TOWN OF NEWBURGH
PLANNING BOARD
TECHNICAL REVIEW COMMENTS

PROJECT NAME:	**KINGDOM HALL**
PROJECT NO.:	**22-31**
PROJECT LOCATION:	**33 OLD LITTLE BRITAIN RD**
	SECTION 97, BLOCK 3, LOT 13
REVIEW DATE:	**12 MAY 2023**
MEETING DATE:	**18 MAY 2023**
PROJECT REPRESENTATIVE:	**GREENMAN – PEDERSEN, INC**

1. The Stormwater Management for the project site has been significantly altered. Design now incorporates a bio-retention and extended detention basin rather than the previously proposed infiltration practices. A review of the SWPPP is being undertaken by this office.

2. Sanitary sewer notes reference submission to NYSDEC in numerous locations. Septic system is less than 1,000 gallons per day and is not required to be submitted to NYSDEC. Septic System notes must require submission of an As Built drawing and certification by a NYS Design Professional as to the construction of the subsurface sanitary sewer disposal system prior to issuance of a Certificate of Occupancy.

3. The subsurface sanitary sewer disposal system design identifies laterals at 80 feet each. Gravity fed laterals have a maximum length of 60 feet.

4. The septic tank is labeled as 1.2 gallon tank on Sheet CU-101. This should be labeled 1,500 gallons per other plan details.

5. A Restrained Joint Pipe Chart should be added to the plans for the watermain.

6. Comments from the Water Department regarding the thumbnail detail on Sheet U-101 should be received. It is unclear why the water line is extended and capped for future connections.

7. The water notes on Sheet 101 identify Pex tubing and PVC SDR21 – this is not permitted in the Town of Newburgh. Reference Town of Newburgh Water notes including in other places in the plan set. Note 6 identifies water line construction shall include bedding and concrete thrust blocking. Concrete thrust blocks are not permitted in the Town of Newburgh. Mechanical Restraint Joint pipe is required. Generally, water notes should conform to Town of Newburgh Water Note requirements.

8. A Stormwater Facilities Maintenance Agreement will be required to be executed and filed.

9. Status of the Highway Superintendent's review of the access drive should be addressed.

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10. Storm drainage notes on plan sheets identify Nyloplast Catch Basins while details identify standard concrete catch basins which are required. Any reference to the plastic catch basins should be removed from the plans.

11. It is noted that the south side of the parking lot does not have curbing. The applicants have designed the parking lot to sheet flow to a swale along the south side. Vehicle delineation such as guiderail should be proposed to keep vehicles from driving off of pavement when parking.

12. Comments regarding the revised SWPPP submitted:
    - Section 3.4 Receiving Water Bodies identifies that the project site openly flows to a roadside drainage feature to the northeast or to Washington Lake located to the southwest. This should be revised as the project does not discharge to Washington Lake. The project may have a small tributary area to the Lockwood Basin, which is below the City of Newburgh's water supply Washington Lake.

Respectfully submitted,

MHE Engineering, D.P.C.

Patrick J. Hines
Principal
PJH/kbw

GPI

Engineering | Design | Planning | Construction Management

Engineers Report

April 28, 2023

STORMWATER POLLUTION PREVENTION PLAN

For

NEWBURGH KINGDOM HALL OF JEHOVAH'S WITNESSES

33 Old Little Britain Road
Town of Newburgh
Orange County
New York

Owner/Developer: **JW Congregation Support, Inc.**
1005 Red Mill Road
Wallkill, New York 12589

WARNING: The alteration of this material in any way, unless under the direction of a comparable professional, i.e. a Professional Engineer, is a violation of the New York State Education Law and/or Regulations and is a Class 'A' misdemeanor.

PREPARER OF THE SWPPP

"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(s) 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."

Name: Ryan Trunko, P.E.

Title: Project Engineer

License No.: 093733

Date: 4/28/2023

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APPENDICES

1.0 EXECUTIVE SUMMARY

This Stormwater Pollution Prevention Plan (SWPPP) has been prepared for construction activities associated with the New Kingdom Hall for Jehovah's Witnesses Project hereafter called "the project site". The "project site" is located to the west of the existing Kingdom Hall building and is associated with 33 Old Little Britain Road in the Town of Newburgh, Orange County, New York. This SWPPP includes elements necessary to comply with the national baseline general permit for construction activities enacted by the U.S. Environmental Protection Agency (EPA) under the National Pollutant Discharge Elimination System (NPDES) program and all local governing agency requirements. Implementation of this SWPPP must be initiated at the start of construction.

This SWPPP has been developed in accordance with the "New York State Department of Environmental Conservation (NYSDEC) State Pollution Discharge Elimination System (SPDES) General Permit for Stormwater Discharges from Construction Activity" General Permit Number GP-0-20-001, effective January 29, 2020, through January 28, 2025.

This SWPPP and the accompanying plan set entitled "Newburgh Kingdom Hall of Jehovah's Witnesses" has been submitted as a set to identify and detail storm water management, pollution prevention, and erosion and sediment control measures required for the project during and following construction. All engineering drawings are considered integral to the SWPPP and thus this SWPPP is only considered complete with their inclusion.

This report considers the impacts associated with the intended development with the purpose of:

- Maintaining existing drainage patterns as much as possible while continuing the conveyance of upland watershed runoff;
- Controlling increases in the rate of stormwater runoff resulting from the proposed redevelopment, so as not to adversely alter downstream conditions; and,
- Mitigating potential stormwater quality impacts and preventing soil erosion and sedimentation resulting from stormwater runoff generated both during and after construction.

1.1 Project Description

JW Congregation Support, Inc. proposes the construction of a new ±4,922 sf Kingdom Hall building. In addition to the new Kingdom Hall building, this project will include a parking lot, site lighting, public utility connections, an onsite septic system, and a stormwater management and conveyance system. The project will also include pedestrian walkways and a new curb cut connection to Old Little Britain Road.

The proposed project is located at 33 Old Little Britain Road in the Town of Newburgh, near the intersection of Old Little Britain Road and Dewey Drive (hereinafter referred to as the "subject site"). The project site is located within an overall parcel that encompasses ±6.81acres of land on the property adjacent to the existing Kingdom Hall facility and includes Tax Map Parcel Number 97-3-13. The site currently exists as an overgrown wooded area with an abandoned structure located centrally within the parcel. Approximately ±2.75 acres of disturbance is anticipated. A location map of the site has been provided in Appendix I, as Figure 1.

This type of project is included in Table 2 of appendix B of GP-0-20-001. Therefore, this SWPPP includes post-construction stormwater management practices as well as erosion and sediment controls.

Project construction activities will consist primarily of the buildings' construction, site grading, paving for sidewalks and parking areas, installation of site lighting, installation of a new onsite septic system, and the installation of a stormwater drainage and management systems. Construction phase pollutant sources anticipated at the site are disturbed (exposed) soil, vehicle fuels and lubricants, chemicals associated with building construction, and building construction materials. Without adequate control, there is the potential for each type of pollutant to be transported by stormwater.

1.2 Stormwater Pollution Controls

The proposed measures outlined herein have been designed to provide water quality controls by treating and runoff prior to its discharge off site. These measures have been designed and evaluated in accordance with the following standards and guidelines:

- New York State Stormwater Management Design Manual (January 2015).
- New York State Standards and Specifications for Erosion and Sediment Control (November 2016).

The project proposes the use of a bioretention practice with extended detention to filter and detain the water quality volume produced from the proposed development area. Runoff from the parking lot and building is captured by a stormwater conveyance system that sends stormwater toward a flow splitter that will divert the WQV to the bioretention and bypass the larger storm events to the extended detention basin. A plunge pool will provide pretreatment for the bioretention area.

Pre- and post-development surface runoff rates have been evaluated for the 1-, 10-, and 100-year 24-hour storm events. Comparison of pre- and post-development watershed conditions demonstrates that the peak rate of runoff from the project site will not be increased; therefore, the project will not have a significant adverse impact on the adjacent or downstream properties or receiving water courses.

The proposed stormwater collection system consisting of pipes and on-site stormwater management facilities will adequately collect, treat, and convey the stormwater.

Stormwater quality will be enhanced through the implementation of the proposed stormwater management facilities, erosion and sediment control measures and maintenance practices outlined herein. The entire Water Quality Volume will be treated through the use standard stormwater management practices with runoff reduction volume capacity.

This project is located within the Town of Newburgh regulated, traditional land use control Municipal Separate Stormwater Sewer System (MS4). Submission of this SWPPP to the MS4 for review and acceptance is required and the MS4 SWPPP Acceptance form must be must be signed by the principal executive officer or ranking elected official from the regulated, traditional land use control MS4, or by a duly authorized representative of that person prior to the signed form along with the NOI per the Notice of Intent submittal requirements. The MS4 Acceptance Form can be found in Appendix B.

1.3 Conclusion

This SWPPP has been prepared in conformance with the current NYS Standards and Specifications for Erosion and Sediment Control and NYS Stormwater Management Design Manual. As such, GP-0-20-001 coverage will be effective five (5) business days from the date the NYSDEC receives the completed NOI.

It is our opinion that the proposed development will not adversely impact adjacent or downstream properties if the stormwater management facilities are properly constructed and maintained in accordance with the requirements outlined herein.

2.0 SWPPP IMPLEMENTATION RESPONSIBILITIES

A summary of the responsibilities and obligations of all parties involved with compliance with the NYSDEC SPDES General Permit, GP-0-20-001 conditions are outlined in the subsequent sections. For a complete listing of the definitions, responsibilities, and obligations, refer to the SPDES General Permit GP-0-20-001 presented in Appendix A.

2.1 Definitions

1. ***General SPDES Permit -*** means a SPDES permit issued pursuant to 6 NYCRR Part 750-1.21 and Section 70-0117 of the Environmental Conservation Law authorizing a category of discharges.

2. ***Owner or Operator -*** means 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 conditions. There may be occasions during the course of a project in which there are multiple Operators, all of which will need to file and maintain the appropriate SWPPP documents and plans, including without limitation, the Notice of Intent (NOI) and Notice of Termination (NOT).

3. ***Qualified Inspector -*** means a person that is knowledgeable in the principles and practices of erosion and sediment control, such as licensed Professional Engineer, Certified Professional in Erosion and Sediment Control (CPESC), Registered Landscape Architect, or other Department 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 an individual working under the direct supervision of the licensed Professional Engineer or Registered Landscape Architect has received four (4) hours of Department endorsed training in proper erosion and sediment control principles from a Soil and Water Conservation District, or other Department 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 post-construction stormwater management practices that include structural components, such as a dam for an impoundment, shall be performed by a licensed Professional Engineer.

4. ***Qualified Professional -*** means a person that is knowledgeable in the principals and practices of Stormwater management and treatment, such as a licensed Professional Engineer, Registered Landscape Architect or other Department endorsed individual(s). Individuals preparing SWPPPs that require the post-construction Stormwater management practice component must have an understanding of the principals of hydrology, water quality management practice design, water quality control design, and, in many cases, the principals of hydraulics in order to prepare a SWPPP that conforms to the Department's technical standard. 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.

5. ***Trained Contractor -*** means an employee from the contracting (construction) company, identified in Part III.A.6., that has received four (4) hours of Department endorsed training in proper erosion and sediment control principals from a Soil and Water Conservation District, or other Department endorsed entity. After receiving the initial training, the *trained contractor* shall receive four (4) hours of training every three (3) years.

2.2 Owners or Operator's & Contractor's Responsibilities

1. Have the SWPPP preparer sign the "SWPPP Preparer Certification" statement on the NOI prior to submitting the form to the Department.

2. Submit the signed NOI along with any required attachments to the following: (The Contractor will assist the Owner or Operator to submit the NOI to ensure coverage is in place prior to commencement of construction)

   A. Per GP 0-20-001 for review and acceptance by the MS4. The MS4 SWPPP Acceptance form must be signed by the principal executive officer or ranking elected official from the regulated, traditional land use control MS4, or by a duly authorized representative of that person to:

      Town of Newburgh – Engineering Department
      James Osborne
      1496 Route 300
      Newburgh, NY 12550

B. Signed NOI to:

NOTICE OF INTENT
NYS DEC, Bureau of Water Permits
625 Broadway, 4^{th} Floor
Albany, New York 12233-3505

3. Pay the required annual fees upon receipt of invoices from NYSDEC. These invoices are generally issued in the fall of each year. The annual fee is calculated as $100.00 per acre disturbed plus $600.00 per future impervious acre.

4. Retain the services of a "Qualified Professional", as defined under Section 2.1, to provide the services outlined in Section 2.3 "Operator's Engineer's Responsibilities".

5. Retain the services of an independent certified materials testing and inspection firm to perform regular tests, inspections, and certifications of the construction materials used in the construction of all post-construction stormwater management practices.

6. Prior to the commencement of construction activity, retain a qualified inspector who will assist to Owner or Operator to identify the contractor(s) and subcontractor(s) that will be responsible for implementing the erosion and sediment control measures and stormwater management practices described in this SWPPP. Have each of these contractors and subcontractors identify at least one "Trained Contractor", as defined under Section 2.1 that will be responsible for the implementation of the SWPPP. Ensure that the Contractor has at least one "Trained Contractor" on site on a daily basis when soil disturbance activities are being performed.

7. Schedule a pre-construction meeting which shall include the Operator's Qualified Professional, Contractor, and their sub-contractors to discuss responsibilities as they relate to the implementation of this SWPPP.

8. Require the Contractor to fully implement the SWPPP prepared for the site by the Operator's Professional to ensure that the provisions of the SWPPP are implemented from the commencement of construction activity until all areas of disturbance have achieved final stabilization and the Notice of Termination (NOT) has been submitted.

9. Forward a copy of the NOI Acknowledgement Letter received from the regulatory agency to the Operator's Engineer for project records, and to the Contractor for display at the job site.

10. Maintain a copy of the General Permit (GP-0-20-001), NOI, NOI Acknowledgement Letter, SWPPP, inspection reports, Spill Prevention, Countermeasures, and Cleanup ("SPCC") Plan, inspection records, and other required records on the job site so that they may be made available to the regulatory agencies. The Contractor and Qualified Inspector will assist the Owner or Operator with creating a binder to maintain required

records.

11. Post at the site, in a publicly accessible location, a copy of the General Permit (GP-0-20-001), a signed copy of the NOI, the NOI Acknowledgement Letter, and on a monthly basis a summary of the site inspection activities.

12. The Contractor will prepare a written summary of projects status with respect to compliance with the general permit at a minimum frequency of every three months during which coverage under the permit exists. The summary is to address the status of achieving the overall goal of the SWPPP. The summary shall be maintained at the site in a publicly accessible location.

13. Prior to submitting a Notice of Termination, take the proper steps to ensure that the long-term operation and maintenance of the post-construction stormwater management practices will be performed. See GP-0-20-001 Part V for details.

14. The Contractor on behalf of the Owner or Operator will obtain Owner or Operator's signature and then Submit a Notice of Termination (NOT) form (see Appendix F) within 48 hours of receipt of the Operator's Professional's certification of final site stabilization to the following:

    NOTICE OF TERMINATION
    NYS DEC, Bureau of Water Permits
    625 Broadway, 4th Floor
    Albany, New York 12233-3505

    Town of Newburgh – Engineering Department
    James Osborne
    1496 Route 300
    Newburgh, NY 12550

15. Request and receive all SWPPP records from the Operator's Professional and archive those records for a minimum of five years after the NOT is filed.

16. Require the implementation of the Post-Construction Inspections and Maintenance procedures outlined in Appendix M.

2.3 Operator's Qualified Professional Responsibilities

1. Prepare the SWPPP using good engineering practices, best management practices, and in compliance with all federal, state, and local regulatory requirements.

2. If requested, assist the Owner or Operator with submitting the SWPPP to the appropriate regulated MS4 for review and acceptance.

3. Prepare the Notice of Intent (NOI) form (see Appendix B), sign the "SWPPP Preparer Certification" section of the NOI, and forward to the Owner or Operator for signature.

4. Assist as requested, the Owner or Operator and Contractor in providing copies of the SWPPP to the municipality having jurisdiction once all signatures and attachments are complete.

5. Participate at pre-construction meeting with the Operator, Contractor, and their sub-contractors to discuss responsibilities as they relate to the implementation of this SWPPP.

6. Enter Contractor's information in Section 2.5 "SWPPP Participants" once a Contractor is selected by the Owner or Operator.

7. Coordinate with the Owner and Operator to retain a construction phase Qualified Professional to complete on-site inspections to determine compliance with the SWPPP. Site inspections shall occur at an interval of at least once every seven calendar days. A written inspection report shall be provided to the Operator and appropriate contractor (or subcontractor) within one business day of the completion of the inspection, with any deficiencies identified. A sample inspection form is provided in Appendix D. Note that more than one Operator's Qualified Professional may exist for the project. Any individual or firm retained by the Owner or Operator to provide inspection will also be the Operator's Qualified Professional during the duration of construction.

   A. The Owner or Operators construction phase Qualified Professional shall review the Contractor's SWPPP records on a periodic basis to ensure compliance with the requirements for daily reports and inspections and maintenance logs.

   B. Maintain the construction Site Log Book throughout the duration of construction.

   C. Update the SWPPP each time there is a significant modification to the pollution prevention measures or a change of the principal Contractor working on the project who may disturb site soil.

   D. Review material testing and inspection reports prepared by an independent testing and inspection firm operating under the direction of a licensed Professional Engineer.

   E. Assist the Owner or Operator to hire a NYS Licensed Professional Land Surveyor to complete a topographic survey of completed post-construction stormwater management facilities completed and perform evaluations of the completed stormwater management systems to determine whether the facilities will function as designed.

F. Conduct a final site assessment and prepare a certification letter to the Owner/Operator indicating that, upon review of the material testing and inspection reports prepared by the firm retained by the Owner/Operator, completion of the topographic survey, and evaluation of the completed stormwater management facilities, the stormwater management facilities have been constructed substantially in accordance with the contract documents and should function as designed.

G. Assist the Owner or Operator with completing and filing of the Notice of Termination (NOT). Sign the NOT Certifications VI (Final Stabilization) and VII (Post-construction Stormwater Management Practices) and forward the NOT to the Owner/Operator for signature of Certification VIII (Owner or Operator Certification).

H. Ensure the transfer of the SWPPP documents, along with all NOI's, permit certificates, NOT's, construction Site Log Book, and written records required by the General Permit to the Operator for archiving.

2.4 Contractor's Responsibilities

1. Send all notifications required by SPDES General Permit Number GP-0-20-001 via certified mail with return receipt. Copies of mailing receipts shall be kept on record at the project site with the SWPPP and shall be considered part of the contract documents.

2. Sign the SWPPP Contractor's Certification Form contained within Appendix C and forward to the Operator's construction phase Qualified Professional for inclusion in the Site Log Book.

3. Identify at least one Trained Individual that will be responsible for implementation of this SWPPP. Ensure that at least one Trained Individual is on site on a daily basis when soil disturbance activities are being performed.

4. Provide the names and addresses of all subcontractors working on the project site. Require all subcontractors who will be involved with the major construction activities that will result in soil disturbance to identify at least one Trained Individual that will be on site on a daily basis when soil disturbance activities are being performed; and to sign a copy of the Contractor's Certification Form and forward to the Operator's construction phase Qualified Professional for inclusion into the Site Log Book. This information must be retained as part of the Site Log Book.

5. Prepare a Spill Prevention and Response Plan in accordance with requirements outlined in Section 5.4. This plan shall be provided to the Operator's construction phase Qualified Professional for inclusion in the Site Log Book.

6. Participate in pre-construction meeting which shall include the Operator, Operator's construction phase Engineer, and all sub-contractors to discuss responsibilities as they relate to the implementation of this SWPPP.

7. If Contractor plans on utilizing adjacent properties for material, waste, borrow, or equipment storage areas, or if Contractor plans to engage in industrial activity other than construction (such as operating asphalt and/or concrete plants) at the site, Contractor shall submit appropriate documentation to the Owner and Operator's design Qualified Professional so that the SWPPP can be modified accordingly.

8. Implement site stabilization, erosion and sediment control measures, and other requirements of the SWPPP.

9. Conduct daily inspections of erosion and sediment control measures installed at the site to ensure that they remain in effective operating condition at all times. Prepare, and retain written documentation of inspections as well as of all repairs/maintenance activities performed. This information must be retained as part of the site Log Book.

10. Maintain a record of the dates when major grading activities occur, when construction activities temporarily or permanently cease on a portion of the site, and when stabilization measures are initiated, until such time as the NOT is filed. A log for keeping such records is provided in Appendix E.

11. Provide monthly training sessions for all entities and subcontractors involved with installing, applying, performing, maintaining and inspecting measures outlined within this SWPPP.

12. Begin implementing corrective actions within one day of receipt of notification by the Qualified Inspector that deficiencies exist with the erosion and sedimentation control measures employed at the site. Corrective actions shall be completed within a reasonable time frame.

13. Comply with all site posting requirements identified herein and on the construction plans.

14. Maintain the site Log Book with all required documentation identified in the previous sections.

SWPPP Participants

1. Design Engineer:	Mr. Ryan Trunko, P.E. GPI/Greenman-Pedersen, Inc. 80 Wolf Rd, Suite 300 Albany, NY 12205 Phone: 518.453.9431	
2. Construction Qualified[1]: Professional	Name and Title:	______________________
	Company Name:	______________________
	Mailing Address:	______________________
		______________________
	Phone:	______________________
	Fax:	______________________
3. Operator:	Michael Stefanski JW Congregation Support, Inc. 1005 Red Mill Road Wallkill, NY 12589	
4. Contractor[2]:	Name and Title:	______________________
	Company Name:	______________________
	Mailing Address:	______________________
		______________________
	Phone:	______________________
	Fax:	______________________

[1] Construction Phase Engineer information to be entered once selected and if different from design engineer.
[2] Contractor's information to be entered once the Contractor has been selected.

3.0 SITE CHARACTERISTICS

3.1 Land Use & Topography

The proposed project site encompasses a ±6.81 acre tax parcel, ±2.75 acres of disturbance, and lies within the Town of Newburgh's R3 –Residential zoning district and the RO – Professional Office Overlay District.

The land is wooded and currently has an existing abandoned building with an overgrown driveway path. The surrounding adjacent properties include several uses including Residential properties to the north of the site, an existing Kingdom Hall to the east, and a commercial utility provider and business to the west and south of the site. The existing abandoned building and overgrown driveway are to be demolished in order to install the proposed site features. The site does not contain any existing utility connections and will need to connect to the existing utilities in Old Little Britain Road.

Existing grades for the new Kingdom Hall site generally slope from a high point elevation to the southeastern edge of the site at ±319.00, to the low point elevations to the east of ±289.00, and to the west of ±300.00. Stormwater runoff generally sheet flows east and west from the central ridge within the site and discharges towards Lake Washington to the west or to the roadside swale along Old Little Britain Road.

3.2 Soils & Groundwater

The United States Department of Agriculture (USDA) Soil Conservation Service (SCS) Soil Survey for Orange County was reviewed and identified surficial soil conditions for the study area. The SCS identified the presence of three series soil types onsite, "Pt" – Pittsfield Gravelly Loam through the middle, "SXC" – Swartswood and Mardin soils at the southwestern corner, and "ErB" – Erie Gravelly Silt Loam at the northeastern corner of the limits of the project's tax parcel which has not been developed. Soil survey maps are provided in Appendix G.

The SCS defines the map unit "Pt – Pittsfield Gravelly Loam" as a very deep well drained, gently to steep sloping soils formed in glacial till deposits derived from limestone and schist. Areas are found on hilltops, ridges, and knolls in uplands, and range from 5 to 15 acres in size. Typically, the surface layers are very dark brown gravelly loam 0 to 10 inches thick with decreasing gravel size at increasing depths. The subsoil layers are generally yellowish brown gravelly fine sandy loam and extend to a depth of 60 inches or more. This map unit includes specific soil labels "PtB", "PtC", and "PtD" which indicate the severity of slopes within the map unit area.

The map unit "ErB – Erie Gravelly Silt Loam is defined by the SCS as a deep, somewhat poorly drained, gently sloping soil that has a fragipan. The soil formed in glacial till deposits derived from shale, slate, and sandstone. It is found in 5 to 20-acre areas on foot slopes, lower hillsides, and along shallow drainageways of the uplands. Typically, the surface layers are dark brown gravelly silt loam that is approximately 9 inches thick. Subsoil layers are approximately 45 inches deep and are generally mottled grayish brown channery silt loam that transitions to a mottled olive brown channery silt loam fragipan.

The map unit "SXC – Swartswood and Mardin very stony soils" are defined by the SCS as well drained and moderately well drained Swartswood soil and moderately well drained Mardin soil that are found in mixed or separate patches within the map unit area. These soils formed in glacial till deposits on hill crests, hilltops, and ridges in uplands. The surface layer of the soil is typically a very dark grayish brown gravelly loam approximately 3 inches deep with scattered large stones and boulders greater than 10 inches in diameter. Areas of the soil are mostly 10 to 100 acres in size.

Table 1: Soil Data

Map Symbol & Description	Hydrologic Soil Group	Permeability (inches/hour)	Erosion Factor K	Depth to Water Table (feet)	Depth to Bedrock (feet)
ErB – Erie gravelly silt loam	D	0.06 - 0.20	0.20	± 1	± 1.5
PtB – Pittsfield gravelly loam	B	0.57- 5.95	0.17	> 6.5	>6.5
PtC – Pittsfield gravelly loam	B	0.57- 5.95	0.17	> 6.5	> 6.5
PtD – Pittsfield gravelly loam	B	0.57- 5.95	0.17	> 6.5	> 6.5
SXC – Swartswood and Mardin soils	C/D	0.00 – 0.57	0.20	± 1.25	± 1.75

The Soil Conservation Service defines the hydrologic soil groups as follows:

- Type A Soils: Soils having a high infiltration rate and low runoff potential when thoroughly wet. These soils consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a moderate rate of water transmission.
- Type B Soils: Soils having a moderate infiltration rate when thoroughly wet and consisting mainly of moderately deep to deep, moderately well to well drained soils with moderately fine to moderately course textures. These soils have a moderate rate of water transmission.
- Type C Soils: Soils having a low infiltration rate when thoroughly wet and consisting chiefly of soils with a layer that impedes downward movement of water and soils with moderately fine-to-fine texture. These soils have a low rate of water transmission.
- Type D Soils: Soils having a very low infiltration rate and high runoff potential when thoroughly wet. These soils consist chiefly of clays that have high shrink-swell

potential, soils that have a permanent high-water table, soils that have a clay pan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very low rate of water transmission.

A geotechnical evaluation was completed at the project site to investigate the properties of the soils within the site. The evaluation was used to confirm the descriptions and qualities of the soils from the USGS. The project's geotechnical investigation report has been included in Appendix G and excerpts from the report are below.

The geotechnical report entitled "Geotechnical Engineering Report – New Jehovah's Witnesses Worship Center" was prepared by Gifford Engineering dated March 2020. A general description of the subsurface conditions for the adjacent project was included in the report and is as follows.

"The four structure borings were drilled near the building corners…the topsoil varies between 4 and 8 inches thick. Subjacent to the topsoil is a till like soil comprised of moist to wet silt with some sand and trace gravel and clay with occasional rock fragments. This later extends to a depth of 12 feet, where the geoprobe refused further advancement of the sampler. The driller reported that he thought this refusal was caused by very dense till rather than rock.

Similar soil conditions were encountered at the sounding that were advanced at the parking lot and stormwater management areas. The silt soil is frost susceptible and will heave during cold weather and settle during spring thaw.

Water level measurements taken during the boring investigation are present on the boring and sounding logs… the depth to groundwater was encountered between 5 and 8 feet below the ground surface.

Two infiltration tests were conducted in accordance with NYSDEC Stormwater Design Manual and ASTM D 4044… The results vary between 1.75 and 2.5 inches per hour"

GPI performed two infiltration tests in the area of the proposed practice on April 25, 2023 to confirm the previously conducted tests. The observed infiltration rate was 1.5-2 inches per hour which is consistent with the geotechnical report.

3.3 Watershed Designation

The project site is not located in a restricted watershed identified in appendix C of GP-0-20-001.

3.4 Receiving Water Bodies

The runoff from the project site ultimately flows to the roadside drainage features to the northeast or to Lake Washington located to the southwest.

The site does not discharge into waters classified in the Section 303(d) list of impaired waters found in appendix E of GP-0-20-001.

3.5 Aquifer Designation

The project site is not located over a US EPA designated Sole Source aquifer; nor is it located over a Primary or Principal aquifer listed in the NYSDEC Technical and Operational Guidance Series (TOGS) 2.1.3 (1980).

3.6 Wetlands

There are no wetlands located on-site and stormwater runoff does not discharge to a regulated wetland.

3.7 Flood Plains

According to the National Flood Insurance Program Flood Insurance Rate Map (FIRM) (Panel 331 of 630 for Orange County, New York) a portion of the project site lies within Zones X in the 500-year floodplain.

3.8 Historic Places

In accordance with GP-0-20-001, the project was sent to the New York State Office of Parks, Recreation and Historic Preservation (NYSOPRHP) Division for Historic Preservation for review. Based upon a review from NYSOPRHP, the letter of no impact dated April 7, 2020 stated, "it is the opinion of OPRHP that no properties, including archaeological and/or historic resources, listed in or eligible for the New York State and National Registers of Historic Places will be impacted by this project."

3.9 Rainfall Data

Rainfall data utilized in the modeling and analysis were obtained from the Northeast Regional Climate Center (NRCC). Rainfall data averaged from the closest rainfall stations to the project site for various 24-hour storm events is presented in Table 2:

Table 2: Rainfall Data

Storm Event Return Period	24-Hour Rainfall (inches)
90% Rainfall	1.2
1-year	2.60
10-year	4.70
100-year	8.38

These values were used to evaluate the stormwater runoff characteristics and hydraulic analysis of the closed drainage systems and stormwater management practices.

4.0 CONSTRUCTION SEQUENCE

This project's disturbance area encompasses less than five acres of land and disturbance of additional off-site properties to facilitate construction is not anticipated, therefore written approval from NYSDEC allowing the disturbance of more than five acres of land at any one time is not required. If the Contractor's construction sequence requires the disturbance of more than five acres at any one-time, written approval must be obtained from NYSDEC prior to disturbing more than five acres at once.

The "Erosion and Sediment Control Plan" in the accompanying drawings identify the major construction activities that are the subject of this SWPPP. The order (or sequence) in which the major activities are expected to begin is presented on the accompanying drawings, though each activity will not necessarily be completed before the next begins. In addition, these activities could occur in a different order if necessary, to maintain adequate erosion and sediment control. If this is the case, the contractor shall notify the Owner and Operator's Quality Professional overseeing the implementation of the SWPPP.

The Contractor will be responsible for implementing the erosion and sediment control measures identified on the plans. The Contractor may designate these tasks to certain subcontractors as seen fit, but the ultimate responsibility for implementing these controls and ensuring their proper function remains with the Contractor.

Refer to the accompanying plans for details and specifications regarding the construction sequencing schedule.

5.0 CONSTRUCTION-PHASE POLLUTION CONTROL

The SWPPP and accompanying plans identify the temporary and permanent erosion and sediment control measures that have been incorporated into the design of this project. These measures will be implemented during construction, to minimize soil erosion and control sediment transport off-site, and after construction, to control the quality and quantity of stormwater runoff from the developed site.

Erosion control measures, designed to minimize soil loss, and sediment control measures, intended to retain eroded soil and prevent it from reaching water bodies or adjoining properties, have been developed in accordance with the following documents:

- NYSDEC SPDES General Permit for Stormwater Discharges From Construction Activity, Permit No. GP-0-20-001 (effective January 29, 2020 through January 28, 2025)
- New York State Standards and Specifications for Erosion and Sediment Control, NYSDEC (November 2016)

The SWPPP and accompanying plans outline the construction sequence for implementing the erosion and sediment control measures. The SWPPP and accompanying plans include limitations on the duration of soil exposure, criteria and specifications for placement and installation of the erosion and sediment control measures, a maintenance schedule, and specifications for the implementation of erosion and sediment control practices and procedures.

Temporary and permanent erosion and sediment control measures that shall be applied during construction generally include:

1. Minimizing soil erosion and sedimentation by stabilization of disturbed areas and by removing sediment from construction-site discharges.
2. Preservation of existing vegetation as much as possible. Following the completion of construction activities in any portion of the site permanent vegetation shall be established on all exposed soils.
3. Site preparation activities shall be planned to minimize the area and duration of soil disruption.
4. Permanent traffic corridors shall be established and "routes of convenience" shall be avoided.

5.1 Temporary Erosion & Sediment Control Measures

The temporary erosion and sediment control measures described in the following sections are included as part of the construction documents.

5.1.1 Dust Control

Water trucks shall be used as needed during construction to reduce dust generated on the site. Dust control must be provided by the general Contractor to a degree that is acceptable to the Owner, and in compliance with the applicable local and state dust control requirements.

5.1.2 Temporary Soil Stockpile

Materials, such as topsoil, will be temporarily stockpiled (if necessary) on the site during the construction process. Stockpiles shall be located in areas away from storm drainage, water bodies and/or courses, and will be properly protected from erosion by a surrounding silt fence barrier.

5.1.3 Sediment Control Barrier

Prior to the initiation of and during construction activities, a sediment control barrier (i.e.: silt fence, compost filter sock, etc.) will be established along the down slope perimeter of areas to be disturbed as a result of the construction which lie up gradient of watercourses or adjacent properties. These barriers may extend into non-impact areas to provide adequate protection of adjacent lands.

Clearing and grubbing will be performed only as necessary for the installation of the sediment control barriers. To facilitate effectiveness of the barriers, daily inspections and inspections immediately after significant storm events will be performed by site personnel. Maintenance of the barrier will be performed as needed.

5.1.4 Temporary Seeding

Areas undergoing clearing or grading and any areas disturbed by construction activities where work is delayed, suspended, or incomplete and will not be re-disturbed for 21 days or more shall be stabilized with temporary vegetative cover within 14 days after construction activity in that portion of the site has ceased.

5.1.5 Sediment Barrier Inlet Protection

Typical Sediment Control Barriers will be placed around both existing catch basins and proposed catch basins once they have been installed, to keep sediment from entering the catch basins and storm sewer system. During construction, sediment barriers shall be replaced as necessary to ensure proper function of the structure.

5.1.6 Erosion Control Blanket

Erosion control blankets shall be installed on all slopes exceeding 3:1. Erosion control blankets provide temporary erosion protection, rapid vegetative establishment, and long-term erosion resistance to shear stresses associated with high runoff flow velocities associated with steep slopes.

5.2 Permanent Erosion & Sediment Control Measures

The permanent erosion and sediment control measures described in the following sections are included as part of the construction documents.

5.2.1 Soil Restoration

Soil Restoration is a required practice applied across areas of a development site where soils have been disturbed and will be vegetated in order to recover the original properties and porosity of the soil. Healthy soil is vital to a sustainable environment and landscape.

The contractor shall implement soil restoration practices in accordance with Table 5.3 of the NYSDEC Stormwater Management Design Manual, included as Table 3 below.

Table 3: Soil Restoration Requirements

<table>
<tr><th>Type of Soil Disturbance</th><th colspan="2">Soil Restoration Requirement</th><th>Comments/Examples</th></tr>
<tr><td>No soil disturbance</td><td colspan="2">Restoration not permitted</td><td>Preservation of Natural Features</td></tr>
<tr><td>Minimal soil disturbance</td><td colspan="2">Restoration not required</td><td>Clearing and grubbing</td></tr>
<tr><td rowspan="2">Areas where topsoil is stripped only- no change in grade</td><td>HSG A&B</td><td>HSG C&D</td><td rowspan="2">Protect area from any ongoing construction activities</td></tr>
<tr><td>Apply 6 inches of topsoil</td><td>Aerate* and apply 6 inches of topsoil</td></tr>
<tr><td rowspan="2">Areas of cut or fill</td><td>HSG A&B</td><td>HSG C&D</td><td rowspan="2"></td></tr>
<tr><td>Aerate* and apply 6 inches of topsoil</td><td>Apply full Soil Restoration**</td></tr>
<tr><td>Heavy traffic areas on site (especially in a zone 5-25-feet around buildings but not within a 5-foot perimeter around foundation walls)</td><td colspan="2">Apply full Soil Restoration** (de-compaction and compost enhancement)</td><td></td></tr>
<tr><td>Areas where Runoff Reduction and/or infiltration practice are applied</td><td colspan="2">Restoration not required, but may be applied to enhance the reduction specified for appropriate practices</td><td>Keep construction equipment from crossing these areas. To protect newly installed practice from any ongoing construction activities construct a single-phase operation fence area</td></tr>
<tr><td>Redevelopment projects</td><td colspan="2">Soil Restoration is required on redevelopment projects in areas where existing impervious area will be converted to pervious area</td><td></td></tr>
</table>

*Aeration includes the use of machines such as tractor-drawn implements with coulters making a narrow slit in the soil, a roller with many spike making indentations in the soil, or prongs which function like a mini-subsoiler.

**Per "Deep Ripping and De-compaction, DEC 2008"

5.2.2 Establishment of Permanent Vegetation

Disturbed areas that will be vegetated must be seeded in accordance with the contract documents. The type of seed, mulch, and maintenance measures as described in the contract documents shall also be followed.

All areas at final grade must be seeded and mulched within 14 days after completion of the major construction activity. All seeded areas should be protected with mulch.

Final site stabilization is achieved when all soil-disturbing activities at the site have been completed and a uniform, perennial vegetative cover with a density of 80 percent has been established or equivalent stabilization measures (such as the use of mulches or geotextiles) have been employed on all unpaved areas and areas not covered by permanent structures.

5.2.3 Rock Outlet Protection

Rock outlet protection shall be installed at the locations as indicated and detailed on the accompanying plans. The installation of rock outlet protection will reduce the depth, velocity, and energy of water, such that the flow will not erode the receiving watercourse or water body.

5.3 Other Pollutant Controls

Control of sediments has been described previously. Other aspects of this SWPPP are listed below:

5.3.1 Solid & Liquid Waste Disposal

No solid or liquid waste materials, including building materials, shall be discharged from the site with stormwater. All solid waste, including disposable materials incidental to any construction activities, must be collected and placed in containers. The containers shall be emptied periodically by a licensed trash disposal service and hauled away from the site.

Substances that have the potential for polluting surface and/or groundwater must be controlled by whatever means necessary in order to ensure that they do not discharge from the site. As an example, special care must be exercised during equipment fueling and servicing operations. If a spill occurs, it must be contained and disposed of so that it will not flow from the site or enter groundwater, even if this requires removal, treatment, and disposal of soil. In this regard, potentially polluting substances should be handled in a manner consistent with the impact they represent.

5.3.2 Sanitary Facilities

Temporary sanitary facilities will be provided by the Contractor throughout the construction phase. They must be utilized by all construction personnel and will be serviced by a licensed commercial Contractor. These facilities must comply with state and local sanitary or septic system regulations.

5.3.3 Water Source

Non-stormwater components of site discharge must be clean water. Water used for construction, which discharges from the site, must originate from a public water supply or private well approved by the Health Department. Water used for construction that does not originate from an approved public supply must not discharge from the site; such water can be retained in ponds until it infiltrates and/or evaporates.

5.4 Construction Housekeeping Practices

During the construction phase, the general Contractor will implement the following measures:

5.4.1 Material Stockpiles

Material resulting from the clearing and grubbing operation will be stockpiled up slope from adequate sedimentation controls.

5.4.2 Equipment Cleaning & Maintenance

The general Contractor will designate areas for equipment cleaning, maintenance, and repair. The general Contractor and subcontractors will utilize those areas. The areas will be protected by a temporary perimeter berm.

5.4.3 Detergents

The use of detergents for large-scale washing is prohibited (i.e., vehicles, buildings, pavement surfaces, etc.)

5.4.4 Spill Prevention and Response

A Spill Prevention and Response Plan shall be developed for the site by the Contractor. The plan shall detail the steps needed to be followed in the event of an accidental spill and shall identify contact names and phone numbers of people and agencies that must be notified.

The plan shall include Material Safety Data Sheets (MSDS) for all materials to be stored on-site. All workers on-site will be required to be trained on safe handling and spill prevention procedures for all materials used during construction. Regular tailgate safety meetings shall be held and all workers that are expected on the site during the week shall be required to attend.

5.4.5 Concrete Wash Areas

Concrete trucks will be allowed to wash out or discharge surplus concrete or drum wash water on the site, but only in specifically designated diked and impervious washout areas which have been prepared to prevent contact between the concrete wash and storm water. Waste generated from concrete wash water shall not be allowed to flow into drainage ways, inlets, receiving waters or highway right of ways, or any location other than the designated Concrete Wash Areas. Proper signage designating the "Concrete Wash Areas" shall be placed near the facility. Concrete Wash Areas shall be located at minimum 100 linear feet from drainage ways, inlets and surface waters.

The hardened residue from the Concrete Wash Areas will be disposed of in the same manner as other non-hazardous construction waste materials. Maintenance of the wash area is to include removal of hardened concrete. Facility shall have sufficient volume to contain all the concrete waste resulting from washout and a minimum freeboard of 12 inches. Facility shall not be filled beyond 95% capacity and shall be cleaned out once 75% full unless a new facility is constructed. The Contractor will be responsible for seeing that these procedures are followed.

Saw-cut Portland Cement Concrete (PCC) slurry shall not be allowed to enter storm drains or watercourses. Saw-cut residue should not be left on the surface of pavement or be allowed to flow over and off pavement.

The Project may require the use of multiple concrete wash areas. All concrete wash areas will be located in an area where the likelihood of the area contributing to storm water discharges is negligible. If required, additional BMPs must be implemented to prevent concrete wastes from contributing to stormwater discharges.

5.4.6 Material Storage

Construction materials shall be stored in a dedicated staging area. The staging area shall be located in an area that minimizes the impacts of the construction materials affecting stormwater quality.

Chemicals, paints, solvents, fertilizers, and other toxic material must be stored in waterproof containers. Except during application, the contents must be kept in trucks or within storage facilities. Runoff containing such material must be collected, removed from the site, treated, and disposed of at an approved solid waste or chemical disposal facility.

5.5 Winter Shutdown Plan

The contractor shall implement the following procedures in order to stabilize the site against erosion during a period of winter shutdown. In areas where vegetation has not been established when the winter shutdown is to be implemented, the contractor shall implement one or more of the following devices.

- Jute/Coconut fiber blankets
- Geotextile
- Hay/straw or mulch
- Alternate method to be approved by the Design and Municipal Engineer

The project site needs to be fully stabilized by November 15th or winter stabilization requirements must be implemented.

Inspections shall proceed as outlined in the inspection section of this document. Inspections shall also be conducted after significant snowmelt has been documented. If damage has been documented during the inspection, the contractor shall provide repairs prior to the next scheduled inspection.

5.6 Winter Stabilization Requirements

Any construction activities with ongoing land disturbance and exposure, or project sites that have not been fully stabilized for winter shutdown, require additional erosion and sediment control measures during the winter season. Per New York State Standards and Specifications for Erosion and Sediment Control, the "winter season" is defined as the period from November 15th to the following April 1st. During this time, the standard inspection schedule shall continue as outlined in the inspection section of this document. The winter stabilization measures described in the following sections are included as part of the construction documents.

5.6.1 Snow Management

The contractor shall designate areas with adequate storage capacity for snow and control of melt water that does not affect ongoing construction activities. Drainage structures must be kept open and free of snow and ice dams. All debris, ice dams or debris from plowing operations that restrict the flow of runoff shall be removed.

5.6.2 Construction Access

The stabilized construction access shall be maintained and kept free from debris and snow. All construction access points shall be enlarged and stabilized to provide for snow management and stockpiling. The intent is to maintain the existing travel width and not restrict construction access. Stone paths shall be used to stabilize access perimeters of buildings under construction and areas where construction vehicle traffic is anticipated. The stone paths shall be a minimum 10' wide or wider to accommodate equipment.

5.6.3 Sediment Control Barrier/Silt Fence

Sediment barriers must be installed at all appropriate perimeter and sensitive locations before the ground freezes. A minimum 25-foot buffer shall be maintained from all perimeter controls such as silt fence. Mark silt fence with tall stakes (min. 5' exposed) that are visible above the snow pack. Edges of disturbed areas that drain to a waterbody within 100 feet will have 2 rows of silt fence, spaced 5 feet apart, installed on the contour. Sediment barrier must be installed at least 15' from the toe of the soil stockpile to prevent soil migration.

5.6.4 Soil Stabilization

In areas where soil disturbance activity has temporarily or permanently ceased, the application of soil stabilization measures should be initiated by the end of the next business day and completed within three days. Mulch used for stabilization shall be applied at double the standard rate. Rolled erosion control blankets must be used on all slopes 3 horizontal to 1 vertical or steeper. Soil stockpiles must be protected by the use of vegetation establishment, anchored straw mulch, rolled stabilization matting, or other durable covering. To ensure adequate stabilization of disturbed soil in advance of a melt event, areas of disturbed soil shall be stabilized at the end of the workday unless work will resume within 24 hours in the same area and no precipitation is forecasted or the work is in an area that collects and retains runoff.

6.0 POST-CONSTRUCTION STORMWATER CONTROL

The goals of this Stormwater Management Plan are to minimize the impact to the quality of runoff exiting the site. The NYS Stormwater Management Design Manual provides both water quality and water quantity objectives to be met by projects requiring a "Full SWPPP". These objectives will be met by applying stormwater control practices to limit peak runoff rates and improve the quality of runoff leaving the developed site.

The proposed storm water management system has been designed to meet the New York State Stormwater Management Design Manual (NYSSMDM) August 2015 edition. This version of the NYSSDM requires runoff reduction volume as well as encouraging green infrastructure techniques. Planners and designers must address a six-step approach to site planning and SMP selection. The following is the six-step process and applicable design considerations for this project.

1. Site Planning to preserve natural features and reduce impervious cover.

- The site has been designed to minimize the impervious cover to the maximum extent practical. The majority of wooded site will remain undisturbed with work only being proposed where the new building, pavement and associated infrastructure is located. The GI Planning Worksheet has been completed and can be found in Appendix L.

2. Calculation of the Water Quality Volume (WQv) for the site

- The water quality volume for the project has been calculated using NYSSDM criteria and is shown on the GI Worksheets in Appendix L and discussed in Section 6.2 of this report.

3. Incorporation of green infrastructure techniques and standard SMP's with Runoff Reduction Volume (RRv) Capacity.

- The project design explored many different options for handling the stormwater onsite. The project proposes to use a bioretention filtering practice with underdrains (40% RRv capacity for Type C soils).

4. Calculation of the minimum (RRv) for the site

- The minimum runoff reduction volume for the site has been calculated for the site and can be found in Appendix L of this report.

5. Apply Standard Stormwater Management Practices to address remaining Water Quality Volume

- This project proposes to handle 100% of the WQv using runoff reduction techniques.

6. Apply volume and peak rate controls practices if still needed to meet requirements

- An extended detention basin is proposed to capture excess volume and slow down the peak runoff leaving the site.

6.1 Stormwater Control Practices

Stormwater runoff from the proposed construction will be collected and conveyed to the control system(s) described herein through a combined open and closed storm sewer network.

The closed storm sewer network portion of the system, consisting of catch basins, drainage manholes, and high-density polyethylene piping (HDPE), has been designed to convey the 10-year storm event.

The stormwater quantity and quality control systems described in the following sections have been incorporated into the stormwater management plan for this project. Design and sizing of the stormwater management practices can be found in Appendix L.

None of the stormwater management facilities to be constructed as part of this project meet the NYSDEC criteria that define a dam. Therefore, they have no dam classification.

6.1.1 Bioretention (F-5)

The bioretention practice is an effective means of capturing the WQv and allowing infiltration of stormwater runoff through the filter medium. The bioretention practice on site will include underdrains due to the poor infiltration rates of the existing soils. Pre-treatment will be provided in a plunge pool within the bioretention practice. 240 SF plunge pool is required for pretreatment and 250 SF is provided, design calculations are in Appendix L. The bioretention practice will include an overflow weir to limit surface ponding to 6".

The bioretention (F-5) practice was designed according to the criteria set forth in Section 6.4 "Stormwater Filtering Systems" of the NYS Stormwater Management Design Manual. The bioretention area was sized using the available NYSDEC Green Infrastructure Worksheets, which can be found in Appendix L.

6.2 Stormwater Quality Analysis

Stormwater runoff from impervious surfaces is recognized as a significant contributor of pollution that can adversely affect the quality of receiving water bodies. Therefore, treatment of stormwater runoff is important since most runoff related water quality contaminants are transported from land, particularly the impervious surfaces, during the initial stages of storm events.

6.2.1 NYSDEC Requirements

The NYS Stormwater Management Design Manual requires that water quality treatment be provided for the initial flush of runoff from every storm. The NYSDEC refers to the amount of runoff to be treated as the "Water Quality Volume" (WQv). Section 4.2 of the NYS SMDM defines the Water Quality Volume as follows:

$$WQv = \frac{[(P)(R_V)(A)]}{12}$$

Where:	P	=	90% Rainfall Event Number
	Rv	=	0.05 + 0.009 (I), minimum Rv = 0.2
	I	=	Impervious Cover (Percent)
	A	=	Contributing Area in Acres

This definition ensures that, all other things being equal, the Water Quality Volume will increase along with the impervious cover percentage.

6.2.2 Methodology

The Water Quality Volume equation has been applied to the drainage areas tributary for the disturbance of the site. The practices have been sized to accommodate the Water Quality Volume, as per the performance criteria presented in Chapter 6 of the NYS Stormwater Management Design Manual. The project used standard stormwater management practices with runoff reduction volume capacity to fully handle the WQv.

Design computations for the initial Water Quality Volume (WQv) required and the Minimum Runoff Reduction Volume (RRv) required are presented in Appendix L.

6.2.3 Performance Summary

For each stormwater quality practice, Table 4 summarizes the Water Quality Volume requirements, WQv provided, and runoff reduction volume provided by each practice. The Stormwater Management Design Manual states that bioretention practices can claim runoff reduction for 40% of the total storage volume or the WQv, whichever is smaller.

The WQv calculated for the site was determined to be 3,614-CF. The bioretention was sized to account for disturbance areas onsite that could not be captured and directed to a treatment device. The minimum RRV was calculated to be 1,044-CF and 1,454-CF is provided so the project meets the minimum RRv requirement. Therefore, the project should not have a significant adverse impact on the quality of receiving waters.

Table 4: Summary of WQ Practices

SWM Practice Number	SWM Practice Type	NYS DEC Design Variant	Tributary Drainage Area (acres)	Tributary Impervious Area (acres)	WQv Required (CF)	Provided RRv (CF)	Provided WQv (CF)
1	Bioretention	F-5	4.61	0.85	3,614	1,454	2,159

6.3 Stormwater Quantity Analysis

This report presents the pre-development and post-development features and conditions associated with the rate of surface water runoff within the study area. For both cases, the drainage patterns, drainage structures, soil types, and ground cover types are considered in this study.

6.3.1 NYSDEC Requirements

The NYS Stormwater Management Design Manual requires that projects meet three separate stormwater quantity criteria:

1. The Channel Protection (CPv) requirement is designed to protect stream channels from erosion. This is accomplished by providing 24 hours of extended detention for the 1-year, 24-hour storm event. The Design Manual defines the CPv detention time as the center of mass detention time through each stormwater management practice.

2. The Overbank Flood Control (Qp) requirement is designed to prevent an increase in the frequency and magnitude of flow events that exceed the bank-full capacity of a channel, and therefore must spill over into the floodplain. This is accomplished by providing detention storage to ensure that, at each design point, the post-development 10-year 24-hour peak discharge rate does not exceed the corresponding pre-development rate.

3. The Extreme Flood Control (Qf) requirement is designed to prevent the increased risk of flood damage from large storm events, to maintain the boundaries of the pre-development 100-year floodplain, and to protect the physical integrity of stormwater management practices. This is accomplished by providing detention storage to ensure that, at each design point, the post-development 100-year 24-hour peak discharge rate does not exceed the corresponding pre-development rate.

6.3.2 Methodology

In order to demonstrate that detention storage requirements are being met, the NYS Stormwater Management Design Manual requires that a hydrologic and hydraulic analysis of the pre- and post-development conditions be performed using the Natural Resources

Conservation Service Technical Release 20 (TR-20) and Technical Release 55 (TR-55) methodologies. HydroCAD, developed by HydroCAD Software Solutions LLC of Tamworth, New Hampshire, is a Computer-Aided-Design (CAD) program for analyzing the hydrologic and hydraulic characteristics of a given watershed and associated stormwater management facilities. HydroCAD uses the TR-20 algorithms and TR-55 methods to create and route runoff hydrographs.

HydroCAD has the capability of computing hydrographs (which represent discharge rates characteristic of specified watershed conditions, precipitation, and geologic factors) combining hydrographs and routing flows though pipes, streams and ponds. HydroCAD can also calculate the center of mass detention time for various hydraulic features. Documentation for HydroCAD can be found on their website: http://www.hydrocad.net/.

For this analysis, the watershed and drainage system were broken down into a network consisting of three types of components as described below:

A. Subcatchment: A relatively homogeneous area of land, which produces a volume and rate of runoff unique to that area.
B. Reach: Uniform streams, channels, or pipes that convey stormwater from one point to another.
C. Pond: Natural or man-made impoundment, which temporarily stores stormwater runoff and empties in a manner determined by its geometry and the hydraulic structure located at its outlets.

Subcatchments, reaches, and ponds are represented by hexagons, squares, and triangles respectively, on the watershed routing diagrams provided with the computations included in Appendix J and Appendix K.

The analysis of hydrologic and hydraulic conditions and proposed stormwater management facilities, servicing the study area, was performed by dividing the tributary watershed into relatively homogeneous subcatchments. The separation of the watershed into subcatchments was dictated by watershed conditions, methods of collection, conveyance, and points of discharge. Watershed characteristics for each subcatchment were then assessed from United States Geological Service (USGS) 7.5-minute topographic maps, aerial photographs, a topographical survey, soil surveys, site investigations, and land use maps.

Proposed stormwater management facilities were designed and evaluated in accordance with the NYS Stormwater Management Design Manual and local regulatory requirements. The hydrologic and hydraulic analysis considered the SCS, Type II 24-hour storm events identified in Table 5.

Table 5: Design Events

Facility	24-hour Storm Event
Storm Sewer	10- year
Stormwater Management Systems	1-year
	10-year
	100-year
Flood Conditions	100-year

6.3.3 Description of Design Points

The proposed site consists of an overall watershed that encompasses approximately ±6.81 acres and contains the ±2.75-acre total disturbed project site. The overall watershed was broken down into smaller watersheds, or subcatchments, to allow for analysis of runoff conditions at several locations throughout the study area. Each of these locations was defined as a Design Point (DP) in order to compare the effects resulting from stormwater management facilities proposed as part of the project. Descriptions of each of the selected design points are provided below.

- Design Point 1: Roadside ditch along Old Little Britain Road located at the northeast corner of the proposed site.
- Design Point 2: Washington Lake, located approximately ±0.1 miles to the southwest of the proposed site.

6.3.4 Pre-development Watershed Conditions

The pre-development project site contains an existing abandoned building with an overgrown driveway path and a forested area. Analysis of pre-development conditions considered existing drainage patterns, soil types, ground cover, and topography. The Pre-Development Watershed Delineation Map has been provided in Appendix J. Summaries of the subcatchments are as follows:

Subcatchment DA-1 can be identified as the location of the existing structure and driveway and wooded areas of the site. Runoff generally sheet flows northeast towards the existing swales located along Old Little Britain road and along the eastern property boundary, ultimately discharging to Design Point 1 at the northeast corner of the site.

Subcatchment DA-2 includes portions of the existing forested area of the site. Runoff generally sheet flows to the southwest before discharging to Design Point 2.

Subcatchment DA-3 includes portions of the existing forested area of the site. Runoff generally sheet flows to the southwest before discharging to Design Point 2. The results of the computer modeling used to analyze the overall watersheds under pre-development conditions are presented in Appendix J. A summary of the pre-development watershed runoff rates at each design point is presented in Table 6.

6.3.5 Post-development Watershed Conditions

The proposed project includes the removal of the existing driveway and residential structure and the construction of a new driveway, parking area, building with associated infrastructure, and stormwater management system.

The contributing post-development watershed areas contains four (4) subcatchments to analyze the site. Existing drainage patterns are mostly unchanged, and the post-development project maintains the same design points. Overall, the post-development project meets the required WQv criteria using a bioretention with extended detention to treat project. The Post-Development Watershed Delineation Map has been provided in Appendix K. A description of each subcatchment is as follows:

Subcatchment DA-1A can be identified as the undisturbed wooded area as well as the northern and eastern portion of the site. Runoff generally sheet flows towards the existing swales located along Old Little Britain road and along the eastern property boundary, ultimately discharging to Design Point 1 at the northeast corner of the site.

Subcatchment DA-1B includes the proposed paved areas, building, and bioretention area. Runoff from the roof of the building will be collected and piped into the proposed storm sewers. Runoff within this sub catchment will sheet flow towards the catch basins and be discharged into the proposed bioretention area by the storm sewers and a flow splitter will divert the WQV to the bioretention and bypass the larger storm event to the extended detention. The extended detention will discharge through an outlet control structure to Design Point 1.

Subcatchment DA-2 comprises the Existing DA-2 with portions remaining undisturbed and the remainder includes the proposed location for the septic system. Runoff generally will retain its pre-developed conditions and sheet flows to the southwest before discharging to Design Point 2.

Subcatchment DA-3 comprises the undisturbed portion of the Existing DA-3. As such this area retains its character as an existing sloped forested area. Runoff generally sheet flows to the southwest before discharging to Design Point 2.

The results of the computer modeling used to analyze the overall watershed under post-development conditions are presented in Appendix K. A summary of the post-development watershed runoff rates at each design point is presented in Table 6.

6.3.6 Performance Summary

A comparison of the pre- and post-development watershed conditions was performed for all design points and storm events evaluated herein. This comparison demonstrates that the peak rate of runoff will not be increased and pre-development rates will be maintained. Therefore, the project will not have a significant adverse impact on the adjacent or downstream properties or receiving water courses.

The results of the computer modeling used to analyze the pre-development and post-development watersheds are presented in Appendix J and Appendix K, respectively. Table 6 summarizes the results of this analysis.

Table 6: Summary of Pre- and Post-Development Peak Discharge Rates

Pre- vs. Post-Development Discharge Rate (cfs)						
Design Point (DP)	1-year 24-hour storm event		10-year 24-hour storm event		100-year 24-hour storm event	
	Pre	Post	Pre	Post	Pre	Post
1	0.61	0.62	4.67	4.39	14.02	13.96
2	0.15	0.14	1.60	1.53	5.54	5.28

7.0 INSPECTION & MAINTENANCE RESPONSIBILITIES

7.1 Inspection & Maintenance Requirements

7.1.1 Pre-Construction Inspection & Certification

Prior to the commencement of construction, the Owner and Operator's Qualified Professional shall conduct an assessment of the site and certify that the appropriate erosion and sediment control measures have been adequately installed and implemented. The Contractor shall contact the Owner and Operator's Qualified Professional once the erosion and sediment control measures have been installed.

7.1.2 Construction Phase Inspections & Maintenance

A Qualified Inspector, as defined in appendix A of the General Permit GP-0-20-001, shall conduct regular site inspections between the time this SWPPP is implemented and final site stabilization. Site inspections shall occur at an interval of at least once every seven calendar days.

The purpose of site inspections is to assess performance of pollutant controls. Based on these inspections, the qualified inspector will decide whether it is necessary to modify this SWPPP, add or relocate sediment barriers, or whatever else may be needed in order to prevent pollutants from leaving the site via stormwater runoff. The general contractor has the duty to cause pollutant control measures to be repaired, modified, maintained, supplemented, or whatever else is necessary in order to achieve effective pollutant control.

Examples of particular items to evaluate during site inspections are listed below. This list is not intended to be comprehensive. During each inspection the inspector must evaluate overall pollutant control system performance as well as particular details of individual system components. Additional factors should be considered as appropriate to the circumstances.

1. Locations where vehicles enter and exit the site must be inspected for evidence of off-site sediment tracking. A stabilized construction entrance will be constructed where vehicles enter and exit. This entrance will be maintained or supplemented as necessary to prevent sediment from leaving the site on vehicles.
2. Sediment barriers must be inspected and, if necessary, they must be enlarged or cleaned in order to provide additional capacity. All material from behind sediment barriers will be stockpiled on the up-slope side. Additional sediment barriers must be constructed as needed.
3. Inspections will evaluate disturbed areas and areas used for storing materials that are exposed to rainfall for evidence of, or the potential for, pollutants entering the drainage system. If necessary, the materials must be covered, or original covers must be repaired or supplemented. Also, protective berms must be constructed, if needed, in order to contain runoff from material storage areas.
4. Grassed areas will be inspected to confirm that a healthy stand of grass is maintained. The site has achieved final stabilization once all areas are covered with building foundation, pavement, or have a stand of grass with at least 80 percent density. The density of 80 percent or greater must be maintained to be considered as stabilized. Areas must be watered, fertilized, and reseeded as needed to achieve this goal.
5. All discharge points must be inspected to determine whether erosion control measures are effective in preventing significant impacts to receiving waters.

The inspection reports must be completed entirely, and additional remarks should be included if needed to fully describe a situation. An important aspect of the inspection report is the description of additional measures that need to be taken to enhance plan effectiveness. The inspection report must identify whether the site was in compliance with the SWPPP at the time of inspection and specifically identify all incidents of non-compliance.

Within one business day of the completion of an inspection, the qualified inspector shall notify the owner or operator and appropriate contractor (or subcontractor) of any corrective actions that need to be taken. The contractor (or subcontractor) shall begin implementing corrective actions within one business day of this notification and shall complete the corrective actions in a reasonable time frame.

In addition to the inspections performed by the Owner and Operator's Qualified Professional, the Contractor shall perform routine inspections that include a visual check of all erosion and sediment control measures. All inspections and maintenance shall be performed in accordance with the inspection and maintenance schedule provided on the accompanying plans. Sediment removed from erosion and sediment control measures will be exported from the site, stockpiled for later use, or used immediately for general non-structural fill.

It is the responsibility of the general contractor to assure the adequacy of site pollutant discharge controls. Actual physical site conditions or contractor practices could make it necessary to install more structural controls than are shown on the accompanying plans. (For example, localized concentrations of runoff could make it necessary to install additional sediment barriers.) Assessing the need for additional controls and implementing them or adjusting existing controls will be a continuing aspect of this SWPPP until the site achieves final stabilization.

7.1.3 Temporary Suspension of Construction Activities

For constructions 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 frequency of Qualified Inspector inspections can be reduced to once every 30 calendar days. Prior to reducing the frequency of inspections, the Owner/Operator shall notify the MS4 Coordinator.

7.1.4 Partial Project Completion

For constructions sites where soil disturbance activities have been shut down with partial project completion, all areas disturbed as of the project shutdown date have achieved final stabilization, and all post-construction stormwater management practices required for the completed portion of the project have been constructed in conformance with the SWPPP and are operational, the Qualified Inspector inspections can stop. Prior to the shutdown, the Owner/Operator shall notify the MS4 Coordinator.

If soil disturbance activities have not resumed within two (2) years from the date of shutdown, a Notice of Termination (NOT) form shall be properly completed and submitted to the NYSDEC.

7.1.5 Post-Construction Inspections & Maintenance

Inspections and maintenance shall be performed in accordance with Appendix M, when all disturbed areas are stabilized, and all stormwater management systems are in place and operable.

7.2 Reporting Requirements

7.2.1 Inspection & Maintenance Reports

Inspection/maintenance reports shall be prepared prior to and during construction in accordance with the schedule outlined herein and in the SPDES General Permit GP-0-20-001 Part IV.C.2. The reports shall be prepared to identify and document the maintenance of the erosion and sediment control measures. A sample inspection form is provided in Appendix D.

Specifically, each inspection shall record the following information:

1. Date and time of inspection.
2. Name and title of person(s) performing inspection.
3. A description of the weather and soil conditions (e.g. dry, wet, saturated) at the time of the inspection.
4. A description of the condition of the runoff at all points of discharge (including conveyance systems and overland flow) from the construction site. This shall include identification of any discharges of sediment from the construction site.
5. Identification of all erosion and sediment control practices that need repair or maintenance.
6. Identification of all erosion and sediment control practices that were not installed properly or are not functioning as designed and need to be reinstalled or repaired.
7. Description and sketch of areas that are disturbed at the time of the inspection and areas that have been stabilized (temporary and/or final) since the last inspection.
8. Current phase of construction of all post-construction stormwater management practices and identification of all construction that is not in conformance with the SWPPP and technical standards.
9. Corrective action(s) that must be taken to install, repair, replace or maintain erosion and sediment control practices; and to correct deficiencies identified with the construction of the post-construction stormwater management practice(s).

7.2.2 Site Log Book

The Owner and Operator's construction phase Qualified Professional, on behalf of the Owner and operator, shall retain a copy of the SWPPP required by NYSDEC SPDES General Permit GP-0-20-001 at the construction-site from the date of initiation of construction activities to the date of final stabilization.

During construction, the Owner and Operator's construction phase Qualified Professional shall maintain a record of all SWPPP inspection reports at the site in the Site Log Book. The Site Log Book shall be maintained on-site and made available to the permitting authority.

7.2.3 Post Construction Records & Archiving

Following construction, the Owner and Operator shall retain copies of the SWPPP, the complete construction Site Log Book, and records of all data used to complete the NOI to be covered by this permit, for a period of at least five years from the date that the site is finally stabilized. This period may be extended by the Department, in its sole discretion, at any time upon written notification.

Record shall be maintained of all post construction inspections and maintenance work performed in accordance with the requirements outlined in Appendix M.

APPENDIX A:

NYSDEC SPDES General Permit GP-0-20-001

NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION

SPDES GENERAL PERMIT
FOR STORMWATER DISCHARGES

From

CONSTRUCTION ACTIVITY

Permit No. GP- 0-20-001

Issued Pursuant to Article 17, Titles 7, 8 and Article 70

of the Environmental Conservation Law

Effective Date: January 29, 2020

Expiration Date: January 28, 2025

John J. Ferguson

Chief Permit Administrator

1-23-20

Authorized Signature

Date

Address: NYS DEC
Division of Environmental Permits
625 Broadway, 4th Floor
Albany, N.Y. 12233-1750

PREFACE

Pursuant to Section 402 of the Clean Water Act ("CWA"), 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 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, 8 and Article 70.

An *owner or operator* of a *construction activity* that is eligible for coverage under this permit must obtain coverage prior to the *commencement of construction activity*. Activities that fit the definition of "*construction activity*", as defined under 40 CFR 122.26(b)(14)(x), (15)(i), and (15)(ii), constitute construction of a *point source* and therefore, pursuant to ECL section 17-0505 and 17-0701, the *owner or operator* must have coverage under a SPDES permit prior to *commencing construction activity*. 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 GENERAL PERMIT FOR STORMWATER DISCHARGES FROM CONSTRUCTION ACTIVITIES

Table of Contents

Part 1. PERMIT COVERAGE AND LIMITATIONS

A. Permit Application

This permit authorizes stormwater *discharges* to *surface waters of the State* from the following *construction activities* identified within 40 CFR Parts 122.26(b)(14)(x), 122.26(b)(15)(i) and 122.26(b)(15)(ii), provided all of the eligibility provisions of this permit are met:

1. *Construction activities* involving soil disturbances of one (1) or more acres; including disturbances of less than one acre that are part of a *larger common plan of development or sale* that will ultimately disturb one or more acres of land; excluding *routine maintenance activity* that is performed to maintain the original line and grade, hydraulic capacity or original purpose of a facility;

2. *Construction activities* involving soil disturbances of less than one (1) acre where the Department 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.*

3. *Construction activities* located in the watershed(s) identified in Appendix D that involve soil disturbances between five thousand (5,000) square feet and one (1) acre of land.

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 I.B.1. (a) – (f) of this permit. 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 I.B.1.(a) – (f) of this permit and be in accordance with the New York State Standards and Specifications for Erosion and Sediment Control, 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 the *Stormwater Pollution Prevention Plan* (“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.

a. **Erosion and Sediment Controls.** Design, install and maintain effective erosion and sediment controls to *minimize* the *discharge* of *pollutants* and prevent a violation of the *water quality standards*. At a minimum, such controls must be designed, installed and maintained to:

(i) *Minimize* soil erosion through application of runoff control and soil stabilization control measure to *minimize pollutant discharges*;

(ii) Control stormwater *discharge*s, including both peak flowrates and total stormwater volume, to *minimize* channel and *streambank* erosion and scour in the immediate vicinity of the *discharge* points;

(iii) *Minimize* the amount of soil exposed during *construction activity*;

(iv) *Minimize* the disturbance of *steep slopes*;

(v) *Minimize* sediment *discharge*s from the site;

(vi) Provide and maintain *natural buffer*s around surface waters, direct stormwater to vegetated areas and maximize stormwater infiltration to reduce *pollutant discharge*s, unless *infeasible*;

(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;

(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 temporarily or permanently ceased, the application of soil stabilization measures must be initiated by the end of the next business day and completed within fourteen (14) 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 E or is located in one of the watersheds listed in Appendix C, the application of soil stabilization measures must be initiated by the end of the next business day and completed within seven (7) days from the date the current soil disturbance activity ceased. See Appendix A for definition of *Temporarily 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**. 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 designed, installed, implemented and maintained to:

(i) *Minimize* the *discharge* of *pollutants* from equipment and vehicle washing, wheel wash water, and other wash waters. This applies to washing operations that use clean water only. Soaps, detergents and solvents cannot be used;

(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. **Prohibited *Discharge*s.** The following *discharge*s are prohibited:

(i) Wastewater from washout of concrete;

(ii) Wastewater from washout and cleanout of stucco, paint, form release oils, curing compounds and other construction materials;

(iii) Fuels, oils, or other *pollutants* used in vehicle and equipment operation and maintenance;

(iv) Soaps or solvents used in vehicle and equipment washing; and

(v) Toxic or hazardous substances from a spill or other release.

f. Surface Outlets. When discharging from basins and impoundments, the outlets shall 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 Requirements

1. The *owner or operator* of a *construction activity* that requires post-construction stormwater management practices pursuant to Part III.C. of this permit must select, design, install, and maintain the practices to meet the *performance criteria* in the New York State Stormwater Management Design Manual ("Design Manual"), dated January 2015, using sound engineering judgment. Where post-construction stormwater management practices ("SMPs") are not designed in conformance with the *performance criteria* in the Design Manual, 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 post-construction stormwater management practices pursuant to Part III.C. of this permit must design the practices to meet the applicable *sizing criteria* in Part I.C.2.a., b., c. or d. of this permit.

a. Sizing Criteria for New Development

(i) Runoff Reduction Volume ("RRv"): Reduce the total Water Quality Volume ("WQv") by application of RR techniques and standard SMPs with RRv capacity. The total WQv shall be calculated in accordance with the criteria in Section 4.2 of the Design Manual.

(ii) Minimum RRv and Treatment of Remaining Total WQv: Construction activities that cannot meet the criteria in Part I.C.2.a.(i) of this permit due to site limitations shall 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 shall 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 4.3 of the Design Manual. The remaining portion of the total WQv that cannot be reduced shall be treated by application of standard SMPs.

(iii) Channel Protection Volume (“Cpv”): Provide 24 hour extended detention of the post-developed 1-year, 24-hour storm event; remaining after runoff reduction. 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 site discharges directly to tidal waters, or fifth order or larger streams.

(iv) *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 discharges directly to tidal waters or fifth order or larger streams, or
(2) A downstream analysis reveals that *overbank* control is not required.

(v) 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 discharges directly 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 Watershed

(i) Runoff Reduction Volume (RRv): Reduce the total Water Quality Volume (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 shall be calculated in accordance with the criteria in Section 10.3 of the Design Manual.

(ii) Minimum RRv and Treatment of Remaining Total WQv: *Construction activities* that cannot meet the criteria in Part I.C.2.b.(i) of this permit due to *site limitations* shall 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 shall 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 10.3 of the Design Manual. The remaining portion of the total WQv that cannot be reduced shall be treated by application of standard SMPs.

(iii) Channel Protection Volume (Cpv): Provide 24 hour extended detention of the post-developed 1-year, 24-hour storm event; remaining after runoff reduction. 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 site *discharge*s directly to tidal waters, or fifth order or larger streams.

(iv) *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 *discharge*s directly to tidal waters or fifth order or larger streams, or
(2) A downstream analysis reveals that *overbank* control is not required.

(v) 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 *discharge*s directly 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* shall be addressed by one of the following options. *Redevelopment activities* located in an Enhanced Phosphorus Removal Watershed (see Part III.B.3. and Appendix C of this permit) shall calculate the WQv in accordance with Section 10.3 of the Design Manual. All other *redevelopment activities* shall calculate the WQv in accordance with Section 4.2 of the Design Manual.

(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 Design Manual must be applied to all newly created pervious areas, or

(2) Capture and treat a minimum of 25% of the WQv from the disturbed, *impervious area* by the application of standard SMPs; or reduce 25% of the WQv from the disturbed, *impervious area* by the application of RR techniques or standard SMPs with RRv capacity., or

(3) Capture and treat a minimum of 75% of the WQv from the disturbed, *impervious area* as well as any additional runoff from tributary areas by application of the alternative practices discussed in Sections 9.3 and 9.4 of the Design Manual., or

(4) Application of a combination of 1, 2 and 3 above that provide a weighted average of at least two of the above methods. Application of this method shall be in accordance with the criteria in Section 9.2.1(B) (IV) of the Design Manual.

If there is an existing post-construction stormwater management practice 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 – 4 above.

(ii) Channel Protection Volume (Cpv): Not required if there are no changes to hydrology that increase the *discharge* rate from the project site.

(iii) *Overbank* Flood Control Criteria (Qp): Not required if there are no changes to hydrology that increase the *discharge* rate from the project site.

(iv) Extreme Flood Control Criteria (Qf): Not required if there are no changes to hydrology that increase 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 shall provide post-construction stormwater management controls that meet the sizing criteria calculated as an aggregate of the Sizing Criteria in Part I.C.2.a. or b. of this permit for the New Development portion of the project and Part I.C.2.c of this permit for Redevelopment Activity portion of the project.

D. Maintaining Water Quality

The Department expects that compliance with the conditions of this permit will control *discharge*s necessary to meet applicable *water quality standards*. It shall be a violation of the *ECL* for any discharge to either cause or contribute to a violation of *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, such as:

1. There shall be no increase in turbidity that will cause a substantial visible contrast to natural conditions;

2. There shall be no increase in suspended, colloidal or settleable solids that will cause deposition or impair the waters for their best usages; and

3. There shall 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 standards*; the *owner or operator* must take appropriate corrective action in accordance with Part IV.C.5. of this general permit and document in accordance with Part IV.C.4. of this general permit. To address the *water quality standard* violation the *owner or operator* may need to provide additional information, include and implement appropriate controls in the SWPPP to correct the problem, or obtain an individual SPDES permit.

If there is evidence indicating that despite compliance with the terms and conditions of this general 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 the Department determines that a modification of the 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. The Department may require the *owner or operator* to obtain an individual SPDES permit to continue discharging.

E. Eligibility Under This General Permit

1. This permit may authorize all *discharges* of stormwater from *construction activity* to *surface waters of the State* and *groundwaters* except for ineligible *discharges* identified under subparagraph F. of this Part.

2. Except for non-stormwater *discharges* explicitly listed in the next paragraph, this permit only authorizes stormwater *discharge*s; including stormwater runoff, snowmelt runoff, and surface runoff and drainage, from *construction activities*.

3. Notwithstanding paragraphs E.1 and E.2 above, the following non-stormwater discharges are authorized by this permit: those 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"; waters to which other components have not been added that are used to control dust in accordance with the SWPPP; and uncontaminated *discharge*s from *construction site* de-watering operations. All non-stormwater discharges must be identified in the SWPPP. Under all circumstances, the *owner or operator* must still comply with *water quality standards* in Part I.D of this permit.

4. The *owner or operator* must maintain permit eligibility to *discharge* under this permit. Any *discharges* that are not compliant with the eligibility conditions of this permit are not authorized by the permit and the *owner or operator* must either apply for a separate permit to cover those ineligible *discharges* or take steps necessary to make the *discharge* eligible for coverage.

F. Activities Which Are Ineligible for Coverage Under This General Permit

All of the following are **<u>not</u>** authorized by this permit:

1. *Discharge*s after *construction activities* have been completed and the site has undergone *final stabilization*;

2. *Discharge*s that are mixed with sources of non-stormwater other than those expressly authorized under subsection E.3. of this Part and identified in the SWPPP required by this permit;

3. *Discharges* that are required to obtain an individual SPDES permit or another SPDES general permit pursuant to Part VII.K. of this permit;

4. *Construction activities* or *discharges* from *construction activities* that may adversely affect an *endangered or threatened species* unless the *owner or*

operator has obtained a permit issued pursuant to 6 NYCRR Part 182 for the project or the Department has issued a letter of non-jurisdiction for the project. All documentation necessary to demonstrate eligibility shall be maintained on site in accordance with Part II.D.2 of this permit;

5. *Discharges* which either cause or contribute to a violation of *water quality standards* adopted pursuant to the *ECL* and its accompanying regulations;

6. *Construction activities* for residential, commercial and institutional projects:

    a. Where the *discharge*s from the *construction activities* are tributary to waters of the state classified as AA or AA-s; and

    b. Which are undertaken on land with no existing *impervious cover*; and

    c. Which disturb one (1) or more acres of land designated on the current United States Department of Agriculture ("USDA") Soil Survey as Soil Slope Phase "D", (provided the map unit name 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.

7. *Construction activities* for linear transportation projects and linear utility projects:

    a. Where the *discharge*s from the *construction activities* are tributary to waters of the state classified as AA or AA-s; and

    b. Which are undertaken on land with no existing *impervious cover*; and

    c. Which disturb two (2) or more acres of land designated on the current USDA Soil Survey as Soil Slope Phase "D" (provided the map unit name 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.

8. *Construction activities* that have the potential to affect an *historic property*, unless there is documentation that such impacts have been resolved. The following documentation necessary to demonstrate eligibility with this requirement shall be maintained on site in accordance with Part II.D.2 of this permit and made available to the Department in accordance with Part VII.F of this permit:

   a. Documentation that the *construction activity* is not within an archeologically sensitive 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.

      - 1-5 acres of disturbance - 20 feet
      - 5-20 acres of disturbance - 50 feet
      - 20+ acres of disturbance - 100 feet, or

   b. DEC consultation form sent to OPRHP, and copied to the NYS DEC Agency Historic Preservation Officer (APO), and
      (i) the State Environmental Quality Review (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/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); or

   c. Documentation of satisfactory compliance with Section 106 of the National Historic Preservation Act for a coterminous project area:

(i) No Affect
(ii) No Adverse Affect
(iii) Executed Memorandum of Agreement, or

d. Documentation that:

(i) SHPA Section 14.09 has been completed by NYS DEC or another state agency.

9. *Discharge*s from *construction activities* that are subject to an existing SPDES individual or general permit where a SPDES permit for *construction activity* has been terminated or denied; or where the *owner or operator* has failed to renew an expired individual permit.

Part II. PERMIT COVERAGE

A. How to Obtain Coverage

1. An *owner or operator* of a *construction activity* that is not subject to the requirements of a regulated, traditional land use control MS4 must first prepare a SWPPP in accordance with all applicable requirements of this permit and then submit a completed Notice of Intent (NOI) to the Department to be authorized to discharge under this permit.

2. An *owner or operator* of a *construction activity* that is subject to the requirements of a *regulated, traditional land use control MS4* must first prepare a SWPPP in accordance with all applicable requirements of this permit and then have the SWPPP reviewed and accepted by the *regulated, traditional land use control MS4* prior to submitting the NOI to the Department. The *owner or operator* shall have the “MS4 SWPPP Acceptance” form signed in accordance with Part VII.H., and then submit that form along with a completed NOI to the Department.

3. The requirement for an *owner or operator* to have its SWPPP reviewed and accepted by the *regulated, traditional land use control MS4* prior to submitting the NOI to the Department does not apply to an *owner or operator* that is obtaining permit coverage in accordance with the requirements in Part II.F. (Change of *Owner or Operator*) or where the *owner or operator* of the *construction activity* is the *regulated, traditional land use control MS4* . This exemption does not apply to *construction activities* subject to the New York City Administrative Code.

B. Notice of Intent (NOI) Submittal

1. Prior to December 21, 2020, an owner or operator shall use either the electronic (eNOI) or paper version of the NOI that the Department prepared. Both versions of the NOI are located on the Department's website (http://www.dec.ny.gov/). The paper version of the NOI shall be signed in accordance with Part VII.H. of this permit and submitted to the following address:

   NOTICE OF INTENT
   NYS DEC, Bureau of Water Permits
   625 Broadway, 4th Floor
   Albany, New York 12233-3505

2. Beginning December 21, 2020 and in accordance with EPA's 2015 NPDES Electronic Reporting Rule (40 CFR Part 127), the *owner or operator* must submit the NOI electronically using the *Department's* online NOI.

3. The *owner or operator* shall have the SWPPP preparer sign the "SWPPP Preparer Certification" statement on the NOI prior to submitting the form to the Department.

4. As of the date the NOI is submitted to the Department, the *owner or operator* shall make the NOI and SWPPP available for review and copying in accordance with the requirements in Part VII.F. of this permit.

C. Permit Authorization

1. An *owner or operator* shall not *commence construction activity* until their authorization to *discharge* under this permit goes into effect.

2. Authorization to *discharge* under this permit will be effective when the *owner or operator* has satisfied all of the following criteria:

   a. project review pursuant to the State Environmental Quality Review Act ("SEQRA") have been satisfied, when SEQRA is applicable. See the Department's website (http://www.dec.ny.gov/) for more information,

   b. where required, all necessary Department permits subject to the *Uniform Procedures Act ("UPA")* (see 6 NYCRR Part 621), or the equivalent from another New York State agency, have been obtained, unless otherwise notified by the Department pursuant to 6 NYCRR 621.3(a)(4). *Owners or operators* of *construction activities* that are required to obtain *UPA* permits must submit a preliminary SWPPP to the appropriate DEC Permit Administrator at the Regional Office listed in Appendix F at the time all other necessary *UPA* permit applications are submitted. The preliminary SWPPP must include sufficient information to demonstrate that the *construction activity* qualifies for authorization under this permit,

c. the final SWPPP has been prepared, and

d. a complete NOI has been submitted to the Department in accordance with the requirements of this permit.

3. An *owner or operator* that has satisfied the requirements of Part II.C.2 above will be authorized to *discharge* stormwater from their *construction activity* in accordance with the following schedule:

   a. For *construction activities* that are <u>not</u> subject to the requirements of a *regulated, traditional land use control MS4*:

      (i) Five (5) business days from the date the Department receives a complete electronic version of the NOI (eNOI) for *construction activities* with a SWPPP that has been prepared in conformance with the design criteria in the technical standard referenced in Part III.B.1 and the *performance criteria* in the technical standard referenced in Parts III.B., 2 or 3, for *construction activities* that require post-construction stormwater management practices pursuant to Part III.C.; or

      (ii) Sixty (60) business days from the date the Department receives a complete NOI (electronic or paper version) for *construction activities* with a SWPPP that has <u>not</u> been prepared in conformance with the design criteria in technical standard referenced in Part III.B.1. or, for *construction activities* that require post-construction stormwater management practices pursuant to Part III.C., the *performance criteria* in the technical standard referenced in Parts III.B., 2 or 3, or;

      (iii) Ten (10) business days from the date the Department receives a complete paper version of the NOI for *construction activities* with a SWPPP that has been prepared in conformance with the design criteria in the technical standard referenced in Part III.B.1 and the *performance criteria* in the technical standard referenced in Parts III.B., 2 or 3, for *construction activities* that require post-construction stormwater management practices pursuant to Part III.C.

b. For *construction activities* that are subject to the requirements of a *regulated, traditional land use control MS4*:

(i) Five (5) business days from the date the Department receives both a complete electronic version of the NOI (eNOI) and signed "*MS4* SWPPP Acceptance" form, or

(ii) Ten (10) business days from the date the Department receives both a complete paper version of the NOI and signed "MS4 SWPPP Acceptance" form.

4. Coverage under this permit authorizes stormwater *discharges* from only those areas of disturbance that are identified in the NOI. If an *owner or operator* wishes to have stormwater *discharges* from future or additional areas of disturbance authorized, they must submit a new NOI that addresses that phase of the development, unless otherwise notified by the Department. The *owner or operator* shall not *commence construction activity* on the future or additional areas until their authorization to *discharge* under this permit goes into effect in accordance with Part II.C. of this permit.

D. General Requirements For Owners or Operators With Permit Coverage

1. The *owner or operator* shall ensure that the provisions of the SWPPP are implemented from the *commencement of construction activity* until all areas of disturbance have achieved *final stabilization* and the Notice of Termination ("NOT") has been submitted to the Department in accordance with Part V. of this permit. This includes any changes made to the SWPPP pursuant to Part III.A.4. of this permit.

2. The *owner or operator* shall maintain a copy of the General Permit (GP-0-20-001), NOI, *NOI Acknowledgment Letter*, SWPPP, MS4 SWPPP Acceptance form, inspection reports, responsible contractor's or subcontractor's certification statement (see Part III.A.6.), and all documentation necessary to demonstrate eligibility with this permit at the *construction site* until all disturbed areas have achieved *final stabilization* and the NOT has been submitted to the Department. The documents must be maintained 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.

3. The *owner or operator* of a *construction activity* shall not disturb greater than five (5) acres of soil at any one time without prior written authorization from the Department or, in areas under the jurisdiction of a *regulated, traditional land* *use control MS4,* the *regulated, traditional land use control MS4* (provided the *regulated, traditional land use control MS4* is not the *owner or operator* of the *construction activity*). At a minimum, the *owner or operator* must comply with the following requirements in order to be authorized to disturb greater than five (5) acres of soil at any one time:

a. The *owner or operator* shall have a *qualified inspector* conduct **at least** two (2) site inspections in accordance with Part IV.C. of this permit every seven (7) calendar days, for as long as greater than five (5) acres of soil remain disturbed. The two (2) inspections shall be separated by a minimum of two (2) full calendar days.

b. In areas where soil disturbance activity has temporarily or permanently ceased, the application of soil stabilization measures must be initiated by the end of the next business day and completed within seven (7) days from the date the current soil disturbance activity ceased. The soil stabilization measures selected shall be in conformance with the technical standard, New York State Standards and Specifications for Erosion and Sediment Control, dated November 2016.

c. The *owner or operator* shall prepare a phasing plan that defines maximum disturbed area per phase and shows required cuts and fills.

d. The *owner or operator* shall install any additional site-specific practices needed to protect water quality.

e. The *owner or operator* shall include the requirements above in their SWPPP.

4. In accordance with statute, regulations, and the terms and conditions of this permit, the Department may suspend or revoke an *owner's or operator's* coverage under this permit at any time if the Department determines that the SWPPP does not meet the permit requirements or consistent with Part VII.K..

5. Upon a finding of significant non-compliance with the practices described in the SWPPP or violation of this permit, the Department may order an immediate stop to all activity at the site until the non-compliance is remedied. The stop work order shall be in writing, describe the non-compliance in detail, and be sent to the *owner or operator*.

6. For *construction activities* that are subject to the requirements of a *regulated, traditional land use control MS4*, the *owner or operator* shall notify the

regulated, traditional land use control MS4 in writing of any planned amendments or modifications to the post-construction stormwater management practice component of the SWPPP required by Part III.A. 4. and 5. of this permit. Unless otherwise notified by the *regulated, traditional land use control MS4*, the *owner or operator* shall have the SWPPP amendments or modifications reviewed and accepted by the *regulated, traditional land use control MS4* prior to commencing construction of the post-construction stormwater management practice.

E. Permit Coverage for Discharges Authorized Under GP-0-15-002

1. Upon renewal of SPDES General Permit for Stormwater Discharges from *Construction Activity* (Permit No. GP-0-15-002), an *owner or operator* of *a construction activity* with coverage under GP-0-15-002, as of the effective date of GP- 0-20-001, shall be authorized to *discharge* in accordance with GP- 0-20-001, unless otherwise notified by the Department.

   An *owner or operator* may continue to implement the technical/design components of the post-construction stormwater management controls provided that such design was done in conformance with the technical standards in place at the time of initial project authorization. However, they must comply with the other, non-design provisions of GP-0-20-001.

F. Change of Owner or Operator

1. When property ownership changes or when there is a change in operational control over the construction plans and specifications, the original *owner or operator* must notify the new *owner or operator*, <u>in writing,</u> of the requirement to obtain permit coverage by submitting a NOI with the Department. For *construction activities* subject to the requirements of a *regulated, traditional land use control MS4,* the original *owner or operator* must also notify the MS4, in writing, of the change in ownership at least 30 calendar days prior to the change in ownership.

2. Once the new *owner or operator* obtains permit coverage, the original *owner or operator* shall then submit a completed NOT with the name and permit identification number of the new *owner or operator* to the Department at the address in Part II.B.1. of this permit. If the original *owner or operator* maintains ownership of a portion of the *construction activity* and will disturb soil, they must maintain their coverage under the permit.

3. Permit coverage for the new *owner or operator* will be effective as of the date the Department receives a complete NOI, provided the original *owner or* *operator* was not subject to a sixty (60) business day authorization period that has not expired as of the date the Department receives the NOI from the new *owner or operator*.

Part III. STORMWATER POLLUTION PREVENTION PLAN (SWPPP)

A. General SWPPP Requirements

1. A SWPPP shall be prepared and implemented by the *owner or operator* of each *construction activity* covered by this permit. 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 I.B. of this permit and where applicable, the post-construction stormwater management practice requirements in Part I.C. of this permit. The SWPPP shall be prepared prior to the submittal of the NOI. The NOI shall be submitted to the Department prior to the *commencement of construction activity*. A copy of the completed, final NOI shall be included in the SWPPP.

2. The SWPPP shall describe the erosion and sediment control practices and where required, post-construction stormwater management practices that will be used and/or constructed to reduce the *pollutants* in stormwater *discharges* and to assure compliance with the terms and conditions of this permit. In addition, the SWPPP shall identify potential sources of pollution which may reasonably be expected to affect the quality of stormwater *discharges*.

3. All SWPPPs that require the post-construction stormwater management practice component shall be prepared by a *qualified professional* that is knowledgeable in the principles and practices of stormwater management and treatment.

4. The *owner or operator* must keep the SWPPP current so that it at all times accurately documents the erosion and sediment controls practices that are being used or will be used during construction, and all post-construction stormwater management practices that will be constructed on the site. At a minimum, the *owner or operator* shall amend the SWPPP, including construction drawings:

    a. whenever the current provisions prove to be ineffective in minimizing *pollutants* in stormwater *discharges* from the site;

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*;

c. to address issues or deficiencies identified during an inspection by the *qualified inspector,* the Department or other regulatory authority; and

d. to document the final construction conditions.

5. The Department 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 shall 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 the Department, the *owner or operator* shall make the required changes to the SWPPP and submit written notification to the Department that the changes have been made. If the *owner or operator* does not respond to the Department's comments in the specified time frame, the Department 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. of this permit.

6. 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 post-construction stormwater management practices included in the SWPPP. The *owner or operator* shall have each of the contractors and subcontractors identify at least one person from their company that will be responsible for implementation of the SWPPP. This person shall be known as the *trained contractor.* The *owner or operator* shall ensure that at least one *trained contractor* is on site on a daily basis when soil disturbance activities are being performed.

   The *owner or operator* shall have each of the contractors and subcontractors identified above sign a copy of the following certification statement below before they commence any *construction activity*:

   "I hereby certify under penalty of law 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 most current version of the New York State Pollutant Discharge Elimination System ("SPDES") general permit for stormwater *discharge*s 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* shall 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 construction has commenced, they must also sign the certification statement and provide the information listed above.

7. For projects where the Department requests a copy of the SWPPP or inspection reports, the *owner or operator* shall submit the documents in both electronic (PDF only) and paper format within five (5) business days, unless otherwise notified by the Department.

B. Required SWPPP Contents

1. Erosion and sediment control component - All SWPPPs prepared pursuant to this permit shall include erosion and sediment control practices designed in conformance with the technical standard, New York State Standards and Specifications for Erosion and Sediment Control, dated November 2016. Where erosion and sediment control practices are not designed in conformance with the design criteria included in the technical standard, the *owner or operator* must demonstrate *equivalence* to the technical standard. At a minimum, the erosion and sediment control component of the SWPPP shall include the following:

   a. Background information about the scope of the project, including the location, type and size of project

b. A site map/construction drawing(s) for the project, including a general location map. At a minimum, the site map shall 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);

c. A description of the soil(s) present at the site, including an identification of the Hydrologic Soil Group (HSG);

d. A construction phasing plan and sequence of operations describing the intended order of *construction activities*, including clearing and grubbing, excavation and grading, utility and infrastructure installation and any other activity at the site that results in soil disturbance;

e. 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;

f. A temporary and permanent soil stabilization plan that meets the requirements of this general permit and the technical standard, New York State Standards and Specifications for Erosion and Sediment Control, dated November 2016, for each stage of the project, including initial land clearing and grubbing to project completion and achievement of *final stabilization*;

g. A site map/construction drawing(s) showing the specific location(s), size(s), and length(s) of each erosion and sediment control practice;

h. 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;

i. A maintenance inspection schedule for the contractor(s) identified in Part III.A.6. of this permit, to ensure continuous and effective operation of the erosion and sediment control practices. The maintenance inspection schedule shall be in accordance with the requirements in the technical standard, New York State Standards and Specifications for Erosion and Sediment Control, dated November 2016;

j. 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*;

k. 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

l. Identification of any elements of the design that are not in conformance with the design criteria in the technical standard, New York State Standards and Specifications for Erosion and Sediment Control, dated November 2016. 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. Post-construction stormwater management practice component – The *owner or operator* of any construction project identified in Table 2 of Appendix B as needing post-construction stormwater management practices shall prepare a SWPPP that includes practices designed in conformance with the applicable *sizing criteria* in Part I.C.2.a., c. or d. of this permit and the *performance criteria* in the technical standard, New York State Stormwater Management Design Manual dated January 2015

   Where post-construction stormwater management practices are not designed in conformance with the *performance criteria* in the technical standard, 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.

   The post-construction stormwater management practice component of the SWPPP shall include the following:

   a. Identification of all post-construction stormwater management practices to be constructed as part of the project. Include the dimensions, material specifications and installation details for each post-construction stormwater management practice;

b. A site map/construction drawing(s) showing the specific location and size of each post-construction stormwater management practice;

c. 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;

(ii) Map(s) showing post-development conditions, including watershed/subcatchments boundaries, flow paths/routing, design points and post-construction stormwater management practices;

(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;

(iv) Summary table, with supporting calculations, which demonstrates that each post-construction stormwater management practice has been designed in conformance with the *sizing criteria* included in the Design Manual;

(v) Identification of any *sizing criteria* that is not required based on the requirements included in Part I.C. of this permit; and

(vi) Identification of any elements of the design that are not in conformance with the *performance criteria* in the Design Manual. 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 Design Manual;

d. Soil testing results and locations (test pits, borings);

e. Infiltration test results, when required; and

f. An operations and maintenance plan that includes inspection and maintenance schedules and actions to ensure continuous and effective operation of each post-construction stormwater management practice. The plan shall identify the entity that will be responsible for the long term operation and maintenance of each practice.

3. Enhanced Phosphorus Removal Standards - All construction projects identified in Table 2 of Appendix B that are located in the watersheds identified in Appendix C shall prepare a SWPPP that includes post-construction stormwater management practices designed in conformance with the applicable *sizing criteria* in Part I.C.2. b., c. or d. of this permit and the *performance criteria,* Enhanced Phosphorus Removal Standards included in the Design Manual. At a minimum, the post-construction stormwater management practice component of the SWPPP shall include items 2.a - 2.f. above.

C. Required SWPPP Components by Project Type

Unless otherwise notified by the Department, *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 conformance with Part III.B.1 of this permit. *Owners or operators* of the *construction activities* identified in Table 2 of Appendix B shall prepare a SWPPP that also includes post-construction stormwater management practices designed in conformance with Part III.B.2 or 3 of this permit.

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 post-construction stormwater management practices identified in the SWPPP are inspected and maintained in accordance with Part IV.B. and C. of this permit.

2. The terms of this permit shall not be construed to prohibit the State of New York from exercising any authority pursuant to the ECL, common law or federal law, or prohibit New York State from taking any measures, whether civil or criminal, to prevent violations of the laws of the State of New York or protect the public health and safety and/or the environment.

B. Contractor Maintenance Inspection Requirements

1. The *owner or operator* of each *construction activity* identified in Tables 1 and 2 of Appendix B shall 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 shall

begin implementing corrective actions within one business day and shall complete the corrective actions in a reasonable time frame.

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. The *trained contractor* shall begin conducting the maintenance inspections in accordance with Part IV.B.1. of this permit 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 if all areas disturbed as of the project shutdown date have achieved *final stabilization* and all post-construction stormwater management practices required for the completed portion of the project have been constructed in conformance with the SWPPP and are operational.

C. Qualified Inspector Inspection Requirements

The *owner or operator* shall have a *qualified inspector* conduct site inspections in conformance with the following requirements:

[Note: The *trained contractor* identified in Part III.A.6. and IV.B. of this permit **cannot** conduct the *qualified inspector* site inspections unless they meet the *qualified inspector* qualifications included in Appendix A. In order to perform these inspections, the *trained contractor* would have to be a:

- licensed Professional Engineer,
- Certified Professional in Erosion and Sediment Control (CPESC),
- New York State Erosion and Sediment Control Certificate Program holder
- Registered Landscape Architect, 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 Department endorsed training in proper erosion and sediment control principles from a Soil and Water Conservation District, or other Department endorsed entity].

1. A *qualified inspector* shall conduct site inspections for all *construction activities* identified in Tables 1 and 2 of Appendix B, with the exception of:

    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 five (5) acres and is not located in one of the watersheds listed in Appendix C and <u>not</u> directly discharging to one of the 303(d) segments listed in Appendix E;

b. the construction of a single family home that involves a soil disturbance of one (1) or more acres of land but less than five (5) acres and is <u>not</u> located in one of the watersheds listed in Appendix C and <u>not</u> directly discharging to one of the 303(d) segments listed in Appendix E;

c. construction on agricultural property that involves a soil disturbance of one (1) or more acres of land but less than five (5) acres; and

d. *construction activities* located in the watersheds identified in Appendix D that involve soil disturbances between five thousand (5,000) square feet and one (1) acre of land.

2. Unless otherwise notified by the Department, the *qualified inspector* shall conduct site inspections in accordance with the following timetable:

   a. For construction sites where soil disturbance activities are on-going, the *qualified inspector* shall conduct a site inspection at least once every seven (7) calendar days.

   b. For construction sites where soil disturbance activities are on-going and the *owner or operator* has received authorization in accordance with Part II.D.3 to disturb greater than five (5) acres of soil at any one time, the *qualified inspector* shall conduct at least two (2) site inspections every seven (7) calendar days. The two (2) inspections shall be separated by a minimum of two (2) full calendar days.

   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* shall conduct a site inspection at least once every thirty (30) calendar days. The *owner or operator* shall notify the DOW Water (SPDES) Program contact at the Regional Office (see contact information in Appendix F) or, in areas under the jurisdiction of a *regulated, traditional land use control MS4,* the *regulated, traditional land use control MS4* (provided the *regulated, traditional land use control MS4* is not the *owner or operator* of the *construction activity*) in writing prior to reducing the frequency of inspections.

d. For construction sites where soil disturbance activities have been shut down with partial project completion, the *qualified inspector* can stop conducting inspections if all areas disturbed as of the project shutdown date have achieved *final stabilization* and all post-construction stormwater management practices required for the completed portion of the project have been constructed in conformance with the SWPPP and are operational. The *owner or operator* shall notify the DOW Water (SPDES) Program contact at the Regional Office (see contact information in Appendix F) or, in areas under the jurisdiction of a *regulated, traditional land use control MS4,* the *regulated, traditional land use control MS4* (provided the *regulated, traditional land use control MS4* is not the *owner or operator* of the *construction activity*) in writing prior to the shutdown. If soil disturbance activities are not resumed within 2 years from the date of shutdown, the *owner or operator* shall have the *qualified inspector* perform a final inspection and certify that all disturbed areas have achieved *final stabilization,* and all temporary, structural erosion and sediment control measures have been removed*;* and that all post-construction stormwater management practices have been constructed in conformance with the SWPPP by signing the "*Final Stabilization*" and "Post-Construction Stormwater Management Practice" certification statements on the NOT. The *owner or operator* shall then submit the completed NOT form to the address in Part II.B.1 of this permit.

e. For construction sites that directly *discharge* to one of the 303(d) segments listed in Appendix E or is located in one of the watersheds listed in Appendix C, the *qualified inspector* shall conduct at least two (2) site inspections every seven (7) calendar days. The two (2) inspections shall be separated by a minimum of two (2) full calendar days.

3. At a minimum, the *qualified inspector* shall inspect all erosion and sediment control practices and pollution prevention measures to ensure integrity and effectiveness, all post-construction stormwater management practices under construction to ensure that they are constructed in conformance with the SWPPP, all areas of disturbance that have not achieved *final stabilization,* all points of *discharge* to natural surface waterbodies located within, or immediately adjacent to, the property boundaries of the *construction site*, and all points of *discharge* from the *construction site*.

4. The *qualified inspector* shall prepare an inspection report subsequent to each and every inspection. At a minimum, the inspection report shall include and/or address the following:

a. Date and time of inspection;

b. Name and title of person(s) performing inspection;

c. A description of the weather and soil conditions (e.g. dry, wet, saturated) at the time of the inspection;

d. A description of the condition of the runoff at all points of *discharge* from the *construction site*. This shall 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;

e. A description of the condition of all natural surface waterbodies located within, or immediately adjacent to, the property boundaries of the *construction site* which receive runoff from disturbed areas. This shall include identification of any *discharges* of sediment to the surface waterbody;

f. Identification of all erosion and sediment control practices and pollution prevention measures that need repair or maintenance;

g. 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;

h. Description and sketch 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;

i. Current phase of construction of all post-construction stormwater management practices and identification of all construction that is not in conformance with the SWPPP and technical standards;

j. 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 post-construction stormwater management practice(s);

k. Identification and status of all corrective actions that were required by previous inspection; and

l. Digital photographs, with date stamp, that clearly show the condition of all practices that have been identified as needing corrective actions. The *qualified inspector* shall attach paper 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* shall 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* shall 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* shall notify the *owner or operator* and appropriate contractor or subcontractor identified in Part III.A.6. of this permit of any corrective actions that need to be taken. The contractor or subcontractor shall begin implementing the corrective actions within one business day of this notification and shall complete the corrective actions in a reasonable time frame.

6. All inspection reports shall be signed by the *qualified inspector.* Pursuant to Part II.D.2. of this permit, the inspection reports shall be maintained on site with the SWPPP.

Part V. TERMINATION OF PERMIT COVERAGE

A. Termination of Permit Coverage

1. An *owner or operator* that is eligible to terminate coverage under this permit must submit a completed NOT form to the address in Part II.B.1 of this permit. The NOT form shall be one which is associated with this permit, signed in accordance with Part VII.H of this permit.

2. An *owner or operator* may terminate coverage when one or more the following conditions have been met:

   a. Total project completion - All *construction activity* identified in the SWPPP has been completed; <u>and</u> all areas of disturbance have achieved *final stabilization*; <u>and</u> all temporary, structural erosion and sediment control measures have been removed; <u>and</u> all post-construction stormwater management practices have been constructed in conformance with the SWPPP and are operational;

b. Planned shutdown with partial project completion - All soil disturbance activities have ceased; <u>and</u> all areas disturbed as of the project shutdown date have achieved *final stabilization*; <u>and</u> all temporary, structural erosion and sediment control measures have been removed; <u>and</u> all post-construction stormwater management practices required for the completed portion of the project have been constructed in conformance with the SWPPP and are operational;

c. A new *owner or operator* has obtained coverage under this permit in accordance with Part II.F. of this permit.

d. The *owner or operator* obtains coverage under an alternative SPDES general permit or an individual SPDES permit.

3. For *construction activities* meeting subdivision 2a. or 2b. of this Part, the *owner or operator* shall have the *qualified inspector* perform a final site inspection prior to submitting the NOT. The *qualified inspector* shall, by signing the "*Final Stabilization*" and "Post-Construction Stormwater Management Practice certification statements on the NOT, certify that all the requirements in Part V.A.2.a. or b. of this permit have been achieved.

4. For *construction activities* that are subject to the requirements of a *regulated, traditional land use control MS4* and meet subdivision 2a. or 2b. of this Part, the *owner or operator* shall have the *regulated, traditional land use control MS4* sign the "MS4 Acceptance" statement on the NOT in accordance with the requirements in Part VII.H. of this permit. The *regulated, traditional land use control MS4* official, by signing this statement, has determined that it is acceptable for the *owner or operator* to submit the NOT in accordance with the requirements of this Part. The *regulated, traditional land use control MS4* can make this determination by performing a final site inspection themselves or by accepting the *qualified inspector*'s final site inspection certification(s) required in Part V.A.3. of this permit.

5. For *construction activities* that require post-construction stormwater management practices and meet subdivision 2a. of this Part, the *owner or operator* must, prior to submitting the NOT, ensure one of the following:

a. the post-construction stormwater management practice(s) and any right-of-way(s) needed to maintain such practice(s) have been deeded to the municipality in which the practice(s) is located,

b. an executed maintenance agreement is in place with the municipality that will maintain the post-construction stormwater management practice(s),

c. for post-construction stormwater management practices 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,

d. for post-construction stormwater management practices 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 policy and procedures in place that ensures operation and maintenance of the practices in accordance with the operation and maintenance plan.

Part VI. REPORTING AND RETENTION RECORDS

A. Record Retention

The *owner or operator* shall retain a copy of the NOI, NOI Acknowledgment Letter, SWPPP, MS4 SWPPP Acceptance form and any inspection reports that were prepared in conjunction with this permit for a period of at least five (5) years from the date that the Department receives a complete NOT submitted in accordance with Part V. of this general permit.

B. Addresses

With the exception of the NOI, NOT, and MS4 SWPPP Acceptance form (which must be submitted to the address referenced in Part II.B.1 of this permit), all written correspondence requested by the Department, including individual permit applications, shall be sent to the address of the appropriate DOW Water (SPDES) Program contact at the Regional Office listed in Appendix F.

Part VII. STANDARD PERMIT CONDITIONS

A. Duty to Comply

The *owner or operator* must comply with all conditions of this permit. All contractors and subcontractors associated with the project must comply with the terms of the SWPPP. Any non-compliance with this permit constitutes a violation of the Clean Water

Act (CWA) and the ECL and is grounds for an enforcement action against the *owner or operator* and/or the contractor/subcontractor; permit revocation, suspension or modification; or denial of a permit renewal application. Upon a finding of significant non-compliance with this permit or the applicable SWPPP, the Department may order an immediate stop to all *construction activity* at the site until the non-compliance is remedied. The stop work order shall be in writing, shall describe the non-compliance in detail, and shall be sent to the *owner or operator*.

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). *Construction activity* shall not resume until written permission to do so has been received from the RWE.

B. Continuation of the Expired General Permit

This permit expires five (5) years from the effective date. If a new general permit is not issued prior to the expiration of this general permit, an *owner or operator* with coverage under this permit may continue to operate and *discharge* in accordance with the terms and conditions of this general permit, if it is extended pursuant to the State Administrative Procedure Act and 6 NYCRR Part 621, until a new general permit is issued.

C. Enforcement

Failure of the *owner or operator,* its contractors, subcontractors, agents and/or assigns to strictly adhere to any of the permit requirements contained herein shall constitute a violation of this permit. There are substantial criminal, civil, and administrative penalties associated with violating the provisions of this permit. Fines of up to $37,500 per day for each violation and imprisonment for up to fifteen (15) years may be assessed depending upon the nature and degree of the offense.

D. Need to Halt or Reduce Activity Not a Defense

It shall not be a defense for an *owner or operator* in an enforcement action that it would have been necessary to halt or reduce the *construction activity* in order to maintain compliance with the conditions of this permit.

E. Duty to Mitigate

The *owner or operator* and its contractors and subcontractors shall 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.

F. Duty to Provide Information

The *owner or operator* shall furnish to the Department, within a reasonable specified time period of a written request, all documentation necessary to demonstrate eligibility and any information to determine compliance with this permit or to determine whether cause exists for modifying or revoking this permit, or suspending or denying coverage under this permit, in accordance with the terms and conditions of this permit. The NOI, SWPPP 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 (5) 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.

G. Other Information

When the *owner or operator* becomes aware that they failed to submit any relevant facts, or submitted incorrect information in the NOI or in any of the documents required by this permit , or have made substantive revisions to the SWPPP (e.g. the scope of the project changes significantly, the type of post-construction stormwater management practice(s) changes, there is a reduction in the sizing of the post-construction stormwater management practice, or there is an increase in the disturbance area or *impervious area*), which were not reflected in the original NOI submitted to the Department, they shall promptly submit such facts or information to the Department using the contact information in Part II.A. of this permit. Failure of the *owner or operator* to correct or supplement any relevant facts within five (5) business days of becoming aware of the deficiency shall constitute a violation of this permit.

H. Signatory Requirements

1. All NOIs and NOTs shall be signed as follows:

   a. For a corporation these forms shall be signed 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 permit application requirements; and where authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures;

b. For a partnership or sole proprietorship these forms shall be signed by a general partner or the proprietor, respectively; or

c. For a municipality, State, Federal, or other public agency these forms shall be signed by either a principal executive officer or ranking elected official. For purposes of this section, a principal executive officer of a Federal agency includes:

(i) the chief executive officer of the agency, or

(ii) 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. The SWPPP and other information requested by the Department shall be signed by a person described in Part VII.H.1. of this permit 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.H.1. of this permit;

b. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity, such as the position of plant manager, operator of a well or a well field, superintendent, 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 shall include the name, title and signature of the authorized representative and be attached to the SWPPP.

3. All inspection reports shall be signed by the *qualified inspector* that performs the inspection.

4. The MS4 SWPPP Acceptance form shall be signed by the principal executive officer or ranking elected official from the *regulated, traditional land use control MS4,* or by a duly authorized representative of that person.

   It shall constitute a permit violation if an incorrect and/or improper signatory authorizes any required forms, SWPPP and/or inspection reports.

I. Property Rights

The issuance of this permit does not convey any property rights of any sort, nor any exclusive privileges, nor does it authorize any injury to private property nor any invasion of personal rights, nor any infringement of Federal, State or local laws or regulations. *Owners or operators* must obtain any applicable conveyances, easements, licenses and/or access to real property prior to *commencing construction activity*.

J. 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 shall not be affected thereby.

K. Requirement to Obtain Coverage Under an Alternative Permit

1. The Department may require any owner or operator authorized by this permit to apply for and/or obtain either an individual SPDES permit or another SPDES general permit. When the Department requires any discharger authorized by a general permit to apply for an individual SPDES permit, it shall notify the discharger in writing that a permit application is required. This notice shall

include a brief statement of the reasons for this decision, an application form, a statement setting a time frame for the owner or operator to file the application for an individual SPDES permit, and a deadline, not sooner than 180 days from owner or operator receipt of the notification letter, whereby the authorization to discharge under this general permit shall be terminated. Applications must be submitted to the appropriate Permit Administrator at the Regional Office. The Department may grant additional time upon demonstration, to the satisfaction of the Department, that additional time to apply for an alternative authorization is necessary or where the Department has not provided a permit determination in accordance with Part 621 of this Title.

2. When an individual SPDES permit is issued to a discharger authorized to *discharge* under a general SPDES permit for the same *discharge*(s), the general permit authorization for outfalls authorized under the individual SPDES permit is automatically terminated on the effective date of the individual permit unless termination is earlier in accordance with 6 NYCRR Part 750.

L. Proper Operation and Maintenance

The *owner or operator* shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the *owner or operator* to achieve compliance with the conditions of this permit and with the requirements of the SWPPP.

M. Inspection and Entry

The *owner or operator* shall allow an authorized representative of the Department, EPA, applicable county health department, 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 conditions of this permit;

2. Have access to and copy at reasonable times, any records that must be kept under the conditions of this permit; and

3. Inspect at reasonable times any facilities or equipment (including monitoring and control equipment), practices or operations regulated or required by this permit.

4. Sample or monitor at reasonable times, for purposes of assuring permit compliance or as otherwise authorized by the Act or ECL, any substances or parameters at any location.

N. Permit Actions

This permit may, at any time, be modified, suspended, revoked, or renewed by the Department in accordance with 6 NYCRR Part 621. The filing of a request by the *owner or operator* for a permit modification, revocation and reissuance, termination, a notification of planned changes or anticipated noncompliance does not limit, diminish and/or stay compliance with any terms of this permit.

O. Definitions

Definitions of key terms are included in Appendix A of this permit.

P. Re-Opener Clause

1. If there is evidence indicating potential or realized impacts on water quality due to any stormwater discharge associated with construction activity covered by this permit, the owner or operator of such discharge may be required to obtain an individual permit or alternative general permit in accordance with Part VII.K. of this permit or the permit may be modified to include different limitations and/or requirements.

2. Any Department initiated permit modification, suspension or revocation will be conducted in accordance with 6 NYCRR Part 621, 6 NYCRR 750-1.18, and 6 NYCRR 750-1.20.

Q. Penalties for Falsification of Forms and Reports

In accordance with 6NYCRR Part 750-2.4 and 750-2.5, 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 reports of compliance or noncompliance shall, upon conviction, be punished in accordance with ECL §71-1933 and or Articles 175 and 210 of the New York State Penal Law.

R. Other Permits

Nothing in this permit relieves the *owner or operator* from a requirement to obtain any other permits required by law.

APPENDIX A – Acronyms and Definitions

Acronyms

APO – Agency Preservation Officer
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)
DOW – Division of Water
EAF – Environmental Assessment Form
ECL - 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
OPRHP – Office of Parks, Recreation and Historic Places
Qf – Extreme Flood
Qp – Overbank Flood
RRv – Runoff Reduction Volume
RWE – Regional Water Engineer
SEQR – State Environmental Quality Review
SEQRA - State Environmental Quality Review Act
SHPA – State Historic Preservation Act
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.

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 –means the land for construction of a barn, *agricultural building*, silo, stockyard, pen or other structural practices identified in Table II in the "Agricultural Management Practices Catalog for Nonpoint Source Pollution in New York State" prepared by the Department in cooperation with agencies of New York Nonpoint Source Coordinating Committee (dated June 2007).

Alter Hydrology from Pre to Post-Development Conditions - means 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 - means a sewer that is designed to collect and convey both "sewage" and "stormwater".

Commence (Commencement of) Construction Activities - means 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.

Construction Activity(ies) - means any clearing, grading, excavation, filling, demolition or stockpiling activities that result in soil disturbance. Clearing activities can include, but are not limited to, 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.

Construction Site – means the land area where *construction activity(ies)* will occur. See definition for "*Commence (Commencement of) Construction Activities"* and "*Larger Common Plan of Development or Sale" also.*

Dewatering – means the act of draining rainwater and/or groundwater from building foundations, vaults or excavations/trenches.

Direct Discharge (to a specific surface waterbody) - means that 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) - means any addition of any pollutant to waters of the State through an outlet or *point source*.

Embankment –means an earthen or rock slope that supports a road/highway.

Endangered or Threatened Species – see 6 NYCRR Part 182 of the Department's rules and regulations for definition of terms and requirements.

Environmental Conservation Law (ECL) - means chapter 43-B of the Consolidated Laws of the State of New York, entitled the Environmental Conservation Law.

Equivalent (Equivalence) – means that 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 - means that 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.

General SPDES permit - means a SPDES permit issued pursuant to 6 NYCRR Part 750-1.21 and Section 70-0117 of the ECL authorizing a category of discharges.

Groundwater(s) - means waters in the saturated zone. The saturated zone is a subsurface zone in which all the interstices are filled with water under pressure greater than that of the atmosphere. Although the zone may contain gas-filled interstices or interstices filled with fluids other than water, it is still considered saturated.

Historic Property – means 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) - means all impermeable surfaces that cannot effectively infiltrate rainfall. This includes paved, concrete and gravel surfaces (i.e. parking lots, driveways, roads, runways and sidewalks); building rooftops and miscellaneous impermeable structures such as patios, pools, and sheds.

Infeasible – means not technologically possible, or not economically practicable and achievable in light of best industry practices.

Larger Common Plan of Development or Sale - means a contiguous area where multiple separate and distinct *construction activities* are occurring, or will occur, under one plan. The term "plan" in "larger 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 (SEQRA) environmental assessment form or other documents, zoning request, computer design, etc.) or physical demarcation (including boundary signs, lot stakes, surveyor markings, etc.) indicating that *construction activities* may occur on a specific plot.

For discrete construction projects that are located within a larger common plan of development or sale that are at least 1/4 mile apart, each project can be treated as a separate plan of development or sale provided any interconnecting road, pipeline or utility project that is part of the same "common plan" is not concurrently being disturbed.

Minimize – means 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 (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):

(i) Owned or operated by a State, city, town, 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*;*
(ii) Designed or used for collecting or conveying stormwater;
(iii) Which is not a *combined sewer*; and
(iv) Which is not part of a Publicly Owned Treatment Works (POTW) as defined at 40 CFR 122.2.

National Pollutant Discharge Elimination System (NPDES) - means the national system for the issuance of wastewater and stormwater permits under the Federal Water Pollution Control Act (Clean Water Act).

Natural Buffer –means an undisturbed area with natural cover running along a surface water (e.g. wetland, stream, river, lake, etc.).

New Development – means 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.

NOI Acknowledgment Letter - means the letter that the Department sends to an owner or operator to acknowledge the Department's receipt and acceptance of a complete Notice of Intent. This letter documents the owner's or operator's authorization to discharge in accordance with the general permit for stormwater discharges from *construction activity*.

Nonpoint Source - means 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 –means flow events that exceed the capacity of the stream channel and spill out into the adjacent floodplain.

Owner or Operator - means 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 conditions.

Performance Criteria – means the design criteria listed under the “Required Elements” sections in Chapters 5, 6 and 10 of the technical standard, New York State Stormwater Management Design Manual, dated January 2015. It does not include the Sizing Criteria (i.e. WQv, RRv, Cpv, Qp and Qf) in Part I.C.2. of the permit.

Point Source - means 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 - means 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 - means 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 Department 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 Department endorsed training in proper erosion and sediment control principles from a Soil and Water Conservation District, or other Department 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 post-construction stormwater management practices that include structural components, such as a dam for an impoundment, shall be performed by a licensed Professional Engineer.

Qualified Professional - means 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 Department endorsed individual(s). Individuals preparing SWPPPs that require the post-construction stormwater management practice 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) – means 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.).

Regulated, Traditional Land Use Control MS4 - means 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).

Routine Maintenance Activity - means *construction activity* that is performed to maintain the original line and grade, hydraulic capacity, or original purpose of a facility, including, but not limited to:

- Re-grading of gravel roads or parking lots,
- Cleaning and shaping of existing roadside ditches and culverts that maintains the approximate original line and grade, and hydraulic capacity of the ditch,
- 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),
- Placement of aggregate shoulder backing that stabilizes the transition between the road shoulder and the ditch or *embankment*,
- 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,
- Long-term use of equipment storage areas at or near highway maintenance facilities,
- 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*,
- Existing use of Canal Corp owned upland disposal sites for the canal, and
- Replacement of curbs, gutters, sidewalks and guide rail posts.

Site limitations – means 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 – means the criteria included in Part I.C.2 of the permit that are used to size post-construction stormwater management control practices. The criteria include; Water Quality Volume (WQv), Runoff Reduction Volume (RRv), Channel Protection Volume (Cpv), *Overbank* Flood (Qp), and Extreme Flood (Qf).

State Pollutant Discharge Elimination System (SPDES) - means the system established pursuant to Article 17 of the ECL and 6 NYCRR Part 750 for issuance of permits authorizing discharges to the waters of the state.

Steep Slope – means land area designated on the current United States Department of Agriculture ("USDA") Soil Survey as Soil Slope Phase "D", (provided the map unit name 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.

Streambank – as used in this permit, means 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) – means 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 post-construction stormwater management controls); and identifies procedures the *owner or operator* will implement to comply with the terms and conditions 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 – means that an existing disturbed area will not be disturbed again within 14 calendar days of the previous soil disturbance.

Temporary Stabilization - means that 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 Loads (TMDLs) - A TMDL is 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 on a daily basis and still meet *water quality standards*, and an allocation of that amount to the pollutant's sources. A TMDL stipulates wasteload allocations (WLAs) for *point source* discharges, load allocations (LAs) for *nonpoint source*s, and a margin of safety (MOS).

Trained Contractor - means an employee from the contracting (construction) company, identified in Part III.A.6., that has received four (4) hours of Department endorsed training in proper erosion and sediment control principles from a Soil and Water Conservation District, or other Department 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.6., 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 Department endorsed training in proper erosion and sediment control principles from a Soil and Water Conservation District, or other Department endorsed entity).

The *trained contractor* is responsible for the day to day implementation of the SWPPP.

Uniform Procedures Act (UPA) Permit - means a permit required under 6 NYCRR Part 621 of the Environmental Conservation Law (ECL), Article 70.

Water Quality Standard - means 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 <u>not</u> located in one of the watersheds listed in Appendix C or <u>not</u> *directly discharging* to one of the 303(d) segments listed in Appendix E • Single family residential subdivisions with 25% or less impervious cover at total site build-out and <u>not</u> located in one of the watersheds listed in Appendix C and <u>not</u> directly discharging to one of the 303(d) segments listed in Appendix E • Construction of a barn or other *agricultural building*, silo, stock yard or pen.
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 watersheds identified in Appendix D that involve soil disturbances between five thousand (5,000) square feet and one (1) acre of land.
The following construction activities that involve soil disturbances of one (1) or more acres of land: • 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 projects, stormwater retrofits and stream restoration projects • Pond construction • Linear bike paths running through areas with vegetative cover, including bike paths surfaced with an impervious cover • Cross-country ski trails and walking/hiking trails • Sidewalk, bike path or walking path projects, surfaced with an impervious cover, that are not part of residential, commercial or institutional development; • Sidewalk, bike path or walking path projects, 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. • Slope stabilization projects • Slope flattening that changes the grade of the site, but does not significantly change the runoff characteristics

Table 1 (Continued) 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:

- Spoil areas that will be covered with vegetation
- Vegetated open space projects (i.e. recreational parks, lawns, meadows, fields, downhill ski trails) excluding projects that *alter hydrology from pre to post development* conditions,
- Athletic fields (natural grass) that do not include the construction or reconstruction of *impervious area* <u>and</u> do not *alter hydrology from pre to post development* conditions
- Demolition project where vegetation will be established, and no redevelopment is planned
- Overhead electric transmission line project that does not include the construction of permanent access roads or parking areas surfaced with *impervious cover*
- Structural practices as identified in Table II in the "Agricultural Management Practices Catalog for Nonpoint Source Pollution in New York State", excluding projects that involve soil disturbances of greater than five acres and construction activities that include the construction or reconstruction of impervious area
- 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

Table 2

CONSTRUCTION ACTIVITIES THAT REQUIRE THE PREPARATION OF A SWPPP THAT INCLUDES POST-CONSTRUCTION STORMWATER MANAGEMENT PRACTICES

The following construction activities that involve soil disturbances of one (1) or more acres of land:

- 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 E
- 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 E
- 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 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 larger common plan of development or sale that will ultimately disturb five or more acres of land
- Multi-family residential developments; includes duplexes, townhomes, condominiums, senior housing complexes, apartment complexes, and mobile home parks
- 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) and structural practices as identified in Table II in the “Agricultural Management Practices Catalog for Nonpoint Source Pollution in New York State” that include the construction or reconstruction of *impervious area*, excluding projects that involve soil disturbances of less than five acres.
- Golf courses
- Institutional development; includes hospitals, prisons, schools and colleges
- Industrial facilities; includes industrial parks
- Landfills
- Municipal facilities; includes highway garages, transfer stations, office buildings, POTW’s, water treatment plants, and water storage tanks
- Office complexes
- Playgrounds that include the construction or reconstruction of impervious area
- Sports complexes
- Racetracks; includes racetracks with earthen (dirt) surface
- Road construction or reconstruction, including roads constructed as part of the construction activities listed in Table 1

Table 2 (Continued)

CONSTRUCTION ACTIVITIES THAT REQUIRE THE PREPARATION OF A SWPPP THAT INCLUDES POST-CONSTRUCTION STORMWATER MANAGEMENT PRACTICES

The following construction activities that involve soil disturbances of one (1) or more acres of land:

- Parking lot construction or reconstruction, including parking lots constructed as part of the construction activities listed in Table 1
- 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 over-head electric transmission line project, wind-power project, cell tower project, oil or gas well drilling project, sewer or water main project or other linear utility project
- Sidewalk, bike path or walking path projects, surfaced with an impervious cover, that are part of a residential, commercial or institutional development
- Sidewalk, bike path or walking path projects, surfaced with an impervious cover, that are part of a highway construction or reconstruction project
- All other construction activities that include the construction or reconstruction of *impervious area* <u>or</u> *alter the hydrology from pre to post development* conditions, <u>and</u> 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 post-construction stormwater management practices designed in conformance with the Enhanced Phosphorus Removal Standards included in the technical standard, New York State Stormwater Management Design Manual ("Design Manual").

- 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

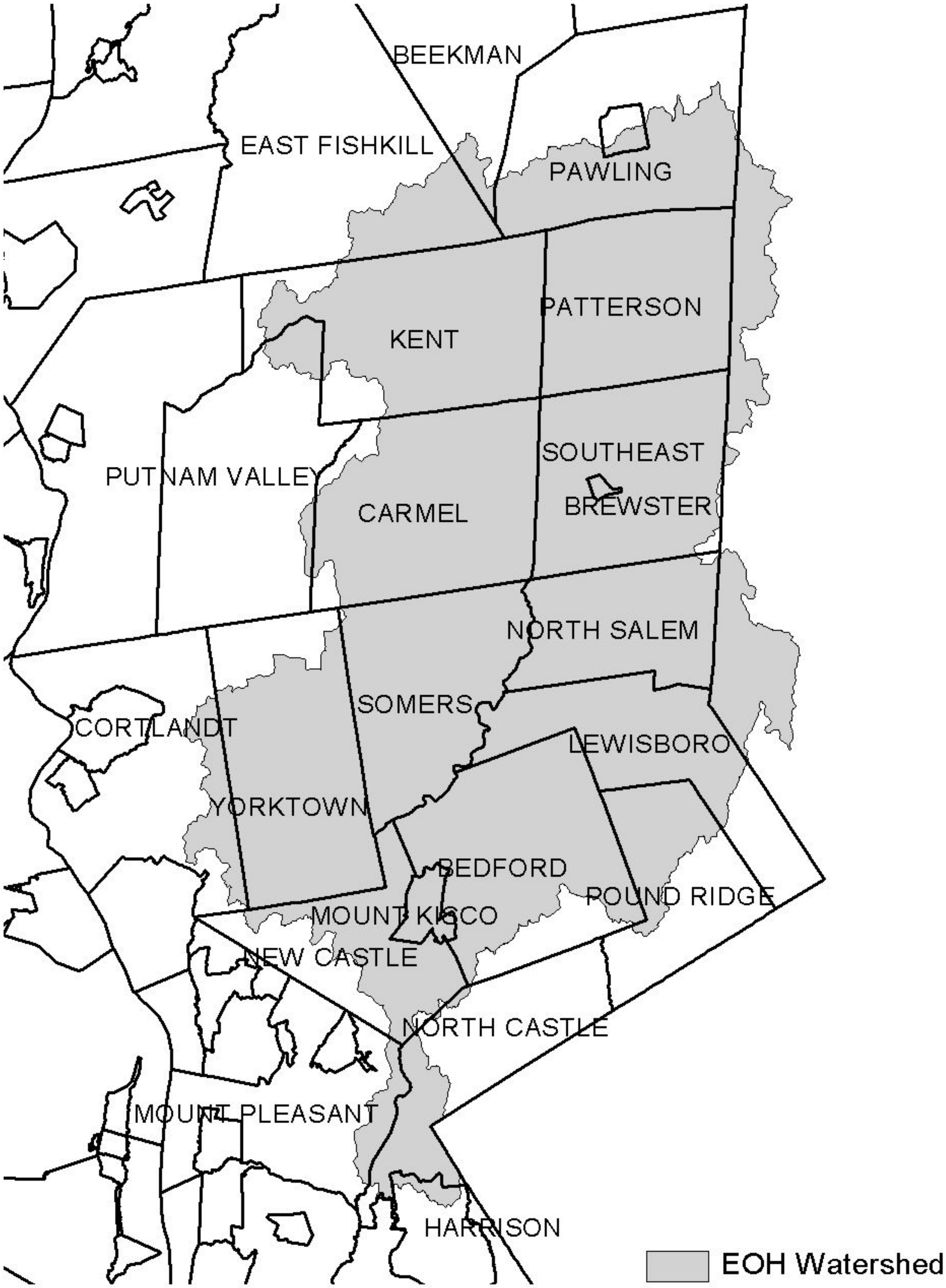


Figure 2 - Onondaga Lake Watershed

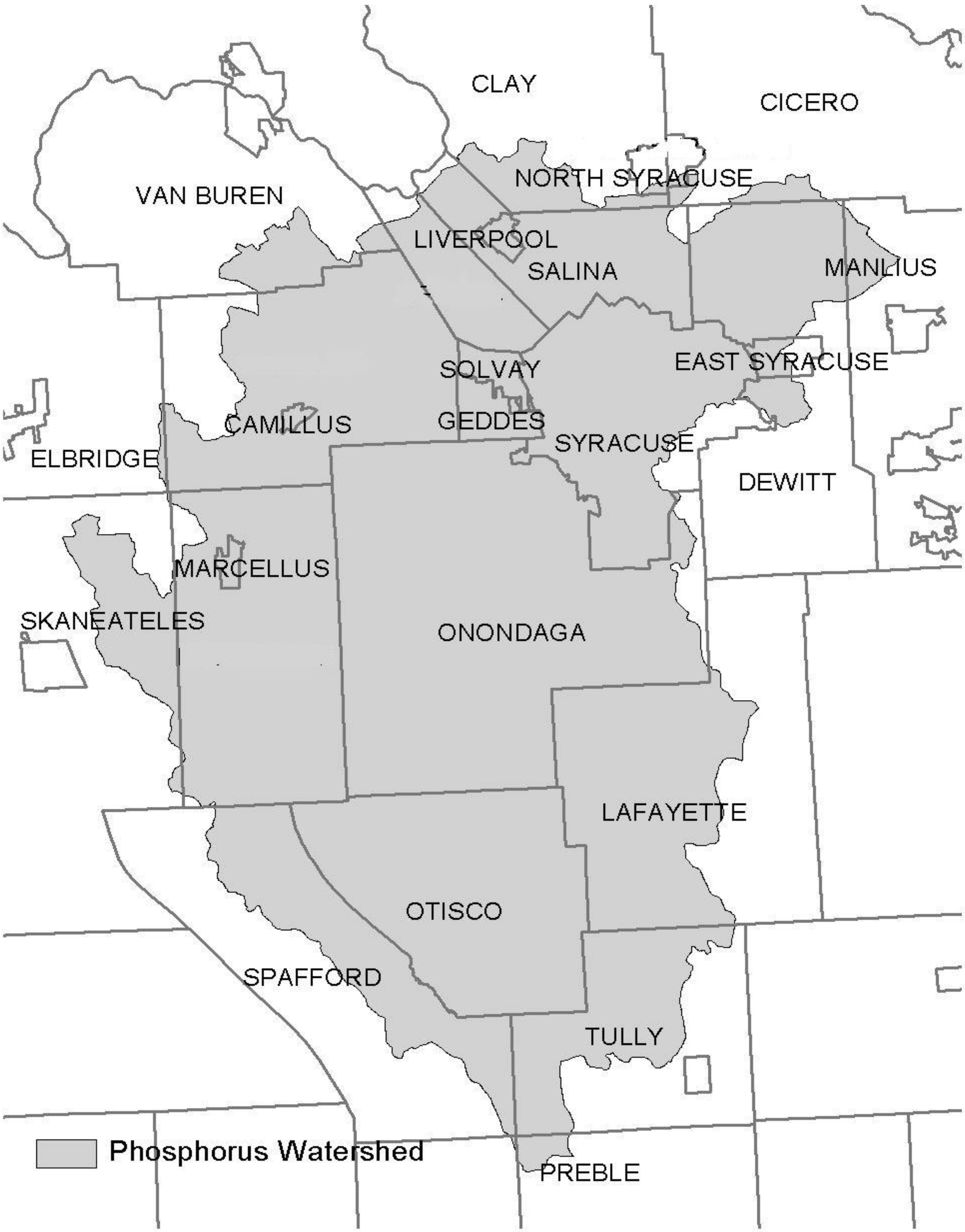


Figure 3 - Greenwood Lake Watershed

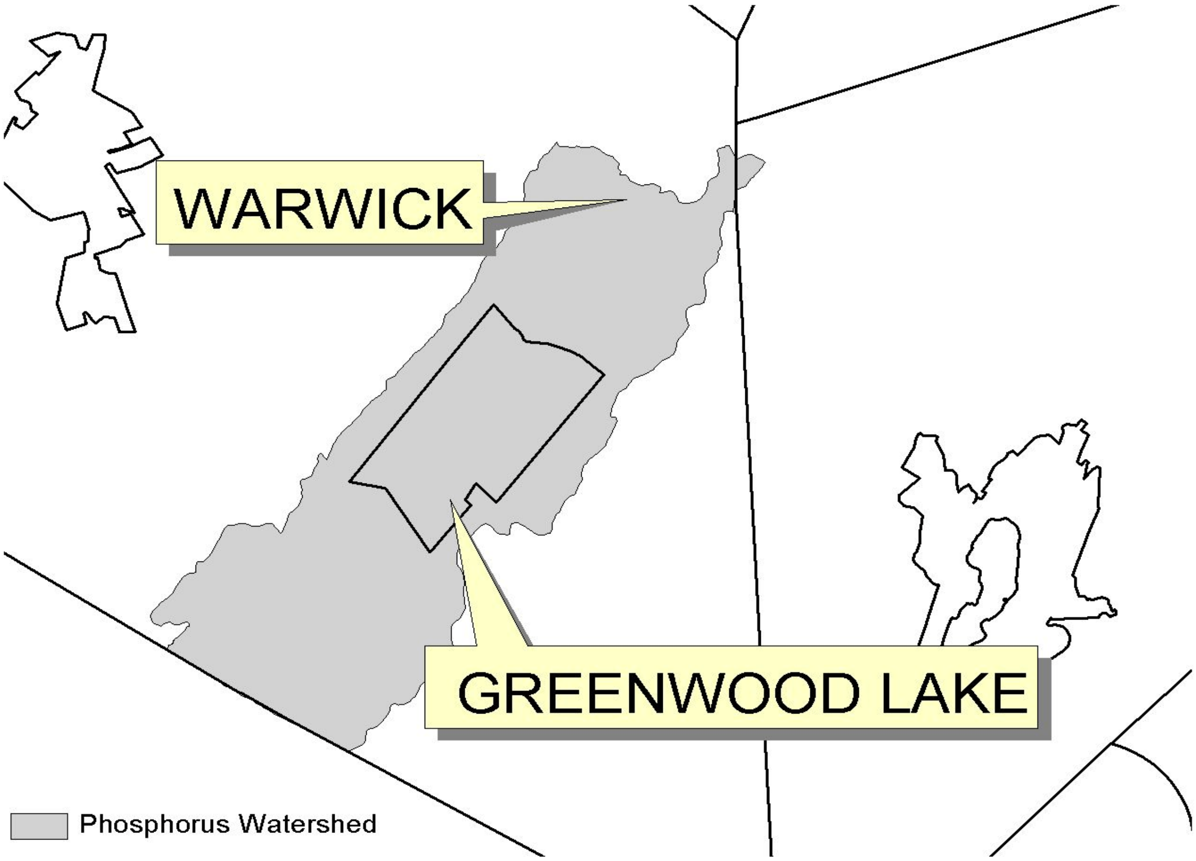


Figure 4 - Oscawana Lake Watershed

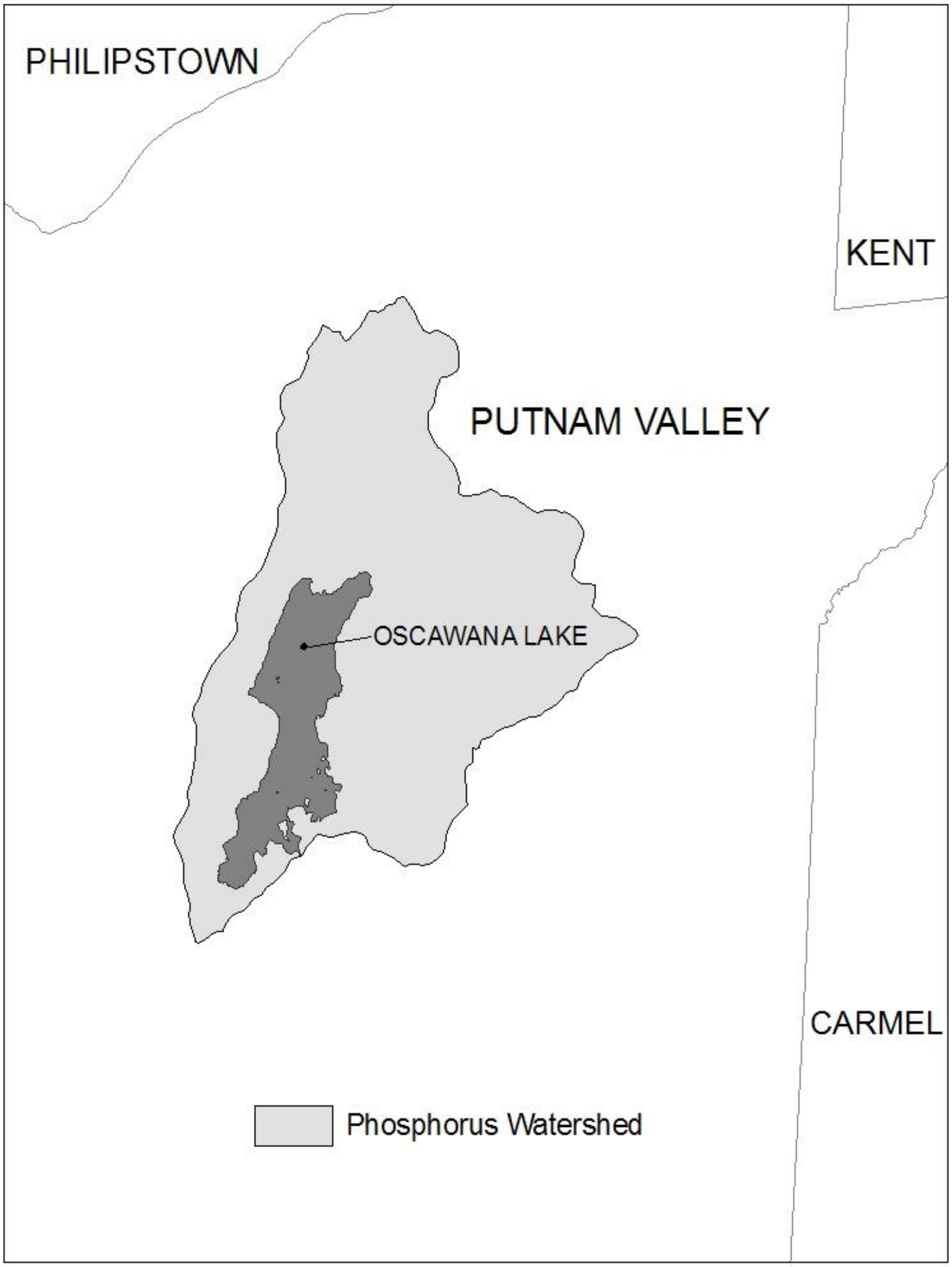
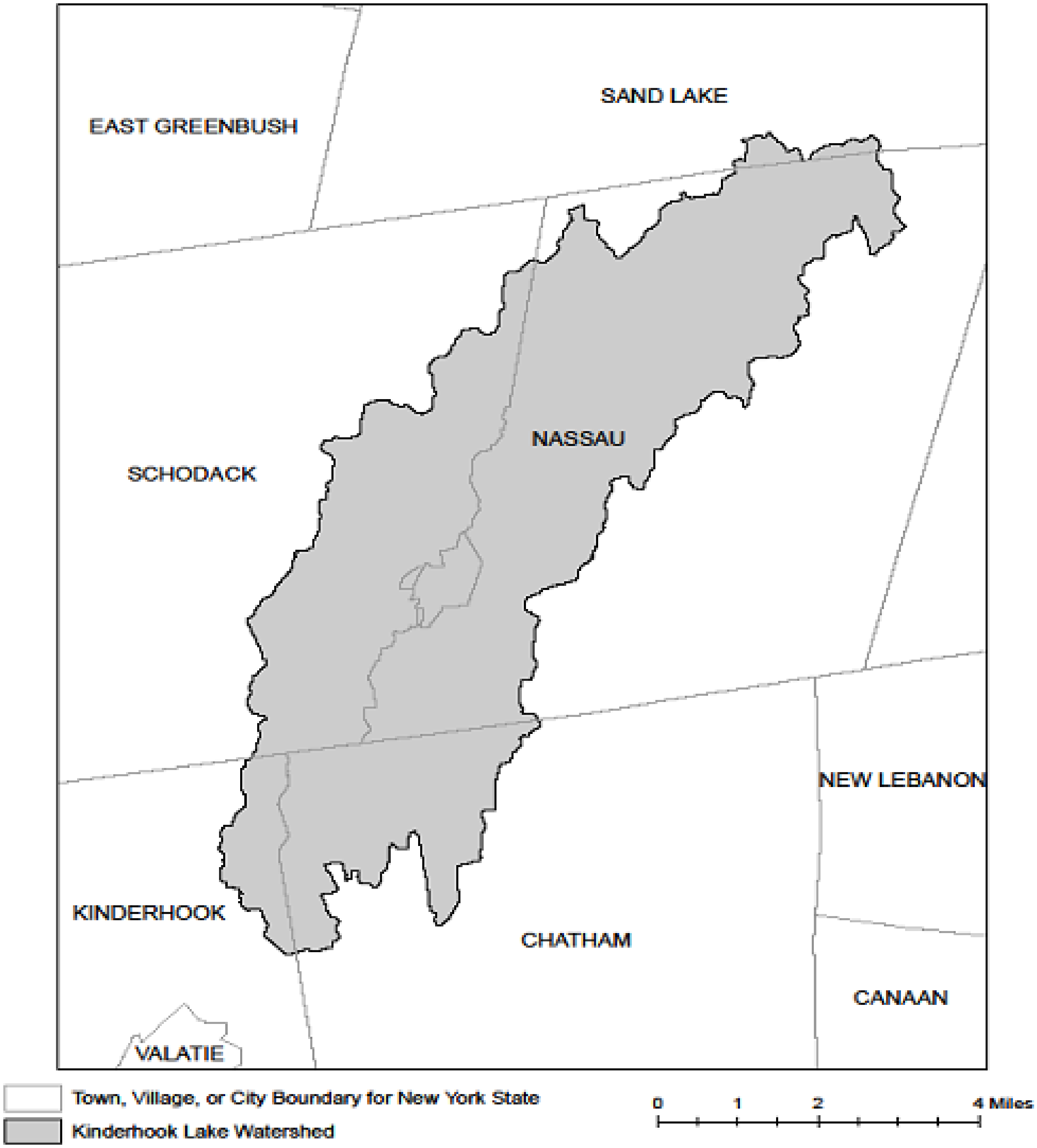


Figure 5 - Kinderhook Lake Watershed



APPENDIX D – Watersheds with Lower Disturbance Threshold

Watersheds where *owners or operators* of construction activities that involve soil disturbances between five thousand (5000) square feet and one (1) acre of land must obtain coverage under this permit.

Entire New York City Watershed that is located east of the Hudson River **-** See Figure 1 in Appendix C

APPENDIX E – 303(d) Segments Impaired by Construction Related Pollutant(s)

List of 303(d) segments impaired by pollutants related to *construction activity* (e.g. silt, sediment or nutrients). The list was developed using ”The Final New York State 2016 Section 303(d) List of Impaired Waters Requiring a TMDL/Other Strategy” dated November 2016. *Owners or operators* of single family home and single family residential subdivisions with 25% or less total impervious cover at total site build-out that involve soil disturbances of one or more acres of land, but less than 5 acres, and *directly discharge* to one of the listed segments below shall prepare a SWPPP that includes post-construction stormwater management practices designed in conformance with the New York State Stormwater Management Design Manual (“Design Manual”), dated January 2015.

COUNTY	WATERBODY	POLLUTANT
Albany	Ann Lee (Shakers) Pond, Stump Pond	Nutrients
Albany	Basic Creek Reservoir	Nutrients
Allegany	Amity Lake, Saunders Pond	Nutrients
Bronx	Long Island Sound, Bronx	Nutrients
Bronx	Van Cortlandt Lake	Nutrients
Broome	Fly Pond, Deer Lake, Sky Lake	Nutrients
Broome	Minor Tribs to Lower Susquehanna (north)	Nutrients
Broome	Whitney Point Lake/Reservoir	Nutrients
Cattaraugus	Allegheny River/Reservoir	Nutrients
Cattaraugus	Beaver (Alma) Lake	Nutrients
Cattaraugus	Case Lake	Nutrients
Cattaraugus	Linlyco/Club Pond	Nutrients
Cayuga	Duck Lake	Nutrients
Cayuga	Little Sodus Bay	Nutrients
Chautauqua	Bear Lake	Nutrients
Chautauqua	Chadakoin River and tribs	Nutrients
Chautauqua	Chautauqua Lake, North	Nutrients
Chautauqua	Chautauqua Lake, South	Nutrients
Chautauqua	Findley Lake	Nutrients
Chautauqua	Hulburt/Clymer Pond	Nutrients
Clinton	Great Chazy River, Lower, Main Stem	Silt/Sediment
Clinton	Lake Champlain, Main Lake, Middle	Nutrients
Clinton	Lake Champlain, Main Lake, North	Nutrients
Columbia	Kinderhook Lake	Nutrients
Columbia	Robinson Pond	Nutrients
Cortland	Dean Pond	Nutrients

303(d) Segments Impaired by Construction Related Pollutant(s)

Dutchess	Fall Kill and tribs	Nutrients
Dutchess	Hillside Lake	Nutrients
Dutchess	Wappingers Lake	Nutrients
Dutchess	Wappingers Lake	Silt/Sediment
Erie	Beeman Creek and tribs	Nutrients
Erie	Ellicott Creek, Lower, and tribs	Silt/Sediment
Erie	Ellicott Creek, Lower, and tribs	Nutrients
Erie	Green Lake	Nutrients
Erie	Little Sister Creek, Lower, and tribs	Nutrients
Erie	Murder Creek, Lower, and tribs	Nutrients
Erie	Rush Creek and tribs	Nutrients
Erie	Scajaquada Creek, Lower, and tribs	Nutrients
Erie	Scajaquada Creek, Middle, and tribs	Nutrients
Erie	Scajaquada Creek, Upper, and tribs	Nutrients
Erie	South Branch Smoke Cr, Lower, and tribs	Silt/Sediment
Erie	South Branch Smoke Cr, Lower, and tribs	Nutrients
Essex	Lake Champlain, Main Lake, South	Nutrients
Essex	Lake Champlain, South Lake	Nutrients
Essex	Willsboro Bay	Nutrients
Genesee	Bigelow Creek and tribs	Nutrients
Genesee	Black Creek, Middle, and minor tribs	Nutrients
Genesee	Black Creek, Upper, and minor tribs	Nutrients
Genesee	Bowen Brook and tribs	Nutrients
Genesee	LeRoy Reservoir	Nutrients
Genesee	Oak Orchard Cr, Upper, and tribs	Nutrients
Genesee	Tonawanda Creek, Middle, Main Stem	Nutrients
Greene	Schoharie Reservoir	Silt/Sediment
Greene	Sleepy Hollow Lake	Silt/Sediment
Herkimer	Steele Creek tribs	Silt/Sediment
Herkimer	Steele Creek tribs	Nutrients
Jefferson	Moon Lake	Nutrients
Kings	Hendrix Creek	Nutrients
Kings	Prospect Park Lake	Nutrients
Lewis	Mill Creek/South Branch, and tribs	Nutrients
Livingston	Christie Creek and tribs	Nutrients
Livingston	Conesus Lake	Nutrients
Livingston	Mill Creek and minor tribs	Silt/Sediment
Monroe	Black Creek, Lower, and minor tribs	Nutrients
Monroe	Buck Pond	Nutrients
Monroe	Cranberry Pond	Nutrients

303(d) Segments Impaired by Construction Related Pollutant(s)

Monroe	Lake Ontario Shoreline, Western	Nutrients
Monroe	Long Pond	Nutrients
Monroe	Mill Creek and tribs	Nutrients
Monroe	Mill Creek/Blue Pond Outlet and tribs	Nutrients
Monroe	Minor Tribs to Irondequoit Bay	Nutrients
Monroe	Rochester Embayment - East	Nutrients
Monroe	Rochester Embayment - West	Nutrients
Monroe	Shipbuilders Creek and tribs	Nutrients
Monroe	Thomas Creek/White Brook and tribs	Nutrients
Nassau	Beaver Lake	Nutrients
Nassau	Camaans Pond	Nutrients
Nassau	East Meadow Brook, Upper, and tribs	Silt/Sediment
Nassau	East Rockaway Channel	Nutrients
Nassau	Grant Park Pond	Nutrients
Nassau	Hempstead Bay	Nutrients
Nassau	Hempstead Lake	Nutrients
Nassau	Hewlett Bay	Nutrients
Nassau	Hog Island Channel	Nutrients
Nassau	Long Island Sound, Nassau County Waters	Nutrients
Nassau	Massapequa Creek and tribs	Nutrients
Nassau	Milburn/Parsonage Creeks, Upp, and tribs	Nutrients
Nassau	Reynolds Channel, west	Nutrients
Nassau	Tidal Tribs to Hempstead Bay	Nutrients
Nassau	Tribs (fresh) to East Bay	Nutrients
Nassau	Tribs (fresh) to East Bay	Silt/Sediment
Nassau	Tribs to Smith/Halls Ponds	Nutrients
Nassau	Woodmere Channel	Nutrients
New York	Harlem Meer	Nutrients
New York	The Lake in Central Park	Nutrients
Niagara	Bergholtz Creek and tribs	Nutrients
Niagara	Hyde Park Lake	Nutrients
Niagara	Lake Ontario Shoreline, Western	Nutrients
Niagara	Lake Ontario Shoreline, Western	Nutrients
Oneida	Ballou, Nail Creeks and tribs	Nutrients
Onondaga	Harbor Brook, Lower, and tribs	Nutrients
Onondaga	Ley Creek and tribs	Nutrients
Onondaga	Minor Tribs to Onondaga Lake	Nutrients
Onondaga	Ninemile Creek, Lower, and tribs	Nutrients
Onondaga	Onondaga Creek, Lower, and tribs	Nutrients
Onondaga	Onondaga Creek, Middle, and tribs	Nutrients

303(d) Segments Impaired by Construction Related Pollutant(s)

Onondaga	Onondaga Lake, northern end	Nutrients
Onondaga	Onondaga Lake, southern end	Nutrients
Ontario	Great Brook and minor tribs	Silt/Sediment
Ontario	Great Brook and minor tribs	Nutrients
Ontario	Hemlock Lake Outlet and minor tribs	Nutrients
Ontario	Honeoye Lake	Nutrients
Orange	Greenwood Lake	Nutrients
Orange	Monhagen Brook and tribs	Nutrients
Orange	Orange Lake	Nutrients
Orleans	Lake Ontario Shoreline, Western	Nutrients
Orleans	Lake Ontario Shoreline, Western	Nutrients
Oswego	Lake Neatahwanta	Nutrients
Oswego	Pleasant Lake	Nutrients
Putnam	Bog Brook Reservoir	Nutrients
Putnam	Boyd Corners Reservoir	Nutrients
Putnam	Croton Falls Reservoir	Nutrients
Putnam	Diverting Reservoir	Nutrients
Putnam	East Branch Reservoir	Nutrients
Putnam	Lake Carmel	Nutrients
Putnam	Middle Branch Reservoir	Nutrients
Putnam	Oscawana Lake	Nutrients
Putnam	Palmer Lake	Nutrients
Putnam	West Branch Reservoir	Nutrients
Queens	Bergen Basin	Nutrients
Queens	Flushing Creek/Bay	Nutrients
Queens	Jamaica Bay, Eastern, and tribs (Queens)	Nutrients
Queens	Kissena Lake	Nutrients
Queens	Meadow Lake	Nutrients
Queens	Willow Lake	Nutrients
Rensselaer	Nassau Lake	Nutrients
Rensselaer	Snyders Lake	Nutrients
Richmond	Grasmere Lake/Bradys Pond	Nutrients
Rockland	Congers Lake, Swartout Lake	Nutrients
Rockland	Rockland Lake	Nutrients
Saratoga	Ballston Lake	Nutrients
Saratoga	Dwaas Kill and tribs	Silt/Sediment
Saratoga	Dwaas Kill and tribs	Nutrients
Saratoga	Lake Lonely	Nutrients
Saratoga	Round Lake	Nutrients
Saratoga	Tribs to Lake Lonely	Nutrients

303(d) Segments Impaired by Construction Related Pollutant(s)

Schenectady	Collins Lake	Nutrients
Schenectady	Duane Lake	Nutrients
Schenectady	Mariaville Lake	Nutrients
Schoharie	Engleville Pond	Nutrients
Schoharie	Summit Lake	Nutrients
Seneca	Reeder Creek and tribs	Nutrients
St.Lawrence	Black Lake Outlet/Black Lake	Nutrients
St.Lawrence	Fish Creek and minor tribs	Nutrients
Steuben	Smith Pond	Nutrients
Suffolk	Agawam Lake	Nutrients
Suffolk	Big/Little Fresh Ponds	Nutrients
Suffolk	Canaan Lake	Silt/Sediment
Suffolk	Canaan Lake	Nutrients
Suffolk	Flanders Bay, West/Lower Sawmill Creek	Nutrients
Suffolk	Fresh Pond	Nutrients
Suffolk	Great South Bay, East	Nutrients
Suffolk	Great South Bay, Middle	Nutrients
Suffolk	Great South Bay, West	Nutrients
Suffolk	Lake Ronkonkoma	Nutrients
Suffolk	Long Island Sound, Suffolk County, West	Nutrients
Suffolk	Mattituck (Marratooka) Pond	Nutrients
Suffolk	Meetinghouse/Terrys Creeks and tribs	Nutrients
Suffolk	Mill and Seven Ponds	Nutrients
Suffolk	Millers Pond	Nutrients
Suffolk	Moriches Bay, East	Nutrients
Suffolk	Moriches Bay, West	Nutrients
Suffolk	Peconic River, Lower, and tidal tribs	Nutrients
Suffolk	Quantuck Bay	Nutrients
Suffolk	Shinnecock Bay and Inlet	Nutrients
Suffolk	Tidal tribs to West Moriches Bay	Nutrients
Sullivan	Bodine, Montgomery Lakes	Nutrients
Sullivan	Davies Lake	Nutrients
Sullivan	Evens Lake	Nutrients
Sullivan	Pleasure Lake	Nutrients
Tompkins	Cayuga Lake, Southern End	Nutrients
Tompkins	Cayuga Lake, Southern End	Silt/Sediment
Tompkins	Owasco Inlet, Upper, and tribs	Nutrients
Ulster	Ashokan Reservoir	Silt/Sediment
Ulster	Esopus Creek, Upper, and minor tribs	Silt/Sediment
Warren	Hague Brook and tribs	Silt/Sediment

303(d) Segments Impaired by Construction Related Pollutant(s)

Warren	Huddle/Finkle Brooks and tribs	Silt/Sediment
Warren	Indian Brook and tribs	Silt/Sediment
Warren	Lake George	Silt/Sediment
Warren	Tribs to L.George, Village of L George	Silt/Sediment
Washington	Cossayuna Lake	Nutrients
Washington	Lake Champlain, South Bay	Nutrients
Washington	Tribs to L.George, East Shore	Silt/Sediment
Washington	Wood Cr/Champlain Canal and minor tribs	Nutrients
Wayne	Port Bay	Nutrients
Westchester	Amawalk Reservoir	Nutrients
Westchester	Blind Brook, Upper, and tribs	Silt/Sediment
Westchester	Cross River Reservoir	Nutrients
Westchester	Lake Katonah	Nutrients
Westchester	Lake Lincolndale	Nutrients
Westchester	Lake Meahagh	Nutrients
Westchester	Lake Mohegan	Nutrients
Westchester	Lake Shenorock	Nutrients
Westchester	Long Island Sound, Westchester (East)	Nutrients
Westchester	Mamaroneck River, Lower	Silt/Sediment
Westchester	Mamaroneck River, Upper, and minor tribs	Silt/Sediment
Westchester	Muscoot/Upper New Croton Reservoir	Nutrients
Westchester	New Croton Reservoir	Nutrients
Westchester	Peach Lake	Nutrients
Westchester	Reservoir No.1 (Lake Isle)	Nutrients
Westchester	Saw Mill River, Lower, and tribs	Nutrients
Westchester	Saw Mill River, Middle, and tribs	Nutrients
Westchester	Sheldrake River and tribs	Silt/Sediment
Westchester	Sheldrake River and tribs	Nutrients
Westchester	Silver Lake	Nutrients
Westchester	Teatown Lake	Nutrients
Westchester	Titicus Reservoir	Nutrients
Westchester	Truesdale Lake	Nutrients
Westchester	Wallace Pond	Nutrients
Wyoming	Java Lake	Nutrients
Wyoming	Silver Lake	Nutrients

APPENDIX F – List of NYS DEC 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	100 Hillside Avenue, Suite 1w White Plains, Ny 10603 Tel. (914) 428 - 2505
4	Albany, Columbia, Delaware, Greene, Montgomery, Otsego, Rensselaer, Schenectady and Schoharie	1150 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	615 ERIE BLVD. WEST SYRACUSE, NY 13204-2400 TEL. (315) 426-7438	615 ERIE BLVD. WEST SYRACUSE, NY 13204-2400 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	270 MICHIGAN AVENUE BUFFALO, NY 14203-2999 TEL. (716) 851-7165	270 MICHIGAN AVENUE BUFFALO, NY 14203-2999 TEL. (716) 851-7070

APPENDIX B:

Notice of Intent (NOI)
MS4 Acceptance Form

NYS Department of Environmental Conservation
Division of Water
625 Broadway, 4th Floor
Albany, New York 12233-3505

MS4 Stormwater Pollution Prevention Plan (SWPPP) Acceptance Form

for

Construction Activities Seeking Authorization Under SPDES General Permit

*(NOTE: Attach Completed Form to Notice Of Intent and Submit to Address Above)

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:
12. MS4 SPDES Permit Identification Number: NYR20A
13. Contact Person:
14. Street Address:
15. City/State/Zip:
16. 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 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. Additional Information

(NYS DEC - MS4 SWPPP Acceptance Form - January 2015)

APPENDIX C:

Contractor's Certification Form
(Sample Form)

Stormwater Pollution Prevention Plan
Contractor or Subcontractor Certification Statement

Newburgh Kingdom Hall of
Jehovah's Witnesses
33 Old Little Britain Road, Town of Newburgh, Orange County, New York

Each Contractor and Subcontractor that will be responsible for installing, constructing, repairing, inspecting and/or maintaining the erosion and sediment control practices and post-construction stormwater management control practices included in the SWPPP is required to complete and sign this Certification Statement before commencing any construction activity at the site. The completed Certification Statement(s) shall be maintained at the construction site.

Contracting Firm Information

Name: ______________________________

Address: ______________________________

____

Telephone & Fax: ______________________________

Contractor's Responsibilities Regarding SWPPP Implementation

____

____

Trained Individual(s) Responsible for SWPPP Implementation[1] (Provide name, title, and date of last training)

____

____

Contractor or Subcontractor Certification[2]

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 Pollutant 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 the State of New York and could subject me to criminal, civil and/or administrative proceedings.

Printed Name: ______________________________

Title/Position: ______________________________

Signature: ____________________ Date: ____________________

[1] A Trained Individual means an employee from a contracting (construction) firm that has received four (4) hours of training, which has been endorsed by the NYSDEC, from a Soil and Water Conservation District, CPESC, Inc. or other NYSDEC endorsed entity, in proper erosion and sediment control principles no later than two (2) years from the date GP-0-20-001 was issued. After receiving initial training, the Trained Individual shall receive four (4) hours of training every three (3) years. This individual will be responsible for implementation of the SWPPP.

[2] Signatory Requirements:

a. For a corporation, this form shall be signed by (i) a president, secretary, treasurer, or vice-president of the corporation in charge of a principle 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 permit application requirements; and where authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.
b. For a partnership or sole proprietorship, this form shall be signed by a general partner or the proprietor, respectively.
c. For a municipality, State, Federal, or other public agency, this form shall be signed by either a principal executive officer or ranking elected official. For purposes of this section, a principal executive officer of a Federal agency includes (i) the chief executive officer of the agency, or (ii) a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g. Regional Administrators of EPA).

APPENDIX D:

Inspection Report
(Sample Form)

Stormwater Pollution Prevention Plan
Inspection Report

Newburgh Kingdom Hall of
Jehovah's Witnesses
33 Old Little Britain Road, Town of Newburgh, Orange County, New York

A Qualified Inspector[1] shall prepare an inspection report subsequent to each and every inspection, as required in Part IV.C of the SPDES General Permit GP-0-20-001. All sections of this report are to be completed.

1. Inspection Information

Inspection number: ____________________

Date and Time of Inspection: ____________________

Weather Conditions: ____________________

Soil Conditions (e.g. dry, wet, saturated): ____________________

2. Qualified Inspector Information

Printed Name: ____________________

Title / Position: ____________________

Signature: ____________________ Date: ____________________

3. On the included site plan, provide a sketch of areas that are disturbed at the time of the inspection and areas that have been stabilized (temporary and/or final) since the last inspection. Provide additional descriptions below if necessary.

____

____

____

____

[1] A Qualified Inspector means a person that is knowledgeable in the principles and practices of erosion and sediment control, such as licensed Professional Engineer, Certified Professional in Erosion and Sediment Control (CPESC), licensed Landscape Architect, or other Department endorsed individual(s). It also means someone working under the direct supervision of the licensed Professional Engineer or licensed 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 an individual performing a site inspection has received four (4) hours of training, endorsed by the Department, from a Soil and Water Conservation District, CPESC, Inc. or other Department endorsed entity in proper erosion and sediment control principles no later than two (2) years from the date GP-0-15-002 was issued. After receiving the initial training, an individual working under the direct supervision of the licensed Professional Engineer or licensed Landscape Architect shall receive four (4) hours of training every three (3) years. Note: Inspections of any post-construction stormwater management practices that include structural components, such as a dam for an impoundment, shall be performed by a licensed Professional Engineer.

4. **In the following table, provide a description of the condition of the runoff at all points of discharge from the construction site, including conveyance systems (pipes, culverts, ditches, etc.) and overland flow. Identify any discharges of sediment from the construction site. Use additional sheets if necessary.**

Description of Discharge Point	Condition of Runoff	Sediment Discharge Noted
		yes / no Estimated Quantity:
		yes / no Estimated Quantity:
		yes / no Estimated Quantity:
		yes / no Estimated Quantity:

5. **For all discharge points where sediment discharge has been noted in the above table, provide detailed corrective actions that are required. Use additional sheets if necessary.**

6. **In the following table, provide checkmarks in the appropriate columns to indicate the condition of all erosion and sediment control practices at the site.**

Erosion & Sediment Control Practice	Not Applicable	Functioning as designed	Needs repair/maintenance	Not installed properly
Stabilized construction entrance				
Temporary parking areas				
Construction vehicle wash areas				
Silt fence				
Temporary swales and berms				
Stone check dams				
Slope protection measures				
Dewatering operations				
Sediment traps				
Inlet protection measures				
Soil stockpiles				
Dust control measures				
Other:				
Other:				

7. **For all erosion and sediment control practices identified in the above table as "needs repair or maintenance" or "not installed properly", provide detailed corrective actions that are required. Use additional sheets if necessary.**

8. In the following table, indicate the current phase of construction of all post-construction stormwater management practices and identify all construction that is not in conformance with the SWPPP and technical standards.

SWM Practice	Current Phase of Construction	Items not in conformance with the SWPPP

9. For all post-construction stormwater management practices which are identified in the above table as including "items not in conformance with the SWPPP", provide detailed corrective action(s) that are required to correct the deficiencies. Use additional sheets if necessary.

APPENDIX E:

Record of Stabilization and Construction Activity Dates (Sample Form)

Site Stabilization & Construction Activities Dates

Newburgh Kingdom Hall of
Jehovah's Witnesses
33 Old Little Britain Road, Town of Newburgh, Orange County, New York

Note: This form shall be completed by the Contractor and shall remain as part of the Stormwater Pollution Prevention Plan that is to remain at the project site for the duration of construction.

A record of dates when major grading activities occur, when construction activities temporarily or permanently cease on a portion of the site, and when stabilization measures are initiated shall be maintained until final site stabilization is achieved and the Notice of Termination is filed.

MAJOR GRADING ACTIVITIES:

Page ___of___

Description of Activity: ____________________
Contractor: ____________________
Location: ____________________
Start Date: ____________________ Finish Date: ____________________

Description of Activity: ____________________
Contractor: ____________________
Location: ____________________
Start Date: ____________________ Finish Date: ____________________

Description of Activity: ____________________
Contractor: ____________________
Location: ____________________
Start Date: ____________________ Finish Date: ____________________

Description of Activity: ____________________
Contractor: ____________________
Location: ____________________
Start Date: ____________________ Finish Date: ____________________

Description of Activity: ____________________
Contractor: ____________________
Location: ____________________
Start Date: ____________________ Finish Date: ____________________

Description of Activity: ____________________
Contractor: ____________________
Location: ____________________
Start Date: ____________________ Finish Date: ____________________

APPENDIX F:

Notice of Termination (NOT)
(Sample Form)

New York State Department of Environmental Conservation
Division of Water
625 Broadway, 4th Floor
Albany, New York 12233-3505
(NOTE: Submit completed form to address above)

NOTICE OF TERMINATION for Storm Water Discharges Authorized under the SPDES General Permit for Construction Activity

Please indicate your permit identification number: NYR ___ ___ ___ ___ ___ ___

I. Owner or Operator Information

1. Owner/Operator Name:

2. Street Address:

3. City/State/Zip:

4. Contact Person: | 4a.Telephone:

5. Contact Person E-Mail:

II. Project Site Information

5. Project/Site Name:

6. Street Address:

7. City/Zip:

8. County:

III. Reason for Termination

9a. ☐ All disturbed areas have achieved final stabilization in accordance with the general permit and SWPPP.
***Date final stabilization completed** (month/year): ____

9b. ☐ Permit coverage has been transferred to new owner/operator. Indicate new owner/operator's permit identification number: NYR ___ ___ ___ ___ ___ ___
(Note: Permit coverage can not be terminated by owner identified in I.1. above until new owner/operator obtains coverage under the general permit)

9c. ☐ Other (Explain on Page 2)

IV. Final Site Information:

10a. Did this construction activity require the development of a SWPPP that includes post-construction stormwater management practices? ☐ yes ☐ no (If no, go to question 10f.)

10b. Have all post-construction stormwater management practices included in the final SWPPP been constructed?
☐ yes ☐ no (If no, explain on Page 2)

10c. Identify the entity responsible for long-term operation and maintenance of practice(s)?

____

NOTICE OF TERMINATION for Storm Water Discharges Authorized under the SPDES General Permit for Construction Activity - continued

10d. Has the entity responsible for long-term operation and maintenance been given a copy of the operation and maintenance plan required by the general permit? ☐ yes ☐ no

10e. Indicate the method used to ensure long-term operation and maintenance of the post-construction stormwater management practice(s):

☐ Post-construction stormwater management practice(s) and any right-of-way(s) needed to maintain practice(s) have been deeded to the municipality.

☐ Executed maintenance agreement is in place with the municipality that will maintain the post-construction stormwater management practice(s).

☐ For post-construction stormwater management practices that are privately owned, the deed of record has been modified to include a deed covenant that requires operation and maintenance of the practice(s) in accordance with the operation and maintenance plan.

☐ For post-construction stormwater management practices that are owned by a public or private institution (e.g. school, college, university), or government agency or authority, policy and procedures are in place that ensures operation and maintenance of the practice(s) in accordance with the operation and maintenance plan.

10f. Provide the total area of impervious surface (i.e. roof, pavement, concrete, gravel, etc.) constructed within the disturbance area? ______________________ (acres)

11. Is this project subject to the requirements of a regulated, traditional land use control MS4? ☐ yes ☐ no (If Yes, complete section VI - "MS4 Acceptance" statement

V. Additional Information/Explanation:

(Use this section to answer questions 9c. and 10b., if applicable)

VI. MS4 Acceptance - MS4 Official (principal executive officer or ranking elected official) or Duly Authorized Representative (Note: Not required when 9b. is checked -transfer of coverage)

I have determined that it is acceptable for the owner or operator of the construction project identified in question 5 to submit the Notice of Termination at this time.

Printed Name:

Title/Position:

Signature:	Date:

NOTICE OF TERMINATION for Storm Water Discharges Authorized under the SPDES General Permit for Construction Activity - continued

VII. Qualified Inspector Certification - Final Stabilization:
I hereby certify that all disturbed areas have achieved final stabilization as defined in the current version of the general permit, and that all temporary, structural erosion and sediment control measures have been removed. Furthermore, I understand that certifying false, incorrect or inaccurate information is a violation of the referenced permit and the laws of the State of New York and could subject me to criminal, civil and/or administrative proceedings.
Printed Name:
Title/Position:

Signature:	Date:

VIII. Qualified Inspector Certification - Post-construction Stormwater Management Practice(s):
I hereby certify that all post-construction stormwater management practices have been constructed in conformance with the SWPPP. Furthermore, I understand that certifying false, incorrect or inaccurate information is a violation of the referenced permit and the laws of the State of New York and could subject me to criminal, civil and/or administrative proceedings.
Printed Name:
Title/Position:

Signature:	Date:

IX. Owner or Operator Certification
I hereby certify that this document was prepared by me or under my direction or supervision. My determination, based upon my inquiry of the person(s) who managed the construction activity, or those persons directly responsible for gathering the information, is that the information provided in this document is true, accurate and complete. Furthermore, I understand that certifying false, incorrect or inaccurate information is a violation of the referenced permit and the laws of the State of New York and could subject me to criminal, civil and/or administrative proceedings.
Printed Name:
Title/Position:

Signature:	Date:

(NYS DEC Notice of Termination - January 2010)

APPENDIX G:

Geotechnical Data and Information

GIFFORD ENGINEERING
Geotechnical and Geoenvironmental Services

FINAL GEOTECHNICAL ENGINEERING REPORT

NEW JEHOVAH WITNESSES WORSHIP CENTER

located at
33 Old Little Britain Road
Newburgh, NY 12550

prepared for:
GPI Engineering
Attn: Mr. John Montagne
80 Wolf Rd, Suite 300
Albany, NY 12205

prepared by:
Gifford Engineering
Gregory P Gifford PhD PE
May 2020
File No. 1960

STATE OF NEW YORK
063178
LICENSED PROFESSIONAL ENGINEER
15 May 2020

FINAL GEOTECHNICAL ENGINEERING REPORT

New Jehovah Witnesses Worship Center
33 Old Little Britain Road
Newburgh, NY 12550

TABLE OF CONTENTS

INTRODUCTION:

This is a report on a subsurface investigation for the proposed Jehovah's Witnesses Worship Center, at 33 Old Little Britain Rd, Town of Newburgh, NY. A total of 11 soil borings and geoprobe soundings have been completed by Martin Geo Environmental, located in Belchertown, MA. A location diagram has been prepared and is included with the boring, sounding, and well logs in the appendix. Services are outlined in my proposal dated November 6, 2019 as authorized by you.

Two buildings are planned on the site. The building construction will be slab on grade with a wood timber frame. An 18 page document entitled Structural Calculations was provided by the client and reviewed. The allowable soil bearing pressure used was 2 ksf, (1 TSF). There will be an access driveway off Old Little Britain Rd and centrally located parking lot. Two stormwater management areas are planned along with two septic systems. Two infiltration wells were installed and tested at the management areas. Results are included in the appendix. The septic system investigation and design will be performed by others.

Environmental issues are beyond the scope of this report and should be addressed by a qualified environmental firm.

This report is intended to; 1) present the findings obtained during the investigation, 2) discuss the analysis of the data gathered during the investigation, and 3) make recommendations for the design and construction of the feasible foundation systems as well as the earthwork requirements of the project.

SUBSURFACE INVESTIGATION PROCEDURES:

The borings were drilled with a track-mounted geoprobe unit advancing a 3.25-inch inside diameter hollow-stem auger. Continuous samples were obtained to 12 feet by the split-spoon sampling technique in conjunction with standard penetration testing as specified by ASTM D 1586. The number of blows required to advance the sampler two feet, in six-inch increments is recorded on the boring logs. The blow count or N value (blows per foot) is numerically equal to the summation of the middle two. The Scope of Services provided by the client indicates that a minimum of 6 borings are required unless the geotechnical engineer documents the decision to perform less. The geotechnical engineer hereby deems the use of 4 structure borings and provide additional investigation as geoprobe soundings as appropriate at this site.

The parking lot and infiltration soundings were advanced with the geoprobe unit. The lucite tube lined probe is advanced with a hammer drill operation. The tube samples are extracted then used to prepare logs of the soundings.

Samples were examined at the boring and sounding sites, sealed in jars or tubes, and transported to the laboratory. The samples were then visually classified and subjected to appropriate testing.

The water level within the borehole and sounding was measured at various times during the investigation. The depth to the water level is affected by boring and sounding procedures and may require some period of time to equilibrate. The measurements of water level are given on the logs along with the time. All boreholes were filled with cuttings or wells were installed prior to leaving the site. There may be minor settlement of the boreholes with time, the client should repair this settlement for safety.

The site was also visited by the geotechnical engineer. The borehole locations had been assigned by the client and were laid out by the geotechnical engineer.

LABORATORY WORK:

In addition to the field identification recorded by the drillers, all samples were examined by a geotechnical engineer. The samples were visually classified using the Unified Soil Classification System as specified by ASTM D 2487. The resulting classification symbol and description are indicated on the soil boring logs. Because the visual classification technique is approximate, variations of a few percent of a particular grain size can result in an inaccurate classification. When inaccurate classification would have a large impact on the recommendations reported herein, further testing was performed or is recommended.

Grain size distribution was measured on samples of granular material by washed mechanical techniques as specified by ASTM D 421, D 422, and D 1140 and the results are included in the appendix.

SITE EVALUATION:

The site is situated to the south of Old Little Britain Rd and west of the existing Kingdom Hall of Jehovah's Witnesses facility. The site is heavily wooded with a dirt road entering the site from Old Little Britain Rd. There is a Central Hudson Gas and Electric facility situated to the south of the site and mixed use development to the west and north.

There is a relatively flat area around this dirt road, where the buildings and parking lot are to be constructed. The stormwater management areas are planned on the hillsides that slope down from this flat area. The overall change in grade across the portion of the site to be developed is estimated at 15 to 20 feet sloping generally downhill to the west, south, and east. Adequate design of drainage will be required to handle runoff.

SUBSURFACE EVALUATION:

The boring and sounding logs indicate the specific subsurface conditions at each boring and sounding location. The subsurface conditions can vary significantly between locations. To aid in the evaluation, a general description of the subsoil conditions has been prepared.

The four structure borings were drilled near the building corners as shown on the boring location diagram. The topsoil varies between 4 and 8 inches thick.

Subjacent to the topsoil is a till like soil comprised of moist to wet silt with some sand and trace gravel and clay with occasional rock fragments. This layer extends to a depth of 12 feet, where the geoprobe refused further advancement of the sampler. The driller reported that he thought this refusal was caused by very dense till rather than rock. Based on blow counts this layer is loose to very dense.

Similar soil conditions were encountered at the soundings that were advanced at the parking lot and stormwater management areas. The silt soil is frost susceptible and will heave during cold weather and settle during spring thaw, which will shorten pavement life. A substantial drainage layer under the pavement will help increase the pavement life.

Based on the testing performed and experience with similar soils, the following design parameters are recommended.

	Unit Weight (pcf)		Friction	Unc. compressive
Material	Moist	Saturated	angle (degrees)	strength (psf)
Silt Till	110	125	26	---

SUBSURFACE WATER:

The water level measurements taken during the boring investigation are presented on the boring and sounding logs. This information is coupled with the estimated degree of saturation of the samples to yield an approximate groundwater level. The depth to groundwater was encountered between 5 and 8 feet below the ground surface.

Low permeability soils may result in perched water tables at elevations above the phreatic water surface. The flow rates and quantity of water associated with these water tables will however be small. Seasonal changes in the phreatic water surface and perched water tables are expected due to variable precipitation and runoff.

GEOTECHNICAL CONSIDERATIONS:

This section addresses the geotechnical considerations for the sitework, foundations, and construction procedures which are recommended. Professional services for this investigation are reported and recommendations made in accordance with generally accepted geotechnical engineering practice. An attachment entitled “Important Information about Your Geotechnical Engineering Report” is prepared by the ASFE, Association of Engineering Firms Practicing in the Geosciences should be reviewed and understood. It contains guidelines and outlines the context in which the report should be used.

It should be understood that this report is based on information provided to us and the results of a limited number of borings and soundings. The borings and soundings were advanced at specific locations and the overburden soils sampled at limited and specific depths. Conditions are known at these locations to the depths investigated. Conditions may vary at other locations and depths and the differences may impact the conclusions reached and recommendations made. For these reasons it is strongly recommended that Gifford Engineering, GE, be retained to provide construction observation and testing services. No warranty, expressed or implied is made.

As the design progresses and plans become finalized, GE should be afforded the opportunity to review them and evaluate the effects that changes made during the design may have on the recommendations made herein. There may have been interpretations of the geotechnical report during the design, which may or may not have been accurate. Interpretations should be coupled with correspondence directed to the geotechnical engineer to avoid confusion.

The subsurface conditions revealed during this investigation are adequate to support the proposed construction. The buildings can be supported on conventional shallow reinforced concrete footings and frost walls. Infiltration rates are provided to aid design of the stormwater management system.

Per Chapter 16 of the New York State Building Code, the site class is D. The following values are provided at the USGS website, confirmed in Section 1615 of the Code, and are recommended for design. The soils encountered are not considered liquefiable in the event of an earthquake.

	Short Period (0.2 Sec)	Long Period (1.0 Sec)
Mapped Spectral Response Acceleration	21.3%g	6.7%g
Site Coefficient	1.6	2.4
Maximum Earthquake Spectral Response	34.1%g	16.1%g
Design Earthquake Spectral Response	22.8%g	10.7%g

Sitework:

Prior to foundation or pavement placement the following remedial actions are recommended for a quality product. The proposed areas of construction should be cleared and grubbed of all organic soils, vegetation, and root matter. Any fill material which was not placed in a controlled manner should be removed from the site. The geotechnical engineer should inspect the subgrades of all pavements, foundations, and slabs. He may require proof rolling of the subgrade with a minimum 10-ton static weight vibratory roller. A heavily loaded truck can be used instead of the roller if approved. The purpose of the proof rolling is to compact the subgrade and locate any soft areas. All soft areas should be removed and replaced with a controlled fill soil. The proof rolling should be witnessed by the geotechnical engineer to evaluate its effectiveness and make recommendations for stabilization.

The following stabilization techniques may be recommended depending upon the site specifics encountered. If necessary, a stabilization technique will be decided by the geotechnical engineer during a site visit to observe subgrade conditions.

The first alternative stabilization technique is most commonly used in these soils and involves a separation or reinforcement geotextile applied to the undercut subgrade and covered with a layer of clean granular fill. Either ¾ inch crushed stone or NYSDOT 733-11, 733-14, or 733-15 are appropriate for use. A geotextile such as Mirafi 500X may be necessary to separate native soils from the fill material. The thickness of this layer usually varies between 1 and 3 feet as dictated at the site. With good weather conditions and proper construction methods, this layer thickness will most likely be on the lower end of the range. The soil should be compacted with a vibratory roller to obtain a stable working mat. It may be necessary to limit vibration during compaction of initial lifts.

A second alternative stabilization technique involves rolling or pounding coarse fill into the upper reaches of a soft spongy subgrade. This coarse material could be brick waste, slag, cobbles, or crushed rock and must be completely embedded to ensure minimal void spaces. The fill material must be processed to have a maximum grain size of 4 inches, less than 5 percent fines, and must be approved for use by the engineer.

A third alternative stabilization technique involves lowering the groundwater table thereby increasing the stability of the subgrade. The dewatering system may employ temporary or permanent drainage. Tile drains or pump dewatering system may be designed to lower the water table. The contractor's proposed dewatering plan must be submitted for review and approval by the engineer prior to installation.

Slopes:

The site designer should ensure that all manmade slopes, including cuts and fills, should be inclined at no steeper than 3H to 1V, (Horizontal to Vertical). If steeper inclinations are necessary due to the design, the geotechnical engineer should review and confirm that the planned slopes will be stable.

Fills that are to be constructed on slopes and exceed 3 feet deep should be placed on a minimum 12 inch thick layer of freely draining granular soil. A separation geotextile such as Mirafi 160N may be needed to separate the fill from native soils below. The drainage layer will allow runoff to drain freely under the fill and not act like a dam. The use of perforated piping within the drainage layer should be considered, if expected flow volumes warrant more drainage.

For fills that exceed 5 feet deep, the geotechnical engineer should review the planned topography and decide if additional measures are needed to ensure stability of the fill and underlying soils. A keyway, scarification, or other means may be necessary.

Infiltration Test Results:

Two infiltration tests were conducted in accordance with NYSDEC Stormwater Design Manual and ASTM D 4044. A 4-inch diameter PVC pipe was placed in a borehole at the desired depth, sealed around the bottom with bentonite, and backfilled with spoils. After saturation, water was added to the pipe and the time for the water level in the well to drop was recorded. This procedure was repeated 4 times at each well. The results vary between 1.75 and 2.5 inches per hour. The test results are appended.

Controlled Fill:

A controlled fill can be constructed of granular fill in horizontal lifts not exceeding 9 to 12 inches in loose thickness. If hand operated compaction equipment is used, lift thickness should be limited to 4 to 6 inches. All lifts should maintain a minimum density of 95 percent modified Proctor density, as specified by ASTM D 1557. A material that meets the requirements of NYSDOT 733-04, or 733-11, or 733-14, (formerly NYSDOT 203-2.02 type B or C or 304-2.02) is recommended. The use of crushed stone NYSDOT 703-02 is an acceptable alternative. Excerpts from the NYS Standard Specifications for these materials are included in the appendix. All proposed fill soils must be submitted for review and approval by the engineer.

Backfill which has been designed to resist structural loading such as pavements or lateral forces should also meet the compaction requirements above. The requirements of compaction for fill beneath ancillary areas can be lessened to 90 to 92 percent of the cited standard, if desired.

The native silt soils are not suitable for use as controlled fill. The moisture content should be within +/- 2 percent of optimum to allow compaction that meet the recommended compaction. Wet silt soils act like slurries and must be dried to stabilize and become compactable. The high silt content often results in very difficult compaction and can be difficult even during good warm weather conditions. Excess soil materials can be used in green space or ancillary areas without structural loading.

A Quality Assurance, Quality Control, and Special Inspection program should be developed and overseen by the geotechnical engineer of record. Conductance of this quality assurance program is required for proper execution and confirmation that the recommendations contained in this report are followed. Conductance of this program does not relieve the contractor of his responsibility to construct the project in accordance with the plans and specifications, Building Code, and normal industry standards.

Foundation Recommendation:

It is recommended that the proposed construction be supported by spread or continuous footings founded on virgin inorganic soils or a controlled structural fill founding on virgin soils. This controlled fill should extend in all directions horizontally from the edge of footing a dimension at least as great as the undercut dimension.

Care should be exercised during excavation so as not to loosen the subgrade soils. If loosened the soil should be recompacted then proof rolled or removed and replaced with controlled fill or lean concrete.

Footings can be designed for a maximum net allowable bearing capacity of 1.0 TSF when bearing at least 4 feet below existing grade. It is recommended that load bearing continuous footings should be a minimum 2.0 feet wide and isolated pier footings a minimum 3.0 feet wide.

Plan S-101 shows a 2 feet wide reinforced concrete footing as a typical detail. The frost wall appears to be concrete block. If the desired design bearing capacity is 3 ksf (1.5 TSF) the following recommendations should be followed. In order to attain this bearing pressure, the footing must be undercut by a minimum of 12 inches and excavated 2 feet wider and longer than the footing width and length (in plan dimension). The undercut subgrade should be compacted and attain a minimum 95 percent of maximum density per ASTM D1557, modified Proctor. The undercut should be lined with a geotextile such as Mirafi 160N and backfilled with compacted ¾ inch crushed stone. This will create a sub footing that must be centered on the footing.

Exterior footings should maintain a minimum 4.0 feet of cover from frost action. Interior footings should bear at least 2.0 feet below finished grade.

All foundation walls and particularly ones which retain soil should be drained. A tile drain can be placed at the footing level and pitched to daylight or a drainage structure. An acceptable tile drain consists of a 4-inch diameter perforated pipe, surrounded with at least 6 inches of freely draining gravel or washed stone, all wrapped in a drainage geotextile such as Geotex 801 or Mirafi 160N.

A controlled freely draining backfill is recommended. This material should extend a horizontal dimension at least two-thirds the depth of the backfill. The surface material and grade should allow minimal water infiltration. The properly backfilled foundation wall can be designed to resist a linearly increasing soil pressure (equivalent hydrostatic) equal to the unit weight of the soil times the appropriate coefficient in psf per vertical foot. For resistance to sliding, a coefficient of friction for the interface between native soils and concrete of 0.4 is recommended.

Recommended lateral earth pressure coefficients based on Rankine Theory are presented. Values are ultimate and a factor of safety should be applied, particularly to passive. Full passive resistance is mobilized only after significant movement.

Soil	At Rest	Active	Passive
Silt	0.56	0.39	2.57

Slab On Grade:

The floor slabs can be designed to rest on virgin inorganic material or on controlled fill resting on these materials. It is recommended that a minimum 8-inch thick layer of freely draining granular material such as NYS DOT 733.14 (formerly 304-2.02), be compacted beneath the slabs. This layer will provide drainage, a capillary break, and more uniform bearing. This layer should be designed to drain to the perimeter footing drain. Proof rolling is recommended prior to placement of the granular material.

For exterior slabs the thickness of the subbase material should be thickened to 12 inches. It is important to note that the subbase is used for drainage so there must be provisions to allow drainage to daylight or a drainage structure. If a “box out” is used it must have outlets at no more than 50 feet spacing.

The use of a vapor barrier should be evaluated by the architect or engineer. If used, it is recommended that a sturdy membrane be used to avoid damage during construction.

The possibility of slab curl should be minimized by appropriate design and construction techniques. Shrinkage and curling of the slab must be controlled. This problem is caused by differential shrinkage of the concrete and may be partially related to soil conditions. It should be addressed by the architect or engineer. The American Concrete Institute presents recommendations for design and control of floor slabs, which may be useful.

Pavement Thickness Design:

The soils encountered are frost susceptible and will shorten the expected pavement life. Based on a design life of 20 years and 10,000 ESALs recommended thickness of pavement and subbase is given. A minimum 8-inch thick subbase comprised of NYSDOT 304.2.02A Type 2 Crusher Run should be placed over a geotextile such as Mirafi 500X. The asphalt base course of 3-inch thickness and top course of 1.5-inch thickness are recommended.

CONSTRUCTION RECOMMENDATIONS:

All excavations of more than 4 feet should be braced or laid back as necessary to prevent sloughing of the sidewalls. Site safety as dictated by regulating organizations such as OSHA and the NYS Department of Labor should be addressed and maintained during construction by the contractors.

Special inspections and reports that are required by Chapter 17 of the NYS Building Code should be performed by a qualified engineer to ensure compliance with the recommendations of this report.

Excavations adjacent to existing foundations or improvements should not extend below them without adequate sheeting, bracing, and/ or underpinning having been installed. This should be designed and stamped by a registered professional engineer.

Temporary dewatering may be necessary in excavation or low areas if groundwater is encountered or during wet periods. Water from precipitation should be removed from excavations immediately rather than allowed to percolate into the subgrade.

Temporary access roadways may be necessary during wet or thaw weather. This may include geofabric and/or coarse fill.

All subgrades and fill material should be kept from freezing during construction. Water, snow, and ice should not be allowed to collect in low areas and excavations.

Some obstacles including boulders or rubble may be encountered in excavations. If necessary, rippers, breaking tools, and drilling and blasting may be required to remove such materials.

All proof rolling operations should be witnessed by a qualified geotechnical engineer. All subgrades should be inspected by a qualified geotechnical engineer.

APPENDIX:

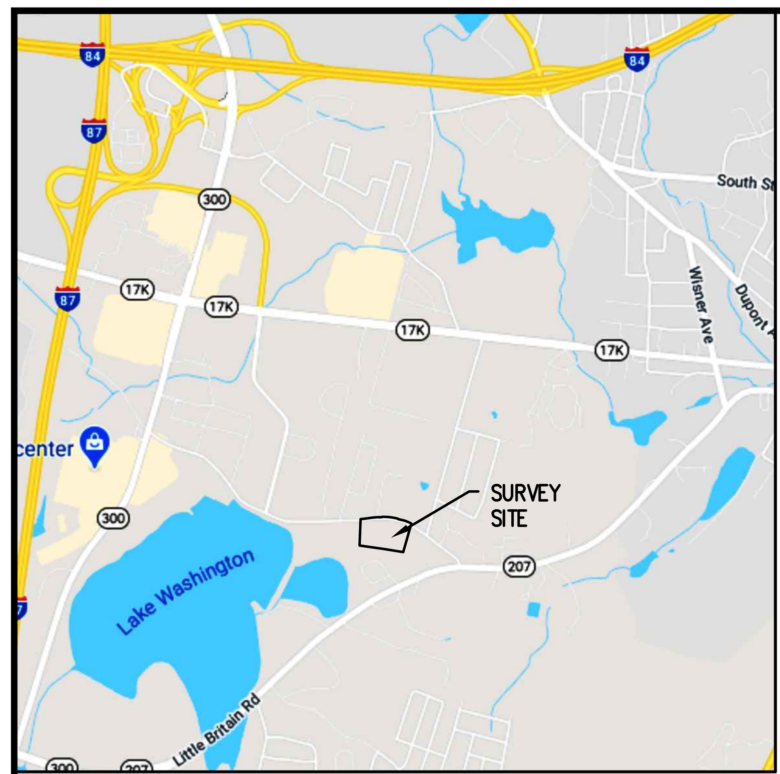
General Qualifications
Location Diagram
Boring and Sounding Logs
Laboratory Test Results
Infiltration Test Results
NYS DOT Standard Specifications Excerpts
SEAC Design Maps Summary Report
General Notes
Unified Soil Classification System
Important Information About Your Geotechnical Engineering Report

GENERAL QUALIFICATIONS:

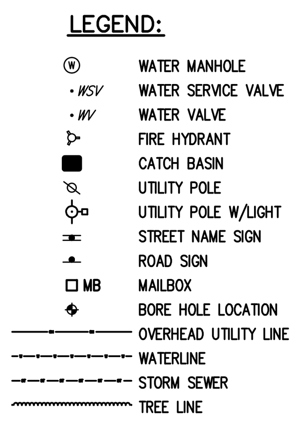
This report has been prepared to aid in the evaluation of this property and to assist the architect and/or engineer in the design of this project. The scope of the project and location described herein, and description of the project represents my understanding of the significant aspects relevant to soil and foundation characteristics. In the event that any changes in the design or location of the proposed facilities, as outlined in this report, are planned, the geotechnical engineer should be informed so the changes can be reviewed and the conclusions of this report modified in writing, if necessary.

It is recommended that all construction operations dealing with earthwork and foundations be inspected by an experienced geotechnical engineer to ensure that the design requirements are fulfilled in the actual construction. If desired, the geotechnical engineer would review the plans and specifications when they have been prepared to ensure that the geotechnical recommendations have been incorporated into the design, plans, and specifications.

The analysis and recommendations submitted in this report are based upon the data obtained from the soil borings and/or test pits performed at the locations indicated on the location diagram and from any other information discussed in the report. This report does not reflect any variations which may occur between these locations. In the performance of subsurface investigations, specific information is obtained at specific locations at specific times. However, it is a well-known fact that variations in soil and rock conditions exist on most sites between subsurface investigation locations and also such situations as groundwater conditions vary from time to time. The nature and extent of variations may not become evident until the course of construction. If variations then appear evident, it will be necessary for a reevaluation of the recommendations of this report after performing on-site observations during the construction period and noting the characteristics of any variations.



LOCATION MAP



GENERAL NOTES:

(1) The source of title in and to 33 Old Little Britain Road (as of the date of this map) is vested in: Woodland Views Corp., as set forth in a deed dated February 20, 2018 given by George F. Stradar and Stewart P. Glenn and recorded in the Orange County Clerk's Office on February 23, 2018 in Liber 14366 Cp 1494., and is known as Tax Parcel No. (S.B.L.) 97–3–13.

(2) The field survey for the property shown hereon was completed using traditional methods, electronic total station instruments and global positioning system technology. The field survey way completed on February 27, 2020.

(3) The boundary line dimensions shown hereon form a mathematically closed figure within ±0.1 foot.

(4) This survey is prepared with the benefit of review of Title No.: 3020–988636, issued by First American Title Insurance Company, having an effective date of October 1, 2019.

(5) Access to the Subject Property is located along Old Little Britain Road.

(6) Without expressing a legal opinion as to the ownership or nature of a potential encroachment or encumbrance, to the best of the undersigned's knowledge all:
– observed encroachments (if any) are graphically depicted hereon.
– all observed encumbrances or as listed in Title No.: 3020–988636 are either addressed as a text comment in Title Exceptions (below) and / or are graphically depicted hereon.

ALTA / NSPS TABLE "A" NOTES

1. Survey markers either found or set are denoted hereon.

2. The Property's assigned street address is: 33 Old Little Britain Road, Newburgh, New York 12550.

4. The total area of the Property measured to the existing centerline of improvement of Old Little Britain Road is: ????? acres, more or less.

5. Topographical features and contours lines are graphically depicted hereon using the methods described in General Note 2. All elevations are tied to the North American Vertical Datum of 1988 (NAVD 88).

7(a) (1): Exterior dimensions of buildings at ground level: shown.

8. Substantial features observed in the process of conducting the field survey are graphically depicted hereon.

11. Utilities shown hereon are plotted from records and / or from observed field evidence, of which were measured during the field survey.

13. Names of adjoining property owners according to current tax records: shown.

17: Proposed changes in street right of way lines: no information was made available to the undersigned. Evidence of recent street or sidewalk construction or repairs observed in the process of conducting the field survey: none observed.

19: Plottable offsite easements or servitudes. None observed.

ALTA / NSPS TABLE "A" NOTES:

Items hereinafter referenced refer to Items in Schedule "B–I" (Exceptions) in Title No.: 3020–988636 referenced in General Note 4:

Items 1 – 5: Each are not a survey matter.

Schedule "A" Description

ALL THAT CERTAIN LOT, PIECE OR PARCLE OF LAND SITUATE, lying and being in the town of Newburgh, County of Orange and State of New York, bounded and described as follows:

Beginning at a point in the center of the Old Little Britain Road leading from the present Little Britain Road to Union Avenue said point of beginning being the northwest corner of lands of M. and J. Flanagan; and runs

thence along the lands of said Flanagan, being along a stone wall, South 29° 29' West 429.65 feet to the corner of a stone wall;

thence along lands of aforesaid Frederick D. Calyer, being along a stone wall, North 67° 48' West 264.4 feet to an angle in said wall;

thence still along lands of said Calyer, being along a stone wall, North 68° 53' West 360.9 feet to the junction of two stone walls in the easterly line of lands of Homer R. Williams;

thence along lands of said Williams, being along a stone wall, North 15° 03' East 379.1 feet to the center of aforesaid Old Little Britain Road;

Thence along the center of said road the following courses and distances:

South 81° 46' East 41 feet

South 87° 13' East 138 feet

South 77° 33' East 115 feet

South 71° 12'; East 232 feet

South 61° 11' East 100.75 feet

South 57° 25' East 113.8 feet to the place of beginning.

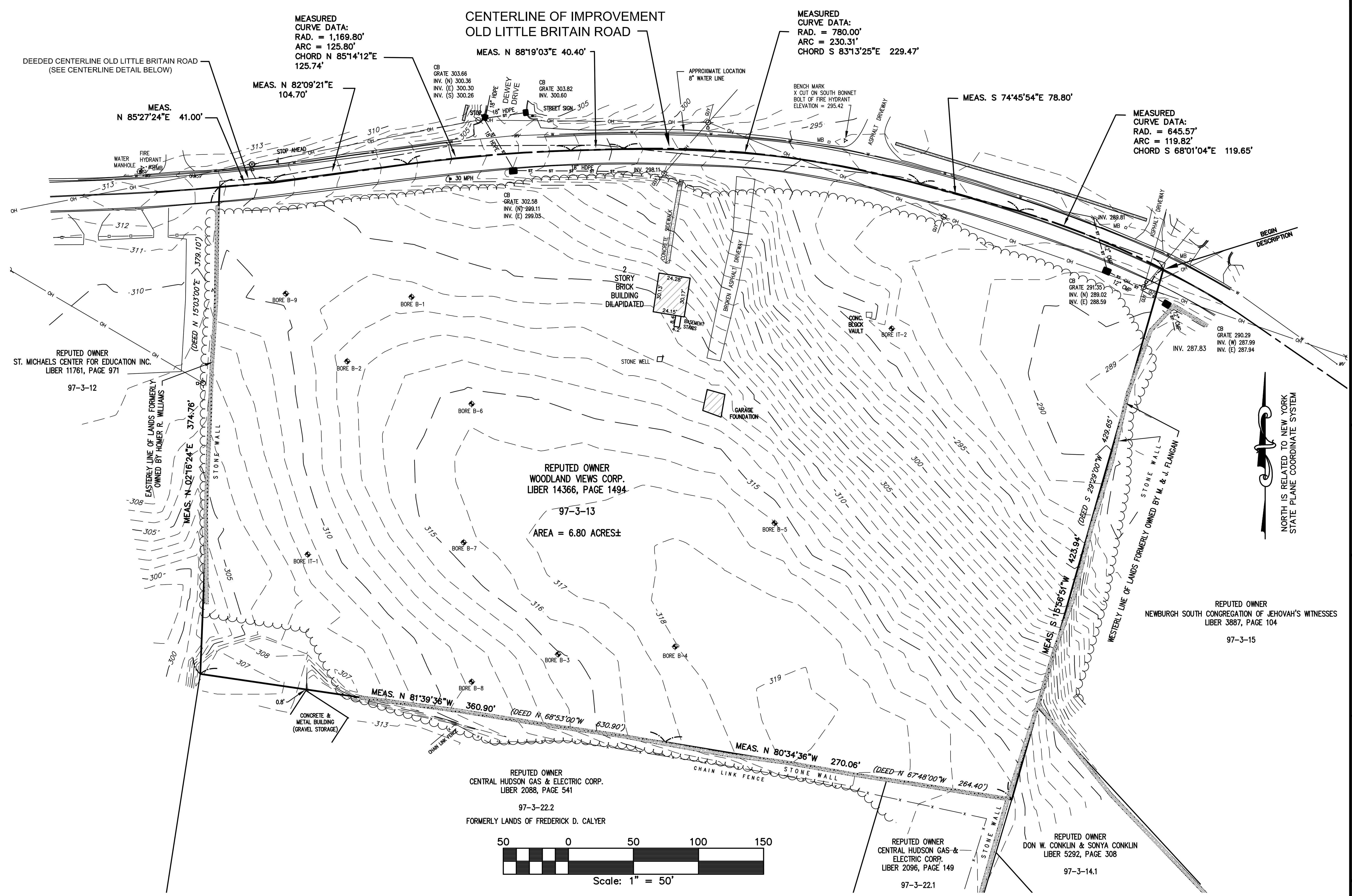
TOGETHER with all the right, title and interest of the party of the first part, of in and to the to land lying in the street in front of the adjoining said premises.

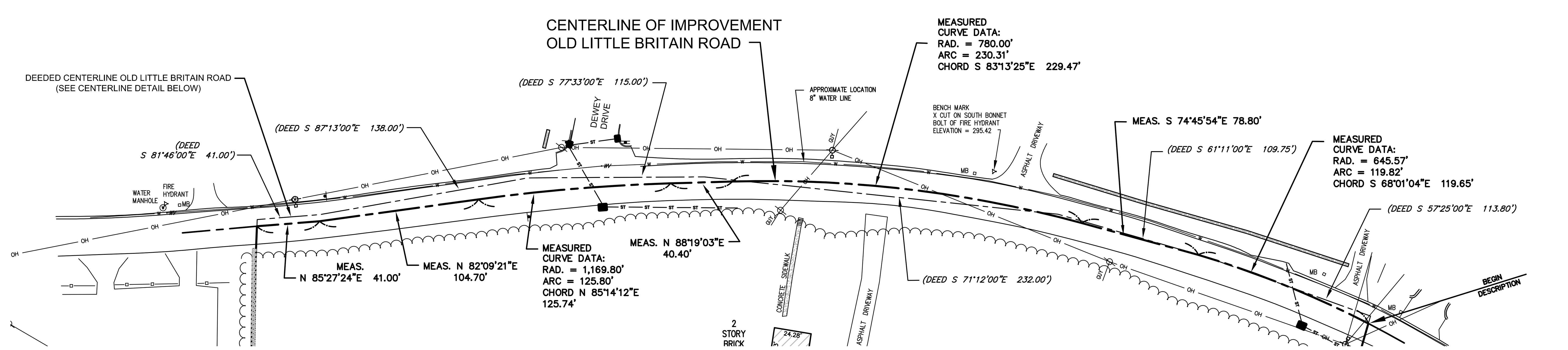
Surveyors Description Tax Parcel 97–3–13

ALL THAT CERTAIN LOT, PIECE OR PARCEL OF LAND, situate, lying and being in the Town of Newburgh, County of Orange and State of New York and being more particularly bounded and described as follows:

BEGINNING at a point on the existing centerline of improvement of Old Little Britain Road leading from present Little Britain Road to Union Avenue at its intersection with the westerly line of lands formerly owed by M. and J. Flanagan, said point also being at the northwesterly corner of lands now owned by Newburgh South Congregation of Jehovah's Witnesses; thence South 15° 56' 51" West (State Plane North) along a stone wall and along the westerly line of said lands of Newburgh South Congregation of Jehovah's Witnesses and the extension southerly thereof, 423.94 feet to point; thence North 80° 34' 36" West along a stone wall and along lands reputedly owned by Central Hudson Gas & Electric Corp., 270.06 feet to an angle point in said wall; thence North 81° 39' 36" West continuing along said stone wall and along said lands of Central Hudson Gas & Electric Corp., 360.90 feet to a point on the easterly line of lands formerly owned Homer R. Williams, which is also the easterly line of lands now owned by St. Michaels Center for Education Inc.; thence North 02° 16' 24" East along a stone wall and along said easterly line of lands of St. Michaels Center for Education Inc., 374.76 feet to a point on the existing centerline of improvement of Old Little Britain Road; thence along said centerline the following seven (7) courses and distances: (1) North 85° 27' 24" East, 41.00 feet to a point; thence (2) North 82° 09' 21" East, 104.70 feet to a point of curvature; thence (3) easterly along a curve to the right having a radius of 1,169.80 feet, an arc length of 125.80 feet and a chord bearing and distance of North 85° 14' 12" E, 125.74 to a point of tangent; thence (4) North 88° 19' 03" East, 40.40 feet to a point of curvature; thence (5) easterly along a curve to the right having a radius of 780.00 feet, an arc length of 230.31 feet and a chord bearing and distance of South 83° 13' 25" East, 229.47 feet to a point of tangent; thence (6) South 74° 45' 54" East, 78.80 feet to a point of curvature; thence (7) southeasterly along a curve to the right having a radius of 645.57 feet, an arc length of 119.82 feet and a chord bearing a distance of South 68° 01' 04" East, 119.65 feet to the point of beginning. Containing 6.80 acres, more or less.

SUBJECT TO the rights of the public in and to that portion of the above described lands lying within the bounds of Old Little Britain Road.





DETAIL OF CENTERLINE OLD LITTLE BRITAIN ROAD

Certification:

To:

This is to certify that this map or plat and the survey on which it is based were made in accordance with the 2016 Minimum Standard Detail Requirements for ALTA/NSPS Land Title Surveys, jointly established and adopted by ALTA and NSPS, and includes Items 1, 2, 4, 5, 7(a)(1), 8, 11, 13, 17, & 19 of Table A thereof. The fieldwork was completed on February 27, 2020

Mark J. Andrews, P.L.S.
NYS License No. 050455

GPI ENGINEERING, LANDSCAPE ARCHITECTURE AND SURVEYING, LLP
ENGINEERING • SURVEYING • LANDSCAPE ARCHITECTURE
200 HARRISON STREET – SUITE H2
JAMESTOWN, NEW YORK 14701
(716) 488–2803 FAX 488–2802

NORTH IS RELATED TO NEW YORK STATE PLANE COORDINATE SYSTEM

DRAWN BY: E. A. OLSON	CHECKED BY: J. E. GOSSETT	JOB NO.: WNY-2020033.33
SCALE: 1" = 50'	DATE: MARCH 12, 2020	DRAWING NO.:

REVISIONS:

NO.		BY	DATE

"ALTA/NSPS LAND TITLE SURVEY" OF LANDS OF:
WOODLAND VIEWS CORP.
33 OLD LITTLE BRITAIN ROAD
TOWN OF NEWBURGH
ORANGE COUNTY – NEW YORK

SHEET NO.
1 OF 1

PROJECT NAME:	New Jehovah Witnesses Worship Center	**FILE NO.:**	1960
BORING NO.:	B-1		**CASING** / **SAMPLER** / **CORE BARREL**
CLIENT:	GPI Engineering	**TYPE:**	HSA / SS /
SITE LOCATION:	33 Old Little Britain Rd, Newburgh, NY 12550	**SIZE I.D.:**	3.25" / 1.375" /
BORING LOCATION:	See Location Diagram	**HAMMER WT.:**	140#
SURFACE ELEVATION:	See Location Diagram	**HAMMER FALL:**	30"

DEPTH	SAMPLE NO.	DEPTH RANGE	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	18-24	REC.	COL. A	STRATA CHANGE	FIELD CLASSIFICATION AND REMARKS
	S-1	0.0' - 2.0'	2	3			1.4'			5-inches topsoil over, brown, moist, loose, Silt,
					5	7				some Sand, trace Gravel and Clay, ML, native with
	S-2	2.0' - 4.0'	5	5			1.6'			rock fragments. Similar except medium dense
					6	5				from 2 to 4 feet.
	S-3	4.0' - 6.0'	7	5			0.7'			Similar.
5					7	9				
	S-4	6.0' - 8.0'	7	8			2.0'			Similar except wet.
					10	12				
	S-5	8.0' - 10.0'	18	27			1.7'			Similar except dry and very dense, till.
					38	31				
10	S-6	10.0' - 11.8'	19	37			1.8'			Similar.
					49	50/0.3'			12'	Auger refusal at 12 feet. Offset 7 feet, probe
										refusal at 12 feet. Driller notes refusal probable at
										till, not bedrock.
										End of boring at 12 feet.
15										
20										
25										
30										
35										
40										

STRATIFICATION LINES REPRESENT APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES. IN-SITU TRANSITION MAY BE GRADUAL.

WATER LEVEL:	Water encountered at about 6 feet.		
DRILLER:	Martin Geo-Environmental, LLC - JM	**DATE:**	09-Mar-20
APPROVED BY:	JCB	**DATE:**	13-Mar-20

GIFFORD ENGINEERING
GEOTECHNICAL & GEOENVIRONMENTAL SERVICES
865 Pearse Road
Niskayuna, NY 12309
Phone: (518) 382-2545

PROJECT NAME: New Jehovah Witnesses Worship Center		**FILE NO.:** 1960	
BORING NO.: B-2	**CASING**	**SAMPLER**	**CORE BARREL**
CLIENT: GPI Engineering	**TYPE:** HSA	SS	
SITE LOCATION: 33 Old Little Britain Rd, Newburgh, NY 12550	**SIZE I.D.:** 3.25"	1.375"	
BORING LOCATION: See Location Diagram	**HAMMER WT.:**	140#	
SURFACE ELEVATION: See Location Diagram	**HAMMER FALL:**	30"	

DEPTH	SAMPLE NO.	DEPTH RANGE	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	18-24	REC.	COL. A	STRATA CHANGE	FIELD CLASSIFICATION AND REMARKS
	S-1	0.0' - 2.0'	3	2			1.0'			4-inches topsoil over, brown, moist, loose, Silt, some Sand, trace Gravel and Clay, ML, native with rock fragments. Similar except medium dense from 2 to 4 feet.
					2	3				
	S-2	2.0' - 4.0'	5	11			1.2'			
					9	7				
5	S-3	4.0' - 6.0'	7	5			1.8'			Similar except wet.
					6	8				
	S-4	6.0' - 7.8'	11	9			1.5'			Similar.
					8	50/0.3'				
	S-5	8.0' - 10.0'	6	17			1.3'			Similar except dry and dense, till.
10					28	26				
	S-6	10.0' - 10.8'	31	50/0.3'			0.8'			Similar, rock in tip of spoon.
									12'	Auger refusal at 12 feet. Offset 8 feet, probe refusal at 12 feet. Driller notes refusal probable at till, not bedrock.
										End of boring at 12 feet.
15										
20										
25										
30										
35										
40										

STRATIFICATION LINES REPRESENT APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES. IN-SITU TRANSITION MAY BE GRADUAL.

WATER LEVEL: Water encountered at about 5 feet.

DRILLER: Martin Geo-Environmental, LLC - JM **DATE:** 09-Mar-20

APPROVED BY: JCB **DATE:** 13-Mar-20

GIFFORD ENGINEERING
GEOTECHNICAL & GEOENVIRONMENTAL SERVICES
865 Pearse Road
Niskayuna, NY 12309
Phone: (518) 382-2545

PROJECT NAME:	New Jehovah Witnesses Worship Center	**FILE NO.:**	1960
BORING NO.:	B-3		**CASING** / **SAMPLER** / **CORE BARREL**
CLIENT:	GPI Engineering	**TYPE:**	HSA / SS /
SITE LOCATION:	33 Old Little Britain Rd, Newburgh, NY 12550	**SIZE I.D.:**	3.25" / 1.375" /
BORING LOCATION:	See Location Diagram	**HAMMER WT.:**	140#
SURFACE ELEVATION:	See Location Diagram	**HAMMER FALL:**	30"

DEPTH	SAMPLE NO.	DEPTH RANGE	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	18-24	REC.	COL. A	STRATA CHANGE	FIELD CLASSIFICATION AND REMARKS
	S-1	0.0' - 2.0'	2	3	5	6	1.5'			5-inches topsoil over, brown, moist, loose, Silt, some Sand, trace Gravel and Clay, ML, native till with rock fragments. Similar except medium dense from 2 to 4 feet.
	S-2	2.0' - 4.0'	14	11	7	4	0.5'			
5	S-3	4.0' - 6.0'	5	9	9	12	1.7'			Similar.
	S-4	6.0' - 8.0'	16	15	9	8	1.8'			Similar.
	S-5	8.0' - 10.0'	9	8	13	15	1.6'			Similar except wet.
10	S-6	10.0' - 10.8'	38	50/0.3'			0.6'		11'	Similar except dense. Auger refusal at 11 feet. Offset 5 feet, probe refusal at 12 feet. Driller notes refusal probable at till, not bedrock.
15										End of boring at 12 feet.
20										
25										
30										
35										
40										

STRATIFICATION LINES REPRESENT APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES. IN-SITU TRANSITION MAY BE GRADUAL.

WATER LEVEL: Water encountered at about 8 feet.

DRILLER: Martin Geo-Environmental, LLC - JM **DATE:** 09-Mar-20

APPROVED BY: JCB **DATE:** 13-Mar-20

GIFFORD ENGINEERING
GEOTECHNICAL & GEOENVIRONMENTAL SERVICES
865 Pearse Road
Niskayuna, NY 12309
Phone: (518) 382-2545

PROJECT NAME:	New Jehovah Witnesses Worship Center	**FILE NO.:** 1960	
BORING NO.:	B-4		**CASING** **SAMPLER** **CORE BARREL**
CLIENT:	GPI Engineering	**TYPE:**	HSA SS
SITE LOCATION:	33 Old Little Britain Rd, Newburgh, NY 12550	**SIZE I.D.:**	3.25" 1.375"
BORING LOCATION:	See Location Diagram	**HAMMER WT.:**	140#
SURFACE ELEVATION:	See Location Diagram	**HAMMER FALL:**	30"

DEPTH	SAMPLE NO.	DEPTH RANGE	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	18-24	REC.	COL. A	STRATA CHANGE	FIELD CLASSIFICATION AND REMARKS
	S-1	0.0' - 2.0'	1	1	2	2	1.4'			8-inches topsoil over, brown, moist, loose, Silt, some Sand, trace Gravel and Clay, ML, native till with rock fragments. No recovery from 2 to 4 feet.
	S-2	2.0' - 4.0'	12	8	6	7	0.0'			Rock in tip of spoon.
5	S-3	4.0' - 6.0'	15	6	7	7	1.8'			Similar.
	S-4	6.0' - 8.0'	6	9	8	7	1.5'			Similar.
	S-5	8.0' - 10.0'	7	8	13	15	1.8'			Similar except wet.
10	S-6	10.0' - 11.8'	13	19	38	50/0.3'	1.7'		12'	Similar except very dense. Auger refusal at 12 feet. Offset 7 feet, probe refusal at 12 feet. Driller notes refusal probable at till, not bedrock.
										End of boring at 12 feet.
15										
20										
25										
30										
35										
40										

STRATIFICATION LINES REPRESENT APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES. IN-SITU TRANSITION MAY BE GRADUAL.

WATER LEVEL: Water encountered at about 8 feet.

DRILLER: Martin Geo-Environmental, LLC - JM **DATE:** 09-Mar-20

APPROVED BY: JCB **DATE:** 13-Mar-20

GIFFORD ENGINEERING
GEOTECHNICAL & GEOENVIRONMENTAL SERVICES
865 Pearse Road
Niskayuna, NY 12309
Phone: (518) 382-2545

March 17, 2020

GEOPROBE LOGS
New Jehovah Witnesses Worship Center, File No. 1960
33 Old Little Britain Road, Newburgh, NY 12550
Geoprobe borings by Martin Geo-Environmental, LLC. with track mounted geoprobe on March 9, 2020.
Logged by J. Bazan.

IT – 1
1st tube (0'-4'): 45.5-inches, 64% recovery.
0.0'-0.3' Brown, moist, topsoil.
0.3'-2.4' Brown, moist, Silt, some Sand, trace Gravel and Clay, ML, native with rock fragments.
2nd tube (4'-8'): 45.5-inches, 49% recovery.
4.0'-5.9' Brown, moist, Silt, some Sand, trace Gravel and Clay, ML, native with rock fragments.
End of boring at 8.0 feet. No water encountered.

IT – 2
1st tube (0'-4'): 45.5-inches, 74% recovery.
0.0'-2.8' Brown, moist, Silt, some Sand, trace Gravel and Clay, ML, native with rock fragments.
2nd tube (4'-8'): 45.5-inches, 70% recovery.
4.0'-6.7' Brown, wet, Silt, some Sand, trace Gravel and Clay, ML, native with rock fragments.
End of boring at 8.0 feet. Water encountered at about 5 feet.

B – 5
1st tube (0'-4'): 45.5-inches, 75% recovery.
0.0'-0.6' Brown, moist, topsoil.
0.6'-2.8' Brown, moist, Silt, some Sand, trace Gravel and Clay, ML, native with rock fragments.
2nd tube (4'-8'): 45.5-inches, 64% recovery.
4.0'-6.4' Brown, wet, Silt, some Sand, trace Gravel and Clay, ML, native with rock fragments.
End of boring at 8.0 feet. Water encountered at about 5 feet.

B – 6
1st tube (0'-4'): 45.5-inches, 57% recovery.
0.0'-0.2' Brown, moist, topsoil.
0.2'-2.2' Brown, moist, Silt, some Sand, trace Gravel and Clay, ML, native with rock fragments.
2nd tube (4'-8'): 45.5-inches, 70% recovery.
4.0'-6.7' Brown, moist, Silt, some Sand, trace Gravel and Clay, ML, native with rock fragments.
End of boring at 8.0 feet. Water encountered at about 5 feet.

B – 7
1st tube (0'-4'): 45.5-inches, 84% recovery.
0.0'-0.3' Brown, moist, topsoil.

0.3’-3.2’ Brown, moist, Silt, some Sand, trace Gravel and Clay, ML, native with rock fragments.

2nd tube (4’-8’): 45.5-inches, 70% recovery.

4.0’-6.7’ Brown, wet, Silt, some Sand, trace Gravel and Clay, ML, native with rock fragments.

End of boring at 8.0 feet. Water encountered at about 5 feet.

B – 8

1st tube (0’-4’): 45.5-inches, 75% recovery.

0.0’-0.2’ Brown, moist, topsoil.

0.2’-2.8’ Brown, moist, Silt, some Sand, trace Gravel and Clay, ML, native with rock fragments.

2nd tube (4’-8’): 45.5-inches, 70% recovery.

4.0’-6.7’ Brown, wet, Silt, some Sand, trace Gravel and Clay, ML, native with rock fragments.

End of boring at 8.0 feet. Water encountered at about 5 feet.

B – 9

1st tube (0’-4’): 45.5-inches, 79% recovery.

0.0’-0.3’ Brown, moist, topsoil.

0.3’-2.4’ Brown, moist to wet, Silt, some Sand, trace Gravel and Clay, ML, native with rock fragments.

2nd tube (4’-8’): 45.5-inches, 100% recovery.

4.0’-7.8’ Brown, wet, Silt, some Sand, trace Gravel and Clay, ML, native with rock fragments.

End of boring at 8.0 feet. Water encountered at about 4 feet.

GIFFORD ENGINEERING
Geotechnical & Geoenvironmental Services

LABORATORY TEST RESULTS
Jehovah Witnesses Worship Center
33 Old Little Britain Rd, Newburgh, NY 12550
File No. 1960

Grain Size Distribution ASTM D 421, D 422 & D 1140

Size/Sieve	Percent Passing by Weight
	B-1 S-2 2'-4'
No. 4	93.0%
No. 10	88.0%
No. 20	82.2%
No. 40	77.4%
No. 100	66.9%
No. 200	59.0%

865 Pearse Road Niskayuna, NY 12309 Tel: (518) 382-2545 giffeng@nycap.rr.com

FIELD TEST RESULTS
Jehovah Witnesses Worship Center
33 Old Little Britain Road
Newburgh, NY 12550
File No. 1960

Infiltration Tests:
Slug permeability testing was performed in monitoring wells in accordance with ASTM D 4044 and NYSDEC Stormwater Design Manual. Borings were advanced to varying depths and 4-inch diameter PVC pipes were placed, sealed around the outside with bentonite chips, and backfilled with spoils. The test procedure involves adding water to the wells and recording time as the water level drops 2 feet. A 5-gallon bucket was emptied into the pipes and the tests were started. Each test was run for one hour or the time required for the water to drain out the bottom of the pipe. A minimum of four tests were performed in each well. The infiltration rates (inches per hour) reported below are for the last test at each location.

The test allows for calculation of coefficient of permeability or hydraulic conductivity (cm per sec), the results are given below. Permeability calculations are from equations in Table 2.6 in "Seepage, Drainage and Flow Nets" by Harry R. Cedergren, (1967), John Wiley & Sons.

$$ShapeFactor, F = \frac{11R}{2} \qquad Permeability, k = \frac{\Pi R^2}{Ft}\ln(\frac{h_1}{h_2}) = \frac{2\Pi R}{11(t_2 - t_1)}\ln(\frac{h_1}{h_2})$$

Slug Permeability Tests were performed on October 23, 2019.

Well No.	Depth to Bottom of Well*	Coeff. of Permeability (cm/sec)	Infiltration Rate (in/hour)
IT-1	4.0' +/-	1.66×10^{-3}	1.75
IT-2	3.0' +/-	1.65×10^{-3}	2.50

* Measured depth of well from ground surface.

NYS DOT Standard Specifications Excerpts

733-04 Subbase Course

733-0401 – Subbase Course, Type 1
733-0402 – Subbase Course, Type 2
733-0403 – Subbase Course, Type 3
733-0404 – Subbase Course, Type 4

Subbase course types are based on the gradation of the material as outlined in Table 733-04A Subbase Gradation.

Sampling. Perform material test and assurance methods pertaining to subbase requirements in conformance with the procedures contained in the Geotechnical Control Procedure (GCP-17) “Procedure for the Control and Quality Assurance of Granular Materials”.

General. Provide suitable material conforming to the requirements of Section 203 Excavation and Embankment and to the requirements contained herein.

Material Requirements.

A. Composition. For Types 1, 3 and 4 furnish materials consisting of Stone, Sand, Gravel, and/or recycled material approved for use in accordance with 733-19 Recycled Materials Approved for Use as Earthwork Material (and is identified in the Approved List), or blends of these materials.

For Type 2, furnish materials consisting of Stone, or recycled material approved for use in accordance with 733-19 Recycled Materials Approved for Use as Earthwork Material (and is identified in the Approved List) which is the product of crushing or blasting ledge rock, or a blend of approved recycled material.

B. Stockpile. Stockpile subbase material in accordance with the Geotechnical Control Procedure (GCP-17) “Procedure for the Control and Quality Assurance of Granular Materials” except as noted herein.

1. Type 3. Material furnished under Type 3 will not be required to be stockpiled unless it contains recycled material approved for use in accordance with 733-19 Recycled Materials Approved for Use as Earthwork Material and as identified in the Approved List.

2. Recycled Materials. Stockpiling of the Reclaimed Asphalt Pavement (RAP) for subbase course is not required.

C. Gradation. Provide subbase material having a gradation in accordance with TABLE 733-04A Subbase Gradation.

NYS DOT Standard Specifications Excerpts

TABLE 733-04A SUBBASE GRADATION

Sieve Size Designation	Percentage Passing by Weight			
	Type 1	Type 2	Type 3	Type 4
4 in.	-	-	100	-
3 in.	100	-	-	-
2 in.	90-100	100	-	100
¼ in.	30-65	25-60	30-75	30-65
No 40	5-40	5-40	5-40	5-40
No. 200	0-10	0-10	0-10	0-10

D. Plasticity Index. Provide material having a Plasticity Index based on the material passing the No. 40 mesh sieve equal to or less than 5.0.

E. Durability.

1. Types 1, 2 and 4. Provide material for Types 1, 2 and 4 having a Magnesium Sulfate Soundness loss less than 20% after four (4) cycles in accordance with the Geotechnical Test Method (GTM-21) “Test Method for Magnesium Sulfate Soundness of Granular Materials”, unless material meeting the requirements of Recycled Materials is used.

2. Type 3. Provide material for Type 3 having a Magnesium Sulfate Soundness loss less than 30% after four (4) cycles in accordance with the Geotechnical Test Method (GTM-21) “Test Method for Magnesium Sulfate Soundness of Granular Materials”.

F. Elongated Particles. A flat or elongated particle is defined herein as one which has its greatest dimension more than thee (3) times its least dimension. Provide material consisting of particles where not more than 30%, by weight, of the particles retains on a ½ in. sieves is flat or elongated. When the State elects to test for this requirement, material with a percentage greater than 30 will be rejected. Acceptance for this requirement will normally be based on a visual inspection by the Regional Geotechnical Engineer.

733-11 Select Granular Fill

Material Requirements.

A. Source. Provide backfill material from a source evaluated in accordance with the Geotechnical Control Procedure (GCP-17) “Procedure for the Control and Quality Assurance of Granular Materials”.

B. Composition. Provide suitable, well graded material consisting of rock, stone, cobbles or gravel, or recycled material approved for use in accordance with 733-19 Recycled Materials Approved for Use as Earthwork Material (and is identified in the Approved List) with the exception of when select granular fill is used as backfill for aluminum pipe. For aluminum pipe applications, the select granular fill shall be free of portland cement of portland cement concrete.

C. Gradation. Provide select granular fill material conforming to the following requirements:

1. Typical. Except when used as backfill material for aluminum pipe with Type IR corrugations (Spiral Rib Pipe), the material shall have a gradation in accordance with TABLE 733-11A Select Granular Fill Gradation.

TABLE 733-11A SELECT GRANULAR FILL GRADATION

Sieve Size Designation	Percentage Passing by Weight
4 in.	100
No. 40	0-70
No. 200	0-15

2. Exception. When used as backfill for Corrugated Aluminum Pipe, Type 1R (Spiral Rib Pipe) 100% of the material shall also pass the 2 in. sieve.

D. Provide material for Type 3 having a Magnesium Sulfate Soundness loss less than 30% after four (4) cycles in accordance with the Geotechnical Test Method (GTM-21) “Test Method for Magnesium Sulfate Soundness of Granular Materials”.

733-14 Select Structural Fill

Material Requirements. The material requirements contained in 733-11 Select Granular Fill shall apply.

703-02 Coarse Aggregates (Crushed Stone) and ASTM #57.

Coarse aggregates shall consist of crushed stone, crushed gravel, screened gravel or crushed air-cooled blasé furnace slag, conforming to the requirements of these specifications. All coarse aggregates shall meet the requirements for these materials as outline in Tables 703-2, “Physical Requirements (Testing)” and 703-3, “Physical Requirements (Deleterious Materials)”, and 703-4, “Sizes of Stone, Gravel and Slag.”

A coarse aggregate meeting the requirements of Tables 703-2, and 703-3 shall be accepted unless service records indicate that it is unsound of that the material is otherwise determined to be unsatisfactory by the Director, Materials Bureau. Coarse aggregate not meeting the requirements of these tables may be further evaluated by additional testing, petrographic examination, geological studies, review of Plant Flow Information and performance history. If the results of the evaluation indicated that the aggregate should perform satisfactorily, the source may be accepted by the Director, Materials Bureau.

1. Crushed Stone. Crushed stone shall be Material Designation 703-0201 and shall consist of clean, durable, sharp-angled fragments of rock of uniform quality. The crushed stone used as coarse aggregate for all items shall be obtained from sources conforming to the requirements of the Department as to sampling, testing methods, Quarry Reports and any other required procedures.
2. Crushed Gravel. Crushed Gravel shall be Material Designation 703-0202 and shall consist of clean, durable, sharp-angled fragments of gravel free from coatings. A crushed particle shall be defined as one in which the total area of face fractured exceeds 25% of the maximum cross-section area of the particle. When two fractured faces are designated, the total area of each fractured face shall exceed 25% of the maximum cross-sectional area of the particle.

Table 703-2
Physical Requirements (Testing)

Material Designation	Crushed Stone 703-0201	Crushed Gravel 70-0202	Screened Gravel 703-0203	Crushed Slag 703-0204
Magnesium Sulfate Test (NYSDOT 207) (2) Max. percent loss by weight at 10 cycles	18	18	18	6
Freezing and Thawing Test (NYSDOT 208) (3) Max. percent loss by weight at 25 cycles	10	10	10	-
Los Angeles Abrasion Test (AASHTO T96) Max. percent loss by weight (Grading A or B)	35 (4) 45 (5)	35	35	40
Flat and Elongated Pieces (ASTM C125) Max. percent by weight				
Flat or Elongated to the Degree of 3:1	30	30	-	-
Flat or Elongated to the Degree of 5:1	10	10	-	-
Crushed Particles Minimum percent by weight in any primary size				
No. 2 size and larger (1 fractured faces)	-	75 (6)	-	-
Smaller than the No. 2 size (2 fractured faces)	-	85 (6)	-	-
Minimum dry rodded weight (NYSDOT 213) lbs./cu. ft.	-	-	-	70

(1) To determine its conformance to specification limits, processed coarse aggregate may be tested at any point after completion of processing. The manufactured material shall be separated into the primary sizes indicated in Table 703-5, "Primary Sizes." Each size fraction shall conform to the requirements of 703-02 Coarse Aggregate.

(2) Loss applies to No. 2 size fraction for stone and gravel. Loss applies to 2 1/2" – 3/16" material when slag is tested according to ASTM C88.

(3) The freeze-thaw requirement applies only to aggregate used in Portland cement concrete. The loss applies to the No. 3 size fraction, but the Department reserves the option to test the

No. 2 size fraction.

(4) Loss applies to limestone, Dolostone, sandstone and trap rock.
(5) Loss applies to marble, granitics, and other crystalline materials.
(6) Crushed particles for each primary size smaller than the No. 2 size shall have a minimum of 85% by weight of the particles with at least two fractured faces.
Crushed particles for each primary size equivalent to or larger than the No. 2 size shall have a minimum of 75% of the particles by weight with at least one fractured face.
Gravel which has not been processed through a crushing operation shall not be combined with crushed gravel.

Table 703-3
Physical Requirements
Deleterious Materials (3)

	Maximum percent by weight in any primary size (2)			
Material Designation	Crushed Stone 703-0201	Crushed Gravel 70-0202	Screened Gravel 703-0203	Crushed Slag 703-0204
Shale or other light materials (1)	1.0	1.0	1.0	-
Coal or Lignite	1.0	1.0	1.0	-
Clay Balls or Lumps	0.2	0.2	0.2	-
Metallic Ore	-	-	-	3.0
Glassy Pieces	-	-	-	5.0
Other Deleterious Substances	1.0	1.0	1.0	-

(1) This requirement may not apply if service records and/or abrasion and soundness tests indicate to the Department that the aggregate is satisfactory.
(2) Coarse aggregate containing more than the above specified amounts of deleterious substances, to be accepted by the Department, shall be washed or otherwise processed until such specifications are satisfied.
(3) Coarse aggregate shall not contain substances which, when mixed in Portland Cement concrete, produce an unacceptable level of chloric ions in the final product.

A naturally fractured face shall be acceptable provided that the sharp angular portion of the particle consists of sound material and is free from unsound or injurious coatings.

The crushed gravel used as coarse aggregate for all items shall be obtained from sources conforming to the requirements of the Department as to sampling, testing methods, Geologic Source Reports, Plant Flow Information, and any other required procedures.

3. Screened Gravel. Screened gravel shall be Material Designation 703-0203 and shall consist of durable gravel free from coatings.

Screened gravel may consist of all uncrushed particles and shall be obtained from sources conforming to the requirements for Crushed gravel.

4. Crushed Slag. Crushed slag particles shall be Material Designation 703-0204 and shall consist of hard, durable, angular fragments which are reasonably uniform in density and quality; free from injurious amounts of Sulphur; and reasonably free from thin, elongated pieces, dirt of other objectionable matter. All crushed slag must be obtained from approved sources conforming to the

requirements of the Department as to sampling, test methods and any other required procedures. Gradation. The sizes of all stone, gravel or slag used under these specifications shall conform to the gradation requirements for the various sizes tabulated in Table 703-4.

Table 703-4 (1)
SIZES OF STONE, GRAVEL AND SLAG

	Screen Sizes										
Size Designation	4"	3"	2 1/2"	2"	1 1/2"	1"	1/2"	1/4"	1/8"	No. 80 Sieve	No. 200 (3) Sieve
Screenings(2)	-	-	-	-	-	-	100	90-100	-	-	0-1.0
1B	-	-	-	-	-	-	-	100	90-100	0-15	0-1.0
1A	-	-	-	-	-	-	100	90-100	0-15	-	0-1.0
1ST	-	-	-	-	-	-	100	0-15	-	-	0-1.0
1	-	-	-	-	-	100	90-100	0-15	-	-	0-1.0
2	-	-	-	-	100	90-100	0-15	-	-	-	0-1.0
3A	-	-	-	100	90-100	0-15	-	-	-	-	0-0.7
3	-	-	100	90-100	35-70	0-15	-	-	-	-	0-0.7
4A	-	100	90-100	-	0-20	-	-	-	-	-	0-0.7
4	100	90-100	-	0-15	-	-	-	-	-	-	0-0.7
5	90-100	0-15	-	-	-	-	-	-	-	-	0-0.7
ASTM#57	-	-	-	-	100	95-100	25-60	0-10	0-5	-	0-2

(1) Percentage by weight passing with the following square openings.
(2) Screenings shall include all of the fine material passing a 1/4" screen.
(3) The minus 200 material requirements applies only to aggregate for use in Portland cement concrete surface treatments, cold mix bituminous pavements, and underlain filter material. The test (NYSDOT 201) will be performed on the entire sample of the designated size aggregate. Primary size does not apply in the determination of the minus 200 material.

Jehovah Witnesses Worship Center, File No.: 1960

Latitude, Longitude: 41.49511775, -74.05860171

Date	3/17/2020, 10:12:45 AM
Design Code Reference Document	IBC-2015
Risk Category	III
Site Class	D - Stiff Soil

Type	Value	Description
S_S	0.213	MCE_R ground motion. (for 0.2 second period)
S_1	0.067	MCE_R ground motion. (for 1.0s period)
S_{MS}	0.341	Site-modified spectral acceleration value
S_{M1}	0.161	Site-modified spectral acceleration value
S_{DS}	0.228	Numeric seismic design value at 0.2 second SA
S_{D1}	0.107	Numeric seismic design value at 1.0 second SA

Type	Value	Description
SDC	B	Seismic design category
F_a	1.6	Site amplification factor at 0.2 second
F_v	2.4	Site amplification factor at 1.0 second
PGA	0.115	MCE_G peak ground acceleration
F_{PGA}	1.57	Site amplification factor at PGA
PGA_M	0.181	Site modified peak ground acceleration
T_L	6	Long-period transition period in seconds
SsRT	0.213	Probabilistic risk-targeted ground motion. (0.2 second)
SsUH	0.239	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration
SsD	1.5	Factored deterministic acceleration value. (0.2 second)
S1RT	0.067	Probabilistic risk-targeted ground motion. (1.0 second)
S1UH	0.075	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration.
S1D	0.6	Factored deterministic acceleration value. (1.0 second)
PGAd	0.6	Factored deterministic acceleration value. (Peak Ground Acceleration)
C_{RS}	0.891	Mapped value of the risk coefficient at short periods
C_{R1}	0.9	Mapped value of the risk coefficient at a period of 1 s

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GENERAL NOTES

DRILLING & SAMPLING SYMBOLS*		WATER LEVEL SYMBOLS**	
SS	Split Spoon – 1 3/8" I.D., 2" O.D.	**WL**	Water Level
ST	Shelby Tube – 3" O.D.	**WCI**	Wet Cave In
OS	Osterberg Sampler – 3" Shelby Tube	**DCI**	Dry Cave In
DB	Diamond Core – NQ, BX, HQ	**WS**	While Sampling
WR	Weight of Rod	**WD**	While Drilling
WH	Weight of Hammer	**BCR**	Before Casing Removal
RD	Rotary Drill Bit	**ACR**	After Casing Removal
DC	Driven Casing, Washed	**AB**	After Boring
WB	Washed Boring		
HSA	Hollow Stem Auger		
OH	Open Hole		
MT	Macro Core MC5 Soil Sampling System		

*Standard "N" Penetration**:** Blows per foot of a 140 pound hammer falling 30 inches on a 2 inch O.D. split spoon, except where noted.

** Water levels indicated on the boring logs are the levels measured in the boring at the times indicated. In pervious soils, the indicated elevations are considered reliable ground water levels. In impervious soils, the accurate determination of ground water elevations is not possible in even several days observation, and additional evidence on ground water elevations must be sought.

CLASSIFICATION

COHESIONLESS SOILS

"Trace"	1% - 10%
"Little"	10% - 20%
"Some	20% - 35%
"And"	35% - 50%
Very Loose	0 – 3 Blows
Loose	4 – 9 Blows
Medium Dense	10 – 29 Blows
Dense	30 – 50 Blows
Very Dense	> 50 Blows

COHESIVE SOILS*

	N (Blows/ft)	**Q_c** (TSF)
Very Soft	0 – 1	0.00 – 0.25
Soft	2 – 4	0.25 – 0.49
Medium	5 – 8	0.50 – 0.99
Stiff	9 – 15	1.00 – 1.99
Very Stiff	16 – 30	2.00 – 3.99
Hard	> 30	≥ 4.00

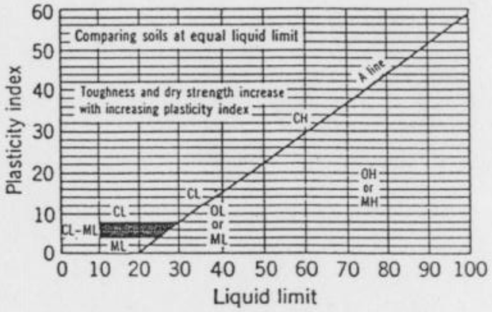
* If Clay content is sufficient so that clay dominates soil properties, then Clay becomes the principal noun with the other major soil constituent as modifier: i.e., Silty Clay. Other minor soil constituents may be added according to classification breakdown for cohesionless soils: i.e., Silty Clay, little Sand, trace Gravel. Additional explanation available upon request. See attached Unified Soil Classification sheet.

Table 3.5 Unified Soil Classification

Field Identification Procedures (Excluding particles larger than 3 in. and basing fractions on estimated weights)				Group Symbols [a]	Typical Names	Information Required for Describing Soils	Laboratory Classification Criteria
Coarse-grained soils More than half of material is *larger* than No. 200 sieve size[b] (The No. 200 sieve size is about the smallest particle visible to naked eye)	Gravels More than half of coarse fraction is larger than No. 4 sieve size (For visual classification, the ¼ in. size may be used as equivalent to the No. 4 sieve size)	Clean gravels (little or no fines)	Wide range in grain size and substantial amounts of all intermediate particle sizes	*GW*	Well graded gravels, gravel-sand mixtures, little or no fines	Give typical name; indicate approximate percentages of sand and gravel; maximum size; angularity, surface condition, and hardness of the coarse grains; local or geologic name and other pertinent descriptive information; and symbols in parentheses	$C_U = \frac{D_{60}}{D_{10}}$ Greater than 4; $C_C = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ Between 1 and 3
			Predominantly one size or a range of sizes with some intermediate sizes missing	*GP*	Poorly graded gravels, gravel-sand mixtures, little or no fines		Not meeting all gradation requirements for *GW*
		Gravels with fines (appreciable amount of fines)	Nonplastic fines (for identification procedures see *ML* below)	*GM*	Silty gravels, poorly graded gravel-sand-silt mixtures	For undisturbed soils add information on stratification, degree of compactness, cementation, moisture conditions and drainage characteristics	Atterberg limits below "A" line, or *PI* less than 4 / Above "A" line with *PI* between 4 and 7 are *borderline* cases requiring use of dual symbols
			Plastic fines (for identification procedures, see *CL* below)	*GC*	Clayey gravels, poorly graded gravel-sand-clay mixtures		Atterberg limits above "A" line, with *PI* greater than 7
	Sands More than half of coarse fraction is smaller than No. 4 sieve size	Clean sands (little or no fines)	Wide range in grain sizes and substantial amounts of all intermediate particle sizes	*SW*	Well graded sands, gravelly sands, little or no fines	Example: *Silty sand*, gravelly; about 20% hard, angular gravel particles ½-in. maximum size; rounded and subangular sand grains coarse to fine, about 15% nonplastic fines with low dry strength; well compacted and moist in place; alluvial sand; (*SM*)	$C_U = \frac{D_{60}}{D_{10}}$ Greater than 6; $C_C = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ Between 1 and 3
			Predominantly one size or a range of sizes with some intermediate sizes missing	*SP*	Poorly graded sands, gravelly sands, little or no fines		Not meeting all gradation requirements for *SW*
		Sands with fines (appreciable amount of fines)	Nonplastic fines (for identification procedures, see *ML* below)	*SM*	Silty sands, poorly graded sand-silt mixtures		Atterberg limits below "A" line or *PI* less than 5 / Above "A" line with *PI* between 4 and 7 are *borderline* cases requiring use of dual symbols
			Plastic fines (for identification procedures, see *CL* below)	*SC*	Clayey sands, poorly graded sand-clay mixtures		Atterberg limits below "A" line with *PI* greater than 7

Laboratory classification criteria for coarse-grained soils: Use grain size curve in identifying the fractions as given under field identification. Determine percentages of gravel and sand from grain size curve. Depending on percentage of fines (fraction smaller than No. 200 sieve size) coarse grained soils are classified as follows: Less than 5% *GW, GP, SW, SP*; More than 12% *GM, GC, SM, SC*; 5% to 12% *Borderline* cases requiring use of dual symbols

Fine-grained soils More than half of material is *smaller* than No. 200 sieve size	Identification Procedures on Fraction Smaller than No. 40 Sieve Size:	Dry Strength (crushing characteristics)	Dilatancy (reaction to shaking)	Toughness (consistency near plastic limit)	Group Symbols [a]	Typical Names	Information Required for Describing Soils
	Silts and clays liquid limit less than 50	None to slight	Quick to slow	None	*ML*	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands with slight plasticity	Give typical name; indicate degree and character of plasticity, amount and maximum size of coarse grains; colour in wet condition, odour if any, local or geologic name, and other pertinent descriptive information, and symbol in parentheses
		Medium to high	None to very slow	Medium	*CL*	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays	
		Slight to medium	Slow	Slight	*OL*	Organic silts and organic silt-clays of low plasticity	For undisturbed soils add information on structure, stratification, consistency in undisturbed and remoulded states, moisture and drainage conditions
	Silts and clays liquid limit greater than 50	Slight to medium	Slow to none	Slight to medium	*MH*	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts	
		High to very high	None	High	*CH*	Inorganic clays of high plasticity, fat clays	Example: *Clayey silt*, brown; slightly plastic; small percentage of fine sand; numerous vertical root holes; firm and dry in place; loess; (*ML*)
		Medium to high	None to very slow	Slight to medium	*OH*	Organic clays of medium to high plasticity	
Highly Organic Soils		Readily identified by colour, odour, spongy feel and frequently by fibrous texture			*Pt*	Peat and other highly organic soils	



Plasticity chart
for laboratory classification of fine grained soils

From Wagner, 1957.

[a] *Boundary classifications*. Soils possessing characteristics of two groups are designated by combinations of group symbols. For example *GW–GC*, well graded gravel-sand mixture with clay binder.

[b] All sieve sizes on this chart are U.S. standard.

Field Identification Procedure for Fine Grained Soils or Fractions

These procedures are to be performed on the minus No. 40 sieve size particles, approximately $\frac{1}{64}$ in. For field classification purposes, screening is not intended, simply remove by hand the coarse particles that interfere with the tests.

Dilatancy (Reaction to shaking):

After removing particles larger than No. 40 sieve size, prepare a pat of moist soil with a volume of about one-half cubic inch. Add enough water if necessary to make the soil soft but not sticky.

Place the pat in the open palm of one hand and shake horizontally, striking vigorously against the other hand several times. A positive reaction consists of the appearance of water on the surface of the pat which changes to a livery consistency and becomes glossy. When the sample is squeezed between the fingers, the water and gloss disappear from the surface, the pat stiffens and finally it cracks or crumbles. The rapidity of appearance of water during shaking and of its disappearance during squeezing assist in identifying the character of the fines in a soil.

Very fine clean sands give the quickest and most distinct reaction whereas a plastic clay has no reaction. Inorganic silts, such as a typical rock flour, show a moderately quick reaction.

Dry Strength (Crushing characteristics):

After removing particles larger than No. 40 sieve size, mould a pat of soil to the consistency of putty, adding water if necessary. Allow the pat to dry completely by oven, sun or air drying, and then test its strength by breaking and crumbling between the fingers. This strength is a measure of the character and quantity of the colloidal fraction contained in the soil. The dry strength increases with increasing plasticity.

High dry strength is characteristic for clays of the CH group. A typical inorganic silt possesses only very slight dry strength. Silty fine sands and silts have about the same slight dry strength, but can be distinguished by the feel when powdering the dried specimen. Fine sand feels gritty whereas a typical silt has the smooth feel of flour.

Toughness (Consistency near plastic limit):

After removing particles larger than the No. 40 sieve size, a specimen of soil about one-half inch cube in size, is moulded to the consistency of putty. If too dry, water must be added and if sticky, the specimen should be spread out in a thin layer and allowed to lose some moisture by evaporation. Then the specimen is rolled out by hand on a smooth surface or between the palms into a thread about one-eight inch in diameter. The thread is then folded and re-rolled repeatedly. During this manipulation the moisture content is gradually reduced and the specimen stiffens, finally loses its plasticity, and crumbles when the plastic limit is reached.

After the thread crumbles, the pieces should be lumped together and a slight kneading action continued until the lump crumbles.

The tougher the thread near the plastic limit and the stiffer the lump when it finally crumbles, the more potent is the colloidal clay fraction in the soil. Weakness of the thread at the plastic limit and quick loss of coherence of the lump below the plastic limit indicate either inorganic clay of low plasticity, or materials such as kaolin-type clays and organic clays which occur below the A-line.

Highly organic clays have a very weak and spongy feel at the plastic limit.

Important Information about This

Geotechnical-Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

The Geoprofessional Business Association (GBA) has prepared this advisory to help you – assumedly a client representative – interpret and apply this geotechnical-engineering report as effectively as possible. In that way, clients can benefit from a lowered exposure to the subsurface problems that, for decades, have been a principal cause of construction delays, cost overruns, claims, and disputes. If you have questions or want more information about any of the issues discussed below, contact your GBA-member geotechnical engineer. Active involvement in the Geoprofessional Business Association exposes geotechnical engineers to a wide array of risk-confrontation techniques that can be of genuine benefit for everyone involved with a construction project.

Geotechnical-Engineering Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical-engineering study conducted for a given civil engineer will not likely meet the needs of a civil-works constructor or even a different civil engineer. Because each geotechnical-engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client. *Those who rely on a geotechnical-engineering report prepared for a different client can be seriously misled*. No one except authorized client representatives should rely on this geotechnical-engineering report without first conferring with the geotechnical engineer who prepared it. *And no one – not even you – should apply this report for any purpose or project except the one originally contemplated.*

Read this Report in Full

Costly problems have occurred because those relying on a geotechnical-engineering report did not read it *in its entirety*. Do not rely on an executive summary. Do not read selected elements only. *Read this report in full.*

You Need to Inform Your Geotechnical Engineer about Change

Your geotechnical engineer considered unique, project-specific factors when designing the study behind this report and developing the confirmation-dependent recommendations the report conveys. A few typical factors include:

- the client's goals, objectives, budget, schedule, and risk-management preferences;
- the general nature of the structure involved, its size, configuration, and performance criteria;
- the structure's location and orientation on the site; and
- other planned or existing site improvements, such as retaining walls, access roads, parking lots, and underground utilities.

Typical changes that could erode the reliability of this report include those that affect:

- the site's size or shape;
- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light-industrial plant to a refrigerated warehouse;
- the elevation, configuration, location, orientation, or weight of the proposed structure;
- the composition of the design team; or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes – even minor ones – and request an assessment of their impact. *The geotechnical engineer who prepared this report cannot accept responsibility or liability for problems that arise because the geotechnical engineer was not informed about developments the engineer otherwise would have considered.*

This Report May Not Be Reliable

Do not rely on this report if your geotechnical engineer prepared it:

- for a different client;
- for a different project;
- for a different site (that may or may not include all or a portion of the original site); or
- before important events occurred at the site or adjacent to it; e.g., man-made events like construction or environmental remediation, or natural events like floods, droughts, earthquakes, or groundwater fluctuations.

Note, too, that it could be unwise to rely on a geotechnical-engineering report whose reliability may have been affected by the passage of time, because of factors like changed subsurface conditions; new or modified codes, standards, or regulations; or new techniques or tools. *If your geotechnical engineer has not indicated an "apply-by" date on the report, ask what it should be*, and, in general, *if you are the least bit uncertain* about the continued reliability of this report, contact your geotechnical engineer before applying it. A minor amount of additional testing or analysis – if any is required at all – could prevent major problems.

Most of the "Findings" Related in This Report Are Professional Opinions

Before construction begins, geotechnical engineers explore a site's subsurface through various sampling and testing procedures. *Geotechnical engineers can observe actual subsurface conditions only at those specific locations where sampling and testing were performed.* The data derived from that sampling and testing were reviewed by your geotechnical engineer, who then applied professional judgment to form opinions about subsurface conditions throughout the site. Actual sitewide-subsurface conditions may differ – maybe significantly – from those indicated in this report. Confront that risk by retaining your geotechnical engineer to serve on the design team from project start to project finish, so the individual can provide informed guidance quickly, whenever needed.

This Report's Recommendations Are Confirmation-Dependent

The recommendations included in this report – including any options or alternatives – are confirmation-dependent. In other words, *they are not final*, because the geotechnical engineer who developed them relied heavily on judgment and opinion to do so. Your geotechnical engineer can finalize the recommendations *only after observing actual subsurface conditions* revealed during construction. If through observation your geotechnical engineer confirms that the conditions assumed to exist actually do exist, the recommendations can be relied upon, assuming no other changes have occurred. *The geotechnical engineer who prepared this report cannot assume responsibility or liability for confirmation-dependent recommendations if you fail to retain that engineer to perform construction observation.*

This Report Could Be Misinterpreted

Other design professionals' misinterpretation of geotechnical-engineering reports has resulted in costly problems. Confront that risk by having your geotechnical engineer serve as a full-time member of the design team, to:

- confer with other design-team members,
- help develop specifications,
- review pertinent elements of other design professionals' plans and specifications, and
- be on hand quickly whenever geotechnical-engineering guidance is needed.

You should also confront the risk of constructors misinterpreting this report. Do so by retaining your geotechnical engineer to participate in prebid and preconstruction conferences and to perform construction observation.

Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can shift unanticipated-subsurface-conditions liability to constructors by limiting the information they provide for bid preparation. To help prevent the costly, contentious problems this practice has caused, include the complete geotechnical-engineering report, along with any attachments or appendices, with your contract documents, *but be certain to note conspicuously that you've included the material for informational purposes only*. To avoid misunderstanding, you may also want to note that "informational purposes" means constructors have no right to rely on the interpretations, opinions, conclusions, or recommendations in the report, but they may rely on the factual data relative to the specific times, locations, and depths/elevations referenced. Be certain that constructors know they may learn about specific project requirements, including options selected from the report, *only* from the design drawings and specifications. Remind constructors that they may perform their own studies if they want to, and *be sure to allow enough time* to permit them to do so. Only then might you be in a position to give constructors the information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions. Conducting prebid and preconstruction conferences can also be valuable in this respect.

Read Responsibility Provisions Closely

Some client representatives, design professionals, and constructors do not realize that geotechnical engineering is far less exact than other engineering disciplines. That lack of understanding has nurtured unrealistic expectations that have resulted in disappointments, delays, cost overruns, claims, and disputes. To confront that risk, geotechnical engineers commonly include explanatory provisions in their reports. Sometimes labeled "limitations," many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely*. Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The personnel, equipment, and techniques used to perform an environmental study – e.g., a "phase-one" or "phase-two" environmental site assessment – differ significantly from those used to perform a geotechnical-engineering study. For that reason, a geotechnical-engineering report does not usually relate any environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated subsurface environmental problems have led to project failures*. If you have not yet obtained your own environmental information, ask your geotechnical consultant for risk-management guidance. As a general rule, *do not rely on an environmental report prepared for a different client, site, or project, or that is more than six months old.*

Obtain Professional Assistance to Deal with Moisture Infiltration and Mold

While your geotechnical engineer may have addressed groundwater, water infiltration, or similar issues in this report, none of the engineer's services were designed, conducted, or intended to prevent uncontrolled migration of moisture – including water vapor – from the soil through building slabs and walls and into the building interior, where it can cause mold growth and material-performance deficiencies. Accordingly, ***proper implementation of the geotechnical engineer's recommendations will not of itself be sufficient to prevent moisture infiltration.*** Confront the risk of moisture infiltration by including building-envelope or mold specialists on the design team. ***Geotechnical engineers are not building-envelope or mold specialists.***

GEOPROFESSIONAL BUSINESS ASSOCIATION

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United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for

Orange County, New York

February 11, 2020

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Soil Map

Map Scale: 1:1,240 if printed on A landscape (11" x 8.5") sheet.

Meters: 0, 15, 30, 60, 90

Feet: 0, 50, 100, 200, 300

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Orange County, New York
Survey Area Data: Version 20, Sep 16, 2019

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Oct 7, 2013—Feb 26, 2017

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
ErB	Erie gravelly silt loam, 3 to 8 percent slopes	0.8	11.5%
PtB	Pittsfield gravelly loam, 3 to 8 percent slopes	2.7	41.0%
PtC	Pittsfield gravelly loam, 8 to 15 percent slopes	1.5	22.9%
PtD	Pittsfield gravelly loam, 15 to 25 percent slopes	1.5	22.6%
SXC	Swartswood and Mardin soils, sloping, very stony	0.1	2.0%
Totals for Area of Interest		**6.5**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Orange County, New York

ErB—Erie gravelly silt loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 9vv9
Mean annual precipitation: 42 to 52 inches
Mean annual air temperature: 46 to 52 degrees F
Frost-free period: 135 to 215 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Erie and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Erie

Setting

Landform: Till plains, drumlinoid ridges, hills
Landform position (two-dimensional): Footslope, summit
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Loamy till derived from siltstone, sandstone, shale, and limestone

Typical profile

H1 - 0 to 9 inches: gravelly silt loam
H2 - 9 to 18 inches: channery silt loam
H3 - 18 to 54 inches: channery silt loam
H4 - 54 to 70 inches: channery silt loam

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 10 to 21 inches to fragipan
Natural drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Available water storage in profile: Very low (about 2.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: D
Hydric soil rating: No

Minor Components

Bath

Percent of map unit: 5 percent
Hydric soil rating: No

Mardin

Percent of map unit: 5 percent
Hydric soil rating: No

Alden

Percent of map unit: 5 percent
Landform: Depressions
Hydric soil rating: Yes

Wurtsboro

Percent of map unit: 5 percent
Hydric soil rating: No

PtB—Pittsfield gravelly loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 9vw8
Elevation: 0 to 1,000 feet
Mean annual precipitation: 42 to 52 inches
Mean annual air temperature: 46 to 52 degrees F
Frost-free period: 135 to 215 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Pittsfield and similar soils: 75 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pittsfield

Setting

Landform: Till plains, drumlinoid ridges, hills
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Crest
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Calcareous loamy till

Typical profile

H1 - 0 to 10 inches: gravelly loam
H2 - 10 to 34 inches: gravelly loam
H3 - 34 to 60 inches: gravelly sandy loam

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None

Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Available water storage in profile: Moderate (about 8.5 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

Hollis
Percent of map unit: 5 percent
Hydric soil rating: No

Bath
Percent of map unit: 5 percent
Hydric soil rating: No

Mardin
Percent of map unit: 5 percent
Hydric soil rating: No

Charlton
Percent of map unit: 5 percent
Hydric soil rating: No

Paxton
Percent of map unit: 5 percent
Hydric soil rating: No

PtC—Pittsfield gravelly loam, 8 to 15 percent slopes

Map Unit Setting
National map unit symbol: 9vw9
Elevation: 0 to 1,000 feet
Mean annual precipitation: 42 to 52 inches
Mean annual air temperature: 46 to 52 degrees F
Frost-free period: 135 to 215 days
Farmland classification: Farmland of statewide importance

Map Unit Composition
Pittsfield and similar soils: 75 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pittsfield

Setting
Landform: Drumlinoid ridges, hills, till plains
Landform position (two-dimensional): Shoulder

Landform position (three-dimensional): Crest
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Calcareous loamy till

Typical profile

H1 - 0 to 9 inches: gravelly loam
H2 - 9 to 31 inches: gravelly loam
H3 - 31 to 60 inches: gravelly sandy loam

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Available water storage in profile: Moderate (about 8.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

Hollis

Percent of map unit: 5 percent
Hydric soil rating: No

Bath

Percent of map unit: 5 percent
Hydric soil rating: No

Mardin

Percent of map unit: 5 percent
Hydric soil rating: No

Charlton

Percent of map unit: 5 percent
Hydric soil rating: No

Paxton

Percent of map unit: 5 percent
Hydric soil rating: No

PtD—Pittsfield gravelly loam, 15 to 25 percent slopes

Map Unit Setting

National map unit symbol: 9vwb
Elevation: 0 to 1,000 feet
Mean annual precipitation: 42 to 52 inches
Mean annual air temperature: 46 to 52 degrees F
Frost-free period: 135 to 215 days
Farmland classification: Not prime farmland

Map Unit Composition

Pittsfield and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pittsfield

Setting

Landform: Drumlinoid ridges, hills, till plains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Calcareous loamy till

Typical profile

H1 - 0 to 8 inches: gravelly loam
H2 - 8 to 28 inches: gravelly loam
H3 - 28 to 60 inches: gravelly sandy loam

Properties and qualities

Slope: 15 to 25 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Available water storage in profile: Moderate (about 8.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

Hollis

Percent of map unit: 5 percent
Hydric soil rating: No

Mardin

Percent of map unit: 5 percent
Hydric soil rating: No

Bath

Percent of map unit: 5 percent
Hydric soil rating: No

Charlton

Percent of map unit: 5 percent
Hydric soil rating: No

SXC—Swartswood and Mardin soils, sloping, very stony

Map Unit Setting

National map unit symbol: 2v30r
Elevation: 330 to 2,460 feet
Mean annual precipitation: 31 to 70 inches
Mean annual air temperature: 39 to 52 degrees F
Frost-free period: 105 to 180 days
Farmland classification: Not prime farmland

Map Unit Composition

Swartswood, very stony, and similar soils: 40 percent
Mardin, very stony, and similar soils: 40 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Swartswood, Very Stony

Setting

Landform: Hills, till plains
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Crest
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy till derived mainly from quartzite, conglomerate, and sandstone

Typical profile

H1 - 0 to 3 inches: gravelly loam
H2 - 3 to 31 inches: gravelly fine sandy loam
H3 - 31 to 60 inches: gravelly fine sandy loam

Properties and qualities

Slope: 8 to 15 percent
Percent of area covered with surface fragments: 1.6 percent
Depth to restrictive feature: 20 to 36 inches to fragipan
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.57 in/hr)
Depth to water table: About 23 to 31 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 3.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: C
Hydric soil rating: No

Description of Mardin, Very Stony

Setting

Landform: Hills, mountains
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Interfluve, side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loamy till

Typical profile

A - 0 to 4 inches: gravelly silt loam
Bw - 4 to 15 inches: gravelly silt loam
E - 15 to 20 inches: gravelly silt loam
Bx - 20 to 72 inches: gravelly silt loam

Properties and qualities

Slope: 8 to 15 percent
Percent of area covered with surface fragments: 1.6 percent
Depth to restrictive feature: 14 to 26 inches to fragipan
Natural drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)
Depth to water table: About 13 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 3.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: D
Hydric soil rating: No

Minor Components

Bath, very stony

Percent of map unit: 5 percent
Landform: Hills, mountains

Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Nose slope, side slope
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Volusia, very stony

Percent of map unit: 5 percent
Landform: Hills, mountains
Landform position (two-dimensional): Footslope, summit
Landform position (three-dimensional): Base slope, interfluve, side slope
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Wurtsboro, very stony

Percent of map unit: 5 percent
Landform: Hills, till plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Crest
Down-slope shape: Concave
Across-slope shape: Convex
Hydric soil rating: No

Lordstown

Percent of map unit: 5 percent
Landform: Mountains, hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank, nose slope, side slope
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

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APPENDIX H:

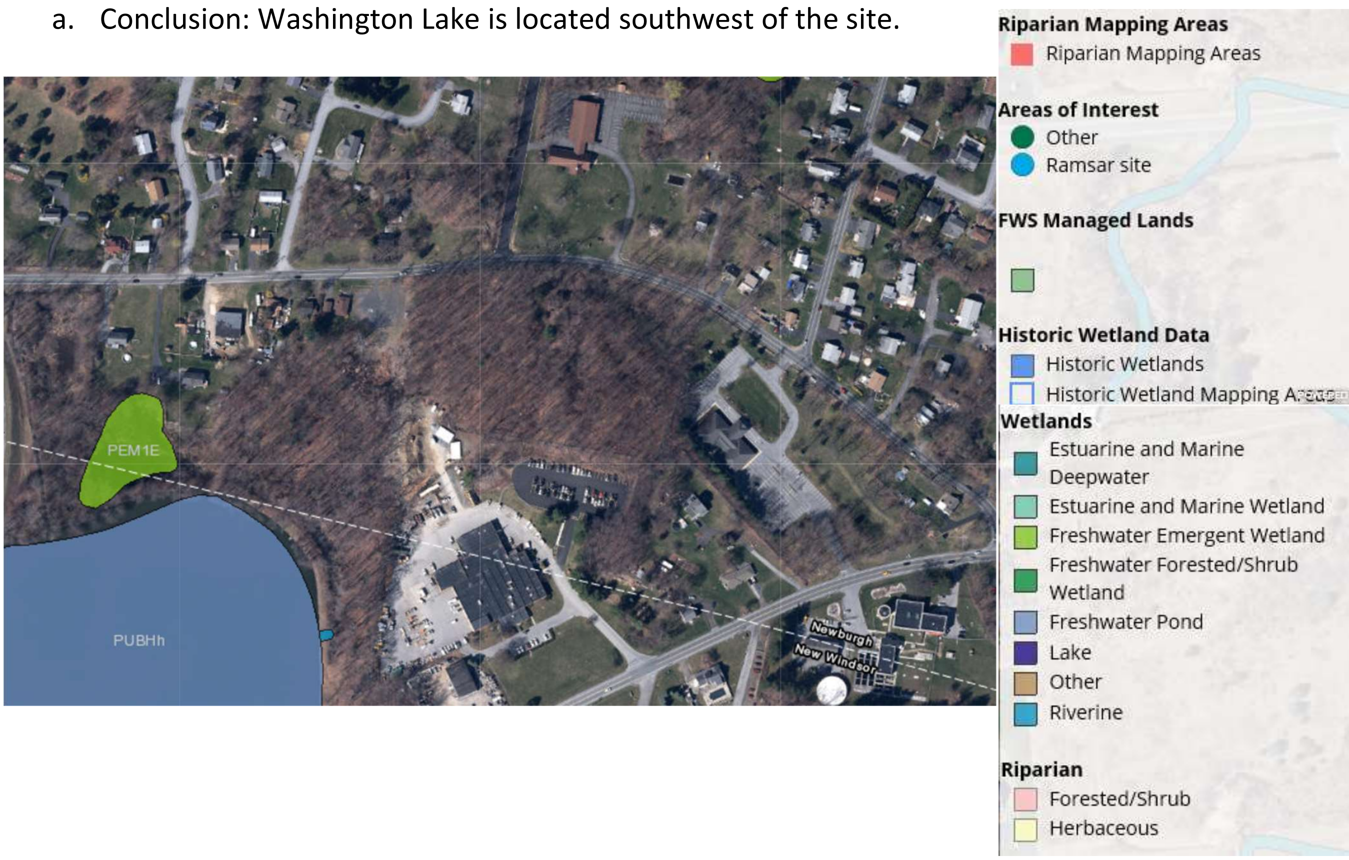
Historical, Cultural, and Environmental Resources

HISTORICAL, CULTURAL, AND ENVIRONMENTAL RESOURCES SUMMARY

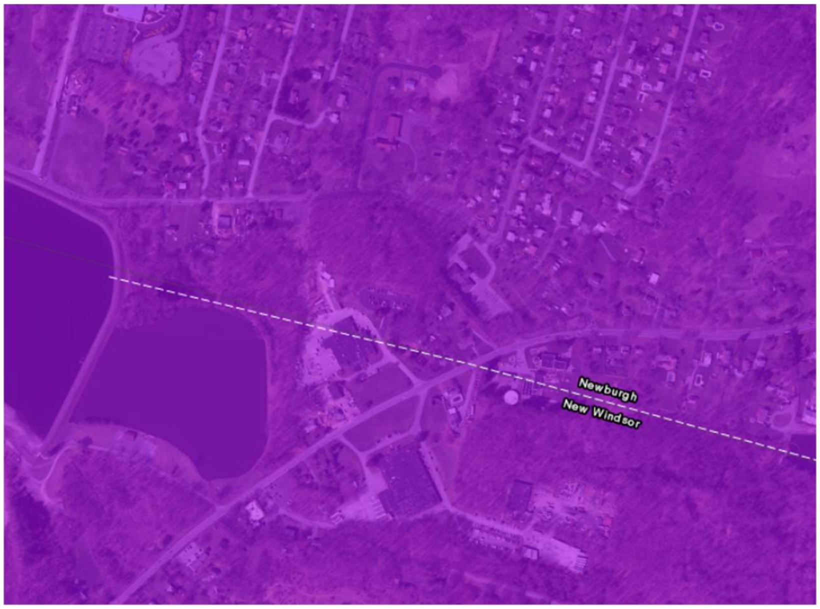
Newburgh Kingdom Hall of Jehovah's Witnesses

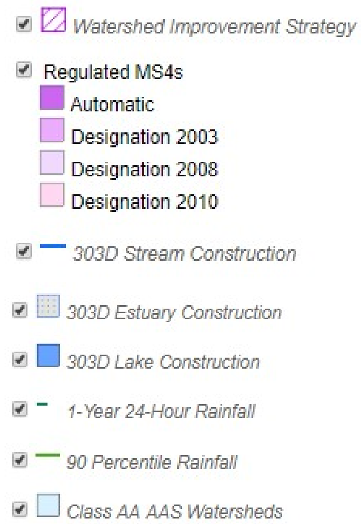
1. USGS Web Soil Survey (http://websoilsurvey.sc.egov.usda.gov/app/homepage.htm)
   a. HSG Classifications
      i. PtB is B
      ii. PtC is B
      iii. PtD is B
      iv. ErB is D
      v. SXC is C

2. National Wetlands Inventory (https://www.fws.gov/wetlands/data/mapper.html)
   a. Conclusion: Washington Lake is located southwest of the site.

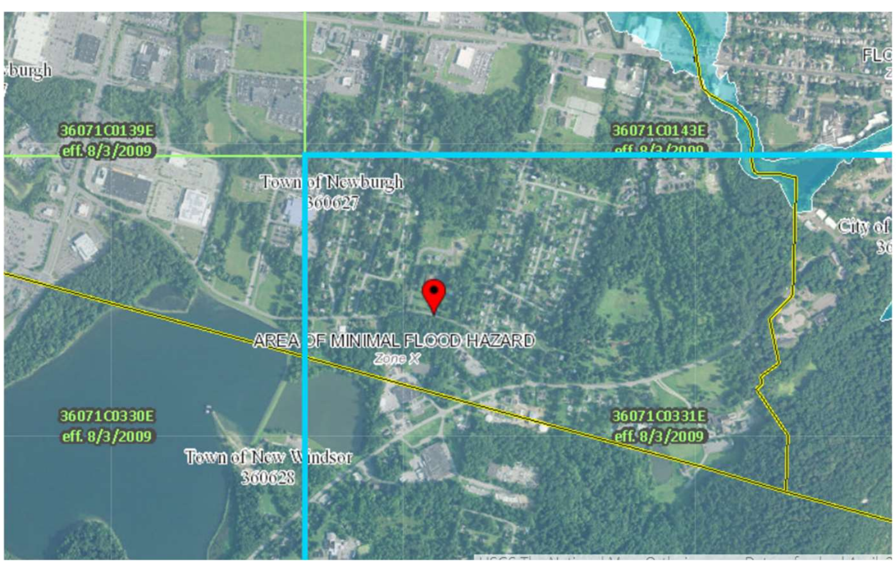


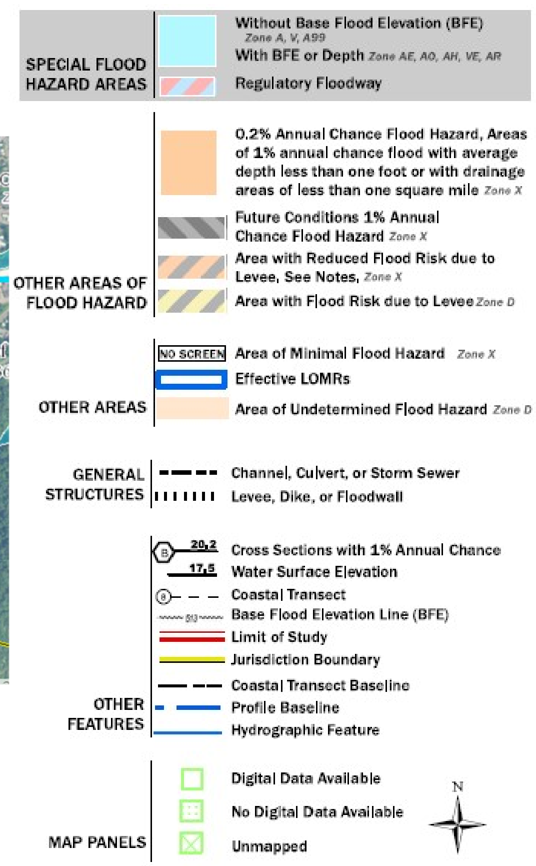
3. NYSDEC's Stormwater Interactive Map (http://www.dec.ny.gov/gis/stormwater/)
   a. Conclusion:
      i. No impaired bodies of water located at the site
      ii. In a regulated MS4 (Town of Newburgh)
      iii. No water bodies on 303D list (https://www.dec.ny.gov/docs/water_pdf/303dListfinal2016.pdf)





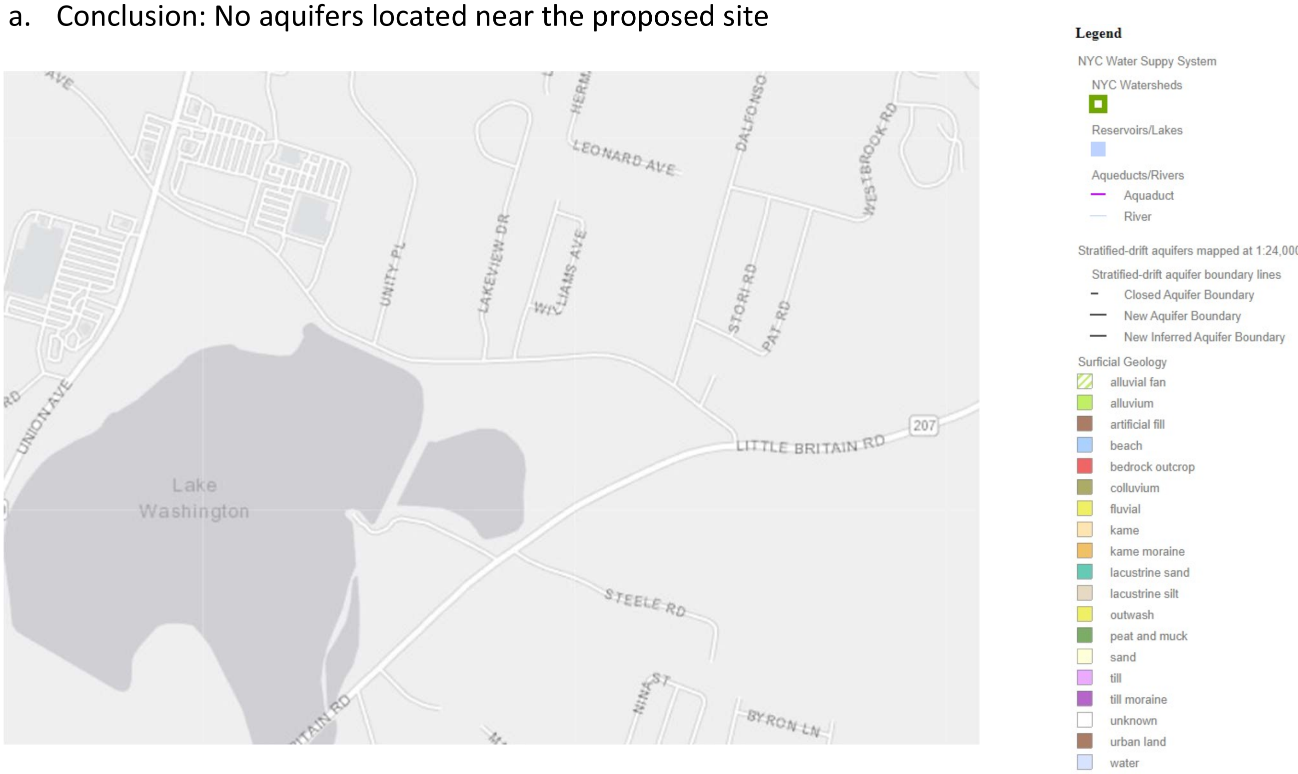
4. FEMA Flood Maps (https://msc.fema.gov/portal)
      i. Conclusion: The site lies within zone X (0.2% annual flood chance)



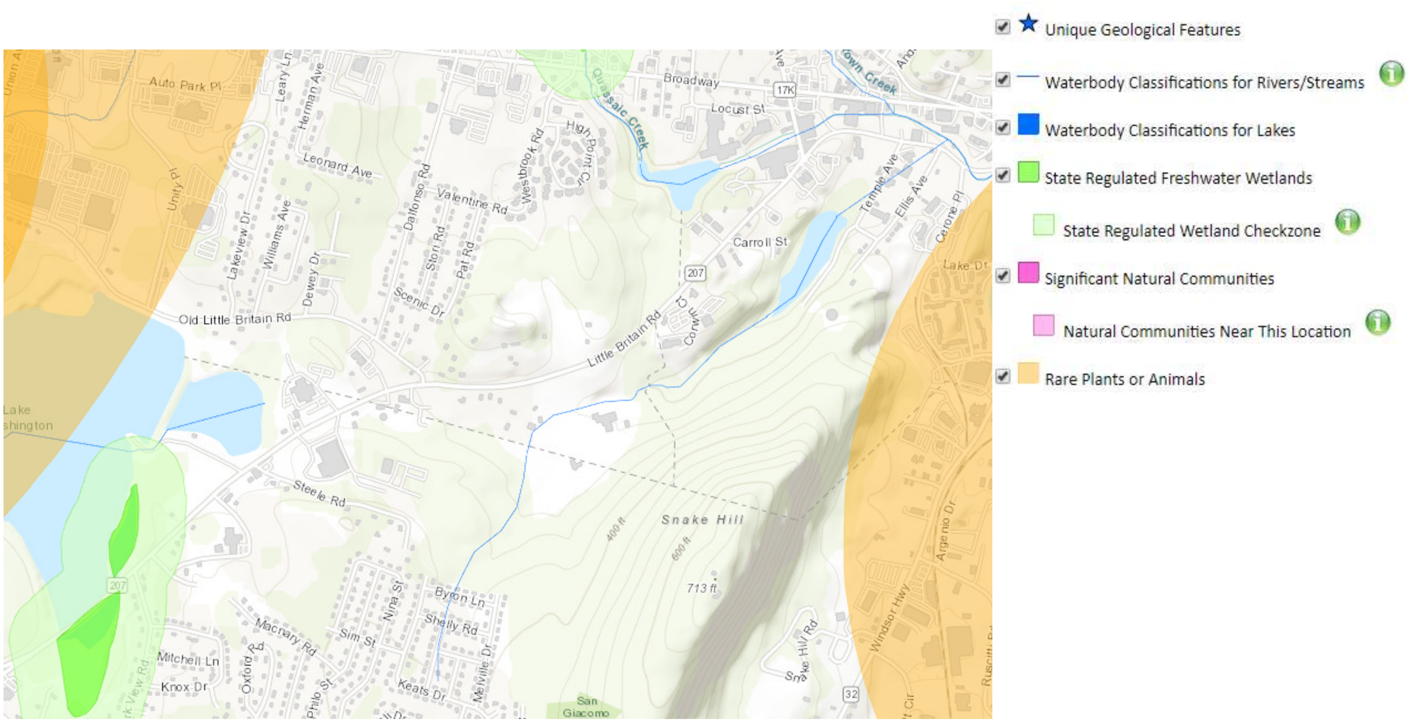


GPI

5. Sole Source, Primary, and Principal Aquifers (https://ny.water.usgs.gov/maps/aquifer/)
    a. Conclusion: No aquifers located near the proposed site

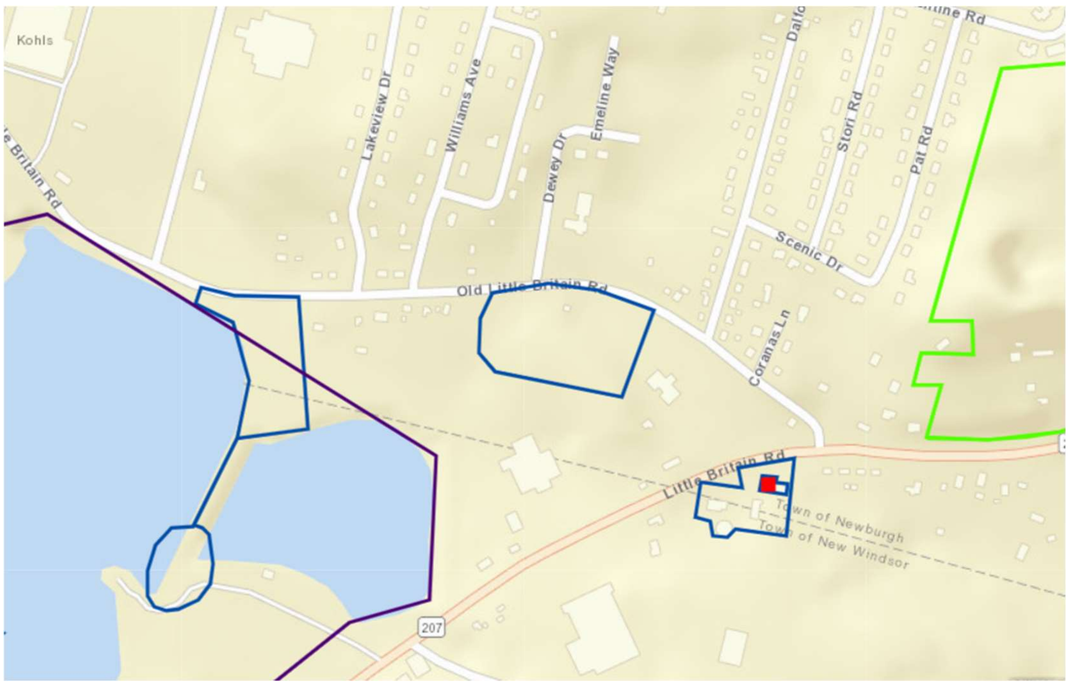


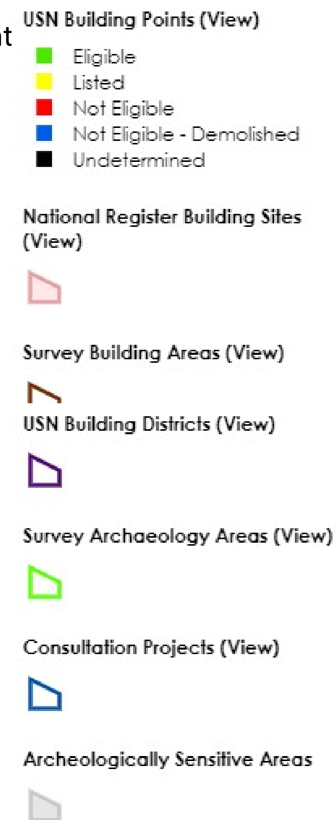
6. NYSDEC's Environmental Resource Mapper (http://www.dec.ny.gov/gis/erm/)
    a. Conclusion: The site contains no significant natural communities, wetlands, or rare plants or animals.



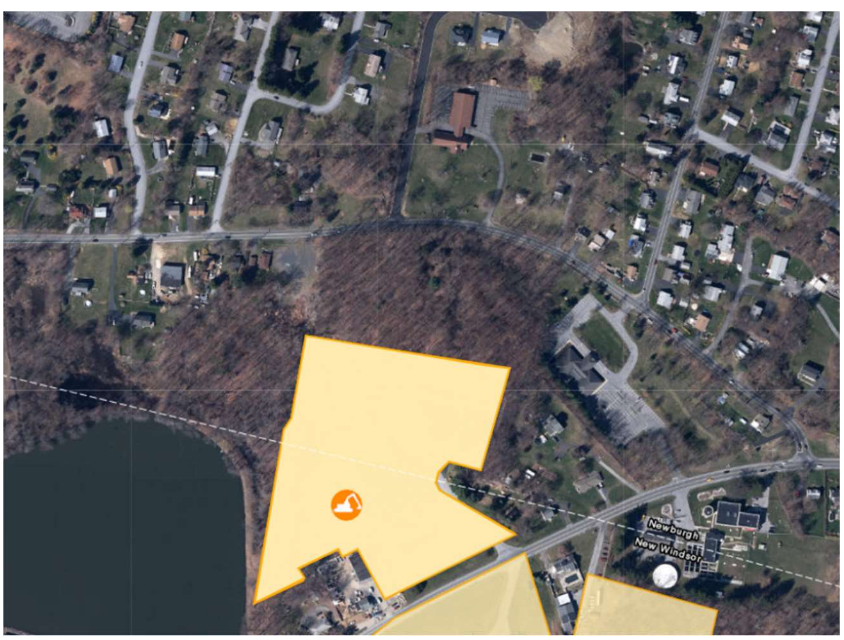
GPI

7. Cultural Resources Information System (http://cris.parks.ny.gov/)
    a. Conclusion: There are no documented historical facilities on or adjacent to the project site.





8. NYSDEC's Info Locator Map (http://www.dec.ny.gov/gis/facilities)
    a. Conclusion:
        i. The property directly adjacent to the south is a closed cleanup site.



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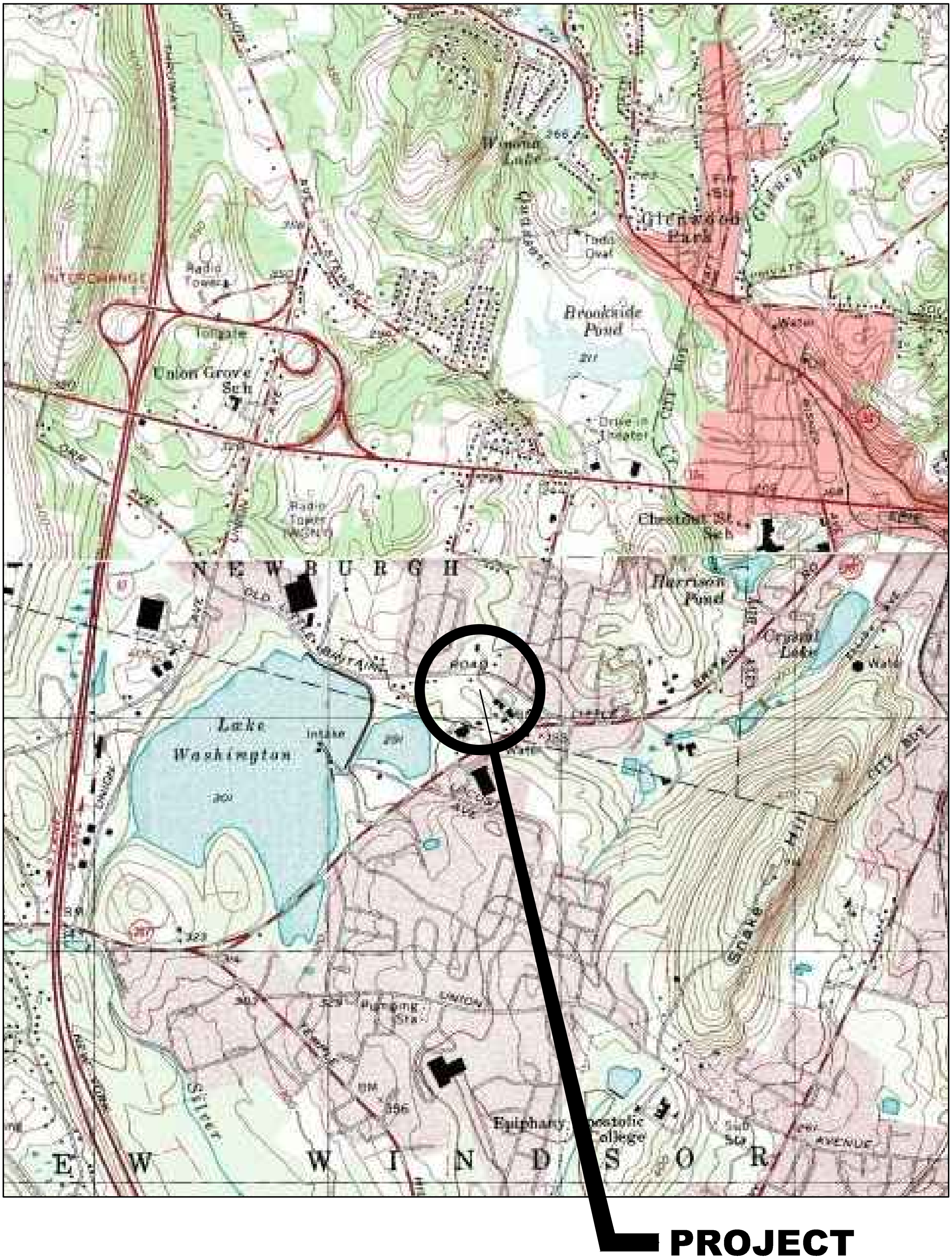
APPENDIX I:

Figures



PROJECT LOCATION

GPI GREENMAN-PEDERSEN, INC CONSULTING ENGINEERS 80 WOLF ROAD, SUITE 300 ALBANY, NY 12205	NEW KINGDOM HALL FOR JEHOVA'S WITNESSES NEWBURGH, NY
	KINGDOM HALL OF JEHOVA'S WITNESSES 33 OLD LITTLE BRITAIN ROAD, TOWN OF NEWBURGH, NY LOCATION MAP

JOB NO.	SCALE:	DATE:	FIGURE NO.
ALB2020015.00	NO SCALE	04/13/2020	1

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Stormwater Interactive Map

Base Map: Satellite with Labels ▼ **Using this map**

Search

Tools

Measurement Tool

Acres

Measurement Result

7.25 Acres

Clear Result

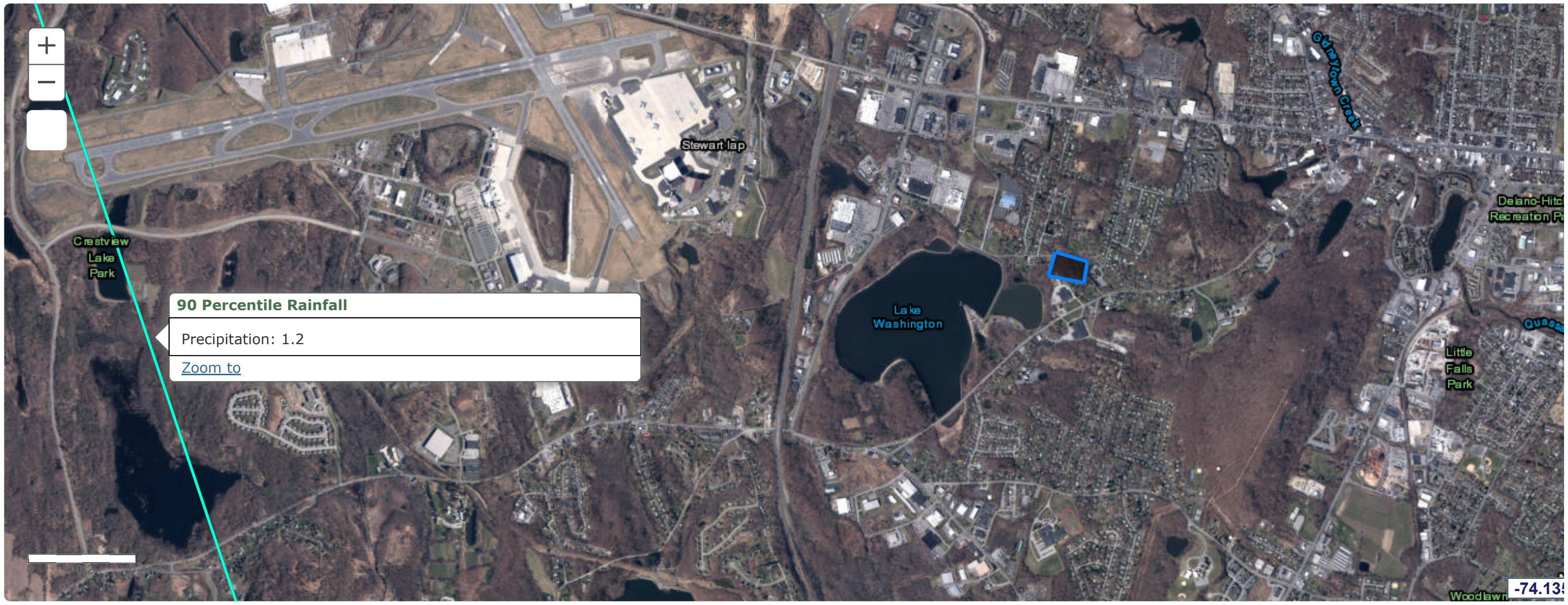
Permit Related Layers

Other Useful Reference Layers

General Permit Information

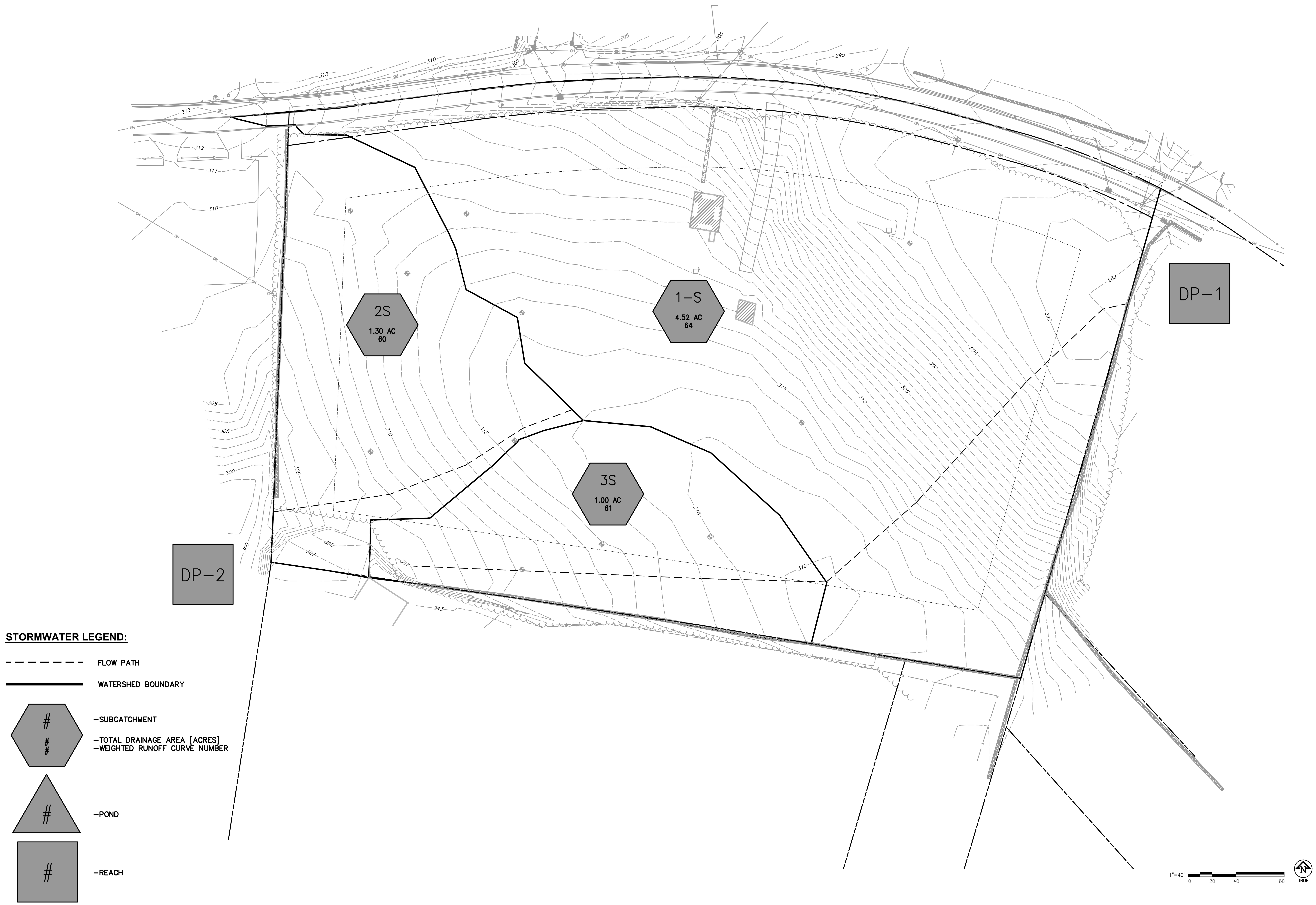
Project Information

Contacts



APPENDIX J:

Pre-Development Drainage and HydroCAD Calculations



CIVIL ENGINEER

GPI Engineering Design Planning Construction Management

518.453.9431 GPINET.COM

Greenman-Pedersen, Inc.
80 Wolf Road, Suite 300
Albany, NY 12205

STATE OF NEW YORK
GREENMAN-PEDERSEN, INC.
No. 131
LICENSED PROFESSIONAL ENGINEER

CONSULTANT:

NOT FOR CONSTRUCTION
THIS DRAWING PROVIDED ONLY FOR
REVIEW AND APPROVAL

MARK:	DATE:	DESCRIPTION:
–	28 APR 23	SUBMISSION TO TOWN
–	15 FEB 23	SUBMISSION TO TOWN
–	11 NOV 22	SUBMISSION TO TOWN
–	20 OCT 22	GPI CONCEPT FOR REVIEW
–	16 SEP 22	CONCEPT FOR REVIEW

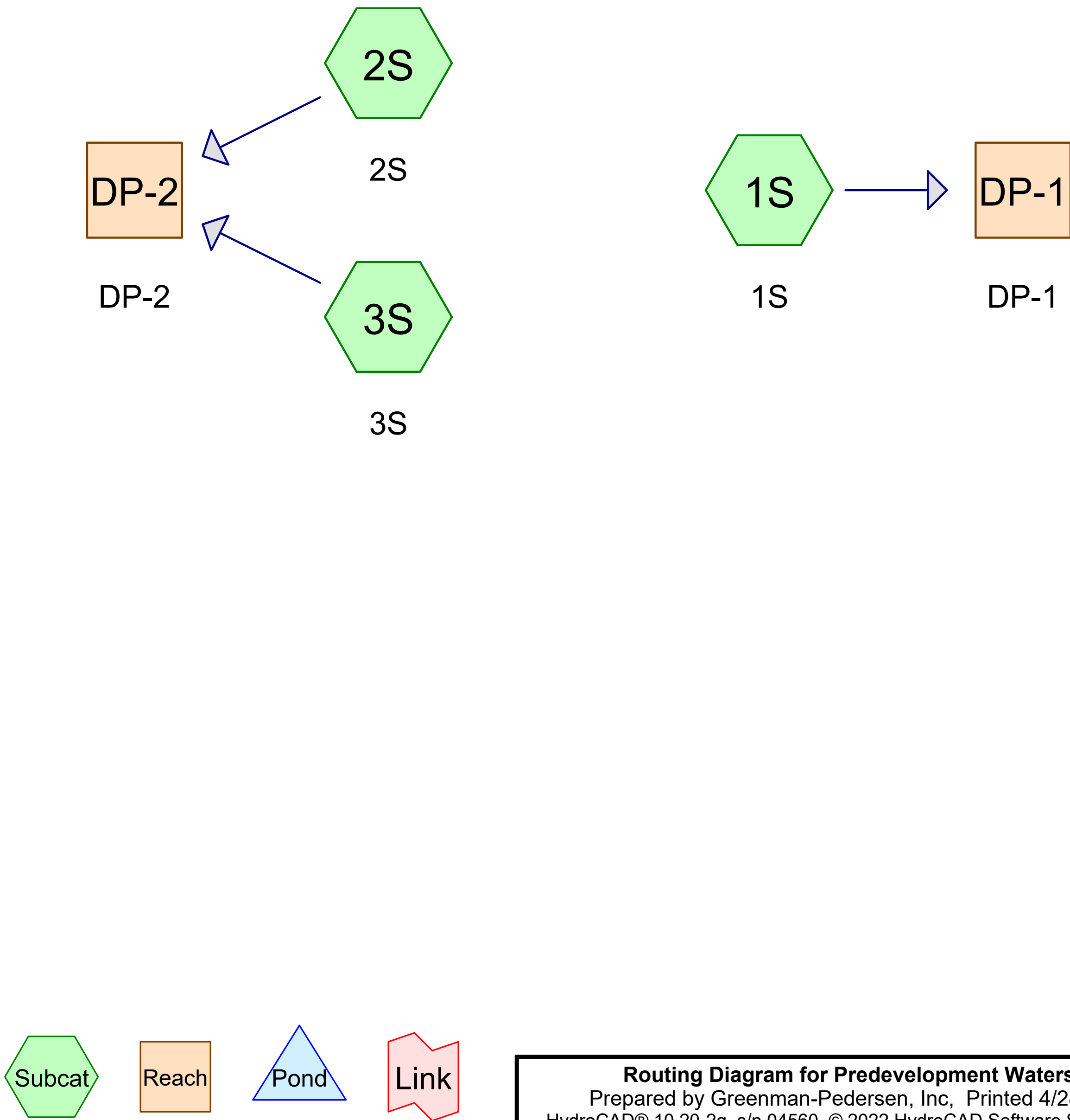
OWNER:
JW CONGREGATION SUPPORT, INC.
1005 RED MILLS ROAD
WALLKILL, NY 12589-3283

PROJECT TITLE:
NEWBURGH KINGDOM HALL OF JEHOVAH'S WITNESSES
33 OLD LITTLE BRITAIN RD
NEWBURGH, NY 12550

SHEET TITLE:
PRE-DEVELOPMENT WATERSHEDS

PROJECT No.
37147

SHEET No.
FIG. 1



Routing Diagram for Predevelopment Watershed
Prepared by Greenman-Pedersen, Inc, Printed 4/28/2023
HydroCAD® 10.20-2g s/n 04560 © 2022 HydroCAD Software Solutions LLC

Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	1-yr	NY-JW NEWBURGH 24-hr S1	1-yr	Default	24.00	1	2.60	2
2	10-yr	NY-JW NEWBURGH 24-hr S1	10-yr	Default	24.00	1	4.70	2
3	100-yr	NY-JW NEWBURGH 24-hr S1	100-yr	Default	24.00	1	8.38	2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.240	98	Paved parking, HSG B (1S)
5.860	60	Woods, Fair, HSG B (1S, 2S, 3S)
0.070	79	Woods, Fair, HSG D (3S)
0.650	77	Woods, Good, HSG D (1S)
6.820	**63**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
6.100	HSG B	1S, 2S, 3S
0.000	HSG C	
0.720	HSG D	1S, 3S
0.000	Other	
6.820		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.240	0.000	0.000	0.000	0.240	Paved parking	1S
0.000	5.860	0.000	0.070	0.000	5.930	Woods, Fair	1S, 2S, 3S
0.000	0.000	0.000	0.650	0.000	0.650	Woods, Good	1S
0.000	**6.100**	**0.000**	**0.720**	**0.000**	**6.820**	**TOTAL AREA**	

Time span=5.00-30.00 hrs, dt=0.05 hrs, 501 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: 1S Runoff Area=4.520 ac 5.31% Impervious Runoff Depth=0.31"
Flow Length=345' Tc=16.8 min CN=64 Runoff=0.61 cfs 0.115 af

Subcatchment2S: 2S Runoff Area=1.300 ac 0.00% Impervious Runoff Depth=0.20"
Flow Length=265' Tc=18.5 min CN=60 Runoff=0.08 cfs 0.022 af

Subcatchment3S: 3S Runoff Area=1.000 ac 0.00% Impervious Runoff Depth=0.23"
Flow Length=348' Tc=25.7 min CN=61 Runoff=0.07 cfs 0.019 af

Reach DP-1: DP-1 Inflow=0.61 cfs 0.115 af
Outflow=0.61 cfs 0.115 af

Reach DP-2: DP-2 Inflow=0.15 cfs 0.041 af
Outflow=0.15 cfs 0.041 af

Total Runoff Area = 6.820 ac Runoff Volume = 0.156 af Average Runoff Depth = 0.27"
96.48% Pervious = 6.580 ac 3.52% Impervious = 0.240 ac

Summary for Subcatchment 1S: 1S

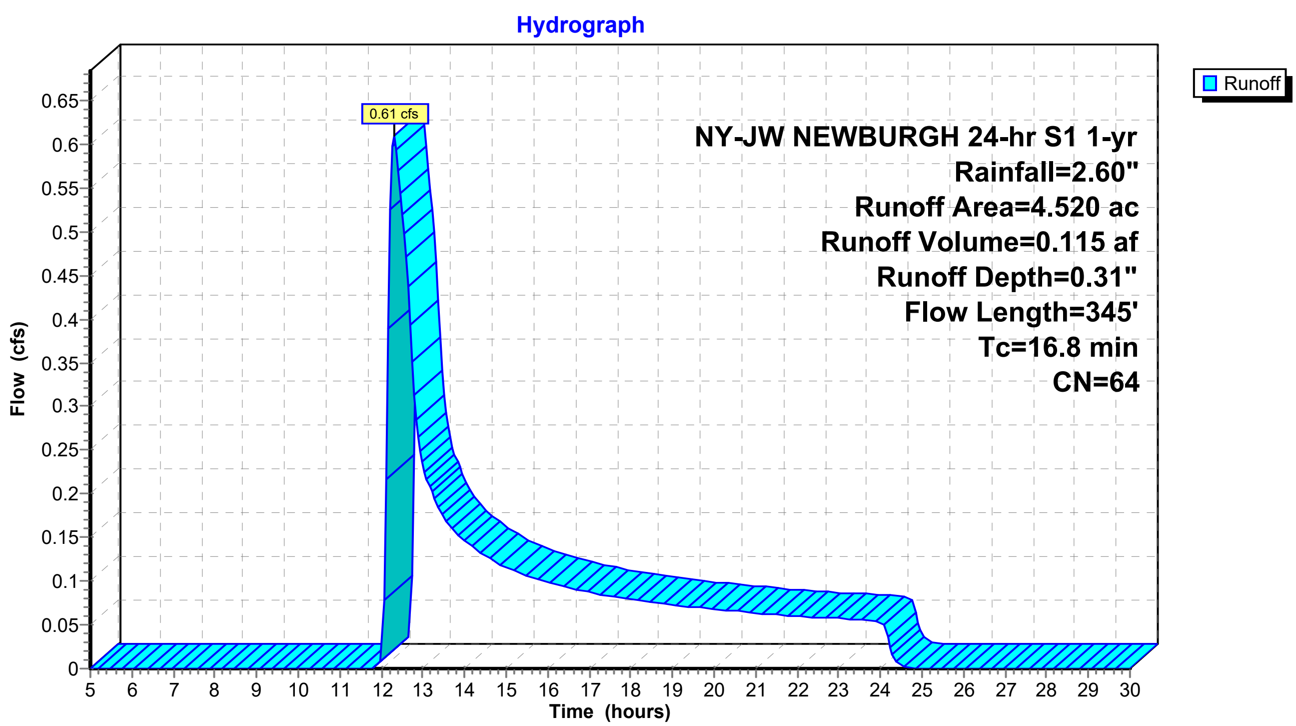
Runoff = 0.61 cfs @ 12.30 hrs, Volume= 0.115 af, Depth= 0.31"
Routed to Reach DP-1 : DP-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
NY-JW NEWBURGH 24-hr S1 1-yr Rainfall=2.60"

Area (ac)	CN	Description
3.630	60	Woods, Fair, HSG B
0.240	98	Paved parking, HSG B
0.650	77	Woods, Good, HSG D
4.520	64	Weighted Average
4.280		94.69% Pervious Area
0.240		5.31% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.9	100	0.0600	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.15"
1.2	136	0.1470	1.92		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.7	109	0.0460	1.07		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
16.8	345	Total			

Subcatchment 1S: 1S



Summary for Subcatchment 2S: 2S

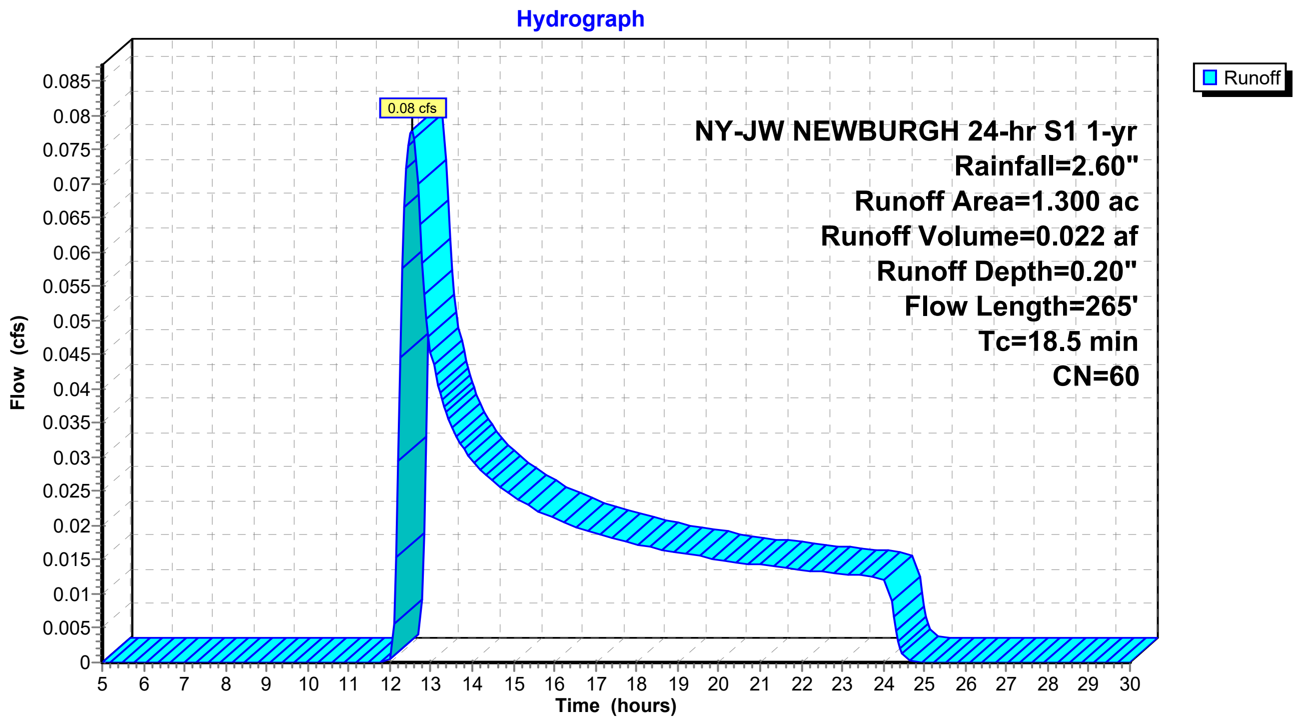
Runoff = 0.08 cfs @ 12.55 hrs, Volume= 0.022 af, Depth= 0.20"
Routed to Reach DP-2 : DP-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
NY-JW NEWBURGH 24-hr S1 1-yr Rainfall=2.60"

Area (ac)	CN	Description
1.300	60	Woods, Fair, HSG B
1.300		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.4	100	0.0400	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.15"
2.1	165	0.0670	1.29		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
18.5	265	Total			

Subcatchment 2S: 2S



Summary for Subcatchment 3S: 3S

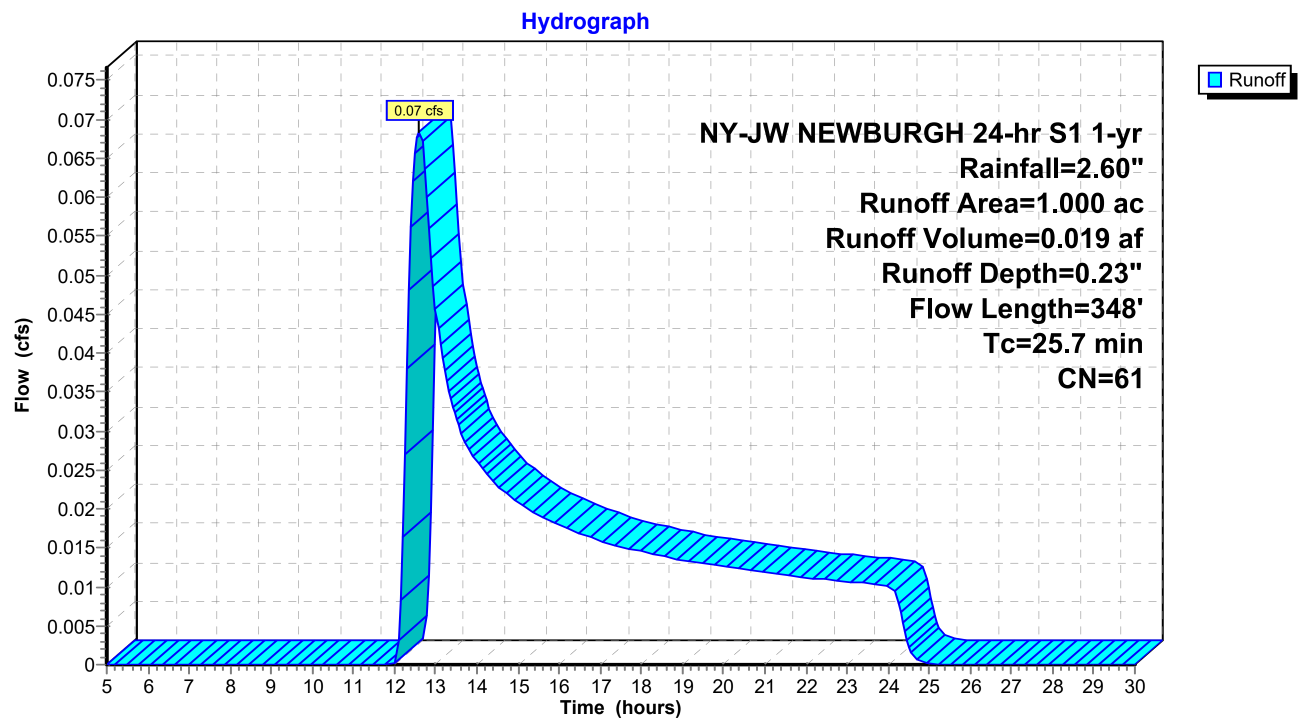
Runoff = 0.07 cfs @ 12.61 hrs, Volume= 0.019 af, Depth= 0.23"
Routed to Reach DP-2 : DP-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
NY-JW NEWBURGH 24-hr S1 1-yr Rainfall=2.60"

Area (ac)	CN	Description
0.930	60	Woods, Fair, HSG B
0.070	79	Woods, Fair, HSG D
1.000	61	Weighted Average
1.000		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.6	100	0.0200	0.08		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.15"
4.1	248	0.0400	1.00		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
25.7	348	Total			

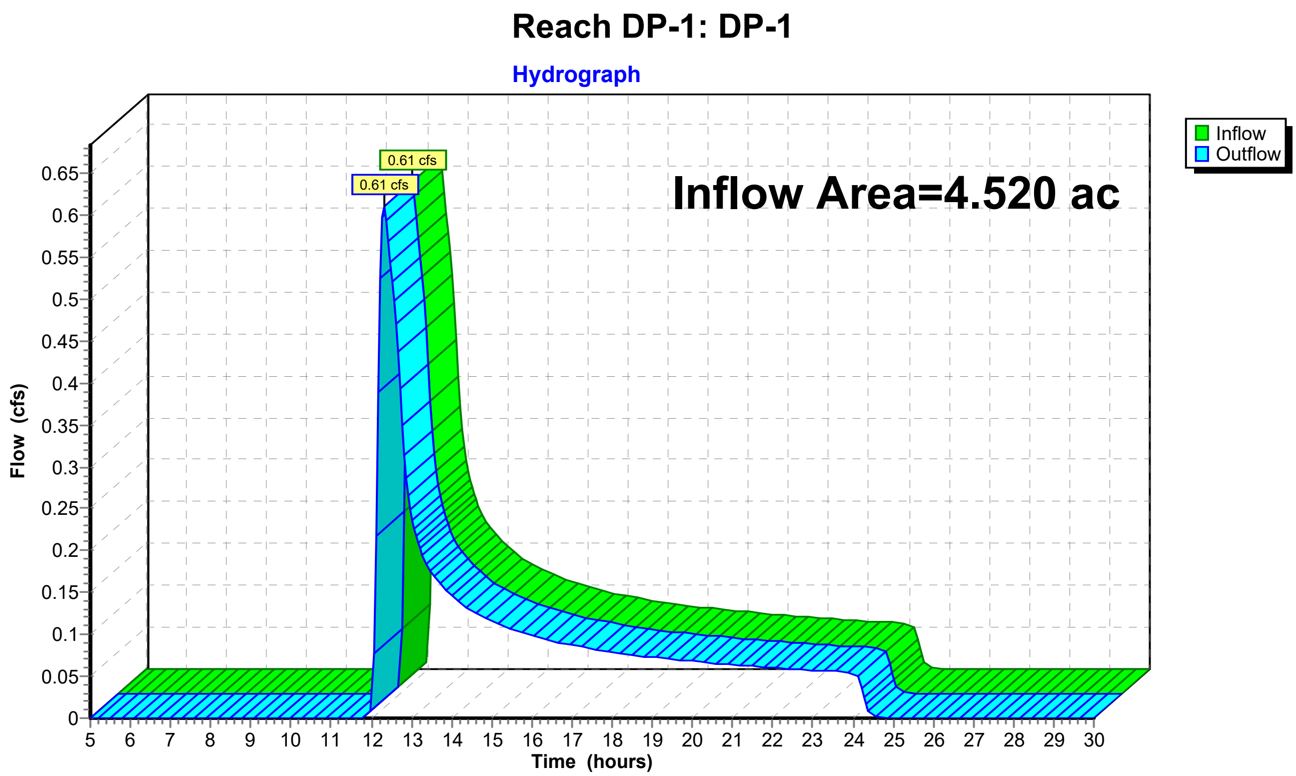
Subcatchment 3S: 3S



Summary for Reach DP-1: DP-1

Inflow Area =	4.520 ac,	5.31% Impervious, Inflow Depth = 0.31"	for 1-yr event	
Inflow =	0.61 cfs @	12.30 hrs, Volume=	0.115 af	
Outflow =	0.61 cfs @	12.30 hrs, Volume=	0.115 af,	Atten= 0%, Lag= 0.0 min

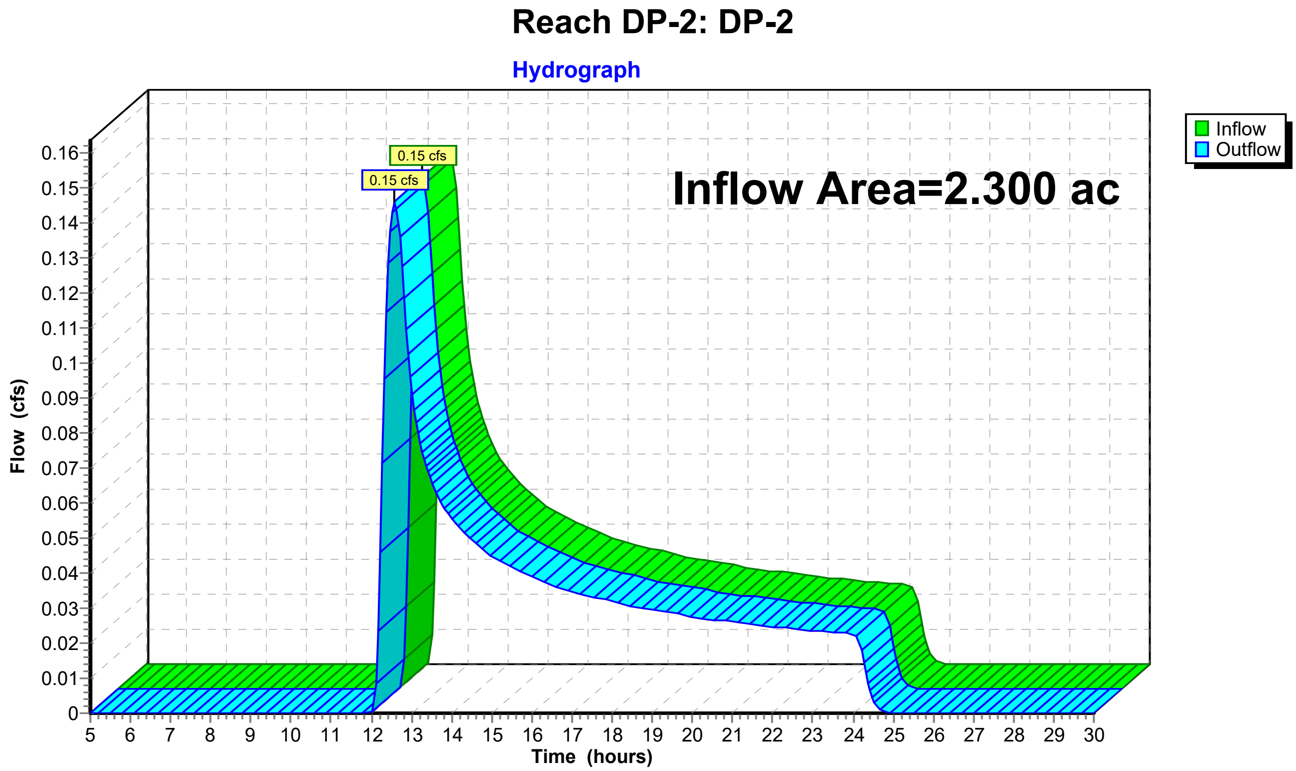
Routing by Stor-Ind+Trans method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs



Summary for Reach DP-2: DP-2

Inflow Area =	2.300 ac,	0.00% Impervious,	Inflow Depth = 0.21"	for 1-yr event	
Inflow =	0.15 cfs @	12.58 hrs,	Volume=	0.041 af	
Outflow =	0.15 cfs @	12.58 hrs,	Volume=	0.041 af,	Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs



Time span=5.00-30.00 hrs, dt=0.05 hrs, 501 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: 1S Runoff Area=4.520 ac 5.31% Impervious Runoff Depth=1.39"
Flow Length=345' Tc=16.8 min CN=64 Runoff=4.67 cfs 0.523 af

Subcatchment2S: 2S Runoff Area=1.300 ac 0.00% Impervious Runoff Depth=1.13"
Flow Length=265' Tc=18.5 min CN=60 Runoff=0.97 cfs 0.122 af

Subcatchment3S: 3S Runoff Area=1.000 ac 0.00% Impervious Runoff Depth=1.19"
Flow Length=348' Tc=25.7 min CN=61 Runoff=0.69 cfs 0.099 af

Reach DP-1: DP-1 Inflow=4.67 cfs 0.523 af
Outflow=4.67 cfs 0.523 af

Reach DP-2: DP-2 Inflow=1.60 cfs 0.222 af
Outflow=1.60 cfs 0.222 af

Total Runoff Area = 6.820 ac Runoff Volume = 0.745 af Average Runoff Depth = 1.31"
96.48% Pervious = 6.580 ac 3.52% Impervious = 0.240 ac

Summary for Subcatchment 1S: 1S

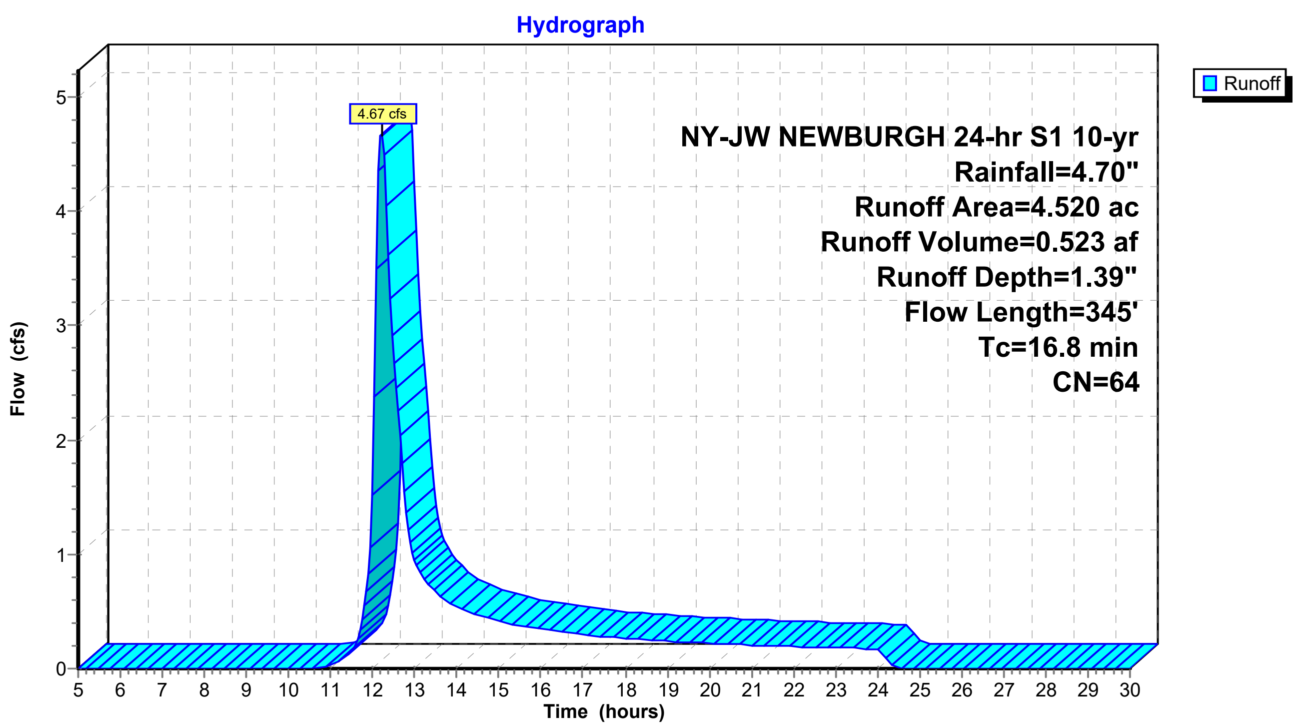
Runoff = 4.67 cfs @ 12.21 hrs, Volume= 0.523 af, Depth= 1.39"
Routed to Reach DP-1 : DP-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
NY-JW NEWBURGH 24-hr S1 10-yr Rainfall=4.70"

Area (ac)	CN	Description
3.630	60	Woods, Fair, HSG B
0.240	98	Paved parking, HSG B
0.650	77	Woods, Good, HSG D
4.520	64	Weighted Average
4.280		94.69% Pervious Area
0.240		5.31% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.9	100	0.0600	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.15"
1.2	136	0.1470	1.92		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.7	109	0.0460	1.07		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
16.8	345	Total			

Subcatchment 1S: 1S



Summary for Subcatchment 2S: 2S

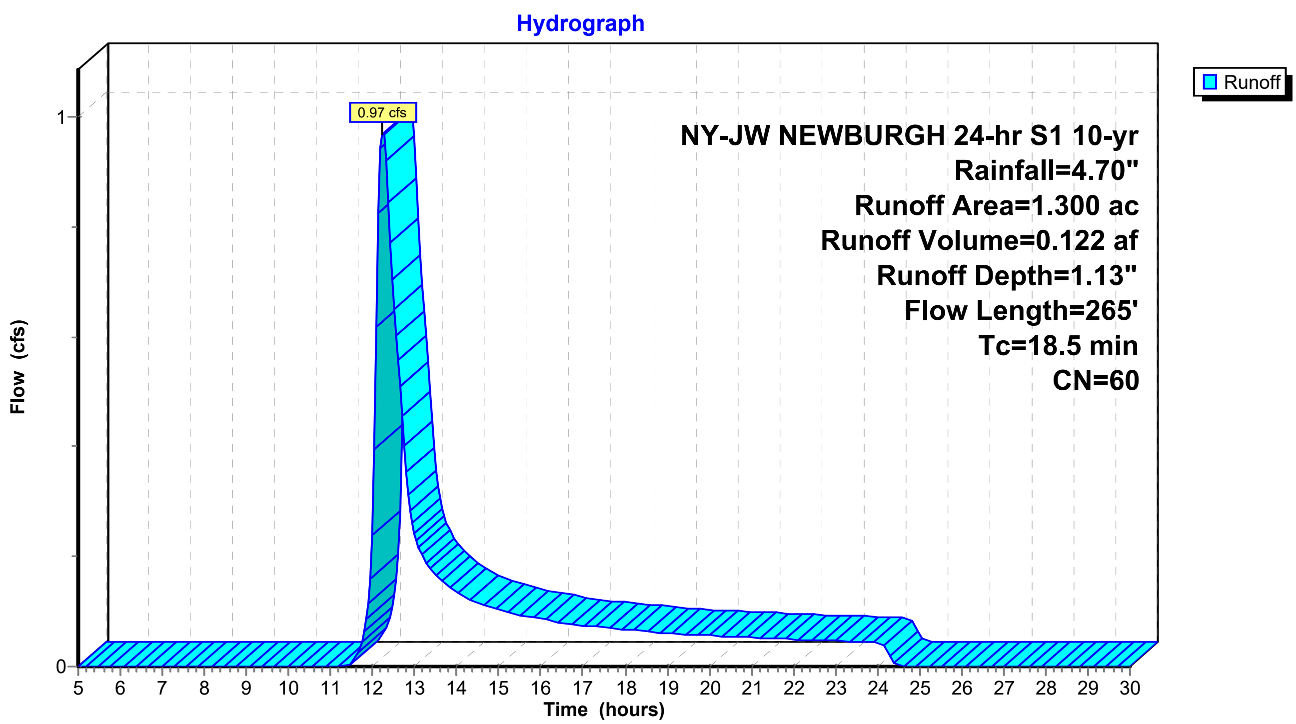
Runoff = 0.97 cfs @ 12.24 hrs, Volume= 0.122 af, Depth= 1.13"
Routed to Reach DP-2 : DP-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
NY-JW NEWBURGH 24-hr S1 10-yr Rainfall=4.70"

Area (ac)	CN	Description
1.300	60	Woods, Fair, HSG B
1.300		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.4	100	0.0400	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.15"
2.1	165	0.0670	1.29		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
18.5	265	Total			

Subcatchment 2S: 2S



Summary for Subcatchment 3S: 3S

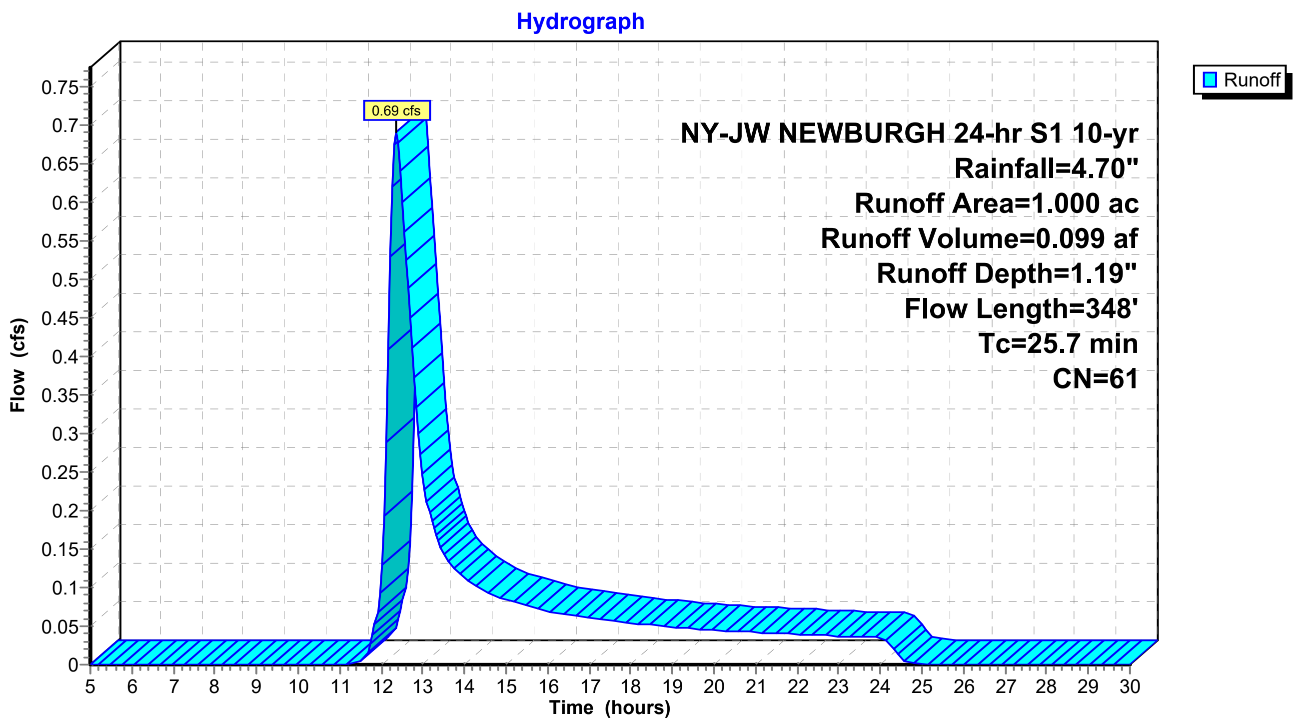
Runoff = 0.69 cfs @ 12.35 hrs, Volume= 0.099 af, Depth= 1.19"
Routed to Reach DP-2 : DP-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
NY-JW NEWBURGH 24-hr S1 10-yr Rainfall=4.70"

Area (ac)	CN	Description
0.930	60	Woods, Fair, HSG B
0.070	79	Woods, Fair, HSG D
1.000	61	Weighted Average
1.000		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.6	100	0.0200	0.08		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.15"
4.1	248	0.0400	1.00		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
25.7	348	Total			

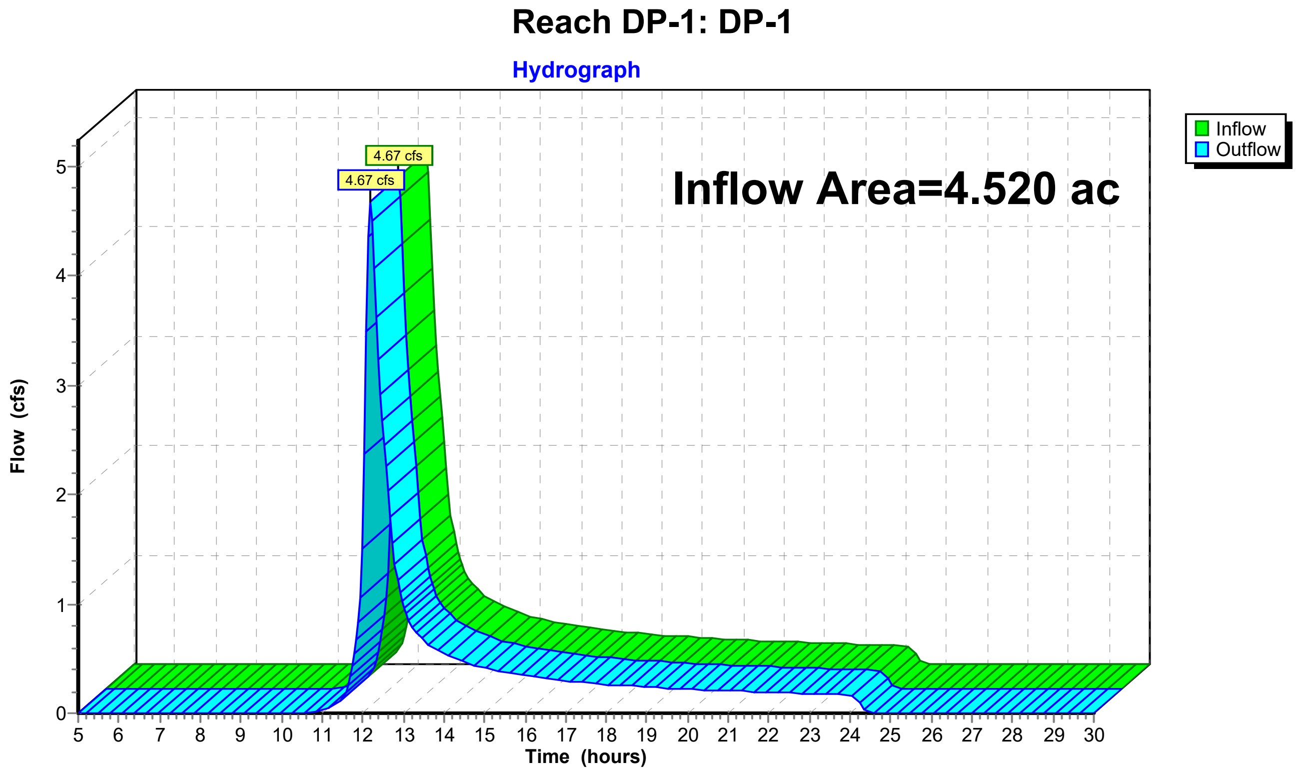
Subcatchment 3S: 3S



Summary for Reach DP-1: DP-1

Inflow Area = 4.520 ac, 5.31% Impervious, Inflow Depth = 1.39" for 10-yr event
Inflow = 4.67 cfs @ 12.21 hrs, Volume= 0.523 af
Outflow = 4.67 cfs @ 12.21 hrs, Volume= 0.523 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs

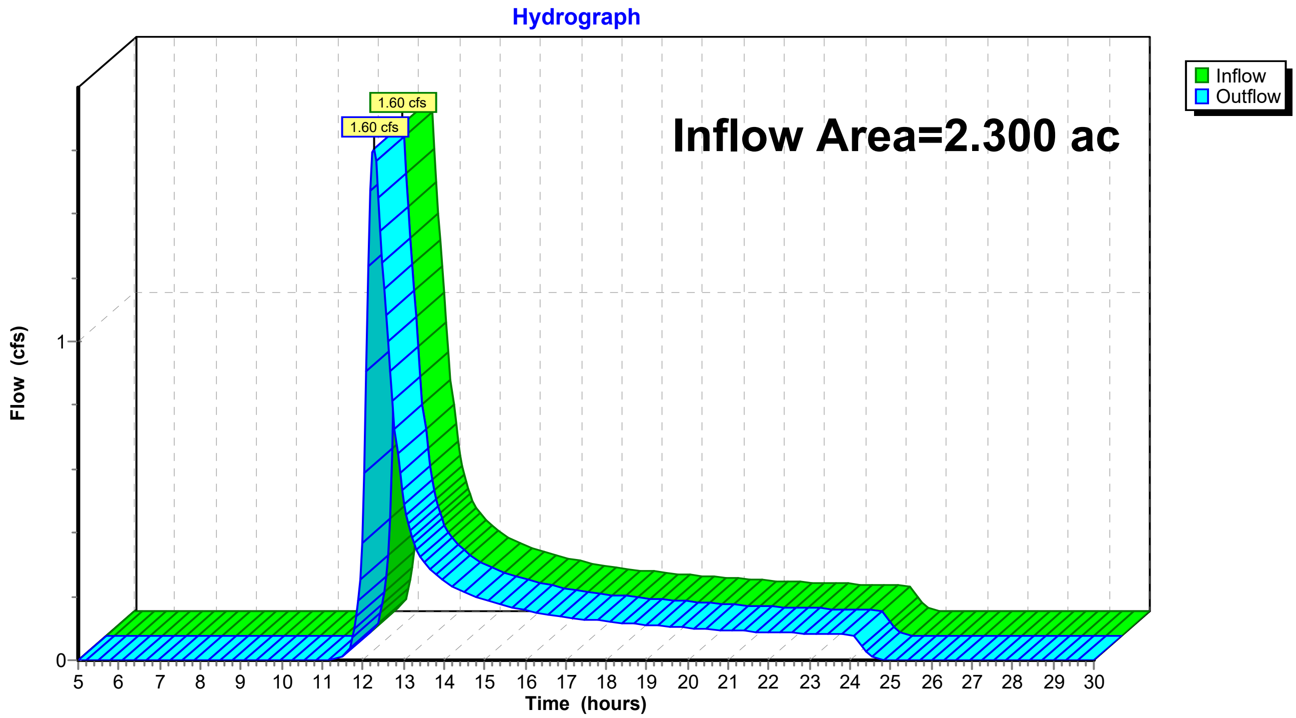


Summary for Reach DP-2: DP-2

Inflow Area = 2.300 ac, 0.00% Impervious, Inflow Depth = 1.16" for 10-yr event
Inflow = 1.60 cfs @ 12.28 hrs, Volume= 0.222 af
Outflow = 1.60 cfs @ 12.28 hrs, Volume= 0.222 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs

Reach DP-2: DP-2



Time span=5.00-30.00 hrs, dt=0.05 hrs, 501 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: 1S Runoff Area=4.520 ac 5.31% Impervious Runoff Depth=4.09"
Flow Length=345' Tc=16.8 min CN=64 Runoff=14.02 cfs 1.539 af

Subcatchment2S: 2S Runoff Area=1.300 ac 0.00% Impervious Runoff Depth=3.62"
Flow Length=265' Tc=18.5 min CN=60 Runoff=3.39 cfs 0.392 af

Subcatchment3S: 3S Runoff Area=1.000 ac 0.00% Impervious Runoff Depth=3.74"
Flow Length=348' Tc=25.7 min CN=61 Runoff=2.33 cfs 0.311 af

Reach DP-1: DP-1 Inflow=14.02 cfs 1.539 af
Outflow=14.02 cfs 1.539 af

Reach DP-2: DP-2 Inflow=5.54 cfs 0.704 af
Outflow=5.54 cfs 0.704 af

Total Runoff Area = 6.820 ac Runoff Volume = 2.243 af Average Runoff Depth = 3.95"
96.48% Pervious = 6.580 ac 3.52% Impervious = 0.240 ac

Summary for Subcatchment 1S: 1S

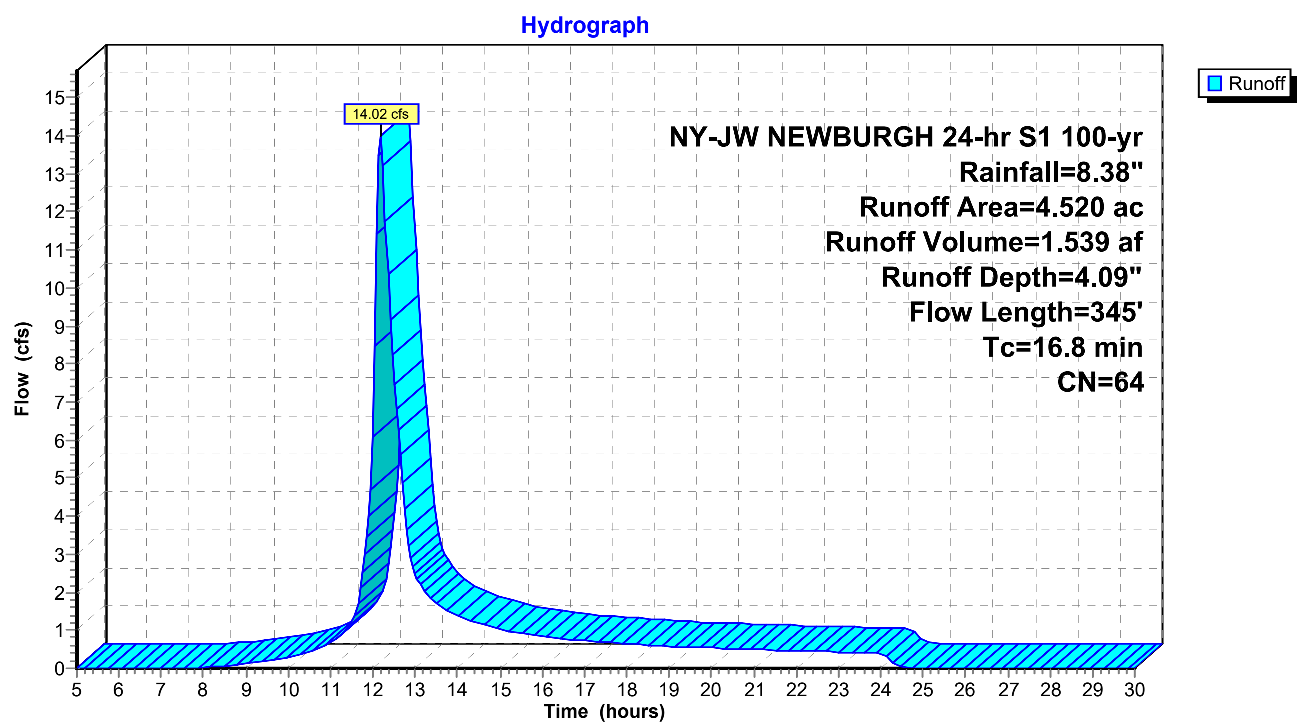
Runoff = 14.02 cfs @ 12.19 hrs, Volume= 1.539 af, Depth= 4.09"
Routed to Reach DP-1 : DP-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
NY-JW NEWBURGH 24-hr S1 100-yr Rainfall=8.38"

Area (ac)	CN	Description
3.630	60	Woods, Fair, HSG B
0.240	98	Paved parking, HSG B
0.650	77	Woods, Good, HSG D
4.520	64	Weighted Average
4.280		94.69% Pervious Area
0.240		5.31% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.9	100	0.0600	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.15"
1.2	136	0.1470	1.92		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.7	109	0.0460	1.07		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
16.8	345	Total			

Subcatchment 1S: 1S



Summary for Subcatchment 2S: 2S

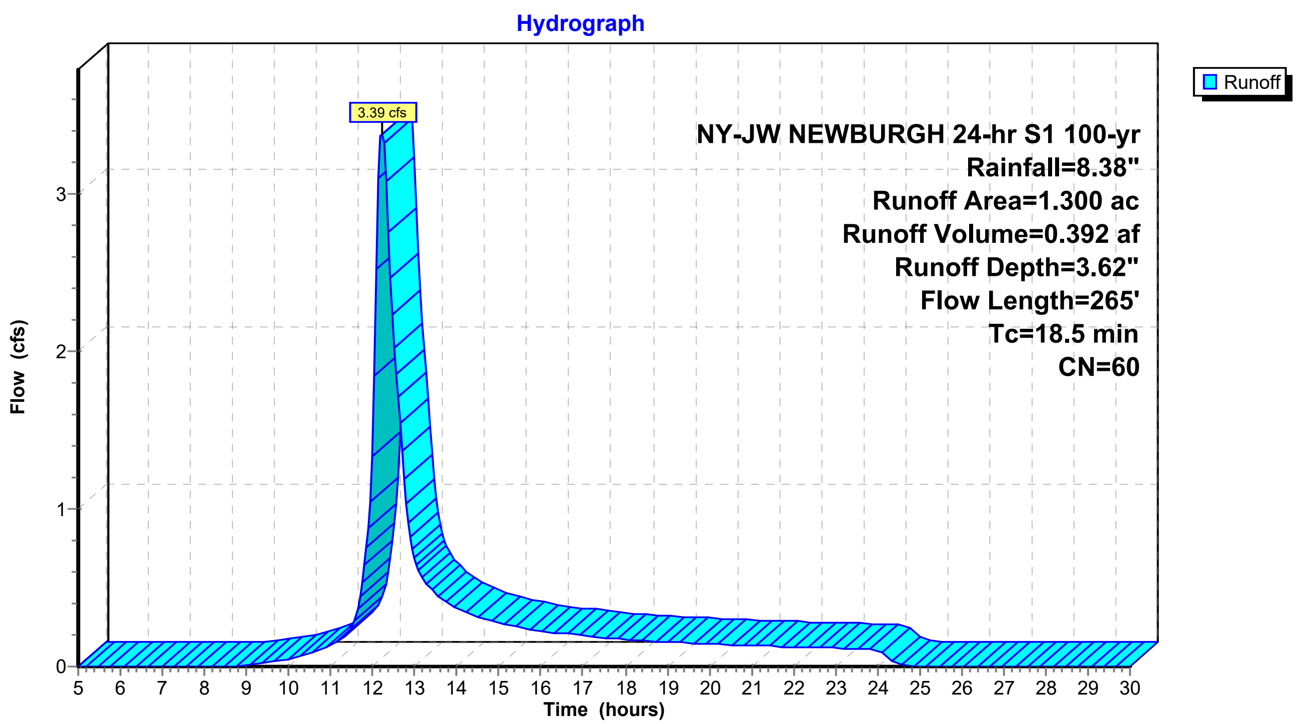
Runoff = 3.39 cfs @ 12.22 hrs, Volume= 0.392 af, Depth= 3.62"
Routed to Reach DP-2 : DP-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
NY-JW NEWBURGH 24-hr S1 100-yr Rainfall=8.38"

Area (ac)	CN	Description
1.300	60	Woods, Fair, HSG B
1.300		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.4	100	0.0400	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.15"
2.1	165	0.0670	1.29		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
18.5	265	Total			

Subcatchment 2S: 2S



Summary for Subcatchment 3S: 3S

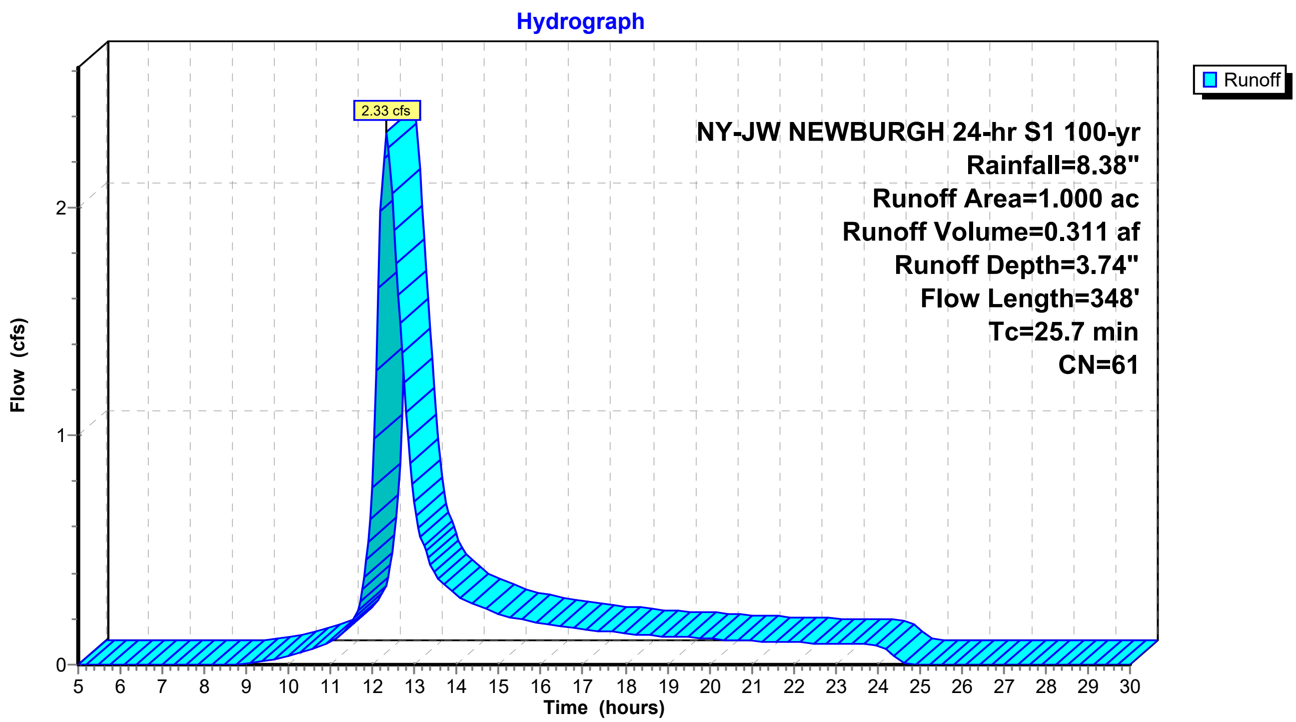
Runoff = 2.33 cfs @ 12.32 hrs, Volume= 0.311 af, Depth= 3.74"
Routed to Reach DP-2 : DP-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
NY-JW NEWBURGH 24-hr S1 100-yr Rainfall=8.38"

Area (ac)	CN	Description
0.930	60	Woods, Fair, HSG B
0.070	79	Woods, Fair, HSG D
1.000	61	Weighted Average
1.000		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.6	100	0.0200	0.08		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.15"
4.1	248	0.0400	1.00		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
25.7	348	Total			

Subcatchment 3S: 3S

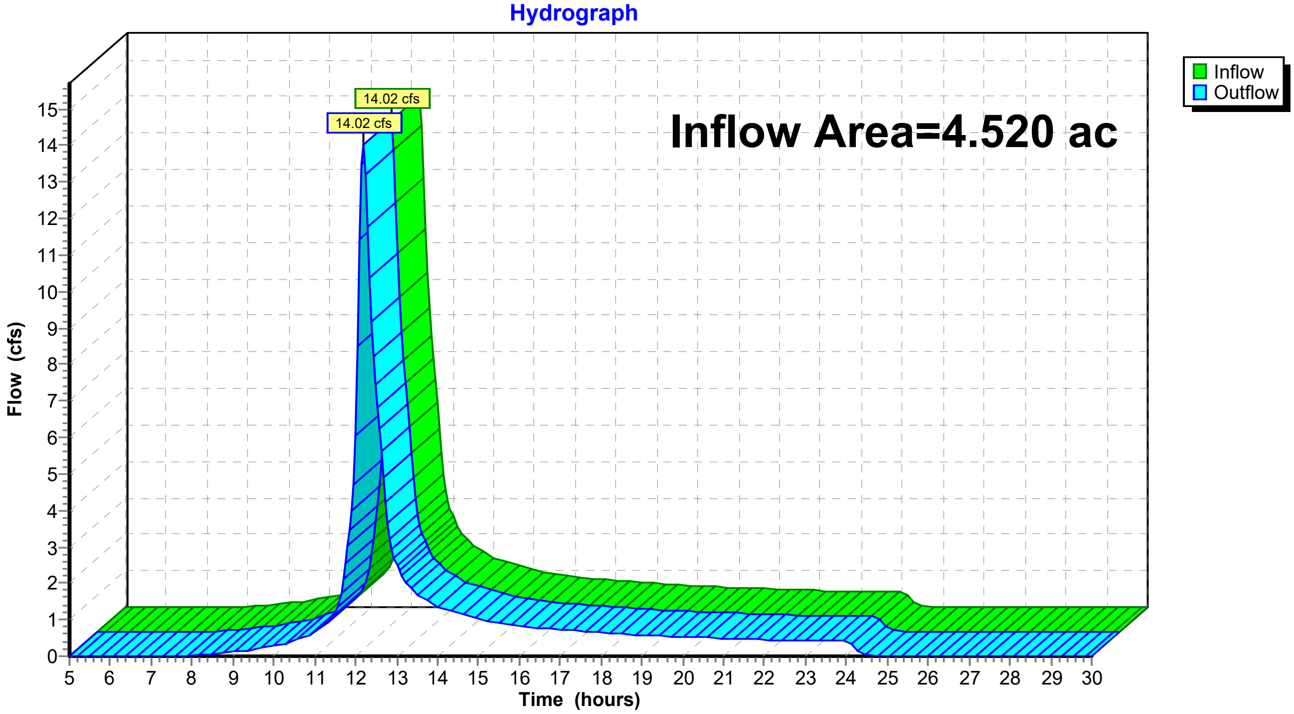


Summary for Reach DP-1: DP-1

Inflow Area = 4.520 ac, 5.31% Impervious, Inflow Depth = 4.09" for 100-yr event
Inflow = 14.02 cfs @ 12.19 hrs, Volume= 1.539 af
Outflow = 14.02 cfs @ 12.19 hrs, Volume= 1.539 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs

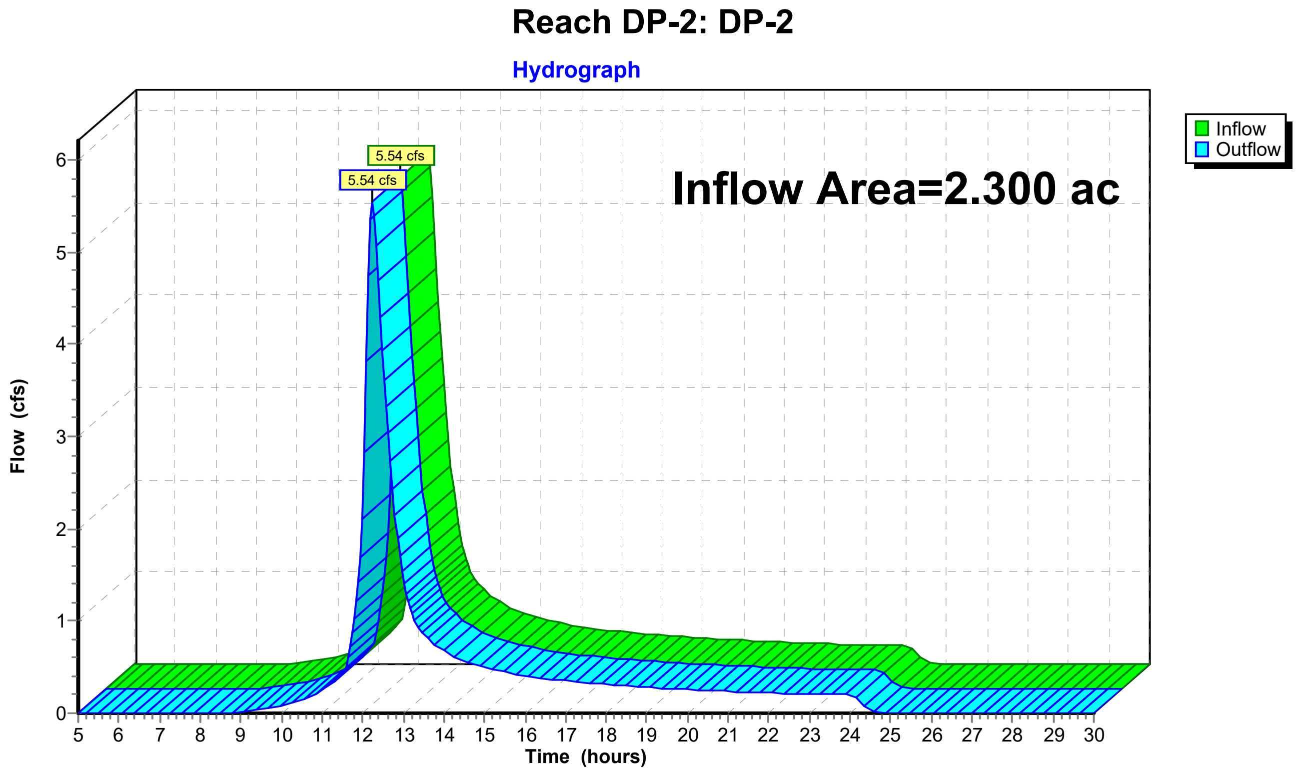
Reach DP-1: DP-1



Summary for Reach DP-2: DP-2

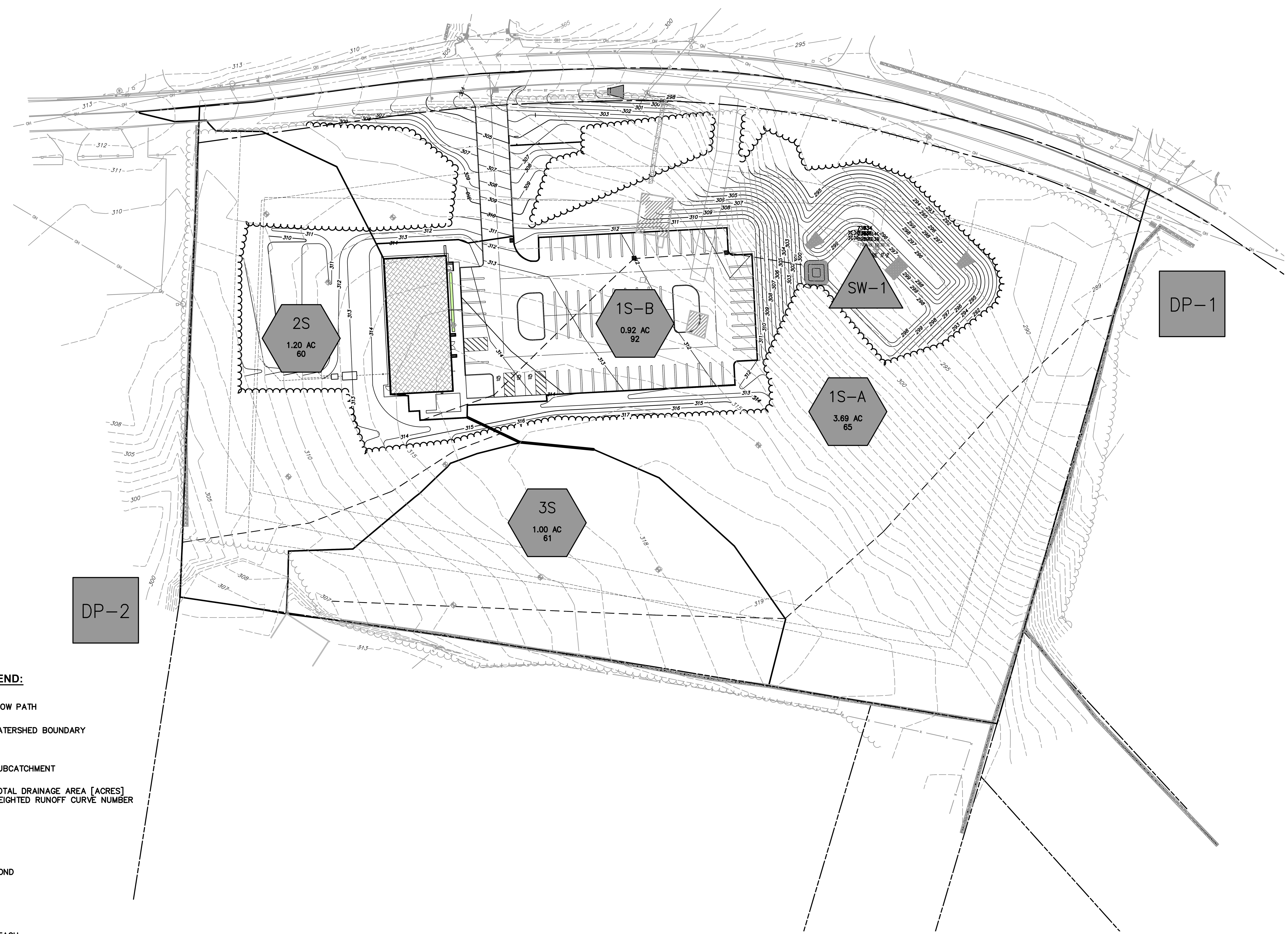
Inflow Area =	2.300 ac,	0.00% Impervious, Inflow Depth = 3.67"	for 100-yr event	
Inflow =	5.54 cfs @	12.25 hrs, Volume=	0.704 af	
Outflow =	5.54 cfs @	12.25 hrs, Volume=	0.704 af,	Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs



APPENDIX K:

Post-Development Drainage and HydroCAD Calculations



STORMWATER LEGEND:

- FLOW PATH
- WATERSHED BOUNDARY
- # -SUBCATCHMENT; # -TOTAL DRAINAGE AREA [ACRES]; # -WEIGHTED RUNOFF CURVE NUMBER
- # -POND
- # -REACH

1"=40' 0 20 40 80 TRUE

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Albany, NY 12205

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CONSULTANT:

NOT FOR CONSTRUCTION
THIS DRAWING PROVIDED ONLY FOR
REVIEW AND APPROVAL

MARK:	DATE:	DESCRIPTION:
–	28 APR 23	SUBMISSION TO TOWN
–	15 FEB 23	SUBMISSION TO TOWN
–	11 NOV 22	SUBMISSION TO TOWN
–	20 OCT 22	GPI CONCEPT FOR REVIEW
–	16 SEP 22	CONCEPT FOR REVIEW

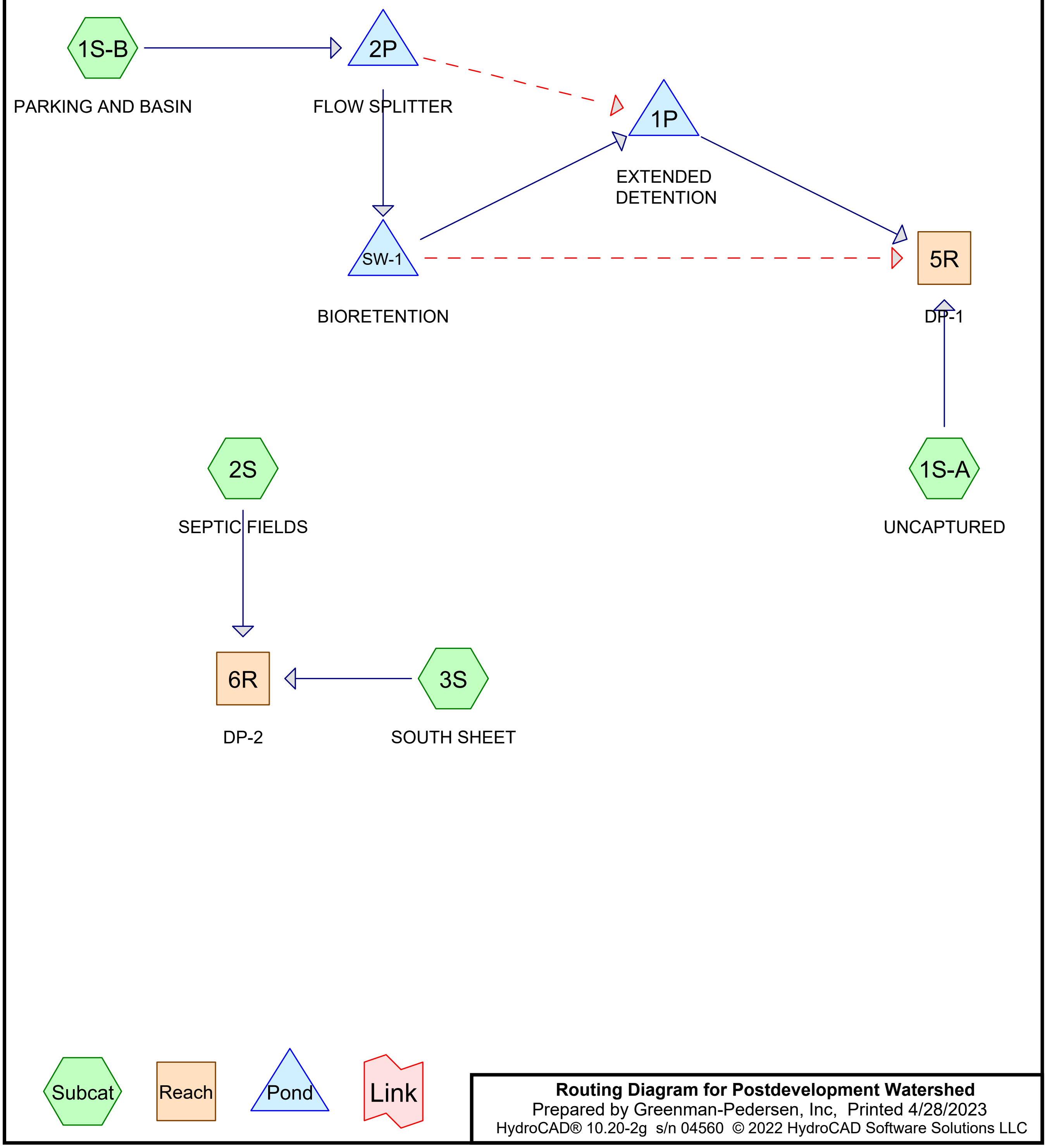
OWNER:
JW CONGREGATION SUPPORT, INC.
1005 RED MILLS ROAD
WALLKILL, NY 12589–3283

PROJECT TITLE:
NEWBURGH KINGDOM HALL OF JEHOVAH'S WITNESSES
33 OLD LITTLE BRITAIN RD
NEWBURGH, NY 12550

SHEET TITLE:
POST–DEVELOPMENT WATERSHEDS

PROJECT No. **37147**

SHEET No. FIG. 2



Routing Diagram for Postdevelopment Watershed
Prepared by Greenman-Pedersen, Inc, Printed 4/28/2023
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Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	1-yr	NY-JW NEWBURGH 24-hr S1	1-yr	Default	24.00	1	2.60	2
2	10-yr	NY-JW NEWBURGH 24-hr S1	10-yr	Default	24.00	1	4.70	2
3	100-yr	NY-JW NEWBURGH 24-hr S1	100-yr	Default	24.00	1	8.38	2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
1.455	61	>75% Grass cover, Good, HSG B (1S-A, 1S-B, 2S)
0.315	80	>75% Grass cover, Good, HSG D (1S-A, 1S-B)
0.575	98	Paved parking, HSG B (1S-B)
0.273	98	Paved parking, HSG D (1S-A)
0.113	98	Roofs, HSG D (1S-B)
3.728	60	Woods, Fair, HSG B (1S-A, 2S, 3S)
0.350	79	Woods, Fair, HSG D (1S-A, 3S)
6.809	**67**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
5.758	HSG B	1S-A, 1S-B, 2S, 3S
0.000	HSG C	
1.051	HSG D	1S-A, 1S-B, 3S
0.000	Other	
6.809		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	1.455	0.000	0.315	0.000	1.770	>75% Grass cover, Good	1S-A, 1S-B, 2S
0.000	0.575	0.000	0.273	0.000	0.849	Paved parking	1S-A, 1S-B
0.000	0.000	0.000	0.113	0.000	0.113	Roofs	1S-B
0.000	3.728	0.000	0.350	0.000	4.078	Woods, Fair	1S-A, 2S, 3S
0.000	**5.758**	**0.000**	**1.051**	**0.000**	**6.809**	**TOTAL AREA**	

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Width (inches)	Diam/Height (inches)	Inside-Fill (inches)
1	1P	295.30	295.00	15.0	0.0200	0.012	0.0	12.0	0.0
2	2P	299.00	298.92	8.0	0.0100	0.012	0.0	6.0	0.0
3	2P	299.00	298.90	10.0	0.0100	0.012	0.0	12.0	0.0
4	SW-1	295.00	294.99	20.0	0.0005	0.012	0.0	4.0	0.0

Time span=1.00-30.00 hrs, dt=0.05 hrs, 581 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S-A: UNCAPTURED Runoff Area=160,873 sf 7.40% Impervious Runoff Depth=0.34"
Flow Length=345' Tc=16.7 min CN=65 Runoff=0.60 cfs 0.103 af

Subcatchment1S-B: PARKING AND BASIN Runoff Area=39,985 sf 74.97% Impervious Runoff Depth=1.79"
Tc=6.0 min CN=92 Runoff=2.21 cfs 0.137 af

Subcatchment2S: SEPTIC FIELDS Runoff Area=1.198 ac 0.00% Impervious Runoff Depth=0.20"
Flow Length=265' Tc=18.5 min CN=60 Runoff=0.07 cfs 0.020 af

Subcatchment3S: SOUTH SHEET Runoff Area=1.000 ac 0.00% Impervious Runoff Depth=0.23"
Flow Length=348' Tc=25.7 min CN=61 Runoff=0.07 cfs 0.019 af

Reach 5R: DP-1 Inflow=0.62 cfs 0.140 af
Outflow=0.62 cfs 0.140 af

Reach 6R: DP-2 Inflow=0.14 cfs 0.039 af
Outflow=0.14 cfs 0.039 af

Pond 1P: EXTENDED DETENTION Peak Elev=297.77' Storage=3,161 cf Inflow=1.56 cfs 0.073 af
Outflow=0.00 cfs 0.000 af

Pond 2P: FLOW SPLITTER Peak Elev=299.77' Storage=0.000 af Inflow=2.21 cfs 0.137 af
Primary=0.65 cfs 0.112 af Secondary=1.56 cfs 0.024 af Outflow=2.22 cfs 0.137 af

Pond SW-1: BIORETENTION Peak Elev=298.56' Storage=1,812 cf Inflow=0.65 cfs 0.112 af
Primary=0.37 cfs 0.048 af Secondary=0.02 cfs 0.036 af Outflow=0.38 cfs 0.085 af

Total Runoff Area = 6.809 ac Runoff Volume = 0.279 af Average Runoff Depth = 0.49"
85.88% Pervious = 5.847 ac 14.12% Impervious = 0.962 ac

Summary for Subcatchment 1S-A: UNCAPTURED

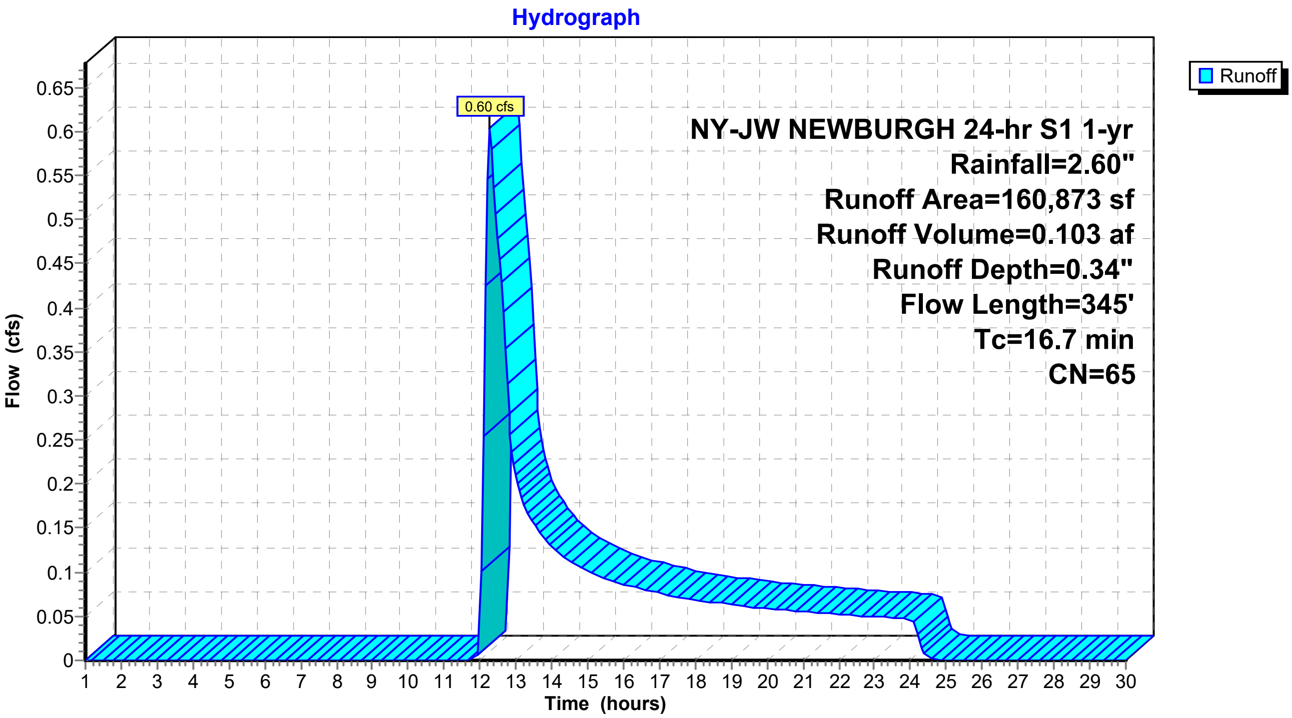
Runoff = 0.60 cfs @ 12.27 hrs, Volume= 0.103 af, Depth= 0.34"
Routed to Reach 5R : DP-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
NY-JW NEWBURGH 24-hr S1 1-yr Rainfall=2.60"

Area (sf)	CN	Description
88,209	60	Woods, Fair, HSG B
12,189	79	Woods, Fair, HSG D
40,963	61	>75% Grass cover, Good, HSG B
7,600	80	>75% Grass cover, Good, HSG D
11,912	98	Paved parking, HSG D
160,873	65	Weighted Average
148,961		92.60% Pervious Area
11,912		7.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.9	100	0.0600	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.15"
1.1	136	0.1617	2.01		**Shallow Concentrated Flow, SHALLOW CONC** Woodland Kv= 5.0 fps
1.7	109	0.0460	1.07		**Shallow Concentrated Flow, SHALLOW CONC FLOW** Woodland Kv= 5.0 fps
16.7	345	Total			

Subcatchment 1S-A: UNCAPTURED



Summary for Subcatchment 1S-B: PARKING AND BASIN

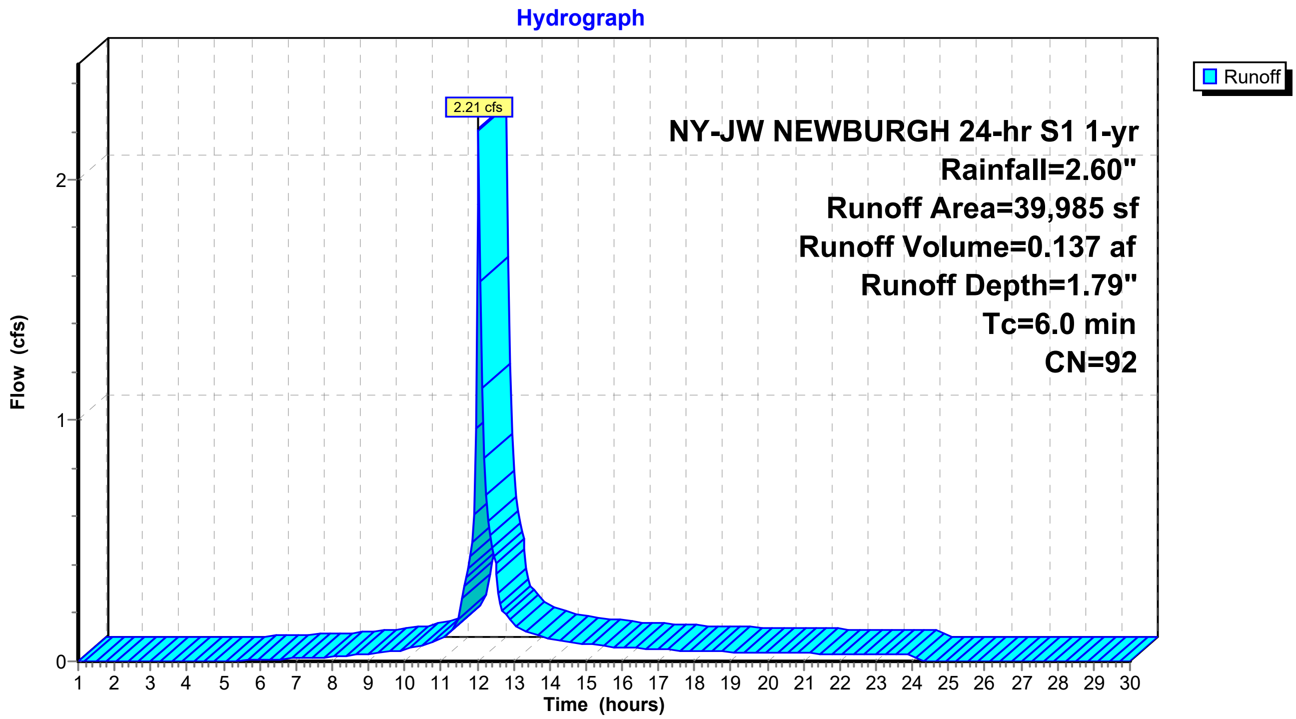
Runoff = 2.21 cfs @ 12.04 hrs, Volume= 0.137 af, Depth= 1.79"
Routed to Pond 2P : FLOW SPLITTER

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
NY-JW NEWBURGH 24-hr S1 1-yr Rainfall=2.60"

Area (sf)	CN	Description
3,910	61	>75% Grass cover, Good, HSG B
25,053	98	Paved parking, HSG B
6,100	80	>75% Grass cover, Good, HSG D
4,922	98	Roofs, HSG D
39,985	92	Weighted Average
10,010		25.03% Pervious Area
29,975		74.97% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, min**

Subcatchment 1S-B: PARKING AND BASIN



Summary for Subcatchment 2S: SEPTIC FIELDS

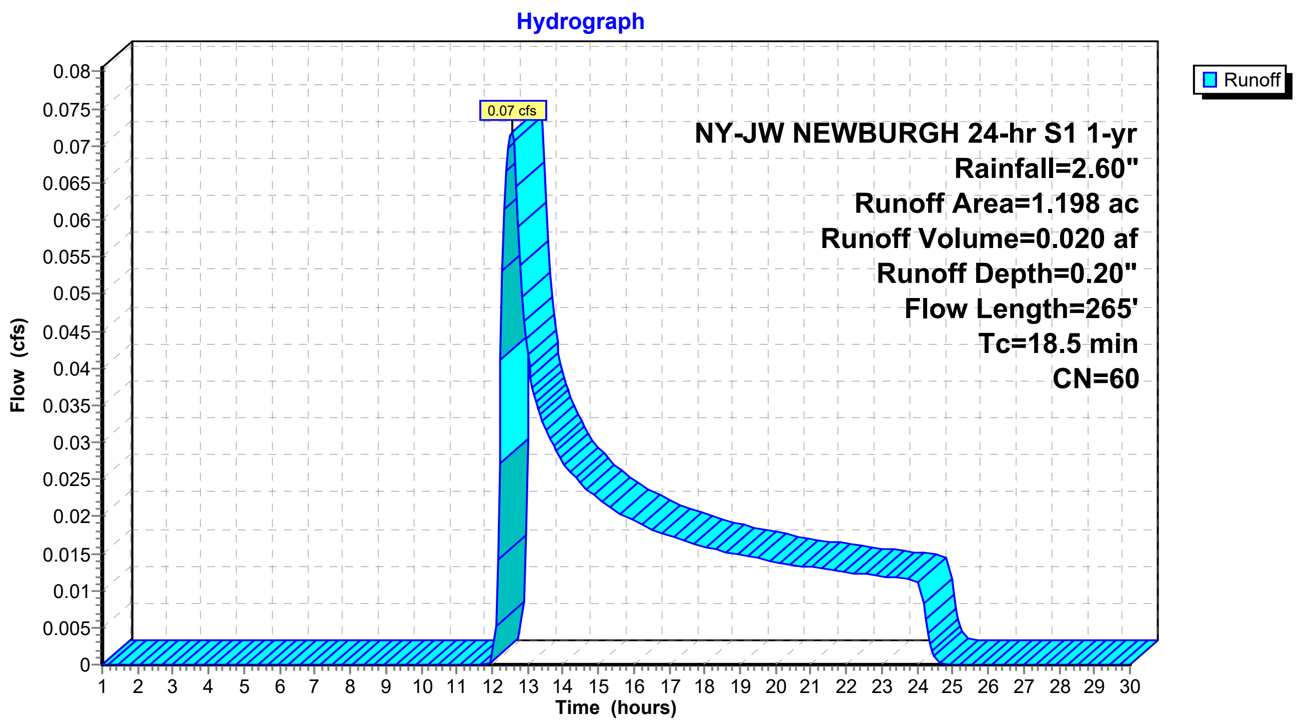
Runoff = 0.07 cfs @ 12.55 hrs, Volume= 0.020 af, Depth= 0.20"
Routed to Reach 6R : DP-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
NY-JW NEWBURGH 24-hr S1 1-yr Rainfall=2.60"

Area (ac)	CN	Description
0.773	60	Woods, Fair, HSG B
0.425	61	>75% Grass cover, Good, HSG B
1.198	60	Weighted Average
1.198		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.4	100	0.0400	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.15"
2.1	165	0.0670	1.29		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
18.5	265	Total			

Subcatchment 2S: SEPTIC FIELDS



Summary for Subcatchment 3S: SOUTH SHEET

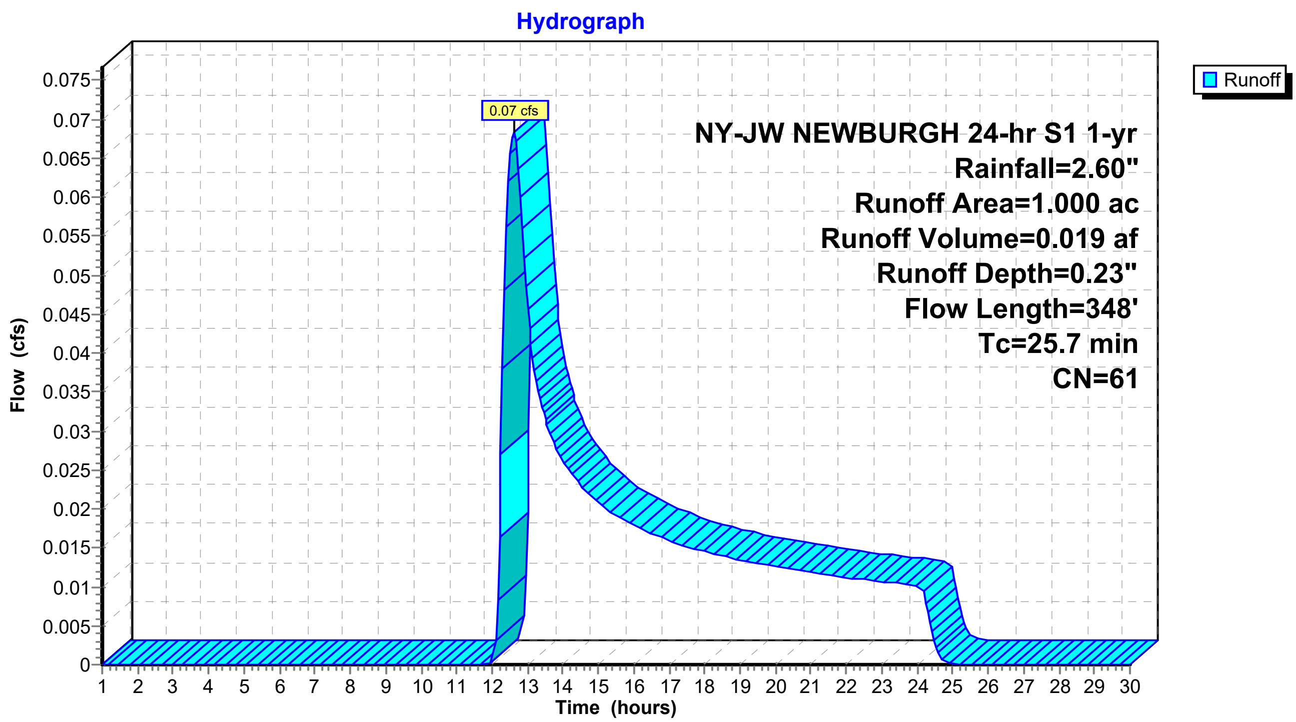
Runoff = 0.07 cfs @ 12.61 hrs, Volume= 0.019 af, Depth= 0.23"
Routed to Reach 6R : DP-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
NY-JW NEWBURGH 24-hr S1 1-yr Rainfall=2.60"

Area (ac)	CN	Description
0.930	60	Woods, Fair, HSG B
0.070	79	Woods, Fair, HSG D
1.000	61	Weighted Average
1.000		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.6	100	0.0200	0.08		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.15"
4.1	248	0.0400	1.00		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
25.7	348	Total			

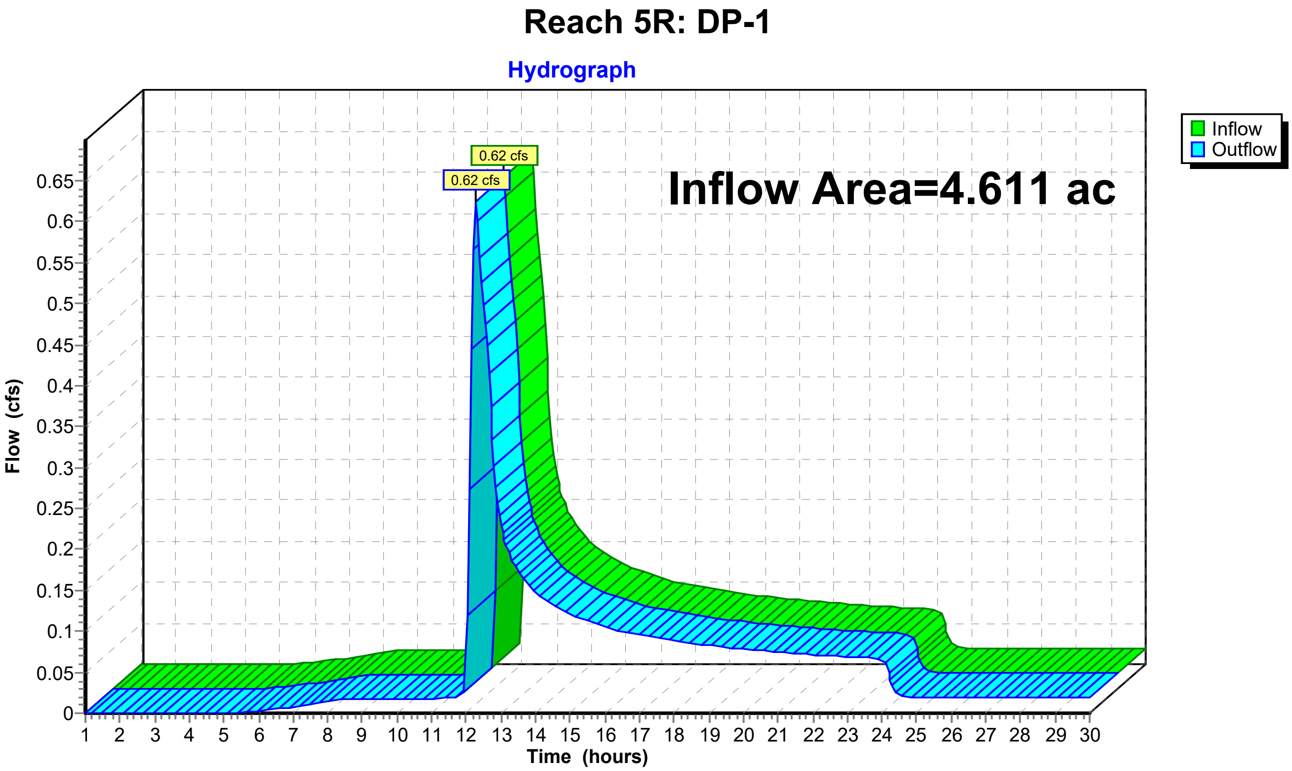
Subcatchment 3S: SOUTH SHEET



Summary for Reach 5R: DP-1

Inflow Area = 4.611 ac, 20.85% Impervious, Inflow Depth > 0.36" for 1-yr event
Inflow = 0.62 cfs @ 12.27 hrs, Volume= 0.140 af
Outflow = 0.62 cfs @ 12.27 hrs, Volume= 0.140 af, Atten= 0%, Lag= 0.0 min

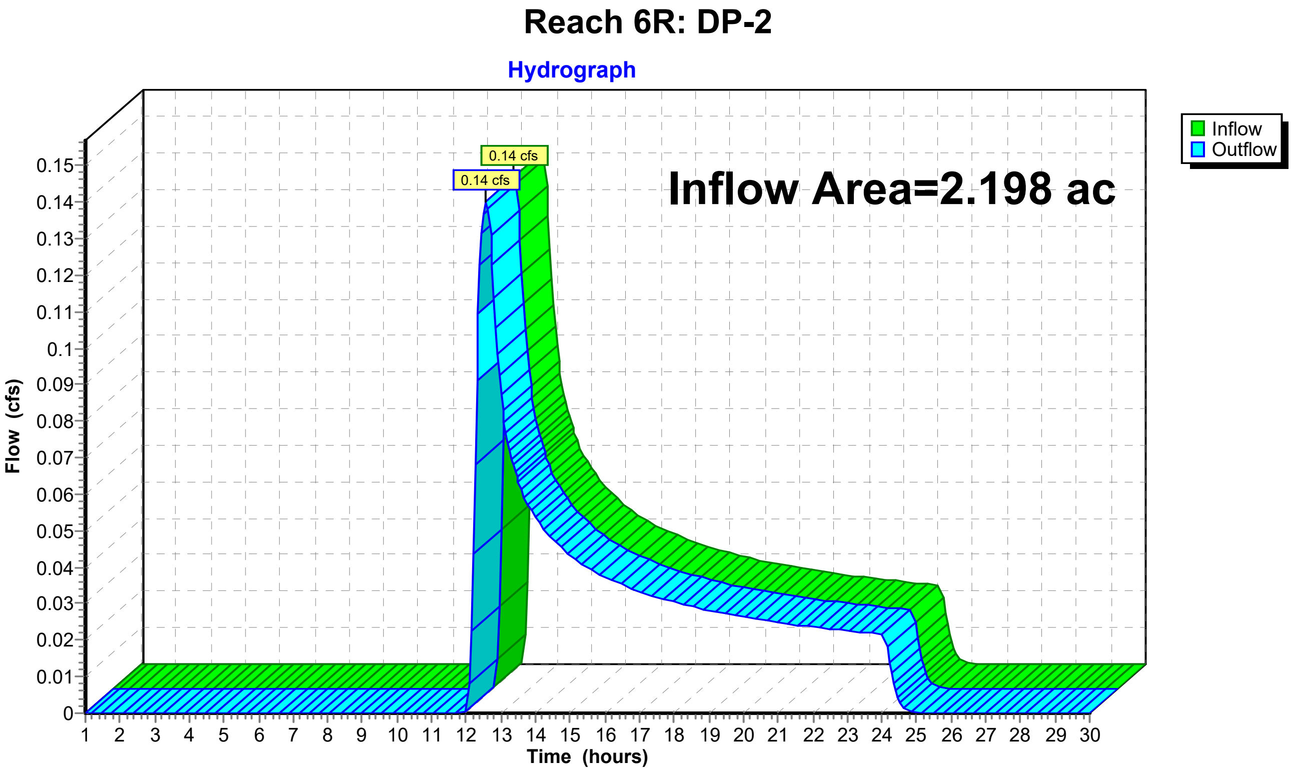
Routing by Stor-Ind+Trans method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs



Summary for Reach 6R: DP-2

Inflow Area =	2.198 ac,	0.00% Impervious,	Inflow Depth = 0.21"	for 1-yr event	
Inflow =	0.14 cfs @	12.58 hrs,	Volume=	0.039 af	
Outflow =	0.14 cfs @	12.58 hrs,	Volume=	0.039 af,	Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs



Summary for Pond 1P: EXTENDED DETENTION

Inflow Area = 0.918 ac, 74.97% Impervious, Inflow Depth = 0.95" for 1-yr event
Inflow = 1.56 cfs @ 12.04 hrs, Volume= 0.073 af
Outflow = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af
Routed to Reach 5R : DP-1

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 297.77' @ 24.30 hrs Surf.Area= 2,563 sf Storage= 3,161 cf

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

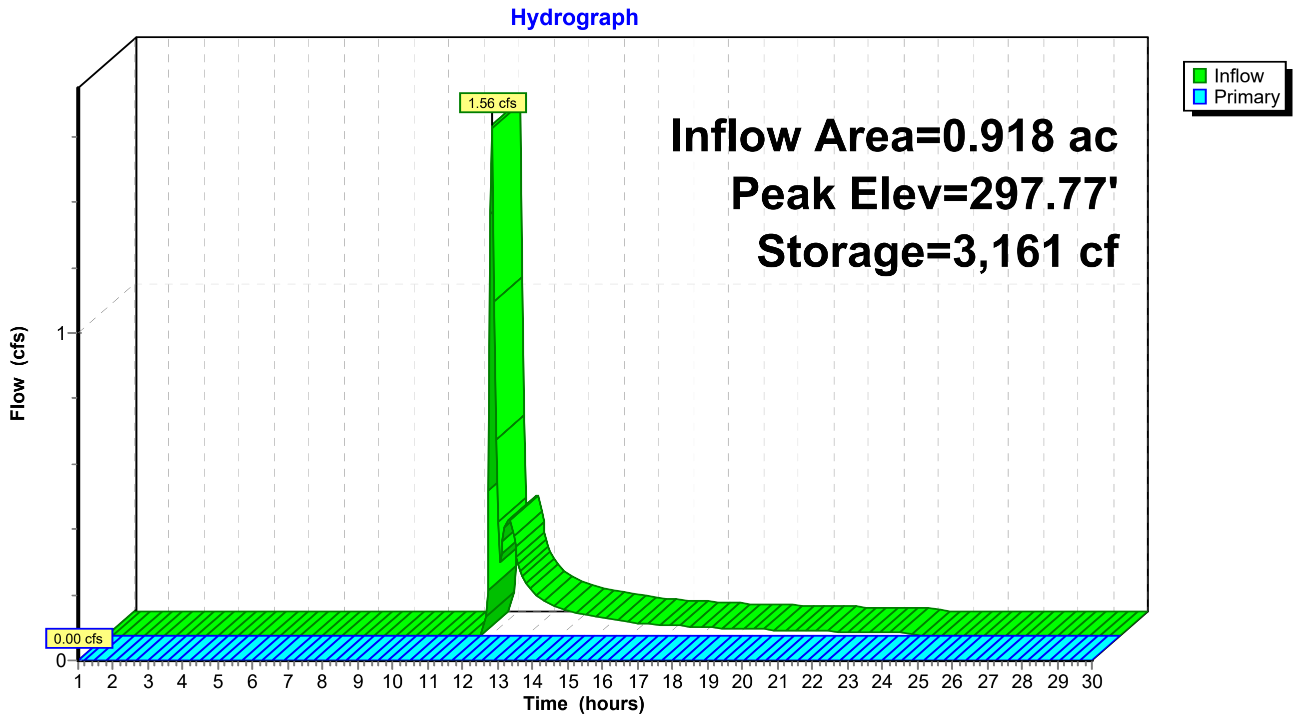
Volume	Invert	Avail.Storage	Storage Description
#1	296.00'	9,015 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
296.00	1,040	0	0
297.00	1,870	1,455	1,455
298.00	2,770	2,320	3,775
299.00	3,730	3,250	7,025
299.50	4,230	1,990	9,015

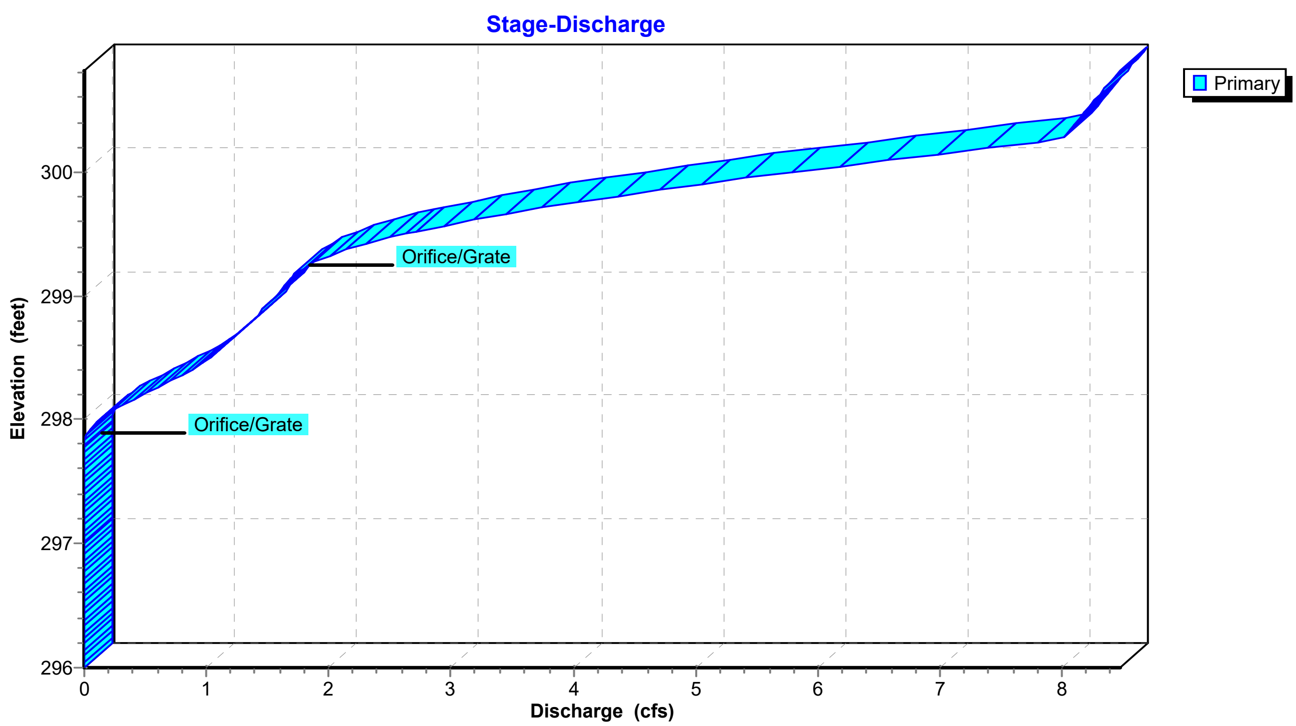
Device	Routing	Invert	Outlet Devices
#1	Primary	295.30'	**12.0" Round Outlet pipe** L= 15.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 295.30' / 295.00' S= 0.0200 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf
#2	Device 1	297.80'	**8.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	299.15'	**20.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.00 cfs @ 1.00 hrs HW=296.00' (Free Discharge)
└─**1=Outlet pipe** (Passes 0.00 cfs of 1.67 cfs potential flow)
  ├─**2=Orifice/Grate** (Controls 0.00 cfs)
  └─**3=Orifice/Grate** (Controls 0.00 cfs)

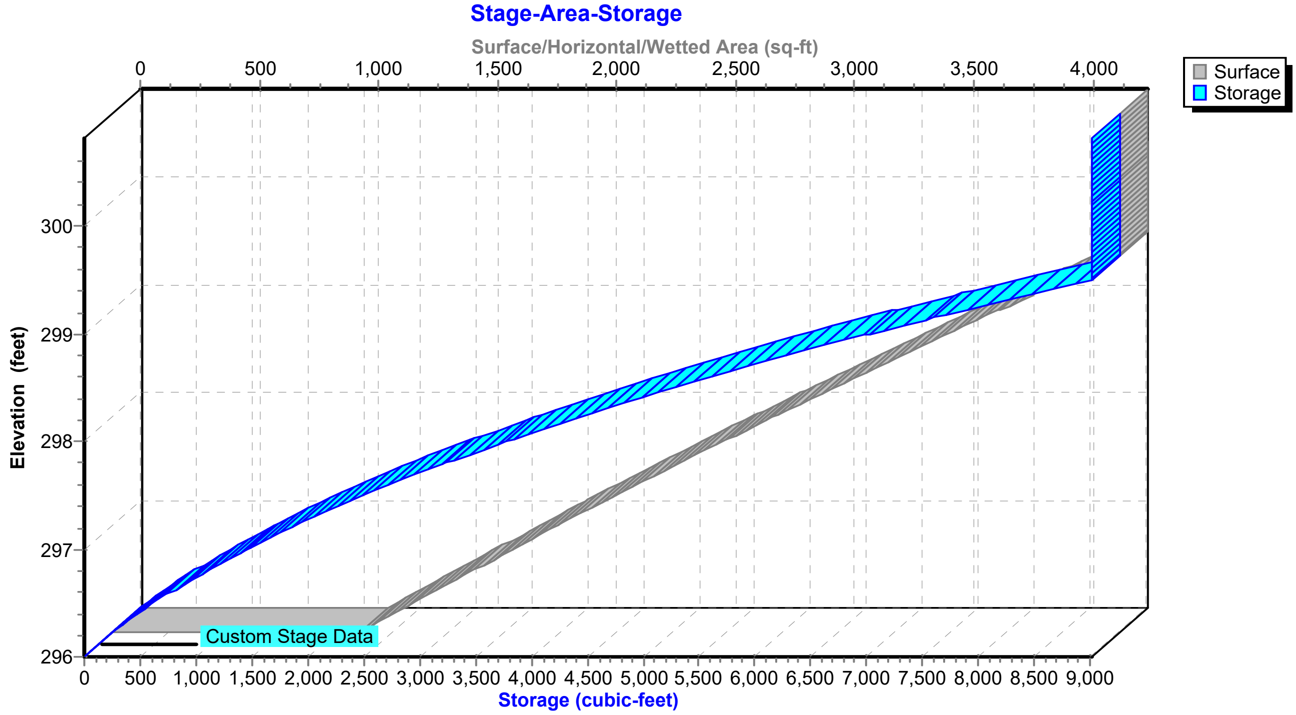
Pond 1P: EXTENDED DETENTION



Pond 1P: EXTENDED DETENTION



Pond 1P: EXTENDED DETENTION



Summary for Pond 2P: FLOW SPLITTER

Inflow Area = 0.918 ac, 74.97% Impervious, Inflow Depth = 1.79" for 1-yr event
Inflow = 2.21 cfs @ 12.04 hrs, Volume= 0.137 af
Outflow = 2.22 cfs @ 12.04 hrs, Volume= 0.137 af, Atten= 0%, Lag= 0.0 min
Primary = 0.65 cfs @ 12.05 hrs, Volume= 0.112 af
Routed to Pond SW-1 : BIORETENTION
Secondary = 1.56 cfs @ 12.04 hrs, Volume= 0.024 af
Routed to Pond 1P : EXTENDED DETENTION

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 299.77' @ 12.04 hrs Surf.Area= 0.000 ac Storage= 0.000 af

Plug-Flow detention time= 0.5 min calculated for 0.136 af (100% of inflow)
Center-of-Mass det. time= 0.5 min (815.0 - 814.6)

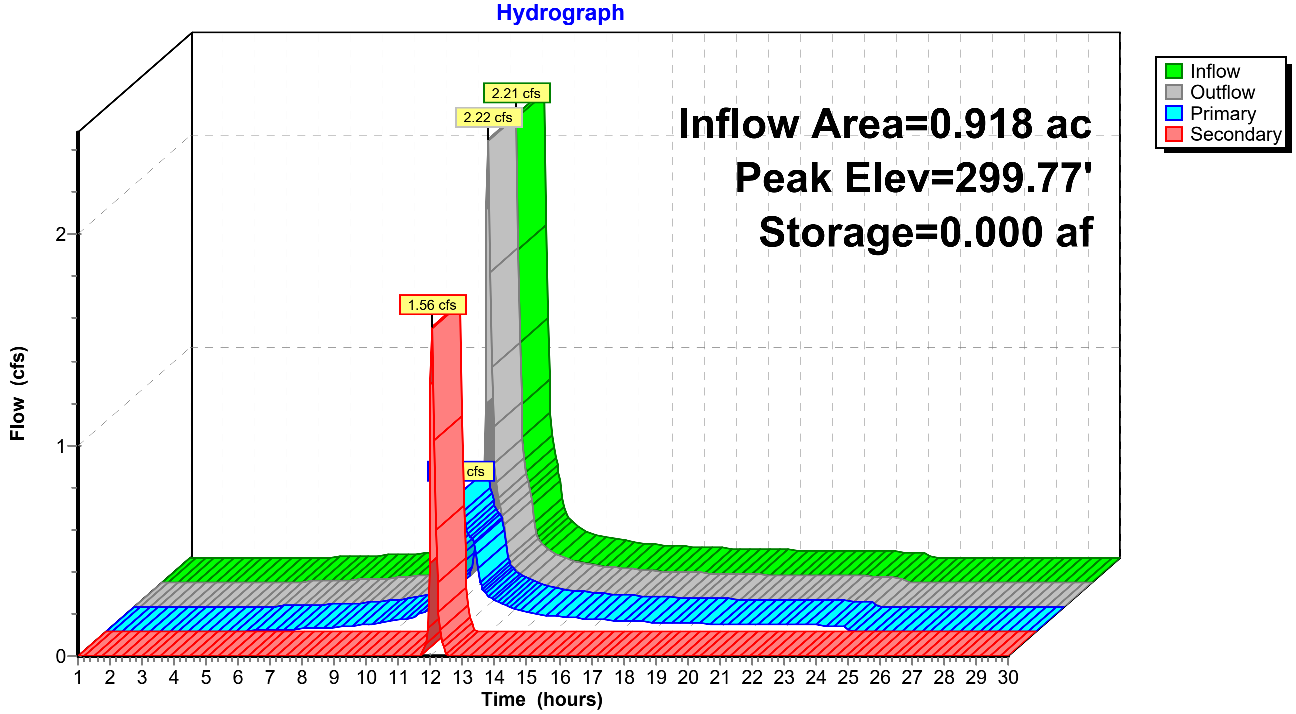
Volume	Invert	Avail.Storage	Storage Description
#1	299.00'	0.001 af	**4.00'W x 4.00'L x 3.00'H Catch Basin**

Device	Routing	Invert	Outlet Devices
#1	Primary	299.00'	**6.0" Round Culvert** L= 8.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 299.00' / 298.92' S= 0.0100 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.20 sf
#2	Secondary	299.00'	**12.0" Round Culvert** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 299.00' / 298.90' S= 0.0100 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf
#3	Device 2	299.50'	**4.0' long x 2.00' rise Sharp-Crested Rectangular Weir** 2 End Contraction(s) 1.0' Crest Height

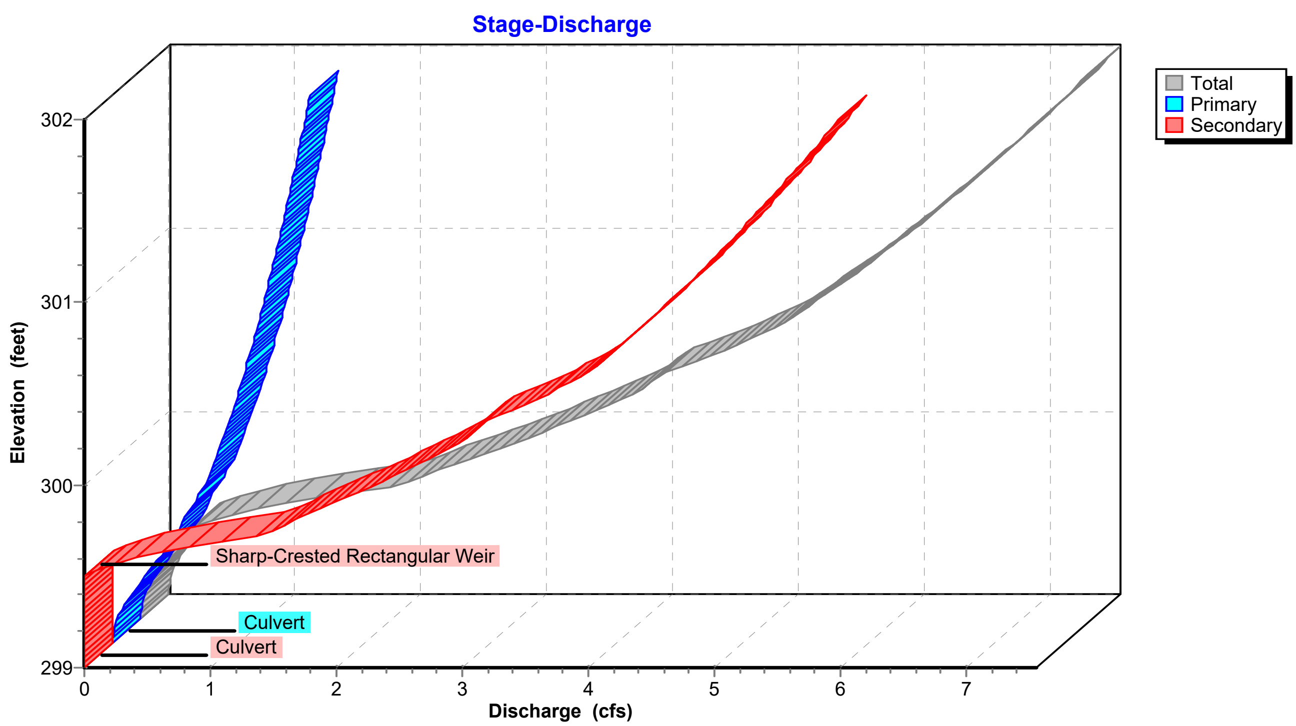
Primary OutFlow Max=0.65 cfs @ 12.05 hrs HW=299.77' (Free Discharge)
└─**1=Culvert** (Barrel Controls 0.65 cfs @ 3.30 fps)

Secondary OutFlow Max=1.52 cfs @ 12.04 hrs HW=299.76' (Free Discharge)
└─**2=Culvert** (Barrel Controls 1.52 cfs @ 3.28 fps)
  └─**3=Sharp-Crested Rectangular Weir** (Passes 1.52 cfs of 1.78 cfs potential flow)

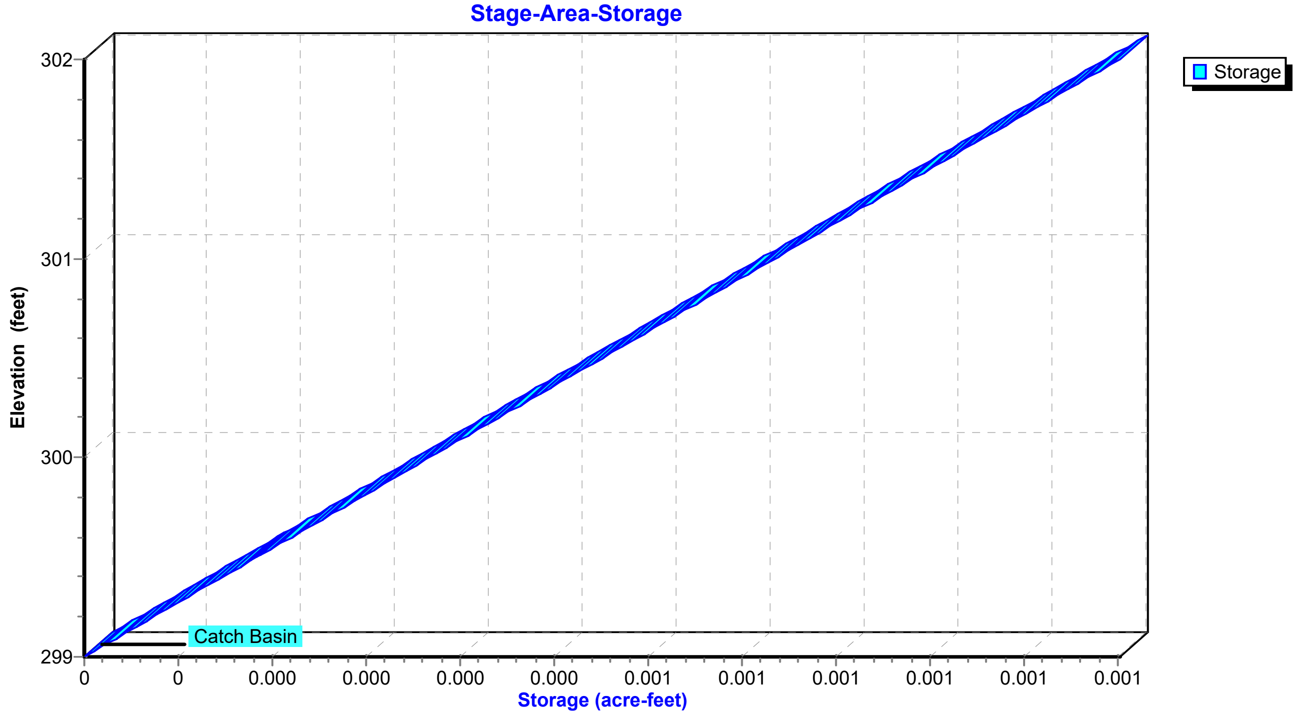
Pond 2P: FLOW SPLITTER



Pond 2P: FLOW SPLITTER



Pond 2P: FLOW SPLITTER



Summary for Pond SW-1: BIORETENTION

Inflow Area = 0.918 ac, 74.97% Impervious, Inflow Depth = 1.47" for 1-yr event
Inflow = 0.65 cfs @ 12.05 hrs, Volume= 0.112 af
Outflow = 0.38 cfs @ 12.53 hrs, Volume= 0.085 af, Atten= 41%, Lag= 29.4 min
Primary = 0.37 cfs @ 12.53 hrs, Volume= 0.048 af
Routed to Pond 1P : EXTENDED DETENTION
Secondary = 0.02 cfs @ 12.53 hrs, Volume= 0.036 af
Routed to Reach 5R : DP-1

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 298.56' @ 12.53 hrs Surf.Area= 3,414 sf Storage= 1,812 cf

Plug-Flow detention time= 266.5 min calculated for 0.085 af (75% of inflow)
Center-of-Mass det. time= 160.9 min (995.7 - 834.8)

Volume	Invert	Avail.Storage	Storage Description
#1	298.00'	5,300 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

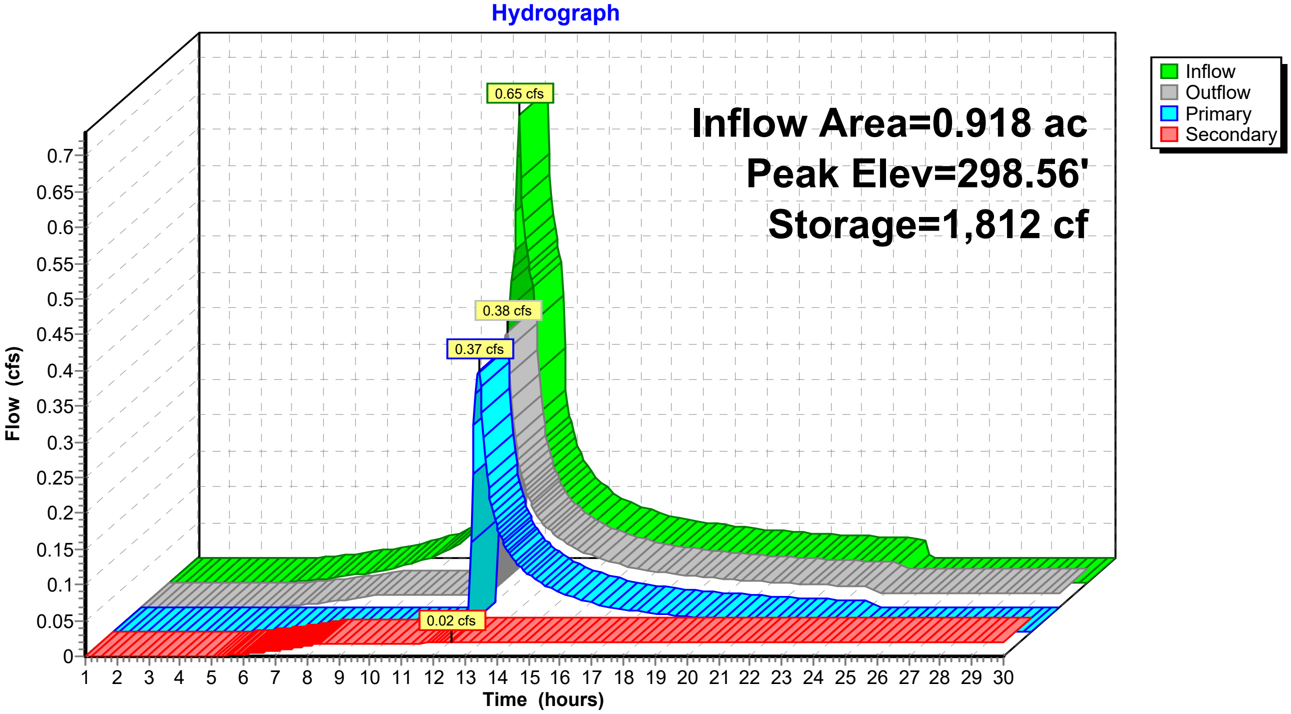
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
298.00	3,050	0	0
299.00	3,700	3,375	3,375
299.50	4,000	1,925	5,300

Device	Routing	Invert	Outlet Devices
#1	Primary	298.50'	**10.0' long x 3.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32
#2	Device 3	298.00'	**0.250 in/hr Exfiltration over Surface area**
#3	Secondary	295.00'	**4.0" Round Culvert** L= 20.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 295.00' / 294.99' S= 0.0005 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.09 sf

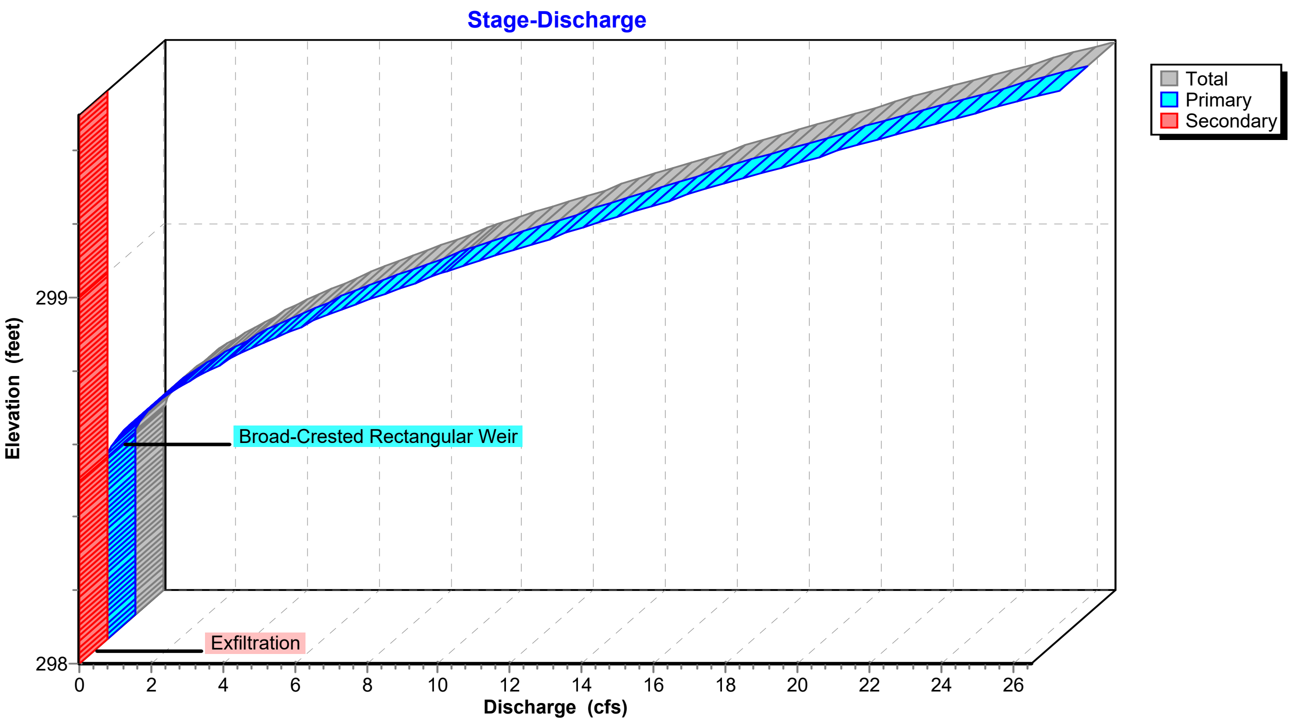
Primary OutFlow Max=0.36 cfs @ 12.53 hrs HW=298.56' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Weir Controls 0.36 cfs @ 0.60 fps)

Secondary OutFlow Max=0.02 cfs @ 12.53 hrs HW=298.56' (Free Discharge)
└─**3=Culvert** (Passes 0.02 cfs of 0.65 cfs potential flow)
  └─**2=Exfiltration** (Exfiltration Controls 0.02 cfs)

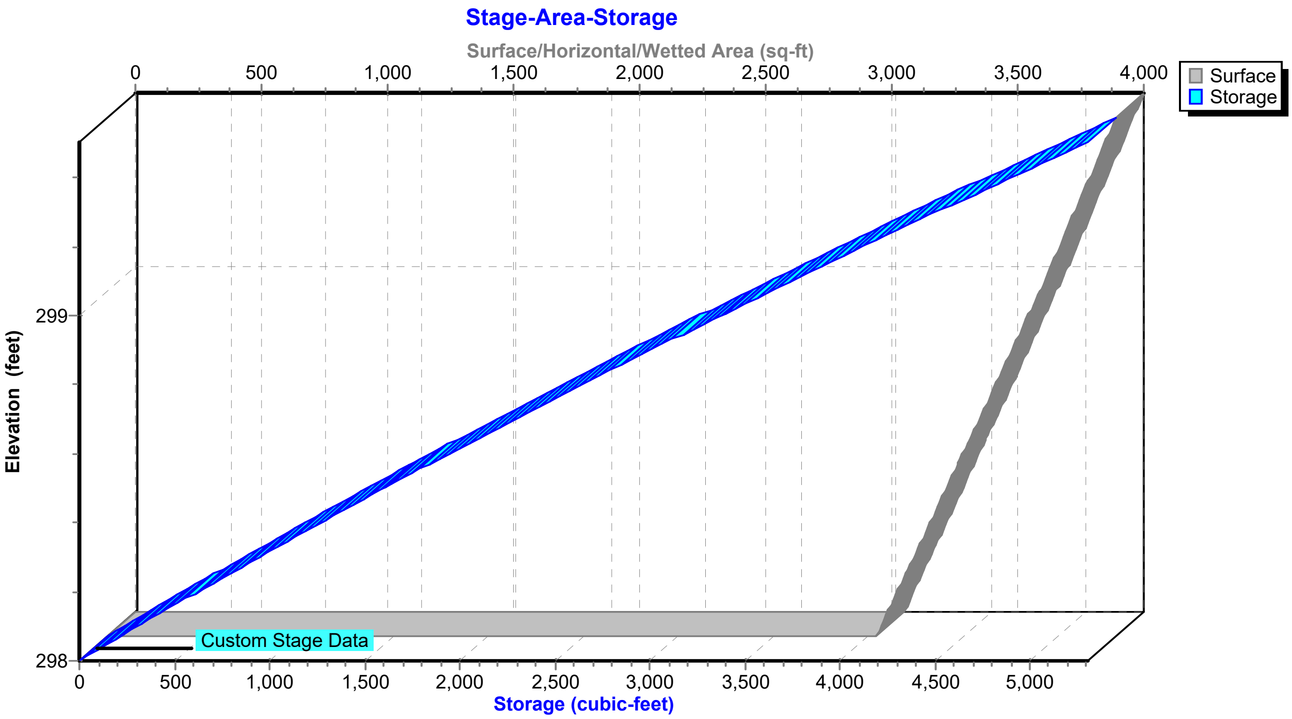
Pond SW-1: BIORETENTION



Pond SW-1: BIORETENTION



Pond SW-1: BIORETENTION



Time span=1.00-30.00 hrs, dt=0.05 hrs, 581 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S-A: UNCAPTURED Runoff Area=160,873 sf 7.40% Impervious Runoff Depth=1.46"
Flow Length=345' Tc=16.7 min CN=65 Runoff=4.07 cfs 0.448 af

Subcatchment1S-B: PARKING AND BASIN Runoff Area=39,985 sf 74.97% Impervious Runoff Depth=3.80"
Tc=6.0 min CN=92 Runoff=4.05 cfs 0.290 af

Subcatchment2S: SEPTIC FIELDS Runoff Area=1.198 ac 0.00% Impervious Runoff Depth=1.13"
Flow Length=265' Tc=18.5 min CN=60 Runoff=0.89 cfs 0.113 af

Subcatchment3S: SOUTH SHEET Runoff Area=1.000 ac 0.00% Impervious Runoff Depth=1.19"
Flow Length=348' Tc=25.7 min CN=61 Runoff=0.69 cfs 0.099 af

Reach 5R: DP-1 Inflow=4.39 cfs 0.635 af
Outflow=4.39 cfs 0.635 af

Reach 6R: DP-2 Inflow=1.53 cfs 0.212 af
Outflow=1.53 cfs 0.212 af

Pond 1P: EXTENDED DETENTION Peak Elev=298.32' Storage=4,699 cf Inflow=3.83 cfs 0.221 af
Outflow=0.71 cfs 0.146 af

Pond 2P: FLOW SPLITTER Peak Elev=300.30' Storage=0.000 af Inflow=4.05 cfs 0.290 af
Primary=0.97 cfs 0.214 af Secondary=3.10 cfs 0.076 af Outflow=4.07 cfs 0.290 af

Pond SW-1: BIORETENTION Peak Elev=298.60' Storage=1,954 cf Inflow=0.97 cfs 0.214 af
Primary=0.80 cfs 0.145 af Secondary=0.02 cfs 0.041 af Outflow=0.82 cfs 0.186 af

Total Runoff Area = 6.809 ac Runoff Volume = 0.951 af Average Runoff Depth = 1.68"
85.88% Pervious = 5.847 ac 14.12% Impervious = 0.962 ac

Summary for Subcatchment 1S-A: UNCAPTURED

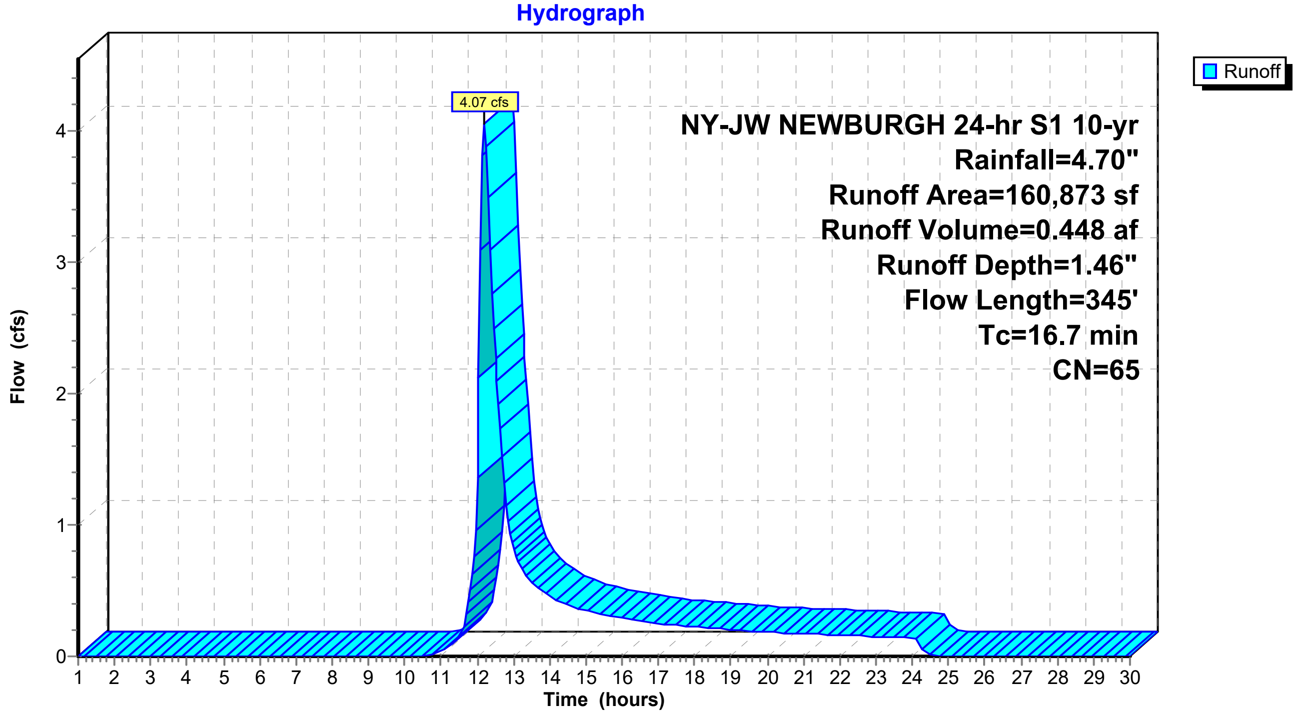
Runoff = 4.07 cfs @ 12.20 hrs, Volume= 0.448 af, Depth= 1.46"
Routed to Reach 5R : DP-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
NY-JW NEWBURGH 24-hr S1 10-yr Rainfall=4.70"

Area (sf)	CN	Description
88,209	60	Woods, Fair, HSG B
12,189	79	Woods, Fair, HSG D
40,963	61	>75% Grass cover, Good, HSG B
7,600	80	>75% Grass cover, Good, HSG D
11,912	98	Paved parking, HSG D
160,873	65	Weighted Average
148,961		92.60% Pervious Area
11,912		7.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.9	100	0.0600	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.15"
1.1	136	0.1617	2.01		**Shallow Concentrated Flow, SHALLOW CONC** Woodland Kv= 5.0 fps
1.7	109	0.0460	1.07		**Shallow Concentrated Flow, SHALLOW CONC FLOW** Woodland Kv= 5.0 fps
16.7	345	Total			

Subcatchment 1S-A: UNCAPTURED



Summary for Subcatchment 1S-B: PARKING AND BASIN

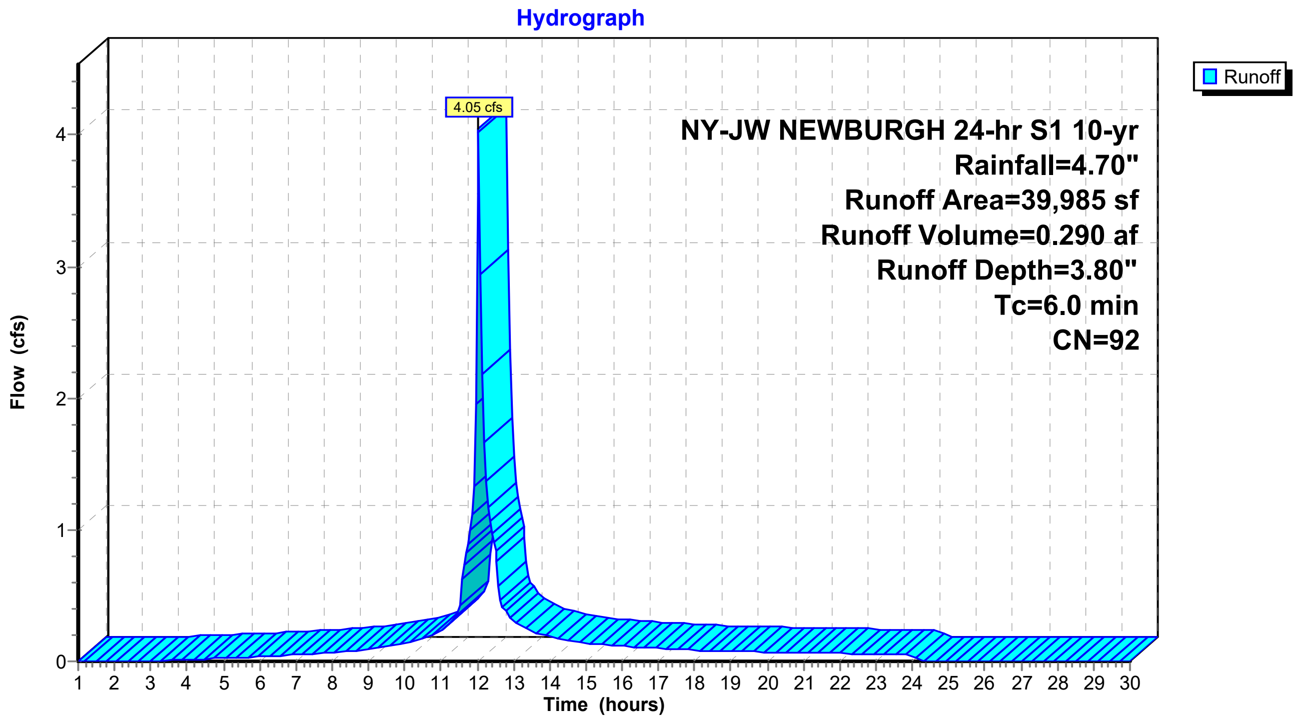
Runoff = 4.05 cfs @ 12.04 hrs, Volume= 0.290 af, Depth= 3.80"
Routed to Pond 2P : FLOW SPLITTER

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
NY-JW NEWBURGH 24-hr S1 10-yr Rainfall=4.70"

Area (sf)	CN	Description
3,910	61	>75% Grass cover, Good, HSG B
25,053	98	Paved parking, HSG B
6,100	80	>75% Grass cover, Good, HSG D
4,922	98	Roofs, HSG D
39,985	92	Weighted Average
10,010		25.03% Pervious Area
29,975		74.97% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, min**

Subcatchment 1S-B: PARKING AND BASIN



Summary for Subcatchment 2S: SEPTIC FIELDS

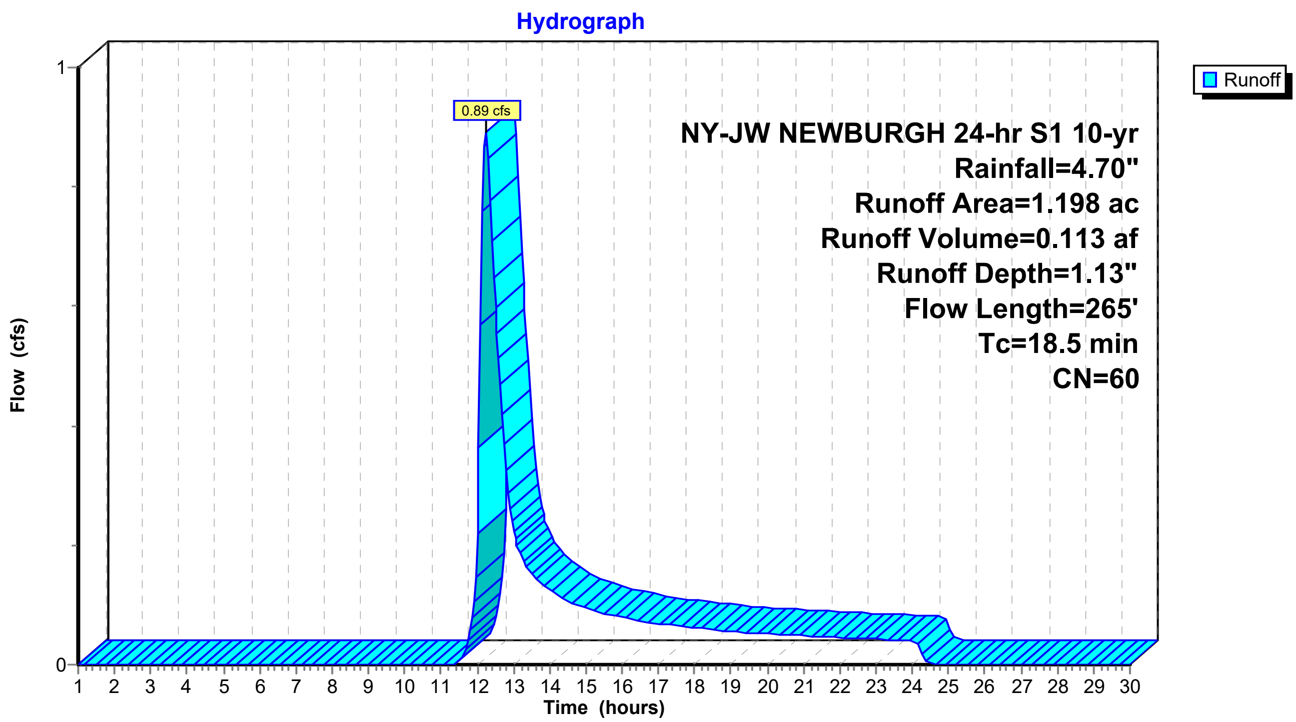
Runoff = 0.89 cfs @ 12.24 hrs, Volume= 0.113 af, Depth= 1.13"
Routed to Reach 6R : DP-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
NY-JW NEWBURGH 24-hr S1 10-yr Rainfall=4.70"

Area (ac)	CN	Description
0.773	60	Woods, Fair, HSG B
0.425	61	>75% Grass cover, Good, HSG B
1.198	60	Weighted Average
1.198		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.4	100	0.0400	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.15"
2.1	165	0.0670	1.29		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
18.5	265	Total			

Subcatchment 2S: SEPTIC FIELDS



Summary for Subcatchment 3S: SOUTH SHEET

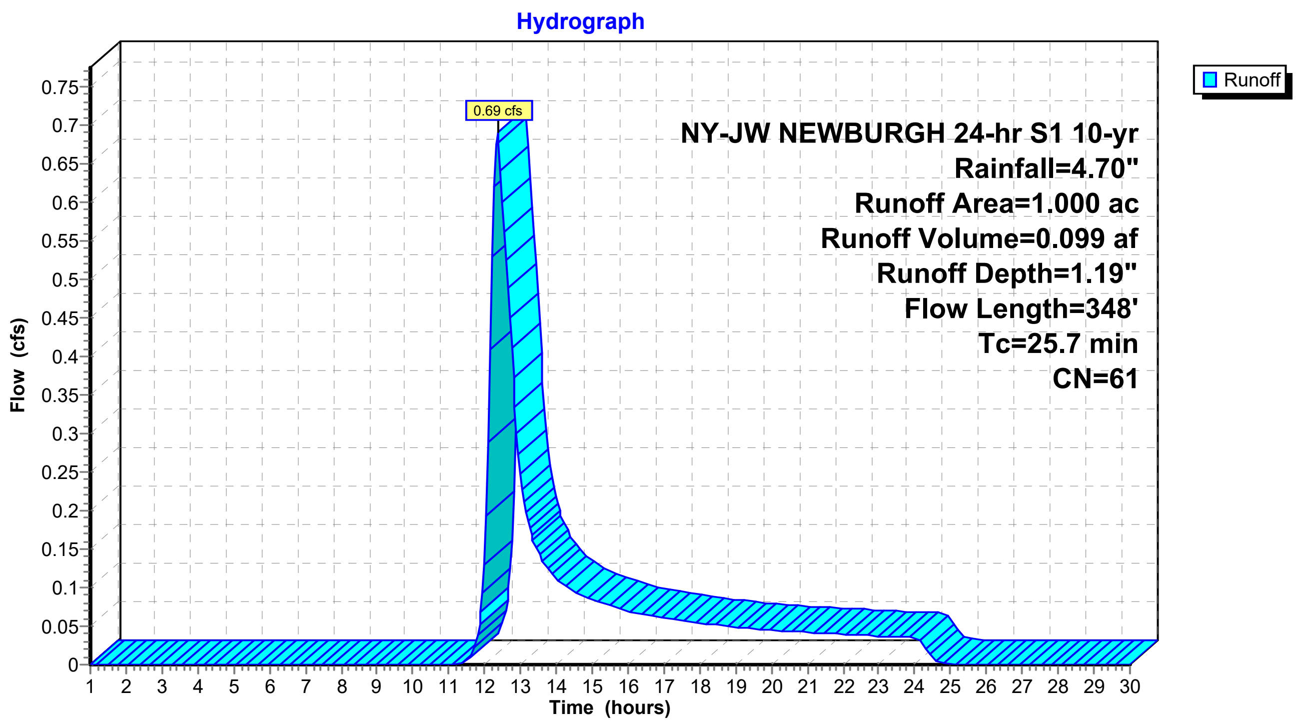
Runoff = 0.69 cfs @ 12.35 hrs, Volume= 0.099 af, Depth= 1.19"
Routed to Reach 6R : DP-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
NY-JW NEWBURGH 24-hr S1 10-yr Rainfall=4.70"

Area (ac)	CN	Description
0.930	60	Woods, Fair, HSG B
0.070	79	Woods, Fair, HSG D
1.000	61	Weighted Average
1.000		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.6	100	0.0200	0.08		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.15"
4.1	248	0.0400	1.00		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
25.7	348	Total			

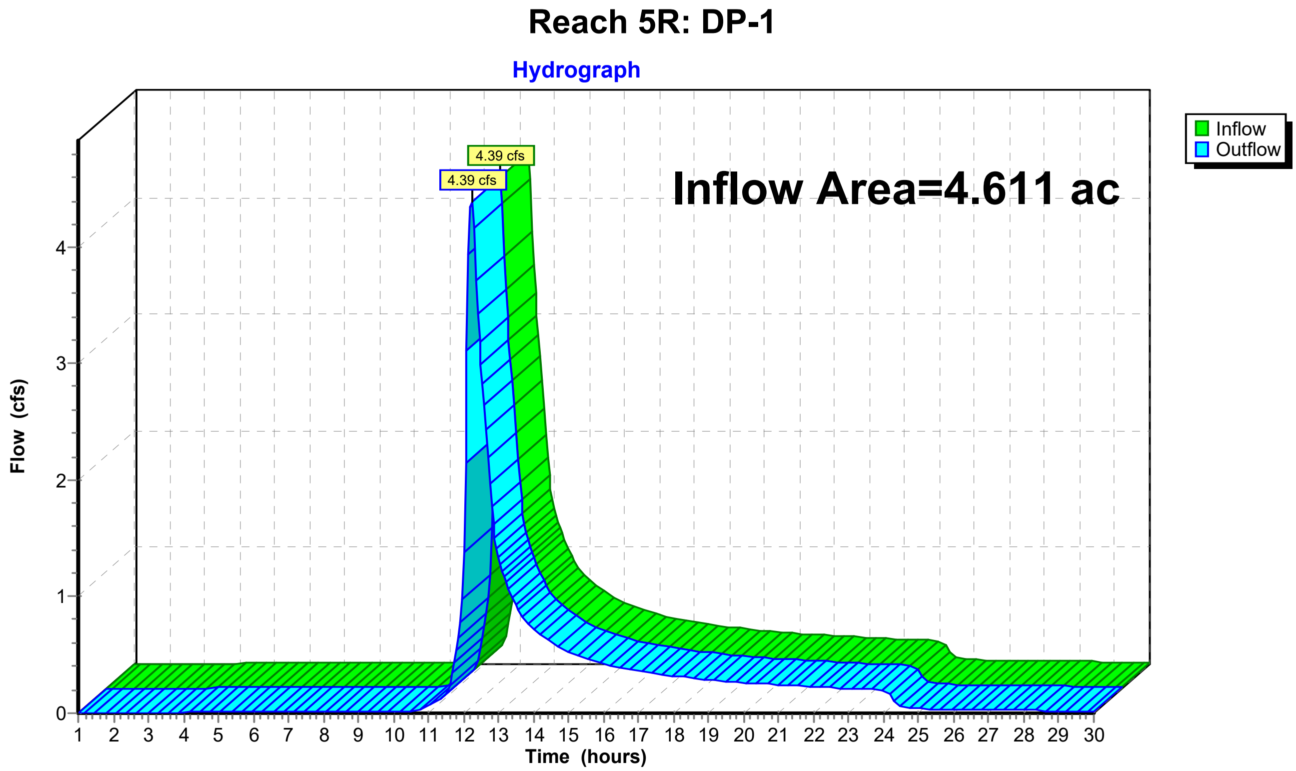
Subcatchment 3S: SOUTH SHEET



Summary for Reach 5R: DP-1

Inflow Area = 4.611 ac, 20.85% Impervious, Inflow Depth > 1.65" for 10-yr event
Inflow = 4.39 cfs @ 12.22 hrs, Volume= 0.635 af
Outflow = 4.39 cfs @ 12.22 hrs, Volume= 0.635 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs

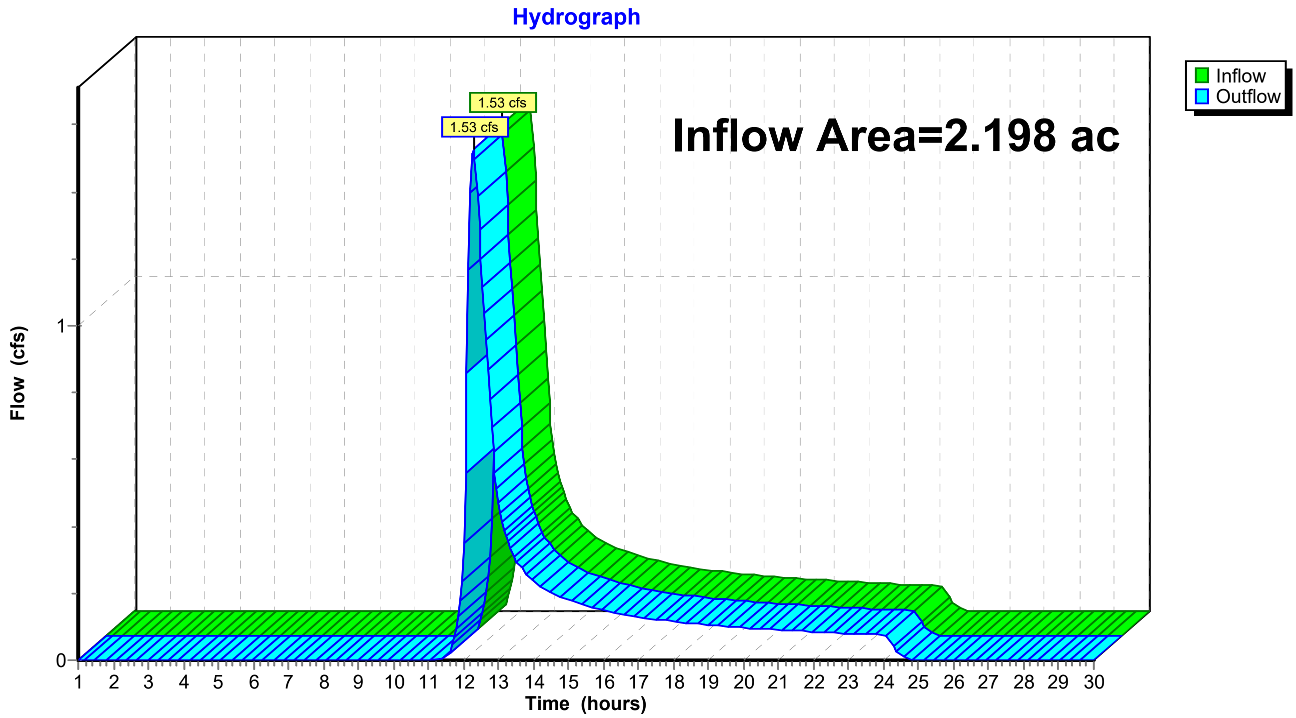


Summary for Reach 6R: DP-2

Inflow Area = 2.198 ac, 0.00% Impervious, Inflow Depth = 1.16" for 10-yr event
Inflow = 1.53 cfs @ 12.28 hrs, Volume= 0.212 af
Outflow = 1.53 cfs @ 12.28 hrs, Volume= 0.212 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs

Reach 6R: DP-2



Summary for Pond 1P: EXTENDED DETENTION

Inflow Area = 0.918 ac, 74.97% Impervious, Inflow Depth = 2.90" for 10-yr event
Inflow = 3.83 cfs @ 12.05 hrs, Volume= 0.221 af
Outflow = 0.71 cfs @ 12.56 hrs, Volume= 0.146 af, Atten= 81%, Lag= 31.1 min
Primary = 0.71 cfs @ 12.56 hrs, Volume= 0.146 af
Routed to Reach 5R : DP-1

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 298.32' @ 12.56 hrs Surf.Area= 3,074 sf Storage= 4,699 cf

Plug-Flow detention time= 209.2 min calculated for 0.145 af (66% of inflow)
Center-of-Mass det. time= 112.8 min (939.8 - 827.0)

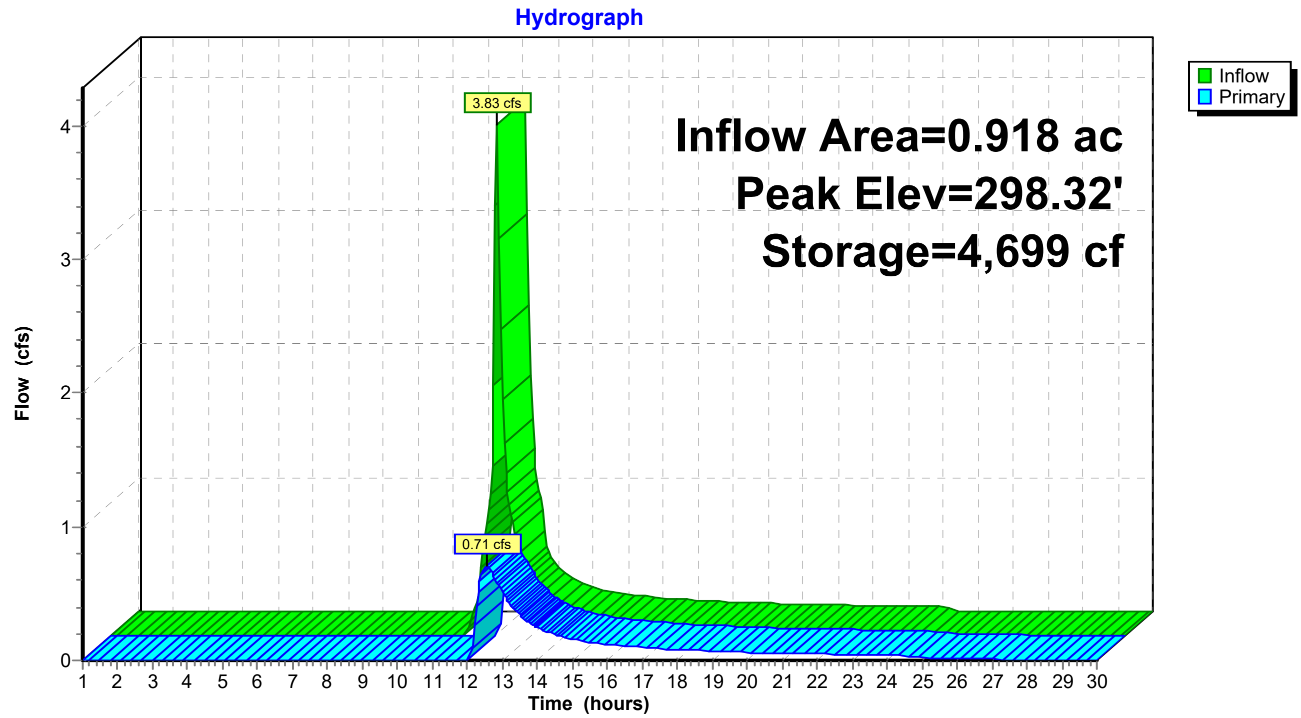
Volume	Invert	Avail.Storage	Storage Description
#1	296.00'	9,015 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
296.00	1,040	0	0
297.00	1,870	1,455	1,455
298.00	2,770	2,320	3,775
299.00	3,730	3,250	7,025
299.50	4,230	1,990	9,015

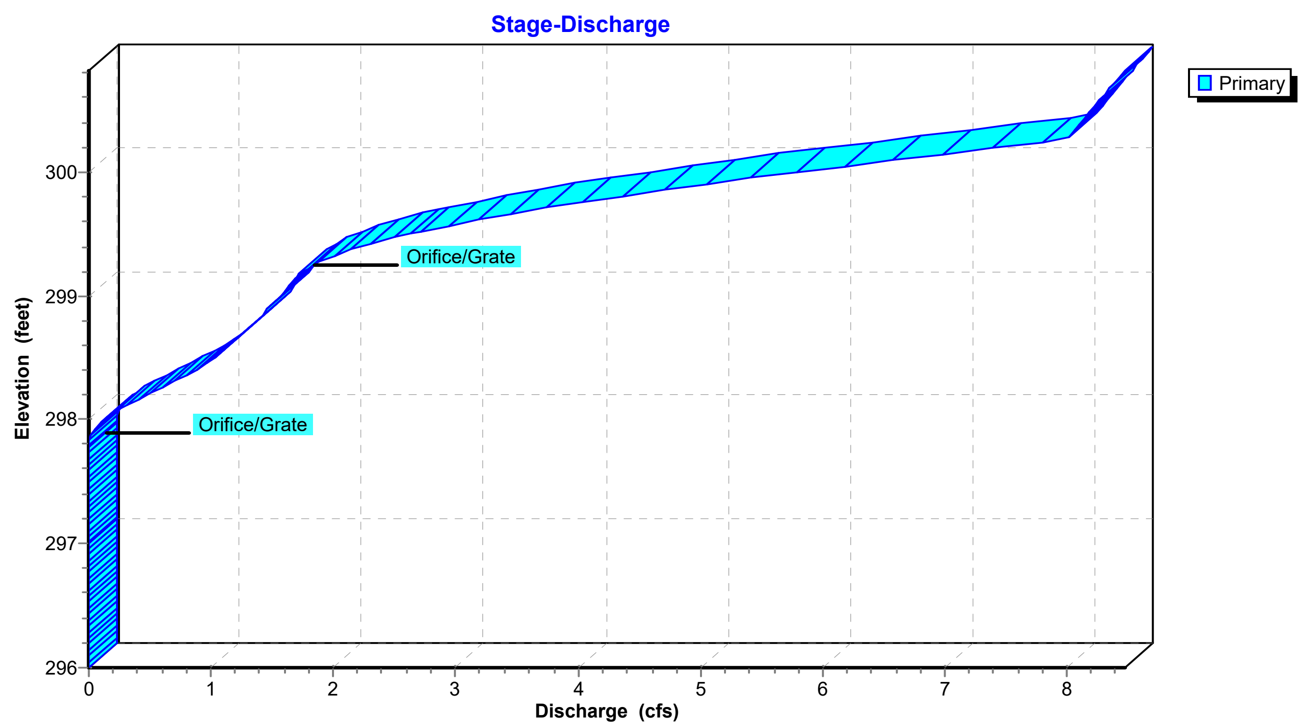
Device	Routing	Invert	Outlet Devices
#1	Primary	295.30'	**12.0" Round Outlet pipe** L= 15.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 295.30' / 295.00' S= 0.0200 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf
#2	Device 1	297.80'	**8.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	299.15'	**20.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.71 cfs @ 12.56 hrs HW=298.32' (Free Discharge)
└─**1=Outlet pipe** (Passes 0.71 cfs of 6.00 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.71 cfs @ 2.44 fps)
  └─**3=Orifice/Grate** (Controls 0.00 cfs)

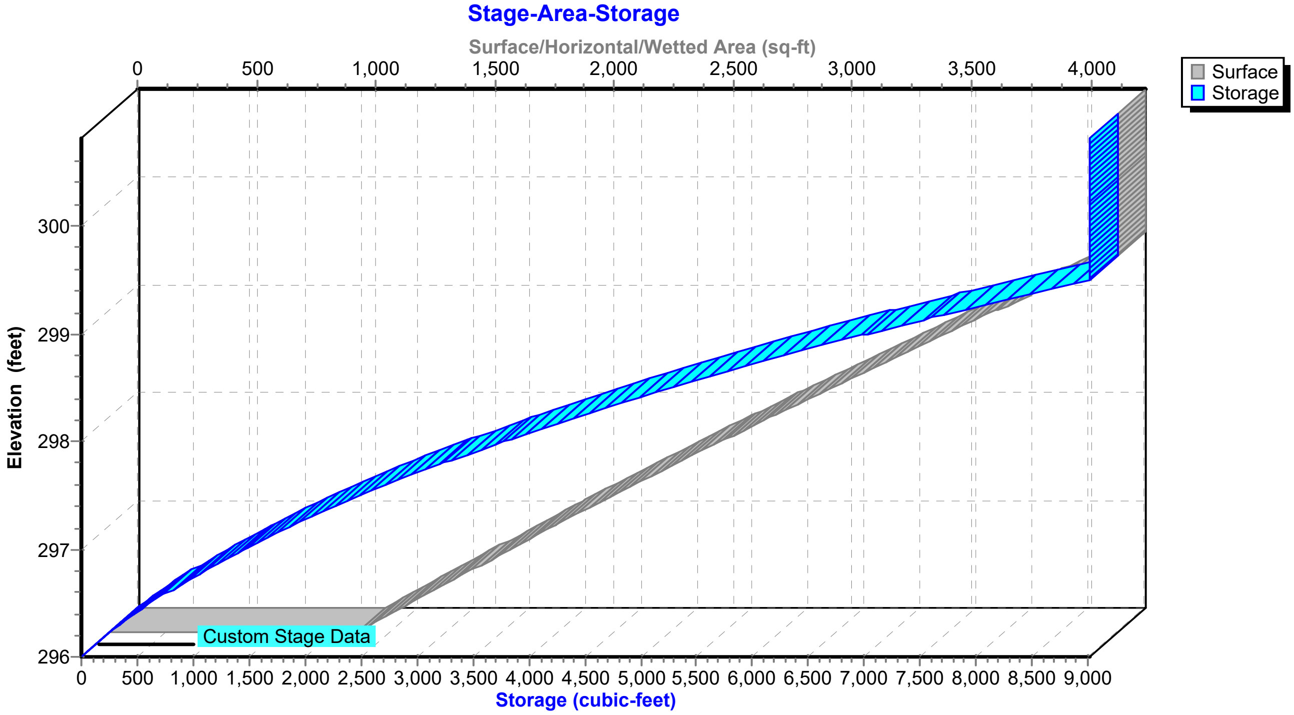
Pond 1P: EXTENDED DETENTION



Pond 1P: EXTENDED DETENTION



Pond 1P: EXTENDED DETENTION



Summary for Pond 2P: FLOW SPLITTER

Inflow Area = 0.918 ac, 74.97% Impervious, Inflow Depth = 3.80" for 10-yr event
Inflow = 4.05 cfs @ 12.04 hrs, Volume= 0.290 af
Outflow = 4.07 cfs @ 12.04 hrs, Volume= 0.290 af, Atten= 0%, Lag= 0.1 min
Primary = 0.97 cfs @ 12.04 hrs, Volume= 0.214 af
Routed to Pond SW-1 : BIORETENTION
Secondary = 3.10 cfs @ 12.04 hrs, Volume= 0.076 af
Routed to Pond 1P : EXTENDED DETENTION

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 300.30' @ 12.04 hrs Surf.Area= 0.000 ac Storage= 0.000 af

Plug-Flow detention time= 0.4 min calculated for 0.290 af (100% of inflow)
Center-of-Mass det. time= 0.4 min (791.7 - 791.3)

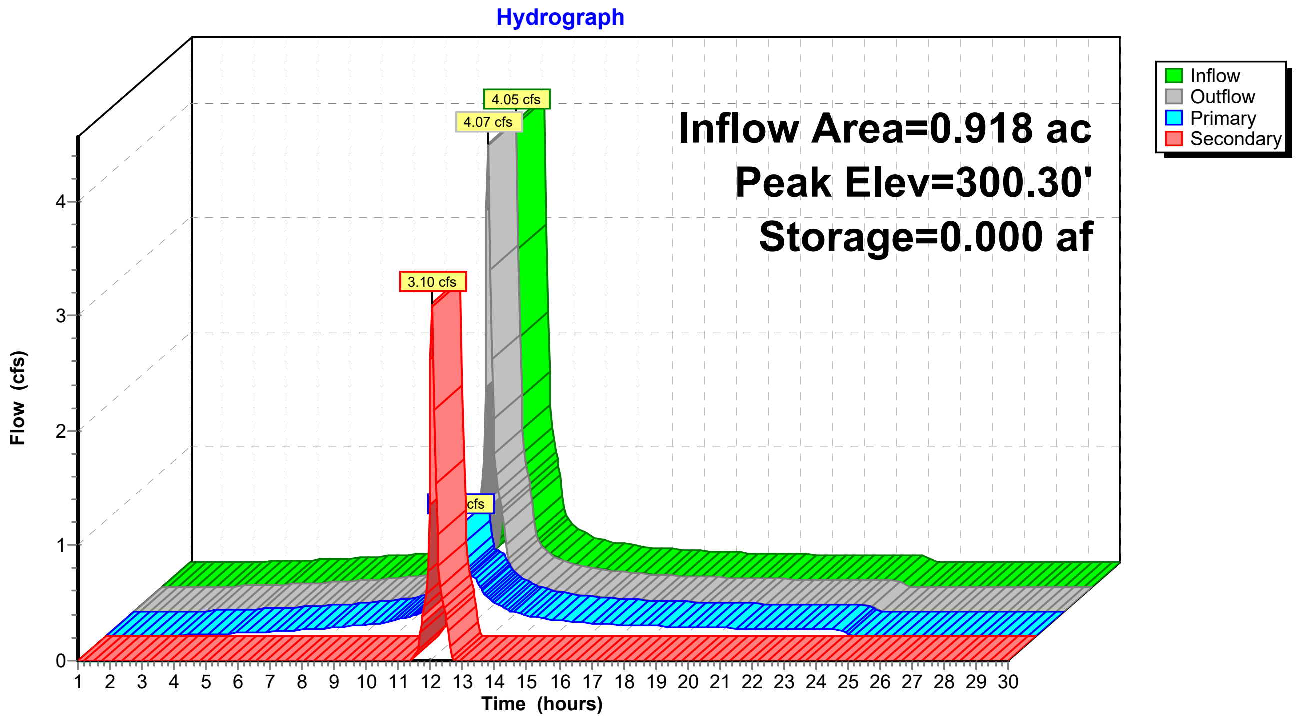
Volume	Invert	Avail.Storage	Storage Description
#1	299.00'	0.001 af	**4.00'W x 4.00'L x 3.00'H Catch Basin**

Device	Routing	Invert	Outlet Devices
#1	Primary	299.00'	**6.0" Round Culvert** L= 8.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 299.00' / 298.92' S= 0.0100 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.20 sf
#2	Secondary	299.00'	**12.0" Round Culvert** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 299.00' / 298.90' S= 0.0100 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf
#3	Device 2	299.50'	**4.0' long x 2.00' rise Sharp-Crested Rectangular Weir** 2 End Contraction(s) 1.0' Crest Height

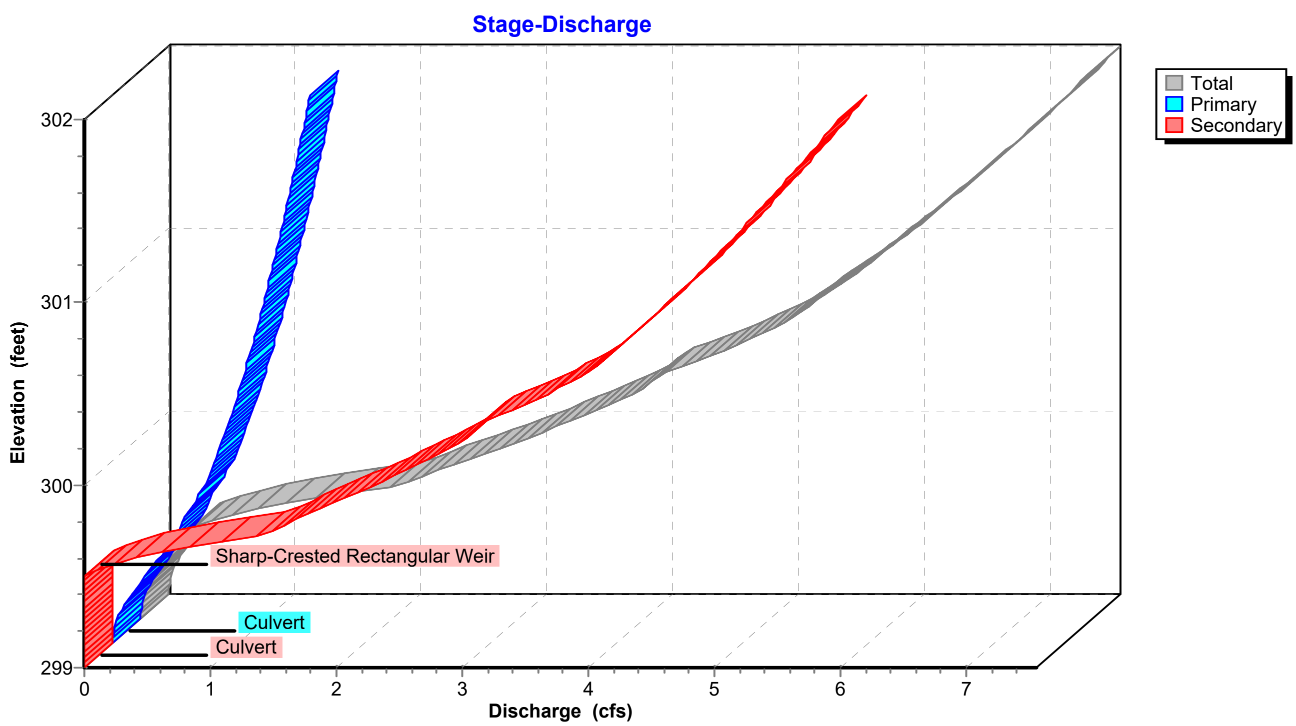
Primary OutFlow Max=0.95 cfs @ 12.04 hrs HW=300.26' (Free Discharge)
└─**1=Culvert** (Inlet Controls 0.95 cfs @ 4.85 fps)

Secondary OutFlow Max=3.03 cfs @ 12.04 hrs HW=300.26' (Free Discharge)
└─**2=Culvert** (Barrel Controls 3.03 cfs @ 3.94 fps)
  └─**3=Sharp-Crested Rectangular Weir** (Passes 3.03 cfs of 9.12 cfs potential flow)

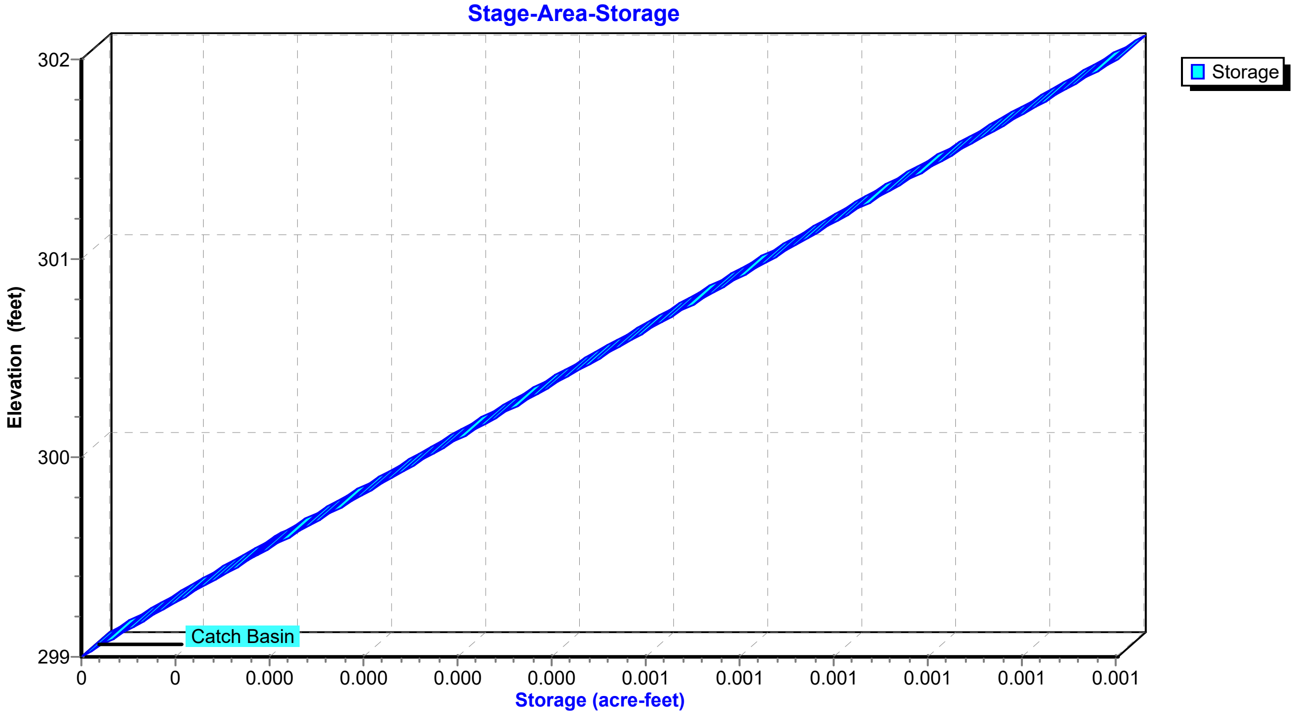
Pond 2P: FLOW SPLITTER



Pond 2P: FLOW SPLITTER



Pond 2P: FLOW SPLITTER



Summary for Pond SW-1: BIORETENTION

Inflow Area = 0.918 ac, 74.97% Impervious, Inflow Depth = 2.80" for 10-yr event
Inflow = 0.97 cfs @ 12.04 hrs, Volume= 0.214 af
Outflow = 0.82 cfs @ 12.10 hrs, Volume= 0.186 af, Atten= 16%, Lag= 3.7 min
Primary = 0.80 cfs @ 12.10 hrs, Volume= 0.145 af
Routed to Pond 1P : EXTENDED DETENTION
Secondary = 0.02 cfs @ 12.10 hrs, Volume= 0.041 af
Routed to Reach 5R : DP-1

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 298.60' @ 12.10 hrs Surf.Area= 3,441 sf Storage= 1,954 cf

Plug-Flow detention time= 168.0 min calculated for 0.186 af (87% of inflow)
Center-of-Mass det. time= 99.2 min (914.7 - 815.4)

Volume	Invert	Avail.Storage	Storage Description
#1	298.00'	5,300 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

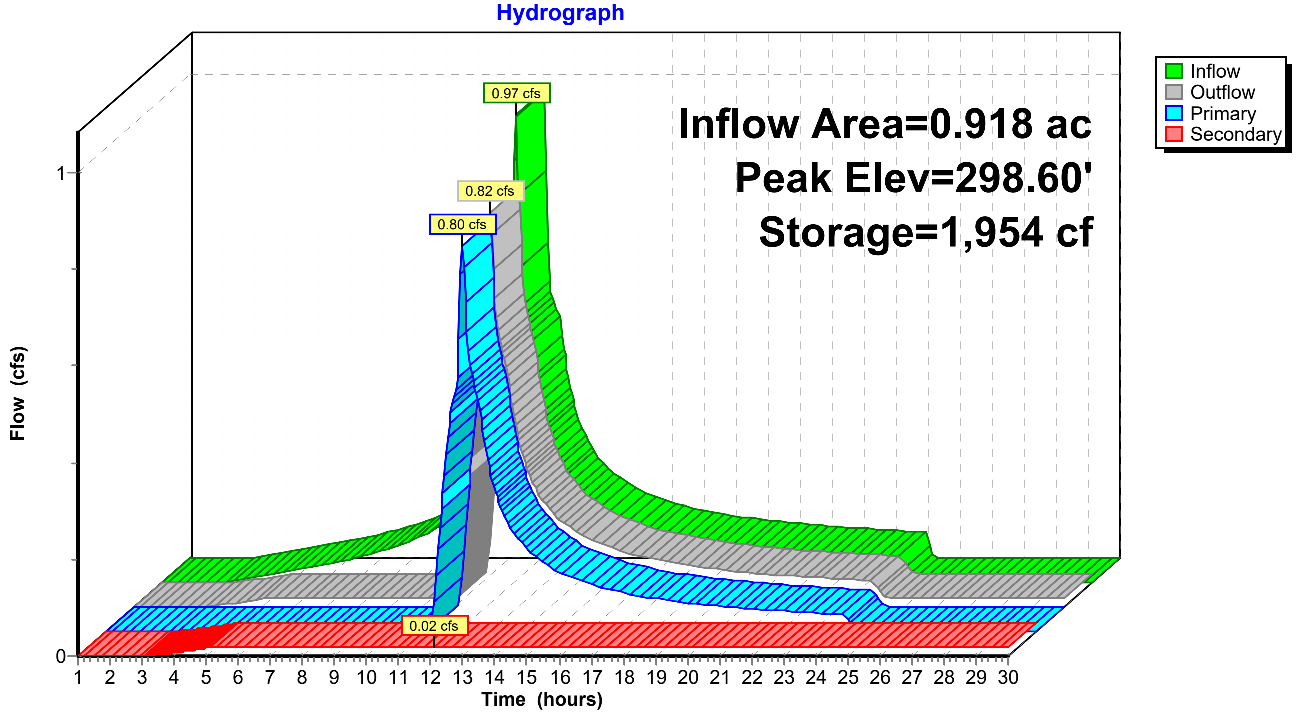
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
298.00	3,050	0	0
299.00	3,700	3,375	3,375
299.50	4,000	1,925	5,300

Device	Routing	Invert	Outlet Devices
#1	Primary	298.50'	**10.0' long x 3.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32
#2	Device 3	298.00'	**0.250 in/hr Exfiltration over Surface area**
#3	Secondary	295.00'	**4.0" Round Culvert** L= 20.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 295.00' / 294.99' S= 0.0005 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.09 sf

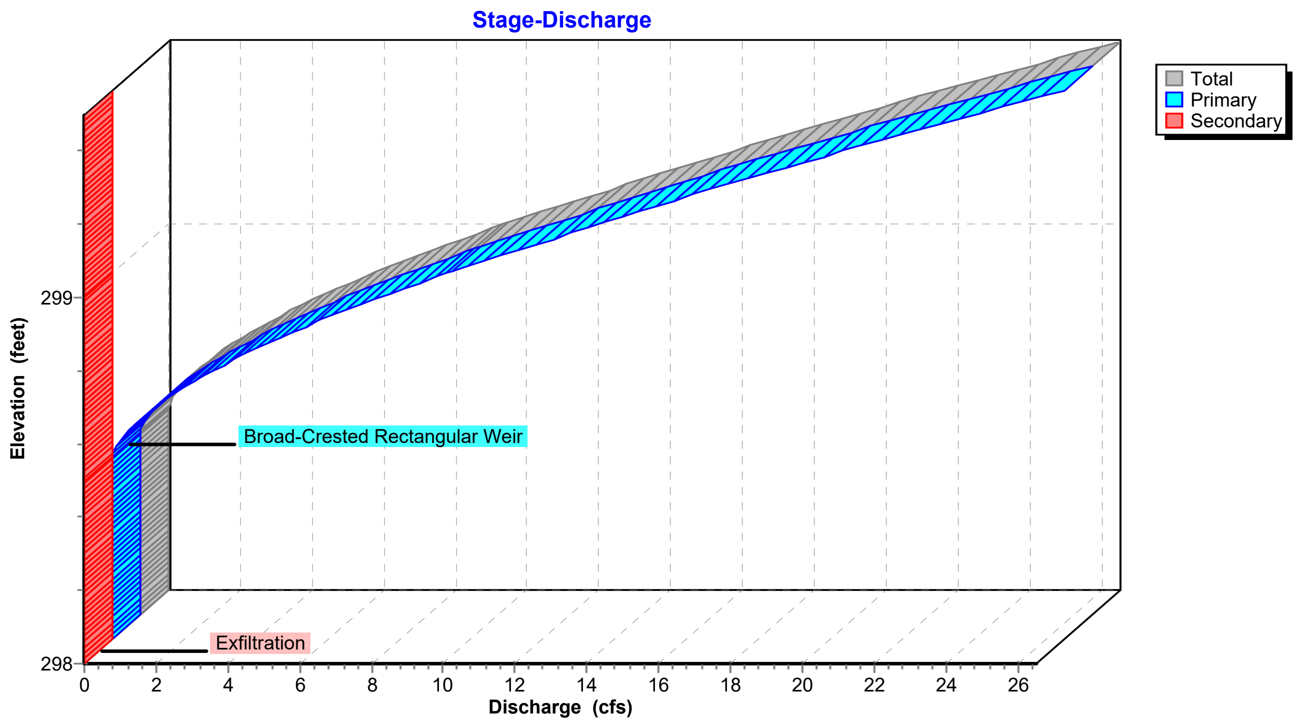
Primary OutFlow Max=0.79 cfs @ 12.10 hrs HW=298.60' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Weir Controls 0.79 cfs @ 0.78 fps)

Secondary OutFlow Max=0.02 cfs @ 12.10 hrs HW=298.60' (Free Discharge)
└─**3=Culvert** (Passes 0.02 cfs of 0.65 cfs potential flow)
  └─**2=Exfiltration** (Exfiltration Controls 0.02 cfs)

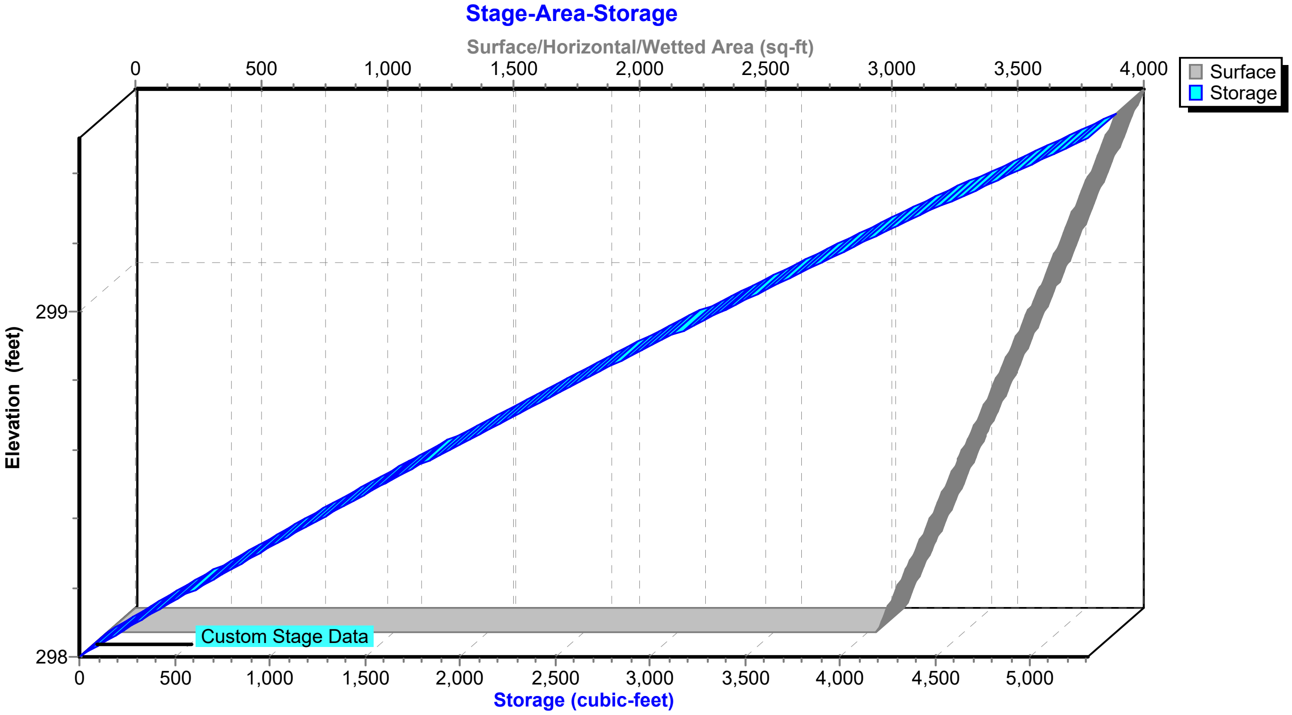
Pond SW-1: BIORETENTION



Pond SW-1: BIORETENTION



Pond SW-1: BIORETENTION



Time span=1.00-30.00 hrs, dt=0.05 hrs, 581 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S-A: UNCAPTURED Runoff Area=160,873 sf 7.40% Impervious Runoff Depth=4.20"
Flow Length=345' Tc=16.7 min CN=65 Runoff=11.83 cfs 1.294 af

Subcatchment1S-B: PARKING AND BASIN Runoff Area=39,985 sf 74.97% Impervious Runoff Depth=7.42"
Tc=6.0 min CN=92 Runoff=6.94 cfs 0.568 af

Subcatchment2S: SEPTIC FIELDS Runoff Area=1.198 ac 0.00% Impervious Runoff Depth=3.62"
Flow Length=265' Tc=18.5 min CN=60 Runoff=3.12 cfs 0.361 af

Subcatchment3S: SOUTH SHEET Runoff Area=1.000 ac 0.00% Impervious Runoff Depth=3.74"
Flow Length=348' Tc=25.7 min CN=61 Runoff=2.33 cfs 0.311 af

Reach 5R: DP-1 Inflow=13.96 cfs 1.757 af
Outflow=13.96 cfs 1.757 af

Reach 6R: DP-2 Inflow=5.28 cfs 0.673 af
Outflow=5.28 cfs 0.673 af

Pond 1P: EXTENDED DETENTION Peak Elev=299.41' Storage=8,632 cf Inflow=6.58 cfs 0.495 af
Outflow=2.27 cfs 0.419 af

Pond 2P: FLOW SPLITTER Peak Elev=301.61' Storage=0.001 af Inflow=6.94 cfs 0.568 af
Primary=1.45 cfs 0.383 af Secondary=5.50 cfs 0.184 af Outflow=6.95 cfs 0.568 af

Pond SW-1: BIORETENTION Peak Elev=298.63' Storage=2,062 cf Inflow=1.45 cfs 0.383 af
Primary=1.19 cfs 0.311 af Secondary=0.02 cfs 0.044 af Outflow=1.21 cfs 0.355 af

Total Runoff Area = 6.809 ac Runoff Volume = 2.534 af Average Runoff Depth = 4.47"
85.88% Pervious = 5.847 ac 14.12% Impervious = 0.962 ac

Summary for Subcatchment 1S-A: UNCAPTURED

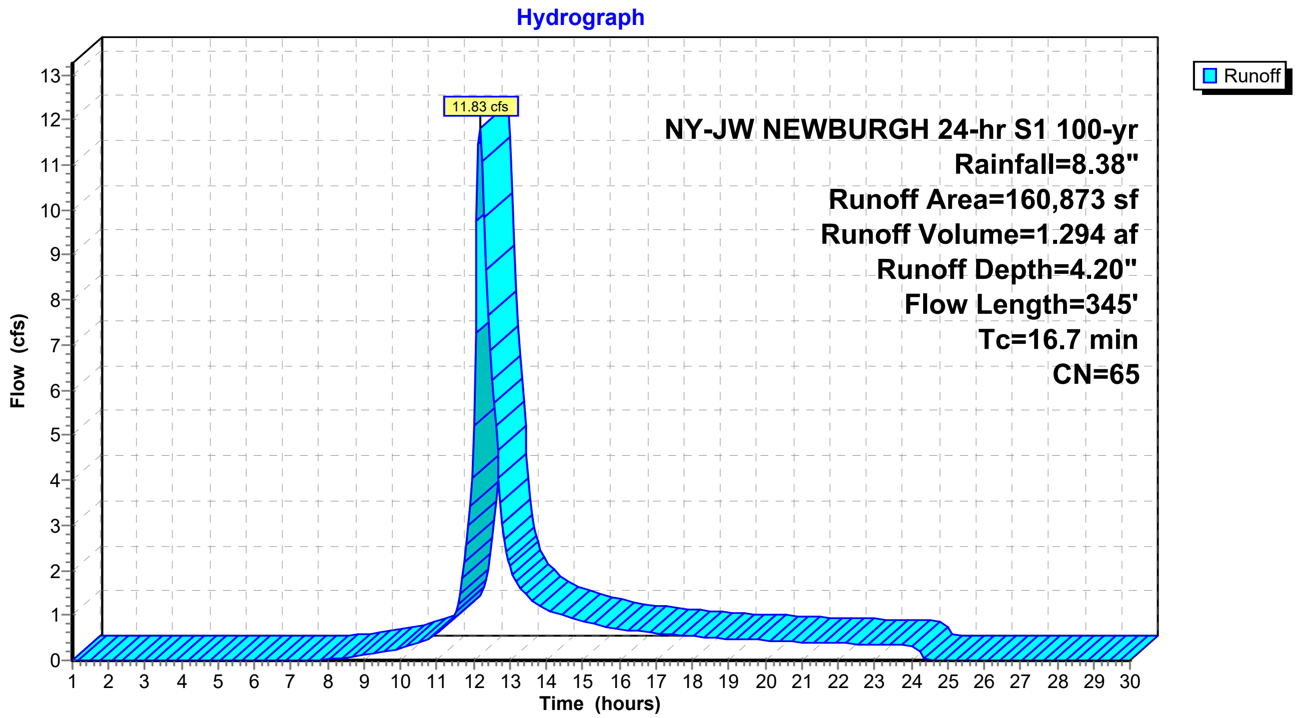
Runoff = 11.83 cfs @ 12.19 hrs, Volume= 1.294 af, Depth= 4.20"
Routed to Reach 5R : DP-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
NY-JW NEWBURGH 24-hr S1 100-yr Rainfall=8.38"

Area (sf)	CN	Description
88,209	60	Woods, Fair, HSG B
12,189	79	Woods, Fair, HSG D
40,963	61	>75% Grass cover, Good, HSG B
7,600	80	>75% Grass cover, Good, HSG D
11,912	98	Paved parking, HSG D
160,873	65	Weighted Average
148,961		92.60% Pervious Area
11,912		7.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.9	100	0.0600	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.15"
1.1	136	0.1617	2.01		**Shallow Concentrated Flow, SHALLOW CONC** Woodland Kv= 5.0 fps
1.7	109	0.0460	1.07		**Shallow Concentrated Flow, SHALLOW CONC FLOW** Woodland Kv= 5.0 fps
16.7	345	Total			

Subcatchment 1S-A: UNCAPTURED



Summary for Subcatchment 1S-B: PARKING AND BASIN

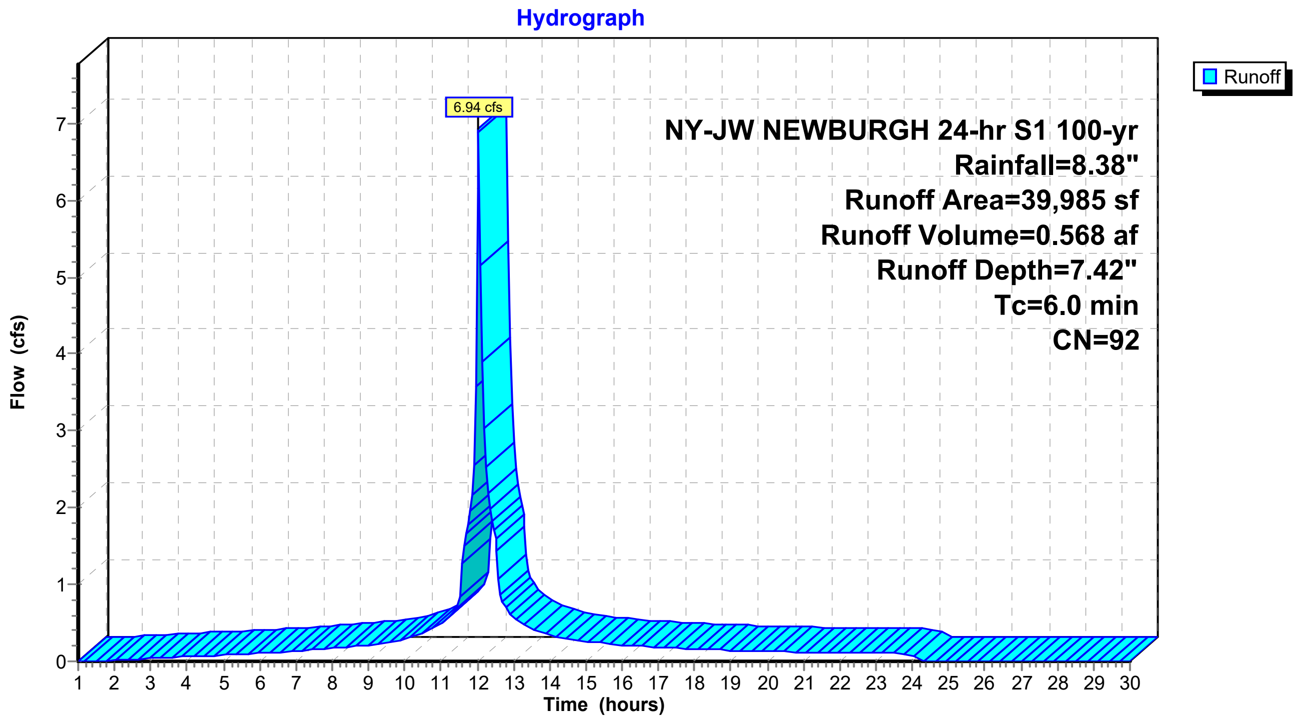
Runoff = 6.94 cfs @ 12.04 hrs, Volume= 0.568 af, Depth= 7.42"
Routed to Pond 2P : FLOW SPLITTER

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
NY-JW NEWBURGH 24-hr S1 100-yr Rainfall=8.38"

Area (sf)	CN	Description
3,910	61	>75% Grass cover, Good, HSG B
25,053	98	Paved parking, HSG B
6,100	80	>75% Grass cover, Good, HSG D
4,922	98	Roofs, HSG D
39,985	92	Weighted Average
10,010		25.03% Pervious Area
29,975		74.97% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, min**

Subcatchment 1S-B: PARKING AND BASIN



Summary for Subcatchment 2S: SEPTIC FIELDS

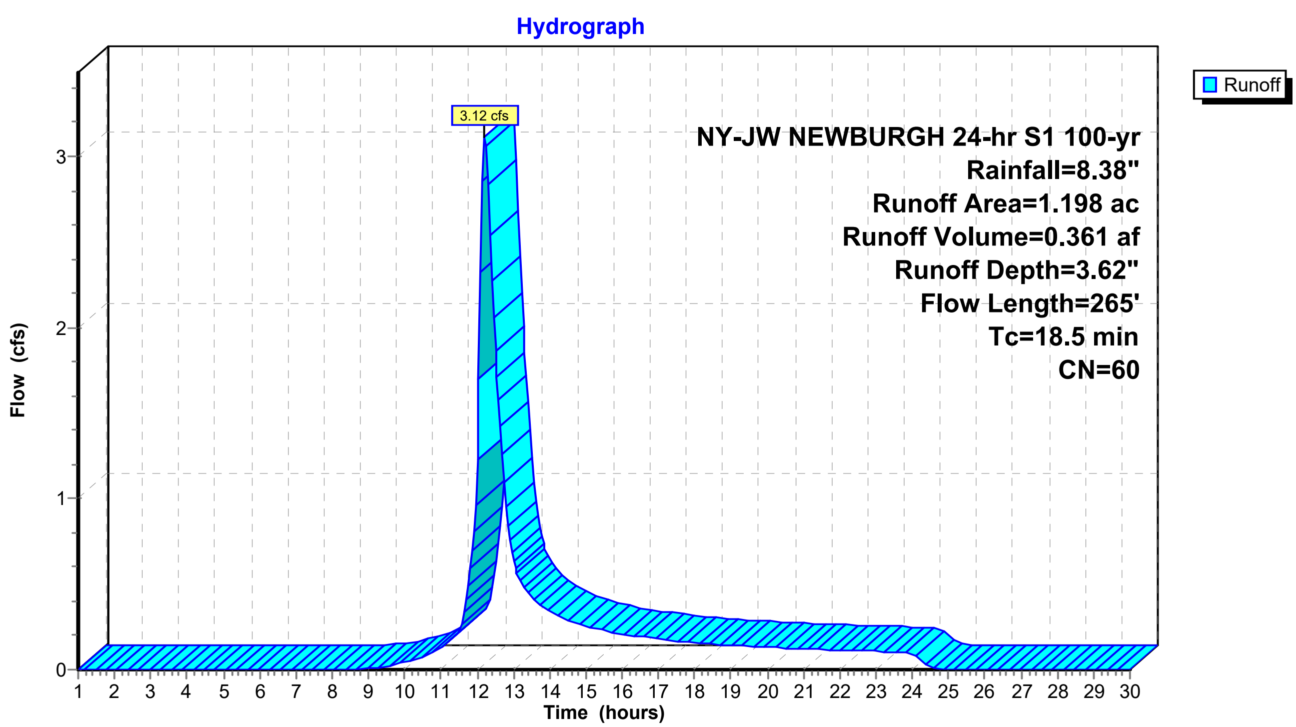
Runoff = 3.12 cfs @ 12.22 hrs, Volume= 0.361 af, Depth= 3.62"
Routed to Reach 6R : DP-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
NY-JW NEWBURGH 24-hr S1 100-yr Rainfall=8.38"

Area (ac)	CN	Description
0.773	60	Woods, Fair, HSG B
0.425	61	>75% Grass cover, Good, HSG B
1.198	60	Weighted Average
1.198		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.4	100	0.0400	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.15"
2.1	165	0.0670	1.29		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
18.5	265	Total			

Subcatchment 2S: SEPTIC FIELDS



Summary for Subcatchment 3S: SOUTH SHEET

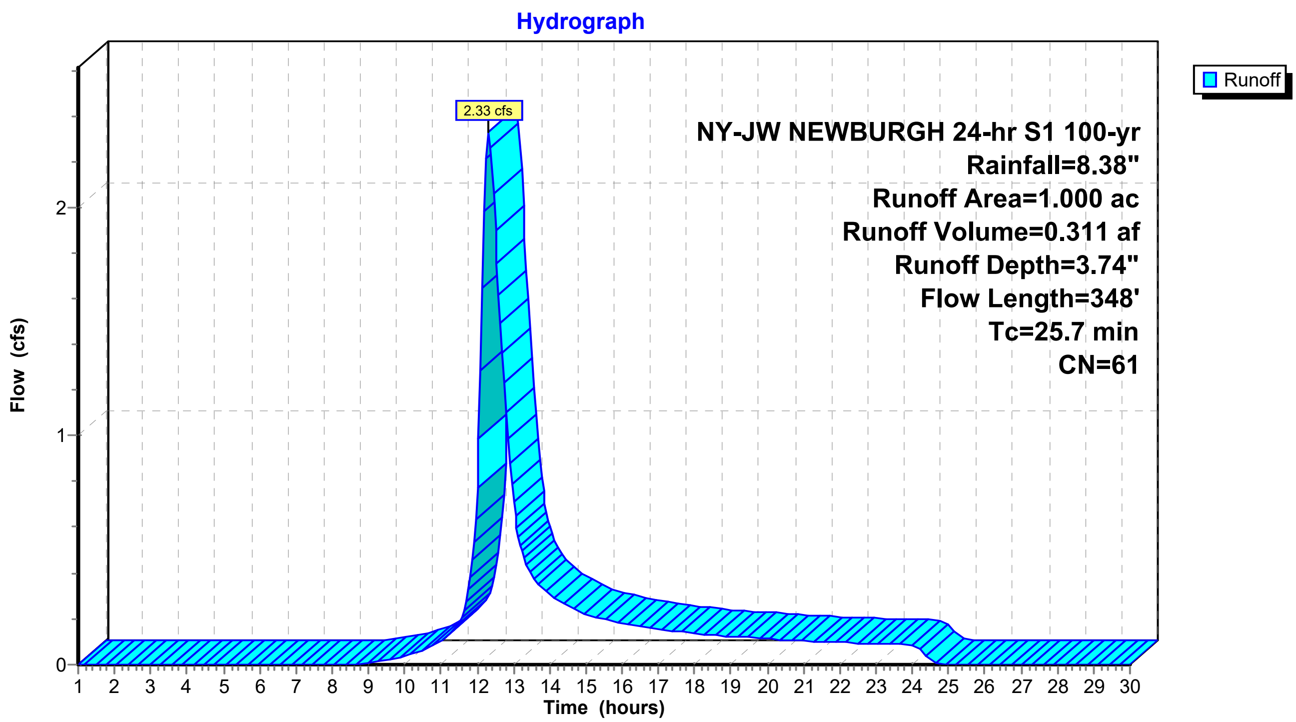
Runoff = 2.33 cfs @ 12.32 hrs, Volume= 0.311 af, Depth= 3.74"
Routed to Reach 6R : DP-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
NY-JW NEWBURGH 24-hr S1 100-yr Rainfall=8.38"

Area (ac)	CN	Description
0.930	60	Woods, Fair, HSG B
0.070	79	Woods, Fair, HSG D
1.000	61	Weighted Average
1.000		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.6	100	0.0200	0.08		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.15"
4.1	248	0.0400	1.00		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
25.7	348	Total			

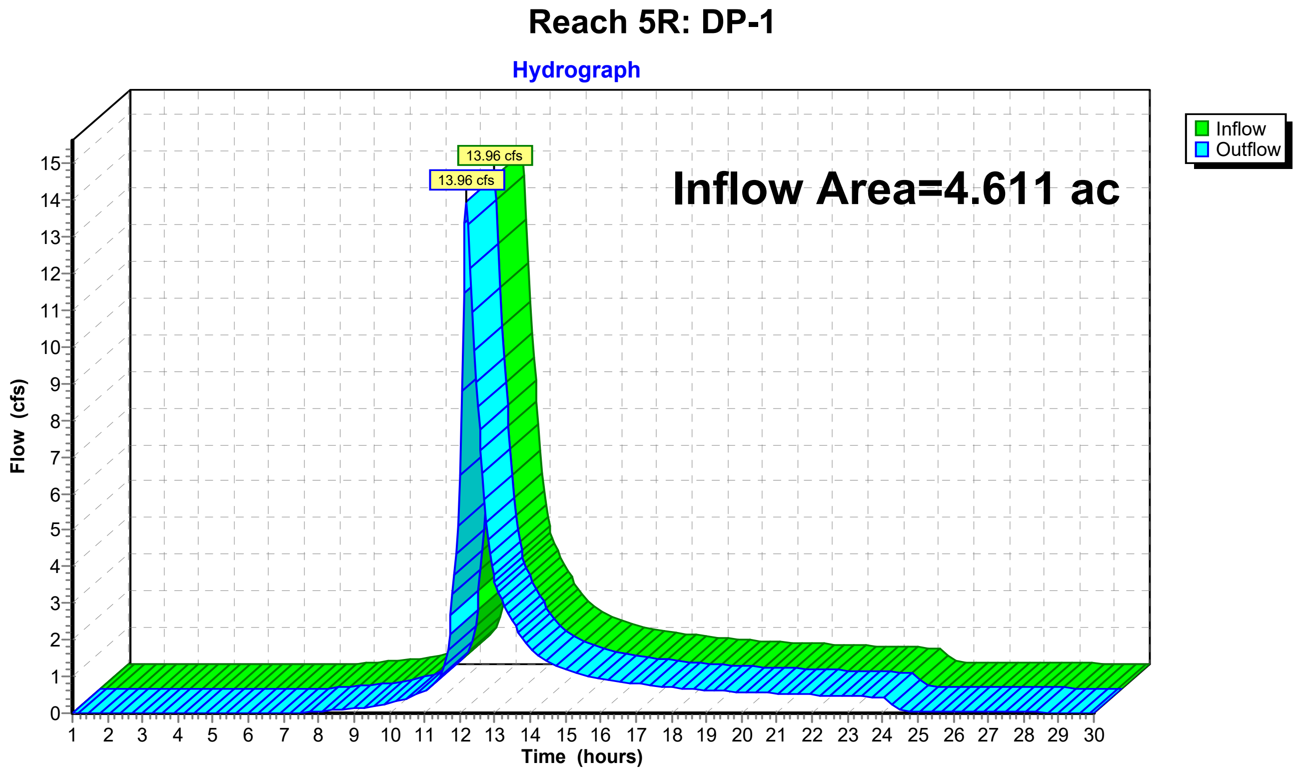
Subcatchment 3S: SOUTH SHEET



Summary for Reach 5R: DP-1

Inflow Area = 4.611 ac, 20.85% Impervious, Inflow Depth > 4.57" for 100-yr event
Inflow = 13.96 cfs @ 12.20 hrs, Volume= 1.757 af
Outflow = 13.96 cfs @ 12.20 hrs, Volume= 1.757 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs

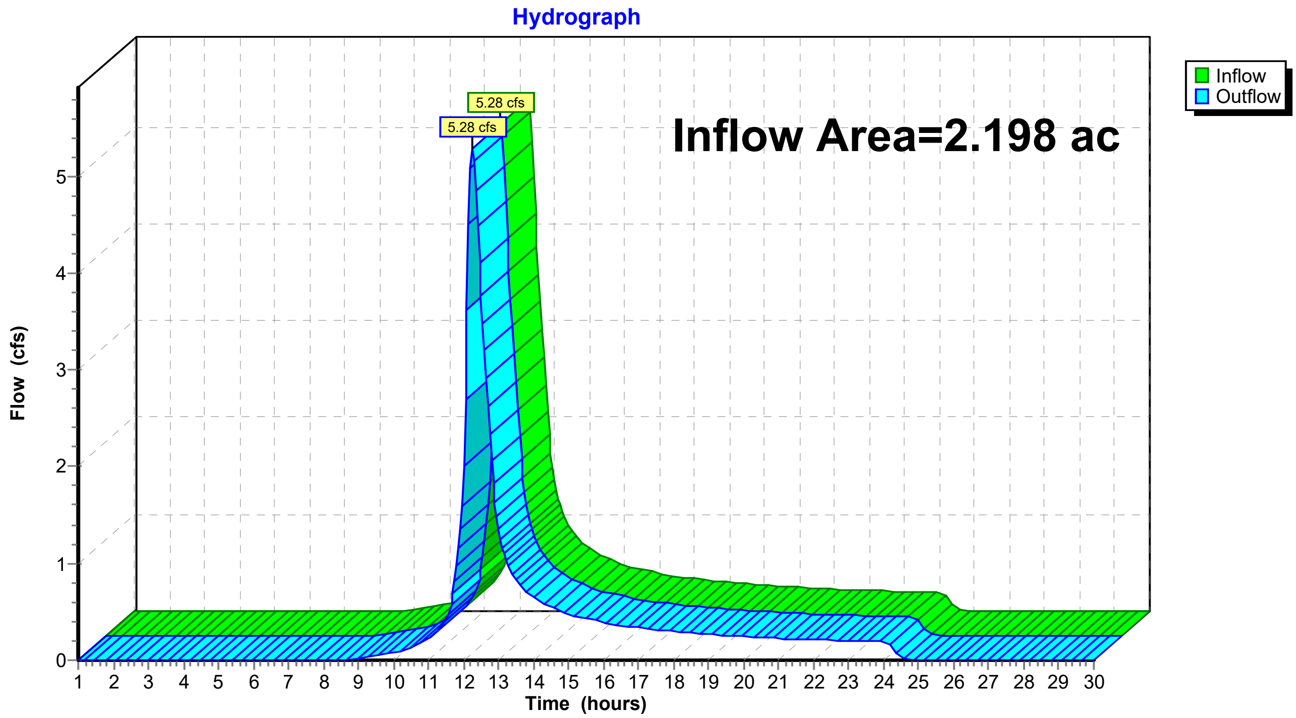


Summary for Reach 6R: DP-2

Inflow Area = 2.198 ac, 0.00% Impervious, Inflow Depth = 3.67" for 100-yr event
Inflow = 5.28 cfs @ 12.26 hrs, Volume= 0.673 af
Outflow = 5.28 cfs @ 12.26 hrs, Volume= 0.673 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs

Reach 6R: DP-2



Summary for Pond 1P: EXTENDED DETENTION

Inflow Area = 0.918 ac, 74.97% Impervious, Inflow Depth = 6.47" for 100-yr event
Inflow = 6.58 cfs @ 12.05 hrs, Volume= 0.495 af
Outflow = 2.27 cfs @ 12.31 hrs, Volume= 0.419 af, Atten= 65%, Lag= 16.1 min
Primary = 2.27 cfs @ 12.31 hrs, Volume= 0.419 af
Routed to Reach 5R : DP-1

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 299.41' @ 12.31 hrs Surf.Area= 4,139 sf Storage= 8,632 cf

Plug-Flow detention time= 145.7 min calculated for 0.419 af (85% of inflow)
Center-of-Mass det. time= 77.4 min (882.8 - 805.4)

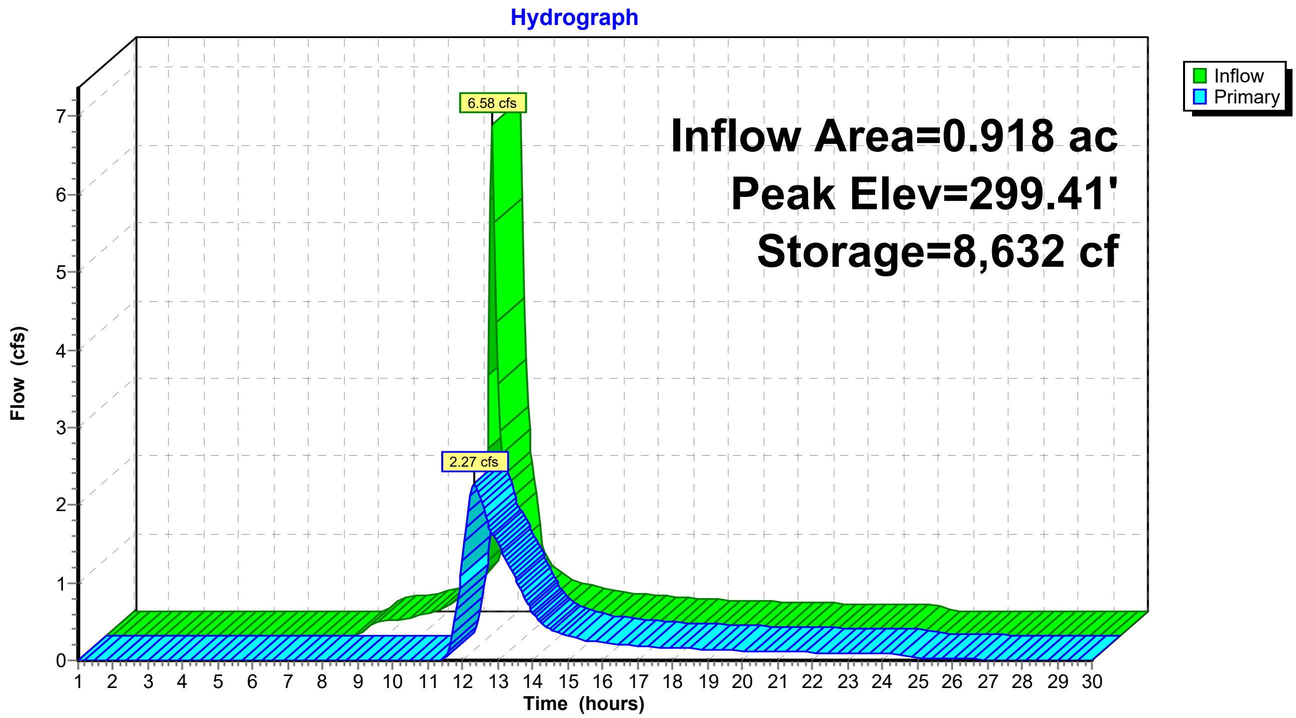
Volume	Invert	Avail.Storage	Storage Description
#1	296.00'	9,015 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
296.00	1,040	0	0
297.00	1,870	1,455	1,455
298.00	2,770	2,320	3,775
299.00	3,730	3,250	7,025
299.50	4,230	1,990	9,015

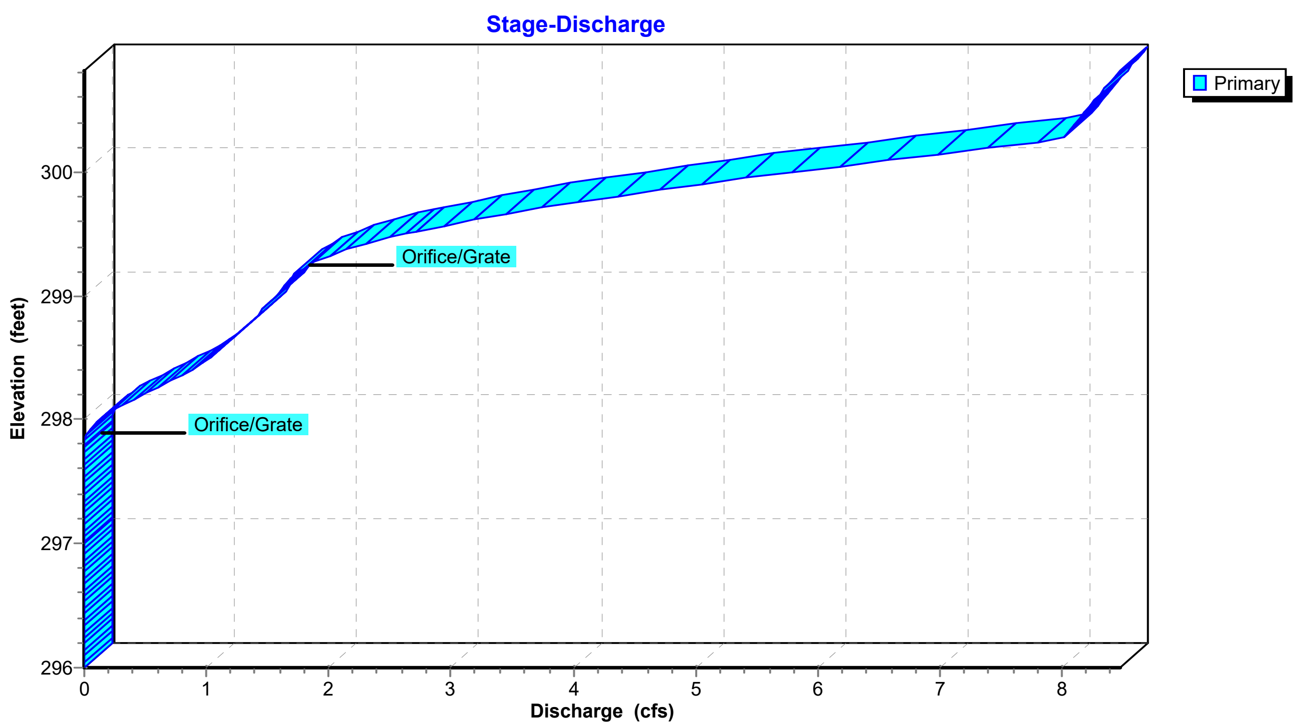
Device	Routing	Invert	Outlet Devices
#1	Primary	295.30'	**12.0" Round Outlet pipe** L= 15.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 295.30' / 295.00' S= 0.0200 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf
#2	Device 1	297.80'	**8.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	299.15'	**20.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=2.27 cfs @ 12.31 hrs HW=299.41' (Free Discharge)
└─**1=Outlet pipe** (Passes 2.27 cfs of 7.18 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 1.90 cfs @ 5.43 fps)
  └─**3=Orifice/Grate** (Orifice Controls 0.37 cfs @ 1.73 fps)

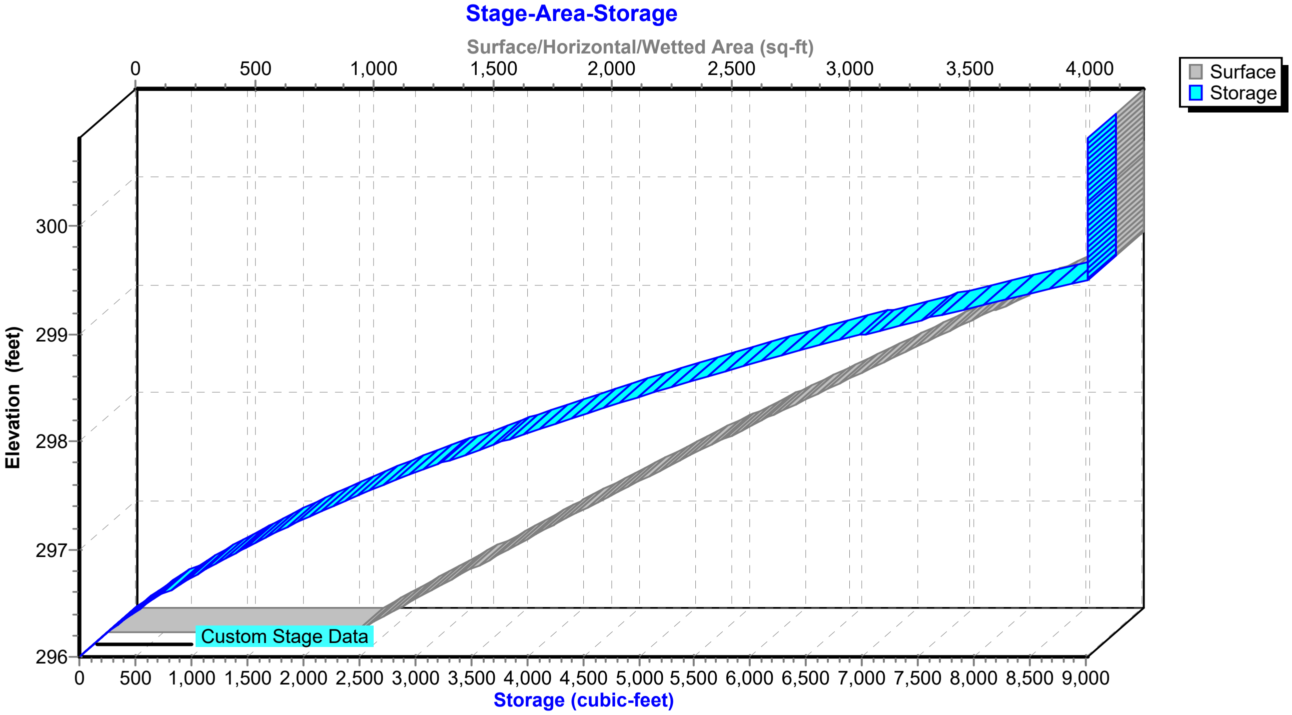
Pond 1P: EXTENDED DETENTION



Pond 1P: EXTENDED DETENTION



Pond 1P: EXTENDED DETENTION



Summary for Pond 2P: FLOW SPLITTER

Inflow Area = 0.918 ac, 74.97% Impervious, Inflow Depth = 7.42" for 100-yr event
Inflow = 6.94 cfs @ 12.04 hrs, Volume= 0.568 af
Outflow = 6.95 cfs @ 12.04 hrs, Volume= 0.568 af, Atten= 0%, Lag= 0.2 min
Primary = 1.45 cfs @ 12.04 hrs, Volume= 0.383 af
Routed to Pond SW-1 : BIORETENTION
Secondary = 5.50 cfs @ 12.04 hrs, Volume= 0.184 af
Routed to Pond 1P : EXTENDED DETENTION

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 301.61' @ 12.04 hrs Surf.Area= 0.000 ac Storage= 0.001 af

Plug-Flow detention time= 0.3 min calculated for 0.567 af (100% of inflow)
Center-of-Mass det. time= 0.3 min (772.3 - 772.0)

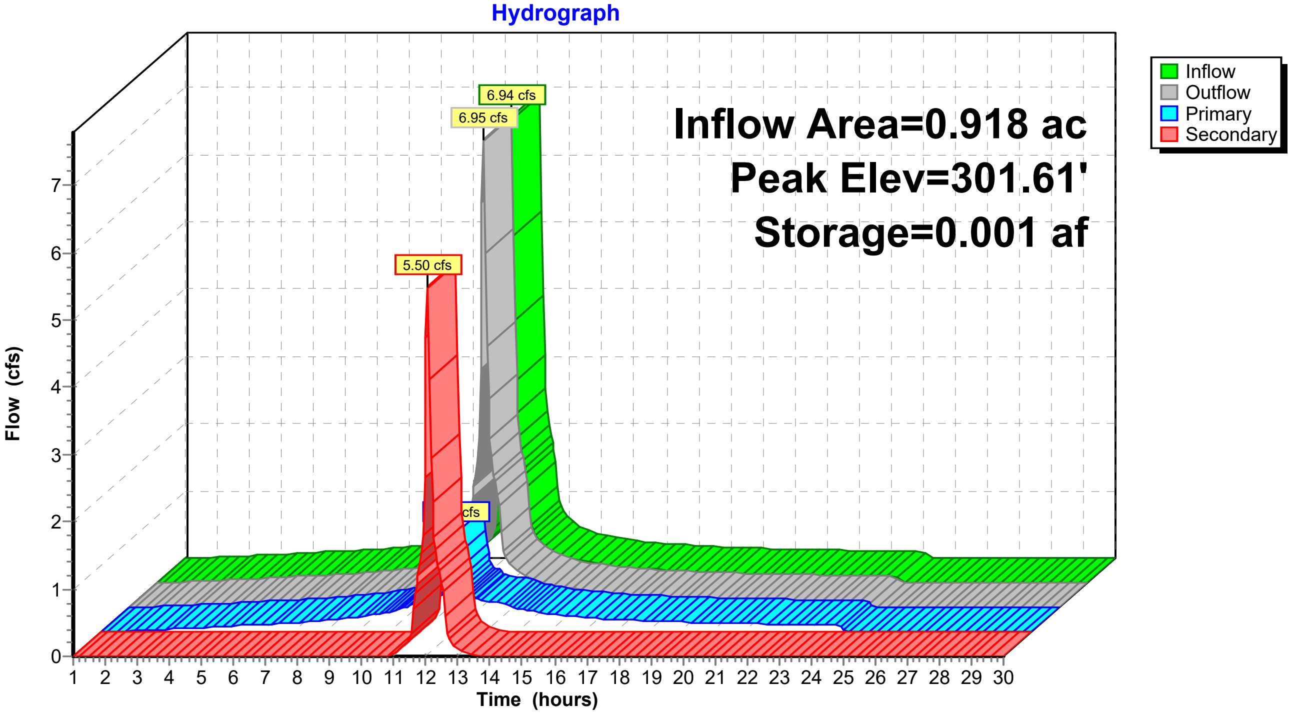
Volume	Invert	Avail.Storage	Storage Description
#1	299.00'	0.001 af	**4.00'W x 4.00'L x 3.00'H Catch Basin**

Device	Routing	Invert	Outlet Devices
#1	Primary	299.00'	**6.0" Round Culvert** L= 8.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 299.00' / 298.92' S= 0.0100 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.20 sf
#2	Secondary	299.00'	**12.0" Round Culvert** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 299.00' / 298.90' S= 0.0100 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf
#3	Device 2	299.50'	**4.0' long x 2.00' rise Sharp-Crested Rectangular Weir** 2 End Contraction(s) 1.0' Crest Height

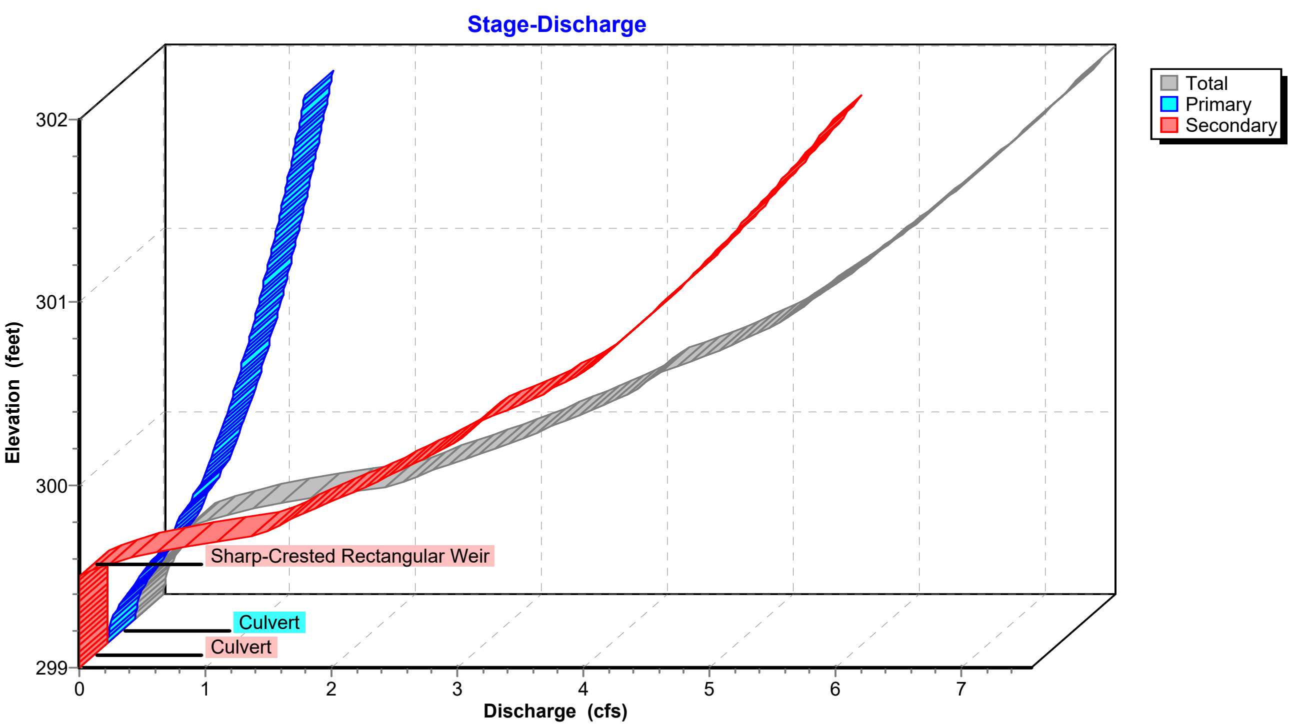
Primary OutFlow Max=1.42 cfs @ 12.04 hrs HW=301.52' (Free Discharge)
└─**1=Culvert** (Inlet Controls 1.42 cfs @ 7.26 fps)

Secondary OutFlow Max=5.38 cfs @ 12.04 hrs HW=301.52' (Free Discharge)
└─**2=Culvert** (Inlet Controls 5.38 cfs @ 6.84 fps)
  └─**3=Sharp-Crested Rectangular Weir** (Passes 5.38 cfs of 42.12 cfs potential flow)

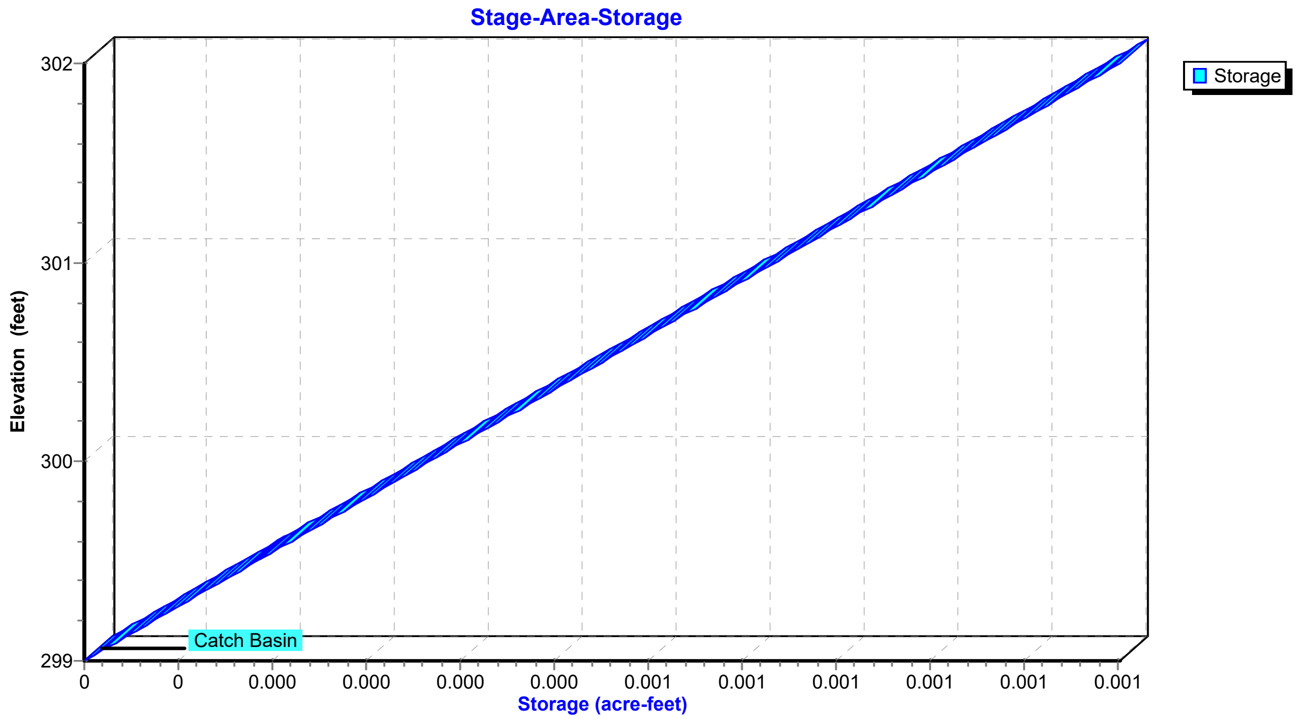
Pond 2P: FLOW SPLITTER



Pond 2P: FLOW SPLITTER



Pond 2P: FLOW SPLITTER



Summary for Pond SW-1: BIORETENTION

Inflow Area = 0.918 ac, 74.97% Impervious, Inflow Depth = 5.01" for 100-yr event
Inflow = 1.45 cfs @ 12.04 hrs, Volume= 0.383 af
Outflow = 1.21 cfs @ 12.10 hrs, Volume= 0.355 af, Atten= 17%, Lag= 3.4 min
Primary = 1.19 cfs @ 12.10 hrs, Volume= 0.311 af
Routed to Pond 1P : EXTENDED DETENTION
Secondary = 0.02 cfs @ 12.10 hrs, Volume= 0.044 af
Routed to Reach 5R : DP-1

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 298.63' @ 12.10 hrs Surf.Area= 3,462 sf Storage= 2,062 cf

Plug-Flow detention time= 117.8 min calculated for 0.355 af (93% of inflow)
Center-of-Mass det. time= 73.7 min (868.7 - 795.0)

Volume	Invert	Avail.Storage	Storage Description
#1	298.00'	5,300 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

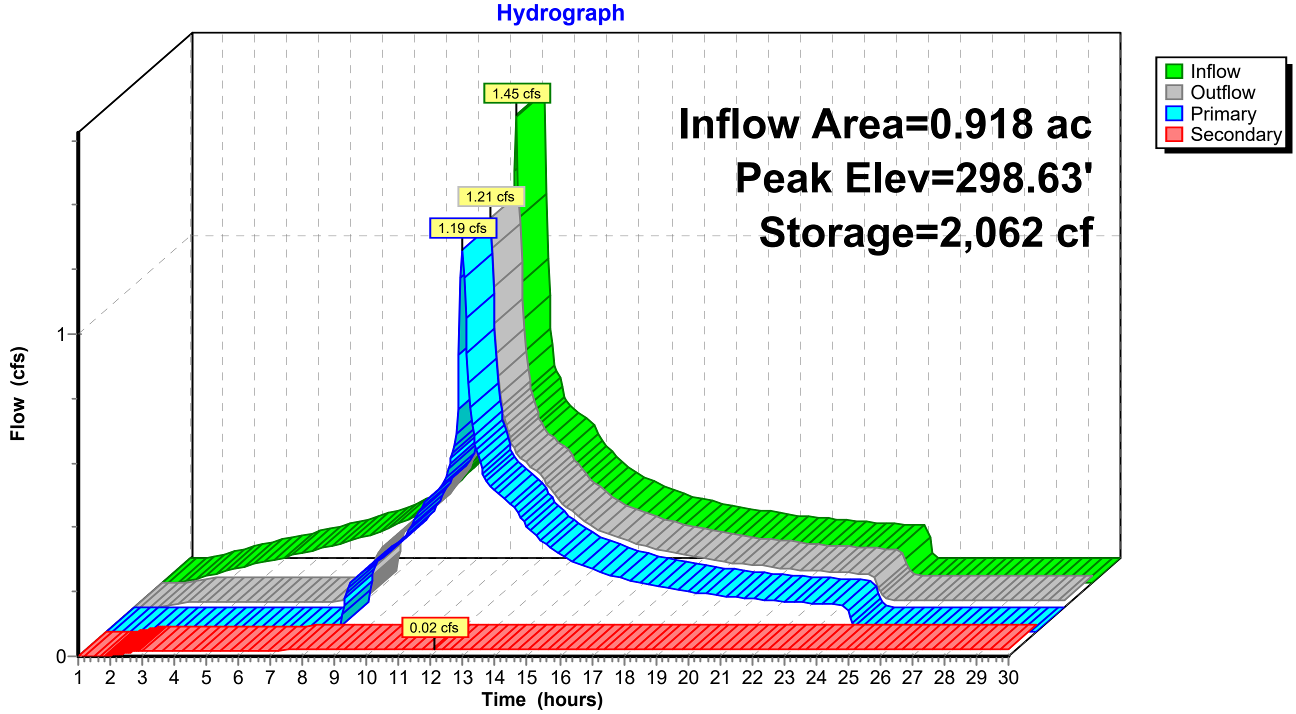
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
298.00	3,050	0	0
299.00	3,700	3,375	3,375
299.50	4,000	1,925	5,300

Device	Routing	Invert	Outlet Devices
#1	Primary	298.50'	**10.0' long x 3.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32
#2	Device 3	298.00'	**0.250 in/hr Exfiltration over Surface area**
#3	Secondary	295.00'	**4.0" Round Culvert** L= 20.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 295.00' / 294.99' S= 0.0005 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.09 sf

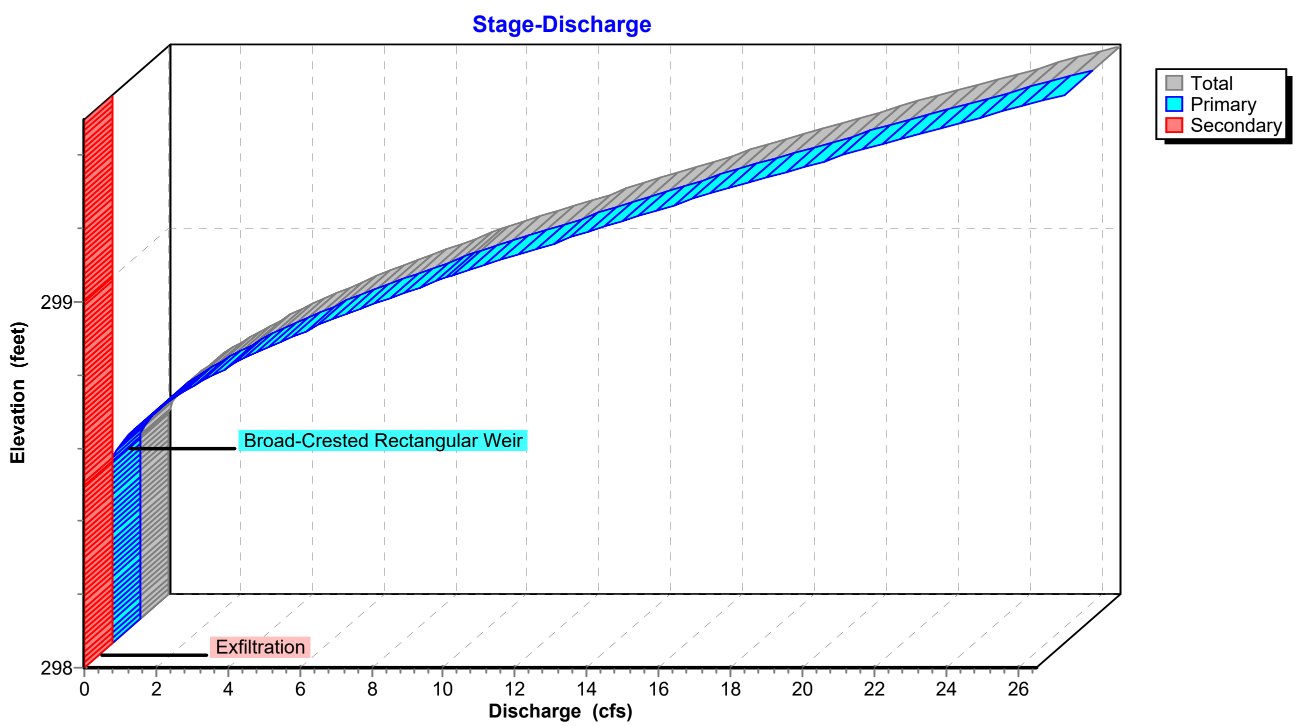
Primary OutFlow Max=1.19 cfs @ 12.10 hrs HW=298.63' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Weir Controls 1.19 cfs @ 0.89 fps)

Secondary OutFlow Max=0.02 cfs @ 12.10 hrs HW=298.63' (Free Discharge)
└─**3=Culvert** (Passes 0.02 cfs of 0.65 cfs potential flow)
  └─**2=Exfiltration** (Exfiltration Controls 0.02 cfs)

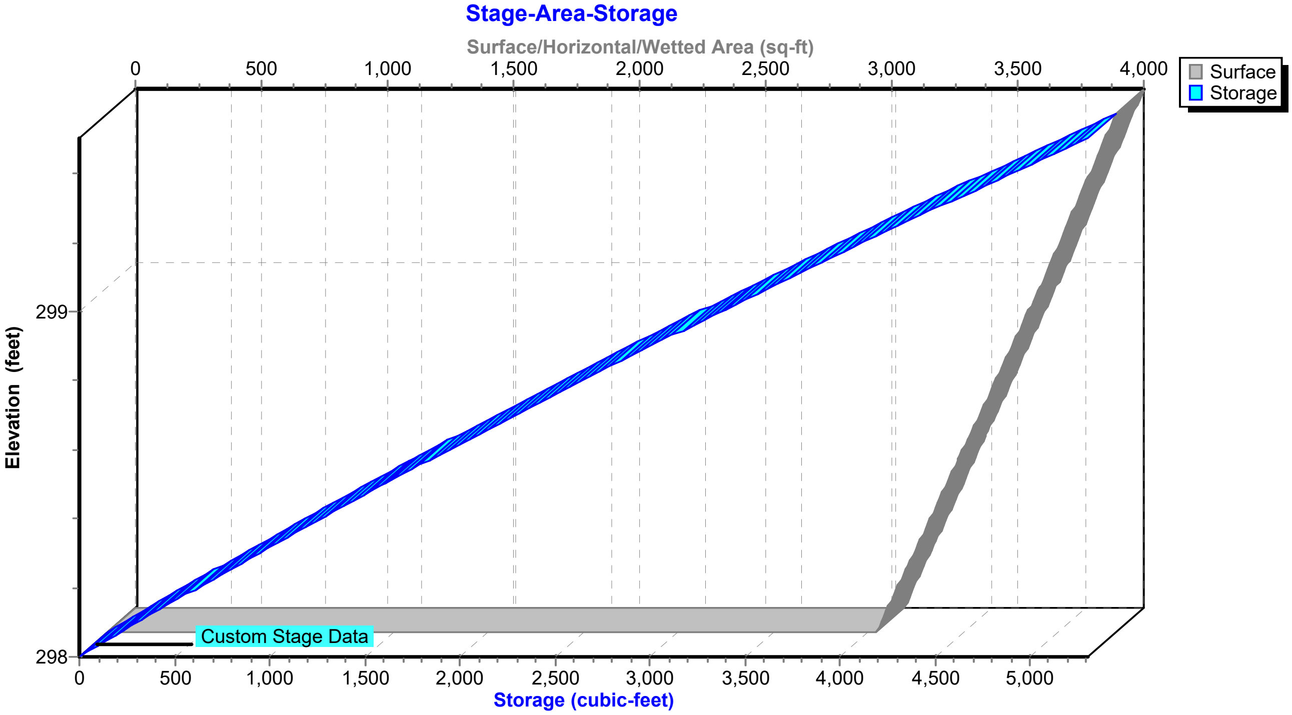
Pond SW-1: BIORETENTION



Pond SW-1: BIORETENTION



Pond SW-1: BIORETENTION



APPENDIX L:

WQv and NYSDEC GI Worksheets

Version 1.8
Last Updated: 11/09/2015

Total Water Quality Volume Calculation

$$WQv(\text{acre-feet}) = [(P)(Rv)(A)] / 12$$

Is this project subject to Chapter 10 of the NYS Design Manual (i.e. WQv is equal to post-development 1 year runoff volume)?...	No

Design Point:	1		*Manually enter P, Total Area and Impervious Cover.*
P=	1.00	*inch*	

Breakdown of Subcatchments						
Catchment Number	**Total Area** *(Acres)*	**Impervious Area** *(Acres)*	**Percent Impervious** *%*	**Rv**	**WQv** *(ft^3)*	**Description**
1	4.61	0.85	18%	0.22	3,614	Bioretention
2						
3						
4						
5						
6						
7						
8						
9						
10						
Subtotal (1-30)	4.61	0.85	18%	0.22	**3,614**	**Subtotal 1**
Total	4.61	0.85	18%	0.22	**3,614**	**Initial WQv**

Identify Runoff Reduction Techniques By Area			
Technique	**Total Contributing Area** *(Acre)*	**Contributing Impervious Area** *(Acre)*	**Notes**
Conservation of Natural Areas	0.00	0.00	*minimum 10,000 sf*
Riparian Buffers	0.00	0.00	*maximum contributing length 75 feet to 150 feet*
Filter Strips	0.00	0.00	
Tree Planting	0.00	0.00	*Up to 100 sf directly connected impervious area may be subtracted per tree*
Total	**0.00**	**0.00**	

Recalculate WQv after application of Area Reduction Techniques					
	Total Area *(Acres)*	**Impervious Area** *(Acres)*	**Percent Impervious** *%*	**Runoff Coefficient Rv**	**WQv** *(ft^3)*
"<<Initial WQv"	4.61	0.85	18%	0.22	3,614
Subtract Area	0.00	0.00			
WQv adjusted after Area Reductions	**4.61**	**0.85**	18%	0.22	3,614
Disconnection of Rooftops		0.00			
Adjusted WQv after Area Reduction and Rooftop Disconnect	4.61	0.85	18%	0.22	**3,614**
WQv reduced by Area Reduction techniques					0

Total Water Quality Volume Calculation

WQv(acre-feet) = [(P)(Rv)(A)] /12

All Subcatchments						
Catchment	**Total Area** *(Acres)*	**Impervious Cover** *(Acres)*	**Percent Impervious** *%*	**Runoff Coefficient** *Rv*	**WQv** *(ft^3)*	**Description**
1	4.61	0.85	0.18	0.22	3613.67	Bioretention
2						
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						

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**
Area/Volume Reduction	Conservation of Natural Areas	RR-1	0.00	0.00		
	Sheetflow to Riparian Buffers/Filter Strips	RR-2	0.00	0.00		
	Tree Planting/Tree Pit	RR-3	0.00	0.00		
	Disconnection of Rooftop Runoff	RR-4		0.00		
	Vegetated Swale	RR-5	0.00	0.00	0	
	Rain Garden	RR-6	0.00	0.00	0	
	Stormwater Planter	RR-7	0.00	0.00	0	
	Rain Barrel/Cistern	RR-8	0.00	0.00	0	
	Porous Pavement	RR-9	0.00	0.00	0	
	Green Roof (Intensive & Extensive)	RR-10	0.00	0.00	0	
Standard SMPs w/RRv Capacity	Infiltration Trench	I-1	0.00	0.00	0	0
	Infiltration Basin	I-2	0.00	0.00	0	0
	Dry Well	I-3	0.00	0.00	0	0
	Underground Infiltration System	I-4				
	Bioretention & Infiltration Bioretention	F-5	4.61	0.85	1454	2159
	Dry swale	O-1	0.00	0.00	0	0
Standard SMPs	Micropool Extended Detention (P-1)	P-1				
	Wet Pond (P-2)	P-2				
	Wet Extended Detention (P-3)	P-3				
	Multiple Pond system (P-4)	P-4				
	Pocket Pond (p-5)	P-5				
	Surface Sand filter (F-1)	F-1				
	Underground Sand filter (F-2)	F-2				
	Perimeter Sand Filter (F-3)	F-3				
	Organic Filter (F-4	F-4				
	Shallow Wetland (W-1)	W-1				
	Extended Detention Wetland (W-2	W-2				
	Pond/Wetland System (W-3)	W-3				
	Pocket Wetland (W-4)	W-4				
	Wet Swale (O-2)	O-2				
Totals by Area Reduction		→	0.00	0.00	0	
Totals by Volume Reduction		→	0.00	0.00	0	
Totals by Standard SMP w/RRV		→	4.61	0.85	1454	2159
Totals by Standard SMP		→	0.00	0.00		0
Totals (Area + Volume + all SMPs)		→	4.61	0.85	1,454	2,159
	Impervious Cover √	okay				

Minimum RRv

Enter the Soils Data for the site		
Soil Group	Acres	S
A	0.00	55%
B	3.13	40%
C	0.92	30%
D	**0.55**	20%
Total Area	4.6	
Calculate the Minimum RRv		
S =	**0.36**	
Impervious =	0.85	*acre*
Precipitation	1	*in*
Rv	0.95	
Minimum RRv	**1,044**	***ft3***
	0.02	af

NOI QUESTIONS

#	NOI Question	Reported Value	
		cf	af
28	Total Water Quality Volume (WQv) Required	3614	*0.083*
30	Total RRV Provided	1454	*0.033*
31	Is RRv Provided ≥WQv Required?	No	
32	Minimum RRv	1044	*0.024*
32a	Is RRv Provided ≥ Minimum RRv Required?	Yes	
33a	Total WQv Treated	2159	*0.050*
34	Sum of Volume Reduced & Treated	3614	*0.083*
34	Sum of Volume Reduced and Treated	3614	*0.083*
35	Is Sum RRv Provided and WQv Provided ≥WQv Required?	Yes	

Apply Peak Flow Attenuation			
36	Channel Protection	*Cpv*	
37	Overbank	*Qp*	
37	Extreme Flood Control	*Qf*	
	Are Quantity Control requirements met?		

Bioretention Worksheet

(For use on HSG C or D Soils with underdrains)

Af=WQv*(df)/[k*(hf+df)(tf)]

Af	Required Surface Area (ft2)
WQv	Water Quality Volume (ft3)
df	Depth of the Soil Medium (feet)
hf	Average height of water above the planter bed
tf	Volume Through the Filter Media (days)

k The hydraulic conductivity [ft/day], can be varied depending on the properties of the soil media. Some reported conductivity values are: ***Sand*** - 3.5 ft/day (City of Austin 1988); ***Peat*** - 2.0 ft/day (Galli 1990); ***Leaf Compost*** - 8.7 ft/day (Claytor and Schueler, 1996); ***Bioretention Soil*** (0.5 ft/day (Claytor &

Design Point: **1**

Enter Site Data For Drainage Area to be Treated by Practice							
Catchment Number	**Total Area** *(Acres)*	**Impervious Area** *(Acres)*	**Percent Impervious** *%*	**Rv**	**WQv** *(ft^3)*	**Precipitation** *(in)*	**Description**
1	4.61	0.85	0.18	0.22	3613.67	1.00	Bioretention
Enter Impervious Area Reduced by Disconnection of Rooftops		0.00	18%	0.22	3,614	<<WQv after adjusting for Disconnected Rooftops	
Enter the portion of the WQv that is not reduced for all practices routed to this practice.					0	*ft^3*	
Soil Information							
Soil Group		C					
Soil Infiltration Rate		0.10	*in/hour*	*Okay*			
Using Underdrains?		Yes	*Okay*				
Calculate the Minimum Filter Area							
				Value		Units	Notes
WQv				3,614		*ft^3*	
Enter Depth of Soil Media			*df*	2.5		*ft*	*2.5-4 ft*
Enter Hydraulic Conductivity			*k*	0.5		*ft/day*	
Enter Average Height of Ponding			*hf*	0.5		*ft*	*6 inches max.*
Enter Filter Time			*tf*	2		*days*	
Required Filter Area			***Af***	**3011**		***ft^2***	
Determine Actual Bio-Retention Area							
Filter Width		3030	*ft*				
Filter Length		1	*ft*				
Filter Area		3030	*ft^2*				
Actual Volume Provided		3636	*ft^3*				
Determine Runoff Reduction							
Is the Bioretention contributing flow to another practice?			No	Select Practice			
RRv		1,454					
RRv applied		**1,454**	***ft^3***	***This is 40% of the storage provided or WQv whichever is less.***			
Volume Treated		2,159	*ft^3*	*This is the portion of the WQv that is not reduced in the practice.*			
Volume Directed		0	*ft^3*	This volume is directed another practice			
Sizing √		OK		*Check to be sure Area provided ≥ Af*			

APPENDIX M:

Post-Construction Inspections and Maintenance

GPI

Engineering | Design | Planning | Construction Management

April 28th, 2023

OPERATION AND MAINTENANCE GUIDE

For

NEW KINGDOM HALL FOR JEHOVA'S WITNESSES

33 Old Little Britain Road
Town of Newburgh
Orange County
New York

Owner/Developer: **JW Congregation Support, Inc.**
1005 Red Mills Road
Wallkill, NY 12589

WARNING: The alteration of this material in any way, unless under the direction of a comparable professional, i.e. a Professional Engineer, is a violation of the New York State Education Law and/or Regulations and is a Class 'A' misdemeanor.

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APPENDICES

POST CONSTRUCTION INSPECTIONS AND MAINTENANCE

PURPOSE:

According to the Stormwater Pollutant Discharge Elimination System General Permit 0-20-001, as well as NYSDEC regulations, Stormwater Pollution Prevention Plans must include ongoing operations and maintenance of all stormwater management facilities and techniques. The NYSDEC requires a maintenance outline in order to ensure continuous and effective operation of the erosion and sediment control practices. The following manual describes the maintenance and operational tasks that will be required for the storm water management components for the Jehova's Witnesses to maintain the operational functionality with the design goals of these practices.

MAINTENANCE RESPONSIBILITY:

The stormwater management system for the project consists of various infrastructure practices that includes: asphalt wing curbs, catch basins, bioretention, and a closed storm sewer system. The Jehova's Witnesses will be responsible for the long-term operation and maintenance of the post-construction stormwater management practices. Access to the stormwater management facilities onsite can be given by site management. The stormwater practices are located adjacent to the parking area.

Below is an inspection summary schedule for the practices on site. See each practice's section for a detailed description of inspection and maintenance measures.

Appendix I of this document describes the three (3) level system of inspectors the NYSDEC has implemented. The Jehova's Witnesses personnel will be responsible for Level 1 inspection requirements. The section also includes a schedule of inspections and outlines when it is required to perform a more intensive inspection. A record of maintenance activities should be recorded on the form included in Appendix III.

INSPECTION/MAINTENANCE SUMMARY TABLE:

PRACTICE	TASK	INTERVAL	PERSONEL
Site Cover and Soil Restoration	Site Inspection	After heavy rainfall events. Continually.	Maintenance Manager
	Mow Lawn	Three times per year minimum.	Maintenance Personnel
	Pavement Sweeping	Two times per year.	Maintenance Personnel
	Inspect Catch Basins	Two times per year. After spring thaw and in the fall.	Maintenance Personnel
	Debris, Trash and Litter Control	Continually.	Maintenance Personnel
	Landscaping	Weekly or as needed for plantings.	Maintenance Personnel
Bioretention Area	Practice Inspection	Every six months.	Maintenance Personnel
	Debris, Trash and Litter Control	Two times per year minimum.	Maintenance Personnel
	Mowing	Minimum of four times per year.	Maintenance Personnel
	Mulch Replenishment	Annually in spring or as required	Maintenance Personnel

1. SITE COVER AND SOIL RESTORATION

a. Inspections

Site cover and associated structures and embankments should be inspected periodically for the first few months following construction and then on a biannual basis. Site inspections should also be performed following all major (i.e., intense storms, thunder storms, cloud burst, etc.) storm events. Items to check for include (but are not limited to):

i. Differential settlement of embankments, cracking or erosion.

ii. Lack of vigor and density of grass turf.

iii. Accumulation of sediments or litter on lawn areas, paved areas, or within catch basin sumps.

iv. Accumulation of pollutants, including oils or grease, in catch basin sumps.

v. Damage or fatigue of storm sewer structures or associated components.

Areas of soil restoration should be inspected periodically, and Soil restoration areas should be inspected after all storm events that produce more than a half inch (0.5") of rainfall for the first six (6) months for cleared, eroded or damaged areas. Items to check for include (but are not limited to):

i. Areas that are bare or eroded.

ii. Dry areas or areas where soil stabilization is not established.

iii. Areas of heavy vehicular/foot traffic.

iv. Areas with any weeds/undesirable vegetation.

b. Mowing and Sweeping

Vegetated areas and landscaping should be maintained to promote vigorous and dense growth. Lawn areas should be mowed at least three times a year (more frequent mowing may be desired for aesthetic reasons). Resultant yard waste shall be collected and disposed of off-site.

Paved areas should be swept at least twice a year. Additional sweeping may be appropriate in the early spring for removal of deicing materials.

c. Landscaping

The vegetation within the areas of soil restoration should be inspected and watered every three (3) days for the first month and one-half inch (0.5") of water every week for the remainder of the first year after construction. Watering schedules may be adjusted to accommodate rain events. Grass height shall not be greater than 6" in height and any non-conforming vegetative growth should be removed upon discovery. Areas of soil restoration shall be fertilized as required and during the first fall season following construction to ensure soil stabilization. Any areas that show erosion should be replenished upon discovery and reseeded/sodded to reestablish stabilization. Bare areas should be reseeded and inspected for anything detrimental to the establishment of vegetation.

d. Debris, Trash and Litter Control

Debris, trash, and litter should be removed from the areas of soil restoration immediately upon discovery. There should be no dumping of landscaping waste within areas of restored soil.

e. Structural Repair or Replacement

Components of the system which require repair or replacement should be addressed immediately following identification.

f. Catch Basins

Catch basins should be inspected for cleaning on a biannual basis, after spring thaw and fall. Debris and litter should be removed from catch basin grates during mowing and sweeping. The frequency for cleanout of catch basin sumps will depend on the efficiency of mowing, sweeping, and debris and litter removal. Sumps should be cleaned when accumulation of sediments are within six inches of the catch basin outlet pipe.

Disposal of material from catch basins sumps, drainage manholes, and trench drains shall be in accordance with local, state, and federal guidelines.

g. Winter Maintenance

To prevent impacts to storm water management facilities, the following winter maintenance limitations, restrictions, or requirements are recommended:

i. Remove snow and ice from inlet structures, basin inlet and outlet structures and away from culvert end sections.

ii. Snow removed from paved areas should not be piled at inlets/outlets of the storm water management basin.

iii. Use of deicing materials should be limited to sand and “environmentally friendly” chemical products. Use of salt mixtures should be kept to a minimum.

iv. Sand used for deicing should be clean, course material free of fines, silt, and clay.

v. Materials used for deicing should be removed during the early spring by sweeping and/ or vacuuming.

2. BIORETENTION BASIN

a. Inspection

Bioretention area and the pea-gravel diaphragms should be inspected periodically for the first few months after construction and then on a monthly basis. On an annual basis the Bioretention areas should be inspected for all items included on the attached "Bioretention Operation, Maintenance and Management Inspection Checklist" in Appendix II. Bioretention areas and the pea-gravel diaphragms should be inspected after all major storm events. Items to check for include (but are not limited to):

i. Accumulation of sediments or litter within sedimentation area over 6 inches.

ii. Accumulation of sediments or litter within bioretention area over 1 inch.

iii. Evidence of erosion of mulch.

iv. Area dewaters between storms.

iii Evidence of embankment erosion or blockage of overflow channel.

b. Debris, Trash and Litter Control

Debris, trash, and litter should be removed from the bioretention areas and pea-gravel diaphragms immediately upon discovery. There should be no dumping of yard waste within the bioretention area or on the pea-gravel diaphragm. Inlets should be cleaned immediately upon discovery of trash and debris.

c. Landscaping

The vegetation within the bioretention areas should be inspected monthly. Grass shall not be greater than 6" in height and plants should be taller than the embankment top. The bioretention area shall be fertilized per the specifications and receive no placement of inappropriate plants. There should be no vegetation within the pea-gravel diaphragm.

d. Mulching

The mulch within the bioretention areas should be inspected monthly. Areas of washed away mulch should be replenished upon discovery. Inlets shall be cleaned of any accumulated mulch. New shredded hardwood mulch should be added annually to a total depth of 3 inches to rejuvenate the planting bed. If filtering capacity of the filter diminishes substantially the top few inches of discolored material shall be removed and shall be replaced with fresh material.

APPENDIX I:

"Maintenance Hierarchy"

SMP Maintenance Guide, Section 1.2

1.2. Maintenance Hierarchy

SMPs require inspections and maintenance to identify small problems before they become more serious and expensive to repair. For example, removing a small amount of sediment from a filtering medium or permeable pavement surface is much less expensive than replacing a surface that has already become clogged. However, it can be cost prohibitive for most communities or SMP owners to hire highly trained staff or contractors to inspect these practices or to carry out the actual maintenance tasks. This can be especially true with the advent of "micro-scale" Green Infrastructure practices, which may be distributed across many individual public and private properties, and where the absolute number of SMPs within a municipality may exceed local government inspection and maintenance capabilities.

Many SMP maintenance problems start out as fairly small, easily rectified issues as long as they are detected early enough through an inspection. For these issues, property owners or managers can likely take care of the issue in an expedient and cost-effective manner.

However, at some point, property owners or managers will encounter an issue where diagnosing the problem and knowing the appropriate remedy will exceed their technical capabilities. At this point, an individual with training in SMP inspection, operation and maintenance, such as a municipal inspector or landscape contractor, may have to be called in for assistance.

Similarly, some problems escalate to the point where a Qualified Professional (i.e. professional engineer or landscape architect) is needed to bring the SMP back to a good functioning condition. The Qualified Professional may need to bring in other experts to assess problems with the SMP. For instance, they may call in a horticulturalist to assess problems with the planting plan.

Figure 1.1 The SMP Maintenance Hierarchy Pyramid

Acknowledging this step-wise approach to SMP inspection and maintenance, the SMP Maintenance Hierarchy concept was developed. The concept uses a combination of skill levels (**Figure 1.1**) as explained in more detail below.

Level 1: Property Owners and Managers, Interns, etc.

This category includes property owners, property managers, or HOA representatives, for privately owned SMPs. For municipally owned SMPS, this could include municipal maintenance staff or interns, and volunteers. These individuals would typically have no or only very limited training in stormwater maintenance and inspection but can use available guidance to quickly identify and rectify common and simple issues with SMP performance. This level completes routine inspections and maintenance activities. For most SMPs, the majority of inspection and maintenance activities can be conducted at this skill level, thus Level 1 forms the base of the Maintenance Hierarchy pyramid. Many well-functioning SMPs can be adequately maintained for long periods of time using Level 1 capabilities.

Although many issues can be addressed at Level 1, these inspectors and maintainers need a relief valve when the SMP problems become harder to diagnose and/or the remedies require a higher level of resources and expertise. Such issues are referred to in this chapter as "kick-outs to Level 2." For instance, an SMP may have a minor amount of sediment that has accumulated at inlets or on the practice bottom. A Level 1 person may be able to take care of this with a flat shovel and wheel barrow. However, a Level 2 inspection would be triggered if the sediment is deep, widespread, keeps recurring, and/or requires more sophisticated equipment to remove.

Level 2: Trained Municipal Staff

This level of inspection and maintenance is conducted primarily by municipal employees or landscape contractors who have completed training on SMP, inspection, operation and maintenance. Level 2 inspections can take place in response to two circumstances:

1. As part of an ongoing, routine municipal inspection program whereby SMPs are visited on a rotating basis at a frequency established by the local program, or

2. In response to a “kick-out” from a Level 1 inspector based on a specific problem or problems.

Circumstance #2 obviously will require coordination and communication between the Level 1 and Level 2 inspectors, with documentation and background provided by the Level 1 inspector. This is an essential part of making the hierarchy approach successful. In the example above, the Level 2 inspector can better diagnose the sources of the sediment, whether the sediment is affecting performance of the SMP, and the specific tasks needed to remove the sediment and abate the source.

As with kick-outs from Level 1 to Level 2, the same can exist from Level 2 to Level 3. It may be that the Level 2 inspector encounters a problem where a Qualified Professional is needed to re-design certain components of the SMP, and a qualified contractor is needed to undertake a more serious repair. This is when Level 3 is activated.

Level 3: Qualified Professionals

Qualified professionals include professional engineers and landscape architects, who can revisit design issues associated with chronic or serious problems. For repair and maintenance of the SMPs at this level, individuals with specific skills and certifications, such as a certified plumber who has experience working with rainwater harvesting practices or a horticulturalist with knowledge on proper plantings may need to be called in by the Qualified Professional. Level 3 inspection or maintenance is triggered in response to specific problems identified during a Level 2 inspection.

Continuing with the example above, the Level 2 inspector identifies that the sediment is accumulating in the SMP because of the lack of pre-treatment or that the practice is not sized properly for its drainage area. The Level 2 inspector at this point should consult a Qualified Professional (Level 3) who can go back to the original or as-built plan and develop workable solutions.

Table 1.2 further describes how maintenance and inspection activities differ among the three levels of the SMP Maintenance Hierarchy.

Table 1.2 Maintenance/Inspection Hierarchy Levels

	Level 1: Owners and Untrained Staff	**Level 2: Trained Municipal Staff**	**Level 3: Qualified Professionals**
Qualifications/ Training of Inspectors	No special training, but person is provided educational materials	On-the-job training and/or short workshops Define adequate training or provide examples	Professional License such as a PE or RLA
Frequency of Inspection	At least annually	Routine as determined by the local program OR as kick-out from Level 1 inspection	Only as needed from Level 2 inspection
Inspection Guidance	Checklists are included for each practice group in **Section 2** of this chapter and in **Appendix A**.	Guidance for the inspection is included in **Section 3**, and checklists are included in **Appendix B.**	**Section 4** includes guidance for diagnosing typical problems.
Typical Maintenance Activities	Routine mowing. Trash removal. Plant care and upkeep. Mulching as needed. Removal of small amounts of sediment from pretreatment areas of the practice.	Removal of larger amounts of sediment. Structural damage repair. Minor regrading and scarification of soil surface to restore permeability.	Redesign an improperly functioning practice. Includes re-grading of the contributing drainage area, replacing soil media and plantings (new planting plan), or modifying conveyance structures.
Triggers for Inspection or Maintenance by this Level	Regular inspection (no trigger)	Level 1 Inspection Sheets (**Section 2**) describe triggers that warrant a Level 2 Inspection.	Level 2 Inspection Guidance (**Section 3**) describes triggers that warrant a Level 3 Inspection.

APPENDIX II:

"Bioretention"
SMP Maintenance Guide, Section 2.7

2.7. Bioretention

Areas of Bioretention

Key areas to inspect for Bioretention include the following:

- BR 1. Drainage Area
- BR 2. Inlets
- BR 3. Bioretention Ponding Area
- BR 4. Vegetation
- BR 5. Outlets

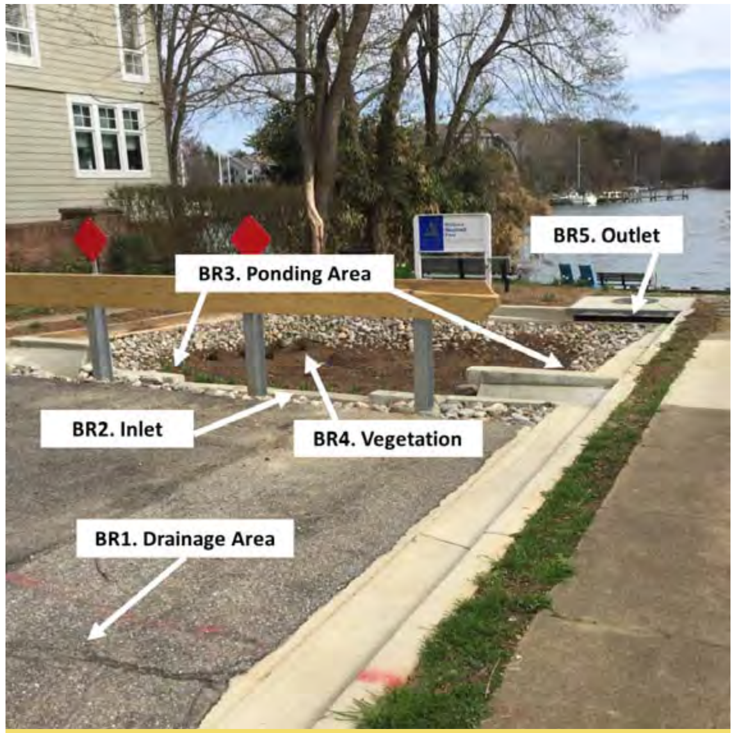

Figure 2.7.1. Key Areas for Level 1 Inspection of Bioretention

Note: The category of Bioretention includes:

- Bioretention cells – areas of soil, mulch, and vegetation that treat runoff
- Dry swales – long, linear bioretention cells, sometimes with check dams along a mildly sloping swale
- Rain gardens – usually small-scale bioretention practices on residential or small commercial properties
- Stormwater planters – usually in more urban settings, with soil and plants in a concrete box that receives roof runoff or perhaps other water from the site
- Tree pits – also a more urban practice where the bioretention is confined within some sort of box (e.g., concrete) and places along road curbs or other areas to treat runoff

For the purposes of this chapter, the term "Bioretention cell" will be used to generally describe these practices.

Bioretention Level 1 Inspection

The Level 1 Inspection focuses on the Drainage Area (BR1), Inlets (BR2), Bioretention Ponding Area (BR3), Vegetation (BR4), and Outlets (BR5). This inspection should be conducted on a regular basis, with an early spring inspection to ensure that the practice has survived the winter, particularly if there has been a significant amount of snow. An inspection during the growing season or in the early fall is also recommended to check on the health of vegetation.

BR 1. Drainage Area

Description: The drainage area sends runoff to and is uphill from the Bioretention cell. When it rains, water runs off and flows to the Bioretention cell and ponds within the cell temporarily (usually for no more than 48 hours). Sometimes, the runoff will contain dirt, grit, grass clippings, oil, or other substances that SHOULD NOT be directed to the Bioretention area.

Instruction: Look for areas that are uphill from the Bioretention cell. Consult **Table 2.7.1** below.

Table 2.7.1 BR Drainage Area

Problem (Check if Present)		Follow-Up Actions
	☐ Bare soil, erosion of the ground (rills washing out the dirt)	☐ Seed and mulch areas of bare soil to establish vegetation. ☐ Fill in erosion areas with soil, compact, and seed and straw to establish vegetation. ☐ 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:
		☐ Kick-Out to Level 2 Inspection: Large areas of soil have been eroded, or larger channels are forming. May require rerouting of flow paths.
	☐ 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:

BR 2. Inlets

Description: The inlets to a Bioretention cell are where water flows into the cell. Depending on the design, water can flow in through:

- Curb cuts or openings in a parking lot or roadway
- Pipes or ditches that carry water into the Bioretention cell from the drainage area
- Flow directly over the land surface (known as “sheetflow”), sometimes across a strip of rock or stone

Curb cut – flow enter through defined place in curb

Curb cut

Gravel diaphragm – flow enters as sheetflow and is evenly distributed across length of practice

Grass filter strip: accepts sheet flow from the parking lot

Figure 2.7.2 Bioretention Cell Inlets

CSN, 2013

Instruction: Stand in the Bioretention cell itself and look for all the places where water flows in. Often there will be multiple points of inflow to the practice. Consult **Table 2.7.2** below for possible problems.

Table 2.7.2 BR Inlets

Problem (Check if Present)	Follow-Up Actions
 ☐ Inlets collect grit and debris or grass/weeds. Some water may not be getting into the Bioretention cell. The objective is to have a clear pathway for water to flow into the cell.	☐ 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 Bioretention cell. ☐ Dispose of all material properly where it will not re-enter the Bioretention cell. ☐ 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 Bioretention cell.
 ☐ 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 Bioretention cell.	☐ 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.

BR 3. Bioretention Ponding Area

Description: The ponding area fills up with water during a rainstorm. If you picture the Bioretention cell as a bathtub, there is the *bottom* (usually flat surface), *side slopes* (areas that slope down to the bottom from the surrounding ground), and *berms or structures that control the depth to which water ponds.*

Instruction: Examine the entire Bioretention surface and side slopes. Consult the table below for possible problems.

Table 2.7.3 BR Ponding Area

Problem (Check if Present)	Follow-Up Actions
 ☐ Mulch (if used) needs to be replaced or replenished. The mulch layer had decomposed or is less than 1-inch thick.	☐ Add new mulch to a total depth (including any existing mulch that is left) of 2 to 3 inches. The mulch should be shredded hardwood mulch that is less likely to float away during rainstorms. ☐ Avoid adding too much mulch so that inlets are obstructed or certain areas become higher than the rest of the Bioretention surface. ☐ Other:
 ☐ Minor areas of sediment, grit, trash, or other debris are accumulating on the bottom.	☐ 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 Bioretention cell. ☐ If removing the material creates a hole or low area, fill with soil mix that matches original mix and cover with mulch so that the Bioretention surface area is as flat as possible. ☐ Remove trash, vegetative 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 Bioretention surface. ☐ Kick-Out to Level 2 Inspection: The Bioretention cell is too densely vegetated to assess sediment accumulation or ponding; see BR-4, Vegetation.

 ☐ There is erosion in the bottom or on the side slopes. Water seems to be carving out rills as it flows across the Bioretention surface or on the slopes, or sinkholes are forming in certain areas. ☐ Source: Stormwater Maintenance, LLC.	☐ Try filling the eroded areas with clean topsoil or sand, and cover with mulch. ☐ If the problem recurs, you may have to use stone (e.g., river cobble) to fill in problem areas. ☐ If the erosion is on a side slope, fill with clay that can be compacted and seed and mulch the area. ☐ 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 Bioretention cell. ☐ 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.
 ☐ The bottom of the Bioretention cell is not flat, and the water pools at one end, along an edge, or in certain pockets. The whole bottom is not uniformly covered with water. See design plan to verify that Bioretention surface is intended to be flat. Check during or immediately after a rainstorm.	☐ If the problem is minor (just small, isolated areas are not covered with water), try raking the surface OR adding mulch to low spots to create a more level surface. You may need to remove and replace plantings in order to properly even off the surface. ☐ Check the surface with a string and bubble level to get the surface as flat as possible. ☐ Other: ☐ Kick-Out to Level 2 Inspection: Ponding water is isolated to less than half of the Bioretention surface area, and there seem to be elevation differences of more than a couple of inches across the surface.
 ☐ Water stands on the surface more than 72 hours after a rainstorm and /or wetland-type vegetation is present. The Bioretention cell 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.

BR 4. Vegetation

Description: The health of vegetation within the Bioretention cell is perhaps the most critical maintenance item for the property owner or responsible party. Many Bioretention cells become overgrown, and “desirable” vegetation becomes choked out by weeds and invasive plants. It is important to know what the Bioretention cell is supposed to look like and what plants seem to be thriving or doing poorly. Periodic maintenance of vegetation will prevent larger problems that are more difficult and costly to manage.

Instruction: Examine all Bioretention cell vegetation. Consult the table below for possible problems.

<table>
<tr><th colspan="2">Table 2.7.4 BR Vegetation</th></tr>
<tr><th>Problem (Check if Present)</th><th>Follow-Up Actions</th></tr>
<tr><td rowspan="2">
☐ Vegetation requires regular maintenance—pulling weeds, removing dead and diseased plants, replacing mulch around plants, adding plants to fill in areas that are not well vegetated, etc.</td><td>☐ If you can identify which plants are weeds or not intended to be part of the planting plan, eliminate these, preferably by hand pulling.
☐ If weeds are widespread, check with the local stormwater authority and/or Extension Office about proper use of herbicides for areas connected with the flow of water.
☐ Even vegetation that is intended to be present can become large, overgrown, and/or crowd out surrounding plants. Prune and thin accordingly.
☐ If weeds or invasive plants have overtaken the whole Bioretention cell, bush-hog the entire area before seedheads form in the spring. It will be necessary to remove the root mat manually or with appropriate herbicides, as noted above.
☐ Re-plant with species that are aesthetically pleasing and seem to be doing well in the Bioretention cell.
☐ Other:</td></tr>
<tr><td>☐ Kick-Out to Level 2 Inspection: You are unsure of the original planting design, or the vegetation maintenance task is beyond your capabilities of time, expertise, or resources. If you are unsure of the health of the vegetation (e.g. salt damage, invasives, which plants are undesirable) or the appropriate season to conduct vegetation management, consult a landscape professional before undertaking any cutting, pruning, mowing, or brush hogging.</td></tr>
<tr><td rowspan="2">
☐ Vegetation is too thin, is not healthy, and there are many spots that are not well vegetated.</td><td>☐ The original plants are likely not suited for the actual conditions within the Bioretention cell. If you are knowledgeable about plants, select and plant more appropriate vegetation (preferably native plants) so that almost the entire surface area will be covered by the end of the second growing season.
☐ Other:</td></tr>
<tr><td>☐ Kick-Out to Level 2 Inspection: For all but small practices (e.g., rain gardens), this task will likely require a landscape design professional or horticulturalist.</td></tr>
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BR 5. Outlets

Description: Outlets are where water leaves the Bioretention cell when there is too much ponded water. There are various ways that outlets are configured. They can be a yard drain type of structure in the Bioretention cell itself or a rock weir where water flows during large storms. Many Bioretention practices have an underdrain, which is like a French drain, that helps the Bioretention cell drain properly after storms. The underdrain pipe may “daylight” (come to the ground surface) at some point downhill from the Bioretention cell.

Instruction: Examine outlets that release water out of the Bioretention cell. Consult the table below for possible problems.

Table 2.7.5 BR Outlets

<table>
<tr><th>Problem (Check if Present)</th><th>Follow-Up Actions</th></tr>
<tr><td rowspan="2">☐ Erosion at outlet</td><td>☐ Add stone to reduce the impact from the water flowing out of the outlet pipe or weir during storms.
☐ Other:</td></tr>
<tr><td>☐ Kick-Out to Level 2 Inspection: Rills have formed and erosion problem becomes more severe.</td></tr>
<tr><td rowspan="2">
☐ Outlet obstructed with mulch, sediment, debris, trash, etc.</td><td>☐ Remove the debris and dispose of it where it cannot re-enter the Bioretention cell.
☐ Other:</td></tr>
<tr><td>☐ Kick-Out to Level 2 Inspection: Outlet is completely clogged or obstructed; there is too much material to remove by hand or with simple hand tools.</td></tr>
</table>

APPENDIX IV:

Record of Maintenance Log

NEW KINGDOM HALL FOR JEHOVA'S WITNESSES – NEWBURGH, NY

RECORD OF MAINTENANCE LOG

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