STORMWATER POLLUTION PREVENTION PLAN

for

Commercial Development
547 East Genesee Street
Village of Fayetteville, Onondaga County, NY

Prepared for:

Millstone Development Group, LLC.
125 High Rock Avenue
Saratoga Springs, NY 12866

Prepared by

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SECTION I. SCOPE

A. PURPOSE

Napierala Consulting, Professional Engineer, P.C., has prepared this Stormwater Pollution Prevention Plan (SWPPP) in compliance with the New York State Department of Environmental Conservation (NYSDEC) State Pollutant Discharge Elimination System (SPDES) General Permit for Stormwater Discharges from Construction Activity. The contractor's participation and adherence to this plan is mandatory. Non-compliance with the plan is subject to various remedies including, without limitation, monetary set-offs, withholding payments; reimbursement for costs, expenses (including reasonable attorney's fees), fines, and civil penalties incurred; and/or liquidated damages. This section provides a descriptive explanation of the Stormwater Pollution Prevention Plan and required contractor participation.

B. SPDES GENERAL PERMIT (GP-0-20-001)

The New York State Department of Environmental Conservation enacted regulations that require permitting for the discharge of stormwater from construction activities on sites where an area of one acre or more of soil disturbance is proposed. In order to comply with these regulations, the developer of the site must request coverage under the NYSDEC SPDES General Permit for Stormwater Discharges from Construction Activity (GP-0-20-001). In order to obtain coverage under the General Permit, a SWPPP for the site must be prepared following the requirements of the New York State Standards and Specifications for Erosion and Sediment Control and the New York State Stormwater Management Design Manual.

The NOI, the SWPPP, and any amendments to the SWPPP, as well as any reports required by the SPDES General Permit for Stormwater Discharges from Construction Activity, must also be submitted concurrently to the local governing body, if required, and any other authorized agency having jurisdiction or regulatory control over the construction project.

C. RESPONSIBILITIES OF THE OWNER

The owner/operator shall 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. The owner/operator shall identify the contractor(s) and subcontractor(s) that will be responsible for constructing the post-construction stormwater management practices included in the SWPPP. The owner/operator shall have each of the contractors and subcontractors identify at least one person from their company that will be responsible for implementation of the SWPPP. The owner/operator shall ensure that at least one trained contractor is on site on a daily basis when soil disturbance activities are being performed. The owner/operator shall have a qualified inspector conduct site inspections.

D. RESPONSIBILITIES OF THE CONTRACTOR

The contractor shall manage the discharge of stormwater from the site in accordance with the NYSDEC SPDES General Permit for Stormwater Discharges from Construction Activity. The contractor shall be responsible for installing and maintaining the stormwater management practices in accordance with the permit. The contractor is responsible for having at least one person onsite during construction activity that has taken the DEC erosion and sediment control class. The owner/operator and contractor shall be responsible for any enforcement action federal, state, or local agencies take or impose, including the cost of fines, construction delays, and remedial actions resulting from the contractor's failure to comply with the permit provisions. ***It shall be the responsibility of the contractor to make any changes to the SWPPP necessary when the contractor or any of his subcontractors elects to use borrow, fill or material storage sites, either contiguous to or remote from the construction site, when such sites are used solely for this construction project.*** Such sites are considered to be part of the construction site that the permit and this SWPPP cover. Off-site borrow, fill, or material storage sites which are used for multiple construction projects are not subject to this requirement, unless state or local regulations specifically require that the SWPPP include such sites. The contractor should consider this requirement in negotiating with earthwork subcontractors since the choice of an off-site borrow, fill, or material storage site may impact their duty to implement, makes changes to, and perform inspections the SWPPP for the site requires.

The SWPPP provides forms for both the general contractor and subcontractor(s) that indentify the company name, business address and telephone number along with the responsible person for the contractor and all subcontractors who will implement the measures identified in the SWPPP. **The general contractor shall sign the "General Contractor's Certification" and all subcontractors shall sign the "Subcontractor's Certification"**, verifying they have been instructed on how to comply with and fully understand the requirements of the NYSDEC and SWPPP. **A fully qualified individual on behalf of each entity must sign this certification prior to the beginning of any construction activities and the certification shall be filed in the project's SWPPP.**

The SWPPP is meant to be a working document that shall be maintained at the site of the construction activities at all times throughout the project, shall be readily available upon the operator's personnel, NYSDEC or any other agency with regulatory authority over stormwater issues requests to review the SWPPP, and shall be kept on-site until the site complies with the Final Stabilization section of this document. **A sign or other notice must be posted near the main entrance of the construction site which contains a completed NOI, the location of the SWPPP and the name and phone number of a contact person responsible for scheduling SWPPP viewing times, and any other state specific requirements.**

E. NOTICE OF INTENT

The operator will [has] petition[ed] the NYSDEC for the stormwater discharges during construction at this site to be covered by the NYSDEC SPDES General Permit for Stormwater Discharges from Construction Activity. The owner/operator will be filing [has filed] a **Notice of Intent** (NOI) to be covered under this permit. The signatory on the NOI must sign all documents (i.e., inspection reports) associated with the SWPPP. If the signatory chooses not to sign all documents, he/she must designate a duly authorized representative to sign all relevant documents. This designation must be made in writing and be included in the SWPPP. The duly authorized representative may be either a named individual or any individual occupying a named position. Additionally, the written designation must be submitted to the NYSDEC.

F. STORMWATER INSPECTIONS

1. Inspection Procedures

Inspections of the erosion control practices are required on a routine basis. A qualified professional shall perform these inspections once a week for land disturbances of up to 5 acres, and twice a week for disturbances of greater than five (5) acres of land. The two (2) inspections per week shall be separated by a minimum of two (2) full calendar days. All inspections will continue until the site complies with the final stabilization section of this document. "Qualified Professional" means a person knowledgeable in the principles and practices of erosion and sediment controls, such as a licensed Professional Engineer (PE), Certified Professional in Erosion and Sediment Control (CPESC), or soil scientist. A report documenting the inspector's findings shall follow the inspection; the report shall document the required maintenance and/or repair for the erosion and sedimentation control measures. It is imperative that the contractor documents the inspection and maintenance of all erosion and sedimentation control measures as soon as possible after the inspection and/or maintenance have been completed. These records are used to prove that the required inspection and maintenance were performed. The records shall be placed in the SWPPP. In addition to inspection and maintenance reports, records should be kept of the construction activities that occur on the site. The operator shall post at the site, in a publicly-accessible location, a summary of the site inspection activities on a monthly basis.

2. Record Keeping

The operator shall also prepare a written summary of its status with respect to compliance with this general permit at a minimum frequency of every three months during which coverage under the NYSDEC SPDES General Permit for Stormwater Discharges from Construction Activity exists. The summary should address the status of achieving each component of the SWPPP. The reports shall be signed by the signatory of the NOI or a duly-authorized person and be retained at the construction site.

The contractor shall retain copies of the SWPPP, all reports and data for a minimum of five (5) years after the project. The following list identifies the required inspection and maintenance documentation that must be maintained by the contractor under this SWPPP:

- Inspection Report
- Stabilization Schedule
- Implementation Schedule Status Report
- Project Rainfall Log

G. SWPPP MODIFICATIONS

For construction activities that are subject to the requirements of a regulated, traditional land use control MS4, the owner or operator shall notify the regulated, traditional land use control MS4 in writing of any planned amendments or modifications to the post-construction stormwater management practice component of the SWPPP required by the General Permit. Unless otherwise notified by the regulated, traditional land use control MS4, the owner or operator shall have the SWPPP amendments or modifications reviewed and accepted by the MS4 prior to commencing construction of the post-construction stormwater management practice. The inspection reports should also identify if any revisions to the SWPPP are warranted due to unexpected conditions. The SWPPP is meant to be a dynamic working document that is to be kept current and amended whenever:

- The NYSDEC provides notification that the SWPPP does not comply with the minimum permit requirements.
- The design, construction, operation, or maintenance of the site changes in a way which significantly affects the potential for the discharge of pollutants or when the plan proves to be ineffective in eliminating or significantly minimized pollutant discharges.
- Within seven (7) calendar days of knowledge of a reportable release.

Any such changes to the SWPPP must be made in writing within seven (7) days of the date such modification or amendment is made. The contractor's failure to monitor or report deficiencies to the operator will result in the contractor being liable for fines and construction delays resulting from any federal, state, or local agency enforcement action.

H. FINAL STABILIZATION AND TERMINATION OF PERMIT COVERAGE

A site can be considered stabilized when all soil disturbing activities have been completed and a uniform perennial vegetative cover with a density of 80% over the unpaved areas and areas not covered by permanent structures has been established or equivalent permanent stabilization measures have been established and the facility no longer discharges stormwater associated with construction activities, and the operator(s) has filed a **Notice of Termination** (NOT) form with the NYSDEC. Prior to filing of the Notice of Termination, the operator shall have the qualified professional perform a final site inspection. The qualified professional shall certify that the site has undergone final stabilization using either vegetative or structural stabilization methods and that all temporary erosion and sediment controls (such as silt fence) not needed for long-term erosion control have been removed. The filing of the NOT terminates coverage under the General Permit and terminates the contractor's responsibility to implement the SWPPP, but the requirements of the SWPPP, including periodic inspections, must be continued until the NOT is filed. Upon achieving this milestone, the contractor shall also submit "Final Stabilization Certification/Termination Checklist". Final payment and/or the release of retainage will be withheld until all provisions of the SWPPP have been submitted, completed and accepted by the operator.

SECTION II. SITE DESCRIPTION

A. PROJECT NAME AND LOCATION

Mixed Commercial Development
547 East Genesee Street (Route 5)
Village of Fayetteville, Onondaga County, NY

UTM Coordinates from NYSDEC Interactive Map: E: 418541; N: 4764819

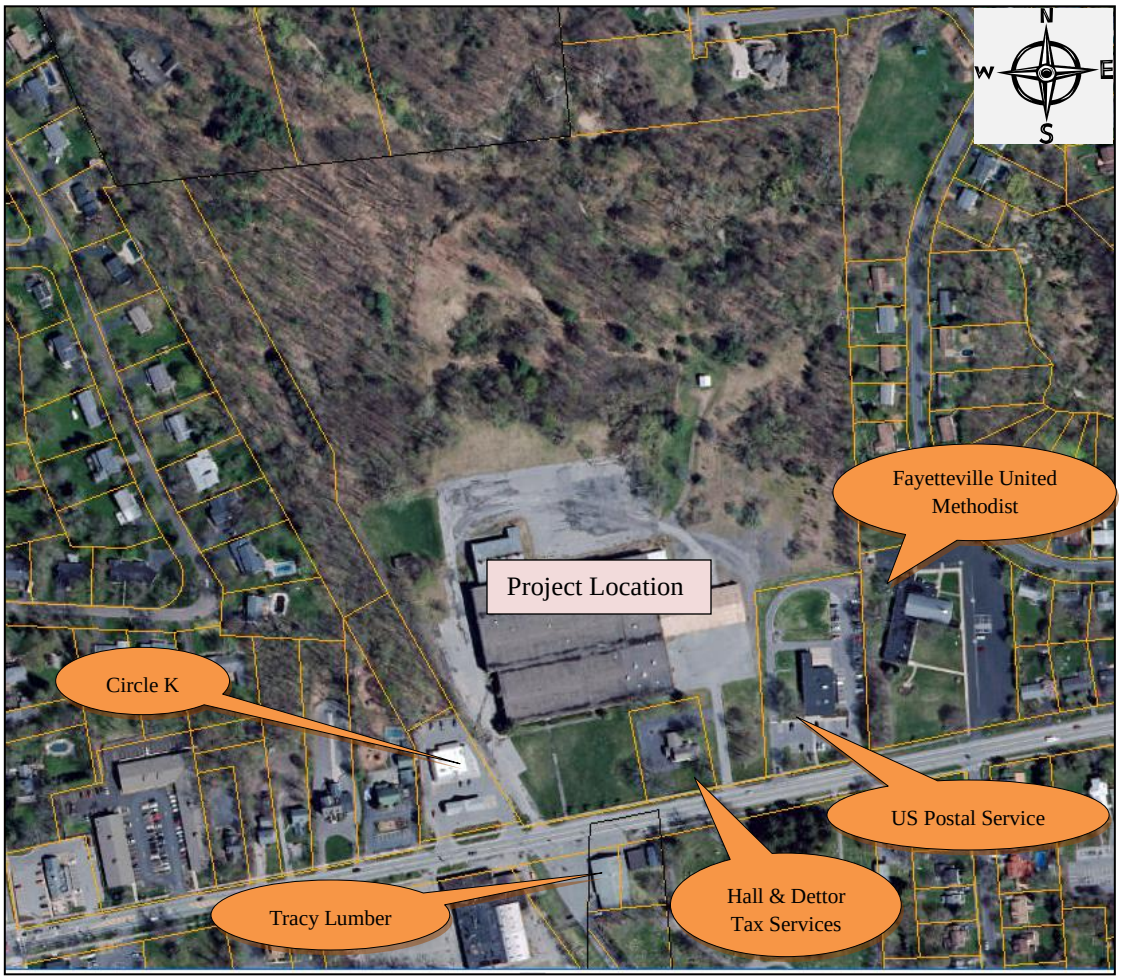


Figure 1: Project Location Map

The project is located on the north side of East Genesee Street (Route 5) approximately 0.25 miles east of the Manlius Street (Route 257) intersection.

B. OWNER/OPERATOR NAME AND ADDRESS

Millstone Development Group, LLC.
125 High Rock Avenue
Saratoga Springs, NY 12866
Contact: Devin Dal Pos
Phone: (518) 306-3747

C. PROJECT DESCRIPTION

The existing parcel of land is approximately 32.9 acres and is located in the eastern portion of the Village of Fayetteville on the north side of East Genesee Street (Route 5). The site is a vacant industrial property with an existing building having a footprint of approximately 137,000 square-feet. The subject site is a listed Hazardous Waste Cleanup site and for over 20 years has been under treatment to remove contaminants from the subsurface. As part of the development the owners are seeking Brownfield Cleanup Program (BCP) assistance to help facilitate the re-development of this contaminated and now abandoned property in the Village. As a part of this project, the existing building, asphalt, and concrete surfaces will be demolished, removed, and properly disposed of off-site.

The proposed re-development project consists of the construction of three new commercial buildings: (1) a 56,550 SF grocery store, (2) a 42,750 SF Memory Care Facility, and (3) a 3,500 SF commercial outparcel building. Each building will have site amenities including asphalt parking, concrete sidewalks, dumpster enclosures, utility connections, site lighting, landscaping, and required stormwater management facilities. Main access to the site will be via a shared access driveway/road off of East Genesee Street. The estimated total area to be disturbed will be about 15.5 acres. The existing impervious area to be disturbed is approximately 8.1 acres. The total impervious area proposed for the developed site is about 9.1 acres, giving an increase of about 1 acre of impervious area to the project site.

The project is located in Region 7 of the New York State Department of Environmental Conservation. The Village of Fayetteville, in which the project is situated, is a regulated MS4 (municipal separate storm sewer system).

D. RECEIVING WATERS

Runoff from the project site sheet flows to the rear of the site where Bishop Brook flows to the northwest across the northeastern corner of the subject property.

The NYS DEC Environmental Resource Mapper shows that no DEC-regulated wetlands are within the vicinity of the project site. The National Wetlands Inventory mapper shows that an Army Corps of Engineer's wetland is located in the rear of the site surrounding Bishop's Brook. The proposed development will have no impact on the stream or wetlands.

Figure 2: USFWS - NWI Wetlands Mapping

E. ENDANGERED OR THREATENED SPECIES

The NYSDEC Environmental Resource Mapper identifies the site as potentially containing rare plants, animals, and significant natural communities. The US Fish & Wildlife Service and the NYSDEC, based on the latest available information, has designated the Northern Long-eared bat as a federally-listed threatened species that has been documented within three miles of the project site. The main impact of concern is the cutting or removal of potential roost trees. In order to avoid disturbing roosting sites, any clearing/felling of trees will occur in the fall through late winter to avoid any possible disturbance.

The NY Natural Heritage Program has documented Maple-Basswood Rich Mesic Forest within 0.25 miles of the project site to the northeast. This natural forest community is considered significant from a statewide perspective and contains a core of old growth trees with good species diversity. The northeastern portion of the subject site will remain undeveloped and should therefore not disturb and buffer trees to this documented forest community.

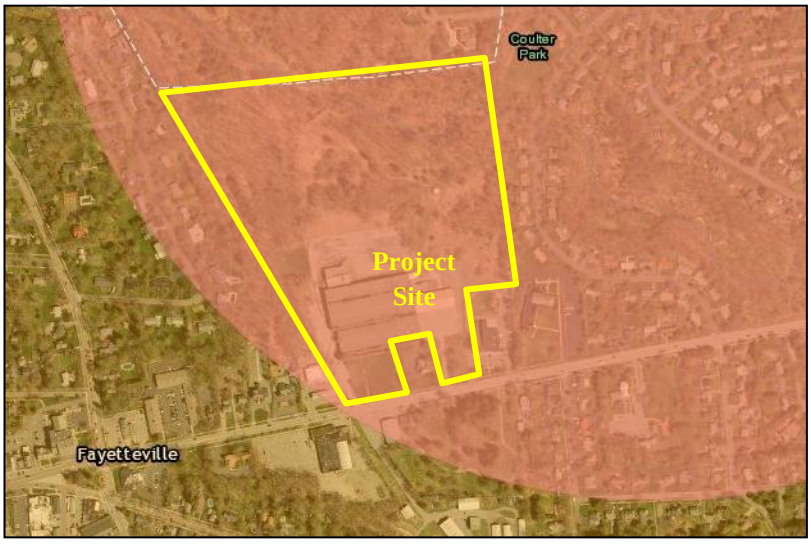


Figure 3: NYSDEC Rare and Endangered Species Mapping

F. FEDERAL AND STATE HISTORIC PRESERVATION

The project site is not located within an archeo-sensitive area according to the NYS SHPO GIS mapping.

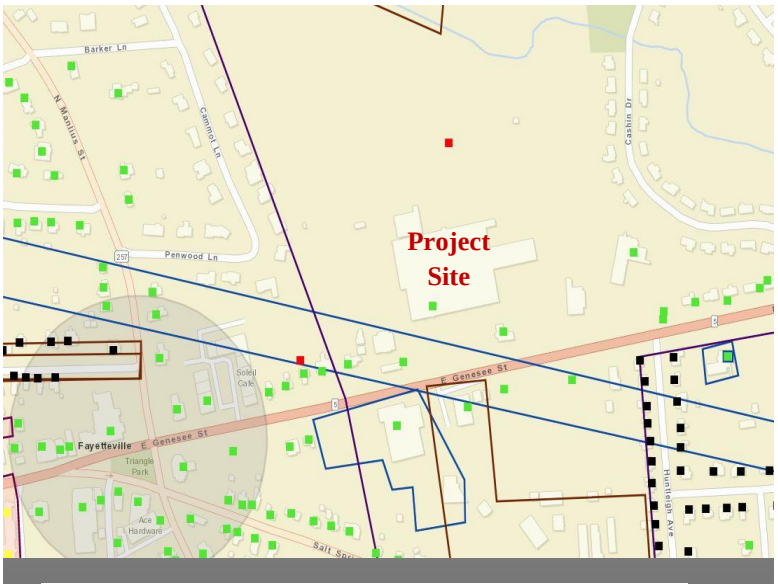


Figure 4: NYS SHiPO CRIS Mapper

SECTION III. EROSION AND SEDIMENT CONTROLS

Prior to the commencement of construction, the operator will identify the contractor(s) and subcontractor(s) that will implement each erosion and sediment control measure identified in this SWPPP. All contractors and subcontractors identified in the SWPPP must sign a copy of the certification statement in Part III.E. of the NYSDEC SPDES General Permit for Stormwater Discharges from Construction Activity in accordance with Part V.H. of the SPDES General Permit.

A. EROSION CONTROL PLANNING AND SITE MANAGEMENT

1. Concrete Truck Washout:

A temporary excavated or above ground lined constructed pit where concrete truck mixers and equipment can be washed after their loads have been discharged to prevent highly alkaline runoff from entering storm drainage systems or leaching into soil.

a. The washout facility is sized to contain solids, wash water, and rainfall. The minimum size shall be eight feet by eight feet at the bottom and two feet deep. If excavated, then the side slopes shall be 2:1 (horizontal to vertical).

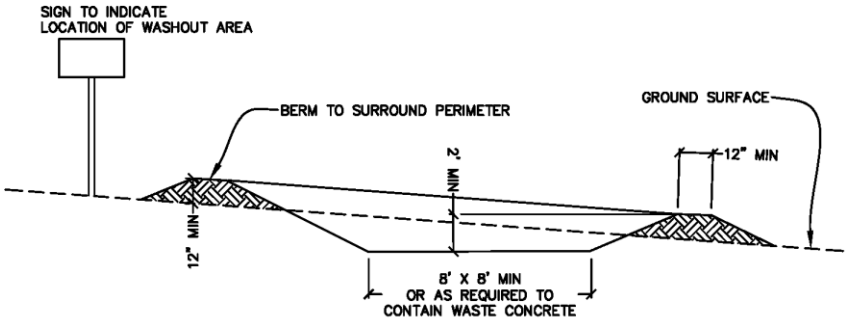


Figure 5: Concrete Washout Area

b. The facility shall be located a minimum of 100 feet from drainage swales, storm drain inlets, wetlands, streams, and other surface waters. Surface water shall be prevented from entering the structure except for the access road. Appropriate access shall be provided with a gravel access road sloped down to the structure. Signs shall be placed to direct drivers to the facility after their load is discharged.

c. All washout facilities will be lined to prevent leaching of liquids into the ground. The liner shall be plastic sheeting with a minimum thickness of 10 mils with no holes or tears, and anchored beyond the top of the pit with an earthen berm, sand bags, stone, or other structural appurtenance except at the access point.

2. Dust Control:

The control of dust resulting from land-disturbing activities is required in order to prevent surface and air movement of dust from disturbed soil surfaces that may cause off-site damage, health hazards, and traffic safety concerns.

a. Non-driving areas - These areas shall use products and materials applied or placed on soil surfaces to prevent airborne migration of soil particles.

i. Vegetative Cover - For disturbed areas not subject to traffic, vegetation provided the most practical method of dust control.

ii. Mulch (including gravel mulch) - Mulch offers a fast effective means of controlling dust. This can also include rolled erosion control blankets.

b. Driving areas - These areas utilize water and barriers to prevent dust movement from the traffic surface into the air.

i. Sprinkling - The site may be sprayed with water until the surface is wet. This is especially effective on haul roads and access routes to provide short term limited dust control.

ii. Barriers - Woven geotextiles can be placed on the driving surface to effectively reduce dust throw and particle migration on haul roads. Stone can also be used for construction roads for effective dust control.

c. Windbreak - A silt fence or similar barrier can control air currents at intervals equal to ten times the barrier height. Preserve existing wind barrier vegetation as much as practical.

3. Site Pollution Prevention:

A collection of management practices intended to control non-sediment pollutants associated with construction activities to prevent the generation of pollutants due to improper handling, storage, and spills and prevent the movement of toxic substances from the site into surface waters.

a. All state and federal regulations shall be followed for the storage, handling, application, usage, and disposal of pesticides, fertilizers, and petroleum products.

b. Vehicle and construction equipment staging and maintenance areas will be located away from all drainage ways with their parking areas graded so the runoff from these areas is collected, contained and treated prior to discharge from the site.

c. Provide sanitary facilities for on-site personnel.

d. Store, cover, and isolate construction materials, including topsoil and chemicals, to prevent runoff of pollutants and contamination of groundwater and surface waters.

e. Develop and implement a spill prevention and control plan.

f. Provide adequate disposal for solid waste including woody debris, stumps, and other construction waste. Fill, woody debris, stumps, and construction waste shall not be placed in regulated wetlands, streams, or other surface waters.

g. Distribute or post informational material regarding proper handling, spill response, spill kit location, and emergency actions to be taken, to all construction personnel.

h. Refueling equipment shall be located at least 100 feet from all wetlands, streams and other surface waters.

4. Stabilized construction access:

A stabilized pad of aggregate underlain with geotextile located at any point where traffic will be entering or leaving a construction site to or from a public right-of-way, street, alley, sidewalk, or parking area. The purpose of stabilized construction access is to reduce or eliminate the tracking of sediment onto public rights-of-way or streets.

a. Aggregate size: Use a matrix of one- to four-inch stone, or reclaimed or recycled equivalent.

b. Thickness: Not less than six inches.

c. Width: 24-foot minimum.

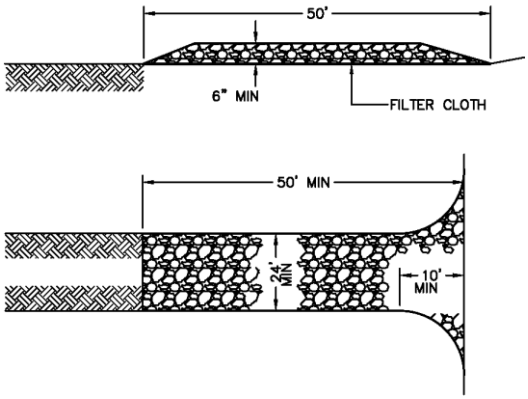


Figure 6: Stabilized Construction Access

d. Length: As required, but not less than 50 feet.

e. Geotextile: To be placed over the entire area to be covered with aggregate. Piping of surface water under entrance shall be provided as required.

5. Winter Stabilization:

A temporary site specific, enhanced erosion and sediment control plan to manage runoff and sediment at the site during construction activities in the winter months to protect off-site water resources. Winter stabilization applies to all construction activities involved with ongoing land disturbance and exposure between November 15th to the following April 1st.

a. Prepare a snow management plan with adequate storage for snow and control of melt water, required cleared snow to be stored in a manner not affecting ongoing construction activities.

b. Enlarge and stabilize access points to provide for snow management and stockpiling. Snow management activities must not destroy or degrade installed erosion and sediment control practices.

c. A minimum 25-foot buffer shall be maintained from all perimeter controls such as silt fence. Mark silt fence with tall stakes that are visible above the snow pack.

d. Edges of disturbed areas that drain to a water body within 100 feet will have 2 rows of silt fence, 5 feet apart, installed on the contour.

e. Drainage structures must be kept open and free of snow and ice dams. All debris, ice dams, or debris from plowing operations, that restrict the flow of runoff and snow melt, shall be removed.

f. Sediment barriers must be installed at all appropriate perimeter and sensitive locations. Silt fence and other practices requiring earth disturbance must be installed before the ground freezes.

g. Soil stockpiles must be protected by the use of established vegetation, anchored straw mulch, rolled stabilization matting, or other durable covering. A barrier must be installed at least 15 feet from the toe of the stockpile to prevent soil migration and to capture loose soil.

h. All slopes must be stabilized as soon as practicable but in no case left unprotected for more than three days. Rolled erosion control blankets must be used on all slopes 3 horizontal to 1 vertical or steeper.

i. If straw mulch alone is used for temporary stabilization, it shall be applied at double the standard rate of 2 tons per acre, making the application rate 4 tons per acre. Other manufactured mulches should be applied at double the manufacturer's recommended rate.

j. To ensure cover of disturbed soil in advance of a melt event, areas of disturbed soil must be stabilized at the end of each work day unless:

   i. work will resume with 24 hours in the same area and no precipitation is forecast or;

   ii. the work is in disturbed areas that collect and retain runoff, such as open utility trenches, foundation excavations, or water management areas.

k. Use stone to stabilize perimeters of buildings under construction and areas where construction vehicle traffic is anticipated. Stone paths should be a minimum 10 feet in width but wider as necessary to accommodate equipment.

B. PERMANENT RUNOFF CONTROL

1. Grassed Waterway:

A permanent man-made channel or trapezoidal cross-section that is below adjacent ground level and is stabilized by suitable vegetation. The flow channel is normally wide and shallow and conveys the runoff down the slope without causing damage by erosion.

a. Capacity: The minimum capacity shall be that required to confine the peak rate of runoff expected from a 10-year, 24-hour frequency rainfall event or a higher frequency corresponding to the hazard involved. Grassed waterways will be constructed in several areas surrounding the site to convey runoff from impervious surfaces within the project site towards the specified stormwater management practices.

b. Velocity: The permissible velocity for a silty clay loam with Kentucky tall fescue and Kentucky bluegrass is 4.0 ft/second.

c. Outlet: Swale outlets will be stabilized with rock outlet protection to dissipate velocity.

d. Stabilization: Waterways shall be stabilized in accordance with the appropriate vegetative stabilization standard and specifications, and will be dependent on such factors as slope, soil class, etc.

2. Rock Outlet Protection

A permanent section of rock protection placed at the outlet end of the culverts, conduits, or channels to reduce the depth, velocity, and energy of water such that the flow will not erode the receiving downstream reach. The outlet protection shall be constructed with no slope along its length. The elevation of the downstream end of the apron shall be equal to the elevation of the receiving channel or adjacent ground.

3. Subsurface Drain (if required)

A permanent conduit, such as tile, pipe, or tubing, installed beneath the ground surface, which intercepts, collects, and/or conveys drainage water to serve one or more of the following purposes:

- Improve the environment for vegetative growth by regulating the water table and groundwater flow.
- Intercept and prevent water movement into a wet area.
- Relieve artesian pressures.
- Remove surface runoff.
- Provide internal drainage of slopes to improve their stability and reduce erosion.
- Provide internal drainage behind bulkheads, retaining walls, etc.
- Replace existing subsurface drains that are interrupted or destroyed by construction operations.
- Provide subsurface drainage for dry storm water management structures.
- Improve dewatering of sediment in sediment basins.

a. Size of Subsurface Drain: All subsurface drains shall have a nominal diameter equal to or greater than six inches.

b. Depth and Spacing: The minimum depth of cover of subsurface drains shall be 24 inches where possible. The spacing of drain laterals will be dependent on the permeability of the soil, the depth of installation of the drains, and degree of drainage required. Generally, drains installed 36 inches deep and spaced 50 feet center-to-center will be adequate.

c. Minimum Velocity and Grade: The minimum grade for subsurface drains shall be 0.10%. Where surface water enters the system a velocity of not less than 2 feet per second shall be used to establish the minimum grades. Provisions shall be made for preventing debris or sediment from entering the system by means of filters or collection and periodic removal of sediment from installed traps.

d. Materials for Subsurface Drains: Acceptable subsurface drain materials include perforated, continuous closed joint conduits of polyethylene plastic, concrete, corrugated metal, polyvinyl chloride, and clay tile. The conduit shall meet strength and durability requirements of the site.

e. Loading: The allowable loads on subsurface drain conduits shall be based on the trench and bedding conditions specified for the job. A factor of safety of not less than 1.5 shall be used in computing the maximum allowable depth of cover for a particular type fo conduit.

f. Envelopes and Envelope Materials: Envelopes shall be used around subsurface drains for proper bedding and to provide better flow into the conduit. Not less than three inches of envelope material shall be used for sand/gravel envelopes. Where necessary to improve the characteristics of flow of groundwater into the conduit, more envelope material may be required.

Where county regulations do not allow sand/gravel envelopes, but require a special type and size of envelope material, they shall be followed.

Envelope material shall be placed to the height of the upper-most seepage strata. Behind bulkheads and retaining walls, it shall go to within 12 inches of the top of the structure. This standard does not cover the design of filter materials where needed.

Materials used for envelopes shall not contain materials which will cause an accumulation of sediment in the conduit or render the envelope unsuitable for bedding of the conduit. Envelope materials shall consist of either filter cloth or sand/gravel material, which shall pass a 1 ½ inch sieve, 90 to 100% shall pass a ¾ inch sieve, and not more than 10% shall pass a No. 60 sieve.

Filter cloth envelope can be either woven or non-woven monofilament yarns and shall have a sieve opening ranging from 40 to 80. The envelope shall be placed in such a manner that once the conduit is installed, it shall completely encase the conduit.

The conduit shall be placed and bedded in a sand/gravel envelope. A minimum of three inches depth of envelope materials shall be placed on the bottom of a conventional trench. The conduit shall be placed on this and the trench completely filled with envelope material to minimum depth of three inches above the conduit.

Soft or yielding soils under the drain shall be stabilized where required and lines protected from settlement by adding gravel or other suitable material to the trench, by placing the conduit on plank or other rigid support, or by using long sections of perforated or watertight pipe with adequate strength to ensure satisfactory subsurface drain performance.

g. Use of Heavy Duty Corrugated Plastic Drainage Tubing: Heavy duty corrugated drainage tubing shall be specified where rocky or gravelly soils are expected to be encountered during installation operations. The quality of tubing will also be specified when cover over this tubing is expected to exceed 24 inches for 6- or 8-inch tubing.

h. Auxiliary Structure and Subsurface Drain Protection: The outlet shall be protected against erosion and undermining of the conduit, against damaging periods of submergence, and against entry of rodents or other animals into the subsurface drain. An animal guard shall be installed on the outlet end of the pipe. A swinging animal guard shall be used if surface water enters the pipe.

A continuous 10-foot section of corrugated metal, cast iron, polyvinyl chloride, or steel pipe without perforations shall be used at the outlet end of the line and shall outlet 1.0 foot above the normal elevation of low flow in the outlet ditch. No envelope material shall be used around the 10-foot section of pipe. Two-thirds of the pipe shall be buried in the ditch bank and the cantilevered section shall extend to a point above the toe of the ditch side slope. If not possible, the side slope shall be protected from erosion.

Conduits under roadways and embankments shall be watertight and designed to exclude debris and prevent sediment from entering the conduit. Lines flowing under pressure shall be designed to

withstand the resulting pressures and velocity of flow. Surface waterways shall be used where feasible.

The upper end of each subsurface drain line shall be capped with a tight fitting cap of the same material as the conduit or other durable material unless connected to a structure.

C. TEMPORARY SOIL STABILIZATION CONTROL

1. Temporary Construction Area Seeding

Providing temporary erosion control protection to disturbed areas and/or localized critical areas for an interim period by covering all bare ground that exists as a result of construction activities or a natural event. Critical areas may include but are not limited to steep excavated cut or fill slopes and any disturbed, denuded natural slopes subject to erosion. Soil stabilization shall be provided where soil disturbance activity has temporarily or permanently ceased. Soil stabilization must be initiated the next business day and completed within 14 days from the date that the soil disturbance activity ceased.

a. Water management practices must be installed as appropriate for site conditions. The area must be rough graded and slopes physically stable. Large debris and rocks are to be removed. Seedbed must be seeded within 24 hours of disturbance or scarification of the soil surface will be necessary prior to seeding.

b. IF: Spring or summer or early fall, then seed the area with ryegrass (annual or perennial) at 30 lbs. per acre (approximately 1 lb/1000 square feet).

c. IF: Late fall or early winter, then seed with certified 'Aroostook' winter rye (cereal rye) at 100 lbs. per acre (2.5 lbs/ 1000 square feet).

d. Any seeding method may be used that will provide uniform application of seed to the area and result in relatively good soil to seed contact.

e. Mulch the area with hay or straw at two tons/acre (approximately 90 lbs./1000 square feet). Quality of the hay or straw mulch allowed will be determined based on long term use and visual concerns. Mulch anchoring will be required where wind or areas of concentrated water are of concern. Wood fiber hydromulch or other sprayable products approved for erosion control (nylon web or mesh) may be used if applied in accordance with manufacturers' specifications.

Caution is advised when using nylon or other synthetic products; they may be difficult to remove prior to final seeding and can be a hazard to young wildlife species.

D. PERMANENT SOIL STABILIZATION CONTROL

1. Anchored Stabilization Matting: A permanent protective covering placed on a prepared planting area that is anchored in place by staples or other means to aid in controlling erosion by absorbing rain splash energy and withstand overland flow as well as provide a microclimate to protect and promote seed establishment. Anchored stabilization mats are required for earthen slopes steeper than three horizontal to one vertical; in vegetated channels where the velocity of the design flow exceeds the allowable velocity for vegetation alone (usually greater than five feet per second); and in areas where wind prevents standard mulching with straw.

2. Land Grading: Permanent reshaping of the existing land surface by grading in accordance with the grading plan and specification to provide for erosion control and vegetative establishment on disturbed, reshaped areas.

a. All graded or disturbed areas, including slopes, shall be protected during clearing and construction in accordance with the erosion and sediment control plan until they are adequately stabilized.

b. All erosion and sediment control practices and measures shall be constructed, applied, and maintained in accordance with the erosion and sediment control plan and these standards.

c. Topsoil required for the establishment of vegetation shall be stockpiled in the amount necessary to complete finished grading of all exposed areas.

d. Areas to be filled shall be cleared, grubbed, and stripped of topsoil to remove trees, vegetation, roots, or other objectionable material.

e. Areas to be topsoiled shall be scarified to a min. depth of 4 inches prior to placement of topsoil.

f. All fills shall be compacted as required to reduce erosion, slippage, settlement, subsidence, or other related problems. Fill intended to support buildings, structures, conduits, etc. shall be compacted in accordance with local requirements or codes.

g. All fill shall be placed and compacted in layers not to exceed nine inches in thickness.

h. Fill material shall be free of frozen particles, brush, roots, sod, or other objectionable materials that would interfere with, or prevent, construction of satisfactory fills.

i. Frozen material or soft, mucky or highly compressible materials shall not be incorporated into fill slopes or structural fills.

j. Fill shall not be placed on saturated or frozen surfaces.

k. All benches shall be kept free of sediment during all phases of development.

l. Seeps or springs encountered during construction shall be handled in accordance with "Subsurface Drain" (see III.C.4).

3. Soil Restoration

The decompaction of areas of a development site or construction project where soils have been disturbed to recover the original properties and porosity of the soil thus providing a sustainable growth medium for vegetation, reduction of runoff and filtering of pollutants from stormwater runoff. Soil restoration shall be completed in accordance with the following table:

Table 1: Soil Restoration Requirements

<table>
<tr><th>Type of Soil Disturbance</th><th colspan="2">Soil Restoration Requirement</th><th>Comments/Examples</th></tr>
<tr><td>No soil disturbance</td><td colspan="2">Restoration not permitted</td><td>Preservation of Natural Features</td></tr>
<tr><td>Minimal soil disturbance</td><td colspan="2">Restoration not required</td><td>Clearing and grubbing</td></tr>
<tr><td rowspan="2">Areas where topsoil is stripped only - no change in grade</td><td>HSG A & B</td><td>HSG C & D</td><td rowspan="2"></td></tr>
<tr><td>Apply 6 inches of topsoil</td><td>Aerate* and apply 6 inches of topsoil</td></tr>
<tr><td rowspan="2">Areas of cut or fill</td><td>HSG A & B</td><td>HSG C & D</td><td rowspan="2"></td></tr>
<tr><td>Aerate* and apply 6 inches of topsoil</td><td>Apply full Soil Restoration**</td></tr>
<tr><td>Heavy traffic areas on site (especially in zones 5 - 25 feet around buildings but not within a 5-foot perimeter around foundation walls)</td><td colspan="2">Apply full soil restoration (decompaction and compost enhancement)</td><td></td></tr>
<tr><td>Areas where Runoff Reduction and/or Infiltration practices are applied</td><td colspan="2">Restoration not required, but may be applied to enhance the reduction specified for appropriate practices.</td><td>Keep construction equipment from crossing these areas, construct a single phase operation fence area to protect newly installed practice from any ongoing construction activities.</td></tr>
<tr><td>Redevelopment projects</td><td colspan="2">Soil Restoration is required on redevelopment projects in areas where existing impervious area will be converted to pervious area.</td><td></td></tr>
<tr><td colspan="4">* Aeration includes the use of machines such as tractor-drawn implements with coulters making a narrow slit in the soil, a roller with many spikes making indentations in the soil, or prongs which function like a mini-subsoiler.
** Per "Deep Ripping and De-compaction, DEC 2008" - Provided in Appendix C</td></tr>
</table>

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

a. Apply three inches of compost over the subsoil. The compost shall be well decomposed (matured at least three months), weed-free, organic matter. It shall be aerobically composted, possess no objectionable odors, and contain less than 1%, by dry weight, of man-made foreign matter. The physical parameters of the compact shall meet the following standards:
   - Organic matter content: 25% to 100% (dry weight)
   - Organic portion: Fibrous and elongated
   - pH: 6.0 to 8.0
   - Moisture content: 30% to 60%
   - Particle Size: 100% passing a 2" screen and 10 to 50% passing a 3/8" screen
   - Soluble salt concentration: 5.0 dS/m maximum

   Note: All biosolids compost produced in New York State (or approved for importation) must meet NYS DEC's 6NYCRR Part 360 (Solid Waste Management Facilities) requirements. The Part 360 requirements are equal to or more stringent than 40 CFR Part 503 which ensure safe standards for pathogen reduction and heavy metal content.

b. Till compost into subsoil to a depth of at least 12 inches using a cat-mounted ripper, tractor mounted disc, or tiller, to mix and circulate air and compost into the subsoil.

c. Rock-pick until uplifted stone/rock materials of four inches and larger size are cleaned off the site.

d. Apply topsoil to a depth of six inches.

e. Vegetate as required by the seeding plan. Use appropriate ground cover with deep roots to maintain the soil structure.

f. Topsoil may be manufactured as a mixture or a mineral component and organic material such as compost.

4. Topsoiling

Spreading a specified quality and quantity of topsoil materials on graded or constructed subsoil areas to provide acceptable plant cover growing conditions, thereby reducing erosion; to reduce irrigation water needs; and to reduce the need for nitrogen fertilizer application.

a. Site Preparation

   i. As needed, install erosion and sediment control practices such as diversions, channels, sediment traps, and stabilizing measures, or maintain if already installed.

   ii. Complete rough grading and final grade, allowing for depth of topsoil to be added.

   iii. Scarify all compact, slowly permeable, medium and fine textured subsoil areas. Scarify at approximately right angles to the slope direction in soil areas that are steeper than 5 percent. Areas that have been overly compacted shall be decompacted in accordance with the Soil Restoration Standard.

   iv. Remove refuse, woody plant parts, stones over three inches in diameter, and other litter.

b. Topsoil Materials

   i. Topsoil shall have at least 6% by weight of fine textured stable organic material, and no greater than 20%. Muck soil shall not be considered topsoil.

   ii. Topsoil shall have not less than 20% fine textured material (passing the No. 200 sieve) and not more than 15% clay.

   iii. Topsoil treated with soil sterilants or herbicides shal be so identified to the purchaser.

iv. Topsoil shall be relatively free of stones over 1 ½ inches in diameter, trash, noxious weeds such as nut sedge and quackgrass, and will have less than 10% gravel.

v. Topsoil containing soluble salts greater than 500 parts per million shall not be used.

vi. Topsoil may be manufactured as a mixture of a mineral component and organic material such as compost.

c. Application and Grading

i. Topsoil shall be distributed to a uniform depth over the area. It shall not be placed when it is partly frozen, muddy, or on frozen slopes or over ice, snow, or standing water puddles.

ii. Topsoil placed and graded on slopes steeper than 5% shall be promptly fertilized, seeded, mulched, and stabilized by "tracking" with suitable equipment.

iii. Apply topsoil in the amounts shown below:

Table 2: Topsoil Application Depth

Site Conditions	Intended Use	Minimum Topsoil Depth
Deep sand or loamy sand	Mowed lawn	6 inches
	Tall legumes, unmowed	2 inches
	Tall grass, unmowed	1 inch
Deep sandy loam	Mowed lawn	5 inches
	Tall legumes, unmowed	2 inches
	Tall grass, unmowed	None
Six inches or more: silt loam, clay loam, loam, or silt	Mowed lawn	4 inches
	Tall legumes, unmowed	1 inches
	Tall grass, unmowed	1 inch

E. TEMPORARY SEDIMENT CONTROL

1. Sediment Trap:

A temporary sediment control device formed by excavation and/or embankment to intercept sediment-laden runoff and trap the sediment in order to protect drainageways, properties, and rights-of-way below the sediment trap from sedimentation.

a. Drainage Area: The maximum drainage area for all sediment traps shall be five acres.

b. Trap size: The volume of a sediment trap as measured at the elevation of the crest of the outlet shall be at least 3,600 cubic feet per acre of drainage area.

c. Trap Cleanout: Sediment shall be removed and the trap restored to the original dimensions when the sediment has accumulated to ½ of the design depth. Sediment removed from the trap shall be deposited in a protected area and in such a manner that it will not erode.

d. Embankment: All earth embankments for sediment traps shall not exceed five feet in height as measured at the low point of the original ground along the centerline of the embankment. Embankments shall have minimum four-foot wide top and side slopes of 2:1 or flatter. The embankment shall be compacted by traversing with equipment while it is being constructed. The embankment shall be stabilized with seed and mulch as soon as it is completed.

The elevation of the top of any dike directing water to any sediment trap will equal or exceed the maximum height of the outlet structure along the entire length of the trap.

e. Excavation: All excavation operations shall be carried out in such a manner that erosion and water pollution shall be minimal. Excavated portions of sediment traps shall have 1:1 or flatter slopes. A length to width ratio of 2:1 should be provided.

f. Outlet: The outlet shall be designed, constructed, and maintained in such a manner that sediment does not leave the trap and that erosion at or below the outlet does not occur.

Sediment traps must outlet onto stabilized (preferably undisturbed) ground, into a watercourse, stabilized channel, or into a storm drain system. Distance between inlet and outlet should be maximized to the longest length practicable.

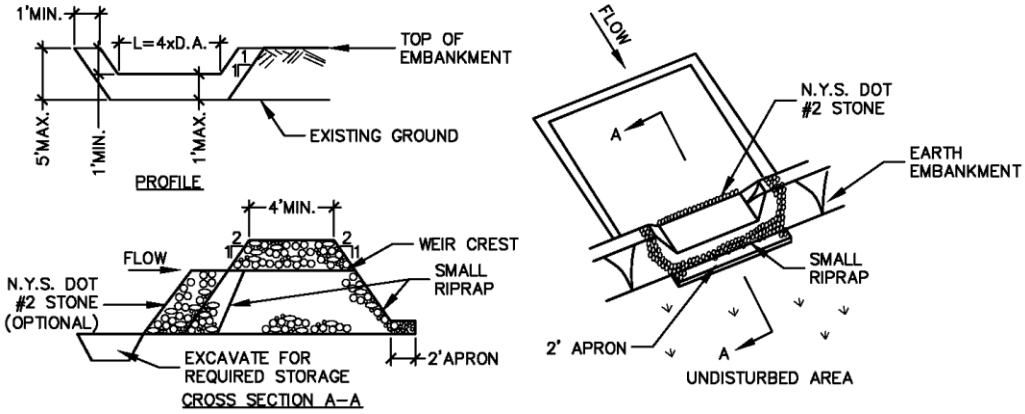


Figure 7. Temporary Sediment Trap Detail

2. Silt Fence

A temporary barrier of geotextile fabric installed on the contours across a slope used to intercept sediment laden runoff from small drainage areas of disturbed soil by temporarily ponding the sediment laden runoff allowing settling to occur. The maximum period of use is limited by the ultraviolet stability of the fabric (approximately one year).

F. SEQUENCE OF MAJOR ACTIVITIES

The contractor shall be responsible for implementing the above listed erosion and sediment control practices. The contractor may designate these tasks to certain subcontractors as is seen fit, but the ultimate responsibility for implementing these controls and ensuring their proper function remains with the contractor. Additionally, it should be noted that the construction sequence shall apply to each of the individual building construction sites in the event that there is a delay in the construction one of the proposed buildings. The order of activities will be as follows:

a. Conduct a preconstruction meeting with all involved parties
b. Delineate boundaries of disturbance as per the site plan
c. Construct temporary stabilized construction entrance at the location(s) shown on the site plan
d. Install silt fence perimeter in locations shown on the site plans
e. Establish staging areas on the project site
f. Conduct demolition of existing building and pavement areas in accordance with NYSDEC requirements and the established remedial investigation work plan.
g. Site remediation and environmental cleanup to be completed in coordination with Ramboll and the NYSDEC. Measures to be put in place to protect and maintain the groundwater remediation system.
h. Construct temporary sediment traps for use during construction
i. Remove topsoil, stockpile and stabilize
j. Rough grade site including swales and provide temporary stabilization when idle for more than 7 days

k. Provide soil stabilization matting, mulch, and seed where applicable
l. Construction of vehicle washing station and concrete washout station
m. Building slabs and building construction
n. Connect and install utilities
o. Compact gravel along driveways and parking areas
p. Perform site concrete work
q. Perform site paving
r. Complete final grading of the site
s. Restore all compacted soils in accordance with section 5.1.6 of the NYS Stormwater Design Manual
t. Provide final stabilization and landscaping of new area
u. Provide final stabilization of disturbed areas via seeding and mulching.
v. Construct bioretention basins and outlet controls upon upstream stabilization
w. Remove sediment traps and finalize grading of detention basin
x. Provide final stabilization of detention basin area via seeding and mulching.
y. Remove all temporary stabilization control practices

SECTION IV. STORMWATER MANAGEMENT

A. METHODOLOGY

1. Hydrologic Conditions

The peak runoff rates for the site were calculated for the existing and proposed hydrologic conditions using HydroCAD software. The HydroCAD program uses the standard SCS TR-55 Curve Number Method for calculation of the time of concentration, composite curve number, and peak runoff rates for the drainage area(s) based on user input. The input data was taken from soil maps, detailed topographic and utility survey information, rainfall distribution maps, and aerial images. The hydrologic conditions are used to assess the impacts to the runoff characteristics and to design appropriate measures to mitigate these impacts. The NYS SPDES General Permit for Stormwater Discharges from Construction Activity requires that a stormwater mitigation system meet the following five design criteria:

- Water Quality Volume: The system must capture and treat 90% of the average annual runoff volume.
- Runoff Reduction Volume: The system must apply green infrastructure techniques and Stormwater Management Practices to replicate pre-development hydrology.
- Provide 24-hour extended detention of the runoff from the one-year, 24-hour rainfall event.
- Attenuation of the post-development 10-year, 24-hour peak discharge rate to predevelopment rates.
- Attenuation of the post-development 100-year, 24-hour peak discharge rate to predevelopment rates.

2. Rainfall Information

The following table shows the rainfall values used in the analysis of the stormwater runoff. These values are taken from rainfall distribution models that the Northeast Regional Climate Center (www.precip.net).

Table 3: Rainfall Data

Precipitation Event	24-Hour Rainfall in inches
Water Quality Volume (WQ_v)	1.00
1-Year, 24-Hour (Cp_v)	2.04
10-Year, 24-Hour (Qp_{10})	3.43
100-Year, 24-Hour (Qp_{100})	5.78

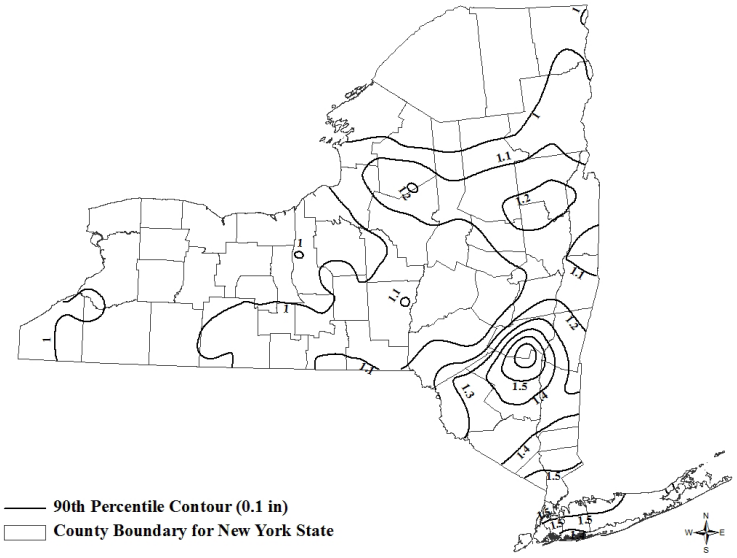


Figure 8: New York State 90% Rainfall Map

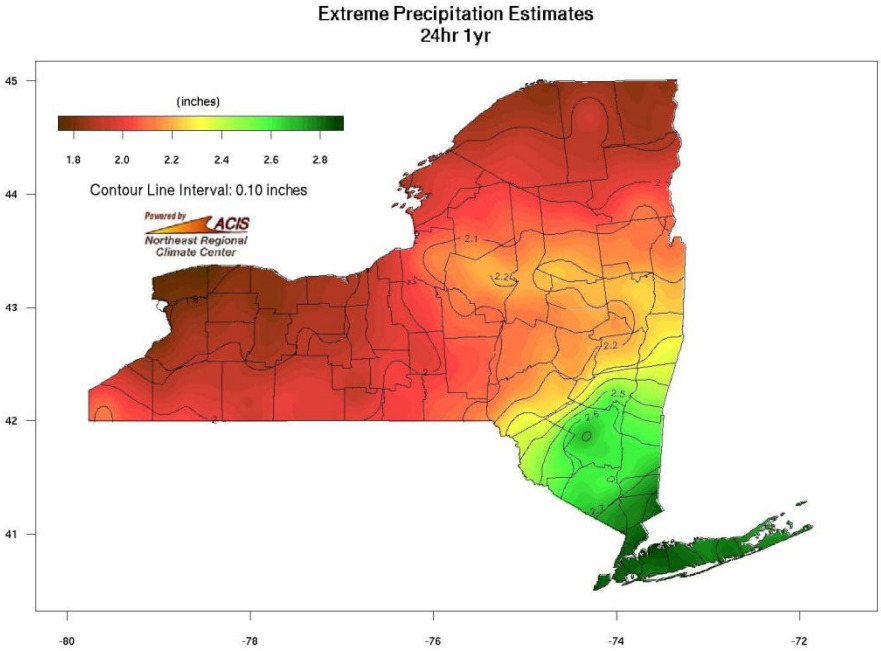


Figure 9: New York State One-Year Design Storm Map

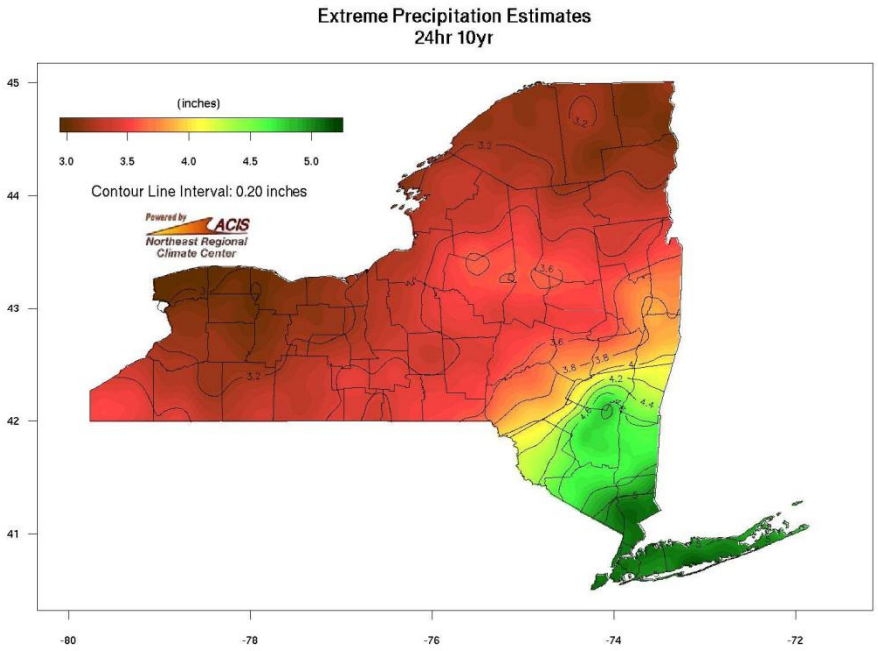


Figure 10: New York State 10-Year Design Storm Map

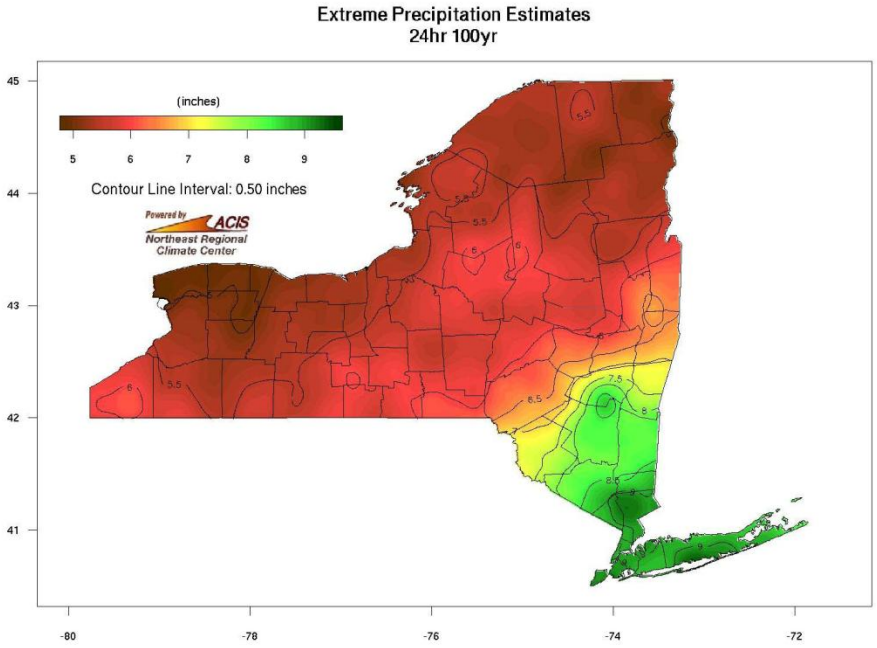


Figure 11: New York State 100-Year Design Storm

3. Soils Information

Soils information for the watershed was collected from the Natural Resource Conservation Service soils mapping database. The watershed consists of several distinct mapping units. A majority of the subject site is labeled as Palmyra gravelly loam which belongs to hydrologic soil group A. Group A soils have a high infiltration rate and are well-drained. The remainder of the subject site is Cazenovia silt loam which is hydrologic soil group C. Group C soils have a slow infiltration rate and a slow rate of water transmission. See Appendix B for the NRCS soils map within the project area.

B. EXISTING CONDITIONS

The subject site is located on the north side of East Genesee Street and is comprised of approximately 40.0 acres. The property generally flows north away from East Genesee Street towards Bishops Brook, which is located in a relatively deep channel along the northern boundary of the site. Residential properties border the eastern and western property lines of the site. There are several adjacent commercial properties along East Genesee Street that are also tributary to the site, including a two story office and a USPS post office. The impervious area on site is comprised of a 137,000 SF building and the surrounding pavement areas. The rest of the site is a mix of lawn area, shrub/brush area, and woods. The toography of the site is generally flat with an increasing slope as you move north towards Bishops Brook in the rear of the site. A high point along the back of the existing site separates the existing draiange area in two. The following tables summarize the TR-55 hydrologic descriptions (curve number and time of concentration) for the existing condition drainage areas.

Table 4: Existing Conditions – DA-1

Area (ac)	CN	Description
5.320	81	Urban industrial, 72% imp, HSG A
6.100	98	Paved parking, HSG A
6.450	39	>75% Grass cover, Good, HSG A
2.040	61	1/4 acre lots, 38% imp, HSG A
0.380	87	1/4 acre lots, 38% imp, HSG D
5.700	30	Woods, Good, HSG A
1.000	55	Woods, Good, HSG B
1.690	70	Woods, Good, HSG C
1.030	77	Woods, Good, HSG D
29.710	63	Weighted Average
18.860		63.48% Pervious Area
10.850		36.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.5	100	0.0400	0.13		**Sheet Flow, sheet flow** Grass: Dense n= 0.240 P2= 2.39"
5.9	1,140	0.0400	3.22		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
0.4	465	0.0600	20.22	161.78	**Channel Flow, slope/brook** Area= 8.0 sf Perim= 8.0' r= 1.00' n= 0.018 Earth, clean & straight
18.8	1,705	Total			

Table 5: Existing Conditions - DA-2

Area (ac)	CN	Description
2.000	98	Paved parking, HSG A
1.970	39	>75% Grass cover, Good, HSG A
0.490	74	>75% Grass cover, Good, HSG C
0.180	30	Woods, Good, HSG A
2.160	70	Woods, Good, HSG C
6.800	68	Weighted Average
4.800		70.59% Pervious Area
2.000		29.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.2	100	0.0180	0.10		**Sheet Flow, sheet flow** Grass: Dense n= 0.240 P2= 2.39"
1.6	250	0.0170	2.65		**Shallow Concentrated Flow, SCF** Paved Kv= 20.3 fps
2.4	855	0.0250	5.87	46.99	**Channel Flow, wooded ditch** Area= 8.0 sf Perim= 8.0' r= 1.00' n= 0.040 Earth, dense weeds
21.2	1,205	Total			

C. PROPOSED CONDITIONS

The proposed project consists of the demolition and removal of the existing building and on-site pavement surfaces in order to construct three commercial buildings: a 56,550 SF grocery store, a 42,750 SF memory care facility, and a 3,500 SF outparcel building. The three uses will all have associated asphalt parking and drive aisles, concrete sidewalks, and typical landscaping with surrounding lawn areas. This project is classified as a redevelopment with an increase in impervious area. In order to minimize the impact to offsite properties through the concentration of stormwater runoff, the grading and associated stormwater management system has been designed to collect runoff from much of the project site and release it in a controlled manner towards Bishops Brook, the current concentrated point of runoff for the watershed. The stormwater management system will mitigate the increase in stormwater runoff to the brook that the increase in tributary area and conversion of land creates. The stormwater management system includes three bioretention filters and an above ground grass-lined detention basin system. These practices act in concert with one another in order to mitigate the stormwater runoff impacts that the development creates.

The proposed conditions for the project (DA-1) has been delineated into four separate drainage areas for analysis purposes. The first two drainage areas, (DA-1A & DA-1B), are mainly comprised of the proposed development pieces and the new impervious area. These two drainage areas are tributary to the two larger bioretention filters and the aboveground stormwater detention system prior to being released towards the point of study. The third drainage area, DA-1C, includes the proposed access road to the existing groundwater monitoring and treatment building. This small portion drains to bioretention filter #3 before discharging towards the point of study. The fourth, DA-1D, is made up of the remaining land area surrounding the new development that drains to the point of study but is left undisturbed by the proposed project. The fifth drainage area is DA-2, which is comprised of undisturbed wooded area to the northwest of the development. The tables below summarize the drainage areas that are tributary to the point of study:

Table 6: Proposed Conditions - DA-1A

Area (ac)	CN	Description
8.210	98	Paved parking, HSG A
5.140	39	>75% Grass cover, Good, HSG A
0.440	74	>75% Grass cover, Good, HSG C
13.790	75	Weighted Average
5.580		40.46% Pervious Area
8.210		59.54% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.3	100	0.0200	0.15		**Sheet Flow, sheet flow** Grass: Short n= 0.150 P2= 2.39"
0.7	470	0.0250	10.68	85.44	**Channel Flow, swale** Area= 8.0 sf Perim= 8.0' r= 1.00' n= 0.022 Earth, clean & straight
0.5	350	0.0250	10.68	128.16	**Channel Flow, swale** Area= 12.0 sf Perim= 12.0' r= 1.00' n= 0.022 Earth, clean & straight
12.5	920	Total			

Table 7: Proposed Conditions - DA-1B

Area (ac)	CN	Description
0.790	98	Paved parking, HSG A
1.040	39	>75% Grass cover, Good, HSG A
0.060	30	Woods, Good, HSG A
1.890	63	Weighted Average
1.100		58.20% Pervious Area
0.790		41.80% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.3	100	0.0200	0.15		**Sheet Flow, sheet flow** Grass: Short n= 0.150 P2= 2.39"
1.4	190	0.0190	2.22		**Shallow Concentrated Flow, shallow flow** Unpaved Kv= 16.1 fps
1.3	360	0.0100	4.54	3.56	**Pipe Channel, culvert** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior
0.3	450	0.2000	22.03	220.33	**Channel Flow, Stormwater Basin** Area= 10.0 sf Perim= 8.0' r= 1.25' n= 0.035 Earth, dense weeds
14.3	1,100	Total			

Table 8: Proposed Conditions - DA-1C

Area (ac)	CN	Description
0.130	98	Paved parking, HSG A
0.310	39	>75% Grass cover, Good, HSG A
0.440	56	Weighted Average
0.310		70.45% Pervious Area
0.130		29.55% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.3	100	0.0600	0.23		**Sheet Flow, sheet flow** Grass: Short n= 0.150 P2= 2.39"
0.4	110	0.0700	4.26		**Shallow Concentrated Flow, shallow flow** Unpaved Kv= 16.1 fps
7.7	210	Total			

Table 9: Proposed Conditions - DA-1D

Area (ac)	CN	Description
5.320	81	Urban industrial, 72% imp, HSG A
3.650	39	>75% Grass cover, Good, HSG A
0.060	74	>75% Grass cover, Good, HSG C
2.040	61	1/4 acre lots, 38% imp, HSG A
0.380	83	1/4 acre lots, 38% imp, HSG C
3.120	30	Woods, Good, HSG A
1.000	55	Woods, Good, HSG B
1.690	70	Woods, Good, HSG C
1.030	77	Woods, Good, HSG D
18.290	59	Weighted Average
13.540		74.03% Pervious Area
4.750		25.97% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.6	100	0.0750	0.11		**Sheet Flow, sheet flow** Woods: Light underbrush n= 0.400 P2= 2.39"
1.0	305	0.1080	5.29		**Shallow Concentrated Flow, shallow flow** Unpaved Kv= 16.1 fps
0.4	270	0.0660	10.91	87.26	**Channel Flow, ditch** Area= 8.0 sf Perim= 8.0' r= 1.00' n= 0.035 Earth, dense weeds
16.0	675	Total			

Table 10: Proposed Conditions - DA-2

Area (ac)	CN	Description
0.080	30	Woods, Good, HSG A
2.010	70	Woods, Good, HSG C
2.090	68	Weighted Average
2.090		100.00% Pervious Area

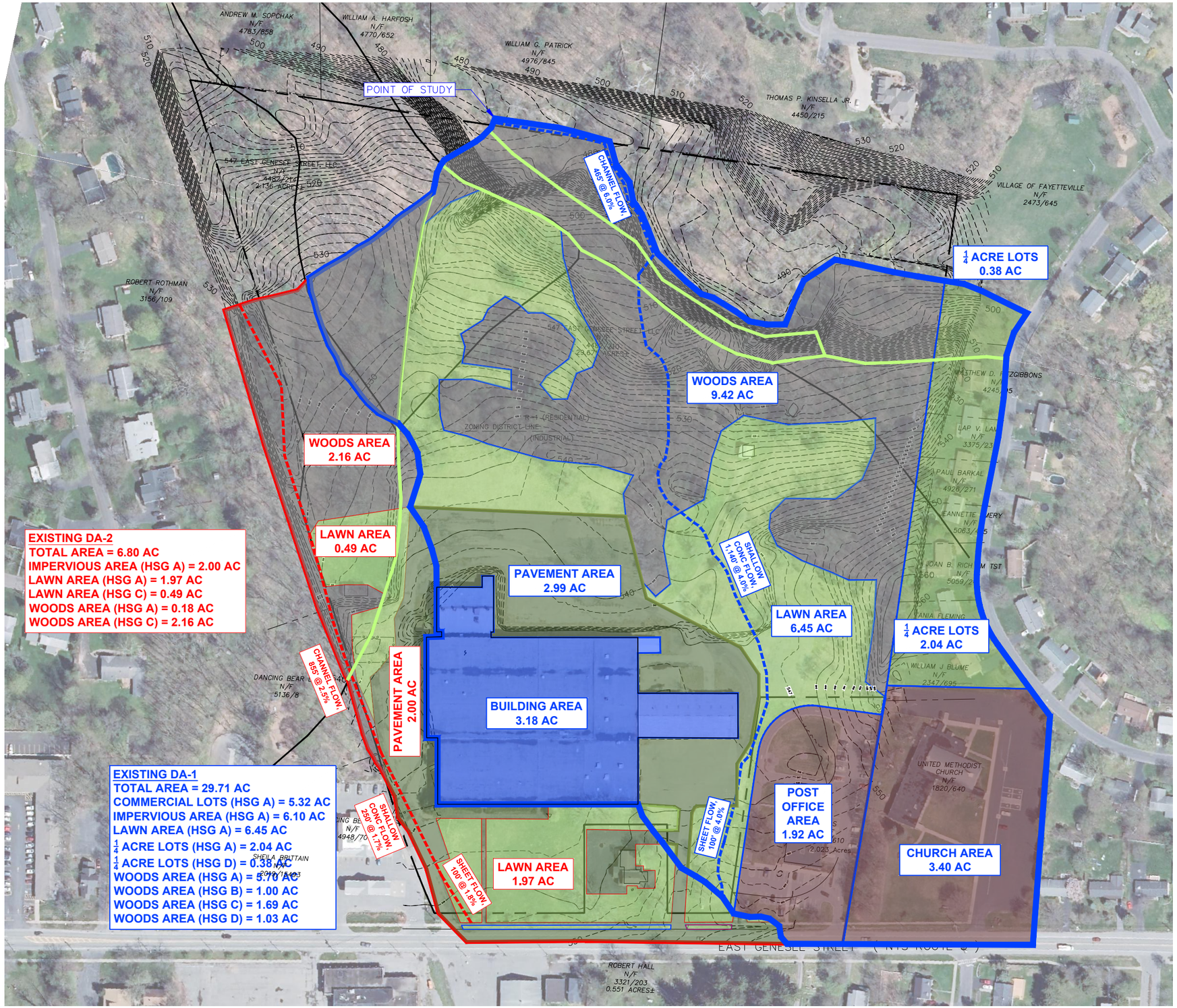
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.5	100	0.0200	0.10		**Sheet Flow, sheet flow** Grass: Dense n= 0.240 P2= 2.39"
0.3	72	0.0700	4.26		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
2.6	770	0.0180	4.98	39.87	**Channel Flow, wooded ditch** Area= 8.0 sf Perim= 8.0' r= 1.00' n= 0.040 Earth, dense weeds
19.4	942	Total			

As stated above, drainage areas DA-1A, DA-1B, and DA-1C will be tributary to the aboveground stormwater management system. The bioretention filters collect runoff from the rooftops, parking areas, and lawn/landscape areas. Bioretention filters are a stormwater management practice that provides runoff reduction and water quality treatment. Bioretention filters, considered a standard stormwater management practice with runoff reduction capacity, use biogeochemical processes to decrease stormwater quantity and improve water quality (NYSDEC Stormwater Management Design Manual, p. 5-97)[1]. The filters collect runoff from rainfall events, temporarily store it, and filter it through the root structure of the plants and the

[1] The "biogeochemical process" in terms of stormwater management is the pathway by which water is recycled through plant material where the plant can consume it or return it to the atmosphere through evapotranspiration.

planting soil media. Through the plants' uptake of runoff and the filtering through the soil media, the amount of runoff the site generates is reduced and the remaining runoff from these frequent, but less intense, rainfall events is treated to remove pollutants such as suspended solids and phosphorus. The runoff volume in excess of the water quality event (the 90th-percentile rain event) will discharge through overflow structures and be conveyed to downstream management practices designed to attenuate the peak rate of runoff from the less frequent but more intense rainfall events. The bioretention filters within the stormwater management system have been designed in accordance with the NYSDEC Stormwater Management Design Manual. Detailed calculations regarding the design of each bioretention filter are presented in Appendix B.

An above ground grass-lined detention basin system is downstream of the bioretention filters. The detention basin provides storage to attenuate the peak rates of runoff so as not to adversely impact the tributary stream, Bishops Brook. Stormwater from the basin will be released downstream via an outlet control structure and culvert pipe with rock outlet protection.



EXISTING DA-2
TOTAL AREA = 6.80 AC
IMPERVIOUS AREA (HSG A) = 2.00 AC
LAWN AREA (HSG A) = 1.97 AC
LAWN AREA (HSG C) = 0.49 AC
WOODS AREA (HSG A) = 0.18 AC
WOODS AREA (HSG C) = 2.16 AC

EXISTING DA-1
TOTAL AREA = 29.71 AC
COMMERCIAL LOTS (HSG A) = 5.32 AC
IMPERVIOUS AREA (HSG A) = 6.10 AC
LAWN AREA (HSG A) = 6.45 AC
¼ ACRE LOTS (HSG A) = 2.04 AC
¼ ACRE LOTS (HSG D) = 0.38 AC
WOODS AREA (HSG A) = 5.71 AC
WOODS AREA (HSG B) = 1.00 AC
WOODS AREA (HSG C) = 1.69 AC
WOODS AREA (HSG D) = 1.03 AC

PROJECT TITLE:
PROPOSED MIXED USE
547 GENESEE ST (ROUTE 5)
VILLAGE OF FAYETTEVILLE ONONDAGA COUNTY, NY

PREPARED FOR:
MILLSTONE DEVELOPMENT GROUP, LLC.
125 HIGH ROCK AVENUE
SARATOGA SPRINGS, NY 12866

SHEET TITLE:
EXISTING DRAINAGE AREA

NO.	REVISION/ISSUE	DATE

GRAPHIC SCALE
0 80' 160'
(IN FEET)
1 inch = 80 ft

PREPARED BY:
NAPIERALA CONSULTING
PROFESSIONAL ENGINEER, P.C.
SITE • DESIGN • ENGINEERING
110 FAYETTE STREET
MANLIUS, New York 13104
email: MNAP@NAPCON.COM
PH: (315) 682-5580 FAX: (315) 682-5544

PRELIMINARY FOR CONCEPT REVIEW ONLY

PLAN SEALED BY:
MATTHEW R. NAPIERALA, P.E.
NYS LICENSED PROFESSIONAL ENGINEER

PROJECT NO. 19-1826
DATE 05 MAY 2020
SCALE 1" = 80'

SHEET EX

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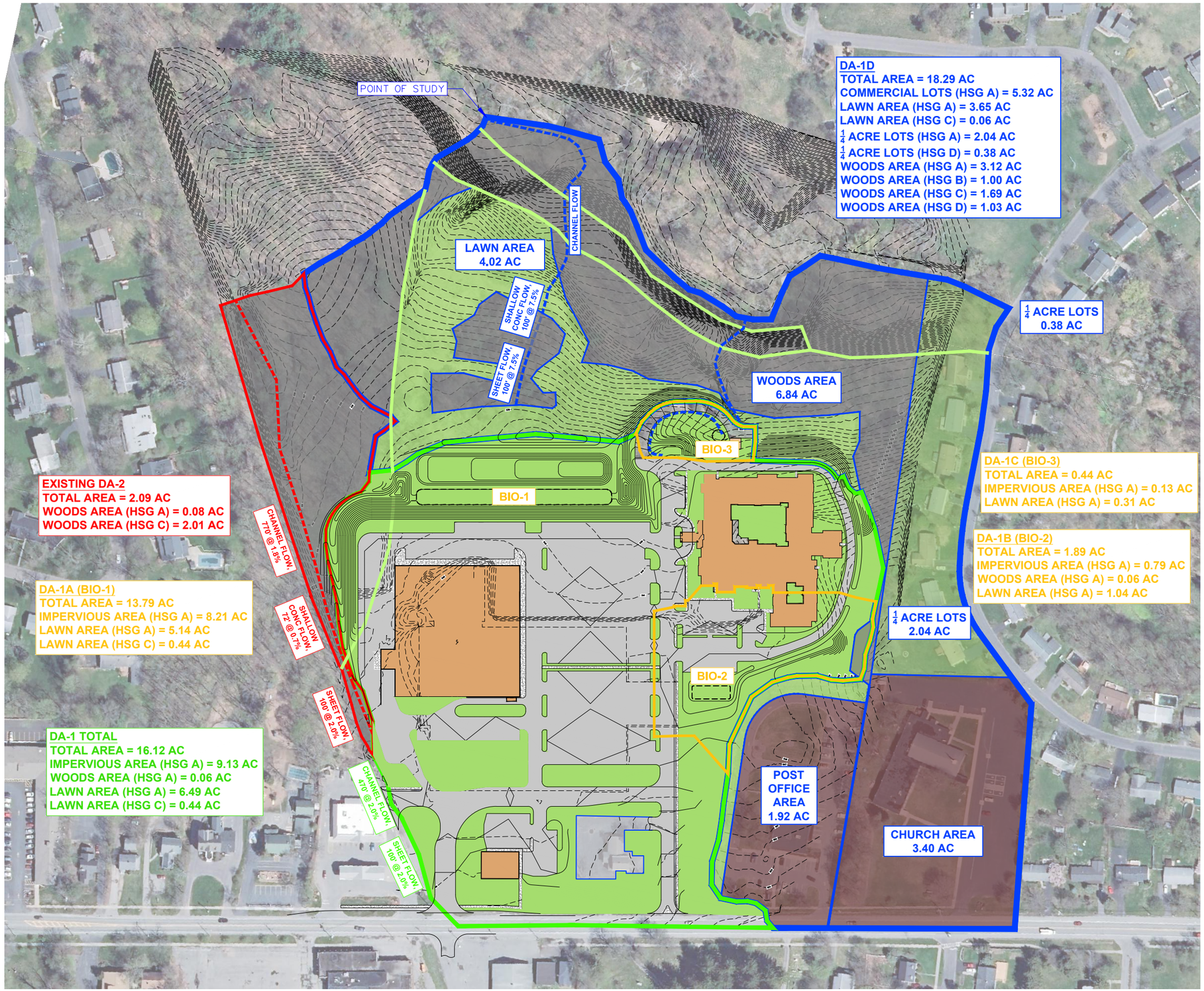

PROJECT TITLE:
PROPOSED MIXED USE
547 GENESEE ST (ROUTE 5)
VILLAGE OF FAYETTEVILLE ONONDAGA COUNTY, NY

PREPARED FOR:
MILLSTONE DEVELOPMENT GROUP, LLC.
125 HIGH ROCK AVENUE
SARATOGA SPRINGS, NY 12866

SHEET TITLE:
PROPOSED
DRAINAGE AREA

GRAPHIC SCALE
0 80' 160'
(IN FEET)
1 inch = 80 ft

PREPARED BY:
NAPIERALA CONSULTING
PROFESSIONAL ENGINEER, P.C.
SITE • DESIGN • ENGINEERING
110 FAYETTE STREET
MANLIUS, NEW YORK 13104
PH: (315) 682-5580 FAX: (315) 682-5544
email: MNAP@NAPCON.COM

NO.	REVISION/ISSUE	DATE

PRELIMINARY FOR CONCEPT REVIEW ONLY

PLAN SEAL BY:
MATTHEW R. NAPIERALA, P.E.
NAME OF NOTARY PUBLIC

PROJECT NO.	DATE	SCALE
19-1826	05 MAY 2020	1" = 80'

SHEET
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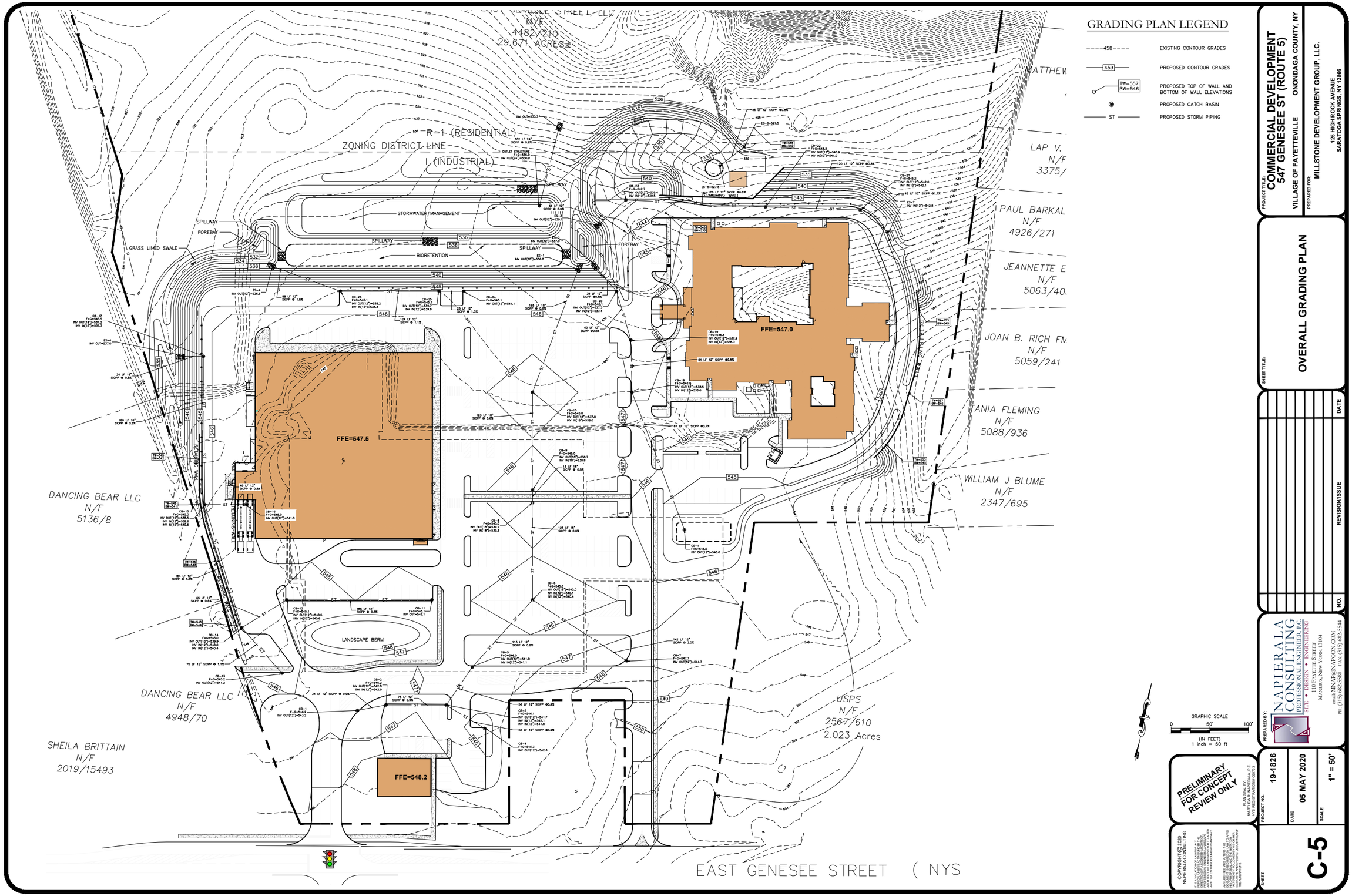

PROJECT TITLE:
COMMERCIAL DEVELOPMENT
547 GENESEE ST (ROUTE 5)
VILLAGE OF FAYETTEVILLE ONONDAGA COUNTY, NY

PREPARED FOR:
MILLSTONE DEVELOPMENT GROUP, LLC.
125 HIGH ROCK AVENUE
SARATOGA SPRINGS, NY 12866

SHEET TITLE:
OVERALL GRADING PLAN

NO.	REVISION/ISSUE	DATE

PREPARED BY:
NAPIERALA CONSULTING
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PRELIMINARY FOR CONCEPT REVIEW ONLY

PLAN SEAL BY:
MATTHEW P. NAPIERALA, P.E.
NEW YORK LICENSE NO. 075572

PROJECT NO. 19-1826
DATE 05 MAY 2020
SCALE 1" = 50'
SHEET C-5

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D. RUNOFF REDUCTION VOLUME (RR_V)

The NYSDEC implemented regulations effective March 1, 2011 that requires all construction projects that disturb greater than one acre of land to provide runoff reduction through the implementation of green infrastructure practices. The goal of the runoff reduction volume criteria is to implement stormwater management practices and green infrastructure techniques to replicate pre-development hydrology. The NYS Stormwater Management Design Manual provides the acceptable green planning techniques and green infrastructure techniques to meet the runoff reduction volume criteria. The following narrative and calculations detail the implementation of the planning and infrastructure techniques on the site to achieve the minimum runoff reduction volume. The narrative follows the Design Manual, Chapter 5.

PLANNING

Plan to preserve, avoid and minimize

	Applicable	Not Applicable
a. Preserve undisturbed, natural buffer, and critical environmental areas.	☒	☐
b. Employ open space, conservation, and clustering site design techniques.	☐	☒
c. Avoid developing in environmentally sensitive areas: floodplain, steep slopes, habitat, ecosystems, bedrock, wetlands, shorelines, shallow groundwater, impervious soils, and unstable soils.	☒	☐
d. Minimize impervious surfaces: building footprints, parking, roads, sidewalks, and driveways.	☒	☐
e. Minimize clearing and grading	☒	☐

Discussion:

a. The project involves the development of land at the front of the property to avoid the steep slopes, wooded buffer areas, and Bishop Brook channel at the rear of the site.

b. This project is a multi-user development. Open space design, as discussed in the Stormwater Management Design Manual, is not applicable to this project. Open space is used in projects on large tracts of land where the development can be concentrated in a portion of the site while maintaining large portions of undisturbed land. Clustering is typically incorporated in subdivision projects involving the creation of multiple lots with multiple buildings.

c. The project involves the development of land at the front of the property to avoid developing areas with steep slopes near Bishops Brook in the rear of the property.

d. Impervious surfaces have been minimized to the maximum extent possible while continuing to provide the amenities for the developments.

e. The proposed grading plan for the project minimizes the amount of grading to the maximum extent practicable. Grade requirements for a functional site were taken into account during the initial design phases.

WATER QUALITY VOLUME

Drainage area DA-1 PROPOSED

Calculate required water quality volume for the additional impervious area (New WQ_v):

$$\mathbf{WQ_v = \frac{PR_vA}{12}}$$

90-th Percentile Rainfall (P) = 1.00 inch

WQ_V Drainage Area (A) = 16.12 acres

Strategy:

Treat 25% of the existing impervious area with a standard water quality treatment practice

Treat 100% of the new impervious area with a standard water quality treatment practice

$$\sum A_I = 0.25A_{I\ Existing} + (A_{I\ Proposed} - A_{I\ Existing})$$

$$\sum A_I = 0.25 \cdot 8.10\ ac + (9.13\ ac - 8.10\ ac)$$

$$\sum A_I = 3.06\ ac$$

$$R_v = 0.05 + 0.9\left(\frac{A_I}{A}\right)$$

$$R_v = 0.05 + 0.9\left(\frac{3.06\ ac}{16.12\ ac}\right)$$

$R_v = 0.221$

$$WQ_v = \frac{PR_vA}{12}$$

$$WQ_v = \frac{1.0 * 0.221 * 16.12}{12}$$

Total Required DA-1 WQ_v = 0.297 ac·ft (12,930 cf)

Total Required DA-1 Pretreatment Volume = 0.297 · 40% = 0.12 ac·ft (5,175 cf)

RUNOFF REDUCTION VOLUME

According to the redevelopment standards in Chapter 9 of the NYS Stormwater Management Design Manual, the runoff reduction volume from the existing impervious area is not required.

Minimum RRv requirements (when 100% WQv reduction cannot be achieved)

Calculate minimum required Runoff Reduction Volume for additional impervious area (New RRv):

$$\mathbf{RR_v = \frac{0.95\,P \cdot S \cdot A_I}{12}}$$

A_I = total impervious area $= 9.13 - 8.10 = 1.03$ ac

S = 0.55 (A Soils), 0.40 (B Soils), 0.30 (C Soils), 0.20 (D Soils), or weighted HSG average in drainage area

Mix of A & C Soils (97.5% A Soils), therefore S = 0.55

$$\text{New } RR_v = \frac{0.95 \cdot 1.00 \cdot 0.55 \cdot 1.03 \text{ ac}}{12}$$

Total Required RR_v = 0.045 ac·ft (1,955 cf)

AREA REDUCTION PRACTICES

Area reduction practices were not utilized for this project. The development is located on-site in such a way that preserves the existing vegetative buffers surrounding the property to the maximum practical extent.

ROOFTOP DISCONNECTION

Roof top disconnection was not utilized on this project. Alternative green infrastructure practices for the rooftop areas were implemented; the rooftop downspouts discharge into bioretention filters that are located throughout the project site. The discussion of this practice is found under the "Source Control" practices.

SOURCE CONTROL WQv TREATMENT PRACTICES

The project includes the construction of bioretention filters strategically located throughout the site in order to collect stormwater runoff from the impervious surfaces. The filters capture the runoff near the source to enhance the reduction of stormwater runoff.

Bioretention Basin 1 (Drainage Area DA-1A)

Calculate the required area of the bioretention filter:

$$R_v = 0.05 + 0.9\left(\frac{A_I}{A}\right)$$

$$R_v = 0.05 + 0.9\left(\frac{8.21\ \text{ac}}{13.79\ \text{ac}}\right)$$

$$R_v = 0.586$$

$$WQ_v = \frac{PR_vA}{12}$$

$$WQ_v = \frac{1.0 * 0.586 * 13.79}{12}$$

$$WQ_v = 0.673\ ac \cdot ft$$

$$A_f = \frac{(WQ_v)(d_f)}{(k)(h_f + d_f)(t_f)}$$

Where,

A_f	=	Area of the filter, (ft^2)
WQ_v	=	Water Quality Volume (ft^3)
d_f	=	depth of the bioretention soil media (2.5 feet as required in NYS Design Manual)
k	=	coefficient of permeability (0.5 ft/day per NYS Design Manual)
h_f	=	average height of water above the filter bed (0.25 ft)
t_f	=	design filter bed drain time (2 days per NYS Design Manual)

$$A_f = \frac{(29{,}335\ \text{ft}^3)(2.5\ \text{ft})}{\left(0.5\ \frac{\text{ft}}{\text{day}}\right)(0.25\ \text{ft} + 2.5\ \text{ft})(2\ \text{days})}$$

$A_f = 26{,}670\ \text{ft}^2$ *required**

***This area represents the required square-footage of a bioretention for the construction of 8.21 acres of additional impervious area. This project is a redevelopment and is therefore only required to treat an aggregate of 3.06 acres of impervious area.**

A_f Provided = 10,000 ft^2

Therefore, the provided WQ_v is calculated as follows:

$$WQ_v = \frac{10{,}000\ \text{ft}^2}{26{,}670\ \text{ft}^2} * 0.673\ ac \cdot ft$$

WQv Provided = 0.252 ac·ft

Allowable Runoff Reduction Volume:
A or B Soils: $RR_v = 1.00\ WQ_v$ (without underdrain)
C or D Soils: $RR_v = 0.40\ WQ_v$ (with underdrain)

The drainage area has "A" and "C" soils:

$$S = \frac{0.44}{16.12}\ \text{C soil}, \frac{15.68}{16.12}\ \text{A soil} = 3\%\ \text{C soils}, 97\%\ \text{A soils} = (0.03 \cdot 0.4) + (0.97 \cdot 1.0) = 0.98$$

Therefore the RR_v provided is calculated as follows:

$$Provided\ RR_v = 0.98 * 0.252\ \text{ac} \cdot \text{ft}$$

RRv Provided = 0.247 ac·ft

Bioretention Basin 2 (Drainage Area DA-1B)

Calculate the required area of the bioretention filter:

$$R_v = 0.05 + 0.9\left(\frac{A_I}{A}\right)$$

$$R_v = 0.05 + 0.9\left(\frac{0.79\ \text{ac}}{1.89\ \text{ac}}\right)$$

$$R_v = 0.426$$

$$WQ_v = \frac{PR_vA}{12}$$

$$WQ_v = \frac{1.0 * 0.426 * 1.89}{12}$$

$$WQ_v = 0.067\ ac \cdot ft$$

$$A_f = \frac{(WQ_v)(d_f)}{(k)(h_f + d_f)(t_f)}$$

Where,

A_f	=	Area of the filter, (ft^2)
WQ_v	=	Water Quality Volume (ft^3)
d_f	=	depth of the bioretention soil media (2.5 feet as required in NYS Design Manual)
k	=	coefficient of permeability (0.5 ft/day per NYS Design Manual)
h_f	=	average height of water above the filter bed (0.25 ft)
t_f	=	design filter bed drain time (2 days per NYS Design Manual)

$$A_f = \frac{(2{,}920\ \text{ft}^3)(2.5\ \text{ft})}{\left(0.5\ \frac{\text{ft}}{\text{day}}\right)(0.25\ \text{ft} + 2.5\ \text{ft})(2\ \text{days})}$$

$$A_f = 2{,}655\ \text{ft}^2\ required*$$

***This area represents the required square-footage of a bioretention for the construction of 0.79 acres of additional impervious area. This project is a redevelopment and is therefore only required to treat an aggregate of 3.06 acres of impervious area.**

A_f Provided = 1,600 ft^2

Therefore, the provided WQ_v is calculated as follows:

$$WQ_v = \frac{1{,}600\ ft^2}{2{,}655\ ft^2} * 0.067\ ac \cdot ft$$

WQv Provided = 0.040 ac·ft

Allowable Runoff Reduction Volume:
A or B Soils: $RR_v = 1.00\ WQ_v$ (without underdrain)
C or D Soils: $RR_v = 0.40\ WQ_v$ (with underdrain)

The drainage area has only "A" soils.

Therefore the RR_v provided is calculated as follows:

$$Provided\ RR_v = 1.0 * 0.040\ ac \cdot ft$$

RRv Provided = 0.040 ac·ft

Bioretention Basin 3 (Drainage Area DA-1C)

Calculate the required area of the bioretention filter:

$$R_v = 0.05 + 0.9\left(\frac{A_I}{A}\right)$$

$$R_v = 0.05 + 0.9\left(\frac{0.13\ ac}{0.44\ ac}\right)$$

$$R_v = 0.316$$

$$WQ_v = \frac{PR_vA}{12}$$

$$WQ_v = \frac{1.0 * 0.316 * 0.44}{12}$$

$$WQ_v = 0.012\ ac \cdot ft$$

$$A_f = \frac{(WQ_v)(d_f)}{(k)(h_f + d_f)(t_f)}$$

Where,

A_f	=	Area of the filter, (ft^2)
WQ_v	=	Water Quality Volume (ft^3)
d_f	=	depth of the bioretention soil media (2.5 feet as required in NYS Design Manual)
k	=	coefficient of permeability (0.5 ft/day per NYS Design Manual)
h_f	=	average height of water above the filter bed (0.25 ft)
t_f	=	design filter bed drain time (2 days per NYS Design Manual)

$$A_f = \frac{(505\ ft^3)(2.5\ ft)}{\left(0.5\ \frac{ft}{day}\right)(0.25\ ft + 2.5\ ft)(2\ days)}$$

$$A_f = 460\ ft^2\ required*$$

***This area represents the required square-footage of a bioretention for the construction of 0.13 acres of additional impervious area. This project is a redevelopment and is therefore only required to treat an aggregate of 3.06 acres of impervious area.**

A_f Provided = 380 ft^2

Therefore, the provided WQ_v is calculated as follows:

$$WQ_v = \frac{380\ ft^2}{460\ ft^2} * 0.012\ ac \cdot ft$$

WQv Provided = 0.010 ac·ft

Allowable Runoff Reduction Volume:
A or B Soils: RR_v = 1.00 WQ_v (without underdrain)
C or D Soils: RR_v = 0.40 WQ_v (with underdrain)

The drainage area has only "A" soils.

Therefore the RR_v provided is calculated as follows:

$Provided\ RR_v = 1.0 * 0.010\ ac \cdot ft$

RRv Provided = 0.010 ac·ft

Total Provided WQ_v:

$$WQ_v = 0.252 + 0.040 + 0.010 = \mathbf{0.302\ ac \cdot ft}\ \textit{(0.297 ac · ft required)}$$

Total Provided RR_v:

$$RR_v = 0.247 + 0.040 + 0.010 = \mathbf{0.297\ ac \cdot ft}\ \textit{(0.045 ac · ft required)}$$

E. WATER QUANTITY

As discussed previously in the report, the proposed project alters the hydrologic characteristics of the existing drainage area. Changes in land cover, grading, and the time of concentration due to the proposed project will increase the amount of runoff and the peak flow rates from the site. The stormwater management system must collect, store, and release the runoff such that the discharge from the site complies with the requirements established in the NYSDEC SPDES General Permit for Stormwater Discharges from Construction Activity. In order to comply with current stormwater regulations, the stormwater system must:

- Control the release of the runoff from the one-year, 24-hour rainfall event such that it is released over a 24-hour period (Channel Protection Volume).
- The peak rate of discharge from the site during the 10-year, 24-hour rainfall event cannot exceed the peak rate of discharge prior to construction (Overbank Flood Control)
- The peak rate of discharge from the site during the 100-year, 24-hour rainfall event cannot exceed the peak rate of discharge prior to construction (Extreme Flood Control).

The HydroCAD computations for the stormwater modeling can be found in Appendices C (Existing Conditions) and D (Proposed Conditions). The following is a summary of the computations and discussion of the results.

1. CHANNEL PROTECTION VOLUME (Cp_v)

The project site must provide sufficient storage of the 1-year, 24-hour runoff event such that the volume is released over a 24-hour period. The NYS Stormwater Design Manual methodology for determining the storage volume was used (Appendix B.1) and is discussed below.

Tributary Area = 16.07 acres

CN = 75

t_c = 14 mins

I_a = 0.703, P = 2.05”

$$\frac{I_a}{P} = 0.34$$

Using I_a/P and T_c, q_u = 600 csm/in (TR-55, Exhibit 4-II)

Using q_u and T = 24 hr, q_o/q_i = 0.035 (Design Manual, Figure B.1)

Using formula 2.1.16 (Design Manual, Appendix B.1), calculate V_s/V_r

$$\frac{V_s}{V_r} = 0.63$$

Using formula 2.1.17 (Design Manual, Appendix B.1), calculate V_s

$$V_s = \frac{\left(\frac{V_s}{V_r}\right) Q_d A}{12}$$

HydroCAD provides the volume of runoff ($Q_dA/12$) = 0.633 ac·ft

$V_s = 0.63 \cdot 0.494$ ac · ft

$V_s = 0.311$ ac · ft *Required*

The provided RR_v is subtracted from V_s to determine the required Cp_v.

$Cp_v = 0.311$ ac · ft $- 0.265$ ac · ft (RR_v provided in bioretention media, not including ponding)

Required $Cp_v = 0.046$ ac · ft

Provided CPv = $0.098\ (at\ elevation\ 532.06) + 0.155\ (Bioretention\ Ponding) = \mathbf{0.253\ ac \cdot ft}$

2. PEAK FLOW MITIGATION ($Q_{P10\text{-}Year}$ and $Q_{P100\text{-}Year}$)

The remaining two requirements of the NYSDEC SPDES General Permit for Stormwater Discharges from Construction Activity are that the stormwater system cannot discharge runoff from the site during the 10-year and 100-year, 24-hour rainfall events at rates higher than the existing condition peak rates of runoff during the correlating rainfall events. To meet these requirements, the stormwater basin will act as a detention basin that captures the runoff, temporarily store it, and release the runoff in a controlled manner to the existing wetland such that the proposed project will not adversely impact the downstream areas. The following table summarizes the HydroCAD results for the 10-year and 100-year rainfall events. Complete HydroCAD calculations are presented in Appendix D.

Table 11: Water Quantity Calculations at Design Point

Rainfall Event	24-Hour Rainfall	Existing Condition Peak Rate of Runoff	Proposed Condition Peak Rate of Runoff	Peak Water Elevation (536.0 max)
10-Year	3.43”	22.3 cfs	12.1 cfs	533.5
100-Year	5.79”	84.5 cfs	57.7 cfs	535.5

Table 12: Detention Basin and Outlet Structure Summary

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
531.00	2,290	0	0
532.00	5,615	3,953	3,953
533.00	9,928	7,772	11,724
534.00	15,229	12,579	24,303
535.00	18,180	16,705	41,007
536.00	20,548	19,364	60,371
536.50	21,753	10,575	70,946

Device	Routing	Invert	Outlet Devices
#1	Primary	530.90'	**24.0" Round Culvert** L= 102.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 530.90' / 530.30' S= 0.0059 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#2	Device 1	531.00'	**4.0" Vert. Orifice1** C= 0.600
#3	Device 1	532.10'	**12.0" W x 18.0" H Vert. Orifice2** C= 0.600
#4	Device 1	535.00'	**24.0" x 24.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads
#5	Secondary	536.00'	**10.0' long x 20.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

SECTION V. INSPECTION AND MAINTENANCE REQUIREMENTS

Best management practices, both construction and operational, must be inspected and maintained on a routine basis in order to ensure continued compliance with the NYS SPDES General Permit for Stormwater Discharges from Construction Activity. The contractor is responsible for inspecting the erosion and sediment control practices daily and after every runoff-producing rainfall event. The operator/owner is responsible for providing a qualified professional, as defined in the SPDES General Permit, to perform the required inspections of the construction site from the time earth-disturbing activities begin until final stabilization is achieved and the Notice of Termination is filed. The inspections shall occur twice a week while the site disturbance is greater than five acres. Once the disturbance is less than five acres, inspection frequency can be reduced to once every seven days. The contractor will submit written evidence of such compliance if requested by the operator or any agent of a regulatory body. The contractor will comply with all conditions of the NYSDEC SPDES General Permit for Stormwater Discharges from Construction Activity, including the conditions related to maintaining the SWPPP and evidence of compliance with the SWPPP at the job site and allowing regulatory personnel access to the job site and to records in order to determine compliance.

A. CONSTRUCTION MAINTENANCE/INSPECTION PROCEDURES

The operator shall maintain a record of all inspection reports in a site logbook. The logbook shall be maintained on site and be made available to the permitting authority upon request. Prior to the commencement of construction, the operator shall certify in the site logbook that the SWPPP, prepared in accordance with Part III.D. of the NYSDEC SPDES General Permit for Stormwater Discharges from Construction Activity, meets all Federal, State and local erosion and sediment control requirements.

The operator shall post at the site, in a publicly accessible location, a summary of the site inspection activities on a monthly basis.

1. Inspection and Maintenance Practices

   a. Inspections shall occur at least once every seven calendar days (and twice per day if greater than five acres of area are disturbed at one time).

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

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

      i. Date and time of inspection;

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

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

      iv. A description of the condition of the runoff at all points of discharge from the construction site. This shall include identification of any discharges of sediment from the construction site. Include discharges from conveyance systems (i.e. pipes, culverts, ditches, etc.) and overland flow;

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

      vi. Identification of all erosion and sediment control practices that need repair or maintenance;

vii. Identification of all erosion and sediment control practices that were not installed or are not functioning as designed and need to be reinstalled or replaced;

viii. Description and sketch of areas that are disturbed at the time of the inspection and areas that have been stabilized (temporarily and/or final) since the last inspection;

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

x. Corrective action(s) that must be taken to install, repair, replace, or maintain erosion and sediment control practices; and to correct deficiencies identified with the construction of the post-construction stormwater management practice(s); and

xi. Digital photographs, with date stamp, that clearly show the condition of all practices that have been identified as needing corrective actions. The qualified inspector shall attach paper color copies of the digital photographs to the inspection report being maintained onsite within seven (7) calendar days of the date of the inspection. The qualified inspector shall also take digital photographs, with date stamp, that clearly show the condition of the practice(s) after the corrective action has been completed. The qualified inspector shall attach paper color copies of the digital photographs to the inspection report that documents the completion of the corrective action work within seven (7) calendar days of that inspection.

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

e. All inspection reports shall be signed by the qualified inspector. The inspection reports shall be maintained on the site.

f. ESC Inspection/Maintenance

i. Concrete Truck Washout:
All concrete washout facilities shall be inspected daily. Damaged or leaking facilities shall be deactivated and repaired or replaced immediately.

Accumulated material shall be removed when 75% of the storage capacity of the structure is filled.

Dispose of hardened material off-site in a construction/demolition landfill. Hardened material can also be recycled or buried and covered with a minimum cover of two feet of clean compacted earthfill that is permanently stabilized to prevent erosion.

The plastic liner shall be replaced with each cleaning of the washout facility.

Inspect the project site frequently to ensure that no concrete discharges are taking place in non-designated areas.

ii. Dust Control - Maintain dust control measures through dry weather periods until all disturbed areas are stabilized.

iii. Stabilized Construction Access:
The access shall be maintained in a condition which will prevent tracking of sediment onto public rights-of-way or streets. This may require periodic top dressing with additional aggregate. All sediment spilled, dropped, or washed onto public rights-of-way must be removed immediately.

When necessary, wheels must be cleaned to remove sediment prior to entrance onto public rights-of-way. When washing is required, it shall be done on an area stabilized

with aggregate, which drains into an approved sediment-trapping device. All sediment shall be prevented from entering storm drains, ditches, or watercourses.

iv. Winter Stabilization

The site shall be inspected frequently to ensure that the erosion and sediment control plan is performing its winter stabilization function. If the site will not have earth disturbing activities ongoing during the "winter season", all bare exposed soil must be stabilized by established vegetation, straw, or other acceptable mulch, matting, rock, or other approved material such as rolled erosion control products. Seeding of areas with mulch cover is preferred but seeding alone is not acceptable for proper stabilization.

Compliance inspections must be performed and reports filed properly in accordance with the SWPPP for all sites under winter shutdown.

v. Check Dams:

The check dams should be inspected after each runoff event. Correct all damage immediately. If significant erosion has occurred between structures, a liner of stone or other suitable material should be installed in that portion of the channel or additional check dams added.

Remove sediment accumulated behind the dam as needed to allow channel to drain through the stone check dam and prevent large flows from carrying sediment over the dam. Replace stones as needed to maintain the design cross section of the structures.

vi. Sediment Trap

Sediment shall be removed and the trap restored to the original dimensions when the sediment has accumulated to ½ of the design depth. Sediment removed from the trap shall be deposited in a protected area and in such a manner that it will not erode.

vii. Seeding: Temporary and permanent seeding and all other stabilization measures will be inspected for bare spots, washouts, and healthy growth.

g. Inspection and Maintenance Report Forms

- Once installation of any required or optional erosion control device or measure has been implemented, at least twice every seven calendar days a Qualified Professional shall inspect each practice. The inspector shall use the forms found in this SWPPP to inventory and report the condition of each measure to assist in maintaining the erosion and sediment control measures in good working order.
- These report forms shall become an integral part of the SWPPP and shall be made readily accessible to governmental inspection officials, the operator's engineer, and the operator for review upon request during visits to the project site. In addition, copies of the reports shall be provided to any of these persons upon requires, via mail or facsimile transmission. Inspection and maintenance report forms are to be maintained by the permittee for three years following the final stabilization of the site.
- The operator shall also prepare a written summary of its status with respect to compliance with the NYSDEC SPDES General Permit for Stormwater Discharges from Construction Activity at a minimum frequency of every three months during which coverage under the SPDES General Permit exists. The summary should address the status of achieving each component of the SWPPP. The reports shall be signed by the signatory of the NOI or a duly authorized person and be retained at the construction site.

h. Other Record Keeping Requirements

The contractor shall keep the following records related to construction activities at the site:

- Dates when major grading activities occur and the areas which were graded.
- Dates and details concerning the installation of structural controls.
- Dates when construction activities cease in an area.
- Dates when an area is stabilized, either temporarily or permanently.
- Dates of rainfall and the amount of rainfall.

- Dates and descriptions of the character and amount of any spills of hazardous materials.
- Records of reports filed with regulatory agencies if reportable quantities of hazardous materials are spilled.

B. OPERATION MAINTENANCE AND INSPECTIONS PROCEDURES

Long-term maintenance of the stormwater management system will be the responsibility of the property owner. Maintenance and inspection check lists have been included in Appendix F and are summarized below:

1. Bioretention basin

a. Monthly Inspections

i. Debris Cleanout
1) Bioretention and contributing areas clean of debris
2) No dumping of yard wastes into practice
3) Litter (branches, dead vegetation, etc.) has been removed

ii. Vegetation
1) Plant height not less than design water depth
2) Fertilized per specifications
3) Plant composition according to approved plans
4) No placement of inappropriate plants
5) Grass height no greater than six inches
6) No evidence of erosion

iii. Dewatering
1) Dewaters between storms
2) No evidence of standing water

b. Annual, After Major Storms

i. Gravel Diaphragm
1) No evidence of sediment buildup
2) Sumps should not be more than 50% full of sediment
3) No evidence of erosion at downstream toe of diaphragm

ii. Outlet/overflow
1) Good condition, no need for repair
2) No evidence of erosion
3) No evidence of blockages

iii. Integrity of Filter Bed
1) Filter bed has not been blocked or filled inappropriately

SECTION VI. MATERIALS MANAGEMENT PLAN

A. MATERIALS COVERED

The following materials or substances are expected to be present onsite during construction:

Concrete/Additives/Wastes	Cleaning Solvents
Detergents	Petroleum-based Products
Paints/Solvents	Pesticides
Acids	Solid and Construction Wastes
Sanitary Wastes	Soil Stabilization Additives

B. MATERIAL MANAGEMENT PRACTICES

The following are the material management practices that will be used to reduce the risk of spills or other accidental exposure of materials and substances to stormwater runoff. The job site superintendent will be responsible for ensuring that these procedures are followed.

1. Good Housekeeping

The following good housekeeping practices will be followed onsite during the construction project:

a. An effort will be made to store only enough products required to do the job.

b. All materials stored onsite will be stored in a neat, orderly manner and, if possible, under a roof or in a containment area. At a minimum, all containers will be stored with their lids on when not in use. Drip pans shall be provided under all dispensers.

c. Products will be kept in their original containers with the original manufacturer's label in legible condition.

d. Substances will not be mixed with one another unless recommended by the manufacturer.

e. Whenever possible, all of a product will be used up before disposing of the container.

f. Manufacturer's recommendations for proper use and disposal will be followed.

g. The job site superintendent will be responsible for daily inspections to ensure proper use and disposal of materials.

2. Hazardous Products

These practices will be used to reduce the risks associated with hazardous materials. Material Safety Data Sheets (MSDS's) for each substance with hazardous properties that is used on the job site will be obtained and used for the proper management of potential wastes that may result from these products. An MSDS will be posted in the immediate area where such product is stored and/or used and another copy of each MSDS will be maintained in the SWPPP file at the job site construction trailer office. Each employee who must handle a substance with hazardous properties will be instructed on the use of MSDS sheets and the specific information in the applicable MSDS for the product he/she is using, particularly regarding spill control techniques.

a. Products will be kept in original containers with the original labels in legible condition.

b. Original labels and material safety data sheets (MSDS's) will be procured and used for each material.

c. If surplus product must be disposed of, manufacturer's or local/state/federal recommended methods for proper disposal will be followed.

3. Hazardous Waste

All hazardous waste materials will be disposed of by the contractor in the manner specified by local, state, and/or federal regulations and by the manufacturer of such products. Site personnel will be instructed in these practices by the job site superintendent, who will also be responsible for seeing that these practices are followed.

4. Product Specific Practices

The following product specific practices will be followed on the job site.

a. Petroleum Products

All onsite vehicles will be monitored for leaks and receive regular preventative maintenance to reduce the chance of leakage. Petroleum products will be stored in tightly sealed containers, which are clearly labeled. Any petroleum storage tanks used onsite will have a dike or berm containment structure constructed around it to contain any spills that may occur. Drip pans shall be provided for all dispensers. Any asphalt substances used onsite will be applied according to the manufacturer's recommendations.

b. Paints, Paint Solvents, and Cleaning Solvents

All containers will be tightly sealed and stored when not in use. Excess paint and solvents will not be discharged to the storm sewer system but will be properly disposed of according to manufacturer's instructions or state and federal regulations.

C. SPILL PREVENTION AND RESPONSE PROCEDURES

The contractor will train all personnel in the proper handling and cleanup of spilled materials. No spilled hazardous materials or hazardous wastes will be allowed to come in contact with stormwater discharges. If such contact occurs, the stormwater discharge will be contained on site until appropriate measures in compliance with state and federal regulations are taken to dispose of such contaminated stormwater. It shall be the responsibility of the job site superintendent to properly train all personnel in spill prevention and clean up procedures.

In order to minimize the potential for a spill of hazardous materials to come into contact with stormwater, the following steps will be implemented:

1. All materials with hazardous properties (such as pesticides, petroleum products, fertilizers, detergents, construction chemicals, acids, paints, paint solvents, cleaning solvents, additives for soil stabilization, concrete curing compounds and additives, etc.) will be stored in a secure location with their lids on, preferably under cover, when not in use.
2. The minimum practical quantity of all such materials will be kept on the job site.
3. A spill control and containment kit (containing, for example, absorbent materials, acid neutralizing powder, brooms, dust pans, mops, rags, gloves, goggles, plastic and metal trash containers, etc.) will be provided at the storage site.
4. Manufacturer's recommended methods for spill cleanup will be clearly posted and site personnel will be trained regarding these procedures and the location of the information and cleanup supplies.

In the event of a spill, the following procedures should be followed:

1. All spills will be cleaned up immediately after discovery.
2. The spill area will be kept well ventilated and personnel will wear appropriate protective clothing to prevent injury from contact with the hazardous substances.
3. The project manager and the Engineer-of-Record will be notified immediately.
4. Spills of toxic or hazardous materials will be reported to the appropriate federal, state, and/or local government agency regardless of the size of the spill. Spills of amounts that exceed Reportable Quantities of certain substances specifically mentioned in federal regulations (40 CFR 110, 40 CFR 117, and 40 CFR 302) must be immediately reported to the NYS DEC 24-Hour Spill Hotline at 1-800-457-7362.
5. If the spill exceeds a Reportable Quantity, the SWPPP must be modified within seven (7) calendar days of knowledge of the discharge to provide a description of the release, the circumstances leading to the release, and the date of the release. The plans must identify measures to prevent the recurrence of such releases and to respond to such releases.
6. The job site superintendent will be the spill prevention and response coordinator. He will designate the individuals who will receive spill prevention and response training. These individuals will each become responsible for a particular phase of prevention and response. The names of these personnel will be posted in the material storage area and in the office trailer onsite.

D. CONTROL OF NON-STORMWATER DISCHARGES

Certain types of discharges are allowable under the NYSDEC SPDES General Permit for Stormwater Discharges from Construction Activity and it is the intent of this SWPPP to allow such discharges. These types of discharges will be allowed under the conditions that no pollutants will be allowed to come in contact with the water prior to or after it is discharged. The control measures, which have been outlined previously

in this SWPPP, will be strictly followed to ensure that no contamination of these non-stormwater discharges takes place. The following non-stormwater discharges are allowed by the NYSDEC and may occur at the job site:

1. Discharges from fire fighting activities
2. Fire hydrant flushing
3. Waters to which cleansers or other components have not been added that are used to wash vehicles or control duct.
4. Routine external building washdown which does not use detergents
5. Pavement washwaters where spills or leaks of toxic or hazardous materials have not occurred (unless all spilled material has been removed) and where detergents are not used
6. Air conditioning condensate
7. Springs
8. Foundation or footing drains where flows are not contaminated with process materials such as solvents.

SECTION VII. CERTIFICATION AND NOTIFICATION

The New York State Department of Environmental Conservation requires that the operator and the contractor make certifications of knowledge of the contents of this SWPPP and agreement to follow the SWPPP. The terms of the General Permit also require that each contractor sign the SWPPP plan, thereby making them co-permittees and acknowledging their responsibility for certain operation aspects of the plan. These certifications should be signed before the contractor begins activities and should be filed with the site's SWPPP at the jobsite.

APPENDIX A

Background Data

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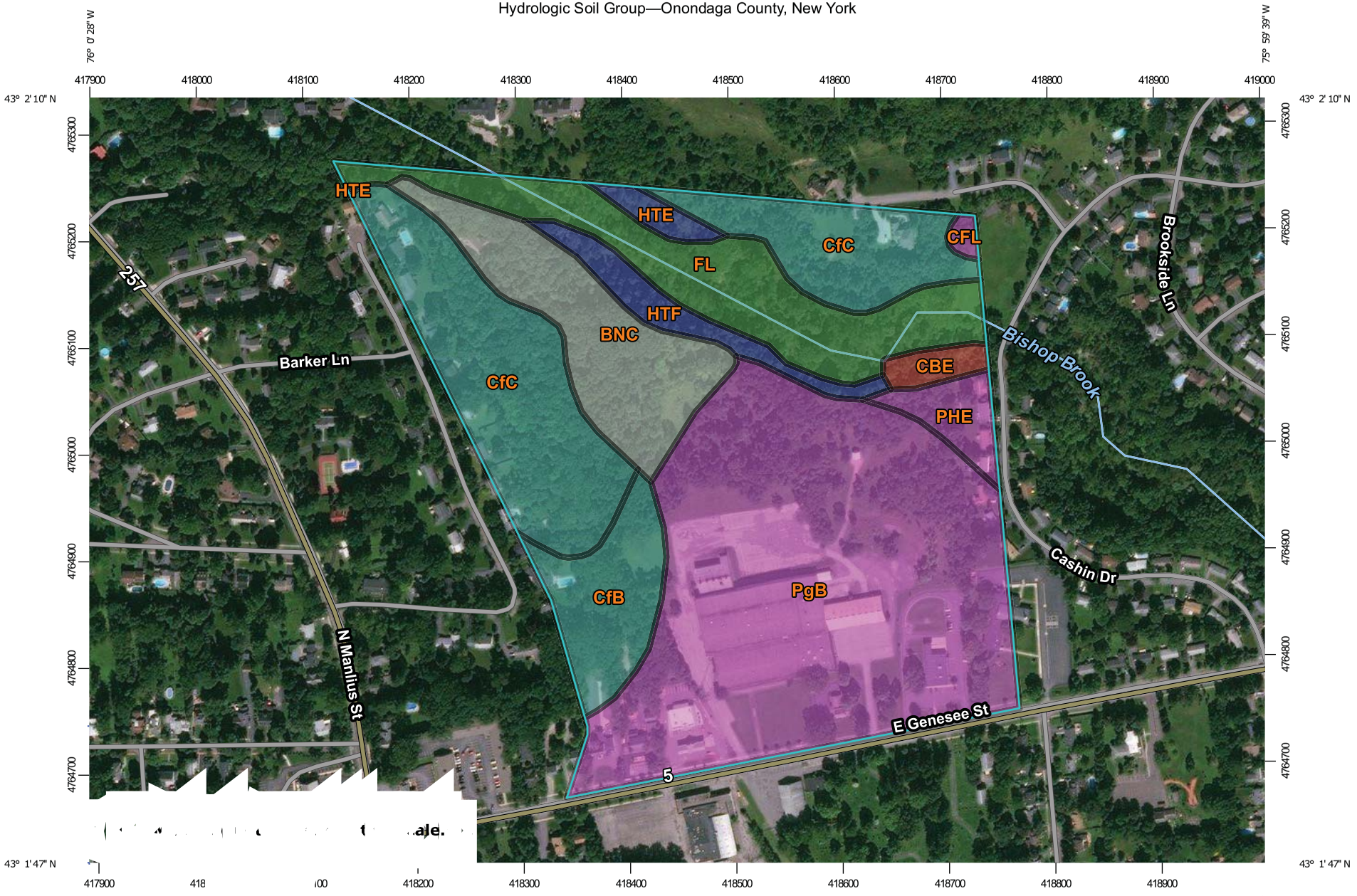

Map Scale: 1:5,060 if prir. ed on A landscape (11" x 8.5") sheet.

N

Meters
0 50 100 200 300

Feet
0 200 400 800 1200

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Lines

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Points

A

A/D

B

B/D

C

C/D

D

Not rated or not available

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 1:20,000.

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: Onondaga County, New York
Survey Area Data: Version 14, Sep 16, 2019

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

Date(s) aerial images were photographed: Jun 18, 2011—Oct 10, 2016

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.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
BNC	Benson-Wassaic-Rock outcrop association, sloping		6.5	10.1%
CBE	Camillus and Lairdsville channery soils, steep	D	0.7	1.2%
CfB	Cazenovia silt loam, 2 to 8 percent slopes	C	3.8	6.0%
CfC	Cazenovia silt loam, 8 to 15 percent slopes	C	13.4	21.1%
CFL	Cut and fill land	A	0.2	0.4%
FL	Fluvaquents, frequently flooded	A/D	7.6	12.0%
HTE	Honeoye, Lansing, and Ontario soils, 25 to 35 percent slopes	B	0.7	1.1%
HTF	Honeoye, Lansing, and Ontario soils, 35 to 50 percent slopes	B	2.0	3.1%
PgB	Palmyra gravelly loam, 3 to 8 percent slopes	A	27.2	42.8%
PHE	Palmyra and Howard soils, steep	A	1.4	2.2%
Totals for Area of Interest			**63.6**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Division of Fish and Wildlife, New York Natural Heritage Program
625 Broadway, Fifth Floor, Albany, NY 12233-4757
P: (518) 402-8935 | F: (518) 402-8925
www.dec.ny.gov

October 28, 2019

Christian Hill
Napierala Consulting
110 Fayette Street
Manlius, NY 13104

Re: Fayetteville Mixed Use Development at 547 Genesee Street
County: Onondaga Town/City: Manlius

Dear Mr. Hill:

In response to your recent request, we have reviewed the New York Natural Heritage Program database with respect to the above project.

Enclosed is a report of rare or state-listed animals and plants, and significant natural communities that our database indicates occur in the vicinity of the project site.

For most sites, comprehensive field surveys have not been conducted; the enclosed report only includes records from our database. We cannot provide a definitive statement as to the presence or absence of all rare or state-listed species or significant natural communities. Depending on the nature of the project and the conditions at the project site, further information from on-site surveys or other sources may be required to fully assess impacts on biological resources.

Our database is continually growing as records are added and updated. If this proposed project is still under development one year from now, we recommend that you contact us again so that we may update this response with the most current information.

The presence of the plants and animals identified in the enclosed report may result in this project requiring additional review or permit conditions. For further guidance, and for information regarding other permits that may be required under state law for regulated areas or activities (e.g., regulated wetlands), please contact the NYS DEC Region 7 Office, Division of Environmental Permits at dep.r7@dec.ny.gov, 315-426-7438.

Sincerely,

Heidi Krahling
Environmental Review Specialist
New York Natural Heritage Program

1182

The following state-listed animal has been documented in the vicinity of the project site.

The following list includes animals that are listed by NYS as Endangered, Threatened, or Special Concern; and/or that are federally listed or are candidates for federal listing.

For information about any permit considerations for your project, please contact the Permits staff at the NYSDEC Region 7 Office at dep.r7@dec.ny.gov, 315-426-7438.

The following species has been documented within 3 miles of the project site. Individual animals may travel 5 miles from documented locations. The main impact of concern is the cutting or removal of potential roost trees.

COMMON NAME	*SCIENTIFIC NAME*	*NY STATE LISTING*	*FEDERAL LISTING*	
Mammals				
Northern Long-eared Bat *Hibernaculum*	*Myotis septentrionalis*	Threatened	Threatened	14190

This report only includes records from the NY Natural Heritage database.

If any rare plants or animals are documented during site visits, we request that information on the observations be provided to the New York Natural Heritage Program so that we may update our database.

Information about many of the listed animals in New York, including habitat, biology, identification, conservation, and management, are available online in Natural Heritage's Conservation Guides at www.guides.nynhp.org, and from NYSDEC at www.dec.ny.gov/animals/7494.html.

The following significant natural community has been documented in the vicinity of the project site.

We recommend that potential impacts of the proposed project on this community be addressed as part of any environmental assessment or review conducted as part of the planning, permitting and approval process, such as reviews conducted under SEQR. Final requirements of the project to avoid, minimize, or mitigate potential impacts are determined by the lead permitting agency or the government body approving the project.

The following natural community is considered significant from a statewide perspective by the NY Natural Heritage Program. By meeting specific, documented criteria, the NY Natural Heritage Program considers this community occurrence to have high ecological and conservation value.

COMMON NAME	*SCIENTIFIC NAME*	*NY STATE LISTING*	*HERITAGE CONSERVATION STATUS*
Upland/Terrestrial Communities			
Maple-Basswood Rich Mesic Forest			High Quality Occurrence of Uncommon Community Type

Documented within 0.25 mile northeast of the project site. This maple-basswood rich mesic forest community is of moderate size and contains a core of about 140 acres of old growth with some trees aged at 200 or more years. Set within a largely residential and farmed landscape, the remaining 179 acres provide a very narrow buffer to the old growth core. The community has very good species diversity. 7911

This report only includes records from the NY Natural Heritage database. For most sites, comprehensive field surveys have not been conducted, and we cannot provide a definitive statement as to the presence or absence of all rare or state-listed species. Depending on the nature of the project and the conditions at the project site, further information from on-site surveys or other sources may be required to fully assess impacts on biological resources.

If any rare plants or animals are documented during site visits, we request that information on the observations be provided to the New York Natural Heritage Program so that we may update our database.

Information about many of the natural community types in New York, including identification, dominant and characteristic vegetation, distribution, conservation, and management, is available online in Natural Heritage's Conservation Guides at www.guides.nynhp.org. For descriptions of all community types, go to www.dec.ny.gov/animals/97703.html for Ecological Communities of New York State.

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APPENDIX B

HydroCAD Output - Existing Conditions

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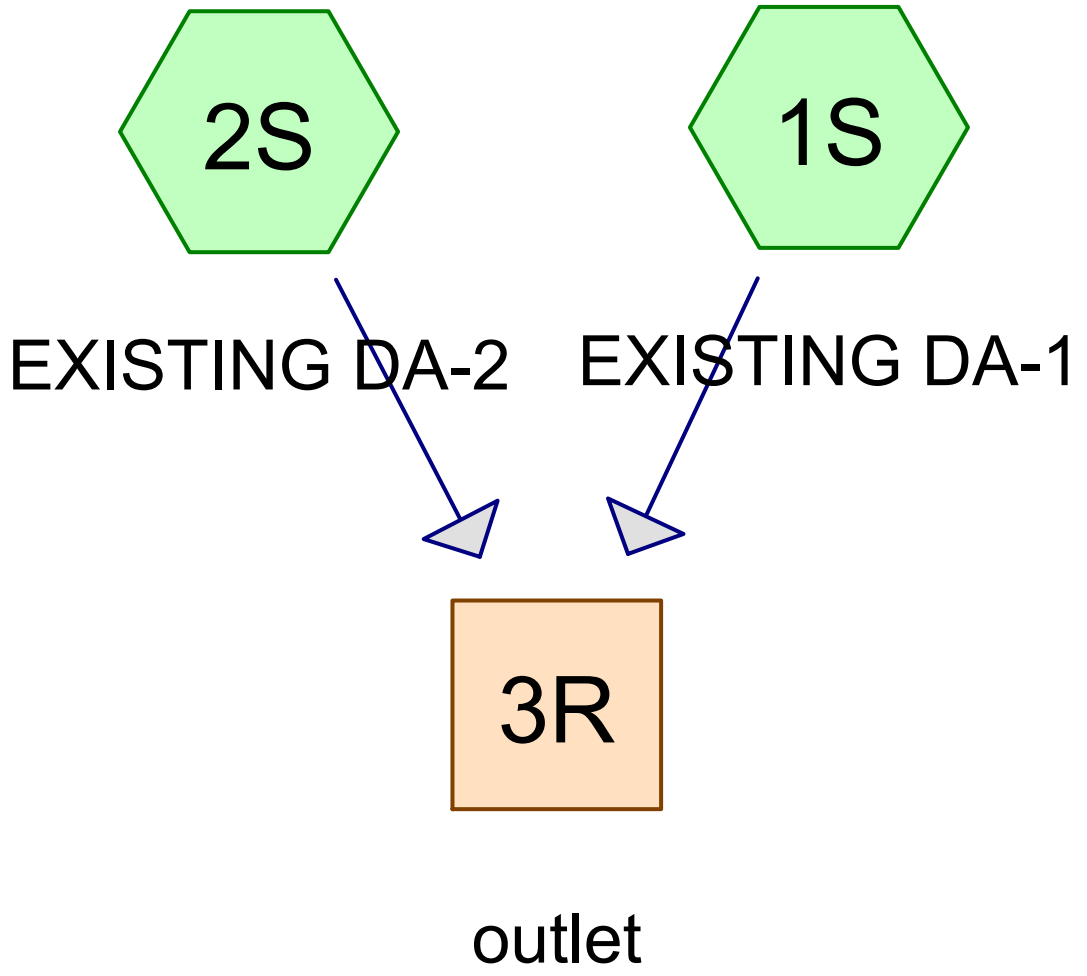


Subcat Reach Pond Link

Routing Diagram for Stormwater Analysis
Prepared by Napierala Consulting, P.C., Printed 4/29/2020

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
2.040	61	1/4 acre lots, 38% imp, HSG A (1S)
0.380	87	1/4 acre lots, 38% imp, HSG D (1S)
8.420	39	>75% Grass cover, Good, HSG A (1S, 2S)
0.490	74	>75% Grass cover, Good, HSG C (2S)
8.100	98	Paved parking, HSG A (1S, 2S)
5.320	81	Urban industrial, 72% imp, HSG A (1S)
5.880	30	Woods, Good, HSG A (1S, 2S)
1.000	55	Woods, Good, HSG B (1S)
3.850	70	Woods, Good, HSG C (1S, 2S)
1.030	77	Woods, Good, HSG D (1S)
36.510	**64**	**TOTAL AREA**

Summary for Subcatchment 1S: EXISTING DA-1

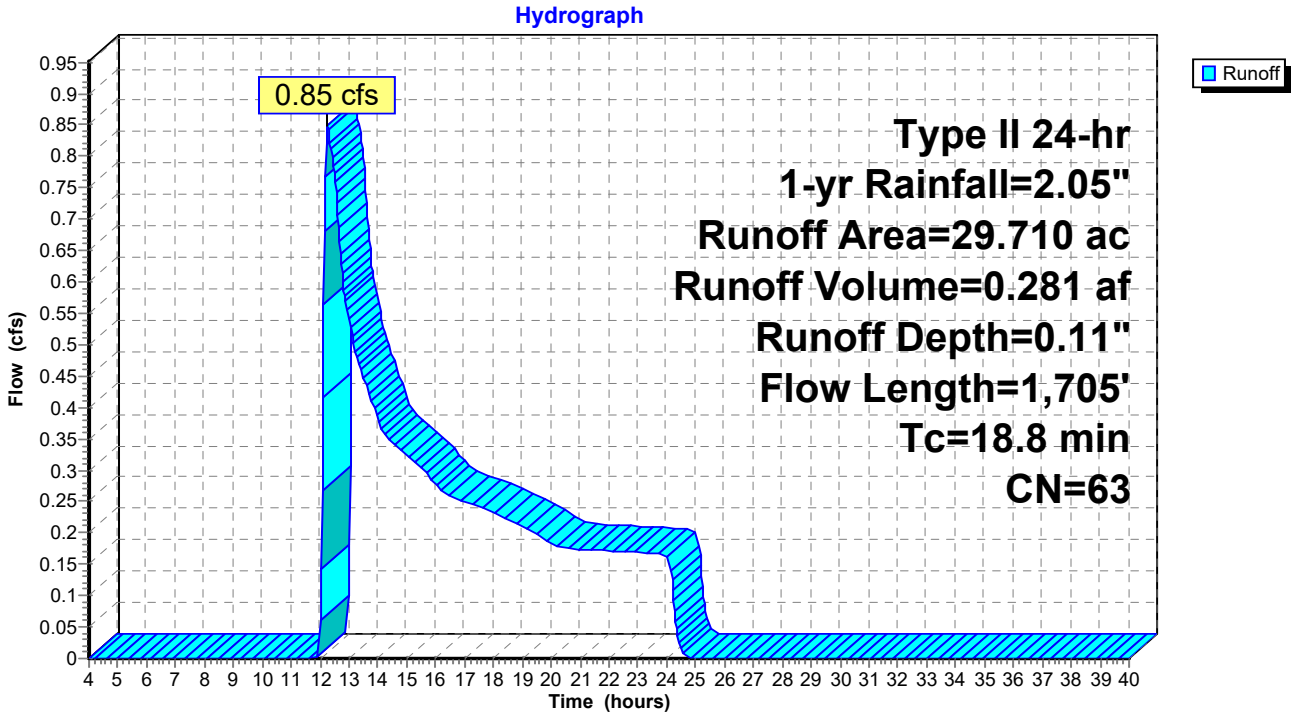
Runoff = 0.85 cfs @ 12.27 hrs, Volume= 0.281 af, Depth= 0.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-40.00 hrs, dt= 0.03 hrs
Type II 24-hr 1-yr Rainfall=2.05"

Area (ac)	CN	Description
5.320	81	Urban industrial, 72% imp, HSG A
6.100	98	Paved parking, HSG A
6.450	39	>75% Grass cover, Good, HSG A
2.040	61	1/4 acre lots, 38% imp, HSG A
0.380	87	1/4 acre lots, 38% imp, HSG D
5.700	30	Woods, Good, HSG A
1.000	55	Woods, Good, HSG B
1.690	70	Woods, Good, HSG C
1.030	77	Woods, Good, HSG D
29.710	63	Weighted Average
18.860		63.48% Pervious Area
10.850		36.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.5	100	0.0400	0.13		**Sheet Flow, sheet flow** Grass: Dense n= 0.240 P2= 2.39"
5.9	1,140	0.0400	3.22		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
0.4	465	0.0600	20.22	161.78	**Channel Flow, slope/brook** Area= 8.0 sf Perim= 8.0' r= 1.00' n= 0.018 Earth, clean & straight
18.8	1,705	Total			

Subcatchment 1S: EXISTING DA-1



Summary for Subcatchment 2S: EXISTING DA-2

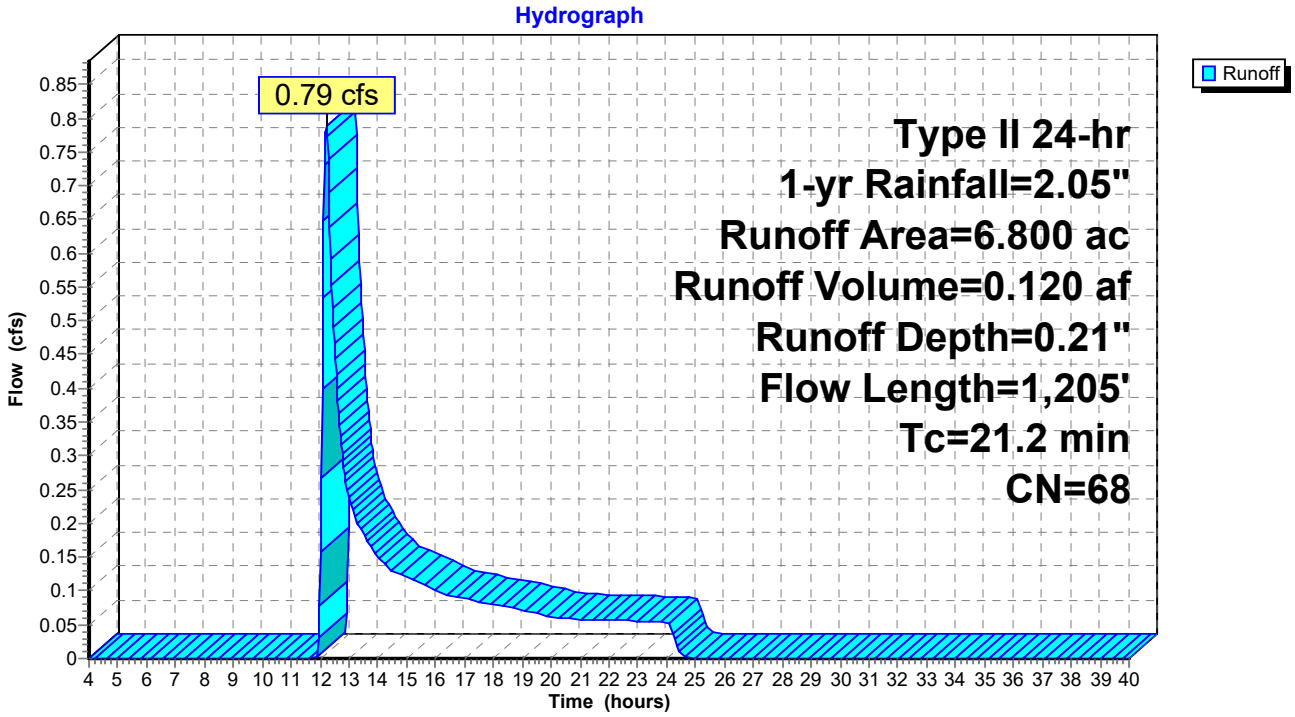
Runoff = 0.79 cfs @ 12.22 hrs, Volume= 0.120 af, Depth= 0.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-40.00 hrs, dt= 0.03 hrs
Type II 24-hr 1-yr Rainfall=2.05"

Area (ac)	CN	Description
2.000	98	Paved parking, HSG A
1.970	39	>75% Grass cover, Good, HSG A
0.490	74	>75% Grass cover, Good, HSG C
0.180	30	Woods, Good, HSG A
2.160	70	Woods, Good, HSG C
6.800	68	Weighted Average
4.800		70.59% Pervious Area
2.000		29.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.2	100	0.0180	0.10		**Sheet Flow, sheet flow** Grass: Dense n= 0.240 P2= 2.39"
1.6	250	0.0170	2.65		**Shallow Concentrated Flow, SCF** Paved Kv= 20.3 fps
2.4	855	0.0250	5.87	46.99	**Channel Flow, wooded ditch** Area= 8.0 sf Perim= 8.0' r= 1.00' n= 0.040 Earth, dense weeds
21.2	1,205	Total			

Subcatchment 2S: EXISTING DA-2

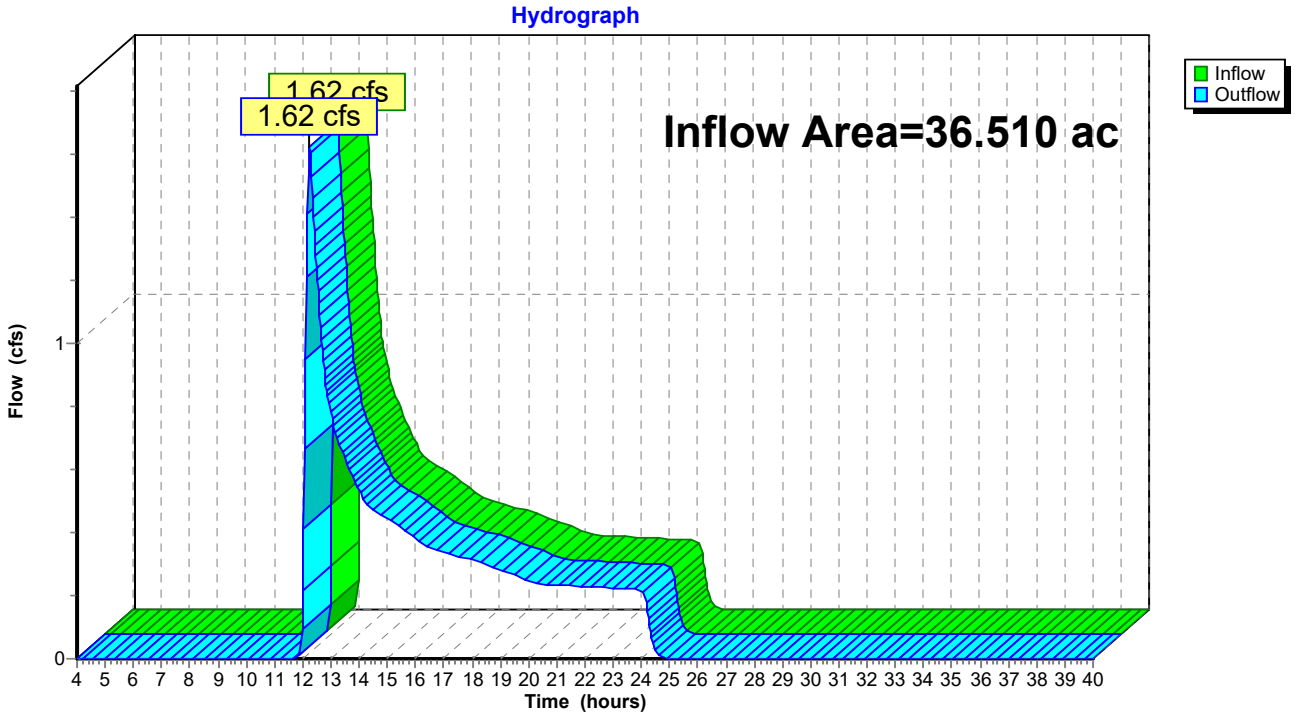


Summary for Reach 3R: outlet

Inflow Area = 36.510 ac, 35.20% Impervious, Inflow Depth = 0.13" for 1-yr event
Inflow = 1.62 cfs @ 12.24 hrs, Volume= 0.401 af
Outflow = 1.62 cfs @ 12.24 hrs, Volume= 0.401 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 4.00-40.00 hrs, dt= 0.03 hrs

Reach 3R: outlet



Summary for Subcatchment 1S: EXISTING DA-1

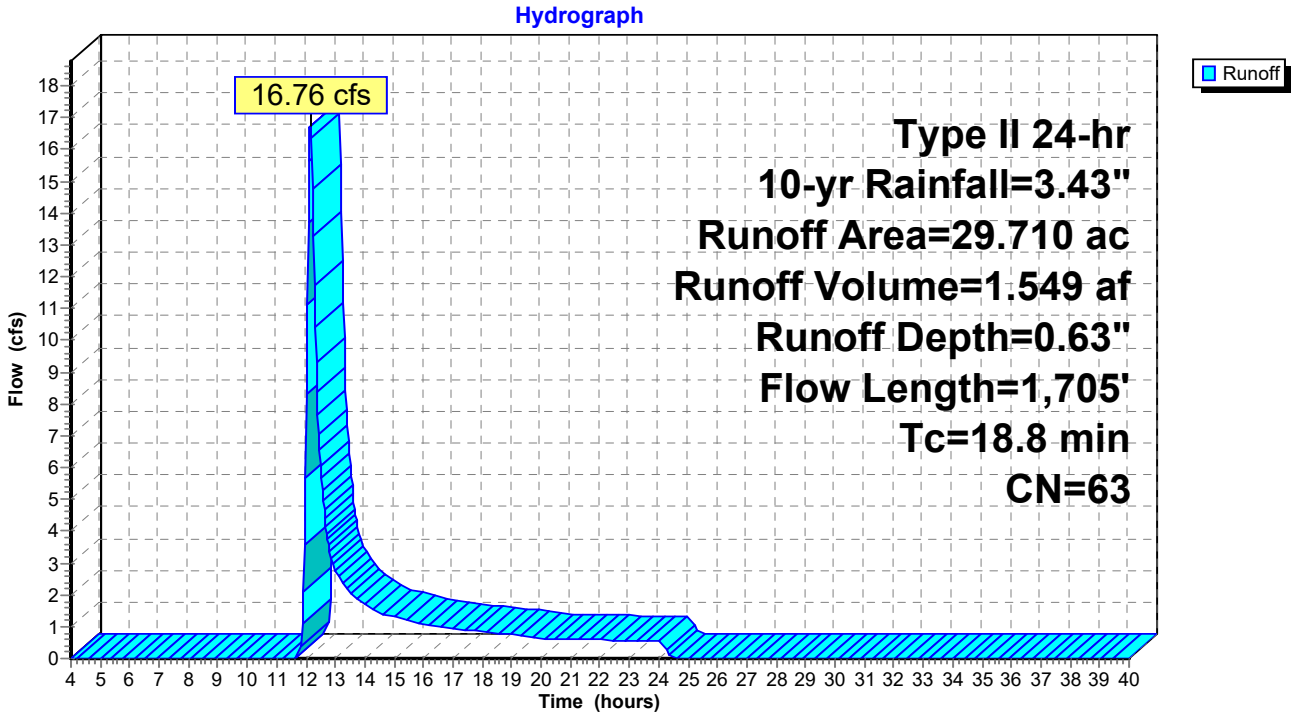
Runoff = 16.76 cfs @ 12.15 hrs, Volume= 1.549 af, Depth= 0.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-40.00 hrs, dt= 0.03 hrs
Type II 24-hr 10-yr Rainfall=3.43"

Area (ac)	CN	Description
5.320	81	Urban industrial, 72% imp, HSG A
6.100	98	Paved parking, HSG A
6.450	39	>75% Grass cover, Good, HSG A
2.040	61	1/4 acre lots, 38% imp, HSG A
0.380	87	1/4 acre lots, 38% imp, HSG D
5.700	30	Woods, Good, HSG A
1.000	55	Woods, Good, HSG B
1.690	70	Woods, Good, HSG C
1.030	77	Woods, Good, HSG D
29.710	63	Weighted Average
18.860		63.48% Pervious Area
10.850		36.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.5	100	0.0400	0.13		**Sheet Flow, sheet flow** Grass: Dense n= 0.240 P2= 2.39"
5.9	1,140	0.0400	3.22		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
0.4	465	0.0600	20.22	161.78	**Channel Flow, slope/brook** Area= 8.0 sf Perim= 8.0' r= 1.00' n= 0.018 Earth, clean & straight
18.8	1,705	Total			

Subcatchment 1S: EXISTING DA-1



Summary for Subcatchment 2S: EXISTING DA-2

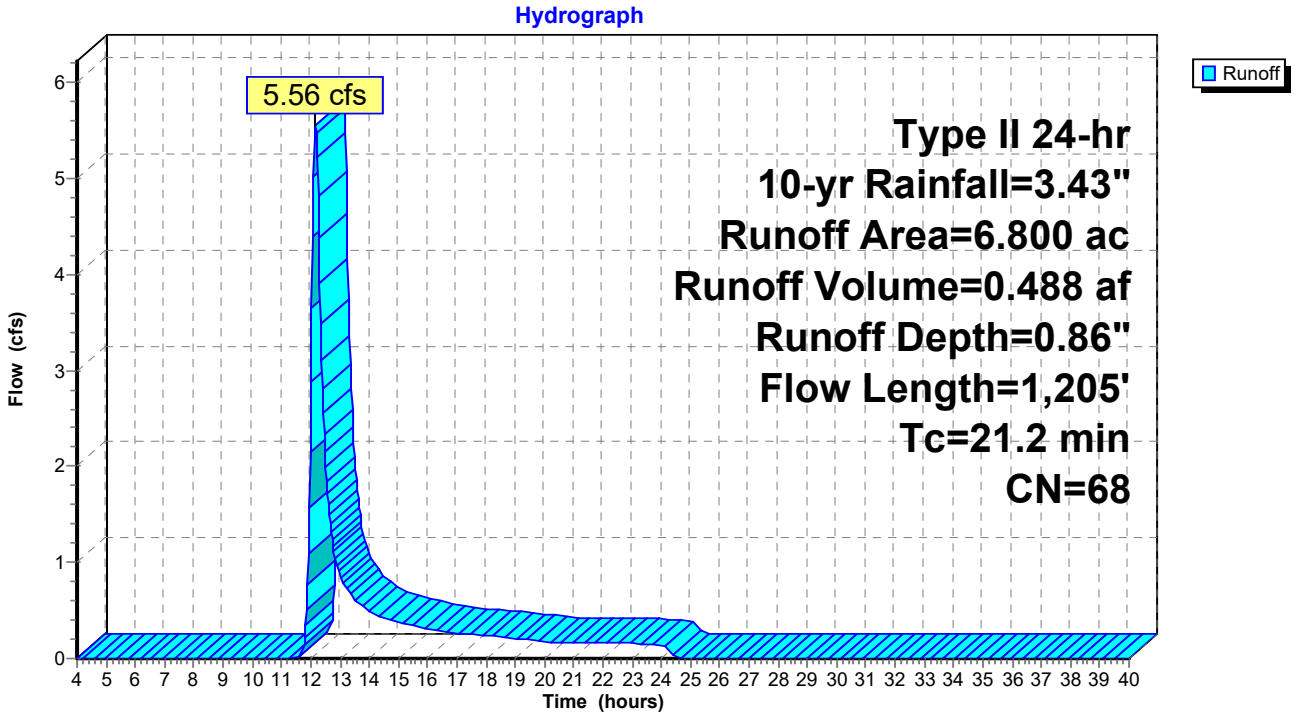
Runoff = 5.56 cfs @ 12.16 hrs, Volume= 0.488 af, Depth= 0.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-40.00 hrs, dt= 0.03 hrs
Type II 24-hr 10-yr Rainfall=3.43"

Area (ac)	CN	Description
2.000	98	Paved parking, HSG A
1.970	39	>75% Grass cover, Good, HSG A
0.490	74	>75% Grass cover, Good, HSG C
0.180	30	Woods, Good, HSG A
2.160	70	Woods, Good, HSG C
6.800	68	Weighted Average
4.800		70.59% Pervious Area
2.000		29.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.2	100	0.0180	0.10		**Sheet Flow, sheet flow** Grass: Dense n= 0.240 P2= 2.39"
1.6	250	0.0170	2.65		**Shallow Concentrated Flow, SCF** Paved Kv= 20.3 fps
2.4	855	0.0250	5.87	46.99	**Channel Flow, wooded ditch** Area= 8.0 sf Perim= 8.0' r= 1.00' n= 0.040 Earth, dense weeds
21.2	1,205	Total			

Subcatchment 2S: EXISTING DA-2

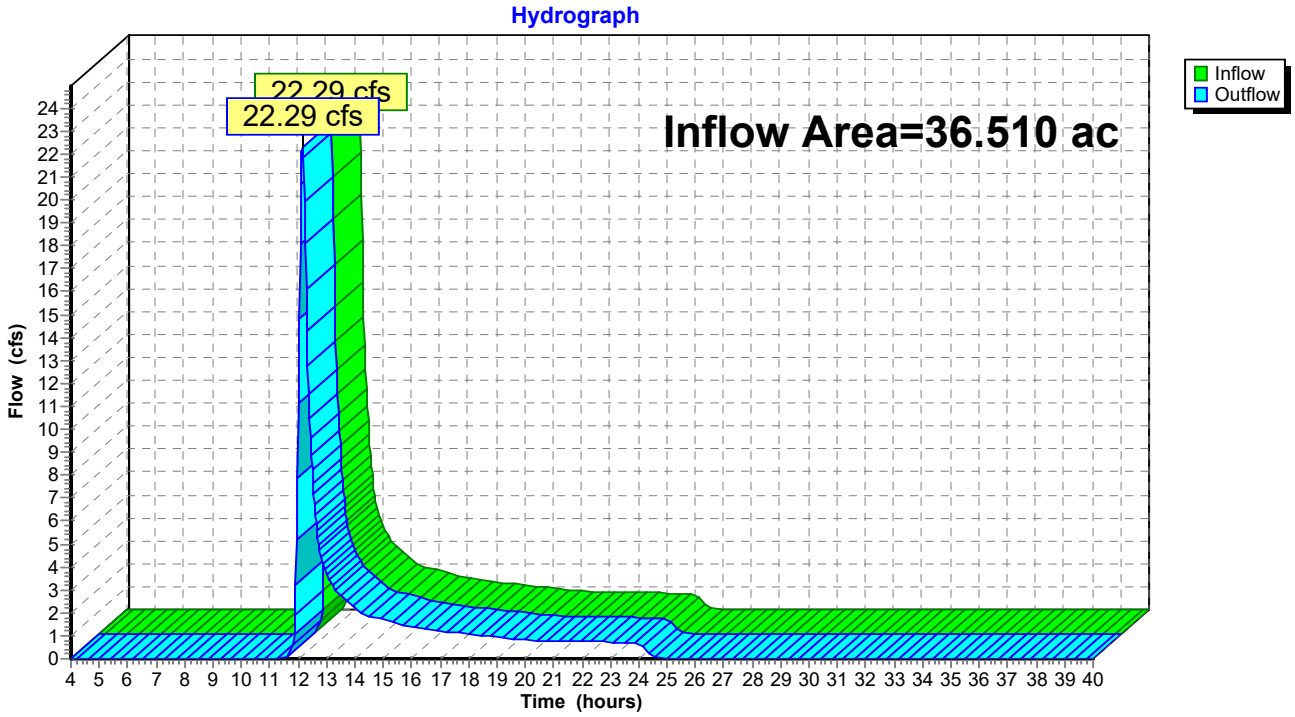


Summary for Reach 3R: outlet

Inflow Area = 36.510 ac, 35.20% Impervious, Inflow Depth = 0.67" for 10-yr event
Inflow = 22.29 cfs @ 12.15 hrs, Volume= 2.037 af
Outflow = 22.29 cfs @ 12.15 hrs, Volume= 2.037 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 4.00-40.00 hrs, dt= 0.03 hrs

Reach 3R: outlet



Summary for Subcatchment 1S: EXISTING DA-1

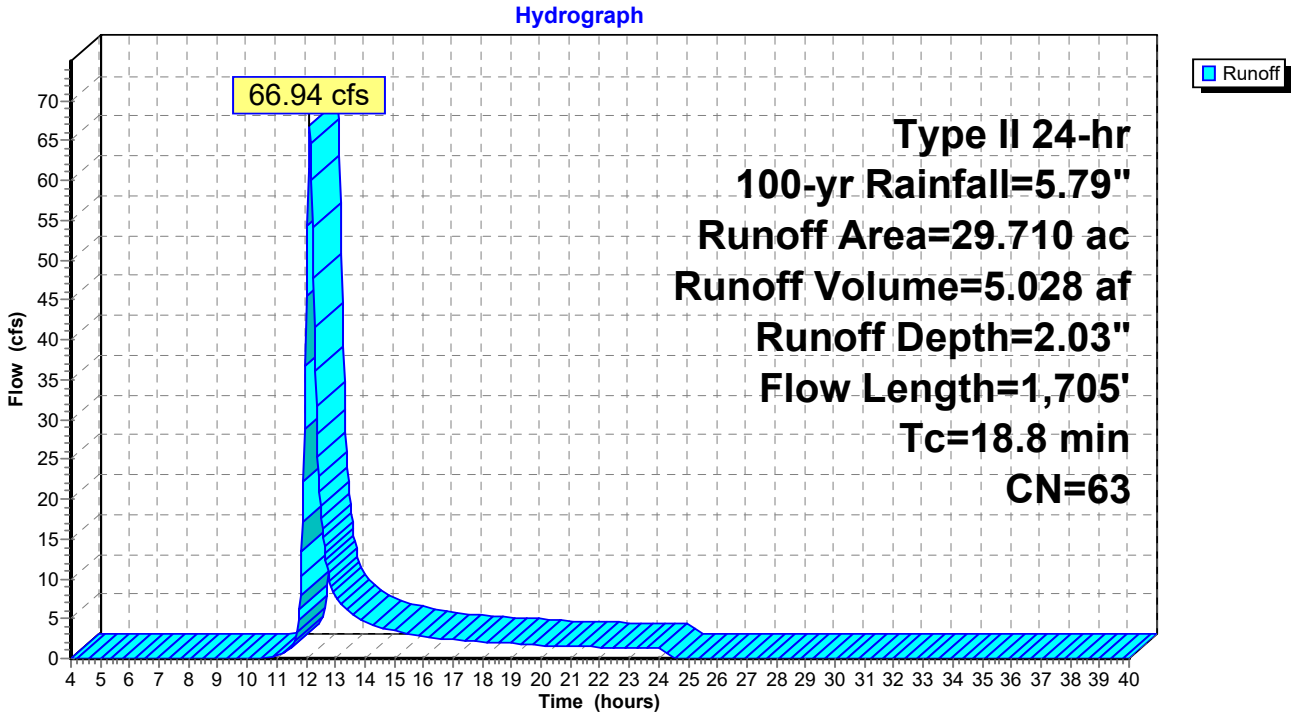
Runoff = 66.94 cfs @ 12.12 hrs, Volume= 5.028 af, Depth= 2.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-40.00 hrs, dt= 0.03 hrs
Type II 24-hr 100-yr Rainfall=5.79"

Area (ac)	CN	Description
5.320	81	Urban industrial, 72% imp, HSG A
6.100	98	Paved parking, HSG A
6.450	39	>75% Grass cover, Good, HSG A
2.040	61	1/4 acre lots, 38% imp, HSG A
0.380	87	1/4 acre lots, 38% imp, HSG D
5.700	30	Woods, Good, HSG A
1.000	55	Woods, Good, HSG B
1.690	70	Woods, Good, HSG C
1.030	77	Woods, Good, HSG D
29.710	63	Weighted Average
18.860		63.48% Pervious Area
10.850		36.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.5	100	0.0400	0.13		**Sheet Flow, sheet flow** Grass: Dense n= 0.240 P2= 2.39"
5.9	1,140	0.0400	3.22		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
0.4	465	0.0600	20.22	161.78	**Channel Flow, slope/brook** Area= 8.0 sf Perim= 8.0' r= 1.00' n= 0.018 Earth, clean & straight
18.8	1,705	Total			

Subcatchment 1S: EXISTING DA-1



Summary for Subcatchment 2S: EXISTING DA-2

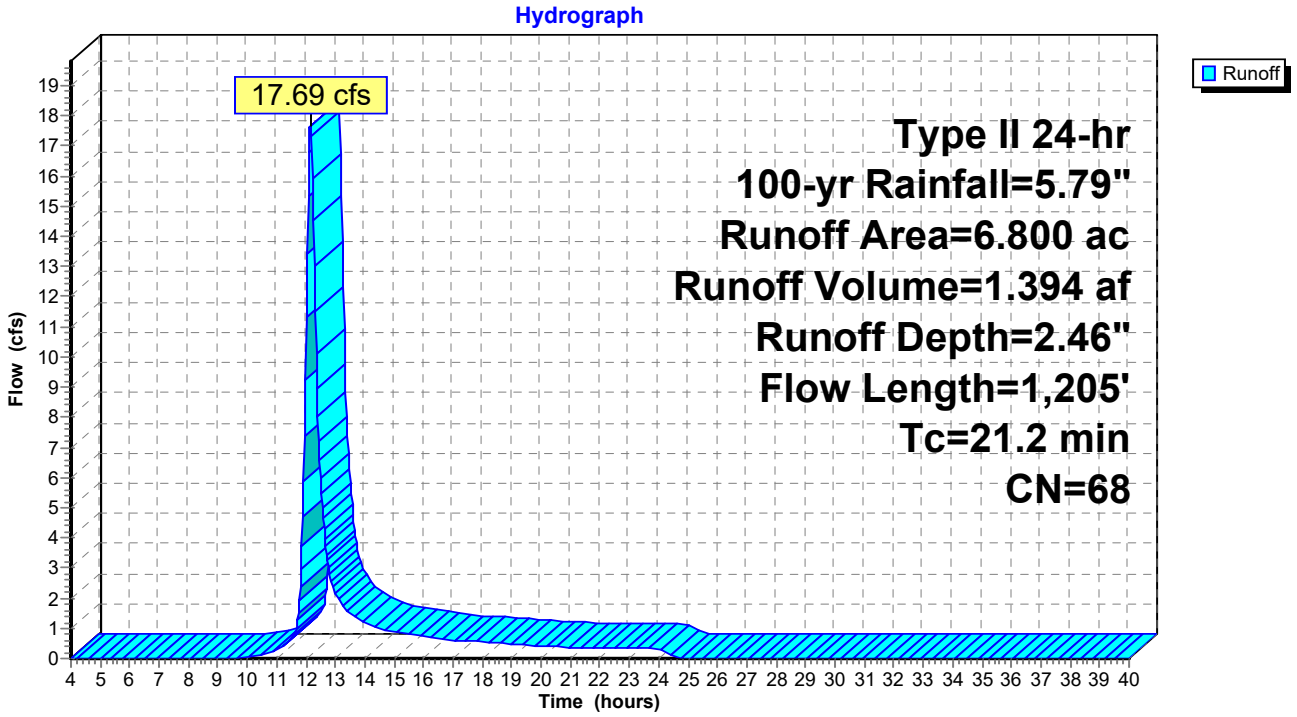
Runoff = 17.69 cfs @ 12.15 hrs, Volume= 1.394 af, Depth= 2.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-40.00 hrs, dt= 0.03 hrs
Type II 24-hr 100-yr Rainfall=5.79"

Area (ac)	CN	Description
2.000	98	Paved parking, HSG A
1.970	39	>75% Grass cover, Good, HSG A
0.490	74	>75% Grass cover, Good, HSG C
0.180	30	Woods, Good, HSG A
2.160	70	Woods, Good, HSG C
6.800	68	Weighted Average
4.800		70.59% Pervious Area
2.000		29.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.2	100	0.0180	0.10		**Sheet Flow, sheet flow** Grass: Dense n= 0.240 P2= 2.39"
1.6	250	0.0170	2.65		**Shallow Concentrated Flow, SCF** Paved Kv= 20.3 fps
2.4	855	0.0250	5.87	46.99	**Channel Flow, wooded ditch** Area= 8.0 sf Perim= 8.0' r= 1.00' n= 0.040 Earth, dense weeds
21.2	1,205	Total			

Subcatchment 2S: EXISTING DA-2

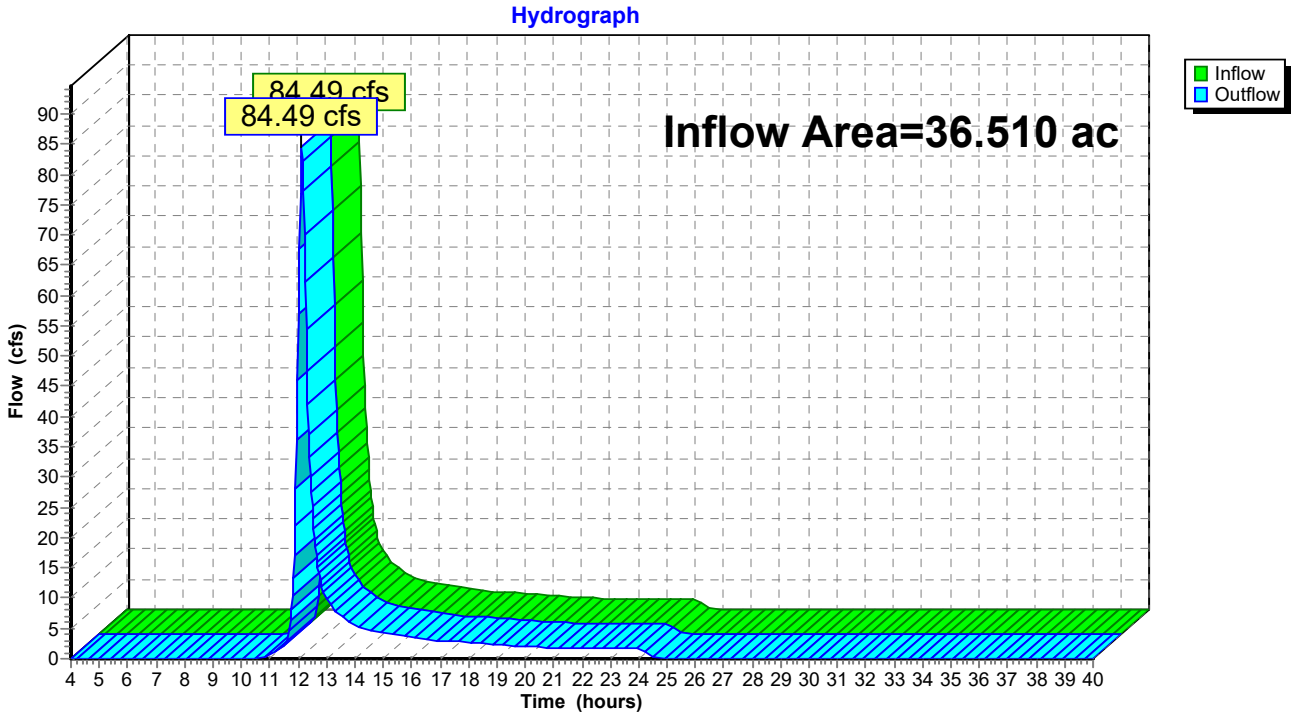


Summary for Reach 3R: outlet

Inflow Area = 36.510 ac, 35.20% Impervious, Inflow Depth = 2.11" for 100-yr event
Inflow = 84.49 cfs @ 12.13 hrs, Volume= 6.423 af
Outflow = 84.49 cfs @ 12.13 hrs, Volume= 6.423 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 4.00-40.00 hrs, dt= 0.03 hrs

Reach 3R: outlet



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APPENDIX C

HydroCAD Output - Proposed Conditions

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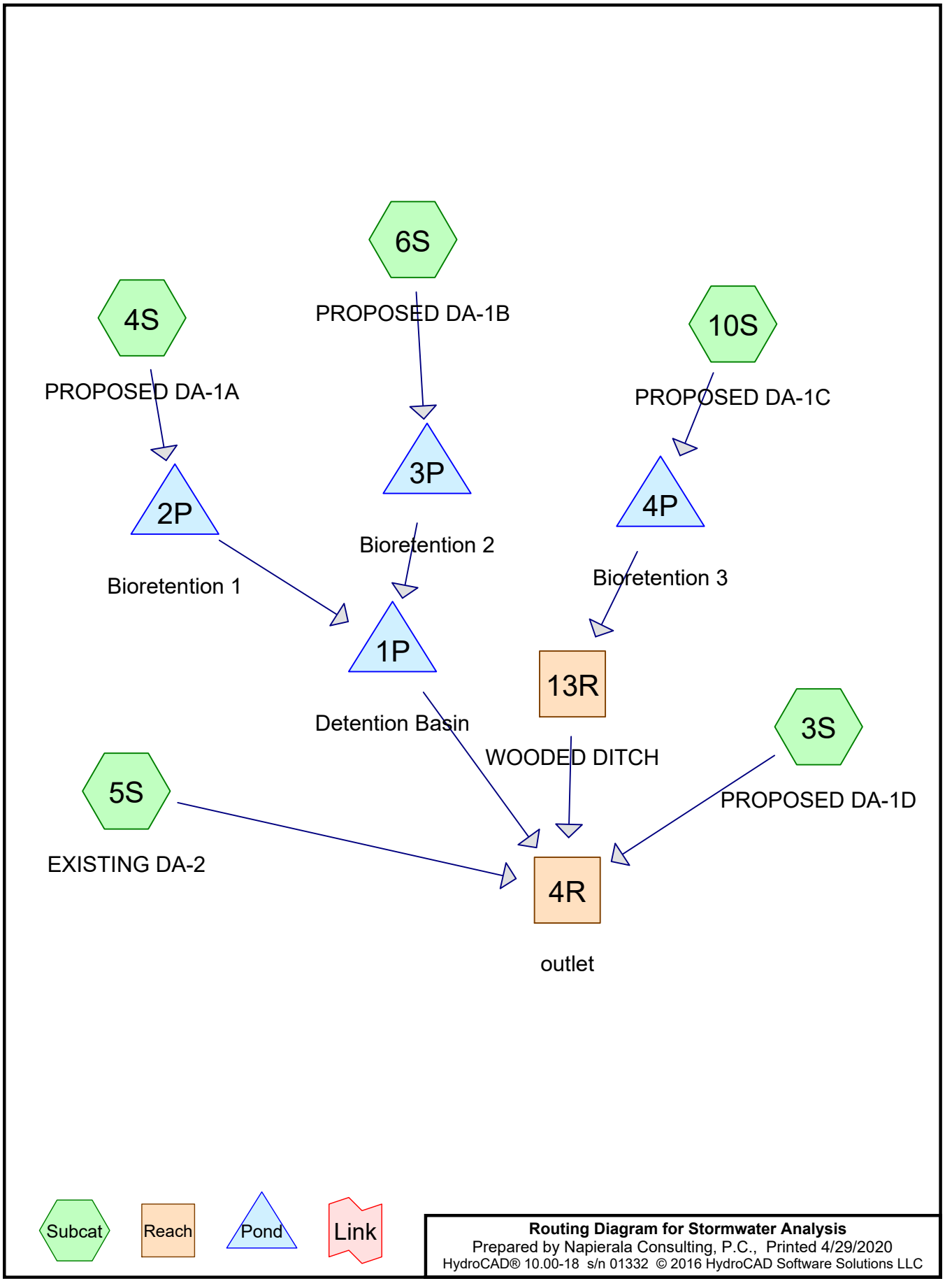


Routing Diagram for Stormwater Analysis
Prepared by Napierala Consulting, P.C., Printed 4/29/2020

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
2.040	61	1/4 acre lots, 38% imp, HSG A (3S)
0.380	83	1/4 acre lots, 38% imp, HSG C (3S)
10.140	39	>75% Grass cover, Good, HSG A (3S, 4S, 6S, 10S)
0.500	74	>75% Grass cover, Good, HSG C (3S, 4S)
9.130	98	Paved parking, HSG A (4S, 6S, 10S)
5.320	81	Urban industrial, 72% imp, HSG A (3S)
3.260	30	Woods, Good, HSG A (3S, 5S, 6S)
1.000	55	Woods, Good, HSG B (3S)
3.700	70	Woods, Good, HSG C (3S, 5S)
1.030	77	Woods, Good, HSG D (3S)
36.500	**66**	**TOTAL AREA**

Summary for Subcatchment 3S: PROPOSED DA-1D

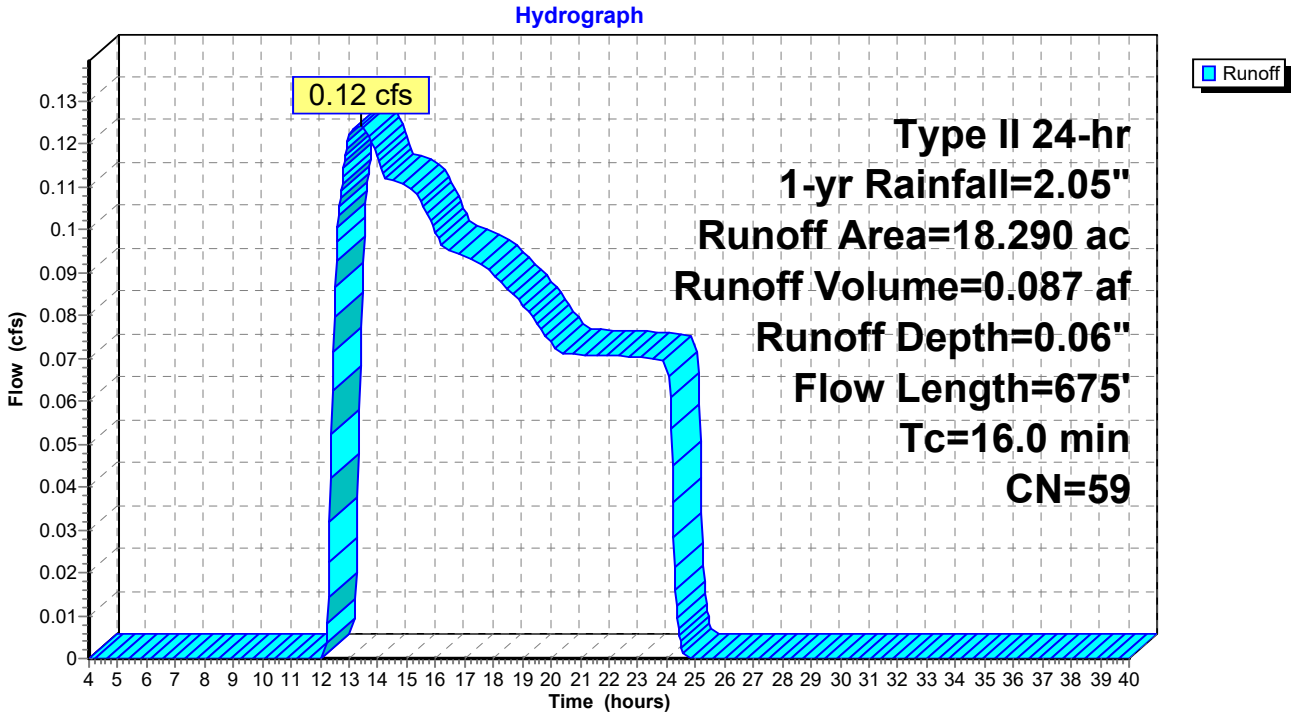
Runoff = 0.12 cfs @ 13.41 hrs, Volume= 0.087 af, Depth= 0.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-40.00 hrs, dt= 0.03 hrs
Type II 24-hr 1-yr Rainfall=2.05"

Area (ac)	CN	Description
5.320	81	Urban industrial, 72% imp, HSG A
3.650	39	>75% Grass cover, Good, HSG A
0.060	74	>75% Grass cover, Good, HSG C
2.040	61	1/4 acre lots, 38% imp, HSG A
0.380	83	1/4 acre lots, 38% imp, HSG C
3.120	30	Woods, Good, HSG A
1.000	55	Woods, Good, HSG B
1.690	70	Woods, Good, HSG C
1.030	77	Woods, Good, HSG D
18.290	59	Weighted Average
13.540		74.03% Pervious Area
4.750		25.97% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.6	100	0.0750	0.11		**Sheet Flow, sheet flow** Woods: Light underbrush n= 0.400 P2= 2.39"
1.0	305	0.1080	5.29		**Shallow Concentrated Flow, shallow flow** Unpaved Kv= 16.1 fps
0.4	270	0.0660	10.91	87.26	**Channel Flow, ditch** Area= 8.0 sf Perim= 8.0' r= 1.00' n= 0.035 Earth, dense weeds
16.0	675	Total			

Subcatchment 3S: PROPOSED DA-1D



Summary for Subcatchment 4S: PROPOSED DA-1A

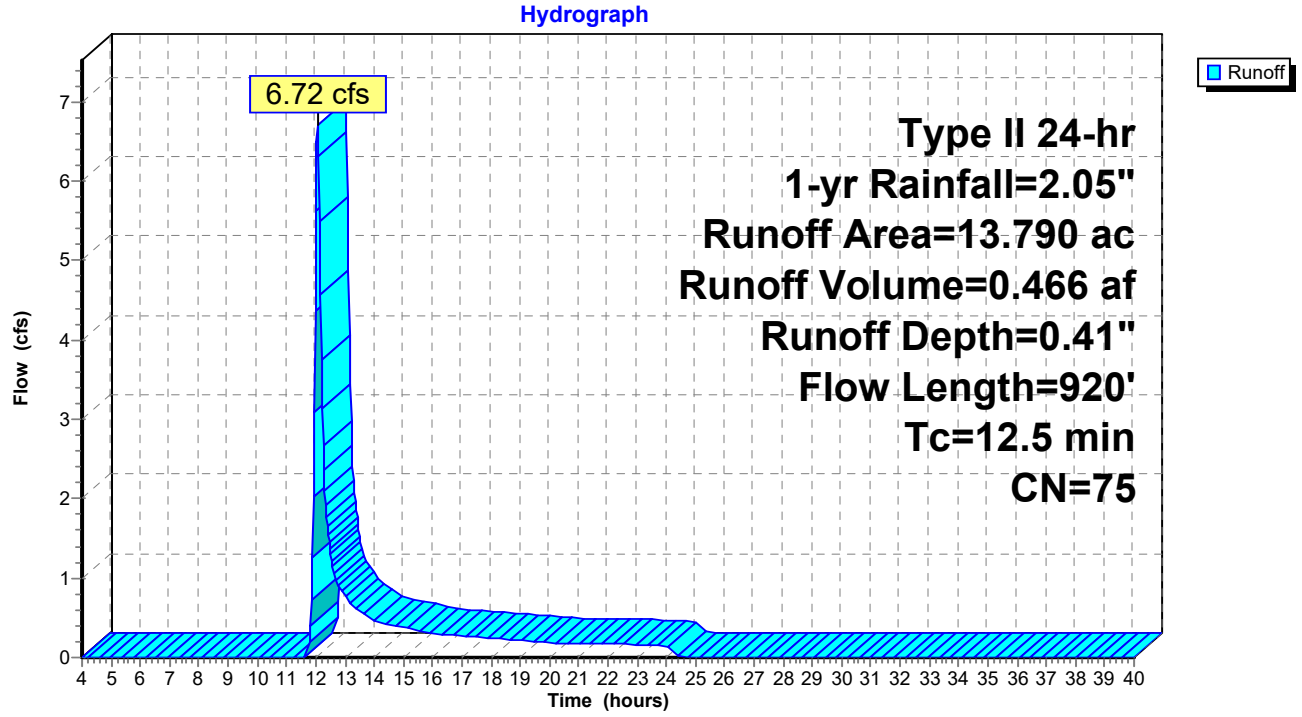
Runoff = 6.72 cfs @ 12.07 hrs, Volume= 0.466 af, Depth= 0.41"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-40.00 hrs, dt= 0.03 hrs
Type II 24-hr 1-yr Rainfall=2.05"

Area (ac)	CN	Description
8.210	98	Paved parking, HSG A
5.140	39	>75% Grass cover, Good, HSG A
0.440	74	>75% Grass cover, Good, HSG C
13.790	75	Weighted Average
5.580		40.46% Pervious Area
8.210		59.54% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.3	100	0.0200	0.15		**Sheet Flow, sheet flow** Grass: Short n= 0.150 P2= 2.39"
0.7	470	0.0250	10.68	85.44	**Channel Flow, swale** Area= 8.0 sf Perim= 8.0' r= 1.00' n= 0.022 Earth, clean & straight
0.5	350	0.0250	10.68	128.16	**Channel Flow, swale** Area= 12.0 sf Perim= 12.0' r= 1.00' n= 0.022 Earth, clean & straight
12.5	920	Total			

Subcatchment 4S: PROPOSED DA-1A



Summary for Subcatchment 5S: EXISTING DA-2

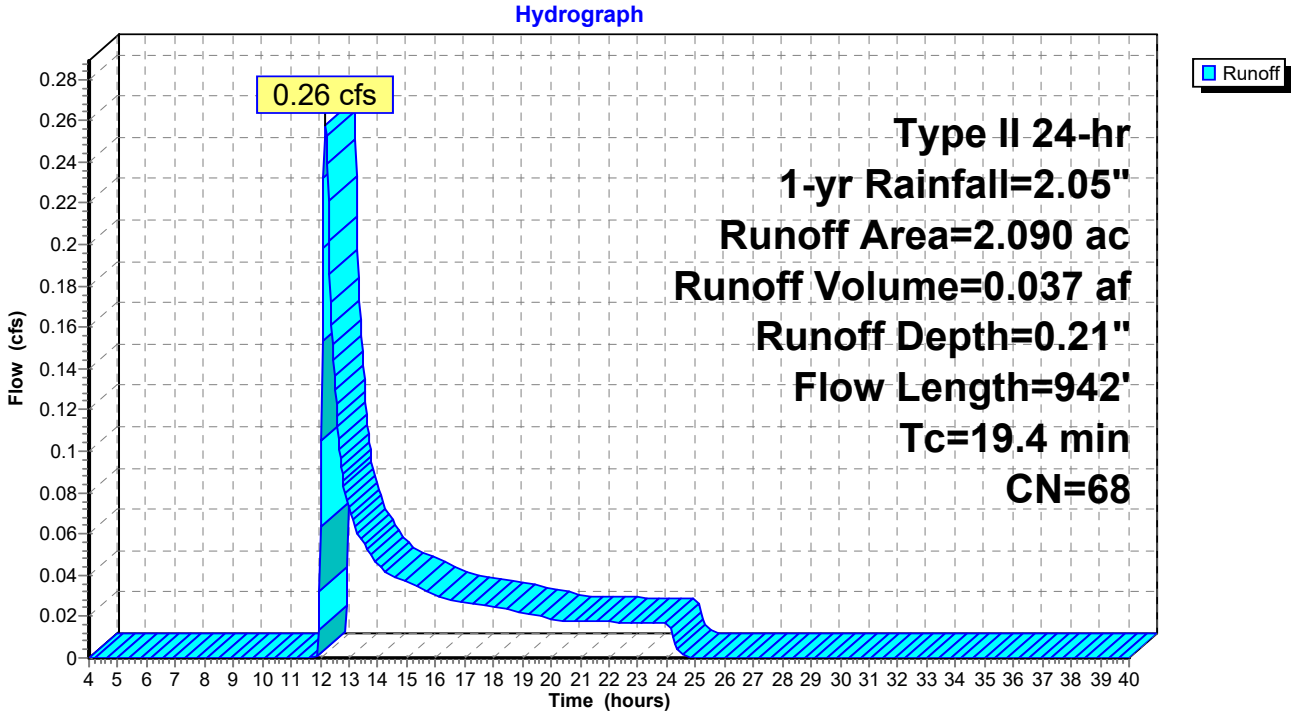
Runoff = 0.26 cfs @ 12.19 hrs, Volume= 0.037 af, Depth= 0.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-40.00 hrs, dt= 0.03 hrs
Type II 24-hr 1-yr Rainfall=2.05"

Area (ac)	CN	Description
0.080	30	Woods, Good, HSG A
2.010	70	Woods, Good, HSG C
2.090	68	Weighted Average
2.090		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.5	100	0.0200	0.10		**Sheet Flow, sheet flow** Grass: Dense n= 0.240 P2= 2.39"
0.3	72	0.0700	4.26		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
2.6	770	0.0180	4.98	39.87	**Channel Flow, wooded ditch** Area= 8.0 sf Perim= 8.0' r= 1.00' n= 0.040 Earth, dense weeds
19.4	942	Total			

Subcatchment 5S: EXISTING DA-2



Summary for Subcatchment 6S: PROPOSED DA-1B

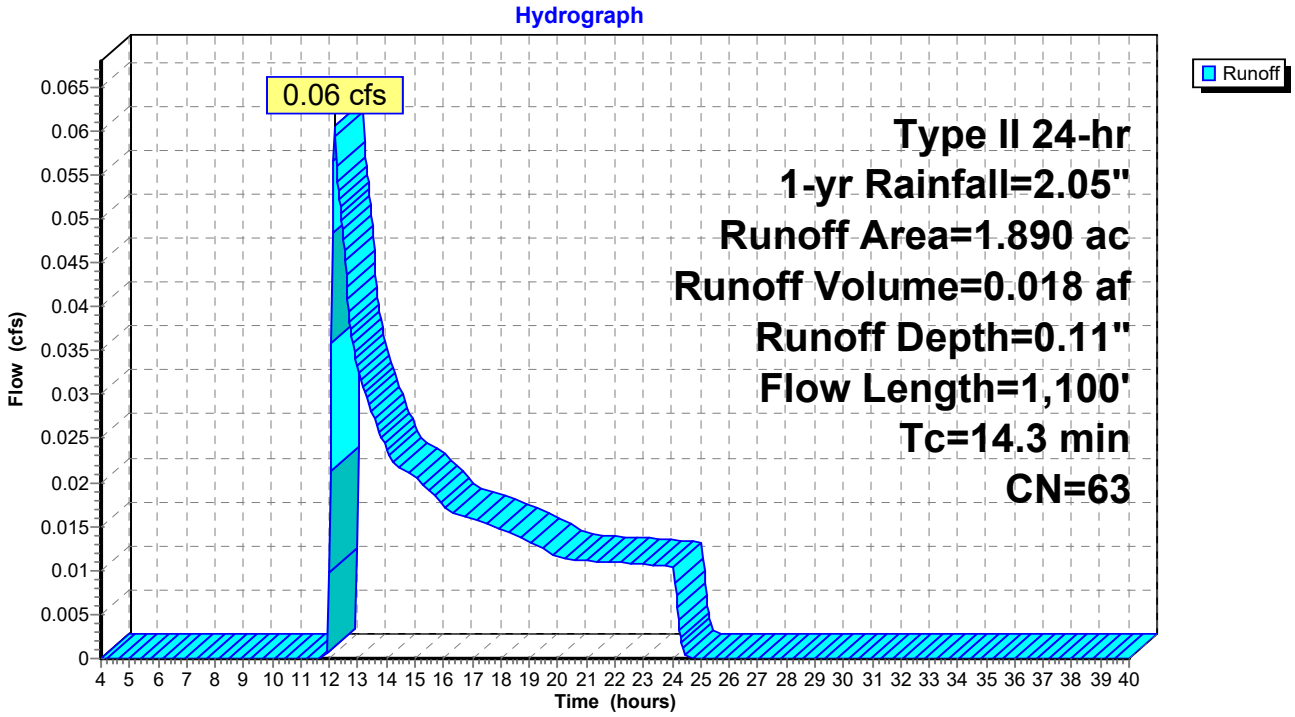
Runoff = 0.06 cfs @ 12.18 hrs, Volume= 0.018 af, Depth= 0.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-40.00 hrs, dt= 0.03 hrs
Type II 24-hr 1-yr Rainfall=2.05"

Area (ac)	CN	Description
0.790	98	Paved parking, HSG A
1.040	39	>75% Grass cover, Good, HSG A
0.060	30	Woods, Good, HSG A
1.890	63	Weighted Average
1.100		58.20% Pervious Area
0.790		41.80% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.3	100	0.0200	0.15		**Sheet Flow, sheet flow** Grass: Short n= 0.150 P2= 2.39"
1.4	190	0.0190	2.22		**Shallow Concentrated Flow, shallow flow** Unpaved Kv= 16.1 fps
1.3	360	0.0100	4.54	3.56	**Pipe Channel, culvert** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior
0.3	450	0.2000	22.03	220.33	**Channel Flow, Stormwater Basin** Area= 10.0 sf Perim= 8.0' r= 1.25' n= 0.035 Earth, dense weeds
14.3	1,100	Total			

Subcatchment 6S: PROPOSED DA-1B



Summary for Subcatchment 10S: PROPOSED DA-1C

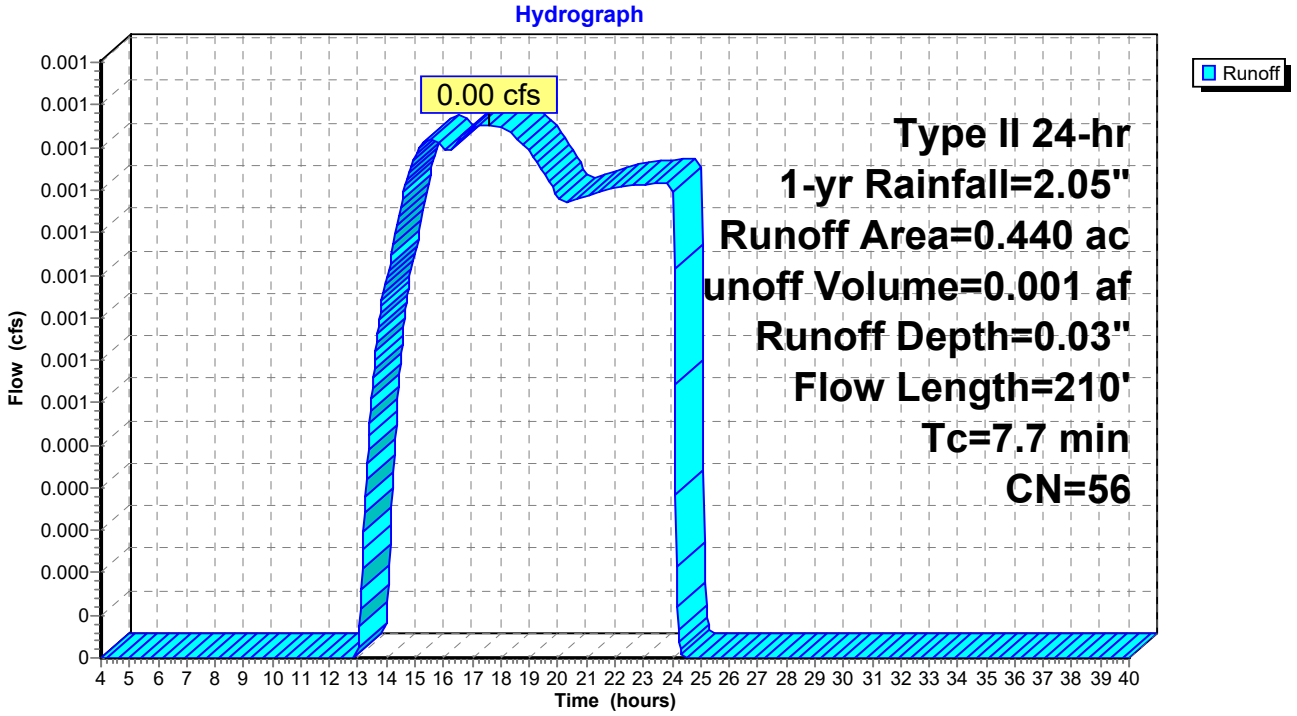
Runoff = 0.00 cfs @ 17.58 hrs, Volume= 0.001 af, Depth= 0.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-40.00 hrs, dt= 0.03 hrs
Type II 24-hr 1-yr Rainfall=2.05"

Area (ac)	CN	Description
0.130	98	Paved parking, HSG A
0.310	39	>75% Grass cover, Good, HSG A
0.440	56	Weighted Average
0.310		70.45% Pervious Area
0.130		29.55% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.3	100	0.0600	0.23		**Sheet Flow, sheet flow** Grass: Short n= 0.150 P2= 2.39"
0.4	110	0.0700	4.26		**Shallow Concentrated Flow, shallow flow** Unpaved Kv= 16.1 fps
7.7	210	Total			

Subcatchment 10S: PROPOSED DA-1C

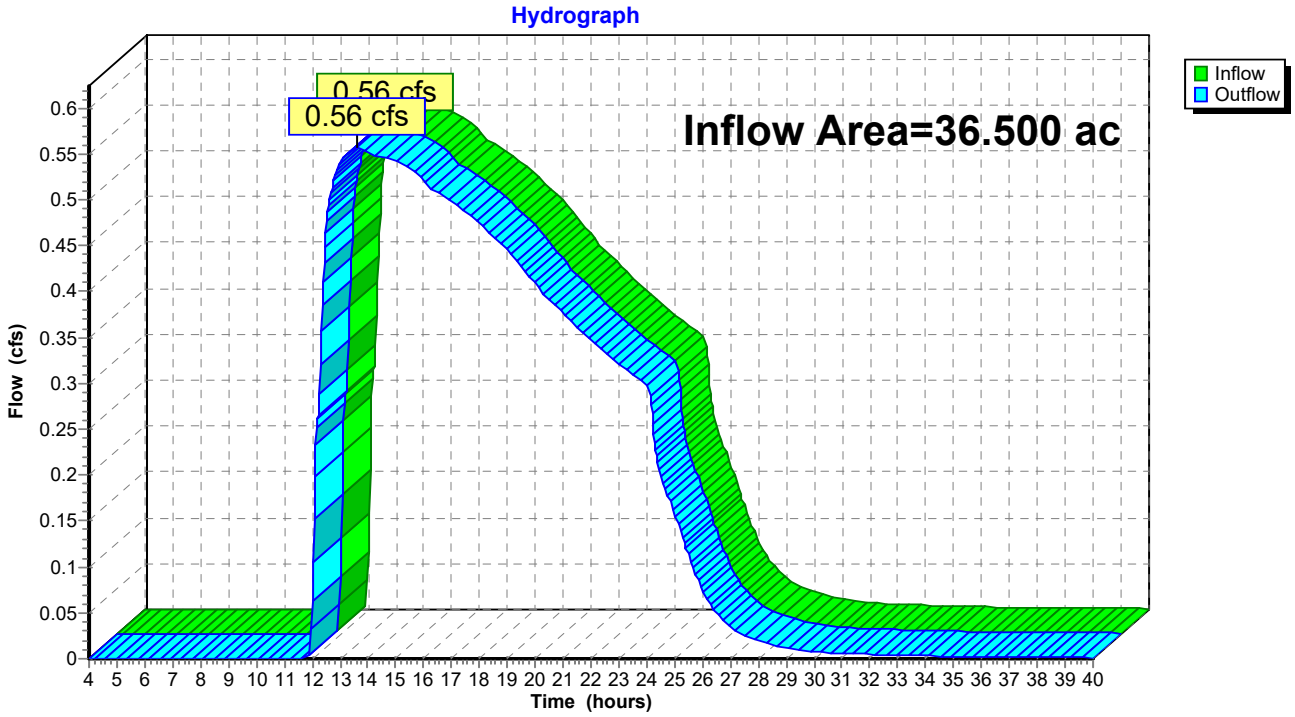


Summary for Reach 4R: outlet

Inflow Area = 36.500 ac, 38.03% Impervious, Inflow Depth > 0.16" for 1-yr event
Inflow = 0.56 cfs @ 13.59 hrs, Volume= 0.478 af
Outflow = 0.56 cfs @ 13.59 hrs, Volume= 0.478 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 4.00-40.00 hrs, dt= 0.03 hrs

Reach 4R: outlet



Summary for Reach 13R: WOODED DITCH

Inflow Area = 0.440 ac, 29.55% Impervious, Inflow Depth = 0.00" for 1-yr event
Inflow = 0.00 cfs @ 4.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 4.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 4.00-40.00 hrs, dt= 0.03 hrs
Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

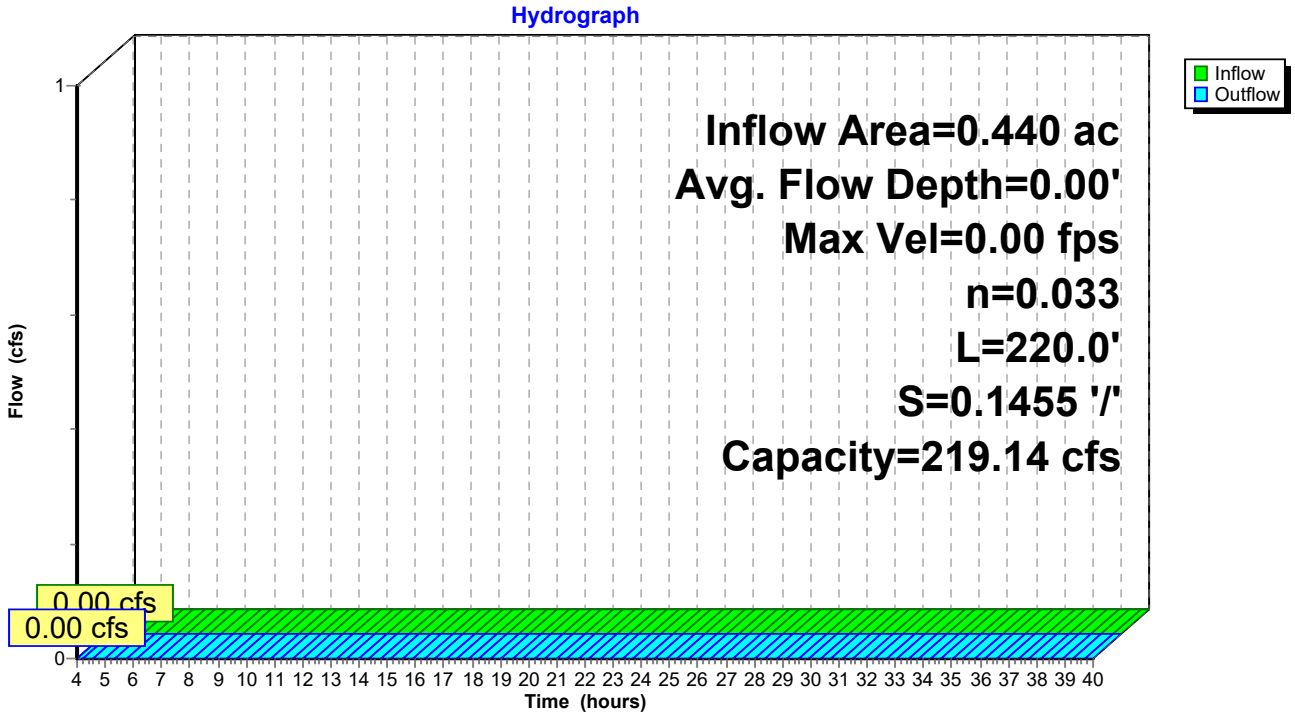
Peak Storage= 0 cf @ 4.00 hrs
Average Depth at Peak Storage= 0.00'
Bank-Full Depth= 2.00' Flow Area= 12.0 sf, Capacity= 219.14 cfs

Custom cross-section, Length= 220.0' Slope= 0.1455 '/'
Constant n= 0.033 Earth, grassed & winding
Inlet Invert= 528.00', Outlet Invert= 496.00'

Offset (feet)	Elevation (feet)	Chan.Depth (feet)
0.00	2.00	0.00
2.00	1.00	1.00
4.00	0.00	2.00
6.00	0.00	2.00
8.00	1.00	1.00
10.00	2.00	0.00

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	2.0	0	0.00
1.00	4.0	6.5	880	49.84
2.00	12.0	10.9	2,640	219.14

Reach 13R: WOODED DITCH



Stage-Area-Storage for Reach 13R: WOODED DITCH

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
528.00	0.0	0
528.02	0.0	9
528.04	0.1	18
528.06	0.1	28
528.08	0.2	38
528.10	0.2	48
528.12	0.3	59
528.14	0.3	70
528.16	0.4	82
528.18	0.4	93
528.20	0.5	106
528.22	0.5	118
528.24	0.6	131
528.26	0.7	144
528.28	0.7	158
528.30	0.8	172
528.32	0.8	186
528.34	0.9	200
528.36	1.0	215
528.38	1.0	231
528.40	1.1	246
528.42	1.2	262
528.44	1.3	279
528.46	1.3	296
528.48	1.4	313
528.50	1.5	330
528.52	1.6	348
528.54	1.7	366
528.56	1.7	384
528.58	1.8	403
528.60	1.9	422
528.62	2.0	442
528.64	2.1	462
528.66	2.2	482
528.68	2.3	503
528.70	2.4	524
528.72	2.5	545
528.74	2.6	567
528.76	2.7	589
528.78	2.8	611
528.80	2.9	634
528.82	3.0	657
528.84	3.1	680
528.86	3.2	704
528.88	3.3	728
528.90	3.4	752
528.92	3.5	777
528.94	3.6	802
528.96	3.8	828
528.98	3.9	854
529.00	4.0	880
529.02	4.1	907
529.04	4.2	934
529.06	4.4	961
529.08	4.5	988
529.10	4.6	1,016
529.12	4.7	1,045
529.14	4.9	1,073
529.16	5.0	1,102
529.18	5.1	1,132
529.20	5.3	1,162
529.22	5.4	1,192
529.24	5.6	1,222
529.26	5.7	1,253
529.28	5.8	1,284
529.30	6.0	1,316
529.32	6.1	1,347
529.34	6.3	1,380
529.36	6.4	1,412
529.38	6.6	1,445
529.40	6.7	1,478
529.42	6.9	1,512
529.44	7.0	1,546
529.46	7.2	1,580
529.48	7.3	1,615
529.50	7.5	1,650
529.52	7.7	1,685
529.54	7.8	1,721
529.56	8.0	1,757
529.58	8.2	1,794
529.60	8.3	1,830
529.62	8.5	1,868
529.64	8.7	1,905
529.66	8.8	1,943
529.68	9.0	1,981
529.70	9.2	2,020
529.72	9.4	2,058
529.74	9.5	2,098
529.76	9.7	2,137
529.78	9.9	2,177
529.80	10.1	2,218
529.82	10.3	2,258
529.84	10.5	2,299
529.86	10.6	2,341
529.88	10.8	2,382
529.90	11.0	2,424
529.92	11.2	2,467
529.94	11.4	2,510
529.96	11.6	2,553
529.98	11.8	2,596
530.00	**12.0**	**2,640**

Summary for Pond 1P: Detention Basin

Inflow Area = 15.680 ac, 57.40% Impervious, Inflow Depth = 0.27" for 1-yr event
Inflow = 1.88 cfs @ 12.35 hrs, Volume= 0.354 af
Outflow = 0.40 cfs @ 14.96 hrs, Volume= 0.353 af, Atten= 79%, Lag= 156.5 min
Primary = 0.40 cfs @ 14.96 hrs, Volume= 0.353 af
Secondary = 0.00 cfs @ 4.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 4.00-40.00 hrs, dt= 0.03 hrs
Peak Elev= 532.06' @ 14.96 hrs Surf.Area= 5,857 sf Storage= 4,275 cf

Plug-Flow detention time= 146.7 min calculated for 0.353 af (100% of inflow)
Center-of-Mass det. time= 146.1 min (1,112.9 - 966.9)

Volume	Invert	Avail.Storage	Storage Description
#1	531.00'	70,946 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

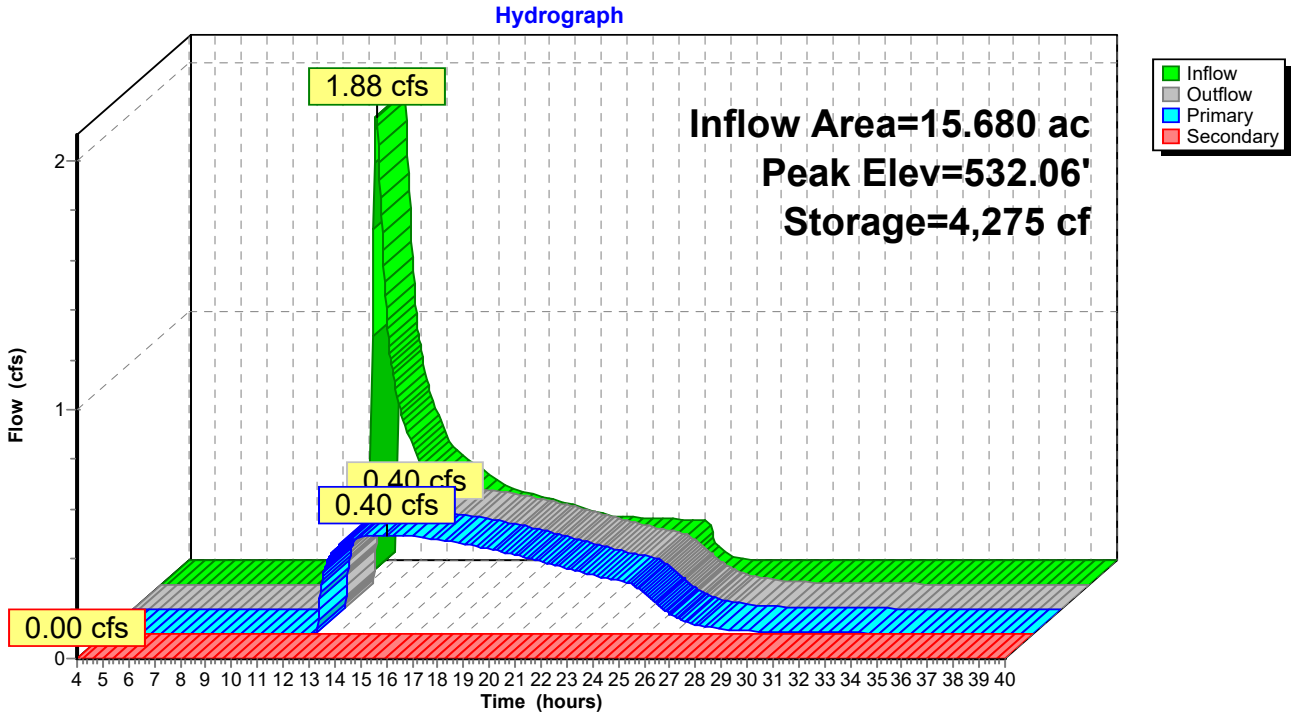
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
531.00	2,290	0	0
532.00	5,615	3,953	3,953
533.00	9,928	7,772	11,724
534.00	15,229	12,579	24,303
535.00	18,180	16,705	41,007
536.00	20,548	19,364	60,371
536.50	21,753	10,575	70,946

Device	Routing	Invert	Outlet Devices
#1	Primary	530.90'	**24.0" Round Culvert** L= 102.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 530.90' / 530.30' S= 0.0059 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#2	Device 1	531.00'	**4.0" Vert. Orifice1** C= 0.600
#3	Device 1	532.10'	**12.0" W x 18.0" H Vert. Orifice2** C= 0.600
#4	Device 1	535.00'	**24.0" x 24.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads
#5	Secondary	536.00'	**10.0' long x 20.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=0.40 cfs @ 14.96 hrs HW=532.06' (Free Discharge)
└**1=Culvert** (Passes 0.40 cfs of 5.40 cfs potential flow)
  ├**2=Orifice1** (Orifice Controls 0.40 cfs @ 4.54 fps)
  ├**3=Orifice2** (Controls 0.00 cfs)
  └**4=Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 4.00 hrs HW=531.00' (Free Discharge)
└**5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 1P: Detention Basin



Stage-Area-Storage for Pond 1P: Detention Basin

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
531.00	2,290	0
531.10	2,623	246
531.20	2,955	525
531.30	3,287	837
531.40	3,620	1,182
531.50	3,953	1,561
531.60	4,285	1,973
531.70	4,618	2,418
531.80	4,950	2,896
531.90	5,282	3,408
532.00	5,615	3,953
532.10	6,046	4,536
532.20	6,478	5,162
532.30	6,909	5,831
532.40	7,340	6,544
532.50	7,772	7,299
532.60	8,203	8,098
532.70	8,634	8,940
532.80	9,065	9,825
532.90	9,497	10,753
533.00	9,928	11,724
533.10	10,458	12,743
533.20	10,988	13,816
533.30	11,518	14,941
533.40	12,048	16,119
533.50	12,579	17,351
533.60	13,109	18,635
533.70	13,639	19,972
533.80	14,169	21,363
533.90	14,699	22,806
534.00	15,229	24,303
534.10	15,524	25,840
534.20	15,819	27,407
534.30	16,114	29,004
534.40	16,409	30,630
534.50	16,705	32,286
534.60	17,000	33,971
534.70	17,295	35,686
534.80	17,590	37,430
534.90	17,885	39,204
535.00	18,180	41,007
535.10	18,417	42,837
535.20	18,654	44,690
535.30	18,890	46,568
535.40	19,127	48,468
535.50	19,364	50,393
535.60	19,601	52,341
535.70	19,838	54,313
535.80	20,074	56,309
535.90	20,311	58,328
536.00	20,548	60,371
536.10	20,789	62,438
536.20	21,030	64,529
536.30	21,271	66,644
536.40	21,512	68,783
536.50	**21,753**	**70,946**

Summary for Pond 2P: Bioretention 1

Inflow Area = 13.790 ac, 59.54% Impervious, Inflow Depth = 0.41" for 1-yr event
Inflow = 6.72 cfs @ 12.07 hrs, Volume= 0.466 af
Outflow = 1.88 cfs @ 12.35 hrs, Volume= 0.353 af, Atten= 72%, Lag= 17.1 min
Primary = 1.88 cfs @ 12.35 hrs, Volume= 0.353 af

Routing by Stor-Ind method, Time Span= 4.00-40.00 hrs, dt= 0.03 hrs
Peak Elev= 536.60' @ 12.35 hrs Surf.Area= 10,645 sf Storage= 5,948 cf

Plug-Flow detention time= 174.2 min calculated for 0.353 af (76% of inflow)
Center-of-Mass det. time= 70.4 min (966.0 - 895.5)

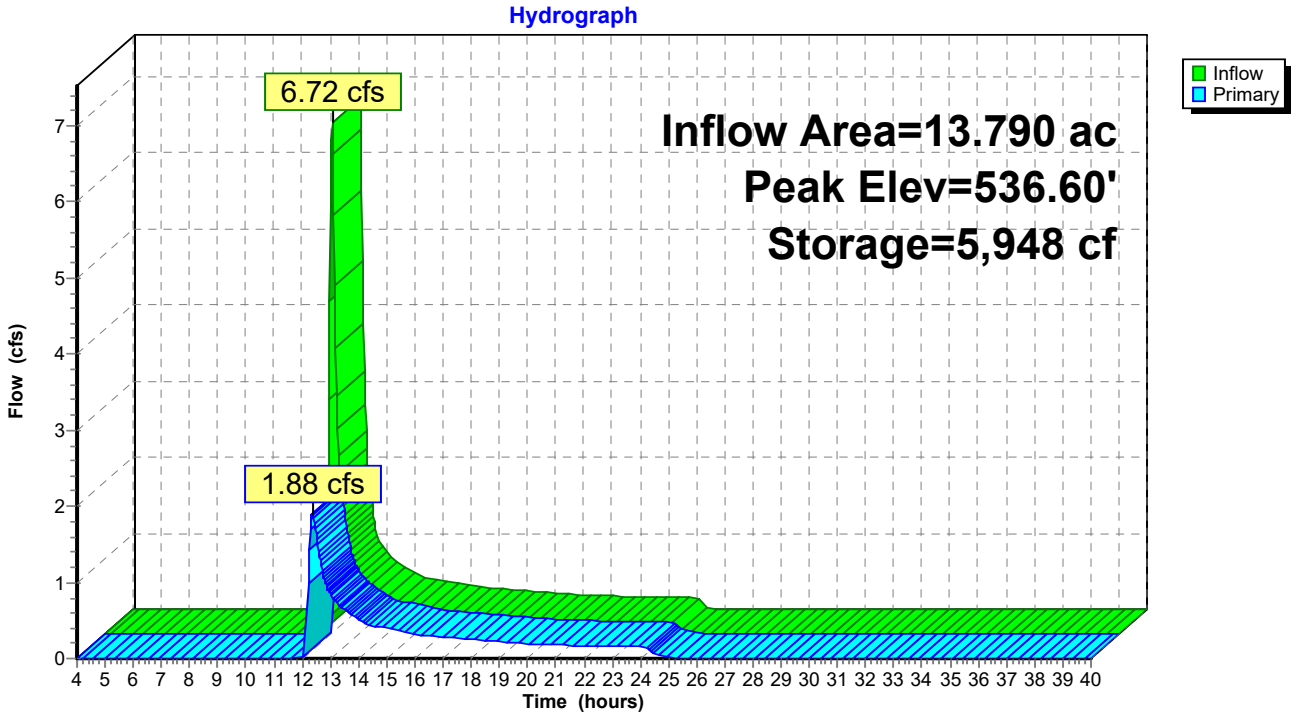
Volume	Invert	Avail.Storage	Storage Description
#1	536.00'	10,426 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
536.00	9,285	0	0
536.50	10,422	4,927	4,927
537.00	11,574	5,499	10,426

Device	Routing	Invert	Outlet Devices
#1	Primary	536.50'	**25.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=1.87 cfs @ 12.35 hrs HW=536.60' (Free Discharge)
↑**1=Broad-Crested Rectangular Weir** (Weir Controls 1.87 cfs @ 0.77 fps)

Pond 2P: Bioretention 1



Stage-Area-Storage for Pond 2P: Bioretention 1

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
536.00	9,285	0
536.01	9,308	93
536.02	9,330	186
536.03	9,353	280
536.04	9,376	373
536.05	9,399	467
536.06	9,421	561
536.07	9,444	656
536.08	9,467	750
536.09	9,490	845
536.10	9,512	940
536.11	9,535	1,035
536.12	9,558	1,131
536.13	9,581	1,226
536.14	9,603	1,322
536.15	9,626	1,418
536.16	9,649	1,515
536.17	9,672	1,611
536.18	9,694	1,708
536.19	9,717	1,805
536.20	9,740	1,902
536.21	9,763	2,000
536.22	9,785	2,098
536.23	9,808	2,196
536.24	9,831	2,294
536.25	9,854	2,392
536.26	9,876	2,491
536.27	9,899	2,590
536.28	9,922	2,689
536.29	9,944	2,788
536.30	9,967	2,888
536.31	9,990	2,988
536.32	10,013	3,088
536.33	10,035	3,188
536.34	10,058	3,288
536.35	10,081	3,389
536.36	10,104	3,490
536.37	10,126	3,591
536.38	10,149	3,692
536.39	10,172	3,794
536.40	10,195	3,896
536.41	10,217	3,998
536.42	10,240	4,100
536.43	10,263	4,203
536.44	10,286	4,306
536.45	10,308	4,408
536.46	10,331	4,512
536.47	10,354	4,615
536.48	10,377	4,719
536.49	10,399	4,823
536.50	10,422	4,927
536.51	10,445	5,031
536.52	10,468	5,136
536.53	10,491	5,240
536.54	10,514	5,345
536.55	10,537	5,451
536.56	10,560	5,556
536.57	10,583	5,662
536.58	10,606	5,768
536.59	10,629	5,874
536.60	10,652	5,980
536.61	10,675	6,087
536.62	10,698	6,194
536.63	10,722	6,301
536.64	10,745	6,408
536.65	10,768	6,516
536.66	10,791	6,624
536.67	10,814	6,732
536.68	10,837	6,840
536.69	10,860	6,949
536.70	10,883	7,057
536.71	10,906	7,166
536.72	10,929	7,275
536.73	10,952	7,385
536.74	10,975	7,494
536.75	10,998	7,604
536.76	11,021	7,714
536.77	11,044	7,825
536.78	11,067	7,935
536.79	11,090	8,046
536.80	11,113	8,157
536.81	11,136	8,268
536.82	11,159	8,380
536.83	11,182	8,491
536.84	11,205	8,603
536.85	11,228	8,716
536.86	11,251	8,828
536.87	11,274	8,941
536.88	11,298	9,053
536.89	11,321	9,167
536.90	11,344	9,280
536.91	11,367	9,393
536.92	11,390	9,507
536.93	11,413	9,621
536.94	11,436	9,735
536.95	11,459	9,850
536.96	11,482	9,965
536.97	11,505	10,080
536.98	11,528	10,195
536.99	11,551	10,310
537.00	**11,574**	**10,426**

Summary for Pond 3P: Bioretention 2

Inflow Area = 1.890 ac, 41.80% Impervious, Inflow Depth = 0.11" for 1-yr event
Inflow = 0.06 cfs @ 12.18 hrs, Volume= 0.018 af
Outflow = 0.01 cfs @ 24.15 hrs, Volume= 0.001 af, Atten= 87%, Lag= 718.1 min
Primary = 0.01 cfs @ 24.15 hrs, Volume= 0.001 af

Routing by Stor-Ind method, Time Span= 4.00-40.00 hrs, dt= 0.03 hrs
Peak Elev= 543.51' @ 24.15 hrs Surf.Area= 1,711 sf Storage= 764 cf

Plug-Flow detention time= 731.7 min calculated for 0.001 af (4% of inflow)
Center-of-Mass det. time= 464.8 min (1,458.6 - 993.8)

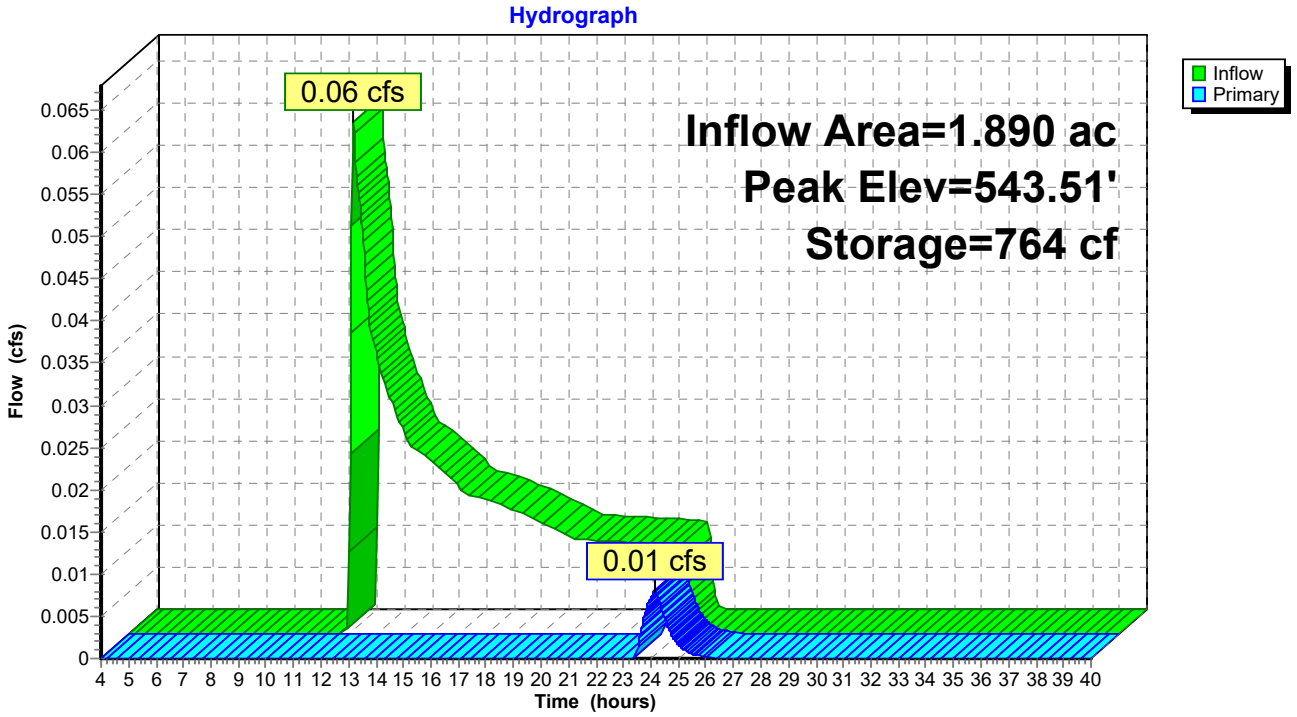
Volume	Invert	Avail.Storage	Storage Description
#1	543.00'	4,037 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
543.00	1,322	0	0
543.50	1,680	751	751
544.00	3,660	1,335	2,086
544.50	4,145	1,951	4,037

Device	Routing	Invert	Outlet Devices
#1	Primary	543.50'	**12.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads
#2	Device 1	540.00'	**12.0" Round Culvert** L= 300.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 540.00' / 537.00' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.01 cfs @ 24.15 hrs HW=543.51' (Free Discharge)
↑**1=Grate** (Weir Controls 0.01 cfs @ 0.29 fps)
↑**2=Culvert** (Passes 0.01 cfs of 0.16 cfs potential flow)

Pond 3P: Bioretention 2



Stage-Area-Storage for Pond 3P: Bioretention 2

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
543.00	1,322	0
543.02	1,336	27
543.04	1,351	53
543.06	1,365	81
543.08	1,379	108
543.10	1,394	136
543.12	1,408	164
543.14	1,422	192
543.16	1,437	221
543.18	1,451	250
543.20	1,465	279
543.22	1,480	308
543.24	1,494	338
543.26	1,508	368
543.28	1,522	398
543.30	1,537	429
543.32	1,551	460
543.34	1,565	491
543.36	1,580	522
543.38	1,594	554
543.40	1,608	586
543.42	1,623	618
543.44	1,637	651
543.46	1,651	684
543.48	1,666	717
543.50	1,680	751
543.52	1,759	785
543.54	1,838	821
543.56	1,918	858
543.58	1,997	898
543.60	2,076	938
543.62	2,155	981
543.64	2,234	1,025
543.66	2,314	1,070
543.68	2,393	1,117
543.70	2,472	1,166
543.72	2,551	1,216
543.74	2,630	1,268
543.76	2,710	1,321
543.78	2,789	1,376
543.80	2,868	1,433
543.82	2,947	1,491
543.84	3,026	1,551
543.86	3,106	1,612
543.88	3,185	1,675
543.90	3,264	1,739
543.92	3,343	1,805
543.94	3,422	1,873
543.96	3,502	1,942
543.98	3,581	2,013
544.00	3,660	2,086
544.02	3,679	2,159
544.04	3,699	2,233
544.06	3,718	2,307
544.08	3,738	2,381
544.10	3,757	2,456
544.12	3,776	2,532
544.14	3,796	2,607
544.16	3,815	2,684
544.18	3,835	2,760
544.20	3,854	2,837
544.22	3,873	2,914
544.24	3,893	2,992
544.26	3,912	3,070
544.28	3,932	3,148
544.30	3,951	3,227
544.32	3,970	3,306
544.34	3,990	3,386
544.36	4,009	3,466
544.38	4,029	3,546
544.40	4,048	3,627
544.42	4,067	3,708
544.44	4,087	3,790
544.46	4,106	3,872
544.48	4,126	3,954
544.50	**4,145**	**4,037**

Summary for Pond 4P: Bioretention 3

Inflow Area = 0.440 ac, 29.55% Impervious, Inflow Depth = 0.03" for 1-yr event
Inflow = 0.00 cfs @ 17.58 hrs, Volume= 0.001 af
Outflow = 0.00 cfs @ 4.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 4.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 4.00-40.00 hrs, dt= 0.03 hrs
Peak Elev= 530.09' @ 24.46 hrs Surf.Area= 522 sf Storage= 44 cf

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

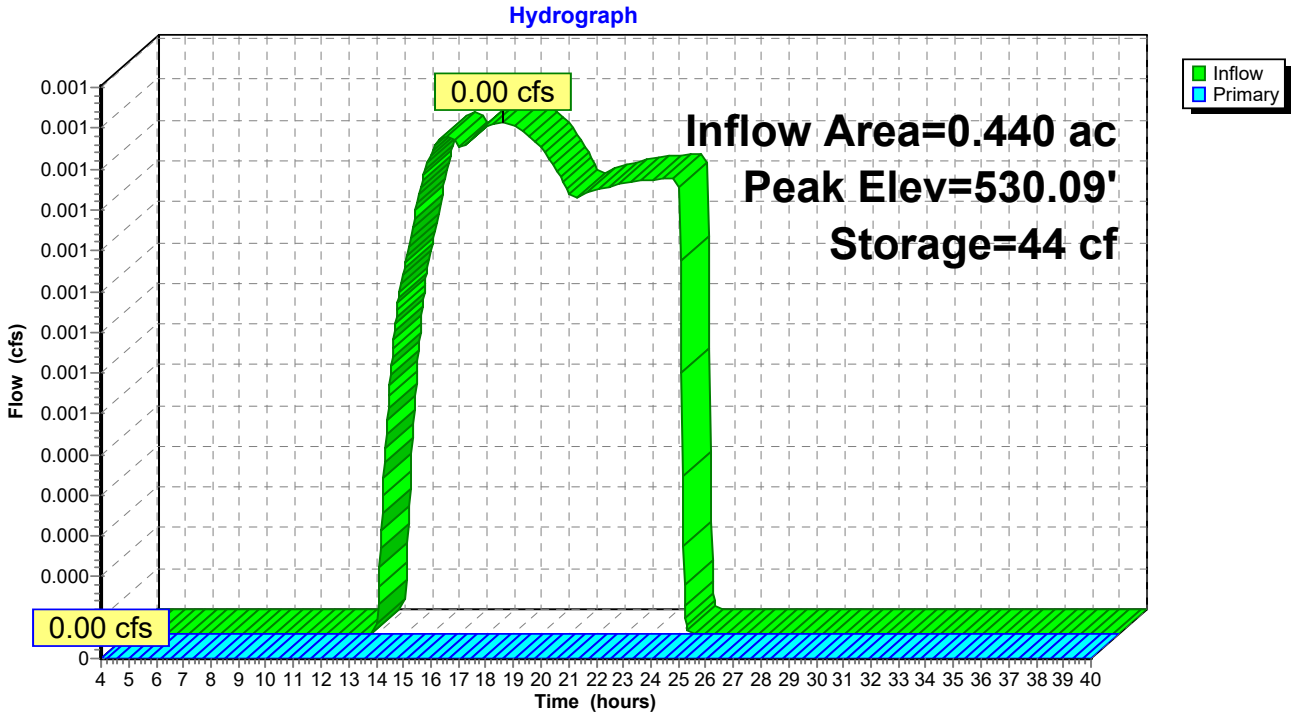
Volume	Invert	Avail.Storage	Storage Description
#1	530.00'	634 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
530.00	500	0	0
530.50	631	283	283
531.00	775	352	634

Device	Routing	Invert	Outlet Devices
#1	Primary	530.50'	**10.0' long x 15.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=0.00 cfs @ 4.00 hrs HW=530.00' (Free Discharge)
↑**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 4P: Bioretention 3



Stage-Area-Storage for Pond 4P: Bioretention 3

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
530.00	500	0
530.01	503	5
530.02	505	10
530.03	508	15
530.04	510	20
530.05	513	25
530.06	516	30
530.07	518	36
530.08	521	41
530.09	524	46
530.10	526	51
530.11	529	57
530.12	531	62
530.13	534	67
530.14	537	73
530.15	539	78
530.16	542	83
530.17	545	89
530.18	547	94
530.19	550	100
530.20	552	105
530.21	555	111
530.22	558	116
530.23	560	122
530.24	563	128
530.25	566	133
530.26	568	139
530.27	571	145
530.28	573	150
530.29	576	156
530.30	579	162
530.31	581	168
530.32	584	173
530.33	586	179
530.34	589	185
530.35	592	191
530.36	594	197
530.37	597	203
530.38	600	209
530.39	602	215
530.40	605	221
530.41	607	227
530.42	610	233
530.43	613	239
530.44	615	245
530.45	618	252
530.46	621	258
530.47	623	264
530.48	626	270
530.49	628	276
530.50	631	283
530.51	634	289
530.52	637	295
530.53	640	302
530.54	643	308
530.55	645	315
530.56	648	321
530.57	651	328
530.58	654	334
530.59	657	341
530.60	660	347
530.61	663	354
530.62	666	361
530.63	668	367
530.64	671	374
530.65	674	381
530.66	677	387
530.67	680	394
530.68	683	401
530.69	686	408
530.70	689	415
530.71	691	422
530.72	694	429
530.73	697	435
530.74	700	442
530.75	703	450
530.76	706	457
530.77	709	464
530.78	712	471
530.79	715	478
530.80	717	485
530.81	720	492
530.82	723	499
530.83	726	507
530.84	729	514
530.85	732	521
530.86	735	529
530.87	738	536
530.88	740	543
530.89	743	551
530.90	746	558
530.91	749	566
530.92	752	573
530.93	755	581
530.94	758	588
530.95	761	596
530.96	763	603
530.97	766	611
530.98	769	619
530.99	772	627
531.00	**775**	**634**

Summary for Subcatchment 3S: PROPOSED DA-1D

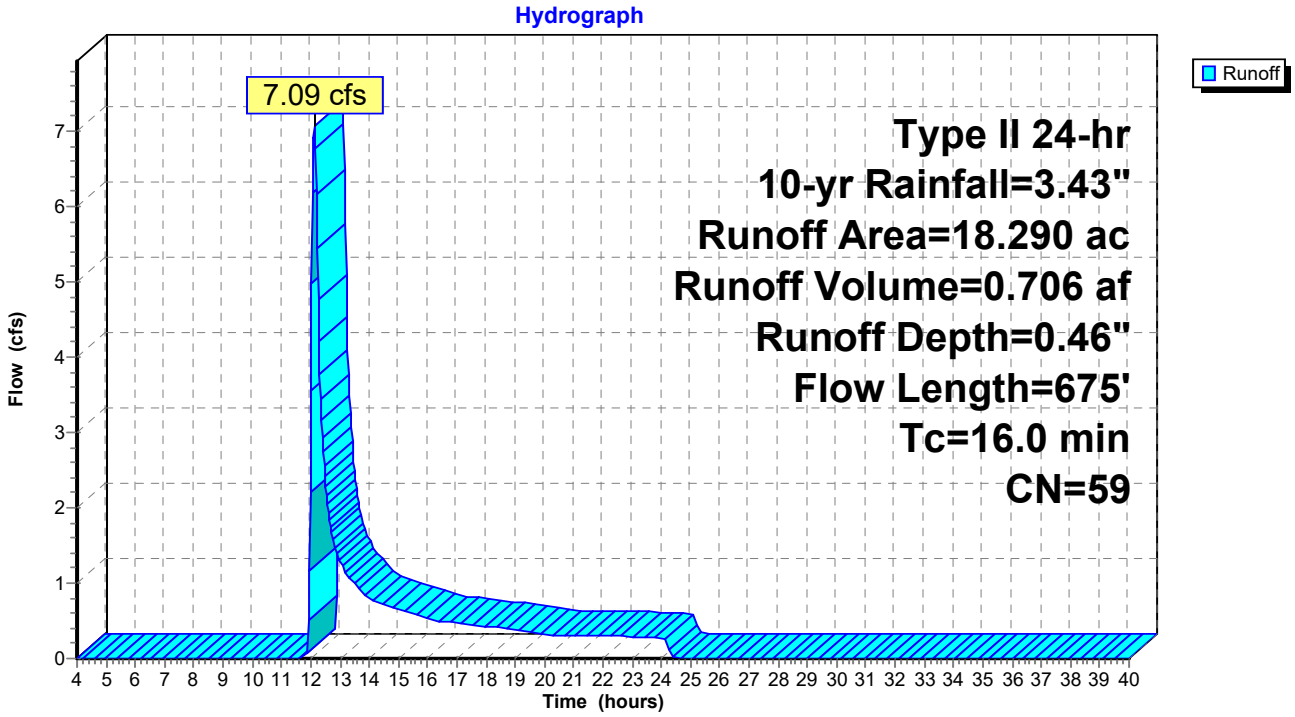
Runoff = 7.09 cfs @ 12.13 hrs, Volume= 0.706 af, Depth= 0.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-40.00 hrs, dt= 0.03 hrs
Type II 24-hr 10-yr Rainfall=3.43"

Area (ac)	CN	Description
5.320	81	Urban industrial, 72% imp, HSG A
3.650	39	>75% Grass cover, Good, HSG A
0.060	74	>75% Grass cover, Good, HSG C
2.040	61	1/4 acre lots, 38% imp, HSG A
0.380	83	1/4 acre lots, 38% imp, HSG C
3.120	30	Woods, Good, HSG A
1.000	55	Woods, Good, HSG B
1.690	70	Woods, Good, HSG C
1.030	77	Woods, Good, HSG D
18.290	59	Weighted Average
13.540		74.03% Pervious Area
4.750		25.97% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.6	100	0.0750	0.11		**Sheet Flow, sheet flow** Woods: Light underbrush n= 0.400 P2= 2.39"
1.0	305	0.1080	5.29		**Shallow Concentrated Flow, shallow flow** Unpaved Kv= 16.1 fps
0.4	270	0.0660	10.91	87.26	**Channel Flow, ditch** Area= 8.0 sf Perim= 8.0' r= 1.00' n= 0.035 Earth, dense weeds
16.0	675	Total			

Subcatchment 3S: PROPOSED DA-1D



Summary for Subcatchment 4S: PROPOSED DA-1A

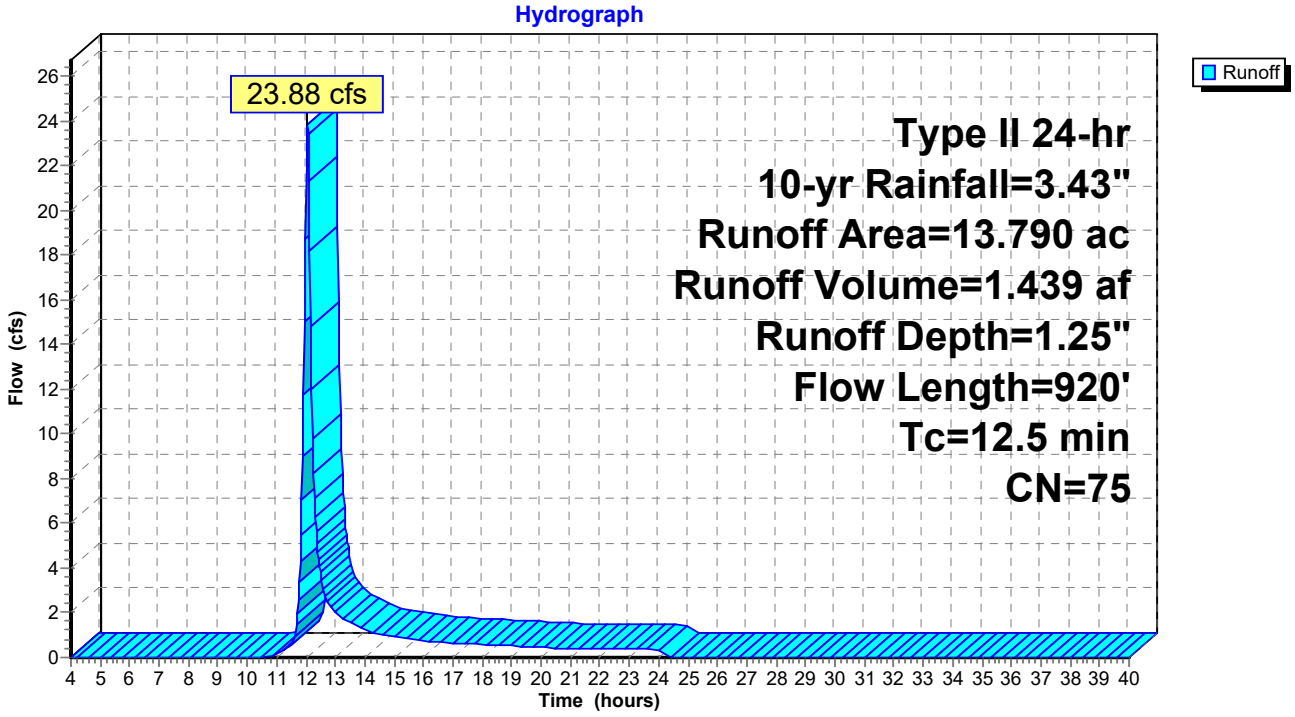
Runoff = 23.88 cfs @ 12.05 hrs, Volume= 1.439 af, Depth= 1.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-40.00 hrs, dt= 0.03 hrs
Type II 24-hr 10-yr Rainfall=3.43"

Area (ac)	CN	Description
8.210	98	Paved parking, HSG A
5.140	39	>75% Grass cover, Good, HSG A
0.440	74	>75% Grass cover, Good, HSG C
13.790	75	Weighted Average
5.580		40.46% Pervious Area
8.210		59.54% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.3	100	0.0200	0.15		**Sheet Flow, sheet flow** Grass: Short n= 0.150 P2= 2.39"
0.7	470	0.0250	10.68	85.44	**Channel Flow, swale** Area= 8.0 sf Perim= 8.0' r= 1.00' n= 0.022 Earth, clean & straight
0.5	350	0.0250	10.68	128.16	**Channel Flow, swale** Area= 12.0 sf Perim= 12.0' r= 1.00' n= 0.022 Earth, clean & straight
12.5	920	Total			

Subcatchment 4S: PROPOSED DA-1A



Summary for Subcatchment 5S: EXISTING DA-2

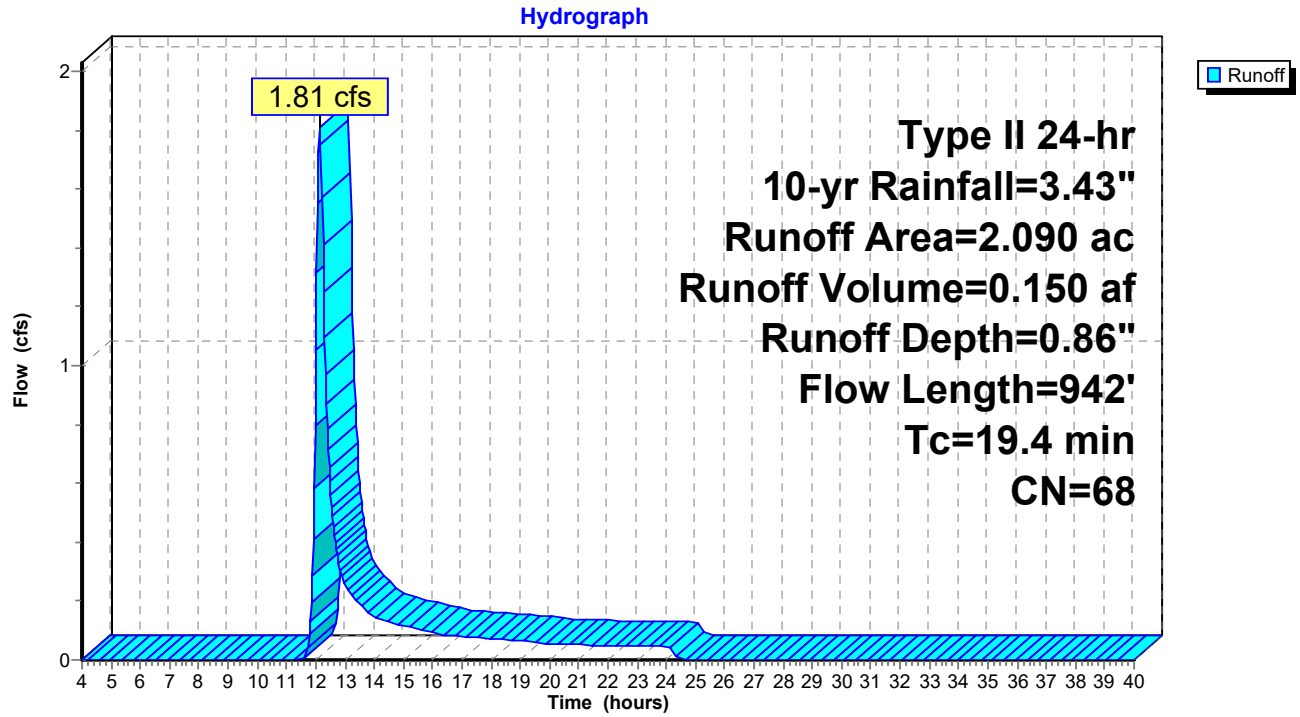
Runoff = 1.81 cfs @ 12.14 hrs, Volume= 0.150 af, Depth= 0.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-40.00 hrs, dt= 0.03 hrs
Type II 24-hr 10-yr Rainfall=3.43"

Area (ac)	CN	Description
0.080	30	Woods, Good, HSG A
2.010	70	Woods, Good, HSG C
2.090	68	Weighted Average
2.090		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.5	100	0.0200	0.10		**Sheet Flow, sheet flow** Grass: Dense n= 0.240 P2= 2.39"
0.3	72	0.0700	4.26		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
2.6	770	0.0180	4.98	39.87	**Channel Flow, wooded ditch** Area= 8.0 sf Perim= 8.0' r= 1.00' n= 0.040 Earth, dense weeds
19.4	942	Total			

Subcatchment 5S: EXISTING DA-2



Summary for Subcatchment 6S: PROPOSED DA-1B

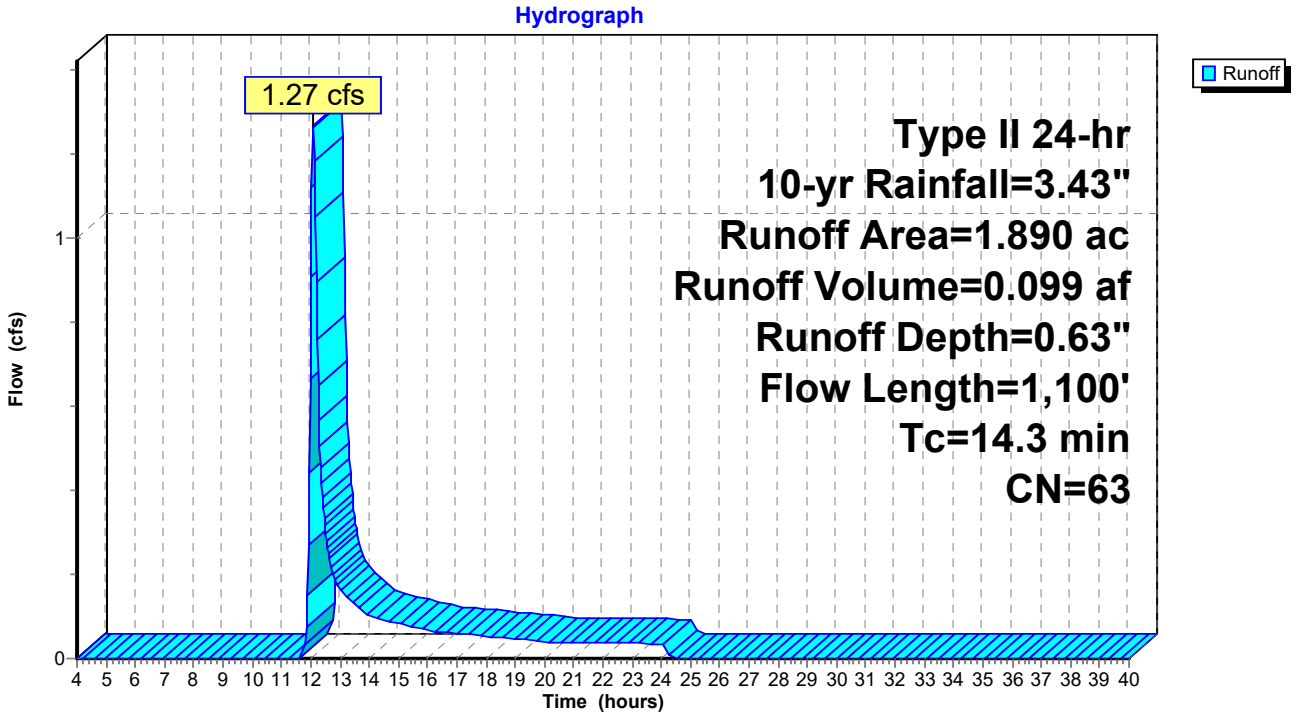
Runoff = 1.27 cfs @ 12.09 hrs, Volume= 0.099 af, Depth= 0.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-40.00 hrs, dt= 0.03 hrs
Type II 24-hr 10-yr Rainfall=3.43"

Area (ac)	CN	Description
0.790	98	Paved parking, HSG A
1.040	39	>75% Grass cover, Good, HSG A
0.060	30	Woods, Good, HSG A
1.890	63	Weighted Average
1.100		58.20% Pervious Area
0.790		41.80% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.3	100	0.0200	0.15		**Sheet Flow, sheet flow** Grass: Short n= 0.150 P2= 2.39"
1.4	190	0.0190	2.22		**Shallow Concentrated Flow, shallow flow** Unpaved Kv= 16.1 fps
1.3	360	0.0100	4.54	3.56	**Pipe Channel, culvert** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior
0.3	450	0.2000	22.03	220.33	**Channel Flow, Stormwater Basin** Area= 10.0 sf Perim= 8.0' r= 1.25' n= 0.035 Earth, dense weeds
14.3	1,100	Total			

Subcatchment 6S: PROPOSED DA-1B



Summary for Subcatchment 10S: PROPOSED DA-1C

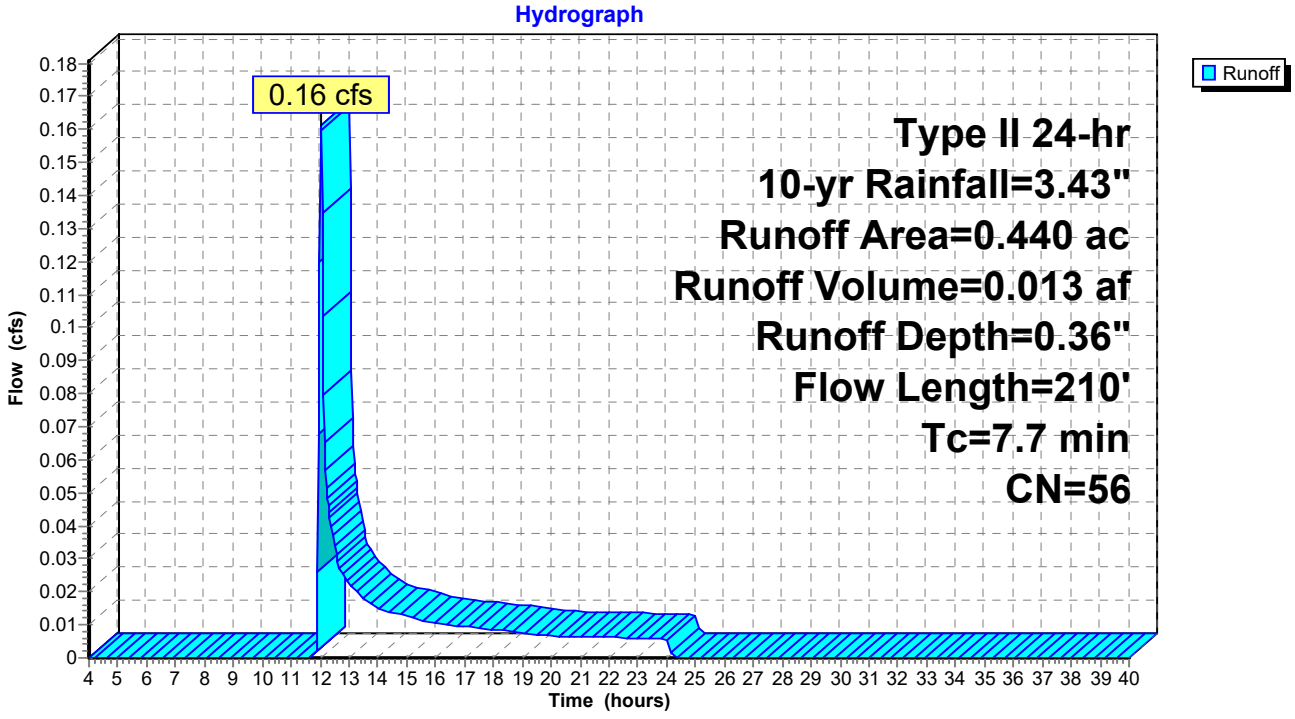
Runoff = 0.16 cfs @ 12.03 hrs, Volume= 0.013 af, Depth= 0.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-40.00 hrs, dt= 0.03 hrs
Type II 24-hr 10-yr Rainfall=3.43"

Area (ac)	CN	Description
0.130	98	Paved parking, HSG A
0.310	39	>75% Grass cover, Good, HSG A
0.440	56	Weighted Average
0.310		70.45% Pervious Area
0.130		29.55% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.3	100	0.0600	0.23		**Sheet Flow, sheet flow** Grass: Short n= 0.150 P2= 2.39"
0.4	110	0.0700	4.26		**Shallow Concentrated Flow, shallow flow** Unpaved Kv= 16.1 fps
7.7	210	Total			

Subcatchment 10S: PROPOSED DA-1C

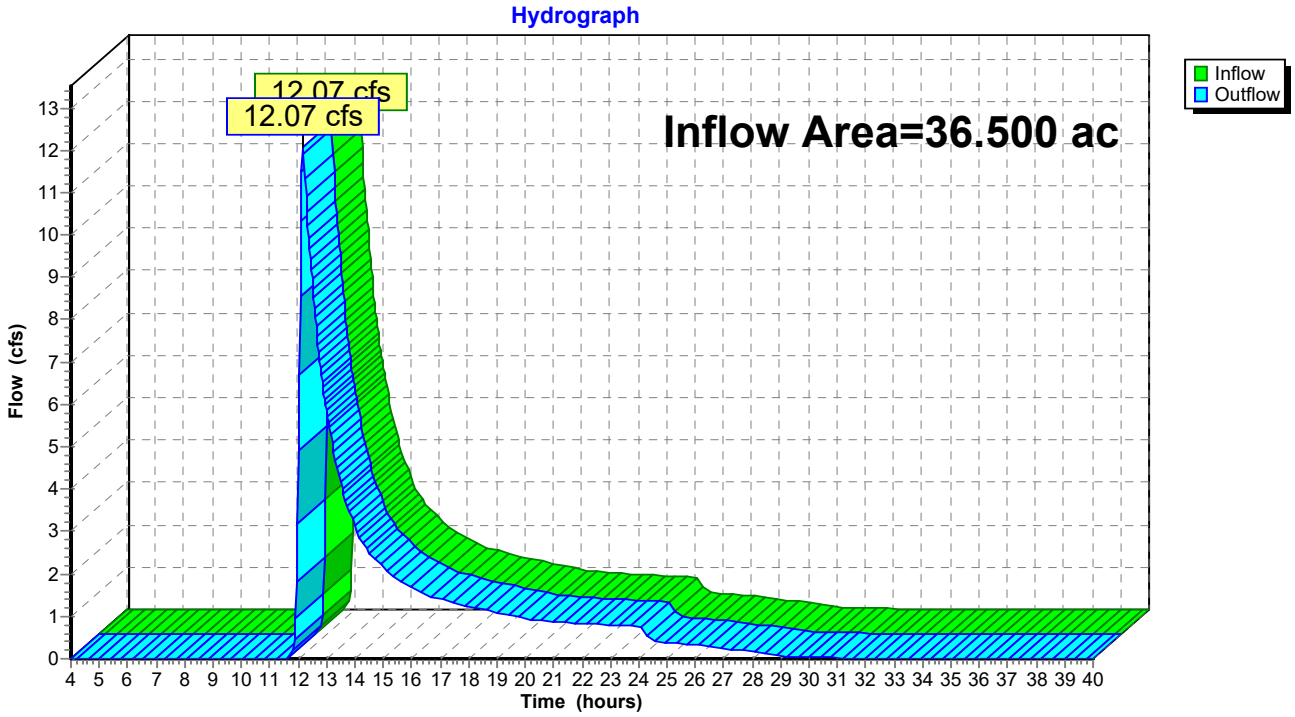


Summary for Reach 4R: outlet

Inflow Area = 36.500 ac, 38.03% Impervious, Inflow Depth > 0.75" for 10-yr event
Inflow = 12.07 cfs @ 12.18 hrs, Volume= 2.269 af
Outflow = 12.07 cfs @ 12.18 hrs, Volume= 2.269 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 4.00-40.00 hrs, dt= 0.03 hrs

Reach 4R: outlet



Summary for Reach 13R: WOODED DITCH

Inflow Area = 0.440 ac, 29.55% Impervious, Inflow Depth = 0.18" for 10-yr event
Inflow = 0.01 cfs @ 14.67 hrs, Volume= 0.007 af
Outflow = 0.01 cfs @ 14.80 hrs, Volume= 0.007 af, Atten= 0%, Lag= 7.8 min

Routing by Stor-Ind+Trans method, Time Span= 4.00-40.00 hrs, dt= 0.03 hrs
Max. Velocity= 1.25 fps, Min. Travel Time= 2.9 min
Avg. Velocity = 1.25 fps, Avg. Travel Time= 2.9 min

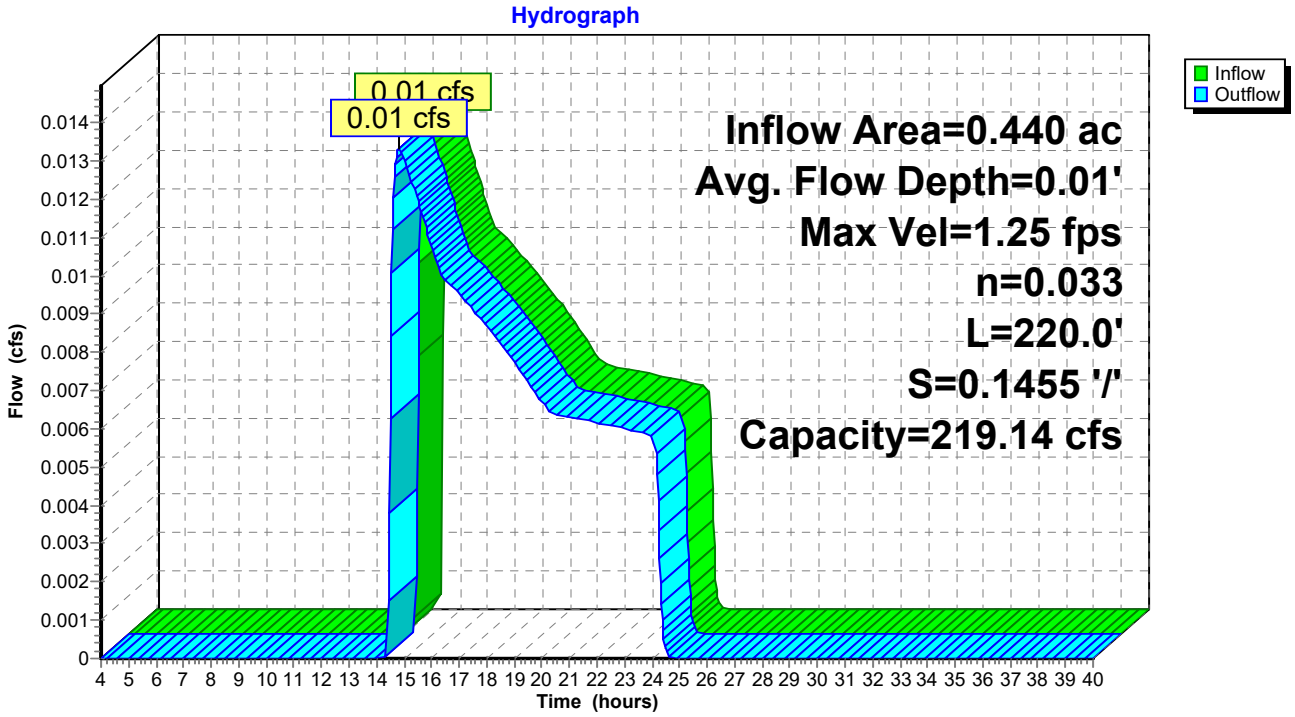
Peak Storage= 2 cf @ 14.75 hrs
Average Depth at Peak Storage= 0.01'
Bank-Full Depth= 2.00' Flow Area= 12.0 sf, Capacity= 219.14 cfs

Custom cross-section, Length= 220.0' Slope= 0.1455 '/'
Constant n= 0.033 Earth, grassed & winding
Inlet Invert= 528.00', Outlet Invert= 496.00'

Offset (feet)	Elevation (feet)	Chan.Depth (feet)
0.00	2.00	0.00
2.00	1.00	1.00
4.00	0.00	2.00
6.00	0.00	2.00
8.00	1.00	1.00
10.00	2.00	0.00

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	2.0	0	0.00
1.00	4.0	6.5	880	49.84
2.00	12.0	10.9	2,640	219.14

Reach 13R: WOODED DITCH



Stage-Area-Storage for Reach 13R: WOODED DITCH

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
528.00	0.0	0
528.02	0.0	9
528.04	0.1	18
528.06	0.1	28
528.08	0.2	38
528.10	0.2	48
528.12	0.3	59
528.14	0.3	70
528.16	0.4	82
528.18	0.4	93
528.20	0.5	106
528.22	0.5	118
528.24	0.6	131
528.26	0.7	144
528.28	0.7	158
528.30	0.8	172
528.32	0.8	186
528.34	0.9	200
528.36	1.0	215
528.38	1.0	231
528.40	1.1	246
528.42	1.2	262
528.44	1.3	279
528.46	1.3	296
528.48	1.4	313
528.50	1.5	330
528.52	1.6	348
528.54	1.7	366
528.56	1.7	384
528.58	1.8	403
528.60	1.9	422
528.62	2.0	442
528.64	2.1	462
528.66	2.2	482
528.68	2.3	503
528.70	2.4	524
528.72	2.5	545
528.74	2.6	567
528.76	2.7	589
528.78	2.8	611
528.80	2.9	634
528.82	3.0	657
528.84	3.1	680
528.86	3.2	704
528.88	3.3	728
528.90	3.4	752
528.92	3.5	777
528.94	3.6	802
528.96	3.8	828
528.98	3.9	854
529.00	4.0	880
529.02	4.1	907
529.04	4.2	934
529.06	4.4	961
529.08	4.5	988
529.10	4.6	1,016
529.12	4.7	1,045
529.14	4.9	1,073
529.16	5.0	1,102
529.18	5.1	1,132
529.20	5.3	1,162
529.22	5.4	1,192
529.24	5.6	1,222
529.26	5.7	1,253
529.28	5.8	1,284
529.30	6.0	1,316
529.32	6.1	1,347
529.34	6.3	1,380
529.36	6.4	1,412
529.38	6.6	1,445
529.40	6.7	1,478
529.42	6.9	1,512
529.44	7.0	1,546
529.46	7.2	1,580
529.48	7.3	1,615
529.50	7.5	1,650
529.52	7.7	1,685
529.54	7.8	1,721
529.56	8.0	1,757
529.58	8.2	1,794
529.60	8.3	1,830
529.62	8.5	1,868
529.64	8.7	1,905
529.66	8.8	1,943
529.68	9.0	1,981
529.70	9.2	2,020
529.72	9.4	2,058
529.74	9.5	2,098
529.76	9.7	2,137
529.78	9.9	2,177
529.80	10.1	2,218
529.82	10.3	2,258
529.84	10.5	2,299
529.86	10.6	2,341
529.88	10.8	2,382
529.90	11.0	2,424
529.92	11.2	2,467
529.94	11.4	2,510
529.96	11.6	2,553
529.98	11.8	2,596
530.00	**12.0**	**2,640**

Summary for Pond 1P: Detention Basin

Inflow Area = 15.680 ac, 57.40% Impervious, Inflow Depth = 1.08" for 10-yr event
Inflow = 21.62 cfs @ 12.10 hrs, Volume= 1.408 af
Outflow = 5.96 cfs @ 12.43 hrs, Volume= 1.407 af, Atten= 72%, Lag= 20.1 min
Primary = 5.96 cfs @ 12.43 hrs, Volume= 1.407 af
Secondary = 0.00 cfs @ 4.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 4.00-40.00 hrs, dt= 0.03 hrs
Peak Elev= 533.50' @ 12.43 hrs Surf.Area= 12,582 sf Storage= 17,360 cf

Plug-Flow detention time= 94.8 min calculated for 1.407 af (100% of inflow)
Center-of-Mass det. time= 94.5 min (978.2 - 883.7)

Volume	Invert	Avail.Storage	Storage Description
#1	531.00'	70,946 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

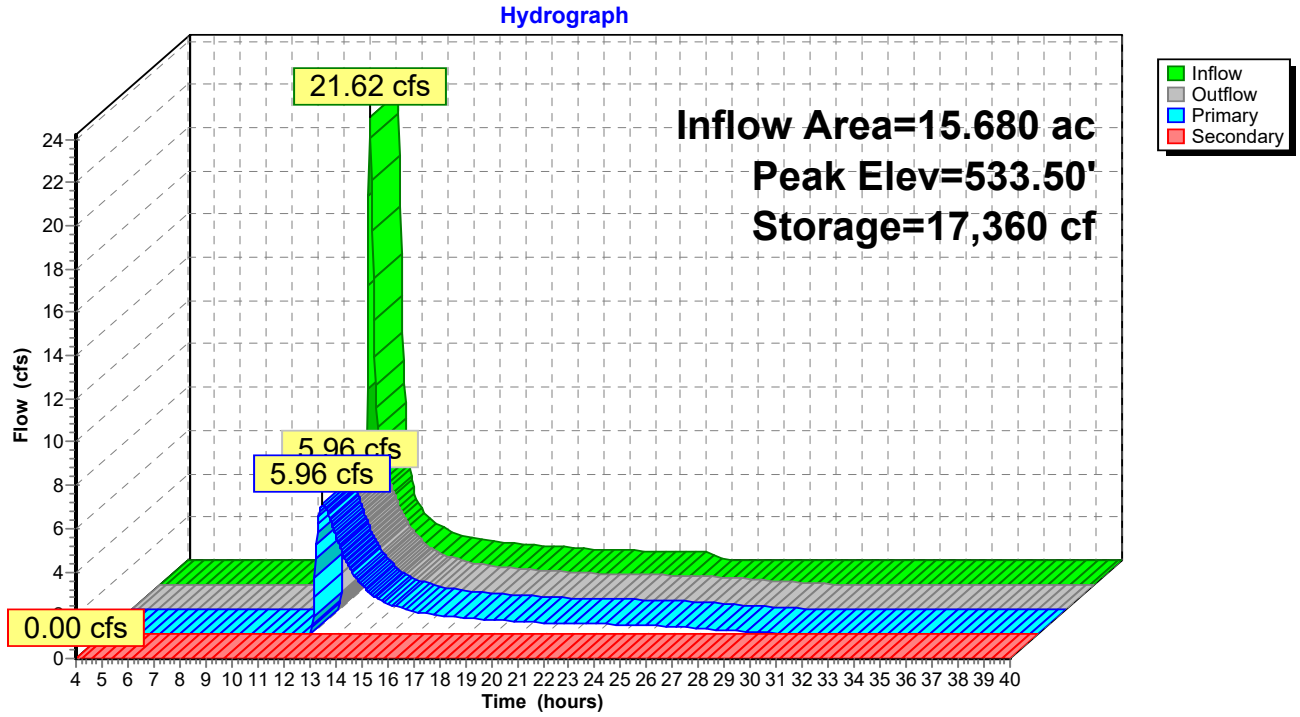
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
531.00	2,290	0	0
532.00	5,615	3,953	3,953
533.00	9,928	7,772	11,724
534.00	15,229	12,579	24,303
535.00	18,180	16,705	41,007
536.00	20,548	19,364	60,371
536.50	21,753	10,575	70,946

Device	Routing	Invert	Outlet Devices
#1	Primary	530.90'	**24.0" Round Culvert** L= 102.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 530.90' / 530.30' S= 0.0059 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#2	Device 1	531.00'	**4.0" Vert. Orifice1** C= 0.600
#3	Device 1	532.10'	**12.0" W x 18.0" H Vert. Orifice2** C= 0.600
#4	Device 1	535.00'	**24.0" x 24.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads
#5	Secondary	536.00'	**10.0' long x 20.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=5.96 cfs @ 12.43 hrs HW=533.50' (Free Discharge)
└**1=Culvert** (Passes 5.96 cfs of 15.11 cfs potential flow)
  ├**2=Orifice1** (Orifice Controls 0.64 cfs @ 7.36 fps)
  ├**3=Orifice2** (Orifice Controls 5.32 cfs @ 3.80 fps)
  └**4=Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 4.00 hrs HW=531.00' (Free Discharge)
└**5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 1P: Detention Basin



Stage-Area-Storage for Pond 1P: Detention Basin

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
531.00	2,290	0
531.10	2,623	246
531.20	2,955	525
531.30	3,287	837
531.40	3,620	1,182
531.50	3,953	1,561
531.60	4,285	1,973
531.70	4,618	2,418
531.80	4,950	2,896
531.90	5,282	3,408
532.00	5,615	3,953
532.10	6,046	4,536
532.20	6,478	5,162
532.30	6,909	5,831
532.40	7,340	6,544
532.50	7,772	7,299
532.60	8,203	8,098
532.70	8,634	8,940
532.80	9,065	9,825
532.90	9,497	10,753
533.00	9,928	11,724
533.10	10,458	12,743
533.20	10,988	13,816
533.30	11,518	14,941
533.40	12,048	16,119
533.50	12,579	17,351
533.60	13,109	18,635
533.70	13,639	19,972
533.80	14,169	21,363
533.90	14,699	22,806
534.00	15,229	24,303
534.10	15,524	25,840
534.20	15,819	27,407
534.30	16,114	29,004
534.40	16,409	30,630
534.50	16,705	32,286
534.60	17,000	33,971
534.70	17,295	35,686
534.80	17,590	37,430
534.90	17,885	39,204
535.00	18,180	41,007
535.10	18,417	42,837
535.20	18,654	44,690
535.30	18,890	46,568
535.40	19,127	48,468
535.50	19,364	50,393
535.60	19,601	52,341
535.70	19,838	54,313
535.80	20,074	56,309
535.90	20,311	58,328
536.00	20,548	60,371
536.10	20,789	62,438
536.20	21,030	64,529
536.30	21,271	66,644
536.40	21,512	68,783
536.50	**21,753**	**70,946**

Summary for Pond 2P: Bioretention 1

Inflow Area = 13.790 ac, 59.54% Impervious, Inflow Depth = 1.25" for 10-yr event
Inflow = 23.88 cfs @ 12.05 hrs, Volume= 1.439 af
Outflow = 21.62 cfs @ 12.10 hrs, Volume= 1.326 af, Atten= 9%, Lag= 2.9 min
Primary = 21.62 cfs @ 12.10 hrs, Volume= 1.326 af

Routing by Stor-Ind method, Time Span= 4.00-40.00 hrs, dt= 0.03 hrs
Peak Elev= 536.98' @ 12.10 hrs Surf.Area= 11,524 sf Storage= 10,174 cf

Plug-Flow detention time= 63.4 min calculated for 1.325 af (92% of inflow)
Center-of-Mass det. time= 22.0 min (879.4 - 857.3)

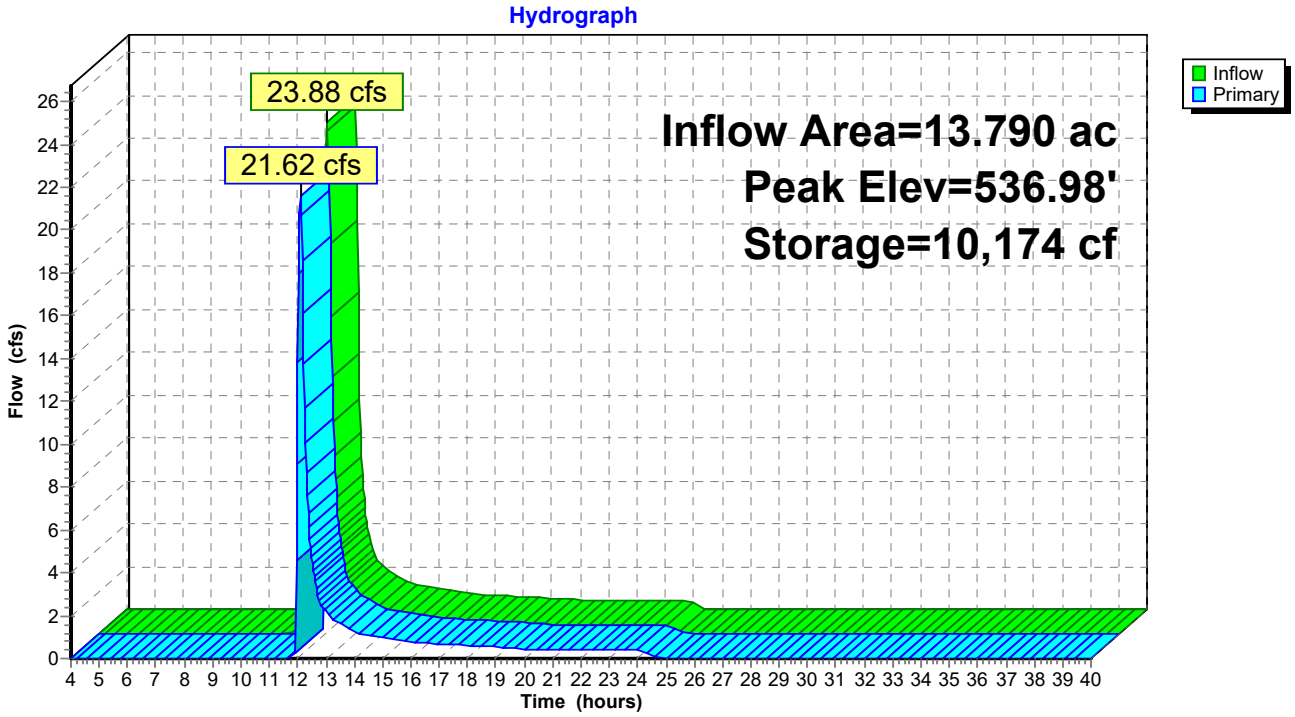
Volume	Invert	Avail.Storage	Storage Description
#1	536.00'	10,426 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
536.00	9,285	0	0
536.50	10,422	4,927	4,927
537.00	11,574	5,499	10,426

Device	Routing	Invert	Outlet Devices
#1	Primary	536.50'	**25.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=21.58 cfs @ 12.10 hrs HW=536.98' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 21.58 cfs @ 1.81 fps)

Pond 2P: Bioretention 1



Stage-Area-Storage for Pond 2P: Bioretention 1

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
536.00	9,285	0
536.01	9,308	93
536.02	9,330	186
536.03	9,353	280
536.04	9,376	373
536.05	9,399	467
536.06	9,421	561
536.07	9,444	656
536.08	9,467	750
536.09	9,490	845
536.10	9,512	940
536.11	9,535	1,035
536.12	9,558	1,131
536.13	9,581	1,226
536.14	9,603	1,322
536.15	9,626	1,418
536.16	9,649	1,515
536.17	9,672	1,611
536.18	9,694	1,708
536.19	9,717	1,805
536.20	9,740	1,902
536.21	9,763	2,000
536.22	9,785	2,098
536.23	9,808	2,196
536.24	9,831	2,294
536.25	9,854	2,392
536.26	9,876	2,491
536.27	9,899	2,590
536.28	9,922	2,689
536.29	9,944	2,788
536.30	9,967	2,888
536.31	9,990	2,988
536.32	10,013	3,088
536.33	10,035	3,188
536.34	10,058	3,288
536.35	10,081	3,389
536.36	10,104	3,490
536.37	10,126	3,591
536.38	10,149	3,692
536.39	10,172	3,794
536.40	10,195	3,896
536.41	10,217	3,998
536.42	10,240	4,100
536.43	10,263	4,203
536.44	10,286	4,306
536.45	10,308	4,408
536.46	10,331	4,512
536.47	10,354	4,615
536.48	10,377	4,719
536.49	10,399	4,823
536.50	10,422	4,927
536.51	10,445	5,031
536.52	10,468	5,136
536.53	10,491	5,240
536.54	10,514	5,345
536.55	10,537	5,451
536.56	10,560	5,556
536.57	10,583	5,662
536.58	10,606	5,768
536.59	10,629	5,874
536.60	10,652	5,980
536.61	10,675	6,087
536.62	10,698	6,194
536.63	10,722	6,301
536.64	10,745	6,408
536.65	10,768	6,516
536.66	10,791	6,624
536.67	10,814	6,732
536.68	10,837	6,840
536.69	10,860	6,949
536.70	10,883	7,057
536.71	10,906	7,166
536.72	10,929	7,275
536.73	10,952	7,385
536.74	10,975	7,494
536.75	10,998	7,604
536.76	11,021	7,714
536.77	11,044	7,825
536.78	11,067	7,935
536.79	11,090	8,046
536.80	11,113	8,157
536.81	11,136	8,268
536.82	11,159	8,380
536.83	11,182	8,491
536.84	11,205	8,603
536.85	11,228	8,716
536.86	11,251	8,828
536.87	11,274	8,941
536.88	11,298	9,053
536.89	11,321	9,167
536.90	11,344	9,280
536.91	11,367	9,393
536.92	11,390	9,507
536.93	11,413	9,621
536.94	11,436	9,735
536.95	11,459	9,850
536.96	11,482	9,965
536.97	11,505	10,080
536.98	11,528	10,195
536.99	11,551	10,310
537.00	**11,574**	**10,426**

Summary for Pond 3P: Bioretention 2

Inflow Area = 1.890 ac, 41.80% Impervious, Inflow Depth = 0.63" for 10-yr event
Inflow = 1.27 cfs @ 12.09 hrs, Volume= 0.099 af
Outflow = 0.52 cfs @ 12.30 hrs, Volume= 0.081 af, Atten= 59%, Lag= 12.8 min
Primary = 0.52 cfs @ 12.30 hrs, Volume= 0.081 af

Routing by Stor-Ind method, Time Span= 4.00-40.00 hrs, dt= 0.03 hrs
Peak Elev= 543.64' @ 12.30 hrs Surf.Area= 2,224 sf Storage= 1,019 cf

Plug-Flow detention time= 132.6 min calculated for 0.081 af (83% of inflow)
Center-of-Mass det. time= 51.8 min (954.3 - 902.5)

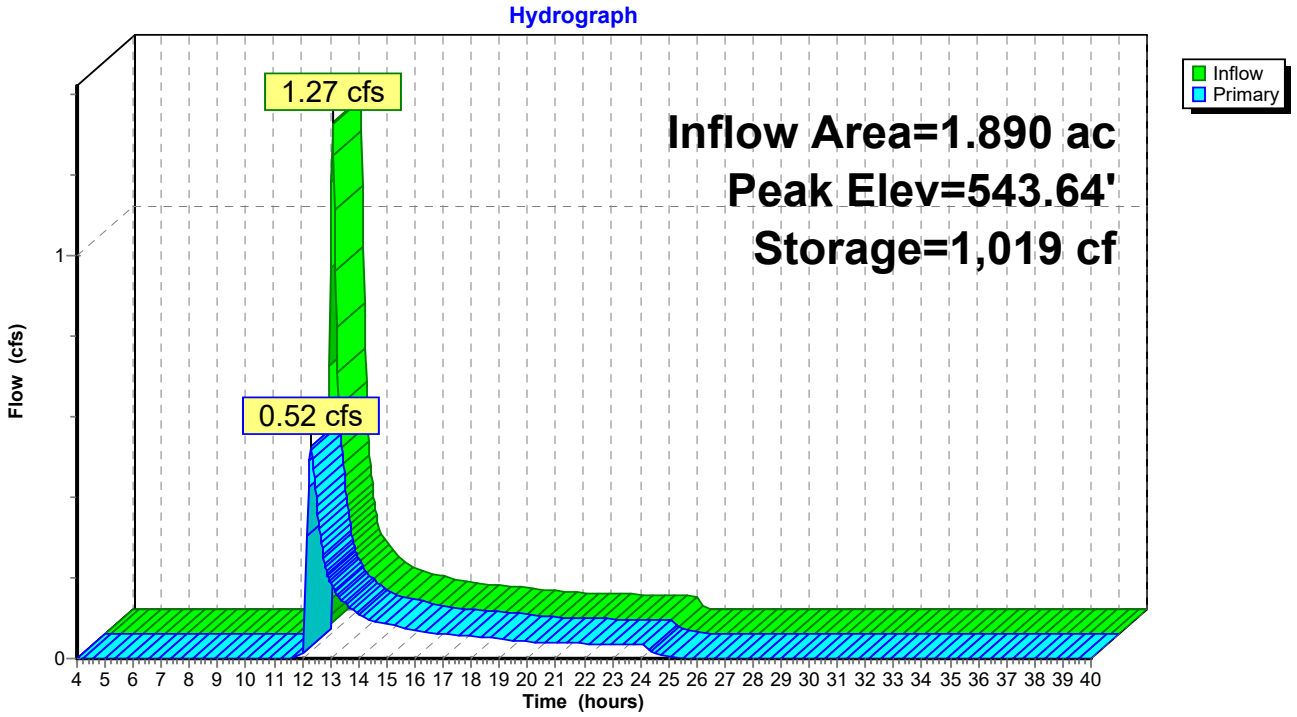
Volume	Invert	Avail.Storage	Storage Description
#1	543.00'	4,037 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
543.00	1,322	0	0
543.50	1,680	751	751
544.00	3,660	1,335	2,086
544.50	4,145	1,951	4,037

Device	Routing	Invert	Outlet Devices
#1	Primary	543.50'	**12.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads
#2	Device 1	540.00'	**12.0" Round Culvert** L= 300.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 540.00' / 537.00' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.52 cfs @ 12.30 hrs HW=543.64' (Free Discharge)
↑**1=Grate** (Weir Controls 0.52 cfs @ 1.21 fps)
↑**2=Culvert** (Passes 0.52 cfs of 0.69 cfs potential flow)

Pond 3P: Bioretention 2



Stage-Area-Storage for Pond 3P: Bioretention 2

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
543.00	1,322	0
543.02	1,336	27
543.04	1,351	53
543.06	1,365	81
543.08	1,379	108
543.10	1,394	136
543.12	1,408	164
543.14	1,422	192
543.16	1,437	221
543.18	1,451	250
543.20	1,465	279
543.22	1,480	308
543.24	1,494	338
543.26	1,508	368
543.28	1,522	398
543.30	1,537	429
543.32	1,551	460
543.34	1,565	491
543.36	1,580	522
543.38	1,594	554
543.40	1,608	586
543.42	1,623	618
543.44	1,637	651
543.46	1,651	684
543.48	1,666	717
543.50	1,680	751
543.52	1,759	785
543.54	1,838	821
543.56	1,918	858
543.58	1,997	898
543.60	2,076	938
543.62	2,155	981
543.64	2,234	1,025
543.66	2,314	1,070
543.68	2,393	1,117
543.70	2,472	1,166
543.72	2,551	1,216
543.74	2,630	1,268
543.76	2,710	1,321
543.78	2,789	1,376
543.80	2,868	1,433
543.82	2,947	1,491
543.84	3,026	1,551
543.86	3,106	1,612
543.88	3,185	1,675
543.90	3,264	1,739
543.92	3,343	1,805
543.94	3,422	1,873
543.96	3,502	1,942
543.98	3,581	2,013
544.00	3,660	2,086
544.02	3,679	2,159
544.04	3,699	2,233
544.06	3,718	2,307
544.08	3,738	2,381
544.10	3,757	2,456
544.12	3,776	2,532
544.14	3,796	2,607
544.16	3,815	2,684
544.18	3,835	2,760
544.20	3,854	2,837
544.22	3,873	2,914
544.24	3,893	2,992
544.26	3,912	3,070
544.28	3,932	3,148
544.30	3,951	3,227
544.32	3,970	3,306
544.34	3,990	3,386
544.36	4,009	3,466
544.38	4,029	3,546
544.40	4,048	3,627
544.42	4,067	3,708
544.44	4,087	3,790
544.46	4,106	3,872
544.48	4,126	3,954
544.50	**4,145**	**4,037**

Summary for Pond 4P: Bioretention 3

Inflow Area = 0.440 ac, 29.55% Impervious, Inflow Depth = 0.36" for 10-yr event
Inflow = 0.16 cfs @ 12.03 hrs, Volume= 0.013 af
Outflow = 0.01 cfs @ 14.67 hrs, Volume= 0.007 af, Atten= 92%, Lag= 158.6 min
Primary = 0.01 cfs @ 14.67 hrs, Volume= 0.007 af

Routing by Stor-Ind method, Time Span= 4.00-40.00 hrs, dt= 0.03 hrs
Peak Elev= 530.50' @ 14.67 hrs Surf.Area= 632 sf Storage= 286 cf

Plug-Flow detention time= 351.4 min calculated for 0.007 af (50% of inflow)
Center-of-Mass det. time= 177.5 min (1,113.7 - 936.2)

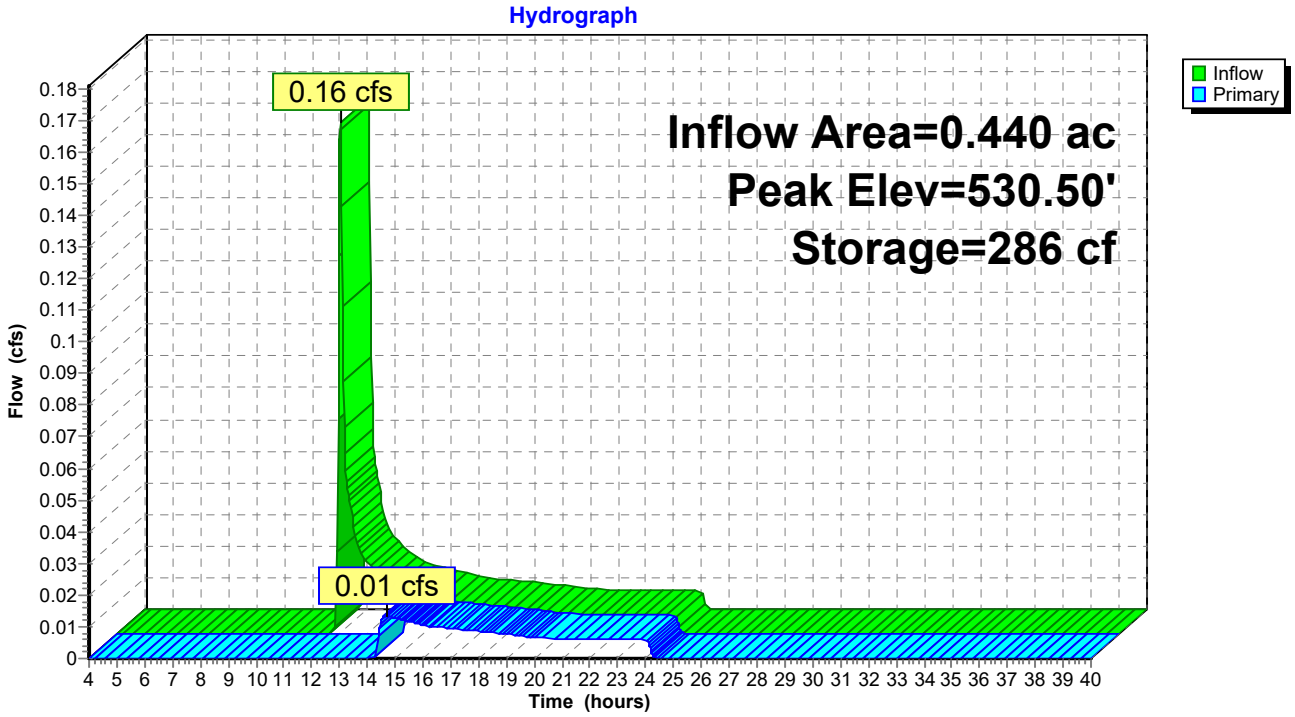
Volume	Invert	Avail.Storage	Storage Description
#1	530.00'	634 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
530.00	500	0	0
530.50	631	283	283
531.00	775	352	634

Device	Routing	Invert	Outlet Devices
#1	Primary	530.50'	**10.0' long x 15.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=0.01 cfs @ 14.67 hrs HW=530.50' (Free Discharge)
↑**1=Broad-Crested Rectangular Weir** (Weir Controls 0.01 cfs @ 0.19 fps)

Pond 4P: Bioretention 3



Stage-Area-Storage for Pond 4P: Bioretention 3

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
530.00	500	0
530.01	503	5
530.02	505	10
530.03	508	15
530.04	510	20
530.05	513	25
530.06	516	30
530.07	518	36
530.08	521	41
530.09	524	46
530.10	526	51
530.11	529	57
530.12	531	62
530.13	534	67
530.14	537	73
530.15	539	78
530.16	542	83
530.17	545	89
530.18	547	94
530.19	550	100
530.20	552	105
530.21	555	111
530.22	558	116
530.23	560	122
530.24	563	128
530.25	566	133
530.26	568	139
530.27	571	145
530.28	573	150
530.29	576	156
530.30	579	162
530.31	581	168
530.32	584	173
530.33	586	179
530.34	589	185
530.35	592	191
530.36	594	197
530.37	597	203
530.38	600	209
530.39	602	215
530.40	605	221
530.41	607	227
530.42	610	233
530.43	613	239
530.44	615	245
530.45	618	252
530.46	621	258
530.47	623	264
530.48	626	270
530.49	628	276
530.50	631	283
530.51	634	289
530.52	637	295
530.53	640	302
530.54	643	308
530.55	645	315
530.56	648	321
530.57	651	328
530.58	654	334
530.59	657	341
530.60	660	347
530.61	663	354
530.62	666	361
530.63	668	367
530.64	671	374
530.65	674	381
530.66	677	387
530.67	680	394
530.68	683	401
530.69	686	408
530.70	689	415
530.71	691	422
530.72	694	429
530.73	697	435
530.74	700	442
530.75	703	450
530.76	706	457
530.77	709	464
530.78	712	471
530.79	715	478
530.80	717	485
530.81	720	492
530.82	723	499
530.83	726	507
530.84	729	514
530.85	732	521
530.86	735	529
530.87	738	536
530.88	740	543
530.89	743	551
530.90	746	558
530.91	749	566
530.92	752	573
530.93	755	581
530.94	758	588
530.95	761	596
530.96	763	603
530.97	766	611
530.98	769	619
530.99	772	627
531.00	**775**	**634**

Summary for Subcatchment 3S: PROPOSED DA-1D

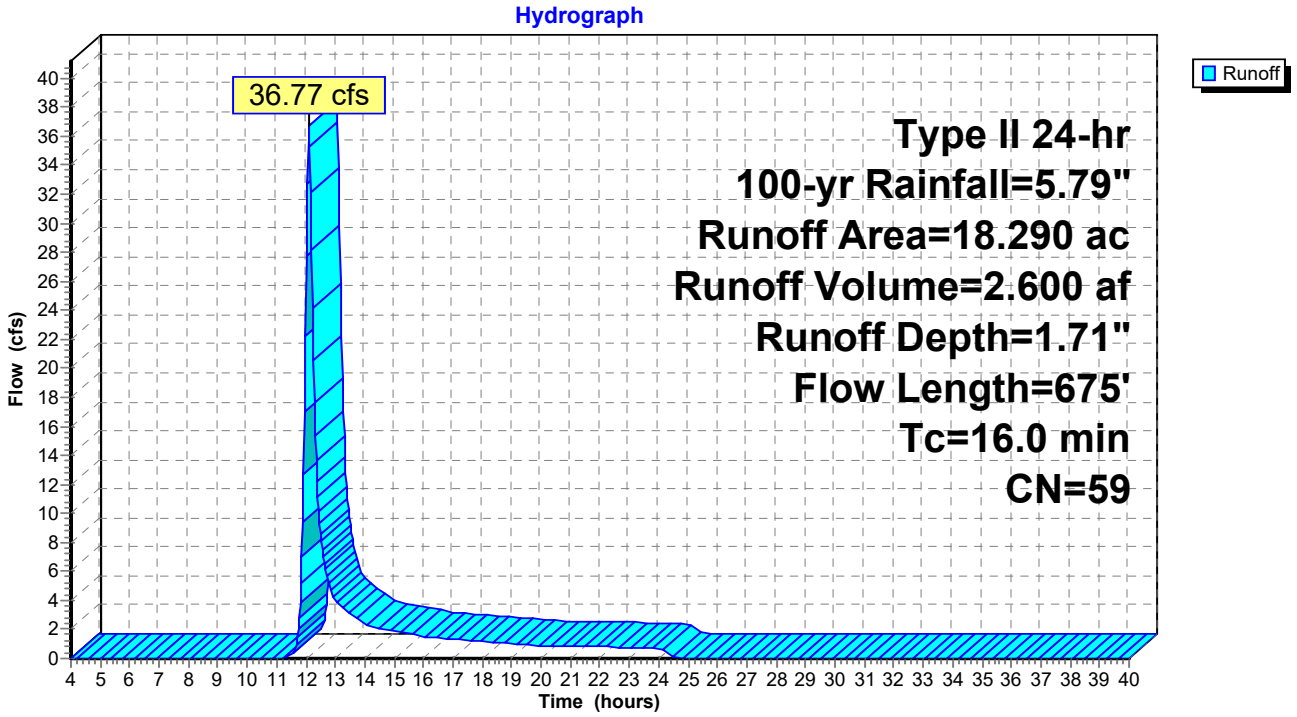
Runoff = 36.77 cfs @ 12.10 hrs, Volume= 2.600 af, Depth= 1.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-40.00 hrs, dt= 0.03 hrs
Type II 24-hr 100-yr Rainfall=5.79"

Area (ac)	CN	Description
5.320	81	Urban industrial, 72% imp, HSG A
3.650	39	>75% Grass cover, Good, HSG A
0.060	74	>75% Grass cover, Good, HSG C
2.040	61	1/4 acre lots, 38% imp, HSG A
0.380	83	1/4 acre lots, 38% imp, HSG C
3.120	30	Woods, Good, HSG A
1.000	55	Woods, Good, HSG B
1.690	70	Woods, Good, HSG C
1.030	77	Woods, Good, HSG D
18.290	59	Weighted Average
13.540		74.03% Pervious Area
4.750		25.97% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.6	100	0.0750	0.11		**Sheet Flow, sheet flow** Woods: Light underbrush n= 0.400 P2= 2.39"
1.0	305	0.1080	5.29		**Shallow Concentrated Flow, shallow flow** Unpaved Kv= 16.1 fps
0.4	270	0.0660	10.91	87.26	**Channel Flow, ditch** Area= 8.0 sf Perim= 8.0' r= 1.00' n= 0.035 Earth, dense weeds
16.0	675	Total			

Subcatchment 3S: PROPOSED DA-1D



Summary for Subcatchment 4S: PROPOSED DA-1A

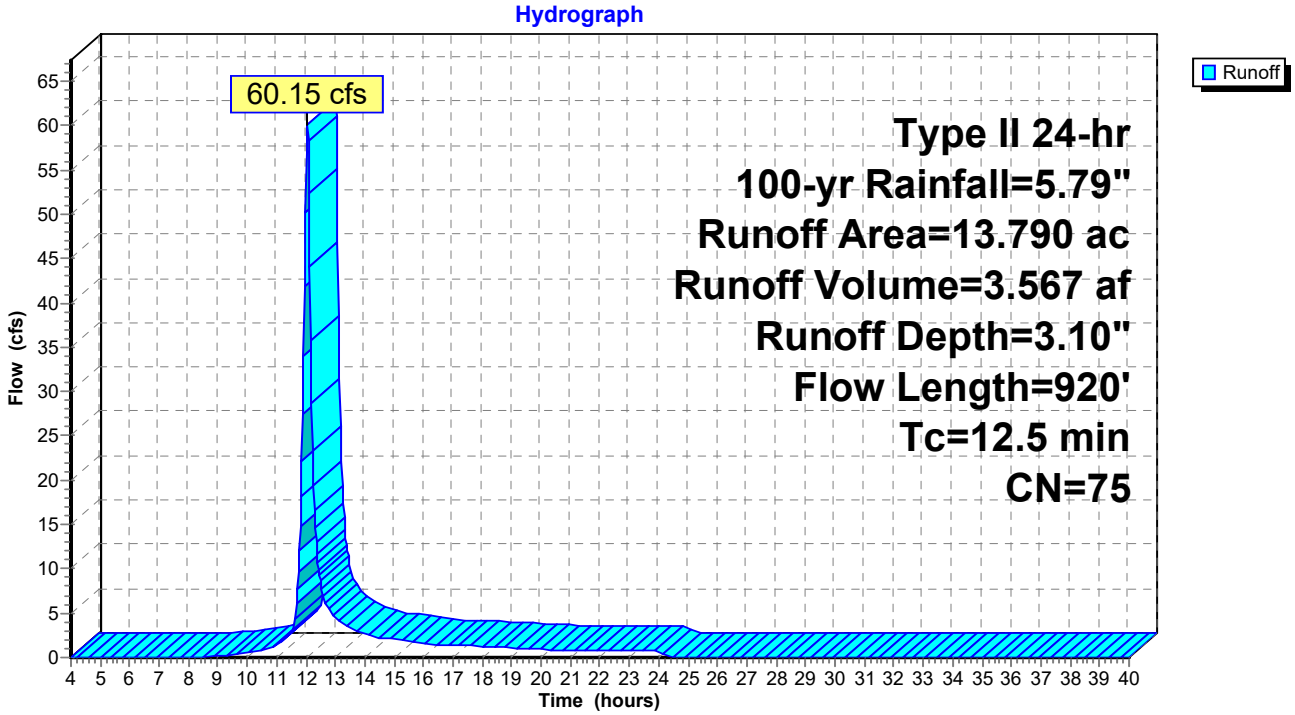
Runoff = 60.15 cfs @ 12.04 hrs, Volume= 3.567 af, Depth= 3.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-40.00 hrs, dt= 0.03 hrs
Type II 24-hr 100-yr Rainfall=5.79"

Area (ac)	CN	Description
8.210	98	Paved parking, HSG A
5.140	39	>75% Grass cover, Good, HSG A
0.440	74	>75% Grass cover, Good, HSG C
13.790	75	Weighted Average
5.580		40.46% Pervious Area
8.210		59.54% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.3	100	0.0200	0.15		**Sheet Flow, sheet flow** Grass: Short n= 0.150 P2= 2.39"
0.7	470	0.0250	10.68	85.44	**Channel Flow, swale** Area= 8.0 sf Perim= 8.0' r= 1.00' n= 0.022 Earth, clean & straight
0.5	350	0.0250	10.68	128.16	**Channel Flow, swale** Area= 12.0 sf Perim= 12.0' r= 1.00' n= 0.022 Earth, clean & straight
12.5	920	Total			

Subcatchment 4S: PROPOSED DA-1A



Summary for Subcatchment 5S: EXISTING DA-2

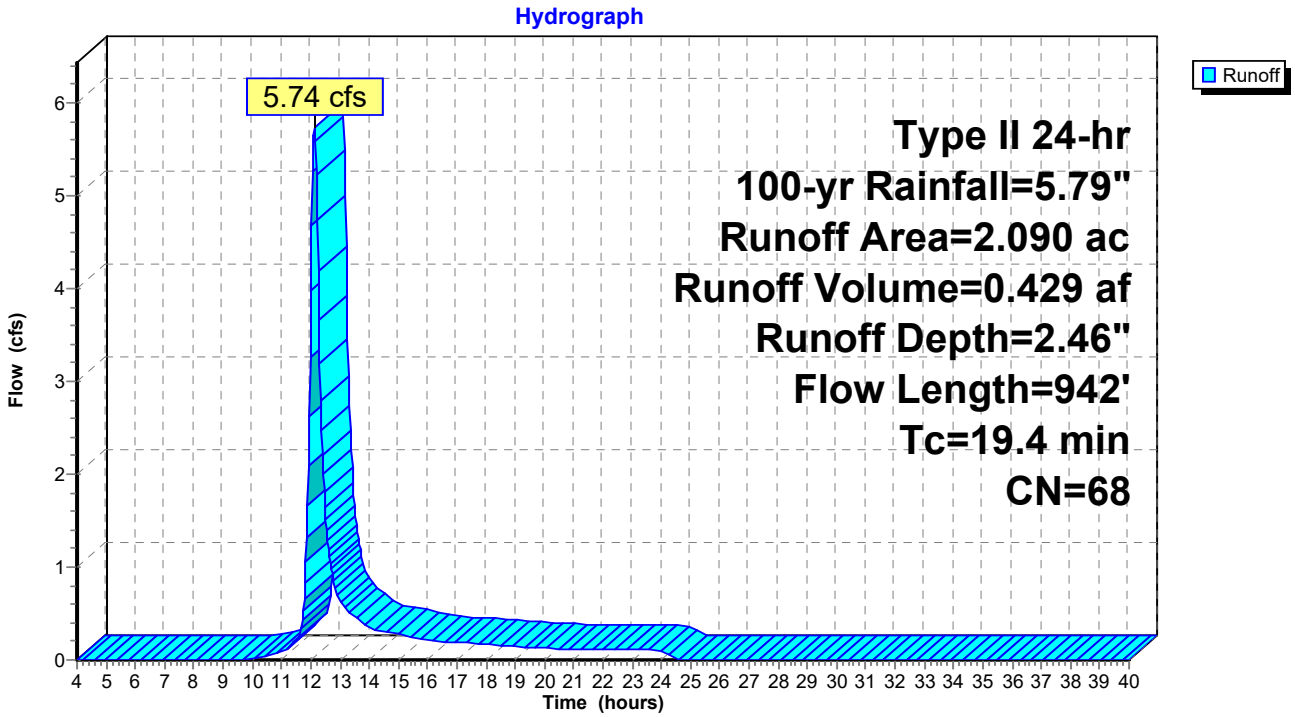
Runoff = 5.74 cfs @ 12.13 hrs, Volume= 0.429 af, Depth= 2.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-40.00 hrs, dt= 0.03 hrs
Type II 24-hr 100-yr Rainfall=5.79"

Area (ac)	CN	Description
0.080	30	Woods, Good, HSG A
2.010	70	Woods, Good, HSG C
2.090	68	Weighted Average
2.090		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.5	100	0.0200	0.10		**Sheet Flow, sheet flow** Grass: Dense n= 0.240 P2= 2.39"
0.3	72	0.0700	4.26		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
2.6	770	0.0180	4.98	39.87	**Channel Flow, wooded ditch** Area= 8.0 sf Perim= 8.0' r= 1.00' n= 0.040 Earth, dense weeds
19.4	942	Total			

Subcatchment 5S: EXISTING DA-2



Summary for Subcatchment 6S: PROPOSED DA-1B

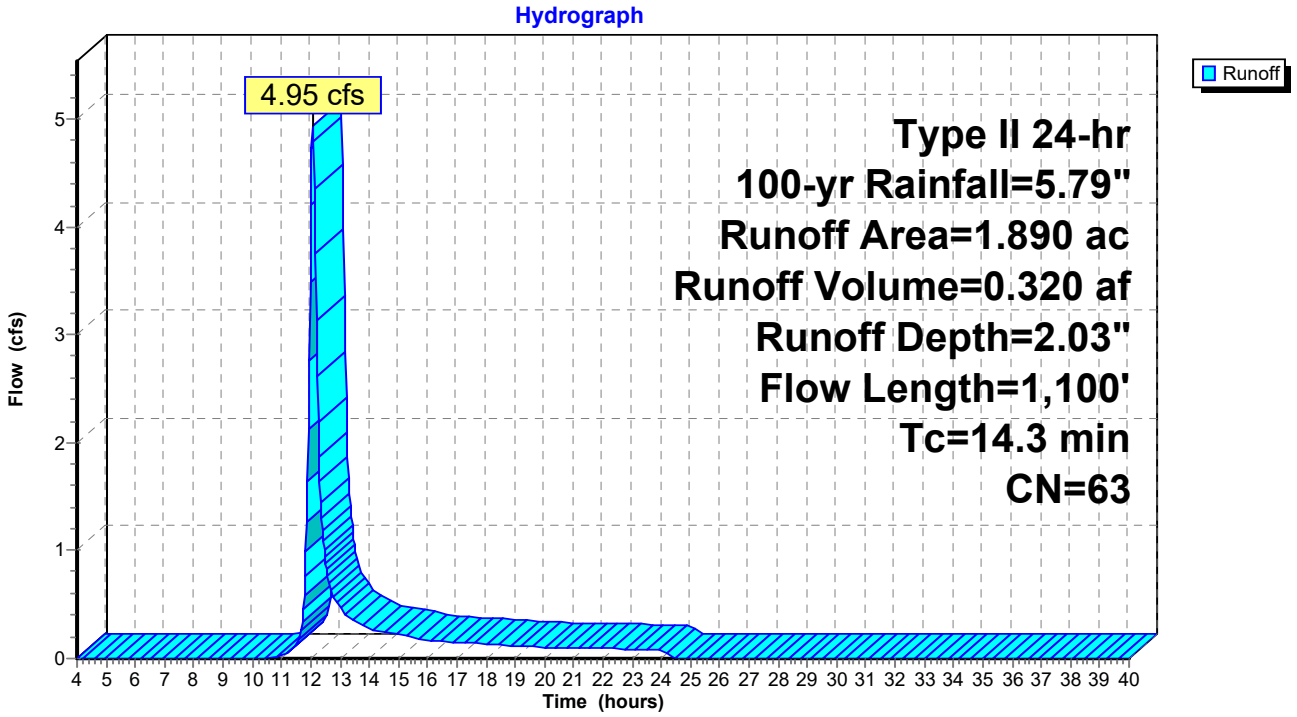
Runoff = 4.95 cfs @ 12.07 hrs, Volume= 0.320 af, Depth= 2.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-40.00 hrs, dt= 0.03 hrs
Type II 24-hr 100-yr Rainfall=5.79"

Area (ac)	CN	Description
0.790	98	Paved parking, HSG A
1.040	39	>75% Grass cover, Good, HSG A
0.060	30	Woods, Good, HSG A
1.890	63	Weighted Average
1.100		58.20% Pervious Area
0.790		41.80% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.3	100	0.0200	0.15		**Sheet Flow, sheet flow** Grass: Short n= 0.150 P2= 2.39"
1.4	190	0.0190	2.22		**Shallow Concentrated Flow, shallow flow** Unpaved Kv= 16.1 fps
1.3	360	0.0100	4.54	3.56	**Pipe Channel, culvert** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior
0.3	450	0.2000	22.03	220.33	**Channel Flow, Stormwater Basin** Area= 10.0 sf Perim= 8.0' r= 1.25' n= 0.035 Earth, dense weeds
14.3	1,100	Total			

Subcatchment 6S: PROPOSED DA-1B



Summary for Subcatchment 10S: PROPOSED DA-1C

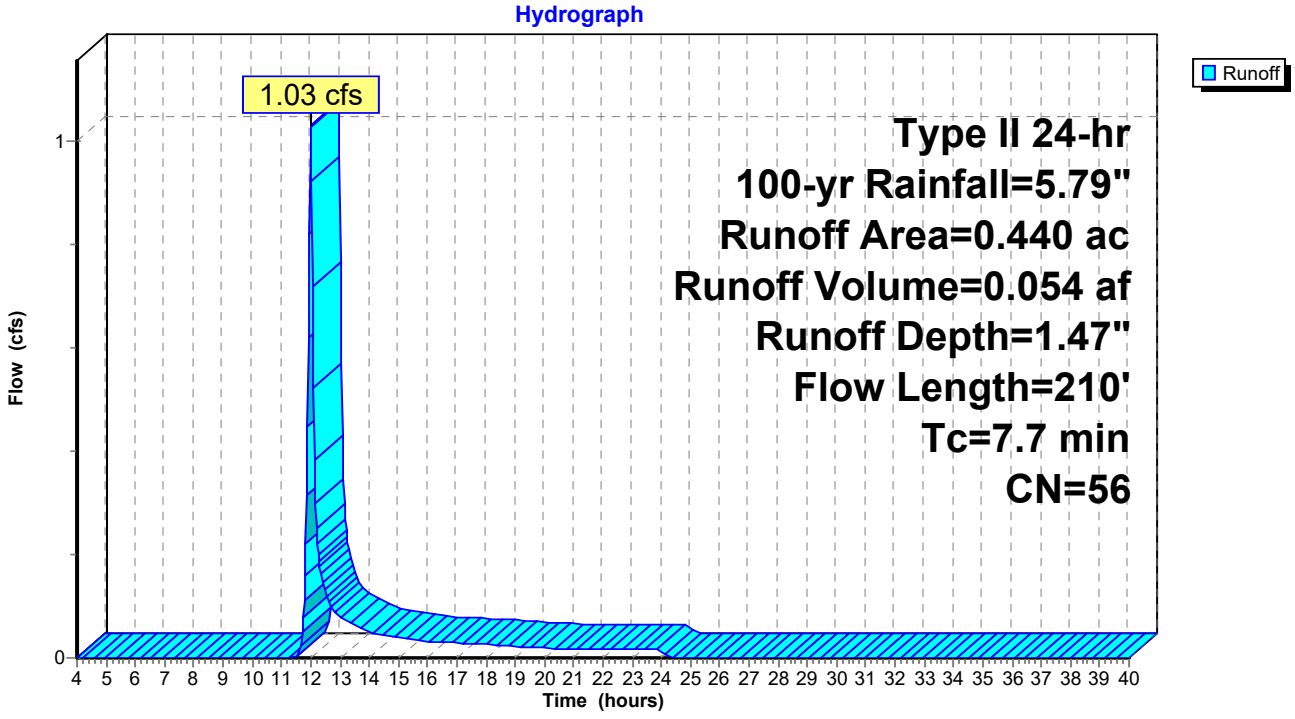
Runoff = 1.03 cfs @ 12.00 hrs, Volume= 0.054 af, Depth= 1.47"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-40.00 hrs, dt= 0.03 hrs
Type II 24-hr 100-yr Rainfall=5.79"

Area (ac)	CN	Description
0.130	98	Paved parking, HSG A
0.310	39	>75% Grass cover, Good, HSG A
0.440	56	Weighted Average
0.310		70.45% Pervious Area
0.130		29.55% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.3	100	0.0600	0.23		**Sheet Flow, sheet flow** Grass: Short n= 0.150 P2= 2.39"
0.4	110	0.0700	4.26		**Shallow Concentrated Flow, shallow flow** Unpaved Kv= 16.1 fps
7.7	210	Total			

Subcatchment 10S: PROPOSED DA-1C

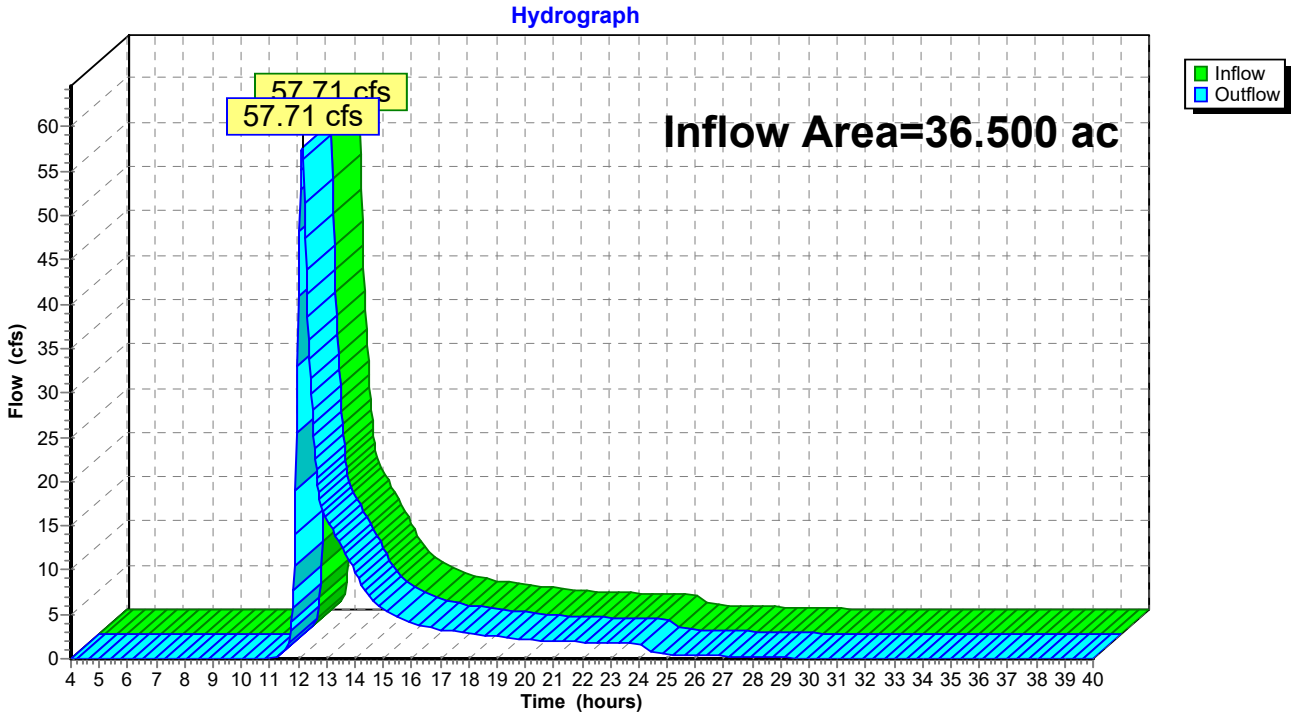


Summary for Reach 4R: outlet

Inflow Area = 36.500 ac, 38.03% Impervious, Inflow Depth = 2.25" for 100-yr event
Inflow = 57.71 cfs @ 12.15 hrs, Volume= 6.832 af
Outflow = 57.71 cfs @ 12.15 hrs, Volume= 6.832 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 4.00-40.00 hrs, dt= 0.03 hrs

Reach 4R: outlet



Summary for Reach 13R: WOODED DITCH

Inflow Area = 0.440 ac, 29.55% Impervious, Inflow Depth = 1.30" for 100-yr event
Inflow = 1.05 cfs @ 12.02 hrs, Volume= 0.048 af
Outflow = 0.96 cfs @ 12.06 hrs, Volume= 0.048 af, Atten= 8%, Lag= 2.2 min

Routing by Stor-Ind+Trans method, Time Span= 4.00-40.00 hrs, dt= 0.03 hrs
Max. Velocity= 3.83 fps, Min. Travel Time= 1.0 min
Avg. Velocity = 1.33 fps, Avg. Travel Time= 2.8 min

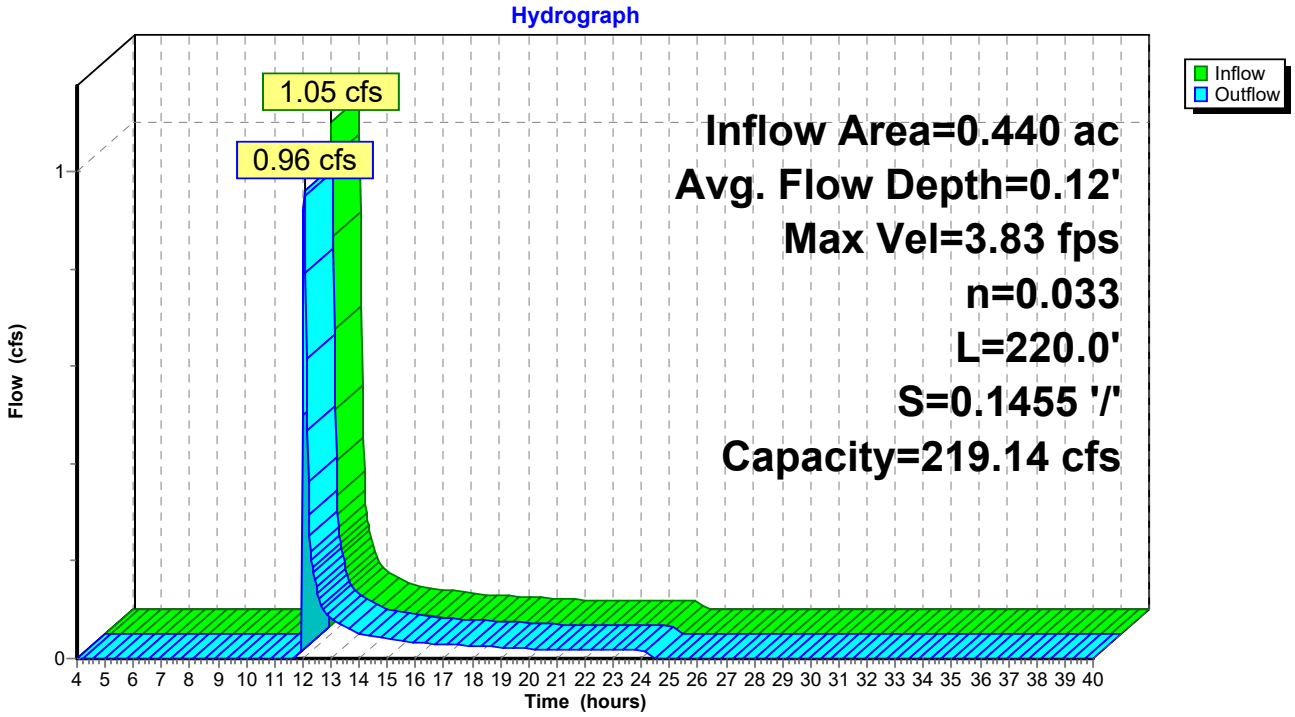
Peak Storage= 59 cf @ 12.04 hrs
Average Depth at Peak Storage= 0.12'
Bank-Full Depth= 2.00' Flow Area= 12.0 sf, Capacity= 219.14 cfs

Custom cross-section, Length= 220.0' Slope= 0.1455 '/'
Constant n= 0.033 Earth, grassed & winding
Inlet Invert= 528.00', Outlet Invert= 496.00'

Offset (feet)	Elevation (feet)	Chan.Depth (feet)
0.00	2.00	0.00
2.00	1.00	1.00
4.00	0.00	2.00
6.00	0.00	2.00
8.00	1.00	1.00
10.00	2.00	0.00

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	2.0	0	0.00
1.00	4.0	6.5	880	49.84
2.00	12.0	10.9	2,640	219.14

Reach 13R: WOODED DITCH



Stage-Area-Storage for Reach 13R: WOODED DITCH

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
528.00	0.0	0
528.02	0.0	9
528.04	0.1	18
528.06	0.1	28
528.08	0.2	38
528.10	0.2	48
528.12	0.3	59
528.14	0.3	70
528.16	0.4	82
528.18	0.4	93
528.20	0.5	106
528.22	0.5	118
528.24	0.6	131
528.26	0.7	144
528.28	0.7	158
528.30	0.8	172
528.32	0.8	186
528.34	0.9	200
528.36	1.0	215
528.38	1.0	231
528.40	1.1	246
528.42	1.2	262
528.44	1.3	279
528.46	1.3	296
528.48	1.4	313
528.50	1.5	330
528.52	1.6	348
528.54	1.7	366
528.56	1.7	384
528.58	1.8	403
528.60	1.9	422
528.62	2.0	442
528.64	2.1	462
528.66	2.2	482
528.68	2.3	503
528.70	2.4	524
528.72	2.5	545
528.74	2.6	567
528.76	2.7	589
528.78	2.8	611
528.80	2.9	634
528.82	3.0	657
528.84	3.1	680
528.86	3.2	704
528.88	3.3	728
528.90	3.4	752
528.92	3.5	777
528.94	3.6	802
528.96	3.8	828
528.98	3.9	854
529.00	4.0	880
529.02	4.1	907
529.04	4.2	934
529.06	4.4	961
529.08	4.5	988
529.10	4.6	1,016
529.12	4.7	1,045
529.14	4.9	1,073
529.16	5.0	1,102
529.18	5.1	1,132
529.20	5.3	1,162
529.22	5.4	1,192
529.24	5.6	1,222
529.26	5.7	1,253
529.28	5.8	1,284
529.30	6.0	1,316
529.32	6.1	1,347
529.34	6.3	1,380
529.36	6.4	1,412
529.38	6.6	1,445
529.40	6.7	1,478
529.42	6.9	1,512
529.44	7.0	1,546
529.46	7.2	1,580
529.48	7.3	1,615
529.50	7.5	1,650
529.52	7.7	1,685
529.54	7.8	1,721
529.56	8.0	1,757
529.58	8.2	1,794
529.60	8.3	1,830
529.62	8.5	1,868
529.64	8.7	1,905
529.66	8.8	1,943
529.68	9.0	1,981
529.70	9.2	2,020
529.72	9.4	2,058
529.74	9.5	2,098
529.76	9.7	2,137
529.78	9.9	2,177
529.80	10.1	2,218
529.82	10.3	2,258
529.84	10.5	2,299
529.86	10.6	2,341
529.88	10.8	2,382
529.90	11.0	2,424
529.92	11.2	2,467
529.94	11.4	2,510
529.96	11.6	2,553
529.98	11.8	2,596
530.00	**12.0**	**2,640**

Summary for Pond 1P: Detention Basin

Inflow Area = 15.680 ac, 57.40% Impervious, Inflow Depth = 2.87" for 100-yr event
Inflow = 61.82 cfs @ 12.06 hrs, Volume= 3.756 af
Outflow = 22.47 cfs @ 12.27 hrs, Volume= 3.756 af, Atten= 64%, Lag= 12.8 min
Primary = 22.47 cfs @ 12.27 hrs, Volume= 3.756 af
Secondary = 0.00 cfs @ 4.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 4.00-40.00 hrs, dt= 0.03 hrs
Peak Elev= 535.54' @ 12.27 hrs Surf.Area= 19,447 sf Storage= 51,072 cf

Plug-Flow detention time= 65.1 min calculated for 3.756 af (100% of inflow)
Center-of-Mass det. time= 64.9 min (912.4 - 847.5)

Volume	Invert	Avail.Storage	Storage Description
#1	531.00'	70,946 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

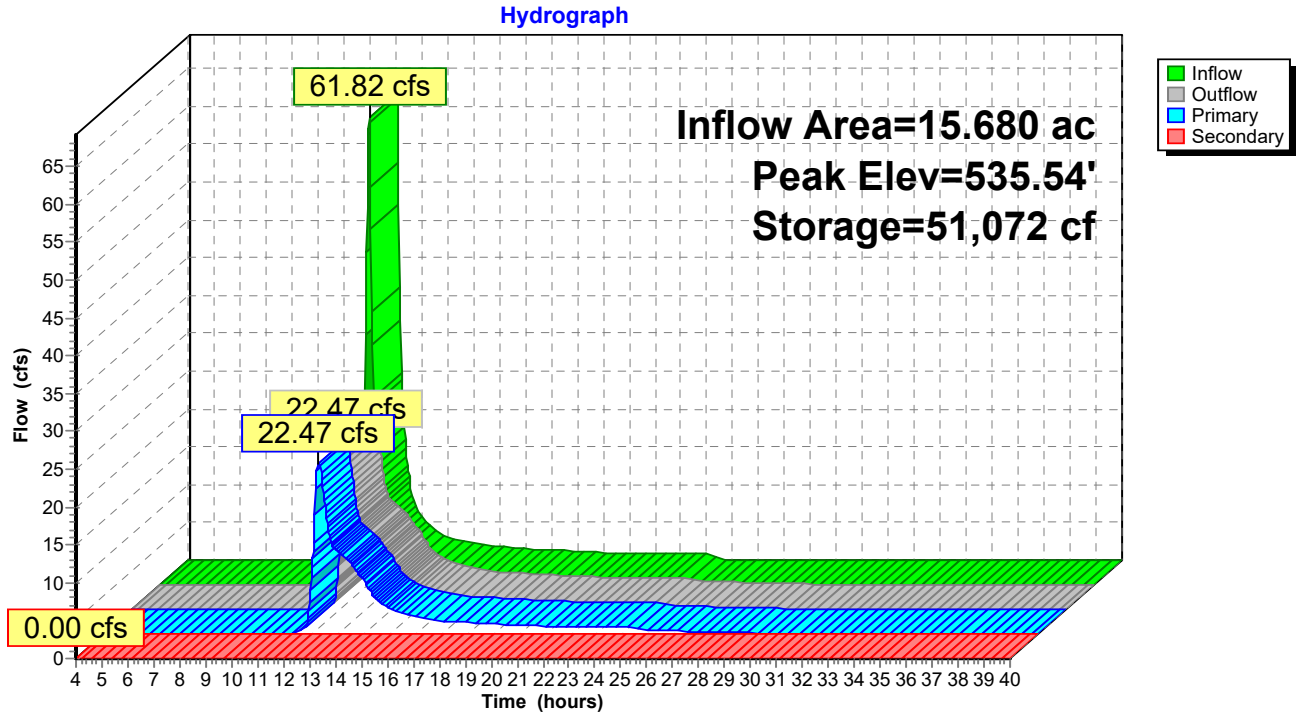
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
531.00	2,290	0	0
532.00	5,615	3,953	3,953
533.00	9,928	7,772	11,724
534.00	15,229	12,579	24,303
535.00	18,180	16,705	41,007
536.00	20,548	19,364	60,371
536.50	21,753	10,575	70,946

Device	Routing	Invert	Outlet Devices
#1	Primary	530.90'	**24.0" Round Culvert** L= 102.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 530.90' / 530.30' S= 0.0059 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#2	Device 1	531.00'	**4.0" Vert. Orifice1** C= 0.600
#3	Device 1	532.10'	**12.0" W x 18.0" H Vert. Orifice2** C= 0.600
#4	Device 1	535.00'	**24.0" x 24.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads
#5	Secondary	536.00'	**10.0' long x 20.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=22.76 cfs @ 12.27 hrs HW=535.53' (Free Discharge)
└**1=Culvert** (Inlet Controls 22.76 cfs @ 7.25 fps)
  ├**2=Orifice1** (Passes < 0.88 cfs potential flow)
  ├**3=Orifice2** (Passes < 11.79 cfs potential flow)
  └**4=Grate** (Passes < 10.20 cfs potential flow)

Secondary OutFlow Max=0.00 cfs @ 4.00 hrs HW=531.00' (Free Discharge)
└**5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 1P: Detention Basin



Stage-Area-Storage for Pond 1P: Detention Basin

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
531.00	2,290	0
531.10	2,623	246
531.20	2,955	525
531.30	3,287	837
531.40	3,620	1,182
531.50	3,953	1,561
531.60	4,285	1,973
531.70	4,618	2,418
531.80	4,950	2,896
531.90	5,282	3,408
532.00	5,615	3,953
532.10	6,046	4,536
532.20	6,478	5,162
532.30	6,909	5,831
532.40	7,340	6,544
532.50	7,772	7,299
532.60	8,203	8,098
532.70	8,634	8,940
532.80	9,065	9,825
532.90	9,497	10,753
533.00	9,928	11,724
533.10	10,458	12,743
533.20	10,988	13,816
533.30	11,518	14,941
533.40	12,048	16,119
533.50	12,579	17,351
533.60	13,109	18,635
533.70	13,639	19,972
533.80	14,169	21,363
533.90	14,699	22,806
534.00	15,229	24,303
534.10	15,524	25,840
534.20	15,819	27,407
534.30	16,114	29,004
534.40	16,409	30,630
534.50	16,705	32,286
534.60	17,000	33,971
534.70	17,295	35,686
534.80	17,590	37,430
534.90	17,885	39,204
535.00	18,180	41,007
535.10	18,417	42,837
535.20	18,654	44,690
535.30	18,890	46,568
535.40	19,127	48,468
535.50	19,364	50,393
535.60	19,601	52,341
535.70	19,838	54,313
535.80	20,074	56,309
535.90	20,311	58,328
536.00	20,548	60,371
536.10	20,789	62,438
536.20	21,030	64,529
536.30	21,271	66,644
536.40	21,512	68,783
536.50	**21,753**	**70,946**

Summary for Pond 2P: Bioretention 1

Inflow Area = 13.790 ac, 59.54% Impervious, Inflow Depth = 3.10" for 100-yr event
Inflow = 60.15 cfs @ 12.04 hrs, Volume= 3.567 af
Outflow = 60.42 cfs @ 12.06 hrs, Volume= 3.454 af, Atten= 0%, Lag= 0.8 min
Primary = 60.42 cfs @ 12.06 hrs, Volume= 3.454 af

Routing by Stor-Ind method, Time Span= 4.00-40.00 hrs, dt= 0.03 hrs
Peak Elev= 537.43' @ 12.06 hrs Surf.Area= 11,574 sf Storage= 10,426 cf

Plug-Flow detention time= 31.9 min calculated for 3.454 af (97% of inflow)
Center-of-Mass det. time= 13.1 min (844.0 - 830.9)

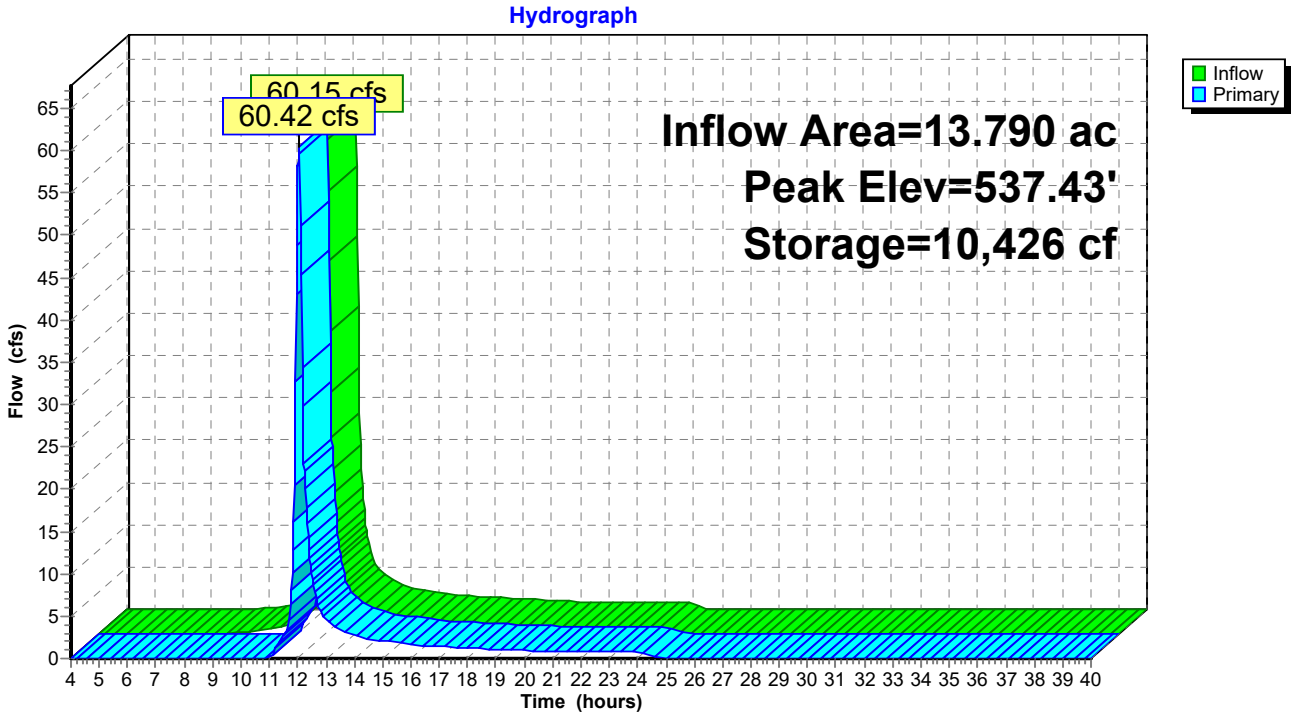
Volume	Invert	Avail.Storage	Storage Description
#1	536.00'	10,426 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
536.00	9,285	0	0
536.50	10,422	4,927	4,927
537.00	11,574	5,499	10,426

Device	Routing	Invert	Outlet Devices
#1	Primary	536.50'	**25.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=59.29 cfs @ 12.06 hrs HW=537.42' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 59.29 cfs @ 2.58 fps)

Pond 2P: Bioretention 1



Stage-Area-Storage for Pond 2P: Bioretention 1

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
536.00	9,285	0
536.02	9,330	186
536.04	9,376	373
536.06	9,421	561
536.08	9,467	750
536.10	9,512	940
536.12	9,558	1,131
536.14	9,603	1,322
536.16	9,649	1,515
536.18	9,694	1,708
536.20	9,740	1,902
536.22	9,785	2,098
536.24	9,831	2,294
536.26	9,876	2,491
536.28	9,922	2,689
536.30	9,967	2,888
536.32	10,013	3,088
536.34	10,058	3,288
536.36	10,104	3,490
536.38	10,149	3,692
536.40	10,195	3,896
536.42	10,240	4,100
536.44	10,286	4,306
536.46	10,331	4,512
536.48	10,377	4,719
536.50	10,422	4,927
536.52	10,468	5,136
536.54	10,514	5,345
536.56	10,560	5,556
536.58	10,606	5,768
536.60	10,652	5,980
536.62	10,698	6,194
536.64	10,745	6,408
536.66	10,791	6,624
536.68	10,837	6,840
536.70	10,883	7,057
536.72	10,929	7,275
536.74	10,975	7,494
536.76	11,021	7,714
536.78	11,067	7,935
536.80	11,113	8,157
536.82	11,159	8,380
536.84	11,205	8,603
536.86	11,251	8,828
536.88	11,298	9,053
536.90	11,344	9,280
536.92	11,390	9,507
536.94	11,436	9,735
536.96	11,482	9,965
536.98	11,528	10,195
537.00	**11,574**	**10,426**
537.02	11,574	10,426
537.04	11,574	10,426
537.06	11,574	10,426
537.08	11,574	10,426
537.10	11,574	10,426
537.12	11,574	10,426
537.14	11,574	10,426
537.16	11,574	10,426
537.18	11,574	10,426
537.20	11,574	10,426
537.22	11,574	10,426
537.24	11,574	10,426
537.26	11,574	10,426
537.28	11,574	10,426
537.30	11,574	10,426
537.32	11,574	10,426
537.34	11,574	10,426
537.36	11,574	10,426
537.38	11,574	10,426
537.40	11,574	10,426
537.42	11,574	10,426

Summary for Pond 3P: Bioretention 2

Inflow Area = 1.890 ac, 41.80% Impervious, Inflow Depth = 2.03" for 100-yr event
Inflow = 4.95 cfs @ 12.07 hrs, Volume= 0.320 af
Outflow = 1.81 cfs @ 12.29 hrs, Volume= 0.303 af, Atten= 63%, Lag= 13.0 min
Primary = 1.81 cfs @ 12.29 hrs, Volume= 0.303 af

Routing by Stor-Ind method, Time Span= 4.00-40.00 hrs, dt= 0.03 hrs
Peak Elev= 544.43' @ 12.29 hrs Surf.Area= 4,082 sf Storage= 3,769 cf

Plug-Flow detention time= 55.0 min calculated for 0.302 af (95% of inflow)
Center-of-Mass det. time= 25.6 min (887.2 - 861.5)

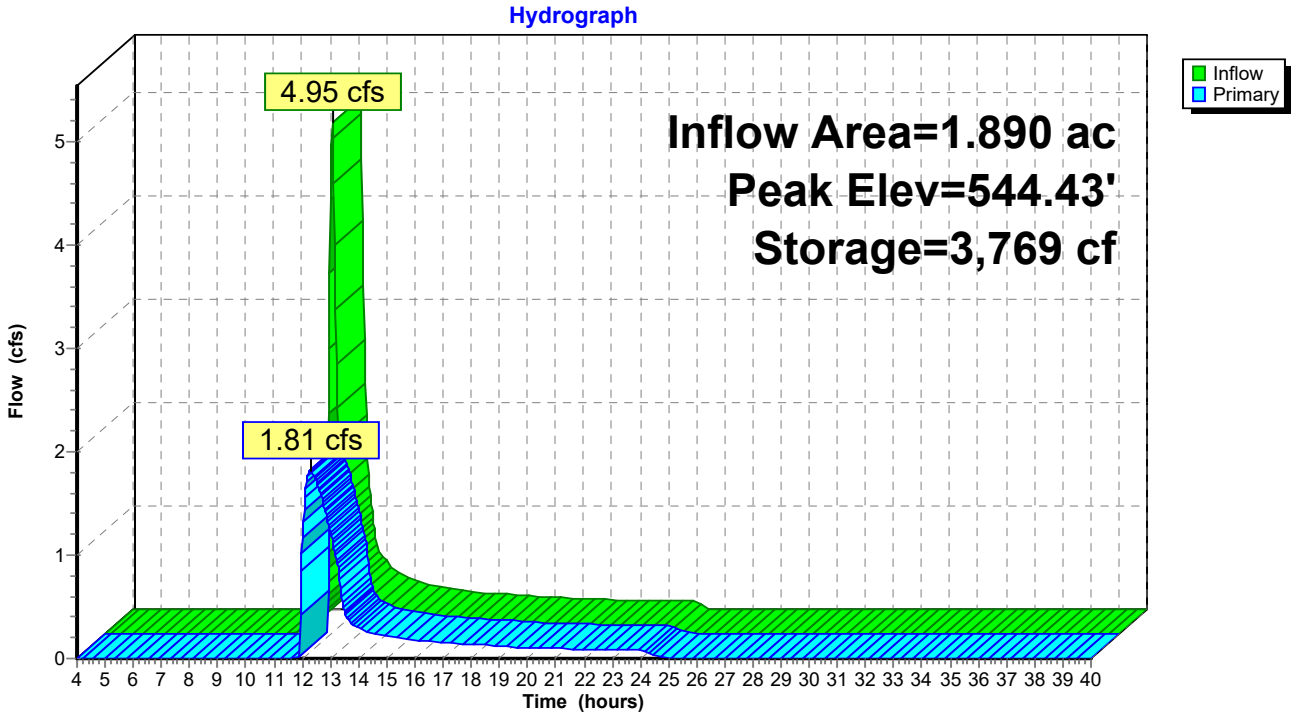
Volume	Invert	Avail.Storage	Storage Description
#1	543.00'	4,037 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
543.00	1,322	0	0
543.50	1,680	751	751
544.00	3,660	1,335	2,086
544.50	4,145	1,951	4,037

Device	Routing	Invert	Outlet Devices
#1	Primary	543.50'	**12.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads
#2	Device 1	540.00'	**12.0" Round Culvert** L= 300.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 540.00' / 537.00' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.81 cfs @ 12.29 hrs HW=544.43' (Free Discharge)
↑**1=Grate** (Passes 1.81 cfs of 3.65 cfs potential flow)
↑**2=Culvert** (Outlet Controls 1.81 cfs @ 2.31 fps)

Pond 3P: Bioretention 2



Stage-Area-Storage for Pond 3P: Bioretention 2

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
543.00	1,322	0
543.02	1,336	27
543.04	1,351	53
543.06	1,365	81
543.08	1,379	108
543.10	1,394	136
543.12	1,408	164
543.14	1,422	192
543.16	1,437	221
543.18	1,451	250
543.20	1,465	279
543.22	1,480	308
543.24	1,494	338
543.26	1,508	368
543.28	1,522	398
543.30	1,537	429
543.32	1,551	460
543.34	1,565	491
543.36	1,580	522
543.38	1,594	554
543.40	1,608	586
543.42	1,623	618
543.44	1,637	651
543.46	1,651	684
543.48	1,666	717
543.50	1,680	751
543.52	1,759	785
543.54	1,838	821
543.56	1,918	858
543.58	1,997	898
543.60	2,076	938
543.62	2,155	981
543.64	2,234	1,025
543.66	2,314	1,070
543.68	2,393	1,117
543.70	2,472	1,166
543.72	2,551	1,216
543.74	2,630	1,268
543.76	2,710	1,321
543.78	2,789	1,376
543.80	2,868	1,433
543.82	2,947	1,491
543.84	3,026	1,551
543.86	3,106	1,612
543.88	3,185	1,675
543.90	3,264	1,739
543.92	3,343	1,805
543.94	3,422	1,873
543.96	3,502	1,942
543.98	3,581	2,013
544.00	3,660	2,086
544.02	3,679	2,159
544.04	3,699	2,233
544.06	3,718	2,307
544.08	3,738	2,381
544.10	3,757	2,456
544.12	3,776	2,532
544.14	3,796	2,607
544.16	3,815	2,684
544.18	3,835	2,760
544.20	3,854	2,837
544.22	3,873	2,914
544.24	3,893	2,992
544.26	3,912	3,070
544.28	3,932	3,148
544.30	3,951	3,227
544.32	3,970	3,306
544.34	3,990	3,386
544.36	4,009	3,466
544.38	4,029	3,546
544.40	4,048	3,627
544.42	4,067	3,708
544.44	4,087	3,790
544.46	4,106	3,872
544.48	4,126	3,954
544.50	**4,145**	**4,037**

Summary for Pond 4P: Bioretention 3

Inflow Area = 0.440 ac, 29.55% Impervious, Inflow Depth = 1.47" for 100-yr event
Inflow = 1.03 cfs @ 12.00 hrs, Volume= 0.054 af
Outflow = 1.05 cfs @ 12.02 hrs, Volume= 0.048 af, Atten= 0%, Lag= 1.1 min
Primary = 1.05 cfs @ 12.02 hrs, Volume= 0.048 af

Routing by Stor-Ind method, Time Span= 4.00-40.00 hrs, dt= 0.03 hrs
Peak Elev= 530.62' @ 12.02 hrs Surf.Area= 664 sf Storage= 358 cf

Plug-Flow detention time= 84.2 min calculated for 0.048 af (88% of inflow)
Center-of-Mass det. time= 25.0 min (900.2 - 875.2)

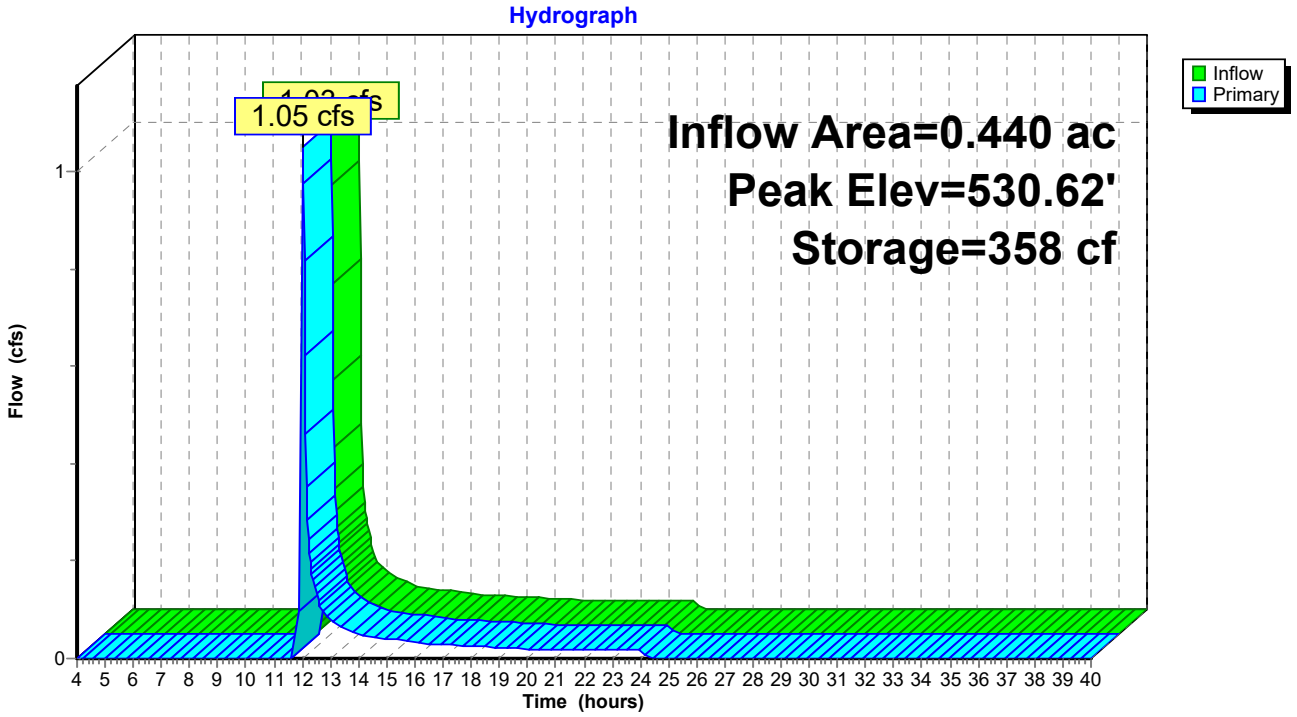
Volume	Invert	Avail.Storage	Storage Description
#1	530.00'	634 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
530.00	500	0	0
530.50	631	283	283
531.00	775	352	634

Device	Routing	Invert	Outlet Devices
#1	Primary	530.50'	**10.0' long x 15.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=0.99 cfs @ 12.02 hrs HW=530.61' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 0.99 cfs @ 0.89 fps)

Pond 4P: Bioretention 3



Stage-Area-Storage for Pond 4P: Bioretention 3

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
530.00	500	0
530.01	503	5
530.02	505	10
530.03	508	15
530.04	510	20
530.05	513	25
530.06	516	30
530.07	518	36
530.08	521	41
530.09	524	46
530.10	526	51
530.11	529	57
530.12	531	62
530.13	534	67
530.14	537	73
530.15	539	78
530.16	542	83
530.17	545	89
530.18	547	94
530.19	550	100
530.20	552	105
530.21	555	111
530.22	558	116
530.23	560	122
530.24	563	128
530.25	566	133
530.26	568	139
530.27	571	145
530.28	573	150
530.29	576	156
530.30	579	162
530.31	581	168
530.32	584	173
530.33	586	179
530.34	589	185
530.35	592	191
530.36	594	197
530.37	597	203
530.38	600	209
530.39	602	215
530.40	605	221
530.41	607	227
530.42	610	233
530.43	613	239
530.44	615	245
530.45	618	252
530.46	621	258
530.47	623	264
530.48	626	270
530.49	628	276
530.50	631	283
530.51	634	289
530.52	637	295
530.53	640	302
530.54	643	308
530.55	645	315
530.56	648	321
530.57	651	328
530.58	654	334
530.59	657	341
530.60	660	347
530.61	663	354
530.62	666	361
530.63	668	367
530.64	671	374
530.65	674	381
530.66	677	387
530.67	680	394
530.68	683	401
530.69	686	408
530.70	689	415
530.71	691	422
530.72	694	429
530.73	697	435
530.74	700	442
530.75	703	450
530.76	706	457
530.77	709	464
530.78	712	471
530.79	715	478
530.80	717	485
530.81	720	492
530.82	723	499
530.83	726	507
530.84	729	514
530.85	732	521
530.86	735	529
530.87	738	536
530.88	740	543
530.89	743	551
530.90	746	558
530.91	749	566
530.92	752	573
530.93	755	581
530.94	758	588
530.95	761	596
530.96	763	603
530.97	766	611
530.98	769	619
530.99	772	627
531.00	**775**	**634**

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APPENDIX D

Inspection, Operation, and Maintenance Forms

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Bioretention Construction Inspection Checklist

Project:
Location:
Site Status:

Date:

Time:

Inspector:

CONSTRUCTION SEQUENCE	SATISFACTORY/ UNSATISFACTORY	COMMENTS
1. Pre-Construction		
Pre-construction meeting		
Runoff diverted		
Facility area cleared		
If designed as exfilter, soil testing for permeability		
Facility location staked out		
2. Excavation		
Size and location		
Lateral slopes completely level		
If designed as exfilter, ensure that excavation does not compact susoils.		
Longitudinal slopes within design range		

CONSTRUCTION SEQUENCE	SATISFACTORY / UNSATISFACTORY	COMMENTS
3. Structural Components		
Stone diaphragm installed correctly		
Outlets installed correctly		
Underdrain		
Pretreatment devices installed		
Soil bed composition and texture		
4. Vegetation		
Complies with planting specs		
Topsoil adequate in composition and placement		
Adequate erosion control measures in place		
5. Final Inspection		
Dimensions		
Proper stone diaphragm		
Proper outlet		
Soil/ filter bed permeability testing		
Effective stand of vegetation and stabilization		
Construction generated sediments removed		
Contributing watershed stabilized before flow is diverted to the practice		

Comments:

Actions to be Taken:

Bioretention Operation, Maintenance and Management Inspection Checklist

Project:
Location:
Site Status:

Date:

Time:

Inspector:

MAINTENANCE ITEM	SATISFACTORY / UNSATISFACTORY	COMMENTS
1. Debris Cleanout (Monthly)		
Bioretention and contributing areas clean of debris		
No dumping of yard wastes into practice		
Litter (branches, etc.) have been removed		
2. Vegetation (Monthly)		
Plant height not less than design water depth		
Fertilized per specifications		
Plant composition according to approved plans		
No placement of inappropriate plants		
Grass height not greater than 6 inches		
No evidence of erosion		
3. Check Dams/Energy Dissipaters/Sumps (Annual, After Major Storms)		
No evidence of sediment buildup		

MAINTENANCE ITEM	SATISFACTORY / UNSATISFACTORY	COMMENTS
Sumps should not be more than 50% full of sediment		
No evidence of erosion at downstream toe of drop structure		
4. Dewatering (Monthly)		
Dewaters between storms		
No evidence of standing water		
5. Sediment Deposition (Annual)		
Swale clean of sediments		
Sediments should not be > 20% of swale design depth		
6. Outlet/Overflow Spillway (Annual, After Major Storms)		
Good condition, no need for repair		
No evidence of erosion		
No evidence of any blockages		
7. Integrity of Filter Bed (Annual)		
Filter bed has not been blocked or filled inappropriately		

Comments:

Actions to be Taken:

Stormwater/Wetland Pond Construction Inspection Checklist

Project:
Location:
Site Status:

Date:

Time:

Inspector:

CONSTRUCTION SEQUENCE	SATISFACTORY/ UNSATISFACTORY	COMMENTS
Pre-Construction/Materials and Equipment		
Pre-construction meeting		
Pipe and appurtenances on-site prior to construction and dimensions checked		
1. Material (including protective coating, if specified)		
2. Diameter		
3. Dimensions of metal riser or pre-cast concrete outlet structure		
4. Required dimensions between water control structures (orifices, weirs, etc.) are in accordance with approved plans		
5. Barrel stub for prefabricated pipe structures at proper angle for design barrel slope		
6. Number and dimensions of prefabricated anti-seep collars		
7. Watertight connectors and gaskets		
8. Outlet drain valve		
Project benchmark near pond site		
Equipment for temporary de-watering		

CONSTRUCTION SEQUENCE	SATISFACTORY/ UNSATISFACTORY	COMMENTS
2. Subgrade Preparation		
Area beneath embankment stripped of all vegetation, topsoil, and organic matter		
3. Pipe Spillway Installation		
Method of installation detailed on plans		
A. Bed preparation		
Installation trench excavated with specified side slopes		
Stable, uniform, dry subgrade of relatively impervious material (If subgrade is wet, contractor shall have defined steps before proceeding with installation)		
Invert at proper elevation and grade		
B. Pipe placement		
Metal / plastic pipe		
1. Watertight connectors and gaskets properly installed		
2. Anti-seep collars properly spaced and having watertight connections to pipe		
3. Backfill placed and tamped by hand under “haunches” of pipe		
4. Remaining backfill placed in max. 8 inch lifts using small power tamping equipment until 2 feet cover over pipe is reached		

CONSTRUCTION SEQUENCE	SATISFACTORY/ UNSATISFACTORY	COMMENTS
3. Pipe Spillway Installation		
Concrete pipe		
1. Pipe set on blocks or concrete slab for pouring of low cradle		
2. Pipe installed with rubber gasket joints with no spalling in gasket interface area		
3. Excavation for lower half of anti-seep collar(s) with reinforcing steel set		
4. Entire area where anti-seep collar(s) will come in contact with pipe coated with mastic or other approved waterproof sealant		
5. Low cradle and bottom half of anti-seep collar installed as monolithic pour and of an approved mix		
6. Upper half of anti-seep collar(s) formed with reinforcing steel set		
7. Concrete for collar of an approved mix and vibrated into place (protected from freezing while curing, if necessary)		
8. Forms stripped and collar inspected for honeycomb prior to backfilling. Parge if necessary.		
C. Backfilling		
Fill placed in maximum 8 inch lifts		
Backfill taken minimum 2 feet above top of anti-seep collar elevation before traversing with heavy equipment		

CONSTRUCTION SEQUENCE	SATISFACTORY/ UNSATISFACTORY	COMMENTS
4. Riser / Outlet Structure Installation		
Riser located within embankment		
A. Metal riser		
Riser base excavated or formed on stable subgrade to design dimensions		
Set on blocks to design elevations and plumbed		
Reinforcing bars placed at right angles and projecting into sides of riser		
Concrete poured so as to fill inside of riser to invert of barrel		
B. Pre-cast concrete structure		
Dry and stable subgrade		
Riser base set to design elevation		
If more than one section, no spalling in gasket interface area; gasket or approved caulking material placed securely		
Watertight and structurally sound collar or gasket joint where structure connects to pipe spillway		
C. Poured concrete structure		
Footing excavated or formed on stable subgrade, to design dimensions with reinforcing steel set		
Structure formed to design dimensions, with reinforcing steel set as per plan		
Concrete of an approved mix and vibrated into place (protected from freezing while curing, if necessary)		
Forms stripped & inspected for “honeycomb” prior to backfilling; parge if necessary		

CONSTRUCTION SEQUENCE	SATISFACTORY/ UNSATISFACTORY	COMMENTS
5. Embankment Construction		
Fill material		
Compaction		
Embankment		
1. Fill placed in specified lifts and compacted with appropriate equipment		
2. Constructed to design cross-section, side slopes and top width		
3. Constructed to design elevation plus allowance for settlement		
6. Impounded Area Construction		
Excavated / graded to design contours and side slopes		
Inlet pipes have adequate outfall protection		
Forebay(s)		
Pond benches		
7. Earth Emergency Spillway Construction		
Spillway located in cut or structurally stabilized with riprap, gabions, concrete, etc.		
Excavated to proper cross-section, side slopes and bottom width		
Entrance channel, crest, and exit channel constructed to design grades and elevations		

CONSTRUCTION SEQUENCE	SATISFACTORY / UNSATISFACTORY	COMMENTS
8. Outlet Protection		
A. End section		
Securely in place and properly backfilled		
B. Endwall		
Footing excavated or formed on stable subgrade, to design dimensions and reinforcing steel set, if specified		
Endwall formed to design dimensions with reinforcing steel set as per plan		
Concrete of an approved mix and vibrated into place (protected from freezing, if necessary)		
Forms stripped and structure inspected for “honeycomb” prior to backfilling; parge if necessary		
C. Riprap apron / channel		
Apron / channel excavated to design cross-section with proper transition to existing ground		
Filter fabric in place		
Stone sized as per plan and uniformly place at the thickness specified		
9. Vegetative Stabilization		
Approved seed mixture or sod		
Proper surface preparation and required soil amendments		
Excelsior mat or other stabilization, as per plan		

CONSTRUCTION SEQUENCE	SATISFACTORY/ UNSATISFACTORY	COMMENTS
10. Miscellaneous		
Drain for ponds having a permanent pool		
Trash rack / anti-vortex device secured to outlet structure		
Trash protection for low flow pipes, orifices, etc.		
Fencing (when required)		
Access road		
Set aside for clean-out maintenance		
11. Stormwater Wetlands		
Adequate water balance		
Variety of depth zones present		
Approved pondscaping plan in place Reinforcement budget for additional plantings		
Plants and materials ordered 6 months prior to construction		
Construction planned to allow for adequate planting and establishment of plant community (April-June planting window)		
Wetland buffer area preserved to maximum extent possible		

Comments:

Actions to be Taken:

Stormwater Pond/Wetland Operation, Maintenance and Management Inspection Checklist

Project _____
Location: _____
Site Status: _____

Date: _____
Time: _____

Inspector: _____

Maintenance Item	Satisfactory/ Unsatisfactory	Comments
1. Embankment and emergency spillway (Annual, After Major Storms)		
1. Vegetation and ground cover adequate		
2. Embankment erosion		
3. Animal burrows		
4. Unauthorized planting		
5. Cracking, bulging, or sliding of dam		
a. Upstream face		
b. Downstream face		
c. At or beyond toe		
downstream		
upstream		
d. Emergency spillway		
6.Pond, toe & chimney drains clear and functioning		
7.Seeps/leaks on downstream face		
8.Slope protection or riprap failure		
9. Vertical/horizontal alignment of top of dam “As-Built”		

Maintenance Item	Satisfactory/ Unsatisfactory	Comments
10. Emergency spillway clear of obstructions and debris		
11. Other (specify)		
2. Riser and principal spillway (Annual)		
Type: Reinforced concrete _____ Corrugated pipe _____ Masonry _____ 1. Low flow orifice obstructed		
2. Low flow trash rack. a. Debris removal necessary		
b. Corrosion control		
3. Weir trash rack maintenance a. Debris removal necessary		
b. corrosion control		
4. Excessive sediment accumulation insider riser		
5. Concrete/masonry condition riser and barrels a. cracks or displacement		
b. Minor spalling (<1")		
c. Major spalling (rebars exposed)		
d. Joint failures		
e. Water tightness		
6. Metal pipe condition		
7. Control valve a. Operational/exercised		
b. Chained and locked		
8. Pond drain valve a. Operational/exercised		
b. Chained and locked		
9. Outfall channels functioning		
10. Other (specify)		

Maintenance Item	Satisfactory/ Unsatisfactory	Comments
3. Permanent Pool (Wet Ponds) (monthly)		
1. Undesirable vegetative growth		
2. Floating or floatable debris removal required		
3. Visible pollution		
4. Shoreline problem		
5. Other (specify)		
4. Sediment Forebays		
1.Sedimentation noted		
2. Sediment cleanout when depth < 50% design depth		
5. Dry Pond Areas		
1. Vegetation adequate		
2. Undesirable vegetative growth		
3. Undesirable woody vegetation		
4. Low flow channels clear of obstructions		
5. Standing water or wet spots		
6. Sediment and / or trash accumulation		
7. Other (specify)		
6. Condition of Outfalls (Annual , After Major Storms)		
1. Riprap failures		
2. Slope erosion		
3. Storm drain pipes		
4.Endwalls / Headwalls		
5. Other (specify)		
7. Other (Monthly)		
1. Encroachment on pond, wetland or easement area		

Maintenance Item	Satisfactory/ Unsatisfactory	Comments
2. Complaints from residents		
3.Aesthetics a. Grass growing required		
b. Graffiti removal needed		
c. Other (specify)		
4. Conditions of maintenance access routes.		
5. Signs of hydrocarbon build-up		
6. Any public hazards (specify)		
8. Wetland Vegetation (Annual)		
1. Vegetation healthy and growing Wetland maintaining 50% surface area coverage of wetland plants after the second growing season. (If unsatisfactory, reinforcement plantings needed)		
2. Dominant wetland plants: Survival of desired wetland plant species Distribution according to landscaping plan?		
3. Evidence of invasive species		
4. Maintenance of adequate water depths for desired wetland plant species		
5. Harvesting of emergent plantings needed		
6. Have sediment accumulations reduced pool volume significantly or are plants “choked” with sediment		
7. Eutrophication level of the wetland.		
8. Other (specify)		

Comments:

Actions to be Taken:

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APPENDIX E

SWPPP Forms (NOI, MS4 Acceptance, NOT)

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0644089821

NOTICE OF INTENT

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

NYR _____
(for DEC use only)

Stormwater Discharges Associated with Construction Activity Under State Pollutant Discharge Elimination System (SPDES) General Permit # GP-0-15-002

All sections must be completed unless otherwise noted. Failure to complete all items may result in this form being returned to you, thereby delaying your coverage under this General Permit. Applicants must read and understand the conditions of the permit and prepare a Stormwater Pollution Prevention Plan prior to submitting this NOI. Applicants are responsible for identifying and obtaining other DEC permits that may be required.

-IMPORTANT-
RETURN THIS FORM TO THE ADDRESS ABOVE
OWNER/OPERATOR MUST SIGN FORM

Owner/Operator Information

Owner/Operator (Company Name/Private Owner Name/Municipality Name)
Millstone Development Group LLC.

Owner/Operator Contact Person Last Name (NOT CONSULTANT)
DalPos

Owner/Operator Contact Person First Name
Devin

Owner/Operator Mailing Address
125 High Rock Avenue

City
Saratoga Springs

State: NY
Zip: 12866-____

Phone (Owner/Operator): 315-306-3747
Fax (Owner/Operator): ___-___-____

Email (Owner/Operator)
devindalpos@msn.com

FED TAX ID
__-_____ (not required for individuals)

Project Site Information

Project/Site Name
Commercial Development

Street Address (NOT P.O. BOX)
547 East Genesee Street (Route 5)

Side of Street
● **North** ○ **South** ○ **East** ○ **West**

City/Town/Village (THAT ISSUES BUILDING PERMIT)
Village of Fayetteville

State: NY | Zip: 13066- | County: Onondaga | DEC Region: 7

Name of Nearest Cross Street
N Manlius Street (Route 257)

Distance to Nearest Cross Street (Feet)
1200

Project In Relation to Cross Street
○ **North** ○ **South** ○ **East** ● **West**

Tax Map Numbers
Section-Block-Parcel
009.-04-19.1

Tax Map Numbers

1. Provide the Geographic Coordinates for the project site in NYTM Units. To do this you **must** go to the NYSDEC Stormwater Interactive Map on the DEC website at:

www.dec.ny.gov/imsmaps/stormwater/viewer.htm

Zoom into your Project Location such that you can accurately click on the centroid of your site. Once you have located your project site, go to the tool boxes on the top and choose "i"(identify). Then click on the center of your site and a new window containing the X, Y coordinates in UTM will pop up. Transcribe these coordinates into the boxes below. For problems with the interactive map use the help function.

X Coordinates (Easting): 418541

Y Coordinates (Northing): 4764819

2. What is the nature of this construction project?

○ **New Construction**

● **Redevelopment with increase in impervious area**

○ **Redevelopment with no increase in impervious area**

3. Select the predominant land use for both pre and post development conditions.
SELECT ONLY ONE CHOICE FOR EACH

Pre-Development Existing Land Use	Post-Development Future Land Use
○ FOREST	○ SINGLE FAMILY HOME
○ PASTURE/OPEN LAND	○ SINGLE FAMILY SUBDIVISION
○ CULTIVATED LAND	○ TOWN HOME RESIDENTIAL
○ SINGLE FAMILY HOME	○ MULTIFAMILY RESIDENTIAL
○ SINGLE FAMILY SUBDIVISION	○ INSTITUTIONAL/SCHOOL
○ TOWN HOME RESIDENTIAL	○ INDUSTRIAL
○ MULTIFAMILY RESIDENTIAL	● COMMERCIAL
○ INSTITUTIONAL/SCHOOL	○ MUNICIPAL
● INDUSTRIAL	○ ROAD/HIGHWAY
○ COMMERCIAL	○ RECREATIONAL/SPORTS FIELD
○ ROAD/HIGHWAY	○ BIKE PATH/TRAIL
○ RECREATIONAL/SPORTS FIELD	○ LINEAR UTILITY (water, sewer, gas, etc.)
○ BIKE PATH/TRAIL	○ PARKING LOT
○ LINEAR UTILITY	○ CLEARING/GRADING ONLY
○ PARKING LOT	○ DEMOLITION, NO REDEVELOPMENT
○ OTHER	○ WELL DRILLING ACTIVITY *(Oil, Gas, etc.)
	○ OTHER

Number of Lots

***Note**: for gas well drilling, non-high volume hydraulic fractured wells only

4. In accordance with the larger common plan of development or sale, enter the total project site area; the total area to be disturbed; existing impervious area to be disturbed (for redevelopment activities); and the future impervious area constructed within the disturbed area. (Round to the nearest tenth of an acre.)

Total Site Area	Total Area To Be Disturbed	Existing Impervious Area To Be Disturbed	Future Impervious Area Within Disturbed Area
32.9	15.5	8.1	9.1

5. Do you plan to disturb more than 5 acres of soil at any one time? ○ **Yes** ○ **No**

6. Indicate the percentage of each Hydrologic Soil Group(HSG) at the site.

A	B	C	D
0 %	80 %	20 %	0 %

7. Is this a phased project? ○ **Yes** ○ **No**

8. Enter the planned start and end dates of the disturbance activities.

Start Date 04/01/2021 - **End Date** 09/31/2022

9. Identify the nearest surface waterbody(ies) to which construction site runoff will discharge.

Name

Bishops Brook

9a. Type of waterbody identified in Question 9?

- ○ Wetland / State Jurisdiction On Site (Answer 9b)
- ○ Wetland / State Jurisdiction Off Site
- ○ Wetland / Federal Jurisdiction On Site (Answer 9b)
- ○ Wetland / Federal Jurisdiction Off Site
- ● Stream / Creek On Site
- ○ Stream / Creek Off Site
- ○ River On Site
- ○ River Off Site
- ○ Lake On Site
- ○ Lake Off Site
- ○ Other Type On Site
- ○ Other Type Off Site

9b. How was the wetland identified?

- ○ Regulatory Map
- ○ Delineated by Consultant
- ○ Delineated by Army Corps of Engineers
- ○ Other (identify)

10. Has the surface waterbody(ies) in question 9 been identified as a 303(d) segment in Appendix E of GP-0-15-002? ○ **Yes** ● **No**

11. Is this project located in one of the Watersheds identified in Appendix C of GP-0-15-002? ○ **Yes** ● **No**

12. Is the project located in one of the watershed areas associated with AA and AA-S classified waters? ○ **Yes** ● **No**
If no, skip question 13.

13. Does this construction activity disturb land with no existing impervious cover and where the Soil Slope Phase is identified as an E or F on the USDA Soil Survey? ○ **Yes** ○ **No**
If Yes, what is the acreage to be disturbed?

.

14. Will the project disturb soils within a State regulated wetland or the protected 100 foot adjacent area? ○ **Yes** ● **No**

15. Does the site runoff enter a separate storm sewer system (including roadside drains, swales, ditches, culverts, etc)? ○ **Yes** ● **No** ○ **Unknown**

16. What is the name of the municipality/entity that owns the separate storm sewer system?

17. Does any runoff from the site enter a sewer classified as a Combined Sewer? ○ **Yes** ● **No** ○ **Unknown**

18. Will future use of this site be an agricultural property as defined by the NYS Agriculture and Markets Law? ○ **Yes** ● **No**

19. Is this property owned by a state authority, state agency, federal government or local government? ○ **Yes** ● **No**

20. Is this a remediation project being done under a Department approved work plan? (i.e. CERCLA, RCRA, Voluntary Cleanup Agreement, etc.) ● **Yes** ○ **No**

21. Has the required Erosion and Sediment Control component of the SWPPP been developed in conformance with the current NYS Standards and Specifications for Erosion and Sediment Control (aka Blue Book)? ● **Yes** ○ **No**

22. Does this construction activity require the development of a SWPPP that includes the post-construction stormwater management practice component (i.e. Runoff Reduction, Water Quality and Quantity Control practices/techniques)? ● **Yes** ○ **No**
If No, skip questions 23 and 27-39.

23. Has the post-construction stormwater management practice component of the SWPPP been developed in conformance with the current NYS Stormwater Management Design Manual? ● **Yes** ○ **No**

24. The Stormwater Pollution Prevention Plan (SWPPP) was prepared by:

- ● **Professional Engineer (P.E.)**
- ○ **Soil and Water Conservation District (SWCD)**
- ○ **Registered Landscape Architect (R.L.A)**
- ○ **Certified Professional in Erosion and Sediment Control (CPESC)**
- ○ **Owner/Operator**
- ○ **Other**

SWPPP Preparer
Napierala Consulting

Contact Name (Last, Space, First)
Napierala Matt

Mailing Address
110 Fayette Street

City
Manlius

State Zip
NY 13104-

Phone
315-682-5580

Fax

Email
mnap@napcon.com

SWPPP Preparer Certification

I hereby certify that the Stormwater Pollution Prevention Plan (SWPPP) for this project has been prepared in accordance with the terms and conditions of the GP-0-15-002. Furthermore, I understand that certifying false, incorrect or inaccurate information is a violation of this permit and the laws of the State of New York and could subject me to criminal, civil and/or administrative proceedings.

First Name
Matthew

MI
R

Last Name
Napierala

Signature

Date
/ /

25. Has a construction sequence schedule for the planned management practices been prepared? ○ Yes ○ No

26. Select **all** of the erosion and sediment control practices that will be employed on the project site:

Temporary Structural

- ● Check Dams
- ○ Construction Road Stabilization
- ○ Dust Control
- ○ Earth Dike
- ○ Level Spreader
- ○ Perimeter Dike/Swale
- ○ Pipe Slope Drain
- ○ Portable Sediment Tank
- ○ Rock Dam
- ● Sediment Basin
- ● Sediment Traps
- ● Silt Fence
- ● Stabilized Construction Entrance
- ● Storm Drain Inlet Protection
- ○ Straw/Hay Bale Dike
- ○ Temporary Access Waterway Crossing
- ○ Temporary Stormdrain Diversion
- ○ Temporary Swale
- ○ Turbidity Curtain
- ○ Water bars

Biotechnical

- ○ Brush Matting
- ○ Wattling

Vegetative Measures

- ○ Brush Matting
- ○ Dune Stabilization
- ● Grassed Waterway
- ● Mulching
- ○ Protecting Vegetation
- ○ Recreation Area Improvement
- ● Seeding
- ○ Sodding
- ○ Straw/Hay Bale Dike
- ○ Streambank Protection
- ○ Temporary Swale
- ● Topsoiling
- ○ Vegetating Waterways

Permanent Structural

- ○ Debris Basin
- ○ Diversion
- ○ Grade Stabilization Structure
- ● Land Grading
- ○ Lined Waterway (Rock)
- ○ Paved Channel (Concrete)
- ○ Paved Flume
- ● Retaining Wall
- ● Riprap Slope Protection
- ● Rock Outlet Protection
- ○ Streambank Protection

Other

Post-construction Stormwater Management Practice (SMP) Requirements

Important: Completion of Questions 27-39 is not required if response to Question 22 is No.

27. Identify all site planning practices that were used to prepare the final site plan/layout for the project.

- ○ **Preservation of Undisturbed Areas**
- ○ **Preservation of Buffers**
- ○ **Reduction of Clearing and Grading**
- ○ **Locating Development in Less Sensitive Areas**
- ○ **Roadway Reduction**
- ○ **Sidewalk Reduction**
- ○ **Driveway Reduction**
- ○ **Cul-de-sac Reduction**
- ○ **Building Footprint Reduction**
- ○ **Parking Reduction**

27a. Indicate which of the following soil restoration criteria was used to address the requirements in Section 5.1.6("Soil Restoration") of the Design Manual (2010 version).

- ● All disturbed areas will be restored in accordance with the Soil Restoration requirements in Table 5.3 of the Design Manual (see page 5-22).
- ○ Compacted areas were considered as impervious cover when calculating the **WQv Required**, and the compacted areas were assigned a post-construction Hydrologic Soil Group (HSG) designation that is one level less permeable than existing conditions for the hydrology analysis.

28. Provide the total Water Quality Volume (WQv) required for this project (based on final site plan/layout).

Total WQv Required

		0	.	2	9	7

acre-feet

29. Identify the RR techniques (Area Reduction), RR techniques(Volume Reduction) and Standard SMPs with RRv Capacity in Table 1 (See Page 9) that were used to reduce the Total WQv Required(#28).

Also, provide in Table 1 the total impervious area that contributes runoff to each technique/practice selected. For the Area Reduction Techniques, provide the total contributing area (includes pervious area) and, if applicable, the total impervious area that contributes runoff to the technique/practice.

Note: Redevelopment projects shall use Tables 1 and 2 to identify the SMPs used to treat and/or reduce the WQv required. If runoff reduction techniques will not be used to reduce the required WQv, skip to question 33a after identifying the SMPs.

Table 1 - Runoff Reduction (RR) Techniques and Standard Stormwater Management Practices (SMPs)

	Total Contributing Area (acres)		Total Contributing Impervious Area(acres)
RR Techniques (Area Reduction)			
○ Conservation of Natural Areas (RR-1)		and/or	
○ Sheetflow to Riparian Buffers/Filters Strips (RR-2)		and/or	
○ Tree Planting/Tree Pit (RR-3)		and/or	
○ Disconnection of Rooftop Runoff (RR-4)		and/or	
RR Techniques (Volume Reduction)			
○ Vegetated Swale (RR-5)			
○ Rain Garden (RR-6)			
○ Stormwater Planter (RR-7)			
○ Rain Barrel/Cistern (RR-8)			
○ Porous Pavement (RR-9)			
○ Green Roof (RR-10)			
Standard SMPs with RRv Capacity			
○ Infiltration Trench (I-1)			
○ Infiltration Basin (I-2)			
○ Dry Well (I-3)			
○ Underground Infiltration System (I-4)			
● Bioretention (F-5)			9.1
○ Dry Swale (O-1)			
Standard SMPs			
○ Micropool Extended Detention (P-1)			
○ Wet Pond (P-2)			
○ Wet Extended Detention (P-3)			
○ Multiple Pond System (P-4)			
○ Pocket Pond (P-5)			
○ Surface Sand Filter (F-1)			
○ Underground Sand Filter (F-2)			
○ Perimeter Sand Filter (F-3)			
○ Organic Filter (F-4)			
○ Shallow Wetland (W-1)			
○ Extended Detention Wetland (W-2)			
○ Pond/Wetland System (W-3)			
○ Pocket Wetland (W-4)			
○ Wet Swale (O-2)			

Table 2 - Alternative SMPs (DO NOT INCLUDE PRACTICES BEING USED FOR PRETREATMENT ONLY)

Alternative SMP	Total Contributing Impervious Area(acres)
○ Hydrodynamic	
○ Wet Vault	
○ Media Filter	
○ Other [ ]	

Provide the name and manufacturer of the Alternative SMPs (i.e. proprietary practice(s)) being used for WQv treatment.

Name

Manufacturer

Note: Redevelopment projects which do not use RR techniques, shall use questions 28, 29, 33 and 33a to provide SMPs used, total WQv required and total WQv provided for the project.

30. Indicate the Total RRv provided by the RR techniques (Area/Volume Reduction) and Standard SMPs with RRv capacity identified in question 29.

Total RRv provided

0.297 **acre-feet**

31. Is the Total RRv provided (#30) greater than or equal to the total WQv required (#28).

● **Yes** ○ **No**

If Yes, go to question 36.
If No, go to question 32.

32. Provide the Minimum RRv required based on HSG.
[Minimum RRv Required = (P)(0.95)(Ai)/12, Ai=(S)(Aic)]

Minimum RRv Required

. **acre-feet**

32a. Is the Total RRv provided (#30) greater than or equal to the Minimum RRv Required (#32)?

● **Yes** ○ **No**

If Yes, go to question 33.
Note: Use the space provided in question #39 to summarize the specific site limitations and justification for not reducing 100% of WQv required (#28). A detailed evaluation of the specific site limitations and justification for not reducing 100% of the WQv required (#28) must also be included in the SWPPP.
If No, sizing criteria has not been met, so NOI can not be processed. SWPPP preparer must modify design to meet sizing criteria.

33. Identify the Standard SMPs in Table 1 and, if applicable, the Alternative SMPs in Table 2 that were used to treat the remaining total WQv(=Total WQv Required in 28 - Total RRv Provided in 30).

Also, provide in Table 1 and 2 the total impervious area that contributes runoff to each practice selected.

Note: Use Tables 1 and 2 to identify the SMPs used on Redevelopment projects.

33a. Indicate the Total WQv provided (i.e. WQv treated) by the SMPs identified in question #33 and Standard SMPs with RRv Capacity identified in question 29.

WQv Provided

[ ][ ][ ].[ ][ ][ ] **acre-feet**

Note: For the standard SMPs with RRv capacity, the WQv provided by each practice = the WQv calculated using the contributing drainage area to the practice - RRv provided by the practice. (See Table 3.5 in Design Manual)

34. Provide the sum of the Total RRv provided (#30) and the WQv provided (#33a). [ ][ ][ ].[ ][ ][ ]

35. Is the sum of the RRv provided (#30) and the WQv provided (#33a) greater than or equal to the total WQv required (#28)? ● **Yes** ○ **No**

If Yes, go to question 36.
If No, sizing criteria has not been met, so NOI can not be processed. SWPPP preparer must modify design to meet sizing criteria.

36. Provide the total Channel Protection Storage Volume (CPv) required and provided or select waiver (36a), if applicable.

CPv Required

[ ][ ]0.[0][4][6] **acre-feet**

CPv Provided

[ ][ ]0.[2][5][3] **acre-feet**

36a. The need to provide channel protection has been waived because:

○ Site discharges directly to tidal waters or a fifth order or larger stream.

○ Reduction of the total CPv is achieved on site through runoff reduction techniques or infiltration systems.

37. Provide the Overbank Flood (Qp) and Extreme Flood (Qf) control criteria or select waiver (37a), if applicable.

Total Overbank Flood Control Criteria (Qp)

Pre-Development

[ ][2][2].[3][ ][ ] **CFS**

Post-development

[ ][1][2].[1][ ][ ] **CFS**

Total Extreme Flood Control Criteria (Qf)

Pre-Development

[ ][8][4].[5][ ][ ] **CFS**

Post-development

[ ][5][7].[7][ ][ ] **CFS**

37a. The need to meet the Qp and Qf criteria has been waived because:

- ○ Site discharges directly to tidal waters or a fifth order or larger stream.
- ○ Downstream analysis reveals that the Qp and Qf controls are not required

38. Has a long term Operation and Maintenance Plan for the post-construction stormwater management practice(s) been developed? ● **Yes** ○ **No**

If Yes, Identify the entity responsible for the long term Operation and Maintenance

Millstone Development Group LLC

39. Use this space to summarize the specific site limitations and justification for not reducing 100% of WQv required(#28). (See question 32a) This space can also be used for other pertinent project information.

40. Identify other DEC permits, existing and new, that are required for this project/facility.

- ○ Air Pollution Control
- ○ Coastal Erosion
- ○ Hazardous Waste
- ○ Long Island Wells
- ○ Mined Land Reclamation
- ○ Solid Waste
- ○ Navigable Waters Protection / Article 15
- ○ Water Quality Certificate
- ○ Dam Safety
- ○ Water Supply
- ○ Freshwater Wetlands/Article 24
- ○ Tidal Wetlands
- ○ Wild, Scenic and Recreational Rivers
- ○ Stream Bed or Bank Protection / Article 15
- ○ Endangered or Threatened Species(Incidental Take Permit)
- ○ Individual SPDES
- ○ SPDES Multi-Sector GP [N][Y][R][ ][ ][ ][ ][ ][ ]
- ○ Other [ ]
- ● None

41. Does this project require a US Army Corps of Engineers Wetland Permit? ○ **Yes** ● **No**
If Yes, Indicate Size of Impact. [ ][ ][ ][ ][ ].[ ]

42. Is this project subject to the requirements of a regulated, traditional land use control MS4? ● **Yes** ○ **No**
(If No, skip question 43)

43. Has the "MS4 SWPPP Acceptance" form been signed by the principal executive officer or ranking elected official and submitted along with this NOI? ● **Yes** ○ **No**

44. If this NOI is being submitted for the purpose of continuing or transferring coverage under a general permit for stormwater runoff from construction activities, please indicate the former SPDES number assigned. [N][Y][R][ ][ ][ ][ ][ ][ ]

Owner/Operator Certification

I have read or been advised of the permit conditions and believe that I understand them. I also understand that, under the terms of the permit, there may be reporting requirements. I hereby certify that this document and the corresponding documents were prepared under my direction or supervision. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations. I further understand that coverage under the general permit will be identified in the acknowledgment that I will receive as a result of submitting this NOI and can be as long as sixty (60) business days as provided for in the general permit. I also understand that, by submitting this NOI, I am acknowledging that the SWPPP has been developed and will be implemented as the first element of construction, and agreeing to comply with all the terms and conditions of the general permit for which this NOI is being submitted.

Print First Name **MI**

Print Last Name

Owner/Operator Signature

Date / /

STORMWATER POLLUTION PREVENTION PLAN
GENERAL CONTRACTOR'S CERTIFICATION

Construction Site:

STORMWATER POLLUTION PREVENTION PLAN

GENERAL CONTRACTOR'S CERTIFICATION:

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

Name: _____
(Print)

Signature: _____

Title: _____

Company Name: _____

Address: _____

Telephone Number: _____

Date: _____

Scope of Services: _____

_____

_____

STORMWATER POLLUTION PREVENTION PLAN
SUBCONTRACTOR'S CERTIFICATION

Construction Site:

STORMWATER POLLUTION PREVENTION PLAN

SUBCONTRACTOR'S CERTIFICATION:

NYS-DEC SPDES General Permit Contractor's Certification Statement

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

Name: _____
(Print)

Signature: _____

Title: _____

Company Name: _____

Address: _____

Telephone Number: _____

Date: _____

Scope of Services: _____

_____

_____

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

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

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

I. Owner or Operator Information

1. Owner/Operator Name:

2. Street Address:

3. City/State/Zip:

4. Contact Person: | 4a.Telephone:

4b. Contact Person E-Mail:

II. Project Site Information

5. Project/Site Name:

6. Street Address:

7. City/Zip:

8. County:

III. Reason for Termination

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

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

9c. □ Other (Explain on Page 2)

IV. Final Site Information:

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

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

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

_____

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

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

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

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

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

□ For post-construction stormwater management practices that are privately owned, a mechanism is 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.

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

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

11. Is this project subject to the requirements of a regulated, traditional land use control MS4? □ yes □ no

(If Yes, complete section VI - "MS4 Acceptance" statement

V. Additional Information/Explanation:

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

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

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

Printed Name:

Title/Position:

Signature:	Date:

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

VII. Qualified Inspector Certification - Final Stabilization:

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

Printed Name:	
Title/Position:	
Signature:	Date:

VIII. Qualified Inspector Certification - Post-construction Stormwater Management Practice(s):

I hereby certify that all post-construction stormwater management practices have been constructed in conformance with the SWPPP. Furthermore, I understand that certifying false, incorrect or inaccurate information is a violation of the referenced permit and the laws of the State of New York and could subject me to criminal, civil and/or administrative proceedings.

Printed Name:	
Title/Position:	
Signature:	Date:

IX. Owner or Operator Certification

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

Printed Name:	
Title/Position:	
Signature:	Date:

(NYS DEC Notice of Termination - January 2015)

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NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

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

MS4 Stormwater Pollution Prevention Plan (SWPPP) Acceptance Form

for

Construction Activities Seeking Authorization Under SPDES General Permit

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

I. Project Owner/Operator Information
1. Owner/Operator Name:
2. Contact Person:
3. Street Address:
4. City/State/Zip:
II. Project Site Information
5. Project/Site Name:
6. Street Address:
7. City/State/Zip:
III. Stormwater Pollution Prevention Plan (SWPPP) Review and Acceptance Information
8. SWPPP Reviewed by:
9. Title/Position:
10. Date Final SWPPP Reviewed and Accepted:
IV. Regulated MS4 Information
11. Name of MS4:
12. MS4 SPDES Permit Identification Number: NYR20A
13. Contact Person:
14. Street Address:
15. City/State/Zip:
16. Telephone Number:

MS4 SWPPP Acceptance Form - continued

V. Certification Statement - MS4 Official (principal executive officer or ranking elected official) or Duly Authorized Representative

I hereby certify that the final Stormwater Pollution Prevention Plan (SWPPP) for the construction project identified in question 5 has been reviewed and meets the substantive requirements in the SPDES General Permit For Stormwater Discharges from Municipal Separate Storm Sewer Systems (MS4s). Note: The MS4, through the acceptance of the SWPPP, assumes no responsibility for the accuracy and adequacy of the design included in the SWPPP. In addition, review and acceptance of the SWPPP by the MS4 does not relieve the owner/operator or their SWPPP preparer of responsibility or liability for errors or omissions in the plan.

Printed Name:

Title/Position:

Signature:

Date:

VI. Additional Information

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