around shrub and tree plantings and recreation trails to inhibit weed competition. Resistant to wind blowing. Decomposes slowly.
Wood fiber cellulose (partly digested wood fibers)	Made from natural wood usually with green dye and dispersing agent	50 lbs.	2,000 lbs.	—	Apply with hydromulcher. No tie down required. Less erosion control provided than 2 tons of hay or straw.
Gravel, Crushed Stone or Slag	Washed; Size 2B or 3A—1 1/2"	9 cu. yds.	405 cu. yds.	3"	Excellent mulch for short slopes and around plants and ornamentals. Use 2B where subject to traffic. (Approximately 2,000 lbs./cu. yd.). Frequently used over filter fabric for better weed control.
Hay or Straw	Air-dried; free of undesirable seeds & coarse materials	90-100 lbs. 2-3 bales	2 tons (100-120 bales)	cover about 90% surface	Use small grain straw where mulch is maintained for more than three months. Subject to wind blowing unless anchored. Most commonly used mulching material. Provides the best micro-environment for germinating seeds.
Jute twisted yarn	Undyed, unbleached plain weave. Warp 78 ends/yd., Weft 41 ends/ yd. 60-90 lbs./roll	48" x 50 yds. or 48" x 75 yds.	—	—	Use without additional mulch. Tie down as per manufacturers specifications. Good for center line of concentrated water flow.
Excelsior wood fiber mats	Interlocking web of excelsior fibers with photodegradable plastic netting	4' x 112.5' or 8' x 112.5'.	—	—	Use without additional mulch. Excellent for seeding establishment. Anchor as per manufacturers specifications. Approximately 72 lbs./roll for excelsior with plastic on both sides. Use two sided plastic for centerline of waterways.
Straw or coconut fiber, or combination	Photodegradable plastic net on one or two sides	Most are 6.5 ft. x 3.5 ft.	81 rolls	—	Designed to tolerate higher velocity water flow, centerlines of waterways, 60 sq. yds. per roll.

Table 4.3
Mulch Anchoring Guide

Anchoring Method or Material	Kind of Mulch to be Anchored	How to Apply
1. Peg and Twine	Hay or straw	After mulching, divide areas into blocks approximately 1 sq. yd. in size. Drive 4-6 pegs per block to within 2" to 3" of soil surface. Secure mulch to surface by stretching twine between pegs in criss-cross pattern on each block. Secure twine around each peg with 2 or more tight turns. Drive pegs flush with soil. Driving stakes into ground tightens the twine.
2. Mulch netting	Hay or straw	Staple the light-weight paper, jute, wood fiber, or plastic nettings to soil surface according to manufacturer's recommendations. Should be biodegradable. Most products are not suitable for foot traffic.
3. Wood cellulose fiber	Hay or straw	Apply with hydroseeder immediately after mulching. Use 500 lbs. wood fiber per acre. Some products contain an adhesive material ("tackifier"), possibly advantageous.
4. Mulch anchoring tool	Hay or straw	Apply mulch and pull a mulch anchoring tool (blunt, straight discs) over mulch as near to the contour as possible. Mulch material should be "tucked" into soil surface about 3".
5. Tackifier	Hay or straw	Mix and apply polymeric and gum tackifiers according to manufacturer's instructions. Avoid application during rain. A 24-hour curing period and a soil temperature higher than 45^0 Fahrenheit are required.

STANDARD AND SPECIFICATIONS FOR ROCK OUTLET PROTECTION



Definition & Scope

A **permanent** section of rock protection placed at the outlet end of the culverts, conduits, or channels to reduce the depth, velocity, and energy of water, such that the flow will not erode the receiving downstream reach.

Conditions Where Practice Applies

This practice applies where discharge velocities and energies at the outlets of culverts, conduits, or channels are sufficient to erode the next downstream reach. This applies to:

1. Culvert outlets of all types.
2. Pipe conduits from all sediment basins, dry storm water ponds, and permanent type ponds.
3. New channels constructed as outlets for culverts and conduits.

Design Criteria

The design of rock outlet protection depends entirely on the location. Pipe outlet at the top of cuts or on slopes steeper than 10 percent, cannot be protected by rock aprons or riprap sections due to re-concentration of flows and high velocities encountered after the flow leaves the apron.

Many counties and state agencies have regulations and design procedures already established for dimensions, type and size of materials, and locations where outlet protection is required. Where these requirements exist, they shall be followed.

Tailwater Depth

The depth of tailwater immediately below the pipe outlet must be determined for the design capacity of the pipe. If the tailwater depth is less than half the diameter of the outlet pipe, and the receiving stream is wide enough to accept divergence of the flow, it shall be classified as a Minimum Tailwater Condition; see Figure 3.16 on page 3.42 as an example. If the tailwater depth is greater than half the pipe diameter and the receiving stream will continue to confine the flow, it shall be classified as a Maximum Tailwater Condition; see Figure 3.17 on page 3.43 as an example. Pipes which outlet onto flat areas with no defined channel may be assumed to have a Minimum Tailwater Condition; see Figure 3.16 on page 3.42 as an example.

Apron Size

The apron length and width shall be determined from the curves according to the tailwater conditions:

Minimum Tailwater – Use Figure 3.16 on page 3.42
Maximum Tailwater – Use Figure 3.17 on page 3.43

If the pipe discharges directly into a well defined channel, the apron shall extend across the channel bottom and up the channel banks to an elevation one foot above the maximum tailwater depth or to the top of the bank, whichever is less.

The upstream end of the apron, adjacent to the pipe, shall have a width two (2) times the diameter of the outlet pipe, or conform to pipe end section if used.

Bottom Grade

The outlet protection apron shall be constructed with no slope along its length. There shall be no overfall at the end of the apron. The elevation of the downstream end of the apron shall be equal to the elevation of the receiving channel or adjacent ground.

Alignment

The outlet protection apron shall be located so that there are no bends in the horizontal alignment.

Materials

The outlet protection may be done using rock riprap, grouted riprap, or gabions. Outlets constructed on the bank of a stream or wetland shall not use grouted rip-rap, gabions or concrete.

Riprap shall be composed of a well-graded mixture of rock size so that 50 percent of the pieces, by weight, shall be larger than the d_{50} size determined by using the charts. A

well-graded mixture, as used herein, is defined as a mixture composed primarily of larger rock sizes, but with a sufficient mixture of other sizes to fill the smaller voids between the rocks. The diameter of the largest rock size in such a mixture shall be 1.5 times the d_{50} size.

Thickness

The minimum thickness of the riprap layer shall be 1.5 times the maximum rock diameter for d_{50} of 15 inches or less; and 1.2 times the maximum rock size for d_{50} greater than 15 inches. The following chart lists some examples:

D_{50} (inches)	d_{max} (inches)	Minimum Blanket Thickness (inches)
4	6	9
6	9	14
9	14	20
12	18	27
15	22	32
18	27	32
21	32	38
24	36	43

Rock Quality

Rock for riprap shall consist of field rock or rough unhewn quarry rock. The rock shall be hard and angular and of a quality that will not disintegrate on exposure to water or weathering. The specific gravity of the individual rocks shall be at least 2.5.

Filter

A filter is a layer of material placed between the riprap and the underlying soil surface to prevent soil movement into and through the riprap. Riprap shall have a filter placed under it in all cases.

A filter can be of two general forms: a gravel layer or a plastic filter cloth. The plastic filter cloth can be woven or non-woven monofilament yarns, and shall meet these base requirements: thickness 20-60 mils, grab strength 90-120 lbs; and shall conform to ASTM D-1777 and ASTM D-1682.

Gravel filter blanket, when used, shall be designed by comparing particle sizes of the overlying material and the base material. Design criteria are available in Standard and Specification for Anchored Slope and Channel Stabilization on page 4.7.

Gabions

Gabions shall be made of hexagonal triple twist mesh with heavily galvanized steel wire. The maximum linear dimension of the mesh opening shall not exceed 4 ½ inches and the area of the mesh opening shall not exceed 10 square inches.

Gabions shall be fabricated in such a manner that the sides, ends, and lid can be assembled at the construction site into a rectangular basket of the specified sizes. Gabions shall be of single unit construction and shall be installed according to manufacturer's recommendations.

The area on which the gabion is to be installed shall be graded as shown on the drawings. Foundation conditions shall be the same as for placing rock riprap, and filter cloth shall be placed under all gabions. Where necessary, key, or tie, the structure into the bank to prevent undermining of the main gabion structure.

Maintenance

Once a riprap outlet has been installed, the maintenance needs are very low. It should be inspected after high flows for evidence of scour beneath the riprap or for dislodged rocks. Repairs should be made immediately.

Design Procedure

1. Investigate the downstream channel to assure that nonerosive velocities can be maintained.

2. Determine the tailwater condition at the outlet to establish which curve to use.

3. Use the appropriate chart with the design discharge to determine the riprap size and apron length required. It is noted that references to pipe diameters in the charts are based on full flow. For other than full pipe flow, the parameters of depth of flow and velocity must be used to adjust the design discharges.

4. Calculate apron width at the downstream end if a flare section is to be employed.

Design Examples are demonstrated in Appendix B.

Construction Specifications

1. The subgrade for the filter, riprap, or gabion shall be prepared to the required lines and grades. Any fill required in the subgrade shall be compacted to a density of approximately that of the surrounding undisturbed material.

2. The rock or gravel shall conform to the specified grad-

ing limits when installed respectively in the riprap or filter.

3. Filter cloth shall be protected from punching, cutting, or tearing. Any damage other than an occasional small hole shall be repaired by placing another piece of cloth over the damaged part or by completely replacing the cloth. All overlaps, whether for repairs or for joining two pieces of cloth shall be a minimum of one foot.

4. Rock for the riprap or gabion outlets may be placed by equipment. Both shall each be constructed to the full course thickness in one operation and in such a manner as to avoid displacement of underlying materials. The rock for riprap or gabion outlets shall be delivered and placed in a manner that will ensure that it is reasonably homogenous with the smaller rocks and spalls filling the voids between the larger rocks. Riprap shall be placed in a manner to prevent damage to the filter blanket or filter cloth. Hand placement will be required to the extent necessary to prevent damage to the permanent works.

Figure 3.16
Outlet Protection Design—Minimum Tailwater Condition Chart (Design of Outlet Protection from a Round Pipe Flowing Full, Minimum Tailwater Condition: $T_w < 0.5D_o$) (USDA - NRCS)

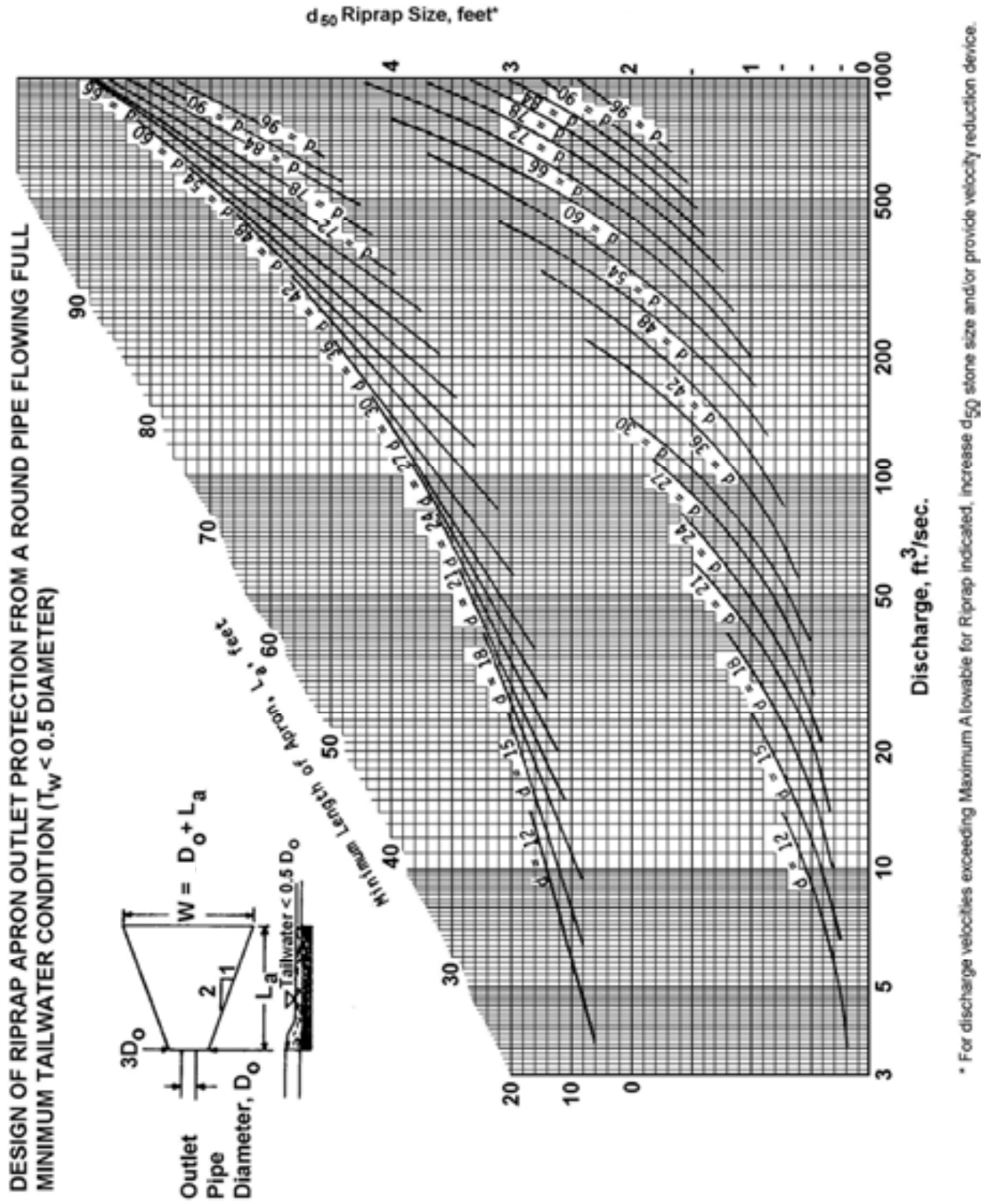


Figure 3.17
Outlet Protection Design—Maximum Tailwater Condition Chart (Design of Outlet Protection from a Round Pipe Flowing Full, Maximum Tailwater Condition: $T_w \geq 0.5D_o$) (USDA - NRCS)

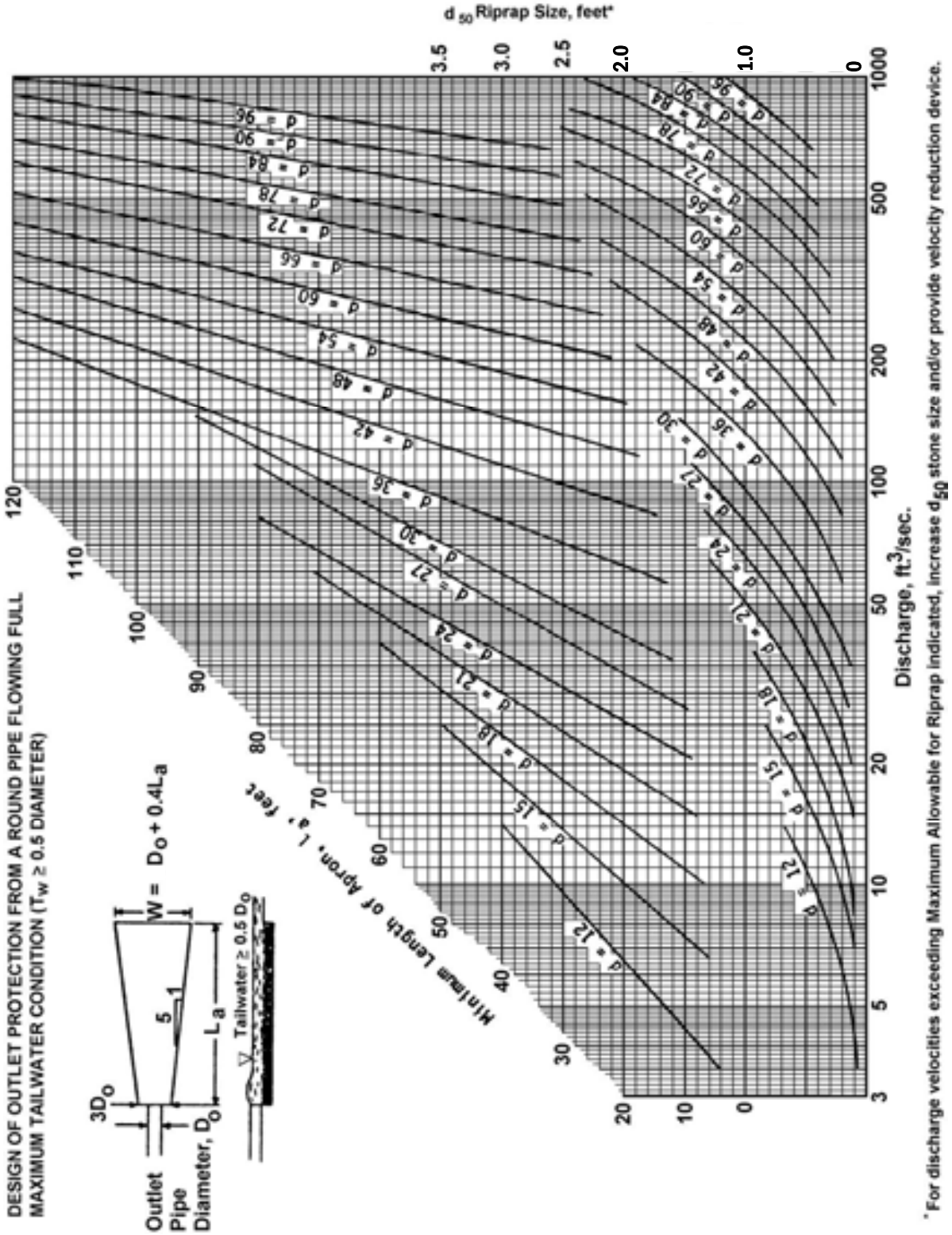


Figure 3.18
Riprap Outlet Protection Detail (1)

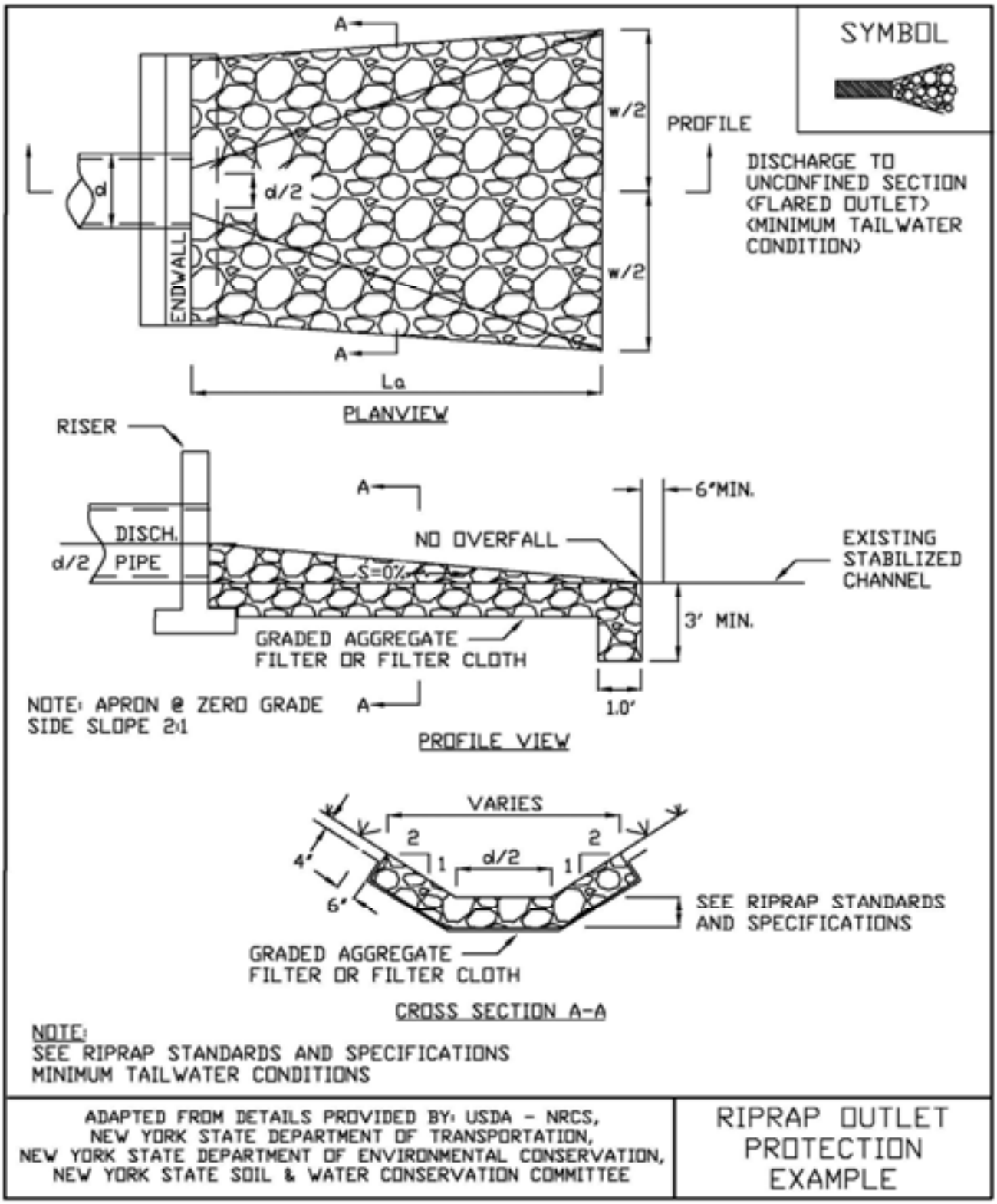


Figure 3.19
Riprap Outlet Protection Detail (2)

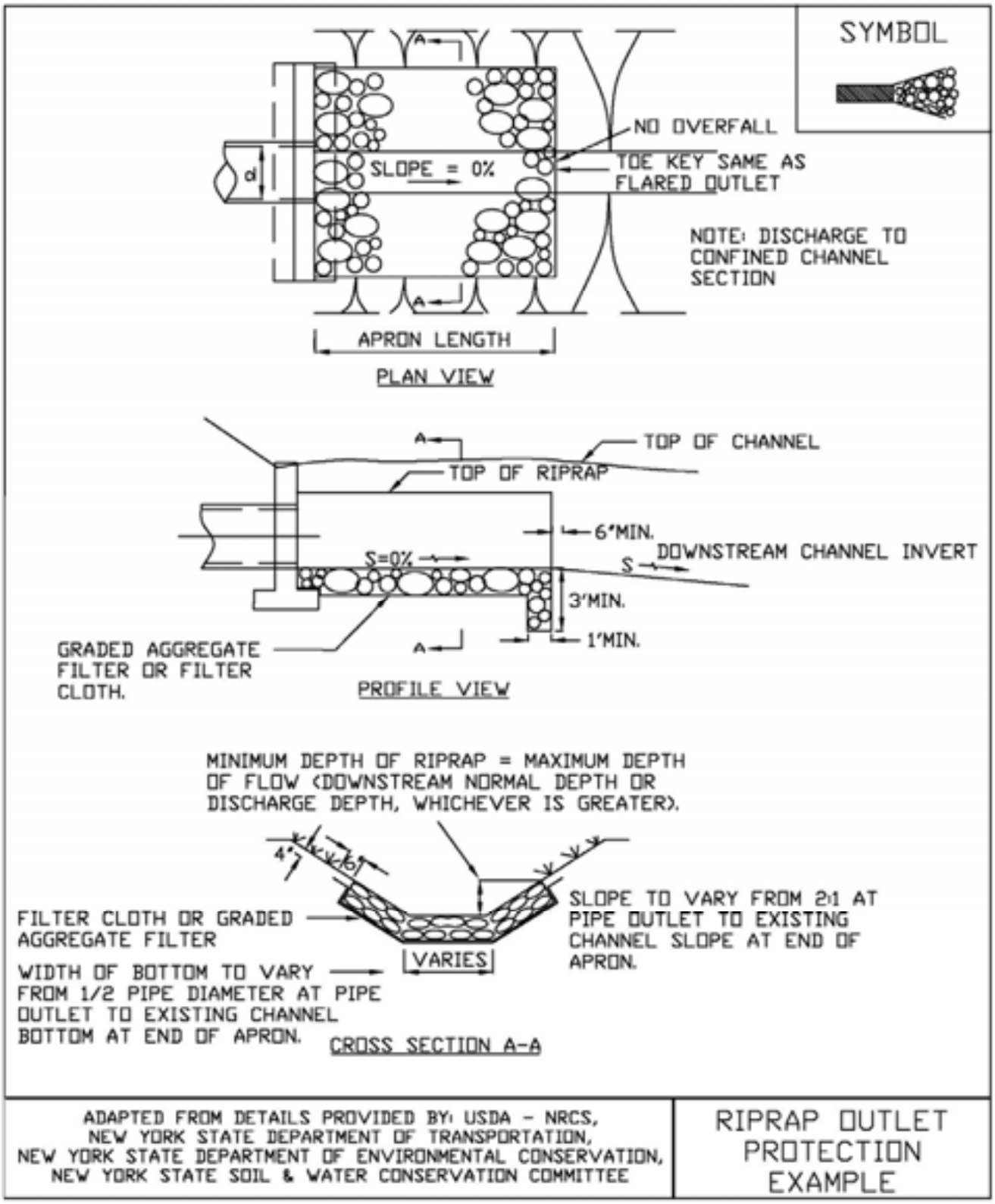
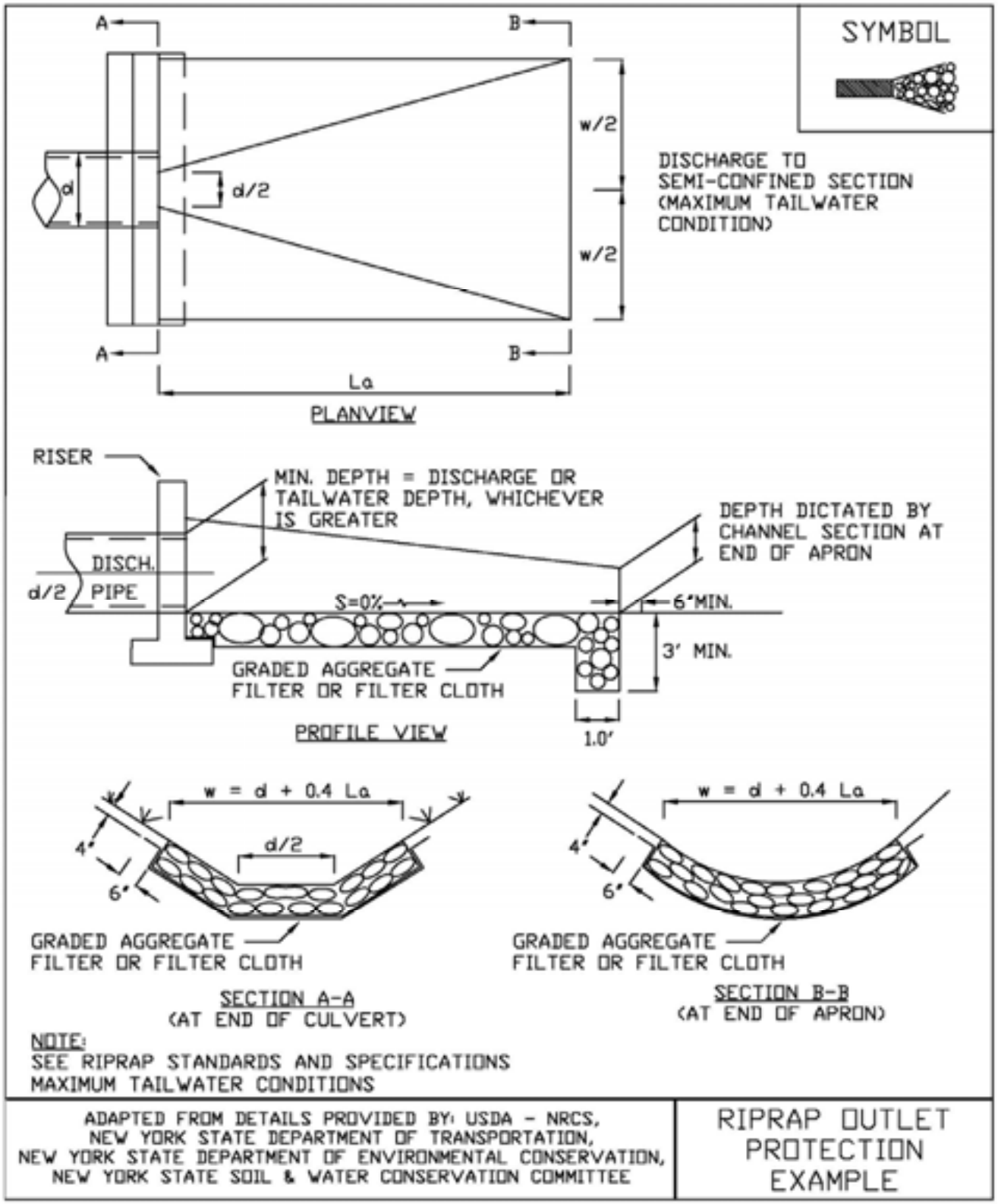


Figure 3.20
Riprap Outlet Protection Detail (3)



STANDARD AND SPECIFICATIONS FOR SEDIMENT BASIN



Definition & Scope

A **temporary** basin with a barrier or dam constructed across a drainage way or at other suitable locations to intercept sediment-laden runoff and reduce the amount of sediment leaving the disturbed area in order to protect drainageways, properties, and rights-of-way below the sediment basin.

Conditions Where Practice Applies

A sediment basin is appropriate where physical site conditions or land ownership restrictions preclude the installation of other control measures to adequately control runoff, erosion, and sedimentation. However, it is required that other erosion control measures be used with the sediment basin. The basin may be used below construction operations which expose critical areas to soil erosion. The basin shall be maintained until the disturbed area is protected against erosion by permanent stabilization.

This standard applies to the installation of temporary sediment basins on sites where: (a) failure of the structure would not result in loss of life, damage to homes or buildings, or interruption of use or service of public roads or utilities; (b) the drainage area does not exceed 50 acres; and (c) the basin is to be removed within 36 months after the beginning of construction of the basin.

Permanent (to function more than 36 months) sediment basins, or structures that temporarily function as a sediment basin but are intended for use as a permanent pool shall be classified as **permanent** structures and shall conform to criteria appropriate for permanent structures. These structures shall be designed and constructed to conform to NRCS Standard And Specification No. 378 for Ponds in the National Handbook of Conservation Practices and the New York State Department of Environmental Conservation, "Guidelines for the Design of Dams."

Design Criteria

Compliance with Laws and Regulations

Design and construction shall comply with state and local laws, ordinances, rules and regulations, including permits.

Location - Maximum Drainage Area = 50 acres

The sediment basin should be located to obtain the maximum storage benefit from the terrain and for ease of cleanout of the trapped sediment. It should be located to minimize interference with construction activities and construction of utilities. Whenever possible, sediment basins should be located so that storm drains may outfall or be diverted into the basin. **Do not locate basins in perennial streams.**

Size and Shape of the Basin

The sediment basin will contain two separate zones. The lowest zone is the sediment storage zone. This zone is sized for a volume equal to 1,000 cubic feet per disturbed acre over the course of the life of the project, contributing to the basin as measured from the bottom of the basin to the bottom of the dewatering zone. It shall have a minimum depth of 1 foot. Layered above this zone is the dewatering zone. This zone is sized for a minimum volume equal to 3,600 cubic feet per each acre draining to the basin. This volume is temporarily stored between the sediment storage zone and the crest of the principal spillway. This zone should be a minimum of 3 feet deep. See Figures 5.8 and 5.9 on pages 5.26 and 5.27. This 3,600 cubic feet per acre is equivalent to one inch of sediment per acre of drainage area. The entire drainage area is used for this computation, rather than the disturbed area above, to maximize trapping efficiency. The length to width ratio shall be 2:1 or greater, where length is the distance between the inlet and outlet. A wedge shape shall be used with the inlet located at the narrow end. See Figure 5.22 on page 5.41.

Surface Area

Research studies (Barfield and Clar 1985; Pitt, 2003) indicate that the following relationship between surface area and peak inflow rate gives a trapping efficiency of 75% for silt loam soils, and greater than 90% for loamy sand soils:

$A = 0.01\ Qp$ or, $A = 0.015x$ D.A. (whichever is greater)

where,

A = the basin surface area, acres, measured at the service spillway crest; and

Qp = the peak inflow rate for the design storm. (The minimum design storm will be a 10 year, 24 hour storm under construction conditions).

D.A. = contributing drainage area.

Sediment basins shall be cleaned out when the sediment storage zone volume described above is reduced by 50 percent, except in no case shall the sediment level be permitted to build up higher than one foot below the bottom of the dewatering zone. At this elevation, cleanout shall be performed to restore the original design volume to the sediment storage zone.

The elevation corresponding to the maximum allowable sediment level shall be determined and shall be stated in the design data as a distance below the top of the riser and shall be clearly marked on the riser.

The basin dimensions necessary to obtain the required basin volume as stated above shall be clearly shown on the plans to facilitate plan review, construction, and inspection.

Spillway Design

Runoff shall be computed by standard accepted hydrologic methods noted previously in this book of standards. **Runoff computations shall be based upon the worst soil cover conditions expected to prevail in the contributing drainage area during the anticipated effective life of the structure.** The combined capacities of the principal and emergency spillway shall be sufficient to pass the peak rate of runoff from a ten (10) year frequency, 24 hour duration storm.

1. Principal spillway: A spillway consisting of a vertical pipe or box type riser joined (watertight connection) to a pipe (barrel) which shall extend through the embankment and outlet beyond the downstream toe of the fill. The minimum capacity of the principal spillway shall be 0.2 cfs per acre of drainage area when the water surface is at the emergency spillway crest elevation. For those basins with no emergency spillway, the principal spillway shall have the capacity to handle the peak flow from a ten-year frequency rainfall event. The minimum size of the barrel shall be 8 inches in diameter. See Figures 5.10, 5.11 and 5.12 on pages 5.28, 5.29, and 5.30 for principal spillway sizes and capacities.

   A. Crest elevation: When used in combination with an emergency spillway, the crest elevation of the riser shall be a minimum one foot below the elevation of the control section of the emergency spillway.

   B. Watertight riser and barrel assembly: The riser and all pipe connections shall be completely watertight except for the inlet opening at the top, or a dewatering opening. There shall not be other holes, leaks, rips, or perforations in the structure.

   C. Dewatering the basin:

      1) Preferred Method- The preferred method for dewatering sediment basins is by using surface skimmers to decant the cleaner top surface water from the basin as the sediment settles out. See Dewatering Device Standard, page 5.10.

      2) Alternative Method– A fixed vertical riser pipe configured with perforations and filter fabric with a cone of pea gravel or small crushed stone is an alternative option for use. See Figure 5.5 on page 5.14.

      The sediment basin dewatering system shall be designed to release the dewatering zone volume between 2 to 7 days in watersheds not impaired by sediment, and 4-7 days in sediment impaired watersheds (check the NYSDEC Waterbody Inventory/Priority Waterbody List - **http://www.dec.ny.gov/chemical/36730.html**, to see if your site is in an impaired watershed). The design performance range will depend on the percent of silt and clay in the soils tributary to the basin. If the performance of the basin does not meet water quality objectives after 7 days, chemical treatment may be necessary.

   D. Anti-vortex device and trash rack:

      An anti-vortex device and trash rack shall be securely installed on top of the riser and shall be the concentric type as shown in Figure 5.13 and 5.14 on pages 5.31 and 5.32.

   E. Base:

      The riser shall have a base attached with a watertight connection and shall have sufficient weight to prevent flotation of the riser. Two approved bases for risers ten feet or less in height are: 1) a concrete base 18 in. thick with the riser embedded 9 in. in the base, and 2) a ¼" minimum thickness steel plate attached to the riser by a continuous weld around the circumference of the riser to form a watertight connection. The plate shall have 2.5 feet of stone, gravel, or compacted earth placed on it to prevent flotation. In either case, each side of the square base shall be twice the riser diameter.

      For risers greater than ten feet high, computations

shall be made to design a base which will prevent flotation. The minimum factor of safety shall be 1.20 (Downward forces = 1.20 x upward forces). See Figure 5.15 on page 5.33 for details.

F. Anti-Seep Collars: Anti-seep collars shall be installed around all conduits through earth fills of impoundment structures according to the following criteria:

1) Collars shall be placed to increase the seepage length along the conduit by a minimum of 15 percent of the pipe length located within the saturation zone.

2) Collar spacing shall be between 5 and 14 times the vertical projection of each collar.

3) All collars shall be placed within the saturation zone.

4) The assumed normal saturation zone (phreatic line) shall be determined by projecting a line at a slope of 4 horizontal to 1 vertical from the point where the normal water (riser crest) elevation touches the upstream slope of the fill to a point where this line intersects the invert of the pipe conduit. All fill located within this line may be assumed as saturated.

$$2(N)(P) = 1.15(L_s) \qquad N = (0.075)(L_s)/P$$

When anti-seep collars are used, the equation for revised seepage length becomes:

Where: Ls = Saturated length is length, in feet, of pipe between riser and intersection of phreatic line and pipe invert.

N = number of anti-seep collars.

P = vertical projection of collar from pipe, in feet.

5) All anti-seep collars and their connections shall be watertight. See Figures 5.16 and 5.17 on pages 5.34 and 5.35 for anti-seep collar design and Figure 5.18 on page 5.36 for construction details. Seepage diaphragms may be used in lieu of anti-seep collars. They shall be designed in accordance to USDA NRCS Pond Standard 378.

G. Outlet: An outlet shall be provided, including a means of conveying the discharge in an erosion free manner to an existing stable channel. Where discharge occurs at the property line, drainage easements will be obtained in accordance with local ordinances. Adequate notes and references will be shown on the erosion and sediment control plan.

Protection against scour at the discharge end of the pipe spillway shall be provided. Measures may include basin, riprap, revetment, excavated plunge pools, or other approved methods. See Standard and Specification for Rock Outlet Protection, Section 3, page 3.39.

2. Emergency Spillways: The entire flow area of the emergency spillway shall be constructed in undisturbed ground (not fill). The emergency spillway cross-section shall be trapezoidal with a minimum bottom width of eight feet. This spillway channel shall have a straight control section of at least 20 feet in length; and a straight outlet section for a minimum distance equal to 25 feet.

A. Capacity: The minimum capacity of the emergency spillway shall be that required to pass the peak rate of runoff from the 10 year 24-hour frequency storm, less any reduction due to flow in the pipe spillway. Emergency spillway dimensions may be determined by using the method described in Figure 5.19 on page 5.37 and the Design Tables in Figures 5.20 and 5.21 on pages 5.38 and 5.39.

B. Velocities: The velocity of flow in the exit channel shall not exceed 5 feet per second for vegetated channels. For channels with erosion protection other than vegetation, velocities shall be within the non-erosive range for the type of protection used.

C. Erosion Protection: Erosion protection shall be provided for by vegetation as prescribed in this publication or by other suitable means such as riprap, asphalt or concrete.

D. Freeboard: Freeboard is the difference between the design high water elevation in the emergency spillway and the top of the settled embankment. If there is no emergency spillway, it is the difference between the water surface elevation required to pass the design flow through the pipe and the top of the settled embankment. Freeboard shall be at least one foot.

Embankment Cross-Section

1. The maximum height of dam = 15 feet (measured from the low point of original ground at the downstream toe to the top of the dam).

2. Minimum top width of dam = 10 feet.

3. Side slopes shall be 2.5 to 1 or flatter.

Entrance of Runoff into Basin

Points of entrance of surface runoff into excavated sediment basins shall be protected to prevent erosion. Considerable care should be given to the major points of inflow into basins. In many cases the difference in elevation of the inflow and the bottom of the basin is considerable, thus creating a potential for severe gullying and sediment generation. Often a riprap drop at major points of inflow would eliminate gullying and sediment generation.

Diversions, grade stabilization structures or other water control devices shall be installed as necessary to ensure direction of runoff and protect points of entry into the basin. Points of entry should be located so as to ensure maximum travel distance of entering runoff to point of exit (the riser) from the basin.

Disposal

The sediment basin plans shall indicate the method (s) of disposing of the sediment removed from the basin. The sediment shall be placed in such a manner that it will not erode from the site. The sediment shall not be deposited downstream from the basin, adjacent to a stream or floodplain. Disposal sites will be covered by an approved sediment control plan.

The sediment basins plans shall also show the method of disposing of the sediment basin after the drainage area is stabilized, and shall include the stabilization of the sediment basin site. Water contained within the storage areas shall be removed from the basin by pumping, cutting the top of the riser, or other appropriate method prior to removing or breaching the embankment. **Sediment shall not be allowed to flush into a stream or drainageway.**

Chemical Treatment

Precipitation of sediment is enhanced with the use of specific chemical flocculants that can be applied to the sediment basin in liquid, powder, or solid form. Flocculants include anionic polyelectrolytes such as polyacrylimides, aluminum sulfate (alum), polyaluminum chloride and chitosan. Cationic polyelectrolytes have a greater toxicity to fish and other aquatic organisms than anionic polyelectrolytes because they bind to the gills of fish resulting in respiratory failure (Pitt, 2003).

Chemical treatment shall not be substituted for proper erosion and sediment control. To reduce the need for flocculants, proper controls include planning, phasing, sequencing and practice design in accordance to NY Standards. **Chemical applications shall not be applied without written approval from the NYSDEC.**

Safety

Sediment basins are attractive to children and can be very dangerous. Local ordinances and regulations must be adhered to regarding health and safety. The developer or owner shall check with local building officials on applicable safety requirements. If fencing of sediment basins is required, the location of and type of fence shall be shown on the plans.

Construction Specifications

Site Preparation

Areas under the embankment shall be cleared, grubbed, and stripped of topsoil to remove trees, vegetation, roots, or other objectionable material. In order to facilitate cleanout and restoration, the pool area (measured at the top of the pipe spillway) will be cleared of all brush, trees, and other objectionable materials.

Cutoff-Trench

A cutoff trench shall be excavated along the centerline of earth fill embankments. The minimum depth shall be two feet. The cutoff trench shall extend up both abutments to the riser crest elevation. The minimum bottom width shall be four feet, but wide enough to permit operation of excavation and compaction equipment. The side slopes shall be no steeper than 1:1. Compaction requirements shall be the same as those for embankment. The trench shall be dewatered during the back-filling/compaction operations.

Embankment

The fill material shall be taken from approved areas shown on the plans. It shall be clean mineral soil free of roots, woody vegetation, oversized stones, rocks, or other objectionable material. Relatively pervious materials such as sand or gravel (Unified Soil Classes GW, GP, SW & SP) shall not be placed in the embankment. Areas on which fill is to be placed shall be scarified prior to placement of fill. The fill material shall contain sufficient moisture so that it can be formed by hand into a ball without crumbling. If water can be squeezed out of a ball, it is too wet for proper compaction. Fill material shall be placed in six to eight-inch thick continuous layers over the entire length of the fill. Compaction shall be obtained by routing and hauling the construction equipment over the fill so that the entire surface of each layer of the fill is traversed by at least one

wheel or tread track of the equipment or by the use of a compactor. The embankment shall be constructed to an elevation 10 percent higher than the design height to allow for settlement.

Pipe Spillway

The riser shall be securely attached to the barrel or barrel stub by welding the full circumference making a watertight structural connection. The barrel stub must be attached to the riser at the same percent (angle) of grade as the outlet conduit. The connection between the riser and the riser base shall be watertight. All connections between barrel sections must be achieved by approved watertight bank assemblies. The barrel and riser shall be placed on a firm, smooth foundation of impervious soil. Pervious materials such as sand, gravel, or crushed stone shall not be used as backfill around the pipe or anti-seep collars. The fill material around the pipe spillway shall be placed in four-inch layers and compacted under and around the pipe to at least the same density as the adjacent embankment.

A minimum depth of two feet of hand compacted backfill shall be placed over the pipe spillway before crossing it with construction equipment. Steel base plates on risers shall have at least 2 ½ feet of compacted earth, stone, or gravel placed over it to prevent flotation.

Emergency Spillway

The emergency spillway shall be installed in undisturbed ground. The achievement of planned elevations, grades, design width, entrance and exit channel slopes are critical to the successful operation of the emergency spillway and must be constructed within a tolerance of +/- 0.2 feet.

Vegetative Treatment

Stabilize the embankment and emergency spillway in accordance with the appropriate vegetative standard and specification immediately following construction. In no case shall the embankment remain unstabilized for more than three (3) days.

Erosion and Pollution Control

Construction operations shall be carried out in such a manner that erosion and water pollution will be minimized. State and local laws shall be complied with concerning pollution abatement.

Safety

State and local requirements shall be met concerning fencing and signs, warning the public of hazards of soft sediment and floodwater.

Maintenance

1. Repair all damages caused by soil erosion and construction equipment at or before the end of each working day.

2. Sediment shall be removed from the basin when it reaches the specified depth for cleanout noted on the plans which will not exceed 50% of the capacity of the sediment storage zone. This sediment shall be placed in such a manner that it will not erode from the site. The sediment shall not be deposited downstream from the embankment, adjacent to a stream or floodplain.

Final Disposal

When temporary structures have served their intended purpose and the contributing drainage area has been properly stabilized, the embankment and resulting sediment deposits are to be leveled or otherwise disposed of in accordance with the approved sediment control plan. The proposed use of a sediment basin site will often dictate final disposition of the basin and any sediment contained therein. If the site is scheduled for future construction, then the basin material and trapped sediments must be removed, safely disposed of, and backfilled with a structural fill. When the basin area is to remain open space, the pond may be pumped dry, graded, and backfilled.

Information to be Submitted

Sediment basin designs and construction plans submitted for review to a local municipality, New York State DEC, New York City DEP, Soil and Water Conservation District, or other agency shall include the following:

1. Specific location of the basin.

2. Plan view of the storage basin and emergency spillway, showing existing and proposed contours.

3. Cross section of dam, principal spillway, emergency spillway, and profile of emergency spillway.

4. Details of pipe connections, riser to pipe connections, riser base, anti-seep control, trash rack cleanout elevation, and anti-vortex device.

5. Runoff calculations for 1 and 10-year frequency storms, if required.

6. Storage Computations

    A. Zones total required

    B. Zones total Available

    C. Elevation of sediment at which cleanout shall be required; also stated as a distance from the riser

TEMPORARY SEDIMENT BASIN DESIGN DATA SHEET

Computed by _____ Date _____Checked by _____Date _____
Project_____Basin #_____
Location _____ Total Area draining to basin (≤50 Ac.) _____Acres

BASIN SIZE DESIGN

1. Sediment storage zone volume = 1,000 cu. ft. x number of disturbed acres = _____ cu. ft., Top of Zone Elev. _____
2. Dewatering zone volume = 3,600 cu. ft. x number of drainage area acres = _____cu. ft., Top of Zone Elev. _____
3. Length to width ratio = _____
4. A. Cleanout at 50% of sediment storage zone volume, Elev. _____
   B. Distance below top of riser _____ feet
5. Minimum surface area is larger of 0.01 $Q_{(10)}$ _____or, 0.015 DA = _____ use _____acres

DESIGN OF SPILLWAYS & ELEVATIONS

Runoff

6. $Q_{p(10)}$ = _____cfs (Attach runoff computation sheets)

Pipe Spillway (Q_{ps})

7. Min. pipe spillway cap., Q_{ps} = 0.2 x _____Drainage Area, acres = _____cfs
   Note: If there is no emergency spillway, then required $Q_{ps} = Q_{p(10)}$ = _____cfs.
8. H, head = _____ft. Barrel length = _____ft
9. Barrel: Diam. _____inches; Q_{ps} = (Q) _____x (cor.fac.)_____=_____cfs.
10. Riser: Diam. _____inches; Length _____ft.; h = _____ft. Crest Elev. _____
11. Trash Rack: Diameter = _____inches; H, height = _____inches

Emergency Spillway Design

12. Emergency Spillway Flow, $Q_{es} = Q_p - Q_{ps}$ = _____ - _____ = _____cfs.
13. Width _____ft.; H_p _____ft Crest elevation _____; Design High Water Elev. _____
    Entrance channel slope_____% ; Top of Dam Elev. _____
    Exit channel slope _____%

ANTI-SEEP COLLAR/SEEPAGE DIAPHRAGM DESIGN

Collars:

14. y = _____ft.; z = _____:1; pipe slope = _____%, L_s = _____ft.
    Use _____ collars, _____ - _____inches square; projection = _____ft.

Diaphragms:

#_____ width_____ ft. height _____ft.

DEWATERING ORIFICE SIZING

(Determined from the Dewatering Device Standard)

15. Dewatering orifice diameter = _____ inches. Skimmer ___ or Riser ____ (check one)
16. Design dewatering time _____ days (Min. 2 days required)

TEMPORARY SEDIMENT BASIN DESIGN DATA SHEET INSTRUCTIONS FOR USE OF FORM

1. Minimum required sediment storage zone volume is 1,000 cubic feet per acre from each disturbed acre within the total drainage area. Minimum required dewatering zone volume is 3,600 cubic feet per total area draining to the basin.

2. The volume of a naturally shaped basin (no excavation in basin) may be approximated by the formula V = (0.4)(A)(d), where V is in cubic feet, A is the surface area of the basin, in square feet, and d is the maximum depth of the basin, in feet. Volume may be computed from contour information or other suitable methods.

3. If volume of basin is not adequate for required storage, excavate to obtain the required zone volumes.

4. The minimum surface area of the basin pool at the storage volume elevation will be the larger of the two elevations shown.

5. Use of the NRCC hydrologic data at www.precip.net with an appropriate hydrologic model, is the preferred process for runoff computation. Runoff curve numbers will be computed for the drainage area that reflects the maximum construction condition.

6. Required minimum discharge from pipe spillway equals 0.2 cfs/ac. times total drainage area. (This is equivalent to a uniform runoff of 5 in. per 24 hours). The pipe shall be designed to carry Q_p if site conditions preclude installation of an emergency spillway to protect the structure.

7. Determine value of "H" from field conditions; "H" is the interval between the centerline of the outlet pipe and the emergency spillway crest, or if there is no emergency spillway, to the design high water.

8. See Pipe Flow Charts, Figures 5.11 and 5.12 on pages 5.29 and 5.30.

9. See Riser Inflow Curves, Figure 5.10 on page 5.28.

10. Compute the orifice size required to dewater the basin over a minimum 48 hour period. See the Dewatering Device Standard on page 5.10.

11. See Trash Rack and Anti-Vortex Device Design, Figures 5.13 and 5.14 on pages 5.31 and 5.32.

12. Compute Q_{es} by subtracting actual flow carried by the pipe spillway from the total inflow, Q_p.

13. Use appropriate tables to obtain values of H_p, bottom width, and actual Q_{es}. If no emergency spillway is to be used, so state, giving reason (s).

14. See Anti-Seep Collar / Seepage Diaphragm Design (see figures 5.16, 5.17 and 5.18 on pages 5.34, 5.35 and 5.36).

15. Fill in design elevations. The emergency spillway crest must be set no closer to riser crest than value of h, which causes pipe spillway to carry the minimum, required Q. Therefore, the elevation difference between spillways shall be equal to the value of h, or one foot, whichever is greater. Design high water is the elevation of the emergency spillway crest plus the value of H_p, or if there is no emergency spillway, it is the elevation of the riser crest plus h required to handle the 10-year storm. Minimum top of dam elevation requires 1.0 ft. of freeboard above design high water.

To use charts for pipe spillway design:

1. Enter chart, Figures 5.11 or 5.12 on pages 5.29 and 5.30 with H and required discharge.

2. Find diameter of pipe conduit that provides equal or greater discharge

3. Enter chart, Figure 5.10 on page 5.28 with actual pipe discharge. Read across to select smallest riser that provides discharge within weir flow portion of rating curve. Read down to find corresponding h required. This h must be 1 foot or less.

Figure 5.8
Pipe Spillway Design

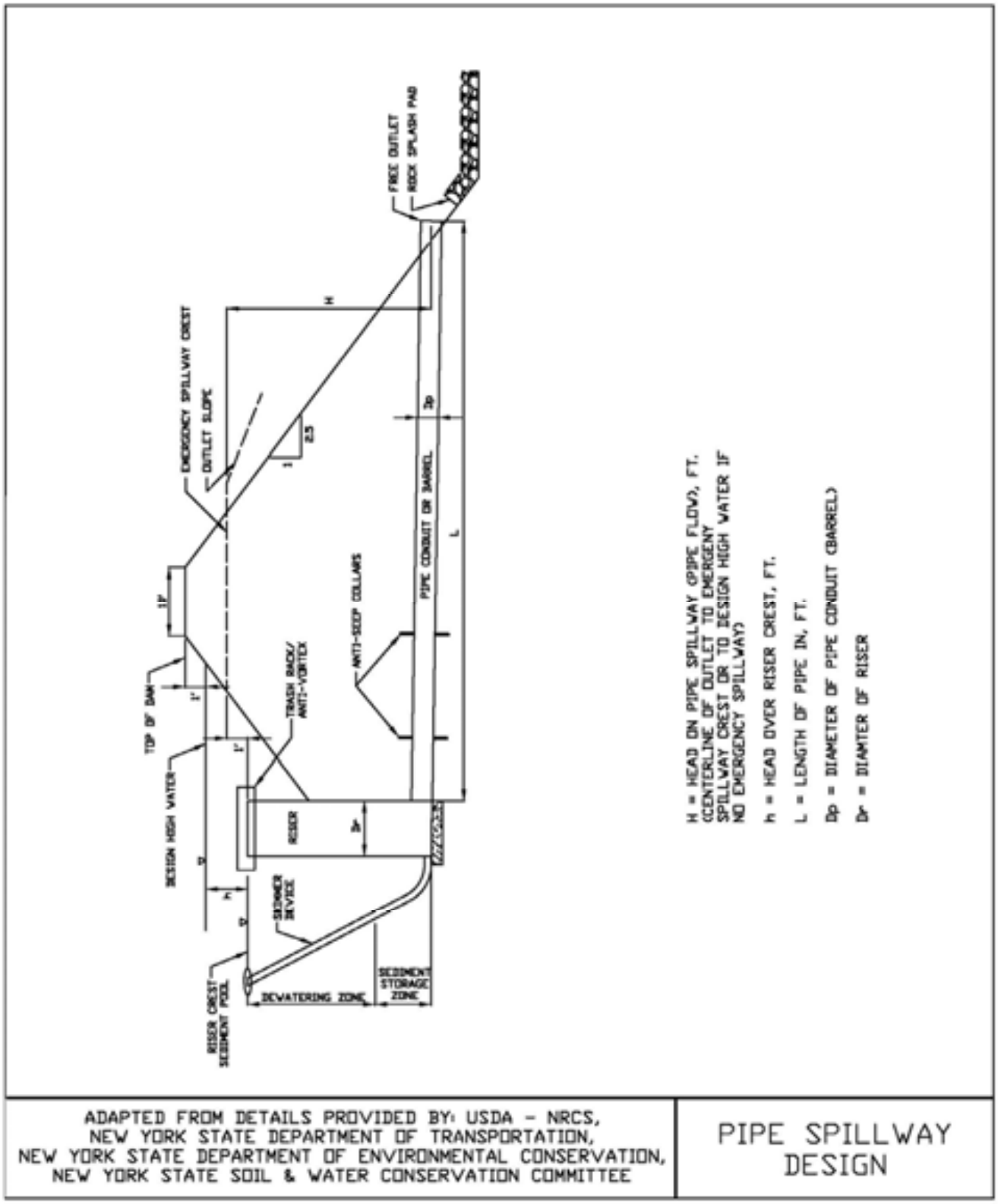
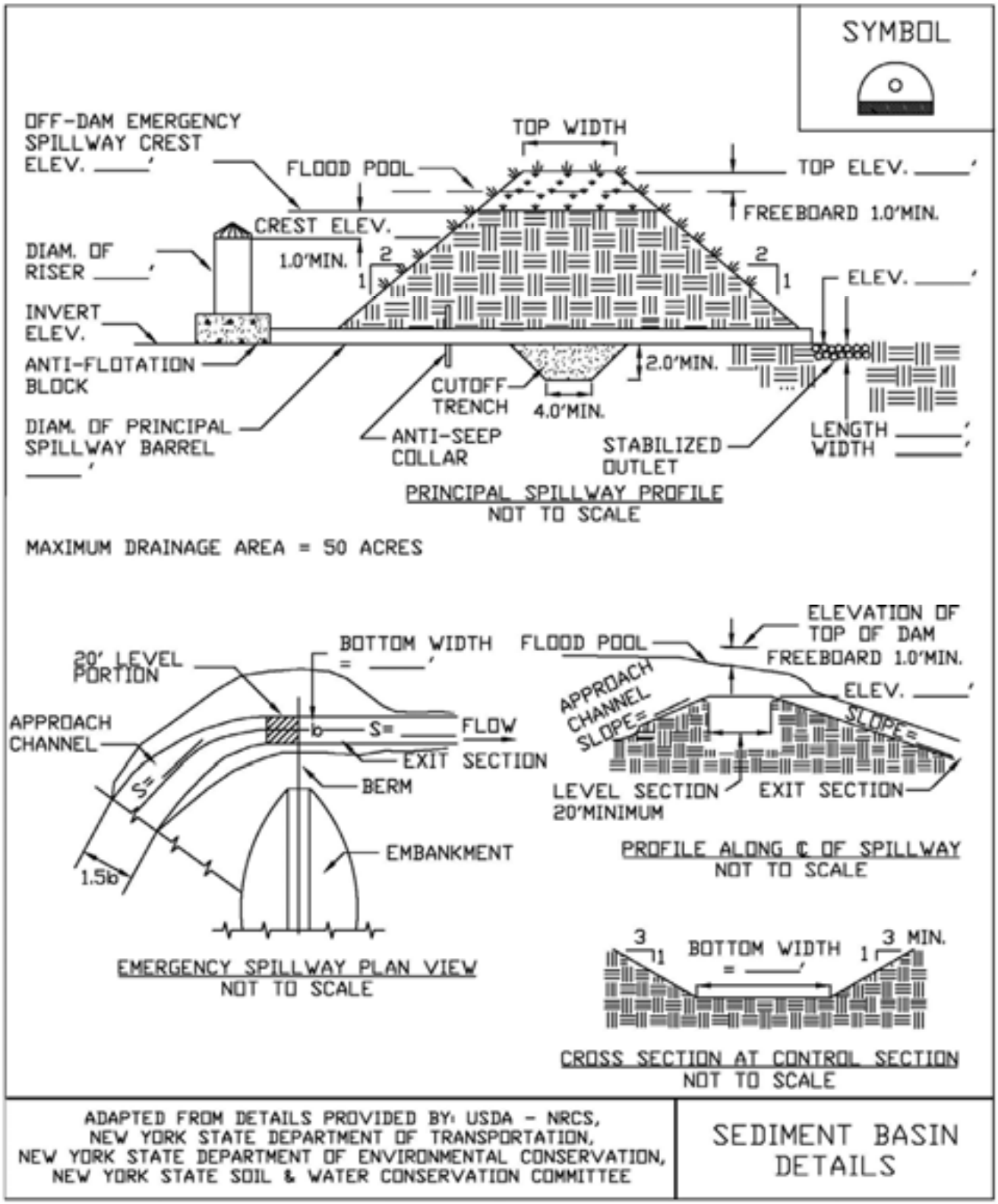


Figure 5.9
Sediment Basin



STANDARD AND SPECIFICATIONS FOR SILT FENCE



Definition & Scope

A **temporary** barrier of geotextile fabric installed on the contours across a slope used to intercept sediment laden runoff from small drainage areas of disturbed soil by temporarily ponding the sediment laden runoff allowing settling to occur. The maximum period of use is limited by the ultraviolet stability of the fabric (approximately one year).

Conditions Where Practice Applies

A silt fence may be used subject to the following conditions:

1. Maximum allowable slope length and fence length will not exceed the limits shown in the Design Criteria for the specific type of silt fence used ; and
2. Maximum ponding depth of 1.5 feet behind the fence; and
3. Erosion would occur in the form of sheet erosion; and
4. There is no concentration of water flowing to the barrier; and
5. Soil conditions allow for proper keying of fabric, or other anchorage, to prevent blowouts.

Design Criteria

1. Design computations are not required for installations of 1 month or less. Longer installation periods should be designed for expected runoff.
2. All silt fences shall be placed as close to the disturbed area as possible, but at least 10 feet from the toe of a slope steeper than 3H:1V, to allow for maintenance and roll down. The area beyond the fence must be undisturbed or stabilized.
3. The type of silt fence specified for each location on the plan shall not exceed the maximum slope length and maximum fence length requirements shown in the following table:

		Slope Length/Fence Length (ft.)		
Slope	Steepness	Standard	Reinforced	Super
<2%	< 50:1	300/1500	N/A	N/A
2-10%	50:1 to 10:1	125/1000	250/2000	300/2500
10-20%	10:1 to 5:1	100/750	150/1000	200/1000
20-33%	5:1 to 3:1	60/500	80/750	100/1000
33-50%	3:1 to 2:1	40/250	70/350	100/500
>50%	> 2:1	20/125	30/175	50/250

Standard Silt Fence (SF) is fabric rolls stapled to wooden stakes driven 16 inches in the ground.
Reinforced Silt Fence (RSF) is fabric placed against welded wire fabric with anchored steel posts driven 16 inches in the ground.
Super Silt Fence (SSF) is fabric placed against chain link fence as support backing with posts driven 3 feet in the ground.

4. Silt fence shall be removed as soon as the disturbed area has achieved final stabilization.

The silt fence shall be installed in accordance with the appropriate details. Where ends of filter cloth come together, they shall be overlapped, folded and stapled to prevent sediment bypass. Butt joints are not acceptable. A detail of the silt fence shall be shown on the plan. See Figure 5.30 on page 5.56 for Reinforced Silt Fence as an example of details to be provided.

Criteria for Silt Fence Materials

1. Silt Fence Fabric: The fabric shall meet the following specifications unless otherwise approved by the appropriate erosion and sediment control plan approval authority. Such approval shall not constitute statewide acceptance.

Fabric Properties	Minimum Acceptable Value	Test Method
Grab Tensile Strength (lbs)	110	ASTM D 4632
Elongation at Failure (%)	20	ASTM D 4632
Mullen Burst Strength (PSI)	300	ASTM D 3786
Puncture Strength (lbs)	60	ASTM D 4833
Minimum Trapezoidal Tear Strength (lbs)	50	ASTM D 4533
Flow Through Rate (gal/ min/sf)	25	ASTM D 4491
Equivalent Opening Size	40-80	US Std Sieve ASTM D 4751
Minimum UV Residual (%)	70	ASTM D 4355

2. Fence Posts (for fabricated units): The length shall be a minimum of 36 inches long. Wood posts will be of sound quality hardwood with a minimum cross sectional area of 3.5 square inches. Steel posts will be standard T and U section weighing not less than 1.00 pound per linear foot. Posts for super silt fence shall be standard chain link fence posts.

3. Wire Fence for reinforced silt fence: Wire fencing shall be a minimum 14 gage with a maximum 6 in. mesh opening, or as approved.

4. Prefabricated silt fence is acceptable as long as all material specifications are met.

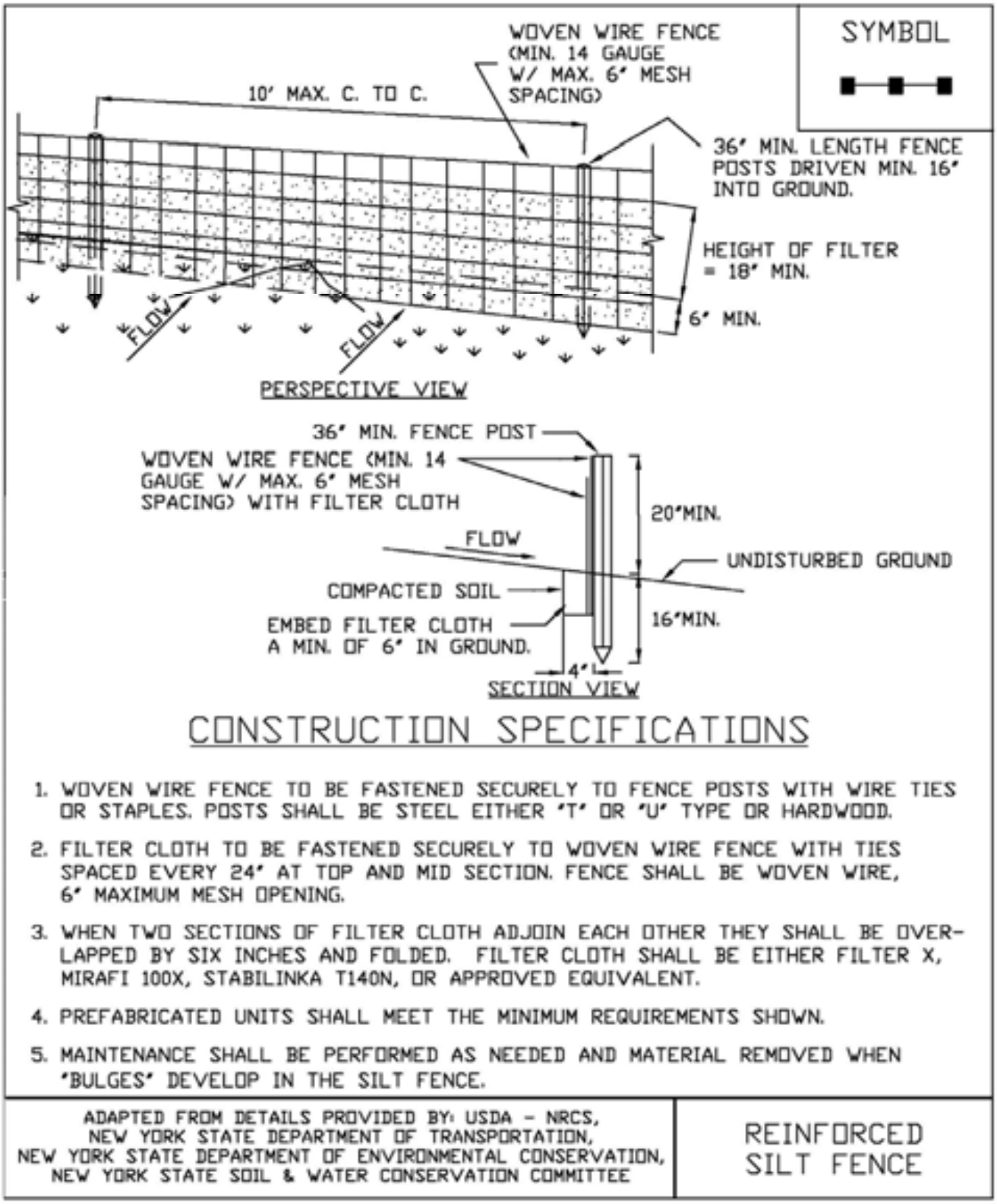
Super Silt Fence



Reinforced Silt Fence



Figure 5.30
Reinforced Silt Fence



STANDARD AND SPECIFICATIONS FOR SOIL RESTORATION



Definition & Scope

The decompaction of areas of a development site or construction project where soils have been disturbed to recover the original properties and porosity of the soil; thus providing a sustainable growth medium for vegetation, reduction of runoff and filtering of pollutants from stormwater runoff.

Conditions Where Practice Applies

Soil restoration is to be applied to areas whose heavy construction traffic is done and final stabilization is to begin. This is generally applied in the cleanup, site restoration, and landscaping phase of construction followed by the permanent establishment of an appropriate ground cover to maintain the soil structure. Soil restoration measures should be applied over and adjacent to any runoff reduction practices to achieve design performance.



Design Criteria

1. Soil restoration areas will be designated on the plan views of areas to be disturbed.
2. Soil restoration will be completed in accordance with Table 4.6 on page 4.53.

Specification for Full Soil Restoration

During periods of relatively low to moderate subsoil moisture, the disturbed subsoils are returned to rough grade and the following Soil Restoration steps applied:

1. Apply 3 inches of compost over subsoil. The compost shall be well decomposed (matured at least 3 months), weed-free, organic matter. It shall be aerobically composted, possess no objectionable odors, and contain less than 1%, by dry weight, of man-made foreign matter. The physical parameters of the compost shall meet the standards listed in Table 5.2 - Compost Standards Table, except for "Particle Size" 100% will pass the 1/2" sieve. **Note: All biosolids compost produced in New York State (or approved for importation) must meet NYS DEC's 6 NYCRR Part 360 (Solid Waste Management Facilities) requirements. The Part 360 requirements are equal to or more stringent than 40 CFR Part 503 which ensure safe standards for pathogen reduction and heavy metals content.**



2. Till compost into subsoil to a depth of at least 12 inches using a cat-mounted ripper, tractor mounted disc, or tiller, to mix and circulate air and compost into the subsoil.
3. Rock-pick until uplifted stone/rock materials of four inches and larger size are cleaned off the site.
4. Apply topsoil to a depth of 6 inches.
5. Vegetate as required by the seeding plan. Use appropriate ground cover with deep roots to maintain the soil structure.
6. Topsoil may be manufactured as a mixture or a mineral component and organic material such as compost.

At the end of the project an inspector should be able to push a 3/8" metal bar 12 inches into the soil just with body weight. This should not be performed within the drip line of any existing trees or over utility installations that are within 24 inches of the surface.

Maintenance

Keep the site free of vehicular and foot traffic or other weight loads. Consider pedestrian footpaths.

Table 4.6
Soil Restoration Requirements

Type of Soil Disturbance	Soil Restoration Requirement		Comments/Examples
No soil disturbance	Restoration not permitted		Preservation of Natural Features
Minimal soil disturbance	Restoration not required		Clearing and grubbing
Areas where topsoil is stripped only - no change in grade	HSG A&B	HSG C&D	Protect area from any ongoing construction activities.
	Apply 6 inches of topsoil	Aerate* and apply 6 inches of topsoil	
Areas of cut or fill	HSG A&B	HSG C&D	
	Aerate* and apply 6 inches of topsoil	Apply full Soil Restoration**	
Heavy traffic areas on site (especially in a zone 5-25 feet around buildings but not within a 5 foot perimeter around foundation walls)	Apply full Soil Restoration (decompaction and compost enhancement)		
Areas where Runoff Reduction and/or Infiltration practices are applied	Restoration not required, but may be applied to enhance the reduction specified for appropriate practices.		Keep construction equipment from crossing these areas. To protect newly installed practice from any ongoing construction activities construct a single phase operation fence area
Redevelopment projects	Soil Restoration is required on redevelopment projects in areas where existing impervious area will be converted to pervious area.		

* Aeration includes the use of machines such as tractor-drawn implements with coulters making a narrow slit in the soil, a roller with many spikes making indentations in the soil, or prongs which function like a mini-subsoiler.
** Per "Deep Ripping and De-compaction, DEC 2008".

STANDARD AND SPECIFICATIONS FOR STABILIZATION WITH SOD



Definition & Scope

Stabilizing restored, exposed soil surfaces by establishing long term stands of grass with sod to reduce damage from sediment and runoff to downstream areas and enhance natural beauty.

Conditions Where Practice Applies

On exposed soils that have a potential for causing off site environmental damage where a quick vegetative cover is desired. Moisture, either applied or natural, is essential to success.

Design Criteria

1. Sod shall be bluegrass or a bluegrass/red fescue mixture or a perennial ryegrass for average sites. (CAUTION: Perennial ryegrass has limited cold tolerance and may winter kill.) Use turf type cultivars of tall fescue for shady, droughty, or otherwise more critical areas. For variety selection, contact Cornell Cooperative Extension Turf Specialist.

2. Sod shall be machine cut at a uniform soil thickness of 3/4 inch, plus or minus 1/4 inch. Measurement for thickness shall exclude top growth and thatch.

3. Standard size sections of sod shall be strong enough to support their own weight and retain their size and shape when suspended vertically from a firm grasp on the upper 10 percent of the section.

4. Sod shall be free of weeds and undesirable coarse weedy grasses. Wild native or pasture grass sod shall not be used unless specified.

5. Sod shall not be harvested or transplanted when moisture content (excessively dry or wet) may adversely affect its survival.

6. Sod shall be harvested, delivered, and installed within a period of 36 hours. Sod not transplanted within this period shall be inspected and approved by the contracting officer or his designated representative prior to its installation.

Site Preparation

Fertilizer and lime application rates shall be determined by soil tests. Under unusual circumstances where there is insufficient time for a complete soil test and the contracting officer agrees, fertilizer and lime materials may be applied in amounts shown in subsection 2 below. Slope land such as to provide good surface water drainage. Avoid depressions or pockets.

1. Prior to sodding, the surface shall be smoothed and cleared of all trash, debris, and of all roots, brush, wire, grade stakes and other objects that would interfere with planting, fertilizing or maintenance operations.

2. **The soil should be tested to determine the amounts of amendments needed.** Where the soil is acid or composed of heavy clays, ground limestone shall be spread to raise the pH to 6.5. If the soil must be fertilized before results of a soil test can be obtained to determine fertilizer needs, apply commercial fertilizer at 20 lbs. of 5-5-10 (or equivalent) and mix into the top 3 inches of soil with the required lime for every 1,000 square feet. Soil should be moist prior to sodding. Arrange for temporary storage of sod to keep it shaded and cool.

Sod Installation

1. For the operation of laying, tamping, and irrigating for any areas, sod shall be completed within eight hours. During periods of excessively high temperature, the soil shall be lightly moistened immediately prior to laying the sod.

2. The first row of sod shall be laid in a straight line with subsequent rows placed parallel to, and tightly wedged against, each other. Lateral joints shall be staggered to promote more uniform growth and strength. Ensure that sod is not stretched or overlapped and that all joints are butted tight in order to prevent voids which would cause air drying of the roots. On sloping areas where erosion may be a problem, sod shall be laid with the long edges parallel to the contour and with

staggered joints.

3. Secure the sod by tamping and pegging, or other approved methods. As sodding is completed in any one section, the entire area shall be rolled or tamped to ensure solid contact of roots with the soil surface.

4. Sod shall be watered immediately after rolling or tamping until the underside of the new sod pad and soil surface below the sod are thoroughly wet. Keep sod moist for at least two weeks.

Sod Maintenance

1. In the absence of adequate rainfall, watering shall be performed daily, or as often as deemed necessary by the inspector, during the first week and in sufficient quantities to maintain moist soil to a depth of 4 inches. Watering should be done in the morning. Avoid excessive watering during applications.

2. After the first week, sod shall be watered as necessary to maintain adequate moisture and ensure establishment.

3. The first mowing should not be attempted until sod is firmly rooted. No more than 1/3 of the grass leaf shall be removed by the initial cutting or subsequent cuttings. Grass height shall be maintained between 2 and 3 inches unless otherwise specified. Avoid heavy mowing equipment for several weeks to prevent rutting.

4. If the soil must be fertilized before results of a soil test can be obtained to determine fertilizer needs, apply fertilizer three to four weeks after sodding, at a rate of 1 pound nitrogen/1,000 sq.ft. Use a complete fertilizer with a 2-1-1 ratio.

5. Weed Control: Target herbicides for weeds present. Consult current Cornell Pest Control Recommendations for Commercial Turfgrass Management or consult the local office of Cornell Cooperative Extension.

6. Disease Control: Consult the local office of the Cornell Cooperative Extension.

Additional References

1. Home Lawns, Establishment and Maintenance, CCE Information Bulletin 185, Revised November 1994. Cornell University, Ithaca, NY.

2. Installing a Sod Lawn. CCE Suffolk County, NY. Thomas Kowalsick February 1994, Revised January 1999. www.cce.cornell.edu/counties/suffolk/grownet

STANDARD AND SPECIFICATIONS FOR CONCRETE TRUCK WASHOUT



Definition & Scope

A temporary excavated or above ground lined constructed pit where concrete truck mixers and equipment can be washed after their loads have been discharged, to prevent highly alkaline runoff from entering storm drainage systems or leaching into soil.

Conditions Where Practice Applies

Washout facilities shall be provided for every project where concrete will be poured or otherwise formed on the site. This facility will receive highly alkaline wash water from the cleaning of chutes, mixers, hoppers, vibrators, placing equipment, trowels, and screeds. Under no circumstances will wash water from these operations be allowed to infiltrate into the soil or enter surface waters.

Design Criteria

Capacity: The washout facility should be sized to contain solids, wash water, and rainfall and sized to allow for the evaporation of the wash water and rainfall. Wash water shall be estimated at 7 gallons per chute and 50 gallons per hopper of the concrete pump truck and/or discharging drum. The minimum size shall be 8 feet by 8 feet at the bottom and 2 feet deep. If excavated, the side slopes shall be 2 horizontal to 1 vertical.

Location: Locate the facility a minimum of 100 feet from drainage swales, storm drain inlets, wetlands, streams and other surface waters. Prevent surface water from entering the structure except for the access road. Provide appropriate access with a gravel access road sloped down to the structure. Signs shall be placed to direct drivers to the facility after their load is discharged.

Liner: All washout facilities will be lined to prevent leaching of liquids into the ground. The liner shall be plastic sheeting with a minimum thickness of 10 mils with no holes or tears, and anchored beyond the top of the pit with an earthen berm, sand bags, stone, or other structural appurtenance except at the access point.

If pre-fabricated washouts are used they must ensure the capture and containment of the concrete wash and be sized based on the expected frequency of concrete pours. They shall be sited as noted in the location criteria.

Maintenance

- All concrete washout facilities shall be inspected daily. Damaged or leaking facilities shall be deactivated and repaired or replaced immediately. Excess rainwater that has accumulated over hardened concrete should be pumped to a stabilized area, such as a grass filter strip.
- Accumulated hardened material shall be removed when 75% of the storage capacity of the structure is filled. Any excess wash water shall be pumped into a containment vessel and properly disposed of off site.
- Dispose of the hardened material off-site in a construction/demolition landfill. On-site disposal may be allowed if this has been approved and accepted as part of the projects SWPPP. In that case, the material should be recycled as specified, or buried and covered with a minimum of 2 feet of clean compacted earthfill that is permanently stabilized to prevent erosion.
- The plastic liner shall be replaced with each cleaning of the washout facility.
- Inspect the project site frequently to ensure that no concrete discharges are taking place in non-designated areas.

APPENDIX J

NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL
CONSERVATION (NYSDEC)

SPDES GENERAL PERMIT
FOR STORMWATER DISCHARGES

From

CONSTRUCTION ACTIVITY

Permit No. GP-0-25-001

Construction General Permit (CGP)

Issued Pursuant to Article 17, Titles 7, 8 and Article 70

of the Environmental Conservation Law

Effective Date: January 29, 2025 Expiration Date: January 28, 2030

Scott E. Sheeley

Chief Permit Administrator

Scott E. Sheeley JAN. 29, 2025

Authorized Signature Date

Address: NYSDEC
Division of Environmental Permits
625 Broadway, 4th Floor
Albany, N.Y. 12233-1750

PREFACE

Pursuant to Section 402 of the Clean Water Act (CWA), and 40 CFR 122.26(b)(14)(x), (15)(i), and (15)(ii), *stormwater discharges* from certain *construction activities* are unlawful unless they are authorized by a National Pollutant Discharge Elimination System (NPDES) permit or by a state permit program. New York State administers the approved State Pollutant Discharge Elimination System (SPDES) program with permits issued in accordance with the New York State Environmental Conservation Law (ECL) Article 17, Titles 7 and 8, and Article 70, as well as 6 NYCRR Parts 621 and 750.

C*onstruction activities* constitute construction of a *point source* and, therefore, pursuant to ECL sections 17-0505, 17-0701, and 17-0803, the *owner or operator* must have coverage under a SPDES permit prior to *commencement of construction activities*. The *owner or operator* cannot wait until there is an actual *discharge* from the *construction site* to obtain permit coverage.

***Note: The italicized words/phrases within this permit are defined in Appendix A.**

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
SPDES CONSTRUCTION GENERAL PERMIT (CGP) GP-0-25-001
FOR STORMWATER DISCHARGES FROM CONSTRUCTION ACTIVITIES

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Part I. How to Obtain Coverage and General Requirements

To be covered under this permit, the *owner or operator* must meet all eligibility requirements in Part I.A. and follow the requirements for obtaining permit coverage in Part I.D., F., or G.

A. Eligibility Requirements

For a *common plan of development or sale*, the *phase(s)* that meet the eligibility requirements in Part I.A. may obtain coverage under this permit even if other *phase(s)* of the same *common plan of development or sale* do not meet the eligibility requirements and require an individual SPDES permit.

1. The *owner's or operator's construction activities* involve soil disturbances of:

    a. one or more acres; or

    b. less than one acre which are part of a *common plan of development or sale* that will ultimately disturb one or more acres; or

    c. less than one acre where NYSDEC has determined that a SPDES permit is required for *stormwater discharges* based on the potential for contribution to a violation of a *water quality standard* or for significant contribution of pollutants to *surface waters of the State*.

        i. 5,000 square feet or more, but less than one acre, and are in the New York City Watershed located east of the Hudson River, Appendix C Figure 1; or

        ii. 20,000 square feet or more, but less than one acre, within the municipal boundaries of the City of New York (NYC); or

        iii. less than 20,000 square feet which are part of a *common plan of development or sale* that will ultimately disturb 20,000 square feet or more, but less than one acre, within the municipal boundaries of NYC; or

        iv. that creates 5,000 square feet or more of *impervious area* within the municipal boundaries of NYC.

2. *Discharges* from the *owner's or operator's construction activities* are/were not:

    a. already covered by a different SPDES permit; or

    b. covered under a different SPDES permit that was denied, terminated, or revoked; or

    c. identified in an expired individual SPDES permit that was not renewed; or

    d. required to obtain an individual SPDES permit or another general SPDES permit in accordance with Part VII.K.

3. If *construction activities* may adversely affect a species that is endangered or threatened, the *owner or operator* must obtain a:

    a. permit issued pursuant to 6 NYCRR Part 182 for the project; or

    b. letter issued by NYSDEC of non-jurisdiction pursuant to 6 NYCRR Part 182 for the project.

4. If *construction activities* have the potential to affect an *historic property*, the *owner or operator* must obtain one of the following:

    a. documentation that the *construction activity* is not within an archeological buffer area indicated on the sensitivity map, and that the *construction activity* is not located on or immediately adjacent to a property listed or determined to be eligible for listing on the National or State Registers of Historic Places, and that there is no new permanent building on the *construction site* within the following distances from a building, structure, or object that is more than 50 years old, or if there is such a new permanent building on the *construction site* within those parameters that NYS Office of Parks, Recreation and Historic Preservation (OPRHP), a Historic Preservation Commission of a Certified Local Government, or a qualified preservation professional has determined that the building, structure, or object more than 50 years old is not historically/archeologically significant:

        i. 1-5 acres of disturbance - 20 feet; or

        ii. 5-20 acres of disturbance - 50 feet; or

iii. 20+ acres of disturbance - 100 feet.

b. NYSDEC consultation form sent to OPRHP,[1] and copied to NYSDEC's Agency Historic Preservation Officer (APO), and

i. the State Environmental Quality Review Act (SEQR) Environmental Assessment Form (EAF) with a negative declaration or the Findings Statement, with documentation of OPRHP's agreement with the resolution; or

ii. documentation from OPRHP that the *construction activity* will result in No Impact; or

iii. documentation from OPRHP providing a determination of No Adverse Impact; or

iv. a Letter of Resolution signed by the *owner or operator*, OPRHP and the DEC APO which allows for this *construction activity* to be eligible for coverage under the general permit in terms of the State Historic Preservation Act (SHPA).

c. documentation of satisfactory compliance with Section 106 of the National Historic Preservation Act for a coterminous project area:

i. No Affect; or

ii. No Adverse Affect; or

iii. Executed Memorandum of Agreement.

d. documentation that SHPA Section 14.09 has been completed by NYSDEC or another state agency.

5. If *construction activities* are subject to SEQR, the *owner or operator* must obtain documentation that SEQR has been satisfied.

6. If *construction activities* are not subject to SEQR, but subject to the equivalent environmental review from another New York State or federal agency, the

[1] The consultation form can be submitted, along with other project information, through OPRHP's Cultural Resource Information System (CRIS) portal. If submitted through CRIS, paper copies of the consultation form need not be mailed.

owner or operator must obtain documentation that project review, pursuant to a process equivalent to SEQR from another New York State or federal agency, has been satisfied.

7. If *construction activities* require Uniform Procedures Act (UPA) Permits (see 6 NYCRR Part 621) from NYSDEC, or the equivalent from another New York State or federal agency, the *owner or operator* must:

    a. obtain all such necessary permits; or

    b. receive notification from NYSDEC pursuant to 6 NYCRR 621.3(a)(4) excepting Part I.A.7.a.

8. *Construction activities* are not eligible if they meet the following criteria in Part I.A.8.a. or b.:

    a. For linear transportation and linear utility project types, the *construction activities*:

        i. are within the watershed of *surface waters of the State* classified as AA or AA-S identified utilizing the Stormwater Interactive Map on NYSDEC's website; and

        ii. are undertaken on land with no existing *impervious cover*; and

        iii. disturb two or more acres of *steep slope*.

    b. For all other project types, the *construction activities*:

        i. are within the watershed of *surface waters of the State* classified as AA or AA-S identified utilizing the Stormwater Interactive Map on NYSDEC's website; and

        ii. are undertaken on land with no existing *impervious cover*; and

        iii. disturb one or more acres of *steep slope*.

B. Types of *Discharges* Authorized

1. The following *stormwater discharges* are authorized under this permit:

   a. *Stormwater discharges*, including *stormwater* runoff, snowmelt runoff, and surface runoff and drainage, associated with *construction activity*, are authorized under this permit provided that appropriate *stormwater* controls are designed, installed, and maintained in accordance with Part II. and Part III.

   b. *Stormwater discharges* from construction support activities at the *construction site* (including concrete or asphalt batch plants, equipment staging yards, material storage areas, excavated material disposal areas, and borrow areas) if the following requirements are met:

      i. The support activity is directly related to the *construction site* required to have permit coverage for *stormwater discharges*; and

      ii. The support activity is not a commercial operation, nor does it serve multiple unrelated *construction sites*; and

      iii. The support activity does not continue to operate beyond the completion of the *construction activity* at the site it supports; and

      iv. *Stormwater* controls are implemented in accordance with Part II. and Part III. for *discharges* from the support activity areas.

2. The following non-*stormwater discharges* associated with *construction activity* are authorized under this permit:

   a. Non-*stormwater discharges* listed in 6 NYCRR 750-1.2(a)(29)(vi), with the following exception: "*Discharges* from firefighting activities are authorized only when the firefighting activities are emergencies/unplanned"; and

   b. Non-*stormwater discharges* of waters to which other components have not been added that are used in accordance with the *SWPPP* to control dust or irrigate vegetation in stabilized areas; and

   c. Uncontaminated *discharges* from *dewatering* operations

3. Authorized *discharges* of *stormwater* or authorized *discharges* of non-*stormwater*, commingled with a *discharge* authorized by a different SPDES permit and/or a *discharge* that does not require SPDES permit authorization, are also authorized under this permit.

C. Prohibited *Discharges*

1. Non-*stormwater discharges* prohibited under this permit include but are not limited to:

    a. Wastewater from washout of concrete; and

    b. Wastewater from washout and cleanout of stucco, paint, form release oils, curing compounds, and other construction materials; and

    c. Fuels, oils, or other *pollutants* used in vehicle and equipment operation and maintenance; and

    d. Soaps, solvents, or detergents used in vehicle and equipment washing or external building washdown; and

    e. Toxic or hazardous substances from a spill or other release.

D. Electronic Notice of Intent (eNOI) Submittal

To receive authorization in accordance with Part I.D.3.b., the *owner or operator* must submit a complete eNOI in accordance with the requirements in Part I.D. The eNOI contains questions to: ensure eligibility requirements in Part I.A. have been met; obtain *owner or operator* contact information; obtain the total area to be disturbed and the existing/future *impervious areas* (rounded to the nearest tenth of an acre); confirm *Traditional Land Use Control MS4 Operator* jurisdiction over construction projects; satisfy the EPA eRule requirements; confirm that the Water Quality-Based Effluent Limitations in Part II. have been met; demonstrate consideration of the future risks due to climate change in accordance with Part III.A.2.; and confirm that the other *Stormwater Pollution Prevention Plan (SWPPP)* requirements in Part III. have been met.

1. An eNOI may be submitted for:

    a. *construction activities* that are not part of a *common plan of development or sale*; or

b. an entire *common plan of development or sale*; or

c. separate *phase(s)* of a *common plan of development or sale* if the following requirements are met:

    i. the *common plan of development or sale* meets the eligibility requirements of Part I.A.5. or 6.; and

    ii. the *phase(s)* meet(s) all other eligibility requirements of Part I.A.; and

    iii. Part III.C. Required *SWPPP* Components by Project Type is based on the *common plan of development or sale*, not the *phase(s)*; or

d. *tree clearing* that is associated with, or will support, a *renewable energy* generation, transmission, or storage project that meets Part I.A.5. and 6., if the *tree clearing*:

    i. meets all other eligibility requirements of Part I.A.; and

    ii. will occur in NYSDEC's Regions 3-9; and

    iii. is not within ¼ mile of a bat hibernaculum protected pursuant to 6 NYCRR Part 182; and

    iv. will occur between November 1st and March 31st.

2. As prerequisites for submitting an eNOI, the *owner or operator* must:

    a. prepare a *SWPPP* for Part I.D.1.a., b., c., or d. in accordance with Part III.; and

    b. based on the following criteria, upload the following signature forms signed in accordance with Part VII.J. to the eNOI prior to submission:

        i. for all eNOIs:

            1. the SWPPP Preparer Certification Form, Appendix F, signed by the *SWPPP* preparer; and

2. the Owner/Operator Certification Form, Appendix J, signed by the *owner or operator*; and

ii. if an eNOI includes *construction activities* within the municipal boundary(ies) of *Traditional Land Use Control MS4 Operator(s)* that will *discharge* to the *MS4(s)*:

1. determine if the *Traditional Land Use Control MS4 Operator(s)* have review authority. A *Traditional Land Use Control MS4 Operator* does not have review authority where:

a. the *owner or operator* of the *construction activities* in Part I.D.2.b.ii. is the same entity as the *Traditional Land Use Control MS4 Operator* identified in Part I.D.2.b.ii.; or

b. there is a statute exempting the *owner or operator* from zoning review by the *Traditional Land Use Control MS4 Operator*; or

c. there is no such statute per Part I.D.2.b.ii.1.b., the *Traditional Land Use Control MS4 Operator* concludes, after public hearing, that it does not have zoning review authority in accordance with Legal Memorandum LU14 Updated January 2020 “Governmental Immunity from Zoning and Other Legislation”; and

2. if the *Traditional Land Use Control MS4 Operator(s)* have review authority, submit the *SWPPP* to the *Traditional Land Use Control MS4 Operator(s)* for review and have:

a. if outside the municipal boundaries of NYC: the MS4 SWPPP Acceptance Form, Appendix G, signed by the principal executive officer or ranking elected official from the *Traditional Land Use Control MS4 Operator,* or by a duly authorized representative of that person in accordance with Part VII.J.2.; or

b. if within the municipal boundaries of NYC: The City of New York Department of Environmental Protection (NYCDEP) SWPPP Acceptance/Approval Form, Appendix H, signed by the principal executive officer or ranking elected official from the Traditional Land Use Control MS4 Operator, or by a duly authorized representative of that person in accordance with Part VII.J.2.; and

3. if the *Traditional Land Use Control MS4 Operator* does not have review authority, have the MS4 No Jurisdiction Form, Appendix I, signed by the principal executive officer or ranking elected official from the *Traditional Land Use Control MS4 Operator,* or by a duly authorized representative of that person in accordance with Part VII.J.2.

3. Submitting an eNOI:

a. The *owner or operator* must submit a complete Notice of Intent electronically using a NYSDEC approved form.[2]

b. The *owner or operator* is authorized to *commence construction activity* as of the authorization date indicated in the Letter of Authorization (LOA), which is sent by NYSDEC after a complete eNOI is submitted.

i. If an eNOI is received for a *SWPPP* that deviates from one of the technical standards but demonstrates *equivalence* in accordance with Part III.B.1.a.ii. or Part III.B.2.b.ii., if the *SWPPP* includes *construction activities* that are not within the municipal boundary(ies) of *Traditional Land Use Control MS4 Operator(s)*, and/or if the *SWPPP* includes *construction activities* within the municipal boundary(ies) of *Traditional Land Use Control MS4 Operator(s)* that do not have review authority in accordance with Part I.D.2.b.ii.1., the authorization date indicated in the LOA will be 60 business days after the eNOI submission date.

[2] Unless NYSDEC grants a waiver in accordance with 40 CFR 127.15(c) or (d). All waiver requests must be submitted to Stormwater_info@dec.ny.gov or NYSDEC, Bureau of Water Permits, 625 Broadway, 4th Floor, Albany, New York 12233-3505.

c. If *Traditional Land Use Control MS4 Operator(s)* have review authority in accordance with Part I.D.2.b.ii.2., the *owner or operator* must, within five business days of receipt of the LOA, send an electronic copy of the LOA to the *Traditional Land Use Control MS4 Operator(s)* with review authority.

E. General Requirements for *Owners or Operators* with Permit Coverage

1. As of the date the LOA is received, the *owner or operator* must make the eNOI, *SWPPP*, and LOA available for review and copying in accordance with the requirements in Part VII.H. When applicable, as of the date an updated LOA is received, the *owner or operator* must make the updated LOA available for review and copying in accordance with the requirements in Part VII.H.

2. The *owner or operator* must ensure compliance with all requirements of this permit and that the provisions of the *SWPPP*, including any changes made to the *SWPPP* in accordance with Part III.A.5., are properly implemented and maintained from the *commencement of construction activity* until:

   a. all areas of disturbance have achieved *final stabilization;* and

   b. the owner's or operator's coverage under this permit is terminated in accordance with Part V.A.5.a.

3. As of the date of the *commencement of construction activities* until Part I.E.2.a. and b. have been met, the *owner or operator* must maintain at the *construction site*, a copy of:

   a. all documentation necessary to demonstrate eligibility with this permit; and

   b. this permit; and

   c. the *SWPPP*; and

   d. the signed SWPPP Preparer Certification Form; and

   e. the signed MS4 SWPPP Acceptance Form or signed NYCDEP SWPPP Acceptance/Approval Form or signed MS4 No Jurisdiction Form (when applicable); and

   f. the signed Owner/Operator Certification Form; and

g. the eNOI; and

h. the LOA; and

i. the LOA transmittal to the Traditional Land Use Control MS4 Operator in accordance with Part I.D.3.c. (when applicable).

4. The *owner or operator* must maintain at the *construction site*, until Part I.E.2.a. and b. have been met, as of the date the documents become final or are received, a copy of the:

   a. responsible contractor's or subcontractor's certification statement(s) in accordance with Part III.A.7.; and

   b. inspection reports in accordance with Part IV.C.4. and 6.; and

   c. Request to Disturb Greater Than Five Acres and the Authorization Letter to Disturb Greater Than Five Acres in accordance with Part I.E.6. (when applicable); and

   d. Request to Continue Coverage and the Letter of Continued Coverage (LOCC) in accordance with Part I.F.2. and 4. (when applicable); and

   e. The updated LOA(s) in accordance with Part I.E.9. (when applicable).

5. The *owner or operator* must maintain the documents in Part I.E.3. and 4. in a secure location, such as a job trailer, on-site construction office, or mailbox with lock. The secure location must be accessible during normal business hours to an individual performing a compliance inspection. The documents must be paper documents unless electronic documents are accessible to the inspector during an inspection to the same extent as a paper copy stored at the site would be. If electronic documents are kept on site, the *owner or operator* must maintain functional equipment on site available to an inspector during normal hours of operation such that an inspector may view the electronic documents in a format that can be read in a similar manner as a paper record and in a legally dependable format with no less evidentiary value than their paper equivalent.

6. The *owner or operator* must meet the following requirements prior to disturbing greater than five acres of soil at any one time:

   a. The *owner or operator* must submit a written Request to Disturb Greater Than Five Acres to:

i. NYSDEC's Regional Office Division of Water staff based on the project location, Appendix E, if a *Traditional Land Use Control MS4 Operator* does not have review authority in accordance with Part I.D.2.b.ii.1.; or

ii. the *Traditional Land Use Control MS4 Operator*, if a *Traditional Land Use Control MS4 Operator* has review authority in accordance with Part I.D.2.b.ii.1.; or

iii. NYSDEC's Regional Office Division of Water staff based on the project location, Appendix E, and each involved *Traditional Land Use Control MS4 Operator*, if the project spans multiple municipalities with more than one *Traditional Land Use Control MS4 Operator* involved with review authority in accordance with Part I.D.2.b.ii.1.

b. The written Request to Disturb Greater Than Five Acres must include:

i. The SPDES permit identification number (Permit ID); and

ii. Full technical justification demonstrating why alternative methods of construction that would result in five acres of soil disturbance or less at any one time are not feasible; and

iii. The phasing plan for the project and sequencing plans for all *phases* from the *SWPPP* in accordance with Part III.B.1.d.; and

iv. Plans with locations and details of erosion and sediment control practices such that the heightened concern for erosion when disturbing greater than five acres at one time has been addressed; and

v. Acknowledgment that "the *owner or operator* will comply with the requirements in Part IV.C.2.b."; and

vi. Acknowledgment that "the *owner or operator* will comply with the requirements in Part II.B.1.b."

c. The *owner or operator* must be in receipt of an Authorization Letter to Disturb Greater Than Five Acres, which will include when the

authorization begins and ends and indicate a maximum area (acres) of soil disturbance allowed at any one time, from:

i. NYSDEC, if Part I.E.6.a.i. or iii. apply; or

ii. the *Traditional Land Use Control MS4 Operator*, if Part I.E.6.a.ii. applies.

7. Upon a finding of significant non-compliance with the practices described in the *SWPPP* or violation of this permit, NYSDEC may order an immediate stop to all *construction activity* at the site until the non-compliance is remedied. The stop work order must be in writing, describe the non-compliance in detail, and be sent to the *owner or operator*.

8. If any human remains or archaeological remains are encountered during excavation, the *owner or operator* must immediately cease, or cause to cease, all *construction activity* in the area of the remains and notify the appropriate Regional Water Engineer (RWE).[3] *Construction activity* shall not resume until written permission to do so has been received from the RWE.

9. To be authorized to implement modifications to the information previously submitted in the eNOI, the *owner or operator* must:

   a. notify NYSDEC via email at Stormwater_info@dec.ny.gov requesting access to update the eNOI; and

   b. update the eNOI to reflect the modifications and resubmit the eNOI in accordance with Part I.D.; and

   c. receive an updated LOA.

10. The eNOI, *SWPPP*, LOA, updated LOAs (when applicable), and inspection reports required by this permit are public documents that the *owner or operator* must make available for review and copying by any person within five business days of the *owner or operator* receiving a written request by any such person to review these documents. Copying of documents will be done at the requester's expense.

[3] The Regional Water Manager where a DEC Region does not have a RWE.

F. Permit Coverage for *Discharges* Authorized Under GP-0-20-001

When applicable:

1. Upon the effective date of this permit, an *owner or operator* of *a construction activity*, with coverage under GP-0-20-001, will have interim coverage under GP-0-25-001 for 45 calendar days starting on the effective date of GP-0-25-001 so long as the *owner or operator* maintains compliance with all applicable requirements of this permit.

2. Within 30 calendar days of the effective date of this permit, the *owner or operator*, with coverage under GP-0-20-001, must submit a complete Request to Continue Coverage electronically using a NYSDEC approved form,[4] which contains the information identified in Part I.F.3. below, if:

   a. the *owner or operator* continues to implement the SMP component in conformance with the technical standards in place at the time of initial project authorization; and

   b. the *owner or operator* will comply with all non-design requirements of GP-0-25-001.

3. The Request to Continue Coverage form contains questions to: ensure eligibility requirements in Part I.A. have been met; verify *owner or operator* contact information; verify the permit identification number; verify the original eNOI submission ID, if applicable; verify Part I.F.2.a. and b.; verify the version of the Design Manual that the technical/design components conform to; and receive an updated Owner/Operator Certification Form, Appendix I.

4. The *owner or operator* has obtained continued coverage under GP-0-25-001 as of the date indicated in the LOCC, which is sent by NYSDEC after a complete Request to Continue Coverage form is submitted.

5. If the owner or operator does not submit the Request to Continue Coverage form in accordance with Part I.F.2. and 3., coverage under this permit is automatically terminated after interim coverage expires.

[4] Unless NYSDEC grants a waiver in accordance with 40 CFR 127.15(c) or (d). All waiver requests must be submitted to Stormwater_info@dec.ny.gov or NYSDEC, Bureau of Water Permits, 625 Broadway, 4th Floor, Albany, New York 12233-3505.

G. Change of *Owner or Operator*

When applicable:

1. When property ownership changes, or when there is a change in operational control over the construction plans and specifications, the following process applies:

    a. The new *owner or operator* must meet the applicable prerequisites for submitting an eNOI in accordance with Part I.D.2.; and

    b. The new *owner or operator* must submit an eNOI in accordance with Part I.D.3.; and

    c. Permit coverage for the new *owner or operator* will be effective upon receipt of the LOA in accordance with Part I.D.3.b.; and

    d. The new *owner or operator*, upon receipt of their LOA, must provide their Permit ID to the original *owner or operator*; and

    e. If the original *owner or operator* will no longer be the *owner or operator* of the *construction activity* identified in the original *owner's or operator's* eNOI, the original *owner or operator*, upon receipt of the new *owner's or operator's* Permit ID in accordance with Part I.G.1.d., must submit to NYSDEC a completed eNOT in accordance with Part V. that includes the name and Permit ID of the new *owner or operator*; or

    f. If the original *owner or operator* maintains ownership of a portion of the *construction activity*, the original *owner or operator* must maintain their coverage under the permit by modifying their eNOI; modifications to the eNOI must include:

        i. the revised area of disturbance and/or *impervious area(s)*; and

        ii. the revised SMP information, if applicable; and

        iii. a narrative description of what has changed; and

        iv. the new *owner's or operator's* Permit ID for the portion of the project removed from the eNOI.

    Owners or operators must follow Part I.E.9. to modify the eNOI.

Part II. Water Quality-Based Effluent Limitations

A. Maintaining Water Quality

NYSDEC expects that compliance with the requirements of this permit will control *discharge*s necessary to meet applicable *water quality standard*s. It shall be a violation of the *ECL* for any *discharge* to either cause or contribute to a violation of the following *water quality standards* as contained in Parts 700 through 705 of Title 6 of the Official Compilation of Codes, Rules and Regulations of the State of New York:

1. There must be no increase in turbidity that will cause a substantial visible contrast to natural conditions; and

2. There must be no increase in suspended, colloidal or settleable solids that will cause deposition or impair the waters for their best usages; and

3. There must be no residue from oil and floating substances, nor visible oil film, nor globules of grease.

If there is evidence indicating that the *stormwater discharge*s authorized by this permit are causing, have the reasonable potential to cause, or are contributing to a violation of the *water quality standard,* the *owner or operator* must take appropriate corrective action in accordance with Part IV.C.5. of this permit and document in accordance with Part IV.C.4. of this permit. To address the *water quality standard* violation the *owner or operator* must include and implement appropriate controls in the *SWPPP* to correct the problem or obtain an individual SPDES permit.

If, despite compliance with the requirements of this permit, it is demonstrated that the *stormwater discharge*s authorized by this permit are causing or contributing to a violation of *water quality standards*, or if NYSDEC determines that a modification of this permit is necessary to prevent a violation of *water quality standards*, the authorized *discharge*s will no longer be eligible for coverage under this permit, and the *owner or operator* must obtain an individual SPDES permit prior to further *discharges* from the *construction site*.

B. Effluent Limitations Applicable to *Discharges* from *Construction Activities*

*Discharge*s authorized by this permit must achieve, at a minimum, the effluent limitations in Part II.B.1.a., b., c., d., and e. These limitations represent the

degree of effluent reduction attainable by the application of best practicable technology currently available.

1. Erosion and Sediment Control Requirements - The *owner or operator* must select, design, install, implement, and maintain control measures to *minimize* the *discharge* of *pollutants* and prevent a violation of the *water quality standards*. The selection, design, installation, implementation, and maintenance of these control measures must meet the non-numeric effluent limitations in Part II.B.1.a., b., c., d., and e. and be in accordance with the New York State Standards and Specifications for Erosion and Sediment Control (BB), dated November 2016, using sound engineering judgment. Where control measures are not designed in conformance with the design criteria included in the technical standard, the *owner or operator* must include in *SWPPP* the reason(s) for the deviation, or alternative design, and provide information in the *SWPPP* demonstrating that the deviation or alternative design is *equivalent* to the technical standard.

    a. **Erosion and Sediment Controls.** At a minimum, erosion and sediment controls must be selected, designed, installed, implemented, and maintained to:

        i. *Minimize* soil erosion through application of runoff control and soil stabilization control measure to *minimize pollutant discharge*s; and

        ii. Control *stormwater discharge*s, including both peak flow rates and total *stormwater* volume, to *minimize* channel and *streambank* erosion and scour in the immediate vicinity of the *discharge* points; and

        iii. *Minimize* the amount of soil exposed during *construction activity*; and

        iv. *Minimize* the disturbance of *steep slope*; and

        v. *Minimize* sediment *discharge*s from the site; and

        vi. Provide and maintain *natural buffers* around surface waters, direct *stormwater* to vegetated areas and maximize *stormwater* infiltration to reduce *pollutant discharge*s, unless *infeasible*; and

        vii. *Minimize* soil compaction. *Minimizing* soil compaction is not required

where the intended function of a specific area of the site dictates that it be compacted; and

viii. Unless *infeasible*, preserve a sufficient amount of topsoil to complete soil restoration and establish a uniform, dense vegetative cover; and

ix. *Minimize* dust. On areas of exposed soil, *minimize* dust through the appropriate application of water or other dust suppression techniques to control the generation of *pollutants* that could be discharged from the site.

b. **Soil Stabilization**. In areas where soil disturbance activity has ceased, whether permanently or *temporarily ceased*, the application of soil stabilization measures must be initiated by the end of the next business day and completed within 14 calendar days from the date the current soil disturbance activity ceased. For *construction sites* that *directly discharge* to one of the 303(d) segments listed in Appendix D, or are located in one of the watersheds listed in Appendix C, or are authorized to disturb greater than five acres in accordance with Part I.E.5.a.viii., the application of soil stabilization measures must be initiated by the end of the next business day and completed within seven calendar days from the date the soil disturbance activity ceased.

c. **Dewatering**. *Discharge*s from *dewatering* activities, including *discharge*s from *dewatering* of trenches and excavations, must be managed by appropriate control measures.

d. **Pollution Prevention Measures**. Select, design, install, implement, and maintain effective pollution prevention measures to *minimize* the *discharge* of *pollutants* and prevent a violation of the *water quality standards*. At a minimum, such measures must be selected, designed, installed, implemented, and maintained to:

i. *Minimize* the *discharge* of *pollutants* from equipment and vehicle washing, wheel wash water, and other wash waters. Soaps, detergents and solvents cannot be used; and

ii. *Minimize* the exposure of building materials, building products, construction wastes, trash, landscape materials, fertilizers, pesticides, herbicides, detergents, sanitary waste, hazardous and toxic waste, and other materials present on the site to precipitation

and to *stormwater*. *Minimization* of exposure is not required in cases where the exposure to precipitation and to *stormwater* will not result in a *discharge* of *pollutants*, or where exposure of a specific material or product poses little risk of *stormwater* contamination (such as final products and materials intended for outdoor use); and

iii. Prevent the *discharge* of *pollutants* from spills and leaks and implement chemical spill and leak prevention and response procedures.

e. **Surface Outlets.** When discharging from basins and impoundments, the surface outlets must be designed, constructed, and maintained in such a manner that sediment does not leave the basin or impoundment and that erosion at or below the outlet does not occur.

C. Post-Construction Stormwater Management Practice (SMP) Requirements

1. The *owner or operator* of a *construction activity* that requires post-construction SMPs, in accordance with Part III.C., must select, design, install, implement, and maintain the SMPs to meet the *performance criteria* in the New York State Stormwater Management Design Manual, dated July 31, 2024 (DM), using sound engineering judgment. Where SMPs are not designed in conformance with the *performance criteria* in the DM, the *owner or operator* must include in the *SWPPP* the reason(s) for the deviation or alternative design and provide information which demonstrates that the deviation or alternative design is *equivalent* to the technical standard.

2. The *owner or operator* of a *construction activity*, that requires SMPs in accordance with Part III.C., must design the practices to meet the applicable *sizing criteria* in Part II.C.2.a., b., c., or d.

a. Sizing Criteria for *New Development*

i. Runoff Reduction Volume (RRv) and Water Quality Volume (WQv):

1. Reduce the total WQv by application of RR techniques and standard SMPs with RRv capacity. The total WQv must be calculated in accordance with the criteria in Section 4.2 of the DM; or

2. Minimum RRv and Treatment of Remaining Total WQv: *Construction activities* that cannot meet the requirements in Part II.C.2.a.i.1. due to *site limitations* must direct runoff from all newly constructed *impervious areas* to a RR technique or standard SMP with RRv capacity unless *infeasible*. The specific *site limitations* that prevent the reduction of 100% of the WQv must be documented in the *SWPPP*. For each *impervious area* that is not directed to a RR technique or standard SMP with RRv capacity, the *SWPPP* must include documentation which demonstrates that all options were considered and for each option explains why it is considered *infeasible*.

   In no case shall the runoff reduction achieved from the newly constructed *impervious areas* be less than the Minimum RRv as calculated using the criteria in Section 4.4 of the DM. The remaining portion of the total WQv that cannot be reduced must be treated by application of standard SMPs.

ii. Channel Protection Volume (CPv): Provide 24 hour extended detention of the post-developed 1-year, 24-hour storm event, remaining after runoff reduction. Where a CPv control orifice is provided, the minimum orifice size must be 3 inches, with acceptable external trash rack or orifice protection. The CPv requirement does not apply when:

   1. Reduction of the entire CPv is achieved by application of runoff reduction techniques or infiltration systems; or

   2. The 1-year post-development peak *discharge* is less than or equal to 2.0 cfs without detention or velocity controls; or

   3. The site *directly discharges* into a fifth order or larger water body (stream, river, or lake), or tidal waters, where the increase in smaller flows will not impact the stream bank or channel integrity. However, the point of *discharge* must be adequately protected against scour and erosion by the increased peak *discharge*.

iii. *Overbank* Flood Control Criteria (Qp): Requires storage to attenuate the post-development 10-year, 24-hour peak *discharge* rate (Qp) to predevelopment rates. The Qp requirement does not apply when:

1. the site *directly discharges* to tidal waters or fifth order or larger streams, or

2. A downstream analysis reveals that *overbank* control is not required.

iv. Extreme Flood Control Criteria (Qf): Requires storage to attenuate the post-development 100-year, 24-hour peak *discharge* rate (Qf) to predevelopment rates. The Qf requirement does not apply when:

1. the site *directly discharges* to tidal waters or fifth order or larger streams, or

2. A downstream analysis reveals that *overbank* control is not required.

b. *Sizing Criteria* for *New Development* in Enhanced Phosphorus Removal Watersheds

i. Runoff Reduction Volume (RRv) and Water Quality Volume (WQv):

1. Reduce the WQv by application of RR techniques and standard SMPs with RRv capacity. The total WQv is the runoff volume from the 1-year, 24-hour design storm over the post-developed watershed and must be calculated in accordance with the criteria in Section 4.3 of the DM; or

2. Minimum RRv and Treatment of Remaining Total WQv: *Construction activities* that cannot meet the criteria in Part II.C.2.b.i.1. due to *site limitations* must direct runoff from all newly constructed *impervious areas* to a RR technique or standard SMP with RRv capacity unless *infeasible*. The specific *site limitations* that prevent the reduction of 100% of the WQv must be documented in the *SWPPP*. For each *impervious area* that is not directed to a RR technique or standard SMP with RRv capacity, the *SWPPP* must include

documentation which demonstrates that all options were considered and for each option explains why it is considered *infeasible.*

In no case shall the runoff reduction achieved from the newly constructed *impervious areas* be less than the Minimum RRv as calculated using the criteria in Section 4.5 of the DM. The remaining portion of the total WQv that cannot be reduced must be treated by application of standard SMPs.

ii. Channel Protection Volume (CPv): Provide 24 hour extended detention of the post-developed 1-year, 24-hour storm event, remaining after runoff reduction. Where a CPv control orifice is provided, the minimum orifice size must be 3 inches, with acceptable external trash rack or orifice protection. The CPv requirement does not apply when:

1. Reduction of the entire CPv is achieved by application of runoff reduction techniques or infiltration systems; or

2. The 1-year post-development peak *discharge* is less than or equal to 2.0 cfs; or

3. The site *directly discharges* to tidal waters, or a fifth order or larger water body (stream, river, or lake) where the increase in smaller flows will not impact the stream bank or channel integrity. However, the point of *discharge* must be adequately protected against scour and erosion by the increased peak *discharge*.

iii. *Overbank* Flood Control Criteria (Qp): Requires storage to attenuate the post-development 10-year, 24-hour peak *discharge* rate (Qp) to predevelopment rates. The Qp requirement does not apply when:

1. the site *directly discharges* to tidal waters or fifth order or larger streams; or

2. A downstream analysis reveals that *overbank* control is not required.

iv. Extreme Flood Control Criteria (Qf): Requires storage to attenuate the post-development 100-year, 24-hour peak *discharge* rate (Qf) to predevelopment rates. The Qf requirement does not apply when:

1. the site *directly discharges* to tidal waters or fifth order or larger streams; or

2. A downstream analysis reveals that *overbank* control is not required.

c. *Sizing Criteria* for *Redevelopment Activity*

i. Water Quality Volume (WQv): The WQv treatment objective for *redevelopment activity* must be addressed by one of the following options, as outlined in Section 9.2.1. *Redevelopment activities* located in an Enhanced Phosphorus Removal Watershed (see Part III.B.3. and Appendix C) must calculate the WQv in accordance with Section 4.3 of the DM. All other *redevelopment activities* must calculate the WQv in accordance with Section 4.2 of the DM.

1. Reduce the existing *impervious cover* by a minimum of 25% of the total disturbed, *impervious area*. The Soil Restoration criteria in Section 5.1.6 of the DM must be applied to all newly created pervious areas; or

2. Capture and treat 100% of the required WQv, for a minimum of 25% of the disturbed redevelopment *impervious area*, by implementation of standard SMPs or reduced by application of runoff reduction techniques; or

3. Capture and treat 100% of the required WQv, for a minimum of 75% of the disturbed redevelopment *impervious area*, by implementation of a volume-based alternative SMP, as defined in Section 9.4 of the DM; or

4. Capture and treat 100% of the required WQv, for a minimum of 75% of the disturbed redevelopment *impervious area*, by implementation of a flow-through alternative SMP sized to treat the peak rate of runoff from the WQv design storm; or

5. Application of a combination of 1 through 4 above that provide a weighted average of at least two of the above methods. Application of this method must be in accordance with the criteria in Section 9.2.1(A)(V) of the DM; or

6. If there is an existing SMP located on the site that captures and treats runoff from the *impervious area* that is being disturbed, the WQv treatment option selected must, at a minimum, provide treatment equal to the treatment that was being provided by the existing practice(s) if that treatment is greater than the treatment required by options 1 through 5 above.

ii. Channel Protection Volume (CPv) is not required if there is 0% change to hydrology that increases the *discharge* rate and volume from the project site.

iii. *Overbank* Flood Control (Qp) is not required if there is 0% change to hydrology that increases the *discharge* rate from the project site.

iv. Extreme Flood Control (Qf) is not required if there is 0% change to hydrology that increases the *discharge* rate from the project site.

d. *Sizing Criteria* for Combination of *Redevelopment Activity* and *New Development*

Construction projects, that include both *new development* and *redevelopment activity*, must use SMPs that meet the *sizing criteria* calculated as an aggregate of the *sizing criteria* in Part II.C.2.a. or b. for the *new development* portion of the project and Part II.C.2.c. for the *redevelopment activity* portion of the project.

Part III. Stormwater Pollution Prevention Plan (SWPPP)

A. General *SWPPP* Requirements

1. A *SWPPP* must be prepared and implemented by the *owner or operator* of all *construction activity* covered by this permit. All authorized *discharges* must be identified in the *SWPPP*. The *SWPPP* must document the selection, design, installation, implementation and maintenance of the control measures and

practices that will be used to meet the effluent limitations in Part II.B. and, where applicable, the SMP requirements in Part II.C.

2. The *SWPPP* must demonstrate consideration in narrative format of the future physical risks due to climate change pursuant to the Community Risk and Resiliency Act (CRRA), 6 NYCRR Part 490, and associated guidance.

    a. The owner or operator must consider:

        i. the following physical risks due to climate change:

            (i) increasing temperature; and

            (ii) increasing precipitation; and

            (iii) increasing variability in precipitation, including chance of drought; and

            (iv) increasing frequency and severity of flooding; and

            (v) rising sea level; and

            (vi) increasing storm surge; and

            (vii) shifting ecology.

        ii. for each of the following:

            (i) overall site planning; and

            (ii) location, elevation, and sizing of:

                a. control measures and practices; and

                b. conveyance system(s); and

                c. detention system(s).

3. The *SWPPP* must describe the erosion and sediment control practices and where required, SMPs that will be used and/or constructed to reduce the *pollutants* in *stormwater discharges* and to assure compliance with the

requirements of this permit. In addition, the *SWPPP* must identify potential sources of pollution which may reasonably be expected to affect the quality of *stormwater discharges*.

4. All *SWPPPs*, that require the SMP component in accordance with Part III.B.2., must be prepared by a *qualified professional*.

5. The *owner or operator* must keep the *SWPPP* current so that, at all times, it accurately documents the erosion and sediment control practices that are being used or will be used during construction, and all SMPs that will be constructed on the site. At a minimum, the *owner or operator* must modify the *SWPPP*, including construction drawings:

   a. whenever the current provisions prove to be ineffective in *minimizing pollutants* in *stormwater discharges* from the site; and

   b. whenever there is a change in design, construction, or operation at the *construction site* that has or could have an effect on the *discharge* of *pollutants*; and

   c. to address issues or deficiencies identified during an inspection by the *qualified inspector,* NYSDEC, or other regulatory authority; and

   d. to document the final construction conditions in an as-built drawing.

6. NYSDEC may notify the *owner or operator* at any time that the *SWPPP* does not meet one or more of the minimum requirements of this permit. The notification must be in writing and identify the provisions of the *SWPPP* that require modification. Within fourteen (14) calendar days of such notification, or as otherwise indicated by NYSDEC, the *owner or operator* must make the required changes to the *SWPPP* and submit written notification to NYSDEC that the changes have been made. If the *owner or operator* does not respond to NYSDEC's comments in the specified time frame, NYSDEC may suspend the *owner's or operator's* coverage under this permit or require the *owner or operator* to obtain coverage under an individual SPDES permit in accordance with Part II.D.4.

7. Prior to the *commencement of construction activity*, the *owner or operator* must identify the contractor(s) and subcontractor(s) that will be responsible for installing, constructing, repairing, replacing, inspecting, and maintaining the erosion and sediment control practices included in the *SWPPP* and the

contractor(s) and subcontractor(s) that will be responsible for constructing the SMPs included in the *SWPPP*. The *owner or operator* must have each of the contractors and subcontractors identify at least one person from their company to be *trained contractor* that will be responsible for implementation of the *SWPPP*. The *owner or operator* must ensure that at least one *trained contractor* is on site daily when soil disturbance activities are being performed.

The *owner or operator* must have each of the contractors and subcontractors identified above sign a copy of the following certification statement below before the *commencement of construction activities*:

> "I hereby certify under penalty of law that I understand and agree to comply with the requirements of the *SWPPP* and agree to implement any corrective actions identified by the *qualified inspector* during a site inspection. I also understand that the *owner or operator* must comply with the requirements of the most current version of the New York State Pollutant Discharge Elimination System (SPDES) Construction General Permit (CGP) for Stormwater Discharges from Construction Activities and that it is unlawful for any person to cause or contribute to a violation of *water quality standards*. Furthermore, I am aware that there are significant penalties for submitting false information, that I do not believe to be true, including the possibility of fine and imprisonment for knowing violations"

In addition to providing the certification statement above, the certification page must also identify the specific elements of the *SWPPP* that each contractor and subcontractor will be responsible for and include the name and title of the person providing the signature; the name and title of the *trained contractor* responsible for *SWPPP* implementation; the name, address and telephone number of the contracting firm; the address (or other identifying description) of the site; and the date the certification statement is signed. The *owner or operator* must attach the certification statement(s) to the copy of the *SWPPP* that is maintained at the *construction site*. If new or additional contractors are hired to implement measures identified in the *SWPPP* after the *commencement of construction activities*, they must also sign the certification statement and provide the information listed above prior to performing *construction activities*.

B. Required *SWPPP* Contents

1. Erosion and sediment control component - The *owner or operator* must prepare a *SWPPP* that includes erosion and sediment control practices.

    a. Erosion and sediment control practices must be designed:

        i. in conformance with the BB; or

        ii. *equivalent* to the BB if deviating from Part III.B.1.a.i.

    b. If the erosion and sediment control practices are designed in conformance with Part III.B.1.a.ii., the *SWPPP* must include a demonstration of *equivalence* to the BB.

    c. At a minimum, the erosion and sediment control component of the *SWPPP* must include the following:

        i. Background information about the scope of the project, including the location, type and size of project; and

        ii. A site map/construction drawing(s) with north arrows for the project, including a general location map. At a minimum, the site map must show the total site area; all improvements; areas of disturbance; areas that will not be disturbed; existing vegetation; on-site and adjacent off-site surface water(s); floodplain/floodway boundaries; wetlands and drainage patterns that could be affected by the *construction activity*; existing and final contours; locations of different soil types with boundaries; material, waste, borrow or equipment storage areas located on adjacent properties; and location(s) of the *stormwater discharge*(s) and receiving surface water(s); and

        iii. A description of the soil(s) present at the site, including an identification of the Hydrologic Soil Group (HSG); and

        iv. A phasing plan for the project and sequencing plans for all *phases*, both of which must address clearing and grubbing, excavation and grading, utility and infrastructure installation, *final stabilization*,

and any other *construction activity* at the site that will result in soil disturbance.

1. The phasing plan must include:

    a. a map delineating and labeling the limits of soil disturbance for all *phases* of a project; and

    b. a table identifying the order and intended schedule of when each *phase* will begin and end its sequencing plan. The table must identify the total disturbed area for each *phase* at any one time and the total disturbed area for the overall project at any one time all on one timeline showing all overlapping quantities of disturbed area at any one time; and

2. A sequencing plan for a specific *phase* must include:

    a. a table indicating the order and intended schedule of *construction activities* within a *phase*, and corresponding construction drawings with a description of the work to be performed; and

    b. all permanent and *temporary stabilization* measures; and

v. A description of the minimum erosion and sediment control practices to be installed or implemented for each *construction activity* that will result in soil disturbance. Include a schedule that identifies the timing of initial placement or implementation of each erosion and sediment control practice and the minimum time frames that each practice should remain in place or be implemented; and

vi. A site map/construction drawing(s) showing the specific location(s), size(s), and length(s) of each erosion and sediment control practice; and

vii. The dimensions, material specifications, installation details, and operation and maintenance requirements for all erosion and sediment control practices. Include the location and sizing of any

temporary sediment basins and structural practices that will be used to divert flows from exposed soils; and

viii. A maintenance inspection schedule for the contractor(s) and subcontractor(s) identified in Part III.A.7. to ensure continuous and effective operation of the erosion and sediment control practices. The maintenance inspection schedule must be in accordance with the requirements in the BB technical standard; and

ix. A description of the pollution prevention measures that will be used to control litter, construction chemicals and construction debris from becoming a *pollutant* source in the *stormwater discharges*; and

x. A description and location of any *stormwater discharges* associated with industrial activity other than construction at the site, including, but not limited to, *stormwater discharges* from asphalt plants and concrete plants located on the *construction site*; and

xi. Identification of any elements of the design that are not in conformance with the design criteria in the BB technical standard. Include the reason for the deviation or alternative design and provide information which demonstrates that the deviation or alternative design is *equivalent* to the technical standard.

2. SMP component – The *owner or operator* of *construction activity* identified in Table 2 of Appendix B must prepare a *SWPPP* that includes SMPs.

   a. SMPs must be designed in conformance with the applicable *sizing criteria* in Part II.C.2.a., c., or d.; and

   b. SMPs must be designed in conformance with the *performance criteria*:

      i. in the DM; or

      ii. *equivalent* to the DM if deviating from Part III.B.2.b.i.; or

      iii. in the New York State Stormwater Management Design Manual, dated January 2015 (2015 Design Manual), or *equivalent* to it, if the following criteria are met:

1. The eNOI is submitted in accordance with Part I.D. before January 29, 2027 for *construction activities* that are either:

    a. subject to governmental review and approval:

        i. where the *owner or operator* made any application to that governmental entity prior to the effective date of this permit; and

        ii. such application included a *SWPPP* developed using the 2015 Design Manual or *equivalent* to it; or

    b. not subject to governmental review and approval:

        i. where a fiscal allocation for the *construction activities* has been developed and approved by a governmental entity; and

        ii. the *SWPPP* was developed using the 2015 Design Manual or *equivalent* to it; and

c. If SMPs are designed in conformance with Part III.B.2.b.ii., the *SWPPP* must include the reason(s) for the deviation or alternative design and a demonstration of *equivalence* to the DM; and

d. If SMPs are designed in conformance with Part III.B.2.b.iii., the *SWPPP* must include supporting information or documentation demonstrating that Part III.B.2.b.iii.1.a. or b. apply; and

e. The SMP component of the *SWPPP* must include the following:

    i. Identification of all SMPs to be constructed as part of the project, including which option the SMP designs conform to, either Part III.B.2.b.i., ii., or iii. Include the dimensions, material specifications and installation details for each SMP; and

    ii. A site map/construction drawing(s) showing the specific location and size of each SMP; and

iii. A Stormwater Modeling and Analysis Report that includes:

(i) Map(s) showing pre-development conditions, including watershed/subcatchments boundaries, flow paths/routing, and design points; and

(ii) Map(s) showing post-development conditions, including watershed/subcatchments boundaries, flow paths/routing, design points and SMPs; and

(iii) Results of *stormwater* modeling (i.e. hydrology and hydraulic analysis) for the required storm events. Include supporting calculations (model runs), methodology, and a summary table that compares pre- and post-development runoff rates and volumes for the different storm events; and

(iv) Summary table, with supporting calculations, which demonstrates that each SMP has been designed in conformance with the *sizing criteria* included in the DM; and

(v) Identification of any *sizing criteria* that is not required based on the requirements included in Part II.C.; and

(vi) Identification of any elements of the design that are not in conformance with the *performance criteria* in the DM. Include the reason(s) for the deviation or alternative design and provide information which demonstrates that the deviation or alternative design is *equivalent* to the DM.

iv. Soil testing results and locations (test pits, borings); and

v. Infiltration test results, when required in accordance with Part III.B.2.a.; and

vi. An operations and maintenance plan that includes inspection and maintenance schedules and actions to ensure continuous and effective operation of each SMP. The plan must identify the entity

that will be responsible for the long-term operation and maintenance of each practice; and

3. Enhanced Phosphorus Removal Standards - The *owner or operator* of *construction activity* identified in Table 2 of Appendix B that is located in a watershed identified in Appendix C must prepare a *SWPPP* that includes SMPs designed in conformance with the applicable *sizing criteria* in Part II.C.2.b., c., or d. and the *performance criteria* Enhanced Phosphorus Removal Standards included in the DM. At a minimum, the SMP component of the *SWPPP* must meet the requirements of Part III.B.2.

C. Required *SWPPP* Components by Project Type

Owners or operators of *construction activities*, identified in Table 1 of Appendix B, are required to prepare a *SWPPP* that only includes erosion and sediment control practices designed in accordance with Part III.B.1. *Owners or operators* of the *construction activities*, identified in Table 2 of Appendix B, must prepare a *SWPPP* that also includes SMPs designed in accordance with Part III.B.2 or 3.

For the entire area of disturbance, including the entire *common plan of development or sale* if applicable, the owner or operator must evaluate every bullet from Appendix B Table 1 and Table 2 separately. If bullets from both Table 1 and Table 2 apply, the *SWPPP* must include erosion and sediment control practices for all *construction activities* but SMPs for only those portions of the *construction activities* that fall under Table 2 bullet(s).

Part IV. Inspection and Maintenance Requirements

A. General Construction Site Inspection and Maintenance Requirements

1. The *owner or operator* must ensure that all erosion and sediment control practices (including pollution prevention measures), and all SMPs identified in the *SWPPP*, are inspected and maintained in accordance with Part IV.B. and C.

B. Contractor Maintenance Inspection Requirements

1. The *owner or operator* of each *construction activity*, identified in Tables 1 and 2 of Appendix B, must have a *trained contractor* inspect the erosion and sediment control practices and pollution prevention measures being

implemented within the active work area daily to ensure that they are being maintained in effective operating condition at all times. If deficiencies are identified, the contractor must:

a. if the corrective action does not require engineering design:

    i. begin implementing corrective actions within one business day; and

    ii. complete the corrective actions within five business days; or

b. if the corrective action requires engineering design:

    i. begin the engineering design process within five business days; and

    ii. complete the corrective action in a reasonable time frame but no later than within 60 calendar days.

2. For *construction sites* where soil disturbance activities have been temporarily suspended (e.g. winter shutdown) and *temporary stabilization* measures have been applied to all disturbed areas, the *trained contractor* can stop conducting the maintenance inspections in accordance with Part IV.B.1. The *trained contractor* must begin conducting the maintenance inspections in accordance with Part IV.B.1. as soon as soil disturbance activities resume.

3. For *construction sites* where soil disturbance activities have been shut down with partial project completion, the *trained contractor* can stop conducting the maintenance inspections in accordance with Part IV.B.1. if all areas disturbed as of the project shutdown date have achieved *final stabilization* and all SMPs required for the completed portion of the project have been constructed in conformance with the *SWPPP* and are operational.

C. *Qualified Inspector* Inspection Requirements

1. With the exception of the following *construction activities* identified in Tables 1 and 2 of Appendix B, a *qualified inspector* must conduct site inspections for all other *construction activities* identified in Tables 1 and 2 of Appendix B:

    a. the construction of a single-family residential subdivision with 25% or less *impervious cover* at total site build-out that involves a soil disturbance of one (1) or more acres of land but less than or equal to five (5) acres and is

not located in one of the watersheds listed in Appendix C and not *directly discharging* to one of the 303(d) segments listed in Appendix D; and

b. the construction of a single-family home that involves soil disturbances of one (1) or more acres but less than or equal to five (5) acres and is not located in one of the watersheds listed in Appendix C and not *directly discharging* to one of the 303(d) segments listed in Appendix D; and

c. construction on *agricultural property* that involves soil disturbances of one (1) or more acres but less than five (5) acres; and

d. *construction activities* located in the New York City Watershed located east of the Hudson River, see Appendix C Figure 1, that involve soil disturbances of 5,000 square feet or more, but less than one acre.

2. The *qualified inspector* must conduct site inspections in accordance with the following timetable:

a. For *construction sites* where soil disturbance activities are on-going, the *qualified inspector* must conduct a site inspection at least once every seven (7) calendar days; or

b. For *construction sites* where soil disturbance activities are on-going and the *owner or operator* has received authorization in accordance with Part I.E.6. to disturb greater than five (5) acres of soil at any one time, the *qualified inspector* must conduct at least two (2) site inspections every seven (7) calendar days. The two (2) inspections must be separated by a minimum of two (2) full calendar days; or

c. For *construction sites* where soil disturbance activities have been temporarily suspended (e.g. winter shutdown) and *temporary stabilization* measures have been applied to all disturbed areas, the *qualified inspector* must conduct a site inspection at least once every thirty (30) calendar days. The *owner or operator* must notify the DOW Water (SPDES) Program contact at the Regional Office (see contact information in Appendix E) or, in areas under the jurisdiction of a *Traditional Land Use Control MS4 Operator,* the *Traditional Land Use Control MS4 Operator* (provided the *Traditional Land Use Control MS4 Operator* is not the *owner or operator* of the *construction activity*) by hard copy or email prior to reducing the inspections to this frequency and again by hard copy or email prior to re-commencing construction; or

d. For *construction sites* where soil disturbance activities have been shut down with partial project completion, the requirement to have the *qualified inspector* conduct inspections ceases if all areas disturbed as of the project shutdown date have achieved *final stabilization* and all SMPs required for the completed portion of the project have been constructed in conformance with the *SWPPP* and are operational. The *owner or operator* must notify the DOW Water (SPDES) Program contact at the Regional Office (see contact information in Appendix E) or, in areas subject to the review authority of *Traditional Land Use Control MS4 Operator(s)* in accordance with Part I.D.2.b.ii.1., the *Traditional Land Use Control MS4 Operator(s)* (provided the *Traditional Land Use Control MS4 Operator(s)* are not the *owners or operators* of the *construction activity*) in writing prior to the shutdown and again in writing prior to resuming *construction activity*. If soil disturbance activities are not resumed within 2 years from the date of shutdown, the *owner or operator* must terminate coverage by meeting the requirements of Part V; or

e. For *construction sites* involving soil disturbance of one (1) or more acres that *directly discharge* to one of the 303(d) segments listed in Appendix D or is located in one of the watersheds listed in Appendix C, the *qualified inspector* must conduct at least two (2) site inspections every seven (7) calendar days. The two (2) inspections must be separated by a minimum of two (2) full calendar days.

3. At a minimum, the *qualified inspector* must inspect:

   a. all erosion and sediment control practices and pollution prevention measures to ensure integrity and effectiveness; and

   b. all SMPs under construction to ensure that they are constructed in conformance with the *SWPPP*; and

   c. all areas of disturbance that have not achieved *final stabilization*; and

   d. all points of *discharge* to *surface waters of the State* located within, or immediately adjacent to, the property boundaries of the *construction site*; and

   e. all points of *discharge* from the *construction site*.

4. The *qualified inspector* must prepare an inspection report subsequent to each and every inspection. At a minimum, the inspection report must include and/or address all of the following, for all *construction activities* except those listed in Part IV.C.1.:

   a. Permit identification number; and

   b. Date and time of inspection; and

   c. Name and title of person(s) performing inspection; and

   d. A description of the weather and soil conditions (e.g. dry, wet, saturated) at the time of the inspection, including the temperature at the time of the inspection; and

   e. A description of the condition of the runoff at all points of *discharge* from the *construction site*. This must include identification of any *discharges* of sediment from the *construction site*. Include *discharges* from conveyance systems (i.e. pipes, culverts, ditches, etc.) and overland flow; and

   f. A description of the condition of all *surface waters of the State* located within, or immediately adjacent to, the property boundaries of the *construction site* which receive runoff from disturbed areas. This must include identification of any *discharges* of sediment to the *surface waters of the State*; and

   g. Identification of all erosion and sediment control practices and pollution prevention measures that need repair or maintenance; and

   h. Identification of all erosion and sediment control practices and pollution prevention measures that were not installed properly or are not functioning as designed and need to be reinstalled or replaced; and

   i. Description and sketch (map) of areas with active soil disturbance activity, areas that have been disturbed but are inactive at the time of the inspection, and areas that have been stabilized (temporary and/or final) since the last inspection; and

   j. Estimates, in square feet or acres, of the following areas:

i. Total area with active soil disturbance (not requiring either *temporary stabilization* or *final stabilization*); and

ii. Total area with inactive soil disturbance (requiring either *temporary stabilization* or *final stabilization*); and

iii. Total area that has achieved *temporary stabilization*; and

iv. Total area that has achieved *final stabilization*; and

k. Current stage of construction of all SMPs and identification of all *construction activity* on site that is not in conformance with the *SWPPP* and technical standards; and

l. Corrective action(s) that must be taken to install, repair, replace or maintain erosion and sediment control practices and pollution prevention measures; and to correct deficiencies identified with the construction of the SMP(s); and

m. Identification and status of all corrective actions that were required by previous inspection; and

n. Digital photographs, with date stamp, that clearly show the condition of all practices that have been identified as needing corrective actions. The *qualified inspector* must attach color copies of the digital photographs to the inspection report being maintained onsite within seven (7) calendar days of the date of the inspection. The *qualified inspector* must also take digital photographs, with date stamp, that clearly show the condition of the practice(s) after the corrective action has been completed. The *qualified inspector* must attach paper color copies of the digital photographs to the inspection report that documents the completion of the corrective action work within seven (7) calendar days of that inspection.

5. Within one business day of the completion of an inspection, the *qualified inspector* must notify the *owner or operator*, and appropriate contractor or subcontractor identified in Part III.A.7., of any corrective actions that need to be taken. The contractor or subcontractor must:

a. if the corrective action does not require engineering design:

i. begin implementing corrective actions within one business day; and

ii. complete the corrective actions within five business days; or

b. if the corrective action requires engineering design:

i. begin the engineering design process within five business days; and

ii. complete the corrective action in a reasonable time frame but no later than within 60 calendar days.

6. All inspection reports must be signed by the *qualified inspector.* In accordance with Part I.E.3., the inspection reports must be maintained on site with the *SWPPP*.

Part V. How to Terminate CGP Coverage

A. Electronic Notice of Termination (eNOT) Submittal

The eNOT contains questions to ensure requirements in Part V.A. have been met.

1. An *owner or operator* must terminate coverage when one or more of the following requirements have been met:

a. Total project completion:

i. all *construction activity* identified in the *SWPPP* has been completed; and

ii. all areas of disturbance have achieved *final stabilization*; and

iii. all temporary, structural erosion and sediment control measures have been removed; and

iv. all SMPs have been constructed in conformance with the *SWPPP* and are operational; and

v. an as-built drawing has been prepared; or

b. Planned shutdown with partial project completion:

   i. all soil disturbance activities have ceased; and

   ii. all areas disturbed as of the project shutdown date have achieved *final stabilization*; and

   iii. all temporary, structural erosion and sediment control measures have been removed; and

   iv. all SMPs required for the completed portion of the project have been constructed in conformance with the *SWPPP* and are operational; and

   v. an as-built drawing has been prepared; or

c. In accordance with Part I.G. Change of Owner or Operator; or

d. The *owner or operator* has obtained coverage under an alternative general SPDES permit or an individual SPDES permit.

2. For *construction activities* that require *qualified inspector* inspections in accordance with Part IV.C.1. and have met Part V.A.1.a. or b., the *owner or operator* must have the *qualified inspector* perform a final site inspection prior to submitting the eNOT. The *qualified inspector* must, by signing the "Final Stabilization" and "Post-Construction Stormwater Management Practice(s)" certification statements on the eNOT, certify that all the requirements in Part V.A.1.a. or b. have been achieved.

3. For *construction activities* that are subject to the review authority of *Traditional Land Use Control MS4 Operator(s)* in accordance with Part I.D.2.b.ii.1. and meet Part V.A.1.a. or b., the *owner or operator* must have the *Traditional Land Use Control MS4 Operator(s)* sign the "MS4 Acceptance" statement on the eNOT in accordance with the requirements in Part VII.J. A *Traditional Land Use Control MS4 Operator* official, by signing this statement, determined that it is acceptable for the *owner or operator* to submit the eNOT in accordance with the requirements of this Part. A *Traditional Land Use Control MS4 Operator* can make this determination by performing a final site inspection themselves or by accepting the *qualified inspector*'s final site inspection certification(s) when required in Part V.A.2.

4. For *construction activities* that require SMPs and meet Part V.A.1.a. or b., the *owner or operator* must, prior to submitting the eNOT, ensure one of the following:

    a. for SMP(s) that were constructed by a private entity, but will be owned, operated, and maintained by a public entity, the SMP(s) and any right-of-way(s) needed to operate and maintain such practice(s) have been deeded to the municipality in which the practice(s) is located; or

    b. for SMP(s) that are privately owned, but will be operated and maintained by a public entity, an executed operation and maintenance agreement is in place with the municipality that will operate and maintain the SMP(s); or

    c. for SMP(s) that are privately owned, the *owner or operator* has a mechanism in place that requires operation and maintenance of the practice(s) in accordance with the operation and maintenance plan, such as a deed covenant in the *owner or operator's* deed of record; or

    d. for SMP(s) that are owned by a public or private institution (e.g. school, university, hospital), government agency or authority, or public utility, the *owner or operator* has policies and procedures in place that ensure operation and maintenance of the practices in accordance with the operation and maintenance plan.

5. An *owner or operator* that has met the requirements of Part V.A.1., 2., 3., and 4. must request termination of coverage under this permit by submitting a complete Notice of Termination form electronically using a NYSDEC approved form.[5]

    a. The owner's or operator's coverage is terminated as of the termination date indicated in the Letter of Termination (LOT), which is sent by NYSDEC after a complete eNOT is submitted.

[5] Unless NYSDEC grants a waiver in accordance with 40 CFR 127.15(c) or (d). All waiver requests must be submitted to Stormwater_info@dec.ny.gov or NYSDEC, Bureau of Water Permits, 625 Broadway, 4th Floor, Albany, New York 12233-3505.

Part VI. Record Retention and Reporting

A. Record Retention

The *owner or operator* must retain a copy of the documents listed in Part I.E.3. and a copy of the LOT for a period of at least five years from the date that NYSDEC accepts a complete NOT submitted in accordance with Part V.

B. Reporting

Except for the eNOI, the signature forms associated with the eNOI, and the eNOT, all other written correspondence requested by NYSDEC, including individual permit applications, must be sent to the address of the appropriate DOW (SPDES) Program contact at the Regional Office listed in Appendix E.

Part VII. Standard Permit Requirements

For the purposes of this permit, examples of contractors and subcontractors include: third-party maintenance and construction contractors.

A. Duty to Comply

The *owner or operator*, and all contractors or subcontractors, must comply with all requirements of this permit. Any non-compliance with the requirements of this permit constitutes a violation of the New York State Environmental Conservation Law (ECL), and its implementing regulations, and is grounds for enforcement action. Filing of a request for termination of coverage under this permit, or a notification of planned changes or anticipated non-compliance, does not limit, diminish or stay compliance with any requirements of this permit.

B. Need to Halt or Reduce Activity Not a Defense

The necessity to halt or reduce the *construction activity* regulated by this permit, in order to maintain compliance with the requirements of this permit, must not be a defense in an enforcement action.

C. Penalties

There are substantial criminal, civil, and administrative penalties associated with violating the requirements of this permit. Fines of up to $37,500 per day for each

violation and imprisonment for up to 15 years may be assessed depending upon the nature and degree of the offense.

D. False Statements

Any person who knowingly makes any false material statement, representation, or certification in any application, record, report, or other document filed or required to be maintained under this permit, including monitoring reports or reports of compliance or noncompliance must, upon conviction, be punished in accordance with ECL §71-1933 and or New York State Penal Law Articles 175 and 210.

E. Re-Opener Clause

Upon issuance of this permit, a determination has been made on the basis of a submitted Notice of Intent, plans, or other available information, that compliance with the specified permit requirements will reasonably protect classified water use and assure compliance with applicable *water quality standards*. Satisfaction of the requirements of this permit notwithstanding, if operation pursuant to this permit causes or contributes to a condition in contravention of State *water quality standards* or guidance values, or if NYSDEC determines that a modification is necessary to prevent impairment of the best use of the waters or to assure maintenance of *water quality standards* or compliance with other provisions of ECL Article 17 or the Clean Water Act (CWA), or any regulations adopted pursuant thereto, NYSDEC may require such modification and the Commissioner may require abatement action to be taken by the *owner or operator* and may also prohibit such operation until the modification has been implemented.

F. Duty to Mitigate

The *owner or operator*, and its contractors and subcontractors, must take all reasonable steps to *minimize* or prevent any *discharge* in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment.

G. Requiring Another General Permit or Individual SPDES Permit

NYSDEC may require any *owner or operator* authorized to *discharge* in accordance with this permit to apply for and obtain an individual SPDES permit or apply for authorization to *discharge* in accordance with another general SPDES permit.

1. Cases where an individual SPDES permit or authorization to discharge in accordance with another general SPDES permit may be required include, but is not limited to the following:

a. the *owner or operator* is not in compliance with the conditions of this permit or does not meet the requirements for coverage under this permit; and

b. a change has occurred in the availability of demonstrated technology or practices for the control or abatement of *pollutants* applicable to the *point source*; and

c. new effluent limitation guidelines or new source performance standards are promulgated that are applicable to *point sources* authorized to *discharge* in accordance with this permit; and

d. existing effluent limitation guidelines or new source performance standards that are applicable to *point sources* authorized to *discharge* in accordance with this permit are modified; and

e. a water quality management plan containing requirements applicable to such *point sources* is approved by NYSDEC; and

f. circumstances have changed since the time of the request to be covered so that the *owner or operator* is no longer appropriately controlled under this permit, or either a temporary or permanent reduction or elimination of the authorized *discharge* is necessary; and

g. the *discharge* is in violation of section 17-0501 of the ECL; and

h. the *discharge(s)* is a significant contributor of *pollutants*. In making this determination, NYSDEC may consider the following factors:

   i. the location of the *discharge(s)* with respect to *surface waters of the State*; and

   ii. the size of the *discharge(s)*; and

   iii. the quantity and nature of the *pollutants discharged* to *surface waters of the State*; and

   iv. other relevant factors including compliance with other provisions of ECL Article 17, or the CWA.

2. When NYSDEC requires any *owner or operator* authorized by this permit to apply for an individual SPDES permit as provided for in this subdivision, it must notify the *owner or operator* in writing that a permit application is required. This notice must include a brief statement of the reasons for this decision, an application

form, a statement setting a time for the *owner or operator* to file the application for an individual SPDES permit, and a deadline, not sooner than 180 days from the *owner's or operator's* receipt of the notification letter, whereby the authorization to *discharge* under this permit must be terminated. NYSDEC may grant additional time upon demonstration, to the satisfaction of the RWE,[6] that additional time to apply for an alternative authorization is necessary or where NYSDEC has not provided a permit determination in accordance with 6 NYCRR Part 621.

3. When an individual SPDES permit is issued to an *owner or operator* authorized to *discharge* under this permit for the same *discharge(s)*, this permit authorization for *construction activities* authorized under the individual SPDES permit is automatically terminated on the effective date of the individual SPDES permit unless termination is earlier in accordance with 6 NYCRR Part 750.

H. Duty to Provide Information

The *owner or operator* must furnish to NYSDEC, within five business days, unless otherwise set forth by NYSDEC, any information that NYSDEC may request to determine whether cause exists to determine compliance with this permit or to determine whether cause exists for requiring an individual SPDES permit in accordance with 6 NYCRR 750-1.21(e) (see Part VII.G. Requiring Another General Permit or Individual Permit).

The *owner or operator* must make available to NYSDEC, for inspection and copying, or furnish to NYSDEC within 25 business days of receipt of a NYSDEC request for such information, any information retained in accordance with this permit.

Except for Part I.D.4. and 5. and Part I.G., the following applies: where the *owner or operator* becomes aware that it failed to submit any relevant facts on the Notice of Intent, or submitted incorrect information in a Notice of Intent or in any report to NYSDEC, the *owner or operator* must submit such facts or corrected information to NYSDEC within five business days.

I. Extension

In the event a new permit is not issued and effective prior to the expiration of this permit, and this permit is extended pursuant to the State Administrative Procedure Act and 6 NYCRR Part 621, then the *owner or operator* with coverage under this permit may continue to operate and *discharge* in accordance with the requirements of this permit until a new permit is issued and effective.

[6] The Regional Water Manager where a DEC Region does not have a RWE.

J. Signatories and Certification

The Notice of Intent, Notice of Termination, and reports required by this permit must be signed as provided in 40 CFR §122.22.

1. All Notices of Intent and Notices of Termination must be signed as follows:

    a. For a corporation. By a responsible corporate officer. For the purpose of this section, a responsible corporate officer means:

        (i) a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy- or decision-making functions for the corporation; or

        (ii) the manager of one or more manufacturing, production or operating facilities, provided, the manager is authorized to make management decisions which govern the operation of the regulated facility including having the explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive measures to assure long term environmental compliance with environmental laws and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for Notice of Intent or Notice of Termination requirements; and where authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.

        Note: NYSDEC does not require specific assignments or delegations of authority to responsible corporate officers identified in 40 CFR §122.22(a)(1)(i). NYSDEC will presume that these responsible corporate officers have the requisite authority to sign the Notice of Intent or Notice of Termination unless the corporation has notified NYSDEC to the contrary. Corporate procedures governing authority to sign a Notice of Intent or Notice of Termination may provide for assignment or delegation to applicable corporate positions under 40 CFR §122.22(a)(1)(ii) rather than to specific individuals.

    b. For a partnership or sole proprietorship. By a general partner or the proprietor, respectively.

c. For a municipality, State, Federal, or other public agency. By either a principal executive officer or ranking elected official. For purposes of this section, a principal executive officer of a Federal agency includes:

    1. the chief executive officer of the agency; or

    2. a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., Regional Administrators of EPA).

2. All reports required by this permit, and other information requested by NYSDEC, must be signed by a person described in Part VII.J.1., or by a duly authorized representative of that person. A person is a duly authorized representative only if:

    a. The authorization is made in writing by a person described in Part VII.J.1. or using the Duly Authorized Form, found on the DEC website; and

    b. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the company. (A duly authorized representative may thus be either a named individual or any individual occupying a named position); and

    c. The written authorization is submitted to NYSDEC.

3. Changes to authorization. If an authorization under Part VII.J.2. is no longer accurate because a different individual or position has responsibility for the overall operation of the *construction activity*, a new authorization satisfying the requirements of Part VII.J.2. must be submitted to NYSDEC prior to or together with any reports, information, or applications to be signed by an authorized representative.

4. Certification. Any person signing a document under Part VII.J.1. or 2. must make the following certification:

    I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who

manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

5. Electronic reporting. If documents described in Part VII.J.1. or 2. are submitted electronically by or on behalf of the *construction activity* with coverage under this permit, any person providing the electronic signature for such documents must meet all relevant requirements of this section, and must ensure that all of the relevant requirements of 40 CFR Part 3 (including, in all cases, subpart D to Part 3) (Cross-Media Electronic Reporting) and 40 CFR Part 127 (NPDES Electronic Reporting Requirements) are met for that submission.

K. Inspection and Entry

The *owner or operator* must allow NYSDEC, the USEPA Regional Administrator, the applicable county health department, or any authorized representatives of those entities, or, in the case of a *construction site* which *discharges* through an *MS4*, an authorized representative of the *MS4* receiving the *discharge*, upon the presentation of credentials and other documents as may be required by law, to:

1. enter upon the *owner's or operator's* premises where a regulated facility or activity is located or conducted or where records must be kept under the requirements of this permit; and

2. have access to and copy at reasonable times, any records that must be kept under the requirements of this permit, including records required to be maintained for purposes of operation and maintenance; and

3. inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices or operations regulated or required under this permit; and

4. sample or monitor at reasonable times, for the purposes of assuring general SPDES permit compliance or as otherwise authorized by the CWA or ECL, any substances or parameters at any location; and

5. enter upon the property of any contributor to the regulated facility or activity under authority of the *owner or operator*.

L. Confidentiality of Information

The following must not be held confidential: this permit, the fact sheet for this permit, the name and address of any *owner or operator*, effluent data, the Notice of Intent, and information regarding the need to obtain an individual permit or an alternative general SPDES permit. This includes information submitted on forms themselves and any attachments used to supply information required by the forms (except information submitted on usage of substances). Upon the request of the *owner or operator*, NYSDEC must make determinations of confidentiality in accordance with 6 NYCRR Part 616, except as set forth in the previous sentence. Any information accorded confidential status must be disclosed to the Regional Administrator upon his or her written request. Prior to disclosing such information to the Regional Administrator, NYSDEC will notify the Regional Administrator of the confidential status of such information.

M. Other Permits May Be Required

Nothing in this permit relieves the *owner or operator* from a requirement to obtain any other permits required by law.

N. NYSDEC Orders or Civil Decrees/Judgments

The issuance of this permit by the NYSDEC, and the coverage under this permit by the *owner or operator*, does not supersede, revoke, or rescind any existing order on consent or civil Decree/Judgment, or modification to any such documents or to any order issued by the Commissioner, or any of the terms, conditions, or requirements contained in such order or modification therefore, unless expressly noted.

O. Property Rights

Coverage under this permit does not convey any property rights in either real or personal property, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of Federal, State, or local laws or regulations, nor does it obviate the necessity of obtaining the assent of any other jurisdiction as required by law for the *discharge* authorized.

P. Compliance with Interstate Standards

If the *construction activity* covered by this permit originates within the jurisdiction of an interstate water pollution control agency, then the *construction activity* must also comply with any applicable effluent standards or *water quality standards* promulgated by that interstate agency and as set forth in this permit for such *construction activities*.

Q. Oil and Hazardous Substance Liability

Coverage under this permit does not affect the imposition of responsibilities upon, or the institution of any legal action against, the *owner or operator* under section 311 of the CWA, which must be in conformance with regulations promulgated pursuant to section 311 governing the applicability of section 311 of the CWA to *discharges* from facilities with *NPDES* permits, nor must such issuance preclude the institution of any legal action or relieve the *owner or operator* from any responsibilities, liabilities, or penalties to which the *owner or operator* is or may be subject pursuant to the Comprehensive Environmental Response, Compensation and Liability Act of 1980, 42 U.S.C. section 9601 et seq. (CERCLA).

R. Severability

The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit, must not be affected thereby.

S. NYSDEC Approved Forms

The *owner or operator* must provide all relevant information that is requested by NYSDEC, and required by this permit, on all NYSDEC approved forms.

APPENDIX A – Abbreviations and Definitions

Abbreviations

APO – Agency Preservation Officer
BB – New York State Standards and Specifications for Erosion and Sediment Control (Blue Book), dated November 2016
BMP – Best Management Practice
CPESC – Certified Professional in Erosion and Sediment Control
CPv – Channel Protection Volume
CWA – Clean Water Act (or the Federal Water Pollution Control Act, 33 U.S.C. §1251 et seq)
DM – New York State Stormwater Management Design Manual (Design Manual), dated July 31, 2024
DOW – Division of Water
EAF – Environmental Assessment Form
ECL – chapter 43-B of the Consolidated Laws of the State of New York, entitled the Environmental Conservation Law
EPA – U.S. Environmental Protection Agency
HSG – Hydrologic Soil Group
MS4 – Municipal Separate Storm Sewer System
NOI – Notice of Intent
NOT – Notice of Termination
NPDES – National Pollutant Discharge Elimination System
NYC – The City of New York
NYCDEP – The City of New York Department of Environmental Protection
NYSDEC – The New York State Department of Environmental Conservation
OPRHP – Office of Parks, Recreation and Historic Places
Qf – Extreme Flood
Qp – Overbank Flood
RR – Runoff Reduction
RRv – Runoff Reduction Volume
RWE – Regional Water Engineer
SEQR – State Environmental Quality Review Act
SHPA – State Historic Preservation Act
SMP – Post-Construction Stormwater Management Practice
SPDES – State Pollutant Discharge Elimination System
SWPPP – Stormwater Pollution Prevention Plan
TMDL – Total Maximum Daily Load
UPA – Uniform Procedures Act
USDA – United States Department of Agriculture
WQv – Water Quality Volume

Definitions

All definitions in this section are solely for the purposes of this permit. If a word is not italicized in the permit, use its common definition.

Agricultural Building – a structure designed and constructed to house farm implements, hay, grain, poultry, livestock or other horticultural products; excluding any structure designed, constructed or used, in whole or in part, for human habitation, as a place of employment where agricultural products are processed, treated or packaged, or as a place used by the public.

Agricultural Property – the land for construction of a barn, *agricultural building*, silo, stockyard, pen or other structural practices identified in Table II in the "Agricultural Best Management Practice Systems Catalogue" (dated June 2023).

Alter Hydrology from Pre- to Post-Development Conditions – the post-development peak flow rate(s) has increased by more than 5% of the pre-developed condition for the design storm of interest (e.g. 10 yr and 100 yr).

Combined Sewer System – a sewer system which conveys sewage and *stormwater* through a single pipe system to a publicly owned treatment works.

Commence (Commencement of) Construction Activities – the initial disturbance of soils associated with clearing, grading or excavation activities; or other construction related activities that disturb or expose soils such as demolition, stockpiling of fill material, and the initial installation of erosion and sediment control practices required in the *SWPPP*. See definition for "*Construction Activity(ies)*" also.

Common Plan of Development or Sale – a contiguous area where multiple separate and distinct *construction activities* are occurring, or may occur, under one plan. The "common plan" of development or sale is broadly defined as any announcement or piece of documentation (including a sign, public notice or hearing, marketing plan, advertisement, drawing, permit application, State Environmental Quality Review Act (SEQR) environmental assessment form or other documents, zoning request, computer design, etc.) or physical demarcation (including boundary signs, lot stakes, surveyor markings, etc.) indicating *construction activities* may occur on a specific plot. A *common plan of development or sale* is comprised of two or more *phases*.

Common plan of development or sale does not include separate and distinct *construction activities* that are occurring, or may occur, under one plan that are at least 1/4 mile apart provided any interconnecting road, pipeline or utility project that is part of the same "common plan" is not concurrently being disturbed.

Construction Activity(ies) – identified within 40 CFR 122.26(b)(14)(x), 122.26(b)(15)(i), and 122.26(b)(15)(ii), any clearing, grading, excavation, filling, demolition or stockpiling activities that result in soil disturbance. Clearing activities can include, but are not limited to, mechanized logging equipment operation, the cutting and skidding of trees, stump removal and/or brush root removal.

Construction activity does not include routine maintenance that is performed to maintain the original line and grade, hydraulic capacity, or original purpose of a facility, which is excluded from the calculation of the soil disturbance for a project. Routine maintenance includes, but is not limited to:

- Re-grading of gravel roads or parking lots; and
- Cleaning and shaping of existing roadside ditches and culverts that maintains the approximate original line and grade, and maintains or improves the hydraulic capacity of the ditch; and
- Replacement of existing culverts that maintains the approximate original line and grade, and maintains or improves the hydraulic capacity of a ditch; and
- Replacement of existing bridges that maintains the approximate original line and grade, and maintains or improves the hydraulic capacity beneath the bridges; and
- Cleaning and shaping of existing roadside ditches that does not maintain the approximate original grade, hydraulic capacity and purpose of the ditch if the changes to the line and grade, hydraulic capacity or purpose of the ditch are installed to improve water quality and quantity controls (e.g. installing grass lined ditch); and
- Placement of aggregate shoulder backing that stabilizes the transition between the road shoulder and the ditch or *embankment*; and
- Full depth milling and filling of existing asphalt pavements, replacement of concrete pavement slabs, and similar work that does not expose soil or disturb the bottom six (6) inches of subbase material; and
- Long-term use of equipment storage areas at or near highway maintenance facilities; and
- Removal of sediment from the edge of the highway to restore a previously existing sheet-flow drainage connection from the highway surface to the highway ditch or *embankment*; and
- Existing use of Canal Corp owned upland disposal sites for the canal, and
- Replacement of curbs, gutters, sidewalks and guide rail posts; and
- Maintenance of ski trails including brush hog use and mowing; and
- Above ground snowmaking pipe replacement; and
- Replacement of existing utility poles; etc.

Construction Site – the land area where *construction activity(ies)* will occur. See also the definitions for "*Commence (Commencement of) Construction Activities"* and "*Common Plan of Development or Sale."*

Dewatering – the act of draining rainwater and/or groundwater from building foundations, vaults or excavations/trenches.

Directly Discharge(s)(ing) (to a specific surface waterbody) – runoff flows from a *construction site* by overland flow and the first point of *discharge* is the specific surface waterbody, or runoff flows from a *construction site* to a separate storm sewer system and the first point of *discharge* from the separate storm sewer system is the specific surface waterbody.

Discharge(s)(d) – any addition of any *pollutant* to waters of the State through an outlet or *point source*.

Embankment – an earthen or rock slope that supports a road/highway.

Equivalent (Equivalence) – the practice or measure meets all the performance, longevity, maintenance, and safety objectives of the technical standard and will provide an equal or greater degree of water quality protection.

Final Stabilization – all soil disturbance activities have ceased and a uniform, perennial vegetative cover with a density of eighty (80) percent over the entire pervious surface has been established; or other *equivalent* stabilization measures, such as permanent landscape mulches, rock rip-rap or washed/crushed stone have been applied on all disturbed areas that are not covered by permanent structures, concrete or pavement.

Historic Property – any building, structure, site, object or district that is listed on the State or National Registers of Historic Places or is determined to be eligible for listing on the State or National Registers of Historic Places.

Impervious Area (Cover) – all impermeable surfaces that cannot effectively infiltrate rainfall. This includes paved, concrete and compacted gravel surfaces (i.e. parking lots, driveways, roads, runways and sidewalks); building rooftops and miscellaneous impermeable structures such as patios, pools, and sheds.

Infeasible – not technologically possible, or not economically practicable and achievable considering best industry practices.

Minimize(ing)(ation) – reduce and/or eliminate to the extent achievable using control measures (including best management practices) that are technologically available and economically practicable and achievable in light of best industry practices.

Municipal Separate Storm Sewer System (MS4) - a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains):

1. owned or operated by a State, city, town, village, borough, county, parish, district, association, or other public body (created by or pursuant to State law) having jurisdiction over disposal of sewage, industrial wastes, *stormwater*, or other wastes, including special districts under State law such as a sewer district, flood control district or drainage district, or similar entity, or an Indian tribe or an authorized Indian tribal organization, or a designated and approved management agency under section 208 of the CWA, that *discharges* to *surface waters of the State*; and

2. designed or used for collecting or conveying *stormwater*; and

3. which is not a *combined sewer system*; and

4. which is not part of a Publicly Owned Treatment Works (POTW) as defined at 40 CFR 122.2.

Natural Buffer(s) – an undisturbed area with natural cover running along a surface water (e.g. wetland, stream, river, lake, etc.).

New Development – any land disturbance that does not meet the definition of *Redevelopment Activity* included in this appendix.

New York State Erosion and Sediment Control Certificate Program – a certificate program that establishes and maintains a process to identify and recognize individuals who are capable of developing, designing, inspecting and maintaining erosion and sediment control plans on projects that disturb soils in New York State. The certificate program is administered by the New York State Conservation District Employees Association.

Nonpoint Source(s) – any source of water pollution or *pollutants* which is not a discrete conveyance or *point source* permitted pursuant to Title 7 or 8 of Article 17 of the Environmental Conservation Law (see ECL Section 17-1403).

Overbank – flow events that exceed the capacity of the stream channel and spill out into the adjacent floodplain.

Owner or Operator – the person, persons, or legal entity which owns or leases the property on which the *construction activity* is occurring; an entity that has operational control over the construction plans and specifications, including the ability to make modifications to the plans and specifications; and/or an entity that has day-to-day operational control of those activities at a project that are necessary to ensure compliance with the permit requirements.

Performance Criteria – the six performance criteria for each group of SMPs in Chapters 5 and 6 of the technical standard, New York State Stormwater Management Design Manual (DM), dated July 31, 2024. These include feasibility, conveyance, pretreatment, treatment, landscaping, and maintenance. It does not include the *Sizing Criteria* (i.e. WQv, RRv, CPv, Qp and Qf) in Part I.C.2. of the permit.

Phase – a defined area in which *construction activities* are occurring or will occur separate from other defined area(s).

Point Source – any discernible, confined, and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, vessel or other floating craft, or landfill leachate collection system from which *pollutants* are or may be *discharged*.

Pollutant(s) – dredged spoil, filter backwash, solid waste, incinerator residue, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand and industrial, municipal, agricultural waste and ballast *discharged* into water; which may cause or might reasonably be expected to cause pollution of the waters of the state in contravention of the standards or guidance values adopted as provided in 6 NYCRR Parts 700 et seq.

Qualified Inspector – a person that is knowledgeable in the principles and practices of erosion and sediment control, such as a licensed Professional Engineer, Certified Professional in Erosion and Sediment Control (CPESC), Registered Landscape Architect, *New York State Erosion and Sediment Control Certificate Program* holder or other NYSDEC endorsed individual(s).

It can also mean someone working under the direct supervision of, and at the same company as, the licensed Professional Engineer or Registered Landscape Architect, provided that person has training in the principles and practices of erosion and sediment control. Training in the principles and practices of erosion and sediment control means that the individual working under the direct supervision of the licensed Professional Engineer or Registered Landscape Architect has received four (4) hours of NYSDEC endorsed training in proper erosion and sediment control principles from a Soil and Water Conservation District, or other NYSDEC endorsed entity. After receiving the initial training, the individual working under the direct supervision of the licensed Professional Engineer or Registered Landscape Architect shall receive four (4) hours of training every three (3) years.

It can also mean a person that meets the *Qualified Professional* qualifications in addition to the *Qualified Inspector* qualifications.

Note: Inspections of any SMPs that include structural components, such as a dam for an impoundment, shall be performed by a licensed Professional Engineer.

Qualified Professional – a person that is knowledgeable in the principles and practices of *stormwater* management and treatment, such as a licensed Professional Engineer, Registered Landscape Architect or other NYSDEC endorsed individual(s). Individuals preparing *SWPPPs* that require the SMP component must have an understanding of the principles of hydrology, water quality management practice design, water quantity control design, and, in many cases, the principles of hydraulics. All components of the *SWPPP* that involve the practice of engineering, as defined by the NYS Education Law (see Article 145), shall be prepared by, or under the direct supervision of, a professional engineer licensed to practice in the State of New York.

Redevelopment Activity(ies) – the disturbance and reconstruction of existing *impervious area*, including *impervious areas* that were removed from a project site within five (5) years of preliminary project plan submission to the local government (i.e. site plan, subdivision, etc.).

Renewable Energy – electricity or thermal energy generated by renewable energy systems through use of the following technologies: solar thermal, photovoltaics, on land and offshore wind, hydroelectric, geothermal electric, geothermal ground source heat, tidal energy, wave energy, ocean thermal, and fuel cells which do not utilize a fossil fuel resource in the process of generating electricity.

Site Limitations – site conditions that prevent the use of an infiltration technique and or infiltration of the total WQv. Typical *site limitations* include: seasonal high groundwater, shallow depth to bedrock, and soils with an infiltration rate less than 0.5 inches/hour. The existence of *site limitations* shall be confirmed and documented using actual field testing (i.e. test pits, soil borings, and infiltration test) or using information from the most current United States Department of Agriculture (USDA) Soil Survey for the County where the project is located.

Sizing Criteria – the criteria included in Part I.C.2 of the permit that are used to size SMPs. The criteria include; Water Quality Volume (WQv), Runoff Reduction Volume (RRv), Channel Protection Volume (Cpv), *Overbank* Flood (Qp), and Extreme Flood (Qf).

Steep Slope – land area designated on the current United States Department of Agriculture (USDA) Soil Survey as Soil Slope Phase D, (provided the map unit name or description is inclusive of slopes greater than 25%), or Soil Slope Phase E or F, (regardless of the map unit name), or a combination of the three designations.

Stormwater – that portion of precipitation that, once having fallen to the ground, is in excess of the evaporative or infiltrative capacity of soils, or the retentive capacity of surface features, which flows or will flow off the land by surface runoff to waters of the State.

Streambank – the terrain alongside the bed of a creek or stream. The bank consists of the sides of the channel, between which the flow is confined.

Stormwater Pollution Prevention Plan (SWPPP) – a project specific report, including construction drawings, that among other things: describes the *construction activity(ies)*, identifies the potential sources of pollution at the *construction site*; describes and shows the *stormwater* controls that will be used to control the *pollutants* (i.e. erosion and sediment controls; for many projects, includes SMPs); and identifies procedures the *owner or operator* will implement to comply with the requirements of the permit. See Part III of the permit for a complete description of the information that must be included in the *SWPPP*.

Surface Waters of the State – shall be construed to include lakes, bays, sounds, ponds, impounding reservoirs, springs, rivers, streams, creeks, estuaries, marshes, inlets, canals, the Atlantic ocean within the territorial seas of the state of New York and all other bodies of surface water, natural or artificial, inland or coastal, fresh or salt, public or private (except those private waters that do not combine or effect a junction with natural surface waters), which are wholly or partially within or bordering the state or within its jurisdiction. Waters of the state are further defined in 6 NYCRR Parts 800 to 941.

Temporarily Ceased – an existing disturbed area will not be disturbed again within 14 calendar days of the previous soil disturbance.

Temporary Stabilization – exposed soil has been covered with material(s) as set forth in the technical standard, New York Standards and Specifications for Erosion and Sediment Control, to prevent the exposed soil from eroding. The materials can include, but are not limited to, mulch, seed and mulch, and erosion control mats (e.g. jute twisted yarn, excelsior wood fiber mats).

Total Maximum Daily Load (TMDL) – the sum of the allowable loads of a single *pollutant* from all contributing point and *nonpoint source*s. It is a calculation of the maximum amount of a *pollutant* that a waterbody can receive and still meet *water quality standards*, and an allocation of that amount to the *pollutant's* sources. A TMDL stipulates Waste Load Allocations (WLA) for *point source discharges*, Load Allocations (LA) for *nonpoint source*s, and a margin of safety (MOS).

Traditional Land Use Control MS4 Operator – a city, town, or village with land use control authority that is authorized to *discharge* under New York State DEC's SPDES General Permit For Stormwater Discharges from Municipal Separate Stormwater Sewer Systems (MS4s) or the City of New York's Individual SPDES Permit for their Municipal Separate Storm Sewer Systems (NY-0287890).

Trained Contractor – an employee from the contracting (construction) company, identified in Part III.A.7., that has received four (4) hours of NYSDEC endorsed training

in proper erosion and sediment control principles from a Soil and Water Conservation District, or other NYSDEC endorsed entity. After receiving the initial training, the *trained contractor* shall receive four (4) hours of training every three (3) years.

It can also mean an employee from the contracting (construction) company, identified in Part III.A.7., that meets the *qualified inspector* qualifications (e.g. licensed Professional Engineer, Certified Professional in Erosion and Sediment Control (CPESC), Registered Landscape Architect, *New York State Erosion and Sediment Control Certificate Program* holder, or someone working under the direct supervision of, and at the same company as, the licensed Professional Engineer or Registered Landscape Architect, provided they have received four (4) hours of NYSDEC endorsed training in proper erosion and sediment control principles from a Soil and Water Conservation District, or other NYSDEC endorsed entity).

The *trained contractor* is responsible for the day-to-day implementation of the *SWPPP*.

Tree Clearing – *construction activities* limited to felling and removal of trees.

Tree clearing does not include hand felling and leaving the trees in place with no support from mechanized equipment, which is not considered *construction activity* requiring coverage under this permit.

Water Quality Standard – such measures of purity or quality for any waters in relation to their reasonable and necessary use as promulgated in 6 NYCRR Part 700 et seq.

APPENDIX B – Required SWPPP Components by Project Type

Table 1
CONSTRUCTION ACTIVITIES THAT REQUIRE THE PREPARATION OF A *SWPPP* THAT ONLY INCLUDES EROSION AND SEDIMENT CONTROLS

The following *construction activities* that involve soil disturbances of one (1) or more acres of land, but less than five (5) acres:

- Single-family home not located in one of the watersheds listed in Appendix C and not *directly discharging* to one of the 303(d) segments listed in Appendix D
- Single-family residential subdivisions with 25% or less *impervious cover* at total site build-out and not located in one of the watersheds listed in Appendix C and not *directly discharging* to one of the 303(d) segments listed in Appendix D
- Construction of a barn or other *agricultural building*, silo, stock yard or pen.
- Structural agricultural conservation practices as identified in Table II in the "Agricultural Best Management Practice Systems Catalogue" (dated June 2023) that include construction or reconstruction of *impervious area* or *alter hydrology from pre- to post-development* conditions.

The following *construction activities* that involve soil disturbances between five thousand (5000) square feet and one (1) acre of land:

- All construction activities located in the New York City Watershed located east of the Hudson River, see Appendix C Figure 1, that involve soil disturbances between five thousand (5,000) square feet and one (1) acre of land.

Within the municipal boundaries of NYC:

- Stand-alone road reconstruction, where the total soil disturbance from only that road construction, is less than one (1) acre of land.

The following *construction activities*:

- Installation of underground linear utilities; such as gas lines, fiber-optic cable, cable TV, electric, telephone, sewer mains, and water mains
- Environmental enhancement projects, such as wetland mitigation, *stormwater* retrofits, stream restoration, and resiliency projects that reconstruct shoreline areas to address sea level rise
- Pond construction
- Linear bike paths running through areas with vegetative cover, including bike paths surfaced with an *impervious cover*
- Cross-country ski trails, walking/hiking trails, and mountain biking trails, including a de minimis parking lot (maximum 10 spaces total, sized for passenger cars) with 35 feet minimum preservation of undisturbed area downgradient from the parking lot
- Dam rehabilitation (the structure of the dam itself)
- Sidewalks, bike paths, or walking paths, surfaced with an *impervious cover*, that are not part of residential, commercial, or institutional development;
- Sidewalks, bike paths, or walking paths, surfaced with an *impervious cover*, that include incidental shoulder or curb work along an existing highway to support construction of the sidewalk, bike path, or walking path.

Table 1 (Continued)
CONSTRUCTION ACTIVITIES THAT REQUIRE THE PREPARATION OF A *SWPPP* THAT ONLY INCLUDES EROSION AND SEDIMENT CONTROLS

The following *construction activities*:

- Slope stabilization
- Slope flattening that changes the grade of the site, but does not significantly change the runoff characteristics
- Spoil areas that will be covered with vegetation
- Vegetated open space (i.e. recreational parks, lawns, meadows, fields, downhill ski trails) that do not *alter hydrology from pre- to post-development* conditions
- Athletic fields (natural grass) that do not include the construction or reconstruction of *impervious area* and do not *alter hydrology from pre- to post-development* conditions
- Demolition where vegetation will be established, and no *redevelopment activity* is planned[1]
- Installation or replacement of either an overhead electric transmission line or a ski lift tower that does not include the construction of permanent access roads or parking areas surfaced with *impervious cover*.
- Solar array field areas that have tables elevated off the ground, spaced one table width apart, do not *alter hydrology from pre- to post-development conditions*, and address water quality volume and runoff reduction volume by maintaining sheet flow on slopes less than 8%.
- Structural agricultural conservation practices as identified in Table II in the "Agricultural Best Management Practice Systems Catalogue" (dated June 2023) that do not include construction or reconstruction of *impervious area* and do not *alter hydrology from pre- to post-development* conditions.
- Temporary access roads, median crossovers, detour roads, lanes, or other temporary *impervious areas* that will be restored to pre-construction conditions once the *construction activity* is complete (in this context, "temporary" means the *impervious area* will be in place for two years or less)
- Other *construction activities* that do not include the construction or reconstruction of *impervious area*, and do not *alter hydrology from pre- to post-development* conditions, and are not listed in Table 2.

1. If the site is redeveloped in the future, a new eNOI must be submitted.

Table 2

CONSTRUCTION ACTIVITIES THAT REQUIRE THE PREPARATION OF A *SWPPP* THAT INCLUDES POST-CONSTRUCTION STORMWATER MANAGEMENT PRACTICES (SMPS)

The following *construction activities*:

- Single-family home located in one of the watersheds listed in Appendix C or *directly discharging* to one of the 303(d) segments listed in Appendix D
- Single-family home that disturbs five (5) or more acres of land
- Single-family residential subdivisions located in one of the watersheds listed in Appendix C or *directly discharging* to one of the 303(d) segments listed in Appendix D
- Single-family residential subdivisions that involve soil disturbances of between one (1) and five (5) acres of land with greater than 25% *impervious cover* at total site build-out
- Single-family residential subdivisions that involve soil disturbances of between 20,000 square feet and one (1) acre of land within the municipal boundaries of NYC with greater than 25% *impervious cover* at total site build-out
- Single-family residential subdivisions that involve soil disturbances of five (5) or more acres of land, and single-family residential subdivisions that involve soil disturbances of less than five (5) acres that are part of a *common plan of development or sale* that will ultimately disturb five (5) or more acres of land
- Multi-family residential developments; includes duplexes, townhomes, condominiums, senior housing complexes, apartment complexes, and mobile home parks
- Creation of 5,000 square feet or more of *impervious area* in the municipal boundaries of NYC
- Airports
- Amusement parks
- Breweries, cideries, and wineries, including establishments constructed on agricultural land
- Campgrounds
- Cemeteries that include the construction or reconstruction of *impervious area* (>5% of disturbed area) or *alter the hydrology from pre- to post-development* conditions
- Commercial developments
- Churches and other places of worship
- Construction of a barn or other *agricultural building* (e.g. silo) that involves soil disturbance greater than five acres.
- Structural agricultural conservation practices as identified in Table II in the “Agricultural Best Management Practice Systems Catalogue” (dated June 2023) that involves soil disturbance greater than five acres and include the construction or reconstruction of *impervious area* or *alter hydrology from pre- to post-development* conditions.
- Facility buildings, including ski lodges, restroom buildings, pumphouses, ski lift terminals, and maintenance and groomer garages
- Institutional development; includes hospitals, prisons, schools and colleges
- Industrial facilities; includes industrial parks
- Landfills; including creation of landfills or capping landfills.
- Municipal facilities; includes highway garages, transfer stations, office buildings, POTWs, water treatment plants, and water storage tanks
- Golf courses
- Office complexes

Table 2 (Continued)

CONSTRUCTION ACTIVITIES THAT REQUIRE THE PREPARATION OF A *SWPPP* THAT INCLUDES POST-CONSTRUCTION STORMWATER MANAGEMENT PRACTICES (SMPS)

The following *construction activities*:

- Permanent laydown yards and equipment storage lots
- Playgrounds that include the construction or reconstruction of *impervious area*
- Sports complexes
- Racetracks; includes racetracks with earthen (dirt) surfaces
- Road construction or reconstruction, outside the municipal boundaries of NYC
- Road construction within the municipal boundaries of NYC
- Stand-alone road reconstruction, within the municipal boundaries of NYC where the total soil disturbance from that road reconstruction involves soil disturbance of one (1) acre or more of land
- Parking lot construction or reconstruction (as with all Table 2 bullets, this includes parking lots constructed as part of the *construction activities* listed in Table 1, unless a Table 1 bullet specifies otherwise)
- Athletic fields (natural grass) that include the construction or reconstruction of *impervious area* (>5% of disturbed area) or *alter the hydrology from pre- to post-development* conditions
- Athletic fields with artificial turf
- Permanent access roads, parking areas, substations, compressor stations, and well drilling pads, surfaced with *impervious cover,* and constructed as part of an overhead electric transmission line, wind-power, cell tower, oil or gas well drilling, sewer or water main, ski lift, or other linear utility project
- Sidewalks, bike paths, or walking paths, surfaced with an *impervious cover*, that are part of a residential, commercial or institutional development
- Sidewalks, bike paths, or walking paths, surfaced with an *impervious cover*, that are part of highway construction or reconstruction
- Solar array field areas on slopes greater than 8% that cannot maintain sheet flow using management practices identified in the BB or the DM
- Solar array field areas on slopes less than 8% that will *alter the hydrology from pre- to post-development* conditions
- Solar array field areas with tables that are not elevated high enough to achieve *final stabilization* beneath the tables
- Traditional *impervious areas* associated with solar development (e.g. roads, buildings, transformers)
- Utility pads surfaced with *impervious cover*, including electric vehicle charging stations
- All other *construction activities* that include the construction or reconstruction of *impervious area* or *alter the hydrology from pre- to post-development* conditions, and are not listed in Table 1

APPENDIX C – Watersheds Requiring Enhanced Phosphorus Removal

Watersheds where *owners or operators* of *construction activities* identified in Table 2 of Appendix B must prepare a *SWPPP* that includes SMPs designed in conformance with the Enhanced Phosphorus Removal Standards included in the DM technical standard.

- Entire New York City Watershed located east of the Hudson River – Figure 1
- Onondaga Lake Watershed – Figure 2
- Greenwood Lake Watershed – Figure 3
- Oscawana Lake Watershed – Figure 4
- Kinderhook Lake Watershed – Figure 5

Figure 1 - New York City Watershed East of the Hudson

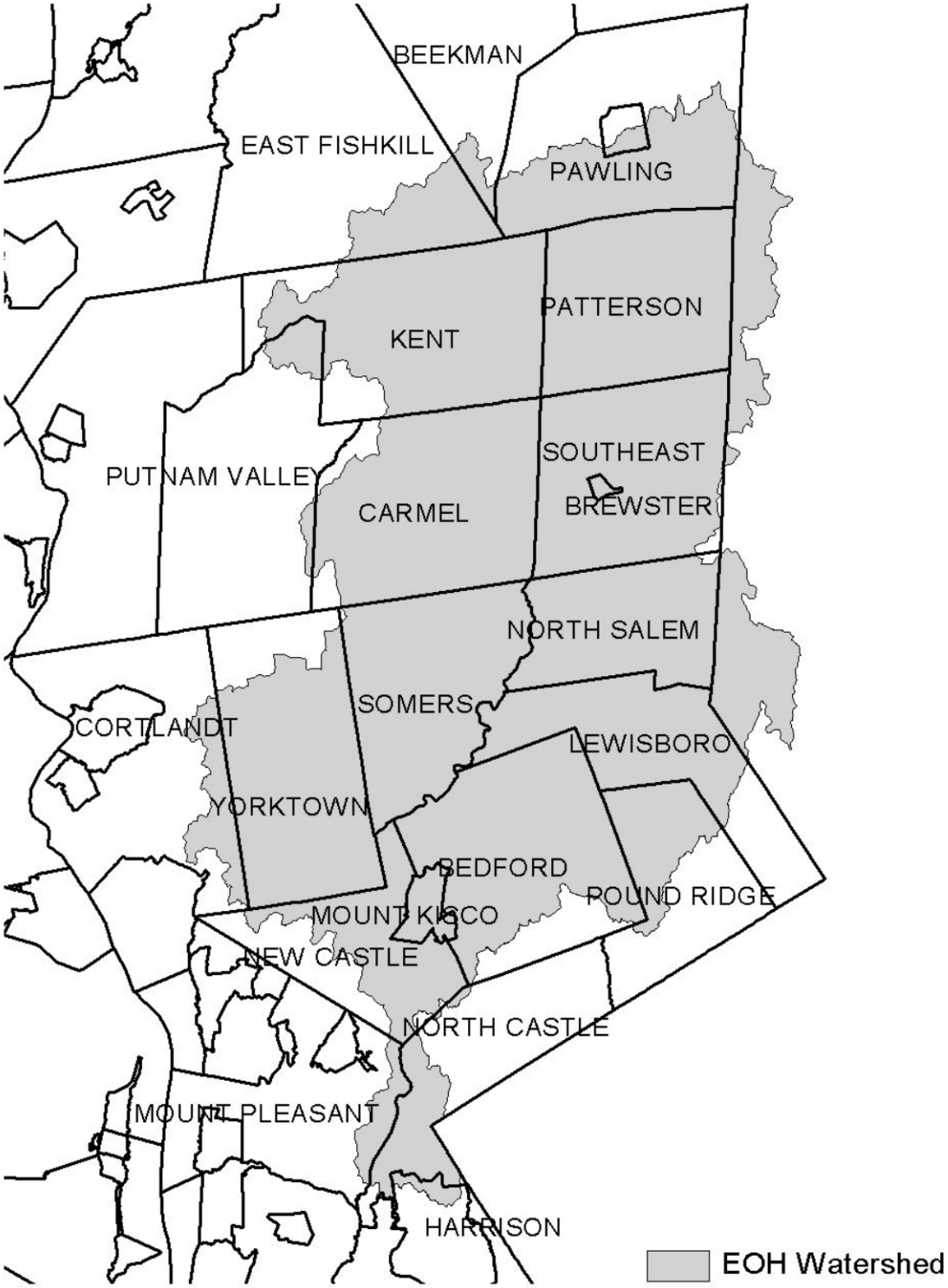


Figure 2 - Onondaga Lake Watershed



Figure 3 - Greenwood Lake Watershed

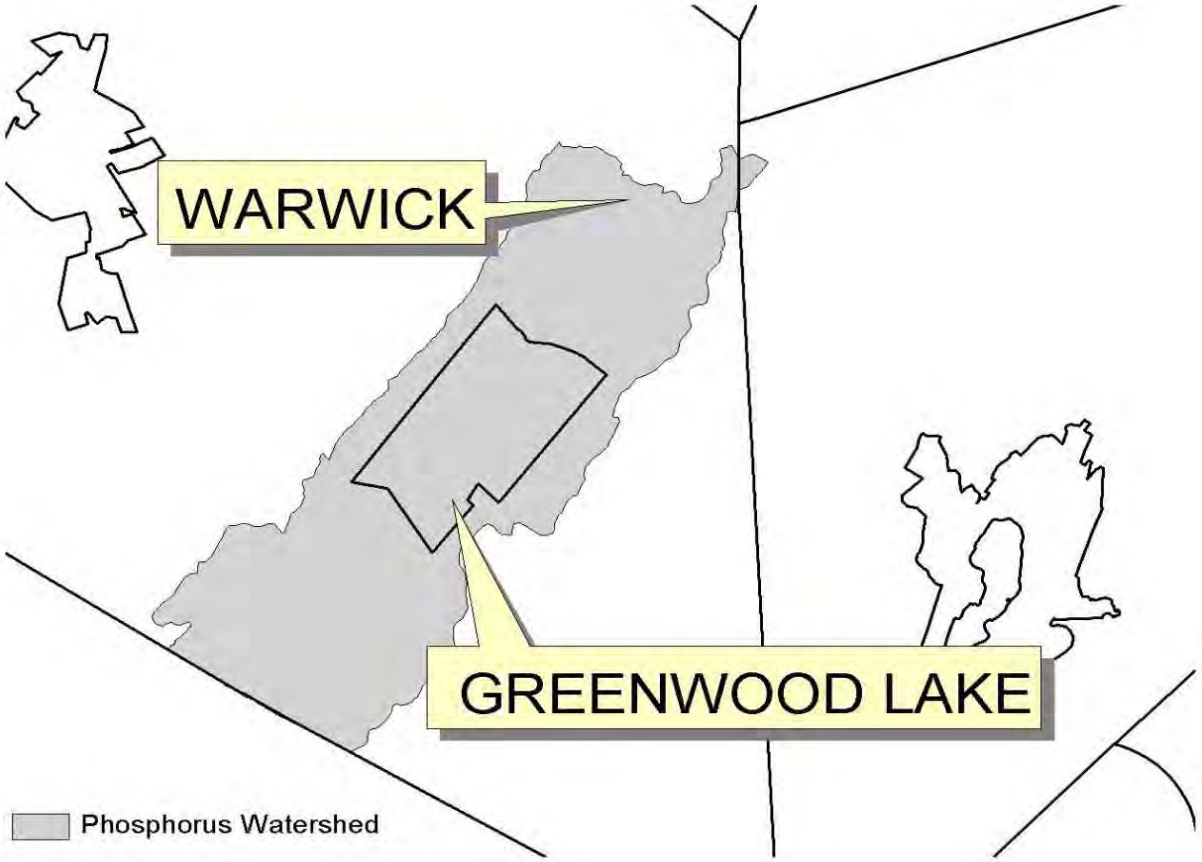


Figure 4 - Oscawana Lake Watershed

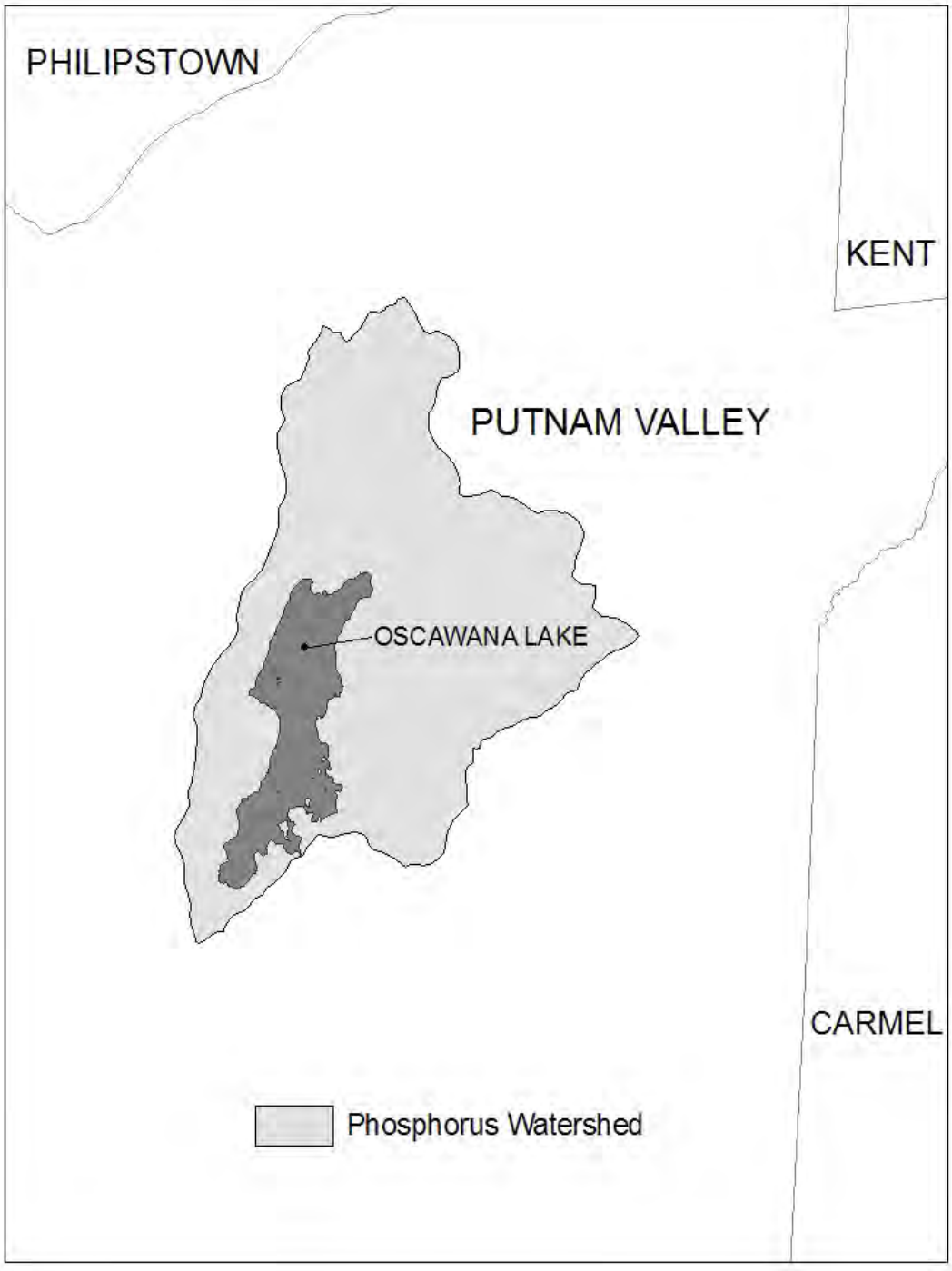
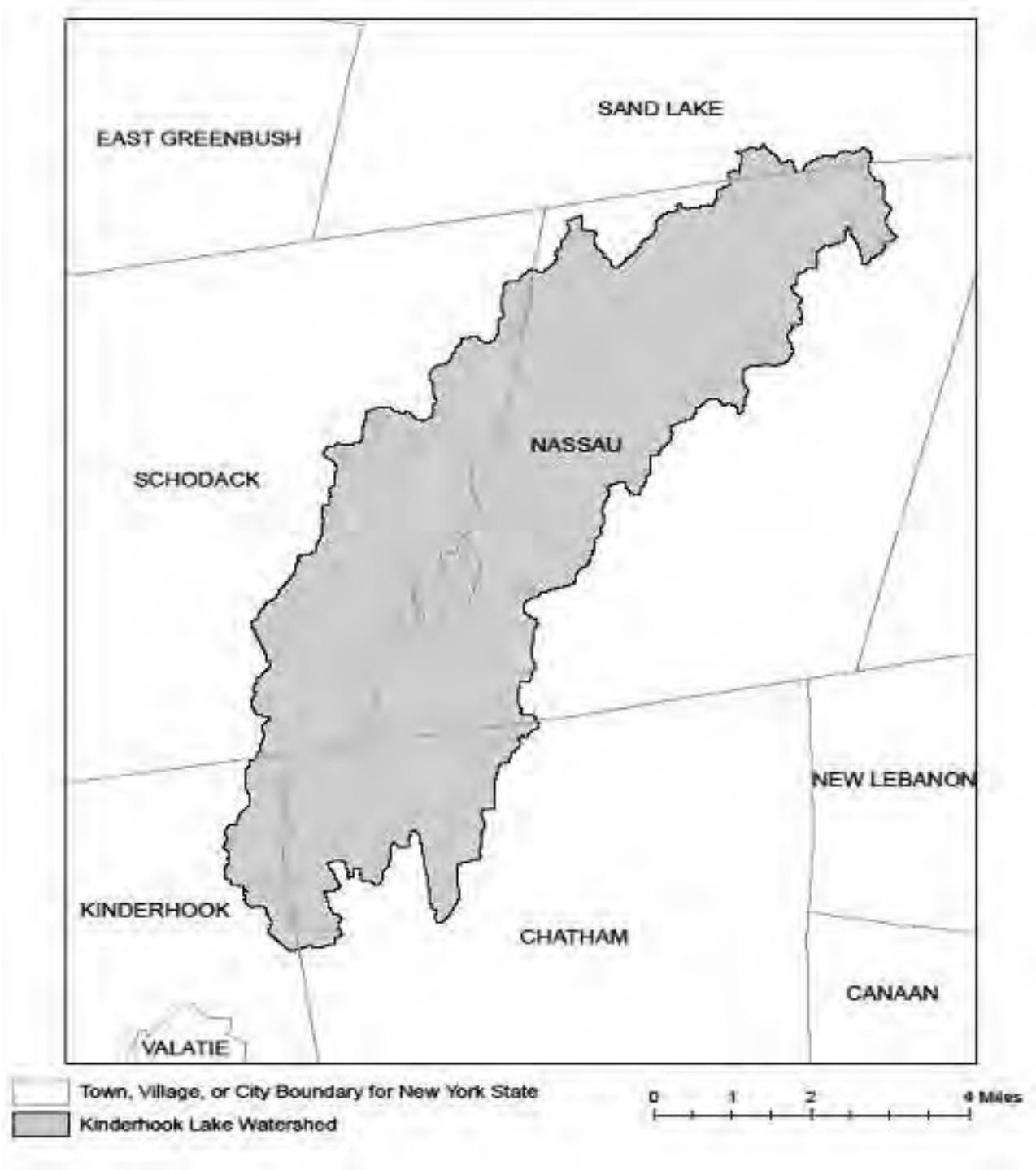


Figure 5 - Kinderhook Lake Watershed



APPENDIX D – Impaired Waterbodies (by Construction Related Pollutants)

List of waterbodies impaired by *pollutants* related to *construction activity*, including turbidity, silt/sediment, and nutrients (e.g. nitrogen, phosphorus). This list is a subset of "The Final New York State 2018 Section 303(d) List of Impaired Waters Requiring a TMDL" dated June 2020.

County	Waterbody	Pollutant
Albany	Ann Lee (Shakers) Pond, Stump Pond (1201-0096)	Phosphorus
Albany	Lawsons Lake (1301-0235)	Phosphorus
Allegany	Amity Lake, Saunders Pond (0403-0054)	Phosphorus
Allegany	Andover Pond (0403-0056)	Phosphorus
Bronx	Reservoir No.1/Lake Isle (1702-0075)	Phosphorus
Bronx	Van Cortlandt Lake (1702-0008)	Phosphorus
Broome	Blueberry, Laurel Lakes (1404-0033)	Phosphorus
Broome	Fly Pond, Deer Lake (1404-0038)	Phosphorus
Broome	Minor Tribs to Lower Susquehanna (0603-0044)	Phosphorus
Broome	Whitney Point Lake/Reservoir (0602-0004)	Phosphorus
Cattaraugus	Allegheny River/Reservoir (0201-0023)	Phosphorus
Cattaraugus	Beaver Lake/Alma Pond (0201-0073)	Phosphorus
Cattaraugus	Case Lake (0201-0020)	Phosphorus
Cattaraugus	Linlyco/Club Pond (0201-0035)	Phosphorus
Cayuga	Duck Lake (0704-0025)	Phosphorus
Cayuga	Owasco Inlet, Upper, and tribs (0706-0014)	Nutrients
Chautauqua	Chadakoin River and tribs (0202-0018)	Phosphorus
Chautauqua	Hulburt/Clymer Pond (0202-0079)	Phosphorus
Chautauqua	Middle Cassadaga Lake (0202-0002)	Phosphorus
Clinton	Great Chazy River, Lower, Main Stem (1002-0001)	Silt/Sediment
Columbia	Robinson Pond (1308-0003)	Phosphorus
Cortland	Dean Pond (0602-0077)	Phosphorus
Dutchess	Fallkill Creek (1301-0087)	Phosphorus
Dutchess	Hillside Lake (1304-0001)	Phosphorus
Dutchess	Wappingers Lake (1305-0001)	Phosphorus
Dutchess	Wappingers Lake (1305-0001)	Silt/Sediment
Erie	Beeman Creek and tribs (0102-0030)	Phosphorus
Erie	Delaware Park Pond (0101-0026)	Phosphorus
Erie	Ellicott Creek, Lower, and tribs (0102-0018)	Phosphorus
Erie	Ellicott Creek, Lower, and tribs (0102-0018)	Silt/Sediment
Erie	Green Lake (0101-0038)	Phosphorus
Erie	Little Sister Creek, Lower, and tribs (0104-0045)	Phosphorus
Erie	Murder Creek, Lower, and tribs (0102-0031)	Phosphorus

Erie	Rush Creek and tribs (0104-0018)	Phosphorus
Erie	Scajaquada Creek, Lower, and tribs (0101-0023)	Phosphorus
Erie	Scajaquada Creek, Middle, and tribs (0101-0033)	Phosphorus
Erie	Scajaquada Creek, Upper, and tribs (0101-0034)	Phosphorus
Erie	South Branch Smoke Cr, Lower, and tribs (0101-0036)	Phosphorus
Erie	South Branch Smoke Cr, Lower, and tribs (0101-0036)	Silt/Sediment
Genesee	Bigelow Creek and tribs (0402-0016)	Phosphorus
Genesee	Black Creek, Middle, and minor tribs (0402 0028)	Phosphorus
Genesee	Black Creek, Upper, and minor tribs (0402-0048)	Phosphorus
Genesee	Bowen Brook and tribs (0102-0036)	Phosphorus
Genesee	LeRoy Reservoir (0402-0003)	Phosphorus
Genesee	Mill Pond (0402-0050)	Phosphorus
Genesee	Oak Orchard Cr, Upper, and tribs (0301-0014)	Phosphorus
Genesee	Oatka Creek, Middle, and minor tribs (0402-0031)	Phosphorus
Genessee	Tonawanda Cr, Middle, Main Stem (0102-0002)	Phosphorus
Greene	Schoharie Reservoir (1202-0012)	Silt/Sediment
Greene	Sleepy Hollow Lake (1301-0059)	Silt/Sediment
Herkimer	Steele Creek tribs (1201-0197)	Phosphorus
Herkimer	Steele Creek tribs (1201-0197)	Silt/Sediment
Kings	Hendrix Creek (1701-0006) 18	Nitrogen
Kings	Prospect Park Lake (1701-0196)	Phosphorus
Lewis	Mill Creek/South Branch, and tribs (0801-0200)	Nutrients
Livingston	Christie Creek and tribs (0402-0060)	Phosphorus
Livingston	Conesus Lake (0402-0004)	Phosphorus
Livingston	Mill Creek and minor tribs (0404-0011)	Silt/Sediment
Monroe	Black Creek, Lower, and minor tribs (0402-0033)	Phosphorus
Monroe	Buck Pond (0301-0017)	Phosphorus
Monroe	Cranberry Pond (0301-0016)	Phosphorus
Monroe	Durand, Eastman Lakes (0302-0037)	Phosphorus
Monroe	Lake Ontario Shoreline, Western (0301-0069) 9	Phosphorus
Monroe	Long Pond (0301-0015)	Phosphorus
Monroe	Mill Creek and tribs (0302-0025)	Phosphorus 2
Monroe	Mill Creek/Blue Pond Outlet and tribs (0402-0049)	Phosphorus
Monroe	Minor Tribs to Irondequoit Bay (0302-0038)	Phosphorus
Monroe	Rochester Embayment - East (0302-0002) [9]	Phosphorus
Monroe	Rochester Embayment - West (0301-0068) 9	Phosphorus
Monroe	Shipbuilders Creek and tribs (0302-0026)	Phosphorus 2
Monroe	Thomas Creek/White Brook and tribs (0302-0023)	Phosphorus

Nassau	Bannister Creek/Bay (1701-0380)	Nitrogen
Nassau	Beaver Lake (1702-0152)	Phosphorus
Nassau	Browswere Bay (1701-0383)	Nitrogen
Nassau	Camaans Pond (1701-0052)	Phosphorus
Nassau	East Meadow Brook, Upper, and tribs (1701-0211)	Silt/Sediment
Nassau	East Rockaway Channel (1701-0381)	Nitrogen
Nassau	Glen Cove Creek, Lower, and tribs (1702-0146)	Silt/Sediment
Nassau	Grant Park Pond (1701-0054)	Phosphorus
Nassau	Hempstead Bay, Broad Channel (1701-0032)	Nitrogen
Nassau	Hempstead Lake (1701-0015)	Phosphorus
Nassau	Hewlett Bay (1701-0382)	Nitrogen
Nassau	Hog Island Channel (1701-0220)	Nitrogen
Nassau	Massapequa Creek, Upper, and tribs (1701-0174)	Phosphorus
Nassau	Milburn/Parsonage Creeks, Upp, and tribs (1701-0212)	Phosphorus
Nassau	Reynolds Channel, East (1701-0215) [12]	Nitrogen
Nassau	Reynolds Channel, West (1701-0216) 12	Nitrogen
Nassau	Tidal Tribs to Hempstead Bay (1701-0218)	Nitrogen
Nassau	Tribs (fresh) to East Bay (1701-0204)	Silt/Sediment
Nassau	Tribs (fresh) to East Bay (1701-0204)	Phosphorus
Nassau	Tribs to Smith Pond/Halls Pond (1701-0221)	Phosphorus
Nassau	Woodmere Channel (1701-0219)	Nitrogen
New York	Harlem Meer (1702-0103)	Phosphorus
New York	The Lake in Central Park (1702-0105)	Phosphorus
Niagara	Bergholtz Creek and tribs (0101-0004)	Phosphorus
Niagara	Hyde Park Lake (0101-0030)	Phosphorus
Niagara	Lake Ontario Shoreline, Western (0301-0053) 9	Phosphorus
Niagara	Lake Ontario Shoreline, Western (0301-0072) 9	Phosphorus
Oneida	Ballou, Nail Creeks (1201-0203)	Phosphorus
Onondaga	Ley Creek and tribs (0702-0001) 10	Nutrients (phosphorus)
Onondaga	Minor Tribs to Onondaga Lake (0702-0022) 10	Nutrients (phosphorus)
Onondaga	Minor Tribs to Onondaga Lake (0702-0022) 10	Nitrogen (NH3, NO2)
Onondaga	Onondaga Creek, Lower (0702-0023) 10	Nutrients (phosphorus)
Onondaga	Onondaga Creek, Lower, and tribs (0702-0023)	Turbidity
Onondaga	Onondaga Creek, Middle, and tribs (0702-0004)	Turbidity
Onondaga	Onondaga Creek, Upper, and tribs (0702-0024)	Turbidity
Ontario	Great Brook and minor tribs (0704-0034)	Phosphorus 2
Ontario	Great Brook and minor tribs (0704-0034)	Silt/Sediment

Ontario	Hemlock Lake Outlet and minor tribs (0402-0013)	Phosphorus
Ontario	Honeoye Lake (0402-0032)	Phosphorus
Orange	Brown Pond Reservoir (1303-0013)	Phosphorus
Orange	Lake Washington (1303-0012)	Phosphorus
Orange	Minor Tribs to Middle Wallkill (1306-0061)	Phosphorus
Orange	Monhagen Brook and tribs (1306-0074)	Phosphorus
Orange	Orange Lake (1301-0008) [16]	Phosphorus
Orange	Quaker Creek and tribs (1306-0025)	Phosphorus
Orange	Wallkill River, Middle, Main Stem (1306-0038)	Phosphorus
Orange	Wallkill River, Upper, and Minor tribs (1306-0017)	Phosphorus
Orleans	Glenvwood Lake (0301-0041)	Phosphorus
Orleans	Lake Ontario Shoreline, Western (0301-0070) 9	Phosphorus
Orleans	Lake Ontario Shoreline, Western (0301-0071) 9	Phosphorus
Oswego	Lake Neatahwanta (0701-0018)	Nutrients (phosphorus)
Oswego	Pleasant Lake (0703-0047)	Phosphorus
Putnam	Lost Lake, Putnam Lake (1302-0053)	Phosphorus
Putnam	Minor Tribs to Croton Falls Reservoir (1302-0001)	Phosphorus
Queens	Bergen Basin (1701-0009) 18	Nitrogen
Queens	Jamaica Bay, Eastern, and tribs, Queens (1701-0005) 18	Nitrogen
Queens	Kissena Lake (1702-0258)	Phosphorus
Queens	Meadow Lake (1702-0030)	Phosphorus
Queens	Shellbank Basin (1701-0001) 18	Nitrogen
Queens	Willow Lake (1702-0031)	Phosphorus
Rensselaer	Nassau Lake (1310-0001)	Phosphorus
Rensselaer	Snyders Lake (1301-0043)	Phosphorus
Richmond	Grassmere Lake/Bradys Pond (1701-0357)	Phosphorus
Rockland	Congers Lake, Swartout Lake (1501-0019)	Phosphorus
Rockland	Rockland Lake (1501-0021)	Phosphorus
Saratoga	Ballston Lake (1101-0036)	Phosphorus
Saratoga	Dwaas Kill and tribs (1101-0007)	Phosphorus
Saratoga	Dwaas Kill and tribs (1101-0007)	Silt/Sediment
Saratoga	Lake Lonely (1101-0034)	Phosphorus
Saratoga	Round Lake (1101-0060)	Phosphorus
Saratoga	Tribs to Lake Lonely (1101-0001)	Phosphorus
Schenectady	Collins Lake (1201-0077)	Phosphorus
Schenectady	Duane Lake (1311-0006)	Phosphorus
Schenectady Lake	Mariaville Lake (1201-0113)	Phosphorus
Schuyler	Cayuta Lake (0603-0005)	Phosphorus

Seneca	Reeder Creek and tribs (0705-0074)	Phosphorus
St.Lawrence	Black Lake Outlet, Black Lake (0906-0001)	Phosphorus
St.Lawrence	Fish Creek and minor tribs (0906-0026)	Phosphorus
Steuben	Smith Pond (0502-0012)	Phosphorus
Suffolk	Agawam Lake (1701-0117)	Phosphorus
Suffolk	Big/Little Fresh Ponds (1701-0125)	Phosphorus
Suffolk	Canaan Lake (1701-0018)	Phosphorus
Suffolk	Canaan Lake (1701-0018)	Silt/Sediment
Suffolk	Fresh Pond (1701-0241)	Phosphorus
Suffolk	Great South Bay, East (1701-0039)	Nitrogen
Suffolk	Great South Bay, Middle (1701-0040)	Nitrogen
Suffolk	Great South Bay, West (1701-0173)	Nitrogen
Suffolk	Lake Ronkonkoma (1701-0020)	Phosphorus
Suffolk	Mattituck/Marratooka Pond (1701-0129)	Phosphorus
Suffolk	Mill and Seven Ponds (1701-0113)	Phosphorus
Suffolk	Millers Pond (1702-0013)	Phosphorus
Suffolk	Moriches Bay, East (1701-0305)	Nitrogen
Suffolk	Moriches Bay, West (1701-0038)	Nitrogen
Suffolk	Quantuck Bay (1701-0042)	Nitrogen
Suffolk	Shinnecock Bay and Inlet (1701-0033)	Nitrogen
Suffolk	Tidal Tribs to West Moriches Bay (1701-0312)	Nitrogen
Sullivan	Bodine, Mongomery Lakes (1401-0091)	Phosphorus
Sullivan	Davies Lake (1402-0047)	Phosphorus
Sullivan	Evens Lake (1402-0004)	Phosphorus
Sullivan	Pleasure Lake (1402-0055)	Phosphorus
Sullivan	Swan Lake (1401-0063)	Phosphorus
Tompkins	Cayuga Lake, Southern End (0705-0040)	Phosphorus
Tompkins	Cayuga Lake, Southern End (0705-0040)	Silt/Sediment
Ulster	Ashokan Reservoir (1307-0004)	Silt/Sediment
Ulster	Esopus Creek, Lower, Main Stem (1307-0010) [17]	Turbidity
Ulster	Esopus Creek, Middle, Main Stem (1307-0003) 17	Turbidity
Ulster	Esopus Creek, Upper, and minor tribs (1307-0007)[3]	Silt/Sediment
Ulster	Wallkill River, Lower, Main Stem (1306-0027)	Phosphorus
Warren	Hague Brook and tribs (1006-0006)	Silt/Sediment
Warren	Huddle/Finkle Brooks and tribs (1006-0003)	Silt/Sediment
Warren	Indian Brook and tribs (1006-0002)	Silt/Sediment
Warren	Lake George (1006-0016) and tribs	Silt/Sediment
Warren	Tribs to Lake George, East Shore (1006-0020)	Silt/Sediment
Warren	Tribs to Lake George, Lk.George Village (1006-0008)	Silt/Sediment

Washington	Wood Cr/Champlain Canal and tribs (1005-0036)	Phosphorus
Westchester	Lake Katonah (1302-0136)	Phosphorus
Westchester	Lake Lincolndale (1302-0089)	Phosphorus
Westchester	Lake Meahagh (1301-0053)	Phosphorus
Westchester	Lake Mohegan (1301-0149)	Phosphorus
Westchester	Lake Shenorock (1302-0083)	Phosphorus
Westchester	Mamaroneck River, Lower (1702-0071)	Silt/Sediment
Westchester	Mamaroneck River, Upp, & minor tribs (1702-0123)	Silt/Sediment
Westchester	Saw Mill River (1301-0007)	Phosphorus
Westchester	Saw Mill River, Middle, and tribs (1301-0100)	Phosphorus
Westchester	Sheldrake River (1702-0069)	Phosphorus
Westchester	Sheldrake River (1702-0069)	Silt/Sedimnt
Westchester	Silver Lake (1702-0040)	Phosphorus
Westchester	Teatown Lake (1302-0150)	Phosphorus
Westchester	Truesdale Lake (1302-0054)	Phosphorus
Westchester	Wallace Pond (1301-0140)	Phosphorus

APPENDIX E – List of NYSDEC Regional Offices

Region	Covering the following counties:	DIVISION OF ENVIRONMENTAL PERMITS (DEP) Permit Administrators	DIVISION OF WATER (DOW) Water (SPDES) Program
1	Nassau and Suffolk	50 Circle Road Stony Brook, NY 11790 Tel. (631) 444-0365	50 Circle Road Stony Brook, NY 11790-3409 Tel. (631) 444-0405
2	Bronx, Kings, New York, Queens and Richmond	1 Hunters Point Plaza, 47-40 21st St. Long Island City, NY 11101-5407 Tel. (718) 482-4997	1 Hunters Point Plaza, 47-40 21st St. Long Island City, NY 11101-5407 Tel. (718) 482-4933
3	Dutchess, Orange, Putnam, Rockland, Sullivan, Ulster and Westchester	21 South Putt Corners Road New Paltz, NY 12561-1696 Tel. (845) 256-3059	220 White Plains Road, Suite 110 Tel. (914) 428 - 2505
4	Albany, Columbia, Delaware, Greene, Montgomery, Otsego, Rensselaer, Schenectady and Schoharie	1130 North Westcott Road Schenectady, NY 12306-2014 Tel. (518) 357-2069	1130 North Westcott Road Schenectady, NY 12306-2014 Tel. (518) 357-2045
5	Clinton, Essex, Franklin, Fulton, Hamilton, Saratoga, Warren and Washington	1115 State Route 86, Po Box 296 Ray Brook, NY 12977-0296 Tel. (518) 897-1234	232 Golf Course Road Warrensburg, NY 12885-1172 Tel. (518) 623-1200
6	HERKIMER, JEFFERSON, LEWIS, ONEIDA AND ST. LAWRENCE	STATE OFFICE BUILDING 317 WASHINGTON STREET WATERTOWN, NY 13601-3787 TEL. (315) 785-2245	STATE OFFICE BUILDING 207 GENESEE STREET UTICA, NY 13501-2885 TEL. (315) 793-2554
7	BROOME, CAYUGA, CHENANGO, CORTLAND, MADISON, ONONDAGA, OSWEGO, TIOGA AND TOMPKINS	5786 WIDEWATERS PARKWAY SYRACUSE, NY 13214-1867 TEL. (315) 426-7438	5786 WIDEWATERS PARKWAY SYRACUSE, NY 13214-1867 TEL. (315) 426-7500
8	CHEMUNG, GENESEE, LIVINGSTON, MONROE, ONTARIO, ORLEANS, SCHUYLER, SENECA, STEUBEN, WAYNE AND YATES	6274 EAST AVON-LIMA ROADAVON, NY 14414-9519 TEL. (585) 226-2466	6274 EAST AVON-LIMA RD. AVON, NY 14414-9519 TEL. (585) 226-2466
9	ALLEGANY, CATTARAUGUS, CHAUTAUQUA, ERIE, NIAGARA AND WYOMING	700 DELAWARE AVENUE BUFFALO, NY 14209-2999 TEL. (716) 851-7165	700 DELAWARE AVENUE BUFFALO, NY 14209-2999 TEL. (716) 851-7070

APPENDIX F – SWPPP Preparer Certification Form

The SWPPP Preparer Certification Form required by this permit begins on the following page.

SWPPP Preparer Certification Form

SPDES General Permit for Stormwater Discharges from Construction Activity, GP-0-25-001 (CGP)

(In accordance with CGP Part I.D.2.b., the completed form must be attached to the eNOI and submitted to NYSDEC electronically.)

Project/Site Name:

eNOI Submission ID:

Owner/Operator Name:

Certification Statement – SWPPP Preparer

I hereby certify that the Stormwater Pollution Prevention Plan (SWPPP) has been prepared in accordance with the requirements of GP-0-25-001. I certify under penalty of law that the SWPPP and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

SWPPP Preparer First Name | MI | SWPPP Preparer Last Name

Signature

Date

Revised: January 2025

APPENDIX G – MS4 SWPPP Acceptance Form

The MS4 SWPPP Acceptance Form required by this permit begins on the following page.

MS4 SWPPP Acceptance Form

for construction activities seeking authorization under the

SPDES General Permit for Stormwater Discharges from Construction Activity, GP-0-25-001 (CGP)

(In accordance with CGP Part I.D.2.b., the completed form must be attached to the eNOI and submitted to NYSDEC electronically.)

I. Project Owner/Operator Information
1. Owner/Operator Name:
2. Contact Person:
3. Street Address:
4. City/State/Zip:
II. Project Site Information
5. Project/Site Name:
6. Street Address:
7. City/State/Zip:
III. Stormwater Pollution Prevention Plan (SWPPP) Review and Acceptance Information
8. SWPPP Reviewed by:
9. Title/Position:
10. Date Final SWPPP Reviewed and Accepted:
IV. Regulated MS4 Information
11. Name of MS4 Operator:
12. MS4 SPDES Permit Identification Number: NYR20A
13. Street Address:
14. City/State/Zip:
15. Telephone Number:

MS4 SWPPP Acceptance Form - continued

V. Certification Statement - MS4 Official (principal executive officer or ranking elected official) or Duly Authorized Representative

I hereby certify that the final Stormwater Pollution Prevention Plan (SWPPP) for the construction project identified in section II. of this form has been reviewed and meets the substantive requirements in the SPDES General Permit for Stormwater Discharges from Construction Activity, GP-0-25-001 (CGP). Note: The MS4 Operator, through the acceptance of the SWPPP, assumes no responsibility for the accuracy and adequacy of the design included in the SWPPP. In addition, review and acceptance of the SWPPP by the MS4 Operator does not relieve the owner/operator or their SWPPP preparer of responsibility or liability for errors or omissions in the plan.

Printed Name[1]:

Title/Position:

Signature:

Date:

VI. Additional Information

[1] Printed name of the principal executive officer or ranking elected official for the MS4 Operator or their duly authorized representative in accordance with CGP Part VII.J.2.

APPENDIX H – NYCDEP SWPPP Acceptance/Approval Form

The City of New York Department of Environmental Protection (NYCDEP) SWPPP Acceptance/Approval form required by this permit begins on the following page.

THE CITY OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL PROTECTION
Bureau of Environmental Planning and Analysis
59-17 Junction Blvd., 9th Floor; Flushing, NY 11373

SWPPP Acceptance/Approval

Application Number:

I. Project Owner/Operator Information

1. Owner/Operator Name:
2. Contact Person:
3. Street Address:
4. City/State/Zip:

II. Project Site Information

5. Project/Site Name:
6. Street Address:
7. City/State/Zip:

III. Stormwater Pollution Prevention Plan (SWPPP) Review and Acceptance/Approval

8. SWPPP Reviewed by:
9. Title/Position: /
10. Date Final SWPPP Reviewed and Accepted:
11. Acceptance/Approval Expiration Date:

IV. Regulated MS4 Information for projects that require coverage under the NY State Pollution Discharge Elimination System General Permit for Stormwater Discharges from Construction Activity

12. Name of MS4: *CITY OF NEW YORK*
13. MS4 SPDES Permit Identification Number: *NY-0287890*
14. Contact Person:
15. Street Address: *59-17 Junction Blvd. 9th Floor*
16. City/State/Zip: *Flushing, NY 11373*
17. Telephone Number:

Projects in the MS4 area must submit a copy of this SWPPP Acceptance with a Notice of Intent for coverage under the NY SPDES General Permit for Stormwater Discharges from Construction Activity to: NYS Department of Environmental Conservation, Division of Water; 625 Broadway, 4th Floor; Albany, New York 12233-3505.

THE CITY OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL PROTECTION
Bureau of Environmental Planning and Analysis
59-17 Junction Blvd., 9th Floor; Flushing, NY 11373

V. Certification Statement - MS4 Official (principal executive officer or ranking elected official) or Duly Authorized Representative

I hereby certify that the final Stormwater Pollution Prevention Plan (SWPPP) for the construction project identified in question 5 has been reviewed and meets the substantive requirements in the SPDES General Permit For Stormwater Discharges from Municipal Separate Storm Sewer Systems (MS4s).

Note: The MS4, through the acceptance of the SWPPP, assumes no responsibility for the accuracy and adequacy of the design included in the SWPPP. In addition, review and acceptance of the SWPPP by the MS4 does not relieve the owner/operator or their SWPPP preparer of responsibility or liability for errors or omissions in the plan.

Printed Name:

Title/Position:

Signature:

Date:

VI. Conditions of Acceptance/Approval and Additional Information

Projects in the MS4 area must submit a copy of this SWPPP Acceptance with a Notice of Intent for coverage under the NY SPDES General Permit for Stormwater Discharges from Construction Activity to: NYS Department of Environmental Conservation, Division of Water; 625 Broadway, 4th Floor; Albany, New York 12233-3505.

APPENDIX I – MS4 No Jurisdiction Form

The MS4 No Jurisdiction Form required by this permit begins on the following page.

MS4 No Jurisdiction Form

for construction activities seeking authorization under the

SPDES General Permit for Stormwater Discharges from Construction Activity, GP-0-25-001 (CGP)

(In accordance with CGP Part I.D.2.b., the completed form must be attached to the eNOI and submitted to NYSDEC electronically.)

I. Project Owner/Operator Information

a. Owner/Operator Name:

b. Contact Person:

c. Street Address:

d. City/State/Zip:

II. Project Site Information

a. Project/Site Name:

b. Street Address:

c. City/State/Zip:

d. eNOI Submission ID:

III. Traditional Land Use Control MS4 Operator Information

a. Name of MS4 Operator:

b. MS4 SPDES Permit ID Number: NYR20A

c. Street Address:

d. City/State/Zip:

e. Telephone Number:

IV. Certification Statement

In accordance with CGP Part I.D.2.b.ii.3., I hereby certify that the Traditional Land Use Control MS4 Operator identified in section III. of this form does not have review authority over the construction project identified in section II. of this form, which is owned/operated by the entity identified in section I. of this form. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

a. Printed name of the principal executive officer or ranking elected official for the MS4 Operator or their duly authorized representative in accordance with CGP Part VII.J.2.:

b. Title/Position:

c. Signature:

d. Date:

APPENDIX J – Owner/Operator Certification Form

The Owner/Operator Certification Form required by this permit begins on the following page.

Owner/Operator Certification Form

SPDES General Permit for Stormwater Discharges from Construction Activity, GP-0-25-001 (CGP)

(In accordance with CGP Part I.D.2.b. or Part I.F.2. and 3., the completed form must be attached to the eNOI or the Request to Continue Coverage, and submitted to NYSDEC electronically.

Project/Site Name: _____

eNOI Submission ID: _____

eNOI Submitted by: ☐ **Owner/Operator** ☐ **SWPPP Preparer** ☐ **Other**

Certification Statement - Owner/Operator

I hereby certify that I read, and will comply with, the GP-0-25-001 permit requirements. I understand that authorization to discharge under the permit for the project/site named above is dependent on receipt of a Letter of Authorization (LOA) or a Letter of Continued Coverage (LOCC) from the New York State Department of Environmental Conservation (NYSDEC) in accordance with CGP Part I.D.3.b. or Part I.F.4. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Owner/Operator First Name MI Owner/Operator Last Name

_____

Signature

_____

Date

Revised: January 2025

APPENDIX K

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

Tree Planting Stormwater Management Practices Level 1 Inspection Checklist

SMP ID #		**SMP Owner**		☐ Private ☐ Public
SMP Location (Address; Latitude & Longitude)				
	Latitude		**Longitude**	

Party Responsible for Maintenance	**System Type**		**Type of Site**
☐ Same as SMP Owner ☐ Other _____	☐ Seasonal ☐ Continuous Use ☐ Other	☐ Above Ground ☐ Below Ground	☐ Commercial ☐ Industrial ☐ Residential ☐ State

Inspection Date		**Inspection Time**	
Inspector			
Date of Last Inspection			

TP Watering

Inspect the trees to determine whether they need watering.

Problem (Check if Present)	**Follow-Up Actions**
☐ Soil is not moist to the touch and/or it has not rained in a week, and leaves/needles are starting to appear wilted/dry.	☐ Water trees deeply and slowly near the base. Soaker hoses and drip irrigation work best for deep watering of trees and shrubs. ☐ Other:

TP Mulch

Mulch should be applied in the late spring and during leaf fall. Check the depth of mulch regularly. Rake the old mulch to break up any matted layers and to refresh the appearance.

Problem (Check if Present)	Follow-Up Actions
☐ Mulch is too thin or thick (should be approximately 3" deep) or does not extend to tree canopy (or 5' radius if tree has a larger than 10' canopy reach).	☐ Add or remove mulch around tree canopy to maximum 5' radius but not within 3" of the bark. ☐ If mulch is against the stems or tree trunks, pull it back several inches to expose the base of the trunk and root crown. ☐ Other:

TP Pruning

Examine the branches and tree shape.

Problem (Check if Present)	Follow-Up Actions
☐ Presence of suckers, dead or diseased branches, branches that interfere with pedestrian traffic	☐ Selective cutting ☐ Prune to make the tree more aesthetically pleasing and remove disease. ☐ Other:
	☐ Kick-Out to Level 2 Inspection: Use an arborist or landscaper for more extensive pruning jobs.

Additional Notes:

Inspector:_____ Date: _____

Complete the following if follow-up/corrective actions were identified during this inspection:

Certified Completion of Follow-Up Actions:

> "I hereby certify that the follow-up/corrective actions identified in the inspection performed on _____ (DATE) have been completed and any required maintenance deficiencies have been adequately corrected."

Inspector/Operator: _____ Date: _____

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

Tree Planting Stormwater Management Practices
Level 2 Inspection Checklist

SMP ID #		**SMP Owner**		☐ Private ☐ Public
SMP Location (Address; Latitude & Longitude)				
	Latitude		**Longitude**	

Party Responsible for Maintenance	**System Type**		**Type of Site**
☐ Same as SMP Owner ☐ Other _____	☐ Seasonal ☐ Continuous Use ☐ Other	☐ Above Ground ☐ Below Ground	☐ Commercial ☐ Industrial ☐ Residential ☐ State

Inspection Date		**Inspection Time**	
Inspector			
Date of Last Inspection			

Level 2 Inspection: TREE PLANTING	
Recommended Repairs	**Triggers for Level 3 Inspection**
Observed Condition: Appearance of fungus or pest damage	
☐ Condition 1: Fungus, discoloration, browning leaves or holes in leaves Check with arborist or other tree professional about the best way to proceed. This requires a Level 3 inspection. ☐ Condition 2: Burrowing insects, holes Check with arborist or other tree professional about the best way to proceed. This requires a Level 3 inspection.	• Any concerns about how to address infestation or disease ☐ Level 3 inspection necessary

Notes:

Inspector:_____ Date: _____

Complete the following if follow-up/corrective actions were identified during this inspection:

Certified Completion of Follow-Up Actions:

"I hereby certify that the follow-up/corrective actions identified in the inspection performed on _____ (DATE) have been completed and any required maintenance deficiencies have been adequately corrected."

Inspector/Operator: _____ Date: _____

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

Infiltration Stormwater Management Practices Level 1 Inspection Checklist

SMP ID #		**SMP Owner**		☐ Private ☐ Public
SMP Location (Address; Latitude & Longitude)				
	Latitude		**Longitude**	

Party Responsible for Maintenance	**System Type**		**Type of Site**
☐ Same as SMP Owner ☐ Other _____	☐ Seasonal ☐ Continuous Use ☐ Other	☐ Above Ground ☐ Below Ground	☐ Commercial ☐ Industrial ☐ Residential ☐ State

Inspection Date		**Inspection Time**	
Inspector			
Date of Last Inspection			

IN Drainage Area

Look for both pervious and impervious areas that are uphill from the Infiltration cell.

Problem (Check if Present)		**Follow-Up Actions**
	☐ Bare soil, erosion of the ground (rills washing out the dirt)	☐ Seed and straw areas of bare soil to establish vegetation. ☐ Fill in erosion areas with soil, compact, and seed and straw to get vegetation established. ☐ If a rill or small channel is forming, try to redirect water flowing to this area by creating a small berm or adding topsoil to areas that are heavily compacted. ☐ Other:

IN Drainage Area

Look for both pervious and impervious areas that are uphill from the Infiltration cell.

Problem (Check if Present)		Follow-Up Actions
		☐ Kick-Out to Level 2 Inspection: Large areas of soil have been eroded, or larger channels are forming. May require rerouting of flow paths.
☐ For Dry Wells: Leaves, sticks, or other debris in gutters and downspouts		☐ Remove all debris by hand. ☐ Other:
	☐ Piles of grass clippings, mulch, dirt, salt, or other materials	☐ Remove or cover piles of grass clippings, mulch, dirt, etc. ☐ Other:
	☐ Open containers of oil, grease, paint, or other substances	☐ Cover or properly dispose of materials; consult your local solid waste authority for guidance on materials that may be toxic or hazardous. ☐ Other:

IN Inlets

Look for all the places where water flows into the Infiltration practice.

Problem (Check if Present)	Follow-Up Actions
 ☐ Inlets are collecting grit and debris or grass/weeds are growing. Some water may not be getting into the Infiltration practice.	☐ Use a flat shovel to remove grit and debris (especially at curb inlets or openings). Parking lots generate fine grit that will accumulate at these spots. ☐ Pull out clumps of growing grass or weeds and scoop out the soil or grit that the plants are growing in. ☐ Remove any grass clippings, leaves, sticks, and other debris that is collecting at inlets. ☐ For pipes and ditches, remove sediment and debris that is partially blocking the pipe or ditch opening where it enters the Infiltration practice. ☐ Dispose of all material properly in an area where it will not re-enter the practice. ☐ Other: ☐ Kick-Out to Level 2 Inspection: Inlets are blocked to the extent that most of the water does not seem to be entering the Infiltration practice.
☐ Some or all of the inlets are eroding so that rills, gullies, and other erosion is present, or there is bare dirt that is washing into the Infiltration practice.	☐ For small areas of erosion, smooth out the eroded part and apply rock or stone (e.g., river cobble) to prevent further erosion. Usually, filter fabric is placed under the rock or stone. ☐ In some cases, reseeding and applying erosion-control matting can be used to prevent further erosion. Some of these materials may be available at a garden center, but it may be best to consult a landscape contractor. ☐ Other: ☐ Kick-Out to Level 2 Inspection: Erosion is occurring at most of the inlets and it looks like there is too much water that is concentrating at these points. The inlet design may have to be modified.

IN Infiltration Area

Examine the surface of the infiltration area and the observation well. Note: The following Problem and Follow-Up Actions apply to infiltration practice pretreatment areas also.

Problem (Check if Present)	Follow-Up Actions
 ☐ For grass-covered Infiltration practices: grass has grown very tall, *Photo credit: Stormwater Maintenance, LLC*	☐ Mow infiltration area at least twice per year. ☐ Other:
 ☐ For grass-covered Infiltration practices: sparse vegetation cover or bare spots	☐ Add topsoil (as needed), grass seed, straw, and water during the growing season to re-establish consistent grass coverage. ☐ Other: ☐ Kick-Out to Level 2 Inspection: Sparse vegetation cover can be a sign that the infiltration area is not infiltrating at the proper rate and water is standing too long after a storm. The surface may be saturated or squishy, and the conditions do not enable grass to grow. This situation should be evaluated by a Level 2 Inspection and likely corrected by a qualified contractor.
☐ Minor areas of sediment, grit, trash, or other debris are accumulating on the surface.	☐ Use a shovel to scoop out minor areas of sediment or grit, especially in the spring after winter sanding materials may wash in and accumulate. Dispose of the material where it cannot re-enter the Infiltration practice. ☐ If removing the material creates a hole or low area, rake the surface smooth and level. ☐ Remove trash, debris, and other undesirable materials. ☐ Other: ☐ Kick-Out to Level 2 Inspection: Sediment has accumulated more than 2-inches deep and covers 25% or more of the surface of the Infiltration area.

IN Infiltration Area

Examine the surface of the infiltration area and the observation well. Note: The following Problem and Follow-Up Actions apply to infiltration practice pretreatment areas also.

Problem (Check if Present)	Follow-Up Actions
 ☐ There is erosion on the surface; water seems to be carving out rills as it flows across the surface of the Infiltration area or sinkholes are forming in certain areas.	☐ For minor areas of erosion, try filling the eroded areas with clean topsoil, sand, or stone (whatever the existing cover is). ☐ If the problem recurs, you may have to use larger stone (e.g., river cobble) to fill in problem areas. ☐ Other: ☐ Kick-Out to Level 2 Inspection: The problem persists or the erosion is more than 3-inches deep and seems to be an issue with how water enters and moves through the infiltration area. ☐ Kick-Out to Level 2 Inspection: The problem does not seem to be caused by flowing water but a collapse or sinking of the surface (e.g., “sinkhole”) due to some underground problem.
 ☐ Observation well is damaged or cap is missing	☐ Kick-Out to Level 2 Inspection: Requires replacing pipes or caps.

IN Infiltration Area

Examine the surface of the infiltration area and the observation well. Note: The following Problem and Follow-Up Actions apply to infiltration practice pretreatment areas also.

Problem (Check if Present)	Follow-Up Actions
 ☐ Water still visible in the observation well more than 72 hours after a rain storm. The Infiltration practice does not appear to be draining properly.	☐ Kick-Out to Level 2 Inspection: This is generally a serious problem, and it will be necessary to activate a Level 2 Inspection.

IN Outlets

Locate and inspect all outlets.

Problem (Check if Present)	Follow-Up Actions
 ☐ Outlet obstructed with sediment, debris, trash, etc.	☐ Remove the debris and dispose of it where it cannot re-enter the infiltration area. ☐ Other:
	☐ Kick-Out to Level 2 Inspection: Outlet is completely obstructed; there is too much material to remove by hand or with simple hand tools.
☐ Rills or gullies are forming at outlet.	☐ For minor rills, fill in with soil, compact, and seed and straw to establish vegetation. ☐ Other:
	☐ Kick-Out to Level 2 Inspection: Rills are more than 2" to 3" deep and require more than just hand raking and re-seeding.

Additional Notes:

Inspector:_____ Date: _____

Complete the following if follow-up/corrective actions were identified during this inspection:

Certified Completion of Follow-Up Actions:

"I hereby certify that the follow-up/corrective actions identified in the inspection performed on _____ (DATE) have been completed and any required maintenance deficiencies have been adequately corrected."

Inspector/Operator: _____ Date: _____

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

Infiltration Stormwater Management Practices Level 2 Inspection Checklist

SMP ID #		**SMP Owner**		☐ Private ☐ Public
SMP Location (Address; Latitude & Longitude)				
	Latitude		**Longitude**	

Party Responsible for Maintenance	**System Type**		**Type of Site**
☐ Same as SMP Owner ☐ Other _____	☐ Seasonal ☐ Continuous Use ☐ Other	☐ Above Ground ☐ Below Ground	☐ Commercial ☐ Industrial ☐ Residential ☐ State

Inspection Date		**Inspection Time**	
Inspector			
Date of Last Inspection			

Level 2 Inspection: INFILTRATION

Recommended Repairs	Triggers for Level 3 Inspection
Observed Condition: Water Stands on Surface for More than 72 Hours after Storm	
☐ Condition 1: Small pockets of standing water For infiltration basins with soil, use a soil probe or auger to examine the soil profile. For gravel infiltration trenches or basins, use a shovel to dig into the gravel layer where the problem is occurring. If isolated areas have accumulated grit, fine silt, or vegetative debris or have bad soil or clogged gravel, try removing and replacing with clean material. If the practice is supposed to have grass cover, it will likely be necessary to replant once the problem is resolved. ☐ Condition 2: Standing water is widespread or covers entire surface Look in the observation well (if it exists) and use a tape measure to estimate the depth of water standing in the soil or gravel. Requires diagnosis and resolution of problem: ≠ Too much sediment/grit washing in from drainage area? ≠ Too much ponding depth? ≠ Improper infiltration media? ≠ Underlying soil not suitable for infiltration? As above, the resolution will likely require replanting and re-establishment of good grass cover if this is part of the design.	≠ Infiltration media is clogged and problem cannot be diagnosed from Level 2 inspection. ≠ Level 2 inspection identifies problem, but it cannot be resolved easily or it is associated with the original design of the practice. ☐ Level 3 Inspection necessary
Observed Condition: Severe erosion of infiltration bed, inlets, or around outlets	
☐ Condition 1: Erosion at inlets The lining (e.g., grass, matting, stone, rock) may not be adequate for the actual flow velocities coming through the inlets. First line of defense is to try a less erosive lining and/or extending the lining further down to where inlet slopes meet the infiltration surface. If problem persists, analysis by a Qualified Professional is warranted. ☐ Condition 2: Erosion of infiltration bed This is often caused by “preferential flow paths” along the surface. The source of flow should be analyzed and methods employed to dissipate energy and disperse the flow (e.g., check dams, rock splash pads).	≠ Erosion (rills, gullies) is more than 12 inches deep ≠ The issue is not caused by moving water but some sort of subsurface defect, which may manifest as a sinkhole or linear depression and be associated with problems with the underlying stone or soil. ☐ Level 3 Inspection necessary

Notes:

Inspector:_____ Date: _____

Complete the following if follow-up/corrective actions were identified during this inspection:

Certified Completion of Follow-Up Actions:

"I hereby certify that the follow-up/corrective actions identified in the inspection performed on _____ (DATE) have been completed and any required maintenance deficiencies have been adequately corrected."

Inspector/Operator: _____ Date: _____

APPENDIX L

Infiltration Basin (I-2)

Design Point:	

Enter Site Data For Drainage Area to be Treated by Practice							
Drainage Area Number	**Contributing Area** (Acres)	**Impervious Area** (Acres)	**Percent Impervious** %	**Rv**	**WQv** (cf)	**Precipitation** (in)	**Description**
2	3.03	1.38	46	0.46	9,965	1.97	Infiltration Basin

Design Criteria		
Enter underlying soil infiltration rate (based on geotechnical testing, refer to Appendix D)	24	
Is the contributing area to the practice an "Infiltration Restricted" stormwater hotspot?	No	
Is the contributing area to the practice an "Infiltration Prohibited" stormwater hotspot?	No	
Maximum contributing area (acres)	50	
Is the contributing area greater than the maximum allowed contributing area?	No	
Enter depth to seasonal high water table (ft)	13	
Enter depth to bedrock (ft)	25	
Enter pretreatment volume provided (cf)	5014	
Enter depth of freeboard (ft)	1	
Enter depth of basin (ft)	5.5	
Enter slope of maintenance access (%)	2	
Enter width of maintenance access (ft)	12	

Sizing Criteria				
		Value	Units	Notes
Water Quality Volume	WQv	9965	cf	
Basin depth	db	5.5	ft	
Required Surface Area	Ab	1,812	sf	
Enter Surface Area Provided	Ab	1998	sf	

Determine Runoff Reduction		
RRv Provided	**9,965**	***cf***

NOI QUESTIONS

#	NOI Question	Reported Value	
		cf	af
28	Total Water Quality Volume (WQv) Required	10864	0.249
30	Total RRV Provided	9965	0.229
31	Is RRv Provided ≥WQv Required?	No	
32	Minimum RRv	13242	0.304
32a	Is RRv Provided ≥ Minimum RRv Required?	No	
	Contact Regional DEC Office		
33a	Total WQv Treated	0	0.000
34	Sum of Volume Reduced & Treated	9965	0.229
35	Is Sum RRv Provided and WQv Provided ≥WQv Required?	No	

Step 3 - Evaluation of RR Techniques and Standard SMPs with RRv Capacity

	Practice	Description	Applicable	Project Specific Evaluation
RR Techniques	**Conservation of Natural Areas (RR-1)**	Retain the pre-development hydrologic and water quality characteristics of undisturbed natural areas by permanently conserving these areas on a site. Undisturbed natural areas include: forest retention areas; reforestation areas; stream and river corridors; shorelines; wetlands, vernal pools, and associated vegetated buffers; and undisturbed open space.	No	EXAMPLES - The project site does not contain any significant natural resources. **OR** As a Redevelopment Project, the proposed site layout has been designed to limit land disturbance to the greatest extent practical. **OR** Approximately XX+/- Acres will be placed into permanent conservation, which accounts for XX% of the total property. **OR** The project does not propose permanent conservation of these areas at this time.
	Sheet Flow to Riparian Buffer/Filter Strip (RR-2)	Undisturbed natural areas such as forested conservation areas and stream buffers or vegetated filter strips and riparian buffers can be used to treat and control stormwater runoff from some areas of a development project.	No	EXAMPLES - The project site does not contain any riparian buffers. **OR** Sheet flow to riparian buffers or grass filter strips is not proposed at this time. The project proposes treatment by RR techniques, Standard SMPs with RRv capacity, or Standard SMPs without RRv capacity. **OR** The project proposes sheet flow to riparian buffers to reduce runoff from XX. Calculations have been provided in the SWPPP. **OR** The project proposes sheet flow to grass filter strips to reduce runoff from XX. Calculations have been provided in the SWPPP.
	Tree Planting/Tree Pit/Tree Trench (RR-3)	Plant or conserve trees to reduce stormwater runoff, increase nutrient uptake, and provide bank stabilization. Trees can be used for applications such as landscaping, stormwater management practice areas, conservation areas and erosion and sediment control.	No	EXAMPLES - The project proposes the preservation of existing mature trees, as well as the planting of numerous trees throughout the site, in order to reduce stormwater runoff, increase nutrient uptake, and provide bank stabilization. **OR** The project proposes new tree plantings/tree pits/tree trenches, adjacent to impervious surfaces, Calculations have been provided in the SWPPP. **OR** Tree plantings/tree pits/tree trenches are proposed on site. However, credit for these trees will not be taken toward area reduction/volume reduction in the RRv calculations.
	Disconnection of Rooftop Runoff (RR-4)	Direct runoff from rooftop areas and upland overland runoff flow to designated pervious areas to reduce runoff volumes and rates.	No	EXAMPLES - The building roof(s) will be directed to downspouts with splash blocks and discharge over a grassed filter. Calculations have been provided in the SWPPP. **OR** The building roof(s) will be directed to downspouts with splash blocks and vegetated areas, which will promote sheet flow and filtering. However, credit for rooftop disconnect will not be taken toward an impervious area reduction in the RRv calculations. **OR** Due to the size/use/layout of the proposed building(s), rooftop disconnect is not proposed at this time.

Steps 3 and 5 - Apply RR Techniques and Standard SMPs

Runoff Reduction Volume and Treated Volumes						
	Runoff Reduction Techiques/Standard SMPs		**Total Contributing Area**	**Total Contributing Impervious Area**	**WQv Reduced (RRv)**	**WQv Treated**
			(acres)	**(acres)**	**(cf)**	**(cf)**
RR Techniques	Conservation of Natural Areas	RR-1	0.00		0	
	Sheet Flow to Riparian Buffer/Filter Strip	RR-2	0.00	0.00	0	
	Tree Planting/Tree Pit/Tree Trench	RR-3	0.00	0.00	0	
	Disconnection of Rooftop Runoff	RR-4		0.00	0	
	Vegetated Swale	RR-5	0.00	0.00	0	
	Rain Garden	RR-6	0.89	0.09	0	
	Stormwater Planter	RR-7	0.00	0.00	0	
	Rainwater Harvesting Systems	RR-8	0.00	0.00	0	
	Porous Pavement	RR-9	0.00	0.00	0	
	Green Roof (Extensive & Intensive)	RR-10	0.00	0.00	0	
	Stream Daylighting	RR-11				
Standard SMPs w/ RRv Capacity	Infiltration Trench	I-1	0.00	0.00	0	0
	Infiltration Basin	I-2	3.03	1.38	9,965	0
	Dry Well	I-3	0.00	0.00	0	0
	Underground Infiltration System	I-4	0.00	0.00	0	0
	Infiltration Bioretention	F-4	0.00	0.00	0	0
	Filtration Bioretention	F-5	0.00	0.00	0	0
	Bioslope	F-6	0.00	0.00	0	0
	Dry swale	O-1	0.00	0.00	0	0
Standard SMPs	Micropool Extended Detention	P-1	0.00	0.00		0
	Wet Pond	P-2	0.00	0.00		0
	Wet Extended Detention	P-3	0.00	0.00		0
	Multiple Pond System	P-4	0.00	0.00		0
	Shallow Wetland	W-1	0.00	0.00		0
	Extended Detention Shallow Wetland	W-2	0.00	0.00		0
	Pond/Wetland System	W-3	0.00	0.00		0
	Pocket Wetland	W-4	0.00	0.00		0
	Gravel Wetland	W-5	0.00	0.00		0
	Surface Sand Filter	F-1	0.00	0.00		0
	Underground Sand Filter	F-2	0.00	0.00		0
	Perimeter Sand Filter	F-3	0.00	0.00		0
	Wet Swale	O-2	0.00	0.00		0
Alt. SMPs	Flow Based Alternative Practice	-	0.00	0.00		0
	Volume Based Alternative Practice	-				
	Totals by RR Technique →		0.89	0.09	0	
	Totals by Standard SMP w/RRV →		3.03	1.38	9,965	0
	Totals by Standard SMP →		0.00	0.00		0
	Totals by Alternative SMP →		0.00	0.00		0
	Totals (RR Techniques + all SMPs) →		3.92	1.47	9,965	0

Step 1 - Site Planning

	Practice	Description	Applicable	Project Specific Evaluation
Preservation of Natural Features and Conservation Design	**Preservation of Undisturbed Areas**	Delineate and protect undisturbed forests, native vegetated areas, riparian corridors, water bodies, wetlands, and natural terrain.	No	EXAMPLES - Approximately XX+/- Acres of land will remain undisturbed, in its natural state, which accounts for XX% of the total project parcel. **OR** The project does not propose permanent conservation of this area at this time.
	Preservation of Buffers	Delineate and protect naturally vegetated buffers along perennial streams, rivers, shorelines, and wetlands.	No	EXAMPLES - There is a stream/river/shorline/wetland located on the project site. For the area adjacent to this water body, a XX-ft naturally vegetated buffer will be applied. No disturbance will occur within this buffer. **OR** The only disturbance that will occur within this buffer will include XX. This disturbance is necessary because XX. **OR** There are no water bodies located on or adjacent to the project site.
	Reduction of Clearing and Grading	Limit clearing and grading to the minimum amount needed for roads, driveways, foundations, utilities and stormwater management facilities.	Yes	EXAMPLES - Clearing and grading will be limited to the area of disturbance and will be minimized to the greatest extent practical. The limits of all proposed clearing will be demarcated in the field with orange construction fencing, prior to construction, to prevent unnecessary removal of trees.
	Locating Development in Less Sensitive Areas	Avoid sensitive resource areas such as floodplains, steep slopes, erodible soils, wetlands, mature forests and critical habitats by locating development to fit the terrain in areas that will create the least impact.	No	EXAMPLES - The site has been designed to avoid sensitive resource areas to the greatest extent practical. Include project specific information for the various sensitive resources. **OR** There are no floodplains, steep slopes, erodible soils, wetlands, mature forests or critical habitats located on the project site.
	Open Space Design	Use clustering, conservation design or open space design to reduce impervious cover, preserve more open space and protect water resources.	N/A	EXAMPLES - The site layout has been designed to maximize open space. Impervious surfaces have been minimized to the greatest extent practical and approximately XX+/- Acres will be maintained as vegetated open space.
	Soil Restoration	Restore the original properties and porosity of the soil by deep till and amendment with compost to reduce the generation of runoff and enhance the runoff reduction performance of post construction practices.	Yes	EXAMPLES - All disturbed areas will be restored in accordance with the Soil Restoration requirements in Table 5.3 of the Design Manual. **OR** Compacted areas were considered as impervious cover when calculating the WQv Required and the compacted areas were assigned a post-construction HSG designation that is one level less permeable than existing conditions for the hydrology analysis.

Step 1 - Site Planning

Reduction of Impervious Cover	**Roadway Reduction**	Minimize roadway widths and lengths, below local requirements, to reduce site impervious area	No	EXAMPLES - Proposed roadways will be constructed with a porous XX surface, in order to minimize the overall impervious surface. **OR** The project proposes to reduce the roadway width to XX-ft, from the required XX-ft. **OR** Reducing the roadway width is not feasible for the project's intended use. **OR** No new roadways are proposed as part of this project.
	Sidewalk Reduction	Minimize sidewalk lengths and widths, below local requirements, to reduce site impervious area	No	EXAMPLES - All pedestrian walkways will be constructed with a porous XX surface. **OR** Sidewalk widths have been minimized to X-ft and quantity of sidewalk has been reduced to that required to ensure safe pedestrian access throughout the site. **OR** Reducing the sidewalk width/length is not feasible for the project's intended use. **OR** No new sidewalks are proposed as part of this project.
	Driveway Reduction	Minimize driveway lengths and widths, below local requirements, to reduce site impervious area	N/A	EXAMPLES - All driveways on-site will be constructed with a permeable XX surface, where feasible, in order to minimize the overall impervious surface. **OR** The project proposes to reduce the driveway width to XX-ft, instead of the required XX-ft. **OR** Reducing the driveway width is not feasible for the intended use. **OR** No new driveways are proposed as part of this project.
	Cul-de-sac Reduction	Minimize the number of cul-de-sacs and incorporate landscaped areas to reduce their impervious cover.	N/A	EXAMPLES - Proposed cul-de-sacs will utilize a landscaped island to reduce impervious cover. **OR** No cul-de-sacs are proposed as part of this project.
	Building Footprint Reduction	Reduce the impervious footprint of residences and commercial buildings by using alternate or taller buildings while maintaining the same floor to area ratio.	Yes	EXAMPLES - All new building area has been allocated to efficiently implement the intended use. **OR** No new buildings are proposed as part of this project. **OR** The current proposal involves the renovation and reuse of XX existing buildings on-site.
	Parking Reduction	Reduce imperviousness on parking lots by eliminating unneeded spaces, providing compact car spaces and efficient parking lanes, reducing stall dimensions below local requirements, using porous pavement surfaces in overflow parking areas, and using multi-storied parking decks where appropriate.	No	EXAMPLES - All parking lots will be constructed of a porous XX surface, to reduce overall impervious surfaces. **OR** The project proposes to reduce the parking stall dimensions to X-ft wide by XX-ft long, instead of the required XX-ft by XX-ft stall. **OR** The project proposes to reduce the number of parking stalls proposed to XX, instead of the required XX, resulting in an approximate XX% reduction in impervious. **OR** Reducing the parking stall dimensions or number of stalls is not feasible for the intended use. **OR** No new parking stalls are proposed as part of this project.

Step 4 - Calcuate Minimum RRv Required

Enter the Soils Data for the site		
Hydrologic Soil Group	Acres	S
A	3.54	55%
B	0.00	40%
C	0.00	30%
D	0.00	20%
Total Area	3.542	

Calculate the Minimum RRv		
S =	**0.55**	
Impervious =	3.54	*acres*
Precipitation	1.97	*inches*
Rv	0.95	
Minimum RRv	**0.304**	***af***
	13242	cf

Step 2 - Calculate Water Quality Volume

Is this project subject to Section 4.3 of the NYS Design Manual for Enhanced Phosphorus Removal?	Yes
What is the nature of this construction project?	New Construction

Design Point:		
P=	1.97	inches

Enter 1 Year 24 Hour Design Storm as P

Calculate Required WQv

Drainage Area Number	Contributing Area (Acres)	Impervious Area (Acres)	Percent Impervious %	Rv	WQv (cf)	SMP Description
1	0.89	0.09	10	0.14	899	
2	3.03	1.38	46	0.46	9,965	Infiltration Basin
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						
Total	3.92	1.47	37	0.39	**10864**	**Required WQv**

APPENDIX M

WEST BRANCH TIOUGH RIVER AND MINOR TRIBS

(SEGMENT ID 0602-0060)

Waterbody Segment Assessment Factsheet

Factsheet Update: March 24, 2025
Integrated Reporting Cycle: 2022
NYSDEC CALM: 2021

NEEDS VERIFICATION

Introduction

This fact sheet contains the most recent water quality assessment information for this waterbody segment. The assessment is based on water quality data that meet the quality assurance requirements of NYSDEC's Division of Water (DOW). An outline of the process used to assess the quality of New York State waters is described in the NYSDEC's Consolidated Assessment and Listing Methodology (CALM). (https://extapps.dec.ny.gov/docs/water_pdf/calm.pdf)

WATERBODY INFORMATION

- **Water Index Number:** SR- 44-14-60
- **Segment Classification:** C
- **Waterbody Type:** River/Stream
- **Size:** 54.4 Miles
- **Drainage Basin:** Susquehanna River
- **Hydrologic Unit Code:** 0205010202
- **County:** Cortland
- **Segment Description:** Entire stream and selected tribs

Assessment of Best Use

Background

New York State waterbodies are classified to reflect their best use(s), and the assessment of a waterbody is based on the ability of waters to support those uses. This section lists whether this waterbody segment supports its best use(s).

Best Use	Use Assessment	Use Assessment Confirmation	Pollutant(s) Cause(s)	303(d) Year	Integrated Reporting Category
 Fishing	Stressed	Unconfirmed	pH	N/A	IR3

Best Use	Use Assessment	Use Assessment Confirmation	Pollutant(s) Cause(s)	303(d) Year	Integrated Reporting Category
Secondary Contact Recreation	Unassessed	—	No Data	N/A	IR3
Primary Contact Recreation	N/A for Waterbody Class	—	—	—	—
Source of Water Supply	N/A for Waterbody Class	—	—	—	—
Shellfishing	N/A for Waterbody Class	—	—	—	—

Water Quality Monitoring Data and Information

Background

Water quality monitoring data used for assessments may come from a variety of sources, including but not limited to NYSDEC's surface water monitoring and regulatory programs, and monitoring network partnerships on rivers, streams, lakes, reservoirs, estuaries, and coastal waters.

For access to current and historical DOW data collected by our stream and lake monitoring programs, please use the Division of Water Monitoring Data Portal (https://experience.arcgis.com/experience/301748017d7d40649bc5082fc1c5365e).

Data Source	Pollutant(s)
Division of Water's Stream Monitoring and Assessment Programs	pH

For more information, or to sign-up for email updates from NYSDEC, visit our website: https://dec.ny.gov/environmental-protection/water (https://dec.ny.gov/environmental-protection/water)

NEW YORK STATE | Department of Environmental Conservation

SECTION 009000 – SCHEDULE OF DRAWINGS

1.1 LIST OF DRAWINGS

A. Drawings: Drawings consist of the Contract Drawings and other drawings listed on the Table of Contents page of the separately bound drawing set titled New Branch Facility Canandaigua National Bank & Trust, dated 14 March 2025, as modified by subsequent Addenda and Contract modifications.

B. List of Drawings: Drawings consist of the following Contract Drawings and other drawings of type indicated:

DRAWING NO.	DESCRIPTION
T1.1	Title Sheet & Drawing Index (Symbols & Abbreviations)
General	
G1.0	General Notes/Wall Types/Ceiling Assemblies
G1.1	First Floor Life Safety Plan
G1.2	Second Floor Life Safety Plan
G1.3	Third Floor Life Safety Plan
G2.0	Typical Accessibility Details
Landscaping	
L1.0	Neighborhood Plan
L1.1	Site Preparation Plan
L2.1	Site Grading, Drainage and Utilities Plan
L3.1	Site Layout Plan
L4.1	Site Planting Plan
L5.1	Site Erosion Control Plan
L6.1	Site Details
L6.2	Site Detail
L6.3	Site Detail
L7.1	Photometric Plan
Structural	
S1.1	Foundation Plan West Side
S1.2	Foundation Plan East Side
S1.3	Second Floor Framing Plan West Side
S1.4	Second Floor Framing Plan East Side
S1.5	Third Floor Framing Plan West Side
S1.6	Third Floor Framing Plan East Side
S1.7	Roof Framing Plan West Side
S1.8	Roof Framing Plan East Side
S1.9	Truss Framing Elevations
S1.10	Truss Framing Elevations
S2.1	Foundation Details
S2.2	Sections & Details
S2.3	Sections & Details
S2.4	Sections & Details

Architectural

A1.1	Partial First Floor Plan – West
A1.2	Partial First Floor Plan – East
A1.3	Partial Second Floor Plan – West
A1.4	Partial Second Floor Plan – East
A1.5	Partial Third Floor Plan – West
A1.6	Partial Third Floor Plan – East
A1.7	Roof Plan
A2.1	Exterior Elevations – South
A2.2	Exterior Elevations – North
A2.3	Exterior Elevations
A2.4	Exterior Elevations
A3.1	Building Section
A3.2	Building Section
A3.3	Building Section
A3.4	Building Section
A3.5	Wall Sections
A4.1	Enlarged Stair Plans & Section
A4.2	Enlarged Stair Plans & Section
A4.3	Enlarged Plan
A4.4	Enlarged First Floor Center Core Plan
A4.5	Enlarged Center Core Floor Plans
A4.6	Interior Elevations
A5.1	Details
A5.2	Details
A5.3	Details
A5.4	Details
A6.1	Partial 1st Floor Reflected Ceiling Plan - West Wing
A6.2	Partial 1st Floor Reflected Ceiling Plan - East Wing
A6.3	Partial 2nd Floor Reflected Ceiling Plan – West Wing
A6.4	Partial 2nd Floor Reflected Ceiling Plan - East Wing
A6.5	Partial 3rd Floor Reflected Ceiling Plan – West Wing
A6.6	Partial 3rd Floor Reflected Ceiling Plan - East Wing
A7.1	Door Schedule, Door Details & Window Type
A7.2	Room Finish Schedule
A8.1	First Floor Finish Plan

Fire Protection

Plumbing

P-0.1	Legend and General Notes
P-2.1	Partial Foundation Plan
P-2.2	Partial Foundation Plan
P-2.3	Partial First Floor Plan
P-2.4	Partial First Floor Plan
P-2.5	Partial Second Floor Plan
P-2.6	Partial Second Floor Plan

P-2.7	Partial Third Floor Plan
P-2.8	Partial Third Floor Plan
P-2.9	Partial Roof Plan
P-2.10	Partial Roof Plan
P-3.1	Enlarged Plans
P-5.1	Schedules
P-5.2	Schedules
P-9.1	Details
P-9.2	Details and Schematics

Mechanical

H-01	General Information
H-2.1	Partial First Floor Plan - Ductwork
H-2.2	Partial First Floor Plan - Ductwork
H-2.3	Partial Second Floor Plan - Ductwork
H-2.4	Partial Second Floor Plan - Ductwork
H-2.5	Partial Third Floor Plan - Ductwork
H-2.5	Partial Third Floor Plan - Ductwork
H-2.6	Partial First Floor Plan - Piping
H-2.7	Partial First Floor Plan - Piping
H-2.8	Partial Second Floor Plan - Piping
H-2.9	Partial Second Floor Plan - Piping
H-2.10	Partial Third Floor Plan - Piping
H-2.11	Partial Third Floor Plan - Piping
H-2.12	Partial Roof Plan - Piping
H-2.13	Partial Roof Plan
H-2.14	Schedules Partial Roof Plan
H-5.1	Schedules
H-5.2	Schedules
H-5.3	Schedules
H-5.4	Schedules
H-9.1	Details
H-9.2	Details

Electrical

E-0.1	Legend and General Notes
E-2.0	Site Plan
E-2.1	Partial First Floor Plan-Lighting
E-2.2	Partial First Floor Plan-Lighting
E-2.3	Partial Second Floor Plan-Lighting
E-2.4	Partial Second Floor Plan-Lighting
E-2.5	Partial Third Floor Plan-Lighting
E-2.6	Partial Third Floor Plan-Lighting
E-2.7	Partial First Floor Plan-Power
E-2.8	Partial First Floor Plan-Power
-2.9	Partial Second Floor Plan-Power
E-2.10	Partial Second Floor Plan-Power
E-2.11	Partial Third Floor Plan-Power
E-2.12	Partial Third Floor Plan-Power
E-2.13	Partial Roof Plan

E-2.14	Partial Roof Plan
E-3.1	Enlarged Partial Floor Plans
E-5.1	Electrical One-line diagram & Fire Alarm Schematic
E-5.2	System Schematics and System Specifications
E-5.3	Schedules
E-5.4	Panel Board Schedules
E-9.1	Details

END OF SECTION 009000

SECTION 009000 – SCHEDULE OF DRAWINGS

1.1 LIST OF DRAWINGS

A. Drawings: Drawings consist of the Contract Drawings and other drawings listed on the Table of Contents page of the separately bound drawing set titled New Branch Facility Canandaigua National Bank & Trust, dated 14 March 2025, as modified by subsequent Addenda and Contract modifications.

B. List of Drawings: Drawings consist of the following Contract Drawings and other drawings of type indicated:

DRAWING NO.	DESCRIPTION
T1.1	Title Sheet & Drawing Index (Symbols & Abbreviations)
General	
G1.0	General Notes/Wall Types/Ceiling Assemblies
G1.1	First Floor Life Safety Plan
G1.2	Second Floor Life Safety Plan
G1.3	Third Floor Life Safety Plan
G2.0	Typical Accessibility Details
Landscaping	
L1.0	Neighborhood Plan
L1.1	Site Preparation Plan
L2.1	Site Grading, Drainage and Utilities Plan
L3.1	Site Layout Plan
L4.1	Site Planting Plan
L5.1	Site Erosion Control Plan
L6.1	Site Details
L6.2	Site Detail
L6.3	Site Detail
L7.1	Photometric Plan
Structural	
S1.1	Foundation Plan West Side
S1.2	Foundation Plan East Side
S1.3	Second Floor Framing Plan West Side
S1.4	Second Floor Framing Plan East Side
S1.5	Third Floor Framing Plan West Side
S1.6	Third Floor Framing Plan East Side
S1.7	Roof Framing Plan West Side
S1.8	Roof Framing Plan East Side
S1.9	Truss Framing Elevations
S1.10	Truss Framing Elevations
S2.1	Foundation Details
S2.2	Sections & Details
S2.3	Sections & Details
S2.4	Sections & Details

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A1.5	Partial Third Floor Plan – West
A1.6	Partial Third Floor Plan – East
A1.7	Roof Plan
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A2.2	Exterior Elevations – North
A2.3	Exterior Elevations
A2.4	Exterior Elevations
A3.1	Building Section
A3.2	Building Section
A3.3	Building Section
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A4.2	Enlarged Stair Plans & Section
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A5.3	Details
A5.4	Details
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Fire Protection

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P-2.4	Partial First Floor Plan
P-2.5	Partial Second Floor Plan
P-2.6	Partial Second Floor Plan

P-2.7	Partial Third Floor Plan
P-2.8	Partial Third Floor Plan
P-2.9	Partial Roof Plan
P-2.10	Partial Roof Plan
P-3.1	Enlarged Plans
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P-5.2	Schedules
P-9.1	Details
P-9.2	Details and Schematics

Mechanical

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H-2.4	Partial Second Floor Plan - Ductwork
H-2.5	Partial Third Floor Plan - Ductwork
H-2.5	Partial Third Floor Plan - Ductwork
H-2.6	Partial First Floor Plan - Piping
H-2.7	Partial First Floor Plan - Piping
H-2.8	Partial Second Floor Plan - Piping
H-2.9	Partial Second Floor Plan - Piping
H-2.10	Partial Third Floor Plan - Piping
H-2.11	Partial Third Floor Plan - Piping
H-2.12	Partial Roof Plan - Piping
H-2.13	Partial Roof Plan
H-2.14	Schedules Partial Roof Plan
H-5.1	Schedules
H-5.2	Schedules
H-5.3	Schedules
H-5.4	Schedules
H-9.1	Details
H-9.2	Details

Electrical

E-0.1	Legend and General Notes
E-2.0	Site Plan
E-2.1	Partial First Floor Plan-Lighting
E-2.2	Partial First Floor Plan-Lighting
E-2.3	Partial Second Floor Plan-Lighting
E-2.4	Partial Second Floor Plan-Lighting
E-2.5	Partial Third Floor Plan-Lighting
E-2.6	Partial Third Floor Plan-Lighting
E-2.7	Partial First Floor Plan-Power
E-2.8	Partial First Floor Plan-Power
-2.9	Partial Second Floor Plan-Power
E-2.10	Partial Second Floor Plan-Power
E-2.11	Partial Third Floor Plan-Power
E-2.12	Partial Third Floor Plan-Power
E-2.13	Partial Roof Plan

E-2.14	Partial Roof Plan
E-3.1	Enlarged Partial Floor Plans
E-5.1	Electrical One-line diagram & Fire Alarm Schematic
E-5.2	System Schematics and System Specifications
E-5.3	Schedules
E-5.4	Panel Board Schedules
E-9.1	Details

END OF SECTION 009000

SECTION 012900 - PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements necessary to prepare and process Applications for Payment.

B. Related Requirements:
   1. Section 012600 "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.
   2. Section 013200 "Construction Progress Documentation" for administrative requirements governing the preparation and submittal of the Contractor's construction schedule.

1.2 SCHEDULE OF VALUES

A. Coordination: Coordinate preparation of the schedule of values with preparation of Contractor's construction schedule.

   1. Coordinate line items in the schedule of values with other required administrative forms and schedules, including the following:

      a. Application for Payment forms with continuation sheets.
      b. Submittal schedule.
      c. Items required to be indicated as separate activities in Contractor's construction schedule.

   2. Submit the schedule of values to Architect at earliest possible date but no later than seven days before the date scheduled for submittal of initial Applications for Payment.
   3. Subschedules for Phased Work: Where the Work is separated into phases requiring separately phased payments, provide subschedules showing values coordinated with each phase of payment.

B. Format and Content: Use Project Manual table of contents as a guide to establish line items for the schedule of values. Provide at least one line item for each Specification Section.

   1. Identification: Include the following Project identification on the schedule of values:

      a. Project name and location.
      b. Name of Architect.
      c. Architect's project number.
      d. Contractor's name and address.
      e. Date of submittal.

   2. Arrange schedule of values consistent with format of AIA Document G703 .
   3. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with Project Manual table of contents. Provide multiple line items for principal subcontract amounts in excess of five percent of the Contract Sum.

a. Include separate line items under Contractor and principal subcontracts for Project closeout requirements in an amount totaling five percent of the Contract Sum and subcontract amount.

4. Round amounts to nearest whole dollar; total shall equal the Contract Sum.
5. Provide a separate line item in the schedule of values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
6. Provide separate line items in the schedule of values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
7. Allowances: Provide a separate line item in the schedule of values for each allowance. Show line-item value of unit-cost allowances, as a product of the unit cost, multiplied by measured quantity. Use information indicated in the Contract Documents to determine quantities.
8. Each item in the schedule of values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.

    a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the schedule of values or distributed as general overhead expense, at Contractor's option.

9. Schedule Updating: Update and resubmit the schedule of values before the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

1.3 APPLICATIONS FOR PAYMENT

A. Each Application for Payment shall be consistent with previous applications and payments as certified by Architect[**and Construction Manager**] and paid for by Owner.

1. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements.

B. Payment Application Times: The date for each progress payment is indicated in the Agreement between Owner and Contractor. The period of construction work covered by each Application for Payment is the period indicated in the Agreement.

C. Payment Application Times: Submit Application for Payment to Architect by the 20th day of the month. The period covered by each Application for Payment is one month, ending on the last day of the month.

D. Application for Payment Forms: Use AIA Document G702 and AIA Document G703 as form for Applications for Payment.

E. Application for Payment Forms: Use forms acceptable to Owner and Architect for Applications for Payment. Sample copies are included in Project Manual.

F. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Architect will return incomplete applications without action.

1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.

2. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
3. Include an amount of **10%** Retainage for completed work on the Application and Certificate for Payment

G. Transmittal: Submit electronic signed and notarized original copies of each Application for Payment to Architect by a method ensuring receipt within 24 hours. Application shall include waivers of lien and similar attachments if required.

1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.

H. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's lien from entities lawfully entitled to file a mechanic's lien arising out of the Contract and related to the Work covered by the payment.

1. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.
2. When an application shows completion of an item, submit conditional final or full waivers.
3. Owner reserves the right to designate which entities involved in the Work must submit waivers.
4. Waiver Forms: Submit executed waivers of lien on forms acceptable to Owner.

I. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:

1. List of subcontractors.
2. Schedule of values.
3. Contractor's construction schedule (preliminary if not final).
4. Schedule of unit prices.
5. Submittal schedule (preliminary if not final).
6. List of Contractor's staff assignments.
7. List of Contractor's principal consultants.
8. Copies of building permits.
9. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
10. Initial progress report.
11. Report of preconstruction conference.
12. Certificates of insurance and insurance policies.

J. Application for Payment at Substantial Completion: After Architect issues the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.

1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
2. This application shall reflect Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work.

K. Final Payment Application: After completing Project closeout requirements, submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:

1. Evidence of completion of Project closeout requirements.
2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
3. Updated final statement, accounting for final changes to the Contract Sum.
4. AIA Document G706-1994, "Contractor's Affidavit of Payment of Debts and Claims."
5. AIA Document G706A-1994, "Contractor's Affidavit of Release of Liens."
6. AIA Document G707-1994, "Consent of Surety to Final Payment."
7. Evidence that claims have been settled.
8. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work.
9. Final liquidated damages settlement statement.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012900

SECTION 013100 - PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
   1. Coordination Drawings.
   2. Administrative and supervisory personnel.
   3. Project meetings.
   4. Air barrier and sealing coordination
   5. Requests for Interpretation (RFIs).

B. Each contractor shall participate in coordination requirements. Certain areas of responsibility will be assigned to a specific contractor.

C. Related Sections include the following:
   1. Division 01 Section "Construction Progress Documentation" for preparing and submitting Contractor's Construction Schedule.
   2. Division 01 Section "Execution Requirements" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.
   3. Division 01 Section "Closeout Procedures" for coordinating closeout of the Contract.

1.3 DEFINITIONS

A. RFI: Request from Contractor seeking interpretation or clarification of the Contract Documents.

1.4 COORDINATION

A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections that depend on each other for proper installation, connection, and operation.
   1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
   2. Coordinate installation of different components with other contractors to ensure maximum accessibility for required maintenance, service, and repair.
   3. Make adequate provisions to accommodate items scheduled for later installation.
   4. Where availability of space is limited, coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair of all components, including mechanical and electrical.

B. 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 and activities of other contractors to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
   1. Preparation of Contractor's Construction Schedule.
   2. Preparation of the Schedule of Values.
   3. Installation and removal of temporary facilities and controls.
   4. Delivery and processing of submittals.
   5. Progress meetings.
   6. Pre-installation conferences.
   7. Project closeout activities.
   8. Startup and adjustment of systems.
   9. Project closeout activities.

D. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials.
   1. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work. Refer to other Sections for disposition of salvaged materials that are designated as Owner's property.

1.5 SUBMITTALS

A. Coordination Drawings: Prepare Coordination Drawings if limited space availability necessitates maximum utilization of space for efficient installation of different components or if coordination is required for installation of products and materials fabricated by separate entities.
   1. Content: Project-specific information, drawn accurately to scale. Do not base Coordination Drawings on reproductions of the Contract Documents or standard printed data. Include the following information, as applicable:

      a. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.
      b. Indicate required installation sequences.
      c. Indicate dimensions shown on the Contract Drawings and make specific note of dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternate sketches to Architect for resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.
   2. Submit electronic copies of each submittal.

      a. Submit electronic copies where Coordination Drawings are required for operation and maintenance manuals.
   3. Refer to individual Sections for Coordination Drawing requirements for Work in those Sections.

B. Key Personnel Names: Within five (5) days of starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses and telephone

numbers, including home and office telephone numbers. Provide names, addresses, and telephone numbers of individuals assigned as standbys in the absence of individuals assigned to Project.

1. Post copies of list in Project meeting room, in temporary field office, and by each temporary telephone. Keep list current at all times.

1.6 ADMINISTRATIVE AND SUPERVISORY PERSONNEL

A. General: In addition to Project superintendent, provide other administrative and supervisory personnel as required for proper performance of the Work.

1.7 PROJECT MEETINGS

A. General: Schedule and conduct meetings and conferences at Project site, unless otherwise indicated.

1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Architect of scheduled meeting dates and times.
2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
3. Minutes: Architect to record significant discussions and agreements achieved. Architect to distribute the meeting minutes to everyone concerned, including the Owner, within seven (7) days of the meeting.

B. Preconstruction Conference: Schedule a preconstruction conference before starting construction, at a time convenient to Owner and Architect, but no later than ten (10) days after execution of the Agreement. Hold the conference at Project site or another convenient location. Conduct the meeting to review responsibilities and personnel assignments.

1. Attendees: Authorized representatives of Owner, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
2. Agenda: Discuss items of significance that could affect progress, including the following:

    a. Tentative construction schedule.
    b. Site Staging.
    c. Critical work sequencing and long-lead items.
        1) Coordination of air barrier installation, and air sealing details with each phase of construction
    d. Designation of key personnel and their duties.
    e. Procedures for processing field decisions and Change Orders.
    f. Procedures for RFIs.
    g. Procedures for testing and inspecting.
    h. Procedures for processing Applications for Payment.
    i. Distribution of the Contract Documents.
    j. Submittal procedures.
    k. Preparation of Record Documents.
    l. Use of the premises.
    m. Work restrictions.
    n. Owner's occupancy requirements.
    o. Responsibility for temporary facilities and controls.
    p. Construction waste management and recycling.
    q. Parking availability.

r. Office, work, and storage areas.
s. Equipment deliveries and priorities.
t. First aid.
u. Security.
v. Progress cleaning.
w. Working hours.

3. Minutes: Architect will record and distribute meeting minutes.

C. Progress Meetings: Conduct progress meetings at regular intervals. Coordinate dates of meetings with preparation of payment requests.

1. Attendees: In addition to representatives of Owner and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
2. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.

a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's Construction Schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
1) Review schedule for next period.

b. Review present and future needs of each entity present, including the following:
1) Interface requirements.
2) Sequence of operations.
3) Status of submittals.
4) Deliveries.
5) Temporary facilities and controls.
6) Progress cleaning.
7) Quality and work standards.
8) Status of correction of deficient items.
9) Field observations.
10) RFIs.
11) Status of proposal requests.
12) Pending changes.
13) Status of Change Orders.
14) Documentation of information for payment requests.

3. Minutes: Architect will record and distribute to Contractor the meeting minutes.
4. Reporting: Distribute minutes of the meeting to each party present and to parties who should have been present.

a. Schedule Updating: Revise Contractor's Construction Schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

1.8 REQUESTS FOR INTERPRETATION (RFIs)

A. Procedure: Immediately on discovery of the need for interpretation of the Contract Documents, and if not possible to request interpretation at Project meeting, prepare and submit an RFI in the form specified.
   1. RFIs shall originate with Contractor. RFIs submitted by entities other than Contractor will be returned with no response.
   2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.

B. Content of the RFI: Include a detailed, legible description of item needing interpretation and the following:
   1. Project name.
   2. Date.
   3. Name of Contractor.
   4. Name of Architect.
   5. RFI number, numbered sequentially.
   6. Specification Section number and title and related paragraphs, as appropriate.
   7. Drawing number and detail references, as appropriate.
   8. Field dimensions and conditions, as appropriate.
   9. Contractor's suggested solution(s). If Contractor's solution(s) impact the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
   10. Contractor's signature.
   11. Attachments: Include drawings, descriptions, measurements, photos, Product Data, Shop Drawings, and other information necessary to fully describe items needing interpretation.

      a. Supplementary drawings prepared by Contractor shall include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments.

C. Architect's Action: Architect will review each RFI, determine action required, and return it. Allow ten (10) working days for Architect's response for each RFI. RFIs received after 1:00 p.m. will be considered as received the following working day.
   1. The following RFIs will be returned without action:

      a. Requests for approval of submittals.
      b. Requests for approval of substitutions.
      c. Requests for coordination information already indicated in the Contract Documents.
      d. Requests for adjustments in the Contract Time or the Contract Sum.
      e. Requests for interpretation of Architect's actions on submittals.
      f. Incomplete RFIs or RFIs with numerous errors.
   2. Architect's action may include a request for additional information, in which case Architect's time for response will start again.
   3. Architect's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to Division 01 Section "Contract Modification Procedures."

      a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Architect in writing within three (3) days of receipt of the RFI response.

D. On receipt of Architect's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Architect within three (3) days if Contractor disagrees with response.

E. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log weekly. Use CSI Log Form 13.2B.
   1. Project name.
   2. Name and address of Contractor.
   3. Name and address of Architect.
   4. RFI number including RFIs that were dropped and not submitted.
   5. RFI description.
   6. Date the RFI was submitted.
   7. Date Architect's response was received.
   8. Identification of related Minor Change in the Work, Construction Change Directive, and Proposal Request, as appropriate.
   9. Identification of related Field Order, Work Change Directive, and Proposal Request, as appropriate.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013100

SECTION 013200 - CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:

1. Preliminary Construction Schedule.
2. Contractor's Construction Schedule.
3. Submittals Schedule.
4. Daily construction reports.
5. Material location reports.
6. Field condition reports.
7. Special reports.

B. Related Sections include the following:

1. Division 01 Section "Payment Procedures" for submitting the Schedule of Values.
2. Division 01 Section "Project Management and Coordination" for submitting and distributing meeting and conference minutes.
3. Division 01 Section "Submittal Procedures" for submitting schedules and reports.
4. Division 01 Section "Quality Requirements" for submitting a schedule of tests and inspections.
5. Division 01 Section “Closeout Procedures” for submitting photographic materials and reports as Project Record Documents at Project closeout.

1.3 SUBMITTALS

A. Submittals Schedule: Submit copies of schedule. Arrange the following information in a tabular format:

1. Scheduled date for first submittal.
2. Specification Section number and title.
3. Submittal category (action or informational).
4. Name of subcontractor.
5. Description of the Work covered.
6. Scheduled date for Architect's final release or approval.

B. Preliminary Construction Schedule: Submit electronic copies.

1. Approval of cost-loaded preliminary construction schedule will not constitute approval of Schedule of Values for cost-loaded activities.

C. Contractor's Construction Schedule: Submit electronic copies of initial schedule, indicating entire schedule for entire construction period.

1. Submit an electronic copy of schedule, using software indicated, on CD-R, and labeled to comply with requirements for submittals. Include type of schedule (Initial or Updated) and date on label.

D. CPM Reports: Concurrent with CPM schedule, submit electronic copies of each of the following computer-generated reports. Format for each activity in reports shall contain activity number, activity description, cost and resource loading, original duration, remaining duration, early start date, early finish date, late start date, late finish date, and total float in calendar days.

1. Activity Report: List of all activities sorted by activity number and then early start date, or actual start date if known.
2. Logic Report: List of preceding and succeeding activities for all activities, sorted in ascending order by activity number and then early start date, or actual start date if known.
3. Total Float Report: List of all activities sorted in ascending order of total float.

E. Daily Construction Reports: Submit at weekly intervals.

F. Field Condition Reports: Submit at time of discovery of differing conditions.

G. Special Reports: Submit at time of unusual event.

1.4 COORDINATION

A. Coordinate preparation and processing of schedules and reports with performance of construction activities and with scheduling and reporting of separate contractors.

B. Coordinate Contractor's Construction Schedule with the Schedule of Values, list of subcontracts, Submittals Schedule, progress reports, payment requests, and other required schedules and reports.

1. Secure time commitments for performing critical elements of the Work from parties involved.
2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

PART 2 - PRODUCTS

2.1 SUBMITTALS SCHEDULE

A. Preparation: Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, re-submittal, ordering, manufacturing, fabrication, and delivery when establishing dates.

1. Coordinate Submittals Schedule with list of subcontracts, the Schedule of Values, and Contractor's Construction Schedule.
2. Initial Submittal: Submit concurrently with preliminary bar-chart schedule. Include submittals required during the first 60 days of construction. List those required to maintain

orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.

a. At Contractor's option, show submittals on the Preliminary Construction Schedule, instead of tabulating them separately.

3. Final Submittal: Submit concurrently with the first complete submittal of Contractor's Construction Schedule.

2.2 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

A. Procedures: Comply with procedures contained in AGC's "Construction Planning & Scheduling."

B. Time Frame: Extend schedule from date established for the Notice to Proceed to date of Substantial Completion.

1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.

C. Activities: Treat each story or separate area as a separate numbered activity for each principal element of the Work. Comply with the following:

1. Activity Duration: Define activities so no activity is longer than twenty (20) days, unless specifically allowed by Architect.
2. Procurement Activities: Include procurement process activities for the following long lead items and major items, requiring a cycle of more than 60 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.
3. Submittal Review Time: Include review and re-submittal times indicated in Division 01 Section "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's Construction Schedule with Submittals Schedule.
4. Startup and Testing Time: Include not less than 10 days for startup and testing.
5. Substantial Completion: Indicate completion in advance of date established for Substantial Completion and allow time for Architect's administrative procedures necessary for certification of Substantial Completion.

D. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule and show how the sequence of the Work is affected.

1. Phasing: Arrange list of activities on schedule by phase.
2. Owner-Furnished Products: Include a separate activity for each product. Include delivery date indicated in Division 01 Section "Summary." Delivery dates indicated stipulate the earliest possible delivery date.
3. Work Restrictions: Show the effect of the following items on the schedule:

a. Coordination with existing construction.
b. Limitations of continued occupancies.
c. Uninterruptible services.
d. Partial occupancy before Substantial Completion.
e. Use of premises restrictions.
f. Environmental control.

4. Area Separations: Identify each major area of construction for each major portion of the Work. Indicate where each construction activity within a major area must be sequenced or integrated with other construction activities to provide for the following:

    a. Structural completion.
    b. Permanent space enclosure.
    c. Completion of mechanical installation.
    d. Completion of electrical installation.
    e. Substantial Completion.

E. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Substantial Completion, and Final Completion.

F. Cost Correlation: At the head of schedule, provide a cost correlation line, indicating planned and actual costs. On the line, show dollar volume of the Work performed as of dates used for preparation of payment requests.

1. Refer to Division 01 Section "Payment Procedures" for cost reporting and payment procedures.
2. Contractor shall assign cost to construction activities on the CPM schedule. Costs shall not be assigned to submittal activities unless specified otherwise but may, with Architect's approval, be assigned to fabrication and delivery activities. Costs shall be under required principal subcontracts for testing and commissioning activities, operation and maintenance manuals, punch list activities, Project Record Documents, and demonstration and training (if applicable), in the amount of 5 percent of the Contract Sum.
3. Each activity cost shall reflect an accurate value subject to approval by Architect.
4. Total cost assigned to activities shall equal the total Contract Sum.

2.3 PRELIMINARY CONSTRUCTION SCHEDULE

A. Bar-Chart Schedule: Submit preliminary horizontal bar-chart-type construction schedule within four days of the bid date.

B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line. Outline significant construction activities for first sixty (60) days of construction. Include skeleton diagram for the remainder of the Work and a cash requirement prediction based on indicated activities.

2.4 CONTRACTOR'S CONSTRUCTION SCHEDULE (CPM SCHEDULE)

A. General: Prepare CPM or Gant format.

B. CPM Schedule: Prepare Contractor's Construction Schedule using a computerized time-scaled CPM network analysis diagram for the Work.

1. Develop network diagram in sufficient time to submit CPM schedule so it can be accepted for use no later than ten (10) days after date established for the Notice to Proceed.

    a. Failure to include any work item required for performance of this Contract shall not excuse Contractor from completing all work within applicable completion dates, regardless of Architect's approval of the schedule.

2. Establish procedures for monitoring and updating CPM schedule and for reporting progress. Coordinate procedures with progress meeting and payment request dates.
3. Use "one workday" as the unit of time. Include list of nonworking days and holidays incorporated into the schedule.

C. CPM Schedule Preparation: Prepare a list of all activities required to complete the Work. Using the preliminary network diagram, prepare a skeleton network to identify probable critical paths.

1. Activities: Indicate the estimated time duration, sequence requirements, and relationship of each activity in relation to other activities. Include estimated time frames for the following activities:

    a. Preparation and processing of submittals.
    b. Mobilization and demobilization.
    c. Delivery.
    d. Fabrication.
    e. Utility interruptions.
    f. Installation.
    g. Testing.

2. Critical Path Activities: Identify critical path activities, including those for interim completion dates. Scheduled start and completion dates shall be consistent with Contract milestone dates.
3. Processing: Process data to produce output data on a computer-drawn, time-scaled network. Revise data, reorganize activity sequences, and reproduce as often as necessary to produce the CPM schedule within the limitations of the Contract Time.
4. Format: Mark the critical path. Locate the critical path near center of network; locate paths with most float near the edges.

    a. Sub-networks on separate sheets are permissible for activities clearly off the critical path.

2.5 REPORTS

A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:

1. List of subcontractors at Project site.
2. Approximate count of personnel at Project site.
3. Equipment at Project site.
4. High and low temperatures and general weather conditions.
5. Accidents.
6. Meetings and significant decisions.
7. Unusual events (refer to special reports).
8. Stoppages, delays, shortages, and losses.
9. Emergency procedures.
10. Orders and requests of authorities having jurisdiction.
11. Change Orders received and implemented.
12. Work Change Directives received and implemented.
13. Services connected and disconnected.
14. Equipment or system tests and startups.
15. Partial Completions and occupancies.

16. Substantial Completions authorized.

B. Field Condition Reports: Immediately on discovery of a difference between field conditions and the Contract Documents, prepare and submit a detailed report. Submit with a request for interpretation on CSI Form 13.2A. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

2.6 SPECIAL REPORTS

A. General: Submit special reports directly to Architect within one (1) day(s) of an occurrence. Distribute copies of report to parties affected by the occurrence.

B. Reporting Unusual Events: When an event of an unusual and significant nature occurs at Project site, whether or not related directly to the Work, prepare and submit a special report. List chain of events, persons participating, response by Contractor's personnel, evaluation of results or effects, and similar pertinent information. Advise Owner in advance when these events are known or predictable.

PART 3 - EXECUTION

3.1 CONTRACTOR'S CONSTRUCTION SCHEDULE

A. Contractor's Construction Schedule Updating: At weekly intervals, update schedule to reflect actual construction progress and activities. Issue schedule at each regularly scheduled progress meeting.

1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
3. As the Work progresses, indicate Actual Completion percentage for each activity.

B. Distribution: Distribute copies of approved schedule to Architect, Owner, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.

1. Post copies in Project meeting rooms and temporary field offices.
2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

END OF SECTION 013200

SECTION 013233 - PHOTOGRAPHIC DOCUMENTATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for the following:

1. Preconstruction photographs and periodic construction photographs.

B. Related Requirements:

1. Section 017700 "Closeout Procedures" for submitting photographic documentation as Project Record Documents at Project closeout.

1.2 INFORMATIONAL SUBMITTALS

A. Key Plan: Submit key plan of Project site and building with notation of vantage points marked for location and direction of each photograph. Indicate elevation or story of construction. Include same information as corresponding photographic documentation.

B. Digital Photographs: Submit unaltered, original, full-size image files within three days of taking photographs.

1. Digital Camera: Minimum sensor resolution of minimum 12 megapixels.
2. Identification: Provide the following information with each image description in file metadata tag:

a. Name of Project.
b. Name and contact information for photographer.
c. Date photograph was taken.
d. Description of vantage point, indicating location, direction (by compass point), and elevation or story of construction.

1.3 QUALITY ASSURANCE

A. Photographer Qualifications: An individual who has been regularly engaged as a professional photographer of construction projects for not less than three years.

1.4 USAGE RIGHTS

A. Obtain and transfer copyright usage rights from photographer to Owner for unlimited reproduction of photographic documentation.

PART 2 - PRODUCTS

2.1 PHOTOGRAPHIC MEDIA

A. Digital Images: Provide images in JPG format, with minimum size of 12 megapixels.

PART 3 - EXECUTION

3.1 CONSTRUCTION PHOTOGRAPHS

A. Photographer: Engage a qualified photographer to take construction photographs.

B. General: Take photographs using the maximum range of depth of field, and that are in focus, to clearly show the Work. Photographs with blurry or out-of-focus areas will not be accepted.

1. Maintain key plan with each set of construction photographs that identifies each photographic location.

C. Digital Images: Submit digital images exactly as originally recorded in the digital camera, without alteration, manipulation, editing, or modifications using image-editing software.

1. Date and Time: Include date and time in file name for each image.
2. Field Office Images: Maintain one set of images accessible in the field office at Project site, available at all times for reference. Identify images in the same manner as those submitted to Architect.

D. Preconstruction Photographs: Before commencement of excavation take photographs of Project site and surrounding properties, including existing items to remain during construction, from different vantage points, as directed by Architect.

1. Flag construction limits before taking construction photographs.
2. Take photographs to show existing conditions adjacent to property before starting the Work.
3. Take photographs of existing buildings either on or adjoining property to accurately record physical conditions at start of construction.

E. Periodic Construction Photographs: Take photographs weekly, with timing each month adjusted to coincide with the cutoff date associated with each Application for Payment. Select vantage points to show status of construction and progress since last photographs were taken.

F. Final Completion Construction Photographs: Take color photographs after date of Substantial Completion for submission as Project Record Documents.

G. Additional Photographs: Architect may request photographs in addition to periodic photographs specified.

1. Three days' notice will be given, where feasible.
2. In emergency situations, take additional photographs within 24 hours of request.
3. Circumstances that could require additional photographs include, but are not limited to, the following:

a. Immediate follow-up when on-site events result in construction damage or losses.
b. Photographs to be taken at fabrication locations away from Project site. These photographs are not subject to unit prices or unit-cost allowances.
c. Substantial Completion of a major phase or component of the Work.
d. Extra record photographs at time of final acceptance.

END OF SECTION 013233

SECTION 013300a SUBMITTAL REVIEW INFORMATION SHEET

The Architect's review of the Contractor's submittals including Shop Drawings, Product Data and Samples, is only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents.

Review of such submittals 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 Architect's review of the Contractor's submittals shall not relieve the Contractor of the obligations under the Contract. The Architect's review shall not constitute approval of safety precautions or, unless otherwise specifically stated by the Architect, of any construction means, methods, techniques, sequences, or procedures. The Architect's approval of a specific item shall not indicate approval of assembly of which the item is a component.

Action Codes Used:

1. Final Unrestricted Release: Where the submittal is marked "**Approved**" **(APP),** the Work covered by the submittal may proceed provided it complies with the Contract Documents. Final acceptance will depend on that compliance.
2. Final-but-Restricted Release: Where the submittal is marked "**Approved as Noted**" **(AAN),** the Work covered by the submittal may proceed provided it complies with both Architect's notations and corrections on the submittal and the Contract Documents. Final Acceptance will depend on that compliance.
3. Returned for Resubmittal: Where the submittal is marked "**Not Approved, Revise and Resubmit**" **(RAR),** do not proceed with the Work covered by the submittal, including purchasing, fabrication, delivery, or other activity for the product submitted. Revise or prepare a new submittal according to Architect's notations and corrections.
4. Rejected: Where the submittal is marked "**Rejected**" **(REJ),** do not proceed with the Work covered by the submittal. Prepare additional information requested, or required by the Contract Documents, that indicates compliance with requirements.
5. Incomplete: Where the submittal is marked "**Submit Additional Information**" **(SAI),** do not proceed with the Work covered by the submittal. Prepare additional information requested, or required by the Contract Documents, that indicates compliance with requirements.
6. Other Action: If the submittal is primarily for information purposes, record purposes, special processing, or other contractor activity, the submittal will be returned marked "**Action Not Required**" **(ANR).**

END OF SECTION 013300a

SUBMITTAL REVIEW

PROJECT NAME:

HKK PROJECT #:

SUBMITTAL SECTION #:

☐ APPROVED

☐ APPROVED AS NOTED

☐ NOT APPROVED, REVISE & RE-SUBMIT

☐ REJECTED

☐ SUBMIT ADDITIONAL INFORMATION

☐ ACTION NOT REQUIRED

The Architect's review of the Contractor's submittals including Shop Drawings, Product Data and Samples, is only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents.

Review of such submittals 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 Architect's review of the Contractor's submittals shall not relieve the Contractor of the obligations under the Contract. The Architect's review shall not constitute approval of safety precautions or, unless otherwise specifically stated by the Architect, of any construction means, methods, techniques, sequences, or procedures. The Architect's approval of a specific item shall not indicate approval of assembly of which the item is a component.

Holmes▪King▪Kallquist & Associates, Architects, LLP

Signature_____ Date _____

Printed Name_____

Comments:

CAD RELEASE FORM

The Drawings, Specifications and other documents prepared by Holmes▪King▪Kallquist & Associates, Architects, LLP for this Project are instruments of Holmes▪King▪Kallquist & Associates, Architects, LLP's services for use solely with respect to this Project, and unless otherwise provided, Holmes▪King▪Kallquist & Associates, Architects, LLP shall be deemed the author of these documents and shall retain all common law, statutory and other reserved rights, including the copyright. All ideas and designs including Drawings, Specifications and other documents provided by Holmes▪King▪Kallquist & Associates, Architects, LLP and expressed in the documents are the property of Holmes▪King▪Kallquist & Associates, Architects, LLP and are not to be used or altered, in whole or in part, for this or any other project without the express written consent of Holmes▪King▪Kallquist & Associates, Architects, LLP. The contractor or others shall be permitted to retain copies, including reproducible copies, of the drawings, specifications and other documents for information and reference in connection with Contractor's or others use during the work. The drawings, specifications or other documents shall not be used or altered by the Contractor or others on other projects, for additions to this Project or for completion of this Project by others, unless Holmes▪King▪Kallquist & Associates, Architects, LLP has granted written permission.

RIVER STREET SENIOR HOUSING - HKK #22050

Corporate Seal

Owner of Corporation Officer Signature

Date

(Print name and title)

SECTION 014000 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for quality assurance and quality control.

B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.

1. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and -control procedures that facilitate compliance with the Contract Document requirements.
2. Requirements for Contractor to provide quality-assurance and -control services required by Architect, Owner or authorities having jurisdiction are not limited by provisions of this Section.
3. Specific test and inspection requirements are not specified in this Section.

1.2 DEFINITIONS

A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.

B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Services do not include contract enforcement activities performed by Architect.

C. Mockups: Full-size physical assemblies that are constructed on-site. Mockups are constructed to verify selections made under Sample submittals; to demonstrate aesthetic effects and, where indicated, qualities of materials and execution; to review coordination, testing, or operation; to show interface between dissimilar materials; and to demonstrate compliance with specified installation tolerances. Mockups are not Samples. Unless otherwise indicated, approved mockups establish the standard by which the Work will be judged.

1. Laboratory Mockups: Full-size physical assemblies constructed at testing facility to verify performance characteristics.

D. Preconstruction Testing: Tests and inspections performed specifically for Project before products and materials are incorporated into the Work, to verify performance or compliance with specified criteria.

E. Product Testing: Tests and inspections that are performed by an NRTL, an NVLAP, or a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.

F. Source Quality-Control Testing: Tests and inspections that are performed at the source, e.g., plant, mill, factory, or shop.

G. Field Quality-Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.

H. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.

I. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.

1. Use of trade-specific terminology in referring to a trade or entity does not require that certain construction activities be performed by accredited or unionized individuals, or that requirements specified apply exclusively to specific trade(s).

J. Experienced: When used with an entity or individual, "experienced" means having successfully completed a minimum of **five** previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

1.3 CONFLICTING REQUIREMENTS

A. Referenced Standards: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer conflicting requirements that are different, but apparently equal, to Architect for a decision before proceeding.

B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Architect for a decision before proceeding.

1.4 INFORMATIONAL SUBMITTALS

A. Contractor's Statement of Responsibility: When required by authorities having jurisdiction, submit copy of written statement of responsibility sent to authorities having jurisdiction before starting work on the following systems:

1. Seismic-force-resisting system, designated seismic system, or component listed in the designated seismic system quality-assurance plan prepared by Architect.
2. Main wind-force-resisting system or a wind-resisting component listed in the wind-force-resisting system quality-assurance plan prepared by Architect.

B. Testing Agency Qualifications: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.

1.5 REPORTS AND DOCUMENTS

A. Test and Inspection Reports: Prepare and submit certified written reports specified in other Sections. Include the following:

1. Date of issue.
2. Project title and number.
3. Name, address, and telephone number of testing agency.
4. Dates and locations of samples and tests or inspections.
5. Names of individuals making tests and inspections.
6. Description of the Work and test and inspection method.
7. Identification of product and Specification Section.
8. Complete test or inspection data.
9. Test and inspection results and an interpretation of test results.
10. Record of temperature and weather conditions at time of sample taking and testing and inspecting.
11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
12. Name and signature of laboratory inspector.
13. Recommendations on retesting and reinspecting.

B. Manufacturer's Field Reports: Prepare written information documenting tests and inspections specified in other Sections. Include the following:

1. Name, address, and telephone number of representative making report.
2. Statement on condition of substrates and their acceptability for installation of product.
3. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
4. Results of operational and other tests and a statement of whether observed performance complies with requirements.
5. Other required items indicated in individual Specification Sections.

C. Permits, Licenses, and Certificates: For Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

1.6 QUALITY ASSURANCE

A. General: Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.

B. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

C. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

D. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.

E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar in material, design, and extent to those indicated for this Project.

F. Specialists: Certain Specification Sections require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.

1. Requirements of authorities having jurisdiction shall supersede requirements for specialists.

G. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspecting indicated, as documented according to **ASTM E 329**; and with additional qualifications specified in individual Sections; and, where required by authorities having jurisdiction, that is acceptable to authorities.

1. NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.
2. NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.

H. Manufacturer's Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

I. Preconstruction Testing: Where testing agency is indicated to perform preconstruction testing for compliance with specified requirements for performance and test methods, comply with the following:

1. Contractor responsibilities include the following:

a. Provide test specimens representative of proposed products and construction.
b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
c. Build laboratory mockups at testing facility using personnel, products, and methods of construction indicated for the completed Work.
d. When testing is complete, remove test specimens, assemblies, and mockups; do not reuse products on Project.

2. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to Architect, with copy to Contractor. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.

J. Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:

1. Build mockups in location and of size indicated or, if not indicated, as directed by Architect.
2. Notify Architect **seven** days in advance of dates and times when mockups will be constructed.

3. Demonstrate the proposed range of aesthetic effects and workmanship.
4. Obtain Architect's approval of mockups before starting work, fabrication, or construction.

    a. Allow **seven** days for initial review and each re-review of each mockup.

5. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
6. Demolish and remove mockups when directed unless otherwise indicated.

1.7 QUALITY CONTROL

A. Owner Responsibilities: Where quality-control services are indicated 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 and a description of types of testing and inspecting they are engaged to perform.
2. Costs for retesting and reinspecting 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.

B. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality-control activities required to verify that the Work complies with requirements, whether specified or not.

1. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.

    a. Contractor shall not employ same entity engaged by Owner, unless agreed to in writing by Owner.

2. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspecting will be performed.
3. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
4. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
5. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.

C. Manufacturer's Field Services: Where indicated, engage a manufacturer's representative to observe and inspect the Work. Manufacturer's representative's services include examination of substrates and conditions, verification of materials, inspection of completed portions of the Work, and submittal of written reports.

D. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.

E. Testing Agency Responsibilities: Cooperate with Architect and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.

1. Notify Architec and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
2. Determine the location from which test samples will be taken and in which in-situ tests are conducted.
3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
6. Do not perform any duties of Contractor.

F. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:

1. Access to the Work.
2. Incidental labor and facilities necessary to facilitate tests and inspections.
3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
4. Facilities for storage and field curing of test samples.
5. Delivery of samples to testing agencies.
6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
7. Security and protection for samples and for testing and inspecting equipment at Project site.

G. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and -control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.

1. Schedule times for tests, inspections, obtaining samples, and similar activities.

1.8 SPECIAL TESTS AND INSPECTIONS

A. Special Tests and Inspections: Owner will engage a qualified testing agency to conduct special tests and inspections required by authorities having jurisdiction as the responsibility of Owner, as indicated in Statement of Special Inspections attached to this Section, and as follows:

B. Special Tests and Inspections: Conducted by a qualified testing agency as required by authorities having jurisdiction, as indicated in individual Specification Sections and in Statement of Special Inspections attached to this Section, and as follows:

1. Verifying that manufacturer maintains detailed fabrication and quality-control procedures and reviews the completeness and adequacy of those procedures to perform the Work.
2. Notifying Architect and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
3. Submitting a certified written report of each test, inspection, and similar quality-control service to Architect with copy to Contractor and to authorities having jurisdiction.
4. Submitting a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.
5. Interpreting tests and inspections and stating in each report whether tested and inspected work complies with or deviates from the Contract Documents.

6. Retesting and reinspecting corrected work.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 TEST AND INSPECTION LOG

A. Test and Inspection Log: Prepare a record of tests and inspections. Include the following:

1. Date test or inspection was conducted.
2. Description of the Work tested or inspected.
3. Date test or inspection results were transmitted to Architect.
4. Identification of testing agency or special inspector conducting test or inspection.

B. Maintain log at Project site. Post changes and revisions as they occur. Provide access to test and inspection log for Architect's reference during normal working hours.

3.2 REPAIR AND PROTECTION

A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.

1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible. Comply with the Contract Document requirements for cutting and patching in Section 017300 "Execution" and 017310 “Cutting and Patching.”

B. Protect construction exposed by or for quality-control service activities.

C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION 014000

SECTION 014100.1 - THE AIR BARRIER SYSTEM

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. This section includes administrative and procedural requirements for accomplishing an airtight building enclosure that controls infiltration or exfiltration of air.
   1. The airtight components of the building enclosure and the joints, junctures and transitions between materials, products, and assemblies forming the air-tightness of the building enclosure are called “the air barrier system”. Services include coordination between the trades, the proper scheduling and sequencing of the work, preconstruction meetings, inspections, tests, and related actions, including reports performed by Contractor, by independent agencies, and by governing authorities. They do not include contract enforcement activities performed by Architect.
   2. The Contractor shall ensure that the intent of constructing the building enclosure with a continuous air barrier system to control air leakage into, or out of the conditioned space is achieved. The air barrier system shall have the following characteristics:
      a. It must be continuous, with all joints sealed.
      b. It must be structurally supported to withstand positive and negative air pressures applied to the building enclosure.
      c. Connection shall be made between:
         1) Foundation and exterior walls.
         2) Interior concrete slabs and foundation walls
         3) Exterior walls and windows or doors.
         4) Different exterior wall systems.
         5) Interior wall adjacent to unconditioned space and exterior walls
         6) Exterior wall / Interior wall and roof.
         7) Exterior wall and roof over unconditioned space.
         8) Walls, floor, slabs, and roof across construction, control and expansion joints.
         9) Walls, floors and roof to electric, pipe and duct penetrations.
   3. Air Barrier Penetrations: All penetrations of the air barrier and paths of air infiltration / exfiltration shall be sealed including hollow conduit or raceway penetrations.

B. Inspection and testing services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with Contract Document requirements.

C. Requirements of this section relate to the coordination between subcontractors required to provide an airtight building enclosure, customized fabrication and installation procedures, not production of standard products.
   1. Continuity of the air barrier materials and products with joints to provide assemblies. Continuity of all the enclosure assemblies with joints and transition materials to provide a whole building air barrier system.

2. Specific quality-control requirements for individual construction activities are specified in the sections of the specifications. Requirements in those sections may also cover production of standard products. It is the Contractor's responsibility to ensure that each subcontractor is adequately and satisfactorily performing the quality assurance documentation, tests and procedures required by each section.
3. Specified inspections, tests, and related actions do not limit Contractor's quality-control procedures that facilitate compliance with Contract Document requirements.
4. Requirements for Contractor to provide an airtight building enclosure is not limited by quality-control services required by Architect, Owner, or authorities having jurisdiction and are not limited by provisions of this section.

1.2 RELATED SECTIONS

A. Division 1 Section Quality Control

B. Division 1 Section Schedule

C. Division 1 Section Meetings

D. Division 3 Section Concrete

E. Division 5 Section Light Gauge Metal Framing

F. Division 6 Section Wood Sheathing

G. Division 7 Section Roofing

H. Division 7 Section Vapor Barrier

I. Division 7 Section Sealants

J. Division 8 Section Windows

K. Division 8 Section Exterior Doors

L. Division 8 Section Storefronts and Entrances.

1.3 RESPONSIBILITIES

A. Contractor Responsibilities: Unless otherwise indicated as the responsibility of another identified entity, Contractor shall provide coordination of the trades, and the sequence of construction to ensure continuity of the air barrier system joints, junctures and transitions between materials and assemblies of materials and products, from substructure to walls to roof. It is the Contractor's responsibility to ensure that all Subcontractors maintain air barrier continuity in conjunction to their respective scopes of work. The Contractor shall coordinate and verify that all penetrations through the air barrier are properly sealed and that any unsealed penetrations are promptly reported and repaired prior to concealment.

B. Provide quality assurance procedures, testing and verification as specified herein. Facilitate inspections, tests, and other quality-control services specified elsewhere in the Contract Documents and required by authorities having jurisdiction or by the Owner. Costs for these services are included in the Contract Sum.
   1. Organize preconstruction meetings between the trades involved in the whole building's air barrier system to discuss where each trade begins and ends and the responsibility and sequence of installation of all the air-tight joints, junctures, and transitions between materials, products and assemblies of products specified in the different sections, to be installed by the different trades.

   2. Build a mock-up before proceeding with the work, satisfactory to the Architect, of each air-tight joint type, juncture, and transition between products, materials and assemblies.

C. Associated Services: Cooperate with agencies performing required inspections, tests, and similar services, and provide reasonable auxiliary services as requested. Notify the agency sufficiently in advance of operations to permit assignment of personnel. Auxiliary services required include, but are not limited to, the following:
   1. Provide access to the Work.
   2. Furnish incidental labor and facilities necessary to facilitate inspections and tests.
   3. Take adequate quantities of representative samples of materials that require testing or assist the agency in taking samples.
   4. Deliver samples to testing laboratories.
   5. Provide security and protection of samples and test equipment at the Project Site.

D. Duties of the Testing and Inspection Agency: The independent agency engaged to perform inspections, sampling, and testing of air barrier materials, components and assemblies specified in individual Sections shall cooperate with the Architect and the Contractor in performance of the agency's duties. The testing agency shall provide qualified personnel to perform required inspections and tests.
   1. The agency shall notify the Architect and the Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
   2. The agency is not authorized to release, revoke, alter, or enlarge requirements of the Contract Documents or approve or accept any portion of the Work.
   3. The agency shall not perform any duties of the Contractor.

E. Coordination: Coordinate the sequence of activities to accommodate required services with a minimum of delay. Coordinate activities to avoid the necessity of removing and replacing construction to accommodate inspections and tests.
   1. The Contractor is responsible for scheduling times for inspections, tests, taking samples, and similar activities.

1.4 PERFORMANCE REQUIREMENTS

A. Compliance Alternatives:
   a. Materials: materials used for the air barrier system in the opaque envelope shall have an air permeance not to exceed 0.004 cfm/ft^2 under a pressure differential of 0.3 in. water (1.57psf) (0.02 L/s.m^2 @ 75 Pa) when tested in accordance with ASTM E 2178. Or,

b. Assemblies of materials and components: shall have an air permeance not to exceed 0.04 cfm/ft^2 under a pressure differential of 0.3 in. water (1.57psf) (0.2 L/s.m^2 @ 75 Pa) when tested in accordance with ASTM E 2357. Or:
c. The entire building: The air leakage of the entire building shall not exceed 0.4 cfm/ft^2 under a pressure differential of 0.3 in. water (1.57psf) (2.0 L/s.m^2 @ 75 Pa) when tested according to ASTM E 779.

1.5 SUBMITTALS

A. Unless the Contractor is responsible for this service, the independent testing agency shall submit a certified written report, in duplicate, of each inspection, test, or similar service to the Architect. If the Contractor is responsible for the service, submit a certified written report, in duplicate, of each inspection, test, or similar service through the Contractor.
   1. Submit additional copies of each written report directly to the governing authority, when the authority so directs.
   2. Report Data: Written reports of each inspection, test, or similar service include, but are not limited to, the following:
      a. Date of issue.
      b. Project title and number.
      c. Name, address, and telephone number of testing agency.
      d. Dates and locations of samples and tests or inspections.
      e. Names of individuals making the inspection or test.
      f. Designation of the Work and test method.
      g. Identification of product and Specification Section.
      h. Complete inspection or test data.
      i. Test results and an interpretation of test results.
      j. Ambient conditions at the time of sample taking and testing.
      k. Comments or professional opinion on whether inspected or tested Work complies with Contract Document requirements.
      l. Name and signature of laboratory inspector.
      m. Recommendations on retesting.

1.6 QUALITY ASSURANCE

A. Qualifications for Air Barrier Testing and Inspection Agencies: Engage air Barrier inspection and testing service agencies, including independent testing laboratories, that are prequalified and that specialize in the types of air barrier system inspections and tests to be performed.

PART 2 - PRODUCTS

(not used)

PART 3 - EXECUTION

3.1 REPAIR AND PROTECTION

A. Upon completion of inspection, testing, sample taking and similar services, repair damaged construction and restore substrates and finishes. Comply with Contract Document requirements for Division 1 Section "Cutting and Patching."

B. Protect construction exposed by or for quality-control service activities, and protect repaired construction.

C. Repair and protection of the air barrier system is Contractor's responsibility, regardless of the assignment of responsibility for inspection, testing, or similar services.

3.2 TESTING AND INSPECTION

A. The Owner will hire a testing and inspection agency to provide observation and inspection during installation of the air barrier system. The testing and inspection agency will provide the following listed services:
   1. Qualitative Testing and Inspection:
      a. Daily reports of observations, with copies to the Owner, Contractor and Architect.
      b. Continuity of the air barrier system throughout the building enclosure with no gaps, holes.
      c. Structural support of the air barrier system to withstand positive and negative design air pressures including Components and Cladding Loads (ASHRAE 7-16) that may impact air barrier system components.
      d. Masonry and concrete surfaces are smooth, clean and free of cavities, protrusions and mortar droppings.
      e. Site conditions for application temperature and dryness of substrates.
      f. Maximum length of exposure time of materials to ultra-violet deterioration.
      g. Surfaces are properly primed.
      h. Laps in material are 2” minimum unless indicated by manufacturer to require more than 2”, and shingled in the correct direction to shed liquid water (or mastic applied on exposed edges), with no fish-mouths.
      i. Mastic compatible with material substrates applied on cut edges.
      j. Hand rollers are to be used over all self-adhered materials to enhance adhesion.
      k. Measure application thickness of liquid-applied materials to manufacturer’s specifications for the specific substrate.
      l. Materials used for compatibility.
      m. Transitions at changes in direction, and structural support at gaps.
      n. Connections between assemblies (membrane and sealants) for cleaning, preparation and priming of surfaces, structural support, integrity and continuity of seal.
      o. All penetrations sealed.
      p. ASTM E 1186 “Standard Practices for Air Leakage Site Detection in Building Envelopes and Air Retarder Systems.”
         1) Infrared scanning with pressurization/depressurization.
         2) Smoke pencil with pressurization/depressurization.
         3) Pressurization/depressurization with use of anemometer
         4) Generated sound with sound detection

5) Tracer gas measurement of decay rate
6) Chamber pressurization/depressurization in conjunction with smoke tracers
7) Chamber depressurization using detection liquids

2. Quantitative tests:
   a. Provide written test reports of all tests performed, with copies to the Owner, Contractor and Architect.
   b. Material compliance for maximum air permeance, ASTM E 2178.
   c. ASTM E 283, Determining rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors under Specified Pressure Differences Across the Specimen.
   d. Assemblies, ASTM E 2357, test pressure and allowable air leakage rate to be determined by design professional for interior design conditions and location of project.
   e. CAN/CGSB 1986 Standard 149.10, Determination of the Airtightness of Building Envelopes by the Fan Depressurization Method.
   f. CAN/CGSB 1996 Standard 149.15 Determination of the Overall Envelope Airtightness of Office Buildings by the Fan Depressurization Method Using the Building's Air Handling System.
   g. Whole building, floors, or suites, ASTM E779, Determining Airtightness of Buildings Air Leakage Rate by Single Zone Air Pressurization.
   h. Windows and connections to adjacent opaque assemblies, ASTM E783 method B
   i. Tracer gas testing, ASTM E741
   j. Pressure test, ASTM E330
   k. Bond to substrate, ASTM D4541

END OF SECTION

SECTION 014100 – STATEMENT OF SPECIAL INSPECTIONS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 GENERAL REQUIREMENTS

A. Special Inspections and Testing shall be in accordance with Chapter 17 of the 2010 Building Code of New York State.

B. The program of Special Inspection and Testing is a Quality Assurance program intended to ensure that the work is performed in accordance with the Contract Documents.

C. The Statement of Special Inspections was prepared by the Architect and the Engineer – the Design Professionals in Responsible Charge.

D. 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 also serves to inform the Special Inspector and Inspection and Testing Agents of their requirements and responsibilities.

1.3 STATEMENT OF SPECIAL INSPECTIONS AND TESTING

A. Refer to the Statement of Special Inspections following this Specification Section.

1. Part A – Project Information and Statement.
2. Part B – Identification of Special Inspector and Special Inspection Agents.
3. Part C – Special Inspections and Tests Matrix

1.4 SCHEDULE OF INSPECTIONS AND TESTS

A. Required inspections and tests are described in the attached *Special Inspection and Testing Matrix* (Part C) 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 and/or an individual certified in the particular area of expertise who is approved by the Architect and the Engineer – The Design Professionals in Responsible Charge, and the local Building Official.

B. The Testing Laboratory and individual Special Inspectors shall be approved by the Architect and the Engineer – The Design Professionals in Responsible Charge, and the local Building Official.

C. The testing laboratory shall maintain a full-time licensed Professional Engineer in the State of New York 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 qualified personnel as outlined in Chapter 17 of the 2010 Building Code of New York State and with the appropriate training and certifications as indicated in the Special Inspections and Testing Matrix, Part C.

1.6 SUBMITTALS

A. The Special Inspector and Inspection and Testing Agents shall submit to the Engineer and Code Enforcement Official for review, a copy of 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 and Inspection and Testing Agents.

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 reinspections of work which fails to comply with the requirements of the contract documents.

1.8 CONTRACTOR RESPONSIBILITIES

A. The Statement of Special Inspections shall be submitted to the Code Enforcement Official with the application for Building Permit.

B. The Contractor shall cooperate with the Special Inspector and the Inspection and Testing Agents so that the Special Inspections and Testing may be performed without hindrance.

C. The Contractor shall provide adequate OSHA-compliant access for the Special Inspector and the Inspection and Testing Agents, for them to perform their work.

D. 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 Inspection and Testing Agents at least 24 hours in advance of a required test, and 3 working days in advance of a required inspection. Uninspected work that required inspection may be rejected solely on that basis.

E. 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.

F. 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 Special Inspector and Inspection and Testing Agents.

G. The Special Inspection program shall in no way relieve the Contractor of his 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 Inspection and Testing shall first be reviewed by the Contractor's quality control personnel.

H. The Contractor shall be solely responsible for construction site safety.

1.9 LIMITS ON SPECIAL INSPECTOR AND TESTING AGENT AUTHORITY

A. The Special Inspector or the Inspection and Testing Agents may not release, revoke, alter, or expand on the requirements of the Contract Documents.

B. The Special Inspector and the Inspection and Testing Agents will not have control over the Contractor's means and methods of construction.

C. Neither the Special Inspector nor the Inspection and Testing Agents shall be responsible for construction site safety.

D. Neither the Special Inspector nor the Inspection and Testing Agents shall have authority to stop the work.

1.10 RECORDS AND REPORTS

A. Inspection and Testing Agents shall prepare detailed reports of each inspection or test and submit to the Special Inspector. 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. Applicable ASTM standard.
6. Weather conditions as applicable.
7. Signature of inspector, or of the individual overseeing the testing.

B. The Special Inspector shall submit interim reports to the Code Enforcement Official, Engineer, Architect, and Contractor.

C. The Special Inspector shall report any discrepancies from the Contract Documents found during an inspection. If the discrepancies are not corrected during the inspection, the Special Inspector shall notify the Engineer and Code Enforcement Official. Reports shall document all discrepancies identified and the corrective action taken.

D. The Testing Laboratory shall promptly notify the Special Inspector and the Engineer by telephone, fax, or email of any test results which fail to comply with the requirements of the Contract Documents.

E. The Inspection and Testing Agents shall submit reports to the Special Inspector within 7 days of the inspection or test. Handwritten reports may be submitted if final typed copies are not available.

F. At the completion of the work requiring Special Inspections, each Inspection and Testing Agent, including laboratories, 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.

1.11 FINAL REPORT OF SPECIAL INSPECTIONS

A. The Final Report of Special Inspections shall be completed by the Special Inspector and submitted to the Engineer and Code Enforcement Official prior to the issuance of a Certificate of Use and Occupancy.

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 (Not Used)

END OF SECTION 014100

STATEMENT OF SPECIAL INSPECTIONS

Project: RIVER STREET SENIOR HOUSING

Location: 30 RIVER STREET, CORTLAND, NY 13045

Owner: RIVER STREET SENIOR APARTMENTS LLC

Owner's Address: 36 TAYLOR STREET, CORTLAND, NY 13045

Architect of Record: HOLMES, KING, KALLQUIST & ASSOCIATES, LLP

Structural Engineer of Record: ST. GERMAIN & AUPPERLE CONSULTING ENGINEERS, PLLC

This *Statement of Special Inspections* is submitted as a condition for permit issuance in accordance with the Special Inspection requirements of the Building Code. It includes a Schedule of Special Inspection Services applicable to this project as well as the name of the special inspector and the identity of other approved agencies intended to be retained for conducting these inspections.

The Special Inspector shall keep records of all inspections and shall furnish inspection reports to the Building Official, Structural Engineer and Architect of Record. Discovered discrepancies shall be brought to the immediate attention of the contractor for correction. If such discrepancies are not corrected, the discrepancies shall be brought to the attention of the Building Official, Structural Engineer and Architect of Record. The Special Inspection program does not relieve the Contractor of his or her responsibilities.

Interim reports shall be submitted to the Building Official, Structural Engineer and Architect of Record.

A *Final Report of Special Inspections* documenting completion of all Special Inspections and correction of any discrepancies noted in the inspections shall be submitted prior to the issuance of a Certificate of Use and Occupancy.

Job site safety and means and methods of construction are solely the responsibility of the Contractor.

Interim report frequency:
☒ Per attached schedule.

Prepared by: Richard P. Aupperle III, PE

07/18/2025
Signature *Date*



Design Professional Seal

Owner's Authorization:

Signature *Date*

Building Official's Acceptance:

Signature *Date*

Schedule of Special Inspection Services

Project: River Street Senior Housing

The following sheets comprise the required schedule of special inspections for this project. The construction divisions which require special inspections are as follows:

- ☒ Soils and Foundations
- ☒ Cast-in-Place Concrete
- ☐ Precast Concrete
- ☒ Masonry
- ☒ Structural Steel
- ☐ Cold-Formed Steel Framing
- ☐ Spray Fire Resistant Material
- ☒ Wood Construction
- ☐ Exterior Insulation and Finish System
- ☐ Mechanical & Electrical Systems
- ☐ Architectural Systems
- ☒ Wood Truss Construction

Inspection Agents	Firm	Address
1. Engineer of Record Richard P. Aupperle III, PE	**St. Germain & Aupperle Consulting Engineers, PLLC**	**5711 W. Genesee St. Camillus, NY 13031 (315) 488-3550**
2. Geotechnical Engineer/ Special Inspector/Testing Laboratory:	**Kenney Geotechnical Engineering Services, PLLC**	**6901 Herman Road Syracuse, NY 13209 (315) 638-2706**
3. Geotechnical Engineer/ Special Inspector/Testing Laboratory:	**CME Associates**	**6035 Corporate Drive East Syracuse, NY 13057 (315) 701-0522**
4. Geotechnical Engineer/ Special Inspector/Testing Laboratory:	**Atlantic Testing**	**6085 Court Street Road Syracuse, NY 13206 (315) 699-5281**

Note: The inspection and Testing agent shall be engaged by the Owner's Agent, and not by the Contractor or Subcontractor whose work is to be inspected or tested. Any conflict of interest must be disclosed to the building official, prior to commencing work.

Seismic Design Category: **C**

Ultimate Design Wind Speed: **115 mph**

Wind Exposure Category: **C**

Qualifications of Inspectors and Testing Technicians

Project: River Street Senior Housing

The qualifications of all personnel performing Special Inspection activities are subject to the approval of the Building Official. The credentials of all Inspectors and Testing Technicians shall be provided if requested. It is recommended that the person administering the Special Inspection program be a Structural Engineer or a Professional Engineer experienced in the design of buildings.

Key for Minimum Qualifications of Inspection Agents:

When the Structural Engineer of Record deems it appropriate that the individual performing a stipulated test or inspection have a specific certification or license as indicated below, such designation shall appear below the *Agent Number* on the *Schedule of Special Inspections.*

PSE **Structural Engineer** – a licensed SE or PE specializing in the design of building structures. This may be required for the inspection of critical structural elements.

GE **Geotechnical Engineer** – a licensed PE specializing in soil mechanics and foundations. This may be required for the inspection of difficult soil conditions or deep foundations.

EIT **Engineer-In-Training** – a graduate engineer who has passed the Fundamentals of Engineering examination. This may be required for the inspection of elements that require some engineering training to properly evaluate.

ACI **American Concrete Institute - Level 1 Certified Concrete Field Testing Technician.** This certification is appropriate for individuals performing concrete sampling, slump tests, air-content tests, temperature tests, unit weight tests, and casting compression test cylinders.

AWS **American Welding Society – Certified Welding Inspector** (CWI). This certification is appropriate for individuals performing visual inspection of welds

ASNT **American Society of Non-Destructive Testing** – Level II or Level III. This certification is appropriate for individuals performing ultra-sonic testing of welds.

SMSI **Structural Masonry Special Inspector** – Certification by ICC.

SWSI **Structural Steel and Welding Inspector** - Certification by ICC.

SFSI **Spray-Applied Fireproofing Special Inspector** - Certification by ICC.

PCSI **Prestressed Concrete Special Inspector** - Certification jointly sponsored by ICC, BOCA and SBCCI with participation form PCI and PTI.

RCSI **Reinforced Concrete Special Inspector** - Certification jointly sponsored by ACI, ICC, BOCA and SBCCI.

MSI **Master Special Inspector** - Certification by ICC.

Schedule of Special Inspection Services

Project: River Street Senior Housing

Soils and Foundations: NYSBC Table 1705.6

Item	Agent No. (Qualif.)	Scope
1.Shallow Foundations	2,3 or 4 GE	a) Verify site preparation at proposed spread and strip footings. (Continuous) Refer to NYSBC Table 1705.6
2.Controlled Structural Fill	1 PSE, 2,3 or 4 GE 2,3 or 4 GE	a) Review submittals for fill material source location and current NYSDOT acceptance number. (Periodic) b) Verify compaction of backfill. (Continuous)

Schedule of Special Inspection Services

Project: River Street Senior Housing

Cast-in-Place Concrete: NYSBC Table 1705.3

Item	Agent No. (Qualif.)	Scope
1.Mix Design	1, PSE	a) Verify use of required design mix. (Periodic) Provide submittals as indicated in project specifications.
2.Material Certification	1, PSE	a) Verify material components of required design mix. (Periodic) Provide submittals as indicated in project specifications.
3.Reinforcement Installation	2, 3, or 4, ACI	a) Inspection of reinforcing steel installation prior to the placement of concrete as indicated in project specifications. (Continuous)
4.Formwork Geometry	2, 3, or 4, ACI	a) Inspection of concrete formwork prior to the placement of concrete as indicated in project specifications. (Periodic)
5.Concrete Placement	2, 3, or 4, ACI 2, 3, or 4, ACI	a) Inspection of concrete placement. (Periodic) b) Sampling fresh concrete and performing slump, air content, and determining the temperature of fresh concrete at the time of making specimens for strength tests as indicated in project specifications. (Continuous)
6.Evaluation of Concrete Strength	2, 3, or 4, ACI	a) Provide concrete strength tests at 7- and 28-day intervals as indicated in concrete specification section. (Continuous)
7.Curing and Protection	2, 3, or 4, ACI	a) Inspect concrete curing and heat/cold protection techniques (Periodic)

Schedule of Special Inspection Services

Project: River Street Senior Housing

Masonry: NYSBC 1705.4

Item	Agent No. (Qualif.)	Scope
1.Material Certification	1, PSE	a) Verify material components of concrete masonry units, joint reinforcing, mortar, grout, and reinforcing bars. (Periodic) Provide submittals as indicated in the project specifications.
2.Mixing of Mortar and Grout	2, 3, or 4, SMSI	a) Verify proportions of site-prepared mortar and grout. (Periodic) Provide submittals as indicated in the project specifications.
3.Installation of Masonry	2, 3, or 4, SMSI	a) Verify construction of mortar joints (Periodic).
4.Reinforcement Installation	2, 3, or 4, SMSI	a) Verify specified size, grade, and type of reinforcement and connectors, and location of reinforcing. (Periodic). Provide submittals as indicated in the project specifications. b) Verify connection of masonry to other structural elements. (Periodic)
5.Grouting Operations	2, 3, or 4, SMSI	a) Verify grout space is clean (Periodic). b) Verify placement of reinforcement and connectors prior to grout placement (Periodic).
6.Weather Protection	2, 3, or 4, SMSI	a) Verify protection of masonry during cold weather (temp. below 40 degrees F) or hot weather (temp. above 90 degrees F). (Periodic)
7.Evaluation of Masonry Strength	2, 3, or 4, SMSI	a) Verify concrete unit masonry, mortar, and grout comply with strength requirements as outlined in project specifications. (Periodic) Provide submittals and test data as indicated in the project specifications.
8.Anchors and Ties	2, 3, or 4, SMSI, EIT	a) Verify size and locations of anchors and ties (Periodic).

Schedule of Special Inspection Services

Project: River Street Senior Housing

Structural Steel: NYSBC 1705.2

Item	Agent No. (Qualif.)	Scope
1.Fabrication Certification/ Quality Control Procedures	1, 2, 3, or 4, PSE or SWSI	a) Shop fabrication to be AISC Certified OR fabrication shop to be inspected and provide written quality control procedures. Provide documentation.
2.Material Certification	2, 3, or 4, SWSI	a) Material verification of high strength bolts, nuts, and washers, and screws: Identification markings to conform to ASTM standards specified in the approved Construction Documents. Manufacturer certificate of compliance required. (Periodic)
	2, 3, or 4, SWSI	b) Material verification of structural steel and metal roof deck: Identification markings to conform to ASTM standards specified in the approved Construction Documents. Manufacturers certified mill test reports required. (Periodic)
3.Bolting	2, 3, or 4, SWSI	a) Inspection of high strength bolting: bearing type connections. (Periodic) 25% of Connections
	2, 3, or 4, SWSI	b) Slip-critical connections: (continuous and periodic)
4.Welding	2, 3, or 4, SWSI	a) Provide verification of weld filler material: Identification markings to conform to AWS specified in the approved Construction Documents. Manufacturer certificate of compliance required. (Periodic).
	2, 3, or 4, AWS	b) Inspection of Structural Steel Welding: All field welds (Periodic).
	2, 3, or 4, AWS	c) Other reinforcing steel (periodic).
5.Structural Details	2, 3, or 4, SWSI	a) Inspection of conformance to construction documents (Periodic).
	2, 3, or 4, AWS	b) Inspection of steel frame joint details for compliance with approved construction documents (periodic).

Schedule of Special Inspection Services

Project: River Street Senior Housing

Wood Construction: Rough Carpentry

Item	Agent No. (Qualif.)	Scope
1.Material Grading	1, 2, 3, or 4, EIT, PE, or MSI	a) 25% of framing lumber to be visually reviewed for species, grade, and visual quality.
	1, 2, 3, or 4, EIT, PE, or MSI	b) Material verification of framing members: Identification markings by agencies certified by the American Lumber Standards Committee shall be reviewed for compliance with project material specifications. (Periodic)
2. Framing	1, 2, 3, or 4, EIT, PE, or MSI	a) Verify lumber construction to be in compliance with construction documents. Verify framing member sizes, spacing, and location with Construction Document Plans and Details. (Periodic).
	1, 2, 3, or 4, EIT, PE, or MSI	b) Wood shear walls: Comprehensive inspections: Verify grade and thickness of wood structural panel sheathing and nominal size of framing members at adjoining panel edges to be in compliance with the Construction Document Plans and Details.
3.Connections	1, 2, 3, or 4, EIT, PE, or MSI	a) 10 % visual inspection of roof and floor framing connections for conformance with construction documents or NYS Building Code Fastening Schedule Table 2304.10.1, or as indicated on construction documents.
	1, 2, 3, or 4, EIT, PE, or MSI	b) Comprehensive inspection of wood shear walls: Verify the nail/staple diameter and length, the number of fastener lines and that the spacing between fasteners in each line and at edge margins is in compliance with the approved construction documents.

Schedule of Special Inspection Services

Project: River Street Senior Housing

Wood Truss Construction: NYSBC 1705.5

Item	Agent No. (Qualif.)	Scope
1.Fabrication Certification/ Quality Control Procedures	1, 2, 3, or 4, PSE or MSI	a) Shop fabrication to be inspected and provide written quality control procedures if fabricator shop is not registered and approved to perform without special inspection. Registered and approved shop to provide certificate of compliance to the code official stating work is performed in accordance with approved construction documents.
2.Material Grading	1, 2, 3, or 4, EIT, PE, or MSI 1, 2, 3, or 4, EIT, PE, or MSI	a) 25% of Truss lumber to be visually reviewed for species, grade, and visual quality. b) Material verification of framing members: Identification markings by agencies certified by the American Lumber Standards Committee shall be reviewed for compliance with wood truss shop drawings & project material specifications. (Periodic)
3. Framing	1, 2, 3, or 4, PE or MSI	a) Verify lumber construction to be in compliance with wood truss shop drawings. Verify framing member sizes, spacing, and location with Wood Truss Shop Drawings & Construction Document Plans and Details. (Periodic).
4.Connections	1, 2, 3, or 4, PE or MSI	a) 10 % visual inspection of truss connections for conformance with wood truss shop drawings & construction document.

SECTION 015000 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes requirements for temporary utilities, support facilities, and security and protection facilities.

B. Related Requirements:

1. Section 011000 "Project Summary" for work restrictions and limitations on utility interruptions.

1.2 USE CHARGES

A. General: Installation and removal of and use charges for temporary facilities shall be included in the Contract Sum unless otherwise indicated. Allow other entities to use temporary services and facilities without cost, including, but not limited to, Owner's construction forces, Architect, occupants of Project, testing agencies, and authorities having jurisdiction.

1.3 INFORMATIONAL SUBMITTALS

A. Site Plan: Show temporary facilities, utility hookups, staging areas, and parking areas for construction personnel.

B. Erosion- and Sedimentation-Control Plan: Show compliance with requirements of EPA Construction General Permit or authorities having jurisdiction, whichever is more stringent.

C. Fire-Safety Program: Show compliance with requirements of NFPA 241 and authorities having jurisdiction. Indicate Contractor personnel responsible for management of fire prevention program.

1.4 QUALITY ASSURANCE

A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.

B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

C. Accessible Temporary Egress: Comply with applicable provisions in ICC/ANSI A117.1.

1.5 PROJECT CONDITIONS

A. Temporary Use of Permanent Facilities: Engage Installer of each permanent service to assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Portable Chain-Link Fencing: Minimum 2-inch, 0.148-inch- thick, galvanized-steel, chain-link fabric fencing; minimum 6 feet high with galvanized-steel pipe posts; minimum 2-3/8-inch- OD line posts and 2-7/8-inch- OD corner and pull posts, with 1-5/8-inch- OD top and bottom rails. Provide galvanized-steel bases for supporting posts.

2.2 TEMPORARY FACILITIES

A. Field Offices, General: Prefabricated or mobile units with serviceable finishes, temperature controls, and foundations adequate for normal loading.

B. Common-Use Field Office: Of sufficient size to accommodate needs of Owner, Architect, and construction personnel office activities and to accommodate Project meetings specified in other Division 01 Sections. Keep office clean and orderly.

C. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations.

2.3 EQUIPMENT

A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.

B. HVAC Equipment: Unless Owner authorizes use of permanent HVAC system, provide vented, self-contained, liquid-propane-gas or fuel-oil heaters with individual space thermostatic control.

1. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.

2. Heating Units: Listed and labeled for type of fuel being consumed, by a qualified testing agency acceptable to authorities having jurisdiction, and marked for intended location and application.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.

1. Locate facilities to limit site disturbance as specified in Section 011000 "Project Summary."

B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.2 TEMPORARY UTILITY INSTALLATION

A. General: Install temporary service or connect to existing service.

1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.

B. Sewers and Drainage: Provide temporary utilities to remove effluent lawfully.

1. Connect temporary sewers to municipal system as directed by authorities having jurisdiction.

C. Water Service: Install water service and distribution piping in sizes and pressures adequate for construction.

D. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking water for use of construction personnel. Comply with requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.

E. Heating and Cooling: Provide temporary heating and cooling required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed.

F. Ventilation and Humidity Control: Provide temporary ventilation required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce ambient condition required and minimize energy consumption.

G. Electric Power Service: Provide electric power service and distribution system of sufficient size, capacity, and power characteristics required for construction operations.

1. Install electric power service overhead unless otherwise indicated.

H. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.

1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.

3.3 SUPPORT FACILITIES INSTALLATION

A. General: Comply with the following:

1. Provide construction for temporary offices, shops, and sheds located within construction area or within 30 feet of building lines that is noncombustible according to ASTM E 136. Comply with NFPA 241.

2. Maintain support facilities until Architect schedules Substantial Completion inspection. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Owner.

B. Temporary Roads and Paved Areas: Construct and maintain temporary roads and paved areas adequate for construction operations. Locate temporary roads and paved areas as indicated on Drawings.

1. Provide dust-control treatment that is nonpolluting and non-tracking. Reapply treatment as required to minimize dust.

C. Temporary Use of Permanent Roads and Paved Areas: Locate temporary roads and paved areas in same location as permanent roads and paved areas. Construct and maintain temporary roads and paved areas adequate for construction operations. Extend temporary roads and paved areas, within construction limits indicated, as necessary for construction operations.

1. Coordinate elevations of temporary roads and paved areas with permanent roads and paved areas.
2. Prepare sub-grade and install subbase and base for temporary roads and paved areas per the contract documents.
3. Recondition base after temporary use, including removing contaminated material, re-grading, proof-rolling, compacting, and testing.
4. Delay installation of final course of permanent hot-mix asphalt pavement until immediately before Substantial Completion. Repair hot-mix asphalt base-course pavement before installation of final course per the contract documents.

D. Traffic Controls: Comply with requirements of authorities having jurisdiction.

1. Protect existing site improvements to remain including curbs, pavement, and utilities.
2. Maintain access for fire-fighting equipment and access to fire hydrants.

E. Parking: Provide temporary parking areas for construction personnel as permitted by the Owner.

F. Dewatering Facilities and Drains: Comply with requirements of authorities having jurisdiction. Maintain Project site, excavations, and construction free of water.

1. Dispose of rainwater in a lawful manner that will not result in flooding Project or adjoining properties or endanger permanent Work or temporary facilities.
2. Remove snow and ice as required to minimize accumulations.

G. Project Signs: Provide Project signs as indicated. Unauthorized signs are not permitted.

1. Identification Signs: Provide Project identification signs as indicated on Drawings.
2. Temporary Signs: Provide other signs as indicated and as required to inform public and individuals seeking entrance to Project.

    a. Provide temporary, directional signs for construction personnel and visitors.

3. Maintain and touchup signs so they are legible at all times.

H. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction. Comply with progress cleaning requirements in Section 017000 "Execution Requirements."

I. Lifts and Hoists: Provide facilities necessary for hoisting materials and personnel.

1. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.

J. Temporary Stairs: Until permanent stairs are available, provide temporary stairs where ladders are not adequate.

K. Temporary Use of Permanent Stairs: Use of new stairs for construction traffic will be permitted, provided stairs are protected and finishes restored to new condition at time of Substantial Completion.

3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

A. Protection of Existing Facilities: Protect existing vegetation, equipment, structures, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.

B. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.

C. Temporary Erosion and Sedimentation Control: Comply with requirements specified in the contract documents.

D. Storm-water Control: Comply with requirements of authorities having jurisdiction. Provide barriers in and around excavations and sub-grade construction to prevent flooding by runoff of storm-water from heavy rains.

E. Tree and Plant Protection: Install temporary fencing located as indicated or outside the drip line of trees to protect vegetation from damage from construction operations. Protect tree root systems from damage, flooding, and erosion.

F. Pest Control: Engage pest-control service to recommend practices to minimize attraction and harboring of rodents, roaches, and other pests and to perform extermination and control procedures at regular intervals so Project will be free of pests and their residues at Substantial Completion. Perform control operations lawfully, using environmentally safe materials.

G. Site Enclosure Fence: Before construction operations begin, furnish and install site enclosure fence in a manner that will prevent people and animals from easily entering site except by entrance gates.

1. Extent of Fence: As required to enclose entire Project site or portion determined sufficient to accommodate construction operations.

2. Maintain security by limiting number of keys and restricting distribution to authorized personnel. Furnish one set of keys to Owner.

H. Security Enclosure and Lockup: Install temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security. Lock entrances at end of each work day.

I. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.

J. Temporary Egress: Maintain temporary egress from existing occupied facilities as indicated and as required by authorities having jurisdiction.

K. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weathertight enclosure for building exterior.

1. Where heating or cooling is needed and permanent enclosure is not complete, insulate temporary enclosures.

L. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241; manage fire prevention program.

1. Prohibit smoking in construction areas.

2. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of authorities having jurisdiction.

3. Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.

4. Provide temporary standpipes and hoses for fire protection. Hang hoses with a warning sign stating that hoses are for fire-protection purposes only and are not to be removed. Match hose size with outlet size and equip with suitable nozzles.

3.5 MOISTURE AND MOLD CONTROL

A. Contractor's Moisture Protection Plan: Avoid trapping water in finished work. Document visible signs of mold that may appear during construction.

B. Exposed Construction Phase: Before installation of weather barriers, when materials are subject to wetting and exposure and to airborne mold spores, protect materials from water damage and keep porous and organic materials from coming into prolonged contact with concrete.

C. Partially Enclosed Construction Phase: After installation of weather barriers but before full enclosure and conditioning of building, when installed materials are still subject to infiltration of moisture and ambient mold spores, protect as follows:

1. Do not load or install drywall or other porous materials or components, or items with high organic content, into partially enclosed building.

2. Keep interior spaces reasonably clean and protected from water damage.

3. Discard or replace water-damaged and wet material.

4. Discard, replace, or clean stored or installed material that begins to grow mold.

5. Perform work in a sequence that allows any wet materials adequate time to dry before enclosing the material in drywall or other interior finishes.

D. Controlled Construction Phase of Construction: After completing and sealing of the building enclosure but prior to the full operation of permanent HVAC systems, maintain as follows:

1. Control moisture and humidity inside building by maintaining effective dry-in conditions.

2. Remove materials that can not be completely restored to their manufactured moisture level within 48 hours.

3.6 OPERATION, TERMINATION, AND REMOVAL

A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.

B. Maintenance: Maintain facilities in good operating condition until removal.

1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.

C. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.

D. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.

1. Materials and facilities that constitute temporary facilities are property of Contractor. Owner reserves right to take possession of Project identification signs.

2. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Section 017700 "Closeout Procedures."

END OF SECTION 015000

SECTION 015800 – PROJECT SIGN

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work included: The work under this Section of the Specifications includes all labor, materials, equipment and services necessary to complete the Project Sign as herein specified.

B. Project Identification Sign.

C. Maintenance.

D. Removal.

1.2 RELATED WORK

A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary conditions and Sections in Division 1 of these Specifications; also include as follows:
   1. Section 008000 - Supplementary General Conditions.
   2. Section 010100 – Project Summary.

1.3 QUALITY ASSURANCE

A. Design sign and structure to withstand 50 mile per hour wind velocity.

B. Sign Painter: Engaged as professional sign painter for not less than three years.

C. Finishes, Painting: Adequate to withstand weathering, fading, and chipping for duration of construction.

1.4 SUBMITTALS

A. Submit shop drawings under provisions of Section 013300.

B. Show content, layout, lettering, colors and construction.

PART 2 - PRODUCTS

2.1 SIGN MATERIALS

A. Structure and Framing: New wood or metal, structurally adequate.

B. Sign Surfaces: Exterior grade plywood with medium density overlay, minimum 1/2" thick, standard large sizes to minimize joints.

C. Rough Hardware: Galvanized.

D. Paint and Primers: Exterior quality, two coats. Colors designated by Architect.

E. Lettering: Exterior quality paint, contrasting colors designated by Architect.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install project identification sign within 30 days after date fixed by Notice to Proceed.

B. Erect at designated location.

C. Erect supports and framing rigidly braced and framed to resist wind loadings.

D. Install sign surface plumb and level with butt joints. Anchor securely.

E. Paint sight-exposed surfaces of sign, supports, and framing.

3.2 PROJECT IDENTIFICATION SIGN

A. One painted sign, 32 square feet area, bottom above-ground, 8'-0".

B. Content:
1. Project title and name of Owner as shown on Contract Documents.
2. Names and titles of Architect and Consultants.
3. Name of Prime Contractors.
4. Color Rendering of Building Project, electronic file provided by the Architect.

C. Graphic Design, Colors, Style of Lettering: Designated by Architect.

D. Contractor to verify and conform with the Town’s sign ordinance.

E. No other signs to be displayed on site without Architect's written approval.

3.3 MAINTENANCE

A. Maintain signs and supports clean; repair deterioration and damages.

3.4 REMOVAL

A. Remove signs, framing, supports, and foundations at completion of Project and restore the area.

END OF SECTION 015800

SECTION 016000 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; product substitutions; and comparable products.

B. Related Sections include the following:

1. Division 01 Section "Alternates" for products selected under an alternate.
2. Division 01 Section "Closeout Procedures" for submitting warranties for Contract closeout.
3. Divisions 02 through 12 Sections for specific requirements for warranties on products and installations specified to be warranted **and written specifications provided on the contract drawings for Civil, Plumbing, Mechanical and Electrical work.**

1.3 DEFINITIONS

A. Products: Items purchased 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 that 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, or where indicated as a product substitution, 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. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.

C. Basis-of-Design Product Specification: Where a specific manufacturer's product is named and accompanied by the words "basis of design," 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 other named manufacturers.

1.4 SUBMITTALS

A. Product List: Submit a list, in tabular form, showing specified products. Include generic names of products required. Include manufacturer's name and proprietary product names for each product.

1. Coordinate product list with Contractor's Construction Schedule and the Submittals Schedule.
2. Form: Tabulate information for each product under the following column headings:

    a. Specification Section number and title.
    b. Proprietary name, model number, and similar designations.
    c. Manufacturer's name and address.
    d. Supplier's name and address.
    e. Installer's name and address.
    f. Projected delivery date or time span of delivery period.
    g. Identification of items that require early submittal approval for scheduled delivery date.

3. Initial Submittal: Within ten (10) days after date of commencement of the Work, submit 3 copies of initial product list. Include a written explanation for omissions of data and for variations from Contract requirements.

    a. At Contractor's option, initial submittal may be limited to product selections and designations that must be established early in Contract period.

4. Completed List: Within thirty (30) days after date of commencement of the Work, submit three (3) copies of completed product list. Include a written explanation for omissions of data and for variations from Contract requirements.
5. Architect's Action: Architect will respond in writing to Contractor within 10 days of receipt of completed product list. Architect's response will include a list of unacceptable product selections and a brief explanation of reasons for this action. Architect's response, or lack of response, does not constitute a waiver of requirement to comply with the Contract Documents.

B. Substitution Requests: Submit a .pdf file format of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.

1. Substitution Request Form: Use CSI Form 13.1A.
2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:

    a. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by Owner and separate contractors that will be necessary to accommodate proposed substitution.
    b. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
    c. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
    d. Samples, where applicable or requested.

e. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
f. Cost information, including a proposal of change, if any, in the Contract Sum.
g. Contractor's certification that proposed substitution complies with requirements in the Contract Documents and is appropriate for applications indicated.
h. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.

3. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within ten (10) days of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution within twenty (20) days of receipt of request, or ten (10) days of receipt of additional information or documentation, whichever is later.

a. Form of Acceptance: Change Order.
b. Use product specified if Architect cannot make a decision on use of a proposed substitution within time allocated.

C. Comparable Product Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.

1. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within ten (10) days of receipt of a comparable product request. Architect will notify Contractor of approval or rejection of proposed comparable product request within twenty (20) days of receipt of request, or ten (10) days of receipt of additional information or documentation, whichever is later.

a. Form of Approval: As specified in Division 01 Section "Submittal Procedures."
b. Use product specified if Architect cannot make a decision on use of a comparable product request within time allocated.

D. Basis-of-Design Product Specification Submittal: Comply with requirements in Division 01 Section "Submittal Procedures." Show compliance with requirements.

1.5 QUALITY ASSURANCE

A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, product selected shall be compatible with products previously selected, even if previously selected products were also options.

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft. Comply with manufacturer's written instructions.

B. Delivery and Handling:

1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.

2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
4. Inspect products on delivery to ensure compliance with the Contract Documents and to ensure that products are undamaged and properly protected.

C. Storage:

1. Store products to allow for inspection and measurement of quantity or counting of units.
2. Store materials in a manner that will not endanger Project structure.
3. Store products that are subject to damage by the elements, under cover in a weather-tight enclosure above ground, with ventilation adequate to prevent condensation.
4. Store cementitious products and materials on elevated platforms.
5. Store foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
6. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
7. Protect stored products from damage and liquids from freezing.

1.7 PRODUCT WARRANTIES

A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.

1. Manufacturer's Warranty: Preprinted written warranty published by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
2. Special Warranty: Written warranty required by or incorporated into the Contract Documents, either to extend time limit provided by manufacturer's warranty or to provide more rights for Owner.

B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution. Submit a draft for approval before final execution.

1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
2. Refer to Divisions 02 through 33 Sections for specific content requirements and particular requirements for submitting special warranties.

C. Submittal Time: Comply with requirements in Division 01 Section "Closeout Procedures."

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

A. General Product Requirements: Provide products that comply with the Contract Documents, that are undamaged and, unless otherwise indicated, that 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. 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.
3. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
4. Where products are accompanied by the term "as selected," Architect will make selection.
5. Where products are accompanied by the term "match sample," sample to be matched is Architect's.
6. Descriptive, performance, and reference standard requirements in the Specifications establish "salient characteristics" of products.
7. Or Equal: Where products are specified by name and accompanied by the term "or equal" or "or approved equal" or "or approved," comply with provisions in Part 2 "Comparable Products" Article to obtain approval for use of an unnamed product.

B. Product Selection Procedures:

1. Products: Where Specifications include a list of names of both products and manufacturers, provide one of the products listed that complies with requirements.
2. Manufacturers: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements.
3. Available Products: Where Specifications include a list of names of both products and manufacturers, provide one of the products listed, or an unnamed product, that complies with requirements. Comply with provisions in Part 2 "Comparable Products" Article for consideration of an unnamed product.
4. Available Manufacturers: Where Specifications include a list of manufacturers, provide a product by one of the manufacturers listed, or an unnamed manufacturer, that complies with requirements. Comply with provisions in Part 2 "Comparable Products" Article for consideration of an unnamed product.
5. Basis-of-Design Product: Where Specifications name a product and include a list of manufacturers, provide the specified 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 provisions in Part 2 "Comparable Products" Article for consideration of an unnamed product by the other named manufacturers.

2.2 PRODUCT SUBSTITUTIONS

A. Timing: Architect will consider requests for substitution if received within fifteen (15) days after commencement of the Work. Requests received after that time may be considered or rejected at discretion of Architect.

B. Conditions: Architect will consider Contractor's request for substitutions when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:

1. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner

must assume. Owner's additional responsibilities may include compensation to Architect for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.

2. Requested substitution is consistent with the Contract Documents and will produce indicated results.

2.3 COMPARABLE PRODUCTS

A. Conditions: Architect will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:

1. Evidence that the proposed product does not require extensive 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.

    a. Requested substitutions are submitted including and indicating the same testing criteria and reference standards used for the products specified and show how the substitution compares to the product specified.

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.

PART 3 - EXECUTION (Not Used)

END OF SECTION 016000

SECTION 017000 - EXECUTION REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes general procedural requirements governing execution of the Work including, but not limited to, the following:

1. General installation of products.
2. Progress cleaning.
3. Starting and adjusting.
4. Protection of installed construction.
5. Correction of the Work.

B. Related Sections include the following:

1. Division 01 Section "Cutting and Patching" for procedural requirements for cutting and patching necessary for the installation or performance of other components of the Work.
2. Division 01 Section "Closeout Procedures" for submitting final property survey with Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, and final cleaning.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Existing Conditions: The existence and location of site improvements, utilities, and other construction indicated as existing are not guaranteed. Before beginning work, investigate and verify the existence and location of mechanical and electrical systems and other construction affecting the Work.

1. Before construction, verify the location and points of connection of utility services.

B. Existing Utilities: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning, investigate and verify the existence and location of underground utilities and other construction affecting the Work.

C. Acceptance of Conditions: Examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.

1. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
2. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.

3. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
4. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Existing Utility Information: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after the contractor arranges temporary utility services according to requirements indicated:

1. Notify Architect not less than three (3) calendar days in advance of proposed utility interruptions.

B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.

D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents, submit a request for information to Architect. Include a detailed description of problem encountered, together with recommendations for changing the Contract Documents. Submit requests on CSI Form 13.2A, "Request for Interpretation."

3.3 INSTALLATION

A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.

1. Make vertical work plumb and make horizontal work level.
2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
3. Conceal pipes, ducts, and wiring in finished areas, unless otherwise indicated.
4. Maintain minimum headroom clearance of 8 feet in spaces without a suspended ceiling.

B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.

C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.

D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.

E. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.

F. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.

G. Anchors and Fasteners: Provide anchors and fasteners as required to anchor each component securely in place, accurately located and aligned with other portions of the Work.

1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.

2. Allow for building movement, including thermal expansion and contraction.
3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

H. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.
I. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.4 PROGRESS CLEANING

A. General: Clean Project site and work areas daily, including common areas. Coordinate progress cleaning for joint-use areas where more than one installer has worked. Enforce requirements strictly. Dispose of materials lawfully.

1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
2. Do not hold materials more than 7 days during normal weather or 3 days if the temperature is expected to rise above 80 deg F.
3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.

B. Site: Maintain Project site free of waste materials and debris.
C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.

1. Remove liquid spills promptly.
2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.

D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
G. Waste Disposal: Burying or burning waste materials on-site will not be permitted. Washing waste materials down sewers or into waterways will not be permitted.

H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

J. Limiting Exposures: Supervise construction operations to assure that no part of the construction completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.5 STARTING AND ADJUSTING

A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
B. Adjust operating components for proper operation without binding. Adjust equipment for proper operation.
C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
D. Manufacturer's Field Service: If a factory-authorized service representative is required to inspect field-assembled components and equipment installation, comply with qualification requirements in Division 01 Section "Quality Requirements."

3.6 PROTECTION OF INSTALLED CONSTRUCTION

A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.
B. Comply with manufacturer's written instructions for temperature and relative humidity.

3.7 CORRECTION OF THE WORK

A. Repair or remove and replace defective construction. Restore damaged substrates and finishes. Comply with requirements in Division 01 Section "Cutting and Patching."

    1. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.

B. Restore permanent facilities used during construction to their specified condition.
C. Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.
D. Repair components that do not operate properly. Remove and replace operating components that cannot be repaired.
E. Remove and replace chipped, scratched, and broken glass or reflective surfaces.

END OF SECTION 017000

SECTION 017310 - 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 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes procedural requirements for cutting and patching.

B. Related Sections include the following:
1. Divisions 02 through 12 Sections for specific requirements and limitations applicable to cutting and patching individual parts of the Work **and written specifications provided on the contract drawings for Civil, Plumbing, Mechanical and Electrical work.**

1.3 DEFINITIONS

A. Cutting: Removal of in-place construction necessary to permit installation or performance of other Work.

B. Patching: Fitting and repair work required to restore surfaces to original conditions after installation of other Work.

1.4 SUBMITTALS

A. Cutting and Patching Proposal: Submit a proposal describing procedures at least 10 days before the time cutting and patching will be performed, requesting approval to proceed. Include the following information:

1. Extent: Describe cutting and patching, show how they will be performed, and indicate why they cannot be avoided.
2. Changes to In-Place Construction: Describe anticipated results. Include changes to structural elements and operating components as well as changes in building's appearance and other significant visual elements.
3. Products: List products to be used and firms or entities that will perform the Work.
4. Dates: Indicate when cutting and patching will be performed.
5. Utility Services and Mechanical/Electrical Systems: List services/systems that cutting and patching procedures will disturb or affect. List services/systems that will be relocated and those that will be temporarily out of service. Indicate how long services/systems will be disrupted.
6. Architect's Approval: Obtain approval of cutting and patching proposal before cutting and patching. Approval does not waive right to later require removal and replacement of unsatisfactory work.

1.5 QUALITY ASSURANCE

A. Structural Elements: Do not cut and patch structural elements in a manner that could change their load-carrying capacity or load-deflection ratio.

B. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety. Operating elements include but not limited to the following:

1. Primary operational systems and equipment.
2. Air or smoke barriers.
3. Fire-suppression systems.
4. Mechanical systems piping and ducts.
5. Control systems.
6. Communication systems.
7. Electrical wiring systems.

C. Miscellaneous Elements: Do not cut and patch miscellaneous 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. Miscellaneous elements include but not limited to the following:

1. Water, moisture, or vapor barriers.
2. Membranes and flashings.
3. Equipment supports.
4. Piping, ductwork, vessels, and equipment.

D. Visual Requirements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Comply with requirements specified in other Sections.

B. In-Place Materials: Use materials identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.

1. If identical materials are unavailable or cannot be used, use materials that, when installed, will match the visual and functional performance of in-place materials.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine surfaces to be cut and patched and conditions under which cutting and patching are to be performed.

1. Compatibility: Before patching, verify compatibility with and suitability of substrates, including compatibility with in-place finishes or primers.
2. Proceed with installation only after unsafe or unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Temporary Support: Provide temporary support of Work to be cut.

B. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.

C. Adjoining Areas: Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.

D. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to minimize interruption to occupied areas.

3.3 PERFORMANCE

A. General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.

1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.

B. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.

1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots as small as possible, neatly to size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
3. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
4. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
5. Proceed with patching after construction operations requiring cutting are complete.

C. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other Work. Patch with durable seams that are as invisible as possible. Provide materials and comply with installation requirements specified in other Sections.

1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate integrity of installation.
2. Exposed Finishes: 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.

    a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
    b. Restore damaged pipe covering to its original condition.

3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.

    a. Where patching occurs in a painted surface, apply primer and intermediate paint coats over the patch and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.

4. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.
5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition.

D. Cleaning: Clean areas and spaces where cutting and patching are performed. Completely remove paint, mortar, oils, putty, and similar materials.

END OF SECTION 017310

SECTION 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for the following:

1. Salvaging nonhazardous demolition and construction waste.
2. Recycling nonhazardous demolition and construction waste.
3. Disposing of nonhazardous demolition and construction waste.

B. Related Requirements:

1. Section 024116 "Structure Demolition" for disposition of waste resulting from demolition of buildings, structures, and site improvements.
2. Section 042000 "Unit Masonry" for disposal requirements for masonry waste.
3. Section 311000 "Site Clearing" for disposition of waste resulting from site clearing and removal of above- and below-grade improvements.

1.3 DEFINITIONS

A. Construction Waste: Building and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.

B. Demolition Waste: Building and site improvement materials resulting from demolition or selective demolition operations.

C. Disposal: Removal off-site of demolition and construction waste and subsequent sale, recycling, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction.

D. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.

E. Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another facility.

F. Salvage and Reuse: Recovery of construction waste and subsequent incorporation into the Work.

1.4 PERFORMANCE REQUIREMENTS

A. General: Achieve end-of-Project rates for salvage/recycling of 25 percent by weight of total non-hazardous solid waste generated by the Work. Practice efficient waste management in the use of materials in the course of the Work. Use all reasonable means to divert construction and demolition waste from landfills and incinerators. Facilitate recycling and salvage of materials, including the following:

1. Demolition Waste:

a. Asphalt paving.
b. Concrete.
c. Concrete reinforcing steel.
d. Brick.
e. Concrete masonry units.
f. Wood studs.
g. Wood joists.
h. Plywood and oriented strand board.
i. Wood paneling.
j. Wood trim.
k. Structural and miscellaneous steel.
l. Rough hardware.
m. Roofing.
n. Insulation.
o. Doors and frames.
p. Door hardware.
q. Windows.
r. Glazing.
s. Metal studs.
t. Gypsum board.
u. Acoustical tile and panels.
v. Carpet.
w. Carpet pad.
x. Demountable partitions.
y. Equipment.
z. Cabinets.
aa. Plumbing fixtures.
bb. Piping.
cc. Supports and hangers.
dd. Valves.
ee. Sprinklers.
ff. Mechanical equipment.
gg. Electrical conduit.
hh. Copper wiring.
ii. Lighting fixtures.
jj. Lamps.
kk. Ballasts.
ll. Electrical devices.
mm. Switchgear and panelboards.
nn. Transformers.

2. Construction Waste:

a. Masonry and CMU.
b. Lumber.
c. Wood sheet materials.
d. Wood trim.
e. Metals.
f. Roofing.
g. Insulation.
h. Carpet and pad.
i. Gypsum board.
j. Piping.
k. Electrical conduit.
l. Packaging: Regardless of salvage/recycle goal indicated in "General" Paragraph above, salvage or recycle 100 percent of the following uncontaminated packaging materials:

1) Paper.
2) Cardboard.
3) Boxes.
4) Plastic sheet and film.
5) Polystyrene packaging.
6) Wood crates.
7) Plastic pails.

1.5 ACTION SUBMITTALS

A. Waste Management Plan: Submit plan within 30 days of date established for commencement of the Work.

1.6 INFORMATIONAL SUBMITTALS

A. Waste Reduction Progress Reports: Concurrent with each Application for Payment, submit report. Use Form CWM-7 for construction waste and Form CWM-8 for demolition waste. Include the following information:

1. Material category.
2. Generation point of waste.
3. Total quantity of waste in tons.
4. Quantity of waste salvaged, both estimated and actual in tons.
5. Quantity of waste recycled, both estimated and actual in tons.
6. Total quantity of waste recovered (salvaged plus recycled) in tons.
7. Total quantity of waste recovered (salvaged plus recycled) as a percentage of total waste.

B. Waste Reduction Calculations: Before request for Substantial Completion, submit calculated end-of-Project rates for salvage, recycling, and disposal as a percentage of total waste generated by the Work.

C. Records of Donations: Indicate receipt and acceptance of salvageable waste donated to individuals and organizations. Indicate whether organization is tax exempt.

D. Records of Sales: Indicate receipt and acceptance of salvageable waste sold to individuals and organizations. Indicate whether organization is tax exempt.

E. Recycling and Processing Facility Records: Indicate receipt and acceptance of recyclable waste by recycling and processing facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.

F. Landfill and Incinerator Disposal Records: Indicate receipt and acceptance of waste by landfills and incinerator facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.

G. Qualification Data: For waste management coordinator.

1.7 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with hauling and disposal regulations of authorities having jurisdiction.

B. Waste Management Conference: Conduct conference at Project site to comply with requirements in Section 013100 "Project Management and Coordination." Review methods and procedures related to waste management including, but not limited to, the following:

1. Review and discuss waste management plan including responsibilities of waste management coordinator.
2. Review requirements for documenting quantities of each type of waste and its disposition.
3. Review and finalize procedures for materials separation and verify availability of containers and bins needed to avoid delays.
4. Review procedures for periodic waste collection and transportation to recycling and disposal facilities.
5. Review waste management requirements for each trade.

1.8 WASTE MANAGEMENT PLAN

A. General: Develop a waste management plan according to ASTM E 1609 and requirements in this Section. Plan shall consist of waste identification, waste reduction work plan, and cost/revenue analysis. Distinguish between demolition and construction waste. Indicate quantities by weight or volume, but use same units of measure throughout waste management plan.

B. Waste Identification: Indicate anticipated types and quantities of demolition site-clearing and construction waste generated by the Work. Use Form CWM-1 for construction waste and Form CWM-2 for demolition waste. Include estimated quantities and assumptions for estimates.

C. Waste Reduction Work Plan: List each type of waste and whether it will be salvaged, recycled, or disposed of in landfill or incinerator. Use Form CWM-3 for construction waste and Form CWM-4 for demolition waste. Include points of waste generation, total quantity of each type of waste, quantity for each means of recovery, and handling and transportation procedures.

1. Salvaged Materials for Reuse: For materials that will be salvaged and reused in this Project, describe methods for preparing salvaged materials before incorporation into the Work.
2. Salvaged Materials for Sale: For materials that will be sold to individuals and organizations, include list of their names, addresses, and telephone numbers.

3. Salvaged Materials for Donation: For materials that will be donated to individuals and organizations, include list of their names, addresses, and telephone numbers.
4. Recycled Materials: Include list of local receivers and processors and type of recycled materials each will accept. Include names, addresses, and telephone numbers.
5. Disposed Materials: Indicate how and where materials will be disposed of. Include name, address, and telephone number of each landfill and incinerator facility.
6. Handling and Transportation Procedures: Include method that will be used for separating recyclable waste including sizes of containers, container labeling, and designated location where materials separation will be performed.

D. Cost/Revenue Analysis: Indicate total cost of waste disposal as if there was no waste management plan and net additional cost or net savings resulting from implementing waste management plan. Use Form CWM-5 for construction waste and Form CWM-6 for demolition waste. Include the following:

1. Total quantity of waste.
2. Estimated cost of disposal (cost per unit). Include hauling and tipping fees and cost of collection containers for each type of waste.
3. Total cost of disposal (with no waste management).
4. Revenue from salvaged materials.
5. Revenue from recycled materials.
6. Savings in hauling and tipping fees by donating materials.
7. Savings in hauling and tipping fees that are avoided.
8. Handling and transportation costs. Include cost of collection containers for each type of waste.
9. Net additional cost or net savings from waste management plan.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 PLAN IMPLEMENTATION

A. General: Implement approved waste management plan. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract.

1. Comply with operation, termination, and removal requirements in Section 015000 "Temporary Facilities and Controls."

B. Training: Train workers, subcontractors, and suppliers on proper waste management procedures, as appropriate for the Work.

1. Distribute waste management plan to everyone concerned within three days of submittal return.
2. Distribute waste management plan to entities when they first begin work on-site. Review plan procedures and locations established for salvage, recycling, and disposal.

C. Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

1. Designate and label specific areas on Project site necessary for separating materials that are to be salvaged, recycled, reused, donated, and sold.
2. Comply with Section 015000 "Temporary Facilities and Controls" for controlling dust and dirt, environmental protection, and noise control.

3.2 SALVAGING DEMOLITION WASTE

A. Salvaged Items for Reuse in the Work: Salvage items for reuse and handle as follows:

1. Clean salvaged items.
2. Pack or crate items after cleaning. Identify contents of containers with label indicating elements, date of removal, quantity, and location where removed.
3. Store items in a secure area until installation.
4. Protect items from damage during transport and storage.
5. Install salvaged items to comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make items functional for use indicated.

B. Salvaged Items for Sale and Donation: Not permitted on Project site.

C. Doors and Hardware: Brace open end of door frames. Except for removing door closers, leave door hardware attached to doors.

D. Equipment: Drain tanks, piping, and fixtures. Seal openings with caps or plugs. Protect equipment from exposure to weather.

E. Plumbing Fixtures: Separate by type and size.

F. Lighting Fixtures: Separate lamps by type and protect from breakage.

G. Electrical Devices: Separate switches, receptacles, switchgear, transformers, meters, panelboards, circuit breakers, and other devices by type.

3.3 RECYCLING DEMOLITION AND CONSTRUCTION WASTE, GENERAL

A. General: Recycle paper and beverage containers used by on-site workers.

B. Recycling Incentives: Revenues, savings, rebates, tax credits, and other incentives received for recycling waste materials shall accrue to Contractor.

C. Preparation of Waste: Prepare and maintain recyclable waste materials according to recycling or reuse facility requirements. Maintain materials free of dirt, adhesives, solvents, petroleum contamination, and other substances deleterious to the recycling process.

D. Procedures: Separate recyclable waste from other waste materials, trash, and debris. Separate recyclable waste by type at Project site to the maximum extent practical according to approved construction waste management plan.

1. Provide appropriately marked containers or bins for controlling recyclable waste until removed from Project site. Include list of acceptable and unacceptable materials at each container and bin.

    a. Inspect containers and bins for contamination and remove contaminated materials if found.

2. Stockpile processed materials on-site without intermixing with other materials. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
3. Stockpile materials away from construction area. Do not store within drip line of remaining trees.
4. Store components off the ground and protect from the weather.
5. Remove recyclable waste from Owner's property and transport to recycling receiver or processor.

3.4 RECYCLING DEMOLITION WASTE

A. Concrete: Remove reinforcement and other metals from concrete and sort with other metals.

1. Pulverize concrete to maximum 4-inch size.
2. Crush concrete and screen to comply with requirements in Section 312000 "Earth Moving" for use as satisfactory soil for fill or subbase.

B. Masonry: Remove metal reinforcement, anchors, and ties from masonry and sort with other metals.

1. Pulverize masonry to maximum 4-inch size.
2. Clean and stack undamaged, whole masonry units on wood pallets.

C. Wood Materials: Sort and stack members according to size, type, and length. Separate lumber, engineered wood products, panel products, and treated wood materials.

D. Metals: Separate metals by type.

1. Structural Steel: Stack members according to size, type of member, and length.
2. Remove and dispose of bolts, nuts, washers, and other rough hardware.

E. Asphalt Shingle Roofing: Separate organic and glass-fiber asphalt shingles and felts. Remove and dispose of nails, staples, and accessories.

F. Gypsum Board: Stack large clean pieces on wood pallets or in container and store in a dry location. Remove edge trim and sort with other metals. Remove and dispose of fasteners.

G. Acoustical Ceiling Panels and Tile: Stack large clean pieces on wood pallets and store in a dry location.

H. Metal Suspension System: Separate metal members including trim, and other metals from acoustical panels and tile and sort with other metals.

I. Carpet and Pad: Roll large pieces tightly after removing debris, trash, adhesive, and tack strips.

1. Store clean, dry carpet and pad in a closed container or trailer provided by Carpet Reclamation Agency or carpet recycler.

J. Carpet Tile: Remove debris, trash, and adhesive.

1. Stack tile on pallet and store clean, dry carpet in a closed container or trailer provided by Carpet Reclamation Agency or carpet recycler.

K. Piping: Reduce piping to straight lengths and store by type and size. Separate supports, hangers, valves, sprinklers, and other components by type and size.

L. Conduit: Reduce conduit to straight lengths and store by type and size.

3.5 RECYCLING CONSTRUCTION WASTE

A. Packaging:

1. Cardboard and Boxes: Break down packaging into flat sheets. Bundle and store in a dry location.
2. Polystyrene Packaging: Separate and bag materials.
3. Pallets: As much as possible, require deliveries using pallets to remove pallets from Project site. For pallets that remain on-site, break down pallets into component wood pieces and comply with requirements for recycling wood.
4. Crates: Break down crates into component wood pieces and comply with requirements for recycling wood.

B. Wood Materials:

1. Clean Cut-Offs of Lumber: Grind or chip into small pieces.
2. Clean Sawdust: Bag sawdust that does not contain painted or treated wood.

a. Comply with requirements in Section 329300 "Plants" for use of clean sawdust as organic mulch.

C. Gypsum Board: Stack large clean pieces on wood pallets or in container and store in a dry location.

1. Clean Gypsum Board: Grind scraps of clean gypsum board using small mobile chipper or hammer mill. Screen out paper after grinding.

a. Comply with requirements in Section 329300 "Plants" for use of clean ground gypsum board as inorganic soil amendment.

3.6 DISPOSAL OF WASTE

A. General: Except for items or materials to be salvaged, recycled, or otherwise reused, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.

1. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.

2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

B. Burning: Do not burn waste materials.

C. Burning: Burning of waste materials is permitted only at designated areas on Owner's property, provided required permits are obtained. Provide full-time monitoring for burning materials until fires are extinguished.

D. Disposal: Remove waste materials from Owner's property and legally dispose of them.

3.7 ATTACHMENTS

A. Form CWM-1 for construction waste identification.

B. Form CWM-2 for demolition waste identification.

C. Form CWM-3 for construction waste reduction work plan.

D. Form CWM-4 for demolition waste reduction work plan.

E. Form CWM-5 cost/revenue analysis of construction waste reduction work plan.

F. Form CWM-6 cost/revenue analysis of demolition waste reduction work plan.

G. Form CWM-7 for construction waste

H. Form CWM-8 for demolition waste.

END OF SECTION 017419

SECTION 017700 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:

1. Inspection procedures.
2. Warranties.
3. Final cleaning.

B. Related Sections include the following:

1. Division 01 Section "Payment Procedures" for requirements for Applications for Payment for Substantial and Final Completion.
2. Division 01 Section "Execution Requirements" for progress cleaning of Project site.
3. Division 01 Section "Project Record Documents" for submitting Record Drawings, Record Specifications, and Record Product Data.
4. Division 01 Section "Operation and Maintenance Data" for operation and maintenance manual requirements.
5. Divisions 02 through 12 Sections for specific closeout and special cleaning requirements for the Work in those Sections **and written specifications provided on the contract drawings for Civil, Plumbing, Mechanical and Electrical work.**

1.3 SUBSTANTIAL COMPLETION

A. Preliminary Procedures: Before requesting inspection for determining date of Substantial Completion, complete the following. List items below that are incomplete in request.

1. Prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the Work is not complete.
2. Advise Owner of pending insurance changeover requirements.
3. Submit specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
4. Obtain and submit releases permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
5. Prepare and submit Project Record Documents, operation and maintenance manuals, Final Completion construction photographs, damage or settlement surveys, property surveys, and similar final record information.
6. Deliver tools, spare parts, extra materials, and similar items to location designated by Owner. Label with manufacturer's name and model number where applicable.
7. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.

8. Complete startup testing of systems.
9. Submit test/adjust/balance records.
10. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
11. Advise Owner of changeover in heat and other utilities.
12. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
13. Complete final cleaning requirements, including touchup painting.
14. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.

B. Inspection: Submit a written request for inspection for Substantial Completion. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.

1. Re-inspection: Request re-inspection when the Work identified in previous inspections as incomplete is completed or corrected.
2. Results of completed inspection will form the basis of requirements for Final Completion.

1.4 FINAL COMPLETION

A. Preliminary Procedures: Before requesting final inspection for determining date of Final Completion, complete the following:

1. Submit a final Application for Payment according to Division 01 Section "Payment Procedures."
2. Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
3. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
4. Submit pest-control final inspection report and warranty.
5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training videotapes if available.

B. Inspection: Submit a written request for final inspection for acceptance. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.

1. Re-inspection: Request re-inspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.5 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

A. Preparation: Submit three] copies of list. Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction. Use CSI Form 14.1A.

1. Organize list of spaces in sequential order.
2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.
3. Include the following information at the top of each page:

    a. Project name.
    b. Date.
    c. Name of Architect.
    d. Name of Contractor.
    e. Page number.

1.6 WARRANTIES

A. Submittal Time: Submit written warranties on request of Architect for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated.

B. Partial Occupancy: Submit properly executed warranties within fifteen (15) days of completion of designated portions of the Work that are completed and occupied or used by Owner during construction period by separate agreement with Contractor.

C. Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual.

1. Bind warranties and bonds in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.
2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.

D. Provide additional copies of each warranty to include in operation and maintenance manuals.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

PART 3 - EXECUTION

3.1 FINAL CLEANING

A. General: Provide final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.

B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.

1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a portion of Project:

a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
c. Remove tools, construction equipment, machinery, and surplus material from Project site.
d. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
e. Vacuum carpet and similar soft surfaces, removing debris and excess nap; shampoo if visible soil or stains remain.
f. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials. Polish mirrors and glass, taking care not to scratch surfaces.
g. Remove labels that are not permanent.
h. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.

1) Do not paint over "UL" and similar labels, including mechanical and electrical nameplates.

i. Wipe surfaces of mechanical and electrical equipment and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
j. Replace parts subject to unusual operating conditions.
k. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
l. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
m. Clean ducts, blowers, and coils if units were operated without filters during construction.
n. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency. Replace burned-out bulbs, and those noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.
o. Leave Project clean and ready for occupancy.

C. Comply with safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on Owner's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from Project site and dispose of lawfully.

END OF SECTION 017700

SECTION 017823 - OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:

1. Operation and maintenance documentation directory.
2. Emergency manuals.
3. Operation manuals for systems, subsystems, and equipment.
4. Maintenance manuals for the care and maintenance of products, materials, and finishes and systems and equipment.

B. Related Sections include the following:

1. Division 01 Section "Submittal Procedures" for submitting copies of submittals for operation and maintenance manuals.
2. Division 01 Section "Closeout Procedures" for submitting operation and maintenance manuals.
3. Division 01 Section "Project Record Documents" for preparing Record Drawings for operation and maintenance manuals.
4. Divisions 02 through 12 Sections for specific operation and maintenance manual requirements for the Work in those Sections **and written specifications provided on the contract drawings for Civil, Plumbing, Mechanical and Electrical work.**

1.3 DEFINITIONS

A. System: An organized collection of parts, equipment, or subsystems united by regular interaction.

B. Subsystem: A portion of a system with characteristics similar to a system.

1.4 SUBMITTALS

A. Final Submittal: **Submit electronic files (.PDF) in final form at least fifteen (15) days before final inspection.** Architect will return copy with comments within fifteen (15) days after final inspection.

1. Correct or modify to comply with Architect's comments.

1.5 COORDINATION

A. Where operation and maintenance documentation includes information on installations by more than one factory-authorized service representative, assemble and coordinate information furnished by representatives and prepare information to be transmitted electronically using a PDF file format.

PART 2 - PRODUCTS

2.1 OPERATION AND MAINTENANCE DOCUMENTATION DIRECTORY

A. Organization: Include a section in the directory for each of the following:

1. List of documents.
2. List of systems.
3. List of equipment.
4. Table of contents.

B. List of Systems and Subsystems: List systems alphabetically. Include references to operation and maintenance manuals that contain information about each system.

C. List of Equipment: List equipment for each system, organized alphabetically by system. For pieces of equipment not part of system, list alphabetically in separate list.

D. Tables of Contents: Include a table of contents for each emergency, operation, and maintenance manual.

E. Identification: In the documentation directory and in each operation and maintenance manual, identify each system, subsystem, and piece of equipment with same designation used in the Contract Documents. If no designation exists, assign a designation according to ASHRAE Guideline 4, "Preparation of Operating and Maintenance Documentation for Building Systems."

2.2 GENERAL

A. Organization: Unless otherwise indicated, organize each into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each file shall contain the following materials, in the order listed:

1. Title page.
2. Table of contents.
3. Manual contents.

B. Title Page: Include the following information:

1. Subject matter included in manual.
2. Name and address of Project.
3. Name and address of Owner.
4. Date of submittal.
5. Name, address, and telephone number of Contractor.
6. Name and address of Architect.
7. Cross-reference to related systems in other operation and maintenance manuals.

C. Table of Contents: List each product included in the file is to identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number.

D. Contents: Organize into manageable file size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single file.

1. Drawings: Include electronic file format (pdf) file for drawings.

2.3 EMERGENCY FILES

A. Content: Organize electronic files into a separate section for each of the following:

1. Type of emergency.
2. Emergency instructions.
3. Emergency procedures.

B. Type of Emergency: Where applicable for each type of emergency indicated below, include instructions and procedures for each system, subsystem, piece of equipment, and component:

1. Fire.
2. Flood.
3. Gas leak.
4. Water leak.
5. Power failure.
6. Water outage.
7. System, subsystem, or equipment failure.
8. Chemical release or spill.

C. Emergency Instructions: Describe and explain warnings, trouble indications, error messages, and similar codes and signals. Include responsibilities of Owner's operating personnel for notification of Installer, supplier, and manufacturer to maintain warranties.

D. Emergency Procedures: Include the following, as applicable:

1. Instructions on stopping.
2. Shutdown instructions for each type of emergency.
3. Operating instructions for conditions outside normal operating limits.
4. Required sequences for electric or electronic systems.
5. Special operating instructions and procedures.

2.4 OPERATION DATA

A. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:

1. System, subsystem, and equipment descriptions.
2. Performance and design criteria if Contractor is delegated design responsibility.
3. Operating standards.
4. Operating procedures.
5. Wiring diagrams.
6. Control diagrams.
7. Piped system diagrams.

8. Precautions against improper use.
9. License requirements including inspection and renewal dates.

B. Descriptions: Include the following:

1. Product name and model number.
2. Manufacturer's name.
3. Equipment identification with serial number of each component.
4. Equipment function.
5. Operating characteristics.
6. Limiting conditions.
7. Complete nomenclature and number of replacement parts.

C. Operating Procedures: Include the following, as applicable:

1. Startup procedures.
2. Equipment or system break-in procedures.
3. Routine and normal operating instructions.
4. Regulation and control procedures.
5. Instructions on stopping.
6. Normal shutdown instructions.
7. Seasonal and weekend operating instructions.
8. Required sequences for electric or electronic systems.

D. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.

E. Piped Systems: Diagram piping as installed, and identify color-coding where required for identification.

2.5 PRODUCT MAINTENANCE DATA

A. Content: Organize electronic files into separate sections for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.

B. Source Information: List each product included, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in electronic file.

C. Product Information: Include the following, as applicable:

1. Product name and model number.
2. Manufacturer's name.
3. Color, pattern, and texture.
4. Material and chemical composition.
5. Reordering information for specially manufactured products.

D. Maintenance Procedures: Include manufacturer's written recommendations and the following:

1. Inspection procedures.
2. Types of cleaning agents to be used and methods of cleaning.

3. List of cleaning agents and methods of cleaning detrimental to product.
4. Schedule for routine cleaning and maintenance.
5. Repair instructions.

E. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.

F. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

1. Include procedures to follow and required notifications for warranty claims.

2.6 SYSTEMS AND EQUIPMENT MAINTENANCE

A. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranty and bond information, as described below.

B. Source Information: List each system, subsystem, and piece of equipment included, identified by product name and arranged to match file's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title.

C. Manufacturers' Maintenance Documentation: Manufacturers' maintenance documentation including the following information for each component part or piece of equipment:

1. Standard printed maintenance instructions and bulletins.
2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
3. Identification and nomenclature of parts and components.
4. List of items recommended to be stocked as spare parts.

D. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:

1. Test and inspection instructions.
2. Troubleshooting guide.
3. Precautions against improper maintenance.
4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
5. Aligning, adjusting, and checking instructions.
6. Demonstration and training videotape, if available.

E. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.

1. Scheduled Maintenance and Service: Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.
2. Maintenance and Service Record: Include manufacturers' forms for recording maintenance.

F. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.

G. Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.

H. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

1. Include procedures to follow and required notifications for warranty claims.

PART 3 - EXECUTION

3.1 PREPARATION

A. Operation and Maintenance Documentation Directory: Prepare a separate PDF files that provides an organized reference to emergency, operation, and maintenance manuals.

B. Emergency Manual: Assemble a complete set of emergency information indicating procedures for use by emergency personnel and by Owner's operating personnel for types of emergencies indicated.

C. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.

D. Operation and Maintenance Manuals: Assemble a complete set of operation and maintenance data indicating operation and maintenance of each system, subsystem, and piece of equipment not part of a system.

1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.

E. Manufacturers' Data: Where files contain manufacturers' standard printed data, include only pertinent to product or component installed. Mark to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.

1. Prepare supplementary text if manufacturers' standard data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.

F. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in Record Drawings to ensure correct illustration of completed installation.

1. Do not use original Project Record Documents as part of operation and maintenance manuals.

2. Comply with requirements of newly prepared Record Drawings in Division 01 Section "Project Record Documents."

G. Comply with Division 01 Section "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

END OF SECTION 017823

SECTION 017839 - PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for Project Record Documents, including the following:
   1. Record Drawings.
   2. Record Specifications.
   3. Record Product Data.

B. Related Sections include the following:
   1. Division 01 Section "Closeout Procedures" for general closeout procedures.
   2. Division 01 Section "Operation and Maintenance Data" for operation and maintenance manual requirements.
   3. Divisions 02 through 12 Sections for specific requirements for Project Record Documents of the Work in those Sections **and written specifications provided on the contract drawings for Civil, Plumbing, Mechanical and Electrical work.**

1.3 SUBMITTALS

A. Record Drawings: Comply with the following:
   1. Number of Copies: Submit copies of Record Drawings as follows:
      a. Final Submittal: Submit one (1) set of marked-up Record Prints, and three (3) copies printed from Record Prints. Print each Drawing, whether or not changes and additional information were recorded.
      b. Provide an electronic file in .pdf file format of the record set to the Owner and Architect.

B. Record Specifications: Submit an electronic file in .pdf file format Project's Specifications, including addenda and contract modifications.

C. Record Product Data: Submit an electronic file in .pdf file format of each Product Data submittal.

PART 2 - PRODUCTS

2.1 RECORD DRAWINGS

A. Record Prints: Maintain one (1) set of blue- or black-line white prints of the Contract Drawings and Shop Drawings.
   1. Preparation: Mark Record Prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to prepare the marked-up Record Prints.

a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
b. Accurately record information in an understandable drawing technique.
c. Record data as soon as possible after obtaining it. Record and check the markup before enclosing concealed installations.

2. Content: Types of items requiring marking include, but are not limited to, the following:
   a. Dimensional changes to Drawings.
   b. Revisions to details shown on Drawings.
   c. Locations and depths of underground utilities.
   d. Revisions to routing of piping and conduits.
   e. Revisions to electrical circuitry.
   f. Actual equipment locations.
   g. Duct size and routing.
   h. Locations of concealed internal utilities.
   i. Changes made by Change Order or Construction Change Directive.
   j. Changes made following Architect's written orders.
   k. Details not on the original Contract Drawings.
   l. Field records for variable and concealed conditions.
3. Mark the Contract Drawings or Shop Drawings, whichever is most capable of showing actual physical conditions, completely and accurately. If Shop Drawings are marked, show cross-reference on the Contract Drawings.
4. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
5. Mark important additional information that was either shown schematically or omitted from original Drawings.
6. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.

B. Newly Prepared Record Drawings: Prepare new Drawings instead of preparing Record Drawings where Architect determines that neither the original Contract Drawings nor Shop Drawings are suitable to show actual installation.
1. New Drawings may be required when a Change Order is issued as a result of accepting an alternate, substitution, or other modification.
2. Consult Architect for proper scale and scope of detailing and notations required to record the actual physical installation and its relation to other construction. Integrate newly prepared Record Drawings into Record Drawing sets; comply with procedures for formatting, organizing, copying, binding, and submitting.

C. Format: Identify and date each Record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.
1. Record Prints and Electronic Files: Organize Record Prints and newly prepared Record Drawings into manageable electronic file sizes. Printed sets to be bound with durable paper cover sheets. Include identification on cover sheets.
2. Identification: As follows:
   a. Project name.
   b. Date.
   c. Designation "PROJECT RECORD DRAWINGS."
   d. Name of Architect.
   e. Name of Contractor.

2.2 RECORD SPECIFICATIONS

A. Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.
   1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
   2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
   3. Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.
   4. For each principal product, indicate whether Record Product Data has been submitted in operation and maintenance manuals instead of submitted as Record Product Data.
   5. Note related Change Orders, Record Product Data, and Record Drawings where applicable.

2.3 RECORD PRODUCT DATA

A. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.
   1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
   2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
   3. Note related Change Orders, Record Specifications, and Record Drawings where applicable.

2.4 MISCELLANEOUS RECORD SUBMITTALS

A. Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.

PART 3 - EXECUTION

3.1 RECORDING AND MAINTENANCE

A. Recording: Maintain one (1) copy of each submittal during the construction period for Project Record Document purposes. Post changes and modifications to Project Record Documents as they occur; do not wait until the end of Project.

B. Maintenance of Record Documents and Samples: Store Record Documents and Samples in the field office apart from the Contract Documents used for construction. Do not use Project Record Documents for construction purposes. Maintain Record Documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to Project Record Documents for Architect's reference during normal working hours**.**

END OF SECTION 017839

SECTION 018113 – SUSTAINABLE DESIGN REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes general requirements and procedure for compliance with the HCR June 2021 Design Guidelines, NYSERDA New Construction – Housing Program, Energy Star Multifamily New Construction Program Version 1.1 - ERI Pathway, and EPA Indoor airPLUS.

1. Copies of Project inspection checklists are attached at the end of this section for information. Contractor is responsible for completing several checklists.

B. Section includes general requirements for procedures for compliance with the New York Energy Star Program administered by NYSERDA.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Submit documentation to Energy Star Program Rater.
1. Environmental inspection checklists.

1.4 ACTION SUBMITTALS

A. General: Submit additional sustainable design submittals required be other specification sections.

1. Product data for adhesives and sealants use inside the weatherproofing system indicating VOC of each product used
2. Product data for paints and coatings used inside the weatherproofing system indicating VOC of each product used.
3. Laboratory Test Reports: For adhesives, indicating compliance with requirements for low-emitting materials.
4. ***Laboratory Test Reports: For flooring products, indicating compliance with requirements for low-emitting materials***
5. Product data for plumbing fixtures indicating water flow rates.
6. Product data for appliances indicating Energy Star labels.

1.5 ATTACHMENTS

A. Energy Star Inspection Process

B. National Program Requirements – Energy Star Multifamily New Construction v1.1 (Rev. 02)

C. National Rater Design Checklist – Energy Star Multifamily New Construction v1.1 (Rev. 02)

D. National HVAC Design Checklist – Energy Star Multifamily New Construction v1.1 (Rev. 02)

E. National Rater Field Checklist – Energy Star Multifamily New Construction v1.1 (Rev. 02)

F. HVAC Functional Testing Checklist – Energy Star Multifamily New Construction v1.1 (Rev. 02)

G. Water Management Checklist – Energy Star Multifamily New Construction v1.1 (Rev. 02)

H. NYSERDA New Construction - Housing Program Summary

I. EPA Indoor airPLUS (Rev. 04)

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. Provide products and procedures necessary to comply with requirements in this Section for material selection and material emissions and pollutant control. Although other Sections may specify some requirements for material selection and material emissions and pollutant control, Contractor shall provide additional materials and procedures necessary to comply with requirements.

2.2 MATERIAL EMISSIONS AND POLLUTANT CONTROL

A. Adhesives and Sealants: Field-applied adhesives and sealants that are inside the weatherproofing system shall comply with either of the following:

1. Low-Emitting Materials: VOC emissions shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

2. VOC content shall not exceed limits of authorities having jurisdiction and the following:

a. Wood Glues: 30 g/L.
b. Metal-to-Metal Adhesives: 30 g/L.
c. Adhesives for Porous Materials (except Wood): 50 g/L.
d. Subfloor Adhesives: 50 g/L.
e. Plastic Foam Adhesives: 50 g/L.
f. Carpet Adhesives: 50 g/L.
g. Carpet Pad Adhesives: 50 g/L.
h. VCT and Asphalt Tile Adhesives: 50 g/L.
i. Cove Base Adhesives: 50 g/L.
j. Gypsum Board and Panel Adhesives: 50 g/L.
k. Rubber Floor Adhesives: 60 g/L.
l. Ceramic Tile Adhesives: 65 g/L.
m. Multipurpose Construction Adhesives: 70 g/L.
n. Fiberglass Adhesives: 80 g/L.

o. Contact Adhesive: 80 g/L.
p. Structural Glazing Adhesives: 100 g/L.
q. Wood Flooring Adhesive: 100 g/L.
r. Structural Wood Member Adhesive: 140 g/L.
s. Single-Ply Roof Membrane Adhesive: 250 g/L.
t. Special-Purpose Contact Adhesive (Contact Adhesive That Is Used to Bond Melamine Covered Board, Metal, Unsupported Vinyl, Rubber, or Wood Veneer 1/16 Inch or Less in Thickness to Any Surface): 250 g/L.
u. Top and Trim Adhesive: 250 g/L.
v. Plastic Cement Welding Compounds: 250 g/L.
w. ABS Welding Compounds: 325 g/L.
x. CPVC Welding Compounds: 490 g/L.
y. PVC Welding Compounds: 510 g/L.
z. Adhesive Primer for Plastic: 550 g/L.
aa. Sheet-Applied Rubber Lining Adhesive: 850 g/L.
bb. Aerosol Adhesive, General-Purpose Mist Spray: 65 percent by weight.
cc. Aerosol Adhesive, General-Purpose Web Spray: 55 percent by weight.
dd. Special-Purpose Aerosol Adhesive (All Types): 70 percent by weight.
ee. Other Adhesives: 250 g/L.
ff. Architectural Sealants: 250 g/L.
gg. Nonmembrane Roof Sealants: 300 g/L.
hh. Single-Ply Roof Membrane Sealants: 450 g/L.
ii. HVAC Duct Sealants: 420 g/L.
jj. Other Sealants: 420 g/L.
kk. Sealant Primers for Nonporous Substrates: 250 g/L.
ll. Sealant Primers for Porous Substrates: 775 g/L.
mm. Modified Bituminous Sealant Primers: 500 g/L.
nn. Other Sealant Primers: 750 g/L.

B. Paints and Coatings: Field-applied paints and coatings that are inside the weatherproofing system shall comply with either of the following:

1. Low-Emitting Materials: VOC emissions shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
2. VOC content shall not exceed limits of authorities having jurisdiction and the following:

a. Flat Coatings: 50 g/L.
b. Nonflat Coatings: 100 g/L.
c. Primers, Sealers, and Undercoats: 100 g/L.
d. Floor Coatings: 100 g/L.
e. Shellacs, Clear: 730 g/L.
f. Shellacs, Pigmented: 550 g/L.
g. Stains: 250 g/L.
h. Clear Wood Finishes (Varnishes, Sanding Sealers, and Lacquers): 275 g/L.

C. Floor covering materials shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

D. Composite wood products, including particleboard, medium-density fiberboard, straw-based particleboard, panel substrates, and door cores, used inside the weatherproofing system shall be made without urea formaldehyde and shall comply with the following:

1. Requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

E. Ceiling and Wall Systems: Ceiling and wall insulation, acoustic ceiling panels, tackable wall panels, gypsum board, and wall coverings shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

PART 3 - EXECUTION

3.1 ENERGY STAR PROGRAM RATER

A. Energy Star Program Rater: Sustainable Comfort, Inc. 55 Linden St, Worcester, MA 10609

3.2 CONTRACTOR ORIENTATION

A. The Energy Star Program Rater will conduct an on-site orientation with all sub-contractors to review the requirements of the program and highlight the inspection process required for these programs. Contractor to coordinate meeting attendance in-site.

3.3 INSPECTIONS

A. Coordinate foundation inspections with the Energy Star Program Rater.

B. Coordinate pre-drywall inspections with the Energy Star Program Rater prior to installing any drywall.

C. Coordinate final performance testing inspections with the Energy Star Program Rater. Final testing will include duct leakage and air infiltration tests of individual apartment units as well as other tests required by Energy Star standards.

3.4 REQUIRED CHECKLISTS

A. Assist Energy Star Program Rater in completing the required checklists by providing site access for testing at the appropriate times during construction.

B. The General Contractor shall be responsible for completing the “Water Management System Builder’s Checklist”.

C. The HVAC sub-contractor shall be responsible for completing applicable sections of the “Functional Testing Checklist”

D. The Energy Star Program Rater shall be responsible for the “Rater Design Checklist” and Rater Field Checklist”

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END OF SECTION 018113

SECTION 31 1000 – SITE CLEARING

PART 1 – GENERAL

1.1 SUMMARY

A. Section includes:
1. Permits.
2. Dust Control.
3. Disconnect Utility Services.
4. Demolition.
5. Removal.

B. Related sections:
1. Section 311001 - Site Preparation
2. Section 334000 - Storm Drainage

PART 2 – PRODUCTS (not used)

PART 3 – EXECUTION

3.1 PERMITS

A. Contractor shall secure all necessary demolition permits including fees and licenses at his own expense.

B. Notify local agencies, such as fire, police, etc., that have jurisdiction.

3. 2 DUST CONTROL

A. Prevent dust and dirt from demolition operations from blowing onto adjacent properties and "items to remain".

B. Contractor shall apply dust surfacant/suppression agent such as Syntech 2002 to control dust as required. Refer to Specification Section 312500 - Erosion, Sediment and Pollution Control for any additional dust control measures.

3.3 DISCONNECT UTILITY SERVICES

A. Disconnect and remove all existing utilities to structures to be demolished unless otherwise noted. Obtain approval of respective utility owners/vendors before capping, removing or shutting off gas, water, sanitary, storm drainage, electrical, telecommunications or other services. Refer to Division 1 Specifications and drawings for additional utility information.

B. Execute work in accordance with applicable utility owners/vendors regulations and directives.

3.4 DEMOLITION

A. Pavements and Other Structures: Define neat regular lines for cutting; saw cut only; protect edges of installations to remain; extend limits of cutting and removal to sound joints or other limits required to remove all adjoining loose, broken, or deteriorating paving; provide a sound stable edge for adjoining installation of new paving. NYSDOT Item No. 520.0900010.

B. Storm Drains: Remove existing active storm drain system components only after temporary or permanent replacement facilities are in place and operative to collect and channel storm water to required outfalls.

C. Salvage and Stockpile: Carefully remove and protect any existing improvements to be reinstalled as part of the work, including any improvements which may be reinstalled at Contractor's discretion.

Contact and coordinate with Owner in advance on salvaging and stockpiling, if any, indicated on drawings, of other existing improvements to be salvaged for future Owner use; stockpile in approved locations on property as determined by Owner.

D. Tree and Vegetation Removal: Clear, grub and remove all existing tree, shrub and other woody vegetation identified on the drawings or otherwise required to completely clear and prepare the site within the perimeter lines and limits of site excavation and regrading work. Protect all trees not identified for removal. NYSDOT Item No. 201.0700008.

Completely pull, grub and otherwise remove tree stumps/woody root systems. All vegetation and woody material stumps shall be legally disposed of off-site.

E. Rubble: Concrete, asphalt rubble and other hard-fill type debris from removal work shall be removed and legally disposed of off-site. NYSDOT Item No. 203.02

F. General Debris: Plastics, metals, garbage and other general debris shall be removed from the site and properly disposed of.

G. The use of explosives is not permitted for any demolition or removal work.

3.5 REMOVAL

A. Remove from site all debris and all materials not indicated to be salvaged. All removed materials become property of Contractor who shall legally dispose of materials.

END OF SECTION 311000

SECTION 31 1001 – SITE PREPARATION

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes:
1. Outline of sitework included.
2. General Job Conditions/Special Conditions.
3. Layout, lines, levels, and field checks.
4. Protection of work areas and existing items to remain.
5. Clearing and grubbing.

B. Related Work Specified Elsewhere:
1. Section 311000 - Site Clearing
2. Section 311413 - Topsoil
3. Section 312213 - Rough Grading
4. Section 312216 - Fine Grading
5. Section 312301 - Sitework Excavation, Backfilling and Compacting
6. Section 321100 - Base Courses
7. Section 321216 - Asphalt Pavement
8. Section 324000 - Site Improvements
9. Section 329200 - Lawns
10. Section 334000 - Storm Drainage

PART 2 – PRODUCTS (not used)

PART 3 – EXECUTION

3.1 SITEWORK INCLUDED

The work includes all labor, materials, plant, equipment, and related construction and services necessary to furnish and install all sitework as shown on the drawings, and in accordance with these specifications. Work includes but is not limited to the following:

A. Site Preparation and Earthwork:
1. Erosion and sedimentation control devices and measures.
2. Removal of existing buildings, paving, curbing, walls, storm sewer system components, trees and vegetation, including any salvaging and stockpiling of items indicated for reuse or for future owner.
3. Stripping and stockpiling of topsoil.
4. Excavation, trenching, grading, filling, backfilling, and related earthwork with compaction to establish subgrades under paving, curbs, walls, drainage facilities, related structures and improvements, and lawn and other vegetation areas.
5. Spreading and grading of topsoil. (Also see Item E below.)
6. Removal of rubble, excess or unsuitable excavated soils, rubble, debris and other materials from site.

B. Site Utilities

1. Storm System: Catch basins, manholes, culverts, drywells, drain inlets, underdrains, stormwater management facilities and related storm drainage improvements.
2. Sanitary Sewer
3. Water Service

C. Paving and Surfacing with any Related Structures:
1. Asphalt concrete paving with pavement markings.
2. Granite curb.
3. Concrete paving, curbs, ramps and other structures.

D. Site Improvements
1. Signs.
2. Steel Bollards

E. Lawns and Plantings:
1. Topsoil fine grading, amendment and related work.
2. Seeding/establishment of lawn, other grasses.
3. Trees/shrub plantings

3.2 GENERAL JOB CONDITIONS

A. Schedule and conduct work to permit access to adjoining Owner and other properties and facilities at all times and in accordance with any phasing requirements of the contract. Do not impede access by emergency vehicles and forces. Notify and coordinate with Owner in advance of work and in advance of limiting or detouring access to or use of any other facilities. Approximate limits of work are as shown or implied on drawings; do not intrude onto other site areas more than reasonably necessary for access, staging, storage and other incidental aspects of work.

B. Verify all existing lines, limits, distances, dimensions, elevations, and other conditions affecting work required. Comply with special instructions on drawings. Notify Architect immediately of any conditions encountered which appear to be inconsistent with work requirements, so that such matters may be resolved. Verify any existing underground utility locations and conditions prior to excavation; contact and secure UFPO services as required (1-800-962-7962). Excavate carefully in all locations close to known or likely underground utility lines.

C. In addition to all requirements of the General Conditions and all other public safety regulations and requirements applicable to the work, exercise caution in all sitework access and operations in anticipation that public pedestrian and vehicular traffic and activity will occur in proximity to the work and to access routes to and from the work at all times.

D. Contractor is held to have visited site and to have identified, investigated and measured surface and subsurface conditions and quantities involved in and affecting the scope, complexity and cost of the work prior to submission of a bid. Contractor may, for his information, make test excavations during bidding period. Contact Architect for approval prior to any such excavation and repair test holes as directed.

Contractor shall use his own judgment in interpreting all surface and subsurface conditions; no responsibility is assumed by Owner or Architect for survey information, lack of survey information, or actual conditions encountered. Any geotechnical evaluation reports with soil test boring and pit logs, descriptions and related data and recommendations on existing subsurface and construction conditions included in the contract documents are made available for the convenience of the Contractor. If included, such reports are not intended as a

representation or warranty of the accuracy of such information or the continuity of conditions between any soil boring and test pit locations. It is expressly understood that the Owner and Architect shall not be responsible for interpretations or conclusions drawn from the reports by the Contractor. Claims for extra compensation or inability to perform work in accordance with Contract Documents, or for an extension of time will not be considered for any alleged or actual differences between site surface or subsurface conditions and such information and data, except as may be provided elsewhere in the Contract Documents. Owner may elect alternative methods of accomplishing work in event that variations in sitework conditions or unknown conditions are encountered.

E. Avoid spills and littering of earth, rubble or other debris on Owner or other public streets or other roadways; clean up any spills promptly and regularly.

F. Notify Architect in writing of any existing damage to "items to remain" prior to commencing work.

3.3 LAYOUT, LINES, LEVELS, AND FIELD CHECKS

A. Employ licensed Engineer or Surveyor to stake out all work.

B. Set hubs, offset lines, and grade stakes where spot elevations shown, at breaks in grade, and as otherwise required.

C. Run lines from existing buildings, monuments, and features shown on drawings. Establish base lines. Mark well and protect during construction. Run levels from benchmarks. Verify benchmark elevations. Advise Architect of results before commencing work.

D. Accurately locate all new buildings, roads, paved areas, walks, features, etc. Advise Architect of any discrepancies, prior to commencing work.

3.4 PROTECTION

A. Plank all walks, pavements, and curbs to be crossed by equipment.

B. Protect Persons and Property: provide temporary fencing, barricades, signs, signals, and other measures and devices for protection of persons, property, existing improvements to remain and traffic and other activities in and adjoining the site of the work, in accordance with all applicable laws and regulations, at all times during work.

When work areas are to be unattended, check that open excavations or other unsafe areas or conditions are adequately barricaded and that signals are operative.

Perform work to prevent erosion, flooding, undermining, lateral movement, settlement, or other instability or damage of adjoining areas of the site and adjoining improvements. Make certain that cut or fill embankments slopes are stable during overnight or other periods of work interruption.

C. Protect Utilities: Protect and preserve in operating condition all active surface and subsurface utilities indicated on the drawings or which may otherwise exist or be encountered within or adjacent to the work. Excavate carefully near any known or suspected utility lines. Cooperate with other contractors performing removals or replacements of utilities. Particularly note the

instructions on the drawings to verify location and/or depth of certain utility lines. Secure UFPO services to locate utilities

Damage to any utility lines or structures resulting from work shall be repaired by at the expense of the contractor, to the satisfaction of the Owner, Architect, utility company or other authority having jurisdiction.

If active utilities are cut, broken, or damaged during work, immediately take all steps necessary to avoid endangering persons or property. Notify Owner, Architect and affected utility company or other jurisdiction to obtain a decision and/or assistance in repair of damaged facilities.

Remove, plug or cap as required any active and abandoned utilities encountered during construction operations or shown on drawings. If contractor is required to reroute/replace any portions of existing active utility lines, determine connection points and otherwise plan work in advance so that service is interrupted as briefly as possible. Where existing lines are to be abandoned, remove any portions which may interfere with or may be unstable or prone to settle under or along new structures or pavements, refer to drawings. Other portions may be abandoned in-place.

In event that water, storm sewer, sanitary sewer, or other utility lines are broken, or that springs, ground water, or other sources of water are encountered, take necessary steps to immediately divert water to prevent erosion, undermining or other damage to existing improvements or construction operations. Permanent replacement, reconstruction or other corrective measures are contractor's responsibility. Methods subject to approval of architect and other having jurisdiction.

D. Protect Trees: protect all trees and shrubs in and adjoining work areas which are not identified to be removed. Do not store or stockpile earth or other materials or equipment and do not operate heavy equipment more than necessary within the branching limits of trees.

3.5 CLEARING AND GRUBBING

A. Unless otherwise noted on the drawings, remove promptly from site and legally dispose of all trees, logs, stumps, roots, brush, vegetation, rubbish, stones, boulders and other objectionable or perishable materials within grading limits to 1'-6" below finish grade or to original grade whichever is the greater depth.

B No burning of any cleared and grubbed material shall be permitted.

END OF SECTION 311001

SECTION 31 1413 – TOPSOIL

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes:
1. Topsoil.

B. Related Sections:
1. Section 312213 - Rough Grading
2. Section 312216 - Fine Grading
3. Section 312500 - Erosion, Sediment and Pollution Control

1.2 DELIVERY, STORAGE AND HANDLING

A. Stockpile in a manner and location that will not impede the work of any other contractor.

1.3 SUBMITTALS

A. Prior to stripping the topsoil, secure and submit analyses of existing topsoil samples. Identify sample locations. Secure analyses from Cornell University Soil Nutrient Laboratory and Physical Analysis Laboratory (can be secured through Cornell Cooperative Extension And local Soil Conservation Service in accordance with soil sample and test kit requirements) or from independent testing service. Analyses to include: mechanical analysis, organic content, nitrogen, phosphorus, potassium, and pH levels. Secure recommendations for fertilization, pH correction and other amendment.

PART 2 – PRODUCTS

2.1 TOPSOIL

A. On-site or Imported Topsoil shall be utilized for or as a component in the Seeded Lawn and Plant Bed Mixture areas shown on the plans. All topsoil shall be screened prior to placement or mixing.

B. On-site Topsoil: Furnish from topsoil stripped from site (NYSDOT Item No. 610.1401). Remove all subsoil, clay lumps, stones 1" in greatest dimension of larger, weeds, stumps, roots, undecomposed sod and other debris. Verify depth of topsoil within Contract Limits prior to submitting bid.

C. Imported or Screened On-SiteTopsoil : Shall consist of a screened and modified topsoil consisting of 70 to 75% coarse to medium sand. Screened topsoil shall meet the following conditions:
1. Natural, fertile, friable granular soil characteristic of productive soils in vicinity. Uniform in composition and texture. Clean, free from subsoil, clay lumps, stones, weeds, stumps, roots, toxic substances and debris of similar substances 1 inch or more in greatest dimension.

2. Topsoil pH value of 5.5 to 7.5 or able to be amended by contractor.
3. Containing not less than 5 percent nor more than 20 percent organic content in that portion of a sample passing a 1/4 inch sieve when determined by the wet combustion method on a sample dried at 105 degrees.
4. Soluble salts not to exceed 500 parts per million.
5. Containing the following gradations:

SIEVE DESIGNATION	% PASSING
1"	100
1/4 inch	97 - 100
No. 200	5-10

D. On-site stockpiled topsoil can be used if above specifications are met by amending with accepted materials and utilizing accepted methods.

PART 3 – EXECUTION

3.1 TOPSOIL STRIPPING

A. Mow lawn areas prior to stripping topsoil. Investigate depth of organic soils in each designated area as the work progresses and strip topsoil accordingly. Depth may vary over the site of the work. Strip full depth of topsoil from all building areas, areas to be paved, and areas of grade change.

B. Stockpile in approved on-site location where material will not interfere with other work and guard against erosion and sedimentation onto adjoining work areas or off-site areas.

C. Do not lift and mix subsoil material with topsoil. Remove debris and other foreign material and large stones encountered as work progresses. Ordinary grass sods and small roots, twigs and other woody material need not be removed but shall be thoroughly broken up and intermixed with soil during handling operations.

D. Excess topsoil is the property of the Owner. Stockpile where directed by owner.

E. All topsoil shall be screened prior to reuse/respreading.

END OF SECTION 311413

SECTION 31 2213 – ROUGH GRADING

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes
1. Rough grading.

B. Related Sections:
1. Section 312216 - Fine Grading.
2. Section 312301 - Sitework Excavation, Backfilling, and Compacting.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION

3.1 ROUGH GRADING

A. Subgrade: Depth below finished grade as required for topsoil or pavement.

B. Accuracy: Set grade stakes where spot elevation shown, at breaks in grade, along drainage "swales" and as otherwise required to correctly grade the area according to elevations shown on plans.

C. Completion of rough grading: Obtain Architect's approval before spreading topsoil or preparing pavement subgrade.

D. Subgrade rolling: All paved areas. In areas inaccessible to roller, use mechanical tamps. Refer to Section 312301, Sitework Excavation, Backfilling and Compacting for compaction requirements.

E. Avoid excessive working of subgrade or use of equipment that causes pumping or weaving.

END OF SECTION 31 2213

SECTION 31 2216 – FINE GRADING

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes:

1. Topsoil spread
2. Fine grading of paved and unpaved areas

B. Related Sections:

1. Section 311413 - Topsoil
2. Section 312213 - Rough Grading

PART 2 – PRODUCTS

2.1 MATERIALS

A. Topsoil as specified in Section 311413.

PART 3 – EXECUTION

3.1 SPREAD TOPSOIL

A. Entire unpaved area within contract limits, unless otherwise noted.

B. Spread, compact and manipulate topsoil to a minimum of thickness as detailed after compaction to smooth draining grades true to elevations shown or indicated on drawings. Generally, all areas shall receive 4 inch topsoil thickness and plant beds shall receive 18 inch minimum topsoil thickness. Refer to drawings for verification and any special requirements for use of stripped topsoil.

C. Excess topsoil: Excess topsoil is the property of the owner. Excess topsoil shall remain in the approved topsoil stockpile area.

3.2 FINE GRADE OUTSIDE BUILDING LINES

A. Disk or harrow 4 inch depth where topsoil has been spread and 4 inch depth in disturbed areas where no grade change occurs.

B. Remove all stones 1 inch diameter and larger, roots, rubbish and all other foreign matter.

C. Grade to exact well draining grades indicated. Maximum allowed tolerances:

1. Unpaved areas – grade surface areas to receive lawn or plantings to a tolerance of plus or minus 0.10 foot. Swales and ditches to a tolerance of plus or minus 0.05 foot.
2. Paved areas--shape subgrade for pavement to a tolerance of plus or minus 0.05 foot.

3. Exterior steps and ramps--finished subgrade to a tolerance of plus or minus 0.05 foot.

END OF SECTION 31 2216

SECTION 31 2301 – SITEWORK EXCAVATION, BACKFILLING and COMPACTING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Excavation.
2. Filling and backfilling.
3. Stabilization fabric.
4. Compaction Requirements

B. Related Sections:
1. Section 312213 - Rough Grading.
2. Section 312216 - Fine Grading.
3. Section 321100 - Base Courses.

1.2 EXAMINATION OF EXISTING GRADES

A. Examine grades and notify Architect of discrepancies, if any, before proceeding. Start of work implies acceptance of existing grades.

1.3 SUBMITTALS

A. Material Certificates (MC) including a certified laboratory sieve analysis (LA) bearing name and location of quarry. Sample (S) of material required (approximate volume 1 cubic foot) in a waterproof container permanently labeled to show source. Submit for the following materials:
1. Subbase Material: (MC), (LA) including moisture/density curves and (S)
2. Coarse Aggregate Fill: (MC) and (S)
3. Drainage Fill: (MC), (LA) and (S)

B. Manufacturers data (MD) and product sample (S) required for the following materials:
1. Stabilization Fabric: (MD) and (S)

1.4 SETTLEMENT

A. Repair to proper grade any slab, pavement, utility, structure or lawn adversely affected by settlement or heaving within two-years after the date of substantial completion at no expense to the owner.

1.5 TIMING

A. Install drainage system prior to or concurrent with road excavation to prevent/limit downstream flooding and erosion/sedimentation, to allow trench or general fill settlement, and to allow installation of subbase materials for construction.

1.6 GENERAL DEWATERING

A. The Contractor shall dewater all excavations when water has entered the excavation or at the direction of the Engineer. The Contractor shall provide all equipment necessary to complete the work.

1.7 USAGE OF ELECTRONIC DOCUMENTS FOR MACHINE CONTROL EQUIP.

A. The contractor may use any type of GPS machine control equipment and systems that results in achieving the proposed grading requirements. The contractor shall convert the electronic data provided by the Architect into the format required by their system.

B. No guarantee is made that the data systems used by the architect will be directly compatible with the systems used by the contractor.

C. Contractor understands that any manipulation of the electronic data provided by the architect shall be at their own risk. The electronic documents are provided as a convenience to the contractor in connection with the contractor's responsibilities and obligations relating to the project. The Owner and Architect shall not be construed to have performed any services in connection with the Contractor's use of the electronic files provided and shall have no liability for any aspect of their use, and has no contractual relationship in connection to their use, other than set forth herein.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Excavated Subsoil/Soil Fill: Approved, free of frost trash, stumps, trees, roots, sod, muck, etc. If suitable excavated material is insufficient to meet fill requirements, furnish additional material at contractor's expense, subject to approval by architect. Thoroughly break up and condition soils for layered placement and compaction in fill areas.

B. Drainage Fill: Crushed stone or washed crushed gravel. NYSDOT #1, Table 703-4. Clean, durable, of uniform quality throughout.

Standard ASTM Sieve Size	% Passing by Weght
1 inch (25 mm)	100
1/2 inch (12.5 mm)	90-100
1/4 inch (6.3 mm)	0-15

C. Stabilization Fabric: Polypropylene fiber Mirafi Celanese Fibers 500x, Amoco 2002, Carthage Mills FX-55 or approved equal.

D. Coarse Aggregate Fill: Clean run-of-bank gravel, 3 inch maximum size. Able to be compacted to compaction standards herein and free from organic and other deleterious materials. Where

any such fill is deeper than 24 inches, a coarser, well-graded run-of-bank material with particle sizes ranging up to 6 inches may be used in the lower layers.

Standard ASTM Sieve Size	% Passing by Weight
1/4 inch (6.3 mm)	30-100
No. 40 (.425 mm)	0-70
No. 200 (.075 mm)	0-10

E. Subbase Course Material: Crushed limestone conforming to NYSDOT Section 304-2.02 Subbase Course Type 2 well graded from coarse to fine to produce tightly bonded material when compacted, and free from soil, organic materials or other contamination.

Standard ASTM Sieve Size	% Passing by Weight
2 inch (50 mm)	100
1/4 inch (6.3 mm)	25-65
No. 40 (.425 mm)	5-40
No. 200 (.075 mm)	0-10

F. Topsoil: Refer to Section 311413 - Topsoil Stripping.

G. Oversized Subbase Course Material: Crushed limestone conforming to NYSDOT Section 304, Subbase Course, Type 1 Gradation with 100% passing a 3 inch sieve and well graded from coarse to fine to produce a rightly bonded material when compacted, and free from soil, organic material or other contaminants.

PART 3 EXECUTION

3.1 GENERAL

A. Banks and sides: Angle of recline or sheathing, shoring, and bracing as required for safety and conforming to all applicable laws, rules, regulations and codes.

B. Protection: Provide lights and barricades to properly protect persons and property. Assume full responsibility for all accidents during the course of work.

3.2 UNCLASSIFIED EXCAVATION

A. Includes all earth and miscellaneous material encountered. NYSDOT Item No. 203.02.

B. Cut to exact elevations and grade. If soil becomes saturated and loses its structure in an area, cease work in that area, after establishing positive surface drainage, until surface dries. When the area has stabilized, continue excavation. Transport to fill areas.

C. Excess excavated material and excavated material not suitable for use as general fill shall be removed from the site. Location and placement methods to be approved.

D. If stockpiled, pile in manner and location that will not impede the work of any other contractor, as directed by the Architect.

E. Excavation Classifications - The following classifications of excavations will be made when rock is encountered:

1. Earth excavation includes excavation of pavements and other obstructions visible on surface: underground structures, utilities, and other items indicated to be demolished and removed: together with earth and other materials that are not classified as rock excavation.
2. Rock excavation for trenches and pits includes removal & disposal of materials and obstructions encountered that cannot be excavated with a track-mounted power excavator, equivalent to Caterpillar Model No. 215c LC, and rated at not less than 115 HP flywheel power and 32,000-pound drawbar pull and equipped with a short stick and a 42 inch wide, short tip radius rock bucket rated at 0.81 cubic yard (heaped) capacity. Trenches in excess of 10 feet in width and pits in excess of 30 feet in either length or width are classified as open excavation.

   Rock excavation in open excavation includes removal and disposal of materials and obstructions encountered that cannot be dislodged and excavated with modern track mounted, heavy duty excavating equipment without drilling, blasting, or ripping. Rock excavation equipment is defined as caterpillar model No. 973 or equivalent track mounted loader, rated at not less than 210 HP flywheel power and developing minimum of 45,000-pound breakout force(measured in accordance with SAE J732).
   a. Typical of materials classified as rock are boulders 1/2 cubic yard or more in volume, solid rock, rock in ledges, and rock hard cementitious aggregate deposits.
   b. Intermittent drilling or ripping performed to increase production and not necessary to permit excavation of material encountered will be classified as earth excavation.

F. Do not perform rock excavation work until material to be excavated has been cross sectioned and classified by architect. Such excavation will be paid on basis of contract conditions relative to changes in work.

G. Rock payment lines are limited to the following:

1. Two feet outside of concrete work for which forms are required, except footings.
2. One foot outside perimeter of footings.
3. In pipe trenches, 6 inched below invert elevation of pipe and 2 feet wider than inside diameter of pipe, but not less than 3-foot minimum trench width.
4. Outside dimensions of concrete work where no forms are required.
5. Under slabs on grade, 6 inches below bottom of concrete slab.

3.3 UNCLASSIFIED EXCAVATION FOR STRUCTURES

A. Includes all earth and miscellaneous material encountered.

B. Excavate to depth as shown on drawings. Transport to fill areas or remove from site.

C. Excess depth: Backfill to proper elevations with Coarse Aggregate Fill at Contractor's expense.

D. Clearance sufficient for form work to be performed. Banks and sides - angle of recline or sheeting, shoring, and bracing as required for safety and conforming to all applicable laws, rules, regulations and codes. Remove before backfilling.

E. Remove loose material and debris from excavation so all footings rest on solid, undisturbed soil.

F. Remove water during excavation for foundations by ditching or pumping so that no water stands.

G. Insure that movement of equipment in the excavation does not cause working and pumping of the underlying soil which is not to be excavated. Should the equipment used cause excessive working, use other methods of excavation to maintain the design bearing capacity of the soil.

3.4 UNCLASSIFIED TRENCH EXCAVATION

A. Includes all earth and miscellaneous material encountered.

B. Excavate to exact depth and grade allowing clearance for pipe bedding as required.

C. Transport excess to fill areas or remove from the site.

D. Report wet or unstable trench bottom to Architect. Should Architect deem unsuitable, excavate to depth as directed and backfill with #1 crushed stone to trench bottom or as otherwise directed.

E. Do not excavate over 12 inches wider than outside diameter of pipe below spring line.

F. Pump as required to dewater excavation.

3.5 GENERAL FILLING REQUIREMENTS

A. Start after approval by Architect.

B. The subgrade to receive fill shall be firm and stable and should not exhibit mud, organic material, topsoil, standing water, debris or frozen material. Where applicable, subgrade should be proofrolled and remediated (if necessary). Approved subgrade should be immediately protected by placement of the planned fill.

C. Fill material shall be placed on a satisfactory and approved subgrade in a manner to minimize segregation. The fill should be placed in nearly horizontal lifts commencing at the lowest fill area elevation and proceeding with each lift upward and outward from the lower lift. The moisture content of the material shall be adjusted prior to application of compaction such that it is within 2 percent of the Optimum Moisture Content. The first lift shall be placed to a loose thickness not to exceed 8 inches (12 inches in mass fill areas). This first lift shall then be compacted to an in place density not to less than 95 percent of the maximum dry density, unless noted otherwise in this specification section.

D. No subsequent lift shall be placed until the underlying lift has been adequately compacted to a stable and uniform mass.

E. All subsequent lifts shall not exceed 8 inches (12 inches in mass fill areas) in compacted thickness, shall be moisture conditioned prior to compaction to within 2% of Optimum Moisture Content, and shall be compacted uniformly to an in-place field density field density of not less than 95% of Maximum Dry Density, unless noted otherwise in this specification section.

F. When the test results indicate that insufficient compaction has been obtained in any layer, the Contractor shall take such action as the engineer may direct to modify or alter the moisture content of the soil, to provide additional compaction or otherwise to increase the in-place soil density. If the contractor cannot obtain satisfactory compaction due to material properties, he shall remove the unsatisfactory material and replace with new material. Materials contaminated by mud, debris, organics and/or any other deleterious materials shall be removed and replaced with uncontaminated specified material.

G. Where a structural fill abuts an existing earthen embankment or slope, each lift shall be stepped or benched into the existing slope and each subsequent lift shall overlap appropriately (at least 12 inches) the underlying step or bench. Refer to plans for typical sections for benching of structural fill.

H. Each lift and the final grade shall be graded or sloped to promote positive drainage off the fill and out of the limit lines. The extent of backfill and fill, upon completion, shall conform to the lines and grades given on the plans.

3.6 TRENCH BACKFILL

A. Materials:
1. Under lawns and under planting beds: Approved excavated subsoil material.
2. Under pavements: Subbase material or coarse aggregate fill, refer to drawings.

B. Start after approval of Architect.

C. Place: Do not place on frozen ground. Place in 6 inch layers from cushion sand or filter material to subgrade. No boulders or stones over 4 inches. Tamp each 6 inch layer with mechanical tamper. Adjust fill to smooth subgrade.

D. Compaction: Uniformly spread each layer, moisten or dry as required, and then compact so unit dry weight of the compacted material meets or exceeds 95% of the maximum modified proctor density based on ASTM D1557 procedures.

3.7 FILL AT STRUCTURES

A. Materials:
1. Fill under pavement subgrade - coarse aggregate fill, oversized subbase course material or subbase course material.
2. Site structures backfill to subgrade where pavement occurs and no footing drains occur - coarse aggregate fill, subbase course material.
3. Demolition backfill to subgrade where no pavements occur - excavated subsoil material.
4. Demolition backfill to bottom of new construction where pavements occur-coarse aggregate fill or subbase course material.

B. Start after approval by Architect.

C. Place: Do not place on frozen ground. Place in 6-inch layers. Compact by approved mechanical equipment. Remove construction debris from excavation.

D. Compaction: Uniformly spread each layer, moisten or dry as required, and then compact so unit dry weight of the compacted material meets or exceeds 95% of the maximum modified proctor density based on ASTM D1557 procedures.

3.8 STABILIZATION FABRIC

A. Place Stabilization fabric in lengths and widths as large as possible. Lap seams per manufacturer's instructions or 6 inches minimum.

B. Cover using methods that will not damage or displace stabilization fabric.

C. Time operations to avoid trenching by any contractor in areas where stabilization fabric has been placed.

3.9 EXCESS EXCAVATED MATERIAL

A. All excess earth excavated material not required to meet on site fill requirements shall be promptly removed from the site and legally disposed of at contractor’s expense unless otherwise noted.

3.10 FIELD QUALITY CONTROL

A. Proofrolling - immediately prior to placing general base material for pavements or slabs on grade, proofroll subgrade with 10 ton minimum loaded smooth drum self- propelled vibratory roller. Undercut all areas which show pumping or weaving and replace with acceptable fill materials compacted to 95% of the maximum modified proctor density for paved areas and 85% of the maximum modified proctor density for lawn areas based on ASTM D1557 procedures.

B. Quality Control Testing during Construction:
1. Owner shall provide and pay for services of independent testing service to inspect and test final cut and fill subgrades, utility trenching and subbase course compaction prior to paving. Additional tests will be taken as required for full coverage of paved areas.
2. Provide timely notice to Architect to inspect and approve subgrades and fill layers before further construction work is performed.
3. Compaction: ASTM D1557, latest edition: 1 test initially and 1 test for each significant change in fill material.
4. Field density or in place density tests: Sand-cone method or other method approved by Architect in accordance with ASTM D1556, latest edition.
   a. Trench Backfill
      One test for each 20 linear feet of trench and for each two feet vertical depth of backfill. Architect may require additional tests to verify results of each test which fails

to meet results specified. If tests verify compaction below that specified, recompact and/or remove, replace and retest material at the same rate until specified compaction is achieved.

b. Paved Areas

At least 1 test for each 2,000 square feet of paved area. Architect may require additional tests to verify results of each test which fails to meet results specified. If tests verify compaction below that specified, remove, replace and retest material at the rate of one test per 1000 square feet of paved area until specified compaction is achieved.

3.11 DEWATERING

A. Details of the dewatering are left to the Contractor's discretion. The Contractor shall submit a dewatering plan of his proposed dewatering system to the Engineer for review. No excavation in the wet shall proceed until the Contractor receives notice the review of the dewatering plan has been completed by the Engineer.

B. The Contractor shall at all times during construction, provide and maintain proper and satisfactory means and devices for the removal of all water entering the excavations, and shall remove all water as fast as it may collect, in such manner as shall not interfere with the prosecution of the work or the proper placing of soil, granular material, sewers, concrete, masonry or other work.

C. Removal of water includes the construction and removal of cofferdams, sheeting and bracing, the excavation and maintenance of ditches and sluice-ways, furnishing and operation of pumps, well points, and furnishing all labor, material and equipment needed to maintain thorough drainage of the work in a satisfactory manner.

D. Water shall not be allowed to rise over or come in contact with any masonry, concrete or mortar and no water shall be allowed to flow over such work until such time as the Engineer may permit.

E. Water pumped or drained from excavations, or any sewers, drains, or water courses encountered in the work, shall be disposed of in a suitable manner without injury to adjacent property, the work under construction, to pavements, roads and drives and must complywith the requirements of the Stormwater Pollution Prevention Plan. No water, including sediments, shall be discharged to sanitary sewers, adjoining properties, water courses or wetlands. Any damage caused by improper handling of water shall be repaired by the Contractor at his own expense.

3.12 REMOVAL OF CONTAMINATED MATERIAL

A. Contractor shall be responsible for excavation and removal from the site of any soils or other materials which become contaminated by spills or dumping on the site of petroleum, solvent, chemical or other hazardous products and materials occurring during and as a result of the work of the contractor or any subcontractor, as observed and ordered by the Owner, Architect or others having jurisdiction. Contractor shall bear the cost of such work and any fees, fines, penalties or other costs levied against any parties by agencies having jurisdiction. Excavation, removal, storage and disposal of such contaminated materials shall be conducted in accordance with all applicable laws and regulations, including notification and other requirements of the

New York State Department of Environmental Conservation and other agencies having jurisdiction. Replacement of removed materials shall be consistent with original material, placement and compaction requirements, and related work.

END OF SECTION 312301

SECTION 31 2500 – EROSION, SEDIMENT and POLLUTION CONTROL

PART 1 – GENERAL

1.1 SUMMARY

A. The extent of the erosion, sediment and pollution control is shown on the drawings.

B. Erosion, sediment and pollution control includes, but is not limited to the following:

1. Erosion, sediment and pollution control measures including silt fence, stone check dams and silt fence dikes
2. Slope and swale protection
3. Construction entrances
4. Permanent and temporary seeding

C. SPEDES General Permit for Stormwater Discharge is required for sites with disturbance areas which are greater than 1 acre. Site disturbance area is greater than 1 acre. A SPEDES permit requires the following items to be on site:

1. Completed Notice of Intent posted on site.
2. SWPPP (Storm water Pollution Prevention Plan) Maintenance and inspection log book will be provided for the contractor.
3. Contract drawings and specifications which include the implementation of Stormwater Management devices.

D. Related sections:

1. Section 311413 - Topsoil.
2. Section 312213 - Rough Grading.
3. Section 312216 - Fine Grading.
4. Section 312301 - Sitework Excavation, Backfilling and Compacting.
5. Section 329200 - Lawns.
6. Section 329300 - Plantings.
7. Section 334000 - Storm Drainage.

1.2 QUALITY ASSURANCE

A. Conform to requirements of all regulatory authorities having jurisdiction including the site.

1.3 REFERENCES

A. Guidelines for Erosion Control in Urban Areas of New York State.

B. New York State Stormwater Management Design Manual.

C. New York State Department of Environmental Conservation's "SPEDES General Permit for Stormwater Discharges for Construction Activity Permit".

1.4 INSPECTIONS and MAINTENANCE CRITERIA

A. SITE ASSESSMENT INSPECTION (PRECONSTRUCTION INSPECTION)

1. The contractor shall have a qualified professional conduct an assessment of the site prior to the commencement of construction and certify in an inspection report that the appropriate erosion and sediment controls described on the plans (Erosion and Sediment Control Plan) and the DEC's technical standards for erosion and sediment controls as detailed in the "New York Standards and Specifications for Erosion and Sediment Control" have been adequately installed or implemented to ensure overall preparedness of the site for the commencement of construction. For the design of water quality and water quantity control (post-construction stormwater control practices), the Department's technical standards are detailed in the "New York State Stormwater Management Design Manual."

B. INSPECTION REQUIREMENTS

1. Following the commencement of construction, site inspections shall be conducted by the Owner at least every 7 calendar days. During each inspection the Owner shall record the following information:
   a. On a site map, indicate the extent of all disturbed areas and drainage pathways. Indicate site areas that are expected to undergo initial disturbance or significant site work within the next 14-day period;
   b. Indicate on a site map all areas of the site that have undergone temporary or permanent stabilization;
   c. Indicate all disturbed areas that have not undergone active sitework during the previous 14-day period;
   d. Inspect all sediment control practices and record the approximate degree of sediment accumulation as a percentage of sediment storage volume.
   e. Inspect all erosion and sediment control practices and record all maintenance requirements verifying the integrity of barrier or diversion systems (earthen berms or silt fencing) and containment systems (sediment basins and sediment traps). Identify any evidence of rill or gully erosion occurring on slopes and any loss of stabilizing vegetation or seeding/mulching. Document any excessive deposition of sediment or ponding water along barrier or diversion systems. Record the depth of sediment within containment structures, any erosion near outlet and overflow structures, and verify the ability of rock filters (check dams, riser pipes) to pass water.
   f. All deficiencies that are identified with the implementation of the SWPPP.

2. The operator (contractor) shall maintain a record of all inspection reports in a site log book. The site log book shall be maintained on site and be made available to the permitting authority upon request. The operator shall post at the site, in a publicly accessible location, a summary of the site inspection activities on a monthly basis.

C. POST CONSTRUCTION INSPECTION

1. Prior to the inspector's submittal of the Notice of Termination or the end of permit term, the operator shall have the qualified professional perform a final site inspection. The qualified professional shall certify that the site has undergone final stabilization.

1.5 SUBMITTALS

A. Material Certificates (MC) and Sample (S) of material required for the following materials:
   1. No. 4 Stone: (MC), (LA) and (S) provide 5 pound sample
   2. Drainage Fill (#1 Crushed Stone): (See Section 31 2300, Submittals)
   3. Subbase Material: (See Section 31 2300, Submittals)
   4. Select Granular Fill: (See Section 31 2300, Submittals)

B. Shop Drawing, Manufacturers' data (MD) and product sample (S) for the following materials as noted below:
   1. Stabilization Fabric for Construction Access Road: (MD)
   2. Silt Fence: (MD)
   3. Jute Mesh: (MD)
   4. Soil Separation Fabric: (MD)

C. Contractor shall submit the name of the qualified professional responsible for conducting the on-site inspections outlined in Section 1.6, Inspections and Maintenance.

D. Certifications (SPEDES Requirement): The contractor(s) responsible for project sitework shall submit a signed SWPPP certification page.

E. Construction Sequence Scheduling (SPEDES Requirement): The contractor is responsible for the completion of Schedule.

F. Maintenance Plan (SPEDES Requirement): The owner/contractor shall submit a Maintenance plan with the following information: (note that some items may not be applicable to this project)
   1. Name, address and phone number of responsible parties for maintenance;
   2. Description of annual maintenance tasks;
   3. Description of funding source;
   4. Minimum vegetative cover requirements;
   5. Access and safety issues;
   6 Testing and disposal of sediments that will likely be necessary;
   7. Evidence of acquisition of all applicable local and non local permits;
   8. Evidence of acquisition of all necessary legal agreements (e.g., easements, covenants, land trusts).

1.6 NOTICE OF INTENT (SPEDES Requirement)

A. Notice of Intent (NOI): The contractor shall post a New York State Department of Environmental Conservation completed Notice of Intent (NOI). Coverage under the general permit will begin 5 business days after the receipt by the Department. The contractor shall post this permit at the site.

B. Notice of Intent will be filed with the NYSDEC by the owner. SPEDES permits have been obtained for the project. Copies of the permit are available to the contractor for posting.

1.7 INSPECTIONS AND MAINTENANCE (SPEDES Requirement)

The contractor shall post the Stormwater Pollution Prevention Plan (SWPPP) and Construction Sequencing Schedule on site and conduct the following activities:

A. Inspections: The operator shall contract a qualified professional to conduct an assessment of the site prior to the commencement of construction and certify in an inspection report that the appropriate erosion and sediment controls described in the SWPPP have been adequately installed or implemented to ensure overall preparedness of the site for the commencement of construction. Following the commencement of construction, facilities shall be inspected within 24 hours of each rain event where rainfall exceeds 0.5 inches of rain or greater whichever comes first or as otherwise specified; proceed immediately to repair any failures, washouts, erosion, overflows or other conditions occurring due to rain events to minimize downstream disturbance and sedimentation.

B. Site Log/Certification: The Owner must maintain a record of all inspection reports in a site log book. The site log book must be maintained on site and made available to the permitting authority upon request. Prior to starting construction, the operator (contractor) must certify in the site log book that the SWPPP was prepared in accordance with the requirements in the permit and that it meets all federal, state and local erosion and sediment control requirements.

C. Stabilization: The operator must initiate stabilization measures as soon as predictable on portions of the site where construction activities have temporarily or permanently ceased.

D. Maintenance: Sediment must be removed from sediment traps or ponds whenever their capacity has been reduced by 50 percent of the design capacity.

1.8 CERTIFICATIONS

A. Refer to Contractor Certification Form contained in the Storm Water Pollution Protection Plan for the project.

1.9 SUPPLEMENTAL DOCUMENTS

A. Storm Water Pollution Prevention Plan for the project will be provided.

B. Stormwater Management System Report for the proposed facilities has been prepared jointly by Keplinger Freeman Associates and RZ Engineering. This report outlines the engineering and design calculation for the increased runoff and stormwater detention facilities required. The stormwater summary is included in the SWPPP Maintenance and Inspection Log Book. Copies of the full stormwater management report are available for a nominal charge.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Silt fence:
1. Fabric - Mirafi 100X or equal.
2. Support - 14-1/2 gauge galvanized woven wire with maximum 6 inch mesh opening.
3. Stakes: rough sawn hardwood, pointed on one end. Minimum cross sectional area.
4. 3 square inches.

B. Construction Access Road (Mudrack):
   1. Stabilization Fabric - Refer to Section 31 23 00 - Excavation, Backfilling and Compacting.
   2. Stone - No. 4 stone or crushed concrete.

C. No. 4 Stone:

Standard ASTM Sieve Size	Percent Passing by Weight
4" (100 mm)	100
3" (75 mm)	90-100
2" (50 mm)	0-15
Passing No. 50	5-10
Passing No. 100	2-5

D. Jute Mesh:
   1. Material - Mutual Industries or approved equal.
   2. Woven jute (undyed and sun bleached)

E. Seeding: Refer to Section 329200.

PART 3 – EXECUTION

3.1 GENERAL

A. The contractor is responsible for controlling sediment from leaving the project site. A Storm Water Pollution Prevention Plan, erosion control plan and erosion control details have been prepared for this project and shall be followed during construction.

B. Pollutants such as fuels, lubricants, bitumens, raw sewage, chlorine and other harmful materials shall be handled and disposed of by approved methods and shall not be discharged into rivers, streams, impoundments, wetlands, or into natural or man-made channels leading thereto. Wash water or waste from concrete mixing or curing operations shall not be allowed to enter live streams.

C. In case of repeated failures on the part of the Contractor to control pollution/erosion, the right shall be reserved by the Owner's representative to employ outside assistance to provide the necessary corrective measures. Such incurred costs, plus related engineering costs, shall be charged to the Contractor and appropriate deductions made to the Contractor's progress payment.

D. Any fines or fees incurred by the Contractor for failure to implement and maintain erosion control devices shall be paid for by the Contractor.

3.2 INSTALLATION OF EROSION CONTROL FACILITIES

A. Simultaneous with removal work and earthwork, install temporary erosion and sediment control facilities shown on drawings and all other facilities required initially and from time to time throughout the work as determined by the Contractor in accordance with "Guidelines for Erosion Control in Urban Areas of New York State" to prevent and reduce erosion and sedimentation affecting existing on-site improvements to remain or adjoining property or roadways.

B. To control erosion and sedimentation, initial construction operations shall include, as a minimum:
   1. Silt fencing or straw bale dikes along all perimeters of work as may be shown on the drawings and other perimeters which could produce erosion and sedimentation affecting adjoining properties, roadways, water bodies, and other improvements and facilities.
   2. Silt fencing or straw bale dikes around stockpiles of topsoil and other excavated soils.
   3. Installation of Stabilized Construction Entrance (Mud Rack)

C. Temporary sediment traps installed by the Contractor shall be sized to provide, as a minimum, 1800 cubic feet of storage capacity for each acre of area being drained.

D. Sediment shall be removed from temporary sediment basin and sediment swales and traps and along silt fences and straw bale dikes regularly to maintain stability, flow and storage capacity.

E. Throughout all building and sitework, Contractor shall be responsible for erosion and sediment control and for planning, scheduling and phasing work to prevent erosion or sedimentation. Drainage areas should be seeded and stabilized as soon as possible as other work is completed. Temporary seeding with Annual Rye may be considered if final seeding is delayed.

F. All facilities shall be removed as the contributory drainage areas are stabilized and as construction is to be completed. Restore all affected site areas and surfaces.

3.3 SLOPE PROTECTION

A. Protect all disturbed areas during and after earthwork operations as required to prevent gullying, mass wasting and erosion. Repair all eroded areas at no expense to the Owner.

3.4 SILT FENCE

A. Construct as detailed truly vertical for entire length.

B. Install where indicated on the drawings, as required and as directed by the landscape architect.

3.5 CONSTRUCTION ENTRANCE

A. Install where indicated on the drawings and/or as required. NYSDOT Item No. 209.22.

B. Construct as detailed from stone or crushed concrete from site demolition. Maintain at all times and renew when no longer effective. Remove when no longer being used.

C. The pavement adjacent to the entrance shall be swept daily to remove excess mud, dirt or rock tracked from the site.

D. Dump trucks hauling material from the site shall be covered with a tarpaulin.

END OF SECTION 312500

SECTION 31 1000 – SITE CLEARING

PART 1 – GENERAL

1.1 SUMMARY

A. Section includes:
1. Permits.
2. Dust Control.
3. Disconnect Utility Services.
4. Demolition.
5. Removal.

B. Related sections:
1. Section 311001 - Site Preparation
2. Section 334000 - Storm Drainage

PART 2 – PRODUCTS (not used)

PART 3 – EXECUTION

3.1 PERMITS

A. Contractor shall secure all necessary demolition permits including fees and licenses at his own expense.

B. Notify local agencies, such as fire, police, etc., that have jurisdiction.

3. 2 DUST CONTROL

A. Prevent dust and dirt from demolition operations from blowing onto adjacent properties and "items to remain".

B. Contractor shall apply dust surfacant/suppression agent such as Syntech 2002 to control dust as required. Refer to Specification Section 312500 - Erosion, Sediment and Pollution Control for any additional dust control measures.

3.3 DISCONNECT UTILITY SERVICES

A. Disconnect and remove all existing utilities to structures to be demolished unless otherwise noted. Obtain approval of respective utility owners/vendors before capping, removing or shutting off gas, water, sanitary, storm drainage, electrical, telecommunications or other services. Refer to Division 1 Specifications and drawings for additional utility information.

B. Execute work in accordance with applicable utility owners/vendors regulations and directives.

3.4 DEMOLITION

A. Pavements and Other Structures: Define neat regular lines for cutting; saw cut only; protect edges of installations to remain; extend limits of cutting and removal to sound joints or other limits required to remove all adjoining loose, broken, or deteriorating paving; provide a sound stable edge for adjoining installation of new paving. NYSDOT Item No. 520.0900010.

B. Storm Drains: Remove existing active storm drain system components only after temporary or permanent replacement facilities are in place and operative to collect and channel storm water to required outfalls.

C. Salvage and Stockpile: Carefully remove and protect any existing improvements to be reinstalled as part of the work, including any improvements which may be reinstalled at Contractor's discretion.

Contact and coordinate with Owner in advance on salvaging and stockpiling, if any, indicated on drawings, of other existing improvements to be salvaged for future Owner use; stockpile in approved locations on property as determined by Owner.

D. Tree and Vegetation Removal: Clear, grub and remove all existing tree, shrub and other woody vegetation identified on the drawings or otherwise required to completely clear and prepare the site within the perimeter lines and limits of site excavation and regrading work. Protect all trees not identified for removal. NYSDOT Item No. 201.0700008.

Completely pull, grub and otherwise remove tree stumps/woody root systems. All vegetation and woody material stumps shall be legally disposed of off-site.

E. Rubble: Concrete, asphalt rubble and other hard-fill type debris from removal work shall be removed and legally disposed of off-site. NYSDOT Item No. 203.02

F. General Debris: Plastics, metals, garbage and other general debris shall be removed from the site and properly disposed of.

G. The use of explosives is not permitted for any demolition or removal work.

3.5 REMOVAL

A. Remove from site all debris and all materials not indicated to be salvaged. All removed materials become property of Contractor who shall legally dispose of materials.

END OF SECTION 311000

SECTION 31 1001 – SITE PREPARATION

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes:
1. Outline of sitework included.
2. General Job Conditions/Special Conditions.
3. Layout, lines, levels, and field checks.
4. Protection of work areas and existing items to remain.
5. Clearing and grubbing.

B. Related Work Specified Elsewhere:
1. Section 311000 - Site Clearing
2. Section 311413 - Topsoil
3. Section 312213 - Rough Grading
4. Section 312216 - Fine Grading
5. Section 312301 - Sitework Excavation, Backfilling and Compacting
6. Section 321100 - Base Courses
7. Section 321216 - Asphalt Pavement
8. Section 324000 - Site Improvements
9. Section 329200 - Lawns
10. Section 334000 - Storm Drainage

PART 2 – PRODUCTS (not used)

PART 3 – EXECUTION

3.1 SITEWORK INCLUDED

The work includes all labor, materials, plant, equipment, and related construction and services necessary to furnish and install all sitework as shown on the drawings, and in accordance with these specifications. Work includes but is not limited to the following:

A. Site Preparation and Earthwork:
1. Erosion and sedimentation control devices and measures.
2. Removal of existing buildings, paving, curbing, walls, storm sewer system components, trees and vegetation, including any salvaging and stockpiling of items indicated for reuse or for future owner.
3. Stripping and stockpiling of topsoil.
4. Excavation, trenching, grading, filling, backfilling, and related earthwork with compaction to establish subgrades under paving, curbs, walls, drainage facilities, related structures and improvements, and lawn and other vegetation areas.
5. Spreading and grading of topsoil. (Also see Item E below.)
6. Removal of rubble, excess or unsuitable excavated soils, rubble, debris and other materials from site.

B. Site Utilities

1. Storm System: Catch basins, manholes, culverts, drywells, drain inlets, underdrains, stormwater management facilities and related storm drainage improvements.
2. Sanitary Sewer
3. Water Service

C. Paving and Surfacing with any Related Structures:
1. Asphalt concrete paving with pavement markings.
2. Granite curb.
3. Concrete paving, curbs, ramps and other structures.

D. Site Improvements
1. Signs.
2. Steel Bollards

E. Lawns and Plantings:
1. Topsoil fine grading, amendment and related work.
2. Seeding/establishment of lawn, other grasses.
3. Trees/shrub plantings

3.2 GENERAL JOB CONDITIONS

A. Schedule and conduct work to permit access to adjoining Owner and other properties and facilities at all times and in accordance with any phasing requirements of the contract. Do not impede access by emergency vehicles and forces. Notify and coordinate with Owner in advance of work and in advance of limiting or detouring access to or use of any other facilities. Approximate limits of work are as shown or implied on drawings; do not intrude onto other site areas more than reasonably necessary for access, staging, storage and other incidental aspects of work.

B. Verify all existing lines, limits, distances, dimensions, elevations, and other conditions affecting work required. Comply with special instructions on drawings. Notify Architect immediately of any conditions encountered which appear to be inconsistent with work requirements, so that such matters may be resolved. Verify any existing underground utility locations and conditions prior to excavation; contact and secure UFPO services as required (1-800-962-7962). Excavate carefully in all locations close to known or likely underground utility lines.

C. In addition to all requirements of the General Conditions and all other public safety regulations and requirements applicable to the work, exercise caution in all sitework access and operations in anticipation that public pedestrian and vehicular traffic and activity will occur in proximity to the work and to access routes to and from the work at all times.

D. Contractor is held to have visited site and to have identified, investigated and measured surface and subsurface conditions and quantities involved in and affecting the scope, complexity and cost of the work prior to submission of a bid. Contractor may, for his information, make test excavations during bidding period. Contact Architect for approval prior to any such excavation and repair test holes as directed.

Contractor shall use his own judgment in interpreting all surface and subsurface conditions; no responsibility is assumed by Owner or Architect for survey information, lack of survey information, or actual conditions encountered. Any geotechnical evaluation reports with soil test boring and pit logs, descriptions and related data and recommendations on existing subsurface and construction conditions included in the contract documents are made available for the convenience of the Contractor. If included, such reports are not intended as a

representation or warranty of the accuracy of such information or the continuity of conditions between any soil boring and test pit locations. It is expressly understood that the Owner and Architect shall not be responsible for interpretations or conclusions drawn from the reports by the Contractor. Claims for extra compensation or inability to perform work in accordance with Contract Documents, or for an extension of time will not be considered for any alleged or actual differences between site surface or subsurface conditions and such information and data, except as may be provided elsewhere in the Contract Documents. Owner may elect alternative methods of accomplishing work in event that variations in sitework conditions or unknown conditions are encountered.

E. Avoid spills and littering of earth, rubble or other debris on Owner or other public streets or other roadways; clean up any spills promptly and regularly.

F. Notify Architect in writing of any existing damage to "items to remain" prior to commencing work.

3.3 LAYOUT, LINES, LEVELS, AND FIELD CHECKS

A. Employ licensed Engineer or Surveyor to stake out all work.

B. Set hubs, offset lines, and grade stakes where spot elevations shown, at breaks in grade, and as otherwise required.

C. Run lines from existing buildings, monuments, and features shown on drawings. Establish base lines. Mark well and protect during construction. Run levels from benchmarks. Verify benchmark elevations. Advise Architect of results before commencing work.

D. Accurately locate all new buildings, roads, paved areas, walks, features, etc. Advise Architect of any discrepancies, prior to commencing work.

3.4 PROTECTION

A. Plank all walks, pavements, and curbs to be crossed by equipment.

B. Protect Persons and Property: provide temporary fencing, barricades, signs, signals, and other measures and devices for protection of persons, property, existing improvements to remain and traffic and other activities in and adjoining the site of the work, in accordance with all applicable laws and regulations, at all times during work.

When work areas are to be unattended, check that open excavations or other unsafe areas or conditions are adequately barricaded and that signals are operative.

Perform work to prevent erosion, flooding, undermining, lateral movement, settlement, or other instability or damage of adjoining areas of the site and adjoining improvements. Make certain that cut or fill embankments slopes are stable during overnight or other periods of work interruption.

C. Protect Utilities: Protect and preserve in operating condition all active surface and subsurface utilities indicated on the drawings or which may otherwise exist or be encountered within or adjacent to the work. Excavate carefully near any known or suspected utility lines. Cooperate with other contractors performing removals or replacements of utilities. Particularly note the

instructions on the drawings to verify location and/or depth of certain utility lines. Secure UFPO services to locate utilities

Damage to any utility lines or structures resulting from work shall be repaired by at the expense of the contractor, to the satisfaction of the Owner, Architect, utility company or other authority having jurisdiction.

If active utilities are cut, broken, or damaged during work, immediately take all steps necessary to avoid endangering persons or property. Notify Owner, Architect and affected utility company or other jurisdiction to obtain a decision and/or assistance in repair of damaged facilities.

Remove, plug or cap as required any active and abandoned utilities encountered during construction operations or shown on drawings. If contractor is required to reroute/replace any portions of existing active utility lines, determine connection points and otherwise plan work in advance so that service is interrupted as briefly as possible. Where existing lines are to be abandoned, remove any portions which may interfere with or may be unstable or prone to settle under or along new structures or pavements, refer to drawings. Other portions may be abandoned in-place.

In event that water, storm sewer, sanitary sewer, or other utility lines are broken, or that springs, ground water, or other sources of water are encountered, take necessary steps to immediately divert water to prevent erosion, undermining or other damage to existing improvements or construction operations. Permanent replacement, reconstruction or other corrective measures are contractor's responsibility. Methods subject to approval of architect and other having jurisdiction.

D. Protect Trees: protect all trees and shrubs in and adjoining work areas which are not identified to be removed. Do not store or stockpile earth or other materials or equipment and do not operate heavy equipment more than necessary within the branching limits of trees.

3.5 CLEARING AND GRUBBING

A. Unless otherwise noted on the drawings, remove promptly from site and legally dispose of all trees, logs, stumps, roots, brush, vegetation, rubbish, stones, boulders and other objectionable or perishable materials within grading limits to 1'-6" below finish grade or to original grade whichever is the greater depth.

B No burning of any cleared and grubbed material shall be permitted.

END OF SECTION 311001

SECTION 31 1413 – TOPSOIL

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes:
1. Topsoil.

B. Related Sections:
1. Section 312213 - Rough Grading
2. Section 312216 - Fine Grading
3. Section 312500 - Erosion, Sediment and Pollution Control

1.2 DELIVERY, STORAGE AND HANDLING

A. Stockpile in a manner and location that will not impede the work of any other contractor.

1.3 SUBMITTALS

A. Prior to stripping the topsoil, secure and submit analyses of existing topsoil samples. Identify sample locations. Secure analyses from Cornell University Soil Nutrient Laboratory and Physical Analysis Laboratory (can be secured through Cornell Cooperative Extension And local Soil Conservation Service in accordance with soil sample and test kit requirements) or from independent testing service. Analyses to include: mechanical analysis, organic content, nitrogen, phosphorus, potassium, and pH levels. Secure recommendations for fertilization, pH correction and other amendment.

PART 2 – PRODUCTS

2.1 TOPSOIL

A. On-site or Imported Topsoil shall be utilized for or as a component in the Seeded Lawn and Plant Bed Mixture areas shown on the plans. All topsoil shall be screened prior to placement or mixing.

B. On-site Topsoil: Furnish from topsoil stripped from site (NYSDOT Item No. 610.1401). Remove all subsoil, clay lumps, stones 1" in greatest dimension of larger, weeds, stumps, roots, undecomposed sod and other debris. Verify depth of topsoil within Contract Limits prior to submitting bid.

C. Imported or Screened On-SiteTopsoil : Shall consist of a screened and modified topsoil consisting of 70 to 75% coarse to medium sand. Screened topsoil shall meet the following conditions:
1. Natural, fertile, friable granular soil characteristic of productive soils in vicinity. Uniform in composition and texture. Clean, free from subsoil, clay lumps, stones, weeds, stumps, roots, toxic substances and debris of similar substances 1 inch or more in greatest dimension.

2. Topsoil pH value of 5.5 to 7.5 or able to be amended by contractor.
3. Containing not less than 5 percent nor more than 20 percent organic content in that portion of a sample passing a 1/4 inch sieve when determined by the wet combustion method on a sample dried at 105 degrees.
4. Soluble salts not to exceed 500 parts per million.
5. Containing the following gradations:

SIEVE DESIGNATION	% PASSING
1"	100
1/4 inch	97 - 100
No. 200	5-10

D. On-site stockpiled topsoil can be used if above specifications are met by amending with accepted materials and utilizing accepted methods.

PART 3 – EXECUTION

3.1 TOPSOIL STRIPPING

A. Mow lawn areas prior to stripping topsoil. Investigate depth of organic soils in each designated area as the work progresses and strip topsoil accordingly. Depth may vary over the site of the work. Strip full depth of topsoil from all building areas, areas to be paved, and areas of grade change.

B. Stockpile in approved on-site location where material will not interfere with other work and guard against erosion and sedimentation onto adjoining work areas or off-site areas.

C. Do not lift and mix subsoil material with topsoil. Remove debris and other foreign material and large stones encountered as work progresses. Ordinary grass sods and small roots, twigs and other woody material need not be removed but shall be thoroughly broken up and intermixed with soil during handling operations.

D. Excess topsoil is the property of the Owner. Stockpile where directed by owner.

E. All topsoil shall be screened prior to reuse/respreading.

END OF SECTION 311413

SECTION 31 2213 – ROUGH GRADING

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes
1. Rough grading.

B. Related Sections:
1. Section 312216 - Fine Grading.
2. Section 312301 - Sitework Excavation, Backfilling, and Compacting.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION

3.1 ROUGH GRADING

A. Subgrade: Depth below finished grade as required for topsoil or pavement.

B. Accuracy: Set grade stakes where spot elevation shown, at breaks in grade, along drainage "swales" and as otherwise required to correctly grade the area according to elevations shown on plans.

C. Completion of rough grading: Obtain Architect's approval before spreading topsoil or preparing pavement subgrade.

D. Subgrade rolling: All paved areas. In areas inaccessible to roller, use mechanical tamps. Refer to Section 312301, Sitework Excavation, Backfilling and Compacting for compaction requirements.

E. Avoid excessive working of subgrade or use of equipment that causes pumping or weaving.

END OF SECTION 31 2213

SECTION 31 2216 – FINE GRADING

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes:

1. Topsoil spread
2. Fine grading of paved and unpaved areas

B. Related Sections:

1. Section 311413 - Topsoil
2. Section 312213 - Rough Grading

PART 2 – PRODUCTS

2.1 MATERIALS

A. Topsoil as specified in Section 311413.

PART 3 – EXECUTION

3.1 SPREAD TOPSOIL

A. Entire unpaved area within contract limits, unless otherwise noted.

B. Spread, compact and manipulate topsoil to a minimum of thickness as detailed after compaction to smooth draining grades true to elevations shown or indicated on drawings. Generally, all areas shall receive 4 inch topsoil thickness and plant beds shall receive 18 inch minimum topsoil thickness. Refer to drawings for verification and any special requirements for use of stripped topsoil.

C. Excess topsoil: Excess topsoil is the property of the owner. Excess topsoil shall remain in the approved topsoil stockpile area.

3.2 FINE GRADE OUTSIDE BUILDING LINES

A. Disk or harrow 4 inch depth where topsoil has been spread and 4 inch depth in disturbed areas where no grade change occurs.

B. Remove all stones 1 inch diameter and larger, roots, rubbish and all other foreign matter.

C. Grade to exact well draining grades indicated. Maximum allowed tolerances:

1. Unpaved areas – grade surface areas to receive lawn or plantings to a tolerance of plus or minus 0.10 foot. Swales and ditches to a tolerance of plus or minus 0.05 foot.
2. Paved areas--shape subgrade for pavement to a tolerance of plus or minus 0.05 foot.

3. Exterior steps and ramps--finished subgrade to a tolerance of plus or minus 0.05 foot.

END OF SECTION 31 2216

SECTION 312300 – STRUCTURAL EXCAVATION, BACKFILL, AND COMPACTION

PART 1 - GENERAL

1.1 RELATED WORK SPECIFIED ELSEWHERE: Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.

1.2 DESCRIPTION OF WORK: Work covered by this section shall include all labor, material, equipment, and services necessary to complete the job as shown or called for on Architectural and Structural Drawings. Also included, but not limited to, shall be:

A. Layout and install batter boards and grade stakes.

B. Excavation for building foundations, footings and retaining walls as shown on the Structural Drawings.

C. Bracing, shoring, and sheeting for protection of excavations.

D. Pumping water from excavations.

E. Hand trim footing excavation to maintain proper size of footing.

F. Backfill excavations and rough grade as indicated and required.

G. Supply, place, and compact slab base and pavement base.

H. Remove all excess excavated material from the site.

1.3 QUALTIY ASSURANCE:

A. Job Safety: This is the sole responsibility of the Contractor. OSHA requirements shall be followed.

1.4 SUBMITTALS:

A. Samples:
1. Slab base material: 20 lbs.
2. Furnish source location and current N.Y.S.D.O.T. acceptance number with above samples.

B. Product Data: Manufacturer's specifications and performance data for Filter Cloth if required on the drawings.

PART 2 - PRODUCTS

2.1 MATERIALS:

A. Batter Boards: Shall be of new lumber with rigid supporting members.

B. Backfill Inside and Outside of the Building Area: Shall be clean, well graded, NYSDOT item 304-2.02 Type 2 or run of crush stone for the top 6" and NYSDOT item 304-2.02 Type 3 below 6" of fill required.

C. Granular Slab Base: Shall be clean, well graded, NYSDOT item 304-2.02 Type 2 or washed and crushed stone, well graded from 3/4" to 2" maximum size, except over footings 12" or less below finished slab on grade.

D. Lean Concrete Fill: Minimum compressive strength of 1,500 psi at twenty-eight (28) days.

E. Shoring and Bracing: Provide materials for shoring and bracing, such as sheet piling, uprights, stringers and cross-braces, in good serviceable condition. Use timbers that are sound and free of large or loose knots.

F. Material Definitions:

1. Satisfactory Soil Materials: Are defined as those complying with the American Association of State Highway Officials (AASHO). Designation M-145, soil classification Groups A-1, A-2-4, A-2-5, and A-3.
2. Unsatisfactory Soil Materials: Are defined as those described in AASHO M-145, soil classification Groups A-2-6, A-2-7, A-4, A-5, A-6, and A-7; also peat and other highly organic soils; and soil materials of any classifications that have a moisture content at the time of compaction beyond the range of 1% below and 3% above the optimum moisture content of the soil material, as determined by the Moisture Density Relations Test.
3. Cohesionless Soil Materials: Includes gravels, sand-gravel mixtures, sands, and gravelly sands. Moisture density relations of cohesionless soils, when plotted on graphs, will show straight lines or reverse-shaped moisture density curves.
4. Cohesive Soil Materials: Includes clayey and silty gravels, sand-clay mixtures, gravel-silt mixtures, clayey and silty sands, sand-silt mixtures, clays, silts, and very fine sands. Moisture density relations of compacted cohesive soils, when plotted on graphs, will show normal moisture density curves.

PART 3 - EXECUTION

3.1 LAYOUT, LINES, LEVELS, AND FIELD CHECKS:

A. The Contractor shall stake out and run levels for the building as indicated on the drawings. Erect batter boards and secure firmly against movement. Batter boards shall be protected against all hazards of damage until their use is no longer required and permission or direction is given by the Architect for their removal and disposal. Maintain carefully all bench marks, monuments, and other reference points.

B. Lines and Levels: Run from property monuments and benchmarks.

C. The Contractor shall verify field conditions such as topography, inverts, location of utilities, and property lines before proceeding with the work so that changes can be made, if necessary, to accommodate the plans to the site. Discrepancies discovered in the field shall be brought to the Architect's attention before proceeding with the work.

3.2 GRADING:

A. Grading surface of fill under building slabs. Grade the surface of compacted existing soil or fill under building slabs smooth and even, free of voids, compacted as specified, and to required elevation. Provide final grades within a tolerance of 1/4" when tested with a ten (10) foot straight-edge.

3.3 EXCAVATING:

A. Subsurface Information: Test borings and other exploratory operations may be made by the Contractor at no additional cost to the Owner, provided such operations are acceptable to the Architect and the Owner.

B. Remove and dispose of material encountered to obtain required subgrade elevations, including pavement, obstructions visible on ground surface, underground structures, and utilities indicated to be removed.

C. Disposal: Transport excavated material offsite to legal disposal.

D. Bracing and Shoring: Provide bracing and shoring as required in excavations, to maintain sides and to protect structures from settlement. Slope sides of excavations over five (5) feet deep to the angle of repose of the material excavated; otherwise, shore, and brace where sloping is not possible either because of space restrictions or stability of material excavated. Maintain shoring and bracing in excavations regardless of the time period excavations will be open. Carry down shoring and bracing as the excavation progresses.

E. All shoring and bracing must be removed before completion of backfilling except where required for structural support of slope stability. The Contractor shall be responsible for the design, installation, and maintenance of such shoring or bracing required to accomplish the above purpose. The Contractor shall indemnify the Owner, the Architects, and the Consulting Engineers against any action arising from damage to existing structures or injury to persons resulting from the Contractor's actions or failure to act in carrying out the intent of this Specification.

F. Protections: Protect structures, utilities, sidewalks, pavements, and other facilities in areas of work. Barricade open excavations and provide warning lights from dusk to dawn each day.

G. Explosives: Use of explosives will not be permitted.

H. Existing Utilities: Locate by hand excavation and provide protection from damage. Cooperate with the Owner and utility companies for maintaining services. Do not break utility connections without providing temporary services, as acceptable to the Architect. Repair damages to existing utilities as directed by the utility company without additional cost to the Owner.

I. Extent of Excavations: Excavate for structures to elevations and dimensions shown, extending excavation a sufficient distance to permit placing and removal of other work and for inspection. Trim bottom to required lines and grades to provide solid base to receive concrete.
   1. Footing bottoms shall be cleaned of loose materials, mud, and debris. Satisfactory bearing material loosened by construction operations or surface water shall be removed and replaced with lean concrete.
   2. Footing bottoms below or within two (2) feet of ground water level shall be sealed with a minimum of a three (3) inch layer of lean concrete below the footing.
   3. If unsatisfactory soil materials are encountered at design elevations, continue excavation to sound material.

4. Removal of materials beyond indicated subgrade elevations shall be filled with lean concrete, or corrected by extending the indicated bottom elevation of the footing to the lower elevation, as directed by the Engineer and with no additional cost to the Owner.

J. Notify the Soils Engineer when excavations to the contract depth are completed in order that assumed foundation bearing materials can be verified before footing concrete is placed.

K. Pumping Equipment: Furnish and operate sufficient pumping machinery to keep all excavated parts free from water at all times. Pits shall be dug, if necessary, into which the excavation shall be drained. Care and proper precautions shall be taken in the use of pumps so that in no case will foundations already in place or existing foundations of adjacent structures be undermined or disturbed due to pumping.

L. Trimming: At excavation for footings, hand trim trench bottoms to firm, hard bearing. Use "blade" type bucket.

3.4 BACKFILLING:

A. Backfill consists of placement of specified backfill material, in layers, in the excavations to the required subgrade elevations.
1. Footings shall be backfilled to tops of footing immediately after removal of forms and any required concrete repairs.
2. Backfill against walls shall not be started until required concrete repairs are made and portions of superstructure bracing the walls are in place, except if specifically approved by the Architect in writing.
3. All backfill at exterior walls shall be pitched to drain surface water away from walls.

B. Slab Base: In all areas where floor slabs on earth occur, after installation and approval of all piping below floors, install fill as specified herein. The subgrade and fill shall be compacted and set to proper elevations with an instrument and shall be pitched to drains as directed.

3.5 PLACEMENT and COMPACTION

A. Place backfill material in layers not more than eight (8) inched in loose depth, compacting each layer to required maximum density. Test each layer with spot checks as required.

B. Compaction: Compact each layer of backfill material to 95% after proof rolling subgrade.

C. Moisture Level: Apply water to surface of subgrade or layers of soil material if required. Remove and replace, or scarify and air dry, soil materials that are too wet to permit compaction to specified density.

D. Equipment: Use power-driven hand tampers for compacting materials adjacent to structures, over footings, and within the building area.

E. Reconditioning Compacted Areas: Where complete compacted areas are disturbed by subsequent construction operations or adverse weather, scarify the surface, re-shape, and

compact to the required density prior to further construction. Use hand tamping for recompaction over underground utilities.

3.6 COMPLETION:

A. On completion of the work as set out, the entire site shall be cleaned up and left free of all surplus earth, large stones, debris, tools and equipment, etc., and shall be left in a neat condition to the satisfaction of the Owner.

END OF SECTION 312300

SECTION 312300 – STRUCTURAL EXCAVATION, BACKFILL, AND COMPACTION

PART 1 - GENERAL

1.1 RELATED WORK SPECIFIED ELSEWHERE: Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.

1.2 DESCRIPTION OF WORK: Work covered by this section shall include all labor, material, equipment, and services necessary to complete the job as shown or called for on Architectural and Structural Drawings. Also included, but not limited to, shall be:

A. Layout and install batter boards and grade stakes.

B. Excavation for building foundations, footings and retaining walls as shown on the Structural Drawings.

C. Bracing, shoring, and sheeting for protection of excavations.

D. Pumping water from excavations.

E. Hand trim footing excavation to maintain proper size of footing.

F. Backfill excavations and rough grade as indicated and required.

G. Supply, place, and compact slab base and pavement base.

H. Remove all excess excavated material from the site.

1.3 QUALTIY ASSURANCE:

A. Job Safety: This is the sole responsibility of the Contractor. OSHA requirements shall be followed.

1.4 SUBMITTALS:

A. Samples:
1. Slab base material: 20 lbs.
2. Furnish source location and current N.Y.S.D.O.T. acceptance number with above samples.

B. Product Data: Manufacturer's specifications and performance data for Filter Cloth if required on the drawings.

PART 2 - PRODUCTS

2.1 MATERIALS:

A. Batter Boards: Shall be of new lumber with rigid supporting members.

B. Backfill Inside and Outside of the Building Area: Shall be clean, well graded, NYSDOT item 304-2.02 Type 2 or run of crush stone for the top 6" and NYSDOT item 304-2.02 Type 3 below 6" of fill required.

C. Granular Slab Base: Shall be clean, well graded, NYSDOT item 304-2.02 Type 2 or washed and crushed stone, well graded from 3/4" to 2" maximum size, except over footings 12" or less below finished slab on grade.

D. Lean Concrete Fill: Minimum compressive strength of 1,500 psi at twenty-eight (28) days.

E. Shoring and Bracing: Provide materials for shoring and bracing, such as sheet piling, uprights, stringers and cross-braces, in good serviceable condition. Use timbers that are sound and free of large or loose knots.

F. Material Definitions:

1. Satisfactory Soil Materials: Are defined as those complying with the American Association of State Highway Officials (AASHO). Designation M-145, soil classification Groups A-1, A-2-4, A-2-5, and A-3.
2. Unsatisfactory Soil Materials: Are defined as those described in AASHO M-145, soil classification Groups A-2-6, A-2-7, A-4, A-5, A-6, and A-7; also peat and other highly organic soils; and soil materials of any classifications that have a moisture content at the time of compaction beyond the range of 1% below and 3% above the optimum moisture content of the soil material, as determined by the Moisture Density Relations Test.
3. Cohesionless Soil Materials: Includes gravels, sand-gravel mixtures, sands, and gravelly sands. Moisture density relations of cohesionless soils, when plotted on graphs, will show straight lines or reverse-shaped moisture density curves.
4. Cohesive Soil Materials: Includes clayey and silty gravels, sand-clay mixtures, gravel-silt mixtures, clayey and silty sands, sand-silt mixtures, clays, silts, and very fine sands. Moisture density relations of compacted cohesive soils, when plotted on graphs, will show normal moisture density curves.

PART 3 - EXECUTION

3.1 LAYOUT, LINES, LEVELS, AND FIELD CHECKS:

A. The Contractor shall stake out and run levels for the building as indicated on the drawings. Erect batter boards and secure firmly against movement. Batter boards shall be protected against all hazards of damage until their use is no longer required and permission or direction is given by the Architect for their removal and disposal. Maintain carefully all bench marks, monuments, and other reference points.

B. Lines and Levels: Run from property monuments and benchmarks.

C. The Contractor shall verify field conditions such as topography, inverts, location of utilities, and property lines before proceeding with the work so that changes can be made, if necessary, to accommodate the plans to the site. Discrepancies discovered in the field shall be brought to the Architect's attention before proceeding with the work.

3.2 GRADING:

A. Grading surface of fill under building slabs. Grade the surface of compacted existing soil or fill under building slabs smooth and even, free of voids, compacted as specified, and to required elevation. Provide final grades within a tolerance of 1/4" when tested with a ten (10) foot straight-edge.

3.3 EXCAVATING:

A. Subsurface Information: Test borings and other exploratory operations may be made by the Contractor at no additional cost to the Owner, provided such operations are acceptable to the Architect and the Owner.

B. Remove and dispose of material encountered to obtain required subgrade elevations, including pavement, obstructions visible on ground surface, underground structures, and utilities indicated to be removed.

C. Disposal: Transport excavated material offsite to legal disposal.

D. Bracing and Shoring: Provide bracing and shoring as required in excavations, to maintain sides and to protect structures from settlement. Slope sides of excavations over five (5) feet deep to the angle of repose of the material excavated; otherwise, shore, and brace where sloping is not possible either because of space restrictions or stability of material excavated. Maintain shoring and bracing in excavations regardless of the time period excavations will be open. Carry down shoring and bracing as the excavation progresses.

E. All shoring and bracing must be removed before completion of backfilling except where required for structural support of slope stability. The Contractor shall be responsible for the design, installation, and maintenance of such shoring or bracing required to accomplish the above purpose. The Contractor shall indemnify the Owner, the Architects, and the Consulting Engineers against any action arising from damage to existing structures or injury to persons resulting from the Contractor's actions or failure to act in carrying out the intent of this Specification.

F. Protections: Protect structures, utilities, sidewalks, pavements, and other facilities in areas of work. Barricade open excavations and provide warning lights from dusk to dawn each day.

G. Explosives: Use of explosives will not be permitted.

H. Existing Utilities: Locate by hand excavation and provide protection from damage. Cooperate with the Owner and utility companies for maintaining services. Do not break utility connections without providing temporary services, as acceptable to the Architect. Repair damages to existing utilities as directed by the utility company without additional cost to the Owner.

I. Extent of Excavations: Excavate for structures to elevations and dimensions shown, extending excavation a sufficient distance to permit placing and removal of other work and for inspection. Trim bottom to required lines and grades to provide solid base to receive concrete.
   1. Footing bottoms shall be cleaned of loose materials, mud, and debris. Satisfactory bearing material loosened by construction operations or surface water shall be removed and replaced with lean concrete.
   2. Footing bottoms below or within two (2) feet of ground water level shall be sealed with a minimum of a three (3) inch layer of lean concrete below the footing.
   3. If unsatisfactory soil materials are encountered at design elevations, continue excavation to sound material.

4. Removal of materials beyond indicated subgrade elevations shall be filled with lean concrete, or corrected by extending the indicated bottom elevation of the footing to the lower elevation, as directed by the Engineer and with no additional cost to the Owner.

J. Notify the Soils Engineer when excavations to the contract depth are completed in order that assumed foundation bearing materials can be verified before footing concrete is placed.

K. Pumping Equipment: Furnish and operate sufficient pumping machinery to keep all excavated parts free from water at all times. Pits shall be dug, if necessary, into which the excavation shall be drained. Care and proper precautions shall be taken in the use of pumps so that in no case will foundations already in place or existing foundations of adjacent structures be undermined or disturbed due to pumping.

L. Trimming: At excavation for footings, hand trim trench bottoms to firm, hard bearing. Use "blade" type bucket.

3.4 BACKFILLING:

A. Backfill consists of placement of specified backfill material, in layers, in the excavations to the required subgrade elevations.
1. Footings shall be backfilled to tops of footing immediately after removal of forms and any required concrete repairs.
2. Backfill against walls shall not be started until required concrete repairs are made and portions of superstructure bracing the walls are in place, except if specifically approved by the Architect in writing.
3. All backfill at exterior walls shall be pitched to drain surface water away from walls.

B. Slab Base: In all areas where floor slabs on earth occur, after installation and approval of all piping below floors, install fill as specified herein. The subgrade and fill shall be compacted and set to proper elevations with an instrument and shall be pitched to drains as directed.

3.5 PLACEMENT and COMPACTION

A. Place backfill material in layers not more than eight (8) inched in loose depth, compacting each layer to required maximum density. Test each layer with spot checks as required.

B. Compaction: Compact each layer of backfill material to 95% after proof rolling subgrade.

C. Moisture Level: Apply water to surface of subgrade or layers of soil material if required. Remove and replace, or scarify and air dry, soil materials that are too wet to permit compaction to specified density.

D. Equipment: Use power-driven hand tampers for compacting materials adjacent to structures, over footings, and within the building area.

E. Reconditioning Compacted Areas: Where complete compacted areas are disturbed by subsequent construction operations or adverse weather, scarify the surface, re-shape, and

compact to the required density prior to further construction. Use hand tamping for recompaction over underground utilities.

3.6 COMPLETION:

A. On completion of the work as set out, the entire site shall be cleaned up and left free of all surplus earth, large stones, debris, tools and equipment, etc., and shall be left in a neat condition to the satisfaction of the Owner.

END OF SECTION 312300

SECTION 31 2301 – SITEWORK EXCAVATION, BACKFILLING and COMPACTING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Excavation.
2. Filling and backfilling.
3. Stabilization fabric.
4. Compaction Requirements

B. Related Sections:
1. Section 312213 - Rough Grading.
2. Section 312216 - Fine Grading.
3. Section 321100 - Base Courses.

1.2 EXAMINATION OF EXISTING GRADES

A. Examine grades and notify Architect of discrepancies, if any, before proceeding. Start of work implies acceptance of existing grades.

1.3 SUBMITTALS

A. Material Certificates (MC) including a certified laboratory sieve analysis (LA) bearing name and location of quarry. Sample (S) of material required (approximate volume 1 cubic foot) in a waterproof container permanently labeled to show source. Submit for the following materials:
1. Subbase Material: (MC), (LA) including moisture/density curves and (S)
2. Coarse Aggregate Fill: (MC) and (S)
3. Drainage Fill: (MC), (LA) and (S)

B. Manufacturers data (MD) and product sample (S) required for the following materials:
1. Stabilization Fabric: (MD) and (S)

1.4 SETTLEMENT

A. Repair to proper grade any slab, pavement, utility, structure or lawn adversely affected by settlement or heaving within two-years after the date of substantial completion at no expense to the owner.

1.5 TIMING

A. Install drainage system prior to or concurrent with road excavation to prevent/limit downstream flooding and erosion/sedimentation, to allow trench or general fill settlement, and to allow installation of subbase materials for construction.

1.6 GENERAL DEWATERING

A. The Contractor shall dewater all excavations when water has entered the excavation or at the direction of the Engineer. The Contractor shall provide all equipment necessary to complete the work.

1.7 USAGE OF ELECTRONIC DOCUMENTS FOR MACHINE CONTROL EQUIP.

A. The contractor may use any type of GPS machine control equipment and systems that results in achieving the proposed grading requirements. The contractor shall convert the electronic data provided by the Architect into the format required by their system.

B. No guarantee is made that the data systems used by the architect will be directly compatible with the systems used by the contractor.

C. Contractor understands that any manipulation of the electronic data provided by the architect shall be at their own risk. The electronic documents are provided as a convenience to the contractor in connection with the contractor's responsibilities and obligations relating to the project. The Owner and Architect shall not be construed to have performed any services in connection with the Contractor's use of the electronic files provided and shall have no liability for any aspect of their use, and has no contractual relationship in connection to their use, other than set forth herein.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Excavated Subsoil/Soil Fill: Approved, free of frost trash, stumps, trees, roots, sod, muck, etc. If suitable excavated material is insufficient to meet fill requirements, furnish additional material at contractor's expense, subject to approval by architect. Thoroughly break up and condition soils for layered placement and compaction in fill areas.

B. Drainage Fill: Crushed stone or washed crushed gravel. NYSDOT #1, Table 703-4. Clean, durable, of uniform quality throughout.

Standard ASTM Sieve Size	% Passing by Weght
1 inch (25 mm)	100
1/2 inch (12.5 mm)	90-100
1/4 inch (6.3 mm)	0-15

C. Stabilization Fabric: Polypropylene fiber Mirafi Celanese Fibers 500x, Amoco 2002, Carthage Mills FX-55 or approved equal.

D. Coarse Aggregate Fill: Clean run-of-bank gravel, 3 inch maximum size. Able to be compacted to compaction standards herein and free from organic and other deleterious materials. Where

any such fill is deeper than 24 inches, a coarser, well-graded run-of-bank material with particle sizes ranging up to 6 inches may be used in the lower layers.

Standard ASTM Sieve Size	% Passing by Weight
1/4 inch (6.3 mm)	30-100
No. 40 (.425 mm)	0-70
No. 200 (.075 mm)	0-10

E. Subbase Course Material: Crushed limestone conforming to NYSDOT Section 304-2.02 Subbase Course Type 2 well graded from coarse to fine to produce tightly bonded material when compacted, and free from soil, organic materials or other contamination.

Standard ASTM Sieve Size	% Passing by Weight
2 inch (50 mm)	100
1/4 inch (6.3 mm)	25-65
No. 40 (.425 mm)	5-40
No. 200 (.075 mm)	0-10

F. Topsoil: Refer to Section 311413 - Topsoil Stripping.

G. Oversized Subbase Course Material: Crushed limestone conforming to NYSDOT Section 304, Subbase Course, Type 1 Gradation with 100% passing a 3 inch sieve and well graded from coarse to fine to produce a rightly bonded material when compacted, and free from soil, organic material or other contaminants.

PART 3 EXECUTION

3.1 GENERAL

A. Banks and sides: Angle of recline or sheathing, shoring, and bracing as required for safety and conforming to all applicable laws, rules, regulations and codes.

B. Protection: Provide lights and barricades to properly protect persons and property. Assume full responsibility for all accidents during the course of work.

3.2 UNCLASSIFIED EXCAVATION

A. Includes all earth and miscellaneous material encountered. NYSDOT Item No. 203.02.

B. Cut to exact elevations and grade. If soil becomes saturated and loses its structure in an area, cease work in that area, after establishing positive surface drainage, until surface dries. When the area has stabilized, continue excavation. Transport to fill areas.

C. Excess excavated material and excavated material not suitable for use as general fill shall be removed from the site. Location and placement methods to be approved.

D. If stockpiled, pile in manner and location that will not impede the work of any other contractor, as directed by the Architect.

E. Excavation Classifications - The following classifications of excavations will be made when rock is encountered:

1. Earth excavation includes excavation of pavements and other obstructions visible on surface: underground structures, utilities, and other items indicated to be demolished and removed: together with earth and other materials that are not classified as rock excavation.
2. Rock excavation for trenches and pits includes removal & disposal of materials and obstructions encountered that cannot be excavated with a track-mounted power excavator, equivalent to Caterpillar Model No. 215c LC, and rated at not less than 115 HP flywheel power and 32,000-pound drawbar pull and equipped with a short stick and a 42 inch wide, short tip radius rock bucket rated at 0.81 cubic yard (heaped) capacity. Trenches in excess of 10 feet in width and pits in excess of 30 feet in either length or width are classified as open excavation.

   Rock excavation in open excavation includes removal and disposal of materials and obstructions encountered that cannot be dislodged and excavated with modern track mounted, heavy duty excavating equipment without drilling, blasting, or ripping. Rock excavation equipment is defined as caterpillar model No. 973 or equivalent track mounted loader, rated at not less than 210 HP flywheel power and developing minimum of 45,000-pound breakout force(measured in accordance with SAE J732).
   a. Typical of materials classified as rock are boulders 1/2 cubic yard or more in volume, solid rock, rock in ledges, and rock hard cementitious aggregate deposits.
   b. Intermittent drilling or ripping performed to increase production and not necessary to permit excavation of material encountered will be classified as earth excavation.

F. Do not perform rock excavation work until material to be excavated has been cross sectioned and classified by architect. Such excavation will be paid on basis of contract conditions relative to changes in work.

G. Rock payment lines are limited to the following:

1. Two feet outside of concrete work for which forms are required, except footings.
2. One foot outside perimeter of footings.
3. In pipe trenches, 6 inched below invert elevation of pipe and 2 feet wider than inside diameter of pipe, but not less than 3-foot minimum trench width.
4. Outside dimensions of concrete work where no forms are required.
5. Under slabs on grade, 6 inches below bottom of concrete slab.

3.3 UNCLASSIFIED EXCAVATION FOR STRUCTURES

A. Includes all earth and miscellaneous material encountered.

B. Excavate to depth as shown on drawings. Transport to fill areas or remove from site.

C. Excess depth: Backfill to proper elevations with Coarse Aggregate Fill at Contractor's expense.

D. Clearance sufficient for form work to be performed. Banks and sides - angle of recline or sheeting, shoring, and bracing as required for safety and conforming to all applicable laws, rules, regulations and codes. Remove before backfilling.

E. Remove loose material and debris from excavation so all footings rest on solid, undisturbed soil.

F. Remove water during excavation for foundations by ditching or pumping so that no water stands.

G. Insure that movement of equipment in the excavation does not cause working and pumping of the underlying soil which is not to be excavated. Should the equipment used cause excessive working, use other methods of excavation to maintain the design bearing capacity of the soil.

3.4 UNCLASSIFIED TRENCH EXCAVATION

A. Includes all earth and miscellaneous material encountered.

B. Excavate to exact depth and grade allowing clearance for pipe bedding as required.

C. Transport excess to fill areas or remove from the site.

D. Report wet or unstable trench bottom to Architect. Should Architect deem unsuitable, excavate to depth as directed and backfill with #1 crushed stone to trench bottom or as otherwise directed.

E. Do not excavate over 12 inches wider than outside diameter of pipe below spring line.

F. Pump as required to dewater excavation.

3.5 GENERAL FILLING REQUIREMENTS

A. Start after approval by Architect.

B. The subgrade to receive fill shall be firm and stable and should not exhibit mud, organic material, topsoil, standing water, debris or frozen material. Where applicable, subgrade should be proofrolled and remediated (if necessary). Approved subgrade should be immediately protected by placement of the planned fill.

C. Fill material shall be placed on a satisfactory and approved subgrade in a manner to minimize segregation. The fill should be placed in nearly horizontal lifts commencing at the lowest fill area elevation and proceeding with each lift upward and outward from the lower lift. The moisture content of the material shall be adjusted prior to application of compaction such that it is within 2 percent of the Optimum Moisture Content. The first lift shall be placed to a loose thickness not to exceed 8 inches (12 inches in mass fill areas). This first lift shall then be compacted to an in place density not to less than 95 percent of the maximum dry density, unless noted otherwise in this specification section.

D. No subsequent lift shall be placed until the underlying lift has been adequately compacted to a stable and uniform mass.

E. All subsequent lifts shall not exceed 8 inches (12 inches in mass fill areas) in compacted thickness, shall be moisture conditioned prior to compaction to within 2% of Optimum Moisture Content, and shall be compacted uniformly to an in-place field density field density of not less than 95% of Maximum Dry Density, unless noted otherwise in this specification section.

F. When the test results indicate that insufficient compaction has been obtained in any layer, the Contractor shall take such action as the engineer may direct to modify or alter the moisture content of the soil, to provide additional compaction or otherwise to increase the in-place soil density. If the contractor cannot obtain satisfactory compaction due to material properties, he shall remove the unsatisfactory material and replace with new material. Materials contaminated by mud, debris, organics and/or any other deleterious materials shall be removed and replaced with uncontaminated specified material.

G. Where a structural fill abuts an existing earthen embankment or slope, each lift shall be stepped or benched into the existing slope and each subsequent lift shall overlap appropriately (at least 12 inches) the underlying step or bench. Refer to plans for typical sections for benching of structural fill.

H. Each lift and the final grade shall be graded or sloped to promote positive drainage off the fill and out of the limit lines. The extent of backfill and fill, upon completion, shall conform to the lines and grades given on the plans.

3.6 TRENCH BACKFILL

A. Materials:
1. Under lawns and under planting beds: Approved excavated subsoil material.
2. Under pavements: Subbase material or coarse aggregate fill, refer to drawings.

B. Start after approval of Architect.

C. Place: Do not place on frozen ground. Place in 6 inch layers from cushion sand or filter material to subgrade. No boulders or stones over 4 inches. Tamp each 6 inch layer with mechanical tamper. Adjust fill to smooth subgrade.

D. Compaction: Uniformly spread each layer, moisten or dry as required, and then compact so unit dry weight of the compacted material meets or exceeds 95% of the maximum modified proctor density based on ASTM D1557 procedures.

3.7 FILL AT STRUCTURES

A. Materials:
1. Fill under pavement subgrade - coarse aggregate fill, oversized subbase course material or subbase course material.
2. Site structures backfill to subgrade where pavement occurs and no footing drains occur - coarse aggregate fill, subbase course material.
3. Demolition backfill to subgrade where no pavements occur - excavated subsoil material.
4. Demolition backfill to bottom of new construction where pavements occur-coarse aggregate fill or subbase course material.

B. Start after approval by Architect.

C. Place: Do not place on frozen ground. Place in 6-inch layers. Compact by approved mechanical equipment. Remove construction debris from excavation.

D. Compaction: Uniformly spread each layer, moisten or dry as required, and then compact so unit dry weight of the compacted material meets or exceeds 95% of the maximum modified proctor density based on ASTM D1557 procedures.

3.8 STABILIZATION FABRIC

A. Place Stabilization fabric in lengths and widths as large as possible. Lap seams per manufacturer's instructions or 6 inches minimum.

B. Cover using methods that will not damage or displace stabilization fabric.

C. Time operations to avoid trenching by any contractor in areas where stabilization fabric has been placed.

3.9 EXCESS EXCAVATED MATERIAL

A. All excess earth excavated material not required to meet on site fill requirements shall be promptly removed from the site and legally disposed of at contractor’s expense unless otherwise noted.

3.10 FIELD QUALITY CONTROL

A. Proofrolling - immediately prior to placing general base material for pavements or slabs on grade, proofroll subgrade with 10 ton minimum loaded smooth drum self- propelled vibratory roller. Undercut all areas which show pumping or weaving and replace with acceptable fill materials compacted to 95% of the maximum modified proctor density for paved areas and 85% of the maximum modified proctor density for lawn areas based on ASTM D1557 procedures.

B. Quality Control Testing during Construction:
1. Owner shall provide and pay for services of independent testing service to inspect and test final cut and fill subgrades, utility trenching and subbase course compaction prior to paving. Additional tests will be taken as required for full coverage of paved areas.
2. Provide timely notice to Architect to inspect and approve subgrades and fill layers before further construction work is performed.
3. Compaction: ASTM D1557, latest edition: 1 test initially and 1 test for each significant change in fill material.
4. Field density or in place density tests: Sand-cone method or other method approved by Architect in accordance with ASTM D1556, latest edition.
   a. Trench Backfill
      One test for each 20 linear feet of trench and for each two feet vertical depth of backfill. Architect may require additional tests to verify results of each test which fails

to meet results specified. If tests verify compaction below that specified, recompact and/or remove, replace and retest material at the same rate until specified compaction is achieved.

b. Paved Areas

At least 1 test for each 2,000 square feet of paved area. Architect may require additional tests to verify results of each test which fails to meet results specified. If tests verify compaction below that specified, remove, replace and retest material at the rate of one test per 1000 square feet of paved area until specified compaction is achieved.

3.11 DEWATERING

A. Details of the dewatering are left to the Contractor's discretion. The Contractor shall submit a dewatering plan of his proposed dewatering system to the Engineer for review. No excavation in the wet shall proceed until the Contractor receives notice the review of the dewatering plan has been completed by the Engineer.

B. The Contractor shall at all times during construction, provide and maintain proper and satisfactory means and devices for the removal of all water entering the excavations, and shall remove all water as fast as it may collect, in such manner as shall not interfere with the prosecution of the work or the proper placing of soil, granular material, sewers, concrete, masonry or other work.

C. Removal of water includes the construction and removal of cofferdams, sheeting and bracing, the excavation and maintenance of ditches and sluice-ways, furnishing and operation of pumps, well points, and furnishing all labor, material and equipment needed to maintain thorough drainage of the work in a satisfactory manner.

D. Water shall not be allowed to rise over or come in contact with any masonry, concrete or mortar and no water shall be allowed to flow over such work until such time as the Engineer may permit.

E. Water pumped or drained from excavations, or any sewers, drains, or water courses encountered in the work, shall be disposed of in a suitable manner without injury to adjacent property, the work under construction, to pavements, roads and drives and must complywith the requirements of the Stormwater Pollution Prevention Plan. No water, including sediments, shall be discharged to sanitary sewers, adjoining properties, water courses or wetlands. Any damage caused by improper handling of water shall be repaired by the Contractor at his own expense.

3.12 REMOVAL OF CONTAMINATED MATERIAL

A. Contractor shall be responsible for excavation and removal from the site of any soils or other materials which become contaminated by spills or dumping on the site of petroleum, solvent, chemical or other hazardous products and materials occurring during and as a result of the work of the contractor or any subcontractor, as observed and ordered by the Owner, Architect or others having jurisdiction. Contractor shall bear the cost of such work and any fees, fines, penalties or other costs levied against any parties by agencies having jurisdiction. Excavation, removal, storage and disposal of such contaminated materials shall be conducted in accordance with all applicable laws and regulations, including notification and other requirements of the

New York State Department of Environmental Conservation and other agencies having jurisdiction. Replacement of removed materials shall be consistent with original material, placement and compaction requirements, and related work.

END OF SECTION 312301

SECTION 31 2500 – EROSION, SEDIMENT and POLLUTION CONTROL

PART 1 – GENERAL

1.1 SUMMARY

A. The extent of the erosion, sediment and pollution control is shown on the drawings.

B. Erosion, sediment and pollution control includes, but is not limited to the following:

1. Erosion, sediment and pollution control measures including silt fence, stone check dams and silt fence dikes
2. Slope and swale protection
3. Construction entrances
4. Permanent and temporary seeding

C. SPEDES General Permit for Stormwater Discharge is required for sites with disturbance areas which are greater than 1 acre. Site disturbance area is greater than 1 acre. A SPEDES permit requires the following items to be on site:

1. Completed Notice of Intent posted on site.
2. SWPPP (Storm water Pollution Prevention Plan) Maintenance and inspection log book will be provided for the contractor.
3. Contract drawings and specifications which include the implementation of Stormwater Management devices.

D. Related sections:

1. Section 311413 - Topsoil.
2. Section 312213 - Rough Grading.
3. Section 312216 - Fine Grading.
4. Section 312301 - Sitework Excavation, Backfilling and Compacting.
5. Section 329200 - Lawns.
6. Section 329300 - Plantings.
7. Section 334000 - Storm Drainage.

1.2 QUALITY ASSURANCE

A. Conform to requirements of all regulatory authorities having jurisdiction including the site.

1.3 REFERENCES

A. Guidelines for Erosion Control in Urban Areas of New York State.

B. New York State Stormwater Management Design Manual.

C. New York State Department of Environmental Conservation's "SPEDES General Permit for Stormwater Discharges for Construction Activity Permit".

1.4 INSPECTIONS and MAINTENANCE CRITERIA

A. SITE ASSESSMENT INSPECTION (PRECONSTRUCTION INSPECTION)

1. The contractor shall have a qualified professional conduct an assessment of the site prior to the commencement of construction and certify in an inspection report that the appropriate erosion and sediment controls described on the plans (Erosion and Sediment Control Plan) and the DEC's technical standards for erosion and sediment controls as detailed in the "New York Standards and Specifications for Erosion and Sediment Control" have been adequately installed or implemented to ensure overall preparedness of the site for the commencement of construction. For the design of water quality and water quantity control (post-construction stormwater control practices), the Department's technical standards are detailed in the "New York State Stormwater Management Design Manual."

B. INSPECTION REQUIREMENTS

1. Following the commencement of construction, site inspections shall be conducted by the Owner at least every 7 calendar days. During each inspection the Owner shall record the following information:
   a. On a site map, indicate the extent of all disturbed areas and drainage pathways. Indicate site areas that are expected to undergo initial disturbance or significant site work within the next 14-day period;
   b. Indicate on a site map all areas of the site that have undergone temporary or permanent stabilization;
   c. Indicate all disturbed areas that have not undergone active sitework during the previous 14-day period;
   d. Inspect all sediment control practices and record the approximate degree of sediment accumulation as a percentage of sediment storage volume.
   e. Inspect all erosion and sediment control practices and record all maintenance requirements verifying the integrity of barrier or diversion systems (earthen berms or silt fencing) and containment systems (sediment basins and sediment traps). Identify any evidence of rill or gully erosion occurring on slopes and any loss of stabilizing vegetation or seeding/mulching. Document any excessive deposition of sediment or ponding water along barrier or diversion systems. Record the depth of sediment within containment structures, any erosion near outlet and overflow structures, and verify the ability of rock filters (check dams, riser pipes) to pass water.
   f. All deficiencies that are identified with the implementation of the SWPPP.

2. The operator (contractor) shall maintain a record of all inspection reports in a site log book. The site log book shall be maintained on site and be made available to the permitting authority upon request. The operator shall post at the site, in a publicly accessible location, a summary of the site inspection activities on a monthly basis.

C. POST CONSTRUCTION INSPECTION

1. Prior to the inspector's submittal of the Notice of Termination or the end of permit term, the operator shall have the qualified professional perform a final site inspection. The qualified professional shall certify that the site has undergone final stabilization.

1.5 SUBMITTALS

A. Material Certificates (MC) and Sample (S) of material required for the following materials:
   1. No. 4 Stone: (MC), (LA) and (S) provide 5 pound sample
   2. Drainage Fill (#1 Crushed Stone): (See Section 31 2300, Submittals)
   3. Subbase Material: (See Section 31 2300, Submittals)
   4. Select Granular Fill: (See Section 31 2300, Submittals)

B. Shop Drawing, Manufacturers' data (MD) and product sample (S) for the following materials as noted below:
   1. Stabilization Fabric for Construction Access Road: (MD)
   2. Silt Fence: (MD)
   3. Jute Mesh: (MD)
   4. Soil Separation Fabric: (MD)

C. Contractor shall submit the name of the qualified professional responsible for conducting the on-site inspections outlined in Section 1.6, Inspections and Maintenance.

D. Certifications (SPEDES Requirement): The contractor(s) responsible for project sitework shall submit a signed SWPPP certification page.

E. Construction Sequence Scheduling (SPEDES Requirement): The contractor is responsible for the completion of Schedule.

F. Maintenance Plan (SPEDES Requirement): The owner/contractor shall submit a Maintenance plan with the following information: (note that some items may not be applicable to this project)
   1. Name, address and phone number of responsible parties for maintenance;
   2. Description of annual maintenance tasks;
   3. Description of funding source;
   4. Minimum vegetative cover requirements;
   5. Access and safety issues;
   6 Testing and disposal of sediments that will likely be necessary;
   7. Evidence of acquisition of all applicable local and non local permits;
   8. Evidence of acquisition of all necessary legal agreements (e.g., easements, covenants, land trusts).

1.6 NOTICE OF INTENT (SPEDES Requirement)

A. Notice of Intent (NOI): The contractor shall post a New York State Department of Environmental Conservation completed Notice of Intent (NOI). Coverage under the general permit will begin 5 business days after the receipt by the Department. The contractor shall post this permit at the site.

B. Notice of Intent will be filed with the NYSDEC by the owner. SPEDES permits have been obtained for the project. Copies of the permit are available to the contractor for posting.

1.7 INSPECTIONS AND MAINTENANCE (SPEDES Requirement)

The contractor shall post the Stormwater Pollution Prevention Plan (SWPPP) and Construction Sequencing Schedule on site and conduct the following activities:

A. Inspections: The operator shall contract a qualified professional to conduct an assessment of the site prior to the commencement of construction and certify in an inspection report that the appropriate erosion and sediment controls described in the SWPPP have been adequately installed or implemented to ensure overall preparedness of the site for the commencement of construction. Following the commencement of construction, facilities shall be inspected within 24 hours of each rain event where rainfall exceeds 0.5 inches of rain or greater whichever comes first or as otherwise specified; proceed immediately to repair any failures, washouts, erosion, overflows or other conditions occurring due to rain events to minimize downstream disturbance and sedimentation.

B. Site Log/Certification: The Owner must maintain a record of all inspection reports in a site log book. The site log book must be maintained on site and made available to the permitting authority upon request. Prior to starting construction, the operator (contractor) must certify in the site log book that the SWPPP was prepared in accordance with the requirements in the permit and that it meets all federal, state and local erosion and sediment control requirements.

C. Stabilization: The operator must initiate stabilization measures as soon as predictable on portions of the site where construction activities have temporarily or permanently ceased.

D. Maintenance: Sediment must be removed from sediment traps or ponds whenever their capacity has been reduced by 50 percent of the design capacity.

1.8 CERTIFICATIONS

A. Refer to Contractor Certification Form contained in the Storm Water Pollution Protection Plan for the project.

1.9 SUPPLEMENTAL DOCUMENTS

A. Storm Water Pollution Prevention Plan for the project will be provided.

B. Stormwater Management System Report for the proposed facilities has been prepared jointly by Keplinger Freeman Associates and RZ Engineering. This report outlines the engineering and design calculation for the increased runoff and stormwater detention facilities required. The stormwater summary is included in the SWPPP Maintenance and Inspection Log Book. Copies of the full stormwater management report are available for a nominal charge.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Silt fence:
1. Fabric - Mirafi 100X or equal.
2. Support - 14-1/2 gauge galvanized woven wire with maximum 6 inch mesh opening.
3. Stakes: rough sawn hardwood, pointed on one end. Minimum cross sectional area.
4. 3 square inches.

B. Construction Access Road (Mudrack):
   1. Stabilization Fabric - Refer to Section 31 23 00 - Excavation, Backfilling and Compacting.
   2. Stone - No. 4 stone or crushed concrete.

C. No. 4 Stone:

Standard ASTM Sieve Size	Percent Passing by Weight
4" (100 mm)	100
3" (75 mm)	90-100
2" (50 mm)	0-15
Passing No. 50	5-10
Passing No. 100	2-5

D. Jute Mesh:
   1. Material - Mutual Industries or approved equal.
   2. Woven jute (undyed and sun bleached)

E. Seeding: Refer to Section 329200.

PART 3 – EXECUTION

3.1 GENERAL

A. The contractor is responsible for controlling sediment from leaving the project site. A Storm Water Pollution Prevention Plan, erosion control plan and erosion control details have been prepared for this project and shall be followed during construction.

B. Pollutants such as fuels, lubricants, bitumens, raw sewage, chlorine and other harmful materials shall be handled and disposed of by approved methods and shall not be discharged into rivers, streams, impoundments, wetlands, or into natural or man-made channels leading thereto. Wash water or waste from concrete mixing or curing operations shall not be allowed to enter live streams.

C. In case of repeated failures on the part of the Contractor to control pollution/erosion, the right shall be reserved by the Owner's representative to employ outside assistance to provide the necessary corrective measures. Such incurred costs, plus related engineering costs, shall be charged to the Contractor and appropriate deductions made to the Contractor's progress payment.

D. Any fines or fees incurred by the Contractor for failure to implement and maintain erosion control devices shall be paid for by the Contractor.

3.2 INSTALLATION OF EROSION CONTROL FACILITIES

A. Simultaneous with removal work and earthwork, install temporary erosion and sediment control facilities shown on drawings and all other facilities required initially and from time to time throughout the work as determined by the Contractor in accordance with "Guidelines for Erosion Control in Urban Areas of New York State" to prevent and reduce erosion and sedimentation affecting existing on-site improvements to remain or adjoining property or roadways.

B. To control erosion and sedimentation, initial construction operations shall include, as a minimum:
   1. Silt fencing or straw bale dikes along all perimeters of work as may be shown on the drawings and other perimeters which could produce erosion and sedimentation affecting adjoining properties, roadways, water bodies, and other improvements and facilities.
   2. Silt fencing or straw bale dikes around stockpiles of topsoil and other excavated soils.
   3. Installation of Stabilized Construction Entrance (Mud Rack)

C. Temporary sediment traps installed by the Contractor shall be sized to provide, as a minimum, 1800 cubic feet of storage capacity for each acre of area being drained.

D. Sediment shall be removed from temporary sediment basin and sediment swales and traps and along silt fences and straw bale dikes regularly to maintain stability, flow and storage capacity.

E. Throughout all building and sitework, Contractor shall be responsible for erosion and sediment control and for planning, scheduling and phasing work to prevent erosion or sedimentation. Drainage areas should be seeded and stabilized as soon as possible as other work is completed. Temporary seeding with Annual Rye may be considered if final seeding is delayed.

F. All facilities shall be removed as the contributory drainage areas are stabilized and as construction is to be completed. Restore all affected site areas and surfaces.

3.3 SLOPE PROTECTION

A. Protect all disturbed areas during and after earthwork operations as required to prevent gullying, mass wasting and erosion. Repair all eroded areas at no expense to the Owner.

3.4 SILT FENCE

A. Construct as detailed truly vertical for entire length.

B. Install where indicated on the drawings, as required and as directed by the landscape architect.

3.5 CONSTRUCTION ENTRANCE

A. Install where indicated on the drawings and/or as required. NYSDOT Item No. 209.22.

B. Construct as detailed from stone or crushed concrete from site demolition. Maintain at all times and renew when no longer effective. Remove when no longer being used.

C. The pavement adjacent to the entrance shall be swept daily to remove excess mud, dirt or rock tracked from the site.

D. Dump trucks hauling material from the site shall be covered with a tarpaulin.

END OF SECTION 312500

SECTION 32 1100 – BASE COURSES

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes:
1. Subgrade preparation
2. Stabilization fabric
3. Subbase course
4. Coarse aggregate fill

B. Related Sections:
1. Section 312213 - Rough Grading
2. Section 312216 - Fine Grading
3. Section 312301 - Sitework Excavation, Backfilling and Compacting

1.2 SUBMITTALS

A. Material Certificates (MC) including a certified laboratory sieve analysis (LA) bearing name and location of quarry. Sample (S) of material required (approximate volume 1 cubic foot) in a waterproof container permanently labeled to show source. Requirements for the following materials:
1. Subbase Material: (See Section 312301 - Sitework Excavation, Backfilling and Compacting, Submittals)
2. Coarse Aggregate Fill: (See Section 312301 - Sitework Excavation, Backfilling and Compacting, Submittals)
3. Drainage Fill: (See Section 312301 - Sitework Excavation, Backfilling and Compacting, Submittals)

B. Manufacturers data (MD) and product sample (S) required for the following materials:
1. Stabilization Fabric: (Refer to Section 312301 - Sitework Excavation, Backfilling and Compacting, Submittals)

PART 2 – PRODUCTS

2.1 BASE COURSES

A. Subbase Course Material: Refer to Section 312301 - Sitework Excavation, Backfilling and Compacting.

B. Coarse Aggregate Fill, Backfill and Foundation Material: Refer to Section 312301 - Sitework Excavation, Backfilling and Compacting.

C. Excavated Subsoil: Refer to Section 312301 - Sitework Excavation, Backfilling and Compacting.

2.2 STABILIZATION FABRICS

A. Stabilization Fabric: Refer to Section 312301 - Sitework Excavation, Backfilling and Compacting.

PART 3 – EXECUTION

3.1 SUBGRADE PREPARATION

A. Grade to smooth draining grades parallel to finish grade and to proper subgrade elevations. No humps or hollows. Proofroll immediately prior to placing general base material for pavements or slabs on grade, proofroll subgrade with 7 ton minimum loaded smooth drum self-propelled vibratory roller. Undercut all areas which show pumping or weaving and replace with acceptable fill materials compacted to 95 percent of the maximum modified proctor density based on ASTM D1557 procedures. Avoid overworking subgrade and running equipment on subgrade unnecessarily. If an area becomes saturated and loses its structure, discontinue working, facilitate surface and subsurface drainage and contact Architect for observation prior to placing pavement base or subbase courses. Refer to Section 312301 for additional compaction requirements.

3. 2 STABILIZATION FABRIC

A. Place paving stabilization fabric in lengths and widths as large as possible. Lap seams per manufacturer's instructions or 6 inches minimum.

B. Cover using methods that will not damage or displace stabilization fabric.

C. Time operations to avoid trenching by any contractor in areas where stabilization fabric has been placed.

3.3 COARSE AGGREGATE FILL

A. Place on dry subgrade on maximum 6 inch lifts. Compact each lift to standard noted under Section 3.1 above.

B. Remove all subgrade material churned or mixed with subbase courses and replace as necessary at Contractor's expense.

3.4 SUBBASE COURSE

A. Place on dry subgrade or subbase course as detailed in maximum 6 inch lifts. Compact each lift to standard noted under Section 3.1 above.

B. Remove all subgrade or subbase course material churned or mixed with base course and replace as necessary at Contractor's expense.

END OF SECTION 32 1100

SECTION 32 1216 - ASPHALT PAVEMENT

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Place and compact asphalt base course, binder and topping.
2. Asphalt Pavement
3. Asphalt Price Index

B. Related Sections:
1. Section 32 1100 - Base Courses.
2. Section 32 1640 - Granite Curb

1.2 SUBMITTALS

A. Material Certificate (MC): Each asphaltic concrete course shall comply with an applicable NYSDOT Job Mix Formula showing NYSDOT signature approval for prior use in the region within the past two years. Submit for the following:
1. Asphalt Top Course - NYSDOT Type 7 – Item No. 402.098303: (MC)
2. Asphalt Binder Course - NYSDOT Type 3 – Item No. 402.198903: (MC)
3. Asphalt Base Course - NYSDOT Type 1 – Item No. 402.258903: (MC)

PART 2 - PRODUCTS

2.1 MATERIALS

A. Asphalt pavement: Plant mix asphalt conforming to NYSDOT Standard Specifications Section 401, Material Requirements, 1990 edition. Paving course as shown on drawings:
1. Asphalt Top Course: Type 7 asphalt concrete conforming to composition requirements of Table 401-1. Installation temperature 280° - 325°F, compacted thickness - per detail.
2. Asphalt Binder Course: Type 3 asphalt concrete conforming to composition requirements of Table 401-1. Installation temperature 280° - 325°F, compacted thickness - per detail
3. Asphalt Base Course: Type 1 asphalt concrete conforming to composition requirements of Table 401-1. Installation temperature 280° - 325°F, compacted thickness - 3''.

B. Above mixes shall contain only crushed limestone coarse aggregates.

C. Tack Coat: NYSDOT Asphalt Emulsion 702-90, prepared, heated, and uniformly sprayed at rate of 0.05 to 0.10 gallons per square yard in accordance with NYSDOT requirements.

D. Joint Sealer: NYSDOT Liquid Asphalt 702-11 or similar.

E. Comply with all requirements of NYSDOT Section 401.

PART 3 - EXECUTION

3.1 ASPHALT PAVEMENT

A. Place and roll each course with approved 10-ton roller until no movement or weaving occur. Correct all humps and depressions to provide smooth surface at correct profile and grade.

B. Install no asphaltic work when surface is wet or temperature below 50□F.

C. Form or cut all pavement edges to clean, sharp, lines of dimensions, alignment, or radius indicated.

D. Joints: Saw cut and shear step joints along existing paving to remain. All joints between new and existing paving or in new paving where work has been discontinued overnight shall be cap sealed.

E. Compaction: Thoroughly and uniformly compact each asphalt course with powered rollers of not less than 10 tons with working watering systems, and with power tampers in and along areas not accessible to the roller. Rollers should move at uniform speeds and not cause undue displacement, cracking or shoving or other movement. Exercise care not to displace the line and grade of edges or any joints. Joints shall be tightly bonded and match surface smoothness and compaction of other sections of the pavement.

F. Surface Tolerance: Base and binder course surface shall be a true plane consistent with required top course surface grades.

Top course surface shall not vary more than 1/8" in 10' measured in any direction, and shall be a true plane consistent with required surface grades. Paving crown lines shall be true with roadway center lines. Finished top course surface shall be flood checked by the Contractor when requested by the Architect in any areas where ponding or inadequate drainage appears evident.

Portions of completed pavement which are defective in finish, compaction, elevation or drainage shall be cut out, removed and replaced. No waviness or irregularities; no ridges; no open or inadequately bonded seams; no abrupt grade changes at catch basins or other structures, center line or other, or elsewhere.

3.2 PAVEMENT GUARANTEE

A. Two-Year Guarantee against Defects in Paving: Contractor guarantees that any areas of settlement, heaving or other movement, cracks, spalling, raveling, surface pitting, flaking or other deterioration, or any other defects which occur in any new or replacement paving, as determined by the Architect and Owner, occurring within two (2) years after the date of substantial Completion, shall be cut out, removed, replaced and corrected to the satisfaction of the Architect and Owner, at the contractor’s expense, in accordance with provisions of the contract dealing with correction of work.

END OF SECTION 32 1216

SECTION 32 1313 – SITE CONCRETE

PART 1 – GENERAL

1.1 SUMMARY

A. Work Includes:
1. Concrete Walk Pavement.
2. Reinforcing.
3. Joints.
4. Finishing.
5. Concrete Curb.

B. Related sections:
1. Section 321100 - Base Courses
2. Section 321314 – Textured Concrete Surfacing

1.2 SUBMITTALS

A. Submit Manufacturer's Data and concrete mix designs for the following:
1. 3500/4000 psi concrete mix design
2. Expansion Joint (MD)
3. Anti Spalling Compound (MD)
4. Sealant (MD)
5. Reinforcement (MD)

PART 2 – PRODUCTS

2.1 MATERIALS

A. Concrete: ready-mix air entrained normal weight concrete mixed in accordance with ACI 304; all pavement concrete fibrous reinforced and installed in two (2) courses; provide the following concrete mix designs:

	Subsurface Concrete, etc.	Paving Course
Compressive Strength (28 Days)	3500 psi	4000 psi
Water/Cement ratio (max.)	0.45 by weight	0.45 by weight
Aggregate Size (Max.)	1 inch	1 inch
Air Entrainment	5%-7%	5%-7%
Slump	4 inches +/- 1inch	4 inches max.
Min. Bags Cement per CY	Six (6)	Six (6)

Comply with the following:
1. Portland cement: ASTM C150, Type 1.
2. Normal weight aggregates: ASTM C33 and as specified.
3. Fine aggregate: Clean, sharp, natural, sand, free from loam, clay and other deleterious substances.

4. Coarse aggregate: Crushed stone (no gravel) processed from hard, natural rock or stone, clean, uncoated, containing no soil or other foreign matter.
5. Water: potable
6. Air entraining admixture: ASTM C260, and water-reducing admixture ASTM C94, Type A. Use in strict compliance with manufacturers' recommendations. Sealtight AEA, W R Meadows, Inc. or approved equal.
7. Ready-mix concrete, comply with ASTM C94. Additional water not permitted to batch for material with insufficient slump. During hot weather or under other conditions contributing to rapid setting of concrete, shorter mixing time than specified in ASTM C94 may be required. When air temperature is between 85F and 90F, reduce mixing/delivery time from 90 minutes to 75 minutes. Cold weather curing protection per ACI recommendations; Provide concrete design mix reports/certificates from supplier, including verification that identical mixes have previously tested at required minimum compressive strength at 28 days. Once approved, all concrete shall be identically mixed by the same supplier; no variations in materials, mix, color permitted.
8. Expansion joint material: 1/2 inch thick premolded asphalt impregnated joint filler: compatible gun grade one or two component sealer, gray color.
9. Sheet material for curing concrete: ASTM C171.
10. Surface sealant: Kure-N-Seal by Sonneborn or equal.
11. Welded wire mesh/fabric: 6 inch x 6 inch welded 6 gauge steel wire fabric ASTM A185, in flat sheets.
12. Reinforcing steel: ASTM A615 deformed per ASTM A305, grade 40 for bar sizes No.4 and smaller; grade 60 for larger bar sizes.
13. Sleeves and other inserts: As may be shown on drawings.

B. Subsurface Concrete: to be used for Footings, Beddings, Encasements, Cradles, or supports.

PART 3 – EXECUTION

3.1 EXECUTION

A. Preparation for concrete walk and curbs:
1. Grade smooth draining grades parallel to finish grade and to proper subgrade elevations. No humps or hollows. Roll with approved 10 ton roller until no movement occurs. Do above operations concurrently. Subgrade shall be smooth, hard and dry.
2. Do not deliver concrete until immediately prior to intended time of installation.
3. Comply fully with the Latest American Concrete Institute Manual of Concrete Practice in mixing, delivery, forming, installation, curing and other aspects of concrete work.

B. Concrete Walk Pavement:
1. Location and Layout: All lines, limits and elevations of paving, curbs and related work accurately located and laid out and staked or otherwise marked and checked and verified prior to installation.
2. Subgrade and base course: check previously established subgrade for any disturbance. Install and compact base course aggregate. Compact to required 95 percent maximum density.
3. Forms: All forms fabricated of wood or steel to full required depth and to facilitate placing of reinforcing bars or mesh as required to support weight of concrete during and after pouring, and to produce neat, true corners and straight and radius edges as required.

4. Placing of concrete: Concrete not placed until reinforcement, expansion joint filler and any sleeves and other inserts are placed and secured and forms are cleaned and oiled. When conditions of excessive drying occur, wet aggregate base course immediately prior to installation of concrete. Place concrete in forms, vibrating to work concrete into all corners and to eliminate honeycombing. Exercise care against displacement of forms. If free water appears on top of concrete, reduce quantity of water; take up immediately with cloth or mop, no application of sand or concrete permitted.
5. Joints: provide expansion joints wherever paving adjoins building walls or other structures or rigid paving, off building corners, at changes in direction, at approximately 30 feet o.c. in runs of walk paving, and as otherwise shown on the drawings.
6. Concrete finishing: surface of concrete brought to a smooth level finish, free of any swirls or float marks by means of a wood float. Provide steel trowel finish on top and face of integral curb and where otherwise required. Provide tooled edge "picture frame" bands with stiff broom finish where indicated. Brooming to be accurate and consistent in alignment and depth. Finish concrete pavement edges tooled round same as joints. Score joints and bands tooled before and again after brooming while concrete is still green.
7. Expansion joints: neatly cut out expansion joint material to 1/2 inch depth below surface and install consistent 1/4 inch depth of sealer system in accordance with manufacturer's recommendations.
8. Protection and curing: Immediately after finishing, surfaces to be protected with waterproof paper covering from traffic and elements for at least three (3) days before opening to traffic. Take necessary precautions to prevent plastic shrinkage cracks during curing. Apply sealant in accordance with manufacturers' recommendations. Protect all concrete work from vandalism. Concrete work which has been vandalized shall be removed and replaced at contractor's expense.
9. Backfill: all concrete work backfilled in accordance with adjoining work requirements. Backfilling shall proceed immediately after removal of the forms, and shall be conducted with care assuring that concrete damage and settlement do not occur. Do not mar surfaces with backfill material or equipment.

3.2 QUALITY CONTROL TESTING DURING CONSTRUCTION

A. The owner shall employ a testing laboratory to take samples and perform tests and to submit test reports. The contractor shall notify the testing agency and the owner's representative for testing in a timely manner.

B. Quality Control testing in field shall be performed by ACI certified Grade I Field Technician. Concrete shall not be placed without a technician onsite.

C. Sampling and testing for quality control during placement of concrete may include the following:
1. Sampling Fresh Concrete: ASTM C 172, except modified for slump to comply with ASTM C 94.
2. Slump: ASTM C 143; one test at point of discharge for each day's placement of each type of concrete and each time a set of compression test specimens are made; additional tests when concrete consistency seems to have changed and each time a set of compression test specimens are made.
3. Air Content: ASTM C 173, volumetric method for lightweight or normal weight concrete; ASTM C 231 pressure method for normal weight concrete; one for each day's placement of

each type of air-entrained concrete and each time a set of compression test specimens are made.

4. Concrete Temperature: Test hourly when air temperature is 40 degrees F. and below and when 80 degrees and above; and each time a set of compression test specimens are made.
5. Compression Test Specimens: ASTM C 31; one set of 4 standard cylinders for each compressive strength test, unless otherwise directed. Mold and store cylinders for laboratory cured test specimens except when field-cure test specimens are required.
6. Compressive Strength Tests: ASTM C 39; one set for each day's placement under 25 cubic yards plus additional sets for each 50 cubic yards over and above the first 25 cubic yards of each concrete placed in any one day. One specimen tested at 7 days, two specimens tested at 28 days, and one specimen reserved for later testing if required.
7. When frequency of testing will provide less than 5 strength tests for a given class of concrete, conduct testing from at least 5 randomly selected batches or from each batch if fewer than 5 are used.
8. When total quantity of a given class of concrete is less than 50 cubic yards, strength test may be waived by Architect if, in his judgment, adequate evidence of satisfactory strength is provided.
9. Strength level of concrete will be considered satisfactory if averages of set of three consecutive strength test results equal or exceed specified compressive strength, and no individual strength test results falls below specified compressive strength by more than 500 psi.
10. Water cement ratio in slabs above driveways shall not exceed 0.40 because drying time is critical in the timing of construction operations.

D. Test results shall be reported in writing to Architect, Owner, Landscape Architect, Contractor and concrete supplier within 24 hours after tests. Reports of compressive strength tests shall contain the project identification name and number, date of concrete placement, name of concrete testing service, concrete type, location of concrete batch in structure, design compressive strength at 28 days, concrete mix proportions and materials, compressive breaking strength and type of break for both 7-day and 24-day tests.

E. Nondestructive testing: impact hammer, sonoscope or other non-destructive device may be permitted but shall not be used as the sole basis for acceptance or rejection.

F. Additional test: the testing service will make additional tests of in-place concrete when test results indicate specified concrete strengths and other characteristics have not been attained in the structure, as directed by the Architect. Testing service may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42, or by other methods as directed. The sitework Contractor shall pay for such tests when unacceptable concrete is verified.

3.3 PAVEMENT GUARANTEE

A. Two-Year Guarantee against Defects in Paving: Contractor guarantees that any areas of settlement, heaving or other movement, cracks, spalling, raveling, surface pitting, flaking or other deterioration, or any other defects which occur in any new or replacement paving, as determined by the Architect and Owner, occurring within two (2) years after the date of substantial Completion, shall be cut out, removed, replaced and corrected to the satisfaction of the Architect and Owner, at the contractor's expense, in accordance with provisions of the contract dealing with correction of work.

END OF SECTION 32 1313

SECTION 32 1723 – PAVEMENT MARKINGS

PART 1 GENERAL

1.1 SUMMARY

A. Section includes:

1. Pavement line paint.
2. Pavement markings and symbols

B. Related sections:

1. Section 32 1216

C. Refer to section 02530 for track and field event surface markings.

1.2 REFERENCES

A. NYSDOT standard specifications.

1.3 SUBMITTALS

A. Submit manufacturers' data (MD) and color samples (S) for the following:

1. Paint Manufacturer (MD)
2. Color sample (S), one per color.

PART 2 PRODUCTS

2.1 MATERIALS

A. Pavement lines paint:

1. Lead-free yellow, blue, red, green or white marking paint complying with NYSDOT Section 640-2, selected from NYSDOT "Approved List." Refer to drawings and details for locations of each color.

PART 3 EXECUTION

3.1 PAVEMENT LINES PAINTING

A. Allow pavement/pavement sealer to properly cure to manufacturers recommendations prior to stripping. Apply one coat by brush or zone marking equipment to the location, limits, and colors indicated on the drawings.

B. Comply with NYSDOT wet thickness requirements.

END OF SECTION 32 1723

SECTION 32 3113 – CHAIN LINK FENCING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:
1. Chain Link Fence.
2. Cantilever Slide Gate

B. Related sections:
1. Section 31 2216 - Fine Grading.
2. Section 31 2300 - Excavating, Backfilling, and Compacting.
3. Section 32 1313 - Site Concrete

1.2 QUALITY ASSURANCE

A. Conform with requirements of the Chain Link Fence Manufacturers Institute Product Manual CLF-2445.

1.3 SUBMITTALS

A. Shop Drawings (SD): Prior to installation, submit manufacturing and dimensioned field erection drawings of all items covered under this section.

B. Product Data (PD): Submit manufacturers' technical data for fencing, fabric, posts and gates.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Concrete: chain link fence post footings: ready-mix 5%-7% air-entrained (adjust to field conditions) normal weight concrete, 3000 psi minimum 28 day compressive strength. Slump 4" maximum, cement 6 bags minimum per cubic yard, .57 W/C ratio. Comply with the following:
1. Portland cement: ASTM C150, Type 1.
2. Normal weight aggregates: ASTM C33 and as specified.
3. Fine aggregate: Clean, sharp, natural, sand, free from loam, clay and other deleterious substances.
4. Coarse aggregate: Crushed stone (no gravel) processed from hard, natural rock or stone, clean, uncoated, containing no soil or other foreign matter.
5. Water: potable
6. Air -entraining admixture: ASTM C260, and water-reducing admixture ASTM C94, Type A. Use in strict compliance with manufacturers recommendations.

B. Chain Link Fence:
1. Galvanized Steel Chain Link Fabric: 9 gauge steel wire woven into chain link fabric with mesh size as noted below with an aluminized, protective coating per ASTM A491.

Selvages knuckled top and bottom. Single width up to and including 12' high. All fabric free of barbs, icicles, or other projections resulting from galvanizing.

a. Standard fence size: 2" mesh, 9 gauge.

2. Posts, Rails, Bracing, and Gate Frames: SS-40 steel pipe, Hot-dip galvanized (0.9 ounce minimum zinc per square foot), chromated by total immersion, and clear polyurethane acrylic coated, all complying with ASTM A 569. Manufacturer; Subject to compliance with requirements, manufacturers providing products which may be incorporated in the work include the following or an approved equal: Bethlehem Steel, U.S. Steel and Page Aluminized Steel Corporation
3. Fittings: Hot-dipped galvanized, all by same manufacturer and intended and appropriate for all fencing and gate components. (gauge galvanized steel wire only for fabric ties; no aluminum wire used for ties.
4. Pull Post: provide pull post per industry standards in length and run of fence.
5. Brace rails: provide brace rail or truss rod and turnbuckle at all pull and end posts.
6. Tension Wire: 7 gauge galvanized steel marcelled wire.
7. Swing Gates: frames welded per AWS standards or fabricated with corner fittings of heavy malleable iron or pressed steel securely riveted to frame to form rigid one piece unit; paint welds with aluminum based or zinc based paint; fabric installed with tension bars; provide brace rails or 3/8" truss rods per industry standards; hinges with ball-and-socket design of adequate strength to support gate without gate twisting or turning under use with full 180 degree swing from closed to open position; all gates with latches and provision for padlock; provide center plunger rod; catch and semi-automatic outer catches for double-leaf gates. Provide owner with one heavy-duty padlock with master key system for each gate.
8. Cantilever Slide Gate frame: Fabricate chain link cantilever slide gates in accordance with ASTM F 1184, Type II, Class 2, using 2 inch square aluminum members, ASTM B221, alloy and temper 6063-T6, weighing 0.94 lb/ft. Weld members together forming rigid one-piece frame integral with top track. Provide 10 truck assemblies for each gate leaf.

Gate Leaf Size	**Cantilever Support (Overhang)**
18 ft (5486mm) to 24 ft (7315mm)	12’-0” (3658mm)

a. Gate Frame Finish: Natural Aluminum
b. Chain Link Filler Finish: Aluminized - ASTM A 491
c. Bracing: provide diagonal adjustable length truss rods of 3/8" galvanized steel, in each panel of gate frame.
d. Top track/rail: Enclosed combination one-piece track and rail, aluminum extrusion with weight of 3.72 lb/ft. Track to withstand reaction load of 2000#.
e. Truck Assembly: Swivel type, zinc die cast, with 4 sealed lubricant ball bearing rollers, 2 inches in diameter by 9/16" in width, and 2 side rolling wheels to ensure truck alignment in track. Mount trucks on post brackets with 7/8" diameter ball bolts with ½" shank. Truck assembly to withstand same reaction load as track, 2000#.
f. Gate Hangars, latches, brackets, guide assemblies, and stops: Malleable iron or steel, galvanized after fabrication. Provide positive latch with provisions for padlocking.
g. Bottom guide wheel assemblies: Each assembly shall consist of two, 3" diameter rubber wheels, straddling bottom horizontal gate rail, allowing adjustment to maintain gate frame plumb and in proper alignment. Attach one assembly to each guide post.
h. Gate posts: galvanized steel 4’’ OD schedule 40 post, ASTM F 1083, weighing 9.1 lb/ft. Provide 1 latch post and 2 support posts for single slide gates. Finish to match fence.

PART 3 - EXECUTION

3.1 CHAIN LINK FENCING

A. Locate accurately. Install chain link fence in accordance with ASTM F567 and manufacturers instructions.

B. Concrete Footings: 10" min. diameter; or as otherwise shown on drawings; 4'-0" min. depth at all end, corner, gate posts; 3'-6" min. depth at line posts.

C. Posts: provide concrete footings in full compliance with manufacturer's recommendations and as shown on drawings. Level, plumb and secure and support all posts in position while concrete sets.

D. Rails: Top Rail Chain Link Fencing Only: Pass top rail thru intermediate post tops to form a continuous brace within each section of fence. Fasten securely to terminal posts. Securely join all other rails to posts.

E. Fence Bracing: At all ends, corners, and gate posts, provide bracing from midway between top rail and ground to first adjacent line post. Secure braces to posts and truss from line post back to terminal post with rods.

F. Fabric: Attach to line posts and gate frames 12" o.c., and to rails 24" o.c.; pull tight without bending posts. Attach fabric to end and corner posts, and canopy framing with tension bars, tension bands, and carriage bolts.

3.2 CANTILEVER SLIDE GATE

A. Verify areas to receive fencing are completed to finish grades and elevations and of sufficient space to receive gate in open position, (gate and overhang).

B. Install gate posts in accordance with manufacturer's recommendations.

C. Concrete set gate posts: Core holes in firm, undisturbed or compacted soil. Holes shall have diameter 4 times greater than outside dimension of post, and depths approximately 6 inches deeper than post bottom. Excavate deeper as required for adequate support in soft and loose soils, and for posts with heavy lateral loads. Set post bottom 36 inches below surface when in firm, undisturbed soil. Place concrete around post in a continuous pour, tamp for consolidation. Trowel finish around post and slope to direct water away from post. Check each post for vertical and top alignment, and maintain in position during placement and finishing operations.

D. Install gates plumb, level and secure for full opening without interference. Attach hardware by means which will prevent unauthorized removal. Attach hardware for smooth operation.

END OF SECTION 32 3113

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SECTION 32 3123 - EXTRUDED POLYVINYL CHLORIDE (PVC) FENCING

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. PVC fencing and accessories.

1.2 RELATED SECTIONS

A. Section 321313 - Site Concrete

1.3 SUBMITTALS:

A. Shop Drawings: Layout of fence and gates with dimensions, details and finishes of component accessories and post foundations.

B. Product Data: Manufacturer's catalogue cuts indicating material compliance and specified options.

C. Samples: Color selections for PVC, samples of materials.

1.4 SPECIAL WARRANTY

A. Provide manufacturer's Lifetime Limited Warranty.

PART 2 - PRODUCTS

2.1 PVC FENCE: *6'-0" height Privacy Legend Vinyl Fence and 5'-0" height Universal Style Fence, foot height*, color: *white, tan or gray* as manufactured by Master Halco,Inc.Orange,Ca, www.fenceonline.com or approved equal. Fence products from other manufacturers having a minimum of 5 years experience manufacturing PVC fencing will be acceptable by the architect if they meet the following specifications for design, size, and fabrication. PVC Profiles, lineals & extrusions used as components must "meet or exceed" the minimum performance guidelines laid out in ASTM 964-02.

A. Pickets, rails, and posts fabricated from PVC extrusion. The PVC extrusions shall comply with ASTM D 1784, Class 14344B and have the following characteristics:

Specific Gravity (+/- 0.02)	1.4 SG
Using 0.125 specimen Izod impact ft. lbs./in. notch	23.0 ft. lbs./in.
Tensile strength, PSI	6,910 PSI
Tensile modulus, PSI	336,000 PSI
Flexural yield strength, PSI	10,104 PSI
Flexural modulus, PSI	385,000 PSI

DTUL at 264 PSI 67d C

2.2 SETTING MATERIAL

A. Concrete: Minimum 28-day compressive strength of 3500 psi.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify areas to receive fencing are completed to final grades and elevations.

B. Ensure property lines and legal boundaries of work are clearly established.

3.2 INSTALLATION

A. Follow individual installation instructions for the appropriate style in setting posts. Posts shall be set in concrete per detail.
Corner posts on all fences and line posts shall be filled with concrete for additional strength.

B. Place assembled fence sections into position and slide rails into posts. The rails are secured into posts by tabs which are notched into the rails and catch on the inside wall of the post.

C. Check each post for vertical and top alignment, and maintain in position during placement and finishing operation.

3.3 GATE INSTALLATION

A. Install gates plumb, level and secure using bolt-on hardware supplied by the manufacturer.

B. Adjust hardware for smooth operation.

3.4 ACCESSORIES

A. Install post caps and other accessories to complete fence.

3.5 CLEANING

A. Clean up debris and unused material and remove from site.

END OF SECTION 32 3123

SECTION 32 4000 – SITE IMPROVEMENTS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Sign posts and plates.
2. Pipe Bollards.
3. Benches.

B. Related sections:

1. Section 31 2216 - Fine Grading.
2. Section 32 1313 – Site Concrete.

1.2 SUBMITTALS

A. Provide manufacturers' data (MD) for the following products:

1. Sign posts, panels and signage system components.
2. Pipe Bollards.
3. Benches.

B. Provide field erection shop drawings (SD) for all items covered under this section.

1.3 QUALITY ASSURANCE

A. Traffic control signage shall conform to the requirements of the "Manual on Uniform Traffic Control Devices.

PART 2 PRODUCTS

2.1 MATERIALS

A. Concrete: As specified Section 32 1313 "Site Concrete".

B. Signage: (Traffic) Refer to sign schedule on the drawings for sign type and size.

1. Panels: Aluminum engineering grade panels conforming to NYSDOT Standard Specification section 730-01.
2. Reflective sheeting for sign face shall conform to NYSDOT Standard Specification section 730-05.02 (Class B). Characters shall meet section 730-12 (Type IV) or 730-13 (Type V) as appropriate.
3. Sign Posts and Footings: conform to requirements on NYSDOT Standard Specification section 830-20.
4. Bumper Post Cover: ¼" thick safety yellow bumper post cover as manufactured by 'Ideal Shield' or approved equal.

2.2 PIPE BOLLARD

A. Pipe Bollard: 6” diameter galvanized schedule 40 steel pipe.
B. Finish: Refer to detail.

2.3 BENCHES

A. Dumor Bench 19 (6 foot) as manufactured by DuMor, Inc. (www.dumor.com) or approved equal. Color by owner

PART 3 EXECUTION

3.1 SIGNAGE and PIPE BOLLARDS

A. Set bollard or sign post in concrete foundation or subbase material as detailed.

3.2 BENCHES

A. Bench to be surface mounted to concrete pad as shown on plans. Attach to concrete pad per manufacturer’s recommendations.

END OF SECTION 32 4000

SECTION 32 9200 - LAWNS

PART 1 – GENERAL

1.1 SUMMARY

A. Section includes:
1. Seeding Lawns.
2. Hydro-seeding Lawns.
3. Meadow Lawn Mixes.
4. Rolled Erosion Control Fabric

B. Related Sections:
1. Section 312216 - Fine Grading.
2. Section 312500 - Erosion, Sediment and Pollution Control.
3. Section 32 9213 – HydroMulch for Slopes

1.2 SUBMITTALS

A. Provide Material Certificates (MC) and Manufacturers' Data (MD) for the following:
1. Seed species and source
2. Fertilizers
3. Jute Mesh
4. Tackifier

B. Furnish name of Landscape Contractor or Nurseryman to perform lawn seeding and obtain Architect's approval.

C. Lawn/Meadow Seed Mix: Submit one (1) pound seed mix sample per seed mixture specified in vendor's sealed package. Label shall clearly show weight, analysis by weight of each species, percent purity, percent germination, and vendor name.

D. Upon seeded lawn acceptance, submit written instructions recommending procedures for maintenance of seeded lawns.

1.3 DELIVERY AND STORAGE

A. Deliver seed and fertilizer materials in original unopened containers, showing weight, analysis, and name of manufacturer. Store in a manner to prevent wetting and deterioration.

1.4 PROJECT CONDITIONS

A. Work notification: Notify Owner at least 7 working days prior to start of seeding operations.

B. Protect existing utilities, paving, and other facilities from damage caused by seeding operations.

C. Perform seeding work only after planting and other work affecting ground surface has been completed.

D. Restrict traffic from lawn areas until grass is established. Erect signs and barriers as required.

E. Provide hose and lawn watering equipment as required.

1.5 WARRANTY

A. Provide a uniform stand of grass by watering, mowing, and maintaining seeded areas until final acceptance. Reseed areas, with specified materials, which fail to provide a uniform stand of grass, until all affected areas are accepted by the Owner.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Lawn fertilizer: Commercial, Starter with approximate 1:2:1 ratio of Nitrogen, Phosphorus, and Potash (such as 13-25-12)

B. Lawn seed: Fresh, clean, new crop. Deliver in original packages, unopened, bearing guaranteed analysis.
1. Meadow Mix A: Northern Ecology Mix as distributed by Northern Nurseries, Cicero, NY. 80% Chewings fescue and 20% Hard Fescue. Apply at a rate of 250 lb.s/acre.
2. Meadow Mix B: Northern Wildflower Mix as distributed by Northern Nurseries, Cicero, NY. 85% (26 lb.s) Sheepsfoot Fescue and 15% (4 lb.s) miscellaneous wildflowers.

C. Soil stabilizer: Manufactured by Soil Seal Corp., Riverside, CA or approved equal.

D. Mulch:
1. Lawns: Stalks of oats, wheat, rye, or other approved crops free from seed or noxious weeds.
2. Hydromulch: Greenwood cellulose fiber mulch as manufactured by Conwed or approved equal.

E. Rolled Erosion Control Fabric: Enkamat Turf Reinforcement Mat (TRM) 7010 as manufactured by Colbond Geosynthetics, Inc. (www.profileproducts.com).

PART 3 – EXECUTION

3.1 LAWNS/GENERAL

A. Where applicable, check and verify fine grading of respread screened stockpiled topsoil and off-site topsoil; repair any disturbances.

B. Where applicable, complete discing, raking, regrading, reconditioning and compost amendment of surface soils.

3.2 SEEDED LAWN / MEADOW LAWN

A. Scope: Make entire unpaved areas within contract limits new lawn unless otherwise noted. Refer to drawings for location of Seeded Lawn Mixture areas. Use Seeded Lawn Mixture in all other areas of disturbance beyond contract limits.

B. Season of year for seeding, hydroseeding, and sodding subject to approval by Architect. Do not seed or sod or hydroseed when high wind, drought, excessive moisture, ice, or other conditions are such that specified results are not likely to be obtained.

C. Fertilize: Evenly distribute at manufacturers recommendation. Work lightly into top 3 inches of soil.

D. Seed:
1. Rake immediately before seeding until surface is smooth, friable and of uniform fine texture. Roll. Rake out undulations shown by roller.
2. Uniformly spread seed in at least two directions at rate of 5 pounds per 1,000 square feet with approved mechanical spreader. Cover seed distributed on the surface to a depth not exceeding 1/4 inch by raking, brush, or chain harrowing, or other approved methods. Roll with 200 pound roller.

E. Mulch all seeded areas immediately after seeding. Hand or machine spread to form a continuous blanket 2 inch uniform thickness, loose measurement. Anchorage to hold mulch in place may be employed at contractor's option, subject to approval by Architect.

F. Hydroseeding:
1. All hydroseeding shall be applied by means of a hydroseed machine.
2. Mixture - Mix water, seed, fertilizer, mulch and soil stabilizer at the following rates and apply to the prepared finish grade by means of a hand-held hose. No truck mounted spraying equipment shall be driven over the areas to be seeded. Discharge shall be in an uphill direction only.

Fertilizer	1,000	pounds per acre
Seed	250	pounds per acre or as specified
Mulch	1,500	pounds per acre
Soil Stabilizer	25	gallons per acre

G. Protect all seeded and hydroseeded areas, at contractor's expense, with snow fences, wire farm fences, or similar structures. Remove upon final acceptance. On steep slopes or areas subject to erosion, stabilize topsoil and seed as required to allow adequate germination.

H. Maintain lawn / Meadow Area:
1. Begin immediately upon completion of seeding and mulching and continue for a minimum of 30 days or longer as required to establish uniform stand of specified grasses and until final acceptance.
2. Water immediately after mulching to saturate the soil to 1/2 inch depth. Thereafter, water all seeded areas to 1 inch depth soil saturation no less than two times per week, and more often during periods of drought or high winds, as required by Architect until final acceptance.
3. Maintain mulch daily, or more often as required. Contain mulch on site and clean up any areas where mulch is blown by wind.
4. Repair all washouts and gullies. Rerake, reseed and remulch as necessary.
5. Mow all lawn areas to 2 inch height until acceptance. Grass shall not exceed 3 inches in height. A minimum of three mowings is required.
6. Meadow areas shall not be mowed.

I. Inspection and final acceptance of lawns / Meadow Areas:
1. Contractor shall request inspection by Architect after establishment of uniformly germinated lawn and completion of maintenance.
2. Owner's responsibility after final acceptance.

3.3 ROLLED EROSION CONTROL FABRIC

A. Installation of Rolled Erosion Control Fabric is required on all slopes 3H:1V or greater. Install per manufacturers recommendations and coordinate with installation of Flexible Growth Medium Flexterra® FGM (Hydromulch).

END SECTION 32 9200

SECTION 32 9300 - PLANTINGS

PART 1 – GENERAL

1.1 SUMMARY

A. Section includes:
1. Soil Preparation
2. Trees, Shrub and Groundcover Planting
3. Planting Soil Mix
4. Plant Maintenance

B. Related sections:
1. Section 311000 - Site Clearing
2. Section 311001 - Site Preparation
3. Section 312301 - Sitework Excavation, Backfilling and Compacting

1.2 SUBMITTALS

A. Submit the following material samples:
1. Mulch
2. Planting Accessories

B. Provide the following Material certifications:
1. Topsoil source and pH
2. Peat Moss
3. Plant fertilizer
4. Hydrogel

1.3 QUALITY ASSURANCE

A. Conform to "Horticultural Standards of the American Association of Nurserymen", latest edition. Plant material shall be true to botanical name and legibly tagged. Well developed fibrous root systems. Free from all pests and disease.

B. Comply with sizing and grading standards of the latest edition of “American Standard for Nursery Stock”. Plant shall be dimensioned as it stands in its natural position.

C. All plants shall be nursery-grown under climatic conditions similar to those in the locality of the project for a minimum of two-years.

1.4 DELIVERY, STORAGE AND HANDLING

A. Deliver fertilizer materials in original, unopened and undamaged containers showing weight, analysis, and name of manufacturer. Store in manner to prevent wetting and deterioration.

B. Take all precautions customary in good trade practice in preparing plants for moving. Workmanship that fails to meet the highest standards will be rejected. Spray deciduous plants and evergreen foliage with an approved "anti-desiccant" immediately after digging to prevent dehydration. Dig, pack, transport and handle plants with care to ensure protection against injury. Inspection certificates required by law shall accompany each shipment invoice or order to stock and on arrival, the certificate shall be filed with the owner. Protect all plants from drying out. If plants cannot be planted immediately upon delivery, protect them with soil, wet peat moss, or in a manner acceptable to the owner. Water healed-in plantings daily. No plants shall be bound with rope or wire in a manner that could damage or break the branches.

C. Cover plants transported in open vehicles with a protective covering to prevent wind burn.

D. Provide dry, loose topsoil for planting bed mixes; frozen or excessively wet topsoil is not acceptable.

1.5 PROJECT CONDITIONS

A. Work notification: notify owner at least seven (7) working days prior to installation of plant material.

B. Protect existing utilities, paving and other facilities and site improvements from damage caused by landscape operations.

C. A complete list of plants, including a schedule of sizes and other requirements is shown on the drawings. If quantity omissions or material omissions occur in the plant material list, the planting plan shall govern.

1.6 PLANT MATERIAL GUARANTEE

A. Guarantee all plant materials to be true to name and size and in vigorous growing condition for a period of two years from date of final acceptance. Inspection will be made by the owner upon completion of planting.

B. Replace, in accordance with the drawings and specifications, all plants that are dead or not found to be in vigorous growing condition or are unsightly, unhealthy, or to have lost their natural shape to dead branches, or cause due to the Contractor's negligence, as determined by Owner during the guarantee period.

C. Plant Material Guarantee shall not include damage or loss of trees, shrubs or groundcover caused by fires, floods, freezing rains, lighting storms, snow plowing, and acts of vandalism.

D. Remove and immediately replace all plants, as determined by the owner to be unsatisfactory during the initial planting installation.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Plant materials: Provide plants typical of their species or variety with normal, densely developed branches, fibrous root systems. Provide only sound, healthy, vigorous plants free from defects, disfiguring knots, sun scald injuries, frost cracks, abrasions of the bark, plant diseases, insect eggs, borers, and all forms of infestation. All plants shall have a fully developed form without voids and open spaces. Plants held in storage will be rejected if they show signs of growth in storage.

1. Balled and burlapped: Dig with firm natural ball of earth of sufficient diameter and depth to encompass the fibrous and feeding root system necessary for full recovery of the plant. American Association of Nurserymen standard sizes to be minimum. Firmly wrap ball with burlap or similar material and bind with twine, cord, or wire mesh.
2. Bare Root: Dig and remove the earth without injury to the fibrous root system necessary for full recovery of the plant. Cover roots with a thick coating of mud by puddling or wrap in wet straw, moss, or other suitable packing material immediately after digging for protection until delivery.
3. Containers: All container-grown plant materials shall be healthy, vigorous, well rooted, and established in the container in which they are sold. An established container-grown plant shall have been transplanted into a container and grown in that container sufficiently long for the new fibrous roots to have developed so that the root mass will retain its shape and hold together when removed from the container. The container shall be sufficiently rigid to hold the ball shape protecting the root mass during shipping. American Association of Nurserymen standard container sizes shall be minimum.
4. Provide tree species that mature at heights over 25'-0" with a single main trunk. Trees that have the main trunk forming a "Y" shape are not acceptable.
5. Plants planted in rows shall be matched in form.
6. Plants larger than those specified in the plant list may be used when acceptable to the Owner.
    a. If the use of the larger plants is acceptable, increase the spread of roots or root ball in proportion to the size of the plant.
7. The height of the trees, measured from the crown of the roots to the top of the top branch, shall not be less than the minimum size designated in the plant list.
8. No pruning wounds shall be present with a diameter of more than 1inch, and such wounds must show vigorous bark on all edges.
9. Evergreen trees shall be branched to the ground.
10. Shrubs and small plants shall meet the requirements for spread and height indicated on the plants list.
    a. The measurements for height shall be taken from the ground level to the average height of the plant, and not the longest branch.
    b. Single-stemmed or thin plants will not be accepted.
    c. Side branches shall be generous, well-twigged, and the plant as a whole well bushed to the ground.
    d. Plants shall be in a moist, vigorous condition, free from dead wood, bruises, or other root or branch injuries.

2.1 ACCESSORIES

A. Mulch: Wood Chip Mulch, 50 percent shredded bark and 50 percent wood chip mixture, 3/4 inch - 2-1/4 inch size, free from elm wood chips and bark. To be utilized on individual tree plantings and perennial/ groundcover plant beds.

B. Planting Soil Mix: Natural, fertile, friable granular soil characteristic of productive soils in vicinity. Uniform in composition and texture. Clean, free from subsoil, clay lumps, stones, weeds, stumps, roots, toxic substances and debris of similar substances 1 inch or more in greatest dimension. Topsoil pH value of 5.5 to 7.5 or able to be amended, 8 to 20 percent minimum organic content, soluble salts not to exceed 500 parts per million.

C. Planting fertilizer: Commercial, containing by weight:
1. 5% Nitrogen 10% Phosphorus 5% Potash

D. Peat Moss: Brown to black in color. Acid reactions 4 to 5 pH. Low in content of woody material. Free from mineral matter harmful to plant life. Water absorbing capacity, 1100 to 2000 percent. Moisture content, 30 percent. Natural, shredded, or granulated.

E. Tree stakes: Sound wood.

F. Hose: For bark protection, new or used 2-ply fiber bearing rubber garden hose not less than 1/2 inch in diameter.

G. Wire: For tree supports. Pliable #9 gauge galvanized annealed steel wire.

H. Turnbuckles: 6 inch long, galvanized.

I. Tree wrapping: Waterproof 30-30-30 Krinklecraft or approved equal. 4 inch wide strips.

J. Anti-desiccant: "Wiltpruf", "Dowwax", "Pro-Tec", or approved equal.

K. Hydrogel: Gelscape(r) or approved equal, Amereq Inc. (914) 634-2400, 19 Squadron Boulevard, New York City, NY 10956.

L. Water: Free of substances harmful to plant growth. Hoses or other method for application and transportation furnished by the contractor.

PART 3 – EXECUTION

3.1 INSPECTION

A. Examine proposed planting areas and conditions prior to plant installation. Do not start planting work until unsatisfactory conditions are corrected.

3.2 PREPARATION

A. Nursery-grown trees
1. Time of planting:

a. Deciduous plant material: Plant deciduous materials in a dormant condition. If deciduous trees deciduous trees are planted in-leaf, they shall be sprayed with an anti-desiccant prior to planting operation.
b. Planting times other than those indicated shall be acceptable to the Owner.
c. Planting shall be performed only by experienced workmen familiar with planting trees under the supervision of a qualified supervisor. Locate plants as indicated or as approved in the field after staking by the Contractor. If obstructions are encountered that are not shown on the drawings, do not proceed with planting operations until alternate plant locations have been selected.

2. Excavate circular plant pits with vertical sides, except for plants specifically indicated to be planted in beds. Provide shrub pits at least 12 inches greater than the diameter of the root system and 24 inches greater for trees. Depth of pit shall accommodate the root system. Scarify the bottom of the pit to a depth of 4 inches. Remove excavated materials from the site.
3. Provide pre-mixed planting mixture for use around the balls and roots of the plants consisting of 5 parts planting topsoil to 1 part peat moss and 1/2 pound plant fertilizer Type A for each cubic yard of mixture.

3.3 INSTALLATION

A. Nursery-grown trees
1. Set plant material in the planting pit to proper grade and alignment. Set plants in upright, plumb, and faced to give the best appearance or relationship to each other or the adjacent structure. Set plant material 2 to 3 inches above the finish grade. No filling will be permitted around trunks or stems. Backfill the pit with planting mixture. Do not use frozen or muddy mixtures for backfilling. Form a ring of soil around the edge of each planting pit to retain water.
2. After balled and burlapped plants are set, muddle planting soil mixture around bases of balls and fill all voids.
   a. Remove all burlap, ropes, and wires from the tops of balls.
3. Anchoring:
   a. Anchor trees immediately after planting, prior to mulching and acceptance. Install the specified anchor system as detailed and in accordance with the manufacturer's recommendations.
4. Mulching:
   a. Mulch tree and shrub planting pits and shrub beds with required mulching material 3 inches deep immediately after planting. Thoroughly water mulched areas. After watering, rake mulch to provide a uniform surface.
5. Wrapping:
   a. Inspect trees for injury to trunks, evidence of insect infestation, and improper pruning before planting.
   b. Wrap trunks of all trees spirally from bottom to top with specified tree wrap and secure in place.
      1) Overlap 1/2 the width of the tree wrap strip and cover the trunk from the ground to the height of the second branch.
      2) Secure tree wrap in place with twine wound spirally downward in opposite direction, tied around the tree in at least 3 places in addition to the top and bottom.
6. Pruning:
   a. Prune branches of deciduous stock, after planting, to balance the loss of roots and preserve the natural character appropriate to the particular plant requirements. In general, remove 1/4 to 1/3 of the leaf-bearing buds; proportion shall in all cases be

acceptable to the Owner. Remove or cut back broken, damaged, and unsymmetrical growth of new wood.

b. Multiple leader plants: Preserve the leader which will best promote the symmetry of the plant. Cut branches flush with the trunk or main branch, at a point beyond a lateral shoot or bud a distance of not less than 1/2 the diameter of the supporting branch. Make cut on an angle.

3.4 MAINTENANCE

A. Maintain plantings until completion and acceptance of the entire project.

B. Maintenance shall include pruning, cultivating, weeding, watering, and application of appropriate insecticides and fungicides necessary to maintain plants free of insects and disease.

1. Re-set settled plants to proper grade and position. Restore planting saucer and adjacent material and remove dead material.
2. Tighten and repair anchor wires as required.
3. Correct defective work as soon as possible after deficiencies become apparent and weather and season permit.
4. Water trees and shrubs within the first 24 hours of initial planting, and as required until final acceptance.

3.5 ACCEPTANCE

A. Inspection to determine acceptance of planted areas will be made by the Owner, upon Contractor's request. Provide notification at least 10 working days before requested inspection date.

1. Planted areas will be accepted providing all requirements, including maintenance, have been complied with and nursery-grown trees are alive and in a healthy, vigorous condition.

B. Upon acceptance, the Owner will assume plant maintenance.

3.6 CLEANING

A. Perform cleaning during installation of the work and upon completion of the work. Remove from site all excess materials, soil, debris, and equipment. Repair damage resulting from planting operations.

END O F SECTION 32 9300

SECTION 32 1100 – BASE COURSES

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes:
1. Subgrade preparation
2. Stabilization fabric
3. Subbase course
4. Coarse aggregate fill

B. Related Sections:
1. Section 312213 - Rough Grading
2. Section 312216 - Fine Grading
3. Section 312301 - Sitework Excavation, Backfilling and Compacting

1.2 SUBMITTALS

A. Material Certificates (MC) including a certified laboratory sieve analysis (LA) bearing name and location of quarry. Sample (S) of material required (approximate volume 1 cubic foot) in a waterproof container permanently labeled to show source. Requirements for the following materials:
1. Subbase Material: (See Section 312301 - Sitework Excavation, Backfilling and Compacting, Submittals)
2. Coarse Aggregate Fill: (See Section 312301 - Sitework Excavation, Backfilling and Compacting, Submittals)
3. Drainage Fill: (See Section 312301 - Sitework Excavation, Backfilling and Compacting, Submittals)

B. Manufacturers data (MD) and product sample (S) required for the following materials:
1. Stabilization Fabric: (Refer to Section 312301 - Sitework Excavation, Backfilling and Compacting, Submittals)

PART 2 – PRODUCTS

2.1 BASE COURSES

A. Subbase Course Material: Refer to Section 312301 - Sitework Excavation, Backfilling and Compacting.

B. Coarse Aggregate Fill, Backfill and Foundation Material: Refer to Section 312301 - Sitework Excavation, Backfilling and Compacting.

C. Excavated Subsoil: Refer to Section 312301 - Sitework Excavation, Backfilling and Compacting.

2.2 STABILIZATION FABRICS

A. Stabilization Fabric: Refer to Section 312301 - Sitework Excavation, Backfilling and Compacting.

PART 3 – EXECUTION

3.1 SUBGRADE PREPARATION

A. Grade to smooth draining grades parallel to finish grade and to proper subgrade elevations. No humps or hollows. Proofroll immediately prior to placing general base material for pavements or slabs on grade, proofroll subgrade with 7 ton minimum loaded smooth drum self-propelled vibratory roller. Undercut all areas which show pumping or weaving and replace with acceptable fill materials compacted to 95 percent of the maximum modified proctor density based on ASTM D1557 procedures. Avoid overworking subgrade and running equipment on subgrade unnecessarily. If an area becomes saturated and loses its structure, discontinue working, facilitate surface and subsurface drainage and contact Architect for observation prior to placing pavement base or subbase courses. Refer to Section 312301 for additional compaction requirements.

3. 2 STABILIZATION FABRIC

A. Place paving stabilization fabric in lengths and widths as large as possible. Lap seams per manufacturer's instructions or 6 inches minimum.

B. Cover using methods that will not damage or displace stabilization fabric.

C. Time operations to avoid trenching by any contractor in areas where stabilization fabric has been placed.

3.3 COARSE AGGREGATE FILL

A. Place on dry subgrade on maximum 6 inch lifts. Compact each lift to standard noted under Section 3.1 above.

B. Remove all subgrade material churned or mixed with subbase courses and replace as necessary at Contractor's expense.

3.4 SUBBASE COURSE

A. Place on dry subgrade or subbase course as detailed in maximum 6 inch lifts. Compact each lift to standard noted under Section 3.1 above.

B. Remove all subgrade or subbase course material churned or mixed with base course and replace as necessary at Contractor's expense.

END OF SECTION 32 1100

SECTION 32 1216 - ASPHALT PAVEMENT

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Place and compact asphalt base course, binder and topping.
2. Asphalt Pavement
3. Asphalt Price Index

B. Related Sections:
1. Section 32 1100 - Base Courses.
2. Section 32 1640 - Granite Curb

1.2 SUBMITTALS

A. Material Certificate (MC): Each asphaltic concrete course shall comply with an applicable NYSDOT Job Mix Formula showing NYSDOT signature approval for prior use in the region within the past two years. Submit for the following:
1. Asphalt Top Course - NYSDOT Type 7 – Item No. 402.098303: (MC)
2. Asphalt Binder Course - NYSDOT Type 3 – Item No. 402.198903: (MC)
3. Asphalt Base Course - NYSDOT Type 1 – Item No. 402.258903: (MC)

PART 2 - PRODUCTS

2.1 MATERIALS

A. Asphalt pavement: Plant mix asphalt conforming to NYSDOT Standard Specifications Section 401, Material Requirements, 1990 edition. Paving course as shown on drawings:
1. Asphalt Top Course: Type 7 asphalt concrete conforming to composition requirements of Table 401-1. Installation temperature 280° - 325°F, compacted thickness - per detail.
2. Asphalt Binder Course: Type 3 asphalt concrete conforming to composition requirements of Table 401-1. Installation temperature 280° - 325°F, compacted thickness - per detail
3. Asphalt Base Course: Type 1 asphalt concrete conforming to composition requirements of Table 401-1. Installation temperature 280° - 325°F, compacted thickness - 3''.

B. Above mixes shall contain only crushed limestone coarse aggregates.

C. Tack Coat: NYSDOT Asphalt Emulsion 702-90, prepared, heated, and uniformly sprayed at rate of 0.05 to 0.10 gallons per square yard in accordance with NYSDOT requirements.

D. Joint Sealer: NYSDOT Liquid Asphalt 702-11 or similar.

E. Comply with all requirements of NYSDOT Section 401.

PART 3 - EXECUTION

3.1 ASPHALT PAVEMENT

A. Place and roll each course with approved 10-ton roller until no movement or weaving occur. Correct all humps and depressions to provide smooth surface at correct profile and grade.

B. Install no asphaltic work when surface is wet or temperature below 50□F.

C. Form or cut all pavement edges to clean, sharp, lines of dimensions, alignment, or radius indicated.

D. Joints: Saw cut and shear step joints along existing paving to remain. All joints between new and existing paving or in new paving where work has been discontinued overnight shall be cap sealed.

E. Compaction: Thoroughly and uniformly compact each asphalt course with powered rollers of not less than 10 tons with working watering systems, and with power tampers in and along areas not accessible to the roller. Rollers should move at uniform speeds and not cause undue displacement, cracking or shoving or other movement. Exercise care not to displace the line and grade of edges or any joints. Joints shall be tightly bonded and match surface smoothness and compaction of other sections of the pavement.

F. Surface Tolerance: Base and binder course surface shall be a true plane consistent with required top course surface grades.

Top course surface shall not vary more than 1/8" in 10' measured in any direction, and shall be a true plane consistent with required surface grades. Paving crown lines shall be true with roadway center lines. Finished top course surface shall be flood checked by the Contractor when requested by the Architect in any areas where ponding or inadequate drainage appears evident.

Portions of completed pavement which are defective in finish, compaction, elevation or drainage shall be cut out, removed and replaced. No waviness or irregularities; no ridges; no open or inadequately bonded seams; no abrupt grade changes at catch basins or other structures, center line or other, or elsewhere.

3.2 PAVEMENT GUARANTEE

A. Two-Year Guarantee against Defects in Paving: Contractor guarantees that any areas of settlement, heaving or other movement, cracks, spalling, raveling, surface pitting, flaking or other deterioration, or any other defects which occur in any new or replacement paving, as determined by the Architect and Owner, occurring within two (2) years after the date of substantial Completion, shall be cut out, removed, replaced and corrected to the satisfaction of the Architect and Owner, at the contractor’s expense, in accordance with provisions of the contract dealing with correction of work.

END OF SECTION 32 1216

SECTION 32 1313 – SITE CONCRETE

PART 1 – GENERAL

1.1 SUMMARY

A. Work Includes:
1. Concrete Walk Pavement.
2. Reinforcing.
3. Joints.
4. Finishing.
5. Concrete Curb.

B. Related sections:
1. Section 321100 - Base Courses
2. Section 321314 – Textured Concrete Surfacing

1.2 SUBMITTALS

A. Submit Manufacturer's Data and concrete mix designs for the following:
1. 3500/4000 psi concrete mix design
2. Expansion Joint (MD)
3. Anti Spalling Compound (MD)
4. Sealant (MD)
5. Reinforcement (MD)

PART 2 – PRODUCTS

2.1 MATERIALS

A. Concrete: ready-mix air entrained normal weight concrete mixed in accordance with ACI 304; all pavement concrete fibrous reinforced and installed in two (2) courses; provide the following concrete mix designs:

	Subsurface Concrete, etc.	Paving Course
Compressive Strength (28 Days)	3500 psi	4000 psi
Water/Cement ratio (max.)	0.45 by weight	0.45 by weight
Aggregate Size (Max.)	1 inch	1 inch
Air Entrainment	5%-7%	5%-7%
Slump	4 inches +/- 1inch	4 inches max.
Min. Bags Cement per CY	Six (6)	Six (6)

Comply with the following:
1. Portland cement: ASTM C150, Type 1.
2. Normal weight aggregates: ASTM C33 and as specified.
3. Fine aggregate: Clean, sharp, natural, sand, free from loam, clay and other deleterious substances.

4. Coarse aggregate: Crushed stone (no gravel) processed from hard, natural rock or stone, clean, uncoated, containing no soil or other foreign matter.
5. Water: potable
6. Air entraining admixture: ASTM C260, and water-reducing admixture ASTM C94, Type A. Use in strict compliance with manufacturers' recommendations. Sealtight AEA, W R Meadows, Inc. or approved equal.
7. Ready-mix concrete, comply with ASTM C94. Additional water not permitted to batch for material with insufficient slump. During hot weather or under other conditions contributing to rapid setting of concrete, shorter mixing time than specified in ASTM C94 may be required. When air temperature is between 85F and 90F, reduce mixing/delivery time from 90 minutes to 75 minutes. Cold weather curing protection per ACI recommendations; Provide concrete design mix reports/certificates from supplier, including verification that identical mixes have previously tested at required minimum compressive strength at 28 days. Once approved, all concrete shall be identically mixed by the same supplier; no variations in materials, mix, color permitted.
8. Expansion joint material: 1/2 inch thick premolded asphalt impregnated joint filler: compatible gun grade one or two component sealer, gray color.
9. Sheet material for curing concrete: ASTM C171.
10. Surface sealant: Kure-N-Seal by Sonneborn or equal.
11. Welded wire mesh/fabric: 6 inch x 6 inch welded 6 gauge steel wire fabric ASTM A185, in flat sheets.
12. Reinforcing steel: ASTM A615 deformed per ASTM A305, grade 40 for bar sizes No.4 and smaller; grade 60 for larger bar sizes.
13. Sleeves and other inserts: As may be shown on drawings.

B. Subsurface Concrete: to be used for Footings, Beddings, Encasements, Cradles, or supports.

PART 3 – EXECUTION

3.1 EXECUTION

A. Preparation for concrete walk and curbs:
1. Grade smooth draining grades parallel to finish grade and to proper subgrade elevations. No humps or hollows. Roll with approved 10 ton roller until no movement occurs. Do above operations concurrently. Subgrade shall be smooth, hard and dry.
2. Do not deliver concrete until immediately prior to intended time of installation.
3. Comply fully with the Latest American Concrete Institute Manual of Concrete Practice in mixing, delivery, forming, installation, curing and other aspects of concrete work.

B. Concrete Walk Pavement:
1. Location and Layout: All lines, limits and elevations of paving, curbs and related work accurately located and laid out and staked or otherwise marked and checked and verified prior to installation.
2. Subgrade and base course: check previously established subgrade for any disturbance. Install and compact base course aggregate. Compact to required 95 percent maximum density.
3. Forms: All forms fabricated of wood or steel to full required depth and to facilitate placing of reinforcing bars or mesh as required to support weight of concrete during and after pouring, and to produce neat, true corners and straight and radius edges as required.

4. Placing of concrete: Concrete not placed until reinforcement, expansion joint filler and any sleeves and other inserts are placed and secured and forms are cleaned and oiled. When conditions of excessive drying occur, wet aggregate base course immediately prior to installation of concrete. Place concrete in forms, vibrating to work concrete into all corners and to eliminate honeycombing. Exercise care against displacement of forms. If free water appears on top of concrete, reduce quantity of water; take up immediately with cloth or mop, no application of sand or concrete permitted.
5. Joints: provide expansion joints wherever paving adjoins building walls or other structures or rigid paving, off building corners, at changes in direction, at approximately 30 feet o.c. in runs of walk paving, and as otherwise shown on the drawings.
6. Concrete finishing: surface of concrete brought to a smooth level finish, free of any swirls or float marks by means of a wood float. Provide steel trowel finish on top and face of integral curb and where otherwise required. Provide tooled edge "picture frame" bands with stiff broom finish where indicated. Brooming to be accurate and consistent in alignment and depth. Finish concrete pavement edges tooled round same as joints. Score joints and bands tooled before and again after brooming while concrete is still green.
7. Expansion joints: neatly cut out expansion joint material to 1/2 inch depth below surface and install consistent 1/4 inch depth of sealer system in accordance with manufacturer's recommendations.
8. Protection and curing: Immediately after finishing, surfaces to be protected with waterproof paper covering from traffic and elements for at least three (3) days before opening to traffic. Take necessary precautions to prevent plastic shrinkage cracks during curing. Apply sealant in accordance with manufacturers' recommendations. Protect all concrete work from vandalism. Concrete work which has been vandalized shall be removed and replaced at contractor's expense.
9. Backfill: all concrete work backfilled in accordance with adjoining work requirements. Backfilling shall proceed immediately after removal of the forms, and shall be conducted with care assuring that concrete damage and settlement do not occur. Do not mar surfaces with backfill material or equipment.

3.2 QUALITY CONTROL TESTING DURING CONSTRUCTION

A. The owner shall employ a testing laboratory to take samples and perform tests and to submit test reports. The contractor shall notify the testing agency and the owner's representative for testing in a timely manner.

B. Quality Control testing in field shall be performed by ACI certified Grade I Field Technician. Concrete shall not be placed without a technician onsite.

C. Sampling and testing for quality control during placement of concrete may include the following:
1. Sampling Fresh Concrete: ASTM C 172, except modified for slump to comply with ASTM C 94.
2. Slump: ASTM C 143; one test at point of discharge for each day's placement of each type of concrete and each time a set of compression test specimens are made; additional tests when concrete consistency seems to have changed and each time a set of compression test specimens are made.
3. Air Content: ASTM C 173, volumetric method for lightweight or normal weight concrete; ASTM C 231 pressure method for normal weight concrete; one for each day's placement of

each type of air-entrained concrete and each time a set of compression test specimens are made.

4. Concrete Temperature: Test hourly when air temperature is 40 degrees F. and below and when 80 degrees and above; and each time a set of compression test specimens are made.
5. Compression Test Specimens: ASTM C 31; one set of 4 standard cylinders for each compressive strength test, unless otherwise directed. Mold and store cylinders for laboratory cured test specimens except when field-cure test specimens are required.
6. Compressive Strength Tests: ASTM C 39; one set for each day's placement under 25 cubic yards plus additional sets for each 50 cubic yards over and above the first 25 cubic yards of each concrete placed in any one day. One specimen tested at 7 days, two specimens tested at 28 days, and one specimen reserved for later testing if required.
7. When frequency of testing will provide less than 5 strength tests for a given class of concrete, conduct testing from at least 5 randomly selected batches or from each batch if fewer than 5 are used.
8. When total quantity of a given class of concrete is less than 50 cubic yards, strength test may be waived by Architect if, in his judgment, adequate evidence of satisfactory strength is provided.
9. Strength level of concrete will be considered satisfactory if averages of set of three consecutive strength test results equal or exceed specified compressive strength, and no individual strength test results falls below specified compressive strength by more than 500 psi.
10. Water cement ratio in slabs above driveways shall not exceed 0.40 because drying time is critical in the timing of construction operations.

D. Test results shall be reported in writing to Architect, Owner, Landscape Architect, Contractor and concrete supplier within 24 hours after tests. Reports of compressive strength tests shall contain the project identification name and number, date of concrete placement, name of concrete testing service, concrete type, location of concrete batch in structure, design compressive strength at 28 days, concrete mix proportions and materials, compressive breaking strength and type of break for both 7-day and 24-day tests.

E. Nondestructive testing: impact hammer, sonoscope or other non-destructive device may be permitted but shall not be used as the sole basis for acceptance or rejection.

F. Additional test: the testing service will make additional tests of in-place concrete when test results indicate specified concrete strengths and other characteristics have not been attained in the structure, as directed by the Architect. Testing service may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42, or by other methods as directed. The sitework Contractor shall pay for such tests when unacceptable concrete is verified.

3.3 PAVEMENT GUARANTEE

A. Two-Year Guarantee against Defects in Paving: Contractor guarantees that any areas of settlement, heaving or other movement, cracks, spalling, raveling, surface pitting, flaking or other deterioration, or any other defects which occur in any new or replacement paving, as determined by the Architect and Owner, occurring within two (2) years after the date of substantial Completion, shall be cut out, removed, replaced and corrected to the satisfaction of the Architect and Owner, at the contractor's expense, in accordance with provisions of the contract dealing with correction of work.

END OF SECTION 32 1313

SECTION 32 1723 – PAVEMENT MARKINGS

PART 1 GENERAL

1.1 SUMMARY

A. Section includes:

1. Pavement line paint.
2. Pavement markings and symbols

B. Related sections:

1. Section 32 1216

C. Refer to section 02530 for track and field event surface markings.

1.2 REFERENCES

A. NYSDOT standard specifications.

1.3 SUBMITTALS

A. Submit manufacturers' data (MD) and color samples (S) for the following:

1. Paint Manufacturer (MD)
2. Color sample (S), one per color.

PART 2 PRODUCTS

2.1 MATERIALS

A. Pavement lines paint:

1. Lead-free yellow, blue, red, green or white marking paint complying with NYSDOT Section 640-2, selected from NYSDOT "Approved List." Refer to drawings and details for locations of each color.

PART 3 EXECUTION

3.1 PAVEMENT LINES PAINTING

A. Allow pavement/pavement sealer to properly cure to manufacturers recommendations prior to stripping. Apply one coat by brush or zone marking equipment to the location, limits, and colors indicated on the drawings.

B. Comply with NYSDOT wet thickness requirements.

END OF SECTION 32 1723

SECTION 32 3113 – CHAIN LINK FENCING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:
1. Chain Link Fence.
2. Cantilever Slide Gate

B. Related sections:
1. Section 31 2216 - Fine Grading.
2. Section 31 2300 - Excavating, Backfilling, and Compacting.
3. Section 32 1313 - Site Concrete

1.2 QUALITY ASSURANCE

A. Conform with requirements of the Chain Link Fence Manufacturers Institute Product Manual CLF-2445.

1.3 SUBMITTALS

A. Shop Drawings (SD): Prior to installation, submit manufacturing and dimensioned field erection drawings of all items covered under this section.

B. Product Data (PD): Submit manufacturers' technical data for fencing, fabric, posts and gates.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Concrete: chain link fence post footings: ready-mix 5%-7% air-entrained (adjust to field conditions) normal weight concrete, 3000 psi minimum 28 day compressive strength. Slump 4" maximum, cement 6 bags minimum per cubic yard, .57 W/C ratio. Comply with the following:
1. Portland cement: ASTM C150, Type 1.
2. Normal weight aggregates: ASTM C33 and as specified.
3. Fine aggregate: Clean, sharp, natural, sand, free from loam, clay and other deleterious substances.
4. Coarse aggregate: Crushed stone (no gravel) processed from hard, natural rock or stone, clean, uncoated, containing no soil or other foreign matter.
5. Water: potable
6. Air -entraining admixture: ASTM C260, and water-reducing admixture ASTM C94, Type A. Use in strict compliance with manufacturers recommendations.

B. Chain Link Fence:
1. Galvanized Steel Chain Link Fabric: 9 gauge steel wire woven into chain link fabric with mesh size as noted below with an aluminized, protective coating per ASTM A491.

Selvages knuckled top and bottom. Single width up to and including 12' high. All fabric free of barbs, icicles, or other projections resulting from galvanizing.

a. Standard fence size: 2" mesh, 9 gauge.

2. Posts, Rails, Bracing, and Gate Frames: SS-40 steel pipe, Hot-dip galvanized (0.9 ounce minimum zinc per square foot), chromated by total immersion, and clear polyurethane acrylic coated, all complying with ASTM A 569. Manufacturer; Subject to compliance with requirements, manufacturers providing products which may be incorporated in the work include the following or an approved equal: Bethlehem Steel, U.S. Steel and Page Aluminized Steel Corporation
3. Fittings: Hot-dipped galvanized, all by same manufacturer and intended and appropriate for all fencing and gate components. (gauge galvanized steel wire only for fabric ties; no aluminum wire used for ties.
4. Pull Post: provide pull post per industry standards in length and run of fence.
5. Brace rails: provide brace rail or truss rod and turnbuckle at all pull and end posts.
6. Tension Wire: 7 gauge galvanized steel marcelled wire.
7. Swing Gates: frames welded per AWS standards or fabricated with corner fittings of heavy malleable iron or pressed steel securely riveted to frame to form rigid one piece unit; paint welds with aluminum based or zinc based paint; fabric installed with tension bars; provide brace rails or 3/8" truss rods per industry standards; hinges with ball-and-socket design of adequate strength to support gate without gate twisting or turning under use with full 180 degree swing from closed to open position; all gates with latches and provision for padlock; provide center plunger rod; catch and semi-automatic outer catches for double-leaf gates. Provide owner with one heavy-duty padlock with master key system for each gate.
8. Cantilever Slide Gate frame: Fabricate chain link cantilever slide gates in accordance with ASTM F 1184, Type II, Class 2, using 2 inch square aluminum members, ASTM B221, alloy and temper 6063-T6, weighing 0.94 lb/ft. Weld members together forming rigid one-piece frame integral with top track. Provide 10 truck assemblies for each gate leaf.

Gate Leaf Size	**Cantilever Support (Overhang)**
18 ft (5486mm) to 24 ft (7315mm)	12’-0” (3658mm)

a. Gate Frame Finish: Natural Aluminum
b. Chain Link Filler Finish: Aluminized - ASTM A 491
c. Bracing: provide diagonal adjustable length truss rods of 3/8" galvanized steel, in each panel of gate frame.
d. Top track/rail: Enclosed combination one-piece track and rail, aluminum extrusion with weight of 3.72 lb/ft. Track to withstand reaction load of 2000#.
e. Truck Assembly: Swivel type, zinc die cast, with 4 sealed lubricant ball bearing rollers, 2 inches in diameter by 9/16" in width, and 2 side rolling wheels to ensure truck alignment in track. Mount trucks on post brackets with 7/8" diameter ball bolts with ½" shank. Truck assembly to withstand same reaction load as track, 2000#.
f. Gate Hangars, latches, brackets, guide assemblies, and stops: Malleable iron or steel, galvanized after fabrication. Provide positive latch with provisions for padlocking.
g. Bottom guide wheel assemblies: Each assembly shall consist of two, 3" diameter rubber wheels, straddling bottom horizontal gate rail, allowing adjustment to maintain gate frame plumb and in proper alignment. Attach one assembly to each guide post.
h. Gate posts: galvanized steel 4’’ OD schedule 40 post, ASTM F 1083, weighing 9.1 lb/ft. Provide 1 latch post and 2 support posts for single slide gates. Finish to match fence.

PART 3 - EXECUTION

3.1 CHAIN LINK FENCING

A. Locate accurately. Install chain link fence in accordance with ASTM F567 and manufacturers instructions.

B. Concrete Footings: 10" min. diameter; or as otherwise shown on drawings; 4'-0" min. depth at all end, corner, gate posts; 3'-6" min. depth at line posts.

C. Posts: provide concrete footings in full compliance with manufacturer's recommendations and as shown on drawings. Level, plumb and secure and support all posts in position while concrete sets.

D. Rails: Top Rail Chain Link Fencing Only: Pass top rail thru intermediate post tops to form a continuous brace within each section of fence. Fasten securely to terminal posts. Securely join all other rails to posts.

E. Fence Bracing: At all ends, corners, and gate posts, provide bracing from midway between top rail and ground to first adjacent line post. Secure braces to posts and truss from line post back to terminal post with rods.

F. Fabric: Attach to line posts and gate frames 12" o.c., and to rails 24" o.c.; pull tight without bending posts. Attach fabric to end and corner posts, and canopy framing with tension bars, tension bands, and carriage bolts.

3.2 CANTILEVER SLIDE GATE

A. Verify areas to receive fencing are completed to finish grades and elevations and of sufficient space to receive gate in open position, (gate and overhang).

B. Install gate posts in accordance with manufacturer's recommendations.

C. Concrete set gate posts: Core holes in firm, undisturbed or compacted soil. Holes shall have diameter 4 times greater than outside dimension of post, and depths approximately 6 inches deeper than post bottom. Excavate deeper as required for adequate support in soft and loose soils, and for posts with heavy lateral loads. Set post bottom 36 inches below surface when in firm, undisturbed soil. Place concrete around post in a continuous pour, tamp for consolidation. Trowel finish around post and slope to direct water away from post. Check each post for vertical and top alignment, and maintain in position during placement and finishing operations.

D. Install gates plumb, level and secure for full opening without interference. Attach hardware by means which will prevent unauthorized removal. Attach hardware for smooth operation.

END OF SECTION 32 3113

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SECTION 32 3123 - EXTRUDED POLYVINYL CHLORIDE (PVC) FENCING

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. PVC fencing and accessories.

1.2 RELATED SECTIONS

A. Section 321313 - Site Concrete

1.3 SUBMITTALS:

A. Shop Drawings: Layout of fence and gates with dimensions, details and finishes of component accessories and post foundations.

B. Product Data: Manufacturer's catalogue cuts indicating material compliance and specified options.

C. Samples: Color selections for PVC, samples of materials.

1.4 SPECIAL WARRANTY

A. Provide manufacturer's Lifetime Limited Warranty.

PART 2 - PRODUCTS

2.1 PVC FENCE: *6'-0" height Privacy Legend Vinyl Fence and 5'-0" height Universal Style Fence, foot height*, color: *white, tan or gray* as manufactured by Master Halco,Inc.Orange,Ca, www.fenceonline.com or approved equal. Fence products from other manufacturers having a minimum of 5 years experience manufacturing PVC fencing will be acceptable by the architect if they meet the following specifications for design, size, and fabrication. PVC Profiles, lineals & extrusions used as components must "meet or exceed" the minimum performance guidelines laid out in ASTM 964-02.

A. Pickets, rails, and posts fabricated from PVC extrusion. The PVC extrusions shall comply with ASTM D 1784, Class 14344B and have the following characteristics:

Specific Gravity (+/- 0.02)	1.4 SG
Using 0.125 specimen Izod impact ft. lbs./in. notch	23.0 ft. lbs./in.
Tensile strength, PSI	6,910 PSI
Tensile modulus, PSI	336,000 PSI
Flexural yield strength, PSI	10,104 PSI
Flexural modulus, PSI	385,000 PSI

DTUL at 264 PSI 67d C

2.2 SETTING MATERIAL

A. Concrete: Minimum 28-day compressive strength of 3500 psi.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify areas to receive fencing are completed to final grades and elevations.

B. Ensure property lines and legal boundaries of work are clearly established.

3.2 INSTALLATION

A. Follow individual installation instructions for the appropriate style in setting posts. Posts shall be set in concrete per detail.
Corner posts on all fences and line posts shall be filled with concrete for additional strength.

B. Place assembled fence sections into position and slide rails into posts. The rails are secured into posts by tabs which are notched into the rails and catch on the inside wall of the post.

C. Check each post for vertical and top alignment, and maintain in position during placement and finishing operation.

3.3 GATE INSTALLATION

A. Install gates plumb, level and secure using bolt-on hardware supplied by the manufacturer.

B. Adjust hardware for smooth operation.

3.4 ACCESSORIES

A. Install post caps and other accessories to complete fence.

3.5 CLEANING

A. Clean up debris and unused material and remove from site.

END OF SECTION 32 3123

SECTION 32 4000 – SITE IMPROVEMENTS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Sign posts and plates.
2. Pipe Bollards.
3. Benches.

B. Related sections:

1. Section 31 2216 - Fine Grading.
2. Section 32 1313 – Site Concrete.

1.2 SUBMITTALS

A. Provide manufacturers' data (MD) for the following products:

1. Sign posts, panels and signage system components.
2. Pipe Bollards.
3. Benches.

B. Provide field erection shop drawings (SD) for all items covered under this section.

1.3 QUALITY ASSURANCE

A. Traffic control signage shall conform to the requirements of the "Manual on Uniform Traffic Control Devices.

PART 2 PRODUCTS

2.1 MATERIALS

A. Concrete: As specified Section 32 1313 "Site Concrete".

B. Signage: (Traffic) Refer to sign schedule on the drawings for sign type and size.

1. Panels: Aluminum engineering grade panels conforming to NYSDOT Standard Specification section 730-01.
2. Reflective sheeting for sign face shall conform to NYSDOT Standard Specification section 730-05.02 (Class B). Characters shall meet section 730-12 (Type IV) or 730-13 (Type V) as appropriate.
3. Sign Posts and Footings: conform to requirements on NYSDOT Standard Specification section 830-20.
4. Bumper Post Cover: ¼" thick safety yellow bumper post cover as manufactured by 'Ideal Shield' or approved equal.

2.2 PIPE BOLLARD

A. Pipe Bollard: 6” diameter galvanized schedule 40 steel pipe.
B. Finish: Refer to detail.

2.3 BENCHES

A. Dumor Bench 19 (6 foot) as manufactured by DuMor, Inc. (www.dumor.com) or approved equal. Color by owner

PART 3 EXECUTION

3.1 SIGNAGE and PIPE BOLLARDS

A. Set bollard or sign post in concrete foundation or subbase material as detailed.

3.2 BENCHES

A. Bench to be surface mounted to concrete pad as shown on plans. Attach to concrete pad per manufacturer’s recommendations.

END OF SECTION 32 4000

SECTION 32 9200 - LAWNS

PART 1 – GENERAL

1.1 SUMMARY

A. Section includes:
1. Seeding Lawns.
2. Hydro-seeding Lawns.
3. Meadow Lawn Mixes.
4. Rolled Erosion Control Fabric

B. Related Sections:
1. Section 312216 - Fine Grading.
2. Section 312500 - Erosion, Sediment and Pollution Control.
3. Section 32 9213 – HydroMulch for Slopes

1.2 SUBMITTALS

A. Provide Material Certificates (MC) and Manufacturers' Data (MD) for the following:
1. Seed species and source
2. Fertilizers
3. Jute Mesh
4. Tackifier

B. Furnish name of Landscape Contractor or Nurseryman to perform lawn seeding and obtain Architect's approval.

C. Lawn/Meadow Seed Mix: Submit one (1) pound seed mix sample per seed mixture specified in vendor's sealed package. Label shall clearly show weight, analysis by weight of each species, percent purity, percent germination, and vendor name.

D. Upon seeded lawn acceptance, submit written instructions recommending procedures for maintenance of seeded lawns.

1.3 DELIVERY AND STORAGE

A. Deliver seed and fertilizer materials in original unopened containers, showing weight, analysis, and name of manufacturer. Store in a manner to prevent wetting and deterioration.

1.4 PROJECT CONDITIONS

A. Work notification: Notify Owner at least 7 working days prior to start of seeding operations.

B. Protect existing utilities, paving, and other facilities from damage caused by seeding operations.

C. Perform seeding work only after planting and other work affecting ground surface has been completed.

D. Restrict traffic from lawn areas until grass is established. Erect signs and barriers as required.

E. Provide hose and lawn watering equipment as required.

1.5 WARRANTY

A. Provide a uniform stand of grass by watering, mowing, and maintaining seeded areas until final acceptance. Reseed areas, with specified materials, which fail to provide a uniform stand of grass, until all affected areas are accepted by the Owner.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Lawn fertilizer: Commercial, Starter with approximate 1:2:1 ratio of Nitrogen, Phosphorus, and Potash (such as 13-25-12)

B. Lawn seed: Fresh, clean, new crop. Deliver in original packages, unopened, bearing guaranteed analysis.
1. Meadow Mix A: Northern Ecology Mix as distributed by Northern Nurseries, Cicero, NY. 80% Chewings fescue and 20% Hard Fescue. Apply at a rate of 250 lb.s/acre.
2. Meadow Mix B: Northern Wildflower Mix as distributed by Northern Nurseries, Cicero, NY. 85% (26 lb.s) Sheepsfoot Fescue and 15% (4 lb.s) miscellaneous wildflowers.

C. Soil stabilizer: Manufactured by Soil Seal Corp., Riverside, CA or approved equal.

D. Mulch:
1. Lawns: Stalks of oats, wheat, rye, or other approved crops free from seed or noxious weeds.
2. Hydromulch: Greenwood cellulose fiber mulch as manufactured by Conwed or approved equal.

E. Rolled Erosion Control Fabric: Enkamat Turf Reinforcement Mat (TRM) 7010 as manufactured by Colbond Geosynthetics, Inc. (www.profileproducts.com).

PART 3 – EXECUTION

3.1 LAWNS/GENERAL

A. Where applicable, check and verify fine grading of respread screened stockpiled topsoil and off-site topsoil; repair any disturbances.

B. Where applicable, complete discing, raking, regrading, reconditioning and compost amendment of surface soils.

3.2 SEEDED LAWN / MEADOW LAWN

A. Scope: Make entire unpaved areas within contract limits new lawn unless otherwise noted. Refer to drawings for location of Seeded Lawn Mixture areas. Use Seeded Lawn Mixture in all other areas of disturbance beyond contract limits.

B. Season of year for seeding, hydroseeding, and sodding subject to approval by Architect. Do not seed or sod or hydroseed when high wind, drought, excessive moisture, ice, or other conditions are such that specified results are not likely to be obtained.

C. Fertilize: Evenly distribute at manufacturers recommendation. Work lightly into top 3 inches of soil.

D. Seed:
1. Rake immediately before seeding until surface is smooth, friable and of uniform fine texture. Roll. Rake out undulations shown by roller.
2. Uniformly spread seed in at least two directions at rate of 5 pounds per 1,000 square feet with approved mechanical spreader. Cover seed distributed on the surface to a depth not exceeding 1/4 inch by raking, brush, or chain harrowing, or other approved methods. Roll with 200 pound roller.

E. Mulch all seeded areas immediately after seeding. Hand or machine spread to form a continuous blanket 2 inch uniform thickness, loose measurement. Anchorage to hold mulch in place may be employed at contractor's option, subject to approval by Architect.

F. Hydroseeding:
1. All hydroseeding shall be applied by means of a hydroseed machine.
2. Mixture - Mix water, seed, fertilizer, mulch and soil stabilizer at the following rates and apply to the prepared finish grade by means of a hand-held hose. No truck mounted spraying equipment shall be driven over the areas to be seeded. Discharge shall be in an uphill direction only.

Fertilizer	1,000	pounds per acre
Seed	250	pounds per acre or as specified
Mulch	1,500	pounds per acre
Soil Stabilizer	25	gallons per acre

G. Protect all seeded and hydroseeded areas, at contractor's expense, with snow fences, wire farm fences, or similar structures. Remove upon final acceptance. On steep slopes or areas subject to erosion, stabilize topsoil and seed as required to allow adequate germination.

H. Maintain lawn / Meadow Area:
1. Begin immediately upon completion of seeding and mulching and continue for a minimum of 30 days or longer as required to establish uniform stand of specified grasses and until final acceptance.
2. Water immediately after mulching to saturate the soil to 1/2 inch depth. Thereafter, water all seeded areas to 1 inch depth soil saturation no less than two times per week, and more often during periods of drought or high winds, as required by Architect until final acceptance.
3. Maintain mulch daily, or more often as required. Contain mulch on site and clean up any areas where mulch is blown by wind.
4. Repair all washouts and gullies. Rerake, reseed and remulch as necessary.
5. Mow all lawn areas to 2 inch height until acceptance. Grass shall not exceed 3 inches in height. A minimum of three mowings is required.
6. Meadow areas shall not be mowed.

I. Inspection and final acceptance of lawns / Meadow Areas:
1. Contractor shall request inspection by Architect after establishment of uniformly germinated lawn and completion of maintenance.
2. Owner's responsibility after final acceptance.

3.3 ROLLED EROSION CONTROL FABRIC

A. Installation of Rolled Erosion Control Fabric is required on all slopes 3H:1V or greater. Install per manufacturers recommendations and coordinate with installation of Flexible Growth Medium Flexterra® FGM (Hydromulch).

END SECTION 32 9200

SECTION 32 9300 - PLANTINGS

PART 1 – GENERAL

1.1 SUMMARY

A. Section includes:
1. Soil Preparation
2. Trees, Shrub and Groundcover Planting
3. Planting Soil Mix
4. Plant Maintenance

B. Related sections:
1. Section 311000 - Site Clearing
2. Section 311001 - Site Preparation
3. Section 312301 - Sitework Excavation, Backfilling and Compacting

1.2 SUBMITTALS

A. Submit the following material samples:
1. Mulch
2. Planting Accessories

B. Provide the following Material certifications:
1. Topsoil source and pH
2. Peat Moss
3. Plant fertilizer
4. Hydrogel

1.3 QUALITY ASSURANCE

A. Conform to "Horticultural Standards of the American Association of Nurserymen", latest edition. Plant material shall be true to botanical name and legibly tagged. Well developed fibrous root systems. Free from all pests and disease.

B. Comply with sizing and grading standards of the latest edition of “American Standard for Nursery Stock”. Plant shall be dimensioned as it stands in its natural position.

C. All plants shall be nursery-grown under climatic conditions similar to those in the locality of the project for a minimum of two-years.

1.4 DELIVERY, STORAGE AND HANDLING

A. Deliver fertilizer materials in original, unopened and undamaged containers showing weight, analysis, and name of manufacturer. Store in manner to prevent wetting and deterioration.

B. Take all precautions customary in good trade practice in preparing plants for moving. Workmanship that fails to meet the highest standards will be rejected. Spray deciduous plants and evergreen foliage with an approved "anti-desiccant" immediately after digging to prevent dehydration. Dig, pack, transport and handle plants with care to ensure protection against injury. Inspection certificates required by law shall accompany each shipment invoice or order to stock and on arrival, the certificate shall be filed with the owner. Protect all plants from drying out. If plants cannot be planted immediately upon delivery, protect them with soil, wet peat moss, or in a manner acceptable to the owner. Water healed-in plantings daily. No plants shall be bound with rope or wire in a manner that could damage or break the branches.

C. Cover plants transported in open vehicles with a protective covering to prevent wind burn.

D. Provide dry, loose topsoil for planting bed mixes; frozen or excessively wet topsoil is not acceptable.

1.5 PROJECT CONDITIONS

A. Work notification: notify owner at least seven (7) working days prior to installation of plant material.

B. Protect existing utilities, paving and other facilities and site improvements from damage caused by landscape operations.

C. A complete list of plants, including a schedule of sizes and other requirements is shown on the drawings. If quantity omissions or material omissions occur in the plant material list, the planting plan shall govern.

1.6 PLANT MATERIAL GUARANTEE

A. Guarantee all plant materials to be true to name and size and in vigorous growing condition for a period of two years from date of final acceptance. Inspection will be made by the owner upon completion of planting.

B. Replace, in accordance with the drawings and specifications, all plants that are dead or not found to be in vigorous growing condition or are unsightly, unhealthy, or to have lost their natural shape to dead branches, or cause due to the Contractor's negligence, as determined by Owner during the guarantee period.

C. Plant Material Guarantee shall not include damage or loss of trees, shrubs or groundcover caused by fires, floods, freezing rains, lighting storms, snow plowing, and acts of vandalism.

D. Remove and immediately replace all plants, as determined by the owner to be unsatisfactory during the initial planting installation.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Plant materials: Provide plants typical of their species or variety with normal, densely developed branches, fibrous root systems. Provide only sound, healthy, vigorous plants free from defects, disfiguring knots, sun scald injuries, frost cracks, abrasions of the bark, plant diseases, insect eggs, borers, and all forms of infestation. All plants shall have a fully developed form without voids and open spaces. Plants held in storage will be rejected if they show signs of growth in storage.

1. Balled and burlapped: Dig with firm natural ball of earth of sufficient diameter and depth to encompass the fibrous and feeding root system necessary for full recovery of the plant. American Association of Nurserymen standard sizes to be minimum. Firmly wrap ball with burlap or similar material and bind with twine, cord, or wire mesh.
2. Bare Root: Dig and remove the earth without injury to the fibrous root system necessary for full recovery of the plant. Cover roots with a thick coating of mud by puddling or wrap in wet straw, moss, or other suitable packing material immediately after digging for protection until delivery.
3. Containers: All container-grown plant materials shall be healthy, vigorous, well rooted, and established in the container in which they are sold. An established container-grown plant shall have been transplanted into a container and grown in that container sufficiently long for the new fibrous roots to have developed so that the root mass will retain its shape and hold together when removed from the container. The container shall be sufficiently rigid to hold the ball shape protecting the root mass during shipping. American Association of Nurserymen standard container sizes shall be minimum.
4. Provide tree species that mature at heights over 25'-0" with a single main trunk. Trees that have the main trunk forming a "Y" shape are not acceptable.
5. Plants planted in rows shall be matched in form.
6. Plants larger than those specified in the plant list may be used when acceptable to the Owner.
    a. If the use of the larger plants is acceptable, increase the spread of roots or root ball in proportion to the size of the plant.
7. The height of the trees, measured from the crown of the roots to the top of the top branch, shall not be less than the minimum size designated in the plant list.
8. No pruning wounds shall be present with a diameter of more than 1inch, and such wounds must show vigorous bark on all edges.
9. Evergreen trees shall be branched to the ground.
10. Shrubs and small plants shall meet the requirements for spread and height indicated on the plants list.
    a. The measurements for height shall be taken from the ground level to the average height of the plant, and not the longest branch.
    b. Single-stemmed or thin plants will not be accepted.
    c. Side branches shall be generous, well-twigged, and the plant as a whole well bushed to the ground.
    d. Plants shall be in a moist, vigorous condition, free from dead wood, bruises, or other root or branch injuries.

2.1 ACCESSORIES

A. Mulch: Wood Chip Mulch, 50 percent shredded bark and 50 percent wood chip mixture, 3/4 inch - 2-1/4 inch size, free from elm wood chips and bark. To be utilized on individual tree plantings and perennial/ groundcover plant beds.

B. Planting Soil Mix: Natural, fertile, friable granular soil characteristic of productive soils in vicinity. Uniform in composition and texture. Clean, free from subsoil, clay lumps, stones, weeds, stumps, roots, toxic substances and debris of similar substances 1 inch or more in greatest dimension. Topsoil pH value of 5.5 to 7.5 or able to be amended, 8 to 20 percent minimum organic content, soluble salts not to exceed 500 parts per million.

C. Planting fertilizer: Commercial, containing by weight:
1. 5% Nitrogen 10% Phosphorus 5% Potash

D. Peat Moss: Brown to black in color. Acid reactions 4 to 5 pH. Low in content of woody material. Free from mineral matter harmful to plant life. Water absorbing capacity, 1100 to 2000 percent. Moisture content, 30 percent. Natural, shredded, or granulated.

E. Tree stakes: Sound wood.

F. Hose: For bark protection, new or used 2-ply fiber bearing rubber garden hose not less than 1/2 inch in diameter.

G. Wire: For tree supports. Pliable #9 gauge galvanized annealed steel wire.

H. Turnbuckles: 6 inch long, galvanized.

I. Tree wrapping: Waterproof 30-30-30 Krinklecraft or approved equal. 4 inch wide strips.

J. Anti-desiccant: "Wiltpruf", "Dowwax", "Pro-Tec", or approved equal.

K. Hydrogel: Gelscape(r) or approved equal, Amereq Inc. (914) 634-2400, 19 Squadron Boulevard, New York City, NY 10956.

L. Water: Free of substances harmful to plant growth. Hoses or other method for application and transportation furnished by the contractor.

PART 3 – EXECUTION

3.1 INSPECTION

A. Examine proposed planting areas and conditions prior to plant installation. Do not start planting work until unsatisfactory conditions are corrected.

3.2 PREPARATION

A. Nursery-grown trees
1. Time of planting:

a. Deciduous plant material: Plant deciduous materials in a dormant condition. If deciduous trees deciduous trees are planted in-leaf, they shall be sprayed with an anti-desiccant prior to planting operation.
b. Planting times other than those indicated shall be acceptable to the Owner.
c. Planting shall be performed only by experienced workmen familiar with planting trees under the supervision of a qualified supervisor. Locate plants as indicated or as approved in the field after staking by the Contractor. If obstructions are encountered that are not shown on the drawings, do not proceed with planting operations until alternate plant locations have been selected.

2. Excavate circular plant pits with vertical sides, except for plants specifically indicated to be planted in beds. Provide shrub pits at least 12 inches greater than the diameter of the root system and 24 inches greater for trees. Depth of pit shall accommodate the root system. Scarify the bottom of the pit to a depth of 4 inches. Remove excavated materials from the site.
3. Provide pre-mixed planting mixture for use around the balls and roots of the plants consisting of 5 parts planting topsoil to 1 part peat moss and 1/2 pound plant fertilizer Type A for each cubic yard of mixture.

3.3 INSTALLATION

A. Nursery-grown trees
1. Set plant material in the planting pit to proper grade and alignment. Set plants in upright, plumb, and faced to give the best appearance or relationship to each other or the adjacent structure. Set plant material 2 to 3 inches above the finish grade. No filling will be permitted around trunks or stems. Backfill the pit with planting mixture. Do not use frozen or muddy mixtures for backfilling. Form a ring of soil around the edge of each planting pit to retain water.
2. After balled and burlapped plants are set, muddle planting soil mixture around bases of balls and fill all voids.
   a. Remove all burlap, ropes, and wires from the tops of balls.
3. Anchoring:
   a. Anchor trees immediately after planting, prior to mulching and acceptance. Install the specified anchor system as detailed and in accordance with the manufacturer's recommendations.
4. Mulching:
   a. Mulch tree and shrub planting pits and shrub beds with required mulching material 3 inches deep immediately after planting. Thoroughly water mulched areas. After watering, rake mulch to provide a uniform surface.
5. Wrapping:
   a. Inspect trees for injury to trunks, evidence of insect infestation, and improper pruning before planting.
   b. Wrap trunks of all trees spirally from bottom to top with specified tree wrap and secure in place.
      1) Overlap 1/2 the width of the tree wrap strip and cover the trunk from the ground to the height of the second branch.
      2) Secure tree wrap in place with twine wound spirally downward in opposite direction, tied around the tree in at least 3 places in addition to the top and bottom.
6. Pruning:
   a. Prune branches of deciduous stock, after planting, to balance the loss of roots and preserve the natural character appropriate to the particular plant requirements. In general, remove 1/4 to 1/3 of the leaf-bearing buds; proportion shall in all cases be

acceptable to the Owner. Remove or cut back broken, damaged, and unsymmetrical growth of new wood.

b. Multiple leader plants: Preserve the leader which will best promote the symmetry of the plant. Cut branches flush with the trunk or main branch, at a point beyond a lateral shoot or bud a distance of not less than 1/2 the diameter of the supporting branch. Make cut on an angle.

3.4 MAINTENANCE

A. Maintain plantings until completion and acceptance of the entire project.

B. Maintenance shall include pruning, cultivating, weeding, watering, and application of appropriate insecticides and fungicides necessary to maintain plants free of insects and disease.

1. Re-set settled plants to proper grade and position. Restore planting saucer and adjacent material and remove dead material.
2. Tighten and repair anchor wires as required.
3. Correct defective work as soon as possible after deficiencies become apparent and weather and season permit.
4. Water trees and shrubs within the first 24 hours of initial planting, and as required until final acceptance.

3.5 ACCEPTANCE

A. Inspection to determine acceptance of planted areas will be made by the Owner, upon Contractor's request. Provide notification at least 10 working days before requested inspection date.

1. Planted areas will be accepted providing all requirements, including maintenance, have been complied with and nursery-grown trees are alive and in a healthy, vigorous condition.

B. Upon acceptance, the Owner will assume plant maintenance.

3.6 CLEANING

A. Perform cleaning during installation of the work and upon completion of the work. Remove from site all excess materials, soil, debris, and equipment. Repair damage resulting from planting operations.

END O F SECTION 32 9300

SECTION 33 1116 – SITE WATER UTILITY DISTRIBUTION PIPING

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Furnishing pipe, fittings, valves and appurtenances for water and process flow.

B. Furnishing miscellaneous appurtenances.

C. Installation.

D. Testing.

1.2 SHOP DRAWINGS

A. Shop drawings for piping, fittings and other appurtenances shall be prepared and submitted in accordance with Section 01010, General Requirements. Shop drawings shall show complete piping, layout including materials, sizes, classes, locations, necessary dimensions, supports, etc. No fabrication or installation shall begin until shop drawings are approved by the Engineer.

B. Certificates
   1. Pressure Test
   2. Disinfection Certificate
   3. Bacteriological Tests

1.3 REFERENCE STANDARDS

A. ANSI A21.4 /AWWA C104 - Cement-Mortar lining for Ductile Iron and Gray Iron Pipe and Fittings for Water.

B. ANSI A21.10 /AWWA C111 - Ductile Iron and Gray Iron Fittings, 3-inch through 48-inch, for Water and Other Liquid.

C. ANSI A21.11 /AWWA C151 - Rubber Gasket Joints for Ductile Iron and Gray Iron Pressure Pipe and Fittings.

D. ANSI A21.51 /AWWA C151 - Ductile Iron Pipe Centrifugally Cast in Metal Molds and Sand Lined Molds for Water and Other Liquids.

E. AWWA C200 - Steel Water Pipe and Fittings for Pipe 8-inch Inside Diameter and Larger.

F. AWWA C206 - Field Welding Joints in Steel Pipe.

G. AWWA C208 - Steel Fittings.

H. ASTM A126 - Gray Iron Castings for Valves, Flanges and Pipe Fittings.

I. ASTM A234 - Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and Elevated Temperatures.

J. ASTM A338 - Malleable Iron Flanges, Pipe Fittings and Valve Parts for Railroad, Marine, and Other Heavy Duty Service at Temperatures up to 650 F (345 C).

K. AWWA C500 - Gate Valves - 3-inch through 48-inch - for Water and Other Liquids.

L. AWWA C600 - Installation of Ductile Iron Water Mains.

M. AWWA C601 - Disinfecting Water Main.

N. UNI-B-5 - Low Pressure Air Testing of Installed Sewer Pipe.

PART 2 - PRODUCTS

2.1 GENERAL

A. All products included in this Section shall conform to the requirements of the standard specifications referenced herein.
   1. Provide products designed for 175 psi working pressure (minimum) or 50 psi above design working pressure, whichever is greater, unless otherwise noted.

B. Pipe size shall be as shown on the Drawings.

C. All pipe shall be restrained push-on joint ductile iron Class 51 as specified herein and shown on the Drawings, except as follows:
   1. Chlorine solution and chemical feed pipe shall be as described herein.
   2. Potable and non-potable water pipe 3-inches or less in diameter shall be Threaded Galvanized Steel.

D. The underground water and process piping system shall be installed as shown on the Drawings.

2.2 PIPE

A. Push-on Joint Ductile Iron Pipe: Shall conform to ANSI 21.51 /AWWA C151, Class 52. Fittings shall be ductile iron conforming to ANSI A21.10 /AWWA C111 standards and shall include plain rubber gaskets. Pipe and fittings for all potable and non-potable water lines shall be double cement lined and seal coated inside and out in accordance with ANSI A21.4 /AWWA C104. All pipe and fittings used as process pipe shall be Type C coal tar enamel lined and coated in accordance with AWWA C203.

   Joints - Pipe shall be furnished with push-on joints and fittings shall be furnished with mechanical joints. The type of joint shall meet the following applicable requirements:

   1. Push-on joint - The rubber gasket joint shall be as generally described in AWWA C111. Push-on joints shall provide the minimum deflections:

Pipe Size	Minimum Deflection
4” thru 12”	5.0
16” thru 18”	3.0
24” thru 36”	1.5

      Push-on joint pipe shall be “Tyton” as manufactured by U.S. Pipe and Foundry or equal.

B. Copper domestic water service pipe shall bear standard markings per AWWA standards.

2.3 GATE VALVES

A. Valve
   1. Provide gate valves with cast iron body, resilient wedge or double disk gate valve, bronze mounted.

B. Supervisory Switches
   1. Provide supervisory switches for OS & Y control valves and indicator posts.
   2. Provide spot circuit switches, 125 volt A.C., .25 amp; 24 volt D.C.
   3. Provide die cast aluminum housing finished in red baked enamel with weatherproof seal and tamper indication.

2.4 MISCELLANEOUS

A. Couplings - Shall be cast iron with stainless steel bolts and nuts. The couplings shall receive two coats of coal tar epoxy paint on all exterior surfaces prior to installation.

2.5 COATINGS

A. Type A Galvanized All piping to be galvanized shall have a deep galvanized coating applied in full accordance with ASTM Designation A-120.

B. Type B Coal Tar Enamel - Caol tar enamel coating shall be furnished and applied in full accordance with AWWA Specification C203 for coal tar enamel coatings.

C. Type C Protective Coating - Steel - All steel pipe shall receive a prime coat of one of the following types:
   1. Coal tar primer conforming to AWWA Specification C203 for coal tar enamel protective coating for steel water pipes.
   2. Bitumastic No. 505 by Koppers Co. or Heavy Duty Black No. 46-449 by Tnemec, or equal. Apply per manufacturer's recommendations.

D. Type D Protective Coating - Ductile Iron or Cast Iron - The standard outside bituminous coating shall be as generally described in AWWA Standards C151 or C106 and C108, respectively.

2.6 STERILIZATION

A. All pipe and fittings connected to and forming part of a potable water supply shall be sterilized in full accordance with both the requirements of AWWA Standard C651 for Disinfecting Water Mains, and the State (or County) Department of Health and shall be acceptable to the Engineer. The continuous feed method shall be used for chlorine application.

B. All new piping shall be filled with not less than 50 mg/l nor more than 75 mg/l available chlorine and retained in the main for not less than 24 hours. During this time, all valves and hydrants in the section treated shall be operated in order to disinfect the appurtenances. At the end of this 24-hour period, the treated water shall contain no less than 25 mg/l available chlorine throughout the length of the main. All chlorine introduced into the system shall be totally dissolved. The introduction of solid hypochlorite directly into the system is prohibited.

C. Sterilization tests shall be repeated as often as necessary until the minimum residual chlorine content of 25 mg/l has been reached. The chlorine solution shall be thoroughly flushed out prior to placing the new sections of main in service. The Contractor is cautioned that the spent chlorine solution must be disposed of in a manner acceptable to the Owner, in an area share its effects will be undetrimental to animal, plant or fish life.

D. After final flushing and before the water main is replaced in service, a water sample or samples from the end of each main shall be collected and analyzed for total coliform, in accordance with local and/or state health department procedures. Analysis shall be performed by health department approved laboratories. If health department drinking Water standards for total coli form are not met, the sterilization procedures and coli form Testing shall be repeated. The Contractor shall bear all necessary costs of coli form Testing.

2.7 LININGS

For potable water applications, all linings and sealers shall conform to all applicable local, state and federal health codes.

A. Type A Standard Cement Lining - All ductile iron potable, non-potable, and effluent water piping and fittings shall have a Type A standard cement lining. Type A standard cement linings shall consist of cement mortar, centrifugally applied in accordance with AWWA Standard C104, except lining thickness shall not be less than 1/8". The inside shall be given a seal coat of asphalt material as described in Section 4.12. of AWWA Standard C104. For potable water applications, all linings and sealers shall conform to all applicable local, State, and Federal health codes.

B. Type D Cement Mortar Lining - The steel pipe shall be lined with a shop-applied cement mortar lining. The lining shall be done in accordance with AWWA Standard C205 for cement-mortar protective lining. The lining thickness shall not be less than 1/4" for 4" to 10", 5/16" for 11" to 23", 3/8" for 24" to 36", and 1/2" for 36" and over.

2.8 ENCASEMENT

In the event an underground pipe 10 inches or smaller is shown under a base slab and there is less than 30 inches separation between the top of the pipe and the bottom of the slab, then the pipe shall be encased in concrete for its entire length under the slab in accordance with details shown on the Drawings. Where no detail is shown, encasement shall be formed to provide a minimum of 8 inches of concrete cover reinforced with #5 reinforcing bars spaced 12 inches each way. When the top of the pipe is within 12 inches of the bottom of the slab, the encasement shall be tied to the base slab with reinforcing.

PART 3 - EXECUTION

3.1 GENERAL

A. Pipe and accessories shall be handled in such a manner as to insure that pipe is installed in sound, undamaged condition. Particular care shall be taken not to injure the pipe coating or lining (if any).

B. Any pipe showing a distinct crack with no evidence of incipient fracture beyond the limits of the visible crack, if approved, may have the cracked portion cutt off by, and at the expense of, the Contractor before the pipe is laid so that the pipe used is perfectly round. The cut shall be made in the sound barrel at a point at least 12 inches from the visible limits of the crack.

C. Cutting of the pipe shall be done in a neat and workmanlike manner without damage to the pipe lining. Unless otherwise authorized by the Engineer, all pipe cutting shall be done by means of an approved type of power cutter. The use of hammer and chisel, or any other method which results in rough edges, chipped or damaged pipe, is prohibited.

D. Each pipe section shall be placed into position in the trench in such manner and by such means required to cause no injury to the pipe, persons, or to any property.

E. The Contractor shall furnish slings, straps and/or approved devices to provide satisfactory support of the pipe when it is lifted. Transportation from storage areas to the trench shall be restricted to operations which can cause no damage to the pipe or lining.

F. The pipe shall not be dropped from trucks onto the ground or into the trench.

G. The Contractor shall have on the job site with each pipe laying crew, all the proper tools to handle and cut the pipe.

H. Damaged pipe coating and/or lining shall be restored before installation as approved by the Engineer.

3.2 CONTROL OF ALIGNMENT AND GRADE

A. Easement and property and other control lines necessary for locating the work as well as elevations used in the design of the work as shown on the Drawings. The Contractor shall use this information to set line and use a level or transit to set grade.

B. The Contractor may use laser equipment to assist in setting the pipe provided he can demonstrate satisfactory skill in its use.

C. The use of string levels, hand levels, carpenter's levels or other relatively crude devices for transferring grade or setting pipe are not to be permitted.

D. The Contractor shall carefully preserve bench marks, reference points and stakes, and in case of willful or careless destruction by his own men, he will be charged with the resulting expense to re-establish such destroyed control data and shall be responsible for any mistakes or delay that may be caused by the unnecessary loss or disturbance of such control data.

3.3 PREPARATION OF BED

A. As soon as excavation has been completed to required depth, place and compact bedding materials as shown on the Contract Drawings and specified in Section 31 23 00 to the elevation necessary to bring the pipe to grade.

B. The compacted bedding material shall be rounded so that at least the bottom quadrant of the pipe shall rest firmly on the bedding for the full length of the barrel. Suitable holes for bells or coupling shall be dug around the pipe joints to provide ample space for making tight joints.

3.4 LAYING PIPE

A. Each pipe length shall be inspected for cracks, defects in coating or lining, and any other evidences of unsuitability.

B. Pipe shall be laid in the dry and at no time shall water in the trench be permitted to flow into the pipe.

C. The pipe shall then be laid on the trench bedding, and the pipe pushed home. Jointing shall be in accordance with the manufacturer's instructions and appropriate ASTM Standards, and the Contractor shall have on hand for each pipe laying crew, the necessary tools, gauges, pipe cutters, etc., necessary to install the pipe in a workmanlike manner. Pipe laying shall proceed upgrade with spigot ends pointing in the direction of flow.

D. Blocking under the pipe will not be permitted except where a concrete cradle is proposed, in which case precast concrete blocks shall be used.

E. After placement of the blanket material, the pipe shall be checked for line and grade and any debris, tools, etc., shall be removed.

F. If inspection of the pipe indicates that the pipe has been properly installed as determined by the Engineer, the Contractor may then refill or backfill the remainder of the trench in accordance with Section 31 23 00 and the typical trench detail shown on the Drawings.

G. At any time that work in not in progress, the end of the pipe shall be suitably closed to prevent the entry of animals, earth, water, etc.

H. At the end of each day's work or at intervals of length at the option of the Engineer, the Engineer, with the Contractor, will inspect the pipe for alignment with lamps or mirrors. unsatisfactory work shall be dug up and reinstalled to the satisfaction of the Engineer.

3.5 VALVE INSTALLATION

A. Install valves of the sizes shown on the Drawings. Valves shall have mechanical joint ends, and shall include all joint accessories and retainer glands. Valves shall be installed plumb and true to line and grade.

B. Valve boxes shall be installed on all buried valves.

3.6 THRUST BLOCKS

A. Concrete thrust blocks shall be used to prevent movement of fittings. The earth which is to form the backing shall be carefully cut by hand so as to leave an undisturbed surface. Concrete shall be kept behind the bell of the fittings and at hydrants. Care shall be taken to see that the drainage hole is not obstructed. Required volume of concrete for thrust blocks shall be as shown on the Drawings.

B. Concrete thrust blocks shall be installed on all bends of pressure pipe, except restrained-joint pipes, and gravity pipe subject to periodic pressurization (for example, tank drain lines subject to being blown-back with air or liquid).

3.7 PLACEMENT UNDER PUBLIC ROADS

A. Where piping runs under public roads, secure and pay for necessary permits from authorities having jurisdiction and perform all work in compliance with their requirements.

3.8 CONNECTION TO EXISTING WATER MAINS

A. Secure and pay for necessary permits from water authority and perform all work in compliance with their requirements.

B. Provide live tap connection to existing main performed by the contractor to avoid interruption of service. Comply with requirements of local water authorities.

C. Provide gate valve at tap with valve box.

3.9 TESTING

A. General
   1. Leakage tests shall be conducted on all pipes installed under this Section. The Engineer shall witness all tests. The Contractor shall supply all plugs, pumps, weirs, gauges, water trucks, etc., necessary to conduct the tests. Should the work fail the leakage tests, corrective action shall be taken by the Contractor in a manner approved by the Engineer and, if directed by the Engineer, the Contractor shall dig up and relay the failed section.
   2. The use of sealants, applied from the inside of the pipe, is not acceptable.
   3. Flush all piping systems with water prior to testing.

B. Test Procedures
   1. Procedure A shall consist of a 15-minute test at 100 psi followed by a three-hour test at 50 psi.
   2. Procedure B shall consist of a one-hour test at 150 psi followed by a two-hour test at 100 psi.
   3. Procedure C shall consist of a 30-minute test at 50 psi.
   4. Procedure D shall consist of an exfiltration test; the pipe is filled with clear water to provide a head of at least 5 feet above the top of the pipe at the highest point of the pipeline under test, and then measuring the loss of water from the line by the amount which must be added to maintain the original level. In this test, the test period (for taking measurements) shall not be less than three hours.

C. Pressure Pipe Testing - All pressure pipe shall be tested as follows: After the pipe has been laid, all newly laid pipe or any valved section thereof shall be subjected to a hydrostatic pressure of at least 1.5 x the highest working pressure in the section.

D. Test Pressure Restrictions - Test pressure shall:
   1. Not be less than 50 psi at the highest point along the test section.
   2. Not exceed pipe or thrust restraint design pressures.
   3. For water lines, test pressure to be 150 psi.
   4. Be of at least 2-hour duration.
   5. Not vary by more than +5 psi.
   6. Not exceed twice the rated pressure of the valves when the pressure boundary of the test section includes closed gate valves.

E. Pressurization - Each valved section of pipe shall be filled with water slowly and the specified test pressure, based on the elevation of the lowest point of the line or section under test and corrected to the elevation of the test gauge, shall be applied by means of a pump connected to the pipe.

F. Air Removal - Before applying the specified test pressure, air shall be expelled completely from the pipe and valves

G. Examination - All exposed pipe, fittings, valves, and joints shall be examined carefully during the test. Any damaged or defective pipe, fittings, or valves that are discovered following the pressure test shall be repaired or replaced with sound material and the test shall be repeated.

H. Leakage Test
   1. A leakage test shall be conducted concurrently with the pressure test.
   2. Leakage defined: Leakage shall be defined as the quantity of water that must be supplied into the newly laid pipe, or any valved section thereof, to maintain pressure within 5 psi of the specified test pressure after the water in the pipe-line has been expelled and the pipe has been filled with water.
   3. Allowable leakage: No pipe installation will be accepted if the leakage is greater than that determined by the following formula: $L = \frac{SDP^{1/2}}{}$

4. L is the allowable leakage, in gallons per hour; S is the length of pipeline tested in feet; D is the nominal diameter of the pipe, in inches; and P is the average test pressure during the leakage test, in pounds per square inch gauge.

3.10 PROXIMITY TO WATER MAINS

A. Sewers shall be located at least 10 feet, horizontally, from any existing or proposed water main, except that a deviation from this separation to avoid subsurface structures, including telecommunication chambers, interference of building foundations shall be allowed subject to a waiver approval by the New York State Department of Environmental Services provided that the sewer is constructed as follows:
   1. Sewer pipe shall be Class 52 ductile iron for a maximum distance of 75 feet each side of the obstruction.
   2. Joints shall be mechanical type, water pressure rated, with zero leakage when tested at 25 pounds per square inch for gravity sewers and 1-1/2 times working pressure for force mains.

B. Whenever sewers must cross water mains, the sewer shall be constructed as follows:
   1. Sewer pipe shall be Class 52 ductile iron for a minimum distance of 9 feet each side of the crossing.
   2. Joints shall be mechanical type water pressure rated with zero leakage when tested at 25 pounds per square inch for gravity sewers and 1-1/2 times working pressure for force mains and joints shall not be located within 9 feet of the crossing.
   3. Vertical separation of the sewer and water main shall not be less than 18 inches.

C. Watermain crossing sewers shall be laid to provide a minimum vertical distance of 18 inches between the outside of the watermain and the outside of the sewer. This shall be the case where the watermain is either above or below the sewer. At crossings, one full length of waterpipe shall be located so both joints will be as far from the sewer as possible. Special structural support for the water and sewer pipes may be required.

D. Any of the aforementioned solutions shall be noted on Utilities Location Drawing.

E. The Contractor shall be responsible for filing the waiver request with the NYSDEC.

END OF SECTION 33 1116

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work Specified
1. Fire Hydrants
a. The work specified shall include all labor, material, equipment, services and incidentals necessary to furnish and install hydrant, hydrant extensions, hydrant marker, storz nozzle, concrete anchors, gate valve, valve box & cover, lateral piping and main size by 6-inch branch anchor tee with thrust block as shown on the plans and specified herein.
2. Blow Off/Flushing Hydrants
a. The work specified shall include all labor, material, equipment, services and incidentals necessary to furnish and install blow off hydrant, blow off hydrant extensions, service saddle, piping and fittings as shown on the plans and specified herein.

B. Related Work Specified Elsewhere
1. Section 32 3100 - Excavation, Backfilling & Compacting
2. Section 32 1313 - Site Concrete
3. Section 33 1115 - Potable Water
4. Section 33 1216 - Resilient Seat Gate Valves
5. Section 33 1218 - Miscellaneous Fittings & Appurtenances
6. Section 33 1220 - Pressure and Leakage Tests
7. Section 33 1300 – Disinfection

1.2 QUALITY ASSURANCE

A. Fire Hydrants
1. Acceptable Manufacturers
a. Mueller- Super Centurion 250, A-423
b. Kennedy - Guardian K81AW
c. Or Equal
2. Reference Standards
a. AWWA C502, Dry-Barrel Fire Hydrants, Latest revision.

B. Flushing Hydrants
1. Acceptable Manufacturers
a. Kupferle Foundry Company #77 Mainguard Hydrant
b. Mueller A-408
c. Other Manufacturers of equivalent products
2. Qualifications
a. Furnish products from a manufacturer with at least 5 years documented experience in the manufacture of this product.

C. Parts Interchangeability
1. Hydrants and appurtenances provided under this Section shall be the standard product in regular production by manufacturers whose products have proven reliable in similar service for at least two years.
2. Hydrants and valves shall be the product of the same manufacturer.

1.3 SUBMITTALS

A. Shop Drawings - Prior to obtaining any products included in this Section, the Contractor shall submit detailed shop drawings and data for review.

B. Materials List - The Contractor shall submit, along with shop drawings, a materials list which shall include full information regarding all components of the equipment. Materials of construction shall be presented in the listing.

C. Other Submittals
1. Prior to installation of the proposed equipment, the Contractor shall furnish the required number of copies of the manufacturer's Operation and Maintenance Manual for each item.
2. The Contractor shall submit certificates of compliance with the applicable referenced standards.

1.4 PRODUCT DELIVERY, STORAGE AND HANDLING

A. During delivery and handling, all materials shall be braced and protected from any distortion or damage; any such distortion or damage shall be basis for rejection of the materials.

B. All hydrants and appurtenances shall be stored in an enclosed shelter and off the ground, unless otherwise approved by the Engineer.

C. Interiors of pipe, fittings and specials shall be kept free from dirt and foreign matter.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General
1. Manufacturer's name: cast in raised letters on hydrant body.
2. All bolts for buried application: Type 304 stainless steel or fluorocarbon coated, high strength corrosion resistant low alloy steel.
3. All other bolts, nuts and studs shall, unless otherwise specified, conform to ASTM A 307, Grade B; or ASTM A 354.
4. Bolts and nuts shall have Pentagon heads and nuts.
5. Gasket material and installation shall conform to manufacturer's recommendations.
6. Fire hydrant shut-off gate valve (auxiliary valve): resilient seat as specified in Section 33 1216, "Resilient Seat Gate Valves".
7. Anchor Tee: Furnish Ductile Iron MJ X MJ run tee with 6-inch Plain End branch with anchored rotating MJ gland. Furnish PVC fittings and hydrant lead piping conforming to AWWA C900, Pressure Class 200 DRI4 when PVC water main pipe is used.

B. Fire Hydrants

1. Furnish hydrant with cast iron body, break-away type barrel, "O" ring operating stem seal and a 170-psi test pressure.
2. Maintainability: All operating parts, including brass valve seat, removable through the barrel without excavation.
3. Compression type, with valve opening not less than *5-1/4* inches and non-rising stems. Valve shall open against pressure and shall close with pressure.
4. Provide two *2-1~2-inch* hose nozzles and one 4-1/2-inch pumper connection with National Standard threads and operating nuts.
5. Barrel length: provide for a minimum of 5 foot bury to maximum of 7 foot bury or as shown on the contract drawings to match grade (extensions to be provided as required to match finish grade).
6. Operating nuts operating direction and caps shall be as shown in the schedule.
7. Inlet: 6-inch mechanical joint unless otherwise specified.
8. Provide weep holes for drainage.
9. Provide Steel Hydrant Marker with Lexan Flag as specified below or Provide Owners Standard Hydrant Marker if one is available:
    a. Flag shall provide 20 sqaure inches of visible surface.
    b. Flag shall be red.
    c. Steel pole length shall be 53".
    d. Steel pole shall have galvanized spring to mount on hydrant.
    e. Provide all bolts and hardware to mount to bolt on top of hydrant.
    f. Manufacturer:
        1) Hydrant Flexi-Flag 53" with Hardware (USA Blue Book Model 44064).
        2) Or Approved Equal.
10. Provide Storz Pumper Nozzle Connection (All Hydrants).

C. Flushing Hydrants
1. Nozzle: 2-1/2 inch NST Bronze with iron cap
2. Barrel: Furnish east barrel with traffic break-away coupling.
3. Inlet: Brass, 2-inch FIP side or bottom as shown on the plans
4. Operator: Slotted operating nut, locking cast iron cover, brass operating screw and connecting nut.
5. Valve: Brass plunger, brass body, dual O-ring full draining.

2.2 EQUIPMENT/TOOLS

A. Contractor shall furnish One (1) Hydrant Wrench for Every Ten (10) Hydrants Installed.

B. Furnish two (2) diffusers (one for 2-1/2" nozzle and one for 4-1/2" nozzle), Including pressure gauge/appurtenances and case.
   1. Pollard - 2-1/2" Diffuser
      a. 2-1/2" Diffuser Model P67501-160
      b. Pressure Gauge Model P66916LF
      c. Assemble/Appurtenances Model P67512
      d. Case Model P675
   2. Pollard - 4-1/2" Diffuser (Able to Connect to Storz Nozzle)
      a. 4-1/2" Diffuser w/pressure gauge Model P67502LF
      b. Case Model P67502
      c. Piezo Model P67513

PART 3 - EXECUTION

3.1 INSTALLATION

A. Fire Hydrants
   1. Set hydrant plumb with the center of the lowest nozzle between 18 inches and 24 inches above the finished grade or as specified by the Engineer.
   2. Auxiliary valve: locate as close to main line as possible, a minimum of 36 inches from the center of the hydrant.
   3. Minimum clearance from traveled way: 2 feet to the face of the curb or 5 feet to the edge of the pavement where no curb exists unless otherwise required by Owner or regulatory agency.
   4. Pumper nozzle: Storz nozzle to face road or as otherwise specified.
   5. Thrust restraint: harness hydrant, auxiliary valve and branch tee or anchor pipe together. Provide thrust block at hydrant tee. Provide 24 inch X 24 inch X 6 inch thick anchor block under hydrant, when PVC piping lead is used.
   6. Drain pocket: approximately 1 cubic yard with Type C NYSDOT No. 1Stone.
      a. Type C material: Extend a minimum 12 inches from drain holes in all directions.
      b. Cover the Type C material with a protective layer of geotextile filter fabric prior to backfilling.
   7. Inspection
      a. All hydrants and valves will be inspected by the Engineer prior to installation.
      b. Verify that existing condition are suitable for installation of hydrant.
      c. Verify that the installation can proceed in accordance with all pertinent codes and regulations, the original design and the referenced standards.
   8. Provide commercially available "Out of Service" Hydrant Bag or Nozzle Markers until testing and inspection is complete and hydrant is placed in service.
   9. High Groundwater Encountered
      a. Hydrant weep holes shall be plugged whenever seasonal high groundwater is encountered above the base of the hydrant.
      b. Hydrant with weep holes plugged shall be tagged with a brass tag indicating "Weep Hole is Plugged. Pump Out Hydrant After Use".
   10. Furnish and Install Hydrant Marker.

B. Flushing Hydrants
   1. Set Hydrants Level and Plumb, with discharge nozzle 24 inches above finish grade.
   2. Connect blow off flushing hydrant to main with bronze double strap service saddle.
   3. Locate hydrant a minimum of 2 feet from the face of the curb or 5 feet from the edge of pavement where no curb exists.
   4. Provide a drain pocket with a minimum of 1 cubic yard of Type C NYSDOT No. 1 Stone.
   5. Cover Type C material in drain pocket with a protective layer of geotextile filter fabric.

C. Discrepancies
   1. Notify the Engineer immediately if the above referenced inspection reveals discrepancies.
   2. Do not proceed with installation until discrepancy is resolved.

3.2 PAINTING

A. Shop paint all interior wetted surfaces of fire hydrants except finished or bearing surfaces in accordance with NSF specifications for potable water. Apply in accordance with the manufacturer's recommendations. Paint exterior surfaces red. Repaint exposed surfaces red in the field after installation.

3.3 TESTING

A. Adjust all parts and components as required to provide correct operation.

B. Demonstrate to the Engineer's satisfaction that all system components operate correctly, both individually and as a system. Provide all required testing equipment.

C. Perform pressure test at Main Pressure
   1. CAUTION! OPENING HYDRANT FULLY BEFORE ALL AIR IS VENTED CAN COMPRESS TRAPPED AIR, CREATING A SAFETY HAZARD!
   2. Remove highest nozzle / outlet cap and open hydrant valve a few turns. Allow water to reach bottom of outlet nozzle.
   3. Reinstall outlet nozzle loosely to allow trapped air to escape.
   4. Tighten outlet nozzle caps after all air has escaped.
   5. Open the hydrant completely.
   6. Check for leakage at flanges, outlet nozzles, and stem seals.
   7. Repair or replace faulty components or hydrants
   8. Repeat as necessary until satisfactory results are obtained.

D. Verify full flow, complete shut off and barrel drainage.
   1. Perform drainage test after pressure testing is completed.
   2. Close hydrant main valve
   3. Remove outlet nozzle cap and cover opening with palm of hand.
   4. Drainage should be rapid enough to create perceptible suction pressure.
   5. If hydrant fails drainage test, partially open hydrant with outlet nozzle caps on to create internal pressure to clear drain valve. Retest hydrant. If hydrant fails second test, remove drain valve assembly and inspect. If drain valve is clear excavate hydrant to inspect drain ports. Make required repairs and restart testing from beginning of pressure test sequence.

E. Verify that hose and pumper threads match local fire company equipment.

F. Protect existing landscaping and facilities from water damage during testing.

G. Make all necessary repairs at no additional cost to the Owner.

H. After testing is complete, coat pumper and hose connection threads with NSF approved food-grade anti-seize compound and install caps.

3.4 SCHEDULE

A. Hydrants
   1. Operating Nut: Pentagon Nut
   2. Closure: Clockwise
   3. Hydrant Color: Red
   4. Hose & Streamer Threads:
      a. Coordinate with local fire department.
      b. Submit sample of each outlet type for verification. Accepted samples may be incorporated in the Work.

END OF SECTION 33 1219

SECTION 33 3910 – SANITARY STRUCTURES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Sanitary Structures
   2. Sanitary Piping
   3. Sanitary Fittings

B. Related Work Specified Elsewhere:
   1. Section 31 1001 – Site Preparation
   2. Section 31 2300 – Excavation, Backfilling and Compacting

1.2 REQUIREMENTS OF REGULATORY AGENCIES

A. Obtain necessary permits from local Authorities. Ascertain and comply with local requirements for materials, construction and restoration of pavement.

1.3 SUBMITTALS

A. Shop Drawings: Show fabrication details and connections to adjacent Work.

B. Product Data: Manufacturer's catalog cuts, specifications, and installation instructions.

C. Product Data: Manufacturer's specifications with all pertinent information regarding dimensions, fittings and installation instructions.

PART 2 PRODUCTS

2.1 GENERAL

A. Each length of pipe and each fitting shall be marked in accordance with the applicable ASTM Designation.

2.2 DRAINAGE PIPE AND FITTINGS

A. PVC Sewer Pipe and Fittings; (6 inches Diameter and Larger): SDR 35 and ASTM D 3034.

B. ABS Sewer Pipe and Fittings: ASTM D 2751.

C. ABS Composite Sewer Pipe: ASTM D 2680.

D. Plastic Pipe (4 and 6 inches Diameter, Solid and Perforated) for Building Drains, Cleanout Pipes, Discharge Lines, Leaching Fields, Drain Tiles, etc: PVC meeting ASTM D 2729 or SR (Styrene Rubber) meeting ASTM D 2852.

2.3 SOLVENT CEMENTS

A. Solvent cement used for joining plastic pipe and fittings shall meet the following designations for the various types of plastic pipe listed.
   1. PVC: ASTM D 2564.
   2. ABS: ASTM D 2235.
   3. SR: ASTM D 3122.

2.4 STRUCTURES

A. Precast Reinforced Concrete Manholes:
   1. Riser Sections: ASTM C 478.
   2. Joints Between Riser Sections-One of the following:
      a. Rubber Gaskets: ASTM C 443.

b. Butyl Joint Sealant: ConSeal CS-202 by Concrete Sealants, Inc., 8917 S. Palmer Rd., P. O. Box 176, New Carlisle, OH 45344, (513) 845-8776.

3. Concrete for Precast Units: Air content 6 percent by volume with an allowable tolerance of plus or minus 1.5 percent. Minimum compressive strength of 4,000 psi after 28 days.
4. Load Rating: AASHTO HS-20 with 30% impact and 130 lb/cf equivalent soil pressure.

B. Glass-Fiber Reinforced Polyester Manholes:
1. One-Piece Monolithic Unit: ASTM D 3753.
2. Nominal Inside Diameter: 48 inches.
3. Minimum Wall Thickness: 0.480 inch.
4. Concentric Cone Top:
a. Minimum Clear Opening: 30 inches.
5. Load Rating: AASHTO HS-20 with 30% impact and 130 lb/cf equivalent soil pressure.
6. Acceptable Fiberglass Manhole Manufacturers: Containment Solutions, Inc., 5150 Jefferson Chemical Rd., Conroe, TX 77301, (888) 409-7731; L.F. Manufacturing, P.O. Box 578, Highway 290 East Giddings, Texas 78942, (800) 237-5791.

C. Precast Reinforced Square and Rectangular Concrete Structures:
1. Riser Sections: ASTM C890.
2. Keyed Joints:
a. Joint Sealant - Select One:
1) Mortar
2) Rubber Gasket
3) Butyl Joint Sealant
3. Load Rating: AASHTO HS-20 with 30% impact and 130 lb/cf equivalent soil pressure.
4. Concrete for Precast Units: Air content 6 percent by volume with an allowable tolerance of plus or minus 1.5 percent. Minimum compressive strength of 4,000 psi after 28 days.

D. Cast-in-Place Concrete for Manhole Invert Channels: Normal weight, air entrained concrete with a minimum compressive strength of 4,000 psi after 28 days.
1. Design Air Content: 6 percent by volume plus or minus 1.5 percent.
2. Cement: Minimum 610 pounds per cubic yard.
3. Slump: Between 2 and 3 inches.

E. Drop Piping:
1. Outside Drop:
a. Ductile Iron Pipe: ANSI/ASTM A-746, Class 50.
b. Polyvinyl Chloride Pipe: PVC compound ASTM D1784, Pipe ASTM D-3034, SDR-26.
2. Inside Drop:
a. Polyvinyl Chloride Pipe: PVC compound ASTM D1784, Pipe ASTM D-3034, SDR-26.

F. Frames, Covers and Grates for Manholes and Catch Basins:
1. Design of each shall be the same throughout the project unless otherwise specified or indicated on the drawings.
2. Units shall meet AASHTO H20 wheel loading requirements. Manufacture, workmanship and certified proof-load tests shall conform to AASHTO M306-89-Standard Specification for Drainage Structure Castings.
3. Material:

a. Cast iron: ASTM A48, Class 30B or 35B.
b. Delivered to Site free of any coatings, unless otherwise specified.

4. Frames:
   a. Round with a 30-inch clear opening.
5. Covers:
   a. Round.
   b. Solid lid, top surface checkered and provided with suitable concealed lifting notches, and lettering cast into cover to indicate type of structure.
6. Grates:
   a. Round.
   b. Minimum open area: 232 sq inches.
   c. Bicycle safe.
7. Provide frames, covers, and gratings of the locking type when indicated on the drawings.
   a. Acceptable Locking Devices: Type J or Type H by Neenah Foundry Company, P. O. Box 729, Neenah, WI 54957, (414) 729-3661; Type A or Type B by Syracuse Casting Sales Corporation, P. O. Box 190, South Bay Rd., Cicero, NY 13039, (315) 699-2601.
8. Acceptable Manhole Frames and Covers: Pattern R-1557-A with platen cover by Neenah Foundry Company, P. O. Box 729, Neenah, WI 54957, (414) 729-3661; Pattern 1012A with platen cover by Syracuse Castings Sales Corp., P. O. Box 190, South Bay Rd., Cicero, NY 13039, (315) 699-2601.
9. Acceptable Catch Basin Frames and Gratings: Pattern R-2557-A frame with Pattern R-2580-A, Type G grate by Neenah Foundry Company, P. O. Box 729, Neenah, WI 54957, (414) 729-3661; Pattern 1012451XC frame with Pattern 1187025 grate by Syracuse Casting Sales Corp., P. O. Box 190, South Bay Rd., Cicero, NY 13039, (315) 699-2601.

G. Curb Inlet Frames, Grates and Curb Boxes:
1. Designed to meet AASHTO H20 wheel loading requirements. Manufacture, workmanship and certified proof-load tests shall conform to AASHTO M306-89-Standard Specification for Drainage Structure Castings.
2. Material:
   a. Cast iron: ASTM A 48, Class 30B or 35B.
   b. Delivered to the Site free of any coatings, unless otherwise specified.
3. Frames: Square top with round 36-inch OD base flange and integral stiffeners.
4. Grates:
   a. Rectangular.
   b. Bicycle safe.
5. Acceptable Curb Inlets: Pattern R-3010 with Type A grate by Neenah Foundry Company, P. O. Box 729, Neenah, WI 54957, (414) 729-3661; Pattern 2640 by Syracuse Castings Sales Corp., P. O. Box 190, South Bay Rd., Cicero, NY 13039, (315) 699-2601.

H. Drop Inlet Frames and Grates:
1. Designed to meet AASHTO H20 wheel loading requirements. Manufacture, workmanship and certified proof-load tests shall conform to AASHTO M306-89-Standard Specification for Drainage Structure Castings.
2. Material:
   a. Cast iron: ASTM A 48, Class 30B or 35B.
   b. Delivered to Site free of any coatings, unless otherwise specified.
3. Frames: Slab type, 24-inch square clear opening.

4. Grates:
   a. Bicycle safe.
5. Acceptable Drop Inlet Frames and Grates: Pattern R-3562 by Neenah Foundry Company, P. O. Box 729, Neenah, WI 54957, (414) 729-3661; Pattern 1396440 frame with Pattern 1396040 grate by Syracuse Castings Sales Corp., P. O. Box 190, South Bay Rd., Cicero, NY 13039, (315) 699-2601.

I. Pipe-to-Manhole/Drainage Structure Connections-One of the following:
1. A-Lok Flexible Connector by A-Lok Products, Inc., 697 Main St., Tullytown, PA 19007, (215) 547-3366.
2. Lockjoint Flexible Connector by Chardon Rubber Company, 373 Washington St., Chardon, OH 44024, (216) 285-2161.
3. Kor-N-Seal Flexible Connector by NPC, Inc., 250 Elm St., Milford, NH 03055, (601) 673-8680.
4. Link-Seal Flexible Connector by Thunderline Link-Seal, Inc., 6525 Goforth St., Houston, TX 77021, (713) 747-8819.

J. Mortar: ASTM C 270, Type M.

PART 3 EXECUTION

3.1 PREPARATION

A. Sewer Lateral Openings in Precast and Cast-in-Place Concrete Risers: Provide openings and install pipe connectors in strict accordance with the recommendation of the connector manufacturer.

3.2 INSPECTION

A. Inspect all pipe and fittings before installation. Remove defective pipe and fittings from the site.
B. Do not backfill before installation is inspected by the Director's Representative.

3.3 GENERAL

A. Install pipe in accordance with the manufacturer's recommendations and as specified in ASTM D 2321.
B. Join PVC pipe with solvent cemented joints as recommended by ASTM D 2855.
C. Use Cushion Material for bedding and backfill to the depth shown on the drawings for solid pipe.
D. Use No. 2 Coarse Aggregate for bedding and backfill to the depth shown on the drawings for perforated pipe.

3.4 INSTALLATION

A. Laying Pipe: Lay pipe to indicated line and grade with a firm uniform bearing for the entire length of the pipe. Excavate sufficient clearance at each bell or coupling to allow uniform bearing along the pipe barrel. Fill excess excavation with suitable material and tamp.
B. Joints:
   1. Wipe inside of sockets and outside of pipe to be jointed, clean and dry.
   2. Install rubber gaskets in accordance with the manufacturer's specifications.
C. Connections:
   1. Make connections to existing manholes by cutting into the floor or bench of the manhole and forming a new channel.

2. If the pipe, manholes or other structures with which connection is to be made has not yet been installed, install the pipe to a point directed by the Director's Representative and plug or cap the end in a satisfactory manner.

D. Lay perforated pipe on a tamped bed of underdrain filter material.

E. Temporary Conductor Outlets: If required, remove existing temporary conductor outlets and deliver them to the Facility Authorities as directed.

F. Cleanouts:
   1. Construct cleanouts at the locations shown and as detailed on the drawings.
   2. Use PVC wyes, bends and pipe as indicated.
   3. Extend cleanout piping to grade and terminate with deck plug installed in accordance with manufacturer's instructions.
   4. Install deck plug flush with grade with grade and encase with 2500 psi - concrete pad as shown.

G. Construct concrete structures with precast reinforced riser sections to the dimensions shown. Seal joints between precast riser sections with material specified.
   1. Wall thickness for circular structures 12 feet deep or less: 5 inches.
   2. Wall thickness for circular structures greater than 12 feet deep: 6 inches.

H. Position tops of structures flush with finished grade.

I. Form inverts in manholes on straight runs by the use of channel pipe. Form inverts in manholes at changes in direction or grade by making curved channels of concrete. Channels shall have a smooth surface free from irregularities.

J. Cut laterals which will enter above the invert to correct length before installation. Do not cut after installation. Construct drops as shown.

K. Install glass-fiber reinforced polyester manholes as detailed on the Drawing and in accordance with the manufacturer's printed installation procedures.

L. Construct drop inlets of concrete or precast units.

M. Install curb inlets where indicated.

3.5 LEAKAGE TESTS

A. Prior to backfilling and laying additional pipe, test the first 100 feet of sewer construction for leakage.
   1. Fill the sewer with water and maintain a head two feet above the highest section of Work being tested. Measure the quantity of leakage. When the sewer being tested in constructed in water bearing soil, the leakage test may, at the discretion of the Director's Representative, be made by measuring the quantity of infiltration into the sewer. The allowable leakage or infiltration shall not exceed 10 gallons per 24 hours per inch pipe diameter per 1000 feet of sewer being tested.
   2. If air testing is used conform to the procedure described in ASTM C 828.

B. Additional leakage tests and a final test shall be performed as directed.

END OF SECTION 33 3910

SECTION 33 4000 – STORM DRAINAGE

PART 1 – GENERAL

1.1 SUMMARY

A. Section includes:
1. Catch basins
2. Inlets
3. Storm Drains
4. Underdrains
5. Underground Stormwater Chambers

B. Related Work Specified Elsewhere.
1. Section 311001 - Site Preparation
2. Section 312301 - Sitework Excavation, Backfilling and Compacting
3. Section 321216 - Asphalt Pavement
4. Section 324000 - Site Improvements
5. Section 329200 - Lawns

1.2 SUBMITTALS

A. Submit Shop Drawings (SD) and Manufacturers' Data (MD) for the items listed below and any special construction details relating to the storm drainage system.
1. Drainage structures: one (SD) per casting type.
2. Drainage structures and Trench Drain: one (SD) per structure. Include rim and bottom elevations, pipe inverts and pipe locations.
3. Castings: one (SD) per type
4. Storm lines and underdrains: one (PD) per pipe material type
5. Filter Fabric: (PD)
6. Detectable Warning Tape: (PD)
7. Non-Shrink Grout: (PD)

B. Material Certificates (MC) including a certified laboratory sieve analysis (LA) bearing name and location of quarry. Sample (S) of material required (approximate volume 1 cubic foot) in a waterproof container permanently labeled to show source. Submit for the following materials:
1. Drainage Fill: (MC), (LA) and (S)
2. Coarse Aggregate Fill: (See section 312301, Submittals)

PART 2 – PRODUCTS

2.1 MATERIALS

A. Concrete: As specified Section 321313 - Site Concrete. Minimum compressive strength 3,000 psi at 28 days.

B. Reinforcing: As specified Section 321313 - Site Concrete.

C. Masonry Units: Common brick, ASTM C-62, latest edition, grade SW.
   1. Mortar: Cement-lime-sand, 1:1:3 mix.

D. Drainage Structures, Frame, Grates and Covers:
   1. Drywells/Catch basins/manholes/inlets: Sizes, shapes, specific unit, or any other special requirements as shown on drawings or equal; precast reinforced concrete units complying with ASTM C 478 with integral floor or poured-in-place concrete base; "O" ring gaskets for interlocking units ASTM C443. Provide ductile iron or reinforced plastic steps integrally cast into sidewalls where indicated. Use only "traffic design" covers in paving areas or where otherwise indicated.

E. Frames, Grates, Covers:
   1. Sizes, specific unit, grate or cover design or any other special requirements as shown on drawings or equal. All units to be heavy-duty suitable for H-20 loading. Syracuse Castings Co. or Neenah Co. products shall be quality standard. Provide castings of uniform quality, free from blow holes, porosity, hard spots, shrinkage defects, cracks, or other injurious defects; gray iron material, ASTM A 48 Class 30, all non-rocking design with machined bearing surfaces. Provide traps or pipe elbow drops if shown on drawings.
   2. Pipe to MH/CB Connectors: Kor-N-Seal flexible EPDM rubber connector by NPC Inc. or approved equal.
   3. Grade Adjustment: Precast concrete rings, NYSDOT Section 715-13 prefabricated cast iron or steel adjustment rings. No brick allowed.
   4. Provide traps or pipe elbows within structure if shown on drawings.

F. Storm Lines:
   1. Cast Iron Pipe (CI): XH ASTM service weight, hub-and-spigot joints CISPI HSN compression type with ASTM C564 neoprene gaskets.
   2. Corrugated Round Steel Pipe (CSP): Comply with NYSDOT Section 707-02. Steel thickness 16 gauge minimum; galvanized hot-dipped bituminous coated inside and out; paved invert or smooth liner if indicated on drawings; all special shapes, fittings, branches, reducers and band couplers to match, same manufacturer. Use maximum available width couplers for pipe size. Provide perforated pipe where shown on drawings.
   3. Corrugated High Density Polyethylene (HDPE): Corrugated Perforated or Non-perforated High Density Polyethylene shall have smooth interior and annular exterior corrugations. Pipe sizes 4 to 60 inches (100 to 1500 mm) shall meet AASHTO M294, Type S. Pipe shall be joined with the bell-and-spigot joint meeting the requirements of AASHTO M252 or AASHTO M294. The joint shall be watertight according to the laboratory requirements of ASTM D3212. 30 inch (750 mm) through 42 inch (1050 mm) pipe joints shall be watertight according to ASTM D3212 with the exception that the joint be tested using 5.0 psi (34.5 kPa). Joints shall remain watertight when subjected to a 1.5 degree axial misalignment. Gaskets shall be made of polyisoprene meeting the laboratory requirements of ASTM F477. Gaskets shall be installed by the pipe manufacturer and covered with a removable wrap to ensure the gasket is free from debris. A joint lubricant supplied by the manufacturer shall be used on the gasket and bell during assembly.
   4. Underdrain (UD): ASTM F 405 perforated corrugated polyethylene tubing, piping and fittings by Advanced Drainage Systems, Hancor, Baughman Tile Co., or equal; use maximum length coils in each run; use internal couplers to join coils. Provide heavy-grade AASHTO M 294 culvert pipe where indicated. Use non-perforated tubing where indicated.

G. Sand Bedding (Storm Drains): Clean coarse natural sand free of organic matter.

H. Drainage Fill (Underdrains): Screened gravel, crushed gravel or crushed stone conforming with NYSDOT Section 703.02 Size 1 Gradation

I. Filter Fabric: Non-woven polypropylene drainage fabric, Mirafi 140N, TerraTex SD or equal.

J. Cleanouts: Heavy-duty coated cast iron body, fitted top with vandal resistant fasteners, cleanout plug. J.R. Smith, Zurn or equal. Use ductile iron pipe riser. Comply with drawings.

K. Non-Shrink Grout: CRD-C 621, factory pre-mixed grout. Products which may be incorporated in the work include the following Non-metallic grouts or an approved equal: "Set Grout" by Master Builders, "Sonogrout" by Sonneborn-Rexnord or "Euco-NS" by Euclid Chemical Co.

L. Dissimilar Material Adapter: Dissimilar Material Adapter by Advanced Drainage Systems or approved equal.

M. Coarse Sand: Well-graded coarse sand generally complying with NYSDOT section 703.07 Concrete Sand specification and gradation, provided that no more than 25 percent by weight shall pass a No. 30 sieve.

N. Underground Stormwater Chambers: ChamberMaxx Stormwater Chamber System by ConTech Engineered Solutions (www.conteches.com) as shown on plans or approved equal.

PART 3 – EXECUTION

3.1 STRUCTURES

A. Precast Units: Bed in gravel, set level and plumb. Align steps in all sections exactly on a plumb axis. On sloping surfaces, arrange for opening to be on the downslope side of the structure so that 12 inch minimum cover is maintained over riser section without bulging the plane of the slope. Finished structure, including all joints and penetrations, shall be watertight.

B. Masonry Extensions: Construct as detailed. Parge inside and out.

C. Castings: Securely set in mortar.

3.2 INSTALLATION OF DRAIN LINES

A. All pipe shall be examined before laying and no piece shall be installed which is found to be defective.

B. Drain placement shall commence at the outlet and proceed section by section "uphill" unless otherwise directed by the Engineer. Place spigot ends in direction of flow.

C. If any defective pipe is discovered after it has been installed, it shall be removed and replaced with a sound pipe in a satisfactory manner at no additional cost to the Owner. All pipe and fittings shall be thoroughly cleaned before installation, shall be kept clean until they are used in the work and when laid, shall conform to the lines and grades required. All piping, flared end sections and fittings shall be installed in accordance with requirements of the manufacturer, or as otherwise provided herein or on the Drawings.

D. As soon as the excavation is complete to normal grade of the bottom of the trench, sand bedding shall be placed, compacted and graded to provide firm, uniform and continuous support for the pipe. The pipe shall be laid accurately to the lines and grades indicated on the Drawings. Blocking under the pipe will not be permitted. Bedding shall be placed evenly on each side of the pipe to mid-diameter and hand tools shall be used to force the bedding where needed to give firm continuous support for the pipe. Depending on final surface material, Sand

Bedding or Coarse Aggregate Fill shall be placed to 12-inch above the top of the pipe (refer to ''Drains'' detail). The initial 3-ft of backfill above the bedding shall be placed in 1-ft layers and carefully compacted. Generally the compaction shall be done evenly on each side of the pipe and compaction equipment shall not be operated directly over the pipe until sufficient backfill has been placed to ensure that such compaction equipment will not have a damaging effect on the pipe. Equipment used in compacting the initial 3 foot of backfill shall be approved by the pipe manufacturer's representative prior to use. Refer to Section 312301, Sitework Excavation, Backfilling and Compacting for additional backfilling requirements.

E. All pipe shall be sound and clean before installation. When installation is not in progress, the open ends of the pipe shall be closed by watertight plug or other approved means. Good alignment shall be preserved during installation. The deflection at joints shall not exceed that recommended by manufacturer.

F. Before any joint is made, the pipe shall be checked to assure that a close joint with the next adjoining pipe has been maintained and that the inverts are matched and conform to the required grade. The pipe shall not be driven down to grade by striking it.

G. Precautions shall be taken to prevent flotation of the pipe in the trench.

H. When moveable trench bracing such as trench boxes, moveable sheeting, shoring or plates are used to support the sides of the trench, care shall be taken in placing and moving the boxes or supporting bracing to prevent movement of the pipe, or disturbance of the pipe bedding and the backfill. Trench boxes, moveable sheeting, shoring or plates shall not be allowed to extend below top of the pipe. If trench boxes, moveable sheeting, shoring or plates have been installed below the top of the pipe, they shall be moved slowly taking care not to disturb pipe, bedding or backfill. As trench boxes, moveable sheeting, shoring or plates are moved, pipe bedding shall be placed to fill any voids created and the backfill shall be recompacted to provide uniform side support for the pipe.

I. Thoroughly clean completed storm drainage system of all debris and sediment prior to final acceptance.

3.3 COORDINATION

A. Coordinate location of wyes and verify inverts of lines and structures with Plumbing Contractor where applicable.

3.4 UNDERDRAINAGE/FRENCH DRAIN/LOW FLOW UNDERDRAIN

A. Drainage Fill: Place as detailed.

B. Perforated lines: Place holes down, true to line and grade. Place remaining drainage fill.

C. Connect to nearest suitable storm manhole whether drawings show routing or not.

D. Backfill: Per Section 312301 Sitework Excavation, Backfilling and Compacting and as detailed on the drawings.

3.5 WATERPROOF PIPE CONNECTOR

A. Install per manufacturer's recommendations.

END SECTION 33 4000

SECTION 33 1116 – SITE WATER UTILITY DISTRIBUTION PIPING

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Furnishing pipe, fittings, valves and appurtenances for water and process flow.

B. Furnishing miscellaneous appurtenances.

C. Installation.

D. Testing.

1.2 SHOP DRAWINGS

A. Shop drawings for piping, fittings and other appurtenances shall be prepared and submitted in accordance with Section 01010, General Requirements. Shop drawings shall show complete piping, layout including materials, sizes, classes, locations, necessary dimensions, supports, etc. No fabrication or installation shall begin until shop drawings are approved by the Engineer.

B. Certificates
   1. Pressure Test
   2. Disinfection Certificate
   3. Bacteriological Tests

1.3 REFERENCE STANDARDS

A. ANSI A21.4 /AWWA C104 - Cement-Mortar lining for Ductile Iron and Gray Iron Pipe and Fittings for Water.

B. ANSI A21.10 /AWWA C111 - Ductile Iron and Gray Iron Fittings, 3-inch through 48-inch, for Water and Other Liquid.

C. ANSI A21.11 /AWWA C151 - Rubber Gasket Joints for Ductile Iron and Gray Iron Pressure Pipe and Fittings.

D. ANSI A21.51 /AWWA C151 - Ductile Iron Pipe Centrifugally Cast in Metal Molds and Sand Lined Molds for Water and Other Liquids.

E. AWWA C200 - Steel Water Pipe and Fittings for Pipe 8-inch Inside Diameter and Larger.

F. AWWA C206 - Field Welding Joints in Steel Pipe.

G. AWWA C208 - Steel Fittings.

H. ASTM A126 - Gray Iron Castings for Valves, Flanges and Pipe Fittings.

I. ASTM A234 - Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and Elevated Temperatures.

J. ASTM A338 - Malleable Iron Flanges, Pipe Fittings and Valve Parts for Railroad, Marine, and Other Heavy Duty Service at Temperatures up to 650 F (345 C).

K. AWWA C500 - Gate Valves - 3-inch through 48-inch - for Water and Other Liquids.

L. AWWA C600 - Installation of Ductile Iron Water Mains.

M. AWWA C601 - Disinfecting Water Main.

N. UNI-B-5 - Low Pressure Air Testing of Installed Sewer Pipe.

PART 2 - PRODUCTS

2.1 GENERAL

A. All products included in this Section shall conform to the requirements of the standard specifications referenced herein.
   1. Provide products designed for 175 psi working pressure (minimum) or 50 psi above design working pressure, whichever is greater, unless otherwise noted.

B. Pipe size shall be as shown on the Drawings.

C. All pipe shall be restrained push-on joint ductile iron Class 51 as specified herein and shown on the Drawings, except as follows:
   1. Chlorine solution and chemical feed pipe shall be as described herein.
   2. Potable and non-potable water pipe 3-inches or less in diameter shall be Threaded Galvanized Steel.

D. The underground water and process piping system shall be installed as shown on the Drawings.

2.2 PIPE

A. Push-on Joint Ductile Iron Pipe: Shall conform to ANSI 21.51 /AWWA C151, Class 52. Fittings shall be ductile iron conforming to ANSI A21.10 /AWWA C111 standards and shall include plain rubber gaskets. Pipe and fittings for all potable and non-potable water lines shall be double cement lined and seal coated inside and out in accordance with ANSI A21.4 /AWWA C104. All pipe and fittings used as process pipe shall be Type C coal tar enamel lined and coated in accordance with AWWA C203.

   Joints - Pipe shall be furnished with push-on joints and fittings shall be furnished with mechanical joints. The type of joint shall meet the following applicable requirements:

   1. Push-on joint - The rubber gasket joint shall be as generally described in AWWA C111. Push-on joints shall provide the minimum deflections:

Pipe Size	Minimum Deflection
4” thru 12”	5.0
16” thru 18”	3.0
24” thru 36”	1.5

      Push-on joint pipe shall be “Tyton” as manufactured by U.S. Pipe and Foundry or equal.

B. Copper domestic water service pipe shall bear standard markings per AWWA standards.

2.3 GATE VALVES

A. Valve
   1. Provide gate valves with cast iron body, resilient wedge or double disk gate valve, bronze mounted.

B. Supervisory Switches
   1. Provide supervisory switches for OS & Y control valves and indicator posts.
   2. Provide spot circuit switches, 125 volt A.C., .25 amp; 24 volt D.C.
   3. Provide die cast aluminum housing finished in red baked enamel with weatherproof seal and tamper indication.

2.4 MISCELLANEOUS

A. Couplings - Shall be cast iron with stainless steel bolts and nuts. The couplings shall receive two coats of coal tar epoxy paint on all exterior surfaces prior to installation.

2.5 COATINGS

A. Type A Galvanized All piping to be galvanized shall have a deep galvanized coating applied in full accordance with ASTM Designation A-120.

B. Type B Coal Tar Enamel - Caol tar enamel coating shall be furnished and applied in full accordance with AWWA Specification C203 for coal tar enamel coatings.

C. Type C Protective Coating - Steel - All steel pipe shall receive a prime coat of one of the following types:
   1. Coal tar primer conforming to AWWA Specification C203 for coal tar enamel protective coating for steel water pipes.
   2. Bitumastic No. 505 by Koppers Co. or Heavy Duty Black No. 46-449 by Tnemec, or equal. Apply per manufacturer's recommendations.

D. Type D Protective Coating - Ductile Iron or Cast Iron - The standard outside bituminous coating shall be as generally described in AWWA Standards C151 or C106 and C108, respectively.

2.6 STERILIZATION

A. All pipe and fittings connected to and forming part of a potable water supply shall be sterilized in full accordance with both the requirements of AWWA Standard C651 for Disinfecting Water Mains, and the State (or County) Department of Health and shall be acceptable to the Engineer. The continuous feed method shall be used for chlorine application.

B. All new piping shall be filled with not less than 50 mg/l nor more than 75 mg/l available chlorine and retained in the main for not less than 24 hours. During this time, all valves and hydrants in the section treated shall be operated in order to disinfect the appurtenances. At the end of this 24-hour period, the treated water shall contain no less than 25 mg/l available chlorine throughout the length of the main. All chlorine introduced into the system shall be totally dissolved. The introduction of solid hypochlorite directly into the system is prohibited.

C. Sterilization tests shall be repeated as often as necessary until the minimum residual chlorine content of 25 mg/l has been reached. The chlorine solution shall be thoroughly flushed out prior to placing the new sections of main in service. The Contractor is cautioned that the spent chlorine solution must be disposed of in a manner acceptable to the Owner, in an area share its effects will be undetrimental to animal, plant or fish life.

D. After final flushing and before the water main is replaced in service, a water sample or samples from the end of each main shall be collected and analyzed for total coliform, in accordance with local and/or state health department procedures. Analysis shall be performed by health department approved laboratories. If health department drinking Water standards for total coli form are not met, the sterilization procedures and coli form Testing shall be repeated. The Contractor shall bear all necessary costs of coli form Testing.

2.7 LININGS

For potable water applications, all linings and sealers shall conform to all applicable local, state and federal health codes.

A. Type A Standard Cement Lining - All ductile iron potable, non-potable, and effluent water piping and fittings shall have a Type A standard cement lining. Type A standard cement linings shall consist of cement mortar, centrifugally applied in accordance with AWWA Standard C104, except lining thickness shall not be less than 1/8". The inside shall be given a seal coat of asphalt material as described in Section 4.12. of AWWA Standard C104. For potable water applications, all linings and sealers shall conform to all applicable local, State, and Federal health codes.

B. Type D Cement Mortar Lining - The steel pipe shall be lined with a shop-applied cement mortar lining. The lining shall be done in accordance with AWWA Standard C205 for cement-mortar protective lining. The lining thickness shall not be less than 1/4" for 4" to 10", 5/16" for 11" to 23", 3/8" for 24" to 36", and 1/2" for 36" and over.

2.8 ENCASEMENT

In the event an underground pipe 10 inches or smaller is shown under a base slab and there is less than 30 inches separation between the top of the pipe and the bottom of the slab, then the pipe shall be encased in concrete for its entire length under the slab in accordance with details shown on the Drawings. Where no detail is shown, encasement shall be formed to provide a minimum of 8 inches of concrete cover reinforced with #5 reinforcing bars spaced 12 inches each way. When the top of the pipe is within 12 inches of the bottom of the slab, the encasement shall be tied to the base slab with reinforcing.

PART 3 - EXECUTION

3.1 GENERAL

A. Pipe and accessories shall be handled in such a manner as to insure that pipe is installed in sound, undamaged condition. Particular care shall be taken not to injure the pipe coating or lining (if any).

B. Any pipe showing a distinct crack with no evidence of incipient fracture beyond the limits of the visible crack, if approved, may have the cracked portion cutt off by, and at the expense of, the Contractor before the pipe is laid so that the pipe used is perfectly round. The cut shall be made in the sound barrel at a point at least 12 inches from the visible limits of the crack.

C. Cutting of the pipe shall be done in a neat and workmanlike manner without damage to the pipe lining. Unless otherwise authorized by the Engineer, all pipe cutting shall be done by means of an approved type of power cutter. The use of hammer and chisel, or any other method which results in rough edges, chipped or damaged pipe, is prohibited.

D. Each pipe section shall be placed into position in the trench in such manner and by such means required to cause no injury to the pipe, persons, or to any property.

E. The Contractor shall furnish slings, straps and/or approved devices to provide satisfactory support of the pipe when it is lifted. Transportation from storage areas to the trench shall be restricted to operations which can cause no damage to the pipe or lining.

F. The pipe shall not be dropped from trucks onto the ground or into the trench.

G. The Contractor shall have on the job site with each pipe laying crew, all the proper tools to handle and cut the pipe.

H. Damaged pipe coating and/or lining shall be restored before installation as approved by the Engineer.

3.2 CONTROL OF ALIGNMENT AND GRADE

A. Easement and property and other control lines necessary for locating the work as well as elevations used in the design of the work as shown on the Drawings. The Contractor shall use this information to set line and use a level or transit to set grade.

B. The Contractor may use laser equipment to assist in setting the pipe provided he can demonstrate satisfactory skill in its use.

C. The use of string levels, hand levels, carpenter's levels or other relatively crude devices for transferring grade or setting pipe are not to be permitted.

D. The Contractor shall carefully preserve bench marks, reference points and stakes, and in case of willful or careless destruction by his own men, he will be charged with the resulting expense to re-establish such destroyed control data and shall be responsible for any mistakes or delay that may be caused by the unnecessary loss or disturbance of such control data.

3.3 PREPARATION OF BED

A. As soon as excavation has been completed to required depth, place and compact bedding materials as shown on the Contract Drawings and specified in Section 31 23 00 to the elevation necessary to bring the pipe to grade.

B. The compacted bedding material shall be rounded so that at least the bottom quadrant of the pipe shall rest firmly on the bedding for the full length of the barrel. Suitable holes for bells or coupling shall be dug around the pipe joints to provide ample space for making tight joints.

3.4 LAYING PIPE

A. Each pipe length shall be inspected for cracks, defects in coating or lining, and any other evidences of unsuitability.

B. Pipe shall be laid in the dry and at no time shall water in the trench be permitted to flow into the pipe.

C. The pipe shall then be laid on the trench bedding, and the pipe pushed home. Jointing shall be in accordance with the manufacturer's instructions and appropriate ASTM Standards, and the Contractor shall have on hand for each pipe laying crew, the necessary tools, gauges, pipe cutters, etc., necessary to install the pipe in a workmanlike manner. Pipe laying shall proceed upgrade with spigot ends pointing in the direction of flow.

D. Blocking under the pipe will not be permitted except where a concrete cradle is proposed, in which case precast concrete blocks shall be used.

E. After placement of the blanket material, the pipe shall be checked for line and grade and any debris, tools, etc., shall be removed.

F. If inspection of the pipe indicates that the pipe has been properly installed as determined by the Engineer, the Contractor may then refill or backfill the remainder of the trench in accordance with Section 31 23 00 and the typical trench detail shown on the Drawings.

G. At any time that work in not in progress, the end of the pipe shall be suitably closed to prevent the entry of animals, earth, water, etc.

H. At the end of each day's work or at intervals of length at the option of the Engineer, the Engineer, with the Contractor, will inspect the pipe for alignment with lamps or mirrors. unsatisfactory work shall be dug up and reinstalled to the satisfaction of the Engineer.

3.5 VALVE INSTALLATION

A. Install valves of the sizes shown on the Drawings. Valves shall have mechanical joint ends, and shall include all joint accessories and retainer glands. Valves shall be installed plumb and true to line and grade.

B. Valve boxes shall be installed on all buried valves.

3.6 THRUST BLOCKS

A. Concrete thrust blocks shall be used to prevent movement of fittings. The earth which is to form the backing shall be carefully cut by hand so as to leave an undisturbed surface. Concrete shall be kept behind the bell of the fittings and at hydrants. Care shall be taken to see that the drainage hole is not obstructed. Required volume of concrete for thrust blocks shall be as shown on the Drawings.

B. Concrete thrust blocks shall be installed on all bends of pressure pipe, except restrained-joint pipes, and gravity pipe subject to periodic pressurization (for example, tank drain lines subject to being blown-back with air or liquid).

3.7 PLACEMENT UNDER PUBLIC ROADS

A. Where piping runs under public roads, secure and pay for necessary permits from authorities having jurisdiction and perform all work in compliance with their requirements.

3.8 CONNECTION TO EXISTING WATER MAINS

A. Secure and pay for necessary permits from water authority and perform all work in compliance with their requirements.

B. Provide live tap connection to existing main performed by the contractor to avoid interruption of service. Comply with requirements of local water authorities.

C. Provide gate valve at tap with valve box.

3.9 TESTING

A. General
   1. Leakage tests shall be conducted on all pipes installed under this Section. The Engineer shall witness all tests. The Contractor shall supply all plugs, pumps, weirs, gauges, water trucks, etc., necessary to conduct the tests. Should the work fail the leakage tests, corrective action shall be taken by the Contractor in a manner approved by the Engineer and, if directed by the Engineer, the Contractor shall dig up and relay the failed section.
   2. The use of sealants, applied from the inside of the pipe, is not acceptable.
   3. Flush all piping systems with water prior to testing.

B. Test Procedures
   1. Procedure A shall consist of a 15-minute test at 100 psi followed by a three-hour test at 50 psi.
   2. Procedure B shall consist of a one-hour test at 150 psi followed by a two-hour test at 100 psi.
   3. Procedure C shall consist of a 30-minute test at 50 psi.
   4. Procedure D shall consist of an exfiltration test; the pipe is filled with clear water to provide a head of at least 5 feet above the top of the pipe at the highest point of the pipeline under test, and then measuring the loss of water from the line by the amount which must be added to maintain the original level. In this test, the test period (for taking measurements) shall not be less than three hours.

C. Pressure Pipe Testing - All pressure pipe shall be tested as follows: After the pipe has been laid, all newly laid pipe or any valved section thereof shall be subjected to a hydrostatic pressure of at least 1.5 x the highest working pressure in the section.

D. Test Pressure Restrictions - Test pressure shall:
   1. Not be less than 50 psi at the highest point along the test section.
   2. Not exceed pipe or thrust restraint design pressures.
   3. For water lines, test pressure to be 150 psi.
   4. Be of at least 2-hour duration.
   5. Not vary by more than +5 psi.
   6. Not exceed twice the rated pressure of the valves when the pressure boundary of the test section includes closed gate valves.

E. Pressurization - Each valved section of pipe shall be filled with water slowly and the specified test pressure, based on the elevation of the lowest point of the line or section under test and corrected to the elevation of the test gauge, shall be applied by means of a pump connected to the pipe.

F. Air Removal - Before applying the specified test pressure, air shall be expelled completely from the pipe and valves

G. Examination - All exposed pipe, fittings, valves, and joints shall be examined carefully during the test. Any damaged or defective pipe, fittings, or valves that are discovered following the pressure test shall be repaired or replaced with sound material and the test shall be repeated.

H. Leakage Test
   1. A leakage test shall be conducted concurrently with the pressure test.
   2. Leakage defined: Leakage shall be defined as the quantity of water that must be supplied into the newly laid pipe, or any valved section thereof, to maintain pressure within 5 psi of the specified test pressure after the water in the pipe-line has been expelled and the pipe has been filled with water.
   3. Allowable leakage: No pipe installation will be accepted if the leakage is greater than that determined by the following formula: $L = \frac{SDP^{1/2}}{}$

4. L is the allowable leakage, in gallons per hour; S is the length of pipeline tested in feet; D is the nominal diameter of the pipe, in inches; and P is the average test pressure during the leakage test, in pounds per square inch gauge.

3.10 PROXIMITY TO WATER MAINS

A. Sewers shall be located at least 10 feet, horizontally, from any existing or proposed water main, except that a deviation from this separation to avoid subsurface structures, including telecommunication chambers, interference of building foundations shall be allowed subject to a waiver approval by the New York State Department of Environmental Services provided that the sewer is constructed as follows:
   1. Sewer pipe shall be Class 52 ductile iron for a maximum distance of 75 feet each side of the obstruction.
   2. Joints shall be mechanical type, water pressure rated, with zero leakage when tested at 25 pounds per square inch for gravity sewers and 1-1/2 times working pressure for force mains.

B. Whenever sewers must cross water mains, the sewer shall be constructed as follows:
   1. Sewer pipe shall be Class 52 ductile iron for a minimum distance of 9 feet each side of the crossing.
   2. Joints shall be mechanical type water pressure rated with zero leakage when tested at 25 pounds per square inch for gravity sewers and 1-1/2 times working pressure for force mains and joints shall not be located within 9 feet of the crossing.
   3. Vertical separation of the sewer and water main shall not be less than 18 inches.

C. Watermain crossing sewers shall be laid to provide a minimum vertical distance of 18 inches between the outside of the watermain and the outside of the sewer. This shall be the case where the watermain is either above or below the sewer. At crossings, one full length of waterpipe shall be located so both joints will be as far from the sewer as possible. Special structural support for the water and sewer pipes may be required.

D. Any of the aforementioned solutions shall be noted on Utilities Location Drawing.

E. The Contractor shall be responsible for filing the waiver request with the NYSDEC.

END OF SECTION 33 1116

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work Specified
1. Fire Hydrants
a. The work specified shall include all labor, material, equipment, services and incidentals necessary to furnish and install hydrant, hydrant extensions, hydrant marker, storz nozzle, concrete anchors, gate valve, valve box & cover, lateral piping and main size by 6-inch branch anchor tee with thrust block as shown on the plans and specified herein.
2. Blow Off/Flushing Hydrants
a. The work specified shall include all labor, material, equipment, services and incidentals necessary to furnish and install blow off hydrant, blow off hydrant extensions, service saddle, piping and fittings as shown on the plans and specified herein.

B. Related Work Specified Elsewhere
1. Section 32 3100 - Excavation, Backfilling & Compacting
2. Section 32 1313 - Site Concrete
3. Section 33 1115 - Potable Water
4. Section 33 1216 - Resilient Seat Gate Valves
5. Section 33 1218 - Miscellaneous Fittings & Appurtenances
6. Section 33 1220 - Pressure and Leakage Tests
7. Section 33 1300 – Disinfection

1.2 QUALITY ASSURANCE

A. Fire Hydrants
1. Acceptable Manufacturers
a. Mueller- Super Centurion 250, A-423
b. Kennedy - Guardian K81AW
c. Or Equal
2. Reference Standards
a. AWWA C502, Dry-Barrel Fire Hydrants, Latest revision.

B. Flushing Hydrants
1. Acceptable Manufacturers
a. Kupferle Foundry Company #77 Mainguard Hydrant
b. Mueller A-408
c. Other Manufacturers of equivalent products
2. Qualifications
a. Furnish products from a manufacturer with at least 5 years documented experience in the manufacture of this product.

C. Parts Interchangeability
1. Hydrants and appurtenances provided under this Section shall be the standard product in regular production by manufacturers whose products have proven reliable in similar service for at least two years.
2. Hydrants and valves shall be the product of the same manufacturer.

1.3 SUBMITTALS

A. Shop Drawings - Prior to obtaining any products included in this Section, the Contractor shall submit detailed shop drawings and data for review.

B. Materials List - The Contractor shall submit, along with shop drawings, a materials list which shall include full information regarding all components of the equipment. Materials of construction shall be presented in the listing.

C. Other Submittals
1. Prior to installation of the proposed equipment, the Contractor shall furnish the required number of copies of the manufacturer's Operation and Maintenance Manual for each item.
2. The Contractor shall submit certificates of compliance with the applicable referenced standards.

1.4 PRODUCT DELIVERY, STORAGE AND HANDLING

A. During delivery and handling, all materials shall be braced and protected from any distortion or damage; any such distortion or damage shall be basis for rejection of the materials.

B. All hydrants and appurtenances shall be stored in an enclosed shelter and off the ground, unless otherwise approved by the Engineer.

C. Interiors of pipe, fittings and specials shall be kept free from dirt and foreign matter.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General
1. Manufacturer's name: cast in raised letters on hydrant body.
2. All bolts for buried application: Type 304 stainless steel or fluorocarbon coated, high strength corrosion resistant low alloy steel.
3. All other bolts, nuts and studs shall, unless otherwise specified, conform to ASTM A 307, Grade B; or ASTM A 354.
4. Bolts and nuts shall have Pentagon heads and nuts.
5. Gasket material and installation shall conform to manufacturer's recommendations.
6. Fire hydrant shut-off gate valve (auxiliary valve): resilient seat as specified in Section 33 1216, "Resilient Seat Gate Valves".
7. Anchor Tee: Furnish Ductile Iron MJ X MJ run tee with 6-inch Plain End branch with anchored rotating MJ gland. Furnish PVC fittings and hydrant lead piping conforming to AWWA C900, Pressure Class 200 DRI4 when PVC water main pipe is used.

B. Fire Hydrants

1. Furnish hydrant with cast iron body, break-away type barrel, "O" ring operating stem seal and a 170-psi test pressure.
2. Maintainability: All operating parts, including brass valve seat, removable through the barrel without excavation.
3. Compression type, with valve opening not less than *5-1/4* inches and non-rising stems. Valve shall open against pressure and shall close with pressure.
4. Provide two *2-1~2-inch* hose nozzles and one 4-1/2-inch pumper connection with National Standard threads and operating nuts.
5. Barrel length: provide for a minimum of 5 foot bury to maximum of 7 foot bury or as shown on the contract drawings to match grade (extensions to be provided as required to match finish grade).
6. Operating nuts operating direction and caps shall be as shown in the schedule.
7. Inlet: 6-inch mechanical joint unless otherwise specified.
8. Provide weep holes for drainage.
9. Provide Steel Hydrant Marker with Lexan Flag as specified below or Provide Owners Standard Hydrant Marker if one is available:
    a. Flag shall provide 20 sqaure inches of visible surface.
    b. Flag shall be red.
    c. Steel pole length shall be 53".
    d. Steel pole shall have galvanized spring to mount on hydrant.
    e. Provide all bolts and hardware to mount to bolt on top of hydrant.
    f. Manufacturer:
        1) Hydrant Flexi-Flag 53" with Hardware (USA Blue Book Model 44064).
        2) Or Approved Equal.
10. Provide Storz Pumper Nozzle Connection (All Hydrants).

C. Flushing Hydrants
1. Nozzle: 2-1/2 inch NST Bronze with iron cap
2. Barrel: Furnish east barrel with traffic break-away coupling.
3. Inlet: Brass, 2-inch FIP side or bottom as shown on the plans
4. Operator: Slotted operating nut, locking cast iron cover, brass operating screw and connecting nut.
5. Valve: Brass plunger, brass body, dual O-ring full draining.

2.2 EQUIPMENT/TOOLS

A. Contractor shall furnish One (1) Hydrant Wrench for Every Ten (10) Hydrants Installed.

B. Furnish two (2) diffusers (one for 2-1/2" nozzle and one for 4-1/2" nozzle), Including pressure gauge/appurtenances and case.
   1. Pollard - 2-1/2" Diffuser
      a. 2-1/2" Diffuser Model P67501-160
      b. Pressure Gauge Model P66916LF
      c. Assemble/Appurtenances Model P67512
      d. Case Model P675
   2. Pollard - 4-1/2" Diffuser (Able to Connect to Storz Nozzle)
      a. 4-1/2" Diffuser w/pressure gauge Model P67502LF
      b. Case Model P67502
      c. Piezo Model P67513

PART 3 - EXECUTION

3.1 INSTALLATION

A. Fire Hydrants
   1. Set hydrant plumb with the center of the lowest nozzle between 18 inches and 24 inches above the finished grade or as specified by the Engineer.
   2. Auxiliary valve: locate as close to main line as possible, a minimum of 36 inches from the center of the hydrant.
   3. Minimum clearance from traveled way: 2 feet to the face of the curb or 5 feet to the edge of the pavement where no curb exists unless otherwise required by Owner or regulatory agency.
   4. Pumper nozzle: Storz nozzle to face road or as otherwise specified.
   5. Thrust restraint: harness hydrant, auxiliary valve and branch tee or anchor pipe together. Provide thrust block at hydrant tee. Provide 24 inch X 24 inch X 6 inch thick anchor block under hydrant, when PVC piping lead is used.
   6. Drain pocket: approximately 1 cubic yard with Type C NYSDOT No. 1Stone.
      a. Type C material: Extend a minimum 12 inches from drain holes in all directions.
      b. Cover the Type C material with a protective layer of geotextile filter fabric prior to backfilling.
   7. Inspection
      a. All hydrants and valves will be inspected by the Engineer prior to installation.
      b. Verify that existing condition are suitable for installation of hydrant.
      c. Verify that the installation can proceed in accordance with all pertinent codes and regulations, the original design and the referenced standards.
   8. Provide commercially available "Out of Service" Hydrant Bag or Nozzle Markers until testing and inspection is complete and hydrant is placed in service.
   9. High Groundwater Encountered
      a. Hydrant weep holes shall be plugged whenever seasonal high groundwater is encountered above the base of the hydrant.
      b. Hydrant with weep holes plugged shall be tagged with a brass tag indicating "Weep Hole is Plugged. Pump Out Hydrant After Use".
   10. Furnish and Install Hydrant Marker.

B. Flushing Hydrants
   1. Set Hydrants Level and Plumb, with discharge nozzle 24 inches above finish grade.
   2. Connect blow off flushing hydrant to main with bronze double strap service saddle.
   3. Locate hydrant a minimum of 2 feet from the face of the curb or 5 feet from the edge of pavement where no curb exists.
   4. Provide a drain pocket with a minimum of 1 cubic yard of Type C NYSDOT No. 1 Stone.
   5. Cover Type C material in drain pocket with a protective layer of geotextile filter fabric.

C. Discrepancies
   1. Notify the Engineer immediately if the above referenced inspection reveals discrepancies.
   2. Do not proceed with installation until discrepancy is resolved.

3.2 PAINTING

A. Shop paint all interior wetted surfaces of fire hydrants except finished or bearing surfaces in accordance with NSF specifications for potable water. Apply in accordance with the manufacturer's recommendations. Paint exterior surfaces red. Repaint exposed surfaces red in the field after installation.

3.3 TESTING

A. Adjust all parts and components as required to provide correct operation.

B. Demonstrate to the Engineer's satisfaction that all system components operate correctly, both individually and as a system. Provide all required testing equipment.

C. Perform pressure test at Main Pressure
   1. CAUTION! OPENING HYDRANT FULLY BEFORE ALL AIR IS VENTED CAN COMPRESS TRAPPED AIR, CREATING A SAFETY HAZARD!
   2. Remove highest nozzle / outlet cap and open hydrant valve a few turns. Allow water to reach bottom of outlet nozzle.
   3. Reinstall outlet nozzle loosely to allow trapped air to escape.
   4. Tighten outlet nozzle caps after all air has escaped.
   5. Open the hydrant completely.
   6. Check for leakage at flanges, outlet nozzles, and stem seals.
   7. Repair or replace faulty components or hydrants
   8. Repeat as necessary until satisfactory results are obtained.

D. Verify full flow, complete shut off and barrel drainage.
   1. Perform drainage test after pressure testing is completed.
   2. Close hydrant main valve
   3. Remove outlet nozzle cap and cover opening with palm of hand.
   4. Drainage should be rapid enough to create perceptible suction pressure.
   5. If hydrant fails drainage test, partially open hydrant with outlet nozzle caps on to create internal pressure to clear drain valve. Retest hydrant. If hydrant fails second test, remove drain valve assembly and inspect. If drain valve is clear excavate hydrant to inspect drain ports. Make required repairs and restart testing from beginning of pressure test sequence.

E. Verify that hose and pumper threads match local fire company equipment.

F. Protect existing landscaping and facilities from water damage during testing.

G. Make all necessary repairs at no additional cost to the Owner.

H. After testing is complete, coat pumper and hose connection threads with NSF approved food-grade anti-seize compound and install caps.

3.4 SCHEDULE

A. Hydrants
   1. Operating Nut: Pentagon Nut
   2. Closure: Clockwise
   3. Hydrant Color: Red
   4. Hose & Streamer Threads:
      a. Coordinate with local fire department.
      b. Submit sample of each outlet type for verification. Accepted samples may be incorporated in the Work.

END OF SECTION 33 1219

SECTION 33 3910 – SANITARY STRUCTURES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Sanitary Structures
   2. Sanitary Piping
   3. Sanitary Fittings

B. Related Work Specified Elsewhere:
   1. Section 31 1001 – Site Preparation
   2. Section 31 2300 – Excavation, Backfilling and Compacting

1.2 REQUIREMENTS OF REGULATORY AGENCIES

A. Obtain necessary permits from local Authorities. Ascertain and comply with local requirements for materials, construction and restoration of pavement.

1.3 SUBMITTALS

A. Shop Drawings: Show fabrication details and connections to adjacent Work.

B. Product Data: Manufacturer's catalog cuts, specifications, and installation instructions.

C. Product Data: Manufacturer's specifications with all pertinent information regarding dimensions, fittings and installation instructions.

PART 2 PRODUCTS

2.1 GENERAL

A. Each length of pipe and each fitting shall be marked in accordance with the applicable ASTM Designation.

2.2 DRAINAGE PIPE AND FITTINGS

A. PVC Sewer Pipe and Fittings; (6 inches Diameter and Larger): SDR 35 and ASTM D 3034.

B. ABS Sewer Pipe and Fittings: ASTM D 2751.

C. ABS Composite Sewer Pipe: ASTM D 2680.

D. Plastic Pipe (4 and 6 inches Diameter, Solid and Perforated) for Building Drains, Cleanout Pipes, Discharge Lines, Leaching Fields, Drain Tiles, etc: PVC meeting ASTM D 2729 or SR (Styrene Rubber) meeting ASTM D 2852.

2.3 SOLVENT CEMENTS

A. Solvent cement used for joining plastic pipe and fittings shall meet the following designations for the various types of plastic pipe listed.
   1. PVC: ASTM D 2564.
   2. ABS: ASTM D 2235.
   3. SR: ASTM D 3122.

2.4 STRUCTURES

A. Precast Reinforced Concrete Manholes:
   1. Riser Sections: ASTM C 478.
   2. Joints Between Riser Sections-One of the following:
      a. Rubber Gaskets: ASTM C 443.

b. Butyl Joint Sealant: ConSeal CS-202 by Concrete Sealants, Inc., 8917 S. Palmer Rd., P. O. Box 176, New Carlisle, OH 45344, (513) 845-8776.

3. Concrete for Precast Units: Air content 6 percent by volume with an allowable tolerance of plus or minus 1.5 percent. Minimum compressive strength of 4,000 psi after 28 days.
4. Load Rating: AASHTO HS-20 with 30% impact and 130 lb/cf equivalent soil pressure.

B. Glass-Fiber Reinforced Polyester Manholes:
1. One-Piece Monolithic Unit: ASTM D 3753.
2. Nominal Inside Diameter: 48 inches.
3. Minimum Wall Thickness: 0.480 inch.
4. Concentric Cone Top:
a. Minimum Clear Opening: 30 inches.
5. Load Rating: AASHTO HS-20 with 30% impact and 130 lb/cf equivalent soil pressure.
6. Acceptable Fiberglass Manhole Manufacturers: Containment Solutions, Inc., 5150 Jefferson Chemical Rd., Conroe, TX 77301, (888) 409-7731; L.F. Manufacturing, P.O. Box 578, Highway 290 East Giddings, Texas 78942, (800) 237-5791.

C. Precast Reinforced Square and Rectangular Concrete Structures:
1. Riser Sections: ASTM C890.
2. Keyed Joints:
a. Joint Sealant - Select One:
1) Mortar
2) Rubber Gasket
3) Butyl Joint Sealant
3. Load Rating: AASHTO HS-20 with 30% impact and 130 lb/cf equivalent soil pressure.
4. Concrete for Precast Units: Air content 6 percent by volume with an allowable tolerance of plus or minus 1.5 percent. Minimum compressive strength of 4,000 psi after 28 days.

D. Cast-in-Place Concrete for Manhole Invert Channels: Normal weight, air entrained concrete with a minimum compressive strength of 4,000 psi after 28 days.
1. Design Air Content: 6 percent by volume plus or minus 1.5 percent.
2. Cement: Minimum 610 pounds per cubic yard.
3. Slump: Between 2 and 3 inches.

E. Drop Piping:
1. Outside Drop:
a. Ductile Iron Pipe: ANSI/ASTM A-746, Class 50.
b. Polyvinyl Chloride Pipe: PVC compound ASTM D1784, Pipe ASTM D-3034, SDR-26.
2. Inside Drop:
a. Polyvinyl Chloride Pipe: PVC compound ASTM D1784, Pipe ASTM D-3034, SDR-26.

F. Frames, Covers and Grates for Manholes and Catch Basins:
1. Design of each shall be the same throughout the project unless otherwise specified or indicated on the drawings.
2. Units shall meet AASHTO H20 wheel loading requirements. Manufacture, workmanship and certified proof-load tests shall conform to AASHTO M306-89-Standard Specification for Drainage Structure Castings.
3. Material:

a. Cast iron: ASTM A48, Class 30B or 35B.
b. Delivered to Site free of any coatings, unless otherwise specified.

4. Frames:
   a. Round with a 30-inch clear opening.
5. Covers:
   a. Round.
   b. Solid lid, top surface checkered and provided with suitable concealed lifting notches, and lettering cast into cover to indicate type of structure.
6. Grates:
   a. Round.
   b. Minimum open area: 232 sq inches.
   c. Bicycle safe.
7. Provide frames, covers, and gratings of the locking type when indicated on the drawings.
   a. Acceptable Locking Devices: Type J or Type H by Neenah Foundry Company, P. O. Box 729, Neenah, WI 54957, (414) 729-3661; Type A or Type B by Syracuse Casting Sales Corporation, P. O. Box 190, South Bay Rd., Cicero, NY 13039, (315) 699-2601.
8. Acceptable Manhole Frames and Covers: Pattern R-1557-A with platen cover by Neenah Foundry Company, P. O. Box 729, Neenah, WI 54957, (414) 729-3661; Pattern 1012A with platen cover by Syracuse Castings Sales Corp., P. O. Box 190, South Bay Rd., Cicero, NY 13039, (315) 699-2601.
9. Acceptable Catch Basin Frames and Gratings: Pattern R-2557-A frame with Pattern R-2580-A, Type G grate by Neenah Foundry Company, P. O. Box 729, Neenah, WI 54957, (414) 729-3661; Pattern 1012451XC frame with Pattern 1187025 grate by Syracuse Casting Sales Corp., P. O. Box 190, South Bay Rd., Cicero, NY 13039, (315) 699-2601.

G. Curb Inlet Frames, Grates and Curb Boxes:
1. Designed to meet AASHTO H20 wheel loading requirements. Manufacture, workmanship and certified proof-load tests shall conform to AASHTO M306-89-Standard Specification for Drainage Structure Castings.
2. Material:
   a. Cast iron: ASTM A 48, Class 30B or 35B.
   b. Delivered to the Site free of any coatings, unless otherwise specified.
3. Frames: Square top with round 36-inch OD base flange and integral stiffeners.
4. Grates:
   a. Rectangular.
   b. Bicycle safe.
5. Acceptable Curb Inlets: Pattern R-3010 with Type A grate by Neenah Foundry Company, P. O. Box 729, Neenah, WI 54957, (414) 729-3661; Pattern 2640 by Syracuse Castings Sales Corp., P. O. Box 190, South Bay Rd., Cicero, NY 13039, (315) 699-2601.

H. Drop Inlet Frames and Grates:
1. Designed to meet AASHTO H20 wheel loading requirements. Manufacture, workmanship and certified proof-load tests shall conform to AASHTO M306-89-Standard Specification for Drainage Structure Castings.
2. Material:
   a. Cast iron: ASTM A 48, Class 30B or 35B.
   b. Delivered to Site free of any coatings, unless otherwise specified.
3. Frames: Slab type, 24-inch square clear opening.

4. Grates:
   a. Bicycle safe.
5. Acceptable Drop Inlet Frames and Grates: Pattern R-3562 by Neenah Foundry Company, P. O. Box 729, Neenah, WI 54957, (414) 729-3661; Pattern 1396440 frame with Pattern 1396040 grate by Syracuse Castings Sales Corp., P. O. Box 190, South Bay Rd., Cicero, NY 13039, (315) 699-2601.

I. Pipe-to-Manhole/Drainage Structure Connections-One of the following:
1. A-Lok Flexible Connector by A-Lok Products, Inc., 697 Main St., Tullytown, PA 19007, (215) 547-3366.
2. Lockjoint Flexible Connector by Chardon Rubber Company, 373 Washington St., Chardon, OH 44024, (216) 285-2161.
3. Kor-N-Seal Flexible Connector by NPC, Inc., 250 Elm St., Milford, NH 03055, (601) 673-8680.
4. Link-Seal Flexible Connector by Thunderline Link-Seal, Inc., 6525 Goforth St., Houston, TX 77021, (713) 747-8819.

J. Mortar: ASTM C 270, Type M.

PART 3 EXECUTION

3.1 PREPARATION

A. Sewer Lateral Openings in Precast and Cast-in-Place Concrete Risers: Provide openings and install pipe connectors in strict accordance with the recommendation of the connector manufacturer.

3.2 INSPECTION

A. Inspect all pipe and fittings before installation. Remove defective pipe and fittings from the site.
B. Do not backfill before installation is inspected by the Director's Representative.

3.3 GENERAL

A. Install pipe in accordance with the manufacturer's recommendations and as specified in ASTM D 2321.
B. Join PVC pipe with solvent cemented joints as recommended by ASTM D 2855.
C. Use Cushion Material for bedding and backfill to the depth shown on the drawings for solid pipe.
D. Use No. 2 Coarse Aggregate for bedding and backfill to the depth shown on the drawings for perforated pipe.

3.4 INSTALLATION

A. Laying Pipe: Lay pipe to indicated line and grade with a firm uniform bearing for the entire length of the pipe. Excavate sufficient clearance at each bell or coupling to allow uniform bearing along the pipe barrel. Fill excess excavation with suitable material and tamp.
B. Joints:
   1. Wipe inside of sockets and outside of pipe to be jointed, clean and dry.
   2. Install rubber gaskets in accordance with the manufacturer's specifications.
C. Connections:
   1. Make connections to existing manholes by cutting into the floor or bench of the manhole and forming a new channel.

2. If the pipe, manholes or other structures with which connection is to be made has not yet been installed, install the pipe to a point directed by the Director's Representative and plug or cap the end in a satisfactory manner.

D. Lay perforated pipe on a tamped bed of underdrain filter material.

E. Temporary Conductor Outlets: If required, remove existing temporary conductor outlets and deliver them to the Facility Authorities as directed.

F. Cleanouts:
   1. Construct cleanouts at the locations shown and as detailed on the drawings.
   2. Use PVC wyes, bends and pipe as indicated.
   3. Extend cleanout piping to grade and terminate with deck plug installed in accordance with manufacturer's instructions.
   4. Install deck plug flush with grade with grade and encase with 2500 psi - concrete pad as shown.

G. Construct concrete structures with precast reinforced riser sections to the dimensions shown. Seal joints between precast riser sections with material specified.
   1. Wall thickness for circular structures 12 feet deep or less: 5 inches.
   2. Wall thickness for circular structures greater than 12 feet deep: 6 inches.

H. Position tops of structures flush with finished grade.

I. Form inverts in manholes on straight runs by the use of channel pipe. Form inverts in manholes at changes in direction or grade by making curved channels of concrete. Channels shall have a smooth surface free from irregularities.

J. Cut laterals which will enter above the invert to correct length before installation. Do not cut after installation. Construct drops as shown.

K. Install glass-fiber reinforced polyester manholes as detailed on the Drawing and in accordance with the manufacturer's printed installation procedures.

L. Construct drop inlets of concrete or precast units.

M. Install curb inlets where indicated.

3.5 LEAKAGE TESTS

A. Prior to backfilling and laying additional pipe, test the first 100 feet of sewer construction for leakage.
   1. Fill the sewer with water and maintain a head two feet above the highest section of Work being tested. Measure the quantity of leakage. When the sewer being tested in constructed in water bearing soil, the leakage test may, at the discretion of the Director's Representative, be made by measuring the quantity of infiltration into the sewer. The allowable leakage or infiltration shall not exceed 10 gallons per 24 hours per inch pipe diameter per 1000 feet of sewer being tested.
   2. If air testing is used conform to the procedure described in ASTM C 828.

B. Additional leakage tests and a final test shall be performed as directed.

END OF SECTION 33 3910

SECTION 33 4000 – STORM DRAINAGE

PART 1 – GENERAL

1.1 SUMMARY

A. Section includes:
1. Catch basins
2. Inlets
3. Storm Drains
4. Underdrains
5. Underground Stormwater Chambers

B. Related Work Specified Elsewhere.
1. Section 311001 - Site Preparation
2. Section 312301 - Sitework Excavation, Backfilling and Compacting
3. Section 321216 - Asphalt Pavement
4. Section 324000 - Site Improvements
5. Section 329200 - Lawns

1.2 SUBMITTALS

A. Submit Shop Drawings (SD) and Manufacturers' Data (MD) for the items listed below and any special construction details relating to the storm drainage system.
1. Drainage structures: one (SD) per casting type.
2. Drainage structures and Trench Drain: one (SD) per structure. Include rim and bottom elevations, pipe inverts and pipe locations.
3. Castings: one (SD) per type
4. Storm lines and underdrains: one (PD) per pipe material type
5. Filter Fabric: (PD)
6. Detectable Warning Tape: (PD)
7. Non-Shrink Grout: (PD)

B. Material Certificates (MC) including a certified laboratory sieve analysis (LA) bearing name and location of quarry. Sample (S) of material required (approximate volume 1 cubic foot) in a waterproof container permanently labeled to show source. Submit for the following materials:
1. Drainage Fill: (MC), (LA) and (S)
2. Coarse Aggregate Fill: (See section 312301, Submittals)

PART 2 – PRODUCTS

2.1 MATERIALS

A. Concrete: As specified Section 321313 - Site Concrete. Minimum compressive strength 3,000 psi at 28 days.

B. Reinforcing: As specified Section 321313 - Site Concrete.

C. Masonry Units: Common brick, ASTM C-62, latest edition, grade SW.
   1. Mortar: Cement-lime-sand, 1:1:3 mix.

D. Drainage Structures, Frame, Grates and Covers:
   1. Drywells/Catch basins/manholes/inlets: Sizes, shapes, specific unit, or any other special requirements as shown on drawings or equal; precast reinforced concrete units complying with ASTM C 478 with integral floor or poured-in-place concrete base; "O" ring gaskets for interlocking units ASTM C443. Provide ductile iron or reinforced plastic steps integrally cast into sidewalls where indicated. Use only "traffic design" covers in paving areas or where otherwise indicated.

E. Frames, Grates, Covers:
   1. Sizes, specific unit, grate or cover design or any other special requirements as shown on drawings or equal. All units to be heavy-duty suitable for H-20 loading. Syracuse Castings Co. or Neenah Co. products shall be quality standard. Provide castings of uniform quality, free from blow holes, porosity, hard spots, shrinkage defects, cracks, or other injurious defects; gray iron material, ASTM A 48 Class 30, all non-rocking design with machined bearing surfaces. Provide traps or pipe elbow drops if shown on drawings.
   2. Pipe to MH/CB Connectors: Kor-N-Seal flexible EPDM rubber connector by NPC Inc. or approved equal.
   3. Grade Adjustment: Precast concrete rings, NYSDOT Section 715-13 prefabricated cast iron or steel adjustment rings. No brick allowed.
   4. Provide traps or pipe elbows within structure if shown on drawings.

F. Storm Lines:
   1. Cast Iron Pipe (CI): XH ASTM service weight, hub-and-spigot joints CISPI HSN compression type with ASTM C564 neoprene gaskets.
   2. Corrugated Round Steel Pipe (CSP): Comply with NYSDOT Section 707-02. Steel thickness 16 gauge minimum; galvanized hot-dipped bituminous coated inside and out; paved invert or smooth liner if indicated on drawings; all special shapes, fittings, branches, reducers and band couplers to match, same manufacturer. Use maximum available width couplers for pipe size. Provide perforated pipe where shown on drawings.
   3. Corrugated High Density Polyethylene (HDPE): Corrugated Perforated or Non-perforated High Density Polyethylene shall have smooth interior and annular exterior corrugations. Pipe sizes 4 to 60 inches (100 to 1500 mm) shall meet AASHTO M294, Type S. Pipe shall be joined with the bell-and-spigot joint meeting the requirements of AASHTO M252 or AASHTO M294. The joint shall be watertight according to the laboratory requirements of ASTM D3212. 30 inch (750 mm) through 42 inch (1050 mm) pipe joints shall be watertight according to ASTM D3212 with the exception that the joint be tested using 5.0 psi (34.5 kPa). Joints shall remain watertight when subjected to a 1.5 degree axial misalignment. Gaskets shall be made of polyisoprene meeting the laboratory requirements of ASTM F477. Gaskets shall be installed by the pipe manufacturer and covered with a removable wrap to ensure the gasket is free from debris. A joint lubricant supplied by the manufacturer shall be used on the gasket and bell during assembly.
   4. Underdrain (UD): ASTM F 405 perforated corrugated polyethylene tubing, piping and fittings by Advanced Drainage Systems, Hancor, Baughman Tile Co., or equal; use maximum length coils in each run; use internal couplers to join coils. Provide heavy-grade AASHTO M 294 culvert pipe where indicated. Use non-perforated tubing where indicated.

G. Sand Bedding (Storm Drains): Clean coarse natural sand free of organic matter.

H. Drainage Fill (Underdrains): Screened gravel, crushed gravel or crushed stone conforming with NYSDOT Section 703.02 Size 1 Gradation

I. Filter Fabric: Non-woven polypropylene drainage fabric, Mirafi 140N, TerraTex SD or equal.

J. Cleanouts: Heavy-duty coated cast iron body, fitted top with vandal resistant fasteners, cleanout plug. J.R. Smith, Zurn or equal. Use ductile iron pipe riser. Comply with drawings.

K. Non-Shrink Grout: CRD-C 621, factory pre-mixed grout. Products which may be incorporated in the work include the following Non-metallic grouts or an approved equal: "Set Grout" by Master Builders, "Sonogrout" by Sonneborn-Rexnord or "Euco-NS" by Euclid Chemical Co.

L. Dissimilar Material Adapter: Dissimilar Material Adapter by Advanced Drainage Systems or approved equal.

M. Coarse Sand: Well-graded coarse sand generally complying with NYSDOT section 703.07 Concrete Sand specification and gradation, provided that no more than 25 percent by weight shall pass a No. 30 sieve.

N. Underground Stormwater Chambers: ChamberMaxx Stormwater Chamber System by ConTech Engineered Solutions (www.conteches.com) as shown on plans or approved equal.

PART 3 – EXECUTION

3.1 STRUCTURES

A. Precast Units: Bed in gravel, set level and plumb. Align steps in all sections exactly on a plumb axis. On sloping surfaces, arrange for opening to be on the downslope side of the structure so that 12 inch minimum cover is maintained over riser section without bulging the plane of the slope. Finished structure, including all joints and penetrations, shall be watertight.

B. Masonry Extensions: Construct as detailed. Parge inside and out.

C. Castings: Securely set in mortar.

3.2 INSTALLATION OF DRAIN LINES

A. All pipe shall be examined before laying and no piece shall be installed which is found to be defective.

B. Drain placement shall commence at the outlet and proceed section by section "uphill" unless otherwise directed by the Engineer. Place spigot ends in direction of flow.

C. If any defective pipe is discovered after it has been installed, it shall be removed and replaced with a sound pipe in a satisfactory manner at no additional cost to the Owner. All pipe and fittings shall be thoroughly cleaned before installation, shall be kept clean until they are used in the work and when laid, shall conform to the lines and grades required. All piping, flared end sections and fittings shall be installed in accordance with requirements of the manufacturer, or as otherwise provided herein or on the Drawings.

D. As soon as the excavation is complete to normal grade of the bottom of the trench, sand bedding shall be placed, compacted and graded to provide firm, uniform and continuous support for the pipe. The pipe shall be laid accurately to the lines and grades indicated on the Drawings. Blocking under the pipe will not be permitted. Bedding shall be placed evenly on each side of the pipe to mid-diameter and hand tools shall be used to force the bedding where needed to give firm continuous support for the pipe. Depending on final surface material, Sand

Bedding or Coarse Aggregate Fill shall be placed to 12-inch above the top of the pipe (refer to ''Drains'' detail). The initial 3-ft of backfill above the bedding shall be placed in 1-ft layers and carefully compacted. Generally the compaction shall be done evenly on each side of the pipe and compaction equipment shall not be operated directly over the pipe until sufficient backfill has been placed to ensure that such compaction equipment will not have a damaging effect on the pipe. Equipment used in compacting the initial 3 foot of backfill shall be approved by the pipe manufacturer's representative prior to use. Refer to Section 312301, Sitework Excavation, Backfilling and Compacting for additional backfilling requirements.

E. All pipe shall be sound and clean before installation. When installation is not in progress, the open ends of the pipe shall be closed by watertight plug or other approved means. Good alignment shall be preserved during installation. The deflection at joints shall not exceed that recommended by manufacturer.

F. Before any joint is made, the pipe shall be checked to assure that a close joint with the next adjoining pipe has been maintained and that the inverts are matched and conform to the required grade. The pipe shall not be driven down to grade by striking it.

G. Precautions shall be taken to prevent flotation of the pipe in the trench.

H. When moveable trench bracing such as trench boxes, moveable sheeting, shoring or plates are used to support the sides of the trench, care shall be taken in placing and moving the boxes or supporting bracing to prevent movement of the pipe, or disturbance of the pipe bedding and the backfill. Trench boxes, moveable sheeting, shoring or plates shall not be allowed to extend below top of the pipe. If trench boxes, moveable sheeting, shoring or plates have been installed below the top of the pipe, they shall be moved slowly taking care not to disturb pipe, bedding or backfill. As trench boxes, moveable sheeting, shoring or plates are moved, pipe bedding shall be placed to fill any voids created and the backfill shall be recompacted to provide uniform side support for the pipe.

I. Thoroughly clean completed storm drainage system of all debris and sediment prior to final acceptance.

3.3 COORDINATION

A. Coordinate location of wyes and verify inverts of lines and structures with Plumbing Contractor where applicable.

3.4 UNDERDRAINAGE/FRENCH DRAIN/LOW FLOW UNDERDRAIN

A. Drainage Fill: Place as detailed.

B. Perforated lines: Place holes down, true to line and grade. Place remaining drainage fill.

C. Connect to nearest suitable storm manhole whether drawings show routing or not.

D. Backfill: Per Section 312301 Sitework Excavation, Backfilling and Compacting and as detailed on the drawings.

3.5 WATERPROOF PIPE CONNECTOR

A. Install per manufacturer's recommendations.

END SECTION 33 4000