Storm Water Pollution Prevention Plan
for

Proposed Britton
Single Family Home Subdivision

Town of Lansing
Lansing, New York

August 2026

Prepared by:

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For:

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18 Murfield Drive
Ithaca, NY 14850

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ATTACHMENTS

Attachment J: NYSDEC Controls Operation & Maintenance Check List

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1.0 EXECUTIVE SUMMARY

The engineer, owner and all contractors involved with construction activity that disturb site soil or who implement pollutant control measures identified in the Storm Water Pollution Prevention Plan (SWPPP) are responsible for complying with the requirements set forth in the New York State Department of Environmental Conservations SPDES General Permit from Construction Activity Permit No. GP-0-25-001 and any local and/or state governing agencies having jurisdiction with regards to erosion and sediment control. The overall requirements of the SPDES Permit are as follows:

A. **Owner:**

Wayne Britton
18 Murfield Drive
Ithaca, NY 14850
607-275-9677
slbritton@att.net

Project Site:

Tax Map ID 37.-4-2.12
N. Triphammer Road
Town of Lansing, Tompkins County NY

B. Filing Notice of Intent

This project is subject to the requirements of a regulated, traditional land use control MS4. As such, items 1 though 4 must be met before a construction activity is authorized to discharge stormwater.

1. An owner or operator that is subject to the requirements of a regulated, traditional land use control MS4, must have its SWPPP reviewed and accepted by the regulated MS4 prior to submitting the NOI to the Department. The owner or operator shall then have the "MS4 SWPPP Acceptance Form," as provided in Attachment A, authorized by the MS4 and submitted to the Department along with the NOI for approval.

2. Complete the Notice of Intent (NOI) provided in Attachment A and forward to the recipients following this section. Five (5) business days from the date the Department receives a complete electronic version of the NOI (eNOI) for construction activities with a SWPPP that has been prepared in conformance with the design criteria in the technical standard referenced in Part III.B.1. of the SPDES General Permit and the

performance criteria in the technical standard referenced in Parts II.B.2 or 3 of the SPDES general permit, for construction activities that require post-construction stormwater management practices pursuant to Part III.C. of the SPDES General Permit; or

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

4. Ten (10) business days from the date the Department receives a complete paper version of the NOI for construction activities with a SWPPP that has not been prepared in conformance with the design criteria in technical standard referenced in Part III.B.1. or, for construction activities that require post-construction stormwater.

C. General Notifications

All notifications regarding this plan shall be sent via certified mail with return receipt to the following addresses. Copies of mailing receipts shall be kept on record at the project site with the SWPPP and shall be considered part of the contract documents.

Town of Lansing Town Hall
29 Auburn Road
Lansing, New York 14882
(607) 533-4142

NOI Recipient:

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

A pre-construction meeting shall be held with the Town's representative. Copies of the SWPPP must be provided to the Town of Lansing once all signatures and attachments are complete.

D. Site Documentation

1. A copy of the General Construction Permit (GP-0-25-001), Notice of Intent (NOI), NOI acknowledgement letter received by the DEC, and MS4 Acceptance Form (if applicable), shall be posted in a prominent place for public viewing at the project site.

2. A complete copy of the SWPPP, NOI, NOI Acknowledgement letter, MS4 Acceptance form (if applicable), including copies of all inspection reports, plan revisions, etc., must be retained at the project site at all times during working hours and kept as part of the permanent project records for a duration of no less than five (5) years following submission of the Notice of Termination (NOT).

3. The site development contractors must provide names and addresses of all subcontractors working on the project who will be involved with the major construction activities that will result in soil disturbance. The Owner shall ensure that each contracting firm identifies one trained individual who will be responsible for implementation of the SWPPP. The owner shall also ensure that at least one trained individual is on site daily when soil disturbance activities are being performed. This information must be retained as part of the SWPPP.

4. The site development contractor and all subcontractors involved with the major construction activities that disturb site soil must sign a copy of the appropriate certification statement included in Attachment C along with the identity of the appropriate trained individual as described in paragraph D of this section.

5. Regular inspections must be made to determine effectiveness of the SWPPP. It would be modified as needed to prevent pollutants from discharging from the site. The inspector must be a person familiar with the site, the nature of the major construction activities, and qualified to evaluate both overall system performance and individual component performance. Additionally, the inspector must either be someone empowered to implement modifications to the SWPPP and the pollutant control devices, if needed, in order to increase effectiveness to an acceptable level, or someone with the authority to cause such events to happen.

6. This SWPPP must be updated each time there is a significant modification to the pollutant prevention system or a change of contractors working on the project who may disturb site soil. The site development

contractor must notify the governing agency(s) as soon as these modifications are implemented.

7. This SWPPP must be amended as necessary during the course of construction in order to keep it current with the pollutant control measures utilized at the site. Amending the SWPPP does not mean that it has to be reprinted. It is acceptable to add addenda, sketches, new sections, and/or revised drawings.

8. A record of the dates when major grading activities occur, when construction activities temporarily or permanently cease on a portion of the site, and when stabilization measures are initiated must be maintained until the NOT is filed. A log for keeping such records is included in Attachment G. A different form for the log may be substituted if it is found to be more useful.

E. Site Pollutants

Discharge of oil or other hazardous substances into the storm water is subject to reporting and cleanup requirements. Refer to Part II.B.1.d of the SPDES General Permit for additional information. Copies of the SPDES General Permit and the Notice of Intent Forms may be found on-line. This SWPPP intends to control water-borne and liquid pollutant discharges by some combination of interception, filtration, and containment. The general contractor and subcontractors implementing this SWPPP must remain alert to the need to periodically refine and update the SWPPP in order to accomplish the intended goals.

F. **eNotice of Termination (eNOT)** - Once the site reaches final stabilization upon completion of the project, Wayne Britton as Owner, may terminate coverage of SPDES permit coverage by submitting an electronic Notice of Termination, Form (included in Attachment B), when one or more of the following conditions are met:

1. <u>Final Stabilization</u>

a. Total Project Completion - All construction activity identified in the SWPPP has been completed; and all disturbance have achieved final stabilization and all temporary, structural erosion and sediment control measures have been removed, all Stormwater Management Practices (SMPs) have been constructed in conformance with the SWPPP and are operational, and an as-built drawing has been prepared or,

b. Planned shutdown with partial project completion – All soil disturbance activities have ceased; and all areas disturbed as of the project shut down date have achieved final stabilization, and all temporary, structural erosion and sediment control measures have been removed, and all SMPs required for the completed portion of the project have been constructed in conformance with the SWPPP and are operational, and an as-built drawing has been prepared, or

c. A new owner or operator has obtained coverage under the General SPDES Permit in accordance with Part I.G.

d. The owner or operator obtains coverage under an alternative SPDES General Permit or individual SPDES permit.

2. Qualified Inspections

For construction activities that require qualified inspections in accordance with Part IV.C.1. and have met Part V.A.1.a or b. of the General Permit, the owner or operator shall have a qualified inspector perform a final site inspection prior to submitting the eNOT. The qualified inspector must, by signing the "Final Stabilization" and "Post-Construction Stormwater Management Practice(s) certification statements on the eNOT, certify that all requirements of the SPDES General Permit have been met in Part V.A.1.a. or b of the General Permit. Further, the owner or operator of construction activities subject to the review authority of a Traditional Land Use Control MS4 Operator(s) in accordance with Part I.D.2.b.ii.1 and meet Part V.A.1.a. or b. of the General Permit must have the Traditional Land Use Control MS4 Operator(s) sign the "MS4 Acceptance" statement on the eNOT in accordance with the requirements in Part VII.J.A. Traditional Land Use Control MS4 Operator official. By signing this statement, it is determined that it is acceptable for the owner or operator to submit the eNOT in accordance with the requirements of this Part. A Traditional Land Use Control MS4 Operator can make this determination by performing a final site inspection themselves or by accepting the qualified inspector's final site inspection certification(s) when required in Part V.A.2 of the General Permit.

3. Maintenance Agreements

a. Lastly, for construction activities that require SMPs and meet Part V.A.1.a. or b of the General Permit, the owner or operator must, prior to submitting the eNOT, ensure one of the following:

1. The SMP(s) that were constructed by a private entity, but will be owned, operated, and maintained by a public entity, the SMP(s) and

any rignt-of-way(s) needed to operate and maintain such practice(s) have been deeded to the municipality in which the practice(s) is located, or,

2. For SMP(s) that are privately owned, but will be operated and maintained by a public entity, an executed operation and maintenance agreement is in place with the municipality that will operate and maintain the SMP(s), or,

3. For SMP(s) that are privately owned, the owner or operator has a mechanism in place that requires operation and maintenance of the practice(s) in accordance with the operation and maintenance plan, such as a deed covenant in the owner or operator's deed of record, or,

4. For SMP(s) that are owned by a public or private institution (e.g. school, university, hospital), government agency or authority, or public utility, the owner or operator has policies and procedure in place that ensures operation and maintenance of the practices in accordance with the operation and maintenance plan.

An owner or operator that has met the above requirements must request termination coverage by submitting a complete eNOT using a NYSDEC approved form. The Owner or Operator's coverage is terminated as of the termination date in the Letter of Termination (LOT), which is sent by the NYSDEC after a complete eNOT is submitted.

2.0 INTRODUCTION

This SWPPP has been prepared for major activities associated with the construction of a 10 single family home subdivision consisting of 1,100-SF homes, a maintenance building, associated driveways, landscaping, public water and sewer. The Britton Subdivision is located in the Town of Lansing, New York approximately 1,500 feet north of the intersection of Asbury Road and N. Triphammer Road and 700 feet south of Sharon Drive. The property sits within a drainage area of approximately 36.63-AC of which, the cumulative land disturbance will be approximately 8.75 acres. The additional total impervious cover added to the site will be 11% based on the calculated ratio of proposed new impervious surface area to existing pervious.

Aside from the commercial construction, the project includes asphalt driveways, an access road, landscaping, public water and private sewer, as well as connections to other service utilities ie. (gas, electric, phone). Permanent stormwater management facilities are proposed including one (1) dry pond, a perimeter diversion swale, two (2) grassed swales, and eight (8) green infrastructure filter strips to address runoff reduction volume concerns. The pond will provide any remaining water quality

volume treatment beyond the green infrastructure and satisfy requirements for quantity attenuation as necessary to control runoff to less than pre-developed conditions as required by the NYSDEC General SPDES Permit. Please see Attachment K for this information.

This report includes the Full SWPPP elements necessary to comply with the SPDES General Permit for Stormwater Discharges GP-0-25-001 administered by the New York State Department of Environmental Protection, the U.S. Environmental Protection Agency (EPA) under the National Pollutant Discharge Elimination System (NPDES) program and all local governing agency requirements. This SWPPP must be implemented at the start of construction.

Construction phase pollutant sources anticipated at the site are disturbed (bare) soil, vehicle fuels and lubricants, chemicals associated with building construction, and building materials. Without adequate control there is the potential for each type of pollutant to be transported by storm water.

A. Purpose

The major goal of pollution prevention efforts during project construction is to control the migration of soil and pollutants that originate on-site and prevent them from impacting surface waters and the environment. The purpose of this SWPPP is to provide guidelines for achieving that goal. A successful pollution prevention program also relies upon careful inspection and adjustments during the construction process in order to enhance its effectiveness.

B. Scope

This SWPPP must be implemented before construction begins on the site. It primarily addresses the impact of storm rainfall and runoff in areas of the ground surface disturbed during the construction process. In addition, there are recommendations for controlling other sources of pollution that could accompany the major construction activities. This SWPPP will terminate when disturbed areas are stabilized, construction activities covered herein have ceased, and a completed Notice of Termination (NOT) is mailed to the governing agency requiring the NOT. See Section 1.0.F for specific NOT eligibility requirements.

Particular forms are included which are necessary for implementing the SWPPP.

The SPDES General Permit for Storm Water Discharges from Construction Activities prohibits most non-storm water discharges during the construction

phase. Allowable non-storm water discharges that could occur during construction on this project, which would therefore be covered by the General Permit, include:

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 dust;

4. Routine external building washdown which does not use detergents;

5. Irrigation drainage;

6. Uncontaminated discharges from construction site de-watering operations;

7. External building wash down which does not use detergents;

8. Runoff from pavement wash down where spills or leaks of toxic or hazardous materials have not occurred (unless all spilled material has been removed) and where detergents have not been used;

9. Air conditioning condensate;

10. Springs and uncontaminated groundwater; and

11. Foundation or footing drains where flows are not contaminated with process materials such as solvents.

The techniques described in this SWPPP focus on providing control of pollutant discharges with practical approaches that utilize readily available expertise, materials, and equipment.

The Owner/Developer referred to in this SWPPP is Wayne Britton, who will be responsible for full development and build-out of the subject parcel.

3.0 PROJECT DESCRIPTION

Described below are the major construction activities that are subject to this SWPPP. The Owner shall not disturb greater than five (5) acres of soil at any one time without prior written authorization from the DEC, or, in areas under the jurisdiction of a regulated MS4, authorization by that municipality. They are

presented in the order (or sequence) they are expected to begin, but each activity will not necessarily be completed before the next begins. Install erosion and sediment control measures as shown on Drainage, Sediment and Erosion Control Plans, down slope from construction activities that disturb site soil before disturbance of soil;

CONSTRUCTION PHASE 1

A. Construction of stabilized construction entrance(s);

B. Placement of silt fence;

C. Construction of dry pond and associated access road swales necessary to bring runoff into practice(s) from areas as shown on design plans ST-11.

D. Construction of development roadway to gain access to each individual construction area.

E. Construction activities for the development of buildings and associated driveway/parking area:

   a. Construct driveways and individual lot temporary parking;

   b. Construct general utility services (ie. water and sewer piping, storm piping, etc.)

   c. Construct buildings;

   d. Construct other utility service connections (gas, electric, phone);

   e. Construct filter strips as shown on site plans.

Note: For all Underground Utilities – Sediment barriers such as silt fencing, proper seeding and mulching will be utilized as required to bind the down slope side of utility construction and soil stockpiles;

F. Remove any accumulated sedimentation from the pond forebays, and associated swales. Return property to permanent lines and grades;

G. Final Grading Mulching & Seeding – Sediment barriers will be maintained down slope from disturbed soil during these operations;

H. Completion of site stabilization, ie. Vegetative cover, driveway surface. Sediment & Erosion Controls to remain in place until vegetative cover reaches 80% density.

I. Notes on soil restoration –

a. Areas with no soil disturbance or minimal disturbance activities do not need to follow special restoration procedures.

b. Areas where topsoil is stripped away only (with no changes in grade), shall apply 6" of new top soil (HSG A & B soils). If HSG C&D soils, aerate with use of tractor-drawn implements with coulters by making a narrow slit in the soil, or a roller with spikes making indentations in the soil, the apply 6" of topsoil.

c. HSG A&B soils that have been cut or filled shall be restored with aeration followed by 6" of top soil. C&D soils shall apply full soil restoration as per "Deep Ripping and De-compaction, DEC 2008."

d. Heavy traffic areas, particularly in an area 5-25' around buildings shall apply full soil restoration.

e. Areas where runoff reduction and/or infiltration practices are applied need no restoration but may be applied to enhance the reduction specified for appropriate practices.

f. Redevelopment projects require soil restoration where existing impervious areas will be converted to pervious areas.

4.0 RUNOFF REDUCTION VOLUME

This project follows guidelines set forth by the DEC for runoff reduction. Chapter 3 of the New York State Stormwater Management Design Manual requires a six step planning process to document compliance with required processes.

<u>Step 1 – Evaluate site feasibility for implementation of each green infrastructure planning measure</u>

This planning step is designed to preserve area natural resources by protecting areas, avoiding sensitive locations, and minimizing grading and soil disturbances. There were no erodible soils, critical areas, wetlands, riparian buffer areas, or locally listed protected areas.

Another component of the planning process is an evaluation of all green infrastructure practices that might be acceptable for runoff reduction on site. This project will utilize a porous pavement surface and corresponding infiltrating drainage layer

The selection process is described as follows:

- Conservation of natural areas – Pre-development hydrology and water quality characteristics of undisturbed natural areas remains unaltered.

- Sheetflow to riparian buffers – None were available on-site.

- Vegetated open swales – Site runoff will be collected and directed to specific treatment practices by way of diversion swales and direct sheet flow.

- Tree planting/tree box – This was not a specific reduction practice considered for this project.

- Disconnection of rooftop runoff – Roof downspouts and driveways will be sheet flowed across grassed filter strip surfaces.

- Stream daylighting for redevelopment projects – None on site.

- Bioswale – Grassed filter strips will be used for water quality treatment.

- Green roof – This practice was cost prohibitive to the project and is impractical for individual homes. As such, this option was not considered.

- Stormwater planters – Grassed filter strip areas will control runoff from rooftop and driveway areas due to the large surface areas involved.

- Rain cistern – This practice was considered impractical for the overall usage and square footage of the developed parcels. Source control measures using a bioretention area and rain garden was considered instead.

- Porous pavement - This practice was cost prohibitive to the project and as such, this was not considered.

Step 2 – Determine Overall Water Quality Treatment Volume (WQv)

See Attachment K for the calculation summary.

Step 3 – Runoff reduction by applying green infrastructure technology to treat 100% WQv

Green infrastructure techniques were evaluated to potentially reduce the overall water quality volume. Green infrastructure practices used for this project were identified in Steps 1 and 2. The majority of site controls was through the use of eight grassed filter strip areas allowing for an impervious cover credit in overall water quality volume and runoff reduction volume calculations. As shown in Attachment K, minimum requirements for runoff reduction volume were met.

Step 4 – If applicable, calculate the minimum RRv required.

A dry pond and associated forebays will treat for the remaining water quality volume so that 100% is met across the site.

Reference Attachment K for the overall treatment calculations.

Step 5 – Provide standard practices to address remaining water quality volume if necessary

Peak rate control is met using one dry pond. The pond reduces runoff from the proposed development to less than pre-developed conditions. See modeling report output for further information.

Step 6 – Apply volume and peak rate control practices if still required

The practice reduces runoff from the proposed development to less than pre-developed conditions. See modeling report output for further information.

5.0 STORM WATER POLLUTION PREVENTION MEASURES AND CONTROLS

Various erosion and sediment control measures have been incorporated into the design of the project, Reference Stormwater, Sediment and Erosion Control Plans accompanying this SWPPP. These measures will be implemented during construction to minimize soil erosion and to protect the character and integrity of downstream receiving waters. Eight grassed filter strips, two grassed swales, and a dry pond will remain upon completion of the project to control the quality and quantity of storm water runoff from the developed site.

The site development contractor shall take all appropriate precautions to prevent soil erosion and discharge of sediment and other pollutants to receiving water bodies and wetlands. Specific measures are outlined in this plan. In general, disturbance areas shall be limited to the smallest practical areas at any given time, and the areas are to be reseeded as soon as possible. During construction the measures outlined in this document and shown on the plans are to be installed as

described. Additional measures may be warranted or required by site and climatic conditions.

Specific erosion control measures, designed to minimize soil loss, and sediment control measures devised to retain eroded soil and prevent it from reaching water bodies or adjoining properties have been developed in accordance with the New *York State Stormwater Management Design Manual*, 2015, NYSDEC and *New York Standards & Specifications for Erosion and Sedimentation Control*, November 2016. Reference Attachment H for copy of *Vegetative and Structural, Measures for Erosion and Sediment Control, New York State Standards & Specifications for Erosion and Sedimentation Control*. (Vegetative; November 2016, Structural; August 2005)

A variety of storm water pollutant controls are recommended for this project. Some controls are intended to function temporarily and will be used as needed for pollutant control during the construction period. These include temporary sediment and erosion control measures as shown on the plans and permanent stormwater facilities including, grassed filter strips, grassed swales, a dry pond, and a diversion swale. For all disturbed areas, permanent stabilization will be accomplished by covering the disturbed soil with vegetation, pavement, or commercial structures.

A. Erosion and Sediment Controls

1. Soil Stabilization – The purpose of soil stabilization is to prevent soil from leaving the site. In the natural condition, soil is stabilized by native vegetation. The primary technique to be used under this project for stabilizing site soil will be to provide a protective cover of turf grass, pavement, or building structure.

    a. Temporary Seeding - Where land disturbance is necessary, temporary seeding with fast-germinating temporary seed and a protection of mulch must be used on areas which will be exposed for more than 14 days.

    b. Permanent Seeding – All areas at final grade must be seeded and mulched within 7 days after completion of the major activity.

    c. Structural Controls – The storm water will be managed on site utilizing proposed site grading, grassed filter strips, pond, and associated drainage systems. Their design is shown on the Project Site Stormwater Plans.

Final site stabilization is achieved when there is a uniform 80 percent density of permanent vegetation on all previously disturbed soil surfaces, exclusive of areas that have been paved.

B. Other Pollutant Controls

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

1. Dust Control – Construction traffic must enter and exit the site at the stabilized construction/driveway entrance. The purpose is to trap dust and mud that would otherwise be carried off-site by construction traffic.

   Dust control must be provided by the general contractor to a degree that is acceptable to the Owner, and in compliance with applicable local and state dust control regulations. After construction, the site will be stabilized (as described elsewhere), which will reduce the potential for dust generation.

2. Solid Waste Disposal – No solid materials, including building materials, are allowed to be discharged from the site with storm water. All solid waste, including disposable materials incidental to the major construction activities, must be collected and placed in containers. The containers will be emptied periodically by a contract trash disposal service and hauled away from the site.

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

3. Sanitary Facilities – All personnel involved with construction activities must comply with state and local sanitary or septic system regulations. Temporary sanitary facilities will be provided at the site throughout the construction phase. They must be utilized by all construction personnel and will be serviced by a commercial contractor.

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

5. Long-Term Pollutant Controls – Storm water pollutant control measures installed during construction that will also provide benefits after construction, include one (1) dry pond, two (2) grassed swales, and eight (8) grassed filter strips. Those sediment barriers, such as check dams, that do not interfere with normal operations and appear to provide long-term benefits can be left in place after construction is completed. All silt fencing must be removed once the site has received proper stabilization.

C. Construction Phase "Best Management Practices"

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

1. Permanent traffic corridors shall be established and "routes of convenience" shall be avoided;

2. Preservation of existing vegetation as much as possible. Following the completion of construction activities in any portion of the site permanent vegetation shall be established an all exposed soils;

3. Site preparation activities shall be planned to minimize the area and duration of soil disruption;

4. Minimizing soil erosion and sedimentation by stabilization of disturbed areas and by removing sediment from construction site discharges;

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

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

7. Use of detergents for large scale washing is prohibited (i.e., vehicles, buildings, pavement surfaces, etc.)

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

6.0 LOCAL PLANS

In addition to this SWPPP, construction activities associated with this project must comply with any guidelines set forth by local and state regulatory agencies. Reference Project Plans and the Stormwater Management Design Summary (Attachment K) prepared to meet Local and State requirements for post-development stormwater quantity & quality.

7.0 NYSHPO

A search was conducted on the New York State Parks, Recreation and Historic Preservation Office website to identify whether the subject parcel is listed under natural or historic places registration, or if the area resides within an archaeologically sensitive location. Although Attachment D, includes a "grey map" indicating that the property is not within a sensitive area, the project is currently awaiting a no-impact statement from SHPO.

8.0 ENVIRONMENTAL MAPPING

A search was conducted on the Tompkins County, New York State, and Federal Inventory websites to identify any areas with known wetlands, protected plants or animal species, or any significant environmental concerns that could be impacted by this project. No issues or concerns were noted. Please see Attachment E for screen prints of this review.

9.0 INSPECTIONS AND SYSTEM MAINTENANCE

Between the time this SWPPP is implemented and final site stabilization is achieved, all disturbed areas and pollutant controls must be inspected at least once every seven calendar days by a licensed professional or Qualified Inspector, as identified by the SPDES General Permit. The purpose of site inspections is to assess performance of pollutant controls. The inspections will be conducted by an independent third party Qualified Inspector to be provided by the Owner using a form similar to the example provided in Attachment F. The Owner/Operator will

also be required to arrange for a designated Trained Contractor (as defined by the SPDES General Permit) to be responsible for the management of this SWPPP during construction, while on-site. Based on these inspections, the Trained Contractor will decide whether it is necessary to modify this SWPPP, add or relocate sediment barriers, or whatever else may be needed in order to prevent pollutants from leaving the site via storm water runoff. The Trained Contractor has the duty to cause pollutant control measures to be repaired, modified, maintained, supplemented, or whatever else is necessary in order to achieve effective pollutant control.

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

A. Construction of stormwater facilities. Insure facilities are constructed substantially in accordance with the plans. (Also, Reference Attachment I for sample inspection checklist - NYSDEC Stormwater Construction Checklist):

B. Locations where vehicles enter and exit the site must be inspected for evidence of off-site sediment tracking. A stabilized construction entrance will be constructed where vehicles enter and exit. This entrance will be maintained or supplemented as necessary to prevent sediment from leaving the site on vehicles.

C. Sediment barriers must be inspected and, if necessary, they must be enlarged or cleaned in order to provide additional capacity. All material from behind sediment barriers will be stockpiled on the up slope side. Additional sediment barriers must be constructed as needed.

D. Inspections will evaluate disturbed areas and areas used for storing materials that are exposed to rainfall for evidence of, or the potential for, pollutants entering the drainage system. If necessary, the materials must be covered or original covers must be repaired or supplemented. Also, protective berms must be constructed, if needed, in order to contain runoff from material storage areas.

E. Grassed areas will be inspected to confirm that a healthy stand of grass is maintained. The site has achieved final stabilization once all areas are covered with building foundation or pavement, or have a stand of grass with at least 80 percent density. The density of 80 percent or greater must be maintained to be considered as stabilized. Areas must be watered, fertilized, and reseeded as needed to achieve this goal.

F. All discharge points must be inspected to determine whether erosion control measures are effective in preventing significant impacts to receiving waters.

Based on inspection results, any modification necessary to increase effectiveness of this SWPPP to an acceptable level must be made within seven calendar days of the inspection. The inspection reports must be completed entirely and additional remarks should be included if needed to fully describe a situation. An important aspect of the inspection report is the description of additional measures that need to be taken to enhance plan effectiveness. The inspection report must identify whether the site was in compliance with the SWPPP at the time of inspection and specifically identify all incidents of non-compliance.

Inspection reports must be kept on file by the Trained Contractor as an integral part of this SWPPP for at least five years from the date of completion and filing of NOT for the project.

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

Winter Stabilization – Between November 15 and April 1 – If construction activities are anticipated during the winter months or, if there are plans to temporarily cease or slow construction activities during this time period, a snow management plan must be prepared to identify specifics on items including snow storage, how to address melt off, and adequate stabilization techniques to ensure that there are strategies to control runoff.

10.0 POST CONSTRUCTION INSPECTION, OPERATION AND MAINTENANCE PLAN

A. Maintenance Responsibility

Short and Long term maintenance responsibilities for the grassed filter strips, dry ponds, diversion swales, and associated drainage infrastructure will be within a drainage district carried by deed through individual lot owner.

Specifically, each lot owner will be aware that the following shall be incorporated into the project as part of an O&M post construction management plan:

1. A legally binding mechanism shall be used to ensure long term operation and maintenance of the Stormwater management practices including culverts, swales, bioretention area, and pond. Specifically, this mechanism shall be through execution of a maintenance agreement between the owner and the Town of Lansing, transferred by deed which states that maintenance is 100% the responsibility of the owner and all future costs associated with proper maintenance of all installed stormwater practices is the obligation of the owner. Should the owner not perform these duties as directed, the Town of Lansing has the right to enter the owner's property and repair and/or maintain said practices at Owner's cost.

2. Copies of the practice designs and details shall be kept on record and be made available at all times. Copies shall also be forwarded to the Town of Lansing for archival purposes.

3. A sign shall be erected in a conspicuous area (ie. close proximity to each developed practice) to identify each stormwater management practice including: the dry ponds, grassed filter strips and diversion swale(s). The sign shall be of a size not less than 18" x 24" (or 10" x 12" for footprints smaller than 400 SF) bearing the following information:

   STORMWATER MANAGEMENT PRACTICE
   Project Identification (*SPDES Permit #*)
   Dry ponds, Grassed Filter Strips, Diversion Swale
   Must be maintained in Accordance with O&M Plan

B. Sediment & Debris Removal

Silt/sediment shall be removed from the bioretention area when the accumulation exceeds 6 inches. The removed sediments shall be disposed in an acceptable manner (ie. Landfill)

C. Inspection & Periodic Maintenance

To ensure the continued operation and long term performance of the proposed stormwater management system(s), inspections shall be conducted periodically for the first few months following construction and then on an annual basis. Site inspection should also be performed following major storm events (i.e., intense storms, thunder storms, cloud bursts, etc.). Items to check for include, but are not limited to the following: (Reference Attachment J for complete inspection checklist - NYSDEC Stormwater Operation, Maintenance and Management Inspection Checklists):

i) Embankment & Structural;

 Check basin embankments, outlets and spillways note cracks, bulges, animal burrows, differential settlement, damage to or fatigue of stormwater pipe, structures and permanent erosion control. Components of the system that require repair or replacement should be addressed immediately following identification. Check pipes, channels, grates, inlet structures and spillways to insure design capacity. Look for objects or accumulations of sediments and debris obstructing flow path.

ii) Vegetation;

 Preclude deep rooted woody plant growth on structure embankment by mowing at least once annually.

 Maintain a dense vigorous growth of grass cover. Spot seed, mulch and fertilize where necessary.

Attachment A:
Notice of Intent, (NOI) and
MS4 Acceptance Form (if applicable)

Construction General Permit (CGP) Electronic Notice of Intent (eNOI) GP-0-25-001

version 1.19

(Submission #: HQQ-QZQ6-NGYJ2, version 1)

Details

Originally Started By	Scott Gibson
Alternate Identifier	Britton Single Family Home Subdivision—Region 7
Submission ID	HQQ-QZQ6-NGYJ2
Status	Draft

Form Input

Eligibility

Disturbance Threshold

1. Will the construction activity involve soil disturbances listed in Part I.A.1 of GP-0-25-001?
Yes

1.a. Will any runoff from the site enter a sewer system classified as a combined sewer?
No

1.b. Is this a remediation project being done under a Department approved work plan (i.e. CERCLA, RCRA, Voluntary Cleanup Agreement, etc.) with a SWPPP which meets the substantive requirements of GP-0-25-001?
No

1.c. Is the construction activity related to a stormwater discharge that does not require a permit as described in 40 CFR 122.3(e), e.g. non-point source agriculture or silviculture activities?
No

Other SPDES Permits

2. Will the discharge from the construction activity meet all conditions listed in Part I.A.2 of GP-0-25-001?
Yes

Threatened and Endangered Species

3. Will the construction activity potentially adversely affect a species that is endangered or threatened per Part I.A.3.?
No

State Historic Preservation Act (SHPA)

4. Is the construction activity designated by the Commissioner of the Office of Parks, Recreation and Historic Preservation (OPRHP), pursuant to 9 NYCRR §§428.12 or 428.13 as exempt from the SHPA review (see Attachment 2 of the Letter of Resolution between NYSDEC and OPRHP, dated January 9, 2015)?
No

4.a. Will the construction activity:

a) occur within an archeologically sensitive area indicated on the sensitivity map, or

b) have the potential to affect a property that is listed or determined to be eligible for listing on the National or State Registers of Historic Places, or

c) include a new permanent building on the construction site within the following distances from a building, structure, or object that is more than 50 years old and OPRHP, a Historic Preservation Commission of a Certified Local Government, or a qualified preservation professional has determined is a historically/archeologically significant building, structure, or object:

- 1-5 acres of disturbance—20 feet
- 5-20 acres of disturbance—50 feet

- 20+ acres of disturbance—100 feet?

No

4.b. Is there documentation at the construction site demonstrating:
a) that the construction activity is not within an archeologically sensitive area indicated on the sensitivity map, and that the construction activity is not immediately adjacent to a property listed or determined to be eligible for listing on the National or State Registers of Historic Places, and
b) that there is no new permanent building to be built on the construction site within the following distances from a building, structure, or object that is more than 50 years old, or if there is such a new permanent building on the construction site within those parameters that OPRHP, a Historic Preservation Commission of a Certified Local Government, or a qualified preservation professional has determined that the building, structure, or object more than 50 years old is not historically/archeologically significant:

- 1-5 acres of disturbance – 20 feet
- 5-20 acres of disturbance – 50 feet
- 20+ acres of disturbance – 100 feet?

Yes

State Environmental Quality Review (SEQR)

5. Is the construction activity subject to SEQR (Part I.A.5.), or the equivalent environmental review from another NYS or federal agency (Part I.A.6.)?
Yes

5.a. Has the owner/operator obtained documentation that the project review pursuant to SEQR, or the equivalent, has been satisfied per Part I.A.5. or I.A.6. of GP-0-25-001?
Yes

Uniform Procedures Act (UPA) Permits

6. Has the owner/operator obtained all necessary UPA permits from NYSDEC, or the equivalent from another NYS or federal agency per Part I.A.7.a. of GP-0-25-001? Select "Yes" if no UPA permits, or the equivalent, are required for this construction activity.
Yes

Steep Slope

7. Is the construction activity within the watershed of surface waters of the State classified as AA or AA-S identified utilizing the Stormwater Interactive Map on NYSDEC's website?
No

Owner/Operator Information

8. Owner/Operator Name
Wayne Britton

9. Owner/Operator Contact Person Information

First and Last Name	Phone	E-mail
Wayne Britton	6072759677	slbritton@att.net

10. Owner/Operator Mailing Address
18 Murfield Drive
Ithaca, NY 14850
USA

11. Is the billing contact different from the Owner/Operator Contact?
No

12. What type of organization is the owner/operator?
Individual

Site Information

13. Project/Site Name
Britton Single Family Home Subdivision

14. Site Address

N. Triphammer Road
Lansing, NY 14882
Tompkins

DEC Region
7

15. Site Latitude & Longitude
42.529920441499684,-76.49162968701054

Project Details

16. This eNOI submission is for:
An entire common plan of development or sale in accordance with Part I.D.1.b.

17. Does the project type fall under Table 1 or Table 2 of Appendix B of GP-0-25-001? If any portion of the construction activity falls under Table 2, regardless of the size of the disturbance, select "Table 2".
Table 2

18. Consistent with Part III.B.1.c.i. of GP-0-25-001, provide a concise overview of the project. Describe existing and proposed conditions, and include any other relevant information.
A 10 single family home subdivision.

Enter the total project site acreage, the acreage to be disturbed, and the future impervious area (acreage) within the disturbed area, rounded to the nearest tenth of an acre.

19. Total Site Area (acres)
9.7

20. Total Area to be Disturbed (acres)
8.8

21. Existing Impervious Area to be Disturbed (acres)
0.0

22. Future Impervious Area Within Disturbed Area (acres)
1.0

Nature of the project:
New Construction

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

---

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

A (%)
0

B (%)
41

C (%)
59

D (%)
0

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

Start Date
11/01/2026

End Date
11/01/2028

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

27. Type of waterbody identified in question 26?
Stream/Creek Off Site

28. Has the surface waterbody in question 26 been identified as a 303(d) segment in Appendix D of GP-0-25-001?
No

29. Is this project located in one of the Watersheds identified in Appendix C of GP-0-25-001?
No

30. Will the project disturb soils within a State regulated wetland or the protected 100 foot adjacent area?
No

31. Does the site runoff enter a separate storm sewer system (including roadside drains, swales, ditches, culverts, etc)?
Yes

31.a. What is the name of the municipality/entity that owns the separate storm sewer system? If the separate sewer system is owned by an MS4 Operator, enter the MS4 Operator name.
Town of Lansing

32. Will future use of this site be an agricultural property as defined by the NYS Agriculture and Markets Law?
No

33. Is this property owned by a state authority, state agency, federal government or local government?
No

Required SWPPP Components

General SWPPP Requirements

34. Has a SWPPP been developed in conformance with the requirements in Part III. of GP-0-25-001?
Yes

35. Does the SWPPP demonstrate consideration of the future physical risks due to climate change pursuant to the CRRA, 6 NYCRR Part 490, and associated guidance per Part III.A.2. of GP-0-25-001?
Yes

36. 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

37. Which version of the NYS Stormwater Management Design Manual was used to develop the SWPPP?
2024

37.a. Has the post-construction stormwater management practice component of the SWPPP been developed in conformance with the NYS Stormwater Management Design Manual?
Yes

SWPPP Preparer

39. The Stormwater Pollution Prevention Plan (SWPPP) was prepared by:
Professional Engineer (P.E.)

40. Name of the person who prepared the SWPPP
Timothy C. Buhl, PE

41. SWPPP Preparer Organization Name
Timothy C. Buhl, PE

42. SWPPP Preparer Contact Information

First and Last Name	Phone	E-mail
Scott Gibson	6072280662	scottgibson198@gmail.com

43. SWPPP Preparer Address
5 Orchard Avenue
Watkins Glen, NY 14891

Download SWPPP Preparer Certification Form

Please take the following steps to prepare and upload your preparer certification form:

1) Click on the link below to download a blank certification form

2) The certified SWPPP preparer should sign this form
3) Upload the completed form
Download SWPPP Preparer Certification Form

44. Please upload the SWPPP Preparer Certification
NONE PROVIDED
Comment
NONE PROVIDED

44.a. Has the SWPPP Preparer Certification Form been signed by the SWPPP preparer in accordance with Part VII.J of GP-0-25-001?
Yes

Erosion & Sediment Control Criteria

45. Has a construction sequence schedule for the planned management practices been prepared?
Yes

Post-Construction Criteria

Site Planning and Soil Restoration

46. Identify all site planning practices that were used to prepare the final site plan/layout for the project.
Preservation of Undisturbed Area
Reduction of Clearing and Grading
Roadway Reduction
Driveway Reduction

47. 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.
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).

Water Quality Criteria

49. Water Quality Sizing Criteria

Total WQv required (acre-feet)	Total RRv provided (acre-feet)	Minimum RRv (acre-feet)	Total WQv provided (acre-feet)	Sum of RRv and WQv provided
0.108	0.04	0.024	0.103	0.143

49.a. Use this space to summarize the specific site limitations and justification for not reducing 100% of WQv required.
Poor soils reduce infiltration prompting the need to send additional runoff to standard practices.

Water Quantity Criteria

51. Does one of the waiver conditions apply to the channel protection for this construction activity?
No

51.b.i. CPv Required (acre-feet)
0.227

51.b.ii. CPv Provided (acre-feet)
0.227

52. Does one of the waiver conditions apply to the Qp and Qf for this construction activity?
No

Overbank Flood Control Criteria (Qp)

52.b.i. Pre-Development (CFS)
14.48

52.b.ii. Post-Development (CFS)
10.92

Total Extreme Flood Control Criteria (Qf)

52.b.iii. Pre-Development (CFS)
50.17

52.b.iv. Post-Development (CFS)
45.91

Operation and Maintenance

53. Has a long-term Operation and Maintenance Plan for the post-construction stormwater management practice(s) been developed?
Yes

53.a. Identify the entity responsible for the long-term Operation and Maintenance.
Wayne Britton until lots are sold. Then individual owners.

Post-Construction SMP Identification

54. Post-Construction RR Techniques and Standard SMPs

RR Techniques and SMPs	Contributing Impervious Area (acres)	Total Contributing Area (acres)
Sheet Flow to Riparian Buffers or Filter Strips (RR-2)	0.34	3.2
Pocket Pond (P-5)	0.65	

55. Alternative SMPs

Type of Alternative SMP	Manufacturer of the Alternative SMP	Name of the Alternative SMP	Contributing Impervious Area (acres)
NONE PROVIDED	*NONE PROVIDED*	*NONE PROVIDED*	*NONE PROVIDED*

Other Permits

56. Identify other permits, existing and new, that are required for this project/facility.
None

57. Is this NOI for a change in owner/operator per Part I.G.?
No

MS4 SWPPP Acceptance

59. Will the construction activities be within the municipal boundary(ies) of Traditional Land Use Control MS4 Operator(s) and discharge to the MS4(s)?
Yes

59.a. Which form is required per Part I.D.2.b.ii.?
MS4 SWPPP Acceptance Form

MS4 SWPPP Acceptance Form Download

Download the MS4 SWPPP Acceptance Form from the link below.
MS4 SWPPP Acceptance Form

60. MS4 Acceptance or No Jurisdiction Form Upload
NONE PROVIDED
Comment
NONE PROVIDED

60.a. Has the form been signed by the principal executive officer or ranking elected official—or duly authorized representative of that person—in accordance with Part VII.J. and submitted along with this NOI?
Yes

Owner/Operator Certification

Owner/Operator Certification Form Download

Download the Owner/Operator Certification Form by clicking the link below.
Owner/Operator Certification Form

61. Upload Owner/Operator Certification Form
NONE PROVIDED
Comment
NONE PROVIDED

61.a. Has the Owner/Operator Certification Form from Appendix J been signed by the owner/operator, or a representative of the owner/operator in accordance with Part VII.J of GP-0-25-001 and uploaded to the eNOI?
Yes

Additional Project Information

62. Enter any additional pertinent project information in the text box below.

NONE PROVIDED

SWPPP Preparer Certification Form

SPDES General Permit for Stormwater Discharges from Construction Activity, GP-0-25-001 (CGP)

(In accordance with CGP Part I.D.2.b., the completed form must be attached to the eNOI and submitted to NYSDEC electronically.)

Project/Site Name:	Britton Single Family Home Subdivision
eNOI Submission ID:	HQQ-QZQ6-NGYJ2
Owner/Operator Name:	Wayne Britton

Certification Statement – SWPPP Preparer

I hereby certify that the Stormwater Pollution Prevention Plan (SWPPP) has been prepared in accordance with the requirements of GP-0-25-001. I certify under penalty of law that the SWPPP and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Timothy	C	Buhl
SWPPP Preparer First Name	MI	SWPPP Preparer Last Name

Signature

Date

Revised: January 2025

MS4 SWPPP Acceptance Form

for construction activities seeking authorization under the

SPDES General Permit for Stormwater Discharges from Construction Activity, GP-0-25-001 (CGP)

(In accordance with CGP Part I.D.2.b., the completed form must be attached to the eNOI and submitted to NYSDEC electronically.)

I. Project Owner/Operator Information	
1. Owner/Operator Name:	Town of Lansing - Town Hall
2. Contact Person:	
3. Street Address:	29 Auburn Road
4. City/State/Zip:	Lansing, NY 14882
II. Project Site Information	
5. Project/Site Name:	Britton Single Family Home Subdivision
6. Street Address:	N. Triphammer Road
7. City/State/Zip:	Lansing, NY 14882
III. Stormwater Pollution Prevention Plan (SWPPP) Review and Acceptance Information	
8. SWPPP Reviewed by:	
9. Title/Position:	
10. Date Final SWPPP Reviewed and Accepted:	
IV. Regulated MS4 Information	
11. Name of MS4 Operator:	
12. MS4 SPDES Permit Identification Number: NYR20A	
13. Street Address:	
14. City/State/Zip:	
15. Telephone Number:	

MS4 SWPPP Acceptance Form - continued

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

I hereby certify that the final Stormwater Pollution Prevention Plan (SWPPP) for the construction project identified in section II. of this form has been reviewed and meets the substantive requirements in the SPDES General Permit for Stormwater Discharges from Construction Activity, GP-0-25-001 (CGP). Note: The MS4 Operator, through the acceptance of the SWPPP, assumes no responsibility for the accuracy and adequacy of the design included in the SWPPP. In addition, review and acceptance of the SWPPP by the MS4 Operator does not relieve the owner/operator or their SWPPP preparer of responsibility or liability for errors or omissions in the plan.

Printed Name[1]:

Title/Position:

Signature:

Date:

VI. Additional Information

[1] Printed name of the principal executive officer or ranking elected official for the MS4 Operator or their duly authorized representative in accordance with CGP Part VII.J.2.

Owner/Operator Certification Form

SPDES General Permit for Stormwater Discharges from Construction Activity, GP-0-25-001 (CGP)

(In accordance with CGP Part I.D.2.b. or Part I.F.2. and 3., the completed form must be attached to the eNOI or the Request to Continue Coverage, and submitted to NYSDEC electronically.

Project/Site Name: Britton Single Family Home Subdivision

eNOI Submission ID: HQQ-QZQ6-NGYJ2

eNOI Submitted by: ☑ **Owner/Operator** ☐ **SWPPP Preparer** ☐ **Other**

Certification Statement - Owner/Operator

I hereby certify that I read, and will comply with, the GP-0-25-001 permit requirements. I understand that authorization to discharge under the permit for the project/site named above is dependent on receipt of a Letter of Authorization (LOA) or a Letter of Continued Coverage (LOCC) from the New York State Department of Environmental Conservation (NYSDEC) in accordance with CGP Part I.D.3.b. or Part I.F.4. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Wayne		Britton
Owner/Operator First Name	MI	Owner/Operator Last Name

_____

Signature

_____

Date

Revised: January 2025

Attachment B:
Notice of Termination, (NOT)

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

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

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

I. Owner or Operator Information

1. Owner/Operator Name:

2. Street Address:

3. City/State/Zip:

4. Contact Person: | 4a.Telephone:

5. Contact Person E-Mail:

II. Project Site Information

5. Project/Site Name:

6. Street Address:

7. City/Zip:

8. County:

III. Reason for Termination

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

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

9c. ☐ Other (Explain on Page 2)

IV. Final Site Information:

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

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

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

_____

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

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

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

- ☐ Post-construction stormwater management practice(s) and any right-of-way(s) needed to maintain practice(s) have been deeded to the municipality.
- ☐ Executed maintenance agreement is in place with the municipality that will maintain the post-construction stormwater management practice(s).
- ☐ For post-construction stormwater management practices that are privately owned, the deed of record has been modified to include a deed covenant that requires operation and maintenance of the practice(s) in accordance with the operation and maintenance plan.
- ☐ For post-construction stormwater management practices that are owned by a public or private institution (e.g. school, college, university), or government agency or authority, policy and procedures are in place that ensures operation and maintenance of the practice(s) in accordance with the operation and maintenance plan.

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

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

V. Additional Information/Explanation:
(Use this section to answer questions 9c. and 10b., if applicable)

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

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

Printed Name:

Title/Position:

Signature:	Date:

NOTICE OF TERMINATION for Storm Water Discharges Authorized under the SPDES General Permit for Construction Activity - continued	
VII. Qualified Inspector Certification - Final Stabilization:	
I hereby certify that all disturbed areas have achieved final stabilization as defined in the current version of the general permit, and that all temporary, structural erosion and sediment control measures have been removed. Furthermore, I understand that certifying false, incorrect or inaccurate information is a violation of the referenced permit and the laws of the State of New York and could subject me to criminal, civil and/or administrative proceedings.	
Printed Name:	
Title/Position:	
Signature:	Date:
VIII. Qualified Inspector Certification - Post-construction Stormwater Management Practice(s):	
I hereby certify that all post-construction stormwater management practices have been constructed in conformance with the SWPPP. Furthermore, I understand that certifying false, incorrect or inaccurate information is a violation of the referenced permit and the laws of the State of New York and could subject me to criminal, civil and/or administrative proceedings.	
Printed Name:	
Title/Position:	
Signature:	Date:
IX. Owner or Operator Certification	
I hereby certify that this document was prepared by me or under my direction or supervision. My determination, based upon my inquiry of the person(s) who managed the construction activity, or those persons directly responsible for gathering the information, is that the information provided in this document is true, accurate and complete. Furthermore, I understand that certifying false, incorrect or inaccurate information is a violation of the referenced permit and the laws of the State of New York and could subject me to criminal, civil and/or administrative proceedings.	
Printed Name:	
Title/Position:	
Signature:	Date:

(NYS DEC Notice of Termination - January 2010)

Attachment C:
Certification Forms

CONTRACTOR and SUBCONTRACTOR CERTIFICATION STATEMENT

for the New York State Department of Environmental Conservation (DEC) State Pollutant Discharge Elimination System Permit for Stormwater Discharges from Construction Activity (GP-0-10-001)

As per *Part III.A.6* on page 13 of *GP-0-10-001* (effective January 29, 2010):

'Prior to the *commencement of construction activity*, the *owner or operator* must identify the contractor(s) and subcontractor(s) that will be responsible for installing, constructing, repairing, replacing, inspecting and maintaining the erosion and sediment control practices included in the SWPPP; and the contractor(s) and subcontractor(s) that will be responsible for constructing the post-construction stormwater management practices included in the SWPPP. The *owner or operator* shall have each of the contractors and sub-contractors identify at least one person from their company that will be responsible for implementation of the SWPPP. This person shall be known as the *trained contractor*. The *owner or operator* shall ensure that at least one *trained contractor* is on site on a daily basis when soil disturbance activities are being performed.'

The *owner or operator* shall have each contractor and subcontractor involved in soil disturbance sign a copy of the following certification statement before they commence <u>any</u> *construction activity*:

_____	**NYR** _____	_____
Name of Construction Site	*DEC Permit ID*	*Municipality (MS4)*

"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.

Responsible Corporate Officer/Partner Signature	Date
Name of above Signatory	Name of Company
Title of above Signatory	Mailing Address
Telephone of Company	City, State and Zip

Identify the specific elements of the SWPPP the contractor or subcontractor is responsible for:

***'TRAINED CONTRACTOR'* FOR THE CERTIFIED CONTRACTOR OR SUBCONTRACTOR**

_____	_____	_____
Name of Trained Employee	*Title of Trained Employee*	*NYSDEC SWT #*

A copy of this signed contractor certification statement must be maintained at the SWPPP on site

Attachment D:
State Historic Preservation Mapping

CRIS Cultural Resource Information System

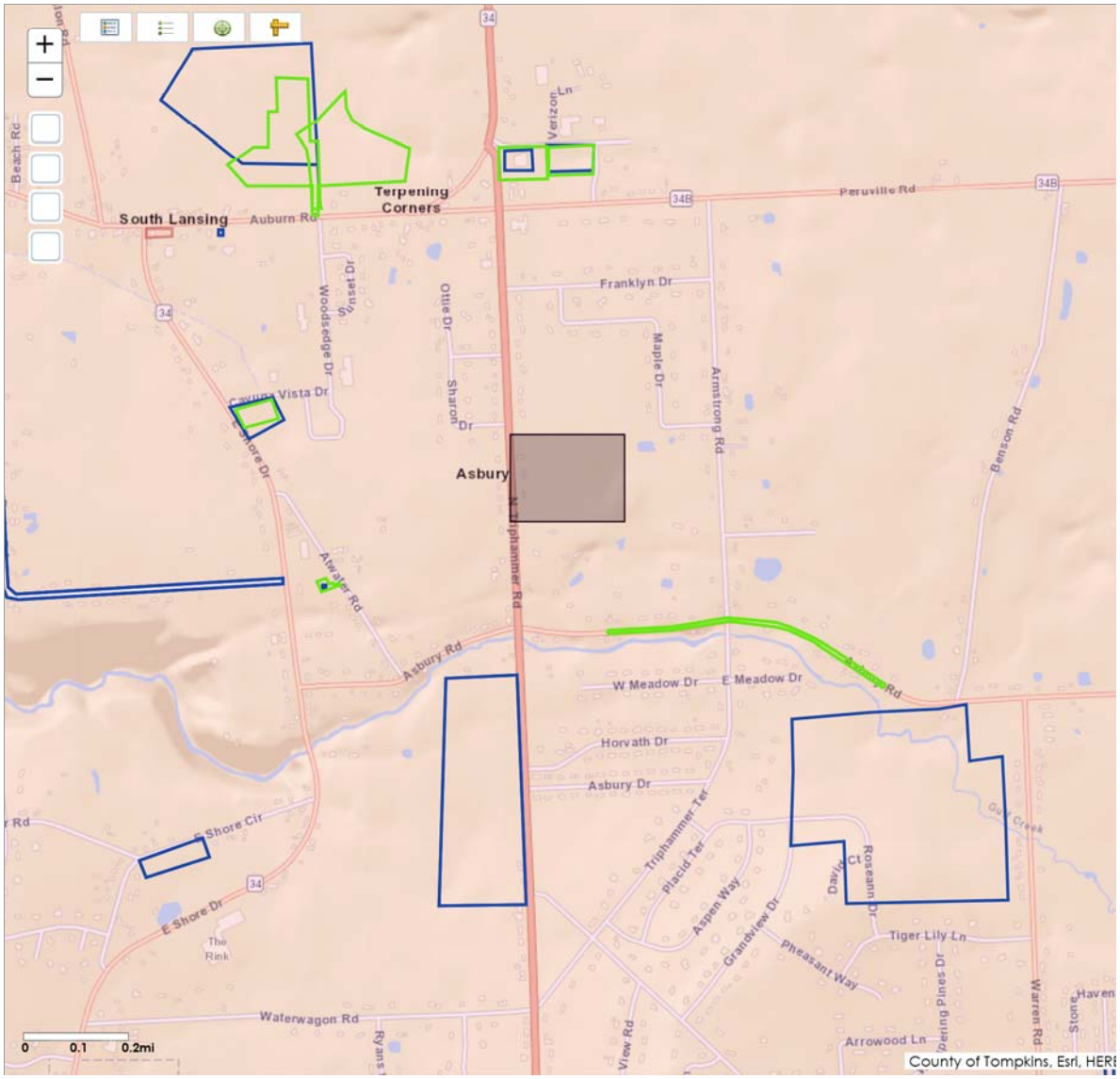
HOME SUBMIT SEARCH COMMUNICATE

Welcome

Criteria Spatial Results

Building Surveys (1 Results Found) Download Results

View	Zoom	Number	Name
☐	☐	19SR00506	WOMEN'S SUFFRAGE IN CENTRAL NEW YORK



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Attachment E:
Environmental Mapping

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Environmental Resource Mapper

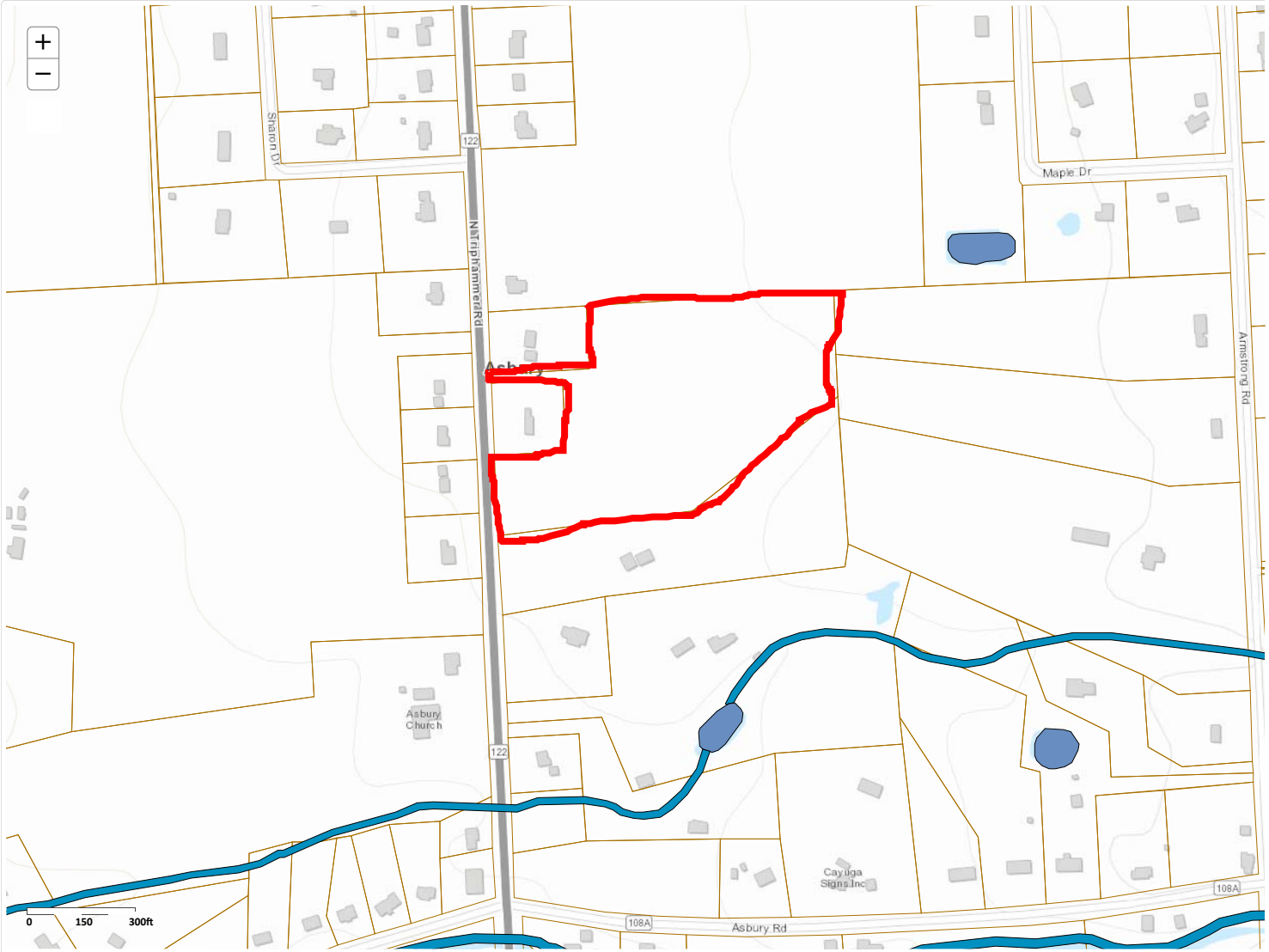
Base Map: Topographical Using this map

- Search
- Tools
- **Layers and Legend**

All Layers

- Unique Geological Features
- Waterbody Classifications for Rivers/Streams
- Waterbody Classifications for Lakes
- State Regulated Freshwater Wetlands
  - State Regulated Wetland Checkzone
- Significant Natural Communities
  - Natural Communities Near This Location
- Rare Plants or Animals

- Other Wetland Layers
- Reference Layers
- Tell Me More...
- Need A Permit?
- Contacts



Attachment F:
Inspection Report (Sample Form)

TOWN OF

Construction Stormwater Inspection Report for SPDES General Permit GP-0- 15-002

Project Name and Location:		Date:	Weather:
		Permit # (if any): **NYR10**	
Municipality:	County:	Entry Time:	Exit Time:
Name of SPDES Permittee:	Contacted: Yes ☐ No ☐	Inspection Type:	
Phone Number:		☐ Compliance ☐ Referral ☐ Complaint ☐ NOT	
On-site Representative(s) and Company(s):			
Phone Number(s):			

SPDES Authority

	Yes	No	N/A	
1.	☐	☐	☐	Does the project have permit coverage?
2.	☐	☐	☐	Is a copy of the NOI and Acknowledgment Letter available on site and accessible for viewing?
3.	☐	☐	☐	Is a copy of the MS4 SWPPP Acceptance Form available on site and accessible for viewing?
4.	☐	☐	☐	Is an up-to-date copy of the signed SWPPP retained at the construction site?
5.	☐	☐	☐	Is a copy of the SPDES General Permit retained at the construction site?
6.	☐	☐	☐	Does the NOI accurately report the number of acres to be disturbed?

SWPPP Content

	Yes	No	N/A	
7.	☐	☐	☐	Does the SWPPP describe and identify the erosion and sediment control measures to be employed?
8.	☐	☐	☐	Does the SWPPP provide an inspection schedule and maintenance requirements for the E&SC measures?
9.	☐	☐	☐	Does the SWPPP describe and identify the stormwater management practices to be employed?
10.	☐	☐	☐	Does the SWPPP identify the contractor(s) and subcontractor(s) responsible for each measure?
11.	☐	☐	☐	Does the SWPPP identify at least one trained individual from each contractor(s) and subcontractor(s) companies
12.	☐	☐	☐	Does the SWPPP include all the necessary Contractor Certification Statements and signatures?
13.	☐	☐	☐	Is the SWPPP signed by the permittee?
14.	☐	☐	☐	Is the SWPPP prepared by a qualified professional (if post-construction stormwater management required)?
15.	☐	☐	☐	Do the SMPs conform to the Enhanced Phosphorus Removal Standards (projects in TMDL watersheds)?

Recordkeeping

	Yes	No	N/A	
16.	☐	☐	☐	Are self-inspections performed as required by the permit (weekly, or twice weekly for >5 acres disturbed)?
17.	☐	☐	☐	Are the self-inspections performed by and signed by a qualified inspector and retained on site?
18.	☐	☐	☐	Do the qualified inspector's reports include the minimum reporting requirements?
19.	☐	☐	☐	Do inspection reports identify corrective measures that have not been implemented or are recurring?

Visual Observations

	Yes	No	N/A	
20.	☐	☐	☐	Are all erosion and sediment control measures installed properly?
21.	☐	☐	☐	Are all erosion and sediment control measures being maintained properly?
22.	☐	☐	☐	Was written authorization issued for any disturbance greater than 5 acres?
23.	☐	☐	☐	Have stabilization measures been implemented in inactive areas per Permit (>5 acres) and E&SC Standards?
24.	☐	☐	☐	Are post-construction stormwater management practices constructed/installed correctly?
25.	☐	☐	☐	Has final site stabilization been achieved and temporary E&SC measures removed prior to NOT submittal?
26.	☐	☐	☐	Was there a discharge from the site on the day of inspection?
27.	☐	☐	☐	Is there evidence that a discharge caused or contributed to a violation of water quality standards?

Water Quality Observations

Describe the discharge(s): location, source(s), impact on receiving water(s), etc.

Describe the quality of the receiving water(s) both upstream and downstream of the discharge

Describe any other water quality standards or permit violations

Additional Comments

☐ Photographs attached

Overall Inspection Rating: ☐ Satisfactory ☐ Marginal ☐ Unsatisfactory	
Name/Agency of Lead Inspector:	**Signature of Lead Inspector:**
Names/Agencies of Other Inspectors:	

Attachment G:
Record of Stabilization and Construction Activity Dates
(Sample Form)

SITE STABILIZATION
and
CONSTRUCTION ACTIVITY DATES

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

MAJOR GRADING ACTIVITIES:

Description of Activity: _____
Begin (date): _____ Site Contractor: _____
Location: _____
End (date): _____

Description of Activity: _____
Begin (date): _____ Site Contractor: _____
Location: _____
End (date): _____

Description of Activity: _____
Begin (date): _____ Site Contractor: _____
Location: _____
End (date): _____

Description of Activity: _____
Begin (date): _____ Site Contractor: _____
Location: _____
End (date): _____

Description of Activity: _____
Begin (date): _____ Site Contractor: _____
Location: _____
End (date): _____

Description of Activity: _____
Begin (date): _____ Site Contractor: _____
Location: _____
End (date): _____

Description of Activity: _____
Begin (date): _____ Site Contractor: _____
Location: _____
End (date): _____

Attachment H:
Vegetative and Structural Measures For Erosion and Sediment Control

(NYS Standards & Specifications for Erosion & Sediment Control)

(Reference)

STANDARD AND SPECIFICATIONS FOR MULCHING

Definition and Scope

Applying coarse plant residue or chips, or other suitable materials, to cover the soil surface to provide initial erosion control while a seeding or shrub planting is establishing. Mulch will conserve moisture and modify the surface soil temperature and reduce fluctuation of both. Mulch will prevent soil surface crusting and aid in weed control. Mulch can also be used alone for temporary stabilization in non-growing months. Use of stone as a mulch could be more permanent and should not be limited to non-growing months.

Conditions Where Practice Applies

On soils subject to erosion and on new seedings and shrub plantings. Mulch is useful on soils with low infiltration rates by retarding runoff.

Criteria

Site preparation prior to mulching requires the installation of necessary erosion control or water management practices and drainage systems.

Slope, grade and smooth the site to fit needs of selected mulch products.

Remove all undesirable stones and other debris to meet the needs of the anticipated land use and maintenance required.

Apply mulch after soil amendments and planting is accomplished or simultaneously if hydroseeding is used.

Select appropriate mulch material and application rate or material needs. Hay mulch shall not be used in wetlands or in areas of permanent seeding. Clean straw mulch is preferred alternative in wetland application. Determine local availability.

Select appropriate mulch anchoring material.

NOTE: The best combination for grass/legume establishment is straw (cereal grain) mulch applied at 2 ton/ acre (90 lbs./1000sq.ft.) and anchored with wood fiber mulch (hydromulch) at 500 – 750 lbs./acre (11 – 17 lbs./1000 sq. ft.). The wood fiber mulch must be applied through a hydroseeder immediately after mulching.

Table 4.2
Guide to Mulch Materials, Rates, and Uses

Mulch Material	Quality Standards	per 1000 Sq. Ft.	per Acre	Depth of Application	Remarks
Wood chips or shavings	Air-dried. Free of objectionable coarse material	500-900 lbs.	10-20 tons	2-7”	Used primarily around shrub and tree plantings and recreation trails to inhibit weed competition. Resistant to wind blowing. Decomposes slowly.
Wood fiber cellulose (partly digested wood fibers)	Made from natural wood usually with green dye and dispersing agent	50 lbs.	2,000 lbs.	—	Apply with hydromulcher. No tie down required. Less erosion control provided than 2 tons of hay or straw.
Gravel, Crushed Stone or Slag	Washed; Size 2B or 3A—1 1/2”	9 cu. yds.	405 cu. yds.	3”	Excellent mulch for short slopes and around plants and ornamentals. Use 2B where subject to traffic. (Approximately 2,000 lbs./cu. yd.). Frequently used over filter fabric for better weed control.
Hay or Straw	Air-dried; free of undesirable seeds & coarse materials	90-100 lbs. 2-3 bales	2 tons (100-120 bales)	cover about 90% surface	Use small grain straw where mulch is maintained for more than three months. Subject to wind blowing unless anchored. Most commonly used mulching material. Provides the best micro-environment for germinating seeds.
Jute twisted yarn	Undyed, unbleached plain weave. Warp 78 ends/yd., Weft 41 ends/yd. 60-90 lbs./roll	48” x 50 yds. or 48” x 75 yds.	—	—	Use without additional mulch. Tie down as per manufacturers specifications. Good for center line of concentrated water flow.
Excelsior wood fiber mats	Interlocking web of excelsior fibers with photodegradable plastic netting	4’ x 112.5’ or 8’ x 112.5’.	—	—	Use without additional mulch. Excellent for seeding establishment. Anchor as per manufacturers specifications. Approximately 72 lbs./roll for excelsior with plastic on both sides. Use two sided plastic for centerline of waterways.
Straw or coconut fiber, or combination	Photodegradable plastic net on one or two sides	Most are 6.5 ft. x 3.5 ft.	81 rolls	—	Designed to tolerate higher velocity water flow, centerlines of waterways, 60 sq. yds. per roll.

Table 4.3
Mulch Anchoring Guide

Anchoring Method or Material	Kind of Mulch to be Anchored	How to Apply
1. Peg and Twine	Hay or straw	After mulching, divide areas into blocks approximately 1 sq. yd. in size. Drive 4-6 pegs per block to within 2" to 3" of soil surface. Secure mulch to surface by stretching twine between pegs in criss-cross pattern on each block. Secure twine around each peg with 2 or more tight turns. Drive pegs flush with soil. Driving stakes into ground tightens the twine.
2. Mulch netting	Hay or straw	Staple the light-weight paper, jute, wood fiber, or plastic nettings to soil surface according to manufacturer's recommendations. Should be biodegradable. Most products are not suitable for foot traffic.
3. Wood cellulose fiber	Hay or straw	Apply with hydroseeder immediately after mulching. Use 500 lbs. wood fiber per acre. Some products contain an adhesive material ("tackifier"), possibly advantageous.
4. Mulch anchoring tool	Hay or straw	Apply mulch and pull a mulch anchoring tool (blunt, straight discs) over mulch as near to the contour as possible. Mulch material should be "tucked" into soil surface about 3".
5. Tackifier	Hay or straw	Mix and apply polymeric and gum tackifiers according to manufacturer's instructions. Avoid application during rain. A 24-hour curing period and a soil temperature higher than 45^0 Fahrenheit are required.

STANDARD AND SPECIFICATIONS FOR PERMANENT CONSTRUCTION AREA PLANTING

Definition & Scope

Establishing **permanent** grasses with other forbs and/or shrubs to provide a minimum 80% perennial vegetative cover on areas disturbed by construction and critical areas to reduce erosion and sediment transport. Critical areas may include but are not limited to steep excavated cut or fill slopes as well as eroding or denuded natural slopes and areas subject to erosion.

Conditions Where Practice Applies

This practice applies to all disturbed areas void of, or having insufficient, cover to prevent erosion and sediment transport. See additional standards for special situations such as sand dunes and sand and gravel pits.

Criteria

All water control measures will be installed as needed prior to final grading and seedbed preparation. Any severely compacted sections will require chiseling or disking to provide an adequate rooting zone, to a minimum depth of 12", see Soil Restoration Standard. The seedbed must be prepared to allow good soil to seed contact, with the soil not too soft and not too compact. Adequate soil moisture must be present to accomplish this. If surface is powder dry or sticky wet, postpone operations until moisture changes to a favorable condition. If seeding is accomplished within 24 hours of final grading, additional scarification is generally not needed, especially on ditch or stream banks. Remove all stones and other debris from the surface that are greater than 4 inches, or that will interfere with future mowing or maintenance.

Soil amendments should be incorporated into the upper 2 inches of soil when feasible. **The soil should be tested to determine the amounts of amendments needed.** Apply ground agricultural limestone to attain a pH of 6.0 in the upper 2 inches of soil. If soil must be fertilized before results of a soil test can be obtained to determine fertilizer needs, apply commercial fertilizer at 600 lbs. per acre of 5-5 -10 or equivalent. If manure is used, apply a quantity to meet the nutrients of the above fertilizer. This requires an appropriate manure analysis prior to applying to the site. Do not use manure on sites to be planted with birdsfoot trefoil or in the path of concentrated water flow.

Seed mixtures may vary depending on location within the state and time of seeding. Generally, warm season grasses should only be seeded during early spring, April to May. These grasses are primarily used for vegetating excessively drained sands and gravels. See Standard and Specification for Sand and Gravel Mine Reclamation. Other grasses may be seeded any time of the year when the soil is not frozen and is workable. When legumes such as birdsfoot trefoil are included, spring seeding is preferred. See Table 4.4, "Permanent Construction Area Planting Mixture Recommendations" for additional seed mixtures.

General Seed Mix:	**Variety**	**lbs./ acre**	**lbs/1000 sq. ft.**
Red Clover[1] OR	Acclaim, Rally, Red Head II, Renegade	8[2]	0.20
Common white clover[1]	Common	8	0.20
PLUS			
Creeping Red Fescue	Common	20	0.45
PLUS			
Smooth Bromegrass OR	Common	2	0.05
Ryegrass (perennial)	Pennfine/Linn	5	0.10

[1] add inoculant immediately prior to seeding
[2] Mix 4 lbs each of Empire and Pardee OR 4 lbs of Birdsfoot and 4 lbs white clover per acre. All seeding rates are given for Pure Live Seed (PLS)

Pure Live Seed, or (PLS) refers to the amount of live seed in a lot of bulk seed. Information on the seed bag label includes the type of seed, supplier, test date, source of seed, purity, and germination. Purity is the percentage of pure seed. Germination is the percentage of pure seed that will produce normal plants when planted under favorable conditions.

To compute Pure Live Seed multiply the "germination percent" times the "purity" and divide that by 100 to get Pure Live Seed.

$$\text{Pure Live Seed (PLS)} = \frac{\%\,\text{Germination} \times \%\,\text{Purity}}{100}$$

For example, the PLS for a lot of Kentucky Blue grass with 75% purity and 96% germination would be calculated as follows:

$$\frac{(96) \times (75)}{100} = 72\%\ \text{Pure Live Seed}$$

For 10lbs of PLS from this lot =

$$\frac{10}{0.72} = 13.9\ \text{lbs}$$

Therefore, 13.9 lbs of seed is the actual weight needed to meet 10lbs PSL from this specific seed lot.

Time of Seeding: The optimum timing for the general seed mixture is early spring. Permanent seedings may be made any time of year if properly mulched and adequate moisture is provided. Late June through early August is not a good time to seed, but may facilitate covering the land without additional disturbance if construction is completed. Portions of the seeding may fail due to drought and heat. These areas may need reseeding in late summer/fall or the following spring.

Method of seeding: Broadcasting, drilling, cultipack type seeding, or hydroseeding are acceptable methods. Proper soil to seed contact is key to successful seedings.

Mulching: Mulching is essential to obtain a uniform stand of seeded plants. Optimum benefits of mulching new seedings are obtained with the use of small grain straw applied at a rate of 2 tons per acre, and anchored with a netting or tackifier. See the Standard and Specifications for Mulching for choices and requirements.

Irrigation: Watering may be essential to establish a new seeding when a drought condition occurs shortly after a new seeding emerges. Irrigation is a specialized practice and care must be taken not to exceed the application rate for the soil or subsoil. When disconnecting irrigation pipe, be sure pipes are drained in a safe manor, not creating an erosion concern.

80% Perennial Vegetative Cover

50% Perennial Vegetative Cover

Table 4.4
Permanent Construction Area Planting Mixture Recommendations

Seed Mixture	Variety	Rate in lbs./acre (PLS)	Rate in lbs./ 1, 000 ft^2
Mix #1			
Creeping red fescue	Ensylva, Pennlawn, Boreal	10	.25
Perennial ryegrass	Pennfine, Linn	10	.25
*This mix is used extensively for shaded areas.			
Mix #2			
Switchgrass	Shelter, Pathfinder, Trailblazer, or Blackwell	20	.50
*This rate is in pure live seed, this would be an excellent choice along the upland edge of a wetland to filter runoff and provide wildlife benefits. In areas where erosion may be a problem, a companion seeding of sand lovegrass should be added to provide quick cover at a rate of 2 lbs. per acre (0.05 lbs. per 1000 sq. ft.).			
Mix #3			
Switchgrass	Shelter, Pathfinder, Trailblazer, or Blackwell	4	.10
Big bluestem	Niagara	4	.10
Little bluestem	Aldous or Camper	2	.05
Indiangrass	Rumsey	4	.10
Coastal panicgrass	Atlantic	2	.05
Sideoats grama	El Reno or Trailway	2	.05
Wildflower mix		.50	.01
*This mix has been successful on sand and gravel plantings. It is very difficult to seed without a warm season grass seeder such as a Truax seed drill. Broadcasting this seed is very difficult due to the fluffy nature of some of the seed, such as bluestems and indiangrass.			
Mix #4			
Switchgrass	Shelter, Pathfinder, Trailblazer, or Blackwell	10	.25
Coastal panicgrass	Atlantic	10	.25
*This mix is salt tolerant, a good choice along the upland edge of tidal areas and roadsides.			
Mix #5			
Saltmeadow cordgrass (Spartina patens)—This grass is used for tidal shoreline protection and tidal marsh restoration. It is planted by vegetative stem divisions. 'Cape' American beachgrass can be planted for sand dune stabilization above the saltmeadow cordgrass zone.			
Mix #6			
Creeping red fescue	Ensylva, Pennlawn, Boreal	20	.45
Chewings Fescue	Common	20	.45
Perennial ryegrass	Pennfine, Linn	5	.10
Red Clover	Common	10	.45
*General purpose erosion control mix. Not to be used for a turf planting or play grounds.			

STANDARD AND SPECIFICATIONS FOR TEMPORARY CONSTRUCTION AREA SEEDING

Definition & Scope

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.

Conditions Where Practice Applies

Temporary seedings may be necessary on construction sites to protect an area, or section, where final grading is complete, when preparing for winter work shutdown, or to provide cover when permanent seedings are likely to fail due to mid-summer heat and drought. The intent is to provide temporary protective cover during temporary shutdown of construction and/or while waiting for optimal planting time.

Criteria

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 usually removed. Seedbed must be seeded within 24 hours of disturbance or scarification of the soil surface will be necessary prior to seeding.

Fertilizer or lime are not typically used for temporary seedings.

IF: Spring or summer or early fall, then seed the area with ryegrass (annual or perennial) at 30 lbs. per acre (Approximately 0.7 lb./1000 sq. ft. or use 1 lb./1000 sq. ft.).

IF: Late fall or early winter, then seed Certified 'Aroostook' winter rye (cereal rye) at 100 lbs. per acre (2.5 lbs./1000 sq. ft.).

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.

Mulch the area with hay or straw at 2 tons/acre (approx. 90 lbs./1000 sq. ft. or 2 bales). Quality of hay or straw mulch allowable 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 according to manufacturers' specification. 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.

STANDARD AND SPECIFICATIONS FOR TOPSOILING

Definition & Scope

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.

Conditions Where Practice Applies

Topsoil is applied to subsoils that are droughty (low available moisture for plants), stony, slowly permeable, salty or extremely acid. It is also used to backfill around shrub and tree transplants. This standard does not apply to wetland soils.

Design Criteria

1. Preserve existing topsoil in place where possible, thereby reducing the need for added topsoil.

2. Conserve by stockpiling topsoil and friable fine textured subsoils that must be stripped from the excavated site and applied after final grading where vegetation will be established. Topsoil stockpiles must be stabilized. Stockpile surfaces can be stabilized by vegetation, geotextile or plastic covers. This can be aided by orientating the stockpile lengthwise into prevailing winds.

3. Refer to USDA Natural Resource Conservation Service soil surveys or soil interpretation record sheets for further soil texture information for selecting appropriate design topsoil depths.

Site Preparation

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

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

3. 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.

4. Remove refuse, woody plant parts, stones over 3 inches in diameter, and other litter.

Topsoil Materials

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

2. Topsoil shall have not less than 20 percent fine textured material (passing the NO. 200 sieve) and not more than 15 percent clay.

3. Topsoil treated with soil sterilants or herbicides shall be so identified to the purchaser.

4. Topsoil shall be relatively free of stones over 1 1/2 inches in diameter, trash, noxious weeds such as nut sedge and quackgrass, and will have less than 10 percent gravel.

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

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

Application and Grading

1. 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.

2. Topsoil placed and graded on slopes steeper than 5 percent shall be promptly fertilized, seeded, mulched, and stabilized by “tracking” with suitable equipment.

3. Apply topsoil in the amounts shown in Table 4.7 below:

Table 4.7 - Topsoil Application Depth		
Site Conditions	**Intended Use**	**Minimum Topsoil Depth**
1. Deep sand or loamy sand	Mowed lawn	6 in.
	Tall legumes, unmowed	2 in.
	Tall grass, unmowed	1 in.
2. Deep sandy loam	Mowed lawn	5 in.
	Tall legumes, unmowed	2 in.
	Tall grass, unmowed	none
3. Six inches or more: silt loam, clay loam, loam, or silt	Mowed lawn	4 in.
	Tall legumes, unmowed	1 in.
	Tall grass, unmowed	1 in.

STRUCTURAL MEASURES FOR EROSION AND SEDIMENT CONTROL

General

Uncontrolled runoff and excess erosion often occurs in urban developments, particularly during the construction stage. This erosion forms rills and gullies; washes out roads; scours cut and fill areas; fills road ditches, storm drains, and streams; and does other damage that is costly to the developers and damaging to land and water users below. Careful inclusion of proven conservation practices in the development plan can prevent or alleviate much of this damage and should be a part of every development plan.

These practices will usually be a combination of vegetative and structural measures. They may be temporary and serve only during the construction stage or they may be permanent in nature and become a part of the completed development. Permanent structural practices should be installed as early as possible in the construction stage. This section deals with the more common structural measures that may be used. Adequate designs, plans, and specification should be prepared for the measures to be used. A number of measures and specifications are included throughout this section. The designer shall determine those elements to be installed to control erosion (Section 2) and follow the criteria included in these standards and specifications.

Introduction

Structural erosion and sediment control practices have been classified as either temporary or permanent, according to how they are used. Temporary structural practices are used during construction to prevent offsite sedimentation. The length of time that temporary practices are functional varies from project to project, since the sediment control strategy may change as construction activity progresses. Permanent structural practices are used to convey surface water runoff to a safe outlet. Permanent structural practices will remain in place and continue to function after the completion of construction.

Regardless of whether the practices are temporary or permanent, runoff control measures should be the first items constructed when grading begins, and be completely functional before downslope land disturbance takes place. Earthen structures such as diversions, dikes, and swales should be stabilized before being considered functional. Only after the runoff control structures are operational and sediment control measures are in place, should clearing and grading on the rest of the construction site begin.

While clearing and grading the site, it is important to minimize the amount of sediment that is produced. In general, it is advantageous to clear only as much area as is necessary to accommodate construction needs. Grade and stabilize large sites in stages whenever possible. Limiting the amount of disturbed area limits the amount of sediment that is generated, thus decreasing the amount of maintenance required on sediment control measures.

Sediment generated during the construction of cut and fill slopes can also be minimized through design and grading techniques. When designing either a cut or fill slope, factors to consider include slope length and steepness, soil type, and upslope drainage area. In general, it is important to leave soil surfaces on disturbed slopes in a roughened condition and to construct a water diversion practice at the top of slopes. Rough soil surfaces do not erode as readily as smooth soil surfaces.

Although design and grading techniques can reduce soil erosion, they cannot eliminate it entirely. Therefore, practices must be installed to prevent offsite sedimentation.

Even though the specific conditions of each site determine what measures are necessary to control erosion and sedimentation, some general principles apply to the selection and placement of sediment control measures.

1. Prevent clean water from becoming turbid, by diverting runoff from upslope areas away from disturbed areas. Earth dikes, temporary swales, perimeter dike/swales, or diversions that outlet in stable areas can be used in this capacity.

2. Remove sediment from turbid water before the water leaves the site. The method of sediment removal depends upon how the water drains from the site. Concentrated flow must be diverted to a trapping device so that suspended sediment can be deposited. Dikes or swales that outlet into traps or basins can accomplish this. A storm drain system may be used to convey concentrated sediment laden water only if the system empties into a trap or basin. Otherwise, all storm drain inlets must be protected so that sediment laden water cannot enter the drainage system before being treated to remove the sediment.

3. Surface runoff draining in sheet flow must be controlled and treated before the water leaves the site. Straw bale dikes, silt fences, or vegetative buffer strips can be used to treat sheet flow.

All practices designed and implemented must be properly maintained in order to remain functional. Sediment accumulated in basins and traps must be removed and disposed of in a manner that stabilizes them on the construction site.

Other factors should be observed during construction in order to make erosion and sediment control measures more effective in pollution control.

These are:

1. Sprinkle or apply dust suppressors. Keep dust down to a tolerable limit on construction sites and haul roads.

2. Use temporary bridges or culverts where fording of streams is objectionable. Avoid borrow areas where pollution from this operation is inevitable.

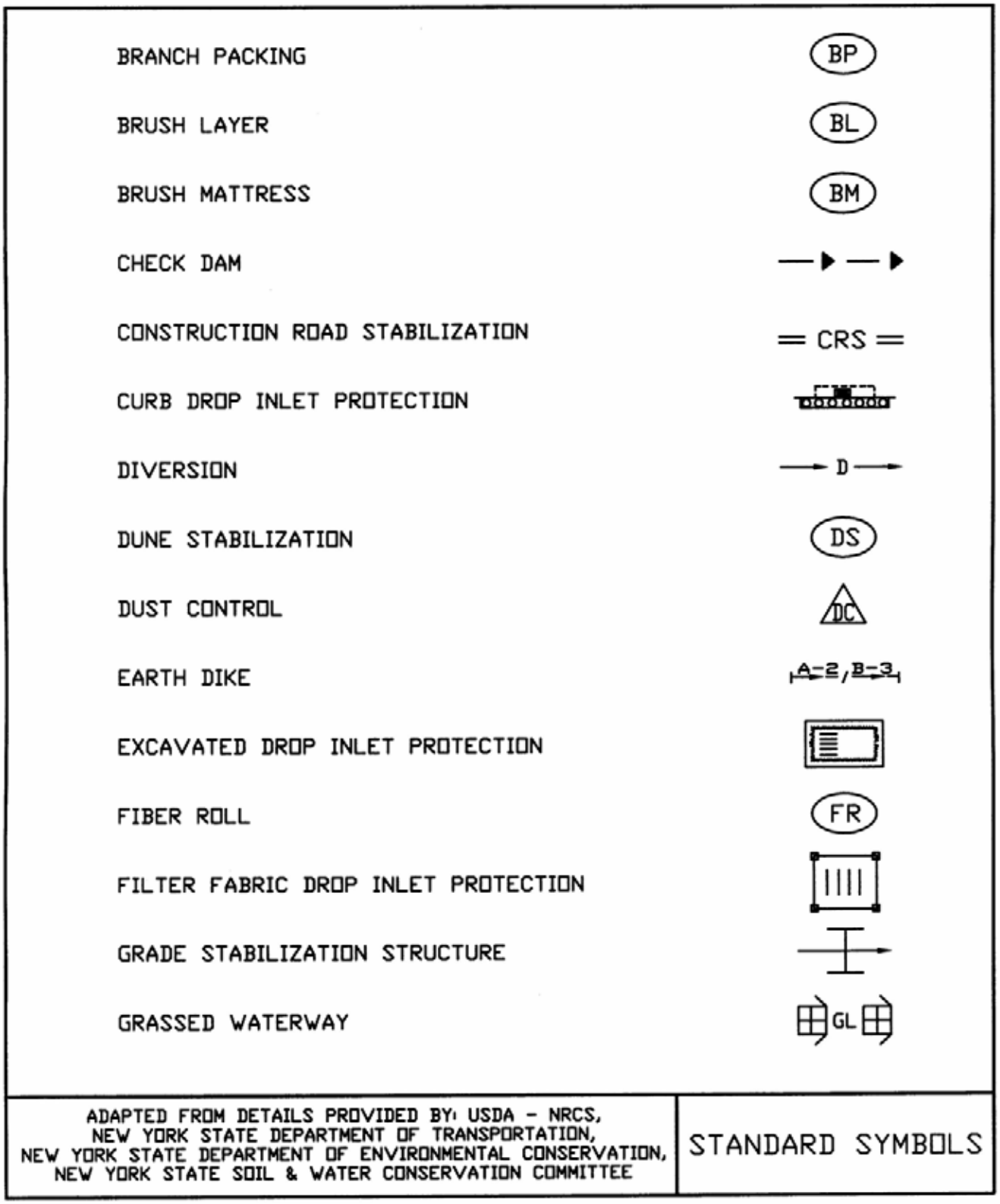
3. Protect streams from chemicals, fuel, lubricants, sewage, or other pollutants.

4. Avoid disposal of fill in floodplains or drainage ways. This reduces the capacity of these areas to pass flood flows.

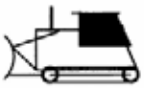
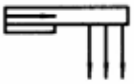
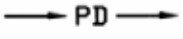
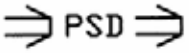
5. Do not locate sanitary facilities over, or adjacent to, waterways, wells, or springs.

6. Locate storage yards and stockpiles where erosion and sediment hazards are slight. Where this is not possible, apply necessary erosion control practices.

STANDARD SYMBOLS

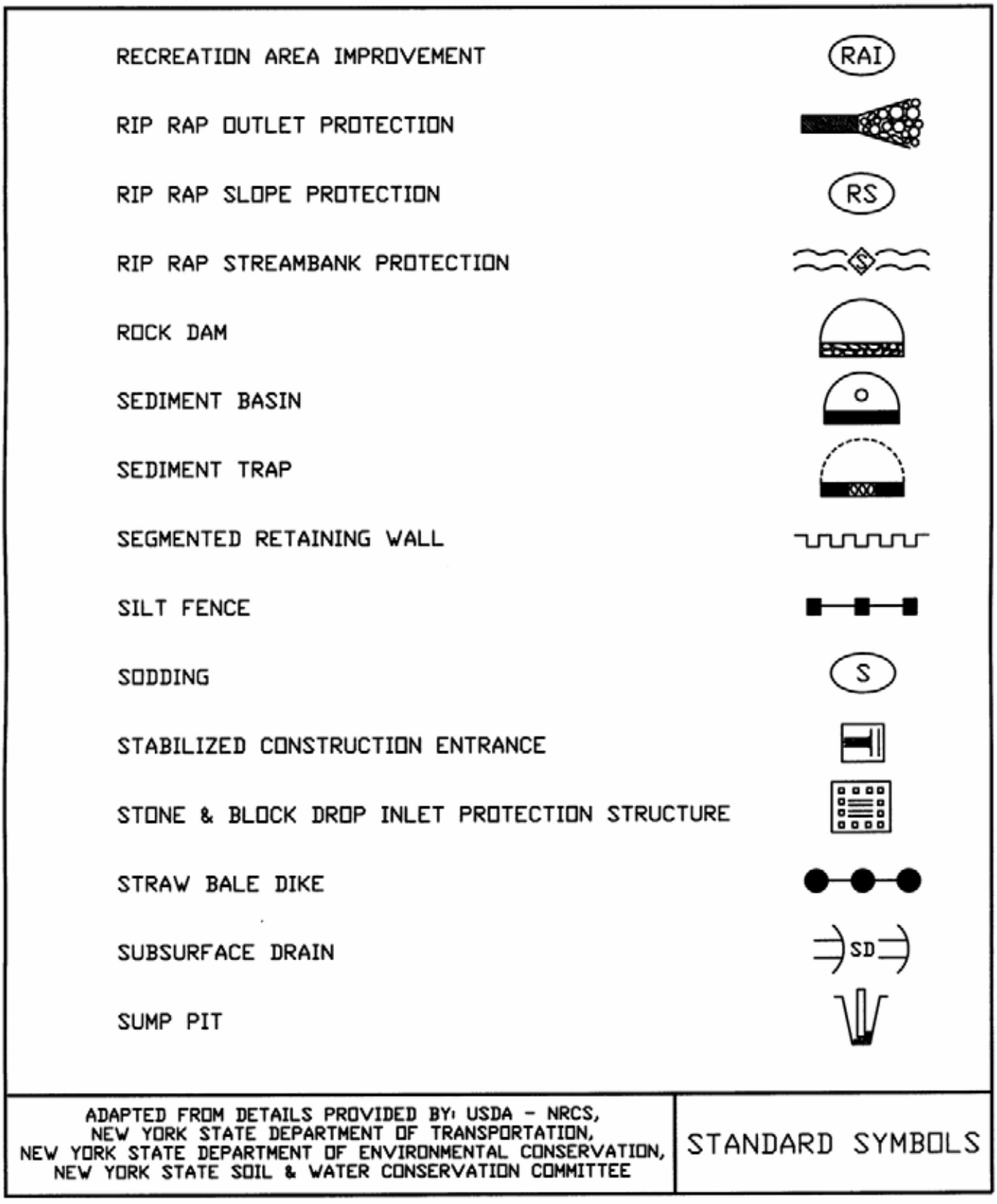


STANDARD SYMBOLS (cont'd)

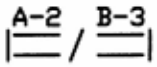
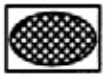
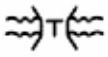
LAND GRADING	
LEVEL SPREADER	
LINED WATERWAY	
LIVE CRIBWALL	
LIVE CUTTINGS/LIVE STAKES PLANTING	
LIVE FASCINE	
MULCHING	
OPTIONAL SEDIMENT TRAP DEWATERING DEVICE	
PAVED FLUME	
PERIMETER DIKE OR SWALE	
PERMANENT SEEDING	
PIPE OUTLET SEDIMENT TRAP	
PIPE SLOPE DRAIN FLEXIBLE	
PORTABLE SEDIMENT TANK	
PROTECTING VEGETATION	

ADAPTED FROM DETAILS PROVIDED BY: USDA – NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE	STANDARD SYMBOLS

STANDARD SYMBOLS (cont'd)



STANDARD SYMBOLS (cont'd)

SURFACE ROUGHENING	
TEMPORARY SEEDING	
TEMPORARY SWALE	
TOPSOILING	
TREE REVETMENT	
TURBIDITY CURTAIN	
VEGETATED ROCK GABIONS	
WATER BAR	
WATERWAY CROSSING	

ADAPTED FROM DETAILS PROVIDED BY: USDA – NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE	STANDARD SYMBOLS

Attachment I:
NYSDEC Stormwater Construction Checklists (Sample Form)

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:

Open Channel System Construction Inspection Checklist

Project:
Location:
Site Status:

Date:

Time:

Inspector:

CONSTRUCTION SEQUENCE	SATISFACTORY / UNSATISFACTORY	COMMENTS
1. Pre-Construction		
Pre-construction meeting		
Runoff diverted		
Facility location staked out		
2. Excavation		
Size and location		
Side slope stable		
Soil permeability		
Groundwater / bedrock		
Lateral slopes completely level		
Longitudinal slopes within design range		
Excavation does not compact subsoils		
3. Check dams		
Dimensions		
Spacing		
Materials		

CONSTRUCTION SEQUENCE	SATISFACTORY / UNSATISFACTORY	COMMENTS
4. Structural Components		
Underdrain installed correctly		
Inflow installed correctly		
Pretreatment devices installed		
5. Vegetation		
Complies with planting specifications		
Topsoil adequate in composition and placement		
Adequate erosion control measures in place		
6. Final inspection		
Dimensions		
Check dams		
Proper outlet		
Effective stand of vegetation and stabilization		
Contributing watershed stabilized before flow is routed to the factility		

Comments:

Actions to be Taken:

Attachment J:
NYSDEC
Operation & Maintenance
Checklist
(Sample Form)

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:

Open Channel Operation, Maintenance, and Management Inspection Checklist

Project:
Location:
Site Status:

Date:

Time:

Inspector:

MAINTENANCE ITEM	SATISFACTORY/ UNSATISFACTORY	COMMENTS
1. Debris Cleanout (Monthly)		
Contributing areas clean of debris		
2. Check Dams or Energy Dissipators (Annual, After Major Storms)		
No evidence of flow going around structures		
No evidence of erosion at downstream toe		
Soil permeability		
Groundwater / bedrock		
3. Vegetation (Monthly)		
Mowing done when needed		
Minimum mowing depth not exceeded		
No evidence of erosion		
Fertilized per specification		
4. Dewatering (Monthly)		
Dewaters between storms		

MAINTENANCE ITEM	SATISFACTORY/ UNSATISFACTORY	COMMENTS
5. Sediment deposition (Annual)		
Clean of sediment		
6. Outlet/Overflow Spillway (Annual)		
Good condition, no need for repairs		
No evidence of erosion		

Comments:

Actions to be Taken:

Attachment K:
Stormwater Management
Summary

INDEX

Stormwater Management Summary

STORMWATER MANAGEMENT SUMMARY

SITE DATA - GENERAL

Site Notes: This summary is for the proposed construction of a ten (10) unit residential subdivision consisting of 1100-SF homes, a maintenance building, associated driveways, an access road, and landscaping on 422,532-SF, (9.70-AC) of land in the Town of Lansing, Tompkins County, NY.

The project will disturb approximately 381,516-SF (8.75-AC) of former wooded and light underbrush area, introducing roughly 43,583-SF (1.00-AC) of new impervious cover, increasing the site total by 11%.

Subcatchment Evaluation: There is one pre-developed (existing) watershed subcatchment for this site totaling 950,525-SF (21.82-AC). To the north, a runoff analysis was prepared for two separate off-site drainage areas OSC-1 (14.81-AC) and OSC-3 (1.63-AC) for pre and post developed impacts on culvert design at the proposed driveway apron in the Triphammer road swale.

Runoff generally moves in a northeast to southwest direction over moderate slopes of 2-8%. Flow from these subcatchments is collected along Triphammer Road and runs south toward Design Point Existing - 1 (DPE-1) as shown on hydrologic and hydraulic worksheet ST-10. Overall, the entire watershed is mainly wooded with the exception of the upper reaches of OSC-1 and within OSC-3, which are 2-AC developed lots.

Post construction site runoff has been divided into two proposed subcatchments, PSC-1 and PSC-2. A standard 2' D x 8'W diversion swale is planned along the eastern and southern edge of PSC-2 to capture 13.87-AC of runoff from the east (OSC-2). This will redirect undisturbed area flow around the developed parcel and into the Triphammer Road swale as shown on Sheet ST-11.

PSC-1 and PSC-2 represent areas that will be impacted by the proposed development. Changes in landcover during construction, minor grading modifications, and the introduction of impervious hardscape surfaces can negatively affect runoff rates and volumes and introduce pollutants as compared to previously existing conditions. As such, a plan to provide water quality volume treatment and quantity attenuation in accordance with NYSDEC standards is necessary. According to State runoff reduction requirements, the use of certain practices, such as grassed filter strips, allows for an impervious cover credit in overall water quality volume calculations. Four lots within PSC-1 and four within PSC-2 will contain shallow permeable berms to promote infiltration across the grassed lawnscape from adjacent rooftops and driveways. Any runoff that percolates through these mounds will sheet flow into the proposed road swale where it will then be carried into a dry pond for quantity attenuation.

Treatment Flowpath: Both proposed subcatchments have been identified as areas in need of water quality treatment due to impacts from construction and added impervious surfaces. Overall, there are eight (8) grassed filter strips, one (1) dry pond, and two (2) grassed swales that have been designed to address runoff reduction volume concerns and to treat 100% of the site water quality volume. The dry pond has been designed to reduce runoff rates to less than pre-developed conditions as required.

Site Control Methods: This project follows the newer DEC design standards on runoff reduction by applying green infrastructure techniques for water quality volume treatment. Eight grassed filter strips will yield a 0.35-AC impervious cover credit to meet NYSDEC guidance standards.

Site Soils: Using the USDA Web Soil Survey, five soil types have been identified within the watershed analysis of the existing site. Conesus (CfA and CfB), Kendaia (KfB), and Lansing (LbB) are gravelly silt loams with moderately low to moderately high drainage characteristics from 0.01 – 1.42 in/hr in the hydrologic soil group B. The areas within the proposed development consist of Ovid (OaA), and Ilion (IcA) silt clay loams, with moderately low to moderately high drainage characteristics from 0.01 – 0.20 in/hr in the hydrologic soil group C.

Soils data was obtained from the on-line USDA Soil Conservation Service Web Soil Survey.

Site Topography: The site as a whole has a varied slope of between 2 – 8% primarily moving downhill from northeast to southwest.

Site Watershed: Of the 36.63-acre watershed, the area of disturbance will be approximately 4.6-acres.

Rainfall: Rainfall data used in the modeling and analysis was taken from www.precipt.net, from the Northeast Regional Climate Center which is an accepted NYSDEC reference (Appendix 4). Rainfall data specific to Tompkins County under consideration, for various 24-hour storm events tabled below:

RAINFALL DATA

STORM	24-HOUR RAINFALL
1-year	1.99 inches
10-year	3.40 inches
100-year	5.84 inches

These values were used in modeling for the evaluation of existing and proposed stormwater run-off conditions.

RUNOFF REDUCTION VOLUME MANAGEMENT STRATEGY

(See Appendix 1 for Worksheet Analyses)

1. **Water Quality Volume and Runoff Reduction Stormwater Management Strategy** - *Reference modeling results and WQv/RRv worksheets which follow this summary:*

The total site water quality volume is:

WQv = 4,695 cu-ft (0.108af)

Of this amount, seven grassed filter strips have been proposed to provide an impervious cover credit of 0.35-AC which reduces the overall water quality volume:

WQv credit = 1,729 *cuft (0.040 af)*

Adjusted WQv = 2,966 cuft (0.068 af)

The minimum RRv was based on the following calculation:

Soil group for site:

C – 7.71-AC S = 30%

Minimum RRv:

S = 0.30
Impervious Area = 0.96-AC
Precipitation = 1.0 in
Rv = 0.95

Minimum Rv = [(P)(Rv)(A)] /12 = ((1.0 **** 0.95"/AC * 0.96AC**)/12)0.30 =

988 cuft or, 0.024-acft

2. **Water Quality Volume Treatment Practices**

Seven grassed filter strips have been designed to the minimum total volume specifications as calculated in the attached practice worksheets. A summary of total runoff reduction volumes is provided in the table below:

Subcatchment	Required RRv (cuft)	RRv Adjust. (Cuft)	Adjusted RRv
PSC-1& PSC-2	4,695	1,729	GF (Credit)
	4,695	1,729	

3. Total of RRv

Total RRv provided by practices 1,729 cuft (0.040-AF)
Total Remaining Storage Volume for practices (after RRv) 2,966 cuft - 0 cuft = 2,966cuft (0.068af)

Is provided RRv > adjusted WQv from #1? 0.040 acft > 0.068 acft **NO**
Is provided RRv > minimum RRv for C soils from #1? 0.040 acft > 0.024 acft **YES**

Is volume available within standard practices for remaining untreated WQv? **YES**

Total Site WQv - 2,966 CF, 0.068AF
RRv 0-CF, 0.000-AF
Remaining WQv - 2,966 CF, 0.068-AF

Remaining WQv is treated by the two standard practice dry pond forebays. Each forebay offers 4,000-CF of storage which represents 8,000-CF of available WQv storage volume.

Is all of the watershed drainage area treated by either area reduction or source control practices? **YES**

Is all of the watershed impervious area treated with either reduction or source control practices? **YES**

Minimum runoff reduction requirements are met for this project.

DPP-1

CONTROL SIZING

Dry Pond

Cpv = 24 hour extended detention of post-developed 1-year, 24-hour Storm event (**1.99-inch rainfall Tompkins County**) - **1 yr Cpv 0.267-AF (11,631-CF)– RRv credit of 0.040AF (1,729-CF) = (9,902-CF).**

Pond CPv orifice

1. Determine H – Avg head above centerline of proposed orifice invert for 1 yr storm. H between 962.00 and 963.48 (1 Yr Peak) = 1.48/2 = 0.74'

2. Determine Q – Flow over 24 hr period.

   1 Yr Peak Volume = Stage storage table volume between 962.74' ad 962.00' = 2,489 cuft

   2,489 cuft/day x 1d/24hrs x 1hr/60min x 1 min/60sec = 0.0288 cuft/s

3. $A = Q/ [C_\delta * Sqrt (2gH)]$

   Where, $C_\delta = 0.6$ and $g = 32.2$ ft/s^2

   $A = 0.0288$ cfs/0.6*[Sqrt ((2(32.2 ft/s^2) x 0.74 ft)] = 0.007 ft^2

4. $A = \pi r^2$

   $r^2 = Sqrt(0.007 ft^2 / 3.14) * 2 = 0.094$ ft or **1.13, round up to 2.0"**

Orifice can adequately outlet the 1 yr 24 hour storm – Entire storm captured.

CPv conditions are met.

DESIGN POINT 1 SUMMARY (DP-1)

Overbank Flood (Qp) – DP1

Qp = Controls the peak discharge from the 10-year storm **(3.40-inch rainfall Tompkins County)** to 10-year predevelopment rates.

Pre-developed max rate = **14.48-CFS**, Total Volume = 2.297AF (100,057-CF). Post-developed w/o controls max rate = 15.45-CFS, Total Volume = 2.574-AF (112,123-CF).

The maximum post-developed run-off rate with the dry pond in-line is 10.92-CFS, and the total run-off volume is 2.048-AF (89,211-CF).

The **Qp** Overbank Flood control criterion is met with the dry pond in-line.

Extreme Storm (Qf) – DP1

Control the peak discharge from the 100-year storm **(5.84-inch rainfall Tompkins County)** to 100-year predevelopment rates. Safely pass the 100-year storm event.

Pre-developed max run-off rate = **50.17-CFS**, Total Volume = 7.062-AF (307,621-CF). Post-developed w/o controls max rate = 48.54-CFS, Total Volume = 7.513-AF (327,266-CF).

The maximum post-developed run-off rate with the dry pond inline is 45.91-CFS, and the total run-off volume is 6.935-AF (278,566-CF).

The **Qf** Overbank Flood control criterion is met with the dry pond in-line.

METHODOLOGY

The methodology used for the hydrologic and hydraulic analysis was obtained from the United States Department of Agriculture (USDA) Soil Conservation Service's (SCS) Technical Release No. 20, as implemented by the application program HydroCAD. HydroCAD, developed by Applied Microcomputer Systems of Chocorua, New Hampshire, is a Computer-Aided-Design (CAD) program for analyzing the hydrologic and hydraulic characteristics of a given watershed and associated stormwater management facilities. It utilizes the latest modeling techniques to predict the consequences of any given storm.

HydroCAD has the capability of computing hydrographs and routing flows through pipes, streams and ponds. Hydrographs represent discharge rates characteristic of specified watershed conditions, precipitation and geologic factors.

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

Subcatchment: A relatively homogeneous area of land, which produces a volume and rate of surface run-off unique to that area.

Reach: Uniform streams, channels or pipes which convey stormwater from one distinct point to another reach or pond.

Pond: Natural or man-made impoundment (ie. pond), which temporarily stores stormwater run-off and empties in a manner determined by its geometry and the hydraulic structure located at its outlet(s).

Subcatchments, reaches and ponds are represented by hexagons, squares and triangles, respectively, on the watershed routing diagrams provided with the computations reference modeling results attached.

MODELING RESULTS TABLED

(See Appendix 2 for actual modeling data)

DPP-1

EXISTING
EXISTING FLOW CONDITIONS AT DESIGN POINT (DP1)

STORM EVENT	*PEAK FLOW (CFS)*	*TOTAL VOLUME (AF)*
1-year	*1.90*	*0.478*
10-year	*14.48*	*2.297*
100-year	*50.17*	*7.062*

PROPOSED
WITHOUT STORMWATER MANAGEMENT
FLOW CONDITIONS AT DESIGN POINT (DP1)

STORM EVENT	*PEAK FLOW (CFS)*	*TOTAL VOLUME (AF)*
1-year	*3.04*	*0.618*
10-year	*15.45*	*2.574*
100-year	*48.54*	*7.513*

PROPOSED
WITH DRY POND IN-LINE
PROPOSED FLOW CONDITIONS AT DESIGN POINT (DP1)

STORM EVENT	*PEAK FLOW (CFS)*	*TOTAL VOLUME (AF)*
1-year	*1.42*	*0.431*
10-year	*10.92*	*2.048*
100-year	*45.91*	*6.935*

STAGE STORAGE TABLES

DRY POND STAGE-STORAGE TABLE P

STORM EVENT	*PEAK STORAGE (CF)*	*PEAK DEPTH (FT)*
WQv	*2,966*	*0.85'*
*1 year (***Cpv**)	*6,594*	*1.48'*
10 year	*21.567*	*3.06'*
100 year	*34,217*	*4.05'*

Notes:
Invert of Dry Pond = El. 0'
*Invert **1 Yr Primary Outlet** (2.0" dia orifice Culvert) El. = 0.0'*
*Invert **10 Yr Primary Outlet** (12.0" dia. Culvert) El. = 2.72'*
Invert **Qf** *Outlet (18" horizontal outlet) El. = 3.00'*
Invert of Emergenyc Overflow – 10' x 4' broadcrested weir = 3.75'
Top of Pond Crest Elev. El. = 5.00'

APPENDIX 1

WATER QUALITY VOLUME/RUNOFF REDUCTION WORKSHEETS

Version 1.6
Last Updated: 03/28/2014

Total Water Quality Volume Calculation
WQv(acre-feet) = [(P)(Rv)(A)] /12

Is this project subject to Chapter 10 of the NYS Design Manual (i.e. WQv is equal to post-development 1 year runoff volume)?.....	No

Design Point:	1	
P=	1.00	*inch*

Manually enter P, Total Area and Impervious Cover.

Breakdown of Subcatchments

Catchment Number	Total Area *(Acres)*	Impervious Area *(Acres)*	Percent Impervious *%*	Rv	WQv *(ft^3)*	Description
1	0.32	0.05	16%	0.19	221	Filter Strips - PSC 1a
2	0.68	0.05	7%	0.12	287	Filter Strips - PSC 1b
3	0.59	0.05	8%	0.13	270	Filter Strips - PSC 1c
4	0.62	0.05	7%	0.12	260	Filter Strips - PSC 1d
5						
6						
7						
8						
9						
10						
Subtotal (1-30)	2.21	0.20	9%	0.13	**1,038**	**Subtotal 1**
Total	2.21	0.20	9%	0.13	**1,038**	**Initial WQv**

Identify Runoff Reduction Techniques By Area

Technique	Total Contributing Area *(Acre)*	Contributing Impervious Area *(Acre)*	Notes
Conservation of Natural Areas	0.00	0.00	*minimum 10,000 sf*
Riparian Buffers	0.00	0.00	*maximum contributing length 75 feet to 150 feet*
Filter Strips	2.21	0.20	
Tree Planting	0.00	0.00	*Up to 100 sf directly connected impervious area may be subtracted per tree*
Total	**2.21**	**0.20**	

Recalculate WQv after application of Area Reduction Techniques

	Total Area *(Acres)*	Impervious Area *(Acres)*	Percent Impervious *%*	Runoff Coefficient Rv	WQv *(ft^3)*
"<<Initial WQv"	2.21	0.20	9%	0.13	1,038
Subtract Area	-2.21	-0.20			
WQv adjusted after Area Reductions	**0.00**	**0.00**	0%	0.05	0
Disconnection of Rooftops		0.00			

Version 1.6 Total Water Quality Volume Calculation
Last Updated: 03/28/2014 WQv(acre-feet) = [(P)(Rv)(A)] /12

Adjusted WQv after Area Reduction and Rooftop Disconnect	0.00	0.00	0%	0.05	**0**
WQv reduced by Area Reduction techniques					1,038

Total Water Quality Volume Calculation

WQv(acre-feet) = [(P)(Rv)(A)] /12

All Subcatchments						
Catchment	**Total Area** *(Acres)*	**Impervious Cover** *(Acres)*	**Percent Impervious** *%*	**Runoff Coefficient** *Rv*	**WQv** *(ft^3)*	**Description**
1	0.32	0.05	0.16	0.19	221.43	Filter Strips - PSC 1a
2	0.68	0.05	0.07	0.12	287	Filter Strips - PSC 1b
3	0.59	0.05	0.08	0.13	270.44	Filter Strips - PSC 1c
4	0.62	0.05	0.07	0.12	259.55	Filter Strips - PSC 1d
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						

Runoff Reduction Volume and Treated volumes						
	Runoff Reduction Techiques/Standard SMPs		**Total Contributing Area**	**Total Contributing Impervious Area**	**WQv Reduced (RRv)**	**WQv Treated**
			(acres)	**(acres)**	**cf**	**cf**
Area/Volume Reduction	Conservation of Natural Areas	RR-1	0.00	0.00		
	Sheetflow to Riparian Buffers/Filter Strips	RR-2	2.21	0.20		
	Tree Planting/Tree Pit	RR-3	0.00	0.00		
	Disconnection of Rooftop Runoff	RR-4		0.00		
	Vegetated Swale	RR-5	0.00	0.00	0	
	Rain Garden	RR-6	0.00	0.00	0	
	Stormwater Planter	RR-7	0.00	0.00	0	
	Rain Barrel/Cistern	RR-8	0.00	0.00	0	
	Porous Pavement	RR-9	0.00	0.00	0	
	Green Roof (Intensive & Extensive)	RR-10	0.00	0.00	0	
Standard SMPs w/RRv Capacity	Infiltration Trench	I-1	0.00	0.00	0	0
	Infiltration Basin	I-2	0.00	0.00	0	0
	Dry Well	I-3	0.00	0.00	0	0
	Underground Infiltration System	I-4	0.00			
	Bioretention & Infiltration Bioretention	F-5	0.00	0.00	0	0
	Dry swale	O-1	0.00	0.00	0	0
Standard SMPs	Micropool Extended Detention (P-1)	P-1				
	Wet Pond (P-2)	P-2				
	Wet Extended Detention (P-3)	P-3				
	Multiple Pond system (P-4)	P-4				
	Pocket Pond (p-5)	P-5				
	Surface Sand filter (F-1)	F-1				
	Underground Sand filter (F-2)	F-2				
	Perimeter Sand Filter (F-3)	F-3				
	Organic Filter (F-4	F-4				
	Shallow Wetland (W-1)	W-1				
	Extended Detention Wetland (W-2	W-2				
	Pond/Wetland System (W-3)	W-3				
	Pocket Wetland (W-4)	W-4				
	Wet Swale (O-2)	O-2				
Totals by Area Reduction →			2.21	0.20	1038	
Totals by Volume Reduction →			0.00	0.00	0	
Totals by Standard SMP w/RRV →			0.00	0.00	0	0
Totals by Standard SMP →			0.00	0.00		0
Totals (Area + Volume + all SMPs) →			2.21	0.20	1,038	0
	Impervious Cover √	okay				

Minimum RRv

Enter the Soils Data for the site		
Soil Group	Acres	S
A		55%
B		40%
C	2.32	30%
D		20%
Total Area	2.32	
Calculate the Minimum RRv		
S =	**0.30**	
Impervious =	0.20	*acre*
Precipitation	1	*in*
Rv	0.95	
Minimum RRv	**202**	***ft3***
	0.00	af

Filter Strip

Design Point:	1

Enter Site Data For Drainage Area to be Treated by Practice							
Catchment Number	**Total Area** *(Acres)*	**Impervious Area** *(Acres)*	**Percent Impervious** *%*	**Rv**	**WQv** *(ft^3)*	**Precipitation** *(in)*	**Description**
1	0.32	0.05	0.16	0.19	221.43	1.00	Filter Strips - PSC 1a

Design Elements			
Is another area based practice applied to this area?	*No*	*Y/N*	
Amended Soils & Dense Turf Cover?	*Yes*	*Y/N*	
Is area protected from compaction from heavy equipment during construction?	*Yes*	*Y/N*	
Small Area of Impervious Area & close to source?	*Yes*	*Y/N*	
Composte Amendments?	*Yes*	*Y/N*	
Boundary Spreader?	*Yes*	*Y/N*	*Gravel Diaphram at top*
Boundary Zone?	*Yes*	*Y/N*	*25 feet of level grass*
Specify how sheet flow will be ensured.	Slope <3.0%		*level spreader shall be used for buffer slopes ranging from 3-15%*
Average contributing slope	2%	*%*	*3% maximum unless a level spreader is*
Slope of first 10 feet of Filter Strip	2	*%*	*2% maximum*
Overall Slope	2	*%*	*8% maximum*
Contributing Length of Pervious Areas (PC)	84	*ft*	*150 ft maximum*
Contributing Length of Impervious areas (IC)	58	*ft*	*75 ft maximum*
Maximum PC Contributing Length for combination of PC & IC	92	*ft*	
Soil Group (HSG)	C		
Filter Strip Width	70	*ft*	*50 ft minimum for slopes 0-8%* *75 ft minimum for slopes 8-12%* *100 ft minimum for slopes 12-15%* *HSG C or D increase by 15-20%*
Are All Criteria for Filter Strips in Section 5.3.2 met?	*Yes*		

Area Reduction Adjustments		
Subtract	**0.32**	***Acres from total Area***
Subtract	**0.05**	***Acres from total Impervious Area***

TRUE

Filter Strip

Design Point:	1

Enter Site Data For Drainage Area to be Treated by Practice							
Catchment Number	**Total Area** *(Acres)*	**Impervious Area** *(Acres)*	**Percent Impervious** *%*	**Rv**	**WQv** *(ft^3)*	**Precipitation** *(in)*	**Description**
2	0.68	0.05	0.07	0.12	286.77	1.00	Filter Strips - PSC 1b

Design Elements			
Is another area based practice applied to this area?	*No*	*Y/N*	
Amended Soils & Dense Turf Cover?	*Yes*	*Y/N*	
Is area protected from compaction from heavy equipment during construction?	*Yes*	*Y/N*	
Small Area of Impervious Area & close to source?	*Yes*	*Y/N*	
Composte Amendments?	*Yes*	*Y/N*	
Boundary Spreader?	*Yes*	*Y/N*	*Gravel Diaphram at top*
Boundary Zone?	*Yes*	*Y/N*	*25 feet of level grass*
Specify how sheet flow will be ensured.	Slope <3.0%		*level spreader shall be used for buffer slopes ranging from 3-15%*
Average contributing slope	2	*%*	*3% maximum unless a level spreader is used.*
Slope of first 10 feet of Filter Strip	2	*%*	*2% maximum*
Overall Slope	2	*%*	*8% maximum*
Contributing Length of Pervious Areas (PC)	49	*ft*	*150 ft maximum*
Contributing Length of Impervious areas	58	*ft*	*75 ft maximum*
Maximum PC Contributing Length for combination of PC & IC	92	*ft*	
Soil Group (HSG)	C		
Filter Strip Width	70	*ft*	*50 ft minimum for slopes 0-8%* *75 ft minimum for slopes 8-12%* *100 ft minimum for slopes 12-15%* *HSG C or D increase by 15-20%*
Are All Criteria for filter strips in Section 5.3.2 met?	*Yes*		

Area Reduction Adjustments		
Subtract	**0.68**	***Acres from total Area***
Subtract	**0.05**	***Acres from total Impervious Area***

TRUE

Filter Strip

Design Point:	1

Enter Site Data For Drainage Area to be Treated by Practice							
Catchment Number	**Total Area** *(Acres)*	**Impervious Area** *(Acres)*	**Percent Impervious** *%*	**Rv**	**WQv** *(ft^3)*	**Precipitation** *(in)*	**Description**
3	0.59	0.05	0.08	0.13	270.44	1.00	Filter Strips - PSC 1c

Design Elements			
Is another area based practice applied to this area?	*No*	*Y/N*	
Amended Soils & Dense Turf Cover?	*Yes*	*Y/N*	
Is area protected from compaction from heavy equipment during construction?	*Yes*	*Y/N*	
Small Area of Impervious Area & close to source?	*Yes*	*Y/N*	
Composte Amendments?	*Yes*	*Y/N*	
Boundary Spreader?	*Yes*	*Y/N*	*Gravel Diaphram at top*
Boundary Zone?	*Yes*	*Y/N*	*25 feet of level grass*
Specify how sheet flow will be ensured.	Slope <3.0%		*level spreader shall be used for buffer slopes ranging from 3-15%*
Average contributing slope	2	*%*	*3% maximum unless a level spreader is*
Slope of first 10 feet of Filter Strip	2	*%*	*2% maximum*
Overall Slope	2	*%*	*8% maximum*
Contributing Length of Pervious Areas (PC)	54	*ft*	*150 ft maximum*
Contributing Length of Impervious areas	58	*ft*	*75 ft maximum*
Maximum PC Contributing Length for combination of PC & IC	92	*ft*	
Soil Group (HSG)	C		
Filter Strip Width	70	*ft*	*50 ft minimum for slopes 0-8%* *75 ft minimum for slopes 8-12%* *100 ft minimum for slopes 12-15%* *HSG C or D increase by 15-20%*
Are All Criteria in Section 5.3.2 (filter strips) met?	*Yes*		

Area Reduction Adjustments		
Subtract	**0.59**	***Acres from total Area***
Subtract	**0.05**	***Acres from total Impervious Area***

TRUE

Filter Strip

Design Point:	1

Enter Site Data For Drainage Area to be Treated by Practice							
Catchment Number	**Total Area** *(Acres)*	**Impervious Area** *(Acres)*	**Percent Impervious** *%*	**Rv**	**WQv** *(ft^3)*	**Precipitation** *(in)*	**Description**
4	0.62	0.05	0.07	0.12	259.55	1.00	Filter Strips - PSC 1d

Design Elements			
Is another area based practice applied to this area?	*No*	*Y/N*	
Amended Soils & Dense Turf Cover?	*Yes*	*Y/N*	
Is area protected from compaction from heavy equipment during construction?	*Yes*	*Y/N*	
Small Area of Impervious Area & close to source?	*Yes*	*Y/N*	
Composte Amendments?	*Yes*	*Y/N*	
Boundary Spreader?	*Yes*	*Y/N*	*Gravel Diaphram at top* *Permeable Berm at bottom*
Boundary Zone?	*Yes*	*Y/N*	*25 feet of level grass*
Specify how sheet flow will be ensured.	Slope <3.0%		*level spreader shall be used for buffer slopes ranging from 3-15%*
Average contributing slope	2	*%*	*3% maximum unless a level spreader is used.*
Slope of first 10 feet of Filter Strip	2	*%*	*2% maximum*
Overall Slope	2	*%*	*8% maximum*
Contributing Length of Pervious Areas (PC)	42	*ft*	*150 ft maximum*
Contributing Length of Impervious areas (IC)	58	*ft*	*75 ft maximum*
Maximum PC Contributing Length for combination of PC & IC	92	*ft*	
Soil Group (HSG)	C		
Filter Strip Width	70	*ft*	*50 ft minimum for slopes 0-8%* *75 ft minimum for slopes 8-12%* *100 ft minimum for slopes 12-15%* *HSG C or D increase by 15-20%*
Are All Criteria in Section 5.3.2 (fitler strips) met?	*Yes*		

Area Reduction Adjustments		
Subtract	**0.62**	***Acres from total Area***
Subtract	**0.05**	***Acres from total Impervious Area***

TRUE

Filter Strip

Total Subtracted from Total Area	2.21
Total Subtracted from Total Impervious Area	0.20

Version 1.6 Total Water Quality Volume Calculation
Last Updated: 03/28/2014 WQv(acre-feet) = [(P)(Rv)(A)] /12

Is this project subject to Chapter 10 of the NYS Design Manual (i.e. WQv is equal to post-development 1 year runoff volume)?.....	No

Design Point:	1	
P=	1.00	*inch*

Manually enter P, Total Area and Impervious Cover.

Breakdown of Subcatchments

Catchment Number	Total Area *(Acres)*	Impervious Area *(Acres)*	Percent Impervious *%*	Rv	WQv *(ft^3)*	Description
1	0.43	0.05	12%	0.15	241	Filter Strips - PSC 2e
2	0.24	0.05	21%	0.24	207	Filter Strips - PSC 2f
3	0.36	0.05	14%	0.18	229	Filter Strips - PSC 2g
4	4.72	0.65	14%	0.17	2,980	Dry Pond
5						
6						
7						
8						
9						
10						
Subtotal (1-30)	5.75	0.80	14%	0.18	**3,657**	**Subtotal 1**
Total	5.75	0.80	14%	0.18	**3,657**	**Initial WQv**

Identify Runoff Reduction Techniques By Area

Technique	Total Contributing Area *(Acre)*	Contributing Impervious Area *(Acre)*	Notes
Conservation of Natural Areas	0.00	0.00	*minimum 10,000 sf*
Riparian Buffers	0.00	0.00	*maximum contributing length 75 feet to 150 feet*
Filter Strips	1.03	0.15	
Tree Planting	0.00	0.00	*Up to 100 sf directly connected impervious area may be subtracted per tree*
Total	**1.03**	**0.15**	

Recalculate WQv after application of Area Reduction Techniques

	Total Area *(Acres)*	Impervious Area *(Acres)*	Percent Impervious *%*	Runoff Coefficient Rv	WQv *(ft^3)*
"<<Initial WQv"	5.75	0.80	14%	0.18	3,657
Subtract Area	-1.03	-0.15			
WQv adjusted after Area Reductions	**4.72**	**0.65**	14%	0.17	2,980
Disconnection of Rooftops		0.00			

Version 1.6 Total Water Quality Volume Calculation
Last Updated: 03/28/2014 WQv(acre-feet) = [(P)(Rv)(A)] /12

Adjusted WQv after Area Reduction and Rooftop Disconnect	4.72	0.65	14%	0.17	**2,980**
WQv reduced by Area Reduction techniques					677

Total Water Quality Volume Calculation

WQv(acre-feet) = [(P)(Rv)(A)] /12

All Subcatchments						
Catchment	**Total Area** *(Acres)*	**Impervious Cover** *(Acres)*	**Percent Impervious** *%*	**Runoff Coefficient** *Rv*	**WQv** *(ft^3)*	**Description**
1	0.43	0.05	0.12	0.15	241.40	Filter Strips - PSC 2e
2	0.24	0.05	0.21	0.24	207	Filter Strips - PSC 2f
3	0.36	0.05	0.14	0.18	228.69	Filter Strips - PSC 2g
4	4.72	0.65	0.14	0.17	2980.23	Dry Pond
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						

Runoff Reduction Volume and Treated volumes						
	Runoff Reduction Techiques/Standard SMPs		**Total Contributing Area**	**Total Contributing Impervious Area**	**WQv Reduced (RRv)**	**WQv Treated**
			(acres)	**(acres)**	**cf**	**cf**
Area/Volume Reduction	Conservation of Natural Areas	RR-1	0.00	0.00		
	Sheetflow to Riparian Buffers/Filter Strips	RR-2	1.03	0.15		
	Tree Planting/Tree Pit	RR-3	0.00	0.00		
	Disconnection of Rooftop Runoff	RR-4		0.00		
	Vegetated Swale	RR-5	0.00	0.00	0	
	Rain Garden	RR-6	0.00	0.00	0	
	Stormwater Planter	RR-7	0.00	0.00	0	
	Rain Barrel/Cistern	RR-8	0.00	0.00	0	
	Porous Pavement	RR-9	0.00	0.00	0	
	Green Roof (Intensive & Extensive)	RR-10	0.00	0.00	0	
Standard SMPs w/RRv Capacity	Infiltration Trench	I-1	0.00	0.00	0	0
	Infiltration Basin	I-2	0.00	0.00	0	0
	Dry Well	I-3	0.00	0.00	0	0
	Underground Infiltration System	I-4	0.00			
	Bioretention & Infiltration Bioretention	F-5	0.00	0.00	0	0
	Dry swale	O-1	0.00	0.00	0	0
Standard SMPs	Micropool Extended Detention (P-1)	P-1				
	Wet Pond (P-2)	P-2				
	Wet Extended Detention (P-3)	P-3				
	Multiple Pond system (P-4)	P-4				
	Pocket Pond (p-5)	P-5	4.72	0.65		2777.000
	Surface Sand filter (F-1)	F-1				
	Underground Sand filter (F-2)	F-2				
	Perimeter Sand Filter (F-3)	F-3				
	Organic Filter (F-4	F-4				
	Shallow Wetland (W-1)	W-1				
	Extended Detention Wetland (W-2	W-2				
	Pond/Wetland System (W-3)	W-3				
	Pocket Wetland (W-4)	W-4				
	Wet Swale (O-2)	O-2				
Totals by Area Reduction →			1.03	0.15	677	
Totals by Volume Reduction →			0.00	0.00	0	
Totals by Standard SMP w/RRV →			0.00	0.00	0	0
Totals by Standard SMP →			4.72	0.65		2777
Totals (Area + Volume + all SMPs) →			5.75	0.80	677	2,777
	Impervious Cover √	okay				

Minimum RRv

Enter the Soils Data for the site		
Soil Group	Acres	S
A		55%
B		40%
C	5.39	30%
D		20%
Total Area	5.39	
Calculate the Minimum RRv		
S =	**0.30**	
Impervious =	0.80	*acre*
Precipitation	1	*in*
Rv	0.95	
Minimum RRv	**828**	***ft3***
	0.02	af

Filter Strip

Design Point:	1

Enter Site Data For Drainage Area to be Treated by Practice							
Catchment Number	**Total Area** *(Acres)*	**Impervious Area** *(Acres)*	**Percent Impervious** *%*	**Rv**	**WQv** *(ft^3)*	**Precipitation** *(in)*	**Description**
1	0.43	0.05	0.12	0.15	241.40	1.00	Filter Strips - PSC 2e

Design Elements			
Is another area based practice applied to this area?	*No*	*Y/N*	
Amended Soils & Dense Turf Cover?	*Yes*	*Y/N*	
Is area protected from compaction from heavy equipment during construction?	*Yes*	*Y/N*	
Small Area of Impervious Area & close to source?	*Yes*	*Y/N*	
Composte Amendments?	*Yes*	*Y/N*	
Boundary Spreader?	*Yes*	*Y/N*	*Gravel Diaphram at top*
Boundary Zone?	*Yes*	*Y/N*	*25 feet of level grass*
Specify how sheet flow will be ensured.	Slope <3.0%		*level spreader shall be used for buffer slopes ranging from 3-15%*
Average contributing slope	2	*%*	*3% maximum unless a level spreader is*
Slope of first 10 feet of Filter Strip	2	*%*	*2% maximum*
Overall Slope	2	*%*	*8% maximum*
Contributing Length of Pervious Areas (PC)	70	*ft*	*150 ft maximum*
Contributing Length of Impervious areas (IC)	58	*ft*	*75 ft maximum*
Maximum PC Contributing Length for combination of PC & IC	92	*ft*	
Soil Group (HSG)	C		
Filter Strip Width	70	*ft*	*50 ft minimum for slopes 0-8%* *75 ft minimum for slopes 8-12%* *100 ft minimum for slopes 12-15%* *HSG C or D increase by 15-20%*
Are All Criteria for Filter Strips in Section 5.3.2 met?	*Yes*		

Area Reduction Adjustments		
Subtract	**0.43**	***Acres from total Area***
Subtract	**0.05**	***Acres from total Impervious Area***

TRUE

Filter Strip

Design Point:	1

Enter Site Data For Drainage Area to be Treated by Practice							
Catchment Number	**Total Area** *(Acres)*	**Impervious Area** *(Acres)*	**Percent Impervious** *%*	**Rv**	**WQv** *(ft^3)*	**Precipitation** *(in)*	**Description**
2	0.24	0.05	0.21	0.24	206.91	1.00	Filter Strips - PSC 2f

Design Elements			
Is another area based practice applied to this area?	*No*	*Y/N*	
Amended Soils & Dense Turf Cover?	*Yes*	*Y/N*	
Is area protected from compaction from heavy equipment during construction?	*Yes*	*Y/N*	
Small Area of Impervious Area & close to source?	*Yes*	*Y/N*	
Composte Amendments?	*Yes*	*Y/N*	
Boundary Spreader?	*Yes*	*Y/N*	*Gravel Diaphram at top*
Boundary Zone?	*Yes*	*Y/N*	*25 feet of level grass*
Specify how sheet flow will be ensured.	Slope <3.0%		*level spreader shall be used for buffer slopes ranging from 3-15%*
Average contributing slope	2	*%*	*3% maximum unless a level spreader is used.*
Slope of first 10 feet of Filter Strip	2	*%*	*2% maximum*
Overall Slope	2	*%*	*8% maximum*
Contributing Length of Pervious Areas (PC)	90	*ft*	*150 ft maximum*
Contributing Length of Impervious areas	58	*ft*	*75 ft maximum*
Maximum PC Contributing Length for combination of PC & IC	92	*ft*	
Soil Group (HSG)	C		
Filter Strip Width	70	*ft*	*50 ft minimum for slopes 0-8%* *75 ft minimum for slopes 8-12%* *100 ft minimum for slopes 12-15%* *HSG C or D increase by 15-20%*
Are All Criteria for filter strips in Section 5.3.2 met?	*Yes*		

Area Reduction Adjustments		
Subtract	**0.24**	***Acres from total Area***
Subtract	**0.05**	***Acres from total Impervious Area***

TRUE

Filter Strip

Design Point:	1

Enter Site Data For Drainage Area to be Treated by Practice							
Catchment Number	**Total Area** *(Acres)*	**Impervious Area** *(Acres)*	**Percent Impervious** *%*	**Rv**	**WQv** *(ft^3)*	**Precipitation** *(in)*	**Description**
3	0.36	0.05	0.14	0.18	228.69	1.00	Filter Strips - PSC 2g

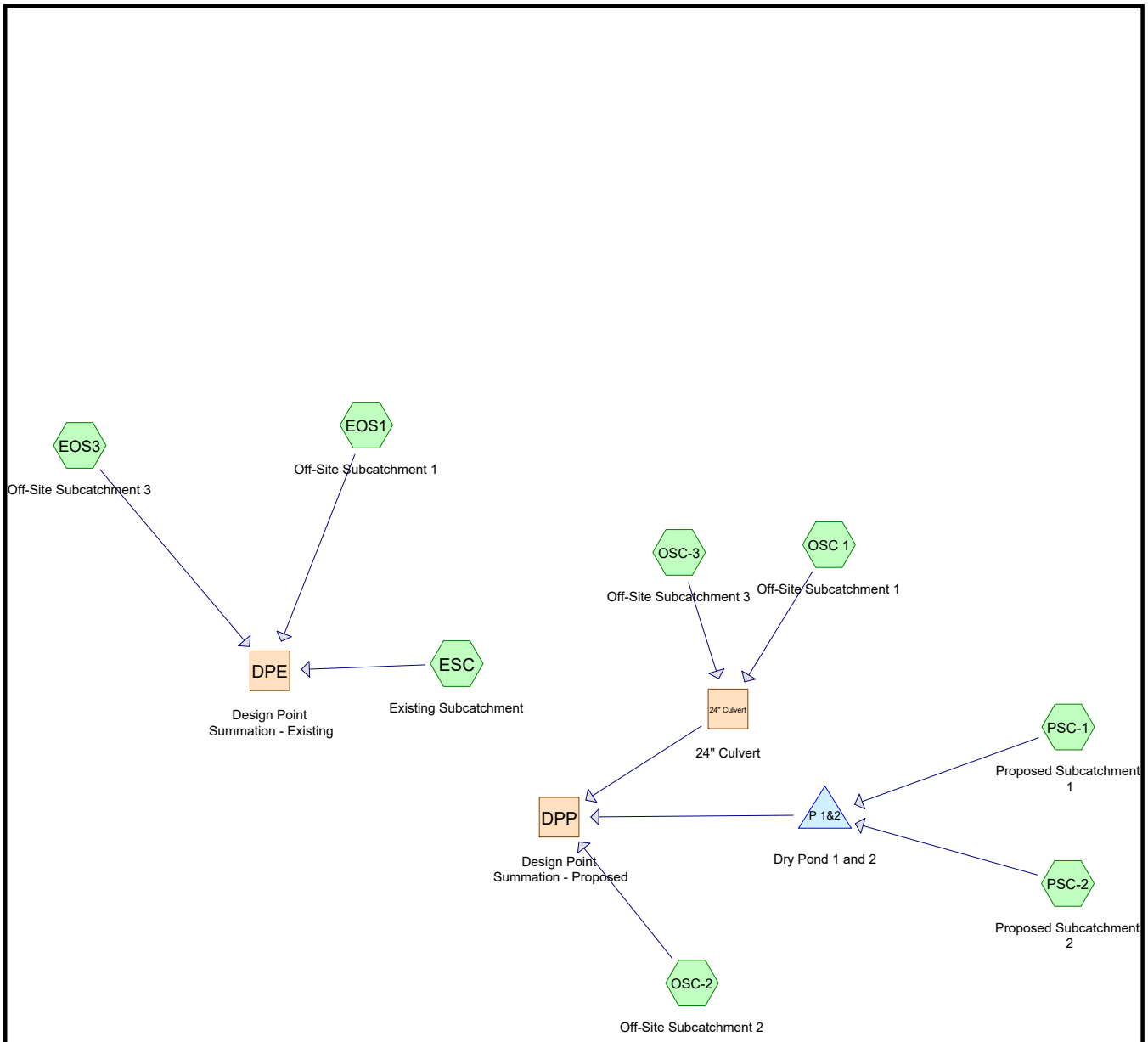
Design Elements			
Is another area based practice applied to this area?	*No*	*Y/N*	
Amended Soils & Dense Turf Cover?	*Yes*	*Y/N*	
Is area protected from compaction from heavy equipment during construction?	*Yes*	*Y/N*	
Small Area of Impervious Area & close to source?	*Yes*	*Y/N*	
Composte Amendments?	*Yes*	*Y/N*	
Boundary Spreader?	*Yes*	*Y/N*	*Gravel Diaphram at top*
Boundary Zone?	*Yes*	*Y/N*	*25 feet of level grass*
Specify how sheet flow will be ensured.	Slope <3%		*level spreader shall be used for buffer slopes ranging from 3-15%*
Average contributing slope	2	*%*	*3% maximum unless a level spreader is*
Slope of first 10 feet of Filter Strip	2	*%*	*2% maximum*
Overall Slope	2	*%*	*8% maximum*
Contributing Length of Pervious Areas (PC)	90	*ft*	*150 ft maximum*
Contributing Length of Impervious areas (IC)	58	*ft*	*75 ft maximum*
Maximum PC Contributing Length for combination of PC & IC	92	*ft*	
Soil Group (HSG)	C		
Filter Strip Width	70	*ft*	*50 ft minimum for slopes 0-8%* *75 ft minimum for slopes 8-12%* *100 ft minimum for slopes 12-15%* *HSG C or D increase by 15-20%*
Are All Criteria in Section 5.3.2 (filter strips) met?	*Yes*		

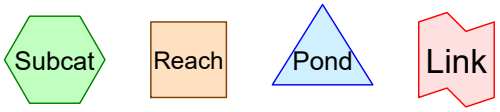
Area Reduction Adjustments		
Subtract	**0.36**	***Acres from total Area***
Subtract	**0.05**	***Acres from total Impervious Area***

TRUE

APPENDIX 2

HYDRAULIC MODELING DATA





Routing Diagram for Britton_Model
Prepared by {enter your company name here}, Printed 8/17/2020
HydroCAD® 10.00-21 s/n 01939 © 2018 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
13.361	65	2 acre lots, 12% imp, HSG B (EOS1, OSC 1)
5.856	77	2 acre lots, 12% imp, HSG C (EOS1, EOS3, OSC 1, OSC-3)
6.934	74	>75% Grass cover, Good, HSG C (PSC-1, PSC-2)
1.001	98	Paved parking, rooftops, road, HSG C (PSC-1, PSC-2)
17.255	58	Woods/grass comb., Good, HSG B (EOS1, ESC, OSC 1, OSC-2)
32.104	72	Woods/grass comb., Good, HSG C (EOS1, EOS3, ESC, OSC 1, OSC-2, OSC-3)
76.510	**69**	**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	13.361	5.856	0.000	0.000	19.216	2 acre lots, 12% imp	EOS1, EOS3, OSC 1, OSC-3
0.000	0.000	6.934	0.000	0.000	6.934	>75% Grass cover, Good	PSC-1, PSC-2
0.000	0.000	1.001	0.000	0.000	1.001	Paved parking, rooftops, road	PSC-1, PSC-2
0.000	17.255	32.104	0.000	0.000	49.359	Woods/grass comb., Good	EOS1, EOS3, ESC, OSC 1, OSC-2, OSC-3
0.000	**30.616**	**45.894**	**0.000**	**0.000**	**76.510**	**TOTAL AREA**	

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	24" Culvert	961.50	961.30	64.0	0.0031	0.013	24.0	0.0	0.0
2	P 1&2	962.00	961.70	53.0	0.0057	0.013	15.0	0.0	0.0

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment EOS1: Off-Site Runoff Area=645,339 sf 7.03% Impervious Runoff Depth>0.15"
Flow Length=2,082' Tc=63.8 min CN=68 Runoff=0.74 cfs 0.188 af

Subcatchment EOS3: Off-Site Runoff Area=70,850 sf 6.81% Impervious Runoff Depth>0.32"
Flow Length=606' Tc=32.5 min CN=75 Runoff=0.38 cfs 0.044 af

Subcatchment ESC: Existing Runoff Area=950,525 sf 0.00% Impervious Runoff Depth>0.14"
Flow Length=1,606' Tc=50.9 min CN=67 Runoff=1.02 cfs 0.247 af

Subcatchment OSC 1: Off-Site Runoff Area=645,339 sf 7.03% Impervious Runoff Depth>0.15"
Flow Length=2,082' Tc=63.8 min CN=68 Runoff=0.74 cfs 0.188 af

Subcatchment OSC-2: Off-Site Runoff Area=604,235 sf 0.00% Impervious Runoff Depth>0.10"
Flow Length=2,344' Tc=41.3 min CN=65 Runoff=0.44 cfs 0.120 af

Subcatchment OSC-3: Off-Site Runoff Area=70,850 sf 6.81% Impervious Runoff Depth>0.32"
Flow Length=606' Tc=32.5 min CN=75 Runoff=0.38 cfs 0.044 af

Subcatchment PSC-1: Proposed Runoff Area=147,569 sf 15.15% Impervious Runoff Depth>0.42"
Flow Length=1,041' Tc=12.4 min CN=78 Runoff=2.07 cfs 0.120 af

Subcatchment PSC-2: Proposed Runoff Area=198,047 sf 10.72% Impervious Runoff Depth>0.39"
Flow Length=979' Tc=28.8 min CN=77 Runoff=1.48 cfs 0.147 af

Reach 24" Culvert: 24" Culvert Avg. Flow Depth=0.36' Max Vel=2.32 fps Inflow=0.89 cfs 0.232 af
24.0" Round Pipe n=0.013 L=64.0' S=0.0031 '/' Capacity=12.65 cfs Outflow=0.89 cfs 0.232 af

Reach DPE: Design Point Summation - Existing Inflow=1.90 cfs 0.478 af
Outflow=1.90 cfs 0.478 af

Reach DPP: Design Point Summation - Proposed Inflow=1.42 cfs 0.431 af
Outflow=1.42 cfs 0.431 af

Pond P 1&2: Dry Pond 1 and 2 Peak Elev=963.48' Storage=6,594 cf Inflow=2.81 cfs 0.266 af
Discarded=0.08 cfs 0.053 af Primary=0.12 cfs 0.080 af Outflow=0.21 cfs 0.132 af

Total Runoff Area = 76.510 ac Runoff Volume = 1.096 af Average Runoff Depth = 0.17"
95.68% Pervious = 73.203 ac 4.32% Impervious = 3.307 ac

Summary for Subcatchment EOS1: Off-Site Subcatchment 1

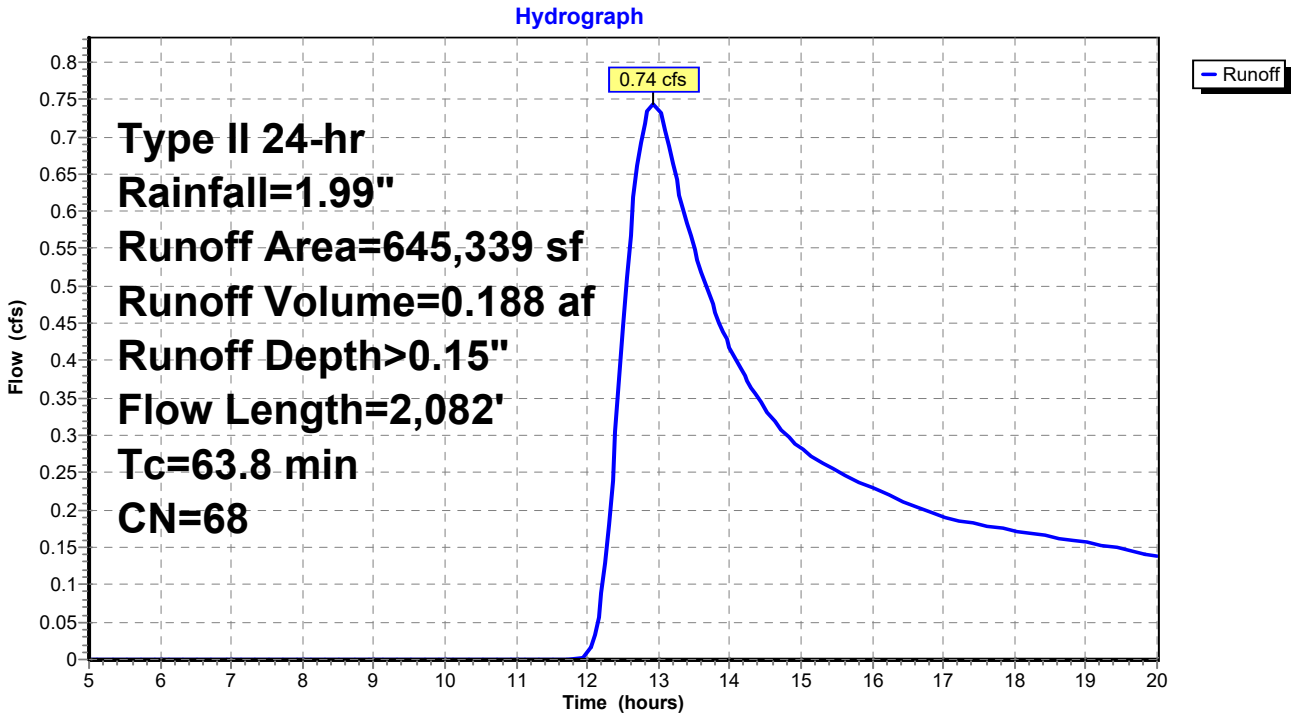
Runoff = 0.74 cfs @ 12.93 hrs, Volume= 0.188 af, Depth> 0.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=1.99"

Area (sf)	CN	Description
64,812	58	Woods/grass comb., Good, HSG B
87,332	77	2 acre lots, 12% imp, HSG C
290,993	65	2 acre lots, 12% imp, HSG B
202,202	72	Woods/grass comb., Good, HSG C
645,339	68	Weighted Average
599,940		92.97% Pervious Area
45,399		7.03% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.6	100	0.0650	0.11		**Sheet Flow, First 100' Flowpath** Woods: Light underbrush n= 0.400 P2= 2.70"
49.2	1,982	0.0180	0.67		**Shallow Concentrated Flow, Balance of Flow to Swale** Woodland Kv= 5.0 fps
63.8	2,082	Total			

Subcatchment EOS1: Off-Site Subcatchment 1



Summary for Subcatchment EOS3: Off-Site Subcatchment 3

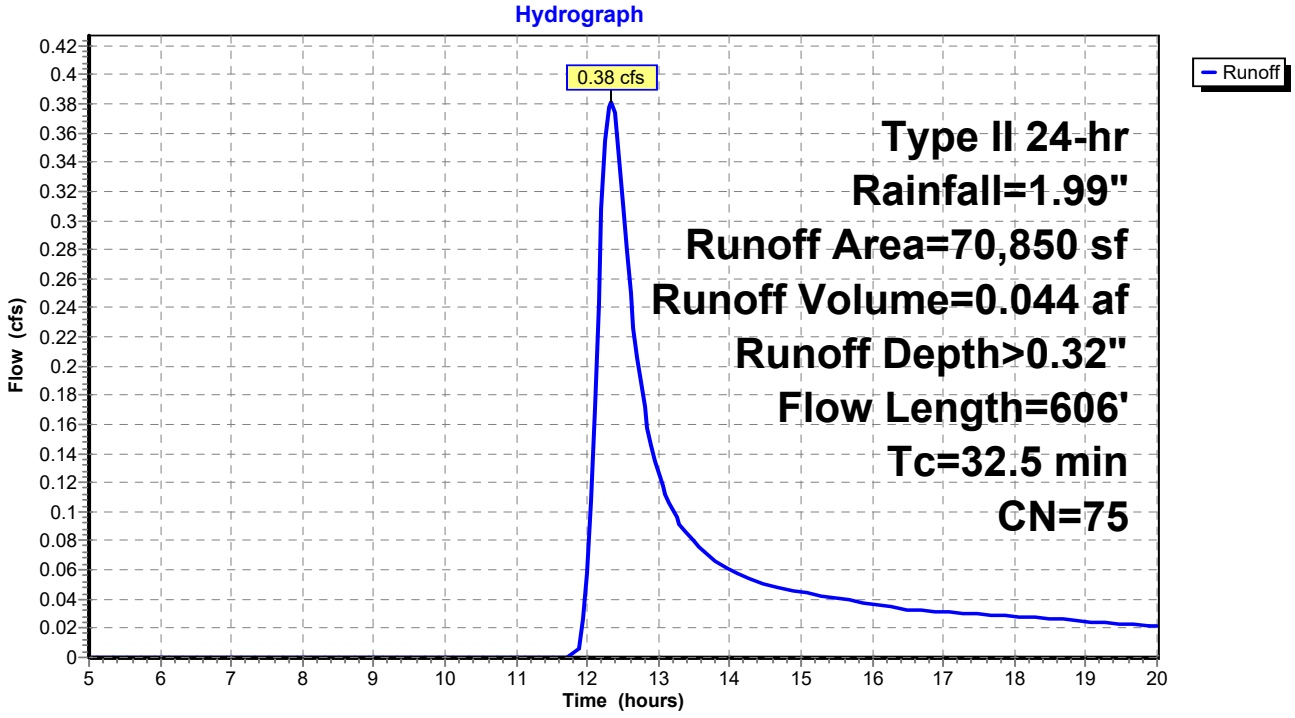
Runoff = 0.38 cfs @ 12.33 hrs, Volume= 0.044 af, Depth> 0.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=1.99"

Area (sf)	CN	Description
40,206	77	2 acre lots, 12% imp, HSG C
30,644	72	Woods/grass comb., Good, HSG C
70,850	75	Weighted Average
66,025		93.19% Pervious Area
4,825		6.81% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.9	100	0.0300	0.08		**Sheet Flow, First 100' Flowpath** Woods: Light underbrush n= 0.400 P2= 2.70"
12.6	506	0.0180	0.67		**Shallow Concentrated Flow, Balance of Longest Flowpath** Woodland Kv= 5.0 fps
32.5	606	Total			

Subcatchment EOS3: Off-Site Subcatchment 3



Summary for Subcatchment ESC: Existing Subcatchment

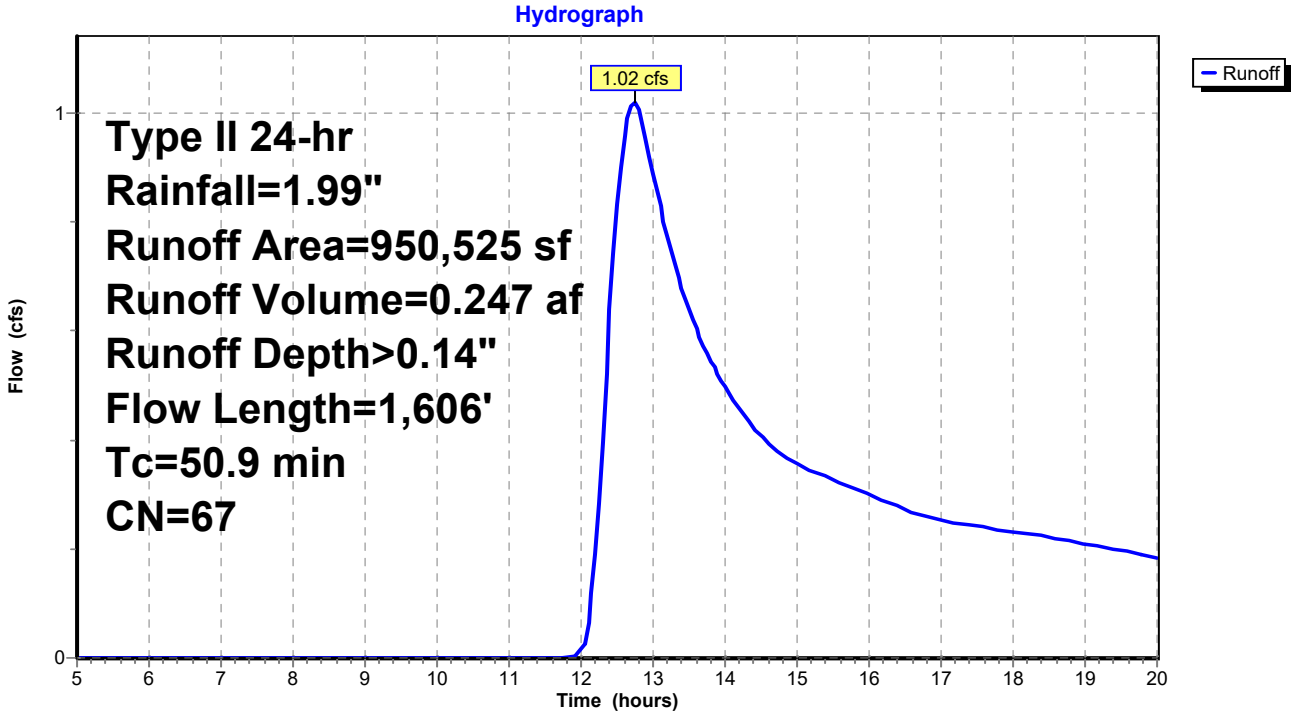
Runoff = 1.02 cfs @ 12.75 hrs, Volume= 0.247 af, Depth> 0.14"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=1.99"

Area (sf)	CN	Description
334,278	58	Woods/grass comb., Good, HSG B
616,247	72	Woods/grass comb., Good, HSG C
950,525	67	Weighted Average
950,525		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.6	150	0.0700	0.13		**Sheet Flow, First 150' Flowpath** Woods: Light underbrush n= 0.400 P2= 2.70"
31.3	1,456	0.0240	0.77		**Shallow Concentrated Flow, Balance of Longest Flowpath** Woodland Kv= 5.0 fps
50.9	1,606	Total			

Subcatchment ESC: Existing Subcatchment



Summary for Subcatchment OSC 1: Off-Site Subcatchment 1

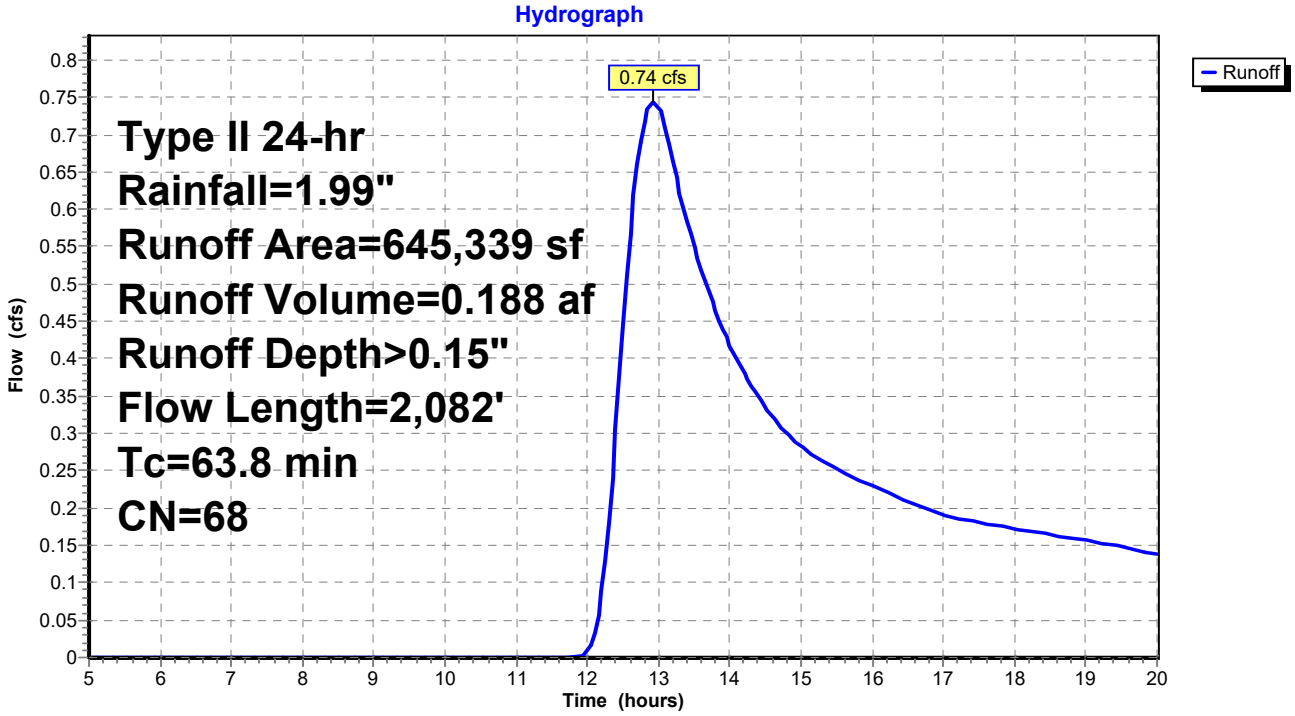
Runoff = 0.74 cfs @ 12.93 hrs, Volume= 0.188 af, Depth> 0.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=1.99"

Area (sf)	CN	Description
64,812	58	Woods/grass comb., Good, HSG B
87,332	77	2 acre lots, 12% imp, HSG C
290,993	65	2 acre lots, 12% imp, HSG B
202,202	72	Woods/grass comb., Good, HSG C
645,339	68	Weighted Average
599,940		92.97% Pervious Area
45,399		7.03% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.6	100	0.0650	0.11		**Sheet Flow, First 100' Flowpath** Woods: Light underbrush n= 0.400 P2= 2.70"
49.2	1,982	0.0180	0.67		**Shallow Concentrated Flow, Balance of Flow to Swale** Woodland Kv= 5.0 fps
63.8	2,082	Total			

Subcatchment OSC 1: Off-Site Subcatchment 1



Summary for Subcatchment OSC-2: Off-Site Subcatchment 2

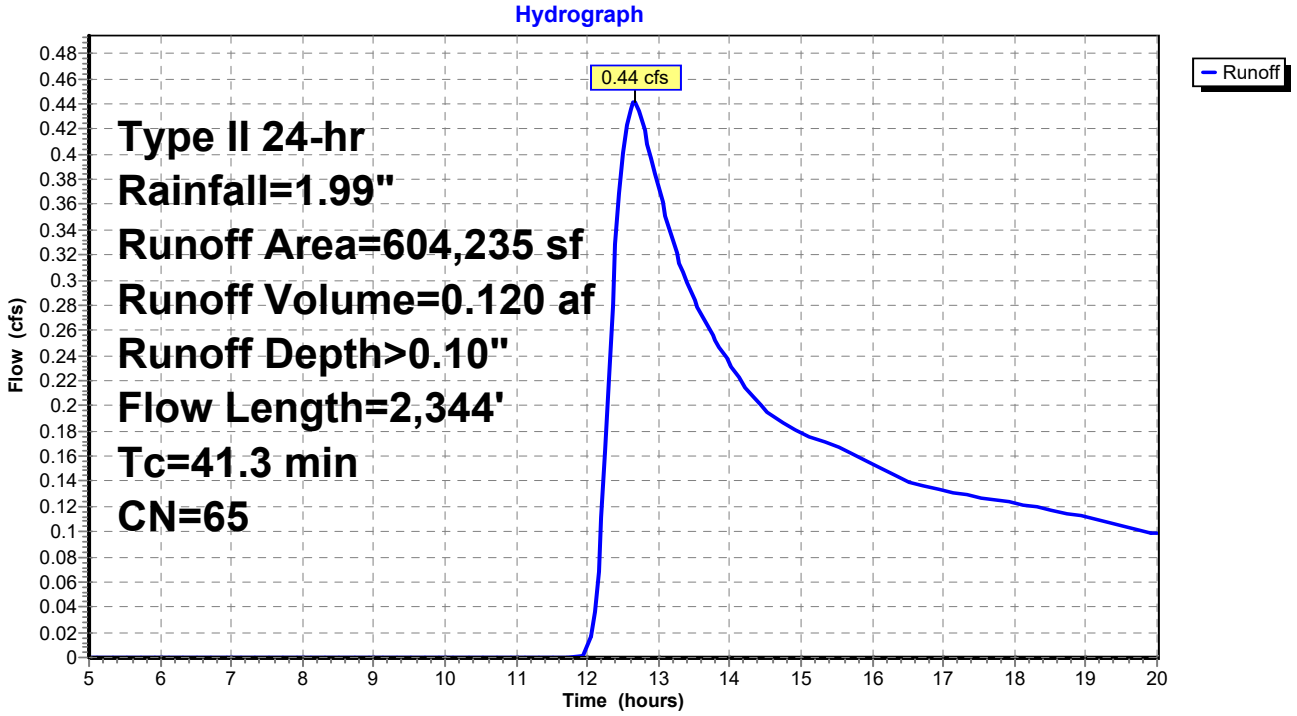
Runoff = 0.44 cfs @ 12.66 hrs, Volume= 0.120 af, Depth> 0.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=1.99"

Area (sf)	CN	Description
287,733	58	Woods/grass comb., Good, HSG B
316,502	72	Woods/grass comb., Good, HSG C
604,235	65	Weighted Average
604,235		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.2	100	0.0700	0.12		**Sheet Flow, First 100' Flowpath** Woods: Light underbrush n= 0.400 P2= 2.70"
24.2	1,102	0.0230	0.76		**Shallow Concentrated Flow, Balance of Flow to Swale** Woodland Kv= 5.0 fps
2.9	1,142	0.0180	6.51	65.06	**Trap/Vee/Rect Channel Flow, Balance of Longest Flowpath** Bot.W=2.00' D=2.00' Z= 3.0 & 0.0 '/' Top.W=8.00' n= 0.030
41.3	2,344	Total			

Subcatchment OSC-2: Off-Site Subcatchment 2



Summary for Subcatchment OSC-3: Off-Site Subcatchment 3

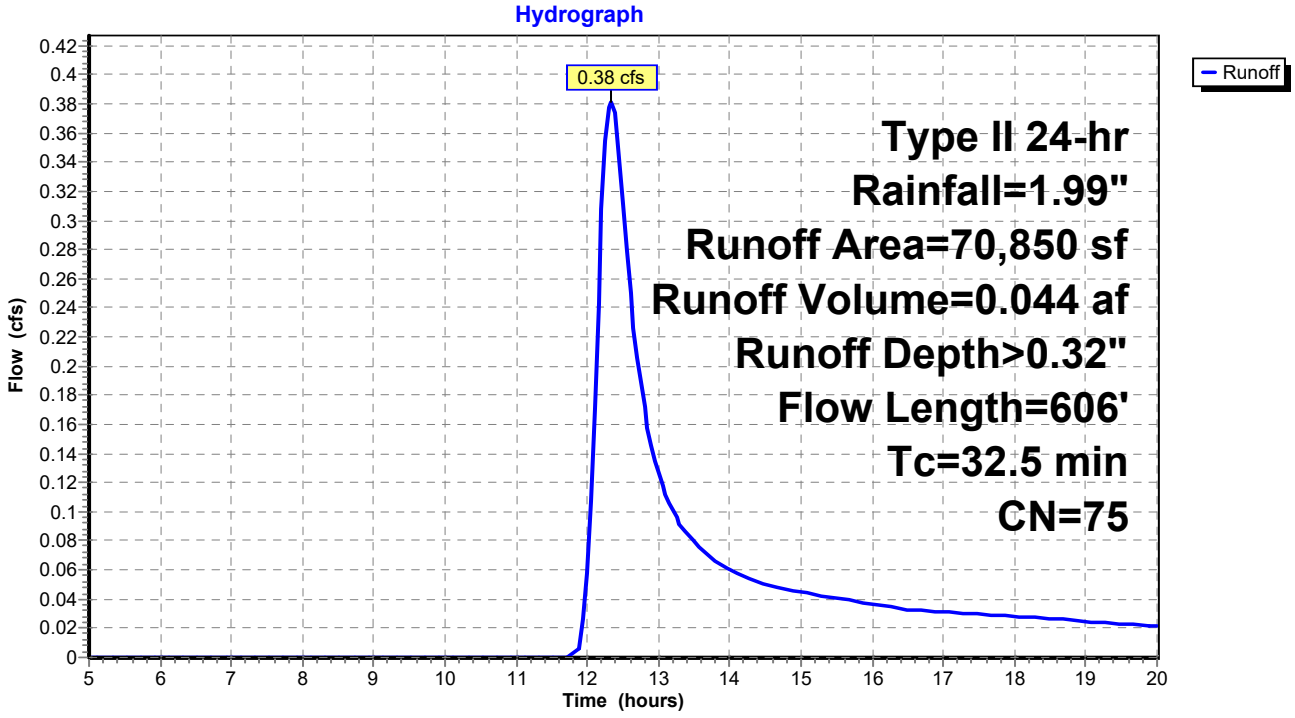
Runoff = 0.38 cfs @ 12.33 hrs, Volume= 0.044 af, Depth> 0.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=1.99"

Area (sf)	CN	Description
40,206	77	2 acre lots, 12% imp, HSG C
30,644	72	Woods/grass comb., Good, HSG C
70,850	75	Weighted Average
66,025		93.19% Pervious Area
4,825		6.81% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.9	100	0.0300	0.08		**Sheet Flow, First 100' Flowpath** Woods: Light underbrush n= 0.400 P2= 2.70"
12.6	506	0.0180	0.67		**Shallow Concentrated Flow, Balance of Longest Flowpath** Woodland Kv= 5.0 fps
32.5	606	Total			

Subcatchment OSC-3: Off-Site Subcatchment 3



Summary for Subcatchment PSC-1: Proposed Subcatchment 1

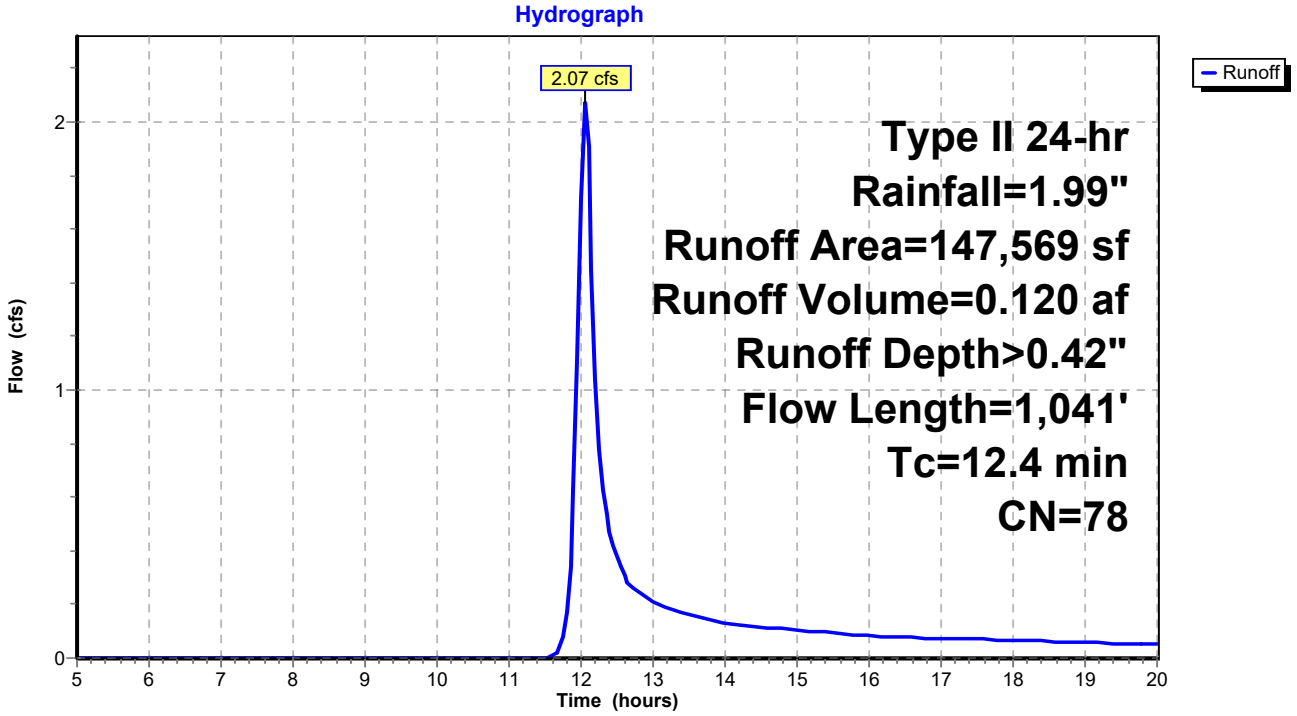
Runoff = 2.07 cfs @ 12.06 hrs, Volume= 0.120 af, Depth> 0.42"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=1.99"

	Area (sf)	CN	Description
*	22,354	98	Paved parking, rooftops, road, HSG C
	125,215	74	>75% Grass cover, Good, HSG C
	147,569	78	Weighted Average
	125,215		84.85% Pervious Area
	22,354		15.15% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	100	0.0500	0.15		**Sheet Flow, First 100' Flowpath** Grass: Dense n= 0.240 P2= 2.70"
0.5	43	0.0480	1.53		**Shallow Concentrated Flow, Balance of Flow to Pavement** Short Grass Pasture Kv= 7.0 fps
0.2	25	0.0150	2.49		**Shallow Concentrated Flow, Pavement** Paved Kv= 20.3 fps
0.9	873	0.0180	16.26	260.24	**Trap/Vee/Rect Channel Flow, Balance of Longest Flowpath** Bot.W=2.00' D=2.00' Z= 3.0 '/' Top.W=14.00' n= 0.013
12.4	1,041	Total			

Subcatchment PSC-1: Proposed Subcatchment 1



Summary for Subcatchment PSC-2: Proposed Subcatchment 2

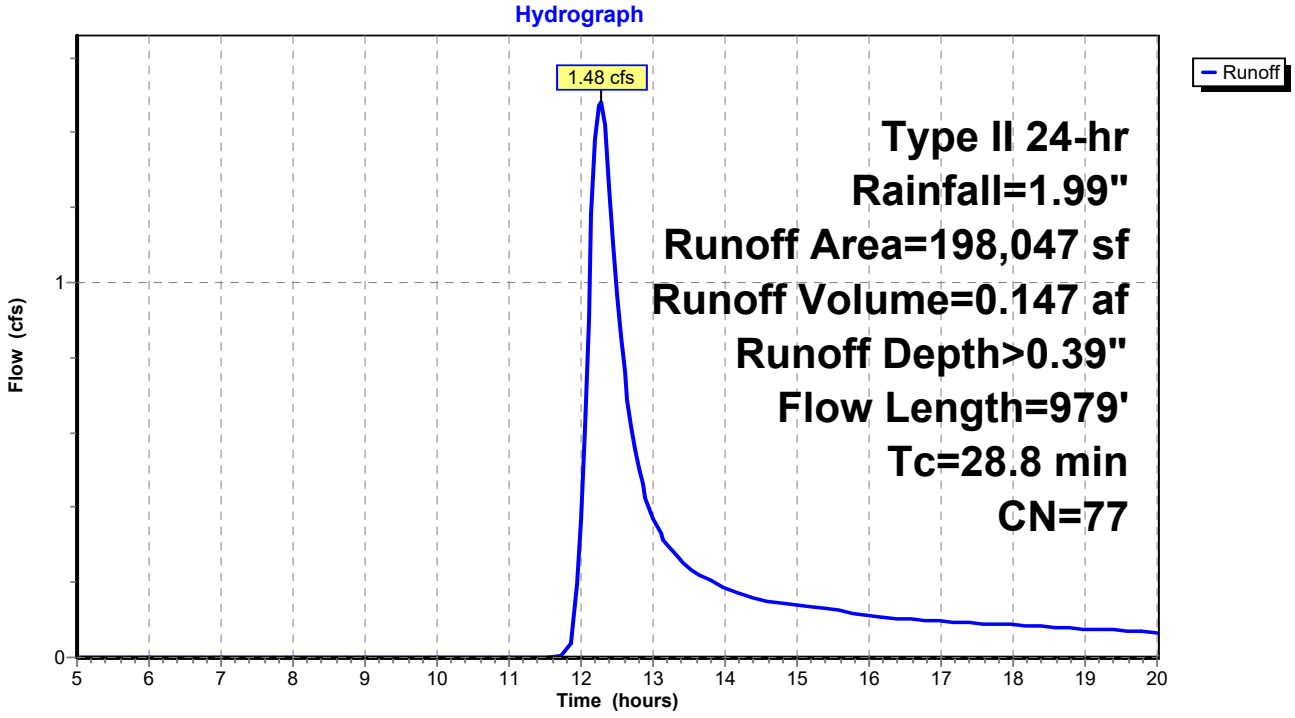
Runoff = 1.48 cfs @ 12.27 hrs, Volume= 0.147 af, Depth> 0.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=1.99"

	Area (sf)	CN	Description
*	21,230	98	Paved parking, rooftops, road, HSG C
	176,817	74	>75% Grass cover, Good, HSG C
	198,047	77	Weighted Average
	176,817		89.28% Pervious Area
	21,230		10.72% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.2	100	0.0300	0.13		**Sheet Flow, First 100' Flowpath** Grass: Dense n= 0.240 P2= 2.70"
15.6	879	0.0180	0.94		**Shallow Concentrated Flow, Balance of Flow to Pavement** Short Grass Pasture Kv= 7.0 fps
28.8	979	Total			

Subcatchment PSC-2: Proposed Subcatchment 2



Summary for Reach 24" Culvert: 24" Culvert

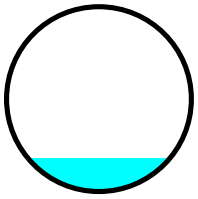
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 16.441 ac, 7.01% Impervious, Inflow Depth > 0.17"
Inflow = 0.89 cfs @ 12.84 hrs, Volume= 0.232 af
Outflow = 0.89 cfs @ 12.86 hrs, Volume= 0.232 af, Atten= 0%, Lag= 0.7 min

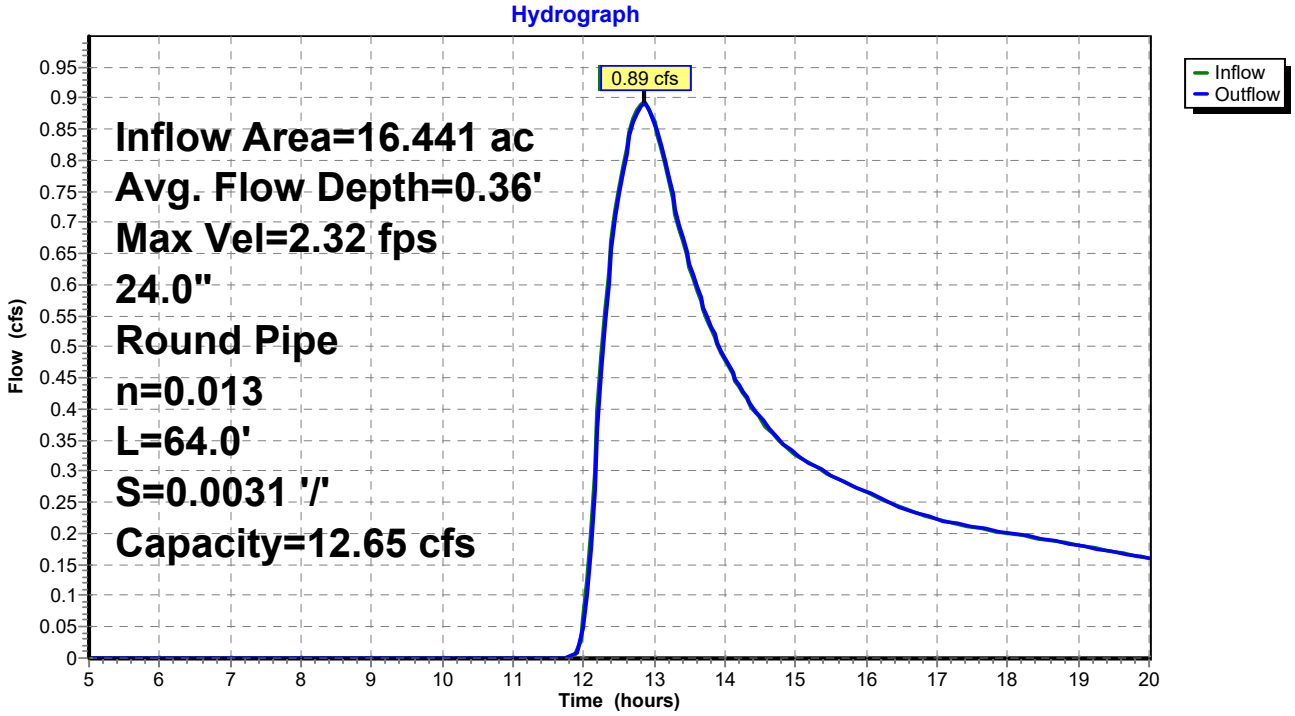
Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.32 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 1.67 fps, Avg. Travel Time= 0.6 min

Peak Storage= 25 cf @ 12.85 hrs
Average Depth at Peak Storage= 0.36'
Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 12.65 cfs

24.0" Round Pipe
n= 0.013
Length= 64.0' Slope= 0.0031 '/'
Inlet Invert= 961.50', Outlet Invert= 961.30'



Reach 24" Culvert: 24" Culvert



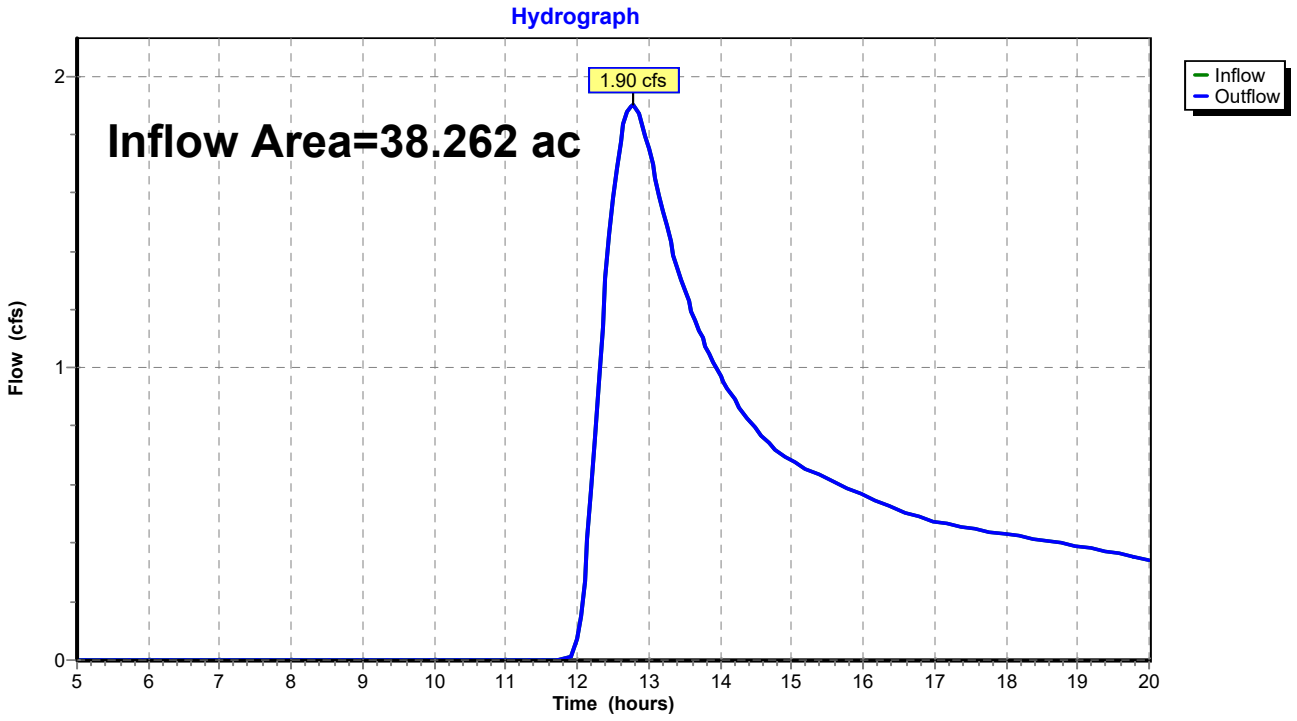
Summary for Reach DPE: Design Point Summation - Existing

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 38.262 ac, 3.01% Impervious, Inflow Depth > 0.15"
Inflow = 1.90 cfs @ 12.78 hrs, Volume= 0.478 af
Outflow = 1.90 cfs @ 12.78 hrs, Volume= 0.478 af, Atten= 0%, Lag= 0.0 min

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

Reach DPE: Design Point Summation - Existing



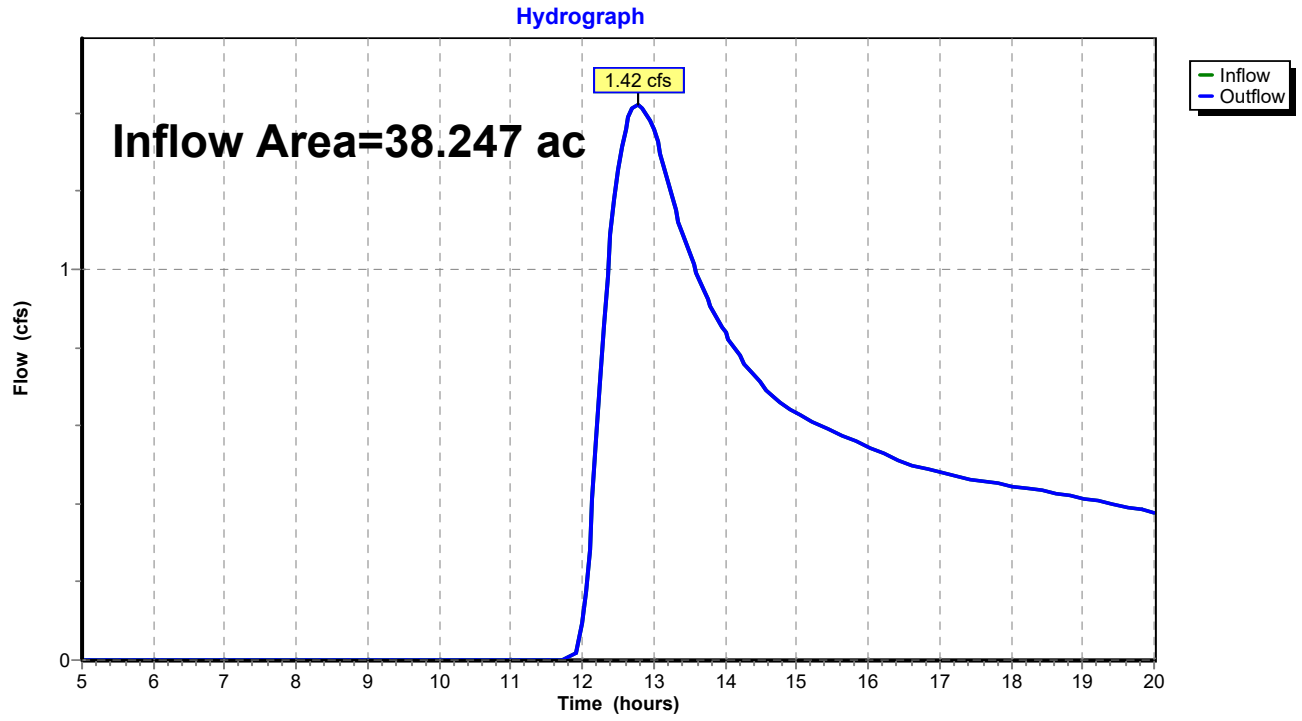
Summary for Reach DPP: Design Point Summation - Proposed

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 38.247 ac, 5.63% Impervious, Inflow Depth > 0.14"
Inflow = 1.42 cfs @ 12.77 hrs, Volume= 0.431 af
Outflow = 1.42 cfs @ 12.77 hrs, Volume= 0.431 af, Atten= 0%, Lag= 0.0 min

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

Reach DPP: Design Point Summation - Proposed



Summary for Pond P 1&2: Dry Pond 1 and 2

Inflow Area = 7.934 ac, 12.61% Impervious, Inflow Depth > 0.40"
Inflow = 2.81 cfs @ 12.10 hrs, Volume= 0.266 af
Outflow = 0.21 cfs @ 15.76 hrs, Volume= 0.132 af, Atten= 93%, Lag= 219.6 min
Discarded = 0.08 cfs @ 15.76 hrs, Volume= 0.053 af
Primary = 0.12 cfs @ 15.76 hrs, Volume= 0.080 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 963.48' @ 15.76 hrs Surf.Area= 7,220 sf Storage= 6,594 cf
Flood Elev= 967.00' Surf.Area= 0 sf Storage= 41,073 cf

Plug-Flow detention time= 228.7 min calculated for 0.132 af (50% of inflow)
Center-of-Mass det. time= 130.7 min (965.2 - 834.5)

Volume	Invert	Avail.Storage	Storage Description
#1	962.00'	41,073 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

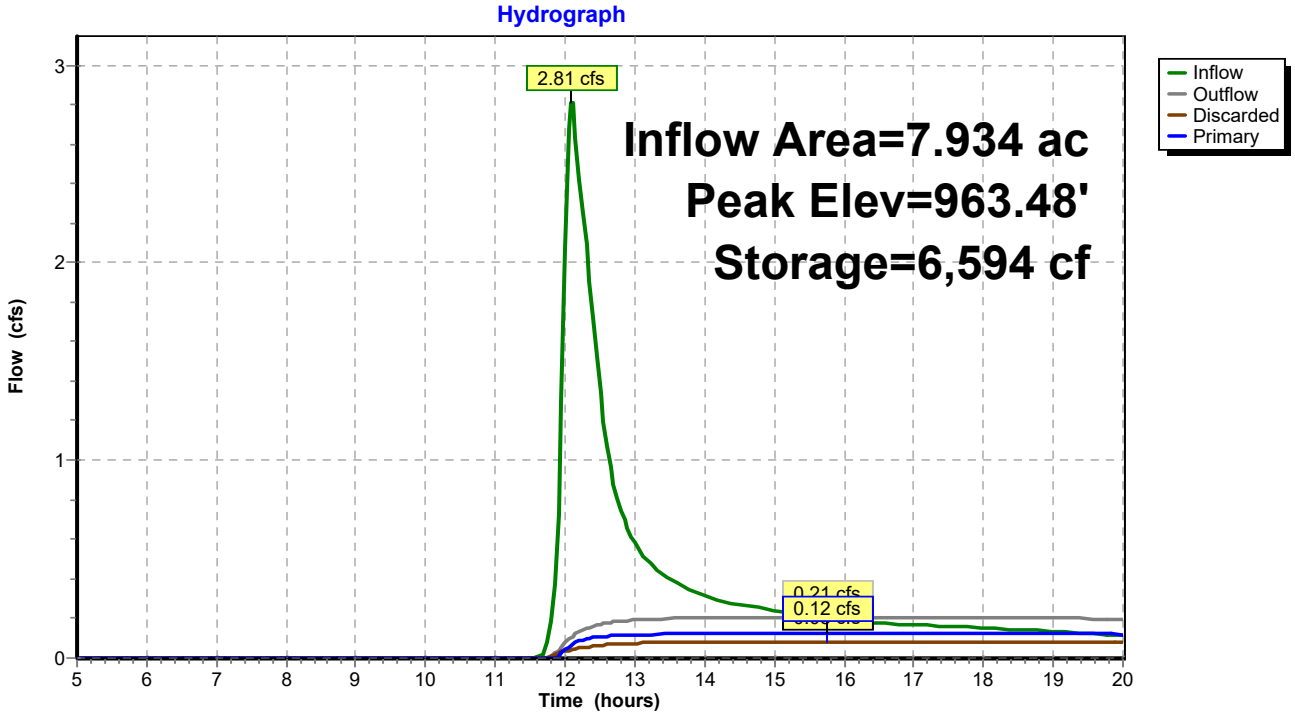
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
962.00	2,481	0	0
963.00	4,866	3,674	3,674
964.00	9,737	7,302	10,975
965.00	10,123	9,930	20,905
966.00	15,106	12,615	33,520
967.00	0	7,553	41,073

Device	Routing	Invert	Outlet Devices
#1	Discarded	962.00'	**0.500 in/hr Exfiltration over Surface area**
#2	Primary	962.00'	**15.0" Round Culvert** L= 53.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 962.00' / 961.70' S= 0.0057 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf
#3	Device 2	962.00'	**2.0" Vert. Orifice/Grate** C= 0.600
#4	Device 2	964.72'	**12.0" Vert. Orifice/Grate** C= 0.600
#5	Device 2	965.00'	**18.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.08 cfs @ 15.76 hrs HW=963.48' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.08 cfs)

Primary OutFlow Max=0.12 cfs @ 15.76 hrs HW=963.48' (Free Discharge)
└**2=Culvert** (Passes 0.12 cfs of 4.32 cfs potential flow)
  ├**3=Orifice/Grate** (Orifice Controls 0.12 cfs @ 5.70 fps)
  ├**4=Orifice/Grate** (Controls 0.00 cfs)
  └**5=Orifice/Grate** (Controls 0.00 cfs)

Pond P 1&2: Dry Pond 1 and 2



Britton_Model

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
13.361	65	2 acre lots, 12% imp, HSG B (EOS1, OSC 1)
5.856	77	2 acre lots, 12% imp, HSG C (EOS1, EOS3, OSC 1, OSC-3)
6.934	74	>75% Grass cover, Good, HSG C (PSC-1, PSC-2)
1.001	98	Paved parking, rooftops, road, HSG C (PSC-1, PSC-2)
17.255	58	Woods/grass comb., Good, HSG B (EOS1, ESC, OSC 1, OSC-2)
32.104	72	Woods/grass comb., Good, HSG C (EOS1, EOS3, ESC, OSC 1, OSC-2, OSC-3)
76.510	**69**	**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	13.361	5.856	0.000	0.000	19.216	2 acre lots, 12% imp	EOS1, EOS3, OSC 1, OSC-3
0.000	0.000	6.934	0.000	0.000	6.934	>75% Grass cover, Good	PSC-1, PSC-2
0.000	0.000	1.001	0.000	0.000	1.001	Paved parking, rooftops, road	PSC-1, PSC-2
0.000	17.255	32.104	0.000	0.000	49.359	Woods/grass comb., Good	EOS1, EOS3, ESC, OSC 1, OSC-2, OSC-3
0.000	**30.616**	**45.894**	**0.000**	**0.000**	**76.510**	**TOTAL AREA**	

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	24" Culvert	961.50	961.30	64.0	0.0031	0.013	24.0	0.0	0.0
2	P 1&2	962.00	961.70	53.0	0.0057	0.013	15.0	0.0	0.0

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment EOS1: Off-Site Runoff Area=645,339 sf 7.03% Impervious Runoff Depth>0.73"
Flow Length=2,082' Tc=63.8 min CN=68 Runoff=5.35 cfs 0.897 af

Subcatchment EOS3: Off-Site Runoff Area=70,850 sf 6.81% Impervious Runoff Depth>1.10"
Flow Length=606' Tc=32.5 min CN=75 Runoff=1.57 cfs 0.150 af

Subcatchment ESC: Existing Runoff Area=950,525 sf 0.00% Impervious Runoff Depth>0.69"
Flow Length=1,606' Tc=50.9 min CN=67 Runoff=8.61 cfs 1.249 af

Subcatchment OSC 1: Off-Site Runoff Area=645,339 sf 7.03% Impervious Runoff Depth>0.73"
Flow Length=2,082' Tc=63.8 min CN=68 Runoff=5.35 cfs 0.897 af

Subcatchment OSC-2: Off-Site Runoff Area=604,235 sf 0.00% Impervious Runoff Depth>0.60"
Flow Length=2,344' Tc=41.3 min CN=65 Runoff=5.31 cfs 0.698 af

Subcatchment OSC-3: Off-Site Runoff Area=70,850 sf 6.81% Impervious Runoff Depth>1.10"
Flow Length=606' Tc=32.5 min CN=75 Runoff=1.57 cfs 0.150 af

Subcatchment PSC-1: Proposed Runoff Area=147,569 sf 15.15% Impervious Runoff Depth>1.29"
Flow Length=1,041' Tc=12.4 min CN=78 Runoff=6.71 cfs 0.366 af

Subcatchment PSC-2: Proposed Runoff Area=198,047 sf 10.72% Impervious Runoff Depth>1.22"
Flow Length=979' Tc=28.8 min CN=77 Runoff=5.31 cfs 0.464 af

Reach 24" Culvert: 24" Culvert Avg. Flow Depth=0.97' Max Vel=3.98 fps Inflow=6.02 cfs 1.047 af
24.0" Round Pipe n=0.013 L=64.0' S=0.0031 '/' Capacity=12.65 cfs Outflow=6.01 cfs 1.046 af

Reach DPE: Design Point Summation - Existing Inflow=14.48 cfs 2.297 af
Outflow=14.48 cfs 2.297 af

Reach DPP: Design Point Summation - Proposed Inflow=10.92 cfs 2.048 af
Outflow=10.92 cfs 2.048 af

Pond P 1&2: Dry Pond 1 and 2 Peak Elev=965.06' Storage=21,567 cf Inflow=9.92 cfs 0.829 af
Discarded=0.12 cfs 0.082 af Primary=0.92 cfs 0.303 af Outflow=1.05 cfs 0.385 af

Total Runoff Area = 76.510 ac Runoff Volume = 4.871 af Average Runoff Depth = 0.76"
95.68% Pervious = 73.203 ac 4.32% Impervious = 3.307 ac

Summary for Subcatchment EOS1: Off-Site Subcatchment 1

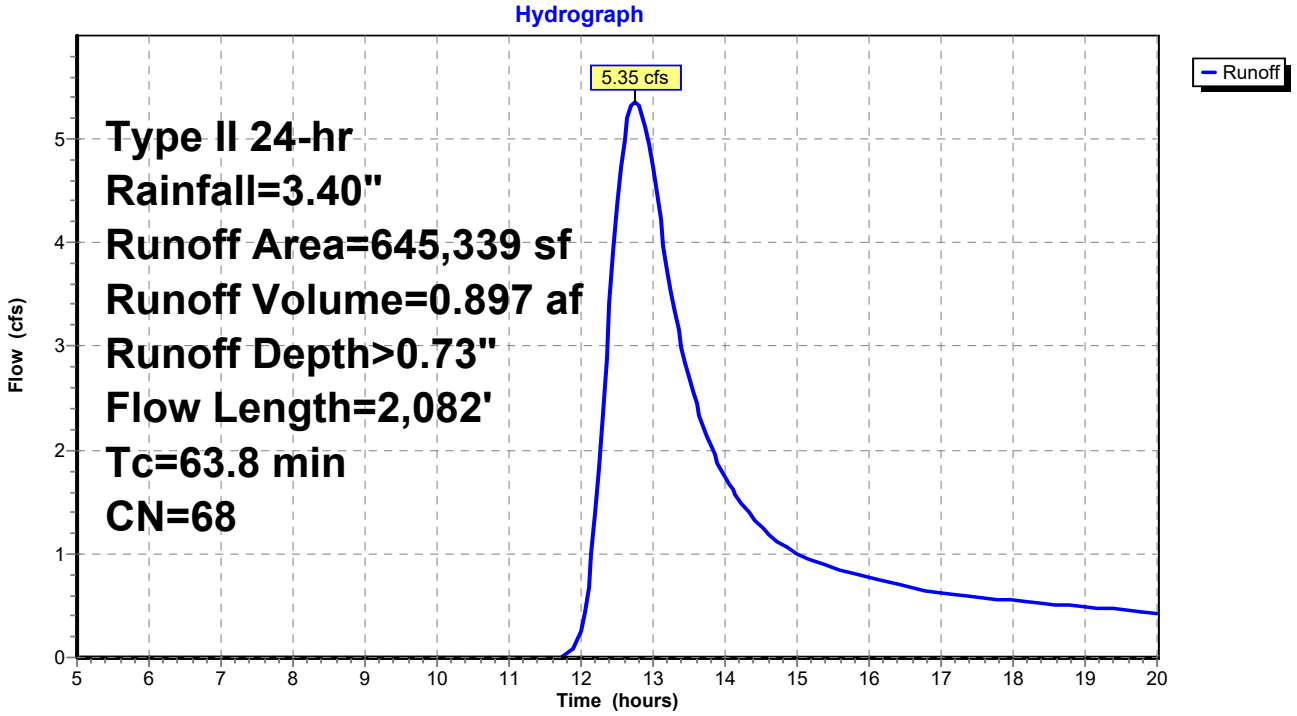
Runoff = 5.35 cfs @ 12.75 hrs, Volume= 0.897 af, Depth> 0.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=3.40"

Area (sf)	CN	Description
64,812	58	Woods/grass comb., Good, HSG B
87,332	77	2 acre lots, 12% imp, HSG C
290,993	65	2 acre lots, 12% imp, HSG B
202,202	72	Woods/grass comb., Good, HSG C
645,339	68	Weighted Average
599,940		92.97% Pervious Area
45,399		7.03% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.6	100	0.0650	0.11		**Sheet Flow, First 100' Flowpath** Woods: Light underbrush n= 0.400 P2= 2.70"
49.2	1,982	0.0180	0.67		**Shallow Concentrated Flow, Balance of Flow to Swale** Woodland Kv= 5.0 fps
63.8	2,082	Total			

Subcatchment EOS1: Off-Site Subcatchment 1



Summary for Subcatchment EOS3: Off-Site Subcatchment 3

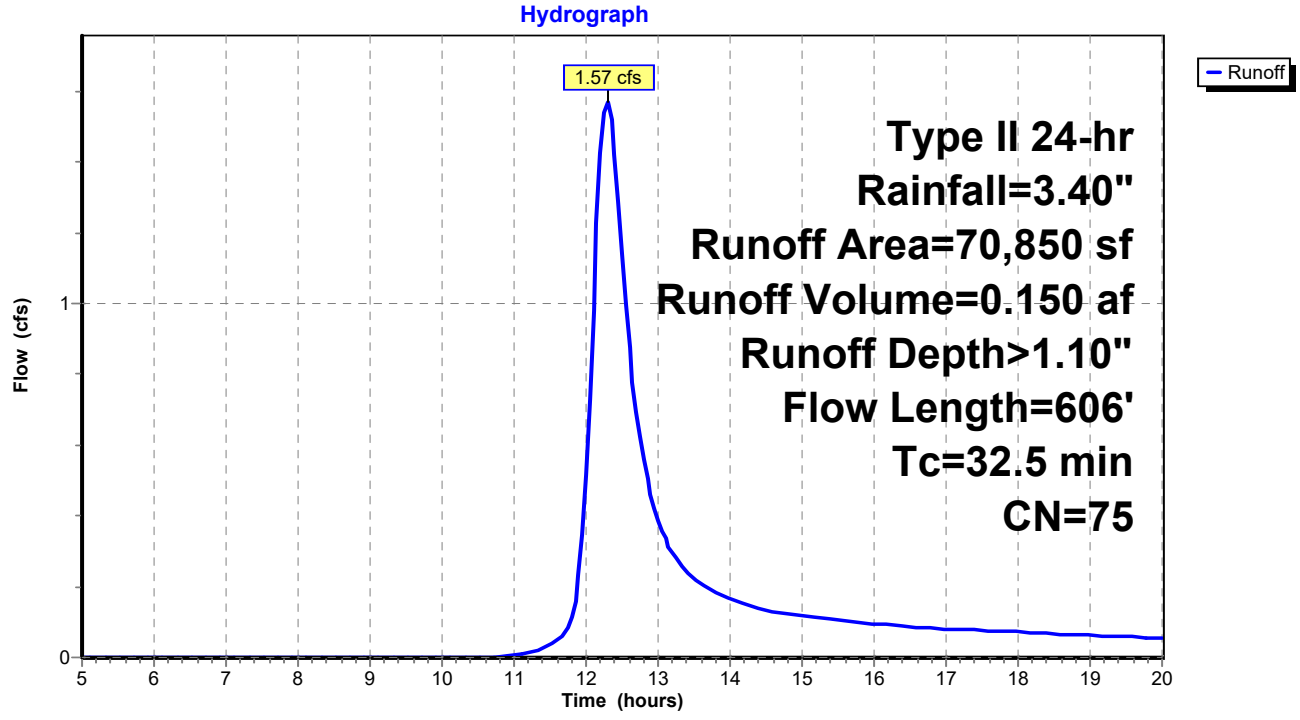
Runoff = 1.57 cfs @ 12.29 hrs, Volume= 0.150 af, Depth> 1.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=3.40"

Area (sf)	CN	Description
40,206	77	2 acre lots, 12% imp, HSG C
30,644	72	Woods/grass comb., Good, HSG C
70,850	75	Weighted Average
66,025		93.19% Pervious Area
4,825		6.81% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.9	100	0.0300	0.08		**Sheet Flow, First 100' Flowpath** Woods: Light underbrush n= 0.400 P2= 2.70"
12.6	506	0.0180	0.67		**Shallow Concentrated Flow, Balance of Longest Flowpath** Woodland Kv= 5.0 fps
32.5	606	Total			

Subcatchment EOS3: Off-Site Subcatchment 3



Summary for Subcatchment ESC: Existing Subcatchment

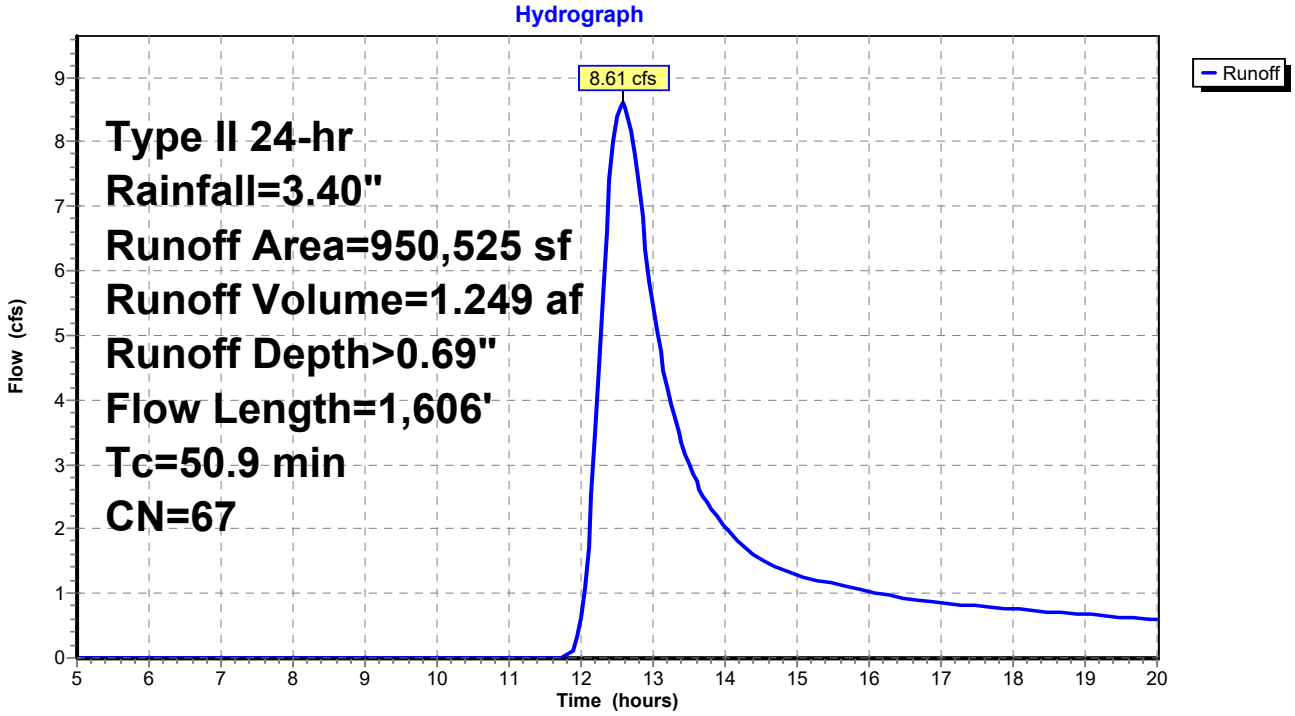
Runoff = 8.61 cfs @ 12.58 hrs, Volume= 1.249 af, Depth> 0.69"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=3.40"

Area (sf)	CN	Description
334,278	58	Woods/grass comb., Good, HSG B
616,247	72	Woods/grass comb., Good, HSG C
950,525	67	Weighted Average
950,525		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.6	150	0.0700	0.13		**Sheet Flow, First 150' Flowpath** Woods: Light underbrush n= 0.400 P2= 2.70"
31.3	1,456	0.0240	0.77		**Shallow Concentrated Flow, Balance of Longest Flowpath** Woodland Kv= 5.0 fps
50.9	1,606	Total			

Subcatchment ESC: Existing Subcatchment



Summary for Subcatchment OSC 1: Off-Site Subcatchment 1

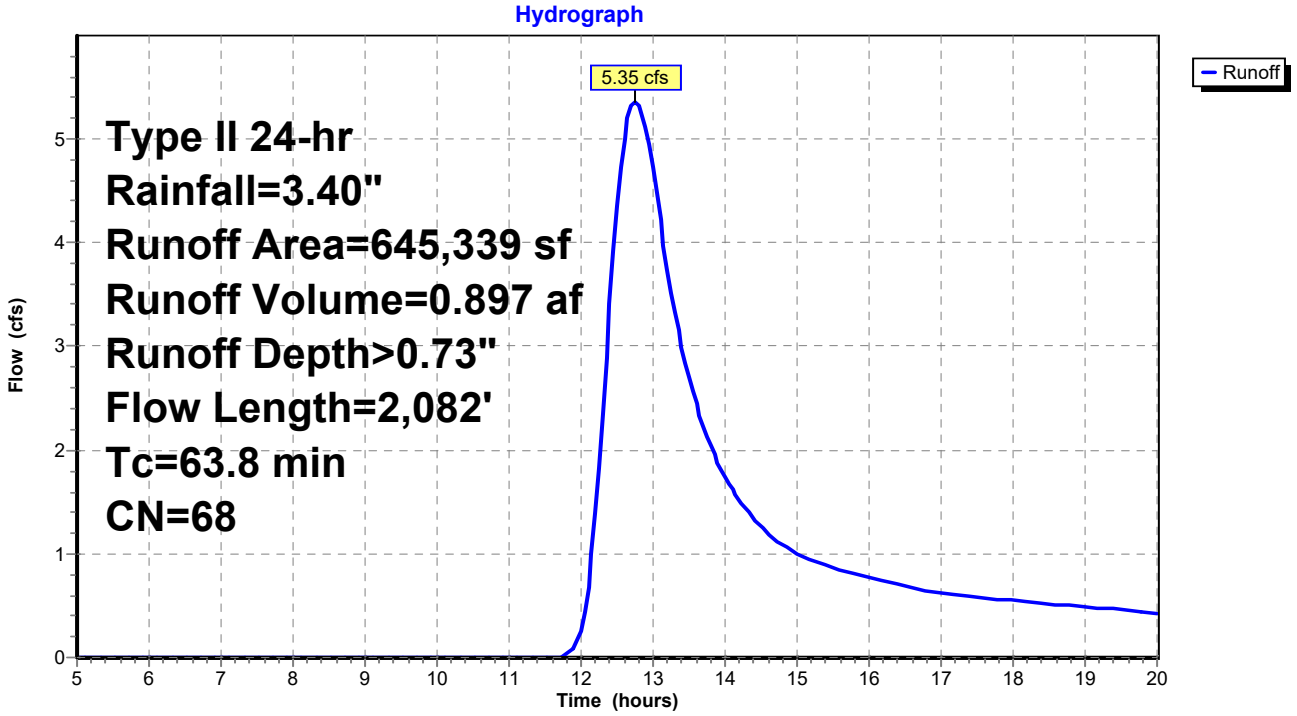
Runoff = 5.35 cfs @ 12.75 hrs, Volume= 0.897 af, Depth> 0.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=3.40"

Area (sf)	CN	Description
64,812	58	Woods/grass comb., Good, HSG B
87,332	77	2 acre lots, 12% imp, HSG C
290,993	65	2 acre lots, 12% imp, HSG B
202,202	72	Woods/grass comb., Good, HSG C
645,339	68	Weighted Average
599,940		92.97% Pervious Area
45,399		7.03% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.6	100	0.0650	0.11		**Sheet Flow, First 100' Flowpath** Woods: Light underbrush n= 0.400 P2= 2.70"
49.2	1,982	0.0180	0.67		**Shallow Concentrated Flow, Balance of Flow to Swale** Woodland Kv= 5.0 fps
63.8	2,082	Total			

Subcatchment OSC 1: Off-Site Subcatchment 1



Summary for Subcatchment OSC-2: Off-Site Subcatchment 2

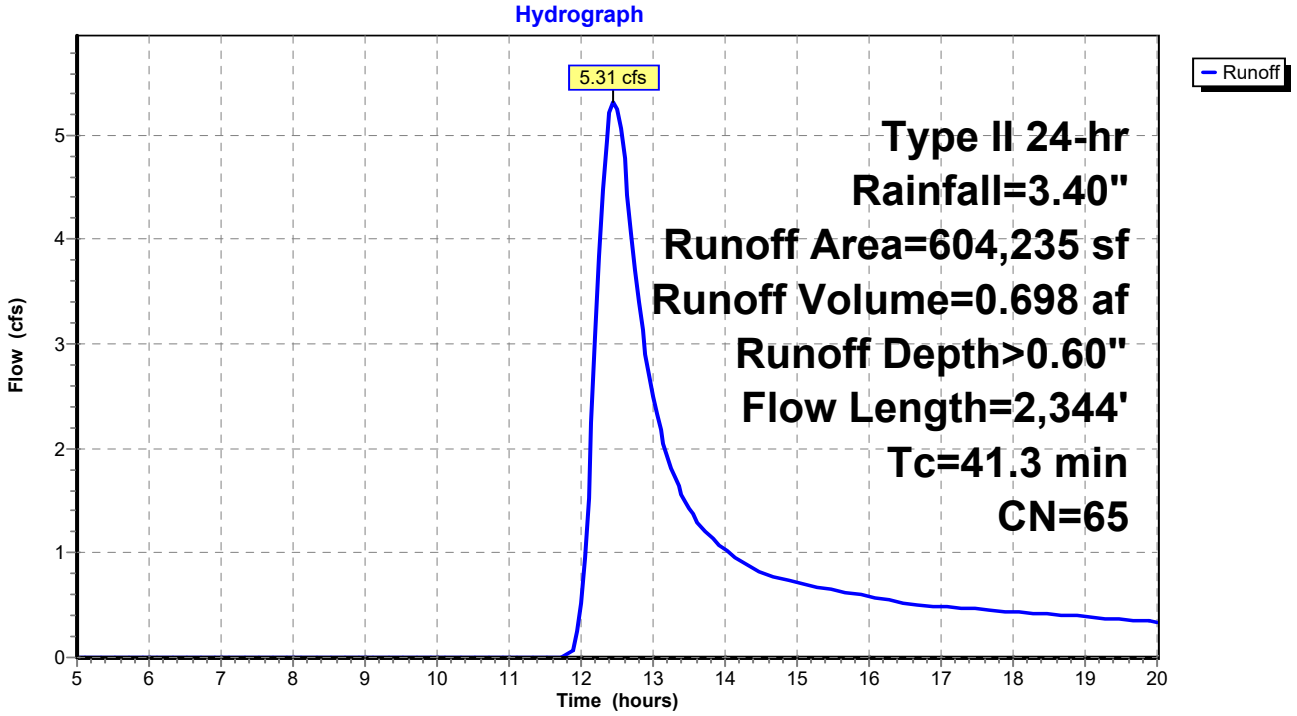
Runoff = 5.31 cfs @ 12.45 hrs, Volume= 0.698 af, Depth> 0.60"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=3.40"

Area (sf)	CN	Description
287,733	58	Woods/grass comb., Good, HSG B
316,502	72	Woods/grass comb., Good, HSG C
604,235	65	Weighted Average
604,235		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.2	100	0.0700	0.12		**Sheet Flow, First 100' Flowpath** Woods: Light underbrush n= 0.400 P2= 2.70"
24.2	1,102	0.0230	0.76		**Shallow Concentrated Flow, Balance of Flow to Swale** Woodland Kv= 5.0 fps
2.9	1,142	0.0180	6.51	65.06	**Trap/Vee/Rect Channel Flow, Balance of Longest Flowpath** Bot.W=2.00' D=2.00' Z= 3.0 & 0.0 '/' Top.W=8.00' n= 0.030
41.3	2,344	Total			

Subcatchment OSC-2: Off-Site Subcatchment 2



Summary for Subcatchment OSC-3: Off-Site Subcatchment 3

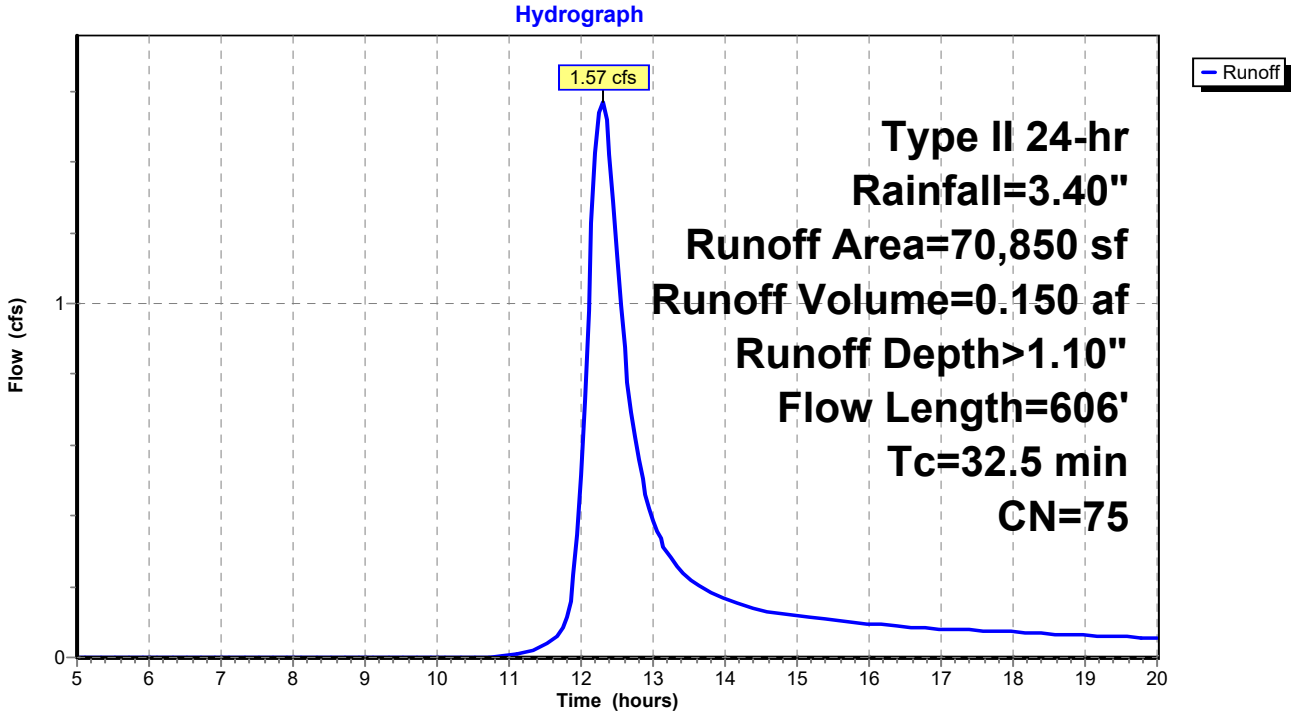
Runoff = 1.57 cfs @ 12.29 hrs, Volume= 0.150 af, Depth> 1.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=3.40"

Area (sf)	CN	Description
40,206	77	2 acre lots, 12% imp, HSG C
30,644	72	Woods/grass comb., Good, HSG C
70,850	75	Weighted Average
66,025		93.19% Pervious Area
4,825		6.81% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.9	100	0.0300	0.08		**Sheet Flow, First 100' Flowpath** Woods: Light underbrush n= 0.400 P2= 2.70"
12.6	506	0.0180	0.67		**Shallow Concentrated Flow, Balance of Longest Flowpath** Woodland Kv= 5.0 fps
32.5	606	Total			

Subcatchment OSC-3: Off-Site Subcatchment 3



Summary for Subcatchment PSC-1: Proposed Subcatchment 1

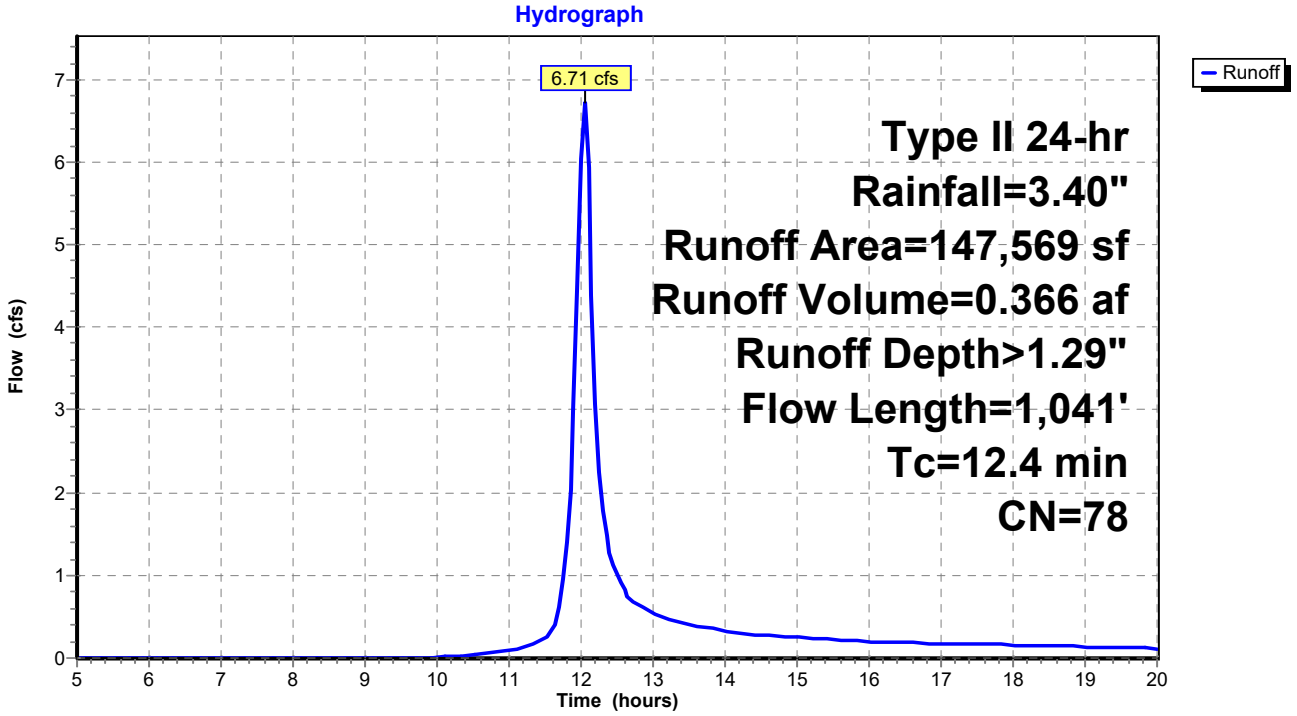
Runoff = 6.71 cfs @ 12.05 hrs, Volume= 0.366 af, Depth> 1.29"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=3.40"

	Area (sf)	CN	Description
*	22,354	98	Paved parking, rooftops, road, HSG C
	125,215	74	>75% Grass cover, Good, HSG C
	147,569	78	Weighted Average
	125,215		84.85% Pervious Area
	22,354		15.15% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	100	0.0500	0.15		**Sheet Flow, First 100' Flowpath** Grass: Dense n= 0.240 P2= 2.70"
0.5	43	0.0480	1.53		**Shallow Concentrated Flow, Balance of Flow to Pavement** Short Grass Pasture Kv= 7.0 fps
0.2	25	0.0150	2.49		**Shallow Concentrated Flow, Pavement** Paved Kv= 20.3 fps
0.9	873	0.0180	16.26	260.24	**Trap/Vee/Rect Channel Flow, Balance of Longest Flowpath** Bot.W=2.00' D=2.00' Z= 3.0 '/' Top.W=14.00' n= 0.013
12.4	1,041	Total			

Subcatchment PSC-1: Proposed Subcatchment 1



Summary for Subcatchment PSC-2: Proposed Subcatchment 2

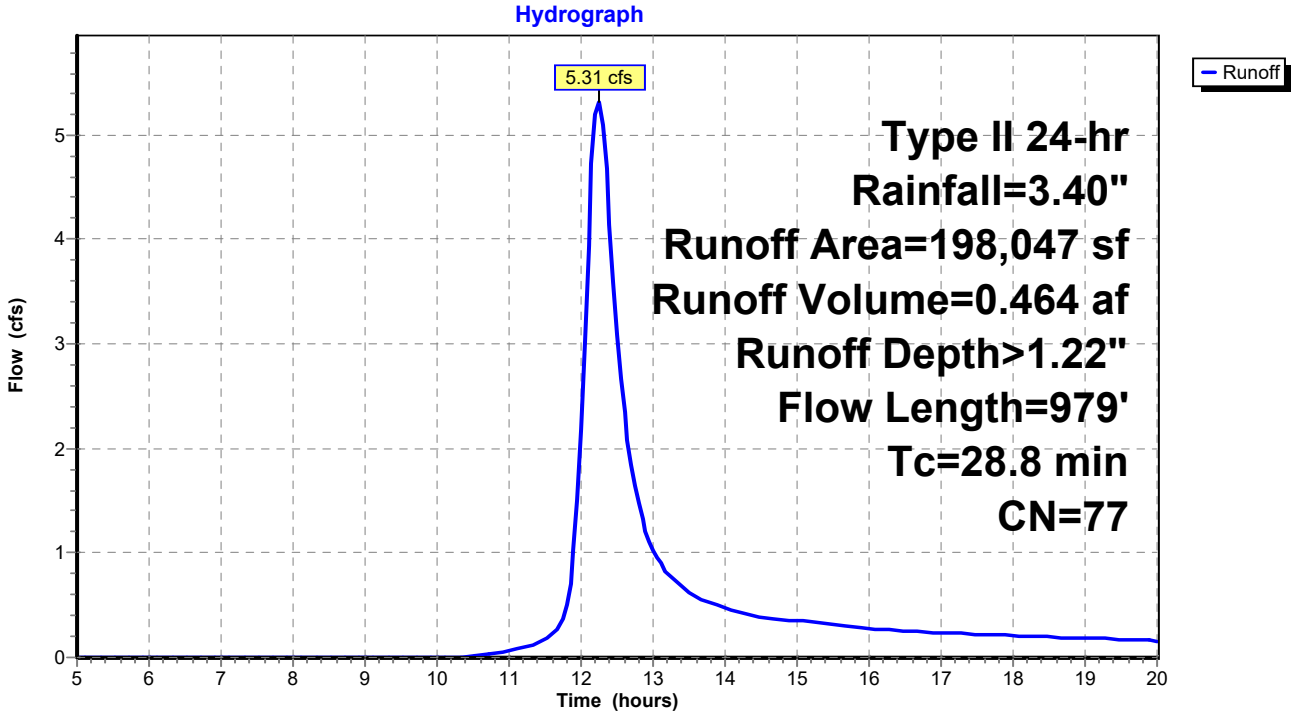
Runoff = 5.31 cfs @ 12.24 hrs, Volume= 0.464 af, Depth> 1.22"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=3.40"

	Area (sf)	CN	Description
*	21,230	98	Paved parking, rooftops, road, HSG C
	176,817	74	>75% Grass cover, Good, HSG C
	198,047	77	Weighted Average
	176,817		89.28% Pervious Area
	21,230		10.72% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.2	100	0.0300	0.13		**Sheet Flow, First 100' Flowpath** Grass: Dense n= 0.240 P2= 2.70"
15.6	879	0.0180	0.94		**Shallow Concentrated Flow, Balance of Flow to Pavement** Short Grass Pasture Kv= 7.0 fps
28.8	979	Total			

Subcatchment PSC-2: Proposed Subcatchment 2



Summary for Reach 24" Culvert: 24" Culvert

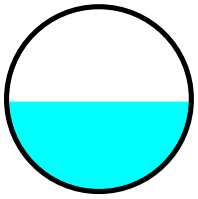
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 16.441 ac, 7.01% Impervious, Inflow Depth > 0.76"
Inflow = 6.02 cfs @ 12.70 hrs, Volume= 1.047 af
Outflow = 6.01 cfs @ 12.71 hrs, Volume= 1.046 af, Atten= 0%, Lag= 0.4 min

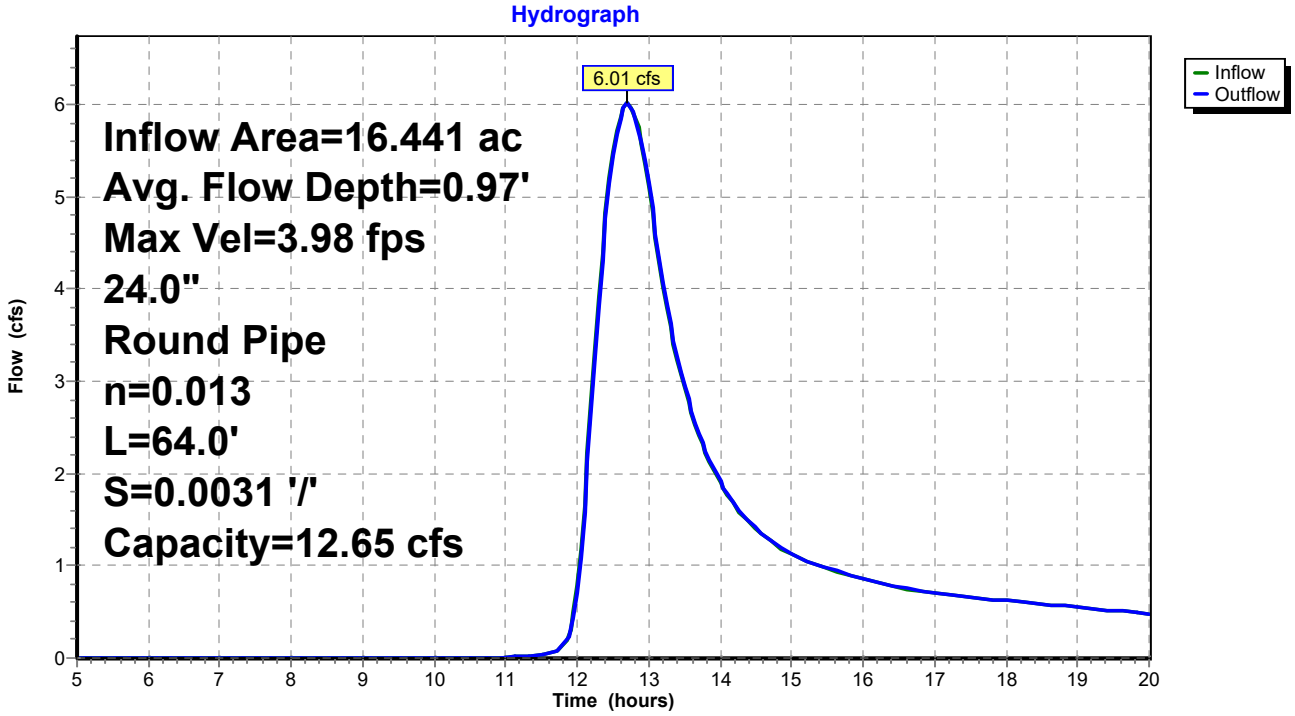
Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.98 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 2.27 fps, Avg. Travel Time= 0.5 min

Peak Storage= 97 cf @ 12.70 hrs
Average Depth at Peak Storage= 0.97'
Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 12.65 cfs

24.0" Round Pipe
n= 0.013
Length= 64.0' Slope= 0.0031 '/'
Inlet Invert= 961.50', Outlet Invert= 961.30'



Reach 24" Culvert: 24" Culvert



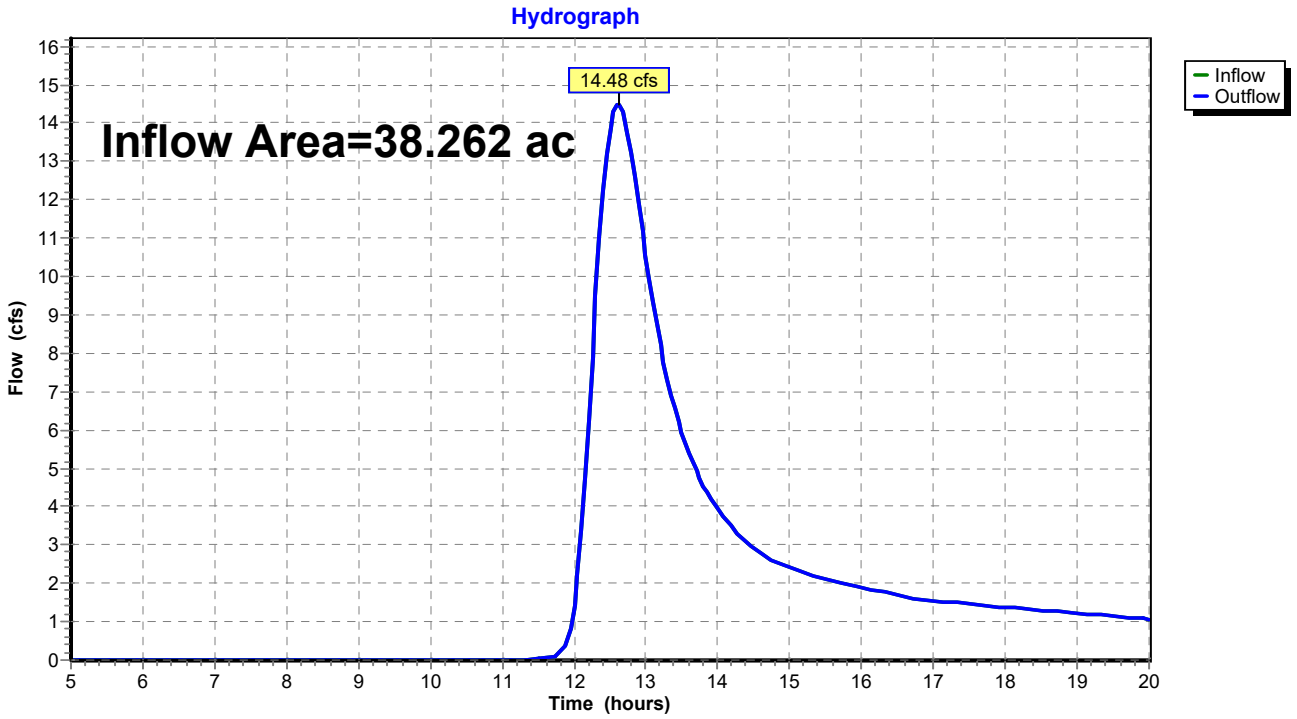
Summary for Reach DPE: Design Point Summation - Existing

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 38.262 ac, 3.01% Impervious, Inflow Depth > 0.72"
Inflow = 14.48 cfs @ 12.61 hrs, Volume= 2.297 af
Outflow = 14.48 cfs @ 12.61 hrs, Volume= 2.297 af, Atten= 0%, Lag= 0.0 min

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

Reach DPE: Design Point Summation - Existing



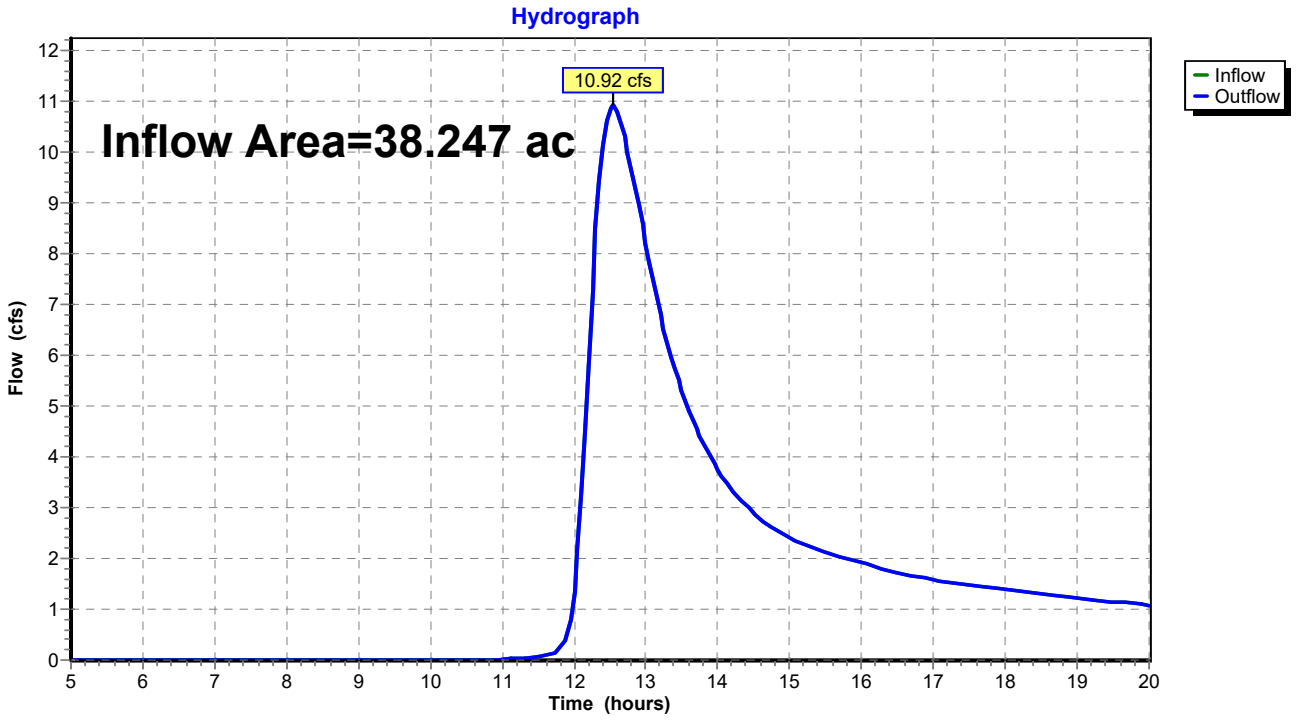
Summary for Reach DPP: Design Point Summation - Proposed

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 38.247 ac, 5.63% Impervious, Inflow Depth > 0.64"
Inflow = 10.92 cfs @ 12.54 hrs, Volume= 2.048 af
Outflow = 10.92 cfs @ 12.54 hrs, Volume= 2.048 af, Atten= 0%, Lag= 0.0 min

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

Reach DPP: Design Point Summation - Proposed



Summary for Pond P 1&2: Dry Pond 1 and 2

Inflow Area = 7.934 ac, 12.61% Impervious, Inflow Depth > 1.25"
Inflow = 9.92 cfs @ 12.08 hrs, Volume= 0.829 af
Outflow = 1.05 cfs @ 13.48 hrs, Volume= 0.385 af, Atten= 89%, Lag= 84.0 min
Discarded = 0.12 cfs @ 13.48 hrs, Volume= 0.082 af
Primary = 0.92 cfs @ 13.48 hrs, Volume= 0.303 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 965.06' @ 13.48 hrs Surf.Area= 10,444 sf Storage= 21,567 cf
Flood Elev= 967.00' Surf.Area= 0 sf Storage= 41,073 cf

Plug-Flow detention time= 208.5 min calculated for 0.383 af (46% of inflow)
Center-of-Mass det. time= 123.2 min (933.4 - 810.2)

Volume	Invert	Avail.Storage	Storage Description
#1	962.00'	41,073 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

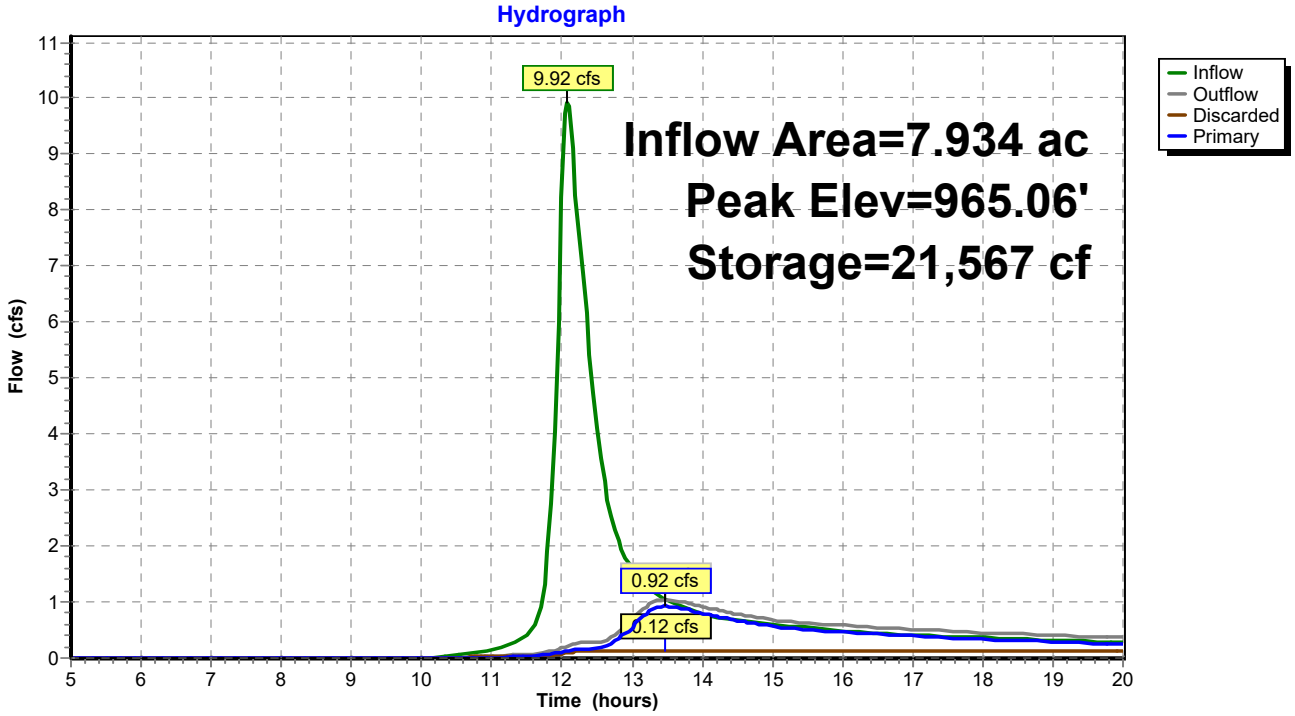
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
962.00	2,481	0	0
963.00	4,866	3,674	3,674
964.00	9,737	7,302	10,975
965.00	10,123	9,930	20,905
966.00	15,106	12,615	33,520
967.00	0	7,553	41,073

Device	Routing	Invert	Outlet Devices
#1	Discarded	962.00'	**0.500 in/hr Exfiltration over Surface area**
#2	Primary	962.00'	**15.0" Round Culvert** L= 53.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 962.00' / 961.70' S= 0.0057 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf
#3	Device 2	962.00'	**2.0" Vert. Orifice/Grate** C= 0.600
#4	Device 2	964.72'	**12.0" Vert. Orifice/Grate** C= 0.600
#5	Device 2	965.00'	**18.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.12 cfs @ 13.48 hrs HW=965.06' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.12 cfs)

Primary OutFlow Max=0.91 cfs @ 13.48 hrs HW=965.06' (Free Discharge)
└**2=Culvert** (Passes 0.91 cfs of 7.29 cfs potential flow)
  ├**3=Orifice/Grate** (Orifice Controls 0.18 cfs @ 8.31 fps)
  ├**4=Orifice/Grate** (Orifice Controls 0.48 cfs @ 2.00 fps)
  └**5=Orifice/Grate** (Weir Controls 0.25 cfs @ 0.83 fps)

Pond P 1&2: Dry Pond 1 and 2



Britton_Model

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
13.361	65	2 acre lots, 12% imp, HSG B (EOS1, OSC 1)
5.856	77	2 acre lots, 12% imp, HSG C (EOS1, EOS3, OSC 1, OSC-3)
6.934	74	>75% Grass cover, Good, HSG C (PSC-1, PSC-2)
1.001	98	Paved parking, rooftops, road, HSG C (PSC-1, PSC-2)
17.255	58	Woods/grass comb., Good, HSG B (EOS1, ESC, OSC 1, OSC-2)
32.104	72	Woods/grass comb., Good, HSG C (EOS1, EOS3, ESC, OSC 1, OSC-2, OSC-3)
76.510	**69**	**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	13.361	5.856	0.000	0.000	19.216	2 acre lots, 12% imp	EOS1, EOS3, OSC 1, OSC-3
0.000	0.000	6.934	0.000	0.000	6.934	>75% Grass cover, Good	PSC-1, PSC-2
0.000	0.000	1.001	0.000	0.000	1.001	Paved parking, rooftops, road	PSC-1, PSC-2
0.000	17.255	32.104	0.000	0.000	49.359	Woods/grass comb., Good	EOS1, EOS3, ESC, OSC 1, OSC-2, OSC-3
0.000	**30.616**	**45.894**	**0.000**	**0.000**	**76.510**	**TOTAL AREA**	

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	24" Culvert	961.50	961.30	64.0	0.0031	0.013	24.0	0.0	0.0
2	P 1&2	962.00	961.70	53.0	0.0057	0.013	15.0	0.0	0.0

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment EOS1: Off-Site Runoff Area=645,339 sf 7.03% Impervious Runoff Depth>1.18"
Flow Length=2,082' Tc=63.8 min CN=68 Runoff=9.27 cfs 1.456 af

Subcatchment EOS3: Off-Site Runoff Area=70,850 sf 6.81% Impervious Runoff Depth>1.66"
Flow Length=606' Tc=32.5 min CN=75 Runoff=2.40 cfs 0.225 af

Subcatchment ESC: Existing Runoff Area=950,525 sf 0.00% Impervious Runoff Depth>1.13"
Flow Length=1,606' Tc=50.9 min CN=67 Runoff=15.18 cfs 2.050 af

Subcatchment OSC 1: Off-Site Runoff Area=645,339 sf 7.03% Impervious Runoff Depth>1.18"
Flow Length=2,082' Tc=63.8 min CN=68 Runoff=9.27 cfs 1.456 af

Subcatchment OSC-2: Off-Site Runoff Area=604,235 sf 0.00% Impervious Runoff Depth>1.02"
Flow Length=2,344' Tc=41.3 min CN=65 Runoff=9.84 cfs 1.176 af

Subcatchment OSC-3: Off-Site Runoff Area=70,850 sf 6.81% Impervious Runoff Depth>1.66"
Flow Length=606' Tc=32.5 min CN=75 Runoff=2.40 cfs 0.225 af

Subcatchment PSC-1: Proposed Runoff Area=147,569 sf 15.15% Impervious Runoff Depth>1.89"
Flow Length=1,041' Tc=12.4 min CN=78 Runoff=9.80 cfs 0.535 af

Subcatchment PSC-2: Proposed Runoff Area=198,047 sf 10.72% Impervious Runoff Depth>1.81"
Flow Length=979' Tc=28.8 min CN=77 Runoff=7.93 cfs 0.685 af

Reach 24" Culvert: 24" Culvert Avg. Flow Depth=1.37' Max Vel=4.49 fps Inflow=10.29 cfs 1.680 af
24.0" Round Pipe n=0.013 L=64.0' S=0.0031 '/' Capacity=12.65 cfs Outflow=10.29 cfs 1.680 af

Reach DPE: Design Point Summation - Existing Inflow=25.23 cfs 3.731 af
Outflow=25.23 cfs 3.731 af

Reach DPP: Design Point Summation - Proposed Inflow=23.93 cfs 3.528 af
Outflow=23.93 cfs 3.528 af

Pond P 1&2: Dry Pond 1 and 2 Peak Elev=965.36' Storage=24,835 cf Inflow=14.74 cfs 1.219 af
Discarded=0.14 cfs 0.087 af Primary=4.91 cfs 0.672 af Outflow=5.05 cfs 0.759 af

Total Runoff Area = 76.510 ac Runoff Volume = 7.806 af Average Runoff Depth = 1.22"
95.68% Pervious = 73.203 ac 4.32% Impervious = 3.307 ac

Summary for Subcatchment EOS1: Off-Site Subcatchment 1

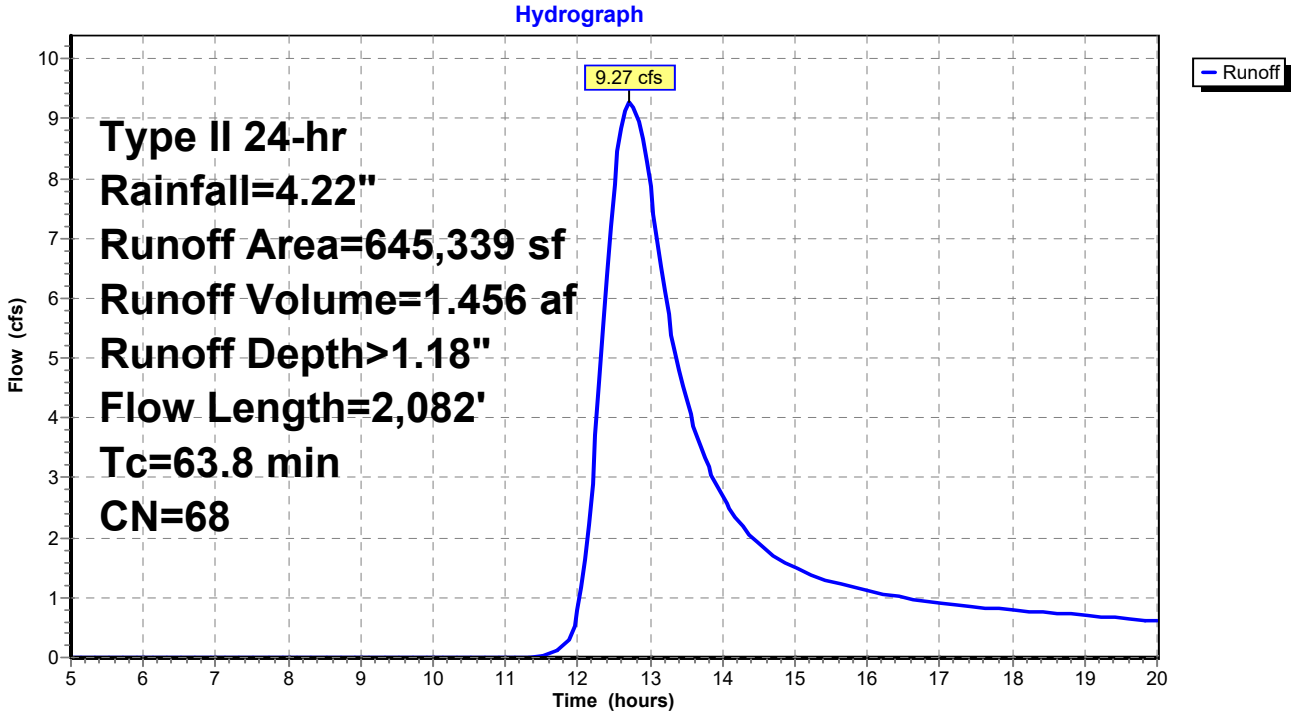
Runoff = 9.27 cfs @ 12.72 hrs, Volume= 1.456 af, Depth> 1.18"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=4.22"

Area (sf)	CN	Description
64,812	58	Woods/grass comb., Good, HSG B
87,332	77	2 acre lots, 12% imp, HSG C
290,993	65	2 acre lots, 12% imp, HSG B
202,202	72	Woods/grass comb., Good, HSG C
645,339	68	Weighted Average
599,940		92.97% Pervious Area
45,399		7.03% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.6	100	0.0650	0.11		**Sheet Flow, First 100' Flowpath** Woods: Light underbrush n= 0.400 P2= 2.70"
49.2	1,982	0.0180	0.67		**Shallow Concentrated Flow, Balance of Flow to Swale** Woodland Kv= 5.0 fps
63.8	2,082	Total			

Subcatchment EOS1: Off-Site Subcatchment 1



Summary for Subcatchment EOS3: Off-Site Subcatchment 3

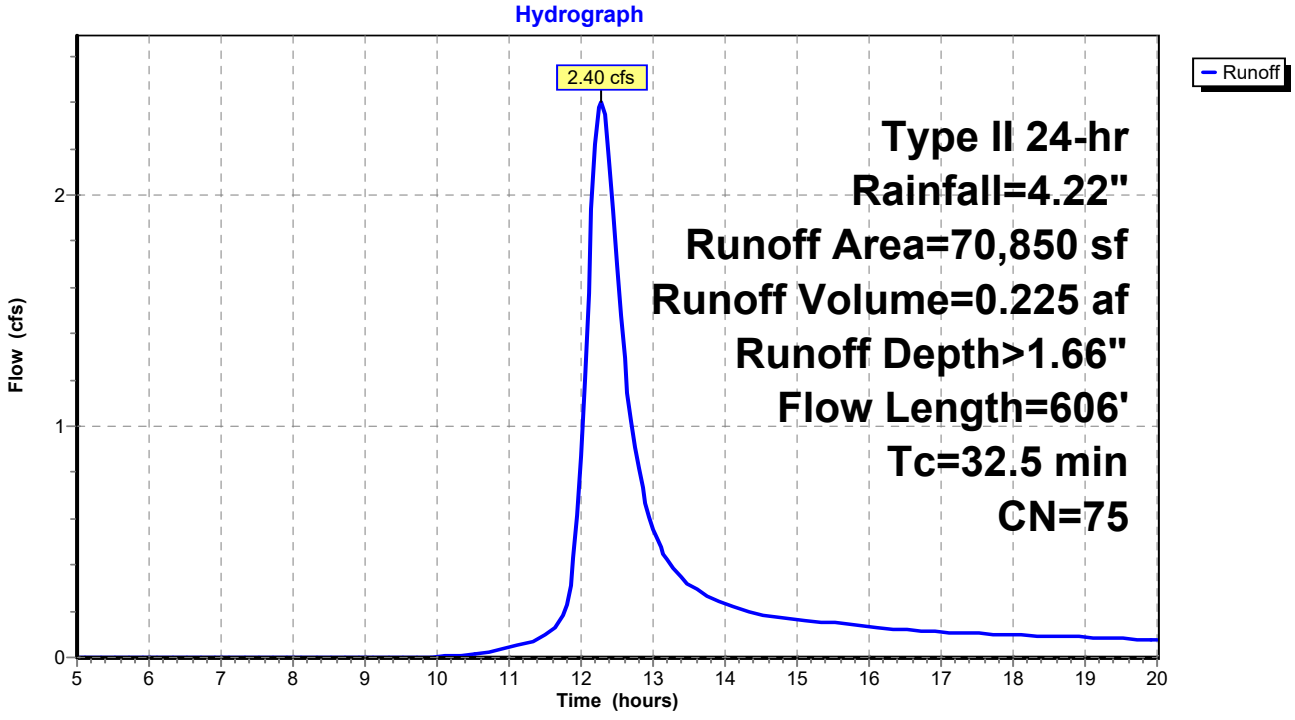
Runoff = 2.40 cfs @ 12.28 hrs, Volume= 0.225 af, Depth> 1.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=4.22"

Area (sf)	CN	Description
40,206	77	2 acre lots, 12% imp, HSG C
30,644	72	Woods/grass comb., Good, HSG C
70,850	75	Weighted Average
66,025		93.19% Pervious Area
4,825		6.81% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.9	100	0.0300	0.08		**Sheet Flow, First 100' Flowpath** Woods: Light underbrush n= 0.400 P2= 2.70"
12.6	506	0.0180	0.67		**Shallow Concentrated Flow, Balance of Longest Flowpath** Woodland Kv= 5.0 fps
32.5	606	Total			

Subcatchment EOS3: Off-Site Subcatchment 3



Summary for Subcatchment ESC: Existing Subcatchment

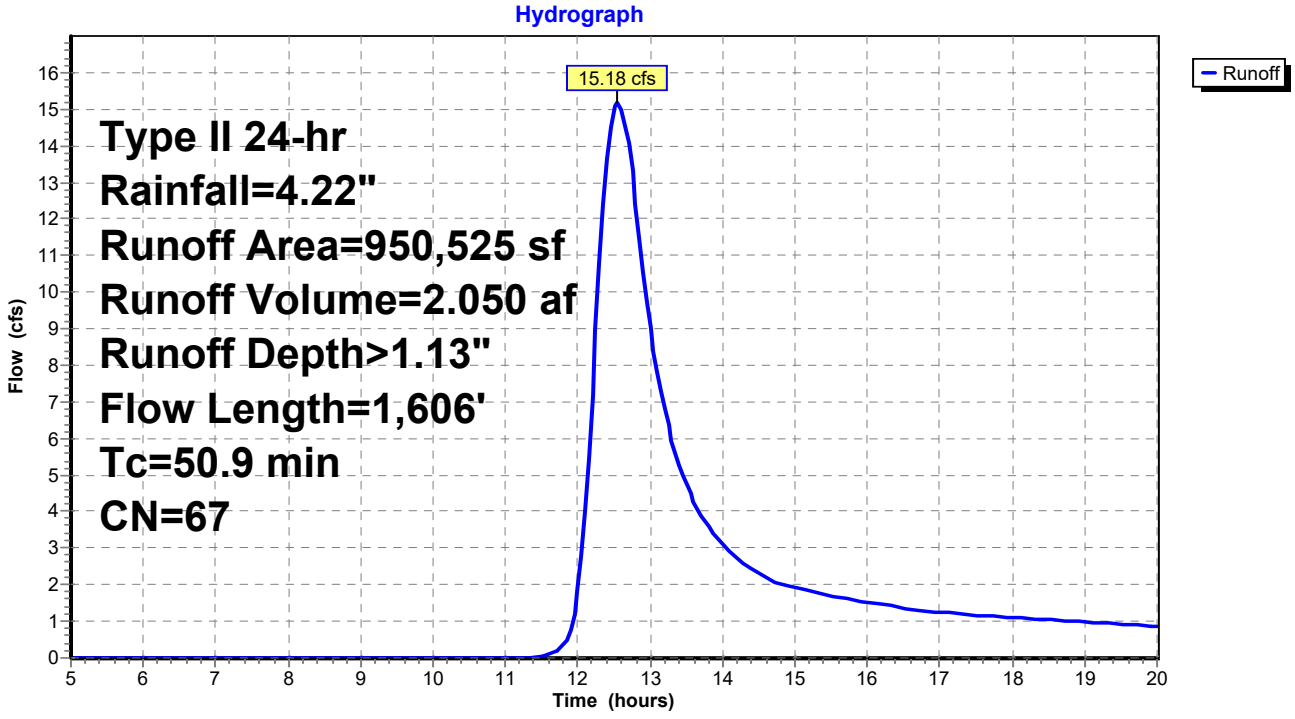
Runoff = 15.18 cfs @ 12.55 hrs, Volume= 2.050 af, Depth> 1.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=4.22"

Area (sf)	CN	Description
334,278	58	Woods/grass comb., Good, HSG B
616,247	72	Woods/grass comb., Good, HSG C
950,525	67	Weighted Average
950,525		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.6	150	0.0700	0.13		**Sheet Flow, First 150' Flowpath** Woods: Light underbrush n= 0.400 P2= 2.70"
31.3	1,456	0.0240	0.77		**Shallow Concentrated Flow, Balance of Longest Flowpath** Woodland Kv= 5.0 fps
50.9	1,606	Total			

Subcatchment ESC: Existing Subcatchment



Summary for Subcatchment OSC 1: Off-Site Subcatchment 1

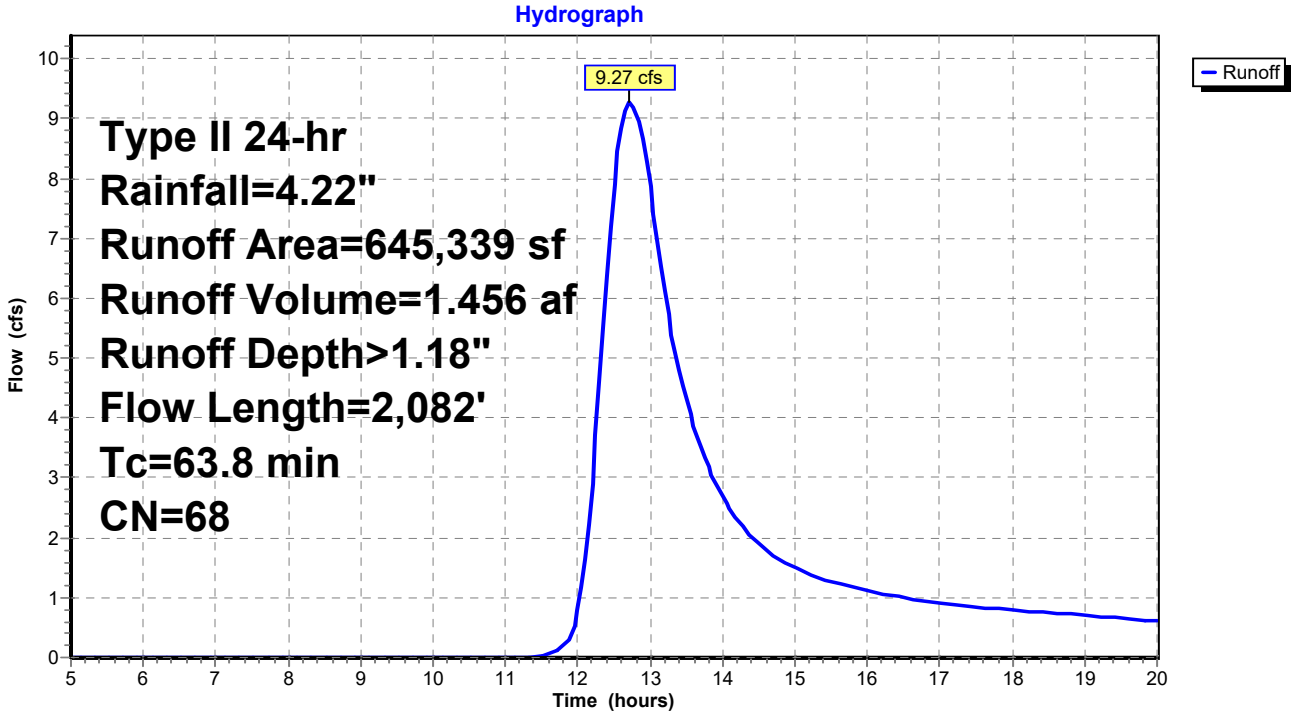
Runoff = 9.27 cfs @ 12.72 hrs, Volume= 1.456 af, Depth> 1.18"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=4.22"

Area (sf)	CN	Description
64,812	58	Woods/grass comb., Good, HSG B
87,332	77	2 acre lots, 12% imp, HSG C
290,993	65	2 acre lots, 12% imp, HSG B
202,202	72	Woods/grass comb., Good, HSG C
645,339	68	Weighted Average
599,940		92.97% Pervious Area
45,399		7.03% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.6	100	0.0650	0.11		**Sheet Flow, First 100' Flowpath** Woods: Light underbrush n= 0.400 P2= 2.70"
49.2	1,982	0.0180	0.67		**Shallow Concentrated Flow, Balance of Flow to Swale** Woodland Kv= 5.0 fps
63.8	2,082	Total			

Subcatchment OSC 1: Off-Site Subcatchment 1



Summary for Subcatchment OSC-2: Off-Site Subcatchment 2

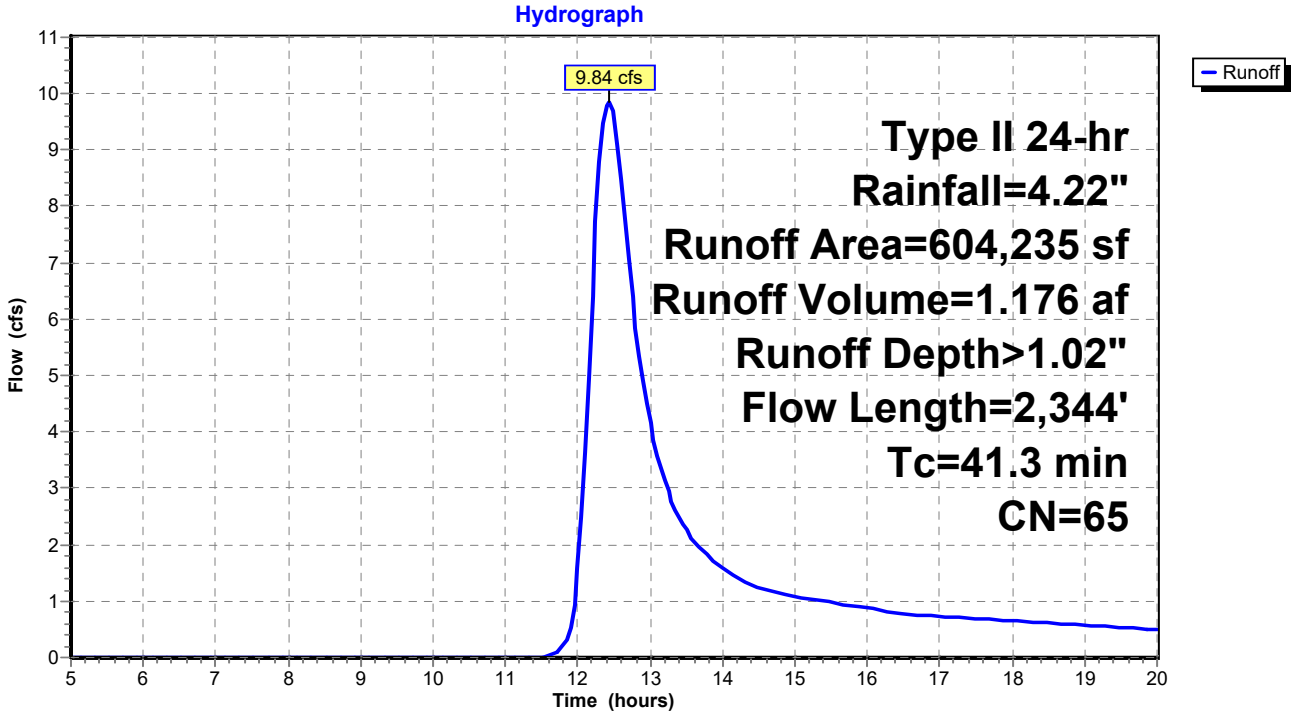
Runoff = 9.84 cfs @ 12.43 hrs, Volume= 1.176 af, Depth> 1.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=4.22"

Area (sf)	CN	Description
287,733	58	Woods/grass comb., Good, HSG B
316,502	72	Woods/grass comb., Good, HSG C
604,235	65	Weighted Average
604,235		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.2	100	0.0700	0.12		**Sheet Flow, First 100' Flowpath** Woods: Light underbrush n= 0.400 P2= 2.70"
24.2	1,102	0.0230	0.76		**Shallow Concentrated Flow, Balance of Flow to Swale** Woodland Kv= 5.0 fps
2.9	1,142	0.0180	6.51	65.06	**Trap/Vee/Rect Channel Flow, Balance of Longest Flowpath** Bot.W=2.00' D=2.00' Z= 3.0 & 0.0 '/' Top.W=8.00' n= 0.030
41.3	2,344	Total			

Subcatchment OSC-2: Off-Site Subcatchment 2



Summary for Subcatchment OSC-3: Off-Site Subcatchment 3

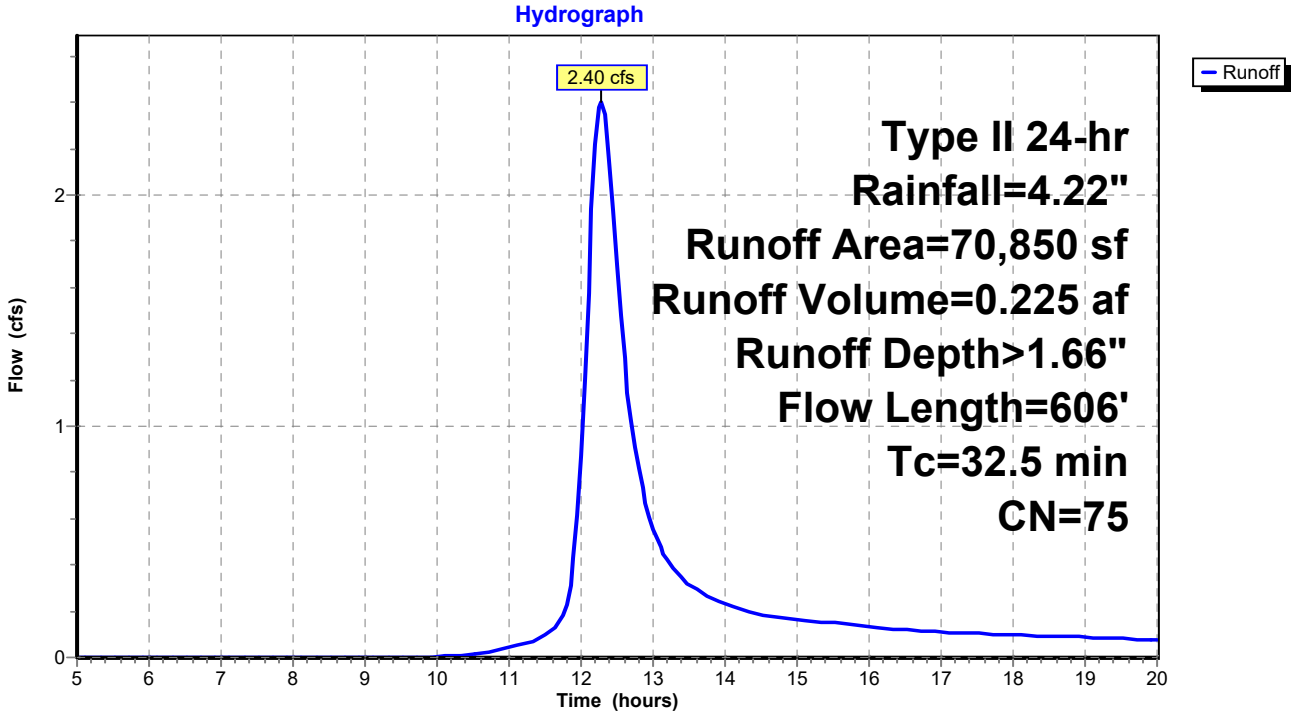
Runoff = 2.40 cfs @ 12.28 hrs, Volume= 0.225 af, Depth> 1.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=4.22"

Area (sf)	CN	Description
40,206	77	2 acre lots, 12% imp, HSG C
30,644	72	Woods/grass comb., Good, HSG C
70,850	75	Weighted Average
66,025		93.19% Pervious Area
4,825		6.81% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.9	100	0.0300	0.08		**Sheet Flow, First 100' Flowpath** Woods: Light underbrush n= 0.400 P2= 2.70"
12.6	506	0.0180	0.67		**Shallow Concentrated Flow, Balance of Longest Flowpath** Woodland Kv= 5.0 fps
32.5	606	Total			

Subcatchment OSC-3: Off-Site Subcatchment 3



Summary for Subcatchment PSC-1: Proposed Subcatchment 1

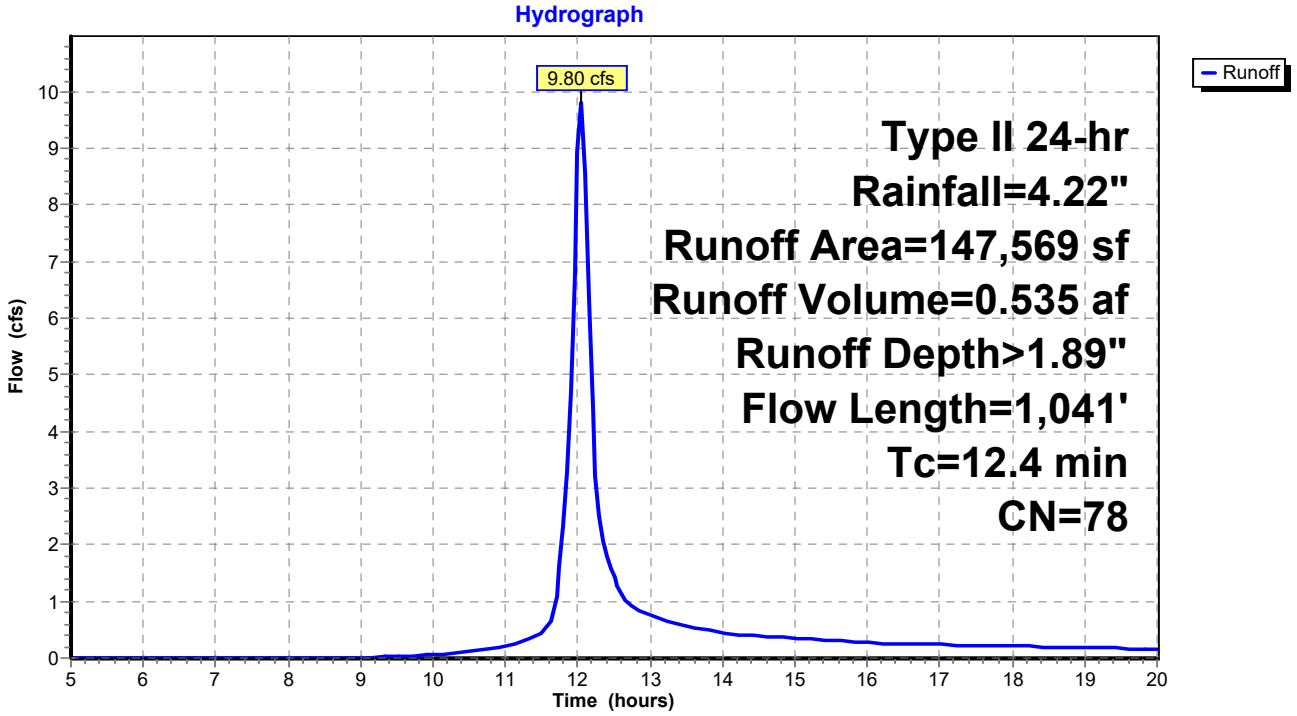
Runoff = 9.80 cfs @ 12.05 hrs, Volume= 0.535 af, Depth> 1.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=4.22"

	Area (sf)	CN	Description
*	22,354	98	Paved parking, rooftops, road, HSG C
	125,215	74	>75% Grass cover, Good, HSG C
	147,569	78	Weighted Average
	125,215		84.85% Pervious Area
	22,354		15.15% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	100	0.0500	0.15		**Sheet Flow, First 100' Flowpath** Grass: Dense n= 0.240 P2= 2.70"
0.5	43	0.0480	1.53		**Shallow Concentrated Flow, Balance of Flow to Pavement** Short Grass Pasture Kv= 7.0 fps
0.2	25	0.0150	2.49		**Shallow Concentrated Flow, Pavement** Paved Kv= 20.3 fps
0.9	873	0.0180	16.26	260.24	**Trap/Vee/Rect Channel Flow, Balance of Longest Flowpath** Bot.W=2.00' D=2.00' Z= 3.0 '/' Top.W=14.00' n= 0.013
12.4	1,041	Total			

Subcatchment PSC-1: Proposed Subcatchment 1



Summary for Subcatchment PSC-2: Proposed Subcatchment 2

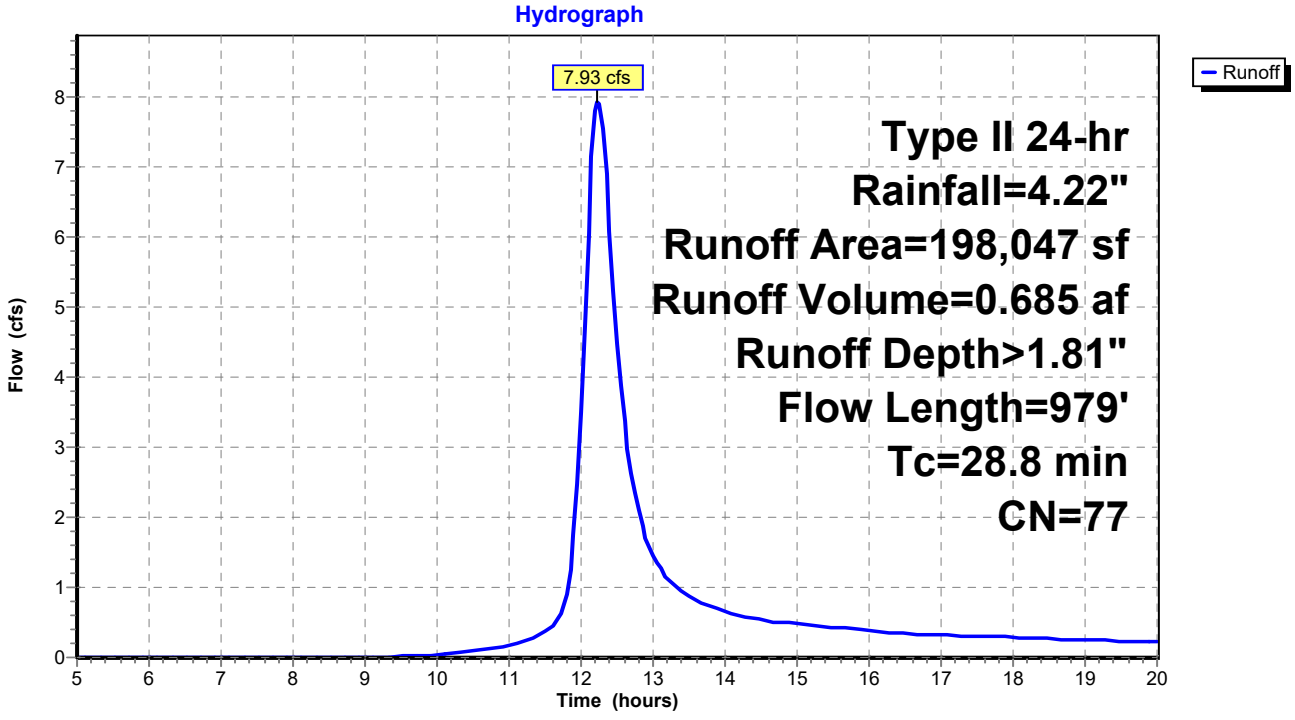
Runoff = 7.93 cfs @ 12.24 hrs, Volume= 0.685 af, Depth> 1.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=4.22"

	Area (sf)	CN	Description
*	21,230	98	Paved parking, rooftops, road, HSG C
	176,817	74	>75% Grass cover, Good, HSG C
	198,047	77	Weighted Average
	176,817		89.28% Pervious Area
	21,230		10.72% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.2	100	0.0300	0.13		**Sheet Flow, First 100' Flowpath** Grass: Dense n= 0.240 P2= 2.70"
15.6	879	0.0180	0.94		**Shallow Concentrated Flow, Balance of Flow to Pavement** Short Grass Pasture Kv= 7.0 fps
28.8	979	Total			

Subcatchment PSC-2: Proposed Subcatchment 2



Summary for Reach 24" Culvert: 24" Culvert

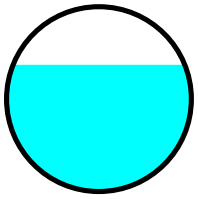
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 16.441 ac, 7.01% Impervious, Inflow Depth > 1.23"
Inflow = 10.29 cfs @ 12.68 hrs, Volume= 1.680 af
Outflow = 10.29 cfs @ 12.69 hrs, Volume= 1.680 af, Atten= 0%, Lag= 0.3 min

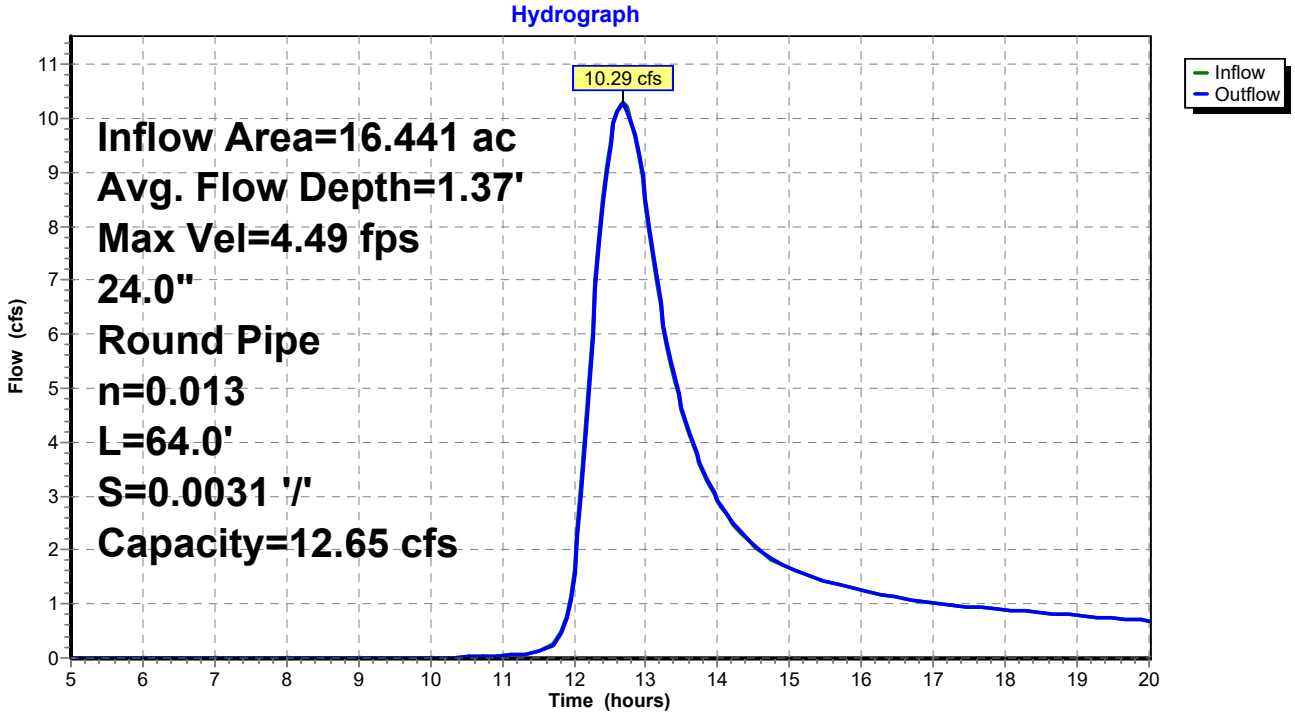
Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.49 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 2.41 fps, Avg. Travel Time= 0.4 min

Peak Storage= 147 cf @ 12.69 hrs
Average Depth at Peak Storage= 1.37'
Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 12.65 cfs

24.0" Round Pipe
n= 0.013
Length= 64.0' Slope= 0.0031 '/'
Inlet Invert= 961.50', Outlet Invert= 961.30'



Reach 24" Culvert: 24" Culvert



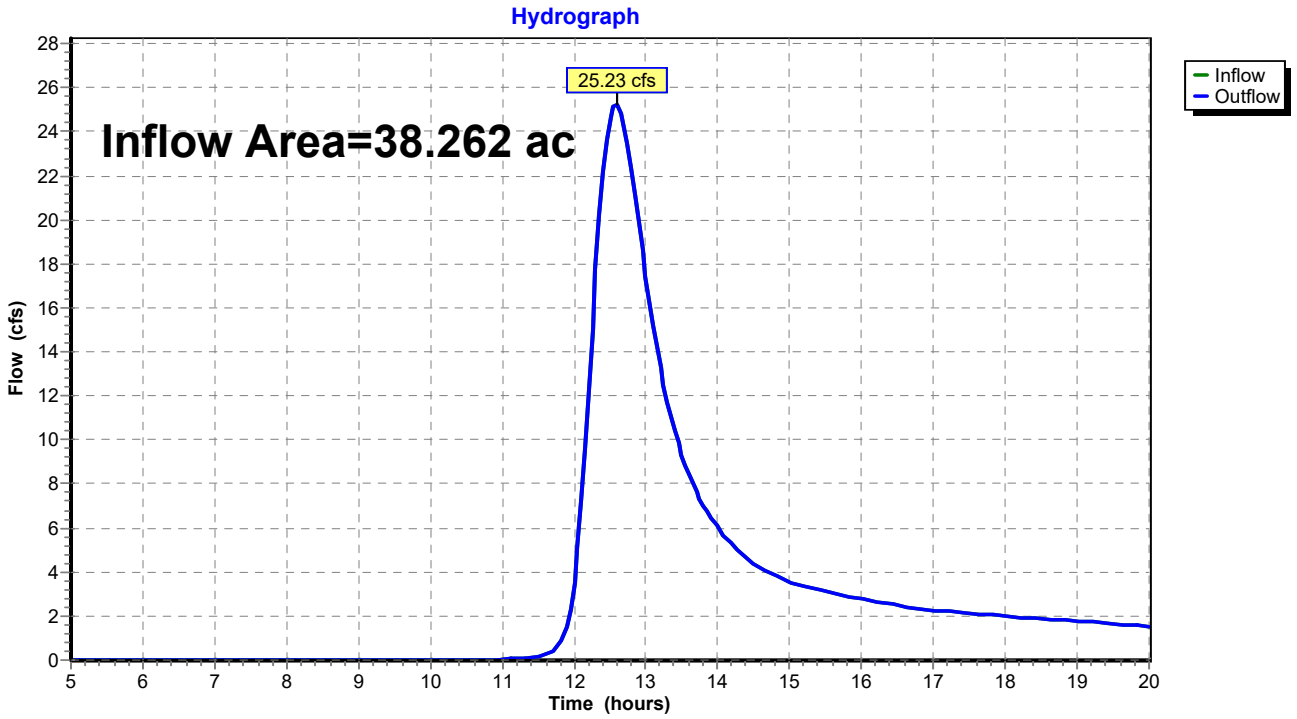
Summary for Reach DPE: Design Point Summation - Existing

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 38.262 ac, 3.01% Impervious, Inflow Depth > 1.17"
Inflow = 25.23 cfs @ 12.59 hrs, Volume= 3.731 af
Outflow = 25.23 cfs @ 12.59 hrs, Volume= 3.731 af, Atten= 0%, Lag= 0.0 min

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

Reach DPE: Design Point Summation - Existing



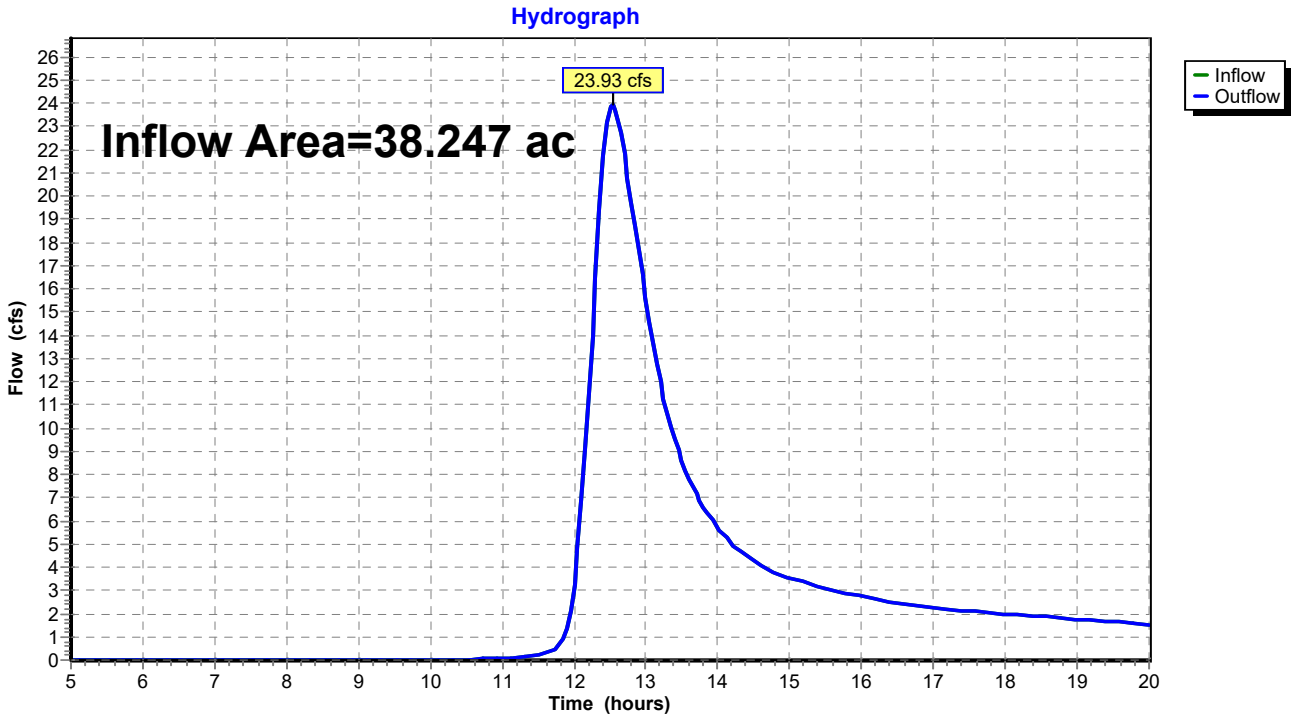
Summary for Reach DPP: Design Point Summation - Proposed

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 38.247 ac, 5.63% Impervious, Inflow Depth > 1.11"
Inflow = 23.93 cfs @ 12.53 hrs, Volume= 3.528 af
Outflow = 23.93 cfs @ 12.53 hrs, Volume= 3.528 af, Atten= 0%, Lag= 0.0 min

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

Reach DPP: Design Point Summation - Proposed



Summary for Pond P 1&2: Dry Pond 1 and 2

Inflow Area = 7.934 ac, 12.61% Impervious, Inflow Depth > 1.84"
Inflow = 14.74 cfs @ 12.08 hrs, Volume= 1.219 af
Outflow = 5.05 cfs @ 12.56 hrs, Volume= 0.759 af, Atten= 66%, Lag= 29.0 min
Discarded = 0.14 cfs @ 12.56 hrs, Volume= 0.087 af
Primary = 4.91 cfs @ 12.56 hrs, Volume= 0.672 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 965.36' @ 12.56 hrs Surf.Area= 11,901 sf Storage= 24,835 cf
Flood Elev= 967.00' Surf.Area= 0 sf Storage= 41,073 cf

Plug-Flow detention time= 145.0 min calculated for 0.759 af (62% of inflow)
Center-of-Mass det. time= 70.4 min (872.7 - 802.3)

Volume	Invert	Avail.Storage	Storage Description
#1	962.00'	41,073 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

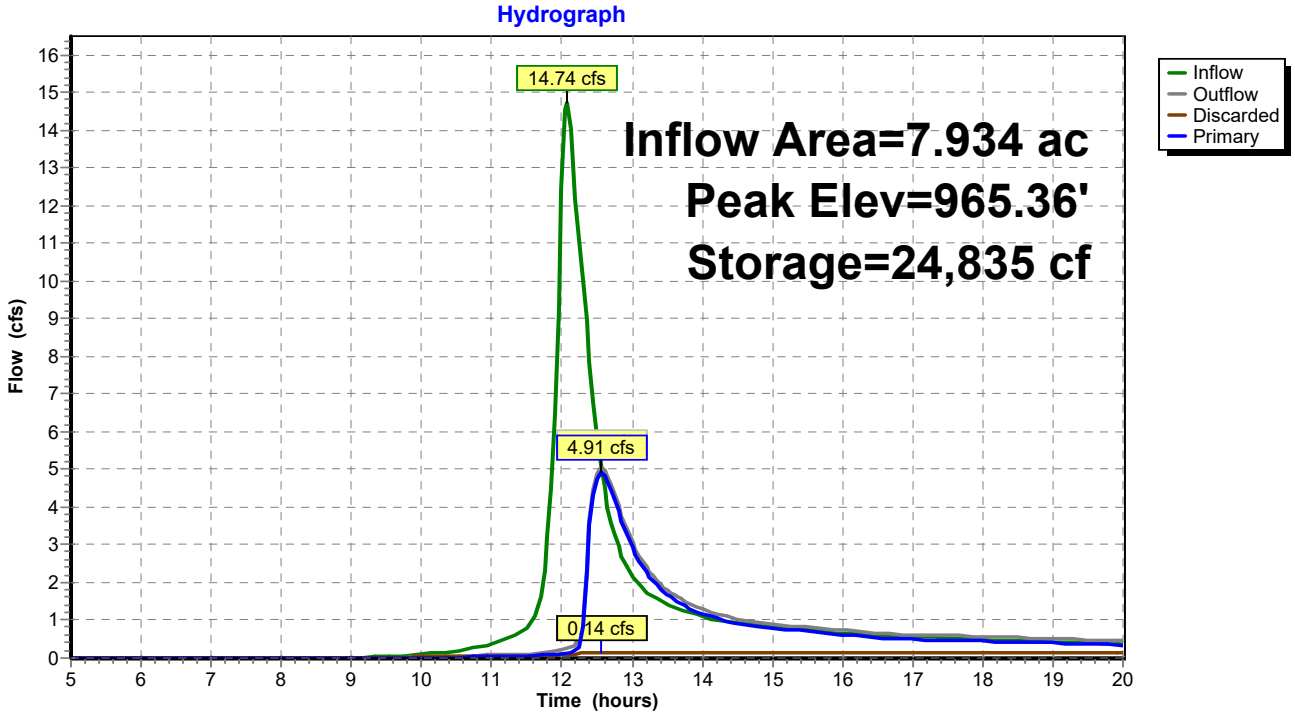
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
962.00	2,481	0	0
963.00	4,866	3,674	3,674
964.00	9,737	7,302	10,975
965.00	10,123	9,930	20,905
966.00	15,106	12,615	33,520
967.00	0	7,553	41,073

Device	Routing	Invert	Outlet Devices
#1	Discarded	962.00'	**0.500 in/hr Exfiltration over Surface area**
#2	Primary	962.00'	**15.0" Round Culvert** L= 53.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 962.00' / 961.70' S= 0.0057 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf
#3	Device 2	962.00'	**2.0" Vert. Orifice/Grate** C= 0.600
#4	Device 2	964.72'	**12.0" Vert. Orifice/Grate** C= 0.600
#5	Device 2	965.00'	**18.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.14 cfs @ 12.56 hrs HW=965.36' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.14 cfs)

Primary OutFlow Max=4.89 cfs @ 12.56 hrs HW=965.36' (Free Discharge)
└**2=Culvert** (Passes 4.89 cfs of 7.71 cfs potential flow)
  ├**3=Orifice/Grate** (Orifice Controls 0.19 cfs @ 8.71 fps)
  ├**4=Orifice/Grate** (Orifice Controls 1.43 cfs @ 2.72 fps)
  └**5=Orifice/Grate** (Weir Controls 3.27 cfs @ 1.95 fps)

Pond P 1&2: Dry Pond 1 and 2



Britton_Model

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
13.361	65	2 acre lots, 12% imp, HSG B (EOS1, OSC 1)
5.856	77	2 acre lots, 12% imp, HSG C (EOS1, EOS3, OSC 1, OSC-3)
6.934	74	>75% Grass cover, Good, HSG C (PSC-1, PSC-2)
1.001	98	Paved parking, rooftops, road, HSG C (PSC-1, PSC-2)
17.255	58	Woods/grass comb., Good, HSG B (EOS1, ESC, OSC 1, OSC-2)
32.104	72	Woods/grass comb., Good, HSG C (EOS1, EOS3, ESC, OSC 1, OSC-2, OSC-3)
76.510	**69**	**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	13.361	5.856	0.000	0.000	19.216	2 acre lots, 12% imp	EOS1, EOS3, OSC 1, OSC-3
0.000	0.000	6.934	0.000	0.000	6.934	>75% Grass cover, Good	PSC-1, PSC-2
0.000	0.000	1.001	0.000	0.000	1.001	Paved parking, rooftops, road	PSC-1, PSC-2
0.000	17.255	32.104	0.000	0.000	49.359	Woods/grass comb., Good	EOS1, EOS3, ESC, OSC 1, OSC-2, OSC-3
0.000	**30.616**	**45.894**	**0.000**	**0.000**	**76.510**	**TOTAL AREA**	

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	24" Culvert	961.50	961.30	64.0	0.0031	0.013	24.0	0.0	0.0
2	P 1&2	962.00	961.70	53.0	0.0057	0.013	15.0	0.0	0.0

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment EOS1: Off-Site Runoff Area=645,339 sf 7.03% Impervious Runoff Depth>2.23"
Flow Length=2,082' Tc=63.8 min CN=68 Runoff=18.31 cfs 2.750 af

Subcatchment EOS3: Off-Site Runoff Area=70,850 sf 6.81% Impervious Runoff Depth>2.88"
Flow Length=606' Tc=32.5 min CN=75 Runoff=4.20 cfs 0.390 af

Subcatchment ESC: Existing Runoff Area=950,525 sf 0.00% Impervious Runoff Depth>2.16"
Flow Length=1,606' Tc=50.9 min CN=67 Runoff=30.61 cfs 3.922 af

Subcatchment OSC 1: Off-Site Runoff Area=645,339 sf 7.03% Impervious Runoff Depth>2.23"
Flow Length=2,082' Tc=63.8 min CN=68 Runoff=18.31 cfs 2.750 af

Subcatchment OSC-2: Off-Site Runoff Area=604,235 sf 0.00% Impervious Runoff Depth>2.00"
Flow Length=2,344' Tc=41.3 min CN=65 Runoff=20.65 cfs 2.314 af

Subcatchment OSC-3: Off-Site Runoff Area=70,850 sf 6.81% Impervious Runoff Depth>2.88"
Flow Length=606' Tc=32.5 min CN=75 Runoff=4.20 cfs 0.390 af

Subcatchment PSC-1: Proposed Runoff Area=147,569 sf 15.15% Impervious Runoff Depth>3.18"
Flow Length=1,041' Tc=12.4 min CN=78 Runoff=16.25 cfs 0.898 af

Subcatchment PSC-2: Proposed Runoff Area=198,047 sf 10.72% Impervious Runoff Depth>3.07"
Flow Length=979' Tc=28.8 min CN=77 Runoff=13.49 cfs 1.163 af

Reach 24" Culvert: 24" Culvert Avg. Flow Depth=2.00' Max Vel=4.59 fps Inflow=20.08 cfs 3.140 af
24.0" Round Pipe n=0.013 L=64.0' S=0.0031 '/' Capacity=12.65 cfs Outflow=12.65 cfs 3.139 af

Reach DPE: Design Point Summation - Existing Inflow=50.17 cfs 7.062 af
Outflow=50.17 cfs 7.062 af

Reach DPP: Design Point Summation - Proposed Inflow=45.91 cfs 6.935 af
Outflow=45.91 cfs 6.935 af

Pond P 1&2: Dry Pond 1 and 2 Peak Elev=966.05' Storage=34,217 cf Inflow=25.09 cfs 2.061 af
Discarded=0.17 cfs 0.099 af Primary=8.63 cfs 1.374 af Secondary=3.99 cfs 0.109 af Outflow=12.78 cfs 1.582 af

Total Runoff Area = 76.510 ac Runoff Volume = 14.576 af Average Runoff Depth = 2.29"
95.68% Pervious = 73.203 ac 4.32% Impervious = 3.307 ac

Summary for Subcatchment EOS1: Off-Site Subcatchment 1

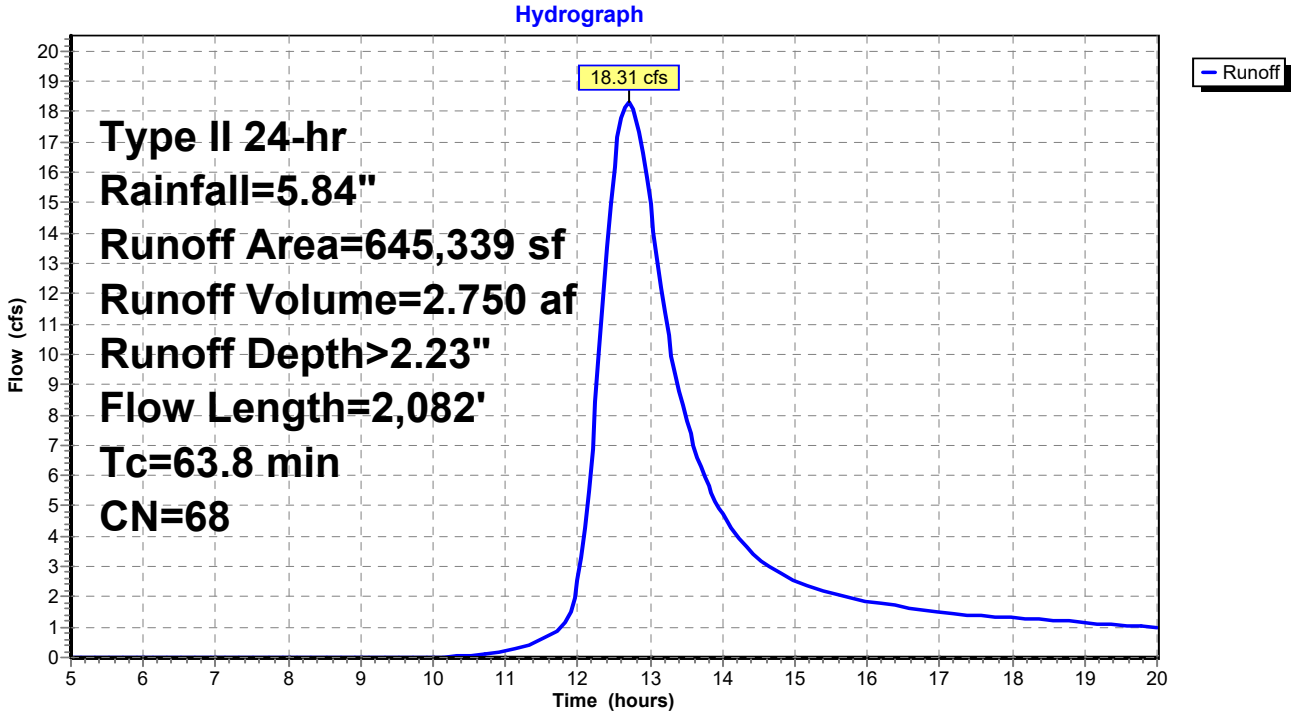
Runoff = 18.31 cfs @ 12.70 hrs, Volume= 2.750 af, Depth> 2.23"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.84"

Area (sf)	CN	Description
64,812	58	Woods/grass comb., Good, HSG B
87,332	77	2 acre lots, 12% imp, HSG C
290,993	65	2 acre lots, 12% imp, HSG B
202,202	72	Woods/grass comb., Good, HSG C
645,339	68	Weighted Average
599,940		92.97% Pervious Area
45,399		7.03% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.6	100	0.0650	0.11		**Sheet Flow, First 100' Flowpath** Woods: Light underbrush n= 0.400 P2= 2.70"
49.2	1,982	0.0180	0.67		**Shallow Concentrated Flow, Balance of Flow to Swale** Woodland Kv= 5.0 fps
63.8	2,082	Total			

Subcatchment EOS1: Off-Site Subcatchment 1



Summary for Subcatchment EOS3: Off-Site Subcatchment 3

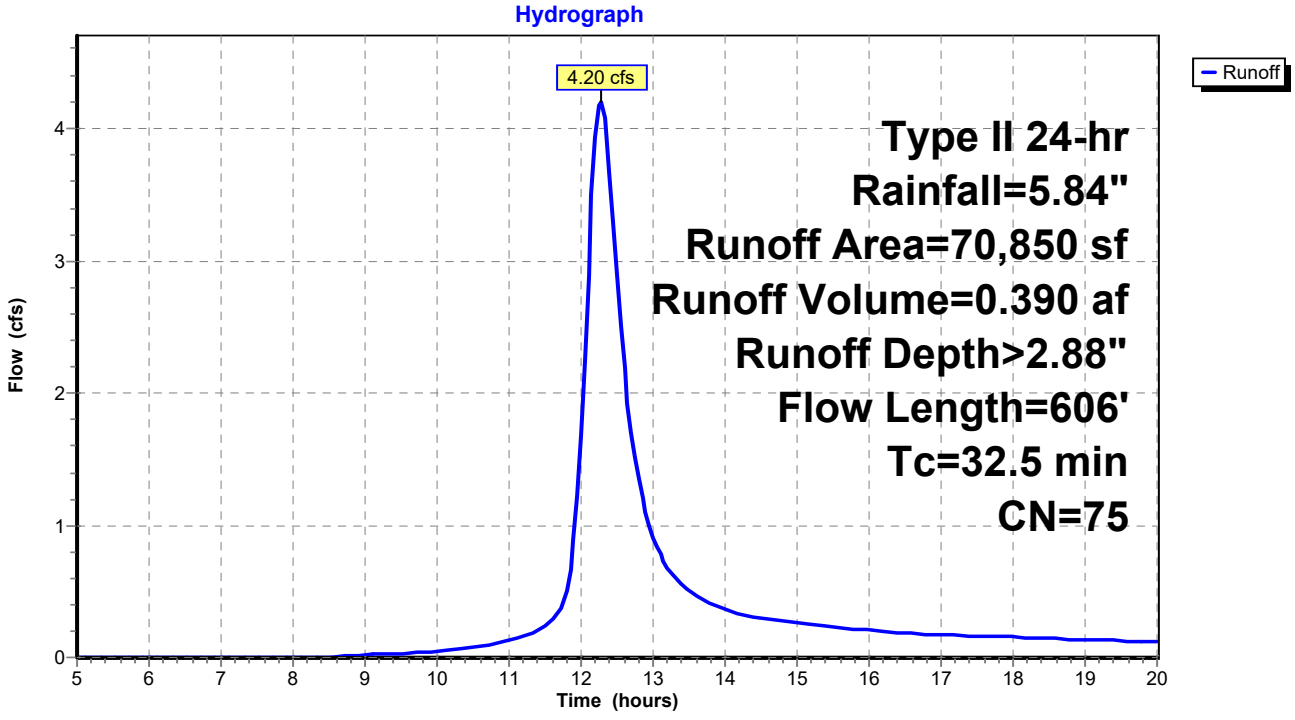
Runoff = 4.20 cfs @ 12.27 hrs, Volume= 0.390 af, Depth> 2.88"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.84"

Area (sf)	CN	Description
40,206	77	2 acre lots, 12% imp, HSG C
30,644	72	Woods/grass comb., Good, HSG C
70,850	75	Weighted Average
66,025		93.19% Pervious Area
4,825		6.81% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.9	100	0.0300	0.08		**Sheet Flow, First 100' Flowpath** Woods: Light underbrush n= 0.400 P2= 2.70"
12.6	506	0.0180	0.67		**Shallow Concentrated Flow, Balance of Longest Flowpath** Woodland Kv= 5.0 fps
32.5	606	Total			

Subcatchment EOS3: Off-Site Subcatchment 3



Summary for Subcatchment ESC: Existing Subcatchment

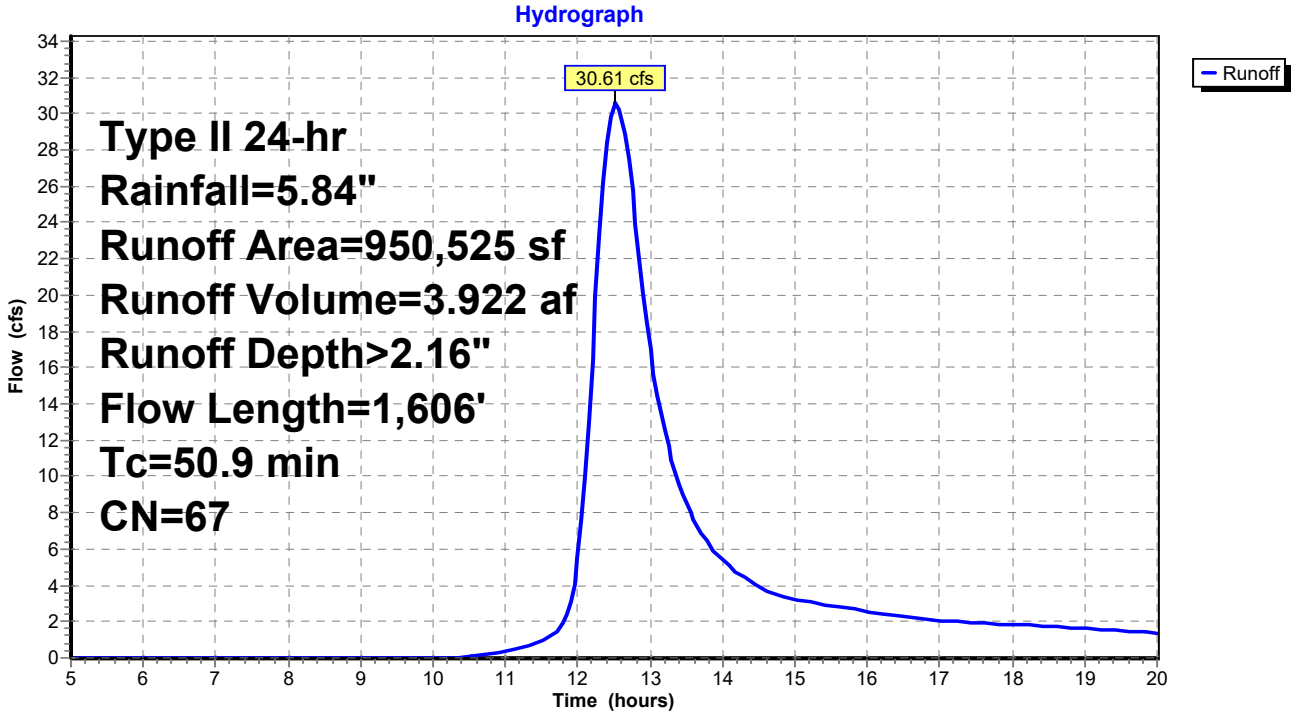
Runoff = 30.61 cfs @ 12.52 hrs, Volume= 3.922 af, Depth> 2.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.84"

Area (sf)	CN	Description
334,278	58	Woods/grass comb., Good, HSG B
616,247	72	Woods/grass comb., Good, HSG C
950,525	67	Weighted Average
950,525		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.6	150	0.0700	0.13		**Sheet Flow, First 150' Flowpath** Woods: Light underbrush n= 0.400 P2= 2.70"
31.3	1,456	0.0240	0.77		**Shallow Concentrated Flow, Balance of Longest Flowpath** Woodland Kv= 5.0 fps
50.9	1,606	Total			

Subcatchment ESC: Existing Subcatchment



Summary for Subcatchment OSC 1: Off-Site Subcatchment 1

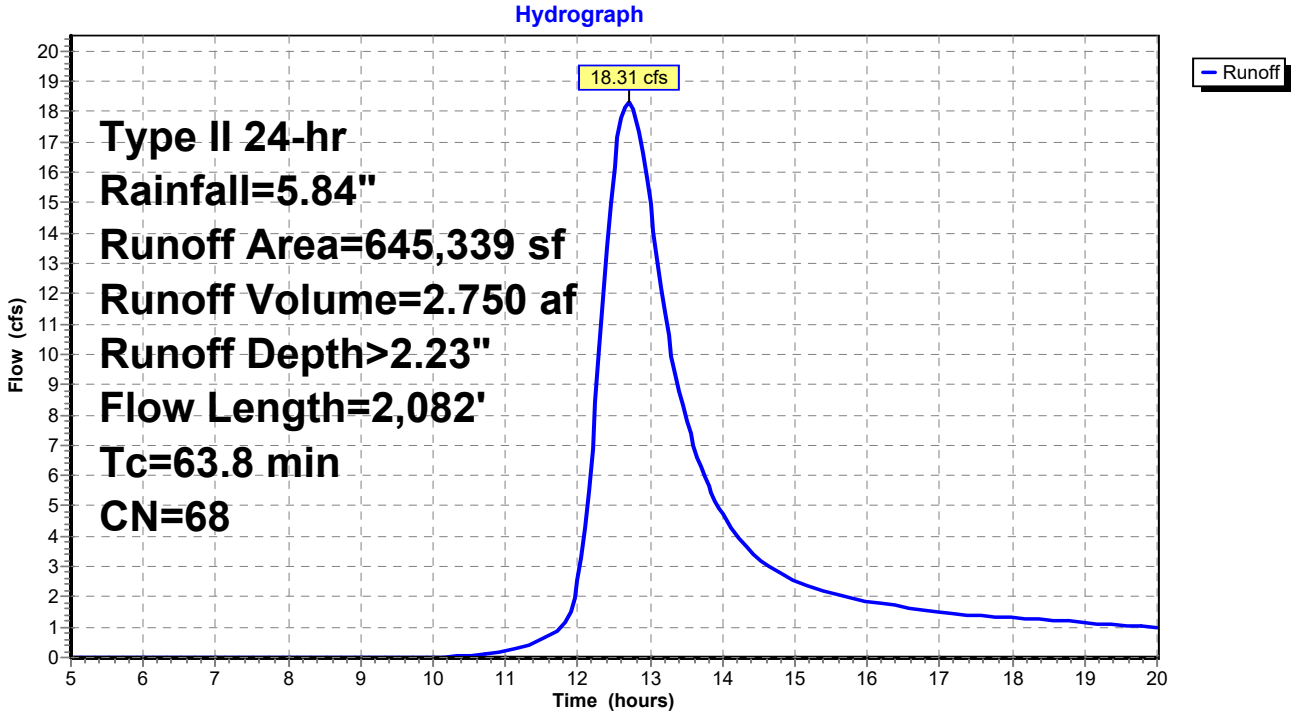
Runoff = 18.31 cfs @ 12.70 hrs, Volume= 2.750 af, Depth> 2.23"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.84"

Area (sf)	CN	Description
64,812	58	Woods/grass comb., Good, HSG B
87,332	77	2 acre lots, 12% imp, HSG C
290,993	65	2 acre lots, 12% imp, HSG B
202,202	72	Woods/grass comb., Good, HSG C
645,339	68	Weighted Average
599,940		92.97% Pervious Area
45,399		7.03% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.6	100	0.0650	0.11		**Sheet Flow, First 100' Flowpath** Woods: Light underbrush n= 0.400 P2= 2.70"
49.2	1,982	0.0180	0.67		**Shallow Concentrated Flow, Balance of Flow to Swale** Woodland Kv= 5.0 fps
63.8	2,082	Total			

Subcatchment OSC 1: Off-Site Subcatchment 1



Summary for Subcatchment OSC-2: Off-Site Subcatchment 2

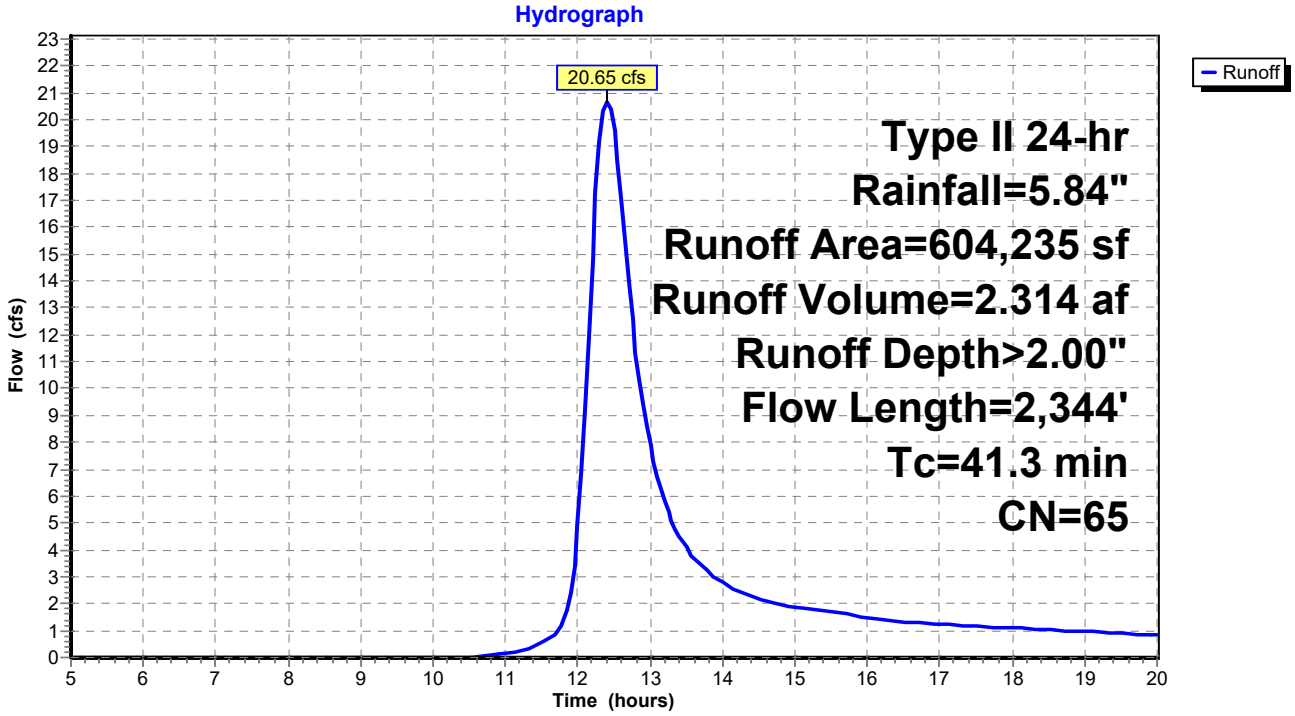
Runoff = 20.65 cfs @ 12.41 hrs, Volume= 2.314 af, Depth> 2.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.84"

Area (sf)	CN	Description
287,733	58	Woods/grass comb., Good, HSG B
316,502	72	Woods/grass comb., Good, HSG C
604,235	65	Weighted Average
604,235		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.2	100	0.0700	0.12		**Sheet Flow, First 100' Flowpath** Woods: Light underbrush n= 0.400 P2= 2.70"
24.2	1,102	0.0230	0.76		**Shallow Concentrated Flow, Balance of Flow to Swale** Woodland Kv= 5.0 fps
2.9	1,142	0.0180	6.51	65.06	**Trap/Vee/Rect Channel Flow, Balance of Longest Flowpath** Bot.W=2.00' D=2.00' Z= 3.0 & 0.0 '/' Top.W=8.00' n= 0.030
41.3	2,344	Total			

Subcatchment OSC-2: Off-Site Subcatchment 2



Summary for Subcatchment OSC-3: Off-Site Subcatchment 3

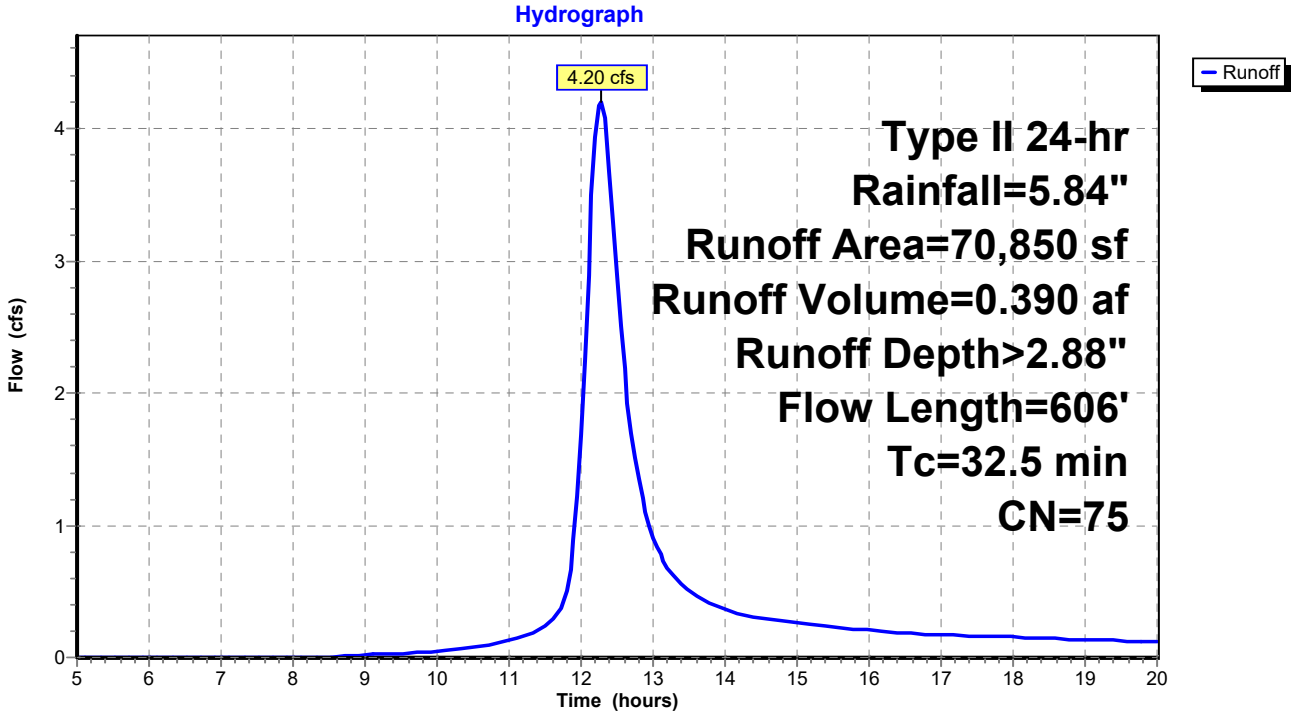
Runoff = 4.20 cfs @ 12.27 hrs, Volume= 0.390 af, Depth> 2.88"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.84"

Area (sf)	CN	Description
40,206	77	2 acre lots, 12% imp, HSG C
30,644	72	Woods/grass comb., Good, HSG C
70,850	75	Weighted Average
66,025		93.19% Pervious Area
4,825		6.81% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.9	100	0.0300	0.08		**Sheet Flow, First 100' Flowpath** Woods: Light underbrush n= 0.400 P2= 2.70"
12.6	506	0.0180	0.67		**Shallow Concentrated Flow, Balance of Longest Flowpath** Woodland Kv= 5.0 fps
32.5	606	Total			

Subcatchment OSC-3: Off-Site Subcatchment 3



Summary for Subcatchment PSC-1: Proposed Subcatchment 1

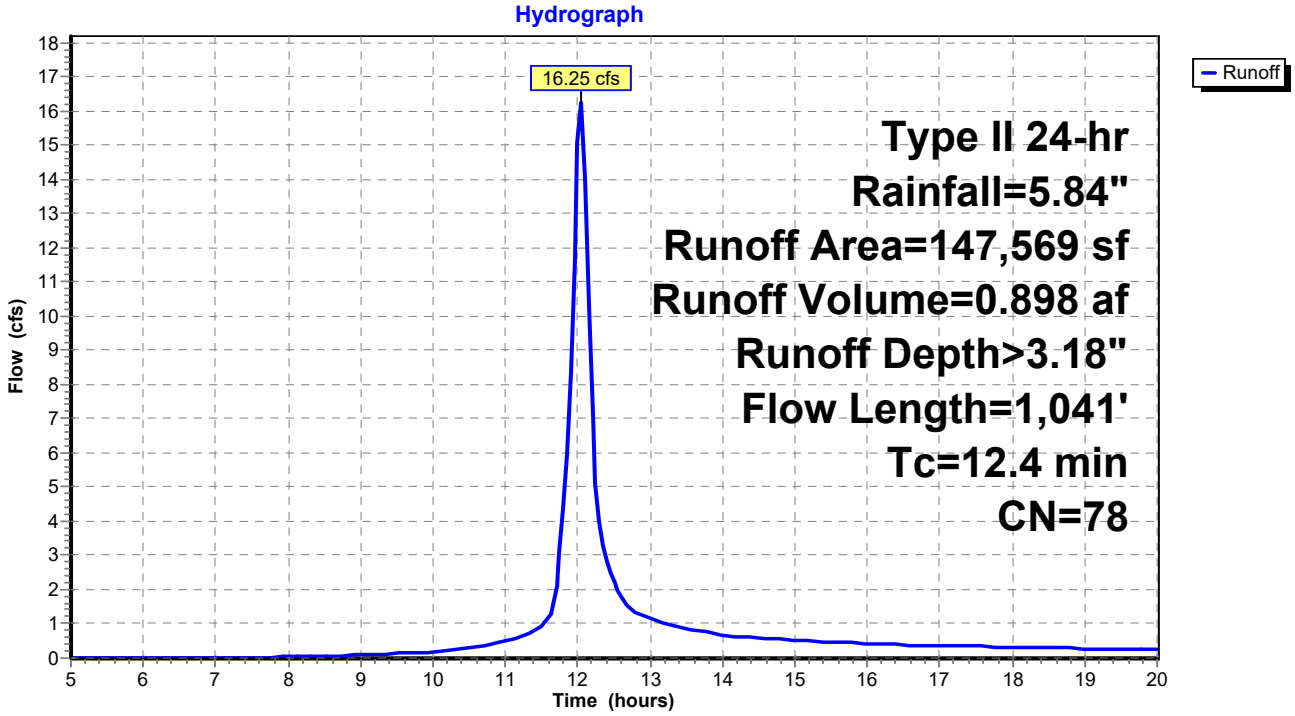
Runoff = 16.25 cfs @ 12.04 hrs, Volume= 0.898 af, Depth> 3.18"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.84"

	Area (sf)	CN	Description
*	22,354	98	Paved parking, rooftops, road, HSG C
	125,215	74	>75% Grass cover, Good, HSG C
	147,569	78	Weighted Average
	125,215		84.85% Pervious Area
	22,354		15.15% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	100	0.0500	0.15		**Sheet Flow, First 100' Flowpath** Grass: Dense n= 0.240 P2= 2.70"
0.5	43	0.0480	1.53		**Shallow Concentrated Flow, Balance of Flow to Pavement** Short Grass Pasture Kv= 7.0 fps
0.2	25	0.0150	2.49		**Shallow Concentrated Flow, Pavement** Paved Kv= 20.3 fps
0.9	873	0.0180	16.26	260.24	**Trap/Vee/Rect Channel Flow, Balance of Longest Flowpath** Bot.W=2.00' D=2.00' Z= 3.0 '/' Top.W=14.00' n= 0.013
12.4	1,041	Total			

Subcatchment PSC-1: Proposed Subcatchment 1



Summary for Subcatchment PSC-2: Proposed Subcatchment 2

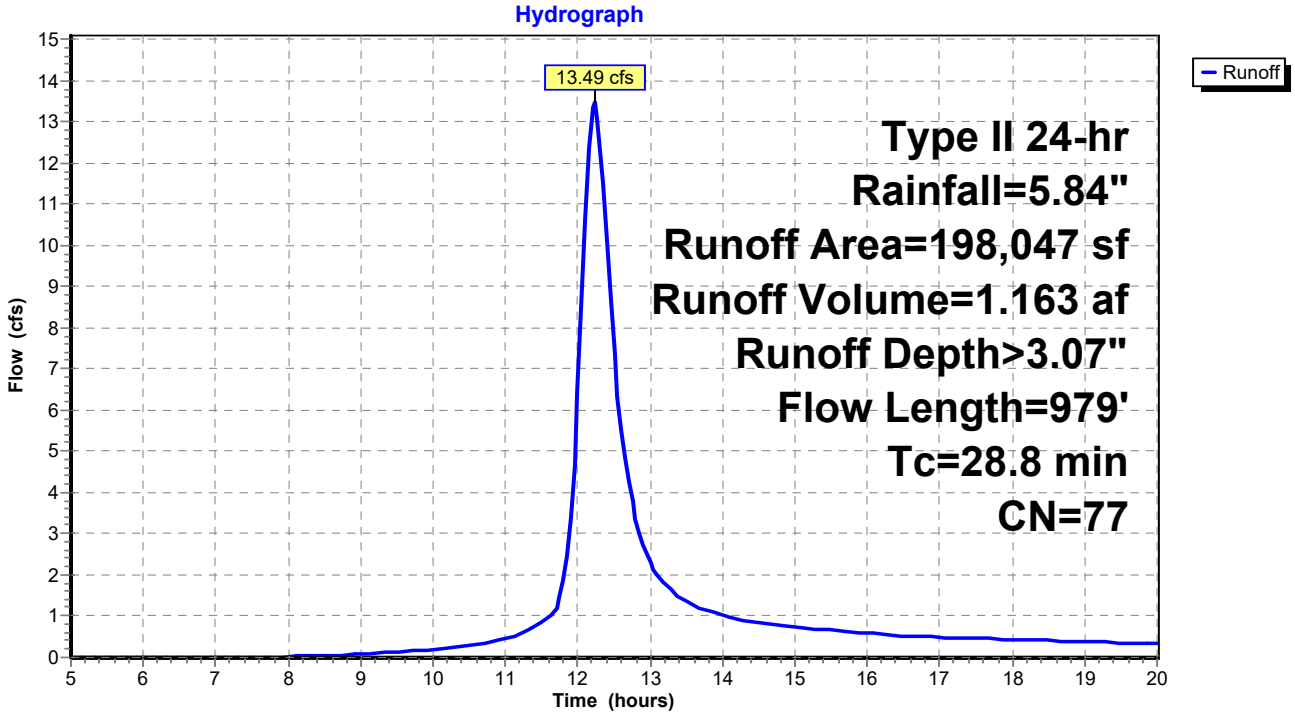
Runoff = 13.49 cfs @ 12.23 hrs, Volume= 1.163 af, Depth> 3.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.84"

	Area (sf)	CN	Description
*	21,230	98	Paved parking, rooftops, road, HSG C
	176,817	74	>75% Grass cover, Good, HSG C
	198,047	77	Weighted Average
	176,817		89.28% Pervious Area
	21,230		10.72% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.2	100	0.0300	0.13		**Sheet Flow, First 100' Flowpath** Grass: Dense n= 0.240 P2= 2.70"
15.6	879	0.0180	0.94		**Shallow Concentrated Flow, Balance of Flow to Pavement** Short Grass Pasture Kv= 7.0 fps
28.8	979	Total			

Subcatchment PSC-2: Proposed Subcatchment 2



Summary for Reach 24" Culvert: 24" Culvert

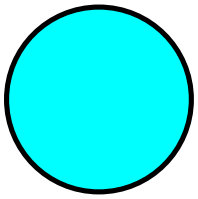
[52] Hint: Inlet/Outlet conditions not evaluated
[55] Hint: Peak inflow is 159% of Manning's capacity
[76] Warning: Detained 0.356 af (Pond w/culvert advised)

Inflow Area = 16.441 ac, 7.01% Impervious, Inflow Depth > 2.29"
Inflow = 20.08 cfs @ 12.66 hrs, Volume= 3.140 af
Outflow = 12.65 cfs @ 12.35 hrs, Volume= 3.139 af, Atten= 37%, Lag= 0.0 min

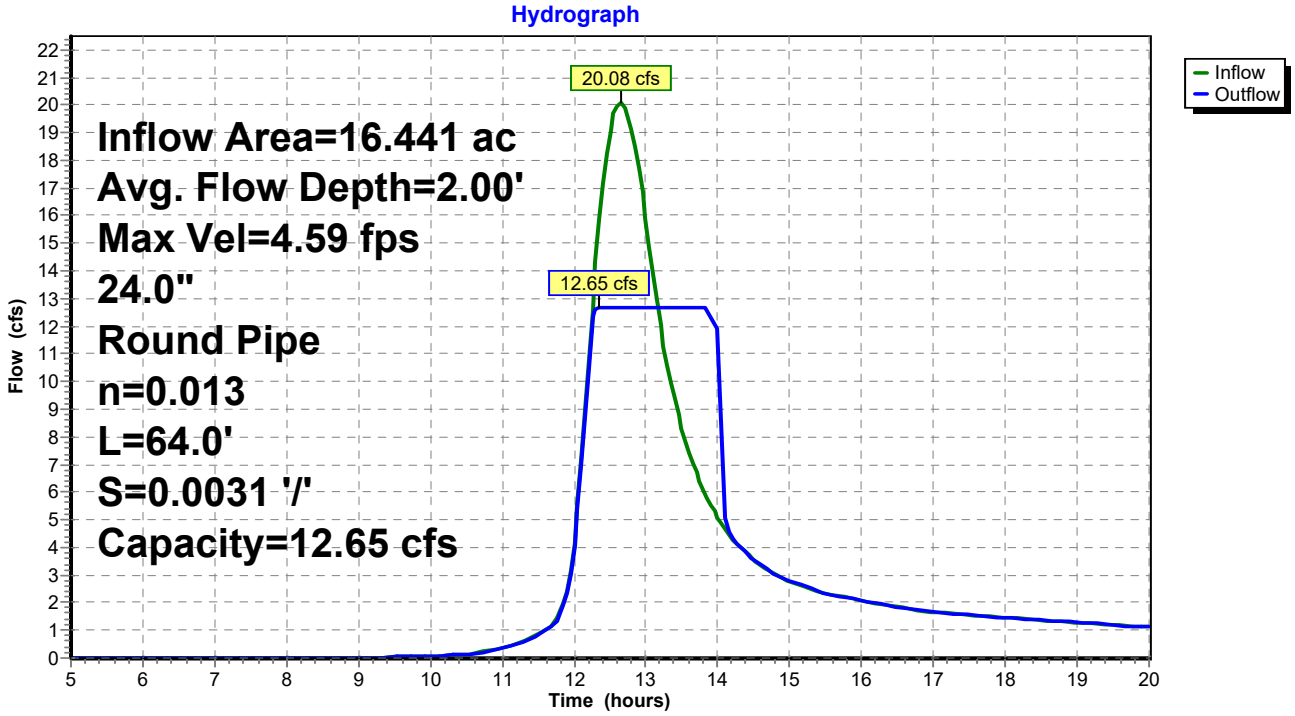
Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.59 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 2.54 fps, Avg. Travel Time= 0.4 min

Peak Storage= 201 cf @ 12.30 hrs
Average Depth at Peak Storage= 2.00'
Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 12.65 cfs

24.0" Round Pipe
n= 0.013
Length= 64.0' Slope= 0.0031 '/'
Inlet Invert= 961.50', Outlet Invert= 961.30'



Reach 24" Culvert: 24" Culvert



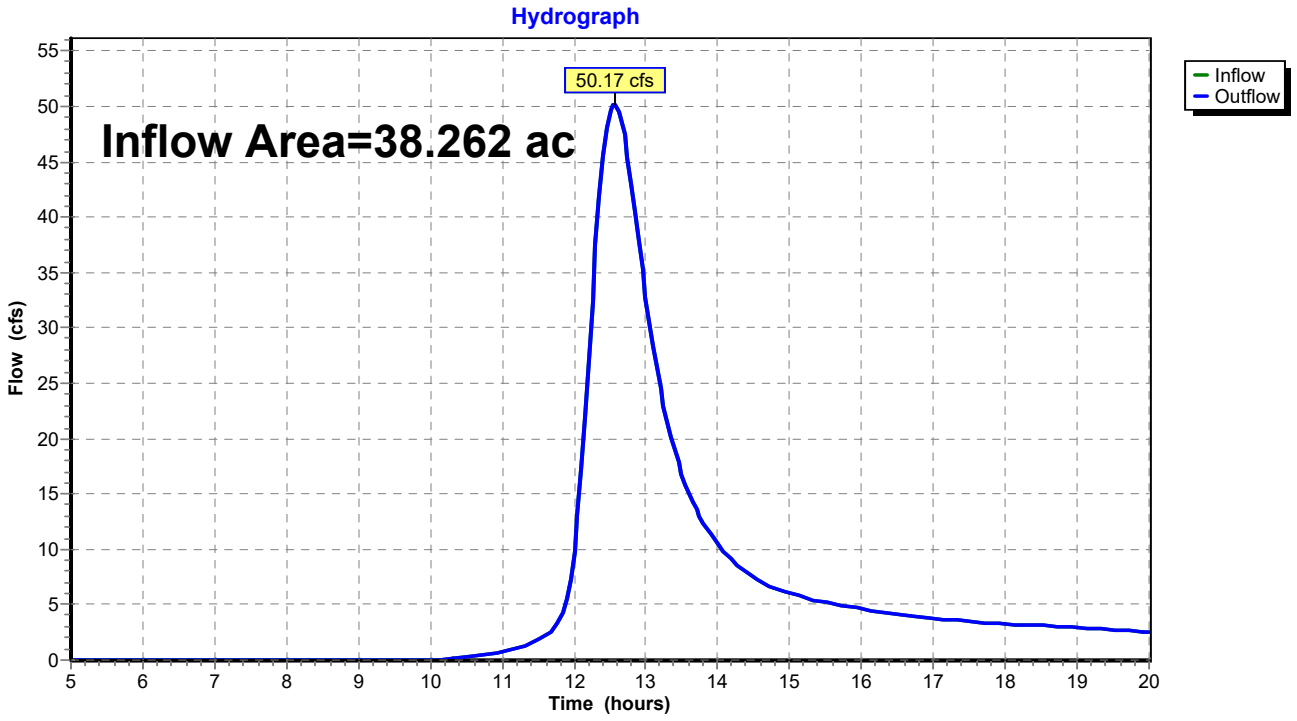
Summary for Reach DPE: Design Point Summation - Existing

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 38.262 ac, 3.01% Impervious, Inflow Depth > 2.21"
Inflow = 50.17 cfs @ 12.56 hrs, Volume= 7.062 af
Outflow = 50.17 cfs @ 12.56 hrs, Volume= 7.062 af, Atten= 0%, Lag= 0.0 min

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

Reach DPE: Design Point Summation - Existing



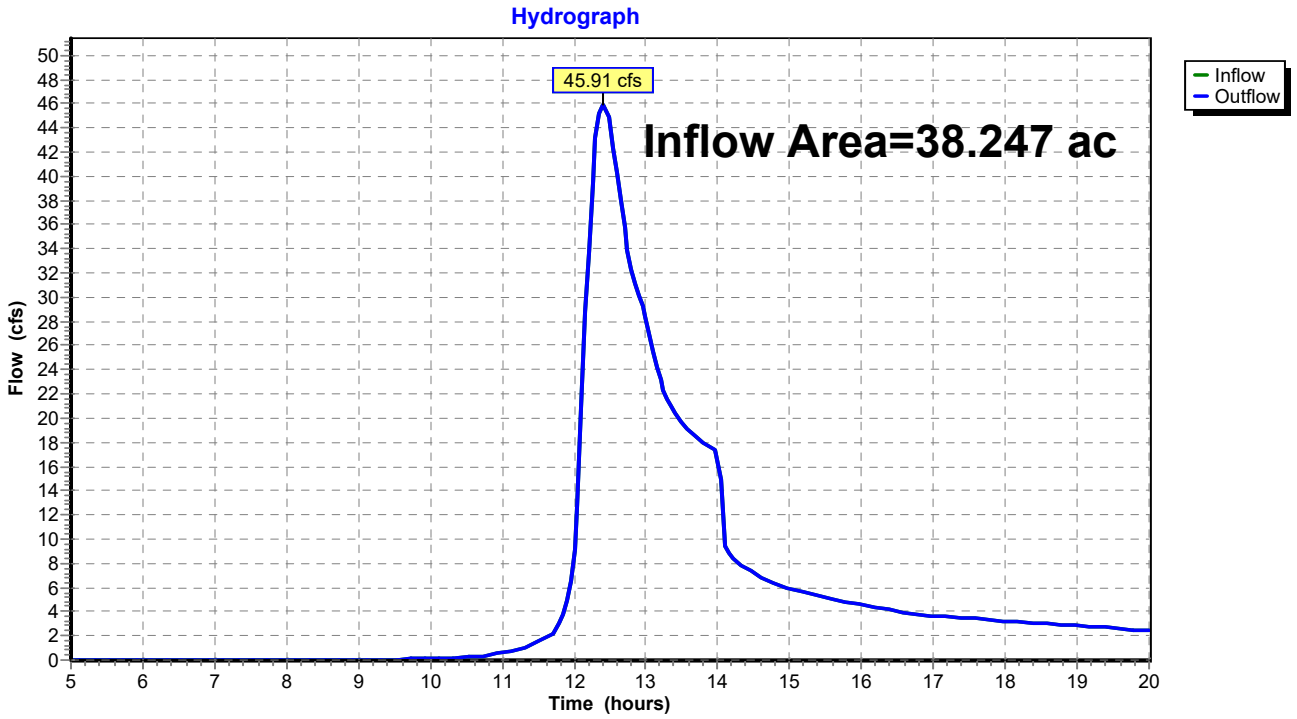
Summary for Reach DPP: Design Point Summation - Proposed

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 38.247 ac, 5.63% Impervious, Inflow Depth > 2.18"
Inflow = 45.91 cfs @ 12.41 hrs, Volume= 6.935 af
Outflow = 45.91 cfs @ 12.41 hrs, Volume= 6.935 af, Atten= 0%, Lag= 0.0 min

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

Reach DPP: Design Point Summation - Proposed



Summary for Pond P 1&2: Dry Pond 1 and 2

Inflow Area = 7.934 ac, 12.61% Impervious, Inflow Depth > 3.12"
Inflow = 25.09 cfs @ 12.07 hrs, Volume= 2.061 af
Outflow = 12.78 cfs @ 12.41 hrs, Volume= 1.582 af, Atten= 49%, Lag= 20.0 min
Discarded = 0.17 cfs @ 12.30 hrs, Volume= 0.099 af
Primary = 8.63 cfs @ 12.41 hrs, Volume= 1.374 af
Secondary = 3.99 cfs @ 12.41 hrs, Volume= 0.109 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 966.05' @ 12.41 hrs Surf.Area= 14,391 sf Storage= 34,217 cf
Flood Elev= 967.00' Surf.Area= 0 sf Storage= 41,073 cf

Plug-Flow detention time= 101.3 min calculated for 1.582 af (77% of inflow)
Center-of-Mass det. time= 42.7 min (833.9 - 791.2)

Volume	Invert	Avail.Storage	Storage Description
#1	962.00'	41,073 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
962.00	2,481	0	0
963.00	4,866	3,674	3,674
964.00	9,737	7,302	10,975
965.00	10,123	9,930	20,905
966.00	15,106	12,615	33,520
967.00	0	7,553	41,073

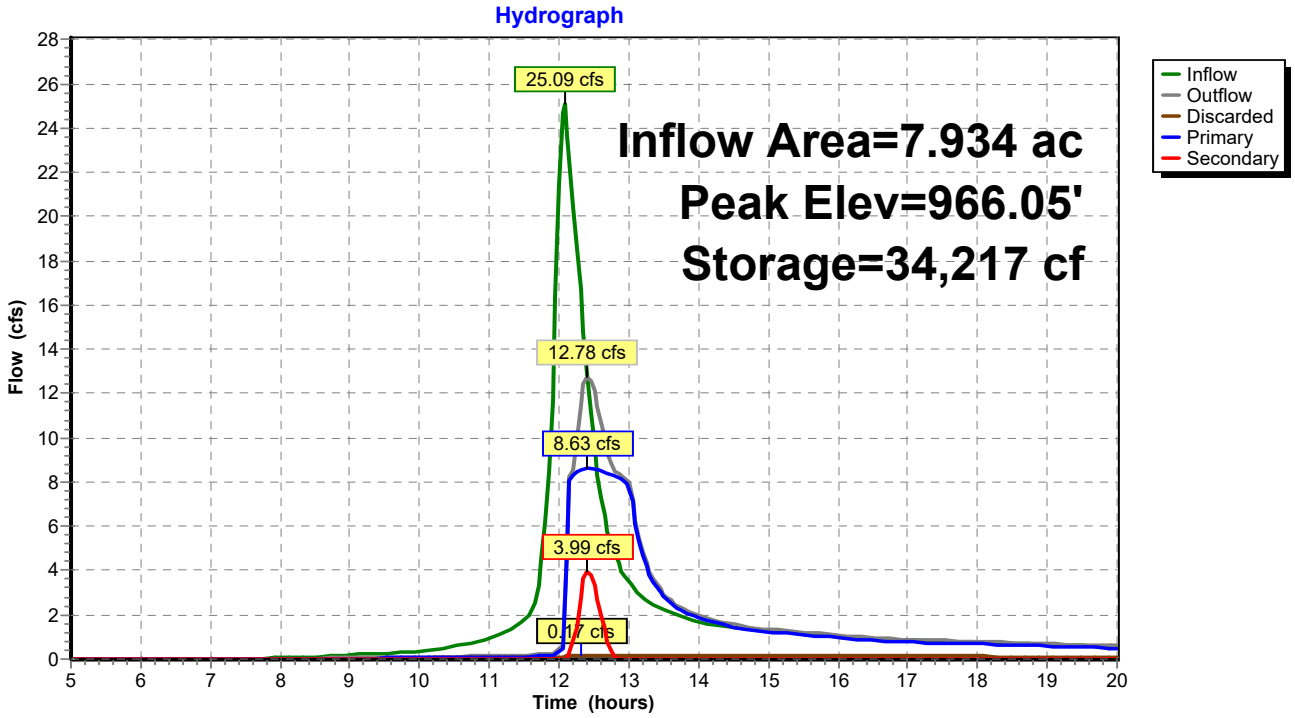
Device	Routing	Invert	Outlet Devices
#1	Discarded	962.00'	**0.500 in/hr Exfiltration over Surface area**
#2	Primary	962.00'	**15.0" Round Culvert** L= 53.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 962.00' / 961.70' S= 0.0057 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf
#3	Device 2	962.00'	**2.0" Vert. Orifice/Grate** C= 0.600
#4	Device 2	964.72'	**12.0" Vert. Orifice/Grate** C= 0.600
#5	Device 2	965.00'	**18.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#6	Secondary	965.75'	**10.0' long x 4.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32

Discarded OutFlow Max=0.17 cfs @ 12.30 hrs HW=965.99' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.17 cfs)

Primary OutFlow Max=8.63 cfs @ 12.41 hrs HW=966.05' (Free Discharge)
└**2=Culvert** (Inlet Controls 8.63 cfs @ 7.03 fps)
  └**3=Orifice/Grate** (Passes < 0.21 cfs potential flow)
  └**4=Orifice/Grate** (Passes < 3.44 cfs potential flow)
  └**5=Orifice/Grate** (Passes < 8.70 cfs potential flow)

Secondary OutFlow Max=3.95 cfs @ 12.41 hrs HW=966.05' (Free Discharge)
└**6=Broad-Crested Rectangular Weir** (Weir Controls 3.95 cfs @ 1.34 fps)

Pond P 1&2: Dry Pond 1 and 2



APPENDIX 3

SOILS DATA

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Tompkins County, New York

August 22, 2019

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map

Map Scale: 1:3,730 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 50 100 200 300

Feet: 0 150 300 600 900

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

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

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: Tompkins County, New York
Survey Area Data: Version 14, Sep 3, 2018

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

Date(s) aerial images were photographed: Aug 29, 2012—Nov 6, 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.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
CfA	Conesus gravelly silt loam, 0 to 3 percent slopes	12.7	18.8%
CfB	Conesus gravelly silt loam, 3 to 8 percent slopes	1.7	2.5%
IcA	Ilion silty clay loam, 0 to 2 percent slopes	36.5	53.8%
KnA	Kendaia and Lyons soils, 0 to 3 percent slopes	13.3	19.6%
LbB	Lansing gravelly silt loam, 3 to 8 percent slopes	2.4	3.5%
Ly	Lyons soils, 0 to 3 percent slopes	0.7	1.0%
OaA	Ovid silt loam, 0 to 6 percent slopes	0.6	0.9%
Totals for Area of Interest		**67.8**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit

descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Tompkins County, New York

CfA—Conesus gravelly silt loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2w3j2
Elevation: 820 to 1,800 feet
Mean annual precipitation: 31 to 57 inches
Mean annual air temperature: 41 to 50 degrees F
Frost-free period: 100 to 190 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Conesus and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Conesus

Setting

Landform: Drumlins, ridges, till plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Crest
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Calcareous loamy lodgment till derived from limestone, sandstone, and shale

Typical profile

Ap - 0 to 9 inches: gravelly silt loam
E/B - 9 to 14 inches: gravelly silt loam
Bt/E - 14 to 19 inches: gravelly silt loam
Bt1 - 19 to 25 inches: gravelly silt loam
Bt2 - 25 to 36 inches: gravelly silt loam
C - 36 to 79 inches: gravelly loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.01 to 1.42 in/hr)
Depth to water table: About 18 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 40 percent
Available water storage in profile: Moderate (about 7.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: B/D
Hydric soil rating: No

Minor Components

Lansing

Percent of map unit: 7 percent
Landform: Drumlins, ridges, till plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Crest
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Kendaia

Percent of map unit: 3 percent
Landform: Till plains, drumlins
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Appleton

Percent of map unit: 2 percent
Landform: Drumlins, till plains
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Nunda

Percent of map unit: 2 percent
Landform: Hills, drumlinoid ridges
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Crest
Down-slope shape: Concave
Across-slope shape: Convex
Hydric soil rating: No

Lyons

Percent of map unit: 1 percent
Landform: Drainageways, depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

CfB—Conesus gravelly silt loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2w3j3
Elevation: 820 to 1,800 feet
Mean annual precipitation: 31 to 57 inches
Mean annual air temperature: 41 to 50 degrees F
Frost-free period: 100 to 190 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Conesus and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Conesus

Setting

Landform: Drumlins, hills, till plains
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Crest
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Calcareous loamy lodgment till derived from limestone, sandstone, and shale

Typical profile

Ap - 0 to 9 inches: gravelly silt loam
E/B - 9 to 14 inches: gravelly silt loam
Bt/E - 14 to 19 inches: gravelly silt loam
Bt1 - 19 to 25 inches: gravelly silt loam
Bt2 - 25 to 36 inches: gravelly silt loam
C - 36 to 79 inches: gravelly loam

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.01 to 1.42 in/hr)
Depth to water table: About 18 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 40 percent
Available water storage in profile: Moderate (about 7.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e

Hydrologic Soil Group: B/D
Hydric soil rating: No

Minor Components

Lansing
Percent of map unit: 7 percent
Landform: Drumlins, hills, till plains
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Crest, side slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Kendaia
Percent of map unit: 3 percent
Landform: Drumlins, till plains
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Appleton
Percent of map unit: 2 percent
Landform: Drumlins, till plains
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Nunda
Percent of map unit: 2 percent
Landform: Drumlinoid ridges, hills
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Crest
Down-slope shape: Concave
Across-slope shape: Convex
Hydric soil rating: No

Lyons
Percent of map unit: 1 percent
Landform: Drainageways, depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

IcA—Ilion silty clay loam, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 9xmh
Elevation: 600 to 1,800 feet
Mean annual precipitation: 32 to 42 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 120 to 160 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Ilion and similar soils: 75 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ilion

Setting

Landform: Depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Loamy till derived from calcareous dark shale

Typical profile

H1 - 0 to 10 inches: silty clay loam
H2 - 10 to 26 inches: silty clay loam
H3 - 26 to 60 inches: silt loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Calcium carbonate, maximum in profile: 10 percent
Available water storage in profile: Moderate (about 7.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: C/D
Hydric soil rating: Yes

Minor Components

Lyons
Percent of map unit: 5 percent
Landform: Depressions
Hydric soil rating: Yes

Alden
Percent of map unit: 5 percent
Landform: Depressions
Hydric soil rating: Yes

Ovid
Percent of map unit: 5 percent
Hydric soil rating: No

Darien
Percent of map unit: 5 percent
Hydric soil rating: No

Erie
Percent of map unit: 5 percent
Hydric soil rating: No

KnA—Kendaia and Lyons soils, 0 to 3 percent slopes

Map Unit Setting
National map unit symbol: 2trwv
Elevation: 430 to 1,510 feet
Mean annual precipitation: 31 to 57 inches
Mean annual air temperature: 41 to 50 degrees F
Frost-free period: 100 to 190 days
Farmland classification: Prime farmland if drained

Map Unit Composition
Kendaia and similar soils: 50 percent
Lyons and similar soils: 25 percent
Lyons, frequently ponded, and similar soils: 15 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Kendaia

Setting
Landform: Till plains, drumlins, ridges
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Calcareous loamy lodgment till derived from limestone, sandstone, and shale

Typical profile

Ap - 0 to 8 inches: silt loam
Bw - 8 to 15 inches: silt loam
Bg - 15 to 20 inches: gravelly silt loam
BCg - 20 to 24 inches: gravelly loam
C - 24 to 79 inches: gravelly loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 1.42 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 40 percent
Available water storage in profile: Moderate (about 7.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: B/D
Hydric soil rating: No

Description of Lyons

Setting

Landform: Depressions, drainageways
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Calcareous loamy lodgment till derived from limestone and shale

Typical profile

Ap - 0 to 10 inches: silt loam
Bg1 - 10 to 19 inches: silt loam
Bg2 - 19 to 25 inches: silty clay loam
BCg - 25 to 34 inches: gravelly silt loam
C - 34 to 79 inches: gravelly loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 1.42 in/hr)
Depth to water table: About 0 to 6 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 40 percent
Available water storage in profile: Moderate (about 8.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: C/D
Hydric soil rating: Yes

Description of Lyons, Frequently Ponded

Setting

Landform: Depressions, drainageways
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Calcareous loamy lodgment till derived from limestone and shale

Typical profile

Ap - 0 to 10 inches: mucky silt loam
Bg1 - 10 to 19 inches: silt loam
Bg2 - 19 to 25 inches: silty clay loam
BCg - 25 to 34 inches: gravelly silt loam
C - 34 to 79 inches: gravelly loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 1.42 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Calcium carbonate, maximum in profile: 40 percent
Available water storage in profile: High (about 9.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: C/D
Hydric soil rating: Yes

Minor Components

Conesus

Percent of map unit: 3 percent
Landform: Drumlinoid ridges, hills, till plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Crest
Down-slope shape: Concave
Across-slope shape: Convex
Hydric soil rating: No

Lima

Percent of map unit: 3 percent
Landform: Drumlins, till plains
Landform position (two-dimensional): Summit

Landform position (three-dimensional): Crest
Down-slope shape: Concave
Across-slope shape: Convex
Hydric soil rating: No

Ilion

Percent of map unit: 2 percent
Landform: Depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Palms

Percent of map unit: 2 percent
Landform: Swamps, marshes
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

LbB—Lansing gravelly silt loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2w3mb
Elevation: 460 to 1,800 feet
Mean annual precipitation: 31 to 57 inches
Mean annual air temperature: 41 to 50 degrees F
Frost-free period: 100 to 190 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Lansing and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Lansing

Setting

Landform: Hills, drumlins, till plains
Landform position (two-dimensional): Summit, backslope, shoulder
Landform position (three-dimensional): Crest, side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Calcareous loamy lodgment till derived from limestone, sandstone, and shale

Typical profile

Ap - 0 to 8 inches: gravelly silt loam
E - 8 to 13 inches: gravelly silt loam
Bt/E - 13 to 21 inches: gravelly silt loam
Bt1 - 21 to 28 inches: gravelly silt loam
Bt2 - 28 to 39 inches: gravelly silt loam
C - 39 to 79 inches: gravelly loam

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.01 to 1.42 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 40 percent
Available water storage in profile: Moderate (about 8.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

Conesus

Percent of map unit: 8 percent
Landform: Drumlins, hills, till plains
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Crest
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

Kendaia

Percent of map unit: 3 percent
Landform: Drumlins, till plains
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Appleton

Percent of map unit: 2 percent
Landform: Drumlins, till plains
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Palatine

Percent of map unit: 1 percent
Landform: Benches, ridges
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Crest, tread
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Danley

Percent of map unit: 1 percent
Landform: Drumlinoid ridges, hills, till plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Crest
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Ly—Lyons soils, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2spjy
Elevation: 250 to 1,900 feet
Mean annual precipitation: 31 to 57 inches
Mean annual air temperature: 41 to 50 degrees F
Frost-free period: 100 to 190 days
Farmland classification: Not prime farmland

Map Unit Composition

Lyons and similar soils: 75 percent
Lyons, frequently ponded, and similar soils: 15 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Lyons

Setting

Landform: Depressions, drainageways
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Calcareous loamy lodgment till derived from limestone and shale

Typical profile

Ap - 0 to 10 inches: silt loam
Bg1 - 10 to 19 inches: silt loam
Bg2 - 19 to 25 inches: silty clay loam
BCg - 25 to 34 inches: gravelly silt loam
C - 34 to 79 inches: gravelly loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 1.42 in/hr)
Depth to water table: About 0 to 6 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 40 percent
Available water storage in profile: Moderate (about 8.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: C/D
Hydric soil rating: Yes

Description of Lyons, Frequently Ponded

Setting

Landform: Depressions, drainageways
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Calcareous loamy lodgment till derived from limestone and shale

Typical profile

Ap - 0 to 10 inches: mucky silt loam
Bg1 - 10 to 19 inches: silt loam
Bg2 - 19 to 25 inches: silty clay loam
BCg - 25 to 34 inches: gravelly silt loam
C - 34 to 79 inches: gravelly loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 1.42 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Calcium carbonate, maximum in profile: 40 percent
Available water storage in profile: High (about 9.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: C/D
Hydric soil rating: Yes

Minor Components

Appleton

Percent of map unit: 3 percent
Landform: Drumlins, till plains
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Canandaigua

Percent of map unit: 3 percent
Landform: Depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Kendaia

Percent of map unit: 2 percent
Landform: Drumlins, till plains
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Palms

Percent of map unit: 1 percent
Landform: Swamps, marshes
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Ilion

Percent of map unit: 1 percent
Landform: Depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

OaA—Ovid silt loam, 0 to 6 percent slopes

Map Unit Setting

National map unit symbol: 9xnm
Elevation: 250 to 1,000 feet
Mean annual precipitation: 32 to 42 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 120 to 160 days
Farmland classification: Prime farmland if drained

Map Unit Composition

Ovid and similar soils: 75 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ovid

Setting

Landform: Till plains, reworked lake plains
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Loamy till with a significant component of reddish shale or reddish glaciolacustrine clays, mixed with limestone and some sandstone

Typical profile

H1 - 0 to 14 inches: silt loam
H2 - 14 to 24 inches: silty clay loam
H3 - 24 to 60 inches: gravelly loam

Properties and qualities

Slope: 0 to 6 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 5 percent
Available water storage in profile: Moderate (about 8.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: C/D
Hydric soil rating: No

Minor Components

Lyons

Percent of map unit: 5 percent
Landform: Depressions
Hydric soil rating: Yes

Rhinebeck

Percent of map unit: 5 percent
Hydric soil rating: No

Ilion

Percent of map unit: 5 percent
Landform: Depressions
Hydric soil rating: Yes

Cayuga

Percent of map unit: 5 percent
Hydric soil rating: No

Kendaia

Percent of map unit: 5 percent
Hydric soil rating: No

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APPENDIX 4

PRECIPITATION DATA

Extreme Precipitation Tables

Northeast Regional Climate Center

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

Smoothing	Yes
State	New York
Location	
Longitude	76.491 degrees West
Latitude	42.531 degrees North
Elevation	0 feet
Date/Time	Mon, 02 Sep 2019 14:36:54 -0400

Extreme Precipitation Estimates

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.28	0.43	0.53	0.70	0.87	1.07	**1yr**	0.75	0.95	1.21	1.44	1.70	1.99	2.25	**1yr**	1.76	2.17	2.57	3.10	3.56	**1yr**
2yr	0.32	0.49	0.62	0.81	1.02	1.26	**2yr**	0.88	1.12	1.42	1.70	2.00	2.34	2.61	**2yr**	2.07	2.51	2.94	3.49	4.00	**2yr**
5yr	0.38	0.59	0.74	0.99	1.26	1.56	**5yr**	1.09	1.39	1.77	2.11	2.49	2.89	3.23	**5yr**	2.56	3.11	3.62	4.20	4.80	**5yr**
10yr	0.42	0.66	0.84	1.14	1.48	1.85	**10yr**	1.28	1.63	2.10	2.51	2.94	3.40	3.80	**10yr**	3.01	3.66	4.23	4.84	5.52	**10yr**
25yr	0.50	0.79	1.00	1.38	1.83	2.30	**25yr**	1.58	2.02	2.62	3.13	3.66	4.22	4.72	**25yr**	3.73	4.54	5.21	5.84	6.65	**25yr**
50yr	0.56	0.90	1.15	1.60	2.15	2.72	**50yr**	1.86	2.38	3.11	3.71	4.33	4.96	5.56	**50yr**	4.39	5.34	6.10	6.72	7.65	**50yr**
100yr	0.63	1.01	1.31	1.86	2.53	3.22	**100yr**	2.19	2.80	3.69	4.39	5.11	5.84	6.55	**100yr**	5.17	6.30	7.14	7.75	8.80	**100yr**
200yr	0.72	1.17	1.51	2.17	2.99	3.81	**200yr**	2.58	3.30	4.36	5.20	6.03	6.88	7.72	**200yr**	6.09	7.42	8.37	8.93	10.14	**200yr**
500yr	0.85	1.39	1.82	2.64	3.71	4.76	**500yr**	3.20	4.10	5.46	6.49	7.52	8.54	9.60	**500yr**	7.56	9.23	10.33	10.78	12.22	**500yr**

Lower Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.25	0.38	0.47	0.63	0.78	0.81	**1yr**	0.67	0.80	0.94	1.05	1.50	1.86	2.10	**1yr**	1.64	2.02	2.43	2.95	3.30	**1yr**
2yr	0.32	0.49	0.60	0.82	1.01	1.11	**2yr**	0.87	1.09	1.23	1.52	1.86	2.28	2.54	**2yr**	2.02	2.45	2.87	3.42	3.92	**2yr**
5yr	0.36	0.55	0.69	0.94	1.20	1.32	**5yr**	1.03	1.29	1.44	1.77	2.17	2.71	3.02	**5yr**	2.40	2.91	3.39	3.98	4.56	**5yr**
10yr	0.40	0.61	0.76	1.06	1.37	1.50	**10yr**	1.18	1.47	1.63	1.98	2.45	3.10	3.44	**10yr**	2.74	3.31	3.85	4.46	5.13	**10yr**
25yr	0.46	0.69	0.86	1.23	1.62	1.78	**25yr**	1.40	1.74	1.92	2.29	2.85	3.67	4.06	**25yr**	3.25	3.90	4.53	5.19	5.99	**25yr**
50yr	0.50	0.76	0.95	1.37	1.84	2.04	**50yr**	1.59	1.99	2.17	2.56	3.21	4.19	4.60	**50yr**	3.71	4.42	5.13	5.81	6.74	**50yr**
100yr	0.55	0.84	1.05	1.52	2.08	2.33	**100yr**	1.80	2.28	2.45	2.86	3.61	4.78	5.22	**100yr**	4.23	5.02	5.80	6.52	7.58	**100yr**
200yr	0.62	0.93	1.18	1.71	2.38	2.67	**200yr**	2.05	2.61	2.79	3.19	4.06	5.45	5.92	**200yr**	4.82	5.69	6.56	7.30	8.52	**200yr**
500yr	0.72	1.07	1.38	2.01	2.85	3.22	**500yr**	2.46	3.15	3.31	3.70	4.75	6.48	6.97	**500yr**	5.73	6.71	7.71	8.49	9.97	**500yr**

Upper Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.30	0.47	0.57	0.77	0.94	1.03	**1yr**	0.81	1.01	1.16	1.43	1.77	2.12	2.38	**1yr**	1.88	2.29	2.70	3.25	3.73	**1yr**
2yr	0.34	0.52	0.64	0.87	1.07	1.18	**2yr**	0.92	1.15	1.31	1.62	1.98	2.40	2.70	**2yr**	2.13	2.60	3.03	3.59	4.10	**2yr**
5yr	0.40	0.62	0.76	1.05	1.33	1.52	**5yr**	1.15	1.49	1.68	2.06	2.52	3.08	3.45	**5yr**	2.72	3.31	3.84	4.44	5.07	**5yr**
10yr	0.46	0.71	0.88	1.23	1.59	1.85	**10yr**	1.37	1.81	2.03	2.47	3.05	3.72	4.17	**10yr**	3.29	4.01	4.62	5.24	5.97	**10yr**
25yr	0.57	0.86	1.07	1.53	2.01	2.41	**25yr**	1.74	2.35	2.62	3.15	3.93	4.78	5.35	**25yr**	4.23	5.15	5.89	6.53	7.41	**25yr**
50yr	0.66	1.00	1.25	1.80	2.42	2.92	**50yr**	2.09	2.86	3.18	3.80	4.76	5.77	6.48	**50yr**	5.11	6.23	7.10	7.71	8.73	**50yr**
100yr	0.77	1.16	1.46	2.11	2.89	3.55	**100yr**	2.49	3.47	3.85	4.59	5.76	6.99	7.85	**100yr**	6.18	7.55	8.56	9.12	10.28	**100yr**
200yr	0.90	1.35	1.71	2.48	3.46	4.32	**200yr**	2.98	4.23	4.67	5.54	6.98	8.45	9.51	**200yr**	7.48	9.15	10.32	10.77	12.11	**200yr**
500yr	1.11	1.65	2.13	3.09	4.39	5.59	**500yr**	3.79	5.47	6.02	7.08	9.02	10.89	12.28	**500yr**	9.64	11.81	13.24	13.45	15.03	**500yr**

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