STORMWATER MANAGEMENT REPORT AND CALCULATIONS FOR A MULTI-FAMILY DEVELOPMENT

AT

269 & 277 GREAT ROAD
BEDFORD, MASSACHUSETTS

Applicant:

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Revised August 25, 2025

Stormwater Management Standards

Project Narrative:

The project site is comprised of two properties located within the Residence B (R-B) District and the Shawsheen West (Roberts) Multifamily Overlay (SWR) District. The parcels are identified on the Town of Bedford Assessor's Map 64 as Lots 0084 and 0083. The subject properties have a total area of 486,255 s.f., and the site currently contains two (2) residential dwellings with associated paved driveways. The applicant is proposing to develop the above-mentioned parcels into a Multifamily Overlay District development per Town of Bedford Zoning Bylaw.

This proposal utilizes conventional stormwater management techniques including ADS Barracuda hydrodynamic separators (HDS), deep sump catch basins, and subsurface infiltration systems for the treatment and mitigation of stormwater. The following is a summary of how the proposed project meets the DEP Stormwater Standards:

Standard 1: No new stormwater conveyances may discharge untreated stormwater directly to or cause erosion in wetlands or waters of the Commonwealth.

There are no untreated stormwater conveyances proposed to discharge to wetlands or waters of the Commonwealth from the project.

Standard 2: Peak Rate Attenuation - Stormwater management systems shall be designed so that post-development peak discharge rates do not exceed pre-development peak discharge rates. This standard may be waived for discharges to land subject to coastal storm flowage as defined in 310 CMR 10.04.

For the purpose of analyzing pre and post development stormwater peak rates of runoff, two (2) design points have been selected based on existing topographic conditions which were used for both the pre and the post peak rate calculations. The design points chosen where the southwestern property line, and the 200 foot riverfront buffer to the southern portion of the property.

The storm event rainfall frequencies used for this analysis have been selected based upon the Extreme Precipitation Tables for the Northeast Regional Climate Center. A full detail of peak rate attenuation along with supplemental stormwater calculations utilizing HydroCAD as well as pre and post drainage site plans have been submitted with the Site Sensitive Development/Site Plan review Application. The details of this report will show that the peak rates of runoff for the 1-year, 2-year, 10-year and 100-year events have been either maintained or reduced from pre to post conditions through the use of a roadway drainage system and subsurface infiltration systems.

The hydrologic calculations from the HydroCAD® have been included in this report and are located in section tab entitled "Hydrologic Calculations".

Proposed Design Points and Subcatchment Areas

Design Point Summary

DP-1/100				
	Existing (Pre)		Proposed (Post)	
Storm Event	Rate(cfs)	Volume(cf)	Rate(cfs)	Volume(cf)
1-Year (2.64 in./hr.)	0	-		
2-Year (3.2 in./hr.)	0	-		
10-Year (4.8 in./hr.)	0.01	318	0.01	236
100-Year (8.8 in./hr.)	1.01	5,803	0.66	3,460

Design Point Summary

DP-2/200				
	Existing (Pre)		Proposed (Post)	
Storm Event	Rate(cfs)	Volume(af)	Rate(cfs)	Volume(af)
1-Year (2.64 in./hr.)	0.01	152	0.00	-
2-Year (3.2 in./hr.)	0.05	308	0.00	-
10-Year (4.8 in./hr.)	0.26	957	0.00	72
100-Year (8.8 in./hr.)	1.04	3,341	0.16	674

Standard 3: Recharge - Loss of annual recharge to groundwater shall be eliminated or minimized…at a minimum, the annual recharge from the post-development site shall approximate the annual recharge from pre-development conditions based on soil type. This standard is met when the stormwater management system is designed to infiltrate the required recharge volume in accordance with the Mass Stormwater Handbook.

Loss of annual recharge to groundwater has been minimized through the use of stormwater Best Management Practices (BMP's), subsurface infiltration systems, and a proposed operation and maintenance program are proposed for this project. The subsurface infiltration systems have been designed for recharging groundwater.

Based on soil maps provided by U.S. Department of Agriculture Soil Conservation Service (map located in the Appendix to the narrative) the site consists of one soil type with a hydrologic group of A. Onsite soil testing was conducted on December 5, 2024, in the areas depicted on the attached plan. This testing revealed a sand parent material with signs of estimated seasonal high groundwater at varying elevations.

Utilizing the current regulations, the proposed design will meet this standard as per the following calculation:

Rv = Fx
Rv = Required Recharge Volume
F = Target Depth Factor associated with hydrologic soil groups located in table 2.3.2 in Volume 3 of the Stormwater Management Handbook
x = Total impervious area proposed

Impervious area within project area 34,767 square feet (sf).
Required recharge volume depth factor for A type soils: 0.6 inches.

Therefore Rv = (34,767)(0.6inches/12 inches per foot) = 1,738 cf

Rv = 1,738 cubic feet (cf)

The proposed subsurface infiltration systems provide a total recharge storage volume of 7,014 CF below the outlet elevation.

In accordance with the Stormwater Handbook, a capture area adjustment calculation has been provided in the appendix of this report to ensure a minimum of 65% of the site impervious areas are directed into recharge facilities. The calculation demonstrates the proposed project directs 85% of the site's proposed impervious surface areas will be directed toward the recharge facilities.

Standard 4: Water Quality – Stormwater management systems shall be designed to remove 80% of the average annual post-construction load of Total Suspended Solids (TSS). The standard is met with pollution prevention plans, stormwater BMP's sized to capture required water quality volume, and pretreatment measures.

The stormwater management system has been designed to remove a minimum of 80% of the average annual post-construction load of Total Suspended Solids (TSS). TSS Removal Calculation Worksheets are included in the Stormwater Analysis and Calculations Report noted herein. These percentages have been achieved using deep sump catch basins, a trench drain (with sediment basin), and a subsurface infiltration system.

The Stormwater Management Handbook assigns TSS removal percentages to each treatment BMP. Each treatment BMP is sized to capture the required water quality volume as calculated in accordance with the Handbook in order to achieve the assigned TSS removal rates.

General Equation from Stormwater Management Handbook

Vwq = (Dwq)(A)
Vwq = required water quality volume
Dwq = water quality depth (1" for critical areas, 0.5" for non-critical areas)
A = impervious area

The following are treatment sizing calculations for portions of the treatment trains based on the 1.0'' for non-critical areas:

Train 1 (Deep Sump Catch Basin to HDS to to PSIS-1)

Vwq = (34,767)(1"/12) = 2,897 cf

The proposed subsurface infiltration systems provide a total recharge storage volume of 7,014 CF below the outlet elevation.

A separate document entitled "Operation and Maintenance & Erosion and Sedimentation Control Program for a Proposed Stormwater Management System" is included as part of this report. Suitable practices for source control and long-term pollution prevention have been identified and shall be implemented as discussed.

The utilization of pretreatment and treatment BMP's combined with the operation and maintenance plan provides compliance with this standard.

Standard 5: Land Uses with Higher Potential Pollutant Loads (LUHPPLs) – Source control and pollution prevention shall be implemented in accordance with the Stormwater Handbook to eliminate or reduce the discharge of stormwater runoff from such land uses to the maximum extent practicable.

Stormwater Standard 5 is not applicable to this project. The proposed development will not subject the site to higher potential pollutant loads as defined in the Massachusetts Department of Environmental protection Wetlands and Water Quality Regulations.

LUHPPLs are identified in 310 CMR 22.20B(2) and C(2)(a)-(k) and (m) and CMR 22.21(2)(a)(1)-(8) and (b)(1)-(6), areas within a site that are the location of activities that are subject to an individual National Pollutant Discharge Elimination System (NPDES) permit or the NPDES Multi-sector General Permit; auto fueling facilities, exterior fleet storage areas, exterior vehicle service and equipment cleaning areas; marinas and boatyards; parking lots with high-intensity-use; confined disposal facilities and disposal sites.

Standard 6: Critical Areas – Stormwater discharges to critical areas require the use of specific source control and pollution prevention measures and specific structural stormwater best management practices determined by the Department to be suitable for managing discharges to such areas.

Stormwater Standard 6 is not applicable to this project given that proposed stormwater does not discharge near a critical area. Critical areas being Outstanding Resource Waters and Special Resource Waters as designated in 314 CMR 4.0, recharge areas for public water supplies as defined in 310 CMR 22.02, bathing beaches as defined in 105 CMR 445.000, cold-water fisheries and shellfish growing areas as defined in 314 CMR 9.02 and 310 CMR 10.04. The design points are not considered a critical area therefore Standard #6 does not applies to this project.

Standard 7: Redevelopments – A redevelopment project is required to meet Standards 1-6 only to the maximum extent practicable. Remaining standards shall be met as well as the project shall improve the existing conditions.

Stormwater Standard 7 is not applicable to this project. Within the Stormwater Management Handbook (volume 1 chapter 1 page 20), the definition of a redevelopment project includes, "development, rehabilitation, expansion and phased projects on previously developed sites, provided the redevelopment results in no net increase in impervious area".

This project will not result in a reduction of impervious area in the proposed conditions.

Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan shall be implemented.

An *Operation and Maintenance & Erosion and Sediment Control Program for a Proposed Stormwater Management System* is included with this report. The program details the construction period operation and maintenance plan and sequencing for pollution prevention measures and erosion and sedimentation controls. Locations of erosion control measures for the project are depicted on the site plan set accompanying this report.

Standard 9: A long term Operation and Maintenance Plan shall be implemented.

An *Operation and Maintenance & Erosion and Sediment Control Program for a Proposed Stormwater Management System* is included with this report. The long term operation and maintenance section of the program provides details and the schedule for routine and non-routine maintenance tasks to be implemented at the completion of the project.

Standard 10: Prohibition of Illicit Discharges – Illicit discharges to the stormwater management system are prohibited.

Illicit discharges to the stormwater management system are discharges that are not entirely comprised of stormwater. Discharges to the stormwater management system from the following activities or facilities are permissible: Firefighting, water line flushing, landscape irrigation, uncontaminated groundwater, potable water sources, foundation drains, air conditioning condensation, footing drains, individual resident car washing, flows from riparian habitats and wetlands, dechlorinated water from swimming pools, water used for street washing and water used to clean residential buildings without detergents. All other illicit discharges are prohibited.

There are no known illicit discharges anticipated through the completion of this project. During construction and post construction procedures are provided to dissipate the potential for illicit discharges to the drainage system. Post construction preventions of illicit discharges are described in the Operation and Maintenance Program under the Good Housekeeping Practices section of the report.

Low-Impact Development Statement

Low Impact Development (LID) strategies were examined in the design process. The potential to utilize rain barrels was reviewed and with the collection system for the roof being internal rain barrels were not a viable option. If through final construction design, there is an opportunity to incorporate rain barrels the

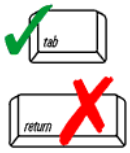
development team would reconsider. The overall site design utilized the existing natural topography, and natural drainage patterns to help prevent flooding and protect natural hydrology while capturing, treating and reducing the stormwater runoff to the design points/abutters. The proposed development also incorporates a robust revegetation plan.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands Program

Checklist for Stormwater Report

A. Introduction

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



A Stormwater Report must be submitted with the Notice of Intent permit application to document compliance with the Stormwater Management Standards. The following checklist is NOT a substitute for the Stormwater Report (which should provide more substantive and detailed information) but is offered here as a tool to help the applicant organize their Stormwater Management documentation for their Report and for the reviewer to assess this information in a consistent format. As noted in the Checklist, the Stormwater Report must contain the engineering computations and supporting information set forth in Volume 3 of the Massachusetts Stormwater Handbook. The Stormwater Report must be prepared and certified by a Registered Professional Engineer (RPE) licensed in the Commonwealth.

The Stormwater Report must include:

- The Stormwater Checklist completed and stamped by a Registered Professional Engineer (see page 2) that certifies that the Stormwater Report contains all required submittals.[1] This Checklist is to be used as the cover for the completed Stormwater Report.
- Applicant/Project Name
- Project Address
- Name of Firm and Registered Professional Engineer that prepared the Report
- Long-Term Pollution Prevention Plan required by Standards 4-6
- Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan required by Standard 8[2]
- Operation and Maintenance Plan required by Standard 9

In addition to all plans and supporting information, the Stormwater Report must include a brief narrative describing stormwater management practices, including environmentally sensitive site design and LID techniques, along with a diagram depicting runoff through the proposed BMP treatment train. Plans are required to show existing and proposed conditions, identify all wetland resource areas, NRCS soil types, critical areas, Land Uses with Higher Potential Pollutant Loads (LUHPPL), and any areas on the site where infiltration rate is greater than 2.4 inches per hour. The Plans shall identify the drainage areas for both existing and proposed conditions at a scale that enables verification of supporting calculations.

As noted in the Checklist, the Stormwater Management Report shall document compliance with each of the Stormwater Management Standards as provided in the Massachusetts Stormwater Handbook. The soils evaluation and calculations shall be done using the methodologies set forth in Volume 3 of the Massachusetts Stormwater Handbook.

To ensure that the Stormwater Report is complete, applicants are required to fill in the Stormwater Report Checklist by checking the box to indicate that the specified information has been included in the Stormwater Report. If any of the information specified in the checklist has not been submitted, the applicant must provide an explanation. The completed Stormwater Report Checklist and Certification must be submitted with the Stormwater Report.

[1] The Stormwater Report may also include the Illicit Discharge Compliance Statement required by Standard 10. If not included in the Stormwater Report, the Illicit Discharge Compliance Statement must be submitted prior to the discharge of stormwater runoff to the post-construction best management practices.

[2] For some complex projects, it may not be possible to include the Construction Period Erosion and Sedimentation Control Plan in the Stormwater Report. In that event, the issuing authority has the discretion to issue an Order of Conditions that approves the project and includes a condition requiring the proponent to submit the Construction Period Erosion and Sedimentation Control Plan before commencing any land disturbance activity on the site.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands Program

Checklist for Stormwater Report

B. Stormwater Checklist and Certification

The following checklist is intended to serve as a guide for applicants as to the elements that ordinarily need to be addressed in a complete Stormwater Report. The checklist is also intended to provide conservation commissions and other reviewing authorities with a summary of the components necessary for a comprehensive Stormwater Report that addresses the ten Stormwater Standards.

Note: Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that the item is not applicable (N.A.) and provide the reasons for that determination.

A complete checklist must include the Certification set forth below signed by the Registered Professional Engineer who prepared the Stormwater Report.

Registered Professional Engineer's Certification

I have reviewed the Stormwater Report, including the soil evaluation, computations, Long-term Pollution Prevention Plan, the Construction Period Erosion and Sedimentation Control Plan (if included), the Long-term Post-Construction Operation and Maintenance Plan, the Illicit Discharge Compliance Statement (if included) and the plans showing the stormwater management system, and have determined that they have been prepared in accordance with the requirements of the Stormwater Management Standards as further elaborated by the Massachusetts Stormwater Handbook. I have also determined that the information presented in the Stormwater Checklist is accurate and that the information presented in the Stormwater Report accurately reflects conditions at the site as of the date of this permit application.

Registered Professional Engineer Block and Signature

08-25-2025

Signature and Date

Checklist

Project Type: Is the application for new development, redevelopment, or a mix of new and redevelopment?

☒ New development

☐ Redevelopment

☐ Mix of New Development and Redevelopment

Checklist for Stormwater Report

Checklist (continued)

LID Measures: Stormwater Standards require LID measures to be considered. Document what environmentally sensitive design and LID Techniques were considered during the planning and design of the project:

- ☐ No disturbance to any Wetland Resource Areas
- ☐ Site Design Practices (e.g. clustered development, reduced frontage setbacks)
- ☐ Reduced Impervious Area (Redevelopment Only)
- ☒ Minimizing disturbance to existing trees and shrubs
- ☐ LID Site Design Credit Requested:
  - ☐ Credit 1
  - ☐ Credit 2
  - ☐ Credit 3
- ☐ Use of “country drainage” versus curb and gutter conveyance and pipe
- ☐ Bioretention Cells (includes Rain Gardens)
- ☐ Constructed Stormwater Wetlands (includes Gravel Wetlands designs)
- ☐ Treebox Filter
- ☐ Water Quality Swale
- ☐ Grass Channel
- ☐ Green Roof
- ☐ Other (describe): _____

Standard 1: No New Untreated Discharges

- ☒ No new untreated discharges
- ☒ Outlets have been designed so there is no erosion or scour to wetlands and waters of the Commonwealth
- ☐ Supporting calculations specified in Volume 3 of the Massachusetts Stormwater Handbook included.

Checklist for Stormwater Report

Checklist (continued)

Standard 2: Peak Rate Attenuation

☐ Standard 2 waiver requested because the project is located in land subject to coastal storm flowage and stormwater discharge is to a wetland subject to coastal flooding.

☒ Evaluation provided to determine whether off-site flooding increases during the 100-year 24-hour storm.

☒ Calculations provided to show that post-development peak discharge rates do not exceed pre-development rates for the 2-year and 10-year 24-hour storms. If evaluation shows that off-site flooding increases during the 100-year 24-hour storm, calculations are also provided to show that post-development peak discharge rates do not exceed pre-development rates for the 100-year 24-hour storm.

Standard 3: Recharge

☒ Soil Analysis provided.

☒ Required Recharge Volume calculation provided.

☐ Required Recharge volume reduced through use of the LID site Design Credits.

☒ Sizing the infiltration, BMPs is based on the following method: Check the method used.

☒ Static ☐ Simple Dynamic ☐ Dynamic Field[1]

☐ Runoff from all impervious areas at the site discharging to the infiltration BMP.

☐ Runoff from all impervious areas at the site is *not* discharging to the infiltration BMP and calculations are provided showing that the drainage area contributing runoff to the infiltration BMPs is sufficient to generate the required recharge volume.

☒ Recharge BMPs have been sized to infiltrate the Required Recharge Volume.

☐ Recharge BMPs have been sized to infiltrate the Required Recharge Volume *only* to the maximum extent practicable for the following reason:

- ☐ Site is comprised solely of C and D soils and/or bedrock at the land surface
- ☐ M.G.L. c. 21E sites pursuant to 310 CMR 40.0000
- ☐ Solid Waste Landfill pursuant to 310 CMR 19.000
- ☐ Project is otherwise subject to Stormwater Management Standards only to the maximum extent practicable.

☒ Calculations showing that the infiltration BMPs will drain in 72 hours are provided.

☐ Property includes a M.G.L. c. 21E site or a solid waste landfill and a mounding analysis is included.

[1] 80% TSS removal is required prior to discharge to infiltration BMP if Dynamic Field method is used.

Checklist for Stormwater Report

Checklist (continued)

Standard 3: Recharge (continued)

☐ The infiltration BMP is used to attenuate peak flows during storms greater than or equal to the 10-year 24-hour storm and separation to seasonal high groundwater is less than 4 feet and a mounding analysis is provided.

☒ Documentation is provided showing that infiltration BMPs do not adversely impact nearby wetland resource areas.

Standard 4: Water Quality

The Long-Term Pollution Prevention Plan typically includes the following:

- Good housekeeping practices;
- Provisions for storing materials and waste products inside or under cover;
- Vehicle washing controls;
- Requirements for routine inspections and maintenance of stormwater BMPs;
- Spill prevention and response plans;
- Provisions for maintenance of lawns, gardens, and other landscaped areas;
- Requirements for storage and use of fertilizers, herbicides, and pesticides;
- Pet waste management provisions;
- Provisions for operation and management of septic systems;
- Provisions for solid waste management;
- Snow disposal and plowing plans relative to Wetland Resource Areas;
- Winter Road Salt and/or Sand Use and Storage restrictions;
- Street sweeping schedules;
- Provisions for prevention of illicit discharges to the stormwater management system;
- Documentation that Stormwater BMPs are designed to provide for shutdown and containment in the event of a spill or discharges to or near critical areas or from LUHPPL;
- Training for staff or personnel involved with implementing Long-Term Pollution Prevention Plan;
- List of Emergency contacts for implementing Long-Term Pollution Prevention Plan.

☒ A Long-Term Pollution Prevention Plan is attached to Stormwater Report and is included as an attachment to the Wetlands Notice of Intent.

☐ Treatment BMPs subject to the 44% TSS removal pretreatment requirement and the one inch rule for calculating the water quality volume are included, and discharge:

- ☐ is within the Zone II or Interim Wellhead Protection Area
- ☐ is near or to other critical areas
- ☐ is within soils with a rapid infiltration rate (greater than 2.4 inches per hour)
- ☐ involves runoff from land uses with higher potential pollutant loads.

☐ The Required Water Quality Volume is reduced through use of the LID site Design Credits.

☒ Calculations documenting that the treatment train meets the 80% TSS removal requirement and, if applicable, the 44% TSS removal pretreatment requirement, are provided.

Checklist for Stormwater Report

Checklist (continued)

Standard 4: Water Quality (continued)

☒ The BMP is sized (and calculations provided) based on:

- ☒ The ½" or 1" Water Quality Volume or
- ☐ The equivalent flow rate associated with the Water Quality Volume and documentation is provided showing that the BMP treats the required water quality volume.

☐ The applicant proposes to use proprietary BMPs, and documentation supporting use of proprietary BMP and proposed TSS removal rate is provided. This documentation may be in the form of the propriety BMP checklist found in Volume 2, Chapter 4 of the Massachusetts Stormwater Handbook and submitting copies of the TARP Report, STEP Report, and/or other third party studies verifying performance of the proprietary BMPs.

☐ A TMDL exists that indicates a need to reduce pollutants other than TSS and documentation showing that the BMPs selected are consistent with the TMDL is provided.

Standard 5: Land Uses With Higher Potential Pollutant Loads (LUHPPLs)

☐ The NPDES Multi-Sector General Permit covers the land use and the Stormwater Pollution Prevention Plan (SWPPP) has been included with the Stormwater Report.

☐ The NPDES Multi-Sector General Permit covers the land use and the SWPPP will be submitted ***prior to*** the discharge of stormwater to the post-construction stormwater BMPs.

☐ The NPDES Multi-Sector General Permit does ***not*** cover the land use.

☐ LUHPPLs are located at the site and industry specific source control and pollution prevention measures have been proposed to reduce or eliminate the exposure of LUHPPLs to rain, snow, snow melt and runoff, and been included in the long term Pollution Prevention Plan.

☐ All exposure has been eliminated.

☐ All exposure has ***not*** been eliminated and all BMPs selected are on MassDEP LUHPPL list.

☐ The LUHPPL has the potential to generate runoff with moderate to higher concentrations of oil and grease (e.g. all parking lots with >1000 vehicle trips per day) and the treatment train includes an oil grit separator, a filtering bioretention area, a sand filter or equivalent.

Standard 6: Critical Areas

☐ The discharge is near or to a critical area and the treatment train includes only BMPs that MassDEP has approved for stormwater discharges to or near that particular class of critical area.

☐ Critical areas and BMPs are identified in the Stormwater Report.

Checklist for Stormwater Report

Checklist (continued)

Standard 7: Redevelopments and Other Projects Subject to the Standards only to the maximum extent practicable

☐ The project is subject to the Stormwater Management Standards only to the maximum Extent Practicable as a:

- ☐ Limited Project
- ☐ Small Residential Projects: 5-9 single family houses or 5-9 units in a multi-family development provided there is no discharge that may potentially affect a critical area.
- ☐ Small Residential Projects: 2-4 single family houses or 2-4 units in a multi-family development with a discharge to a critical area
- ☐ Marina and/or boatyard provided the hull painting, service and maintenance areas are protected from exposure to rain, snow, snow melt and runoff
- ☐ Bike Path and/or Foot Path
- ☐ Redevelopment Project
- ☐ Redevelopment portion of mix of new and redevelopment.

☐ Certain standards are not fully met (Standard No. 1, 8, 9, and 10 must always be fully met) and an explanation of why these standards are not met is contained in the Stormwater Report.

☐ The project involves redevelopment and a description of all measures that have been taken to improve existing conditions is provided in the Stormwater Report. The redevelopment checklist found in Volume 2 Chapter 3 of the Massachusetts Stormwater Handbook may be used to document that the proposed stormwater management system (a) complies with Standards 2, 3 and the pretreatment and structural BMP requirements of Standards 4-6 to the maximum extent practicable and (b) improves existing conditions.

Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control

A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan must include the following information:

- Narrative;
- Construction Period Operation and Maintenance Plan;
- Names of Persons or Entity Responsible for Plan Compliance;
- Construction Period Pollution Prevention Measures;
- Erosion and Sedimentation Control Plan Drawings;
- Detail drawings and specifications for erosion control BMPs, including sizing calculations;
- Vegetation Planning;
- Site Development Plan;
- Construction Sequencing Plan;
- Sequencing of Erosion and Sedimentation Controls;
- Operation and Maintenance of Erosion and Sedimentation Controls;
- Inspection Schedule;
- Maintenance Schedule;
- Inspection and Maintenance Log Form.

☒ A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan containing the information set forth above has been included in the Stormwater Report.

Checklist for Stormwater Report

Checklist (continued)

Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control (continued)

☐ The project is highly complex and information is included in the Stormwater Report that explains why it is not possible to submit the Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan with the application. A Construction Period Pollution Prevention and Erosion and Sedimentation Control has ***not*** been included in the Stormwater Report but will be submitted ***before*** land disturbance begins.

☒ The project is ***not*** covered by a NPDES Construction General Permit.

☐ The project is covered by a NPDES Construction General Permit and a copy of the SWPPP is in the Stormwater Report.

☐ The project is covered by a NPDES Construction General Permit but no SWPPP been submitted. The SWPPP will be submitted BEFORE land disturbance begins.

Standard 9: Operation and Maintenance Plan

☒ The Post Construction Operation and Maintenance Plan is included in the Stormwater Report and includes the following information:

- ☒ Name of the stormwater management system owners;
- ☒ Party responsible for operation and maintenance;
- ☒ Schedule for implementation of routine and non-routine maintenance tasks;
- ☒ Plan showing the location of all stormwater BMPs maintenance access areas;
- ☐ Description and delineation of public safety features;
- ☐ Estimated operation and maintenance budget; and
- ☒ Operation and Maintenance Log Form.

☐ The responsible party is ***not*** the owner of the parcel where the BMP is located and the Stormwater Report includes the following submissions:

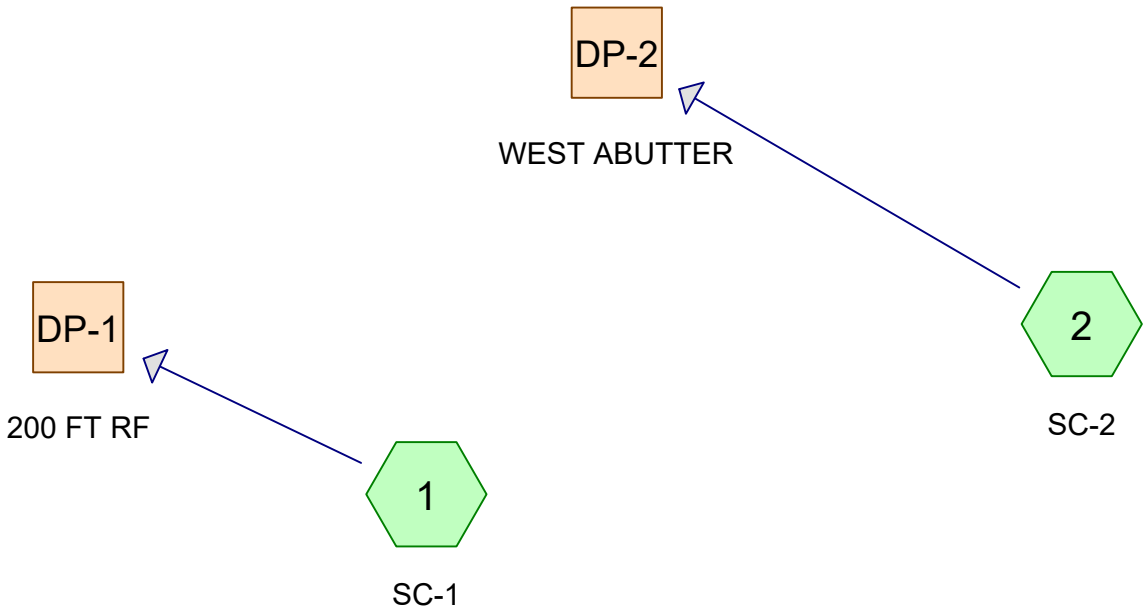
- ☐ A copy of the legal instrument (deed, homeowner's association, utility trust or other legal entity) that establishes the terms of and legal responsibility for the operation and maintenance of the project site stormwater BMPs;
- ☐ A plan and easement deed that allows site access for the legal entity to operate and maintain BMP functions.

Standard 10: Prohibition of Illicit Discharges

☒ The Long-Term Pollution Prevention Plan includes measures to prevent illicit discharges;

☐ An Illicit Discharge Compliance Statement is attached;

☒ NO Illicit Discharge Compliance Statement is attached but will be submitted ***prior to*** the discharge of any stormwater to post-construction BMPs.



Subcat Reach Pond Link

Routing Diagram for GREAT ROAD_PRE
Prepared by Patriot Engineering, Printed 8/25/2025

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	1-Yr 24 Hr	Type III 24-hr		Default	24.00	1	2.64	2
2	2-Yr 24 Hr	Type III 24-hr		Default	24.00	1	3.20	2
3	10-Yr 24 Hr	Type III 24-hr		Default	24.00	1	4.80	2
4	100-Yr 24 Hr	Type III 24-hr		Default	24.00	1	8.80	2

Summary for Subcatchment 1: SC-1

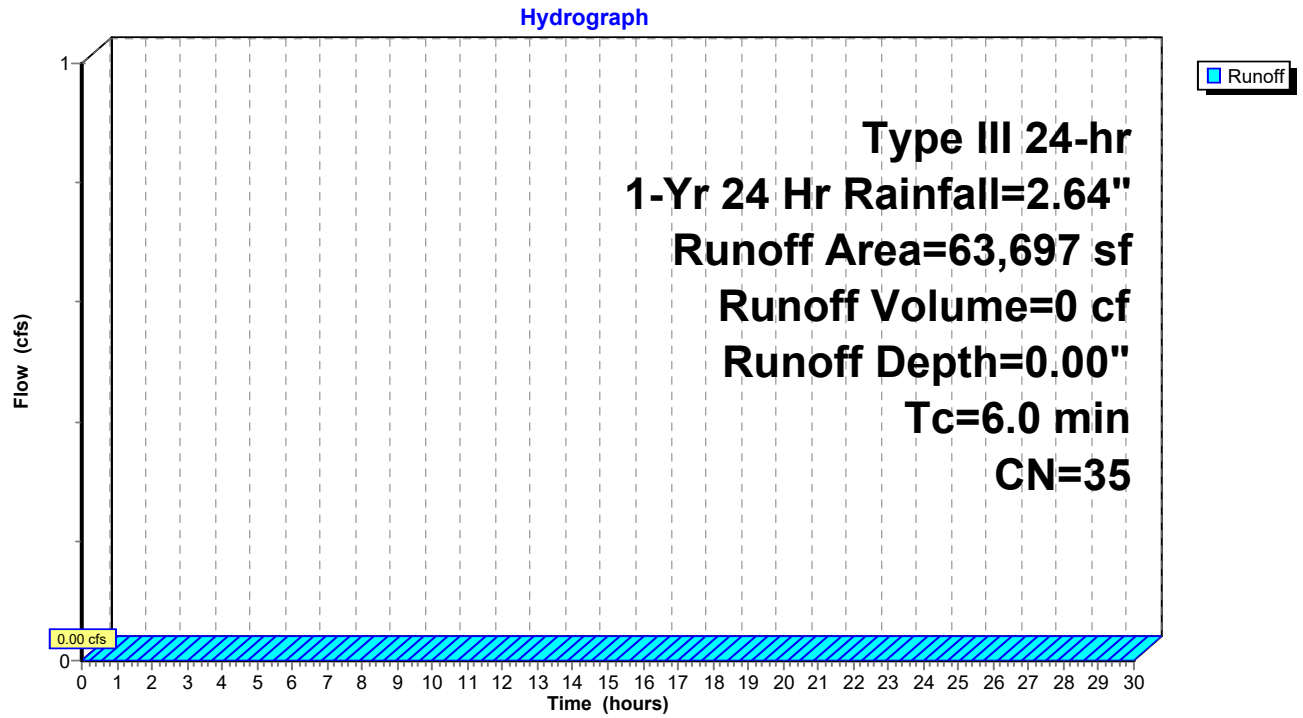
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Depth= 0.00"
Routed to Reach DP-1 : 200 FT RF

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Yr 24 Hr Rainfall=2.64"

	Area (sf)	CN	Description
*	2,010	98	Roofs, drives,patio, HSG A
	12,140	39	>75% Grass cover, Good, HSG A
	49,547	32	Woods/grass comb., Good, HSG A
	63,697	35	Weighted Average
	61,687		96.84% Pervious Area
	2,010		3.16% Impervious Area

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

Subcatchment 1: SC-1



Summary for Subcatchment 2: SC-2

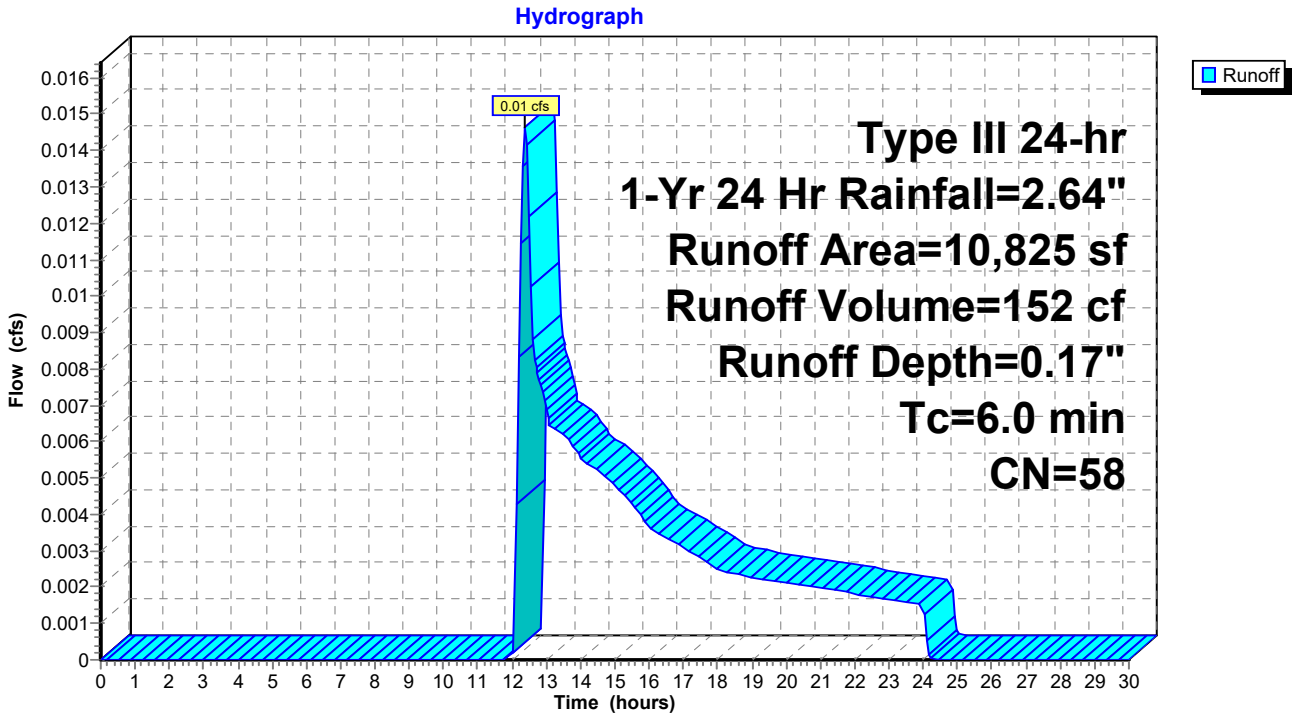
Runoff = 0.01 cfs @ 12.38 hrs, Volume= 152 cf, Depth= 0.17"
Routed to Reach DP-2 : WEST ABUTTER

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Yr 24 Hr Rainfall=2.64"

	Area (sf)	CN	Description
	1,420	98	Paved parking, HSG A
*	2,170	98	Roofs and Patios, HSG A
	1,480	32	Woods/grass comb., Good, HSG A
	5,755	39	>75% Grass cover, Good, HSG A
	10,825	58	Weighted Average
	7,235		66.84% Pervious Area
	3,590		33.16% Impervious Area

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

Subcatchment 2: SC-2

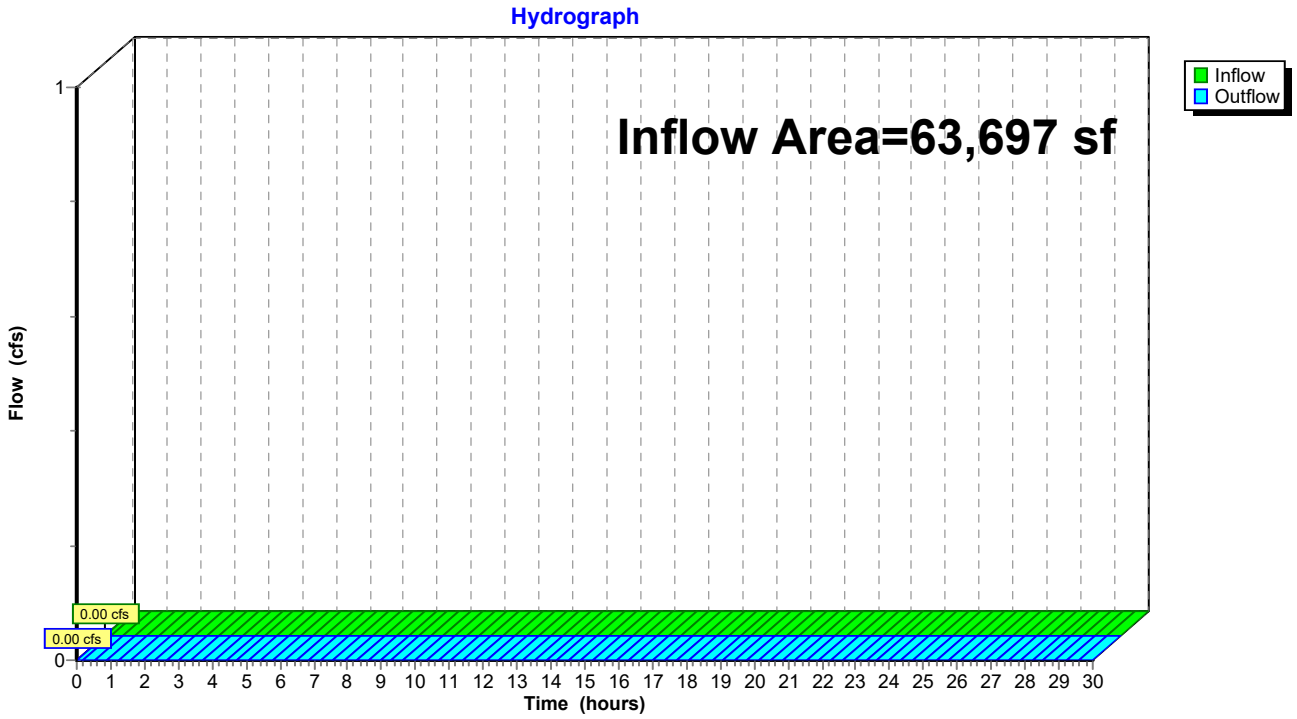


Summary for Reach DP-1: 200 FT RF

Inflow Area = 63,697 sf, 3.16% Impervious, Inflow Depth = 0.00" for 1-Yr 24 Hr event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Reach DP-1: 200 FT RF

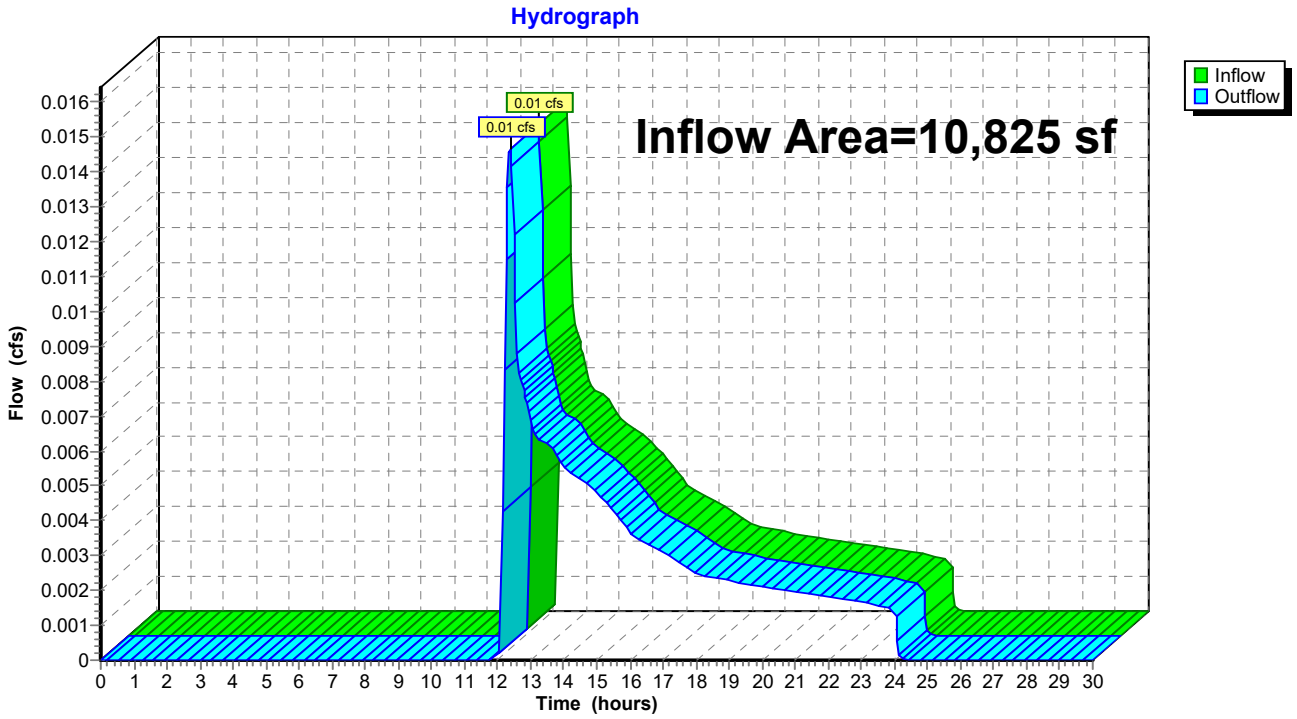


Summary for Reach DP-2: WEST ABUTTER

Inflow Area = 10,825 sf, 33.16% Impervious, Inflow Depth = 0.17" for 1-Yr 24 Hr event
Inflow = 0.01 cfs @ 12.38 hrs, Volume= 152 cf
Outflow = 0.01 cfs @ 12.38 hrs, Volume= 152 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Reach DP-2: WEST ABUTTER



Summary for Subcatchment 1: SC-1

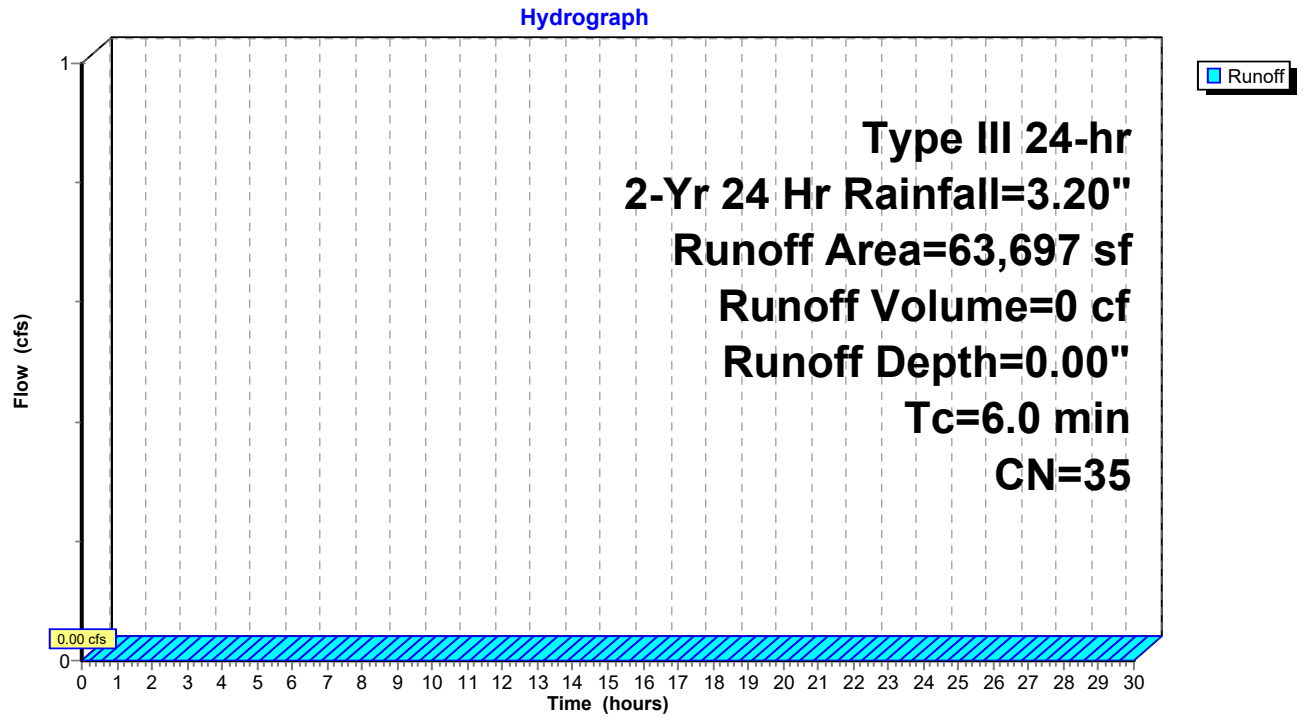
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Depth= 0.00"
Routed to Reach DP-1 : 200 FT RF

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Yr 24 Hr Rainfall=3.20"

	Area (sf)	CN	Description
*	2,010	98	Roofs, drives,patio, HSG A
	12,140	39	>75% Grass cover, Good, HSG A
	49,547	32	Woods/grass comb., Good, HSG A
	63,697	35	Weighted Average
	61,687		96.84% Pervious Area
	2,010		3.16% Impervious Area

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

Subcatchment 1: SC-1



Summary for Subcatchment 2: SC-2

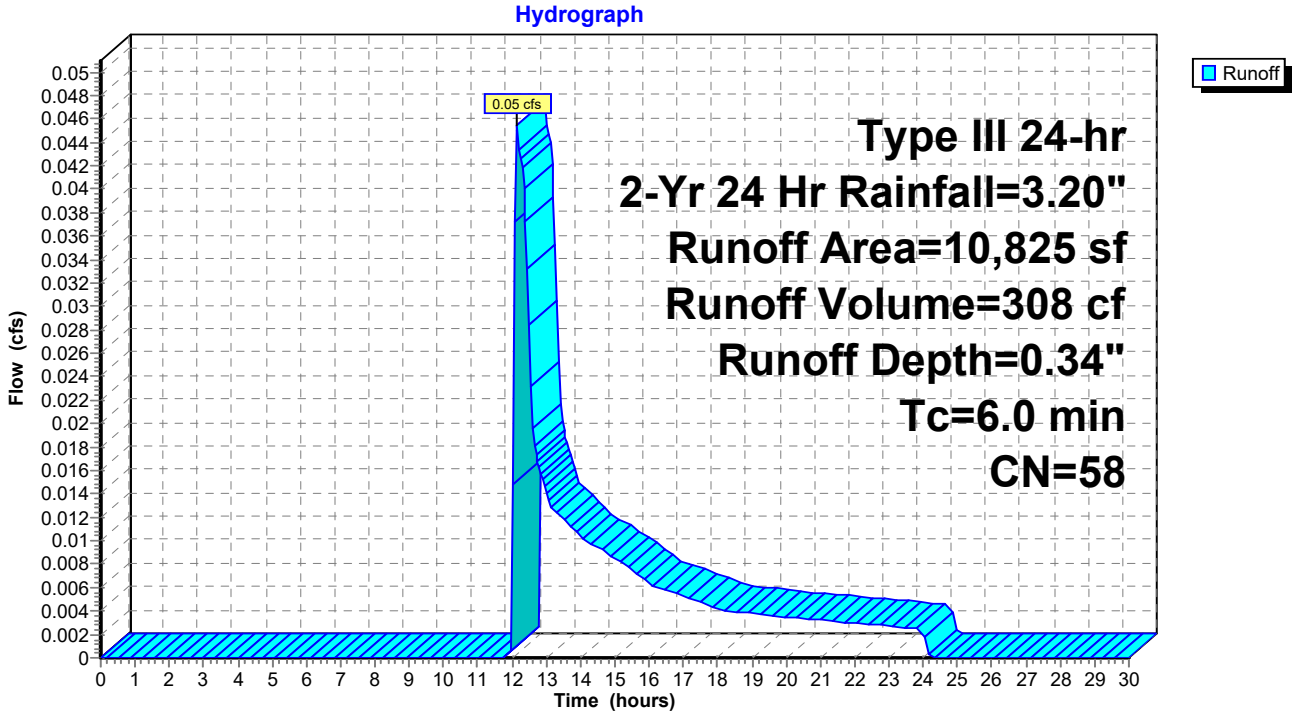
Runoff = 0.05 cfs @ 12.17 hrs, Volume= 308 cf, Depth= 0.34"
Routed to Reach DP-2 : WEST ABUTTER

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Yr 24 Hr Rainfall=3.20"

	Area (sf)	CN	Description
	1,420	98	Paved parking, HSG A
*	2,170	98	Roofs and Patios, HSG A
	1,480	32	Woods/grass comb., Good, HSG A
	5,755	39	>75% Grass cover, Good, HSG A
	10,825	58	Weighted Average
	7,235		66.84% Pervious Area
	3,590		33.16% Impervious Area

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

Subcatchment 2: SC-2

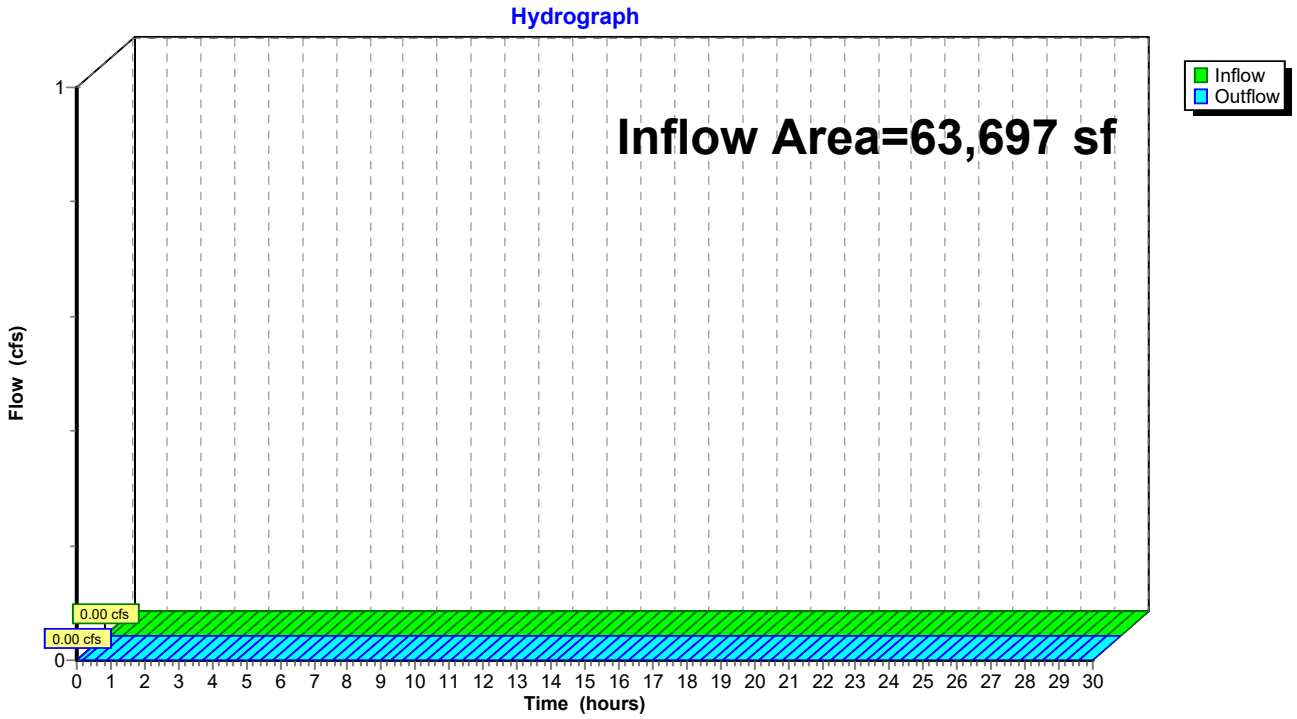


Summary for Reach DP-1: 200 FT RF

Inflow Area = 63,697 sf, 3.16% Impervious, Inflow Depth = 0.00" for 2-Yr 24 Hr event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Reach DP-1: 200 FT RF

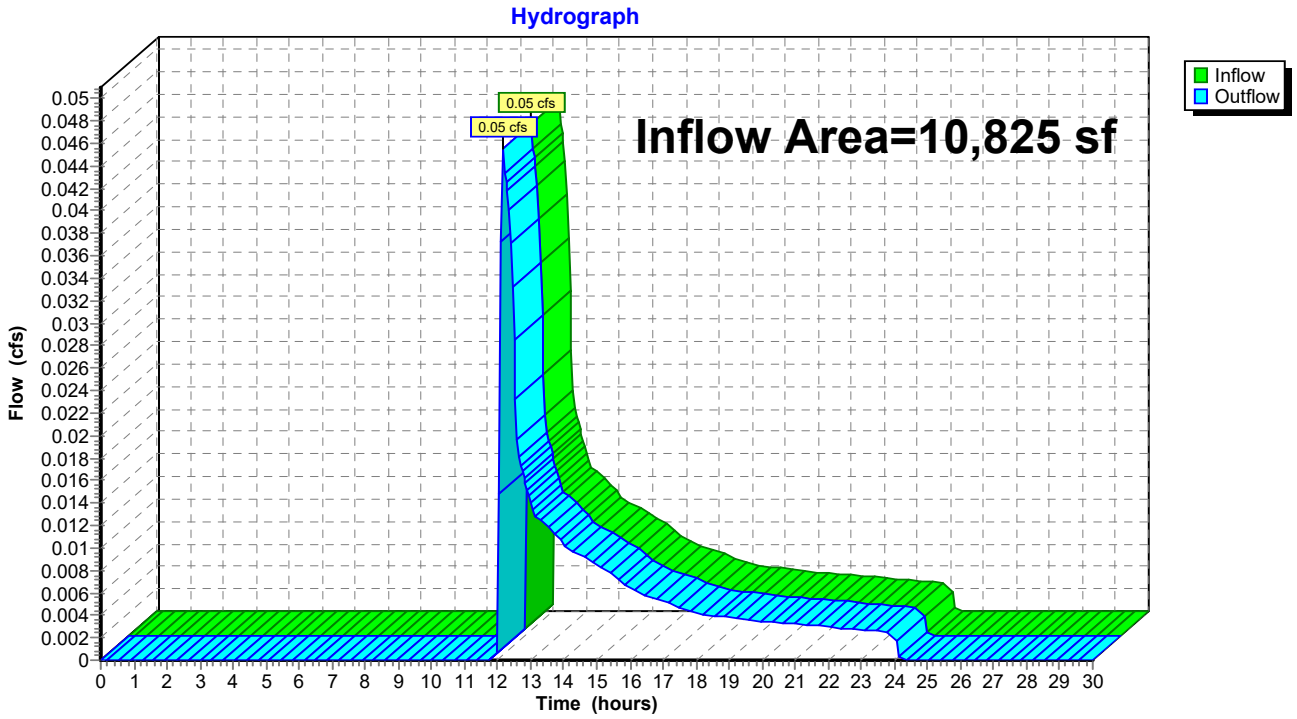


Summary for Reach DP-2: WEST ABUTTER

Inflow Area = 10,825 sf, 33.16% Impervious, Inflow Depth = 0.34" for 2-Yr 24 Hr event
Inflow = 0.05 cfs @ 12.17 hrs, Volume= 308 cf
Outflow = 0.05 cfs @ 12.17 hrs, Volume= 308 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Reach DP-2: WEST ABUTTER



Summary for Subcatchment 1: SC-1

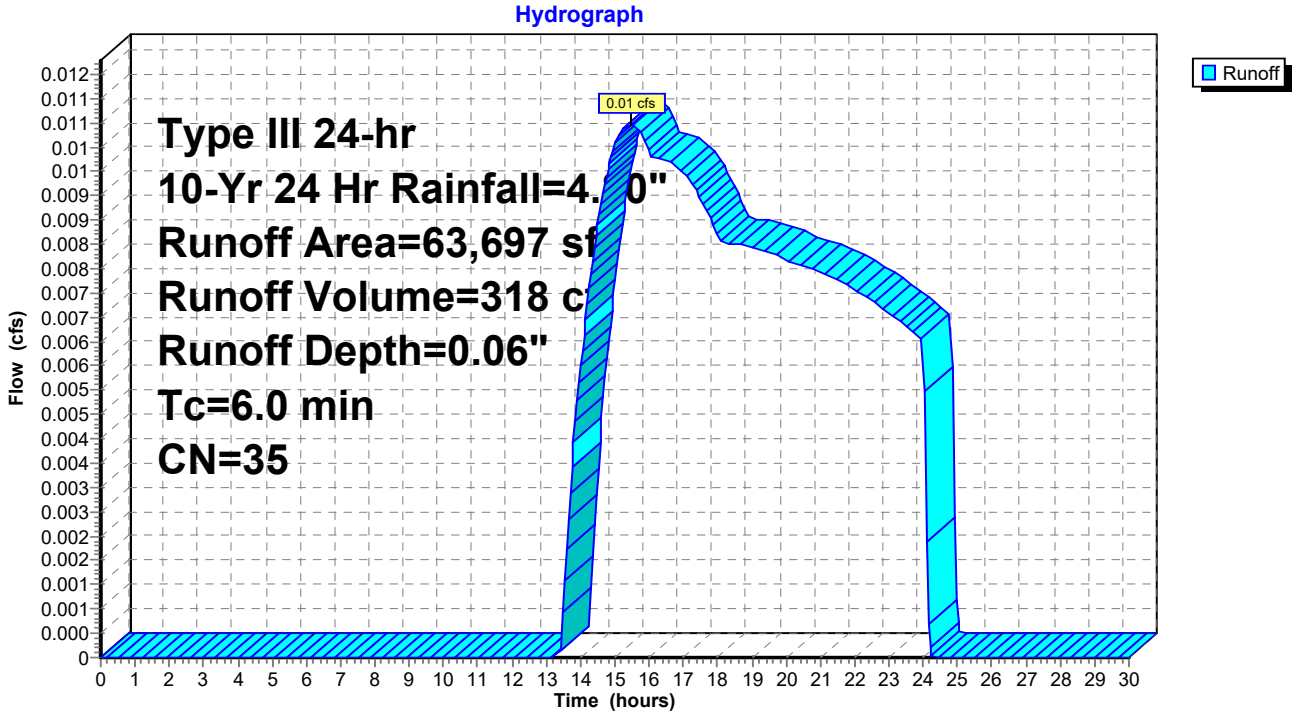
Runoff = 0.01 cfs @ 15.45 hrs, Volume= 318 cf, Depth= 0.06"
Routed to Reach DP-1 : 200 FT RF

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Yr 24 Hr Rainfall=4.80"

	Area (sf)	CN	Description
*	2,010	98	Roofs, drives,patio, HSG A
	12,140	39	>75% Grass cover, Good, HSG A
	49,547	32	Woods/grass comb., Good, HSG A
	63,697	35	Weighted Average
	61,687		96.84% Pervious Area
	2,010		3.16% Impervious Area

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

Subcatchment 1: SC-1



Summary for Subcatchment 2: SC-2

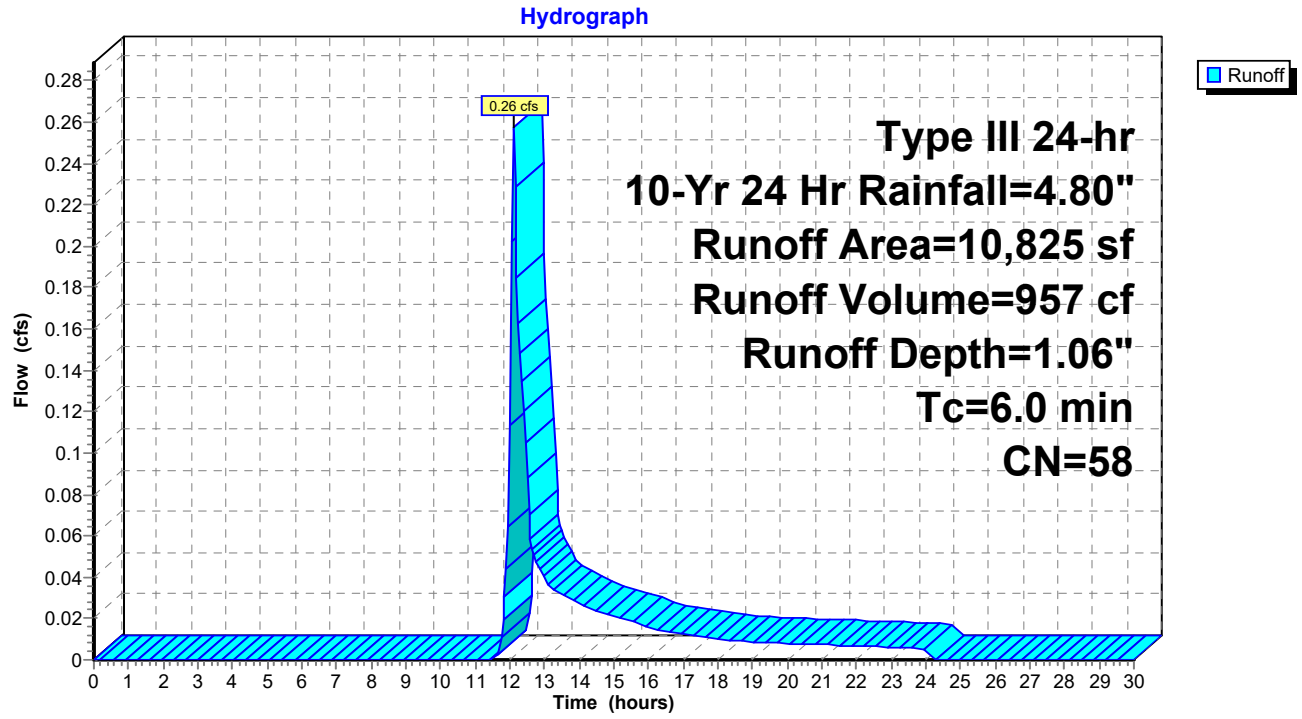
Runoff = 0.26 cfs @ 12.11 hrs, Volume= 957 cf, Depth= 1.06"
Routed to Reach DP-2 : WEST ABUTTER

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Yr 24 Hr Rainfall=4.80"

	Area (sf)	CN	Description
	1,420	98	Paved parking, HSG A
*	2,170	98	Roofs and Patios, HSG A
	1,480	32	Woods/grass comb., Good, HSG A
	5,755	39	>75% Grass cover, Good, HSG A
	10,825	58	Weighted Average
	7,235		66.84% Pervious Area
	3,590		33.16% Impervious Area

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

Subcatchment 2: SC-2

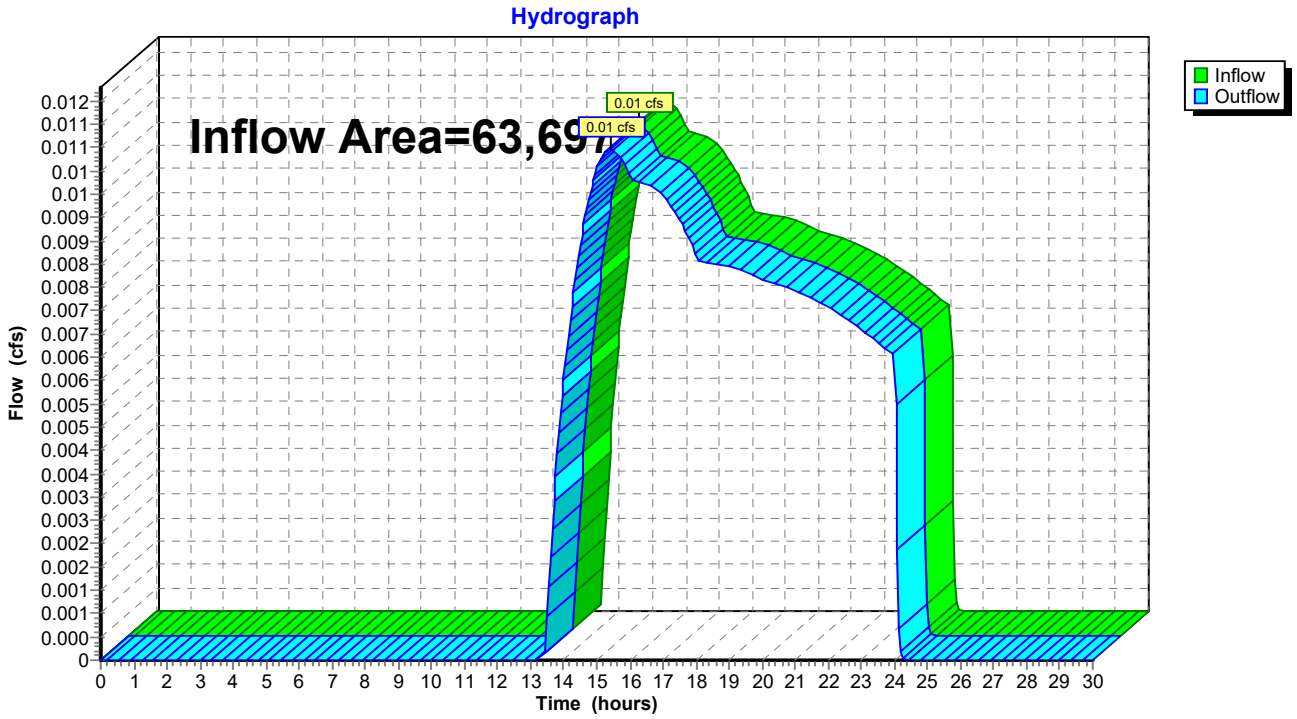


Summary for Reach DP-1: 200 FT RF

Inflow Area = 63,697 sf, 3.16% Impervious, Inflow Depth = 0.06" for 10-Yr 24 Hr event
Inflow = 0.01 cfs @ 15.45 hrs, Volume= 318 cf
Outflow = 0.01 cfs @ 15.45 hrs, Volume= 318 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Reach DP-1: 200 FT RF

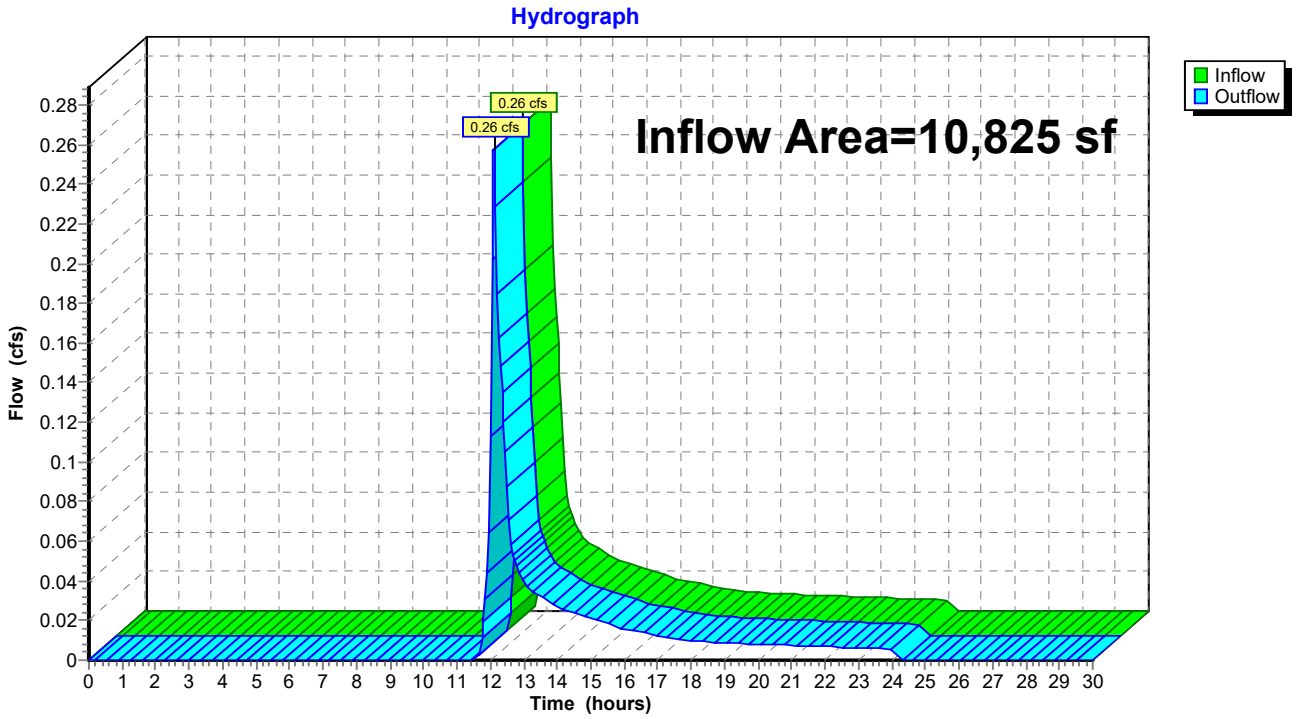


Summary for Reach DP-2: WEST ABUTTER

Inflow Area = 10,825 sf, 33.16% Impervious, Inflow Depth = 1.06" for 10-Yr 24 Hr event
Inflow = 0.26 cfs @ 12.11 hrs, Volume= 957 cf
Outflow = 0.26 cfs @ 12.11 hrs, Volume= 957 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Reach DP-2: WEST ABUTTER



Summary for Subcatchment 1: SC-1

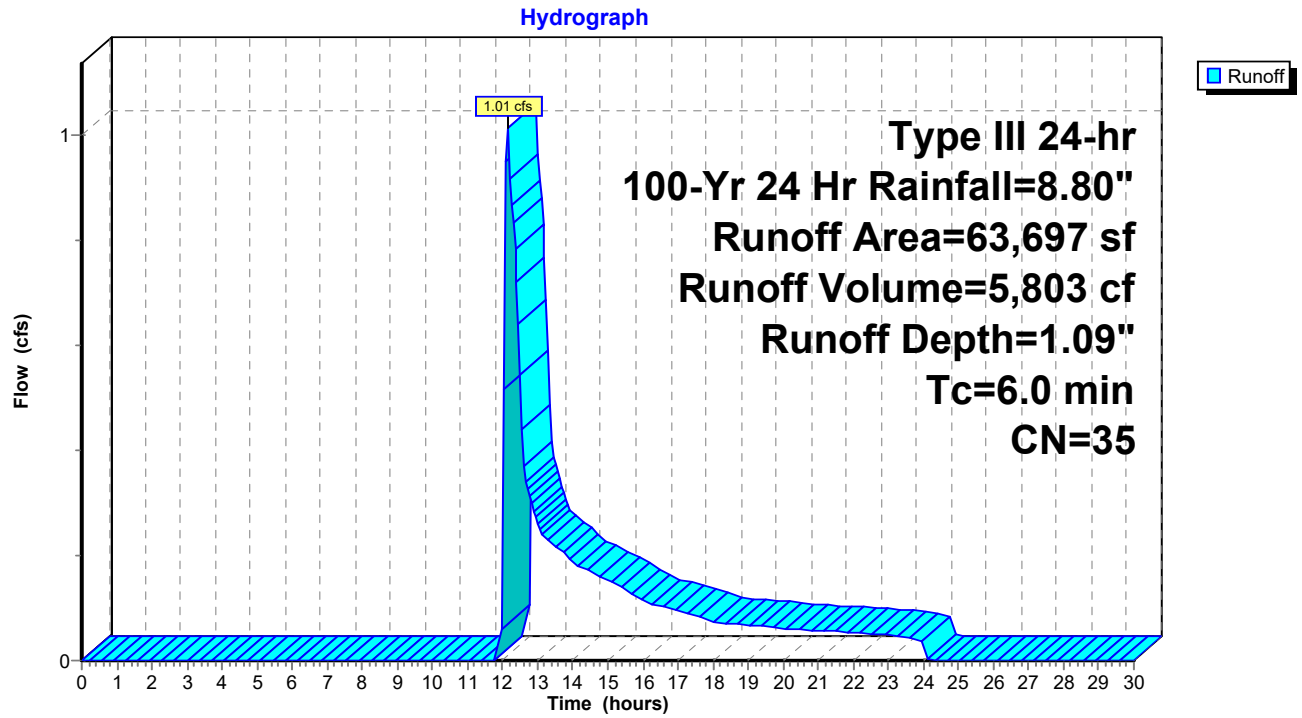
Runoff = 1.01 cfs @ 12.14 hrs, Volume= 5,803 cf, Depth= 1.09"
Routed to Reach DP-1 : 200 FT RF

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Yr 24 Hr Rainfall=8.80"

	Area (sf)	CN	Description
*	2,010	98	Roofs, drives,patio, HSG A
	12,140	39	>75% Grass cover, Good, HSG A
	49,547	32	Woods/grass comb., Good, HSG A
	63,697	35	Weighted Average
	61,687		96.84% Pervious Area
	2,010		3.16% Impervious Area

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

Subcatchment 1: SC-1



Summary for Subcatchment 2: SC-2

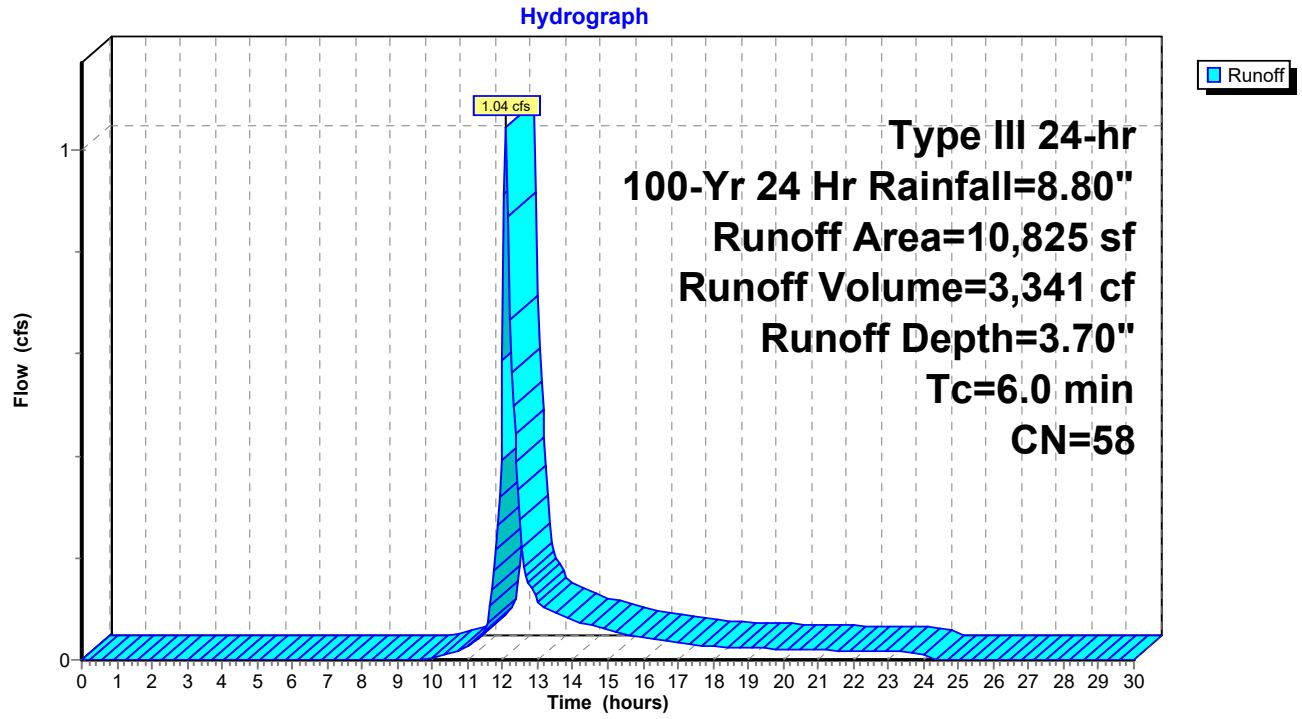
Runoff = 1.04 cfs @ 12.10 hrs, Volume= 3,341 cf, Depth= 3.70"
Routed to Reach DP-2 : WEST ABUTTER

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Yr 24 Hr Rainfall=8.80"

	Area (sf)	CN	Description
	1,420	98	Paved parking, HSG A
*	2,170	98	Roofs and Patios, HSG A
	1,480	32	Woods/grass comb., Good, HSG A
	5,755	39	>75% Grass cover, Good, HSG A
	10,825	58	Weighted Average
	7,235		66.84% Pervious Area
	3,590		33.16% Impervious Area

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

Subcatchment 2: SC-2

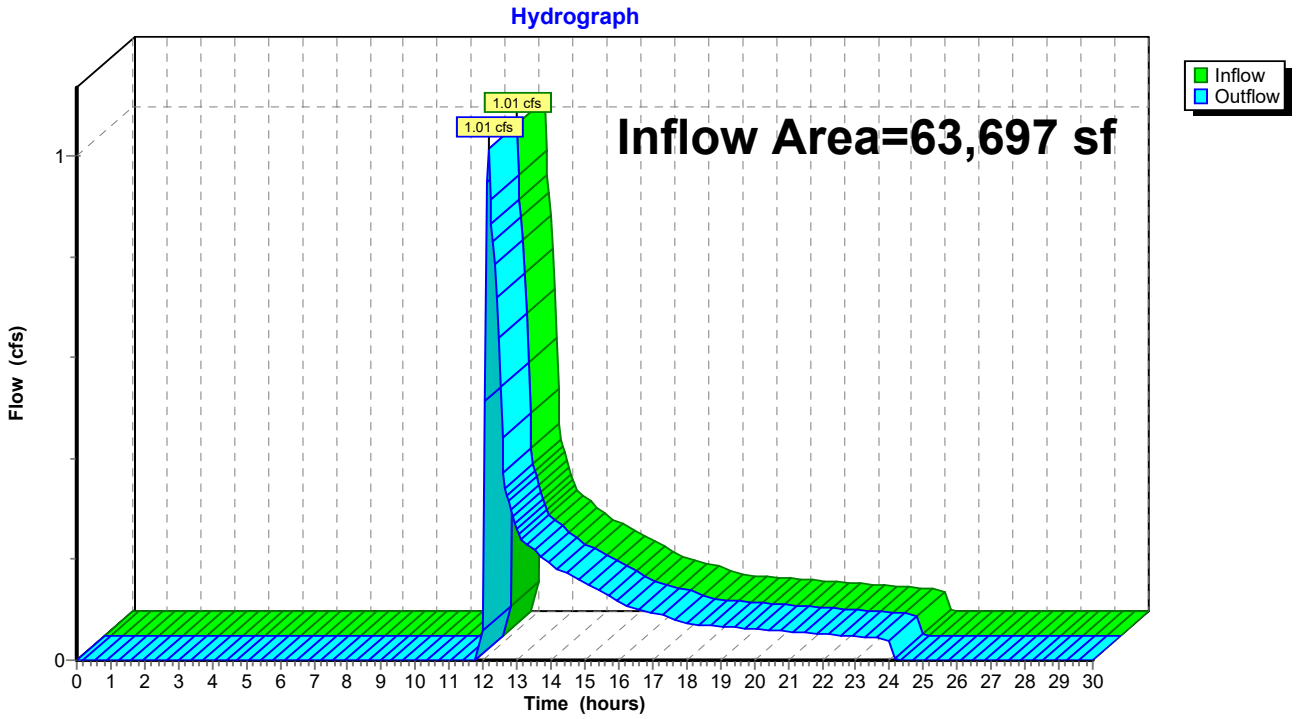


Summary for Reach DP-1: 200 FT RF

Inflow Area = 63,697 sf, 3.16% Impervious, Inflow Depth = 1.09" for 100-Yr 24 Hr event
Inflow = 1.01 cfs @ 12.14 hrs, Volume= 5,803 cf
Outflow = 1.01 cfs @ 12.14 hrs, Volume= 5,803 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Reach DP-1: 200 FT RF

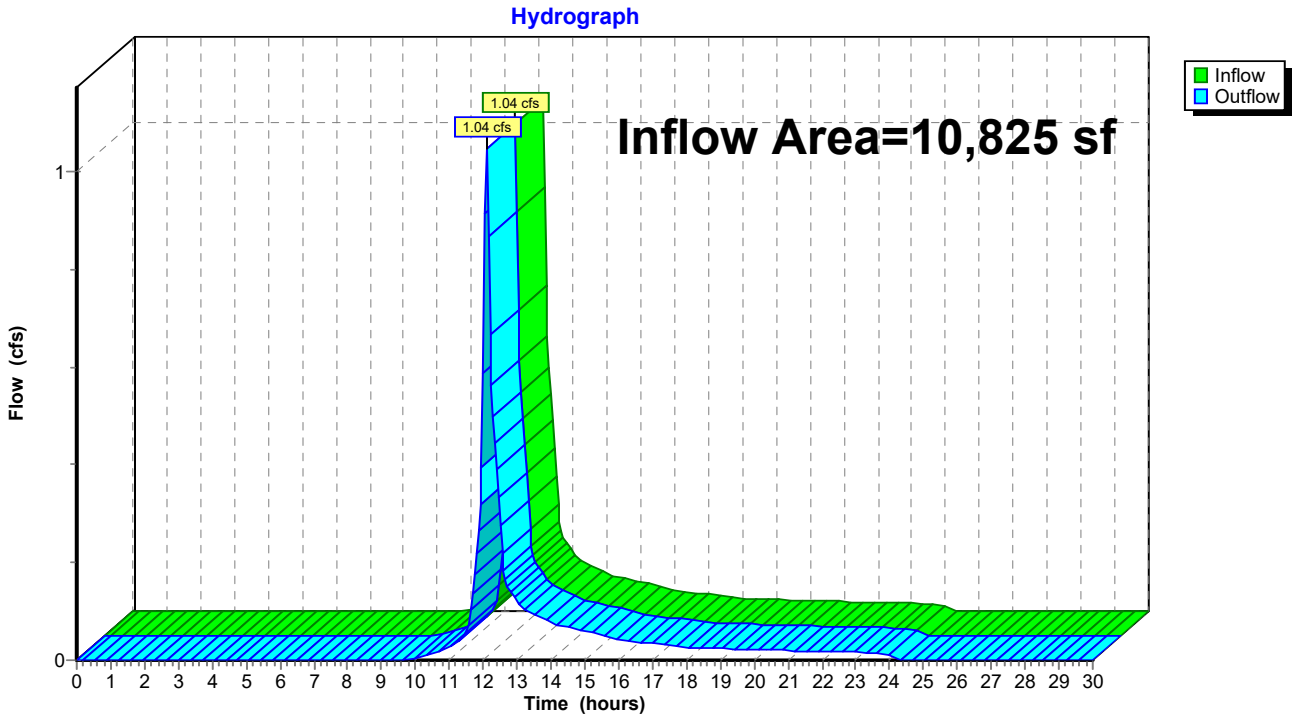


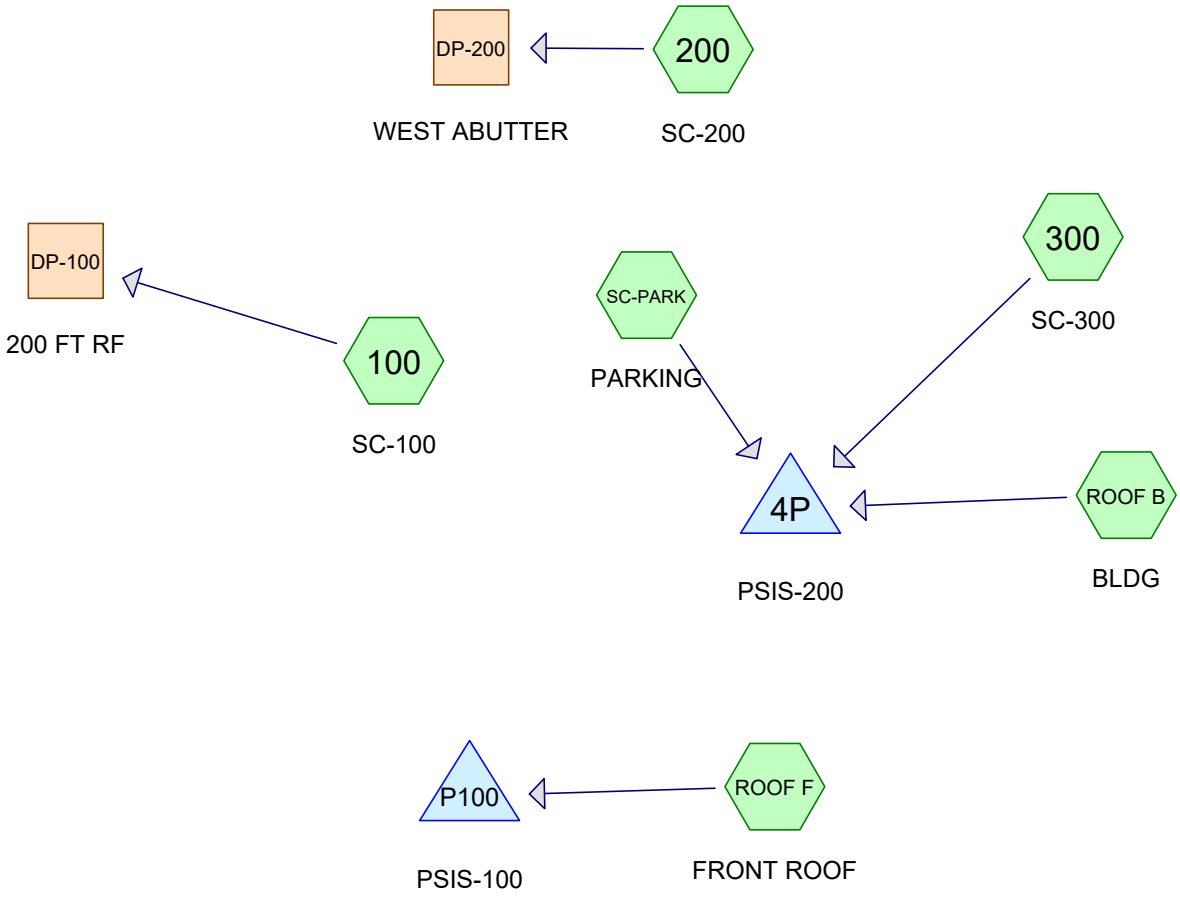
Summary for Reach DP-2: WEST ABUTTER

Inflow Area = 10,825 sf, 33.16% Impervious, Inflow Depth = 3.70" for 100-Yr 24 Hr event
Inflow = 1.04 cfs @ 12.10 hrs, Volume= 3,341 cf
Outflow = 1.04 cfs @ 12.10 hrs, Volume= 3,341 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Reach DP-2: WEST ABUTTER





Subcat Reach Pond Link

Routing Diagram for GREAT ROAD_POST_REV-3
Prepared by Patriot Engineering, Printed 8/25/2025

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	1-Yr 24 Hr	Type III 24-hr		Default	24.00	1	2.64	2
2	2-Yr 24 Hr	Type III 24-hr		Default	24.00	1	3.20	2
3	10-Yr 24 Hr	Type III 24-hr		Default	24.00	1	4.80	2
4	100-Yr 24 Hr	Type III 24-hr		Default	24.00	1	8.80	2

Summary for Subcatchment 100: SC-100

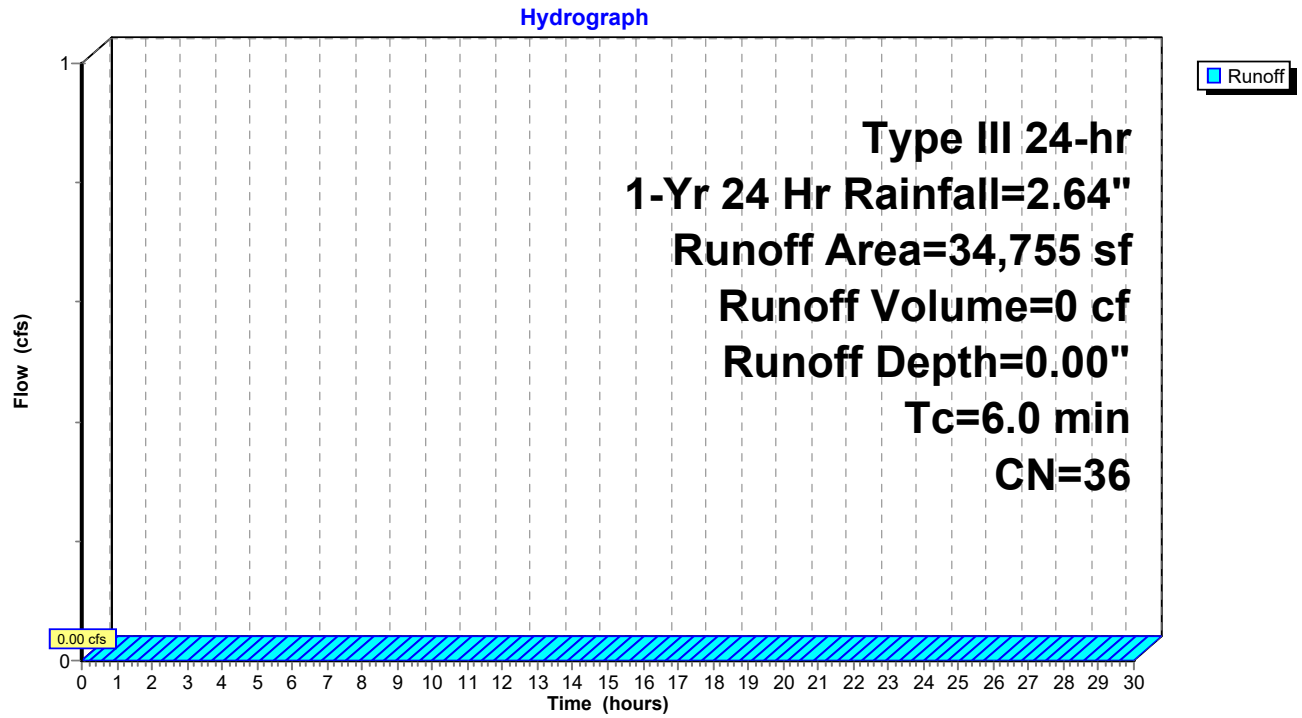
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Depth= 0.00"
Routed to Reach DP-100 : 200 FT RF

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Yr 24 Hr Rainfall=2.64"

Area (sf)	CN	Description
18,813	39	>75% Grass cover, Good, HSG A
15,580	32	Woods/grass comb., Good, HSG A
362	98	Paved parking, HSG A
34,755	36	Weighted Average
34,393		98.96% Pervious Area
362		1.04% Impervious Area

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

Subcatchment 100: SC-100



Summary for Subcatchment 200: SC-200

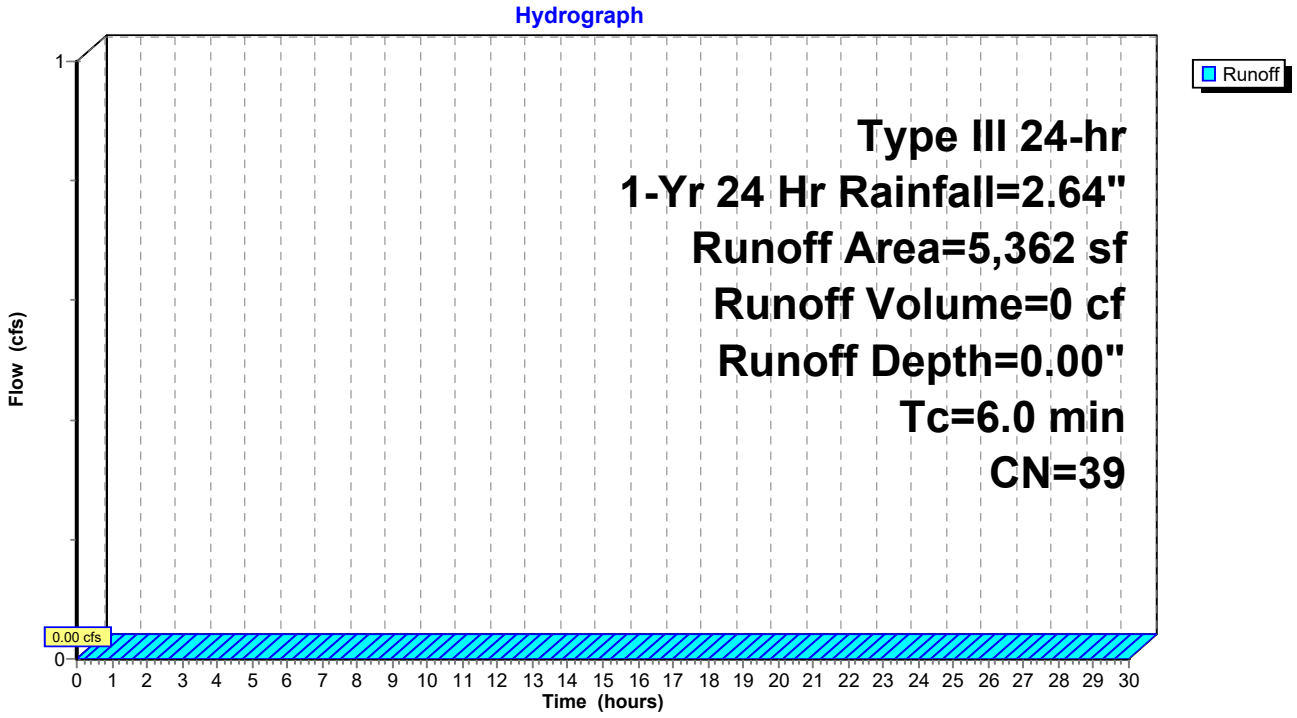
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Depth= 0.00"
Routed to Reach DP-200 : WEST ABUTTER

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Yr 24 Hr Rainfall=2.64"

Area (sf)	CN	Description
5,362	39	>75% Grass cover, Good, HSG A
5,362		100.00% Pervious Area

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

Subcatchment 200: SC-200



Summary for Subcatchment 300: SC-300

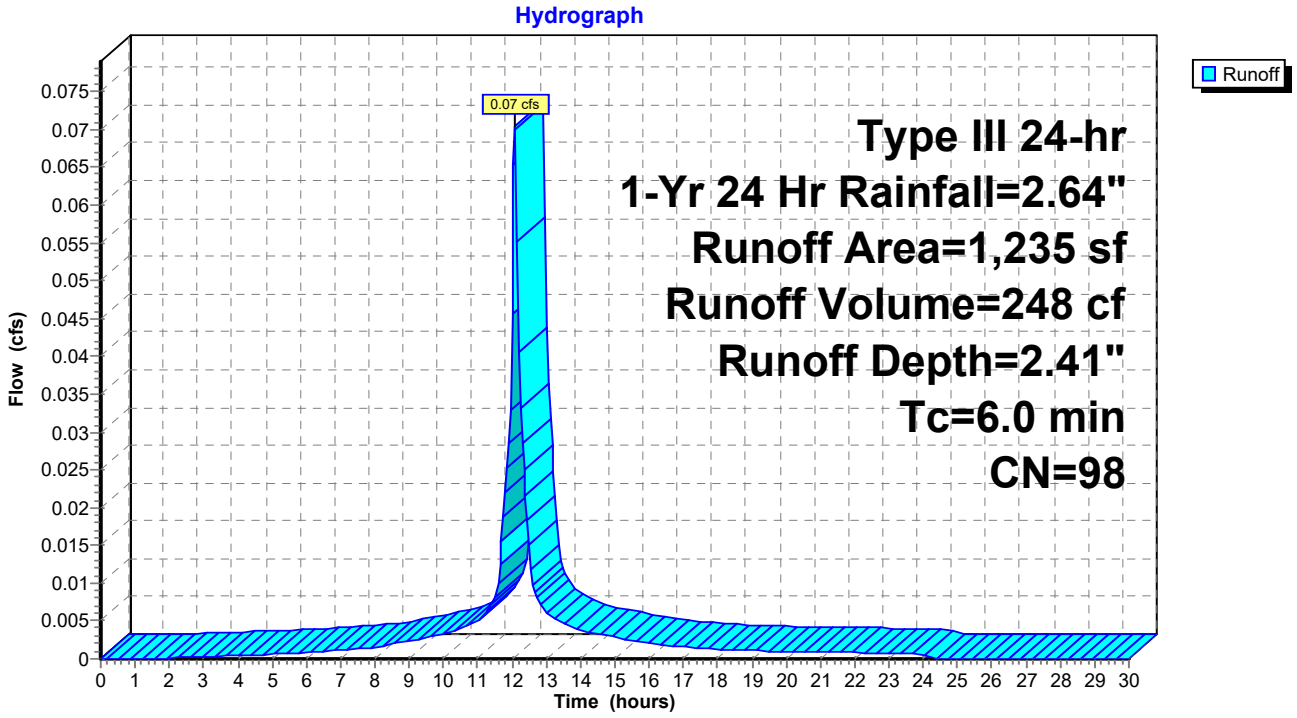
Runoff = 0.07 cfs @ 12.09 hrs, Volume= 248 cf, Depth= 2.41"
Routed to Pond 4P : PSIS-200

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Yr 24 Hr Rainfall=2.64"

Area (sf)	CN	Description
1,235	98	Roofs, HSG A
1,235		100.00% Impervious Area

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

Subcatchment 300: SC-300



Summary for Subcatchment ROOF B: BLDG

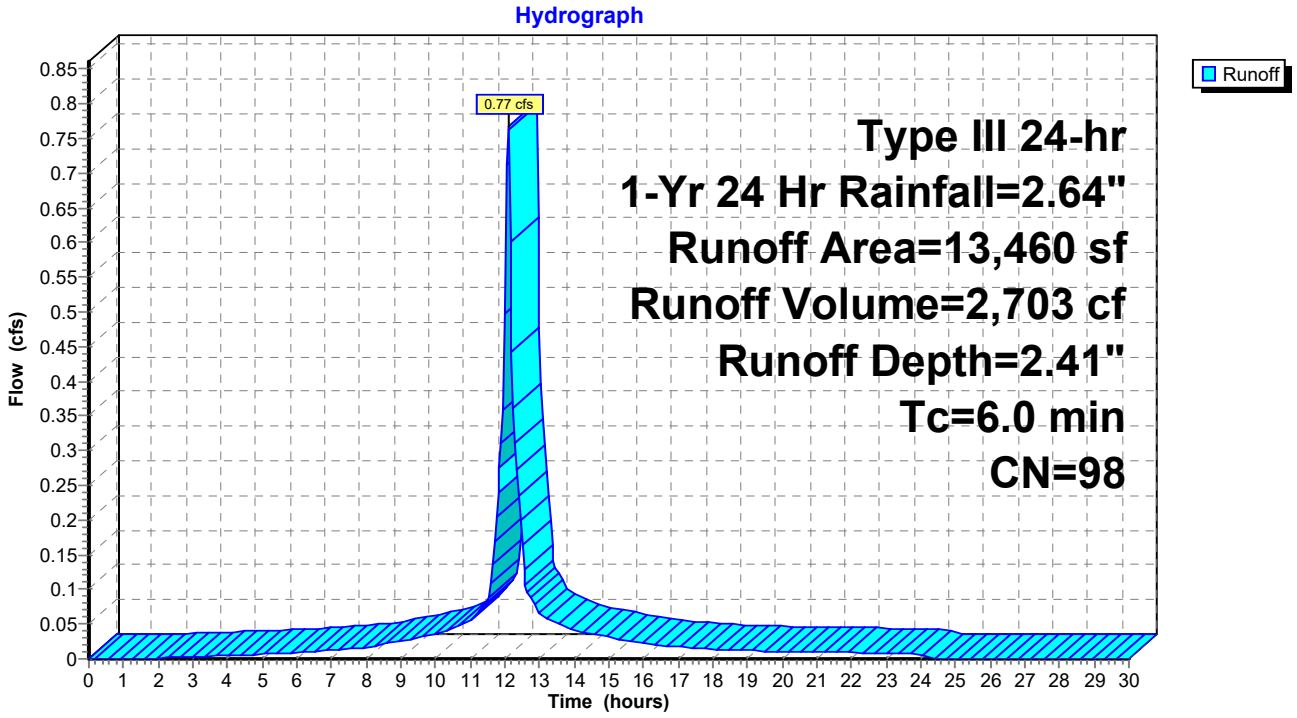
Runoff = 0.77 cfs @ 12.09 hrs, Volume= 2,703 cf, Depth= 2.41"
Routed to Pond 4P : PSIS-200

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Yr 24 Hr Rainfall=2.64"

	Area (sf)	CN	Description
*	13,460	98	Proposed Driveway/Walk
	13,460		100.00% Impervious Area

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

Subcatchment ROOF B: BLDG



Summary for Subcatchment ROOF F: FRONT ROOF

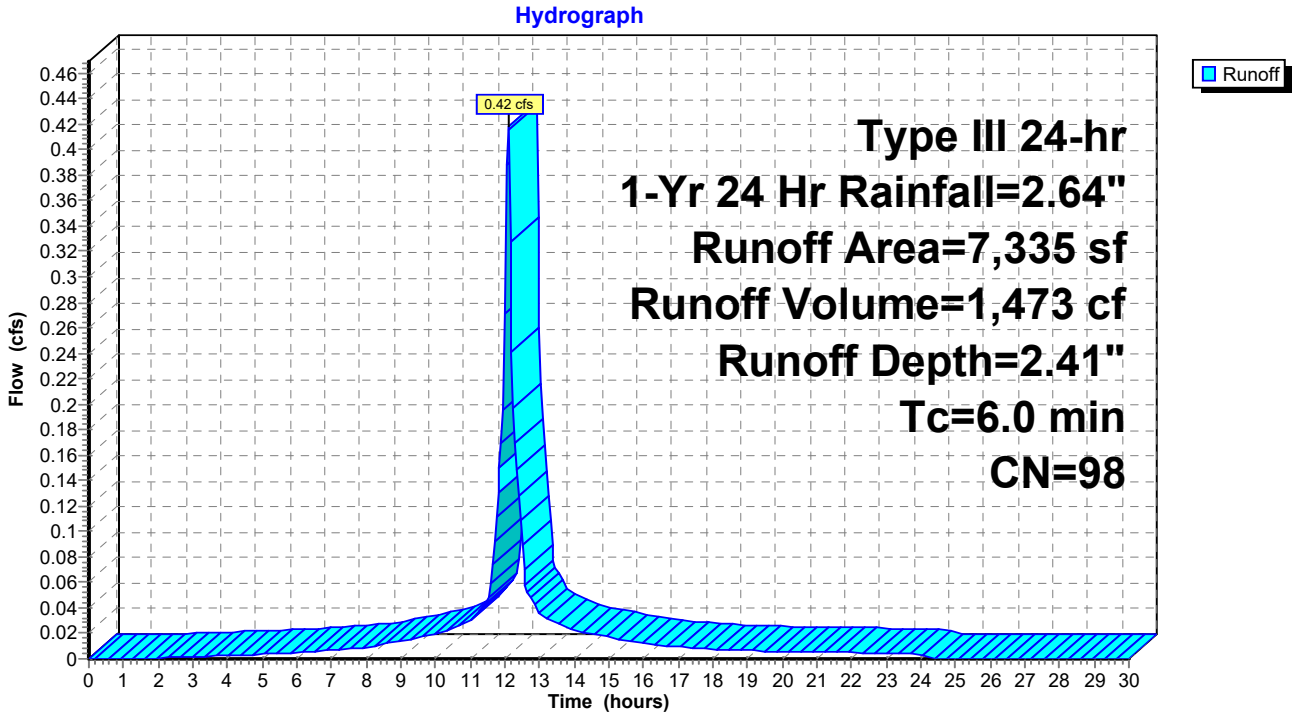
Runoff = 0.42 cfs @ 12.09 hrs, Volume= 1,473 cf, Depth= 2.41"
Routed to Pond P100 : PSIS-100

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Yr 24 Hr Rainfall=2.64"

Area (sf)	CN	Description
7,335	98	Roofs, HSG A
7,335		100.00% Impervious Area

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

Subcatchment ROOF F: FRONT ROOF



Summary for Subcatchment SC-PARK: PARKING

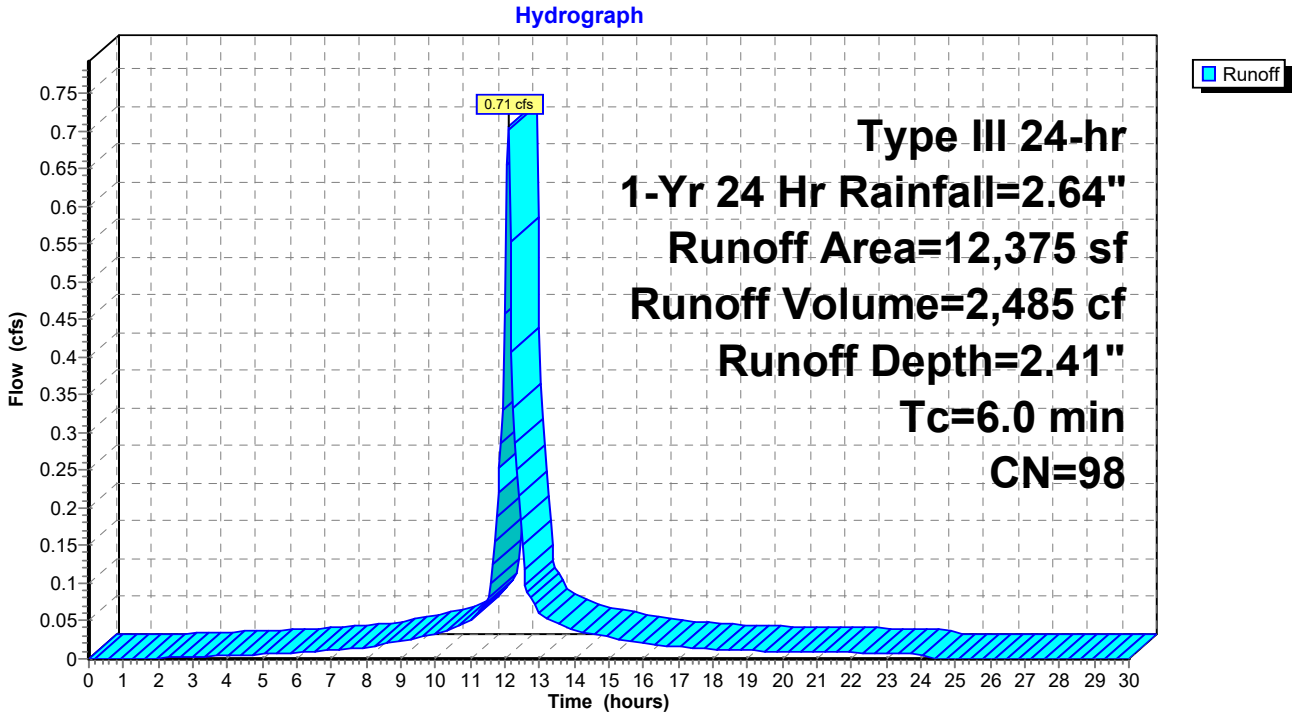
Runoff = 0.71 cfs @ 12.09 hrs, Volume= 2,485 cf, Depth= 2.41"
Routed to Pond 4P : PSIS-200

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Yr 24 Hr Rainfall=2.64"

Area (sf)	CN	Description
12,375	98	Paved parking, HSG A
12,375		100.00% Impervious Area

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

Subcatchment SC-PARK: PARKING

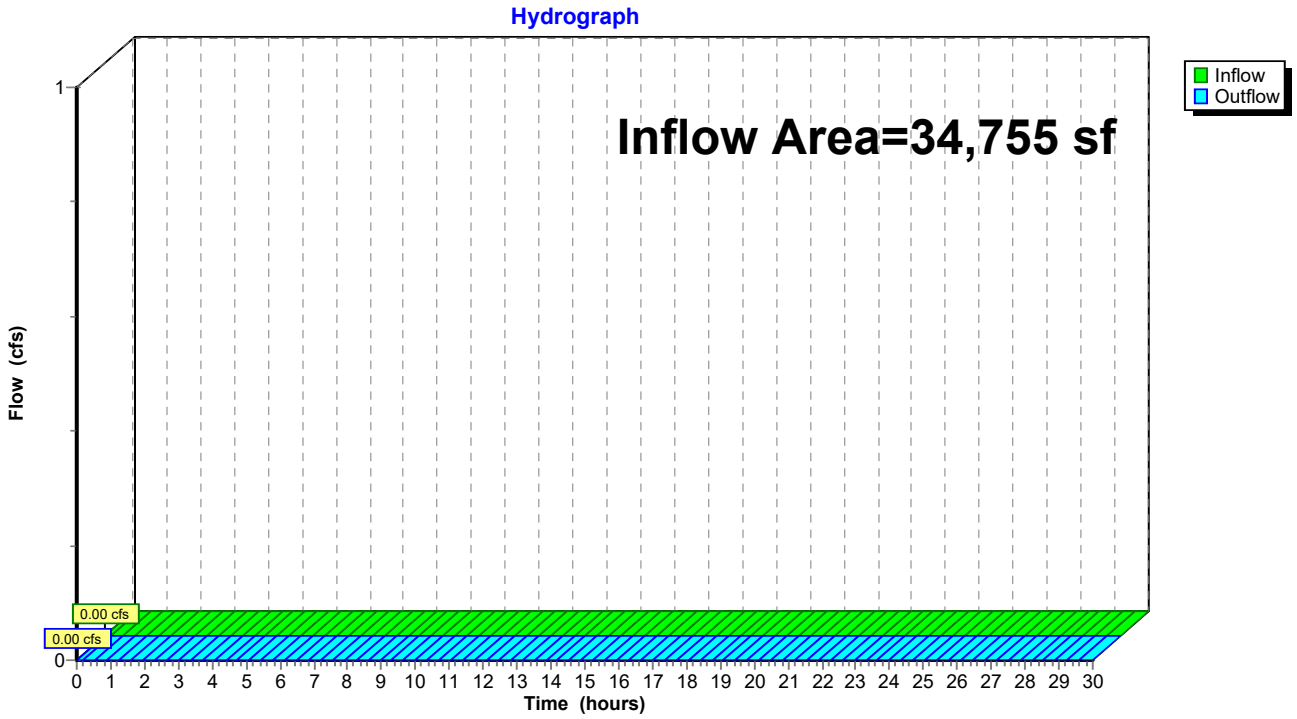


Summary for Reach DP-100: 200 FT RF

Inflow Area = 34,755 sf, 1.04% Impervious, Inflow Depth = 0.00" for 1-Yr 24 Hr event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Reach DP-100: 200 FT RF

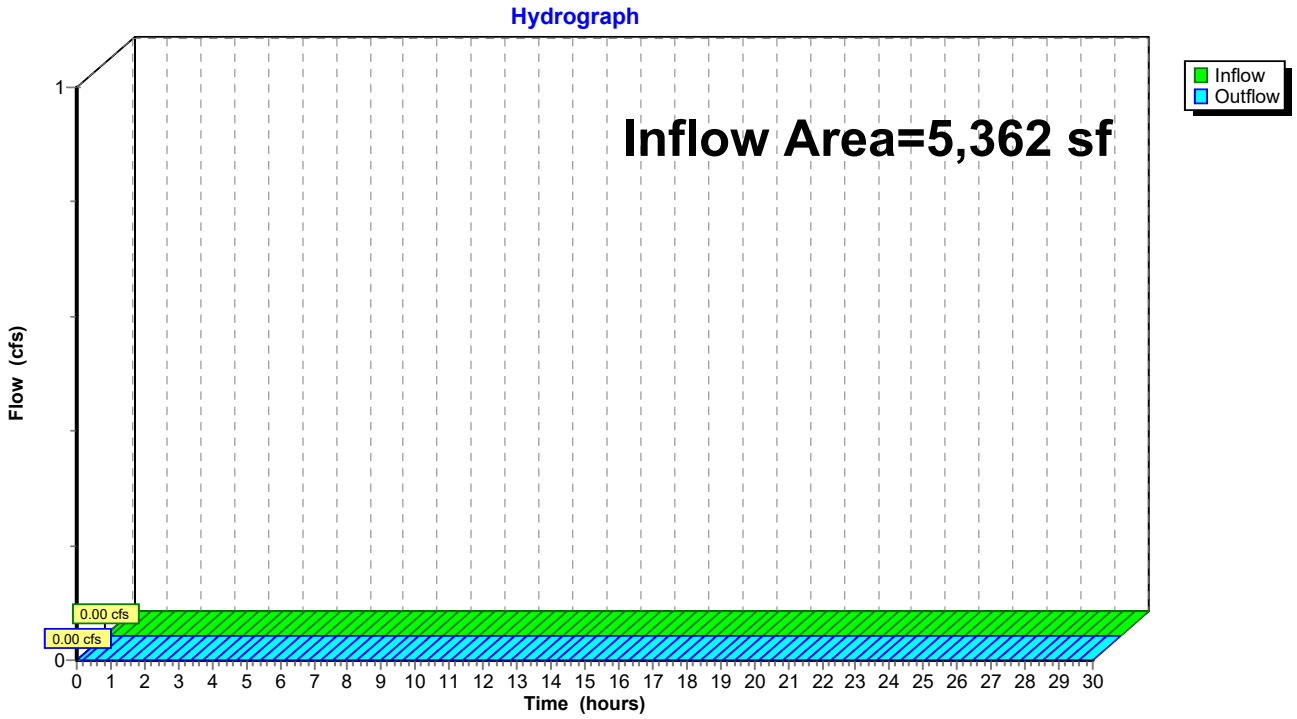


Summary for Reach DP-200: WEST ABUTTER

Inflow Area = 5,362 sf, 0.00% Impervious, Inflow Depth = 0.00" for 1-Yr 24 Hr event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Reach DP-200: WEST ABUTTER



Summary for Pond 4P: PSIS-200

Inflow Area = 27,070 sf,100.00% Impervious, Inflow Depth = 2.41" for 1-Yr 24 Hr event
Inflow = 1.55 cfs @ 12.09 hrs, Volume= 5,436 cf
Outflow = 0.79 cfs @ 12.00 hrs, Volume= 5,436 cf, Atten= 49%, Lag= 0.0 min
Discarded = 0.79 cfs @ 12.00 hrs, Volume= 5,436 cf

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 108.85' @ 12.23 hrs Surf.Area= 4,101 sf Storage= 417 cf
Flood Elev= 110.93' Surf.Area= 4,101 sf Storage= 5,237 cf

Plug-Flow detention time= 2.3 min calculated for 5,427 cf (100% of inflow)
Center-of-Mass det. time= 2.3 min (763.0 - 760.6)

Volume	Invert	Avail.Storage	Storage Description
#1A	108.60'	2,884 cf	**68.17'W x 60.16'L x 2.33'H Field A** 9,569 cf Overall - 2,359 cf Embedded = 7,210 cf x 40.0% Voids
#2A	109.10'	2,359 cf	**ADS_StormTech SC-310 +Cap** x 160 Inside #1 Effective Size= 28.9"W x 16.0"H => 2.07 sf x 7.12'L = 14.7 cf Overall Size= 34.0"W x 16.0"H x 7.56'L with 0.44' Overlap 160 Chambers in 20 Rows
		5,243 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	108.60'	**8.270 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.79 cfs @ 12.00 hrs HW=108.63' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.79 cfs)

Pond 4P: PSIS-200 - Chamber Wizard Field A

Chamber Model = ADS_StormTech SC-310 +Cap (ADS StormTech® SC-310 with cap length)
Effective Size= 28.9"W x 16.0"H => 2.07 sf x 7.12'L = 14.7 cf
Overall Size= 34.0"W x 16.0"H x 7.56'L with 0.44' Overlap

34.0" Wide + 6.0" Spacing = 40.0" C-C Row Spacing

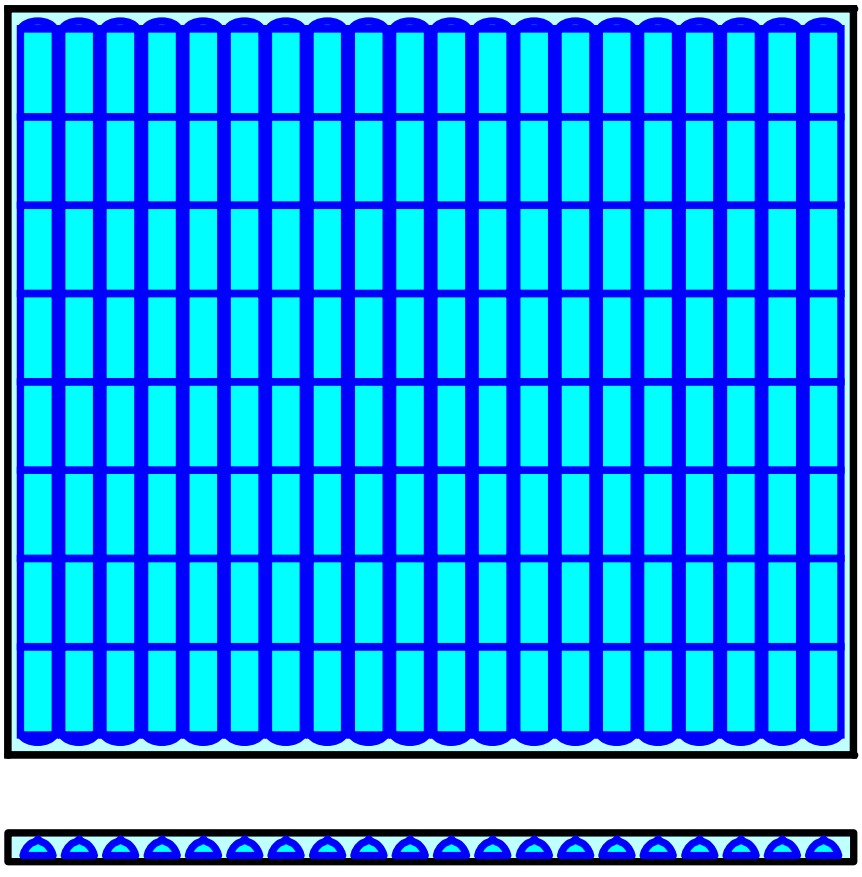
8 Chambers/Row x 7.12' Long +0.60' Cap Length x 2 = 58.16' Row Length +12.0" End Stone x 2 = 60.16' Base Length
20 Rows x 34.0" Wide + 6.0" Spacing x 19 + 12.0" Side Stone x 2 = 68.17' Base Width
6.0" Stone Base + 16.0" Chamber Height + 6.0" Stone Cover = 2.33' Field Height

160 Chambers x 14.7 cf = 2,358.7 cf Chamber Storage

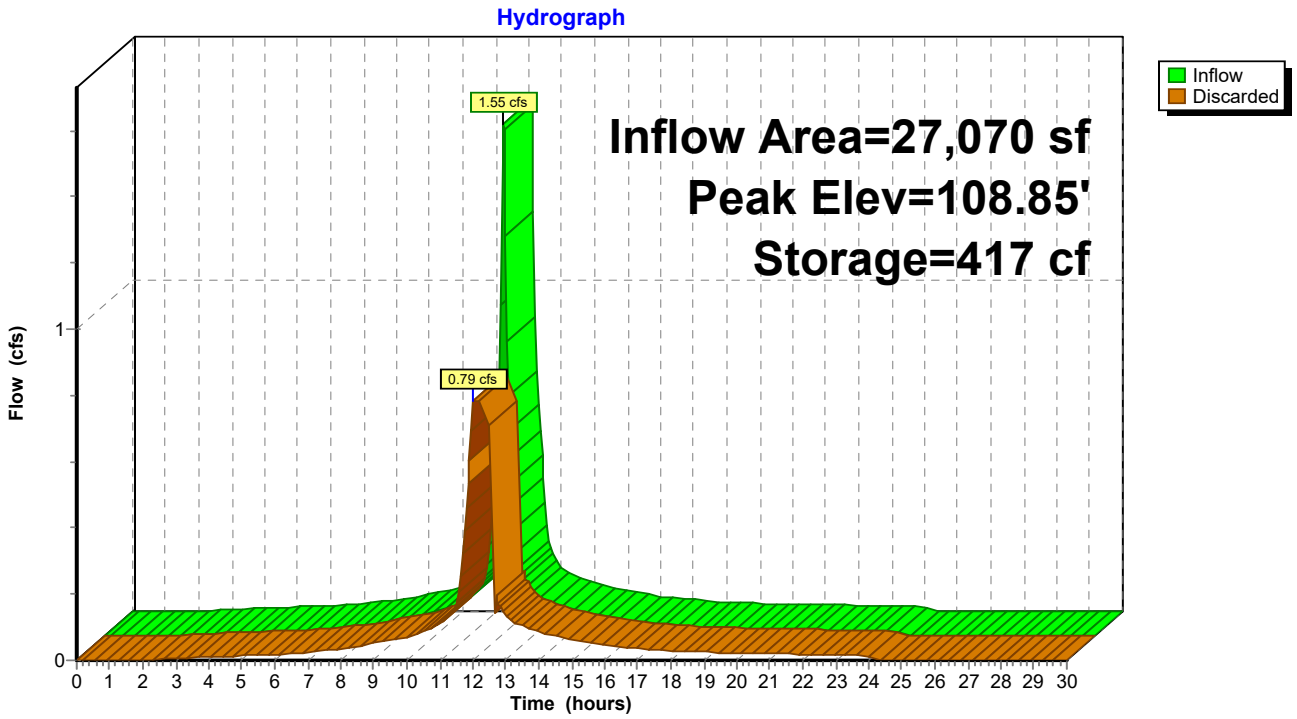
9,568.8 cf Field - 2,358.7 cf Chambers = 7,210.1 cf Stone x 40.0% Voids = 2,884.0 cf Stone Storage

Chamber Storage + Stone Storage = 5,242.7 cf = 0.120 af
Overall Storage Efficiency = 54.8%
Overall System Size = 60.16' x 68.17' x 2.33'

160 Chambers
354.4 cy Field
267.0 cy Stone



Pond 4P: PSIS-200



Summary for Pond P100: PSIS-100

Inflow Area = 7,335 sf,100.00% Impervious, Inflow Depth = 2.41" for 1-Yr 24 Hr event
Inflow = 0.42 cfs @ 12.09 hrs, Volume= 1,473 cf
Outflow = 0.16 cfs @ 11.90 hrs, Volume= 1,473 cf, Atten= 62%, Lag= 0.0 min
Discarded = 0.16 cfs @ 11.90 hrs, Volume= 1,473 cf

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 109.31' @ 12.32 hrs Surf.Area= 842 sf Storage= 177 cf
Flood Elev= 112.30' Surf.Area= 842 sf Storage= 1,771 cf

Plug-Flow detention time= 5.0 min calculated for 1,471 cf (100% of inflow)
Center-of-Mass det. time= 5.0 min (765.6 - 760.6)

Volume	Invert	Avail.Storage	Storage Description
#1A	108.80'	784 cf	**15.75'W x 53.46'L x 3.50'H Field A** 2,947 cf Overall - 987 cf Embedded = 1,960 cf x 40.0% Voids
#2A	109.30'	987 cf	**ADS_StormTech DC-780 b +Cap** x 21 Inside #1 Effective Size= 45.4"W x 30.0"H => 6.49 sf x 7.12'L = 46.2 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 21 Chambers in 3 Rows Cap Storage= 2.7 cf x 2 x 3 rows = 15.9 cf
		1,771 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	108.80'	**8.270 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.16 cfs @ 11.90 hrs HW=108.84' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.16 cfs)

Pond P100: PSIS-100 - Chamber Wizard Field A

Chamber Model = ADS_StormTech DC-780 b +Cap (ADS StormTech® DC-780 with cap storage)
Effective Size= 45.4"W x 30.0"H => 6.49 sf x 7.12'L = 46.2 cf
Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap
Cap Storage= 2.7 cf x 2 x 3 rows = 15.9 cf

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

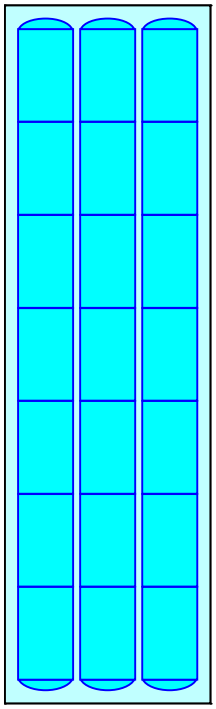
7 Chambers/Row x 7.12' Long +0.81' Cap Length x 2 = 51.46' Row Length +12.0" End Stone x 2 = 53.46' Base Length
3 Rows x 51.0" Wide + 6.0" Spacing x 2 + 12.0" Side Stone x 2 = 15.75' Base Width
6.0" Stone Base + 30.0" Chamber Height + 6.0" Stone Cover = 3.50' Field Height

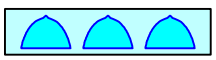
21 Chambers x 46.2 cf + 2.7 cf Cap Volume x 2 x 3 Rows = 987.0 cf Chamber Storage

2,946.8 cf Field - 987.0 cf Chambers = 1,959.8 cf Stone x 40.0% Voids = 783.9 cf Stone Storage

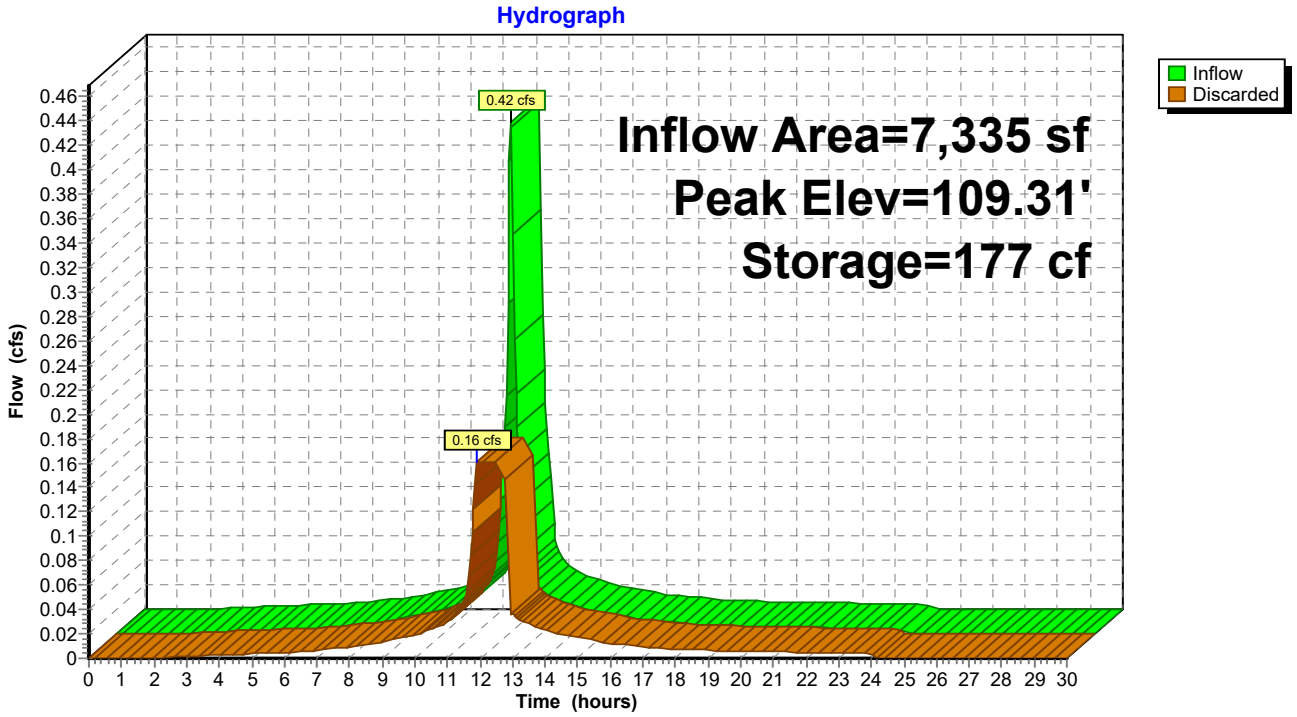
Chamber Storage + Stone Storage = 1,770.9 cf = 0.041 af
Overall Storage Efficiency = 60.1%
Overall System Size = 53.46' x 15.75' x 3.50'

21 Chambers
109.1 cy Field
72.6 cy Stone





Pond P100: PSIS-100



Summary for Subcatchment 100: SC-100

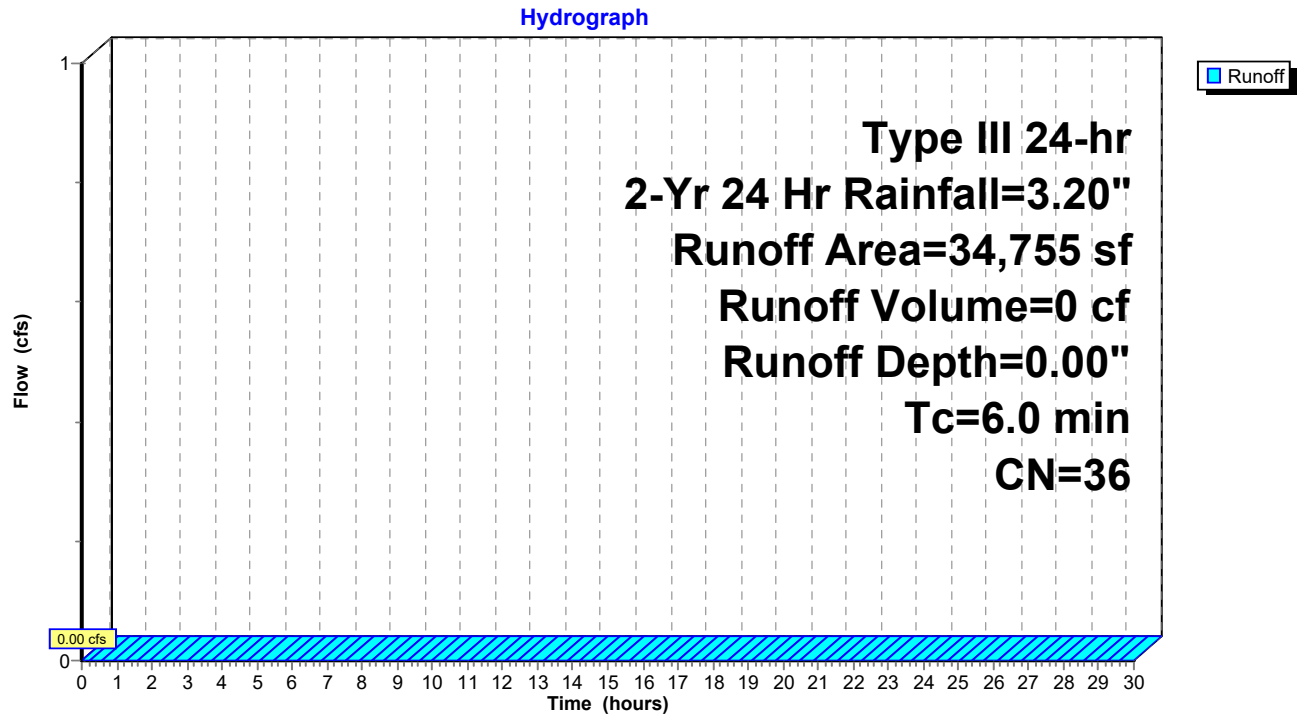
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Depth= 0.00"
Routed to Reach DP-100 : 200 FT RF

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Yr 24 Hr Rainfall=3.20"

Area (sf)	CN	Description
18,813	39	>75% Grass cover, Good, HSG A
15,580	32	Woods/grass comb., Good, HSG A
362	98	Paved parking, HSG A
34,755	36	Weighted Average
34,393		98.96% Pervious Area
362		1.04% Impervious Area

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

Subcatchment 100: SC-100



Summary for Subcatchment 200: SC-200

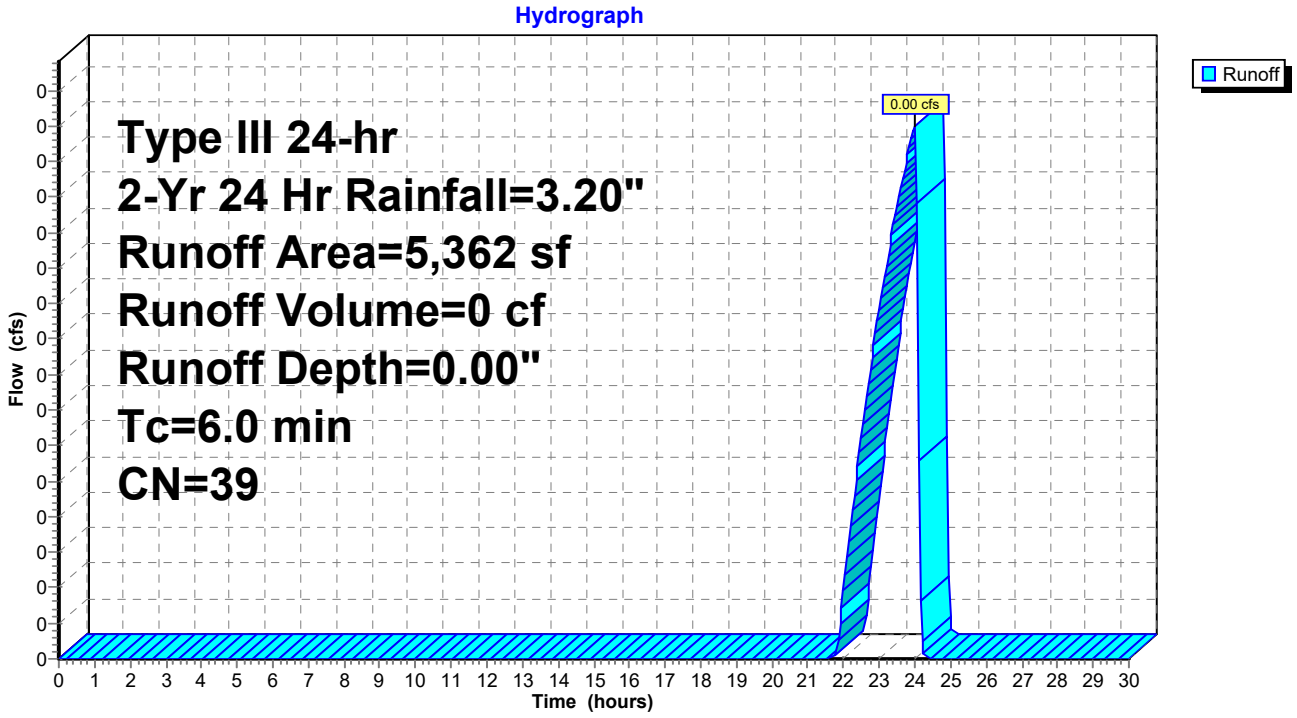
Runoff = 0.00 cfs @ 24.00 hrs, Volume= 0 cf, Depth= 0.00"
Routed to Reach DP-200 : WEST ABUTTER

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Yr 24 Hr Rainfall=3.20"

Area (sf)	CN	Description
5,362	39	>75% Grass cover, Good, HSG A
5,362		100.00% Pervious Area

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

Subcatchment 200: SC-200



Summary for Subcatchment 300: SC-300

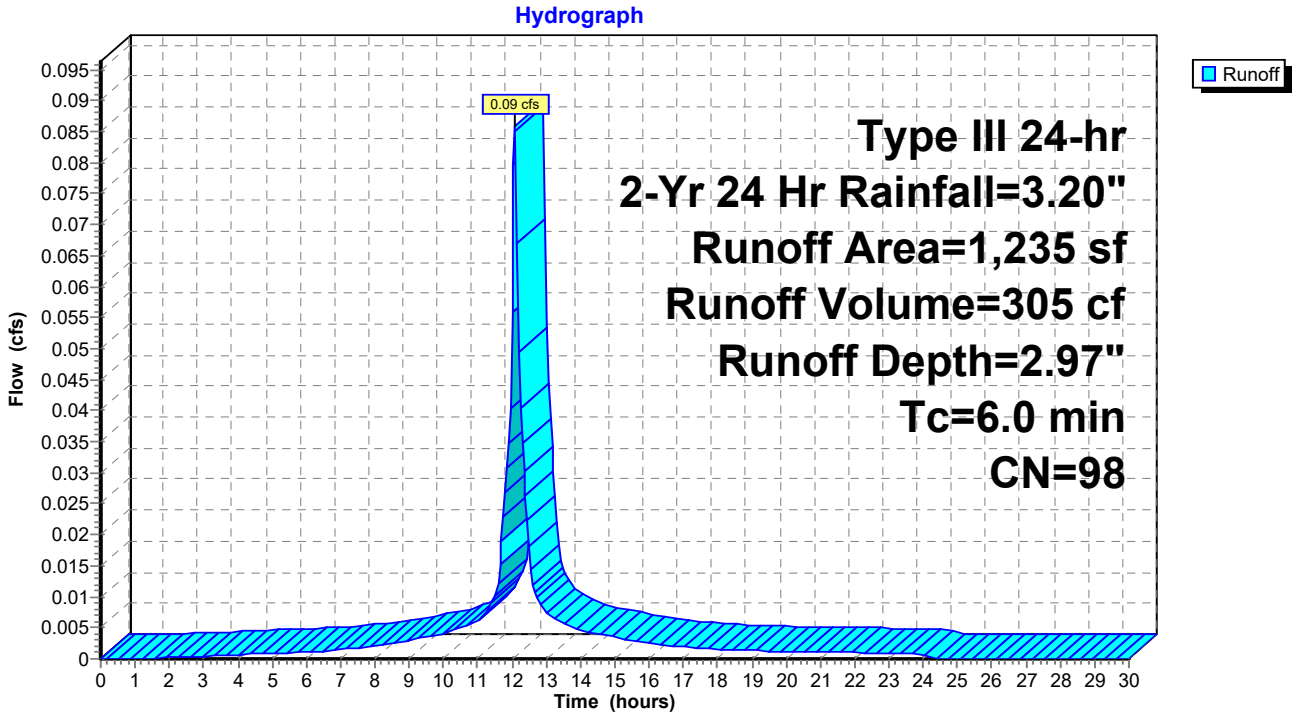
Runoff = 0.09 cfs @ 12.09 hrs, Volume= 305 cf, Depth= 2.97"
Routed to Pond 4P : PSIS-200

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Yr 24 Hr Rainfall=3.20"

Area (sf)	CN	Description
1,235	98	Roofs, HSG A
1,235		100.00% Impervious Area

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

Subcatchment 300: SC-300



Summary for Subcatchment ROOF B: BLDG

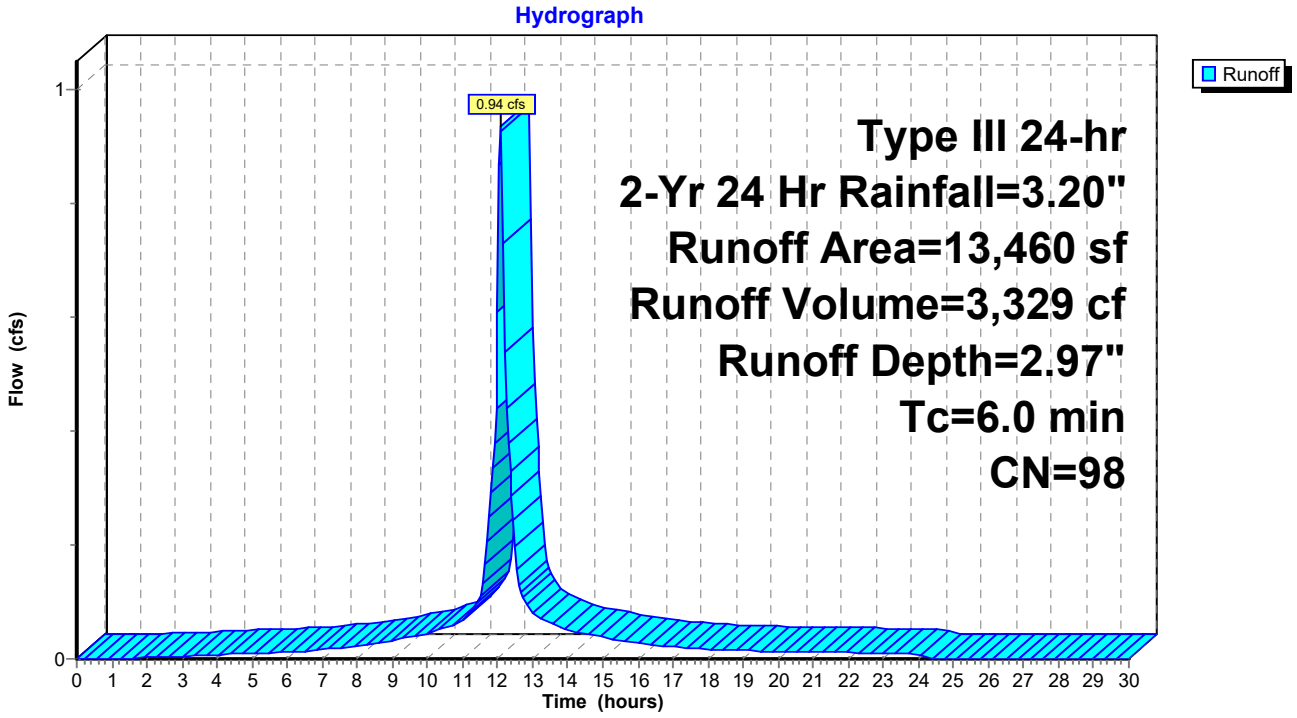
Runoff = 0.94 cfs @ 12.09 hrs, Volume= 3,329 cf, Depth= 2.97"
Routed to Pond 4P : PSIS-200

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Yr 24 Hr Rainfall=3.20"

	Area (sf)	CN	Description
*	13,460	98	Proposed Driveway/Walk
	13,460		100.00% Impervious Area

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

Subcatchment ROOF B: BLDG



Summary for Subcatchment ROOF F: FRONT ROOF

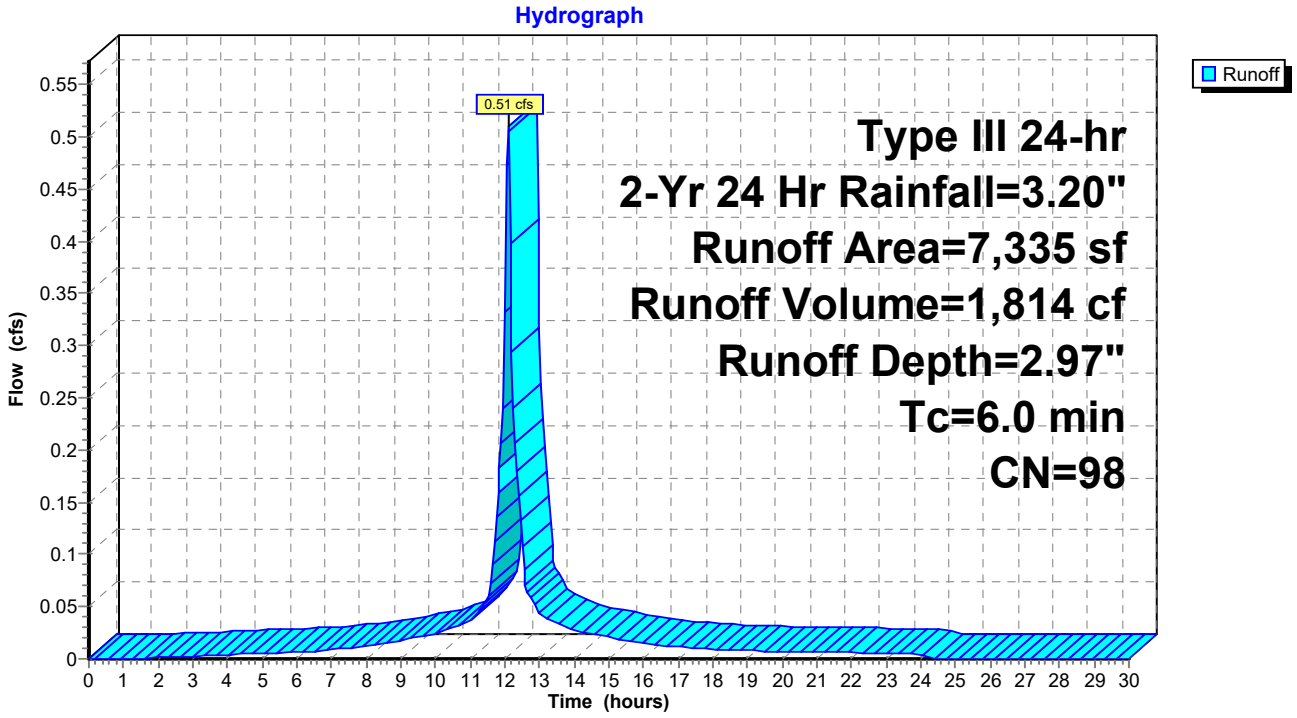
Runoff = 0.51 cfs @ 12.09 hrs, Volume= 1,814 cf, Depth= 2.97"
Routed to Pond P100 : PSIS-100

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Yr 24 Hr Rainfall=3.20"

Area (sf)	CN	Description
7,335	98	Roofs, HSG A
7,335		100.00% Impervious Area

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

Subcatchment ROOF F: FRONT ROOF



Summary for Subcatchment SC-PARK: PARKING

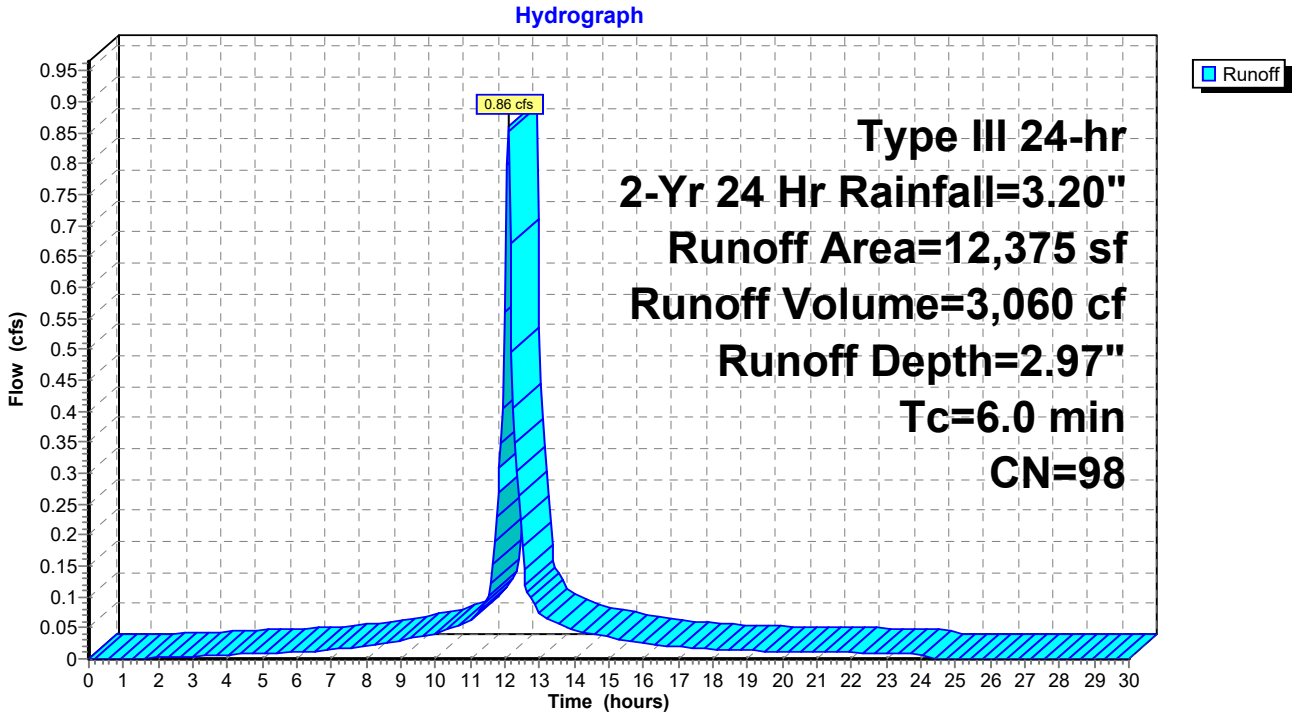
Runoff = 0.86 cfs @ 12.09 hrs, Volume= 3,060 cf, Depth= 2.97"
Routed to Pond 4P : PSIS-200

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Yr 24 Hr Rainfall=3.20"

Area (sf)	CN	Description
12,375	98	Paved parking, HSG A
12,375		100.00% Impervious Area

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

Subcatchment SC-PARK: PARKING

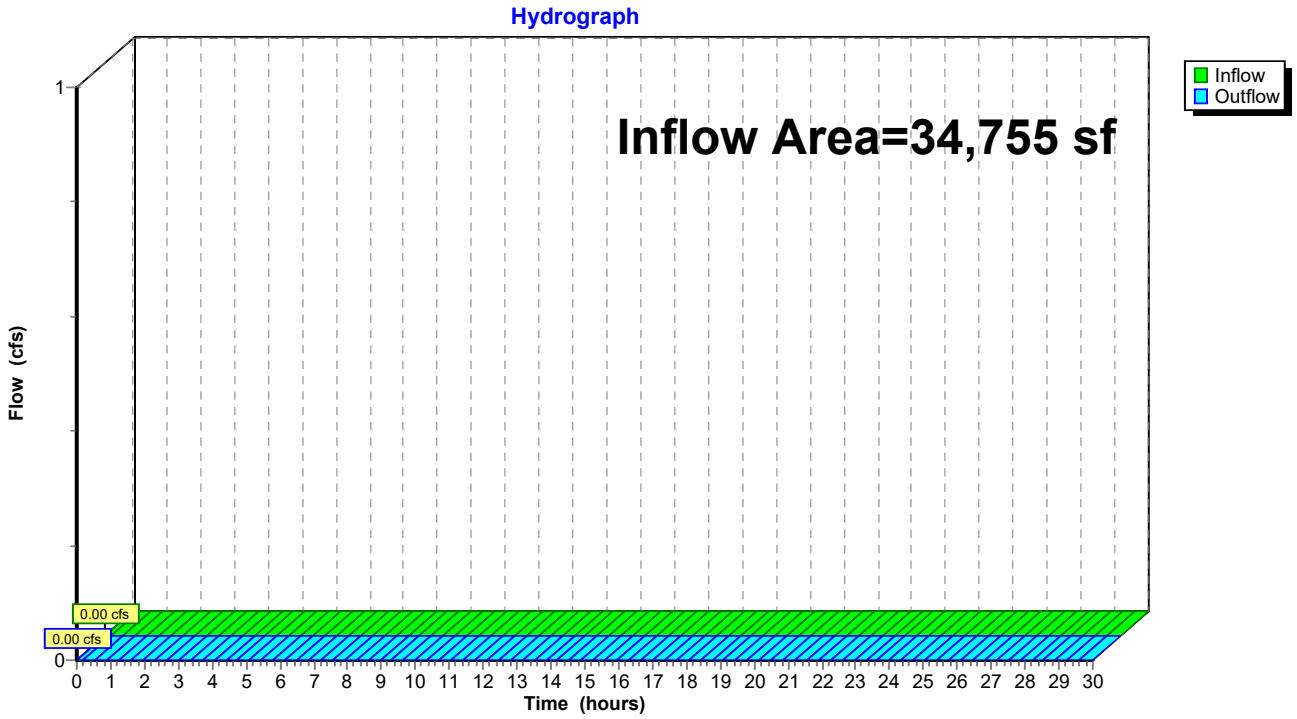


Summary for Reach DP-100: 200 FT RF

Inflow Area = 34,755 sf, 1.04% Impervious, Inflow Depth = 0.00" for 2-Yr 24 Hr event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Reach DP-100: 200 FT RF

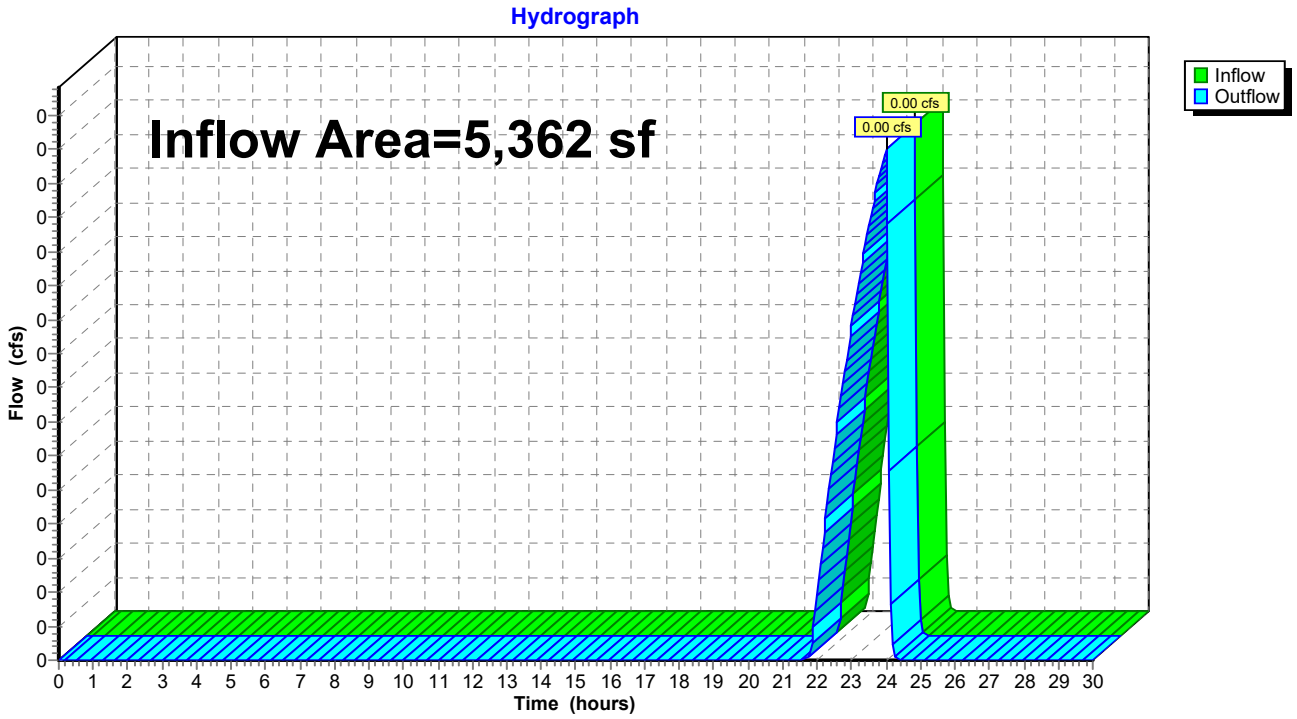


Summary for Reach DP-200: WEST ABUTTER

Inflow Area = 5,362 sf, 0.00% Impervious, Inflow Depth = 0.00" for 2-Yr 24 Hr event
Inflow = 0.00 cfs @ 24.00 hrs, Volume= 0 cf
Outflow = 0.00 cfs @ 24.00 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Reach DP-200: WEST ABUTTER



Summary for Pond 4P: PSIS-200

Inflow Area = 27,070 sf,100.00% Impervious, Inflow Depth = 2.97" for 2-Yr 24 Hr event
Inflow = 1.89 cfs @ 12.09 hrs, Volume= 6,694 cf
Outflow = 0.79 cfs @ 11.95 hrs, Volume= 6,694 cf, Atten= 58%, Lag= 0.0 min
Discarded = 0.79 cfs @ 11.95 hrs, Volume= 6,694 cf

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 109.02' @ 12.29 hrs Surf.Area= 4,101 sf Storage= 695 cf
Flood Elev= 110.93' Surf.Area= 4,101 sf Storage= 5,237 cf

Plug-Flow detention time= 3.8 min calculated for 6,683 cf (100% of inflow)
Center-of-Mass det. time= 3.8 min (760.2 - 756.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	108.60'	2,884 cf	**68.17'W x 60.16'L x 2.33'H Field A** 9,569 cf Overall - 2,359 cf Embedded = 7,210 cf x 40.0% Voids
#2A	109.10'	2,359 cf	**ADS_StormTech SC-310 +Cap** x 160 Inside #1 Effective Size= 28.9"W x 16.0"H => 2.07 sf x 7.12'L = 14.7 cf Overall Size= 34.0"W x 16.0"H x 7.56'L with 0.44' Overlap 160 Chambers in 20 Rows
		5,243 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	108.60'	**8.270 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.79 cfs @ 11.95 hrs HW=108.63' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.79 cfs)

Pond 4P: PSIS-200 - Chamber Wizard Field A

Chamber Model = ADS_StormTech SC-310 +Cap (ADS StormTech® SC-310 with cap length)
Effective Size= 28.9"W x 16.0"H => 2.07 sf x 7.12'L = 14.7 cf
Overall Size= 34.0"W x 16.0"H x 7.56'L with 0.44' Overlap

34.0" Wide + 6.0" Spacing = 40.0" C-C Row Spacing

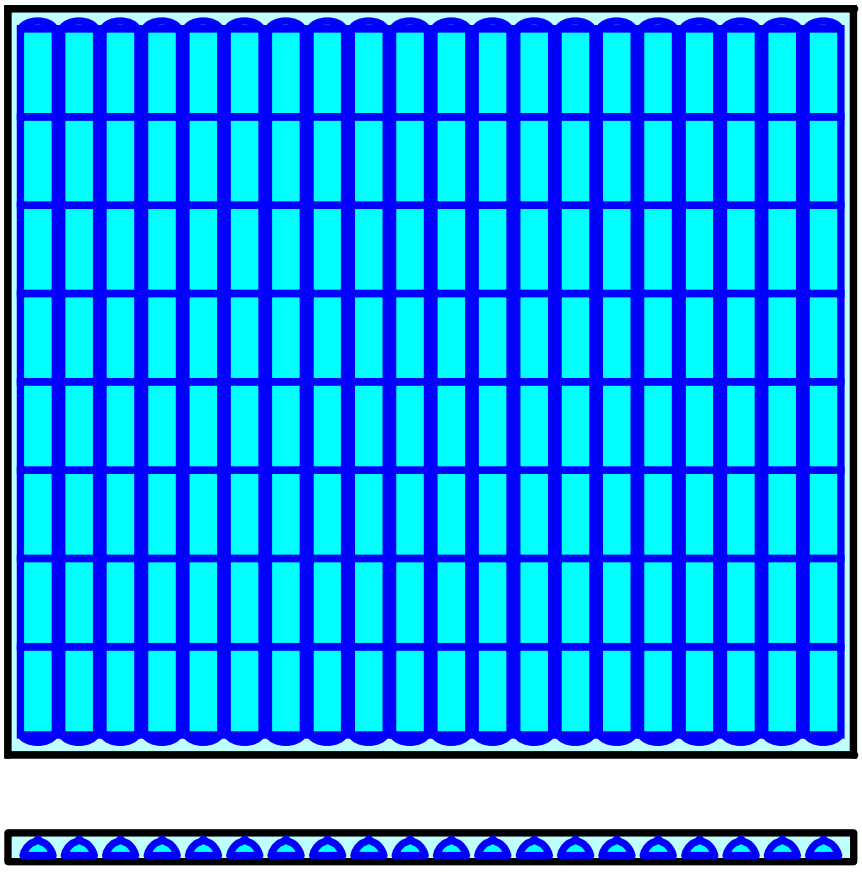
8 Chambers/Row x 7.12' Long +0.60' Cap Length x 2 = 58.16' Row Length +12.0" End Stone x 2 = 60.16' Base Length
20 Rows x 34.0" Wide + 6.0" Spacing x 19 + 12.0" Side Stone x 2 = 68.17' Base Width
6.0" Stone Base + 16.0" Chamber Height + 6.0" Stone Cover = 2.33' Field Height

160 Chambers x 14.7 cf = 2,358.7 cf Chamber Storage

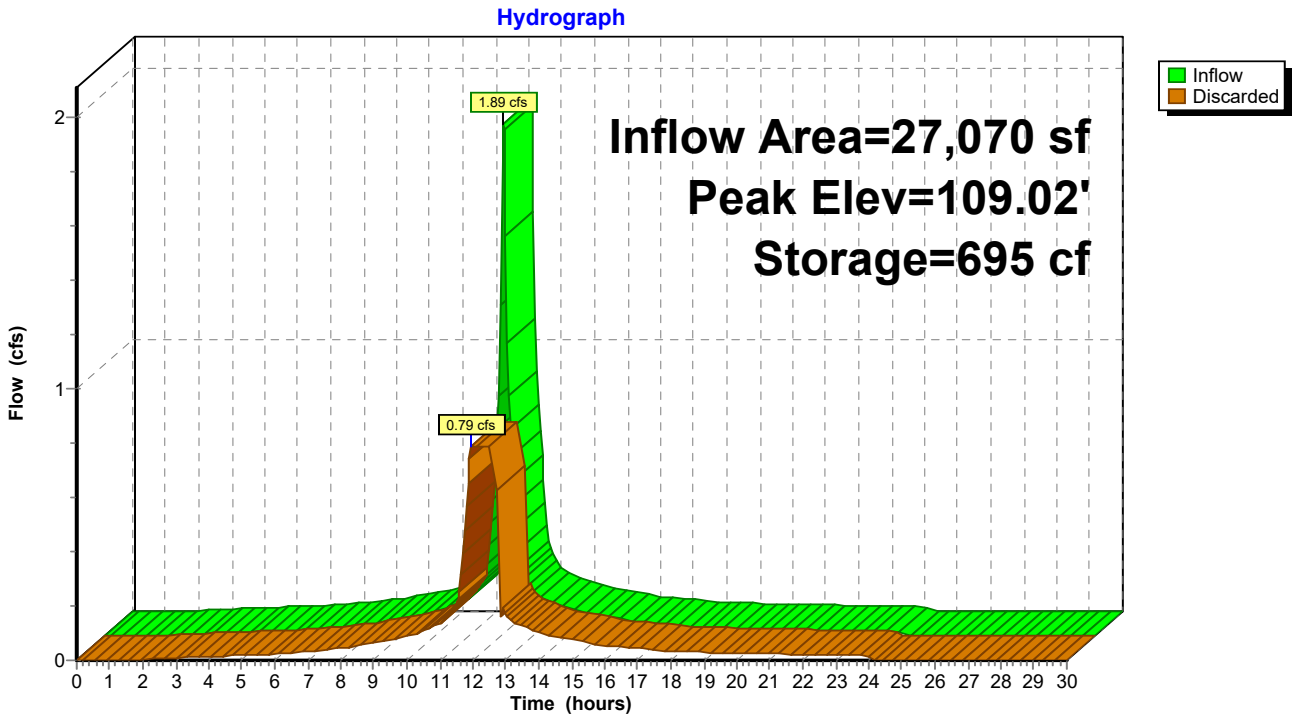
9,568.8 cf Field - 2,358.7 cf Chambers = 7,210.1 cf Stone x 40.0% Voids = 2,884.0 cf Stone Storage

Chamber Storage + Stone Storage = 5,242.7 cf = 0.120 af
Overall Storage Efficiency = 54.8%
Overall System Size = 60.16' x 68.17' x 2.33'

160 Chambers
354.4 cy Field
267.0 cy Stone



Pond 4P: PSIS-200



Summary for Pond P100: PSIS-100

Inflow Area = 7,335 sf,100.00% Impervious, Inflow Depth = 2.97" for 2-Yr 24 Hr event
Inflow = 0.51 cfs @ 12.09 hrs, Volume= 1,814 cf
Outflow = 0.16 cfs @ 11.85 hrs, Volume= 1,814 cf, Atten= 68%, Lag= 0.0 min
Discarded = 0.16 cfs @ 11.85 hrs, Volume= 1,814 cf

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 109.46' @ 12.39 hrs Surf.Area= 842 sf Storage= 279 cf
Flood Elev= 112.30' Surf.Area= 842 sf Storage= 1,771 cf

Plug-Flow detention time= 7.9 min calculated for 1,811 cf (100% of inflow)
Center-of-Mass det. time= 7.9 min (764.3 - 756.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	108.80'	784 cf	**15.75'W x 53.46'L x 3.50'H Field A** 2,947 cf Overall - 987 cf Embedded = 1,960 cf x 40.0% Voids
#2A	109.30'	987 cf	**ADS_StormTech DC-780 b +Cap** x 21 Inside #1 Effective Size= 45.4"W x 30.0"H => 6.49 sf x 7.12'L = 46.2 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 21 Chambers in 3 Rows Cap Storage= 2.7 cf x 2 x 3 rows = 15.9 cf
		1,771 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	108.80'	**8.270 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.16 cfs @ 11.85 hrs HW=108.84' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.16 cfs)

Pond P100: PSIS-100 - Chamber Wizard Field A

Chamber Model = ADS_StormTech DC-780 b +Cap (ADS StormTech® DC-780 with cap storage)
Effective Size= 45.4"W x 30.0"H => 6.49 sf x 7.12'L = 46.2 cf
Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap
Cap Storage= 2.7 cf x 2 x 3 rows = 15.9 cf

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

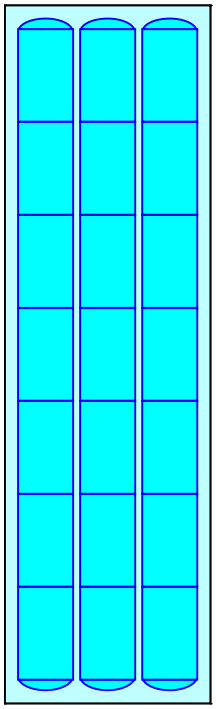
7 Chambers/Row x 7.12' Long +0.81' Cap Length x 2 = 51.46' Row Length +12.0" End Stone x 2 = 53.46' Base Length
3 Rows x 51.0" Wide + 6.0" Spacing x 2 + 12.0" Side Stone x 2 = 15.75' Base Width
6.0" Stone Base + 30.0" Chamber Height + 6.0" Stone Cover = 3.50' Field Height

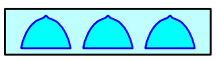
21 Chambers x 46.2 cf + 2.7 cf Cap Volume x 2 x 3 Rows = 987.0 cf Chamber Storage

2,946.8 cf Field - 987.0 cf Chambers = 1,959.8 cf Stone x 40.0% Voids = 783.9 cf Stone Storage

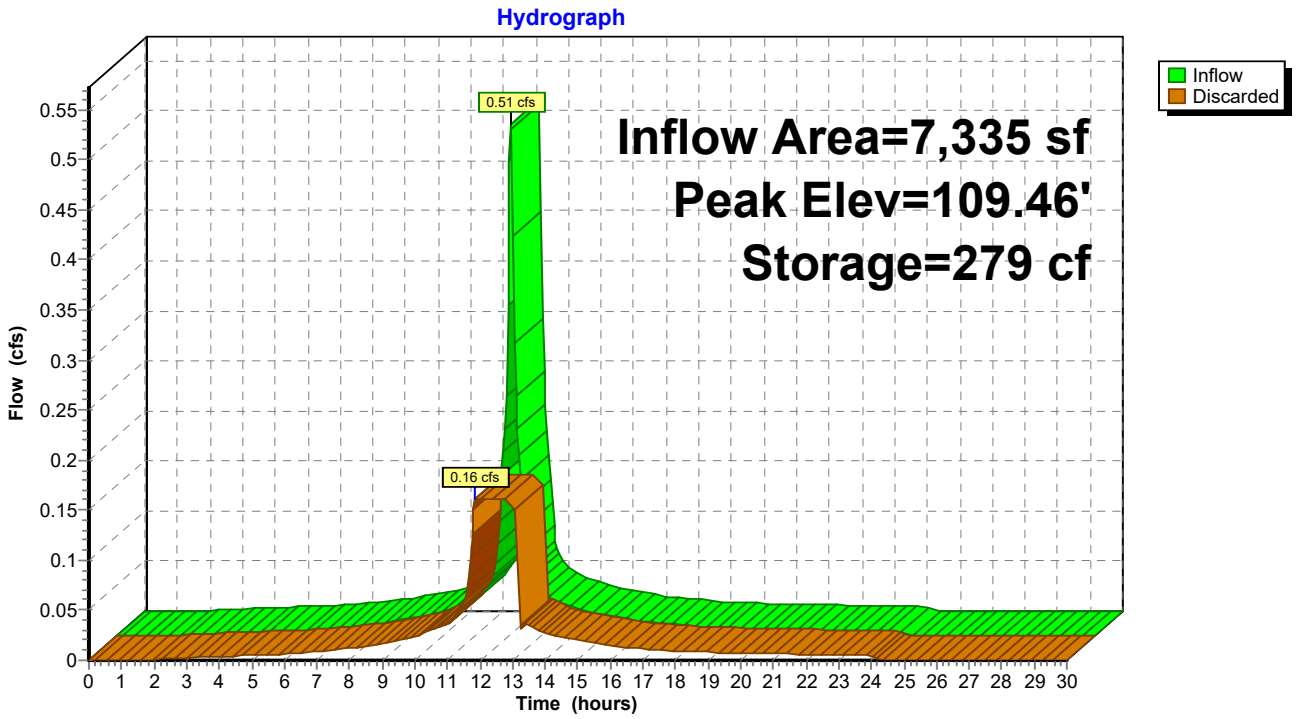
Chamber Storage + Stone Storage = 1,770.9 cf = 0.041 af
Overall Storage Efficiency = 60.1%
Overall System Size = 53.46' x 15.75' x 3.50'

21 Chambers
109.1 cy Field
72.6 cy Stone





Pond P100: PSIS-100



Summary for Subcatchment 100: SC-100

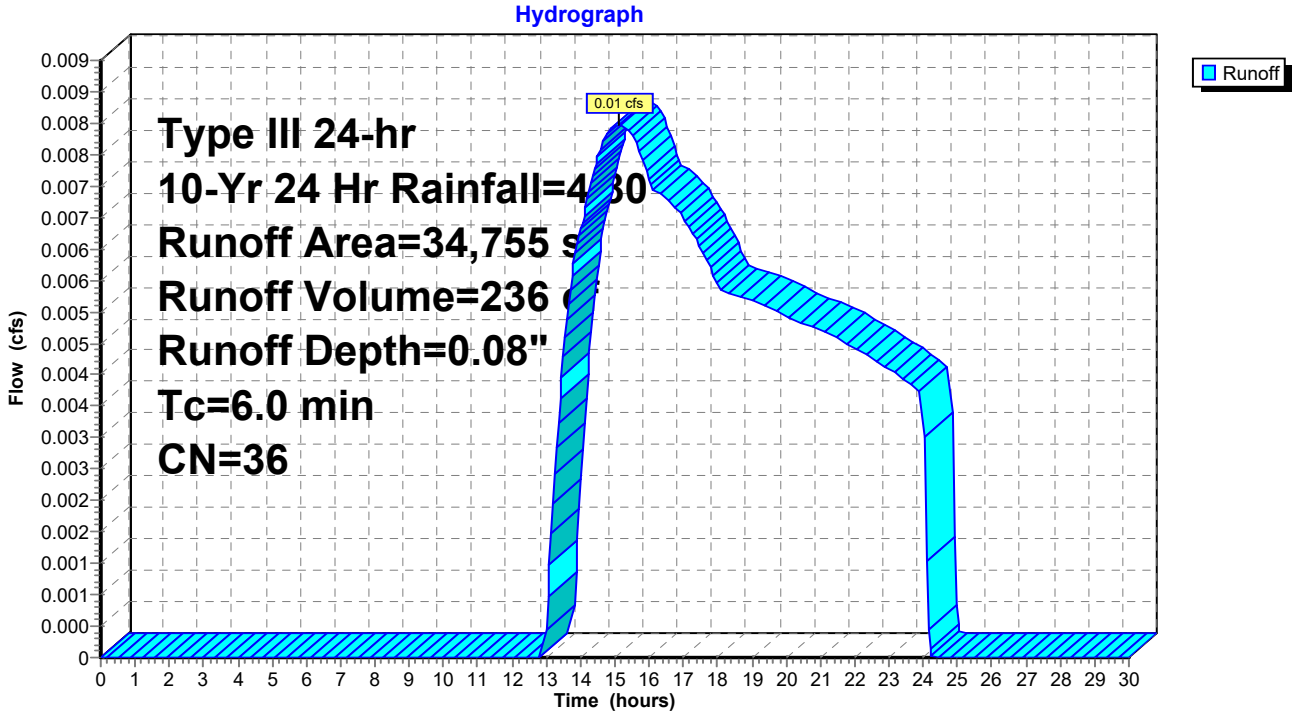
Runoff = 0.01 cfs @ 15.13 hrs, Volume= 236 cf, Depth= 0.08"
Routed to Reach DP-100 : 200 FT RF

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Yr 24 Hr Rainfall=4.80"

Area (sf)	CN	Description
18,813	39	>75% Grass cover, Good, HSG A
15,580	32	Woods/grass comb., Good, HSG A
362	98	Paved parking, HSG A
34,755	36	Weighted Average
34,393		98.96% Pervious Area
362		1.04% Impervious Area

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

Subcatchment 100: SC-100



Summary for Subcatchment 200: SC-200

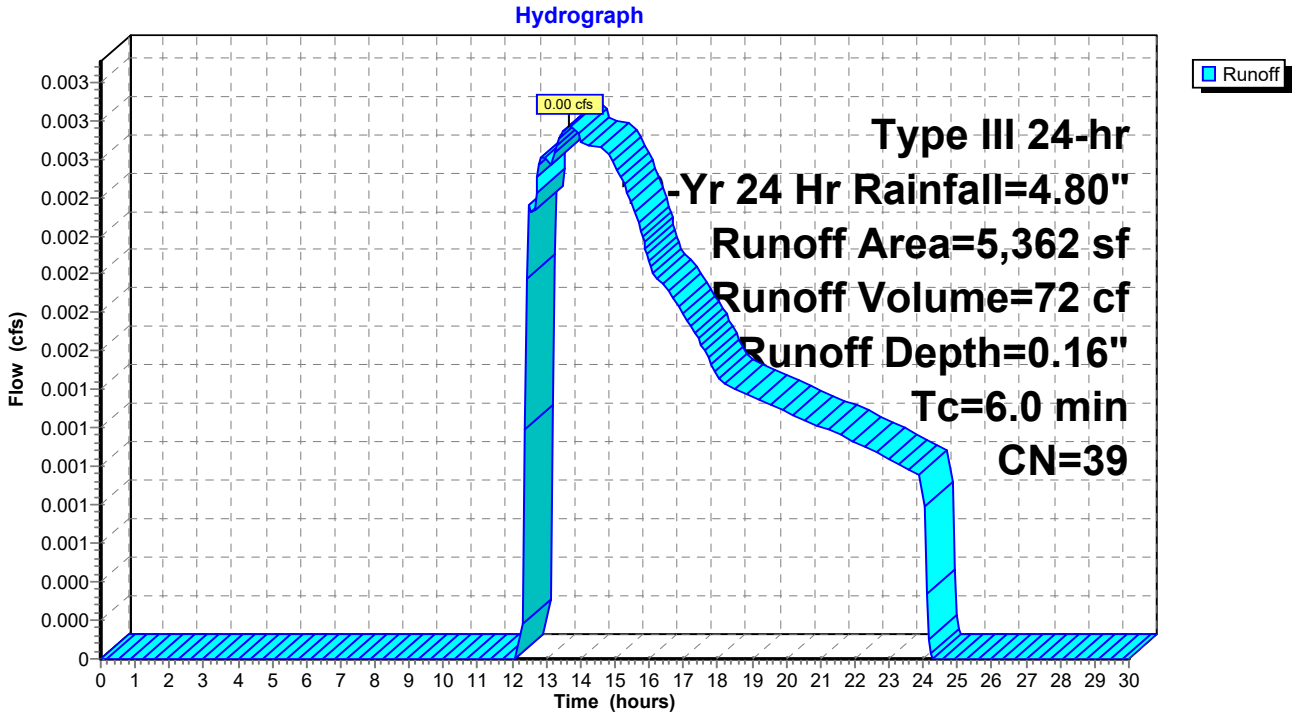
Runoff = 0.00 cfs @ 13.67 hrs, Volume= 72 cf, Depth= 0.16"
Routed to Reach DP-200 : WEST ABUTTER

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Yr 24 Hr Rainfall=4.80"

Area (sf)	CN	Description
5,362	39	>75% Grass cover, Good, HSG A
5,362		100.00% Pervious Area

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

Subcatchment 200: SC-200



Summary for Subcatchment 300: SC-300

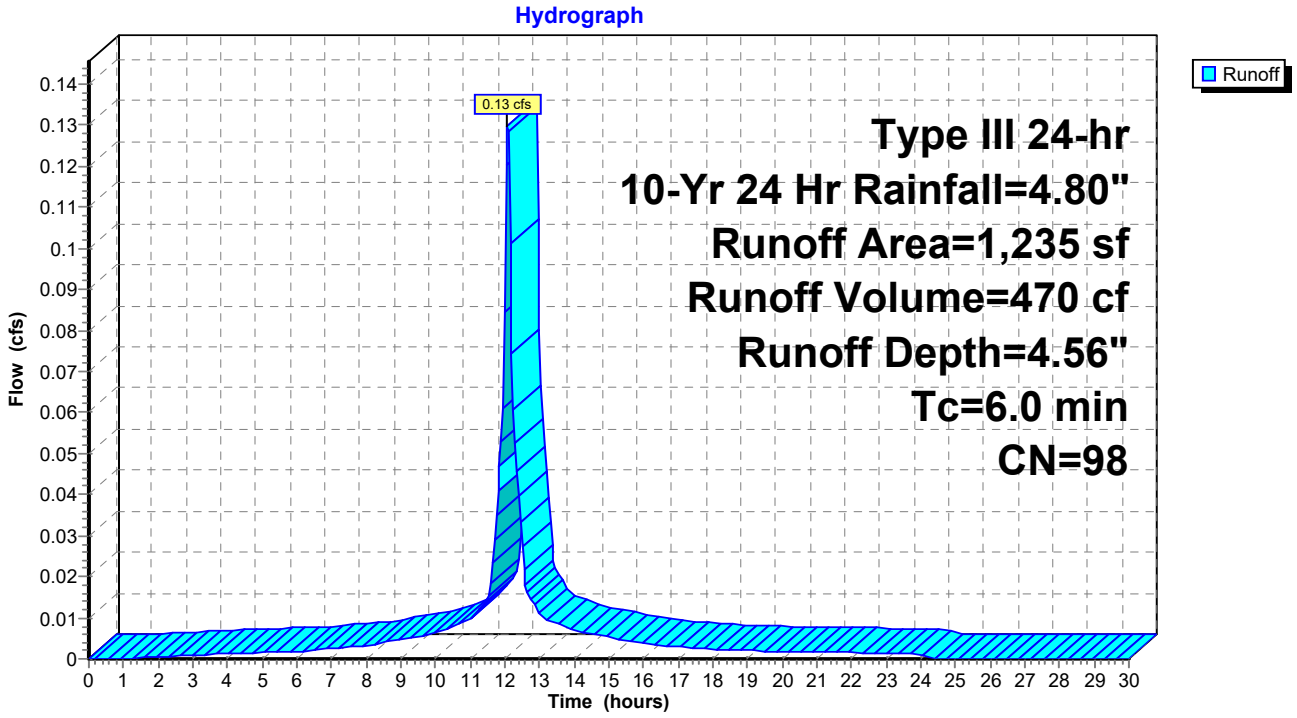
Runoff = 0.13 cfs @ 12.09 hrs, Volume= 470 cf, Depth= 4.56"
Routed to Pond 4P : PSIS-200

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Yr 24 Hr Rainfall=4.80"

Area (sf)	CN	Description
1,235	98	Roofs, HSG A
1,235		100.00% Impervious Area

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

Subcatchment 300: SC-300



Summary for Subcatchment ROOF B: BLDG

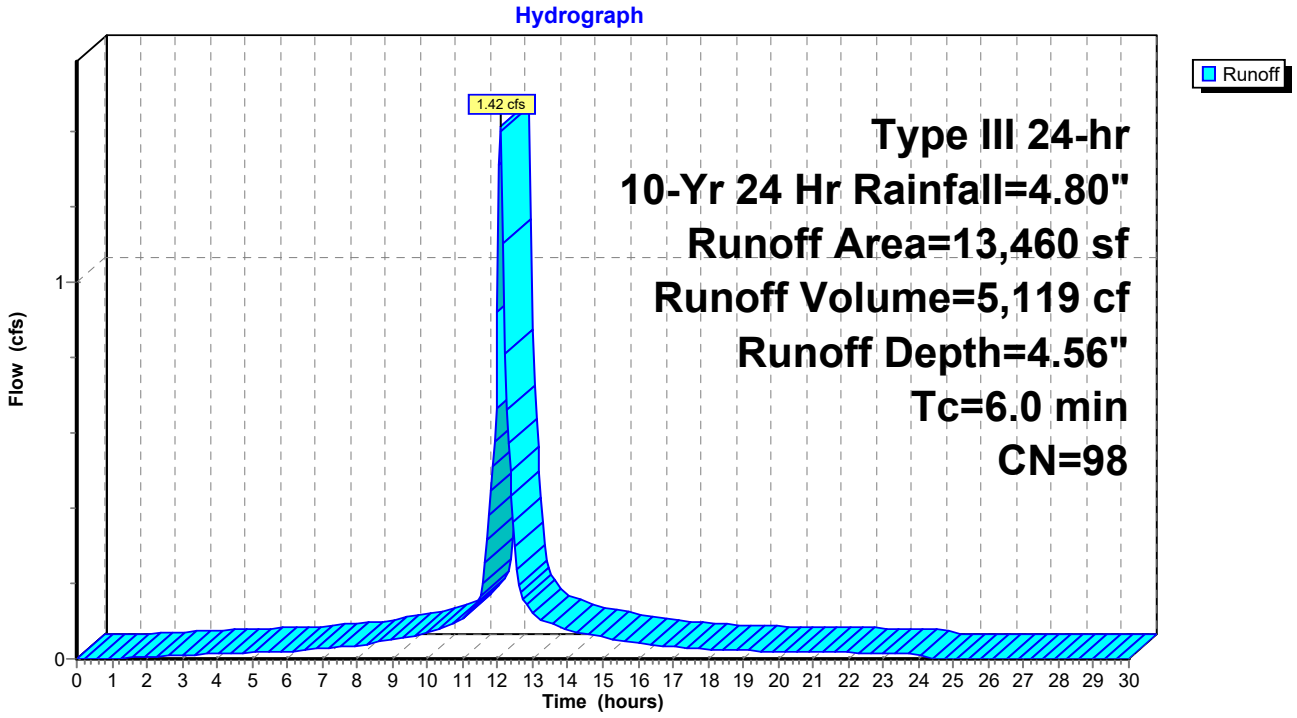
Runoff = 1.42 cfs @ 12.09 hrs, Volume= 5,119 cf, Depth= 4.56"
Routed to Pond 4P : PSIS-200

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Yr 24 Hr Rainfall=4.80"

	Area (sf)	CN	Description
*	13,460	98	Proposed Driveway/Walk
	13,460		100.00% Impervious Area

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

Subcatchment ROOF B: BLDG



Summary for Subcatchment ROOF F: FRONT ROOF

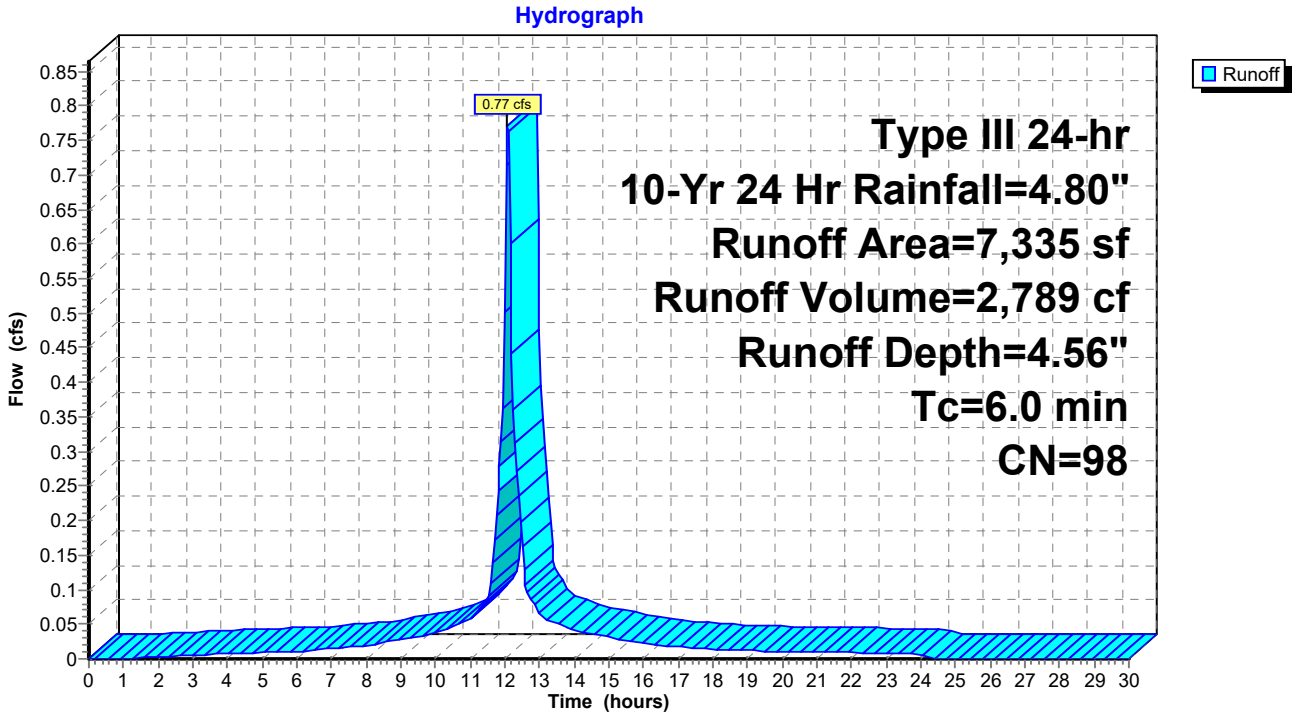
Runoff = 0.77 cfs @ 12.09 hrs, Volume= 2,789 cf, Depth= 4.56"
Routed to Pond P100 : PSIS-100

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Yr 24 Hr Rainfall=4.80"

Area (sf)	CN	Description
7,335	98	Roofs, HSG A
7,335		100.00% Impervious Area

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

Subcatchment ROOF F: FRONT ROOF



Summary for Subcatchment SC-PARK: PARKING

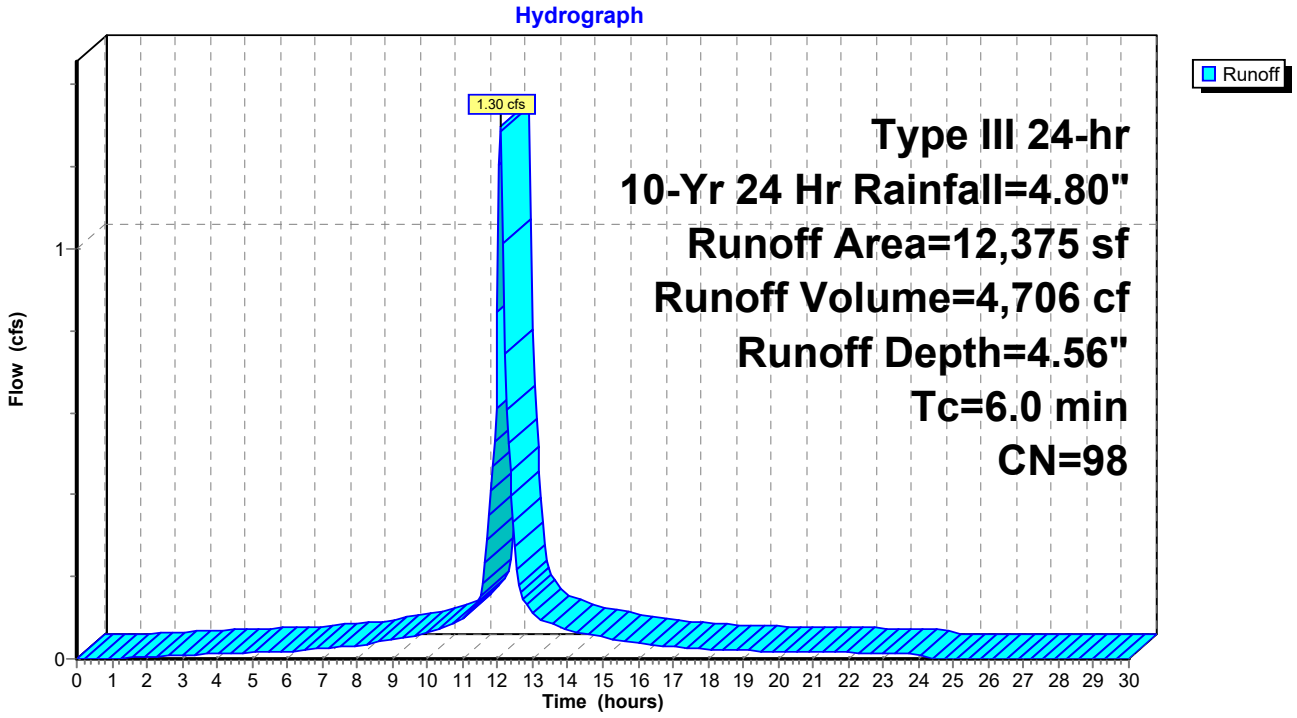
Runoff = 1.30 cfs @ 12.09 hrs, Volume= 4,706 cf, Depth= 4.56"
Routed to Pond 4P : PSIS-200

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Yr 24 Hr Rainfall=4.80"

Area (sf)	CN	Description
12,375	98	Paved parking, HSG A
12,375		100.00% Impervious Area

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

Subcatchment SC-PARK: PARKING

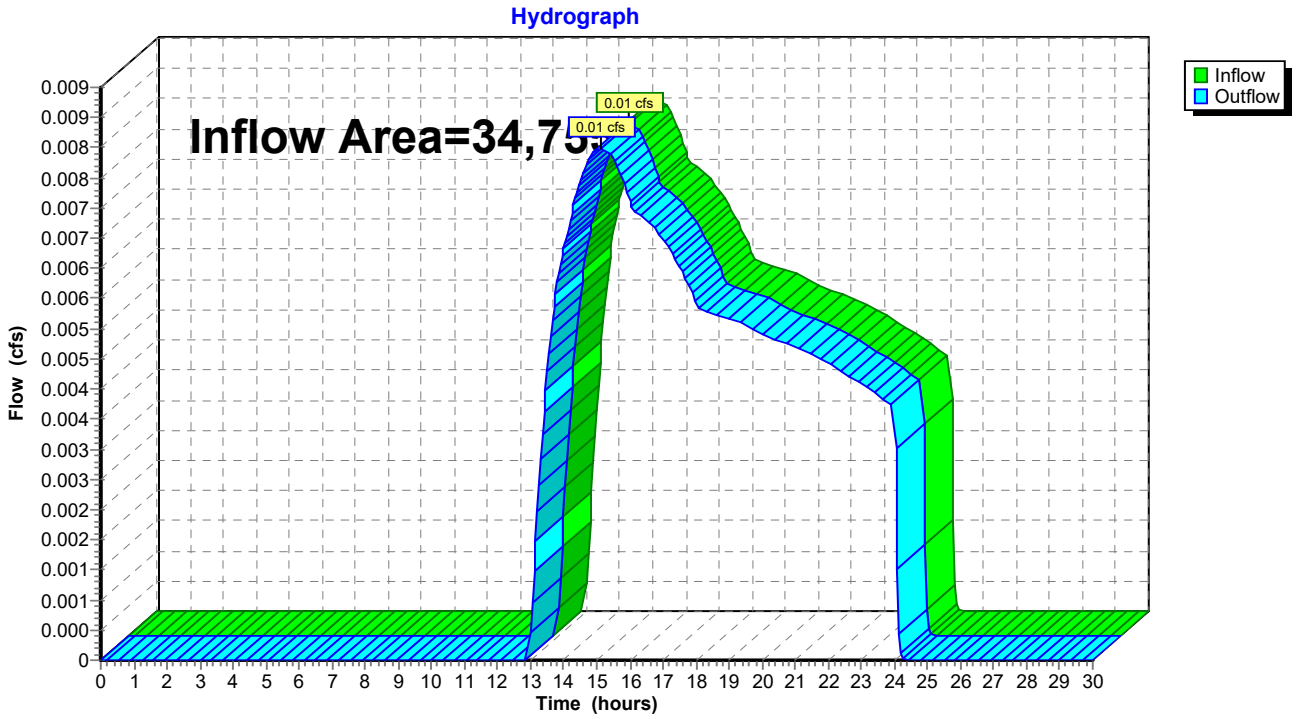


Summary for Reach DP-100: 200 FT RF

Inflow Area = 34,755 sf, 1.04% Impervious, Inflow Depth = 0.08" for 10-Yr 24 Hr event
Inflow = 0.01 cfs @ 15.13 hrs, Volume= 236 cf
Outflow = 0.01 cfs @ 15.13 hrs, Volume= 236 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Reach DP-100: 200 FT RF

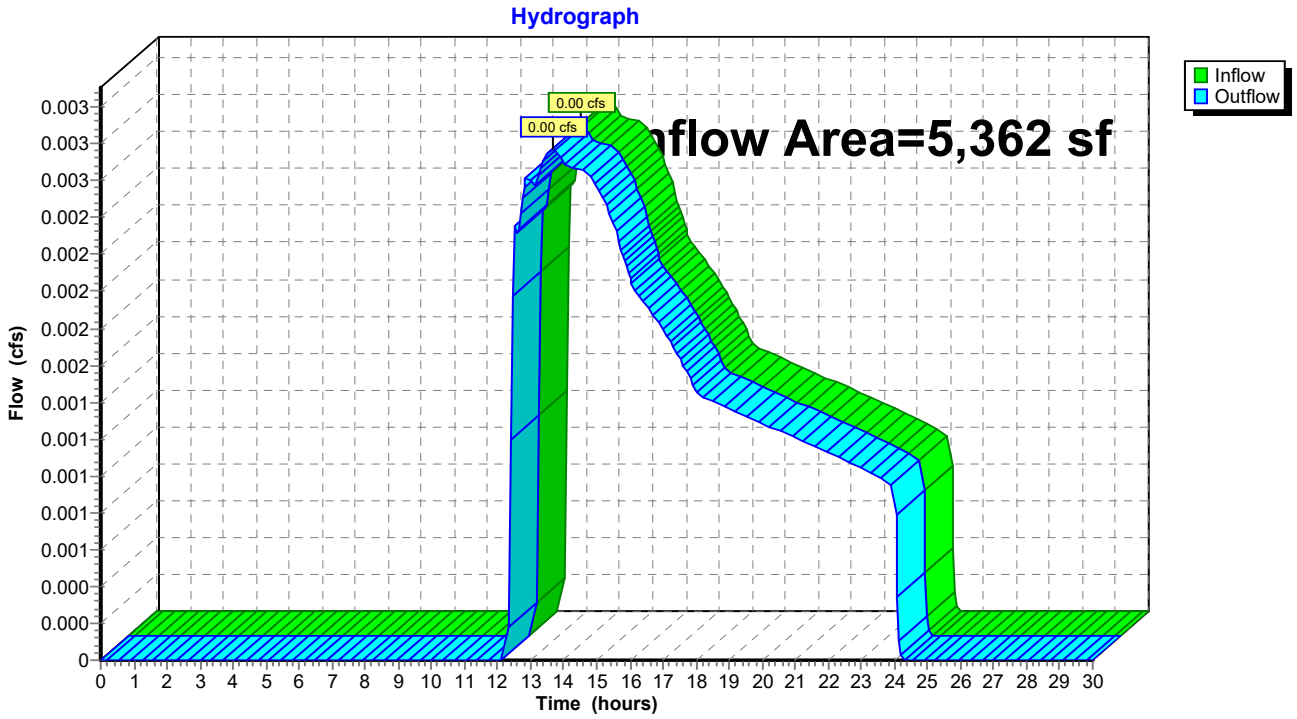


Summary for Reach DP-200: WEST ABUTTER

Inflow Area = 5,362 sf, 0.00% Impervious, Inflow Depth = 0.16" for 10-Yr 24 Hr event
Inflow = 0.00 cfs @ 13.67 hrs, Volume= 72 cf
Outflow = 0.00 cfs @ 13.67 hrs, Volume= 72 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Reach DP-200: WEST ABUTTER



Summary for Pond 4P: PSIS-200

Inflow Area = 27,070 sf,100.00% Impervious, Inflow Depth = 4.56" for 10-Yr 24 Hr event
Inflow = 2.85 cfs @ 12.09 hrs, Volume= 10,294 cf
Outflow = 0.79 cfs @ 11.80 hrs, Volume= 10,294 cf, Atten= 72%, Lag= 0.0 min
Discarded = 0.79 cfs @ 11.80 hrs, Volume= 10,294 cf

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 109.40' @ 12.43 hrs Surf.Area= 4,101 sf Storage= 1,786 cf
Flood Elev= 110.93' Surf.Area= 4,101 sf Storage= 5,237 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 10.1 min (758.9 - 748.7)

Volume	Invert	Avail.Storage	Storage Description
#1A	108.60'	2,884 cf	**68.17'W x 60.16'L x 2.33'H Field A** 9,569 cf Overall - 2,359 cf Embedded = 7,210 cf x 40.0% Voids
#2A	109.10'	2,359 cf	**ADS_StormTech SC-310 +Cap** x 160 Inside #1 Effective Size= 28.9"W x 16.0"H => 2.07 sf x 7.12'L = 14.7 cf Overall Size= 34.0"W x 16.0"H x 7.56'L with 0.44' Overlap 160 Chambers in 20 Rows
		5,243 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	108.60'	**8.270 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.79 cfs @ 11.80 hrs HW=108.63' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.79 cfs)

Pond 4P: PSIS-200 - Chamber Wizard Field A

Chamber Model = ADS_StormTech SC-310 +Cap (ADS StormTech® SC-310 with cap length)
Effective Size= 28.9"W x 16.0"H => 2.07 sf x 7.12'L = 14.7 cf
Overall Size= 34.0"W x 16.0"H x 7.56'L with 0.44' Overlap

34.0" Wide + 6.0" Spacing = 40.0" C-C Row Spacing

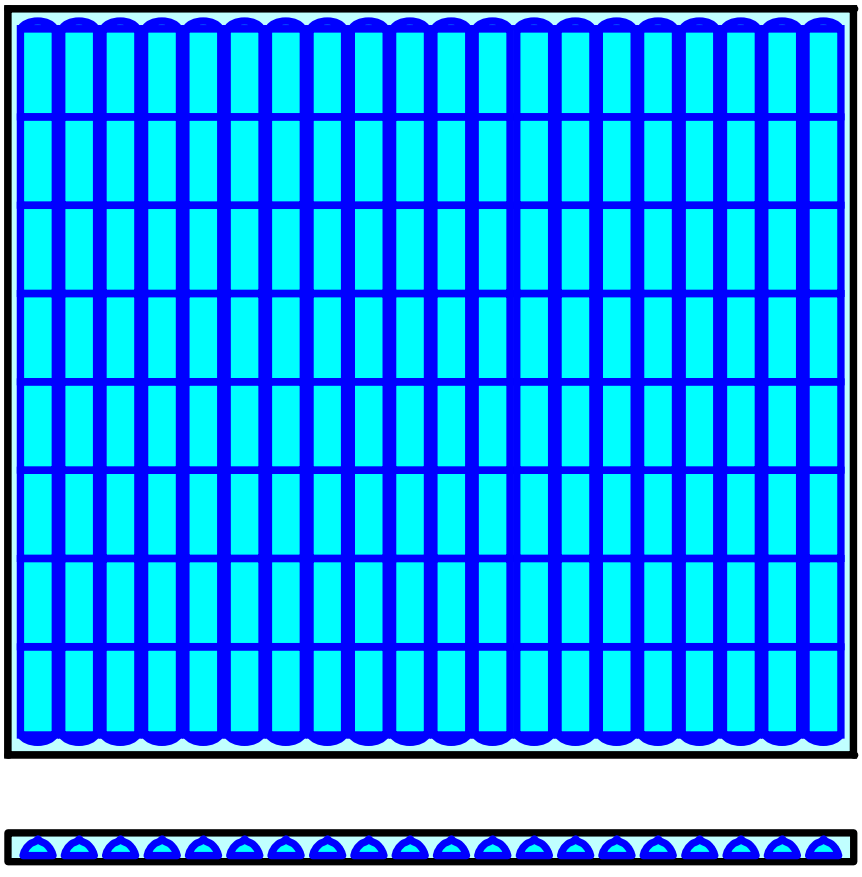
8 Chambers/Row x 7.12' Long +0.60' Cap Length x 2 = 58.16' Row Length +12.0" End Stone x 2 = 60.16' Base Length
20 Rows x 34.0" Wide + 6.0" Spacing x 19 + 12.0" Side Stone x 2 = 68.17' Base Width
6.0" Stone Base + 16.0" Chamber Height + 6.0" Stone Cover = 2.33' Field Height

160 Chambers x 14.7 cf = 2,358.7 cf Chamber Storage

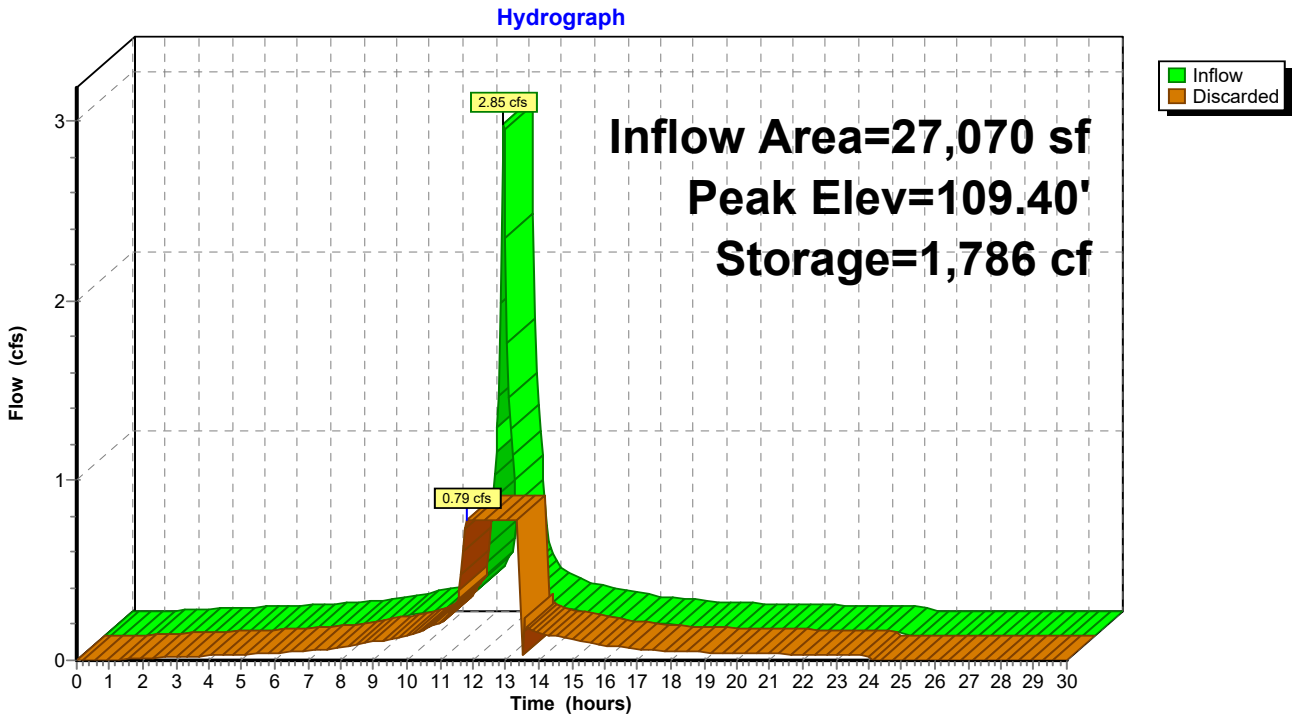
9,568.8 cf Field - 2,358.7 cf Chambers = 7,210.1 cf Stone x 40.0% Voids = 2,884.0 cf Stone Storage

Chamber Storage + Stone Storage = 5,242.7 cf = 0.120 af
Overall Storage Efficiency = 54.8%
Overall System Size = 60.16' x 68.17' x 2.33'

160 Chambers
354.4 cy Field
267.0 cy Stone



Pond 4P: PSIS-200



Summary for Pond P100: PSIS-100

Inflow Area = 7,335 sf,100.00% Impervious, Inflow Depth = 4.56" for 10-Yr 24 Hr event
Inflow = 0.77 cfs @ 12.09 hrs, Volume= 2,789 cf
Outflow = 0.16 cfs @ 11.75 hrs, Volume= 2,789 cf, Atten= 79%, Lag= 0.0 min
Discarded = 0.16 cfs @ 11.75 hrs, Volume= 2,789 cf

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 109.98' @ 12.50 hrs Surf.Area= 842 sf Storage= 623 cf
Flood Elev= 112.30' Surf.Area= 842 sf Storage= 1,771 cf

Plug-Flow detention time= 19.2 min calculated for 2,785 cf (100% of inflow)
Center-of-Mass det. time= 19.2 min (767.9 - 748.7)

Volume	Invert	Avail.Storage	Storage Description
#1A	108.80'	784 cf	**15.75'W x 53.46'L x 3.50'H Field A** 2,947 cf Overall - 987 cf Embedded = 1,960 cf x 40.0% Voids
#2A	109.30'	987 cf	**ADS_StormTech DC-780 b +Cap** x 21 Inside #1 Effective Size= 45.4"W x 30.0"H => 6.49 sf x 7.12'L = 46.2 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 21 Chambers in 3 Rows Cap Storage= 2.7 cf x 2 x 3 rows = 15.9 cf
		1,771 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	108.80'	**8.270 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.16 cfs @ 11.75 hrs HW=108.85' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.16 cfs)

Pond P100: PSIS-100 - Chamber Wizard Field A

Chamber Model = ADS_StormTech DC-780 b +Cap (ADS StormTech® DC-780 with cap storage)
Effective Size= 45.4"W x 30.0"H => 6.49 sf x 7.12'L = 46.2 cf
Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap
Cap Storage= 2.7 cf x 2 x 3 rows = 15.9 cf

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

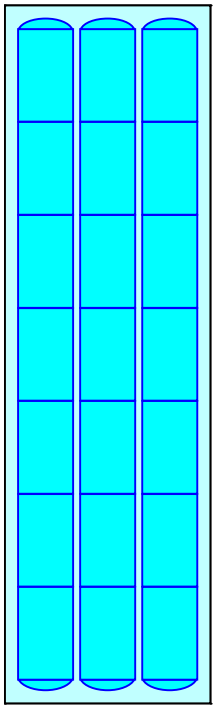
7 Chambers/Row x 7.12' Long +0.81' Cap Length x 2 = 51.46' Row Length +12.0" End Stone x 2 = 53.46' Base Length
3 Rows x 51.0" Wide + 6.0" Spacing x 2 + 12.0" Side Stone x 2 = 15.75' Base Width
6.0" Stone Base + 30.0" Chamber Height + 6.0" Stone Cover = 3.50' Field Height

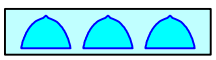
21 Chambers x 46.2 cf + 2.7 cf Cap Volume x 2 x 3 Rows = 987.0 cf Chamber Storage

2,946.8 cf Field - 987.0 cf Chambers = 1,959.8 cf Stone x 40.0% Voids = 783.9 cf Stone Storage

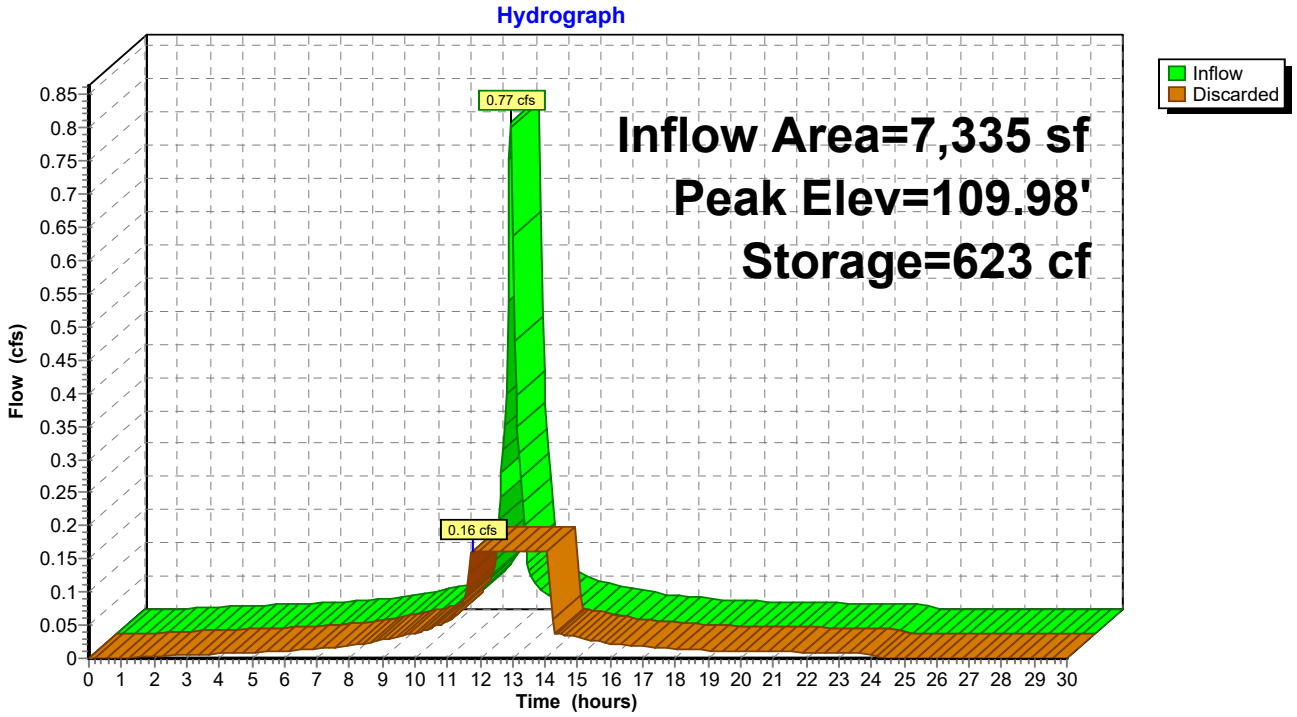
Chamber Storage + Stone Storage = 1,770.9 cf = 0.041 af
Overall Storage Efficiency = 60.1%
Overall System Size = 53.46' x 15.75' x 3.50'

21 Chambers
109.1 cy Field
72.6 cy Stone





Pond P100: PSIS-100



Summary for Subcatchment 100: SC-100

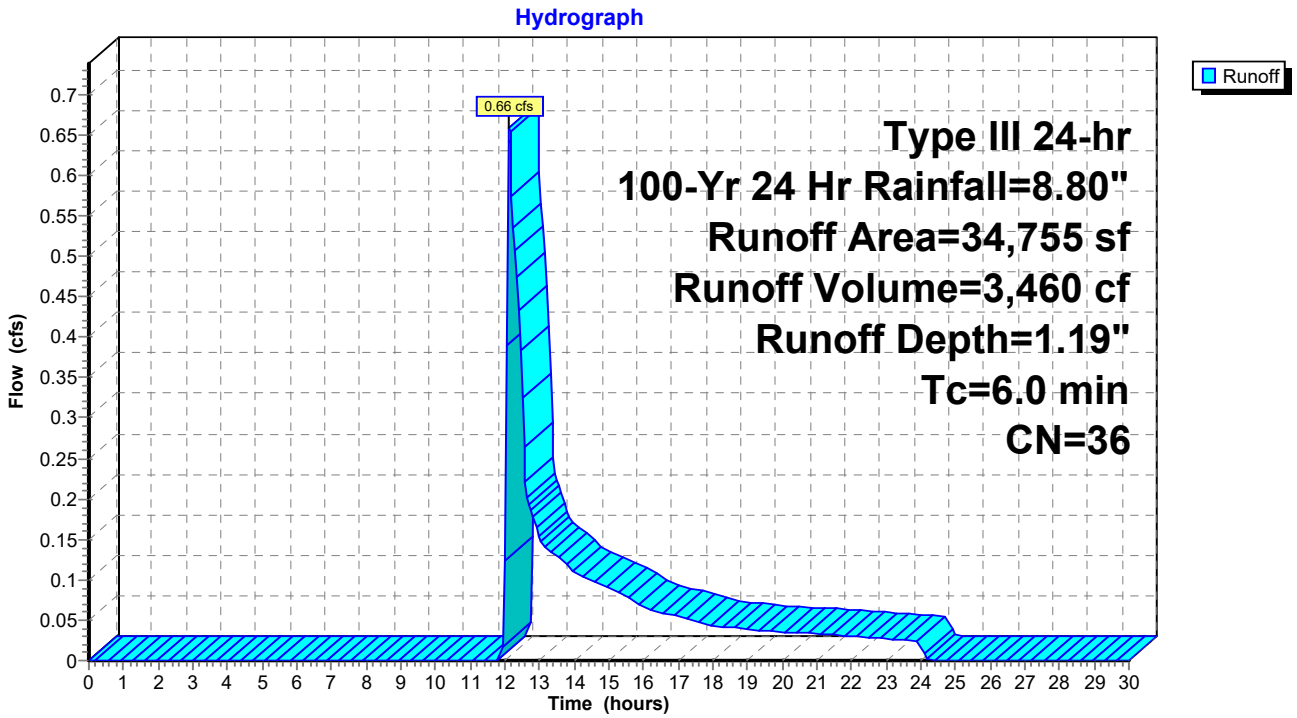
Runoff = 0.66 cfs @ 12.13 hrs, Volume= 3,460 cf, Depth= 1.19"
Routed to Reach DP-100 : 200 FT RF

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Yr 24 Hr Rainfall=8.80"

Area (sf)	CN	Description
18,813	39	>75% Grass cover, Good, HSG A
15,580	32	Woods/grass comb., Good, HSG A
362	98	Paved parking, HSG A
34,755	36	Weighted Average
34,393		98.96% Pervious Area
362		1.04% Impervious Area

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

Subcatchment 100: SC-100



Summary for Subcatchment 200: SC-200

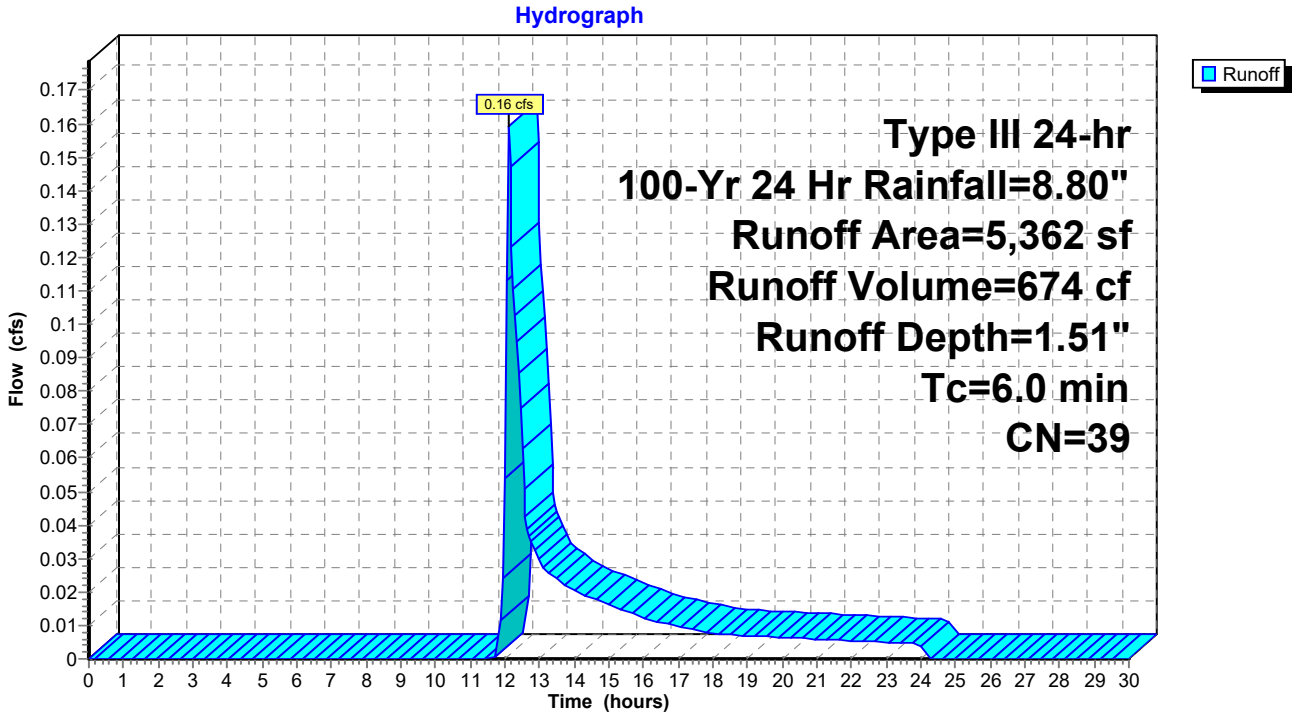
Runoff = 0.16 cfs @ 12.12 hrs, Volume= 674 cf, Depth= 1.51"
Routed to Reach DP-200 : WEST ABUTTER

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Yr 24 Hr Rainfall=8.80"

Area (sf)	CN	Description
5,362	39	>75% Grass cover, Good, HSG A
5,362		100.00% Pervious Area

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

Subcatchment 200: SC-200



Summary for Subcatchment 300: SC-300

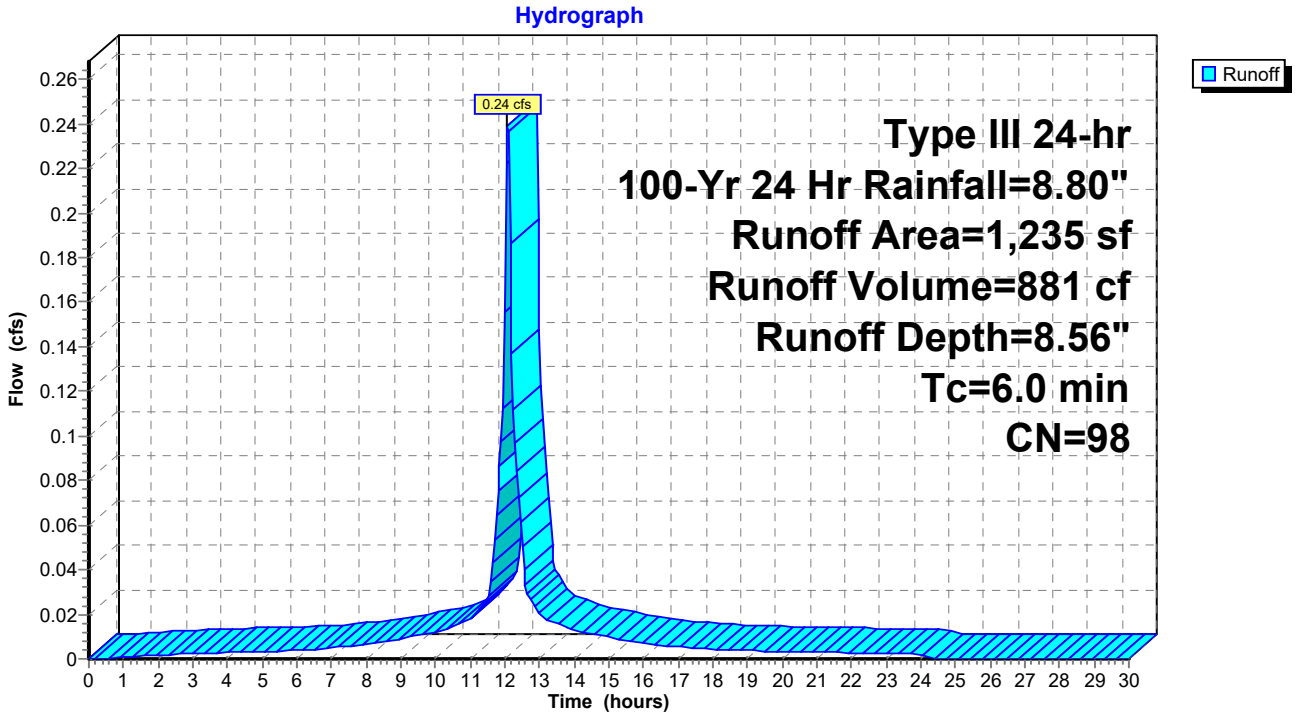
Runoff = 0.24 cfs @ 12.09 hrs, Volume= 881 cf, Depth= 8.56"
Routed to Pond 4P : PSIS-200

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Yr 24 Hr Rainfall=8.80"

Area (sf)	CN	Description
1,235	98	Roofs, HSG A
1,235		100.00% Impervious Area

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

Subcatchment 300: SC-300



Summary for Subcatchment ROOF B: BLDG

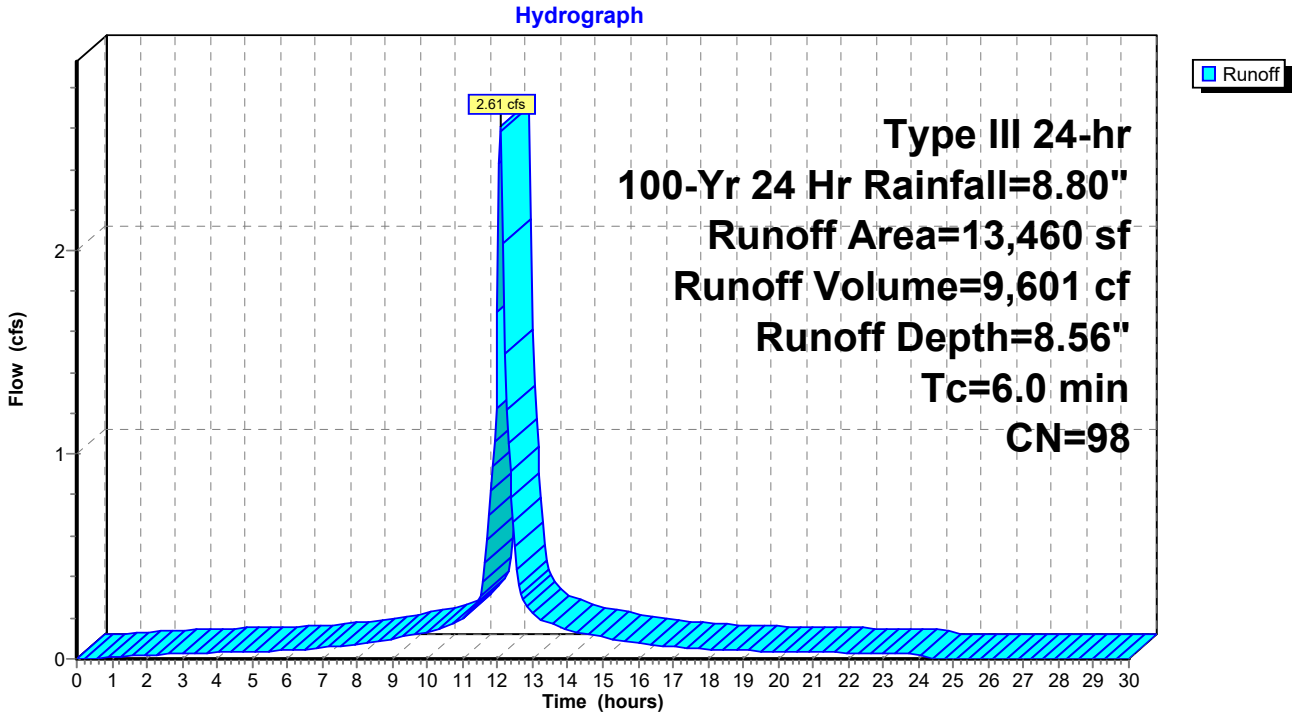
Runoff = 2.61 cfs @ 12.09 hrs, Volume= 9,601 cf, Depth= 8.56"
Routed to Pond 4P : PSIS-200

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Yr 24 Hr Rainfall=8.80"

	Area (sf)	CN	Description
*	13,460	98	Proposed Driveway/Walk
	13,460		100.00% Impervious Area

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

Subcatchment ROOF B: BLDG



Summary for Subcatchment ROOF F: FRONT ROOF

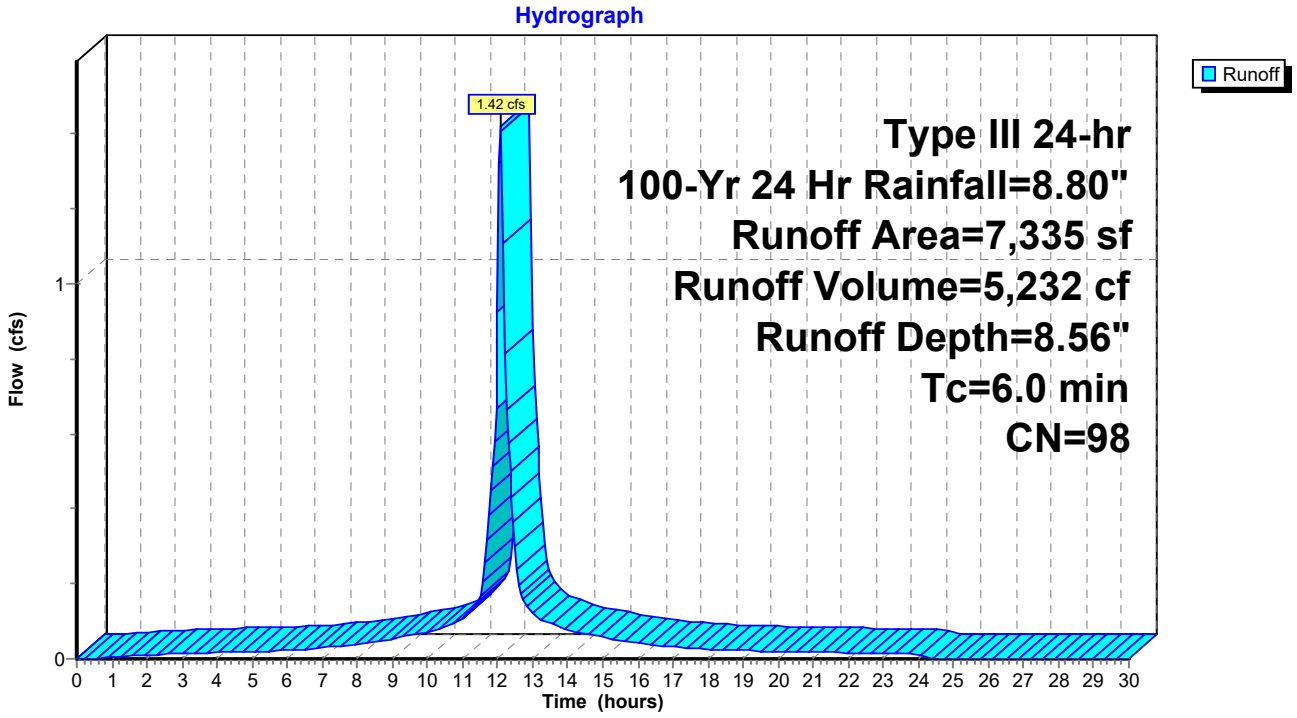
Runoff = 1.42 cfs @ 12.09 hrs, Volume= 5,232 cf, Depth= 8.56"
Routed to Pond P100 : PSIS-100

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Yr 24 Hr Rainfall=8.80"

Area (sf)	CN	Description
7,335	98	Roofs, HSG A
7,335		100.00% Impervious Area

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

Subcatchment ROOF F: FRONT ROOF



Summary for Subcatchment SC-PARK: PARKING

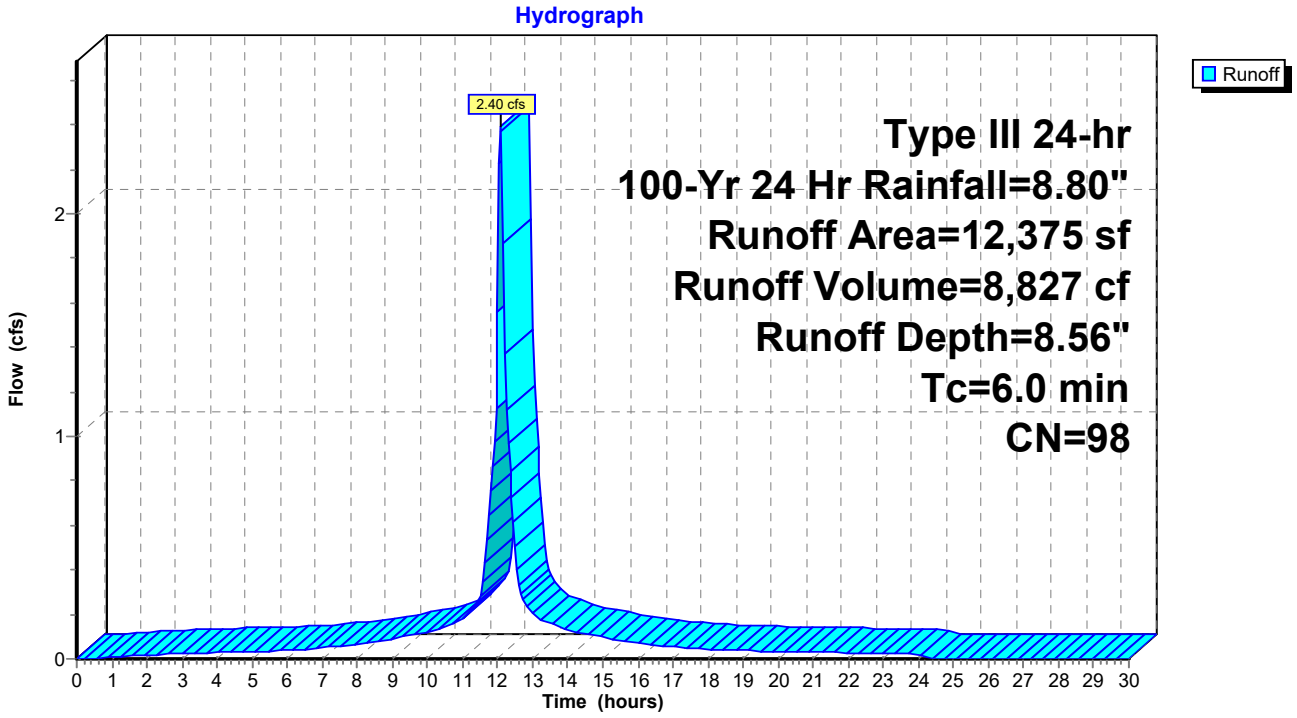
Runoff = 2.40 cfs @ 12.09 hrs, Volume= 8,827 cf, Depth= 8.56"
Routed to Pond 4P : PSIS-200

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Yr 24 Hr Rainfall=8.80"

Area (sf)	CN	Description
12,375	98	Paved parking, HSG A
12,375		100.00% Impervious Area

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

Subcatchment SC-PARK: PARKING

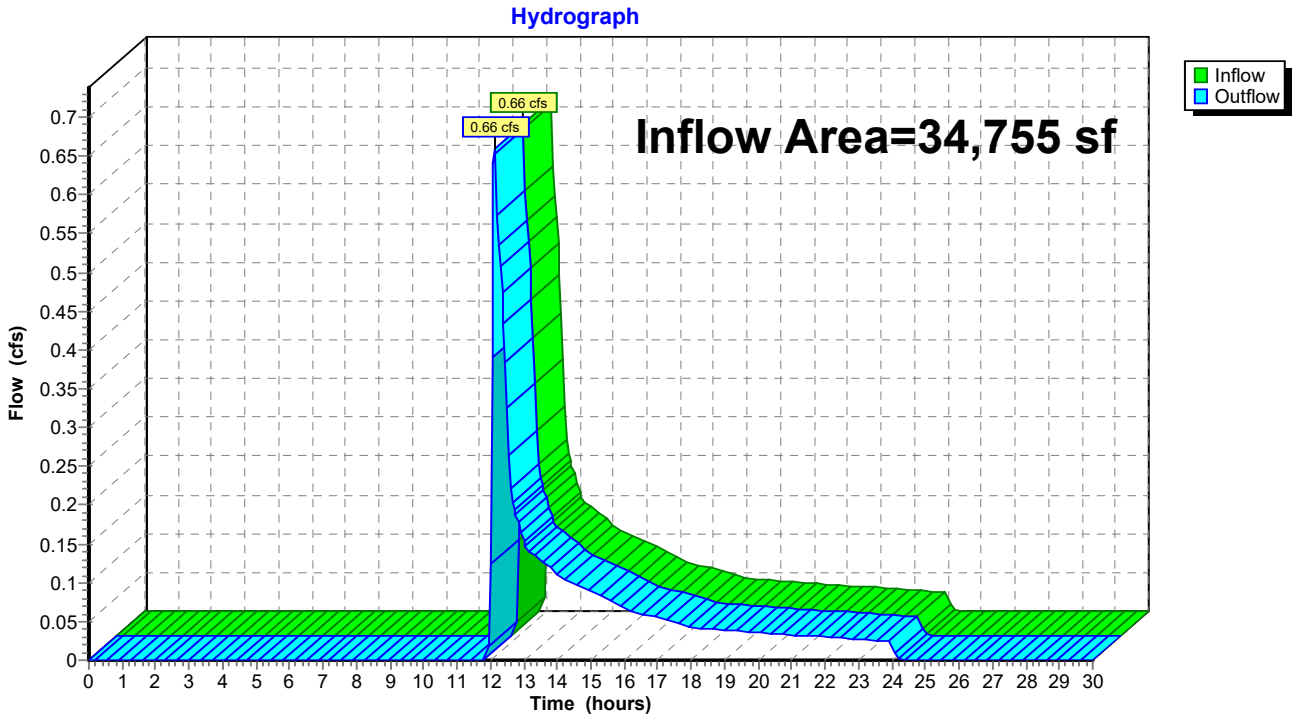


Summary for Reach DP-100: 200 FT RF

Inflow Area = 34,755 sf, 1.04% Impervious, Inflow Depth = 1.19" for 100-Yr 24 Hr event
Inflow = 0.66 cfs @ 12.13 hrs, Volume= 3,460 cf
Outflow = 0.66 cfs @ 12.13 hrs, Volume= 3,460 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Reach DP-100: 200 FT RF

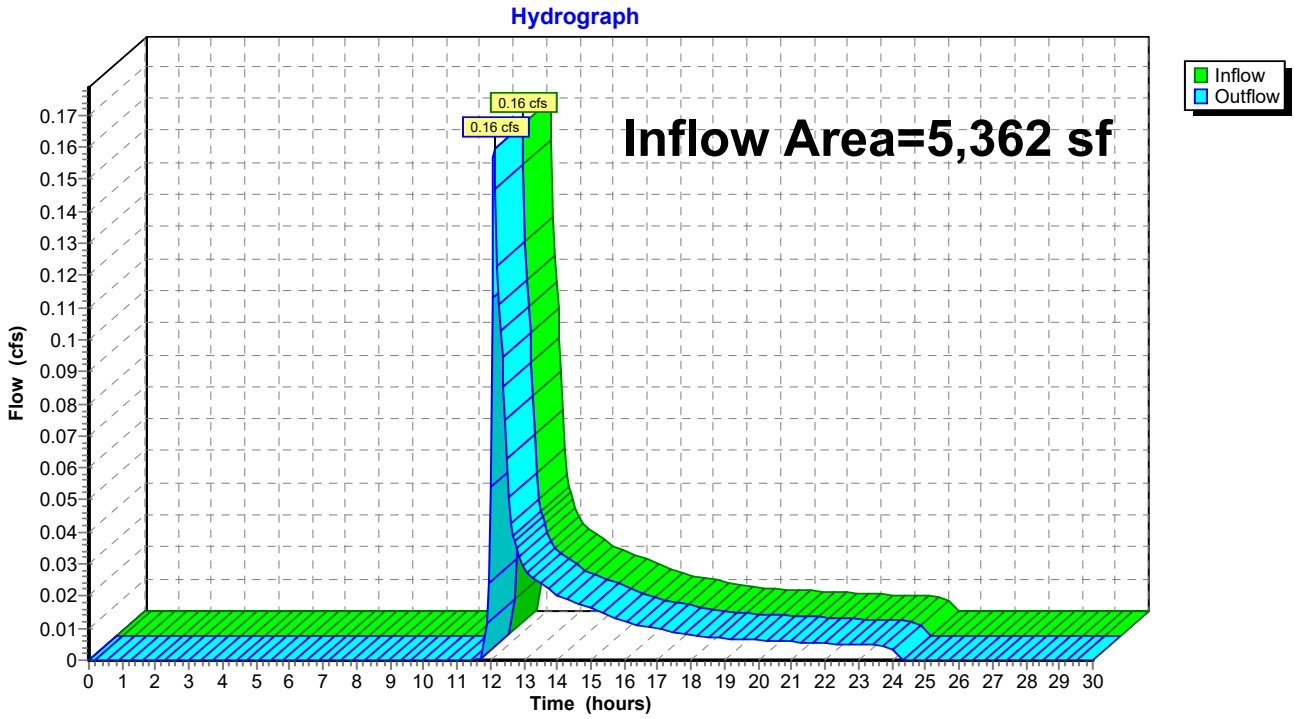


Summary for Reach DP-200: WEST ABUTTER

Inflow Area = 5,362 sf, 0.00% Impervious, Inflow Depth = 1.51" for 100-Yr 24 Hr event
Inflow = 0.16 cfs @ 12.12 hrs, Volume= 674 cf
Outflow = 0.16 cfs @ 12.12 hrs, Volume= 674 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Reach DP-200: WEST ABUTTER



Summary for Pond 4P: PSIS-200

Inflow Area = 27,070 sf,100.00% Impervious, Inflow Depth = 8.56" for 100-Yr 24 Hr event
Inflow = 5.24 cfs @ 12.09 hrs, Volume= 19,309 cf
Outflow = 0.79 cfs @ 11.65 hrs, Volume= 19,309 cf, Atten= 85%, Lag= 0.0 min
Discarded = 0.79 cfs @ 11.65 hrs, Volume= 19,309 cf

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 110.90' @ 12.58 hrs Surf.Area= 4,101 sf Storage= 5,192 cf
Flood Elev= 110.93' Surf.Area= 4,101 sf Storage= 5,237 cf

Plug-Flow detention time= 36.4 min calculated for 19,277 cf (100% of inflow)
Center-of-Mass det. time= 36.3 min (776.4 - 740.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	108.60'	2,884 cf	**68.17'W x 60.16'L x 2.33'H Field A** 9,569 cf Overall - 2,359 cf Embedded = 7,210 cf x 40.0% Voids
#2A	109.10'	2,359 cf	**ADS_StormTech SC-310 +Cap** x 160 Inside #1 Effective Size= 28.9"W x 16.0"H => 2.07 sf x 7.12'L = 14.7 cf Overall Size= 34.0"W x 16.0"H x 7.56'L with 0.44' Overlap 160 Chambers in 20 Rows
		5,243 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	108.60'	**8.270 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.79 cfs @ 11.65 hrs HW=108.63' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.79 cfs)

Pond 4P: PSIS-200 - Chamber Wizard Field A

Chamber Model = ADS_StormTech SC-310 +Cap (ADS StormTech® SC-310 with cap length)
Effective Size= 28.9"W x 16.0"H => 2.07 sf x 7.12'L = 14.7 cf
Overall Size= 34.0"W x 16.0"H x 7.56'L with 0.44' Overlap

34.0" Wide + 6.0" Spacing = 40.0" C-C Row Spacing

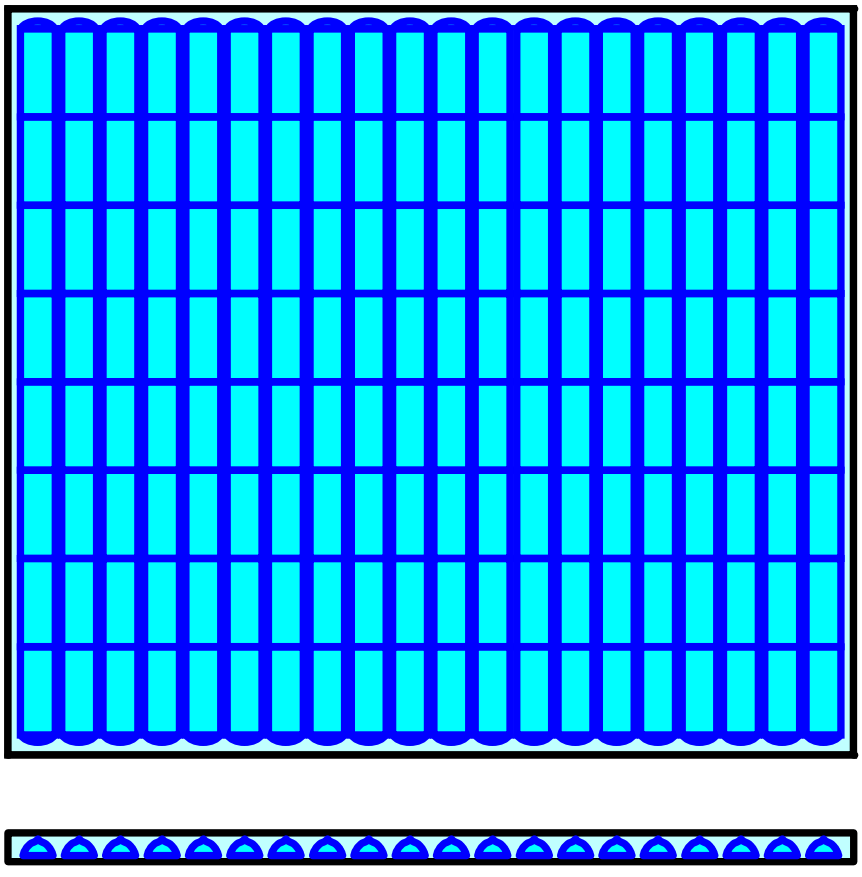
8 Chambers/Row x 7.12' Long +0.60' Cap Length x 2 = 58.16' Row Length +12.0" End Stone x 2 = 60.16' Base Length
20 Rows x 34.0" Wide + 6.0" Spacing x 19 + 12.0" Side Stone x 2 = 68.17' Base Width
6.0" Stone Base + 16.0" Chamber Height + 6.0" Stone Cover = 2.33' Field Height

160 Chambers x 14.7 cf = 2,358.7 cf Chamber Storage

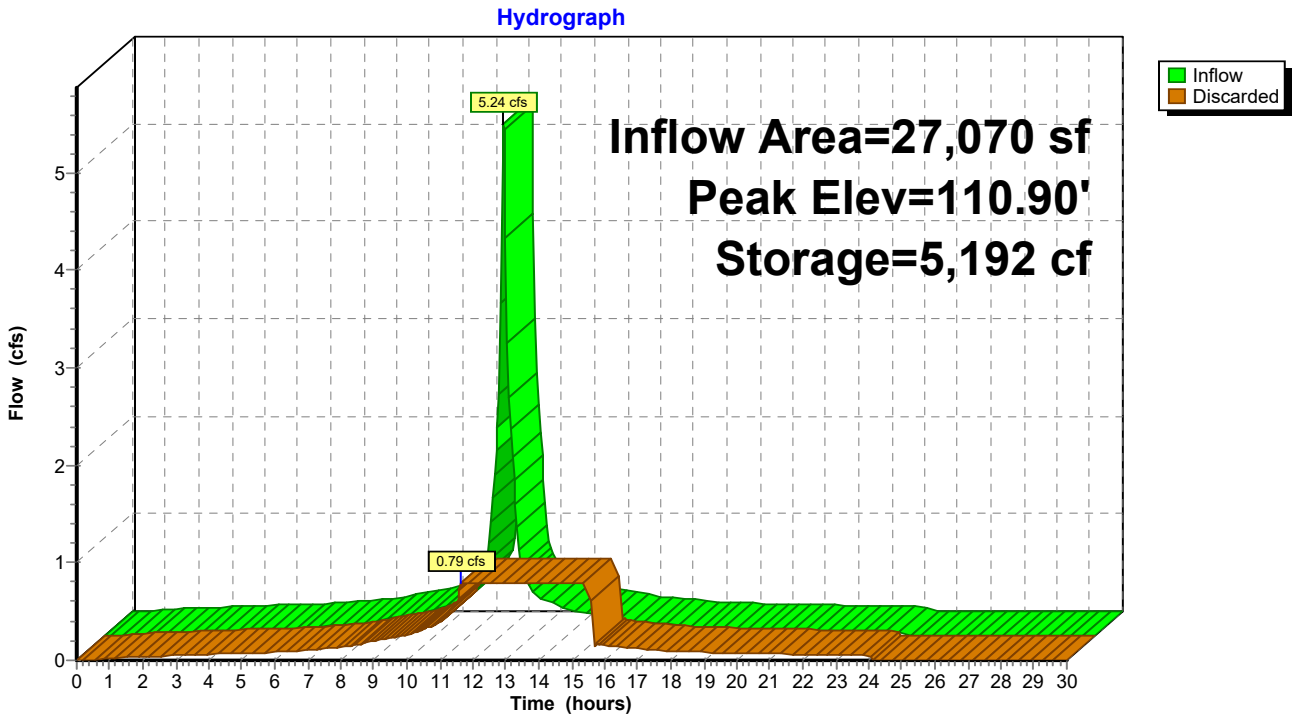
9,568.8 cf Field - 2,358.7 cf Chambers = 7,210.1 cf Stone x 40.0% Voids = 2,884.0 cf Stone Storage

Chamber Storage + Stone Storage = 5,242.7 cf = 0.120 af
Overall Storage Efficiency = 54.8%
Overall System Size = 60.16' x 68.17' x 2.33'

160 Chambers
354.4 cy Field
267.0 cy Stone



Pond 4P: PSIS-200



Summary for Pond P100: PSIS-100

Inflow Area = 7,335 sf,100.00% Impervious, Inflow Depth = 8.56" for 100-Yr 24 Hr event
Inflow = 1.42 cfs @ 12.09 hrs, Volume= 5,232 cf
Outflow = 0.16 cfs @ 11.50 hrs, Volume= 5,232 cf, Atten= 89%, Lag= 0.0 min
Discarded = 0.16 cfs @ 11.50 hrs, Volume= 5,232 cf

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 111.81' @ 12.72 hrs Surf.Area= 842 sf Storage= 1,605 cf
Flood Elev= 112.30' Surf.Area= 842 sf Storage= 1,771 cf

Plug-Flow detention time= 61.6 min calculated for 5,223 cf (100% of inflow)
Center-of-Mass det. time= 61.5 min (801.6 - 740.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	108.80'	784 cf	**15.75'W x 53.46'L x 3.50'H Field A** 2,947 cf Overall - 987 cf Embedded = 1,960 cf x 40.0% Voids
#2A	109.30'	987 cf	**ADS_StormTech DC-780 b +Cap** x 21 Inside #1 Effective Size= 45.4"W x 30.0"H => 6.49 sf x 7.12'L = 46.2 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 21 Chambers in 3 Rows Cap Storage= 2.7 cf x 2 x 3 rows = 15.9 cf
		1,771 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	108.80'	**8.270 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.16 cfs @ 11.50 hrs HW=108.84' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.16 cfs)

Pond P100: PSIS-100 - Chamber Wizard Field A

Chamber Model = ADS_StormTech DC-780 b +Cap (ADS StormTech® DC-780 with cap storage)
Effective Size= 45.4"W x 30.0"H => 6.49 sf x 7.12'L = 46.2 cf
Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap
Cap Storage= 2.7 cf x 2 x 3 rows = 15.9 cf

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

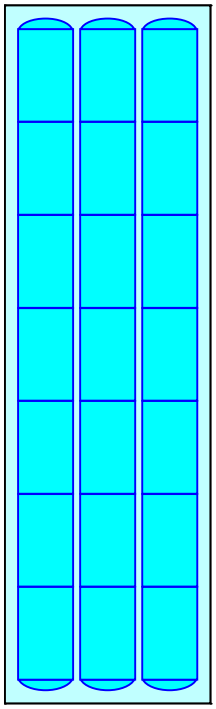
7 Chambers/Row x 7.12' Long +0.81' Cap Length x 2 = 51.46' Row Length +12.0" End Stone x 2 = 53.46' Base Length
3 Rows x 51.0" Wide + 6.0" Spacing x 2 + 12.0" Side Stone x 2 = 15.75' Base Width
6.0" Stone Base + 30.0" Chamber Height + 6.0" Stone Cover = 3.50' Field Height

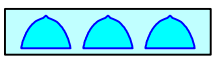
21 Chambers x 46.2 cf + 2.7 cf Cap Volume x 2 x 3 Rows = 987.0 cf Chamber Storage

2,946.8 cf Field - 987.0 cf Chambers = 1,959.8 cf Stone x 40.0% Voids = 783.9 cf Stone Storage

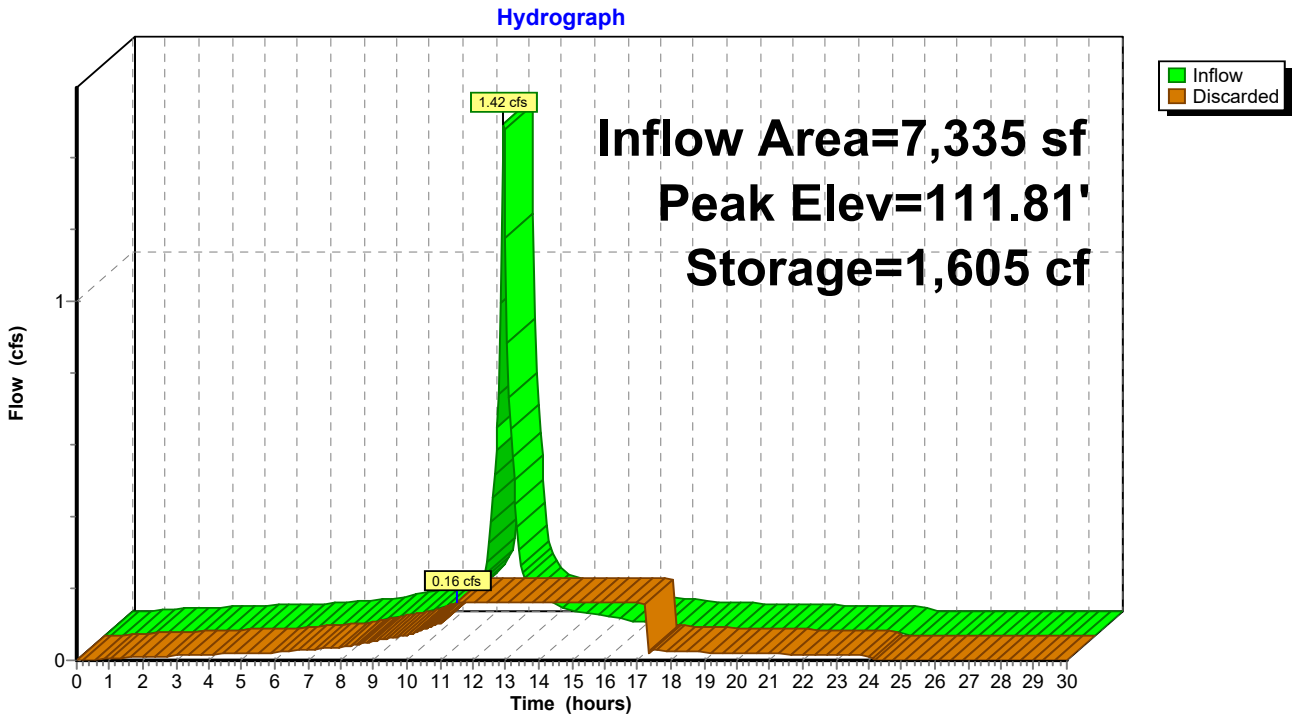
Chamber Storage + Stone Storage = 1,770.9 cf = 0.041 af
Overall Storage Efficiency = 60.1%
Overall System Size = 53.46' x 15.75' x 3.50'

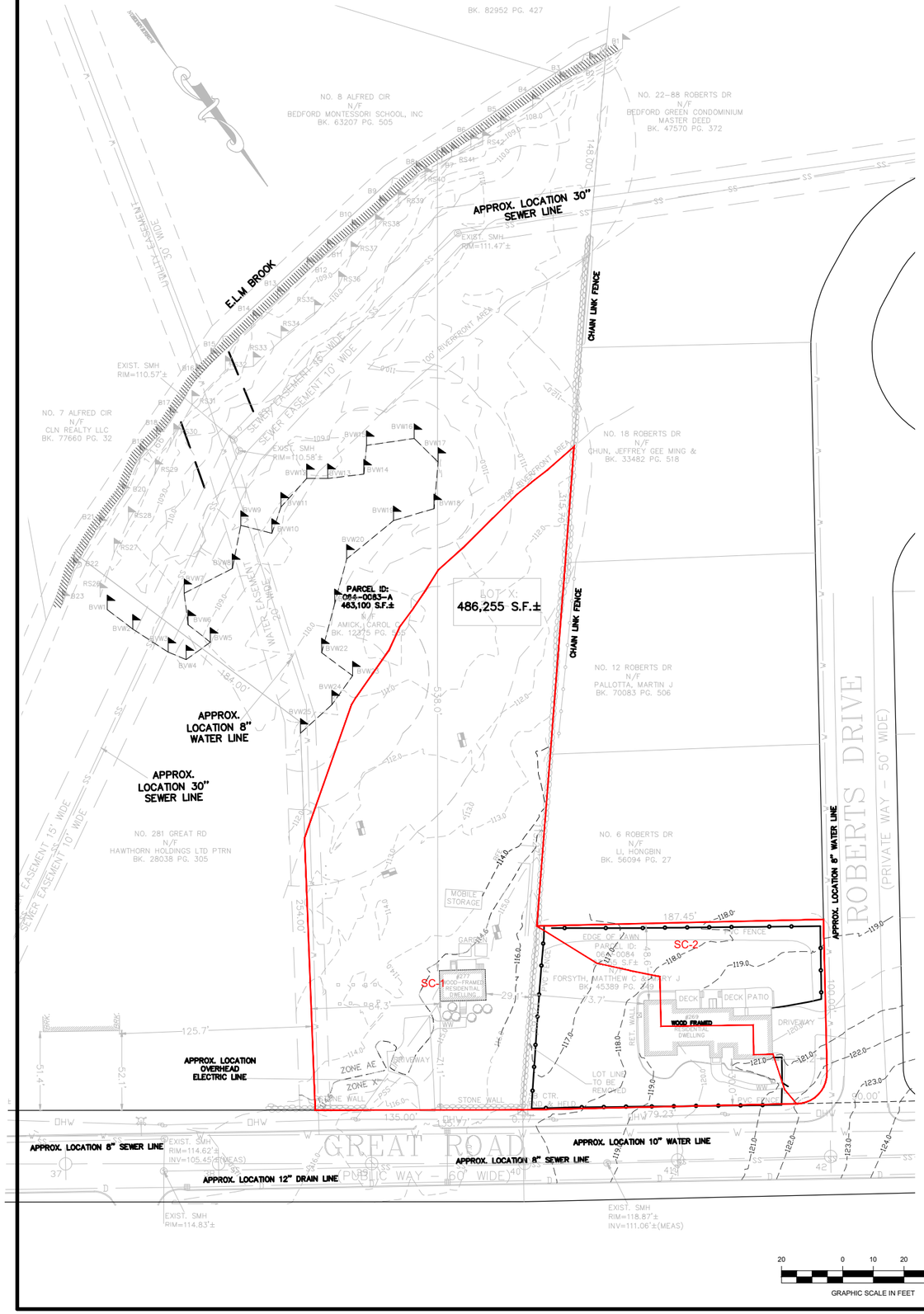
21 Chambers
109.1 cy Field
72.6 cy Stone

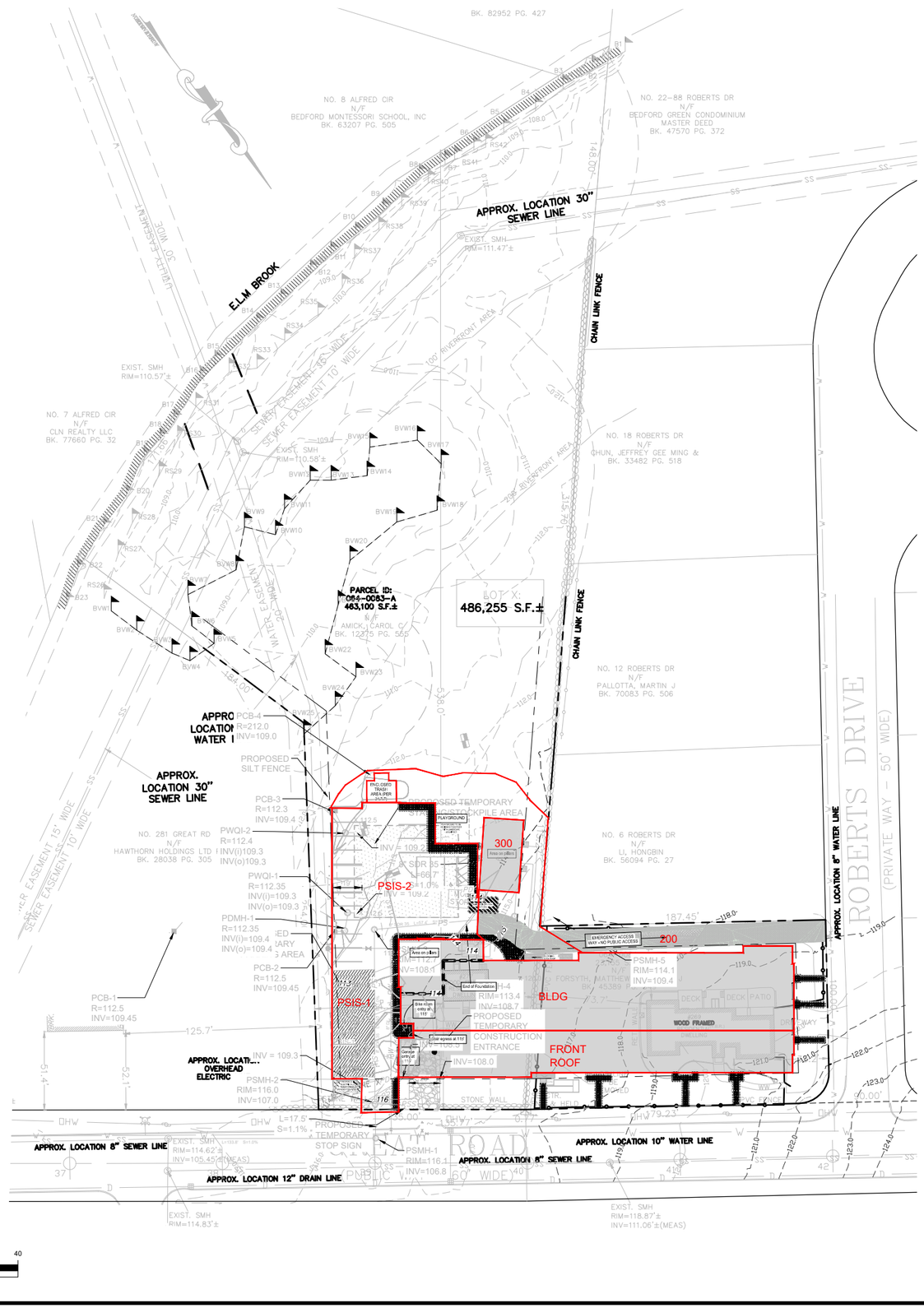




Pond P100: PSIS-100







20 0 10 20 40

GRAPHIC SCALE IN FEET

277 GREAT ROAD
BEDFORD, MA

DRAWN BY: MVC
DATE: 08-25-2025
CHECKED BY: MJN

REVISIONS

DATE	BY	DESCRIPTION

PATRIOT Engineering
PO BOX 362
LEXINGTON, MASSACHUSETTS 02420
T: (978) 726-2654
www.patriot-eng.com

DRAINAGE AREA MAP
LOCATED IN
BEDFORD, MA
(MIDDLESEX COUNTY)
PREPARED FOR
SA DEVELOPMENT

SHEET
DAM

Non-automated: Mar.4, 2008

INSTRUCTIONS:
1. Sheet is nonautomated. Print sheet and complete using hand calculations. Column A and B: See MassDEP Structural BMP Table
2. The calcualtions must be completed using the Column Headings specified in Chart and Not the Excel Column Headings
3. To complete Chart Column D, multiple Column B value within Row x Column C value within Row
4. To complete Chart Column E value, subtract Column D value within Row from Column C within Row
5. Total TSS Removal = Sum All Values in Column D

Location: 269 and 277 Great Road Bedford MA

Train 1: Barracuda HDS, PSIS-2

TSS Removal Calculation

A BMP	B TSS Removal Rate	C Starting TSS Load*	D Amount Removed (B*C)	E Remaining Load (C-D)
Barracuda (PWQI-1)	50%	1.00	0.50	0.50
Infiltration System	80%	0.50	0.40	0.10

Total TSS Removal = 90.0%

Project: 269 & 277 Great Road
Prepared By: Patriot Engineering
Date: 8/26/2025

*Equals remaining load from previous BMP(E) which enters the BMP

** See portion of STEP Fact Sheet for removal rate

Non-automated TSS Calculation Sheet
must be used if Proprietary BMP Proposed
1. From MassDEP Stormwater Handbook Vol. 1

72-HOUR DRAW DOWN CALCULATIONS

$$\text{Time} = \frac{Rv}{(K)(BottomArea)(n)}$$

R_v = Storage Volume
K = Saturated Hydraulic Conductivity for Sand = 8.27 in/hour
Bottom Area = Bottom Area of Recharge Structure
n = Porosity (1)

PSIS-100

R_v = 1,771 cf
Bottom Area = 842 sf

Time = 1,771 cf /(8.27 in/hr)(1'/12")(842 sf)(1)

Time = 3.0 hours
3.0 hours < 72 hours

PSIS-200

R_v = 5,243 cf
Bottom Area = 4,101 sf

Time = 5,243 cf /(8.27 in/hr)(1'/12")(4,101 sf)(1)

Time = 1.85 hours
1.85 hours < 72 hours

CAPTURE AREA ADJUSTMENT

The following calculation in accordance with MA Stormwater Handbook demonstrates at the storage capacity of the infiltration BMP's is sufficient to meet Standard #3.

Steps:

1. Required recharge volume for total site impervious area.

   From Standard #3 recharge calculations page, summation of required recharge volume = 1,738 CF

2. Site impervious area draining to recharge facilities (from previous).

   Area = 34,767 SF

3. Divide total site impervious area by impervious area draining to recharge facilities. Roof runoff captured completely within infiltration system.

   Total Site Impervious =34,767 SF

   34,767 SF / 34,405 SF = 1.01

4. Multiply result of #3 by original recharge volume in #1.

   1.01 x 1,738 = 1,756 CF

5. Ensure minimum 65% impervious area draining to recharge facilities.

   34,405 SF / 34,767 SF = 0.989 = 98.9 %

6. Recharge facilities provide total recharge volume of 7,017 CF.
   Recharge volume 7,014 > 1,756 CF adjusted total recharge volume.

All Recharge Volumes have been achieved as required by the Massachusetts Stormwater Management Standards

Middlesex County, Massachusetts

626B—Merrimac-Urban land complex, 0 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2tyr9
Elevation: 0 to 820 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 250 days
Farmland classification: Not prime farmland

Map Unit Composition

Merrimac and similar soils: 45 percent
Urban land: 40 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Merrimac

Setting

Landform: Outwash plains, outwash terraces, moraines, eskers, kames
Landform position (two-dimensional): Summit, shoulder, backslope, footslope
Landform position (three-dimensional): Side slope, crest, riser, tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy glaciofluvial deposits derived from granite, schist, and gneiss over sandy and gravelly glaciofluvial deposits derived from granite, schist, and gneiss

Typical profile

Ap - 0 to 10 inches: fine sandy loam
Bw1 - 10 to 22 inches: fine sandy loam
Bw2 - 22 to 26 inches: stratified gravel to gravelly loamy sand
2C - 26 to 65 inches: stratified gravel to very gravelly sand

Properties and qualities

Slope: 0 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 99.90 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 2 percent
Maximum salinity: Nonsaline (0.0 to 1.4 mmhos/cm)

Sodium adsorption ratio, maximum: 1.0
Available water supply, 0 to 60 inches: Low (about 4.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: A
Ecological site: F144AY022MA - Dry Outwash
Hydric soil rating: No

Description of Urban Land

Typical profile

M - 0 to 10 inches: cemented material

Properties and qualities

Slope: 0 to 8 percent
Depth to restrictive feature: 0 inches to manufactured layer
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Available water supply, 0 to 60 inches: Very low (about 0.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydrologic Soil Group: D
Hydric soil rating: Unranked

Minor Components

Hinckley

Percent of map unit: 5 percent
Landform: Deltas, kames, eskers, outwash plains
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Head slope, nose slope, side slope, crest, rise
Down-slope shape: Convex
Across-slope shape: Convex, linear
Hydric soil rating: No

Sudbury

Percent of map unit: 5 percent
Landform: Deltas, terraces, outwash plains
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Windsor

Percent of map unit: 5 percent
Landform: Outwash terraces, dunes, outwash plains, deltas
Landform position (three-dimensional): Tread, riser
Down-slope shape: Linear, convex

Across-slope shape: Linear, convex
Hydric soil rating: No

Data Source Information

Soil Survey Area: Middlesex County, Massachusetts
Survey Area Data: Version 24, Aug 27, 2024

Middlesex County, Massachusetts

36A—Saco mucky silt loam, frequently ponded, 0 to 1 percent slopes, frequently flooded

Map Unit Setting

National map unit symbol: 2zvfl
Elevation: 30 to 500 feet
Mean annual precipitation: 45 to 54 inches
Mean annual air temperature: 43 to 54 degrees F
Frost-free period: 145 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Saco and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Saco

Setting

Landform: Terraces, alluvial flats
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread, dip
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Silty alluvium

Typical profile

H1 - 0 to 13 inches: mucky silt loam
H2 - 13 to 30 inches: silt loam
H3 - 30 to 45 inches: silt loam
H4 - 45 to 65 inches: loamy sand

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: About 0 to 2 inches
Frequency of flooding: Frequent
Frequency of ponding: Frequent
Available water supply, 0 to 60 inches: High (about 11.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6w
Hydrologic Soil Group: B/D
Ecological site: F144AY016MA - Very Wet Low Floodplain
Hydric soil rating: Yes

Minor Components

Swansea

Percent of map unit: 8 percent
Landform: Depressions, bogs
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Freetown

Percent of map unit: 8 percent
Landform: Bogs, depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

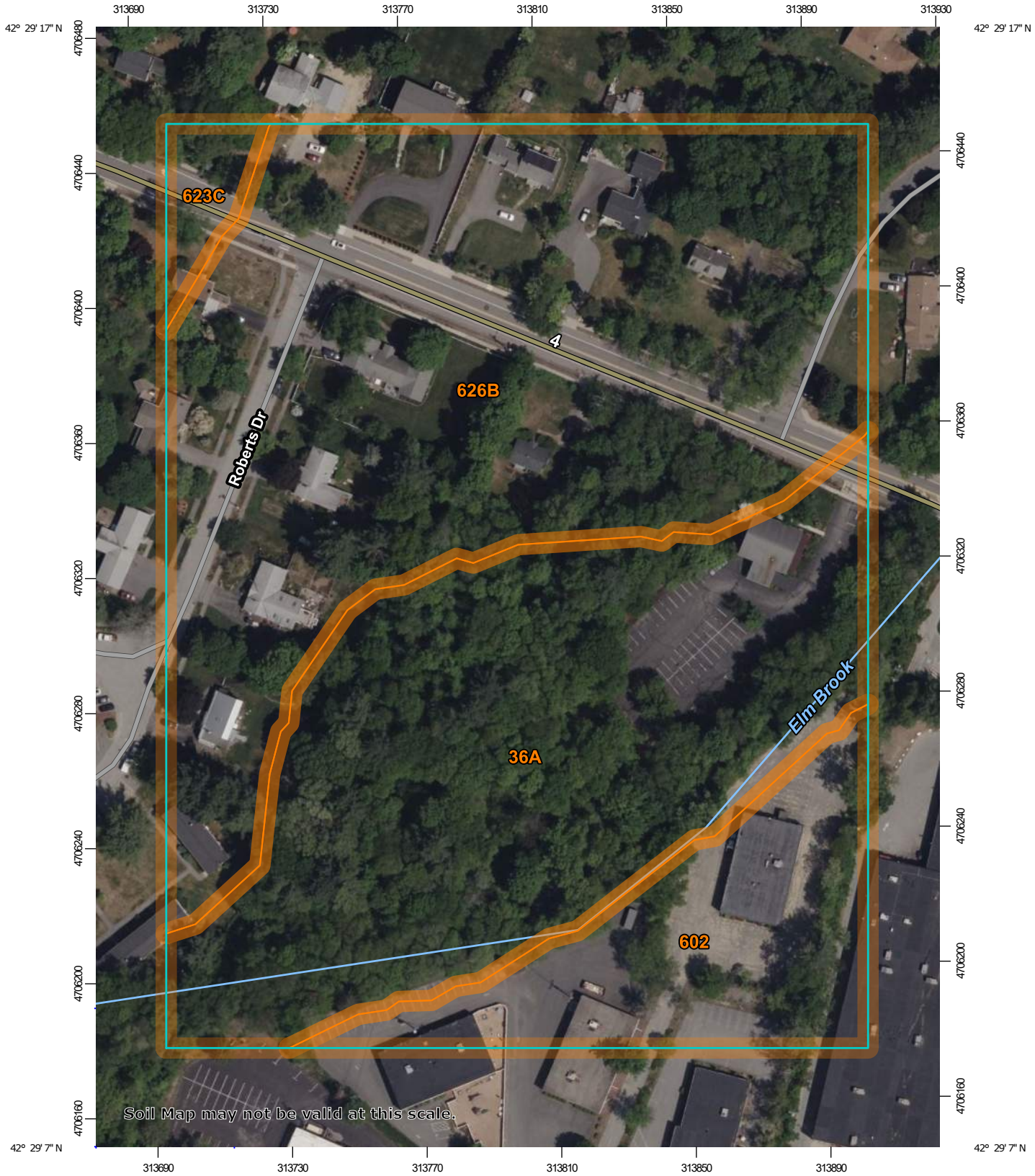
Limerick

Percent of map unit: 4 percent
Landform: Terraces, alluvial flats
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread, dip
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: Yes

Data Source Information

Soil Survey Area: Middlesex County, Massachusetts
Survey Area Data: Version 24, Aug 27, 2024

Soil Map—Middlesex County, Massachusetts



Map Scale: 1:1,620 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 20 40 80 120

Feet: 0 50 100 200 300

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 19N 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 1:24,000.

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: Middlesex County, Massachusetts
Survey Area Data: Version 24, Aug 27, 2024

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

Date(s) aerial images were photographed: May 22, 2022—Jun 5, 2022

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
36A	Saco mucky silt loam, frequently ponded, 0 to 1 percent slopes, frequently flooded	5.0	35.3%
602	Urban land	1.8	12.7%
623C	Woodbridge-Urban land complex, 3 to 15 percent slopes	0.3	1.9%
626B	Merrimac-Urban land complex, 0 to 8 percent slopes	7.1	50.1%
Totals for Area of Interest		**14.2**	**100.0%**

OPERATION AND MAINTENANCE &
EROSION AND SEDIMENTATION CONTROL PROGRAM
for
A PROPOSED STORMWATER MANAGEMENT SYSTEM
located at
269 & 277 GREAT ROAD
BEDFORD, MASSACHUSETTS

Applicant:

277 Great Road Bedford LLC
200 Main Street Box 352
Stoneham, MA 02180

Prepared by:

Patriot Engineering
PO Box 362
Lexington, Massachusetts 02420

April 28, 2025
Revised August 25, 2025

Project Name: **269 and 277 Great Road**

Owner Name: 277 Great Road Bedford LLC

Party Responsible for Maintenance During Construction: Contractor

Party Responsible for Maintenance After Construction: Homeowner's Association

Erosion and Sedimentation Control Measures during Construction Activities

Filtermitt (or approved equal)

Filtermitt (or approved equal) will be installed along the down gradient limit of work as depicted on the Site Plan. The filtermitt shall be installed prior to the commencement of any work on-site and in accordance with the design plans. An additional supply of filtermitt shall be on-site to replace and/or repair any filtermitt that have been disturbed or are in poor condition. The line of filtermitt shall be inspected and maintained on a weekly basis and after every major storm event (2-year) during construction. No construction activities are to occur beyond the filtermitt at any time. Deposited sediments shall be removed when the volume of the deposition reaches approximately one-half the height of the filtermitt.

Stockpiles

All unused debris, soil, and other material shall be stockpiled in locations of relatively flat grades, away from any trees identified to be saved and upgradient of the filtermitt. Stockpile side slopes shall not be greater than 2:1. All stockpiles shall be surrounded by a row of filtermitt. Surrounding filtermitt shall be inspected and maintained on a daily basis.

Surface Stabilization

The surface of all disturbed areas shall be stabilized during and after construction. Disturbed areas remaining idle for more than 14 days shall be stabilized. Temporary measures shall be taken during construction to prevent erosion and siltation. No construction sediment shall be allowed to enter any infiltration system or formal drainage system. All disturbed slopes will be stabilized with a permanent vegetative cover. Some or all of the following measures will be utilized on this project as conditions may warrant.

a. Temporary Seeding
b. Temporary Mulching
c. Permanent Seeding
d. Placement of Sod
e. Hydroseeding
f. Placement of Hay
g. Placement of Jute Netting

Dust shall be controlled at the site.

Tree Protection

Existing trees to be saved shall be protected with orange construction fence (offset from the tree trunk by professional standard based on canopy).

Construction Tracking Pad

A construction tracking pad shall be installed at the designated entrances/exits, as shown on the Site plans, to the site to reduce the amount of sediment transported off site. The construction tracking pad shall be inspected weekly.

Inspection and Maintenance of Trench/Area Drain

The performance of the trench/area drain shall be checked after every major storm event during construction.

Catch Basins/Trench Drains

Silt Sacks shall be installed within the basins. The performance of the basins shall be checked after every major storm event during construction, in the event of clogging within the Silt Sack, it shall be removed and replaced with a clean Silt Sack. Stormwater quality unit shall be checked bi-weekly.

Subsurface Infiltration Facility

Construction activity above and around the proposed location of the subsurface infiltration facility shall be limited to prevent compaction of the existing soil. Care shall be taken to redirect stormwater runoff from this area to prevent ponding. The installation of this system shall occur under dry weather conditions and system shall be backfilled immediately to prohibit the introduction of fines or other material that would compromise the functionality of this system.

Removal of Sediment and Erosion Controls

At the completion of construction activities and after receiving approval from the Town of Lexington, all physical sediment and erosion controls shall be removed from the site per Town of Lexington. The areas where the controls have been removed shall be seeded and stabilized immediately upon removal.

Long-Term Inspection and Maintenance Measures after Construction

Erosion Control

Eroded sediments can adversely affect the performance of the stormwater management system. Eroding or barren areas should be immediately re-vegetated.

Inspection and Maintenance of Trench/Area Drain

The area drain shall be inspected six (6) times per year including the end of the foliage and snow removal seasons, and if necessary, any maintenance shall be performed so that it functions as designed. The yard drain shall be cleaned six times per year, or when sediment in the bottom of the sump reaches ½ the depth from the bottom of the invert of the lowest pipe in the basin. Inlet and outlet pipes should be checked for clogging.

Subsurface Infiltration Facility

The infiltration system inspections should include inspections following the first several rainfall events or first few months after construction, after all major storms (3.2" inches of rain over a 24-hour period or greater), and on regular bi-annual scheduled dates, to ascertain whether captured runoff drains within 72 hours following the event. Ponded water inside the system (as visible from the observation well) after several dry days often indicates that the bottom of the system is clogged. If the water does not drain, then a qualified professional should be retained to determine the cause of apparent infiltration failure and recommend corrective action. Such corrective action should be immediately implemented by the Homeowners Association. If depth of sediment is observed to be greater than 3" then the system should be cleaned. The homeowner shall contact a sewer and drain cleaning company to flood the system via pump truck so the water is forced back to the upstream cleanout where sediment can be vacuumed out.

Screens on the roof drain inlets shall be inspected each spring and fall and after major storm events

Water Quality Units

The Barracuda HDS (PWQI#1 and PWQI#2) should be inspected at regular intervals and maintained when necessary to ensure optimum performance. The rate at which the system collects pollutants will depend more heavily on-site activities than the size of the unit. At a minimum, inspections should be performed twice per year (e.g. spring and fall), however more frequent inspections may be necessary in climates where winter sanding operations may lead to rapid accumulations, or in equipment washdown areas.

The manufacturers recommended maintenance guide is provided at the end of this document for reference.

Debris and Litter Removal

Trash may collect in the BMP's, potentially causing clogging of the facilities. All debris and litter shall be removed when necessary, and after each storm event. Sediment and debris collected from vacuuming and/or sweeping should be disposed of at a permitted waste disposal facility. Avoid disposing of this material on site, where it could be washed into the proposed subsurface infiltration systems.

Lawn Mowing

All lawn mowing to take place will be done with a mulch mower so grass clippings will not be an issue.

Ongoing Inspection and Maintenance as required by Town of Lexington Stormwater Regulations

A. Maintenance Inspections

The property owner responsible for the operation and maintenance of stormwater management facilities shall retain a Qualified Inspector who shall submit, on an annual basis by January 1st of each year, a written certification to the Stormwater Agency documenting that work has been done to properly operate and maintain the stormwater management facilities consistent with the approved O&M plan. The property owner responsible for the operation and maintenance of a stormwater management system shall prepare records of the all maintenance and repairs, using the example inspection and maintenance form included in Appendix E of these Regulations.

(1) Maintenance inspections shall include consideration of the condition of:

(a) Pretreatment devices;
(b) Vegetation or filter media;
(c) Fences or other safety devices;
(d) Spillways, valves, or other control structures;
(e) Embankments, slopes, and safety benches;
(f) Reservoir or treatment areas;
(g) Inlet and outlet channels and structures;
(h) Underground drainage;
(i) Sediment and debris accumulation in storage and fore bay areas (including catch basins);
(j) Any nonstructural practices; and
(k) Any other item that could affect the proper function of the stormwater management system.

B. Right-of-Entry for Inspection

The terms of the O&M Plan and any maintenance agreement for the implementation thereof shall provide for the Stormwater Agency or its designee to enter the properly at reasonable times and in a reasonable manner for the purpose of inspection in accordance with Section 181-72(C) of these regulations.

C. Records of Inspections and Maintenance, Repair, Replacement and Disposal Activities

Property owners responsible for the operation and maintenance of stormwater management facilities shall prepare records of the installation and of all inspections, maintenance, repairs, replacement, and disposal activities, and shall retain the records for at least five years. These records shall be made available to the Stormwater Agency during inspection of the facility and upon request. For disposal, the record must indicate the type of material, quantity of material, and disposal location.

D. Failure to Maintain

After notification is provided to the signatories to the Maintenance Agreement of any deficiencies discovered from an inspection of a Stormwater Management System, the owner of the property shall have 30 days (which time may be extended by the Stormwater Agency) to correct the deficiency. The Stormwater Agency shall then conduct a subsequent inspection to ensure completion of repairs.

Good Housekeeping Practices (in accordance with Standard 10 of the Stormwater Management Handbook to prevent illicit discharges)

Provisions for storing paints, cleaners, automotive waste and other potentially hazardous household waste products inside or under cover

- All materials on site will be stored inside in a neat, orderly, manner in their appropriate containers with the original manufacturer's label.

- Only store enough material necessary. Whenever possible, all of a product shall be used up before disposing of container.
- Manufacturer, local, and State recommendations for proper use and disposal shall be followed.

Vehicle washing controls
- Prohibited.

Requirements for routine inspection and maintenance of stormwater BMPs
- See Inspection and Maintenance Measures after Construction.

Spill prevention and response plans
- Spill Control Practices shall be in conformance with the guidelines set forth in the National Pollutant Discharge Elimination System (NPDES) Stormwater Pollution Prevention Plan (SWPPP)

Provisions for maintenance of lawns, gardens, and other landscaped areas
- Grass shall not be cut shorter than 2 to 3 inches and mulch clipping should be left on lawn as a natural fertilizer.
- Use low volume water approaches such as drip-type or sprinkler systems. Water plants only when needed to enhance root growth and avoid runoff problems.
- The use of mulch shall be utilized where possible. Mulch helps retain water and prevents erosion.

Requirements for storage and use of fertilizers, herbicides and pesticides
- Fertilizers used will be applied only in the minimum amounts recommended by the manufacturer. Once applied, fertilizer will be worked into the soil to limit exposure to storm water. Storage will be in a covered shed. The contents of any partially used bags of fertilizer will be transferred to a sealable plastic bin to avoid spills.
- Do not fertilize before a rainstorm.
- Consider using organic fertilizers. They release nutrients more slowly.
- Pesticides shall be applied on lawns and gardens only when necessary and applied only in the minimum amounts recommended by the manufacturer.

Pet waste management
- Scoop up and seal pet wastes in a plastic bag. Dispose of properly, in the garbage.

Provisions for solid waste management
- All solid waste shall be disposed of or recycled in accordance with local town regulations.

Snow disposal and plowing plans relative to Resource Area
- Snow shall be plowed and stored on gravel, grass, or other permeable surfaces to allow filtration to occur.
- Once snow melts all sand salt and debris shall be extracted from surface and properly disposed of.
- Snow shall not be disposed of in any resource area or waterbody.
- Disposing snow on top of storm drain catchbasins or stormwater drainage swale is prohibited.
- Snow shall be removed from the site once the storage capacity of the dedicated areas has been exceeded.

Winter Road Salt and/or Sand use and storage restrictions

- Sand storage piles should be located outside the 100-year buffer zone and shall be covered at all times. No salt to be stored or used on site.
- Alternative materials, such as sand or gravel, should be used in especially sensitive areas.

Roadway and Parking Lot sweeping schedule

- Pavement sweeping shall be conducted at a frequency of not less than once per year.
- Removal of any accumulated sand, grit, and debris from driveway after the snow melts shall be completed shortly after snow melts for the season.

Documentation that Stormwater BMPs are designed to provide for shutdown and containment in the event of a spill or discharges to or near critical areas or from LUHPPL

Not Applicable

Training for staff or personnel involved with implementing Long-Term Pollution Prevention Plan

To be determined by the owner.

List of Emergency contacts for implementing Long-Term Pollution Prevention Plan

To be determined by the owner.

Applicant's Certification

I certify under penalty of law that I have read, understand and agree to abide by the practices outlined in this document.

Signed:_____ Date:_____

277 Great Road Bedford LLC

Contractor's Certification

I certify under penalty of law that I have read, understand and agree to abide by the practices outlined in this document.

Signed:_____ Date:_____

Contractor

STORMWATER MANAGEMENT
CONSTRUCTION PHASE

INSPECTION SCHEDULE AND EVALUATION CHECKLIST

PROJECT LOCATION: 269 and 277 Great Road Bedford, MA **WEATHER:** _____

Inspection Date	***Inspector***	***Area Inspected***	***Required Inspection Frequency if BMP***	***Comments***	***Recommendation***	***Follow-up Inspection Required (yes/no)***
		Filtermitt	*Weekly and After Major Storm Events*			
		Construction Tracking Pad	*Weekly and After Major Storm Events*			
		Area/Trench Drains	*Weekly and After Major Storm Events*			
		Protection of Subsurface Infiltration Systems	*Weekly and After Major Storm Events*			

(1) Refer to the Massachusetts Stormwater Handbook, Volume Two: Stormwater Technical Handbook (February 2008) for recommendations regarding frequency for inspection and maintenance of specific BMP's.

(2) Inspections to be conducted by a qualified professional such as an environmental scientist or civil engineer.

Limited or no use of sodium chloride salts, fertilizers or pesticides recommended.

Other notes: (Include deviations from: Con. Comm. Order of Conditions, PB Approval, Construction Sequence and Approved Plan)

Stormwater Control Manager: _____

STORMWATER MANAGEMENT
AFTER CONSTRUCTION

INSPECTION SCHEDULE AND EVALUATION CHECKLIST

PROJECT LOCATION: 269 and 277 Great Road Bedford, MA **WEATHER:** _____

Inspection Date	***Inspector***	***Area Inspected***	***Required Inspection Frequency if BMP***	***Comments***	***Recommendation***	***Follow-up Inspection Required (yes/no)***
		Barracuda HDS (PWQI#1)	*Bi-annually and After Major Storm Events*			
		Barracuda HDS (PWQI#2)	*Bi-annually and After Major Storm Events*			
		Area/Trench Drain	*Bi-annually and After Major Storm Events*			
		Subsurface Infiltration Systems	*Bi-annually and After Major Storm Events*			

(3) Refer to the Massachusetts Stormwater Handbook, Volume Two: Stormwater Technical Handbook (February 2008) for recommendations regarding frequency for inspection and maintenance of specific BMP's.

(4) Inspections to be conducted by a qualified professional such as an environmental scientist or civil engineer.

Limited or no use of sodium chloride salts, fertilizers or pesticides recommended.

Other notes: (Include deviations from: Con. Comm. Order of Conditions, PB Approval, Construction Sequence and Approved Plan)

Stormwater Control Manager: _____