Preliminary Stormwater Pollution Prevention Plan

Prepared for:
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716 Sports Complex

Town of Amherst, Erie County, New York

DATE: OCTOBER 2025
LAST REVISED: NOVEMBER 2025
PROJECT NO. 2254561

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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 gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Name and Title[1]: Robert Steehler, PE

Date: Issued: November 2025

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[1] *This is a signature of a New York State licensed Professional Engineer employed by LaBella Associates that is duly authorized to sign and seal Stormwater Pollution Prevention Plans (SWPPPs), NOIs, and NOTs prepared under their direct supervision. Refer to Appendix B for the SWPPP Preparer Certification Form, and Appendix I for the LaBella Certifying Professionals Letter.*

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1.0 EXECUTIVE SUMMARY

This Stormwater Pollution Prevention Plan (SWPPP) has been prepared for major activities associated with construction of a new sports complex including commercial/retail building in the Town of Amherst. This SWPPP includes the 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. This SWPPP must be executed, and permit coverage must be obtained prior to the commencement of construction activity.

This SWPPP has been developed in accordance with the "New York State Department of Environmental Conservation (NYSDEC) State Pollutant Discharge Elimination System (SPDES) General Permit for Stormwater Discharges from Construction Activity," Permit No. GP-0-25-001, effective January 29, 2025 through January 28, 2030. The SWPPP and accompanying plans identify and detail stormwater management, pollution prevention, and erosion and sediment control measures necessary during and following completion of construction.

This SWPPP and the accompanying plans entitled "716 Sports Complex" have been submitted as a set. These engineering drawings are considered an integral part of this SWPPP. Therefore, this SWPPP is not considered complete without them. References made herein to "the plans" or to a specific "sheet" refer to these drawings.

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

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

The analysis and design completed and documented in this report is intended to be part of the application made for a commercial development project completed on behalf of the Owner/Operator.

1.1 Project Description

ARC Building Partners is proposing development project, to include: two (2) indoor dome sports complexes, each 275 ft x 500 ft totaling 275,000 sf, a 2-story and a 50,000 sf commercial/retail building. Development includes associated parking, internal roadways, pedestrian walkways, lighting, landscaping, and utility infrastructure. The total project area of disturbance proposed is 19.0 acres. The project will disturb one (1) or more acres and as such, preparation of this SWPPP is required under GP-0-25-001. A Site Location Map has been provided in Appendix A, as Figure A-1.

This type of project is included in Table 2 of Appendix B of GP-0-25-001; and the project site is not located in one of the watersheds listed in Appendix C of GP-0-25-001. Therefore, this SWPPP includes post-construction stormwater management practices, as well as erosion and sediment controls.

This project is located within the Town Of Amherst regulated, traditional land use control Municipal Separate Stormwater Sewer System (MS4). Therefore, an MS4 SWPPP Acceptance Form is required to accompany NOIs submitted to the NYSDEC.

Runoff from the project site will discharge to the Ellicott Creek, Lower and tribs, which is included in the list of Section 303(d) water bodies included in Appendix D of GP-0-25-001.

Project construction activities will consist primarily of site grading, paving, building construction, and the installation of storm drainage, water supply, sanitary sewer, and public utility infrastructure necessary to support the proposed development project. Construction phase pollutant sources anticipated at the site are disturbed (exposed) soil, vehicle fuels and lubricants, chemicals associated with building construction, and building materials. Without adequate control there is the potential for each type of pollutant to be transported by stormwater.

1.2 Stormwater Pollution Controls

The stormwater pollution controls outlined herein have been designed and evaluated in accordance with the following standards and guidelines:

- New York State Stormwater Management Design Manual, dated July 31, 2024 (Design Manual).
- New York State Standards and Specifications for Erosion and Sediment Control, dated November 2016 (SSESC).

Stormwater quality will be enhanced through the implementation of temporary and permanent erosion and sediment control measures, the proposed stormwater management practice(s), and other construction-phase pollution controls outlined herein.

The proposed stormwater management approach consisting of pipes, open drainage ways, and on-site stormwater management practices will adequately collect, treat, and convey the stormwater runoff.

Bioretentions and underground storm chambers will be used to manage and treat stormwater runoff generated by the proposed development project.

Pre- and post-development surface runoff rates will be evaluated for the 1-, 10-, 25- and 100-year 24-hour storm events. Stormwater runoff rates will be reduced for all storm events to at or below the pre-development runoff rates. Additionally, per the Town of Amherst requirements the 25-year 24-hour storm will be reduced to the pre-development 10-year storm rate through the implementation of underground stormwater detention chambers.

2.0 SITE CHARACTERISTICS

2.1 State Environmental Quality Review

The construction activity is subject to State Environmental Quality Review (SEQR). The project is considered a Type I action. As such, SEQR coordination has been initiated A copy of the SEQR documentation, in accordance with Part I.A.5. of GP-0-25-001, will be provided in Appendix A, as Figure A-5 upon receipt.

2.2 Land Use and Topography

The project site is located within the General Business (GB) zoning district. Commercial recreation activities, indoor, and retail services are all permitted uses within this district.

The overall site is slightly sloping, with slopes ranging from 1 to 8 percent. Site elevations range from approximately 595 feet above mean sea level (MSL) to 600 feet MSL. A small portion of the site to the south is draining towards Maple Road. The remaining site drains to the north east towards and existing low point off site.

2.3 Soils and Groundwater

The US Department of Agriculture (USDA) Web Soil Survey (http://websoilsurvey.nrcs.usda.gov/app/) was used to obtain surficial soil conditions for the study area, as follows:

Table 1: USDA Soil Data

Map Symbol & Description	Hydrologic Soil Group	Permeability (inches/hour)	Erosion Factor K	Depth to Water Table (feet)	Depth to Bedrock (feet)
Od – Odessa silt loam	D	<0.2	0.49	>16	>5.0
SaA – Schoharie silt loam	D	<0.2	0.49	>16	>5.0

Upon review of the soil data presented in Table 1, the project site does not contain soils with a soil slope phase of D with a map unit name that inclusive of slopes greater than 25%, and does not contain soils with a soil slope phase of E or F.

The project site is composed of HSG D soils, as shown in the table below.

Table 2: Project Site HSG Data

HSG A	HSG B	HSG C	HSG D
0%	0%	0%	100%

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

- 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.

An on-site geotechnical investigation was performed by Barron & Associates, PC dated December 21, 2006. Refer to the Geotechnical report for detailed geotechnical information.

The soils map for the study area is presented in Appendix A, as Figure A-2.

2.4 Watershed Designation

The project site is not located in a restricted watershed identified in Appendix C of GP-0-25-001.

2.5 Receiving Water Bodies

The nearest natural classified water course into which runoff from the project site will discharge is the Ellicott Creek, Lower, and tribs. The Ellicott Creek, Lower, and tribs are classified by NYSDEC as a Class B water course, and is included in the Section 303(d) list of impaired waters found in Appendix D of GP-0-25-001.

2.6 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).

2.7 Wetlands

Wetlands depicted on the accompanying plan set were delineated by LaBella wetland biologists on September 3, 2025. The wetland boundary was surveyed by LaBella Associates on September 3, 2025 and presented on a map entitled “Wetland and Stream Report” and dated September 2025. These wetlands are state regulated wetlands that encompass approximately 3.41 acres of the 21.3 acre property.

2.8 Flood Plains

According to the National Flood Insurance Program Flood Insurance Rate Map (FIRM), Town of Amherst, New York, Community Panel Number 36029C0207H, the project site lies within Flood Zone X, areas determined to be outside 500-year floodplain The FEMA Flood Map has been provided in Appendix A, as Figure A-5.

2.9 Listed, Endangered, or Threatened Species

A search was performed on the NYSDEC Environmental Resource Mapper on September 30, 2025, and determined that the project site has no known occurrences of threatened or endangered species, or critical habitat. An Environmental Resource Map has been provided in Appendix A, as Figure A-4.

2.10 Historic Places

A search on the New York State Cultural Resource Information System (CRIS) database, performed on October 2, 2025, revealed that the construction activity is not within an archaeological buffer area indicated on the sensitivity map, and that the construction activity is not located on or immediately adjacent to a property listed or determined to be eligible for listing on the National or State Registers of Historic Places, and that there is no new permanent building on the construction site within 50 feet from a building, structure, or object that is more than 50 years, in accordance with Part I.A.4 of GP-0-25-001. A printout of the historic places screening map is presented in Appendix A, as Figure A-3.

2.11 Rainfall Data

Rainfall data utilized in the modeling and analysis was obtained from the Cornell University online Extreme Precipitation in New York & New England website (http://precip.eas.cornell.edu/). A local IDF file was imported, and specific mass curves were generated, in HydroCAD to evaluate the pre- and post-development stormwater runoff characteristics. Rainfall data specific to the portion of Erie County under consideration, for various 24-hour storm events, is presented in the following Table:

Table 3: Rainfall Data

Storm Event Return Period	24-Hour Rainfall (inches)
1-year	1.57
10-year	2.64
25-year	3.30
100-year	4.65

2.12 Pre-development Watershed Conditions

The pre-development project site is covered predominantly by short grass and trees. 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 A, as Figure A-5.

2.13 Post-development Watershed Conditions

The post-development project site is covered predominantly by buildings and associated parking and pedestrian sidewalks and greenspace. The analysis of post-development conditions considered existing drainage patterns, soil types, ground cover to remain, planned site development, site grading, and stormwater management facilities proposed as part of site improvements. The Post-Development Watershed Delineation Map has been provided in Appendix A, as Figure A-6.

2.14 Description of Design Points

The study area consists of the 21.3 acre project site and 19.0 acre area of disturbance. 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: Off-site discharge to low area located at the northeast corner of site.
- Design Point 2: Existing 18" RCP located along Maple Road which flows from East to West.

3.0 STORMWATER MANAGEMENT PLANNING

Chapter 3 of the Design Manual outlines a six-step planning process for site planning and selection of stormwater management practices that must be implemented for both new development and redevelopment projects. This process is intended to develop a design that maintains pre-construction hydrologic conditions through the application of environmentally sound development principles, as well as treatment and control of runoff discharges from the site. The following sections outline the step-by-step process and how it has been applied to this project.

The goals of this Stormwater Management Plan are to analyze the peak rate of runoff under pre- and post-development conditions, to maintain the pre-development rate of runoff in order to minimize impacts to adjacent or downstream properties, and to minimize the impact to the quality of runoff exiting the site.

The 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.

3.1 STEP 1 – Site Planning

During the Site Planning process, the project site is evaluated for implementation of the green infrastructure planning measures identified in Table 3.1 of the Design Manual, in order to preserve natural resources and reduce impervious cover. Appendix C provides a description of each green infrastructure planning measure, along with a project specific evaluation.

3.2 STEP 2 – Calculate Water Quality Treatment Volume (WQv)

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.

3.2.1 NYSDEC Requirements for Water Quality Volume

The 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 Design Manual defines the Water Quality Volume as follows:

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

Where:	P	=	90% Rainfall Event Number
	R_v	=	0.05 + 0.009 (I)
	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.

3.2.2

3.2.2 Methodology for New Development

The Water Quality Volume equation has been applied to the drainage area tributary to each of the stormwater quality practices proposed for this project. The practices have been sized to accommodate the Water Quality Volume, as per the performance criteria presented in Chapter 5 and/or Chapter 6 of the Design Manual. Water quality volume calculations for each of the proposed practices are presented in Appendix C.

Table 4: Required WQv Summary

Required WQv	
53,397 cf	1.23 af

3.3 STEP 3 – Apply RR Techniques and Standard SMPs with RRv Capacity to Reduce Total WQv

Land use change and development in the watershed increases the volume of runoff. As such, reductions in the amount of runoff from new development, accomplished through the implementation of a stormwater management plan for the site, will play an important role in the success or failure of the watershed-wide stormwater management plan. Runoff reduction techniques can be applied to manage, reduce, and treat stormwater, while maintaining and restoring natural hydrology through infiltration, evapo-transpiration, and the capture and reuse of stormwater. Volume reduction techniques by themselves typically are not sufficient to provide adequate attenuation of stormwater runoff, but they can decrease the size of the peak runoff rate reduction facilities.

3.3.1 NYSDEC Requirements for New Development

The Design Manual states that runoff reduction shall be achieved through infiltration, groundwater recharge, reuse, recycle, and/or evaporation/evapotranspiration of 100-percent of the post-development water quality volume to replicate pre-development hydrology. Runoff control techniques provide treatment in a distributed manner before runoff reaches the collection system, by maintaining pre-construction infiltration, peak runoff flow, discharge volume, as well as minimizing concentrated flow. This can be accomplished by applying a combination of Runoff Reduction Techniques, standard Stormwater Management Practices (SMPs) with RRv capacity, and good operation and maintenance.

3.3.2 Methodology

In order to reduce the required WQv and meet the RRv criteria, a site specific evaluation must be performed to determine the most practical means of reducing runoff volume by application of a combination of RR techniques and standard SMPs with RRv capacity.

3.3.3 Application of Standard Stormwater Management Practices (SMPs) with RRv Capacity

The following Table demonstrates a summary of the standard SMP(s) with RRv capacity that have been incorporated into the stormwater management plan for this project. The standard SMP(s) with RRv capacity have been designed in accordance with Chapter 6 of the Design Manual. Refer to the contract drawings for practice dimensions, material specifications, and installation details. Practice specific calculations are presented in Appendix C.

Table 5: Summary of Standard SMPs with RRv Capacity being Applied

Standard SMP with RRv Capacity	Design Variant	Pretreatment Volume Required (% of WQv)	Pretreatment Volume Provided (CF)	RRv Capacity	WQv Required (CF)	WQv Reduced /RRv Provided (CF)	WQv Treated[1] (CF)	Total WQv Provided[2] (CF)
Filtration Bioretention	F-5	25	13,350	40%	53,397	21,360	32,038	53,397

Footnotes:
[1]*WQv Treated = WQV Required - RRv Provided*
[2]*Total WQv Provided = WQV Treated + RRv Provided*

3.3.4 RRv Performance Summary

A summary of the RRv provided is presented in the following table:

Table 6: RRv Summary

WQv Required (CF)	RRv Provided WQv Reduced (CF)	% RRv Provided/ WQv Reduced
53,397	21,360	>100%

As indicated in the above table, the RRv provided is greater than the RRv required for the project site. As such, the RRv criteria has been met and the designer can proceed to Step 6.

3.4 STEP 4 – Calculate the Minimum RRv Required

As previously discussed, the RRv provided is greater than the RRv required for this project. As such, the runoff reduction volume criteria has been met, and minimum RRv is not applicable.

3.5 STEP 5 – Apply Standard SMPs to Address Remaining Water Quality Volume

As previously discussed, 100% of the required WQv is being provided and reduced through RRv practices. As such, the water quality and runoff reduction volume criteria have been met and no other standard SMPs are required.

3.5.1 Underground Stormwater Detention System

Underground stormwater detention systems store and detain stormwater runoff in order to meet water quantity control requirements. Stormwater is stored in subsurface vaults and/or a system of large diameter interconnected storage pipes. Stored water is then released at rates designed to reduce peak run-off flows during post-development storms. Underground stormwater storage provides minimal stormwater quality benefits, but can be an effective component of a development's overall stormwater management plan.

3.6

3.6 Climate Change Consideration

This report presents the consideration for future physical risks due to climate change, in accordance with Part III.A.2 of the permit. Overall site planning, control measures and practices, conveyance systems and detention systems were evaluated against the seven (7) physical risks identified by NYSDEC due to climate change pursuant to the Community Risk and Resiliency Act (CRRA), 6 NYCRR 490, and associated guidance. Appendix C provides a description of each consideration, specific to the project.

4.0 CONSTRUCTION SEQUENCE

In order for construction to progress in a practical and efficient manner, soil disturbance in excess of five acres at any given time will be required. The General Permit allows for soil disturbance of greater than five acres upon written authorization from the the Town of Amherst. Therefore, once the site contractor is awarded the construction contract, a waiver will be requested to allow the disturbance of more than five acres at any one time. In accordance with Part I.E.6.b the written Request to Disturb Greater than Five Acres must include:

- The SPDES permit identification number (Permit ID); and
- Full technical justification demonstrating why alternative methods of construction that would result in five acres of soil disturbance or less at any one time are not feasible; and
- The phasing plan for the project and sequencing plans for all phases from the SWPPP in accordance with Part III.B.1.d.; and
- Plans with locations and details of erosion and sediment control practices such that the heightened concern for erosion when disturbing greater than five acres at one time has been addressed; and
- Acknowledgement that the Owner/Operator will comply with the requirements in Part IV.C.2.b.; and
- Acknowledgement that the Owner/Operator will comply with the requirements in Part II.B.1.b.

The Owner/Operator must be in receipt of an Authorization Letter to Disturb Greater than Five Acres, which will include when the authorization begins and ends and indicate a maximum area (acres) of soil disturbance allowed at any one time from the Town of Amherst. Should the request be denied, the contractor shall limit the area of disturbance to less than five acres of disturbance at any given time. The contractor shall prepare and submit to the Owner's/Operator's Engineer a sequencing plan that identifies the progression of construction through the site. This sequencing plan must be retained as part of the Site Log Book.

The "Erosion and Sediment Control Plan" and the "Erosion and Sediment Control Plan Prior to Construction" in the accompanying drawings and waiver request identifies 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's/Operator's Engineer 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 they see fit, but the ultimate responsibility for implementing these controls and ensuring their proper function remains with the Contractor.

In accordance with Part III.B.c.iv. a phasing plan for the project and sequencing plans for all phases have been provided. The plans address clearing and grubbing, excavation and grading, utility and infrastructure installation, final stabilization, and any other construction activity at the site that will result in soil disturbance. Refer to the plans for further information on the project phasing and sequencing.

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-0-25-001 (effective January 29, 2025 through January 28, 2030)
- New York State Standards and Specifications for Erosion and Sediment Control, NYSDEC (November 2016)

The SWPPP and accompanying plans outline the construction scheduling for implementing the erosion and sediment control measures. These documents 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 to the greatest extent practical. 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 to minimize the area and duration of soil disruption.
4. Establishment of permanent traffic corridors to ensure that “routes of convenience” are avoided.

5.1 Temporary Erosion and 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 *Stabilized Construction Access*

Prior to construction, stabilized construction access(es) will be installed, per accompanying plans, to reduce the tracking of sediment onto public roadways.

Construction traffic must enter and exit the site at the stabilized construction access(es). The intent is to trap dust and mud that would otherwise be carried off-site by construction traffic.

The access(es) shall be maintained in a condition, which will control tracking of sediment onto public rights-of-way or streets. When necessary, additional aggregate will be placed atop the filter fabric to assure the minimum thickness is maintained. All sediment and/or soil spilled, dropped, or washed onto public rights-of-way must be removed immediately. Periodic inspection and needed maintenance shall be provided after each substantial rainfall event.

5.1.2 *Dust Control*

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

5.1.3 *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 an area away from storm drainage, water bodies and/or courses, and will be properly protected from erosion by a surrounding silt fence barrier.

5.1.4 *Silt Fencing*

Prior to the initiation of and during construction activities, a geotextile filter fabric (or silt fence) will be established downgradient of all disturbed areas. 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 barrier. To facilitate effectiveness of the silt fencing, daily inspections and inspections immediately after significant storm events will be performed by the Contractor(s). Maintenance of the fence will be performed as needed.

5.1.5 *Temporary Seeding*

The project is authorized to disturb greater than five acres in accordance with Part I.E.5.a.viii. As such, temporary soil stabilization measures must be initiated by the end of the next business day and completed within seven (7) days from the date the soil disturbance activity has temporarily ceased.

5.1.6 *Manufactured Insert Inlet Protection*

Install insert inlet protection beneath the grate of all catch basins, to prevent sediment from entering the catch basins and storm sewer system. Remove sediment accumulation and repair or replace insert as necessary to ensure proper function.

5.1.7 *Filter Fabric Drop Inlet Protection*

Install filter fabric or silt fence with wooden stakes at the perimeter of existing or proposed catch basins located in lawn areas, to prevent sediment from entering the catch basins and storm sewer system. Remove sediment accumulation and repair or replace fabric as necessary to ensure proper function.

5.1.8 Stone Check Dams

Stone check dams will be installed within drainage ditches to reduce the velocity of stormwater runoff, promote settling of sediment, and reduce sediment transport off-site.

Sediment accumulated behind the stone check dam will be removed as needed to maintain flow through the stone check dam and prevent large flows from carrying sediment over or around the dam. Stones shall be replaced as needed to maintain the design cross section of the structures.

5.1.9 Temporary Sediment Trap

Temporary sediment traps shall be constructed to intercept sediment-laden runoff, reduce the amount of sediment leaving the disturbed areas, and protect drainage ways, properties, and rights-of-way.

Accumulated sediment shall be removed from the trap when it reaches no greater than 50 percent of the design capacity. Sediment shall not be placed downstream from the embankment, adjacent to a stream, or floodplain.

Temporary sediment traps depicted on the accompanying plans have been designed to provide 3,600 CF of storage per acre of tributary watershed.

5.1.10 Temporary Diversion Swales

Temporary diversion swales shall be used to divert off-site runoff around the construction site and divert runoff from stabilized areas around disturbed areas.

5.1.11 Dewatering Operations

Dewatering will be used to intercept sediment-laden stormwater or pumped groundwater and allow it to settle out of the pumped discharge prior to being discharged from the site. Water from dewatering operations shall be treated to eliminate the discharge of sediment and other pollutants. Water resulting from dewatering operations shall be directed to temporary sediment traps or dewatering devices. Temporary sediment traps and dewatering bags will be provided, installed, and maintained at downgradient locations to control sediment deposits to downstream surfaces.

5.1.12 Fiber Roll

Prior to the initiation of and during construction activities, fiber rolls (12” minimum diameter) will be established downgradient of all disturbed areas to reduce sheet flow on slopes. These rolls may extend into non-impact areas to provide adequate protection of adjacent lands. Spacing will conform to NYSDEC specification for straw bale dike.

Clearing and grubbing will be performed only as necessary for the installation of the fiber rolls. To facilitate effectiveness, daily inspections and inspections immediately after significant storm events will be performed by the Contractor(s) and maintenance will be performed as needed.

5.1.13 Compost Filter Sock

Prior to the initiation of and during construction activities, a compost filter sock (or silt sock) will be established downgradient of all disturbed areas. These filters may extend into non-impact areas to provide adequate protection of adjacent lands. The spacing of the compost filter sock, which will depend on the ground slope and diameter of the sock, shall be based upon New York State or EPA guidance.

Clearing and grubbing will be performed only as necessary for the installation of the sediment control filter; and unlike sediment control barriers, trenching is not required. The ends of the filter sock should be directed upslope, to prevent stormwater from running around the end of the sock. The preferred anchoring method is to drive stakes through the center of the sock at regular intervals; alternatively, stakes can be placed on the downstream side of the sock. To facilitate effectiveness of the compost filter sock, daily inspections and inspections immediately after significant storm events will be performed by the Contractor(s) to ensure that they are intact and the area behind the sock is not filled with sediment. Maintenance of the sock will be performed as needed.

5.2 Permanent Erosion and 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 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.

The project is authorized to disturb greater than five acres in accordance with Part I.E.5.a.viii. As such, permanent soil stabilization measures must be initiated by the end of the next business day and completed within seven (7) days from the date the soil disturbance activity has permanently ceased.

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.

5.2.2 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 velocity and energy of water, such that the flow will not erode downstream surfaces.

5.2.3 Permanent Turf Reinforcement

Permanent turf reinforcement mats (TRMs) provide long-term erosion protection and vegetation establishment assistance while permanently reinforcing vegetation. TRMs shall be installed on slopes/channels where specified. TRM's provide two key advantages. First, their unique fiber shape and 3-D pattern create a thick matrix of voids that trap seed, soil, and water in place for quicker, thicker vegetation growth. Secondly, they provide additional reinforcement that doubles the vegetation's natural erosion protection abilities by remaining a permanent part of the application and anchoring mature plants to the soil for superior, long-term erosion resistance.

5.3 Implementation Schedule for Erosion and Sediment Control Measures

Proper implementation of the outlined erosion and sediment control measures is critical to minimizing soil erosion and controlling off-site sediment transport during construction, as well as controlling the quality and quantity of stormwater runoff from the developed site after construction. The following table outlines the implementation schedule for initial placement of these measures, and the duration for which they should remain in place.

Table 7: Implementation Schedule for Erosion and Sediment Control Measures

Erosion and Sediment Control Measure	Initial Placement	Duration to Remain In-Place
Stabilized Construction Access	Upon mobilizing to site	Until construction is complete
Dust Control	As needed	As needed
Temporary Soil Stockpile	Upon delivery of materials to the site or excavation of on-site materials for reuse	Until materials have been placed or removed from the site
Silt Fencing	Prior to upgradient soil disturbance	Until upgradient area has achieved permanent stabilization
Temporary Seeding	Apply to any disturbed soil that will remain exposed for more than 14 days	Apply additional seed as needed for temporary stabilization
Manufactured Insert Inlet Protection	*Existing structures:* prior to upgradient soil disturbance *New structures:* upon installation of structure/grate	Until upgradient area has achieved permanent stabilization
Stone Check Dams	*Existing swales:* upon completion of swale reshaping *New swales:* upon completion of swale excavation	Permanent
Dewatering Operations	As needed during excavation	Until excavation/backfilling is complete
Compost Filter Sock	Prior to upgradient soil disturbance	Until upgradient area has achieved permanent stabilization
Establishment of Permanent Vegetation	As soon as possible after completion of final grading	Permanent, apply additional seed as needed to achieve 80% minimum uniform coverage
Rock Outlet Protection	During installation of tributary culverts/pipes	Permanent
Permanent Turf Reinforcement	Upon completion of slope grading operations	Permanent

5.4 Other Pollutant Controls

Part I.C.1 of GP-0-25-001 prohibits discharges from construction material wastewater, pollutants used in vehicle and equipment operation and maintenance, vehicle and equipment washing and toxic or hazardous substances.

The following table identifies materials and/or chemicals commonly used and/or stored on construction sites and should be addressed in the site-specific spill prevention and response plan:

Table 8: Common Construction Pollutants

Material/Chemical	Physical Description	Stormwater Pollutants	Location*
Pesticides (insecticides, fungicides, herbicides, rodenticides)	Various colored to colorless liquid, powder, pellets, or grains	Chlorinated hydrocarbons, organophosphates, carbamates, arsenic	Herbicides used for noxious weed control
Fertilizer	Liquid or solid grains	Nitrogen, phosphorous	Newly seeded areas
Cleaning solvents	Colorless, blue, or yellow-green liquid	Perchloroethylene, methylene chloride, trichloroethylene, petroleum distillates	No equipment cleaning allowed in project limits
Asphalt	Black solid	Oil, petroleum distillates	Streets and roofing
Concrete	White solid/grey liquid	Limestone, sand, pH, chromium	Curb and gutter, building construction
Curing compounds	Creamy white liquid	Naphtha	Curb and gutter
Hydraulic oil/fluids	Brown oily petroleum hydrocarbon	Mineral oil	Leaks or broken hoses from equipment
Gasoline	Colorless, pale brown or pink petroleum hydrocarbon	Benzene, ethyl benzene, toluene, xylene, MTBE	Secondary containment / staging area
Diesel Fuel	Clear, blue-green to yellow liquid	Petroleum distillate, oil & grease, naphthalene, xylenes	Secondary containment / staging area
Kerosene	Pale yellow liquid petroleum hydrocarbon	Coal oil, petroleum distillates	Secondary containment / staging area
Antifreeze/coolant	Clear green/yellow liquid	Ethylene glycol, propylene glycol, heavy metals (copper, lead, zinc)	Leaks or broken hoses from equipment
Sanitary toilets	Various colored liquid	Bacteria, parasites, and viruses	Staging area
Construction materials			
Granular fill	Various colored solids	Sediment	Stockpile / fill areas
Subbase course	Gray/brown solid	Sediment, dust	Stockpile
Topsoil	Brown solid	Sediment	Stockpile
Mulch	Various colored solid	Sediment, debris	Staging area
Seed	Brown/yellow solid	Nutrients, debris	Staging area
HDPE Storm Pipe	Black solid		Staging area
SDR-35, SDR-21 PVC Pipe	Various colored solid		Staging area
Metals Frames and Grates	Gray solid		Staging area
Joint Sealant	Light gray viscous solid	Polyurethane	Staging area

*(Area where material/chemical is used on-site)

5.5 Construction Housekeeping Practices

During the construction phase, the Contractor(s) will implement the following measures:

5.5.1 Sediment Sweeping/Vacuuming

Any sediment that is tracked by construction vehicles or erosion onto adjacent public or private impervious surfaces must be swept or vacuumed, utilizing self-propelled and/or walk-behind equipment, and removed on a daily basis. Kick brooms and sweeper attachments are not an acceptable means of sweeping. Sweeping or vacuuming should not take place while tracked sediment is wet. If tracked sediment is compacted, the sediment must be scraped loose prior to sweeping or vacuuming.

5.5.2 Material Stockpiles

Material resulting from clearing and grubbing operations that will be stockpiled on-site, must be adequately protected with downgradient erosion and sediment controls.

5.5.3 Equipment Cleaning and Maintenance

The Contractor(s) will designate areas for equipment cleaning, maintenance, and repair. The Contractor(s) and subcontractor(s) will utilize those areas. The areas will be protected by a temporary perimeter berm.

5.5.4 Detergents

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

5.5.5 Spill Prevention and Response

A Spill Prevention and Response Plan shall be developed, for the pollutants identified in Section 5.3, for the site by the Contractor(s) that addresses the following:

1. Reducing chance of spills
2. Stopping the source of spills
3. Containing and cleaning up spills
4. Disposing of materials contaminated by spills
5. Training personnel responsible for spill prevention/response
6. Material handling procedures
7. Material storage requirements

The plan shall detail the steps required 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 Safety Data Sheets (SDS) 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.

5.5.6 Concrete Washout Areas

A temporary concrete washout area shall be provided for every project where concrete will be poured or otherwise formed on-site and shall consist of an excavated or above-ground lined construction pit where concrete trucks or equipment can be washed out after their loads have been discharged. Waste generated from concrete wash water that shall not be allowed to flow into drainage ways, inlets, receiving waters, highway right-of-way, or any location other than the designated concrete washout area(s). Proper signage shall be placed adjacent to the facility to designate the "Concrete Washout Area". Locate the facility a minimum of 100-feet from drainage swales, storm drain inlets, wetlands, streams, and other surface waters. Prevent surface water from entering the washout area.

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 washout area shall include removal of hardened material when 75% of the storage capacity is filled, and a minimum freeboard of 12 inches shall be maintained. The Contractor will be responsible for seeing that these procedures are followed. The project may require the use of multiple concrete washout areas based on the frequency of concrete pours.

5.5.7 Material Storage

Construction materials shall be stored in a dedicated staging area. The staging area shall be located in an area that prevents negative impacts of construction materials on 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.

6.0 INSPECTIONS, MAINTENANCE, AND REPORTING

6.1 Inspection and Maintenance Requirements

6.1.1 Pre-Construction Inspection and Certification

Prior to the commencement of construction, the Qualified Inspector/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 Qualified Inspector/Qualified Professional once the erosion and sediment control measures have been installed.

6.1.2 Construction Phase Inspections and Maintenance

A Qualified Inspector/Qualified Professional, as defined in Appendix A of the General Permit GP-0-25-001, shall conduct regular site inspections between the time this SWPPP is implemented and final site stabilization. Because this project involves the disturbance of greater than five (5) acres of soil at any one time, site inspections shall occur at an interval of at least twice every seven (7) calendar days for as long as greater than five (5) acres of soil remain disturbed, with the inspections separated by a minimum of at least two (2) full calendar days.

The purpose of site inspections is to assess performance of pollutant controls. Based on these inspections, the Qualified Inspector/Qualified Professional 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 access will be constructed where vehicles enter and exit. This access 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 or 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 (1) business day of the completion of an inspection, the *Qualified Inspector/Qualified Professional* shall notify the Owner/Operator and appropriate contractor or subcontractor of any corrective actions that need to be taken. For corrective actions not requiring engineering design, the contractor must begin implementing corrective actions within one business day and complete the corrective actions within five business days. For corrective actions requiring engineering design, the engineering design process must begin within five business days and the contractor must complete the corrective action in a reasonable time frame but no later than 60 calendar days.

In addition to the inspections performed by the *Qualified Inspector/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, sediment traps, etc.)

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.

6.1.3 Temporary Suspension of Construction Activities

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 frequency of Qualified Inspector/Qualified Professional inspections can be reduced to once every 30 calendar days. Prior to reducing the frequency of inspections, the Owner/Operator shall notify the NYSDEC Region 9 stormwater contact person and the Town of Amherst in writing.

6.1.4 Partial Project Completion

For construction 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 inspections by the Qualified Inspector/Qualified Professional can stop. Prior to the shutdown, the Owner/Operator shall notify the NYSDEC Region 9 stormwater contact person and the Town of Amherst in writing.

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

6.1.5 Post-Construction Inspections and Maintenance

Inspections and maintenance of final stabilization measures and post-construction stormwater management practices shall be performed in accordance with Appendix G, once all disturbed areas are stabilized and all stormwater management systems are in place and operable.

6.2 Reporting Requirements

6.2.1 Inspection Reports

Pursuant to Part IV.C of GP-0-25-001, inspection reports shall be prepared for the duration of construction, as outlined herein, and shall be signed by the *Qualified Inspector* or *Qualified Professional*. A sample inspection form is provided in Appendix F.

At a minimum, each inspection report shall record the following information:

1. Permit identification number; and
2. Date and time of inspection; and
3. Name and title of person(s) performing inspection; and
4. A description of the weather and soil conditions (e.g. dry, wet, saturated) at the time of the inspection, including the temperature at the time of the inspection; and
5. A description of the condition of the runoff at all points of discharge from the construction site. This must include identification of any discharges of sediment from the construction site. Include discharges from conveyance systems (i.e. pipes, culverts, ditches, etc.) and overland flow; and

6. A description of the condition of all surface waters of the State located within, or immediately adjacent to, the property boundaries of the construction site which receive runoff from disturbed areas. This must include identification of any discharges of sediment to the surface waters of the State; and
7. Identification of all erosion and sediment control practices and pollution prevention measures that need repair or maintenance; and
8. Identification of all erosion and sediment control practices and pollution prevention measures that were not installed properly or are not functioning as designed and need to be reinstalled or replaced; and
9. Description and sketch (map) of areas with active soil disturbance activity, areas that have been disturbed but are inactive at the time of the inspection, and areas that have been stabilized (temporary and/or final) since the last inspection; and
10. Estimates, in square feet or acres, of the following areas:
    a. Total area with active soil disturbance (not requiring either temporary stabilization or final stabilization); and
    b. Total area with inactive soil disturbance (requiring either temporary stabilization or final stabilization); and
    c. Total area that has achieved temporary stabilization; and
    d. Total area that has achieved final stabilization; and
11. Current stage of construction of all SMPs and identification of all construction activity on site that is not in conformance with the SWPPP and technical standards; and
12. Corrective action(s) that must be taken to install, repair, replace or maintain erosion and sediment control practices and pollution prevention measures; and to correct deficiencies identified with the construction of the SMP(s); and
13. Identification and status of all corrective actions that were required by previous inspection; and
14. Digital photographs, with date stamp, that clearly show the condition of all practices that have been identified as needing corrective actions. The qualified inspector must attach color copies of the digital photographs to the inspection report being maintained onsite within seven (7) calendar days of the date of the inspection. The qualified inspector must also take digital photographs, with date stamp, that clearly show the condition of the practice(s) after the corrective action has been completed. The qualified inspector must attach paper color copies of the digital photographs to the inspection report that documents the completion of the corrective action work within seven (7) calendar days of that inspection.

6.2.2 Site Log Book

Pursuant to Part I.E.3 of GP-0-25-001, the Owner/Operator shall retain a copy of the General Permit, NOI, NOI Acknowledgment Letter, MS4 SWPPP Acceptance Form (if applicable), inspection reports, contractor and subcontractor certification forms, and all documentation necessary to demonstrate eligibility under the permit, at the construction site from commencement of construction activity until the date that all areas of disturbance have achieved final stabilization and the Notice of Termination has been submitted to the NYSDEC.

The Site Log Book shall be maintained on-site in a secure location (i.e. job trailer, on-site construction office, or mailbox with lock) and must be accessible during normal business hours to an individual performing a compliance inspection.

6.2.3 Post Construction Records and Archiving

Following construction, the Owner/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 NYSDEC, at its sole discretion, at any time upon written notification.

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

7.0 SWPPP IMPLEMENTATION RESPONSIBILITIES

A summary of the responsibilities and obligations of all parties involved with compliance with the NYSDEC SPDES General Permit GP-0-25-001 conditions is outlined in the subsequent sections. For a complete listing of the definitions, responsibilities, and obligations, refer to the SPDES General Permit GP-0-25-001 presented in Appendix J.

7.1 Owner's/Operator's Responsibilities

1. Ensure that control measures are selected, designed, installed, implemented and maintained to minimize the discharge of pollutants and prevent a violation of the water quality standards, meeting the non-numeric effluent limitations in Part II.B.1.(a)-(e) of the SPDES General Permit and in accordance with the New York State Standards and Specifications for Erosion and Sediment Control, dated November 2016.

2. Ensure that practices are selected, designed, installed, and maintained to meet the performance criteria in the Design Manual. Practices must be designed to meet the applicable sizing criteria in Part II.C.2.a., b., c. or d. of GP-0-25-001.

3. Retain the services of a "Qualified Inspector" or "Qualified Professional" as defined under GP-0-25-001, to provide the services outlined in Section 7.5 "Qualified Inspector's/Qualified Professional's Responsibilities."

4. Retain the services of a "Qualified Professional," as defined under GP-0-25-001, to provide the services outlined in Section 2.3 "Owner's/Operator's Engineers Responsibilities."

5. Have an authorized corporate officer sign the Owner/Operator Certification Form to accompany the eNOI. A copy of the completed NOI is included in Appendix B.

6. Submit the electronic version of the NOI (eNOI) along with the MS4 SWPPP acceptance form using the NYSDEC's website (http://www.dec.ny.gov/chemical/43133.html).

7. Submit the electronic version of the NOI (eNOI) along with the MS4 No Jurisdiction Form using the NYSDEC's website (http://www.dec.ny.gov/chemical/43133.html).

8. Pay the required initial and annual fees upon receipt of invoices from NYSDEC. These invoices are generally issued in the fall of each year. The initial fee is calculated as $110.00 per acre disturbed plus $675.00 per acre of net increase in impervious cover, and the annual fee is $110.00.

9. Prior to the commencement of construction activity, identify the contractor(s) and subcontractor(s) that will be responsible for installing, constructing, repairing, replacing, inspecting, and maintaining the erosion control practices included in the SWPPP and the contractor(s) and subcontractor(s) that will be responsible for constructing the SMPs included in the SWPPP. Each of the contractors and subcontractors must identify at least one person from their company to be the trained contractor that will be responsible for implementation of the SWPPP. Ensure that at least one trained contractor is on site daily when soil disturbance activities are being performed.

10. Schedule a pre-construction meeting which shall include the Town of Amherst representative, Owner's/Operator's Engineer, Qualified Inspector, Contractor, and their sub-contractors to discuss responsibilities as they relate to the implementation of this SWPPP.

11. Retain the services of an independent certified materials testing and inspection firm operating under the direction of a licensed Professional Engineer to perform regular tests, inspections, and certifications of the construction materials used in the construction of all post-construction stormwater management practices.

12. Retain the services of a NYS licensed land surveyor to perform an as-built topographic survey of the completed post-construction stormwater management facilities.

13. Require the Contractor to fully implement the SWPPP prepared for the site by the Owner/Operator's Engineer 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 to the NYSDEC.

14. The Owner/Operator is authorized to commence construction activity as of the authorization date indicated in the Letter of Authorization (LOA), which is sent by NYSDEC after a complete eNOI is submitted.

15. Within five (5) business days of receipt of the LOA, send an electronic copy of the LOA to the MS4 operator(s) with review authority.

16. Forward a copy of the LOA received from DEC to the Owner's/Operator's Engineer for project records, and to the Contractor for display at the construction site.

17. As of the date the LOA is received, the Owner/Operator must make the eNOI, SWPPP and LOA available for review and copying in accordance with the requirements in Part VII.H. of GP-0-25-001. When applicable, as of the date an updated LOA is received, the Owner/Operator must make the updated LOA available for review and copying in accordance with the requirements in Part VII.H.

18. The Owner/Operator must ensure compliance with all requirements of GP-0-25-001 and that the provisions of the SWPPP, including any changes made to the SWPPP in accordance with Part III.A.5., are properly implemented and maintained from the commencement of construction activity until all area of disturbance have achieved final stabilization; and the Owner/Operator's coverage under the permit is terminated in accordance with Part V.A.5.a.

19. As of the date of the commencement of construction activities until Part I.E.2.a. and b. have been met, the Owner/Operator must maintain at the construction site, a copy of all documentation necessary to demonstrate eligibility with GP-0-25-001, a copy of GP-0-25-001, the SWPPP, the signed SWPPP Preparer Certification Form, the signed MS4 SWPPP Acceptance Form, NYCDEP SWPPP Acceptance/Approval Form, MS4 No Jurisdiction Form, signed Owner/Operator Certification Form, eNOI, and LOA, and LOA transmittal to the MS4 Operator in accordance with Part I.D.3.c.

20. The Owner/Operator must maintain at the construction site, until Part I.E.2.a and b. have been met, as of the date the documents become final or are received, a copy of the responsible contractor's or subcontractor's certification statement(s) in accordance with Part III.A.7, and inspection reports in accordance with Part IV.C.4. and 6., and Request to Disturb Greater than Five Acres and the Authorization Letter to Disturb Greater than Five Acres in accordance with Part I.E.6, Request to Continue Coverage and the Letter of Continued Coverage (LOCC) in accordance with Part I.F.2. and 4., and the updated LOA(s) in accordance with Part I.E.9.

21. The Owner/Operator must maintain the documents in a secure location, such as a job trailer, on-site construction office, or mailbox with lock. The secure location must be accessible during normal business hours to an individual performing a compliance inspection. The documents must be paper documents unless electronic documents are accessible to the inspector during an inspection to the same extent as a paper copy stored at the site would be. If electronic documents are kept on site, the Owner/Operator must maintain functional equipment on site available to an inspector during normal hours of operation such that an inspector may view the electronic documents in a format that can be red in a similar manner as a paper record and in a legally dependable format with no less evidentiary value than their paper equivalent.

22. Upon finding a significant non-compliance with the practices described in the SWPPP or violation of GP-0-25-001, NYSDEC may order an immediate stop to all construction activity at the site until the non-compliance is remedied. The stop work order must be in writing, describe the non-compliance in detail, and be sent to the Owner/Operator. Forward a copy of any stop work order received immediately to the Owner's/Operator's Engineer and to the Contractor.

23. If any human remains or archaeological remains are encountered during excavation, the Owner/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.

24. To be authorized to implement modifications to the information previously submitted in the eNOI, the Owner/Operator must notify NYSDEC via email at Stormwater_info@dec.ny.gov requesting access to update the eNOI, update the eNOI to reflect the modifications and resubmit the eNOI in accordance with Part I.D., and receive an updated LOA.

25. The eNOI, SWPPP, LOA, updated LOAs, and inspection reports required by GP-0-25-001 are public documents that the Owner/Operator must make available for review and copying by any person within five (5) business days of the Owner/Operator receiving a written request by any such person to review these documents. Copying of documents will be done at the requester's expense.

26. The Owner/Operator must terminate coverage when the project reaches total project completion, has a planned shutdown with partial project completion, is changing Owner/Operator or has obtained coverage under an alternative general SPDES permit or an individual SPDES permit.

27. Have a qualified inspector perform a final site inspection prior to submitting the eNOT.

28. Have the MS4 sign the MS4 Acceptance statement on the eNOT in accordance with the requirements in Part VII.J.

29. Prior to submitting a Notice of Termination, ensure for SMP(s) that are privately owned, the Owner/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/Operator's deed of record.

30. Submit a complete Notice of Termination form electronically using the NYSDEC eNOT. Coverage is terminated as of the termination date indicated in the Letter of Termination (LOT), which is sent by NYSDEC after a complete eNOT is submitted.

31. Request and receive all SWPPP records from the Owner's/Operator's Engineer and archive those records, along with the LOT, for a period of at least five (5) years from the date that NYSDEC accepts a complete NOT submitted.

32. Implement the Post-Construction Inspections and Maintenance procedures outlined in Appendix G.

33. The Owner/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/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 project 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; and
    c) To address issues or deficiencies identified during an inspection by the "Qualified Inspector," the Department, or other Regulatory Authority.
    d) To document the final construction conditions.

34. 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, in writing, of the requirement to obtain permit coverage by submitting a NOI with the Department, in conformance with Part I.G.. 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.

7.2 Owner's/Operator's Engineer's Responsibilities

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

2. Prepare the electronic Notice of Intent (eNOI) (see Appendix B) and sign the "SWPPP Preparer Certification Form." Forward the Owner/Operator Certification Form to the Owner/Operator for signature.

3. Provide copies of the SWPPP to the Town of Amherst once all signatures and attachments are complete.

4. Enter Contractor's information in Section 7.5 "SWPPP Participants" once a Contractor is selected by the Owner/Operator.

5. Participate in a pre-construction meeting which shall include the Town of Amherst representative, Owner/Operator, Qualified Inspector, Contractor, and all subcontractors to discuss responsibilities as they relate to the implementation of this SWPPP.

6. 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.

7.3 Contractor's Responsibilities

1. Sign the SWPPP Contractor's Certification Form contained within Appendix B and forward to the Owner's/Operator's Engineer for inclusion in the Site Log Book.

2. Identify at least one Trained Contractor that will be responsible for implementation of this SWPPP. Ensure that at least one Trained Contractor is on site on a daily basis when soil disturbance activities are being performed. The Trained Contractor shall 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 conditions at all times. For corrective actions not requiring engineering design, the contractor must begin implementing corrective actions within one business day and complete the corrective actions within five business days. For corrective actions requiring engineering design, the engineering design process must begin within five business days and the contractor must complete the corrective action in a reasonable time frame but no later than 60 calendar days.

3. Provide the names and addresses of all subcontractors working on the project site. Require all subcontractors who will be involved with construction activities that will result in soil disturbance to identify at least one Trained Contractor that will be on site on a daily basis when soil disturbance activities are being performed; and to sign a copy of the Subcontractor's Certification Form contained within Appendix B, then forward to the Owner's/Operator's Engineer for inclusion into the Site Log Book. This information must be retained as part of the Site Log Book.

4. Maintain a Spill Prevention and Response Plan in accordance with requirements outlined in Section 5 of this SWPPP. This plan shall be provided to the Owner's/Operator's Engineer for inclusion in the Site Log Book, prior to mobilization on-site.

5. Participate in a pre-construction meeting which shall include the Town of Amherst representative, Owner/Operator, Owner's/Operator's Engineer, Qualified Inspector, and all subcontractors to discuss responsibilities as they relate to the implementation of this SWPPP.

6. 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's/Operator's Engineer so that the SWPPP can be modified accordingly.

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

8. In accordance with the requirements in the most current version of the NYS Standards and Specifications for Erosion and Sediment Control, conduct 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.

9. Begin implementing corrective actions within one (1) business day of receipt of notification by the Qualified Inspector/Qualified Professional of any corrective actions. For corrective actions not requiring engineering design, the contractor must begin implementing corrective actions within one business day and complete the corrective actions within five business days. For corrective actions requiring engineering design, the engineering design process must begin within five business days and the contractor must complete the corrective action in a reasonable time frame but no later than 60 calendar days.

10. Maintain a record of the date(s) and location(s) that soil restoration is performed in accordance with the accompanying plans and NYSDEC Division of Water's publication "Deep-Ripping and Decompaction," dated April 2008. A copy of this publication is provided in Appendix H. The record that is to be maintained shall be a copy of the overall site grading plan delineating the area(s) and date(s) that the soil was restored.

11. Upon completion of all construction at the site, the contractor responsible for overall SWPPP Compliance shall sign the certification on their Contractor Certification Form indicating that: a.) all temporary erosion and sediment control measures have been removed from the site, b.) the on-site soils disturbed by construction activity have been restored in accordance with the SWPPP and the NYSDEC Division of Water's publication "Deep-Ripping and Decompaction," and c.) all permanent stormwater management practices required by the SWPPP have been installed in accordance with the contract documents.

7.4 Qualified Inspector's/Qualified Professional's Responsibilities

1. Participate in a pre-construction meeting with the Town of Amherst representative, Owner/Operator, Owner/Operator's Engineer, Contractor, and their subcontractors to discuss responsibilities as they relate to the implementation of this SWPPP.

2. Conduct an initial assessment of the site prior to the commencement of construction and certify in an inspection report that the appropriate erosion and sediment control measures described within this SWPPP have been adequately installed and implemented to ensure overall preparedness of the site.

3. Provide on-site inspections to determine compliance with the SWPPP. Because this project involves the disturbance of greater than five (5) acres of soil at any one time, site inspections shall occur at an interval of at least twice every seven (7) calendar days for as long as greater than five (5) acres of soil remain disturbed, with the inspections separated by a minimum of at least two (2) full calendar days. A written inspection report shall be provided to the

Owner/Operator and general contractor within one business day of the completion of the inspection, with any deficiencies identified. A sample inspection form is provided in Appendix F.

4. Prepare an inspection report subsequent to each and every inspection that shall include/address the items listed in Part IV.C.4 of GP-0-25-001. Sign all inspection reports and maintain on site with the SWPPP.

5. Notify the owner/operator and appropriate contractor or subcontractor of any corrective actions that need to be taken.

6. Prepare a construction Site Log Book to be used as a record of all inspection reports generated throughout the duration of construction. Ensure that the construction Site Log Book is maintained and kept up-to-date throughout the duration of construction.

7. Review the Contractor's SWPPP records on a periodic basis to ensure compliance with the requirements for daily reports, soil restoration, inspections, and maintenance logs.

8. Based on the as-built survey and material testing certifications performed by others, the Qualified Professional shall perform evaluations of the completed stormwater management practices to determine whether they were constructed in accordance with this SWPPP.

9. The Qualified Professional shall 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, review of the completed 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.

10. Prepare the Notice of Termination (NOT). The Qualified Professional shall sign the NOT Certifications VI (Final Stabilization) and VII (Post-construction Stormwater Management Practices) and forward the NOT to the Owner/Operator for signature on Certification VIII (Owner/Operator Certification).

11. The owner's or operator's coverage is terminated as of the termination date indicated in the Letter of Termination (LOT), which is sent by NYSDEC after a complete eNOT is submitted.

12. Transfer the SWPPP documents, along with all NOI's, LOA, permit certificates, NOT's, LOT, construction Site Log Book, and written records required by the General Permit to the Owner/Operator for archiving.

7.5 SWPPP Participants

1. Owner's/Operator's Engineer [3]: Robert Steehler, PE
   LaBella Associates, DPC
   300 State Street, Suite 201
   Rochester, NY 14614
   Phone: (585) 454-6110

2. Owner/Operator [4]: Frank Ciminelli II, President & CEO
   Arc Building Partners
   100 South Elmwood Ave, Suite 100,
   Buffalo, NY 14202
   Phone: 716-427-6100

3. Contractor[5,6]:

   Name and Title: ______________________________

   Company Name: ______________________________

   Mailing Address: ______________________________

   ____

   Phone: ______________________________

   Fax: ______________________________

[3] *Refer to Appendix B for the SWPPP Preparer Certification Form.*
[4] *Refer to Appendix B for the Owner/Operator Certification Form.*
[5] *Refer to Appendix B for Contractor and Subcontractor Certification Form.*
[6] *Contractor's information to be entered once the Contractor has been selected.*

APPENDIX A: FIGURES

A-1: Site Location Map
A-2: Soils Map
A-3: Historic Places Screening Map
A-3A: Historic Places Screening Map
A-4: Environmental Resource Map
A-4A NYSDEC Coordination Document
A-5: Environmental Review Documentation
A-6: FEMA Firm Map
A-7: Pre-Development Watershed Delineation Map
A-8: Post-Development Watershed Delineation Map

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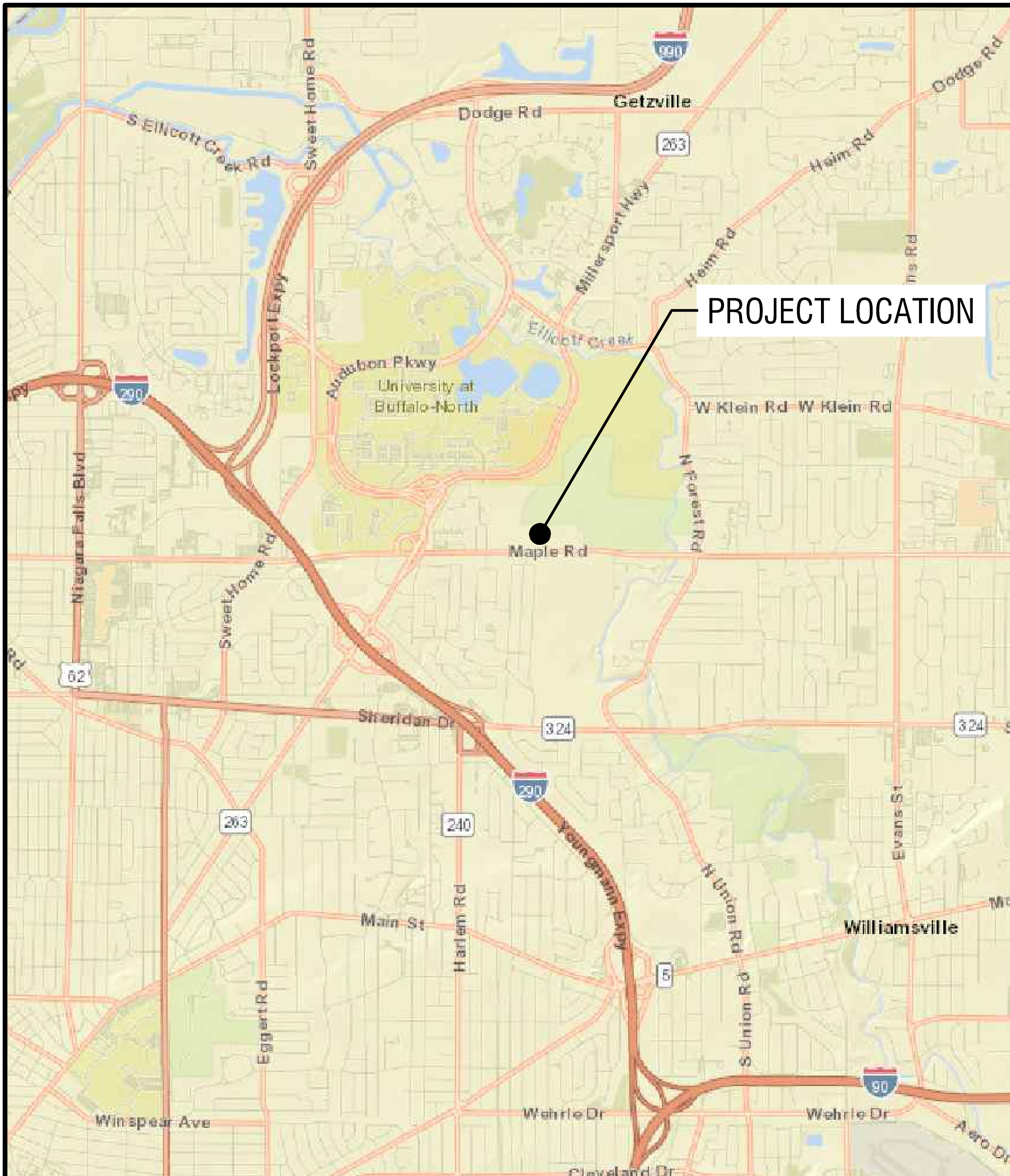

It is a violation of New York Education Law Article 145 Sec.7209, for any person, unless acting under the direction of a licensed architect, professional engineer, or land surveyor, to alter an item in any way. If an item bearing the seal of an architect, engineer, or land surveyor is altered; the altering architect, engineer, or land surveyor shall affix to the item their seal and notation "altered by" followed by their signature and date of such alteration, and a specific description of the alteration.

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ISSUED FOR:		
SWPPP FIGURE - NOT FOR CONSTRUCTION		
DRAWN BY: --	DATE: OCT. 2025	PROJECT NO.: 2254561

DRAWING NAME: **SITE LOCATION MAP**

PROJECT NAME: **716 SPORTS FIELDHOUSE COMPLEX**
330 MAPLE ROAD, BUFFALO, NY 14221

DRAWING NUMBER: **A-1**

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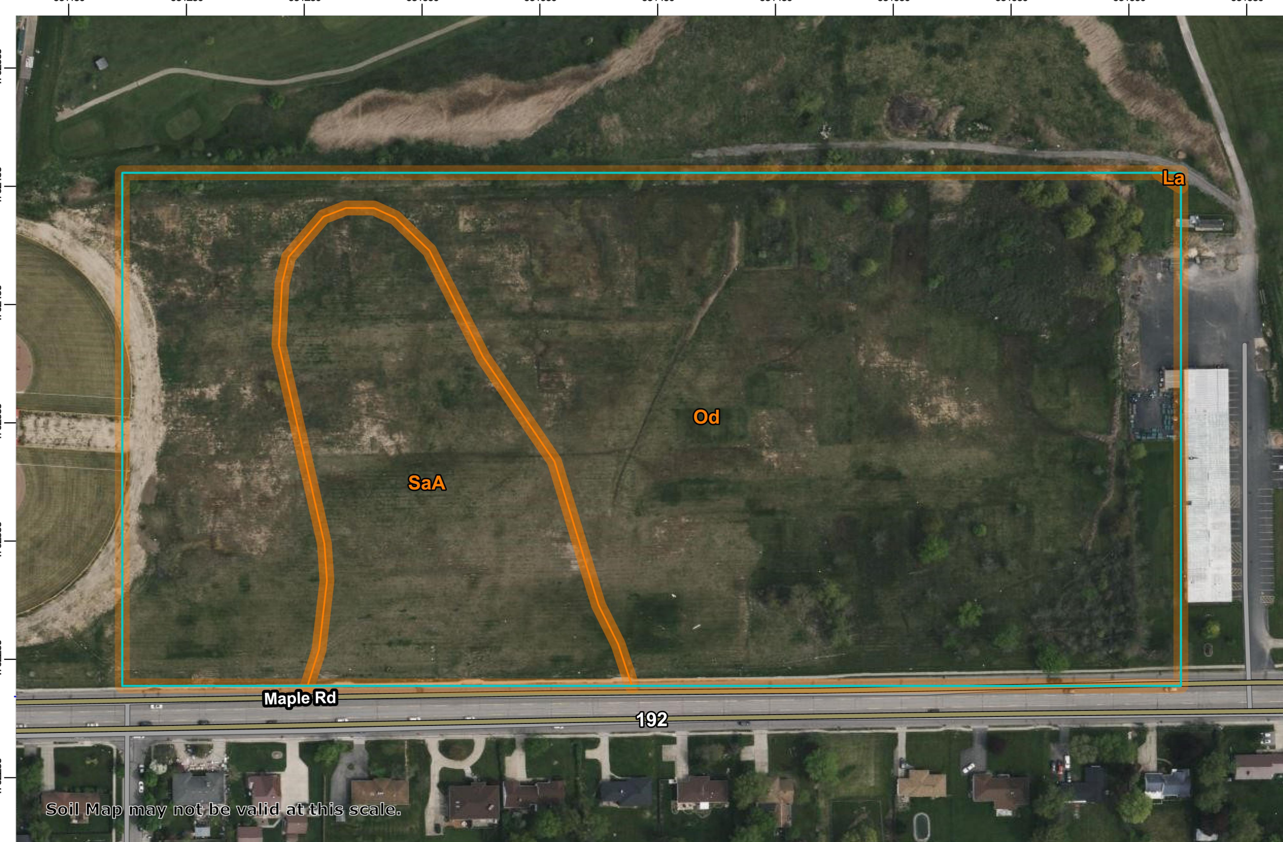
Custom Soil Resource Report
Soil Map



Map Scale: 1:2,470 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 35 70 140 210

Feet: 0 100 200 400 600

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 17N WGS84

9

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DRAWING NAME: **SOILS MAP**

DRAWN BY: --

DATE: OCT. 2025

PROJECT NO.: 2254561

PROJECT NAME: **716 SPORTS BUILDING COMPLEX**
330 MAPLE ROAD, BUFFALO, NY 14221

DRAWING NUMBER: **A-2**

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: Erie County, New York
Survey Area Data: Version 25, Sep 4, 2025

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: May 13, 2023—May 27, 2023

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.

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DRAWN BY: --
DATE: OCT. 2025
PROJECT NO.: 2254561

PROJECT NAME: **716 SPORTS BUILDING COMPLEX**
330 MAPLE ROAD, BUFFALO, NY 14221

DRAWING NUMBER: **A-2**

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
La	Lakemont silt loam, 0 to 3 percent slopes	0.0	0.0%
Od	Odessa silt loam, 0 to 3 percent slopes	19.4	80.3%
SaA	Schoharie silt loam, 0 to 3 percent slopes	4.8	19.7%
Totals for Area of Interest		**24.2**	**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

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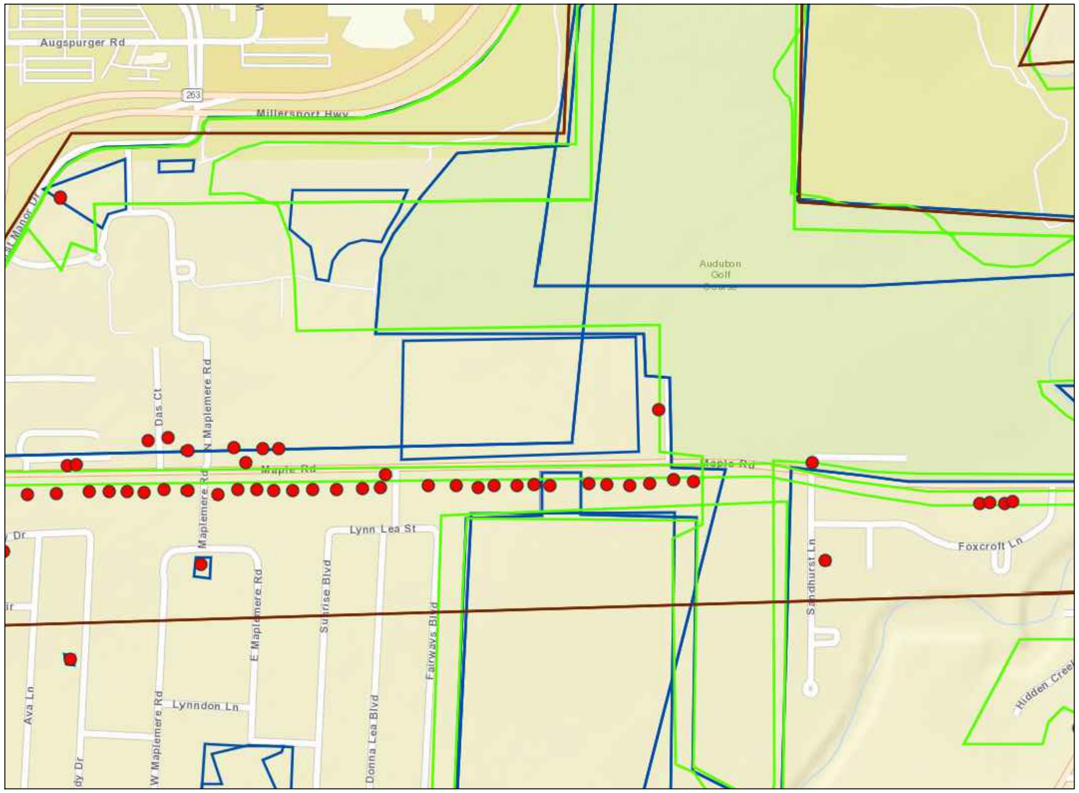

Consultation Projects (View)

Archeologically Sensitive Areas

Survey Building Areas (View)

LPC Historic Districts

USN Building Points (View)

- Eligible
- Listed
- Not Eligible
- Not Eligible - Demolished
- Undetermined

LPC Landmarks

Survey Archaeology Areas (View)

National Register Building Sites (View)

USN Building Districts (View)

Cemeteries

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DRAWING NAME:
HISTORIC PLACES SCREENING MAP

DRAWN BY:	DATE:	PROJECT NO.:
--	OCT. 2025	2254561

PROJECT NAME:
716 SPORTS BUILDING COMPLEX
330 MAPLE ROAD, BUFFALO, NY 14221

DRAWING NUMBER:
A-3

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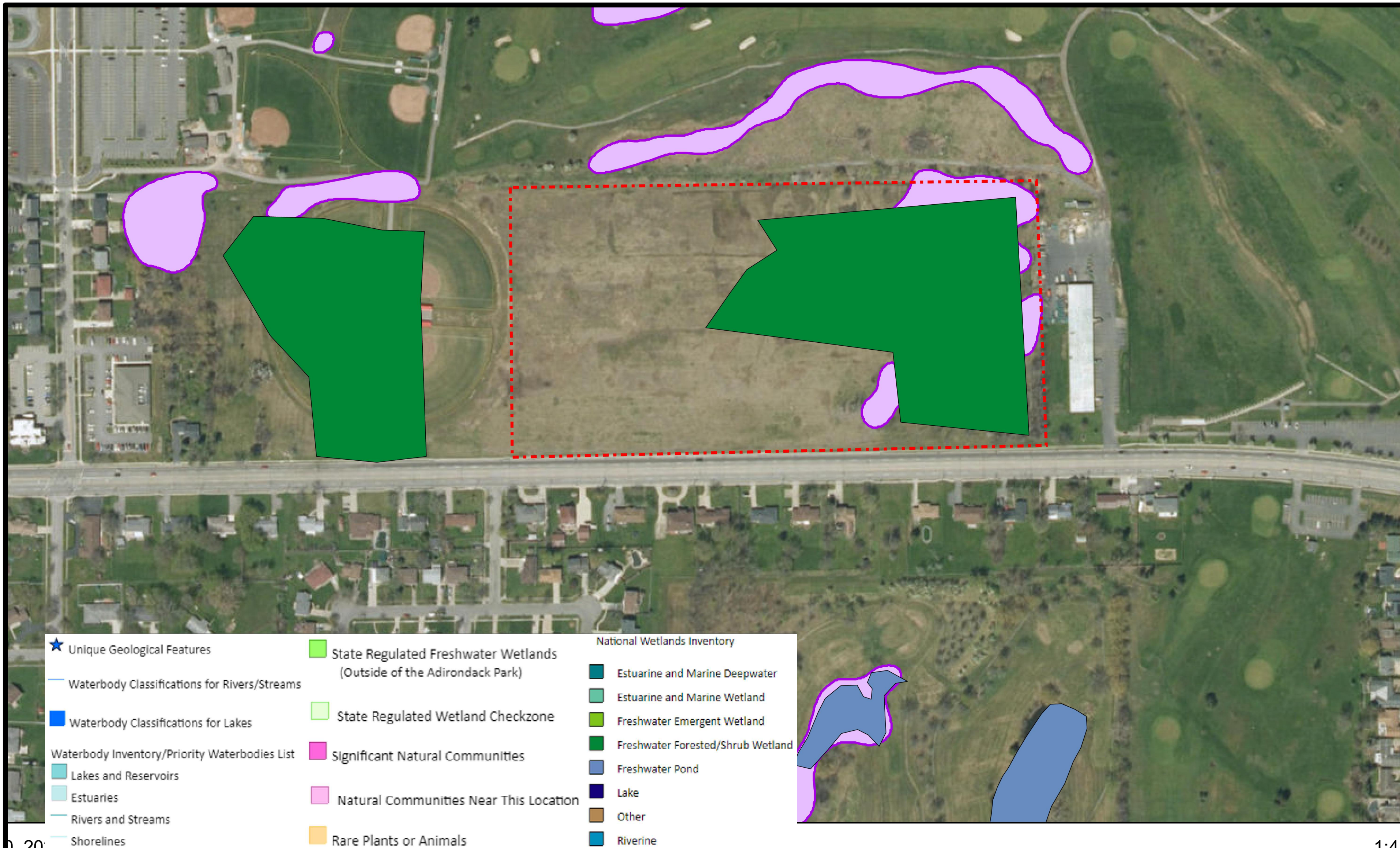

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DRAWING NAME: **ENVIRONMENTAL RESOURCE MAP**

DRAWN BY: --

DATE: OCT. 2025

PROJECT NO.: 2254561

PROJECT NAME: **716 SPORTS BUILDING COMPLEX**
330 MAPLE ROAD, BUFFALO, NY 14221

DRAWING NUMBER: **A-4**

National Flood Hazard Layer FIRMette

FEMA

78°47'W 42°59'46"N

0 250 500 1,000 1,500 2,000 Feet

1:6,000

78°46'22"W 42°59'19"N

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 / 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation
- Coastal Transect
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 10/2/2025 at 6:24 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

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DATE: OCT. 2025

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PROJECT NAME: **716 SPORTS BUILDING COMPLEX**
330 MAPLE ROAD, BUFFALO, NY 14221

DRAWING NUMBER: **A-6**

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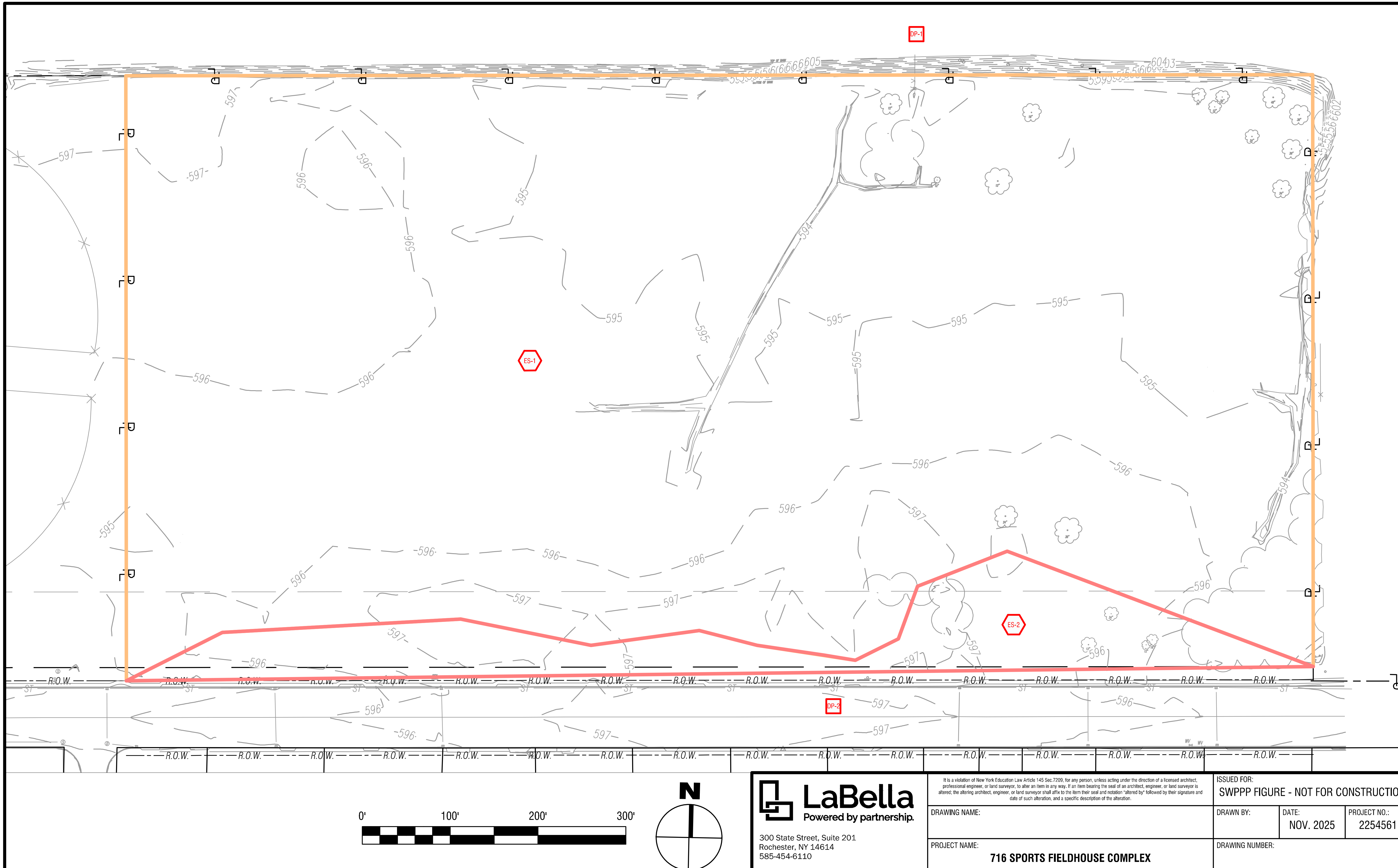

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PROJECT NO.: 2254561

PROJECT NAME:

716 SPORTS FIELDHOUSE COMPLEX

330 MAPLE ROAD, BUFFALO, NY 14221

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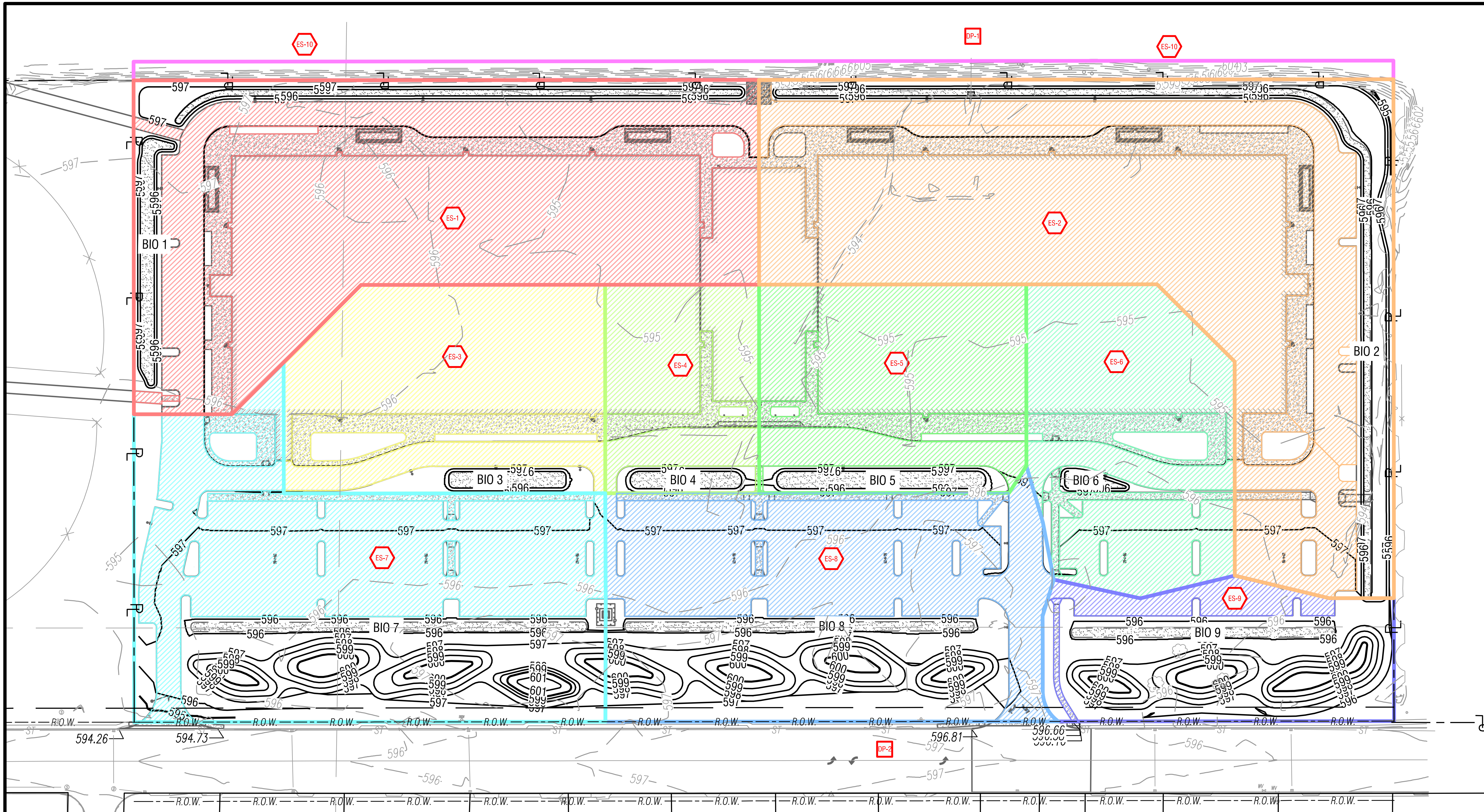

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DATE: NOV. 2025

PROJECT NO.: 2254561

PROJECT NAME:
716 SPORTS FIELDHOUSE COMPLEX
330 MAPLE ROAD, BUFFALO, NY 14221

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APPENDIX C:
PROJECT EVALUATION AND DESIGN CALCULATIONS

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Step 2 - Calculate Water Quality Volume

Is this project subject to Section 4.3 of the NYS Design Manual for Enhanced Phosphorus Removal?						No
What is the nature of this construction project?			New Construction			
Design Point:	1		*Enter 90% Rainfall Event as P*			
P=	1.00	inches				

Calculate Required WQv						
Drainage Area Number	**Contributing Area** (Acres)	**Impervious Area** (Acres)	**Percent Impervious** %	**Rv**	**WQv** (cf)	**SMP Description**
1	3.93	3.26	83	0.80	11,364	
2	4.80	3.81	79	0.76	13,318	
3	1.70	1.45	85	0.82	5,046	
4	0.85	0.74	87	0.83	2,572	
5	1.46	1.26	86	0.83	4,381	
6	1.54	1.39	90	0.86	4,821	
7	3.19	1.74	55	0.54	6,264	
8	2.66	1.43	54	0.53	5,155	
9	1.21	0.21	17	0.21	906	
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						
Total	21.34	15.29	72	0.69	**53826**	**Required WQv**

Filtration Bioretention (F-5)

Design Point:	1

Enter Site Data For Drainage Area to be Treated by Practice							
Drainage Area Number	**Contributing Area** (Acres)	**Impervious Area** (Acres)	**Percent Impervious** %	**Rv**	**WQv** (cf)	**Precipitation** (in)	**Description**
1	3.93	3.26	83	0.80	11,364	1.00	0

Design Criteria		
Enter underlying soil infiltration rate (based on geotechnical testing, refer to Appendix D)	0	Underdrains required
Is the contributing area to the practice a stormwater hotspot?	No	
Is the practice the first in series for treatment of a Level 1 (Infiltration Restricted) hotspot?	No	
Is contributing area greater than max. contributing area?	No	
Enter depth to seasonal high water table (ft)	6	
Enter depth to bedrock (ft)	6	
Is pretreatment provided, in conformance with Section 6.4.3.1	Yes	
Enter average height of ponding (ft)	0.5	
Enter depth of surface layer (inches)	3	
Enter depth of filter media (ft)	2.5	
Enter depth of drainage layer (inches)	10	
Enter slope of maintenance access (%)	1	
Enter width of maintenance access (ft)	12	

Sizing Criteria				
		Value	Units	Notes
Permeability Flow Rate	k	1	ft/day	
Filter Time	tf	2	days	
Required Filter Area	Af	4735	sf	
Enter Provided Filter Area	Af	8330	sf	
Recalculated Water Quality Volume (based on provided filter area)	WQv calc	19992	cf	

Calculate Runoff Reduction			
RRv Provided	**7,997**	***cf***	
WQv Treated	3367	cf	This is the portion of the WQv that is not reduced in the practice.

Filtration Bioretention (F-5)

Design Point:	1						
Enter Site Data For Drainage Area to be Treated by Practice							
Drainage Area Number	**Contributing Area** (Acres)	**Impervious Area** (Acres)	**Percent Impervious** %	**Rv**	**WQv** (cf)	**Precipitation** (in)	**Description**
2	4.80	3.81	79	0.76	13,318	1.00	0

Design Criteria		
Enter underlying soil infiltration rate (based on geotechnical testing, refer to Appendix D)	0	Underdrains required
Is the contributing area to the practice a stormwater hotspot?	No	
Is the practice the first in series for treatment of a Level 1 (Infiltration Restricted) hotspot?	No	
Is contributing area greater than max. contributing area?	No	
Enter depth to seasonal high water table (ft)	6	
Enter depth to bedrock (ft)	6	
Is pretreatment provided, in conformance with Section 6.4.3.1	Yes	
Enter average height of ponding (ft)	0.5	
Enter depth of surface layer (inches)	3	
Enter depth of filter media (ft)	2.5	
Enter depth of drainage layer (inches)	10	
Enter slope of maintenance access (%)	1	
Enter width of maintenance access (ft)	12	

Sizing Criteria				
		Value	Units	Notes
Permeability Flow Rate	k	1	ft/day	
Filter Time	tf	2	days	
Required Filter Area	Af	5549	sf	
Enter Provided Filter Area	Af	7855	sf	
Recalculated Water Quality Volume (based on provided filter area)	WQv calc	18852	cf	

Calculate Runoff Reduction			
RRv Provided	**7,541**	***cf***	
WQv Treated	5777	cf	This is the portion of the WQv that is not reduced in the practice.

Filtration Bioretention (F-5)

Design Point:	1

Enter Site Data For Drainage Area to be Treated by Practice							
Drainage Area Number	**Contributing Area** (Acres)	**Impervious Area** (Acres)	**Percent Impervious** %	**Rv**	**WQv** (cf)	**Precipitation** (in)	**Description**
3	1.70	1.45	85	0.82	5,046	1.00	0

Design Criteria		
Enter underlying soil infiltration rate (based on geotechnical testing, refer to Appendix D)	0	Underdrains required
Is the contributing area to the practice a stormwater hotspot?	No	
Is the practice the first in series for treatment of a Level 1 (Infiltration Restricted) hotspot?	No	
Is contributing area greater than max. contributing area?	No	
Enter depth to seasonal high water table (ft)	6	
Enter depth to bedrock (ft)	6	
Is pretreatment provided, in conformance with Section 6.4.3.1	Yes	
Enter average height of ponding (ft)	0.5	
Enter depth of surface layer (inches)	3	
Enter depth of filter media (ft)	2.5	
Enter depth of drainage layer (inches)	10	
Enter slope of maintenance access (%)	1	
Enter width of maintenance access (ft)	12	

Sizing Criteria				
		Value	Units	Notes
Permeability Flow Rate	k	1	ft/day	
Filter Time	tf	2	days	
Required Filter Area	Af	2103	sf	
Enter Provided Filter Area	Af	2103	sf	
Recalculated Water Quality Volume (based on provided filter area)	WQv calc	5047.2	cf	

Calculate Runoff Reduction			
RRv Provided	**2,019**	***cf***	
WQv Treated	3027	cf	This is the portion of the WQv that is not reduced in the practice.

Filtration Bioretention (F-5)

Design Point:	**1**						
Enter Site Data For Drainage Area to be Treated by Practice							
Drainage Area Number	**Contributing Area** (Acres)	**Impervious Area** (Acres)	**Percent Impervious** %	**Rv**	**WQv** (cf)	**Precipitation** (in)	**Description**
4	0.85	0.74	87	0.83	2,572	1.00	0
Design Criteria							
Enter underlying soil infiltration rate (based on geotechnical testing, refer to Appendix D)			0	Underdrains required			
Is the contributing area to the practice a stormwater hotspot?			No				
Is the practice the first in series for treatment of a Level 1 (Infiltration Restricted) hotspot?			No				
Is contributing area greater than max. contributing area?			No				
Enter depth to seasonal high water table (ft)			6				
Enter depth to bedrock (ft)			6				
Is pretreatment provided, in conformance with Section 6.4.3.1			Yes				
Enter average height of ponding (ft)			0.5				
Enter depth of surface layer (inches)			3				
Enter depth of filter media (ft)			2.5				
Enter depth of drainage layer (inches)			10				
Enter slope of maintenance access (%)			1				
Enter width of maintenance access (ft)			12				
Sizing Criteria							
				Value	Units	Notes	
Permeability Flow Rate			k	1	ft/day		
Filter Time			tf	2	days		
Required Filter Area			Af	1072	sf		
Enter Provided Filter Area			Af	2080	sf		
Recalculated Water Quality Volume (based on provided filter area)			WQv calc	4992	cf		
Calculate Runoff Reduction							
RRv Provided		**1,997**	***cf***				
WQv Treated		575	cf	This is the portion of the WQv that is not reduced in the practice.			

Filtration Bioretention (F-5)

Design Point:	1

Enter Site Data For Drainage Area to be Treated by Practice							
Drainage Area Number	**Contributing Area** (Acres)	**Impervious Area** (Acres)	**Percent Impervious** %	**Rv**	**WQv** (cf)	**Precipitation** (in)	**Description**
5	1.46	1.26	86	0.83	4,381	1.00	0

Design Criteria		
Enter underlying soil infiltration rate (based on geotechnical testing, refer to Appendix D)	0	Underdrains required
Is the contributing area to the practice a stormwater hotspot?	No	
Is the practice the first in series for treatment of a Level 1 (Infiltration Restricted) hotspot?	No	
Is contributing area greater than max. contributing area?	No	
Enter depth to seasonal high water table (ft)	6	
Enter depth to bedrock (ft)	6	
Is pretreatment provided, in conformance with Section 6.4.3.1	Yes	
Enter average height of ponding (ft)	0.5	
Enter depth of surface layer (inches)	3	
Enter depth of filter media (ft)	2.5	
Enter depth of drainage layer (inches)	10	
Enter slope of maintenance access (%)	1	
Enter width of maintenance access (ft)	12	

Sizing Criteria				
		Value	Units	Notes
Permeability Flow Rate	k	1	ft/day	
Filter Time	tf	2	days	
Required Filter Area	Af	1825	sf	
Enter Provided Filter Area	Af	3962	sf	
Recalculated Water Quality Volume (based on provided filter area)	WQv calc	9508.8	cf	

Calculate Runoff Reduction			
RRv Provided	**3,804**	***cf***	
WQv Treated	577	cf	This is the portion of the WQv that is not reduced in the practice.

Filtration Bioretention (F-5)

Design Point:	1						
Enter Site Data For Drainage Area to be Treated by Practice							
Drainage Area Number	**Contributing Area** (Acres)	**Impervious Area** (Acres)	**Percent Impervious** %	**Rv**	**WQv** (cf)	**Precipitation** (in)	**Description**
6	1.54	1.39	90	0.86	4,821	1.00	0

Design Criteria		
Enter underlying soil infiltration rate (based on geotechnical testing, refer to Appendix D)	0	Underdrains required
Is the contributing area to the practice a stormwater hotspot?	No	
Is the practice the first in series for treatment of a Level 1 (Infiltration Restricted) hotspot?	No	
Is contributing area greater than max. contributing area?	No	
Enter depth to seasonal high water table (ft)	6	
Enter depth to bedrock (ft)	6	
Is pretreatment provided, in conformance with Section 6.4.3.1	Yes	
Enter average height of ponding (ft)	0.5	
Enter depth of surface layer (inches)	3	
Enter depth of filter media (ft)	2.5	
Enter depth of drainage layer (inches)	10	
Enter slope of maintenance access (%)	1	
Enter width of maintenance access (ft)	12	

Sizing Criteria				
		Value	Units	Notes
Permeability Flow Rate	k	1	ft/day	
Filter Time	tf	2	days	
Required Filter Area	Af	2009	sf	
Enter Provided Filter Area	Af	2009	sf	
Recalculated Water Quality Volume (based on provided filter area)	WQv calc	4821.6	cf	

Calculate Runoff Reduction			
RRv Provided	**1,929**	***cf***	
WQv Treated	2892	cf	This is the portion of the WQv that is not reduced in the practice.

Filtration Bioretention (F-5)

Design Point:	1

Drainage Area Number	Contributing Area (Acres)	Impervious Area (Acres)	Percent Impervious %	Rv	WQv (cf)	Precipitation (in)	Description
Enter Site Data For Drainage Area to be Treated by Practice							
7	3.19	1.74	55	0.54	6,264	1.00	0

Design Criteria		
Enter underlying soil infiltration rate (based on geotechnical testing, refer to Appendix D)	0	Underdrains required
Is the contributing area to the practice a stormwater hotspot?	No	
Is the practice the first in series for treatment of a Level 1 (Infiltration Restricted) hotspot?	No	
Is contributing area greater than max. contributing area?	No	
Enter depth to seasonal high water table (ft)	6	
Enter depth to bedrock (ft)	6	
Is pretreatment provided, in conformance with Section 6.4.3.1	Yes	
Enter average height of ponding (ft)	0.5	
Enter depth of surface layer (inches)	3	
Enter depth of filter media (ft)	2.5	
Enter depth of drainage layer (inches)	10	
Enter slope of maintenance access (%)	1	
Enter width of maintenance access (ft)	12	

Sizing Criteria

		Value	Units	Notes
Permeability Flow Rate	k	1	ft/day	
Filter Time	tf	2	days	
Required Filter Area	Af	2610	sf	
Enter Provided Filter Area	Af	4200	sf	
Recalculated Water Quality Volume (based on provided filter area)	WQv calc	10080	cf	

Calculate Runoff Reduction

RRv Provided	**4,032**	***cf***	
WQv Treated	2232	cf	This is the portion of the WQv that is not reduced in the practice.

Filtration Bioretention (F-5)

Design Point:	1

Enter Site Data For Drainage Area to be Treated by Practice							
Drainage Area Number	**Contributing Area** (Acres)	**Impervious Area** (Acres)	**Percent Impervious** %	**Rv**	**WQv** (cf)	**Precipitation** (in)	**Description**
8	2.66	1.43	54	0.53	5,155	1.00	0

Design Criteria		
Enter underlying soil infiltration rate (based on geotechnical testing, refer to Appendix D)	0	Underdrains required
Is the contributing area to the practice a stormwater hotspot?	No	
Is the practice the first in series for treatment of a Level 1 (Infiltration Restricted) hotspot?	No	
Is contributing area greater than max. contributing area?	No	
Enter depth to seasonal high water table (ft)	6	
Enter depth to bedrock (ft)	6	
Is pretreatment provided, in conformance with Section 6.4.3.1	Yes	
Enter average height of ponding (ft)	0.5	
Enter depth of surface layer (inches)	3	
Enter depth of filter media (ft)	2.5	
Enter depth of drainage layer (inches)	10	
Enter slope of maintenance access (%)	1	
Enter width of maintenance access (ft)	12	

Sizing Criteria				
		Value	Units	Notes
Permeability Flow Rate	k	1	ft/day	
Filter Time	tf	2	days	
Required Filter Area	Af	2148	sf	
Enter Provided Filter Area	Af	3700	sf	
Recalculated Water Quality Volume (based on provided filter area)	WQv calc	8880	cf	

Calculate Runoff Reduction			
RRv Provided	**3,552**	***cf***	
WQv Treated	1603	cf	This is the portion of the WQv that is not reduced in the practice.

Filtration Bioretention (F-5)

Design Point:	1

Enter Site Data For Drainage Area to be Treated by Practice							
Drainage Area Number	**Contributing Area** (Acres)	**Impervious Area** (Acres)	**Percent Impervious** %	**Rv**	**WQv** (cf)	**Precipitation** (in)	**Description**
9	1.21	0.21	17	0.21	906	1.00	0

Design Criteria		
Enter underlying soil infiltration rate (based on geotechnical testing, refer to Appendix D)	0	Underdrains required
Is the contributing area to the practice a stormwater hotspot?	No	
Is the practice the first in series for treatment of a Level 1 (Infiltration Restricted) hotspot?	No	
Is contributing area greater than max. contributing area?	No	
Enter depth to seasonal high water table (ft)	6	
Enter depth to bedrock (ft)	6	
Is pretreatment provided, in conformance with Section 6.4.3.1	Yes	
Enter average height of ponding (ft)	0.5	
Enter depth of surface layer (inches)	3	
Enter depth of filter media (ft)	2.5	
Enter depth of drainage layer (inches)	10	
Enter slope of maintenance access (%)	1	
Enter width of maintenance access (ft)	12	

Sizing Criteria				
		Value	Units	Notes
Permeability Flow Rate	k	1	ft/day	
Filter Time	tf	2	days	
Required Filter Area	Af	378	sf	
Enter Provided Filter Area	Af	2800	sf	
Recalculated Water Quality Volume (based on provided filter area)	WQv calc	6720	cf	

Calculate Runoff Reduction			
RRv Provided	**906**	***cf***	
WQv Treated	0	cf	This is the portion of the WQv that is not reduced in the practice.

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APPENDIX D:
PRE-DEVELOPMENT STORMWATER MODELING

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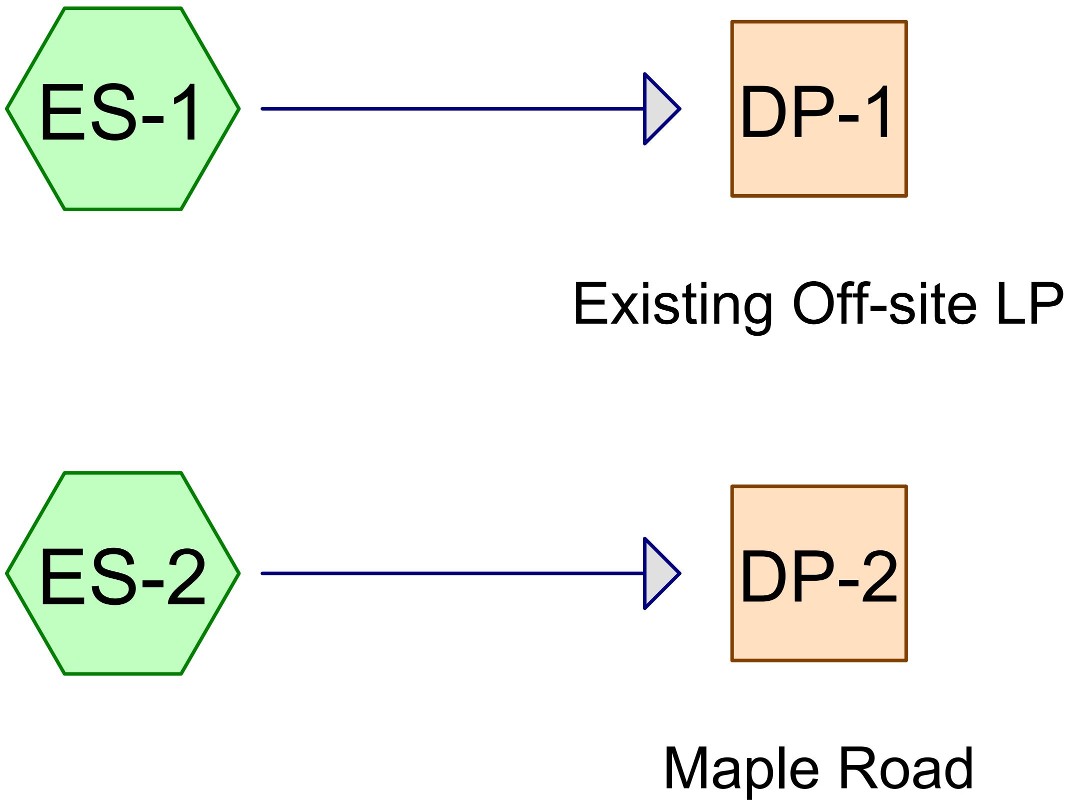
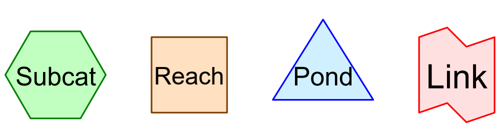




Routing Diagram for D_App D_Pre-Development Model
Prepared by Labella Associates, Printed 11/5/2025
HydroCAD® 10.20-7a s/n 09581 © 2025 HydroCAD Software Solutions LLC

Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	1-yr	NY-Amherst 24-hr S1	1-yr	Default	24.00	1	1.81	2
2	10-yr	NY-Amherst 24-hr S1	10-yr	Default	24.00	1	3.08	2
3	25-yr	NY-Amherst 24-hr S1	25-yr	Default	24.00	1	3.75	2
4	100-yr	NY-Amherst 24-hr S1	100-yr	Default	24.00	1	5.07	2

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
21.300	80	>75% Grass cover, Good, HSG D (ES-1, ES-2)
21.300	**80**	**TOTAL AREA**

Soil Listing (selected nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
21.300	HSG D	ES-1, ES-2
0.000	Other	
21.300		**TOTAL AREA**

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment ES-1: Runoff Area=15.100 ac 0.00% Impervious Runoff Depth=0.45"
Flow Length=700' Tc=47.3 min CN=80 Runoff=3.52 cfs 0.567 af

Subcatchment ES-2: Runoff Area=6.200 ac 0.00% Impervious Runoff Depth=0.45"
Flow Length=700' Tc=47.3 min CN=80 Runoff=1.44 cfs 0.233 af

Reach DP-1: Existing Off-site LP Inflow=3.52 cfs 0.567 af
Outflow=3.52 cfs 0.567 af

Reach DP-2: Maple Road Inflow=1.44 cfs 0.233 af
Outflow=1.44 cfs 0.233 af

Total Runoff Area = 21.300 ac Runoff Volume = 0.799 af Average Runoff Depth = 0.45"
100.00% Pervious = 21.300 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment ES-1:

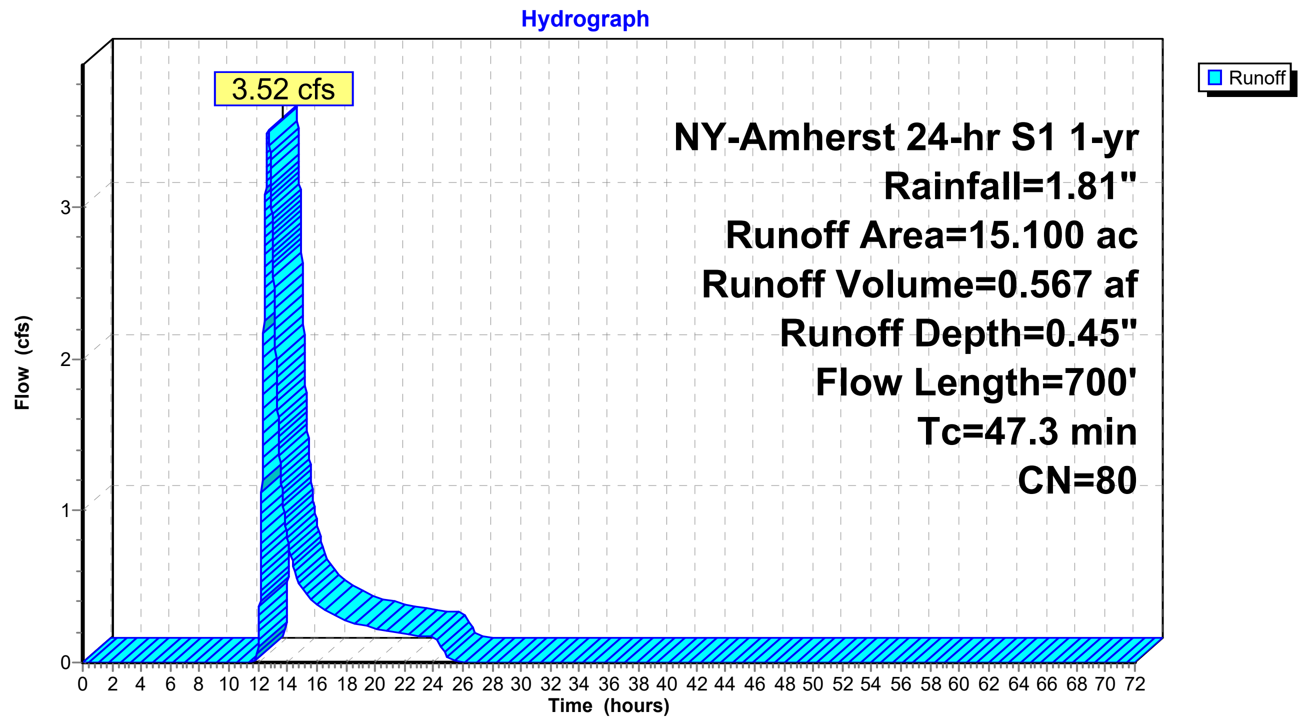
Runoff = 3.52 cfs @ 12.71 hrs, Volume= 0.567 af, Depth= 0.45"
Routed to Reach DP-1 : Existing Off-site LP

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Amherst 24-hr S1 1-yr Rainfall=1.81"

Area (ac)	CN	Description
15.100	80	>75% Grass cover, Good, HSG D
15.100		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.4	100	0.0050	0.07		**Sheet Flow, SF** Grass: Short n= 0.150 P2= 1.86"
24.9	600	0.0033	0.40		**Shallow Concentrated Flow, SCF** Short Grass Pasture Kv= 7.0 fps
47.3	700	Total			

Subcatchment ES-1:



Summary for Subcatchment ES-2:

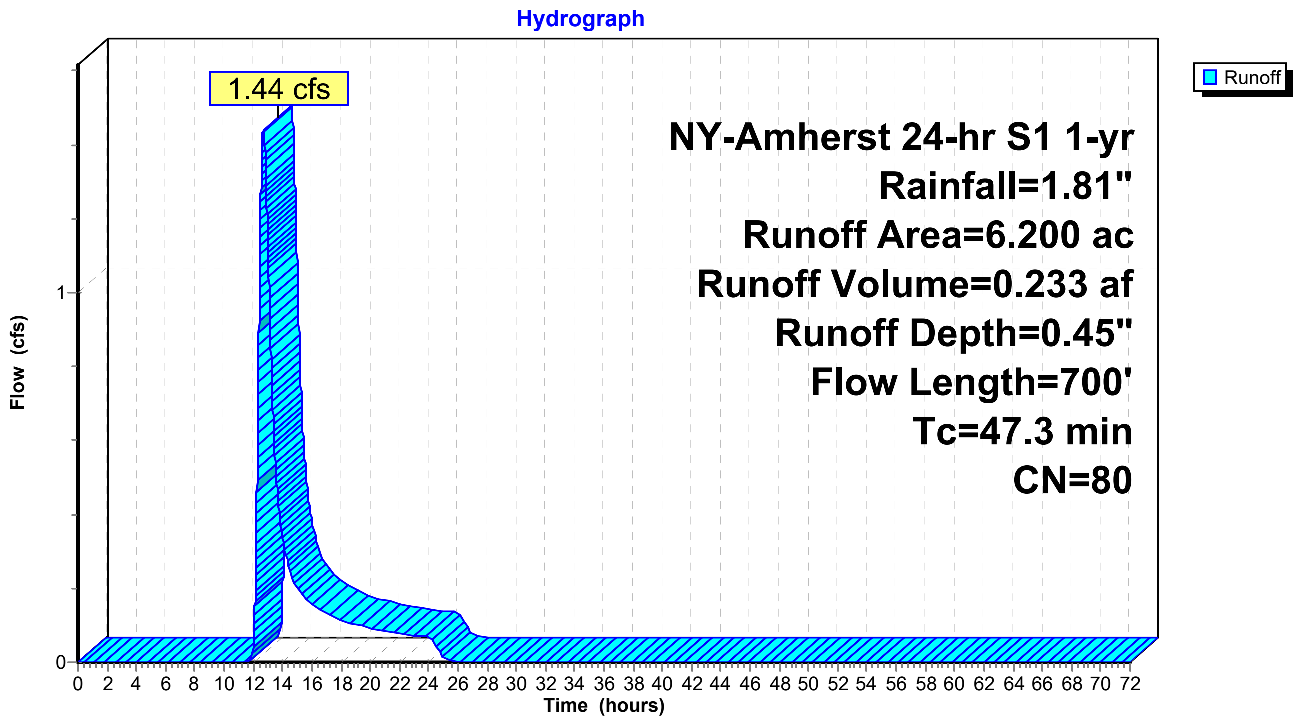
Runoff = 1.44 cfs @ 12.71 hrs, Volume= 0.233 af, Depth= 0.45"
Routed to Reach DP-2 : Maple Road

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Amherst 24-hr S1 1-yr Rainfall=1.81"

Area (ac)	CN	Description
6.200	80	>75% Grass cover, Good, HSG D
6.200		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.4	100	0.0050	0.07		**Sheet Flow, SF** Grass: Short n= 0.150 P2= 1.86"
24.9	600	0.0033	0.40		**Shallow Concentrated Flow, SCF** Short Grass Pasture Kv= 7.0 fps
47.3	700	Total			

Subcatchment ES-2:

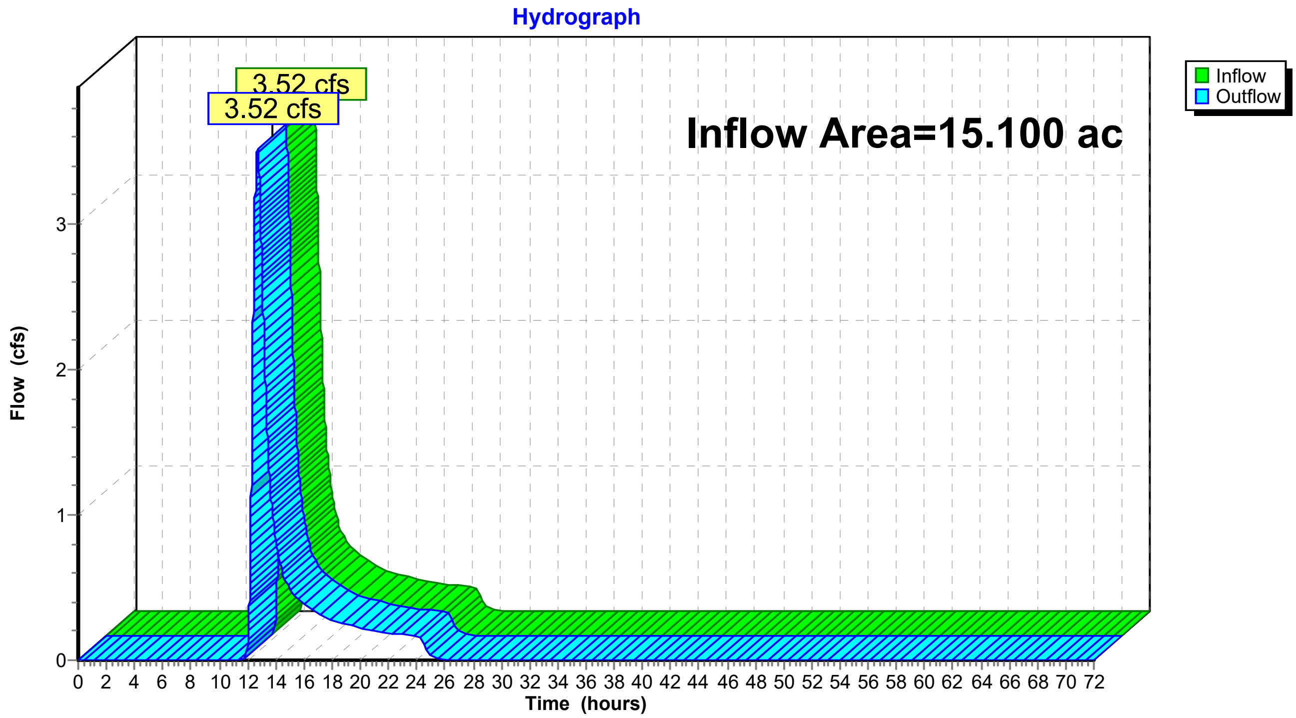


Summary for Reach DP-1: Existing Off-site LP

Inflow Area =	15.100 ac,	0.00% Impervious, Inflow Depth = 0.45"	for 1-yr event	
Inflow =	3.52 cfs @	12.71 hrs, Volume=	0.567 af	
Outflow =	3.52 cfs @	12.71 hrs, Volume=	0.567 af,	Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Reach DP-1: Existing Off-site LP

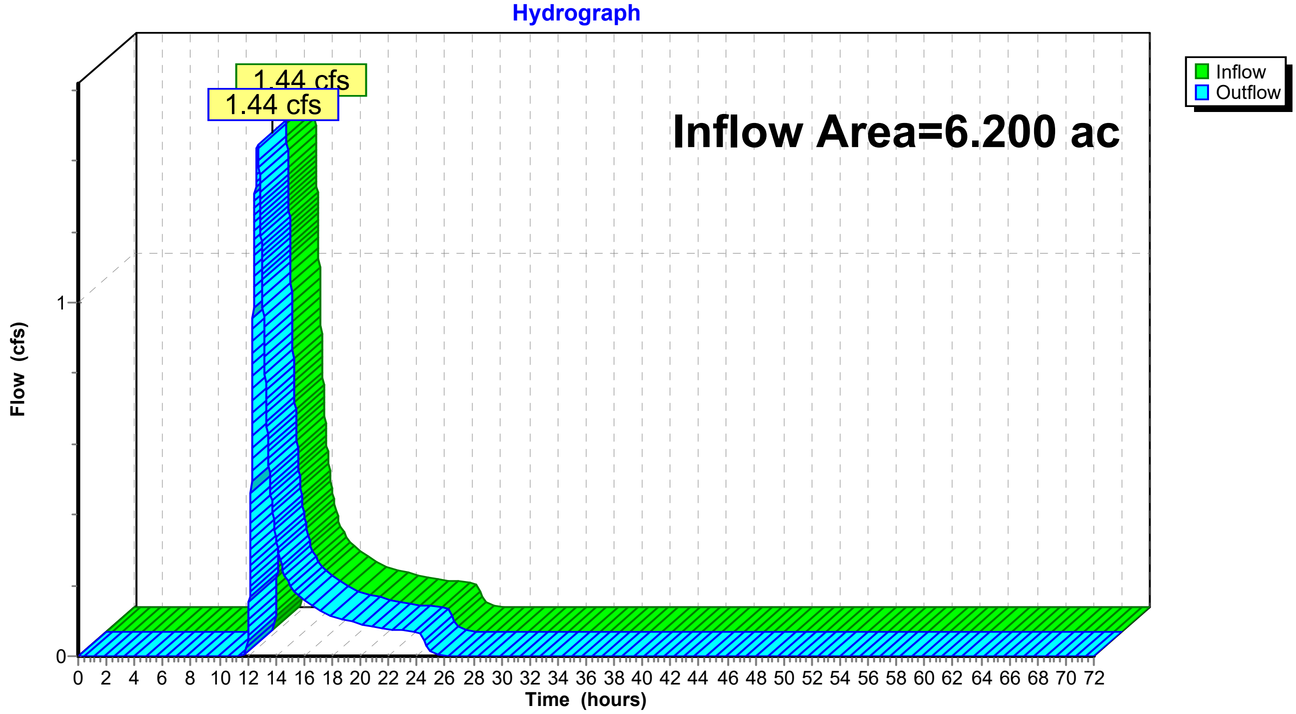


Summary for Reach DP-2: Maple Road

Inflow Area = 6.200 ac, 0.00% Impervious, Inflow Depth = 0.45" for 1-yr event
Inflow = 1.44 cfs @ 12.71 hrs, Volume= 0.233 af
Outflow = 1.44 cfs @ 12.71 hrs, Volume= 0.233 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Reach DP-2: Maple Road



Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentES-1: Runoff Area=15.100 ac 0.00% Impervious Runoff Depth=1.31"
Flow Length=700' Tc=47.3 min CN=80 Runoff=11.38 cfs 1.649 af

SubcatchmentES-2: Runoff Area=6.200 ac 0.00% Impervious Runoff Depth=1.31"
Flow Length=700' Tc=47.3 min CN=80 Runoff=4.67 cfs 0.677 af

Reach DP-1: Existing Off-site LP Inflow=11.38 cfs 1.649 af
Outflow=11.38 cfs 1.649 af

Reach DP-2: Maple Road Inflow=4.67 cfs 0.677 af
Outflow=4.67 cfs 0.677 af

Total Runoff Area = 21.300 ac Runoff Volume = 2.326 af Average Runoff Depth = 1.31"
100.00% Pervious = 21.300 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment ES-1:

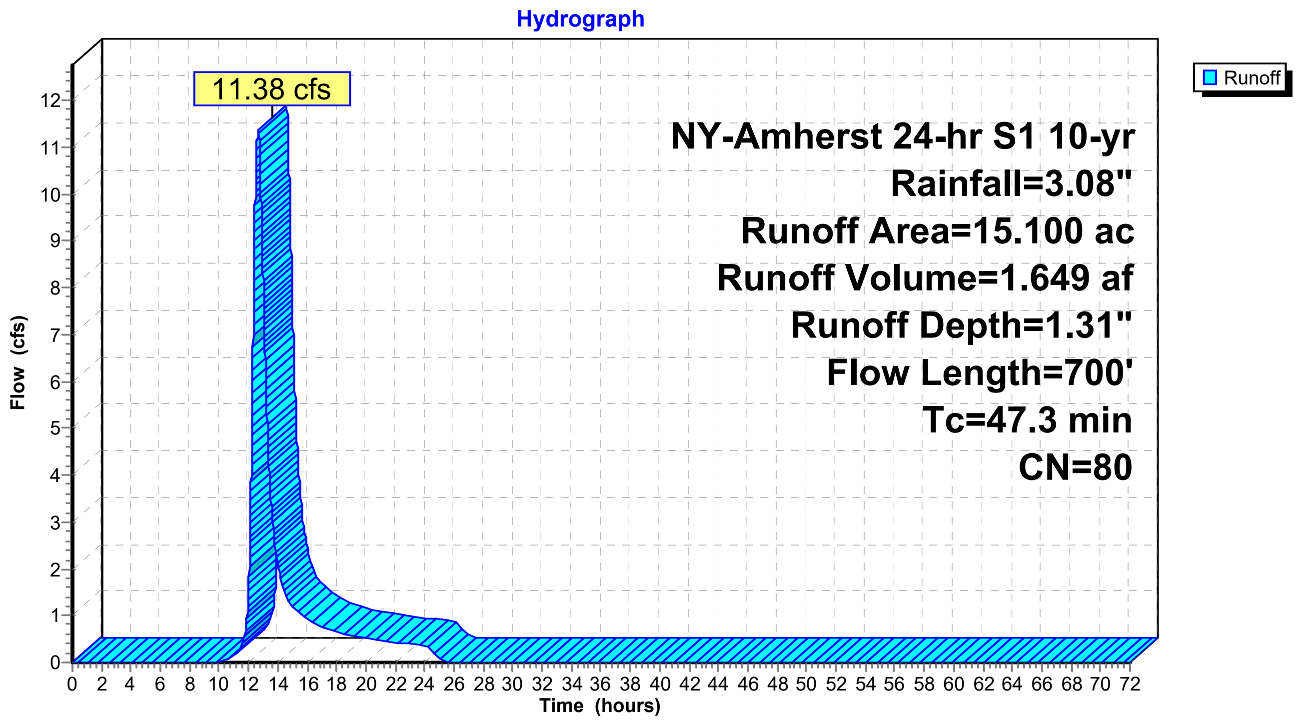
Runoff = 11.38 cfs @ 12.66 hrs, Volume= 1.649 af, Depth= 1.31"
Routed to Reach DP-1 : Existing Off-site LP

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Amherst 24-hr S1 10-yr Rainfall=3.08"

Area (ac)	CN	Description
15.100	80	>75% Grass cover, Good, HSG D
15.100		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.4	100	0.0050	0.07		**Sheet Flow, SF** Grass: Short n= 0.150 P2= 1.86"
24.9	600	0.0033	0.40		**Shallow Concentrated Flow, SCF** Short Grass Pasture Kv= 7.0 fps
47.3	700	Total			

Subcatchment ES-1:



Summary for Subcatchment ES-2:

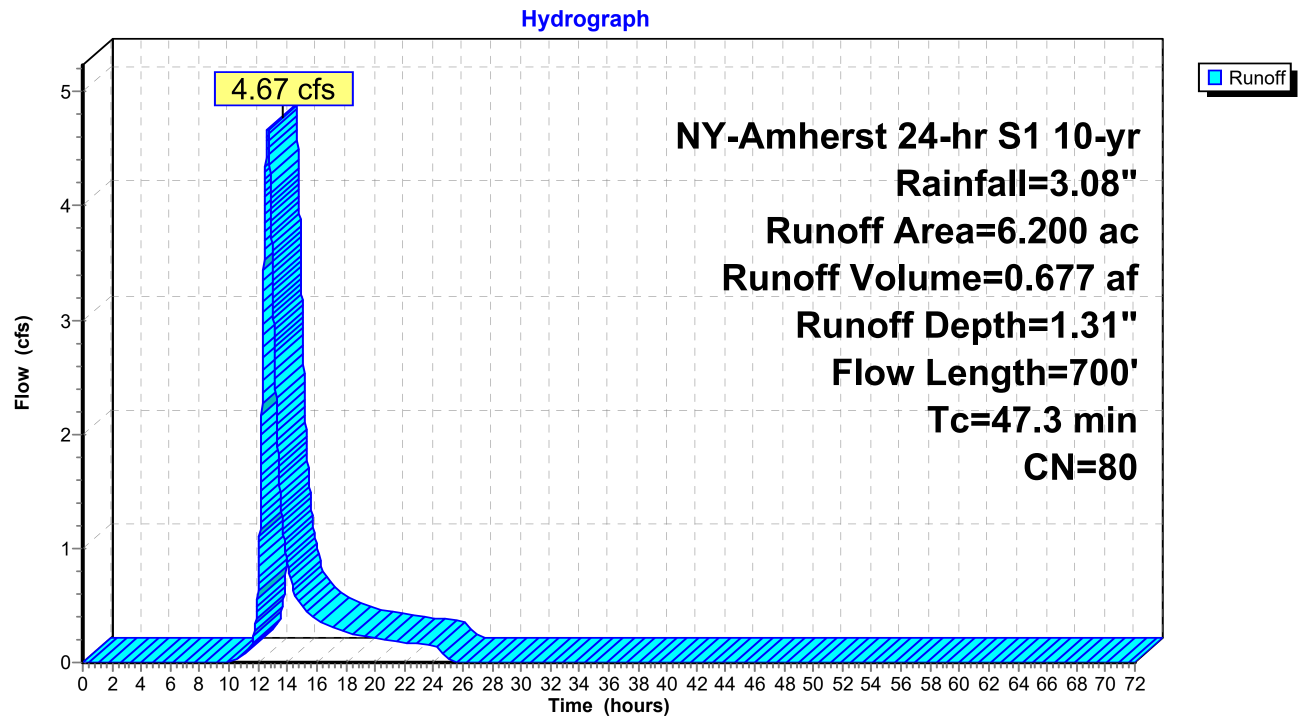
Runoff = 4.67 cfs @ 12.66 hrs, Volume= 0.677 af, Depth= 1.31"
Routed to Reach DP-2 : Maple Road

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Amherst 24-hr S1 10-yr Rainfall=3.08"

Area (ac)	CN	Description
6.200	80	>75% Grass cover, Good, HSG D
6.200		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.4	100	0.0050	0.07		**Sheet Flow, SF** Grass: Short n= 0.150 P2= 1.86"
24.9	600	0.0033	0.40		**Shallow Concentrated Flow, SCF** Short Grass Pasture Kv= 7.0 fps
47.3	700	Total			

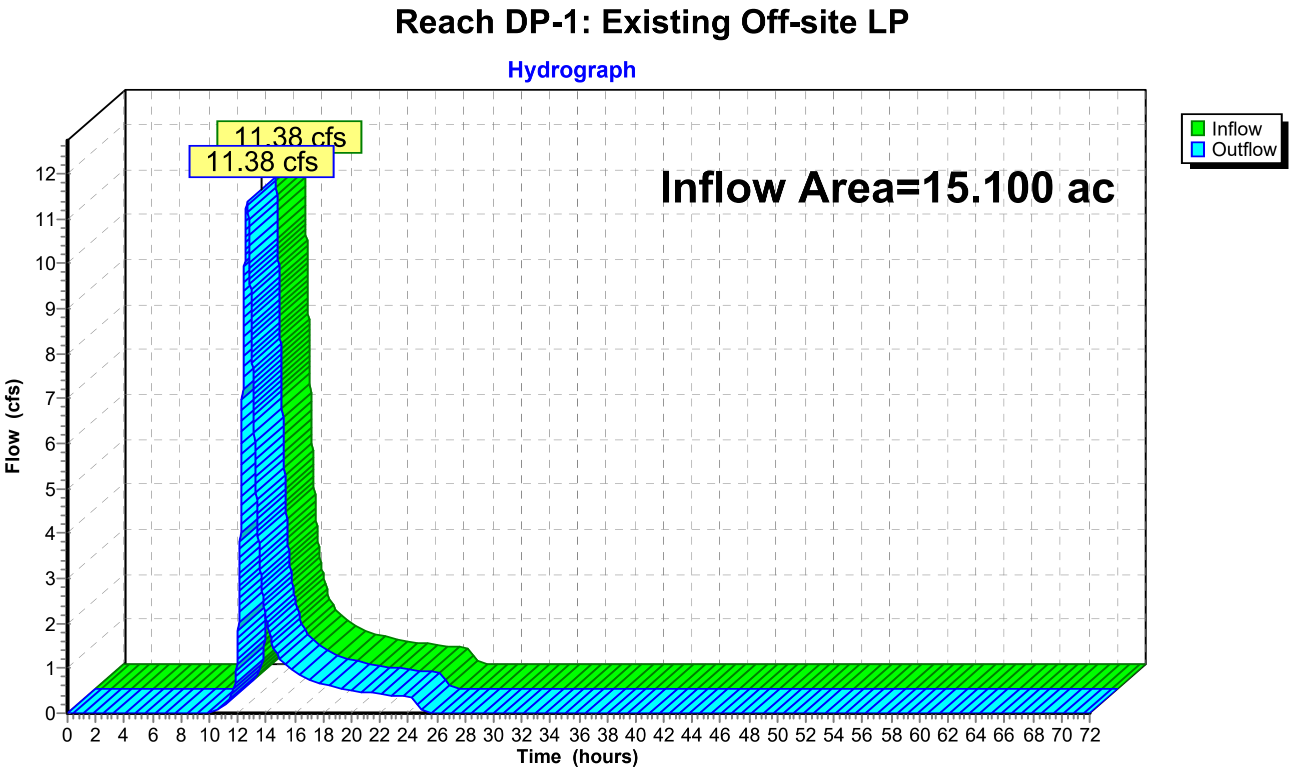
Subcatchment ES-2:



Summary for Reach DP-1: Existing Off-site LP

Inflow Area =	15.100 ac,	0.00% Impervious,	Inflow Depth = 1.31"	for 10-yr event	
Inflow =	11.38 cfs @	12.66 hrs,	Volume=	1.649 af	
Outflow =	11.38 cfs @	12.66 hrs,	Volume=	1.649 af,	Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

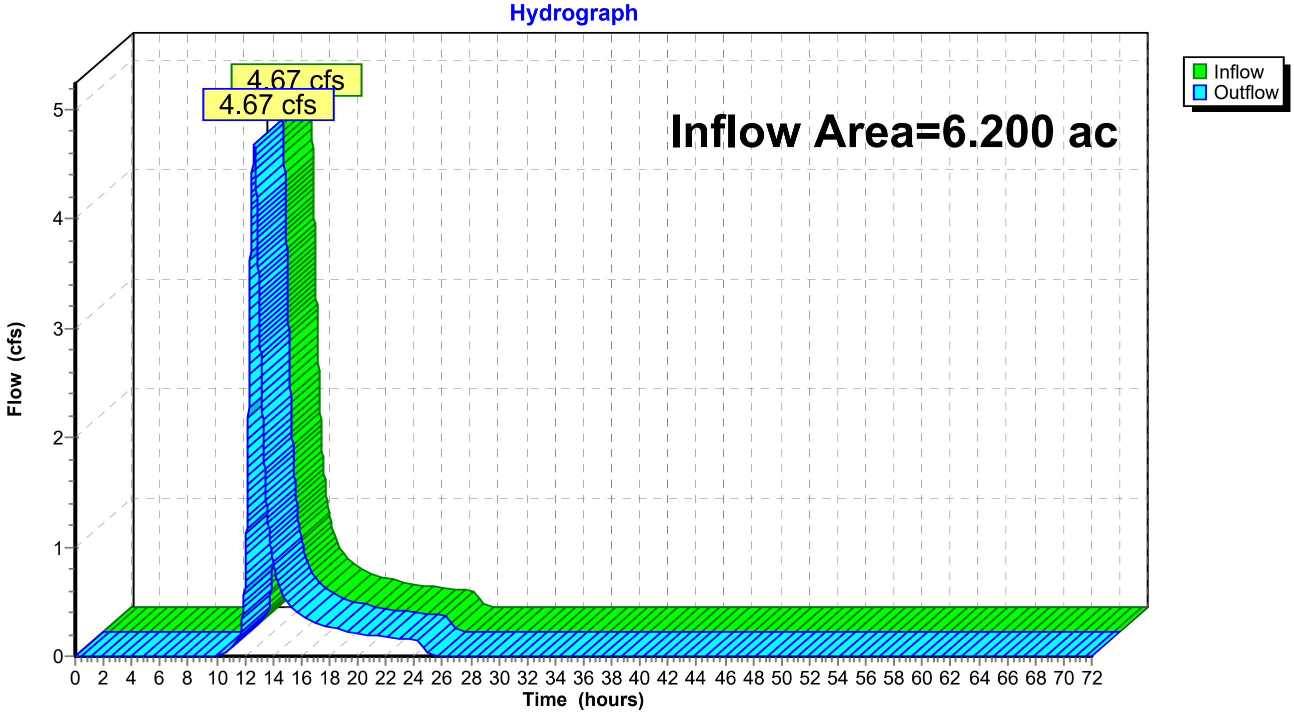


Summary for Reach DP-2: Maple Road

Inflow Area = 6.200 ac, 0.00% Impervious, Inflow Depth = 1.31" for 10-yr event
Inflow = 4.67 cfs @ 12.66 hrs, Volume= 0.677 af
Outflow = 4.67 cfs @ 12.66 hrs, Volume= 0.677 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Reach DP-2: Maple Road



Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentES-1: Runoff Area=15.100 ac 0.00% Impervious Runoff Depth=1.84"
Flow Length=700' Tc=47.3 min CN=80 Runoff=16.52 cfs 2.312 af

SubcatchmentES-2: Runoff Area=6.200 ac 0.00% Impervious Runoff Depth=1.84"
Flow Length=700' Tc=47.3 min CN=80 Runoff=6.78 cfs 0.949 af

Reach DP-1: Existing Off-site LP Inflow=16.52 cfs 2.312 af
Outflow=16.52 cfs 2.312 af

Reach DP-2: Maple Road Inflow=6.78 cfs 0.949 af
Outflow=6.78 cfs 0.949 af

Total Runoff Area = 21.300 ac Runoff Volume = 3.261 af Average Runoff Depth = 1.84"
100.00% Pervious = 21.300 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment ES-1:

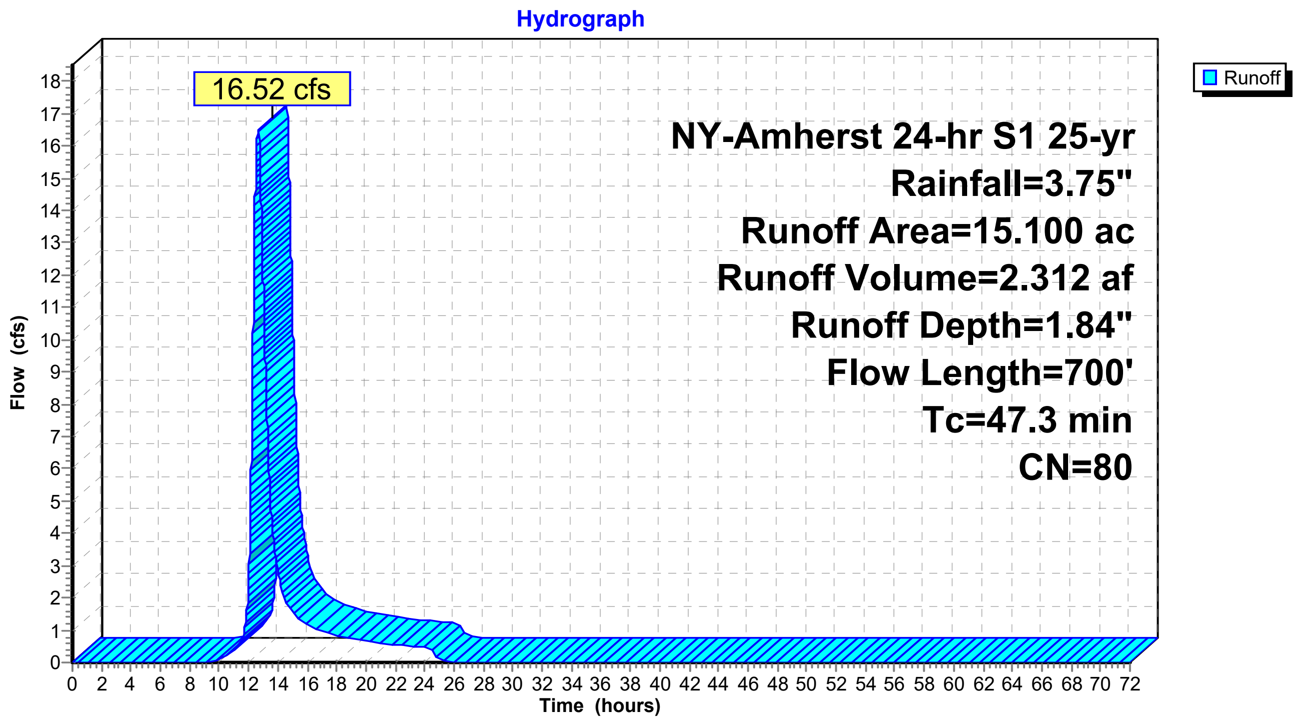
Runoff = 16.52 cfs @ 12.66 hrs, Volume= 2.312 af, Depth= 1.84"
Routed to Reach DP-1 : Existing Off-site LP

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Amherst 24-hr S1 25-yr Rainfall=3.75"

Area (ac)	CN	Description
15.100	80	>75% Grass cover, Good, HSG D
15.100		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.4	100	0.0050	0.07		**Sheet Flow, SF** Grass: Short n= 0.150 P2= 1.86"
24.9	600	0.0033	0.40		**Shallow Concentrated Flow, SCF** Short Grass Pasture Kv= 7.0 fps
47.3	700	Total			

Subcatchment ES-1:



Summary for Subcatchment ES-2:

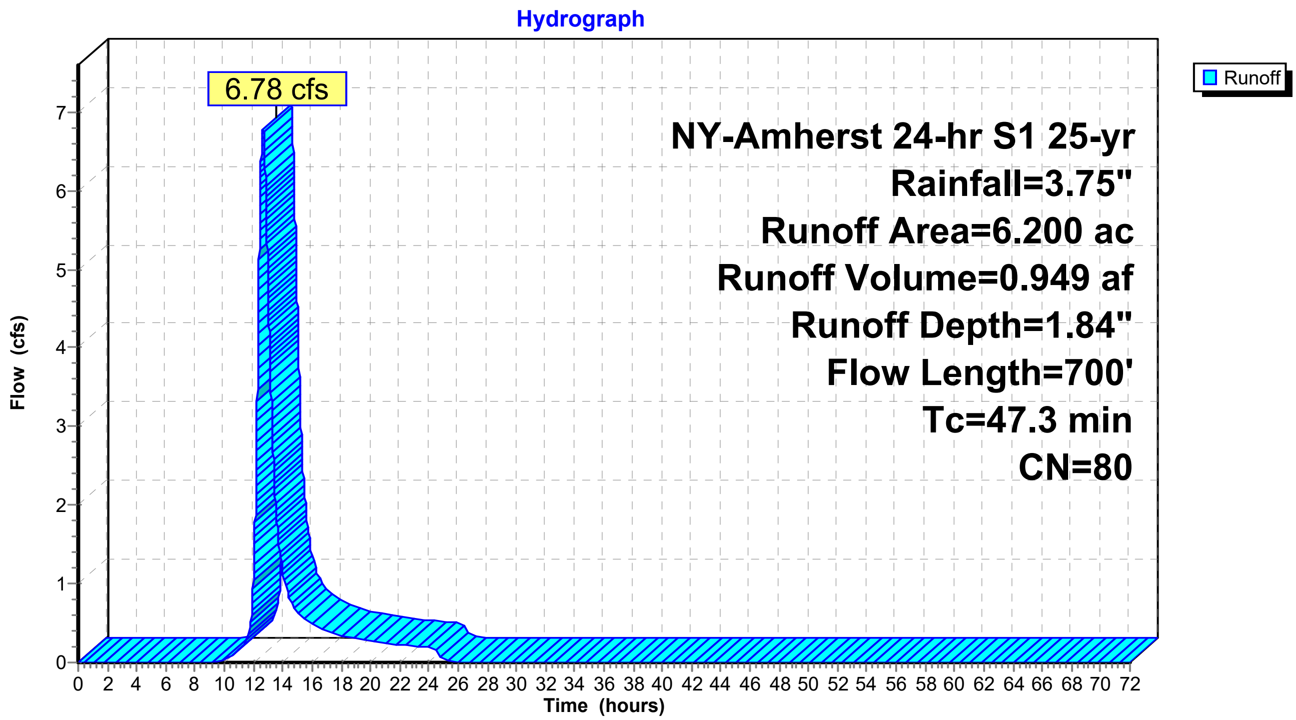
Runoff = 6.78 cfs @ 12.66 hrs, Volume= 0.949 af, Depth= 1.84"
Routed to Reach DP-2 : Maple Road

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Amherst 24-hr S1 25-yr Rainfall=3.75"

Area (ac)	CN	Description
6.200	80	>75% Grass cover, Good, HSG D
6.200		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.4	100	0.0050	0.07		**Sheet Flow, SF** Grass: Short n= 0.150 P2= 1.86"
24.9	600	0.0033	0.40		**Shallow Concentrated Flow, SCF** Short Grass Pasture Kv= 7.0 fps
47.3	700	Total			

Subcatchment ES-2:

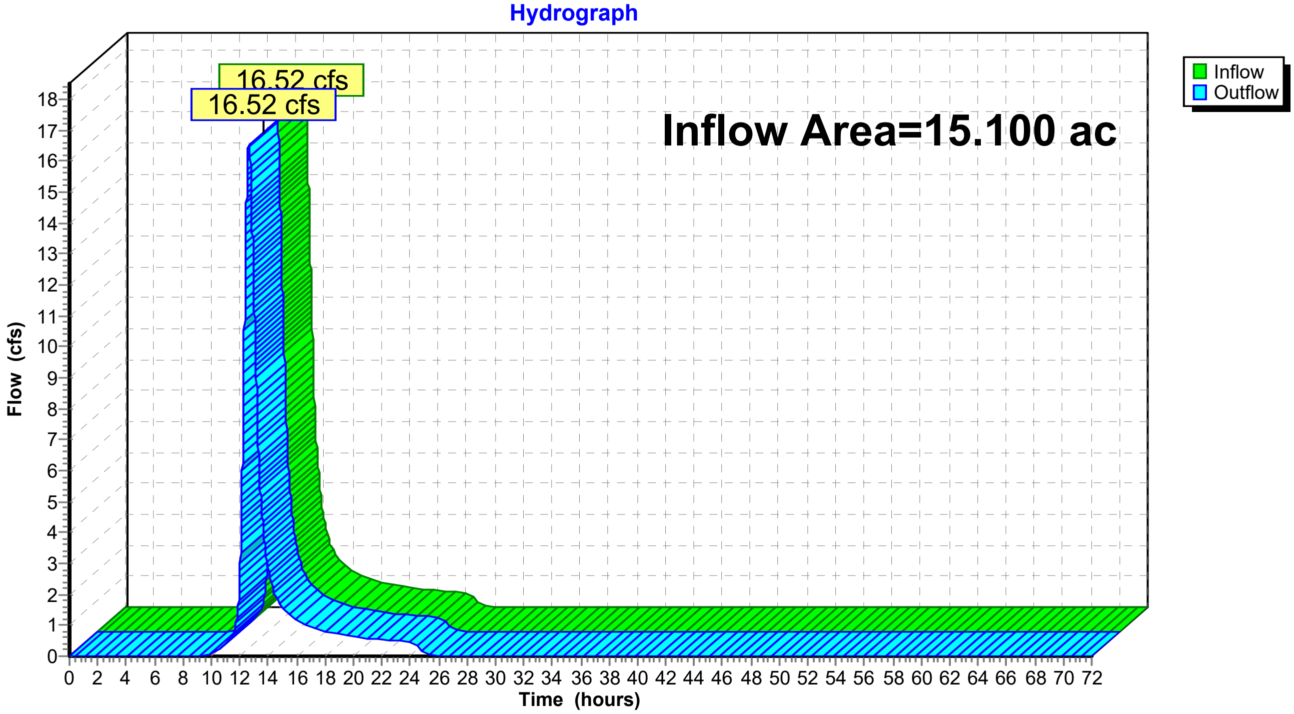


Summary for Reach DP-1: Existing Off-site LP

Inflow Area =	15.100 ac,	0.00% Impervious, Inflow Depth =	1.84"	for 25-yr event
Inflow =	16.52 cfs @	12.66 hrs, Volume=	2.312 af	
Outflow =	16.52 cfs @	12.66 hrs, Volume=	2.312 af,	Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Reach DP-1: Existing Off-site LP

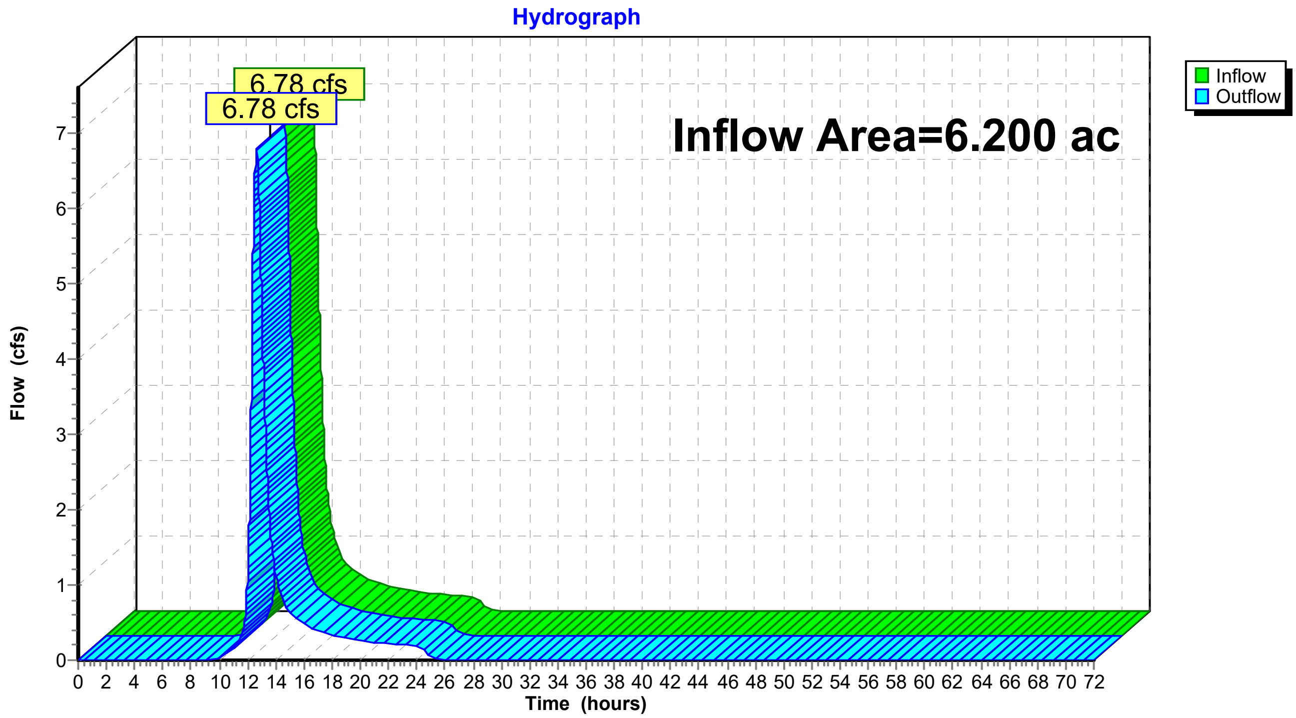


Summary for Reach DP-2: Maple Road

Inflow Area =	6.200 ac,	0.00% Impervious, Inflow Depth = 1.84"	for 25-yr event	
Inflow =	6.78 cfs @	12.66 hrs, Volume=	0.949 af	
Outflow =	6.78 cfs @	12.66 hrs, Volume=	0.949 af,	Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Reach DP-2: Maple Road



Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentES-1: Runoff Area=15.100 ac 0.00% Impervious Runoff Depth=2.95"
Flow Length=700' Tc=47.3 min CN=80 Runoff=27.48 cfs 3.717 af

SubcatchmentES-2: Runoff Area=6.200 ac 0.00% Impervious Runoff Depth=2.95"
Flow Length=700' Tc=47.3 min CN=80 Runoff=11.28 cfs 1.526 af

Reach DP-1: Existing Off-site LP Inflow=27.48 cfs 3.717 af
Outflow=27.48 cfs 3.717 af

Reach DP-2: Maple Road Inflow=11.28 cfs 1.526 af
Outflow=11.28 cfs 1.526 af

Total Runoff Area = 21.300 ac Runoff Volume = 5.243 af Average Runoff Depth = 2.95"
100.00% Pervious = 21.300 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment ES-1:

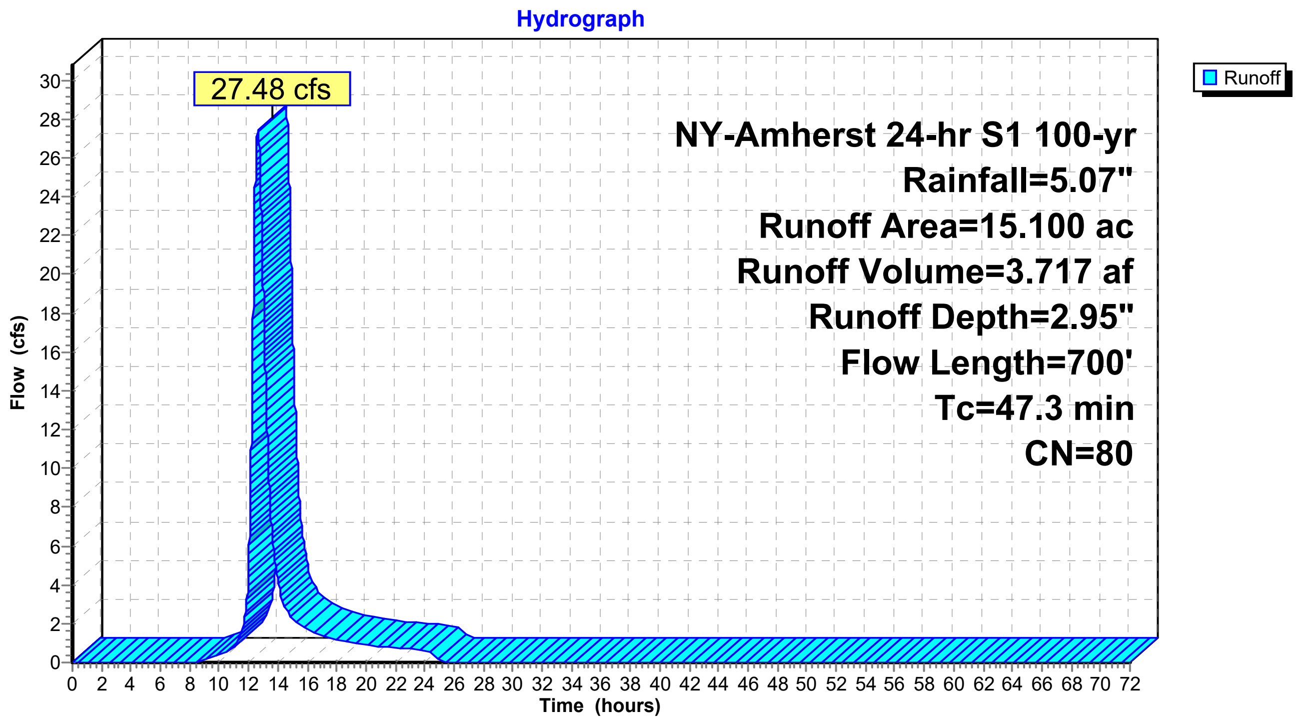
Runoff = 27.48 cfs @ 12.62 hrs, Volume= 3.717 af, Depth= 2.95"
Routed to Reach DP-1 : Existing Off-site LP

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Amherst 24-hr S1 100-yr Rainfall=5.07"

Area (ac)	CN	Description
15.100	80	>75% Grass cover, Good, HSG D
15.100		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.4	100	0.0050	0.07		**Sheet Flow, SF** Grass: Short n= 0.150 P2= 1.86"
24.9	600	0.0033	0.40		**Shallow Concentrated Flow, SCF** Short Grass Pasture Kv= 7.0 fps
47.3	700	Total			

Subcatchment ES-1:



Summary for Subcatchment ES-2:

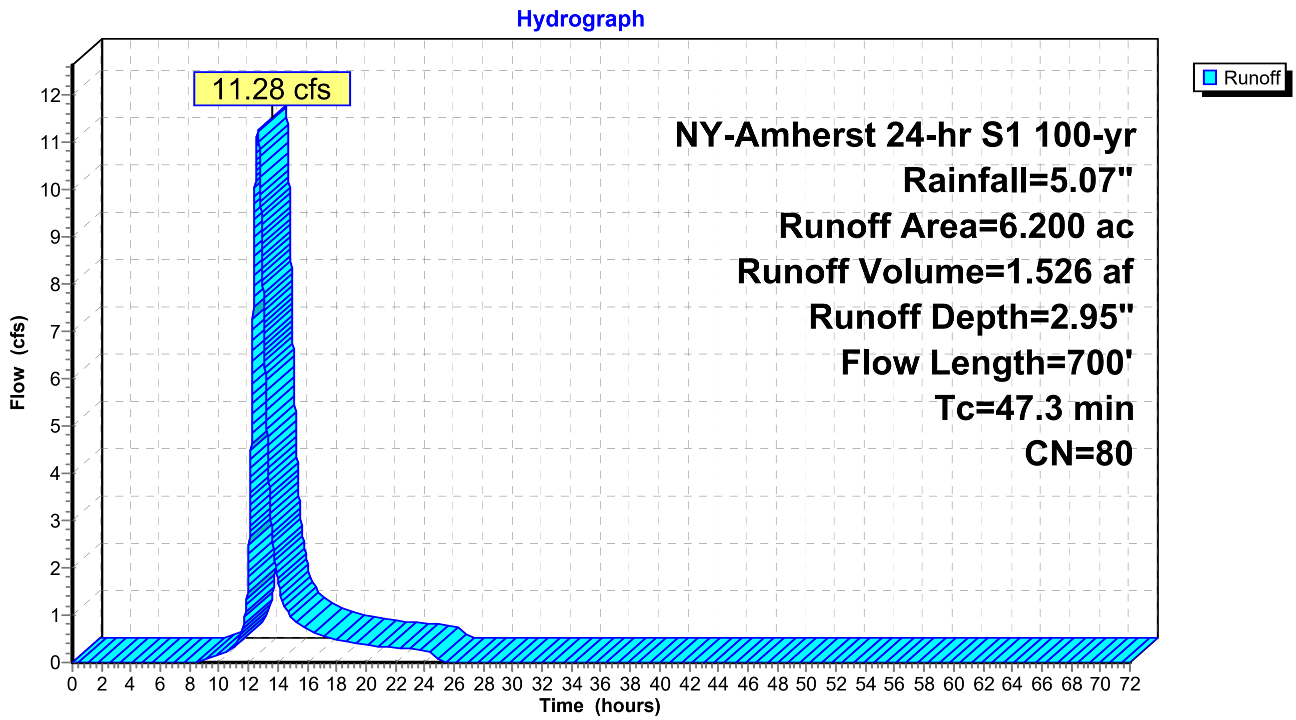
Runoff = 11.28 cfs @ 12.62 hrs, Volume= 1.526 af, Depth= 2.95"
Routed to Reach DP-2 : Maple Road

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Amherst 24-hr S1 100-yr Rainfall=5.07"

Area (ac)	CN	Description
6.200	80	>75% Grass cover, Good, HSG D
6.200		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.4	100	0.0050	0.07		**Sheet Flow, SF** Grass: Short n= 0.150 P2= 1.86"
24.9	600	0.0033	0.40		**Shallow Concentrated Flow, SCF** Short Grass Pasture Kv= 7.0 fps
47.3	700	Total			

Subcatchment ES-2:

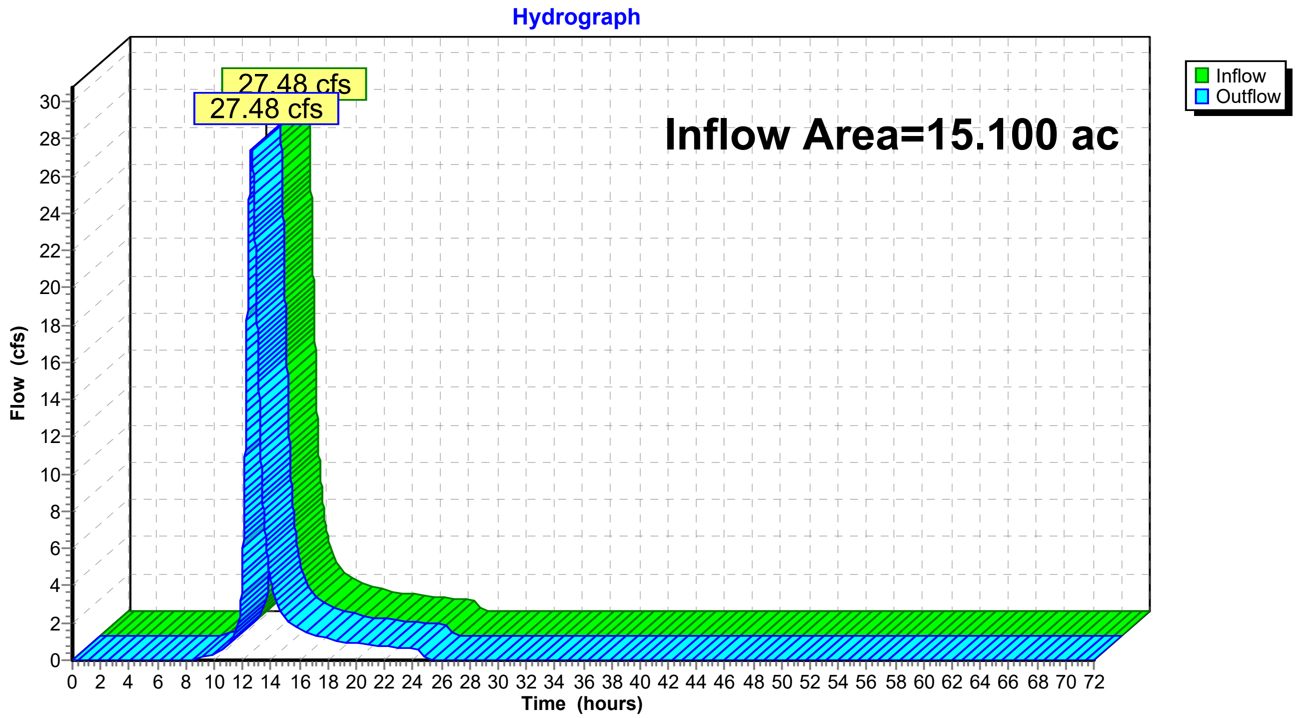


Summary for Reach DP-1: Existing Off-site LP

Inflow Area = 15.100 ac, 0.00% Impervious, Inflow Depth = 2.95" for 100-yr event
Inflow = 27.48 cfs @ 12.62 hrs, Volume= 3.717 af
Outflow = 27.48 cfs @ 12.62 hrs, Volume= 3.717 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Reach DP-1: Existing Off-site LP

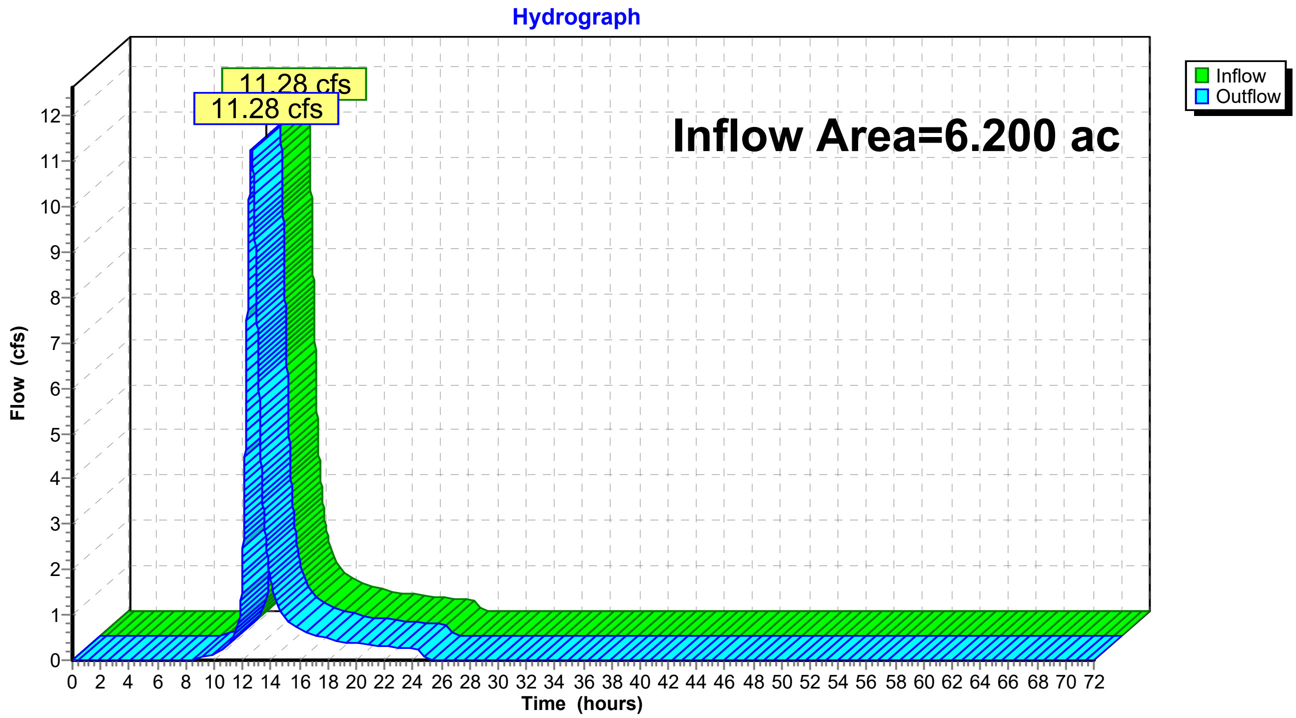


Summary for Reach DP-2: Maple Road

Inflow Area =	6.200 ac,	0.00% Impervious, Inflow Depth = 2.95"	for 100-yr event	
Inflow =	11.28 cfs @	12.62 hrs, Volume=	1.526 af	
Outflow =	11.28 cfs @	12.62 hrs, Volume=	1.526 af,	Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Reach DP-2: Maple Road



Events for Subcatchment ES-1:

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
1-yr	1.81	3.52	0.567	0.45
10-yr	3.08	11.38	1.649	1.31
25-yr	3.75	16.52	2.312	1.84
100-yr	**5.07**	**27.48**	**3.717**	**2.95**

Events for Subcatchment ES-2:

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
1-yr	1.81	1.44	0.233	0.45
10-yr	3.08	4.67	0.677	1.31
25-yr	3.75	6.78	0.949	1.84
100-yr	**5.07**	**11.28**	**1.526**	**2.95**

Events for Reach DP-1: Existing Off-site LP

Event	Inflow (cfs)	Outflow (cfs)	Elevation (feet)	Storage (cubic-feet)
1-yr	3.52	3.52	**0.00**	**0**
10-yr	11.38	11.38	0.00	0
25-yr	16.52	16.52	0.00	0
100-yr	**27.48**	**27.48**	0.00	0

Events for Reach DP-2: Maple Road

Event	Inflow (cfs)	Outflow (cfs)	Elevation (feet)	Storage (cubic-feet)
1-yr	1.44	1.44	**0.00**	**0**
10-yr	4.67	4.67	0.00	0
25-yr	6.78	6.78	0.00	0
100-yr	**11.28**	**11.28**	0.00	0

APPENDIX E:
POST DEVELOPMENT STORMWATER MODELING

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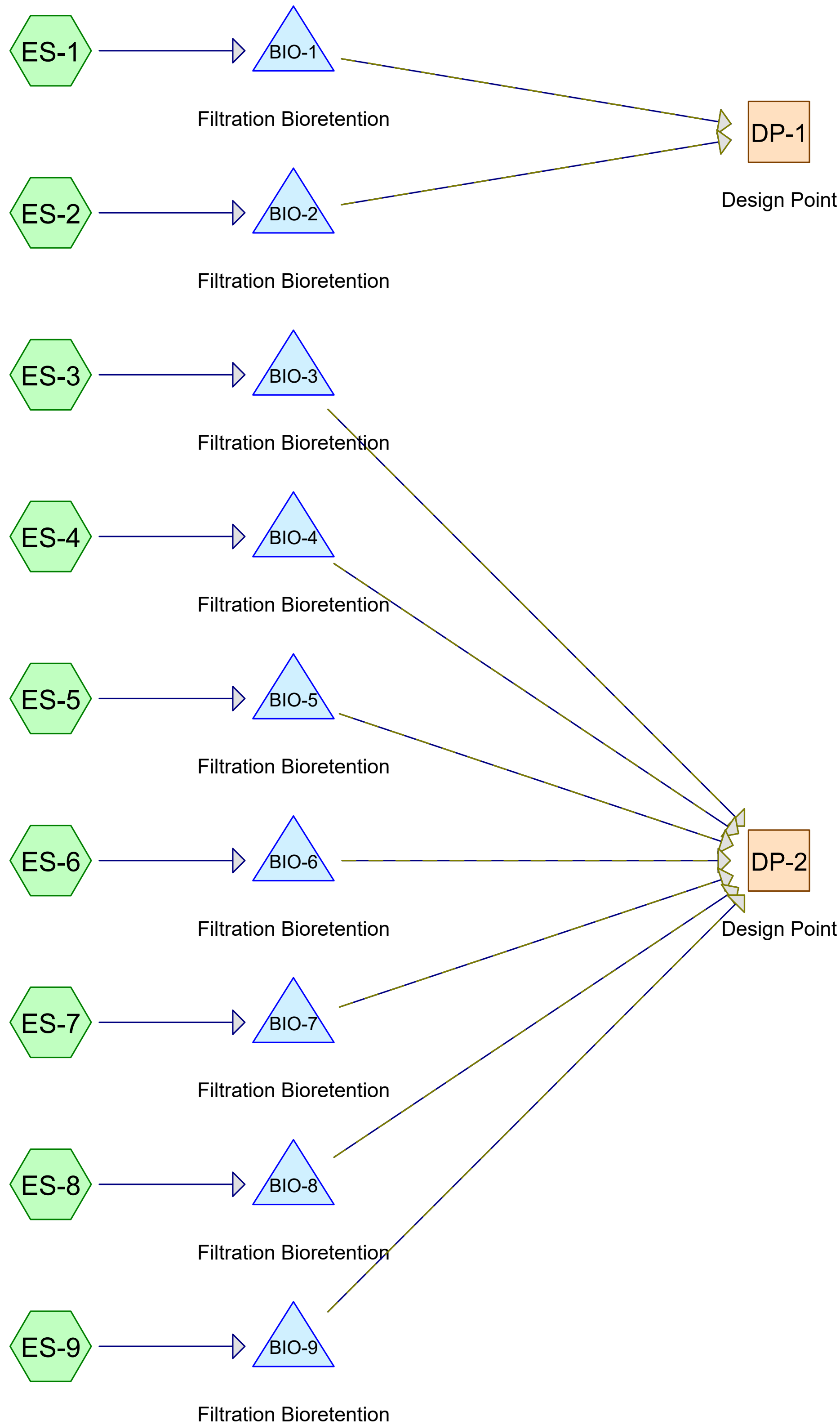
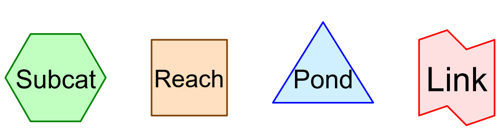




Routing Diagram for E_App E_Post-Development Model
Prepared by Labella Associates, Printed 11/5/2025
HydroCAD® 10.20-7a s/n 09581 © 2025 HydroCAD Software Solutions LLC

Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	1-yr	NY-Amherst 24-hr S1	1-yr	Default	24.00	1	1.81	2
2	10-yr	NY-Amherst 24-hr S1	10-yr	Default	24.00	1	3.08	2
3	25-yr	NY-Amherst 24-hr S1	25-yr	Default	24.00	1	3.75	2
4	100-yr	NY-Amherst 24-hr S1	100-yr	Default	24.00	1	5.07	2

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
6.027	80	>75% Grass cover, Good, HSG D (ES-1, ES-2, ES-3, ES-4, ES-5, ES-6, ES-7, ES-8, ES-9)
15.294	98	Paved parking, HSG D (ES-1, ES-2, ES-3, ES-4, ES-5, ES-6, ES-7, ES-8, ES-9)
21.321	**93**	**TOTAL AREA**

Soil Listing (selected nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
21.321	HSG D	ES-1, ES-2, ES-3, ES-4, ES-5, ES-6, ES-7, ES-8, ES-9
0.000	Other	
21.321		**TOTAL AREA**

Pipe Listing (selected nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Width (inches)	Diam/Height (inches)	Inside-Fill (inches)	Node Name
1	BIO-1	592.41	592.39	20.0	0.0010	0.012	0.0	12.0	0.0	
2	BIO-2	592.41	592.39	20.0	0.0010	0.012	0.0	6.0	0.0	
3	BIO-3	592.41	592.39	20.0	0.0010	0.012	0.0	12.0	0.0	
4	BIO-4	592.41	592.39	20.0	0.0010	0.012	0.0	12.0	0.0	
5	BIO-5	592.41	592.39	20.0	0.0010	0.012	0.0	12.0	0.0	
6	BIO-6	592.41	592.39	20.0	0.0010	0.012	0.0	12.0	0.0	
7	BIO-7	592.41	592.39	20.0	0.0010	0.012	0.0	12.0	0.0	
8	BIO-8	592.41	592.39	20.0	0.0010	0.012	0.0	12.0	0.0	
9	BIO-9	592.41	592.39	20.0	0.0010	0.012	0.0	12.0	0.0	

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment ES-1: Runoff Area=171,199 sf 82.98% Impervious Runoff Depth=1.30"
Tc=6.0 min CN=95 Runoff=8.12 cfs 0.427 af

Subcatchment ES-2: Runoff Area=4.795 ac 79.40% Impervious Runoff Depth=1.22"
Tc=6.0 min CN=94 Runoff=9.34 cfs 0.487 af

Subcatchment ES-3: Runoff Area=73,554 sf 85.79% Impervious Runoff Depth=1.30"
Tc=6.0 min CN=95 Runoff=3.49 cfs 0.183 af

Subcatchment ES-4: Runoff Area=36,878 sf 87.56% Impervious Runoff Depth=1.39"
Tc=6.0 min CN=96 Runoff=1.85 cfs 0.098 af

Subcatchment ES-5: Runoff Area=63,721 sf 86.36% Impervious Runoff Depth=1.39"
Tc=6.0 min CN=96 Runoff=3.19 cfs 0.170 af

Subcatchment ES-6: Runoff Area=66,972 sf 90.28% Impervious Runoff Depth=1.39"
Tc=6.0 min CN=96 Runoff=3.35 cfs 0.178 af

Subcatchment ES-7: Runoff Area=138,942 sf 54.68% Impervious Runoff Depth=0.93"
Tc=6.0 min CN=90 Runoff=4.76 cfs 0.248 af

Subcatchment ES-8: Runoff Area=115,772 sf 53.78% Impervious Runoff Depth=0.93"
Tc=6.0 min CN=90 Runoff=3.97 cfs 0.207 af

Subcatchment ES-9: Runoff Area=52,852 sf 17.45% Impervious Runoff Depth=0.57"
Tc=6.0 min CN=83 Runoff=1.02 cfs 0.057 af

Reach DP-1: Design Point Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Reach DP-2: Design Point Inflow=0.83 cfs 0.098 af
Outflow=0.83 cfs 0.098 af

Pond BIO-1: Filtration Bioretention Peak Elev=595.31' Storage=18,583 cf Inflow=8.12 cfs 0.427 af
Primary=0.00 cfs 0.000 af Tertiary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.000 af

Pond BIO-2: Filtration Bioretention Peak Elev=595.78' Storage=21,228 cf Inflow=9.34 cfs 0.487 af
Primary=0.00 cfs 0.000 af Tertiary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.000 af

Pond BIO-3: Filtration Bioretention Peak Elev=596.50' Storage=7,690 cf Inflow=3.49 cfs 0.183 af
Primary=0.03 cfs 0.007 af Tertiary=0.00 cfs 0.000 af Outflow=0.03 cfs 0.007 af

Pond BIO-4: Filtration Bioretention Peak Elev=595.14' Storage=4,275 cf Inflow=1.85 cfs 0.098 af
Primary=0.00 cfs 0.000 af Tertiary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.000 af

Pond BIO-5: Filtration Bioretention Peak Elev=594.94' Storage=7,386 cf Inflow=3.19 cfs 0.170 af
Primary=0.00 cfs 0.000 af Tertiary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.000 af

Pond BIO-6: Filtration Bioretention Peak Elev=596.56' Storage=4,164 cf Inflow=3.35 cfs 0.178 af
Primary=0.83 cfs 0.091 af Tertiary=0.00 cfs 0.000 af Outflow=0.83 cfs 0.091 af

Pond BIO-7: Filtration Bioretention Peak Elev=595.66' Storage=10,816 cf Inflow=4.76 cfs 0.248 af
Primary=0.00 cfs 0.000 af Tertiary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.000 af

Pond BIO-8: Filtration Bioretention Peak Elev=595.52' Storage=9,012 cf Inflow=3.97 cfs 0.207 af
Primary=0.00 cfs 0.000 af Tertiary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.000 af

Pond BIO-9: Filtration Bioretention Peak Elev=593.97' Storage=2,505 cf Inflow=1.02 cfs 0.057 af
Primary=0.00 cfs 0.000 af Tertiary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.000 af

Total Runoff Area = 21.321 ac Runoff Volume = 2.056 af Average Runoff Depth = 1.16"
28.27% Pervious = 6.027 ac 71.73% Impervious = 15.294 ac

Summary for Subcatchment ES-1:

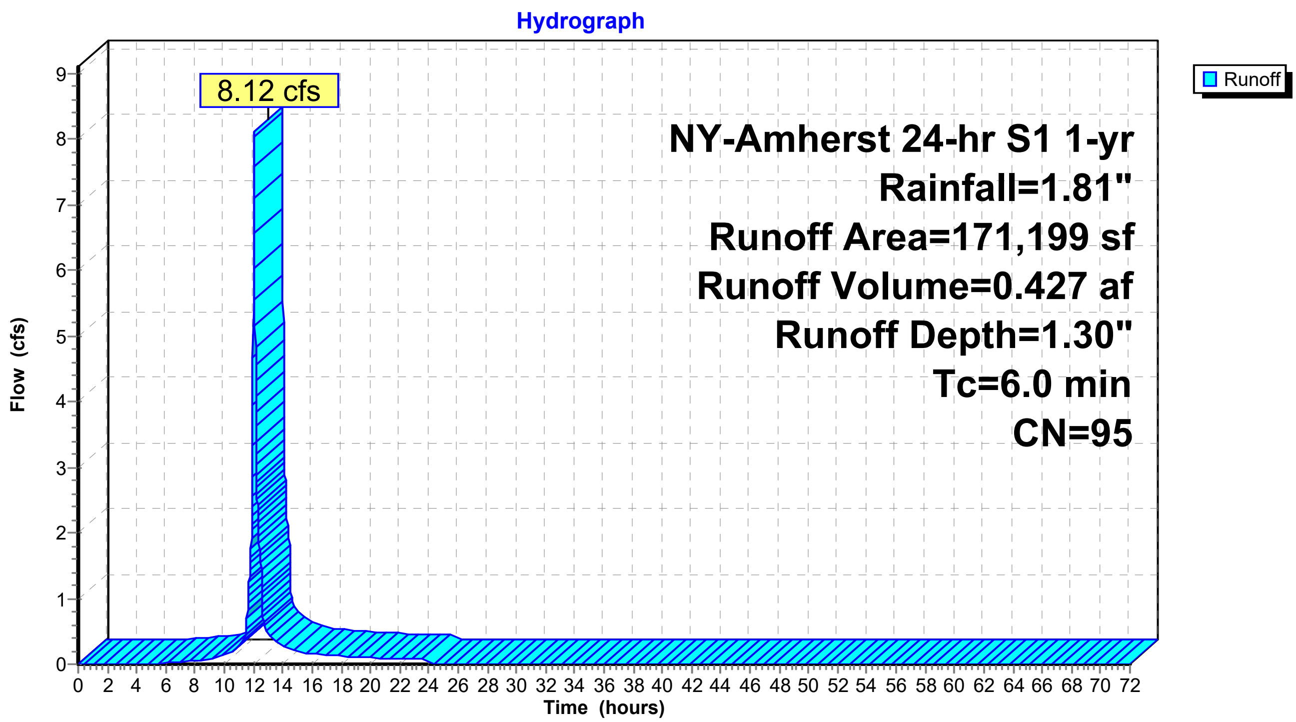
Runoff = 8.12 cfs @ 12.04 hrs, Volume= 0.427 af, Depth= 1.30"
Routed to Pond BIO-1 : Filtration Bioretention

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Amherst 24-hr S1 1-yr Rainfall=1.81"

Area (sf)	CN	Description
142,056	98	Paved parking, HSG D
29,143	80	>75% Grass cover, Good, HSG D
171,199	95	Weighted Average
29,143		17.02% Pervious Area
142,056		82.98% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Direct**

Subcatchment ES-1:



Summary for Subcatchment ES-2:

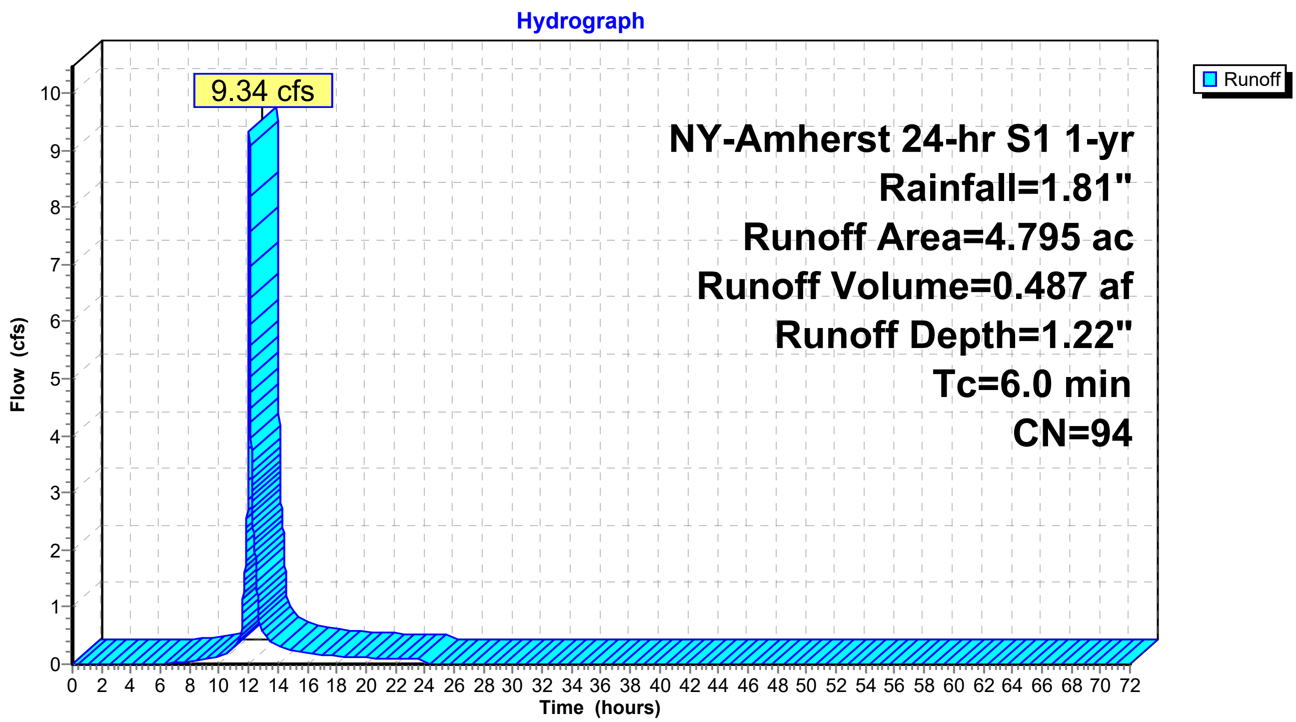
Runoff = 9.34 cfs @ 12.04 hrs, Volume= 0.487 af, Depth= 1.22"
Routed to Pond BIO-2 : Filtration Bioretention

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Amherst 24-hr S1 1-yr Rainfall=1.81"

Area (ac)	CN	Description
3.807	98	Paved parking, HSG D
0.988	80	>75% Grass cover, Good, HSG D
4.795	94	Weighted Average
0.988		20.60% Pervious Area
3.807		79.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Direct**

Subcatchment ES-2:



Summary for Subcatchment ES-3:

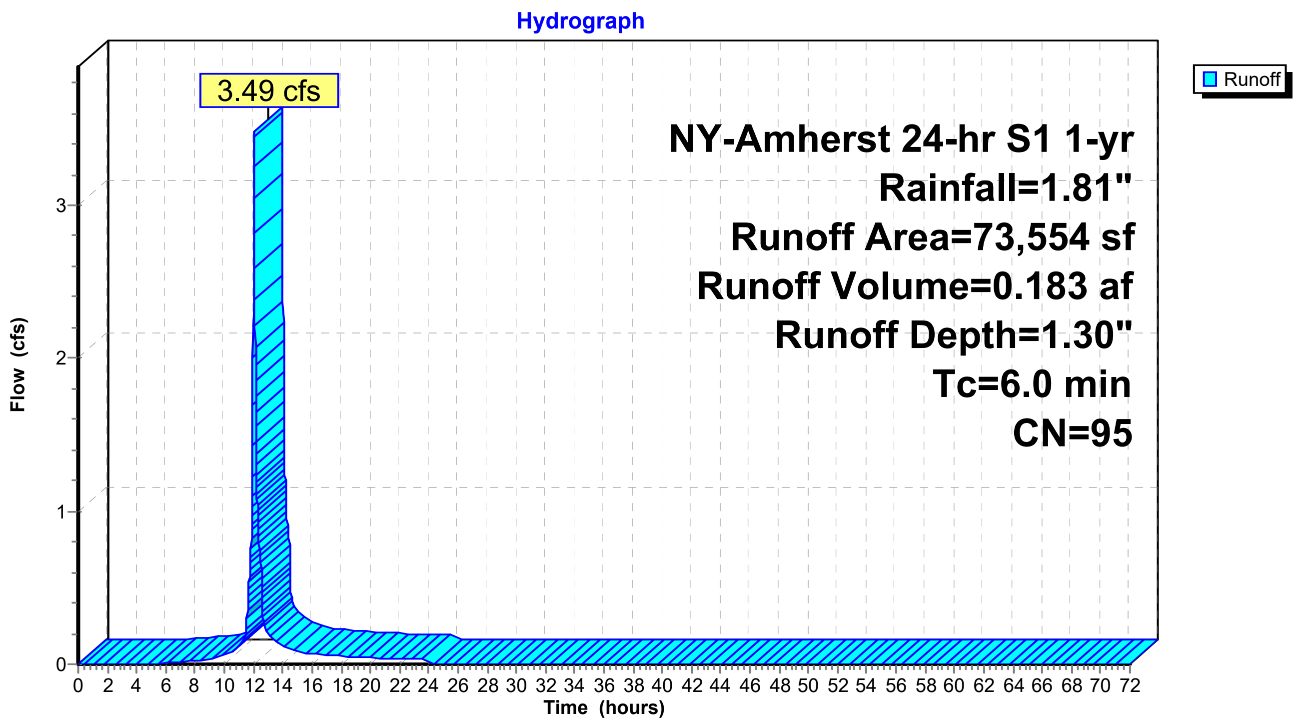
Runoff = 3.49 cfs @ 12.04 hrs, Volume= 0.183 af, Depth= 1.30"
Routed to Pond BIO-3 : Filtration Bioretention

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Amherst 24-hr S1 1-yr Rainfall=1.81"

Area (sf)	CN	Description
63,101	98	Paved parking, HSG D
10,453	80	>75% Grass cover, Good, HSG D
73,554	95	Weighted Average
10,453		14.21% Pervious Area
63,101		85.79% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Direct**

Subcatchment ES-3:



Summary for Subcatchment ES-4:

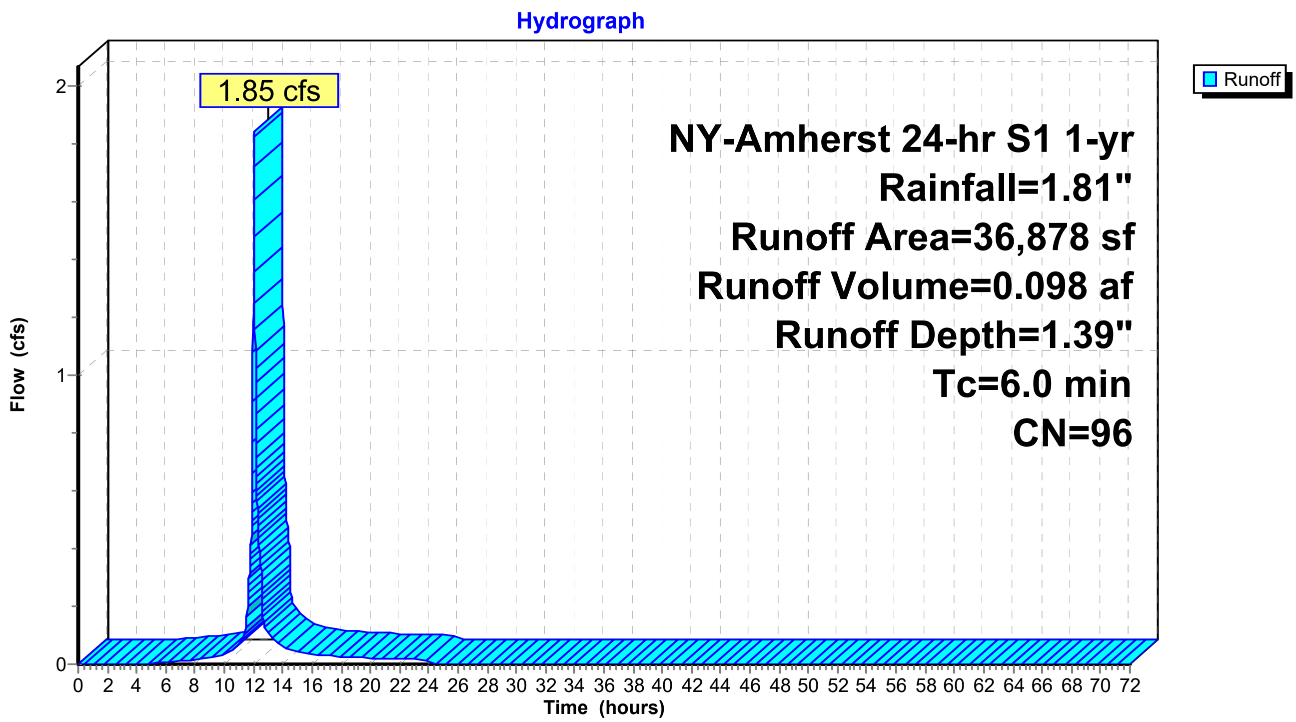
Runoff = 1.85 cfs @ 12.04 hrs, Volume= 0.098 af, Depth= 1.39"
Routed to Pond BIO-4 : Filtration Bioretention

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Amherst 24-hr S1 1-yr Rainfall=1.81"

Area (sf)	CN	Description
32,291	98	Paved parking, HSG D
4,587	80	>75% Grass cover, Good, HSG D
36,878	96	Weighted Average
4,587		12.44% Pervious Area
32,291		87.56% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Direct**

Subcatchment ES-4:



Summary for Subcatchment ES-5:

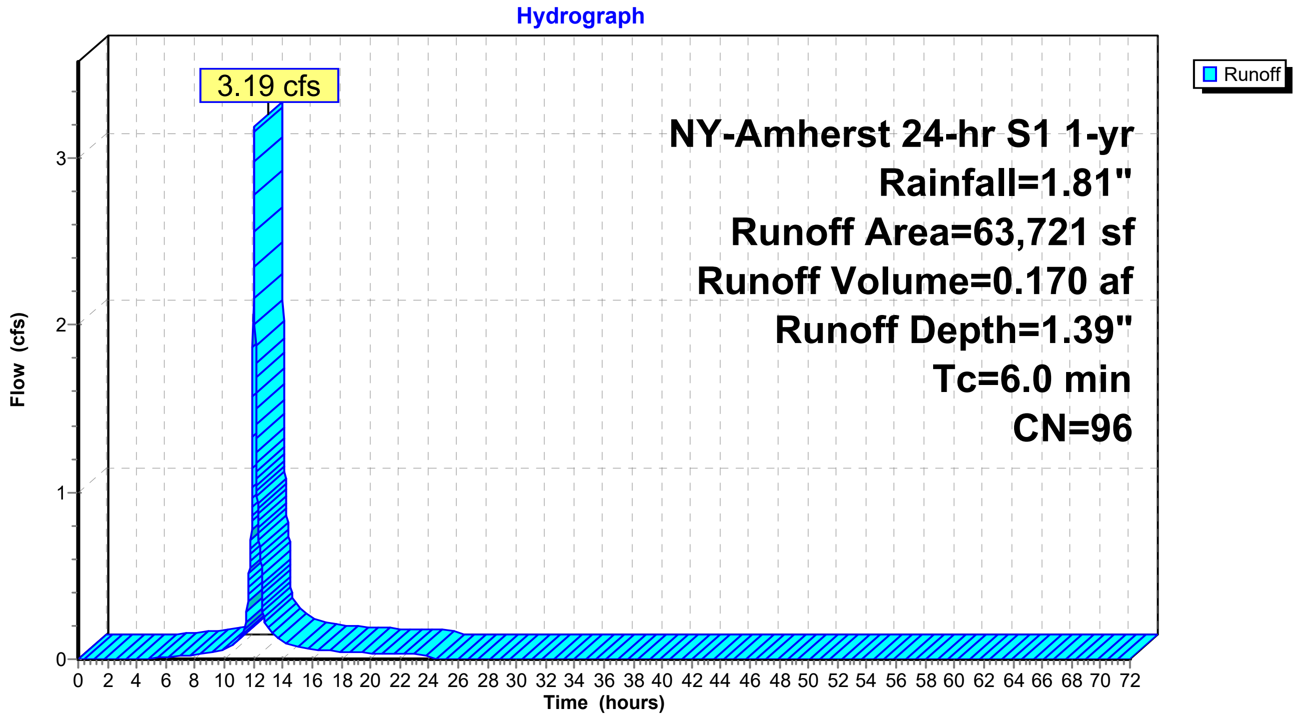
Runoff = 3.19 cfs @ 12.04 hrs, Volume= 0.170 af, Depth= 1.39"
Routed to Pond BIO-5 : Filtration Bioretention

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Amherst 24-hr S1 1-yr Rainfall=1.81"

Area (sf)	CN	Description
55,032	98	Paved parking, HSG D
8,689	80	>75% Grass cover, Good, HSG D
63,721	96	Weighted Average
8,689		13.64% Pervious Area
55,032		86.36% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Direct**

Subcatchment ES-5:



Summary for Subcatchment ES-6:

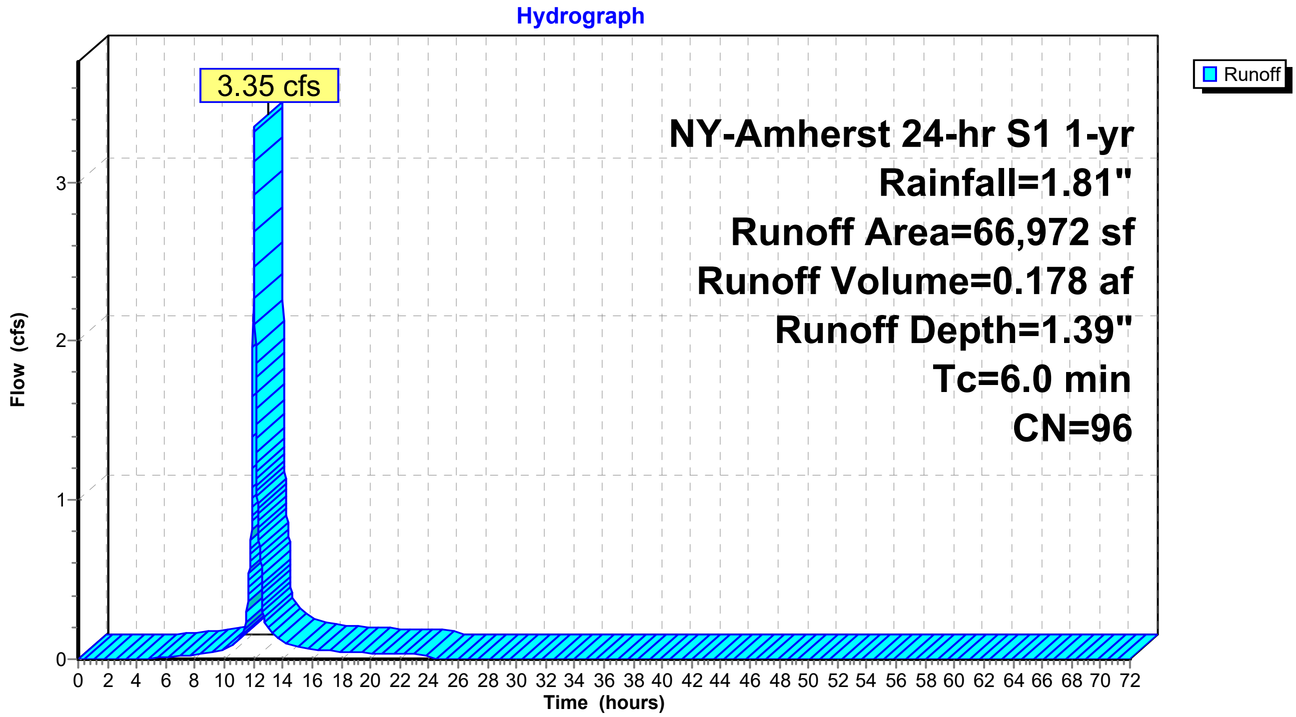
Runoff = 3.35 cfs @ 12.04 hrs, Volume= 0.178 af, Depth= 1.39"
Routed to Pond BIO-6 : Filtration Bioretention

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Amherst 24-hr S1 1-yr Rainfall=1.81"

Area (sf)	CN	Description
60,462	98	Paved parking, HSG D
6,510	80	>75% Grass cover, Good, HSG D
66,972	96	Weighted Average
6,510		9.72% Pervious Area
60,462		90.28% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Direct**

Subcatchment ES-6:



Summary for Subcatchment ES-7:

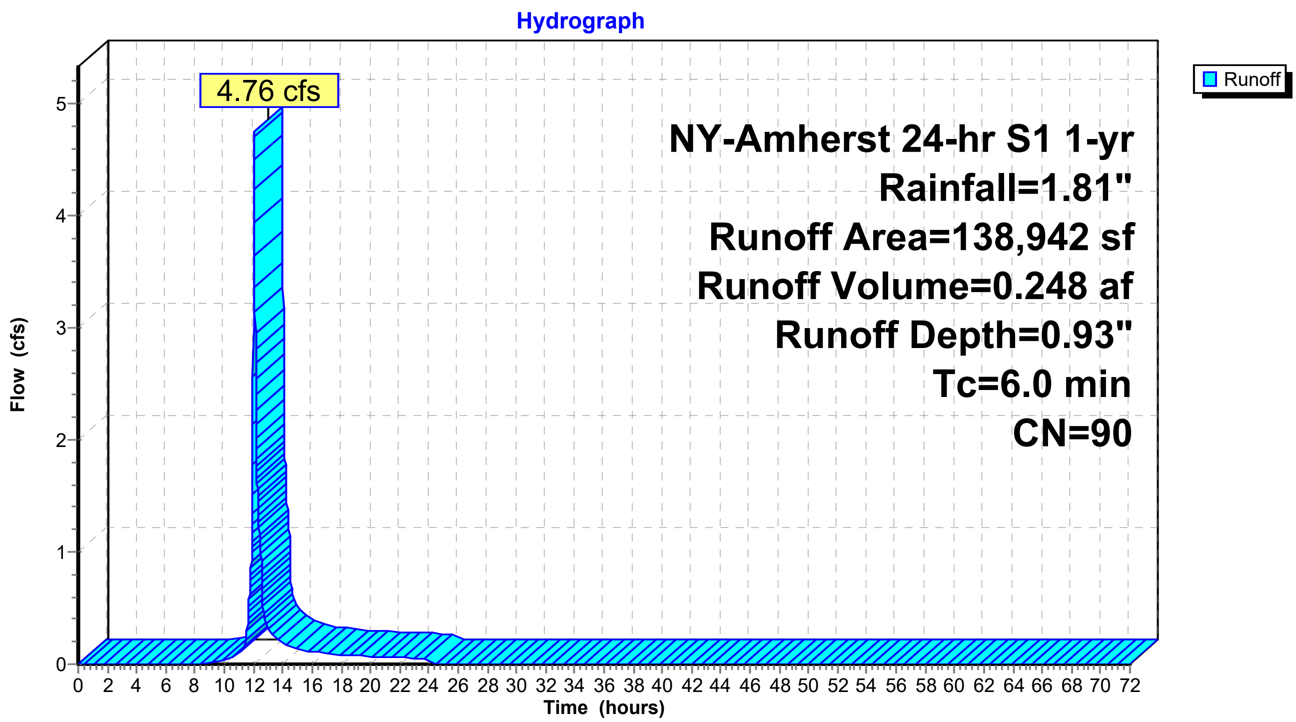
Runoff = 4.76 cfs @ 12.04 hrs, Volume= 0.248 af, Depth= 0.93"
Routed to Pond BIO-7 : Filtration Bioretention

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Amherst 24-hr S1 1-yr Rainfall=1.81"

Area (sf)	CN	Description
75,973	98	Paved parking, HSG D
62,969	80	>75% Grass cover, Good, HSG D
138,942	90	Weighted Average
62,969		45.32% Pervious Area
75,973		54.68% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Direct**

Subcatchment ES-7:



Summary for Subcatchment ES-8:

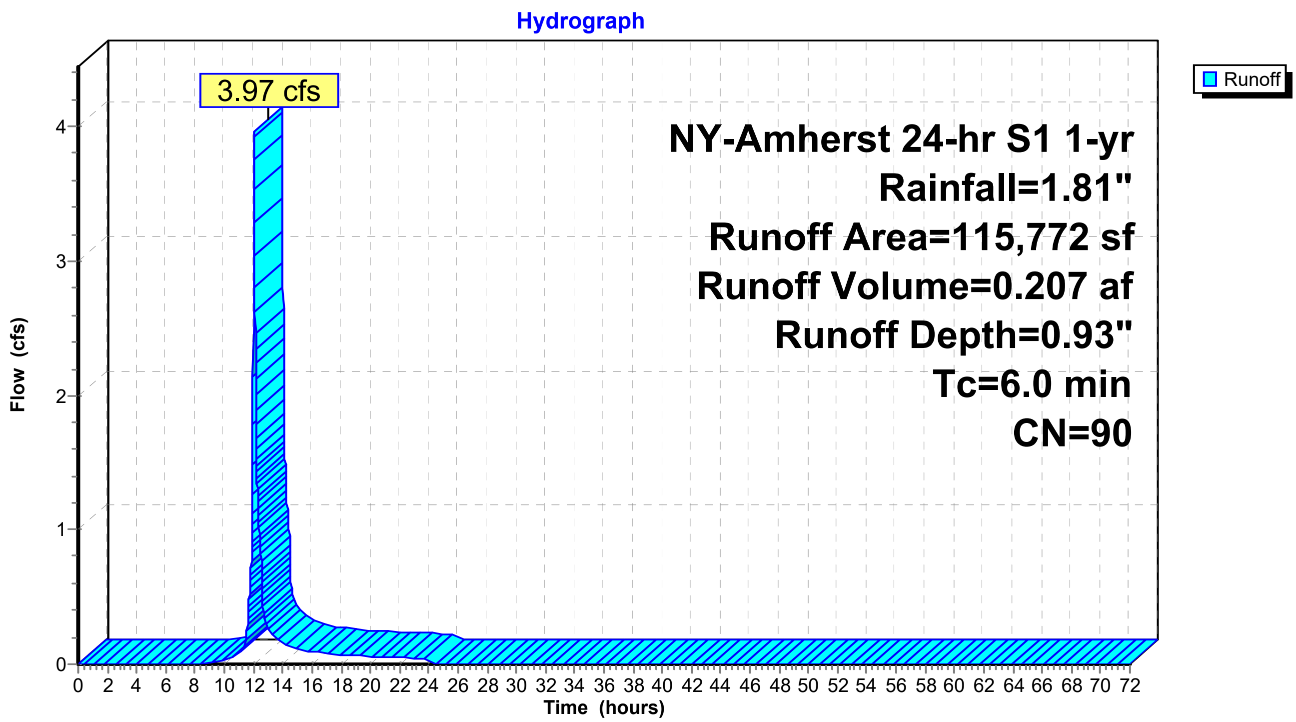
Runoff = 3.97 cfs @ 12.04 hrs, Volume= 0.207 af, Depth= 0.93"
Routed to Pond BIO-8 : Filtration Bioretention

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Amherst 24-hr S1 1-yr Rainfall=1.81"

Area (sf)	CN	Description
62,258	98	Paved parking, HSG D
53,514	80	>75% Grass cover, Good, HSG D
115,772	90	Weighted Average
53,514		46.22% Pervious Area
62,258		53.78% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Direct**

Subcatchment ES-8:



Summary for Subcatchment ES-9:

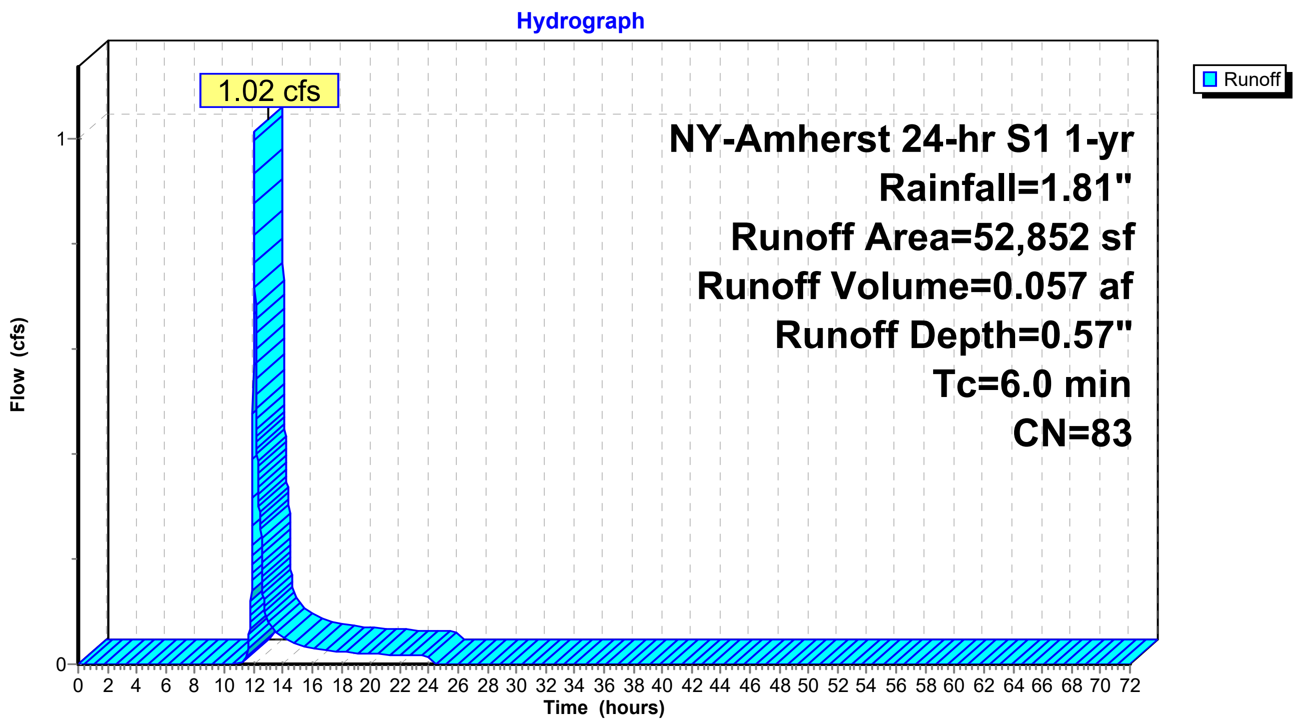
Runoff = 1.02 cfs @ 12.05 hrs, Volume= 0.057 af, Depth= 0.57"
Routed to Pond BIO-9 : Filtration Bioretention

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Amherst 24-hr S1 1-yr Rainfall=1.81"

Area (sf)	CN	Description
9,221	98	Paved parking, HSG D
43,631	80	>75% Grass cover, Good, HSG D
52,852	83	Weighted Average
43,631		82.55% Pervious Area
9,221		17.45% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Direct**

Subcatchment ES-9:

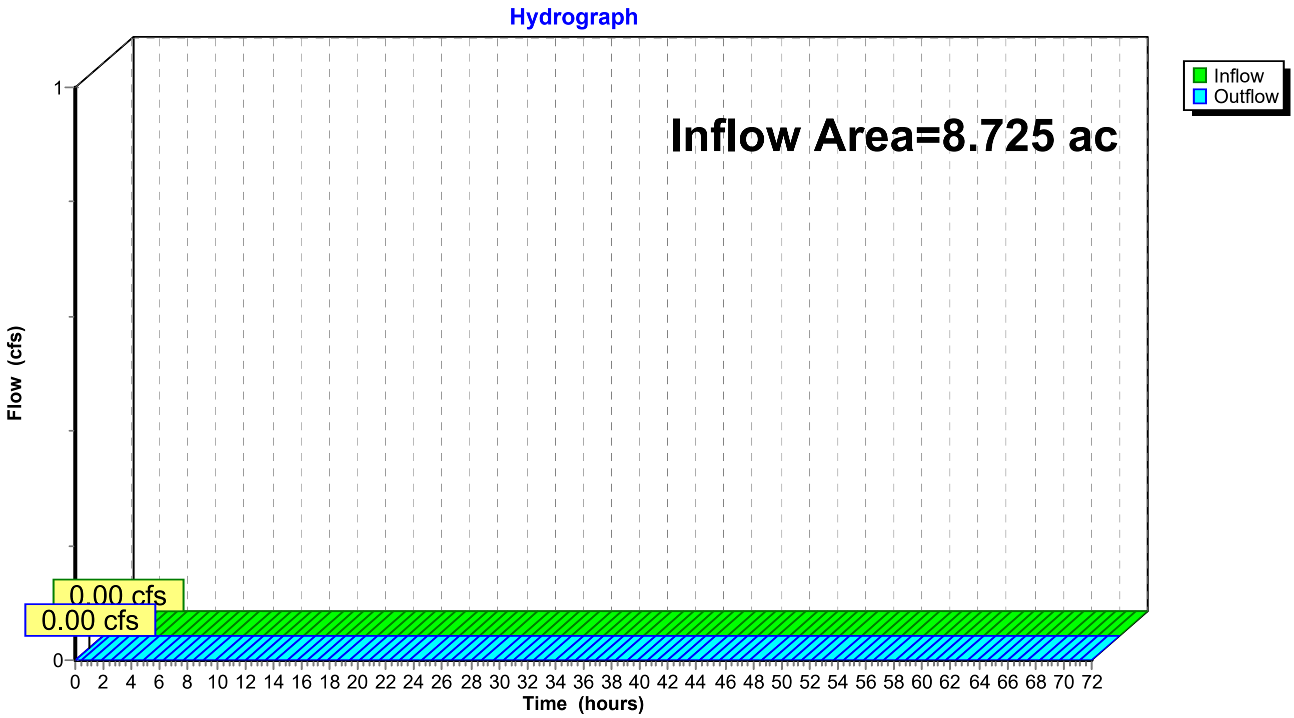


Summary for Reach DP-1: Design Point

Inflow Area = 8.725 ac, 81.01% Impervious, Inflow Depth = 0.00" for 1-yr event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Reach DP-1: Design Point

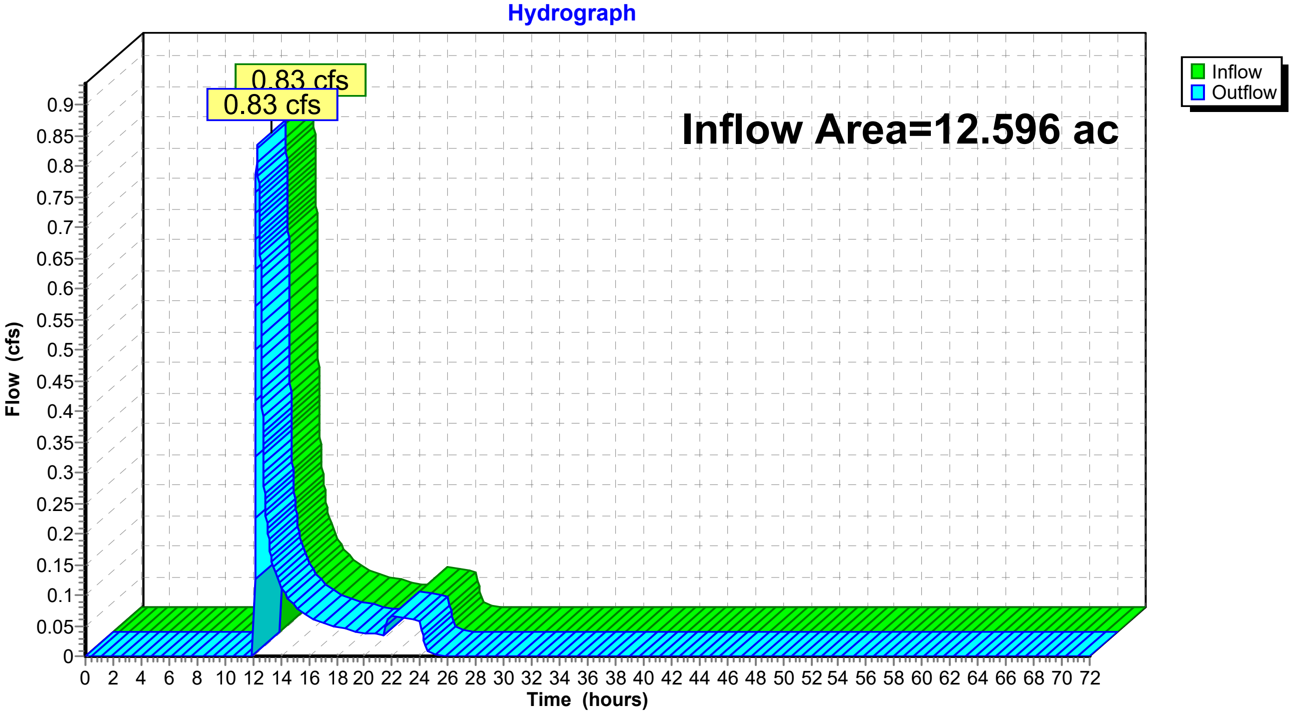


Summary for Reach DP-2: Design Point

Inflow Area =	12.596 ac, 65.31% Impervious, Inflow Depth = 0.09"	for 1-yr event	
Inflow =	0.83 cfs @ 12.31 hrs, Volume=	0.098 af	
Outflow =	0.83 cfs @ 12.31 hrs, Volume=	0.098 af, Atten= 0%, Lag= 0.0 min	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Reach DP-2: Design Point



Summary for Pond BIO-1: Filtration Bioretention

Inflow Area = 3.930 ac, 82.98% Impervious, Inflow Depth = 1.30" for 1-yr event
Inflow = 8.12 cfs @ 12.04 hrs, Volume= 0.427 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach DP-1 : Design Point
Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach DP-1 : Design Point

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 595.31' @ 24.34 hrs Surf.Area= 8,330 sf Storage= 18,583 cf
Flood Elev= 597.00' Surf.Area= 24,070 sf Storage= 36,359 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	596.00'	12,035 cf	**Above Mulch Surface (Prismatic)** Listed below (Recalc)
#2	592.41'	24,324 cf	**Filtration Media (Prismatic)** Listed below (Recalc)
		36,359 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
596.00	8,330	0	0
597.00	15,740	12,035	12,035

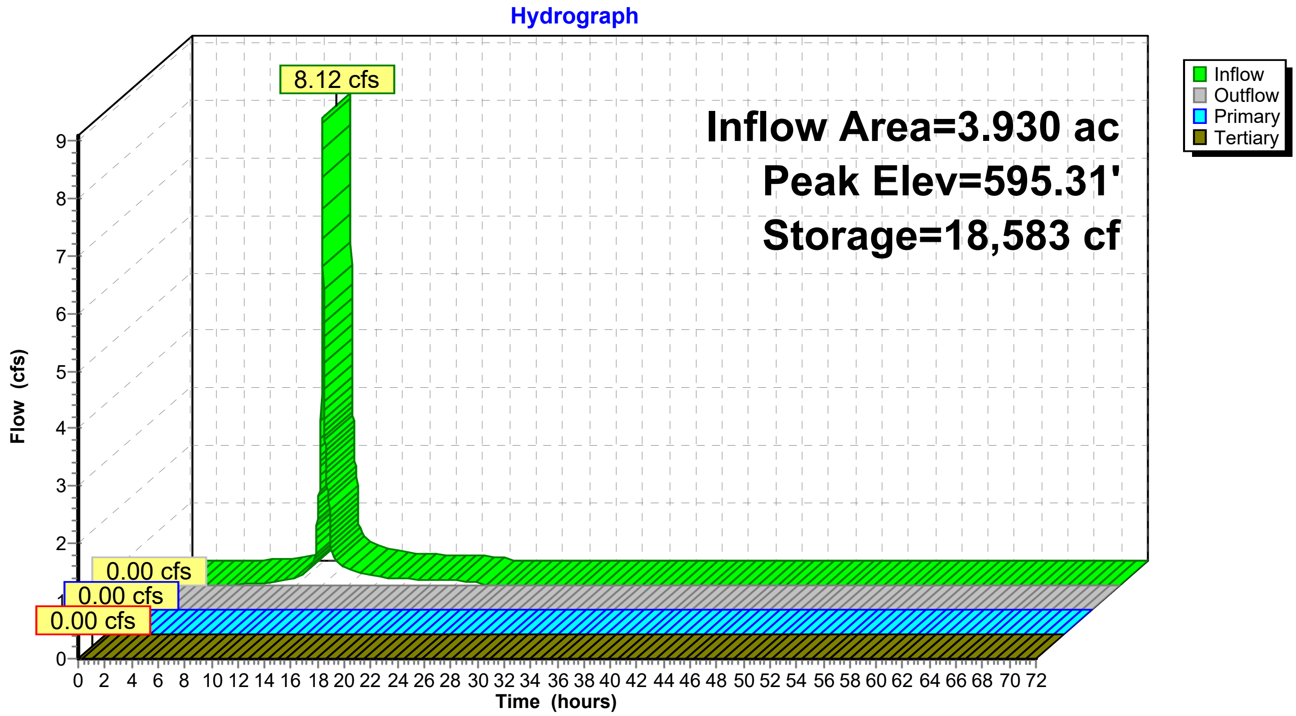
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
592.41	8,330	0.0	0	0
592.42	8,330	40.0	33	33
593.25	8,330	20.0	1,383	1,416
595.75	8,330	100.0	20,825	22,241
596.00	8,330	100.0	2,083	24,324

Device	Routing	Invert	Outlet Devices
#1	Device 2	596.50'	**24.0" x 24.0" Horiz. Overflow Grate X 6.00** C= 0.600 Limited to weir flow at low heads
#2	Primary	592.41'	**12.0" Round Culvert** L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 592.41' / 592.39' S= 0.0010 '/' Cc= 0.900 n= 0.012 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#3	Tertiary	596.90'	**10.0' long x 3.0' breadth Emergency Overflow 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

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=592.41' TW=0.00' (Dynamic Tailwater)
└─**2=Culvert** (Controls 0.00 cfs)
  └─**1=Overflow Grate** (Controls 0.00 cfs)

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=592.41' TW=0.00' (Dynamic Tailwater)
└─**3=Emergency Overflow Weir** (Controls 0.00 cfs)

Pond BIO-1: Filtration Bioretention



Summary for Pond BIO-2: Filtration Bioretention

Inflow Area = 4.795 ac, 79.40% Impervious, Inflow Depth = 1.22" for 1-yr event
Inflow = 9.34 cfs @ 12.04 hrs, Volume= 0.487 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach DP-1 : Design Point
Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach DP-1 : Design Point

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 595.78' @ 24.34 hrs Surf.Area= 7,855 sf Storage= 21,228 cf
Flood Elev= 597.00' Surf.Area= 57,855 sf Storage= 51,864 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	596.00'	28,928 cf	**Above Mulch Surface (Prismatic)**Listed below (Recalc)
#2	592.41'	22,937 cf	**Filtration Media (Prismatic)**Listed below (Recalc)
		51,864 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
596.00	7,855	0	0
597.00	50,000	28,928	28,928

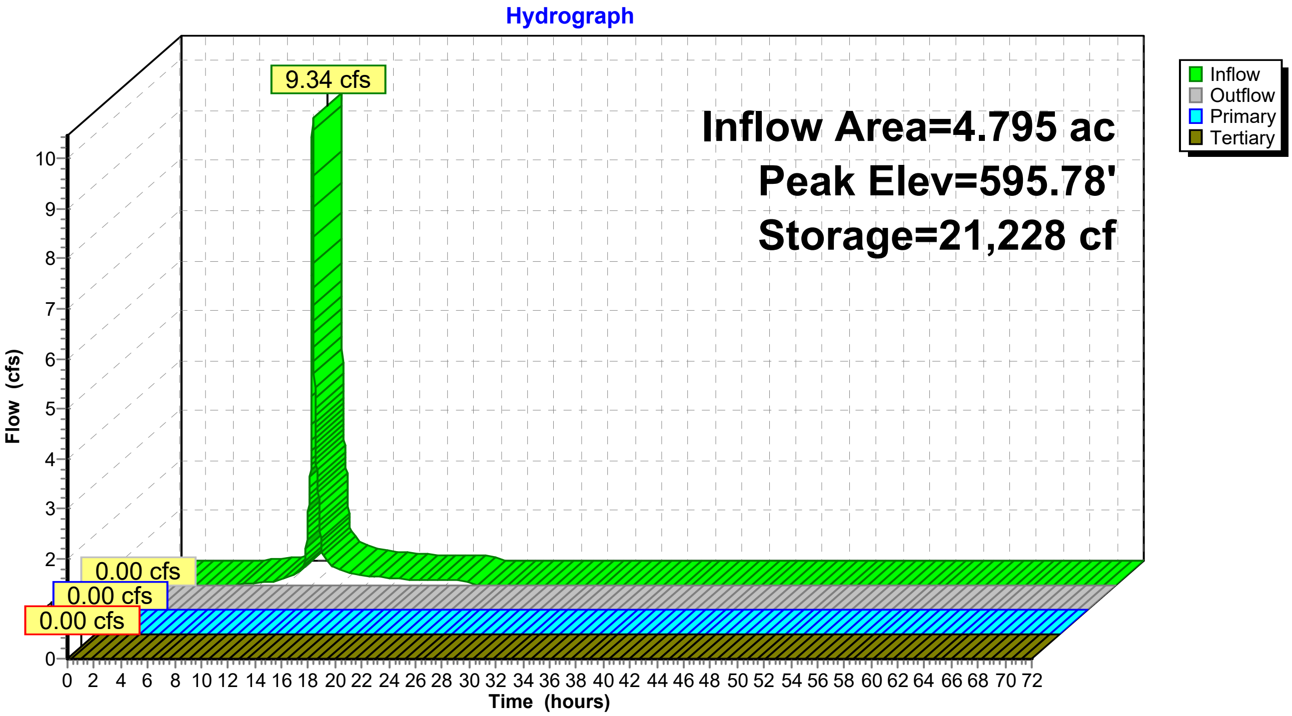
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
592.41	7,855	0.0	0	0
592.42	7,855	40.0	31	31
593.25	7,855	20.0	1,304	1,335
595.75	7,855	100.0	19,638	20,973
596.00	7,855	100.0	1,964	22,937

Device	Routing	Invert	Outlet Devices
#1	Device 2	596.50'	**24.0" x 24.0" Horiz. Overflow Grate X 8.00** C= 0.600 Limited to weir flow at low heads
#2	Primary	592.41'	**6.0" Round Culvert** L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 592.41' / 592.39' S= 0.0010 '/' Cc= 0.900 n= 0.012 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#3	Tertiary	596.90'	**10.0' long x 3.0' breadth Emergency Overflow 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

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=592.41' TW=0.00' (Dynamic Tailwater)
└─**2=Culvert** (Controls 0.00 cfs)
  └─**1=Overflow Grate** (Controls 0.00 cfs)

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=592.41' TW=0.00' (Dynamic Tailwater)
└─**3=Emergency Overflow Weir** (Controls 0.00 cfs)

Pond BIO-2: Filtration Bioretention



Summary for Pond BIO-3: Filtration Bioretention

Inflow Area = 1.689 ac, 85.79% Impervious, Inflow Depth = 1.30" for 1-yr event
Inflow = 3.49 cfs @ 12.04 hrs, Volume= 0.183 af
Outflow = 0.03 cfs @ 21.91 hrs, Volume= 0.007 af, Atten= 99%, Lag= 592.4 min
Primary = 0.03 cfs @ 21.91 hrs, Volume= 0.007 af
Routed to Reach DP-2 : Design Point
Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach DP-2 : Design Point

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 596.50' @ 21.91 hrs Surf.Area= 6,152 sf Storage= 7,690 cf
Flood Elev= 597.00' Surf.Area= 8,070 sf Storage= 10,176 cf

Plug-Flow detention time= 874.9 min calculated for 0.007 af (4% of inflow)
Center-of-Mass det. time= 571.2 min (1,371.5 - 800.3)

Volume	Invert	Avail.Storage	Storage Description
#1	596.00'	4,035 cf	**Above Mulch Surface (Prismatic)** Listed below (Recalc)
#2	592.41'	6,141 cf	**Filtration Media (Prismatic)** Listed below (Recalc)
		10,176 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
596.00	2,103	0	0
597.00	5,967	4,035	4,035

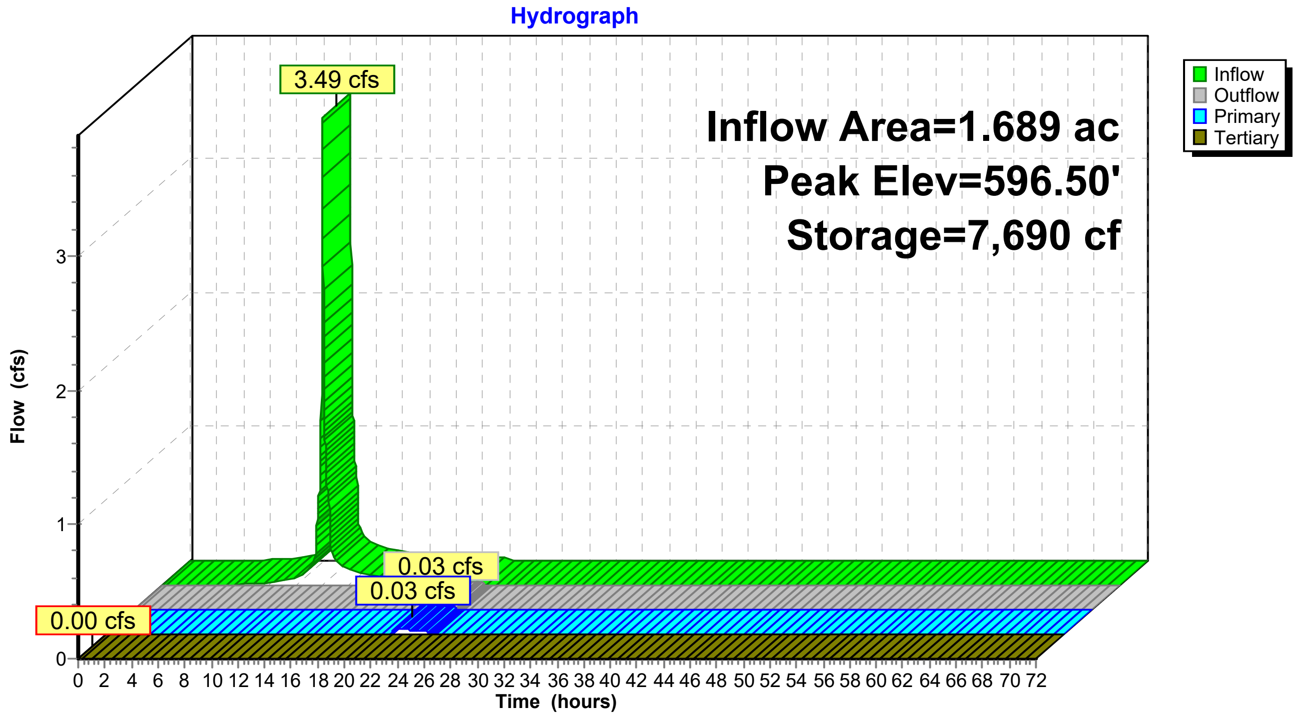
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
592.41	2,103	0.0	0	0
592.42	2,103	40.0	8	8
593.25	2,103	20.0	349	358
595.75	2,103	100.0	5,258	5,615
596.00	2,103	100.0	526	6,141

Device	Routing	Invert	Outlet Devices
#1	Device 2	596.50'	**24.0" x 24.0" Horiz. Overflow Grate X 6.00** C= 0.600 Limited to weir flow at low heads
#2	Primary	592.41'	**12.0" Round Culvert** L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 592.41' / 592.39' S= 0.0010 '/' Cc= 0.900 n= 0.012 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#3	Tertiary	596.95'	**10.0' long x 3.0' breadth Emergency Overflow 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

Primary OutFlow Max=0.03 cfs @ 21.91 hrs HW=596.50' TW=0.00' (Dynamic Tailwater)
└─**2=Culvert** (Passes 0.03 cfs of 5.66 cfs potential flow)
  └─**1=Overflow Grate** (Weir Controls 0.03 cfs @ 0.20 fps)

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=592.41' TW=0.00' (Dynamic Tailwater)
└─**3=Emergency Overflow Weir** (Controls 0.00 cfs)

Pond BIO-3: Filtration Bioretention



Summary for Pond BIO-4: Filtration Bioretention

Inflow Area = 0.847 ac, 87.56% Impervious, Inflow Depth = 1.39" for 1-yr event
Inflow = 1.85 cfs @ 12.04 hrs, Volume= 0.098 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach dp-2 : Design Point
Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach dp-2 : Design Point

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 595.14' @ 24.34 hrs Surf.Area= 2,080 sf Storage= 4,275 cf
Flood Elev= 597.00' Surf.Area= 7,080 sf Storage= 9,614 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	596.00'	3,540 cf	**Above Mulch Surface (Prismatic)** Listed below (Recalc)
#2	592.41'	6,074 cf	**Filtration Media (Prismatic)** Listed below (Recalc)
		9,614 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
596.00	2,080	0	0
597.00	5,000	3,540	3,540

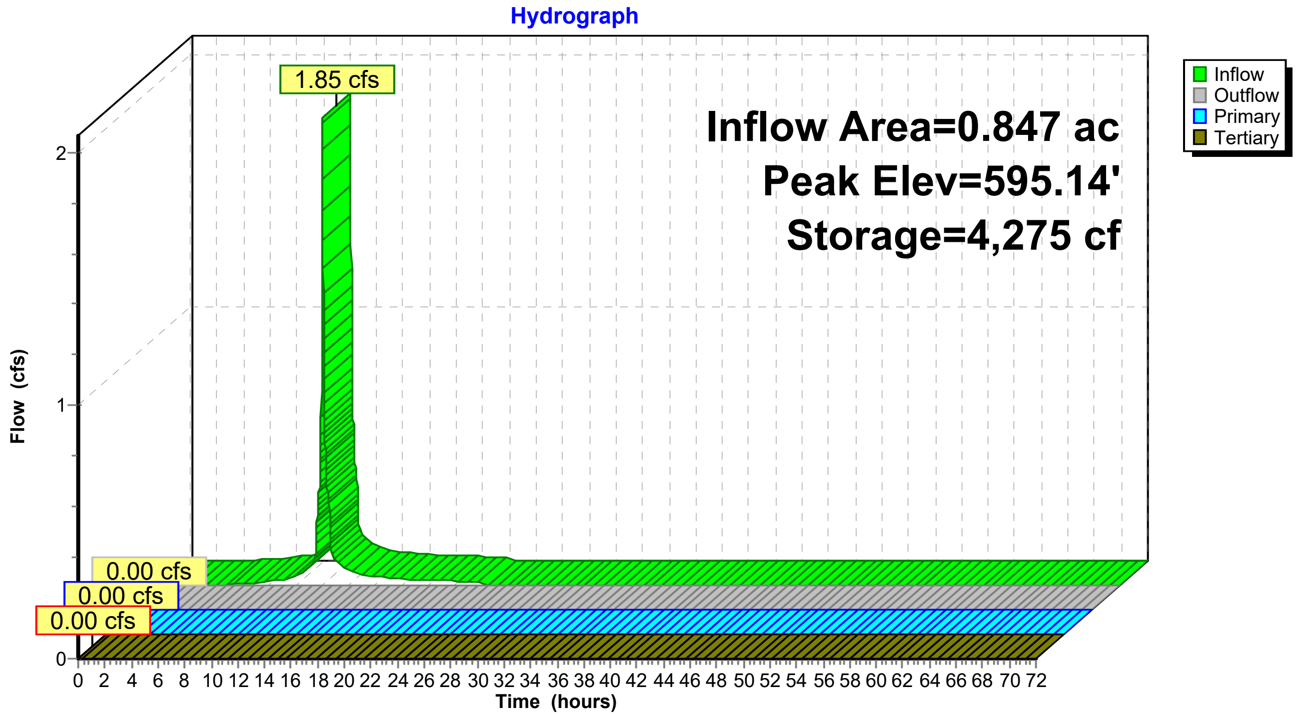
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
592.41	2,080	0.0	0	0
592.42	2,080	40.0	8	8
593.25	2,080	20.0	345	354
595.75	2,080	100.0	5,200	5,554
596.00	2,080	100.0	520	6,074

Device	Routing	Invert	Outlet Devices
#1	Device 2	596.50'	**24.0" x 24.0" Horiz. Overflow Grate X 3.00** C= 0.600 Limited to weir flow at low heads
#2	Primary	592.41'	**12.0" Round Culvert** L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 592.41' / 592.39' S= 0.0010 '/' Cc= 0.900 n= 0.012 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#3	Tertiary	596.90'	**10.0' long x 3.0' breadth Emergency Overflow 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

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=592.41' TW=0.00' (Dynamic Tailwater)
└─**2=Culvert** (Controls 0.00 cfs)
　└─**1=Overflow Grate** (Controls 0.00 cfs)

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=592.41' TW=0.00' (Dynamic Tailwater)
└─**3=Emergency Overflow Weir** (Controls 0.00 cfs)

Pond BIO-4: Filtration Bioretention



Summary for Pond BIO-5: Filtration Bioretention

Inflow Area = 1.463 ac, 86.36% Impervious, Inflow Depth = 1.39" for 1-yr event
Inflow = 3.19 cfs @ 12.04 hrs, Volume= 0.170 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach dp-2 : Design Point
Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach dp-2 : Design Point

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 594.94' @ 24.34 hrs Surf.Area= 3,962 sf Storage= 7,386 cf
Flood Elev= 597.00' Surf.Area= 9,962 sf Storage= 16,550 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	596.00'	4,981 cf	**Above Mulch Surface (Prismatic)** Listed below (Recalc)
#2	592.41'	11,569 cf	**Filtration Media (Prismatic)** Listed below (Recalc)
		16,550 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
596.00	3,962	0	0
597.00	6,000	4,981	4,981

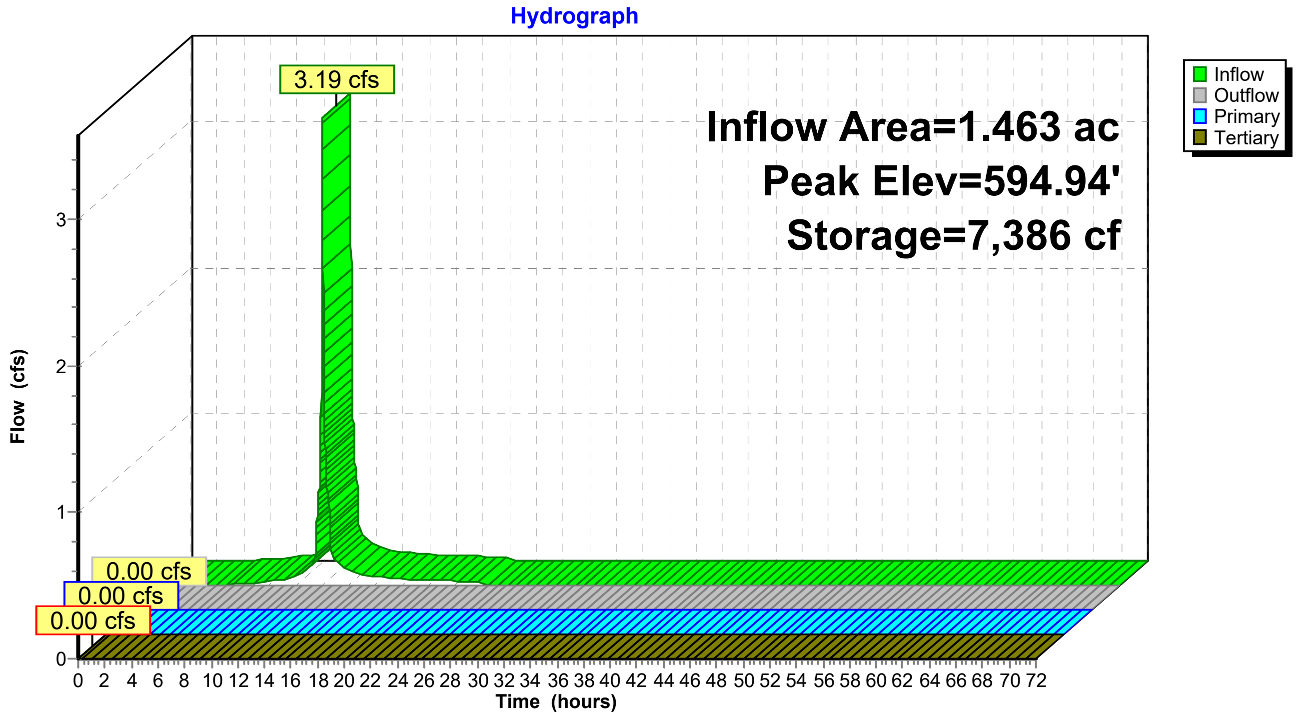
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
592.41	3,962	0.0	0	0
592.42	3,962	40.0	16	16
593.25	3,962	20.0	658	674
595.75	3,962	100.0	9,905	10,579
596.00	3,962	100.0	991	11,569

Device	Routing	Invert	Outlet Devices
#1	Device 2	596.50'	**24.0" x 24.0" Horiz. Overflow Grate X 3.00** C= 0.600 Limited to weir flow at low heads
#2	Primary	592.41'	**12.0" Round Culvert** L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 592.41' / 592.39' S= 0.0010 '/' Cc= 0.900 n= 0.012 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#3	Tertiary	596.90'	**10.0' long x 3.0' breadth Emergency Overflow 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

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=592.41' TW=0.00' (Dynamic Tailwater)
└─**2=Culvert** (Controls 0.00 cfs)
  └─**1=Overflow Grate** (Controls 0.00 cfs)

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=592.41' TW=0.00' (Dynamic Tailwater)
└─**3=Emergency Overflow Weir** (Controls 0.00 cfs)

Pond BIO-5: Filtration Bioretention



Summary for Pond BIO-6: Filtration Bioretention

Inflow Area = 1.537 ac, 90.28% Impervious, Inflow Depth = 1.39" for 1-yr event
Inflow = 3.35 cfs @ 12.04 hrs, Volume= 0.178 af
Outflow = 0.83 cfs @ 12.31 hrs, Volume= 0.091 af, Atten= 75%, Lag= 16.5 min
Primary = 0.83 cfs @ 12.31 hrs, Volume= 0.091 af
Routed to Reach dp-2 : Design Point
Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach dp-2 : Design Point

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 596.56' @ 12.31 hrs Surf.Area= 6,747 sf Storage= 4,164 cf
Flood Elev= 597.00' Surf.Area= 10,775 sf Storage= 7,651 cf

Plug-Flow detention time= 230.7 min calculated for 0.091 af (51% of inflow)
Center-of-Mass det. time= 120.7 min (912.7 - 792.0)

Volume	Invert	Avail.Storage	Storage Description
#1	596.00'	5,388 cf	**Above Mulch Surface (Prismatic)** Listed below (Recalc)
#2	592.41'	2,263 cf	**Filtration Media (Prismatic)** Listed below (Recalc)
		7,651 cf	Total Available Storage

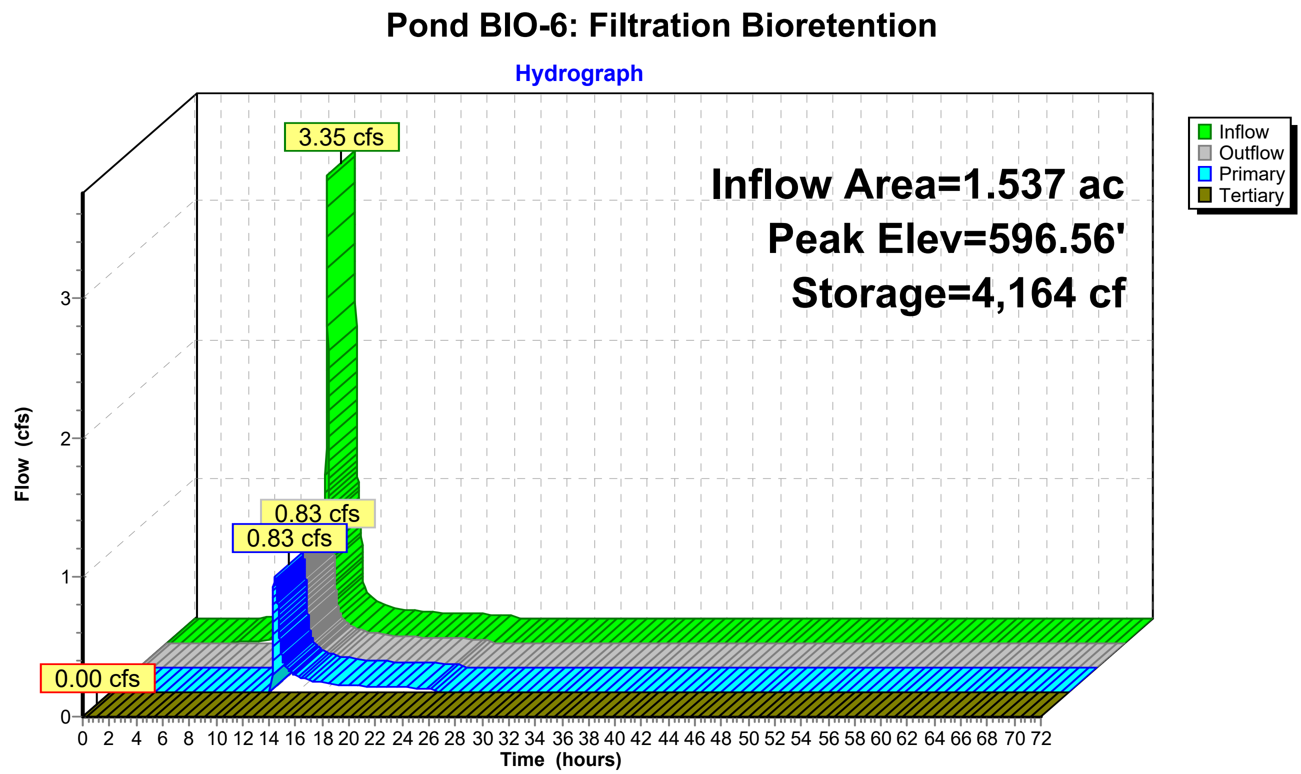
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
596.00	775	0	0
597.00	10,000	5,388	5,388

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
592.41	775	0.0	0	0
592.42	775	40.0	3	3
593.25	775	20.0	129	132
595.75	775	100.0	1,938	2,069
596.00	775	100.0	194	2,263

Device	Routing	Invert	Outlet Devices
#1	Device 2	596.50'	**24.0" x 24.0" Horiz. Overflow Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#2	Primary	592.41'	**12.0" Round Culvert** L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 592.41' / 592.39' S= 0.0010 '/' Cc= 0.900 n= 0.012 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#3	Tertiary	596.90'	**10.0' long x 3.0' breadth Emergency Overflow 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

Primary OutFlow Max=0.83 cfs @ 12.31 hrs HW=596.56' TW=0.00' (Dynamic Tailwater)
└─**2=Culvert** (Passes 0.83 cfs of 5.71 cfs potential flow)
  └─**1=Overflow Grate** (Weir Controls 0.83 cfs @ 0.82 fps)

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=592.41' TW=0.00' (Dynamic Tailwater)
└─**3=Emergency Overflow Weir** (Controls 0.00 cfs)



Summary for Pond BIO-7: Filtration Bioretention

Inflow Area = 3.190 ac, 54.68% Impervious, Inflow Depth = 0.93" for 1-yr event
Inflow = 4.76 cfs @ 12.04 hrs, Volume= 0.248 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach dp-2 : Design Point
Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach dp-2 : Design Point

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 595.66' @ 24.34 hrs Surf.Area= 4,200 sf Storage= 10,816 cf
Flood Elev= 597.00' Surf.Area= 19,200 sf Storage= 21,864 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	596.00'	9,600 cf	**Above Mulch Surface (Prismatic)** Listed below (Recalc)
#2	592.41'	12,264 cf	**Filtration Media (Prismatic)** Listed below (Recalc)
		21,864 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
596.00	4,200	0	0
597.00	15,000	9,600	9,600

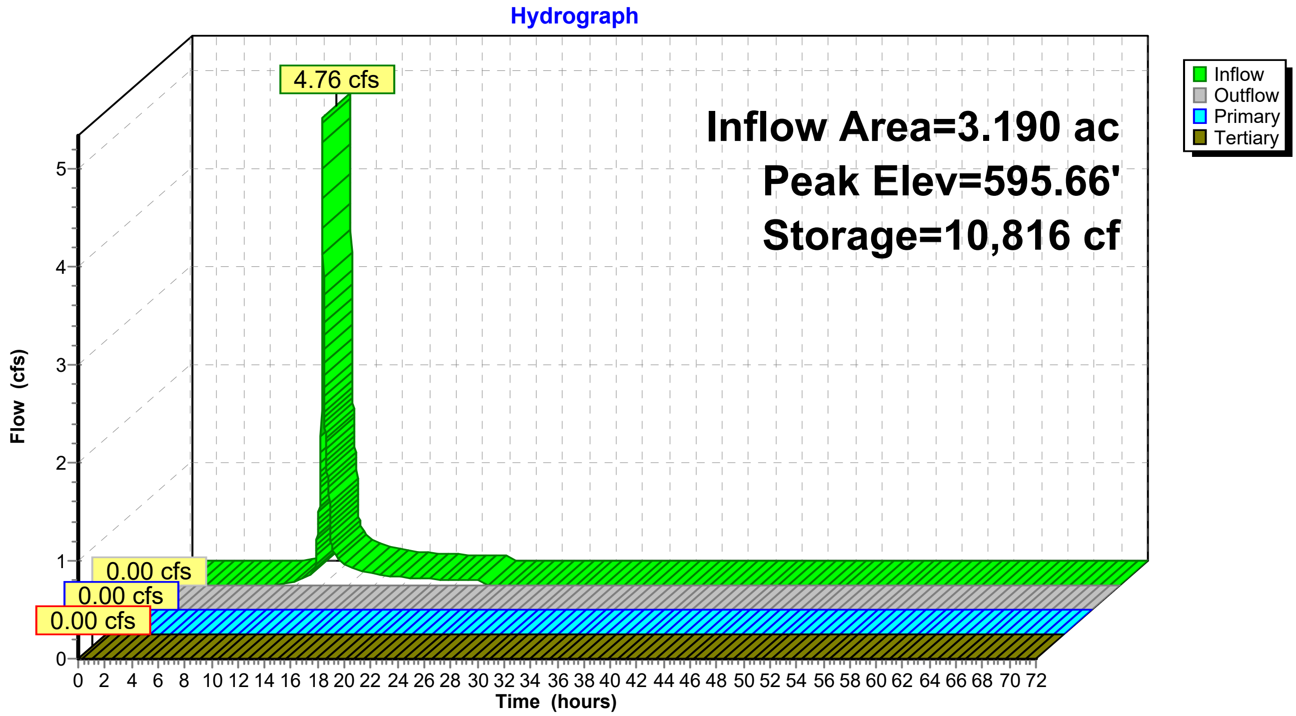
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
592.41	4,200	0.0	0	0
592.42	4,200	40.0	17	17
593.25	4,200	20.0	697	714
595.75	4,200	100.0	10,500	11,214
596.00	4,200	100.0	1,050	12,264

Device	Routing	Invert	Outlet Devices
#1	Device 2	596.50'	**24.0" x 24.0" Horiz. Overflow Grate X 3.00** C= 0.600 Limited to weir flow at low heads
#2	Primary	592.41'	**12.0" Round Culvert** L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 592.41' / 592.39' S= 0.0010 '/' Cc= 0.900 n= 0.012 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#3	Tertiary	596.90'	**10.0' long x 3.0' breadth Emergency Overflow 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

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=592.41' TW=0.00' (Dynamic Tailwater)
└─**2=Culvert** (Controls 0.00 cfs)
  └─**1=Overflow Grate** (Controls 0.00 cfs)

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=592.41' TW=0.00' (Dynamic Tailwater)
└─**3=Emergency Overflow Weir** (Controls 0.00 cfs)

Pond BIO-7: Filtration Bioretention



Summary for Pond BIO-8: Filtration Bioretention

Inflow Area = 2.658 ac, 53.78% Impervious, Inflow Depth = 0.93" for 1-yr event
Inflow = 3.97 cfs @ 12.04 hrs, Volume= 0.207 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach dp-2 : Design Point
Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach dp-2 : Design Point

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 595.52' @ 24.34 hrs Surf.Area= 3,700 sf Storage= 9,012 cf
Flood Elev= 597.00' Surf.Area= 13,700 sf Storage= 17,654 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	596.00'	6,850 cf	**Above Mulch Surface (Prismatic)** Listed below (Recalc)
#2	592.41'	10,804 cf	**Filtration Media (Prismatic)** Listed below (Recalc)
		17,654 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
596.00	3,700	0	0
597.00	10,000	6,850	6,850

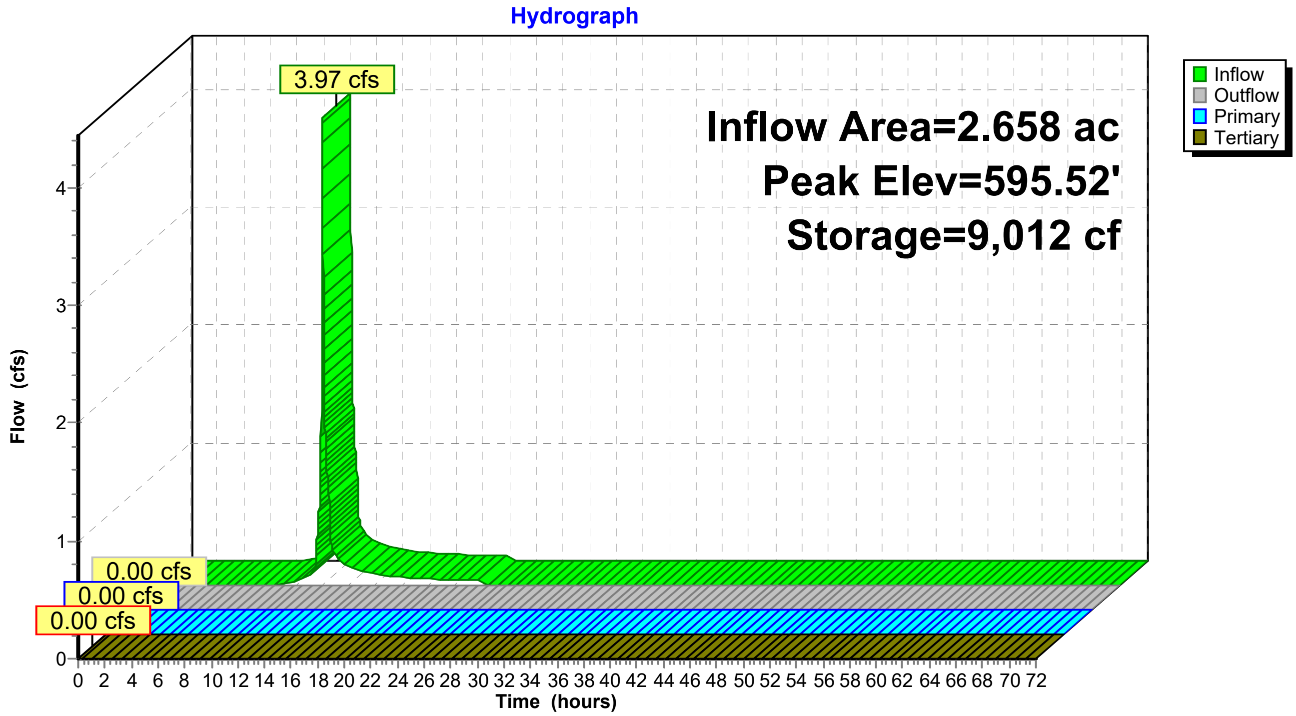
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
592.41	3,700	0.0	0	0
592.42	3,700	40.0	15	15
593.25	3,700	20.0	614	629
595.75	3,700	100.0	9,250	9,879
596.00	3,700	100.0	925	10,804

Device	Routing	Invert	Outlet Devices
#1	Device 2	596.50'	**24.0" x 24.0" Horiz. Overflow Grate X 3.00** C= 0.600 Limited to weir flow at low heads
#2	Primary	592.41'	**12.0" Round Culvert** L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 592.41' / 592.39' S= 0.0010 '/' Cc= 0.900 n= 0.012 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#3	Tertiary	596.90'	**10.0' long x 3.0' breadth Emergency Overflow 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

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=592.41' TW=0.00' (Dynamic Tailwater)
└─**2=Culvert** (Controls 0.00 cfs)
  └─**1=Overflow Grate** (Controls 0.00 cfs)

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=592.41' TW=0.00' (Dynamic Tailwater)
└─**3=Emergency Overflow Weir** (Controls 0.00 cfs)

Pond BIO-8: Filtration Bioretention



Summary for Pond BIO-9: Filtration Bioretention

Inflow Area = 1.213 ac, 17.45% Impervious, Inflow Depth = 0.57" for 1-yr event
Inflow = 1.02 cfs @ 12.05 hrs, Volume= 0.057 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach dp-2 : Design Point
Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach dp-2 : Design Point

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 593.97' @ 24.34 hrs Surf.Area= 2,800 sf Storage= 2,505 cf
Flood Elev= 597.00' Surf.Area= 8,165 sf Storage= 12,259 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	596.00'	4,083 cf	**Above Mulch Surface (Prismatic)** Listed below (Recalc)
#2	592.41'	8,176 cf	**Filtration Media (Prismatic)** Listed below (Recalc)
		12,259 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
596.00	2,800	0	0
597.00	5,365	4,083	4,083

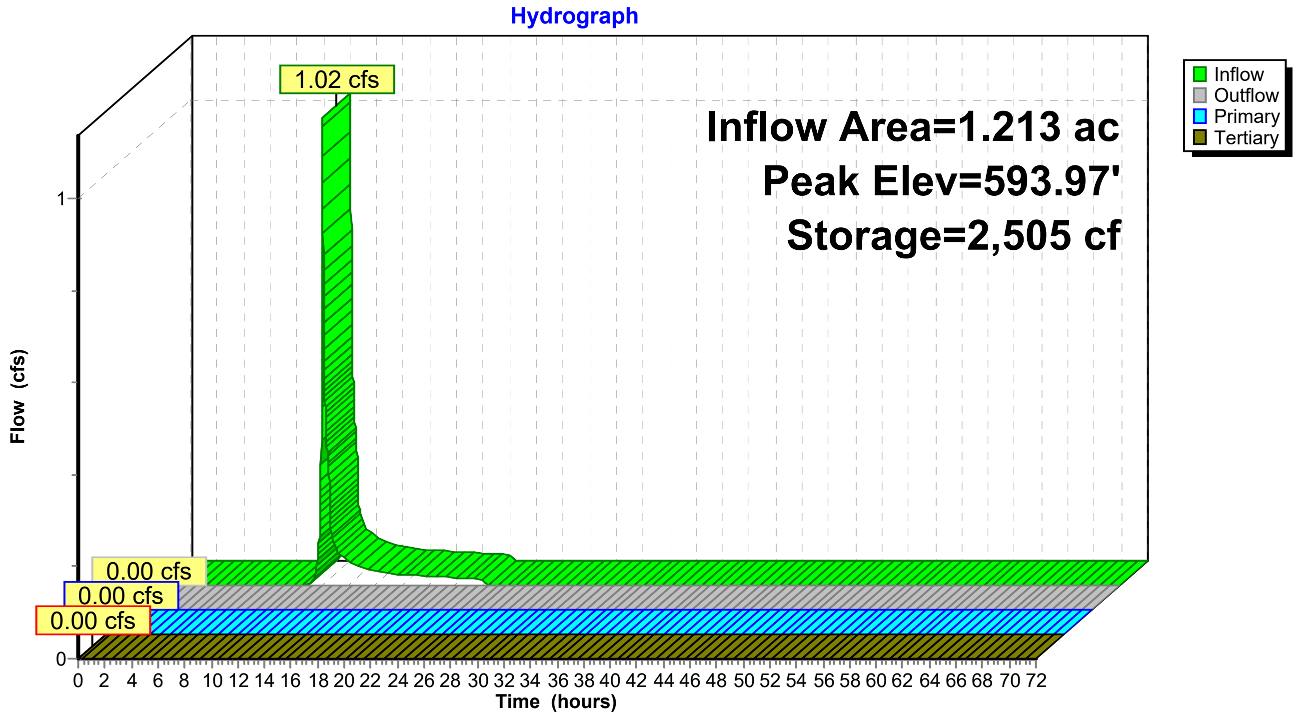
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
592.41	2,800	0.0	0	0
592.42	2,800	40.0	11	11
593.25	2,800	20.0	465	476
595.75	2,800	100.0	7,000	7,476
596.00	2,800	100.0	700	8,176

Device	Routing	Invert	Outlet Devices
#1	Device 2	596.50'	**24.0" x 24.0" Horiz. Overflow Grate X 3.00** C= 0.600 Limited to weir flow at low heads
#2	Primary	592.41'	**12.0" Round Culvert** L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 592.41' / 592.39' S= 0.0010 '/' Cc= 0.900 n= 0.012 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#3	Tertiary	596.90'	**10.0' long x 3.0' breadth Emergency Overflow 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

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=592.41' TW=0.00' (Dynamic Tailwater)
└─**2=Culvert** (Controls 0.00 cfs)
  └─**1=Overflow Grate** (Controls 0.00 cfs)

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=592.41' TW=0.00' (Dynamic Tailwater)
└─**3=Emergency Overflow Weir** (Controls 0.00 cfs)

Pond BIO-9: Filtration Bioretention



Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment ES-1: Runoff Area=171,199 sf 82.98% Impervious Runoff Depth=2.53"
Tc=6.0 min CN=95 Runoff=14.36 cfs 0.828 af

Subcatchment ES-2: Runoff Area=4.795 ac 79.40% Impervious Runoff Depth=2.43"
Tc=6.0 min CN=94 Runoff=17.02 cfs 0.970 af

Subcatchment ES-3: Runoff Area=73,554 sf 85.79% Impervious Runoff Depth=2.53"
Tc=6.0 min CN=95 Runoff=6.17 cfs 0.356 af

Subcatchment ES-4: Runoff Area=36,878 sf 87.56% Impervious Runoff Depth=2.63"
Tc=6.0 min CN=96 Runoff=3.17 cfs 0.186 af

Subcatchment ES-5: Runoff Area=63,721 sf 86.36% Impervious Runoff Depth=2.63"
Tc=6.0 min CN=96 Runoff=5.48 cfs 0.321 af

Subcatchment ES-6: Runoff Area=66,972 sf 90.28% Impervious Runoff Depth=2.63"
Tc=6.0 min CN=96 Runoff=5.76 cfs 0.337 af

Subcatchment ES-7: Runoff Area=138,942 sf 54.68% Impervious Runoff Depth=2.06"
Tc=6.0 min CN=90 Runoff=9.84 cfs 0.547 af

Subcatchment ES-8: Runoff Area=115,772 sf 53.78% Impervious Runoff Depth=2.06"
Tc=6.0 min CN=90 Runoff=8.20 cfs 0.456 af

Subcatchment ES-9: Runoff Area=52,852 sf 17.45% Impervious Runoff Depth=1.51"
Tc=6.0 min CN=83 Runoff=2.74 cfs 0.153 af

Reach DP-1: Design Point Inflow=0.77 cfs 0.385 af
Outflow=0.77 cfs 0.385 af

Reach DP-2: Design Point Inflow=6.02 cfs 0.780 af
Outflow=6.02 cfs 0.780 af

Pond BIO-1: Filtration Bioretention Peak Elev=596.52' Storage=29,616 cf Inflow=14.36 cfs 0.828 af
Primary=0.34 cfs 0.153 af Tertiary=0.00 cfs 0.000 af Outflow=0.34 cfs 0.153 af

Pond BIO-2: Filtration Bioretention Peak Elev=596.52' Storage=32,671 cf Inflow=17.02 cfs 0.970 af
Primary=0.52 cfs 0.232 af Tertiary=0.00 cfs 0.000 af Outflow=0.52 cfs 0.232 af

Pond BIO-3: Filtration Bioretention Peak Elev=596.56' Storage=7,945 cf Inflow=6.17 cfs 0.356 af
Primary=2.60 cfs 0.179 af Tertiary=0.00 cfs 0.000 af Outflow=2.60 cfs 0.179 af

Pond BIO-4: Filtration Bioretention Peak Elev=596.51' Storage=7,501 cf Inflow=3.17 cfs 0.186 af
Primary=0.04 cfs 0.014 af Tertiary=0.00 cfs 0.000 af Outflow=0.04 cfs 0.014 af

Pond BIO-5: Filtration Bioretention Peak Elev=596.51' Storage=13,840 cf Inflow=5.48 cfs 0.321 af
Primary=0.05 cfs 0.004 af Tertiary=0.00 cfs 0.000 af Outflow=0.05 cfs 0.004 af

Pond BIO-6: Filtration Bioretention Peak Elev=596.70' Storage=5,061 cf Inflow=5.76 cfs 0.337 af
Primary=4.66 cfs 0.250 af Tertiary=0.00 cfs 0.000 af Outflow=4.66 cfs 0.250 af

Pond BIO-7: Filtration Bioretention Peak Elev=596.54' Storage=16,078 cf Inflow=9.84 cfs 0.547 af
Primary=0.56 cfs 0.186 af Tertiary=0.00 cfs 0.000 af Outflow=0.56 cfs 0.186 af

Pond BIO-8: Filtration Bioretention Peak Elev=596.53' Storage=13,659 cf Inflow=8.20 cfs 0.456 af
Primary=0.43 cfs 0.147 af Tertiary=0.00 cfs 0.000 af Outflow=0.43 cfs 0.147 af

Pond BIO-9: Filtration Bioretention Peak Elev=595.46' Storage=6,656 cf Inflow=2.74 cfs 0.153 af
Primary=0.00 cfs 0.000 af Tertiary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.000 af

Total Runoff Area = 21.321 ac Runoff Volume = 4.152 af Average Runoff Depth = 2.34"
28.27% Pervious = 6.027 ac 71.73% Impervious = 15.294 ac

Summary for Subcatchment ES-1:

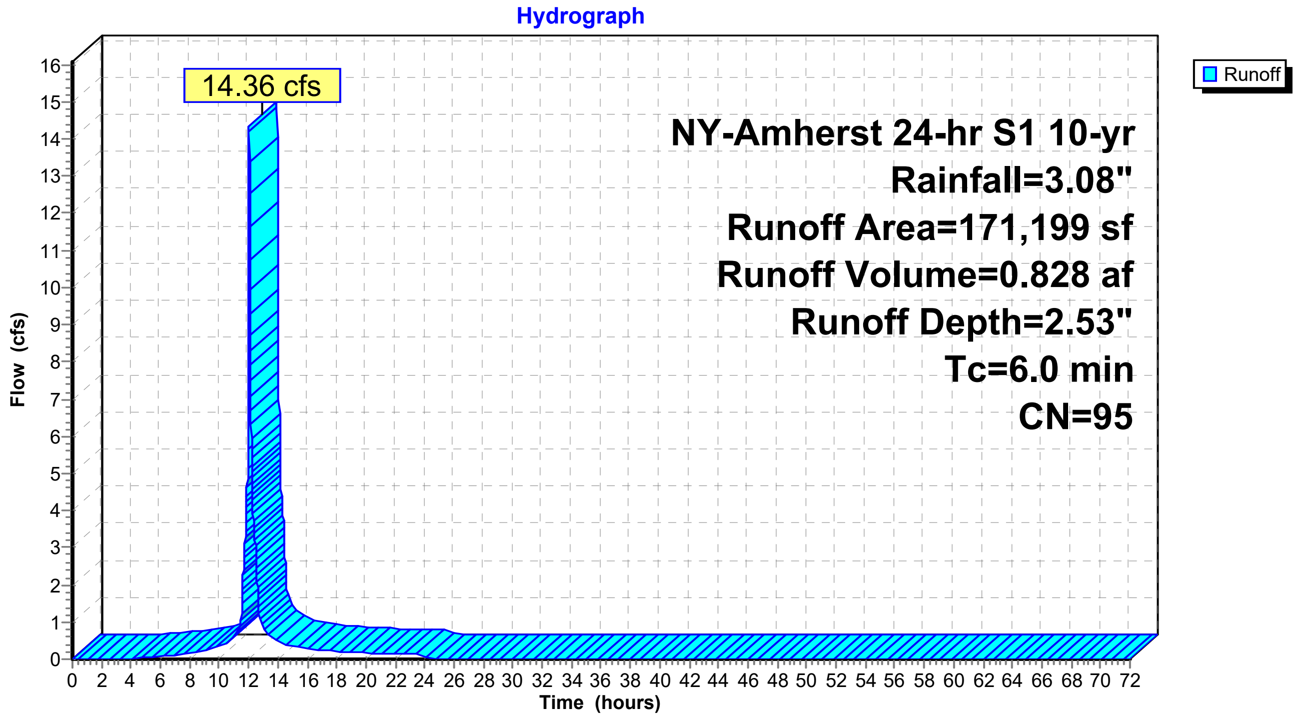
Runoff = 14.36 cfs @ 12.04 hrs, Volume= 0.828 af, Depth= 2.53"
Routed to Pond BIO-1 : Filtration Bioretention

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Amherst 24-hr S1 10-yr Rainfall=3.08"

Area (sf)	CN	Description
142,056	98	Paved parking, HSG D
29,143	80	>75% Grass cover, Good, HSG D
171,199	95	Weighted Average
29,143		17.02% Pervious Area
142,056		82.98% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Direct**

Subcatchment ES-1:



Summary for Subcatchment ES-2:

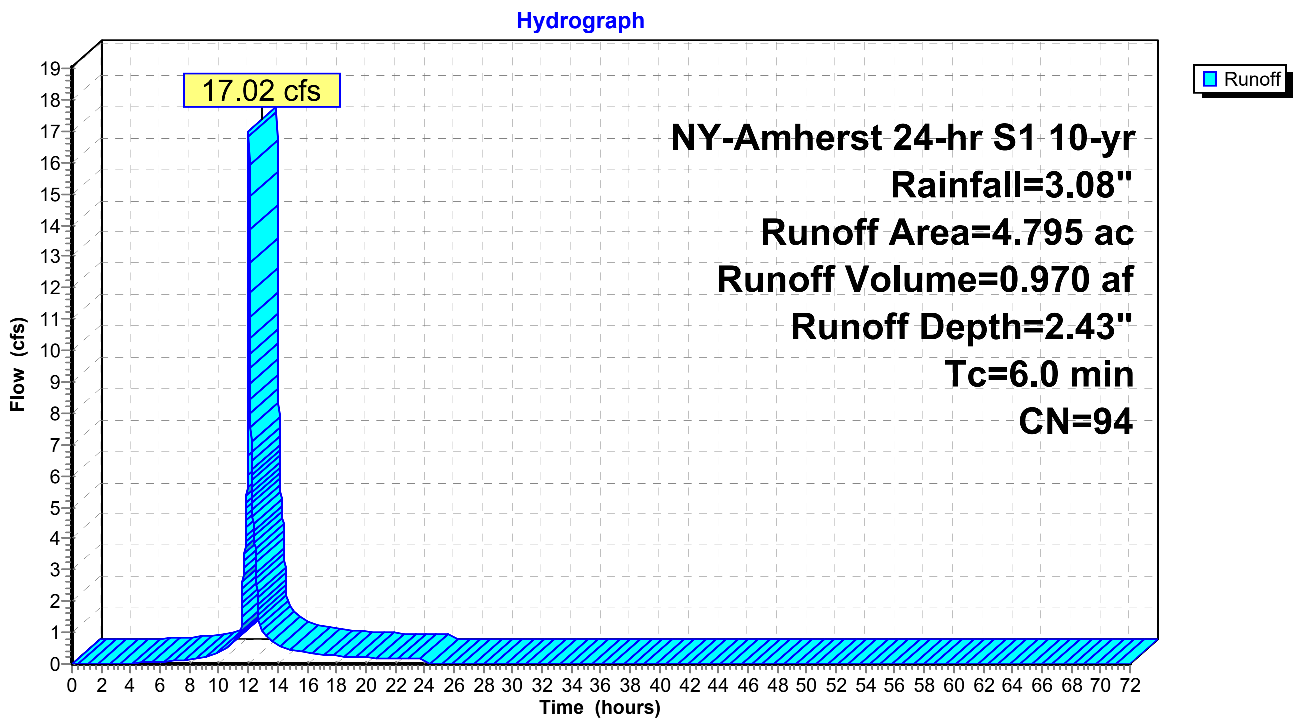
Runoff = 17.02 cfs @ 12.04 hrs, Volume= 0.970 af, Depth= 2.43"
Routed to Pond BIO-2 : Filtration Bioretention

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Amherst 24-hr S1 10-yr Rainfall=3.08"

Area (ac)	CN	Description
3.807	98	Paved parking, HSG D
0.988	80	>75% Grass cover, Good, HSG D
4.795	94	Weighted Average
0.988		20.60% Pervious Area
3.807		79.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Direct**

Subcatchment ES-2:



Summary for Subcatchment ES-3:

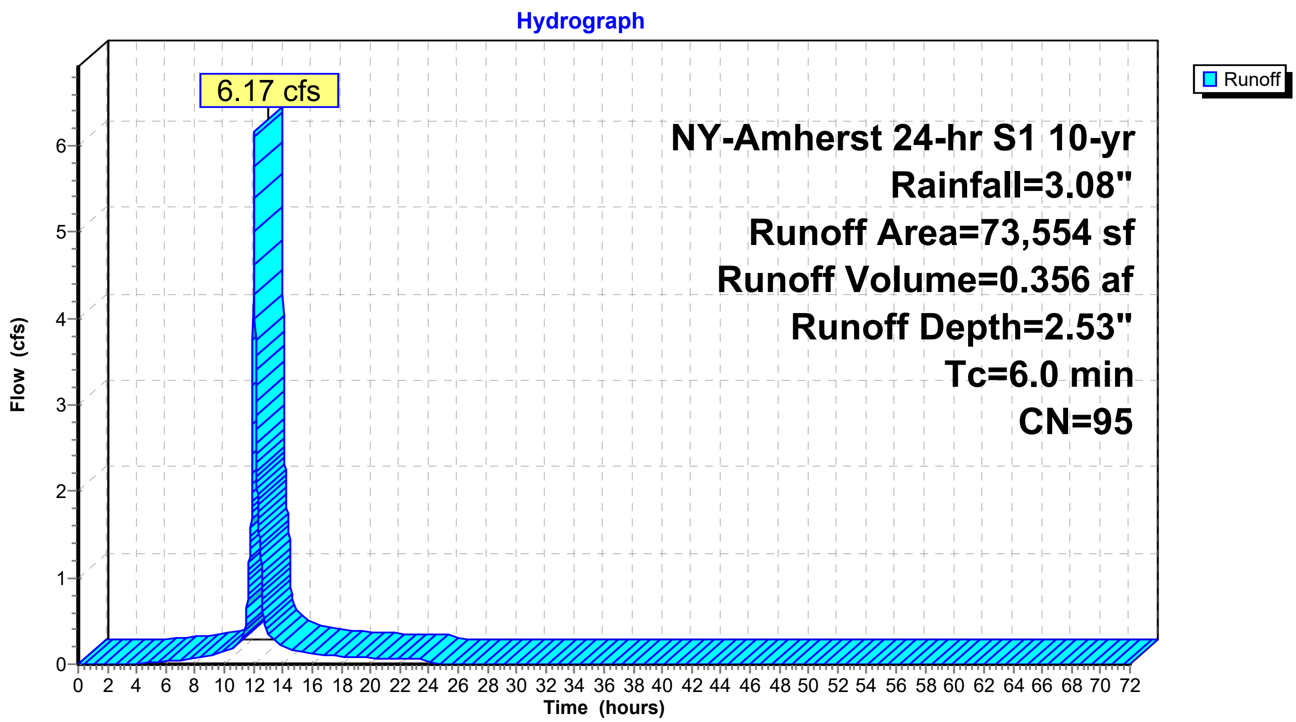
Runoff = 6.17 cfs @ 12.04 hrs, Volume= 0.356 af, Depth= 2.53"
Routed to Pond BIO-3 : Filtration Bioretention

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Amherst 24-hr S1 10-yr Rainfall=3.08"

Area (sf)	CN	Description
63,101	98	Paved parking, HSG D
10,453	80	>75% Grass cover, Good, HSG D
73,554	95	Weighted Average
10,453		14.21% Pervious Area
63,101		85.79% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Direct**

Subcatchment ES-3:



Summary for Subcatchment ES-4:

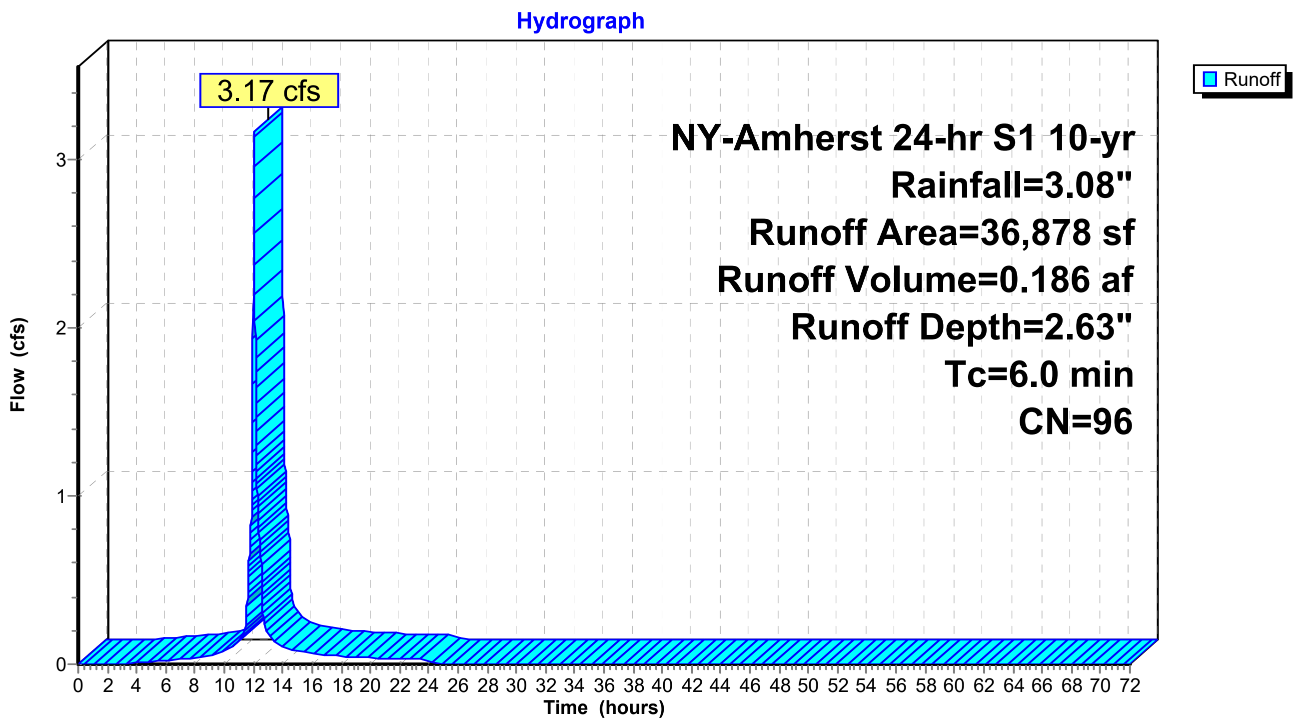
Runoff = 3.17 cfs @ 12.04 hrs, Volume= 0.186 af, Depth= 2.63"
Routed to Pond BIO-4 : Filtration Bioretention

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Amherst 24-hr S1 10-yr Rainfall=3.08"

Area (sf)	CN	Description
32,291	98	Paved parking, HSG D
4,587	80	>75% Grass cover, Good, HSG D
36,878	96	Weighted Average
4,587		12.44% Pervious Area
32,291		87.56% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Direct**

Subcatchment ES-4:



Summary for Subcatchment ES-5:

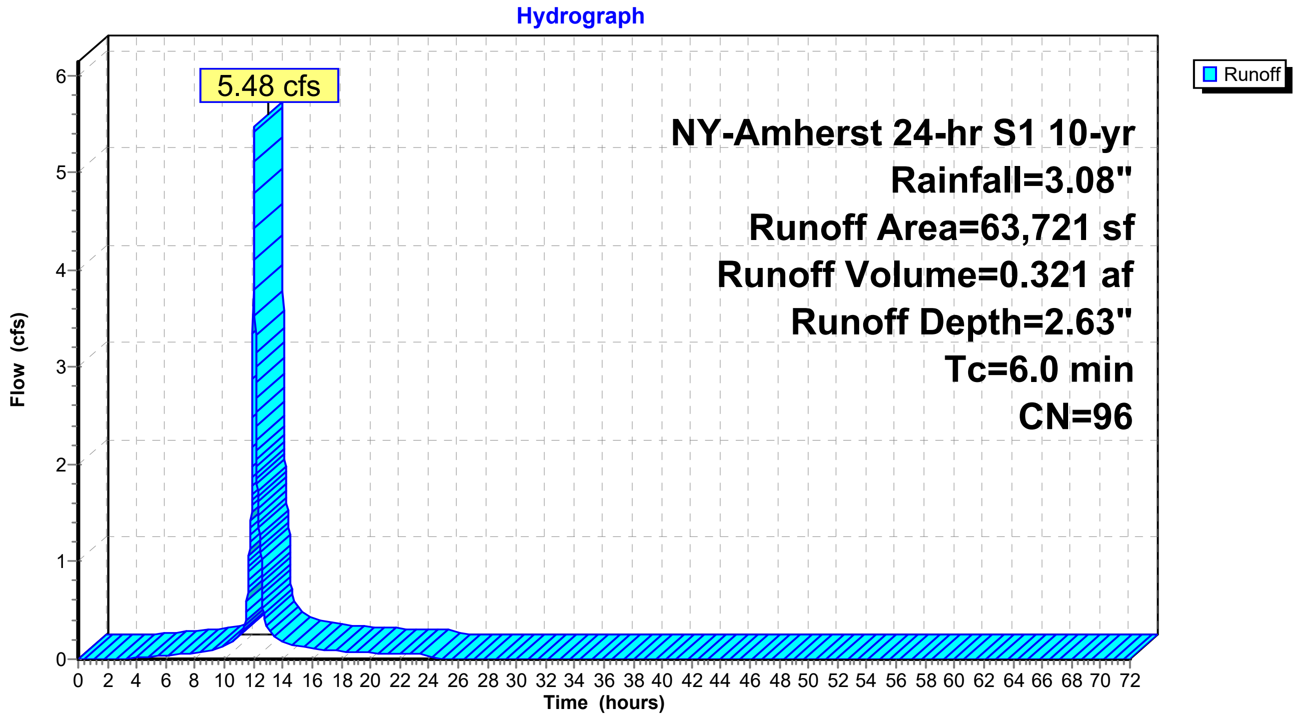
Runoff = 5.48 cfs @ 12.04 hrs, Volume= 0.321 af, Depth= 2.63"
Routed to Pond BIO-5 : Filtration Bioretention

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Amherst 24-hr S1 10-yr Rainfall=3.08"

Area (sf)	CN	Description
55,032	98	Paved parking, HSG D
8,689	80	>75% Grass cover, Good, HSG D
63,721	96	Weighted Average
8,689		13.64% Pervious Area
55,032		86.36% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Direct**

Subcatchment ES-5:



Summary for Subcatchment ES-6:

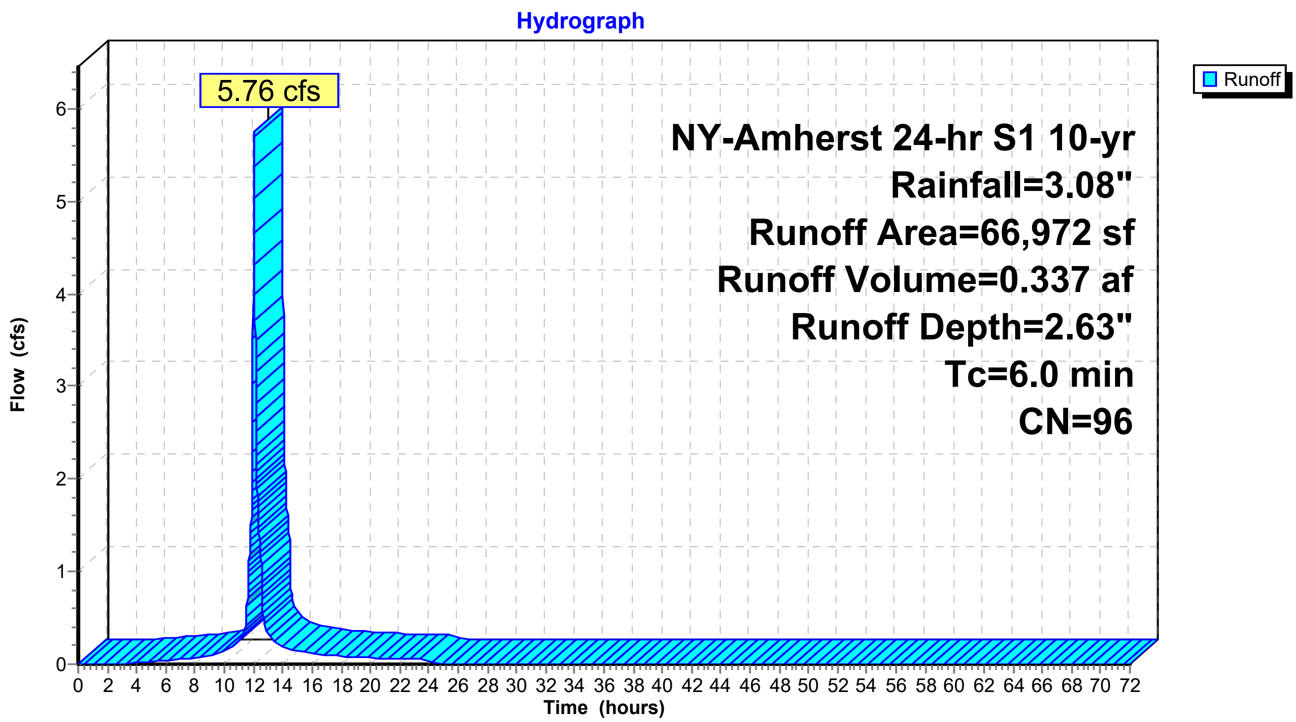
Runoff = 5.76 cfs @ 12.04 hrs, Volume= 0.337 af, Depth= 2.63"
Routed to Pond BIO-6 : Filtration Bioretention

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Amherst 24-hr S1 10-yr Rainfall=3.08"

Area (sf)	CN	Description
60,462	98	Paved parking, HSG D
6,510	80	>75% Grass cover, Good, HSG D
66,972	96	Weighted Average
6,510		9.72% Pervious Area
60,462		90.28% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Direct**

Subcatchment ES-6:



Summary for Subcatchment ES-7:

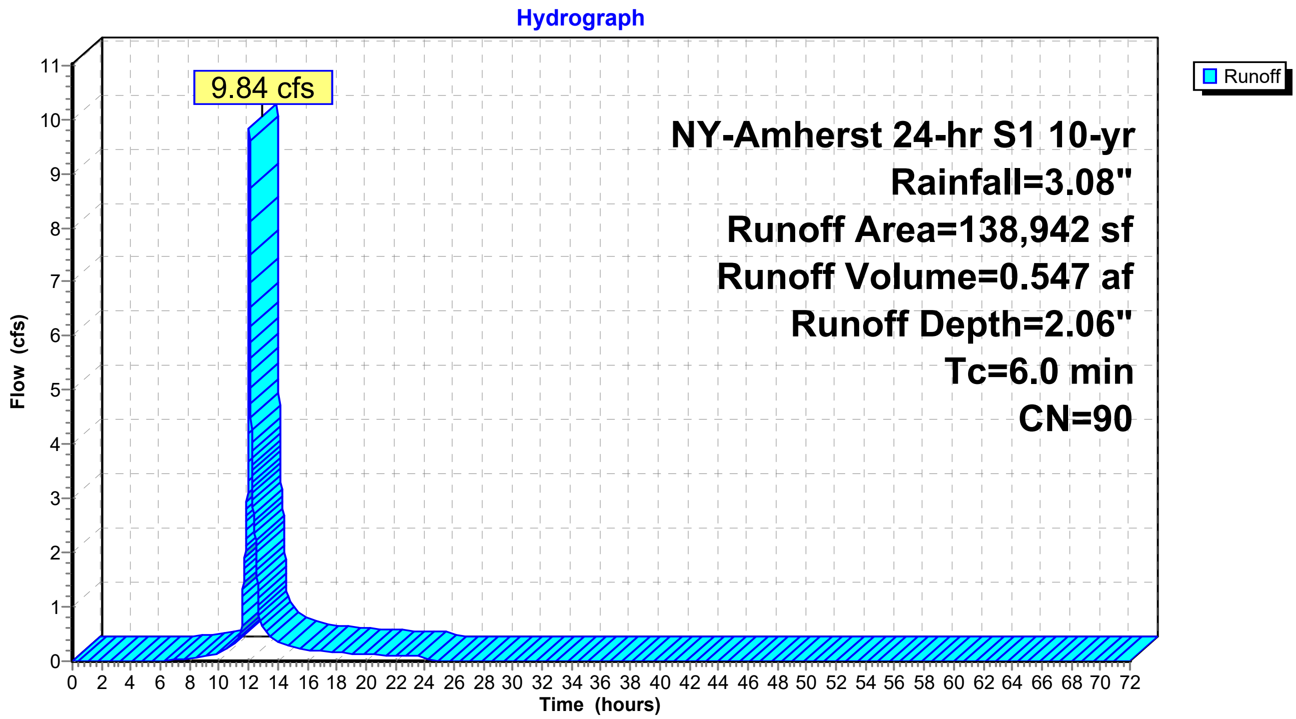
Runoff = 9.84 cfs @ 12.04 hrs, Volume= 0.547 af, Depth= 2.06"
Routed to Pond BIO-7 : Filtration Bioretention

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Amherst 24-hr S1 10-yr Rainfall=3.08"

Area (sf)	CN	Description
75,973	98	Paved parking, HSG D
62,969	80	>75% Grass cover, Good, HSG D
138,942	90	Weighted Average
62,969		45.32% Pervious Area
75,973		54.68% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Direct**

Subcatchment ES-7:



Summary for Subcatchment ES-8:

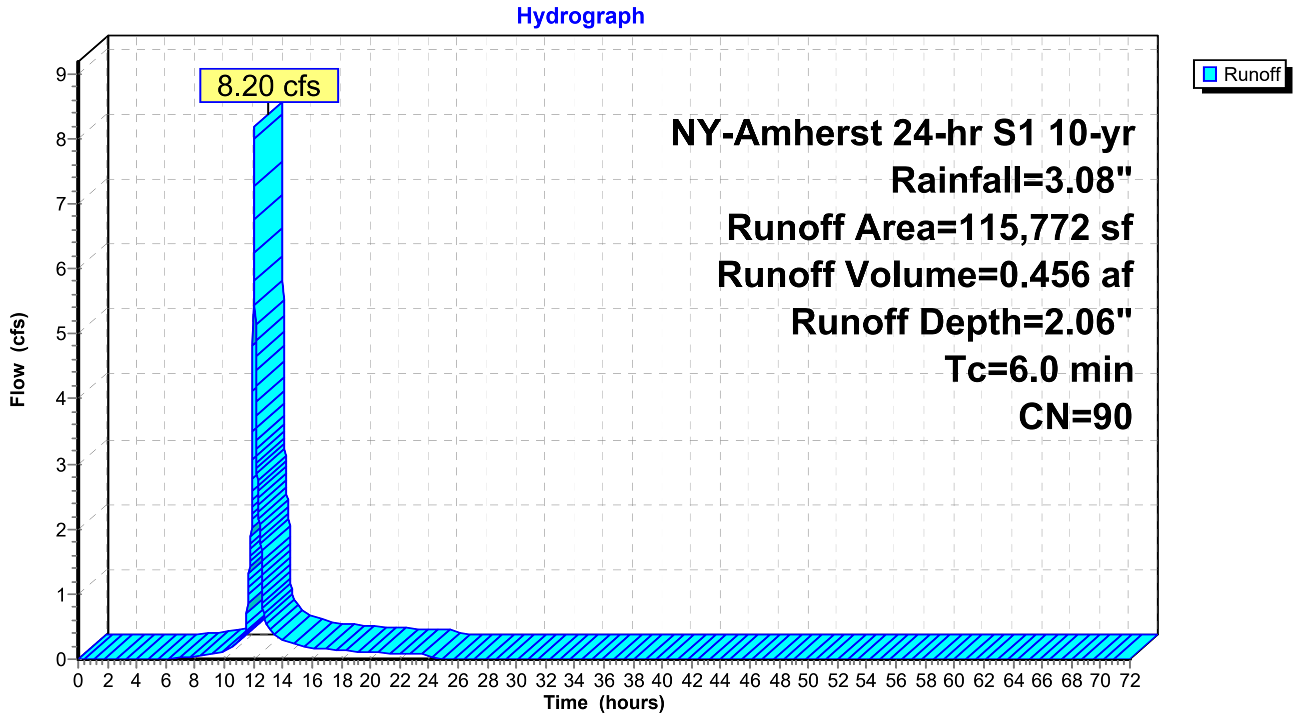
Runoff = 8.20 cfs @ 12.04 hrs, Volume= 0.456 af, Depth= 2.06"
Routed to Pond BIO-8 : Filtration Bioretention

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Amherst 24-hr S1 10-yr Rainfall=3.08"

Area (sf)	CN	Description
62,258	98	Paved parking, HSG D
53,514	80	>75% Grass cover, Good, HSG D
115,772	90	Weighted Average
53,514		46.22% Pervious Area
62,258		53.78% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Direct**

Subcatchment ES-8:



Summary for Subcatchment ES-9:

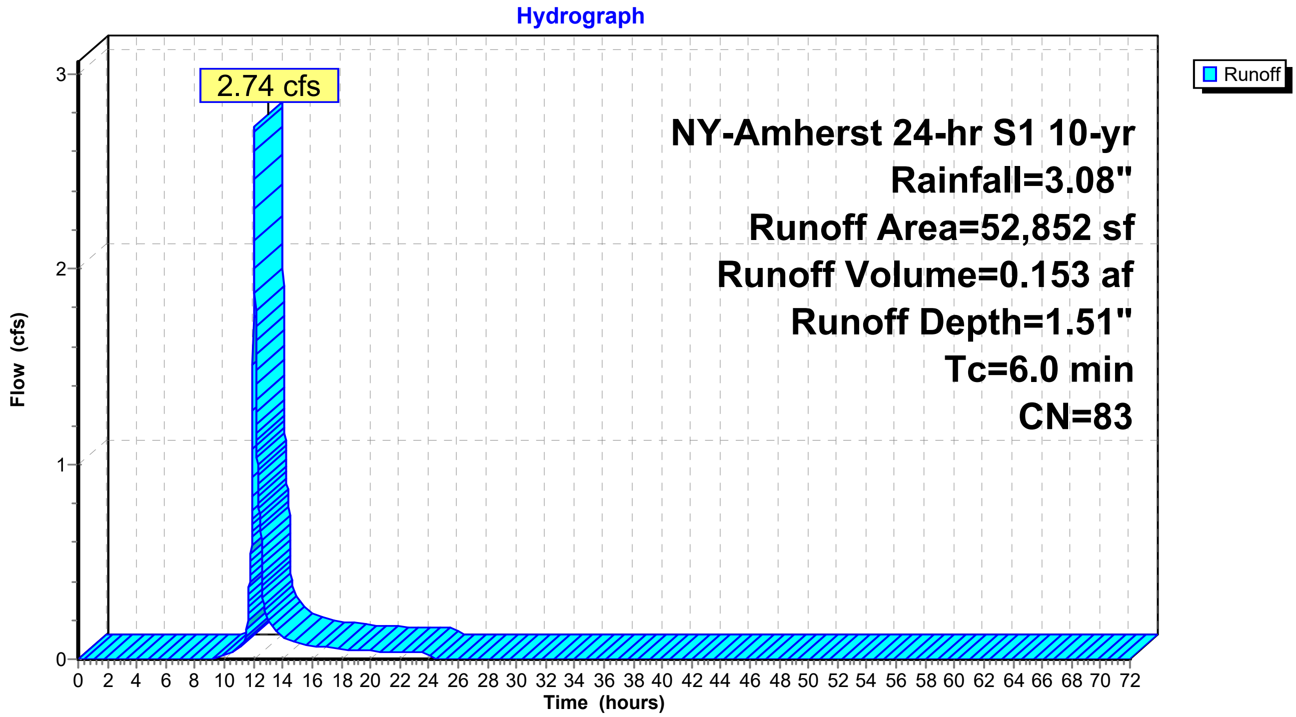
Runoff = 2.74 cfs @ 12.04 hrs, Volume= 0.153 af, Depth= 1.51"
Routed to Pond BIO-9 : Filtration Bioretention

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Amherst 24-hr S1 10-yr Rainfall=3.08"

Area (sf)	CN	Description
9,221	98	Paved parking, HSG D
43,631	80	>75% Grass cover, Good, HSG D
52,852	83	Weighted Average
43,631		82.55% Pervious Area
9,221		17.45% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Direct**

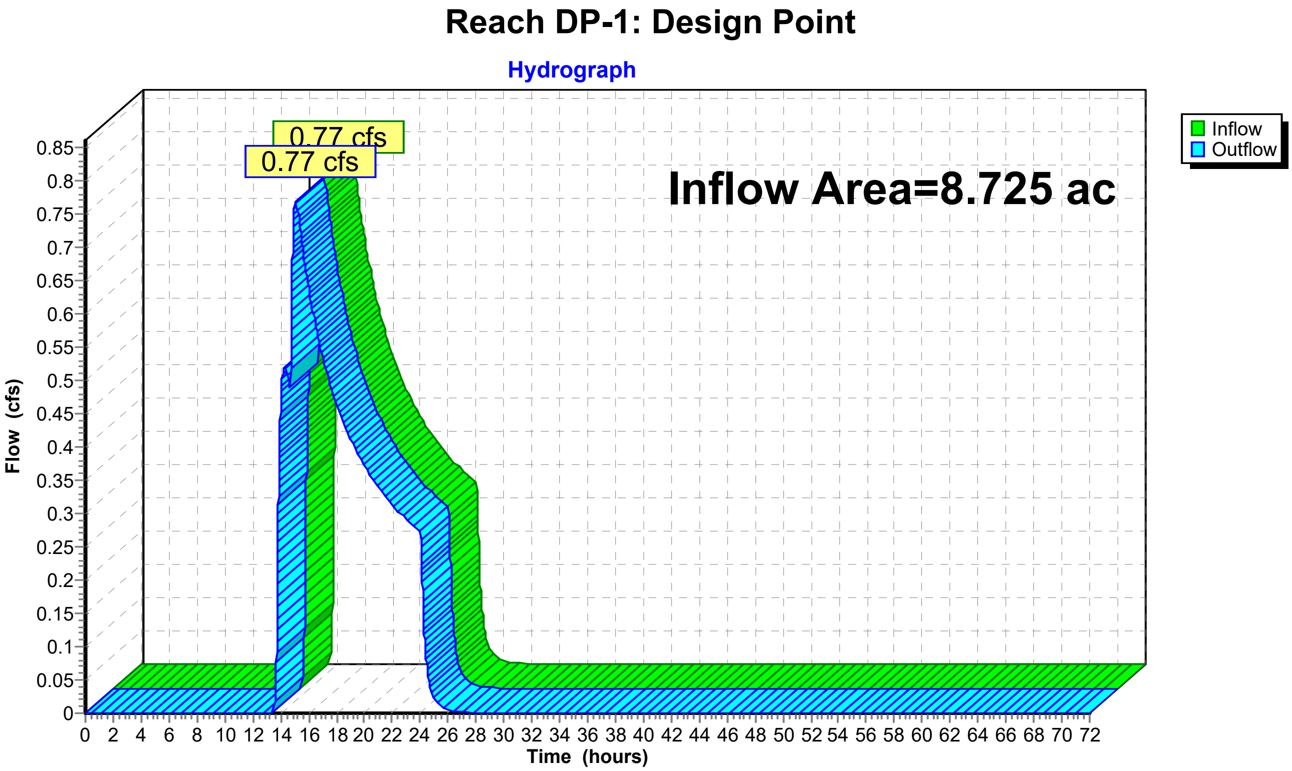
Subcatchment ES-9:



Summary for Reach DP-1: Design Point

Inflow Area =	8.725 ac,	81.01% Impervious, Inflow Depth = 0.53"	for 10-yr event	
Inflow =	0.77 cfs @	15.07 hrs, Volume=	0.385 af	
Outflow =	0.77 cfs @	15.07 hrs, Volume=	0.385 af,	Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

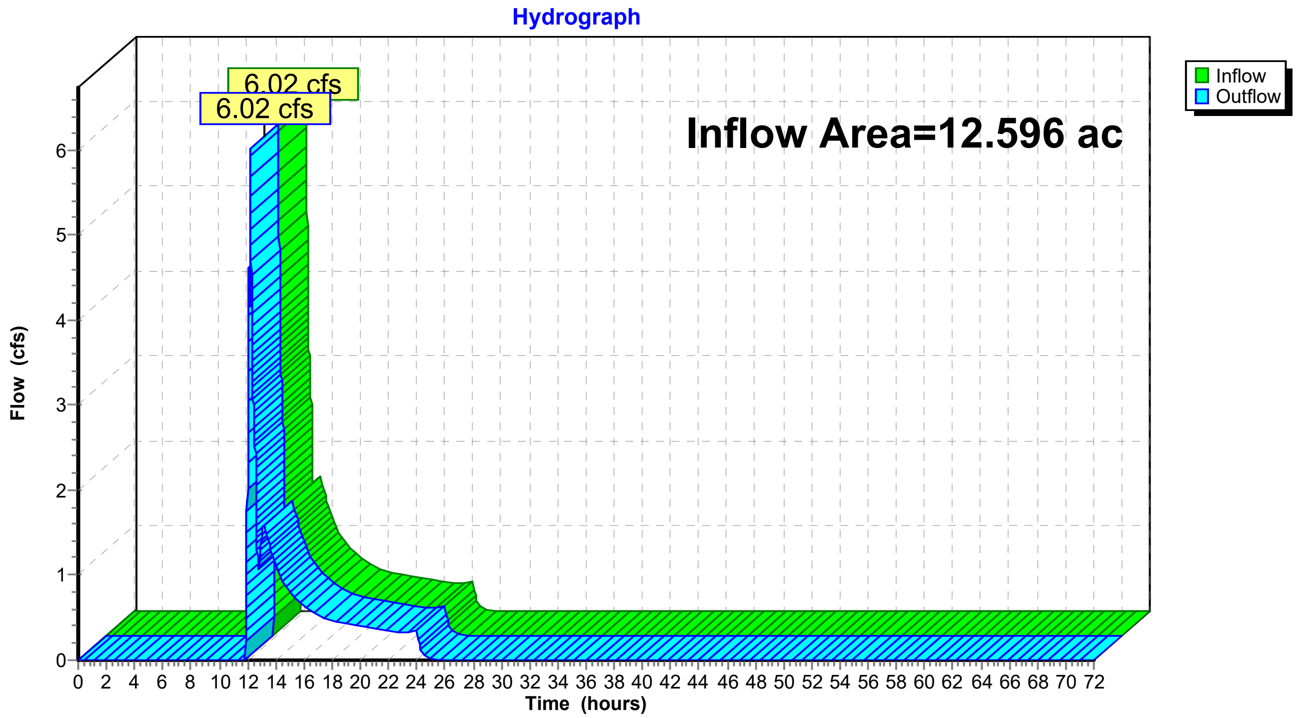


Summary for Reach DP-2: Design Point

Inflow Area = 12.596 ac, 65.31% Impervious, Inflow Depth = 0.74" for 10-yr event
Inflow = 6.02 cfs @ 12.17 hrs, Volume= 0.780 af
Outflow = 6.02 cfs @ 12.17 hrs, Volume= 0.780 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Reach DP-2: Design Point



Summary for Pond BIO-1: Filtration Bioretention

Inflow Area = 3.930 ac, 82.98% Impervious, Inflow Depth = 2.53" for 10-yr event
Inflow = 14.36 cfs @ 12.04 hrs, Volume= 0.828 af
Outflow = 0.34 cfs @ 15.16 hrs, Volume= 0.153 af, Atten= 98%, Lag= 187.5 min
Primary = 0.34 cfs @ 15.16 hrs, Volume= 0.153 af
Routed to Reach DP-1 : Design Point
Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach DP-1 : Design Point

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 596.52' @ 15.16 hrs Surf.Area= 20,488 sf Storage= 29,616 cf
Flood Elev= 597.00' Surf.Area= 24,070 sf Storage= 36,359 cf

Plug-Flow detention time= 536.1 min calculated for 0.153 af (18% of inflow)
Center-of-Mass det. time= 341.5 min (1,123.5 - 782.0)

Volume	Invert	Avail.Storage	Storage Description
#1	596.00'	12,035 cf	**Above Mulch Surface (Prismatic)** Listed below (Recalc)
#2	592.41'	24,324 cf	**Filtration Media (Prismatic)** Listed below (Recalc)
		36,359 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
596.00	8,330	0	0
597.00	15,740	12,035	12,035

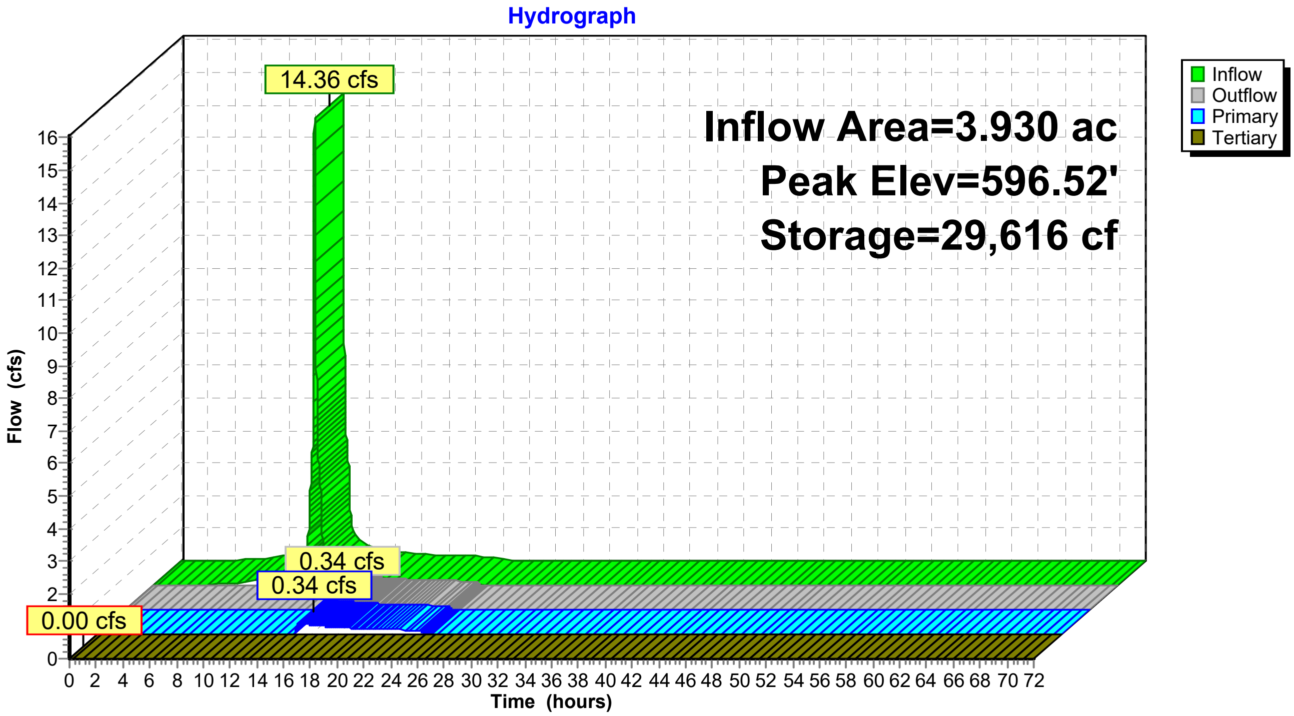
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
592.41	8,330	0.0	0	0
592.42	8,330	40.0	33	33
593.25	8,330	20.0	1,383	1,416
595.75	8,330	100.0	20,825	22,241
596.00	8,330	100.0	2,083	24,324

Device	Routing	Invert	Outlet Devices
#1	Device 2	596.50'	**24.0" x 24.0" Horiz. Overflow Grate X 6.00** C= 0.600 Limited to weir flow at low heads
#2	Primary	592.41'	**12.0" Round Culvert** L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 592.41' / 592.39' S= 0.0010 '/' Cc= 0.900 n= 0.012 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#3	Tertiary	596.90'	**10.0' long x 3.0' breadth Emergency Overflow 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

Primary OutFlow Max=0.34 cfs @ 15.16 hrs HW=596.52' TW=0.00' (Dynamic Tailwater)
└─**2=Culvert** (Passes 0.34 cfs of 5.67 cfs potential flow)
  └─**1=Overflow Grate** (Weir Controls 0.34 cfs @ 0.42 fps)

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=592.41' TW=0.00' (Dynamic Tailwater)
└─**3=Emergency Overflow Weir** (Controls 0.00 cfs)

Pond BIO-1: Filtration Bioretention



Summary for Pond BIO-2: Filtration Bioretention

Inflow Area = 4.795 ac, 79.40% Impervious, Inflow Depth = 2.43" for 10-yr event
Inflow = 17.02 cfs @ 12.04 hrs, Volume= 0.970 af
Outflow = 0.52 cfs @ 14.27 hrs, Volume= 0.232 af, Atten= 97%, Lag= 134.1 min
Primary = 0.52 cfs @ 14.27 hrs, Volume= 0.232 af
Routed to Reach DP-1 : Design Point
Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach DP-1 : Design Point

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 596.52' @ 14.27 hrs Surf.Area= 37,557 sf Storage= 32,671 cf
Flood Elev= 597.00' Surf.Area= 57,855 sf Storage= 51,864 cf

Plug-Flow detention time= 449.3 min calculated for 0.232 af (24% of inflow)
Center-of-Mass det. time= 290.3 min (1,078.6 - 788.3)

Volume	Invert	Avail.Storage	Storage Description
#1	596.00'	28,928 cf	**Above Mulch Surface (Prismatic)** Listed below (Recalc)
#2	592.41'	22,937 cf	**Filtration Media (Prismatic)** Listed below (Recalc)
		51,864 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
596.00	7,855	0	0
597.00	50,000	28,928	28,928

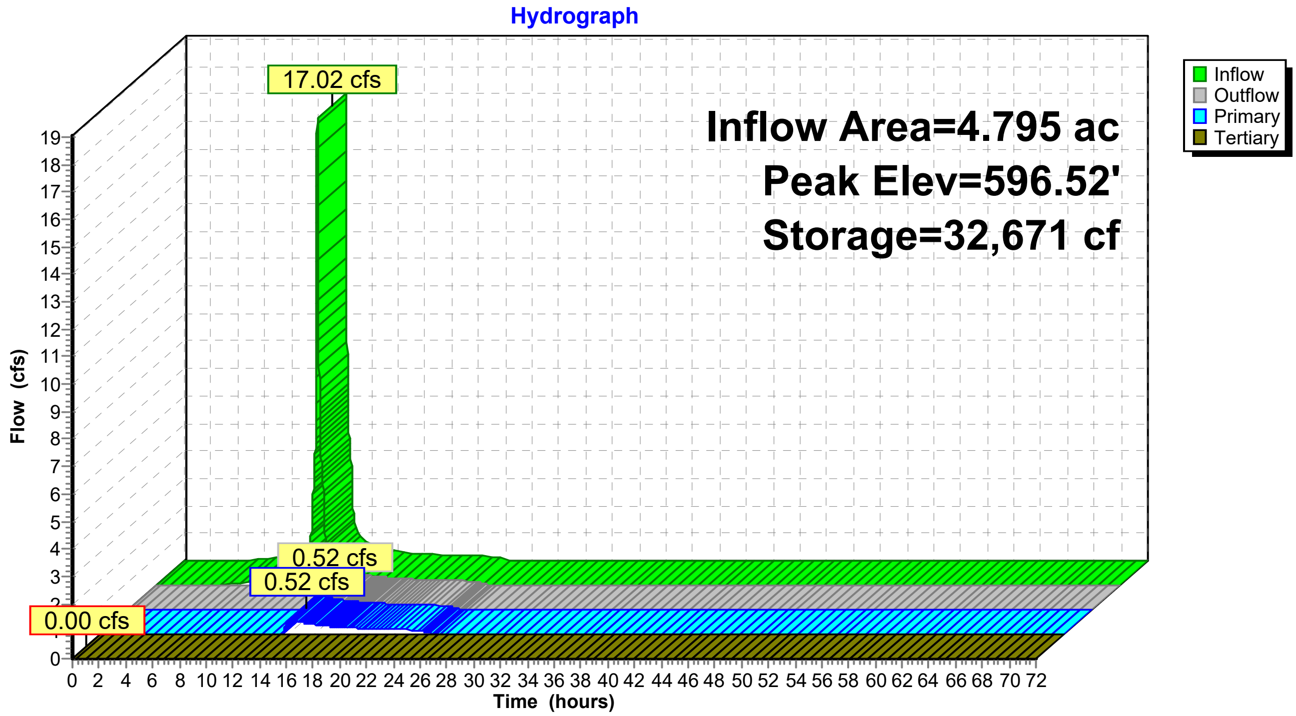
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
592.41	7,855	0.0	0	0
592.42	7,855	40.0	31	31
593.25	7,855	20.0	1,304	1,335
595.75	7,855	100.0	19,638	20,973
596.00	7,855	100.0	1,964	22,937

Device	Routing	Invert	Outlet Devices
#1	Device 2	596.50'	**24.0" x 24.0" Horiz. Overflow Grate X 8.00** C= 0.600 Limited to weir flow at low heads
#2	Primary	592.41'	**6.0" Round Culvert** L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 592.41' / 592.39' S= 0.0010 '/' Cc= 0.900 n= 0.012 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#3	Tertiary	596.90'	**10.0' long x 3.0' breadth Emergency Overflow 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

Primary OutFlow Max=0.52 cfs @ 14.27 hrs HW=596.52' TW=0.00' (Dynamic Tailwater)
└─**2=Culvert** (Passes 0.52 cfs of 1.47 cfs potential flow)
  └─**1=Overflow Grate** (Weir Controls 0.52 cfs @ 0.44 fps)

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=592.41' TW=0.00' (Dynamic Tailwater)
└─**3=Emergency Overflow Weir** (Controls 0.00 cfs)

Pond BIO-2: Filtration Bioretention



Summary for Pond BIO-3: Filtration Bioretention

Inflow Area = 1.689 ac, 85.79% Impervious, Inflow Depth = 2.53" for 10-yr event
Inflow = 6.17 cfs @ 12.04 hrs, Volume= 0.356 af
Outflow = 2.60 cfs @ 12.19 hrs, Volume= 0.179 af, Atten= 58%, Lag= 9.1 min
Primary = 2.60 cfs @ 12.19 hrs, Volume= 0.179 af
Routed to Reach DP-2 : Design Point
Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach DP-2 : Design Point

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 596.56' @ 12.19 hrs Surf.Area= 6,389 sf Storage= 7,945 cf
Flood Elev= 597.00' Surf.Area= 8,070 sf Storage= 10,176 cf

Plug-Flow detention time= 226.0 min calculated for 0.179 af (50% of inflow)
Center-of-Mass det. time= 114.2 min (896.3 - 782.0)

Volume	Invert	Avail.Storage	Storage Description
#1	596.00'	4,035 cf	**Above Mulch Surface (Prismatic)**Listed below (Recalc)
#2	592.41'	6,141 cf	**Filtration Media (Prismatic)**Listed below (Recalc)
		10,176 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
596.00	2,103	0	0
597.00	5,967	4,035	4,035

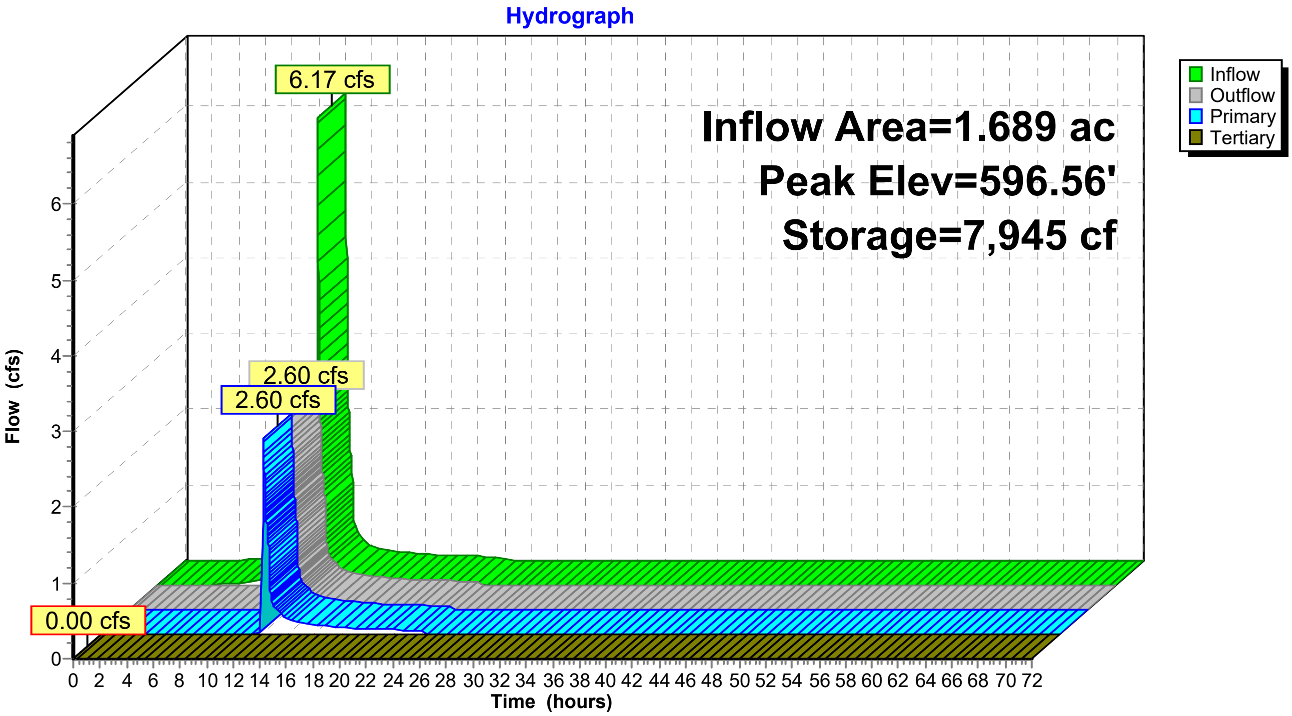
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
592.41	2,103	0.0	0	0
592.42	2,103	40.0	8	8
593.25	2,103	20.0	349	358
595.75	2,103	100.0	5,258	5,615
596.00	2,103	100.0	526	6,141

Device	Routing	Invert	Outlet Devices
#1	Device 2	596.50'	**24.0" x 24.0" Horiz. Overflow Grate X 6.00** C= 0.600 Limited to weir flow at low heads
#2	Primary	592.41'	**12.0" Round Culvert** L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 592.41' / 592.39' S= 0.0010 '/' Cc= 0.900 n= 0.012 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#3	Tertiary	596.95'	**10.0' long x 3.0' breadth Emergency Overflow 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

Primary OutFlow Max=2.59 cfs @ 12.19 hrs HW=596.56' TW=0.00' (Dynamic Tailwater)
└─**2=Culvert** (Passes 2.59 cfs of 5.71 cfs potential flow)
  └─**1=Overflow Grate** (Weir Controls 2.59 cfs @ 0.83 fps)

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=592.41' TW=0.00' (Dynamic Tailwater)
└─**3=Emergency Overflow Weir** (Controls 0.00 cfs)

Pond BIO-3: Filtration Bioretention



Summary for Pond BIO-4: Filtration Bioretention

Inflow Area = 0.847 ac, 87.56% Impervious, Inflow Depth = 2.63" for 10-yr event
Inflow = 3.17 cfs @ 12.04 hrs, Volume= 0.186 af
Outflow = 0.04 cfs @ 19.41 hrs, Volume= 0.014 af, Atten= 99%, Lag= 442.2 min
Primary = 0.04 cfs @ 19.41 hrs, Volume= 0.014 af
Routed to Reach dp-2 : Design Point
Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach dp-2 : Design Point

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 596.51' @ 19.41 hrs Surf.Area= 5,638 sf Storage= 7,501 cf
Flood Elev= 597.00' Surf.Area= 7,080 sf Storage= 9,614 cf

Plug-Flow detention time= 842.1 min calculated for 0.014 af (8% of inflow)
Center-of-Mass det. time= 512.7 min (1,287.6 - 775.0)

Volume	Invert	Avail.Storage	Storage Description
#1	596.00'	3,540 cf	**Above Mulch Surface (Prismatic)** Listed below (Recalc)
#2	592.41'	6,074 cf	**Filtration Media (Prismatic)** Listed below (Recalc)
		9,614 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
596.00	2,080	0	0
597.00	5,000	3,540	3,540

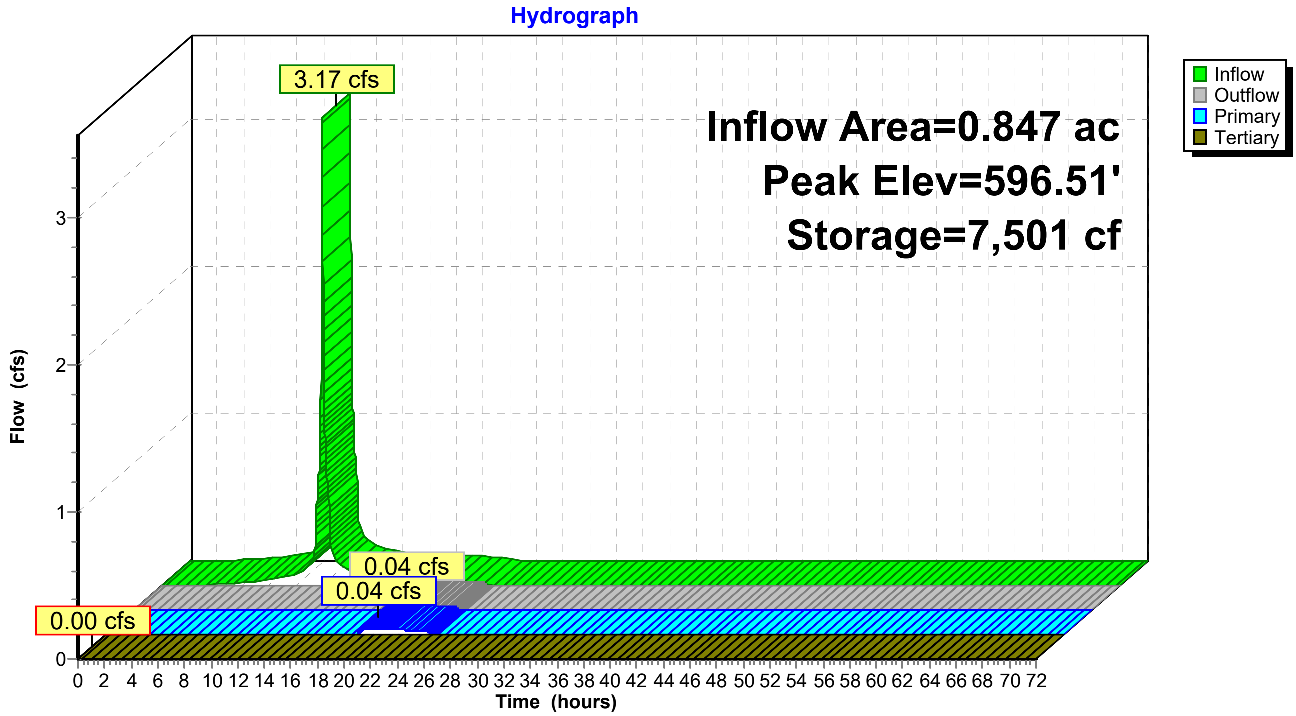
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
592.41	2,080	0.0	0	0
592.42	2,080	40.0	8	8
593.25	2,080	20.0	345	354
595.75	2,080	100.0	5,200	5,554
596.00	2,080	100.0	520	6,074

Device	Routing	Invert	Outlet Devices
#1	Device 2	596.50'	**24.0" x 24.0" Horiz. Overflow Grate X 3.00** C= 0.600 Limited to weir flow at low heads
#2	Primary	592.41'	**12.0" Round Culvert** L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 592.41' / 592.39' S= 0.0010 '/' Cc= 0.900 n= 0.012 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#3	Tertiary	596.90'	**10.0' long x 3.0' breadth Emergency Overflow 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

Primary OutFlow Max=0.04 cfs @ 19.41 hrs HW=596.51' TW=0.00' (Dynamic Tailwater)
└─**2=Culvert** (Passes 0.04 cfs of 5.66 cfs potential flow)
  └─**1=Overflow Grate** (Weir Controls 0.04 cfs @ 0.26 fps)

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=592.41' TW=0.00' (Dynamic Tailwater)
└─**3=Emergency Overflow Weir** (Controls 0.00 cfs)

Pond BIO-4: Filtration Bioretention



Summary for Pond BIO-5: Filtration Bioretention

Inflow Area = 1.463 ac, 86.36% Impervious, Inflow Depth = 2.63" for 10-yr event
Inflow = 5.48 cfs @ 12.04 hrs, Volume= 0.321 af
Outflow = 0.05 cfs @ 23.87 hrs, Volume= 0.004 af, Atten= 99%, Lag= 710.2 min
Primary = 0.05 cfs @ 23.87 hrs, Volume= 0.004 af
Routed to Reach dp-2 : Design Point
Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach dp-2 : Design Point

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 596.51' @ 23.87 hrs Surf.Area= 8,957 sf Storage= 13,840 cf
Flood Elev= 597.00' Surf.Area= 9,962 sf Storage= 16,550 cf

Plug-Flow detention time= 1,156.5 min calculated for 0.004 af (1% of inflow)
Center-of-Mass det. time= 656.2 min (1,431.1 - 775.0)

Volume	Invert	Avail.Storage	Storage Description
#1	596.00'	4,981 cf	**Above Mulch Surface (Prismatic)** Listed below (Recalc)
#2	592.41'	11,569 cf	**Filtration Media (Prismatic)** Listed below (Recalc)
		16,550 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
596.00	3,962	0	0
597.00	6,000	4,981	4,981

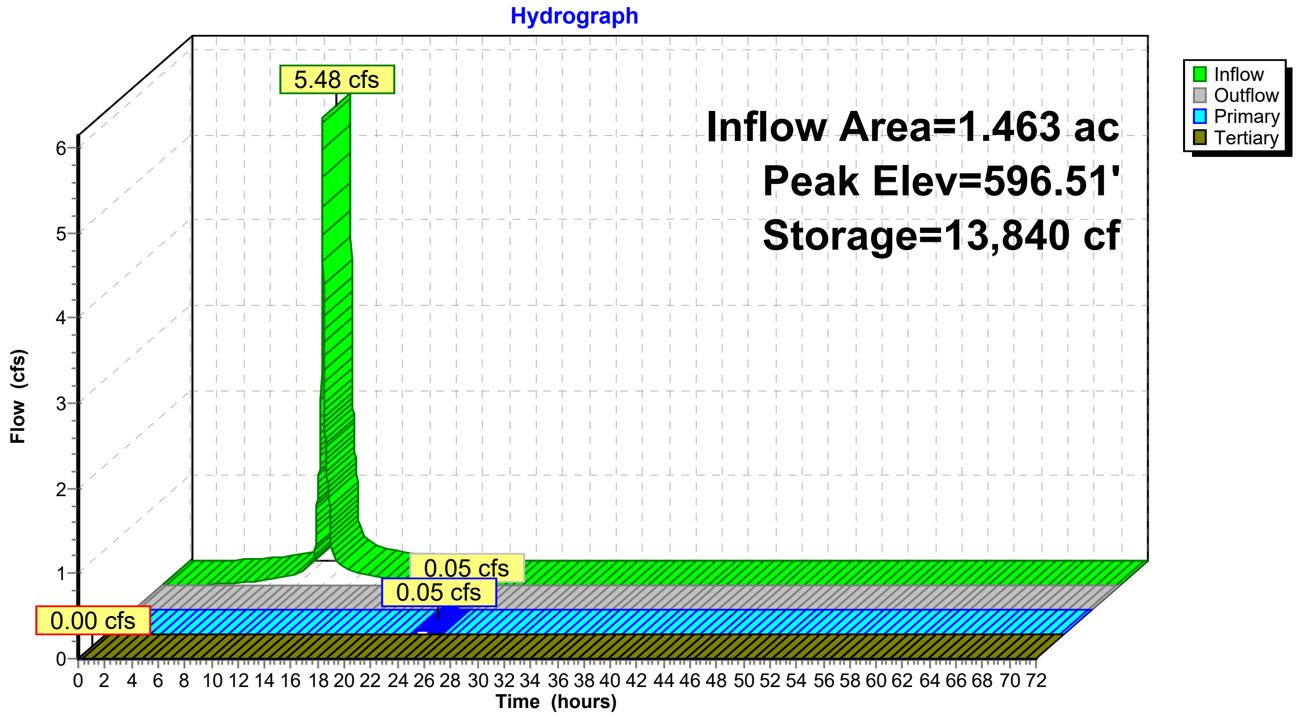
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
592.41	3,962	0.0	0	0
592.42	3,962	40.0	16	16
593.25	3,962	20.0	658	674
595.75	3,962	100.0	9,905	10,579
596.00	3,962	100.0	991	11,569

Device	Routing	Invert	Outlet Devices
#1	Device 2	596.50'	**24.0" x 24.0" Horiz. Overflow Grate X 3.00** C= 0.600 Limited to weir flow at low heads
#2	Primary	592.41'	**12.0" Round Culvert** L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 592.41' / 592.39' S= 0.0010 '/' Cc= 0.900 n= 0.012 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#3	Tertiary	596.90'	**10.0' long x 3.0' breadth Emergency Overflow 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

Primary OutFlow Max=0.05 cfs @ 23.87 hrs HW=596.51' TW=0.00' (Dynamic Tailwater)
└─**2=Culvert** (Passes 0.05 cfs of 5.66 cfs potential flow)
  └─**1=Overflow Grate** (Weir Controls 0.05 cfs @ 0.27 fps)

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=592.41' TW=0.00' (Dynamic Tailwater)
└─**3=Emergency Overflow Weir** (Controls 0.00 cfs)

Pond BIO-5: Filtration Bioretention



Summary for Pond BIO-6: Filtration Bioretention

Inflow Area = 1.537 ac, 90.28% Impervious, Inflow Depth = 2.63" for 10-yr event
Inflow = 5.76 cfs @ 12.04 hrs, Volume= 0.337 af
Outflow = 4.66 cfs @ 12.08 hrs, Volume= 0.250 af, Atten= 19%, Lag= 2.7 min
Primary = 4.66 cfs @ 12.08 hrs, Volume= 0.250 af
Routed to Reach dp-2 : Design Point
Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach dp-2 : Design Point

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 596.70' @ 12.08 hrs Surf.Area= 8,001 sf Storage= 5,061 cf
Flood Elev= 597.00' Surf.Area= 10,775 sf Storage= 7,651 cf

Plug-Flow detention time= 154.9 min calculated for 0.250 af (74% of inflow)
Center-of-Mass det. time= 68.0 min (843.0 - 775.0)

Volume	Invert	Avail.Storage	Storage Description
#1	596.00'	5,388 cf	**Above Mulch Surface (Prismatic)** Listed below (Recalc)
#2	592.41'	2,263 cf	**Filtration Media (Prismatic)** Listed below (Recalc)
		7,651 cf	Total Available Storage

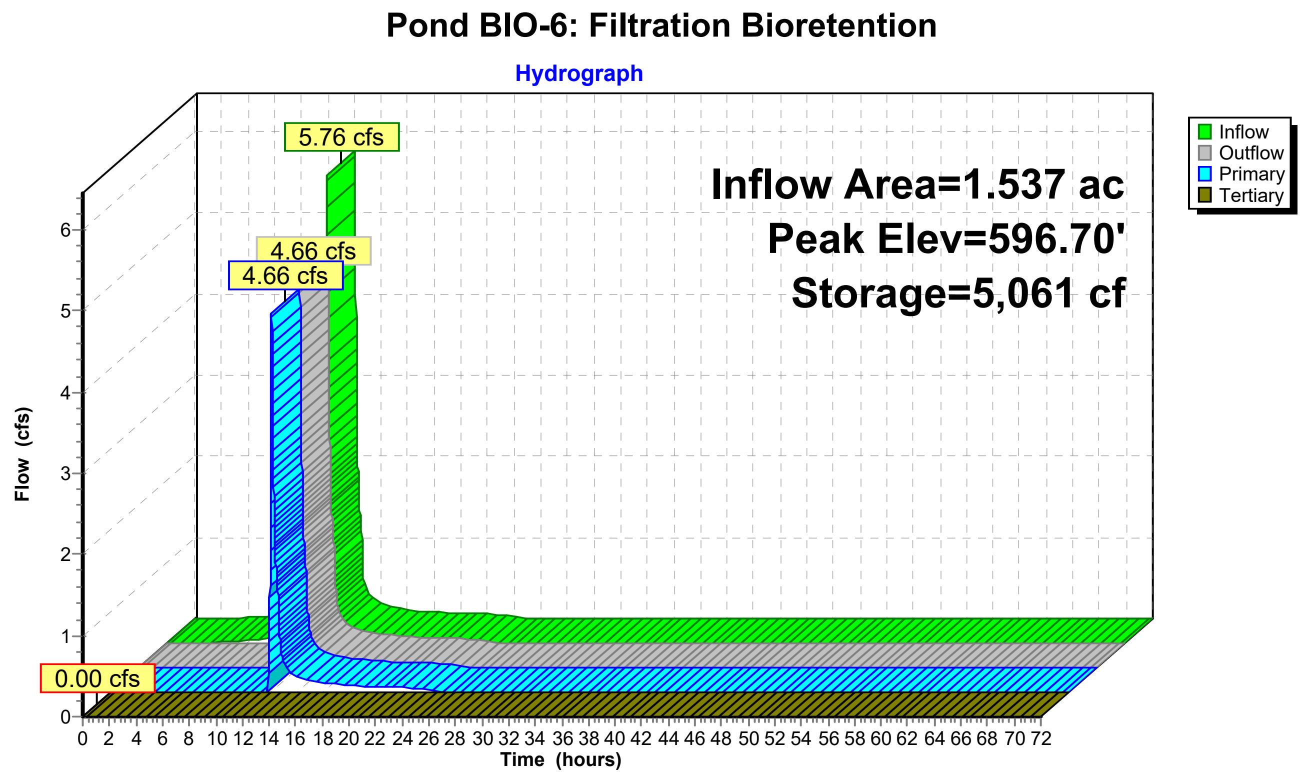
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
596.00	775	0	0
597.00	10,000	5,388	5,388

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
592.41	775	0.0	0	0
592.42	775	40.0	3	3
593.25	775	20.0	129	132
595.75	775	100.0	1,938	2,069
596.00	775	100.0	194	2,263

Device	Routing	Invert	Outlet Devices
#1	Device 2	596.50'	**24.0" x 24.0" Horiz. Overflow Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#2	Primary	592.41'	**12.0" Round Culvert** L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 592.41' / 592.39' S= 0.0010 '/' Cc= 0.900 n= 0.012 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#3	Tertiary	596.90'	**10.0' long x 3.0' breadth Emergency Overflow 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

Primary OutFlow Max=4.65 cfs @ 12.08 hrs HW=596.70' TW=0.00' (Dynamic Tailwater)
└─**2=Culvert** (Passes 4.65 cfs of 5.81 cfs potential flow)
  └─**1=Overflow Grate** (Weir Controls 4.65 cfs @ 1.46 fps)

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=592.41' TW=0.00' (Dynamic Tailwater)
└─**3=Emergency Overflow Weir** (Controls 0.00 cfs)



Summary for Pond BIO-7: Filtration Bioretention

Inflow Area = 3.190 ac, 54.68% Impervious, Inflow Depth = 2.06" for 10-yr event
Inflow = 9.84 cfs @ 12.04 hrs, Volume= 0.547 af
Outflow = 0.56 cfs @ 13.12 hrs, Volume= 0.186 af, Atten= 94%, Lag= 64.8 min
Primary = 0.56 cfs @ 13.12 hrs, Volume= 0.186 af
Routed to Reach dp-2 : Design Point
Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach dp-2 : Design Point

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 596.54' @ 13.12 hrs Surf.Area= 14,201 sf Storage= 16,078 cf
Flood Elev= 597.00' Surf.Area= 19,200 sf Storage= 21,864 cf

Plug-Flow detention time= 330.1 min calculated for 0.186 af (34% of inflow)
Center-of-Mass det. time= 206.2 min (1,014.3 - 808.1)

Volume	Invert	Avail.Storage	Storage Description
#1	596.00'	9,600 cf	**Above Mulch Surface (Prismatic)** Listed below (Recalc)
#2	592.41'	12,264 cf	**Filtration Media (Prismatic)** Listed below (Recalc)
		21,864 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
596.00	4,200	0	0
597.00	15,000	9,600	9,600

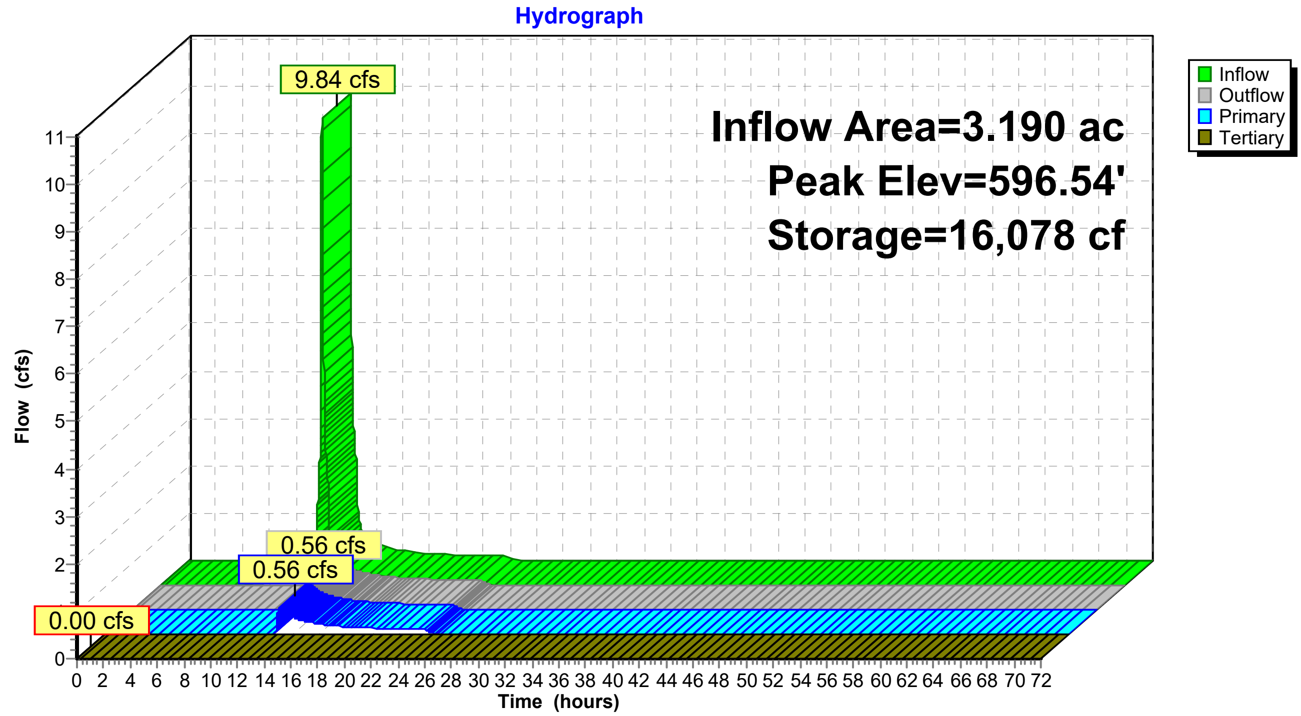
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
592.41	4,200	0.0	0	0
592.42	4,200	40.0	17	17
593.25	4,200	20.0	697	714
595.75	4,200	100.0	10,500	11,214
596.00	4,200	100.0	1,050	12,264

Device	Routing	Invert	Outlet Devices
#1	Device 2	596.50'	**24.0" x 24.0" Horiz. Overflow Grate X 3.00** C= 0.600 Limited to weir flow at low heads
#2	Primary	592.41'	**12.0" Round Culvert** L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 592.41' / 592.39' S= 0.0010 '/' Cc= 0.900 n= 0.012 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#3	Tertiary	596.90'	**10.0' long x 3.0' breadth Emergency Overflow 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

Primary OutFlow Max=0.56 cfs @ 13.12 hrs HW=596.54' TW=0.00' (Dynamic Tailwater)
└─**2=Culvert** (Passes 0.56 cfs of 5.69 cfs potential flow)
  └─**1=Overflow Grate** (Weir Controls 0.56 cfs @ 0.63 fps)

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=592.41' TW=0.00' (Dynamic Tailwater)
└─**3=Emergency Overflow Weir** (Controls 0.00 cfs)

Pond BIO-7: Filtration Bioretention



Summary for Pond BIO-8: Filtration Bioretention

Inflow Area = 2.658 ac, 53.78% Impervious, Inflow Depth = 2.06" for 10-yr event
Inflow = 8.20 cfs @ 12.04 hrs, Volume= 0.456 af
Outflow = 0.43 cfs @ 13.24 hrs, Volume= 0.147 af, Atten= 95%, Lag= 71.8 min
Primary = 0.43 cfs @ 13.24 hrs, Volume= 0.147 af
Routed to Reach dp-2 : Design Point
Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach dp-2 : Design Point

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 596.53' @ 13.24 hrs Surf.Area= 10,747 sf Storage= 13,659 cf
Flood Elev= 597.00' Surf.Area= 13,700 sf Storage= 17,654 cf

Plug-Flow detention time= 341.2 min calculated for 0.147 af (32% of inflow)
Center-of-Mass det. time= 215.1 min (1,023.2 - 808.1)

Volume	Invert	Avail.Storage	Storage Description
#1	596.00'	6,850 cf	**Above Mulch Surface (Prismatic)** Listed below (Recalc)
#2	592.41'	10,804 cf	**Filtration Media (Prismatic)** Listed below (Recalc)
		17,654 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
596.00	3,700	0	0
597.00	10,000	6,850	6,850

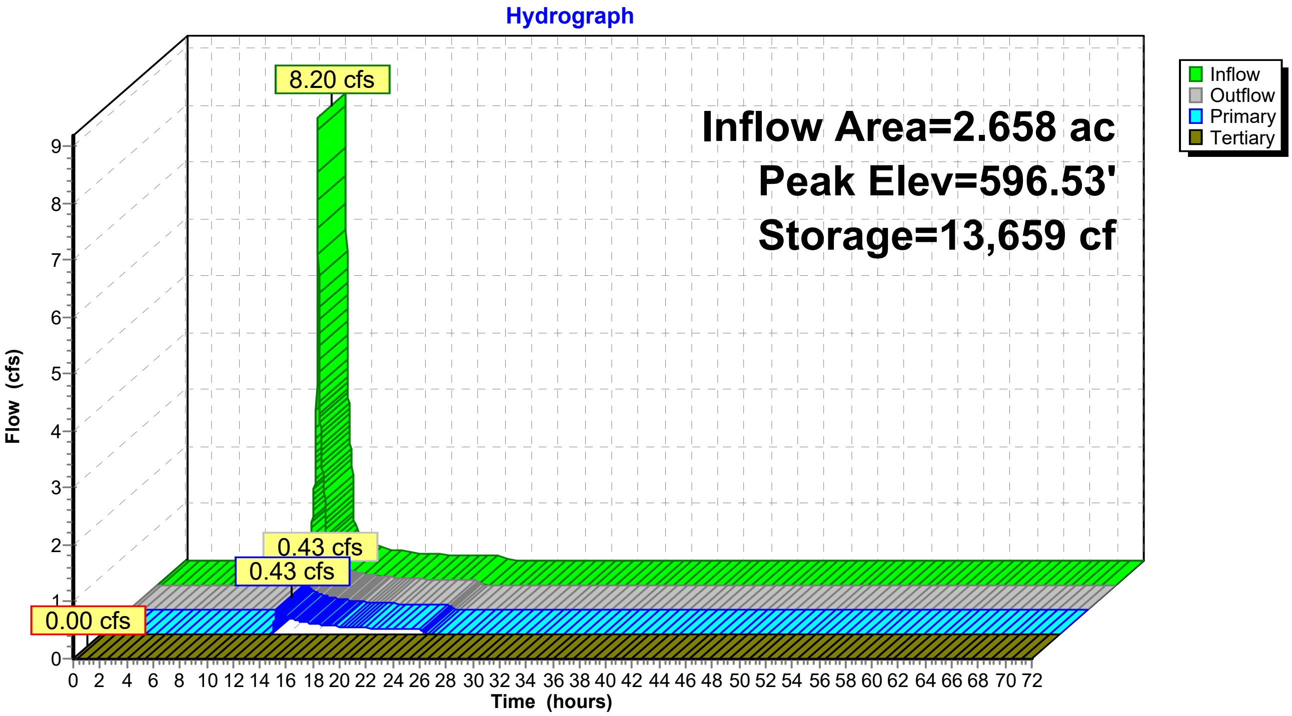
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
592.41	3,700	0.0	0	0
592.42	3,700	40.0	15	15
593.25	3,700	20.0	614	629
595.75	3,700	100.0	9,250	9,879
596.00	3,700	100.0	925	10,804

Device	Routing	Invert	Outlet Devices
#1	Device 2	596.50'	**24.0" x 24.0" Horiz. Overflow Grate X 3.00** C= 0.600 Limited to weir flow at low heads
#2	Primary	592.41'	**12.0" Round Culvert** L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 592.41' / 592.39' S= 0.0010 '/' Cc= 0.900 n= 0.012 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#3	Tertiary	596.90'	**10.0' long x 3.0' breadth Emergency Overflow 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

Primary OutFlow Max=0.43 cfs @ 13.24 hrs HW=596.53' TW=0.00' (Dynamic Tailwater)
└─**2=Culvert** (Passes 0.43 cfs of 5.68 cfs potential flow)
  └─**1=Overflow Grate** (Weir Controls 0.43 cfs @ 0.58 fps)

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=592.41' TW=0.00' (Dynamic Tailwater)
└─**3=Emergency Overflow Weir** (Controls 0.00 cfs)

Pond BIO-8: Filtration Bioretention



Summary for Pond BIO-9: Filtration Bioretention

Inflow Area = 1.213 ac, 17.45% Impervious, Inflow Depth = 1.51" for 10-yr event
Inflow = 2.74 cfs @ 12.04 hrs, Volume= 0.153 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach dp-2 : Design Point
Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach dp-2 : Design Point

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 595.46' @ 24.34 hrs Surf.Area= 2,800 sf Storage= 6,656 cf
Flood Elev= 597.00' Surf.Area= 8,165 sf Storage= 12,259 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	596.00'	4,083 cf	**Above Mulch Surface (Prismatic)** Listed below (Recalc)
#2	592.41'	8,176 cf	**Filtration Media (Prismatic)** Listed below (Recalc)
		12,259 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
596.00	2,800	0	0
597.00	5,365	4,083	4,083

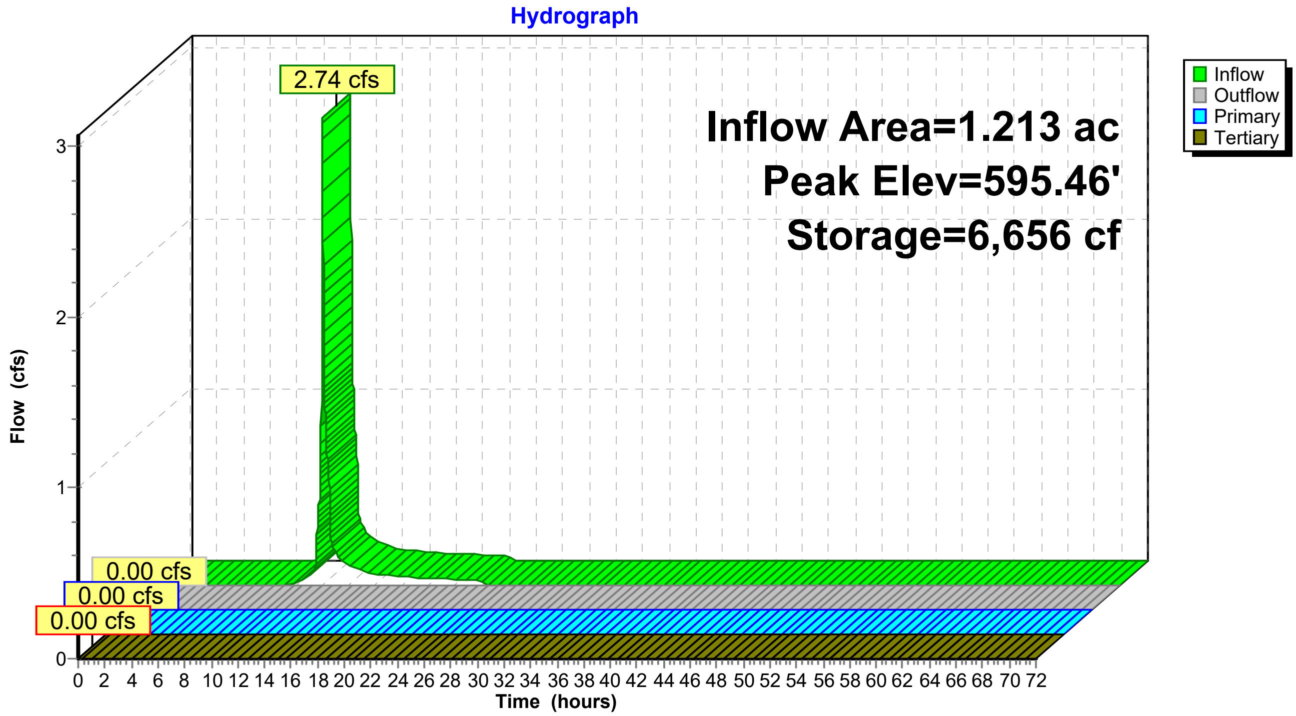
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
592.41	2,800	0.0	0	0
592.42	2,800	40.0	11	11
593.25	2,800	20.0	465	476
595.75	2,800	100.0	7,000	7,476
596.00	2,800	100.0	700	8,176

Device	Routing	Invert	Outlet Devices
#1	Device 2	596.50'	**24.0" x 24.0" Horiz. Overflow Grate X 3.00** C= 0.600 Limited to weir flow at low heads
#2	Primary	592.41'	**12.0" Round Culvert** L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 592.41' / 592.39' S= 0.0010 '/' Cc= 0.900 n= 0.012 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#3	Tertiary	596.90'	**10.0' long x 3.0' breadth Emergency Overflow 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

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=592.41' TW=0.00' (Dynamic Tailwater)
└─**2=Culvert** (Controls 0.00 cfs)
  └─**1=Overflow Grate** (Controls 0.00 cfs)

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=592.41' TW=0.00' (Dynamic Tailwater)
└─**3=Emergency Overflow Weir** (Controls 0.00 cfs)

Pond BIO-9: Filtration Bioretention



Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentES-1: Runoff Area=171,199 sf 82.98% Impervious Runoff Depth=3.18"
Tc=6.0 min CN=95 Runoff=17.97 cfs 1.043 af

SubcatchmentES-2: Runoff Area=4.795 ac 79.40% Impervious Runoff Depth=3.08"
Tc=6.0 min CN=94 Runoff=21.46 cfs 1.231 af

SubcatchmentES-3: Runoff Area=73,554 sf 85.79% Impervious Runoff Depth=3.18"
Tc=6.0 min CN=95 Runoff=7.72 cfs 0.448 af

SubcatchmentES-4: Runoff Area=36,878 sf 87.56% Impervious Runoff Depth=3.29"
Tc=6.0 min CN=96 Runoff=3.95 cfs 0.232 af

SubcatchmentES-5: Runoff Area=63,721 sf 86.36% Impervious Runoff Depth=3.29"
Tc=6.0 min CN=96 Runoff=6.82 cfs 0.401 af

SubcatchmentES-6: Runoff Area=66,972 sf 90.28% Impervious Runoff Depth=3.29"
Tc=6.0 min CN=96 Runoff=7.17 cfs 0.422 af

SubcatchmentES-7: Runoff Area=138,942 sf 54.68% Impervious Runoff Depth=2.68"
Tc=6.0 min CN=90 Runoff=12.81 cfs 0.713 af

SubcatchmentES-8: Runoff Area=115,772 sf 53.78% Impervious Runoff Depth=2.68"
Tc=6.0 min CN=90 Runoff=10.67 cfs 0.594 af

SubcatchmentES-9: Runoff Area=52,852 sf 17.45% Impervious Runoff Depth=2.07"
Tc=6.0 min CN=83 Runoff=3.80 cfs 0.209 af

Reach DP-1: Design Point Inflow=4.66 cfs 0.861 af
Outflow=4.66 cfs 0.861 af

Reach DP-2: Design Point Inflow=11.60 cfs 1.390 af
Outflow=11.60 cfs 1.390 af

Pond BIO-1: Filtration Bioretention Peak Elev=596.57' Storage=30,329 cf Inflow=17.97 cfs 1.043 af
Primary=3.18 cfs 0.368 af Tertiary=0.00 cfs 0.000 af Outflow=3.18 cfs 0.368 af

Pond BIO-2: Filtration Bioretention Peak Elev=596.62' Storage=35,913 cf Inflow=21.46 cfs 1.231 af
Primary=1.49 cfs 0.493 af Tertiary=0.00 cfs 0.000 af Outflow=1.49 cfs 0.493 af

Pond BIO-3: Filtration Bioretention Peak Elev=596.63' Storage=8,224 cf Inflow=7.72 cfs 0.448 af
Primary=5.76 cfs 0.272 af Tertiary=0.00 cfs 0.000 af Outflow=5.76 cfs 0.272 af

Pond BIO-4: Filtration Bioretention Peak Elev=596.52' Storage=7,544 cf Inflow=3.95 cfs 0.232 af
Primary=0.20 cfs 0.061 af Tertiary=0.00 cfs 0.000 af Outflow=0.20 cfs 0.061 af

Pond BIO-5: Filtration Bioretention Peak Elev=596.52' Storage=13,902 cf Inflow=6.82 cfs 0.401 af
Primary=0.21 cfs 0.084 af Tertiary=0.00 cfs 0.000 af Outflow=0.21 cfs 0.084 af

Pond BIO-6: Filtration Bioretention Peak Elev=596.74' Storage=5,330 cf Inflow=7.17 cfs 0.422 af
Primary=5.84 cfs 0.335 af Tertiary=0.00 cfs 0.000 af Outflow=5.84 cfs 0.335 af

Pond BIO-7: Filtration Bioretention Peak Elev=596.62' Storage=16,944 cf Inflow=12.81 cfs 0.713 af
Primary=3.26 cfs 0.352 af Tertiary=0.00 cfs 0.000 af Outflow=3.26 cfs 0.352 af

Pond BIO-8: Filtration Bioretention Peak Elev=596.61' Storage=14,216 cf Inflow=10.67 cfs 0.594 af
Primary=2.77 cfs 0.286 af Tertiary=0.00 cfs 0.000 af Outflow=2.77 cfs 0.286 af

Pond BIO-9: Filtration Bioretention Peak Elev=596.30' Storage=9,120 cf Inflow=3.80 cfs 0.209 af
Primary=0.00 cfs 0.000 af Tertiary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.000 af

Total Runoff Area = 21.321 ac Runoff Volume = 5.294 af Average Runoff Depth = 2.98"
28.27% Pervious = 6.027 ac 71.73% Impervious = 15.294 ac

Summary for Subcatchment ES-1:

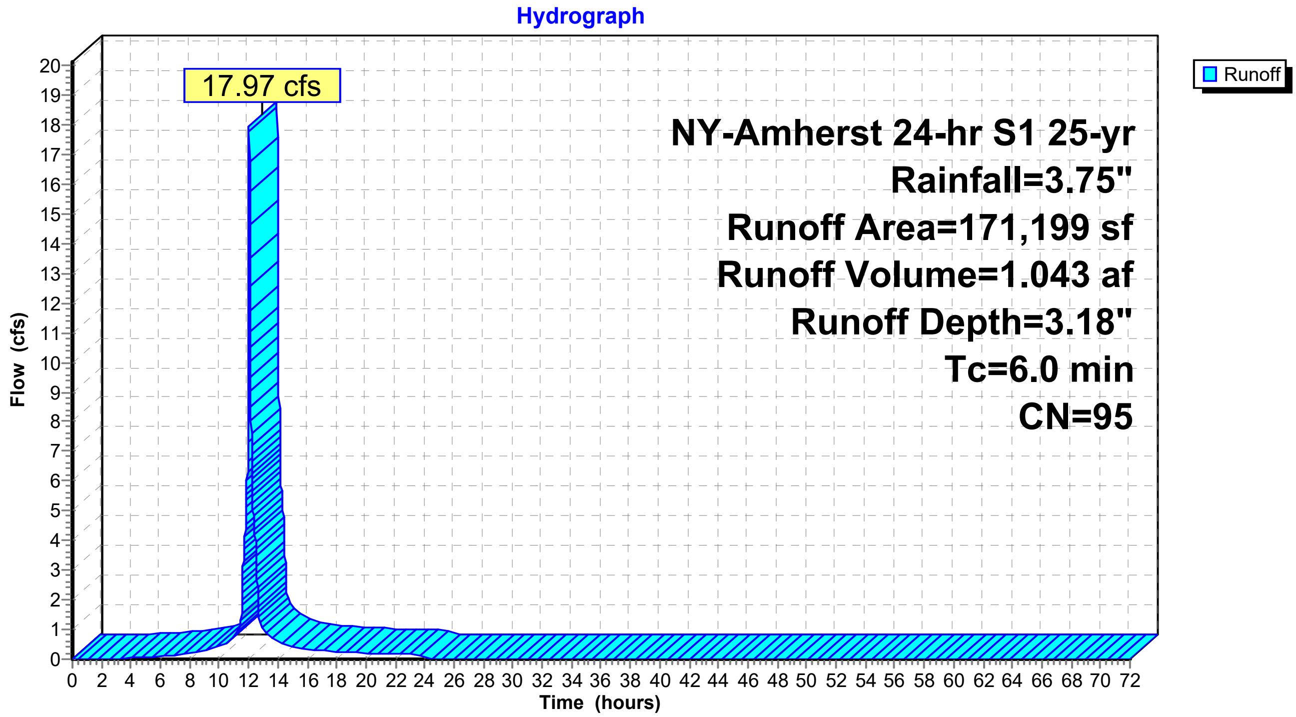
Runoff = 17.97 cfs @ 12.04 hrs, Volume= 1.043 af, Depth= 3.18"
Routed to Pond BIO-1 : Filtration Bioretention

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Amherst 24-hr S1 25-yr Rainfall=3.75"

Area (sf)	CN	Description
142,056	98	Paved parking, HSG D
29,143	80	>75% Grass cover, Good, HSG D
171,199	95	Weighted Average
29,143		17.02% Pervious Area
142,056		82.98% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Direct**

Subcatchment ES-1:



Summary for Subcatchment ES-2:

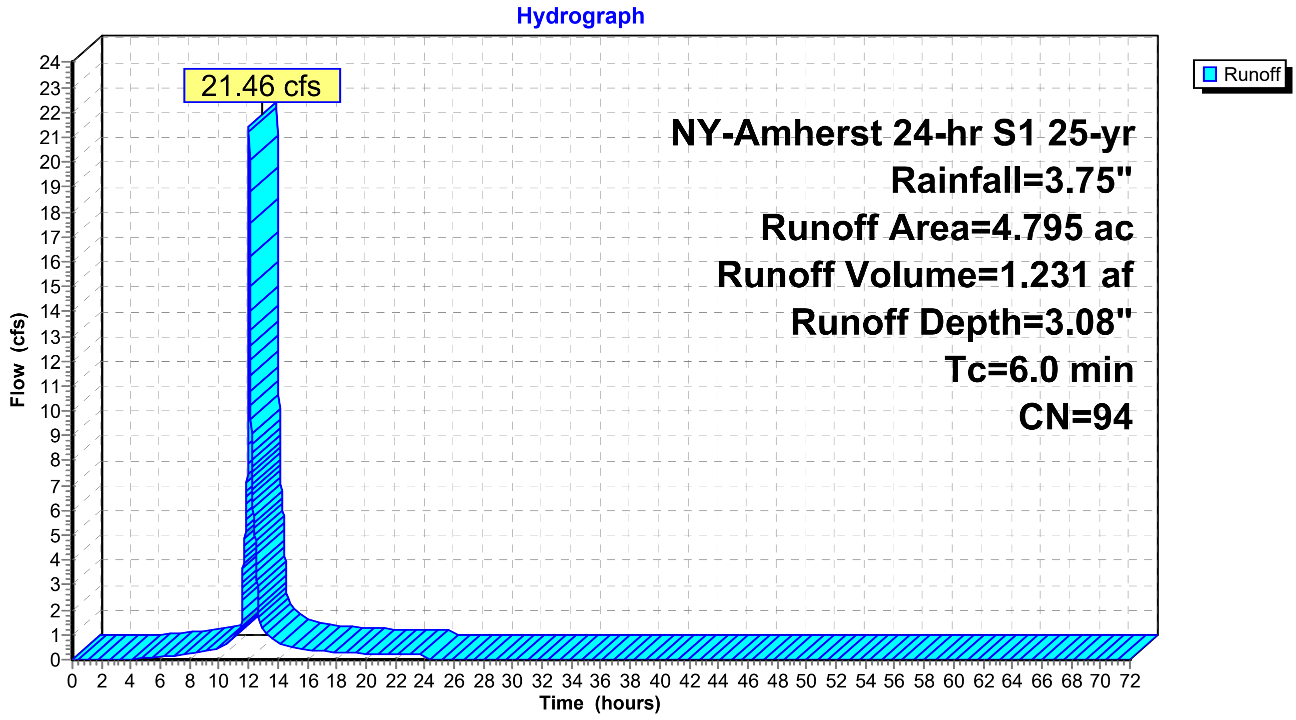
Runoff = 21.46 cfs @ 12.04 hrs, Volume= 1.231 af, Depth= 3.08"
Routed to Pond BIO-2 : Filtration Bioretention

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Amherst 24-hr S1 25-yr Rainfall=3.75"

Area (ac)	CN	Description
3.807	98	Paved parking, HSG D
0.988	80	>75% Grass cover, Good, HSG D
4.795	94	Weighted Average
0.988		20.60% Pervious Area
3.807		79.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Direct**

Subcatchment ES-2:



Summary for Subcatchment ES-3:

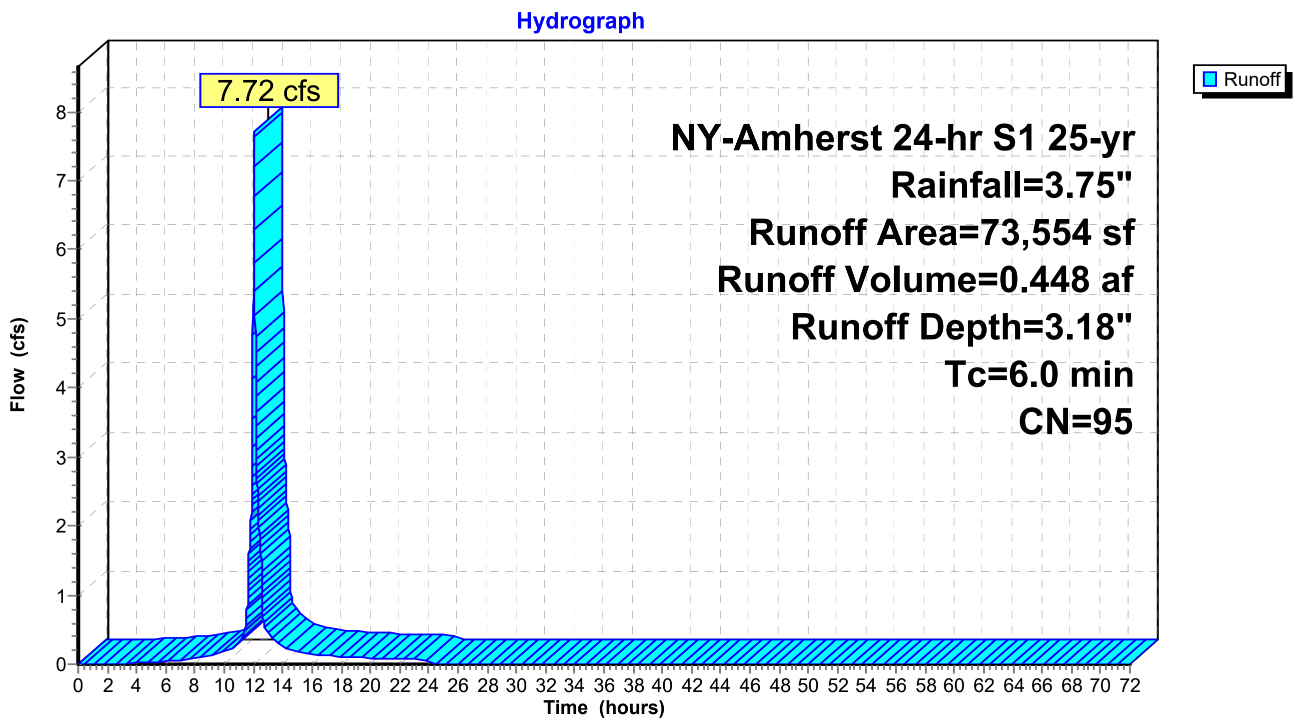
Runoff = 7.72 cfs @ 12.04 hrs, Volume= 0.448 af, Depth= 3.18"
Routed to Pond BIO-3 : Filtration Bioretention

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Amherst 24-hr S1 25-yr Rainfall=3.75"

Area (sf)	CN	Description
63,101	98	Paved parking, HSG D
10,453	80	>75% Grass cover, Good, HSG D
73,554	95	Weighted Average
10,453		14.21% Pervious Area
63,101		85.79% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Direct**

Subcatchment ES-3:



Summary for Subcatchment ES-4:

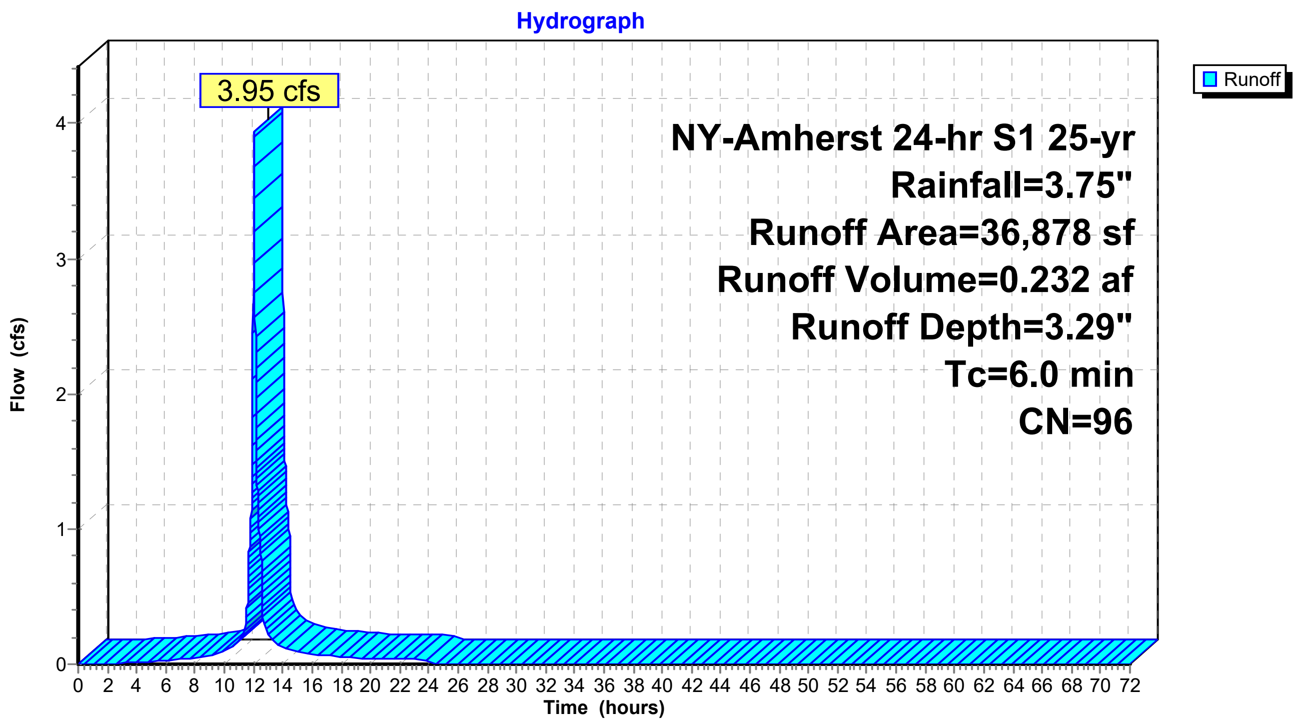
Runoff = 3.95 cfs @ 12.04 hrs, Volume= 0.232 af, Depth= 3.29"
Routed to Pond BIO-4 : Filtration Bioretention

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Amherst 24-hr S1 25-yr Rainfall=3.75"

Area (sf)	CN	Description
32,291	98	Paved parking, HSG D
4,587	80	>75% Grass cover, Good, HSG D
36,878	96	Weighted Average
4,587		12.44% Pervious Area
32,291		87.56% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Direct**

Subcatchment ES-4:



Summary for Subcatchment ES-5:

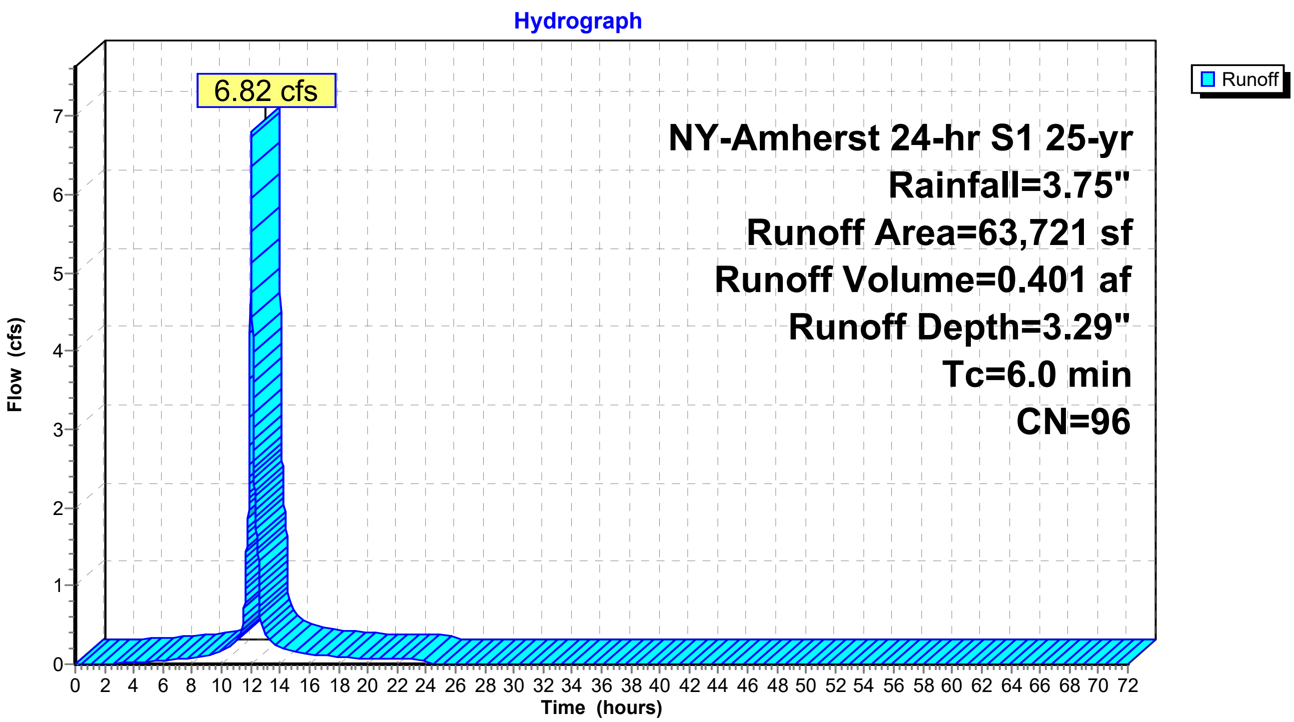
Runoff = 6.82 cfs @ 12.04 hrs, Volume= 0.401 af, Depth= 3.29"
Routed to Pond BIO-5 : Filtration Bioretention

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Amherst 24-hr S1 25-yr Rainfall=3.75"

Area (sf)	CN	Description
55,032	98	Paved parking, HSG D
8,689	80	>75% Grass cover, Good, HSG D
63,721	96	Weighted Average
8,689		13.64% Pervious Area
55,032		86.36% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Direct**

Subcatchment ES-5:



Summary for Subcatchment ES-6:

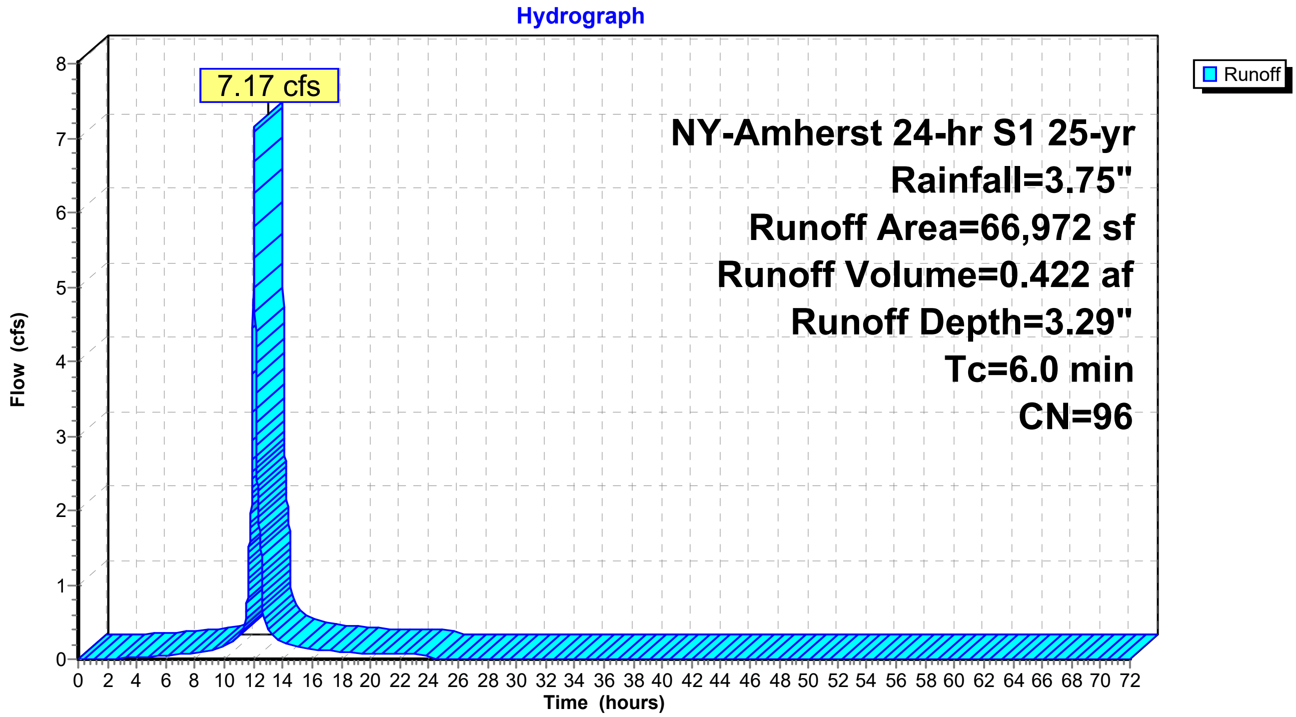
Runoff = 7.17 cfs @ 12.04 hrs, Volume= 0.422 af, Depth= 3.29"
Routed to Pond BIO-6 : Filtration Bioretention

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Amherst 24-hr S1 25-yr Rainfall=3.75"

Area (sf)	CN	Description
60,462	98	Paved parking, HSG D
6,510	80	>75% Grass cover, Good, HSG D
66,972	96	Weighted Average
6,510		9.72% Pervious Area
60,462		90.28% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Direct**

Subcatchment ES-6:



Summary for Subcatchment ES-7:

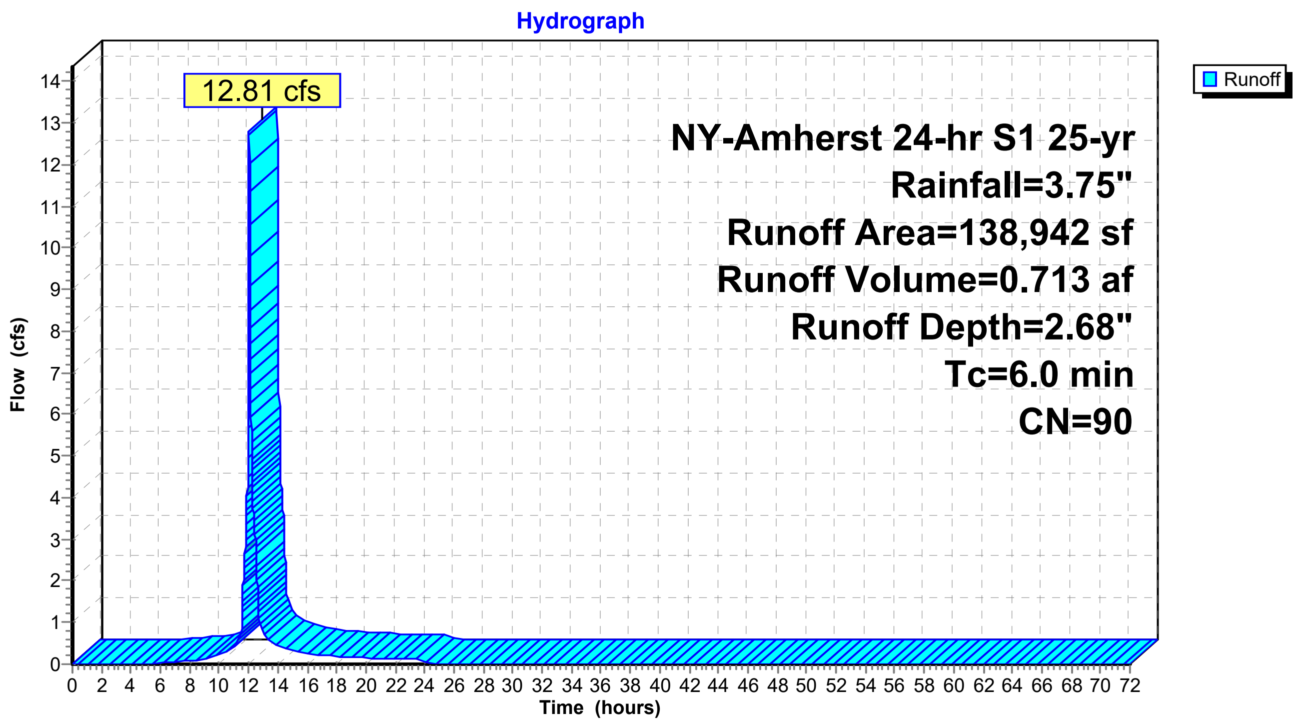
Runoff = 12.81 cfs @ 12.04 hrs, Volume= 0.713 af, Depth= 2.68"
Routed to Pond BIO-7 : Filtration Bioretention

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Amherst 24-hr S1 25-yr Rainfall=3.75"

Area (sf)	CN	Description
75,973	98	Paved parking, HSG D
62,969	80	>75% Grass cover, Good, HSG D
138,942	90	Weighted Average
62,969		45.32% Pervious Area
75,973		54.68% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Direct**

Subcatchment ES-7:



Summary for Subcatchment ES-8:

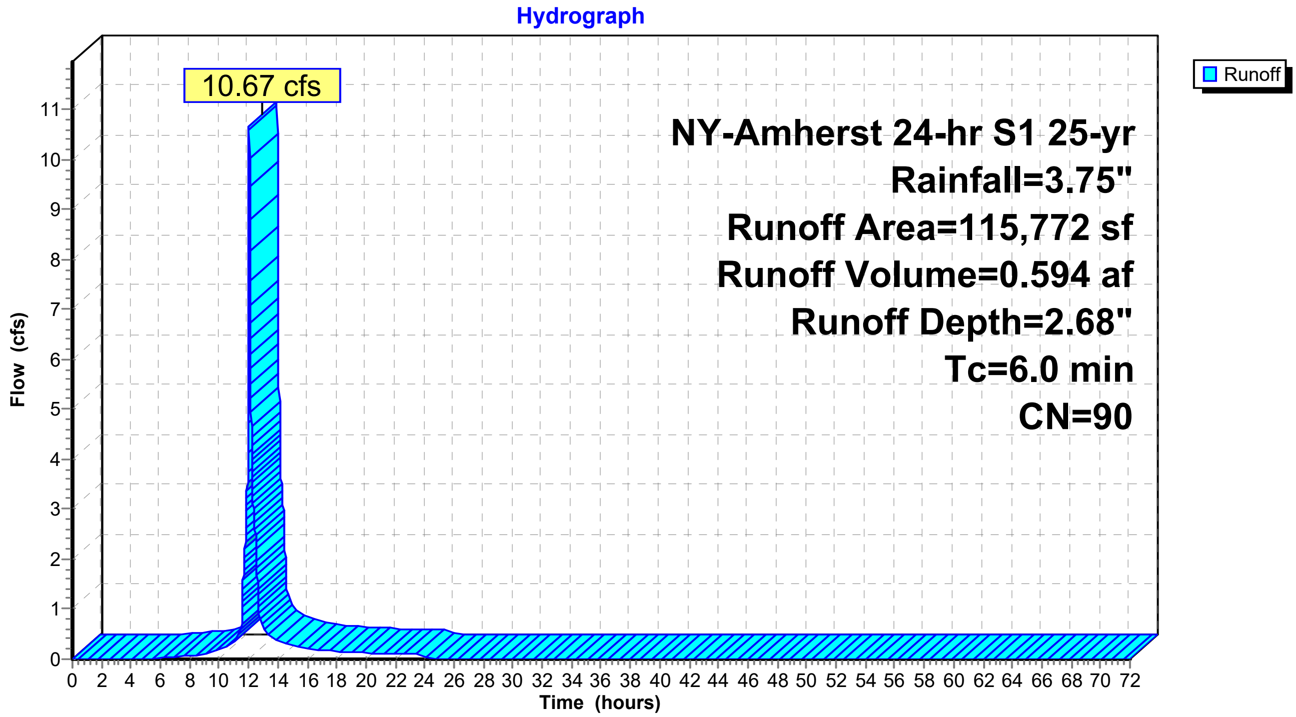
Runoff = 10.67 cfs @ 12.04 hrs, Volume= 0.594 af, Depth= 2.68"
Routed to Pond BIO-8 : Filtration Bioretention

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Amherst 24-hr S1 25-yr Rainfall=3.75"

Area (sf)	CN	Description
62,258	98	Paved parking, HSG D
53,514	80	>75% Grass cover, Good, HSG D
115,772	90	Weighted Average
53,514		46.22% Pervious Area
62,258		53.78% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Direct**

Subcatchment ES-8:



Summary for Subcatchment ES-9:

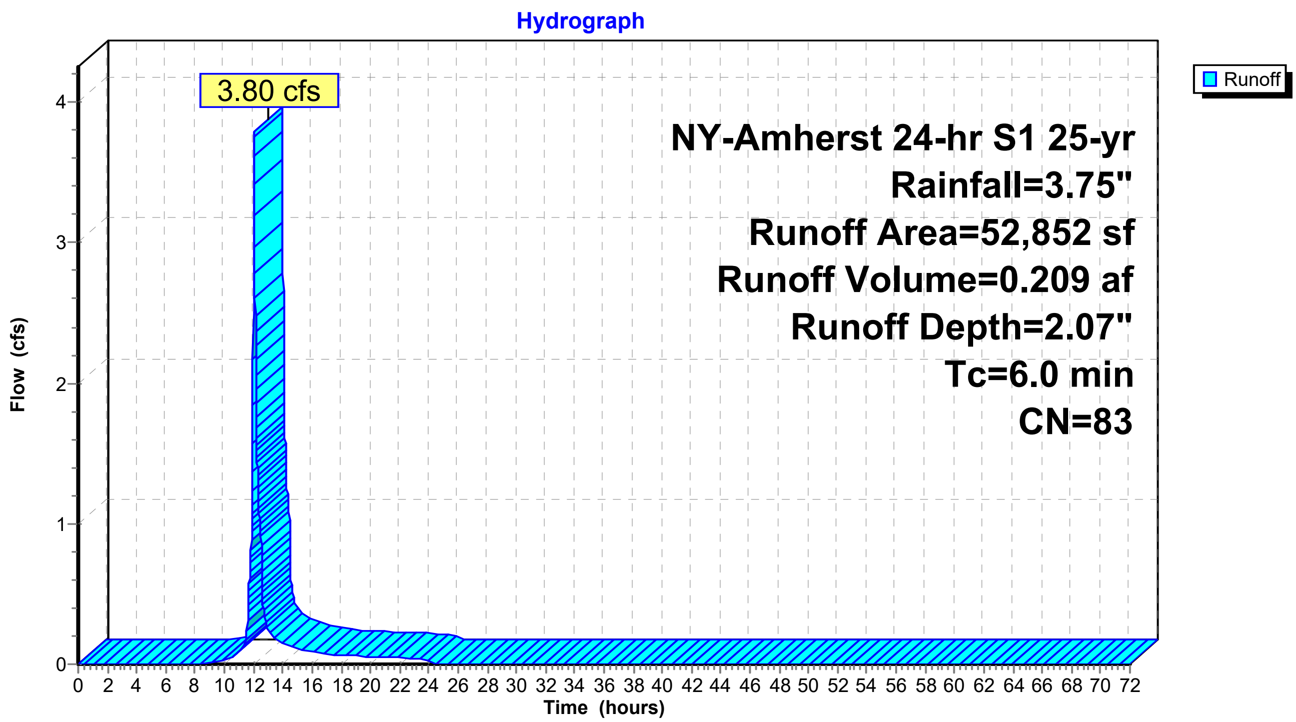
Runoff = 3.80 cfs @ 12.04 hrs, Volume= 0.209 af, Depth= 2.07"
Routed to Pond BIO-9 : Filtration Bioretention

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Amherst 24-hr S1 25-yr Rainfall=3.75"

Area (sf)	CN	Description
9,221	98	Paved parking, HSG D
43,631	80	>75% Grass cover, Good, HSG D
52,852	83	Weighted Average
43,631		82.55% Pervious Area
9,221		17.45% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Direct**

Subcatchment ES-9:

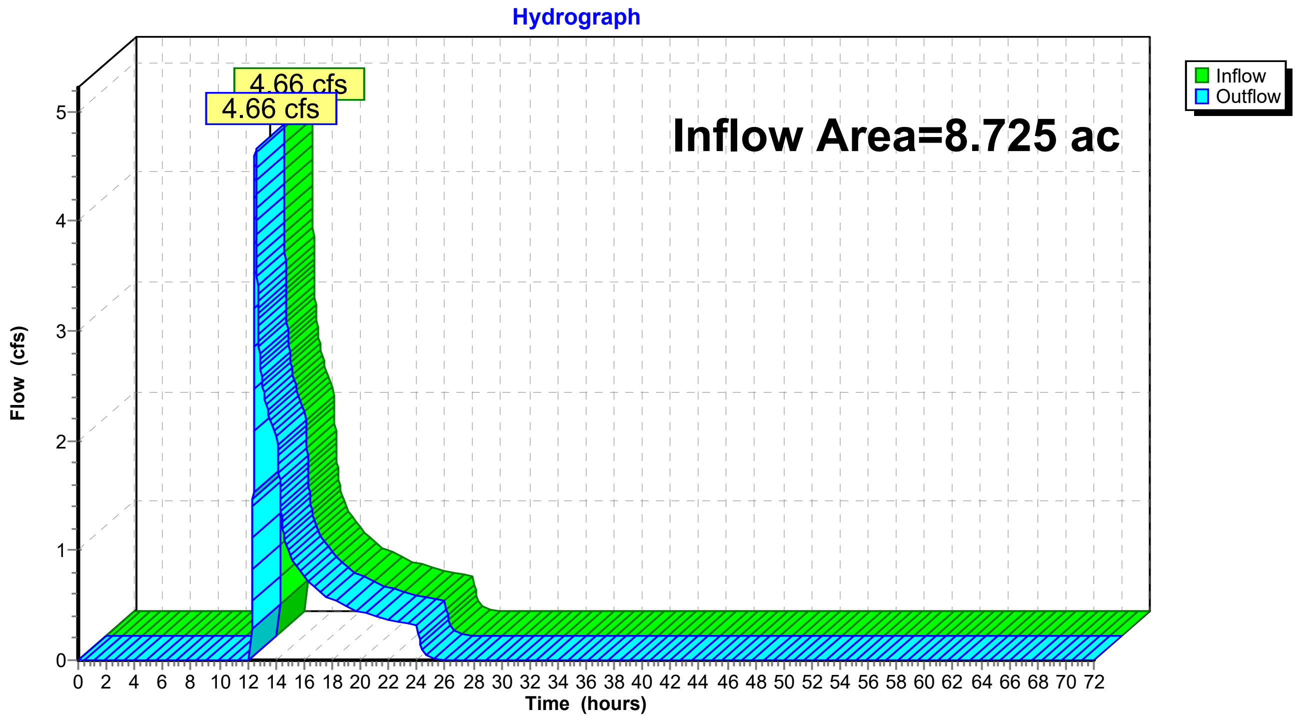


Summary for Reach DP-1: Design Point

Inflow Area = 8.725 ac, 81.01% Impervious, Inflow Depth = 1.18" for 25-yr event
Inflow = 4.66 cfs @ 12.56 hrs, Volume= 0.861 af
Outflow = 4.66 cfs @ 12.56 hrs, Volume= 0.861 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Reach DP-1: Design Point

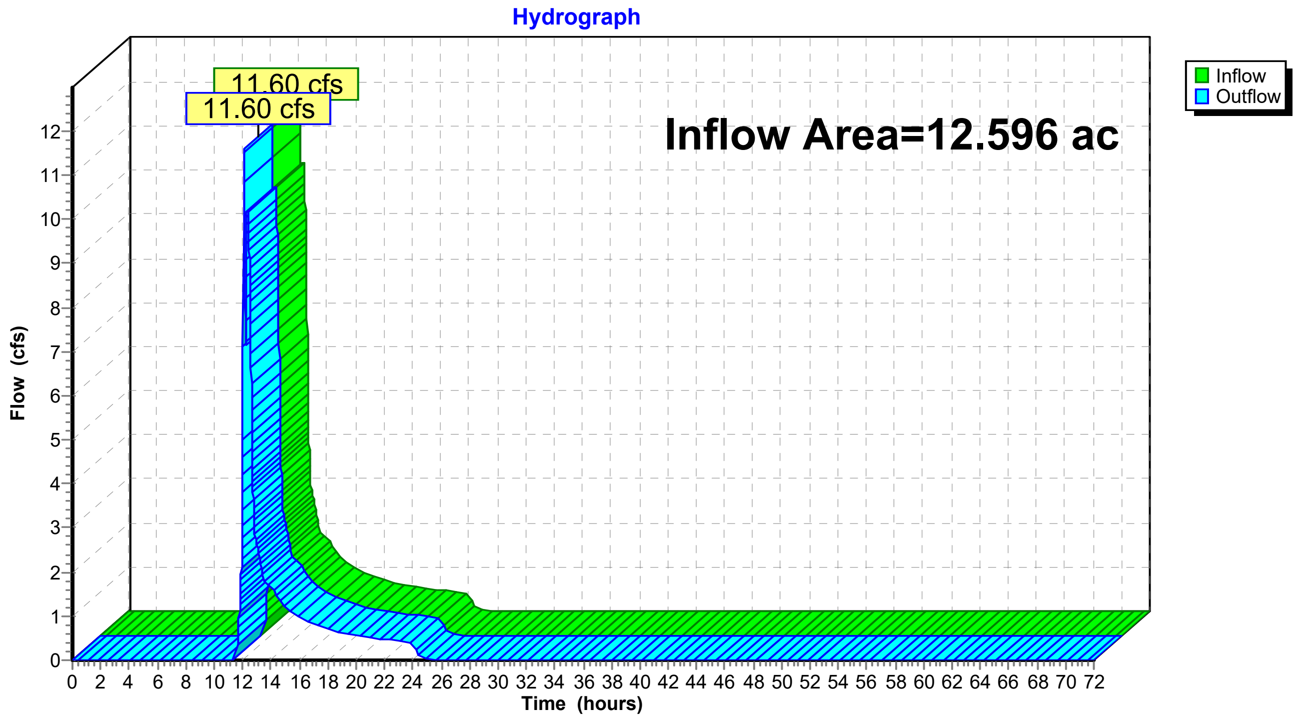


Summary for Reach DP-2: Design Point

Inflow Area = 12.596 ac, 65.31% Impervious, Inflow Depth = 1.32" for 25-yr event
Inflow = 11.60 cfs @ 12.09 hrs, Volume= 1.390 af
Outflow = 11.60 cfs @ 12.09 hrs, Volume= 1.390 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Reach DP-2: Design Point



Summary for Pond BIO-1: Filtration Bioretention

Inflow Area = 3.930 ac, 82.98% Impervious, Inflow Depth = 3.18" for 25-yr event
Inflow = 17.97 cfs @ 12.04 hrs, Volume= 1.043 af
Outflow = 3.18 cfs @ 12.56 hrs, Volume= 0.368 af, Atten= 82%, Lag= 31.3 min
Primary = 3.18 cfs @ 12.56 hrs, Volume= 0.368 af
Routed to Reach DP-1 : Design Point
Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach DP-1 : Design Point

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 596.57' @ 12.56 hrs Surf.Area= 20,915 sf Storage= 30,329 cf
Flood Elev= 597.00' Surf.Area= 24,070 sf Storage= 36,359 cf

Plug-Flow detention time= 316.1 min calculated for 0.368 af (35% of inflow)
Center-of-Mass det. time= 181.9 min (957.0 - 775.1)

Volume	Invert	Avail.Storage	Storage Description
#1	596.00'	12,035 cf	**Above Mulch Surface (Prismatic)** Listed below (Recalc)
#2	592.41'	24,324 cf	**Filtration Media (Prismatic)** Listed below (Recalc)
		36,359 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
596.00	8,330	0	0
597.00	15,740	12,035	12,035

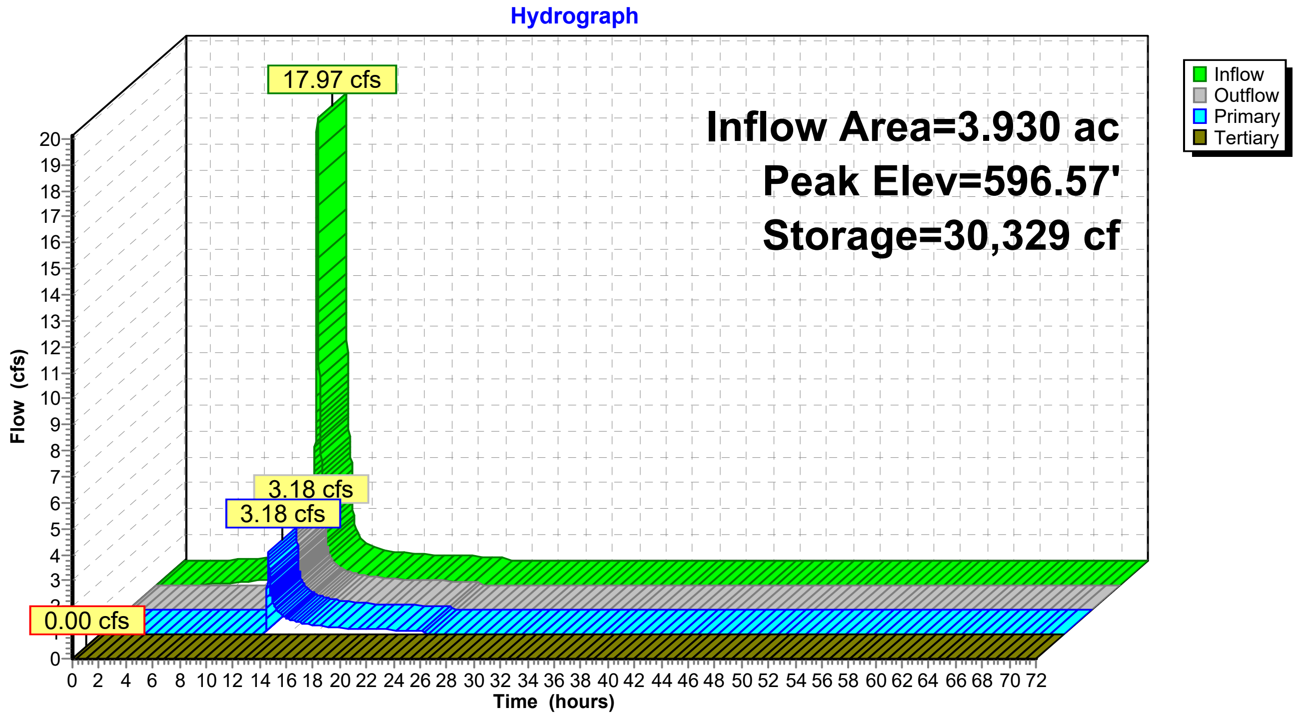
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
592.41	8,330	0.0	0	0
592.42	8,330	40.0	33	33
593.25	8,330	20.0	1,383	1,416
595.75	8,330	100.0	20,825	22,241
596.00	8,330	100.0	2,083	24,324

Device	Routing	Invert	Outlet Devices
#1	Device 2	596.50'	**24.0" x 24.0" Horiz. Overflow Grate X 6.00** C= 0.600 Limited to weir flow at low heads
#2	Primary	592.41'	**12.0" Round Culvert** L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 592.41' / 592.39' S= 0.0010 '/' Cc= 0.900 n= 0.012 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#3	Tertiary	596.90'	**10.0' long x 3.0' breadth Emergency Overflow 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

Primary OutFlow Max=3.17 cfs @ 12.56 hrs HW=596.57' TW=0.00' (Dynamic Tailwater)
└─**2=Culvert** (Passes 3.17 cfs of 5.71 cfs potential flow)
  └─**1=Overflow Grate** (Weir Controls 3.17 cfs @ 0.89 fps)

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=592.41' TW=0.00' (Dynamic Tailwater)
└─**3=Emergency Overflow Weir** (Controls 0.00 cfs)

Pond BIO-1: Filtration Bioretention



Summary for Pond BIO-2: Filtration Bioretention

Inflow Area = 4.795 ac, 79.40% Impervious, Inflow Depth = 3.08" for 25-yr event
Inflow = 21.46 cfs @ 12.04 hrs, Volume= 1.231 af
Outflow = 1.49 cfs @ 12.78 hrs, Volume= 0.493 af, Atten= 93%, Lag= 44.8 min
Primary = 1.49 cfs @ 12.78 hrs, Volume= 0.493 af
Routed to Reach DP-1 : Design Point
Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach DP-1 : Design Point

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 596.62' @ 12.78 hrs Surf.Area= 41,847 sf Storage= 35,913 cf
Flood Elev= 597.00' Surf.Area= 57,855 sf Storage= 51,864 cf

Plug-Flow detention time= 293.9 min calculated for 0.493 af (40% of inflow)
Center-of-Mass det. time= 172.5 min (953.4 - 780.8)

Volume	Invert	Avail.Storage	Storage Description
#1	596.00'	28,928 cf	**Above Mulch Surface (Prismatic)**Listed below (Recalc)
#2	592.41'	22,937 cf	**Filtration Media (Prismatic)**Listed below (Recalc)
		51,864 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
596.00	7,855	0	0
597.00	50,000	28,928	28,928

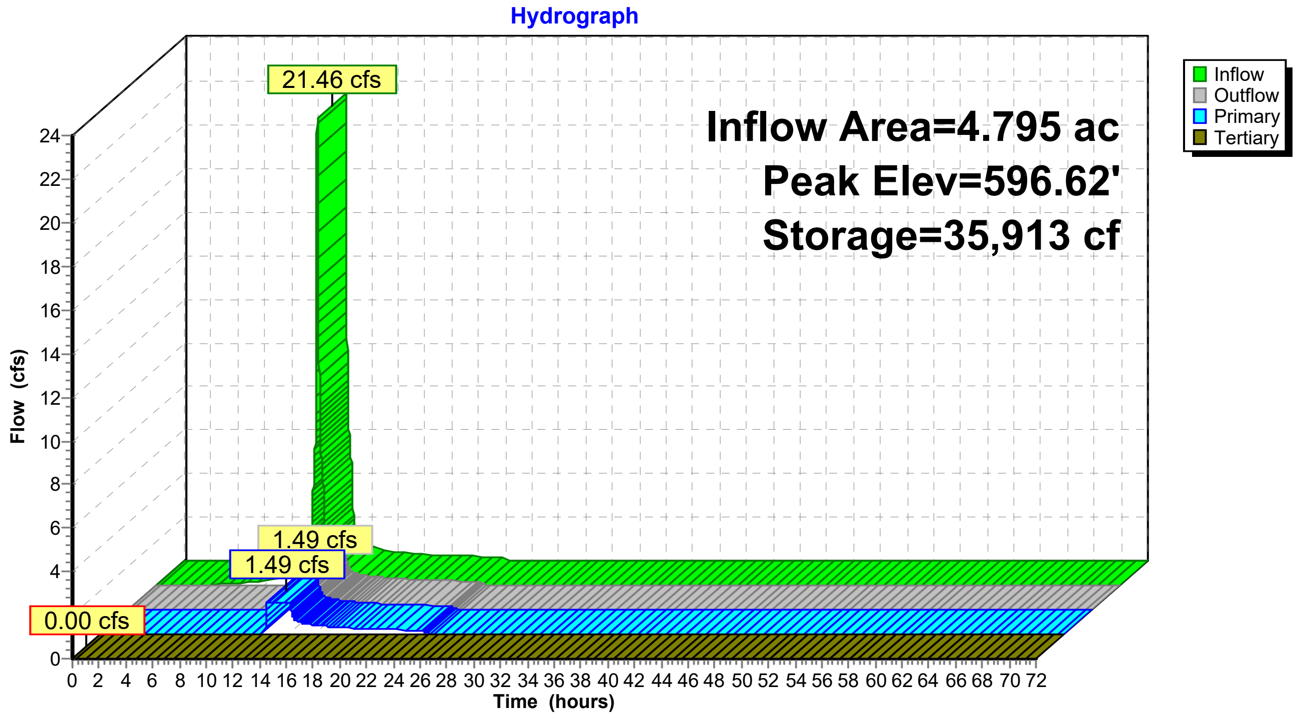
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
592.41	7,855	0.0	0	0
592.42	7,855	40.0	31	31
593.25	7,855	20.0	1,304	1,335
595.75	7,855	100.0	19,638	20,973
596.00	7,855	100.0	1,964	22,937

Device	Routing	Invert	Outlet Devices
#1	Device 2	596.50'	**24.0" x 24.0" Horiz. Overflow Grate X 8.00** C= 0.600 Limited to weir flow at low heads
#2	Primary	592.41'	**6.0" Round Culvert** L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 592.41' / 592.39' S= 0.0010 '/' Cc= 0.900 n= 0.012 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#3	Tertiary	596.90'	**10.0' long x 3.0' breadth Emergency Overflow 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

Primary OutFlow Max=1.49 cfs @ 12.78 hrs HW=596.62' TW=0.00' (Dynamic Tailwater)
└─**2=Culvert** (Inlet Controls 1.49 cfs @ 7.56 fps)
  └─**1=Overflow Grate** (Passes 1.49 cfs of 8.72 cfs potential flow)

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=592.41' TW=0.00' (Dynamic Tailwater)
└─**3=Emergency Overflow Weir** (Controls 0.00 cfs)

Pond BIO-2: Filtration Bioretention



Summary for Pond BIO-3: Filtration Bioretention

Inflow Area = 1.689 ac, 85.79% Impervious, Inflow Depth = 3.18" for 25-yr event
Inflow = 7.72 cfs @ 12.04 hrs, Volume= 0.448 af
Outflow = 5.76 cfs @ 12.09 hrs, Volume= 0.272 af, Atten= 25%, Lag= 3.3 min
Primary = 5.76 cfs @ 12.09 hrs, Volume= 0.272 af
Routed to Reach DP-2 : Design Point
Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach DP-2 : Design Point

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 596.63' @ 12.09 hrs Surf.Area= 6,633 sf Storage= 8,224 cf
Flood Elev= 597.00' Surf.Area= 8,070 sf Storage= 10,176 cf

Plug-Flow detention time= 182.9 min calculated for 0.272 af (61% of inflow)
Center-of-Mass det. time= 84.7 min (859.8 - 775.1)

Volume	Invert	Avail.Storage	Storage Description
#1	596.00'	4,035 cf	**Above Mulch Surface (Prismatic)** Listed below (Recalc)
#2	592.41'	6,141 cf	**Filtration Media (Prismatic)** Listed below (Recalc)
		10,176 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
596.00	2,103	0	0
597.00	5,967	4,035	4,035

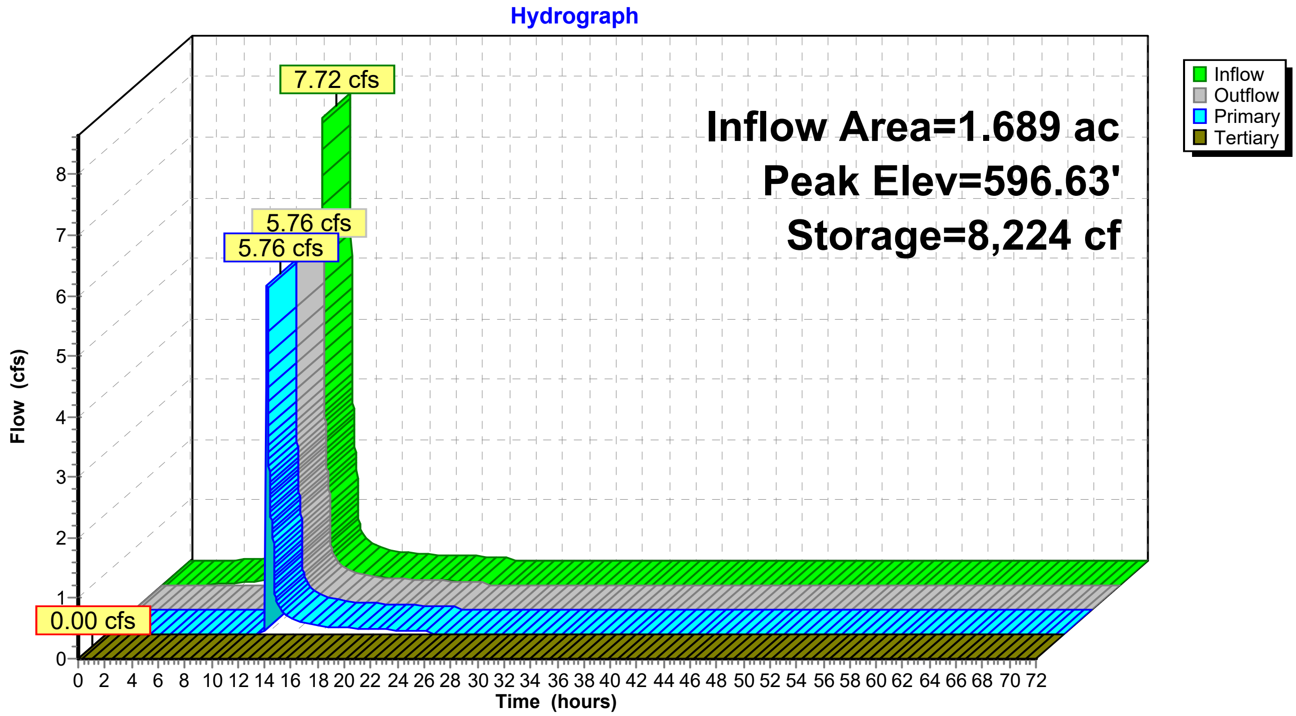
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
592.41	2,103	0.0	0	0
592.42	2,103	40.0	8	8
593.25	2,103	20.0	349	358
595.75	2,103	100.0	5,258	5,615
596.00	2,103	100.0	526	6,141

Device	Routing	Invert	Outlet Devices
#1	Device 2	596.50'	**24.0" x 24.0" Horiz. Overflow Grate X 6.00** C= 0.600 Limited to weir flow at low heads
#2	Primary	592.41'	**12.0" Round Culvert** L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 592.41' / 592.39' S= 0.0010 '/' Cc= 0.900 n= 0.012 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#3	Tertiary	596.95'	**10.0' long x 3.0' breadth Emergency Overflow 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

Primary OutFlow Max=5.76 cfs @ 12.09 hrs HW=596.63' TW=0.00' (Dynamic Tailwater)
└─**2=Culvert** (Inlet Controls 5.76 cfs @ 7.33 fps)
  └─**1=Overflow Grate** (Passes 5.76 cfs of 7.17 cfs potential flow)

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=592.41' TW=0.00' (Dynamic Tailwater)
└─**3=Emergency Overflow Weir** (Controls 0.00 cfs)

Pond BIO-3: Filtration Bioretention



Summary for Pond BIO-4: Filtration Bioretention

Inflow Area = 0.847 ac, 87.56% Impervious, Inflow Depth = 3.29" for 25-yr event
Inflow = 3.95 cfs @ 12.04 hrs, Volume= 0.232 af
Outflow = 0.20 cfs @ 13.15 hrs, Volume= 0.061 af, Atten= 95%, Lag= 66.8 min
Primary = 0.20 cfs @ 13.15 hrs, Volume= 0.061 af
Routed to Reach dp-2 : Design Point
Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach dp-2 : Design Point

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 596.52' @ 13.15 hrs Surf.Area= 5,674 sf Storage= 7,544 cf
Flood Elev= 597.00' Surf.Area= 7,080 sf Storage= 9,614 cf

Plug-Flow detention time= 418.2 min calculated for 0.061 af (26% of inflow)
Center-of-Mass det. time= 247.8 min (1,016.5 - 768.7)

Volume	Invert	Avail.Storage	Storage Description
#1	596.00'	3,540 cf	**Above Mulch Surface (Prismatic)** Listed below (Recalc)
#2	592.41'	6,074 cf	**Filtration Media (Prismatic)** Listed below (Recalc)
		9,614 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
596.00	2,080	0	0
597.00	5,000	3,540	3,540

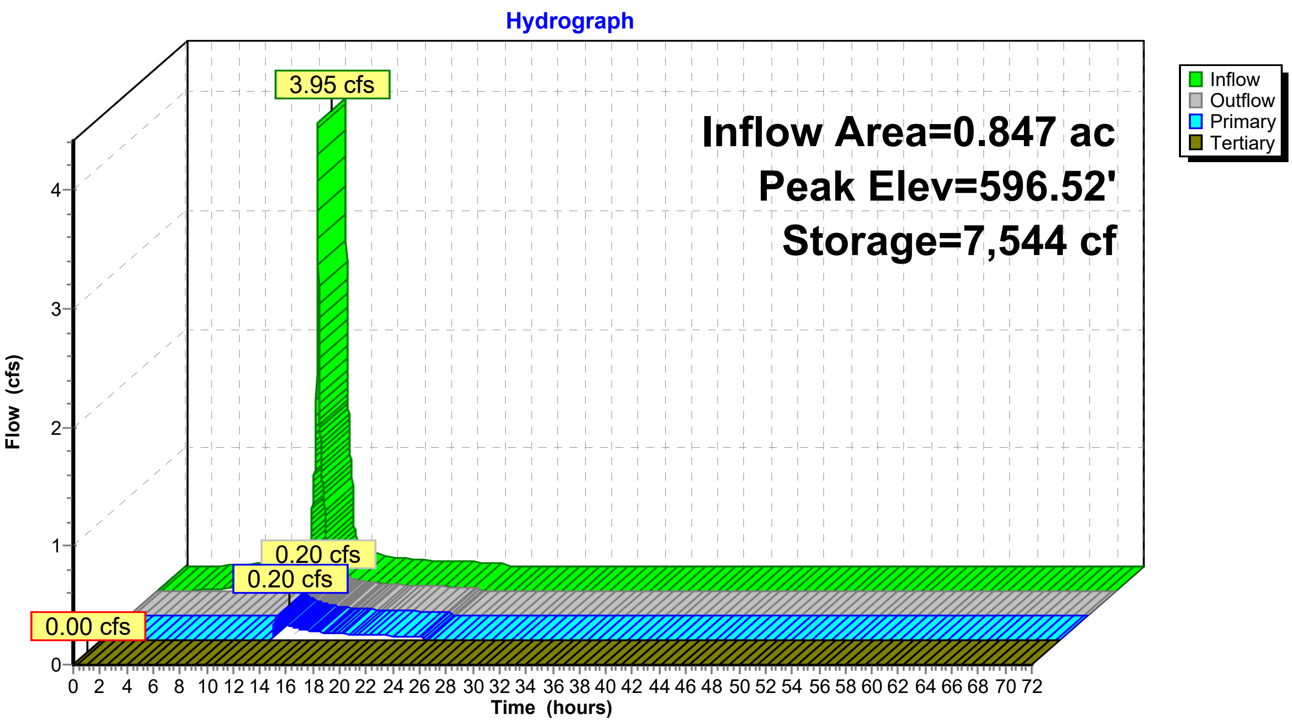
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
592.41	2,080	0.0	0	0
592.42	2,080	40.0	8	8
593.25	2,080	20.0	345	354
595.75	2,080	100.0	5,200	5,554
596.00	2,080	100.0	520	6,074

Device	Routing	Invert	Outlet Devices
#1	Device 2	596.50'	**24.0" x 24.0" Horiz. Overflow Grate X 3.00** C= 0.600 Limited to weir flow at low heads
#2	Primary	592.41'	**12.0" Round Culvert** L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 592.41' / 592.39' S= 0.0010 '/' Cc= 0.900 n= 0.012 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#3	Tertiary	596.90'	**10.0' long x 3.0' breadth Emergency Overflow 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

Primary OutFlow Max=0.20 cfs @ 13.15 hrs HW=596.52' TW=0.00' (Dynamic Tailwater)
└─**2=Culvert** (Passes 0.20 cfs of 5.67 cfs potential flow)
  └─**1=Overflow Grate** (Weir Controls 0.20 cfs @ 0.44 fps)

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=592.41' TW=0.00' (Dynamic Tailwater)
└─**3=Emergency Overflow Weir** (Controls 0.00 cfs)

Pond BIO-4: Filtration Bioretention



Summary for Pond BIO-5: Filtration Bioretention

Inflow Area = 1.463 ac, 86.36% Impervious, Inflow Depth = 3.29" for 25-yr event
Inflow = 6.82 cfs @ 12.04 hrs, Volume= 0.401 af
Outflow = 0.21 cfs @ 14.05 hrs, Volume= 0.084 af, Atten= 97%, Lag= 120.9 min
Primary = 0.21 cfs @ 14.05 hrs, Volume= 0.084 af
Routed to Reach dp-2 : Design Point
Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach dp-2 : Design Point

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 596.52' @ 14.05 hrs Surf.Area= 8,982 sf Storage= 13,902 cf
Flood Elev= 597.00' Surf.Area= 9,962 sf Storage= 16,550 cf

Plug-Flow detention time= 496.9 min calculated for 0.084 af (21% of inflow)
Center-of-Mass det. time= 300.7 min (1,069.4 - 768.7)

Volume	Invert	Avail.Storage	Storage Description
#1	596.00'	4,981 cf	**Above Mulch Surface (Prismatic)** Listed below (Recalc)
#2	592.41'	11,569 cf	**Filtration Media (Prismatic)** Listed below (Recalc)
		16,550 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
596.00	3,962	0	0
597.00	6,000	4,981	4,981

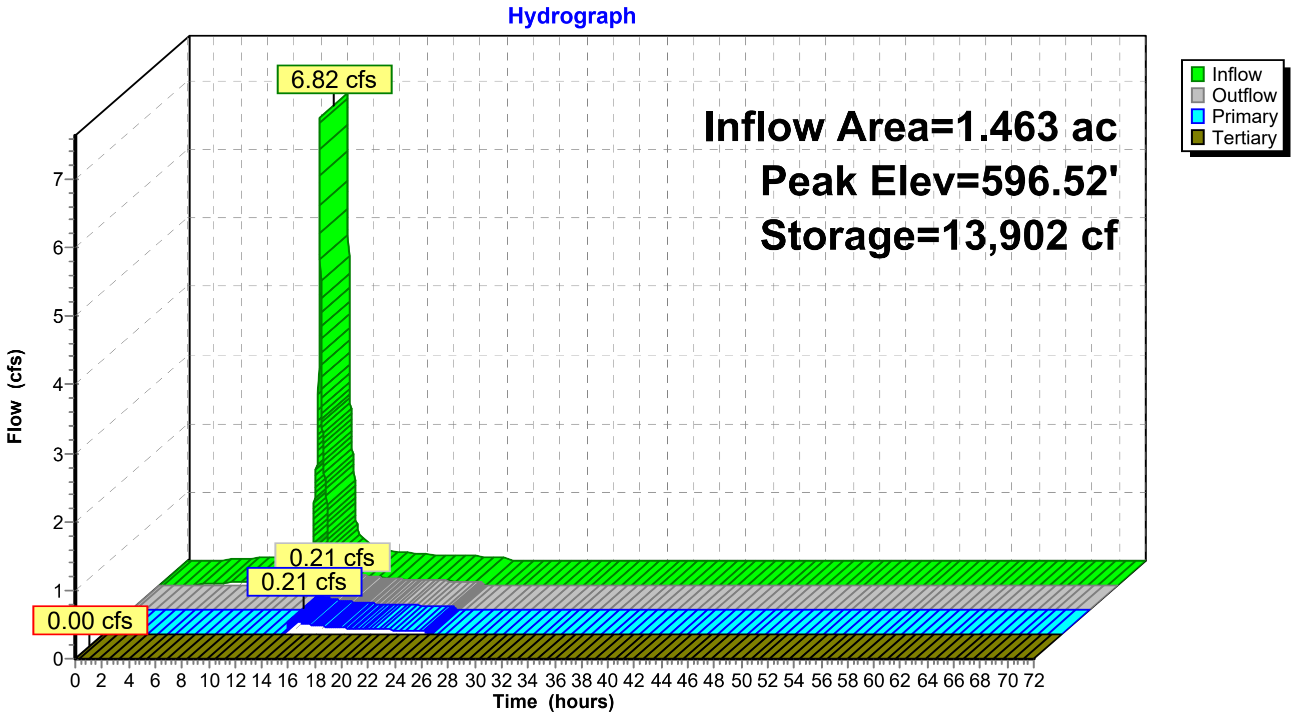
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
592.41	3,962	0.0	0	0
592.42	3,962	40.0	16	16
593.25	3,962	20.0	658	674
595.75	3,962	100.0	9,905	10,579
596.00	3,962	100.0	991	11,569

Device	Routing	Invert	Outlet Devices
#1	Device 2	596.50'	**24.0" x 24.0" Horiz. Overflow Grate X 3.00** C= 0.600 Limited to weir flow at low heads
#2	Primary	592.41'	**12.0" Round Culvert** L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 592.41' / 592.39' S= 0.0010 '/' Cc= 0.900 n= 0.012 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#3	Tertiary	596.90'	**10.0' long x 3.0' breadth Emergency Overflow 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

Primary OutFlow Max=0.21 cfs @ 14.05 hrs HW=596.52' TW=0.00' (Dynamic Tailwater)
└─**2=Culvert** (Passes 0.21 cfs of 5.67 cfs potential flow)
  └─**1=Overflow Grate** (Weir Controls 0.21 cfs @ 0.46 fps)

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=592.41' TW=0.00' (Dynamic Tailwater)
└─**3=Emergency Overflow Weir** (Controls 0.00 cfs)

Pond BIO-5: Filtration Bioretention



Summary for Pond BIO-6: Filtration Bioretention

Inflow Area = 1.537 ac, 90.28% Impervious, Inflow Depth = 3.29" for 25-yr event
Inflow = 7.17 cfs @ 12.04 hrs, Volume= 0.422 af
Outflow = 5.84 cfs @ 12.08 hrs, Volume= 0.335 af, Atten= 19%, Lag= 2.6 min
Primary = 5.84 cfs @ 12.08 hrs, Volume= 0.335 af
Routed to Reach dp-2 : Design Point
Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach dp-2 : Design Point

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 596.74' @ 12.08 hrs Surf.Area= 8,338 sf Storage= 5,330 cf
Flood Elev= 597.00' Surf.Area= 10,775 sf Storage= 7,651 cf

Plug-Flow detention time= 136.6 min calculated for 0.335 af (79% of inflow)
Center-of-Mass det. time= 59.6 min (828.3 - 768.7)

Volume	Invert	Avail.Storage	Storage Description
#1	596.00'	5,388 cf	**Above Mulch Surface (Prismatic)**Listed below (Recalc)
#2	592.41'	2,263 cf	**Filtration Media (Prismatic)**Listed below (Recalc)
		7,651 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
596.00	775	0	0
597.00	10,000	5,388	5,388

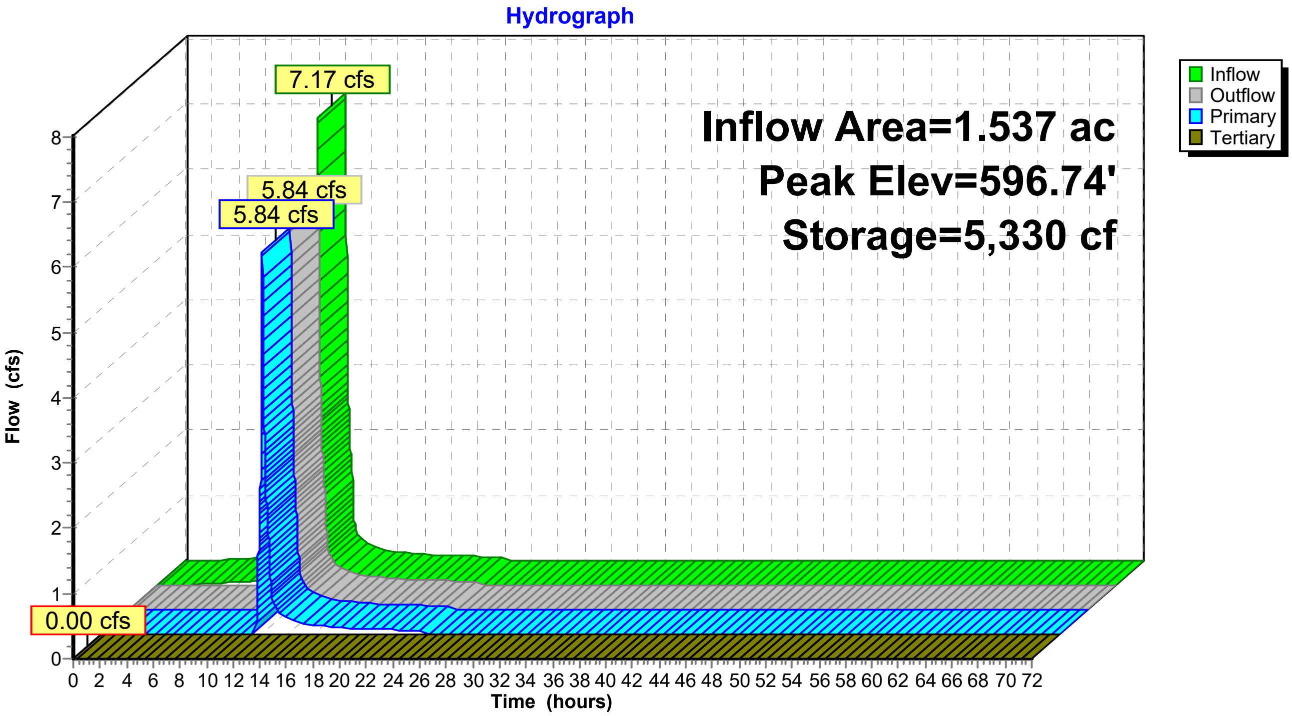
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
592.41	775	0.0	0	0
592.42	775	40.0	3	3
593.25	775	20.0	129	132
595.75	775	100.0	1,938	2,069
596.00	775	100.0	194	2,263

Device	Routing	Invert	Outlet Devices
#1	Device 2	596.50'	**24.0" x 24.0" Horiz. Overflow Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#2	Primary	592.41'	**12.0" Round Culvert** L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 592.41' / 592.39' S= 0.0010 '/' Cc= 0.900 n= 0.012 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#3	Tertiary	596.90'	**10.0' long x 3.0' breadth Emergency Overflow 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

Primary OutFlow Max=5.84 cfs @ 12.08 hrs HW=596.74' TW=0.00' (Dynamic Tailwater)
└─**2=Culvert** (Inlet Controls 5.84 cfs @ 7.44 fps)
  └─**1=Overflow Grate** (Passes 5.84 cfs of 5.99 cfs potential flow)

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=592.41' TW=0.00' (Dynamic Tailwater)
└─**3=Emergency Overflow Weir** (Controls 0.00 cfs)

Pond BIO-6: Filtration Bioretention



Summary for Pond BIO-7: Filtration Bioretention

Inflow Area = 3.190 ac, 54.68% Impervious, Inflow Depth = 2.68" for 25-yr event
Inflow = 12.81 cfs @ 12.04 hrs, Volume= 0.713 af
Outflow = 3.26 cfs @ 12.39 hrs, Volume= 0.352 af, Atten= 75%, Lag= 21.3 min
Primary = 3.26 cfs @ 12.39 hrs, Volume= 0.352 af
Routed to Reach dp-2 : Design Point
Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach dp-2 : Design Point

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 596.62' @ 12.39 hrs Surf.Area= 15,096 sf Storage= 16,944 cf
Flood Elev= 597.00' Surf.Area= 19,200 sf Storage= 21,864 cf

Plug-Flow detention time= 226.3 min calculated for 0.352 af (49% of inflow)
Center-of-Mass det. time= 119.8 min (918.8 - 799.1)

Volume	Invert	Avail.Storage	Storage Description
#1	596.00'	9,600 cf	**Above Mulch Surface (Prismatic)** Listed below (Recalc)
#2	592.41'	12,264 cf	**Filtration Media (Prismatic)** Listed below (Recalc)
		21,864 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
596.00	4,200	0	0
597.00	15,000	9,600	9,600

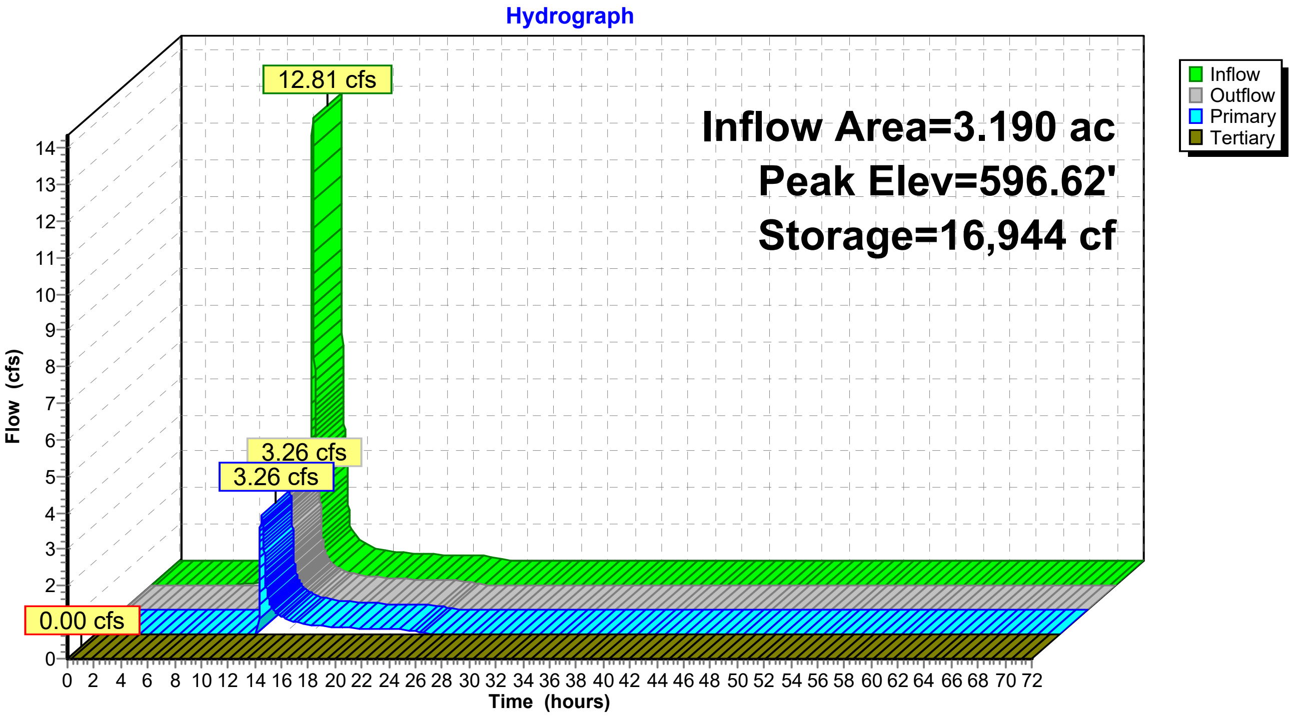
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
592.41	4,200	0.0	0	0
592.42	4,200	40.0	17	17
593.25	4,200	20.0	697	714
595.75	4,200	100.0	10,500	11,214
596.00	4,200	100.0	1,050	12,264

Device	Routing	Invert	Outlet Devices
#1	Device 2	596.50'	**24.0" x 24.0" Horiz. Overflow Grate X 3.00** C= 0.600 Limited to weir flow at low heads
#2	Primary	592.41'	**12.0" Round Culvert** L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 592.41' / 592.39' S= 0.0010 '/' Cc= 0.900 n= 0.012 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#3	Tertiary	596.90'	**10.0' long x 3.0' breadth Emergency Overflow 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

Primary OutFlow Max=3.26 cfs @ 12.39 hrs HW=596.62' TW=0.00' (Dynamic Tailwater)
└─**2=Culvert** (Passes 3.26 cfs of 5.75 cfs potential flow)
  └─**1=Overflow Grate** (Weir Controls 3.26 cfs @ 1.13 fps)

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=592.41' TW=0.00' (Dynamic Tailwater)
└─**3=Emergency Overflow Weir** (Controls 0.00 cfs)

Pond BIO-7: Filtration Bioretention



Summary for Pond BIO-8: Filtration Bioretention

Inflow Area = 2.658 ac, 53.78% Impervious, Inflow Depth = 2.68" for 25-yr event
Inflow = 10.67 cfs @ 12.04 hrs, Volume= 0.594 af
Outflow = 2.77 cfs @ 12.38 hrs, Volume= 0.286 af, Atten= 74%, Lag= 20.7 min
Primary = 2.77 cfs @ 12.38 hrs, Volume= 0.286 af
Routed to Reach dp-2 : Design Point
Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach dp-2 : Design Point

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 596.61' @ 12.38 hrs Surf.Area= 11,229 sf Storage= 14,216 cf
Flood Elev= 597.00' Surf.Area= 13,700 sf Storage= 17,654 cf

Plug-Flow detention time= 229.5 min calculated for 0.286 af (48% of inflow)
Center-of-Mass det. time= 121.9 min (921.0 - 799.1)

Volume	Invert	Avail.Storage	Storage Description
#1	596.00'	6,850 cf	**Above Mulch Surface (Prismatic)**Listed below (Recalc)
#2	592.41'	10,804 cf	**Filtration Media (Prismatic)**Listed below (Recalc)
		17,654 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
596.00	3,700	0	0
597.00	10,000	6,850	6,850

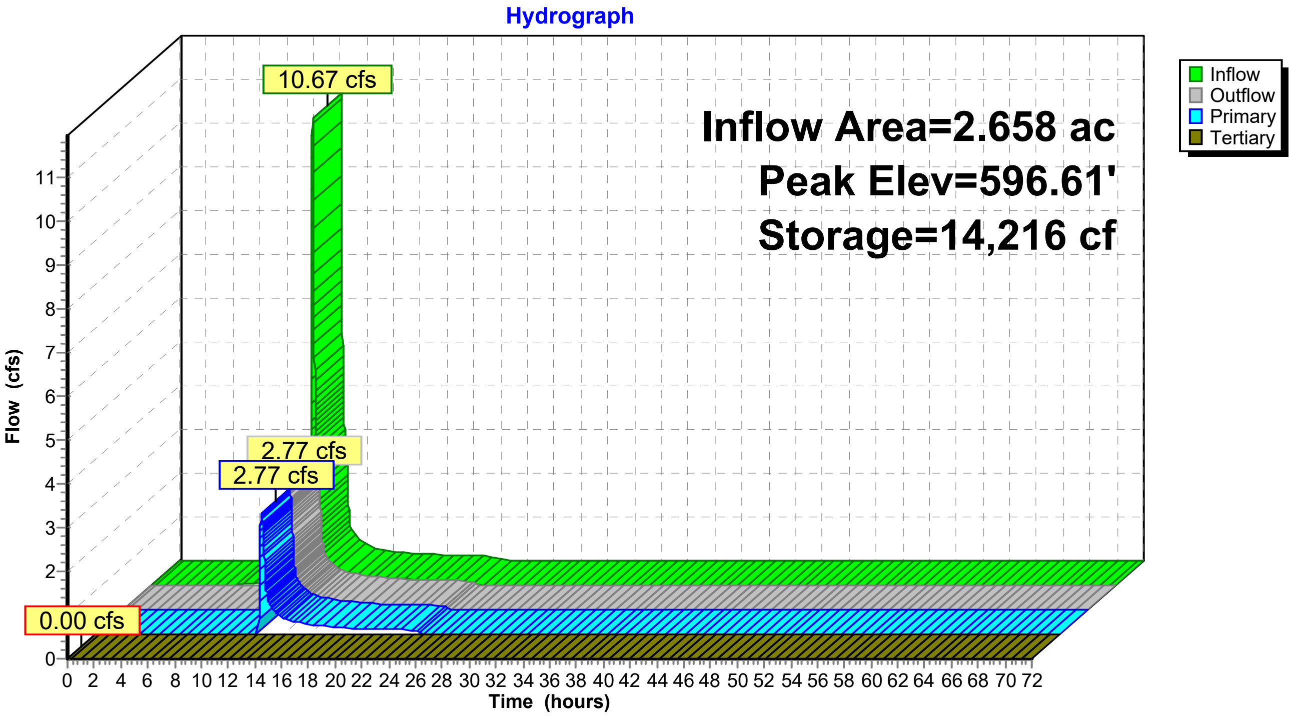
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
592.41	3,700	0.0	0	0
592.42	3,700	40.0	15	15
593.25	3,700	20.0	614	629
595.75	3,700	100.0	9,250	9,879
596.00	3,700	100.0	925	10,804

Device	Routing	Invert	Outlet Devices
#1	Device 2	596.50'	**24.0" x 24.0" Horiz. Overflow Grate X 3.00** C= 0.600 Limited to weir flow at low heads
#2	Primary	592.41'	**12.0" Round Culvert** L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 592.41' / 592.39' S= 0.0010 '/' Cc= 0.900 n= 0.012 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#3	Tertiary	596.90'	**10.0' long x 3.0' breadth Emergency Overflow 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

Primary OutFlow Max=2.77 cfs @ 12.38 hrs HW=596.61' TW=0.00' (Dynamic Tailwater)
└─**2=Culvert** (Passes 2.77 cfs of 5.74 cfs potential flow)
  └─**1=Overflow Grate** (Weir Controls 2.77 cfs @ 1.07 fps)

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=592.41' TW=0.00' (Dynamic Tailwater)
└─**3=Emergency Overflow Weir** (Controls 0.00 cfs)

Pond BIO-8: Filtration Bioretention



Summary for Pond BIO-9: Filtration Bioretention

Inflow Area = 1.213 ac, 17.45% Impervious, Inflow Depth = 2.07" for 25-yr event
Inflow = 3.80 cfs @ 12.04 hrs, Volume= 0.209 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach dp-2 : Design Point
Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach dp-2 : Design Point

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 596.30' @ 24.34 hrs Surf.Area= 6,361 sf Storage= 9,120 cf
Flood Elev= 597.00' Surf.Area= 8,165 sf Storage= 12,259 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	596.00'	4,083 cf	**Above Mulch Surface (Prismatic)** Listed below (Recalc)
#2	592.41'	8,176 cf	**Filtration Media (Prismatic)** Listed below (Recalc)
		12,259 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
596.00	2,800	0	0
597.00	5,365	4,083	4,083

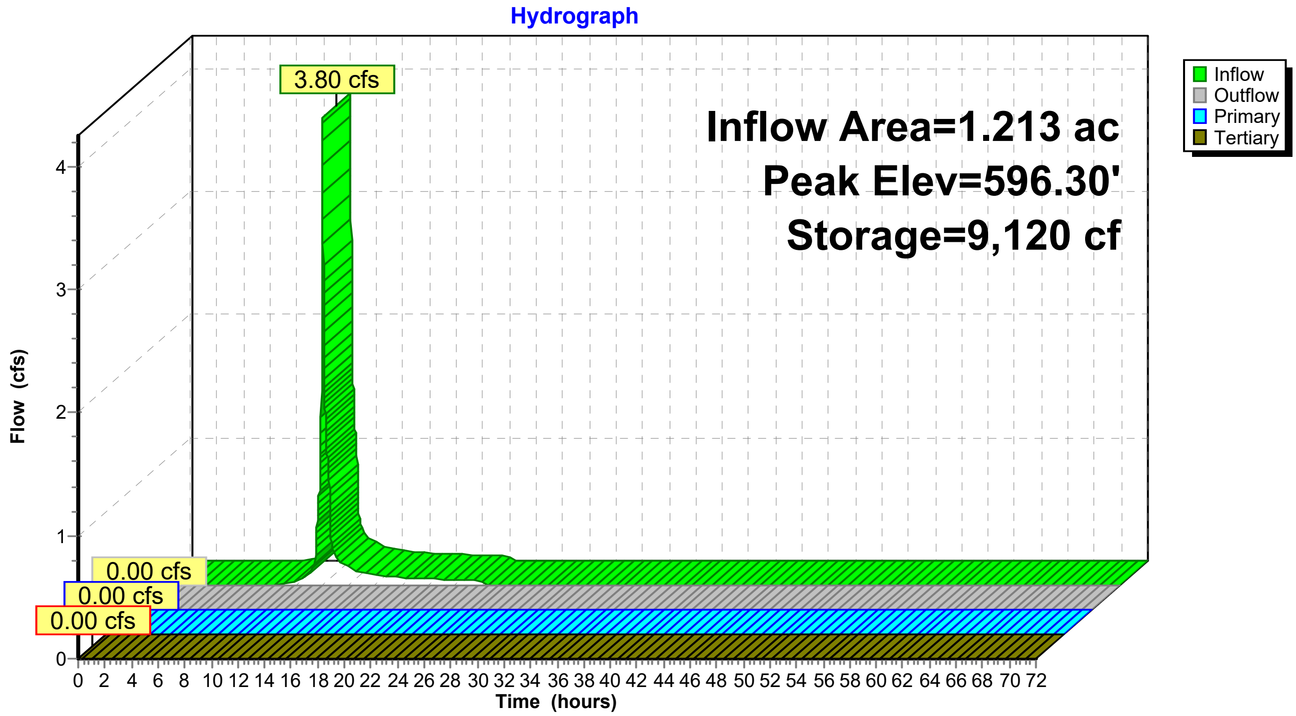
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
592.41	2,800	0.0	0	0
592.42	2,800	40.0	11	11
593.25	2,800	20.0	465	476
595.75	2,800	100.0	7,000	7,476
596.00	2,800	100.0	700	8,176

Device	Routing	Invert	Outlet Devices
#1	Device 2	596.50'	**24.0" x 24.0" Horiz. Overflow Grate X 3.00** C= 0.600 Limited to weir flow at low heads
#2	Primary	592.41'	**12.0" Round Culvert** L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 592.41' / 592.39' S= 0.0010 '/' Cc= 0.900 n= 0.012 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#3	Tertiary	596.90'	**10.0' long x 3.0' breadth Emergency Overflow 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

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=592.41' TW=0.00' (Dynamic Tailwater)
└─**2=Culvert** (Controls 0.00 cfs)
  └─**1=Overflow Grate** (Controls 0.00 cfs)

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=592.41' TW=0.00' (Dynamic Tailwater)
└─**3=Emergency Overflow Weir** (Controls 0.00 cfs)

Pond BIO-9: Filtration Bioretention



Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentES-1: Runoff Area=171,199 sf 82.98% Impervious Runoff Depth=4.49"
Tc=6.0 min CN=95 Runoff=24.83 cfs 1.470 af

SubcatchmentES-2: Runoff Area=4.795 ac 79.40% Impervious Runoff Depth=4.38"
Tc=6.0 min CN=94 Runoff=29.88 cfs 1.749 af

SubcatchmentES-3: Runoff Area=73,554 sf 85.79% Impervious Runoff Depth=4.49"
Tc=6.0 min CN=95 Runoff=10.67 cfs 0.632 af

SubcatchmentES-4: Runoff Area=36,878 sf 87.56% Impervious Runoff Depth=4.60"
Tc=6.0 min CN=96 Runoff=5.41 cfs 0.325 af

SubcatchmentES-5: Runoff Area=63,721 sf 86.36% Impervious Runoff Depth=4.60"
Tc=6.0 min CN=96 Runoff=9.35 cfs 0.561 af

SubcatchmentES-6: Runoff Area=66,972 sf 90.28% Impervious Runoff Depth=4.60"
Tc=6.0 min CN=96 Runoff=9.83 cfs 0.590 af

SubcatchmentES-7: Runoff Area=138,942 sf 54.68% Impervious Runoff Depth=3.94"
Tc=6.0 min CN=90 Runoff=18.51 cfs 1.048 af

SubcatchmentES-8: Runoff Area=115,772 sf 53.78% Impervious Runoff Depth=3.94"
Tc=6.0 min CN=90 Runoff=15.42 cfs 0.873 af

SubcatchmentES-9: Runoff Area=52,852 sf 17.45% Impervious Runoff Depth=3.24"
Tc=6.0 min CN=83 Runoff=5.92 cfs 0.327 af

Reach DP-1: Design Point Inflow=8.11 cfs 1.806 af
Outflow=8.11 cfs 1.806 af

Reach DP-2: Design Point Inflow=28.90 cfs 2.707 af
Outflow=28.90 cfs 2.707 af

Pond BIO-1: Filtration Bioretention Peak Elev=596.93' Storage=35,327 cf Inflow=24.83 cfs 1.470 af
Primary=5.99 cfs 0.792 af Tertiary=0.15 cfs 0.003 af Outflow=6.14 cfs 0.795 af

Pond BIO-2: Filtration Bioretention Peak Elev=596.99' Storage=51,277 cf Inflow=29.88 cfs 1.749 af
Primary=1.55 cfs 0.955 af Tertiary=0.64 cfs 0.057 af Outflow=2.19 cfs 1.011 af

Pond BIO-3: Filtration Bioretention Peak Elev=596.94' Storage=9,846 cf Inflow=10.67 cfs 0.632 af
Primary=6.00 cfs 0.455 af Tertiary=0.00 cfs 0.000 af Outflow=6.00 cfs 0.455 af

Pond BIO-4: Filtration Bioretention Peak Elev=596.59' Storage=7,818 cf Inflow=5.41 cfs 0.325 af
Primary=2.20 cfs 0.153 af Tertiary=0.00 cfs 0.000 af Outflow=2.20 cfs 0.153 af

Pond BIO-5: Filtration Bioretention Peak Elev=596.61' Storage=14,381 cf Inflow=9.35 cfs 0.561 af
Primary=2.98 cfs 0.244 af Tertiary=0.00 cfs 0.000 af Outflow=2.98 cfs 0.244 af

Pond BIO-6: Filtration Bioretention Peak Elev=596.86' Storage=6,365 cf Inflow=9.83 cfs 0.590 af
Primary=5.94 cfs 0.502 af Tertiary=0.00 cfs 0.000 af Outflow=5.94 cfs 0.502 af

Pond BIO-7: Filtration Bioretention Peak Elev=596.94' Storage=20,996 cf Inflow=18.51 cfs 1.048 af
Primary=5.99 cfs 0.685 af Tertiary=0.20 cfs 0.003 af Outflow=6.20 cfs 0.688 af

Pond BIO-8: Filtration Bioretention Peak Elev=596.92' Storage=16,842 cf Inflow=15.42 cfs 0.873 af
Primary=5.98 cfs 0.565 af Tertiary=0.05 cfs 0.000 af Outflow=6.03 cfs 0.565 af

Pond BIO-9: Filtration Bioretention Peak Elev=596.53' Storage=10,001 cf Inflow=5.92 cfs 0.327 af
Primary=0.32 cfs 0.100 af Tertiary=0.00 cfs 0.000 af Outflow=0.32 cfs 0.100 af

Total Runoff Area = 21.321 ac Runoff Volume = 7.575 af Average Runoff Depth = 4.26"
28.27% Pervious = 6.027 ac 71.73% Impervious = 15.294 ac

Summary for Subcatchment ES-1:

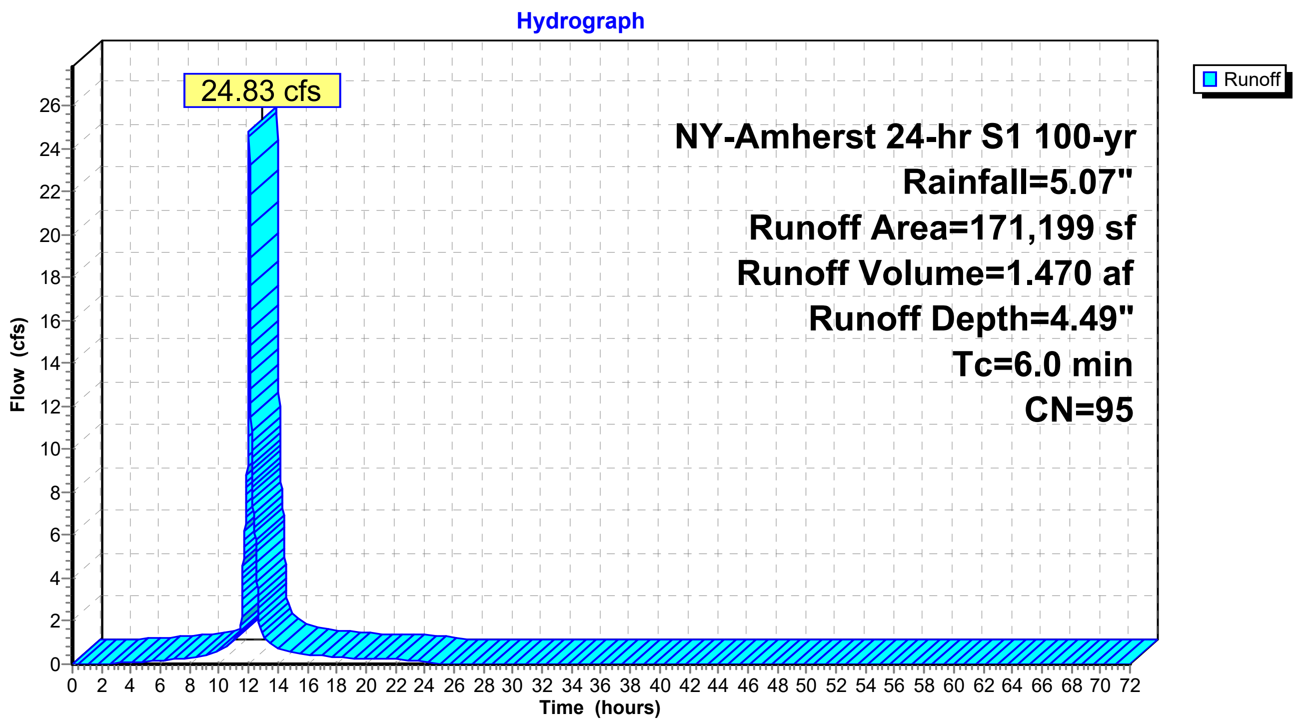
Runoff = 24.83 cfs @ 12.04 hrs, Volume= 1.470 af, Depth= 4.49"
Routed to Pond BIO-1 : Filtration Bioretention

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Amherst 24-hr S1 100-yr Rainfall=5.07"

Area (sf)	CN	Description
142,056	98	Paved parking, HSG D
29,143	80	>75% Grass cover, Good, HSG D
171,199	95	Weighted Average
29,143		17.02% Pervious Area
142,056		82.98% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Direct**

Subcatchment ES-1:



Summary for Subcatchment ES-2:

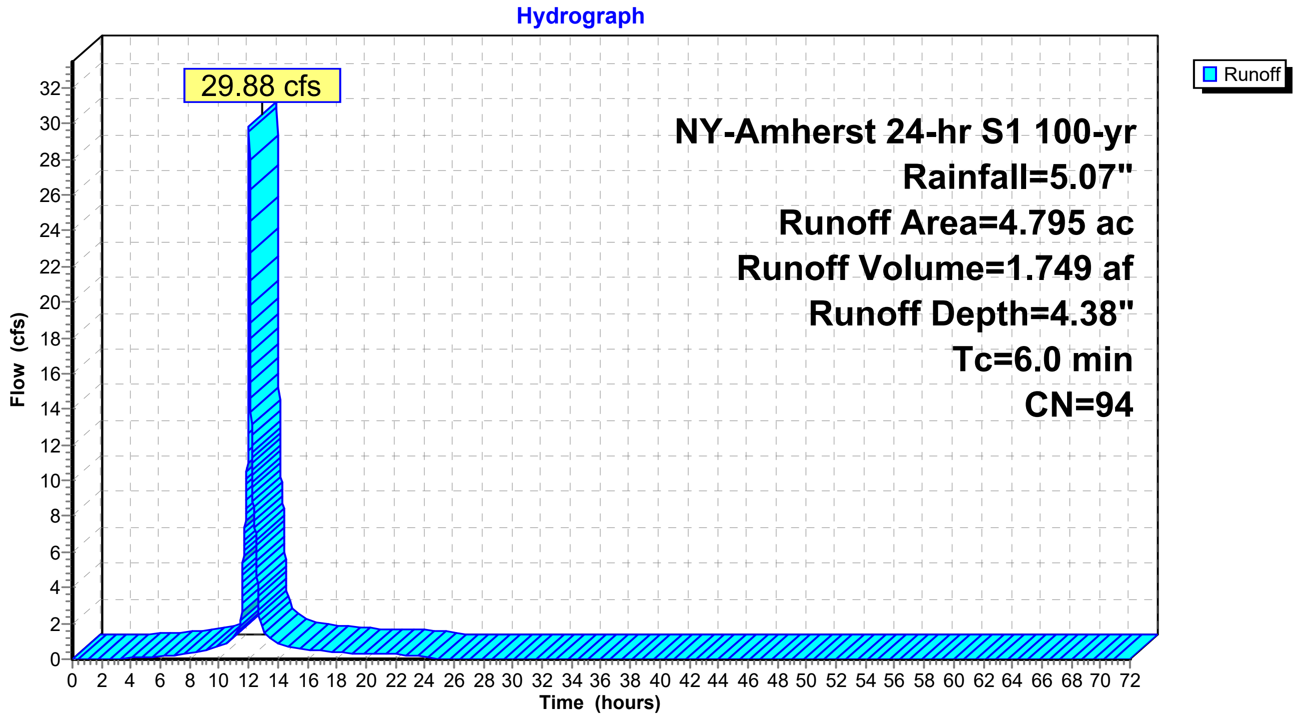
Runoff = 29.88 cfs @ 12.04 hrs, Volume= 1.749 af, Depth= 4.38"
Routed to Pond BIO-2 : Filtration Bioretention

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Amherst 24-hr S1 100-yr Rainfall=5.07"

Area (ac)	CN	Description
3.807	98	Paved parking, HSG D
0.988	80	>75% Grass cover, Good, HSG D
4.795	94	Weighted Average
0.988		20.60% Pervious Area
3.807		79.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Direct**

Subcatchment ES-2:



Summary for Subcatchment ES-3:

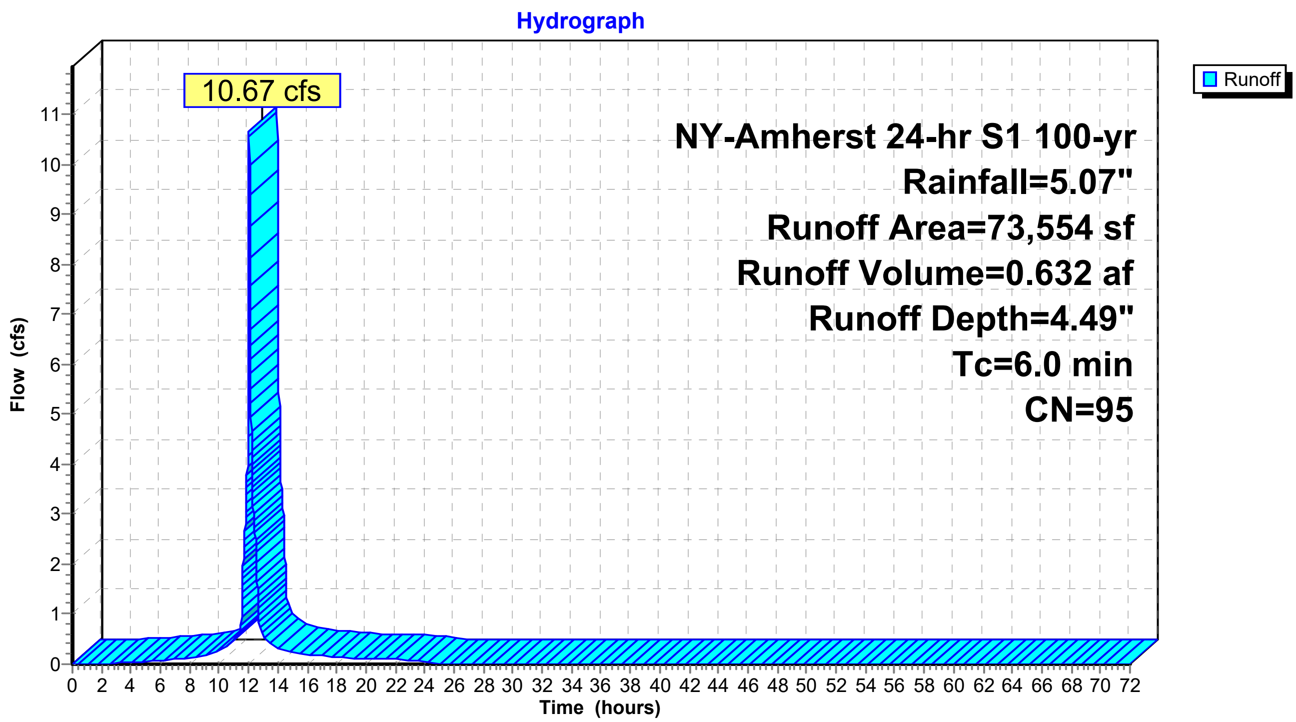
Runoff = 10.67 cfs @ 12.04 hrs, Volume= 0.632 af, Depth= 4.49"
Routed to Pond BIO-3 : Filtration Bioretention

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Amherst 24-hr S1 100-yr Rainfall=5.07"

Area (sf)	CN	Description
63,101	98	Paved parking, HSG D
10,453	80	>75% Grass cover, Good, HSG D
73,554	95	Weighted Average
10,453		14.21% Pervious Area
63,101		85.79% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Direct**

Subcatchment ES-3:



Summary for Subcatchment ES-4:

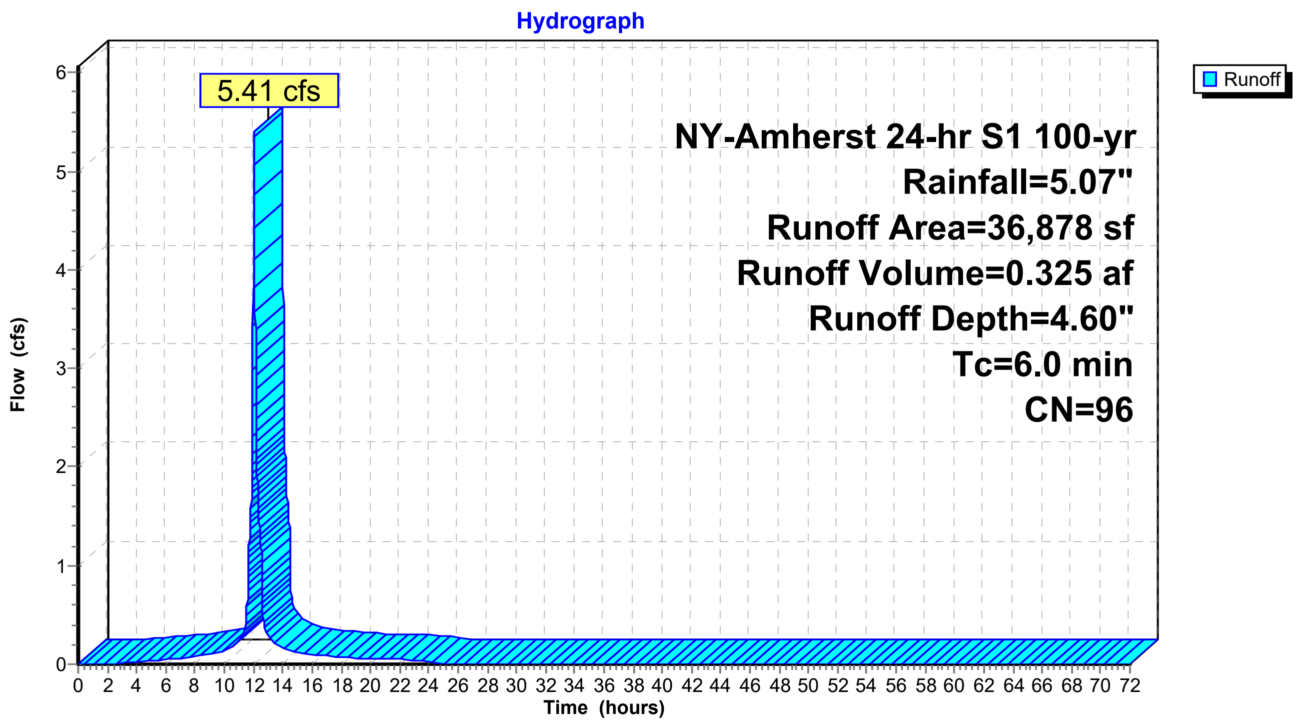
Runoff = 5.41 cfs @ 12.04 hrs, Volume= 0.325 af, Depth= 4.60"
Routed to Pond BIO-4 : Filtration Bioretention

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Amherst 24-hr S1 100-yr Rainfall=5.07"

Area (sf)	CN	Description
32,291	98	Paved parking, HSG D
4,587	80	>75% Grass cover, Good, HSG D
36,878	96	Weighted Average
4,587		12.44% Pervious Area
32,291		87.56% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Direct**

Subcatchment ES-4:



Summary for Subcatchment ES-5:

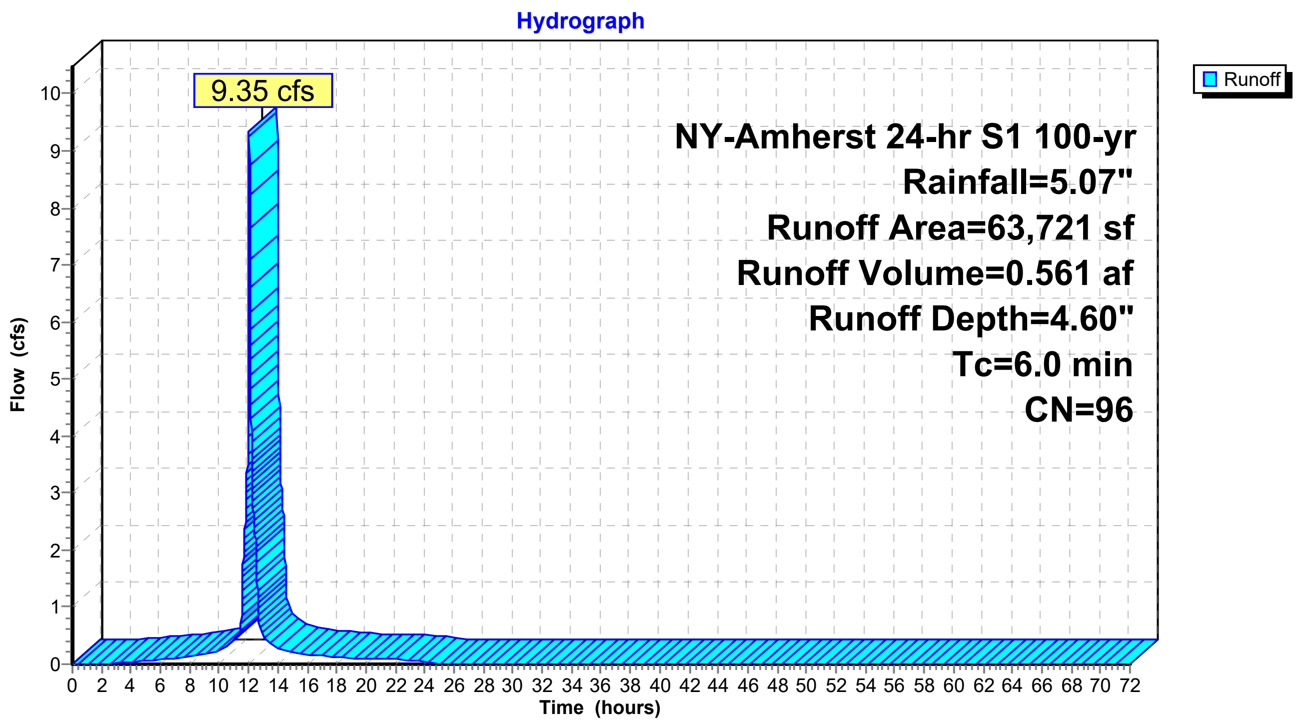
Runoff = 9.35 cfs @ 12.04 hrs, Volume= 0.561 af, Depth= 4.60"
Routed to Pond BIO-5 : Filtration Bioretention

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Amherst 24-hr S1 100-yr Rainfall=5.07"

Area (sf)	CN	Description
55,032	98	Paved parking, HSG D
8,689	80	>75% Grass cover, Good, HSG D
63,721	96	Weighted Average
8,689		13.64% Pervious Area
55,032		86.36% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Direct**

Subcatchment ES-5:



Summary for Subcatchment ES-6:

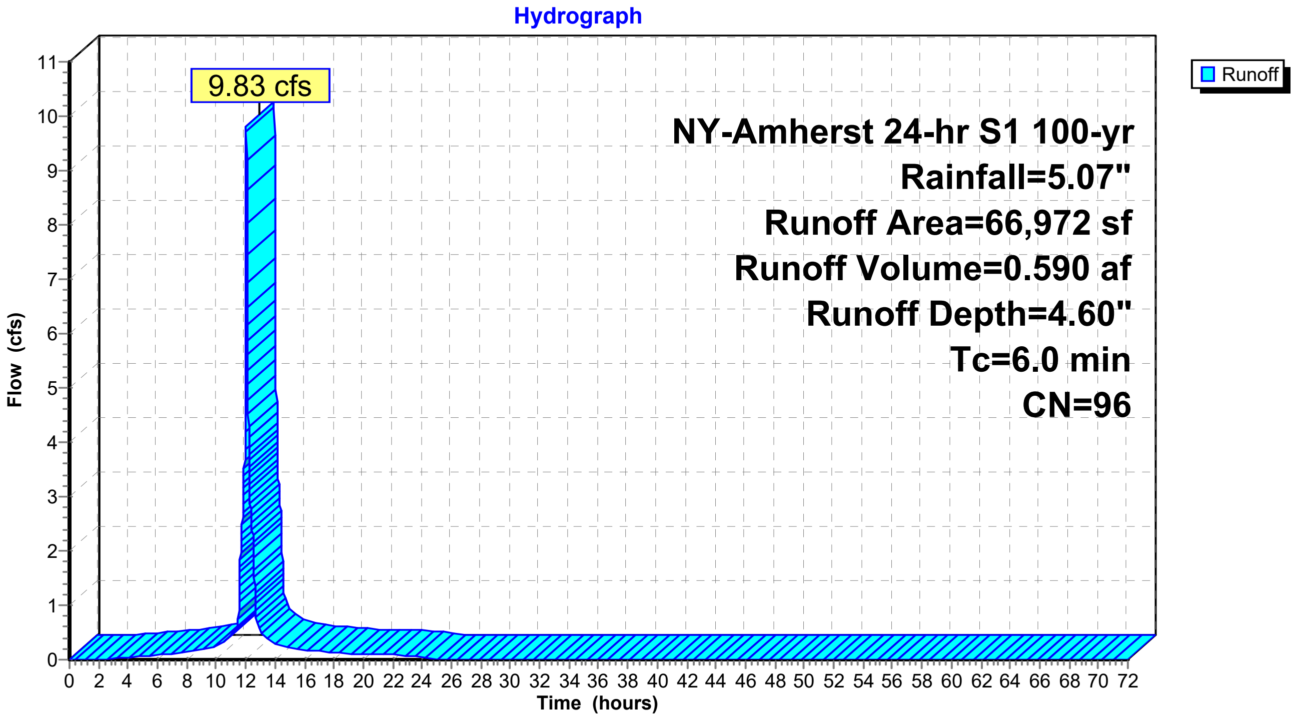
Runoff = 9.83 cfs @ 12.04 hrs, Volume= 0.590 af, Depth= 4.60"
Routed to Pond BIO-6 : Filtration Bioretention

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Amherst 24-hr S1 100-yr Rainfall=5.07"

Area (sf)	CN	Description
60,462	98	Paved parking, HSG D
6,510	80	>75% Grass cover, Good, HSG D
66,972	96	Weighted Average
6,510		9.72% Pervious Area
60,462		90.28% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Direct**

Subcatchment ES-6:



Summary for Subcatchment ES-7:

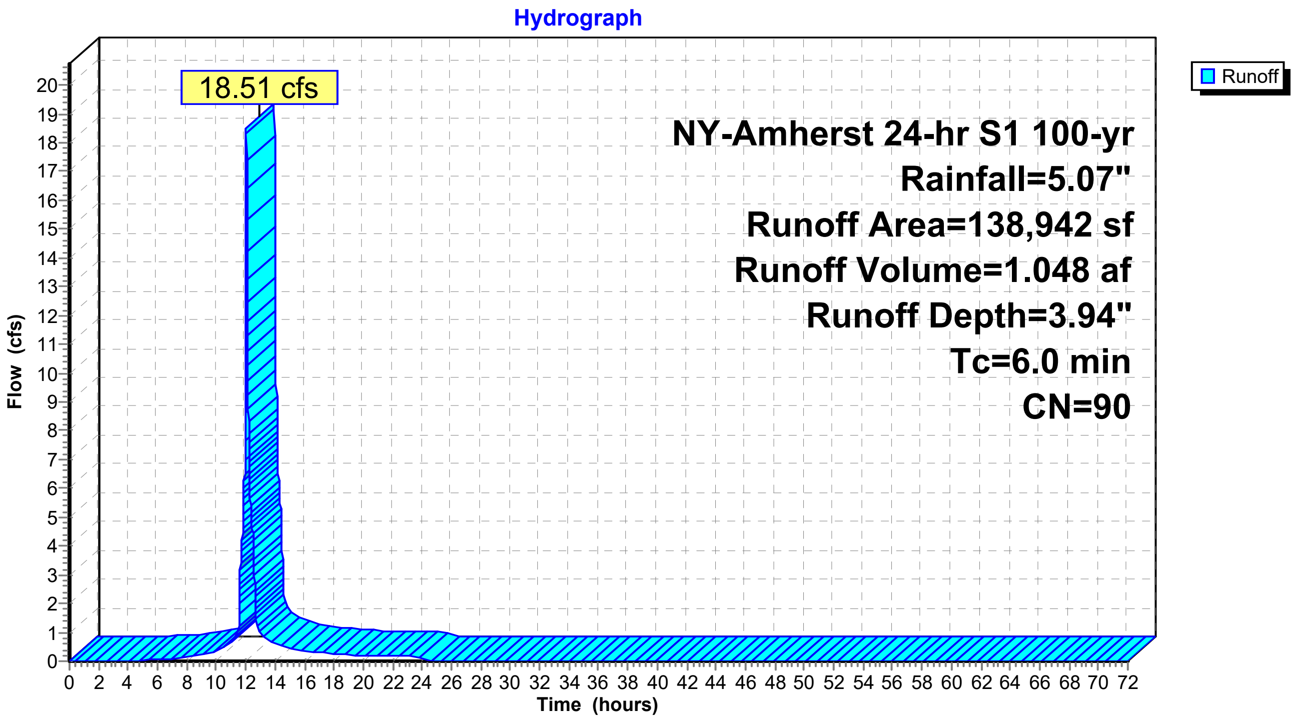
Runoff = 18.51 cfs @ 12.04 hrs, Volume= 1.048 af, Depth= 3.94"
Routed to Pond BIO-7 : Filtration Bioretention

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Amherst 24-hr S1 100-yr Rainfall=5.07"

Area (sf)	CN	Description
75,973	98	Paved parking, HSG D
62,969	80	>75% Grass cover, Good, HSG D
138,942	90	Weighted Average
62,969		45.32% Pervious Area
75,973		54.68% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Direct**

Subcatchment ES-7:



Summary for Subcatchment ES-8:

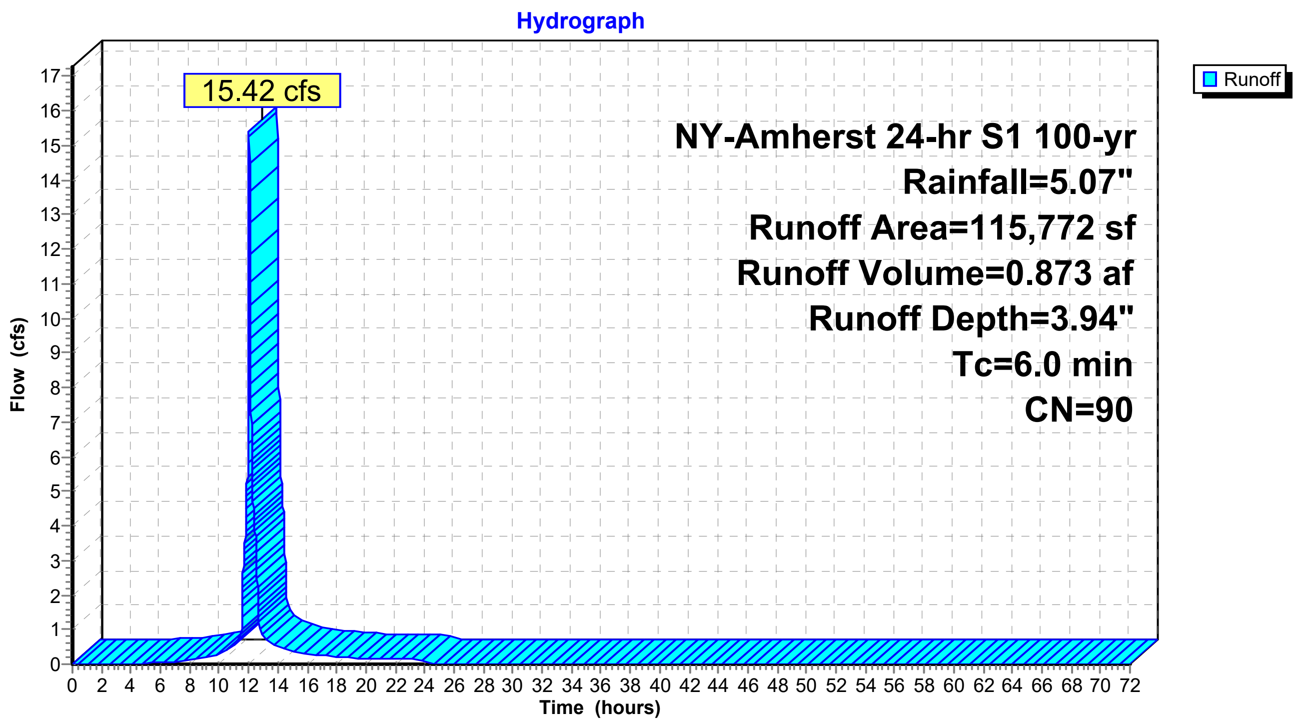
Runoff = 15.42 cfs @ 12.04 hrs, Volume= 0.873 af, Depth= 3.94"
Routed to Pond BIO-8 : Filtration Bioretention

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Amherst 24-hr S1 100-yr Rainfall=5.07"

Area (sf)	CN	Description
62,258	98	Paved parking, HSG D
53,514	80	>75% Grass cover, Good, HSG D
115,772	90	Weighted Average
53,514		46.22% Pervious Area
62,258		53.78% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Direct**

Subcatchment ES-8:



Summary for Subcatchment ES-9:

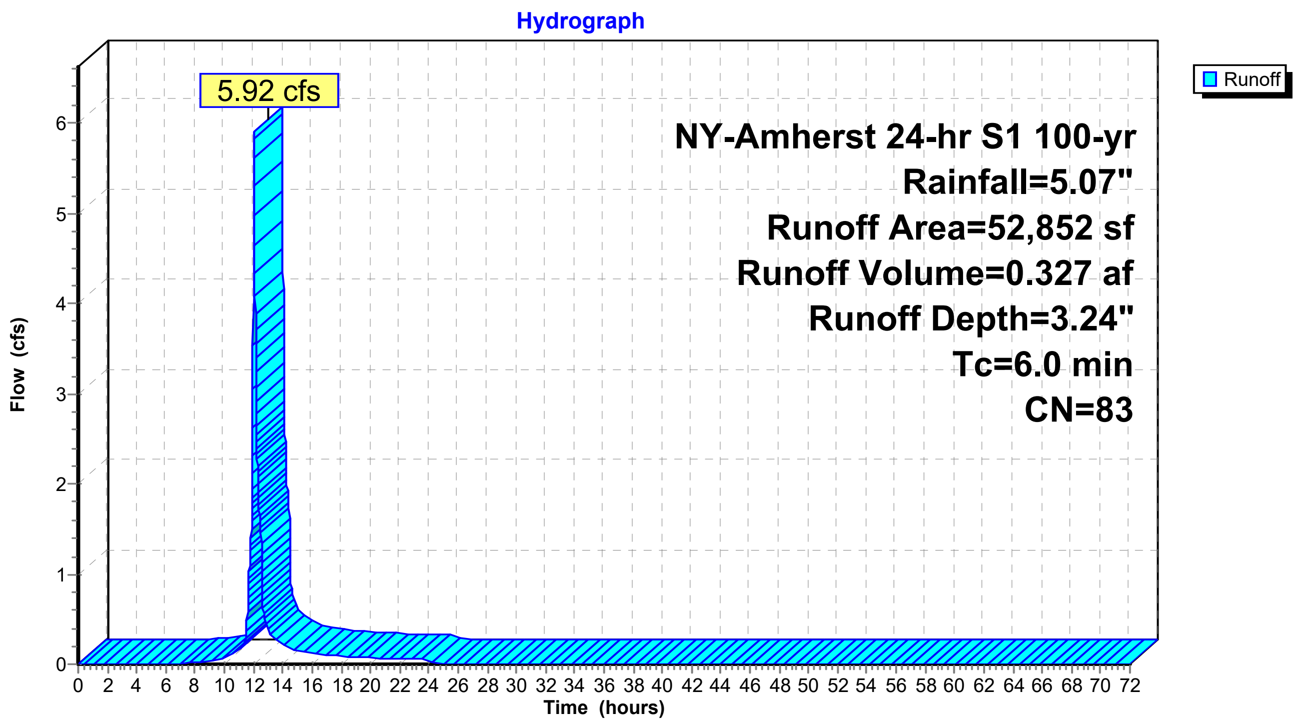
Runoff = 5.92 cfs @ 12.04 hrs, Volume= 0.327 af, Depth= 3.24"
Routed to Pond BIO-9 : Filtration Bioretention

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Amherst 24-hr S1 100-yr Rainfall=5.07"

Area (sf)	CN	Description
9,221	98	Paved parking, HSG D
43,631	80	>75% Grass cover, Good, HSG D
52,852	83	Weighted Average
43,631		82.55% Pervious Area
9,221		17.45% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Direct**

Subcatchment ES-9:

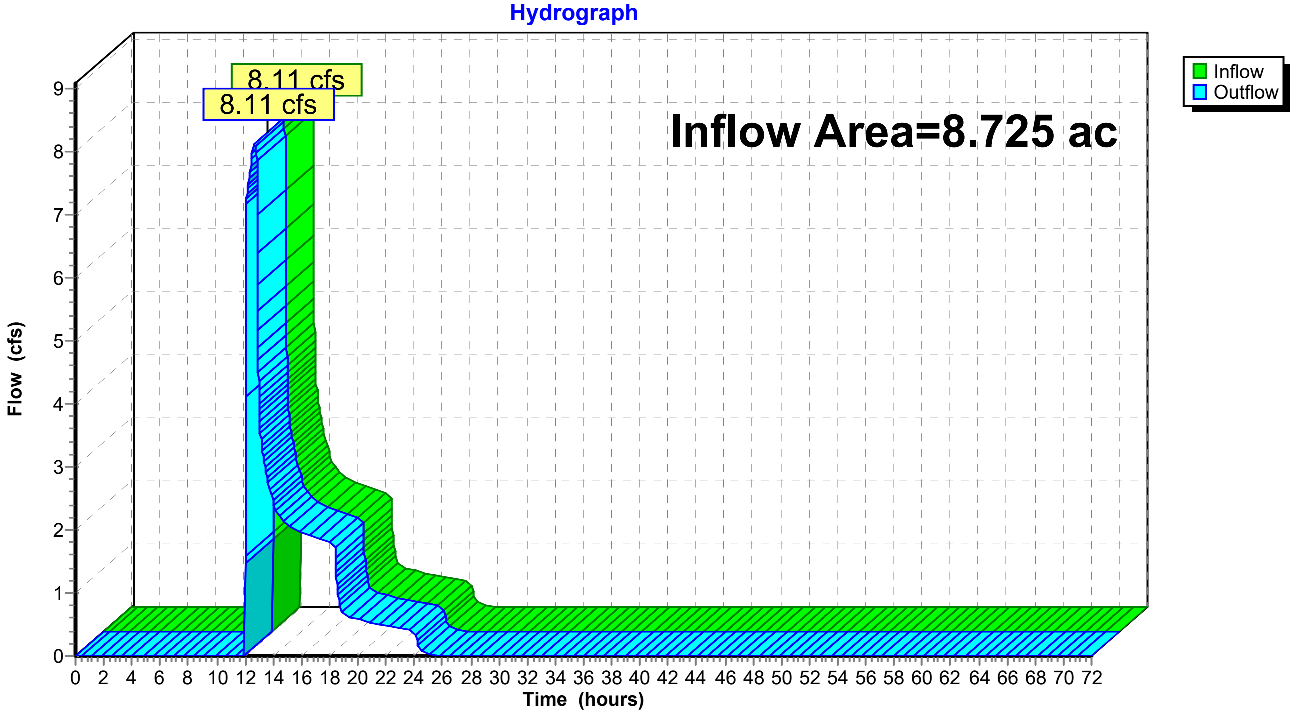


Summary for Reach DP-1: Design Point

Inflow Area = 8.725 ac, 81.01% Impervious, Inflow Depth = 2.48" for 100-yr event
Inflow = 8.11 cfs @ 12.63 hrs, Volume= 1.806 af
Outflow = 8.11 cfs @ 12.63 hrs, Volume= 1.806 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Reach DP-1: Design Point

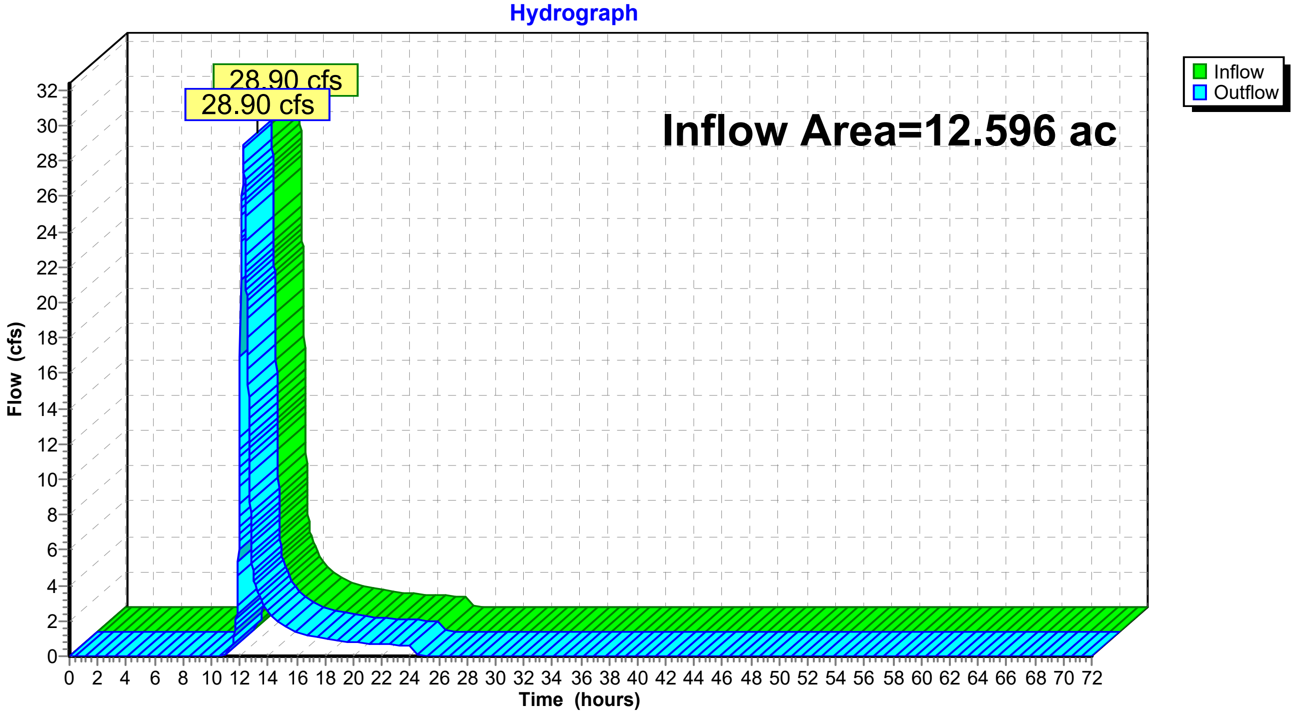


Summary for Reach DP-2: Design Point

Inflow Area = 12.596 ac, 65.31% Impervious, Inflow Depth = 2.58" for 100-yr event
Inflow = 28.90 cfs @ 12.26 hrs, Volume= 2.707 af
Outflow = 28.90 cfs @ 12.26 hrs, Volume= 2.707 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Reach DP-2: Design Point



Summary for Pond BIO-1: Filtration Bioretention

Inflow Area = 3.930 ac, 82.98% Impervious, Inflow Depth = 4.49" for 100-yr event
Inflow = 24.83 cfs @ 12.04 hrs, Volume= 1.470 af
Outflow = 6.14 cfs @ 12.42 hrs, Volume= 0.795 af, Atten= 75%, Lag= 23.0 min
Primary = 5.99 cfs @ 12.42 hrs, Volume= 0.792 af
Routed to Reach DP-1 : Design Point
Tertiary = 0.15 cfs @ 12.42 hrs, Volume= 0.003 af
Routed to Reach DP-1 : Design Point

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 596.93' @ 12.42 hrs Surf.Area= 23,577 sf Storage= 35,327 cf
Flood Elev= 597.00' Surf.Area= 24,070 sf Storage= 36,359 cf

Plug-Flow detention time= 210.1 min calculated for 0.795 af (54% of inflow)
Center-of-Mass det. time= 107.4 min (873.4 - 766.0)

Volume	Invert	Avail.Storage	Storage Description
#1	596.00'	12,035 cf	**Above Mulch Surface (Prismatic)** Listed below (Recalc)
#2	592.41'	24,324 cf	**Filtration Media (Prismatic)** Listed below (Recalc)
		36,359 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
596.00	8,330	0	0
597.00	15,740	12,035	12,035

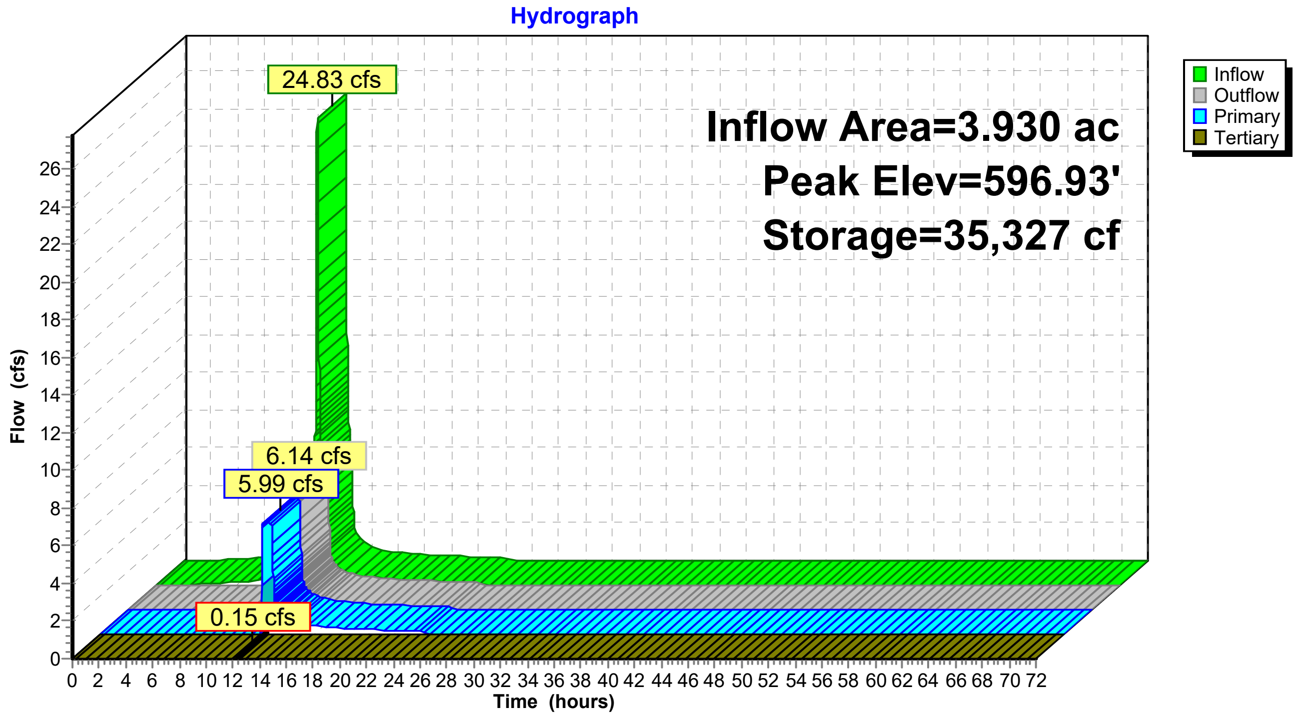
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
592.41	8,330	0.0	0	0
592.42	8,330	40.0	33	33
593.25	8,330	20.0	1,383	1,416
595.75	8,330	100.0	20,825	22,241
596.00	8,330	100.0	2,083	24,324

Device	Routing	Invert	Outlet Devices
#1	Device 2	596.50'	**24.0" x 24.0" Horiz. Overflow Grate X 6.00** C= 0.600 Limited to weir flow at low heads
#2	Primary	592.41'	**12.0" Round Culvert** L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 592.41' / 592.39' S= 0.0010 '/' Cc= 0.900 n= 0.012 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#3	Tertiary	596.90'	**10.0' long x 3.0' breadth Emergency Overflow 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

Primary OutFlow Max=5.99 cfs @ 12.42 hrs HW=596.93' TW=0.00' (Dynamic Tailwater)
└─**2=Culvert** (Inlet Controls 5.99 cfs @ 7.62 fps)
  └─**1=Overflow Grate** (Passes 5.99 cfs of 44.79 cfs potential flow)

Tertiary OutFlow Max=0.15 cfs @ 12.42 hrs HW=596.93' TW=0.00' (Dynamic Tailwater)
└─**3=Emergency Overflow Weir** (Weir Controls 0.15 cfs @ 0.45 fps)

Pond BIO-1: Filtration Bioretention



Summary for Pond BIO-2: Filtration Bioretention

Inflow Area = 4.795 ac, 79.40% Impervious, Inflow Depth = 4.38" for 100-yr event
Inflow = 29.88 cfs @ 12.04 hrs, Volume= 1.749 af
Outflow = 2.19 cfs @ 12.73 hrs, Volume= 1.011 af, Atten= 93%, Lag= 41.4 min
Primary = 1.55 cfs @ 12.73 hrs, Volume= 0.955 af
Routed to Reach DP-1 : Design Point
Tertiary = 0.64 cfs @ 12.73 hrs, Volume= 0.057 af
Routed to Reach DP-1 : Design Point

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 596.99' @ 12.73 hrs Surf.Area= 57,358 sf Storage= 51,277 cf
Flood Elev= 597.00' Surf.Area= 57,855 sf Storage= 51,864 cf

Plug-Flow detention time= 285.0 min calculated for 1.011 af (58% of inflow)
Center-of-Mass det. time= 187.8 min (958.8 - 771.0)

Volume	Invert	Avail.Storage	Storage Description
#1	596.00'	28,928 cf	**Above Mulch Surface (Prismatic)** Listed below (Recalc)
#2	592.41'	22,937 cf	**Filtration Media (Prismatic)** Listed below (Recalc)
		51,864 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
596.00	7,855	0	0
597.00	50,000	28,928	28,928

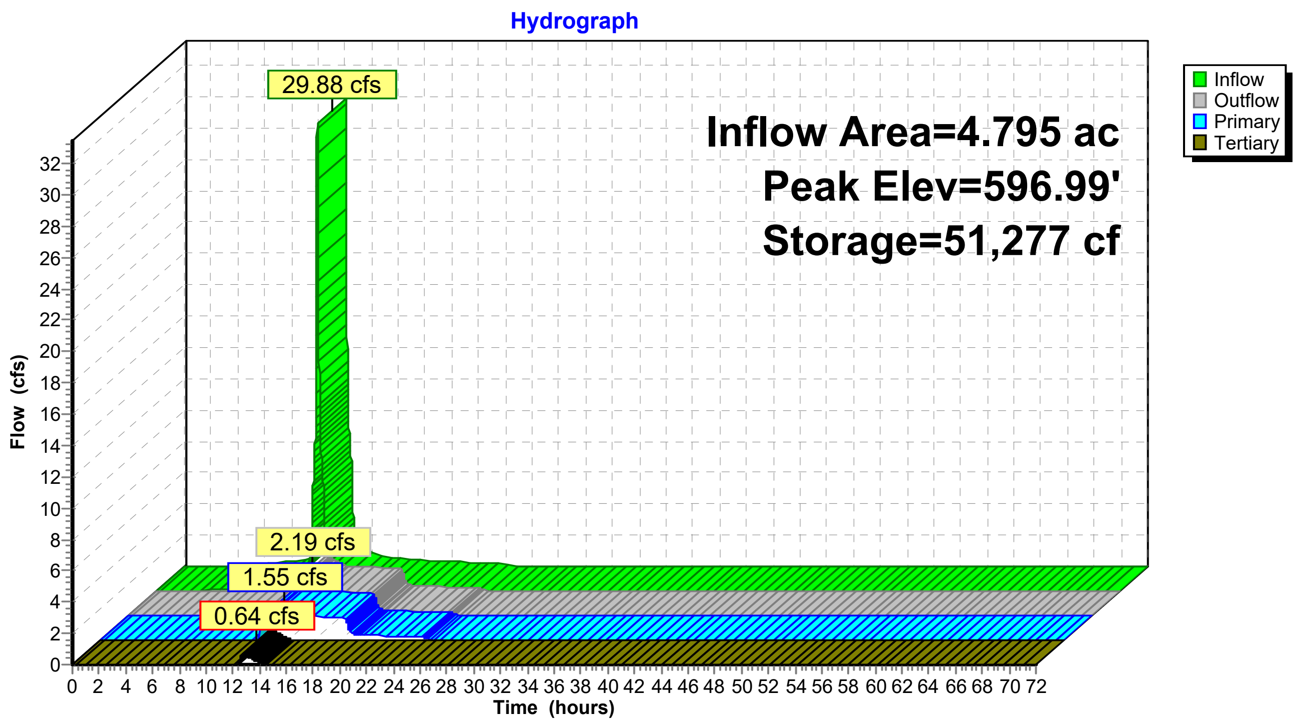
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
592.41	7,855	0.0	0	0
592.42	7,855	40.0	31	31
593.25	7,855	20.0	1,304	1,335
595.75	7,855	100.0	19,638	20,973
596.00	7,855	100.0	1,964	22,937

Device	Routing	Invert	Outlet Devices
#1	Device 2	596.50'	**24.0" x 24.0" Horiz. Overflow Grate X 8.00** C= 0.600 Limited to weir flow at low heads
#2	Primary	592.41'	**6.0" Round Culvert** L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 592.41' / 592.39' S= 0.0010 '/' Cc= 0.900 n= 0.012 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#3	Tertiary	596.90'	**10.0' long x 3.0' breadth Emergency Overflow 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

Primary OutFlow Max=1.55 cfs @ 12.73 hrs HW=596.99' TW=0.00' (Dynamic Tailwater)
└─**2=Culvert** (Inlet Controls 1.55 cfs @ 7.91 fps)
  └─**1=Overflow Grate** (Passes 1.55 cfs of 71.39 cfs potential flow)

Tertiary OutFlow Max=0.64 cfs @ 12.73 hrs HW=596.99' TW=0.00' (Dynamic Tailwater)
└─**3=Emergency Overflow Weir** (Weir Controls 0.64 cfs @ 0.72 fps)

Pond BIO-2: Filtration Bioretention



Summary for Pond BIO-3: Filtration Bioretention

Inflow Area = 1.689 ac, 85.79% Impervious, Inflow Depth = 4.49" for 100-yr event
Inflow = 10.67 cfs @ 12.04 hrs, Volume= 0.632 af
Outflow = 6.00 cfs @ 12.14 hrs, Volume= 0.455 af, Atten= 44%, Lag= 6.4 min
Primary = 6.00 cfs @ 12.14 hrs, Volume= 0.455 af
Routed to Reach DP-2 : Design Point
Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach DP-2 : Design Point

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 596.94' @ 12.14 hrs Surf.Area= 7,853 sf Storage= 9,846 cf
Flood Elev= 597.00' Surf.Area= 8,070 sf Storage= 10,176 cf

Plug-Flow detention time= 147.8 min calculated for 0.455 af (72% of inflow)
Center-of-Mass det. time= 64.5 min (830.5 - 766.0)

Volume	Invert	Avail.Storage	Storage Description
#1	596.00'	4,035 cf	**Above Mulch Surface (Prismatic)** Listed below (Recalc)
#2	592.41'	6,141 cf	**Filtration Media (Prismatic)** Listed below (Recalc)
		10,176 cf	Total Available Storage

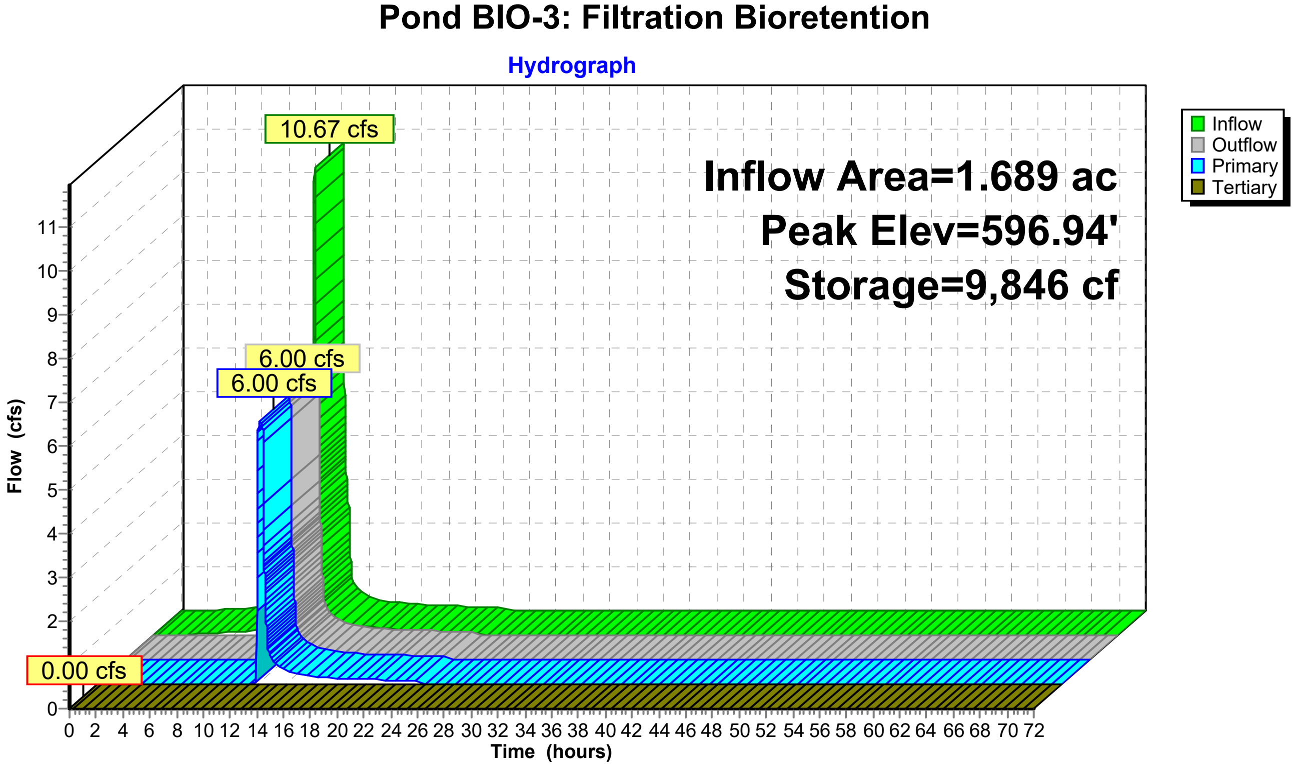
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
596.00	2,103	0	0
597.00	5,967	4,035	4,035

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
592.41	2,103	0.0	0	0
592.42	2,103	40.0	8	8
593.25	2,103	20.0	349	358
595.75	2,103	100.0	5,258	5,615
596.00	2,103	100.0	526	6,141

Device	Routing	Invert	Outlet Devices
#1	Device 2	596.50'	**24.0" x 24.0" Horiz. Overflow Grate X 6.00** C= 0.600 Limited to weir flow at low heads
#2	Primary	592.41'	**12.0" Round Culvert** L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 592.41' / 592.39' S= 0.0010 '/' Cc= 0.900 n= 0.012 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#3	Tertiary	596.95'	**10.0' long x 3.0' breadth Emergency Overflow 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

Primary OutFlow Max=6.00 cfs @ 12.14 hrs HW=596.94' TW=0.00' (Dynamic Tailwater)
└─**2=Culvert** (Inlet Controls 6.00 cfs @ 7.63 fps)
  └─**1=Overflow Grate** (Passes 6.00 cfs of 46.36 cfs potential flow)

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=592.41' TW=0.00' (Dynamic Tailwater)
└─**3=Emergency Overflow Weir** (Controls 0.00 cfs)



Summary for Pond BIO-4: Filtration Bioretention

Inflow Area = 0.847 ac, 87.56% Impervious, Inflow Depth = 4.60" for 100-yr event
Inflow = 5.41 cfs @ 12.04 hrs, Volume= 0.325 af
Outflow = 2.20 cfs @ 12.21 hrs, Volume= 0.153 af, Atten= 59%, Lag= 10.2 min
Primary = 2.20 cfs @ 12.21 hrs, Volume= 0.153 af
Routed to Reach dp-2 : Design Point
Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach dp-2 : Design Point

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 596.59' @ 12.21 hrs Surf.Area= 5,889 sf Storage= 7,818 cf
Flood Elev= 597.00' Surf.Area= 7,080 sf Storage= 9,614 cf

Plug-Flow detention time= 239.2 min calculated for 0.153 af (47% of inflow)
Center-of-Mass det. time= 124.4 min (884.8 - 760.5)

Volume	Invert	Avail.Storage	Storage Description
#1	596.00'	3,540 cf	**Above Mulch Surface (Prismatic)** Listed below (Recalc)
#2	592.41'	6,074 cf	**Filtration Media (Prismatic)** Listed below (Recalc)
		9,614 cf	Total Available Storage

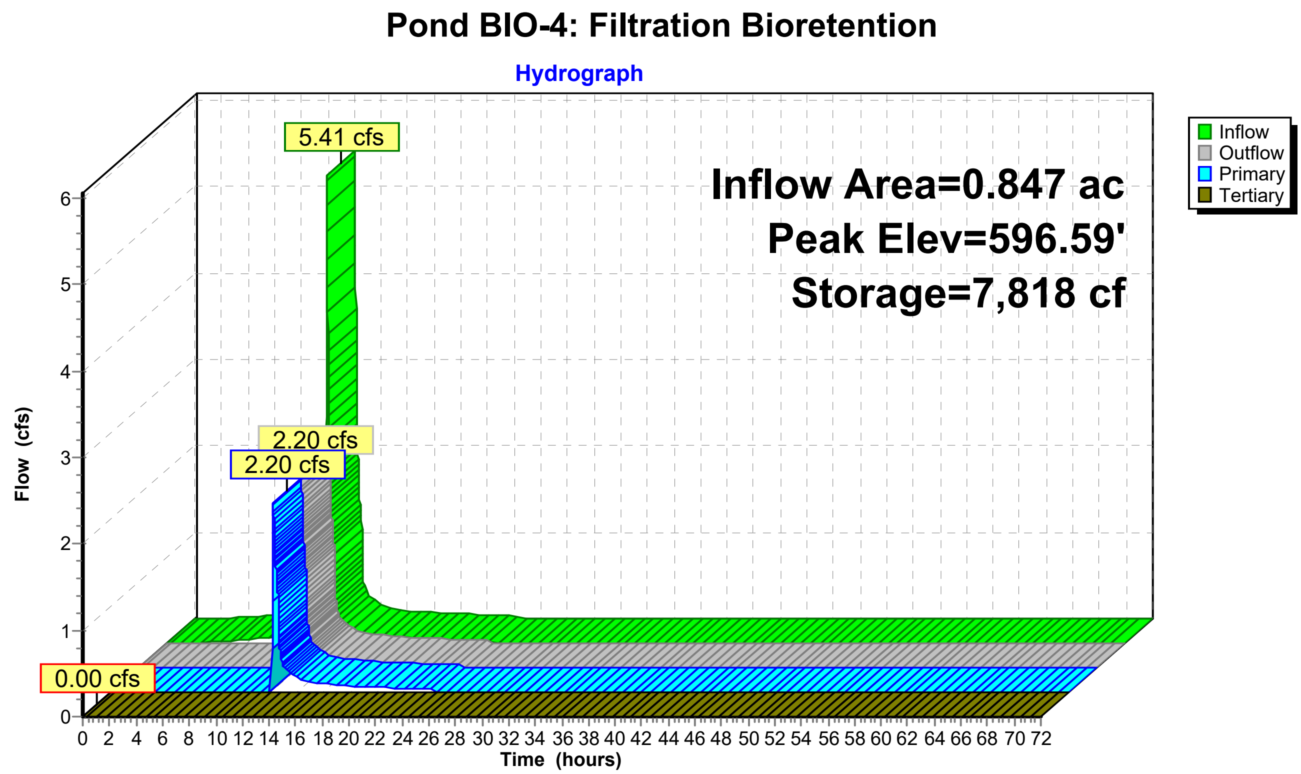
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
596.00	2,080	0	0
597.00	5,000	3,540	3,540

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
592.41	2,080	0.0	0	0
592.42	2,080	40.0	8	8
593.25	2,080	20.0	345	354
595.75	2,080	100.0	5,200	5,554
596.00	2,080	100.0	520	6,074

Device	Routing	Invert	Outlet Devices
#1	Device 2	596.50'	**24.0" x 24.0" Horiz. Overflow Grate X 3.00** C= 0.600 Limited to weir flow at low heads
#2	Primary	592.41'	**12.0" Round Culvert** L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 592.41' / 592.39' S= 0.0010 '/' Cc= 0.900 n= 0.012 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#3	Tertiary	596.90'	**10.0' long x 3.0' breadth Emergency Overflow 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

Primary OutFlow Max=2.20 cfs @ 12.21 hrs HW=596.59' TW=0.00' (Dynamic Tailwater)
└─**2=Culvert** (Passes 2.20 cfs of 5.73 cfs potential flow)
  └─**1=Overflow Grate** (Weir Controls 2.20 cfs @ 0.99 fps)

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=592.41' TW=0.00' (Dynamic Tailwater)
└─**3=Emergency Overflow Weir** (Controls 0.00 cfs)



Summary for Pond BIO-5: Filtration Bioretention

Inflow Area = 1.463 ac, 86.36% Impervious, Inflow Depth = 4.60" for 100-yr event
Inflow = 9.35 cfs @ 12.04 hrs, Volume= 0.561 af
Outflow = 2.98 cfs @ 12.28 hrs, Volume= 0.244 af, Atten= 68%, Lag= 14.7 min
Primary = 2.98 cfs @ 12.28 hrs, Volume= 0.244 af
Routed to Reach dp-2 : Design Point
Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach dp-2 : Design Point

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 596.61' @ 12.28 hrs Surf.Area= 9,173 sf Storage= 14,381 cf
Flood Elev= 597.00' Surf.Area= 9,962 sf Storage= 16,550 cf

Plug-Flow detention time= 259.3 min calculated for 0.244 af (44% of inflow)
Center-of-Mass det. time= 138.0 min (898.5 - 760.5)

Volume	Invert	Avail.Storage	Storage Description
#1	596.00'	4,981 cf	**Above Mulch Surface (Prismatic)** Listed below (Recalc)
#2	592.41'	11,569 cf	**Filtration Media (Prismatic)** Listed below (Recalc)
		16,550 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
596.00	3,962	0	0
597.00	6,000	4,981	4,981

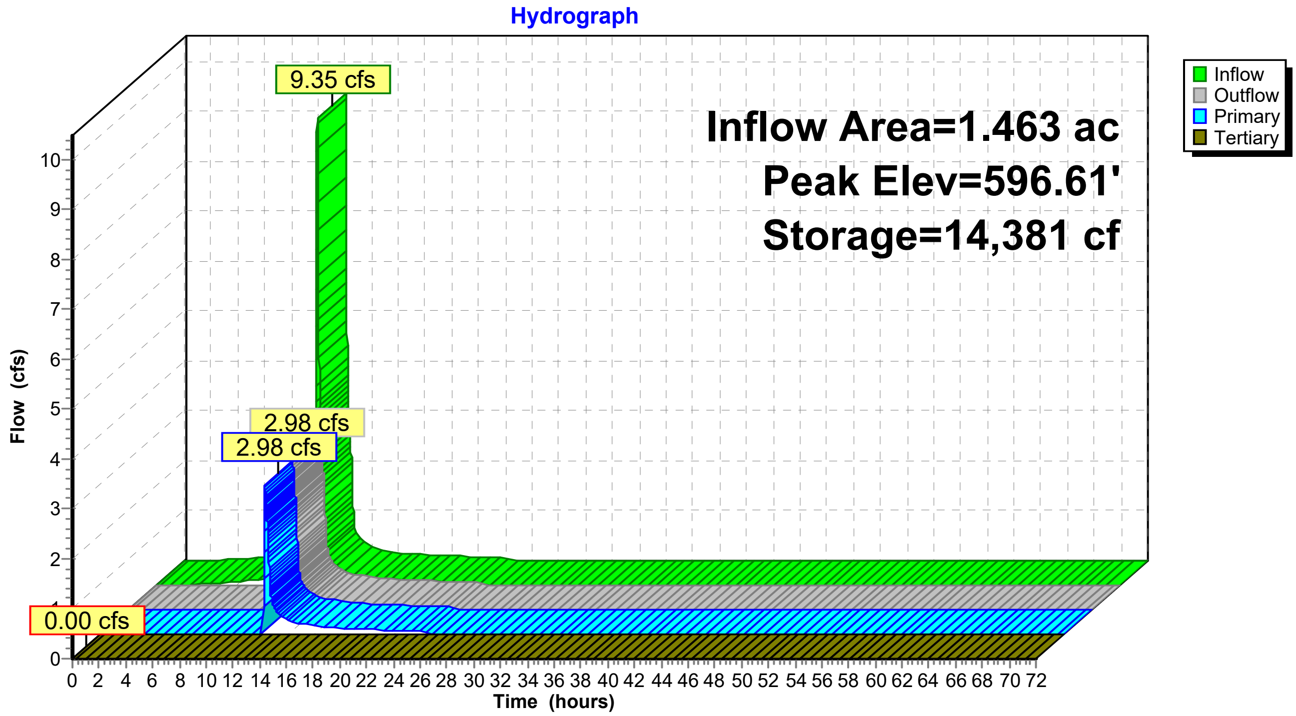
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
592.41	3,962	0.0	0	0
592.42	3,962	40.0	16	16
593.25	3,962	20.0	658	674
595.75	3,962	100.0	9,905	10,579
596.00	3,962	100.0	991	11,569

Device	Routing	Invert	Outlet Devices
#1	Device 2	596.50'	**24.0" x 24.0" Horiz. Overflow Grate X 3.00** C= 0.600 Limited to weir flow at low heads
#2	Primary	592.41'	**12.0" Round Culvert** L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 592.41' / 592.39' S= 0.0010 '/' Cc= 0.900 n= 0.012 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#3	Tertiary	596.90'	**10.0' long x 3.0' breadth Emergency Overflow 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

Primary OutFlow Max=2.98 cfs @ 12.28 hrs HW=596.61' TW=0.00' (Dynamic Tailwater)
└─**2=Culvert** (Passes 2.98 cfs of 5.75 cfs potential flow)
  └─**1=Overflow Grate** (Weir Controls 2.98 cfs @ 1.10 fps)

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=592.41' TW=0.00' (Dynamic Tailwater)
└─**3=Emergency Overflow Weir** (Controls 0.00 cfs)

Pond BIO-5: Filtration Bioretention



Summary for Pond BIO-6: Filtration Bioretention

Inflow Area = 1.537 ac, 90.28% Impervious, Inflow Depth = 4.60" for 100-yr event
Inflow = 9.83 cfs @ 12.04 hrs, Volume= 0.590 af
Outflow = 5.94 cfs @ 12.13 hrs, Volume= 0.502 af, Atten= 40%, Lag= 5.5 min
Primary = 5.94 cfs @ 12.13 hrs, Volume= 0.502 af
Routed to Reach dp-2 : Design Point
Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach dp-2 : Design Point

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 596.86' @ 12.13 hrs Surf.Area= 9,509 sf Storage= 6,365 cf
Flood Elev= 597.00' Surf.Area= 10,775 sf Storage= 7,651 cf

Plug-Flow detention time= 114.7 min calculated for 0.502 af (85% of inflow)
Center-of-Mass det. time= 51.7 min (812.2 - 760.5)

Volume	Invert	Avail.Storage	Storage Description
#1	596.00'	5,388 cf	**Above Mulch Surface (Prismatic)**Listed below (Recalc)
#2	592.41'	2,263 cf	**Filtration Media (Prismatic)**Listed below (Recalc)
		7,651 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
596.00	775	0	0
597.00	10,000	5,388	5,388

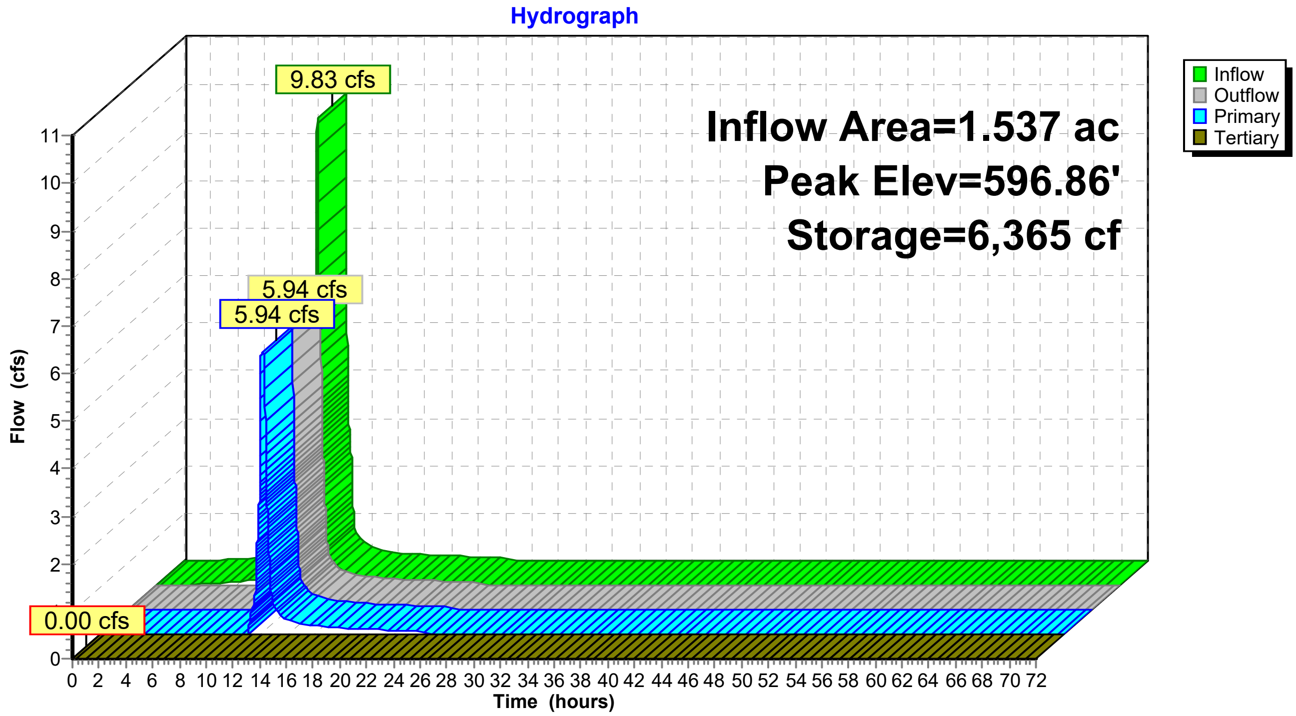
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
592.41	775	0.0	0	0
592.42	775	40.0	3	3
593.25	775	20.0	129	132
595.75	775	100.0	1,938	2,069
596.00	775	100.0	194	2,263

Device	Routing	Invert	Outlet Devices
#1	Device 2	596.50'	**24.0" x 24.0" Horiz. Overflow Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#2	Primary	592.41'	**12.0" Round Culvert** L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 592.41' / 592.39' S= 0.0010 '/' Cc= 0.900 n= 0.012 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#3	Tertiary	596.90'	**10.0' long x 3.0' breadth Emergency Overflow 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

Primary OutFlow Max=5.94 cfs @ 12.13 hrs HW=596.86' TW=0.00' (Dynamic Tailwater)
└─**2=Culvert** (Inlet Controls 5.94 cfs @ 7.56 fps)
  └─**1=Overflow Grate** (Passes 5.94 cfs of 11.43 cfs potential flow)

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=592.41' TW=0.00' (Dynamic Tailwater)
└─**3=Emergency Overflow Weir** (Controls 0.00 cfs)

Pond BIO-6: Filtration Bioretention



Summary for Pond BIO-7: Filtration Bioretention

Inflow Area = 3.190 ac, 54.68% Impervious, Inflow Depth = 3.94" for 100-yr event
Inflow = 18.51 cfs @ 12.04 hrs, Volume= 1.048 af
Outflow = 6.20 cfs @ 12.28 hrs, Volume= 0.688 af, Atten= 67%, Lag= 14.4 min
Primary = 5.99 cfs @ 12.28 hrs, Volume= 0.685 af
Routed to Reach dp-2 : Design Point
Tertiary = 0.20 cfs @ 12.28 hrs, Volume= 0.003 af
Routed to Reach dp-2 : Design Point

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 596.94' @ 12.28 hrs Surf.Area= 18,561 sf Storage= 20,996 cf
Flood Elev= 597.00' Surf.Area= 19,200 sf Storage= 21,864 cf

Plug-Flow detention time= 164.1 min calculated for 0.687 af (66% of inflow)
Center-of-Mass det. time= 74.8 min (861.8 - 787.0)

Volume	Invert	Avail.Storage	Storage Description
#1	596.00'	9,600 cf	**Above Mulch Surface (Prismatic)**Listed below (Recalc)
#2	592.41'	12,264 cf	**Filtration Media (Prismatic)**Listed below (Recalc)
		21,864 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
596.00	4,200	0	0
597.00	15,000	9,600	9,600

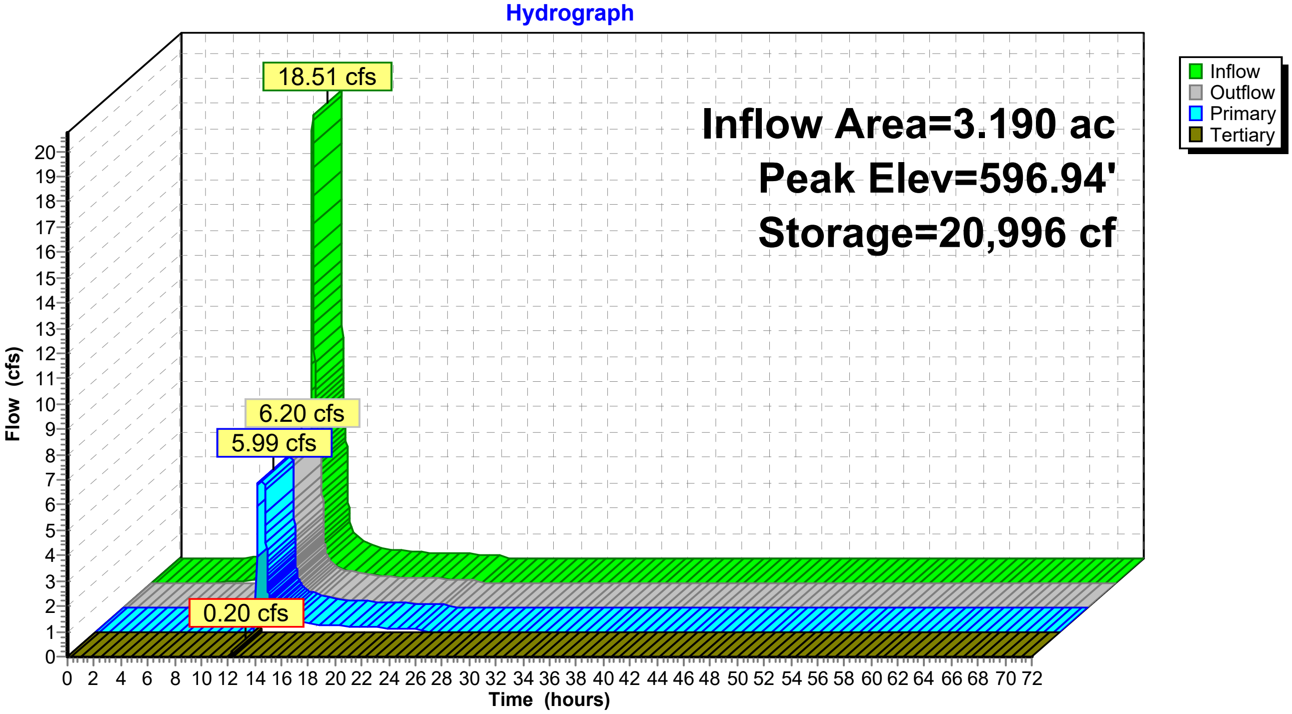
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
592.41	4,200	0.0	0	0
592.42	4,200	40.0	17	17
593.25	4,200	20.0	697	714
595.75	4,200	100.0	10,500	11,214
596.00	4,200	100.0	1,050	12,264

Device	Routing	Invert	Outlet Devices
#1	Device 2	596.50'	**24.0" x 24.0" Horiz. Overflow Grate X 3.00** C= 0.600 Limited to weir flow at low heads
#2	Primary	592.41'	**12.0" Round Culvert** L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 592.41' / 592.39' S= 0.0010 '/' Cc= 0.900 n= 0.012 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#3	Tertiary	596.90'	**10.0' long x 3.0' breadth Emergency Overflow 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

Primary OutFlow Max=5.99 cfs @ 12.28 hrs HW=596.94' TW=0.00' (Dynamic Tailwater)
└─**2=Culvert** (Inlet Controls 5.99 cfs @ 7.63 fps)
  └─**1=Overflow Grate** (Passes 5.99 cfs of 22.97 cfs potential flow)

Tertiary OutFlow Max=0.20 cfs @ 12.28 hrs HW=596.94' TW=0.00' (Dynamic Tailwater)
└─**3=Emergency Overflow Weir** (Weir Controls 0.20 cfs @ 0.49 fps)

Pond BIO-7: Filtration Bioretention



Summary for Pond BIO-8: Filtration Bioretention

Inflow Area = 2.658 ac, 53.78% Impervious, Inflow Depth = 3.94" for 100-yr event
Inflow = 15.42 cfs @ 12.04 hrs, Volume= 0.873 af
Outflow = 6.03 cfs @ 12.23 hrs, Volume= 0.565 af, Atten= 61%, Lag= 11.3 min
Primary = 5.98 cfs @ 12.23 hrs, Volume= 0.565 af
Routed to Reach dp-2 : Design Point
Tertiary = 0.05 cfs @ 12.23 hrs, Volume= 0.000 af
Routed to Reach dp-2 : Design Point

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 596.92' @ 12.23 hrs Surf.Area= 13,175 sf Storage= 16,842 cf
Flood Elev= 597.00' Surf.Area= 13,700 sf Storage= 17,654 cf

Plug-Flow detention time= 163.2 min calculated for 0.565 af (65% of inflow)
Center-of-Mass det. time= 73.0 min (860.0 - 787.0)

Volume	Invert	Avail.Storage	Storage Description
#1	596.00'	6,850 cf	**Above Mulch Surface (Prismatic)**Listed below (Recalc)
#2	592.41'	10,804 cf	**Filtration Media (Prismatic)**Listed below (Recalc)
		17,654 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
596.00	3,700	0	0
597.00	10,000	6,850	6,850

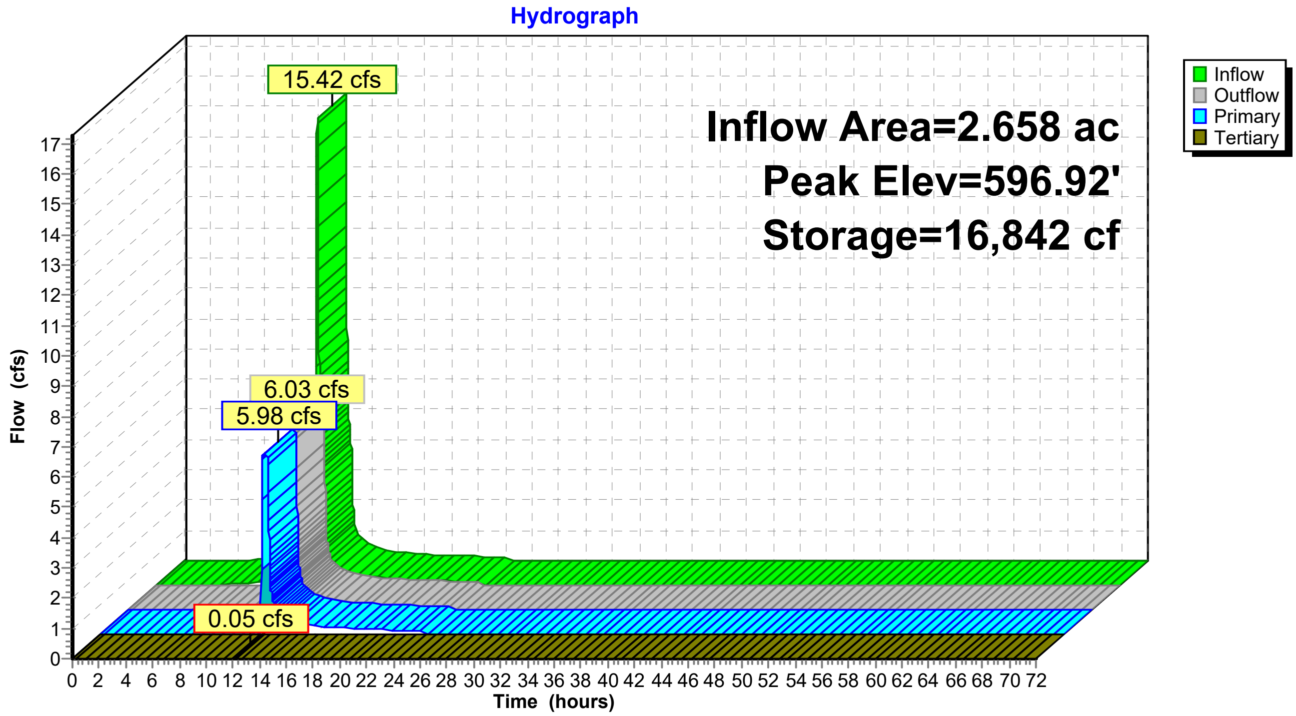
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
592.41	3,700	0.0	0	0
592.42	3,700	40.0	15	15
593.25	3,700	20.0	614	629
595.75	3,700	100.0	9,250	9,879
596.00	3,700	100.0	925	10,804

Device	Routing	Invert	Outlet Devices
#1	Device 2	596.50'	**24.0" x 24.0" Horiz. Overflow Grate X 3.00** C= 0.600 Limited to weir flow at low heads
#2	Primary	592.41'	**12.0" Round Culvert** L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 592.41' / 592.39' S= 0.0010 '/' Cc= 0.900 n= 0.012 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#3	Tertiary	596.90'	**10.0' long x 3.0' breadth Emergency Overflow 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

Primary OutFlow Max=5.98 cfs @ 12.23 hrs HW=596.92' TW=0.00' (Dynamic Tailwater)
└─**2=Culvert** (Inlet Controls 5.98 cfs @ 7.61 fps)
  └─**1=Overflow Grate** (Passes 5.98 cfs of 21.10 cfs potential flow)

Tertiary OutFlow Max=0.05 cfs @ 12.23 hrs HW=596.92' TW=0.00' (Dynamic Tailwater)
└─**3=Emergency Overflow Weir** (Weir Controls 0.05 cfs @ 0.31 fps)

Pond BIO-8: Filtration Bioretention



Summary for Pond BIO-9: Filtration Bioretention

Inflow Area = 1.213 ac, 17.45% Impervious, Inflow Depth = 3.24" for 100-yr event
Inflow = 5.92 cfs @ 12.04 hrs, Volume= 0.327 af
Outflow = 0.32 cfs @ 13.19 hrs, Volume= 0.100 af, Atten= 95%, Lag= 69.1 min
Primary = 0.32 cfs @ 13.19 hrs, Volume= 0.100 af
Routed to Reach dp-2 : Design Point
Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach dp-2 : Design Point

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 596.53' @ 13.19 hrs Surf.Area= 6,947 sf Storage= 10,001 cf
Flood Elev= 597.00' Surf.Area= 8,165 sf Storage= 12,259 cf

Plug-Flow detention time= 329.5 min calculated for 0.100 af (31% of inflow)
Center-of-Mass det. time= 212.8 min (1,020.4 - 807.6)

Volume	Invert	Avail.Storage	Storage Description
#1	596.00'	4,083 cf	**Above Mulch Surface (Prismatic)** Listed below (Recalc)
#2	592.41'	8,176 cf	**Filtration Media (Prismatic)** Listed below (Recalc)
		12,259 cf	Total Available Storage

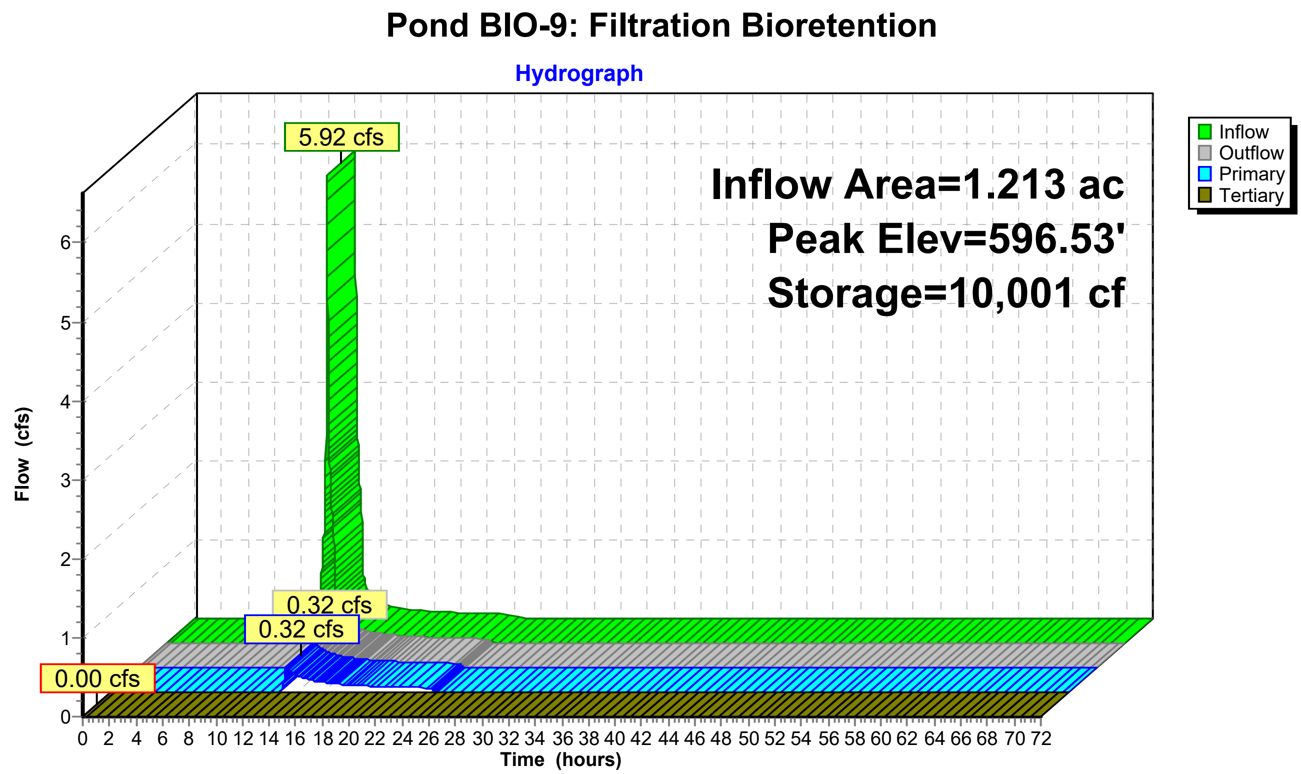
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
596.00	2,800	0	0
597.00	5,365	4,083	4,083

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
592.41	2,800	0.0	0	0
592.42	2,800	40.0	11	11
593.25	2,800	20.0	465	476
595.75	2,800	100.0	7,000	7,476
596.00	2,800	100.0	700	8,176

Device	Routing	Invert	Outlet Devices
#1	Device 2	596.50'	**24.0" x 24.0" Horiz. Overflow Grate X 3.00** C= 0.600 Limited to weir flow at low heads
#2	Primary	592.41'	**12.0" Round Culvert** L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 592.41' / 592.39' S= 0.0010 '/' Cc= 0.900 n= 0.012 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#3	Tertiary	596.90'	**10.0' long x 3.0' breadth Emergency Overflow 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

Primary OutFlow Max=0.32 cfs @ 13.19 hrs HW=596.53' TW=0.00' (Dynamic Tailwater)
└─**2=Culvert** (Passes 0.32 cfs of 5.68 cfs potential flow)
  └─**1=Overflow Grate** (Weir Controls 0.32 cfs @ 0.52 fps)

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=592.41' TW=0.00' (Dynamic Tailwater)
└─**3=Emergency Overflow Weir** (Controls 0.00 cfs)



Events for Subcatchment ES-1:

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
1-yr	1.81	8.12	0.427	1.30
10-yr	3.08	14.36	0.828	2.53
25-yr	3.75	17.97	1.043	3.18
100-yr	**5.07**	**24.83**	**1.470**	**4.49**

Events for Subcatchment ES-2:

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
1-yr	1.81	9.34	0.487	1.22
10-yr	3.08	17.02	0.970	2.43
25-yr	3.75	21.46	1.231	3.08
100-yr	**5.07**	**29.88**	**1.749**	**4.38**

Events for Subcatchment ES-3:

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
1-yr	1.81	3.49	0.183	1.30
10-yr	3.08	6.17	0.356	2.53
25-yr	3.75	7.72	0.448	3.18
100-yr	**5.07**	**10.67**	**0.632**	**4.49**

Events for Subcatchment ES-4:

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
1-yr	1.81	1.85	0.098	1.39
10-yr	3.08	3.17	0.186	2.63
25-yr	3.75	3.95	0.232	3.29
100-yr	**5.07**	**5.41**	**0.325**	**4.60**

Events for Subcatchment ES-5:

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
1-yr	1.81	3.19	0.170	1.39
10-yr	3.08	5.48	0.321	2.63
25-yr	3.75	6.82	0.401	3.29
100-yr	**5.07**	**9.35**	**0.561**	**4.60**

Events for Subcatchment ES-6:

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
1-yr	1.81	3.35	0.178	1.39
10-yr	3.08	5.76	0.337	2.63
25-yr	3.75	7.17	0.422	3.29
100-yr	**5.07**	**9.83**	**0.590**	**4.60**

Events for Subcatchment ES-7:

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
1-yr	1.81	4.76	0.248	0.93
10-yr	3.08	9.84	0.547	2.06
25-yr	3.75	12.81	0.713	2.68
100-yr	**5.07**	**18.51**	**1.048**	**3.94**

Events for Subcatchment ES-8:

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
1-yr	1.81	3.97	0.207	0.93
10-yr	3.08	8.20	0.456	2.06
25-yr	3.75	10.67	0.594	2.68
100-yr	**5.07**	**15.42**	**0.873**	**3.94**

Events for Subcatchment ES-9:

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
1-yr	1.81	1.02	0.057	0.57
10-yr	3.08	2.74	0.153	1.51
25-yr	3.75	3.80	0.209	2.07
100-yr	**5.07**	**5.92**	**0.327**	**3.24**

Events for Reach DP-1: Design Point

Event	Inflow (cfs)	Outflow (cfs)	Elevation (feet)	Storage (cubic-feet)
1-yr	0.00	0.00	**0.00**	**0**
10-yr	0.77	0.77	0.00	0
25-yr	4.66	4.66	0.00	0
100-yr	**8.11**	**8.11**	0.00	0

Events for Reach DP-2: Design Point

Event	Inflow (cfs)	Outflow (cfs)	Elevation (feet)	Storage (cubic-feet)
1-yr	0.83	0.83	**0.00**	**0**
10-yr	6.02	6.02	0.00	0
25-yr	11.60	11.60	0.00	0
100-yr	**28.90**	**28.90**	0.00	0

Events for Pond BIO-1: Filtration Bioretention

Event	Inflow (cfs)	Outflow (cfs)	Primary (cfs)	Tertiary (cfs)	Elevation (feet)	Storage (cubic-feet)
1-yr	8.12	0.00	0.00	0.00	595.31	18,583
10-yr	14.36	0.34	0.34	0.00	596.52	29,616
25-yr	17.97	3.18	3.18	0.00	596.57	30,329
100-yr	**24.83**	**6.14**	**5.99**	**0.15**	**596.93**	**35,327**

Events for Pond BIO-2: Filtration Bioretention

Event	Inflow (cfs)	Outflow (cfs)	Primary (cfs)	Tertiary (cfs)	Elevation (feet)	Storage (cubic-feet)
1-yr	9.34	0.00	0.00	0.00	595.78	21,228
10-yr	17.02	0.52	0.52	0.00	596.52	32,671
25-yr	21.46	1.49	1.49	0.00	596.62	35,913
100-yr	**29.88**	**2.19**	**1.55**	**0.64**	**596.99**	**51,277**

Events for Pond BIO-3: Filtration Bioretention

Event	Inflow (cfs)	Outflow (cfs)	Primary (cfs)	Tertiary (cfs)	Elevation (feet)	Storage (cubic-feet)
1-yr	3.49	0.03	0.03	**0.00**	596.50	7,690
10-yr	6.17	2.60	2.60	0.00	596.56	7,945
25-yr	7.72	5.76	5.76	0.00	596.63	8,224
100-yr	**10.67**	**6.00**	**6.00**	0.00	**596.94**	**9,846**

Events for Pond BIO-4: Filtration Bioretention

Event	Inflow (cfs)	Outflow (cfs)	Primary (cfs)	Tertiary (cfs)	Elevation (feet)	Storage (cubic-feet)
1-yr	1.85	0.00	0.00	**0.00**	595.14	4,275
10-yr	3.17	0.04	0.04	0.00	596.51	7,501
25-yr	3.95	0.20	0.20	0.00	596.52	7,544
100-yr	**5.41**	**2.20**	**2.20**	0.00	**596.59**	**7,818**

Events for Pond BIO-5: Filtration Bioretention

Event	Inflow (cfs)	Outflow (cfs)	Primary (cfs)	Tertiary (cfs)	Elevation (feet)	Storage (cubic-feet)
1-yr	3.19	0.00	0.00	**0.00**	594.94	7,386
10-yr	5.48	0.05	0.05	0.00	596.51	13,840
25-yr	6.82	0.21	0.21	0.00	596.52	13,902
100-yr	**9.35**	**2.98**	**2.98**	0.00	**596.61**	**14,381**

Events for Pond BIO-6: Filtration Bioretention

Event	Inflow (cfs)	Outflow (cfs)	Primary (cfs)	Tertiary (cfs)	Elevation (feet)	Storage (cubic-feet)
1-yr	3.35	0.83	0.83	**0.00**	596.56	4,164
10-yr	5.76	4.66	4.66	0.00	596.70	5,061
25-yr	7.17	5.84	5.84	0.00	596.74	5,330
100-yr	**9.83**	**5.94**	**5.94**	0.00	**596.86**	**6,365**

Events for Pond BIO-7: Filtration Bioretention

Event	Inflow (cfs)	Outflow (cfs)	Primary (cfs)	Tertiary (cfs)	Elevation (feet)	Storage (cubic-feet)
1-yr	4.76	0.00	0.00	0.00	595.66	10,816
10-yr	9.84	0.56	0.56	0.00	596.54	16,078
25-yr	12.81	3.26	3.26	0.00	596.62	16,944
100-yr	**18.51**	**6.20**	**5.99**	**0.20**	**596.94**	**20,996**

Events for Pond BIO-8: Filtration Bioretention

Event	Inflow (cfs)	Outflow (cfs)	Primary (cfs)	Tertiary (cfs)	Elevation (feet)	Storage (cubic-feet)
1-yr	3.97	0.00	0.00	0.00	595.52	9,012
10-yr	8.20	0.43	0.43	0.00	596.53	13,659
25-yr	10.67	2.77	2.77	0.00	596.61	14,216
100-yr	**15.42**	**6.03**	**5.98**	**0.05**	**596.92**	**16,842**

Events for Pond BIO-9: Filtration Bioretention

Event	Inflow (cfs)	Outflow (cfs)	Primary (cfs)	Tertiary (cfs)	Elevation (feet)	Storage (cubic-feet)
1-yr	1.02	0.00	0.00	**0.00**	593.97	2,505
10-yr	2.74	0.00	0.00	0.00	595.46	6,656
25-yr	3.80	0.00	0.00	0.00	596.30	9,120
100-yr	**5.92**	**0.32**	**0.32**	0.00	**596.53**	**10,001**

APPENDIX F:
SWPPP INSPECTION REPORT
(SAMPLE FORM)

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Prepared by:
LaBella Associates
Choose an item.
Choose an item.
Choose an item.

SWPPP INSPECTION REPORT NUMBER XX
CLIENT NAME
PROJECT NAME
PROJECT ADDRESS, TOWN OF X, X COUNTY, NY
PERMIT NUMBER

Performed:	2/1/2025 @ 12:00 AM
Report Issued:	2/1/2025

Status: SATISFACTORY (All erosion control measures are installed and in working order)

Qualified Inspector (name and title)	Qualified Professional (name and title)
Click or tap to enter a date.	Click or tap to enter a date.
Date	Date
Signature	Signature

NYSDEC Documentation and SWPPP Forms

The project has received a Letter of Authorization (LOA) from NYSDEC	Choose an item.
The project has received a five acre waiver approved by NYSDEC or MS4	Choose an item.
The project currently has disturbance greater than five acres	Choose an item.
The project directly discharges to a 303d waterbody/course	Choose an item.
The project is within a phosphorus enhanced watershed	Choose an item.
Number of inspections required per week	Choose an item.

Included in Site Log Book

Preconstruction Assessment	Choose an item.
Copy of Notice of Intent (NOI)	Choose an item.
Letter of Authorization (LOA)	Choose an item.
SWPPP Preparer Certification Form	Choose an item.
Owner/Operator Certification Form	Choose an item.
MS4 SWPPP Acceptance Form	Choose an item.
NYCDEP SWPPP Acceptance/Approval Form	Choose an item.
MS4 No Jurisdiction Form	Choose an item.
Contractor and Subcontractor Certifications	Choose an item.
SPDES General Permit	Choose an item.
Five Acre Waiver Authorization	Choose an item.
Notice of Termination (NOT)	Choose an item.

Site Conditions

Total area (acres) with active soil disturbance (not requiring temporary or final stabilization)	
Total area (acres) with inactive soil disturbance (requiring temporary or final stabilization)	
Total area (acres) that has achieved temporary stabilization	
Total area (acres) that has achieved final stabilization	
Allowable disturbed area (acres) per NOI and/or five acre waiver	

Provide a general description of construction activities ongoing during inspection:

Weather Conditions	Choose an item.
Temperature at time of inspection	XX degrees F
Soil conditions at time of inspection	Choose an item.

Description of Discharge Point/Surface Waters of the State	Condition of Runoff	Sediment Discharge Noted	Corrective Action(s)
	Choose an item.	Choose an item.	
	Choose an item.	Choose an item.	
	Choose an item.	Choose an item.	
	Choose an item.	Choose an item.	

Erosion and Sediment Control Deficiencies and Corrective Actions

In the following table, provide marks in the appropriate columns to indicate the conditions of all erosion and sediment control practices at the site.

Erosion & Sediment Control Practice	Not Applicable	Functioning as Designed	Needs Repair or Maintenance	Not Installed Properly
Temporary Erosion & Sediment Control Practices				
General Site Conditions	☐	☐	☐	☐
Stabilized Construction Access	☐	☐	☐	☐
Silt Fence	☐	☐	☐	☐
Inlet Protection Measures	☐	☐	☐	☐
Soil Stockpiles	☐	☐	☐	☐
Dust Control Measures	☐	☐	☐	☐
Pavement Sweeping	☐	☐	☐	☐
Temporary Stabilization	☐	☐	☐	☐
Dewatering Operations	☐	☐	☐	☐
Slope Protection Measures	☐	☐	☐	☐
Temporary Parking Areas	☐	☐	☐	☐
Concrete Washout	☐	☐	☐	☐
Temporary Swales and Berms	☐	☐	☐	☐
Stone Check Dams	☐	☐	☐	☐
Sediment Traps/Basins	☐	☐	☐	☐
Compost Filter Sock	☐	☐	☐	☐
Temporary Stream Crossing	☐	☐	☐	☐
Fiber Roll	☐	☐	☐	☐
Water Bars	☐	☐	☐	☐
Flow Diffusers	☐	☐	☐	☐
Other:	☐	☐	☐	☐
Permanent Erosion & Sediment Control Practices				
Rock Outlet Protection	☐	☐	☐	☐
Permanent Turf Reinforcement	☐	☐	☐	☐
Permanent Stabilization	☐	☐	☐	☐
Other:	☐	☐	☐	☐
Refer to the following page for deficiencies and corrective actions				

Corrective Actions

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.

ESC Practice ID	Deficiency and Corrective Action	Date Deficiency First Reported	Deficiency Corrected?	Date Deficiency Corrected
Choose an item.		Click or	Choose an	Click or tap
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Stormwater Management Practices

For all stormwater management practices proposed on the project, indicate the status of each practice at the time of inspection, any deficiencies (if applicable) and corresponding corrective actions.

SMP Practice ID	Sign Installed	Status	Deficiency and Corrective Action (if Applicable)	Deficiency Date	Corrected Action Date
	Choose an item.	Choose an item.		Click or tap to enter a date.	Click or tap to enter a date.
	Choose an item.	Choose an item.		Click or tap to enter a date.	Click or tap to enter a date.
	Choose an item.	Choose an item.		Click or tap to enter a date.	Click or tap to enter a date.
	Choose an item.	Choose an item.		Click or tap to enter a date.	Click or tap to enter a date.
	Choose an item.	Choose an item.		Click or tap to enter a date.	Click or tap to enter a date.
	Choose an item.	Choose an item.		Click or tap to enter a date.	Click or tap to enter a date.
	Choose an item.	Choose an item.		Click or tap to enter a date.	Click or tap to enter a date.
	Choose an item.	Choose an item.		Click or tap to enter a date.	Click or tap to enter a date.
	Choose an item.	Choose an item.		Click or tap to enter a date.	Click or tap to enter a date.
	Choose an item.	Choose an item.		Click or tap to enter a date.	Click or tap to enter a date.

Deficiencies and Corrective Action Photo Log

Deficiency Photo 1 *ESC/SMP Practice ID:* *Deficiency Date:* Click or tap to enter a date.	***Corrective Action Photo 1*** *ESC/SMP Practice ID:* *Corrective Action Photo Date:* Click or tap to enter a date.
Deficiency Photo 2 *ESC/SMP Practice ID:* *Deficiency Date:* Click or tap to enter a date.	***Corrective Action Photo 2*** *ESC/SMP Practice ID:* *Corrective Action Photo Date:* Click or tap to enter a date.
Deficiency Photo 3 *ESC/SMP Practice ID:* *Deficiency Date:* Click or tap to enter a date.	***Corrective Action Photo 3*** *ESC/SMP Practice ID:* *Corrective Action Photo Date:* Click or tap to enter a date.

Deficiencies and Corrective Action Photo Log (continued)

Deficiency Photo 4 *ESC/SMP Practice ID:* *Deficiency Date:* Click or tap to enter a date.	***Corrective Action Photo 4*** *ESC/SMP Practice ID:* *Corrective Action Photo Date:* Click or tap to enter a date.
Deficiency Photo 5 *ESC/SMP Practice ID:* *Deficiency Date:* Click or tap to enter a date.	***Corrective Action Photo 5*** *ESC/SMP Practice ID:* *Corrective Action Photo Date:* Click or tap to enter a date.
Deficiency Photo 6 *ESC/SMP Practice ID:* *Deficiency Date:* Click or tap to enter a date.	***Corrective Action Photo 6*** *ESC/SMP Practice ID:* *Corrective Action Photo Date:* Click or tap to enter a date.

Disturbance / Photo Location Map

Replace this page to include an 11x17 erosion control plan sketch to scale showing:

1. Areas with active soil disturbance activity
2. Areas with inactive soil disturbance activity
3. Areas that have achieved temporary stabilization
4. Areas that have achieved final stabilization
5. Photo locations for deficiencies
6. Photo locations for corrective actions
7. Location of erosion and sediment control practices installed

Use Bluebeam template with standard colors to indicate limits

APPENDIX H:
NYSDEC "DEEP-RIPPING AND DECOMPACTION," APRIL 2008

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New York State
DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Division of Water

Deep-Ripping and Decompaction

April 2008

New York State
Department of Environmental Conservation

Document Prepared by:

John E. Lacey,
Land Resource Consultant and Environmental Compliance Monitor
(Formerly with the Division of Agricultural Protection and Development Services,
NYS Dept. of Agriculture & Markets)

Alternative Stormwater Management
Deep-Ripping and Decompaction

Description

The two-phase practice of 1) "Deep Ripping;" and 2) "Decompaction" (deep subsoiling), of the soil material as a step in the cleanup and restoration/landscaping of a construction site, helps mitigate the physically induced impacts of soil compression; i.e.: soil compaction or the substantial increase in the bulk density of the soil material.

Deep Ripping and Decompaction are key factors which help in restoring soil pore space and permeability for water infiltration. Conversely, the physical actions of cut-and-fill work, land grading, the ongoing movement of construction equipment and the transport of building materials throughout a site alter the architecture and structure of the soil, resulting in: the mixing of layers (horizons) of soil materials, compression of those materials and diminished soil porosity which, if left unchecked, severely impairs the soil's water holding capacity and vertical drainage (rainfall infiltration), from the surface downward.

In a humid climate region, compaction damage on a site is virtually guaranteed over the duration of a project. Soil in very moist to wet condition when compacted, will have severely reduced permeability. Figure 1 displays the early stage of the deep-ripping phase (Note that all topsoil was stripped prior to construction access, and it remains stockpiled until the next phase – decompaction – is complete). A heavy-duty tractor is pulling a three-shank ripper on the first of several series of incrementally deepening passes through the construction access corridor's densely compressed subsoil material. Figure 2 illustrates the approximate volumetric composition of a loam surface soil when conditions are good for plant growth, with adequate natural pore space for fluctuating moisture conditions.

Fig. 1. A typical deep ripping phase of this practice, during the first in a series of progressively deeper "rips" through severely compressed subsoil.

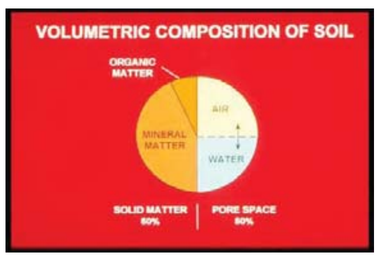

Fig. 2. About 50% of the volume of undisturbed loam surface soil is pore space, when soil is in good condition for plant growth. Brady, 2002.

Recommended Application of Practice

The objective of Deep Ripping and Decompaction is to effectively fracture (vertically and laterallly) through the thickness of the physically compressed subsoil material (see Figure 3), restoring soil porosity and permeability and aiding infiltration to help reduce runoff. Together with topsoil stripping, the "two-phase" practice of Deep Ripping and Decompaction first became established as a "best management practice" through ongoing success on commercial farmlands affected by heavy utility construction right-of-way projects (transmission pipelines and large power lines).

Fig. 3. Construction site with significant compaction of the deep basal till subsoil extends 24 inches below this exposed cut-and-fill work surface.

Soil permeability, soil drainage and cropland productivity were restored. For broader construction application, the two-phase practice of Deep Ripping and Decompaction is best adapted to areas impacted with significant soil compaction, on contiguous open portions of large construction sites and inside long, open construction corridors used as temporary access over the duration of construction. Each mitigation area should have minimal above-and-below-ground obstructions for the easy avoidance and maneuvering of a large tractor and ripping/decompacting implements. Conversely, the complete two-phase practice is not recommended in congested or obstructed areas due to the limitations on tractor and implement movement.

Benefits

Aggressive "deep ripping" through the compressed thickness of exposed subsoil before the replacement/respreading of the topsoil layer, followed by "decompaction," i.e.: "sub-soiling," through the restored topsoil layer down into the subsoil, offers the following benefits:

- Increases the project (larger size) area's direct surface infiltration of rainfall by providing the open site's mitigated soil condition and lowers the demand on concentrated runoff control structures
- Enhances direct groundwater recharge through greater dispersion across and through a broader surface than afforded by some runoff-control structural measures
- Decreases runoff volume generated and provides hydrologic source control
- May be planned for application in feasible open locations either alone or in

conjunction with plans for structural practices (e.g., subsurface drain line or infiltration basin) serving the same or contiguous areas

- Promotes successful long-term revegetation by restoring soil permeability, drainage and water holding capacity for healthy (rather than restricted) root-system development of trees, shrubs and deep rooted ground cover, minimizing plant drowning during wet periods and burnout during dry periods.

Feasibility / Limitations

The effectiveness of Deep Ripping and Decompaction is governed mostly by site factors such as: the original (undisturbed) soil's hydrologic characteristics; the general slope; local weather/timing (soil moisture) for implementation; the space-related freedom of equipment/implement maneuverability (noted above in **Recommended Application of Practice**), and by the proper selection and operation of tractor and implements (explained below in **Design Guidance**). The more notable site-related factors include:

Soil
In the undisturbed condition, each identified soil type comprising a site is grouped into one of four categories of soil hydrology, Hydrologic Soil Group A, B, C or D, determined primarily by a range of characteristics including soil texture, drainage capability when thoroughly wet, and depth to water table. The natural rates of infiltration and transmission of soil-water through the undisturbed soil layers for Group A is "high" with a low runoff potential while soils in Group B are moderate in infiltration and the transmission of soil-water with a moderate runoff potential, depending somewhat on slope. Soils in Group C have slow rates of infiltration and transmission of soil-water and a moderately high runoff potential influenced by soil texture and slope; while soils in Group D have exceptionally slow rates of infiltration and transmission of soil-water, and high runoff potential.

In Figure 4, the profile displays the undisturbed horizons of a soil in Hydrologic Soil Group C and the naturally slow rate of infiltration through the subsoil. The slow rate of infiltration begins immediately below the topsoil horizon (30 cm), due to the limited amount of macro pores, e.g.: natural subsoil fractures, worm holes and root channels. Infiltration after the construction-induced mixing and compression of such subsoil material is virtually absent; but can be restored back to this natural level with the two-phase practice of deep ripping and decompaction, followed by the permanent establishment of an appropriate, deep taproot

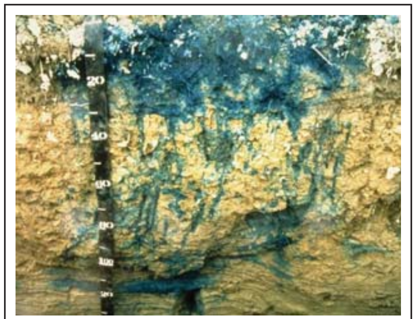

Fig. 4. Profile (in centimeters) displaying the infiltration test result of the natural undisturbed horizons of a soil in Hydrologic Soil Group C.

lawn/ground cover to help maintain the restored subsoil structure. Infiltration after construction-induced mixing and compression of such subsoil material can be notably rehabilitated with the Deep Ripping and Decompaction practice, which prepares the site for the appropriate long-term lawn/ground cover mix including deep taproot plants such as clover, fescue or trefoil, etc. needed for all rehabilitated soils.

Generally, soils in Hydrologic Soil Groups A and B, which respectively may include deep, well-drained, sandy-gravelly materials or deep, moderately well-drained basal till materials, are among the easier ones to restore permeability and infiltration, by deep ripping and decompaction. Among the many different soils in Hydrologic Soil Group C are those unique glacial tills having a natural fragipan zone, beginning about 12 to 18 inches (30 – 45cm), below surface. Although soils in Hydrologic Soil Group C do require a somewhat more carefully applied level of the Deep Ripping and Decompaction practice, it can greatly benefit such affected areas by reducing the runoff and fostering infiltration to a level equal to that of pre-disturbance.

Soils in Hydrologic Soil Group D typically have a permanent high water table close to the surface, influenced by a clay or other highly impervious layer of material. In many locations with clay subsoil material, the bulk density is so naturally high that heavy trafficking has little or no added impact on infiltration; and structural runoff control practices rather than Deep Ripping and Decompaction should be considered.

The information about Hydrologic Soil Groups is merely a general guideline. Site-specific data such as limited depths of cut-and-fill grading with minimal removal or translocation of the inherent subsoil materials (as analyzed in the county soil survey) or, conversely, the excavation and translocation of deeper, unconsolidated substratum or consolidated bedrock materials (unlike the analyzed subsoil horizons' materials referred to in the county soil survey) should always be taken into account.

Sites made up with significant quantities of large rocks, or having a very shallow depth to bedrock, are not conducive to deep ripping and decompation (subsoiling); and other measures may be more practical.

Slope
The two-phase application of 1) deep ripping and 2) decompaction (deep subsoiling), is most practical on flat, gentle and moderate slopes. In some situations, such as but not limited to temporary construction access corridors, inclusion areas that are moderately steep along a project's otherwise gentle or moderate slope may also be deep ripped and decompacted. For limited instances of moderate steepness on other projects, however, the post-construction land use and the relative alignment of the potential ripping and decompaction work in relation to the lay of the slope should be reviewed for safety and practicality. In broad construction areas predominated by moderately steep or steep slopes, the practice is generally not used.

Local Weather/Timing/Soil Moisture
Effective fracturing of compressed subsoil material from the exposed work surface, laterally and vertically down through the affected zone is achieved only when the soil material is moderately dry to moderately moist. Neither one of the two-phases, deep ripping nor decompaction (deep

subsoiling), can be effectively conducted when the soil material (subsoil or replaced topsoil) is in either a "plastic" or "liquid" state of soil consistency. Pulling the respective implements legs through the soil when it is overly moist only results in the "slicing and smearing" of the material or added "squeezing and compression" instead of the necessary fracturing. Ample drying time is needed for a "rippable" soil condition not merely in the material close to the surface, but throughout the material located down to the bottom of the physically compressed zone of the subsoil.

The "poor man's Atterberg field test" for soil plasticity is a simple "hand-roll" method used for quick, on-site determination of whether or not the moisture level of the affected soil material is low enough for: effective deep ripping of subsoil; respreading of topsoil in a friable state; and final decompaction (deep subsoiling). Using a sample of soil material obtained from the planned bottom depth of ripping, e.g.: 20 - 24 inches below exposed subsoil surface, the sample is hand rolled between the palms down to a 1/8-inch diameter thread. (Use the same test for stored topsoil material before respreading on the site.) If the respective soil sample crumbles apart in segments no greater than 3/8 of an inch long, by the time it is rolled down to 1/8 inch diameter, it is low enough in moisture for deep ripping (or topsoil replacement), and decompaction. Conversely, as shown in Figure 5, if the rolled sample stretches out in increments greater than 3/8 of an inch long before crumbling, it is in a "plastic" state of soil consistency and is too wet for subsoil ripping (as well as topsoil replacement) and final decompaction.

Fig. 5. Augered from a depth of 19 inches below the surface of the replaced topsoil, this subsoil sample was hand rolled to a 1/8-inch diameter. The test shows the soil at this site stretches out too far without crumbling; it indicates the material is in a plastic state of consistence, too wet for final decompaction (deep subsoiling) at this time.

Design Guidance

Beyond the above-noted site factors, a vital requirement for the effective Deep Ripping and Decompaction (deep subsoiling), is implementing the practice in its distinct, two-phase process:

1) Deep rip the affected thickness of exposed subsoil material (see Figure 10 and 11), aggressively fracturing it before the protected topsoil is reapplied on the site (see Figure 12); and

2) Decompact (deep subsoil), simultaneously through the restored topsoil layer and the upper half of the affected subsoil (Figure 13). The second phase, "decompaction," mitigates the partial recompaction which occurs during the heavy process of topsoil spreading/grading. Prior to deep ripping and decompacting the site, all construction activity, including construction equipment and material storage, site cleanup and trafficking (Figure 14), should be finished; and the site closed off to further disturbance. Likewise, once the practice is underway and the area's soil permeability and rainfall infiltration are being restored, a policy limiting all further traffic to permanent travel lanes is maintained.

The other critical elements, outlined below, are: using the proper implements (deep, heavy-duty rippers and subsoilers), and ample pulling-power equipment (tractors); and conducting the practice at the appropriate speed, depth and pattern(s) of movement.

Note that an appropriate plan for the separate practice of establishing a healthy perennial ground cover, with deep rooting to help maintain the restored soil structure, should be developed in advance. This may require the assistance of an agronomist or landscape horticulturist.

Implements

Avoid the use of all undersize implements. The small-to-medium, light-duty tool will, at best, only "scarify" the uppermost surface portion of the mass of compacted subsoil material. The term "chisel plow" is commonly but incorrectly applied to a broad range of implements. While a few may be adapted for the moderate subsoiling of non-impacted soils, the majority are less durable and used for only lighter land-fitting (see Figure 6).

Fig. 6. A light duty chisel implement, not adequate for either the deep ripping or decompaction (deep subsoiling) phase.

Fig. 7. One of several variations of an agricultural ripper. This unit has long, rugged shanks mounted on a steel V-frame for deep, aggressive fracturing through Phase 1.

Use a "heavy duty" agricultural-grade, deep ripper (see Figures 7,9,10 and 11) for the first phase: the lateral and vertical fracturing of the mass of exposed and compressed subsoil, down and through, to the bottom of impact, prior to the replacement of the topsoil layer. (Any oversize rocks which are uplifted to the subsoil surface during the deep ripping phase are picked and removed.) Like the heavy-duty class of implement for the first phase, the decompaction (deep subsoiling) of Phase 2 is conducted with the heavy-duty version of the deep subsoiler. More preferable is the angled-leg variety of deep subsoiler (shown in Figures 8 and 13). It minimizes the inversion of the subsoil and topsoil layers while laterally and vertically fracturing the upper half of the previously ripped subsoil layer and all of the topsoil layer by delivering a momentary, wave-like "lifting and shattering" action up through the soil layers as it is pulled.

Pulling-Power of Equipment

Use the following rule of thumb for tractor horsepower (hp) whenever deep ripping and decompacting a significantly impacted site: For both types of implement, have at least 40 hp of tractor pull available for each mounted shank/ leg.

Using the examples of a 3-shank and a 5-shank implement, the respective tractors should have 120 and 200 hp available for fracturing down to the final depth of 20-to-24 inches per phase. Final depth for the deep ripping in Phase 1 is achieved incrementally by a progressive series of passes (see Depth and Patterns of Movement, below); while for Phase 2, the full operating depth of the deep subsoiler is applied from the beginning.

The operating speed for pulling both types of implement should not exceed 2 to 3 mph. At this slow and managed rate of operating speed, maximum functional performance is sustained by the tractor and the implement performing the soil fracturing. Referring to Figure 8, the implement is the 6-leg version of the deep angled-leg subsoiler. Its two outside legs are "chained up" so that only four legs will be engaged (at the maximum depth), requiring no less than 160 hp, (rather than 240 hp) of pull. The 4-wheel drive, articulated-frame tractor in Figure 8 is 174 hp. It will be decompacting this unobstructed, former construction access area simultaneously through 11 inches of replaced topsoil and the upper 12 inches of the previously deep-ripped subsoil. In constricted areas of Phase 1) Deep Ripping, a medium-size tractor with adequate hp, such as the one in Figure 9 pulling a 3-shank deep ripper, may be more maneuverable.

Fig. 8. A deep, angled-leg subsoiler, ideal for Phase 2 decompaction of after the topsoil layer is graded on top of the ripped subsoil.

Fig. 9. This medium tractor is pulling a 3-shank deep ripper. The severely compacted construction access corridor is narrow, and the 120 hp tractor is more maneuverable for Phase 1 deep ripping (subsoil fracturing), here.

Some industrial-grade variations of ripping implements are attached to power graders and bulldozers. Although highly durable, they are generally not recommended. Typically, the shanks or "teeth" of these rippers are too short and stout; and they are mounted too far apart to achieve the well-distributed type of lateral and vertical fracturing of the soil materials necessary to restore soil permeability and infiltration. In addition, the power graders and bulldozers, as pullers, are far less maneuverable for turns and patterns than the tractor.

Depth and Patterns of Movement

As previously noted both Phase 1 Deep Ripping through significantly compressed, exposed subsoil and Phase 2 Decompaction (deep subsoiling) through the replaced topsoil and upper subsoil need to be performed at maximum capable depth of each implement. With an implement's guide wheels attached, some have a "normal" maximum operating depth of 18 inches, while others may go deeper. In many situations, however, the tractor/implement operator must first remove the guide wheels and other non essential elements from the implement. This adapts the ripper or the deep subsoiler for skillful pulling with its frame only a few inches above surface, while the shanks or legs, fracture the soil material 20-to-24 inches deep.

There may be construction sites where the depth of the exposed subsoil's compression is moderate, e.g.: 12 inches, rather than deep. This can be verified by using a ¾ inch cone penetrometer and a shovel to test the subsoil for its level of compaction, incrementally, every three inches of increasing depth. Once the full thickness of the subsoil's compacted zone is finally "pieced" and there is a significant drop in the psi measurements of the soil penetrometer, the depth/thickness of compaction is determined. This is repeated at several representative locations of the construction site. If the thickness of the site's subsoil compaction is verified as, for example, ten inches, then the Phase 1 Deep Ripping can be correspondingly reduced to the implement's minimum operable depth of 12 inches. However, the Phase 2 simultaneous Decompation (subsoiling) of an 11 inch thick layer of replaced topsoil and the upper subsoil should run at the subsoiling implements full operating depth.

Fig. 10. An early pass with a 3-shank deep ripper penetrating only 8 inches into this worksite's severely compressed subsoil.

Fig. 11. A repeat run of the 3-shank ripper along the same patterned pass area as Fig. 9; here, incrementally reaching 18 of the needed 22 inches of subsoil fracture.

Typically, three separate series (patterns) are used for both the Phase 1 Deep Ripping and the Phase 2 Decompaction on significantly compacted sites. For Phase 1, each series begins with a moderate depth of rip and, by repeat-pass, continues until full depth is reached. Phase 2 applies the full depth of Decompation (subsoiling), from the beginning.

Every separate series (pattern) consists of parallel, forward-and-return runs, with each progressive pass of the implement's legs or shanks evenly staggered between those from the previous pass. This compensates for the shank or leg-spacing on the implement, e.g., with 24-to-30 inches between each shank or leg. The staggered return pass ensures lateral and vertical fracturing actuated every 12 to 15 inches across the densely compressed soil mass.

Large, Unobstructed Areas
For larger easy areas, use the standard patterns of movement:

- The first series (pattern) of passes is applied lengthwise, parallel with the longest spread of the site; gradually progressing across the site's width, with each successive pass.

- The second series runs obliquely, crossing the first series at an angle of about 45 degrees.

- The third series runs at right angle (or 90 degrees), to the first series to complete the fracturing and shattering on severely compacted sites, and avoid leaving large unbroken blocks of compressed soil material. (In certain instances, the third series may be optional, depending on how thoroughly the first two series loosen the material and eliminate large chunks/blocks of material as verified by tests with a ¾-inch cone penetrometer.)

Fig. 12. Moderately dry topsoil is being replaced on the affected site now that Phase 1 deep ripping of the compressed subsoil is complete.


Fig. 13. The same deep, angled-leg subsoiler shown in Fig. 7 is engaged at maximum depth for Phase 2, decompaction (deep soiling), of the replaced topsoil and the upper subsoil materials.

Corridors
In long corridors of limited width and less maneuverability than larger sites, e.g.: along compacted areas used as temporary construction access, a modified series of pattern passes are used.

- First, apply the same initial lengthwise, parallel series of passes described above.

- A second series of passes makes a broad "S" shaped pattern of rips, continually and gradually alternating the "S" curves between opposite edges inside the compacted corridor.

- The third and final series again uses the broad, alternating S pattern, but it is "flip-flopped" to continually cross the previous S pattern along the corridor's centerline. This final series of the S pattern curves back along the edge areas skipped by the second series.

Maintenance and Cost

Once the two-phase practice of Deep Ripping and Decompation is completed, two items are essential for maintaining a site's soil porosity and permeability for infiltration. They are: planting and maintaining the appropriate ground cover with deep roots to maintain the soil structure (see Figure 15); and keeping the site free of traffic or other weight loads.

Note that site-specific choice of an appropriate vegetative ground-cover seed mix, including the proper seeding ratio of one or more perennial species with a deep taproot system and the proper amount of lime and soil nutrients (fertilizer mix) adapted to the soil-needs, are basic to the final practice of landscaping, i.e: surface tillage, seeding/planting/fertilizing and culti-packing or mulching is applied. The "maintenance" of an effectively deep-ripped and decompacted area is generally limited to the successful perennial (long-term) landscape ground cover; as long as no weight-bearing force of soil compaction is applied.


Fig. 14. The severely compacted soil of a temporary construction yard used daily by heavy equipment for four months; shown before deep ripping, topsoil replacement, and decompaction.


Fig. 15. The same site as Fig. 14 after deep ripping of the exposed subsoil, topsoil replacement, decompaction through the topsoil and upper subsoil and final surface tillage and revegetation to maintain soil permeability and infiltration.

The Deep Ripping and Decompaction practice is, by necessity, more extensive than periodic subsoiling of farmland.The cost of deep ripping and decompacting (deep subsoiling), will vary according to the depth and severity of soil-material compression and the relative amount of tractor and implement time that is required. In some instances, depending on open maneuverability, two-to-three acres of compacted project area may be deep-ripped in one day. In other situations of more severe compaction and - or less maneuverability, as little as one acre may be fully ripped in a day. Generally, if the Phase 1) Deep Ripping is fully effective, the Phase 2) Decompaction should be completed in 2/3 to 3/4 of the time required for Phase 1.

Using the example of two acres of Phase 1) Deep Ripping in one day, at $1800 per day, the net cost is $900 per acre. If the Phase 2) Decompacting or deep subsoiling takes 3/4 the time as Phase 1, it costs $675 per acre for a combined total of $1575 per acre to complete the practice (these figures do not include the cost of the separate practice of topsoil stripping and replacement). Due to the many variables, it must be recognized that cost will be determined by the specific conditions or constraints of the site and the availability of proper equipment.

Resources

Publications:

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- Baver, L.D. 1948. *Soil Physics.* John Wiley & Sons.
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- Harpstead, M.I., T.J. Sauer, and W.F. Bennett. 2001. *Soil Science Simplified. 4th ed.* Iowa State University Press.
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- Plaster, E.J. 1992. *Soil Science & Management. 3rd ed.* Delmar Publishers.
- Union Gas Limited, Ontario, Canada. 1984. *Rehabilitation of Agricultural Lands, Dawn-Kerwood Loop Pipeline; Technical Report*. Ecological Services for Planning, Ltd.; Robinson, Merritt & Devries, Ltd. and Smith, Hoffman Associates, Ltd.
- US Department of Agriculture in cooperation with Cornell University Agricultural Experiment Station. Various years. *Soil Survey of (various names) County, New York.* USDA.

Internet Access:

- Examples of implements:

V-Rippers. Access by internet search of *John Deere Ag -New Equipment for 915* (larger-frame model) *V-Rippe*; and, *for 913* (smaller-frame model) *V-Ripper*. Deep, angled-leg subsoiler. Access by internet search of: B*igham Brothers Shear Bolt Paratill-Subsoiler*. http://salesmanual.deere.com/sales/salesmanual/en_NA/primary_tillage/2008/feature/rippers/915v_pattern_frame.html?sbu=ag&link=prodcat Last visited March 08.

- Soils data of USDA Natural Resources Conservation Service. *NRCS Web Soil Survey.* http://websoilsurvey.nrcs.usda.gov/app/ and *USDA-NRCS Official Soil Series Descriptions; View by Name.* http://ortho.ftw.nrcs.usda.gov/cgi-bin/osd/osdname.cgi . *Last visited Jan. 08.*
- Soil penetrometer information. Access by internet searches of: *Diagnosing Soil Compaction using a Penetrometer (soil compaction tester), PSU Extension;* as well as *Dickey-john Soil Compaction Tester*. http://www.dickey-johnproducts.com/pdf/SoilCompactionTest.pdf and http://cropsoil.psu.edu/Extension/Facts/uc178pdf Last visited Sept. 07

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APPENDIX I:
LABELLA CERTIFYING PROFESSIONALS LETTER

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February 21, 2025

RE: LaBella Certifying Professionals for NYSDEC SPDES GP-0-25-001

To Whom it May Concern:

In accordance with the NYSDEC SPDES General Permit GP-0-25-001, Part VII.J.2, Robert Steehler, PE, a New York State Qualified Professional employed by LaBella Associates, is duly authorized to sign and seal Stormwater Pollution Prevention Plans (SWPPPs), Notice of Intents (NOIs) and Notice of Terminations (NOTs).

Respectfully submitted,

LaBella Associates

Timothy Webber
Vice President, Civil Division Director

Robert Steehler, PE
Senior Civil Engineer
Discipline Leader

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APPENDIX J:
NYSDEC SPDES GENERAL PERMIT
GP-0-25-001

LaBella
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Department of Environmental Conservation

NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL
CONSERVATION (NYSDEC)

SPDES GENERAL PERMIT
FOR STORMWATER DISCHARGES

From

CONSTRUCTION ACTIVITY

Permit No. GP-0-25-001

Construction General Permit (CGP)

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

of the Environmental Conservation Law

Effective Date: January 29, 2025 Expiration Date: January 28, 2030

Scott E. Sheeley

Chief Permit Administrator

Scott E. Sheeley JAN. 29, 2025

Authorized Signature Date

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

PREFACE

Pursuant to Section 402 of the Clean Water Act (CWA), and 40 CFR 122.26(b)(14)(x), (15)(i), and (15)(ii), *stormwater discharges* from certain *construction activities* are unlawful unless they are authorized by a National Pollutant Discharge Elimination System (NPDES) permit or by a state permit program. New York State administers the approved State Pollutant Discharge Elimination System (SPDES) program with permits issued in accordance with the New York State Environmental Conservation Law (ECL) Article 17, Titles 7 and 8, and Article 70, as well as 6 NYCRR Parts 621 and 750.

Construction activities constitute construction of a *point source* and, therefore, pursuant to ECL sections 17-0505, 17-0701, and 17-0803, the *owner or operator* must have coverage under a SPDES permit prior to *commencement of construction activities*. The *owner or operator* cannot wait until there is an actual *discharge* from the *construction site* to obtain permit coverage.

***Note: The italicized words/phrases within this permit are defined in Appendix A.**

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
SPDES CONSTRUCTION GENERAL PERMIT (CGP) GP-0-25-001
FOR STORMWATER DISCHARGES FROM CONSTRUCTION ACTIVITIES

Table of Contents

Part I. How to Obtain Coverage and General Requirements

To be covered under this permit, the *owner or operator* must meet all eligibility requirements in Part I.A. and follow the requirements for obtaining permit coverage in Part I.D., F., or G.

A. Eligibility Requirements

For a *common plan of development or sale*, the *phase(s)* that meet the eligibility requirements in Part I.A. may obtain coverage under this permit even if other *phase(s)* of the same *common plan of development or sale* do not meet the eligibility requirements and require an individual SPDES permit.

1. The *owner's or operator's construction activities* involve soil disturbances of:

    a. one or more acres; or

    b. less than one acre which are part of a *common plan of development or sale* that will ultimately disturb one or more acres; or

    c. less than one acre where NYSDEC has determined that a SPDES permit is required for *stormwater discharges* based on the potential for contribution to a violation of a *water quality standard* or for significant contribution of pollutants to *surface waters of the State*.

        i. 5,000 square feet or more, but less than one acre, and are in the New York City Watershed located east of the Hudson River, Appendix C Figure 1; or

        ii. 20,000 square feet or more, but less than one acre, within the municipal boundaries of the City of New York (NYC); or

        iii. less than 20,000 square feet which are part of a *common plan of development or sale* that will ultimately disturb 20,000 square feet or more, but less than one acre, within the municipal boundaries of NYC; or

        iv. that creates 5,000 square feet or more of *impervious area* within the municipal boundaries of NYC.

2. *Discharges* from the *owner's or operator's construction activities* are/were not:

    a. already covered by a different SPDES permit; or

    b. covered under a different SPDES permit that was denied, terminated, or revoked; or

    c. identified in an expired individual SPDES permit that was not renewed; or

    d. required to obtain an individual SPDES permit or another general SPDES permit in accordance with Part VII.K.

3. If *construction activities* may adversely affect a species that is endangered or threatened, the *owner or operator* must obtain a:

    a. permit issued pursuant to 6 NYCRR Part 182 for the project; or

    b. letter issued by NYSDEC of non-jurisdiction pursuant to 6 NYCRR Part 182 for the project.

4. If *construction activities* have the potential to affect an *historic property*, the *owner or operator* must obtain one of the following:

    a. documentation that the *construction activity* is not within an archeological buffer area indicated on the sensitivity map, and that the *construction activity* is not located on or immediately adjacent to a property listed or determined to be eligible for listing on the National or State Registers of Historic Places, and that there is no new permanent building on the *construction site* within the following distances from a building, structure, or object that is more than 50 years old, or if there is such a new permanent building on the *construction site* within those parameters that NYS Office of Parks, Recreation and Historic Preservation (OPRHP), a Historic Preservation Commission of a Certified Local Government, or a qualified preservation professional has determined that the building, structure, or object more than 50 years old is not historically/archeologically significant:

        i. 1-5 acres of disturbance - 20 feet; or

        ii. 5-20 acres of disturbance - 50 feet; or

iii. 20+ acres of disturbance - 100 feet.

b. NYSDEC consultation form sent to OPRHP,[1] and copied to NYSDEC's Agency Historic Preservation Officer (APO), and

i. the State Environmental Quality Review Act (SEQR) Environmental Assessment Form (EAF) with a negative declaration or the Findings Statement, with documentation of OPRHP's agreement with the resolution; or

ii. documentation from OPRHP that the *construction activity* will result in No Impact; or

iii. documentation from OPRHP providing a determination of No Adverse Impact; or

iv. a Letter of Resolution signed by the *owner or operator*, OPRHP and the DEC APO which allows for this *construction activity* to be eligible for coverage under the general permit in terms of the State Historic Preservation Act (SHPA).

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

i. No Affect; or

ii. No Adverse Affect; or

iii. Executed Memorandum of Agreement.

d. documentation that SHPA Section 14.09 has been completed by NYSDEC or another state agency.

5. If *construction activities* are subject to SEQR, the *owner or operator* must obtain documentation that SEQR has been satisfied.

6. If *construction activities* are not subject to SEQR, but subject to the equivalent environmental review from another New York State or federal agency, the

[1] The consultation form can be submitted, along with other project information, through OPRHP's Cultural Resource Information System (CRIS) portal. If submitted through CRIS, paper copies of the consultation form need not be mailed.

owner or operator must obtain documentation that project review, pursuant to a process equivalent to SEQR from another New York State or federal agency, has been satisfied.

7. If *construction activities* require Uniform Procedures Act (UPA) Permits (see 6 NYCRR Part 621) from NYSDEC, or the equivalent from another New York State or federal agency, the *owner or operator* must:

a. obtain all such necessary permits; or

b. receive notification from NYSDEC pursuant to 6 NYCRR 621.3(a)(4) excepting Part I.A.7.a.

8. *Construction activities* are not eligible if they meet the following criteria in Part I.A.8.a. or b.:

a. For linear transportation and linear utility project types, the *construction activities*:

i. are within the watershed of *surface waters of the State* classified as AA or AA-S identified utilizing the Stormwater Interactive Map on NYSDEC's website; and

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

iii. disturb two or more acres of *steep slope*.

b. For all other project types, the *construction activities*:

i. are within the watershed of *surface waters of the State* classified as AA or AA-S identified utilizing the Stormwater Interactive Map on NYSDEC's website; and

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

iii. disturb one or more acres of *steep slope*.

B. Types of *Discharges* Authorized

1. The following *stormwater discharges* are authorized under this permit:

   a. *Stormwater discharges*, including *stormwater* runoff, snowmelt runoff, and surface runoff and drainage, associated with *construction activity*, are authorized under this permit provided that appropriate *stormwater* controls are designed, installed, and maintained in accordance with Part **II.** and Part **III.**

   b. *Stormwater discharges* from construction support activities at the *construction site* (including concrete or asphalt batch plants, equipment staging yards, material storage areas, excavated material disposal areas, and borrow areas) if the following requirements are met:

      i. The support activity is directly related to the *construction site* required to have permit coverage for *stormwater discharges*; and

      ii. The support activity is not a commercial operation, nor does it serve multiple unrelated *construction sites*; and

      iii. The support activity does not continue to operate beyond the completion of the *construction activity* at the site it supports; and

      iv. *Stormwater* controls are implemented in accordance with Part **II.** and Part **III.** for *discharges* from the support activity areas.

2. The following non-*stormwater discharges* associated with *construction activity* are authorized under this permit:

   a. Non-*stormwater discharges* listed in 6 NYCRR 750-1.2(a)(29)(vi), with the following exception: "*Discharges* from firefighting activities are authorized only when the firefighting activities are emergencies/unplanned"; and

   b. Non-*stormwater discharges* of waters to which other components have not been added that are used in accordance with the *SWPPP* to control dust or irrigate vegetation in stabilized areas; and

   c. Uncontaminated *discharges* from *dewatering* operations

3. Authorized *discharges* of *stormwater* or authorized *discharges* of non-*stormwater*, commingled with a *discharge* authorized by a different SPDES permit and/or a *discharge* that does not require SPDES permit authorization, are also authorized under this permit.

C. Prohibited *Discharges*

1. Non-*stormwater discharges* prohibited under this permit include but are not limited to:

   a. Wastewater from washout of concrete; and

   b. Wastewater from washout and cleanout of stucco, paint, form release oils, curing compounds, and other construction materials; and

   c. Fuels, oils, or other *pollutants* used in vehicle and equipment operation and maintenance; and

   d. Soaps, solvents, or detergents used in vehicle and equipment washing or external building washdown; and

   e. Toxic or hazardous substances from a spill or other release.

D. Electronic Notice of Intent (eNOI) Submittal

To receive authorization in accordance with Part I.D.3.b., the *owner or operator* must submit a complete eNOI in accordance with the requirements in Part **I**.D. The eNOI contains questions to: ensure eligibility requirements in Part I.A. have been met; obtain *owner or operator* contact information; obtain the total area to be disturbed and the existing/future *impervious areas* (rounded to the nearest tenth of an acre); confirm *Traditional Land Use Control MS4 Operator* jurisdiction over construction projects; satisfy the EPA eRule requirements; confirm that the Water Quality-Based Effluent Limitations in Part **II.** have been met; demonstrate consideration of the future risks due to climate change in accordance with Part **III.**A.2.; and confirm that the other *Stormwater Pollution Prevention Plan (SWPPP)* requirements in Part **III.** have been met.

1. An eNOI may be submitted for:

   a. *construction activities* that are not part of a *common plan of development or sale*; or

b. an entire *common plan of development or sale*; or

c. separate *phase(s)* of a *common plan of development or sale* if the following requirements are met:

   i. the *common plan of development or sale* meets the eligibility requirements of Part I.A.5. or 6.; and

   ii. the *phase(s)* meet(s) all other eligibility requirements of Part I.A.; and

   iii. Part III.C. Required *SWPPP* Components by Project Type is based on the *common plan of development or sale*, not the *phase(s)*; or

d. *tree clearing* that is associated with, or will support, a *renewable energy* generation, transmission, or storage project that meets Part I.A.5. and 6., if the *tree clearing*:

   i. meets all other eligibility requirements of Part I.A.; and

   ii. will occur in NYSDEC's Regions 3-9; and

   iii. is not within ¼ mile of a bat hibernaculum protected pursuant to 6 NYCRR Part 182; and

   iv. will occur between November 1st and March 31st.

2. As prerequisites for submitting an eNOI, the *owner or operator* must:

   a. prepare a *SWPPP* for Part I.D.1.a., b., c., or d. in accordance with Part III.; and

   b. based on the following criteria, upload the following signature forms signed in accordance with Part VII.J. to the eNOI prior to submission:

      i. for all eNOIs:

         1. the SWPPP Preparer Certification Form, Appendix F, signed by the *SWPPP* preparer; and

         2. the Owner/Operator Certification Form, Appendix J, signed by the *owner or operator*; and

      ii. if an eNOI includes *construction activities* within the municipal boundary(ies) of *Traditional Land Use Control MS4 Operator(s)* that will *discharge* to the *MS4(s)*:

         1. determine if the *Traditional Land Use Control MS4 Operator(s)* have review authority. A *Traditional Land Use Control MS4 Operator* does not have review authority where:

            a. the *owner or operator* of the *construction activities* in Part I.D.2.b.ii. is the same entity as the *Traditional Land Use Control MS4 Operator* identified in Part I.D.2.b.ii.; or

            b. there is a statute exempting the *owner or operator* from zoning review by the *Traditional Land Use Control MS4 Operator*; or

            c. there is no such statute per Part I.D.2.b.ii.1.b., the *Traditional Land Use Control MS4 Operator* concludes, after public hearing, that it does not have zoning review authority in accordance with Legal Memorandum LU14 Updated January 2020 "Governmental Immunity from Zoning and Other Legislation"; and

         2. if the *Traditional Land Use Control MS4 Operator(s)* have review authority, submit the *SWPPP* to the *Traditional Land Use Control MS4 Operator(s)* for review and have:

            a. if outside the municipal boundaries of NYC: the MS4 SWPPP Acceptance Form, Appendix G, signed by the principal executive officer or ranking elected official from the *Traditional Land Use Control MS4 Operator,* or by a duly authorized representative of that person in accordance with Part VII.J.2.; or

b. if within the municipal boundaries of NYC: The City of New York Department of Environmental Protection (NYCDEP) SWPPP Acceptance/Approval Form, Appendix H, signed by the principal executive officer or ranking elected official from the Traditional Land Use Control MS4 Operator, or by a duly authorized representative of that person in accordance with Part VII.J.2.; and

3. if the *Traditional Land Use Control MS4 Operator* does not have review authority, have the MS4 No Jurisdiction Form, Appendix I, signed by the principal executive officer or ranking elected official from the *Traditional Land Use Control MS4 Operator,* or by a duly authorized representative of that person in accordance with Part VII.J.2.

3. Submitting an eNOI:

a. The *owner or operator* must submit a complete Notice of Intent electronically using a NYSDEC approved form.[2]

b. The *owner or operator* is authorized to *commence construction activity* as of the authorization date indicated in the Letter of Authorization (LOA), which is sent by NYSDEC after a complete eNOI is submitted.

i. If an eNOI is received for a *SWPPP* that deviates from one of the technical standards but demonstrates *equivalence* in accordance with Part III.B.1.a.ii. or Part III.B.2.b.ii., if the *SWPPP* includes *construction activities* that are not within the municipal boundary(ies) of *Traditional Land Use Control MS4 Operator(s)*, and/or if the *SWPPP* includes *construction activities* within the municipal boundary(ies) of *Traditional Land Use Control MS4 Operator(s)* that do not have review authority in accordance with Part I.D.2.b.ii.1., the authorization date indicated in the LOA will be 60 business days after the eNOI submission date.

[2] Unless NYSDEC grants a waiver in accordance with 40 CFR 127.15(c) or (d). All waiver requests must be submitted to Stormwater_info@dec.ny.gov or NYSDEC, Bureau of Water Permits, 625 Broadway, 4th Floor, Albany, New York 12233-3505.

c. If *Traditional Land Use Control MS4 Operator(s)* have review authority in accordance with Part I.D.2.b.ii.2., the *owner or operator* must, within five business days of receipt of the LOA, send an electronic copy of the LOA to the *Traditional Land Use Control MS4 Operator(s)* with review authority.

E. General Requirements for *Owners or Operators* with Permit Coverage

1. As of the date the LOA is received, the *owner or operator* must make the eNOI, *SWPPP*, and LOA available for review and copying in accordance with the requirements in Part VII.H. When applicable, as of the date an updated LOA is received, the *owner or operator* must make the updated LOA available for review and copying in accordance with the requirements in Part VII.H.

2. The *owner or operator* must ensure compliance with all requirements of this permit and that the provisions of the *SWPPP*, including any changes made to the *SWPPP* in accordance with Part III.A.5., are properly implemented and maintained from the *commencement of construction activity* until:

a. all areas of disturbance have achieved *final stabilization;* and

b. the owner's or operator's coverage under this permit is terminated in accordance with Part V.A.5.a.

3. As of the date of the *commencement of construction activities* until Part I.E.2.a. and b. have been met, the *owner or operator* must maintain at the *construction site*, a copy of:

a. all documentation necessary to demonstrate eligibility with this permit; and

b. this permit; and

c. the *SWPPP*; and

d. the signed SWPPP Preparer Certification Form; and

e. the signed MS4 SWPPP Acceptance Form or signed NYCDEP SWPPP Acceptance/Approval Form or signed MS4 No Jurisdiction Form (when applicable); and

f. the signed Owner/Operator Certification Form; and

g. the eNOI; and

h. the LOA; and

i. the LOA transmittal to the Traditional Land Use Control MS4 Operator in accordance with Part I.D.3.c. (when applicable).

4. The *owner or operator* must maintain at the *construction site*, until Part I.E.2.a. and b. have been met, as of the date the documents become final or are received, a copy of the:

   a. responsible contractor's or subcontractor's certification statement(s) in accordance with Part III.A.7.; and

   b. inspection reports in accordance with Part IV.C.4. and 6.; and

   c. Request to Disturb Greater Than Five Acres and the Authorization Letter to Disturb Greater Than Five Acres in accordance with Part I.E.6. (when applicable); and

   d. Request to Continue Coverage and the Letter of Continued Coverage (LOCC) in accordance with Part I.F.2. and 4. (when applicable); and

   e. The updated LOA(s) in accordance with Part I.E.9. (when applicable).

5. The *owner or operator* must maintain the documents in Part I.E.3. and 4. in a secure location, such as a job trailer, on-site construction office, or mailbox with lock. The secure location must be accessible during normal business hours to an individual performing a compliance inspection. The documents must be paper documents unless electronic documents are accessible to the inspector during an inspection to the same extent as a paper copy stored at the site would be. If electronic documents are kept on site, the *owner or operator* must maintain functional equipment on site available to an inspector during normal hours of operation such that an inspector may view the electronic documents in a format that can be read in a similar manner as a paper record and in a legally dependable format with no less evidentiary value than their paper equivalent.

6. The *owner or operator* must meet the following requirements prior to disturbing greater than five acres of soil at any one time:

   a. The *owner or operator* must submit a written Request to Disturb Greater Than Five Acres to:

      i. NYSDEC's Regional Office Division of Water staff based on the project location, Appendix E, if a *Traditional Land Use Control MS4 Operator* does not have review authority in accordance with Part I.D.2.b.ii.1.; or

      ii. the *Traditional Land Use Control MS4 Operator*, if a *Traditional Land Use Control MS4 Operator* has review authority in accordance with Part I.D.2.b.ii.1.; or

      iii. NYSDEC's Regional Office Division of Water staff based on the project location, Appendix E, and each involved *Traditional Land Use Control MS4 Operator*, if the project spans multiple municipalities with more than one *Traditional Land Use Control MS4 Operator* involved with review authority in accordance with Part I.D.2.b.ii.1.

   b. The written Request to Disturb Greater Than Five Acres must include:

      i. The SPDES permit identification number (Permit ID); and

      ii. Full technical justification demonstrating why alternative methods of construction that would result in five acres of soil disturbance or less at any one time are not feasible; and

      iii. The phasing plan for the project and sequencing plans for all *phases* from the *SWPPP* in accordance with Part III.B.1.d.; and

      iv. Plans with locations and details of erosion and sediment control practices such that the heightened concern for erosion when disturbing greater than five acres at one time has been addressed; and

      v. Acknowledgment that "the *owner or operator* will comply with the requirements in Part IV.C.2.b."; and

      vi. Acknowledgment that "the *owner or operator* will comply with the requirements in Part II.B.1.b."

   c. The *owner or operator* must be in receipt of an Authorization Letter to Disturb Greater Than Five Acres, which will include when the authorization begins and ends and indicate a maximum area (acres) of soil disturbance allowed at any one time, from:

i. NYSDEC, if Part I.E.6.a.i. or iii. apply; or

ii. the *Traditional Land Use Control MS4 Operator*, if Part I.E.6.a.ii. applies.

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

8. If any human remains or archaeological remains are encountered during excavation, the *owner or operator* must immediately cease, or cause to cease, all *construction activity* in the area of the remains and notify the appropriate Regional Water Engineer (RWE).[3] *Construction activity* shall not resume until written permission to do so has been received from the RWE.

9. To be authorized to implement modifications to the information previously submitted in the eNOI, the *owner or operator* must:

   a. notify NYSDEC via email at Stormwater_info@dec.ny.gov requesting access to update the eNOI; and

   b. update the eNOI to reflect the modifications and resubmit the eNOI in accordance with Part I.D.; and

   c. receive an updated LOA.

10. The eNOI, *SWPPP*, LOA, updated LOAs (when applicable), and inspection reports required by this permit are public documents that the *owner or operator* must make available for review and copying by any person within five business days of the *owner or operator* receiving a written request by any such person to review these documents. Copying of documents will be done at the requester's expense.

[3] The Regional Water Manager where a DEC Region does not have a RWE.

F. Permit Coverage for *Discharges* Authorized Under GP-0-20-001

When applicable:

1. Upon the effective date of this permit, an *owner or operator* of *a construction activity*, with coverage under GP-0-20-001, will have interim coverage under GP-0-25-001 for 45 calendar days starting on the effective date of GP-0-25-001 so long as the *owner or operator* maintains compliance with all applicable requirements of this permit.

2. Within 30 calendar days of the effective date of this permit, the *owner or operator*, with coverage under GP-0-20-001, must submit a complete Request to Continue Coverage electronically using a NYSDEC approved form,[4] which contains the information identified in Part I.F.3. below, if:

   a. the *owner or operator* continues to implement the SMP component in conformance with the technical standards in place at the time of initial project authorization; and

   b. the *owner or operator* will comply with all non-design requirements of GP-0-25-001.

3. The Request to Continue Coverage form contains questions to: ensure eligibility requirements in Part I.A. have been met; verify *owner or operator* contact information; verify the permit identification number; verify the original eNOI submission ID, if applicable; verify Part I.F.2.a. and b.; verify the version of the Design Manual that the technical/design components conform to; and receive an updated Owner/Operator Certification Form, Appendix I.

4. The *owner or operator* has obtained continued coverage under GP-0-25-001 as of the date indicated in the LOCC, which is sent by NYSDEC after a complete Request to Continue Coverage form is submitted.

5. If the owner or operator does not submit the Request to Continue Coverage form in accordance with Part I.F.2. and 3., coverage under this permit is automatically terminated after interim coverage expires.

[4] Unless NYSDEC grants a waiver in accordance with 40 CFR 127.15(c) or (d). All waiver requests must be submitted to Stormwater_info@dec.ny.gov or NYSDEC, Bureau of Water Permits, 625 Broadway, 4th Floor, Albany, New York 12233-3505.

G. Change of *Owner or Operator*

When applicable:

1. When property ownership changes, or when there is a change in operational control over the construction plans and specifications, the following process applies:

   a. The new *owner or operator* must meet the applicable prerequisites for submitting an eNOI in accordance with Part I.D.2.; and

   b. The new *owner or operator* must submit an eNOI in accordance with Part I.D.3.; and

   c. Permit coverage for the new *owner or operator* will be effective upon receipt of the LOA in accordance with Part I.D.3.b.; and

   d. The new *owner or operator*, upon receipt of their LOA, must provide their Permit ID to the original *owner or operator*; and

   e. If the original *owner or operator* will no longer be the *owner or operator* of the *construction activity* identified in the original *owner's or operator's* eNOI, the original *owner or operator*, upon receipt of the new *owner's or operator's* Permit ID in accordance with Part I.G.1.d., must submit to NYSDEC a completed eNOT in accordance with Part V. that includes the name and Permit ID of the new *owner or operator*; or

   f. If the original *owner or operator* maintains ownership of a portion of the *construction activity*, the original *owner or operator* must maintain their coverage under the permit by modifying their eNOI; modifications to the eNOI must include:

      i. the revised area of disturbance and/or *impervious area(s)*; and

      ii. the revised SMP information, if applicable; and

      iii. a narrative description of what has changed; and

      iv. the new *owner's or operator's* Permit ID for the portion of the project removed from the eNOI.

   Owners or operators must follow Part I.E.9. to modify the eNOI.

Part II. Water Quality-Based Effluent Limitations

A. Maintaining Water Quality

NYSDEC expects that compliance with the requirements of this permit will control *discharges* 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 the following *water quality standards* as contained in Parts 700 through 705 of Title 6 of the Official Compilation of Codes, Rules and Regulations of the State of New York:

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

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

3. There must be no residue from oil and floating substances, nor visible oil film, nor globules of grease.

If there is evidence indicating that the *stormwater discharges* authorized by this permit are causing, have the reasonable potential to cause, or are contributing to a violation of the *water quality standard,* the *owner or operator* must take appropriate corrective action in accordance with Part IV.C.5. of this permit and document in accordance with Part IV.C.4. of this permit. To address the *water quality standard* violation the *owner or operator* must include and implement appropriate controls in the *SWPPP* to correct the problem or obtain an individual SPDES permit.

If, despite compliance with the requirements of this permit, it is demonstrated that the *stormwater discharges* authorized by this permit are causing or contributing to a violation of *water quality standards*, or if NYSDEC determines that a modification of this permit is necessary to prevent a violation of *water quality standards*, the authorized *discharges* will no longer be eligible for coverage under this permit, and the *owner or operator* must obtain an individual SPDES permit prior to further *discharges* from the *construction site*.

B. Effluent Limitations Applicable to *Discharges* from *Construction Activities*

Discharges authorized by this permit must achieve, at a minimum, the effluent limitations in Part II.B.1.a., b., c., d., and e. These limitations represent the degree of effluent reduction attainable by the application of best practicable technology currently available.

1. Erosion and Sediment Control Requirements - The *owner or operator* must select, design, install, implement, and maintain control measures to *minimize* the *discharge* of *pollutants* and prevent a violation of the *water quality standards*. The selection, design, installation, implementation, and maintenance of these control measures must meet the non-numeric effluent limitations in Part II.B.1.a., b., c., d., and e. and be in accordance with the New York State Standards and Specifications for Erosion and Sediment Control (BB), dated November 2016, using sound engineering judgment. Where control measures are not designed in conformance with the design criteria included in the technical standard, the *owner or operator* must include in *SWPPP* the reason(s) for the deviation, or alternative design, and provide information in the *SWPPP* demonstrating that the deviation or alternative design is *equivalent* to the technical standard.

   a. **Erosion and Sediment Controls.** At a minimum, erosion and sediment controls must be selected, designed, installed, implemented, and maintained to:

      i. *Minimize* soil erosion through application of runoff control and soil stabilization control measure to *minimize pollutant discharge*s; and

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

      iii. *Minimize* the amount of soil exposed during *construction activity*; and

      iv. *Minimize* the disturbance of *steep slope*; and

      v. *Minimize* sediment *discharge*s from the site; and

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

      vii. *Minimize* soil compaction. *Minimizing* soil compaction is not required

where the intended function of a specific area of the site dictates that it be compacted; and

      viii. Unless *infeasible*, preserve a sufficient amount of topsoil to complete soil restoration and establish a uniform, dense vegetative cover; and

      ix. *Minimize* dust. On areas of exposed soil, *minimize* dust through the appropriate application of water or other dust suppression techniques to control the generation of *pollutants* that could be discharged from the site.

   b. **Soil Stabilization**. In areas where soil disturbance activity has ceased, whether permanently or *temporarily ceased*, the application of soil stabilization measures must be initiated by the end of the next business day and completed within 14 calendar days from the date the current soil disturbance activity ceased. For *construction sites* that *directly discharge* to one of the 303(d) segments listed in Appendix D, or are located in one of the watersheds listed in Appendix C, or are authorized to disturb greater than five acres in accordance with Part I.E.5.a.viii., the application of soil stabilization measures must be initiated by the end of the next business day and completed within seven calendar days from the date the soil disturbance activity ceased.

   c. **Dewatering**. *Discharge*s from *dewatering* activities, including *discharge*s from *dewatering* of trenches and excavations, must be managed by appropriate control measures.

   d. **Pollution Prevention Measures**. Select, design, install, implement, and maintain effective pollution prevention measures to *minimize* the *discharge* of *pollutants* and prevent a violation of the *water quality standards*. At a minimum, such measures must be selected, designed, installed, implemented, and maintained to:

      i. *Minimize* the *discharge* of *pollutants* from equipment and vehicle washing, wheel wash water, and other wash waters. Soaps, detergents and solvents cannot be used; and

      ii. *Minimize* the exposure of building materials, building products, construction wastes, trash, landscape materials, fertilizers, pesticides, herbicides, detergents, sanitary waste, hazardous and toxic waste, and other materials present on the site to precipitation and to *stormwater*. *Minimization* of exposure is not required in cases where the exposure to precipitation and to *stormwater* will not result in a *discharge* of *pollutants*, or where exposure of a specific material or product poses little risk of *stormwater* contamination (such as final products and materials intended for outdoor use); and

iii. Prevent the *discharge* of *pollutants* from spills and leaks and implement chemical spill and leak prevention and response procedures.

e. **Surface Outlets.** When discharging from basins and impoundments, the surface outlets must be designed, constructed, and maintained in such a manner that sediment does not leave the basin or impoundment and that erosion at or below the outlet does not occur.

C. Post-Construction Stormwater Management Practice (SMP) Requirements

1. The *owner or operator* of a *construction activity* that requires post-construction SMPs, in accordance with Part III.C., must select, design, install, implement, and maintain the SMPs to meet the *performance criteria* in the New York State Stormwater Management Design Manual, dated July 31, 2024 (DM), using sound engineering judgment. Where SMPs are not designed in conformance with the *performance criteria* in the DM, the *owner or operator* must include in the *SWPPP* the reason(s) for the deviation or alternative design and provide information which demonstrates that the deviation or alternative design is *equivalent* to the technical standard.

2. The *owner or operator* of a *construction activity*, that requires SMPs in accordance with Part III.C., must design the practices to meet the applicable *sizing criteria* in Part II.C.2.a., b., c., or d.

a. Sizing Criteria for ***New Development***

i. Runoff Reduction Volume (RRv) and Water Quality Volume (WQv):

1. Reduce the total WQv by application of RR techniques and standard SMPs with RRv capacity. The total WQv must be calculated in accordance with the criteria in Section 4.2 of the DM; or

2. Minimum RRv and Treatment of Remaining Total WQv: *Construction activities* that cannot meet the requirements in Part II.C.2.a.i.1. due to *site limitations* must direct runoff from all newly constructed *impervious areas* to a RR technique or standard SMP with RRv capacity unless *infeasible*. The specific *site limitations* that prevent the reduction of 100% of the WQv must be documented in the *SWPPP*. For each *impervious area* that is not directed to a RR technique or standard SMP with RRv capacity, the *SWPPP* must include documentation which demonstrates that all options were considered and for each option explains why it is considered *infeasible*.

   In no case shall the runoff reduction achieved from the newly constructed *impervious areas* be less than the Minimum RRv as calculated using the criteria in Section 4.4 of the DM. The remaining portion of the total WQv that cannot be reduced must be treated by application of standard SMPs.

ii. Channel Protection Volume (CPv): Provide 24 hour extended detention of the post-developed 1-year, 24-hour storm event, remaining after runoff reduction. Where a CPv control orifice is provided, the minimum orifice size must be 3 inches, with acceptable external trash rack or orifice protection. The CPv requirement does not apply when:

1. Reduction of the entire CPv is achieved by application of runoff reduction techniques or infiltration systems; or

2. The 1-year post-development peak *discharge* is less than or equal to 2.0 cfs without detention or velocity controls; or

3. The site *directly discharges* into a fifth order or larger water body (stream, river, or lake), or tidal waters, where the increase in smaller flows will not impact the stream bank or channel integrity. However, the point of *discharge* must be adequately protected against scour and erosion by the increased peak *discharge*.

iii. *Overbank* Flood Control Criteria (Qp): Requires storage to attenuate the post-development 10-year, 24-hour peak *discharge* rate (Qp) to predevelopment rates. The Qp requirement does not apply when:

1. the site *directly discharges* to tidal waters or fifth order or larger streams, or

2. A downstream analysis reveals that *overbank* control is not required.

iv. Extreme Flood Control Criteria (Qf): Requires storage to attenuate the post-development 100-year, 24-hour peak *discharge* rate (Qf) to predevelopment rates. The Qf requirement does not apply when:

1. the site *directly discharges* to tidal waters or fifth order or larger streams, or

2. A downstream analysis reveals that *overbank* control is not required.

b. *Sizing Criteria* for *New Development* in Enhanced Phosphorus Removal Watersheds

i. Runoff Reduction Volume (RRv) and Water Quality Volume (WQv):

1. Reduce the WQv by application of RR techniques and standard SMPs with RRv capacity. The total WQv is the runoff volume from the 1-year, 24-hour design storm over the post-developed watershed and must be calculated in accordance with the criteria in Section 4.3 of the DM; or

2. Minimum RRv and Treatment of Remaining Total WQv: *Construction activities* that cannot meet the criteria in Part II.C.2.b.i.1. due to *site limitations* must direct runoff from all newly constructed *impervious areas* to a RR technique or standard SMP with RRv capacity unless *infeasible*. The specific *site limitations* that prevent the reduction of 100% of the WQv must be documented in the *SWPPP*. For each *impervious area* that is not directed to a RR technique or standard SMP with RRv capacity, the *SWPPP* must include

documentation which demonstrates that all options were considered and for each option explains why it is considered *infeasible.*

In no case shall the runoff reduction achieved from the newly constructed *impervious areas* be less than the Minimum RRv as calculated using the criteria in Section 4.5 of the DM. The remaining portion of the total WQv that cannot be reduced must be treated by application of standard SMPs.

ii. Channel Protection Volume (CPv): Provide 24 hour extended detention of the post-developed 1-year, 24-hour storm event, remaining after runoff reduction. Where a CPv control orifice is provided, the minimum orifice size must be 3 inches, with acceptable external trash rack or orifice protection. The CPv requirement does not apply when:

1. Reduction of the entire CPv is achieved by application of runoff reduction techniques or infiltration systems; or

2. The 1-year post-development peak *discharge* is less than or equal to 2.0 cfs; or

3. The site *directly discharges* to tidal waters, or a fifth order or larger water body (stream, river, or lake) where the increase in smaller flows will not impact the stream bank or channel integrity. However, the point of *discharge* must be adequately protected against scour and erosion by the increased peak *discharge*.

iii. *Overbank* Flood Control Criteria (Qp): Requires storage to attenuate the post-development 10-year, 24-hour peak *discharge* rate (Qp) to predevelopment rates. The Qp requirement does not apply when:

1. the site *directly discharges* to tidal waters or fifth order or larger streams; or

2. A downstream analysis reveals that *overbank* control is not required.

iv. Extreme Flood Control Criteria (Qf): Requires storage to attenuate the post-development 100-year, 24-hour peak *discharge* rate (Qf) to predevelopment rates. The Qf requirement does not apply when:

1. the site *directly discharges* to tidal waters or fifth order or larger streams; or

2. A downstream analysis reveals that *overbank* control is not required.

c. *Sizing Criteria* for *Redevelopment Activity*

i. Water Quality Volume (WQv): The WQv treatment objective for *redevelopment activity* must be addressed by one of the following options, as outlined in Section 9.2.1. *Redevelopment activities* located in an Enhanced Phosphorus Removal Watershed (see Part III.B.3. and Appendix C) must calculate the WQv in accordance with Section 4.3 of the DM. All other *redevelopment activities* must calculate the WQv in accordance with Section 4.2 of the DM.

1. Reduce the existing *impervious cover* by a minimum of 25% of the total disturbed, *impervious area*. The Soil Restoration criteria in Section 5.1.6 of the DM must be applied to all newly created pervious areas; or

2. Capture and treat 100% of the required WQv, for a minimum of 25% of the disturbed redevelopment *impervious area*, by implementation of standard SMPs or reduced by application of runoff reduction techniques; or

3. Capture and treat 100% of the required WQv, for a minimum of 75% of the disturbed redevelopment *impervious area*, by implementation of a volume-based alternative SMP, as defined in Section 9.4 of the DM; or

4. Capture and treat 100% of the required WQv, for a minimum of 75% of the disturbed redevelopment *impervious area*, by implementation of a flow-through alternative SMP sized to treat the peak rate of runoff from the WQv design storm; or

5. Application of a combination of 1 through 4 above that provide a weighted average of at least two of the above methods. Application of this method must be in accordance with the criteria in Section 9.2.1(A)(V) of the DM; or

6. If there is an existing SMP located on the site that captures and treats runoff from the *impervious area* that is being disturbed, the WQv treatment option selected must, at a minimum, provide treatment equal to the treatment that was being provided by the existing practice(s) if that treatment is greater than the treatment required by options 1 through 5 above.

ii. Channel Protection Volume (CPv) is not required if there is 0% change to hydrology that increases the *discharge* rate and volume from the project site.

iii. *Overbank* Flood Control (Qp) is not required if there is 0% change to hydrology that increases the *discharge* rate from the project site.

iv. Extreme Flood Control (Qf) is not required if there is 0% change to hydrology that increases the *discharge* rate from the project site.

d. *Sizing Criteria* for Combination of *Redevelopment Activity* and *New Development*

Construction projects, that include both *new development* and *redevelopment activity*, must use SMPs that meet the *sizing criteria* calculated as an aggregate of the *sizing criteria* in Part II.C.2.a. or b. for the *new development* portion of the project and Part II.C.2.c. for the *redevelopment activity* portion of the project.

Part III. Stormwater Pollution Prevention Plan (SWPPP)

A. General *SWPPP* Requirements

1. A *SWPPP* must be prepared and implemented by the *owner or operator* of all *construction activity* covered by this permit. All authorized *discharges* must be identified in the *SWPPP*. The *SWPPP* must document the selection, design, installation, implementation and maintenance of the control measures and

practices that will be used to meet the effluent limitations in Part II.B. and, where applicable, the SMP requirements in Part II.C.

2. The *SWPPP* must demonstrate consideration in narrative format of the future physical risks due to climate change pursuant to the Community Risk and Resiliency Act (CRRA), 6 NYCRR Part 490, and associated guidance.

    a. The owner or operator must consider:

        i. the following physical risks due to climate change:

            (i) increasing temperature; and

            (ii) increasing precipitation; and

            (iii) increasing variability in precipitation, including chance of drought; and

            (iv) increasing frequency and severity of flooding; and

            (v) rising sea level; and

            (vi) increasing storm surge; and

            (vii) shifting ecology.

        ii. for each of the following:

            (i) overall site planning; and

            (ii) location, elevation, and sizing of:

                a. control measures and practices; and

                b. conveyance system(s); and

                c. detention system(s).

3. The *SWPPP* must describe the erosion and sediment control practices and where required, SMPs that will be used and/or constructed to reduce the *pollutants* in *stormwater discharges* and to assure compliance with the

requirements of this permit. In addition, the *SWPPP* must identify potential sources of pollution which may reasonably be expected to affect the quality of *stormwater discharges*.

4. All *SWPPPs*, that require the SMP component in accordance with Part III.B.2., must be prepared by a *qualified professional*.

5. The *owner or operator* must keep the *SWPPP* current so that, at all times, it accurately documents the erosion and sediment control practices that are being used or will be used during construction, and all SMPs that will be constructed on the site. At a minimum, the *owner or operator* must modify the *SWPPP*, including construction drawings:

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

    b. whenever there is a change in design, construction, or operation at the *construction site* that has or could have an effect on the *discharge* of *pollutants*; and

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

    d. to document the final construction conditions in an as-built drawing.

6. NYSDEC may notify the *owner or operator* at any time that the *SWPPP* does not meet one or more of the minimum requirements of this permit. The notification must be in writing and identify the provisions of the *SWPPP* that require modification. Within fourteen (14) calendar days of such notification, or as otherwise indicated by NYSDEC, the *owner or operator* must make the required changes to the *SWPPP* and submit written notification to NYSDEC that the changes have been made. If the *owner or operator* does not respond to NYSDEC's comments in the specified time frame, NYSDEC may suspend the *owner's or operator's* coverage under this permit or require the *owner or operator* to obtain coverage under an individual SPDES permit in accordance with Part II.D.4.

7. Prior to the *commencement of construction activity*, the *owner or operator* must identify the contractor(s) and subcontractor(s) that will be responsible for installing, constructing, repairing, replacing, inspecting, and maintaining the erosion and sediment control practices included in the *SWPPP* and the

contractor(s) and subcontractor(s) that will be responsible for constructing the SMPs included in the *SWPPP*. The *owner or operator* must have each of the contractors and subcontractors identify at least one person from their company to be *trained contractor* that will be responsible for implementation of the *SWPPP*. The *owner or operator* must ensure that at least one *trained contractor* is on site daily when soil disturbance activities are being performed.

The *owner or operator* must have each of the contractors and subcontractors identified above sign a copy of the following certification statement below before the *commencement of construction activities*:

> "I hereby certify under penalty of law that I understand and agree to comply with the requirements of the *SWPPP* and agree to implement any corrective actions identified by the *qualified inspector* during a site inspection. I also understand that the *owner or operator* must comply with the requirements of the most current version of the New York State Pollutant Discharge Elimination System (SPDES) Construction General Permit (CGP) for Stormwater Discharges from Construction Activities and that it is unlawful for any person to cause or contribute to a violation of *water quality standards*. Furthermore, I am aware that there are significant penalties for submitting false information, that I do not believe to be true, including the possibility of fine and imprisonment for knowing violations"

In addition to providing the certification statement above, the certification page must also identify the specific elements of the *SWPPP* that each contractor and subcontractor will be responsible for and include the name and title of the person providing the signature; the name and title of the *trained contractor* responsible for *SWPPP* implementation; the name, address and telephone number of the contracting firm; the address (or other identifying description) of the site; and the date the certification statement is signed. The *owner or operator* must attach the certification statement(s) to the copy of the *SWPPP* that is maintained at the *construction site*. If new or additional contractors are hired to implement measures identified in the *SWPPP* after the *commencement of construction activities*, they must also sign the certification statement and provide the information listed above prior to performing *construction activities*.

B. Required *SWPPP* Contents

1. Erosion and sediment control component - The *owner or operator* must prepare a *SWPPP* that includes erosion and sediment control practices.

   a. Erosion and sediment control practices must be designed:

      i. in conformance with the BB; or

      ii. *equivalent* to the BB if deviating from Part III.B.1.a.i.

   b. If the erosion and sediment control practices are designed in conformance with Part III.B.1.a.ii., the *SWPPP* must include a demonstration of *equivalence* to the BB.

   c. At a minimum, the erosion and sediment control component of the *SWPPP* must include the following:

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

      ii. A site map/construction drawing(s) with north arrows for the project, including a general location map. At a minimum, the site map must show the total site area; all improvements; areas of disturbance; areas that will not be disturbed; existing vegetation; on-site and adjacent off-site surface water(s); floodplain/floodway boundaries; wetlands and drainage patterns that could be affected by the *construction activity*; existing and final contours; locations of different soil types with boundaries; material, waste, borrow or equipment storage areas located on adjacent properties; and location(s) of the *stormwater discharge*(s) and receiving surface water(s); and

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

      iv. A phasing plan for the project and sequencing plans for all *phases*, both of which must address clearing and grubbing, excavation and grading, utility and infrastructure installation, *final stabilization*, and any other *construction activity* at the site that will result in soil disturbance.

1. The phasing plan must include:

   a. a map delineating and labeling the limits of soil disturbance for all *phases* of a project; and

   b. a table identifying the order and intended schedule of when each *phase* will begin and end its sequencing plan. The table must identify the total disturbed area for each *phase* at any one time and the total disturbed area for the overall project at any one time all on one timeline showing all overlapping quantities of disturbed area at any one time; and

2. A sequencing plan for a specific *phase* must include:

   a. a table indicating the order and intended schedule of *construction activities* within a *phase*, and corresponding construction drawings with a description of the work to be performed; and

   b. all permanent and *temporary stabilization* measures; and

v. A description of the minimum erosion and sediment control practices to be installed or implemented for each *construction activity* that will result in soil disturbance. Include a schedule that identifies the timing of initial placement or implementation of each erosion and sediment control practice and the minimum time frames that each practice should remain in place or be implemented; and

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

vii. The dimensions, material specifications, installation details, and operation and maintenance requirements for all erosion and sediment control practices. Include the location and sizing of any

temporary sediment basins and structural practices that will be used to divert flows from exposed soils; and

viii. A maintenance inspection schedule for the contractor(s) and subcontractor(s) identified in Part III.A.7. to ensure continuous and effective operation of the erosion and sediment control practices. The maintenance inspection schedule must be in accordance with the requirements in the BB technical standard; and

ix. A description of the pollution prevention measures that will be used to control litter, construction chemicals and construction debris from becoming a *pollutant* source in the *stormwater discharges*; and

x. A description and location of any *stormwater discharges* associated with industrial activity other than construction at the site, including, but not limited to, *stormwater discharges* from asphalt plants and concrete plants located on the *construction site*; and

xi. Identification of any elements of the design that are not in conformance with the design criteria in the BB technical standard. Include the reason for the deviation or alternative design and provide information which demonstrates that the deviation or alternative design is *equivalent* to the technical standard.

2. SMP component – The *owner or operator* of *construction activity* identified in Table 2 of Appendix B must prepare a *SWPPP* that includes SMPs.

   a. SMPs must be designed in conformance with the applicable *sizing criteria* in Part II.C.2.a., c., or d.; and

   b. SMPs must be designed in conformance with the *performance criteria*:

      i. in the DM; or

      ii. *equivalent* to the DM if deviating from Part III.B.2.b.i.; or

      iii. in the New York State Stormwater Management Design Manual, dated January 2015 (2015 Design Manual), or *equivalent* to it, if the following criteria are met:

1. The eNOI is submitted in accordance with Part I.D. before January 29, 2027 for *construction activities* that are either:

    a. subject to governmental review and approval:

        i. where the *owner or operator* made any application to that governmental entity prior to the effective date of this permit; and

        ii. such application included a *SWPPP* developed using the 2015 Design Manual or *equivalent* to it; or

    b. not subject to governmental review and approval:

        i. where a fiscal allocation for the *construction activities* has been developed and approved by a governmental entity; and

        ii. the *SWPPP* was developed using the 2015 Design Manual or *equivalent* to it; and

c. If SMPs are designed in conformance with Part III.B.2.b.ii., the *SWPPP* must include the reason(s) for the deviation or alternative design and a demonstration of *equivalence* to the DM; and

d. If SMPs are designed in conformance with Part III.B.2.b.iii., the *SWPPP* must include supporting information or documentation demonstrating that Part III.B.2.b.iii.1.a. or b. apply; and

e. The SMP component of the *SWPPP* must include the following:

    i. Identification of all SMPs to be constructed as part of the project, including which option the SMP designs conform to, either Part III.B.2.b.i., ii., or iii. Include the dimensions, material specifications and installation details for each SMP; and

    ii. A site map/construction drawing(s) showing the specific location and size of each SMP; and

iii. A Stormwater Modeling and Analysis Report that includes:

(i) Map(s) showing pre-development conditions, including watershed/subcatchments boundaries, flow paths/routing, and design points; and

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

(iii) Results of *stormwater* modeling (i.e. hydrology and hydraulic analysis) for the required storm events. Include supporting calculations (model runs), methodology, and a summary table that compares pre- and post-development runoff rates and volumes for the different storm events; and

(iv) Summary table, with supporting calculations, which demonstrates that each SMP has been designed in conformance with the *sizing criteria* included in the DM; and

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

(vi) Identification of any elements of the design that are not in conformance with the *performance criteria* in the DM. Include the reason(s) for the deviation or alternative design and provide information which demonstrates that the deviation or alternative design is *equivalent* to the DM.

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

v. Infiltration test results, when required in accordance with Part III.B.2.a.; and

vi. An operations and maintenance plan that includes inspection and maintenance schedules and actions to ensure continuous and effective operation of each SMP. The plan must identify the entity that will be responsible for the long-term operation and maintenance of each practice; and

3. Enhanced Phosphorus Removal Standards - The *owner or operator* of *construction activity* identified in Table 2 of Appendix B that is located in a watershed identified in Appendix C must prepare a *SWPPP* that includes SMPs designed in conformance with the applicable *sizing criteria* in Part II.C.2.b., c., or d. and the *performance criteria* Enhanced Phosphorus Removal Standards included in the DM. At a minimum, the SMP component of the *SWPPP* must meet the requirements of Part III.B.2.

C. Required *SWPPP* Components by Project Type

Owners or operators of *construction activities*, identified in Table 1 of Appendix B, are required to prepare a *SWPPP* that only includes erosion and sediment control practices designed in accordance with Part III.B.1. *Owners or operators* of the *construction activities*, identified in Table 2 of Appendix B, must prepare a *SWPPP* that also includes SMPs designed in accordance with Part III.B.2 or 3.

For the entire area of disturbance, including the entire *common plan of development or sale* if applicable, the owner or operator must evaluate every bullet from Appendix B Table 1 and Table 2 separately. If bullets from both Table 1 and Table 2 apply, the *SWPPP* must include erosion and sediment control practices for all *construction activities* but SMPs for only those portions of the *construction activities* that fall under Table 2 bullet(s).

Part IV. Inspection and Maintenance Requirements

A. General Construction Site Inspection and Maintenance Requirements

1. The *owner or operator* must ensure that all erosion and sediment control practices (including pollution prevention measures), and all SMPs identified in the *SWPPP*, are inspected and maintained in accordance with Part IV.B. and C.

B. Contractor Maintenance Inspection Requirements

1. The *owner or operator* of each *construction activity*, identified in Tables 1 and 2 of Appendix B, must have a *trained contractor* inspect the erosion and sediment control practices and pollution prevention measures being

implemented within the active work area daily to ensure that they are being maintained in effective operating condition at all times. If deficiencies are identified, the contractor must:

a. if the corrective action does not require engineering design:

   i. begin implementing corrective actions within one business day; and

   ii. complete the corrective actions within five business days; or

b. if the corrective action requires engineering design:

   i. begin the engineering design process within five business days; and

   ii. complete the corrective action in a reasonable time frame but no later than within 60 calendar days.

2. For *construction sites* where soil disturbance activities have been temporarily suspended (e.g. winter shutdown) and *temporary stabilization* measures have been applied to all disturbed areas, the *trained contractor* can stop conducting the maintenance inspections in accordance with Part IV.B.1. The *trained contractor* must begin conducting the maintenance inspections in accordance with Part IV.B.1. as soon as soil disturbance activities resume.

3. For *construction sites* where soil disturbance activities have been shut down with partial project completion, the *trained contractor* can stop conducting the maintenance inspections in accordance with Part IV.B.1. if all areas disturbed as of the project shutdown date have achieved *final stabilization* <u>and</u> all SMPs required for the completed portion of the project have been constructed in conformance with the *SWPPP* and are operational.

C. *Qualified Inspector* Inspection Requirements

1. With the exception of the following *construction activities* identified in Tables 1 and 2 of Appendix B, a *qualified inspector* must conduct site inspections for all other *construction activities* identified in Tables 1 and 2 of Appendix B:

   a. the construction of a single-family residential subdivision with 25% or less *impervious cover* at total site build-out that involves a soil disturbance of one (1) or more acres of land but less than or equal to five (5) acres and is

<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 D; and

b. the construction of a single-family home that involves soil disturbances of one (1) or more acres but less than or equal to five (5) acres and is <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 D; and

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

d. *construction activities* located in the New York City Watershed located east of the Hudson River, see Appendix C Figure 1, that involve soil disturbances of 5,000 square feet or more, but less than one acre.

2. The *qualified inspector* must conduct site inspections in accordance with the following timetable:

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

b. For *construction sites* where soil disturbance activities are on-going and the *owner or operator* has received authorization in accordance with Part I.E.6. to disturb greater than five (5) acres of soil at any one time, the *qualified inspector* must conduct at least two (2) site inspections every seven (7) calendar days. The two (2) inspections must be separated by a minimum of two (2) full calendar days; or

c. For *construction sites* where soil disturbance activities have been temporarily suspended (e.g. winter shutdown) and *temporary stabilization* measures have been applied to all disturbed areas, the *qualified inspector* must conduct a site inspection at least once every thirty (30) calendar days. The *owner or operator* must notify the DOW Water (SPDES) Program contact at the Regional Office (see contact information in Appendix E) or, in areas under the jurisdiction of a *Traditional Land Use Control MS4 Operator,* the *Traditional Land Use Control MS4 Operator* (provided the *Traditional Land Use Control MS4 Operator* is not the *owner or operator* of the *construction activity*) by hard copy or email prior to reducing the inspections to this frequency and again by hard copy or email prior to re-commencing construction; or

d. For *construction sites* where soil disturbance activities have been shut down with partial project completion, the requirement to have the *qualified inspector* conduct inspections ceases if all areas disturbed as of the project shutdown date have achieved *final stabilization* <u>and</u> all SMPs required for the completed portion of the project have been constructed in conformance with the *SWPPP* and are operational. The *owner or operator* must notify the DOW Water (SPDES) Program contact at the Regional Office (see contact information in Appendix E) or, in areas subject to the review authority of *Traditional Land Use Control MS4 Operator(s)* in accordance with Part I.D.2.b.ii.1., the *Traditional Land Use Control MS4 Operator(s)* (provided the *Traditional Land Use Control MS4 Operator(s)* are not the *owners or operators* of the *construction activity*) in writing prior to the shutdown and again in writing prior to resuming *construction activity*. If soil disturbance activities are not resumed within 2 years from the date of shutdown, the *owner or operator* must terminate coverage by meeting the requirements of Part V; or

e. For *construction sites* involving soil disturbance of one (1) or more acres that *directly discharge* to one of the 303(d) segments listed in Appendix D or is located in one of the watersheds listed in Appendix C, the *qualified inspector* must conduct at least two (2) site inspections every seven (7) calendar days. The two (2) inspections must be separated by a minimum of two (2) full calendar days.

3. At a minimum, the *qualified inspector* must inspect:

a. all erosion and sediment control practices and pollution prevention measures to ensure integrity and effectiveness; and

b. all SMPs under construction to ensure that they are constructed in conformance with the *SWPPP*; and

c. all areas of disturbance that have not achieved *final stabilization*; and

d. all points of *discharge* to *surface waters of the State* located within, or immediately adjacent to, the property boundaries of the *construction site*; and

e. all points of *discharge* from the *construction site*.

4. The *qualified inspector* must prepare an inspection report subsequent to each and every inspection. At a minimum, the inspection report must include and/or address all of the following, for all *construction activities* except those listed in Part IV.C.1.:

   a. Permit identification number; and

   b. Date and time of inspection; and

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

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

   e. A description of the condition of the runoff at all points of *discharge* from the *construction site*. This must include identification of any *discharges* of sediment from the *construction site*. Include *discharges* from conveyance systems (i.e. pipes, culverts, ditches, etc.) and overland flow; and

   f. A description of the condition of all *surface waters of the State* located within, or immediately adjacent to, the property boundaries of the *construction site* which receive runoff from disturbed areas. This must include identification of any *discharges* of sediment to the *surface waters of the State*; and

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

   h. Identification of all erosion and sediment control practices and pollution prevention measures that were not installed properly or are not functioning as designed and need to be reinstalled or replaced; and

   i. Description and sketch (map) of areas with active soil disturbance activity, areas that have been disturbed but are inactive at the time of the inspection, and areas that have been stabilized (temporary and/or final) since the last inspection; and

   j. Estimates, in square feet or acres, of the following areas:

      i. Total area with active soil disturbance (not requiring either *temporary stabilization* or *final stabilization*); and

      ii. Total area with inactive soil disturbance (requiring either *temporary stabilization* or *final stabilization*); and

      iii. Total area that has achieved *temporary stabilization*; and

      iv. Total area that has achieved *final stabilization*; and

   k. Current stage of construction of all SMPs and identification of all *construction activity* on site that is not in conformance with the *SWPPP* and technical standards; and

   l. Corrective action(s) that must be taken to install, repair, replace or maintain erosion and sediment control practices and pollution prevention measures; and to correct deficiencies identified with the construction of the SMP(s); and

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

   n. Digital photographs, with date stamp, that clearly show the condition of all practices that have been identified as needing corrective actions. The *qualified inspector* must attach color copies of the digital photographs to the inspection report being maintained onsite within seven (7) calendar days of the date of the inspection. The *qualified inspector* must also take digital photographs, with date stamp, that clearly show the condition of the practice(s) after the corrective action has been completed. The *qualified inspector* must attach paper color copies of the digital photographs to the inspection report that documents the completion of the corrective action work within seven (7) calendar days of that inspection.

5. Within one business day of the completion of an inspection, the *qualified inspector* must notify the *owner or operator*, and appropriate contractor or subcontractor identified in Part III.A.7., of any corrective actions that need to be taken. The contractor or subcontractor must:

   a. if the corrective action does not require engineering design:

i. begin implementing corrective actions within one business day; and

ii. complete the corrective actions within five business days; or

b. if the corrective action requires engineering design:

i. begin the engineering design process within five business days; and

ii. complete the corrective action in a reasonable time frame but no later than within 60 calendar days.

6. All inspection reports must be signed by the *qualified inspector.* In accordance with Part I.E.3., the inspection reports must be maintained on site with the *SWPPP*.

Part V. How to Terminate CGP Coverage

A. Electronic Notice of Termination (eNOT) Submittal

The eNOT contains questions to ensure requirements in Part V.A. have been met.

1. An *owner or operator* must terminate coverage when one or more of the following requirements have been met:

a. Total project completion:

i. all *construction activity* identified in the *SWPPP* has been completed; and

ii. all areas of disturbance have achieved *final stabilization*; and

iii. all temporary, structural erosion and sediment control measures have been removed; and

iv. all SMPs have been constructed in conformance with the *SWPPP* and are operational; and

v. an as-built drawing has been prepared; or

b. Planned shutdown with partial project completion:

i. all soil disturbance activities have ceased; and

ii. all areas disturbed as of the project shutdown date have achieved *final stabilization*; and

iii. all temporary, structural erosion and sediment control measures have been removed; and

iv. all SMPs required for the completed portion of the project have been constructed in conformance with the *SWPPP* and are operational; and

v. an as-built drawing has been prepared; or

c. In accordance with Part I.G. Change of Owner or Operator; or

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

2. For *construction activities* that require *qualified inspector* inspections in accordance with Part IV.C.1. and have met Part V.A.1.a. or b., the *owner or operator* must have the *qualified inspector* perform a final site inspection prior to submitting the eNOT. The *qualified inspector* must, by signing the “Final Stabilization” and “Post-Construction Stormwater Management Practice(s)” certification statements on the eNOT, certify that all the requirements in Part V.A.1.a. or b. have been achieved.

3. For *construction activities* that are subject to the review authority of *Traditional Land Use Control MS4 Operator(s)* in accordance with Part I.D.2.b.ii.1. and meet Part V.A.1.a. or b., the *owner or operator* must have the *Traditional Land Use Control MS4 Operator(s)* sign the “MS4 Acceptance” statement on the eNOT in accordance with the requirements in Part VII.J. A *Traditional Land Use Control MS4 Operator* official, by signing this statement, determined that it is acceptable for the *owner or operator* to submit the eNOT in accordance with the requirements of this Part. A *Traditional Land Use Control MS4 Operator* can make this determination by performing a final site inspection themselves or by accepting the *qualified inspector*’s final site inspection certification(s) when required in Part V.A.2.

4. For *construction activities* that require SMPs and meet Part V.A.1.a. or b., the *owner or operator* must, prior to submitting the eNOT, ensure one of the following:

    a. for SMP(s) that were constructed by a private entity, but will be owned, operated, and maintained by a public entity, the SMP(s) and any right-of-way(s) needed to operate and maintain such practice(s) have been deeded to the municipality in which the practice(s) is located; or

    b. for SMP(s) that are privately owned, but will be operated and maintained by a public entity, an executed operation and maintenance agreement is in place with the municipality that will operate and maintain the SMP(s); or

    c. for SMP(s) that are privately owned, the *owner or operator* has a mechanism in place that requires operation and maintenance of the practice(s) in accordance with the operation and maintenance plan, such as a deed covenant in the *owner or operator's* deed of record; or

    d. for SMP(s) that are owned by a public or private institution (e.g. school, university, hospital), government agency or authority, or public utility, the *owner or operator* has policies and procedures in place that ensure operation and maintenance of the practices in accordance with the operation and maintenance plan.

5. An *owner or operator* that has met the requirements of Part V.A.1., 2., 3., and 4. must request termination of coverage under this permit by submitting a complete Notice of Termination form electronically using a NYSDEC approved form.[5]

    a. The owner's or operator's coverage is terminated as of the termination date indicated in the Letter of Termination (LOT), which is sent by NYSDEC after a complete eNOT is submitted.

[5] Unless NYSDEC grants a waiver in accordance with 40 CFR 127.15(c) or (d). All waiver requests must be submitted to Stormwater_info@dec.ny.gov or NYSDEC, Bureau of Water Permits, 625 Broadway, 4th Floor, Albany, New York 12233-3505.

Part VI. Record Retention and Reporting

A. Record Retention

The *owner or operator* must retain a copy of the documents listed in Part I.E.3. and a copy of the LOT for a period of at least five years from the date that NYSDEC accepts a complete NOT submitted in accordance with Part V.

B. Reporting

Except for the eNOI, the signature forms associated with the eNOI, and the eNOT, all other written correspondence requested by NYSDEC, including individual permit applications, must be sent to the address of the appropriate DOW (SPDES) Program contact at the Regional Office listed in Appendix E.

Part VII. Standard Permit Requirements

For the purposes of this permit, examples of contractors and subcontractors include: third-party maintenance and construction contractors.

A. Duty to Comply

The *owner or operator*, and all contractors or subcontractors, must comply with all requirements of this permit. Any non-compliance with the requirements of this permit constitutes a violation of the New York State Environmental Conservation Law (ECL), and its implementing regulations, and is grounds for enforcement action. Filing of a request for termination of coverage under this permit, or a notification of planned changes or anticipated non-compliance, does not limit, diminish or stay compliance with any requirements of this permit.

B. Need to Halt or Reduce Activity Not a Defense

The necessity to halt or reduce the *construction activity* regulated by this permit, in order to maintain compliance with the requirements of this permit, must not be a defense in an enforcement action.

C. Penalties

There are substantial criminal, civil, and administrative penalties associated with violating the requirements of this permit. Fines of up to $37,500 per day for each violation and imprisonment for up to 15 years may be assessed depending upon the nature and degree of the offense.

D. False Statements

Any person who knowingly makes any false material statement, representation, or certification in any application, record, report, or other document filed or required to be maintained under this permit, including monitoring reports or reports of compliance or noncompliance must, upon conviction, be punished in accordance with ECL §71-1933 and or New York State Penal Law Articles 175 and 210.

E. Re-Opener Clause

Upon issuance of this permit, a determination has been made on the basis of a submitted Notice of Intent, plans, or other available information, that compliance with the specified permit requirements will reasonably protect classified water use and assure compliance with applicable *water quality standards*. Satisfaction of the requirements of this permit notwithstanding, if operation pursuant to this permit causes or contributes to a condition in contravention of State *water quality standards* or guidance values, or if NYSDEC determines that a modification is necessary to prevent impairment of the best use of the waters or to assure maintenance of *water quality standards* or compliance with other provisions of ECL Article 17 or the Clean Water Act (CWA), or any regulations adopted pursuant thereto, NYSDEC may require such modification and the Commissioner may require abatement action to be taken by the *owner or operator* and may also prohibit such operation until the modification has been implemented.

F. Duty to Mitigate

The *owner or operator*, and its contractors and subcontractors, must take all reasonable steps to *minimize* or prevent any *discharge* in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment.

G. Requiring Another General Permit or Individual SPDES Permit

NYSDEC may require any *owner or operator* authorized to *discharge* in accordance with this permit to apply for and obtain an individual SPDES permit or apply for authorization to *discharge* in accordance with another general SPDES permit.

1. Cases where an individual SPDES permit or authorization to discharge in accordance with another general SPDES permit may be required include, but is not limited to the following:

a. the *owner or operator* is not in compliance with the conditions of this permit or does not meet the requirements for coverage under this permit; and

b. a change has occurred in the availability of demonstrated technology or practices for the control or abatement of *pollutants* applicable to the *point source*; and

c. new effluent limitation guidelines or new source performance standards are promulgated that are applicable to *point sources* authorized to *discharge* in accordance with this permit; and

d. existing effluent limitation guidelines or new source performance standards that are applicable to *point sources* authorized to *discharge* in accordance with this permit are modified; and

e. a water quality management plan containing requirements applicable to such *point sources* is approved by NYSDEC; and

f. circumstances have changed since the time of the request to be covered so that the *owner or operator* is no longer appropriately controlled under this permit, or either a temporary or permanent reduction or elimination of the authorized *discharge* is necessary; and

g. the *discharge* is in violation of section 17-0501 of the ECL; and

h. the *discharge(s)* is a significant contributor of *pollutants*. In making this determination, NYSDEC may consider the following factors:

    i. the location of the *discharge(s)* with respect to *surface waters of the State*; and

    ii. the size of the *discharge(s)*; and

    iii. the quantity and nature of the *pollutants discharged* to *surface waters of the State*; and

    iv. other relevant factors including compliance with other provisions of ECL Article 17, or the CWA.

2. When NYSDEC requires any *owner or operator* authorized by this permit to apply for an individual SPDES permit as provided for in this subdivision, it must notify the *owner or operator* in writing that a permit application is required. This notice must include a brief statement of the reasons for this decision, an application

form, a statement setting a time for the *owner or operator* to file the application for an individual SPDES permit, and a deadline, not sooner than 180 days from the *owner's or operator's* receipt of the notification letter, whereby the authorization to *discharge* under this permit must be terminated. NYSDEC may grant additional time upon demonstration, to the satisfaction of the RWE,[6] that additional time to apply for an alternative authorization is necessary or where NYSDEC has not provided a permit determination in accordance with 6 NYCRR Part 621.

3. When an individual SPDES permit is issued to an *owner or operator* authorized to *discharge* under this permit for the same *discharge(s)*, this permit authorization for *construction activities* authorized under the individual SPDES permit is automatically terminated on the effective date of the individual SPDES permit unless termination is earlier in accordance with 6 NYCRR Part 750.

H. Duty to Provide Information

The *owner or operator* must furnish to NYSDEC, within five business days, unless otherwise set forth by NYSDEC, any information that NYSDEC may request to determine whether cause exists to determine compliance with this permit or to determine whether cause exists for requiring an individual SPDES permit in accordance with 6 NYCRR 750-1.21(e) (see Part VII.G. Requiring Another General Permit or Individual Permit).

The *owner or operator* must make available to NYSDEC, for inspection and copying, or furnish to NYSDEC within 25 business days of receipt of a NYSDEC request for such information, any information retained in accordance with this permit.

Except for Part I.D.4. and 5. and Part I.G., the following applies: where the *owner or operator* becomes aware that it failed to submit any relevant facts on the Notice of Intent, or submitted incorrect information in a Notice of Intent or in any report to NYSDEC, the *owner or operator* must submit such facts or corrected information to NYSDEC within five business days.

I. Extension

In the event a new permit is not issued and effective prior to the expiration of this permit, and this permit is extended pursuant to the State Administrative Procedure Act and 6 NYCRR Part 621, then the *owner or operator* with coverage under this permit may continue to operate and *discharge* in accordance with the requirements of this permit until a new permit is issued and effective.

[6] The Regional Water Manager where a DEC Region does not have a RWE.

J. Signatories and Certification

The Notice of Intent, Notice of Termination, and reports required by this permit must be signed as provided in 40 CFR §122.22.

1. All Notices of Intent and Notices of Termination must be signed as follows:

   a. For a corporation. By a responsible corporate officer. For the purpose of this section, a responsible corporate officer means:

      (i) a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy- or decision-making functions for the corporation; or

      (ii) the manager of one or more manufacturing, production or operating facilities, provided, the manager is authorized to make management decisions which govern the operation of the regulated facility including having the explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive measures to assure long term environmental compliance with environmental laws and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for Notice of Intent or Notice of Termination requirements; and where authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.

      Note: NYSDEC does not require specific assignments or delegations of authority to responsible corporate officers identified in 40 CFR §122.22(a)(1)(i). NYSDEC will presume that these responsible corporate officers have the requisite authority to sign the Notice of Intent or Notice of Termination unless the corporation has notified NYSDEC to the contrary. Corporate procedures governing authority to sign a Notice of Intent or Notice of Termination may provide for assignment or delegation to applicable corporate positions under 40 CFR §122.22(a)(1)(ii) rather than to specific individuals.

   b. For a partnership or sole proprietorship. By a general partner or the proprietor, respectively.

c. For a municipality, State, Federal, or other public agency. By either a principal executive officer or ranking elected official. For purposes of this section, a principal executive officer of a Federal agency includes:

   1. the chief executive officer of the agency; or

   2. a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., Regional Administrators of EPA).

2. All reports required by this permit, and other information requested by NYSDEC, must be signed by a person described in Part VII.J.1., or by a duly authorized representative of that person. A person is a duly authorized representative only if:

   a. The authorization is made in writing by a person described in Part VII.J.1. or using the Duly Authorized Form, found on the DEC website; and

   b. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the company. (A duly authorized representative may thus be either a named individual or any individual occupying a named position); and

   c. The written authorization is submitted to NYSDEC.

3. Changes to authorization. If an authorization under Part VII.J.2. is no longer accurate because a different individual or position has responsibility for the overall operation of the *construction activity*, a new authorization satisfying the requirements of Part VII.J.2. must be submitted to NYSDEC prior to or together with any reports, information, or applications to be signed by an authorized representative.

4. Certification. Any person signing a document under Part VII.J.1. or 2. must make the following certification:

   I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who

   manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

5. Electronic reporting. If documents described in Part VII.J.1. or 2. are submitted electronically by or on behalf of the *construction activity* with coverage under this permit, any person providing the electronic signature for such documents must meet all relevant requirements of this section, and must ensure that all of the relevant requirements of 40 CFR Part 3 (including, in all cases, subpart D to Part 3) (Cross-Media Electronic Reporting) and 40 CFR Part 127 (NPDES Electronic Reporting Requirements) are met for that submission.

K. Inspection and Entry

The *owner or operator* must allow NYSDEC, the USEPA Regional Administrator, the applicable county health department, or any authorized representatives of those entities, or, in the case of a *construction site* which *discharges* through an *MS4*, an authorized representative of the *MS4* receiving the *discharge*, upon the presentation of credentials and other documents as may be required by law, to:

1. enter upon the *owner's or operator's* premises where a regulated facility or activity is located or conducted or where records must be kept under the requirements of this permit; and

2. have access to and copy at reasonable times, any records that must be kept under the requirements of this permit, including records required to be maintained for purposes of operation and maintenance; and

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

4. sample or monitor at reasonable times, for the purposes of assuring general SPDES permit compliance or as otherwise authorized by the CWA or ECL, any substances or parameters at any location; and

5. enter upon the property of any contributor to the regulated facility or activity under authority of the *owner or operator*.

L. Confidentiality of Information

The following must not be held confidential: this permit, the fact sheet for this permit, the name and address of any *owner or operator*, effluent data, the Notice of Intent, and information regarding the need to obtain an individual permit or an alternative general SPDES permit. This includes information submitted on forms themselves and any attachments used to supply information required by the forms (except information submitted on usage of substances). Upon the request of the *owner or operator*, NYSDEC must make determinations of confidentiality in accordance with 6 NYCRR Part 616, except as set forth in the previous sentence. Any information accorded confidential status must be disclosed to the Regional Administrator upon his or her written request. Prior to disclosing such information to the Regional Administrator, NYSDEC will notify the Regional Administrator of the confidential status of such information.

M. Other Permits May Be Required

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

N. NYSDEC Orders or Civil Decrees/Judgments

The issuance of this permit by the NYSDEC, and the coverage under this permit by the *owner or operator*, does not supersede, revoke, or rescind any existing order on consent or civil Decree/Judgment, or modification to any such documents or to any order issued by the Commissioner, or any of the terms, conditions, or requirements contained in such order or modification therefore, unless expressly noted.

O. Property Rights

Coverage under this permit does not convey any property rights in either real or personal property, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of Federal, State, or local laws or regulations, nor does it obviate the necessity of obtaining the assent of any other jurisdiction as required by law for the *discharge* authorized.

P. Compliance with Interstate Standards

If the *construction activity* covered by this permit originates within the jurisdiction of an interstate water pollution control agency, then the *construction activity* must also comply with any applicable effluent standards or *water quality standards* promulgated by that interstate agency and as set forth in this permit for such *construction activities*.

Q. Oil and Hazardous Substance Liability

Coverage under this permit does not affect the imposition of responsibilities upon, or the institution of any legal action against, the *owner or operator* under section 311 of the CWA, which must be in conformance with regulations promulgated pursuant to section 311 governing the applicability of section 311 of the CWA to *discharges* from facilities with *NPDES* permits, nor must such issuance preclude the institution of any legal action or relieve the *owner or operator* from any responsibilities, liabilities, or penalties to which the *owner or operator* is or may be subject pursuant to the Comprehensive Environmental Response, Compensation and Liability Act of 1980, 42 U.S.C. section 9601 et seq. (CERCLA).

R. Severability

The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit, must not be affected thereby.

S. NYSDEC Approved Forms

The *owner or operator* must provide all relevant information that is requested by NYSDEC, and required by this permit, on all NYSDEC approved forms.

APPENDIX A – Abbreviations and Definitions

Abbreviations

APO – Agency Preservation Officer
BB – New York State Standards and Specifications for Erosion and Sediment Control (Blue Book), dated November 2016
BMP – Best Management Practice
CPESC – Certified Professional in Erosion and Sediment Control
CPv – Channel Protection Volume
CWA – Clean Water Act (or the Federal Water Pollution Control Act, 33 U.S.C. §1251 et seq)
DM – New York State Stormwater Management Design Manual (Design Manual), dated July 31, 2024
DOW – Division of Water
EAF – Environmental Assessment Form
ECL – chapter 43-B of the Consolidated Laws of the State of New York, entitled the Environmental Conservation Law
EPA – U.S. Environmental Protection Agency
HSG – Hydrologic Soil Group
MS4 – Municipal Separate Storm Sewer System
NOI – Notice of Intent
NOT – Notice of Termination
NPDES – National Pollutant Discharge Elimination System
NYC – The City of New York
NYCDEP – The City of New York Department of Environmental Protection
NYSDEC – The New York State Department of Environmental Conservation
OPRHP – Office of Parks, Recreation and Historic Places
Qf – Extreme Flood
Qp – Overbank Flood
RR – Runoff Reduction
RRv – Runoff Reduction Volume
RWE – Regional Water Engineer
SEQR – State Environmental Quality Review Act
SHPA – State Historic Preservation Act
SMP – Post-Construction Stormwater Management Practice
SPDES – State Pollutant Discharge Elimination System
SWPPP – Stormwater Pollution Prevention Plan
TMDL – Total Maximum Daily Load
UPA – Uniform Procedures Act
USDA – United States Department of Agriculture
WQv – Water Quality Volume

Definitions

<u>All definitions in this section are solely for the purposes of this permit. If a word is not italicized in the permit, use its common definition.</u>

Agricultural Building – a structure designed and constructed to house farm implements, hay, grain, poultry, livestock or other horticultural products; excluding any structure designed, constructed or used, in whole or in part, for human habitation, as a place of employment where agricultural products are processed, treated or packaged, or as a place used by the public.

Agricultural Property – the land for construction of a barn, *agricultural building*, silo, stockyard, pen or other structural practices identified in Table II in the “Agricultural Best Management Practice Systems Catalogue” (dated June 2023).

Alter Hydrology from Pre- to Post-Development Conditions – the post-development peak flow rate(s) has increased by more than 5% of the pre-developed condition for the design storm of interest (e.g. 10 yr and 100 yr).

Combined Sewer System – a sewer system which conveys sewage and *stormwater* through a single pipe system to a publicly owned treatment works.

Commence (Commencement of) Construction Activities – the initial disturbance of soils associated with clearing, grading or excavation activities; or other construction related activities that disturb or expose soils such as demolition, stockpiling of fill material, and the initial installation of erosion and sediment control practices required in the *SWPPP*. See definition for “*Construction Activity(ies)*” also.

Common Plan of Development or Sale – a contiguous area where multiple separate and distinct *construction activities* are occurring, or may occur, under one plan. The “common plan” of development or sale is broadly defined as any announcement or piece of documentation (including a sign, public notice or hearing, marketing plan, advertisement, drawing, permit application, State Environmental Quality Review Act (SEQR) environmental assessment form or other documents, zoning request, computer design, etc.) or physical demarcation (including boundary signs, lot stakes, surveyor markings, etc.) indicating *construction activities* may occur on a specific plot. A *common plan of development or sale* is comprised of two or more *phases*.

Common plan of development or sale does <u>not</u> include separate and distinct *construction activities* that are occurring, or may occur, under one plan that are at least 1/4 mile apart provided any interconnecting road, pipeline or utility project that is part of the same “common plan” is not concurrently being disturbed.

Construction Activity(ies) – identified within 40 CFR 122.26(b)(14)(x), 122.26(b)(15)(i), and 122.26(b)(15)(ii), any clearing, grading, excavation, filling, demolition or stockpiling activities that result in soil disturbance. Clearing activities can include, but are not limited to, mechanized logging equipment operation, the cutting and skidding of trees, stump removal and/or brush root removal.

Construction activity does <u>not</u> include routine maintenance that is performed to maintain the original line and grade, hydraulic capacity, or original purpose of a facility, which is excluded from the calculation of the soil disturbance for a project. Routine maintenance includes, but is not limited to:

- Re-grading of gravel roads or parking lots; and
- Cleaning and shaping of existing roadside ditches and culverts that maintains the approximate original line and grade, and maintains or improves the hydraulic capacity of the ditch; and
- Replacement of existing culverts that maintains the approximate original line and grade, and maintains or improves the hydraulic capacity of a ditch; and
- Replacement of existing bridges that maintains the approximate original line and grade, and maintains or improves the hydraulic capacity beneath the bridges; and
- Cleaning and shaping of existing roadside ditches that does not maintain the approximate original grade, hydraulic capacity and purpose of the ditch if the changes to the line and grade, hydraulic capacity or purpose of the ditch are installed to improve water quality and quantity controls (e.g. installing grass lined ditch); and
- Placement of aggregate shoulder backing that stabilizes the transition between the road shoulder and the ditch or *embankment*; and
- Full depth milling and filling of existing asphalt pavements, replacement of concrete pavement slabs, and similar work that does not expose soil or disturb the bottom six (6) inches of subbase material; and
- Long-term use of equipment storage areas at or near highway maintenance facilities; and
- Removal of sediment from the edge of the highway to restore a previously existing sheet-flow drainage connection from the highway surface to the highway ditch or *embankment*; and
- Existing use of Canal Corp owned upland disposal sites for the canal, and
- Replacement of curbs, gutters, sidewalks and guide rail posts; and
- Maintenance of ski trails including brush hog use and mowing; and
- Above ground snowmaking pipe replacement; and
- Replacement of existing utility poles; etc.

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

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

Directly Discharge(s)(ing) (to a specific surface waterbody) – runoff flows from a *construction site* by overland flow and the first point of *discharge* is the specific surface waterbody, or runoff flows from a *construction site* to a separate storm sewer system and the first point of *discharge* from the separate storm sewer system is the specific surface waterbody.

Discharge(s)(d) – any addition of any *pollutant* to waters of the State through an outlet or *point source*.

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

Equivalent (Equivalence) – the practice or measure meets all the performance, longevity, maintenance, and safety objectives of the technical standard and will provide an equal or greater degree of water quality protection.

Final Stabilization – all soil disturbance activities have ceased and a uniform, perennial vegetative cover with a density of eighty (80) percent over the entire pervious surface has been established; or other *equivalent* stabilization measures, such as permanent landscape mulches, rock rip-rap or washed/crushed stone have been applied on all disturbed areas that are not covered by permanent structures, concrete or pavement.

Historic Property – any building, structure, site, object or district that is listed on the State or National Registers of Historic Places or is determined to be eligible for listing on the State or National Registers of Historic Places.

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

Infeasible – not technologically possible, or not economically practicable and achievable considering best industry practices.

Minimize(ing)(ation) – reduce and/or eliminate to the extent achievable using control measures (including best management practices) that are technologically available and economically practicable and achievable in light of best industry practices.

Municipal Separate Storm Sewer System (MS4) - a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains):

1. owned or operated by a State, city, town, village, borough, county, parish, district, association, or other public body (created by or pursuant to State law) having jurisdiction over disposal of sewage, industrial wastes, *stormwater*, or other wastes, including special districts under State law such as a sewer district, flood control district or drainage district, or similar entity, or an Indian tribe or an authorized Indian tribal organization, or a designated and approved management agency under section 208 of the CWA, that *discharges* to *surface waters of the State*; and

2. designed or used for collecting or conveying *stormwater*; and

3. which is not a *combined sewer system*; and

4. which is not part of a Publicly Owned Treatment Works (POTW) as defined at 40 CFR 122.2.

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

New Development – any land disturbance that does not meet the definition of *Redevelopment Activity* included in this appendix.

New York State Erosion and Sediment Control Certificate Program – a certificate program that establishes and maintains a process to identify and recognize individuals who are capable of developing, designing, inspecting and maintaining erosion and sediment control plans on projects that disturb soils in New York State. The certificate program is administered by the New York State Conservation District Employees Association.

Nonpoint Source(s) – any source of water pollution or *pollutants* which is not a discrete conveyance or *point source* permitted pursuant to Title 7 or 8 of Article 17 of the Environmental Conservation Law (see ECL Section 17-1403).

Overbank – flow events that exceed the capacity of the stream channel and spill out into the adjacent floodplain.

Owner or Operator – the person, persons, or legal entity which owns or leases the property on which the *construction activity* is occurring; an entity that has operational control over the construction plans and specifications, including the ability to make modifications to the plans and specifications; and/or an entity that has day-to-day operational control of those activities at a project that are necessary to ensure compliance with the permit requirements.

Performance Criteria – the six performance criteria for each group of SMPs in Chapters 5 and 6 of the technical standard, New York State Stormwater Management Design Manual (DM), dated July 31, 2024. These include feasibility, conveyance, pretreatment, treatment, landscaping, and maintenance. It does not include the *Sizing Criteria* (i.e. WQv, RRv, CPv, Qp and Qf) in Part I.C.2. of the permit.

Phase – a defined area in which *construction activities* are occurring or will occur separate from other defined area(s).

Point Source – any discernible, confined, and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, vessel or other floating craft, or landfill leachate collection system from which *pollutants* are or may be *discharged*.

Pollutant(s) – dredged spoil, filter backwash, solid waste, incinerator residue, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand and industrial, municipal, agricultural waste and ballast *discharged* into water; which may cause or might reasonably be expected to cause pollution of the waters of the state in contravention of the standards or guidance values adopted as provided in 6 NYCRR Parts 700 et seq.

Qualified Inspector – a person that is knowledgeable in the principles and practices of erosion and sediment control, such as a licensed Professional Engineer, Certified Professional in Erosion and Sediment Control (CPESC), Registered Landscape Architect, *New York State Erosion and Sediment Control Certificate Program* holder or other NYSDEC endorsed individual(s).

It can also mean someone working under the direct supervision of, and at the same company as, the licensed Professional Engineer or Registered Landscape Architect, provided that person has training in the principles and practices of erosion and sediment control. Training in the principles and practices of erosion and sediment control means that the individual working under the direct supervision of the licensed Professional Engineer or Registered Landscape Architect has received four (4) hours of NYSDEC endorsed training in proper erosion and sediment control principles from a Soil and Water Conservation District, or other NYSDEC endorsed entity. After receiving the initial training, the individual working under the direct supervision of the licensed Professional Engineer or Registered Landscape Architect shall receive four (4) hours of training every three (3) years.

It can also mean a person that meets the *Qualified Professional* qualifications in addition to the *Qualified Inspector* qualifications.

Note: Inspections of any SMPs that include structural components, such as a dam for an impoundment, shall be performed by a licensed Professional Engineer.

Qualified Professional – a person that is knowledgeable in the principles and practices of *stormwater* management and treatment, such as a licensed Professional Engineer, Registered Landscape Architect or other NYSDEC endorsed individual(s). Individuals preparing *SWPPPs* that require the SMP component must have an understanding of the principles of hydrology, water quality management practice design, water quantity control design, and, in many cases, the principles of hydraulics. All components of the *SWPPP* that involve the practice of engineering, as defined by the NYS Education Law (see Article 145), shall be prepared by, or under the direct supervision of, a professional engineer licensed to practice in the State of New York.

Redevelopment Activity(ies) – the disturbance and reconstruction of existing *impervious area*, including *impervious areas* that were removed from a project site within five (5) years of preliminary project plan submission to the local government (i.e. site plan, subdivision, etc.).

Renewable Energy – electricity or thermal energy generated by renewable energy systems through use of the following technologies: solar thermal, photovoltaics, on land and offshore wind, hydroelectric, geothermal electric, geothermal ground source heat, tidal energy, wave energy, ocean thermal, and fuel cells which do not utilize a fossil fuel resource in the process of generating electricity.

Site Limitations – site conditions that prevent the use of an infiltration technique and or infiltration of the total WQv. Typical *site limitations* include: seasonal high groundwater, shallow depth to bedrock, and soils with an infiltration rate less than 0.5 inches/hour. The existence of *site limitations* shall be confirmed and documented using actual field testing (i.e. test pits, soil borings, and infiltration test) or using information from the most current United States Department of Agriculture (USDA) Soil Survey for the County where the project is located.

Sizing Criteria – the criteria included in Part I.C.2 of the permit that are used to size SMPs. The criteria include; Water Quality Volume (WQv), Runoff Reduction Volume (RRv), Channel Protection Volume (Cpv), *Overbank* Flood (Qp), and Extreme Flood (Qf).

Steep Slope – land area designated on the current United States Department of Agriculture (USDA) Soil Survey as Soil Slope Phase D, (provided the map unit name or description is inclusive of slopes greater than 25%), or Soil Slope Phase E or F, (regardless of the map unit name), or a combination of the three designations.

Stormwater – that portion of precipitation that, once having fallen to the ground, is in excess of the evaporative or infiltrative capacity of soils, or the retentive capacity of surface features, which flows or will flow off the land by surface runoff to waters of the State.

Streambank – the terrain alongside the bed of a creek or stream. The bank consists of the sides of the channel, between which the flow is confined.

Stormwater Pollution Prevention Plan (SWPPP) – a project specific report, including construction drawings, that among other things: describes the *construction activity(ies)*, identifies the potential sources of pollution at the *construction site*; describes and shows the *stormwater* controls that will be used to control the *pollutants* (i.e. erosion and sediment controls; for many projects, includes SMPs); and identifies procedures the *owner or operator* will implement to comply with the requirements of the permit. See Part III of the permit for a complete description of the information that must be included in the *SWPPP*.

Surface Waters of the State – shall be construed to include lakes, bays, sounds, ponds, impounding reservoirs, springs, rivers, streams, creeks, estuaries, marshes, inlets, canals, the Atlantic ocean within the territorial seas of the state of New York and all other bodies of surface water, natural or artificial, inland or coastal, fresh or salt, public or private (except those private waters that do not combine or effect a junction with natural surface waters), which are wholly or partially within or bordering the state or within its jurisdiction. Waters of the state are further defined in 6 NYCRR Parts 800 to 941.

Temporarily Ceased – an existing disturbed area will not be disturbed again within 14 calendar days of the previous soil disturbance.

Temporary Stabilization – exposed soil has been covered with material(s) as set forth in the technical standard, New York Standards and Specifications for Erosion and Sediment Control, to prevent the exposed soil from eroding. The materials can include, but are not limited to, mulch, seed and mulch, and erosion control mats (e.g. jute twisted yarn, excelsior wood fiber mats).

Total Maximum Daily Load (TMDL) **–** the sum of the allowable loads of a single *pollutant* from all contributing point and *nonpoint source*s. It is a calculation of the maximum amount of a *pollutant* that a waterbody can receive and still meet *water quality standards*, and an allocation of that amount to the *pollutant's* sources. A TMDL stipulates Waste Load Allocations (WLA) for *point source discharges*, Load Allocations (LA) for *nonpoint source*s, and a margin of safety (MOS).

Traditional Land Use Control MS4 Operator – a city, town, or village with land use control authority that is authorized to *discharge* under New York State DEC's SPDES General Permit For Stormwater Discharges from Municipal Separate Stormwater Sewer Systems (MS4s) or the City of New York's Individual SPDES Permit for their Municipal Separate Storm Sewer Systems (NY-0287890).

Trained Contractor – an employee from the contracting (construction) company, identified in Part III.A.7., that has received four (4) hours of NYSDEC endorsed training in proper erosion and sediment control principles from a Soil and Water Conservation District, or other NYSDEC endorsed entity. After receiving the initial training, the *trained contractor* shall receive four (4) hours of training every three (3) years.

It can also mean an employee from the contracting (construction) company, identified in Part III.A.7., that meets the *qualified inspector* qualifications (e.g. licensed Professional Engineer, Certified Professional in Erosion and Sediment Control (CPESC), Registered Landscape Architect, *New York State Erosion and Sediment Control Certificate Program* holder, or someone working under the direct supervision of, and at the same company as, the licensed Professional Engineer or Registered Landscape Architect, provided they have received four (4) hours of NYSDEC endorsed training in proper erosion and sediment control principles from a Soil and Water Conservation District, or other NYSDEC endorsed entity).

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

Tree Clearing – *construction activities* limited to felling and removal of trees.

Tree clearing does not include hand felling and leaving the trees in place with no support from mechanized equipment, which is not considered *construction activity* requiring coverage under this permit.

Water Quality Standard – such measures of purity or quality for any waters in relation to their reasonable and necessary use as promulgated in 6 NYCRR Part 700 et seq.

APPENDIX B – Required SWPPP Components by Project Type

Table 1

CONSTRUCTION ACTIVITIES THAT REQUIRE THE PREPARATION OF A SWPPP THAT ONLY INCLUDES EROSION AND SEDIMENT CONTROLS

The following *construction activities* that involve soil disturbances of one (1) or more acres of land, but less than five (5) acres:

- Single-family home not located in one of the watersheds listed in Appendix C and not *directly discharging* to one of the 303(d) segments listed in Appendix D
- Single-family residential subdivisions with 25% or less *impervious cover* at total site build-out and not located in one of the watersheds listed in Appendix C and not *directly discharging* to one of the 303(d) segments listed in Appendix D
- Construction of a barn or other *agricultural building*, silo, stock yard or pen.
- Structural agricultural conservation practices as identified in Table II in the "Agricultural Best Management Practice Systems Catalogue" (dated June 2023) that include construction or reconstruction of *impervious area* or *alter hydrology from pre- to post-development* conditions.

The following *construction activities* that involve soil disturbances between five thousand (5000) square feet and one (1) acre of land:

- All construction activities located in the New York City Watershed located east of the Hudson River, see Appendix C Figure 1, that involve soil disturbances between five thousand (5,000) square feet and one (1) acre of land.

Within the municipal boundaries of NYC:

- Stand-alone road reconstruction, where the total soil disturbance from only that road construction, is less than one (1) acre of land.

The following *construction activities*:

- Installation of underground linear utilities; such as gas lines, fiber-optic cable, cable TV, electric, telephone, sewer mains, and water mains
- Environmental enhancement projects, such as wetland mitigation, *stormwater* retrofits, stream restoration, and resiliency projects that reconstruct shoreline areas to address sea level rise
- Pond construction
- Linear bike paths running through areas with vegetative cover, including bike paths surfaced with an *impervious cover*
- Cross-country ski trails, walking/hiking trails, and mountain biking trails, including a de minimis parking lot (maximum 10 spaces total, sized for passenger cars) with 35 feet minimum preservation of undisturbed area downgradient from the parking lot
- Dam rehabilitation (the structure of the dam itself)
- Sidewalks, bike paths, or walking paths, surfaced with an *impervious cover*, that are not part of residential, commercial, or institutional development;
- Sidewalks, bike paths, or walking paths, surfaced with an *impervious cover*, that include incidental shoulder or curb work along an existing highway to support construction of the sidewalk, bike path, or walking path.

Table 1 (Continued)

CONSTRUCTION ACTIVITIES THAT REQUIRE THE PREPARATION OF A _SWPPP_ THAT ONLY INCLUDES EROSION AND SEDIMENT CONTROLS

The following *construction activities*:

- Slope stabilization
- Slope flattening that changes the grade of the site, but does not significantly change the runoff characteristics
- Spoil areas that will be covered with vegetation
- Vegetated open space (i.e. recreational parks, lawns, meadows, fields, downhill ski trails) that do not *alter hydrology from pre- to post-development* conditions
- Athletic fields (natural grass) that do not include the construction or reconstruction of *impervious area* and do not *alter hydrology from pre- to post-development* conditions
- Demolition where vegetation will be established, and no *redevelopment activity* is planned[1]
- Installation or replacement of either an overhead electric transmission line or a ski lift tower that does not include the construction of permanent access roads or parking areas surfaced with *impervious cover*.
- Solar array field areas that have tables elevated off the ground, spaced one table width apart, do not *alter hydrology from pre- to post-development conditions*, and address water quality volume and runoff reduction volume by maintaining sheet flow on slopes less than 8%.
- Structural agricultural conservation practices as identified in Table II in the "Agricultural Best Management Practice Systems Catalogue" (dated June 2023) that do not include construction or reconstruction of *impervious area* and do not *alter hydrology from pre- to post-development* conditions.
- Temporary access roads, median crossovers, detour roads, lanes, or other temporary *impervious areas* that will be restored to pre-construction conditions once the *construction activity* is complete (in this context, "temporary" means the *impervious area* will be in place for two years or less)
- Other *construction activities* that do not include the construction or reconstruction of *impervious area*, and do not *alter hydrology from pre- to post-development* conditions, and are not listed in Table 2.

1. If the site is redeveloped in the future, a new eNOI must be submitted.

Table 2

CONSTRUCTION ACTIVITIES THAT REQUIRE THE PREPARATION OF A _SWPPP_ THAT INCLUDES POST-CONSTRUCTION STORMWATER MANAGEMENT PRACTICES (SMPS)

The following *construction activities*:

- Single-family home located in one of the watersheds listed in Appendix C or *directly discharging* to one of the 303(d) segments listed in Appendix D
- Single-family home that disturbs five (5) or more acres of land
- Single-family residential subdivisions located in one of the watersheds listed in Appendix C or *directly discharging* to one of the 303(d) segments listed in Appendix D
- Single-family residential subdivisions that involve soil disturbances of between one (1) and five (5) acres of land with greater than 25% *impervious cover* at total site build-out
- Single-family residential subdivisions that involve soil disturbances of between 20,000 square feet and one (1) acre of land within the municipal boundaries of NYC with greater than 25% *impervious cover* at total site build-out
- Single-family residential subdivisions that involve soil disturbances of five (5) or more acres of land, and single-family residential subdivisions that involve soil disturbances of less than five (5) acres that are part of a *common plan of development or sale* that will ultimately disturb five (5) or more acres of land
- Multi-family residential developments; includes duplexes, townhomes, condominiums, senior housing complexes, apartment complexes, and mobile home parks
- Creation of 5,000 square feet or more of *impervious area* in the municipal boundaries of NYC
- Airports
- Amusement parks
- Breweries, cideries, and wineries, including establishments constructed on agricultural land
- Campgrounds
- Cemeteries that include the construction or reconstruction of *impervious area* (>5% of disturbed area) or *alter the hydrology from pre- to post-development* conditions
- Commercial developments
- Churches and other places of worship
- Construction of a barn or other *agricultural building* (e.g. silo) that involves soil disturbance greater than five acres.
- Structural agricultural conservation practices as identified in Table II in the "Agricultural Best Management Practice Systems Catalogue" (dated June 2023) that involves soil disturbance greater than five acres and include the construction or reconstruction of *impervious area* or *alter hydrology from pre- to post-development* conditions.
- Facility buildings, including ski lodges, restroom buildings, pumphouses, ski lift terminals, and maintenance and groomer garages
- Institutional development; includes hospitals, prisons, schools and colleges
- Industrial facilities; includes industrial parks
- Landfills; including creation of landfills or capping landfills.
- Municipal facilities; includes highway garages, transfer stations, office buildings, POTWs, water treatment plants, and water storage tanks
- Golf courses
- Office complexes

Table 2 (Continued)

***CONSTRUCTION ACTIVITIES* THAT REQUIRE THE PREPARATION OF A *SWPPP* THAT INCLUDES POST-CONSTRUCTION STORMWATER MANAGEMENT PRACTICES (SMPS)**

The following *construction activities*:

- Permanent laydown yards and equipment storage lots
- Playgrounds that include the construction or reconstruction of *impervious area*
- Sports complexes
- Racetracks; includes racetracks with earthen (dirt) surfaces
- Road construction or reconstruction, outside the municipal boundaries of NYC
- Road construction within the municipal boundaries of NYC
- Stand-alone road reconstruction, within the municipal boundaries of NYC where the total soil disturbance from that road reconstruction involves soil disturbance of one (1) acre or more of land
- Parking lot construction or reconstruction (as with all Table 2 bullets, this includes parking lots constructed as part of the *construction activities* listed in Table 1, unless a Table 1 bullet specifies otherwise)
- Athletic fields (natural grass) that include the construction or reconstruction of *impervious area* (>5% of disturbed area) or *alter the hydrology from pre- to post-development* conditions
- Athletic fields with artificial turf
- Permanent access roads, parking areas, substations, compressor stations, and well drilling pads, surfaced with *impervious cover*, and constructed as part of an overhead electric transmission line, wind-power, cell tower, oil or gas well drilling, sewer or water main, ski lift, or other linear utility project
- Sidewalks, bike paths, or walking paths, surfaced with an *impervious cover*, that are part of a residential, commercial or institutional development
- Sidewalks, bike paths, or walking paths, surfaced with an *impervious cover*, that are part of highway construction or reconstruction
- Solar array field areas on slopes greater than 8% that cannot maintain sheet flow using management practices identified in the BB or the DM
- Solar array field areas on slopes less than 8% that will *alter the hydrology from pre- to post-development* conditions
- Solar array field areas with tables that are not elevated high enough to achieve *final stabilization* beneath the tables
- Traditional *impervious areas* associated with solar development (e.g. roads, buildings, transformers)
- Utility pads surfaced with *impervious cover*, including electric vehicle charging stations
- All other *construction activities* that include the construction or reconstruction of *impervious area* or *alter the hydrology from pre- to post-development* conditions, and are not listed in Table 1

APPENDIX C – Watersheds Requiring Enhanced Phosphorus Removal

Watersheds where *owners or operators* of *construction activities* identified in Table 2 of Appendix B must prepare a *SWPPP* that includes SMPs designed in conformance with the Enhanced Phosphorus Removal Standards included in the DM technical standard.

- Entire New York City Watershed located east of the Hudson River – Figure 1
- Onondaga Lake Watershed – Figure 2
- Greenwood Lake Watershed – Figure 3
- Oscawana Lake Watershed – Figure 4
- Kinderhook Lake Watershed – Figure 5

Figure 1 - New York City Watershed East of the Hudson

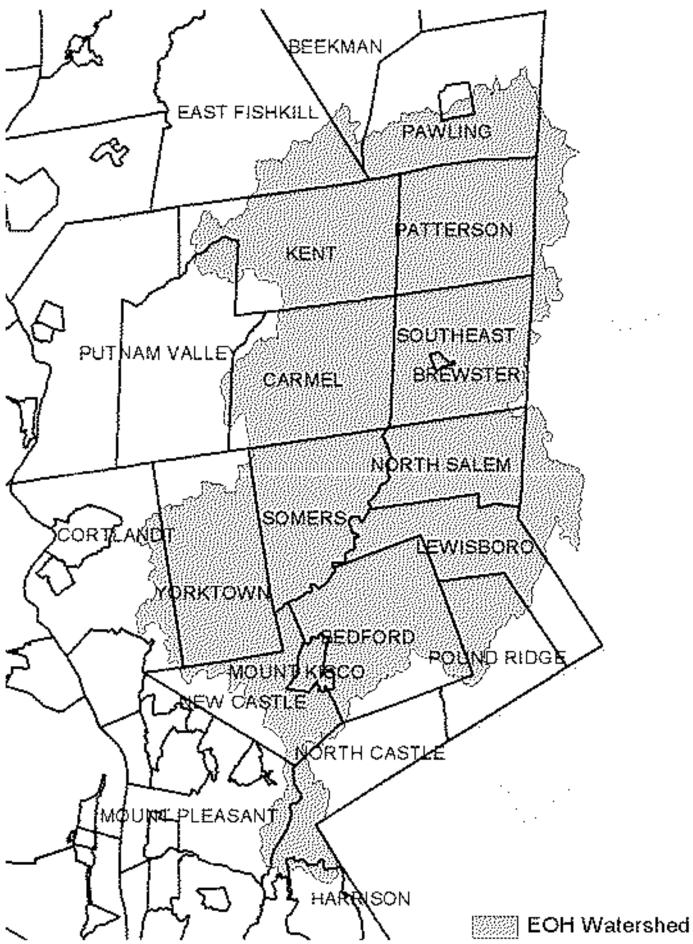


Figure 2 - Onondaga Lake Watershed

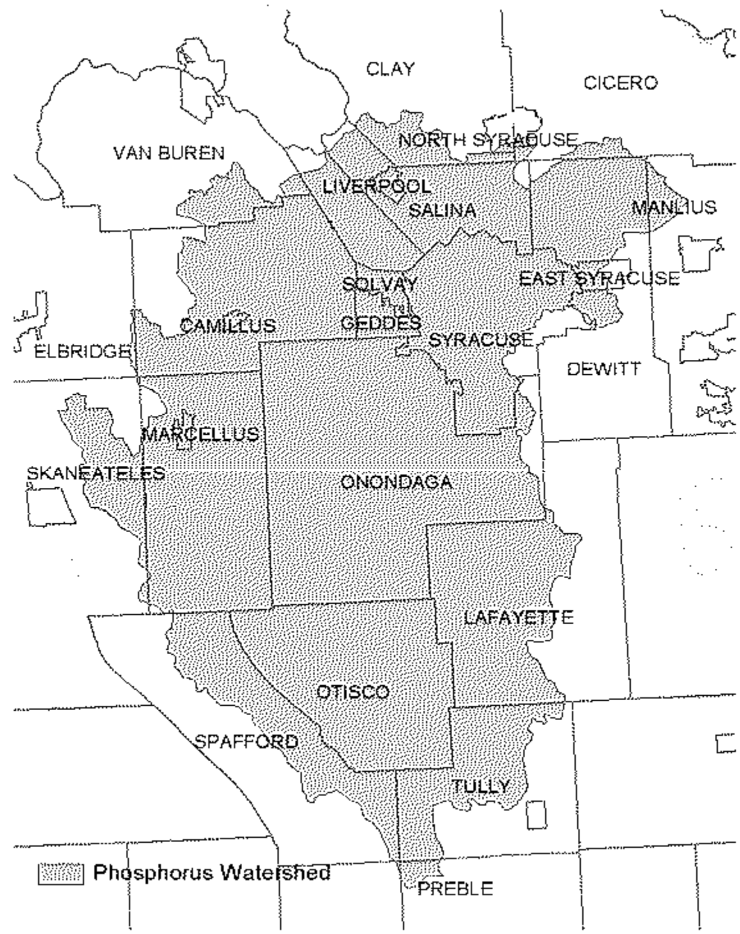


Figure 3 - Greenwood Lake Watershed

Figure 4 - Oscawana Lake Watershed

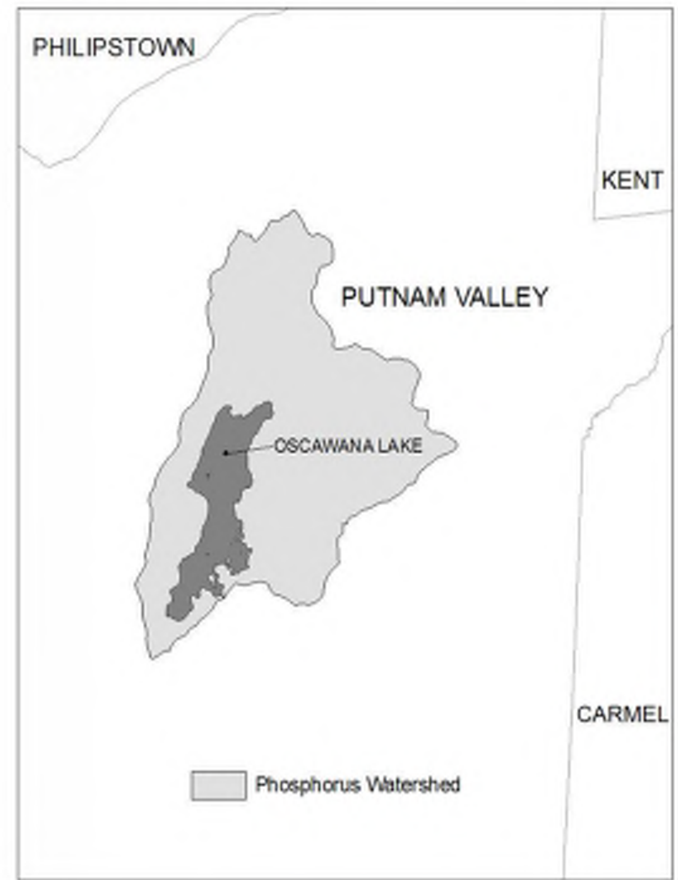
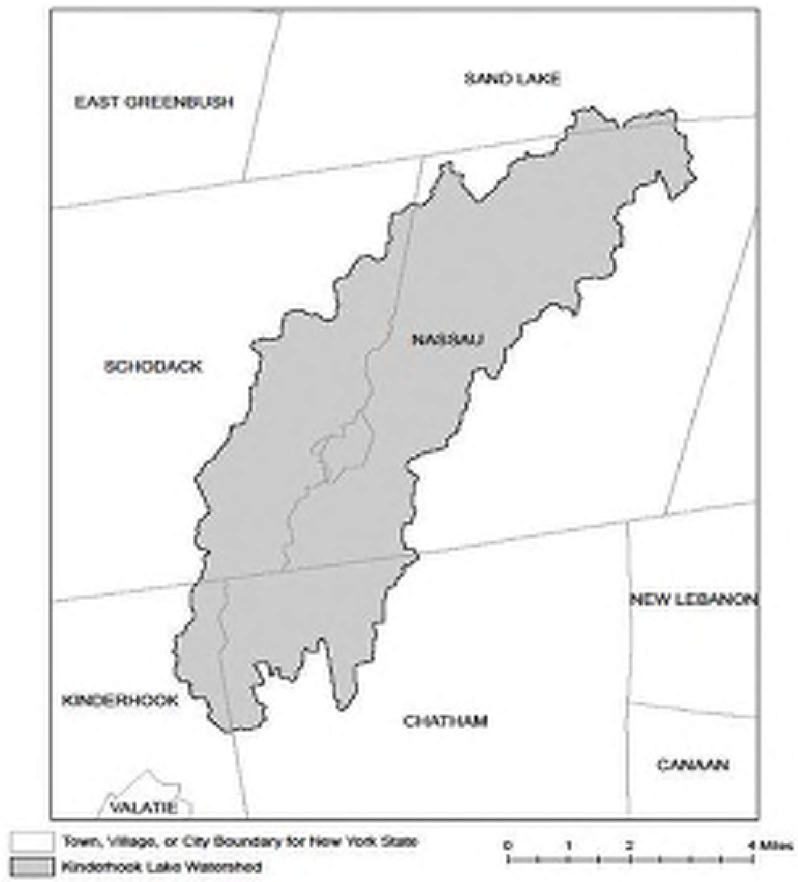


Figure 5 - Kinderhook Lake Watershed



APPENDIX D – Impaired Waterbodies (by Construction Related Pollutants)

List of waterbodies impaired by *pollutants* related to *construction activity*, including turbidity, silt/sediment, and nutrients (e.g. nitrogen, phosphorus). This list is a subset of "The Final New York State 2018 Section 303(d) List of Impaired Waters Requiring a TMDL" dated June 2020.

County	Waterbody	Pollutant
Albany	Ann Lee (Shakers) Pond, Stump Pond (1201-0096)	Phosphorus
Albany	Lawsons Lake (1301-0235)	Phosphorus
Allegany	Amity Lake, Saunders Pond (0403-0054)	Phosphorus
Allegany	Andover Pond (0403-0056)	Phosphorus
Bronx	Reservoir No.1/Lake Isle (1702-0075)	Phosphorus
Bronx	Van Cortlandt Lake (1702-0008)	Phosphorus
Broome	Blueberry, Laurel Lakes (1404-0033)	Phosphorus
Broome	Fly Pond, Deer Lake (1404-0038)	Phosphorus
Broome	Minor Tribs to Lower Susquehanna (0603-0044)	Phosphorus
Broome	Whitney Point Lake/Reservoir (0602-0004)	Phosphorus
Cattaraugus	Allegheny River/Reservoir (0201-0023)	Phosphorus
Cattaraugus	Beaver Lake/Alma Pond (0201-0073)	Phosphorus
Cattaraugus	Case Lake (0201-0020)	Phosphorus
Cattaraugus	Linlyco/Club Pond (0201-0035)	Phosphorus
Cayuga	Duck Lake (0704-0025)	Phosphorus
Cayuga	Owasco Inlet, Upper, and tribs (0706-0014)	Nutrients
Chautauqua	Chadakoin River and tribs (0202-0018)	Phosphorus
Chautauqua	Hulburt/Clymer Pond (0202-0079)	Phosphorus
Chautauqua	Middle Cassadaga Lake (0202-0002)	Phosphorus
Clinton	Great Chazy River, Lower, Main Stem (1002-0001)	Silt/Sediment
Columbia	Robinson Pond (1308-0003)	Phosphorus
Cortland	Dean Pond (0602-0077)	Phosphorus
Dutchess	Fallkill Creek (1301-0087)	Phosphorus
Dutchess	Hillside Lake (1304-0001)	Phosphorus
Dutchess	Wappingers Lake (1305-0001)	Phosphorus
Dutchess	Wappingers Lake (1305-0001)	Silt/Sediment
Erie	Beeman Creek and tribs (0102-0030)	Phosphorus
Erie	Delaware Park Pond (0101-0026)	Phosphorus
Erie	Ellicott Creek, Lower, and tribs (0102-0018)	Phosphorus
Erie	Ellicott Creek, Lower, and tribs (0102-0018)	Silt/Sediment
Erie	Green Lake (0101-0038)	Phosphorus
Erie	Little Sister Creek, Lower, and tribs (0104-0045)	Phosphorus
Erie	Murder Creek, Lower, and tribs (0102-0031)	Phosphorus

Erie	Rush Creek and tribs (0104-0018)	Phosphorus
Erie	Scajaquada Creek, Lower, and tribs (0101-0023)	Phosphorus
Erie	Scajaquada Creek, Middle, and tribs (0101-0033)	Phosphorus
Erie	Scajaquada Creek, Upper, and tribs (0101-0034)	Phosphorus
Erie	South Branch Smoke Cr, Lower, and tribs (0101-0036)	Phosphorus
Erie	South Branch Smoke Cr, Lower, and tribs (0101-0036)	Silt/Sediment
Genesee	Bigelow Creek and tribs (0402-0016)	Phosphorus
Genesee	Black Creek, Middle, and minor tribs (0402 0028)	Phosphorus
Genesee	Black Creek, Upper, and minor tribs (0402-0048)	Phosphorus
Genesee	Bowen Brook and tribs (0102-0036)	Phosphorus
Genesee	LeRoy Reservoir (0402-0003)	Phosphorus
Genesee	Mill Pond (0402-0050)	Phosphorus
Genesee	Oak Orchard Cr, Upper, and tribs (0301-0014)	Phosphorus
Genesee	Oatka Creek, Middle, and minor tribs (0402-0031)	Phosphorus
Genessee	Tonawanda Cr, Middle, Main Stem (0102-0002)	Phosphorus
Greene	Schoharie Reservoir (1202-0012)	Silt/Sediment
Greene	Sleepy Hollow Lake (1301-0059)	Silt/Sediment
Herkimer	Steele Creek tribs (1201-0197)	Phosphorus
Herkimer	Steele Creek tribs (1201-0197)	Silt/Sediment
Kings	Hendrix Creek (1701-0006) 18	Nitrogen
Kings	Prospect Park Lake (1701-0196)	Phosphorus
Lewis	Mill Creek/South Branch, and tribs (0801-0200)	Nutrients
Livingston	Christie Creek and tribs (0402-0060)	Phosphorus
Livingston	Conesus Lake (0402-0004)	Phosphorus
Livingston	Mill Creek and minor tribs (0404-0011)	Silt/Sediment
Monroe	Black Creek, Lower, and minor tribs (0402-0033)	Phosphorus
Monroe	Buck Pond (0301-0017)	Phosphorus
Monroe	Cranberry Pond (0301-0016)	Phosphorus
Monroe	Durand, Eastman Lakes (0302-0037)	Phosphorus
Monroe	Lake Ontario Shoreline, Western (0301-0069) 9	Phosphorus
Monroe	Long Pond (0301-0015)	Phosphorus
Monroe	Mill Creek and tribs (0302-0025)	Phosphorus 2
Monroe	Mill Creek/Blue Pond Outlet and tribs (0402-0049)	Phosphorus
Monroe	Minor Tribs to Irondequoit Bay (0302-0038)	Phosphorus
Monroe	Rochester Embayment - East (0302-0002) [9]	Phosphorus
Monroe	Rochester Embayment - West (0301-0068) 9	Phosphorus
Monroe	Shipbuilders Creek and tribs (0302-0026)	Phosphorus 2
Monroe	Thomas Creek/White Brook and tribs (0302-0023)	Phosphorus

Nassau	Bannister Creek/Bay (1701-0380)	Nitrogen
Nassau	Beaver Lake (1702-0152)	Phosphorus
Nassau	Browswere Bay (1701-0383)	Nitrogen
Nassau	Camaans Pond (1701-0052)	Phosphorus
Nassau	East Meadow Brook, Upper, and tribs (1701-0211)	Silt/Sediment
Nassau	East Rockaway Channel (1701-0381)	Nitrogen
Nassau	Glen Cove Creek, Lower, and tribs (1702-0146)	Silt/Sediment
Nassau	Grant Park Pond (1701-0054)	Phosphorus
Nassau	Hempstead Bay, Broad Channel (1701-0032)	Nitrogen
Nassau	Hempstead Lake (1701-0015)	Phosphorus
Nassau	Hewlett Bay (1701-0382)	Nitrogen
Nassau	Hog Island Channel (1701-0220)	Nitrogen
Nassau	Massapequa Creek, Upper, and tribs (1701-0174)	Phosphorus
Nassau	Milburn/Parsonage Creeks, Upp, and tribs (1701-0212)	Phosphorus
Nassau	Reynolds Channel, East (1701-0215) [12]	Nitrogen
Nassau	Reynolds Channel, West (1701-0216) 12	Nitrogen
Nassau	Tidal Tribs to Hempstead Bay (1701-0218)	Nitrogen
Nassau	Tribs (fresh) to East Bay (1701-0204)	Silt/Sediment
Nassau	Tribs (fresh) to East Bay (1701-0204)	Phosphorus
Nassau	Tribs to Smith Pond/Halls Pond (1701-0221)	Phosphorus
Nassau	Woodmere Channel (1701-0219)	Nitrogen
New York	Harlem Meer (1702-0103)	Phosphorus
New York	The Lake in Central Park (1702-0105)	Phosphorus
Niagara	Bergholtz Creek and tribs (0101-0004)	Phosphorus
Niagara	Hyde Park Lake (0101-0030)	Phosphorus
Niagara	Lake Ontario Shoreline, Western (0301-0053) 9	Phosphorus
Niagara	Lake Ontario Shoreline, Western (0301-0072) 9	Phosphorus
Oneida	Ballou, Nail Creeks (1201-0203)	Phosphorus
Onondaga	Ley Creek and tribs (0702-0001) 10	Nutrients (phosphorus)
Onondaga	Minor Tribs to Onondaga Lake (0702-0022) 10	Nutrients (phosphorus)
Onondaga	Minor Tribs to Onondaga Lake (0702-0022) 10	Nitrogen (NH3, NO2)
Onondaga	Onondaga Creek, Lower (0702-0023) 10	Nutrients (phosphorus)
Onondaga	Onondaga Creek, Lower, and tribs (0702-0023)	Turbidity
Onondaga	Onondaga Creek, Middle, and tribs (0702-0004)	Turbidity
Onondaga	Onondaga Creek, Upper, and tribs (0702-0024)	Turbidity
Ontario	Great Brook and minor tribs (0704-0034)	Phosphorus 2
Ontario	Great Brook and minor tribs (0704-0034)	Silt/Sediment

Ontario	Hemlock Lake Outlet and minor tribs (0402-0013)	Phosphorus
Ontario	Honeoye Lake (0402-0032)	Phosphorus
Orange	Brown Pond Reservoir (1303-0013)	Phosphorus
Orange	Lake Washington (1303-0012)	Phosphorus
Orange	Minor Tribs to Middle Wallkill (1306-0061)	Phosphorus
Orange	Monhagen Brook and tribs (1306-0074)	Phosphorus
Orange	Orange Lake (1301-0008) [16]	Phosphorus
Orange	Quaker Creek and tribs (1306-0025)	Phosphorus
Orange	Wallkill River, Middle, Main Stem (1306-0038)	Phosphorus
Orange	Wallkill River, Upper, and Minor tribs (1306-0017)	Phosphorus
Orleans	Glenvwood Lake (0301-0041)	Phosphorus
Orleans	Lake Ontario Shoreline, Western (0301-0070) 9	Phosphorus
Orleans	Lake Ontario Shoreline, Western (0301-0071) 9	Phosphorus
Oswego	Lake Neatahwanta (0701-0018)	Nutrients (phosphorus)
Oswego	Pleasant Lake (0703-0047)	Phosphorus
Putnam	Lost Lake, Putnam Lake (1302-0053)	Phosphorus
Putnam	Minor Tribs to Croton Falls Reservoir (1302-0001)	Phosphorus
Queens	Bergen Basin (1701-0009) 18	Nitrogen
Queens	Jamaica Bay, Eastern, and tribs, Queens (1701-0005) 18	Nitrogen
Queens	Kissena Lake (1702-0258)	Phosphorus
Queens	Meadow Lake (1702-0030)	Phosphorus
Queens	Shellbank Basin (1701-0001) 18	Nitrogen
Queens	Willow Lake (1702-0031)	Phosphorus
Rensselaer	Nassau Lake (1310-0001)	Phosphorus
Rensselaer	Snyders Lake (1301-0043)	Phosphorus
Richmond	Grassmere Lake/Bradys Pond (1701-0357)	Phosphorus
Rockland	Congers Lake, Swartout Lake (1501-0019)	Phosphorus
Rockland	Rockland Lake (1501-0021)	Phosphorus
Saratoga	Ballston Lake (1101-0036)	Phosphorus
Saratoga	Dwaas Kill and tribs (1101-0007)	Phosphorus
Saratoga	Dwaas Kill and tribs (1101-0007)	Silt/Sediment
Saratoga	Lake Lonely (1101-0034)	Phosphorus
Saratoga	Round Lake (1101-0060)	Phosphorus
Saratoga	Tribs to Lake Lonely (1101-0001)	Phosphorus
Schenectady	Collins Lake (1201-0077)	Phosphorus
Schenectady	Duane Lake (1311-0006)	Phosphorus
Schenectady Lake	Mariaville Lake (1201-0113)	Phosphorus
Schuyler	Cayuta Lake (0603-0005)	Phosphorus

Seneca	Reeder Creek and tribs (0705-0074)	Phosphorus
St.Lawrence	Black Lake Outlet, Black Lake (0906-0001)	Phosphorus
St.Lawrence	Fish Creek and minor tribs (0906-0026)	Phosphorus
Steuben	Smith Pond (0502-0012)	Phosphorus
Suffolk	Agawam Lake (1701-0117)	Phosphorus
Suffolk	Big/Little Fresh Ponds (1701-0125)	Phosphorus
Suffolk	Canaan Lake (1701-0018)	Phosphorus
Suffolk	Canaan Lake (1701-0018)	Silt/Sediment
Suffolk	Fresh Pond (1701-0241)	Phosphorus
Suffolk	Great South Bay, East (1701-0039)	Nitrogen
Suffolk	Great South Bay, Middle (1701-0040)	Nitrogen
Suffolk	Great South Bay, West (1701-0173)	Nitrogen
Suffolk	Lake Ronkonkoma (1701-0020)	Phosphorus
Suffolk	Mattituck/Marratooka Pond (1701-0129)	Phosphorus
Suffolk	Mill and Seven Ponds (1701-0113)	Phosphorus
Suffolk	Millers Pond (1702-0013)	Phosphorus
Suffolk	Moriches Bay, East (1701-0305)	Nitrogen
Suffolk	Moriches Bay, West (1701-0038)	Nitrogen
Suffolk	Quantuck Bay (1701-0042)	Nitrogen
Suffolk	Shinnecock Bay and Inlet (1701-0033)	Nitrogen
Suffolk	Tidal Tribs to West Moriches Bay (1701-0312)	Nitrogen
Sullivan	Bodine, Mongomery Lakes (1401-0091)	Phosphorus
Sullivan	Davies Lake (1402-0047)	Phosphorus
Sullivan	Evens Lake (1402-0004)	Phosphorus
Sullivan	Pleasure Lake (1402-0055)	Phosphorus
Sullivan	Swan Lake (1401-0063)	Phosphorus
Tompkins	Cayuga Lake, Southern End (0705-0040)	Phosphorus
Tompkins	Cayuga Lake, Southern End (0705-0040)	Silt/Sediment
Ulster	Ashokan Reservoir (1307-0004)	Silt/Sediment
Ulster	Esopus Creek, Lower, Main Stem (1307-0010) [17]	Turbidity
Ulster	Esopus Creek, Middle, Main Stem (1307-0003) 17	Turbidity
Ulster	Esopus Creek, Upper, and minor tribs (1307-0007)[3]	Silt/Sediment
Ulster	Wallkill River, Lower, Main Stem (1306-0027)	Phosphorus
Warren	Hague Brook and tribs (1006-0006)	Silt/Sediment
Warren	Huddle/Finkle Brooks and tribs (1006-0003)	Silt/Sediment
Warren	Indian Brook and tribs (1006-0002)	Silt/Sediment
Warren	Lake George (1006-0016) and tribs	Silt/Sediment
Warren	Tribs to Lake George, East Shore (1006-0020)	Silt/Sediment
Warren	Tribs to Lake George, Lk.George Village (1006-0008)	Silt/Sediment

Washington	Wood Cr/Champlain Canal and tribs (1005-0036)	Phosphorus
Westchester	Lake Katonah (1302-0136)	Phosphorus
Westchester	Lake Lincolndale (1302-0089)	Phosphorus
Westchester	Lake Meahagh (1301-0053)	Phosphorus
Westchester	Lake Mohegan (1301-0149)	Phosphorus
Westchester	Lake Shenorock (1302-0083)	Phosphorus
Westchester	Mamaroneck River, Lower (1702-0071)	Silt/Sediment
Westchester	Mamaroneck River, Upp, & minor tribs (1702-0123)	Silt/Sediment
Westchester	Saw Mill River (1301-0007)	Phosphorus
Westchester	Saw Mill River, Middle, and tribs (1301-0100)	Phosphorus
Westchester	Sheldrake River (1702-0069)	Phosphorus
Westchester	Sheldrake River (1702-0069)	Silt/Sedimnt
Westchester	Silver Lake (1702-0040)	Phosphorus
Westchester	Teatown Lake (1302-0150)	Phosphorus
Westchester	Truesdale Lake (1302-0054)	Phosphorus
Westchester	Wallace Pond (1301-0140)	Phosphorus

APPENDIX E – List of NYSDEC Regional Offices

Region	Covering the following counties:	Division of Environmental Permits (DEP) Permit Administrators	Division of Water (DOW) Water (SPDES) Program
1	Nassau and Suffolk	50 Circle Road Stony Brook, NY 11790 Tel. (631) 444-0365	50 Circle Road Stony Brook, NY 11790-3409 Tel. (631) 444-0405
2	Bronx, Kings, New York, Queens and Richmond	1 Hunters Point Plaza, 47-40 21st St. Long Island City, NY 11101-5407 Tel. (718) 482-4997	1 Hunters Point Plaza, 47-40 21st St. Long Island City, NY 11101-5407 Tel. (718) 482-4933
3	Dutchess, Orange, Putnam, Rockland, Sullivan, Ulster and Westchester	21 South Putt Corners Road New Paltz, NY 12561-1696 Tel. (845) 256-3059	220 White Plains Road, Suite 110 Tel. (914) 428 - 2505
4	Albany, Columbia, Delaware, Greene, Montgomery, Otsego, Rensselaer, Schenectady and Schoharie	1130 North Westcott Road Schenectady, NY 12306-2014 Tel. (518) 357-2069	1130 North Westcott Road Schenectady, NY 12306-2014 Tel. (518) 357-2045
5	Clinton, Essex, Franklin, Fulton, Hamilton, Saratoga, Warren and Washington	1115 State Route 86, Po Box 296 Ray Brook, NY 12977-0296 Tel. (518) 897-1234	232 Golf Course Road Warrensburg, NY 12885-1172 Tel. (518) 623-1200
6	HERKIMER, JEFFERSON, LEWIS, ONEIDA AND ST. LAWRENCE	STATE OFFICE BUILDING 317 WASHINGTON STREET WATERTOWN, NY 13601-3787 TEL. (315) 785-2245	STATE OFFICE BUILDING 207 GENESEE STREET UTICA, NY 13501-2885 TEL. (315) 793-2554
7	BROOME, CAYUGA, CHENANGO, CORTLAND, MADISON, ONONDAGA, OSWEGO, TIOGA AND TOMPKINS	5786 WIDEWATERS PARKWAY SYRACUSE, NY 13214-1867 TEL. (315) 426-7438	5786 WIDEWATERS PARKWAY SYRACUSE, NY 13214-1867 TEL. (315) 426-7500
8	CHEMUNG, GENESEE, LIVINGSTON, MONROE, ONTARIO, ORLEANS, SCHUYLER, SENECA, STEUBEN, WAYNE AND YATES	6274 EAST AVON-LIMA ROADAVON, NY 14414-9519 TEL. (585) 226-2466	6274 EAST AVON-LIMA RD. AVON, NY 14414-9519 TEL. (585) 226-2466
9	ALLEGANY, CATTARAUGUS, CHAUTAUQUA, ERIE, NIAGARA AND WYOMING	700 DELAWARE AVENUE BUFFALO, NY 14209-2999 TEL. (716) 851-7165	700 DELAWARE AVENUE BUFFALO, NY 14209-2999 TEL. (716) 851-7070

APPENDIX F – SWPPP Preparer Certification Form

The SWPPP Preparer Certification Form required by this permit begins on the following page.

New York State Department of Environmental Conservation

SWPPP Preparer Certification Form

SPDES General Permit for Stormwater Discharges from Construction Activity, GP-0-25-001 (CGP)

(In accordance with CGP Part I.D.2.b., the completed form must be attached to the eNOI and submitted to NYSDEC electronically.)

Project/Site Name: ____________

eNOI Submission ID: ____________

Owner/Operator Name: ____________

Certification Statement – SWPPP Preparer

I hereby certify that the Stormwater Pollution Prevention Plan (SWPPP) has been prepared in accordance with the requirements of GP-0-25-001. I certify under penalty of law that the SWPPP and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

SWPPP Preparer First Name	MI	SWPPP Preparer Last Name

Signature　　　　　　　　Date

APPENDIX G – MS4 SWPPP Acceptance Form

The MS4 SWPPP Acceptance Form required by this permit begins on the following page.

NEW YORK STATE | Department of Environmental Conservation

MS4 SWPPP Acceptance Form

for construction activities seeking authorization under the

SPDES General Permit for Stormwater Discharges from Construction Activity, GP-0-25-001 (CGP)

(In accordance with CGP Part I.D.2.b., the completed form must be attached to the eNOI and submitted to NYSDEC electronically.)

I. Project Owner/Operator Information
1. Owner/Operator Name:
2. Contact Person:
3. Street Address:
4. City/State/Zip:
II. Project Site Information
5. Project/Site Name:
6. Street Address:
7. City/State/Zip:
III. Stormwater Pollution Prevention Plan (SWPPP) Review and Acceptance Information
8. SWPPP Reviewed by:
9. Title/Position:
10. Date Final SWPPP Reviewed and Accepted:
IV. Regulated MS4 Information
11. Name of MS4 Operator:
12. MS4 SPDES Permit Identification Number: NYR20A
13. Street Address:
14. City/State/Zip:
15. Telephone Number:

MS4 SWPPP Acceptance Form - continued
V. Certification Statement - MS4 Official (principal executive officer or ranking elected official) or Duly Authorized Representative
I hereby certify that the final Stormwater Pollution Prevention Plan (SWPPP) for the construction project identified in section II. of this form has been reviewed and meets the substantive requirements in the SPDES General Permit for Stormwater Discharges from Construction Activity, GP-0-25-001 (CGP). Note: The MS4 Operator, through the acceptance of the SWPPP, assumes no responsibility for the accuracy and adequacy of the design included in the SWPPP. In addition, review and acceptance of the SWPPP by the MS4 Operator does not relieve the owner/operator or their SWPPP preparer of responsibility or liability for errors or omissions in the plan.
Printed Name[1]:
Title/Position:
Signature:
Date:
VI. Additional Information

[1] Printed name of the principal executive officer or ranking elected official for the MS4 Operator or their duly authorized representative in accordance with CGP Part VII.J.2.

APPENDIX H – NYCDEP SWPPP Acceptance/Approval Form

The City of New York Department of Environmental Protection (NYCDEP) SWPPP Acceptance/Approval form required by this permit begins on the following page.

THE CITY OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL PROTECTION
Bureau of Environmental Planning and Analysis
59-17 Junction Blvd., 9th Floor; Flushing, NY 11373

SWPPP Acceptance/Approval

Application Number:

I. Project Owner/Operator Information
1. Owner/Operator Name:
2. Contact Person:
3. Street Address:
4. City/State/Zip:
II. Project Site Information
5. Project/Site Name:
6. Street Address:
7. City/State/Zip:
III. Stormwater Pollution Prevention Plan (SWPPP) Review and Acceptance/Approval
8. SWPPP Reviewed by:
9. Title/Position: /
10. Date Final SWPPP Reviewed and Accepted:
11. Acceptance/Approval Expiration Date:
IV. Regulated MS4 Information for projects that require coverage under the NY State Pollution Discharge Elimination System General Permit for Stormwater Discharges from Construction Activity
12. Name of MS4: *CITY OF NEW YORK*
13. MS4 SPDES Permit Identification Number: *NY-0287890*
14. Contact Person:
15. Street Address: *59-17 Junction Blvd. 9th Floor*
16. City/State/Zip: *Flushing, NY 11373*
17. Telephone Number:

Department of Environmental Conservation

Projects in the MS4 area must submit a copy of this SWPPP Acceptance with a Notice of Intent for coverage under the NY SPDES General Permit for Stormwater Discharges from Construction Activity to: NYS Department of Environmental Conservation, Division of Water; 625 Broadway, 4th Floor; Albany, New York 12233-3505.

THE CITY OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL PROTECTION
Bureau of Environmental Planning and Analysis
59-17 Junction Blvd., 9th Floor; Flushing, NY 11373

V. Certification Statement - MS4 Official (principal executive officer or ranking elected official) or Duly Authorized Representative
I hereby certify that the final Stormwater Pollution Prevention Plan (SWPPP) for the construction project identified in question 5 has been reviewed and meets the substantive requirements in the SPDES General Permit For Stormwater Discharges from Municipal Separate Storm Sewer Systems (MS4s). Note: The MS4, through the acceptance of the SWPPP, assumes no responsibility for the accuracy and adequacy of the design included in the SWPPP. In addition, review and acceptance of the SWPPP by the MS4 does not relieve the owner/operator or their SWPPP preparer of responsibility or liability for errors or omissions in the plan.
Printed Name:
Title/Position:
Signature:
Date:
VI. Conditions of Acceptance/Approval and Additional Information

Department of Environmental Conservation

Projects in the MS4 area must submit a copy of this SWPPP Acceptance with a Notice of Intent for coverage under the NY SPDES General Permit for Stormwater Discharges from Construction Activity to: NYS Department of Environmental Conservation, Division of Water; 625 Broadway, 4th Floor; Albany, New York 12233-3505.

APPENDIX I – MS4 No Jurisdiction Form

The MS4 No Jurisdiction Form required by this permit begins on the following page.

NEW YORK STATE | Department of Environmental Conservation

MS4 No Jurisdiction Form

for construction activities seeking authorization under the

SPDES General Permit for Stormwater Discharges from Construction Activity, GP-0-25-001 (CGP)

(In accordance with CGP Part I.D.2.b., the completed form must be attached to the eNOI and submitted to NYSDEC electronically.)

I. Project Owner/Operator Information

a. Owner/Operator Name:

b. Contact Person:

c. Street Address:

d. City/State/Zip:

II. Project Site Information

a. Project/Site Name:

b. Street Address:

c. City/State/Zip:

d. eNOI Submission ID:

III. Traditional Land Use Control MS4 Operator Information

a. Name of MS4 Operator:

b. MS4 SPDES Permit ID Number: NYR20A

c. Street Address:

d. City/State/Zip:

e. Telephone Number:

IV. Certification Statement

In accordance with CGP Part I.D.2.b.ii.3., I hereby certify that the Traditional Land Use Control MS4 Operator identified in section III. of this form does not have review authority over the construction project identified in section II. of this form, which is owned/operated by the entity identified in section I. of this form. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

a. Printed name of the principal executive officer or ranking elected official for the MS4 Operator or their duly authorized representative in accordance with CGP Part VII.J.2.:

b. Title/Position:

c. Signature:

d. Date:

APPENDIX J – Owner/Operator Certification Form

The Owner/Operator Certification Form required by this permit begins on the following page.

Owner/Operator Certification Form

SPDES General Permit for Stormwater Discharges from Construction Activity, GP-0-25-001 (CGP)

(In accordance with CGP Part I.D.2.b. or Part I.F.2. and 3., the completed form must be attached to the eNOI or the Request to Continue Coverage, and submitted to NYSDEC electronically.

Project/Site Name: ______________________________

eNOI Submission ID: ______________________________

eNOI Submitted by: ☐ **Owner/Operator** ☐ **SWPPP Preparer** ☐ **Other**

Certification Statement - Owner/Operator

I hereby certify that I read, and will comply with, the GP-0-25-001 permit requirements. I understand that authorization to discharge under the permit for the project/site named above is dependent on receipt of a Letter of Authorization (LOA) or a Letter of Continued Coverage (LOCC) from the New York State Department of Environmental Conservation (NYSDEC) in accordance with CGP Part I.D.3.b. or Part I.F.4. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Owner/Operator First Name MI Owner/Operator Last Name

____
Signature

____
Date

Revised: January 2025