
DRAINAGE REPORT

KING STREET COMMONS MIXED-USE SUBDIVISION

**ASSESSORS MAP U08, LOT 10-0
550 KING STREET
LITTLETON, MASSACHUSETTS**

Prepared for:

550 King Street, LLC
290 Merrimack Street
Lawrence, MA 01843

Prepared by:

TEC, Inc.
282 Merrimack Street
Lawrence, MA 01843



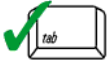
August 22, 2023
Rev. February 21, 2024



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 8²
- 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.



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.

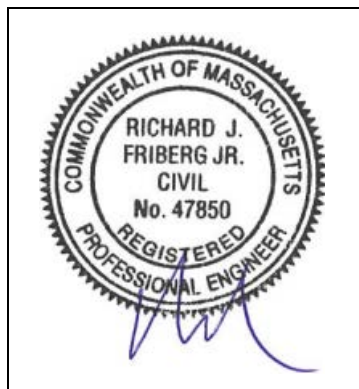
Note: Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that the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



2/21/2024

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): Water Quality Units

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 Field¹
- ☐ 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.

Table of Contents

MassDEP Checklist for Stormwater Report

List of Tables	ii
----------------------	----

List of Figures	iii
-----------------------	-----

Narrative	1
-----------------	---

Introduction	1
Existing Conditions	2
Proposed Conditions	2
Methodology	3
Pre-Development Runoff	3
Post-Development Runoff	4
Regulatory Compliance	6
Standard 1: No New Untreated Discharges	11
Standard 2: Peak Rate Attenuation	12
Standard 3: Recharge	12
Standard 4: Water Quality	13
Standard 5: Land Uses with Higher Potential Pollutant Loads	15
Standard 6: Critical Areas	15
Standard 7: Redevelopment Projects	15
Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control	15
Standard 9: Operation and Maintenance Plan	15
Standard 10: Illicit Discharges	15
Conclusion	16

Appendix

A	Hydrologic Calculations
B	Water Quality Data
C	NRCS Soil Resource Report
D	Operation & Maintenance Plan
E	CPPP and Erosion Prevention & Sedimentation Control Plan
F	Illicit Discharge Compliance Statement
G	Test Pit Logs

List of Tables

Table No.	Title	Page
1	Peak Flow Summary.....	12
2	Required Recharge Volume.....	13
3	Water Quality Unit Summary.....	14

List of Figures

Figure No.	Title	Page
1	Project Location Map	16
2	NRCS Soil Map.....	17
3	FEMA FIRM (100-Year Floodplain).....	18
D-1	Pre-Development Drainage Areas.....	19
D-2	Post-Development Drainage Areas	20

1

Narrative

Introduction

550 King Street, LLC, “the Applicant” is proposing a mixed-use subdivision at 550 King Street comprised of 21 lots. The proposed development on these lots consists of approximately 865 residential units, 67 hotel units, 112,880 SF of commercial/retail space, 19,000 SF of office space, and a re-use of the existing IBM office buildings which total 545,500 SF. The project is identified on the Town of Littleton’s Assessors Map U08, Lot 10-0 within the King Street Common Zoning District. The project site, “the Site”, occupies a portion of the total 43.2 acreage, approximately 6.2 acres that will become a public right-of-way. The Site is situated between the intersection of King Street (southeasterly bound), Great Road (southwesterly bound), and Route 495 (northerly bound) as defined on the *Project Location Map* (Figure 1).

The Applicant is proposing to redevelop the Site by constructing a boulevard-style two lane road with 158 on-street parking spaces, utilities which will service the subdivided parcels, stormwater management infrastructure, and landscaped areas. The Preliminary Subdivision Plan has been approved by the Town of Littleton Planning Board and is seeking further review and approval from the Planning Board with the submittal of a Definitive Subdivision Plan.

This drainage study was performed in order to assess the potential impacts of the proposed improvements and to provide measures to mitigate any impacts of the project. Currently, the Site consists of paved roadway and parking areas, concrete sidewalks, and landscaped areas. Runoff from the existing Site is collected in catch basins and directed to one of three locations: a large, constructed stormwater wetland in the west corner of the parcel, an outlet near the northwest edge of the parcel, or the existing closed drainage system in King Street. The project will provide a stormwater management system incorporating traditional and Low Impact Design (LID) Best Management Practices (BMPs). This analysis has been prepared to verify that the project will not have an adverse effect on the stormwater conditions both on-site and off-site.

The Stormwater Management Plan has been designed to comply with all pertinent state and local standards including the Massachusetts Stormwater Handbook. The proposed project improves upon existing conditions by reducing peak runoff rates, decreasing the risk of erosion and sedimentation, and improving stormwater runoff quality by removing total suspended solids (TSS).

Existing Conditions

The existing Site is approximately 6.2 acres consisting of 52.7% impervious paved site driveways, parking areas, sidewalks, and 47.3% pervious landscaped islands and vegetated areas. Site topography generally grades away from the middle of the site, where runoff is conveyed via catch basins and drainage pipe networks to a constructed stormwater wetland at the west corner of the parcel or to the outfall near the northwest edge of the parcel. The elevation on Site ranges from approximately 301 feet in the center of the Site, to 257 feet at the west corner of the site and 281 feet at the east corner. The Site has two major 2:1 sloping hills, one in the center of the Site and one at the northwest corner of the Site. Another gently sloping hill exists at the west corner of the Site. The remainder of the Site is gently sloping.

The Site is comprised of a variety of soil groups according to the Natural Resources Conservation Service Web Soil Survey (NRCS), which includes Paxton-Urban land complex, Udhorthents-urban land complex, Woodbridge fine sandy loam, Merrimac-Urban land complex, Scarboro mucky fine sandy loam, and Canton fine sandy loam, which span from hydrologic soil groups A to D. Please refer to Figure 2 to review the NRCS Soil Map which depicts the various soils present at and around the Site. Test pits were performed on December 21, 2023 and January 3, 2024. The test pits revealed that the Site is primarily composed of fill and sandy soils with locations of hydrologic soil groups A and C. Please see the attached Test Pit Logs in Appendix G.

According to the FEMA Flood Insurance Rate Maps (FIRM), map number 25017C0236F, dated July 7, 2014, the project is located within an area of minimal flood hazard, denoted Zone X. Please see attached FEMA National Flood Hazard Layer FIRMette.

Proposed Conditions

The proposed Site will consist of boulevard-style two lane road with 158 on-street parking spaces, utilities which will service the subdivided parcels, stormwater management infrastructure, and landscaped areas. The proposed conditions will have 69.2% impervious area consisting of paved roadway and parking areas, curbing, and cement concrete sidewalks, and 30.8% pervious landscaped areas. The proposed stormwater management system has been

designed in accordance with the Massachusetts Stormwater Handbook and includes traditional and LID BMPs. The proposed stormwater treatment system includes traditional deep sump and hooded catch basins, a subsurface CMP detention structure, a rain garden, and two water quality units for the reduction of the peak runoff and removal of TSS in post-construction conditions.

Methodology

The Stormwater Management Plan, which will be implemented as part of this project, will provide adequate collection, management, and treatment of the stormwater runoff. The proposed stormwater management system will comply with the standards set forth in the Massachusetts Stormwater Handbook.

Existing and proposed hydrologic conditions were analyzed using HydroCAD, an SCS TR-20 based program, to calculate existing and proposed peak discharge rates. This method takes into account existing and proposed pervious and impervious areas including soil types and hydrologic classifications. Peak rainfall data was collected for the Site from the NRCS rainfall data. The 2-, 10-, 25-, 50- and 100-year, 24-hour storm frequencies were used in the analysis in accordance with the Massachusetts Department of Environmental Protection (MassDEP) and Town of Littleton requirements. The "Regulatory Compliance" portion of this report addresses the ten MassDEP Stormwater Standards listed in the Massachusetts Stormwater Handbook.

Pre-Development Runoff

In the Site's current condition, there are six existing subcatchment areas. The *Pre-Development Drainage Areas* are depicted in Figure D-1 of this report. This figure presents the delineation of the existing catchment areas and design points DP-1, DP-2, and DP-3.

Existing Subcatchment Area 1 (EX-1) consists of 15,204 SF of pervious area consisting of landscaped and vegetated areas. Stormwater runoff from EX-1 either infiltrates into the ground or sheet flows into the constructed stormwater wetland, Design Point #1 (DP-1).

Existing Subcatchment Area 2 (EX-2) consists of 44,128 SF of impervious paved roadway, and 29,087 SF of pervious landscaped areas. Stormwater runoff from EX-2 either infiltrates into the ground or is captured in catch basins and routed to DP-1.

Existing Subcatchment Area 3 (EX-3) consists of 50,042 SF of impervious area consisting of paved roadway and parking areas, and 20,116 SF of pervious landscaped areas. Stormwater runoff from EX-3 either infiltrates into the ground or is captured in catch basins and routed to DP-1.

Existing Subcatchment Area 4 (EX-4) consists of 113,505 SF of impervious area consisting of paved roadway and parking areas, and cement concrete sidewalks, and 50,465 SF of pervious landscaped areas. Stormwater runoff from EX-4 is captured in catch basins and routed to the northwest edge of the Site, Design Point #3 (DP-3).

Existing Subcatchment Area 5 (EX-5) consists of 79,893 SF of impervious area consisting of paved roadway, paved parking areas, and cement concrete sidewalks, and 61,680 SF of pervious landscaped areas. Stormwater runoff from EX-5 either infiltrates into the ground or is captured in catch basins and routed to DP-3.

Existing Subcatchment Area 6 (EX-6) consists of 7,984 SF of impervious area consisting of paved roadway and cement concrete sidewalks, and 15,102 SF of pervious area consisting of landscaped and vegetated areas. Stormwater runoff from EX-6 either infiltrates into the ground or is captured in catch basins and routed to the closed drainage system which runs along King Street, Design Point #2 (DP-2).

Post-Development Runoff

The proposed stormwater management system is designed to mitigate the effects of the proposed development by reducing the peak runoff rates compared to the existing conditions. In the Site's proposed conditions, there are 37 subcatchment areas. The majority of the Site's runoff, including all runoff from impervious surfaces, is directed to the proposed CMP infiltration basin which is then routed to a water quality unit and then to the proposed rain garden that is equipped with an overflow directed towards the existing constructed stormwater wetland (DP-1). One fully pervious catchment area is directed to the northwest edge of the parcel (DP-3) via sheet flow. No proposed runoff is directed to the closed drainage system within King Street (DP-2). The post-development subcatchment areas are identified in Figure D-2, *Post-Development Drainage Areas*.

Proposed Subcatchment Area 1 (PR-1) is comprised of 16,828 SF of impervious area consisting of paved roadway and cement concrete sidewalks, and 22,228 SF of pervious landscaped area. Stormwater runoff from PR-1 either infiltrates into the ground or is captured in deep-sump and hooded catch basins and routed to a water quality unit prior to discharge to DP-1.

Proposed Subcatchment Area 2 (PR-2) is comprised of 4,877 SF of impervious area consisting of paved roadway, parking areas, and cement

concrete sidewalks, and 1,112 SF of pervious landscaped area. Stormwater runoff from PR-2 is captured in deep-sump and hooded catch basins, then routed through the proposed CMP infiltration basin, a water quality unit, and the proposed rain garden where water either infiltrates into the ground or overflows to the existing constructed stormwater wetland, DP-1.

Proposed Subcatchment Area 3 (PR-3) is comprised of 4,253 SF of impervious area consisting of paved roadway, parking areas, and cement concrete sidewalks, and 1,505 SF of pervious area consisting of landscaped islands and areas. Stormwater runoff from PR-3 either infiltrates into the ground or is captured in deep-sump and hooded catch basins, then routed through the proposed CMP infiltration basin, a water quality unit, and the proposed rain garden where water either infiltrates into the ground or overflows to the existing constructed stormwater wetland, DP-1.

Proposed Subcatchment Area 4 (PR-4) is comprised of 5,665 SF of impervious area consisting of paved roadway, parking areas, and cement concrete sidewalks, and 1,015 SF of pervious area consisting of landscaped islands and areas. Stormwater runoff from PR-4 either infiltrates into the ground or captured in deep-sump and hooded catch basins, then routed through the proposed CMP infiltration basin, a water quality unit, and the proposed rain garden where water either infiltrates into the ground or overflows to the existing constructed stormwater wetland, DP-1.

Proposed Subcatchment Area 5 (PR-5) is comprised of 5,633 SF of impervious area consisting of paved roadway, parking areas, and cement concrete sidewalks, and 1,681 SF of pervious area consisting of landscaped islands and areas. Stormwater runoff from PR-5 either infiltrates into the ground or captured in deep-sump and hooded catch basins, then routed through the proposed CMP infiltration basin, a water quality unit, and the proposed rain garden where water either infiltrates into the ground or overflows to the existing constructed stormwater wetland, DP-1.

Proposed Subcatchment Area 6 (PR-6) is comprised of 8,749 SF of impervious area consisting of paved roadway, parking areas, and cement concrete sidewalks, and 6,780 SF of pervious area consisting of landscaped islands and areas. Stormwater runoff from PR-6 either infiltrates into the ground or is captured in deep-sump and hooded catch basins, then routed through the proposed CMP infiltration basin, a water quality unit, and the proposed rain garden where water either infiltrates into the ground or overflows to the existing constructed stormwater wetland, DP-1.

Proposed Subcatchment Area 7 (PR-7) is comprised of 6,876 SF of impervious area consisting of paved roadway and cement concrete sidewalks, and 1,862 SF of pervious area consisting of landscaped islands and areas. Stormwater runoff from PR-7 either infiltrates into the ground or is captured in deep-sump and hooded catch basins, then routed through the proposed CMP infiltration basin, a water quality unit, and the proposed rain garden

where water either infiltrates into the ground or overflows to the existing constructed stormwater wetland, DP-1.

Proposed Subcatchment Area 8 (PR-8) is comprised of 8,502 SF of impervious area consisting of paved roadway and cement concrete sidewalks, and 7,721 SF of pervious area consisting of landscaped islands and areas. Stormwater runoff from PR-8 either infiltrates into the ground or is captured in deep-sump and hooded catch basins, then routed through the proposed CMP infiltration basin, a water quality unit, and the proposed rain garden where water either infiltrates into the ground or overflows to the existing constructed stormwater wetland, DP-1.

Proposed Subcatchment Area 9 (PR-9) is comprised of 5,354 SF of impervious area consisting of paved roadway, parking areas, and cement concrete sidewalks, and 1,826 SF of pervious area consisting of landscaped islands and areas. Stormwater runoff from PR-9 either infiltrates into the ground or is captured in deep-sump and hooded catch basins, then routed through the proposed CMP infiltration basin, a water quality unit, and the proposed rain garden where water either infiltrates into the ground or overflows to the existing constructed stormwater wetland, DP-1.

Proposed Subcatchment Area 10 (PR-10) is comprised of 4,103 SF of pervious landscaped area. Stormwater runoff from PR-10 either infiltrates into the ground or sheet flows to the northwest edge of the parcel, DP-3.

Proposed Subcatchment Area 11 (PR-11) is comprised of 9,523 SF of impervious area consisting of paved roadway, parking areas, and cement concrete sidewalks, and 2,826 SF of pervious area consisting of landscaped islands and areas. Stormwater runoff from PR-11 either infiltrates into the ground or is captured in deep-sump and hooded catch basins, then routed through the proposed CMP infiltration basin, a water quality unit, and the proposed rain garden where water either infiltrates into the ground or overflows to the existing constructed stormwater wetland, DP-1.

Proposed Subcatchment Area 12 (PR-12) is comprised of 9,087 SF of impervious area consisting of paved roadway, parking areas, and cement concrete sidewalks, and 3,677 SF of pervious area consisting of landscaped islands and areas. Stormwater runoff from PR-12 either infiltrates into the ground or is captured in deep-sump and hooded catch basins, then routed through the proposed CMP infiltration basin, a water quality unit, and the proposed rain garden where water either infiltrates into the ground or overflows to the existing constructed stormwater wetland, DP-1.

Proposed Subcatchment Area 13 (PR-13) is comprised of 3,019 SF of impervious area consisting of paved roadway, parking areas, and cement concrete sidewalks, and 4,574 SF of pervious area consisting of landscaped islands and areas. Stormwater runoff from PR-13 either infiltrates into the ground or is captured in deep-sump and hooded catch basins, then routed

through the proposed CMP infiltration basin, a water quality unit, and the proposed rain garden where water either infiltrates into the ground or overflows to the existing constructed stormwater wetland, DP-1.

Proposed Subcatchment Area 14 (PR-14) is comprised of 2,653 SF of impervious area consisting of paved roadway, parking areas, and cement concrete sidewalks, and 572 SF of pervious area consisting of landscaped islands and areas. Stormwater runoff from PR-14 either infiltrates into the ground or is captured in deep-sump and hooded catch basins, then routed through the proposed CMP infiltration basin, a water quality unit, and the proposed rain garden where water either infiltrates into the ground or overflows to the existing constructed stormwater wetland, DP-1.

Proposed Subcatchment Area 15 (PR-15) is comprised of 2,331 SF of impervious area consisting of paved roadway, and parking areas, and 386 SF of pervious area consisting of landscaped islands and areas. Stormwater runoff from PR-15 either infiltrates into the ground or is captured in deep-sump and hooded catch basins, then routed through the proposed CMP infiltration basin, a water quality unit, and the proposed rain garden where water either infiltrates into the ground or overflows to the existing constructed stormwater wetland, DP-1.

Proposed Subcatchment Area 16 (PR-16) is comprised of 1,349 SF of impervious area consisting of paved roadway, and parking areas. Stormwater runoff from PR-16 either infiltrates into the ground or is captured in deep-sump and hooded catch basins, then routed through the proposed CMP infiltration basin, a water quality unit, and the proposed rain garden where water either infiltrates into the ground or overflows to the existing constructed stormwater wetland, DP-1.

Proposed Subcatchment Area 17 (PR-17) is comprised of 10,249 SF of impervious area consisting of paved roadway, parking areas, and cement concrete sidewalks, and 4,046 SF of pervious area consisting of landscaped islands and areas. Stormwater runoff from PR-17 either infiltrates into the ground or is captured in deep-sump and hooded catch basins, then routed through the proposed CMP infiltration basin, a water quality unit, and the proposed rain garden where water either infiltrates into the ground or overflows to the existing constructed stormwater wetland, DP-1.

Proposed Subcatchment Area 18 (PR-18) is comprised of 9,108 SF of impervious area consisting of paved roadway, parking areas, and cement concrete sidewalks, and 308 SF of pervious area consisting of landscaped islands and areas. Stormwater runoff from PR-18 either infiltrates into the ground or is captured in deep-sump and hooded catch basins, then routed through the proposed CMP infiltration basin, a water quality unit, and the proposed rain garden where water either infiltrates into the ground or overflows to the existing constructed stormwater wetland, DP-1.

Proposed Subcatchment Area 19 (PR-19) is comprised of 1,343 SF of impervious area consisting of paved roadway, parking areas, and cement concrete sidewalks, and 444 SF of pervious area consisting of landscaped islands and areas. Stormwater runoff from PR-19 either infiltrates into the ground or is captured in deep-sump and hooded catch basins, then routed through the proposed CMP infiltration basin, a water quality unit, and the proposed rain garden where water either infiltrates into the ground or overflows to the existing constructed stormwater wetland, DP-1.

Proposed Subcatchment Area 20 (PR-20) is comprised of 5,999 SF of impervious area consisting of paved roadway, parking areas, and cement concrete sidewalks, and 771 SF of pervious area consisting of landscaped islands and areas. Stormwater runoff from PR-20 either infiltrates into the ground or is captured in deep-sump and hooded catch basins, then routed through the proposed CMP infiltration basin, a water quality unit, and the proposed rain garden where water either infiltrates into the ground or overflows to the existing constructed stormwater wetland, DP-1.

Proposed Subcatchment Area 21 (PR-21) is comprised of 6,019 SF of impervious area consisting of paved roadway, parking areas, and cement concrete sidewalks, and 736 SF of pervious area consisting of landscaped islands and areas. Stormwater runoff from PR-21 either infiltrates into the ground or is captured in deep-sump and hooded catch basins, then routed through the proposed CMP infiltration basin, a water quality unit, and the proposed rain garden where water either infiltrates into the ground or overflows to the existing constructed stormwater wetland, DP-1.

Proposed Subcatchment Area 22 (PR-22) is comprised of 3,757 SF of impervious area consisting of paved roadway, parking areas, and cement concrete sidewalks, and 1,367 SF of pervious area consisting of landscaped islands and areas. Stormwater runoff from PR-22 either infiltrates into the ground or is captured in deep-sump and hooded catch basins, then routed through the proposed CMP infiltration basin, a water quality unit, and the proposed rain garden where water either infiltrates into the ground or overflows to the existing constructed stormwater wetland, DP-1.

Proposed Subcatchment Area 23 (PR-23) is comprised of 5,228 SF of impervious area consisting of paved roadway, parking areas, and cement concrete sidewalks, and 1,383 SF of pervious area consisting of landscaped islands and areas. Stormwater runoff from PR-23 either infiltrates into the ground or is captured in deep-sump and hooded catch basins, then routed through the proposed CMP infiltration basin, a water quality unit, and the proposed rain garden where water either infiltrates into the ground or overflows to the existing constructed stormwater wetland, DP-1.

Proposed Subcatchment Area 24 (PR-24) is comprised of 4,259 SF of impervious area consisting of paved roadway, parking areas, and cement concrete sidewalks, and 1,054 SF of pervious area consisting of landscaped

islands and areas. Stormwater runoff from PR-24 either infiltrates into the ground or is captured in deep-sump and hooded catch basins, then routed through the proposed CMP infiltration basin, a water quality unit, and the proposed rain garden where water either infiltrates into the ground or overflows to the existing constructed stormwater wetland, DP-1.

Proposed Subcatchment Area 25 (PR-25) is comprised of 4,904 SF of impervious area consisting of paved roadway, parking areas, and cement concrete sidewalks, and 3,308 SF of pervious area consisting of landscaped area. Stormwater runoff from PR-25 either infiltrates into the ground or is captured in deep-sump and hooded catch basins, then routed through the proposed CMP infiltration basin, a water quality unit, and the proposed rain garden where water either infiltrates into the ground or overflows to the existing constructed stormwater wetland, DP-1.

Proposed Subcatchment Area 26 (PR-26) is comprised of 5,339 SF of impervious area consisting of paved roadway, parking areas, and cement concrete sidewalks, and 431 SF of pervious area consisting of landscaped islands and areas. Stormwater runoff from PR-26 either infiltrates into the ground or is captured in deep-sump and hooded catch basins, then routed through the proposed CMP infiltration basin, a water quality unit, and the proposed rain garden where water either infiltrates into the ground or overflows to the existing constructed stormwater wetland, DP-1.

Proposed Subcatchment Area 27 (PR-27) is comprised of 5,220 SF of impervious area consisting of paved roadway, parking areas, and cement concrete sidewalks, and 510 SF of pervious area consisting of landscaped islands and areas. Stormwater runoff from PR-27 either infiltrates into the ground or is captured in deep-sump and hooded catch basins, then routed through the proposed CMP infiltration basin, a water quality unit, and the proposed rain garden where water either infiltrates into the ground or overflows to the existing constructed stormwater wetland, DP-1.

Proposed Subcatchment Area 28 (PR-28) is comprised of 2,044 SF of impervious area consisting of paved roadway, parking areas, and cement concrete sidewalks, and 2,447 SF of pervious area consisting of landscaped islands and areas. Stormwater runoff from PR-28 either infiltrates into the ground or is captured in deep-sump and hooded catch basins, then routed through the proposed CMP infiltration basin, a water quality unit, and the proposed rain garden where water either infiltrates into the ground or overflows to the existing constructed stormwater wetland, DP-1.

Proposed Subcatchment Area 29 (PR-29) is comprised of 1,153 SF of impervious area consisting of paved roadway, parking areas, and cement concrete sidewalks, and 264 SF of pervious area consisting of landscaped islands and areas. Stormwater runoff from PR-29 either infiltrates into the ground or is captured in deep-sump and hooded catch basins, then routed through the proposed CMP infiltration basin, a water quality unit, and the

proposed rain garden where water either infiltrates into the ground or overflows to the existing constructed stormwater wetland, DP-1.

Proposed Subcatchment Area 30 (PR-30) is comprised of 6,517 SF of impervious area consisting of paved roadway, parking areas, and cement concrete sidewalks, and 2,336 SF of pervious area consisting of landscaped islands and areas. Stormwater runoff from PR-30 either infiltrates into the ground or is captured in deep-sump and hooded catch basins, then routed through the proposed CMP infiltration basin, a water quality unit, and the proposed rain garden where water either infiltrates into the ground or overflows to the existing constructed stormwater wetland, DP-1.

Proposed Subcatchment Area 31 (PR-31) is comprised of 7,587 SF of impervious area consisting of paved roadway, parking areas, and cement concrete sidewalks, and 2,397 SF of pervious area consisting of landscaped islands and areas. Stormwater runoff from PR-31 either infiltrates into the ground or is captured in deep-sump and hooded catch basins, then routed through the proposed CMP infiltration basin, a water quality unit, and the proposed rain garden where water either infiltrates into the ground or overflows to the existing constructed stormwater wetland, DP-1.

Proposed Subcatchment Area 32 (PR-32) is comprised of 8,524 SF of impervious area consisting of paved roadway, parking areas, and cement concrete sidewalks, and 7,480 SF of pervious area consisting of landscaped islands and areas. Stormwater runoff from PR-32 either infiltrates into the ground or is captured in deep-sump and hooded catch basins, then routed through the proposed CMP infiltration basin, a water quality unit, and the proposed rain garden where water either infiltrates into the ground or overflows to the existing constructed stormwater wetland, DP-1.

Proposed Subcatchment Area 33 (PR-33) is comprised of 6,026 SF of impervious area consisting of paved roadway, parking areas, and cement concrete sidewalks, and 1,600 SF of pervious area consisting of landscaped islands and areas. Stormwater runoff from PR-33 either infiltrates into the ground or is captured in deep-sump and hooded catch basins, then routed through the proposed CMP infiltration basin, a water quality unit, and the proposed rain garden where water either infiltrates into the ground or overflows to the existing constructed stormwater wetland, DP-1.

Proposed Subcatchment Area 34 (PR-34) is comprised of 2,623 SF of impervious area consisting of paved roadway, parking areas, and cement concrete sidewalks, and 512 SF of pervious area consisting of landscaped islands and areas. Stormwater runoff from PR-34 either infiltrates into the ground or is captured in deep-sump and hooded catch basins, then routed through the proposed CMP infiltration basin, a water quality unit, and the proposed rain garden where water either infiltrates into the ground or overflows to the existing constructed stormwater wetland, DP-1.

Proposed Subcatchment Area 35 (PR-35) is comprised of 452 SF of impervious area consisting of paved roadway, parking areas, and cement concrete sidewalks, and 7 SF of pervious area consisting of landscaped islands and areas. Stormwater runoff from PR-35 either infiltrates into the ground or is captured in deep-sump and hooded catch basins, then routed through the proposed CMP infiltration basin, a water quality unit, and the proposed rain garden where water either infiltrates into the ground or overflows to the existing constructed stormwater wetland, DP-1.

Proposed Subcatchment Area 36 (PR-36) is comprised of 5,655 SF of impervious area consisting of paved roadway, parking areas, and cement concrete sidewalks, and 810 SF of pervious area consisting of landscaped islands and areas. Stormwater runoff from PR-36 either infiltrates into the ground or is captured in deep-sump and hooded catch basins, then routed through the proposed CMP infiltration basin, a water quality unit, and the proposed rain garden where water either infiltrates into the ground or overflows to the existing constructed stormwater wetland, DP-1.

Proposed Subcatchment Area 37 (PR-37) is comprised of 6,354 SF of impervious area consisting of paved roadway, parking areas, and cement concrete sidewalks, and 693 SF of pervious area consisting of landscaped islands and areas. Stormwater runoff from PR-37 either infiltrates into the ground or is captured in deep-sump and hooded catch basins, then routed through the proposed CMP infiltration basin, a water quality unit, and the proposed rain garden where water either infiltrates into the ground or overflows to the existing constructed stormwater wetland, DP-1.

Regulatory Compliance

The project is a combination of redevelopment and new development, with 142,149 SF of redevelopment, and 44,697 SF of new development. The Site's stormwater management design will improve upon existing conditions, and fully meets all Massachusetts Stormwater Management Standards for both the redevelopment and new development.

Standard 1: No New Untreated Discharges

No new untreated discharges are proposed or will be permitted as part of this development. The proposed point source discharge at DP-1 will receive treatment via deep-sump and hooded catch basins and water quality units. The minimal discharge to DP-3 solely consists of sheet flow over landscaped area and is anticipated to primarily infiltrate in the hydrologic soil group A soils prior to reaching DP-3.

Erosion will be prevented by the construction of rip-rap aprons in accordance with the Federal Highway Administration (FHWA) and the Natural Resource Conservation Service (NRCS) design methods at all point source discharge locations, including inlets and outlets to the proposed rain garden. See

Appendix B for apron sizing calculations. The proposed conditions will greatly improve upon the erosion control at the outfall location.

Standard 2: Peak Rate Attenuation

The proposed project meets Standard 2. The post-development peak flow is mitigated by the proposed subsurface CMP infiltration basin and rain garden. Peak discharges were calculated using HydroCAD, a TR-20 program, and include all land area within the Site and draining onto the Site. The post-development peak discharge rates do not exceed pre-development peak discharge rates for all storm events, as seen in Table 1. Please see Appendix A for the full hydrologic calculations.

Table 1 (Peak Flow Summary)

Design Point	2-Year Storm		10-Year Storm		25-Year Storm		50-Year Storm		100-Year Storm	
	Exist (cfs)	Prop (cfs)	Exist (cfs)	Prop (cfs)	Exist (cfs)	Prop (cfs)	Exist (cfs)	Prop (cfs)	Exist (cfs)	Prop (cfs)
DP-1 (Existing Constructed Stormwater Wetland)	6.76	0.41	11.94	6.62	16.06	13.56	19.89	17.62	24.50	20.46
DP-2 (King Street Closed Drainage System)	0.72	0.00	1.47	0.00	2.09	0.00	2.68	0.00	3.39	0.00
DP-3 (Northwest Edge of Parcel)	10.44	0.13	17.95	0.26	23.83	0.37	29.25	0.48	35.74	0.60

Standard 3: Recharge

Soil types were determined from the NRCS Soil Resource Report (Appendix C) and confirmed with test pits (Appendix G). The soils onsite are primarily hydrologic soil group (HSG) A, comprised of urban fill and gravelly sand. Two isolated locations were determined to have HSG C soils.

The required recharge volume has been calculated below in accordance with the Massachusetts Stormwater Manual. The new development volume and redevelopment volume will be fully infiltrated via a rain garden on the south corner of the Site. The rain garden receives pre-treatment from Contech Cascade® water quality units, receiving a minimum of 87% TSS removal.

Required Recharge Volume:

$R_v = F \times \text{impervious area}$

R_v = Required Recharge Volume, expressed in Ft³, cubic yards, or acre-feet

F = Target Depth Factor associated with each Hydrologic Soil Group

Impervious Area = pavement, cement concrete sidewalk

Table 2 (Required Recharge Volume)

Hydrologic Soil Group	New Development		Rv (CF)
	F	Impervious Area (SF)	
A	0.60 inch	48,626	2,431
C	0.25 inch	0	0
Total			2,431

Hydrologic Soil Group	Redevelopment		Rv (CF)
	F	Impervious Area (SF)	
A	0.60 inch	109,828	5,491
C	0.25 inch	28,500	594
Total			6,085

Because not all of the impervious area is directed to the infiltration BMP, the required recharge volume must be adjusted as seen below.

Adjusted Required Recharge Volume:

$$ARv = Rv \times (\text{Total Impervious Area} / \text{Impervious Area Directed to BMP})$$

$$ARv = (2,431 \text{ CF} + 6,085 \text{ CF}) (186,846 \text{ SF} / 167,197 \text{ SF}) = 9,517 \text{ CF}$$

The rain garden BMP has been designed to infiltrate the adjusted recharge volume for the new development and redevelopment. The BMP has a volume of 9,548 CF below the lowest outlet structure invert. The bottom of the BMP where infiltration occurs is located four feet above the estimated seasonal high groundwater table and the BMP will drain within 72 hours in accordance with the Massachusetts Stormwater Manual. The Rawls infiltration rate was determined from data from Test Pits #1 and #2 (Appendix G).

Drawdown Calculation.

$$K = \text{Saturated Hydraulic Conductivity (Rawls Rate)}$$

$$Rv = \text{Storage Volume}$$

$$\text{Time}_{\text{drawdown}} = Rv / (K)(\text{Bottom Area})$$

$$\text{Time}_{\text{drawdown}} = [9,548 \text{ CF} / (8.27 \text{ in/hr})(5,369 \text{ SF})] \times [12 \text{ in} / 1 \text{ FT}] = 2.6 \text{ hours}$$

The adjusted required recharge volume will be fully pre-treated and infiltrated by the proposed rain garden BMP. The BMP will drain within 72 hours in accordance with the Massachusetts Stormwater Standards.

Further infiltration in excess of the adjusted required recharge volume will be provided by the subsurface corrugated metal pipe infiltration basin. A Rawl's rate of 2.41 in/hr was utilized in calculations, as determined by Test Pit #6 (Appendix G). The system will fully drain by an outlet pipe located at the bottom of the system.

Standard 4: Water Quality

Currently, there are no TSS removal BMPs onsite. Runoff flows directly into catch basins before being discharged to the constructed stormwater wetland

or to the closed drainage system along King Street, or it infiltrates into the ground.

Proposed water quality treatment includes deep-sump and hooded catch basins, three Contech Cascade® water quality units, and a rain garden located in the south corner of the Site.

The required water quality volume (WQV) has been calculated below in accordance with the Massachusetts Stormwater Manual.

Site Water Quality Volume:

$$V_{WQ} = \text{Required Water Quality Volume (in cubic feet)}$$

$$D_{WQ} = \text{Water Quality Depth: 1-inch}$$

$$A_{IMP} = \text{Impervious Area (in acres)}$$

New Development:

$$V_{WQ} = D_{WQ} \times A_{IMP}$$

$$= [(1 \text{ inch})(44,697 \text{ SF})] \times [1 \text{ FT} / 12 \text{ in}]$$

$$= 3,725 \text{ CF (0.086 AF)}$$

Redevelopment:

$$V_{WQ} = D_{WQ} \times A_{IMP}$$

$$= [(1 \text{ inch})(142,149 \text{ SF})] \times [1 \text{ FT} / 12 \text{ in}]$$

$$= 11,846 \text{ CF (0.272 AF)}$$

The water quality flow (WQF) has been calculated below to properly size the water quality units and is summarized in Table 3. All runoff from impervious areas will be treated by deep-sump and hooded catch basins prior to water quality unit treatment. Water quality units have been sized to provide a minimum of 87% annual net TSS removal, exceeding the 80% net TSS removal standard. Runoff from 92% of the impervious area will also pass through the proposed rain garden with 90% TSS removal credit after water quality unit treatment.

Example Water Quality Flow Calculation for WQU-56:

$$Q = \text{Required Water Quality Flow (in cfs)}$$

$$CN = 98$$

$$T_c = 48 \text{ min}$$

$$q_u = 398 \text{ csm/in}$$

$$Q = (q_u)(A)(WQV)$$

$$Q = (398 \text{ csm/in})(4.065 \text{ AC})(1 \text{ mi}^2 / 640 \text{ AC})(1 \text{ inch}) = 2.53 \text{ cfs}$$

Table 3 (Water Quality Unit Summary)

Unit	Contributing Impervious Area (AC)	Time of Concentration (hr)	qu (Type III Storm)	Water Quality Flow (CFS)	Model to Treat WQF	Treatment Capacity (CFS)	TSS Net Annual Removal Provided (%)
WQU-56	4.065	0.80	398	2.53	CS-5	2.00	86.99
WQU-59	0.263	0.083	795	0.33	CS-4	3.50	99.83
WQU-66	0.386	0.083	795	0.48	CS-4	3.50	99.30

Treatment Train #1 treats runoff from subcatchment areas PR-2 through PR-37 with the exception of PR-10. Groundcover includes a LUHPPL parking lot, roadway, sidewalks, and landscaped area. Runoff is collected in deep-sump and hooded catch basins which is routed to water quality units (WQU-56 and WQU-59) and then to the subsurface CMP infiltration basin. Runoff is then conveyed to the rain garden. This treatment train receives 99% TSS removal credit (See Appendix B).

Treatment Train #2 treats runoff from subcatchment area PR-1, which includes a roadway, sidewalks, and landscaped area. Runoff is collected in deep-sump and hooded catch basins and routed to a water quality unit (WQU-66). This treatment train receives 99% TSS removal credit (See Appendix B).

Subcatchment area PR-10 consists solely of landscaped area and does not receive any TSS treatment.

Standard 5: Land Uses with Higher Potential Pollutant Loads

The site includes a high-intensity use parking lot with an estimated greater than 1000 trips per day. Therefore, the site is a Land Use with a Higher Potential Pollutant Load (LUHPPL). This standard has been met by using 1 inch to calculate the required recharge volume (see Standard 3). The 44% LUHPPL TSS pre-treatment requirement prior to infiltration is exceeded (see Standard 4).

Standard 6: Critical Areas

Stormwater will not discharge to any critical areas.

Standard 7: Redevelopment Projects

This project is considered a new development and redevelopment project. New development accounts for 44,697 SF of impervious area and redevelopment accounts for 142,149 SF of impervious area.

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

This project is covered by an NPDES Construction General Permit. The CPPP and Erosion Prevention & Sedimentation Control Plan can be found in Appendix E of this report.

Standard 9: Operation and Maintenance Plan

The roadway will be maintained by the owner as described in the O&M procedures. Standard O&M procedures will be used on the parking lot including catch basin cleaning, and inspection of drainage infrastructure. Please see the Operation & Maintenance Plan in Appendix D of this report for more detail.

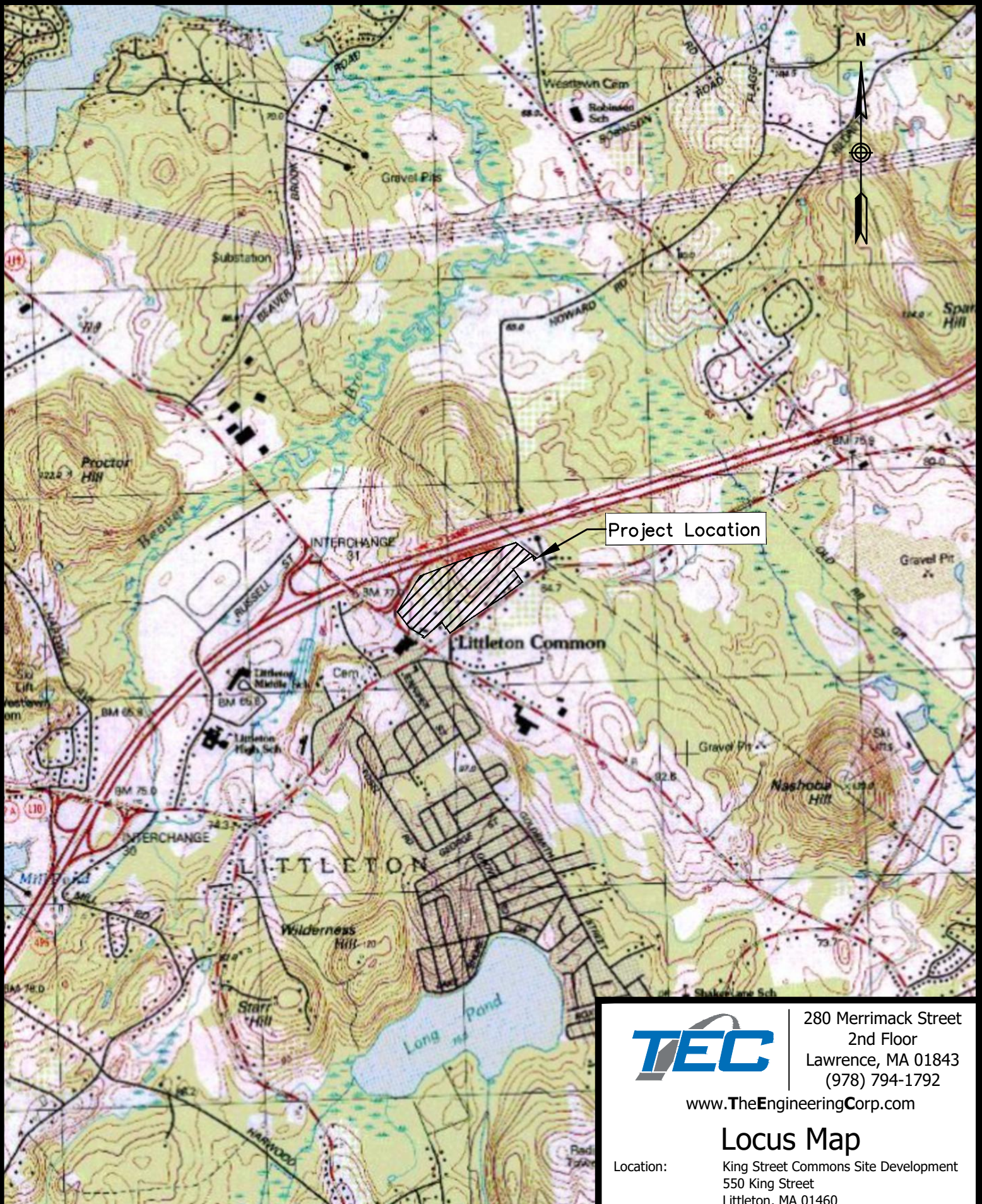
Standard 10: Illicit Discharges

No illicit discharges are expected nor will be permitted as part of the redevelopment project. An Illicit Discharge Compliance Statement can be found in Appendix F of this report.

Conclusion

The proposed site redevelopment will transform the existing site into a mixed-use development offering quality residential and commercial opportunities. The project also provides a stormwater management system to mitigate the increasing Site impervious cover associated with the project and drastically increase the quality of runoff leaving the site. The stormwater management plan controls the flow of stormwater, reduces peak runoff rates, promotes stormwater infiltration, and provides water quality treatment. The stormwater management plan provides erosion and sediment control resulting in cleaner stormwater runoff. The project has been designed in accordance with the Massachusetts Stormwater Handbook and will not adversely impact resource areas or abutting properties.

**Figure 1 – Project Location Map
(Intentionally LEFT BLANK)**



2000 0 2000 4000



SCALE IN FEET

February 21, 2024



280 Merrimack Street
2nd Floor
Lawrence, MA 01843
(978) 794-1792

www.TheEngineeringCorp.com

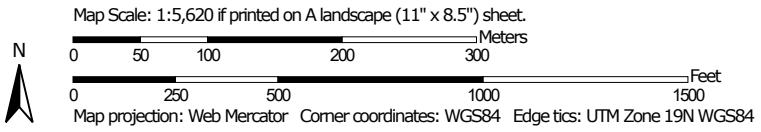
Locus Map

Location: King Street Commons Site Development
550 King Street
Littleton, MA 01460

Prepared For: 550 King Street, LLC
290 Merrimack Street
Lawrence, MA 01843

**Figure 2 – NRCS Soil Map
(Intentionally LEFT BLANK)**

Custom Soil Resource Report Soil Map



Custom Soil Resource Report

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 1:25,000.

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 22, Sep 9, 2022

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

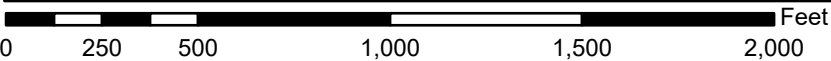
The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Figure 3 – FEMA FIRM
(Intentionally LEFT BLANK)

National Flood Hazard Layer FIRMMette



71°28'34"W 42°33'12"N



1:6,000

71°27'56"W 42°32'46"N

Basemap Imagery Source: USGS National Map 2023

Legend

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

SPECIAL FLOOD HAZARD AREAS		Without Base Flood Elevation (BFE) Zone A, V, A99
		With BFE or Depth Zone AE, AO, AH, VE, AR
		Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD		0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
		Future Conditions 1% Annual Chance Flood Hazard Zone X
		Area with Reduced Flood Risk due to Levee. See Notes. Zone X
		Area with Flood Risk due to Levee Zone D
OTHER AREAS		NO SCREEN Area of Minimal Flood Hazard Zone X
		Effective LOMRs
		Area of Undetermined Flood Hazard Zone D
GENERAL STRUCTURES		Channel, Culvert, or Storm Sewer
		Levee, Dike, or Floodwall
OTHER FEATURES		20.2 Cross Sections with 1% Annual Chance Water Surface Elevation
		17.5 Cross Sections with 1% Annual Chance Water Surface Elevation
		Coastal Transect
		Base Flood Elevation Line (BFE)
		Limit of Study
		Jurisdiction Boundary
		Coastal Transect Baseline
		Profile Baseline
MAP PANELS		Digital Data Available
		No Digital Data Available
		Unmapped



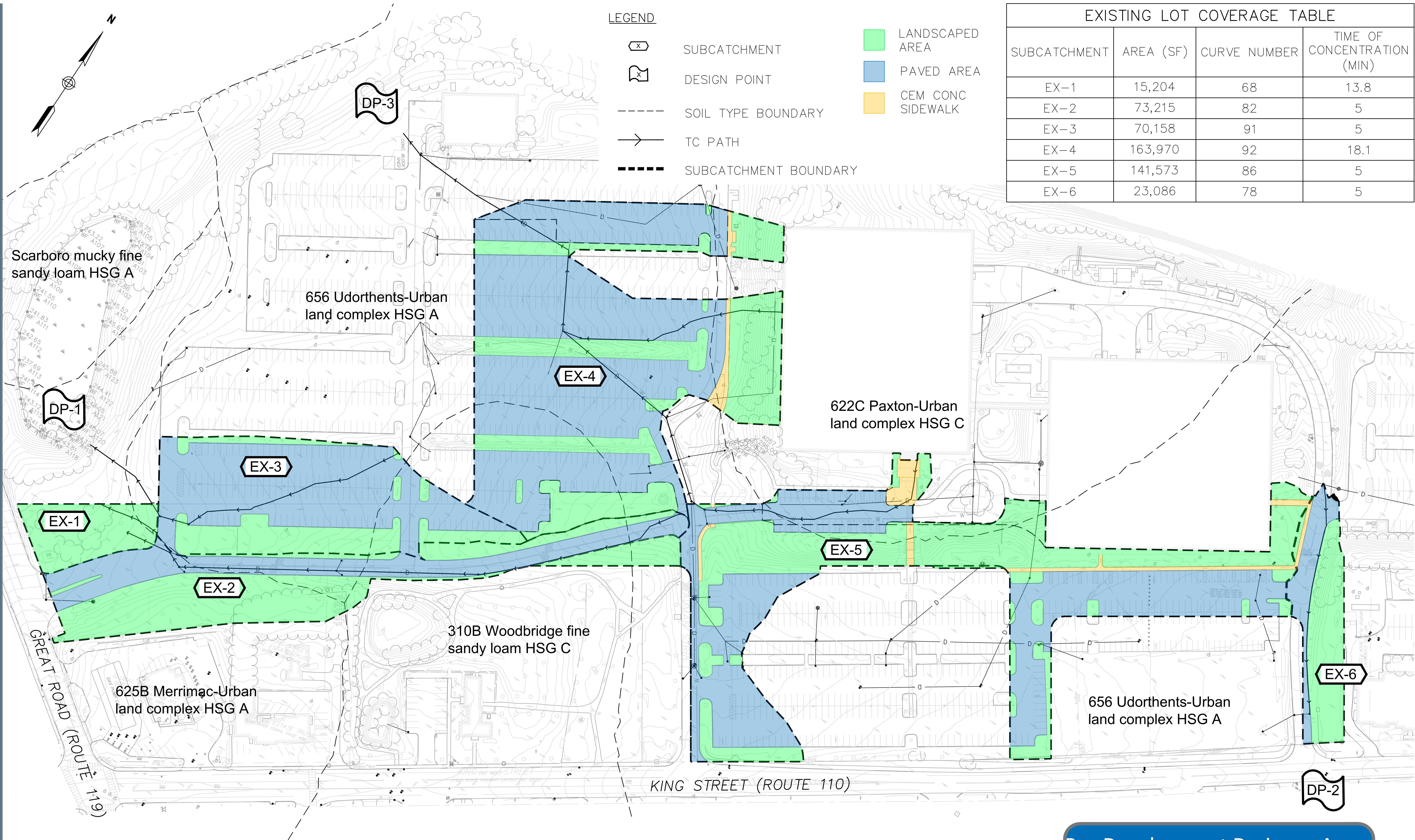
The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

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

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 8/15/2023 at 10:23 AM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

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

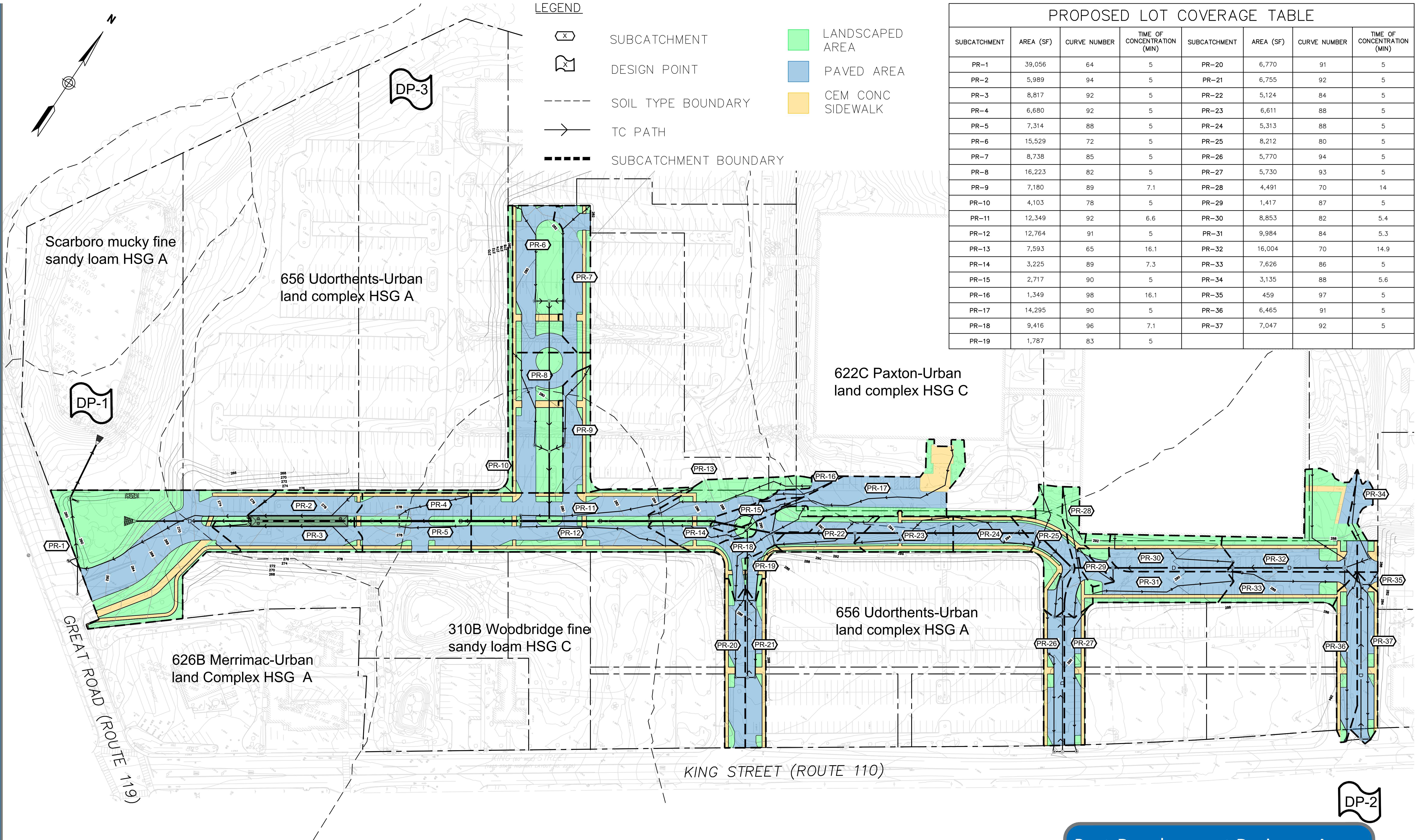
**Figure D-1 Pre-Development Drainage Areas
(Intentionally LEFT BLANK)**



Pre-Development Drainage Areas

550 King Street
Littleton, Massachusetts

**Figure D-2 – Post Development Drainage Areas
(Intentionally LEFT BLANK)**



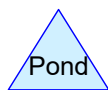
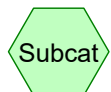
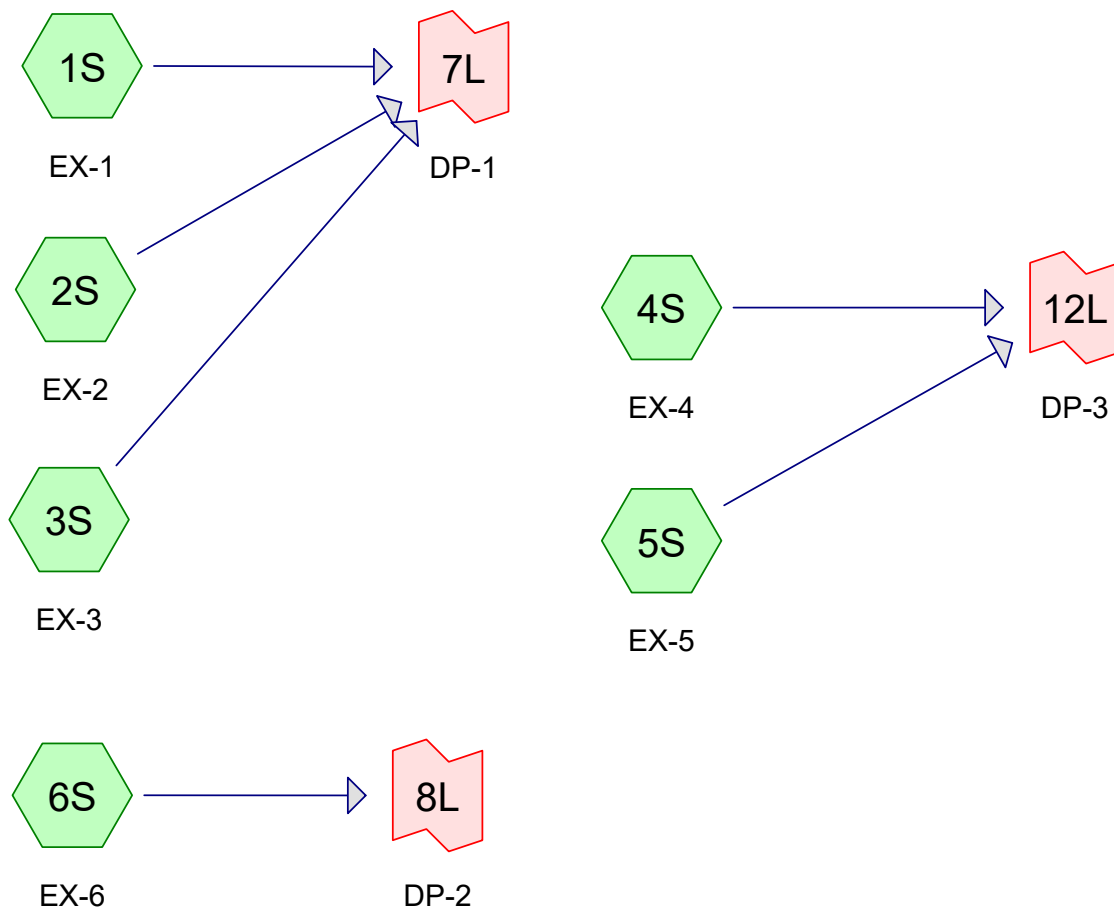
PROPOSED LOT COVERAGE TABLE							
SUBCATCHMENT	AREA (SF)	CURVE NUMBER	TIME OF CONCENTRATION (MIN)	SUBCATCHMENT	AREA (SF)	CURVE NUMBER	TIME OF CONCENTRATION (MIN)
PR-1	39,056	64	5	PR-20	6,770	91	5
PR-2	5,989	94	5	PR-21	6,755	92	5
PR-3	8,817	92	5	PR-22	5,124	84	5
PR-4	6,680	92	5	PR-23	6,611	88	5
PR-5	7,314	88	5	PR-24	5,313	88	5
PR-6	15,529	72	5	PR-25	8,212	80	5
PR-7	8,738	85	5	PR-26	5,770	94	5
PR-8	16,223	82	5	PR-27	5,730	93	5
PR-9	7,180	89	7.1	PR-28	4,491	70	14
PR-10	4,103	78	5	PR-29	1,417	87	5
PR-11	12,349	92	6.6	PR-30	8,853	82	5.4
PR-12	12,764	91	5	PR-31	9,984	84	5.3
PR-13	7,593	65	16.1	PR-32	16,004	70	14.9
PR-14	3,225	89	7.3	PR-33	7,626	86	5
PR-15	2,717	90	5	PR-34	3,135	88	5.6
PR-16	1,349	98	16.1	PR-35	459	97	5
PR-17	14,295	90	5	PR-36	6,465	91	5
PR-18	9,416	96	7.1	PR-37	7,047	92	5
PR-19	1,787	83	5				

2

Appendix

A

Hydrologic Calculations



Routing Diagram for T1180_PRE

Prepared by TEC, Inc, Printed 1/12/2024

HydroCAD® 10.20-4a s/n 02793 © 2023 HydroCAD Software Solutions LLC

T1180_PRE

Prepared by TEC, Inc

Printed 1/12/2024

HydroCAD® 10.20-4a s/n 02793 © 2023 HydroCAD Software Solutions LLC

Page 2

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-Year	NRCC 24-hr	D	Default	24.00	1	3.09	2
2	10-Year	NRCC 24-hr	D	Default	24.00	1	4.65	2
3	25-Year	NRCC 24-hr	D	Default	24.00	1	5.87	2
4	50-Year	NRCC 24-hr	D	Default	24.00	1	7.00	2
5	100-Year	NRCC 24-hr	D	Default	24.00	1	8.36	2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
3.551	68	<50% Grass cover, Poor, HSG A (1S, 2S, 3S, 4S, 5S, 6S)
1.194	86	<50% Grass cover, Poor, HSG C (2S, 3S, 4S, 5S)
0.206	98	Cement Concrete Sidewalk (4S, 5S, 6S)
0.172	98	Paved parking (6S)
4.913	98	Paved parking, HSG A (2S, 4S, 5S)
1.149	98	Paved parking, HSG C (3S)
11.185	87	TOTAL AREA

T1180_PRE

Prepared by TEC, Inc

HydroCAD® 10.20-4a s/n 02793 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr D 2-Year Rainfall=3.09"

Printed 1/12/2024

Page 4

Time span=0.00-36.00 hrs, dt=0.04 hrs, 901 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: EX-1	Runoff Area=15,204 sf 0.00% Impervious Runoff Depth=0.67" Flow Length=92' Slope=0.0540 '/' Tc=13.8 min CN=68 Runoff=0.17 cfs 0.020 af
Subcatchment2S: EX-2	Runoff Area=73,215 sf 39.73% Impervious Runoff Depth=1.45" Tc=5.0 min CN=82 Runoff=2.80 cfs 0.203 af
Subcatchment3S: EX-3	Runoff Area=70,158 sf 71.33% Impervious Runoff Depth=2.16" Tc=5.0 min CN=91 Runoff=3.87 cfs 0.289 af
Subcatchment4S: EX-4	Runoff Area=163,970 sf 69.22% Impervious Runoff Depth=2.25" Flow Length=302' Tc=18.1 min CN=92 Runoff=6.10 cfs 0.705 af
Subcatchment5S: EX-5	Runoff Area=141,573 sf 56.43% Impervious Runoff Depth=1.74" Tc=5.0 min CN=86 Runoff=6.46 cfs 0.471 af
Subcatchment6S: EX-6	Runoff Area=23,086 sf 34.58% Impervious Runoff Depth=1.19" Tc=5.0 min CN=78 Runoff=0.72 cfs 0.053 af
Link 7L: DP-1	Inflow=6.76 cfs 0.512 af Primary=6.76 cfs 0.512 af
Link 8L: DP-2	Inflow=0.72 cfs 0.053 af Primary=0.72 cfs 0.053 af
Link 12L: DP-3	Inflow=10.44 cfs 1.176 af Primary=10.44 cfs 1.176 af

Total Runoff Area = 11.185 ac Runoff Volume = 1.741 af Average Runoff Depth = 1.87"
42.42% Pervious = 4.745 ac 57.58% Impervious = 6.440 ac

Summary for Subcatchment 1S: EX-1

Runoff = 0.17 cfs @ 12.24 hrs, Volume= 0.020 af, Depth= 0.67"
 Routed to Link 7L : DP-1

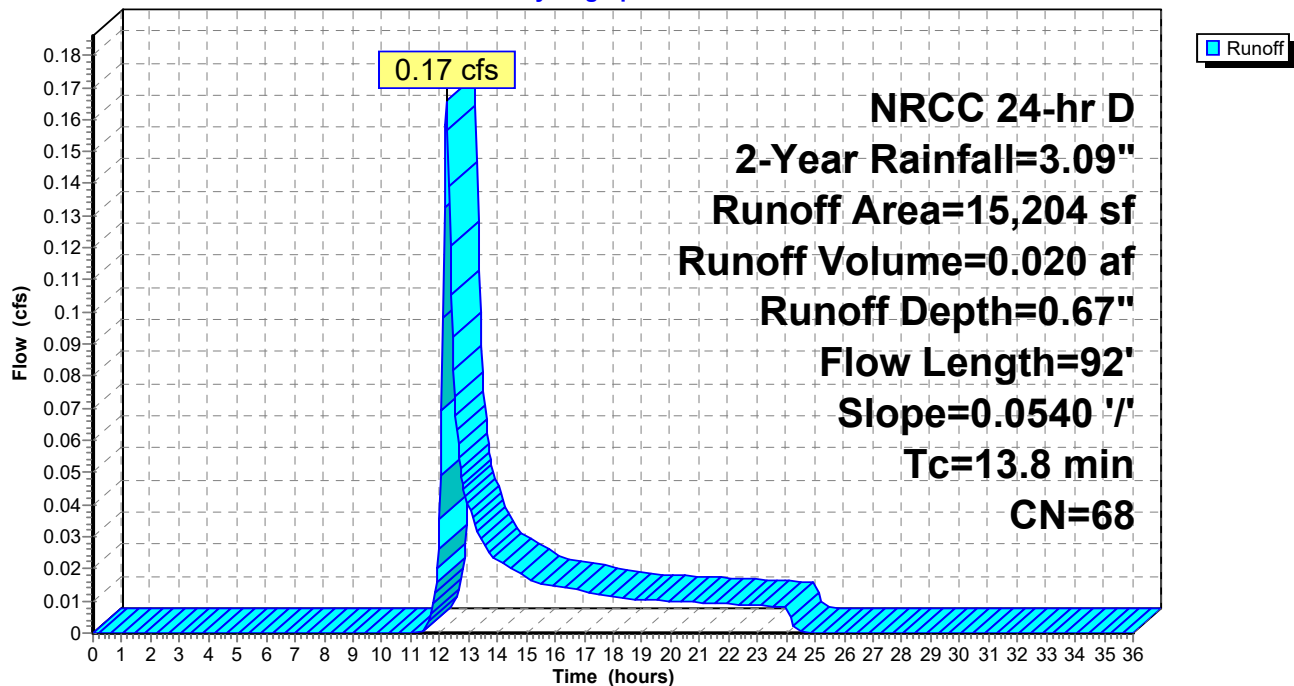
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 2-Year Rainfall=3.09"

Area (sf)	CN	Description
14,044	68	<50% Grass cover, Poor, HSG A
1,160	68	<50% Grass cover, Poor, HSG A
15,204	68	Weighted Average
15,204		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.8	92	0.0540	0.11		Sheet Flow, GRASS
Grass: Bermuda n= 0.410 P2= 3.17"					

Subcatchment 1S: EX-1

Hydrograph



Summary for Subcatchment 2S: EX-2

Runoff = 2.80 cfs @ 12.12 hrs, Volume= 0.203 af, Depth= 1.45"
 Routed to Link 7L : DP-1

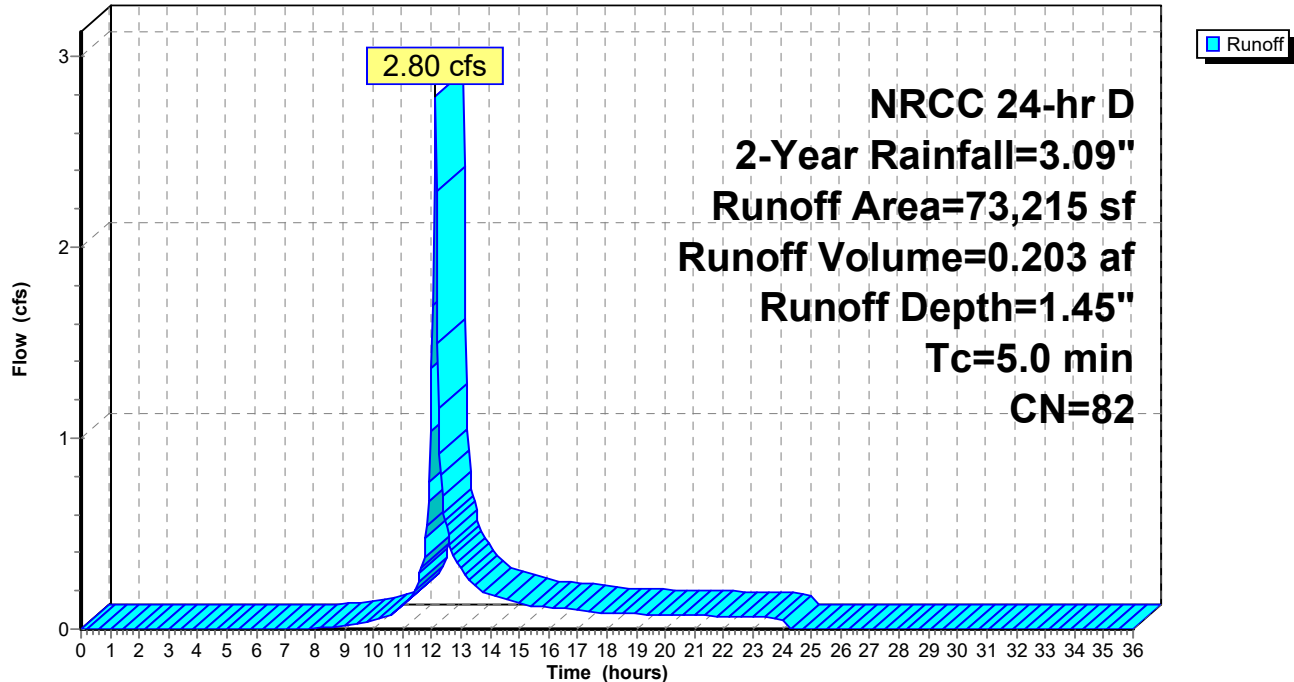
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 2-Year Rainfall=3.09"

Area (sf)	CN	Description
26,739	68	<50% Grass cover, Poor, HSG A
9,853	86	<50% Grass cover, Poor, HSG C
7,536	68	<50% Grass cover, Poor, HSG A
* 29,087	98	Paved parking, HSG A
73,215	82	Weighted Average
44,128		60.27% Pervious Area
29,087		39.73% Impervious Area

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

Subcatchment 2S: EX-2

Hydrograph



Summary for Subcatchment 3S: EX-3

Runoff = 3.87 cfs @ 12.12 hrs, Volume= 0.289 af, Depth= 2.16"
 Routed to Link 7L : DP-1

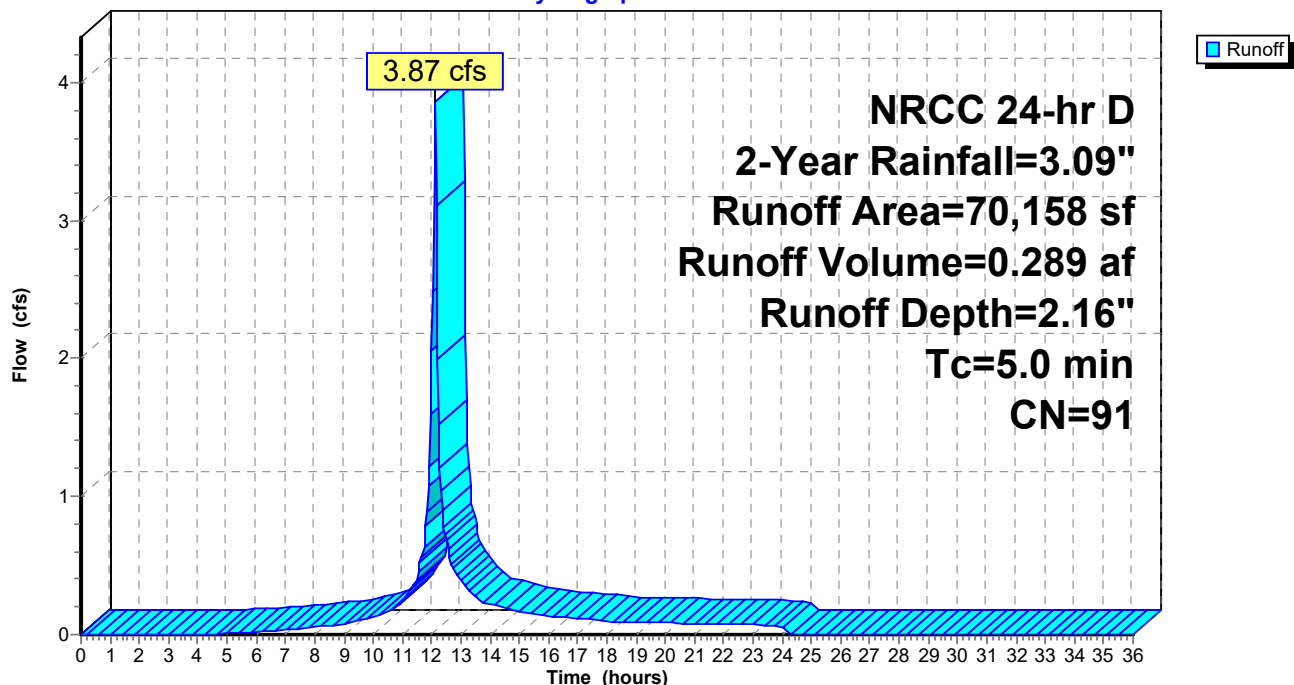
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 2-Year Rainfall=3.09"

Area (sf)	CN	Description
50,042	98	Paved parking, HSG C
5,322	86	<50% Grass cover, Poor, HSG C
14,794	68	<50% Grass cover, Poor, HSG A
70,158	91	Weighted Average
20,116		28.67% Pervious Area
50,042		71.33% Impervious Area

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

Subcatchment 3S: EX-3

Hydrograph



Summary for Subcatchment 4S: EX-4

Runoff = 6.10 cfs @ 12.26 hrs, Volume= 0.705 af, Depth= 2.25"
 Routed to Link 12L : DP-3

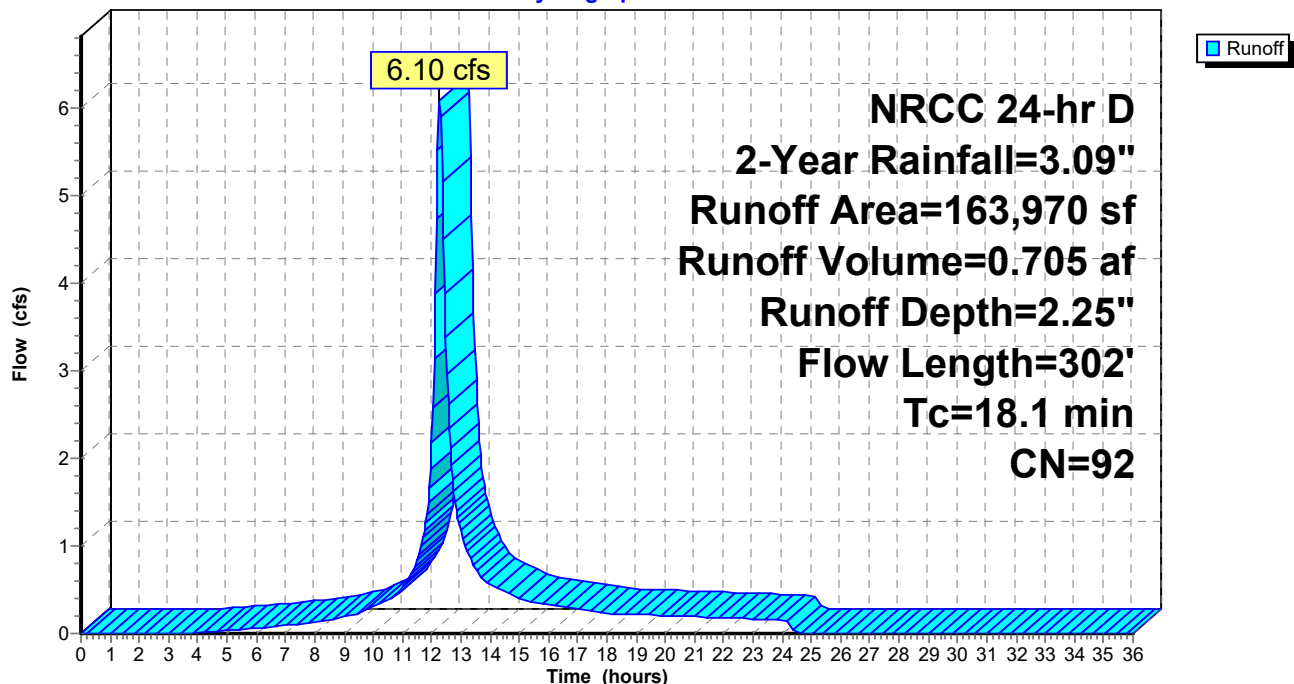
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 2-Year Rainfall=3.09"

Area (sf)	CN	Description
* 111,285	98	Paved parking, HSG A
* 2,220	98	Cement Concrete Sidewalk
28,989	86	<50% Grass cover, Poor, HSG C
21,476	68	<50% Grass cover, Poor, HSG A
163,970	92	Weighted Average
50,465		30.78% Pervious Area
113,505		69.22% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.0	76	0.0220	0.07		Sheet Flow, GRASS Grass: Bermuda n= 0.410 P2= 3.17"
0.3	24	0.0400	1.36		Sheet Flow, PAVEMENT Smooth surfaces n= 0.011 P2= 3.17"
0.8	202	0.0400	4.06		Shallow Concentrated Flow, PAVEMENT Paved Kv= 20.3 fps
18.1	302	Total			

Subcatchment 4S: EX-4

Hydrograph



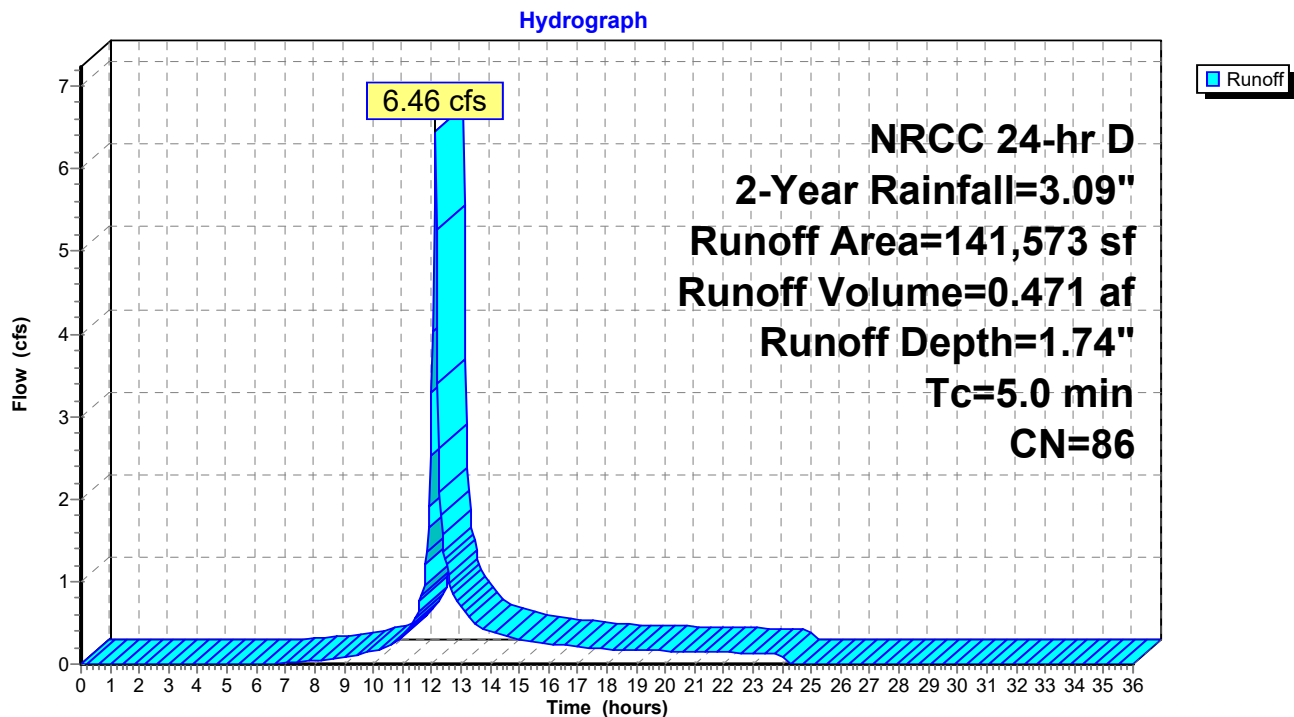
Summary for Subcatchment 5S: EX-5

Runoff = 6.46 cfs @ 12.12 hrs, Volume= 0.471 af, Depth= 1.74"
 Routed to Link 12L : DP-3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 2-Year Rainfall=3.09"

	Area (sf)	CN	Description
*	73,632	98	Paved parking, HSG A
*	6,261	98	Cement Concrete Sidewalk
	53,820	68	<50% Grass cover, Poor, HSG A
	7,860	86	<50% Grass cover, Poor, HSG C
	141,573	86	Weighted Average
	61,680		43.57% Pervious Area
	79,893		56.43% Impervious Area

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

Subcatchment 5S: EX-5

Summary for Subcatchment 6S: EX-6

Runoff = 0.72 cfs @ 12.12 hrs, Volume= 0.053 af, Depth= 1.19"
 Routed to Link 8L : DP-2

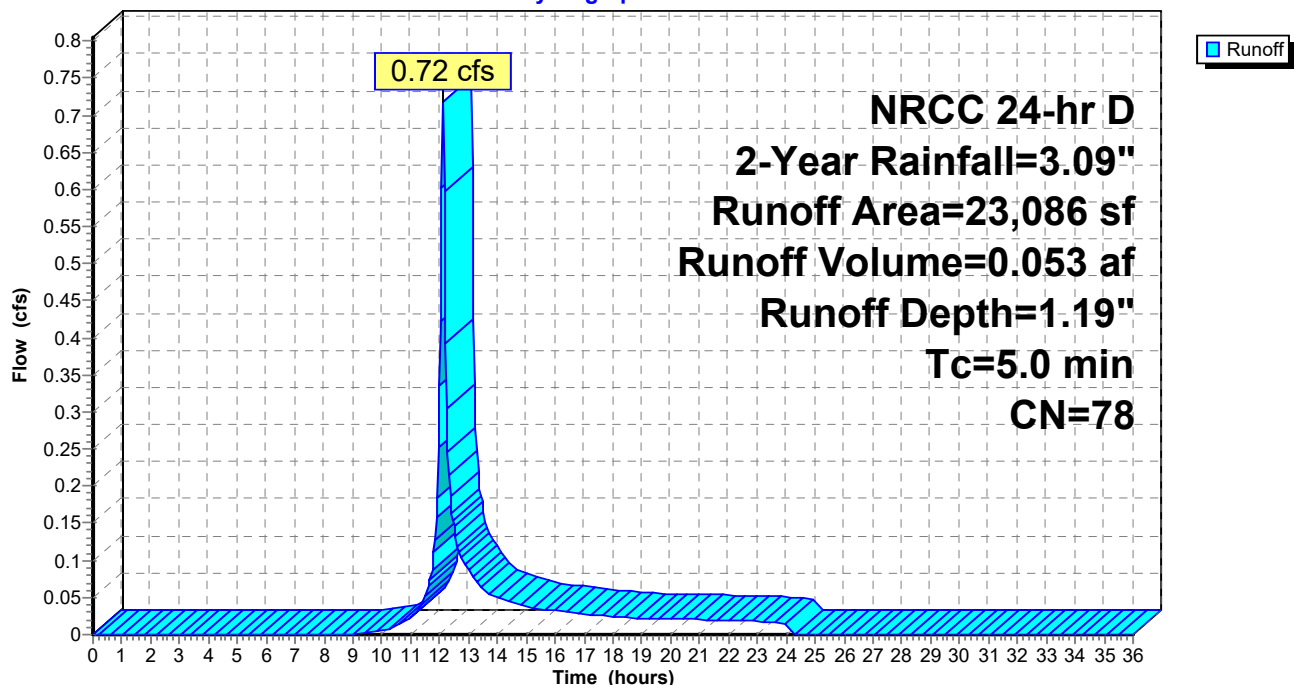
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 2-Year Rainfall=3.09"

	Area (sf)	CN	Description
*	7,475	98	Paved parking
*	509	98	Cement Concrete Sidewalk
	15,102	68	<50% Grass cover, Poor, HSG A
	23,086	78	Weighted Average
	15,102		65.42% Pervious Area
	7,984		34.58% Impervious Area

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

Subcatchment 6S: EX-6

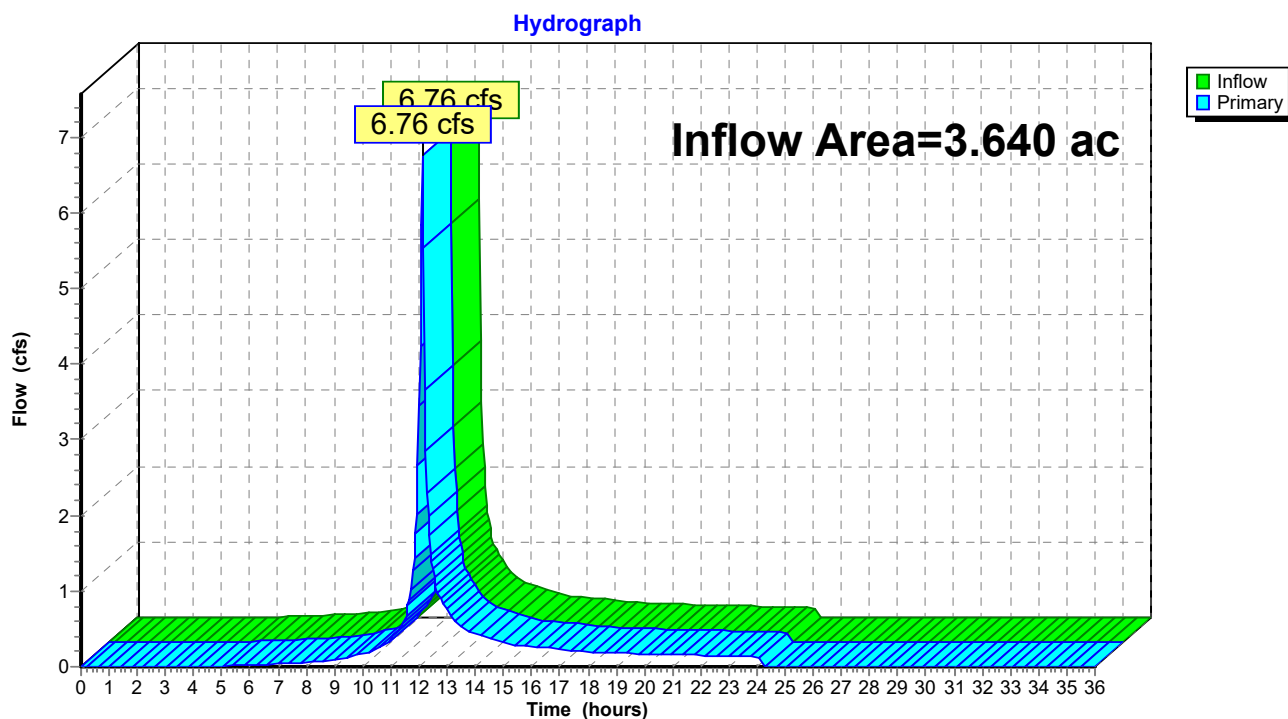
Hydrograph



Summary for Link 7L: DP-1

Inflow Area = 3.640 ac, 49.90% Impervious, Inflow Depth = 1.69" for 2-Year event
Inflow = 6.76 cfs @ 12.12 hrs, Volume= 0.512 af
Primary = 6.76 cfs @ 12.12 hrs, Volume= 0.512 af, Atten= 0%, Lag= 0.0 min

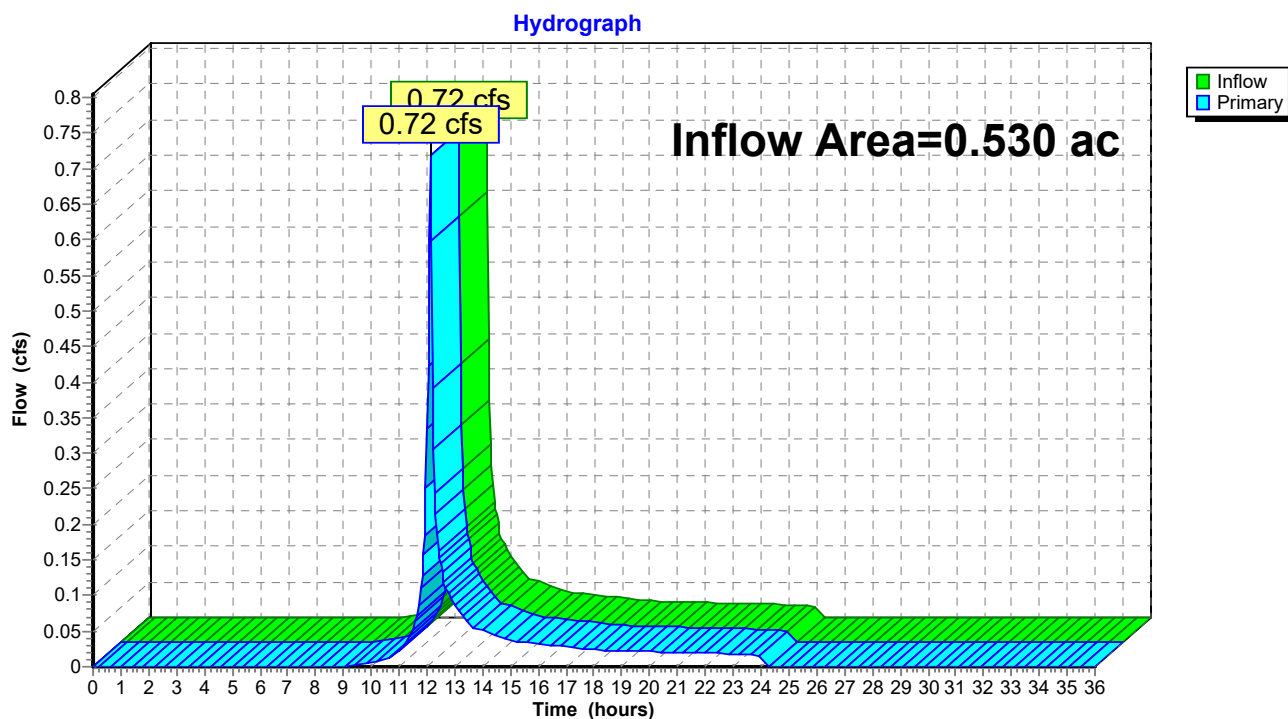
Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs

Link 7L: DP-1

Summary for Link 8L: DP-2

Inflow Area = 0.530 ac, 34.58% Impervious, Inflow Depth = 1.19" for 2-Year event
Inflow = 0.72 cfs @ 12.12 hrs, Volume= 0.053 af
Primary = 0.72 cfs @ 12.12 hrs, Volume= 0.053 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs

Link 8L: DP-2

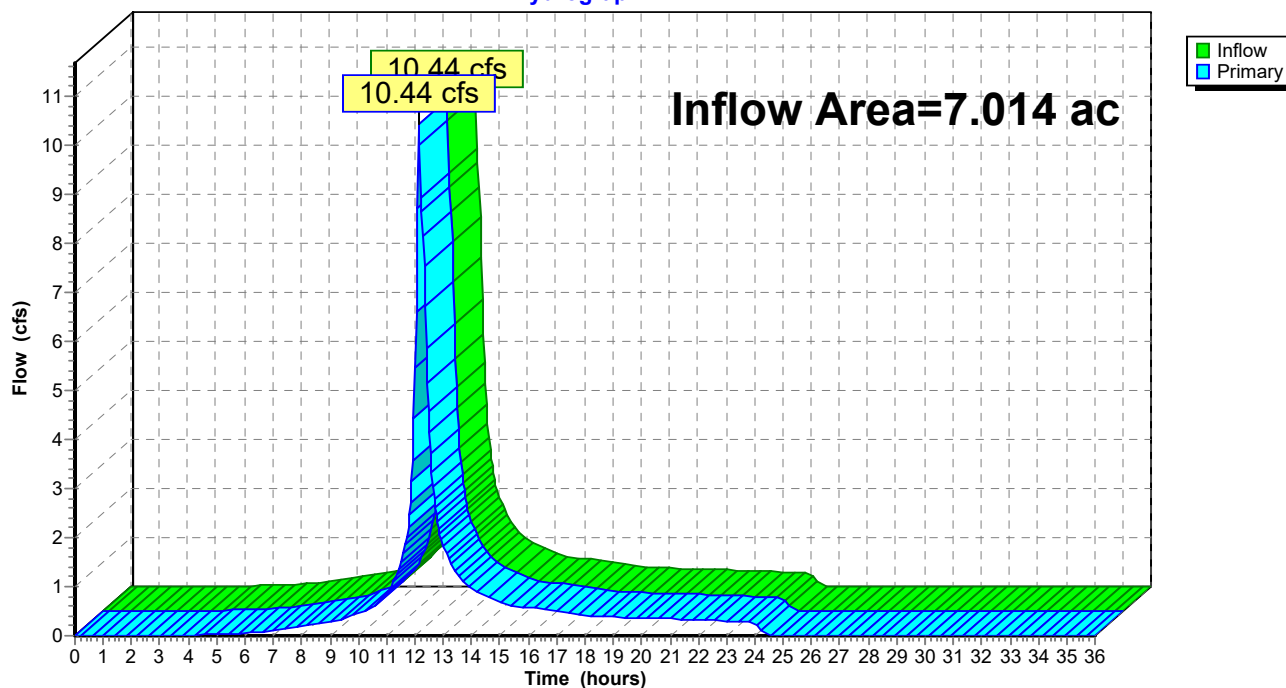
Summary for Link 12L: DP-3

Inflow Area = 7.014 ac, 63.30% Impervious, Inflow Depth = 2.01" for 2-Year event
Inflow = 10.44 cfs @ 12.13 hrs, Volume= 1.176 af
Primary = 10.44 cfs @ 12.13 hrs, Volume= 1.176 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs

Link 12L: DP-3

Hydrograph



Time span=0.00-36.00 hrs, dt=0.04 hrs, 901 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: EX-1 Runoff Area=15,204 sf 0.00% Impervious Runoff Depth=1.63"
Flow Length=92' Slope=0.0540 '/' Tc=13.8 min CN=68 Runoff=0.46 cfs 0.048 af

Subcatchment2S: EX-2 Runoff Area=73,215 sf 39.73% Impervious Runoff Depth=2.77"
Tc=5.0 min CN=82 Runoff=5.30 cfs 0.388 af

Subcatchment3S: EX-3 Runoff Area=70,158 sf 71.33% Impervious Runoff Depth=3.64"
Tc=5.0 min CN=91 Runoff=6.34 cfs 0.489 af

Subcatchment4S: EX-4 Runoff Area=163,970 sf 69.22% Impervious Runoff Depth=3.75"
Flow Length=302' Tc=18.1 min CN=92 Runoff=9.91 cfs 1.176 af

Subcatchment5S: EX-5 Runoff Area=141,573 sf 56.43% Impervious Runoff Depth=3.14"
Tc=5.0 min CN=86 Runoff=11.44 cfs 0.851 af

Subcatchment6S: EX-6 Runoff Area=23,086 sf 34.58% Impervious Runoff Depth=2.42"
Tc=5.0 min CN=78 Runoff=1.47 cfs 0.107 af

Link 7L: DP-1 Inflow=11.94 cfs 0.924 af
Primary=11.94 cfs 0.924 af

Link 8L: DP-2 Inflow=1.47 cfs 0.107 af
Primary=1.47 cfs 0.107 af

Link 12L: DP-3 Inflow=17.95 cfs 2.027 af
Primary=17.95 cfs 2.027 af

Total Runoff Area = 11.185 ac Runoff Volume = 3.058 af Average Runoff Depth = 3.28"
42.42% Pervious = 4.745 ac 57.58% Impervious = 6.440 ac

Summary for Subcatchment 1S: EX-1

Runoff = 0.46 cfs @ 12.23 hrs, Volume= 0.048 af, Depth= 1.63"
 Routed to Link 7L : DP-1

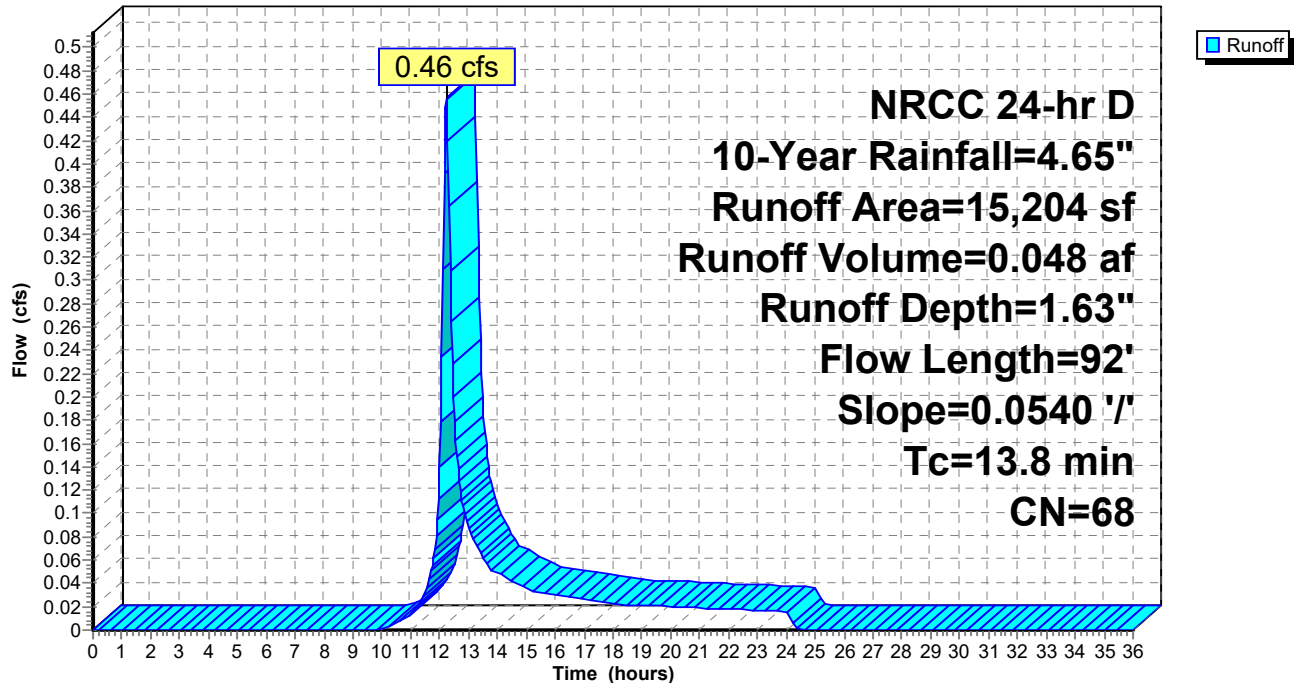
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 10-Year Rainfall=4.65"

Area (sf)	CN	Description
14,044	68	<50% Grass cover, Poor, HSG A
1,160	68	<50% Grass cover, Poor, HSG A
15,204	68	Weighted Average
15,204		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.8	92	0.0540	0.11		Sheet Flow, GRASS
Grass: Bermuda n= 0.410 P2= 3.17"					

Subcatchment 1S: EX-1

Hydrograph



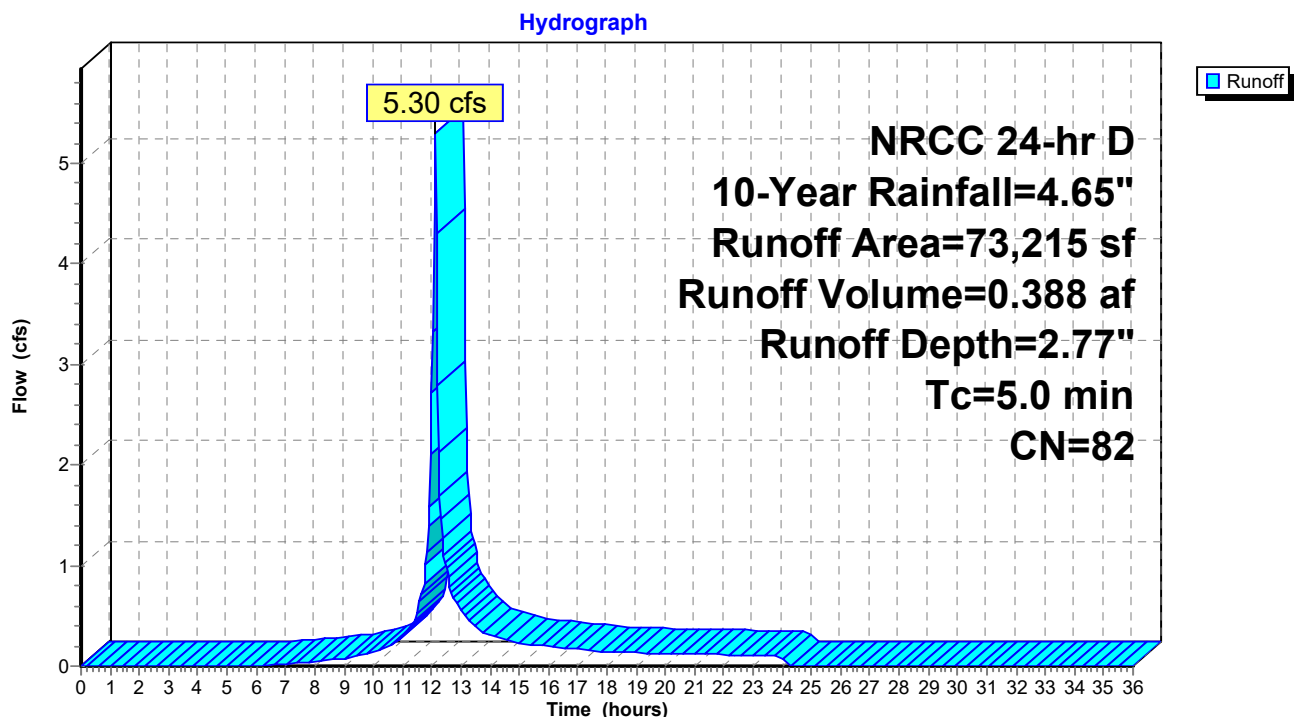
Summary for Subcatchment 2S: EX-2

Runoff = 5.30 cfs @ 12.12 hrs, Volume= 0.388 af, Depth= 2.77"
 Routed to Link 7L : DP-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 10-Year Rainfall=4.65"

Area (sf)	CN	Description
26,739	68	<50% Grass cover, Poor, HSG A
9,853	86	<50% Grass cover, Poor, HSG C
7,536	68	<50% Grass cover, Poor, HSG A
* 29,087	98	Paved parking, HSG A
73,215	82	Weighted Average
44,128		60.27% Pervious Area
29,087		39.73% Impervious Area

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

Subcatchment 2S: EX-2

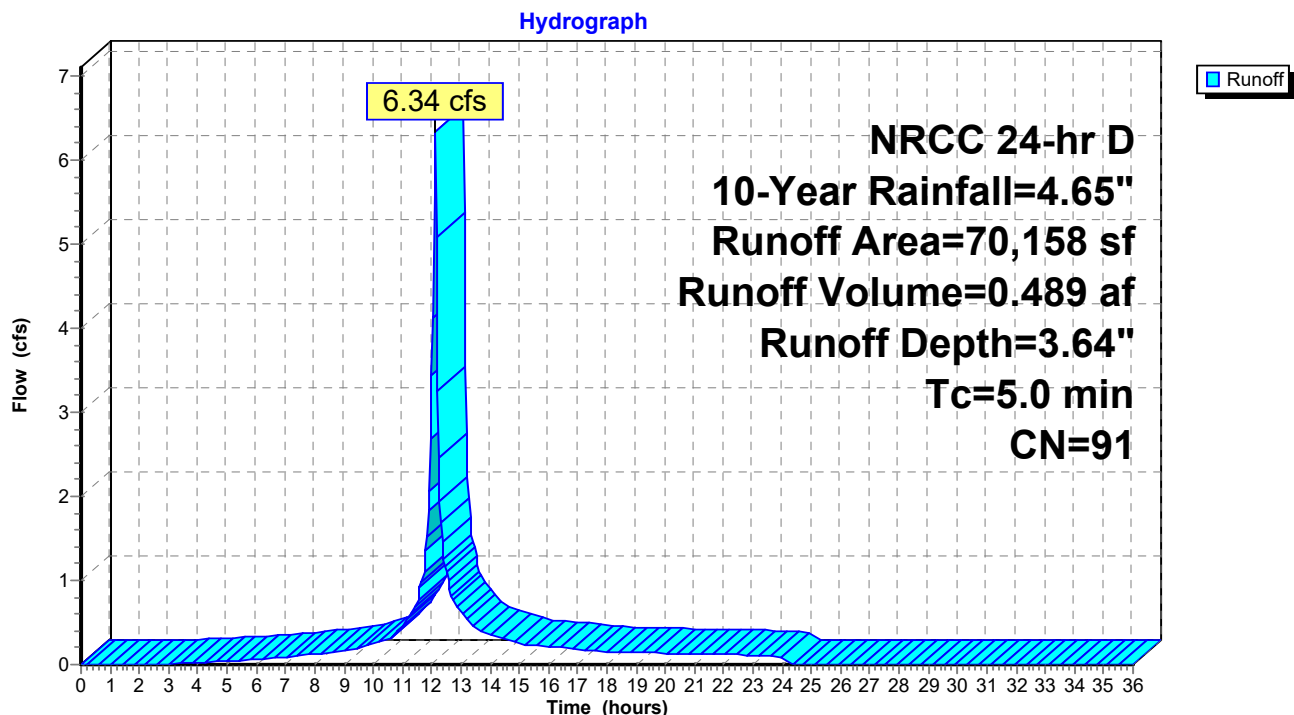
Summary for Subcatchment 3S: EX-3

Runoff = 6.34 cfs @ 12.12 hrs, Volume= 0.489 af, Depth= 3.64"
 Routed to Link 7L : DP-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 10-Year Rainfall=4.65"

Area (sf)	CN	Description
50,042	98	Paved parking, HSG C
5,322	86	<50% Grass cover, Poor, HSG C
14,794	68	<50% Grass cover, Poor, HSG A
70,158	91	Weighted Average
20,116		28.67% Pervious Area
50,042		71.33% Impervious Area

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

Subcatchment 3S: EX-3

Summary for Subcatchment 4S: EX-4

Runoff = 9.91 cfs @ 12.26 hrs, Volume= 1.176 af, Depth= 3.75"
 Routed to Link 12L : DP-3

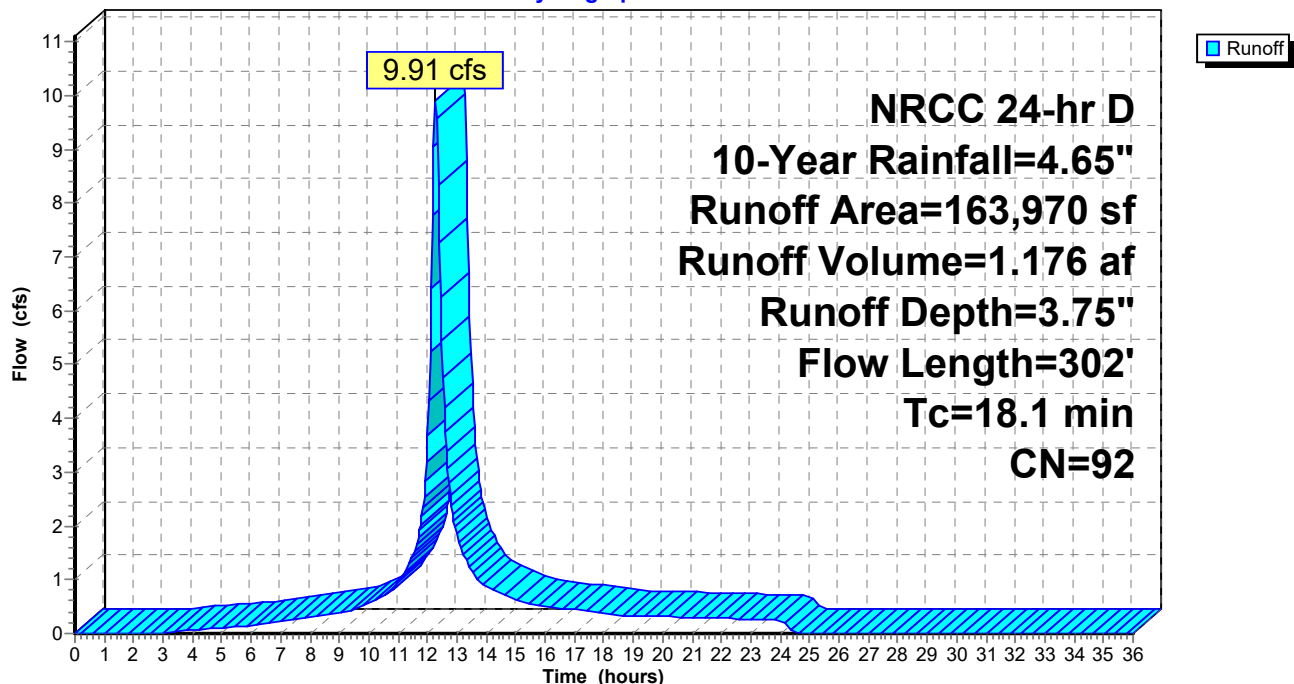
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 10-Year Rainfall=4.65"

Area (sf)	CN	Description
* 111,285	98	Paved parking, HSG A
* 2,220	98	Cement Concrete Sidewalk
28,989	86	<50% Grass cover, Poor, HSG C
21,476	68	<50% Grass cover, Poor, HSG A
163,970	92	Weighted Average
50,465		30.78% Pervious Area
113,505		69.22% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.0	76	0.0220	0.07		Sheet Flow, GRASS Grass: Bermuda n= 0.410 P2= 3.17"
0.3	24	0.0400	1.36		Sheet Flow, PAVEMENT Smooth surfaces n= 0.011 P2= 3.17"
0.8	202	0.0400	4.06		Shallow Concentrated Flow, PAVEMENT Paved Kv= 20.3 fps
18.1	302	Total			

Subcatchment 4S: EX-4

Hydrograph



Summary for Subcatchment 5S: EX-5

Runoff = 11.44 cfs @ 12.12 hrs, Volume= 0.851 af, Depth= 3.14"
 Routed to Link 12L : DP-3

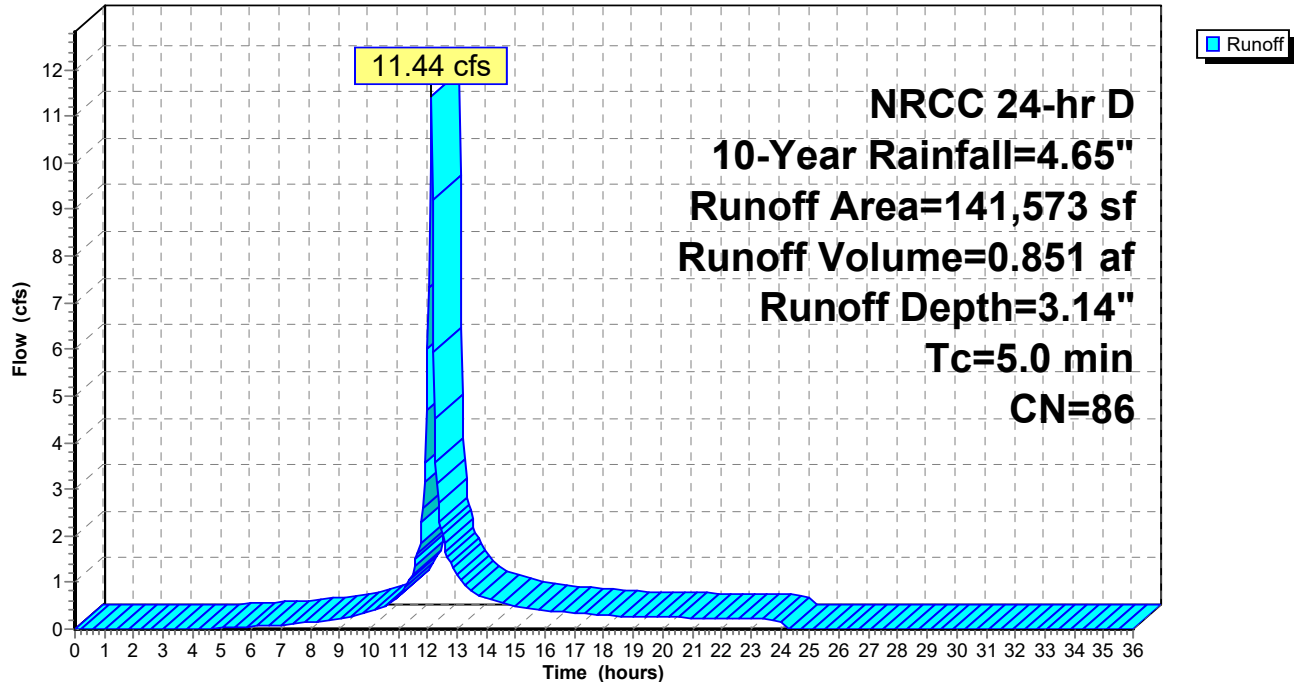
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 10-Year Rainfall=4.65"

	Area (sf)	CN	Description
*	73,632	98	Paved parking, HSG A
*	6,261	98	Cement Concrete Sidewalk
	53,820	68	<50% Grass cover, Poor, HSG A
	7,860	86	<50% Grass cover, Poor, HSG C
	141,573	86	Weighted Average
	61,680		43.57% Pervious Area
	79,893		56.43% Impervious Area

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

Subcatchment 5S: EX-5

Hydrograph



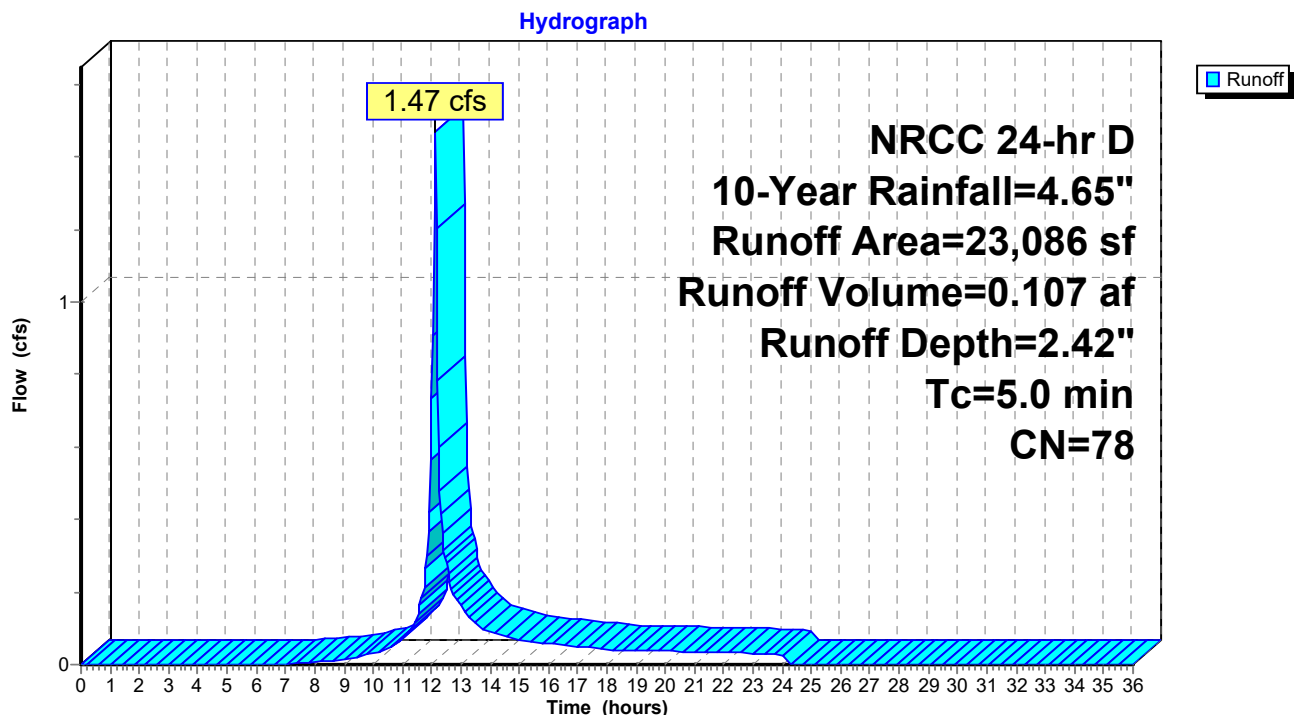
Summary for Subcatchment 6S: EX-6

Runoff = 1.47 cfs @ 12.12 hrs, Volume= 0.107 af, Depth= 2.42"
 Routed to Link 8L : DP-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 10-Year Rainfall=4.65"

	Area (sf)	CN	Description
*	7,475	98	Paved parking
*	509	98	Cement Concrete Sidewalk
	15,102	68	<50% Grass cover, Poor, HSG A
	23,086	78	Weighted Average
	15,102		65.42% Pervious Area
	7,984		34.58% Impervious Area

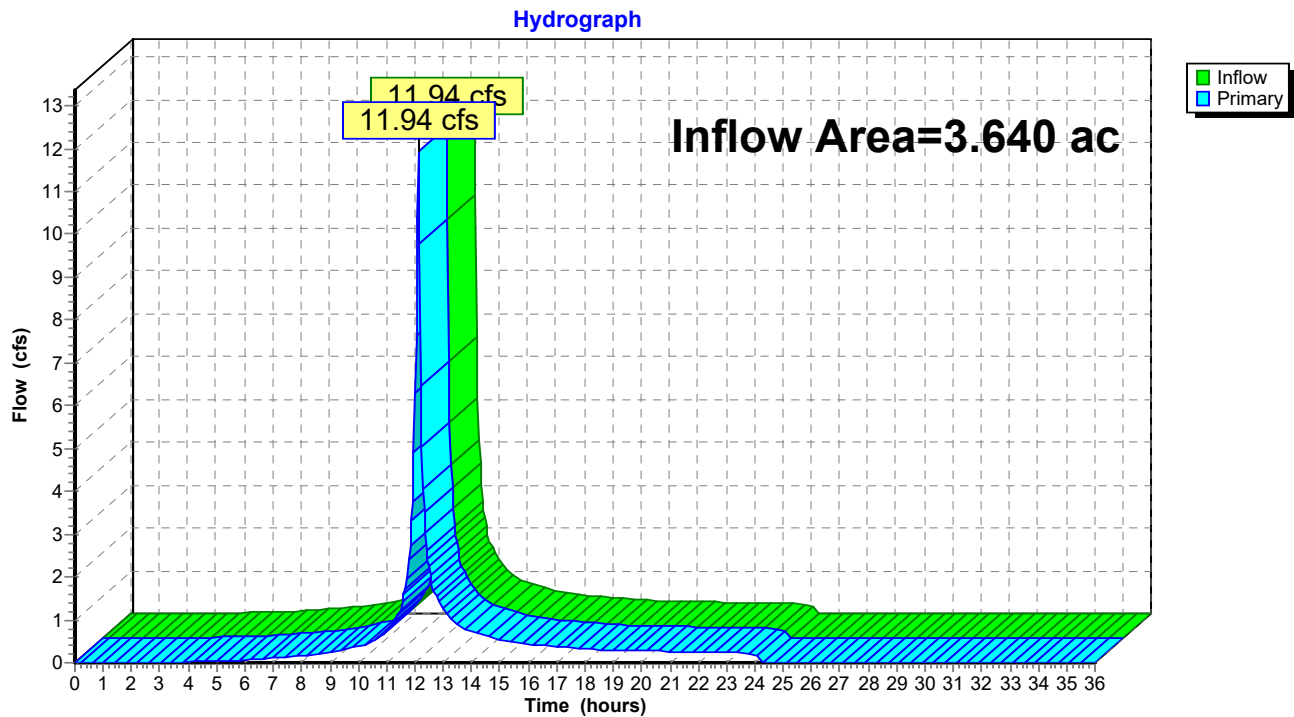
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, DIRECT

Subcatchment 6S: EX-6

Summary for Link 7L: DP-1

Inflow Area = 3.640 ac, 49.90% Impervious, Inflow Depth = 3.05" for 10-Year event
Inflow = 11.94 cfs @ 12.12 hrs, Volume= 0.924 af
Primary = 11.94 cfs @ 12.12 hrs, Volume= 0.924 af, Atten= 0%, Lag= 0.0 min

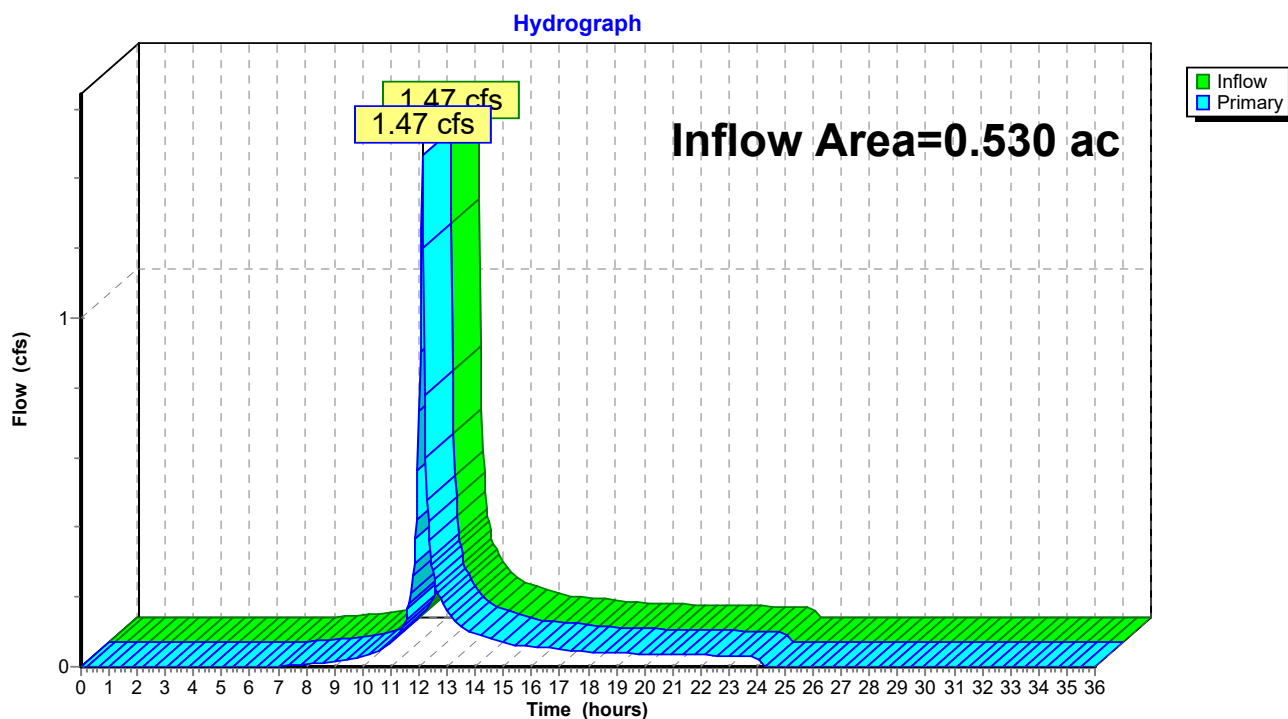
Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs

Link 7L: DP-1

Summary for Link 8L: DP-2

Inflow Area = 0.530 ac, 34.58% Impervious, Inflow Depth = 2.42" for 10-Year event
Inflow = 1.47 cfs @ 12.12 hrs, Volume= 0.107 af
Primary = 1.47 cfs @ 12.12 hrs, Volume= 0.107 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs

Link 8L: DP-2

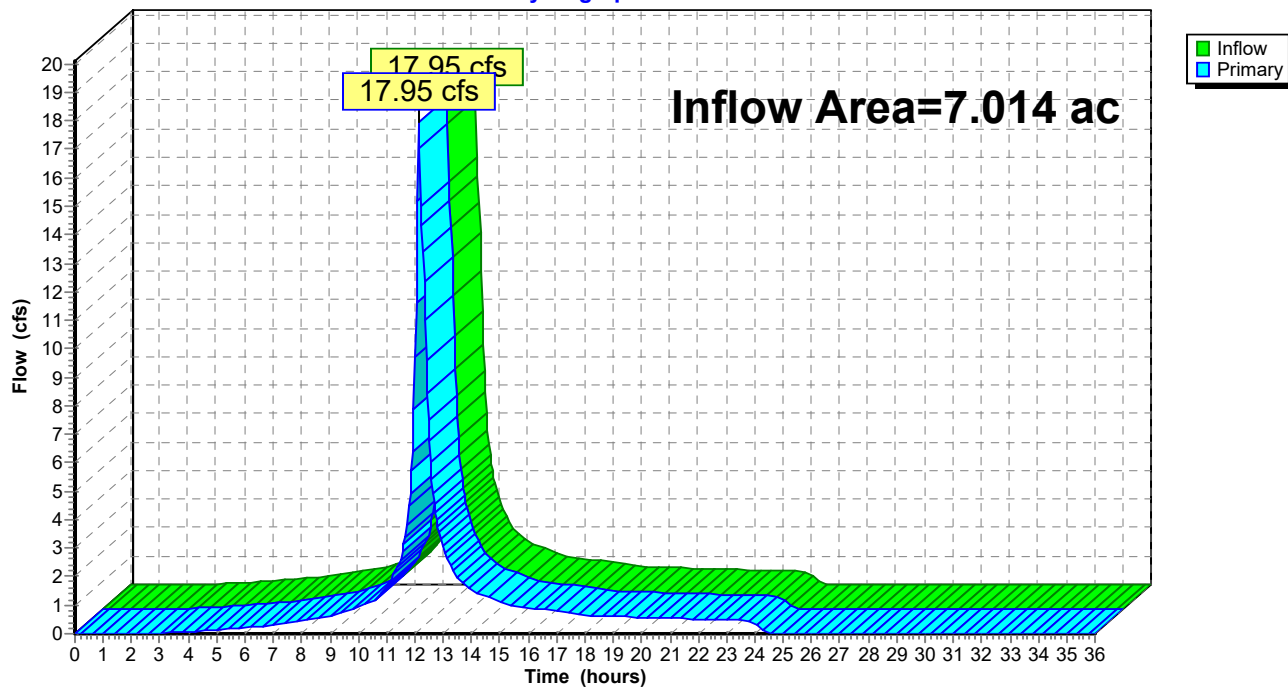
Summary for Link 12L: DP-3

Inflow Area = 7.014 ac, 63.30% Impervious, Inflow Depth = 3.47" for 10-Year event
Inflow = 17.95 cfs @ 12.13 hrs, Volume= 2.027 af
Primary = 17.95 cfs @ 12.13 hrs, Volume= 2.027 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs

Link 12L: DP-3

Hydrograph



Time span=0.00-36.00 hrs, dt=0.04 hrs, 901 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: EX-1 Runoff Area=15,204 sf 0.00% Impervious Runoff Depth=2.52"
Flow Length=92' Slope=0.0540 '/' Tc=13.8 min CN=68 Runoff=0.72 cfs 0.073 af

Subcatchment2S: EX-2 Runoff Area=73,215 sf 39.73% Impervious Runoff Depth=3.87"
Tc=5.0 min CN=82 Runoff=7.31 cfs 0.542 af

Subcatchment3S: EX-3 Runoff Area=70,158 sf 71.33% Impervious Runoff Depth=4.83"
Tc=5.0 min CN=91 Runoff=8.26 cfs 0.648 af

Subcatchment4S: EX-4 Runoff Area=163,970 sf 69.22% Impervious Runoff Depth=4.94"
Flow Length=302' Tc=18.1 min CN=92 Runoff=12.87 cfs 1.550 af

Subcatchment5S: EX-5 Runoff Area=141,573 sf 56.43% Impervious Runoff Depth=4.29"
Tc=5.0 min CN=86 Runoff=15.36 cfs 1.161 af

Subcatchment6S: EX-6 Runoff Area=23,086 sf 34.58% Impervious Runoff Depth=3.46"
Tc=5.0 min CN=78 Runoff=2.09 cfs 0.153 af

Link 7L: DP-1 Inflow=16.06 cfs 1.263 af
Primary=16.06 cfs 1.263 af

Link 8L: DP-2 Inflow=2.09 cfs 0.153 af
Primary=2.09 cfs 0.153 af

Link 12L: DP-3 Inflow=23.83 cfs 2.711 af
Primary=23.83 cfs 2.711 af

Total Runoff Area = 11.185 ac Runoff Volume = 4.127 af Average Runoff Depth = 4.43"
42.42% Pervious = 4.745 ac 57.58% Impervious = 6.440 ac

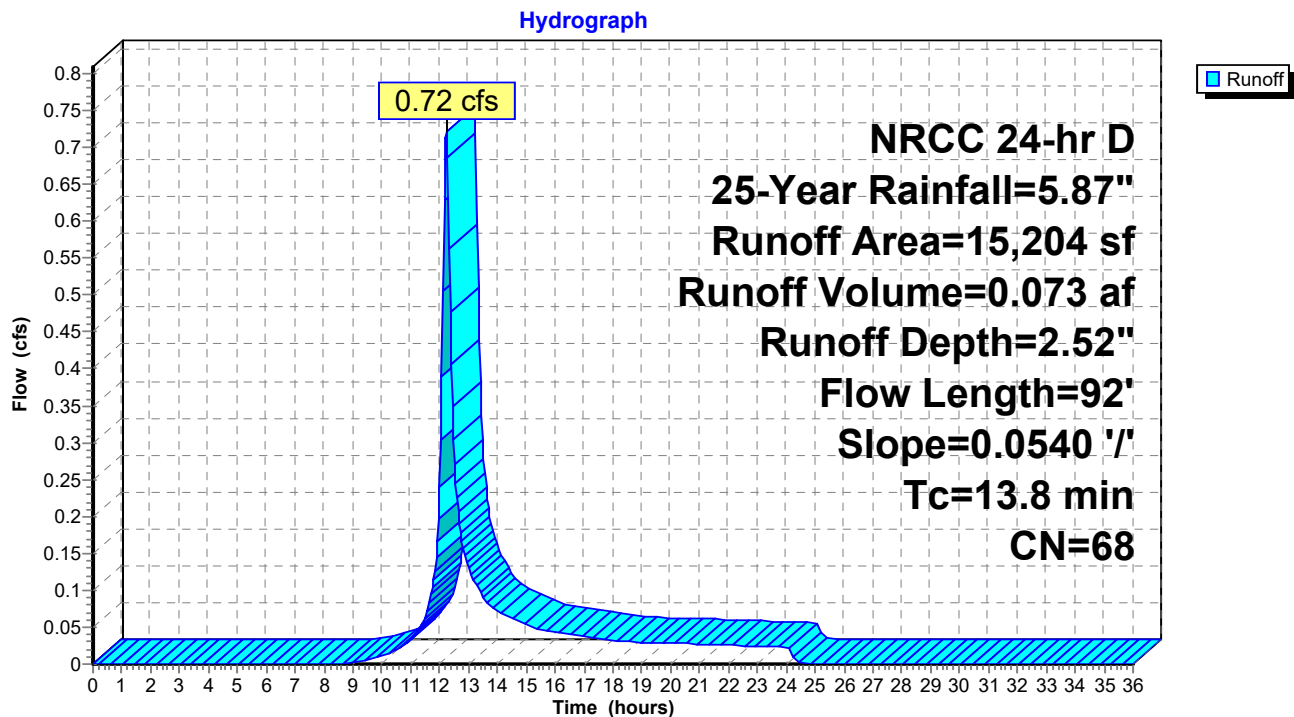
Summary for Subcatchment 1S: EX-1

Runoff = 0.72 cfs @ 12.22 hrs, Volume= 0.073 af, Depth= 2.52"
 Routed to Link 7L : DP-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 25-Year Rainfall=5.87"

Area (sf)	CN	Description
14,044	68	<50% Grass cover, Poor, HSG A
1,160	68	<50% Grass cover, Poor, HSG A
15,204	68	Weighted Average
15,204		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.8	92	0.0540	0.11		Sheet Flow, GRASS Grass: Bermuda n= 0.410 P2= 3.17"

Subcatchment 1S: EX-1

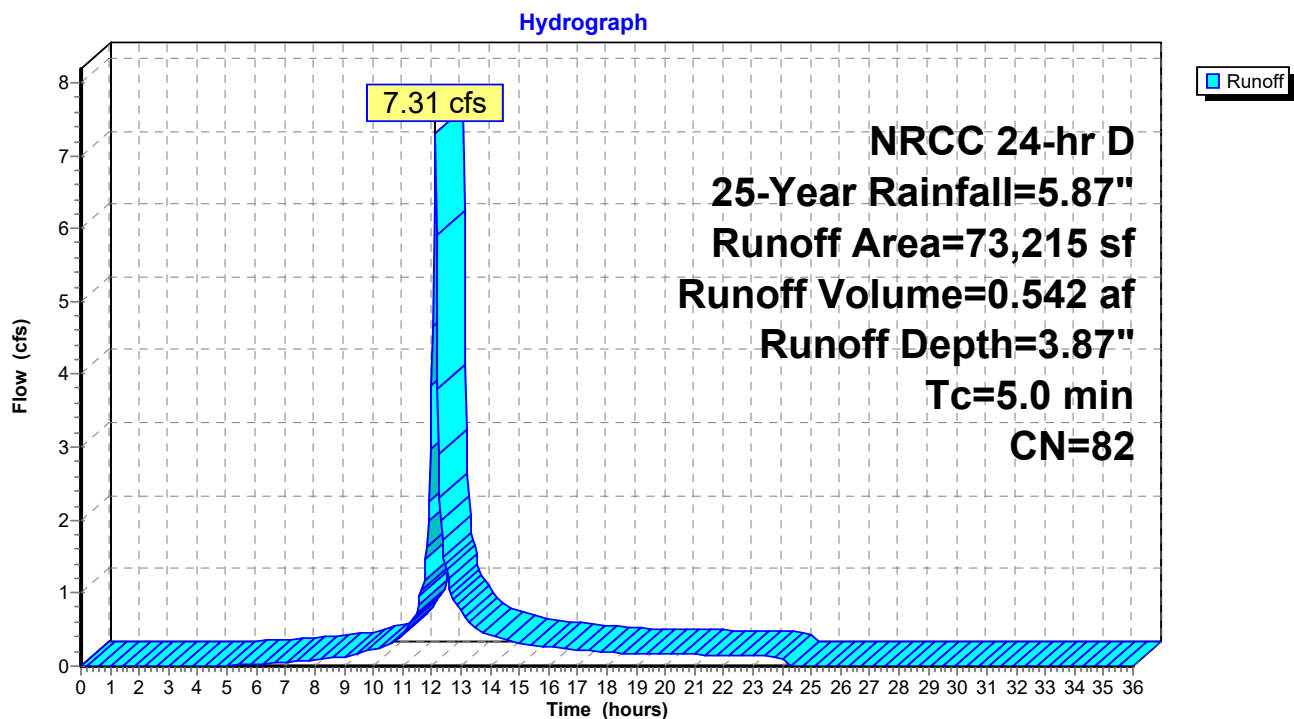
Summary for Subcatchment 2S: EX-2

Runoff = 7.31 cfs @ 12.12 hrs, Volume= 0.542 af, Depth= 3.87"
 Routed to Link 7L : DP-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 25-Year Rainfall=5.87"

Area (sf)	CN	Description
26,739	68	<50% Grass cover, Poor, HSG A
9,853	86	<50% Grass cover, Poor, HSG C
7,536	68	<50% Grass cover, Poor, HSG A
* 29,087	98	Paved parking, HSG A
73,215	82	Weighted Average
44,128		60.27% Pervious Area
29,087		39.73% Impervious Area

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

Subcatchment 2S: EX-2

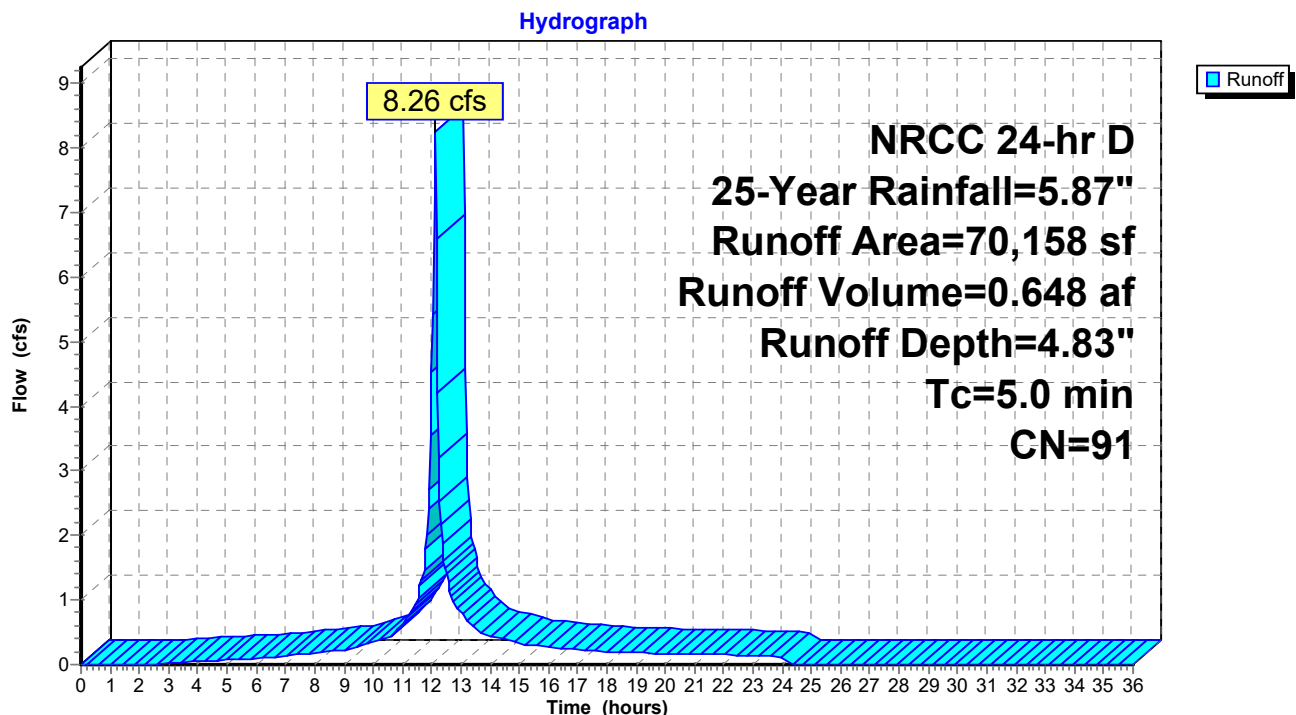
Summary for Subcatchment 3S: EX-3

Runoff = 8.26 cfs @ 12.11 hrs, Volume= 0.648 af, Depth= 4.83"
 Routed to Link 7L : DP-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 25-Year Rainfall=5.87"

Area (sf)	CN	Description
50,042	98	Paved parking, HSG C
5,322	86	<50% Grass cover, Poor, HSG C
14,794	68	<50% Grass cover, Poor, HSG A
70,158	91	Weighted Average
20,116		28.67% Pervious Area
50,042		71.33% Impervious Area

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

Subcatchment 3S: EX-3

Summary for Subcatchment 4S: EX-4

Runoff = 12.87 cfs @ 12.26 hrs, Volume= 1.550 af, Depth= 4.94"
 Routed to Link 12L : DP-3

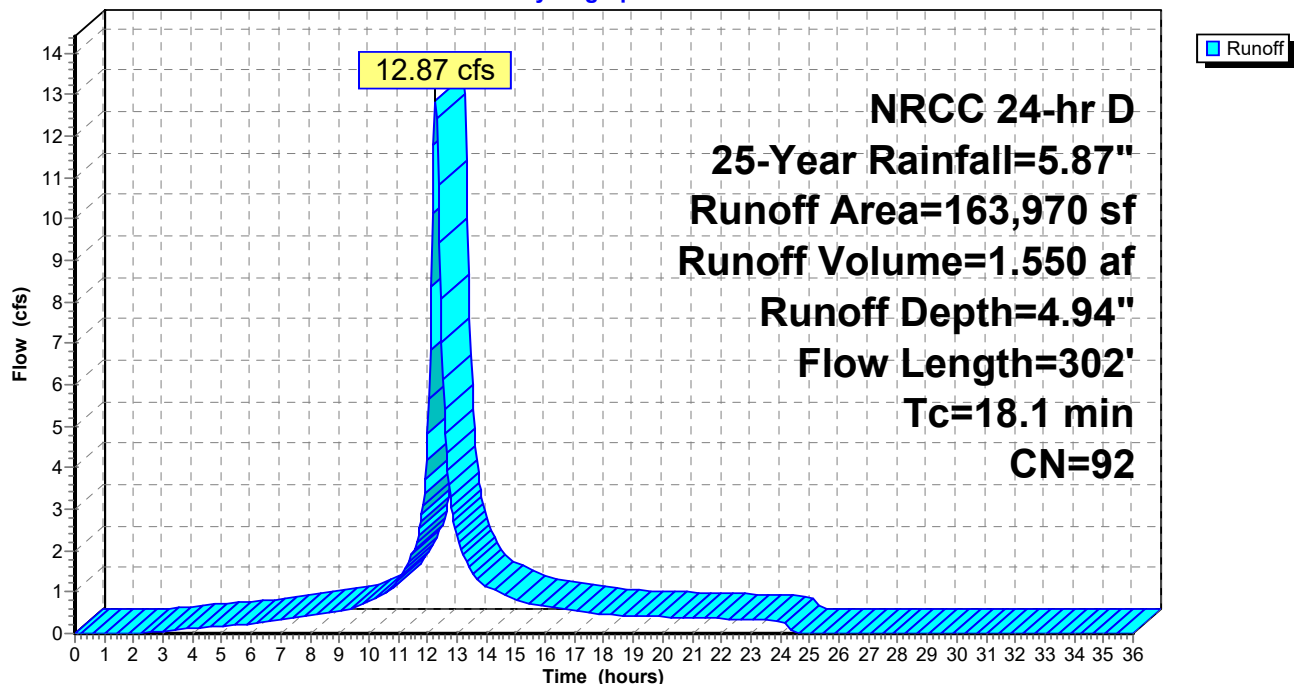
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 25-Year Rainfall=5.87"

Area (sf)	CN	Description
* 111,285	98	Paved parking, HSG A
* 2,220	98	Cement Concrete Sidewalk
28,989	86	<50% Grass cover, Poor, HSG C
21,476	68	<50% Grass cover, Poor, HSG A
163,970	92	Weighted Average
50,465		30.78% Pervious Area
113,505		69.22% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.0	76	0.0220	0.07		Sheet Flow, GRASS Grass: Bermuda n= 0.410 P2= 3.17"
0.3	24	0.0400	1.36		Sheet Flow, PAVEMENT Smooth surfaces n= 0.011 P2= 3.17"
0.8	202	0.0400	4.06		Shallow Concentrated Flow, PAVEMENT Paved Kv= 20.3 fps
18.1	302	Total			

Subcatchment 4S: EX-4

Hydrograph



Summary for Subcatchment 5S: EX-5

Runoff = 15.36 cfs @ 12.12 hrs, Volume= 1.161 af, Depth= 4.29"
 Routed to Link 12L : DP-3

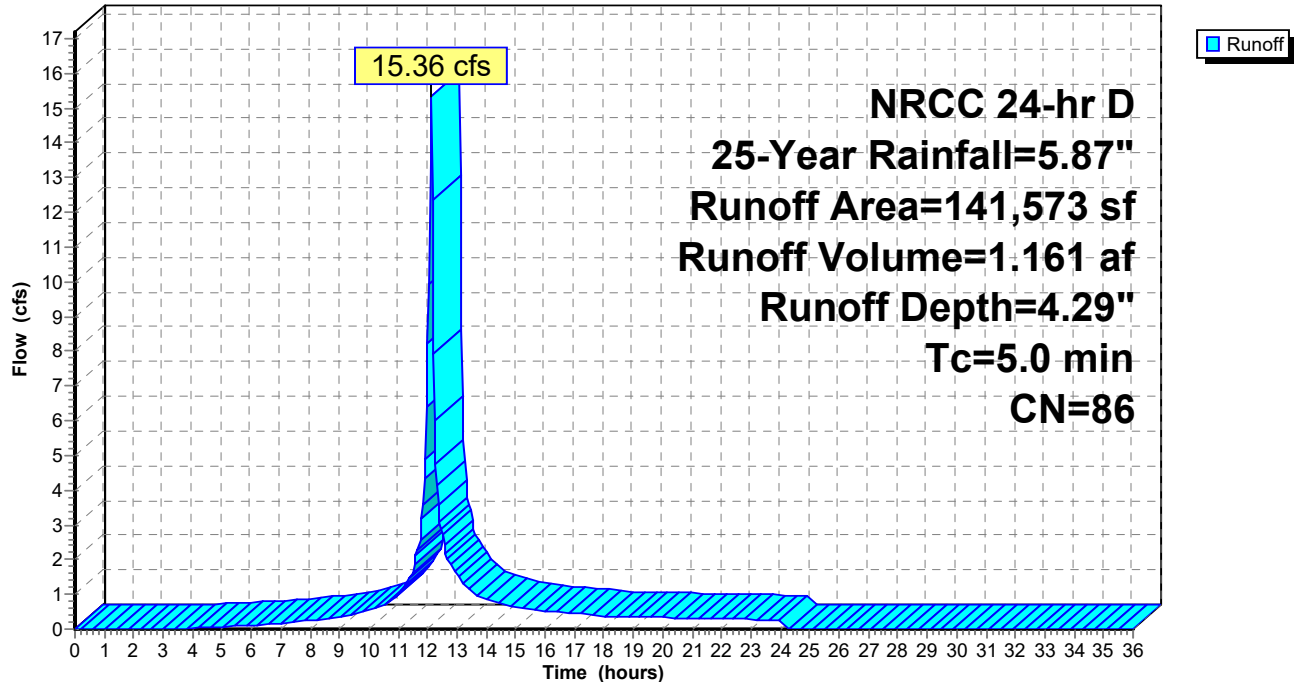
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 25-Year Rainfall=5.87"

	Area (sf)	CN	Description
*	73,632	98	Paved parking, HSG A
*	6,261	98	Cement Concrete Sidewalk
	53,820	68	<50% Grass cover, Poor, HSG A
	7,860	86	<50% Grass cover, Poor, HSG C
	141,573	86	Weighted Average
	61,680		43.57% Pervious Area
	79,893		56.43% Impervious Area

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

Subcatchment 5S: EX-5

Hydrograph



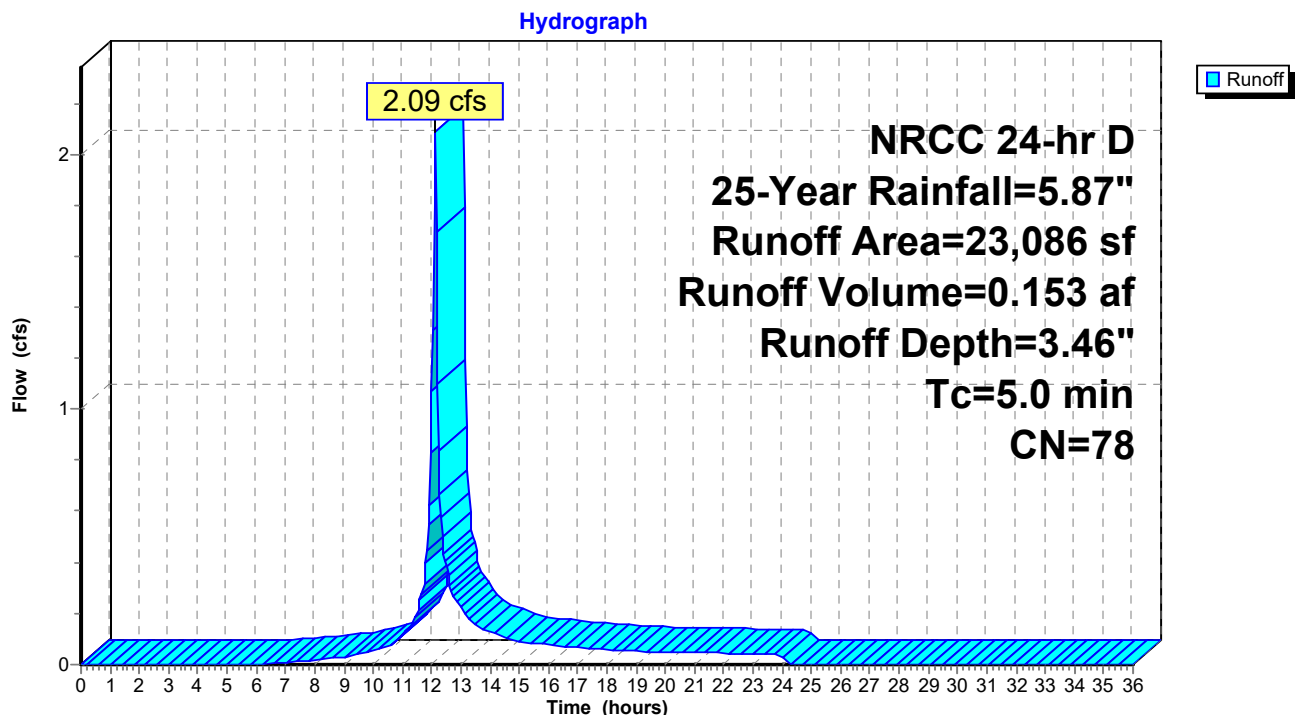
Summary for Subcatchment 6S: EX-6

Runoff = 2.09 cfs @ 12.12 hrs, Volume= 0.153 af, Depth= 3.46"
 Routed to Link 8L : DP-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 25-Year Rainfall=5.87"

	Area (sf)	CN	Description
*	7,475	98	Paved parking
*	509	98	Cement Concrete Sidewalk
	15,102	68	<50% Grass cover, Poor, HSG A
	23,086	78	Weighted Average
	15,102		65.42% Pervious Area
	7,984		34.58% Impervious Area

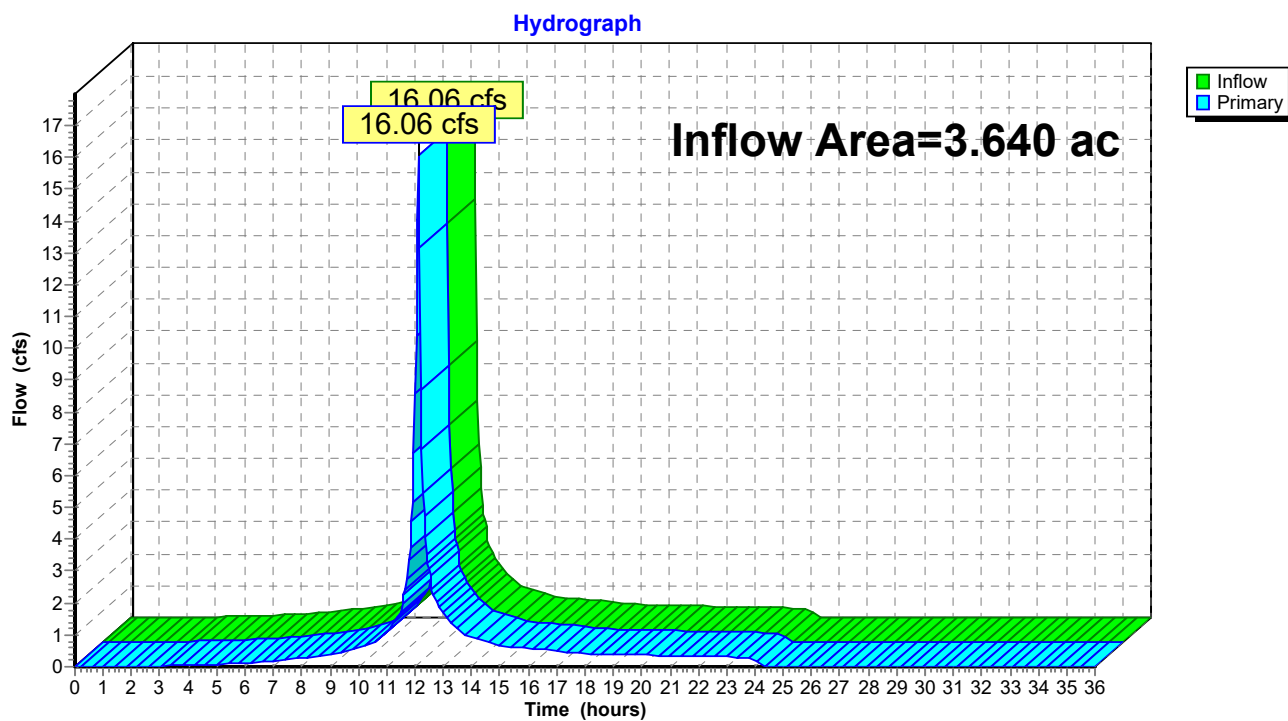
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, DIRECT

Subcatchment 6S: EX-6

Summary for Link 7L: DP-1

Inflow Area = 3.640 ac, 49.90% Impervious, Inflow Depth = 4.16" for 25-Year event
Inflow = 16.06 cfs @ 12.12 hrs, Volume= 1.263 af
Primary = 16.06 cfs @ 12.12 hrs, Volume= 1.263 af, Atten= 0%, Lag= 0.0 min

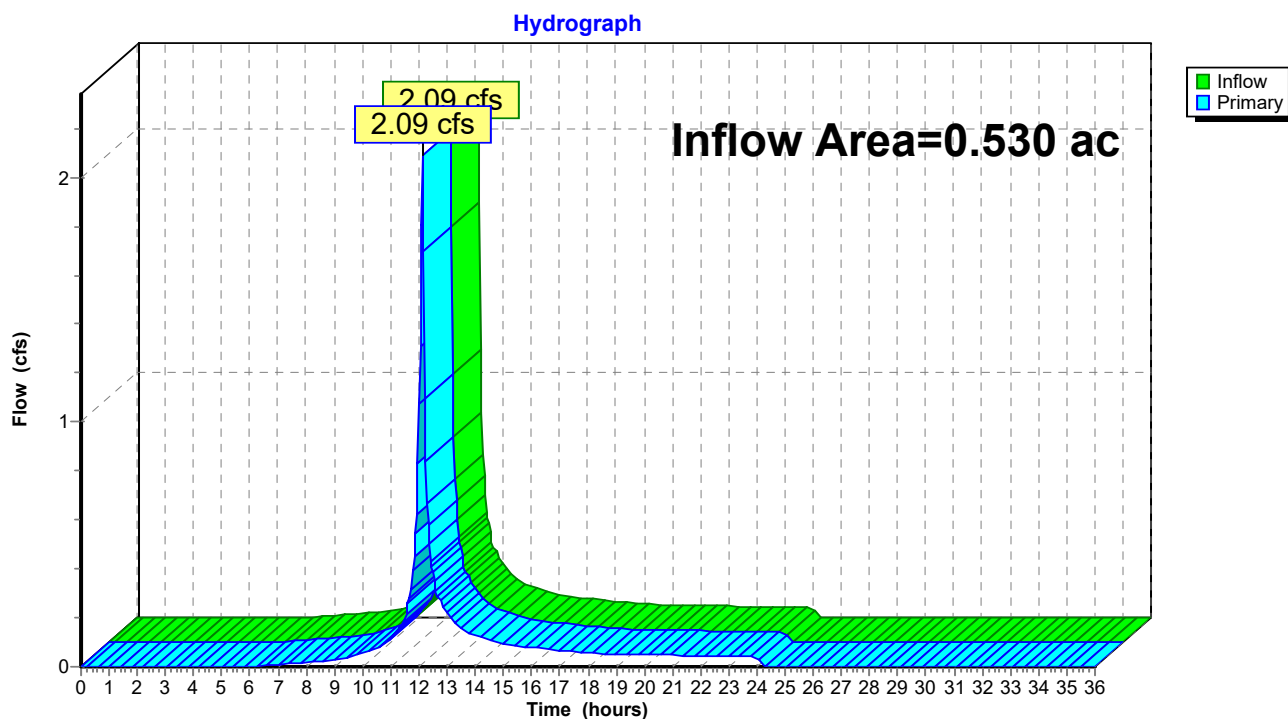
Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs

Link 7L: DP-1

Summary for Link 8L: DP-2

Inflow Area = 0.530 ac, 34.58% Impervious, Inflow Depth = 3.46" for 25-Year event
Inflow = 2.09 cfs @ 12.12 hrs, Volume= 0.153 af
Primary = 2.09 cfs @ 12.12 hrs, Volume= 0.153 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs

Link 8L: DP-2

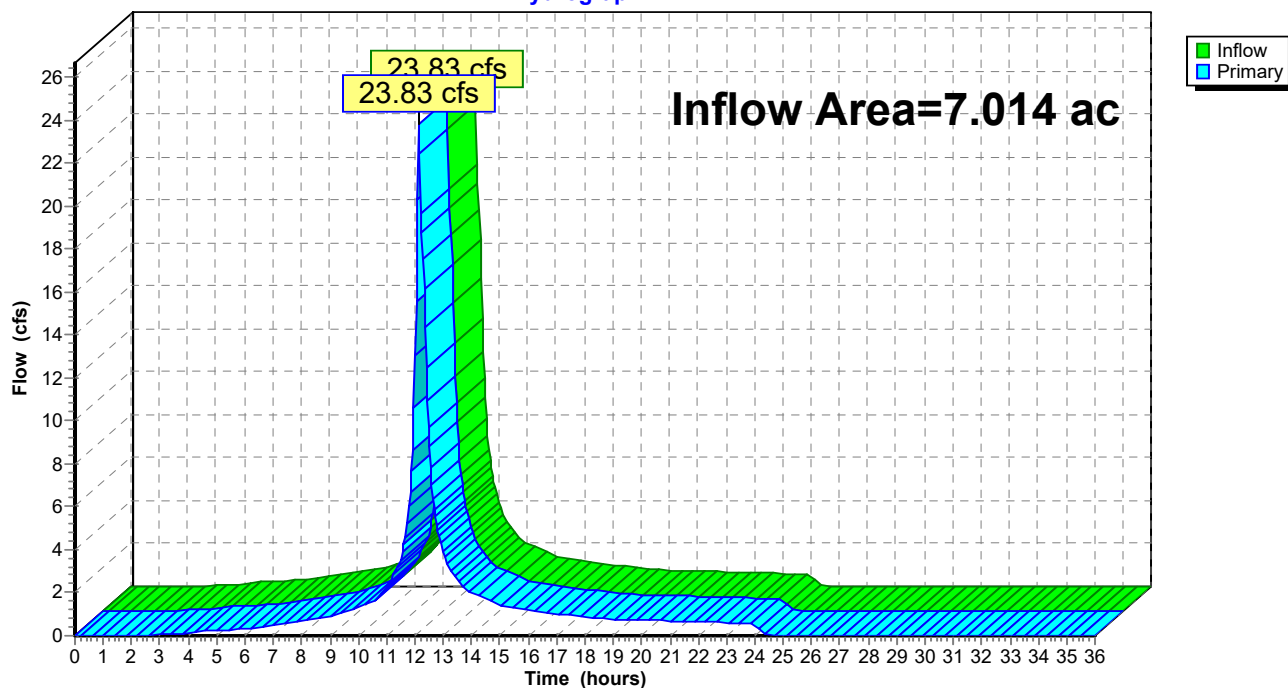
Summary for Link 12L: DP-3

Inflow Area = 7.014 ac, 63.30% Impervious, Inflow Depth = 4.64" for 25-Year event
Inflow = 23.83 cfs @ 12.13 hrs, Volume= 2.711 af
Primary = 23.83 cfs @ 12.13 hrs, Volume= 2.711 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs

Link 12L: DP-3

Hydrograph



Time span=0.00-36.00 hrs, dt=0.04 hrs, 901 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: EX-1 Runoff Area=15,204 sf 0.00% Impervious Runoff Depth=3.41"
Flow Length=92' Slope=0.0540 '/' Tc=13.8 min CN=68 Runoff=0.98 cfs 0.099 af

Subcatchment2S: EX-2 Runoff Area=73,215 sf 39.73% Impervious Runoff Depth=4.92"
Tc=5.0 min CN=82 Runoff=9.19 cfs 0.689 af

Subcatchment3S: EX-3 Runoff Area=70,158 sf 71.33% Impervious Runoff Depth=5.94"
Tc=5.0 min CN=91 Runoff=10.02 cfs 0.797 af

Subcatchment4S: EX-4 Runoff Area=163,970 sf 69.22% Impervious Runoff Depth=6.05"
Flow Length=302' Tc=18.1 min CN=92 Runoff=15.58 cfs 1.899 af

Subcatchment5S: EX-5 Runoff Area=141,573 sf 56.43% Impervious Runoff Depth=5.37"
Tc=5.0 min CN=86 Runoff=18.98 cfs 1.453 af

Subcatchment6S: EX-6 Runoff Area=23,086 sf 34.58% Impervious Runoff Depth=4.47"
Tc=5.0 min CN=78 Runoff=2.68 cfs 0.198 af

Link 7L: DP-1 Inflow=19.89 cfs 1.585 af
Primary=19.89 cfs 1.585 af

Link 8L: DP-2 Inflow=2.68 cfs 0.198 af
Primary=2.68 cfs 0.198 af

Link 12L: DP-3 Inflow=29.25 cfs 3.353 af
Primary=29.25 cfs 3.353 af

Total Runoff Area = 11.185 ac Runoff Volume = 5.135 af Average Runoff Depth = 5.51"
42.42% Pervious = 4.745 ac 57.58% Impervious = 6.440 ac

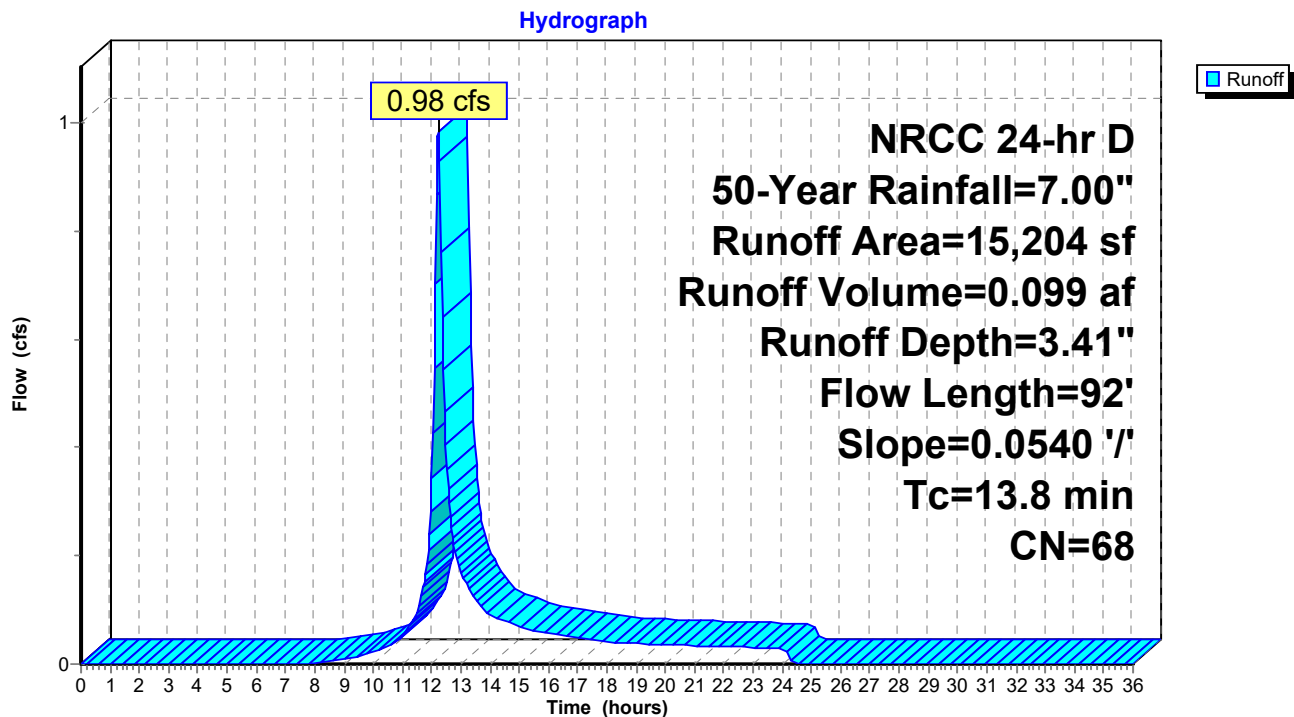
Summary for Subcatchment 1S: EX-1

Runoff = 0.98 cfs @ 12.22 hrs, Volume= 0.099 af, Depth= 3.41"
 Routed to Link 7L : DP-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 50-Year Rainfall=7.00"

Area (sf)	CN	Description
14,044	68	<50% Grass cover, Poor, HSG A
1,160	68	<50% Grass cover, Poor, HSG A
15,204	68	Weighted Average
15,204		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.8	92	0.0540	0.11		Sheet Flow, GRASS Grass: Bermuda n= 0.410 P2= 3.17"

Subcatchment 1S: EX-1

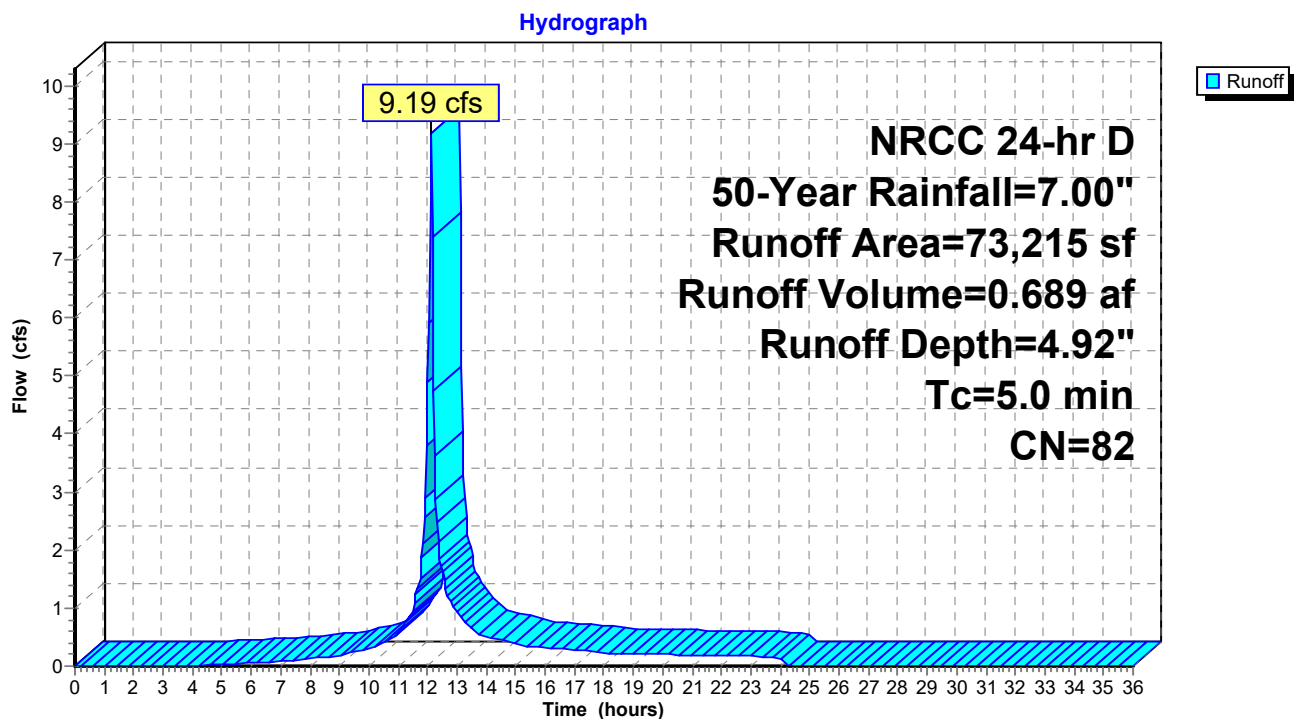
Summary for Subcatchment 2S: EX-2

Runoff = 9.19 cfs @ 12.12 hrs, Volume= 0.689 af, Depth= 4.92"
 Routed to Link 7L : DP-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 50-Year Rainfall=7.00"

Area (sf)	CN	Description
26,739	68	<50% Grass cover, Poor, HSG A
9,853	86	<50% Grass cover, Poor, HSG C
7,536	68	<50% Grass cover, Poor, HSG A
* 29,087	98	Paved parking, HSG A
73,215	82	Weighted Average
44,128		60.27% Pervious Area
29,087		39.73% Impervious Area

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

Subcatchment 2S: EX-2

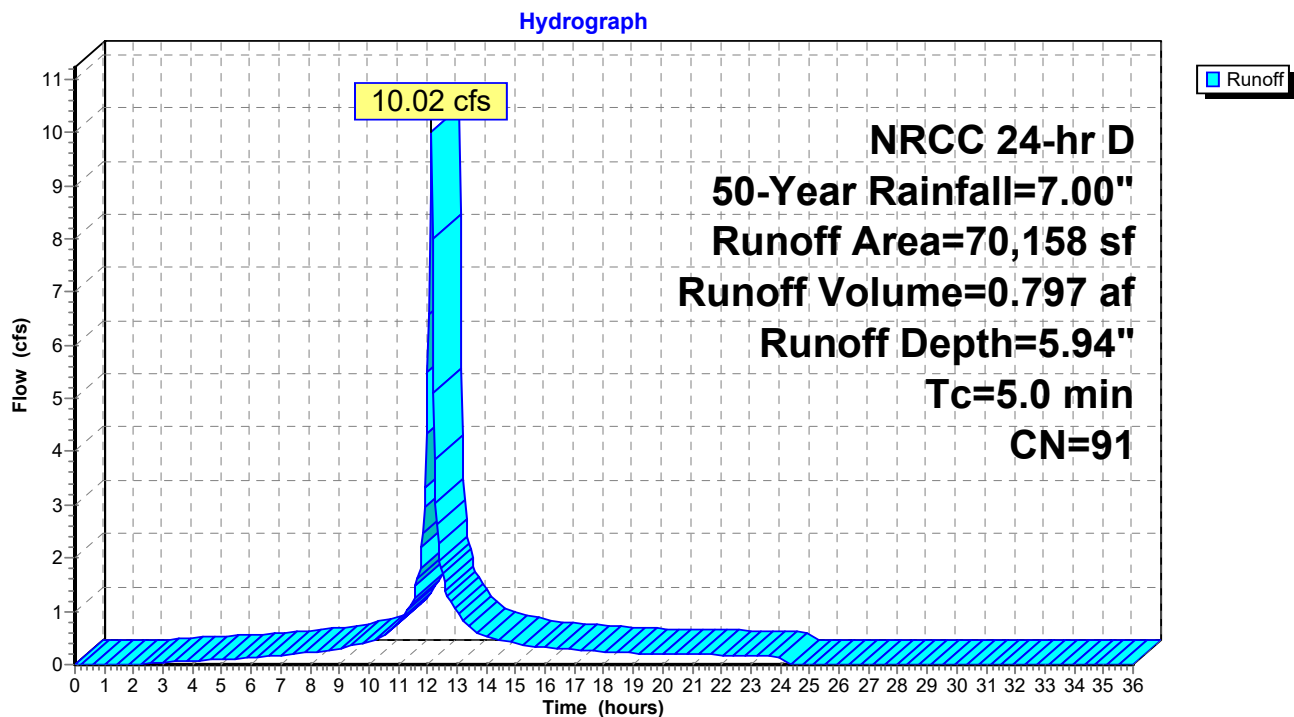
Summary for Subcatchment 3S: EX-3

Runoff = 10.02 cfs @ 12.11 hrs, Volume= 0.797 af, Depth= 5.94"
 Routed to Link 7L : DP-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 50-Year Rainfall=7.00"

Area (sf)	CN	Description
50,042	98	Paved parking, HSG C
5,322	86	<50% Grass cover, Poor, HSG C
14,794	68	<50% Grass cover, Poor, HSG A
70,158	91	Weighted Average
20,116		28.67% Pervious Area
50,042		71.33% Impervious Area

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

Subcatchment 3S: EX-3

Summary for Subcatchment 4S: EX-4

Runoff = 15.58 cfs @ 12.26 hrs, Volume= 1.899 af, Depth= 6.05"
 Routed to Link 12L : DP-3

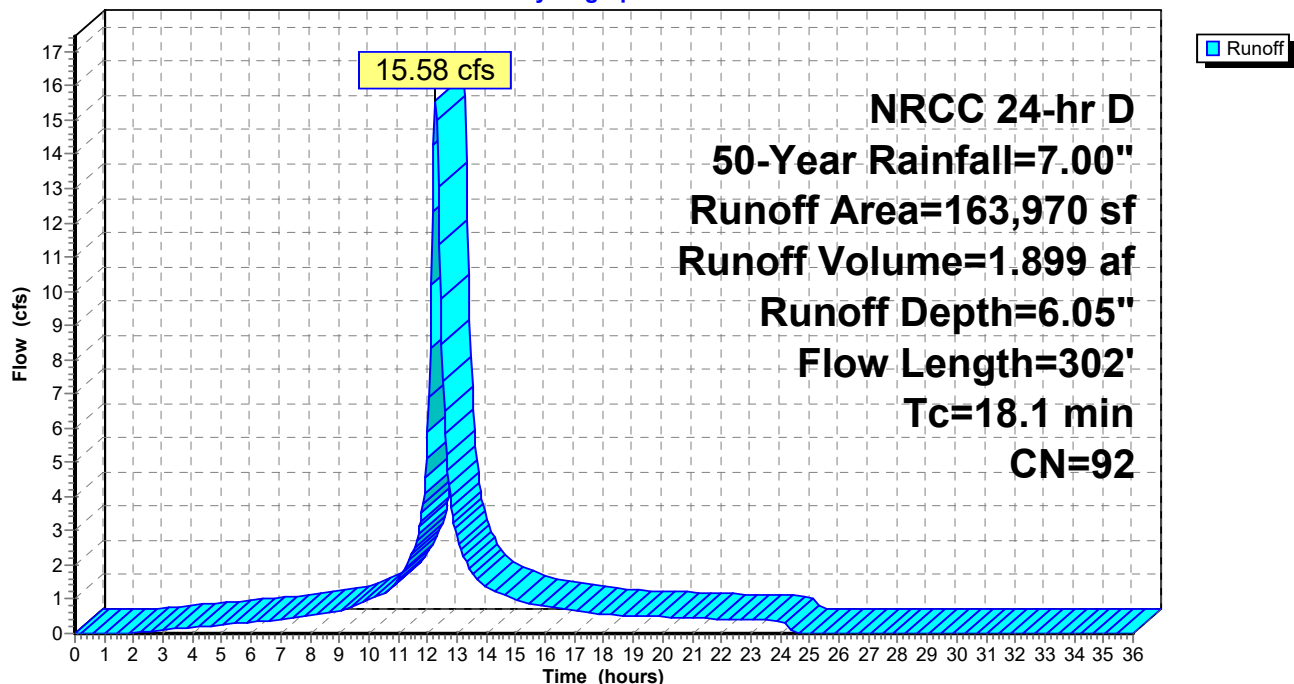
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 50-Year Rainfall=7.00"

Area (sf)	CN	Description
* 111,285	98	Paved parking, HSG A
* 2,220	98	Cement Concrete Sidewalk
28,989	86	<50% Grass cover, Poor, HSG C
21,476	68	<50% Grass cover, Poor, HSG A
163,970	92	Weighted Average
50,465		30.78% Pervious Area
113,505		69.22% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.0	76	0.0220	0.07		Sheet Flow, GRASS Grass: Bermuda n= 0.410 P2= 3.17"
0.3	24	0.0400	1.36		Sheet Flow, PAVEMENT Smooth surfaces n= 0.011 P2= 3.17"
0.8	202	0.0400	4.06		Shallow Concentrated Flow, PAVEMENT Paved Kv= 20.3 fps
18.1	302	Total			

Subcatchment 4S: EX-4

Hydrograph



Summary for Subcatchment 5S: EX-5

Runoff = 18.98 cfs @ 12.12 hrs, Volume= 1.453 af, Depth= 5.37"
 Routed to Link 12L : DP-3

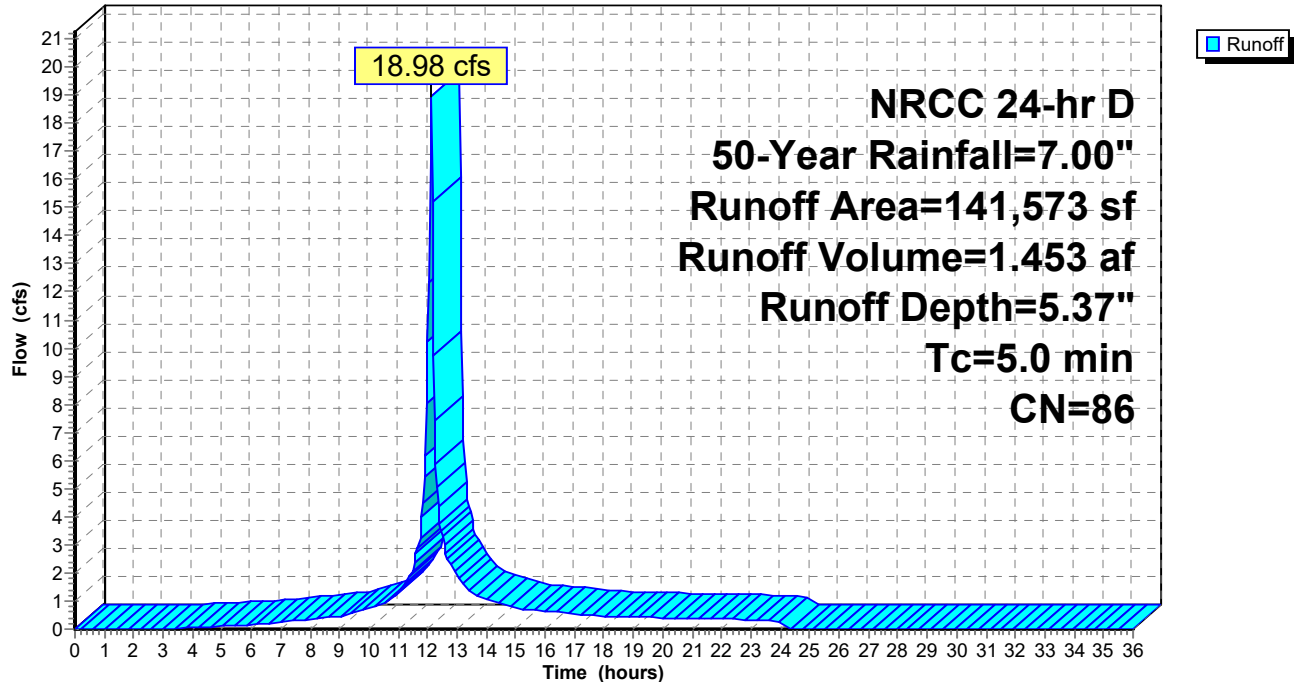
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 50-Year Rainfall=7.00"

	Area (sf)	CN	Description
*	73,632	98	Paved parking, HSG A
*	6,261	98	Cement Concrete Sidewalk
	53,820	68	<50% Grass cover, Poor, HSG A
	7,860	86	<50% Grass cover, Poor, HSG C
	141,573	86	Weighted Average
	61,680		43.57% Pervious Area
	79,893		56.43% Impervious Area

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

Subcatchment 5S: EX-5

Hydrograph



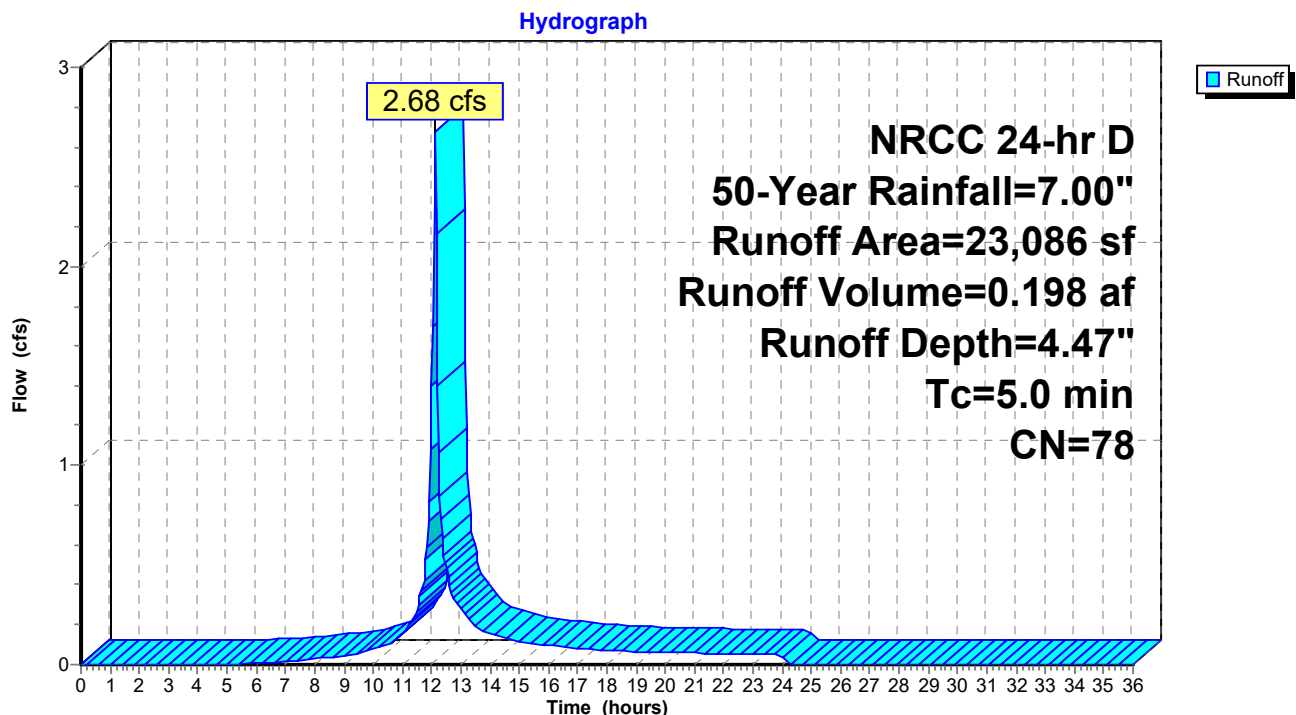
Summary for Subcatchment 6S: EX-6

Runoff = 2.68 cfs @ 12.12 hrs, Volume= 0.198 af, Depth= 4.47"
 Routed to Link 8L : DP-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 50-Year Rainfall=7.00"

	Area (sf)	CN	Description
*	7,475	98	Paved parking
*	509	98	Cement Concrete Sidewalk
	15,102	68	<50% Grass cover, Poor, HSG A
	23,086	78	Weighted Average
	15,102		65.42% Pervious Area
	7,984		34.58% Impervious Area

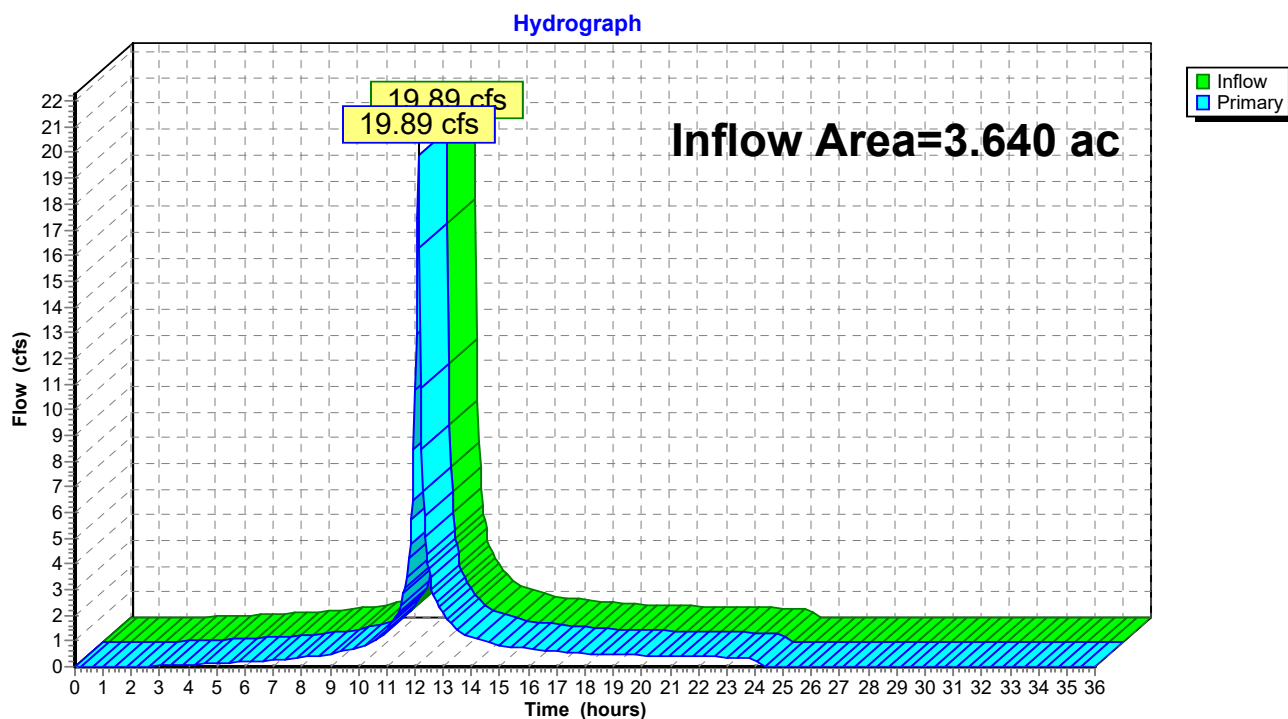
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, DIRECT

Subcatchment 6S: EX-6

Summary for Link 7L: DP-1

Inflow Area = 3.640 ac, 49.90% Impervious, Inflow Depth = 5.22" for 50-Year event
Inflow = 19.89 cfs @ 12.12 hrs, Volume= 1.585 af
Primary = 19.89 cfs @ 12.12 hrs, Volume= 1.585 af, Atten= 0%, Lag= 0.0 min

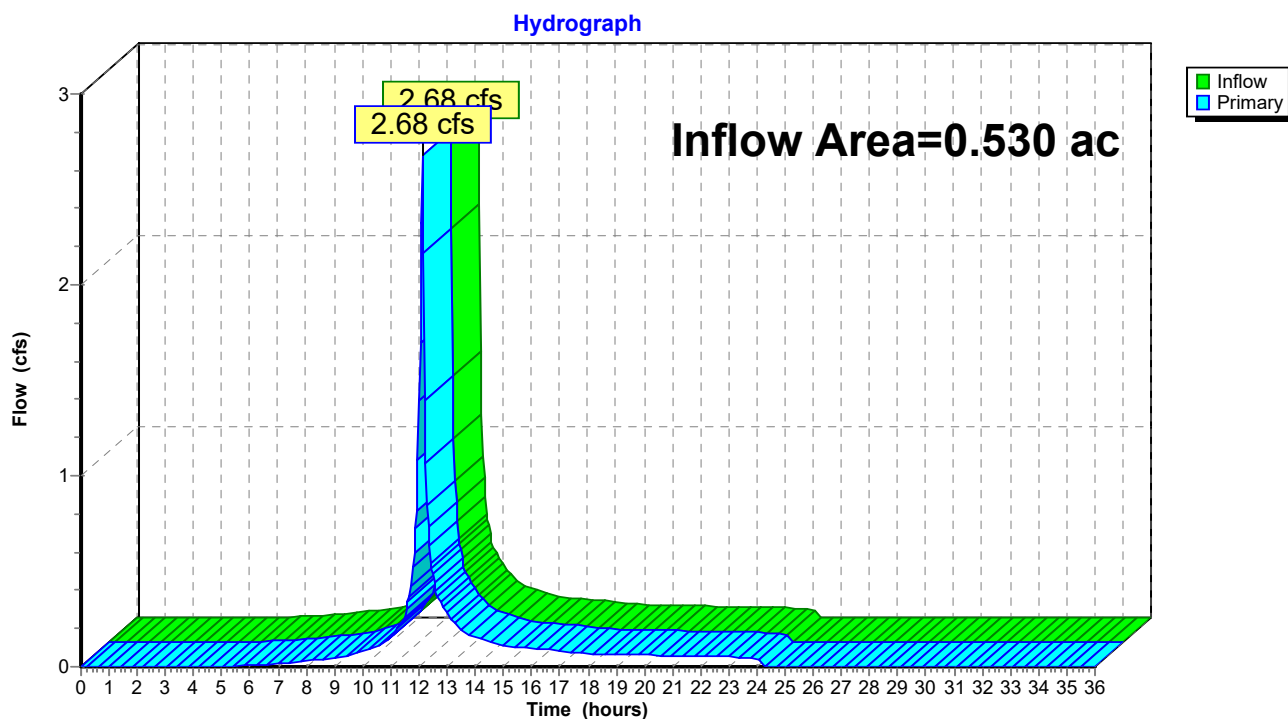
Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs

Link 7L: DP-1

Summary for Link 8L: DP-2

Inflow Area = 0.530 ac, 34.58% Impervious, Inflow Depth = 4.47" for 50-Year event
Inflow = 2.68 cfs @ 12.12 hrs, Volume= 0.198 af
Primary = 2.68 cfs @ 12.12 hrs, Volume= 0.198 af, Atten= 0%, Lag= 0.0 min

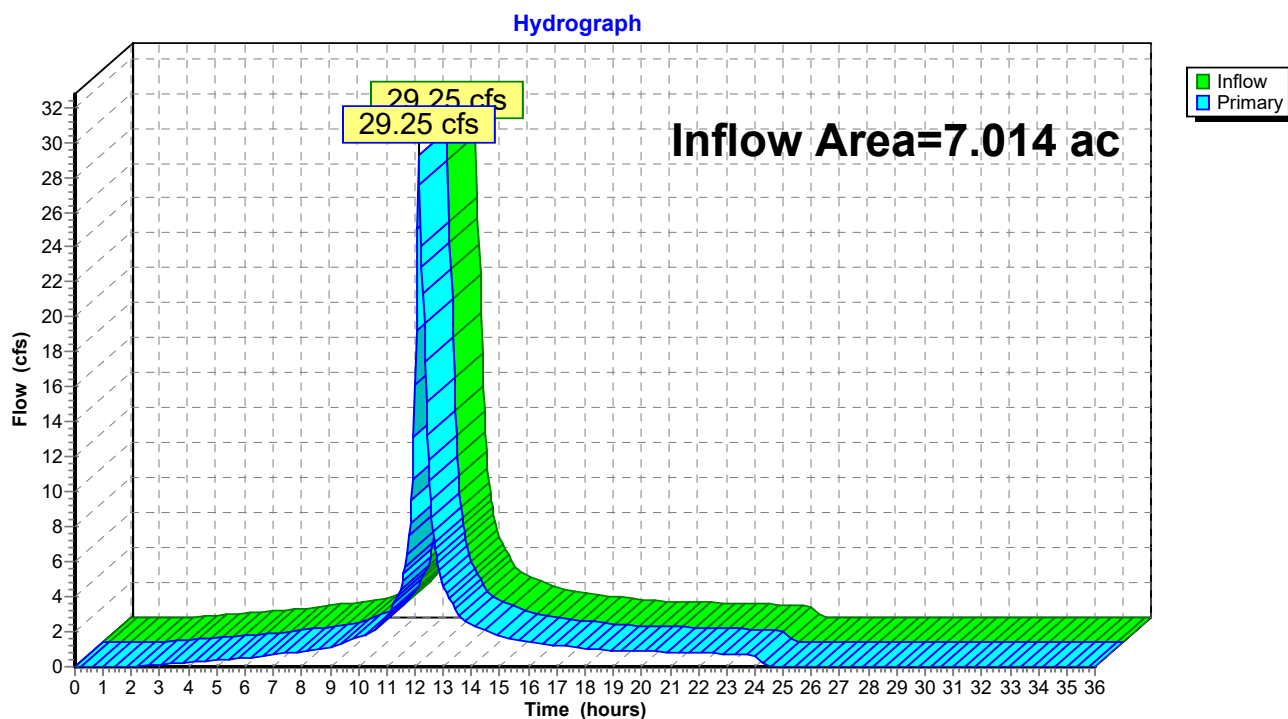
Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs

Link 8L: DP-2

Summary for Link 12L: DP-3

Inflow Area = 7.014 ac, 63.30% Impervious, Inflow Depth = 5.74" for 50-Year event
Inflow = 29.25 cfs @ 12.13 hrs, Volume= 3.353 af
Primary = 29.25 cfs @ 12.13 hrs, Volume= 3.353 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs

Link 12L: DP-3

Time span=0.00-36.00 hrs, dt=0.04 hrs, 901 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: EX-1 Runoff Area=15,204 sf 0.00% Impervious Runoff Depth=4.54"
Flow Length=92' Slope=0.0540 '/' Tc=13.8 min CN=68 Runoff=1.32 cfs 0.132 af

Subcatchment2S: EX-2 Runoff Area=73,215 sf 39.73% Impervious Runoff Depth=6.20"
Tc=5.0 min CN=82 Runoff=11.45 cfs 0.869 af

Subcatchment3S: EX-3 Runoff Area=70,158 sf 71.33% Impervious Runoff Depth=7.28"
Tc=5.0 min CN=91 Runoff=12.13 cfs 0.977 af

Subcatchment4S: EX-4 Runoff Area=163,970 sf 69.22% Impervious Runoff Depth=7.40"
Flow Length=302' Tc=18.1 min CN=92 Runoff=18.83 cfs 2.321 af

Subcatchment5S: EX-5 Runoff Area=141,573 sf 56.43% Impervious Runoff Depth=6.68"
Tc=5.0 min CN=86 Runoff=23.31 cfs 1.809 af

Subcatchment6S: EX-6 Runoff Area=23,086 sf 34.58% Impervious Runoff Depth=5.72"
Tc=5.0 min CN=78 Runoff=3.39 cfs 0.253 af

Link 7L: DP-1 Inflow=24.50 cfs 1.978 af
Primary=24.50 cfs 1.978 af

Link 8L: DP-2 Inflow=3.39 cfs 0.253 af
Primary=3.39 cfs 0.253 af

Link 12L: DP-3 Inflow=35.74 cfs 4.131 af
Primary=35.74 cfs 4.131 af

Total Runoff Area = 11.185 ac Runoff Volume = 6.361 af Average Runoff Depth = 6.83"
42.42% Pervious = 4.745 ac 57.58% Impervious = 6.440 ac

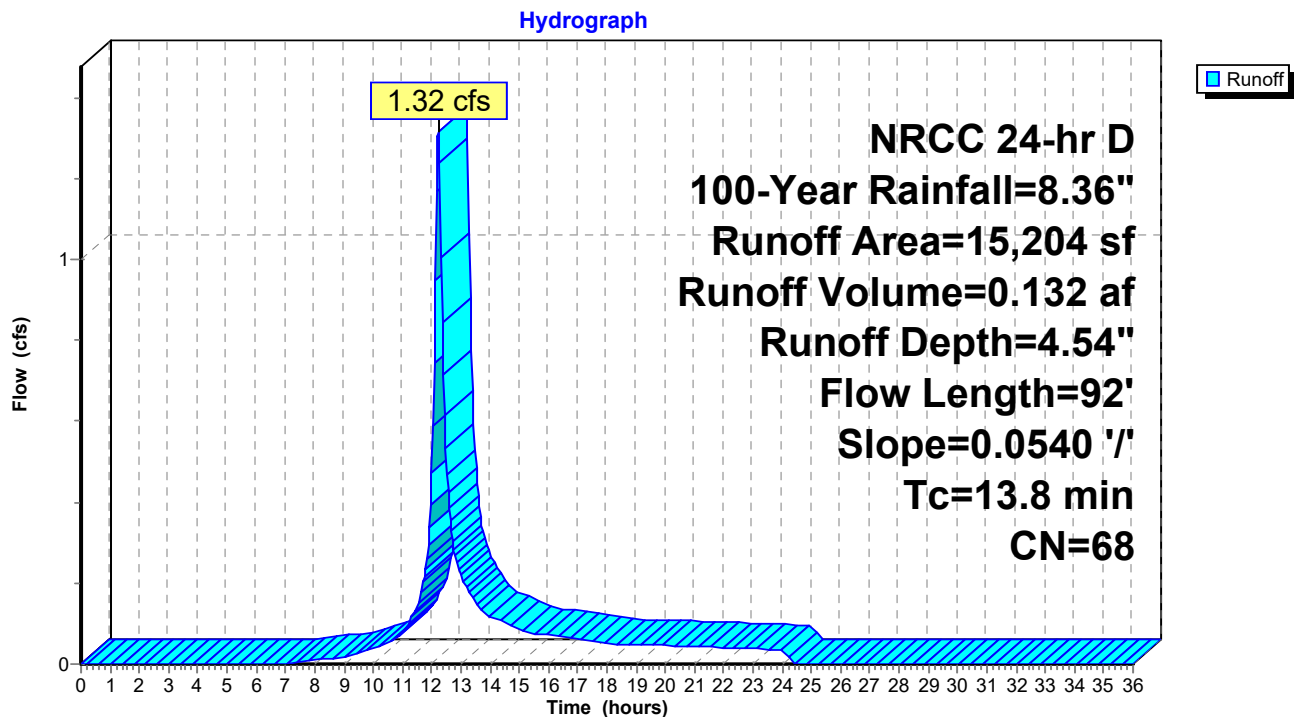
Summary for Subcatchment 1S: EX-1

Runoff = 1.32 cfs @ 12.22 hrs, Volume= 0.132 af, Depth= 4.54"
 Routed to Link 7L : DP-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 100-Year Rainfall=8.36"

Area (sf)	CN	Description
14,044	68	<50% Grass cover, Poor, HSG A
1,160	68	<50% Grass cover, Poor, HSG A
15,204	68	Weighted Average
15,204		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.8	92	0.0540	0.11		Sheet Flow, GRASS Grass: Bermuda n= 0.410 P2= 3.17"

Subcatchment 1S: EX-1

Summary for Subcatchment 2S: EX-2

Runoff = 11.45 cfs @ 12.12 hrs, Volume= 0.869 af, Depth= 6.20"
 Routed to Link 7L : DP-1

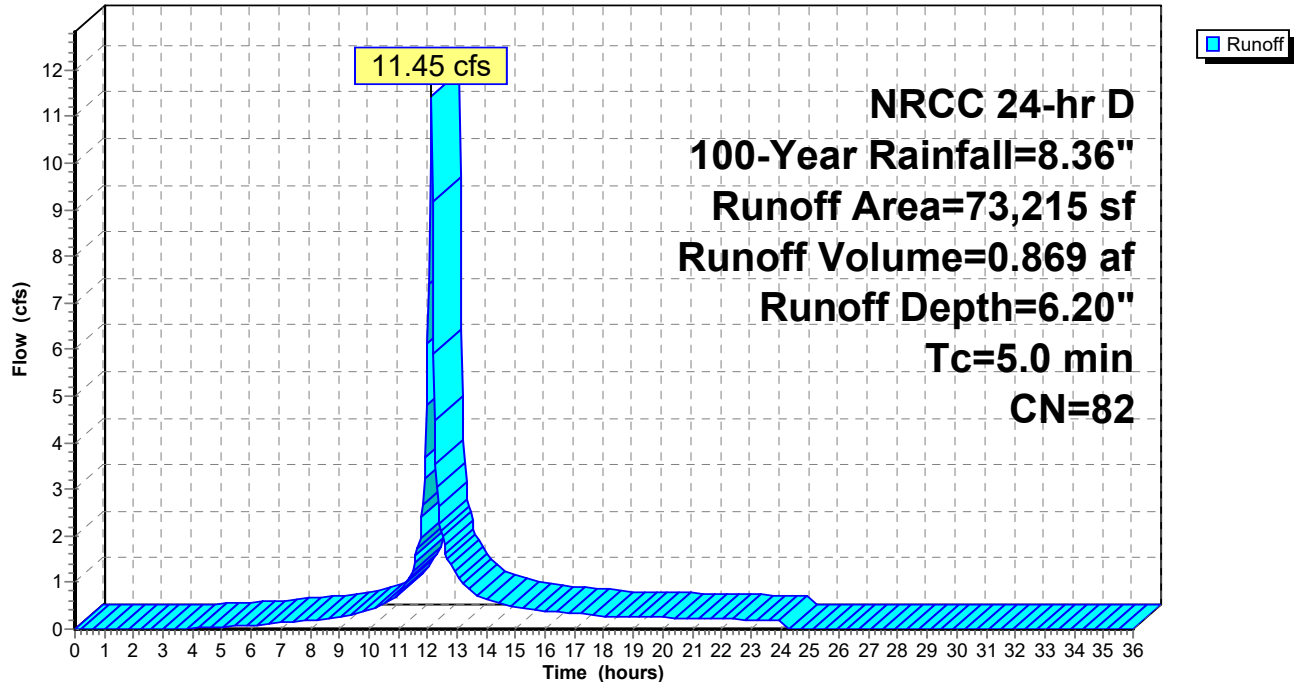
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 100-Year Rainfall=8.36"

Area (sf)	CN	Description
26,739	68	<50% Grass cover, Poor, HSG A
9,853	86	<50% Grass cover, Poor, HSG C
7,536	68	<50% Grass cover, Poor, HSG A
* 29,087	98	Paved parking, HSG A
73,215	82	Weighted Average
44,128		60.27% Pervious Area
29,087		39.73% Impervious Area

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

Subcatchment 2S: EX-2

Hydrograph



Summary for Subcatchment 3S: EX-3

Runoff = 12.13 cfs @ 12.11 hrs, Volume= 0.977 af, Depth= 7.28"
 Routed to Link 7L : DP-1

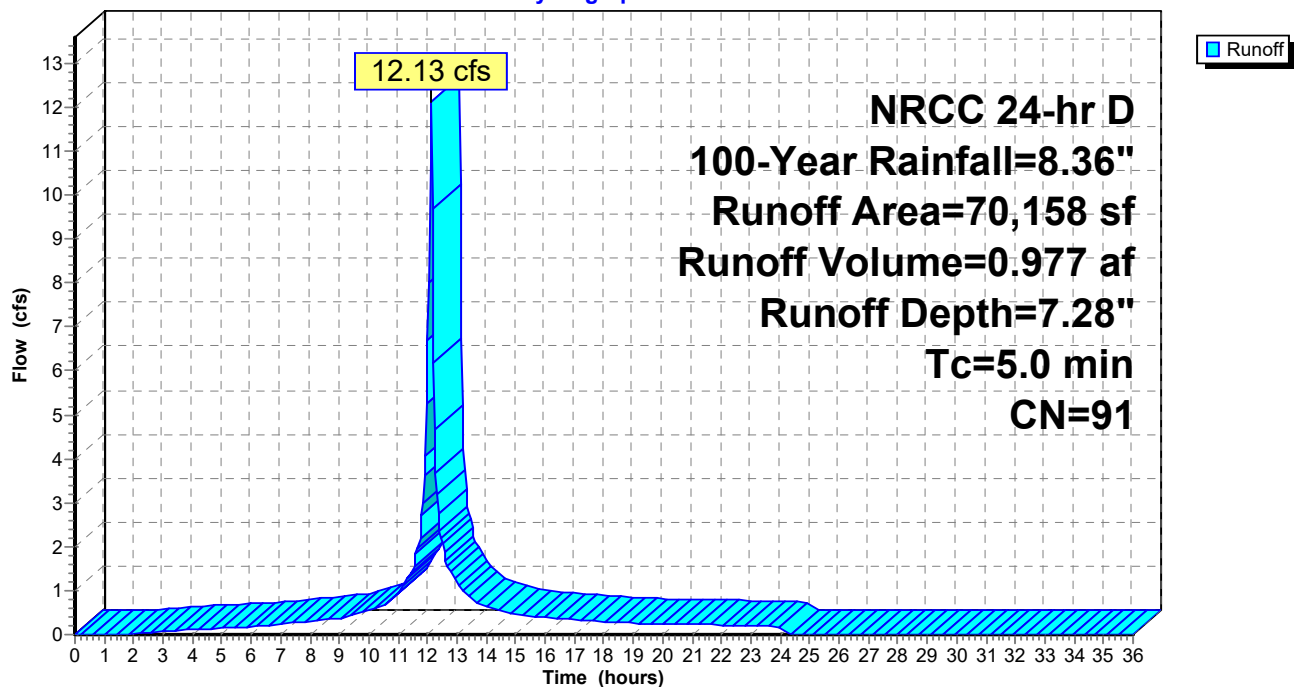
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 100-Year Rainfall=8.36"

Area (sf)	CN	Description
50,042	98	Paved parking, HSG C
5,322	86	<50% Grass cover, Poor, HSG C
14,794	68	<50% Grass cover, Poor, HSG A
70,158	91	Weighted Average
20,116		28.67% Pervious Area
50,042		71.33% Impervious Area

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

Subcatchment 3S: EX-3

Hydrograph



Summary for Subcatchment 4S: EX-4

Runoff = 18.83 cfs @ 12.26 hrs, Volume= 2.321 af, Depth= 7.40"
 Routed to Link 12L : DP-3

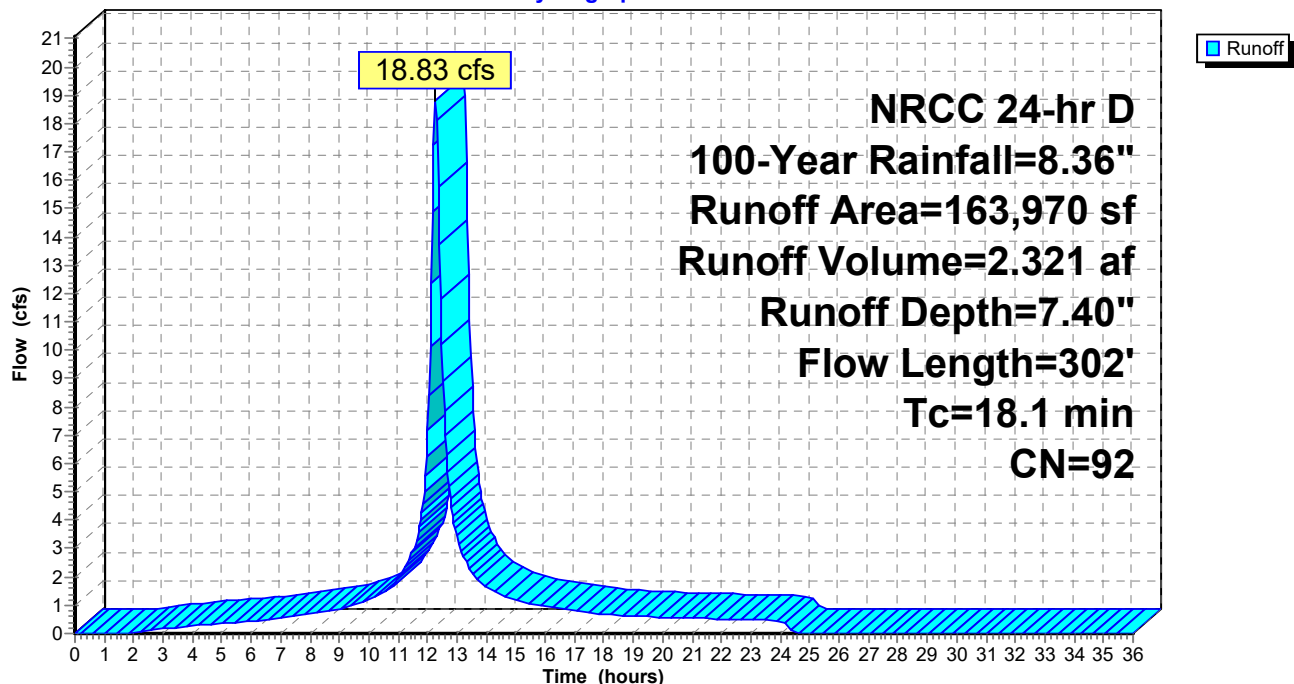
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 100-Year Rainfall=8.36"

Area (sf)	CN	Description
* 111,285	98	Paved parking, HSG A
* 2,220	98	Cement Concrete Sidewalk
28,989	86	<50% Grass cover, Poor, HSG C
21,476	68	<50% Grass cover, Poor, HSG A
163,970	92	Weighted Average
50,465		30.78% Pervious Area
113,505		69.22% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.0	76	0.0220	0.07		Sheet Flow, GRASS Grass: Bermuda n= 0.410 P2= 3.17"
0.3	24	0.0400	1.36		Sheet Flow, PAVEMENT Smooth surfaces n= 0.011 P2= 3.17"
0.8	202	0.0400	4.06		Shallow Concentrated Flow, PAVEMENT Paved Kv= 20.3 fps
18.1	302	Total			

Subcatchment 4S: EX-4

Hydrograph



Summary for Subcatchment 5S: EX-5

Runoff = 23.31 cfs @ 12.11 hrs, Volume= 1.809 af, Depth= 6.68"
 Routed to Link 12L : DP-3

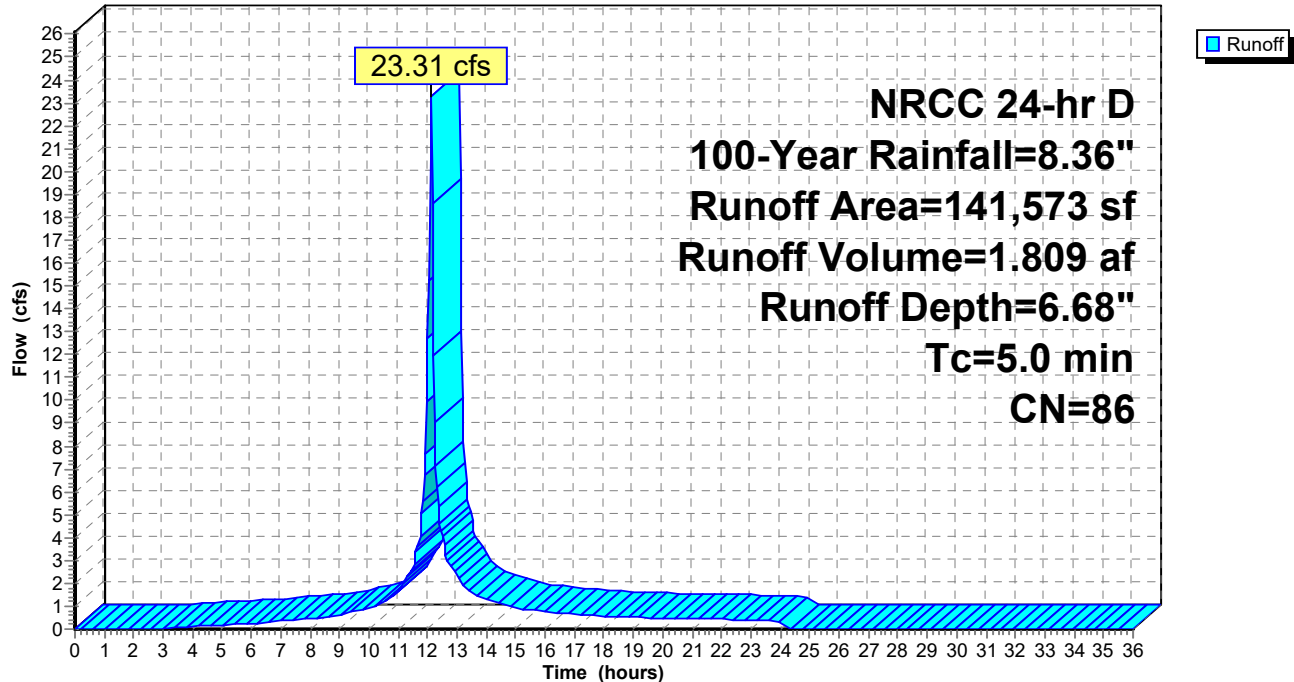
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 100-Year Rainfall=8.36"

	Area (sf)	CN	Description
*	73,632	98	Paved parking, HSG A
*	6,261	98	Cement Concrete Sidewalk
	53,820	68	<50% Grass cover, Poor, HSG A
	7,860	86	<50% Grass cover, Poor, HSG C
	141,573	86	Weighted Average
	61,680		43.57% Pervious Area
	79,893		56.43% Impervious Area

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

Subcatchment 5S: EX-5

Hydrograph



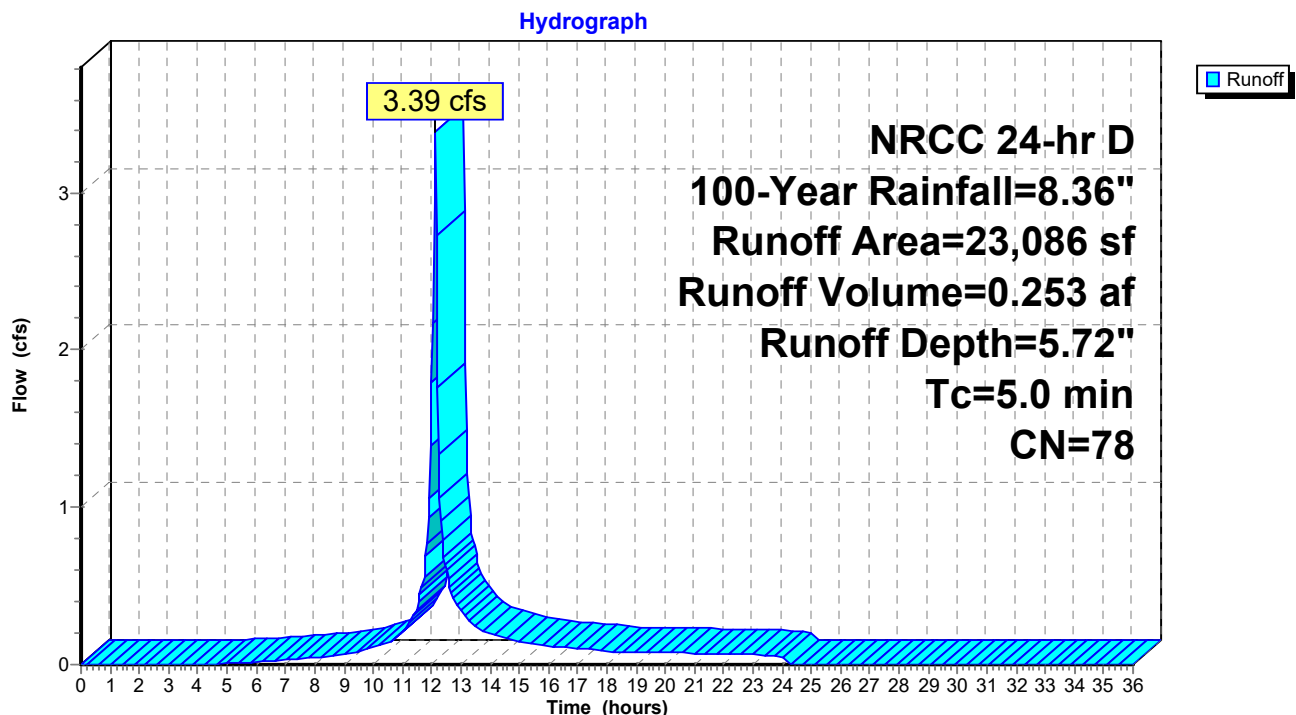
Summary for Subcatchment 6S: EX-6

Runoff = 3.39 cfs @ 12.12 hrs, Volume= 0.253 af, Depth= 5.72"
 Routed to Link 8L : DP-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 100-Year Rainfall=8.36"

	Area (sf)	CN	Description
*	7,475	98	Paved parking
*	509	98	Cement Concrete Sidewalk
	15,102	68	<50% Grass cover, Poor, HSG A
	23,086	78	Weighted Average
	15,102		65.42% Pervious Area
	7,984		34.58% Impervious Area

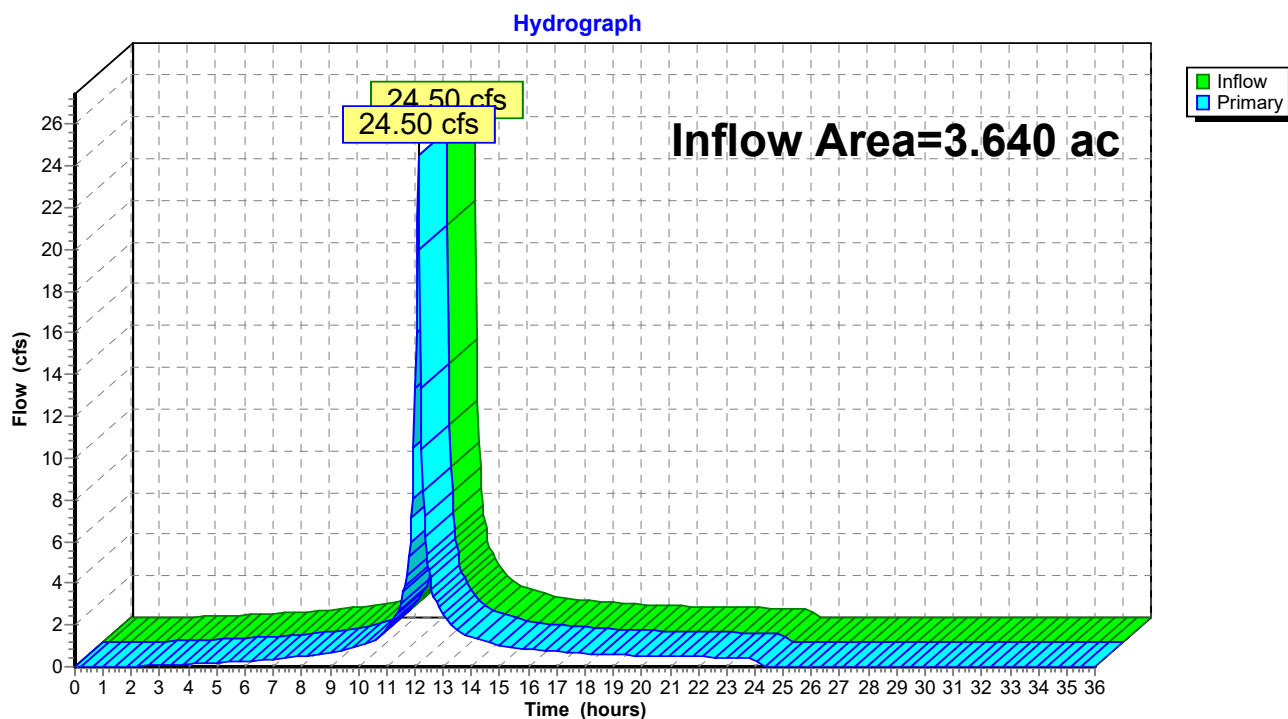
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, DIRECT

Subcatchment 6S: EX-6

Summary for Link 7L: DP-1

Inflow Area = 3.640 ac, 49.90% Impervious, Inflow Depth = 6.52" for 100-Year event
Inflow = 24.50 cfs @ 12.12 hrs, Volume= 1.978 af
Primary = 24.50 cfs @ 12.12 hrs, Volume= 1.978 af, Atten= 0%, Lag= 0.0 min

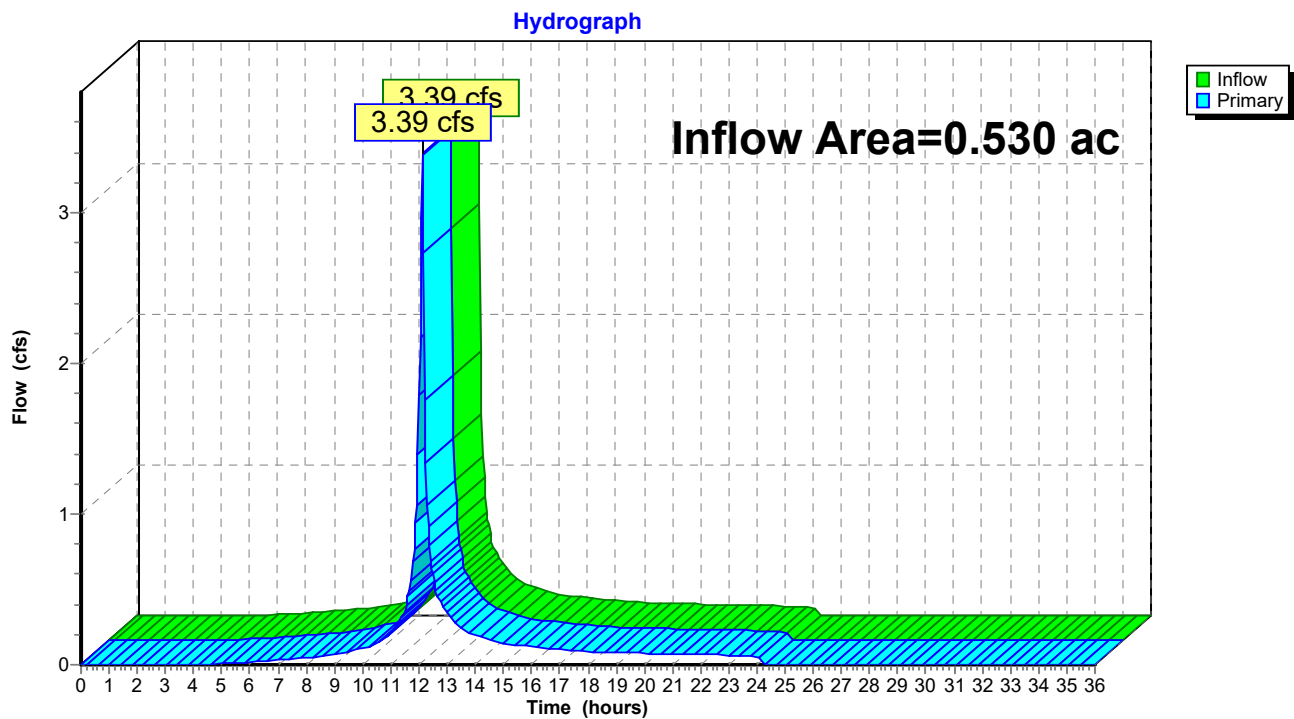
Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs

Link 7L: DP-1

Summary for Link 8L: DP-2

Inflow Area = 0.530 ac, 34.58% Impervious, Inflow Depth = 5.72" for 100-Year event
Inflow = 3.39 cfs @ 12.12 hrs, Volume= 0.253 af
Primary = 3.39 cfs @ 12.12 hrs, Volume= 0.253 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs

Link 8L: DP-2

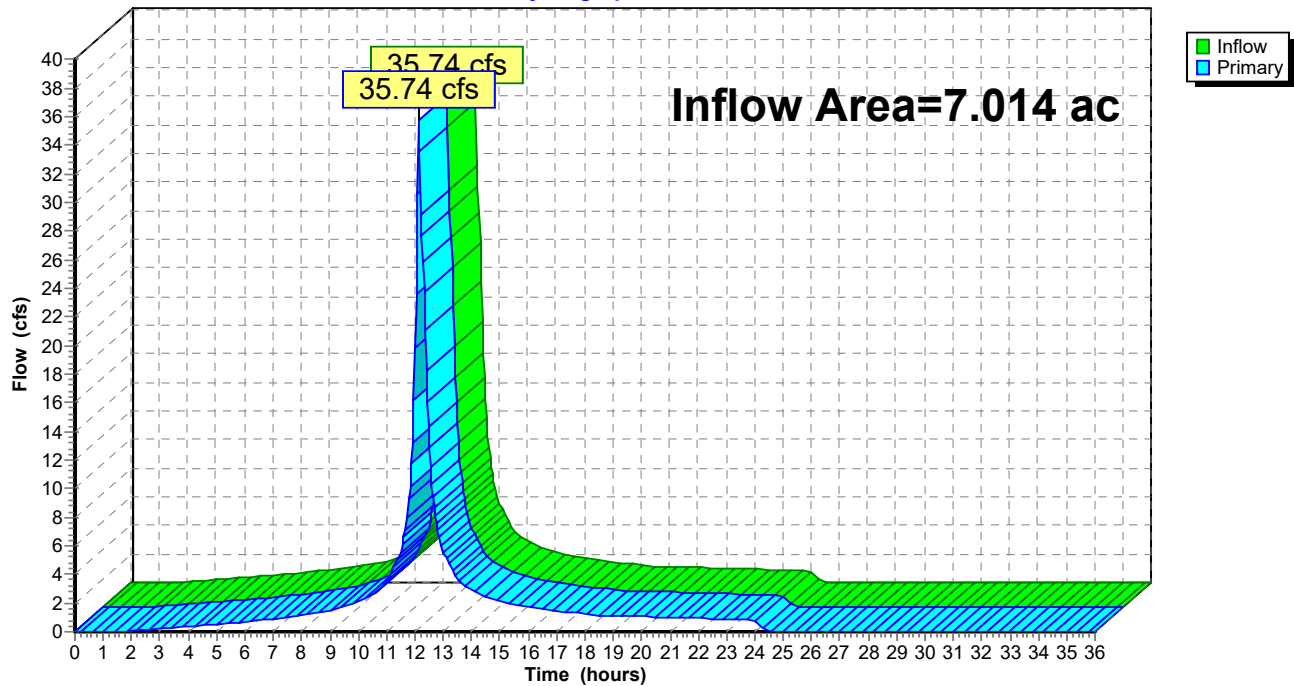
Summary for Link 12L: DP-3

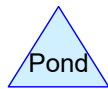
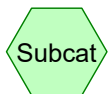
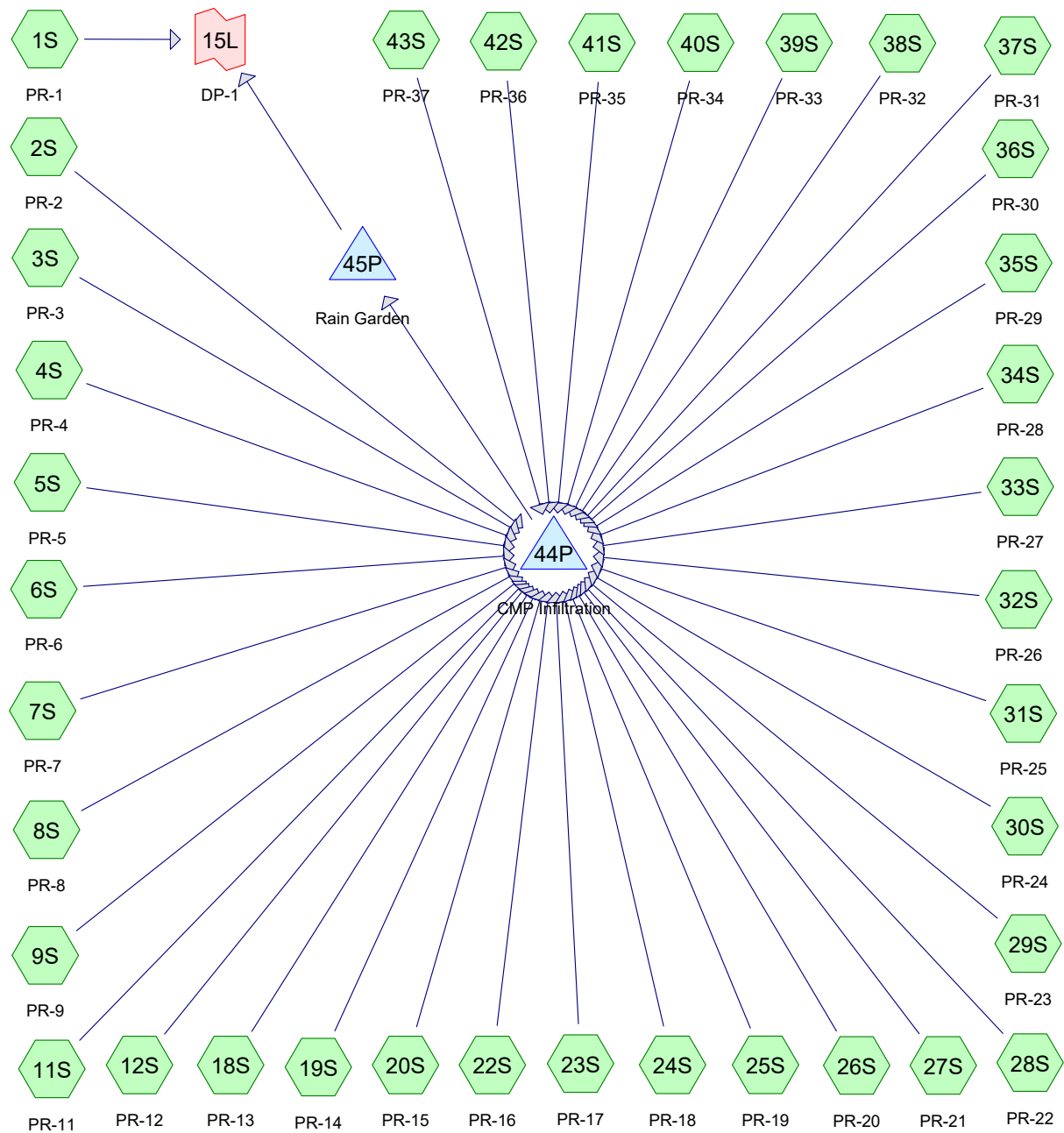
Inflow Area = 7.014 ac, 63.30% Impervious, Inflow Depth = 7.07" for 100-Year event
Inflow = 35.74 cfs @ 12.13 hrs, Volume= 4.131 af
Primary = 35.74 cfs @ 12.13 hrs, Volume= 4.131 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs

Link 12L: DP-3

Hydrograph





Routing Diagram for T1180_POST - Contech Edit- TEC Edit

Prepared by TEC, Inc, Printed 2/8/2024

HydroCAD® 10.20-4a s/n 02793 © 2023 HydroCAD Software Solutions LLC

T1180_POST - Contech Edit- TEC Edit

Prepared by TEC, Inc

Printed 2/8/2024

HydroCAD® 10.20-4a s/n 02793 © 2023 HydroCAD Software Solutions LLC

Page 2

Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-Year	NRCC 24-hr	D	Default	24.00	1	3.09	2
2	10-Year	NRCC 24-hr	D	Default	24.00	1	4.65	2
3	25-Year	NRCC 24-hr	D	Default	24.00	1	5.87	2
4	50-Year	NRCC 24-hr	D	Default	24.00	1	7.00	2
5	100-Year	NRCC 24-hr	D	Default	24.00	1	8.36	2

T1180_POST - Contech Edit- TEC Edit

Prepared by TEC, Inc

Printed 2/8/2024

HydroCAD® 10.20-4a s/n 02793 © 2023 HydroCAD Software Solutions LLC

Page 3

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
1.531	39	>75% Grass cover, Good, HSG A (1S, 4S, 5S, 6S, 7S, 8S, 9S, 11S, 12S, 18S, 19S, 20S, 23S, 24S, 25S, 26S, 27S, 28S, 29S, 30S, 31S, 32S, 33S, 34S, 35S, 36S, 37S, 38S, 39S, 40S, 41S, 42S, 43S)
0.605	74	>75% Grass cover, Good, HSG C (2S, 3S, 4S, 5S, 8S, 9S, 10S, 11S, 12S, 18S, 19S, 23S, 28S, 29S, 30S, 31S, 34S)
0.058	80	>75% Grass cover, Good, HSG D (10S)
0.649	98	Cement Concrete Sidewalk, HSG A (1S, 4S, 5S, 6S, 7S, 8S, 9S, 11S, 12S, 19S, 24S, 25S, 26S, 27S, 29S, 30S, 31S, 32S, 33S, 34S, 35S, 36S, 37S, 38S, 39S, 40S, 41S, 42S, 43S)
0.264	98	Cement Concrete Sidewalk, HSG C (2S, 3S, 4S, 5S, 8S, 9S, 11S, 12S, 18S, 23S, 28S, 29S, 30S, 31S)
2.747	98	Paved parking, HSG A (1S, 4S, 5S, 6S, 7S, 8S, 9S, 11S, 12S, 18S, 19S, 20S, 22S, 23S, 24S, 25S, 26S, 27S, 28S, 29S, 30S, 31S, 32S, 33S, 34S, 35S, 36S, 37S, 38S, 39S, 40S, 41S, 42S, 43S)
1.054	98	Paved parking, HSG C (2S, 3S, 4S, 5S, 8S, 9S, 11S, 12S, 18S, 19S, 22S, 23S, 28S, 29S, 30S)
6.907	83	TOTAL AREA

Time span=0.00-36.00 hrs, dt=0.04 hrs, 901 points x 3
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: PR-1	Runoff Area=39,056 sf 43.09% Impervious Runoff Depth=0.51" Tc=5.0 min CN=64 Runoff=0.41 cfs 0.038 af
Subcatchment2S: PR-2	Runoff Area=5,989 sf 81.43% Impervious Runoff Depth=2.44" Tc=5.0 min CN=94 Runoff=0.36 cfs 0.028 af
Subcatchment3S: PR-3	Runoff Area=8,817 sf 74.45% Impervious Runoff Depth=2.25" Tc=5.0 min CN=92 Runoff=0.50 cfs 0.038 af
Subcatchment4S: PR-4	Runoff Area=6,680 sf 84.81% Impervious Runoff Depth=2.25" Tc=5.0 min CN=92 Runoff=0.38 cfs 0.029 af
Subcatchment5S: PR-5	Runoff Area=7,314 sf 77.02% Impervious Runoff Depth=1.90" Tc=5.0 min CN=88 Runoff=0.36 cfs 0.027 af
Subcatchment6S: PR-6	Runoff Area=15,529 sf 56.34% Impervious Runoff Depth=0.86" Tc=5.0 min CN=72 Runoff=0.33 cfs 0.026 af
Subcatchment7S: PR-7	Runoff Area=8,738 sf 78.69% Impervious Runoff Depth=1.66" Tc=5.0 min CN=85 Runoff=0.38 cfs 0.028 af
Subcatchment8S: PR-8	Runoff Area=16,223 sf 52.41% Impervious Runoff Depth=1.45" Tc=5.0 min CN=82 Runoff=0.62 cfs 0.045 af
Subcatchment9S: PR-9	Runoff Area=7,180 sf 74.57% Impervious Runoff Depth=1.98" Flow Length=127' Tc=7.1 min CN=89 Runoff=0.34 cfs 0.027 af
Subcatchment10S: PR-10	Runoff Area=4,103 sf 0.00% Impervious Runoff Depth=1.19" Tc=5.0 min CN=78 Runoff=0.13 cfs 0.009 af
Subcatchment11S: PR-11	Runoff Area=12,349 sf 77.12% Impervious Runoff Depth=2.25" Flow Length=257' Tc=6.6 min CN=92 Runoff=0.66 cfs 0.053 af
Subcatchment12S: PR-12	Runoff Area=12,764 sf 71.19% Impervious Runoff Depth=2.16" Tc=5.0 min CN=91 Runoff=0.70 cfs 0.053 af
Subcatchment18S: PR-13	Runoff Area=7,593 sf 39.33% Impervious Runoff Depth=0.55" Flow Length=246' Tc=16.1 min CN=65 Runoff=0.06 cfs 0.008 af
Subcatchment19S: PR-14	Runoff Area=3,225 sf 82.26% Impervious Runoff Depth=1.98" Flow Length=166' Tc=7.3 min CN=89 Runoff=0.15 cfs 0.012 af
Subcatchment20S: PR-15	Runoff Area=2,717 sf 85.79% Impervious Runoff Depth=2.07" Tc=5.0 min CN=90 Runoff=0.14 cfs 0.011 af
Subcatchment22S: PR-16	Runoff Area=1,349 sf 100.00% Impervious Runoff Depth=2.86" Flow Length=247' Tc=16.1 min CN=98 Runoff=0.06 cfs 0.007 af

Subcatchment23S: PR-17	Runoff Area=14,295 sf 71.70% Impervious Runoff Depth=2.07" Tc=5.0 min CN=90 Runoff=0.76 cfs 0.057 af
Subcatchment24S: PR-18	Runoff Area=9,416 sf 96.73% Impervious Runoff Depth=2.64" Flow Length=189' Tc=7.1 min CN=96 Runoff=0.54 cfs 0.048 af
Subcatchment25S: PR-19	Runoff Area=1,787 sf 75.15% Impervious Runoff Depth=1.52" Tc=5.0 min CN=83 Runoff=0.07 cfs 0.005 af
Subcatchment26S: PR-20	Runoff Area=6,770 sf 88.61% Impervious Runoff Depth=2.16" Tc=5.0 min CN=91 Runoff=0.37 cfs 0.028 af
Subcatchment27S: PR-21	Runoff Area=6,755 sf 89.10% Impervious Runoff Depth=2.25" Tc=5.0 min CN=92 Runoff=0.38 cfs 0.029 af
Subcatchment28S: PR-22	Runoff Area=5,124 sf 73.32% Impervious Runoff Depth=1.59" Tc=5.0 min CN=84 Runoff=0.21 cfs 0.016 af
Subcatchment29S: PR-23	Runoff Area=6,611 sf 79.08% Impervious Runoff Depth=1.90" Tc=5.0 min CN=88 Runoff=0.33 cfs 0.024 af
Subcatchment30S: PR-24	Runoff Area=5,313 sf 80.16% Impervious Runoff Depth=1.90" Tc=5.0 min CN=88 Runoff=0.26 cfs 0.019 af
Subcatchment31S: PR-25	Runoff Area=8,212 sf 59.72% Impervious Runoff Depth=1.32" Flow Length=218' Tc=11.9 min CN=80 Runoff=0.22 cfs 0.021 af
Subcatchment32S: PR-26	Runoff Area=5,770 sf 92.53% Impervious Runoff Depth=2.44" Tc=5.0 min CN=94 Runoff=0.35 cfs 0.027 af
Subcatchment33S: PR-27	Runoff Area=5,730 sf 91.10% Impervious Runoff Depth=2.34" Tc=5.0 min CN=93 Runoff=0.34 cfs 0.026 af
Subcatchment34S: PR-28	Runoff Area=4,491 sf 45.51% Impervious Runoff Depth=0.76" Flow Length=193' Tc=14.0 min CN=70 Runoff=0.06 cfs 0.007 af
Subcatchment35S: PR-29	Runoff Area=1,417 sf 81.37% Impervious Runoff Depth=1.82" Tc=5.0 min CN=87 Runoff=0.07 cfs 0.005 af
Subcatchment36S: PR-30	Runoff Area=8,853 sf 73.61% Impervious Runoff Depth=1.45" Flow Length=198' Tc=5.4 min CN=82 Runoff=0.33 cfs 0.025 af
Subcatchment37S: PR-31	Runoff Area=9,984 sf 75.99% Impervious Runoff Depth=1.59" Flow Length=205' Tc=5.3 min CN=84 Runoff=0.41 cfs 0.030 af
Subcatchment38S: PR-32	Runoff Area=16,004 sf 53.26% Impervious Runoff Depth=0.76" Flow Length=154' Tc=14.9 min CN=70 Runoff=0.20 cfs 0.023 af
Subcatchment39S: PR-33	Runoff Area=7,626 sf 79.02% Impervious Runoff Depth=1.74" Tc=5.0 min CN=86 Runoff=0.35 cfs 0.025 af
Subcatchment40S: PR-34	Runoff Area=3,135 sf 83.67% Impervious Runoff Depth=1.90" Flow Length=134' Tc=5.6 min CN=88 Runoff=0.15 cfs 0.011 af

Subcatchment41S: PR-35 Runoff Area=459 sf 98.47% Impervious Runoff Depth=2.75"
Tc=5.0 min CN=97 Runoff=0.03 cfs 0.002 af

Subcatchment42S: PR-36 Runoff Area=6,465 sf 87.47% Impervious Runoff Depth=2.16"
Tc=5.0 min CN=91 Runoff=0.36 cfs 0.027 af

Subcatchment43S: PR-37 Runoff Area=7,047 sf 90.17% Impervious Runoff Depth=2.25"
Tc=5.0 min CN=92 Runoff=0.40 cfs 0.030 af

Pond 44P: CMP Infiltration Peak Elev=268.38' Storage=0.061 af Inflow=10.99 cfs 0.875 af
Discarded=0.17 cfs 0.228 af Primary=9.28 cfs 0.647 af Outflow=9.45 cfs 0.875 af

Pond 45P: Rain Garden Peak Elev=258.68' Storage=7,426 cf Inflow=9.28 cfs 0.647 af
Discarded=2.93 cfs 0.648 af Primary=0.00 cfs 0.000 af Outflow=2.93 cfs 0.648 af

Link 15L: DP-1 Inflow=0.41 cfs 0.038 af
Primary=0.41 cfs 0.038 af

Link 16L: DP-2 Primary=0.00 cfs 0.000 af

Link 17L: DP-3 Inflow=0.13 cfs 0.009 af
Primary=0.13 cfs 0.009 af

Total Runoff Area = 6.907 ac Runoff Volume = 0.922 af Average Runoff Depth = 1.60"
31.76% Pervious = 2.194 ac 68.24% Impervious = 4.714 ac

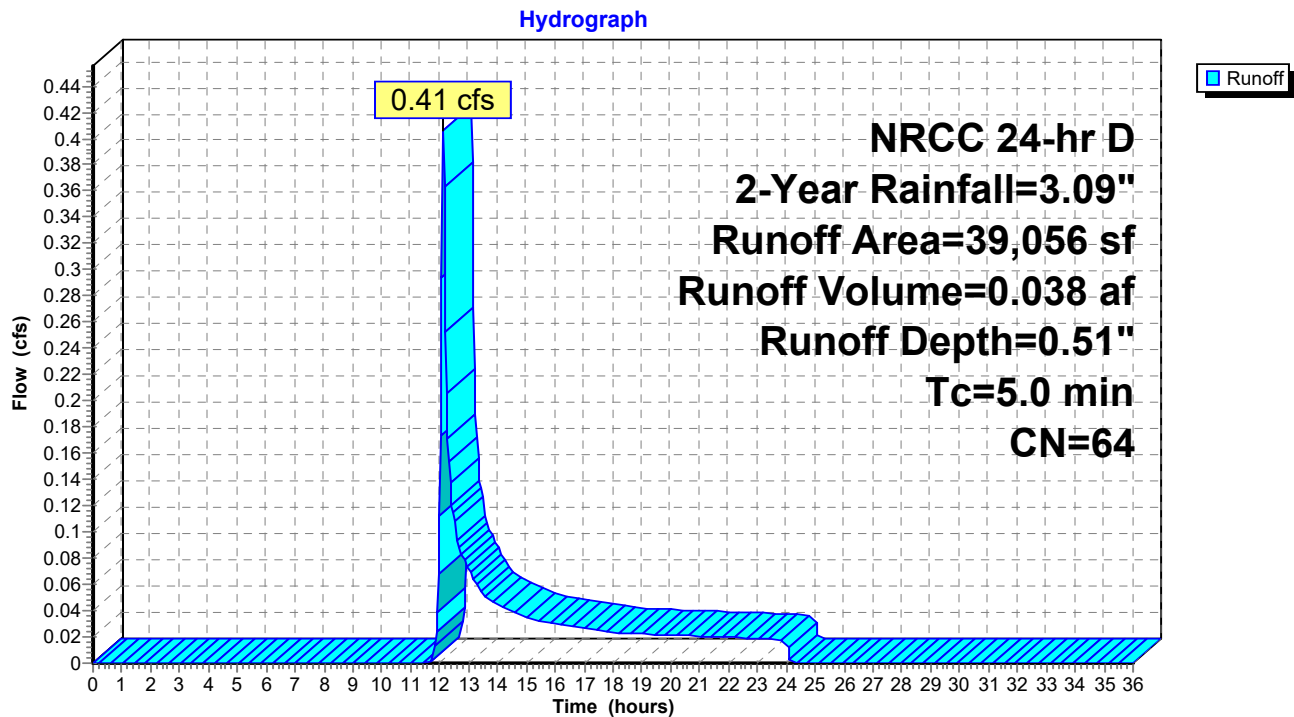
Summary for Subcatchment 1S: PR-1

Runoff = 0.41 cfs @ 12.13 hrs, Volume= 0.038 af, Depth= 0.51"
 Routed to Link 15L : DP-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 2-Year Rainfall=3.09"

Area (sf)	CN	Description
6,150	98	Paved parking, HSG A
* 6,781	98	Paved parking, HSG A
* 2,817	98	Cement Concrete Sidewalk, HSG A
* 1,080	98	Cement Concrete Sidewalk, HSG A
20,357	39	>75% Grass cover, Good, HSG A
1,871	39	>75% Grass cover, Good, HSG A
39,056	64	Weighted Average
22,228		56.91% Pervious Area
16,828		43.09% Impervious Area

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

Subcatchment 1S: PR-1

Summary for Subcatchment 2S: PR-2

Runoff = 0.36 cfs @ 12.11 hrs, Volume= 0.028 af, Depth= 2.44"
 Routed to Pond 44P : CMP Infiltration

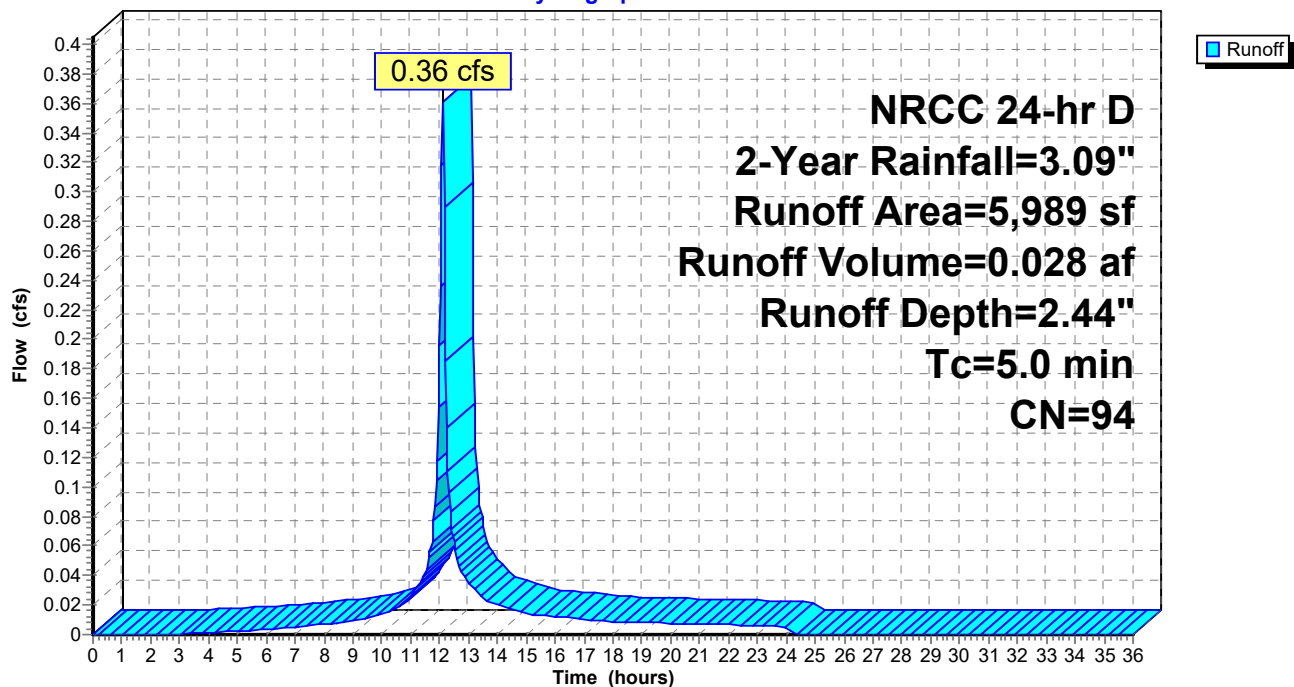
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 2-Year Rainfall=3.09"

	Area (sf)	CN	Description
*	4,187	98	Paved parking, HSG C
*	690	98	Cement Concrete Sidewalk, HSG C
	1,112	74	>75% Grass cover, Good, HSG C
	5,989	94	Weighted Average
	1,112		18.57% Pervious Area
	4,877		81.43% Impervious Area

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

Subcatchment 2S: PR-2

Hydrograph



Summary for Subcatchment 3S: PR-3

Runoff = 0.50 cfs @ 12.12 hrs, Volume= 0.038 af, Depth= 2.25"
 Routed to Pond 44P : CMP Infiltration

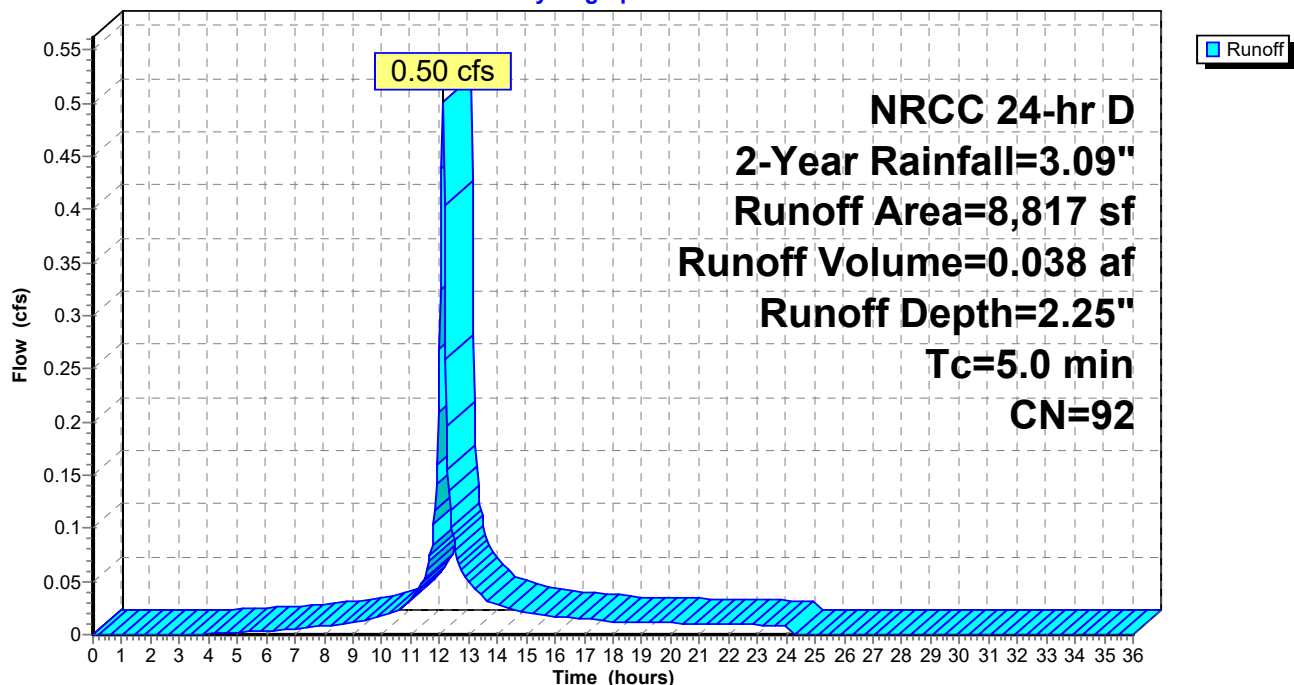
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 2-Year Rainfall=3.09"

Area (sf)	CN	Description
5,618	98	Paved parking, HSG C
* 946	98	Cement Concrete Sidewalk, HSG C
2,253	74	>75% Grass cover, Good, HSG C
8,817	92	Weighted Average
2,253		25.55% Pervious Area
6,564		74.45% Impervious Area

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

Subcatchment 3S: PR-3

Hydrograph



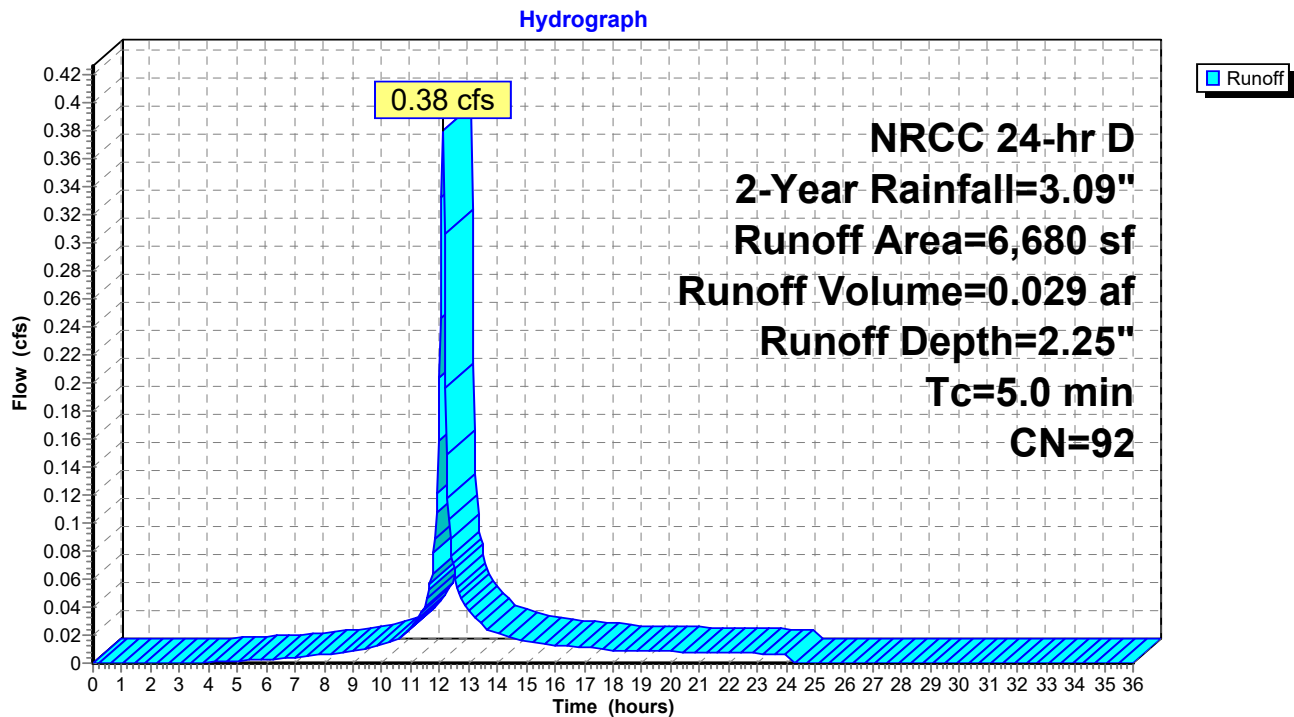
Summary for Subcatchment 4S: PR-4

Runoff = 0.38 cfs @ 12.12 hrs, Volume= 0.029 af, Depth= 2.25"
 Routed to Pond 44P : CMP Infiltration

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 2-Year Rainfall=3.09"

Area (sf)	CN	Description
2,045	98	Paved parking, HSG C
* 2,781	98	Paved parking, HSG A
* 424	98	Cement Concrete Sidewalk, HSG C
* 415	98	Cement Concrete Sidewalk, HSG A
559	74	>75% Grass cover, Good, HSG C
456	39	>75% Grass cover, Good, HSG A
6,680	92	Weighted Average
1,015		15.19% Pervious Area
5,665		84.81% Impervious Area

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

Subcatchment 4S: PR-4

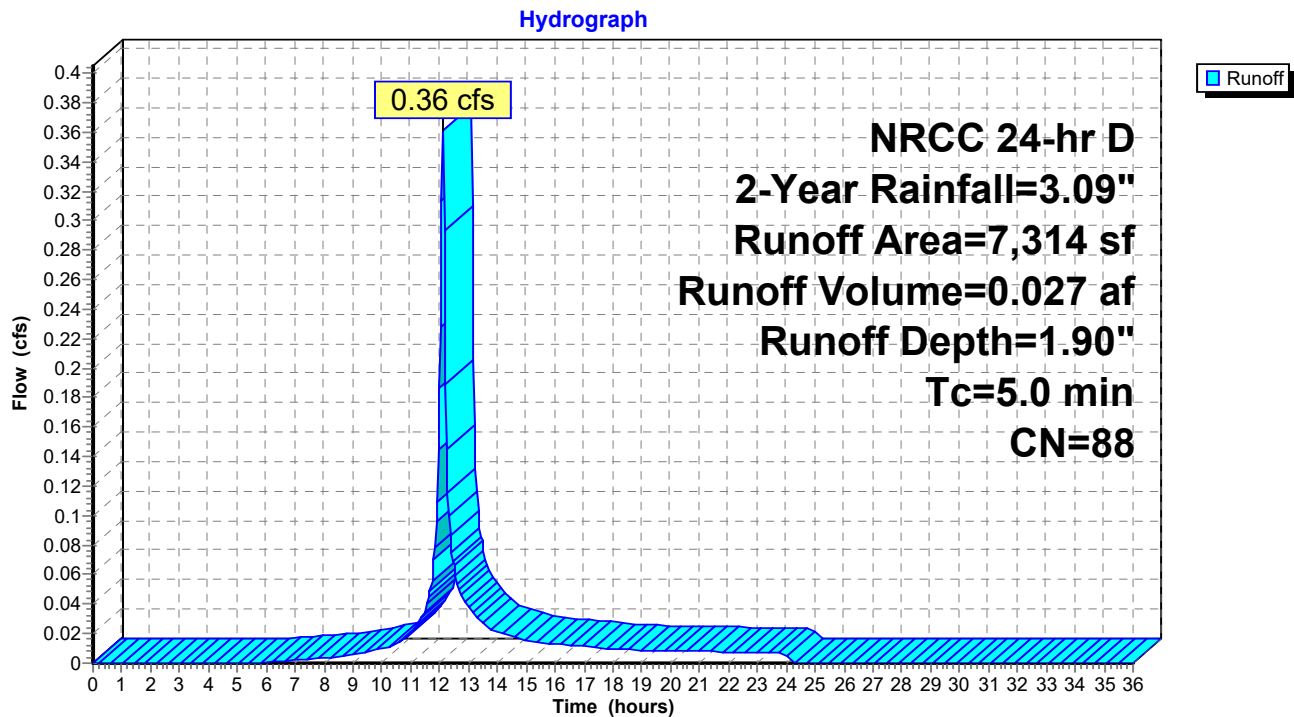
Summary for Subcatchment 5S: PR-5

Runoff = 0.36 cfs @ 12.12 hrs, Volume= 0.027 af, Depth= 1.90"
 Routed to Pond 44P : CMP Infiltration

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 2-Year Rainfall=3.09"

	Area (sf)	CN	Description
*	1,817	98	Paved parking, HSG C
*	3,098	98	Paved parking, HSG A
*	327	98	Cement Concrete Sidewalk, HSG C
*	391	98	Cement Concrete Sidewalk, HSG A
	725	74	>75% Grass cover, Good, HSG C
	956	39	>75% Grass cover, Good, HSG A
	7,314	88	Weighted Average
	1,681		22.98% Pervious Area
	5,633		77.02% Impervious Area

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

Subcatchment 5S: PR-5

Summary for Subcatchment 6S: PR-6

Runoff = 0.33 cfs @ 12.12 hrs, Volume= 0.026 af, Depth= 0.86"
 Routed to Pond 44P : CMP Infiltration

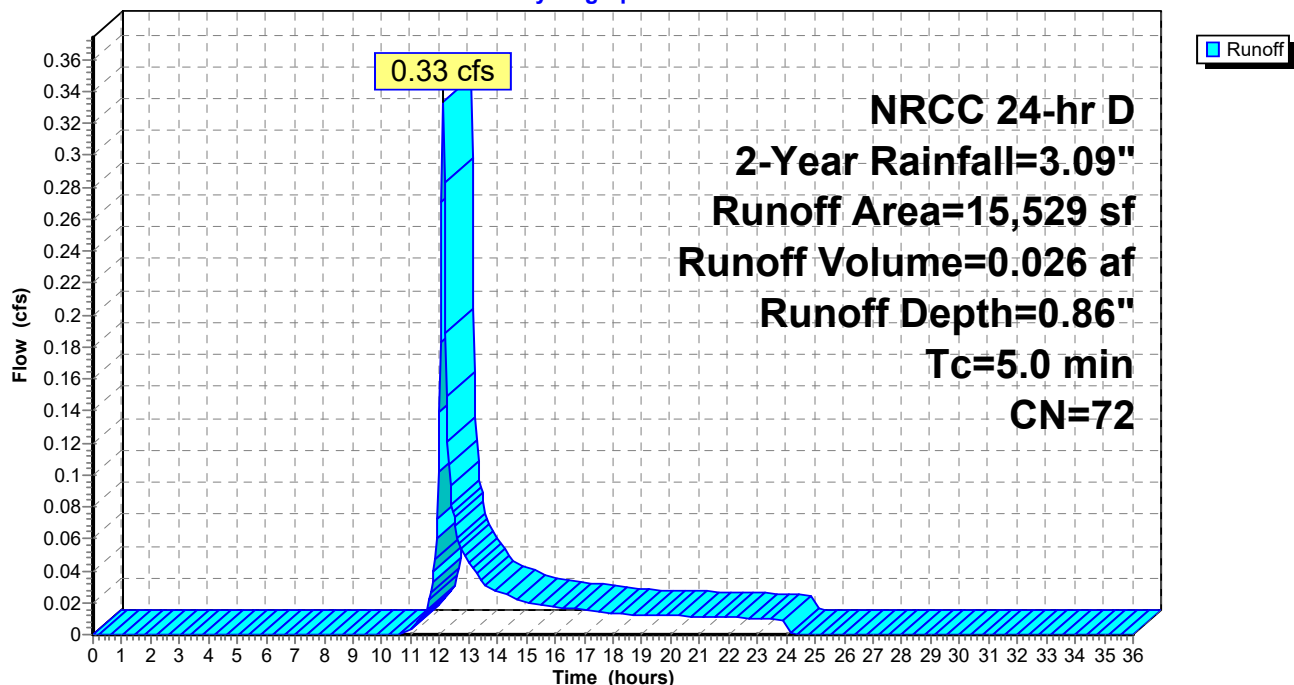
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 2-Year Rainfall=3.09"

	Area (sf)	CN	Description
*	7,257	98	Paved parking, HSG A
*	1,492	98	Cement Concrete Sidewalk, HSG A
	6,780	39	>75% Grass cover, Good, HSG A
	15,529	72	Weighted Average
	6,780		43.66% Pervious Area
	8,749		56.34% Impervious Area

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

Subcatchment 6S: PR-6

Hydrograph



Summary for Subcatchment 7S: PR-7

Runoff = 0.38 cfs @ 12.12 hrs, Volume= 0.028 af, Depth= 1.66"
 Routed to Pond 44P : CMP Infiltration

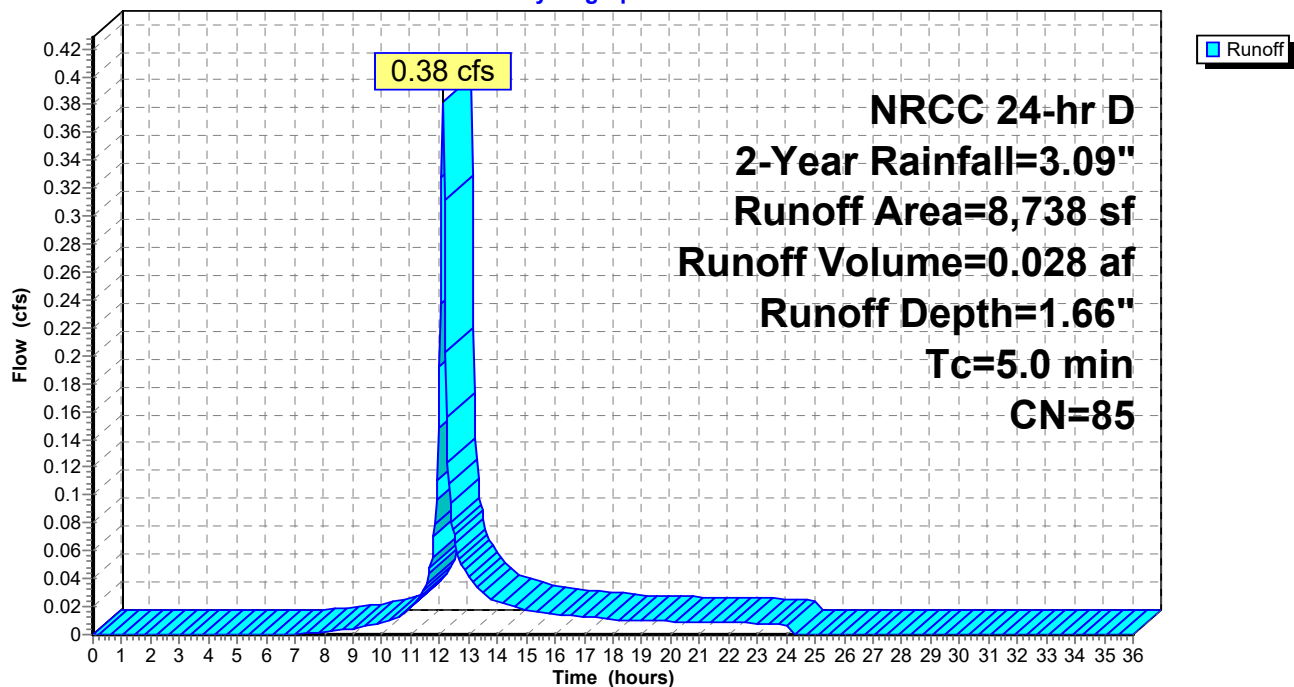
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 2-Year Rainfall=3.09"

	Area (sf)	CN	Description
*	5,839	98	Paved parking, HSG A
*	1,037	98	Cement Concrete Sidewalk, HSG A
	1,862	39	>75% Grass cover, Good, HSG A
	8,738	85	Weighted Average
	1,862		21.31% Pervious Area
	6,876		78.69% Impervious Area

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

Subcatchment 7S: PR-7

Hydrograph



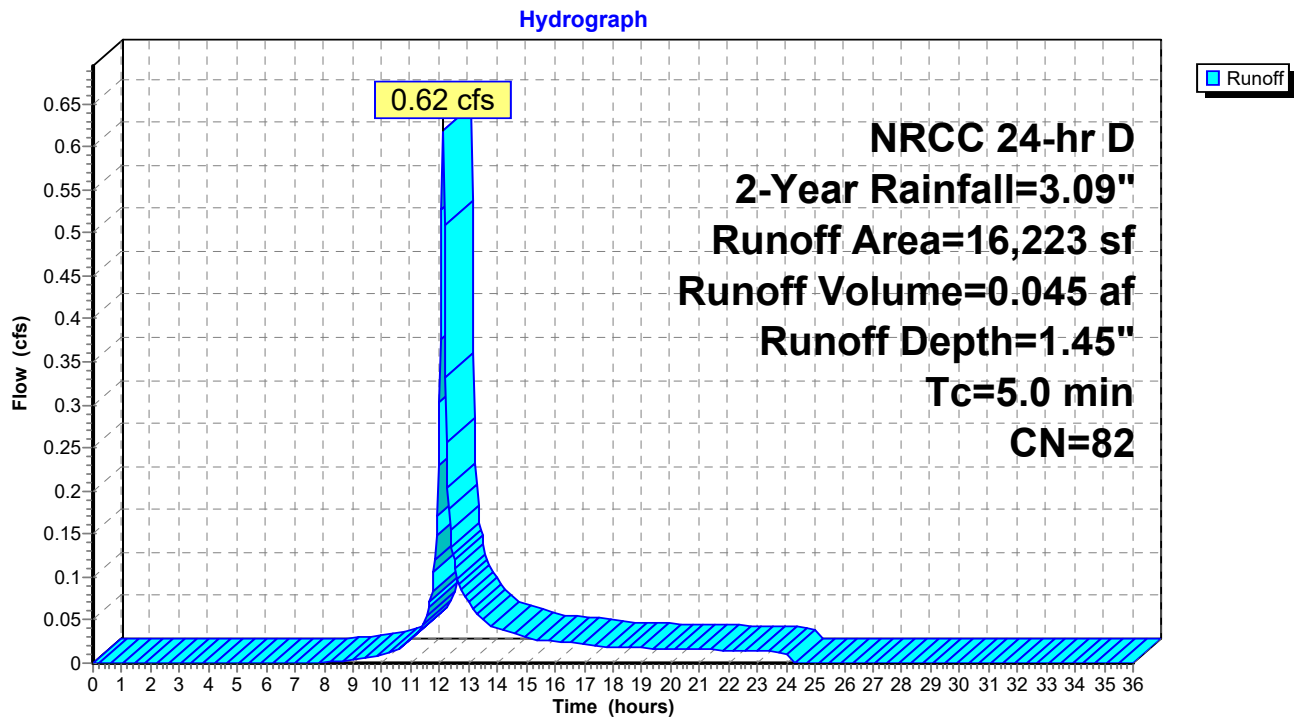
Summary for Subcatchment 8S: PR-8

Runoff = 0.62 cfs @ 12.12 hrs, Volume= 0.045 af, Depth= 1.45"
 Routed to Pond 44P : CMP Infiltration

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 2-Year Rainfall=3.09"

	Area (sf)	CN	Description
*	2,852	98	Paved parking, HSG A
*	4,008	98	Paved parking, HSG C
*	1,252	98	Cement Concrete Sidewalk, HSG C
*	390	98	Cement Concrete Sidewalk, HSG A
	1,994	39	>75% Grass cover, Good, HSG A
	5,727	74	>75% Grass cover, Good, HSG C
	16,223	82	Weighted Average
	7,721		47.59% Pervious Area
	8,502		52.41% Impervious Area

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

Subcatchment 8S: PR-8

Summary for Subcatchment 9S: PR-9

Runoff = 0.34 cfs @ 12.14 hrs, Volume= 0.027 af, Depth= 1.98"
 Routed to Pond 44P : CMP Infiltration

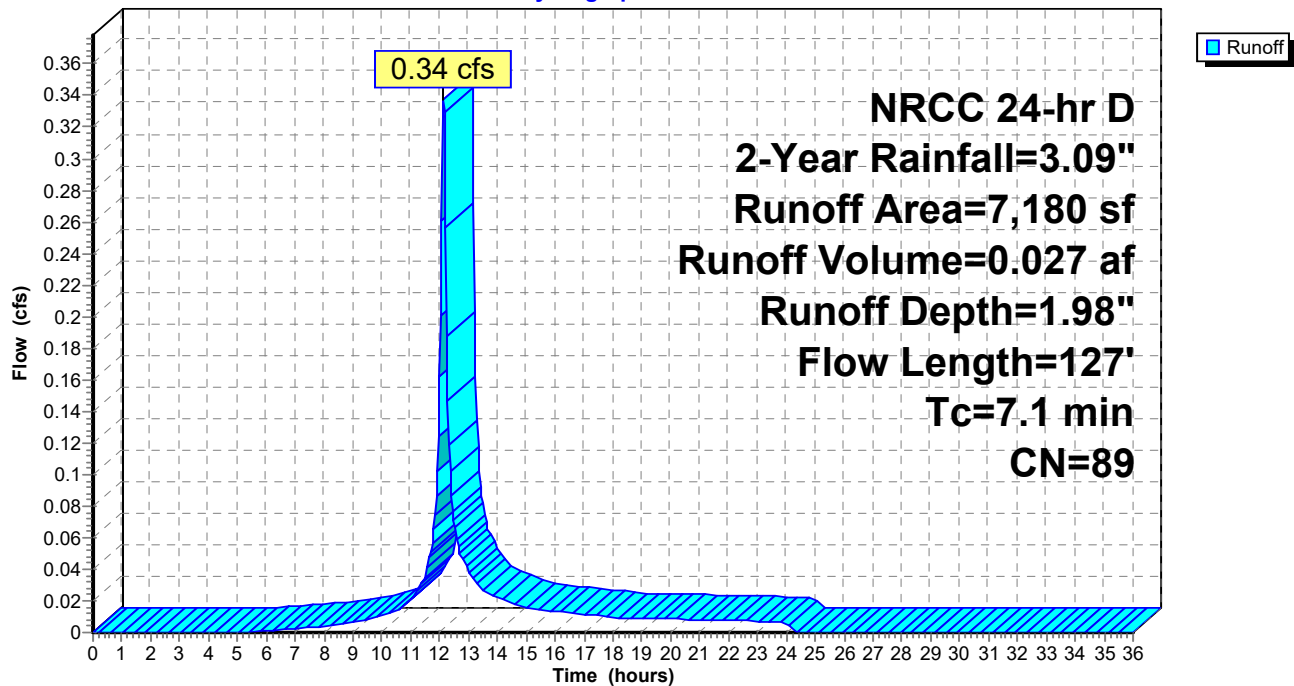
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 2-Year Rainfall=3.09"

	Area (sf)	CN	Description
*	479	98	Paved parking, HSG A
*	3,817	98	Paved parking, HSG C
*	216	98	Cement Concrete Sidewalk, HSG A
*	842	98	Cement Concrete Sidewalk, HSG C
	623	39	>75% Grass cover, Good, HSG A
	1,203	74	>75% Grass cover, Good, HSG C
	7,180	89	Weighted Average
	1,826		25.43% Pervious Area
	5,354		74.57% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.1	25	0.0500	0.08		Sheet Flow, GRASS Grass: Bermuda n= 0.410 P2= 3.13"
1.7	75	0.0050	0.74		Sheet Flow, PAVEMENT Smooth surfaces n= 0.011 P2= 3.13"
0.3	27	0.0050	1.44		Shallow Concentrated Flow, PAVEMENT Paved Kv= 20.3 fps
7.1	127	Total			

Subcatchment 9S: PR-9

Hydrograph



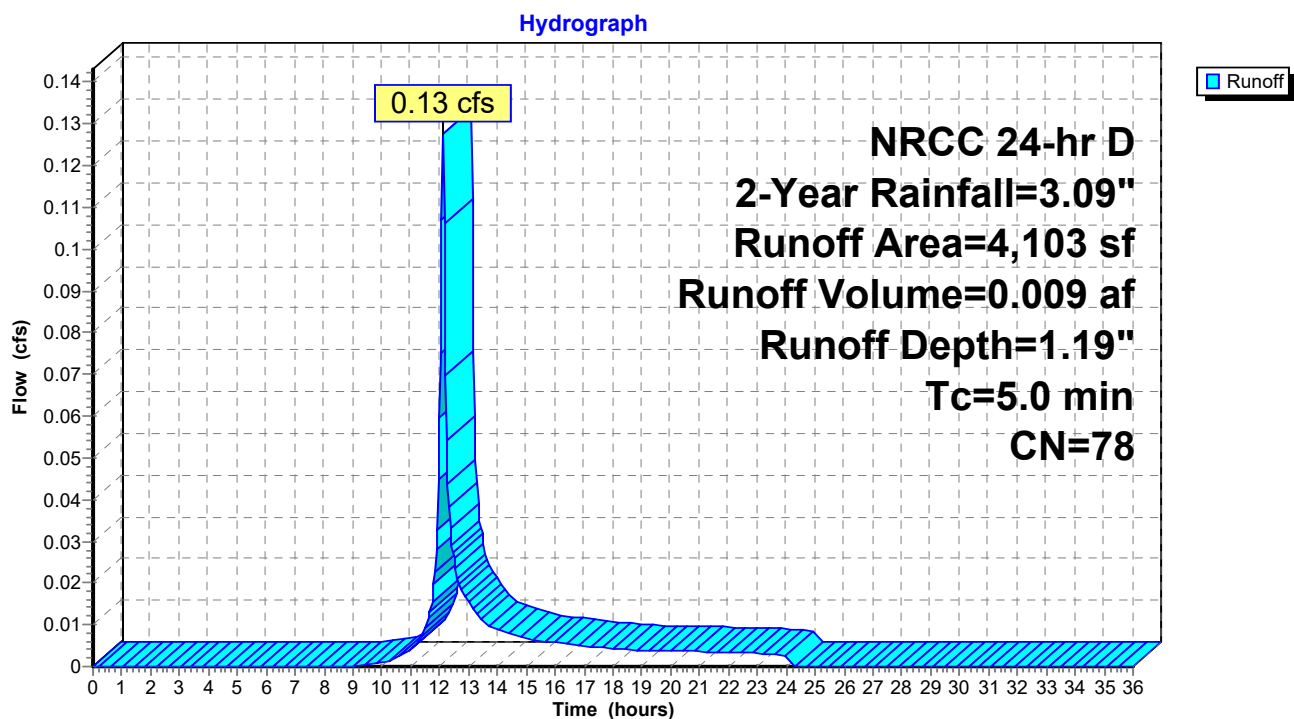
Summary for Subcatchment 10S: PR-10

Runoff = 0.13 cfs @ 12.12 hrs, Volume= 0.009 af, Depth= 1.19"
 Routed to Link 17L : DP-3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 2-Year Rainfall=3.09"

Area (sf)	CN	Description
1,584	74	>75% Grass cover, Good, HSG C
2,519	80	>75% Grass cover, Good, HSG D
4,103	78	Weighted Average
4,103		100.00% Pervious Area

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

Subcatchment 10S: PR-10

Summary for Subcatchment 11S: PR-11

Runoff = 0.66 cfs @ 12.13 hrs, Volume= 0.053 af, Depth= 2.25"
 Routed to Pond 44P : CMP Infiltration

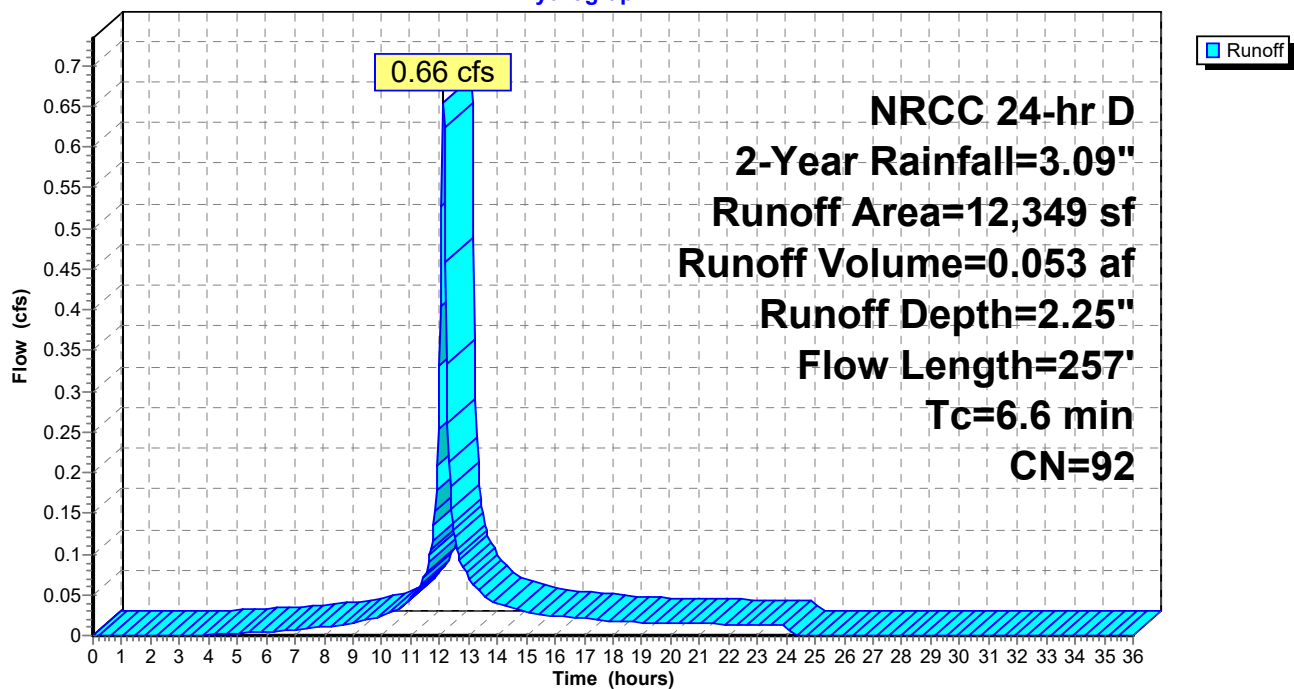
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 2-Year Rainfall=3.09"

	Area (sf)	CN	Description
*	7,691	98	Paved parking, HSG C
*	276	98	Paved parking, HSG A
*	1,371	98	Cement Concrete Sidewalk, HSG C
*	185	98	Cement Concrete Sidewalk, HSG A
	2,481	74	>75% Grass cover, Good, HSG C
	345	39	>75% Grass cover, Good, HSG A
	12,349	92	Weighted Average
	2,826		22.88% Pervious Area
	9,523		77.12% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.1	25	0.0500	0.08		Sheet Flow, GRASS Grass: Bermuda n= 0.410 P2= 3.13"
0.8	75	0.0350	1.61		Sheet Flow, PAVEMENT Smooth surfaces n= 0.011 P2= 3.13"
0.7	157	0.0350	3.80		Shallow Concentrated Flow, PAVEMENT Paved Kv= 20.3 fps
6.6	257	Total			

Subcatchment 11S: PR-11

Hydrograph



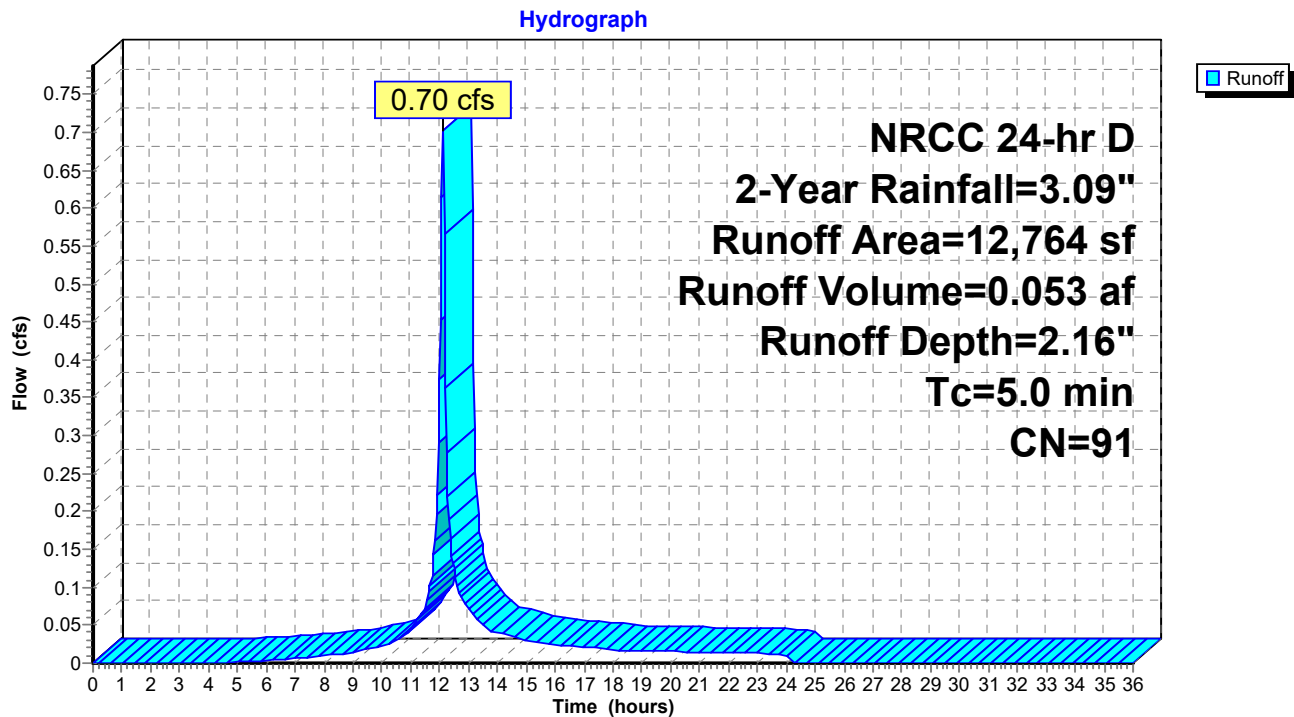
Summary for Subcatchment 12S: PR-12

Runoff = 0.70 cfs @ 12.12 hrs, Volume= 0.053 af, Depth= 2.16"
 Routed to Pond 44P : CMP Infiltration

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 2-Year Rainfall=3.09"

	Area (sf)	CN	Description
*	7,226	98	Paved parking, HSG C
*	139	98	Paved parking, HSG A
*	1,592	98	Cement Concrete Sidewalk, HSG C
*	130	98	Cement Concrete Sidewalk, HSG A
	3,543	74	>75% Grass cover, Good, HSG C
	134	39	>75% Grass cover, Good, HSG A
	12,764	91	Weighted Average
	3,677		28.81% Pervious Area
	9,087		71.19% Impervious Area

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

Subcatchment 12S: PR-12

Summary for Subcatchment 18S: PR-13

Runoff = 0.06 cfs @ 12.28 hrs, Volume= 0.008 af, Depth= 0.55"
 Routed to Pond 44P : CMP Infiltration

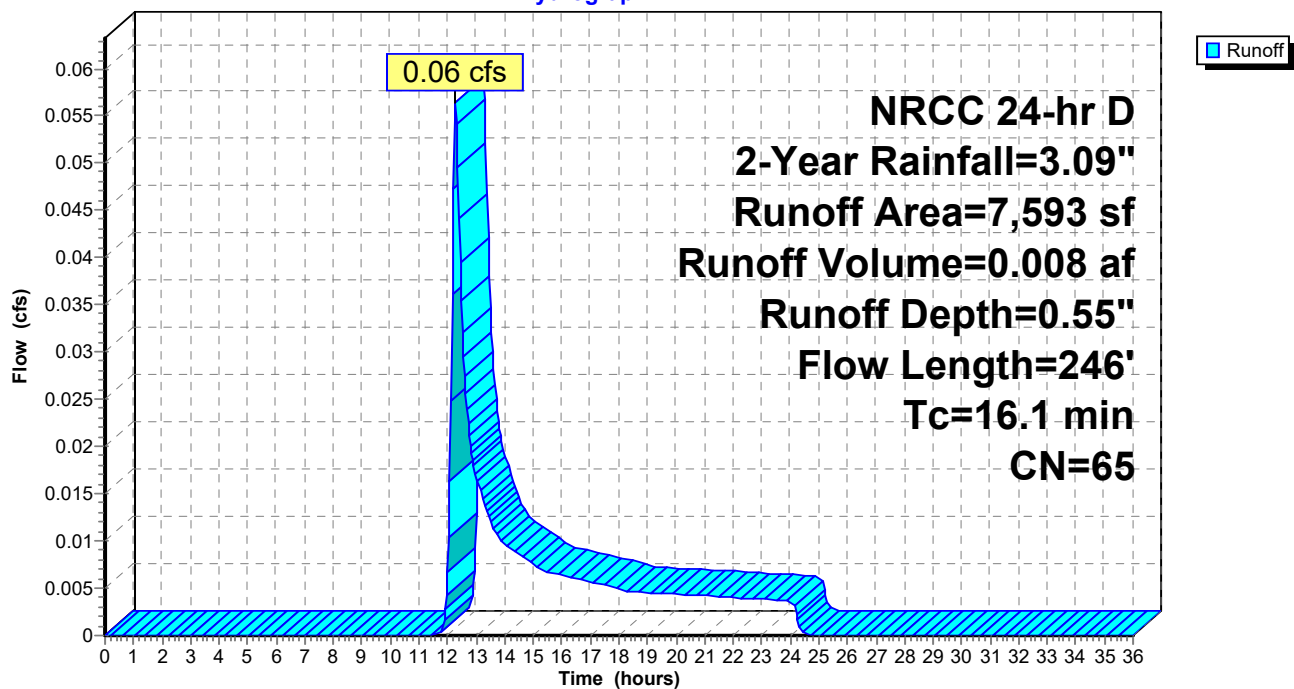
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 2-Year Rainfall=3.09"

Area (sf)	CN	Description
131	98	Paved parking, HSG C
* 2,672	98	Paved parking, HSG A
* 183	98	Cement Concrete Sidewalk, HSG C
499	74	>75% Grass cover, Good, HSG C
4,108	39	>75% Grass cover, Good, HSG A
7,593	65	Weighted Average
4,607		60.67% Pervious Area
2,986		39.33% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.4	100	0.0500	0.11		Sheet Flow, GRASS Grass: Bermuda n= 0.410 P2= 3.13"
0.2	38	0.0500	3.35		Shallow Concentrated Flow, GRASS Grassed Waterway Kv= 15.0 fps
0.5	108	0.0350	3.80		Shallow Concentrated Flow, PAVEMENT Paved Kv= 20.3 fps
16.1	246	Total			

Subcatchment 18S: PR-13

Hydrograph



Summary for Subcatchment 19S: PR-14

Runoff = 0.15 cfs @ 12.14 hrs, Volume= 0.012 af, Depth= 1.98"
 Routed to Pond 44P : CMP Infiltration

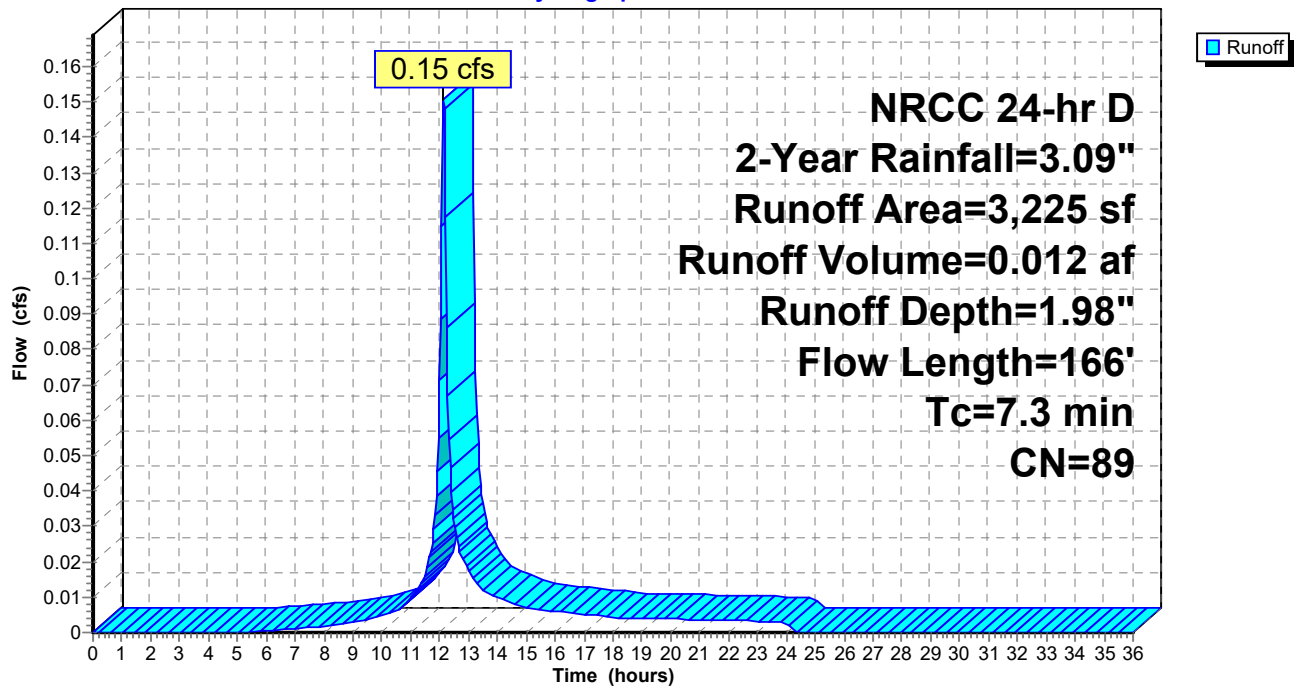
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 2-Year Rainfall=3.09"

	Area (sf)	CN	Description
*	199	98	Paved parking, HSG C
*	2,132	98	Paved parking, HSG A
*	322	98	Cement Concrete Sidewalk, HSG A
	126	74	>75% Grass cover, Good, HSG C
	446	39	>75% Grass cover, Good, HSG A
	3,225	89	Weighted Average
	572		17.74% Pervious Area
	2,653		82.26% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.3	33	0.0500	0.09		Sheet Flow, GRASS Grass: Bermuda n= 0.410 P2= 3.13"
0.7	67	0.0350	1.57		Sheet Flow, PAVEMENT Smooth surfaces n= 0.011 P2= 3.13"
0.3	66	0.0350	3.80		Shallow Concentrated Flow, PAVEMENT Paved Kv= 20.3 fps
7.3	166	Total			

Subcatchment 19S: PR-14

Hydrograph



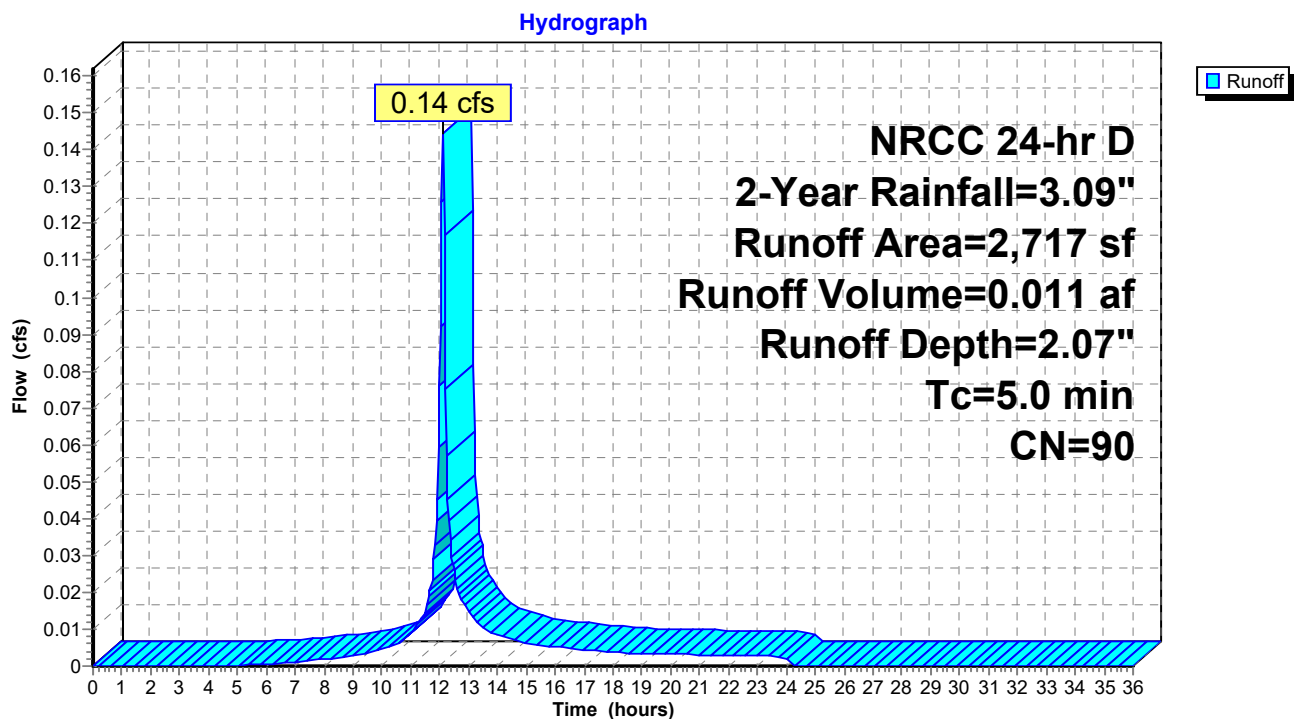
Summary for Subcatchment 20S: PR-15

Runoff = 0.14 cfs @ 12.12 hrs, Volume= 0.011 af, Depth= 2.07"
 Routed to Pond 44P : CMP Infiltration

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 2-Year Rainfall=3.09"

	Area (sf)	CN	Description
*	2,331	98	Paved parking, HSG A
	386	39	>75% Grass cover, Good, HSG A
	2,717	90	Weighted Average
	386		14.21% Pervious Area
	2,331		85.79% Impervious Area

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

Subcatchment 20S: PR-15

Summary for Subcatchment 22S: PR-16

Runoff = 0.06 cfs @ 12.24 hrs, Volume= 0.007 af, Depth= 2.86"
 Routed to Pond 44P : CMP Infiltration

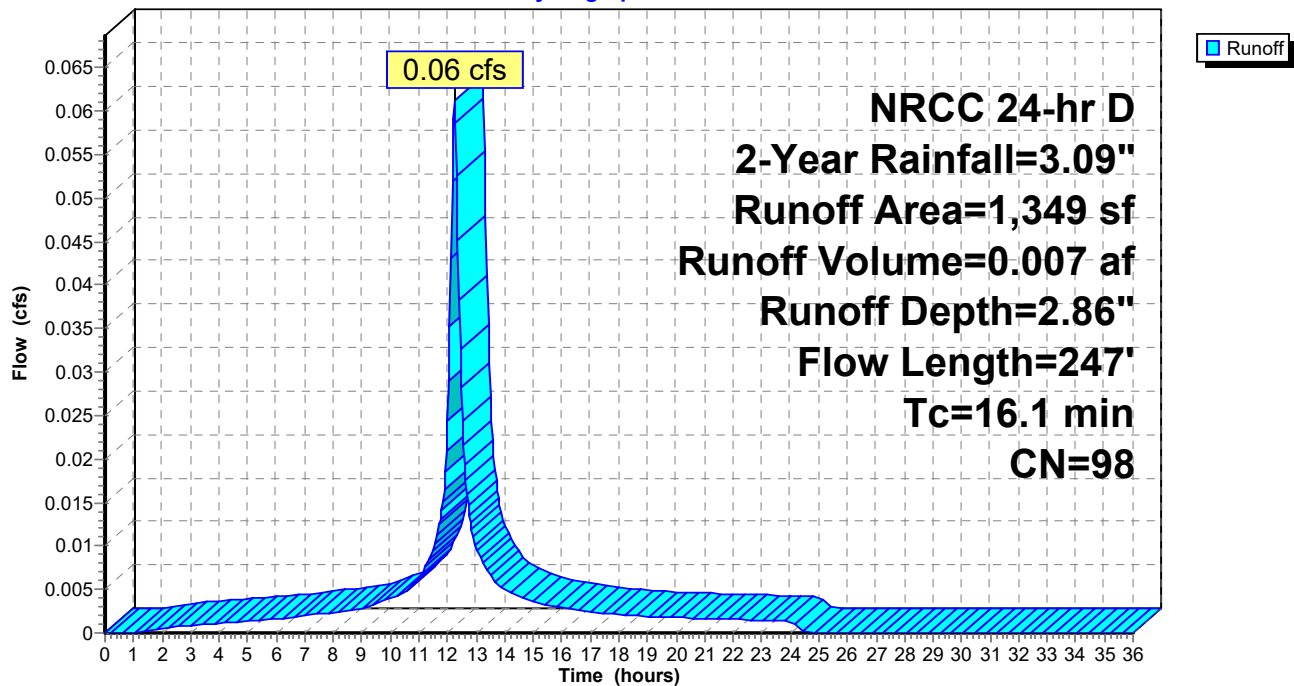
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 2-Year Rainfall=3.09"

Area (sf)	CN	Description
* 614	98	Paved parking, HSG A
* 735	98	Paved parking, HSG C
1,349	98	Weighted Average
1,349		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.4	100	0.0500	0.11		Sheet Flow, GRASS Grass: Bermuda n= 0.410 P2= 3.13"
0.2	38	0.0500	3.35		Shallow Concentrated Flow, GRASS Grassed Waterway Kv= 15.0 fps
0.5	109	0.0350	3.80		Shallow Concentrated Flow, PAVEMENT Paved Kv= 20.3 fps
16.1	247	Total			

Subcatchment 22S: PR-16

Hydrograph



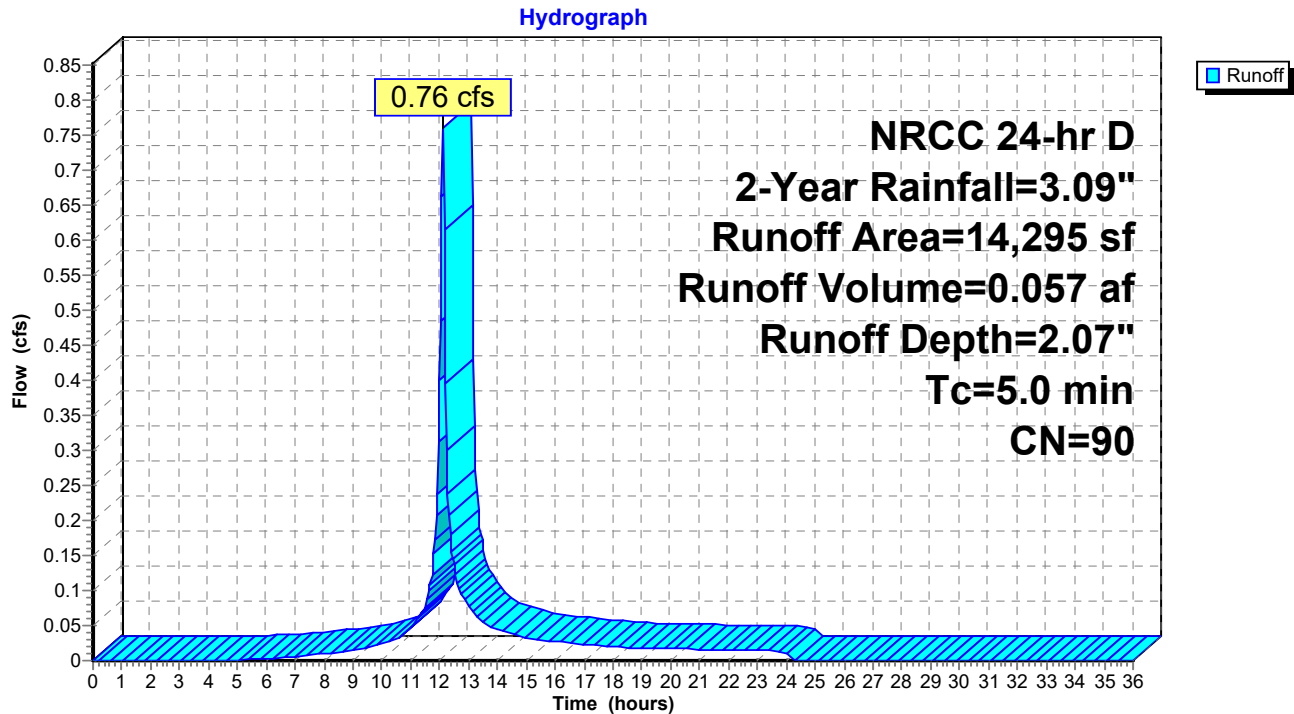
Summary for Subcatchment 23S: PR-17

Runoff = 0.76 cfs @ 12.12 hrs, Volume= 0.057 af, Depth= 2.07"
 Routed to Pond 44P : CMP Infiltration

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 2-Year Rainfall=3.09"

	Area (sf)	CN	Description
*	447	98	Paved parking, HSG A
*	7,461	98	Paved parking, HSG C
*	2,341	98	Cement Concrete Sidewalk, HSG C
	488	39	>75% Grass cover, Good, HSG A
	3,558	74	>75% Grass cover, Good, HSG C
	14,295	90	Weighted Average
	4,046		28.30% Pervious Area
	10,249		71.70% Impervious Area

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

Subcatchment 23S: PR-17

Summary for Subcatchment 24S: PR-18

Runoff = 0.54 cfs @ 12.14 hrs, Volume= 0.048 af, Depth= 2.64"
 Routed to Pond 44P : CMP Infiltration

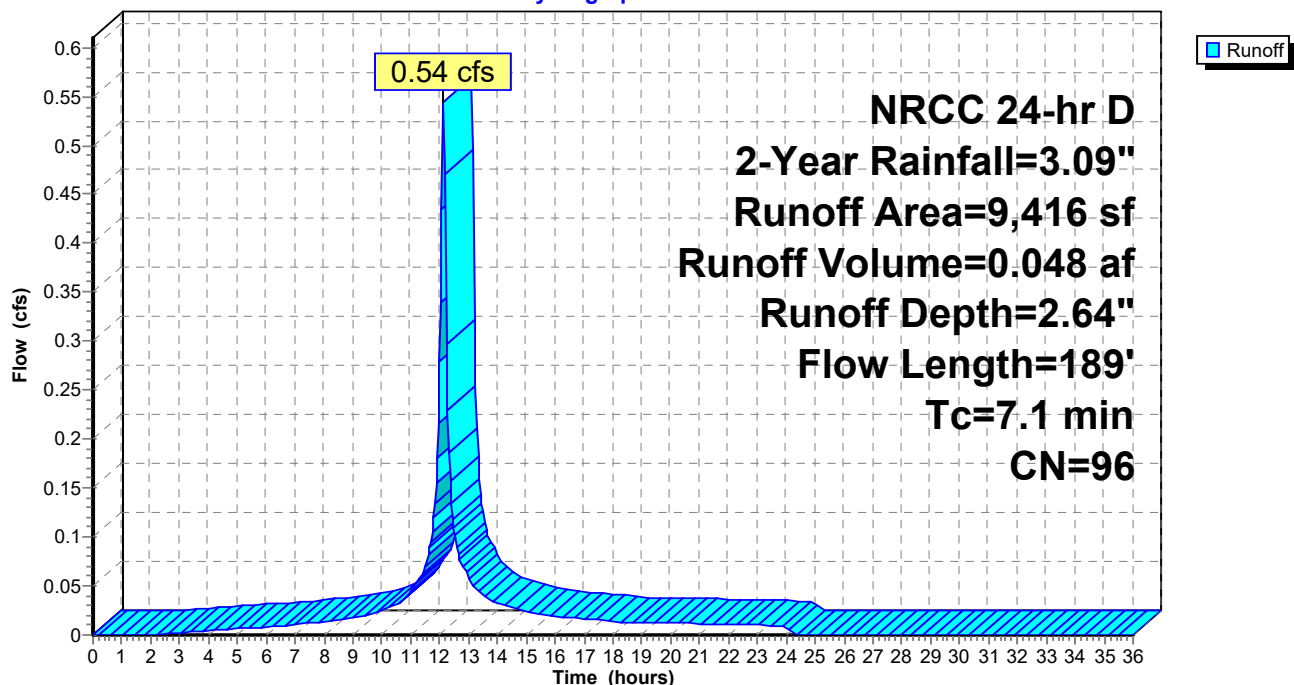
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 2-Year Rainfall=3.09"

	Area (sf)	CN	Description
*	4,554	98	Paved parking, HSG A
*	4,554	98	Cement Concrete Sidewalk, HSG A
	308	39	>75% Grass cover, Good, HSG A
	9,416	96	Weighted Average
	308		3.27% Pervious Area
	9,108		96.73% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	29	0.0500	0.08		Sheet Flow, GRASS Grass: Bermuda n= 0.410 P2= 3.13"
0.9	71	0.0200	1.27		Sheet Flow, PAVEMENT Smooth surfaces n= 0.011 P2= 3.13"
0.5	89	0.0200	2.87		Shallow Concentrated Flow, PAVEMENT Paved Kv= 20.3 fps
7.1	189	Total			

Subcatchment 24S: PR-18

Hydrograph



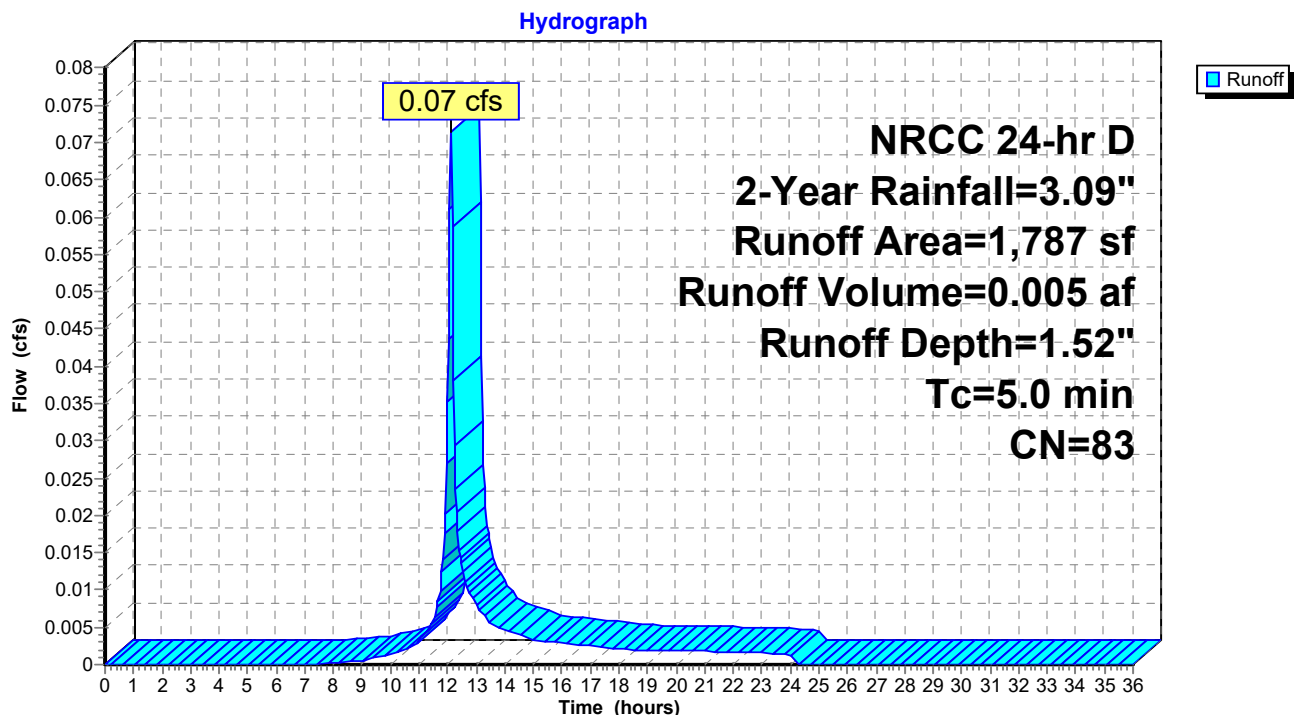
Summary for Subcatchment 25S: PR-19

Runoff = 0.07 cfs @ 12.12 hrs, Volume= 0.005 af, Depth= 1.52"
 Routed to Pond 44P : CMP Infiltration

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 2-Year Rainfall=3.09"

	Area (sf)	CN	Description
*	1,006	98	Paved parking, HSG A
*	337	98	Cement Concrete Sidewalk, HSG A
	444	39	>75% Grass cover, Good, HSG A
	1,787	83	Weighted Average
	444		24.85% Pervious Area
	1,343		75.15% Impervious Area

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

Subcatchment 25S: PR-19

Summary for Subcatchment 26S: PR-20

Runoff = 0.37 cfs @ 12.12 hrs, Volume= 0.028 af, Depth= 2.16"
 Routed to Pond 44P : CMP Infiltration

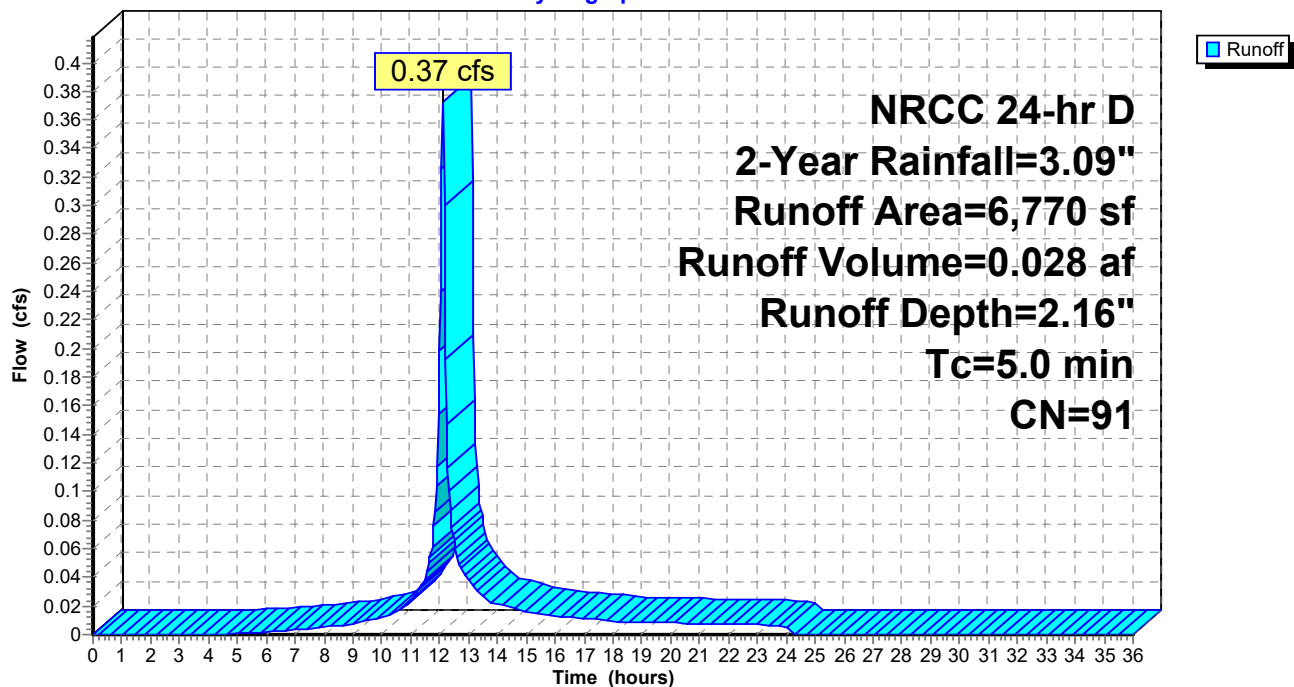
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 2-Year Rainfall=3.09"

	Area (sf)	CN	Description
*	4,671	98	Paved parking, HSG A
*	1,328	98	Cement Concrete Sidewalk, HSG A
	771	39	>75% Grass cover, Good, HSG A
	6,770	91	Weighted Average
	771		11.39% Pervious Area
	5,999		88.61% Impervious Area

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

Subcatchment 26S: PR-20

Hydrograph



Summary for Subcatchment 27S: PR-21

Runoff = 0.38 cfs @ 12.12 hrs, Volume= 0.029 af, Depth= 2.25"
 Routed to Pond 44P : CMP Infiltration

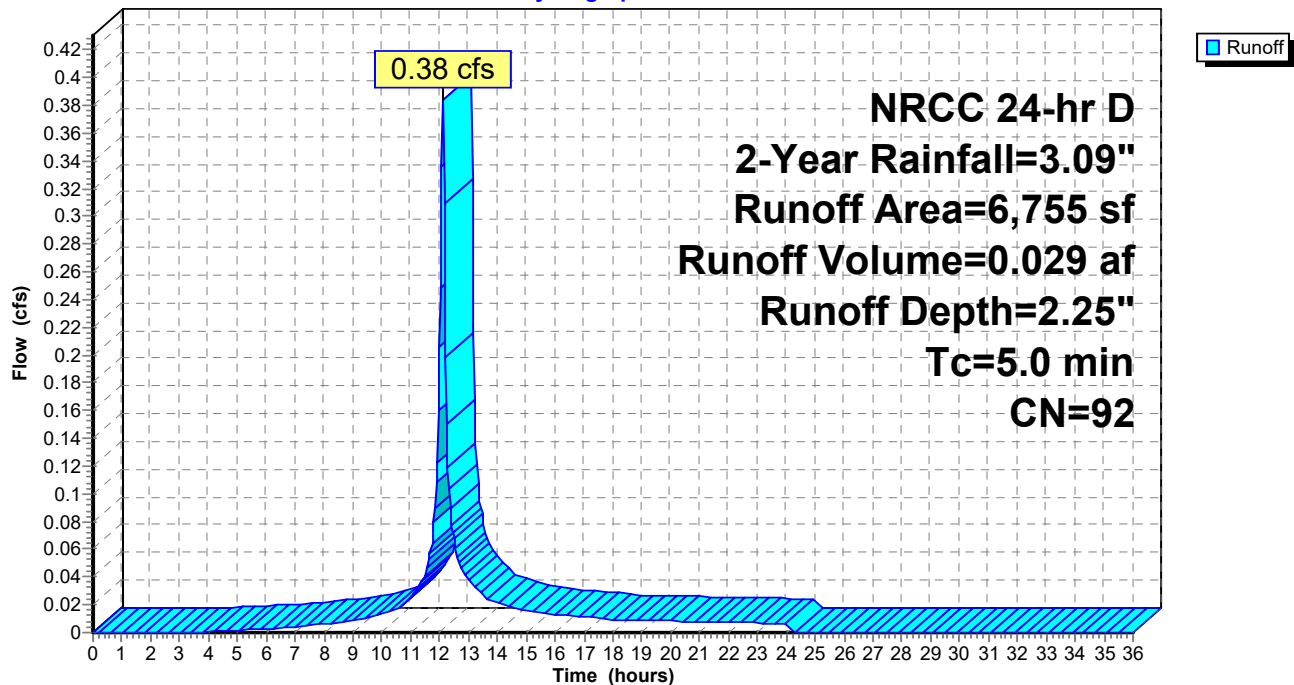
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 2-Year Rainfall=3.09"

	Area (sf)	CN	Description
*	4,688	98	Paved parking, HSG A
*	1,331	98	Cement Concrete Sidewalk, HSG A
	736	39	>75% Grass cover, Good, HSG A
	6,755	92	Weighted Average
	736		10.90% Pervious Area
	6,019		89.10% Impervious Area

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

Subcatchment 27S: PR-21

Hydrograph



Summary for Subcatchment 28S: PR-22

Runoff = 0.21 cfs @ 12.12 hrs, Volume= 0.016 af, Depth= 1.59"
 Routed to Pond 44P : CMP Infiltration

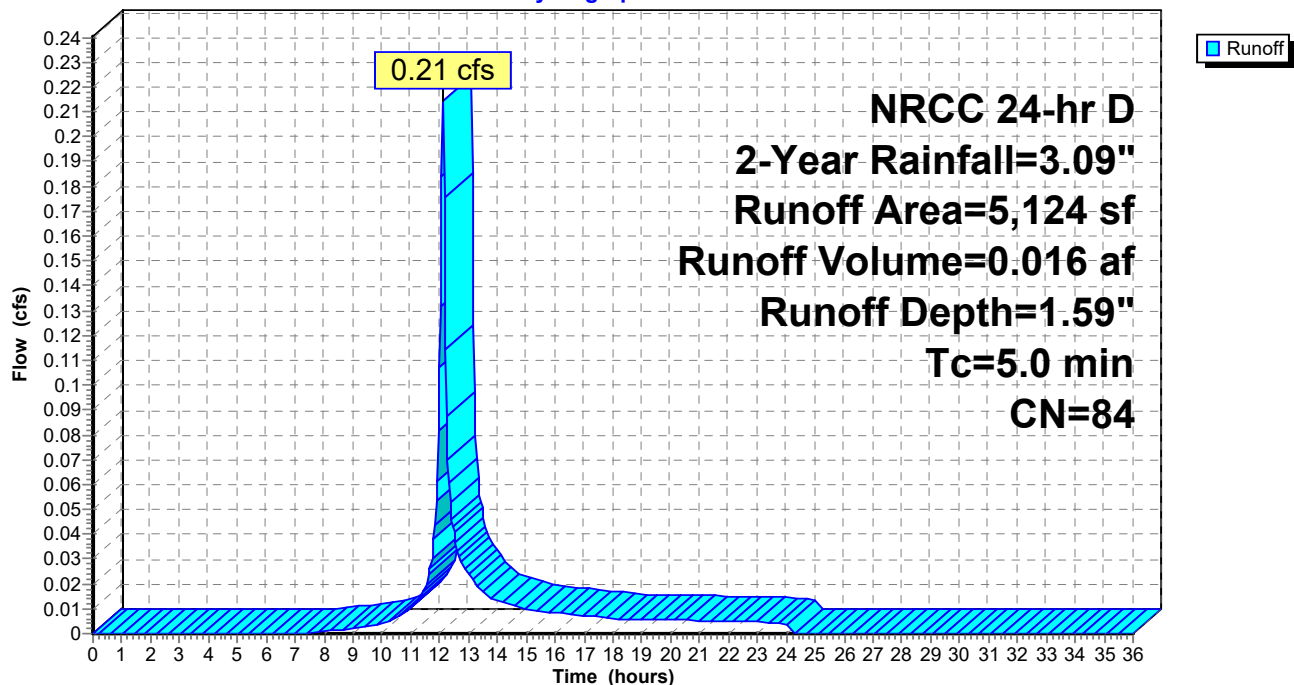
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 2-Year Rainfall=3.09"

	Area (sf)	CN	Description
*	3,097	98	Paved parking, HSG A
*	72	98	Paved parking, HSG C
*	588	98	Cement Concrete Sidewalk, HSG C
	1,052	39	>75% Grass cover, Good, HSG A
	315	74	>75% Grass cover, Good, HSG C
	5,124	84	Weighted Average
	1,367		26.68% Pervious Area
	3,757		73.32% Impervious Area

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

Subcatchment 28S: PR-22

Hydrograph



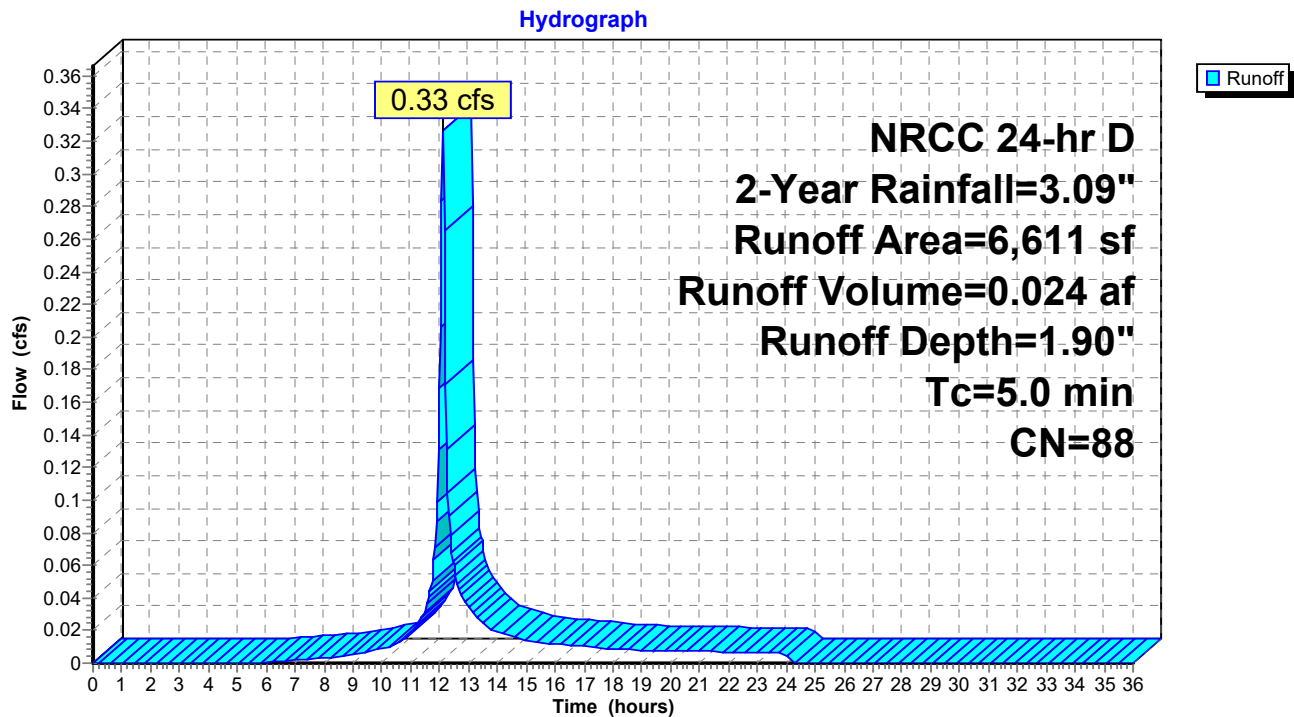
Summary for Subcatchment 29S: PR-23

Runoff = 0.33 cfs @ 12.12 hrs, Volume= 0.024 af, Depth= 1.90"
 Routed to Pond 44P : CMP Infiltration

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 2-Year Rainfall=3.09"

	Area (sf)	CN	Description
*	3,322	98	Paved parking, HSG A
*	748	98	Paved parking, HSG C
*	695	98	Cement Concrete Sidewalk, HSG A
*	463	98	Cement Concrete Sidewalk, HSG C
	914	39	>75% Grass cover, Good, HSG A
	469	74	>75% Grass cover, Good, HSG C
	6,611	88	Weighted Average
	1,383		20.92% Pervious Area
	5,228		79.08% Impervious Area

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

Subcatchment 29S: PR-23

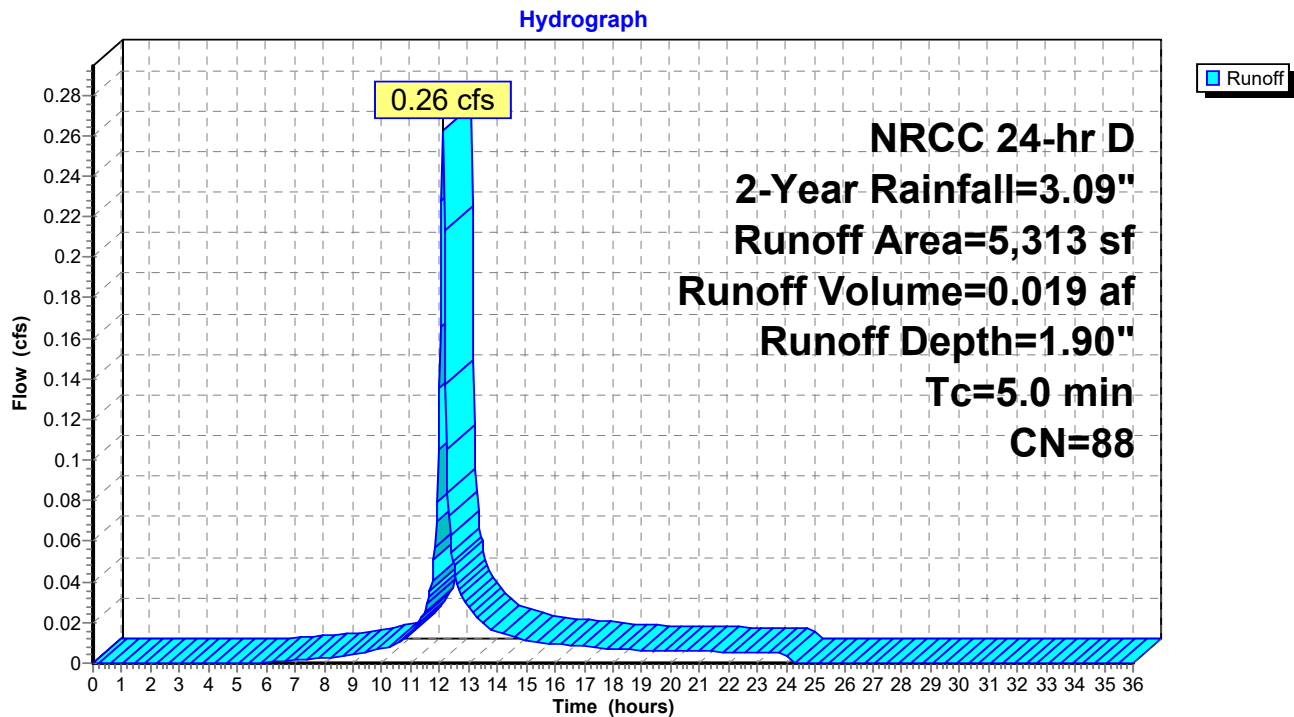
Summary for Subcatchment 30S: PR-24

Runoff = 0.26 cfs @ 12.12 hrs, Volume= 0.019 af, Depth= 1.90"
 Routed to Pond 44P : CMP Infiltration

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 2-Year Rainfall=3.09"

	Area (sf)	CN	Description
*	3,109	98	Paved parking, HSG A
*	146	98	Paved parking, HSG C
*	572	98	Cement Concrete Sidewalk, HSG A
*	432	98	Cement Concrete Sidewalk, HSG C
	819	39	>75% Grass cover, Good, HSG A
	235	74	>75% Grass cover, Good, HSG C
	5,313	88	Weighted Average
	1,054		19.84% Pervious Area
	4,259		80.16% Impervious Area

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

Subcatchment 30S: PR-24

Summary for Subcatchment 31S: PR-25

Runoff = 0.22 cfs @ 12.20 hrs, Volume= 0.021 af, Depth= 1.32"
 Routed to Pond 44P : CMP Infiltration

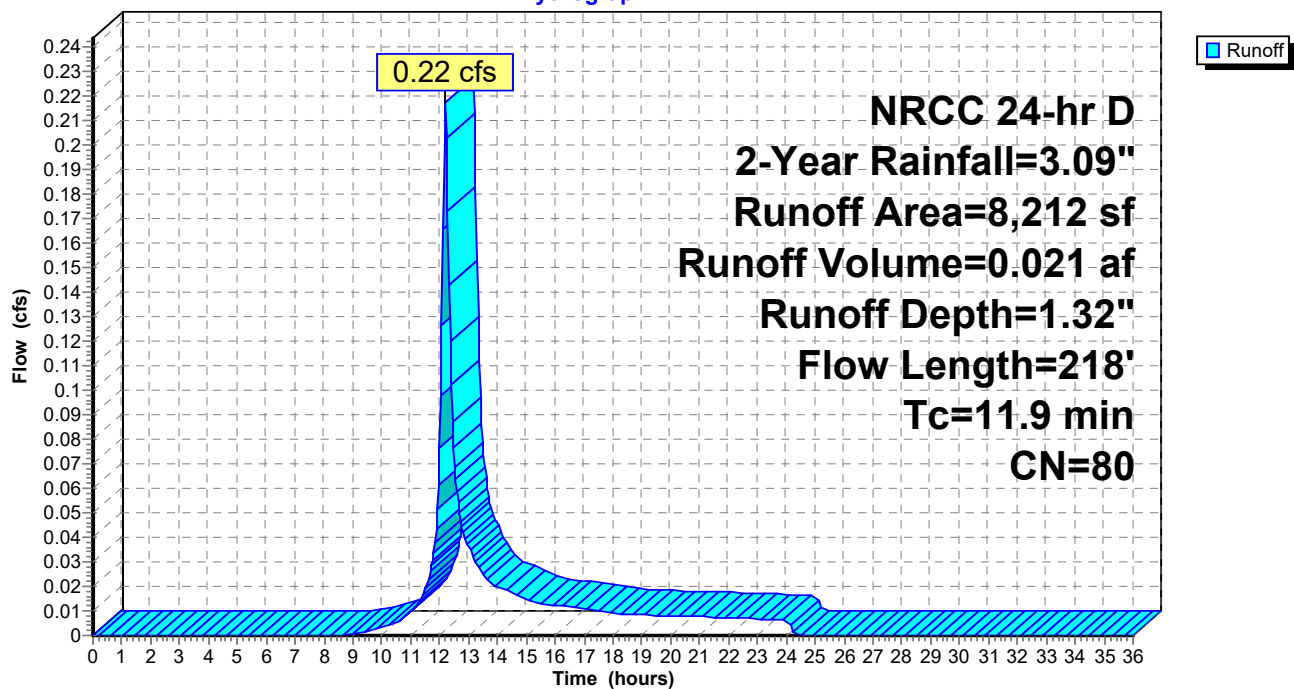
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 2-Year Rainfall=3.09"

	Area (sf)	CN	Description
*	3,851	98	Paved parking, HSG A
*	988	98	Cement Concrete Sidewalk, HSG A
*	65	98	Cement Concrete Sidewalk, HSG C
	1,910	39	>75% Grass cover, Good, HSG A
	1,398	74	>75% Grass cover, Good, HSG C
	8,212	80	Weighted Average
	3,308		40.28% Pervious Area
	4,904		59.72% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.6	63	0.0500	0.10		Sheet Flow, GRASS Grass: Bermuda n= 0.410 P2= 3.13"
0.6	37	0.0150	0.99		Sheet Flow, PAVEMENT Smooth surfaces n= 0.011 P2= 3.13"
0.7	118	0.0200	2.87		Shallow Concentrated Flow, PAVEMENT Paved Kv= 20.3 fps
11.9	218	Total			

Subcatchment 31S: PR-25

Hydrograph



Summary for Subcatchment 32S: PR-26

Runoff = 0.35 cfs @ 12.11 hrs, Volume= 0.027 af, Depth= 2.44"
 Routed to Pond 44P : CMP Infiltration

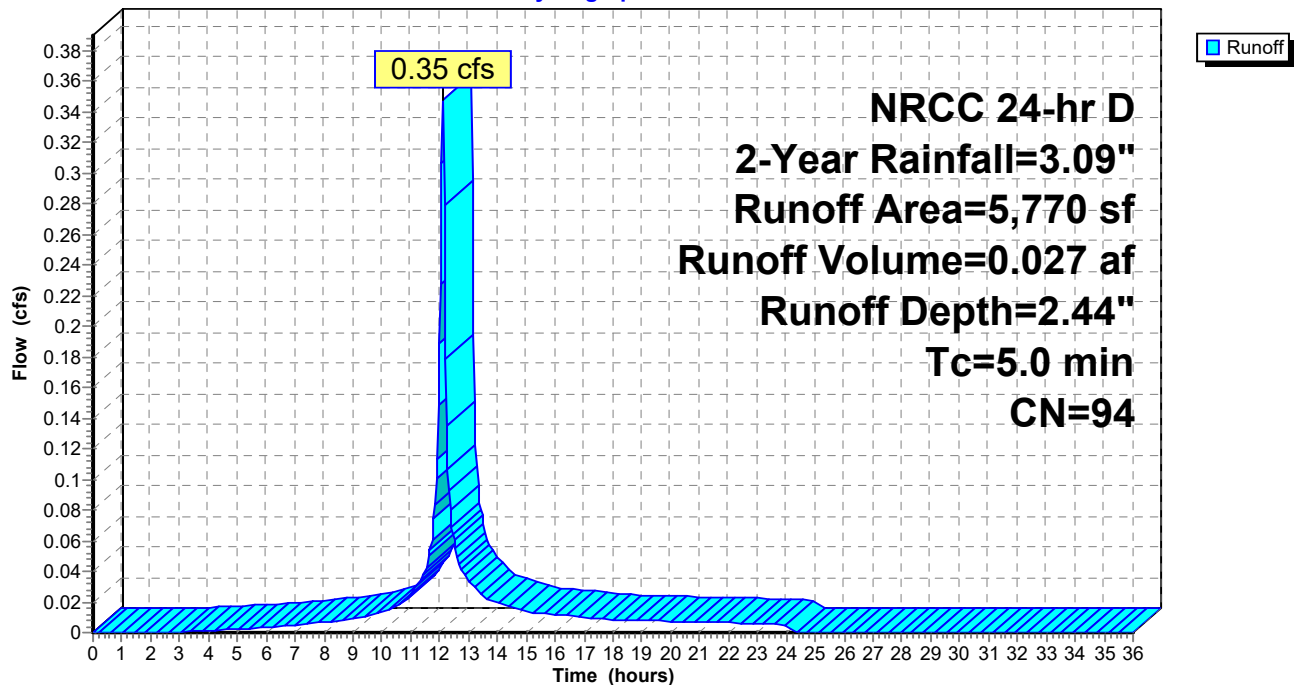
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 2-Year Rainfall=3.09"

	Area (sf)	CN	Description
*	4,263	98	Paved parking, HSG A
*	1,076	98	Cement Concrete Sidewalk, HSG A
	431	39	>75% Grass cover, Good, HSG A
	5,770	94	Weighted Average
	431		7.47% Pervious Area
	5,339		92.53% Impervious Area

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

Subcatchment 32S: PR-26

Hydrograph



Summary for Subcatchment 33S: PR-27

Runoff = 0.34 cfs @ 12.12 hrs, Volume= 0.026 af, Depth= 2.34"
 Routed to Pond 44P : CMP Infiltration

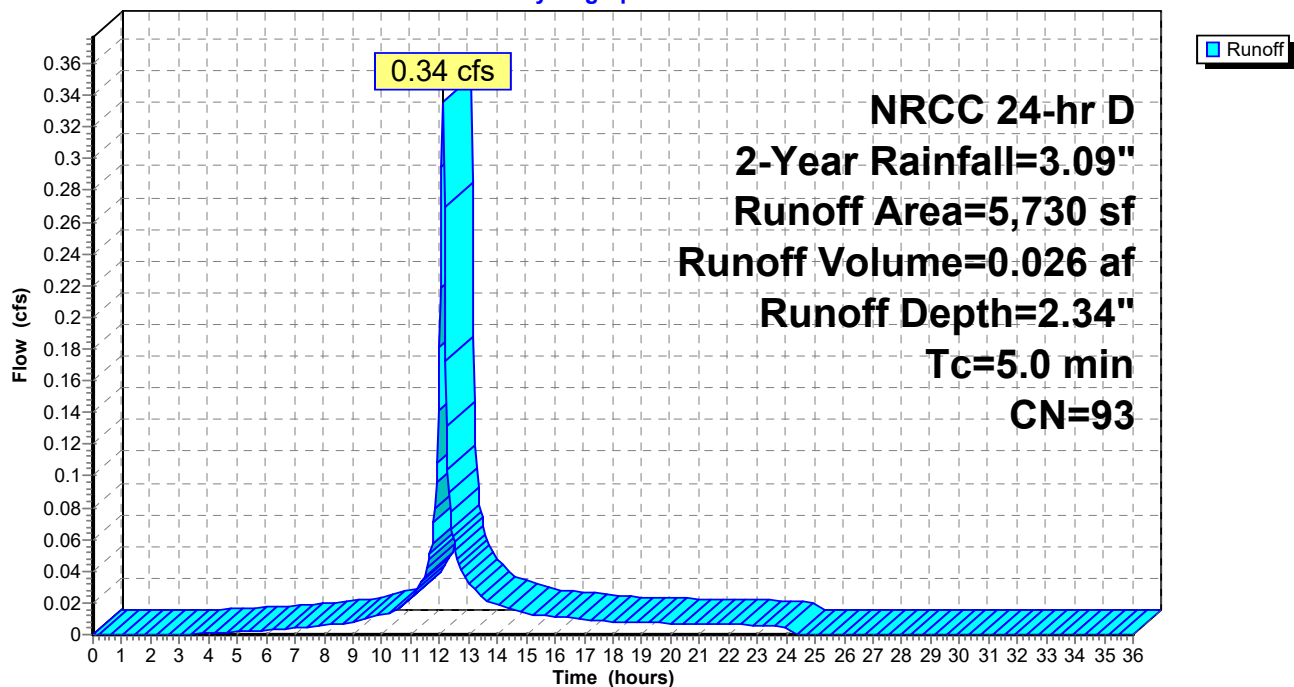
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 2-Year Rainfall=3.09"

	Area (sf)	CN	Description
*	4,151	98	Paved parking, HSG A
*	1,069	98	Cement Concrete Sidewalk, HSG A
	510	39	>75% Grass cover, Good, HSG A
	5,730	93	Weighted Average
	510		8.90% Pervious Area
	5,220		91.10% Impervious Area

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

Subcatchment 33S: PR-27

Hydrograph



Summary for Subcatchment 34S: PR-28

Runoff = 0.06 cfs @ 12.24 hrs, Volume= 0.007 af, Depth= 0.76"
 Routed to Pond 44P : CMP Infiltration

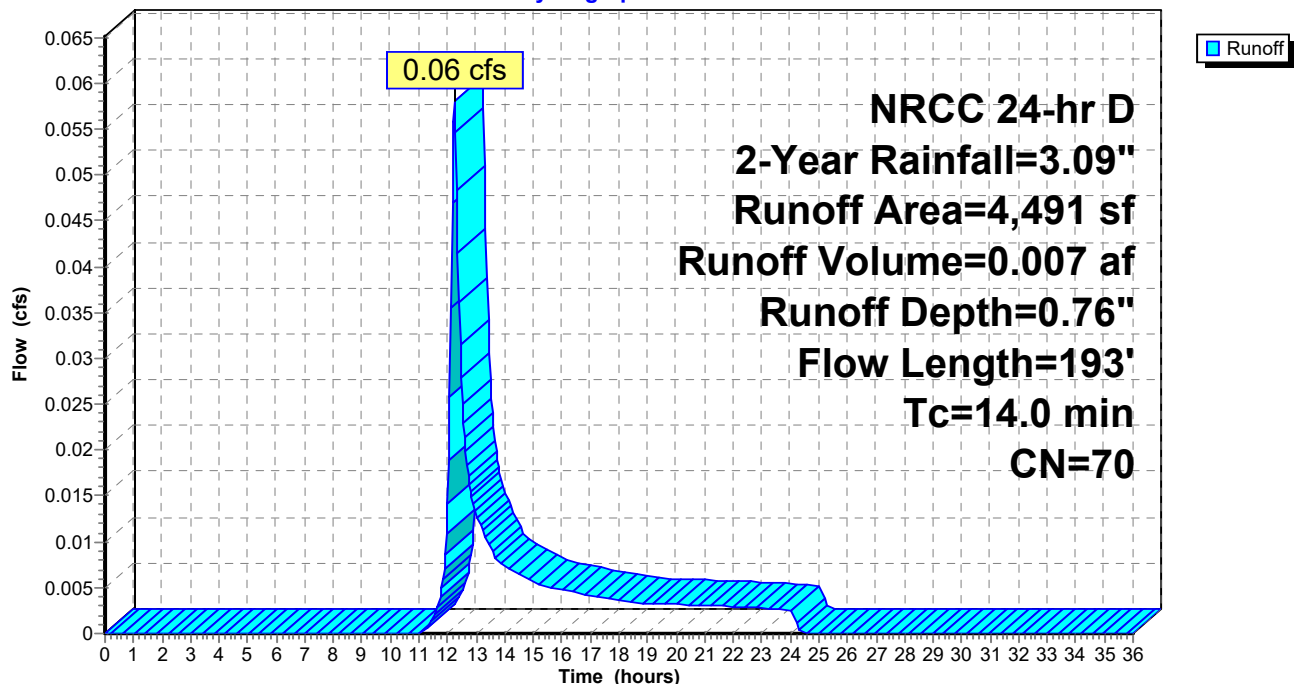
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 2-Year Rainfall=3.09"

Area (sf)	CN	Description
* 1,588	98	Paved parking, HSG A
* 456	98	Cement Concrete Sidewalk, HSG A
1,899	39	>75% Grass cover, Good, HSG A
548	74	>75% Grass cover, Good, HSG C
4,491	70	Weighted Average
2,447		54.49% Pervious Area
2,044		45.51% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.0	81	0.0500	0.10		Sheet Flow, GRASS Grass: Bermuda n= 0.410 P2= 3.13"
0.4	19	0.0150	0.87		Sheet Flow, PAVEMENT Smooth surfaces n= 0.011 P2= 3.13"
0.6	93	0.0150	2.49		Shallow Concentrated Flow, PAVEMENT Paved Kv= 20.3 fps
14.0	193	Total			

Subcatchment 34S: PR-28

Hydrograph



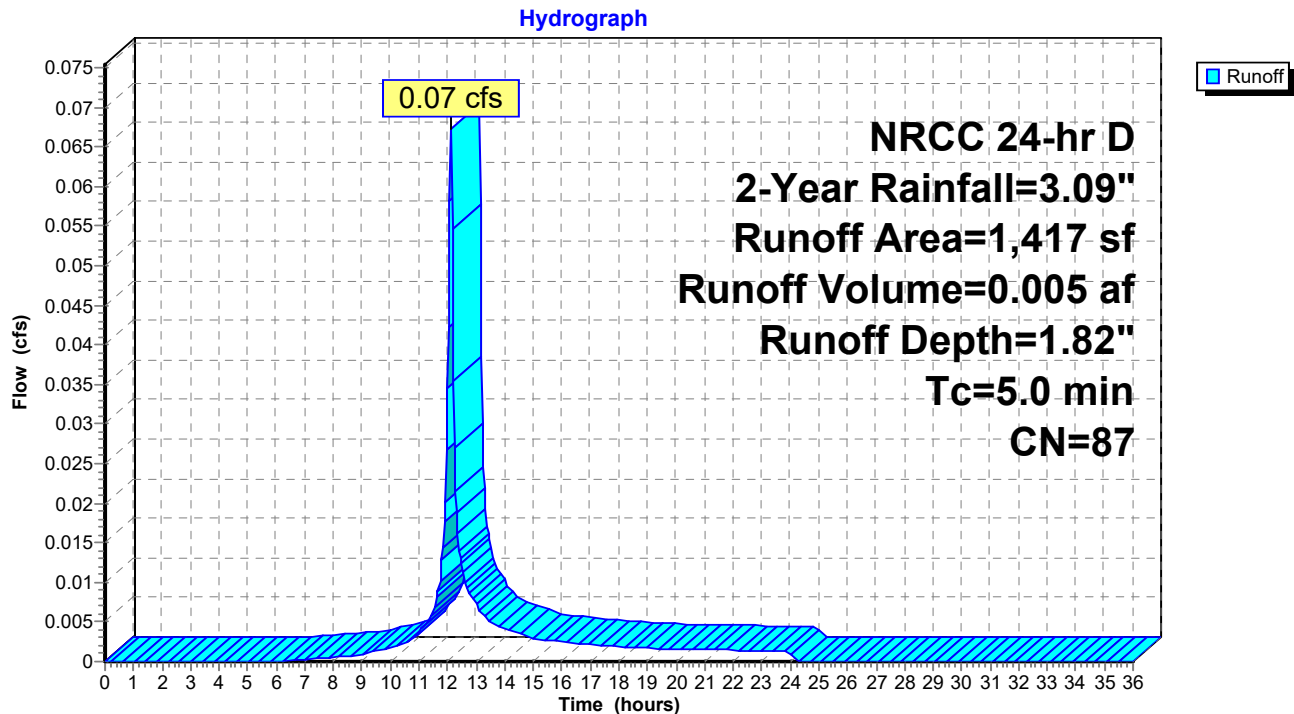
Summary for Subcatchment 35S: PR-29

Runoff = 0.07 cfs @ 12.12 hrs, Volume= 0.005 af, Depth= 1.82"
 Routed to Pond 44P : CMP Infiltration

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 2-Year Rainfall=3.09"

	Area (sf)	CN	Description
*	1,137	98	Paved parking, HSG A
*	16	98	Cement Concrete Sidewalk, HSG A
	264	39	>75% Grass cover, Good, HSG A
	1,417	87	Weighted Average
	264		18.63% Pervious Area
	1,153		81.37% Impervious Area

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

Subcatchment 35S: PR-29

Summary for Subcatchment 36S: PR-30

Runoff = 0.33 cfs @ 12.12 hrs, Volume= 0.025 af, Depth= 1.45"
 Routed to Pond 44P : CMP Infiltration

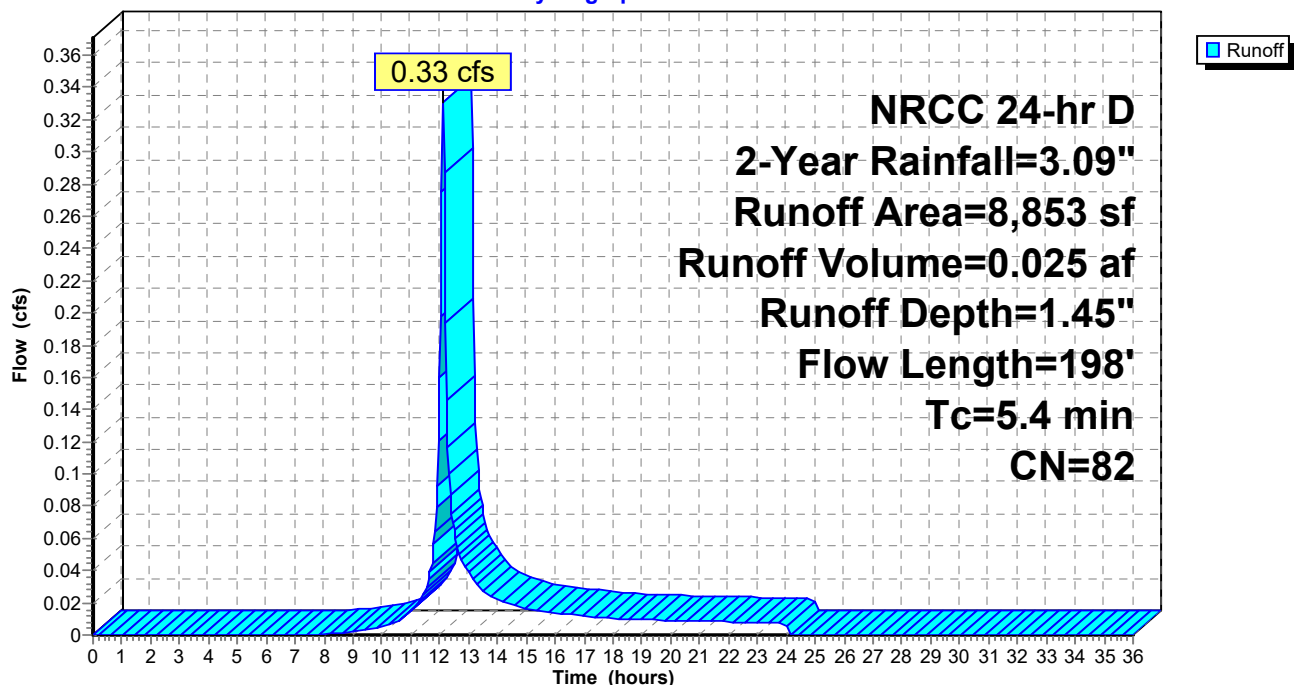
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 2-Year Rainfall=3.09"

	Area (sf)	CN	Description
*	5,691	98	Paved parking, HSG A
*	826	98	Cement Concrete Sidewalk, HSG A
	2,336	39	>75% Grass cover, Good, HSG A
	8,853	82	Weighted Average
	2,336		26.39% Pervious Area
	6,517		73.61% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.5	16	0.0500	0.08		Sheet Flow, GRASS Grass: Bermuda n= 0.410 P2= 3.13"
1.2	84	0.0150	1.17		Sheet Flow, PAVEMENT Smooth surfaces n= 0.011 P2= 3.13"
0.7	98	0.0150	2.49		Shallow Concentrated Flow, PAVEMENT Paved Kv= 20.3 fps
5.4	198	Total			

Subcatchment 36S: PR-30

Hydrograph



Summary for Subcatchment 37S: PR-31

Runoff = 0.41 cfs @ 12.12 hrs, Volume= 0.030 af, Depth= 1.59"
 Routed to Pond 44P : CMP Infiltration

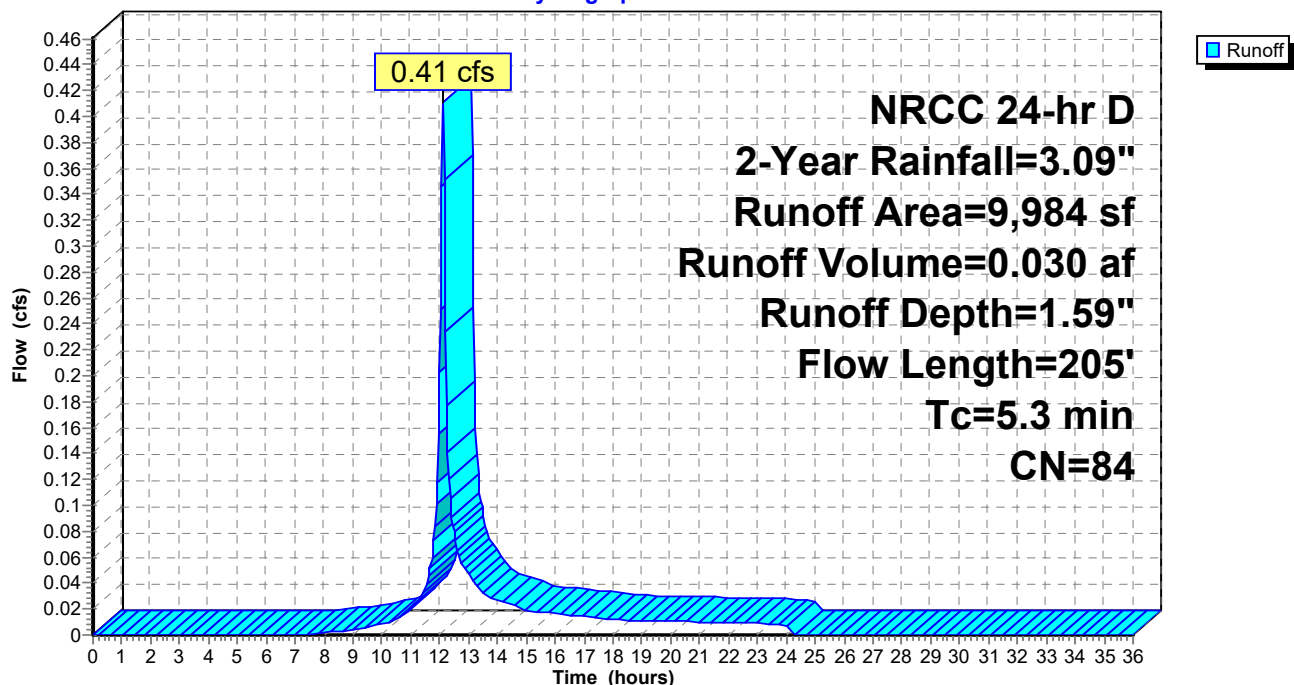
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 2-Year Rainfall=3.09"

	Area (sf)	CN	Description
*	6,479	98	Paved parking, HSG A
*	1,108	98	Cement Concrete Sidewalk, HSG A
	2,397	39	>75% Grass cover, Good, HSG A
	9,984	84	Weighted Average
	2,397		24.01% Pervious Area
	7,587		75.99% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.4	15	0.0500	0.07		Sheet Flow, GRASS Grass: Bermuda n= 0.410 P2= 3.13"
1.2	85	0.0150	1.17		Sheet Flow, PAVEMENT Smooth surfaces n= 0.011 P2= 3.13"
0.7	105	0.0150	2.49		Shallow Concentrated Flow, PAVEMENT Paved Kv= 20.3 fps
5.3	205	Total			

Subcatchment 37S: PR-31

Hydrograph



Summary for Subcatchment 38S: PR-32

Runoff = 0.20 cfs @ 12.25 hrs, Volume= 0.023 af, Depth= 0.76"
 Routed to Pond 44P : CMP Infiltration

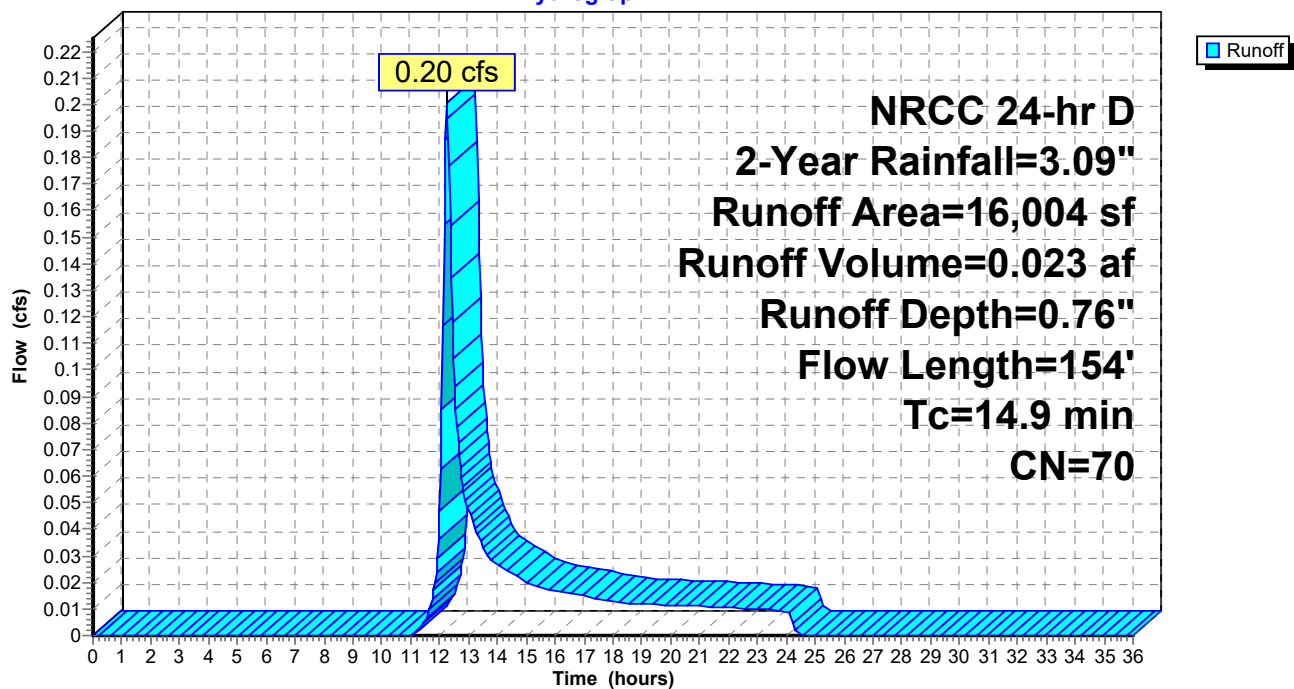
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 2-Year Rainfall=3.09"

	Area (sf)	CN	Description
*	6,711	98	Paved parking, HSG A
*	1,813	98	Cement Concrete Sidewalk, HSG A
	7,480	39	>75% Grass cover, Good, HSG A
	16,004	70	Weighted Average
	7,480		46.74% Pervious Area
	8,524		53.26% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.4	92	0.0500	0.11		Sheet Flow, GRASS Grass: Bermuda n= 0.410 P2= 3.13"
0.2	8	0.0200	0.82		Sheet Flow, PAVEMENT Smooth surfaces n= 0.011 P2= 3.13"
0.2	34	0.0500	3.35		Shallow Concentrated Flow, GRASS Grassed Waterway Kv= 15.0 fps
0.1	20	0.0200	2.87		Shallow Concentrated Flow, PAVEMENT Paved Kv= 20.3 fps
14.9	154	Total			

Subcatchment 38S: PR-32

Hydrograph



Summary for Subcatchment 39S: PR-33

Runoff = 0.35 cfs @ 12.12 hrs, Volume= 0.025 af, Depth= 1.74"
 Routed to Pond 44P : CMP Infiltration

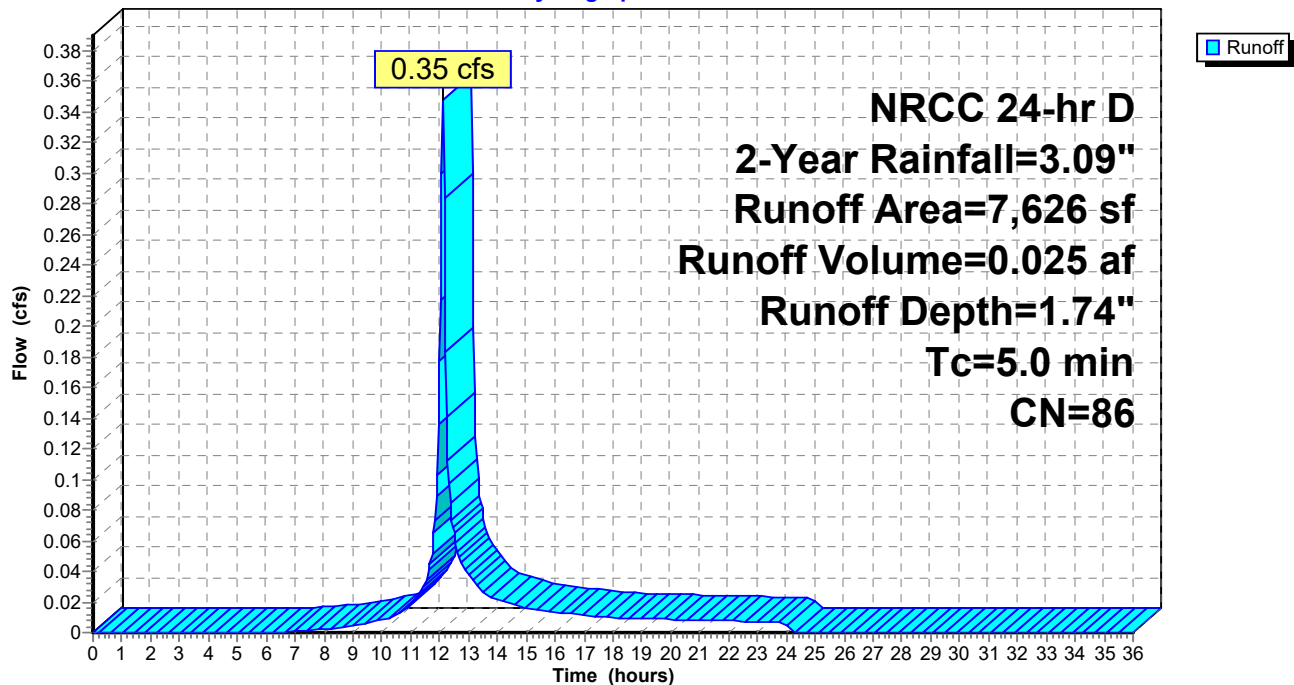
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 2-Year Rainfall=3.09"

	Area (sf)	CN	Description
*	5,106	98	Paved parking, HSG A
*	920	98	Cement Concrete Sidewalk, HSG A
	1,600	39	>75% Grass cover, Good, HSG A
	7,626	86	Weighted Average
	1,600		20.98% Pervious Area
	6,026		79.02% Impervious Area

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

Subcatchment 39S: PR-33

Hydrograph



Summary for Subcatchment 40S: PR-34

Runoff = 0.15 cfs @ 12.12 hrs, Volume= 0.011 af, Depth= 1.90"
 Routed to Pond 44P : CMP Infiltration

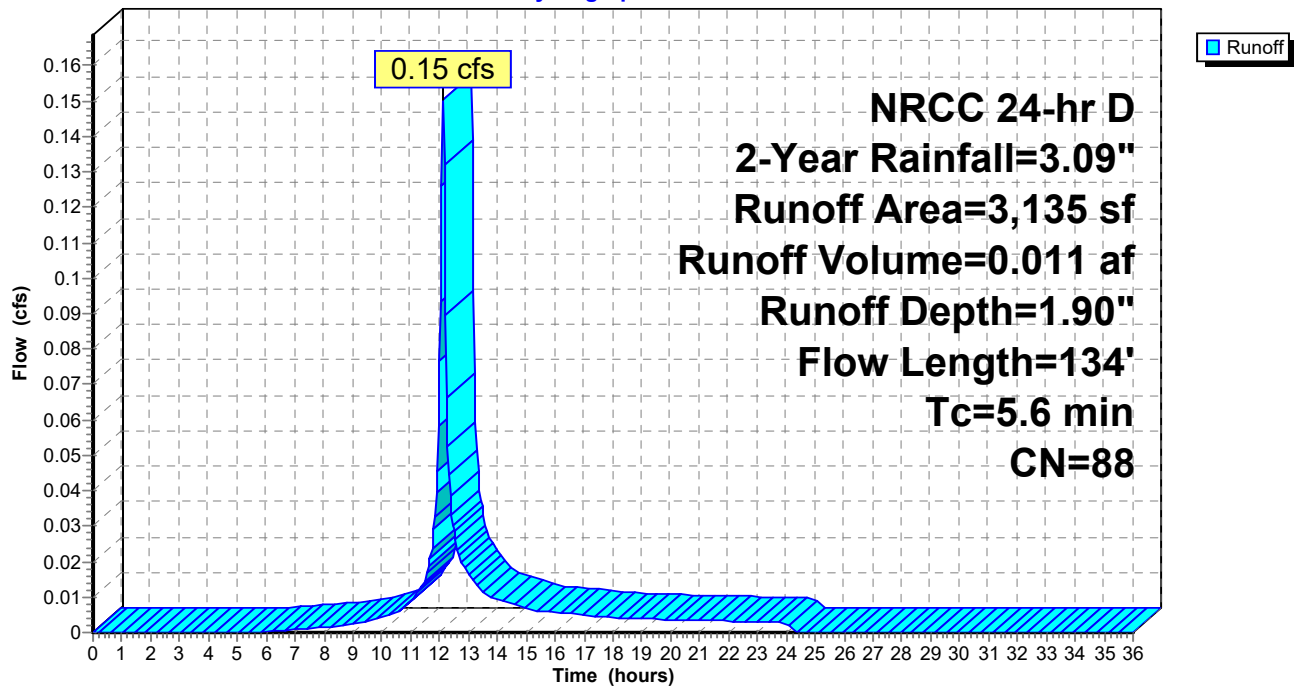
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 2-Year Rainfall=3.09"

	Area (sf)	CN	Description
*	2,389	98	Paved parking, HSG A
*	234	98	Cement Concrete Sidewalk, HSG A
	512	39	>75% Grass cover, Good, HSG A
	3,135	88	Weighted Average
	512		16.33% Pervious Area
	2,623		83.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.4	21	0.0500	0.08		Sheet Flow, GRASS Grass: Bermuda n= 0.410 P2= 3.13"
1.0	79	0.0200	1.30		Sheet Flow, PAVEMENT Smooth surfaces n= 0.011 P2= 3.13"
0.0	7	0.0500	3.35		Shallow Concentrated Flow, GRASS Grassed Waterway Kv= 15.0 fps
0.2	27	0.0200	2.87		Shallow Concentrated Flow, PAVEMENT Paved Kv= 20.3 fps
5.6	134	Total			

Subcatchment 40S: PR-34

Hydrograph



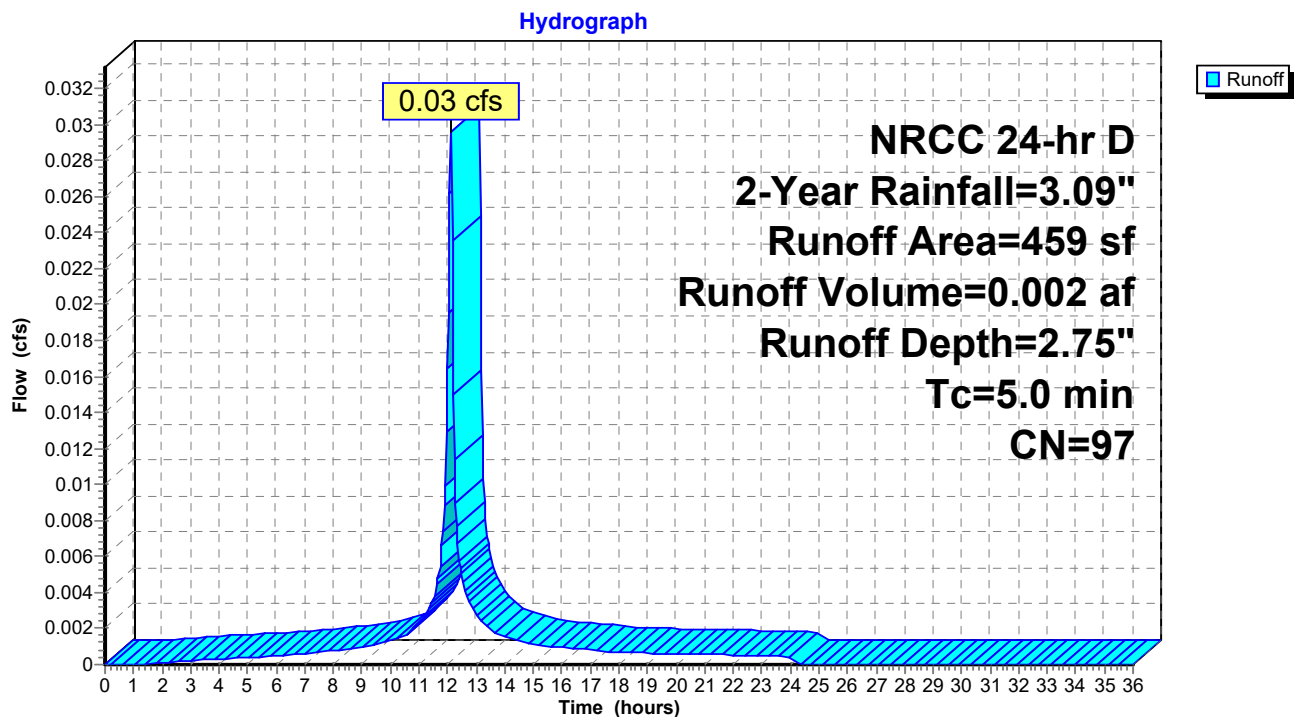
Summary for Subcatchment 41S: PR-35

Runoff = 0.03 cfs @ 12.11 hrs, Volume= 0.002 af, Depth= 2.75"
 Routed to Pond 44P : CMP Infiltration

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 2-Year Rainfall=3.09"

	Area (sf)	CN	Description
*	366	98	Paved parking, HSG A
*	86	98	Cement Concrete Sidewalk, HSG A
	7	39	>75% Grass cover, Good, HSG A
	459	97	Weighted Average
	7		1.53% Pervious Area
	452		98.47% Impervious Area

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

Subcatchment 41S: PR-35

Summary for Subcatchment 42S: PR-36

Runoff = 0.36 cfs @ 12.12 hrs, Volume= 0.027 af, Depth= 2.16"
 Routed to Pond 44P : CMP Infiltration

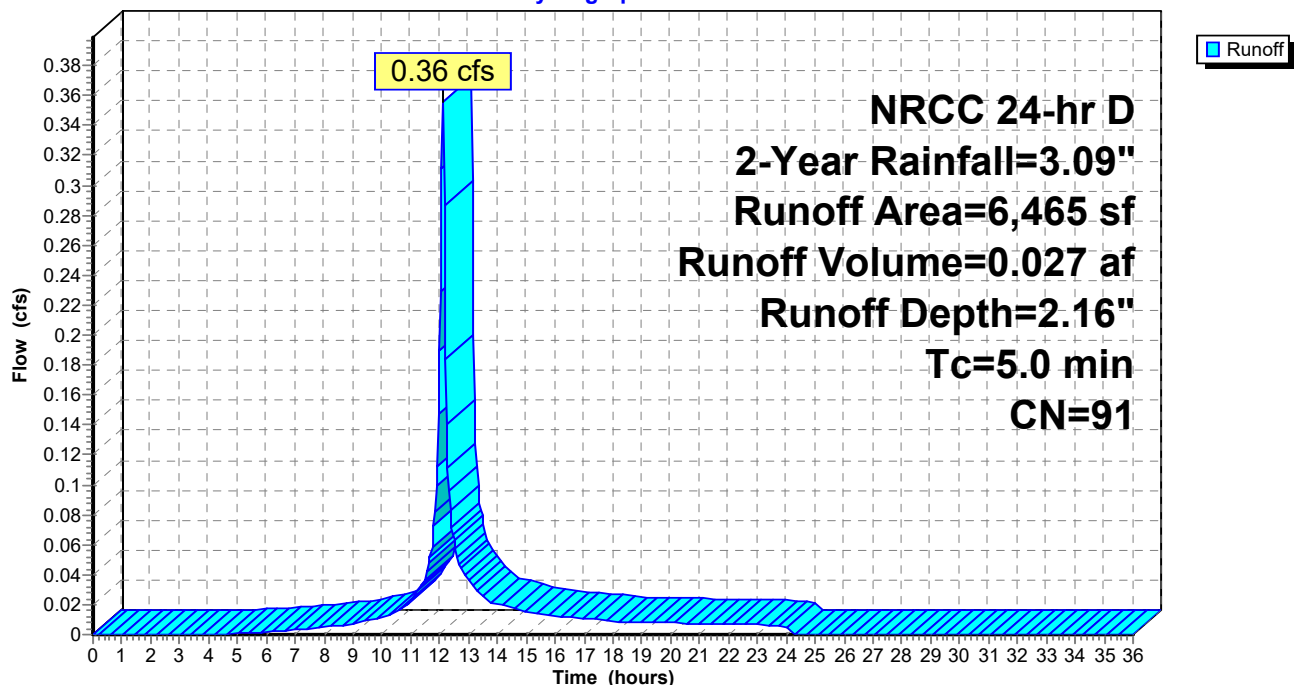
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 2-Year Rainfall=3.09"

	Area (sf)	CN	Description
*	4,448	98	Paved parking, HSG A
*	1,207	98	Cement Concrete Sidewalk, HSG A
	810	39	>75% Grass cover, Good, HSG A
	6,465	91	Weighted Average
	810		12.53% Pervious Area
	5,655		87.47% Impervious Area

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

Subcatchment 42S: PR-36

Hydrograph



Summary for Subcatchment 43S: PR-37

Runoff = 0.40 cfs @ 12.12 hrs, Volume= 0.030 af, Depth= 2.25"
 Routed to Pond 44P : CMP Infiltration

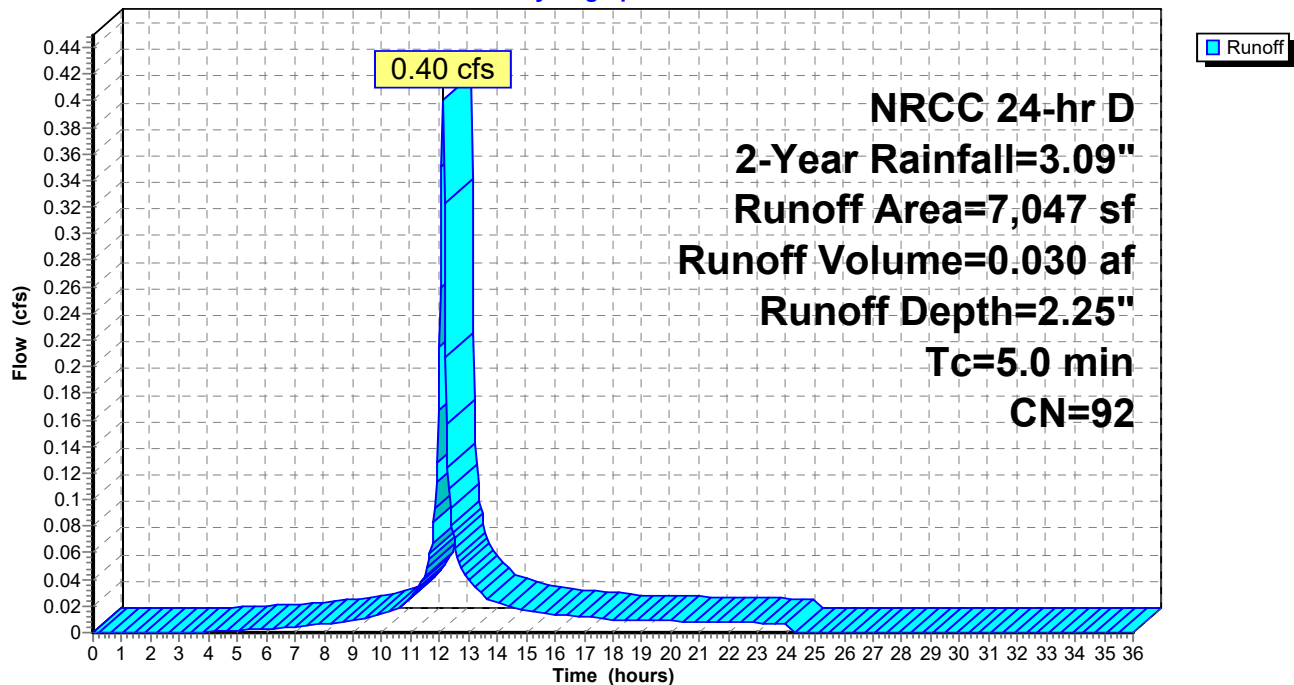
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 2-Year Rainfall=3.09"

	Area (sf)	CN	Description
*	5,177	98	Paved parking, HSG A
*	1,177	98	Cement Concrete Sidewalk, HSG A
	693	39	>75% Grass cover, Good, HSG A
	7,047	92	Weighted Average
	693		9.83% Pervious Area
	6,354		90.17% Impervious Area

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

Subcatchment 43S: PR-37

Hydrograph



Summary for Pond 44P: CMP Infiltration

Inflow Area = 5.917 ac, 73.14% Impervious, Inflow Depth = 1.77" for 2-Year event
 Inflow = 10.99 cfs @ 12.12 hrs, Volume= 0.875 af
 Outflow = 9.45 cfs @ 12.16 hrs, Volume= 0.875 af, Atten= 14%, Lag= 2.4 min
 Discarded = 0.17 cfs @ 12.16 hrs, Volume= 0.228 af
 Primary = 9.28 cfs @ 12.16 hrs, Volume= 0.647 af
 Routed to Pond 45P : Rain Garden

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs / 3
 Peak Elev= 268.38' @ 12.16 hrs Surf.Area= 0.055 ac Storage= 0.061 af

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 18.2 min (851.0 - 832.8)

Volume	Invert	Avail.Storage	Storage Description
#1C	266.50'	0.081 af	17.00'W x 142.00'L x 7.00'H Field C 0.388 af Overall - 0.186 af Embedded = 0.202 af x 40.0% Voids
#2C	267.00'	0.186 af	CMP Round 72 x 12 Inside #1 Effective Size= 72.0"W x 72.0"H => 28.27 sf x 20.00'L = 565.5 cf Overall Size= 72.0"W x 72.0"H x 20.00'L Row Length Adjustment= +8.00' x 28.27 sf x 2 rows 15.00' Header x 28.27 sf x 2 = 848.2 cf Inside
		0.267 af	Total Available Storage

Storage Group C created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	267.00'	18.0" Round Culvert L= 169.0' RCP, rounded edge headwall, Ke= 0.100 Inlet / Outlet Invert= 267.00' / 260.24' S= 0.0400 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.77 sf
#2	Discarded	266.50'	2.410 in/hr Exfiltration over Wetted area

Discarded OutFlow Max=0.17 cfs @ 12.16 hrs HW=268.38' (Free Discharge)
 ↑ **2=Exfiltration** (Exfiltration Controls 0.17 cfs)

Primary OutFlow Max=9.28 cfs @ 12.16 hrs HW=268.38' TW=257.54' (Dynamic Tailwater)
 ↑ **1=Culvert** (Inlet Controls 9.28 cfs @ 5.45 fps)

Pond 44P: CMP Infiltration - Chamber Wizard Field C

Chamber Model = CMP Round 72 (Round Corrugated Metal Pipe)

Effective Size= 72.0"W x 72.0"H => 28.27 sf x 20.00'L = 565.5 cf

Overall Size= 72.0"W x 72.0"H x 20.00'L

Row Length Adjustment= +8.00' x 28.27 sf x 2 rows

72.0" Wide + 36.0" Spacing = 108.0" C-C Row Spacing

6 Chambers/Row x 20.00' Long +8.00' Row Adjustment +6.00' Header x 2 = 140.00' Row Length +12.0"

End Stone x 2 = 142.00' Base Length

2 Rows x 72.0" Wide + 36.0" Spacing x 1 + 12.0" Side Stone x 2 = 17.00' Base Width

6.0" Stone Base + 72.0" Chamber Height + 6.0" Stone Cover = 7.00' Field Height

12 Chambers x 565.5 cf +8.00' Row Adjustment x 28.27 sf x 2 Rows + 15.00' Header x 28.27 sf x 2 =
8,086.5 cf Chamber Storage

16,898.0 cf Field - 8,086.5 cf Chambers = 8,811.5 cf Stone x 40.0% Voids = 3,524.6 cf Stone Storage

Chamber Storage + Stone Storage = 11,611.1 cf = 0.267 af

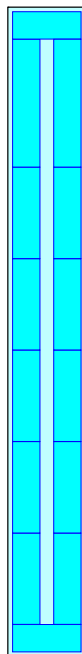
Overall Storage Efficiency = 68.7%

Overall System Size = 142.00' x 17.00' x 7.00'

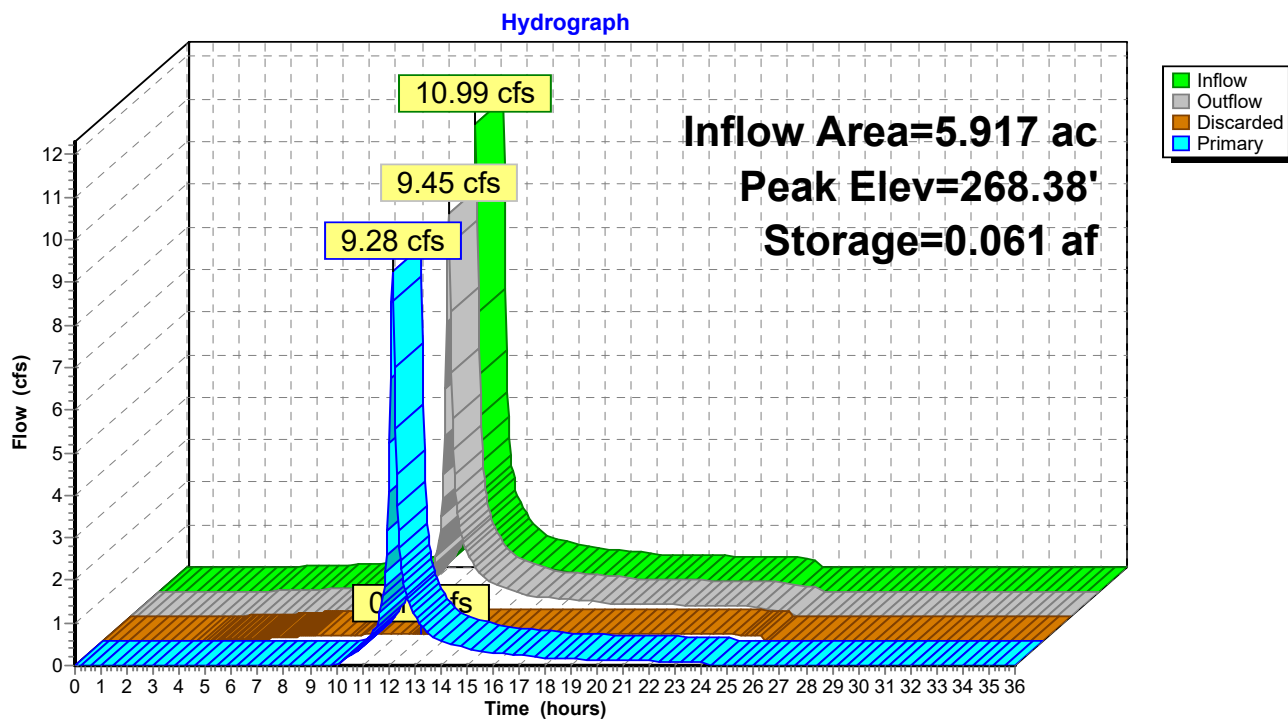
12 Chambers

625.9 cy Field

326.4 cy Stone



Pond 44P: CMP Infiltration



Stage-Area-Storage for Pond 44P: CMP Infiltration

Elevation (feet)	Wetted (acres)	Storage (acre-feet)	Elevation (feet)	Wetted (acres)	Storage (acre-feet)
266.50	0.055	0.000	271.80	0.094	0.213
266.60	0.056	0.002	271.90	0.095	0.217
266.70	0.057	0.004	272.00	0.096	0.221
266.80	0.058	0.007	272.10	0.096	0.225
266.90	0.058	0.009	272.20	0.097	0.229
267.00	0.059	0.011	272.30	0.098	0.233
267.10	0.060	0.014	272.40	0.098	0.236
267.20	0.061	0.017	272.50	0.099	0.240
267.30	0.061	0.020	272.60	0.100	0.243
267.40	0.062	0.023	272.70	0.101	0.247
267.50	0.063	0.027	272.80	0.101	0.250
267.60	0.063	0.030	272.90	0.102	0.253
267.70	0.064	0.034	273.00	0.103	0.255
267.80	0.065	0.038	273.10	0.104	0.258
267.90	0.066	0.042	273.20	0.104	0.260
268.00	0.066	0.045	273.30	0.105	0.262
268.10	0.067	0.049	273.40	0.106	0.264
268.20	0.068	0.054	273.50	0.107	0.267
268.30	0.069	0.058			
268.40	0.069	0.062			
268.50	0.070	0.066			
268.60	0.071	0.070			
268.70	0.071	0.075			
268.80	0.072	0.079			
268.90	0.073	0.083			
269.00	0.074	0.088			
269.10	0.074	0.092			
269.20	0.075	0.097			
269.30	0.076	0.101			
269.40	0.077	0.106			
269.50	0.077	0.110			
269.60	0.078	0.115			
269.70	0.079	0.120			
269.80	0.080	0.124			
269.90	0.080	0.129			
270.00	0.081	0.133			
270.10	0.082	0.138			
270.20	0.082	0.142			
270.30	0.083	0.147			
270.40	0.084	0.152			
270.50	0.085	0.156			
270.60	0.085	0.161			
270.70	0.086	0.165			
270.80	0.087	0.170			
270.90	0.088	0.174			
271.00	0.088	0.179			
271.10	0.089	0.183			
271.20	0.090	0.187			
271.30	0.090	0.192			
271.40	0.091	0.196			
271.50	0.092	0.200			
271.60	0.093	0.205			
271.70	0.093	0.209			

Summary for Pond 45P: Rain Garden

Inflow Area = 5.917 ac, 73.14% Impervious, Inflow Depth = 1.31" for 2-Year event
 Inflow = 9.28 cfs @ 12.16 hrs, Volume= 0.647 af
 Outflow = 2.93 cfs @ 12.42 hrs, Volume= 0.648 af, Atten= 68%, Lag= 15.8 min
 Discarded = 2.93 cfs @ 12.42 hrs, Volume= 0.648 af
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Routed to Link 15L : DP-1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs / 3
 Peak Elev= 258.68' @ 12.42 hrs Surf.Area= 10,916 sf Storage= 7,426 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 27.4 min (845.3 - 817.9)

Volume	Invert	Avail.Storage	Storage Description
#1	255.50'	6,443 cf	Custom Stage Data (Irregular) Listed below (Recalc) 16,107 cf Overall x 40.0% Voids
#2	258.50'	10,400 cf	Custom Stage Data (Irregular) Listed below (Recalc)
		16,843 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
255.50	5,369	313.0	0	0	5,369
258.50	5,369	313.0	16,107	16,107	6,308

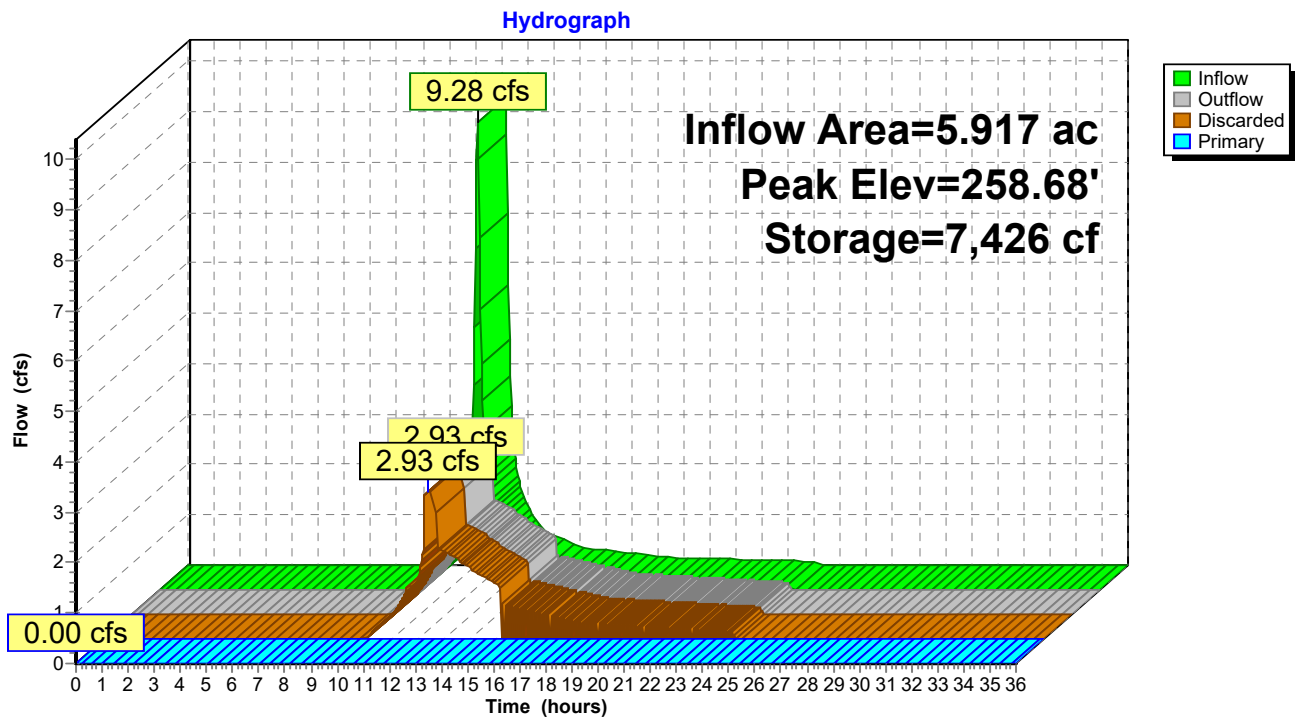
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
258.50	5,369	313.0	0	0	5,369
260.00	6,938	357.4	9,205	9,205	7,790
260.17	7,118	360.5	1,195	10,400	7,978

Device	Routing	Invert	Outlet Devices
#1	Primary	253.71'	24.0" Round Culvert L= 32.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 253.71' / 253.36' S= 0.0109 ' / ' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 3.14 sf
#2	Discarded	255.50'	8.270 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 251.50'
#3	Device 1	259.55'	2.0" x 2.0" Horiz. Orifice/Grate X 6.00 columns X 6 rows C= 0.600 Limited to weir flow at low heads
#4	Primary	259.05'	6.0' long x 0.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 Coef. (English) 2.80 2.92

Discarded OutFlow Max=2.93 cfs @ 12.42 hrs HW=258.68' (Free Discharge)
 ↳ **2=Exfiltration** (Controls 2.93 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=255.50' TW=0.00' (Dynamic Tailwater)
 ↳ **1=Culvert** (Passes 0.00 cfs of 10.67 cfs potential flow)
 ↳ **3=Orifice/Grate** (Controls 0.00 cfs)
 ↳ **4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 45P: Rain Garden



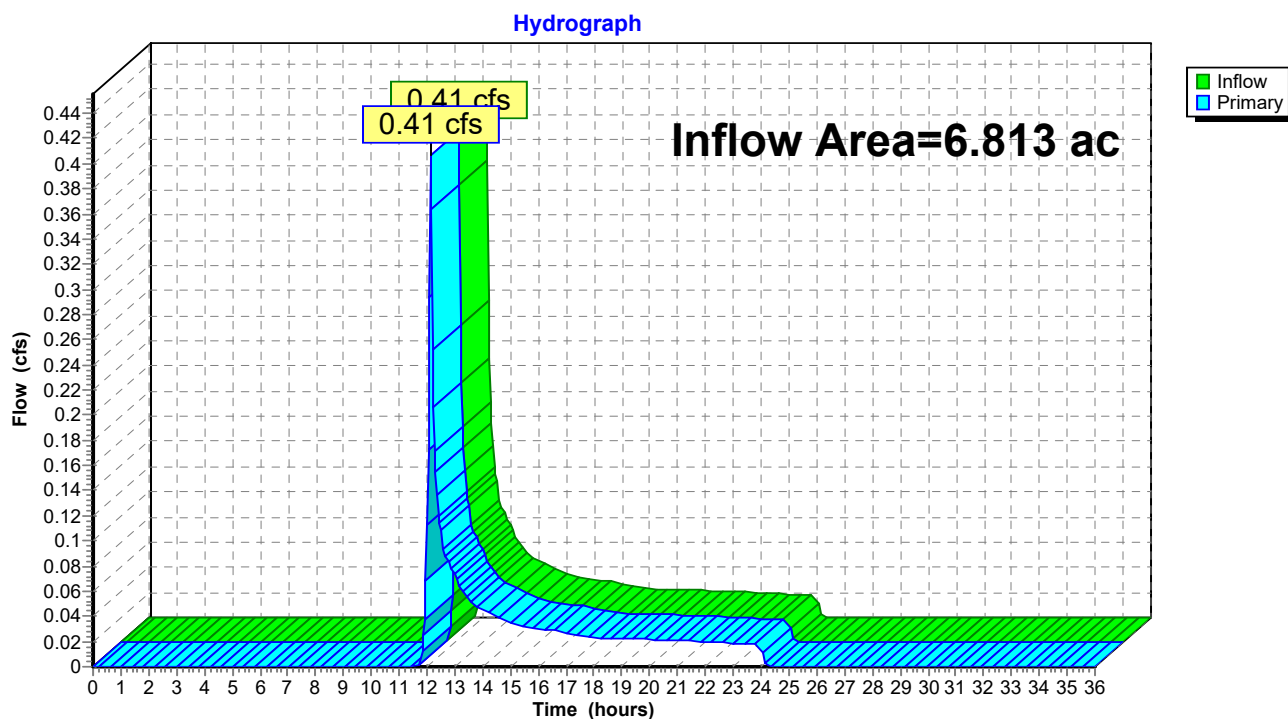
Stage-Area-Storage for Pond 45P: Rain Garden

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
255.50	5,369	0
255.60	5,369	215
255.70	5,369	430
255.80	5,369	644
255.90	5,369	859
256.00	5,369	1,074
256.10	5,369	1,289
256.20	5,369	1,503
256.30	5,369	1,718
256.40	5,369	1,933
256.50	5,369	2,148
256.60	5,369	2,362
256.70	5,369	2,577
256.80	5,369	2,792
256.90	5,369	3,007
257.00	5,369	3,221
257.10	5,369	3,436
257.20	5,369	3,651
257.30	5,369	3,866
257.40	5,369	4,080
257.50	5,369	4,295
257.60	5,369	4,510
257.70	5,369	4,725
257.80	5,369	4,939
257.90	5,369	5,154
258.00	5,369	5,369
258.10	5,369	5,584
258.20	5,369	5,799
258.30	5,369	6,013
258.40	5,369	6,228
258.50	10,738	6,443
258.60	10,836	6,985
258.70	10,936	7,536
258.80	11,036	8,098
258.90	11,137	8,670
259.00	11,239	9,252
259.10	11,341	9,844
259.20	11,445	10,446
259.30	11,550	11,059
259.40	11,655	11,682
259.50	11,762	12,316
259.60	11,869	12,961
259.70	11,977	13,616
259.80	12,086	14,282
259.90	12,196	14,960
260.00	12,307	15,648
260.10	12,413	16,347

Summary for Link 15L: DP-1

Inflow Area = 6.813 ac, 69.19% Impervious, Inflow Depth = 0.07" for 2-Year event
Inflow = 0.41 cfs @ 12.13 hrs, Volume= 0.038 af
Primary = 0.41 cfs @ 12.13 hrs, Volume= 0.038 af, Atten= 0%, Lag= 0.0 min

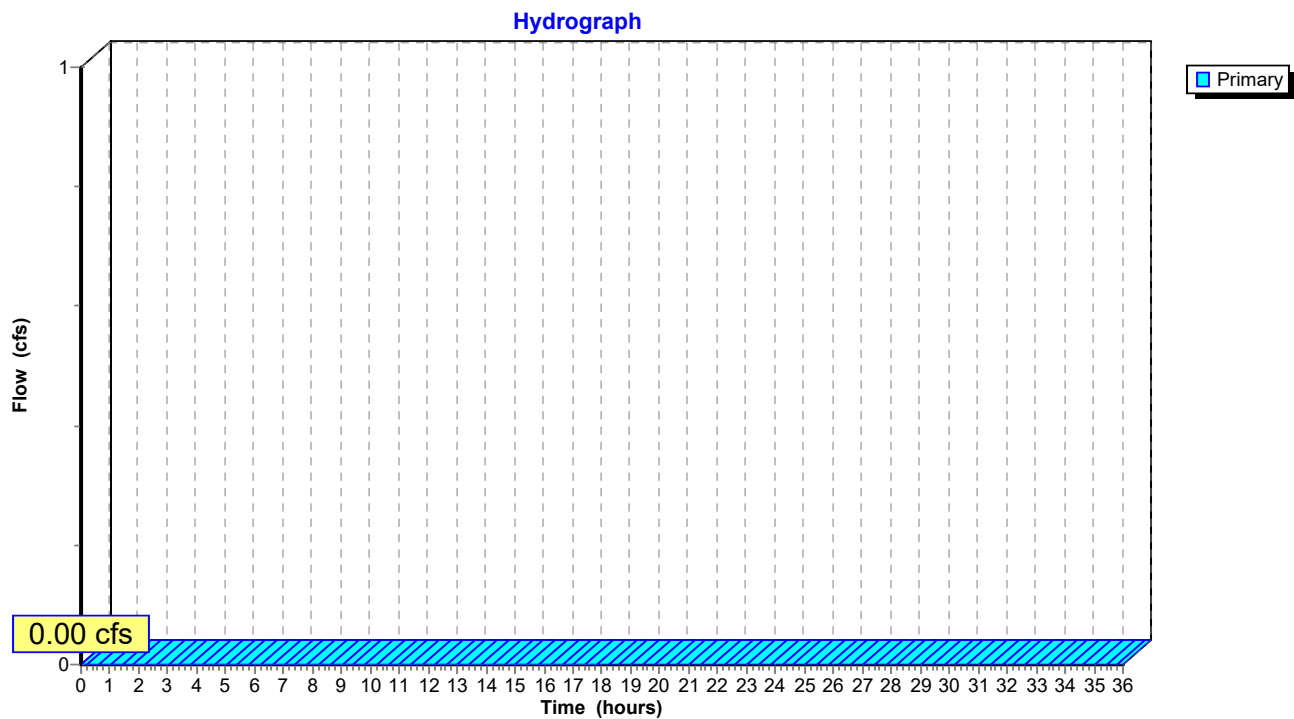
Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs

Link 15L: DP-1

Summary for Link 16L: DP-2

Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

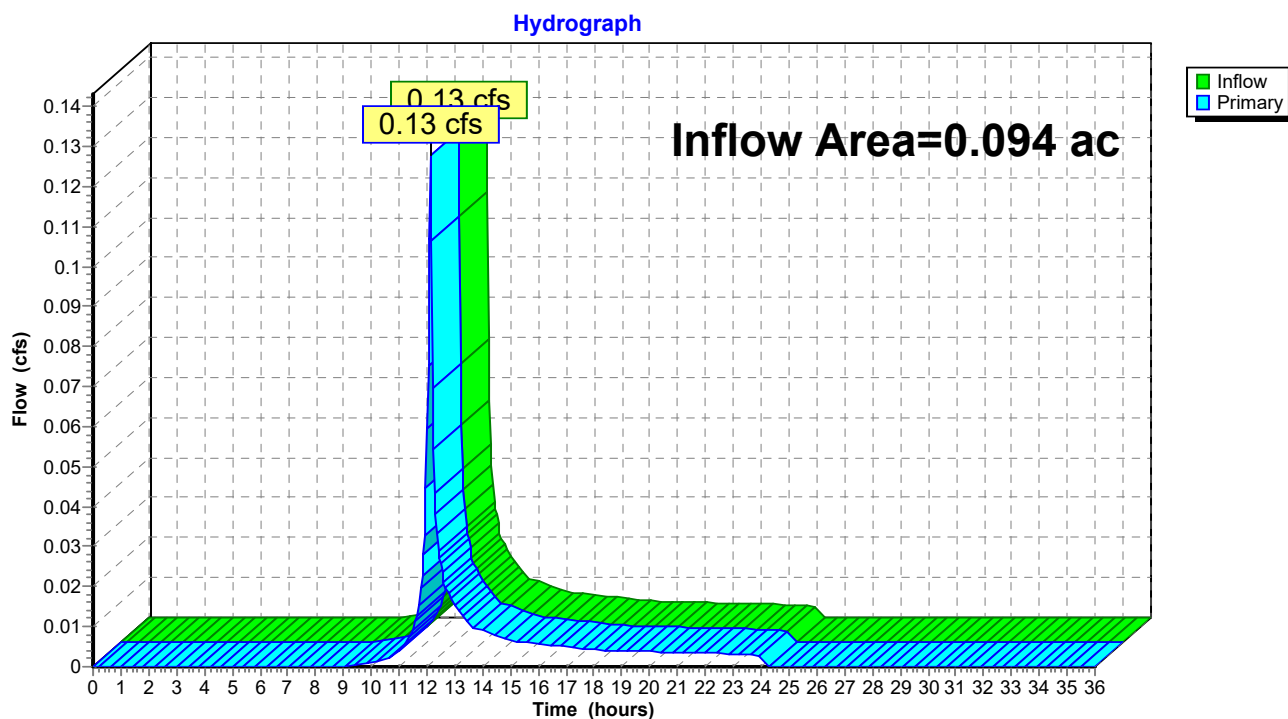
Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs

Link 16L: DP-2

Summary for Link 17L: DP-3

Inflow Area = 0.094 ac, 0.00% Impervious, Inflow Depth = 1.19" for 2-Year event
Inflow = 0.13 cfs @ 12.12 hrs, Volume= 0.009 af
Primary = 0.13 cfs @ 12.12 hrs, Volume= 0.009 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs

Link 17L: DP-3

Time span=0.00-36.00 hrs, dt=0.04 hrs, 901 points x 3
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: PR-1	Runoff Area=39,056 sf 43.09% Impervious Runoff Depth=1.36" Tc=5.0 min CN=64 Runoff=1.33 cfs 0.101 af
Subcatchment2S: PR-2	Runoff Area=5,989 sf 81.43% Impervious Runoff Depth=3.96" Tc=5.0 min CN=94 Runoff=0.57 cfs 0.045 af
Subcatchment3S: PR-3	Runoff Area=8,817 sf 74.45% Impervious Runoff Depth=3.75" Tc=5.0 min CN=92 Runoff=0.81 cfs 0.063 af
Subcatchment4S: PR-4	Runoff Area=6,680 sf 84.81% Impervious Runoff Depth=3.75" Tc=5.0 min CN=92 Runoff=0.62 cfs 0.048 af
Subcatchment5S: PR-5	Runoff Area=7,314 sf 77.02% Impervious Runoff Depth=3.34" Tc=5.0 min CN=88 Runoff=0.62 cfs 0.047 af
Subcatchment6S: PR-6	Runoff Area=15,529 sf 56.34% Impervious Runoff Depth=1.93" Tc=5.0 min CN=72 Runoff=0.79 cfs 0.057 af
Subcatchment7S: PR-7	Runoff Area=8,738 sf 78.69% Impervious Runoff Depth=3.05" Tc=5.0 min CN=85 Runoff=0.69 cfs 0.051 af
Subcatchment8S: PR-8	Runoff Area=16,223 sf 52.41% Impervious Runoff Depth=2.77" Tc=5.0 min CN=82 Runoff=1.17 cfs 0.086 af
Subcatchment9S: PR-9	Runoff Area=7,180 sf 74.57% Impervious Runoff Depth=3.44" Flow Length=127' Tc=7.1 min CN=89 Runoff=0.57 cfs 0.047 af
Subcatchment10S: PR-10	Runoff Area=4,103 sf 0.00% Impervious Runoff Depth=2.42" Tc=5.0 min CN=78 Runoff=0.26 cfs 0.019 af
Subcatchment11S: PR-11	Runoff Area=12,349 sf 77.12% Impervious Runoff Depth=3.75" Flow Length=257' Tc=6.6 min CN=92 Runoff=1.06 cfs 0.089 af
Subcatchment12S: PR-12	Runoff Area=12,764 sf 71.19% Impervious Runoff Depth=3.64" Tc=5.0 min CN=91 Runoff=1.15 cfs 0.089 af
Subcatchment18S: PR-13	Runoff Area=7,593 sf 39.33% Impervious Runoff Depth=1.43" Flow Length=246' Tc=16.1 min CN=65 Runoff=0.18 cfs 0.021 af
Subcatchment19S: PR-14	Runoff Area=3,225 sf 82.26% Impervious Runoff Depth=3.44" Flow Length=166' Tc=7.3 min CN=89 Runoff=0.26 cfs 0.021 af
Subcatchment20S: PR-15	Runoff Area=2,717 sf 85.79% Impervious Runoff Depth=3.54" Tc=5.0 min CN=90 Runoff=0.24 cfs 0.018 af
Subcatchment22S: PR-16	Runoff Area=1,349 sf 100.00% Impervious Runoff Depth=4.41" Flow Length=247' Tc=16.1 min CN=98 Runoff=0.09 cfs 0.011 af

Subcatchment23S: PR-17	Runoff Area=14,295 sf 71.70% Impervious Runoff Depth=3.54" Tc=5.0 min CN=90 Runoff=1.27 cfs 0.097 af
Subcatchment24S: PR-18	Runoff Area=9,416 sf 96.73% Impervious Runoff Depth=4.18" Flow Length=189' Tc=7.1 min CN=96 Runoff=0.84 cfs 0.075 af
Subcatchment25S: PR-19	Runoff Area=1,787 sf 75.15% Impervious Runoff Depth=2.86" Tc=5.0 min CN=83 Runoff=0.13 cfs 0.010 af
Subcatchment26S: PR-20	Runoff Area=6,770 sf 88.61% Impervious Runoff Depth=3.64" Tc=5.0 min CN=91 Runoff=0.61 cfs 0.047 af
Subcatchment27S: PR-21	Runoff Area=6,755 sf 89.10% Impervious Runoff Depth=3.75" Tc=5.0 min CN=92 Runoff=0.62 cfs 0.048 af
Subcatchment28S: PR-22	Runoff Area=5,124 sf 73.32% Impervious Runoff Depth=2.95" Tc=5.0 min CN=84 Runoff=0.39 cfs 0.029 af
Subcatchment29S: PR-23	Runoff Area=6,611 sf 79.08% Impervious Runoff Depth=3.34" Tc=5.0 min CN=88 Runoff=0.56 cfs 0.042 af
Subcatchment30S: PR-24	Runoff Area=5,313 sf 80.16% Impervious Runoff Depth=3.34" Tc=5.0 min CN=88 Runoff=0.45 cfs 0.034 af
Subcatchment31S: PR-25	Runoff Area=8,212 sf 59.72% Impervious Runoff Depth=2.59" Flow Length=218' Tc=11.9 min CN=80 Runoff=0.43 cfs 0.041 af
Subcatchment32S: PR-26	Runoff Area=5,770 sf 92.53% Impervious Runoff Depth=3.96" Tc=5.0 min CN=94 Runoff=0.55 cfs 0.044 af
Subcatchment33S: PR-27	Runoff Area=5,730 sf 91.10% Impervious Runoff Depth=3.85" Tc=5.0 min CN=93 Runoff=0.54 cfs 0.042 af
Subcatchment34S: PR-28	Runoff Area=4,491 sf 45.51% Impervious Runoff Depth=1.78" Flow Length=193' Tc=14.0 min CN=70 Runoff=0.15 cfs 0.015 af
Subcatchment35S: PR-29	Runoff Area=1,417 sf 81.37% Impervious Runoff Depth=3.24" Tc=5.0 min CN=87 Runoff=0.12 cfs 0.009 af
Subcatchment36S: PR-30	Runoff Area=8,853 sf 73.61% Impervious Runoff Depth=2.77" Flow Length=198' Tc=5.4 min CN=82 Runoff=0.63 cfs 0.047 af
Subcatchment37S: PR-31	Runoff Area=9,984 sf 75.99% Impervious Runoff Depth=2.95" Flow Length=205' Tc=5.3 min CN=84 Runoff=0.75 cfs 0.056 af
Subcatchment38S: PR-32	Runoff Area=16,004 sf 53.26% Impervious Runoff Depth=1.78" Flow Length=154' Tc=14.9 min CN=70 Runoff=0.51 cfs 0.055 af
Subcatchment39S: PR-33	Runoff Area=7,626 sf 79.02% Impervious Runoff Depth=3.14" Tc=5.0 min CN=86 Runoff=0.62 cfs 0.046 af
Subcatchment40S: PR-34	Runoff Area=3,135 sf 83.67% Impervious Runoff Depth=3.34" Flow Length=134' Tc=5.6 min CN=88 Runoff=0.26 cfs 0.020 af

Subcatchment41S: PR-35 Runoff Area=459 sf 98.47% Impervious Runoff Depth=4.30"
Tc=5.0 min CN=97 Runoff=0.05 cfs 0.004 af

Subcatchment42S: PR-36 Runoff Area=6,465 sf 87.47% Impervious Runoff Depth=3.64"
Tc=5.0 min CN=91 Runoff=0.58 cfs 0.045 af

Subcatchment43S: PR-37 Runoff Area=7,047 sf 90.17% Impervious Runoff Depth=3.75"
Tc=5.0 min CN=92 Runoff=0.65 cfs 0.051 af

Pond 44P: CMP Infiltration Peak Elev=269.35' Storage=0.104 af Inflow=19.02 cfs 1.550 af
Discarded=0.19 cfs 0.257 af Primary=14.67 cfs 1.293 af Outflow=14.86 cfs 1.550 af

Pond 45P: Rain Garden Peak Elev=259.55' Storage=12,636 cf Inflow=14.67 cfs 1.293 af
Discarded=3.46 cfs 1.143 af Primary=6.19 cfs 0.151 af Outflow=9.66 cfs 1.294 af

Link 15L: DP-1 Inflow=6.62 cfs 0.253 af
Primary=6.62 cfs 0.253 af

Link 16L: DP-2 Primary=0.00 cfs 0.000 af

Link 17L: DP-3 Inflow=0.26 cfs 0.019 af
Primary=0.26 cfs 0.019 af

Total Runoff Area = 6.907 ac Runoff Volume = 1.671 af Average Runoff Depth = 2.90"
31.76% Pervious = 2.194 ac 68.24% Impervious = 4.714 ac

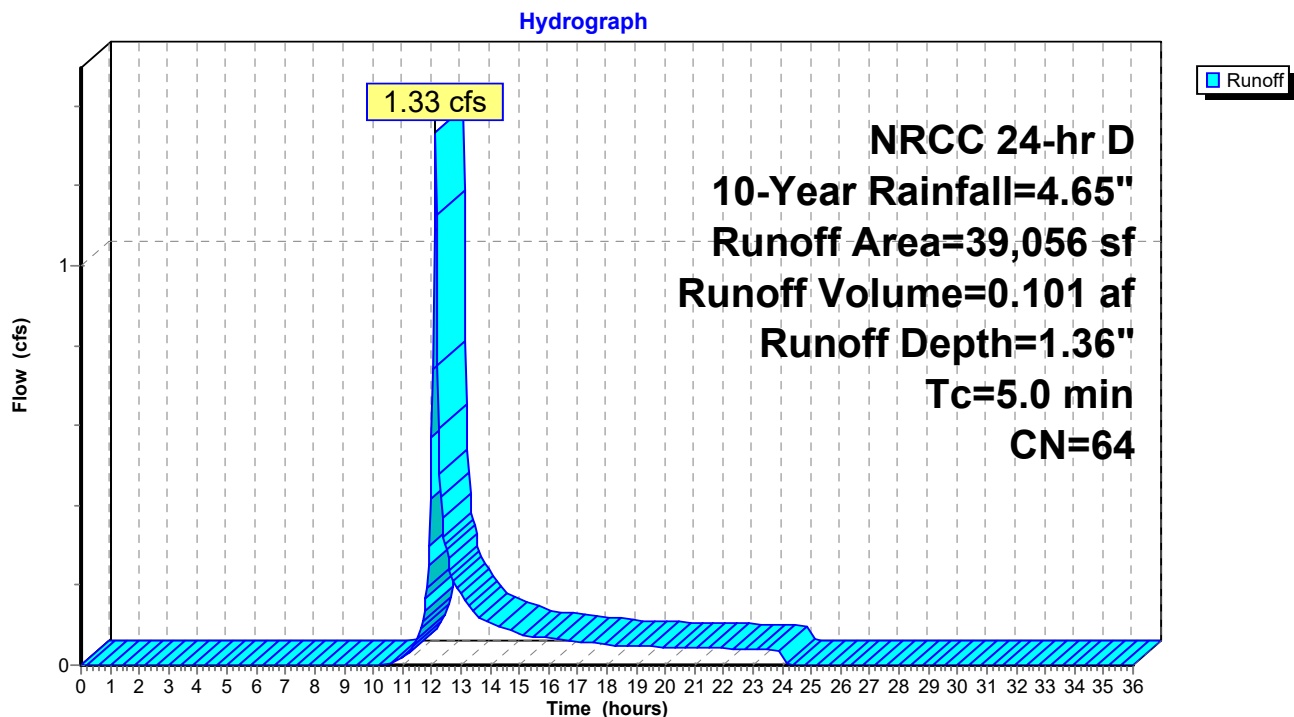
Summary for Subcatchment 1S: PR-1

Runoff = 1.33 cfs @ 12.12 hrs, Volume= 0.101 af, Depth= 1.36"
 Routed to Link 15L : DP-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 10-Year Rainfall=4.65"

Area (sf)	CN	Description
6,150	98	Paved parking, HSG A
* 6,781	98	Paved parking, HSG A
* 2,817	98	Cement Concrete Sidewalk, HSG A
* 1,080	98	Cement Concrete Sidewalk, HSG A
20,357	39	>75% Grass cover, Good, HSG A
1,871	39	>75% Grass cover, Good, HSG A
39,056	64	Weighted Average
22,228		56.91% Pervious Area
16,828		43.09% Impervious Area

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

Subcatchment 1S: PR-1

Summary for Subcatchment 2S: PR-2

Runoff = 0.57 cfs @ 12.11 hrs, Volume= 0.045 af, Depth= 3.96"
 Routed to Pond 44P : CMP Infiltration

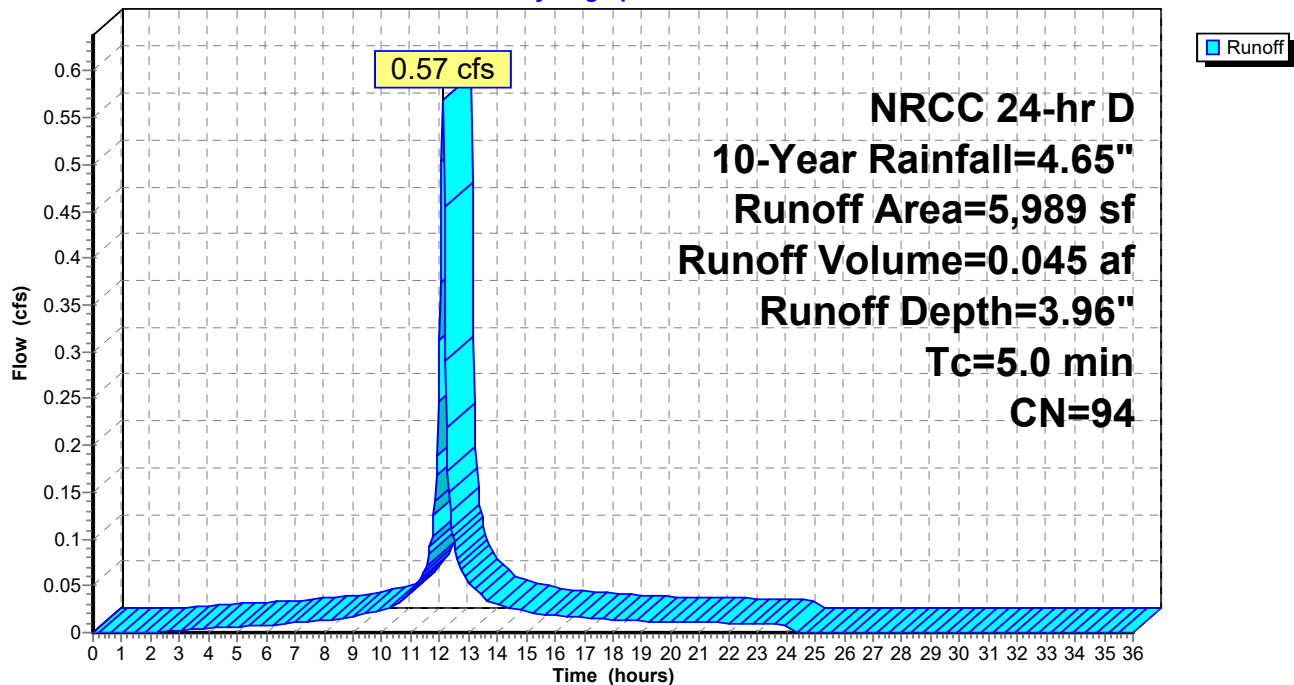
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 10-Year Rainfall=4.65"

	Area (sf)	CN	Description
*	4,187	98	Paved parking, HSG C
*	690	98	Cement Concrete Sidewalk, HSG C
	1,112	74	>75% Grass cover, Good, HSG C
	5,989	94	Weighted Average
	1,112		18.57% Pervious Area
	4,877		81.43% Impervious Area

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

Subcatchment 2S: PR-2

Hydrograph



Summary for Subcatchment 3S: PR-3

Runoff = 0.81 cfs @ 12.11 hrs, Volume= 0.063 af, Depth= 3.75"
 Routed to Pond 44P : CMP Infiltration

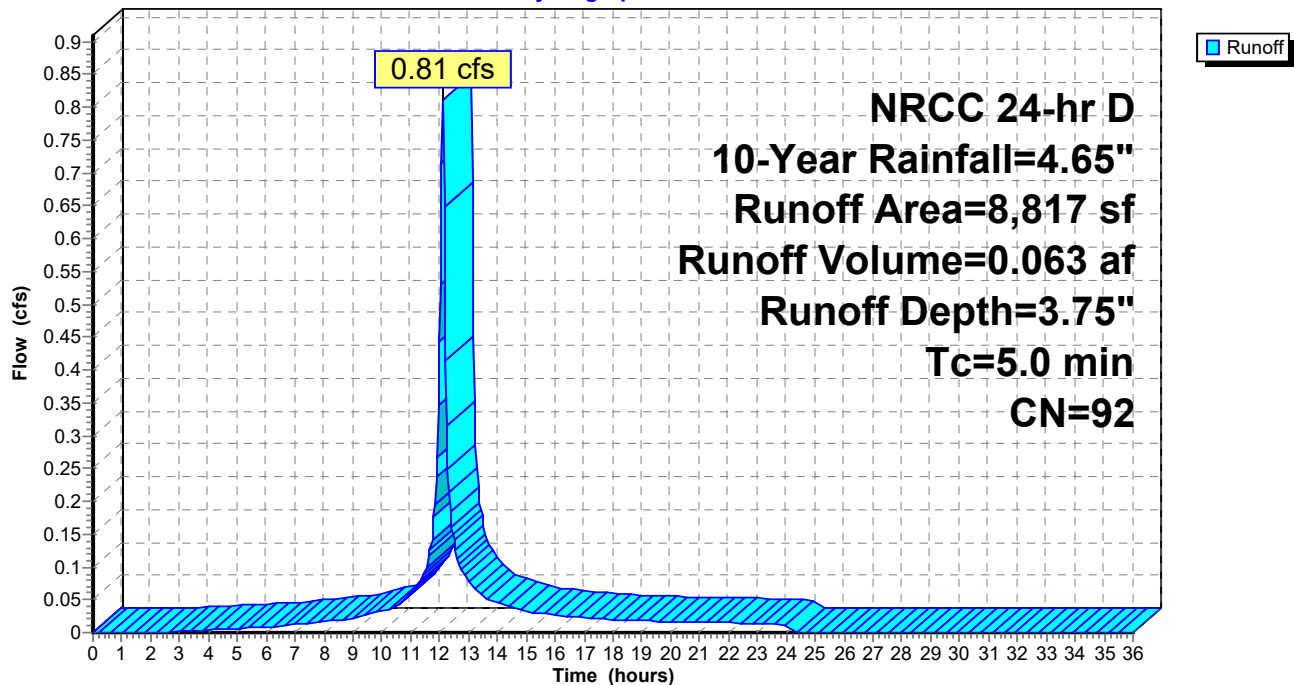
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 10-Year Rainfall=4.65"

Area (sf)	CN	Description
5,618	98	Paved parking, HSG C
* 946	98	Cement Concrete Sidewalk, HSG C
2,253	74	>75% Grass cover, Good, HSG C
8,817	92	Weighted Average
2,253		25.55% Pervious Area
6,564		74.45% Impervious Area

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

Subcatchment 3S: PR-3

Hydrograph



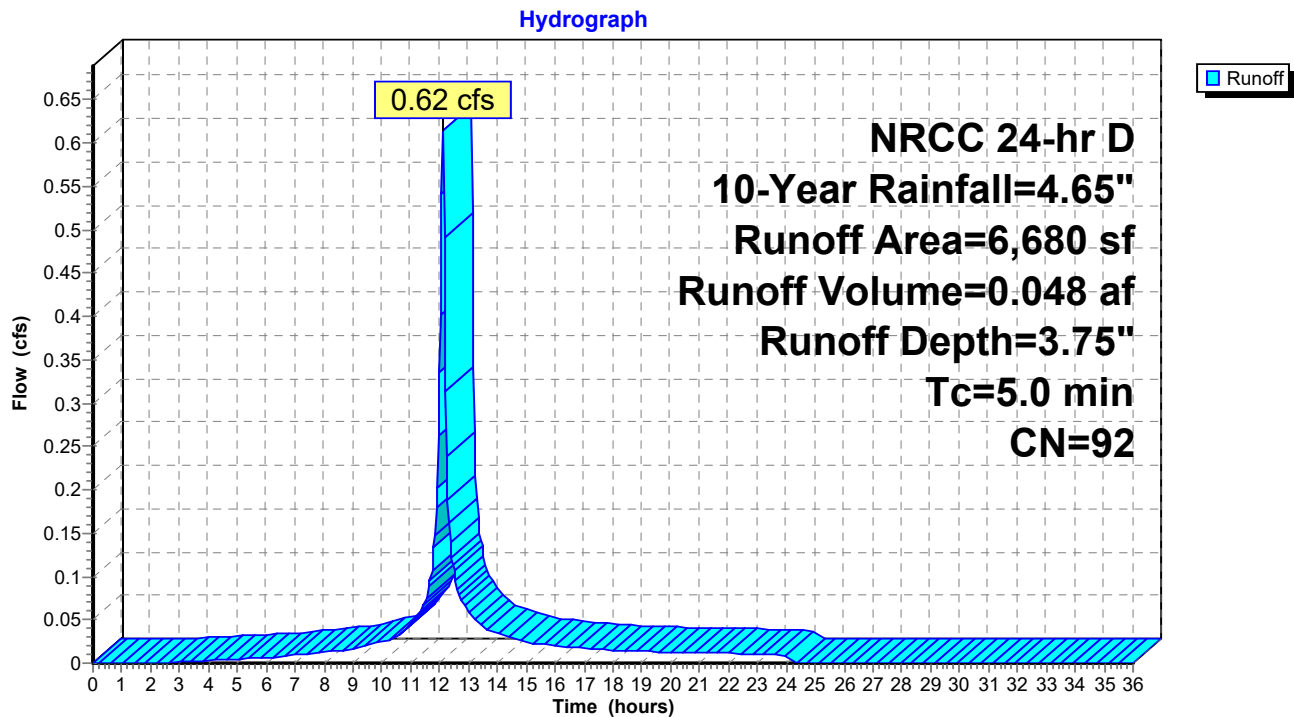
Summary for Subcatchment 4S: PR-4

Runoff = 0.62 cfs @ 12.11 hrs, Volume= 0.048 af, Depth= 3.75"
 Routed to Pond 44P : CMP Infiltration

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 10-Year Rainfall=4.65"

Area (sf)	CN	Description
2,045	98	Paved parking, HSG C
* 2,781	98	Paved parking, HSG A
* 424	98	Cement Concrete Sidewalk, HSG C
* 415	98	Cement Concrete Sidewalk, HSG A
559	74	>75% Grass cover, Good, HSG C
456	39	>75% Grass cover, Good, HSG A
6,680	92	Weighted Average
1,015		15.19% Pervious Area
5,665		84.81% Impervious Area

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

Subcatchment 4S: PR-4

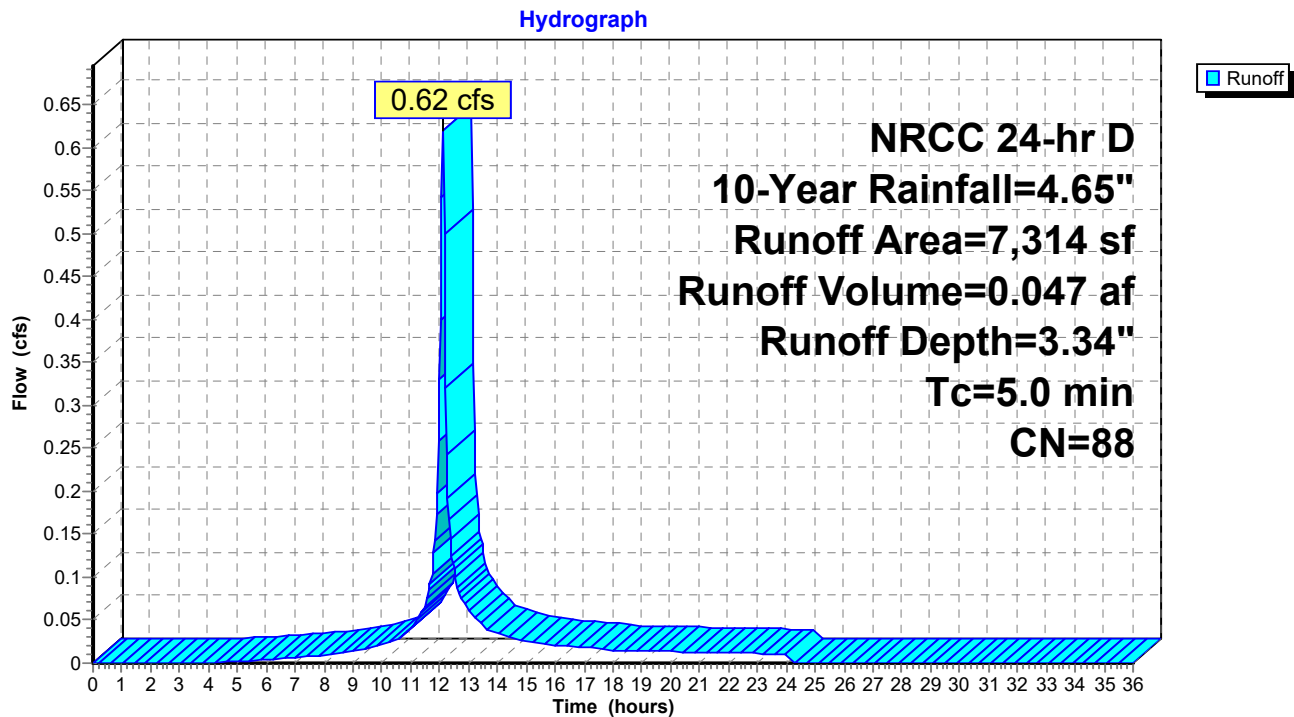
Summary for Subcatchment 5S: PR-5

Runoff = 0.62 cfs @ 12.12 hrs, Volume= 0.047 af, Depth= 3.34"
 Routed to Pond 44P : CMP Infiltration

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 10-Year Rainfall=4.65"

	Area (sf)	CN	Description
*	1,817	98	Paved parking, HSG C
*	3,098	98	Paved parking, HSG A
*	327	98	Cement Concrete Sidewalk, HSG C
*	391	98	Cement Concrete Sidewalk, HSG A
	725	74	>75% Grass cover, Good, HSG C
	956	39	>75% Grass cover, Good, HSG A
	7,314	88	Weighted Average
	1,681		22.98% Pervious Area
	5,633		77.02% Impervious Area

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

Subcatchment 5S: PR-5

Summary for Subcatchment 6S: PR-6

Runoff = 0.79 cfs @ 12.12 hrs, Volume= 0.057 af, Depth= 1.93"
 Routed to Pond 44P : CMP Infiltration

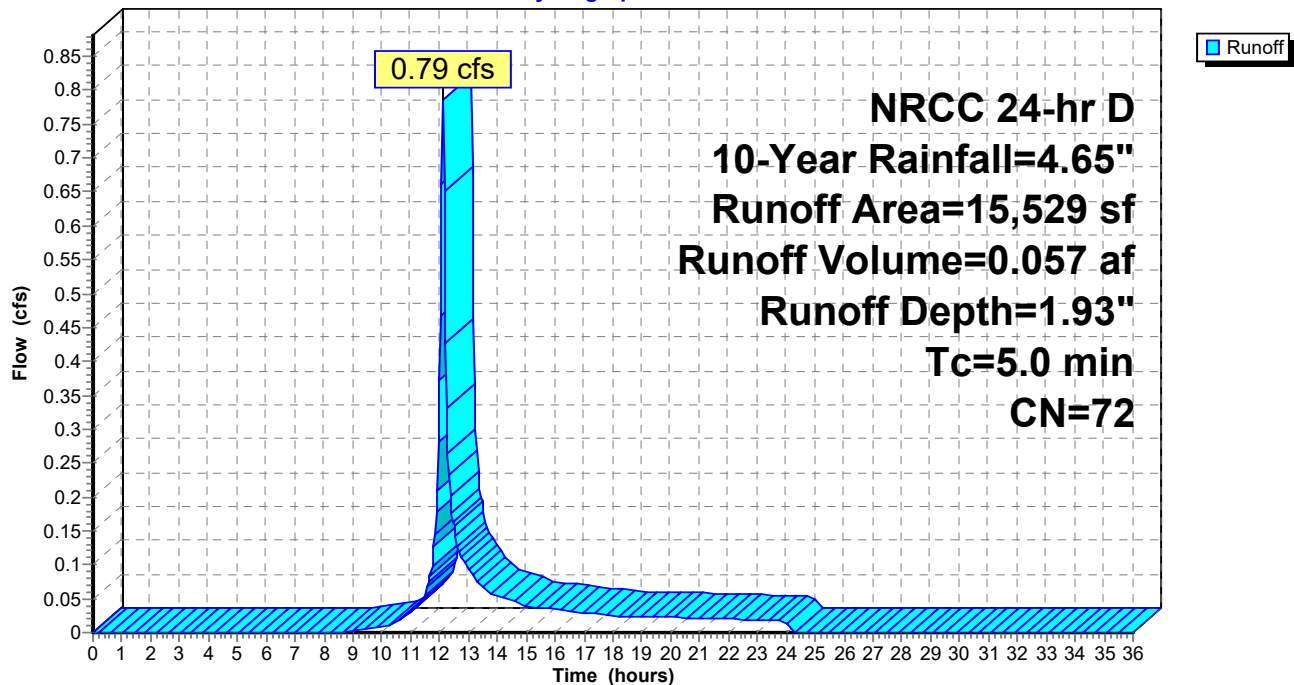
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 10-Year Rainfall=4.65"

	Area (sf)	CN	Description
*	7,257	98	Paved parking, HSG A
*	1,492	98	Cement Concrete Sidewalk, HSG A
	6,780	39	>75% Grass cover, Good, HSG A
	15,529	72	Weighted Average
	6,780		43.66% Pervious Area
	8,749		56.34% Impervious Area

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

Subcatchment 6S: PR-6

Hydrograph



Summary for Subcatchment 7S: PR-7

Runoff = 0.69 cfs @ 12.12 hrs, Volume= 0.051 af, Depth= 3.05"
 Routed to Pond 44P : CMP Infiltration

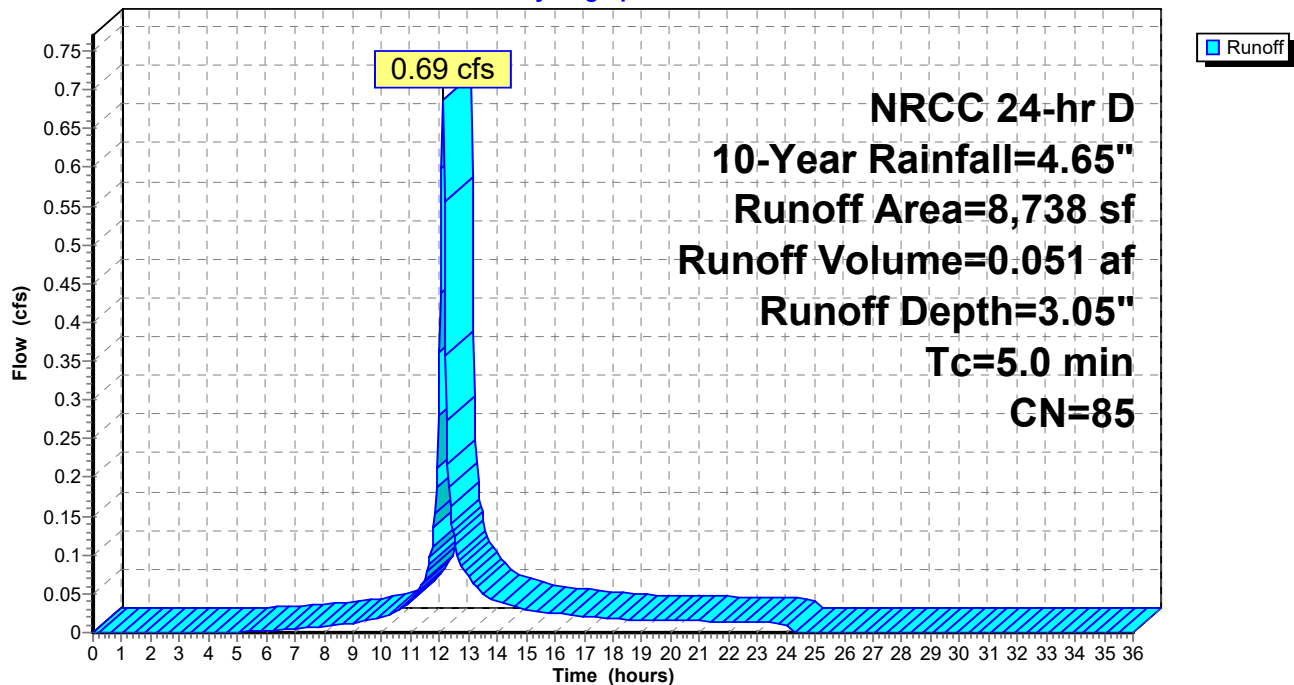
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 10-Year Rainfall=4.65"

	Area (sf)	CN	Description
*	5,839	98	Paved parking, HSG A
*	1,037	98	Cement Concrete Sidewalk, HSG A
	1,862	39	>75% Grass cover, Good, HSG A
	8,738	85	Weighted Average
	1,862		21.31% Pervious Area
	6,876		78.69% Impervious Area

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

Subcatchment 7S: PR-7

Hydrograph



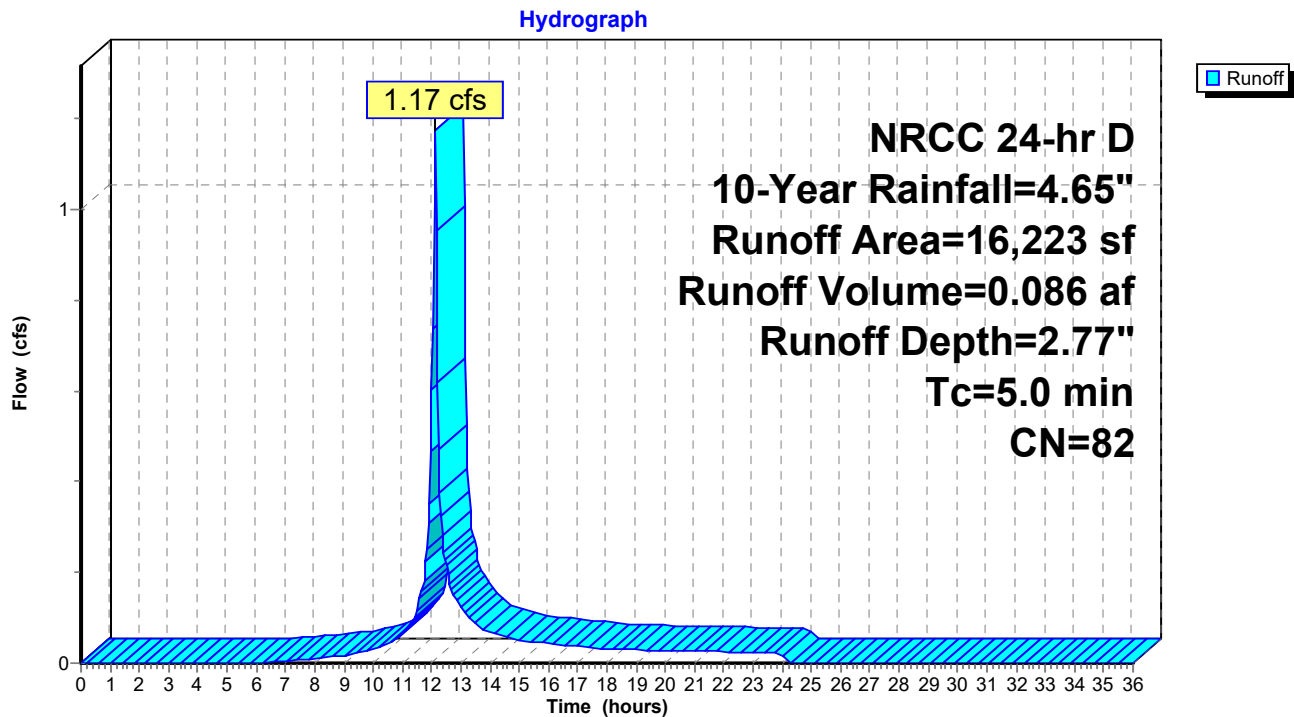
Summary for Subcatchment 8S: PR-8

Runoff = 1.17 cfs @ 12.12 hrs, Volume= 0.086 af, Depth= 2.77"
 Routed to Pond 44P : CMP Infiltration

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 10-Year Rainfall=4.65"

	Area (sf)	CN	Description
*	2,852	98	Paved parking, HSG A
*	4,008	98	Paved parking, HSG C
*	1,252	98	Cement Concrete Sidewalk, HSG C
*	390	98	Cement Concrete Sidewalk, HSG A
	1,994	39	>75% Grass cover, Good, HSG A
	5,727	74	>75% Grass cover, Good, HSG C
	16,223	82	Weighted Average
	7,721		47.59% Pervious Area
	8,502		52.41% Impervious Area

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

Subcatchment 8S: PR-8

Summary for Subcatchment 9S: PR-9

Runoff = 0.57 cfs @ 12.14 hrs, Volume= 0.047 af, Depth= 3.44"
 Routed to Pond 44P : CMP Infiltration

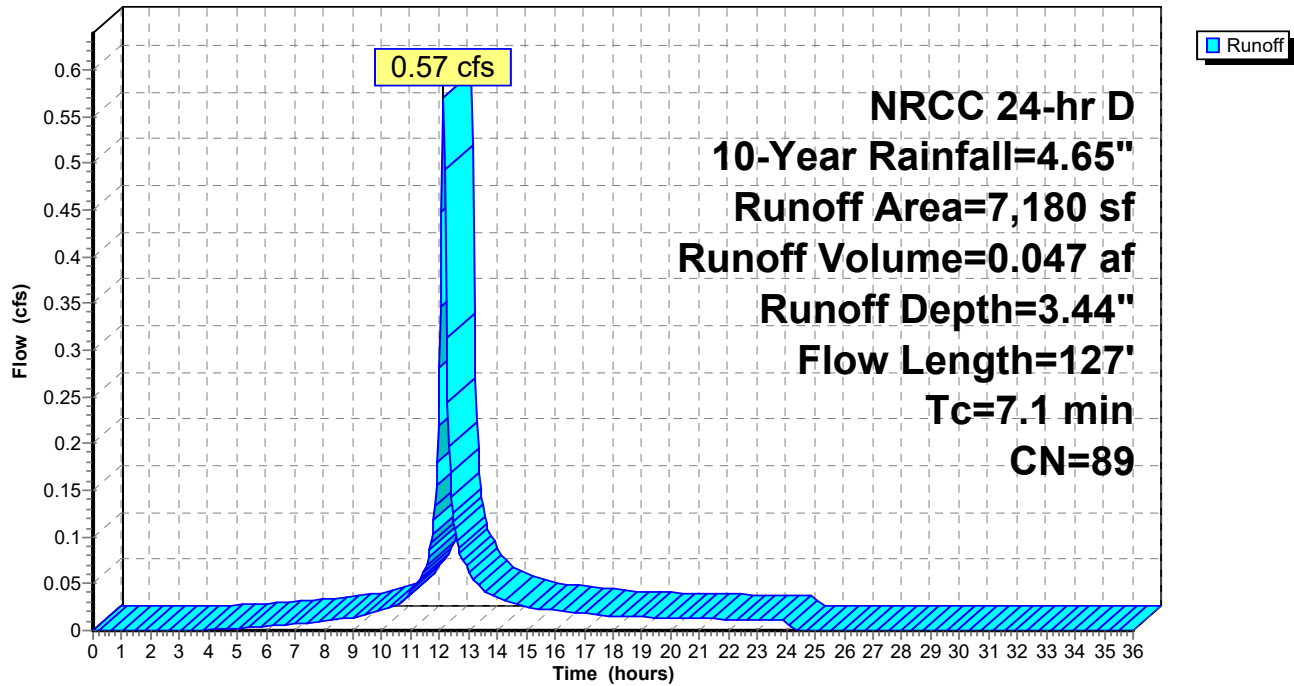
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 10-Year Rainfall=4.65"

	Area (sf)	CN	Description
*	479	98	Paved parking, HSG A
*	3,817	98	Paved parking, HSG C
*	216	98	Cement Concrete Sidewalk, HSG A
*	842	98	Cement Concrete Sidewalk, HSG C
	623	39	>75% Grass cover, Good, HSG A
	1,203	74	>75% Grass cover, Good, HSG C
	7,180	89	Weighted Average
	1,826		25.43% Pervious Area
	5,354		74.57% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.1	25	0.0500	0.08		Sheet Flow, GRASS Grass: Bermuda n= 0.410 P2= 3.13"
1.7	75	0.0050	0.74		Sheet Flow, PAVEMENT Smooth surfaces n= 0.011 P2= 3.13"
0.3	27	0.0050	1.44		Shallow Concentrated Flow, PAVEMENT Paved Kv= 20.3 fps
7.1	127	Total			

Subcatchment 9S: PR-9

Hydrograph



Summary for Subcatchment 10S: PR-10

Runoff = 0.26 cfs @ 12.12 hrs, Volume= 0.019 af, Depth= 2.42"
 Routed to Link 17L : DP-3

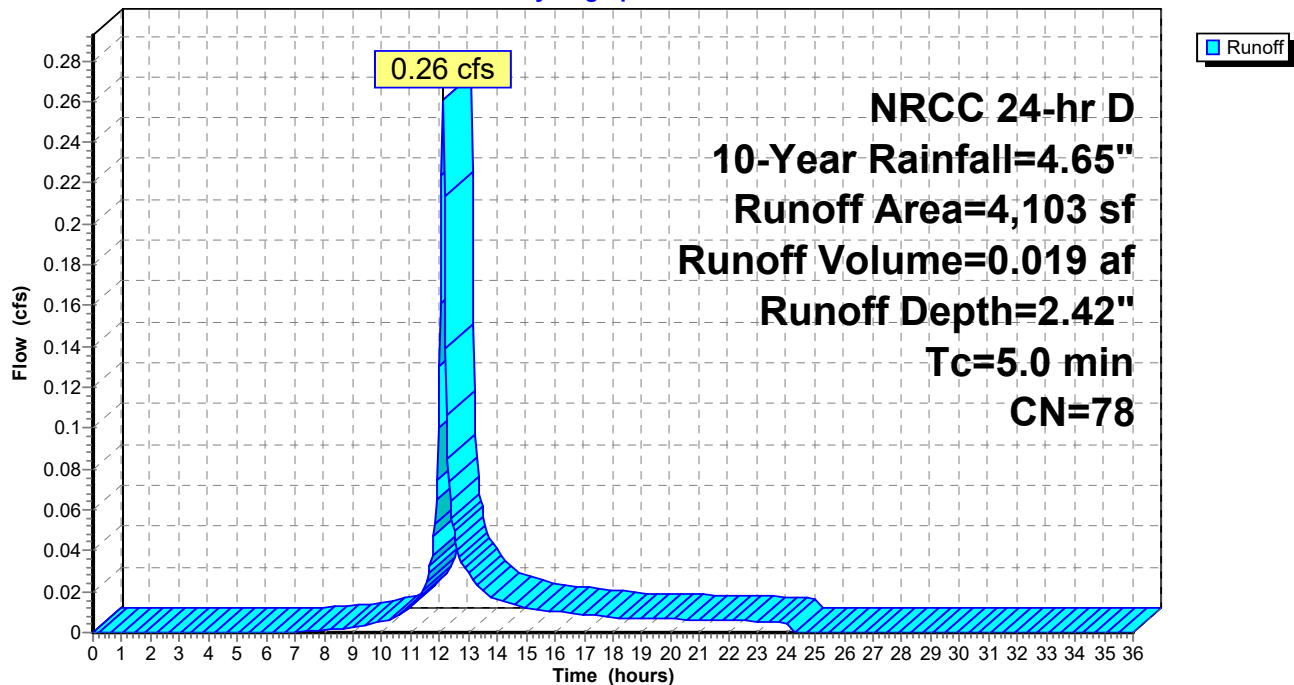
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 10-Year Rainfall=4.65"

Area (sf)	CN	Description
1,584	74	>75% Grass cover, Good, HSG C
2,519	80	>75% Grass cover, Good, HSG D
4,103	78	Weighted Average
4,103		100.00% Pervious Area

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

Subcatchment 10S: PR-10

Hydrograph



Summary for Subcatchment 11S: PR-11

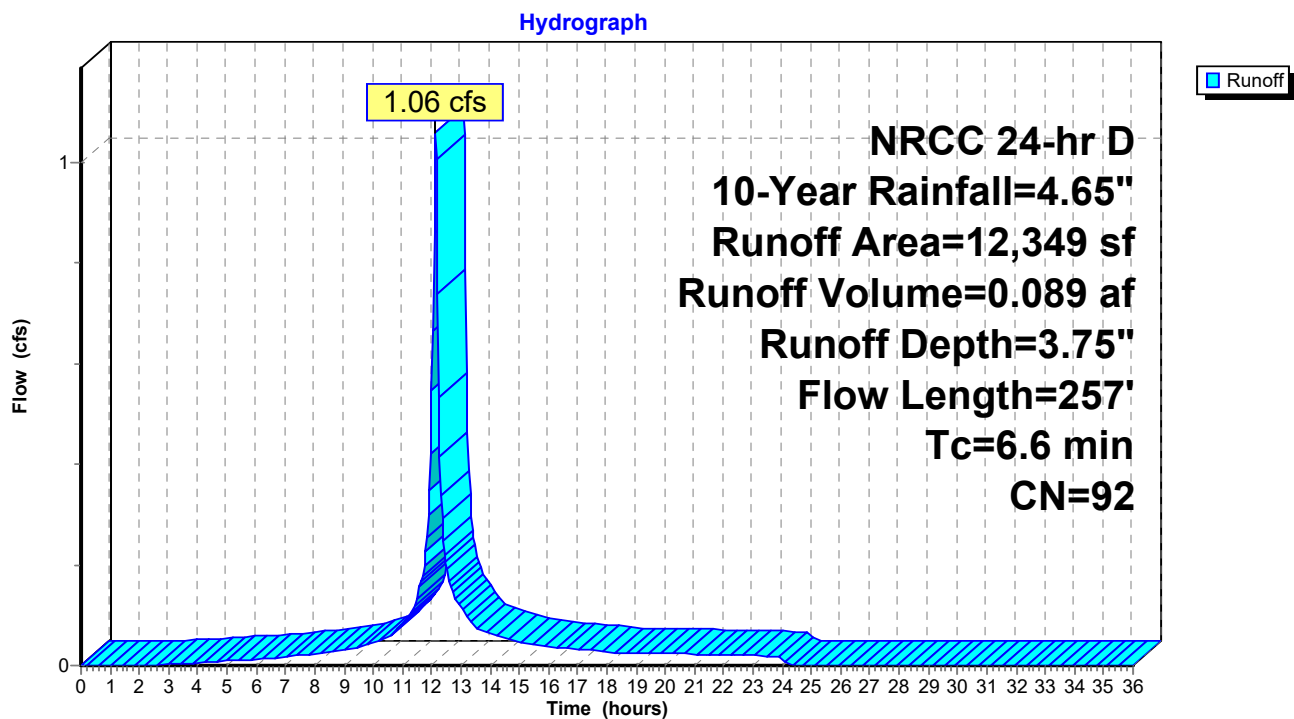
Runoff = 1.06 cfs @ 12.13 hrs, Volume= 0.089 af, Depth= 3.75"
 Routed to Pond 44P : CMP Infiltration

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 10-Year Rainfall=4.65"

	Area (sf)	CN	Description
*	7,691	98	Paved parking, HSG C
*	276	98	Paved parking, HSG A
*	1,371	98	Cement Concrete Sidewalk, HSG C
*	185	98	Cement Concrete Sidewalk, HSG A
	2,481	74	>75% Grass cover, Good, HSG C
	345	39	>75% Grass cover, Good, HSG A
	12,349	92	Weighted Average
	2,826		22.88% Pervious Area
	9,523		77.12% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.1	25	0.0500	0.08		Sheet Flow, GRASS Grass: Bermuda n= 0.410 P2= 3.13"
0.8	75	0.0350	1.61		Sheet Flow, PAVEMENT Smooth surfaces n= 0.011 P2= 3.13"
0.7	157	0.0350	3.80		Shallow Concentrated Flow, PAVEMENT Paved Kv= 20.3 fps
6.6	257	Total			

Subcatchment 11S: PR-11



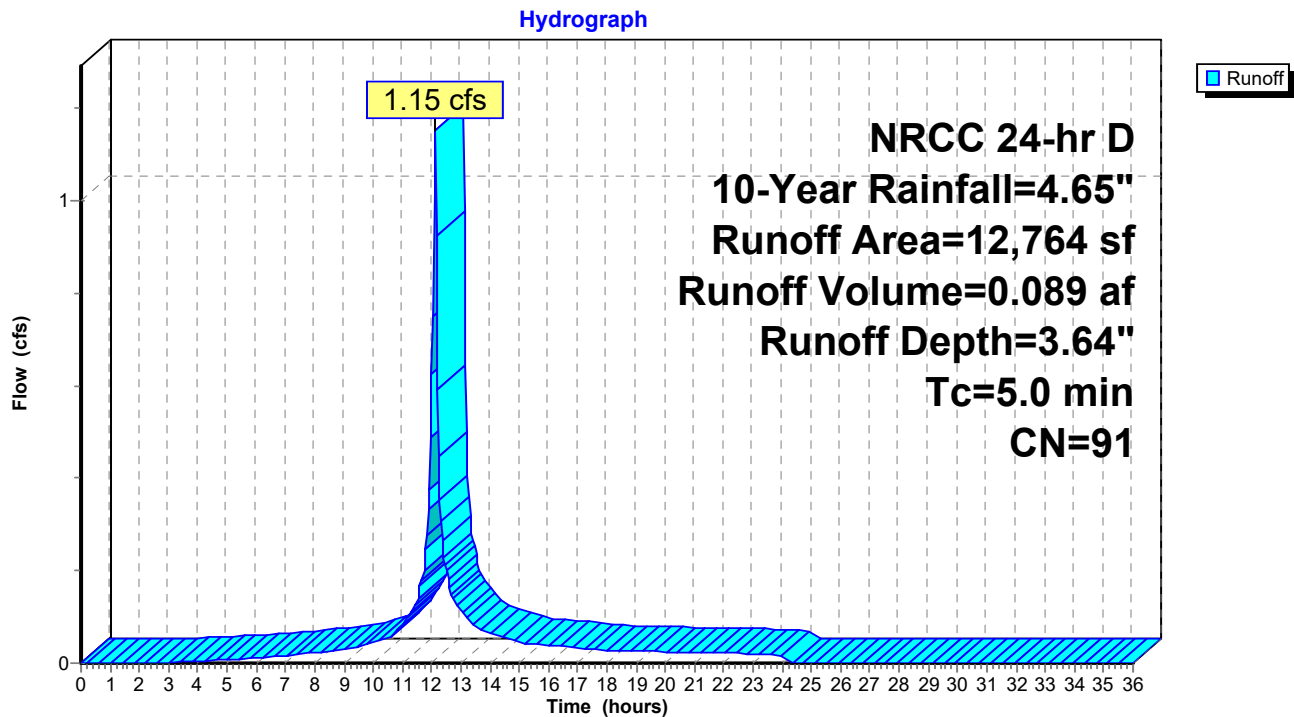
Summary for Subcatchment 12S: PR-12

Runoff = 1.15 cfs @ 12.12 hrs, Volume= 0.089 af, Depth= 3.64"
 Routed to Pond 44P : CMP Infiltration

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 10-Year Rainfall=4.65"

	Area (sf)	CN	Description
*	7,226	98	Paved parking, HSG C
*	139	98	Paved parking, HSG A
*	1,592	98	Cement Concrete Sidewalk, HSG C
*	130	98	Cement Concrete Sidewalk, HSG A
	3,543	74	>75% Grass cover, Good, HSG C
	134	39	>75% Grass cover, Good, HSG A
	12,764	91	Weighted Average
	3,677		28.81% Pervious Area
	9,087		71.19% Impervious Area

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

Subcatchment 12S: PR-12

Summary for Subcatchment 18S: PR-13

Runoff = 0.18 cfs @ 12.26 hrs, Volume= 0.021 af, Depth= 1.43"
 Routed to Pond 44P : CMP Infiltration

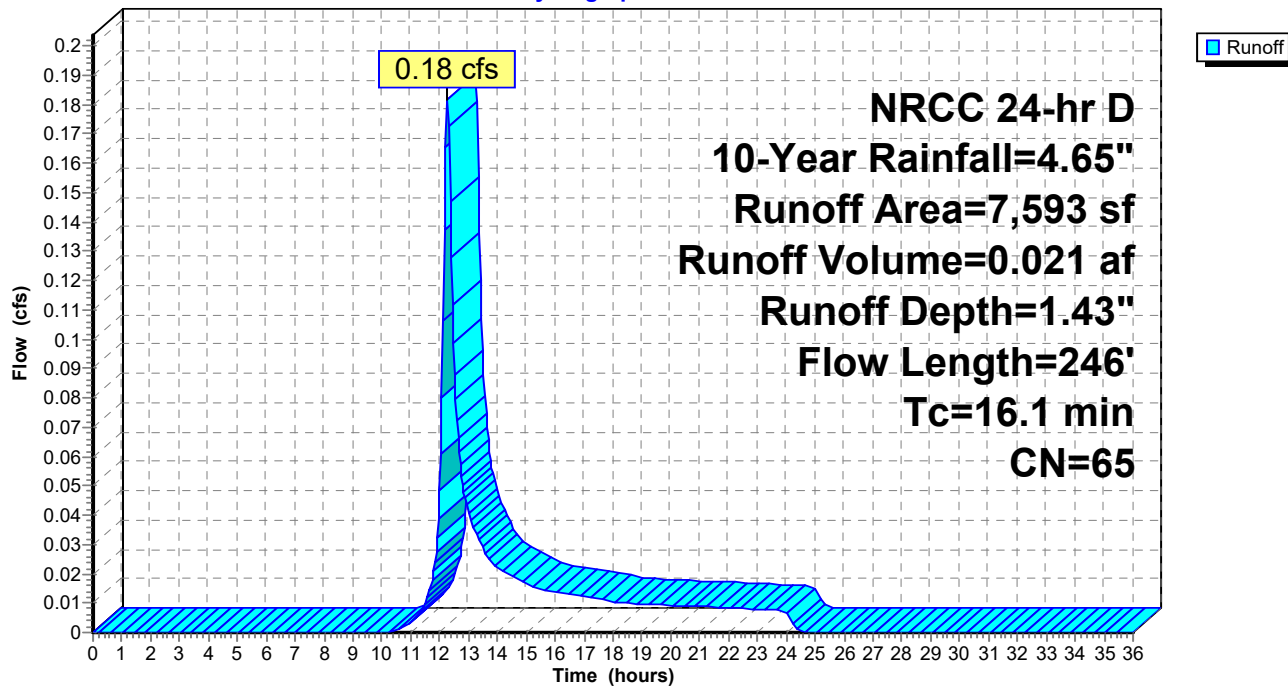
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 10-Year Rainfall=4.65"

Area (sf)	CN	Description
131	98	Paved parking, HSG C
* 2,672	98	Paved parking, HSG A
* 183	98	Cement Concrete Sidewalk, HSG C
499	74	>75% Grass cover, Good, HSG C
4,108	39	>75% Grass cover, Good, HSG A
7,593	65	Weighted Average
4,607		60.67% Pervious Area
2,986		39.33% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.4	100	0.0500	0.11		Sheet Flow, GRASS Grass: Bermuda n= 0.410 P2= 3.13"
0.2	38	0.0500	3.35		Shallow Concentrated Flow, GRASS Grassed Waterway Kv= 15.0 fps
0.5	108	0.0350	3.80		Shallow Concentrated Flow, PAVEMENT Paved Kv= 20.3 fps
16.1	246	Total			

Subcatchment 18S: PR-13

Hydrograph



Summary for Subcatchment 19S: PR-14

Runoff = 0.26 cfs @ 12.14 hrs, Volume= 0.021 af, Depth= 3.44"
 Routed to Pond 44P : CMP Infiltration

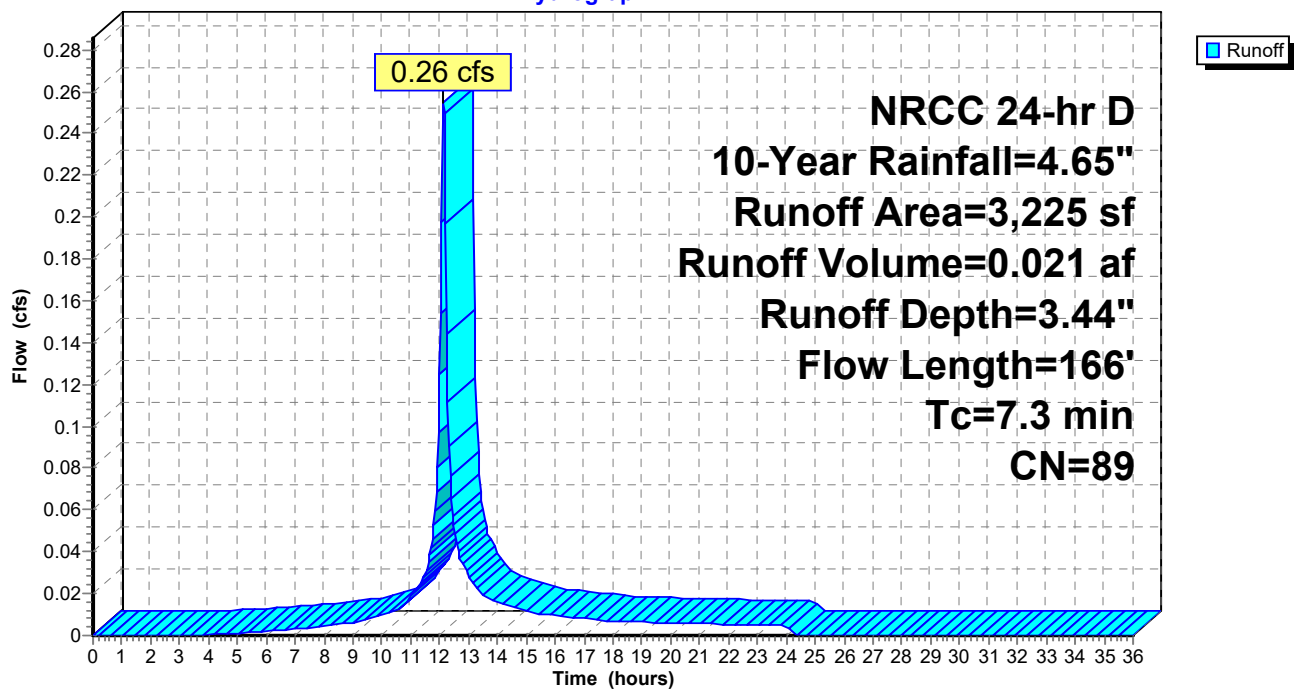
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 10-Year Rainfall=4.65"

	Area (sf)	CN	Description
*	199	98	Paved parking, HSG C
*	2,132	98	Paved parking, HSG A
*	322	98	Cement Concrete Sidewalk, HSG A
	126	74	>75% Grass cover, Good, HSG C
	446	39	>75% Grass cover, Good, HSG A
	3,225	89	Weighted Average
	572		17.74% Pervious Area
	2,653		82.26% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.3	33	0.0500	0.09		Sheet Flow, GRASS Grass: Bermuda n= 0.410 P2= 3.13"
0.7	67	0.0350	1.57		Sheet Flow, PAVEMENT Smooth surfaces n= 0.011 P2= 3.13"
0.3	66	0.0350	3.80		Shallow Concentrated Flow, PAVEMENT Paved Kv= 20.3 fps
7.3	166	Total			

Subcatchment 19S: PR-14

Hydrograph



Summary for Subcatchment 20S: PR-15

Runoff = 0.24 cfs @ 12.12 hrs, Volume= 0.018 af, Depth= 3.54"
 Routed to Pond 44P : CMP Infiltration

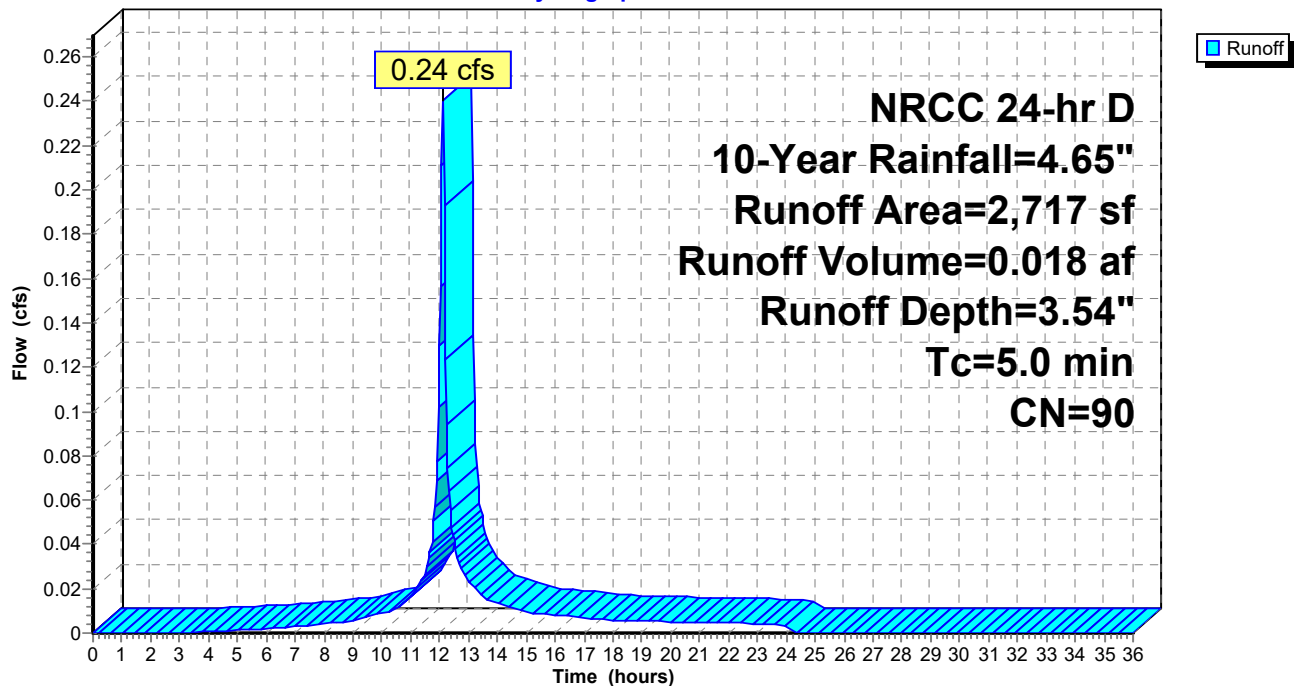
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 10-Year Rainfall=4.65"

	Area (sf)	CN	Description
*	2,331	98	Paved parking, HSG A
	386	39	>75% Grass cover, Good, HSG A
	2,717	90	Weighted Average
	386		14.21% Pervious Area
	2,331		85.79% Impervious Area

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

Subcatchment 20S: PR-15

Hydrograph



Summary for Subcatchment 22S: PR-16

Runoff = 0.09 cfs @ 12.24 hrs, Volume= 0.011 af, Depth= 4.41"
 Routed to Pond 44P : CMP Infiltration

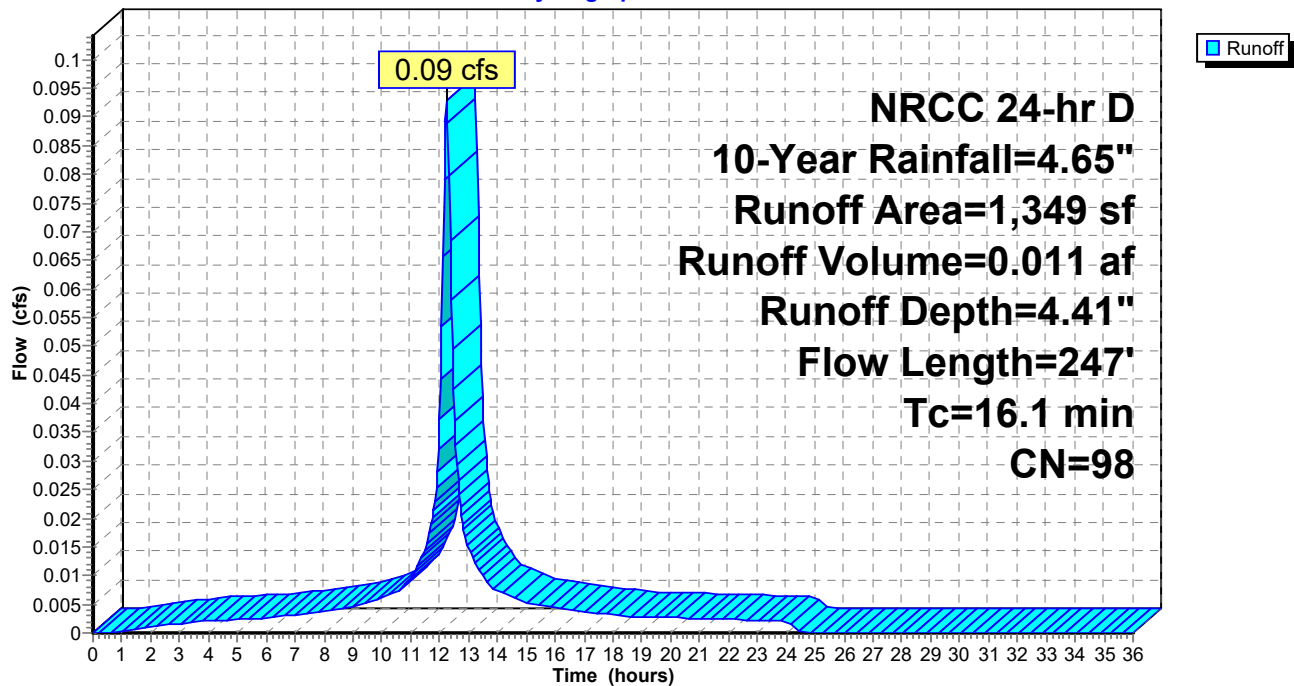
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 10-Year Rainfall=4.65"

Area (sf)	CN	Description
* 614	98	Paved parking, HSG A
* 735	98	Paved parking, HSG C
1,349	98	Weighted Average
1,349		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.4	100	0.0500	0.11		Sheet Flow, GRASS Grass: Bermuda n= 0.410 P2= 3.13"
0.2	38	0.0500	3.35		Shallow Concentrated Flow, GRASS Grassed Waterway Kv= 15.0 fps
0.5	109	0.0350	3.80		Shallow Concentrated Flow, PAVEMENT Paved Kv= 20.3 fps
16.1	247	Total			

Subcatchment 22S: PR-16

Hydrograph



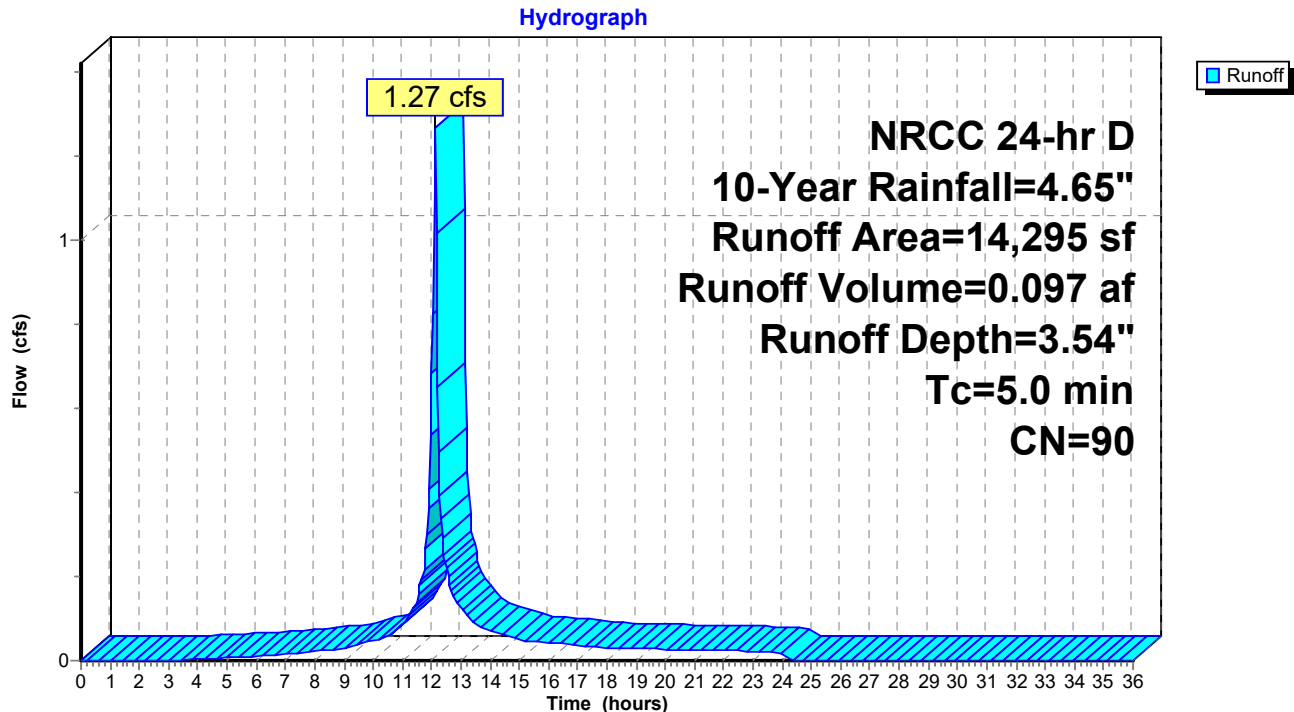
Summary for Subcatchment 23S: PR-17

Runoff = 1.27 cfs @ 12.12 hrs, Volume= 0.097 af, Depth= 3.54"
 Routed to Pond 44P : CMP Infiltration

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 10-Year Rainfall=4.65"

	Area (sf)	CN	Description
*	447	98	Paved parking, HSG A
*	7,461	98	Paved parking, HSG C
*	2,341	98	Cement Concrete Sidewalk, HSG C
	488	39	>75% Grass cover, Good, HSG A
	3,558	74	>75% Grass cover, Good, HSG C
	14,295	90	Weighted Average
	4,046		28.30% Pervious Area
	10,249		71.70% Impervious Area

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

Subcatchment 23S: PR-17

Summary for Subcatchment 24S: PR-18

Runoff = 0.84 cfs @ 12.14 hrs, Volume= 0.075 af, Depth= 4.18"
 Routed to Pond 44P : CMP Infiltration

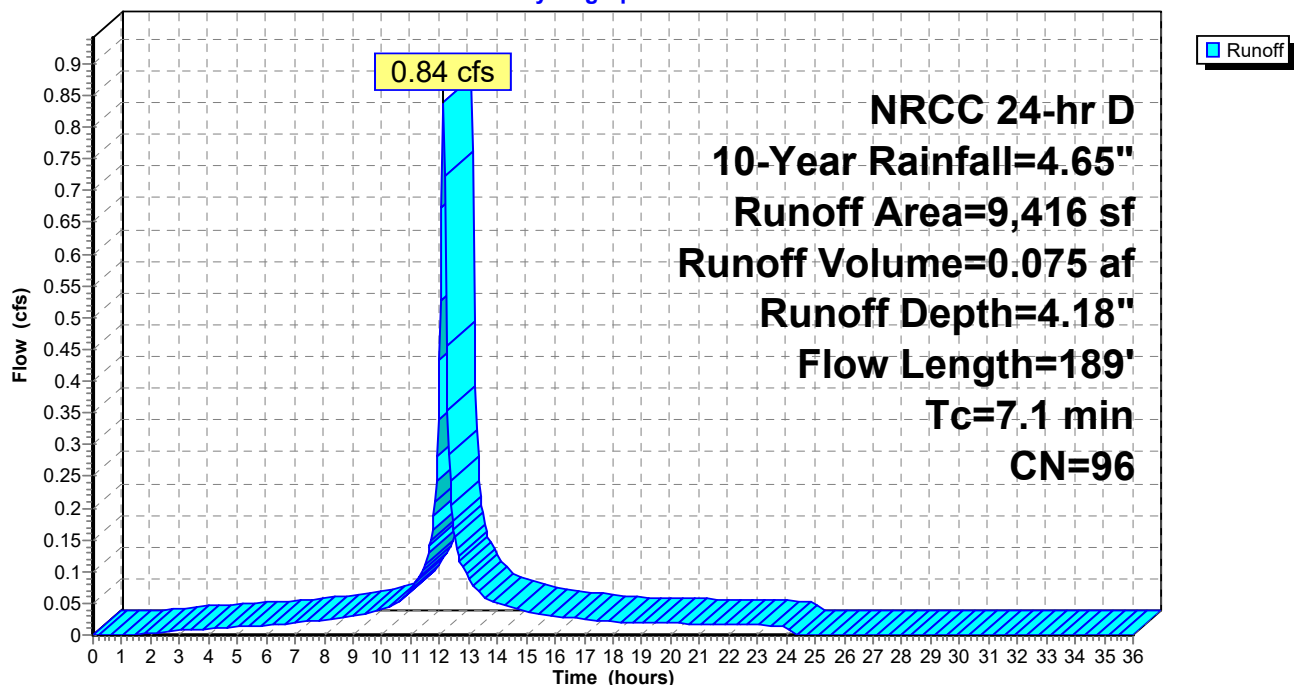
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 10-Year Rainfall=4.65"

	Area (sf)	CN	Description
*	4,554	98	Paved parking, HSG A
*	4,554	98	Cement Concrete Sidewalk, HSG A
	308	39	>75% Grass cover, Good, HSG A
	9,416	96	Weighted Average
	308		3.27% Pervious Area
	9,108		96.73% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	29	0.0500	0.08		Sheet Flow, GRASS Grass: Bermuda n= 0.410 P2= 3.13"
0.9	71	0.0200	1.27		Sheet Flow, PAVEMENT Smooth surfaces n= 0.011 P2= 3.13"
0.5	89	0.0200	2.87		Shallow Concentrated Flow, PAVEMENT Paved Kv= 20.3 fps
7.1	189	Total			

Subcatchment 24S: PR-18

Hydrograph



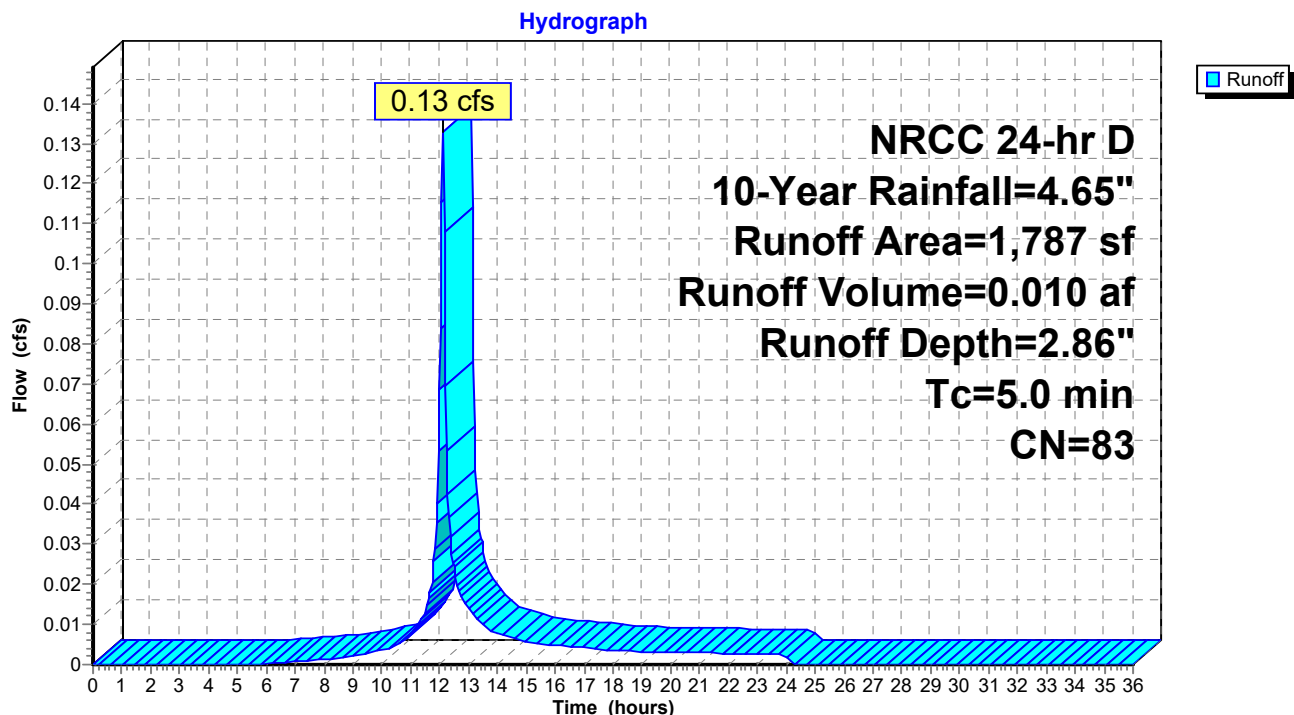
Summary for Subcatchment 25S: PR-19

Runoff = 0.13 cfs @ 12.12 hrs, Volume= 0.010 af, Depth= 2.86"
 Routed to Pond 44P : CMP Infiltration

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 10-Year Rainfall=4.65"

	Area (sf)	CN	Description
*	1,006	98	Paved parking, HSG A
*	337	98	Cement Concrete Sidewalk, HSG A
	444	39	>75% Grass cover, Good, HSG A
	1,787	83	Weighted Average
	444		24.85% Pervious Area
	1,343		75.15% Impervious Area

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

Subcatchment 25S: PR-19

Summary for Subcatchment 26S: PR-20

Runoff = 0.61 cfs @ 12.12 hrs, Volume= 0.047 af, Depth= 3.64"
 Routed to Pond 44P : CMP Infiltration

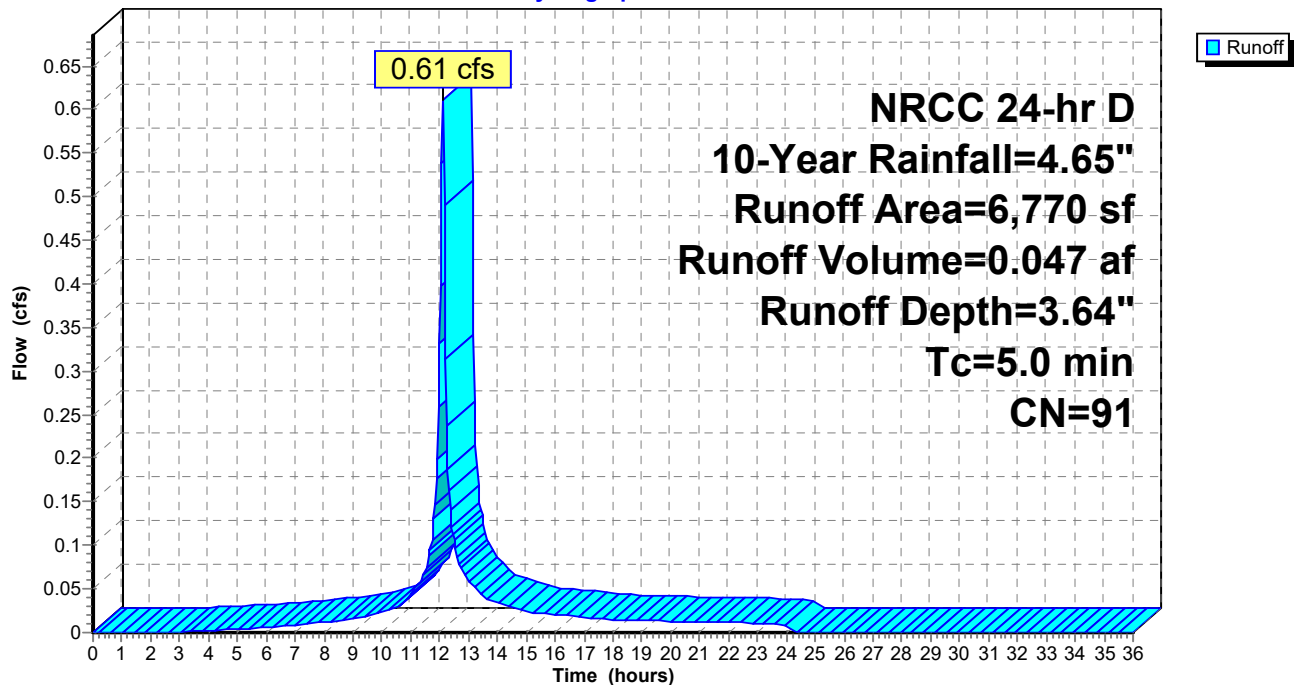
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 10-Year Rainfall=4.65"

	Area (sf)	CN	Description
*	4,671	98	Paved parking, HSG A
*	1,328	98	Cement Concrete Sidewalk, HSG A
	771	39	>75% Grass cover, Good, HSG A
	6,770	91	Weighted Average
	771		11.39% Pervious Area
	5,999		88.61% Impervious Area

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

Subcatchment 26S: PR-20

Hydrograph



Summary for Subcatchment 27S: PR-21

Runoff = 0.62 cfs @ 12.11 hrs, Volume= 0.048 af, Depth= 3.75"
 Routed to Pond 44P : CMP Infiltration

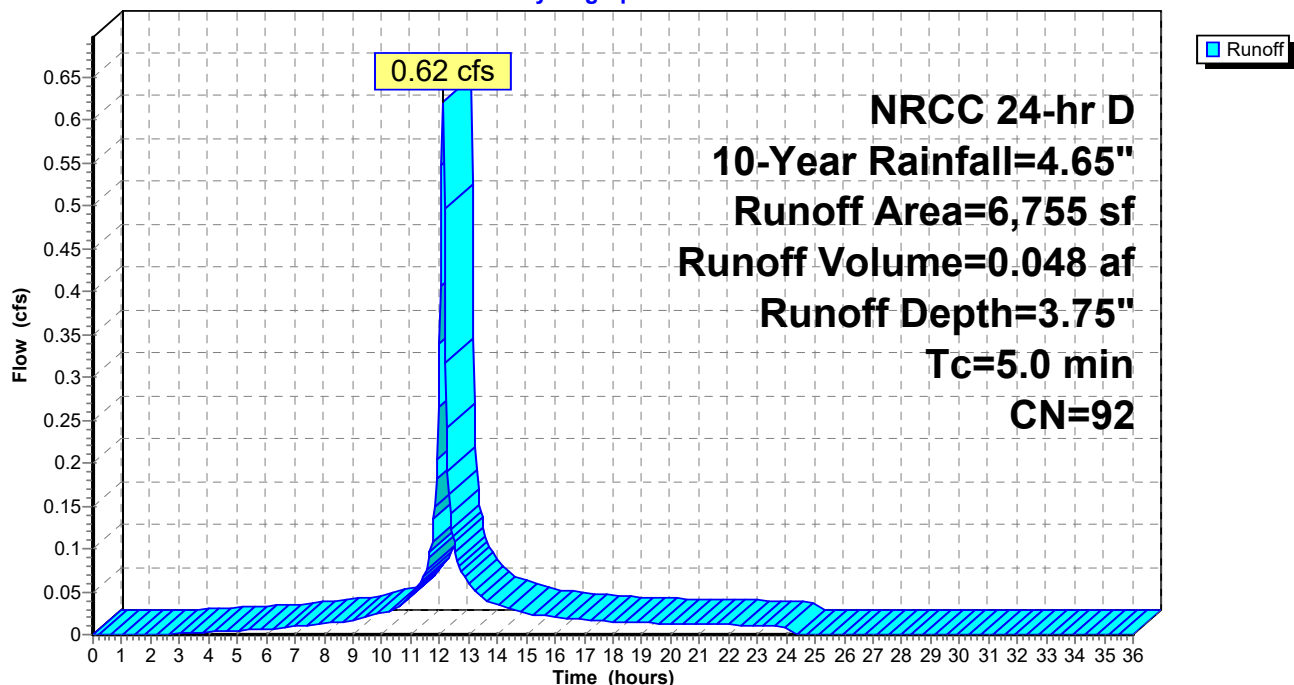
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 10-Year Rainfall=4.65"

	Area (sf)	CN	Description
*	4,688	98	Paved parking, HSG A
*	1,331	98	Cement Concrete Sidewalk, HSG A
	736	39	>75% Grass cover, Good, HSG A
	6,755	92	Weighted Average
	736		10.90% Pervious Area
	6,019		89.10% Impervious Area

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

Subcatchment 27S: PR-21

Hydrograph



Summary for Subcatchment 28S: PR-22

Runoff = 0.39 cfs @ 12.12 hrs, Volume= 0.029 af, Depth= 2.95"
 Routed to Pond 44P : CMP Infiltration

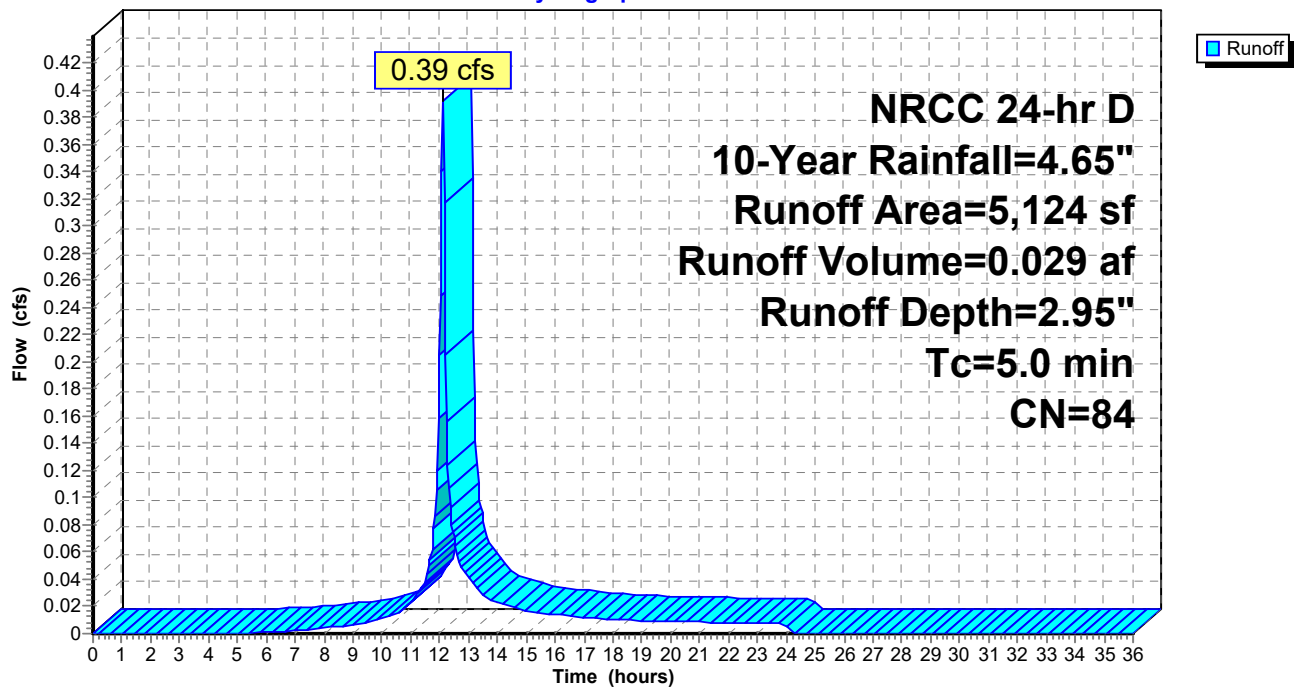
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 10-Year Rainfall=4.65"

	Area (sf)	CN	Description
*	3,097	98	Paved parking, HSG A
*	72	98	Paved parking, HSG C
*	588	98	Cement Concrete Sidewalk, HSG C
	1,052	39	>75% Grass cover, Good, HSG A
	315	74	>75% Grass cover, Good, HSG C
	5,124	84	Weighted Average
	1,367		26.68% Pervious Area
	3,757		73.32% Impervious Area

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

Subcatchment 28S: PR-22

Hydrograph



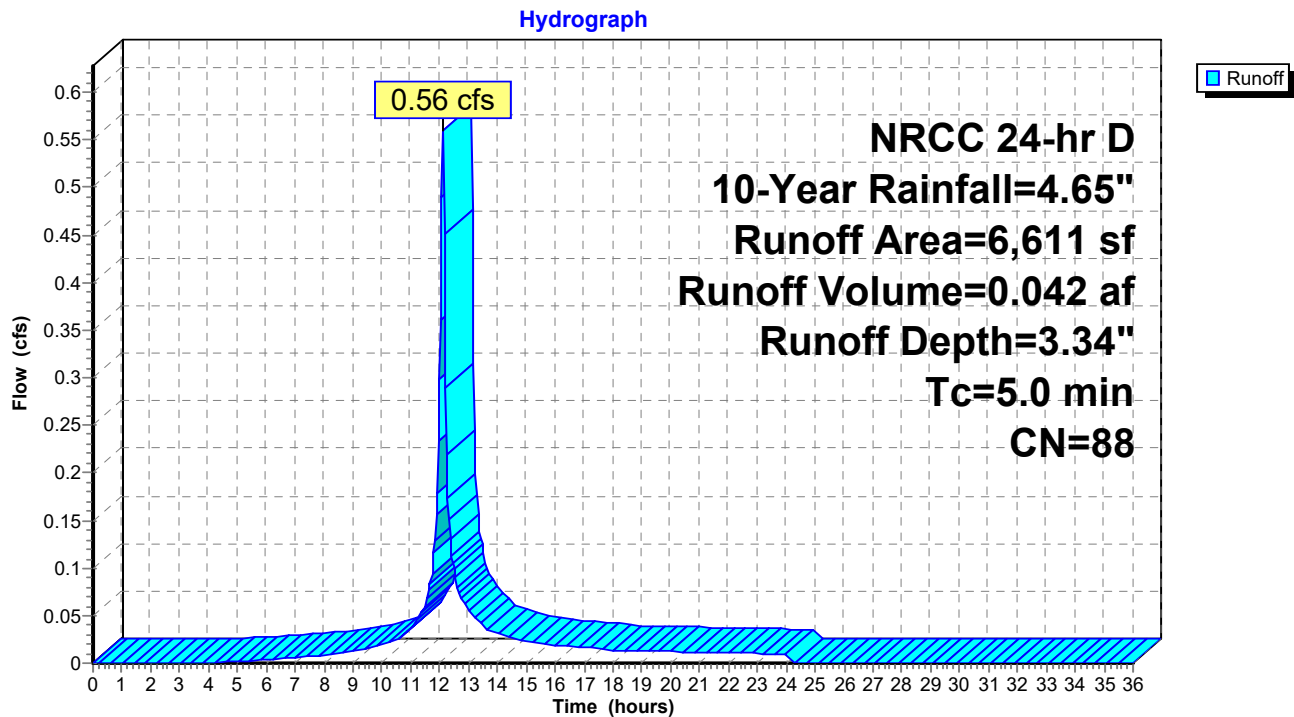
Summary for Subcatchment 29S: PR-23

Runoff = 0.56 cfs @ 12.12 hrs, Volume= 0.042 af, Depth= 3.34"
 Routed to Pond 44P : CMP Infiltration

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 10-Year Rainfall=4.65"

	Area (sf)	CN	Description
*	3,322	98	Paved parking, HSG A
*	748	98	Paved parking, HSG C
*	695	98	Cement Concrete Sidewalk, HSG A
*	463	98	Cement Concrete Sidewalk, HSG C
	914	39	>75% Grass cover, Good, HSG A
	469	74	>75% Grass cover, Good, HSG C
	6,611	88	Weighted Average
	1,383		20.92% Pervious Area
	5,228		79.08% Impervious Area

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

Subcatchment 29S: PR-23

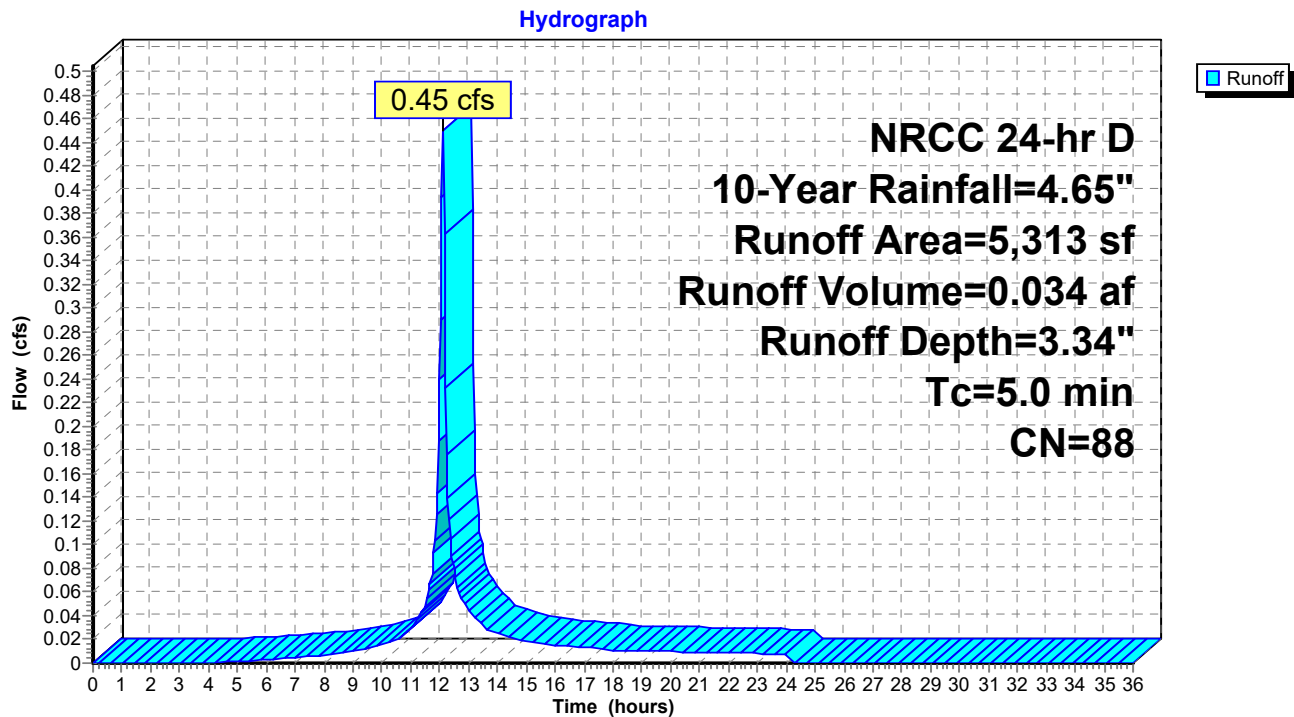
Summary for Subcatchment 30S: PR-24

Runoff = 0.45 cfs @ 12.12 hrs, Volume= 0.034 af, Depth= 3.34"
 Routed to Pond 44P : CMP Infiltration

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 10-Year Rainfall=4.65"

	Area (sf)	CN	Description
*	3,109	98	Paved parking, HSG A
*	146	98	Paved parking, HSG C
*	572	98	Cement Concrete Sidewalk, HSG A
*	432	98	Cement Concrete Sidewalk, HSG C
	819	39	>75% Grass cover, Good, HSG A
	235	74	>75% Grass cover, Good, HSG C
	5,313	88	Weighted Average
	1,054		19.84% Pervious Area
	4,259		80.16% Impervious Area

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

Subcatchment 30S: PR-24

Summary for Subcatchment 31S: PR-25

Runoff = 0.43 cfs @ 12.20 hrs, Volume= 0.041 af, Depth= 2.59"
 Routed to Pond 44P : CMP Infiltration

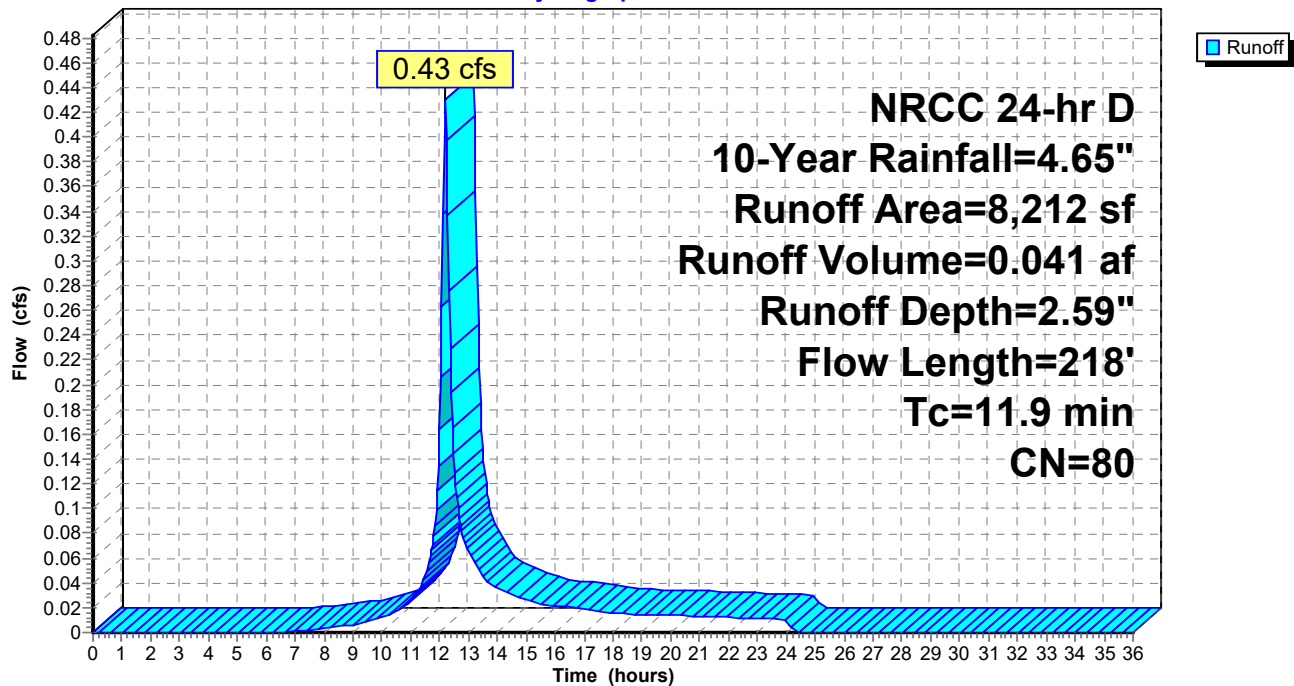
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 10-Year Rainfall=4.65"

	Area (sf)	CN	Description
*	3,851	98	Paved parking, HSG A
*	988	98	Cement Concrete Sidewalk, HSG A
*	65	98	Cement Concrete Sidewalk, HSG C
	1,910	39	>75% Grass cover, Good, HSG A
	1,398	74	>75% Grass cover, Good, HSG C
	8,212	80	Weighted Average
	3,308		40.28% Pervious Area
	4,904		59.72% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.6	63	0.0500	0.10		Sheet Flow, GRASS Grass: Bermuda n= 0.410 P2= 3.13"
0.6	37	0.0150	0.99		Sheet Flow, PAVEMENT Smooth surfaces n= 0.011 P2= 3.13"
0.7	118	0.0200	2.87		Shallow Concentrated Flow, PAVEMENT Paved Kv= 20.3 fps
11.9	218	Total			

Subcatchment 31S: PR-25

Hydrograph



Summary for Subcatchment 32S: PR-26

Runoff = 0.55 cfs @ 12.11 hrs, Volume= 0.044 af, Depth= 3.96"
 Routed to Pond 44P : CMP Infiltration

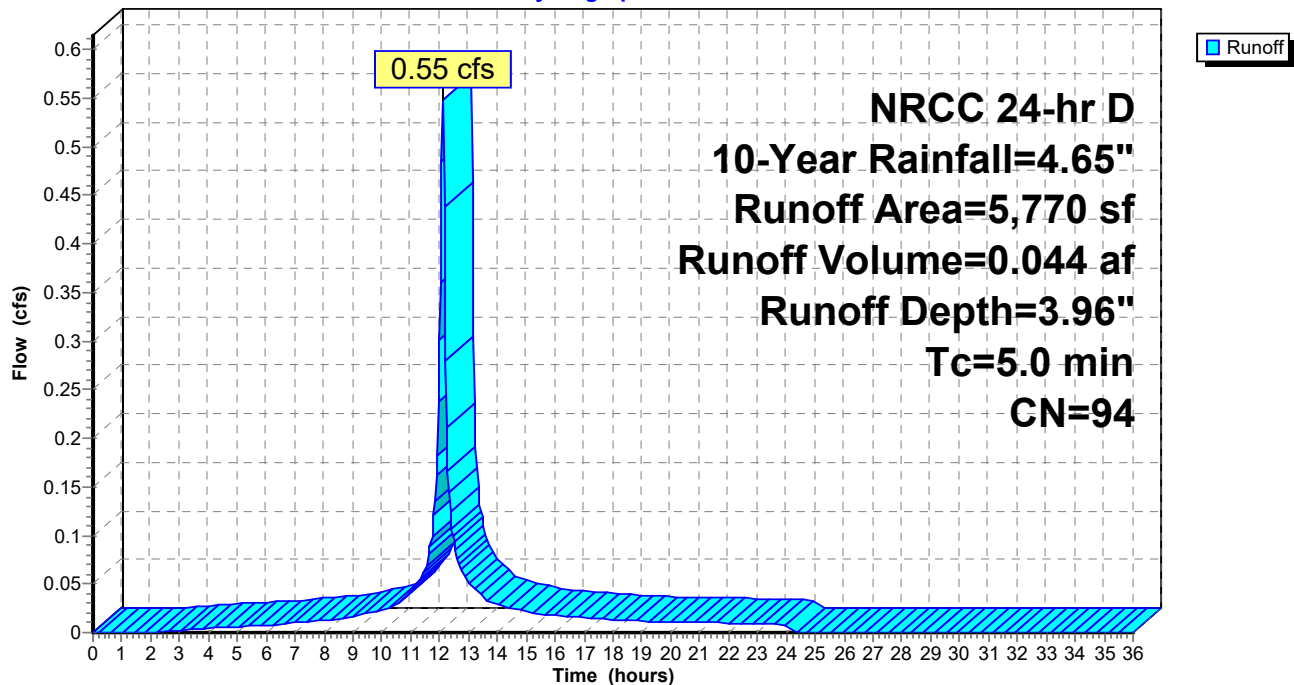
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 10-Year Rainfall=4.65"

	Area (sf)	CN	Description
*	4,263	98	Paved parking, HSG A
*	1,076	98	Cement Concrete Sidewalk, HSG A
	431	39	>75% Grass cover, Good, HSG A
	5,770	94	Weighted Average
	431		7.47% Pervious Area
	5,339		92.53% Impervious Area

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

Subcatchment 32S: PR-26

Hydrograph



Summary for Subcatchment 33S: PR-27

Runoff = 0.54 cfs @ 12.11 hrs, Volume= 0.042 af, Depth= 3.85"
 Routed to Pond 44P : CMP Infiltration

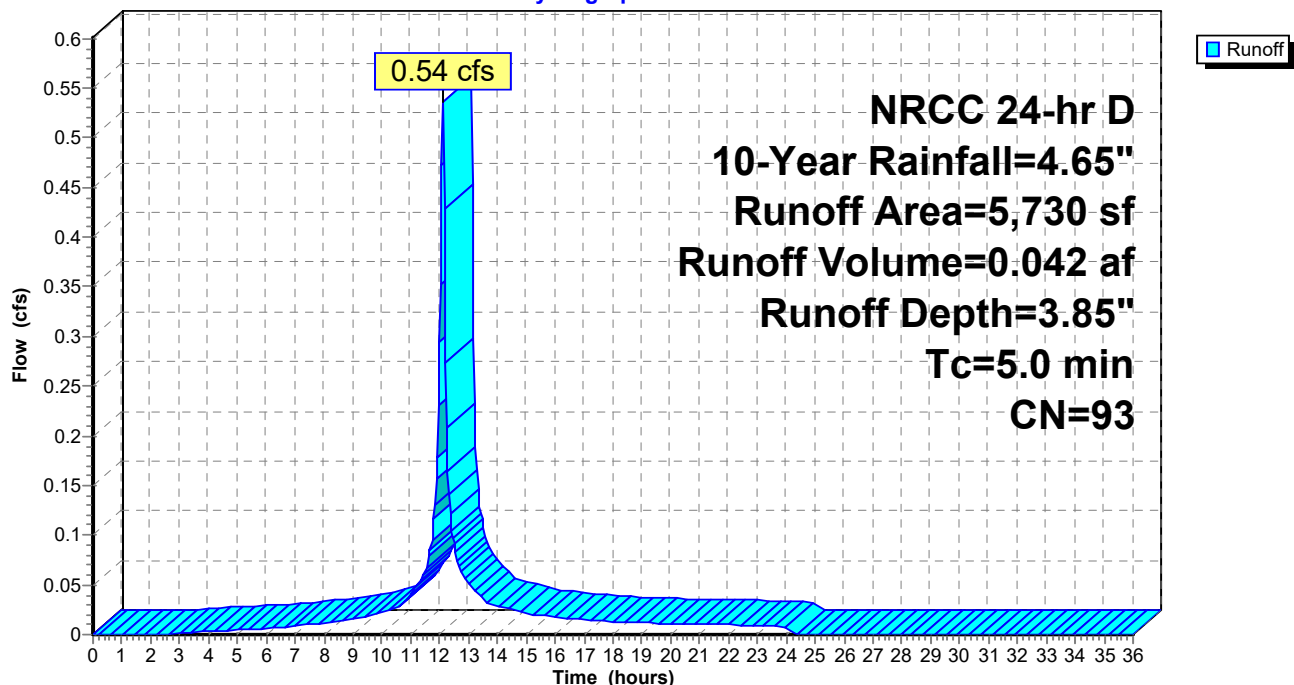
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 10-Year Rainfall=4.65"

	Area (sf)	CN	Description
*	4,151	98	Paved parking, HSG A
*	1,069	98	Cement Concrete Sidewalk, HSG A
	510	39	>75% Grass cover, Good, HSG A
	5,730	93	Weighted Average
	510		8.90% Pervious Area
	5,220		91.10% Impervious Area

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

Subcatchment 33S: PR-27

Hydrograph



Summary for Subcatchment 34S: PR-28

Runoff = 0.15 cfs @ 12.23 hrs, Volume= 0.015 af, Depth= 1.78"
 Routed to Pond 44P : CMP Infiltration

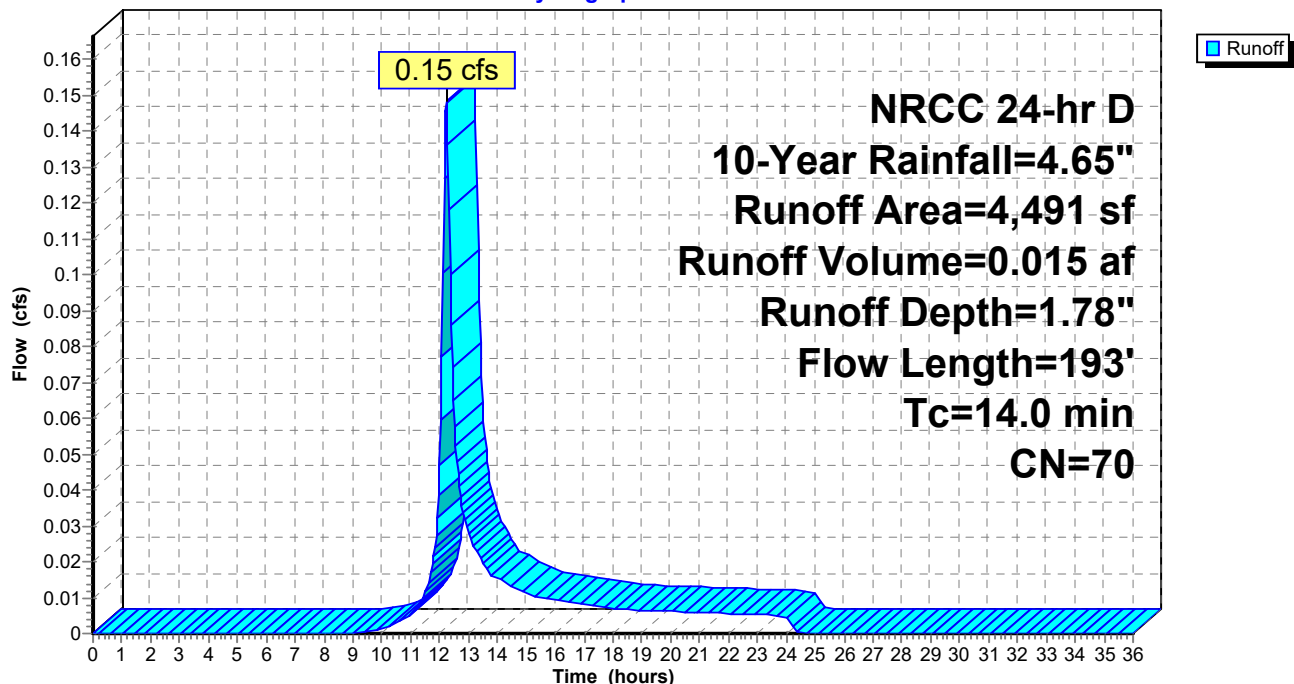
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 10-Year Rainfall=4.65"

	Area (sf)	CN	Description
*	1,588	98	Paved parking, HSG A
*	456	98	Cement Concrete Sidewalk, HSG A
	1,899	39	>75% Grass cover, Good, HSG A
	548	74	>75% Grass cover, Good, HSG C
	4,491	70	Weighted Average
	2,447		54.49% Pervious Area
	2,044		45.51% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.0	81	0.0500	0.10		Sheet Flow, GRASS Grass: Bermuda n= 0.410 P2= 3.13"
0.4	19	0.0150	0.87		Sheet Flow, PAVEMENT Smooth surfaces n= 0.011 P2= 3.13"
0.6	93	0.0150	2.49		Shallow Concentrated Flow, PAVEMENT Paved Kv= 20.3 fps
14.0	193	Total			

Subcatchment 34S: PR-28

Hydrograph



Summary for Subcatchment 35S: PR-29

Runoff = 0.12 cfs @ 12.12 hrs, Volume= 0.009 af, Depth= 3.24"
 Routed to Pond 44P : CMP Infiltration

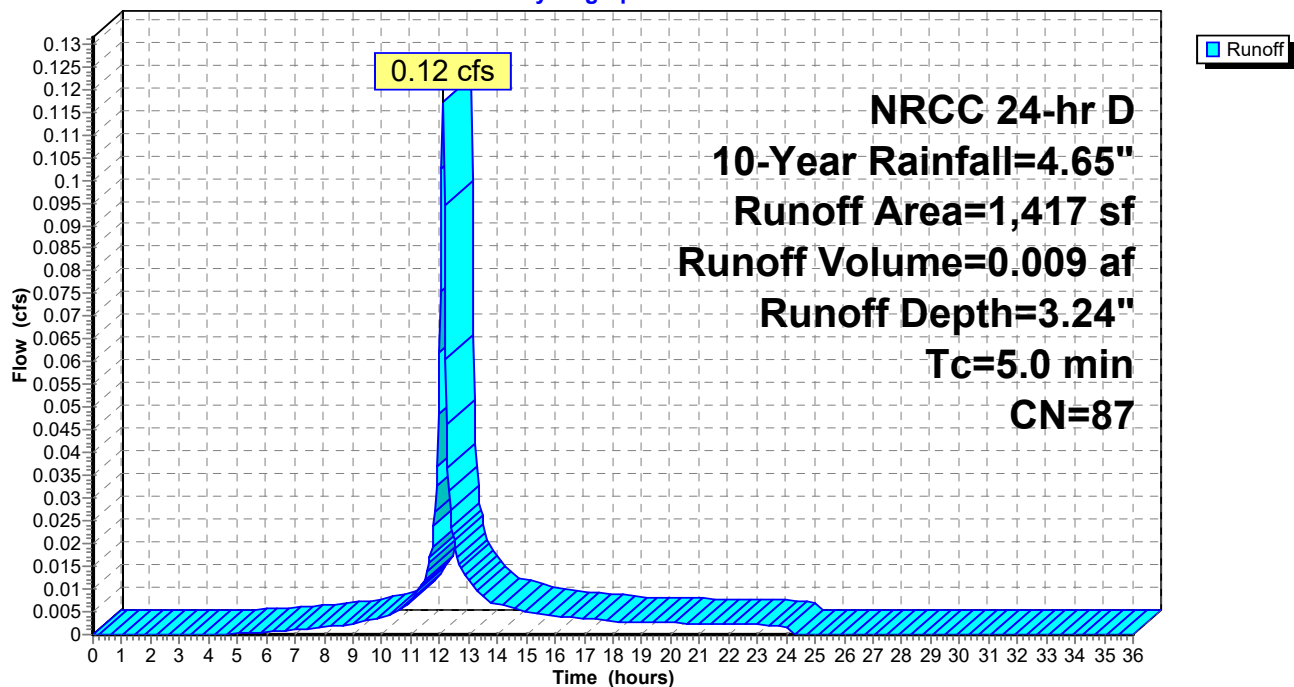
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 10-Year Rainfall=4.65"

	Area (sf)	CN	Description
*	1,137	98	Paved parking, HSG A
*	16	98	Cement Concrete Sidewalk, HSG A
	264	39	>75% Grass cover, Good, HSG A
	1,417	87	Weighted Average
	264		18.63% Pervious Area
	1,153		81.37% Impervious Area

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

Subcatchment 35S: PR-29

Hydrograph



Summary for Subcatchment 36S: PR-30

Runoff = 0.63 cfs @ 12.12 hrs, Volume= 0.047 af, Depth= 2.77"
 Routed to Pond 44P : CMP Infiltration

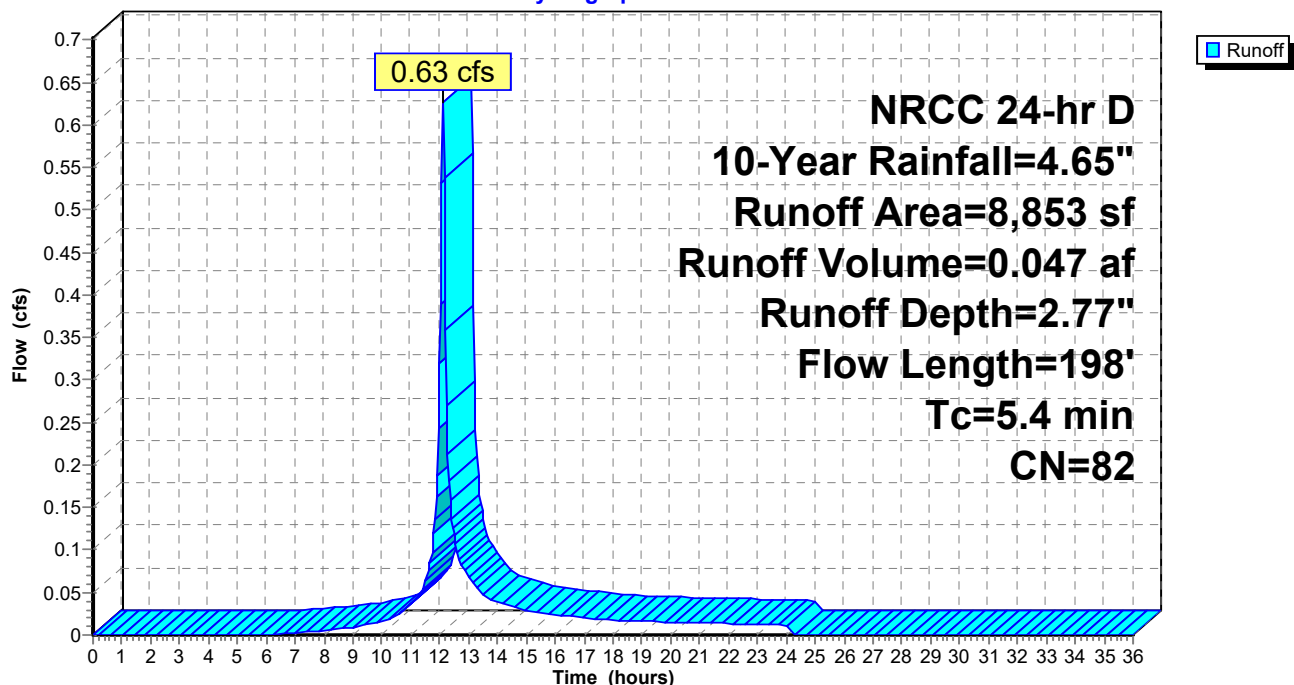
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 10-Year Rainfall=4.65"

Area (sf)	CN	Description
* 5,691	98	Paved parking, HSG A
* 826	98	Cement Concrete Sidewalk, HSG A
2,336	39	>75% Grass cover, Good, HSG A
8,853	82	Weighted Average
2,336		26.39% Pervious Area
6,517		73.61% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.5	16	0.0500	0.08		Sheet Flow, GRASS Grass: Bermuda n= 0.410 P2= 3.13"
1.2	84	0.0150	1.17		Sheet Flow, PAVEMENT Smooth surfaces n= 0.011 P2= 3.13"
0.7	98	0.0150	2.49		Shallow Concentrated Flow, PAVEMENT Paved Kv= 20.3 fps
5.4	198	Total			

Subcatchment 36S: PR-30

Hydrograph



Summary for Subcatchment 37S: PR-31

Runoff = 0.75 cfs @ 12.12 hrs, Volume= 0.056 af, Depth= 2.95"
 Routed to Pond 44P : CMP Infiltration

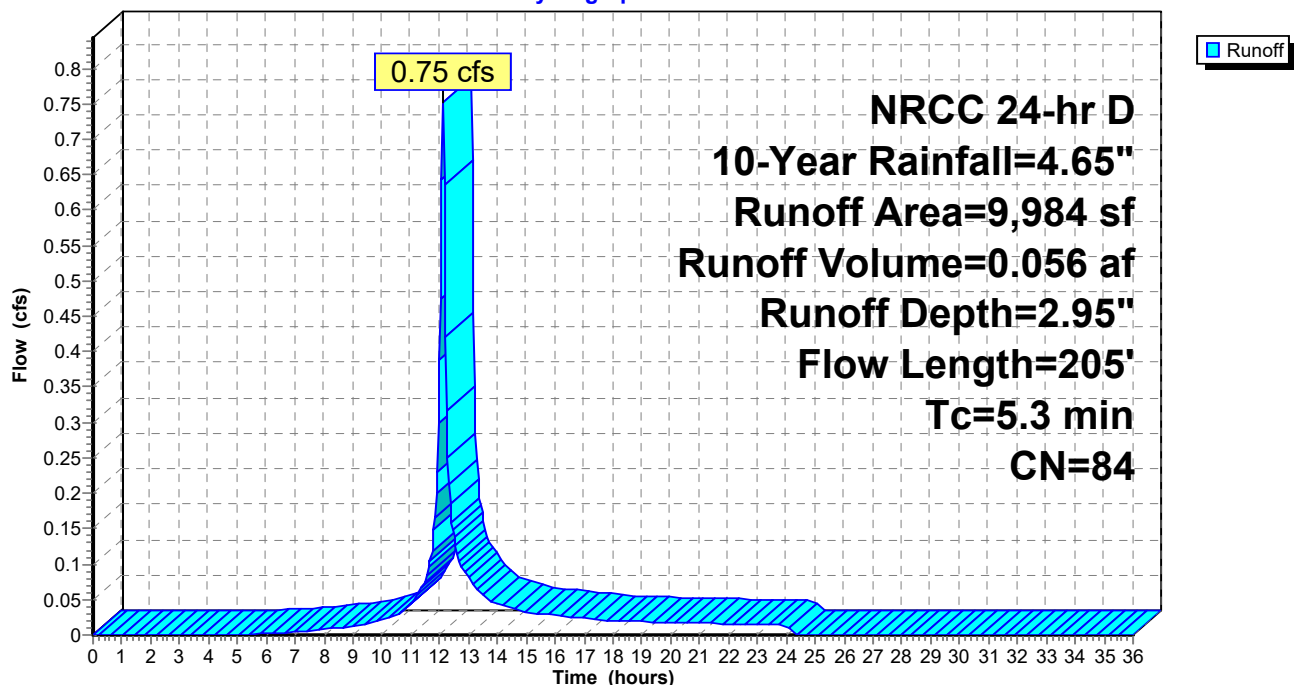
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 10-Year Rainfall=4.65"

	Area (sf)	CN	Description
*	6,479	98	Paved parking, HSG A
*	1,108	98	Cement Concrete Sidewalk, HSG A
	2,397	39	>75% Grass cover, Good, HSG A
	9,984	84	Weighted Average
	2,397		24.01% Pervious Area
	7,587		75.99% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.4	15	0.0500	0.07		Sheet Flow, GRASS Grass: Bermuda n= 0.410 P2= 3.13"
1.2	85	0.0150	1.17		Sheet Flow, PAVEMENT Smooth surfaces n= 0.011 P2= 3.13"
0.7	105	0.0150	2.49		Shallow Concentrated Flow, PAVEMENT Paved Kv= 20.3 fps
5.3	205	Total			

Subcatchment 37S: PR-31

Hydrograph



Summary for Subcatchment 38S: PR-32

Runoff = 0.51 cfs @ 12.24 hrs, Volume= 0.055 af, Depth= 1.78"
 Routed to Pond 44P : CMP Infiltration

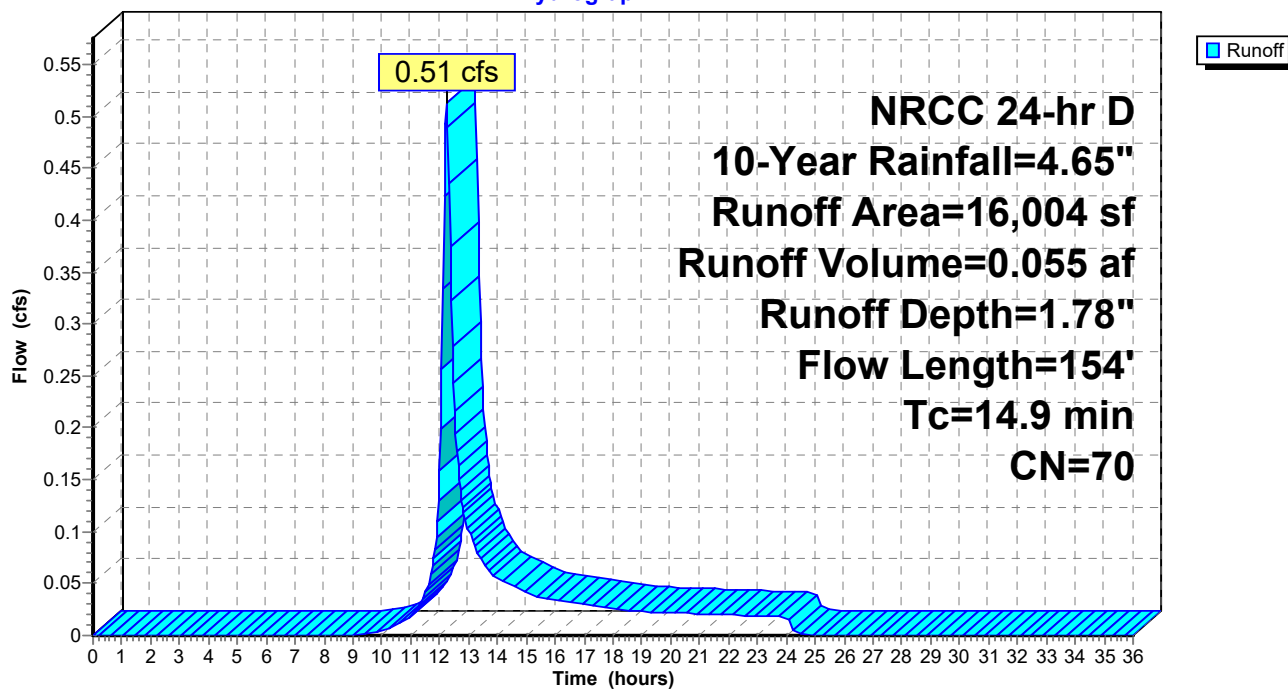
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 10-Year Rainfall=4.65"

	Area (sf)	CN	Description
*	6,711	98	Paved parking, HSG A
*	1,813	98	Cement Concrete Sidewalk, HSG A
	7,480	39	>75% Grass cover, Good, HSG A
	16,004	70	Weighted Average
	7,480		46.74% Pervious Area
	8,524		53.26% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.4	92	0.0500	0.11		Sheet Flow, GRASS Grass: Bermuda n= 0.410 P2= 3.13"
0.2	8	0.0200	0.82		Sheet Flow, PAVEMENT Smooth surfaces n= 0.011 P2= 3.13"
0.2	34	0.0500	3.35		Shallow Concentrated Flow, GRASS Grassed Waterway Kv= 15.0 fps
0.1	20	0.0200	2.87		Shallow Concentrated Flow, PAVEMENT Paved Kv= 20.3 fps
14.9	154	Total			

Subcatchment 38S: PR-32

Hydrograph



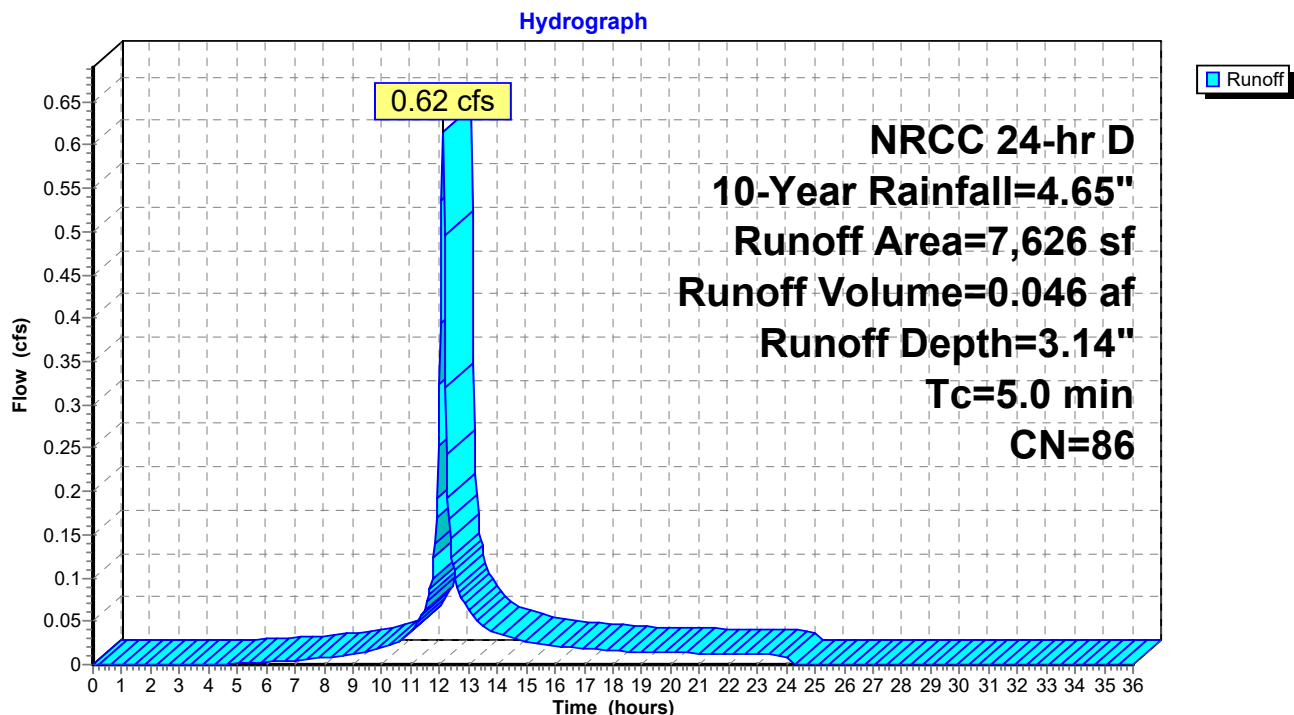
Summary for Subcatchment 39S: PR-33

Runoff = 0.62 cfs @ 12.12 hrs, Volume= 0.046 af, Depth= 3.14"
 Routed to Pond 44P : CMP Infiltration

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 10-Year Rainfall=4.65"

	Area (sf)	CN	Description
*	5,106	98	Paved parking, HSG A
*	920	98	Cement Concrete Sidewalk, HSG A
	1,600	39	>75% Grass cover, Good, HSG A
	7,626	86	Weighted Average
	1,600		20.98% Pervious Area
	6,026		79.02% Impervious Area

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

Subcatchment 39S: PR-33

Summary for Subcatchment 40S: PR-34

Runoff = 0.26 cfs @ 12.12 hrs, Volume= 0.020 af, Depth= 3.34"
 Routed to Pond 44P : CMP Infiltration

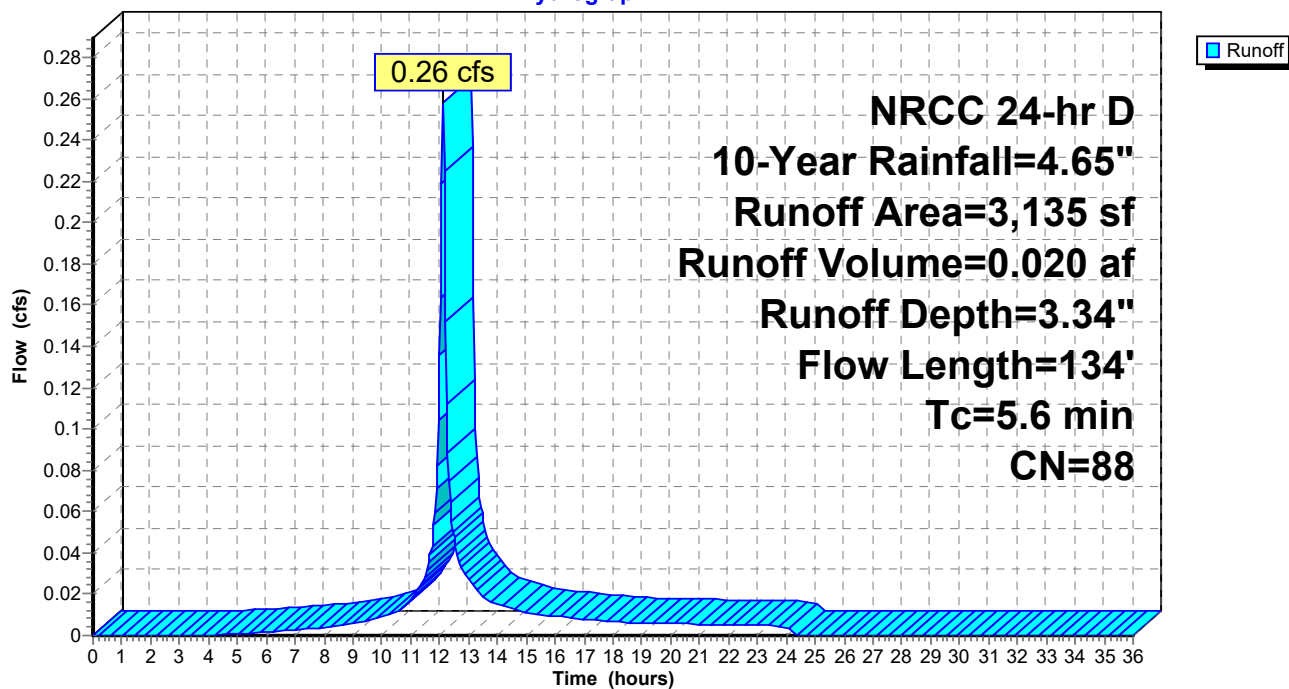
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 10-Year Rainfall=4.65"

	Area (sf)	CN	Description
*	2,389	98	Paved parking, HSG A
*	234	98	Cement Concrete Sidewalk, HSG A
	512	39	>75% Grass cover, Good, HSG A
	3,135	88	Weighted Average
	512		16.33% Pervious Area
	2,623		83.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.4	21	0.0500	0.08		Sheet Flow, GRASS Grass: Bermuda n= 0.410 P2= 3.13"
1.0	79	0.0200	1.30		Sheet Flow, PAVEMENT Smooth surfaces n= 0.011 P2= 3.13"
0.0	7	0.0500	3.35		Shallow Concentrated Flow, GRASS Grassed Waterway Kv= 15.0 fps
0.2	27	0.0200	2.87		Shallow Concentrated Flow, PAVEMENT Paved Kv= 20.3 fps
5.6	134	Total			

Subcatchment 40S: PR-34

Hydrograph



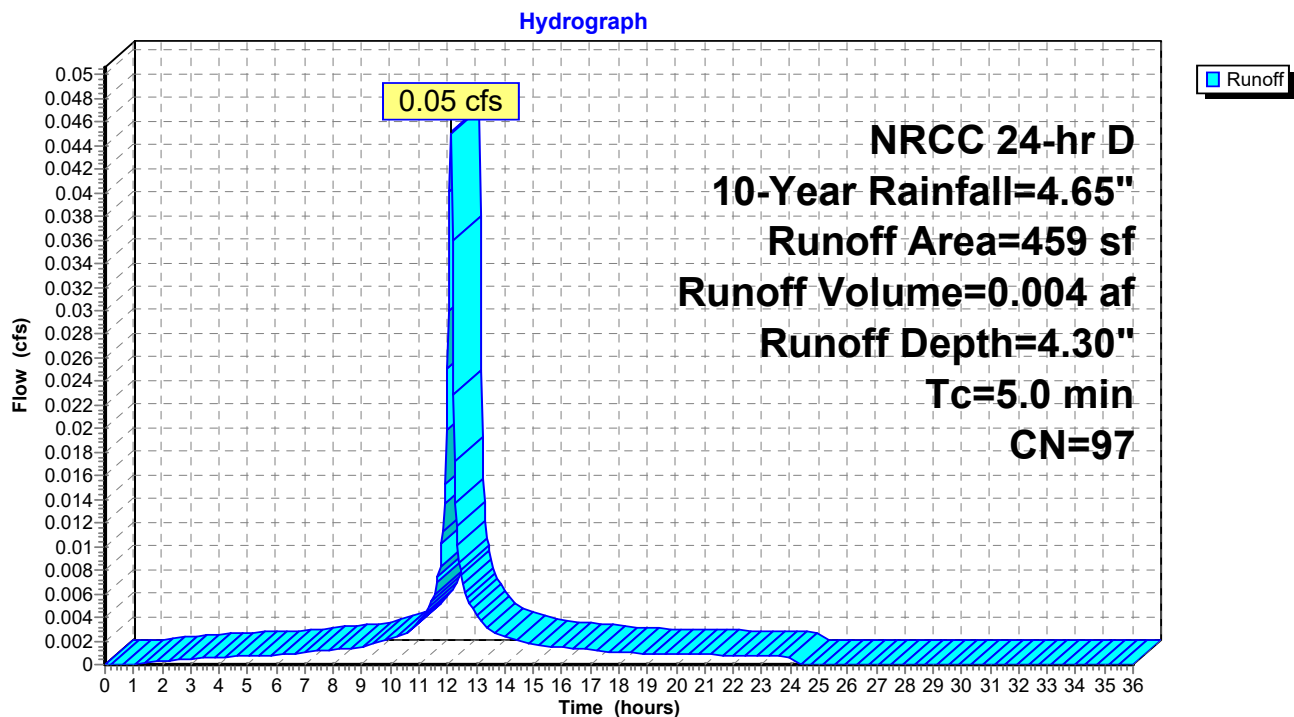
Summary for Subcatchment 41S: PR-35

Runoff = 0.05 cfs @ 12.11 hrs, Volume= 0.004 af, Depth= 4.30"
 Routed to Pond 44P : CMP Infiltration

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 10-Year Rainfall=4.65"

	Area (sf)	CN	Description
*	366	98	Paved parking, HSG A
*	86	98	Cement Concrete Sidewalk, HSG A
	7	39	>75% Grass cover, Good, HSG A
	459	97	Weighted Average
	7		1.53% Pervious Area
	452		98.47% Impervious Area

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

Subcatchment 41S: PR-35

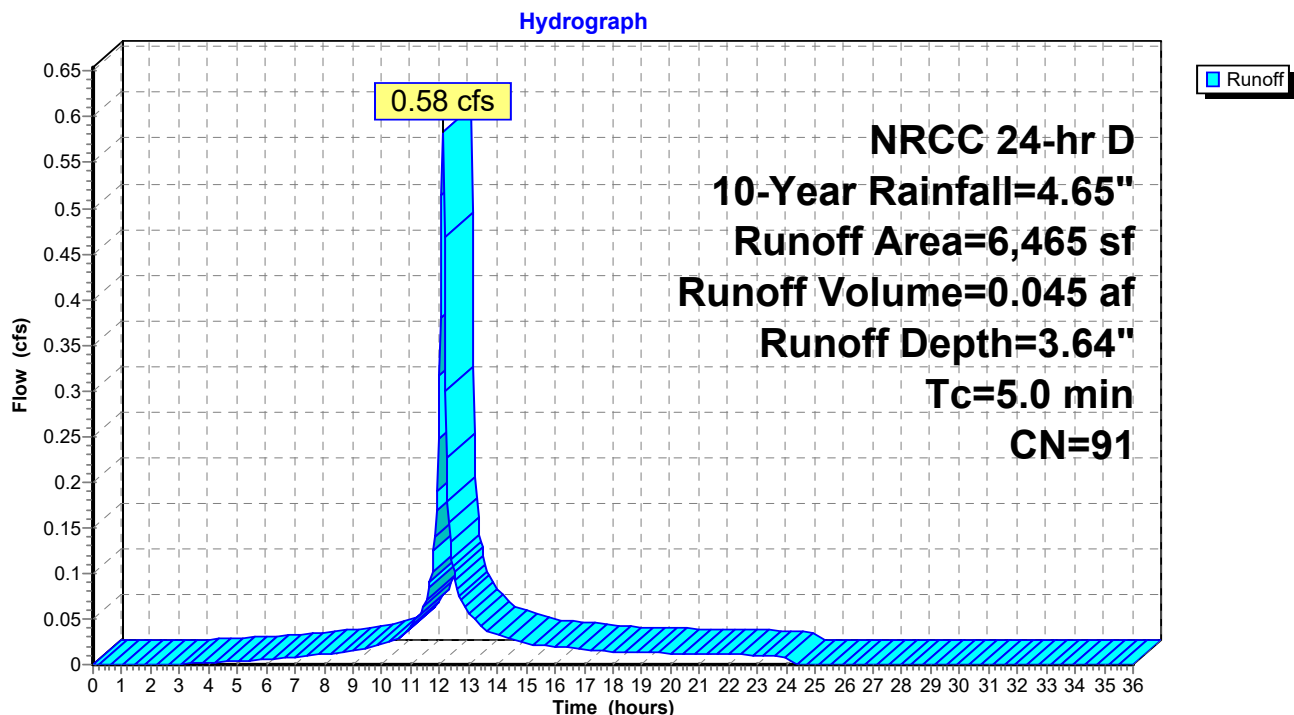
Summary for Subcatchment 42S: PR-36

Runoff = 0.58 cfs @ 12.12 hrs, Volume= 0.045 af, Depth= 3.64"
 Routed to Pond 44P : CMP Infiltration

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 10-Year Rainfall=4.65"

	Area (sf)	CN	Description
*	4,448	98	Paved parking, HSG A
*	1,207	98	Cement Concrete Sidewalk, HSG A
	810	39	>75% Grass cover, Good, HSG A
	6,465	91	Weighted Average
	810		12.53% Pervious Area
	5,655		87.47% Impervious Area

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

Subcatchment 42S: PR-36

Summary for Subcatchment 43S: PR-37

Runoff = 0.65 cfs @ 12.11 hrs, Volume= 0.051 af, Depth= 3.75"
 Routed to Pond 44P : CMP Infiltration

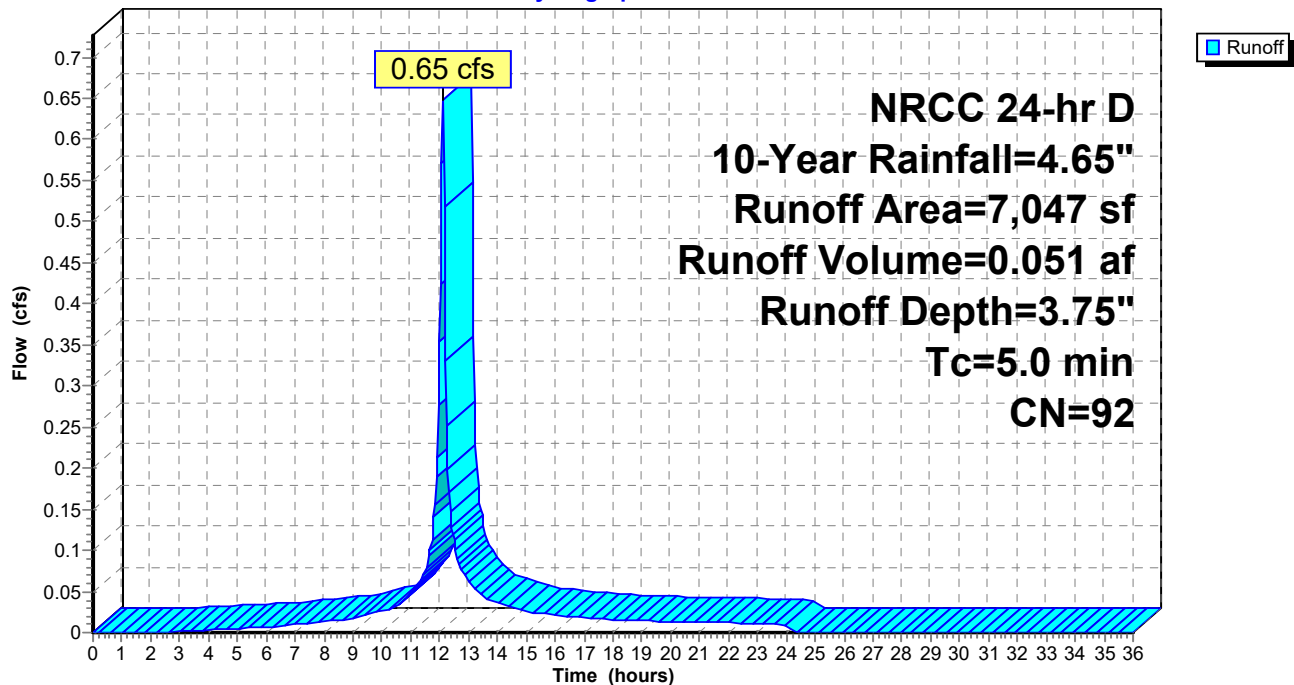
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 10-Year Rainfall=4.65"

	Area (sf)	CN	Description
*	5,177	98	Paved parking, HSG A
*	1,177	98	Cement Concrete Sidewalk, HSG A
	693	39	>75% Grass cover, Good, HSG A
	7,047	92	Weighted Average
	693		9.83% Pervious Area
	6,354		90.17% Impervious Area

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

Subcatchment 43S: PR-37

Hydrograph



Summary for Pond 44P: CMP Infiltration

Inflow Area = 5.917 ac, 73.14% Impervious, Inflow Depth = 3.14" for 10-Year event
 Inflow = 19.02 cfs @ 12.12 hrs, Volume= 1.550 af
 Outflow = 14.86 cfs @ 12.17 hrs, Volume= 1.550 af, Atten= 22%, Lag= 3.2 min
 Discarded = 0.19 cfs @ 12.17 hrs, Volume= 0.257 af
 Primary = 14.67 cfs @ 12.17 hrs, Volume= 1.293 af
 Routed to Pond 45P : Rain Garden

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs / 3
 Peak Elev= 269.35' @ 12.17 hrs Surf.Area= 0.055 ac Storage= 0.104 af

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 13.9 min (829.1 - 815.2)

Volume	Invert	Avail.Storage	Storage Description
#1C	266.50'	0.081 af	17.00'W x 142.00'L x 7.00'H Field C 0.388 af Overall - 0.186 af Embedded = 0.202 af x 40.0% Voids
#2C	267.00'	0.186 af	CMP Round 72 x 12 Inside #1 Effective Size= 72.0"W x 72.0"H => 28.27 sf x 20.00'L = 565.5 cf Overall Size= 72.0"W x 72.0"H x 20.00'L Row Length Adjustment= +8.00' x 28.27 sf x 2 rows 15.00' Header x 28.27 sf x 2 = 848.2 cf Inside
		0.267 af	Total Available Storage

Storage Group C created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	267.00'	18.0" Round Culvert L= 169.0' RCP, rounded edge headwall, Ke= 0.100 Inlet / Outlet Invert= 267.00' / 260.24' S= 0.0400 '/ Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.77 sf
#2	Discarded	266.50'	2.410 in/hr Exfiltration over Wetted area

Discarded OutFlow Max=0.18 cfs @ 12.17 hrs HW=269.31' (Free Discharge)
 ↑ **2=Exfiltration** (Exfiltration Controls 0.18 cfs)

Primary OutFlow Max=14.51 cfs @ 12.17 hrs HW=269.31' TW=259.13' (Dynamic Tailwater)
 ↑ **1=Culvert** (Inlet Controls 14.51 cfs @ 8.21 fps)

Pond 44P: CMP Infiltration - Chamber Wizard Field C**Chamber Model = CMP Round 72 (Round Corrugated Metal Pipe)**

Effective Size= 72.0"W x 72.0"H => 28.27 sf x 20.00'L = 565.5 cf

Overall Size= 72.0"W x 72.0"H x 20.00'L

Row Length Adjustment= +8.00' x 28.27 sf x 2 rows

72.0" Wide + 36.0" Spacing = 108.0" C-C Row Spacing

6 Chambers/Row x 20.00' Long +8.00' Row Adjustment +6.00' Header x 2 = 140.00' Row Length +12.0"

End Stone x 2 = 142.00' Base Length

2 Rows x 72.0" Wide + 36.0" Spacing x 1 + 12.0" Side Stone x 2 = 17.00' Base Width

6.0" Stone Base + 72.0" Chamber Height + 6.0" Stone Cover = 7.00' Field Height

12 Chambers x 565.5 cf +8.00' Row Adjustment x 28.27 sf x 2 Rows + 15.00' Header x 28.27 sf x 2 =
8,086.5 cf Chamber Storage

16,898.0 cf Field - 8,086.5 cf Chambers = 8,811.5 cf Stone x 40.0% Voids = 3,524.6 cf Stone Storage

Chamber Storage + Stone Storage = 11,611.1 cf = 0.267 af

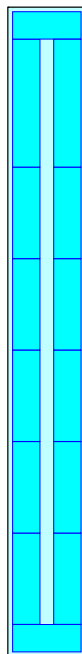
Overall Storage Efficiency = 68.7%

Overall System Size = 142.00' x 17.00' x 7.00'

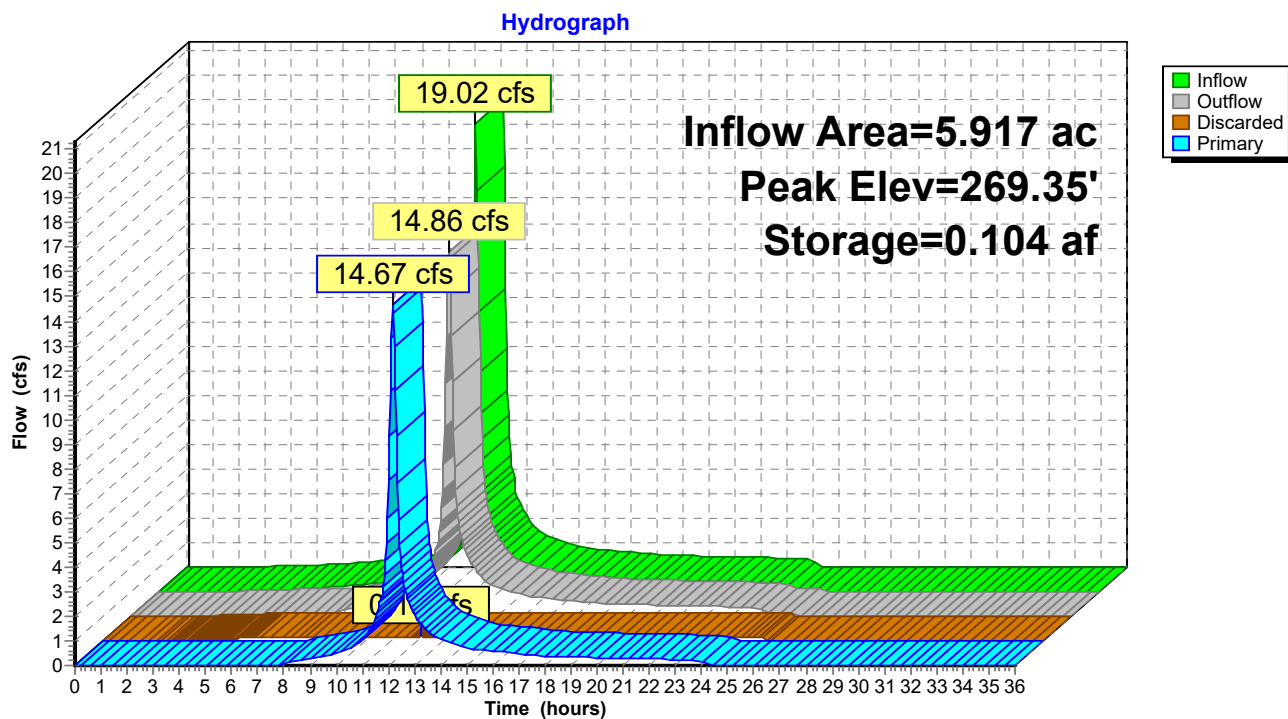
12 Chambers

625.9 cy Field

326.4 cy Stone



Pond 44P: CMP Infiltration



Stage-Area-Storage for Pond 44P: CMP Infiltration

Elevation (feet)	Wetted (acres)	Storage (acre-feet)	Elevation (feet)	Wetted (acres)	Storage (acre-feet)
266.50	0.055	0.000	271.80	0.094	0.213
266.60	0.056	0.002	271.90	0.095	0.217
266.70	0.057	0.004	272.00	0.096	0.221
266.80	0.058	0.007	272.10	0.096	0.225
266.90	0.058	0.009	272.20	0.097	0.229
267.00	0.059	0.011	272.30	0.098	0.233
267.10	0.060	0.014	272.40	0.098	0.236
267.20	0.061	0.017	272.50	0.099	0.240
267.30	0.061	0.020	272.60	0.100	0.243
267.40	0.062	0.023	272.70	0.101	0.247
267.50	0.063	0.027	272.80	0.101	0.250
267.60	0.063	0.030	272.90	0.102	0.253
267.70	0.064	0.034	273.00	0.103	0.255
267.80	0.065	0.038	273.10	0.104	0.258
267.90	0.066	0.042	273.20	0.104	0.260
268.00	0.066	0.045	273.30	0.105	0.262
268.10	0.067	0.049	273.40	0.106	0.264
268.20	0.068	0.054	273.50	0.107	0.267
268.30	0.069	0.058			
268.40	0.069	0.062			
268.50	0.070	0.066			
268.60	0.071	0.070			
268.70	0.071	0.075			
268.80	0.072	0.079			
268.90	0.073	0.083			
269.00	0.074	0.088			
269.10	0.074	0.092			
269.20	0.075	0.097			
269.30	0.076	0.101			
269.40	0.077	0.106			
269.50	0.077	0.110			
269.60	0.078	0.115			
269.70	0.079	0.120			
269.80	0.080	0.124			
269.90	0.080	0.129			
270.00	0.081	0.133			
270.10	0.082	0.138			
270.20	0.082	0.142			
270.30	0.083	0.147			
270.40	0.084	0.152			
270.50	0.085	0.156			
270.60	0.085	0.161			
270.70	0.086	0.165			
270.80	0.087	0.170			
270.90	0.088	0.174			
271.00	0.088	0.179			
271.10	0.089	0.183			
271.20	0.090	0.187			
271.30	0.090	0.192			
271.40	0.091	0.196			
271.50	0.092	0.200			
271.60	0.093	0.205			
271.70	0.093	0.209			

Summary for Pond 45P: Rain Garden

Inflow Area = 5.917 ac, 73.14% Impervious, Inflow Depth = 2.62" for 10-Year event
 Inflow = 14.67 cfs @ 12.17 hrs, Volume= 1.293 af
 Outflow = 9.66 cfs @ 12.32 hrs, Volume= 1.294 af, Atten= 34%, Lag= 8.7 min
 Discarded = 3.46 cfs @ 12.32 hrs, Volume= 1.143 af
 Primary = 6.19 cfs @ 12.32 hrs, Volume= 0.151 af
 Routed to Link 15L : DP-1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs / 3
 Peak Elev= 259.55' @ 12.32 hrs Surf.Area= 11,815 sf Storage= 12,636 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 26.9 min (844.3 - 817.4)

Volume	Invert	Avail.Storage	Storage Description
#1	255.50'	6,443 cf	Custom Stage Data (Irregular) Listed below (Recalc) 16,107 cf Overall x 40.0% Voids
#2	258.50'	10,400 cf	Custom Stage Data (Irregular) Listed below (Recalc)
		16,843 cf	Total Available Storage

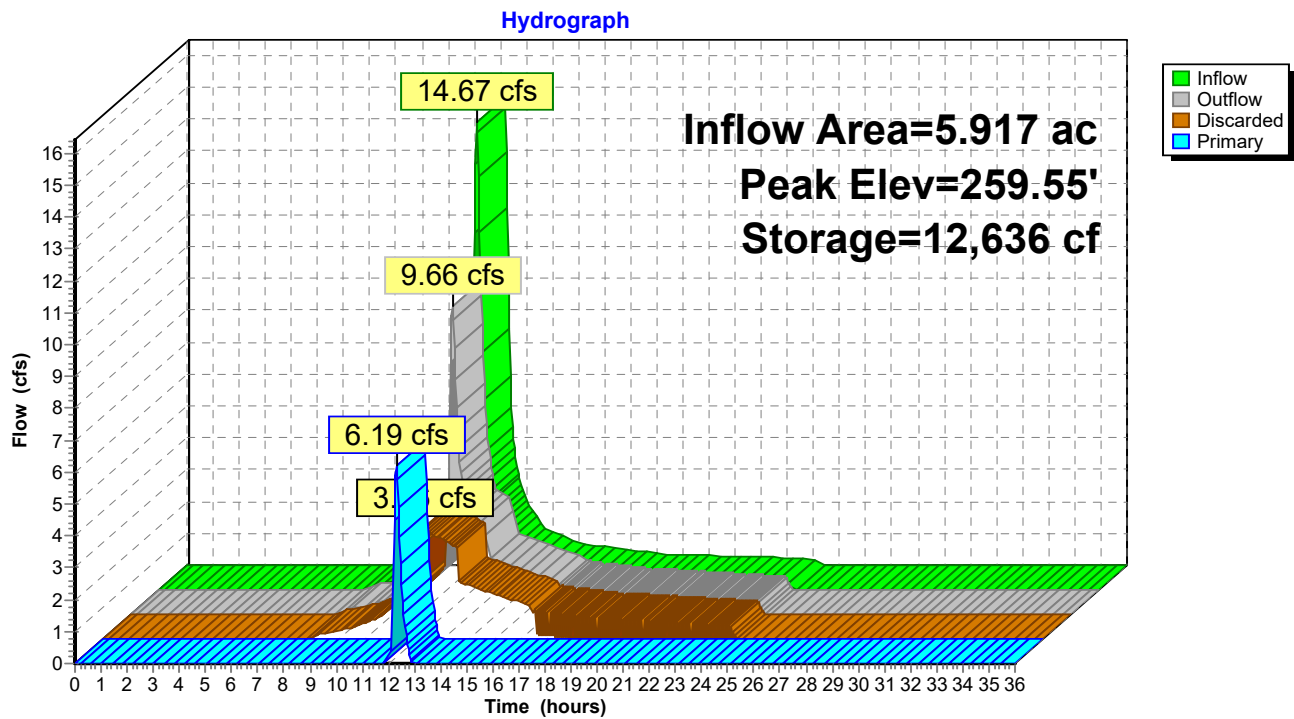
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
255.50	5,369	313.0	0	0	5,369
258.50	5,369	313.0	16,107	16,107	6,308

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
258.50	5,369	313.0	0	0	5,369
260.00	6,938	357.4	9,205	9,205	7,790
260.17	7,118	360.5	1,195	10,400	7,978

Device	Routing	Invert	Outlet Devices
#1	Primary	253.71'	24.0" Round Culvert L= 32.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 253.71' / 253.36' S= 0.0109 ' / ' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 3.14 sf
#2	Discarded	255.50'	8.270 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 251.50'
#3	Device 1	259.55'	2.0" x 2.0" Horiz. Orifice/Grate X 6.00 columns X 6 rows C= 0.600 Limited to weir flow at low heads
#4	Primary	259.05'	6.0' long x 0.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 Coef. (English) 2.80 2.92

Discarded OutFlow Max=3.46 cfs @ 12.32 hrs HW=259.55' (Free Discharge)
 ↳ **2=Exfiltration** (Controls 3.46 cfs)

Primary OutFlow Max=6.17 cfs @ 12.32 hrs HW=259.55' TW=0.00' (Dynamic Tailwater)
 ↳ **1=Culvert** (Passes 0.00 cfs of 26.27 cfs potential flow)
 ↳ **3=Orifice/Grate** (Controls 0.00 cfs)
 ↳ **4=Broad-Crested Rectangular Weir** (Weir Controls 6.17 cfs @ 2.06 fps)

Pond 45P: Rain Garden

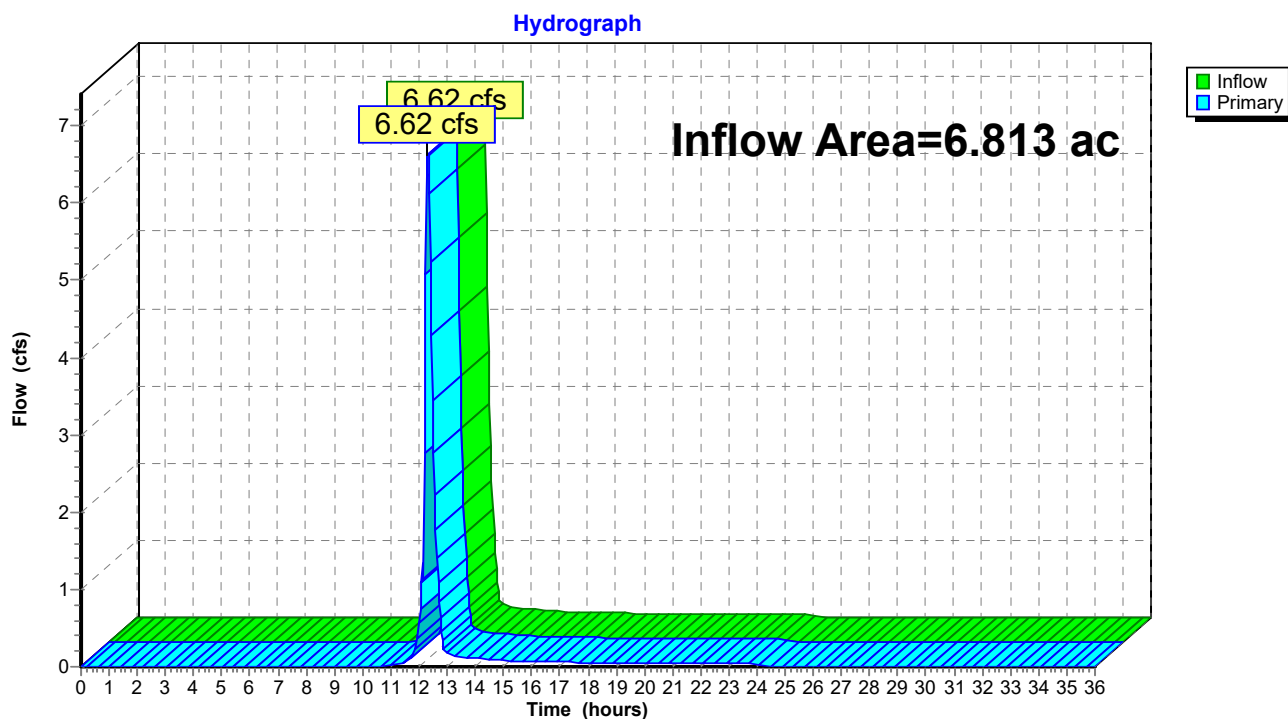
Stage-Area-Storage for Pond 45P: Rain Garden

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
255.50	5,369	0
255.60	5,369	215
255.70	5,369	430
255.80	5,369	644
255.90	5,369	859
256.00	5,369	1,074
256.10	5,369	1,289
256.20	5,369	1,503
256.30	5,369	1,718
256.40	5,369	1,933
256.50	5,369	2,148
256.60	5,369	2,362
256.70	5,369	2,577
256.80	5,369	2,792
256.90	5,369	3,007
257.00	5,369	3,221
257.10	5,369	3,436
257.20	5,369	3,651
257.30	5,369	3,866
257.40	5,369	4,080
257.50	5,369	4,295
257.60	5,369	4,510
257.70	5,369	4,725
257.80	5,369	4,939
257.90	5,369	5,154
258.00	5,369	5,369
258.10	5,369	5,584
258.20	5,369	5,799
258.30	5,369	6,013
258.40	5,369	6,228
258.50	10,738	6,443
258.60	10,836	6,985
258.70	10,936	7,536
258.80	11,036	8,098
258.90	11,137	8,670
259.00	11,239	9,252
259.10	11,341	9,844
259.20	11,445	10,446
259.30	11,550	11,059
259.40	11,655	11,682
259.50	11,762	12,316
259.60	11,869	12,961
259.70	11,977	13,616
259.80	12,086	14,282
259.90	12,196	14,960
260.00	12,307	15,648
260.10	12,413	16,347

Summary for Link 15L: DP-1

Inflow Area = 6.813 ac, 69.19% Impervious, Inflow Depth = 0.45" for 10-Year event
Inflow = 6.62 cfs @ 12.31 hrs, Volume= 0.253 af
Primary = 6.62 cfs @ 12.31 hrs, Volume= 0.253 af, Atten= 0%, Lag= 0.0 min

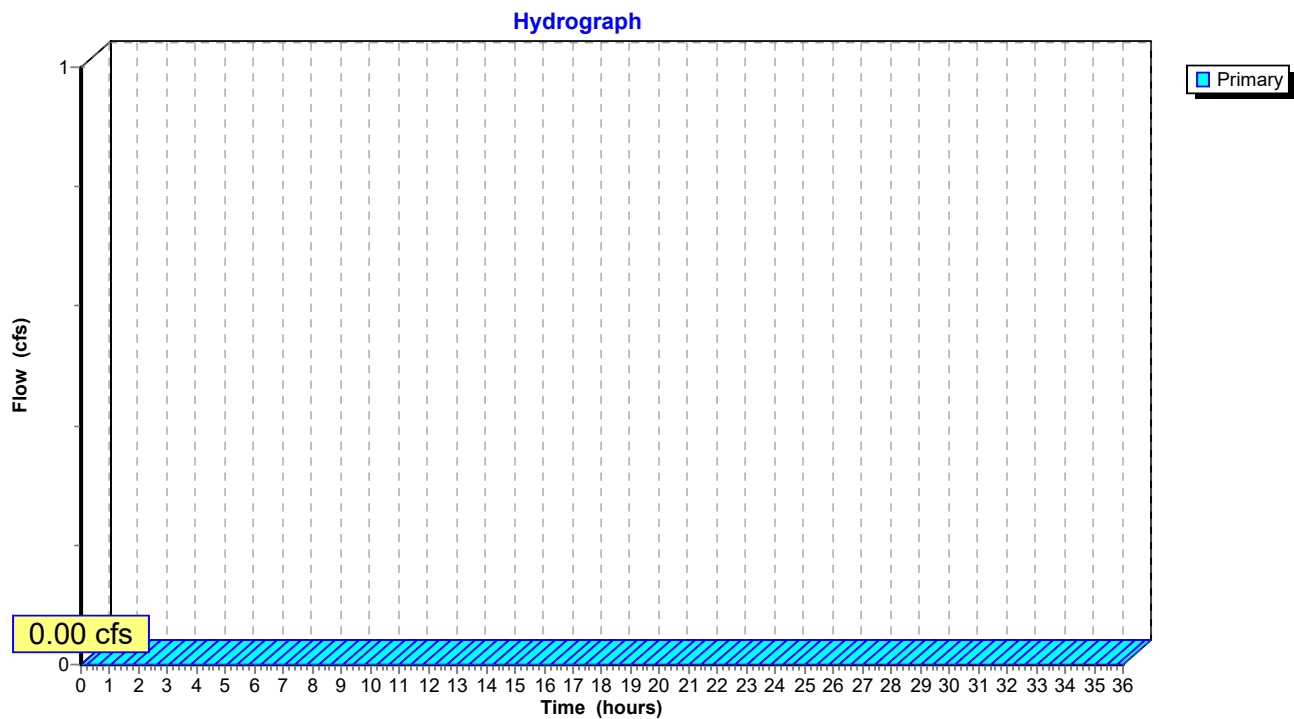
Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs

Link 15L: DP-1

Summary for Link 16L: DP-2

Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

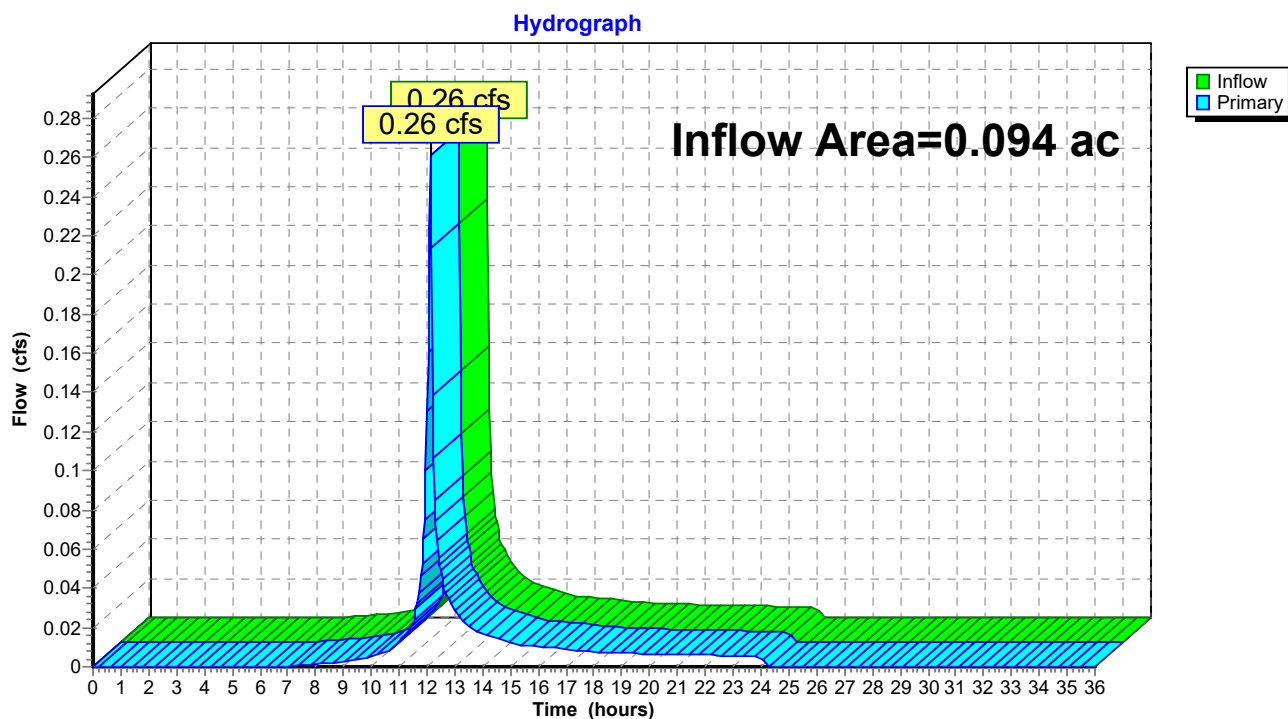
Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs

Link 16L: DP-2

Summary for Link 17L: DP-3

Inflow Area = 0.094 ac, 0.00% Impervious, Inflow Depth = 2.42" for 10-Year event
Inflow = 0.26 cfs @ 12.12 hrs, Volume= 0.019 af
Primary = 0.26 cfs @ 12.12 hrs, Volume= 0.019 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs

Link 17L: DP-3

Time span=0.00-36.00 hrs, dt=0.04 hrs, 901 points x 3
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: PR-1	Runoff Area=39,056 sf 43.09% Impervious Runoff Depth=2.17" Tc=5.0 min CN=64 Runoff=2.20 cfs 0.162 af
Subcatchment2S: PR-2	Runoff Area=5,989 sf 81.43% Impervious Runoff Depth=5.17" Tc=5.0 min CN=94 Runoff=0.73 cfs 0.059 af
Subcatchment3S: PR-3	Runoff Area=8,817 sf 74.45% Impervious Runoff Depth=4.94" Tc=5.0 min CN=92 Runoff=1.05 cfs 0.083 af
Subcatchment4S: PR-4	Runoff Area=6,680 sf 84.81% Impervious Runoff Depth=4.94" Tc=5.0 min CN=92 Runoff=0.80 cfs 0.063 af
Subcatchment5S: PR-5	Runoff Area=7,314 sf 77.02% Impervious Runoff Depth=4.50" Tc=5.0 min CN=88 Runoff=0.82 cfs 0.063 af
Subcatchment6S: PR-6	Runoff Area=15,529 sf 56.34% Impervious Runoff Depth=2.89" Tc=5.0 min CN=72 Runoff=1.18 cfs 0.086 af
Subcatchment7S: PR-7	Runoff Area=8,738 sf 78.69% Impervious Runoff Depth=4.18" Tc=5.0 min CN=85 Runoff=0.93 cfs 0.070 af
Subcatchment8S: PR-8	Runoff Area=16,223 sf 52.41% Impervious Runoff Depth=3.87" Tc=5.0 min CN=82 Runoff=1.62 cfs 0.120 af
Subcatchment9S: PR-9	Runoff Area=7,180 sf 74.57% Impervious Runoff Depth=4.61" Flow Length=127' Tc=7.1 min CN=89 Runoff=0.75 cfs 0.063 af
Subcatchment10S: PR-10	Runoff Area=4,103 sf 0.00% Impervious Runoff Depth=3.46" Tc=5.0 min CN=78 Runoff=0.37 cfs 0.027 af
Subcatchment11S: PR-11	Runoff Area=12,349 sf 77.12% Impervious Runoff Depth=4.94" Flow Length=257' Tc=6.6 min CN=92 Runoff=1.38 cfs 0.117 af
Subcatchment12S: PR-12	Runoff Area=12,764 sf 71.19% Impervious Runoff Depth=4.83" Tc=5.0 min CN=91 Runoff=1.50 cfs 0.118 af
Subcatchment18S: PR-13	Runoff Area=7,593 sf 39.33% Impervious Runoff Depth=2.26" Flow Length=246' Tc=16.1 min CN=65 Runoff=0.30 cfs 0.033 af
Subcatchment19S: PR-14	Runoff Area=3,225 sf 82.26% Impervious Runoff Depth=4.61" Flow Length=166' Tc=7.3 min CN=89 Runoff=0.34 cfs 0.028 af
Subcatchment20S: PR-15	Runoff Area=2,717 sf 85.79% Impervious Runoff Depth=4.72" Tc=5.0 min CN=90 Runoff=0.32 cfs 0.025 af
Subcatchment22S: PR-16	Runoff Area=1,349 sf 100.00% Impervious Runoff Depth=5.63" Flow Length=247' Tc=16.1 min CN=98 Runoff=0.12 cfs 0.015 af

Subcatchment23S: PR-17	Runoff Area=14,295 sf 71.70% Impervious Runoff Depth=4.72" Tc=5.0 min CN=90 Runoff=1.66 cfs 0.129 af
Subcatchment24S: PR-18	Runoff Area=9,416 sf 96.73% Impervious Runoff Depth=5.40" Flow Length=189' Tc=7.1 min CN=96 Runoff=1.07 cfs 0.097 af
Subcatchment25S: PR-19	Runoff Area=1,787 sf 75.15% Impervious Runoff Depth=3.97" Tc=5.0 min CN=83 Runoff=0.18 cfs 0.014 af
Subcatchment26S: PR-20	Runoff Area=6,770 sf 88.61% Impervious Runoff Depth=4.83" Tc=5.0 min CN=91 Runoff=0.80 cfs 0.063 af
Subcatchment27S: PR-21	Runoff Area=6,755 sf 89.10% Impervious Runoff Depth=4.94" Tc=5.0 min CN=92 Runoff=0.81 cfs 0.064 af
Subcatchment28S: PR-22	Runoff Area=5,124 sf 73.32% Impervious Runoff Depth=4.07" Tc=5.0 min CN=84 Runoff=0.53 cfs 0.040 af
Subcatchment29S: PR-23	Runoff Area=6,611 sf 79.08% Impervious Runoff Depth=4.50" Tc=5.0 min CN=88 Runoff=0.74 cfs 0.057 af
Subcatchment30S: PR-24	Runoff Area=5,313 sf 80.16% Impervious Runoff Depth=4.50" Tc=5.0 min CN=88 Runoff=0.60 cfs 0.046 af
Subcatchment31S: PR-25	Runoff Area=8,212 sf 59.72% Impervious Runoff Depth=3.66" Flow Length=218' Tc=11.9 min CN=80 Runoff=0.61 cfs 0.058 af
Subcatchment32S: PR-26	Runoff Area=5,770 sf 92.53% Impervious Runoff Depth=5.17" Tc=5.0 min CN=94 Runoff=0.70 cfs 0.057 af
Subcatchment33S: PR-27	Runoff Area=5,730 sf 91.10% Impervious Runoff Depth=5.05" Tc=5.0 min CN=93 Runoff=0.69 cfs 0.055 af
Subcatchment34S: PR-28	Runoff Area=4,491 sf 45.51% Impervious Runoff Depth=2.70" Flow Length=193' Tc=14.0 min CN=70 Runoff=0.23 cfs 0.023 af
Subcatchment35S: PR-29	Runoff Area=1,417 sf 81.37% Impervious Runoff Depth=4.39" Tc=5.0 min CN=87 Runoff=0.16 cfs 0.012 af
Subcatchment36S: PR-30	Runoff Area=8,853 sf 73.61% Impervious Runoff Depth=3.87" Flow Length=198' Tc=5.4 min CN=82 Runoff=0.87 cfs 0.066 af
Subcatchment37S: PR-31	Runoff Area=9,984 sf 75.99% Impervious Runoff Depth=4.07" Flow Length=205' Tc=5.3 min CN=84 Runoff=1.03 cfs 0.078 af
Subcatchment38S: PR-32	Runoff Area=16,004 sf 53.26% Impervious Runoff Depth=2.70" Flow Length=154' Tc=14.9 min CN=70 Runoff=0.79 cfs 0.083 af
Subcatchment39S: PR-33	Runoff Area=7,626 sf 79.02% Impervious Runoff Depth=4.29" Tc=5.0 min CN=86 Runoff=0.83 cfs 0.063 af
Subcatchment40S: PR-34	Runoff Area=3,135 sf 83.67% Impervious Runoff Depth=4.50" Flow Length=134' Tc=5.6 min CN=88 Runoff=0.34 cfs 0.027 af

Subcatchment41S: PR-35

Runoff Area=459 sf 98.47% Impervious Runoff Depth=5.51"
Tc=5.0 min CN=97 Runoff=0.06 cfs 0.005 af

Subcatchment42S: PR-36

Runoff Area=6,465 sf 87.47% Impervious Runoff Depth=4.83"
Tc=5.0 min CN=91 Runoff=0.76 cfs 0.060 af

Subcatchment43S: PR-37

Runoff Area=7,047 sf 90.17% Impervious Runoff Depth=4.94"
Tc=5.0 min CN=92 Runoff=0.84 cfs 0.067 af

Pond 44P: CMP Infiltration

Peak Elev=270.29' Storage=0.147 af Inflow=25.41 cfs 2.104 af
Discarded=0.20 cfs 0.272 af Primary=18.52 cfs 1.832 af Outflow=18.72 cfs 2.104 af

Pond 45P: Rain Garden

Peak Elev=259.76' Storage=14,010 cf Inflow=18.52 cfs 1.832 af
Discarded=3.60 cfs 1.460 af Primary=12.67 cfs 0.372 af Outflow=16.27 cfs 1.832 af

Link 15L: DP-1

Inflow=13.56 cfs 0.534 af
Primary=13.56 cfs 0.534 af

Link 16L: DP-2

Primary=0.00 cfs 0.000 af

Link 17L: DP-3

Inflow=0.37 cfs 0.027 af
Primary=0.37 cfs 0.027 af

Total Runoff Area = 6.907 ac Runoff Volume = 2.293 af Average Runoff Depth = 3.98"
31.76% Pervious = 2.194 ac 68.24% Impervious = 4.714 ac

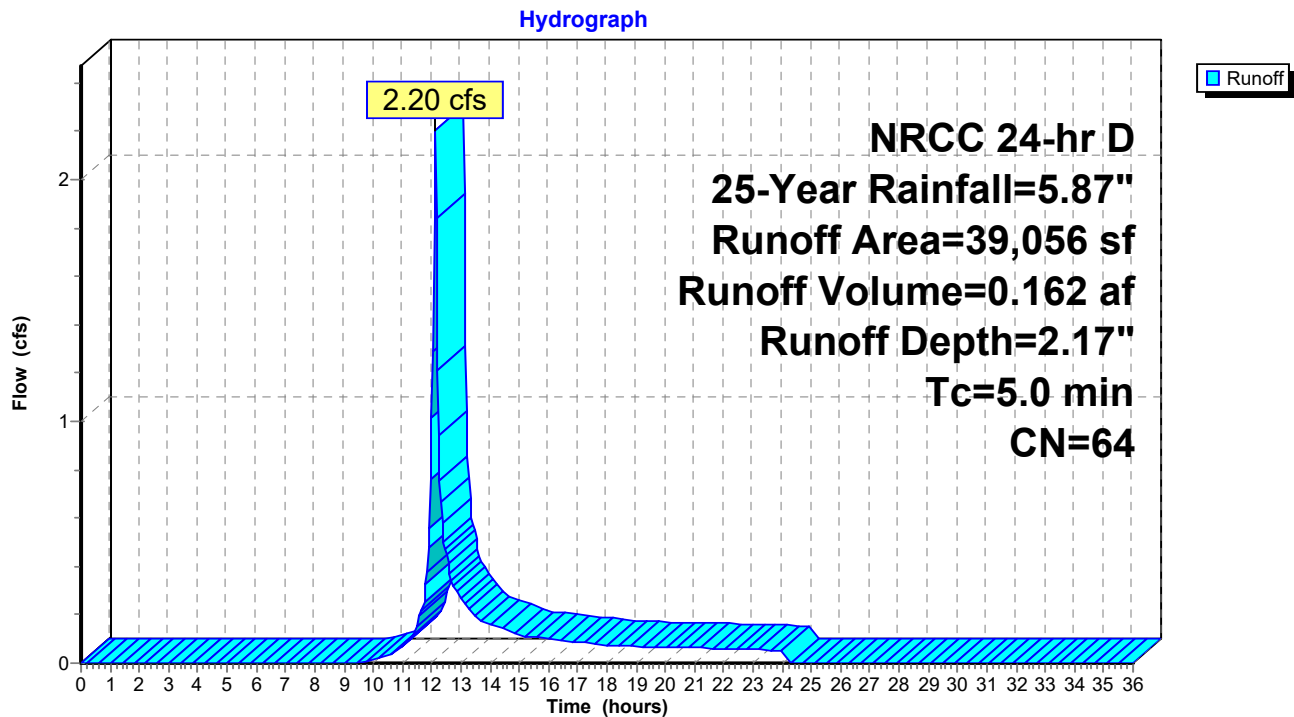
Summary for Subcatchment 1S: PR-1

Runoff = 2.20 cfs @ 12.12 hrs, Volume= 0.162 af, Depth= 2.17"
 Routed to Link 15L : DP-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 25-Year Rainfall=5.87"

Area (sf)	CN	Description
6,150	98	Paved parking, HSG A
* 6,781	98	Paved parking, HSG A
* 2,817	98	Cement Concrete Sidewalk, HSG A
* 1,080	98	Cement Concrete Sidewalk, HSG A
20,357	39	>75% Grass cover, Good, HSG A
1,871	39	>75% Grass cover, Good, HSG A
39,056	64	Weighted Average
22,228		56.91% Pervious Area
16,828		43.09% Impervious Area

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

Subcatchment 1S: PR-1

Summary for Subcatchment 2S: PR-2

Runoff = 0.73 cfs @ 12.11 hrs, Volume= 0.059 af, Depth= 5.17"
 Routed to Pond 44P : CMP Infiltration

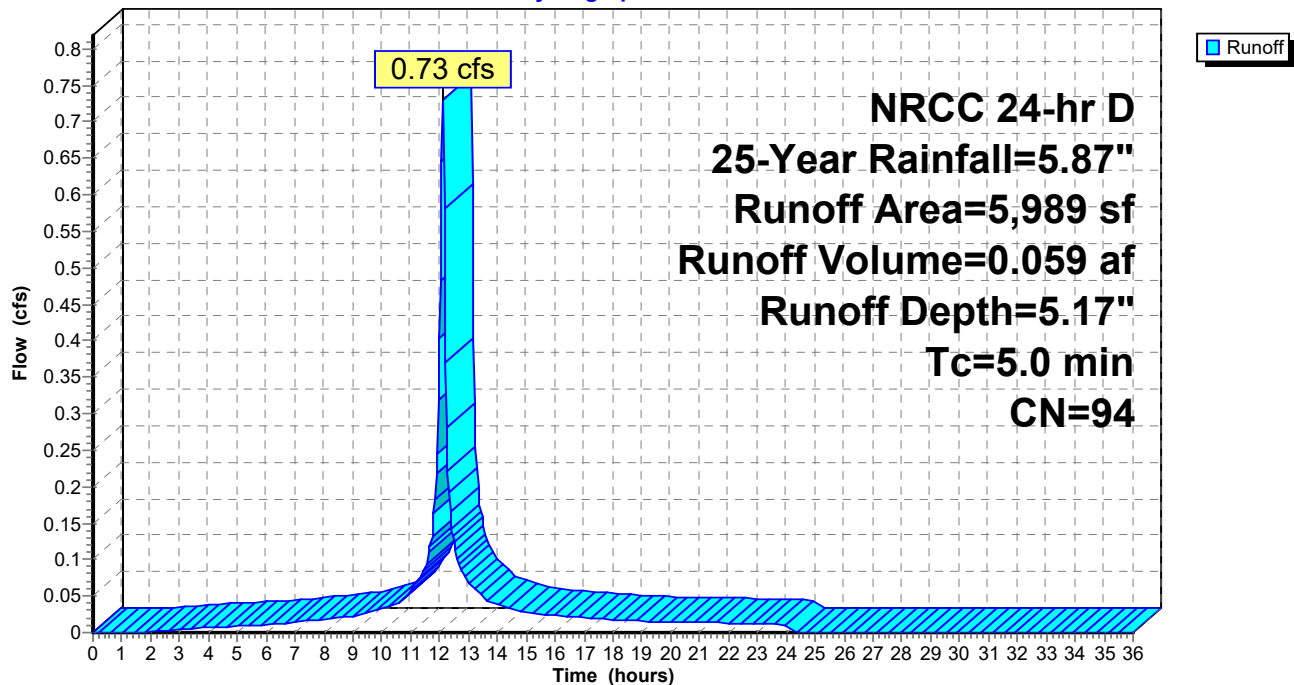
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 25-Year Rainfall=5.87"

	Area (sf)	CN	Description
*	4,187	98	Paved parking, HSG C
*	690	98	Cement Concrete Sidewalk, HSG C
	1,112	74	>75% Grass cover, Good, HSG C
	5,989	94	Weighted Average
	1,112		18.57% Pervious Area
	4,877		81.43% Impervious Area

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

Subcatchment 2S: PR-2

Hydrograph



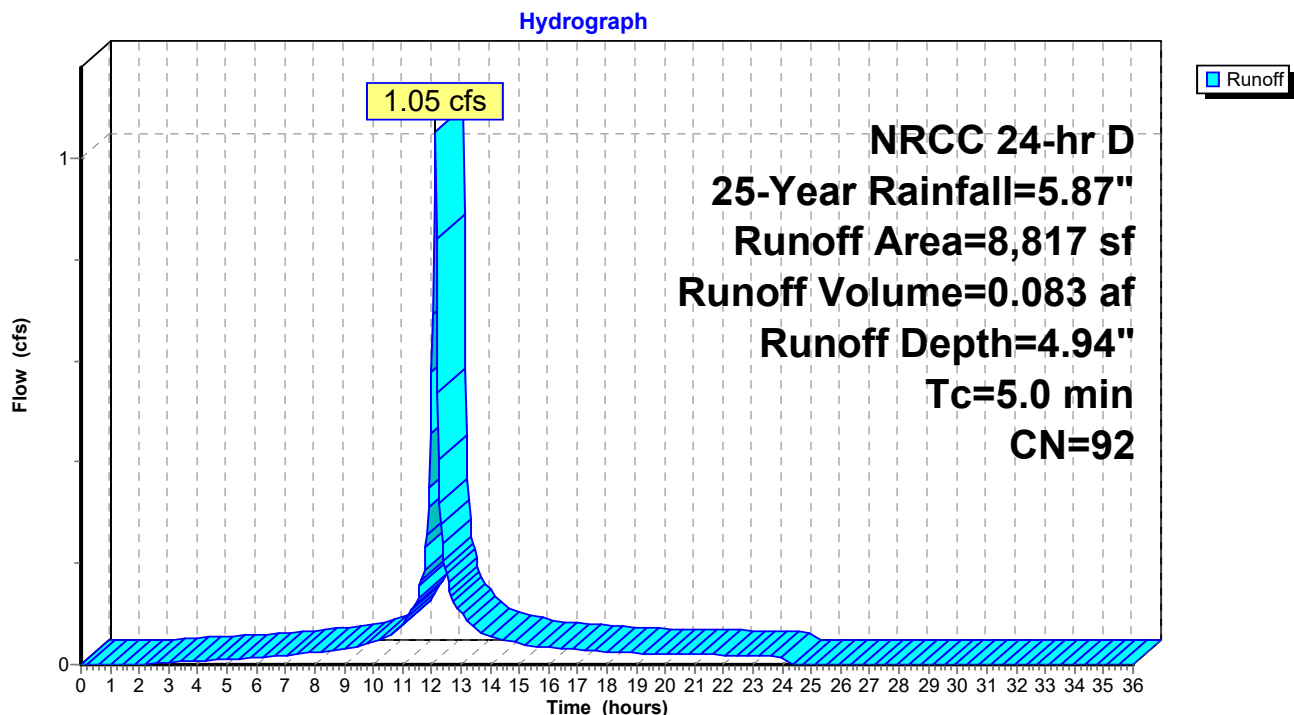
Summary for Subcatchment 3S: PR-3

Runoff = 1.05 cfs @ 12.11 hrs, Volume= 0.083 af, Depth= 4.94"
 Routed to Pond 44P : CMP Infiltration

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 25-Year Rainfall=5.87"

Area (sf)	CN	Description
5,618	98	Paved parking, HSG C
* 946	98	Cement Concrete Sidewalk, HSG C
2,253	74	>75% Grass cover, Good, HSG C
8,817	92	Weighted Average
2,253		25.55% Pervious Area
6,564		74.45% Impervious Area

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

Subcatchment 3S: PR-3

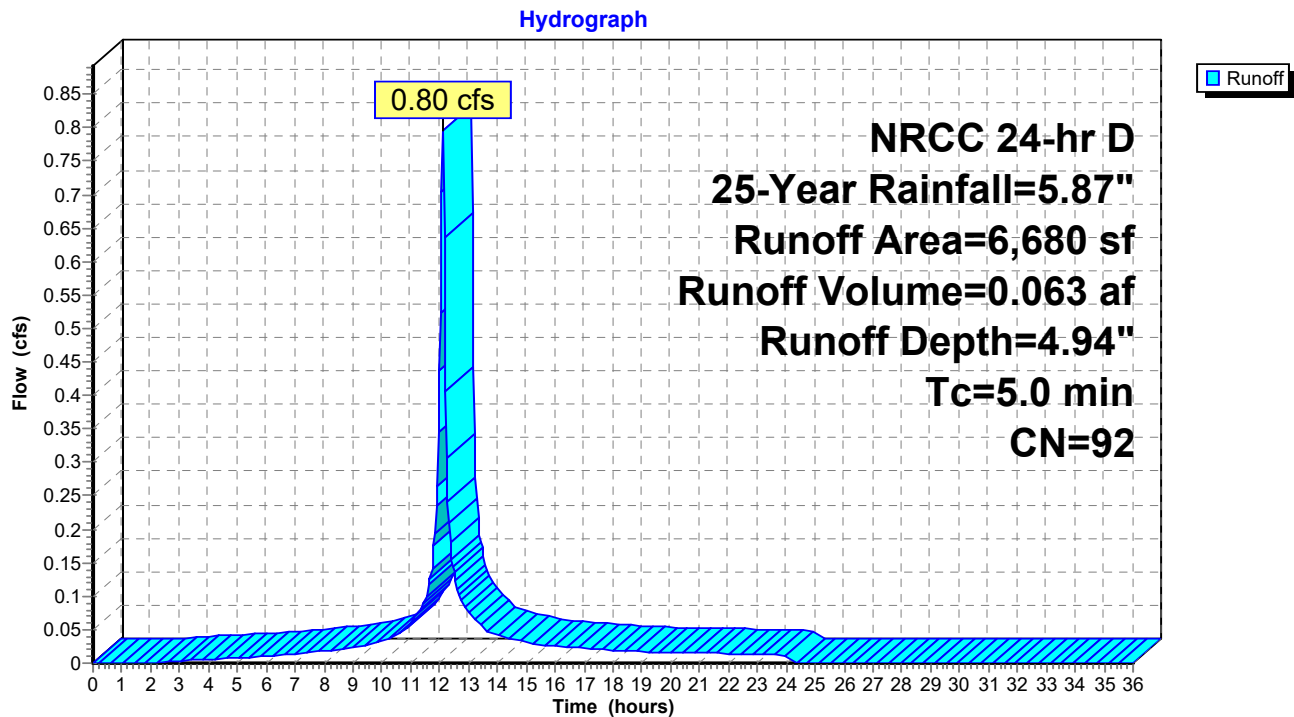
Summary for Subcatchment 4S: PR-4

Runoff = 0.80 cfs @ 12.11 hrs, Volume= 0.063 af, Depth= 4.94"
 Routed to Pond 44P : CMP Infiltration

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 25-Year Rainfall=5.87"

Area (sf)	CN	Description
2,045	98	Paved parking, HSG C
* 2,781	98	Paved parking, HSG A
* 424	98	Cement Concrete Sidewalk, HSG C
* 415	98	Cement Concrete Sidewalk, HSG A
559	74	>75% Grass cover, Good, HSG C
456	39	>75% Grass cover, Good, HSG A
6,680	92	Weighted Average
1,015		15.19% Pervious Area
5,665		84.81% Impervious Area

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

Subcatchment 4S: PR-4

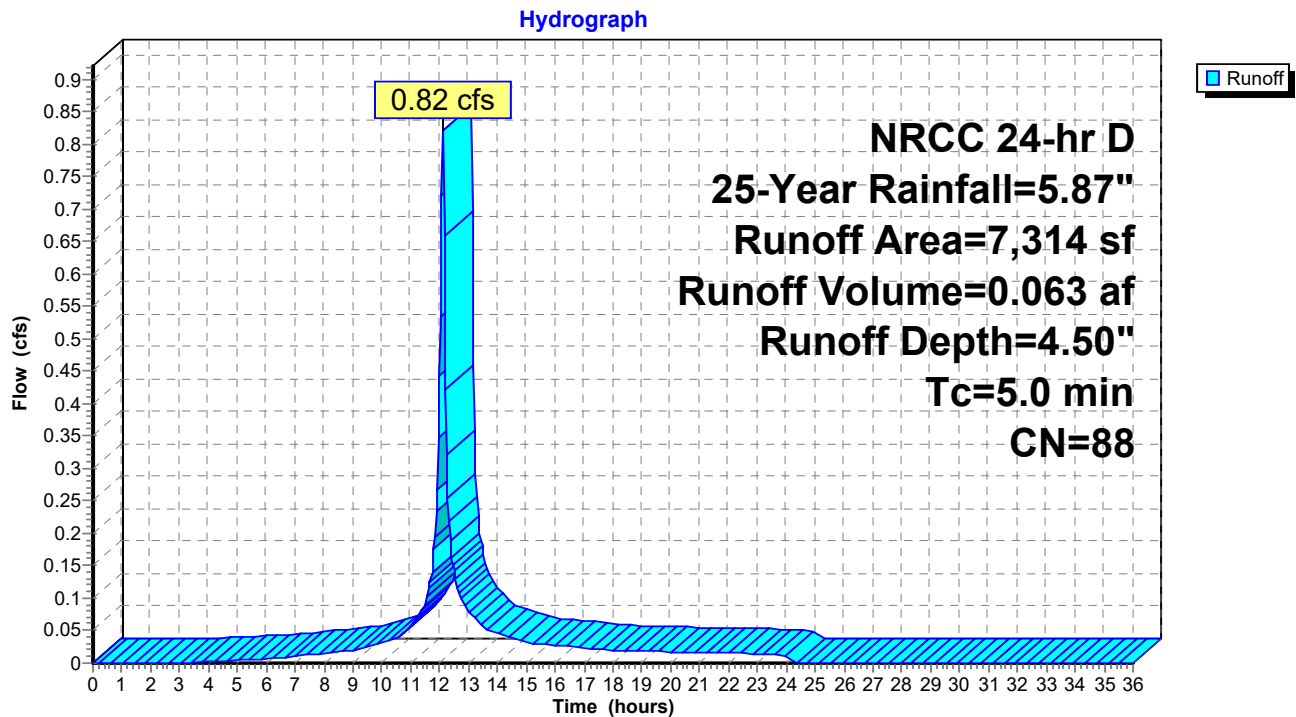
Summary for Subcatchment 5S: PR-5

Runoff = 0.82 cfs @ 12.12 hrs, Volume= 0.063 af, Depth= 4.50"
 Routed to Pond 44P : CMP Infiltration

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 25-Year Rainfall=5.87"

	Area (sf)	CN	Description
*	1,817	98	Paved parking, HSG C
*	3,098	98	Paved parking, HSG A
*	327	98	Cement Concrete Sidewalk, HSG C
*	391	98	Cement Concrete Sidewalk, HSG A
	725	74	>75% Grass cover, Good, HSG C
	956	39	>75% Grass cover, Good, HSG A
	7,314	88	Weighted Average
	1,681		22.98% Pervious Area
	5,633		77.02% Impervious Area

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

Subcatchment 5S: PR-5

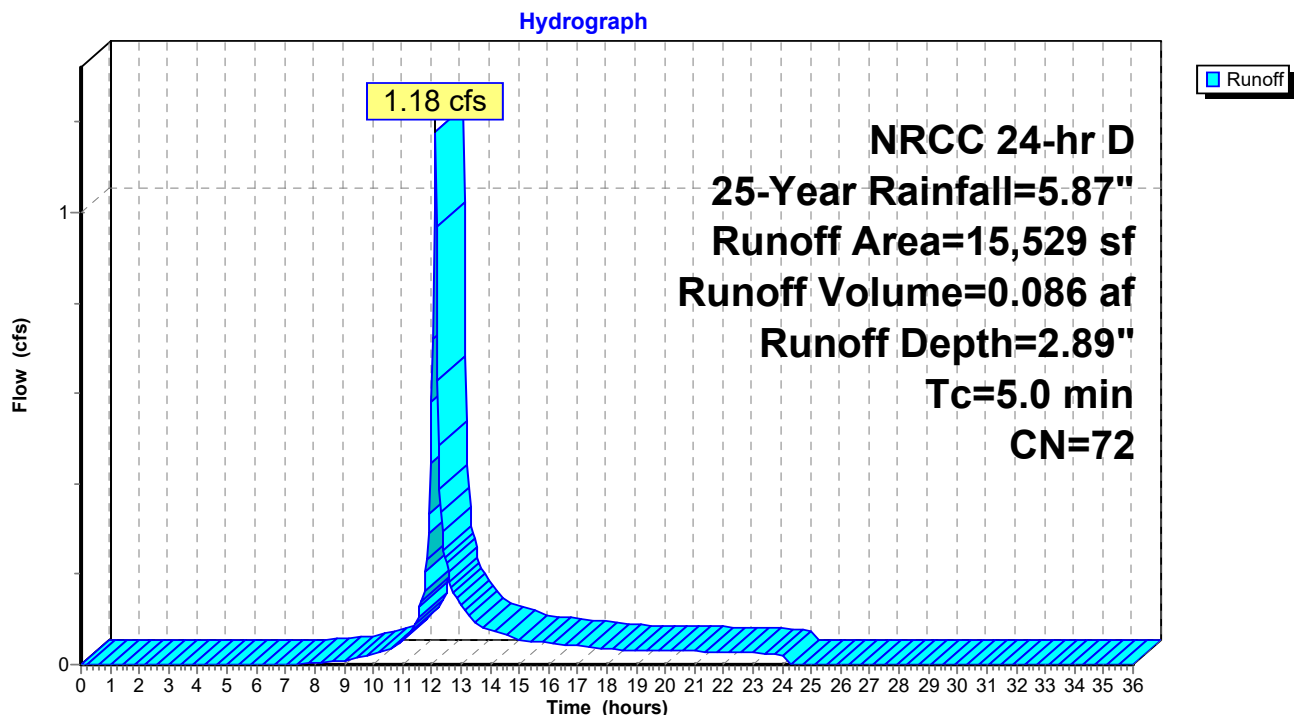
Summary for Subcatchment 6S: PR-6

Runoff = 1.18 cfs @ 12.12 hrs, Volume= 0.086 af, Depth= 2.89"
 Routed to Pond 44P : CMP Infiltration

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 25-Year Rainfall=5.87"

	Area (sf)	CN	Description
*	7,257	98	Paved parking, HSG A
*	1,492	98	Cement Concrete Sidewalk, HSG A
	6,780	39	>75% Grass cover, Good, HSG A
	15,529	72	Weighted Average
	6,780		43.66% Pervious Area
	8,749		56.34% Impervious Area

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

Subcatchment 6S: PR-6

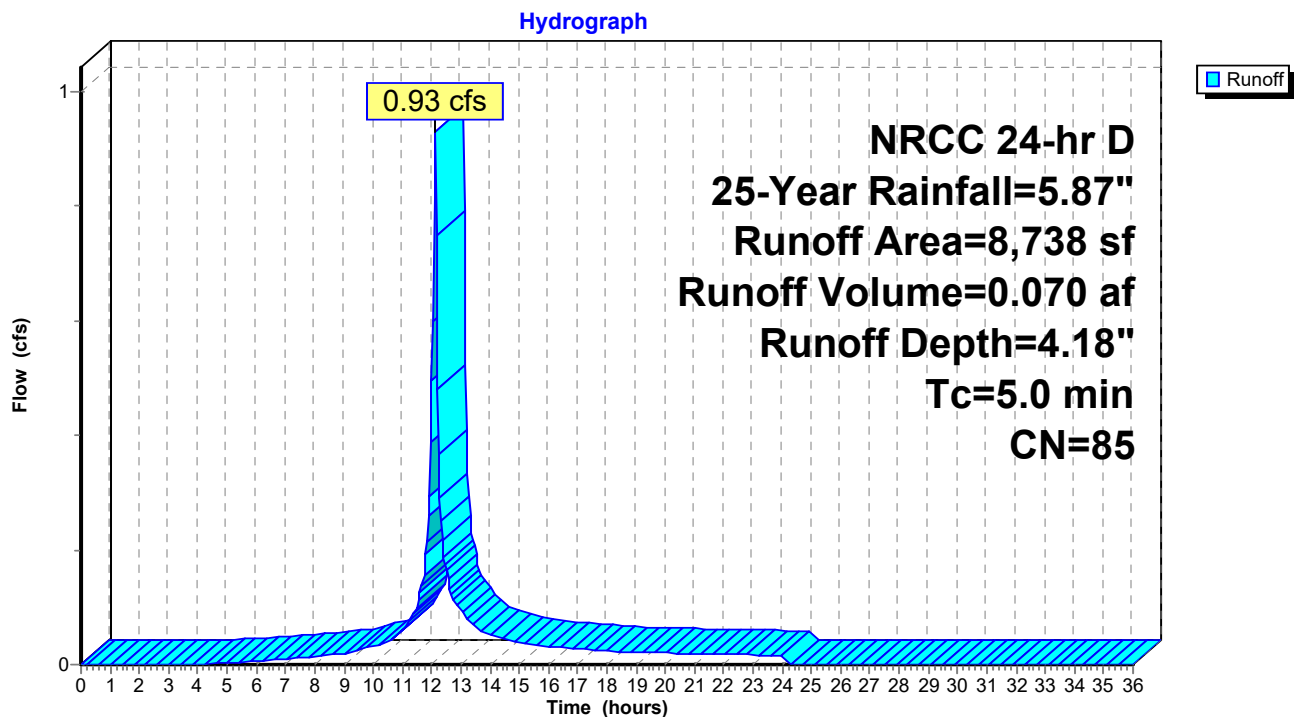
Summary for Subcatchment 7S: PR-7

Runoff = 0.93 cfs @ 12.12 hrs, Volume= 0.070 af, Depth= 4.18"
 Routed to Pond 44P : CMP Infiltration

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 25-Year Rainfall=5.87"

	Area (sf)	CN	Description
*	5,839	98	Paved parking, HSG A
*	1,037	98	Cement Concrete Sidewalk, HSG A
	1,862	39	>75% Grass cover, Good, HSG A
	8,738	85	Weighted Average
	1,862		21.31% Pervious Area
	6,876		78.69% Impervious Area

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

Subcatchment 7S: PR-7

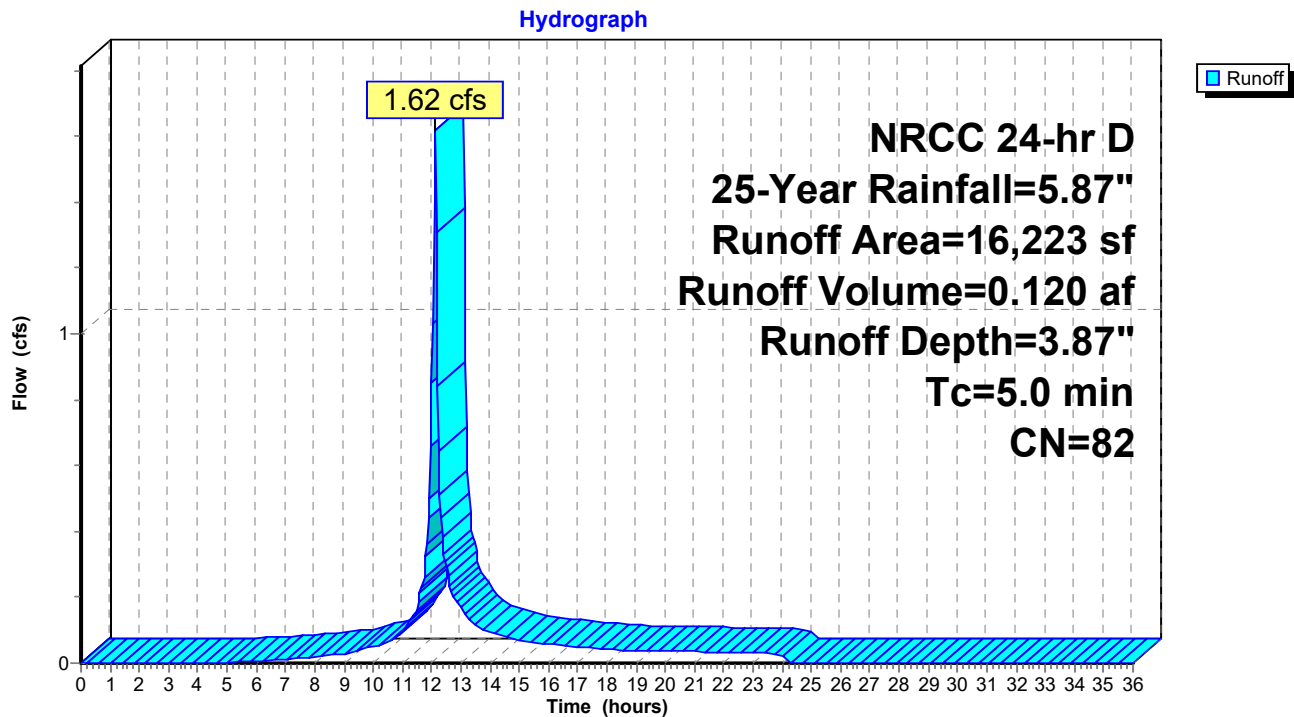
Summary for Subcatchment 8S: PR-8

Runoff = 1.62 cfs @ 12.12 hrs, Volume= 0.120 af, Depth= 3.87"
 Routed to Pond 44P : CMP Infiltration

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 25-Year Rainfall=5.87"

	Area (sf)	CN	Description
*	2,852	98	Paved parking, HSG A
*	4,008	98	Paved parking, HSG C
*	1,252	98	Cement Concrete Sidewalk, HSG C
*	390	98	Cement Concrete Sidewalk, HSG A
	1,994	39	>75% Grass cover, Good, HSG A
	5,727	74	>75% Grass cover, Good, HSG C
	16,223	82	Weighted Average
	7,721		47.59% Pervious Area
	8,502		52.41% Impervious Area

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

Subcatchment 8S: PR-8

Summary for Subcatchment 9S: PR-9

Runoff = 0.75 cfs @ 12.14 hrs, Volume= 0.063 af, Depth= 4.61"
 Routed to Pond 44P : CMP Infiltration

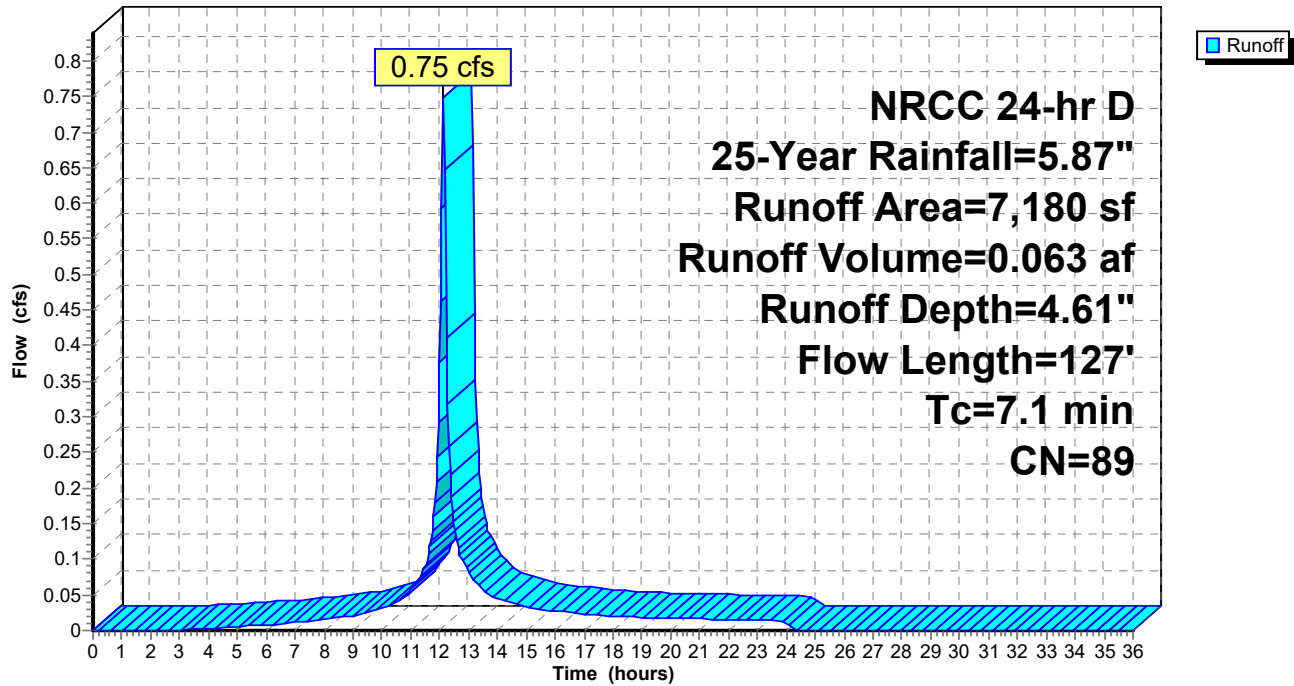
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 25-Year Rainfall=5.87"

	Area (sf)	CN	Description
*	479	98	Paved parking, HSG A
*	3,817	98	Paved parking, HSG C
*	216	98	Cement Concrete Sidewalk, HSG A
*	842	98	Cement Concrete Sidewalk, HSG C
	623	39	>75% Grass cover, Good, HSG A
	1,203	74	>75% Grass cover, Good, HSG C
	7,180	89	Weighted Average
	1,826		25.43% Pervious Area
	5,354		74.57% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.1	25	0.0500	0.08		Sheet Flow, GRASS Grass: Bermuda n= 0.410 P2= 3.13"
1.7	75	0.0050	0.74		Sheet Flow, PAVEMENT Smooth surfaces n= 0.011 P2= 3.13"
0.3	27	0.0050	1.44		Shallow Concentrated Flow, PAVEMENT Paved Kv= 20.3 fps
7.1	127	Total			

Subcatchment 9S: PR-9

Hydrograph



Summary for Subcatchment 10S: PR-10

Runoff = 0.37 cfs @ 12.12 hrs, Volume= 0.027 af, Depth= 3.46"
 Routed to Link 17L : DP-3

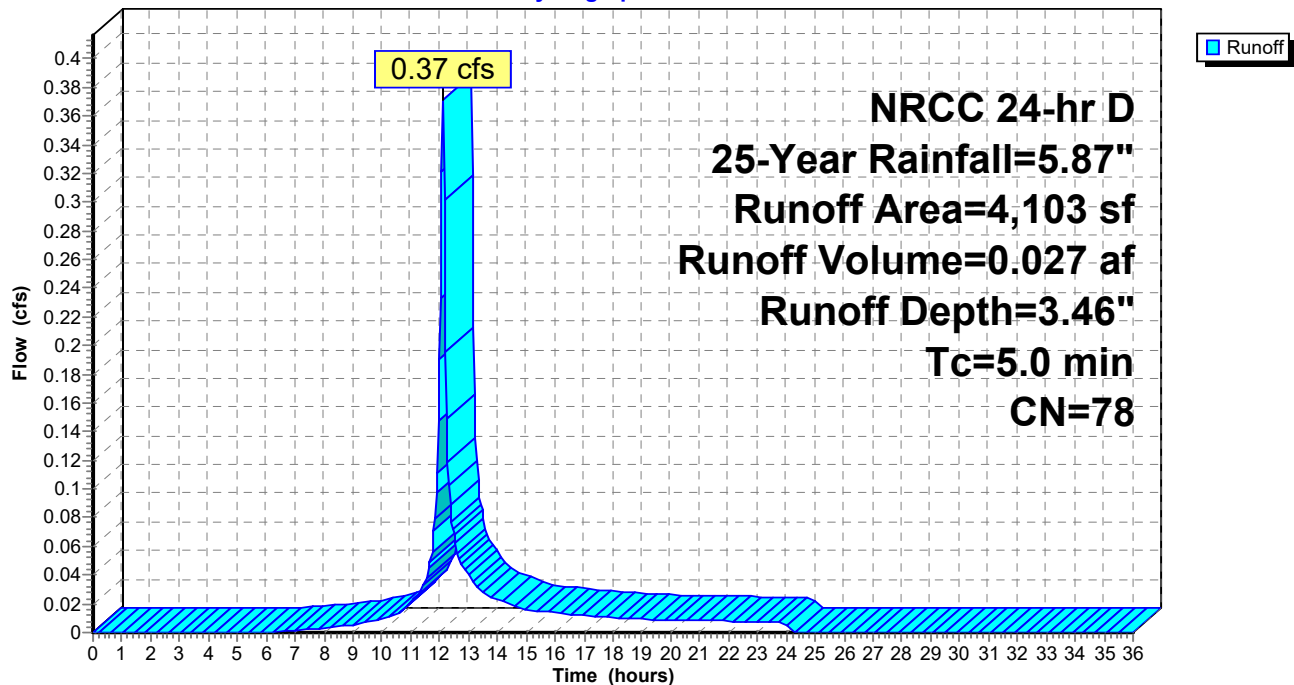
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 25-Year Rainfall=5.87"

Area (sf)	CN	Description
1,584	74	>75% Grass cover, Good, HSG C
2,519	80	>75% Grass cover, Good, HSG D
4,103	78	Weighted Average
4,103		100.00% Pervious Area

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

Subcatchment 10S: PR-10

Hydrograph



Summary for Subcatchment 11S: PR-11

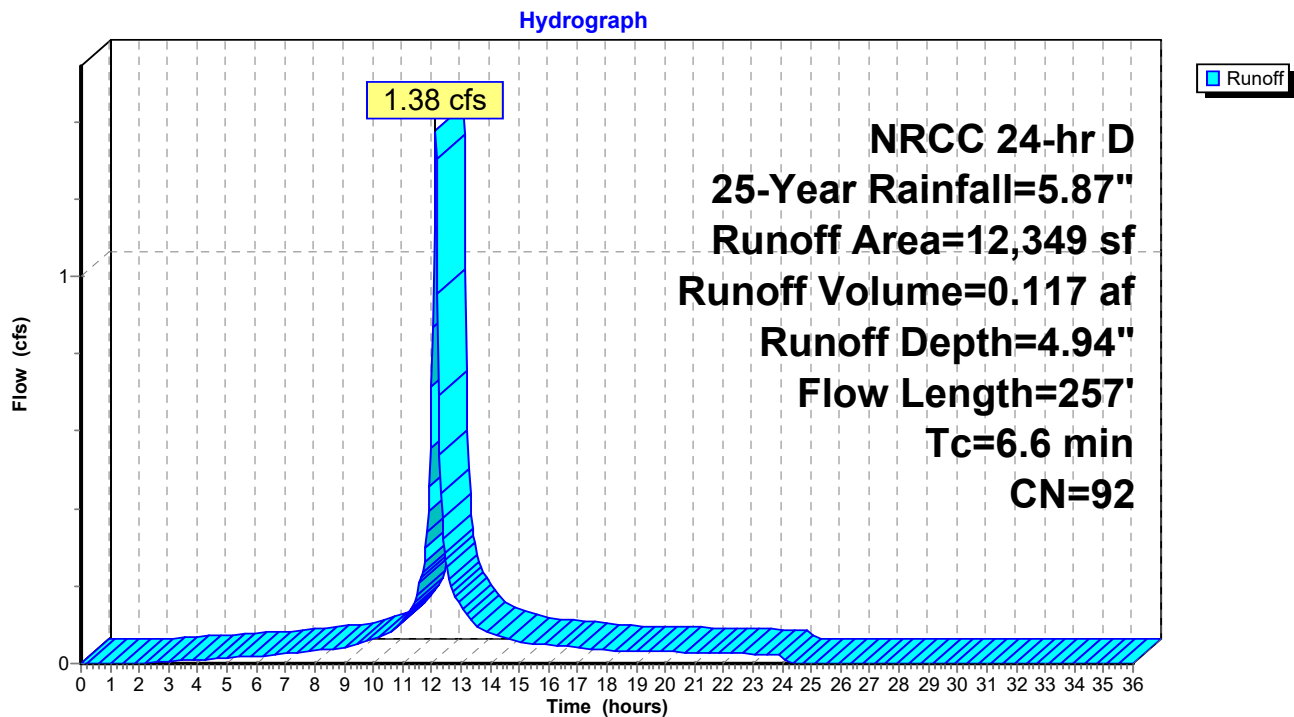
Runoff = 1.38 cfs @ 12.13 hrs, Volume= 0.117 af, Depth= 4.94"
 Routed to Pond 44P : CMP Infiltration

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 25-Year Rainfall=5.87"

	Area (sf)	CN	Description
*	7,691	98	Paved parking, HSG C
*	276	98	Paved parking, HSG A
*	1,371	98	Cement Concrete Sidewalk, HSG C
*	185	98	Cement Concrete Sidewalk, HSG A
	2,481	74	>75% Grass cover, Good, HSG C
	345	39	>75% Grass cover, Good, HSG A
	12,349	92	Weighted Average
	2,826		22.88% Pervious Area
	9,523		77.12% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.1	25	0.0500	0.08		Sheet Flow, GRASS Grass: Bermuda n= 0.410 P2= 3.13"
0.8	75	0.0350	1.61		Sheet Flow, PAVEMENT Smooth surfaces n= 0.011 P2= 3.13"
0.7	157	0.0350	3.80		Shallow Concentrated Flow, PAVEMENT Paved Kv= 20.3 fps
6.6	257	Total			

Subcatchment 11S: PR-11



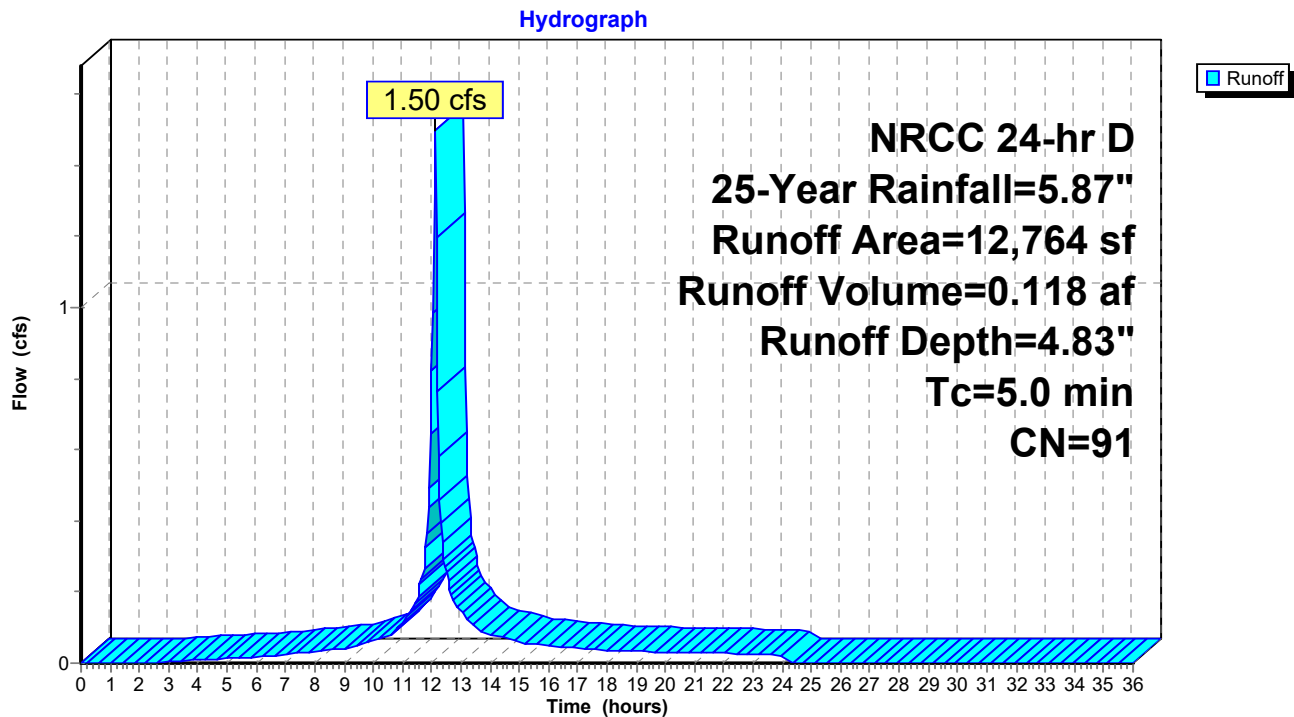
Summary for Subcatchment 12S: PR-12

Runoff = 1.50 cfs @ 12.11 hrs, Volume= 0.118 af, Depth= 4.83"
 Routed to Pond 44P : CMP Infiltration

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 25-Year Rainfall=5.87"

	Area (sf)	CN	Description
*	7,226	98	Paved parking, HSG C
*	139	98	Paved parking, HSG A
*	1,592	98	Cement Concrete Sidewalk, HSG C
*	130	98	Cement Concrete Sidewalk, HSG A
	3,543	74	>75% Grass cover, Good, HSG C
	134	39	>75% Grass cover, Good, HSG A
	12,764	91	Weighted Average
	3,677		28.81% Pervious Area
	9,087		71.19% Impervious Area

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

Subcatchment 12S: PR-12

Summary for Subcatchment 18S: PR-13

Runoff = 0.30 cfs @ 12.25 hrs, Volume= 0.033 af, Depth= 2.26"
 Routed to Pond 44P : CMP Infiltration

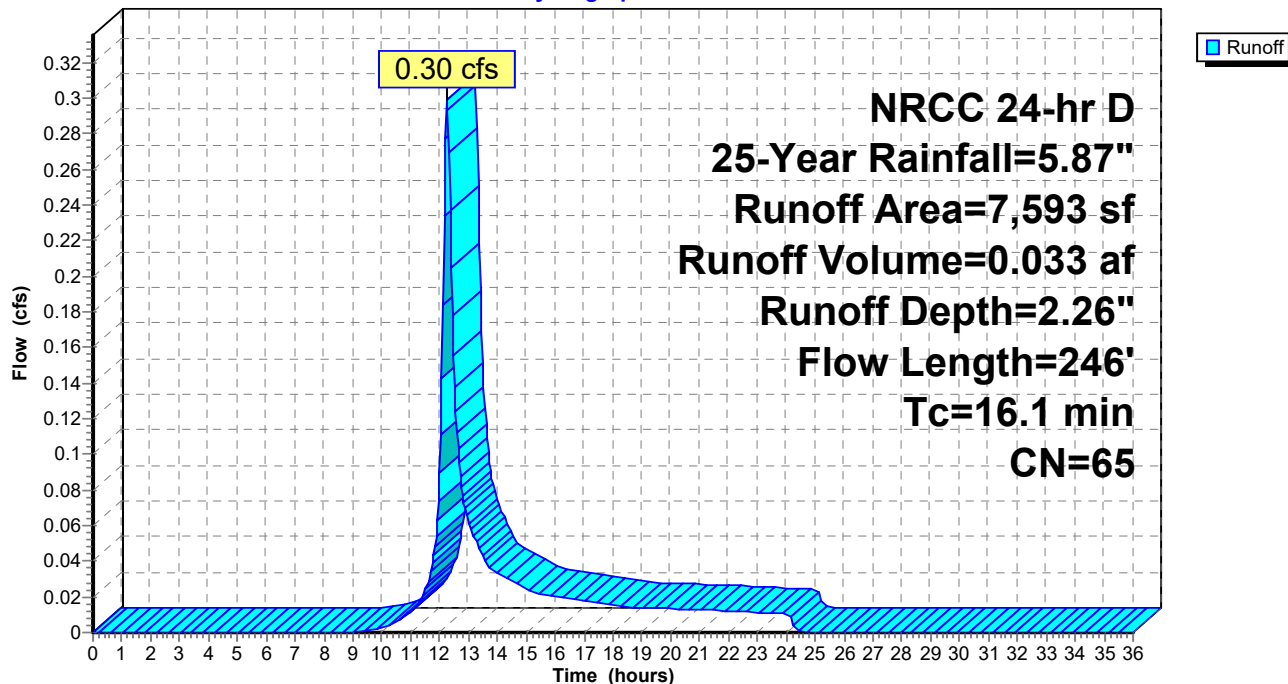
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 25-Year Rainfall=5.87"

Area (sf)	CN	Description
131	98	Paved parking, HSG C
* 2,672	98	Paved parking, HSG A
* 183	98	Cement Concrete Sidewalk, HSG C
499	74	>75% Grass cover, Good, HSG C
4,108	39	>75% Grass cover, Good, HSG A
7,593	65	Weighted Average
4,607		60.67% Pervious Area
2,986		39.33% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.4	100	0.0500	0.11		Sheet Flow, GRASS Grass: Bermuda n= 0.410 P2= 3.13"
0.2	38	0.0500	3.35		Shallow Concentrated Flow, GRASS Grassed Waterway Kv= 15.0 fps
0.5	108	0.0350	3.80		Shallow Concentrated Flow, PAVEMENT Paved Kv= 20.3 fps
16.1	246	Total			

Subcatchment 18S: PR-13

Hydrograph



Summary for Subcatchment 19S: PR-14

Runoff = 0.34 cfs @ 12.14 hrs, Volume= 0.028 af, Depth= 4.61"
 Routed to Pond 44P : CMP Infiltration

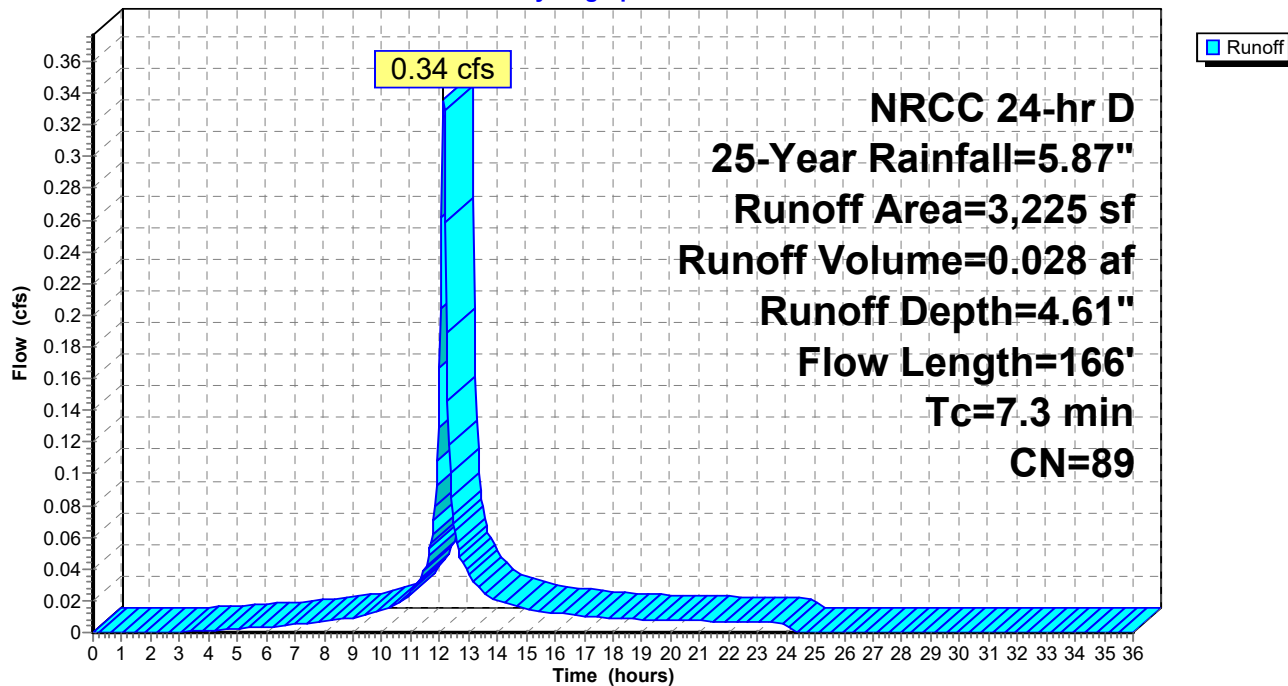
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 25-Year Rainfall=5.87"

	Area (sf)	CN	Description
*	199	98	Paved parking, HSG C
*	2,132	98	Paved parking, HSG A
*	322	98	Cement Concrete Sidewalk, HSG A
	126	74	>75% Grass cover, Good, HSG C
	446	39	>75% Grass cover, Good, HSG A
	3,225	89	Weighted Average
	572		17.74% Pervious Area
	2,653		82.26% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.3	33	0.0500	0.09		Sheet Flow, GRASS Grass: Bermuda n= 0.410 P2= 3.13"
0.7	67	0.0350	1.57		Sheet Flow, PAVEMENT Smooth surfaces n= 0.011 P2= 3.13"
0.3	66	0.0350	3.80		Shallow Concentrated Flow, PAVEMENT Paved Kv= 20.3 fps
7.3	166	Total			

Subcatchment 19S: PR-14

Hydrograph



Summary for Subcatchment 20S: PR-15

Runoff = 0.32 cfs @ 12.11 hrs, Volume= 0.025 af, Depth= 4.72"
 Routed to Pond 44P : CMP Infiltration

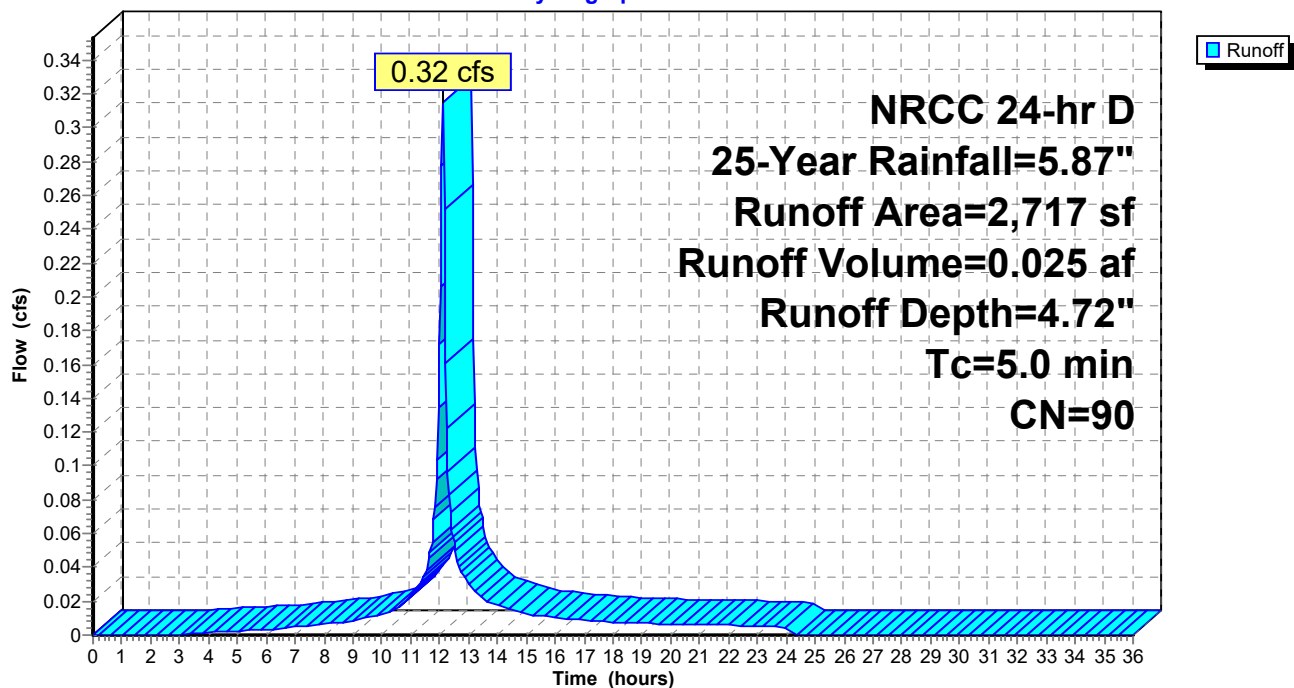
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 25-Year Rainfall=5.87"

	Area (sf)	CN	Description
*	2,331	98	Paved parking, HSG A
	386	39	>75% Grass cover, Good, HSG A
	2,717	90	Weighted Average
	386		14.21% Pervious Area
	2,331		85.79% Impervious Area

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

Subcatchment 20S: PR-15

Hydrograph



Summary for Subcatchment 22S: PR-16

Runoff = 0.12 cfs @ 12.24 hrs, Volume= 0.015 af, Depth= 5.63"
 Routed to Pond 44P : CMP Infiltration

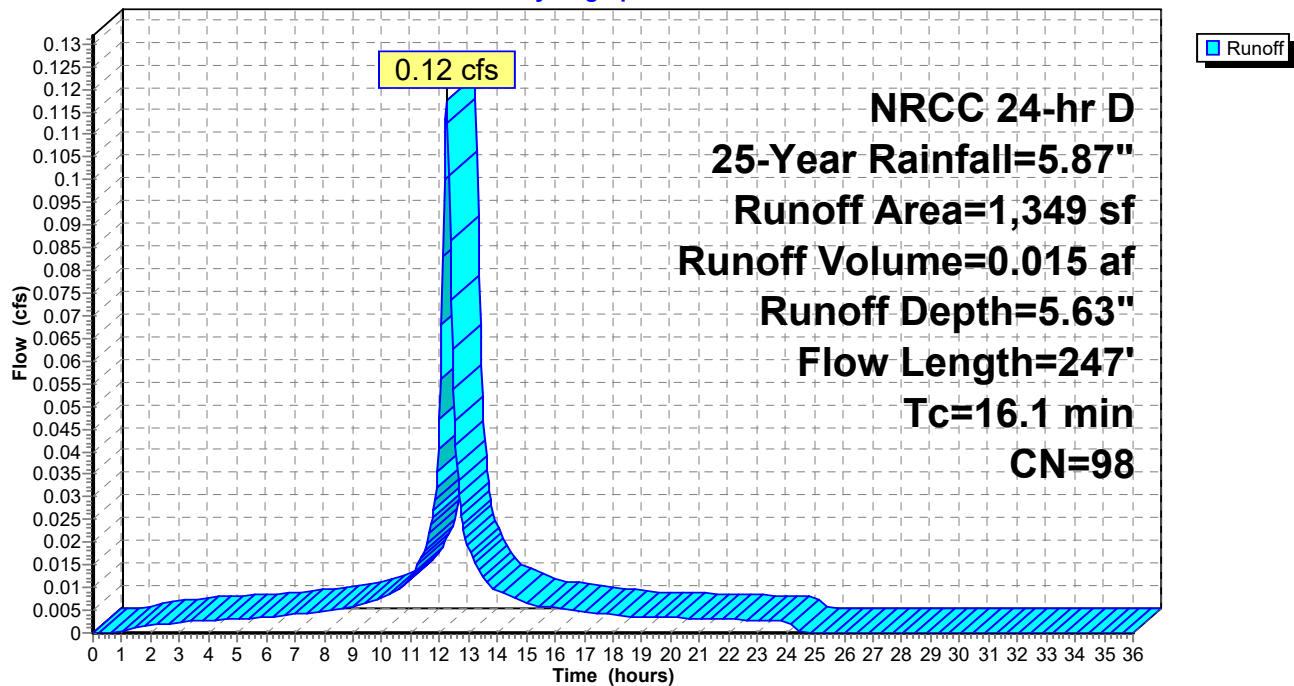
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 25-Year Rainfall=5.87"

Area (sf)	CN	Description
* 614	98	Paved parking, HSG A
* 735	98	Paved parking, HSG C
1,349	98	Weighted Average
1,349		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.4	100	0.0500	0.11		Sheet Flow, GRASS Grass: Bermuda n= 0.410 P2= 3.13"
0.2	38	0.0500	3.35		Shallow Concentrated Flow, GRASS Grassed Waterway Kv= 15.0 fps
0.5	109	0.0350	3.80		Shallow Concentrated Flow, PAVEMENT Paved Kv= 20.3 fps
16.1	247	Total			

Subcatchment 22S: PR-16

Hydrograph



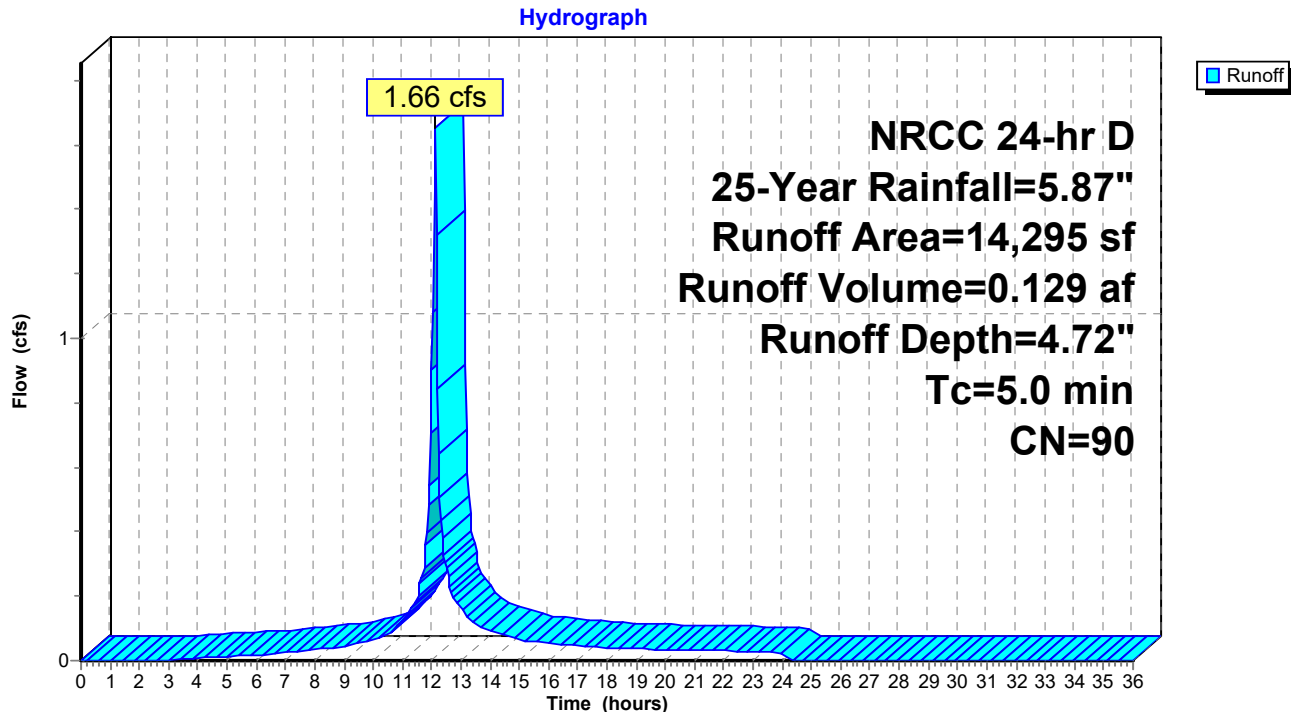
Summary for Subcatchment 23S: PR-17

Runoff = 1.66 cfs @ 12.11 hrs, Volume= 0.129 af, Depth= 4.72"
 Routed to Pond 44P : CMP Infiltration

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 25-Year Rainfall=5.87"

	Area (sf)	CN	Description
*	447	98	Paved parking, HSG A
*	7,461	98	Paved parking, HSG C
*	2,341	98	Cement Concrete Sidewalk, HSG C
	488	39	>75% Grass cover, Good, HSG A
	3,558	74	>75% Grass cover, Good, HSG C
	14,295	90	Weighted Average
	4,046		28.30% Pervious Area
	10,249		71.70% Impervious Area

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

Subcatchment 23S: PR-17

Summary for Subcatchment 24S: PR-18

Runoff = 1.07 cfs @ 12.14 hrs, Volume= 0.097 af, Depth= 5.40"
 Routed to Pond 44P : CMP Infiltration

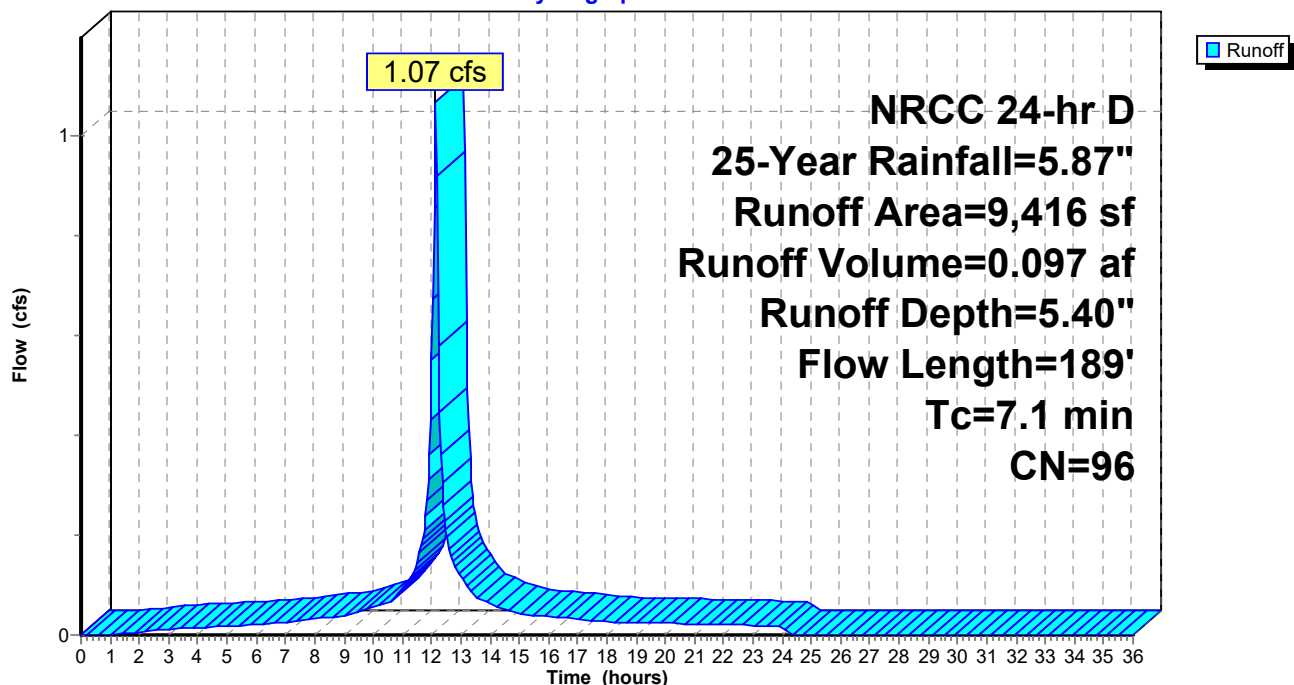
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 25-Year Rainfall=5.87"

	Area (sf)	CN	Description
*	4,554	98	Paved parking, HSG A
*	4,554	98	Cement Concrete Sidewalk, HSG A
	308	39	>75% Grass cover, Good, HSG A
	9,416	96	Weighted Average
	308		3.27% Pervious Area
	9,108		96.73% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	29	0.0500	0.08		Sheet Flow, GRASS Grass: Bermuda n= 0.410 P2= 3.13"
0.9	71	0.0200	1.27		Sheet Flow, PAVEMENT Smooth surfaces n= 0.011 P2= 3.13"
0.5	89	0.0200	2.87		Shallow Concentrated Flow, PAVEMENT Paved Kv= 20.3 fps
7.1	189	Total			

Subcatchment 24S: PR-18

Hydrograph



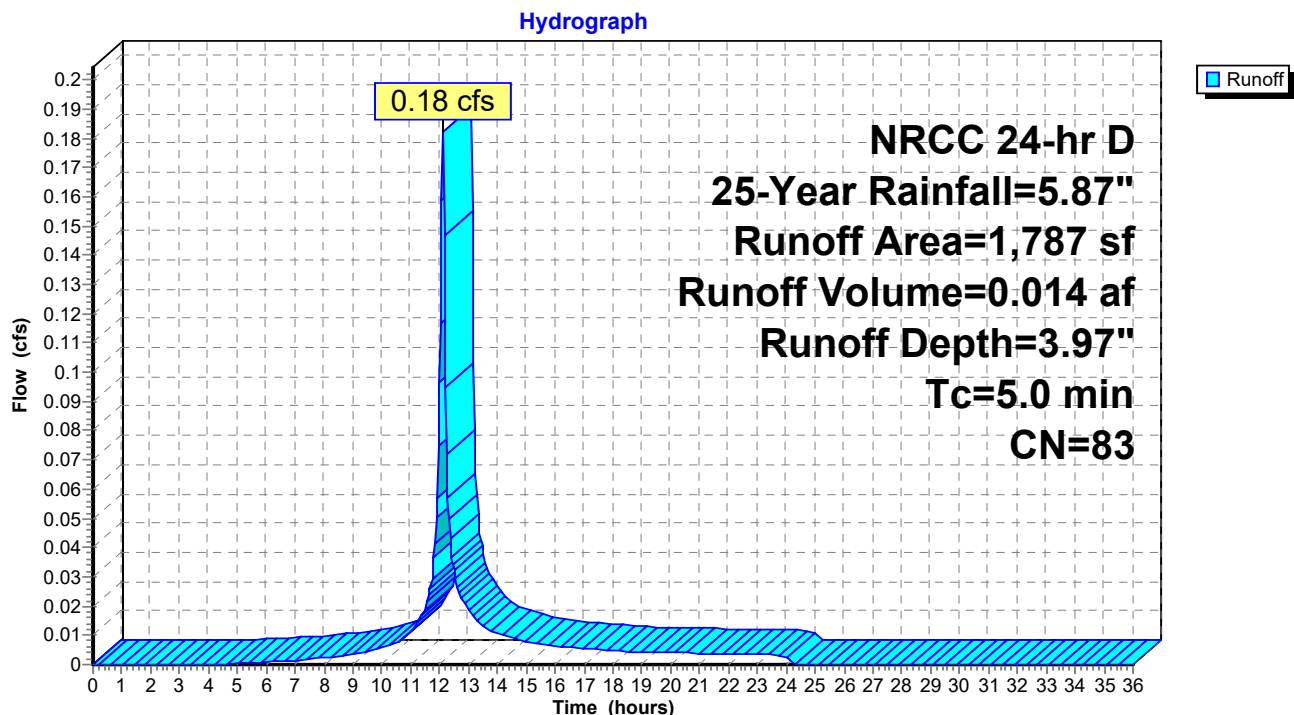
Summary for Subcatchment 25S: PR-19

Runoff = 0.18 cfs @ 12.12 hrs, Volume= 0.014 af, Depth= 3.97"
 Routed to Pond 44P : CMP Infiltration

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 25-Year Rainfall=5.87"

	Area (sf)	CN	Description
*	1,006	98	Paved parking, HSG A
*	337	98	Cement Concrete Sidewalk, HSG A
	444	39	>75% Grass cover, Good, HSG A
	1,787	83	Weighted Average
	444		24.85% Pervious Area
	1,343		75.15% Impervious Area

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

Subcatchment 25S: PR-19

Summary for Subcatchment 26S: PR-20

Runoff = 0.80 cfs @ 12.11 hrs, Volume= 0.063 af, Depth= 4.83"
 Routed to Pond 44P : CMP Infiltration

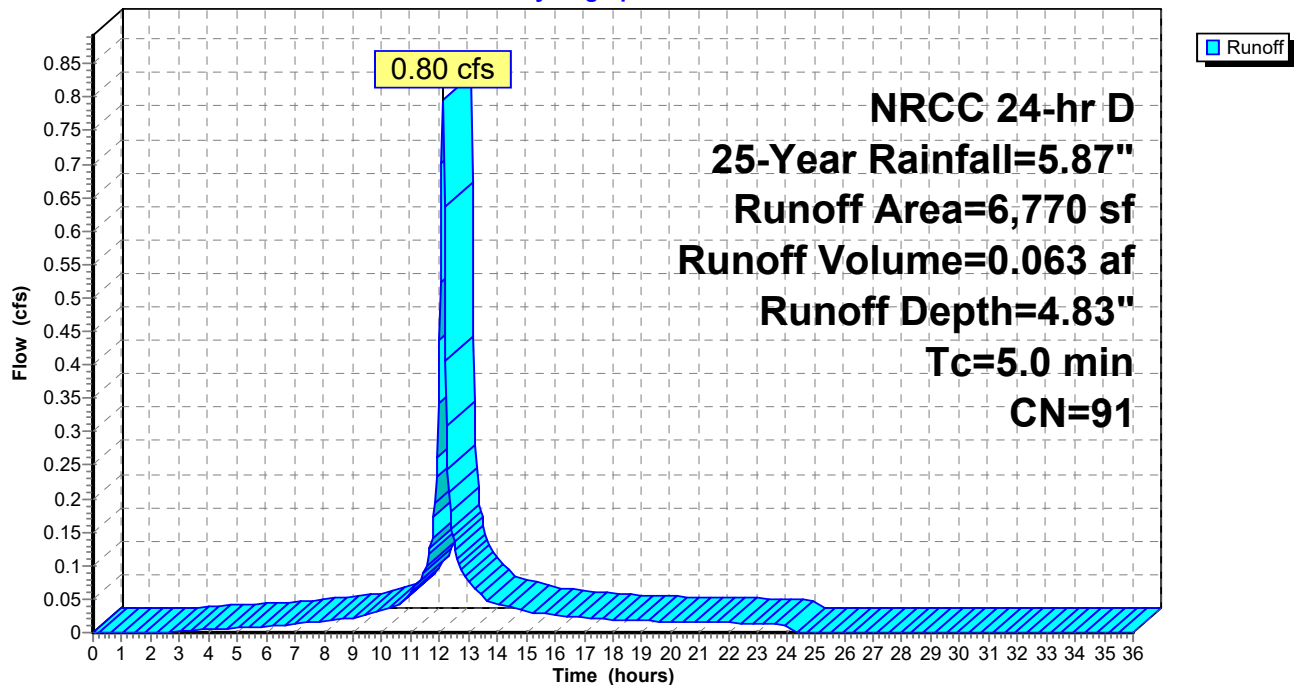
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 25-Year Rainfall=5.87"

	Area (sf)	CN	Description
*	4,671	98	Paved parking, HSG A
*	1,328	98	Cement Concrete Sidewalk, HSG A
	771	39	>75% Grass cover, Good, HSG A
	6,770	91	Weighted Average
	771		11.39% Pervious Area
	5,999		88.61% Impervious Area

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

Subcatchment 26S: PR-20

Hydrograph



Summary for Subcatchment 27S: PR-21

Runoff = 0.81 cfs @ 12.11 hrs, Volume= 0.064 af, Depth= 4.94"
 Routed to Pond 44P : CMP Infiltration

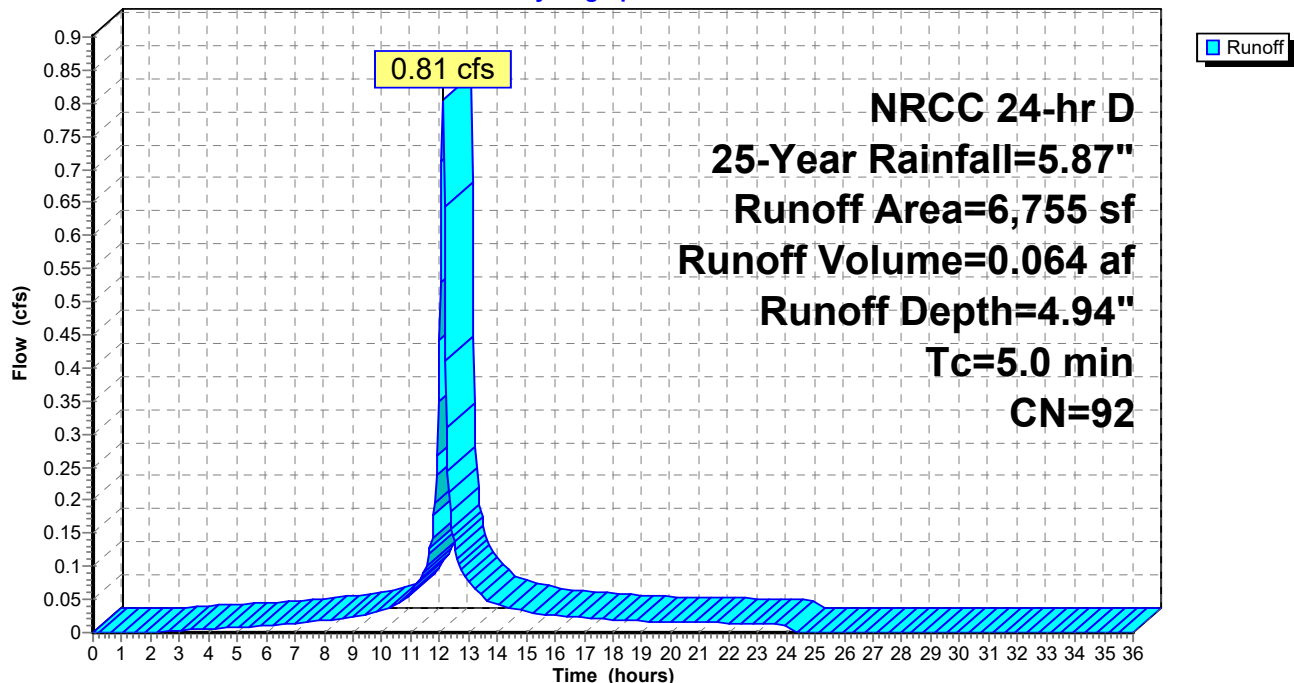
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 25-Year Rainfall=5.87"

	Area (sf)	CN	Description
*	4,688	98	Paved parking, HSG A
*	1,331	98	Cement Concrete Sidewalk, HSG A
	736	39	>75% Grass cover, Good, HSG A
	6,755	92	Weighted Average
	736		10.90% Pervious Area
	6,019		89.10% Impervious Area

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

Subcatchment 27S: PR-21

Hydrograph



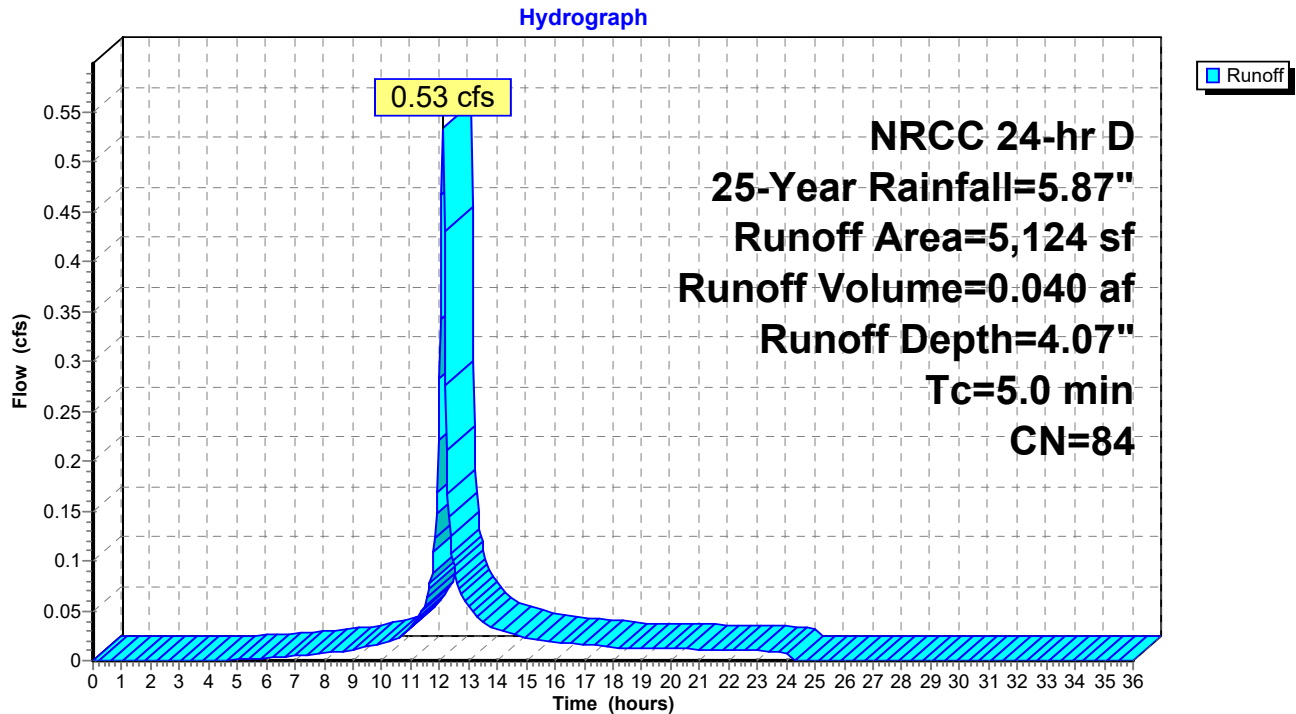
Summary for Subcatchment 28S: PR-22

Runoff = 0.53 cfs @ 12.12 hrs, Volume= 0.040 af, Depth= 4.07"
 Routed to Pond 44P : CMP Infiltration

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 25-Year Rainfall=5.87"

	Area (sf)	CN	Description
*	3,097	98	Paved parking, HSG A
*	72	98	Paved parking, HSG C
*	588	98	Cement Concrete Sidewalk, HSG C
	1,052	39	>75% Grass cover, Good, HSG A
	315	74	>75% Grass cover, Good, HSG C
	5,124	84	Weighted Average
	1,367		26.68% Pervious Area
	3,757		73.32% Impervious Area

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

Subcatchment 28S: PR-22

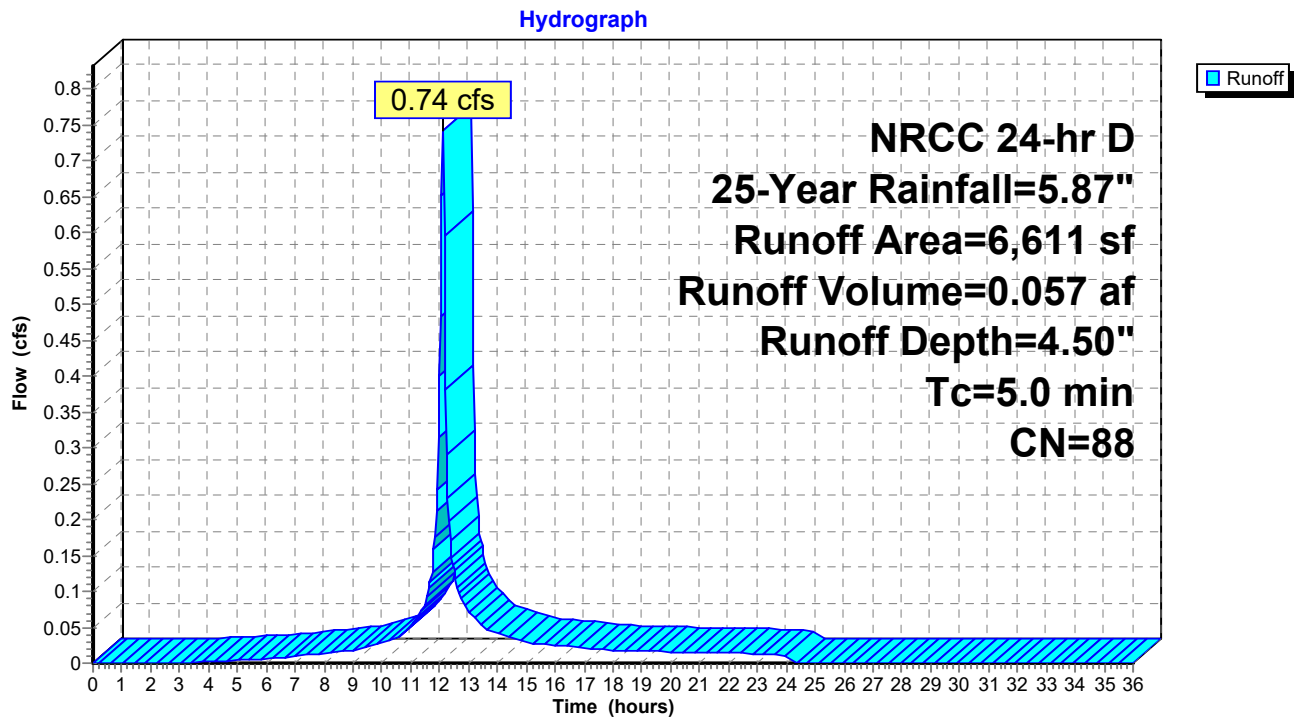
Summary for Subcatchment 29S: PR-23

Runoff = 0.74 cfs @ 12.12 hrs, Volume= 0.057 af, Depth= 4.50"
 Routed to Pond 44P : CMP Infiltration

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 25-Year Rainfall=5.87"

	Area (sf)	CN	Description
*	3,322	98	Paved parking, HSG A
*	748	98	Paved parking, HSG C
*	695	98	Cement Concrete Sidewalk, HSG A
*	463	98	Cement Concrete Sidewalk, HSG C
	914	39	>75% Grass cover, Good, HSG A
	469	74	>75% Grass cover, Good, HSG C
	6,611	88	Weighted Average
	1,383		20.92% Pervious Area
	5,228		79.08% Impervious Area

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

Subcatchment 29S: PR-23

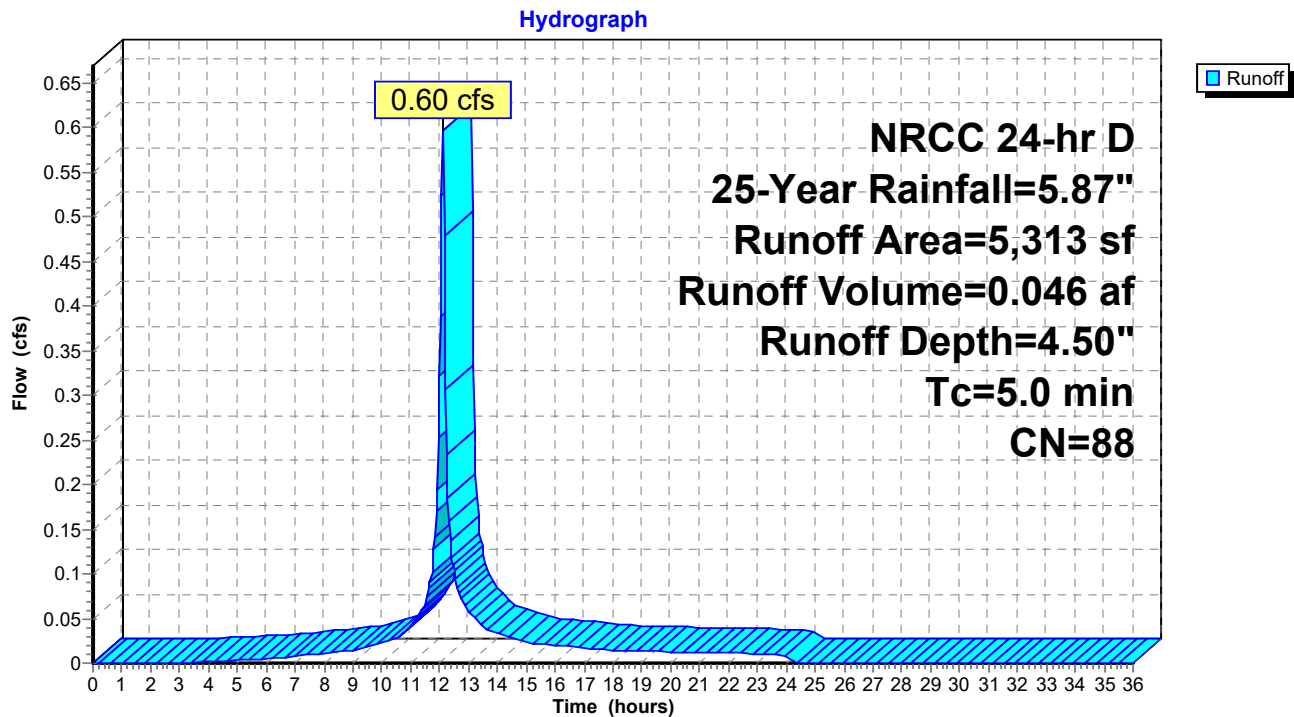
Summary for Subcatchment 30S: PR-24

Runoff = 0.60 cfs @ 12.12 hrs, Volume= 0.046 af, Depth= 4.50"
 Routed to Pond 44P : CMP Infiltration

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 25-Year Rainfall=5.87"

	Area (sf)	CN	Description
*	3,109	98	Paved parking, HSG A
*	146	98	Paved parking, HSG C
*	572	98	Cement Concrete Sidewalk, HSG A
*	432	98	Cement Concrete Sidewalk, HSG C
	819	39	>75% Grass cover, Good, HSG A
	235	74	>75% Grass cover, Good, HSG C
	5,313	88	Weighted Average
	1,054		19.84% Pervious Area
	4,259		80.16% Impervious Area

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

Subcatchment 30S: PR-24

Summary for Subcatchment 31S: PR-25

Runoff = 0.61 cfs @ 12.20 hrs, Volume= 0.058 af, Depth= 3.66"
 Routed to Pond 44P : CMP Infiltration

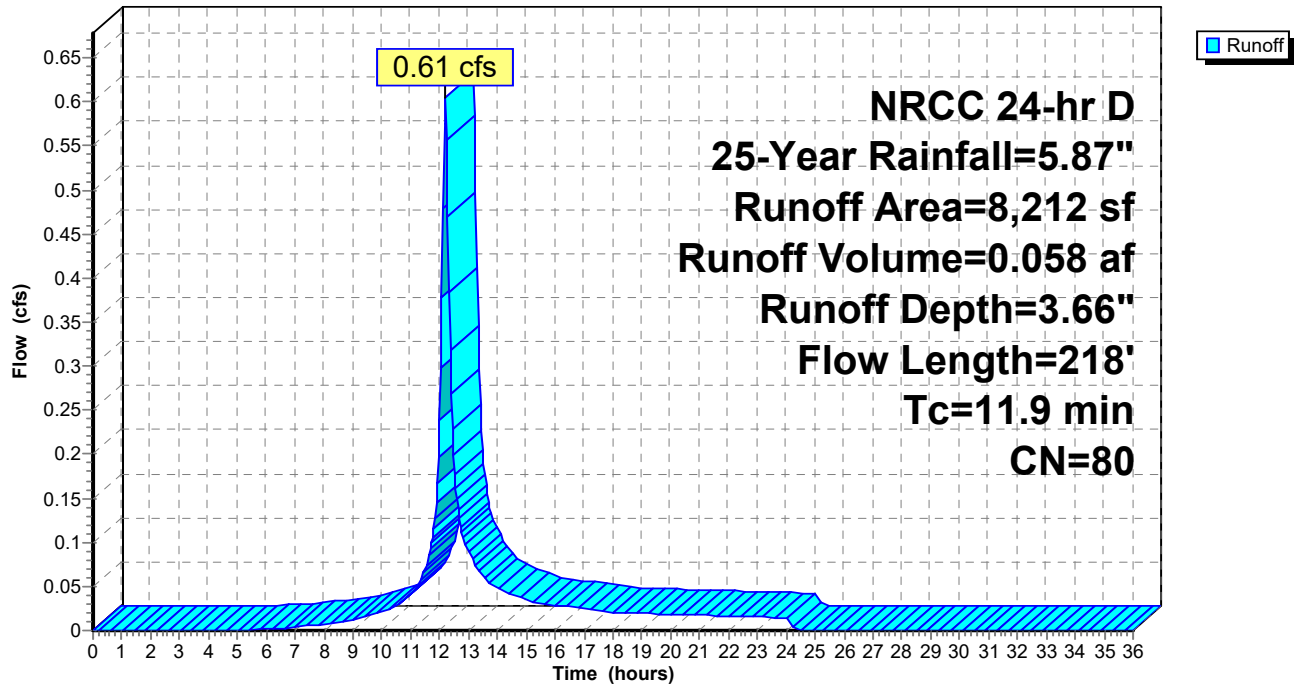
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 25-Year Rainfall=5.87"

	Area (sf)	CN	Description
*	3,851	98	Paved parking, HSG A
*	988	98	Cement Concrete Sidewalk, HSG A
*	65	98	Cement Concrete Sidewalk, HSG C
	1,910	39	>75% Grass cover, Good, HSG A
	1,398	74	>75% Grass cover, Good, HSG C
	8,212	80	Weighted Average
	3,308		40.28% Pervious Area
	4,904		59.72% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.6	63	0.0500	0.10		Sheet Flow, GRASS Grass: Bermuda n= 0.410 P2= 3.13"
0.6	37	0.0150	0.99		Sheet Flow, PAVEMENT Smooth surfaces n= 0.011 P2= 3.13"
0.7	118	0.0200	2.87		Shallow Concentrated Flow, PAVEMENT Paved Kv= 20.3 fps
11.9	218	Total			

Subcatchment 31S: PR-25

Hydrograph



Summary for Subcatchment 32S: PR-26

Runoff = 0.70 cfs @ 12.11 hrs, Volume= 0.057 af, Depth= 5.17"
 Routed to Pond 44P : CMP Infiltration

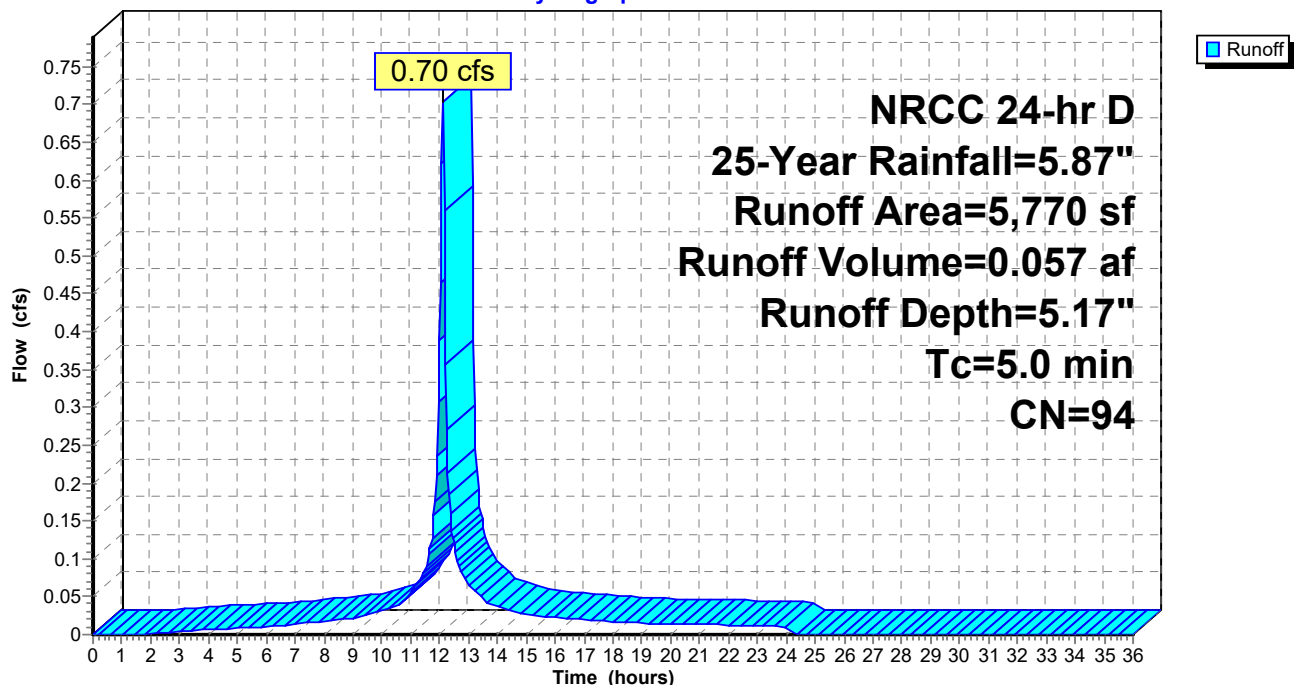
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 25-Year Rainfall=5.87"

	Area (sf)	CN	Description
*	4,263	98	Paved parking, HSG A
*	1,076	98	Cement Concrete Sidewalk, HSG A
	431	39	>75% Grass cover, Good, HSG A
	5,770	94	Weighted Average
	431		7.47% Pervious Area
	5,339		92.53% Impervious Area

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

Subcatchment 32S: PR-26

Hydrograph



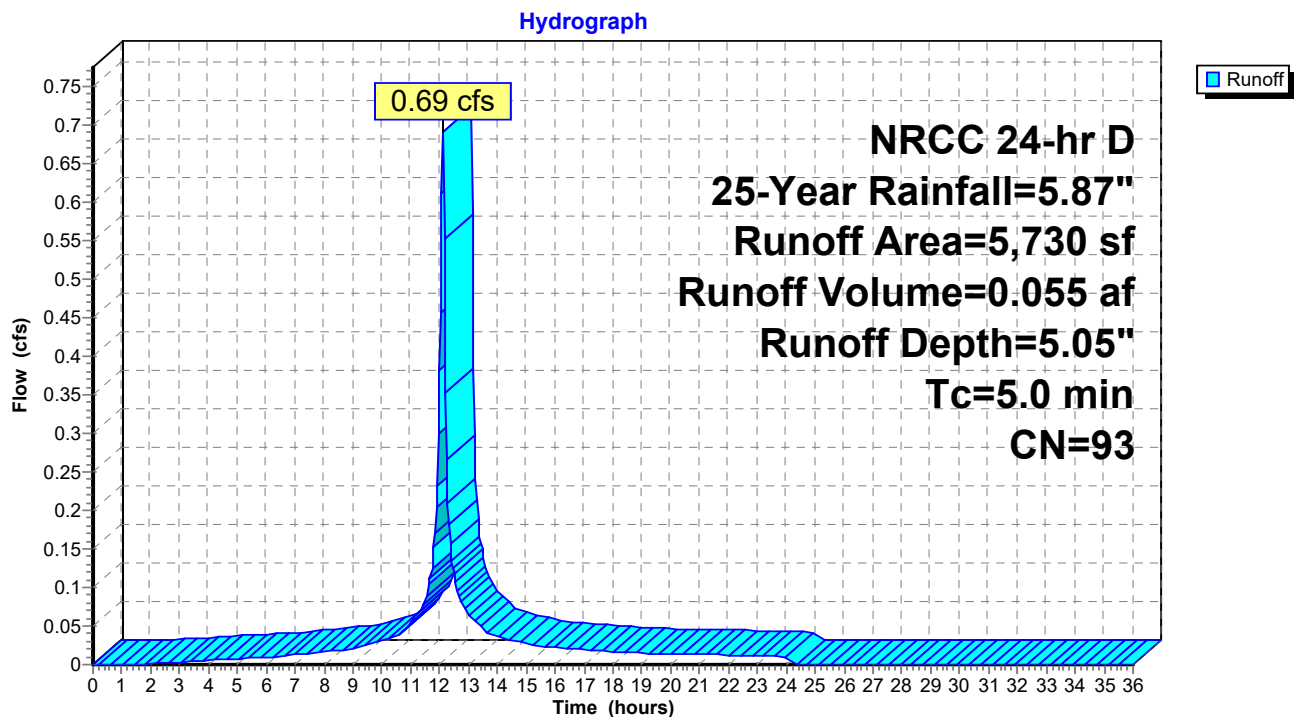
Summary for Subcatchment 33S: PR-27

Runoff = 0.69 cfs @ 12.11 hrs, Volume= 0.055 af, Depth= 5.05"
 Routed to Pond 44P : CMP Infiltration

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 25-Year Rainfall=5.87"

	Area (sf)	CN	Description
*	4,151	98	Paved parking, HSG A
*	1,069	98	Cement Concrete Sidewalk, HSG A
	510	39	>75% Grass cover, Good, HSG A
	5,730	93	Weighted Average
	510		8.90% Pervious Area
	5,220		91.10% Impervious Area

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

Subcatchment 33S: PR-27

Summary for Subcatchment 34S: PR-28

Runoff = 0.23 cfs @ 12.22 hrs, Volume= 0.023 af, Depth= 2.70"
 Routed to Pond 44P : CMP Infiltration

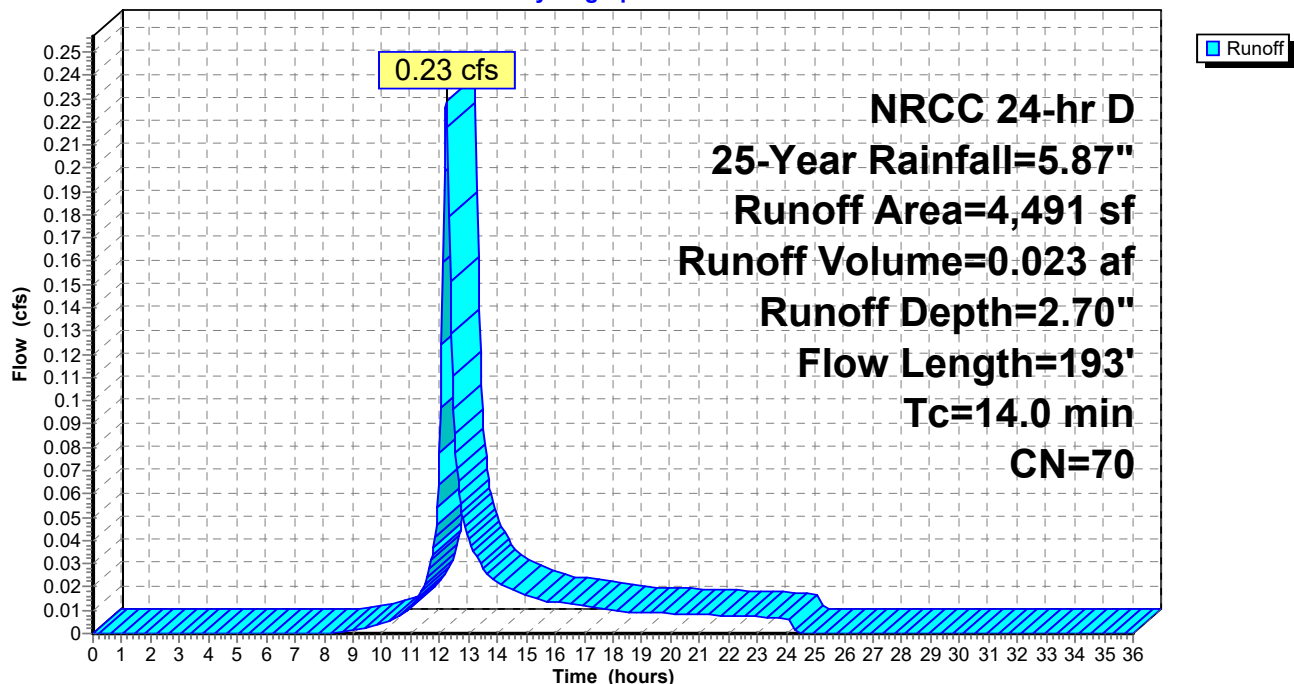
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 25-Year Rainfall=5.87"

Area (sf)	CN	Description
* 1,588	98	Paved parking, HSG A
* 456	98	Cement Concrete Sidewalk, HSG A
1,899	39	>75% Grass cover, Good, HSG A
548	74	>75% Grass cover, Good, HSG C
4,491	70	Weighted Average
2,447		54.49% Pervious Area
2,044		45.51% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.0	81	0.0500	0.10		Sheet Flow, GRASS Grass: Bermuda n= 0.410 P2= 3.13"
0.4	19	0.0150	0.87		Sheet Flow, PAVEMENT Smooth surfaces n= 0.011 P2= 3.13"
0.6	93	0.0150	2.49		Shallow Concentrated Flow, PAVEMENT Paved Kv= 20.3 fps
14.0	193	Total			

Subcatchment 34S: PR-28

Hydrograph



Summary for Subcatchment 35S: PR-29

Runoff = 0.16 cfs @ 12.12 hrs, Volume= 0.012 af, Depth= 4.39"
 Routed to Pond 44P : CMP Infiltration

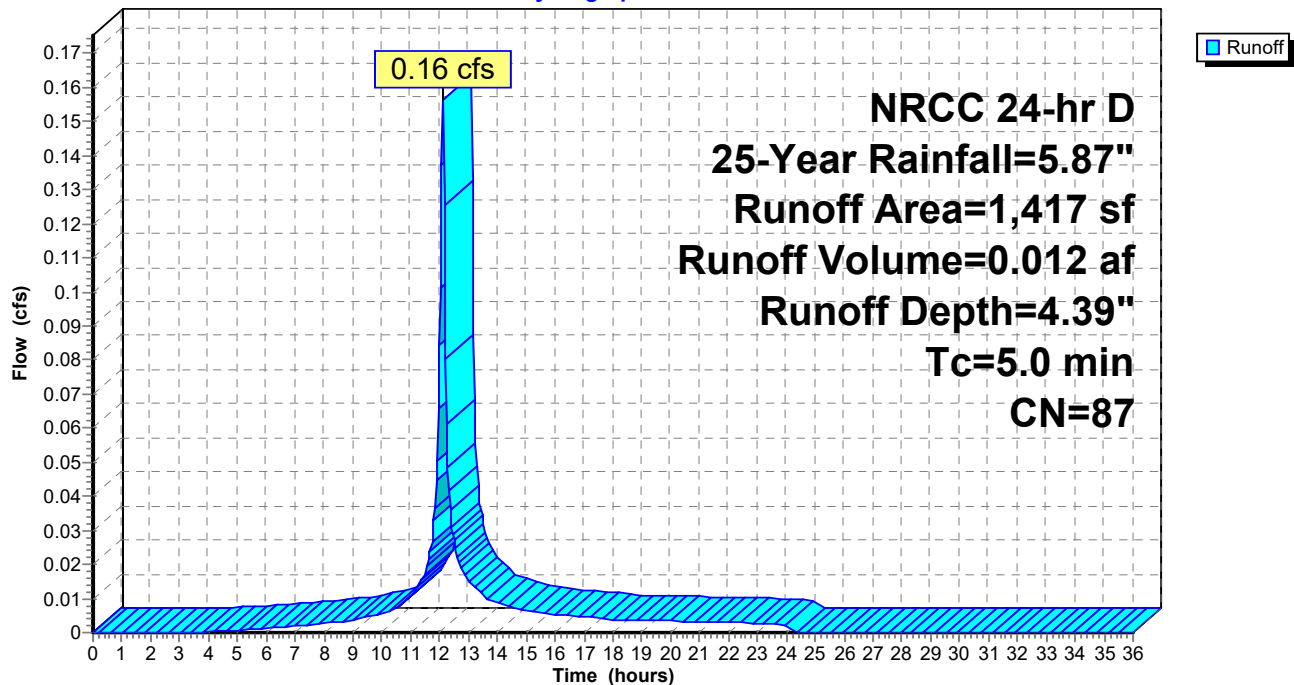
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 25-Year Rainfall=5.87"

	Area (sf)	CN	Description
*	1,137	98	Paved parking, HSG A
*	16	98	Cement Concrete Sidewalk, HSG A
	264	39	>75% Grass cover, Good, HSG A
	1,417	87	Weighted Average
	264		18.63% Pervious Area
	1,153		81.37% Impervious Area

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

Subcatchment 35S: PR-29

Hydrograph



Summary for Subcatchment 36S: PR-30

Runoff = 0.87 cfs @ 12.12 hrs, Volume= 0.066 af, Depth= 3.87"
 Routed to Pond 44P : CMP Infiltration

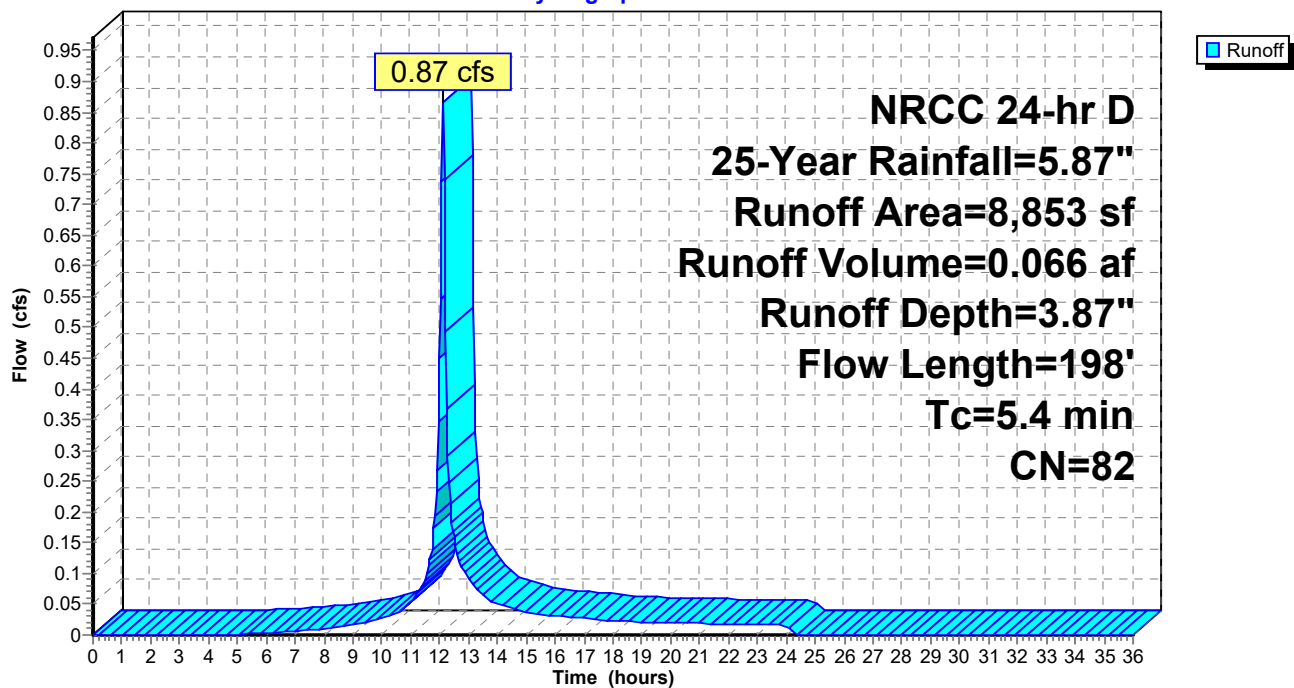
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 25-Year Rainfall=5.87"

Area (sf)	CN	Description
* 5,691	98	Paved parking, HSG A
* 826	98	Cement Concrete Sidewalk, HSG A
2,336	39	>75% Grass cover, Good, HSG A
8,853	82	Weighted Average
2,336		26.39% Pervious Area
6,517		73.61% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.5	16	0.0500	0.08		Sheet Flow, GRASS Grass: Bermuda n= 0.410 P2= 3.13"
1.2	84	0.0150	1.17		Sheet Flow, PAVEMENT Smooth surfaces n= 0.011 P2= 3.13"
0.7	98	0.0150	2.49		Shallow Concentrated Flow, PAVEMENT Paved Kv= 20.3 fps
5.4	198	Total			

Subcatchment 36S: PR-30

Hydrograph



Summary for Subcatchment 37S: PR-31

Runoff = 1.03 cfs @ 12.12 hrs, Volume= 0.078 af, Depth= 4.07"
 Routed to Pond 44P : CMP Infiltration

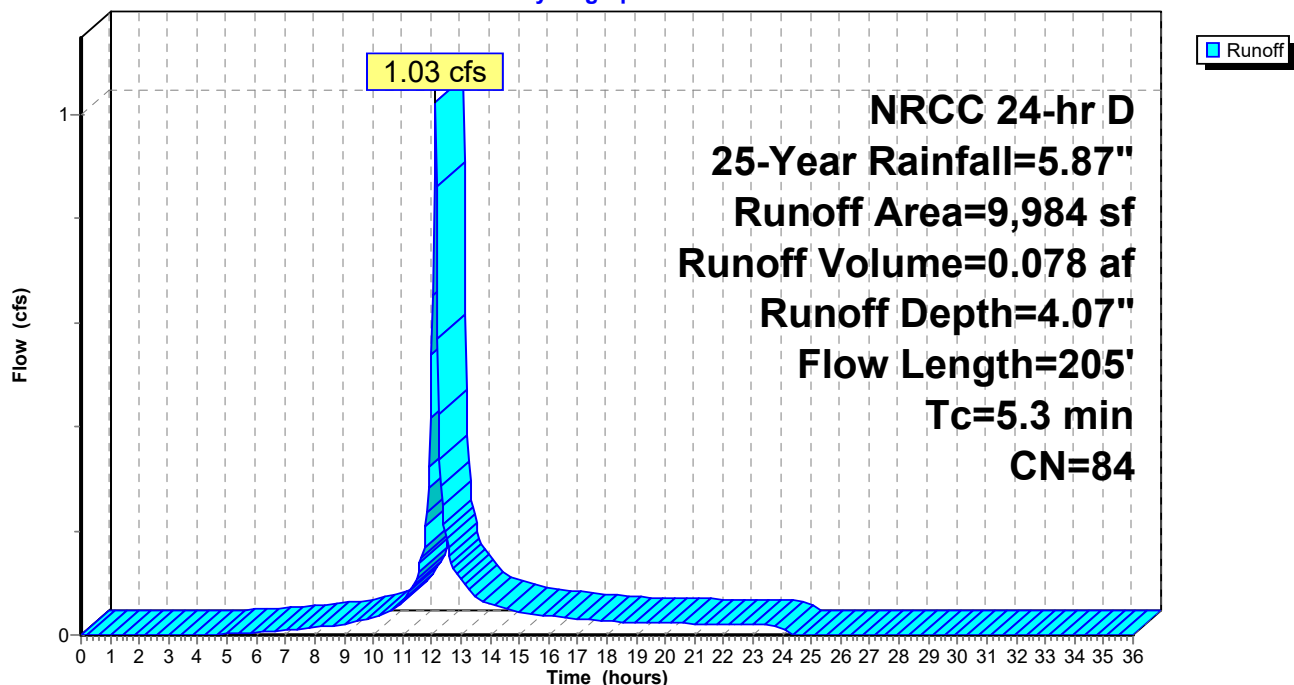
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 25-Year Rainfall=5.87"

	Area (sf)	CN	Description
*	6,479	98	Paved parking, HSG A
*	1,108	98	Cement Concrete Sidewalk, HSG A
	2,397	39	>75% Grass cover, Good, HSG A
	9,984	84	Weighted Average
	2,397		24.01% Pervious Area
	7,587		75.99% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.4	15	0.0500	0.07		Sheet Flow, GRASS Grass: Bermuda n= 0.410 P2= 3.13"
1.2	85	0.0150	1.17		Sheet Flow, PAVEMENT Smooth surfaces n= 0.011 P2= 3.13"
0.7	105	0.0150	2.49		Shallow Concentrated Flow, PAVEMENT Paved Kv= 20.3 fps
5.3	205	Total			

Subcatchment 37S: PR-31

Hydrograph



Summary for Subcatchment 38S: PR-32

Runoff = 0.79 cfs @ 12.24 hrs, Volume= 0.083 af, Depth= 2.70"
 Routed to Pond 44P : CMP Infiltration

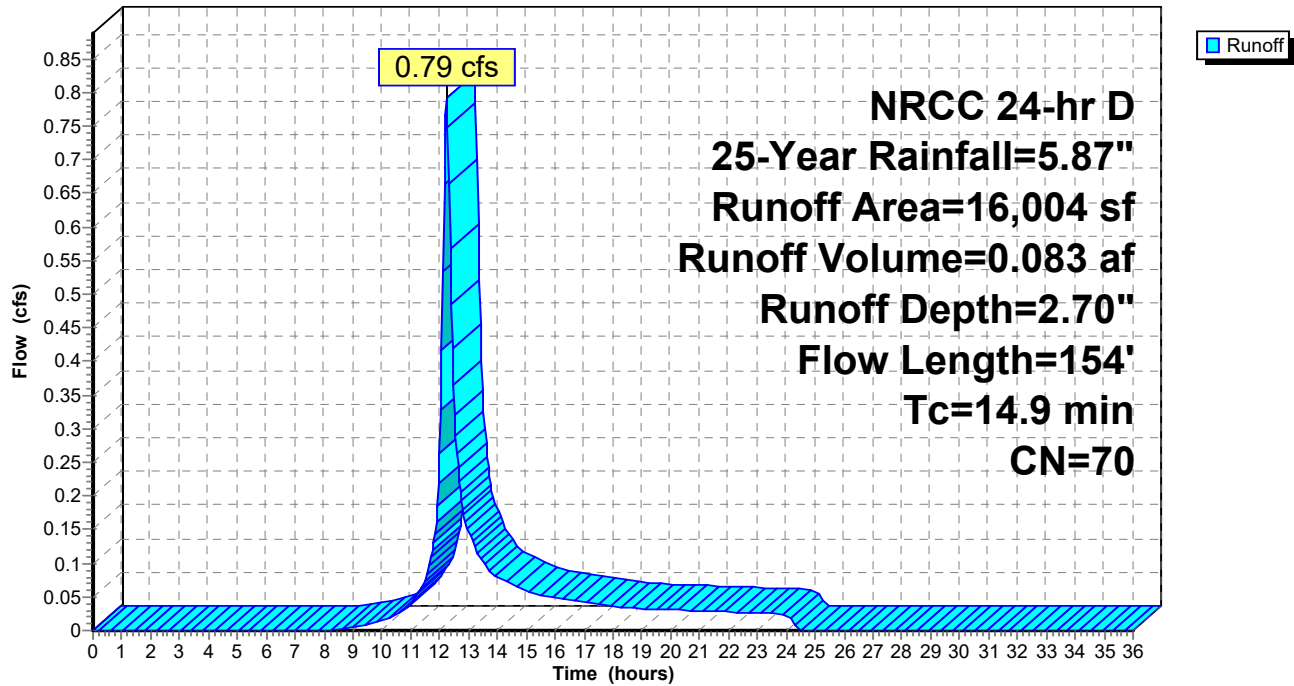
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 25-Year Rainfall=5.87"

	Area (sf)	CN	Description
*	6,711	98	Paved parking, HSG A
*	1,813	98	Cement Concrete Sidewalk, HSG A
	7,480	39	>75% Grass cover, Good, HSG A
	16,004	70	Weighted Average
	7,480		46.74% Pervious Area
	8,524		53.26% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.4	92	0.0500	0.11		Sheet Flow, GRASS Grass: Bermuda n= 0.410 P2= 3.13"
0.2	8	0.0200	0.82		Sheet Flow, PAVEMENT Smooth surfaces n= 0.011 P2= 3.13"
0.2	34	0.0500	3.35		Shallow Concentrated Flow, GRASS Grassed Waterway Kv= 15.0 fps
0.1	20	0.0200	2.87		Shallow Concentrated Flow, PAVEMENT Paved Kv= 20.3 fps
14.9	154	Total			

Subcatchment 38S: PR-32

Hydrograph



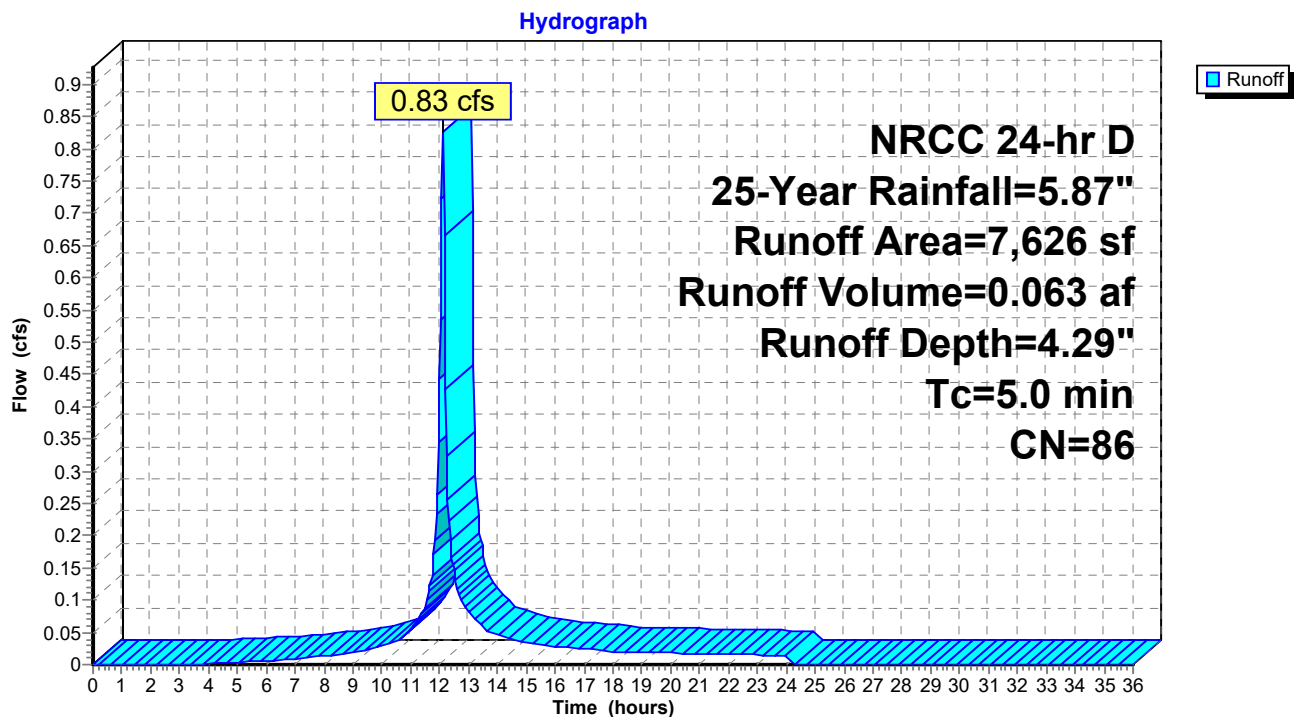
Summary for Subcatchment 39S: PR-33

Runoff = 0.83 cfs @ 12.12 hrs, Volume= 0.063 af, Depth= 4.29"
 Routed to Pond 44P : CMP Infiltration

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 25-Year Rainfall=5.87"

	Area (sf)	CN	Description
*	5,106	98	Paved parking, HSG A
*	920	98	Cement Concrete Sidewalk, HSG A
	1,600	39	>75% Grass cover, Good, HSG A
	7,626	86	Weighted Average
	1,600		20.98% Pervious Area
	6,026		79.02% Impervious Area

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

Subcatchment 39S: PR-33

Summary for Subcatchment 40S: PR-34

Runoff = 0.34 cfs @ 12.12 hrs, Volume= 0.027 af, Depth= 4.50"
 Routed to Pond 44P : CMP Infiltration

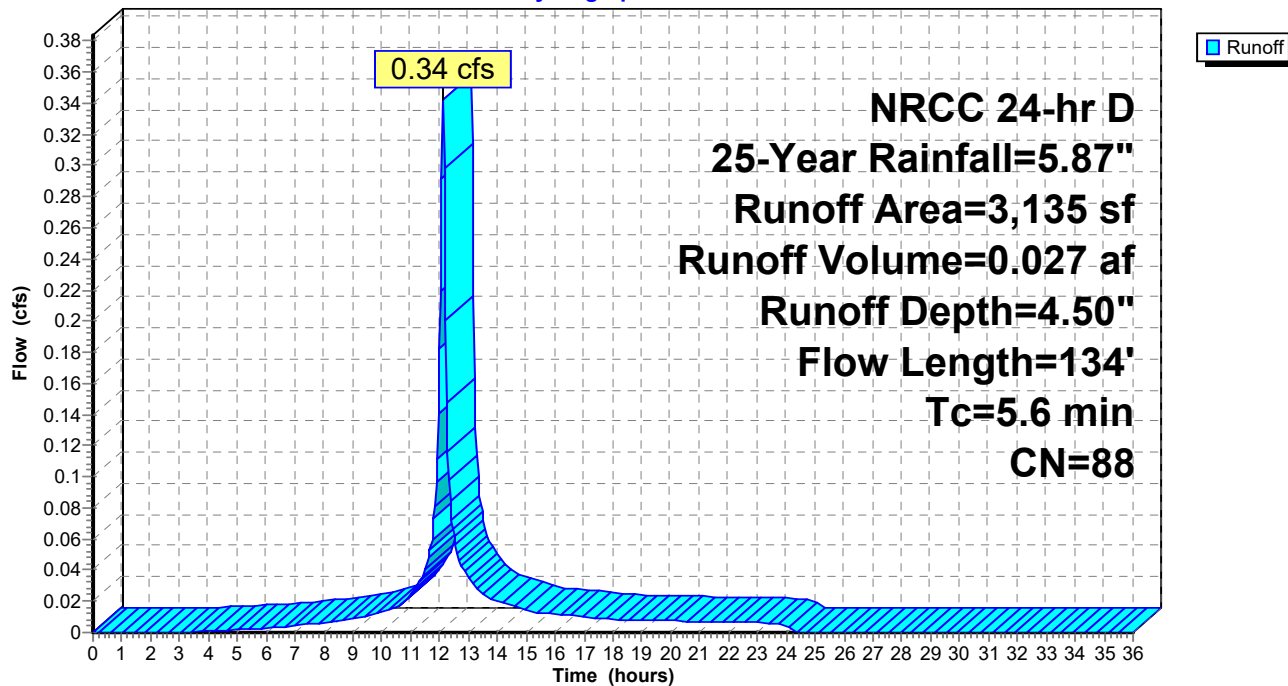
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 25-Year Rainfall=5.87"

	Area (sf)	CN	Description
*	2,389	98	Paved parking, HSG A
*	234	98	Cement Concrete Sidewalk, HSG A
	512	39	>75% Grass cover, Good, HSG A
	3,135	88	Weighted Average
	512		16.33% Pervious Area
	2,623		83.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.4	21	0.0500	0.08		Sheet Flow, GRASS Grass: Bermuda n= 0.410 P2= 3.13"
1.0	79	0.0200	1.30		Sheet Flow, PAVEMENT Smooth surfaces n= 0.011 P2= 3.13"
0.0	7	0.0500	3.35		Shallow Concentrated Flow, GRASS Grassed Waterway Kv= 15.0 fps
0.2	27	0.0200	2.87		Shallow Concentrated Flow, PAVEMENT Paved Kv= 20.3 fps
5.6	134	Total			

Subcatchment 40S: PR-34

Hydrograph



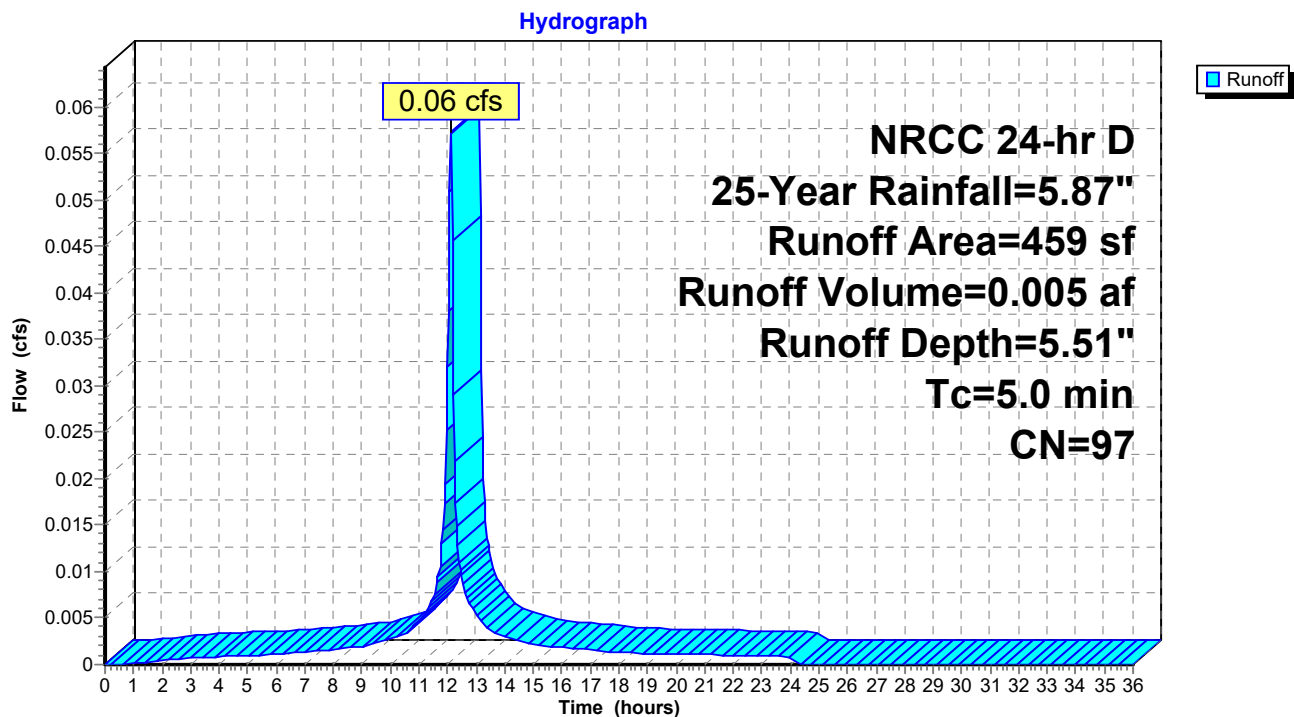
Summary for Subcatchment 41S: PR-35

Runoff = 0.06 cfs @ 12.11 hrs, Volume= 0.005 af, Depth= 5.51"
 Routed to Pond 44P : CMP Infiltration

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 25-Year Rainfall=5.87"

	Area (sf)	CN	Description
*	366	98	Paved parking, HSG A
*	86	98	Cement Concrete Sidewalk, HSG A
	7	39	>75% Grass cover, Good, HSG A
	459	97	Weighted Average
	7		1.53% Pervious Area
	452		98.47% Impervious Area

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

Subcatchment 41S: PR-35

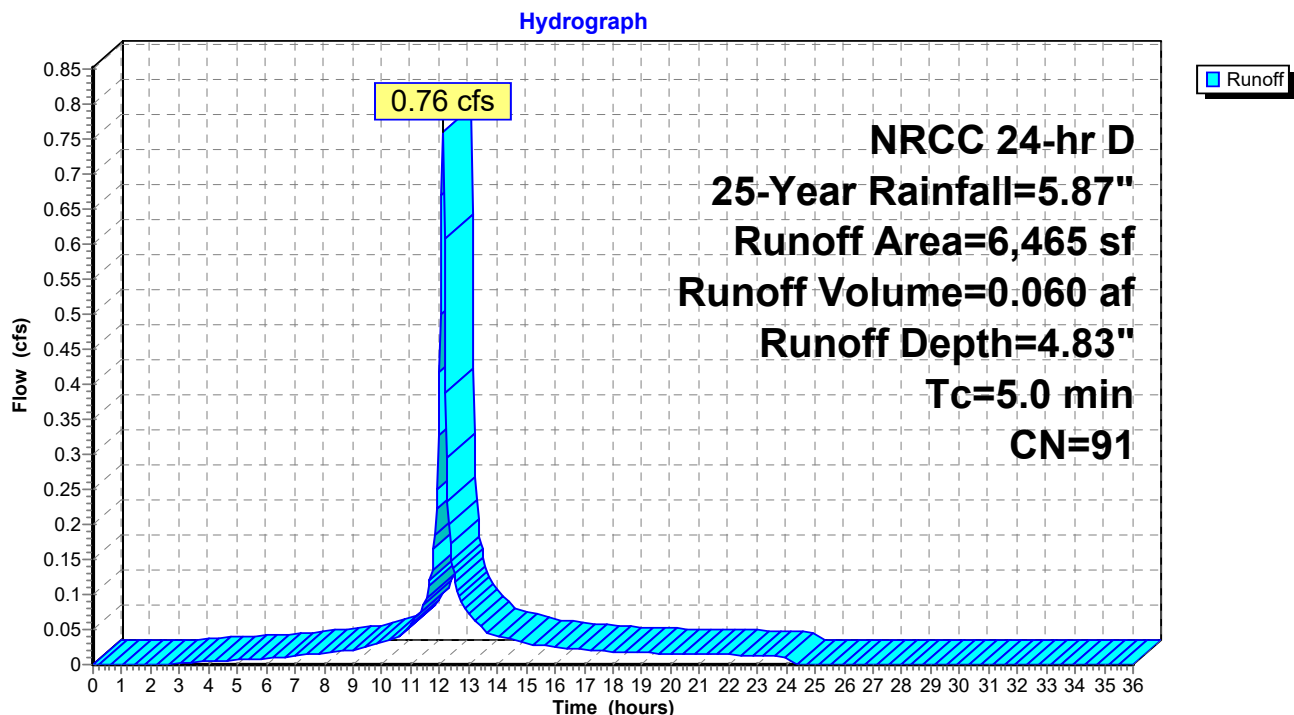
Summary for Subcatchment 42S: PR-36

Runoff = 0.76 cfs @ 12.11 hrs, Volume= 0.060 af, Depth= 4.83"
 Routed to Pond 44P : CMP Infiltration

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 25-Year Rainfall=5.87"

	Area (sf)	CN	Description
*	4,448	98	Paved parking, HSG A
*	1,207	98	Cement Concrete Sidewalk, HSG A
	810	39	>75% Grass cover, Good, HSG A
	6,465	91	Weighted Average
	810		12.53% Pervious Area
	5,655		87.47% Impervious Area

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

Subcatchment 42S: PR-36

Summary for Subcatchment 43S: PR-37

Runoff = 0.84 cfs @ 12.11 hrs, Volume= 0.067 af, Depth= 4.94"
 Routed to Pond 44P : CMP Infiltration

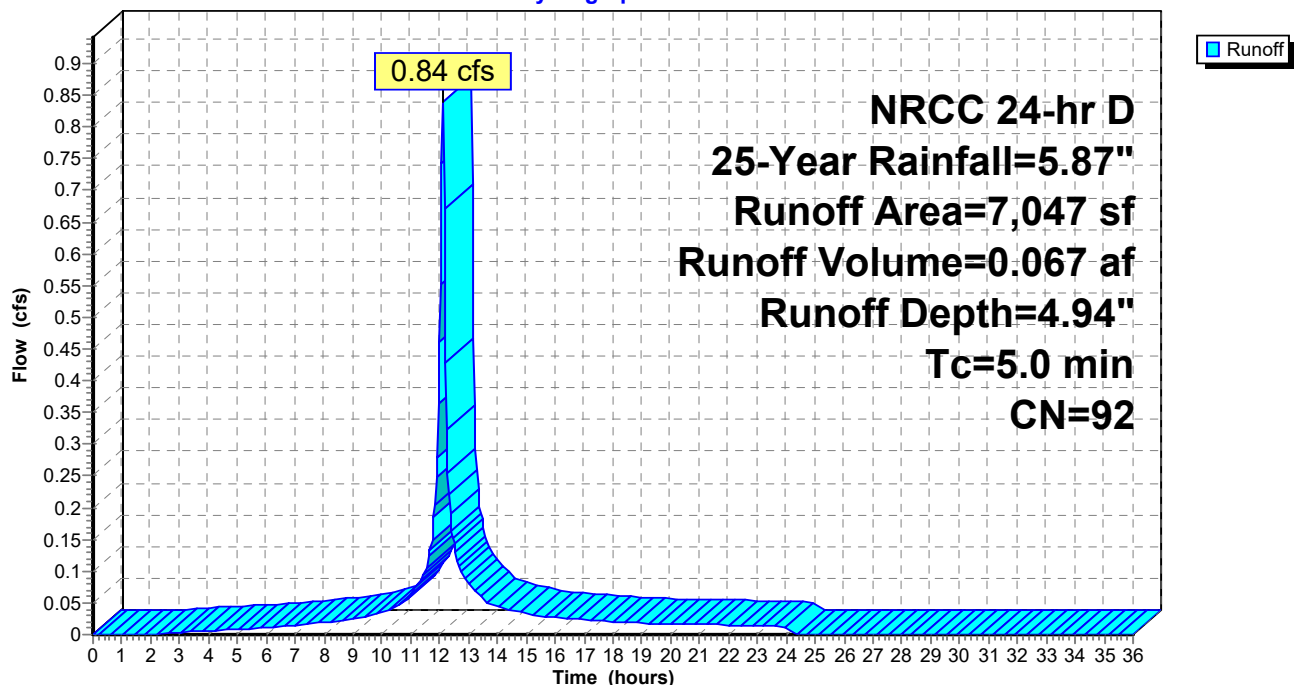
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 25-Year Rainfall=5.87"

	Area (sf)	CN	Description
*	5,177	98	Paved parking, HSG A
*	1,177	98	Cement Concrete Sidewalk, HSG A
	693	39	>75% Grass cover, Good, HSG A
	7,047	92	Weighted Average
	693		9.83% Pervious Area
	6,354		90.17% Impervious Area

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

Subcatchment 43S: PR-37

Hydrograph



Summary for Pond 44P: CMP Infiltration

Inflow Area = 5.917 ac, 73.14% Impervious, Inflow Depth = 4.27" for 25-Year event
 Inflow = 25.41 cfs @ 12.12 hrs, Volume= 2.104 af
 Outflow = 18.72 cfs @ 12.18 hrs, Volume= 2.104 af, Atten= 26%, Lag= 3.6 min
 Discarded = 0.20 cfs @ 12.18 hrs, Volume= 0.272 af
 Primary = 18.52 cfs @ 12.18 hrs, Volume= 1.832 af
 Routed to Pond 45P : Rain Garden

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs / 3
 Peak Elev= 270.29' @ 12.18 hrs Surf.Area= 0.055 ac Storage= 0.147 af

Plug-Flow detention time= 12.0 min calculated for 2.101 af (100% of inflow)
 Center-of-Mass det. time= 12.2 min (818.1 - 805.9)

Volume	Invert	Avail.Storage	Storage Description
#1C	266.50'	0.081 af	17.00'W x 142.00'L x 7.00'H Field C 0.388 af Overall - 0.186 af Embedded = 0.202 af x 40.0% Voids
#2C	267.00'	0.186 af	CMP Round 72 x 12 Inside #1 Effective Size= 72.0"W x 72.0"H => 28.27 sf x 20.00'L = 565.5 cf Overall Size= 72.0"W x 72.0"H x 20.00'L Row Length Adjustment= +8.00' x 28.27 sf x 2 rows 15.00' Header x 28.27 sf x 2 = 848.2 cf Inside
		0.267 af	Total Available Storage

Storage Group C created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	267.00'	18.0" Round Culvert L= 169.0' RCP, rounded edge headwall, Ke= 0.100 Inlet / Outlet Invert= 267.00' / 260.24' S= 0.0400 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.77 sf
#2	Discarded	266.50'	2.410 in/hr Exfiltration over Wetted area

Discarded OutFlow Max=0.20 cfs @ 12.18 hrs HW=270.24' (Free Discharge)

↑**2=Exfiltration** (Exfiltration Controls 0.20 cfs)

Primary OutFlow Max=18.31 cfs @ 12.18 hrs HW=270.24' TW=259.64' (Dynamic Tailwater)

↑**1=Culvert** (Inlet Controls 18.31 cfs @ 10.36 fps)

Pond 44P: CMP Infiltration - Chamber Wizard Field C

Chamber Model = CMP Round 72 (Round Corrugated Metal Pipe)

Effective Size= 72.0"W x 72.0"H => 28.27 sf x 20.00'L = 565.5 cf

Overall Size= 72.0"W x 72.0"H x 20.00'L

Row Length Adjustment= +8.00' x 28.27 sf x 2 rows

72.0" Wide + 36.0" Spacing = 108.0" C-C Row Spacing

6 Chambers/Row x 20.00' Long +8.00' Row Adjustment +6.00' Header x 2 = 140.00' Row Length +12.0"

End Stone x 2 = 142.00' Base Length

2 Rows x 72.0" Wide + 36.0" Spacing x 1 + 12.0" Side Stone x 2 = 17.00' Base Width

6.0" Stone Base + 72.0" Chamber Height + 6.0" Stone Cover = 7.00' Field Height

12 Chambers x 565.5 cf +8.00' Row Adjustment x 28.27 sf x 2 Rows + 15.00' Header x 28.27 sf x 2 =
8,086.5 cf Chamber Storage

16,898.0 cf Field - 8,086.5 cf Chambers = 8,811.5 cf Stone x 40.0% Voids = 3,524.6 cf Stone Storage

Chamber Storage + Stone Storage = 11,611.1 cf = 0.267 af

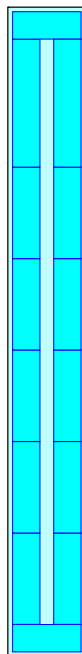
Overall Storage Efficiency = 68.7%

Overall System Size = 142.00' x 17.00' x 7.00'

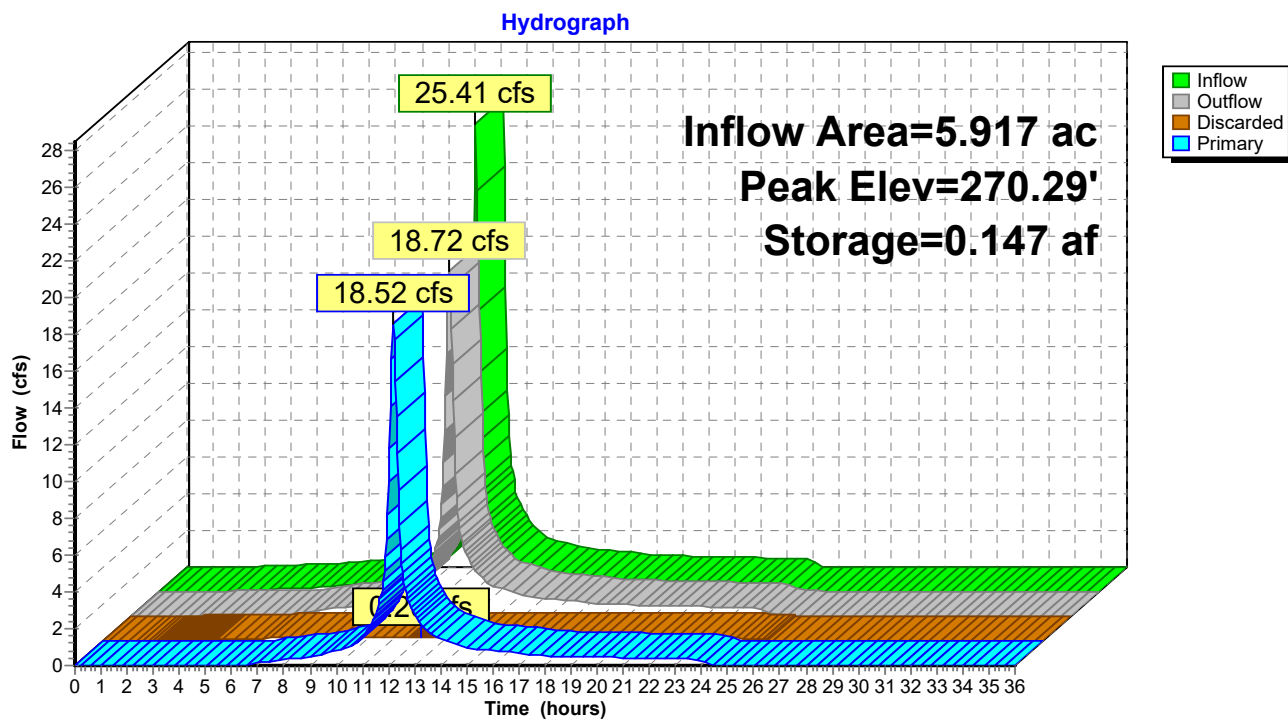
12 Chambers

625.9 cy Field

326.4 cy Stone



Pond 44P: CMP Infiltration



Stage-Area-Storage for Pond 44P: CMP Infiltration

Elevation (feet)	Wetted (acres)	Storage (acre-feet)	Elevation (feet)	Wetted (acres)	Storage (acre-feet)
266.50	0.055	0.000	271.80	0.094	0.213
266.60	0.056	0.002	271.90	0.095	0.217
266.70	0.057	0.004	272.00	0.096	0.221
266.80	0.058	0.007	272.10	0.096	0.225
266.90	0.058	0.009	272.20	0.097	0.229
267.00	0.059	0.011	272.30	0.098	0.233
267.10	0.060	0.014	272.40	0.098	0.236
267.20	0.061	0.017	272.50	0.099	0.240
267.30	0.061	0.020	272.60	0.100	0.243
267.40	0.062	0.023	272.70	0.101	0.247
267.50	0.063	0.027	272.80	0.101	0.250
267.60	0.063	0.030	272.90	0.102	0.253
267.70	0.064	0.034	273.00	0.103	0.255
267.80	0.065	0.038	273.10	0.104	0.258
267.90	0.066	0.042	273.20	0.104	0.260
268.00	0.066	0.045	273.30	0.105	0.262
268.10	0.067	0.049	273.40	0.106	0.264
268.20	0.068	0.054	273.50	0.107	0.267
268.30	0.069	0.058			
268.40	0.069	0.062			
268.50	0.070	0.066			
268.60	0.071	0.070			
268.70	0.071	0.075			
268.80	0.072	0.079			
268.90	0.073	0.083			
269.00	0.074	0.088			
269.10	0.074	0.092			
269.20	0.075	0.097			
269.30	0.076	0.101			
269.40	0.077	0.106			
269.50	0.077	0.110			
269.60	0.078	0.115			
269.70	0.079	0.120			
269.80	0.080	0.124			
269.90	0.080	0.129			
270.00	0.081	0.133			
270.10	0.082	0.138			
270.20	0.082	0.142			
270.30	0.083	0.147			
270.40	0.084	0.152			
270.50	0.085	0.156			
270.60	0.085	0.161			
270.70	0.086	0.165			
270.80	0.087	0.170			
270.90	0.088	0.174			
271.00	0.088	0.179			
271.10	0.089	0.183			
271.20	0.090	0.187			
271.30	0.090	0.192			
271.40	0.091	0.196			
271.50	0.092	0.200			
271.60	0.093	0.205			
271.70	0.093	0.209			

Summary for Pond 45P: Rain Garden

Inflow Area = 5.917 ac, 73.14% Impervious, Inflow Depth = 3.72" for 25-Year event
 Inflow = 18.52 cfs @ 12.18 hrs, Volume= 1.832 af
 Outflow = 16.27 cfs @ 12.26 hrs, Volume= 1.832 af, Atten= 12%, Lag= 5.0 min
 Discarded = 3.60 cfs @ 12.26 hrs, Volume= 1.460 af
 Primary = 12.67 cfs @ 12.26 hrs, Volume= 0.372 af
 Routed to Link 15L : DP-1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs / 3
 Peak Elev= 259.76' @ 12.26 hrs Surf.Area= 12,042 sf Storage= 14,010 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 25.1 min (837.0 - 811.9)

Volume	Invert	Avail.Storage	Storage Description
#1	255.50'	6,443 cf	Custom Stage Data (Irregular) Listed below (Recalc) 16,107 cf Overall x 40.0% Voids
#2	258.50'	10,400 cf	Custom Stage Data (Irregular) Listed below (Recalc)
		16,843 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
255.50	5,369	313.0	0	0	5,369
258.50	5,369	313.0	16,107	16,107	6,308

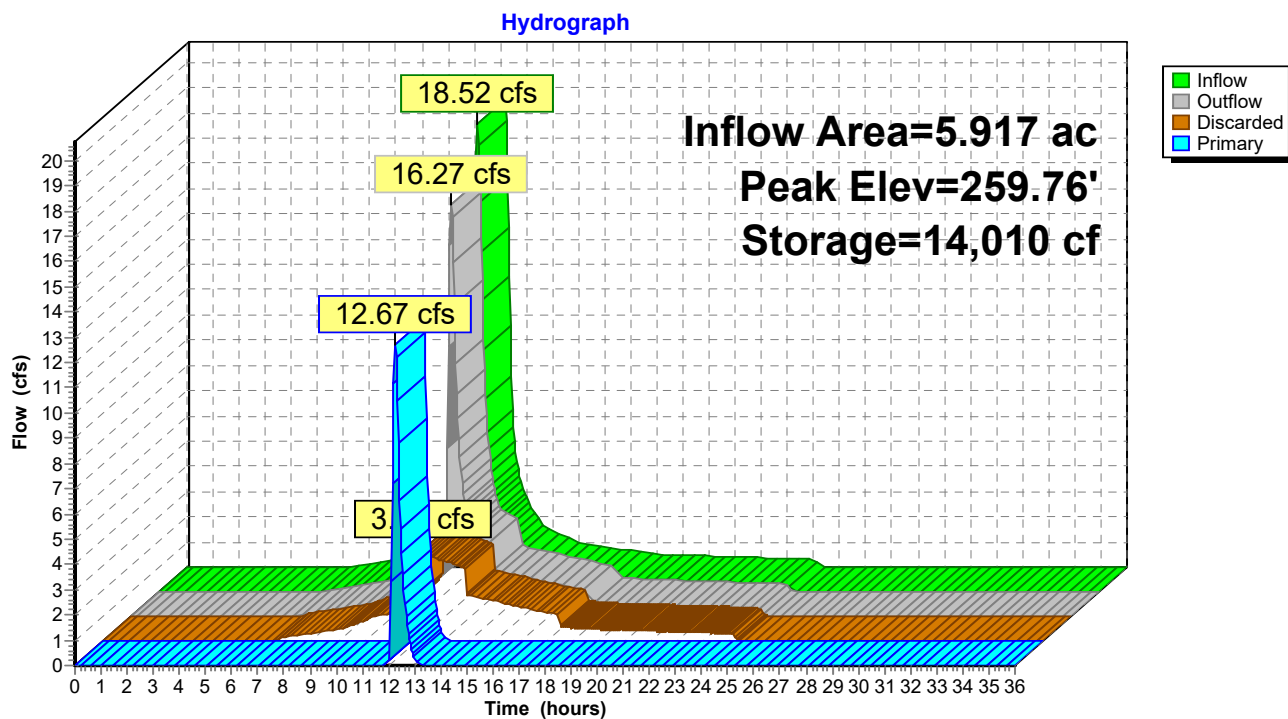
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
258.50	5,369	313.0	0	0	5,369
260.00	6,938	357.4	9,205	9,205	7,790
260.17	7,118	360.5	1,195	10,400	7,978

Device	Routing	Invert	Outlet Devices
#1	Primary	253.71'	24.0" Round Culvert L= 32.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 253.71' / 253.36' S= 0.0109 ' / ' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 3.14 sf
#2	Discarded	255.50'	8.270 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 251.50'
#3	Device 1	259.55'	2.0" x 2.0" Horiz. Orifice/Grate X 6.00 columns X 6 rows C= 0.600 Limited to weir flow at low heads
#4	Primary	259.05'	6.0' long x 0.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 Coef. (English) 2.80 2.92

Discarded OutFlow Max=3.60 cfs @ 12.26 hrs HW=259.76' (Free Discharge)
 ↳ **2=Exfiltration** (Controls 3.60 cfs)

Primary OutFlow Max=12.56 cfs @ 12.26 hrs HW=259.76' TW=0.00' (Dynamic Tailwater)
 ↳ **1=Culvert** (Passes 2.18 cfs of 26.82 cfs potential flow)
 ↳ **3=Orifice/Grate** (Orifice Controls 2.18 cfs @ 2.18 fps)
 ↳ **4=Broad-Crested Rectangular Weir** (Weir Controls 10.38 cfs @ 2.45 fps)

Pond 45P: Rain Garden



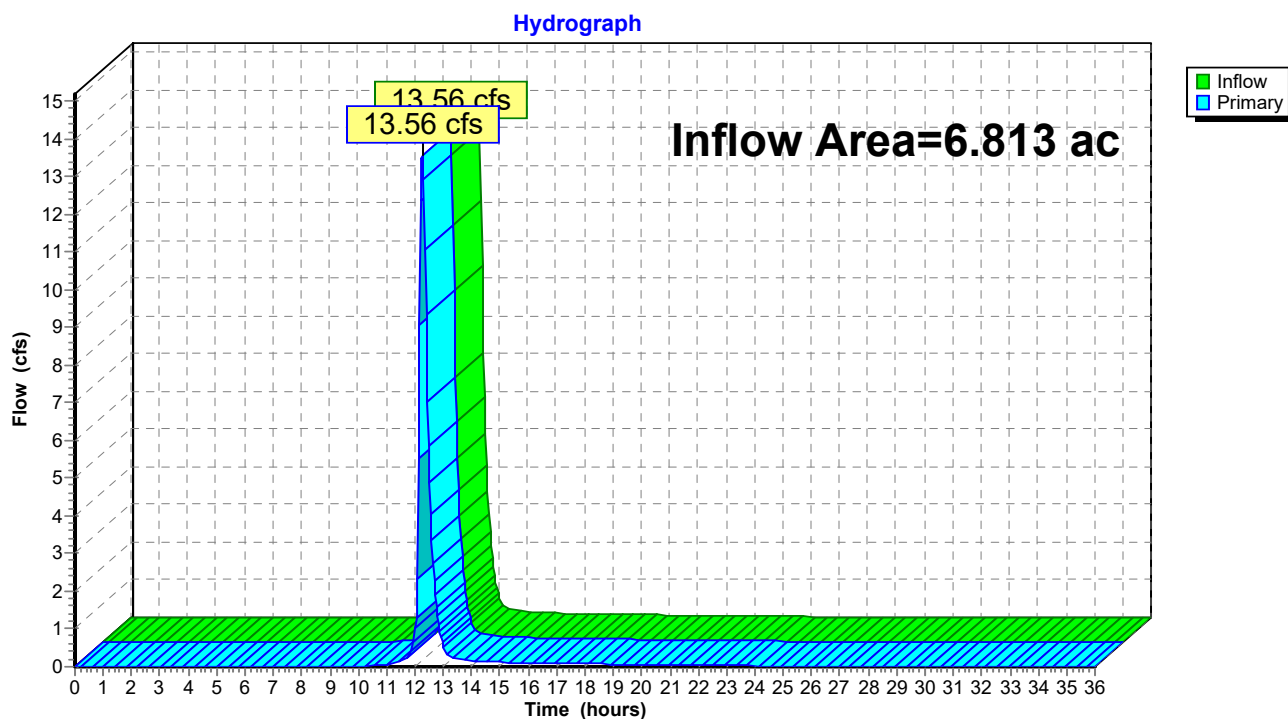
Stage-Area-Storage for Pond 45P: Rain Garden

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
255.50	5,369	0
255.60	5,369	215
255.70	5,369	430
255.80	5,369	644
255.90	5,369	859
256.00	5,369	1,074
256.10	5,369	1,289
256.20	5,369	1,503
256.30	5,369	1,718
256.40	5,369	1,933
256.50	5,369	2,148
256.60	5,369	2,362
256.70	5,369	2,577
256.80	5,369	2,792
256.90	5,369	3,007
257.00	5,369	3,221
257.10	5,369	3,436
257.20	5,369	3,651
257.30	5,369	3,866
257.40	5,369	4,080
257.50	5,369	4,295
257.60	5,369	4,510
257.70	5,369	4,725
257.80	5,369	4,939
257.90	5,369	5,154
258.00	5,369	5,369
258.10	5,369	5,584
258.20	5,369	5,799
258.30	5,369	6,013
258.40	5,369	6,228
258.50	10,738	6,443
258.60	10,836	6,985
258.70	10,936	7,536
258.80	11,036	8,098
258.90	11,137	8,670
259.00	11,239	9,252
259.10	11,341	9,844
259.20	11,445	10,446
259.30	11,550	11,059
259.40	11,655	11,682
259.50	11,762	12,316
259.60	11,869	12,961
259.70	11,977	13,616
259.80	12,086	14,282
259.90	12,196	14,960
260.00	12,307	15,648
260.10	12,413	16,347

Summary for Link 15L: DP-1

Inflow Area = 6.813 ac, 69.19% Impervious, Inflow Depth = 0.94" for 25-Year event
Inflow = 13.56 cfs @ 12.26 hrs, Volume= 0.534 af
Primary = 13.56 cfs @ 12.26 hrs, Volume= 0.534 af, Atten= 0%, Lag= 0.0 min

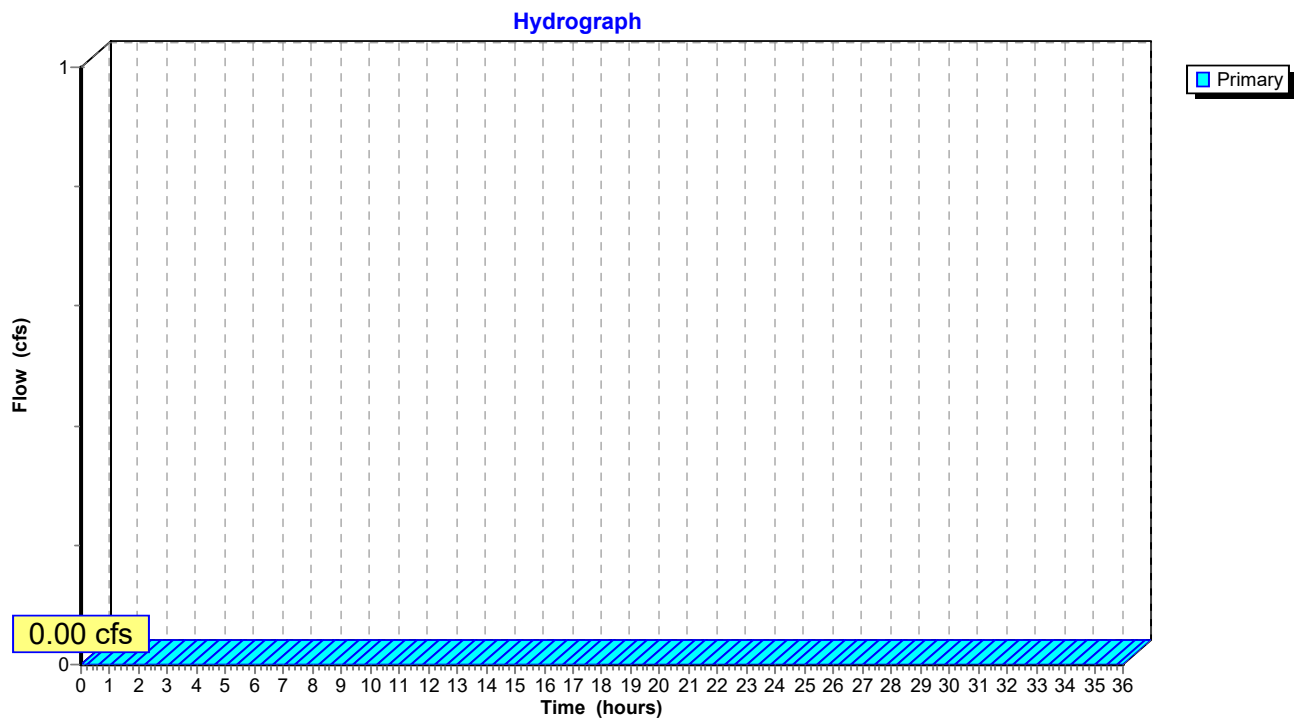
Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs

Link 15L: DP-1

Summary for Link 16L: DP-2

Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs

Link 16L: DP-2

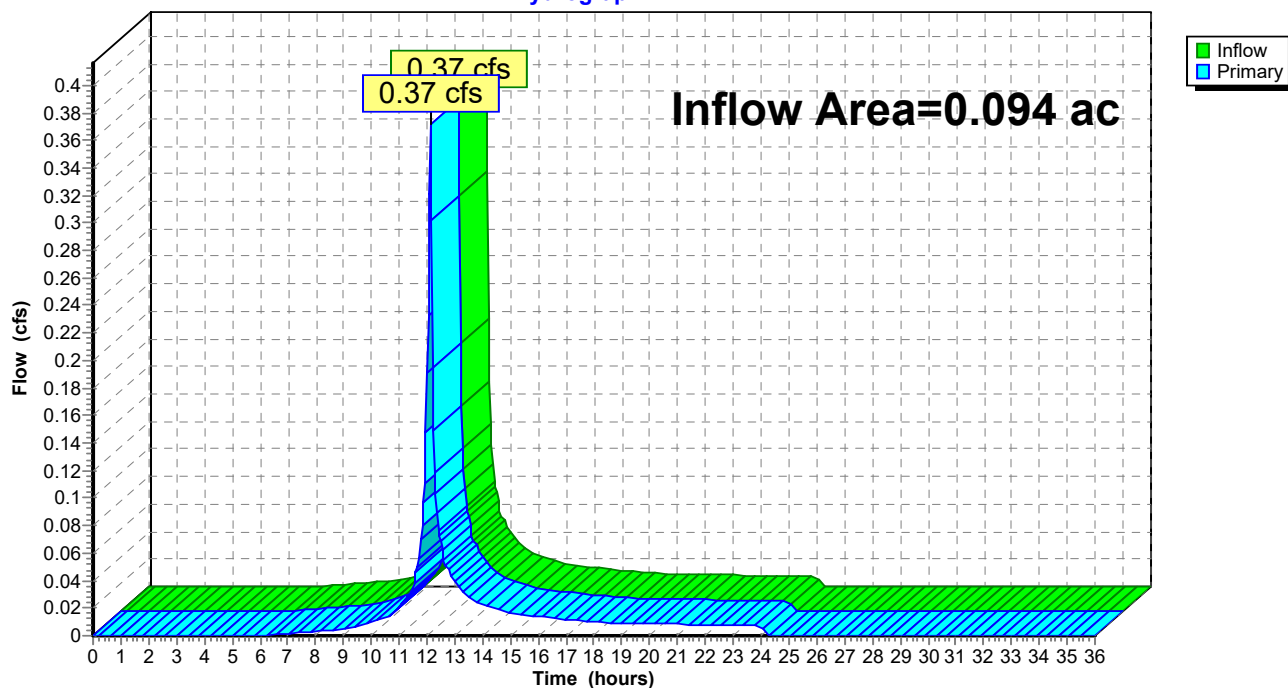
Summary for Link 17L: DP-3

Inflow Area = 0.094 ac, 0.00% Impervious, Inflow Depth = 3.46" for 25-Year event
Inflow = 0.37 cfs @ 12.12 hrs, Volume= 0.027 af
Primary = 0.37 cfs @ 12.12 hrs, Volume= 0.027 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs

Link 17L: DP-3

Hydrograph



Time span=0.00-36.00 hrs, dt=0.04 hrs, 901 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: PR-1	Runoff Area=39,056 sf 43.09% Impervious Runoff Depth=3.00" Tc=5.0 min CN=64 Runoff=3.08 cfs 0.224 af
Subcatchment2S: PR-2	Runoff Area=5,989 sf 81.43% Impervious Runoff Depth=6.29" Tc=5.0 min CN=94 Runoff=0.88 cfs 0.072 af
Subcatchment3S: PR-3	Runoff Area=8,817 sf 74.45% Impervious Runoff Depth=6.05" Tc=5.0 min CN=92 Runoff=1.27 cfs 0.102 af
Subcatchment4S: PR-4	Runoff Area=6,680 sf 84.81% Impervious Runoff Depth=6.05" Tc=5.0 min CN=92 Runoff=0.96 cfs 0.077 af
Subcatchment5S: PR-5	Runoff Area=7,314 sf 77.02% Impervious Runoff Depth=5.59" Tc=5.0 min CN=88 Runoff=1.01 cfs 0.078 af
Subcatchment6S: PR-6	Runoff Area=15,529 sf 56.34% Impervious Runoff Depth=3.83" Tc=5.0 min CN=72 Runoff=1.56 cfs 0.114 af
Subcatchment7S: PR-7	Runoff Area=8,738 sf 78.69% Impervious Runoff Depth=5.25" Tc=5.0 min CN=85 Runoff=1.15 cfs 0.088 af
Subcatchment8S: PR-8	Runoff Area=16,223 sf 52.41% Impervious Runoff Depth=4.92" Tc=5.0 min CN=82 Runoff=2.04 cfs 0.153 af
Subcatchment9S: PR-9	Runoff Area=7,180 sf 74.57% Impervious Runoff Depth=5.71" Flow Length=127' Tc=7.1 min CN=89 Runoff=0.92 cfs 0.078 af
Subcatchment10S: PR-10	Runoff Area=4,103 sf 0.00% Impervious Runoff Depth=4.47" Tc=5.0 min CN=78 Runoff=0.48 cfs 0.035 af
Subcatchment11S: PR-11	Runoff Area=12,349 sf 77.12% Impervious Runoff Depth=6.05" Flow Length=257' Tc=6.6 min CN=92 Runoff=1.66 cfs 0.143 af
Subcatchment12S: PR-12	Runoff Area=12,764 sf 71.19% Impervious Runoff Depth=5.94" Tc=5.0 min CN=91 Runoff=1.82 cfs 0.145 af
Subcatchment18S: PR-13	Runoff Area=7,593 sf 39.33% Impervious Runoff Depth=3.10" Flow Length=246' Tc=16.1 min CN=65 Runoff=0.42 cfs 0.045 af
Subcatchment19S: PR-14	Runoff Area=3,225 sf 82.26% Impervious Runoff Depth=5.71" Flow Length=166' Tc=7.3 min CN=89 Runoff=0.41 cfs 0.035 af
Subcatchment20S: PR-15	Runoff Area=2,717 sf 85.79% Impervious Runoff Depth=5.82" Tc=5.0 min CN=90 Runoff=0.38 cfs 0.030 af
Subcatchment22S: PR-16	Runoff Area=1,349 sf 100.00% Impervious Runoff Depth=6.76" Flow Length=247' Tc=16.1 min CN=98 Runoff=0.14 cfs 0.017 af

Subcatchment23S: PR-17	Runoff Area=14,295 sf 71.70% Impervious Runoff Depth=5.82" Tc=5.0 min CN=90 Runoff=2.02 cfs 0.159 af
Subcatchment24S: PR-18	Runoff Area=9,416 sf 96.73% Impervious Runoff Depth=6.52" Flow Length=189' Tc=7.1 min CN=96 Runoff=1.28 cfs 0.118 af
Subcatchment25S: PR-19	Runoff Area=1,787 sf 75.15% Impervious Runoff Depth=5.03" Tc=5.0 min CN=83 Runoff=0.23 cfs 0.017 af
Subcatchment26S: PR-20	Runoff Area=6,770 sf 88.61% Impervious Runoff Depth=5.94" Tc=5.0 min CN=91 Runoff=0.97 cfs 0.077 af
Subcatchment27S: PR-21	Runoff Area=6,755 sf 89.10% Impervious Runoff Depth=6.05" Tc=5.0 min CN=92 Runoff=0.97 cfs 0.078 af
Subcatchment28S: PR-22	Runoff Area=5,124 sf 73.32% Impervious Runoff Depth=5.14" Tc=5.0 min CN=84 Runoff=0.67 cfs 0.050 af
Subcatchment29S: PR-23	Runoff Area=6,611 sf 79.08% Impervious Runoff Depth=5.59" Tc=5.0 min CN=88 Runoff=0.91 cfs 0.071 af
Subcatchment30S: PR-24	Runoff Area=5,313 sf 80.16% Impervious Runoff Depth=5.59" Tc=5.0 min CN=88 Runoff=0.73 cfs 0.057 af
Subcatchment31S: PR-25	Runoff Area=8,212 sf 59.72% Impervious Runoff Depth=4.69" Flow Length=218' Tc=11.9 min CN=80 Runoff=0.77 cfs 0.074 af
Subcatchment32S: PR-26	Runoff Area=5,770 sf 92.53% Impervious Runoff Depth=6.29" Tc=5.0 min CN=94 Runoff=0.85 cfs 0.069 af
Subcatchment33S: PR-27	Runoff Area=5,730 sf 91.10% Impervious Runoff Depth=6.17" Tc=5.0 min CN=93 Runoff=0.83 cfs 0.068 af
Subcatchment34S: PR-28	Runoff Area=4,491 sf 45.51% Impervious Runoff Depth=3.62" Flow Length=193' Tc=14.0 min CN=70 Runoff=0.31 cfs 0.031 af
Subcatchment35S: PR-29	Runoff Area=1,417 sf 81.37% Impervious Runoff Depth=5.48" Tc=5.0 min CN=87 Runoff=0.19 cfs 0.015 af
Subcatchment36S: PR-30	Runoff Area=8,853 sf 73.61% Impervious Runoff Depth=4.92" Flow Length=198' Tc=5.4 min CN=82 Runoff=1.09 cfs 0.083 af
Subcatchment37S: PR-31	Runoff Area=9,984 sf 75.99% Impervious Runoff Depth=5.14" Flow Length=205' Tc=5.3 min CN=84 Runoff=1.28 cfs 0.098 af
Subcatchment38S: PR-32	Runoff Area=16,004 sf 53.26% Impervious Runoff Depth=3.62" Flow Length=154' Tc=14.9 min CN=70 Runoff=1.07 cfs 0.111 af
Subcatchment39S: PR-33	Runoff Area=7,626 sf 79.02% Impervious Runoff Depth=5.37" Tc=5.0 min CN=86 Runoff=1.02 cfs 0.078 af
Subcatchment40S: PR-34	Runoff Area=3,135 sf 83.67% Impervious Runoff Depth=5.59" Flow Length=134' Tc=5.6 min CN=88 Runoff=0.42 cfs 0.034 af

Subcatchment41S: PR-35

Runoff Area=459 sf 98.47% Impervious Runoff Depth=6.64"
Tc=5.0 min CN=97 Runoff=0.07 cfs 0.006 af

Subcatchment42S: PR-36

Runoff Area=6,465 sf 87.47% Impervious Runoff Depth=5.94"
Tc=5.0 min CN=91 Runoff=0.92 cfs 0.073 af

Subcatchment43S: PR-37

Runoff Area=7,047 sf 90.17% Impervious Runoff Depth=6.05"
Tc=5.0 min CN=92 Runoff=1.02 cfs 0.082 af

Pond 44P: CMP Infiltration

Peak Elev=271.33' Storage=0.193 af Inflow=31.34 cfs 2.627 af
Discarded=0.22 cfs 0.282 af Primary=21.47 cfs 2.346 af Outflow=21.69 cfs 2.627 af

Pond 45P: Rain Garden

Peak Elev=259.89' Storage=14,925 cf Inflow=21.47 cfs 2.346 af
Discarded=3.69 cfs 1.747 af Primary=16.44 cfs 0.599 af Outflow=20.12 cfs 2.346 af

Link 15L: DP-1

Inflow=17.62 cfs 0.823 af
Primary=17.62 cfs 0.823 af

Link 16L: DP-2

Primary=0.00 cfs 0.000 af

Link 17L: DP-3

Inflow=0.48 cfs 0.035 af
Primary=0.48 cfs 0.035 af

Total Runoff Area = 6.907 ac Runoff Volume = 2.887 af Average Runoff Depth = 5.01"
31.76% Pervious = 2.194 ac 68.24% Impervious = 4.714 ac

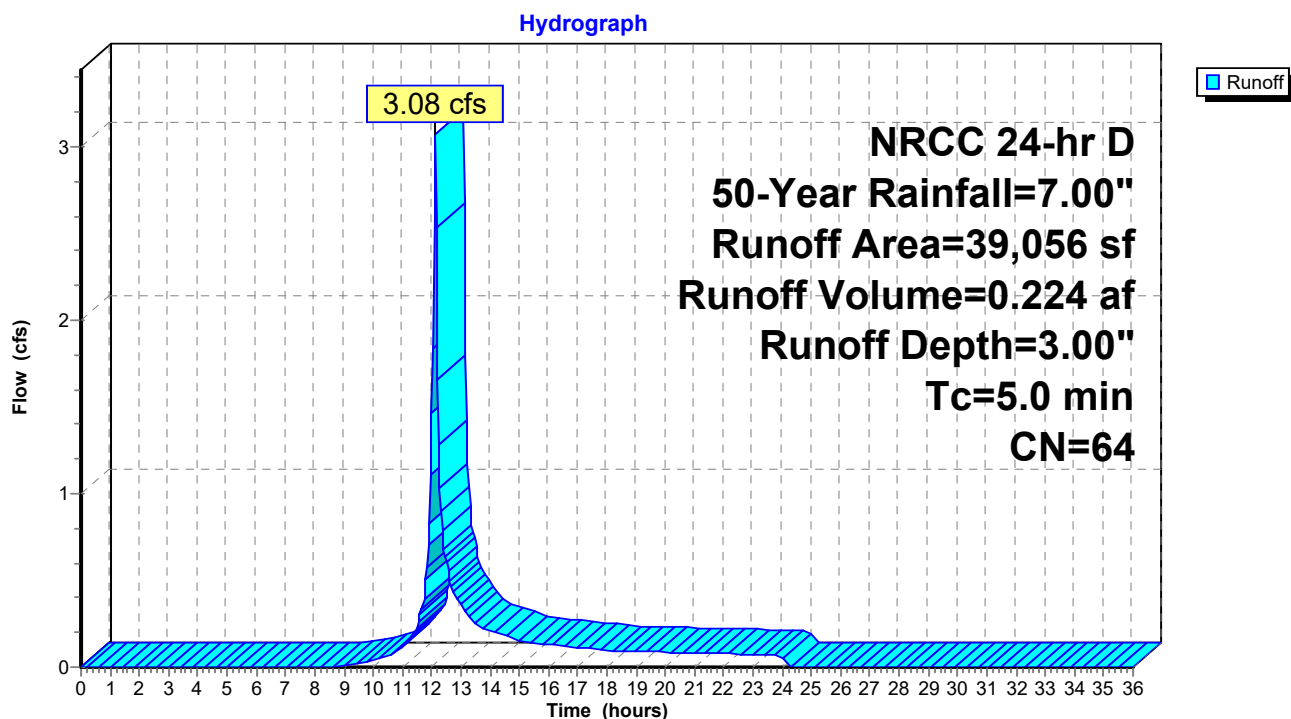
Summary for Subcatchment 1S: PR-1

Runoff = 3.08 cfs @ 12.12 hrs, Volume= 0.224 af, Depth= 3.00"
 Routed to Link 15L : DP-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 50-Year Rainfall=7.00"

Area (sf)	CN	Description
6,150	98	Paved parking, HSG A
* 6,781	98	Paved parking, HSG A
* 2,817	98	Cement Concrete Sidewalk, HSG A
* 1,080	98	Cement Concrete Sidewalk, HSG A
20,357	39	>75% Grass cover, Good, HSG A
1,871	39	>75% Grass cover, Good, HSG A
39,056	64	Weighted Average
22,228		56.91% Pervious Area
16,828		43.09% Impervious Area

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

Subcatchment 1S: PR-1

Summary for Subcatchment 2S: PR-2

Runoff = 0.88 cfs @ 12.11 hrs, Volume= 0.072 af, Depth= 6.29"
 Routed to Pond 44P : CMP Infiltration

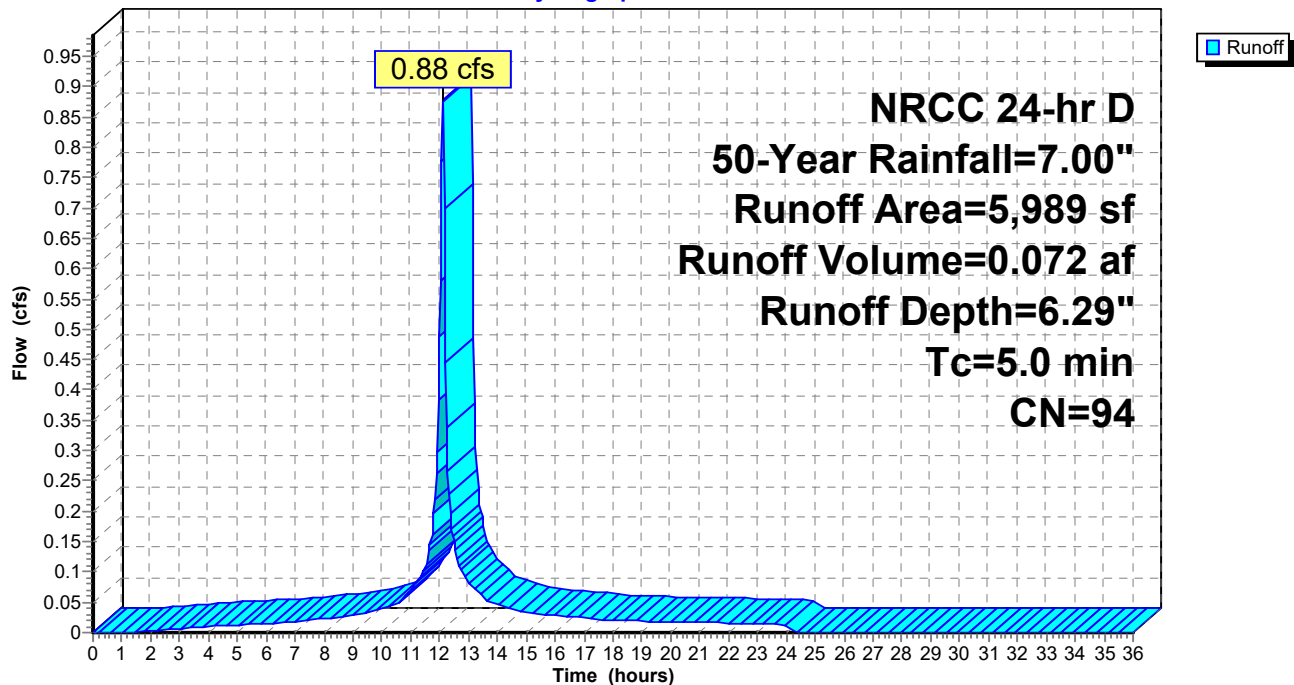
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 50-Year Rainfall=7.00"

	Area (sf)	CN	Description
*	4,187	98	Paved parking, HSG C
*	690	98	Cement Concrete Sidewalk, HSG C
	1,112	74	>75% Grass cover, Good, HSG C
	5,989	94	Weighted Average
	1,112		18.57% Pervious Area
	4,877		81.43% Impervious Area

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

Subcatchment 2S: PR-2

Hydrograph



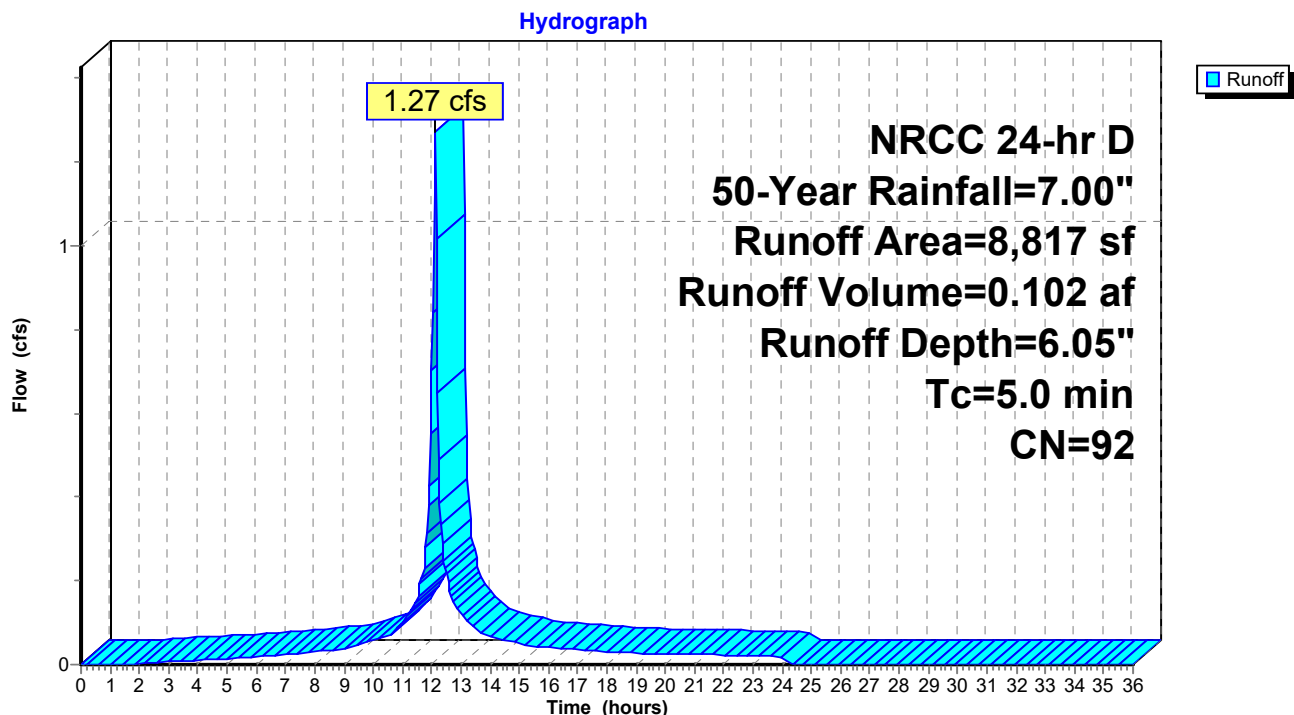
Summary for Subcatchment 3S: PR-3

Runoff = 1.27 cfs @ 12.11 hrs, Volume= 0.102 af, Depth= 6.05"
 Routed to Pond 44P : CMP Infiltration

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 50-Year Rainfall=7.00"

Area (sf)	CN	Description
5,618	98	Paved parking, HSG C
* 946	98	Cement Concrete Sidewalk, HSG C
2,253	74	>75% Grass cover, Good, HSG C
8,817	92	Weighted Average
2,253		25.55% Pervious Area
6,564		74.45% Impervious Area

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

Subcatchment 3S: PR-3

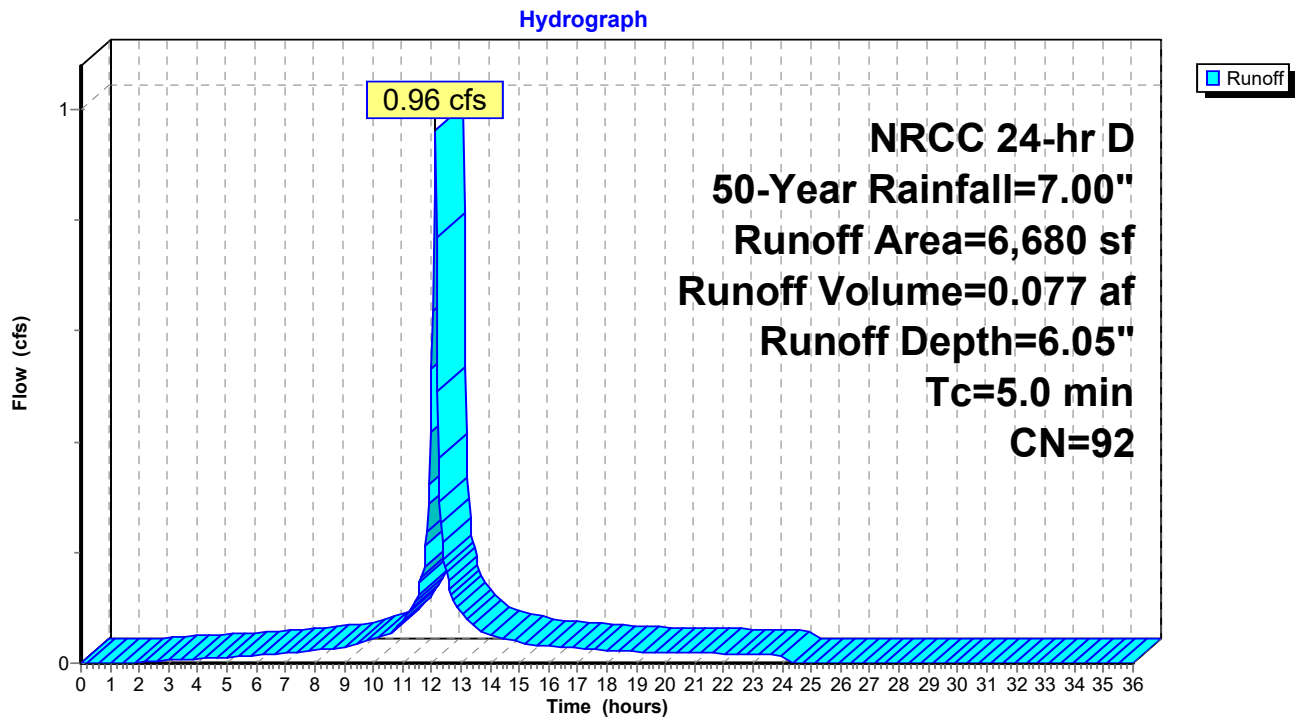
Summary for Subcatchment 4S: PR-4

Runoff = 0.96 cfs @ 12.11 hrs, Volume= 0.077 af, Depth= 6.05"
 Routed to Pond 44P : CMP Infiltration

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 50-Year Rainfall=7.00"

Area (sf)	CN	Description
2,045	98	Paved parking, HSG C
* 2,781	98	Paved parking, HSG A
* 424	98	Cement Concrete Sidewalk, HSG C
* 415	98	Cement Concrete Sidewalk, HSG A
559	74	>75% Grass cover, Good, HSG C
456	39	>75% Grass cover, Good, HSG A
6,680	92	Weighted Average
1,015		15.19% Pervious Area
5,665		84.81% Impervious Area

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

Subcatchment 4S: PR-4

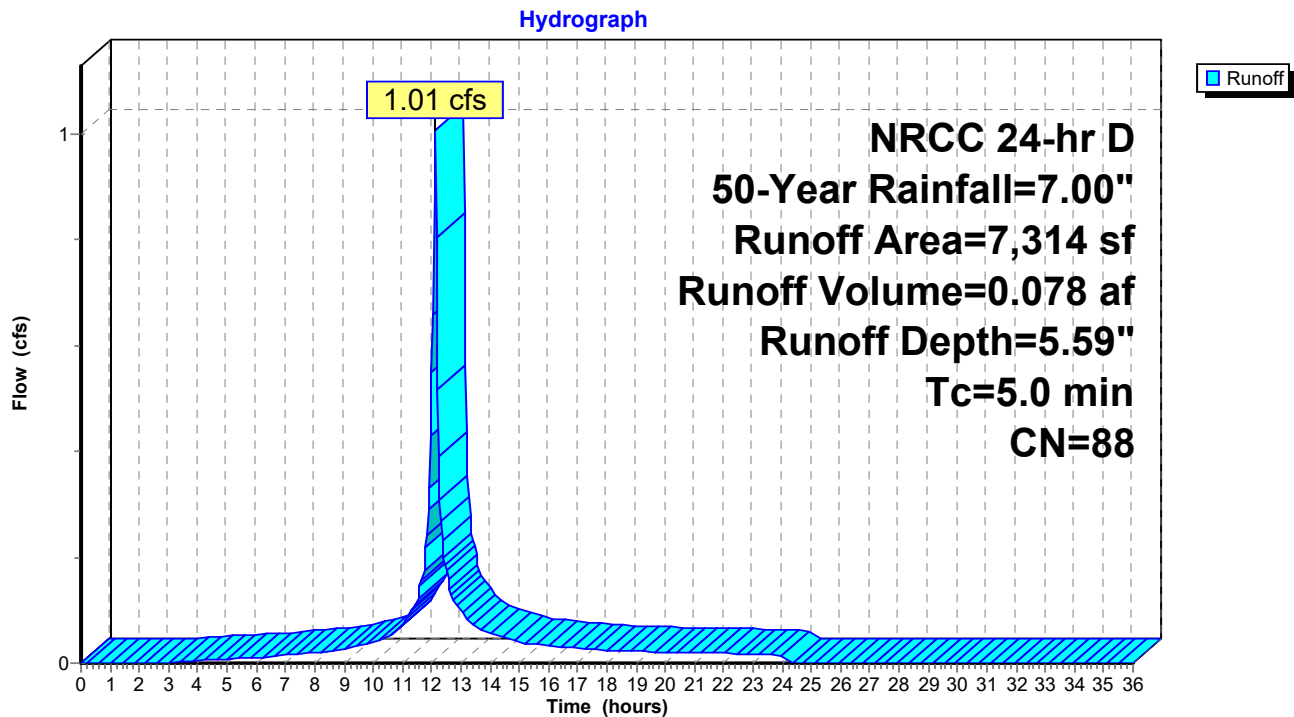
Summary for Subcatchment 5S: PR-5

Runoff = 1.01 cfs @ 12.11 hrs, Volume= 0.078 af, Depth= 5.59"
 Routed to Pond 44P : CMP Infiltration

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 50-Year Rainfall=7.00"

	Area (sf)	CN	Description
*	1,817	98	Paved parking, HSG C
*	3,098	98	Paved parking, HSG A
*	327	98	Cement Concrete Sidewalk, HSG C
*	391	98	Cement Concrete Sidewalk, HSG A
	725	74	>75% Grass cover, Good, HSG C
	956	39	>75% Grass cover, Good, HSG A
	7,314	88	Weighted Average
	1,681		22.98% Pervious Area
	5,633		77.02% Impervious Area

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

Subcatchment 5S: PR-5

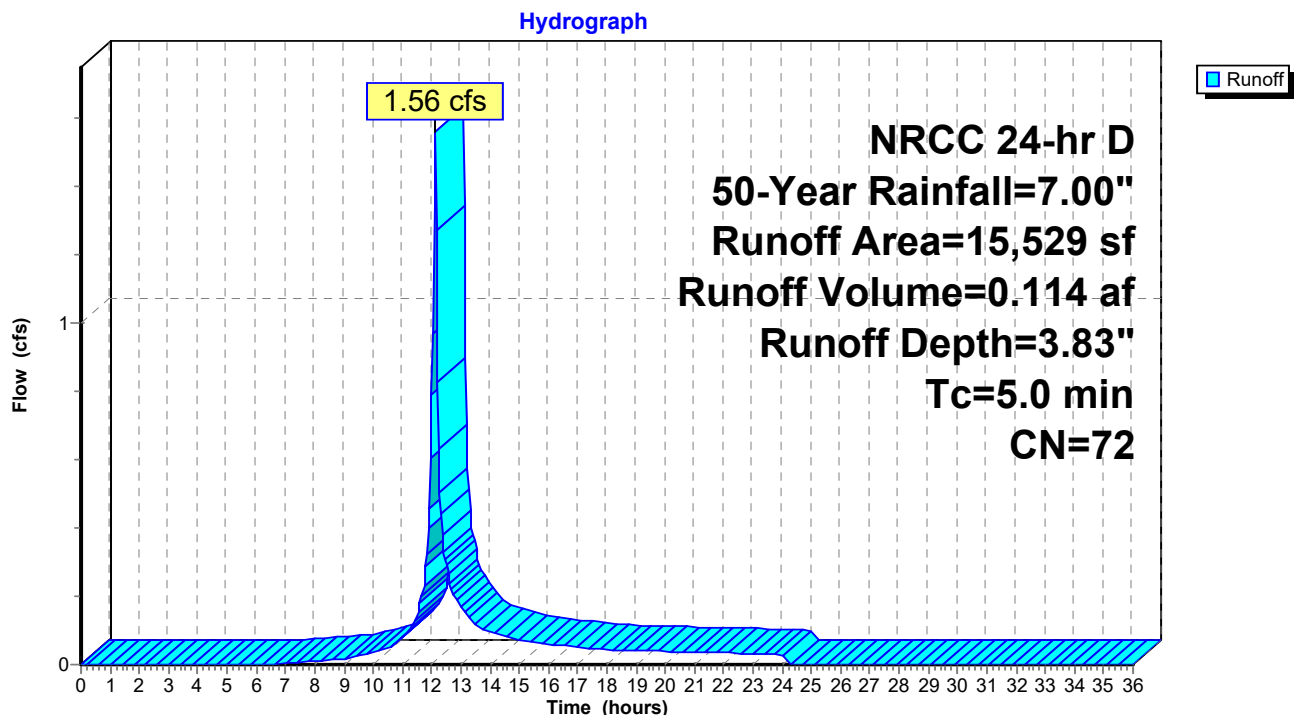
Summary for Subcatchment 6S: PR-6

Runoff = 1.56 cfs @ 12.12 hrs, Volume= 0.114 af, Depth= 3.83"
 Routed to Pond 44P : CMP Infiltration

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 50-Year Rainfall=7.00"

	Area (sf)	CN	Description
*	7,257	98	Paved parking, HSG A
*	1,492	98	Cement Concrete Sidewalk, HSG A
	6,780	39	>75% Grass cover, Good, HSG A
	15,529	72	Weighted Average
	6,780		43.66% Pervious Area
	8,749		56.34% Impervious Area

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

Subcatchment 6S: PR-6

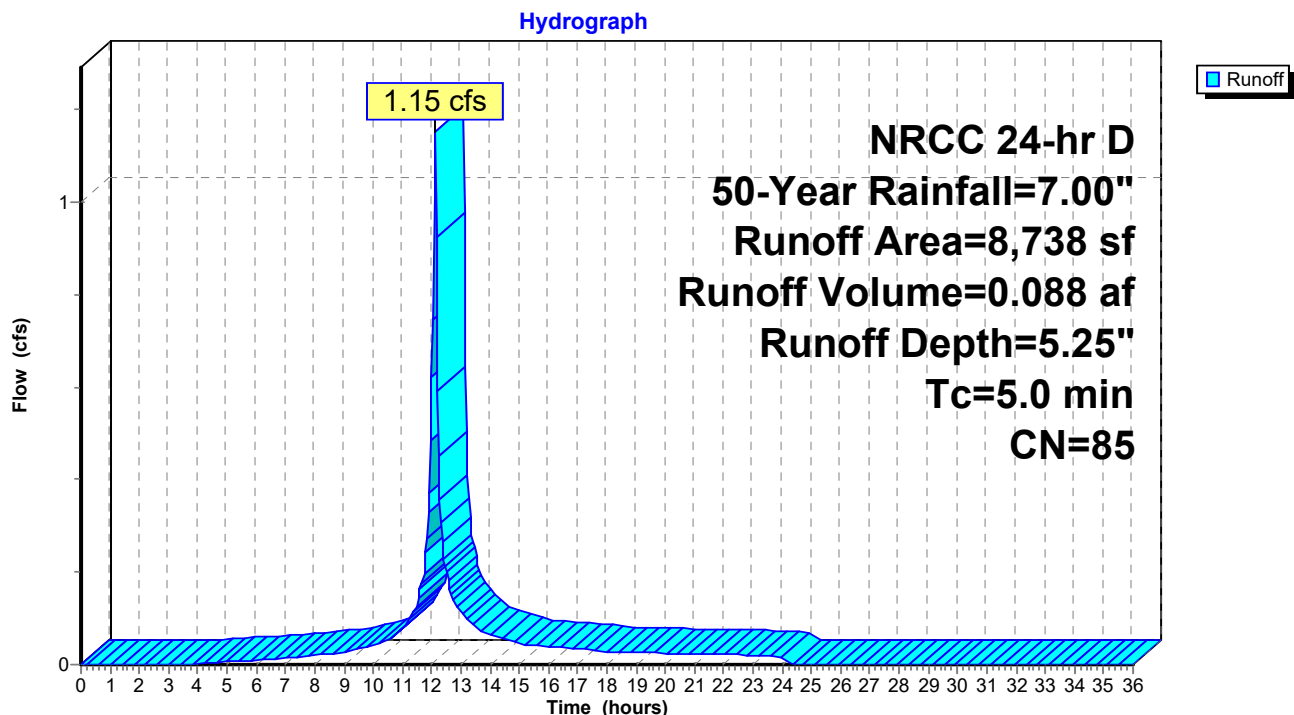
Summary for Subcatchment 7S: PR-7

Runoff = 1.15 cfs @ 12.12 hrs, Volume= 0.088 af, Depth= 5.25"
 Routed to Pond 44P : CMP Infiltration

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 50-Year Rainfall=7.00"

	Area (sf)	CN	Description
*	5,839	98	Paved parking, HSG A
*	1,037	98	Cement Concrete Sidewalk, HSG A
	1,862	39	>75% Grass cover, Good, HSG A
	8,738	85	Weighted Average
	1,862		21.31% Pervious Area
	6,876		78.69% Impervious Area

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

Subcatchment 7S: PR-7

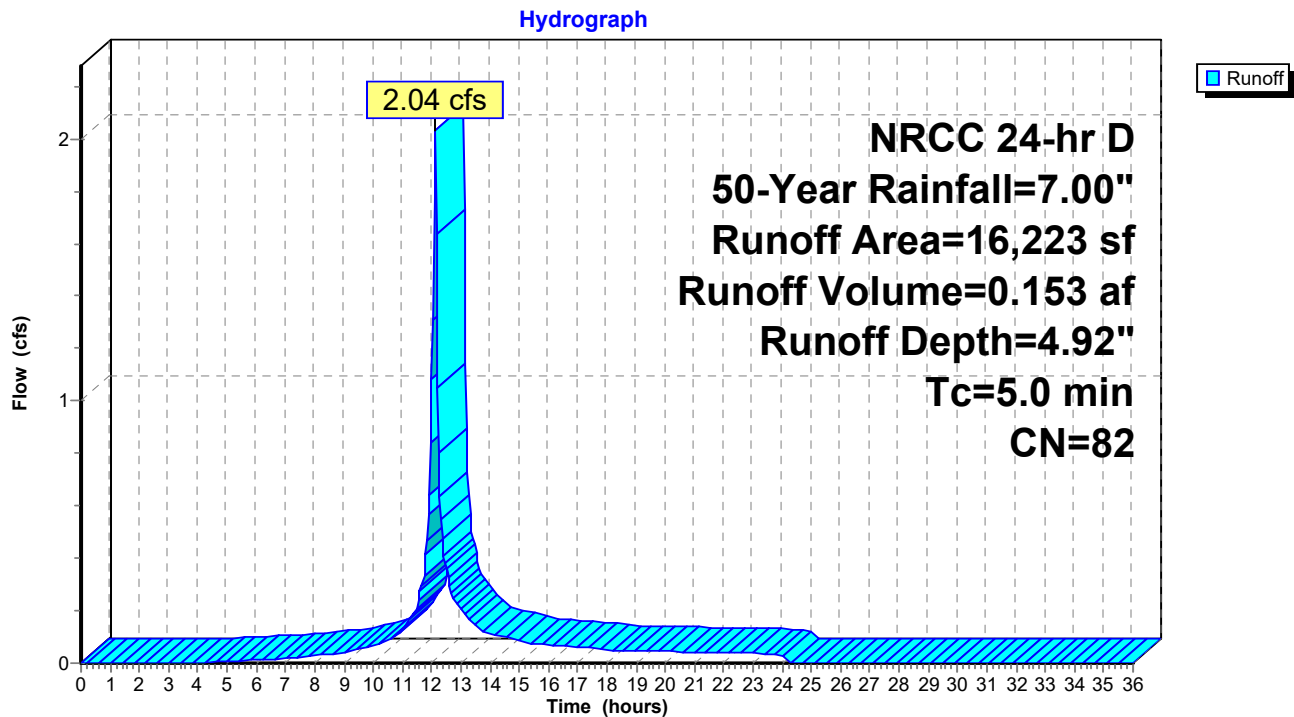
Summary for Subcatchment 8S: PR-8

Runoff = 2.04 cfs @ 12.12 hrs, Volume= 0.153 af, Depth= 4.92"
 Routed to Pond 44P : CMP Infiltration

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 50-Year Rainfall=7.00"

	Area (sf)	CN	Description
*	2,852	98	Paved parking, HSG A
*	4,008	98	Paved parking, HSG C
*	1,252	98	Cement Concrete Sidewalk, HSG C
*	390	98	Cement Concrete Sidewalk, HSG A
	1,994	39	>75% Grass cover, Good, HSG A
	5,727	74	>75% Grass cover, Good, HSG C
	16,223	82	Weighted Average
	7,721		47.59% Pervious Area
	8,502		52.41% Impervious Area

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

Subcatchment 8S: PR-8

Summary for Subcatchment 9S: PR-9

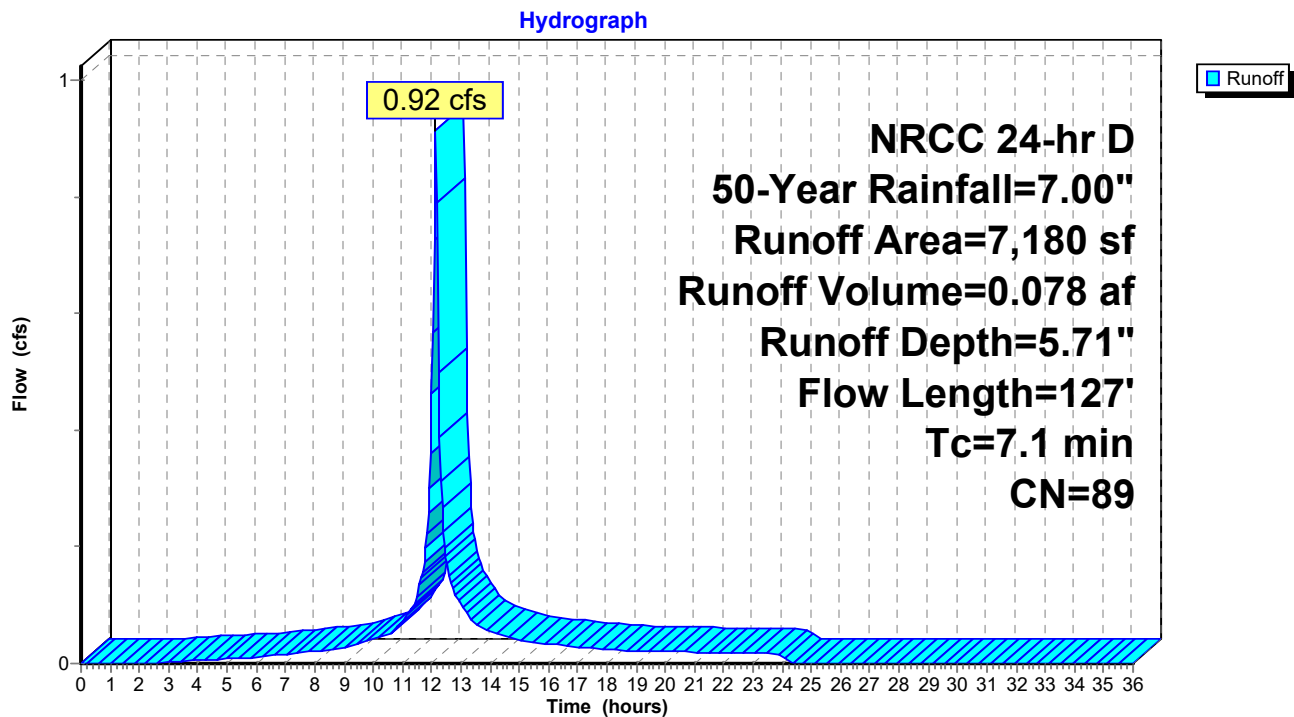
Runoff = 0.92 cfs @ 12.14 hrs, Volume= 0.078 af, Depth= 5.71"
 Routed to Pond 44P : CMP Infiltration

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 50-Year Rainfall=7.00"

	Area (sf)	CN	Description
*	479	98	Paved parking, HSG A
*	3,817	98	Paved parking, HSG C
*	216	98	Cement Concrete Sidewalk, HSG A
*	842	98	Cement Concrete Sidewalk, HSG C
	623	39	>75% Grass cover, Good, HSG A
	1,203	74	>75% Grass cover, Good, HSG C
	7,180	89	Weighted Average
	1,826		25.43% Pervious Area
	5,354		74.57% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.1	25	0.0500	0.08		Sheet Flow, GRASS Grass: Bermuda n= 0.410 P2= 3.13"
1.7	75	0.0050	0.74		Sheet Flow, PAVEMENT Smooth surfaces n= 0.011 P2= 3.13"
0.3	27	0.0050	1.44		Shallow Concentrated Flow, PAVEMENT Paved Kv= 20.3 fps
7.1	127	Total			

Subcatchment 9S: PR-9



Summary for Subcatchment 10S: PR-10

Runoff = 0.48 cfs @ 12.12 hrs, Volume= 0.035 af, Depth= 4.47"
 Routed to Link 17L : DP-3

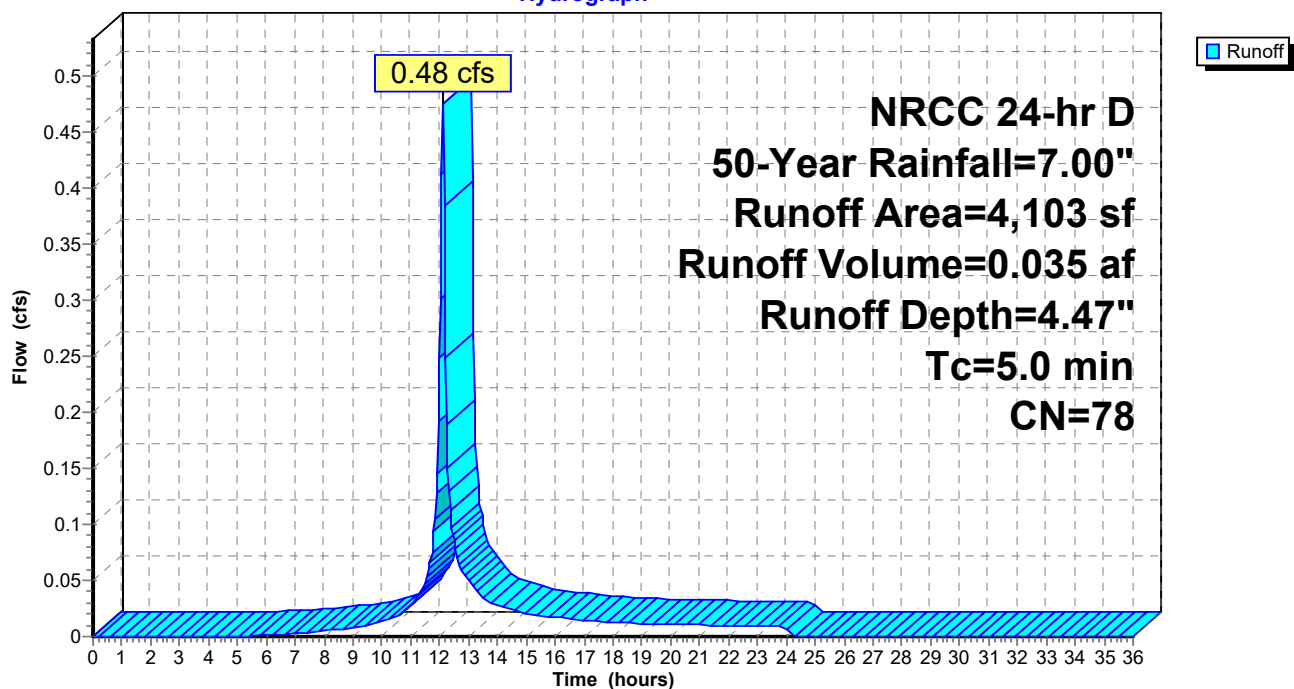
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 50-Year Rainfall=7.00"

Area (sf)	CN	Description
1,584	74	>75% Grass cover, Good, HSG C
2,519	80	>75% Grass cover, Good, HSG D
4,103	78	Weighted Average
4,103		100.00% Pervious Area

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

Subcatchment 10S: PR-10

Hydrograph



Summary for Subcatchment 11S: PR-11

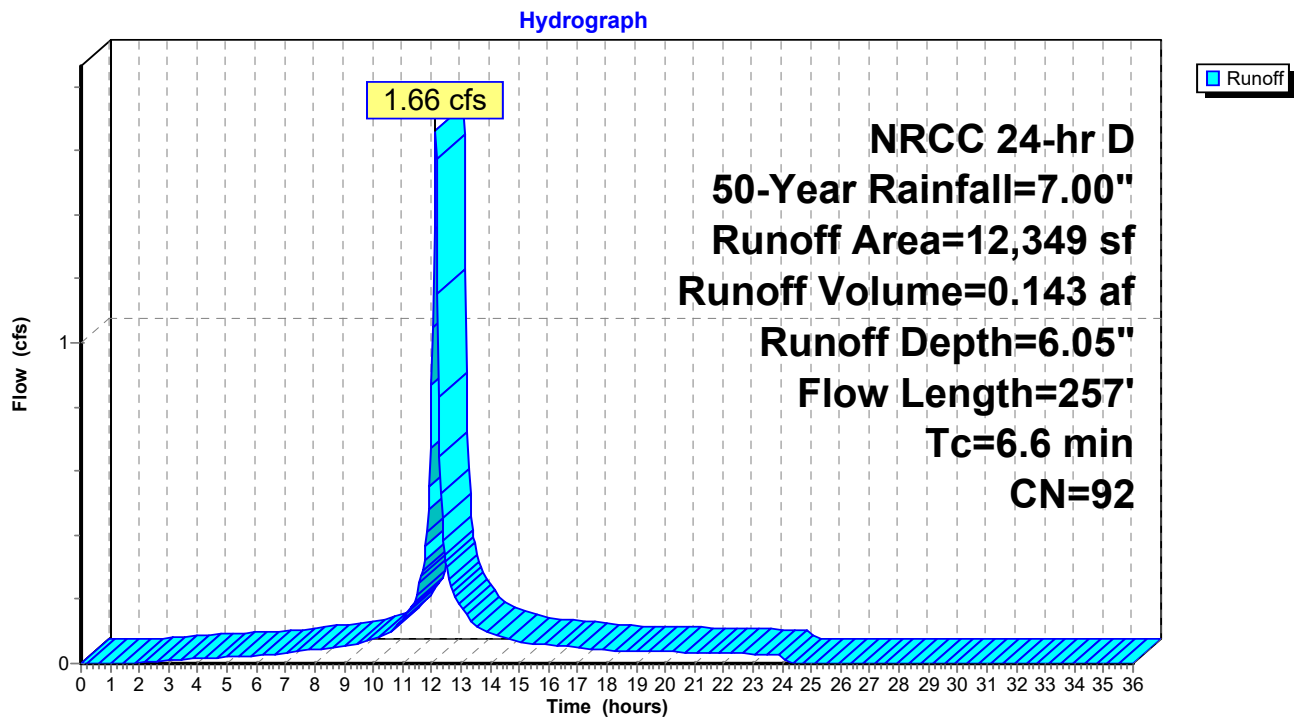
Runoff = 1.66 cfs @ 12.13 hrs, Volume= 0.143 af, Depth= 6.05"
 Routed to Pond 44P : CMP Infiltration

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 50-Year Rainfall=7.00"

	Area (sf)	CN	Description
*	7,691	98	Paved parking, HSG C
*	276	98	Paved parking, HSG A
*	1,371	98	Cement Concrete Sidewalk, HSG C
*	185	98	Cement Concrete Sidewalk, HSG A
	2,481	74	>75% Grass cover, Good, HSG C
	345	39	>75% Grass cover, Good, HSG A
	12,349	92	Weighted Average
	2,826		22.88% Pervious Area
	9,523		77.12% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.1	25	0.0500	0.08		Sheet Flow, GRASS Grass: Bermuda n= 0.410 P2= 3.13"
0.8	75	0.0350	1.61		Sheet Flow, PAVEMENT Smooth surfaces n= 0.011 P2= 3.13"
0.7	157	0.0350	3.80		Shallow Concentrated Flow, PAVEMENT Paved Kv= 20.3 fps
6.6	257	Total			

Subcatchment 11S: PR-11



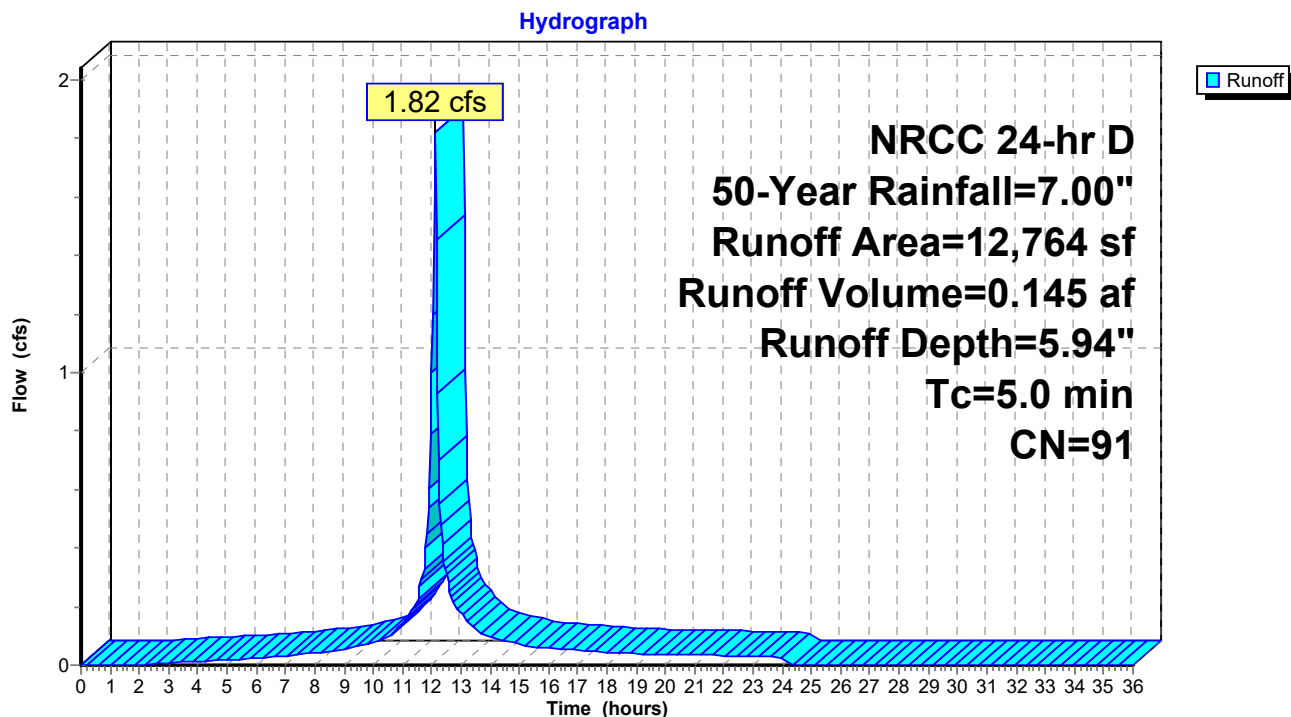
Summary for Subcatchment 12S: PR-12

Runoff = 1.82 cfs @ 12.11 hrs, Volume= 0.145 af, Depth= 5.94"
 Routed to Pond 44P : CMP Infiltration

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 50-Year Rainfall=7.00"

	Area (sf)	CN	Description
*	7,226	98	Paved parking, HSG C
*	139	98	Paved parking, HSG A
*	1,592	98	Cement Concrete Sidewalk, HSG C
*	130	98	Cement Concrete Sidewalk, HSG A
	3,543	74	>75% Grass cover, Good, HSG C
	134	39	>75% Grass cover, Good, HSG A
	12,764	91	Weighted Average
	3,677		28.81% Pervious Area
	9,087		71.19% Impervious Area

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

Subcatchment 12S: PR-12

Summary for Subcatchment 18S: PR-13

Runoff = 0.42 cfs @ 12.25 hrs, Volume= 0.045 af, Depth= 3.10"
 Routed to Pond 44P : CMP Infiltration

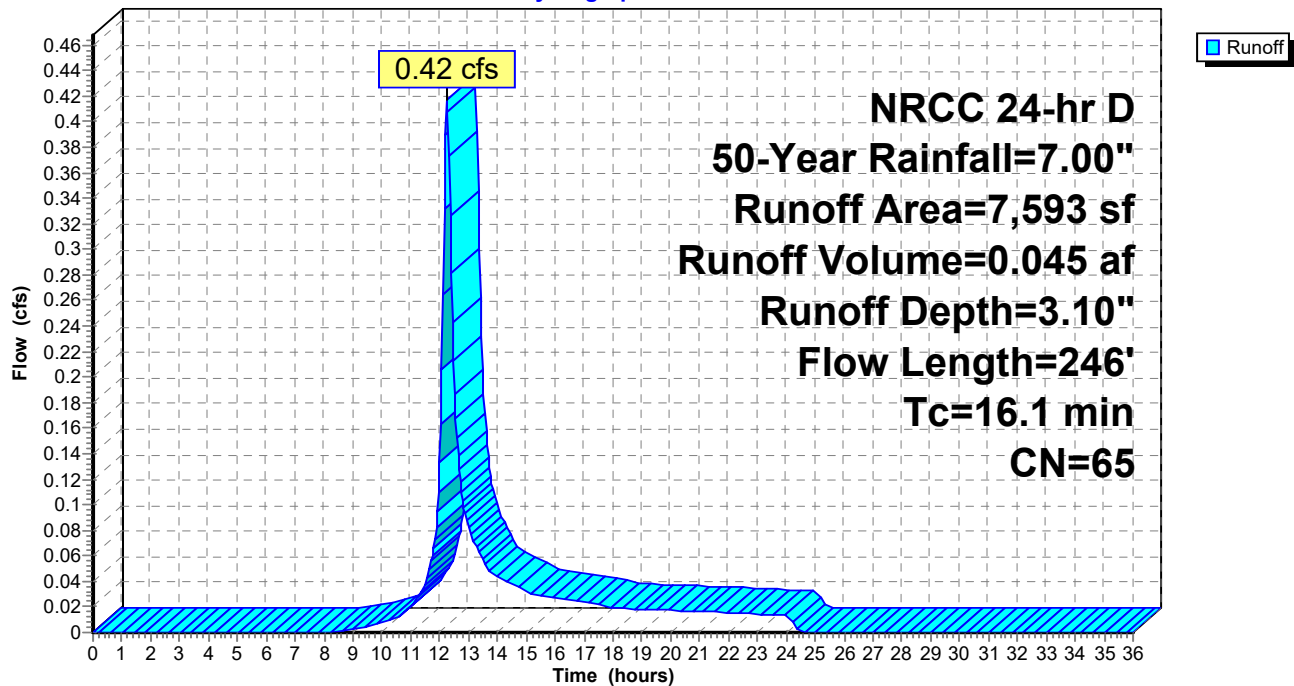
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 50-Year Rainfall=7.00"

Area (sf)	CN	Description
131	98	Paved parking, HSG C
* 2,672	98	Paved parking, HSG A
* 183	98	Cement Concrete Sidewalk, HSG C
499	74	>75% Grass cover, Good, HSG C
4,108	39	>75% Grass cover, Good, HSG A
7,593	65	Weighted Average
4,607		60.67% Pervious Area
2,986		39.33% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.4	100	0.0500	0.11		Sheet Flow, GRASS Grass: Bermuda n= 0.410 P2= 3.13"
0.2	38	0.0500	3.35		Shallow Concentrated Flow, GRASS Grassed Waterway Kv= 15.0 fps
0.5	108	0.0350	3.80		Shallow Concentrated Flow, PAVEMENT Paved Kv= 20.3 fps
16.1	246	Total			

Subcatchment 18S: PR-13

Hydrograph



Summary for Subcatchment 19S: PR-14

Runoff = 0.41 cfs @ 12.14 hrs, Volume= 0.035 af, Depth= 5.71"
 Routed to Pond 44P : CMP Infiltration

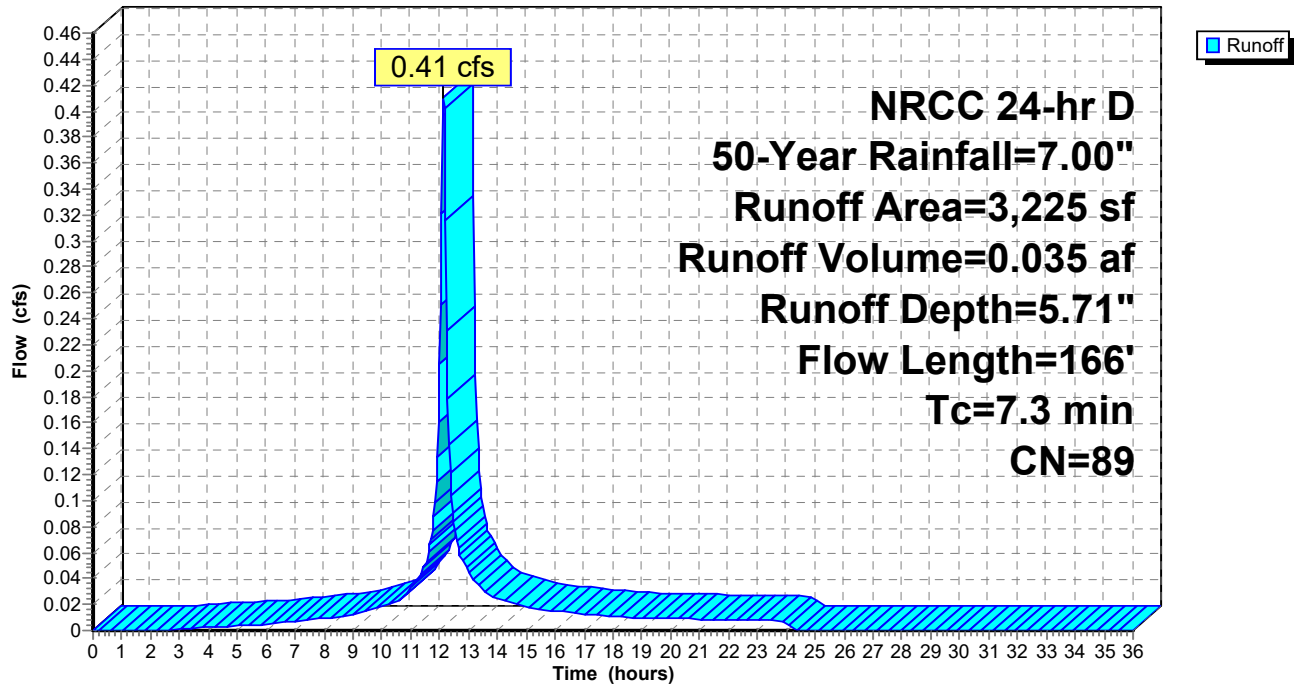
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 50-Year Rainfall=7.00"

	Area (sf)	CN	Description
*	199	98	Paved parking, HSG C
*	2,132	98	Paved parking, HSG A
*	322	98	Cement Concrete Sidewalk, HSG A
	126	74	>75% Grass cover, Good, HSG C
	446	39	>75% Grass cover, Good, HSG A
	3,225	89	Weighted Average
	572		17.74% Pervious Area
	2,653		82.26% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.3	33	0.0500	0.09		Sheet Flow, GRASS Grass: Bermuda n= 0.410 P2= 3.13"
0.7	67	0.0350	1.57		Sheet Flow, PAVEMENT Smooth surfaces n= 0.011 P2= 3.13"
0.3	66	0.0350	3.80		Shallow Concentrated Flow, PAVEMENT Paved Kv= 20.3 fps
7.3	166	Total			

Subcatchment 19S: PR-14

Hydrograph



Summary for Subcatchment 20S: PR-15

Runoff = 0.38 cfs @ 12.11 hrs, Volume= 0.030 af, Depth= 5.82"
 Routed to Pond 44P : CMP Infiltration

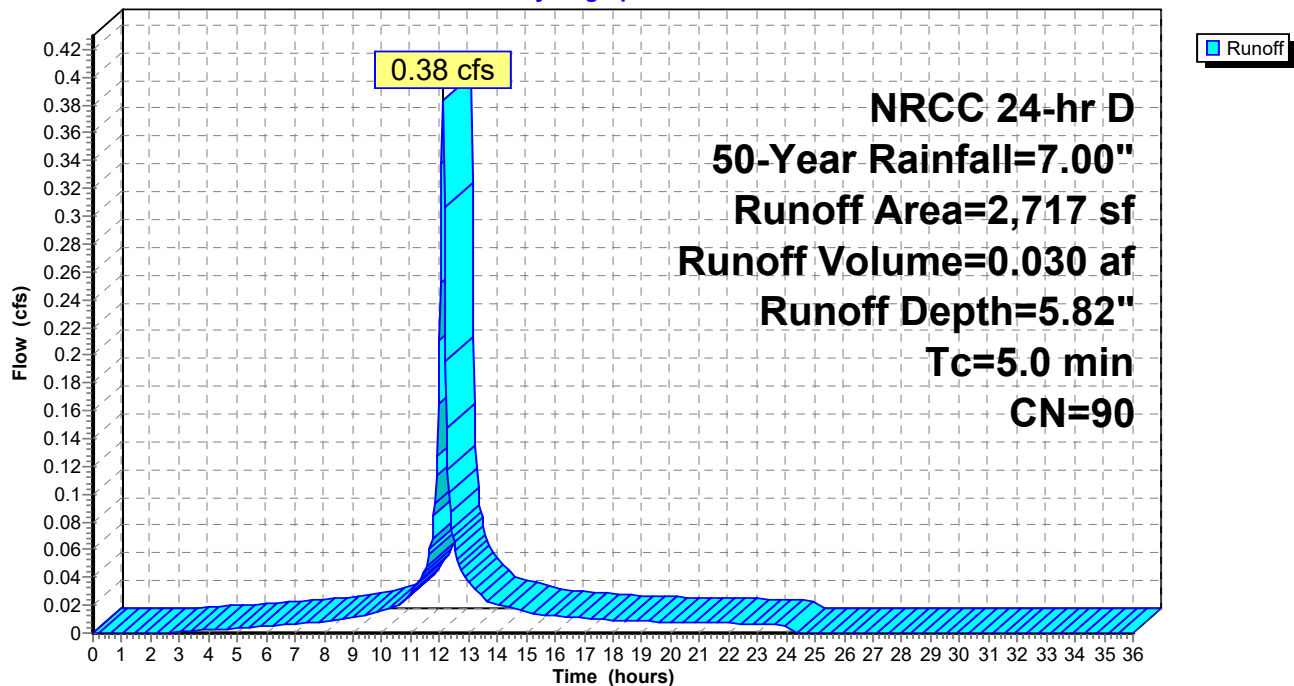
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 50-Year Rainfall=7.00"

	Area (sf)	CN	Description
*	2,331	98	Paved parking, HSG A
	386	39	>75% Grass cover, Good, HSG A
	2,717	90	Weighted Average
	386		14.21% Pervious Area
	2,331		85.79% Impervious Area

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

Subcatchment 20S: PR-15

Hydrograph



Summary for Subcatchment 22S: PR-16

Runoff = 0.14 cfs @ 12.24 hrs, Volume= 0.017 af, Depth= 6.76"
 Routed to Pond 44P : CMP Infiltration

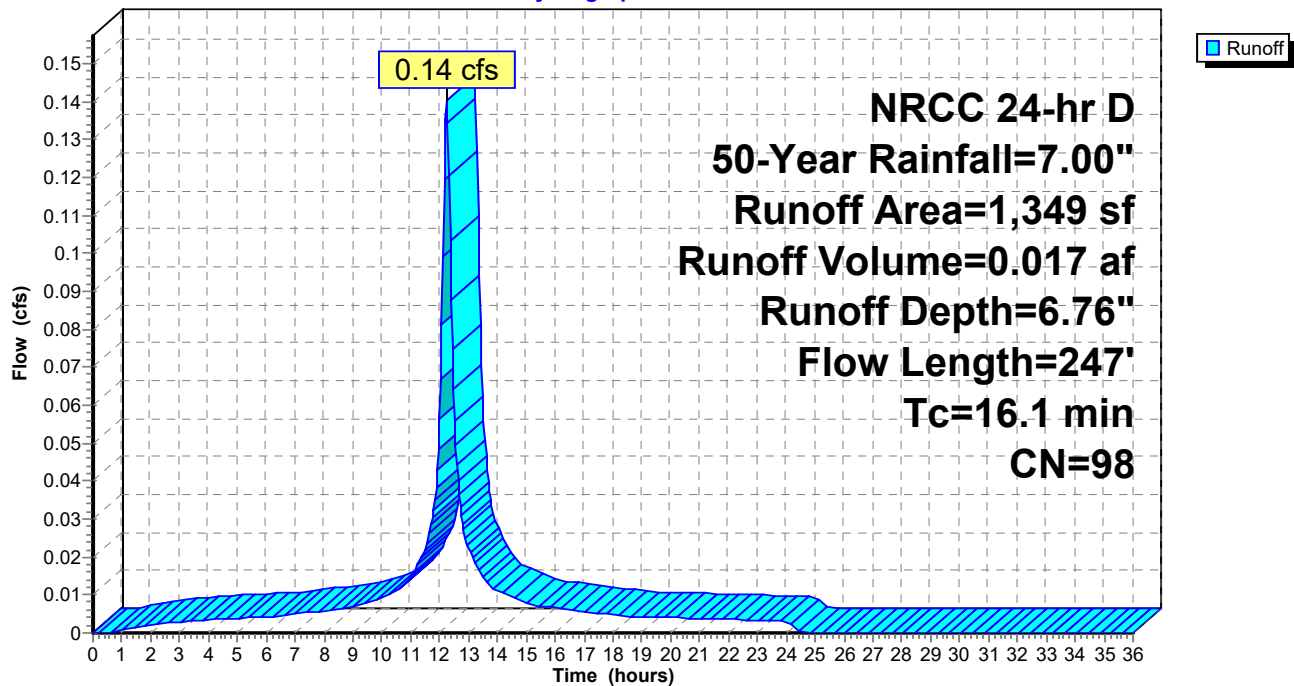
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 50-Year Rainfall=7.00"

Area (sf)	CN	Description
* 614	98	Paved parking, HSG A
* 735	98	Paved parking, HSG C
1,349	98	Weighted Average
1,349		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.4	100	0.0500	0.11		Sheet Flow, GRASS Grass: Bermuda n= 0.410 P2= 3.13"
0.2	38	0.0500	3.35		Shallow Concentrated Flow, GRASS Grassed Waterway Kv= 15.0 fps
0.5	109	0.0350	3.80		Shallow Concentrated Flow, PAVEMENT Paved Kv= 20.3 fps
16.1	247	Total			

Subcatchment 22S: PR-16

Hydrograph



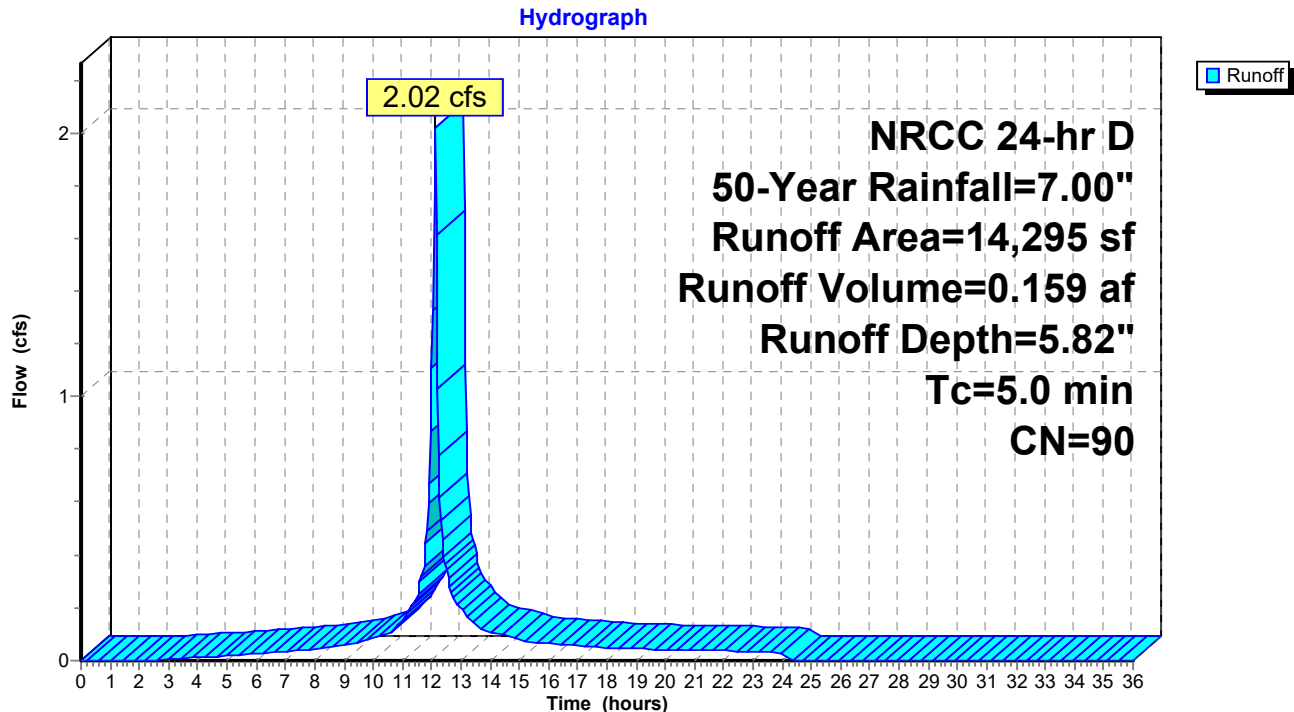
Summary for Subcatchment 23S: PR-17

Runoff = 2.02 cfs @ 12.11 hrs, Volume= 0.159 af, Depth= 5.82"
 Routed to Pond 44P : CMP Infiltration

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 50-Year Rainfall=7.00"

	Area (sf)	CN	Description
*	447	98	Paved parking, HSG A
*	7,461	98	Paved parking, HSG C
*	2,341	98	Cement Concrete Sidewalk, HSG C
	488	39	>75% Grass cover, Good, HSG A
	3,558	74	>75% Grass cover, Good, HSG C
	14,295	90	Weighted Average
	4,046		28.30% Pervious Area
	10,249		71.70% Impervious Area

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

Subcatchment 23S: PR-17

Summary for Subcatchment 24S: PR-18

Runoff = 1.28 cfs @ 12.14 hrs, Volume= 0.118 af, Depth= 6.52"
 Routed to Pond 44P : CMP Infiltration

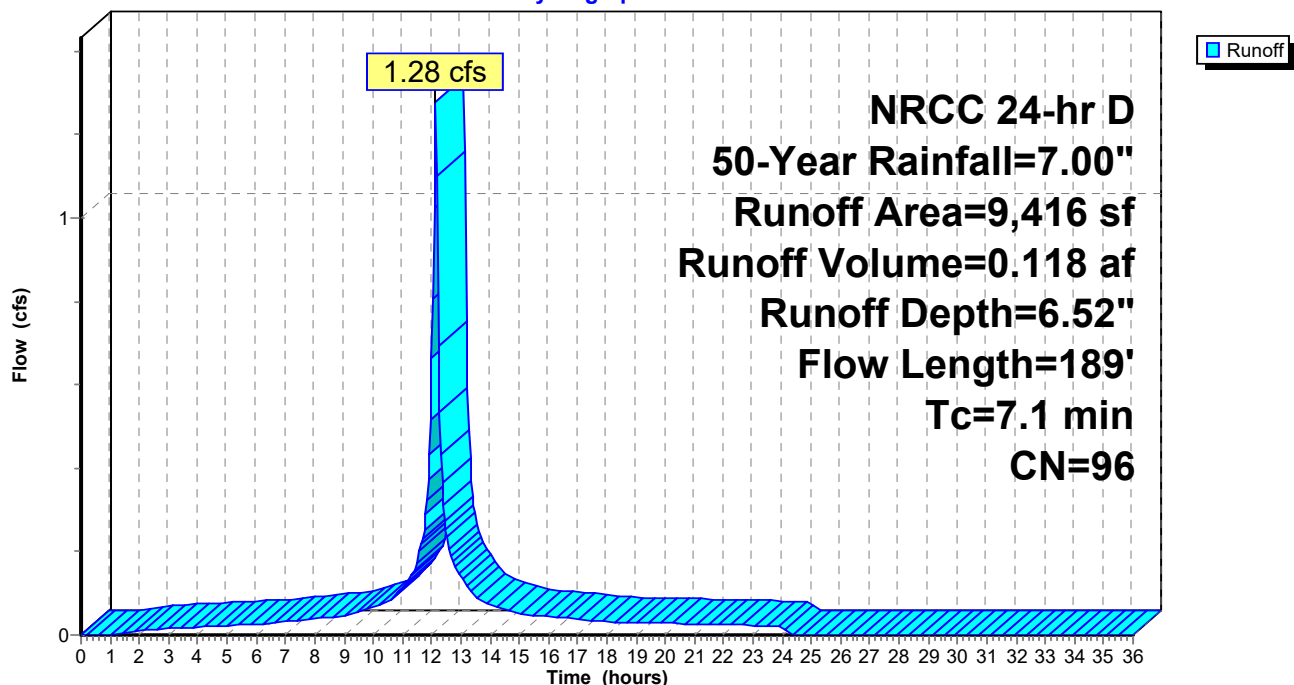
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 50-Year Rainfall=7.00"

	Area (sf)	CN	Description
*	4,554	98	Paved parking, HSG A
*	4,554	98	Cement Concrete Sidewalk, HSG A
	308	39	>75% Grass cover, Good, HSG A
	9,416	96	Weighted Average
	308		3.27% Pervious Area
	9,108		96.73% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	29	0.0500	0.08		Sheet Flow, GRASS Grass: Bermuda n= 0.410 P2= 3.13"
0.9	71	0.0200	1.27		Sheet Flow, PAVEMENT Smooth surfaces n= 0.011 P2= 3.13"
0.5	89	0.0200	2.87		Shallow Concentrated Flow, PAVEMENT Paved Kv= 20.3 fps
7.1	189	Total			

Subcatchment 24S: PR-18

Hydrograph



Summary for Subcatchment 25S: PR-19

Runoff = 0.23 cfs @ 12.12 hrs, Volume= 0.017 af, Depth= 5.03"
 Routed to Pond 44P : CMP Infiltration

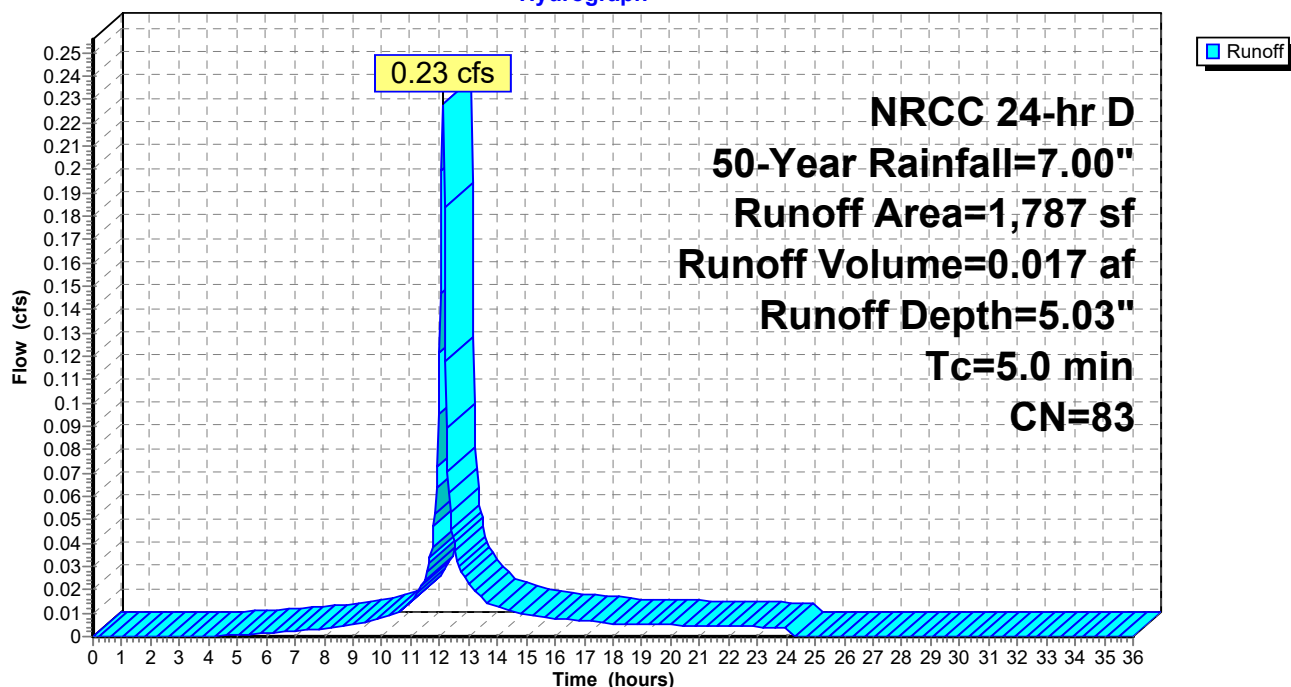
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 50-Year Rainfall=7.00"

	Area (sf)	CN	Description
*	1,006	98	Paved parking, HSG A
*	337	98	Cement Concrete Sidewalk, HSG A
	444	39	>75% Grass cover, Good, HSG A
	1,787	83	Weighted Average
	444		24.85% Pervious Area
	1,343		75.15% Impervious Area

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

Subcatchment 25S: PR-19

Hydrograph



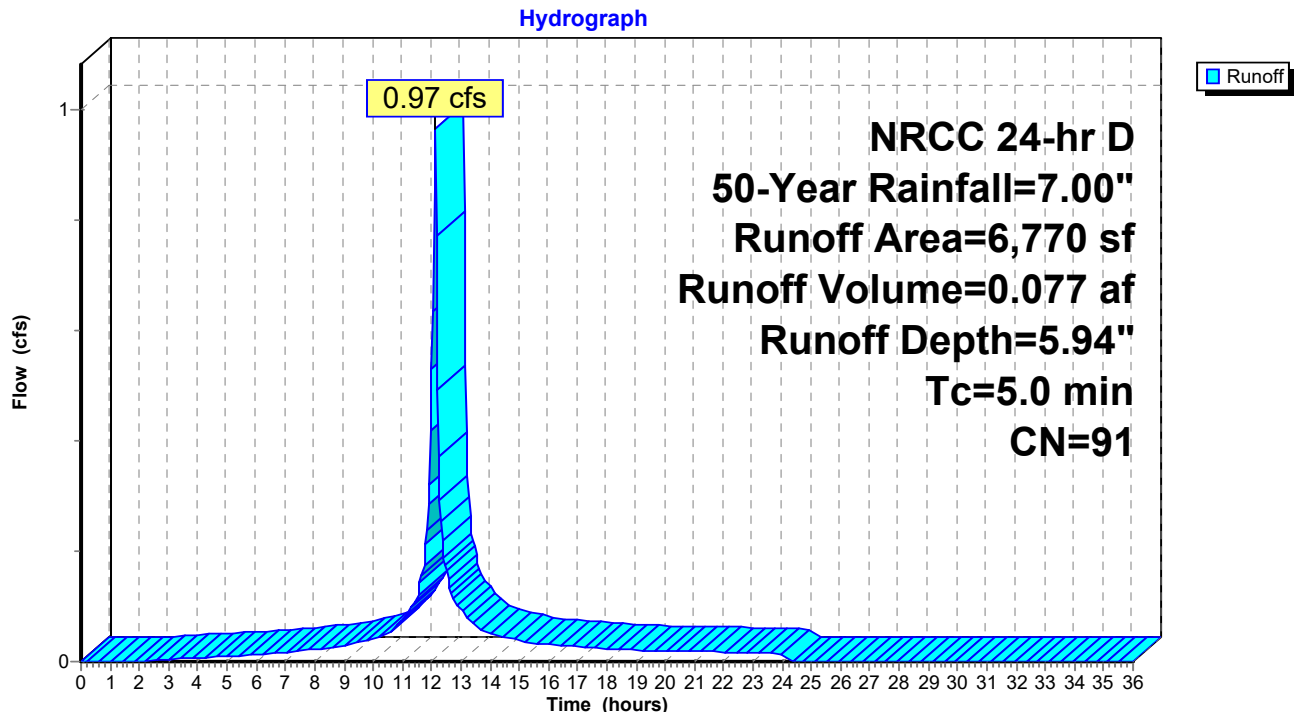
Summary for Subcatchment 26S: PR-20

Runoff = 0.97 cfs @ 12.11 hrs, Volume= 0.077 af, Depth= 5.94"
 Routed to Pond 44P : CMP Infiltration

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 50-Year Rainfall=7.00"

	Area (sf)	CN	Description
*	4,671	98	Paved parking, HSG A
*	1,328	98	Cement Concrete Sidewalk, HSG A
	771	39	>75% Grass cover, Good, HSG A
	6,770	91	Weighted Average
	771		11.39% Pervious Area
	5,999		88.61% Impervious Area

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

Subcatchment 26S: PR-20

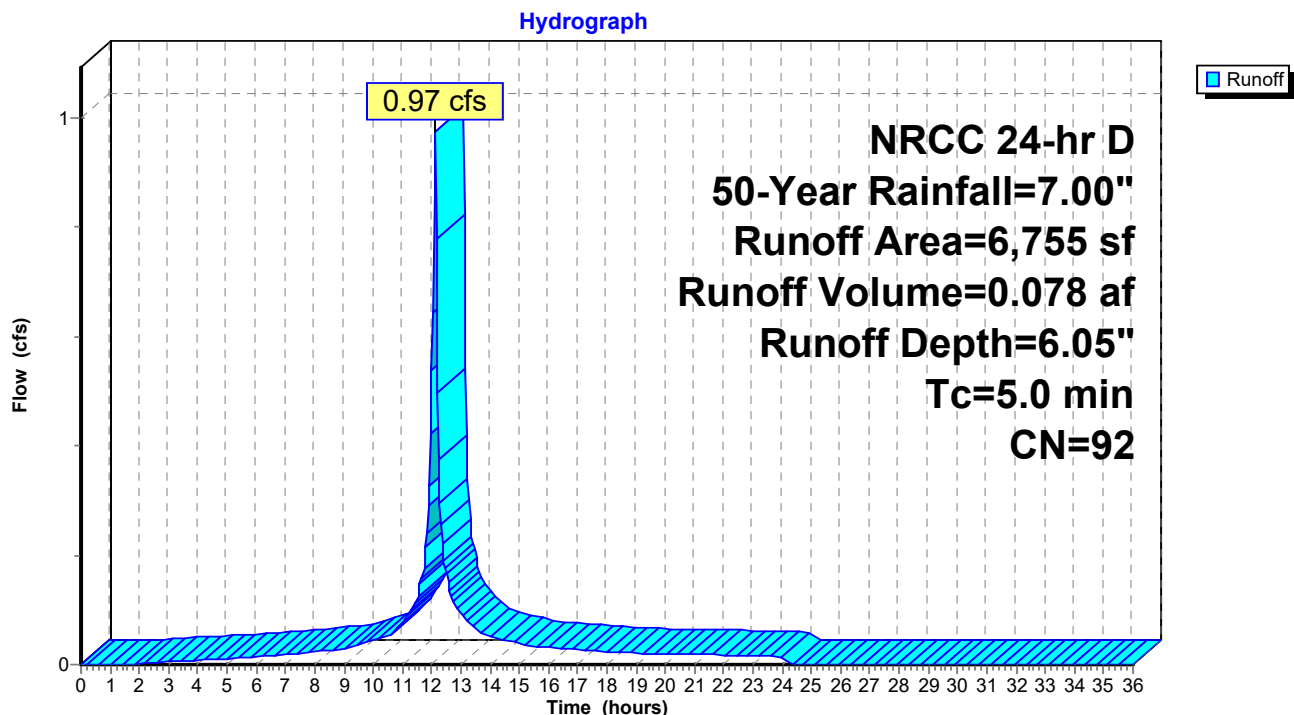
Summary for Subcatchment 27S: PR-21

Runoff = 0.97 cfs @ 12.11 hrs, Volume= 0.078 af, Depth= 6.05"
 Routed to Pond 44P : CMP Infiltration

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 50-Year Rainfall=7.00"

	Area (sf)	CN	Description
*	4,688	98	Paved parking, HSG A
*	1,331	98	Cement Concrete Sidewalk, HSG A
	736	39	>75% Grass cover, Good, HSG A
	6,755	92	Weighted Average
	736		10.90% Pervious Area
	6,019		89.10% Impervious Area

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

Subcatchment 27S: PR-21

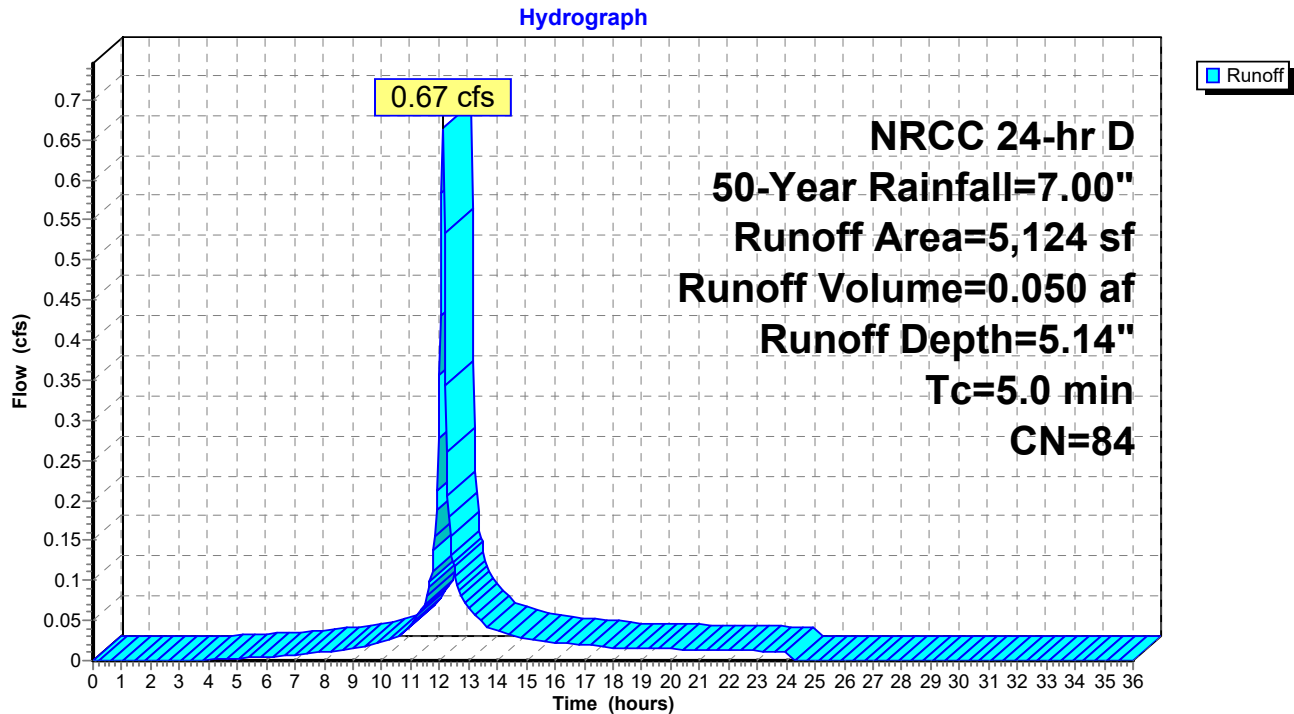
Summary for Subcatchment 28S: PR-22

Runoff = 0.67 cfs @ 12.12 hrs, Volume= 0.050 af, Depth= 5.14"
 Routed to Pond 44P : CMP Infiltration

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 50-Year Rainfall=7.00"

	Area (sf)	CN	Description
*	3,097	98	Paved parking, HSG A
*	72	98	Paved parking, HSG C
*	588	98	Cement Concrete Sidewalk, HSG C
	1,052	39	>75% Grass cover, Good, HSG A
	315	74	>75% Grass cover, Good, HSG C
	5,124	84	Weighted Average
	1,367		26.68% Pervious Area
	3,757		73.32% Impervious Area

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

Subcatchment 28S: PR-22

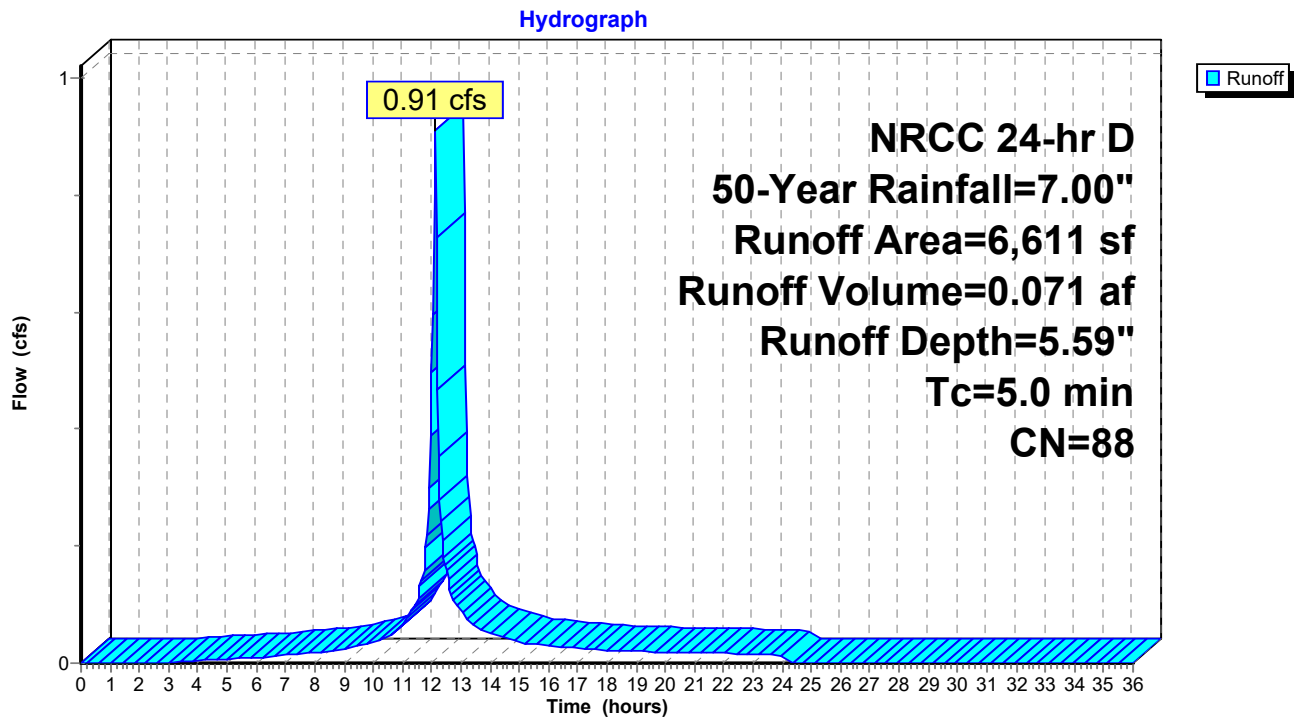
Summary for Subcatchment 29S: PR-23

Runoff = 0.91 cfs @ 12.11 hrs, Volume= 0.071 af, Depth= 5.59"
 Routed to Pond 44P : CMP Infiltration

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 50-Year Rainfall=7.00"

	Area (sf)	CN	Description
*	3,322	98	Paved parking, HSG A
*	748	98	Paved parking, HSG C
*	695	98	Cement Concrete Sidewalk, HSG A
*	463	98	Cement Concrete Sidewalk, HSG C
	914	39	>75% Grass cover, Good, HSG A
	469	74	>75% Grass cover, Good, HSG C
	6,611	88	Weighted Average
	1,383		20.92% Pervious Area
	5,228		79.08% Impervious Area

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

Subcatchment 29S: PR-23

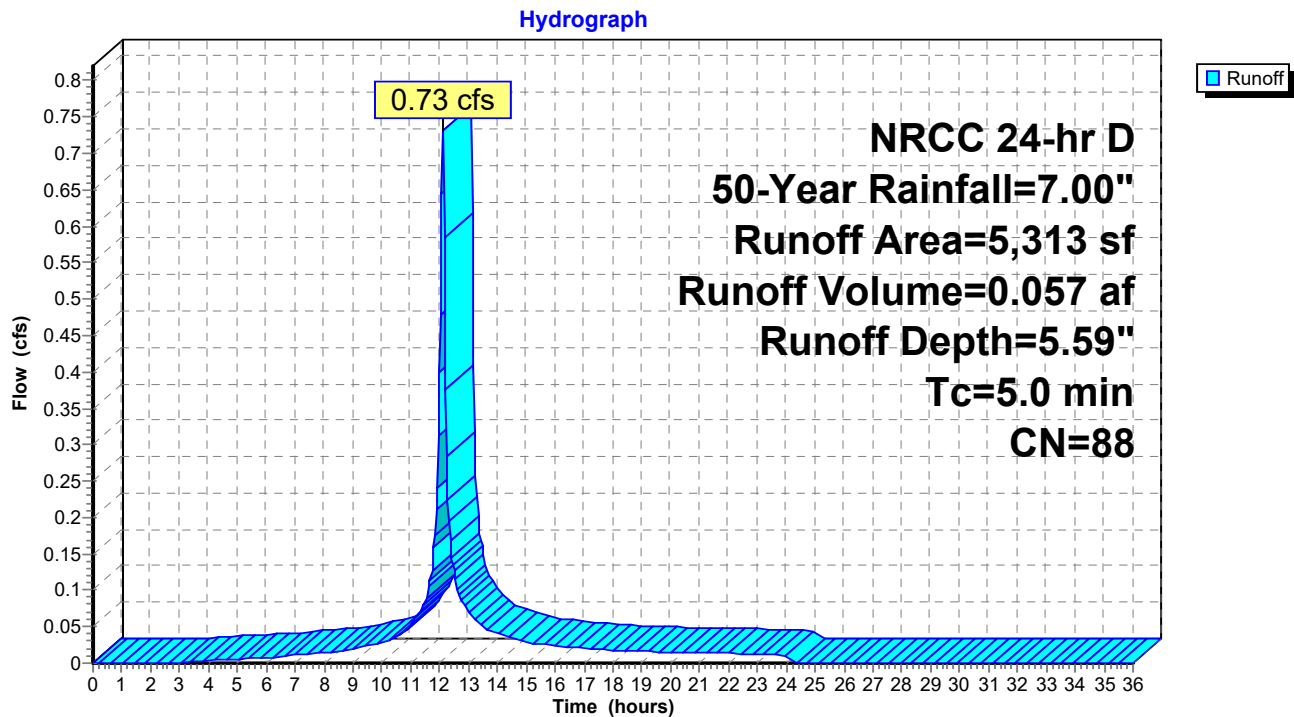
Summary for Subcatchment 30S: PR-24

Runoff = 0.73 cfs @ 12.11 hrs, Volume= 0.057 af, Depth= 5.59"
 Routed to Pond 44P : CMP Infiltration

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 50-Year Rainfall=7.00"

	Area (sf)	CN	Description
*	3,109	98	Paved parking, HSG A
*	146	98	Paved parking, HSG C
*	572	98	Cement Concrete Sidewalk, HSG A
*	432	98	Cement Concrete Sidewalk, HSG C
	819	39	>75% Grass cover, Good, HSG A
	235	74	>75% Grass cover, Good, HSG C
	5,313	88	Weighted Average
	1,054		19.84% Pervious Area
	4,259		80.16% Impervious Area

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

Subcatchment 30S: PR-24

Summary for Subcatchment 31S: PR-25

Runoff = 0.77 cfs @ 12.19 hrs, Volume= 0.074 af, Depth= 4.69"
 Routed to Pond 44P : CMP Infiltration

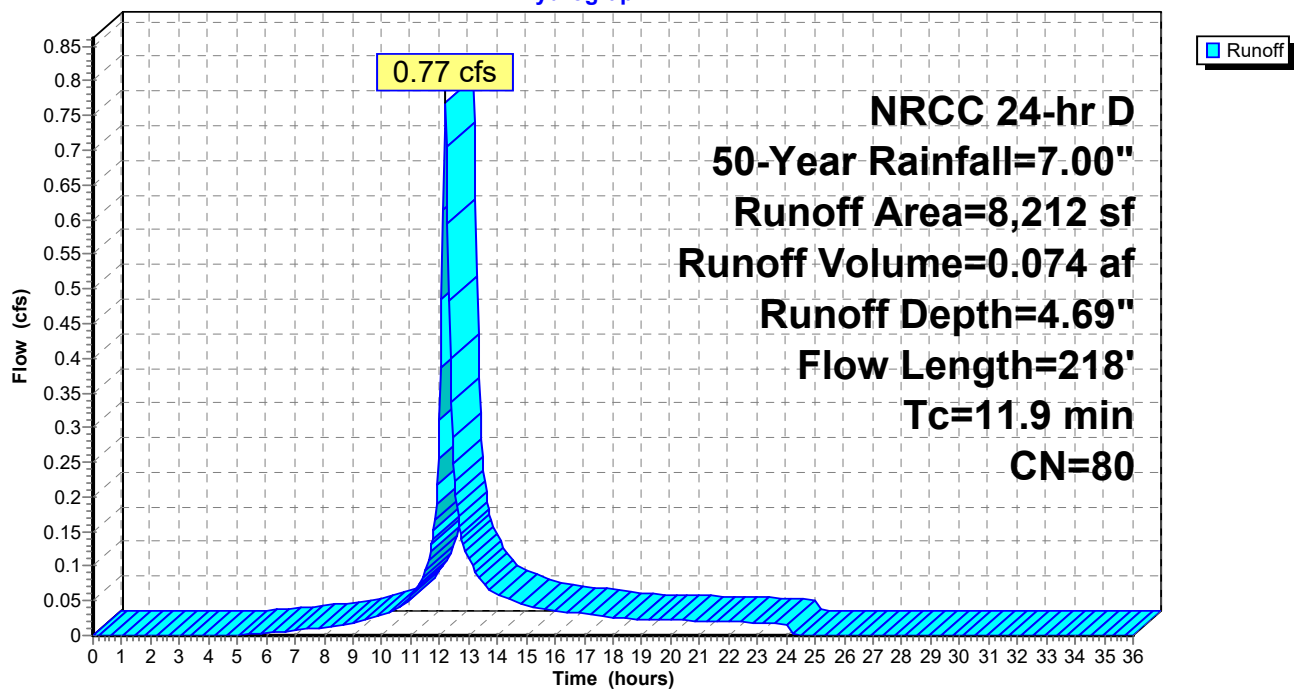
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 50-Year Rainfall=7.00"

	Area (sf)	CN	Description
*	3,851	98	Paved parking, HSG A
*	988	98	Cement Concrete Sidewalk, HSG A
*	65	98	Cement Concrete Sidewalk, HSG C
	1,910	39	>75% Grass cover, Good, HSG A
	1,398	74	>75% Grass cover, Good, HSG C
	8,212	80	Weighted Average
	3,308		40.28% Pervious Area
	4,904		59.72% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.6	63	0.0500	0.10		Sheet Flow, GRASS Grass: Bermuda n= 0.410 P2= 3.13"
0.6	37	0.0150	0.99		Sheet Flow, PAVEMENT Smooth surfaces n= 0.011 P2= 3.13"
0.7	118	0.0200	2.87		Shallow Concentrated Flow, PAVEMENT Paved Kv= 20.3 fps
11.9	218	Total			

Subcatchment 31S: PR-25

Hydrograph



Summary for Subcatchment 32S: PR-26

Runoff = 0.85 cfs @ 12.11 hrs, Volume= 0.069 af, Depth= 6.29"
 Routed to Pond 44P : CMP Infiltration

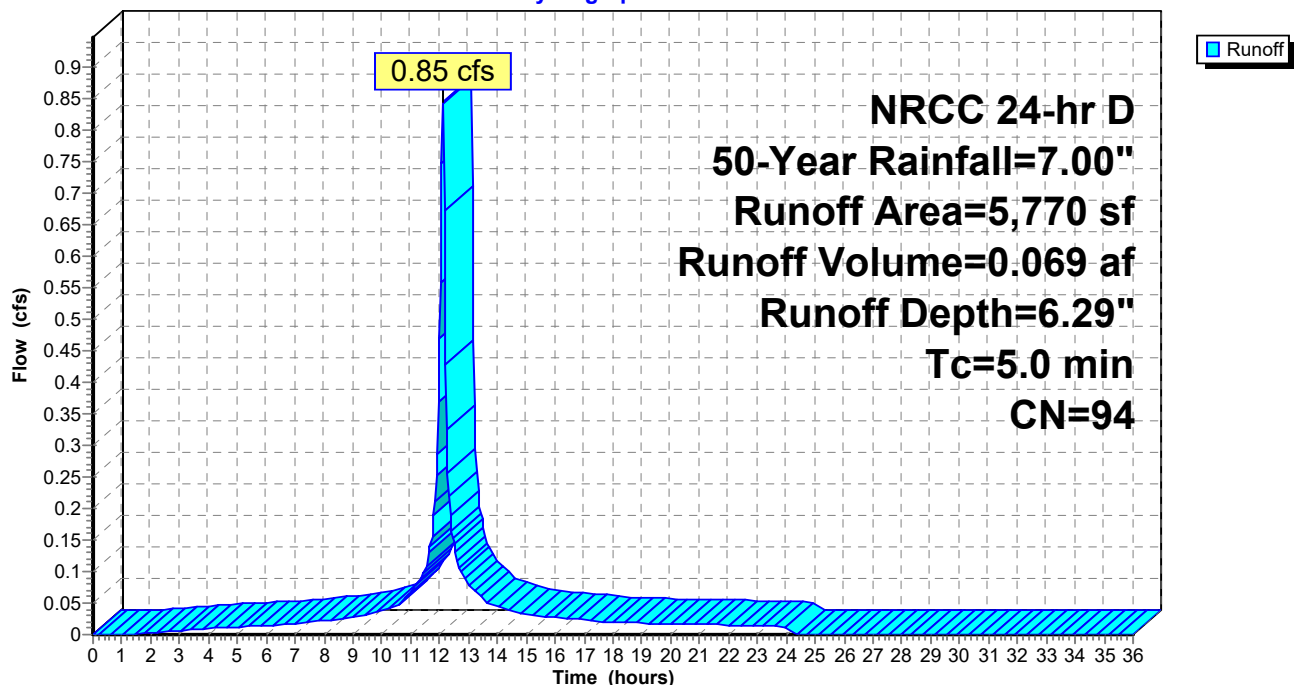
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 50-Year Rainfall=7.00"

	Area (sf)	CN	Description
*	4,263	98	Paved parking, HSG A
*	1,076	98	Cement Concrete Sidewalk, HSG A
	431	39	>75% Grass cover, Good, HSG A
	5,770	94	Weighted Average
	431		7.47% Pervious Area
	5,339		92.53% Impervious Area

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

Subcatchment 32S: PR-26

Hydrograph



Summary for Subcatchment 33S: PR-27

Runoff = 0.83 cfs @ 12.11 hrs, Volume= 0.068 af, Depth= 6.17"
 Routed to Pond 44P : CMP Infiltration

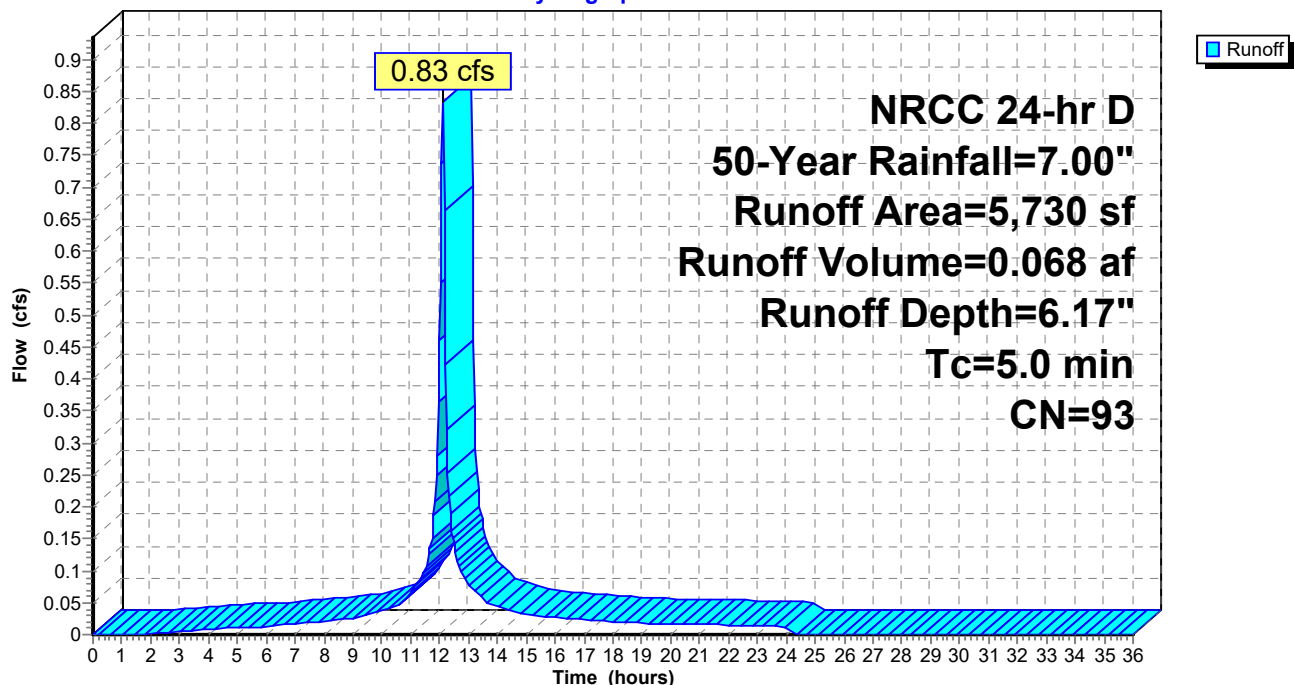
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 50-Year Rainfall=7.00"

	Area (sf)	CN	Description
*	4,151	98	Paved parking, HSG A
*	1,069	98	Cement Concrete Sidewalk, HSG A
	510	39	>75% Grass cover, Good, HSG A
	5,730	93	Weighted Average
	510		8.90% Pervious Area
	5,220		91.10% Impervious Area

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

Subcatchment 33S: PR-27

Hydrograph



Summary for Subcatchment 34S: PR-28

Runoff = 0.31 cfs @ 12.22 hrs, Volume= 0.031 af, Depth= 3.62"
 Routed to Pond 44P : CMP Infiltration

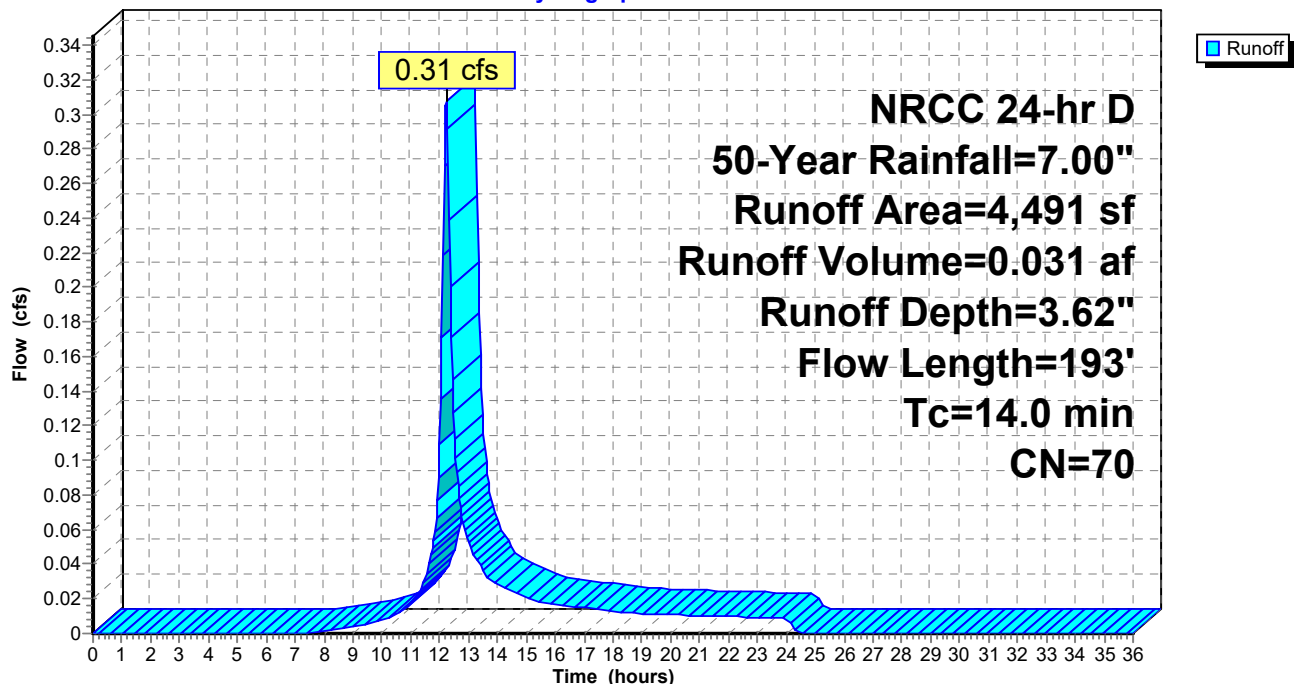
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 50-Year Rainfall=7.00"

Area (sf)	CN	Description
* 1,588	98	Paved parking, HSG A
* 456	98	Cement Concrete Sidewalk, HSG A
1,899	39	>75% Grass cover, Good, HSG A
548	74	>75% Grass cover, Good, HSG C
4,491	70	Weighted Average
2,447		54.49% Pervious Area
2,044		45.51% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.0	81	0.0500	0.10		Sheet Flow, GRASS Grass: Bermuda n= 0.410 P2= 3.13"
0.4	19	0.0150	0.87		Sheet Flow, PAVEMENT Smooth surfaces n= 0.011 P2= 3.13"
0.6	93	0.0150	2.49		Shallow Concentrated Flow, PAVEMENT Paved Kv= 20.3 fps
14.0	193	Total			

Subcatchment 34S: PR-28

Hydrograph



Summary for Subcatchment 35S: PR-29

Runoff = 0.19 cfs @ 12.12 hrs, Volume= 0.015 af, Depth= 5.48"
 Routed to Pond 44P : CMP Infiltration

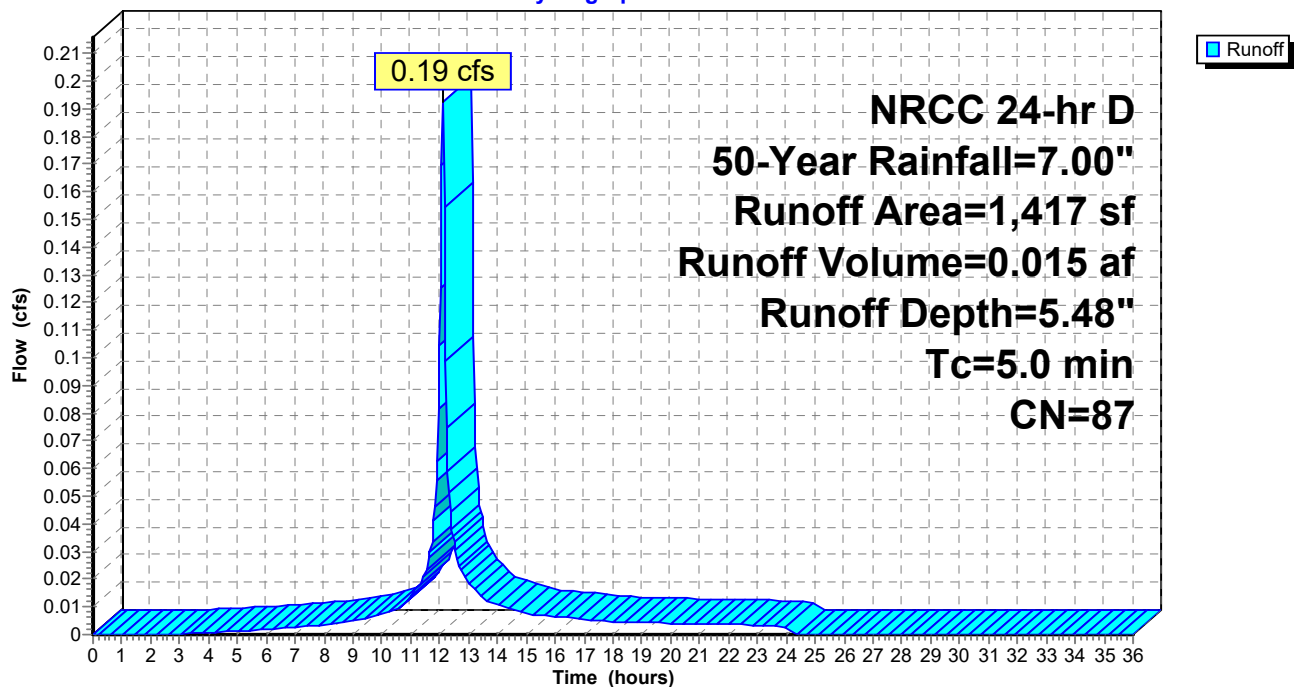
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 50-Year Rainfall=7.00"

	Area (sf)	CN	Description
*	1,137	98	Paved parking, HSG A
*	16	98	Cement Concrete Sidewalk, HSG A
	264	39	>75% Grass cover, Good, HSG A
	1,417	87	Weighted Average
	264		18.63% Pervious Area
	1,153		81.37% Impervious Area

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

Subcatchment 35S: PR-29

Hydrograph



Summary for Subcatchment 36S: PR-30

Runoff = 1.09 cfs @ 12.12 hrs, Volume= 0.083 af, Depth= 4.92"
 Routed to Pond 44P : CMP Infiltration

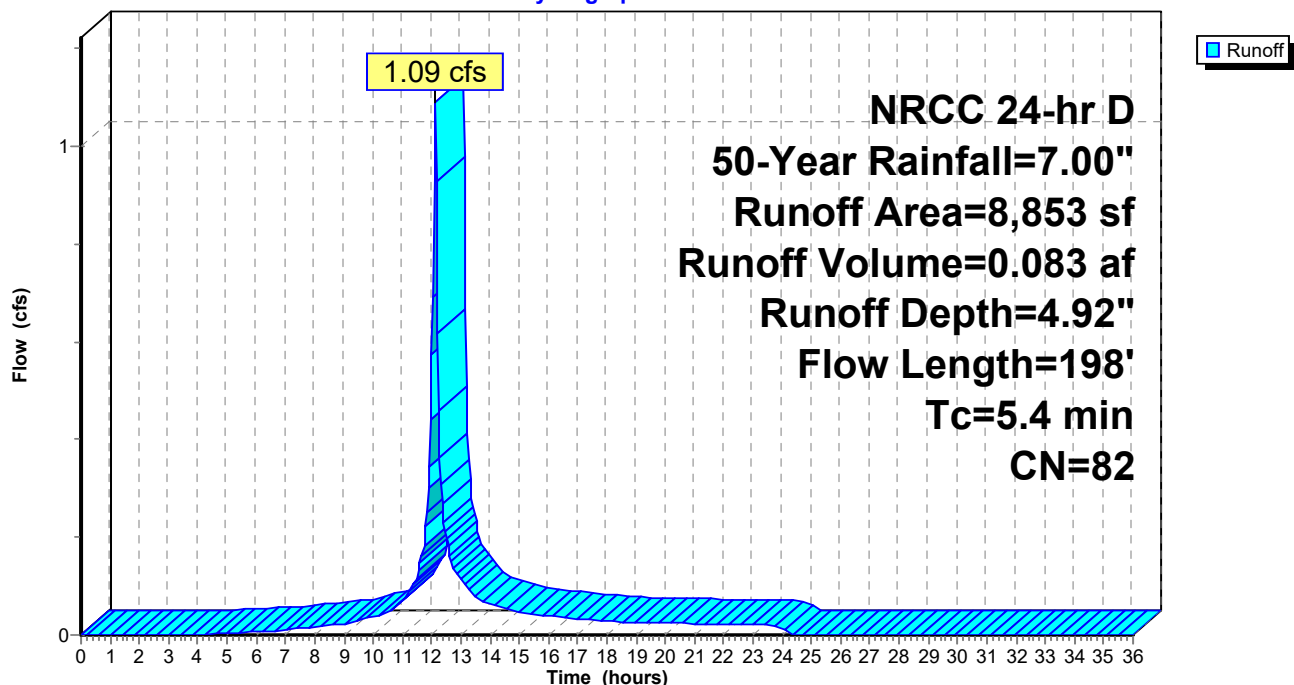
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 50-Year Rainfall=7.00"

	Area (sf)	CN	Description
*	5,691	98	Paved parking, HSG A
*	826	98	Cement Concrete Sidewalk, HSG A
	2,336	39	>75% Grass cover, Good, HSG A
	8,853	82	Weighted Average
	2,336		26.39% Pervious Area
	6,517		73.61% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.5	16	0.0500	0.08		Sheet Flow, GRASS Grass: Bermuda n= 0.410 P2= 3.13"
1.2	84	0.0150	1.17		Sheet Flow, PAVEMENT Smooth surfaces n= 0.011 P2= 3.13"
0.7	98	0.0150	2.49		Shallow Concentrated Flow, PAVEMENT Paved Kv= 20.3 fps
5.4	198	Total			

Subcatchment 36S: PR-30

Hydrograph



Summary for Subcatchment 37S: PR-31

Runoff = 1.28 cfs @ 12.12 hrs, Volume= 0.098 af, Depth= 5.14"
 Routed to Pond 44P : CMP Infiltration

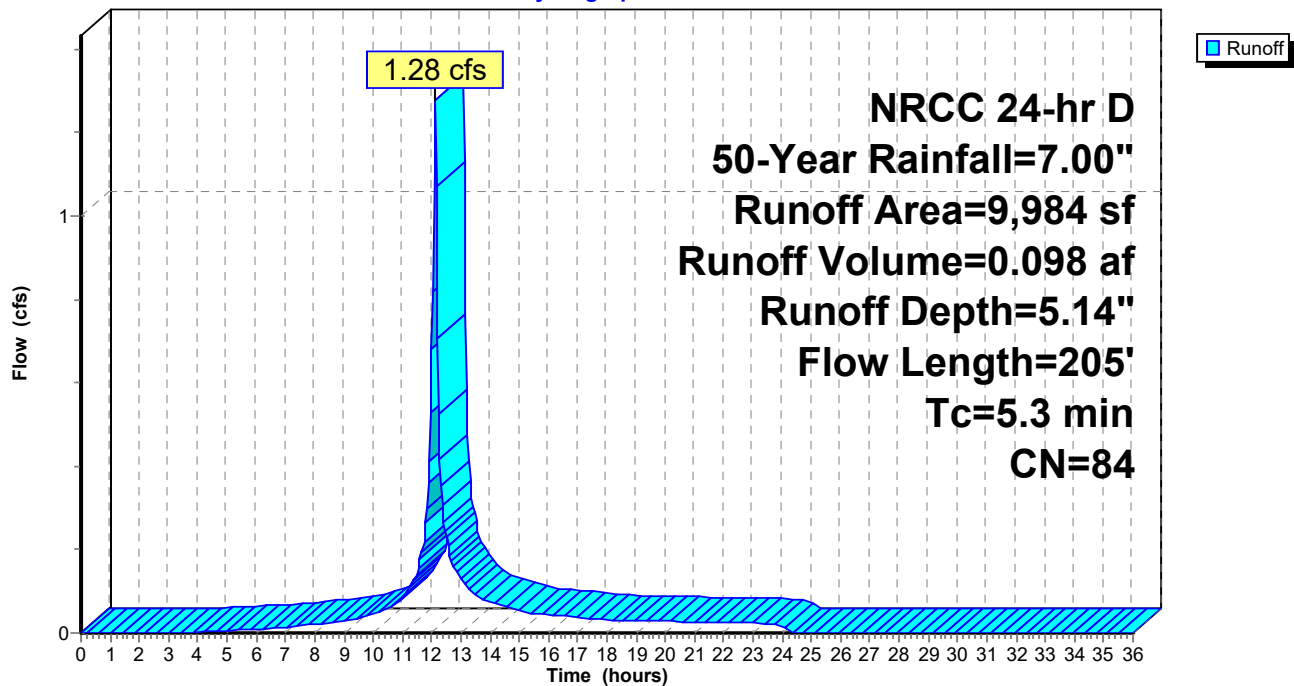
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 50-Year Rainfall=7.00"

	Area (sf)	CN	Description
*	6,479	98	Paved parking, HSG A
*	1,108	98	Cement Concrete Sidewalk, HSG A
	2,397	39	>75% Grass cover, Good, HSG A
	9,984	84	Weighted Average
	2,397		24.01% Pervious Area
	7,587		75.99% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.4	15	0.0500	0.07		Sheet Flow, GRASS Grass: Bermuda n= 0.410 P2= 3.13"
1.2	85	0.0150	1.17		Sheet Flow, PAVEMENT Smooth surfaces n= 0.011 P2= 3.13"
0.7	105	0.0150	2.49		Shallow Concentrated Flow, PAVEMENT Paved Kv= 20.3 fps
5.3	205	Total			

Subcatchment 37S: PR-31

Hydrograph



Summary for Subcatchment 38S: PR-32

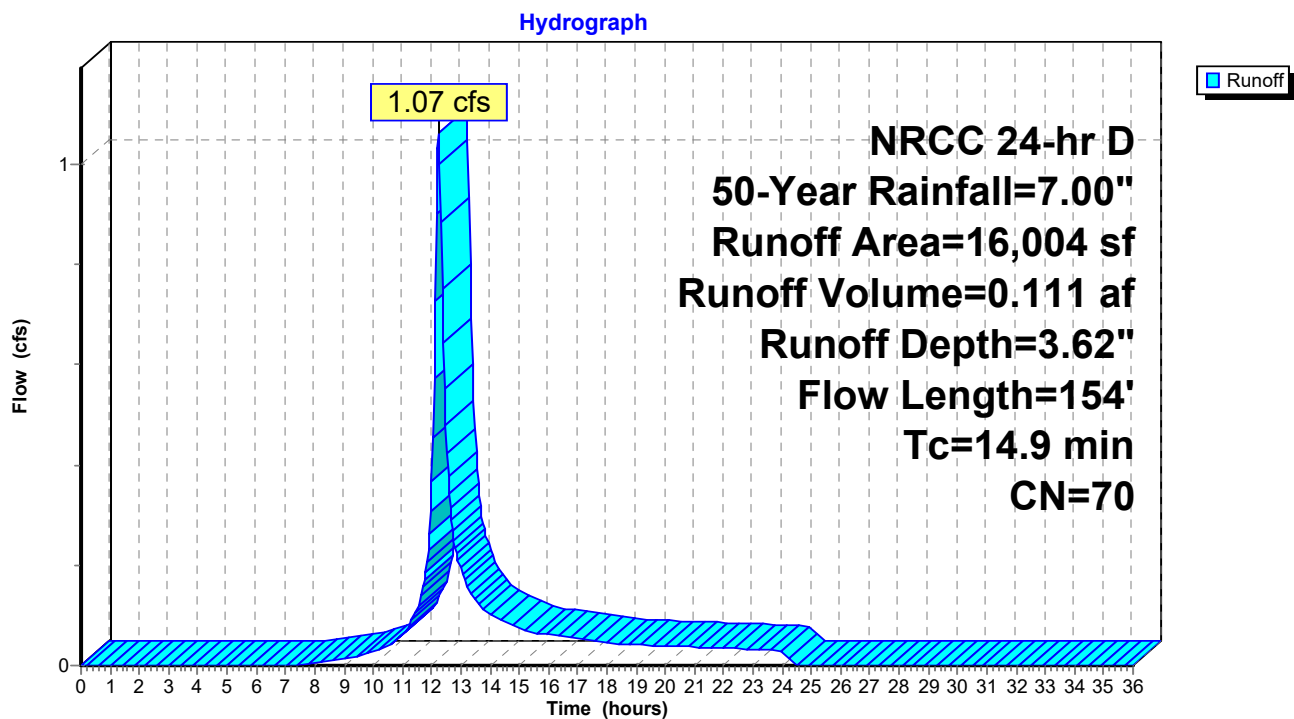
Runoff = 1.07 cfs @ 12.23 hrs, Volume= 0.111 af, Depth= 3.62"
 Routed to Pond 44P : CMP Infiltration

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 50-Year Rainfall=7.00"

	Area (sf)	CN	Description
*	6,711	98	Paved parking, HSG A
*	1,813	98	Cement Concrete Sidewalk, HSG A
	7,480	39	>75% Grass cover, Good, HSG A
	16,004	70	Weighted Average
	7,480		46.74% Pervious Area
	8,524		53.26% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.4	92	0.0500	0.11		Sheet Flow, GRASS Grass: Bermuda n= 0.410 P2= 3.13"
0.2	8	0.0200	0.82		Sheet Flow, PAVEMENT Smooth surfaces n= 0.011 P2= 3.13"
0.2	34	0.0500	3.35		Shallow Concentrated Flow, GRASS Grassed Waterway Kv= 15.0 fps
0.1	20	0.0200	2.87		Shallow Concentrated Flow, PAVEMENT Paved Kv= 20.3 fps
14.9	154	Total			

Subcatchment 38S: PR-32



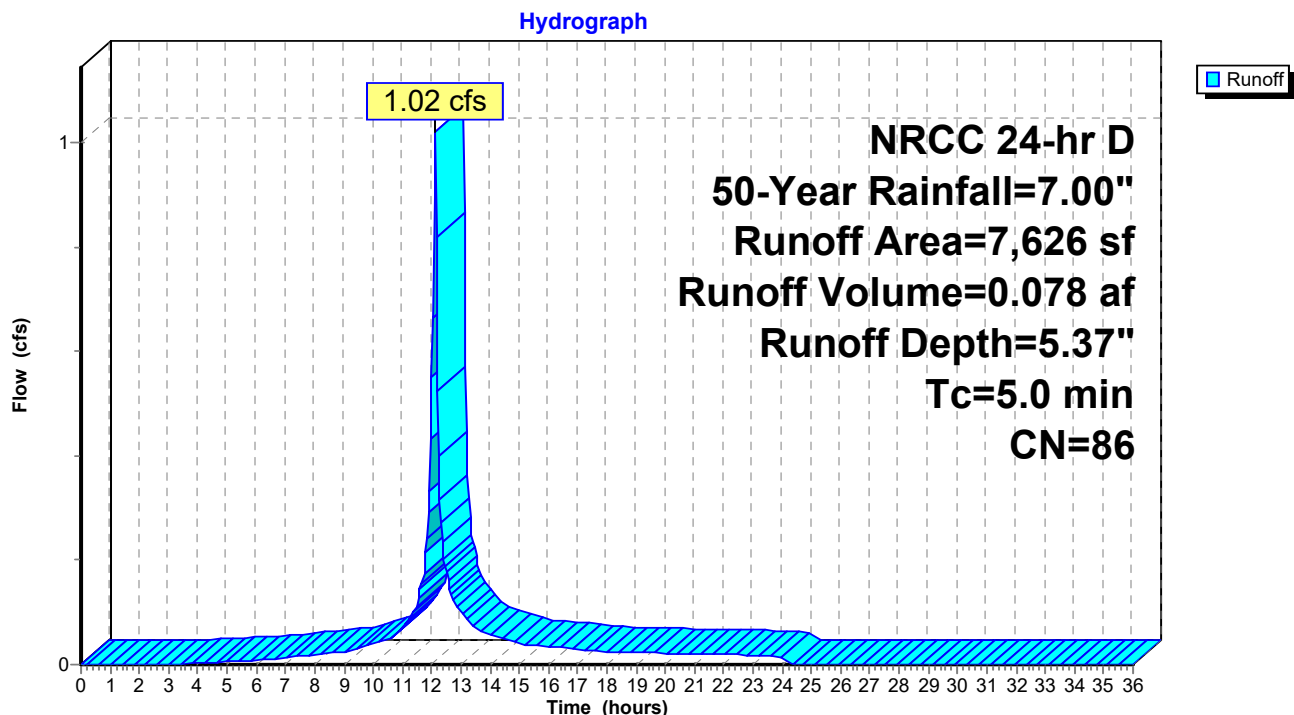
Summary for Subcatchment 39S: PR-33

Runoff = 1.02 cfs @ 12.12 hrs, Volume= 0.078 af, Depth= 5.37"
 Routed to Pond 44P : CMP Infiltration

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 50-Year Rainfall=7.00"

	Area (sf)	CN	Description
*	5,106	98	Paved parking, HSG A
*	920	98	Cement Concrete Sidewalk, HSG A
	1,600	39	>75% Grass cover, Good, HSG A
	7,626	86	Weighted Average
	1,600		20.98% Pervious Area
	6,026		79.02% Impervious Area

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

Subcatchment 39S: PR-33

Summary for Subcatchment 40S: PR-34

Runoff = 0.42 cfs @ 12.12 hrs, Volume= 0.034 af, Depth= 5.59"
 Routed to Pond 44P : CMP Infiltration

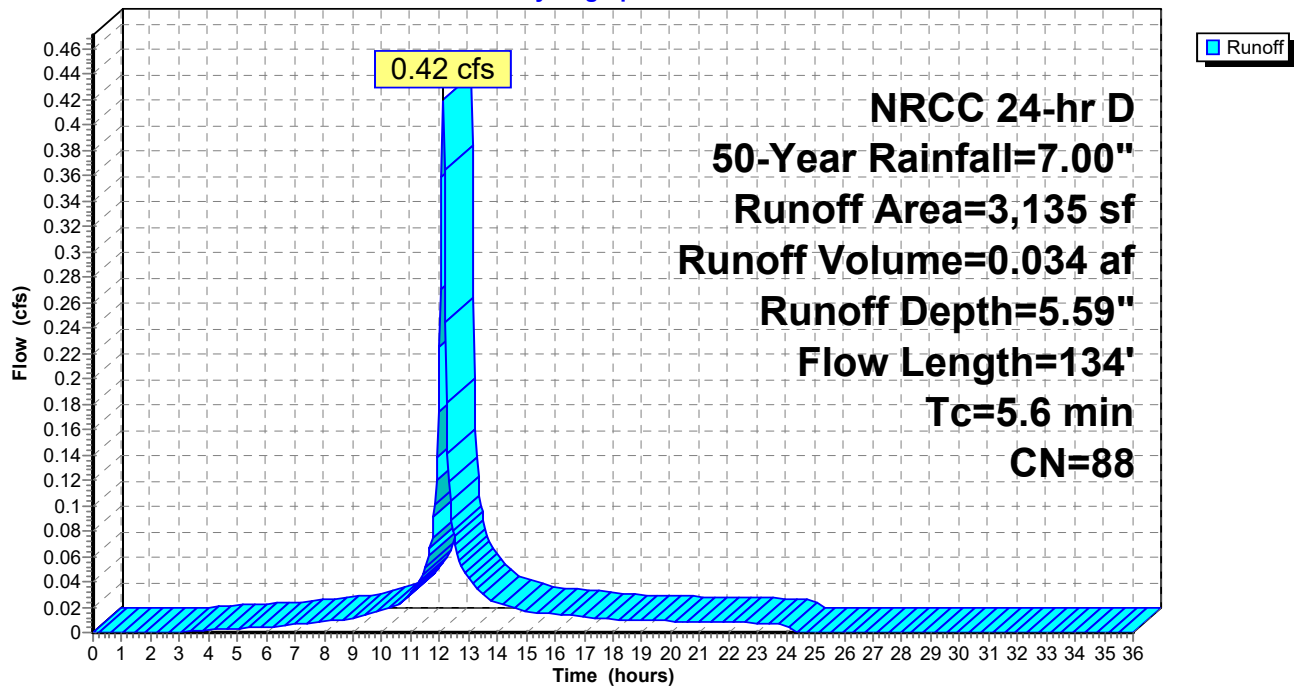
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 50-Year Rainfall=7.00"

	Area (sf)	CN	Description
*	2,389	98	Paved parking, HSG A
*	234	98	Cement Concrete Sidewalk, HSG A
	512	39	>75% Grass cover, Good, HSG A
	3,135	88	Weighted Average
	512		16.33% Pervious Area
	2,623		83.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.4	21	0.0500	0.08		Sheet Flow, GRASS Grass: Bermuda n= 0.410 P2= 3.13"
1.0	79	0.0200	1.30		Sheet Flow, PAVEMENT Smooth surfaces n= 0.011 P2= 3.13"
0.0	7	0.0500	3.35		Shallow Concentrated Flow, GRASS Grassed Waterway Kv= 15.0 fps
0.2	27	0.0200	2.87		Shallow Concentrated Flow, PAVEMENT Paved Kv= 20.3 fps
5.6	134	Total			

Subcatchment 40S: PR-34

Hydrograph



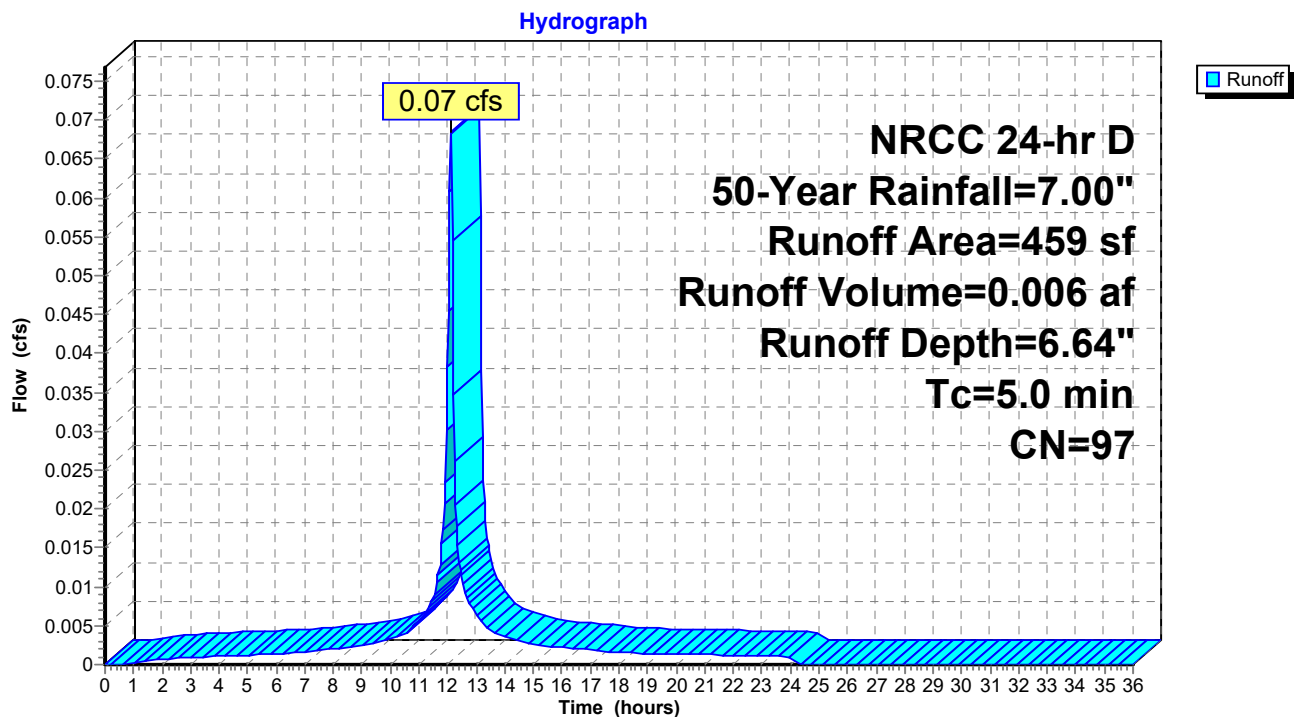
Summary for Subcatchment 41S: PR-35

Runoff = 0.07 cfs @ 12.11 hrs, Volume= 0.006 af, Depth= 6.64"
 Routed to Pond 44P : CMP Infiltration

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 50-Year Rainfall=7.00"

	Area (sf)	CN	Description
*	366	98	Paved parking, HSG A
*	86	98	Cement Concrete Sidewalk, HSG A
	7	39	>75% Grass cover, Good, HSG A
	459	97	Weighted Average
	7		1.53% Pervious Area
	452		98.47% Impervious Area

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

Subcatchment 41S: PR-35

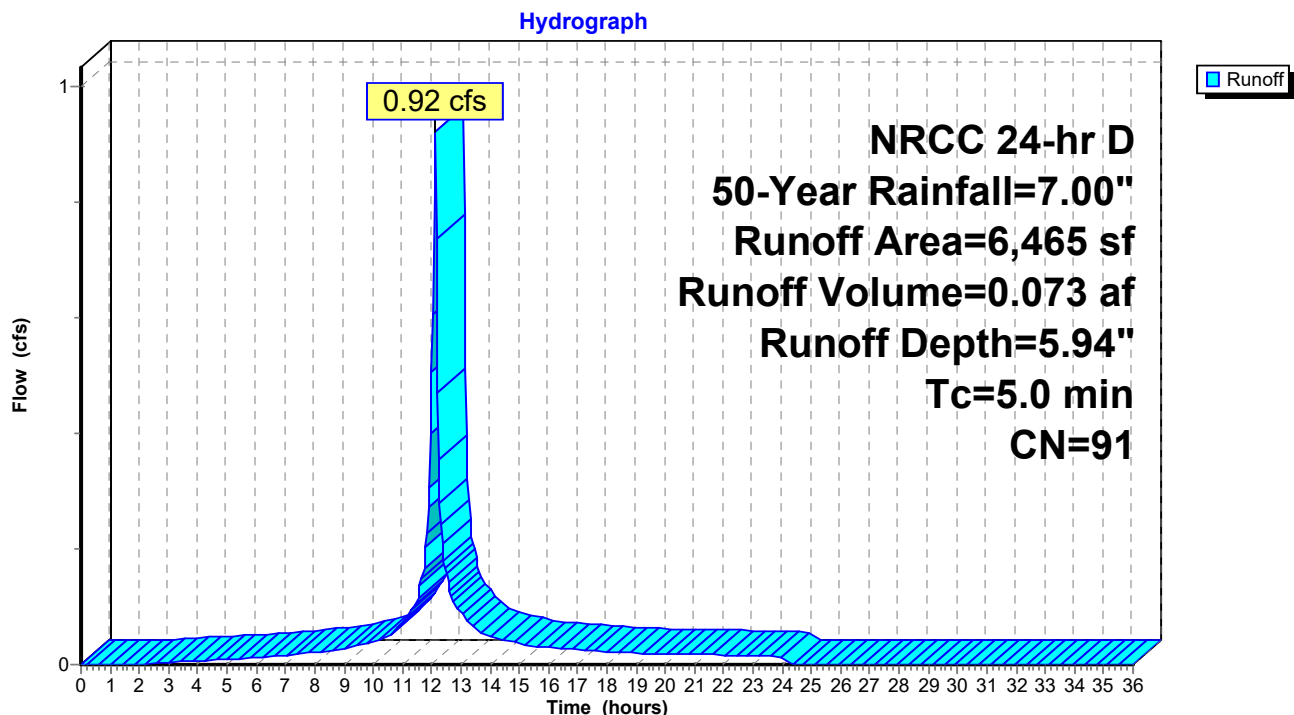
Summary for Subcatchment 42S: PR-36

Runoff = 0.92 cfs @ 12.11 hrs, Volume= 0.073 af, Depth= 5.94"
 Routed to Pond 44P : CMP Infiltration

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 50-Year Rainfall=7.00"

	Area (sf)	CN	Description
*	4,448	98	Paved parking, HSG A
*	1,207	98	Cement Concrete Sidewalk, HSG A
	810	39	>75% Grass cover, Good, HSG A
	6,465	91	Weighted Average
	810		12.53% Pervious Area
	5,655		87.47% Impervious Area

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

Subcatchment 42S: PR-36

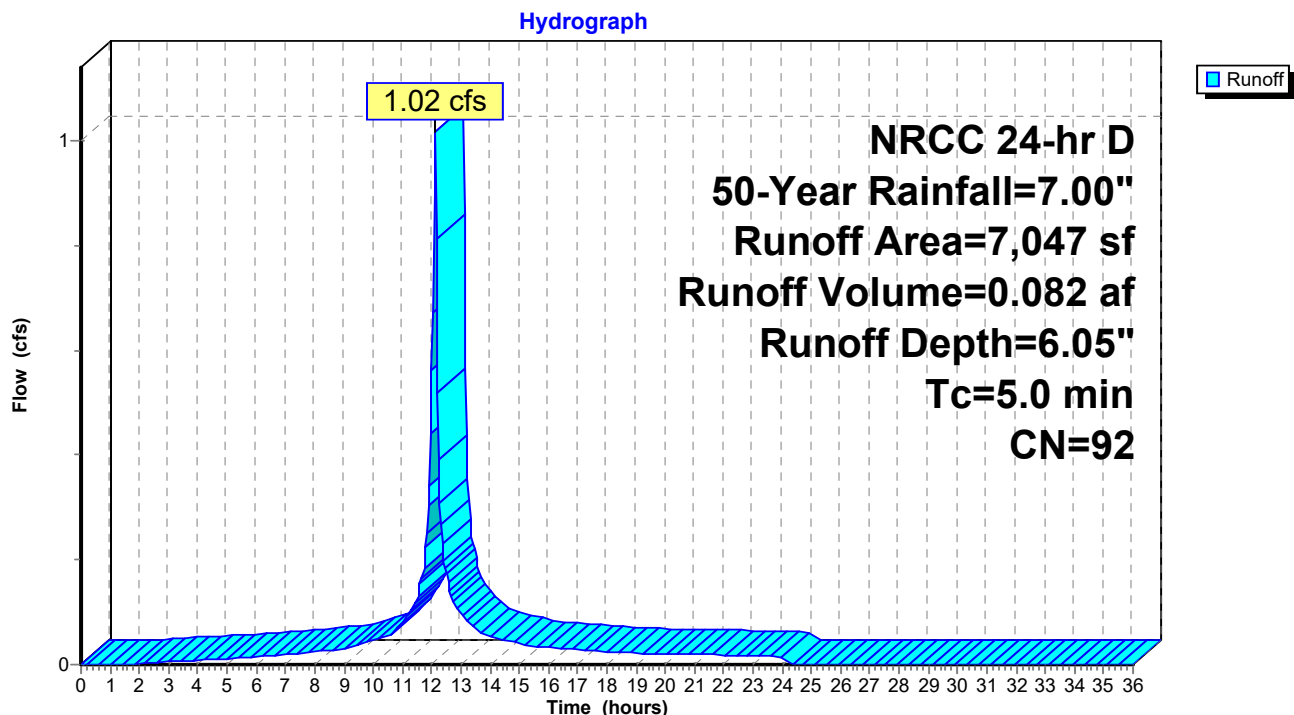
Summary for Subcatchment 43S: PR-37

Runoff = 1.02 cfs @ 12.11 hrs, Volume= 0.082 af, Depth= 6.05"
 Routed to Pond 44P : CMP Infiltration

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 50-Year Rainfall=7.00"

	Area (sf)	CN	Description
*	5,177	98	Paved parking, HSG A
*	1,177	98	Cement Concrete Sidewalk, HSG A
	693	39	>75% Grass cover, Good, HSG A
	7,047	92	Weighted Average
	693		9.83% Pervious Area
	6,354		90.17% Impervious Area

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

Subcatchment 43S: PR-37

Summary for Pond 44P: CMP Infiltration

Inflow Area = 5.917 ac, 73.14% Impervious, Inflow Depth = 5.33" for 50-Year event
 Inflow = 31.34 cfs @ 12.12 hrs, Volume= 2.627 af
 Outflow = 21.69 cfs @ 12.19 hrs, Volume= 2.627 af, Atten= 31%, Lag= 4.0 min
 Discarded = 0.22 cfs @ 12.19 hrs, Volume= 0.282 af
 Primary = 21.47 cfs @ 12.19 hrs, Volume= 2.346 af
 Routed to Pond 45P : Rain Garden

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs / 3
 Peak Elev= 271.33' @ 12.19 hrs Surf.Area= 0.055 ac Storage= 0.193 af

Plug-Flow detention time= 11.0 min calculated for 2.624 af (100% of inflow)
 Center-of-Mass det. time= 11.1 min (810.4 - 799.3)

Volume	Invert	Avail.Storage	Storage Description
#1C	266.50'	0.081 af	17.00'W x 142.00'L x 7.00'H Field C 0.388 af Overall - 0.186 af Embedded = 0.202 af x 40.0% Voids
#2C	267.00'	0.186 af	CMP Round 72 x 12 Inside #1 Effective Size= 72.0"W x 72.0"H => 28.27 sf x 20.00'L = 565.5 cf Overall Size= 72.0"W x 72.0"H x 20.00'L Row Length Adjustment= +8.00' x 28.27 sf x 2 rows 15.00' Header x 28.27 sf x 2 = 848.2 cf Inside
		0.267 af	Total Available Storage

Storage Group C created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	267.00'	18.0" Round Culvert L= 169.0' RCP, rounded edge headwall, Ke= 0.100 Inlet / Outlet Invert= 267.00' / 260.24' S= 0.0400 ' / ' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.77 sf
#2	Discarded	266.50'	2.410 in/hr Exfiltration over Wetted area

Discarded OutFlow Max=0.22 cfs @ 12.19 hrs HW=271.28' (Free Discharge)

↑**2=Exfiltration** (Exfiltration Controls 0.22 cfs)

Primary OutFlow Max=21.39 cfs @ 12.19 hrs HW=271.28' TW=259.83' (Dynamic Tailwater)

↑**1=Culvert** (Barrel Controls 21.39 cfs @ 12.11 fps)

Pond 44P: CMP Infiltration - Chamber Wizard Field C

Chamber Model = CMP Round 72 (Round Corrugated Metal Pipe)

Effective Size= 72.0"W x 72.0"H => 28.27 sf x 20.00'L = 565.5 cf

Overall Size= 72.0"W x 72.0"H x 20.00'L

Row Length Adjustment= +8.00' x 28.27 sf x 2 rows

72.0" Wide + 36.0" Spacing = 108.0" C-C Row Spacing

6 Chambers/Row x 20.00' Long +8.00' Row Adjustment +6.00' Header x 2 = 140.00' Row Length +12.0"

End Stone x 2 = 142.00' Base Length

2 Rows x 72.0" Wide + 36.0" Spacing x 1 + 12.0" Side Stone x 2 = 17.00' Base Width

6.0" Stone Base + 72.0" Chamber Height + 6.0" Stone Cover = 7.00' Field Height

12 Chambers x 565.5 cf +8.00' Row Adjustment x 28.27 sf x 2 Rows + 15.00' Header x 28.27 sf x 2 =
8,086.5 cf Chamber Storage

16,898.0 cf Field - 8,086.5 cf Chambers = 8,811.5 cf Stone x 40.0% Voids = 3,524.6 cf Stone Storage

Chamber Storage + Stone Storage = 11,611.1 cf = 0.267 af

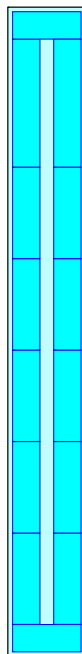
Overall Storage Efficiency = 68.7%

Overall System Size = 142.00' x 17.00' x 7.00'

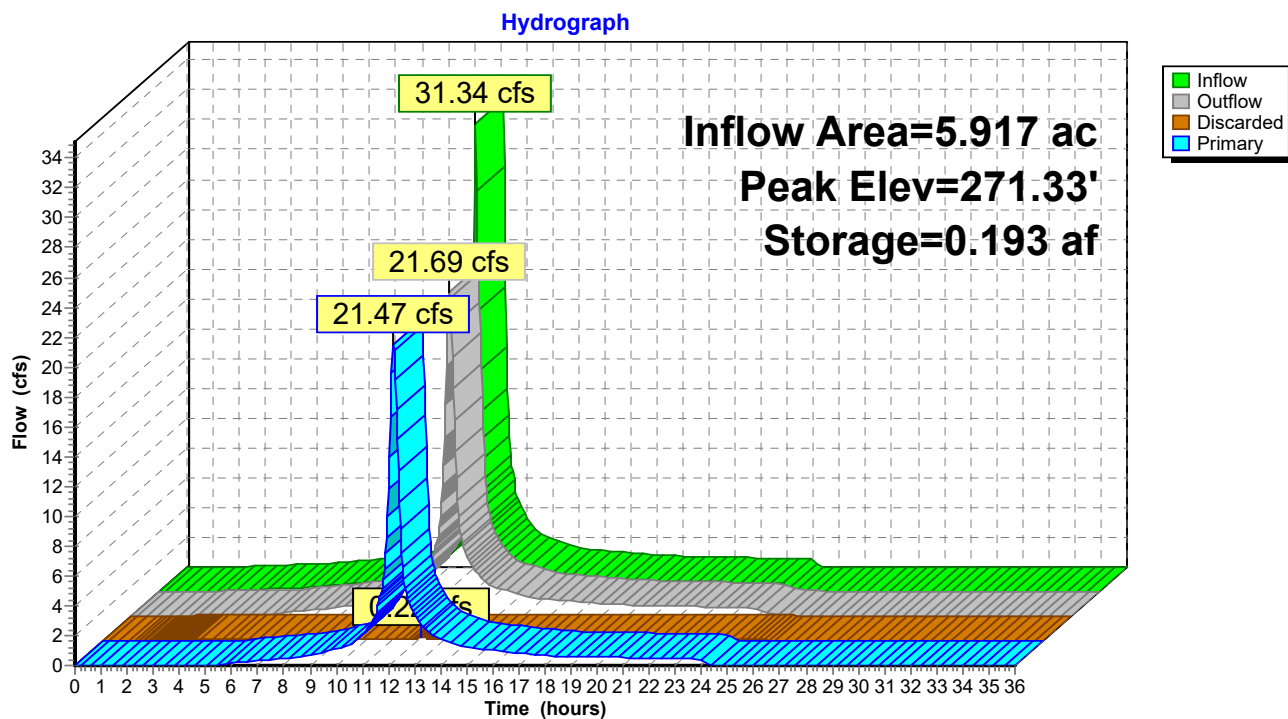
12 Chambers

625.9 cy Field

326.4 cy Stone



Pond 44P: CMP Infiltration



Stage-Area-Storage for Pond 44P: CMP Infiltration

Elevation (feet)	Wetted (acres)	Storage (acre-feet)	Elevation (feet)	Wetted (acres)	Storage (acre-feet)
266.50	0.055	0.000	271.80	0.094	0.213
266.60	0.056	0.002	271.90	0.095	0.217
266.70	0.057	0.004	272.00	0.096	0.221
266.80	0.058	0.007	272.10	0.096	0.225
266.90	0.058	0.009	272.20	0.097	0.229
267.00	0.059	0.011	272.30	0.098	0.233
267.10	0.060	0.014	272.40	0.098	0.236
267.20	0.061	0.017	272.50	0.099	0.240
267.30	0.061	0.020	272.60	0.100	0.243
267.40	0.062	0.023	272.70	0.101	0.247
267.50	0.063	0.027	272.80	0.101	0.250
267.60	0.063	0.030	272.90	0.102	0.253
267.70	0.064	0.034	273.00	0.103	0.255
267.80	0.065	0.038	273.10	0.104	0.258
267.90	0.066	0.042	273.20	0.104	0.260
268.00	0.066	0.045	273.30	0.105	0.262
268.10	0.067	0.049	273.40	0.106	0.264
268.20	0.068	0.054	273.50	0.107	0.267
268.30	0.069	0.058			
268.40	0.069	0.062			
268.50	0.070	0.066			
268.60	0.071	0.070			
268.70	0.071	0.075			
268.80	0.072	0.079			
268.90	0.073	0.083			
269.00	0.074	0.088			
269.10	0.074	0.092			
269.20	0.075	0.097			
269.30	0.076	0.101			
269.40	0.077	0.106			
269.50	0.077	0.110			
269.60	0.078	0.115			
269.70	0.079	0.120			
269.80	0.080	0.124			
269.90	0.080	0.129			
270.00	0.081	0.133			
270.10	0.082	0.138			
270.20	0.082	0.142			
270.30	0.083	0.147			
270.40	0.084	0.152			
270.50	0.085	0.156			
270.60	0.085	0.161			
270.70	0.086	0.165			
270.80	0.087	0.170			
270.90	0.088	0.174			
271.00	0.088	0.179			
271.10	0.089	0.183			
271.20	0.090	0.187			
271.30	0.090	0.192			
271.40	0.091	0.196			
271.50	0.092	0.200			
271.60	0.093	0.205			
271.70	0.093	0.209			

Summary for Pond 45P: Rain Garden

Inflow Area = 5.917 ac, 73.14% Impervious, Inflow Depth = 4.76" for 50-Year event
 Inflow = 21.47 cfs @ 12.19 hrs, Volume= 2.346 af
 Outflow = 20.12 cfs @ 12.26 hrs, Volume= 2.346 af, Atten= 6%, Lag= 4.4 min
 Discarded = 3.69 cfs @ 12.26 hrs, Volume= 1.747 af
 Primary = 16.44 cfs @ 12.26 hrs, Volume= 0.599 af
 Routed to Link 15L : DP-1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs / 3
 Peak Elev= 259.89' @ 12.26 hrs Surf.Area= 12,191 sf Storage= 14,925 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 24.6 min (831.2 - 806.6)

Volume	Invert	Avail.Storage	Storage Description
#1	255.50'	6,443 cf	Custom Stage Data (Irregular) Listed below (Recalc) 16,107 cf Overall x 40.0% Voids
#2	258.50'	10,400 cf	Custom Stage Data (Irregular) Listed below (Recalc)
		16,843 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
255.50	5,369	313.0	0	0	5,369
258.50	5,369	313.0	16,107	16,107	6,308

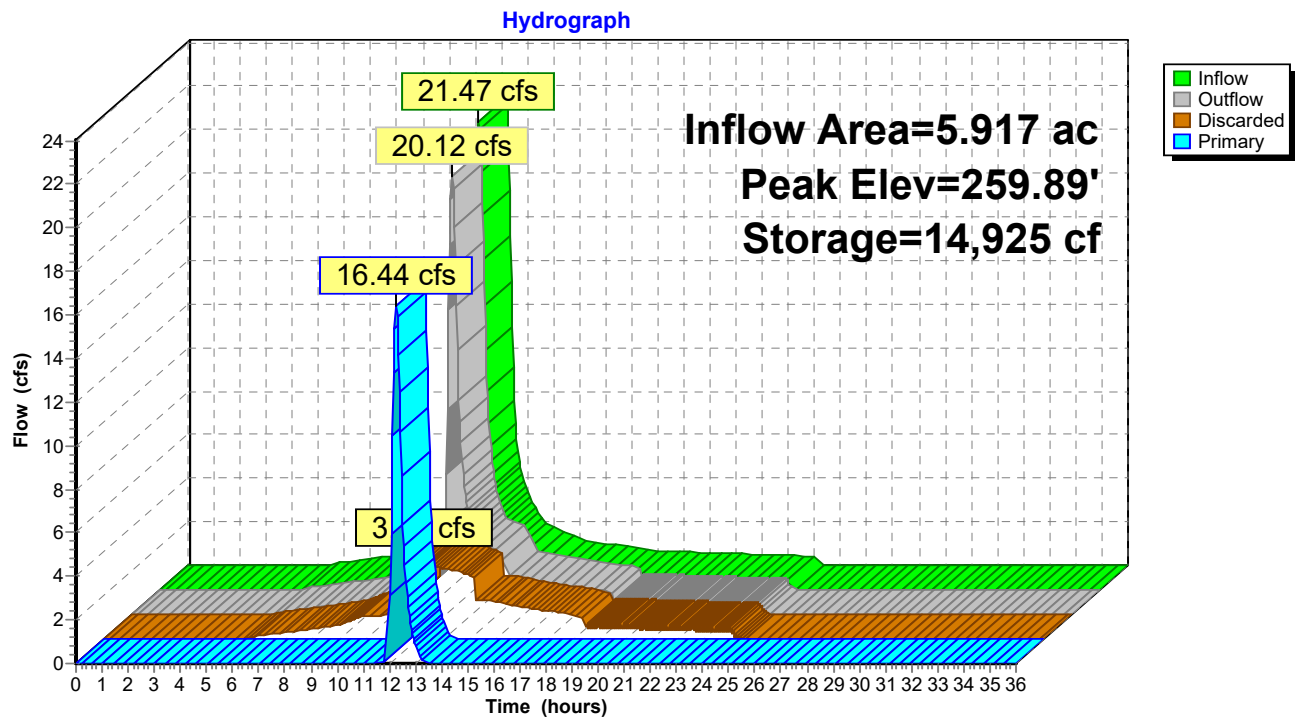
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
258.50	5,369	313.0	0	0	5,369
260.00	6,938	357.4	9,205	9,205	7,790
260.17	7,118	360.5	1,195	10,400	7,978

Device	Routing	Invert	Outlet Devices
#1	Primary	253.71'	24.0" Round Culvert L= 32.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 253.71' / 253.36' S= 0.0109 ' / ' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 3.14 sf
#2	Discarded	255.50'	8.270 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 251.50'
#3	Device 1	259.55'	2.0" x 2.0" Horiz. Orifice/Grate X 6.00 columns X 6 rows C= 0.600 Limited to weir flow at low heads
#4	Primary	259.05'	6.0' long x 0.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 Coef. (English) 2.80 2.92

Discarded OutFlow Max=3.68 cfs @ 12.26 hrs HW=259.89' (Free Discharge)
 ↳ **2=Exfiltration** (Controls 3.68 cfs)

Primary OutFlow Max=16.31 cfs @ 12.26 hrs HW=259.89' TW=0.00' (Dynamic Tailwater)
 ↳ **1=Culvert** (Passes 2.81 cfs of 27.18 cfs potential flow)
 ↳ **3=Orifice/Grate** (Orifice Controls 2.81 cfs @ 2.81 fps)
 ↳ **4=Broad-Crested Rectangular Weir** (Weir Controls 13.50 cfs @ 2.68 fps)

Pond 45P: Rain Garden



Stage-Area-Storage for Pond 45P: Rain Garden

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
255.50	5,369	0
255.60	5,369	215
255.70	5,369	430
255.80	5,369	644
255.90	5,369	859
256.00	5,369	1,074
256.10	5,369	1,289
256.20	5,369	1,503
256.30	5,369	1,718
256.40	5,369	1,933
256.50	5,369	2,148
256.60	5,369	2,362
256.70	5,369	2,577
256.80	5,369	2,792
256.90	5,369	3,007
257.00	5,369	3,221
257.10	5,369	3,436
257.20	5,369	3,651
257.30	5,369	3,866
257.40	5,369	4,080
257.50	5,369	4,295
257.60	5,369	4,510
257.70	5,369	4,725
257.80	5,369	4,939
257.90	5,369	5,154
258.00	5,369	5,369
258.10	5,369	5,584
258.20	5,369	5,799
258.30	5,369	6,013
258.40	5,369	6,228
258.50	10,738	6,443
258.60	10,836	6,985
258.70	10,936	7,536
258.80	11,036	8,098
258.90	11,137	8,670
259.00	11,239	9,252
259.10	11,341	9,844
259.20	11,445	10,446
259.30	11,550	11,059
259.40	11,655	11,682
259.50	11,762	12,316
259.60	11,869	12,961
259.70	11,977	13,616
259.80	12,086	14,282
259.90	12,196	14,960
260.00	12,307	15,648
260.10	12,413	16,347

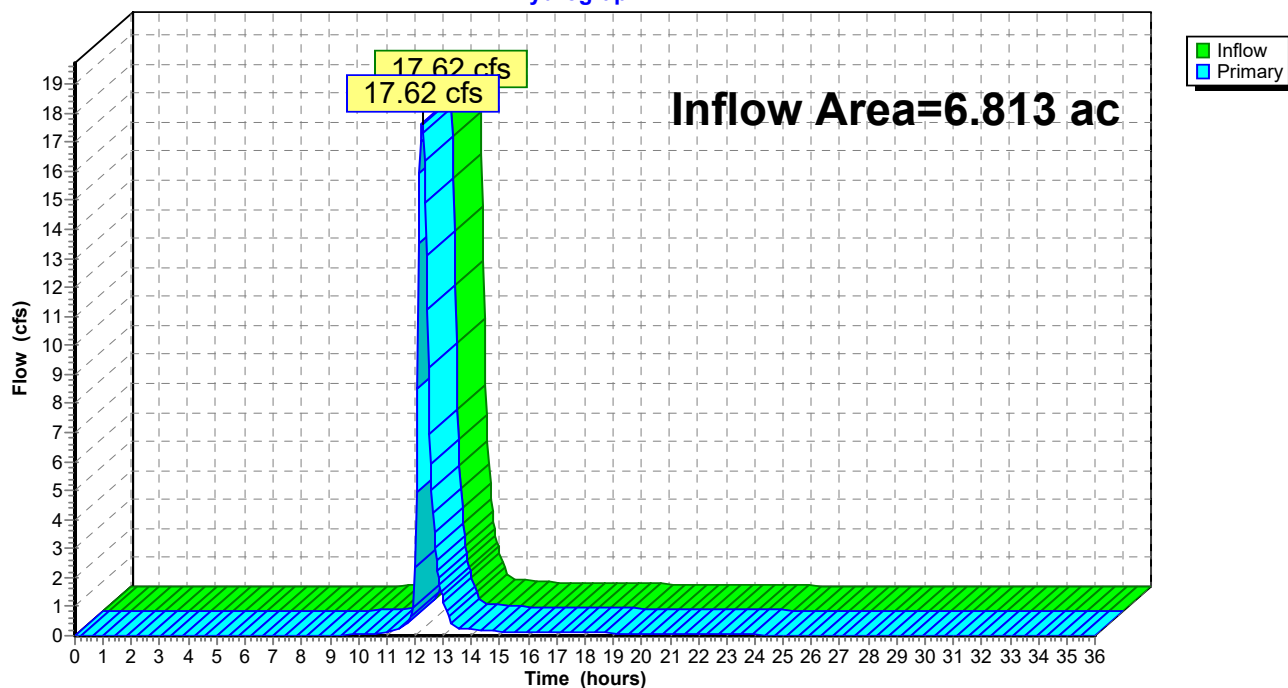
Summary for Link 15L: DP-1

Inflow Area = 6.813 ac, 69.19% Impervious, Inflow Depth = 1.45" for 50-Year event
Inflow = 17.62 cfs @ 12.25 hrs, Volume= 0.823 af
Primary = 17.62 cfs @ 12.25 hrs, Volume= 0.823 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs

Link 15L: DP-1

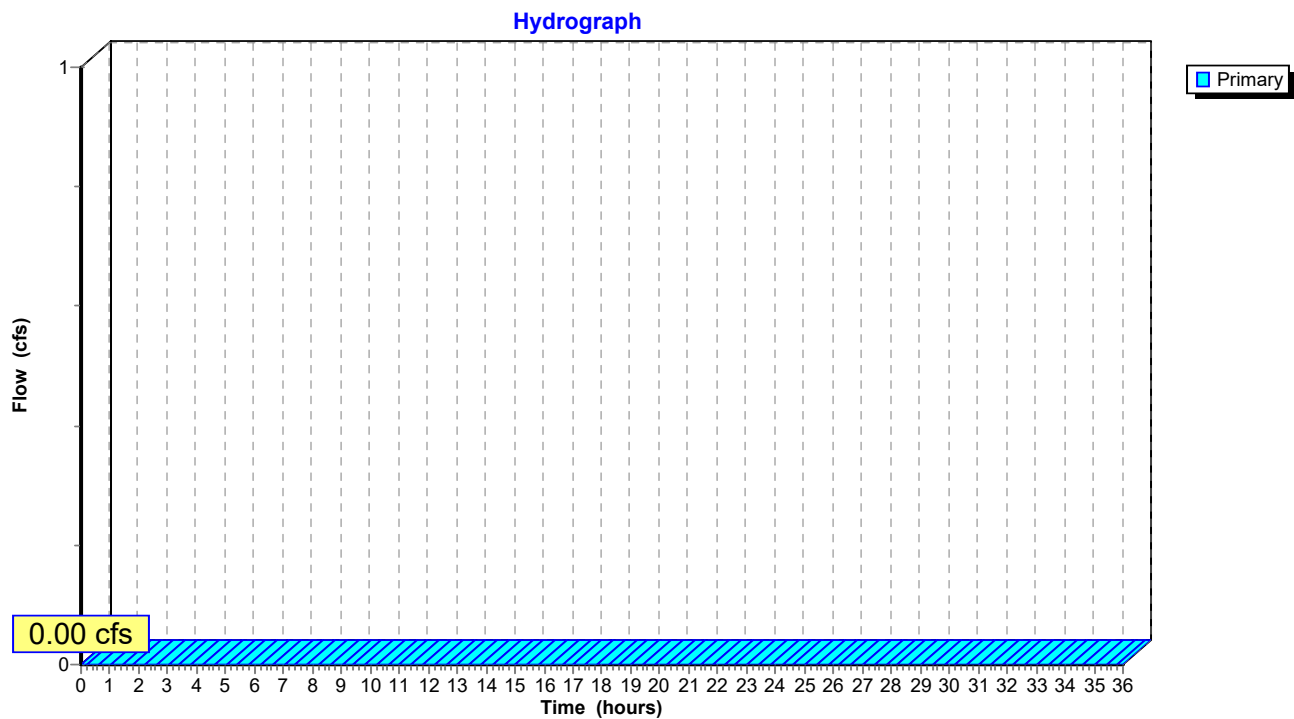
Hydrograph



Summary for Link 16L: DP-2

Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

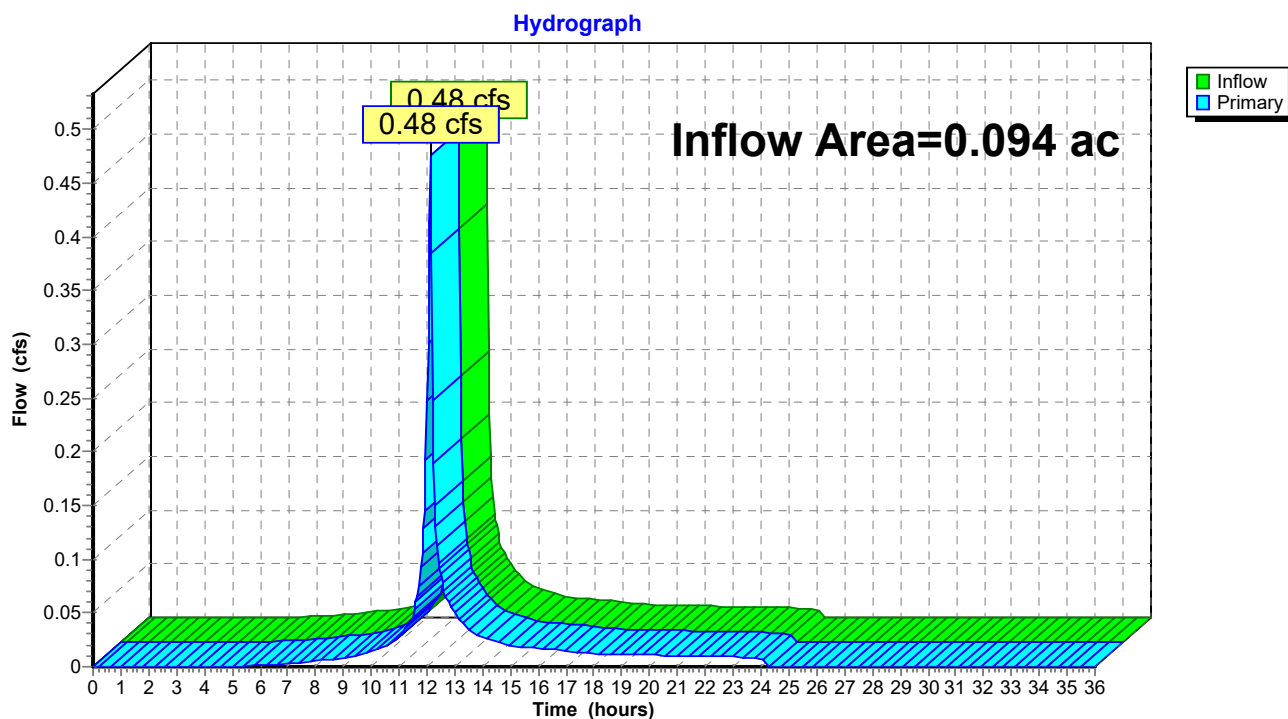
Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs

Link 16L: DP-2

Summary for Link 17L: DP-3

Inflow Area = 0.094 ac, 0.00% Impervious, Inflow Depth = 4.47" for 50-Year event
Inflow = 0.48 cfs @ 12.12 hrs, Volume= 0.035 af
Primary = 0.48 cfs @ 12.12 hrs, Volume= 0.035 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs

Link 17L: DP-3

Time span=0.00-36.00 hrs, dt=0.04 hrs, 901 points x 3
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: PR-1	Runoff Area=39,056 sf 43.09% Impervious Runoff Depth=4.07" Tc=5.0 min CN=64 Runoff=4.19 cfs 0.304 af
Subcatchment2S: PR-2	Runoff Area=5,989 sf 81.43% Impervious Runoff Depth=7.64" Tc=5.0 min CN=94 Runoff=1.06 cfs 0.088 af
Subcatchment3S: PR-3	Runoff Area=8,817 sf 74.45% Impervious Runoff Depth=7.40" Tc=5.0 min CN=92 Runoff=1.54 cfs 0.125 af
Subcatchment4S: PR-4	Runoff Area=6,680 sf 84.81% Impervious Runoff Depth=7.40" Tc=5.0 min CN=92 Runoff=1.16 cfs 0.095 af
Subcatchment5S: PR-5	Runoff Area=7,314 sf 77.02% Impervious Runoff Depth=6.92" Tc=5.0 min CN=88 Runoff=1.23 cfs 0.097 af
Subcatchment6S: PR-6	Runoff Area=15,529 sf 56.34% Impervious Runoff Depth=5.01" Tc=5.0 min CN=72 Runoff=2.03 cfs 0.149 af
Subcatchment7S: PR-7	Runoff Area=8,738 sf 78.69% Impervious Runoff Depth=6.56" Tc=5.0 min CN=85 Runoff=1.42 cfs 0.110 af
Subcatchment8S: PR-8	Runoff Area=16,223 sf 52.41% Impervious Runoff Depth=6.20" Tc=5.0 min CN=82 Runoff=2.54 cfs 0.192 af
Subcatchment9S: PR-9	Runoff Area=7,180 sf 74.57% Impervious Runoff Depth=7.04" Flow Length=127' Tc=7.1 min CN=89 Runoff=1.11 cfs 0.097 af
Subcatchment10S: PR-10	Runoff Area=4,103 sf 0.00% Impervious Runoff Depth=5.72" Tc=5.0 min CN=78 Runoff=0.60 cfs 0.045 af
Subcatchment11S: PR-11	Runoff Area=12,349 sf 77.12% Impervious Runoff Depth=7.40" Flow Length=257' Tc=6.6 min CN=92 Runoff=2.01 cfs 0.175 af
Subcatchment12S: PR-12	Runoff Area=12,764 sf 71.19% Impervious Runoff Depth=7.28" Tc=5.0 min CN=91 Runoff=2.21 cfs 0.178 af
Subcatchment18S: PR-13	Runoff Area=7,593 sf 39.33% Impervious Runoff Depth=4.19" Flow Length=246' Tc=16.1 min CN=65 Runoff=0.57 cfs 0.061 af
Subcatchment19S: PR-14	Runoff Area=3,225 sf 82.26% Impervious Runoff Depth=7.04" Flow Length=166' Tc=7.3 min CN=89 Runoff=0.50 cfs 0.043 af
Subcatchment20S: PR-15	Runoff Area=2,717 sf 85.79% Impervious Runoff Depth=7.16" Tc=5.0 min CN=90 Runoff=0.47 cfs 0.037 af
Subcatchment22S: PR-16	Runoff Area=1,349 sf 100.00% Impervious Runoff Depth=8.12" Flow Length=247' Tc=16.1 min CN=98 Runoff=0.17 cfs 0.021 af

Subcatchment23S: PR-17	Runoff Area=14,295 sf 71.70% Impervious Runoff Depth=7.16" Tc=5.0 min CN=90 Runoff=2.45 cfs 0.196 af
Subcatchment24S: PR-18	Runoff Area=9,416 sf 96.73% Impervious Runoff Depth=7.88" Flow Length=189' Tc=7.1 min CN=96 Runoff=1.53 cfs 0.142 af
Subcatchment25S: PR-19	Runoff Area=1,787 sf 75.15% Impervious Runoff Depth=6.32" Tc=5.0 min CN=83 Runoff=0.28 cfs 0.022 af
Subcatchment26S: PR-20	Runoff Area=6,770 sf 88.61% Impervious Runoff Depth=7.28" Tc=5.0 min CN=91 Runoff=1.17 cfs 0.094 af
Subcatchment27S: PR-21	Runoff Area=6,755 sf 89.10% Impervious Runoff Depth=7.40" Tc=5.0 min CN=92 Runoff=1.18 cfs 0.096 af
Subcatchment28S: PR-22	Runoff Area=5,124 sf 73.32% Impervious Runoff Depth=6.44" Tc=5.0 min CN=84 Runoff=0.82 cfs 0.063 af
Subcatchment29S: PR-23	Runoff Area=6,611 sf 79.08% Impervious Runoff Depth=6.92" Tc=5.0 min CN=88 Runoff=1.11 cfs 0.088 af
Subcatchment30S: PR-24	Runoff Area=5,313 sf 80.16% Impervious Runoff Depth=6.92" Tc=5.0 min CN=88 Runoff=0.89 cfs 0.070 af
Subcatchment31S: PR-25	Runoff Area=8,212 sf 59.72% Impervious Runoff Depth=5.96" Flow Length=218' Tc=11.9 min CN=80 Runoff=0.97 cfs 0.094 af
Subcatchment32S: PR-26	Runoff Area=5,770 sf 92.53% Impervious Runoff Depth=7.64" Tc=5.0 min CN=94 Runoff=1.02 cfs 0.084 af
Subcatchment33S: PR-27	Runoff Area=5,730 sf 91.10% Impervious Runoff Depth=7.52" Tc=5.0 min CN=93 Runoff=1.01 cfs 0.082 af
Subcatchment34S: PR-28	Runoff Area=4,491 sf 45.51% Impervious Runoff Depth=4.78" Flow Length=193' Tc=14.0 min CN=70 Runoff=0.41 cfs 0.041 af
Subcatchment35S: PR-29	Runoff Area=1,417 sf 81.37% Impervious Runoff Depth=6.80" Tc=5.0 min CN=87 Runoff=0.24 cfs 0.018 af
Subcatchment36S: PR-30	Runoff Area=8,853 sf 73.61% Impervious Runoff Depth=6.20" Flow Length=198' Tc=5.4 min CN=82 Runoff=1.36 cfs 0.105 af
Subcatchment37S: PR-31	Runoff Area=9,984 sf 75.99% Impervious Runoff Depth=6.44" Flow Length=205' Tc=5.3 min CN=84 Runoff=1.58 cfs 0.123 af
Subcatchment38S: PR-32	Runoff Area=16,004 sf 53.26% Impervious Runoff Depth=4.78" Flow Length=154' Tc=14.9 min CN=70 Runoff=1.41 cfs 0.146 af
Subcatchment39S: PR-33	Runoff Area=7,626 sf 79.02% Impervious Runoff Depth=6.68" Tc=5.0 min CN=86 Runoff=1.26 cfs 0.097 af
Subcatchment40S: PR-34	Runoff Area=3,135 sf 83.67% Impervious Runoff Depth=6.92" Flow Length=134' Tc=5.6 min CN=88 Runoff=0.51 cfs 0.042 af

Subcatchment41S: PR-35

Runoff Area=459 sf 98.47% Impervious Runoff Depth=8.00"
Tc=5.0 min CN=97 Runoff=0.08 cfs 0.007 af

Subcatchment42S: PR-36

Runoff Area=6,465 sf 87.47% Impervious Runoff Depth=7.28"
Tc=5.0 min CN=91 Runoff=1.12 cfs 0.090 af

Subcatchment43S: PR-37

Runoff Area=7,047 sf 90.17% Impervious Runoff Depth=7.40"
Tc=5.0 min CN=92 Runoff=1.23 cfs 0.100 af

Pond 44P: CMP Infiltration

Peak Elev=273.48' Storage=0.266 af Inflow=38.48 cfs 3.267 af
Discarded=0.26 cfs 0.291 af Primary=23.73 cfs 2.976 af Outflow=23.99 cfs 3.267 af

Pond 45P: Rain Garden

Peak Elev=259.98' Storage=15,523 cf Inflow=23.73 cfs 2.976 af
Discarded=3.74 cfs 2.084 af Primary=18.93 cfs 0.893 af Outflow=22.67 cfs 2.976 af

Link 15L: DP-1

Inflow=20.46 cfs 1.197 af
Primary=20.46 cfs 1.197 af

Link 16L: DP-2

Primary=0.00 cfs 0.000 af

Link 17L: DP-3

Inflow=0.60 cfs 0.045 af
Primary=0.60 cfs 0.045 af

Total Runoff Area = 6.907 ac Runoff Volume = 3.616 af Average Runoff Depth = 6.28"
31.76% Pervious = 2.194 ac 68.24% Impervious = 4.714 ac

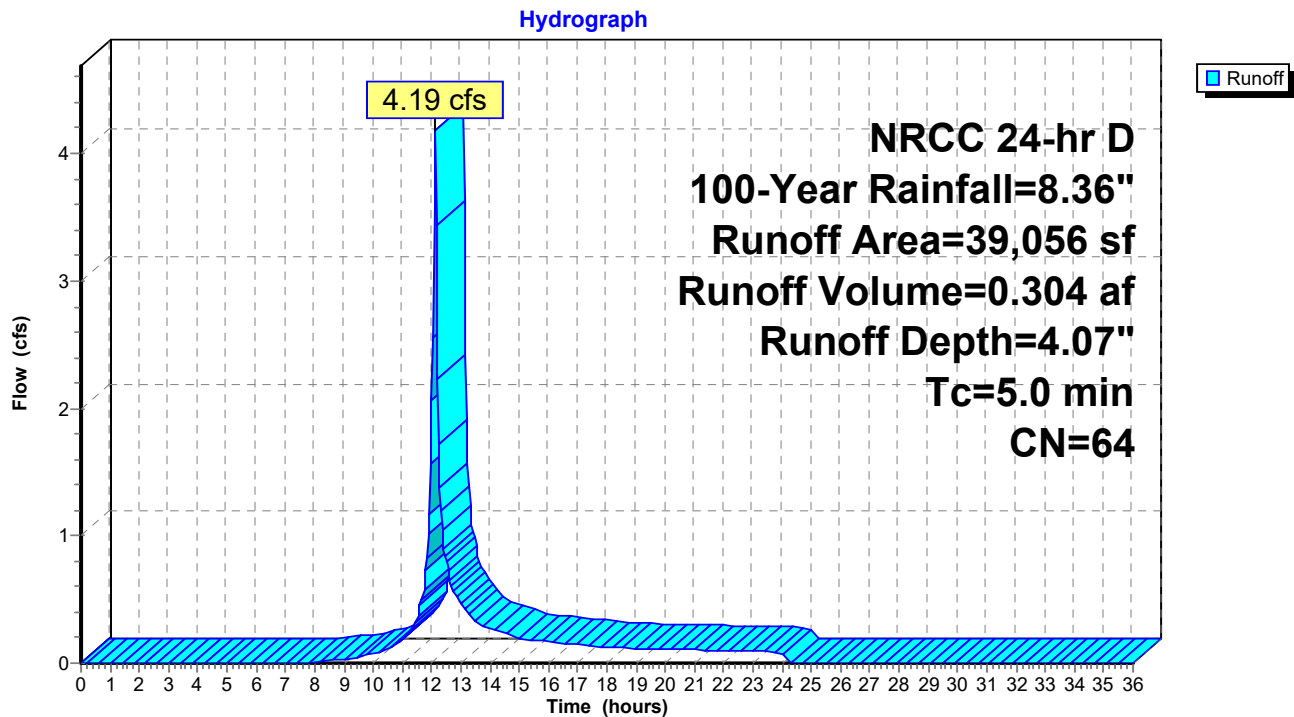
Summary for Subcatchment 1S: PR-1

Runoff = 4.19 cfs @ 12.12 hrs, Volume= 0.304 af, Depth= 4.07"
 Routed to Link 15L : DP-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 100-Year Rainfall=8.36"

Area (sf)	CN	Description
6,150	98	Paved parking, HSG A
* 6,781	98	Paved parking, HSG A
* 2,817	98	Cement Concrete Sidewalk, HSG A
* 1,080	98	Cement Concrete Sidewalk, HSG A
20,357	39	>75% Grass cover, Good, HSG A
1,871	39	>75% Grass cover, Good, HSG A
39,056	64	Weighted Average
22,228		56.91% Pervious Area
16,828		43.09% Impervious Area

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

Subcatchment 1S: PR-1

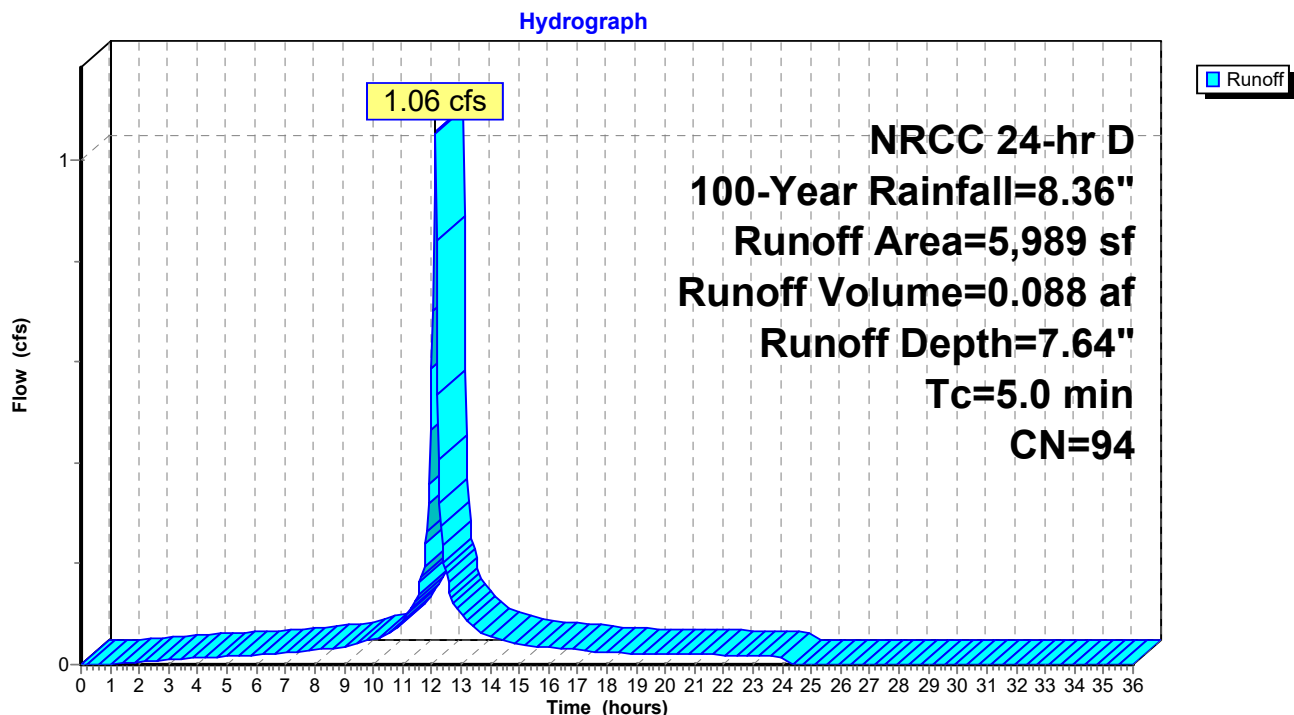
Summary for Subcatchment 2S: PR-2

Runoff = 1.06 cfs @ 12.11 hrs, Volume= 0.088 af, Depth= 7.64"
 Routed to Pond 44P : CMP Infiltration

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 100-Year Rainfall=8.36"

	Area (sf)	CN	Description
*	4,187	98	Paved parking, HSG C
*	690	98	Cement Concrete Sidewalk, HSG C
	1,112	74	>75% Grass cover, Good, HSG C
	5,989	94	Weighted Average
	1,112		18.57% Pervious Area
	4,877		81.43% Impervious Area

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

Subcatchment 2S: PR-2

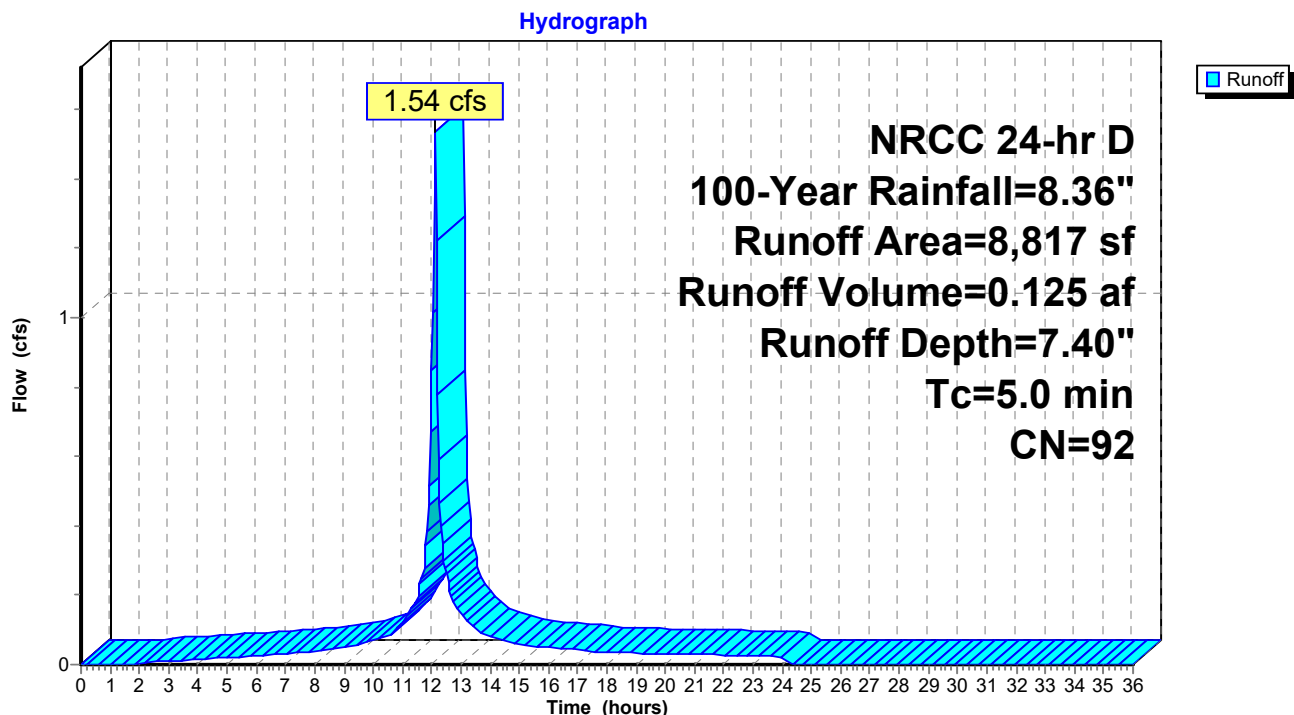
Summary for Subcatchment 3S: PR-3

Runoff = 1.54 cfs @ 12.11 hrs, Volume= 0.125 af, Depth= 7.40"
 Routed to Pond 44P : CMP Infiltration

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 100-Year Rainfall=8.36"

Area (sf)	CN	Description
5,618	98	Paved parking, HSG C
* 946	98	Cement Concrete Sidewalk, HSG C
2,253	74	>75% Grass cover, Good, HSG C
8,817	92	Weighted Average
2,253		25.55% Pervious Area
6,564		74.45% Impervious Area

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

Subcatchment 3S: PR-3

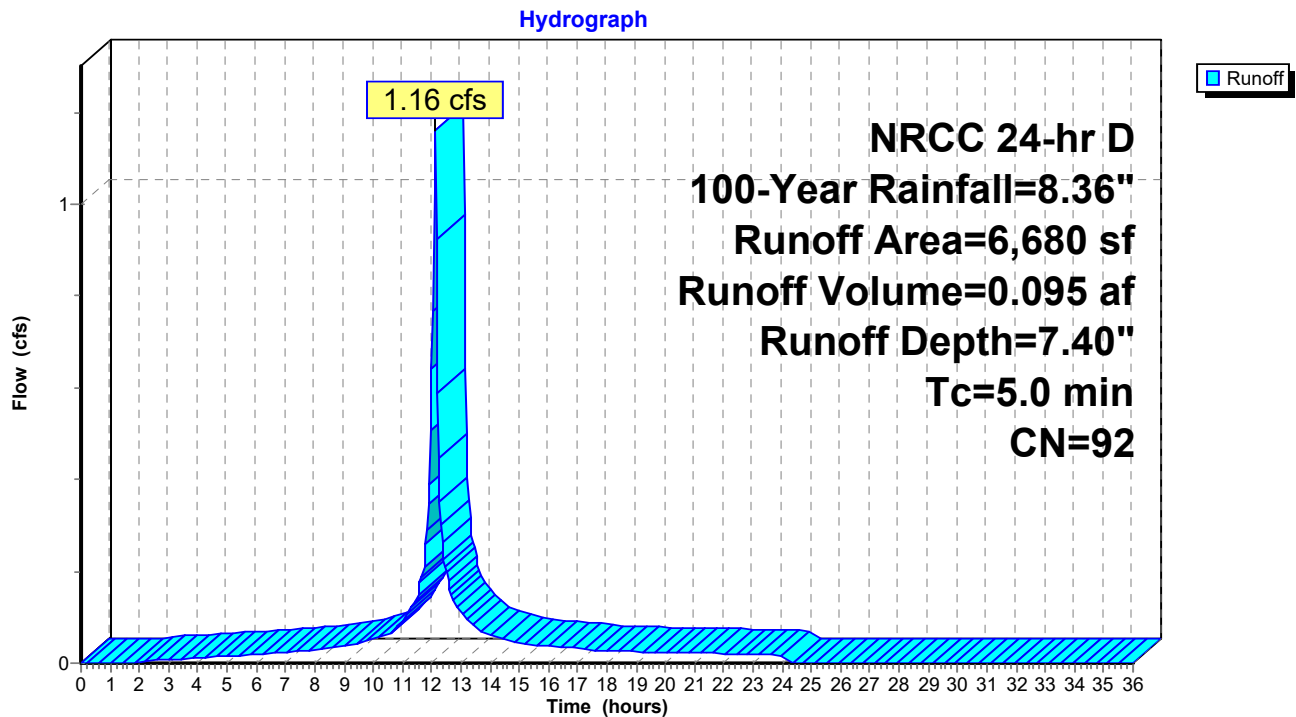
Summary for Subcatchment 4S: PR-4

Runoff = 1.16 cfs @ 12.11 hrs, Volume= 0.095 af, Depth= 7.40"
 Routed to Pond 44P : CMP Infiltration

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 100-Year Rainfall=8.36"

Area (sf)	CN	Description
2,045	98	Paved parking, HSG C
* 2,781	98	Paved parking, HSG A
* 424	98	Cement Concrete Sidewalk, HSG C
* 415	98	Cement Concrete Sidewalk, HSG A
559	74	>75% Grass cover, Good, HSG C
456	39	>75% Grass cover, Good, HSG A
6,680	92	Weighted Average
1,015		15.19% Pervious Area
5,665		84.81% Impervious Area

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

Subcatchment 4S: PR-4

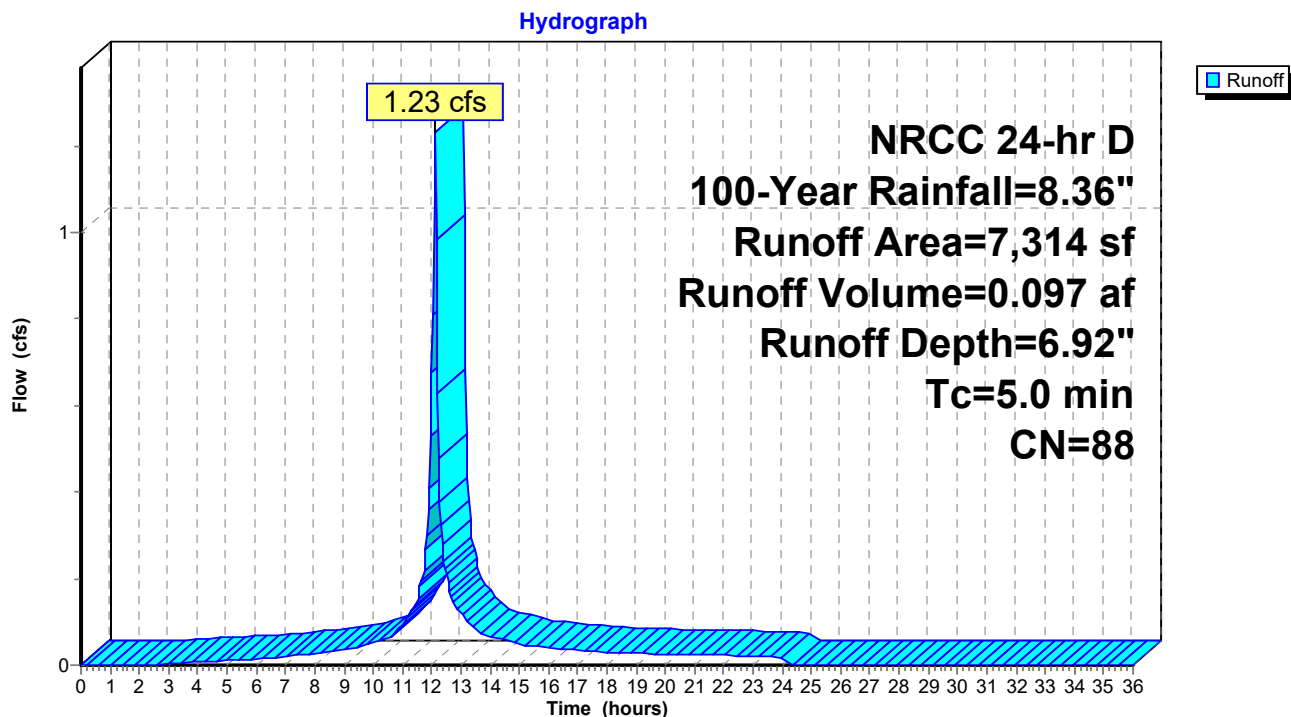
Summary for Subcatchment 5S: PR-5

Runoff = 1.23 cfs @ 12.11 hrs, Volume= 0.097 af, Depth= 6.92"
 Routed to Pond 44P : CMP Infiltration

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 100-Year Rainfall=8.36"

	Area (sf)	CN	Description
*	1,817	98	Paved parking, HSG C
*	3,098	98	Paved parking, HSG A
*	327	98	Cement Concrete Sidewalk, HSG C
*	391	98	Cement Concrete Sidewalk, HSG A
	725	74	>75% Grass cover, Good, HSG C
	956	39	>75% Grass cover, Good, HSG A
	7,314	88	Weighted Average
	1,681		22.98% Pervious Area
	5,633		77.02% Impervious Area

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

Subcatchment 5S: PR-5

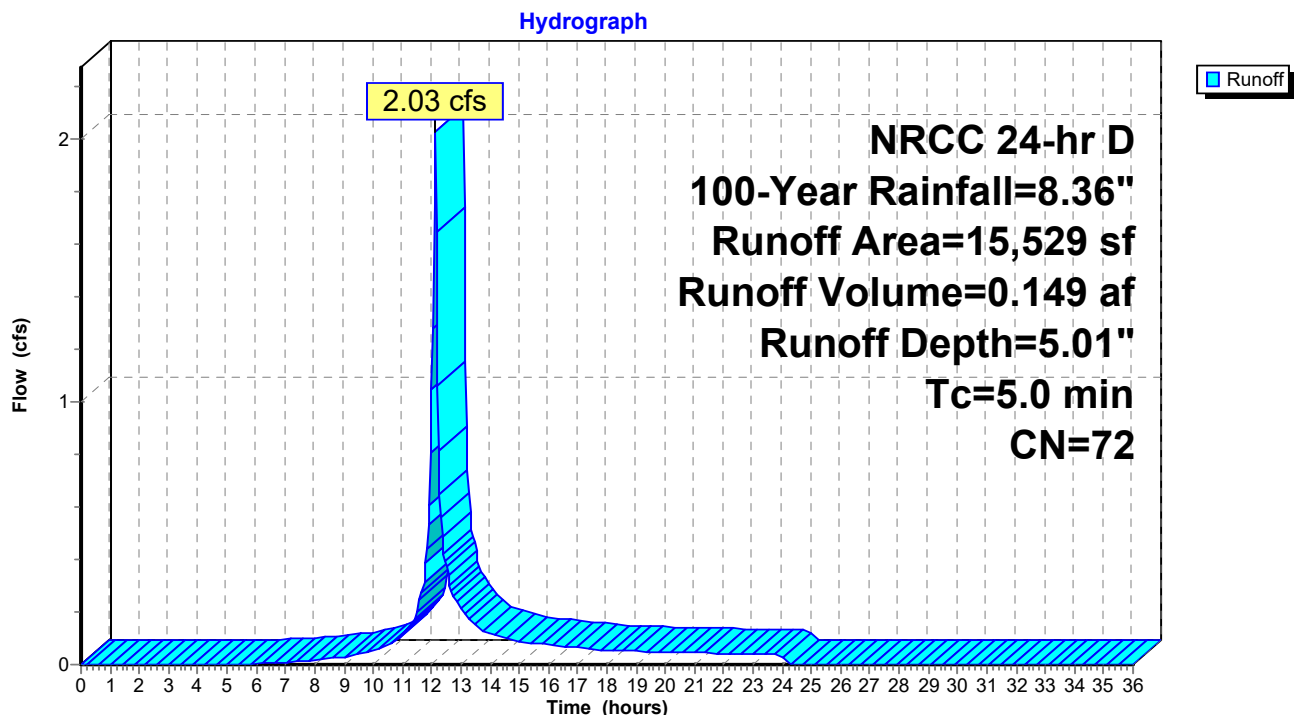
Summary for Subcatchment 6S: PR-6

Runoff = 2.03 cfs @ 12.12 hrs, Volume= 0.149 af, Depth= 5.01"
 Routed to Pond 44P : CMP Infiltration

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 100-Year Rainfall=8.36"

	Area (sf)	CN	Description
*	7,257	98	Paved parking, HSG A
*	1,492	98	Cement Concrete Sidewalk, HSG A
	6,780	39	>75% Grass cover, Good, HSG A
	15,529	72	Weighted Average
	6,780		43.66% Pervious Area
	8,749		56.34% Impervious Area

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

Subcatchment 6S: PR-6

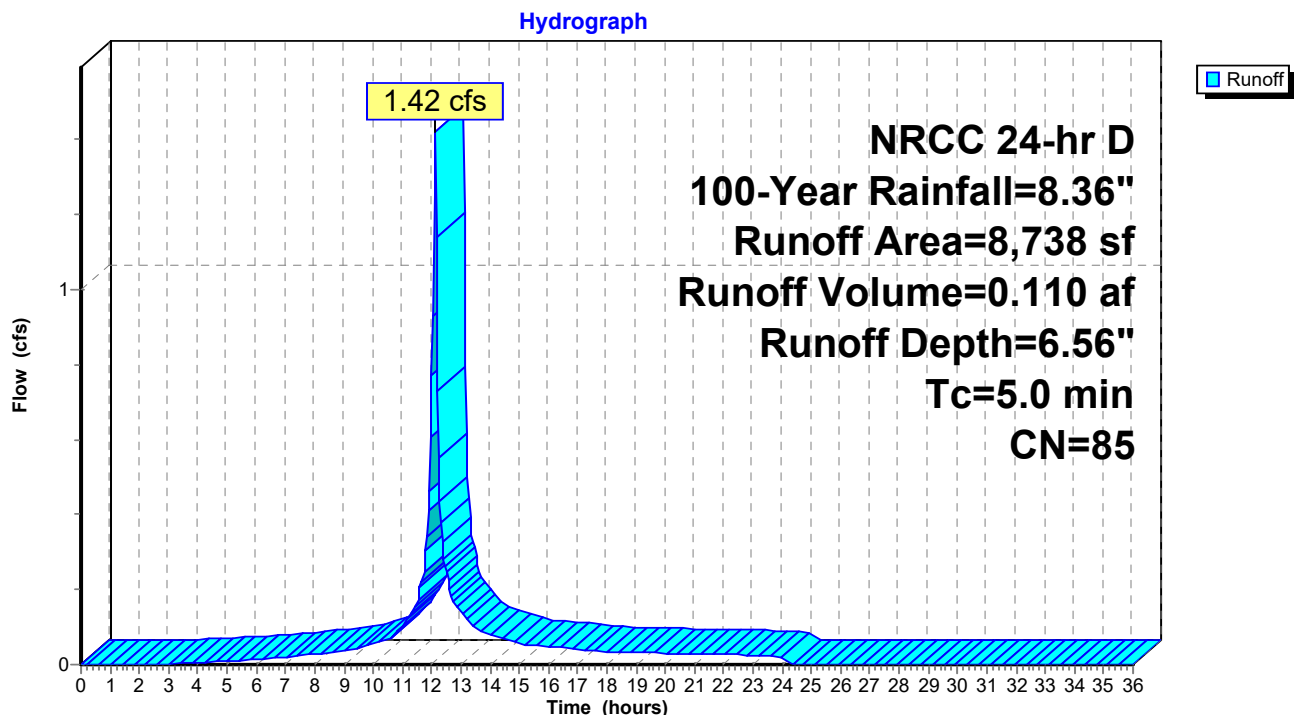
Summary for Subcatchment 7S: PR-7

Runoff = 1.42 cfs @ 12.12 hrs, Volume= 0.110 af, Depth= 6.56"
 Routed to Pond 44P : CMP Infiltration

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 100-Year Rainfall=8.36"

	Area (sf)	CN	Description
*	5,839	98	Paved parking, HSG A
*	1,037	98	Cement Concrete Sidewalk, HSG A
	1,862	39	>75% Grass cover, Good, HSG A
	8,738	85	Weighted Average
	1,862		21.31% Pervious Area
	6,876		78.69% Impervious Area

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

Subcatchment 7S: PR-7

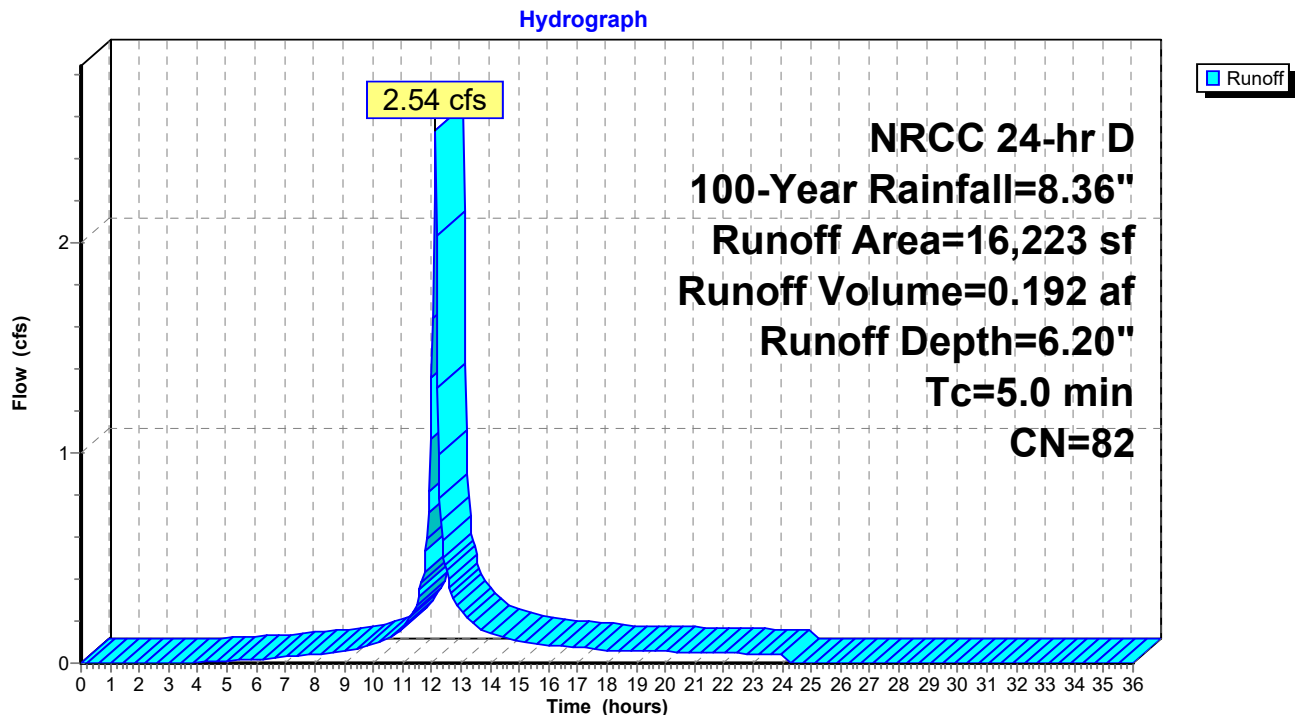
Summary for Subcatchment 8S: PR-8

Runoff = 2.54 cfs @ 12.12 hrs, Volume= 0.192 af, Depth= 6.20"
 Routed to Pond 44P : CMP Infiltration

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 100-Year Rainfall=8.36"

	Area (sf)	CN	Description
*	2,852	98	Paved parking, HSG A
*	4,008	98	Paved parking, HSG C
*	1,252	98	Cement Concrete Sidewalk, HSG C
*	390	98	Cement Concrete Sidewalk, HSG A
	1,994	39	>75% Grass cover, Good, HSG A
	5,727	74	>75% Grass cover, Good, HSG C
	16,223	82	Weighted Average
	7,721		47.59% Pervious Area
	8,502		52.41% Impervious Area

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

Subcatchment 8S: PR-8

Summary for Subcatchment 9S: PR-9

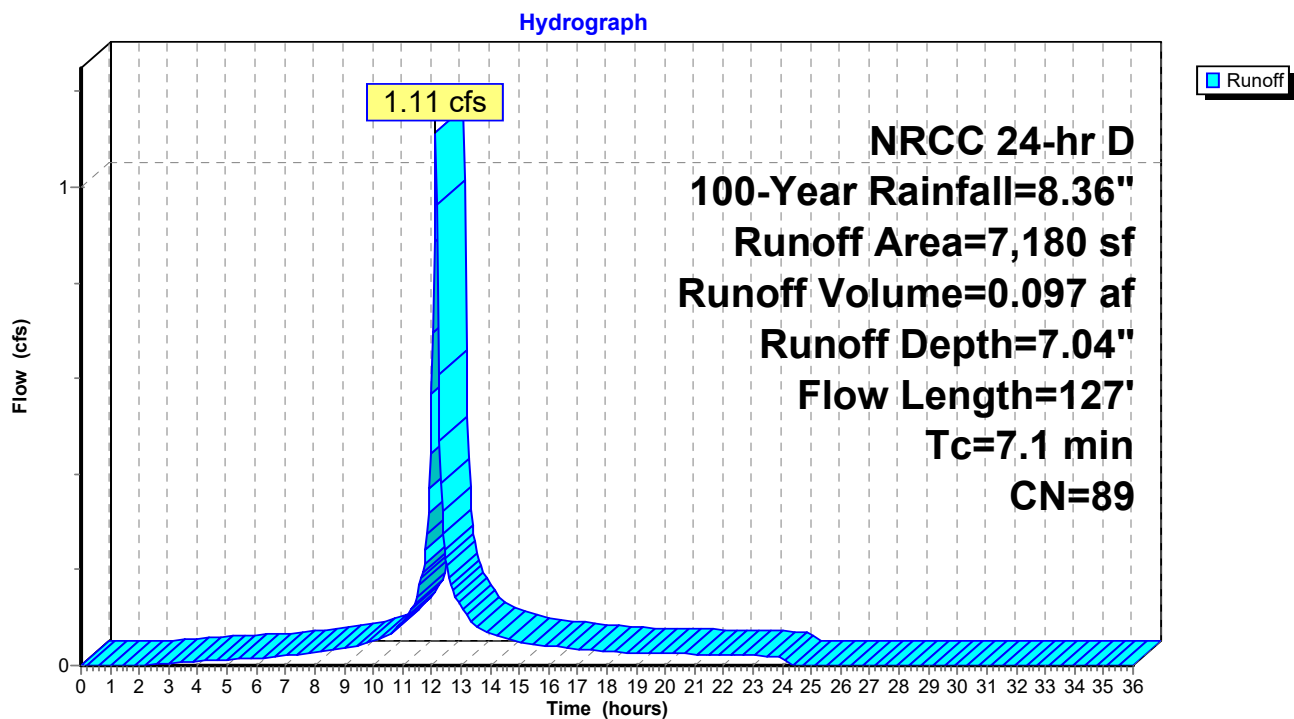
Runoff = 1.11 cfs @ 12.14 hrs, Volume= 0.097 af, Depth= 7.04"
 Routed to Pond 44P : CMP Infiltration

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 100-Year Rainfall=8.36"

	Area (sf)	CN	Description
*	479	98	Paved parking, HSG A
*	3,817	98	Paved parking, HSG C
*	216	98	Cement Concrete Sidewalk, HSG A
*	842	98	Cement Concrete Sidewalk, HSG C
	623	39	>75% Grass cover, Good, HSG A
	1,203	74	>75% Grass cover, Good, HSG C
	7,180	89	Weighted Average
	1,826		25.43% Pervious Area
	5,354		74.57% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.1	25	0.0500	0.08		Sheet Flow, GRASS Grass: Bermuda n= 0.410 P2= 3.13"
1.7	75	0.0050	0.74		Sheet Flow, PAVEMENT Smooth surfaces n= 0.011 P2= 3.13"
0.3	27	0.0050	1.44		Shallow Concentrated Flow, PAVEMENT Paved Kv= 20.3 fps
7.1	127	Total			

Subcatchment 9S: PR-9



Summary for Subcatchment 10S: PR-10

Runoff = 0.60 cfs @ 12.12 hrs, Volume= 0.045 af, Depth= 5.72"
 Routed to Link 17L : DP-3

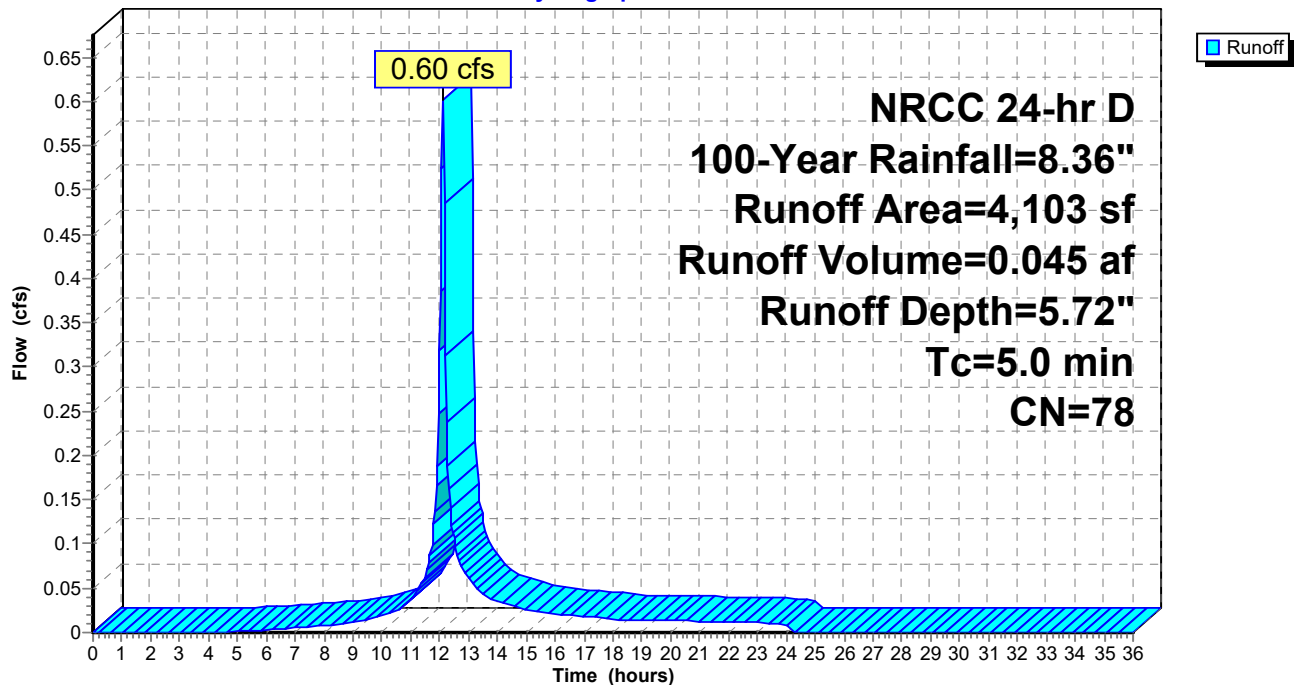
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 100-Year Rainfall=8.36"

Area (sf)	CN	Description
1,584	74	>75% Grass cover, Good, HSG C
2,519	80	>75% Grass cover, Good, HSG D
4,103	78	Weighted Average
4,103		100.00% Pervious Area

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

Subcatchment 10S: PR-10

Hydrograph



Summary for Subcatchment 11S: PR-11

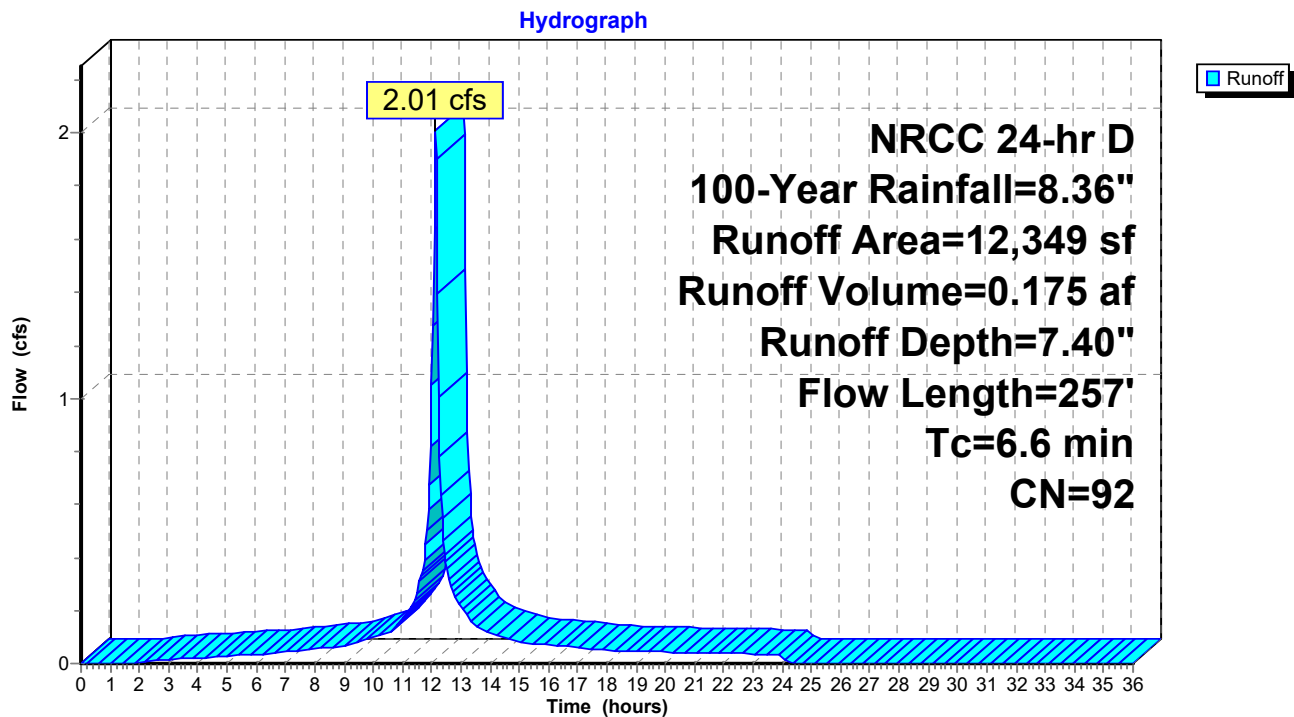
Runoff = 2.01 cfs @ 12.13 hrs, Volume= 0.175 af, Depth= 7.40"
 Routed to Pond 44P : CMP Infiltration

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 100-Year Rainfall=8.36"

	Area (sf)	CN	Description
*	7,691	98	Paved parking, HSG C
*	276	98	Paved parking, HSG A
*	1,371	98	Cement Concrete Sidewalk, HSG C
*	185	98	Cement Concrete Sidewalk, HSG A
	2,481	74	>75% Grass cover, Good, HSG C
	345	39	>75% Grass cover, Good, HSG A
	12,349	92	Weighted Average
	2,826		22.88% Pervious Area
	9,523		77.12% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.1	25	0.0500	0.08		Sheet Flow, GRASS Grass: Bermuda n= 0.410 P2= 3.13"
0.8	75	0.0350	1.61		Sheet Flow, PAVEMENT Smooth surfaces n= 0.011 P2= 3.13"
0.7	157	0.0350	3.80		Shallow Concentrated Flow, PAVEMENT Paved Kv= 20.3 fps
6.6	257	Total			

Subcatchment 11S: PR-11



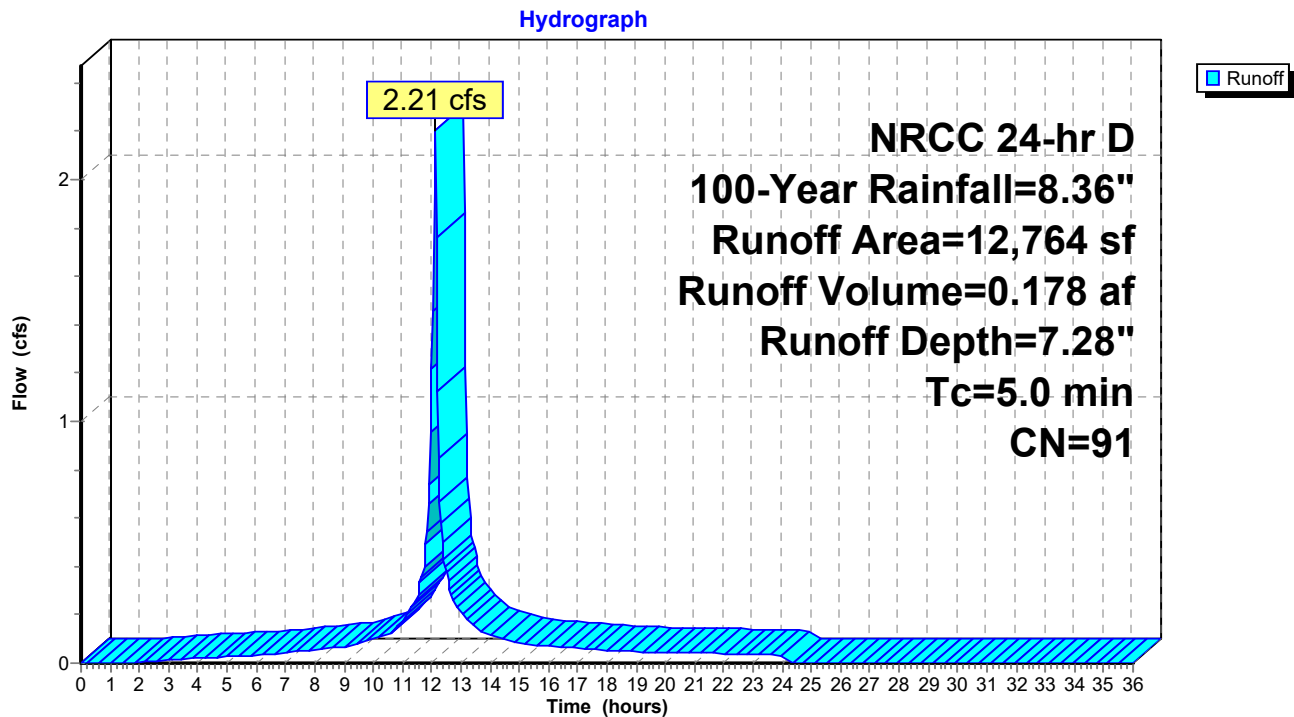
Summary for Subcatchment 12S: PR-12

Runoff = 2.21 cfs @ 12.11 hrs, Volume= 0.178 af, Depth= 7.28"
 Routed to Pond 44P : CMP Infiltration

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 100-Year Rainfall=8.36"

	Area (sf)	CN	Description
*	7,226	98	Paved parking, HSG C
*	139	98	Paved parking, HSG A
*	1,592	98	Cement Concrete Sidewalk, HSG C
*	130	98	Cement Concrete Sidewalk, HSG A
	3,543	74	>75% Grass cover, Good, HSG C
	134	39	>75% Grass cover, Good, HSG A
	12,764	91	Weighted Average
	3,677		28.81% Pervious Area
	9,087		71.19% Impervious Area

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

Subcatchment 12S: PR-12

Summary for Subcatchment 18S: PR-13

Runoff = 0.57 cfs @ 12.25 hrs, Volume= 0.061 af, Depth= 4.19"
 Routed to Pond 44P : CMP Infiltration

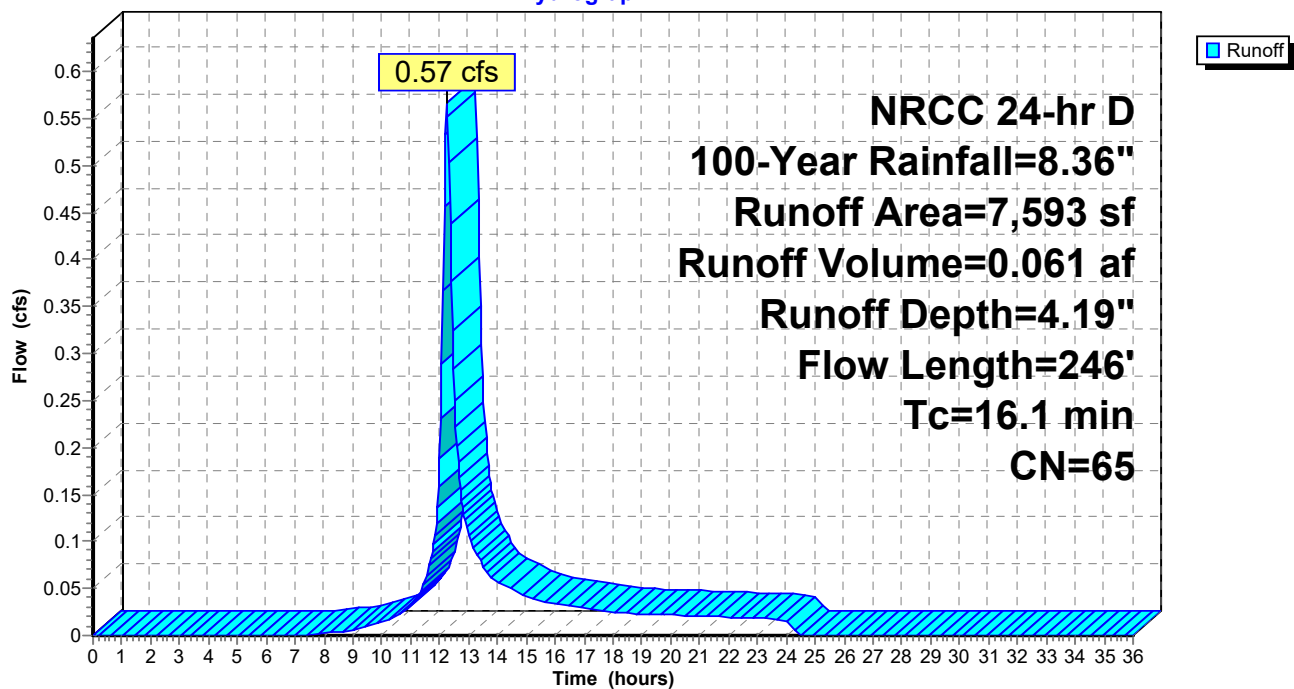
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 100-Year Rainfall=8.36"

Area (sf)	CN	Description
131	98	Paved parking, HSG C
* 2,672	98	Paved parking, HSG A
* 183	98	Cement Concrete Sidewalk, HSG C
499	74	>75% Grass cover, Good, HSG C
4,108	39	>75% Grass cover, Good, HSG A
7,593	65	Weighted Average
4,607		60.67% Pervious Area
2,986		39.33% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.4	100	0.0500	0.11		Sheet Flow, GRASS Grass: Bermuda n= 0.410 P2= 3.13"
0.2	38	0.0500	3.35		Shallow Concentrated Flow, GRASS Grassed Waterway Kv= 15.0 fps
0.5	108	0.0350	3.80		Shallow Concentrated Flow, PAVEMENT Paved Kv= 20.3 fps
16.1	246	Total			

Subcatchment 18S: PR-13

Hydrograph



Summary for Subcatchment 19S: PR-14

Runoff = 0.50 cfs @ 12.14 hrs, Volume= 0.043 af, Depth= 7.04"
 Routed to Pond 44P : CMP Infiltration

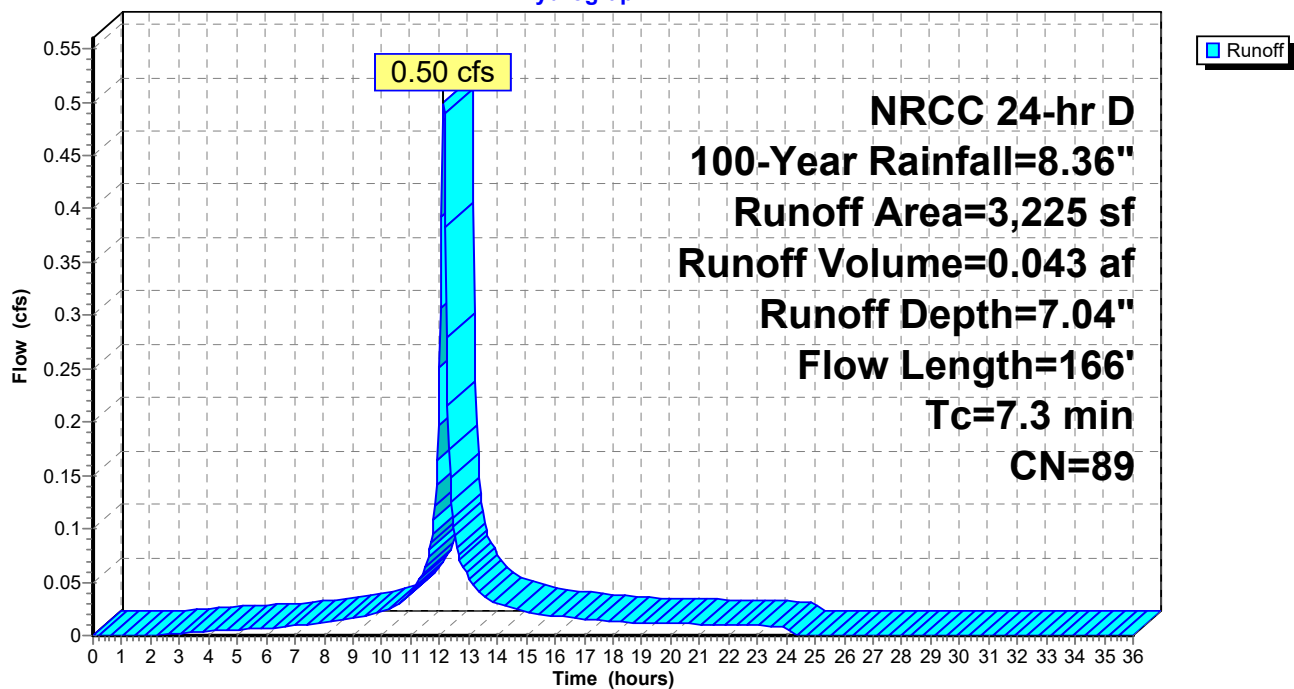
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 100-Year Rainfall=8.36"

	Area (sf)	CN	Description
*	199	98	Paved parking, HSG C
*	2,132	98	Paved parking, HSG A
*	322	98	Cement Concrete Sidewalk, HSG A
	126	74	>75% Grass cover, Good, HSG C
	446	39	>75% Grass cover, Good, HSG A
	3,225	89	Weighted Average
	572		17.74% Pervious Area
	2,653		82.26% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.3	33	0.0500	0.09		Sheet Flow, GRASS Grass: Bermuda n= 0.410 P2= 3.13"
0.7	67	0.0350	1.57		Sheet Flow, PAVEMENT Smooth surfaces n= 0.011 P2= 3.13"
0.3	66	0.0350	3.80		Shallow Concentrated Flow, PAVEMENT Paved Kv= 20.3 fps
7.3	166	Total			

Subcatchment 19S: PR-14

Hydrograph



Summary for Subcatchment 20S: PR-15

Runoff = 0.47 cfs @ 12.11 hrs, Volume= 0.037 af, Depth= 7.16"
 Routed to Pond 44P : CMP Infiltration

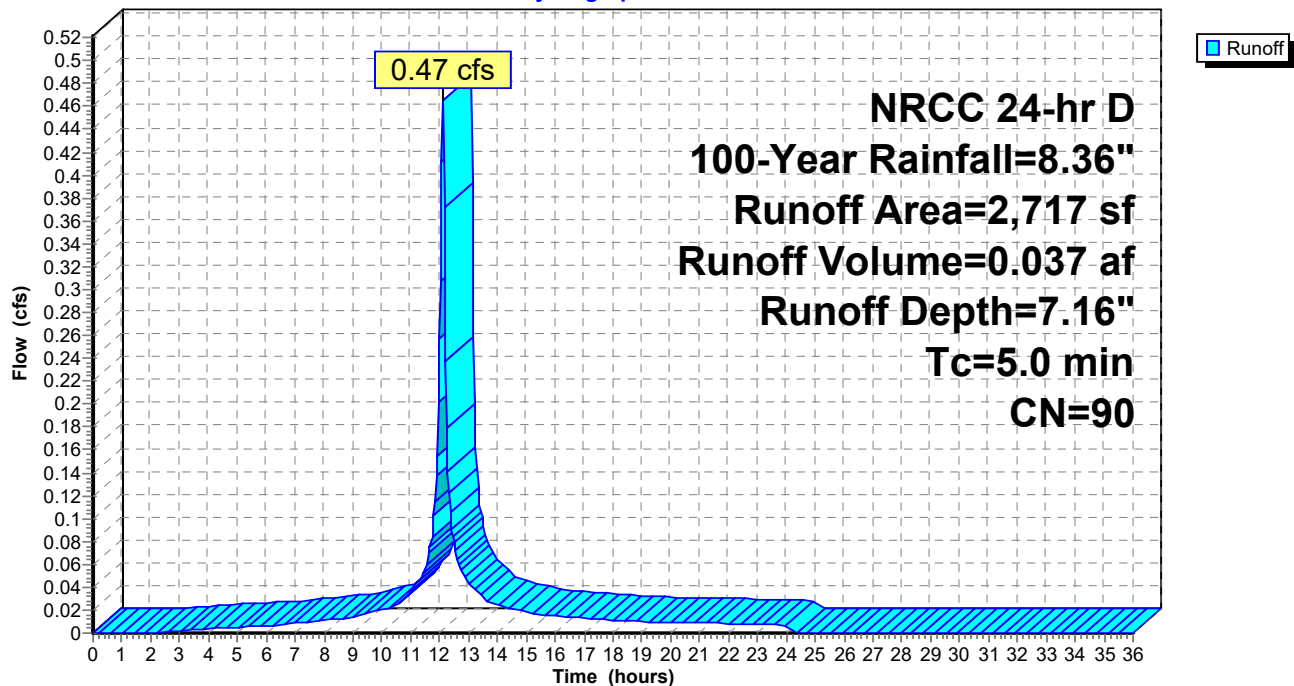
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 100-Year Rainfall=8.36"

	Area (sf)	CN	Description
*	2,331	98	Paved parking, HSG A
	386	39	>75% Grass cover, Good, HSG A
	2,717	90	Weighted Average
	386		14.21% Pervious Area
	2,331		85.79% Impervious Area

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

Subcatchment 20S: PR-15

Hydrograph



Summary for Subcatchment 22S: PR-16

Runoff = 0.17 cfs @ 12.24 hrs, Volume= 0.021 af, Depth= 8.12"
 Routed to Pond 44P : CMP Infiltration

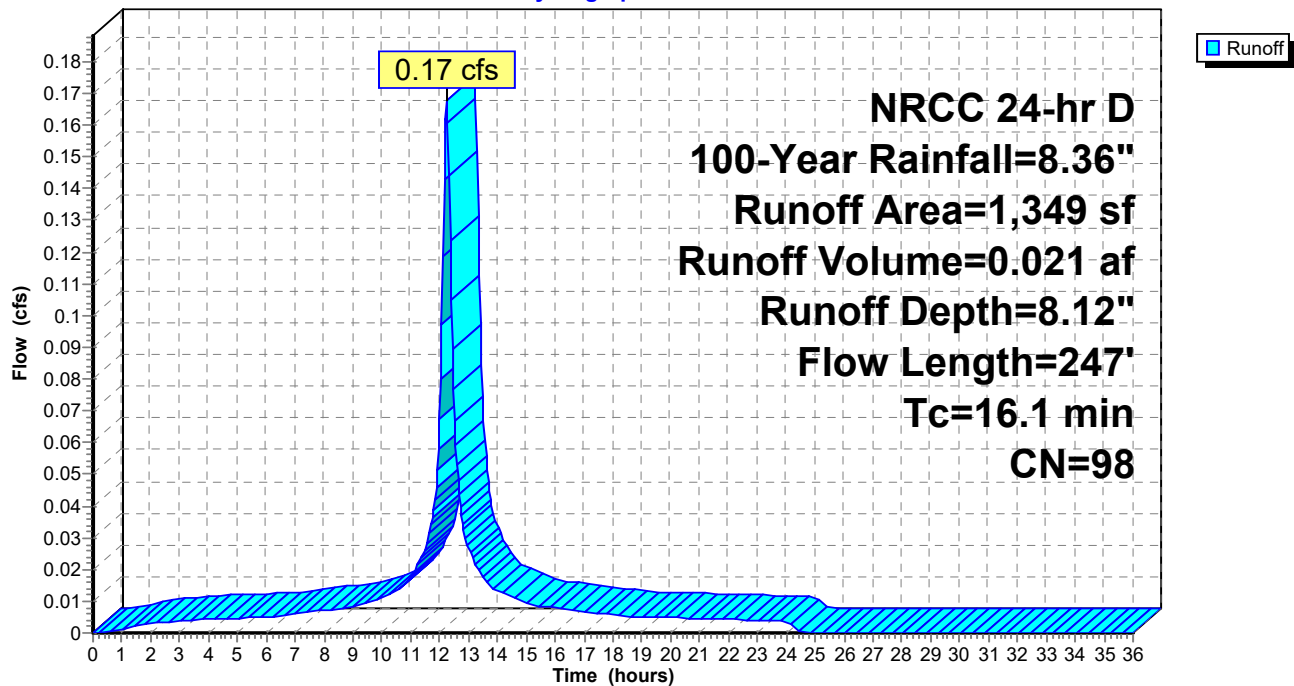
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 100-Year Rainfall=8.36"

Area (sf)	CN	Description
* 614	98	Paved parking, HSG A
* 735	98	Paved parking, HSG C
1,349	98	Weighted Average
1,349		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.4	100	0.0500	0.11		Sheet Flow, GRASS Grass: Bermuda n= 0.410 P2= 3.13"
0.2	38	0.0500	3.35		Shallow Concentrated Flow, GRASS Grassed Waterway Kv= 15.0 fps
0.5	109	0.0350	3.80		Shallow Concentrated Flow, PAVEMENT Paved Kv= 20.3 fps
16.1	247	Total			

Subcatchment 22S: PR-16

Hydrograph



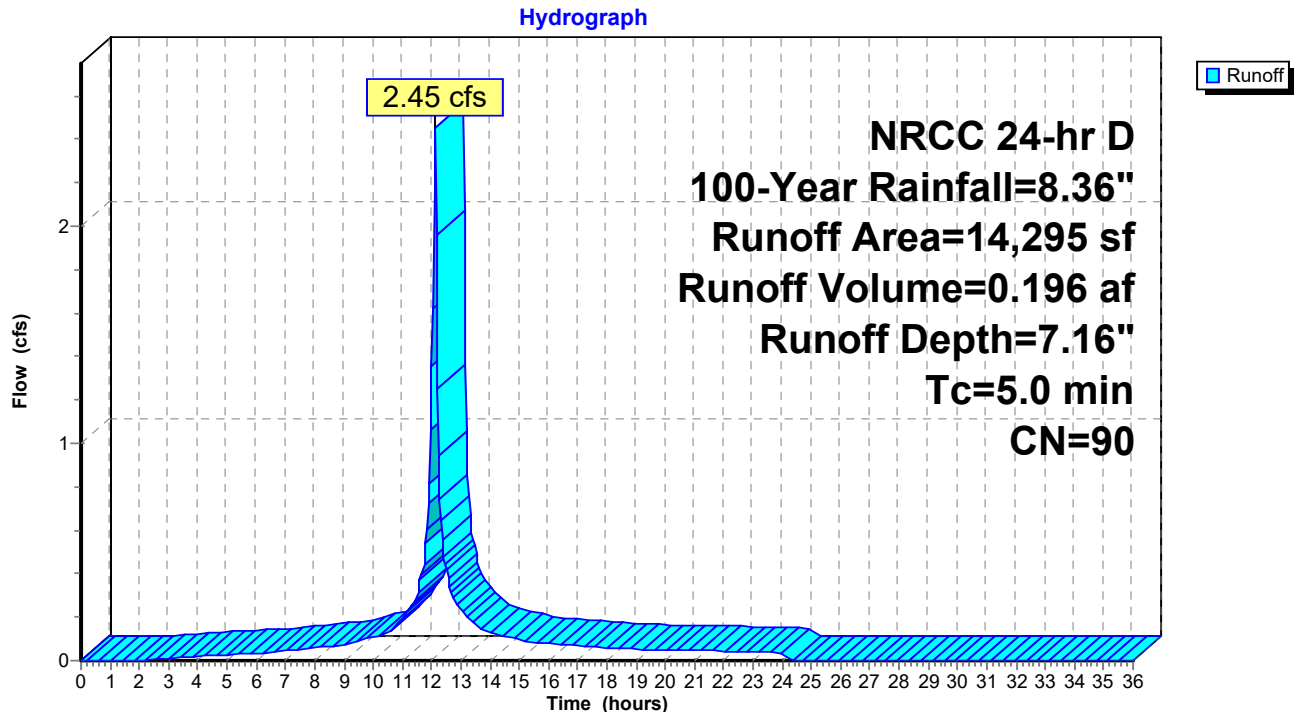
Summary for Subcatchment 23S: PR-17

Runoff = 2.45 cfs @ 12.11 hrs, Volume= 0.196 af, Depth= 7.16"
 Routed to Pond 44P : CMP Infiltration

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 100-Year Rainfall=8.36"

	Area (sf)	CN	Description
*	447	98	Paved parking, HSG A
*	7,461	98	Paved parking, HSG C
*	2,341	98	Cement Concrete Sidewalk, HSG C
	488	39	>75% Grass cover, Good, HSG A
	3,558	74	>75% Grass cover, Good, HSG C
	14,295	90	Weighted Average
	4,046		28.30% Pervious Area
	10,249		71.70% Impervious Area

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

Subcatchment 23S: PR-17

Summary for Subcatchment 24S: PR-18

Runoff = 1.53 cfs @ 12.14 hrs, Volume= 0.142 af, Depth= 7.88"
 Routed to Pond 44P : CMP Infiltration

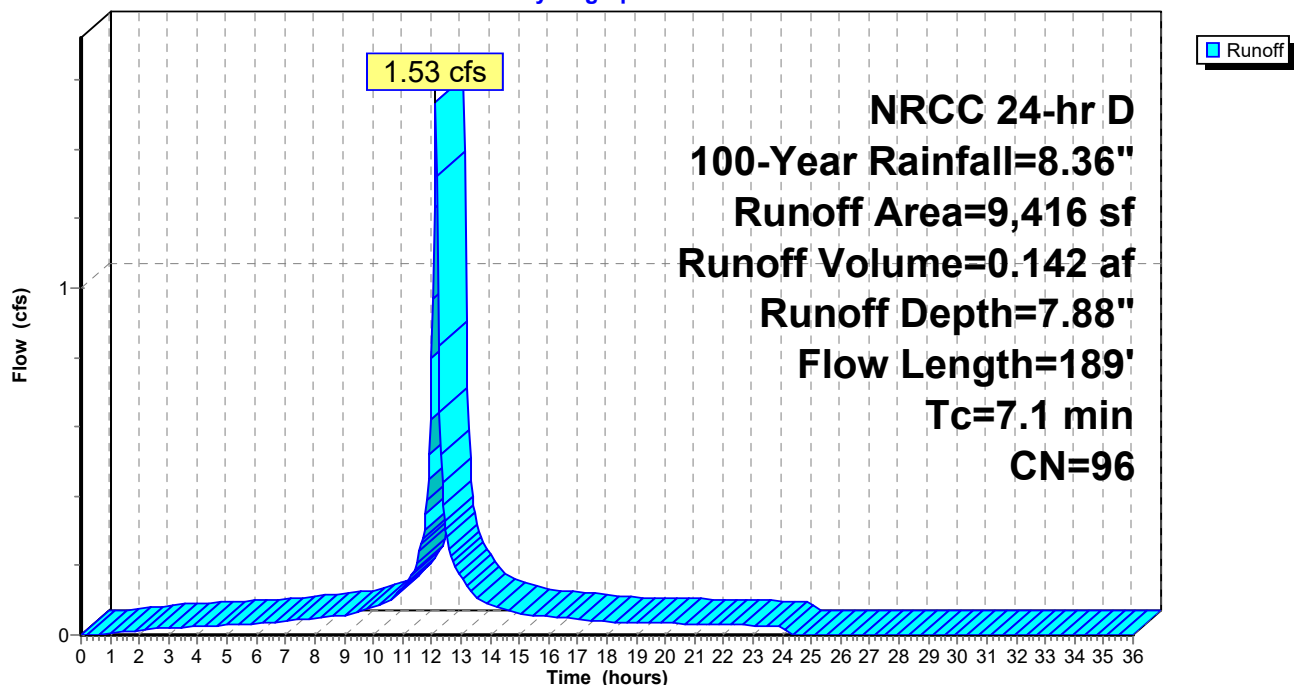
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 100-Year Rainfall=8.36"

	Area (sf)	CN	Description
*	4,554	98	Paved parking, HSG A
*	4,554	98	Cement Concrete Sidewalk, HSG A
	308	39	>75% Grass cover, Good, HSG A
	9,416	96	Weighted Average
	308		3.27% Pervious Area
	9,108		96.73% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	29	0.0500	0.08		Sheet Flow, GRASS Grass: Bermuda n= 0.410 P2= 3.13"
0.9	71	0.0200	1.27		Sheet Flow, PAVEMENT Smooth surfaces n= 0.011 P2= 3.13"
0.5	89	0.0200	2.87		Shallow Concentrated Flow, PAVEMENT Paved Kv= 20.3 fps
7.1	189	Total			

Subcatchment 24S: PR-18

Hydrograph



Summary for Subcatchment 25S: PR-19

Runoff = 0.28 cfs @ 12.12 hrs, Volume= 0.022 af, Depth= 6.32"
 Routed to Pond 44P : CMP Infiltration

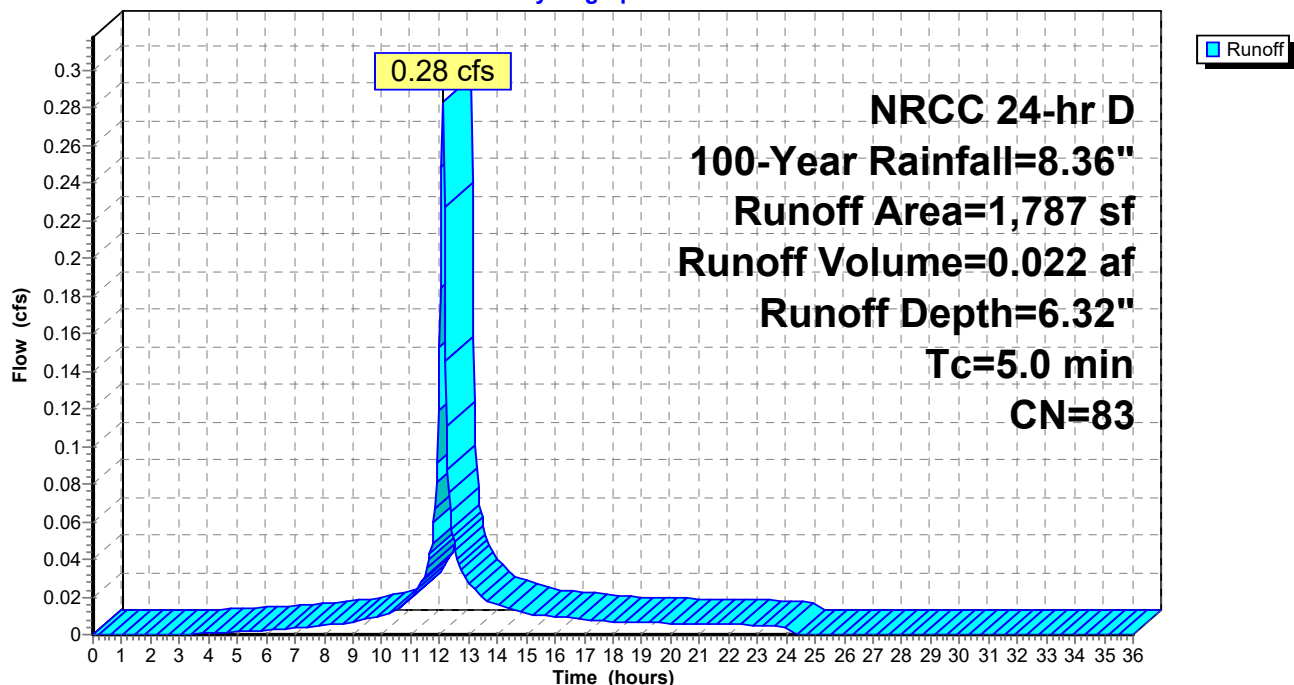
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 100-Year Rainfall=8.36"

	Area (sf)	CN	Description
*	1,006	98	Paved parking, HSG A
*	337	98	Cement Concrete Sidewalk, HSG A
	444	39	>75% Grass cover, Good, HSG A
	1,787	83	Weighted Average
	444		24.85% Pervious Area
	1,343		75.15% Impervious Area

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

Subcatchment 25S: PR-19

Hydrograph



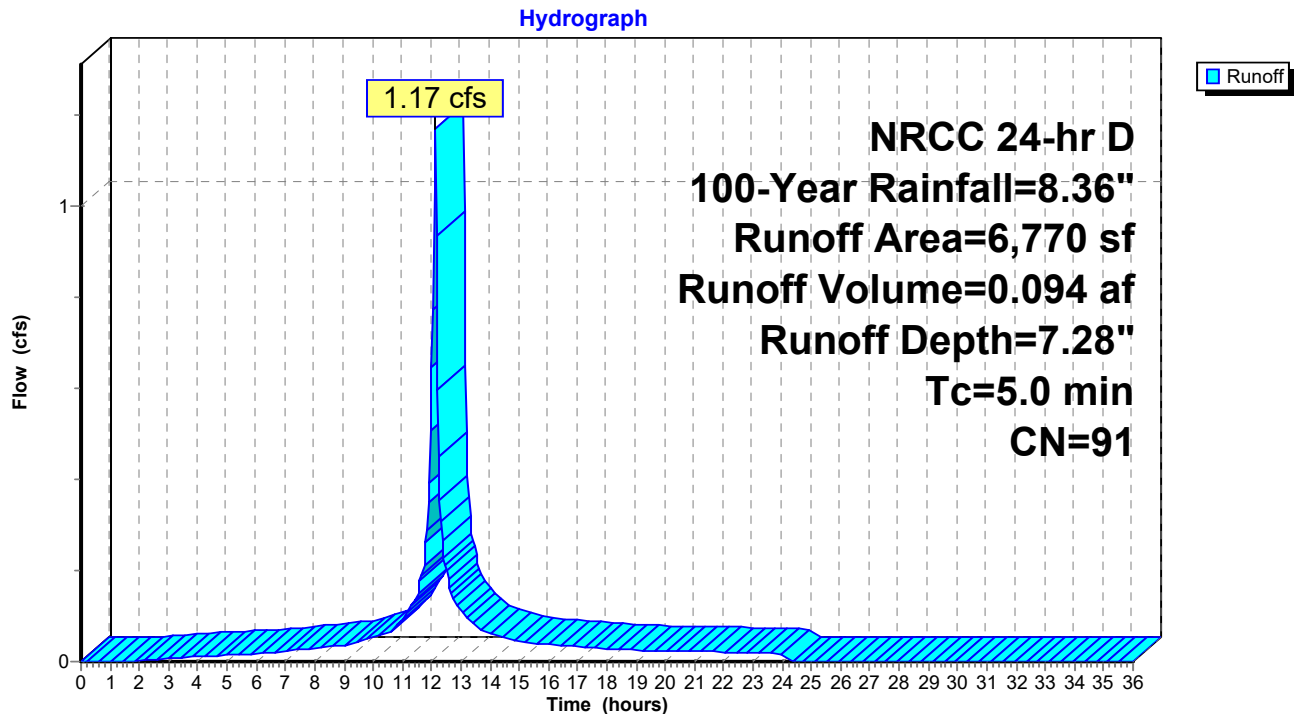
Summary for Subcatchment 26S: PR-20

Runoff = 1.17 cfs @ 12.11 hrs, Volume= 0.094 af, Depth= 7.28"
 Routed to Pond 44P : CMP Infiltration

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 100-Year Rainfall=8.36"

	Area (sf)	CN	Description
*	4,671	98	Paved parking, HSG A
*	1,328	98	Cement Concrete Sidewalk, HSG A
	771	39	>75% Grass cover, Good, HSG A
	6,770	91	Weighted Average
	771		11.39% Pervious Area
	5,999		88.61% Impervious Area

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

Subcatchment 26S: PR-20

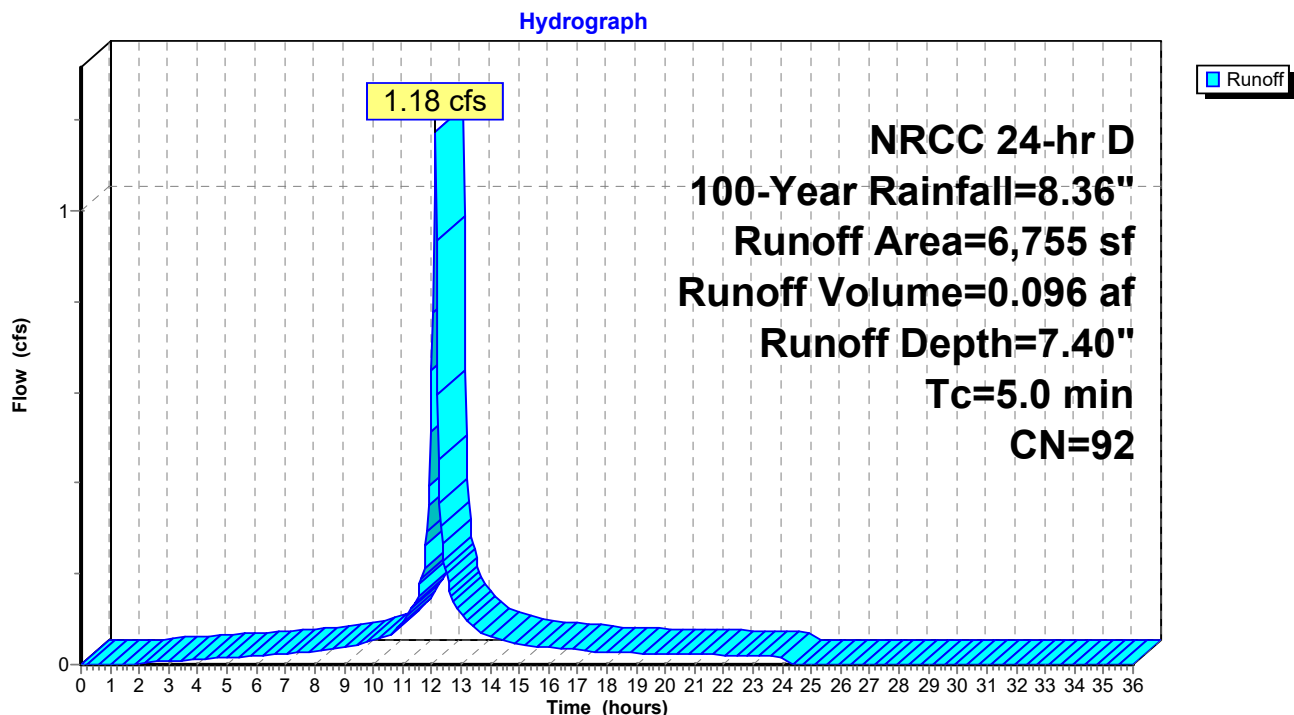
Summary for Subcatchment 27S: PR-21

Runoff = 1.18 cfs @ 12.11 hrs, Volume= 0.096 af, Depth= 7.40"
 Routed to Pond 44P : CMP Infiltration

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 100-Year Rainfall=8.36"

	Area (sf)	CN	Description
*	4,688	98	Paved parking, HSG A
*	1,331	98	Cement Concrete Sidewalk, HSG A
	736	39	>75% Grass cover, Good, HSG A
	6,755	92	Weighted Average
	736		10.90% Pervious Area
	6,019		89.10% Impervious Area

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

Subcatchment 27S: PR-21

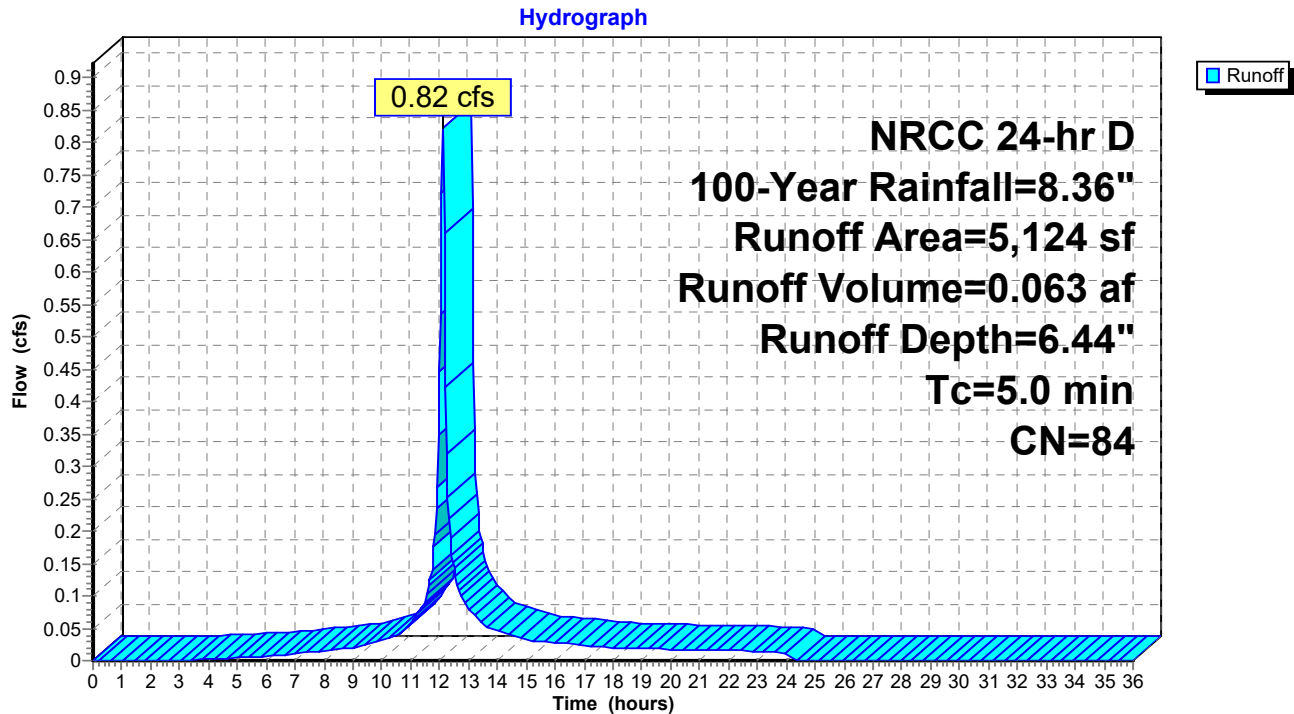
Summary for Subcatchment 28S: PR-22

Runoff = 0.82 cfs @ 12.12 hrs, Volume= 0.063 af, Depth= 6.44"
 Routed to Pond 44P : CMP Infiltration

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 100-Year Rainfall=8.36"

	Area (sf)	CN	Description
*	3,097	98	Paved parking, HSG A
*	72	98	Paved parking, HSG C
*	588	98	Cement Concrete Sidewalk, HSG C
	1,052	39	>75% Grass cover, Good, HSG A
	315	74	>75% Grass cover, Good, HSG C
	5,124	84	Weighted Average
	1,367		26.68% Pervious Area
	3,757		73.32% Impervious Area

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

Subcatchment 28S: PR-22

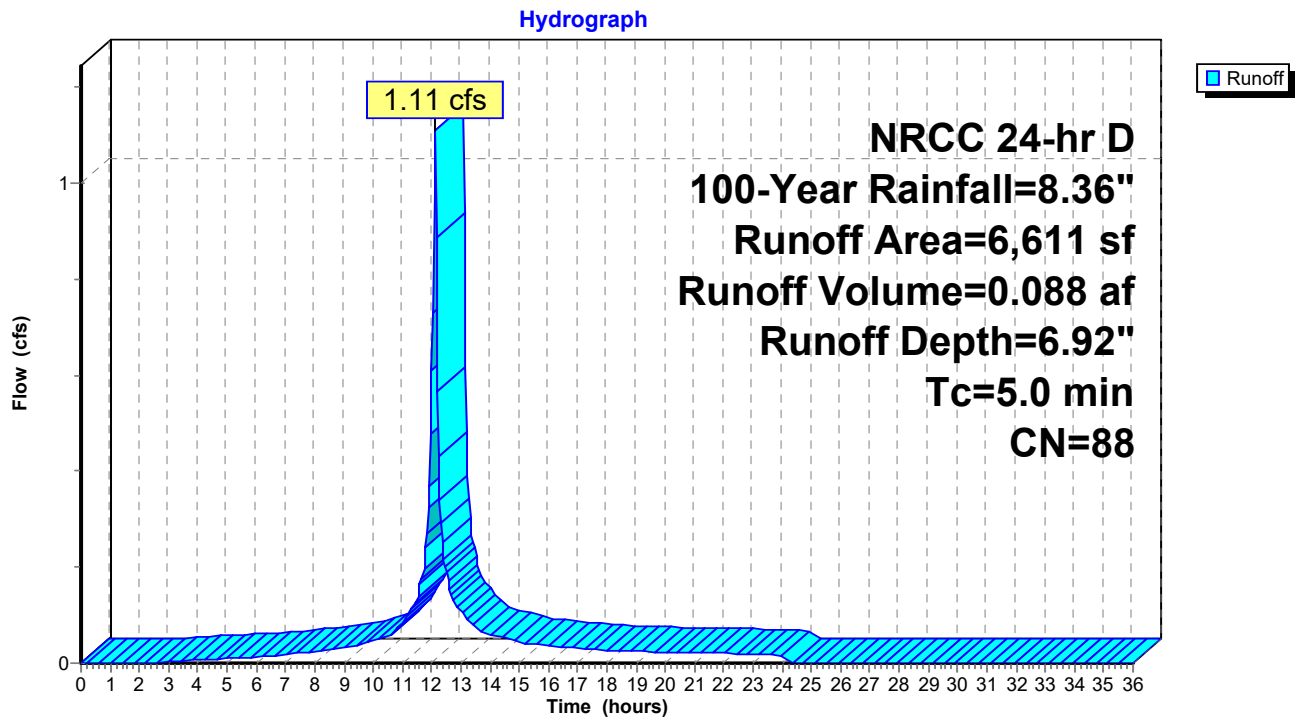
Summary for Subcatchment 29S: PR-23

Runoff = 1.11 cfs @ 12.11 hrs, Volume= 0.088 af, Depth= 6.92"
 Routed to Pond 44P : CMP Infiltration

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 100-Year Rainfall=8.36"

	Area (sf)	CN	Description
*	3,322	98	Paved parking, HSG A
*	748	98	Paved parking, HSG C
*	695	98	Cement Concrete Sidewalk, HSG A
*	463	98	Cement Concrete Sidewalk, HSG C
	914	39	>75% Grass cover, Good, HSG A
	469	74	>75% Grass cover, Good, HSG C
	6,611	88	Weighted Average
	1,383		20.92% Pervious Area
	5,228		79.08% Impervious Area

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

Subcatchment 29S: PR-23

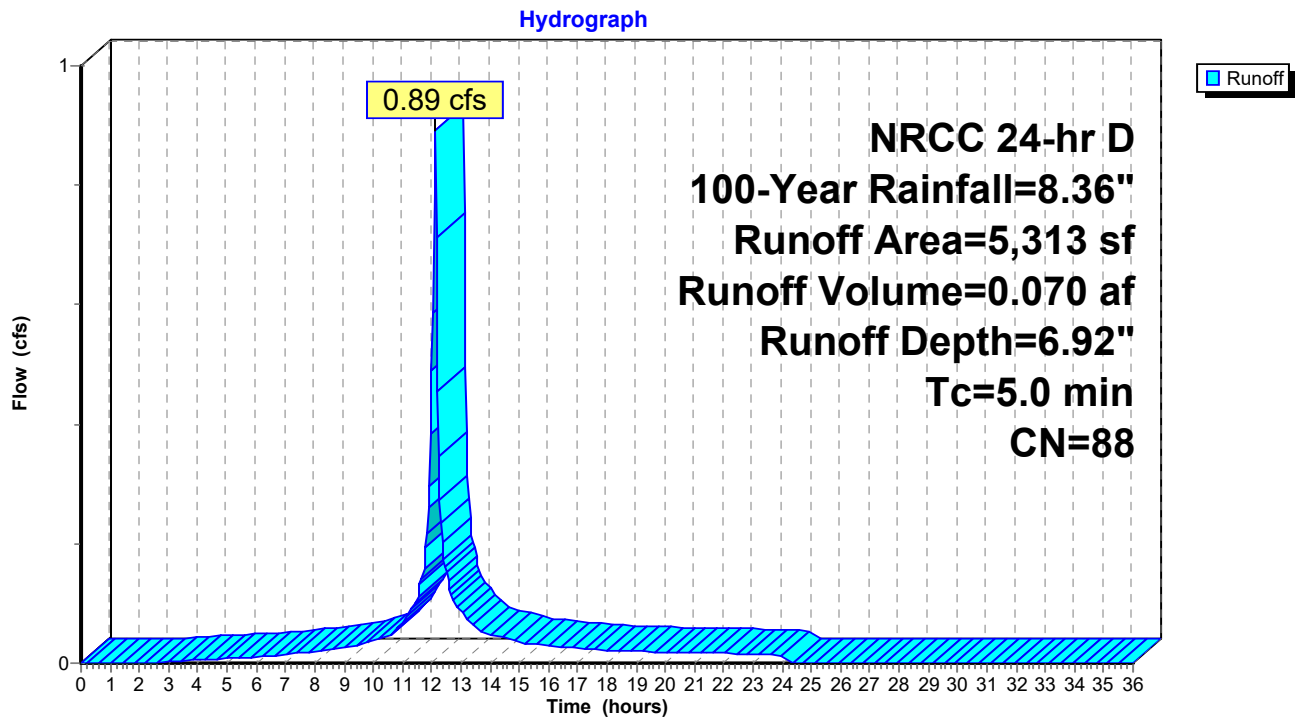
Summary for Subcatchment 30S: PR-24

Runoff = 0.89 cfs @ 12.11 hrs, Volume= 0.070 af, Depth= 6.92"
 Routed to Pond 44P : CMP Infiltration

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 100-Year Rainfall=8.36"

	Area (sf)	CN	Description
*	3,109	98	Paved parking, HSG A
*	146	98	Paved parking, HSG C
*	572	98	Cement Concrete Sidewalk, HSG A
*	432	98	Cement Concrete Sidewalk, HSG C
	819	39	>75% Grass cover, Good, HSG A
	235	74	>75% Grass cover, Good, HSG C
	5,313	88	Weighted Average
	1,054		19.84% Pervious Area
	4,259		80.16% Impervious Area

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

Subcatchment 30S: PR-24

Summary for Subcatchment 31S: PR-25

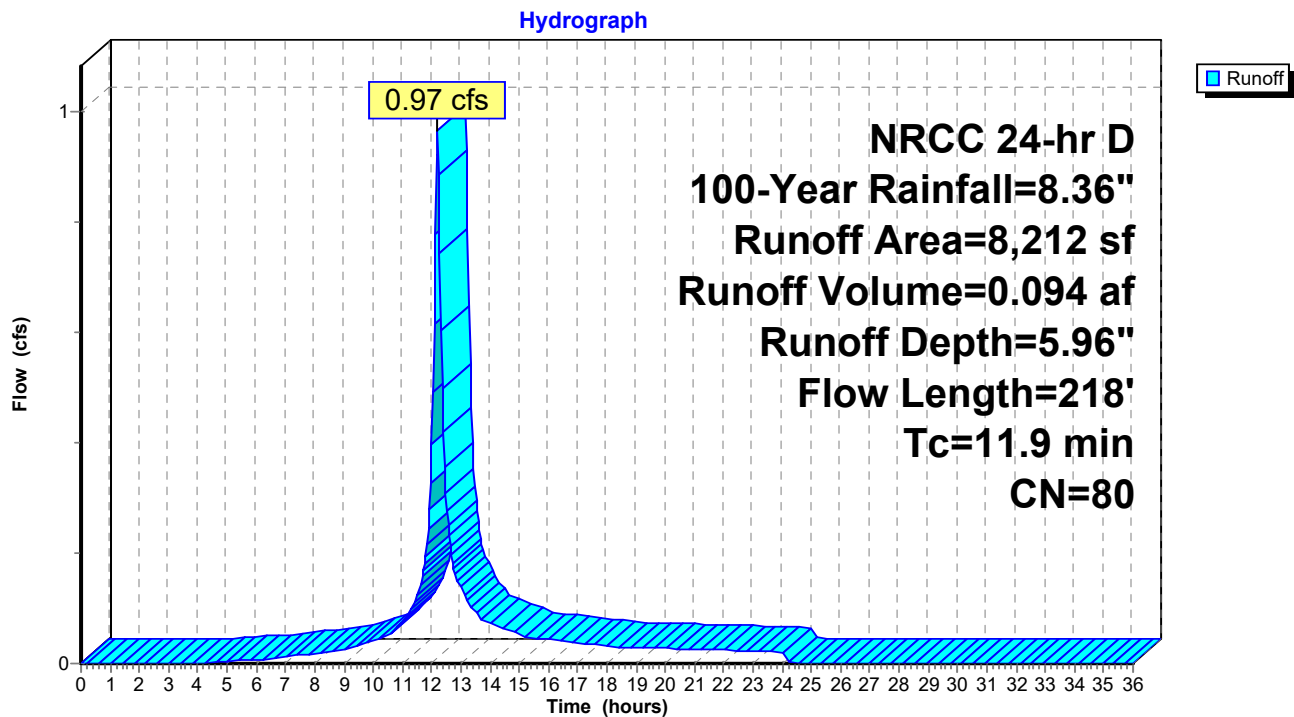
Runoff = 0.97 cfs @ 12.19 hrs, Volume= 0.094 af, Depth= 5.96"
 Routed to Pond 44P : CMP Infiltration

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 100-Year Rainfall=8.36"

	Area (sf)	CN	Description
*	3,851	98	Paved parking, HSG A
*	988	98	Cement Concrete Sidewalk, HSG A
*	65	98	Cement Concrete Sidewalk, HSG C
	1,910	39	>75% Grass cover, Good, HSG A
	1,398	74	>75% Grass cover, Good, HSG C
	8,212	80	Weighted Average
	3,308		40.28% Pervious Area
	4,904		59.72% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.6	63	0.0500	0.10		Sheet Flow, GRASS Grass: Bermuda n= 0.410 P2= 3.13"
0.6	37	0.0150	0.99		Sheet Flow, PAVEMENT Smooth surfaces n= 0.011 P2= 3.13"
0.7	118	0.0200	2.87		Shallow Concentrated Flow, PAVEMENT Paved Kv= 20.3 fps
11.9	218	Total			

Subcatchment 31S: PR-25



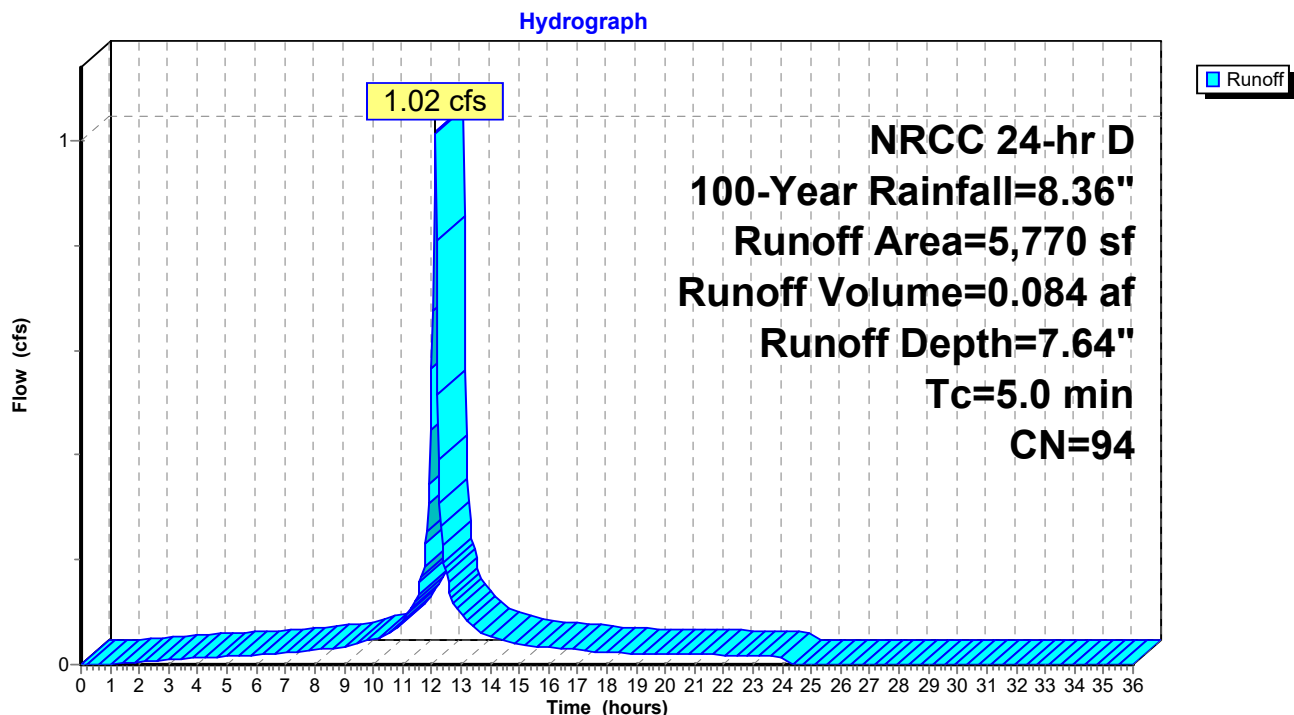
Summary for Subcatchment 32S: PR-26

Runoff = 1.02 cfs @ 12.11 hrs, Volume= 0.084 af, Depth= 7.64"
 Routed to Pond 44P : CMP Infiltration

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 100-Year Rainfall=8.36"

	Area (sf)	CN	Description
*	4,263	98	Paved parking, HSG A
*	1,076	98	Cement Concrete Sidewalk, HSG A
	431	39	>75% Grass cover, Good, HSG A
	5,770	94	Weighted Average
	431		7.47% Pervious Area
	5,339		92.53% Impervious Area

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

Subcatchment 32S: PR-26

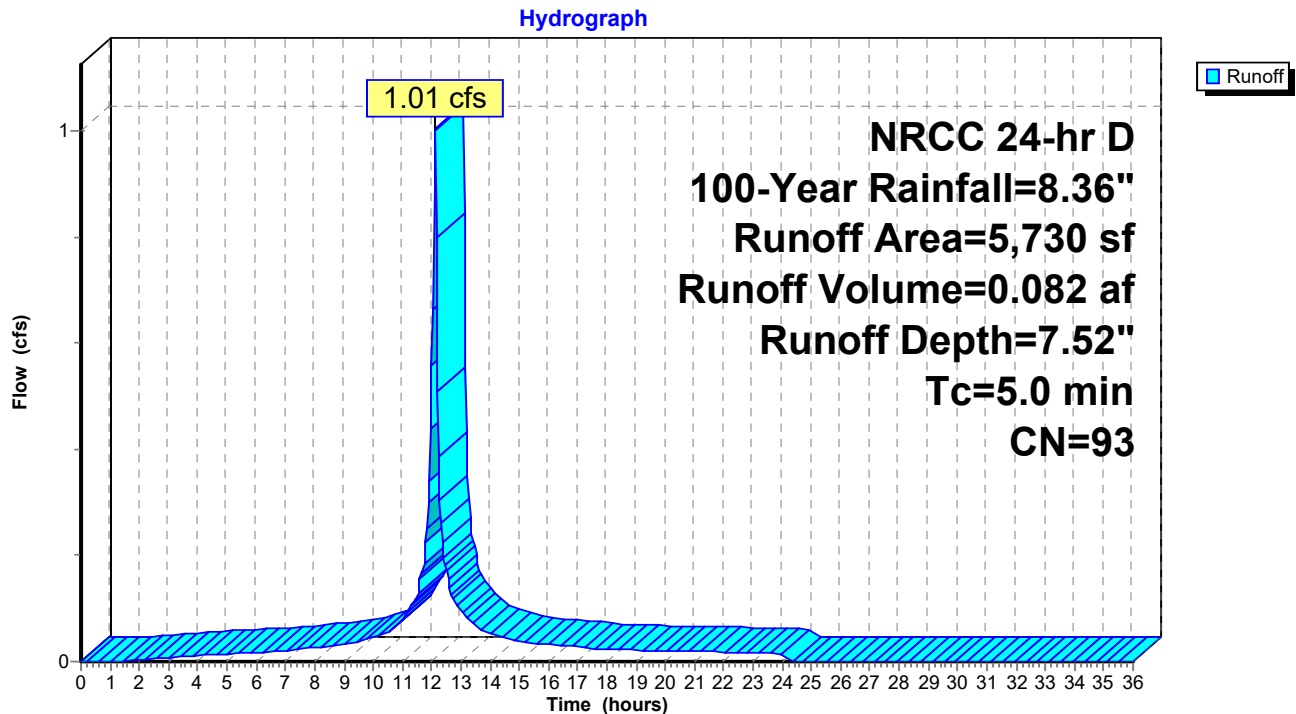
Summary for Subcatchment 33S: PR-27

Runoff = 1.01 cfs @ 12.11 hrs, Volume= 0.082 af, Depth= 7.52"
 Routed to Pond 44P : CMP Infiltration

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 100-Year Rainfall=8.36"

	Area (sf)	CN	Description
*	4,151	98	Paved parking, HSG A
*	1,069	98	Cement Concrete Sidewalk, HSG A
	510	39	>75% Grass cover, Good, HSG A
	5,730	93	Weighted Average
	510		8.90% Pervious Area
	5,220		91.10% Impervious Area

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

Subcatchment 33S: PR-27

Summary for Subcatchment 34S: PR-28

Runoff = 0.41 cfs @ 12.22 hrs, Volume= 0.041 af, Depth= 4.78"
 Routed to Pond 44P : CMP Infiltration

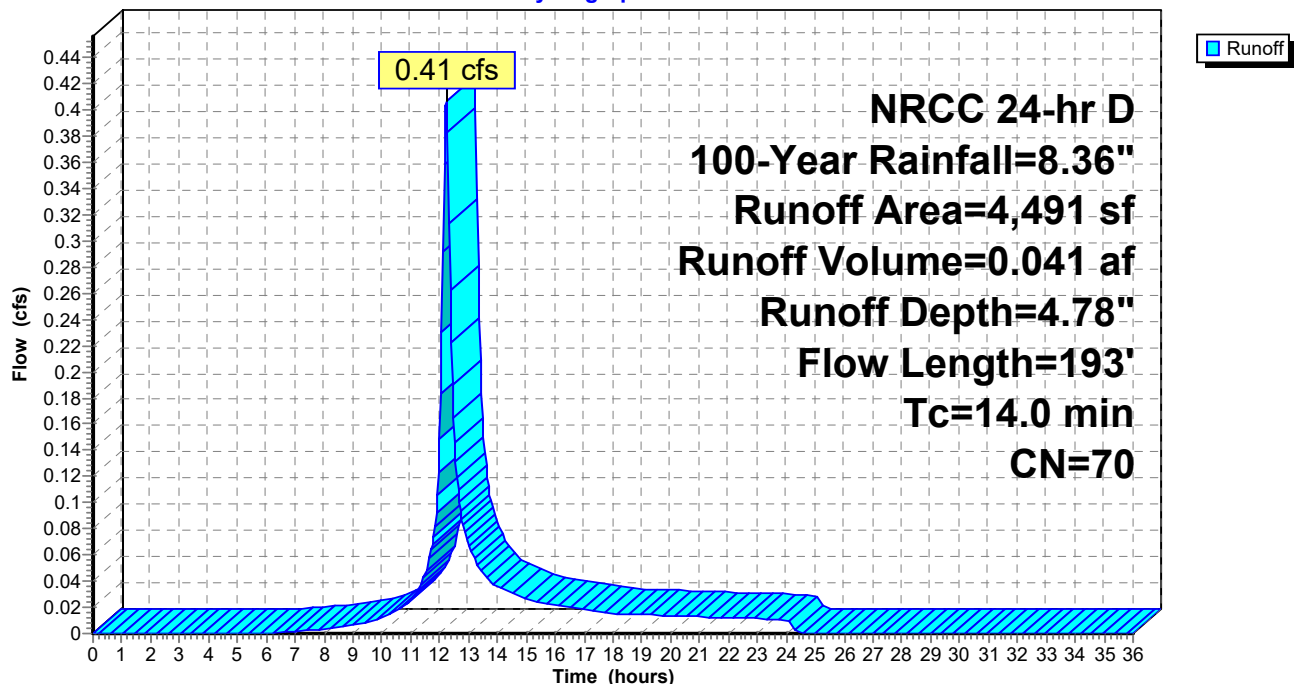
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 100-Year Rainfall=8.36"

	Area (sf)	CN	Description
*	1,588	98	Paved parking, HSG A
*	456	98	Cement Concrete Sidewalk, HSG A
	1,899	39	>75% Grass cover, Good, HSG A
	548	74	>75% Grass cover, Good, HSG C
	4,491	70	Weighted Average
	2,447		54.49% Pervious Area
	2,044		45.51% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.0	81	0.0500	0.10		Sheet Flow, GRASS Grass: Bermuda n= 0.410 P2= 3.13"
0.4	19	0.0150	0.87		Sheet Flow, PAVEMENT Smooth surfaces n= 0.011 P2= 3.13"
0.6	93	0.0150	2.49		Shallow Concentrated Flow, PAVEMENT Paved Kv= 20.3 fps
14.0	193	Total			

Subcatchment 34S: PR-28

Hydrograph



Summary for Subcatchment 35S: PR-29

Runoff = 0.24 cfs @ 12.11 hrs, Volume= 0.018 af, Depth= 6.80"
 Routed to Pond 44P : CMP Infiltration

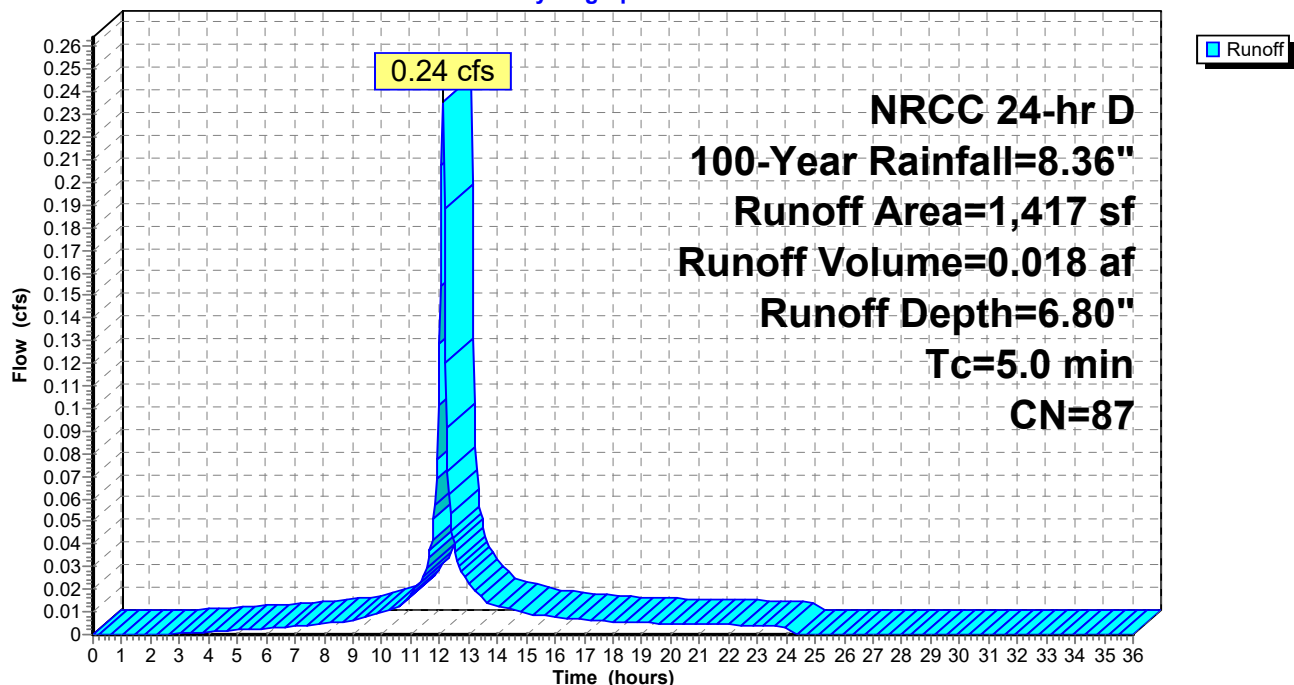
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 100-Year Rainfall=8.36"

	Area (sf)	CN	Description
*	1,137	98	Paved parking, HSG A
*	16	98	Cement Concrete Sidewalk, HSG A
	264	39	>75% Grass cover, Good, HSG A
	1,417	87	Weighted Average
	264		18.63% Pervious Area
	1,153		81.37% Impervious Area

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

Subcatchment 35S: PR-29

Hydrograph



Summary for Subcatchment 36S: PR-30

Runoff = 1.36 cfs @ 12.12 hrs, Volume= 0.105 af, Depth= 6.20"
 Routed to Pond 44P : CMP Infiltration

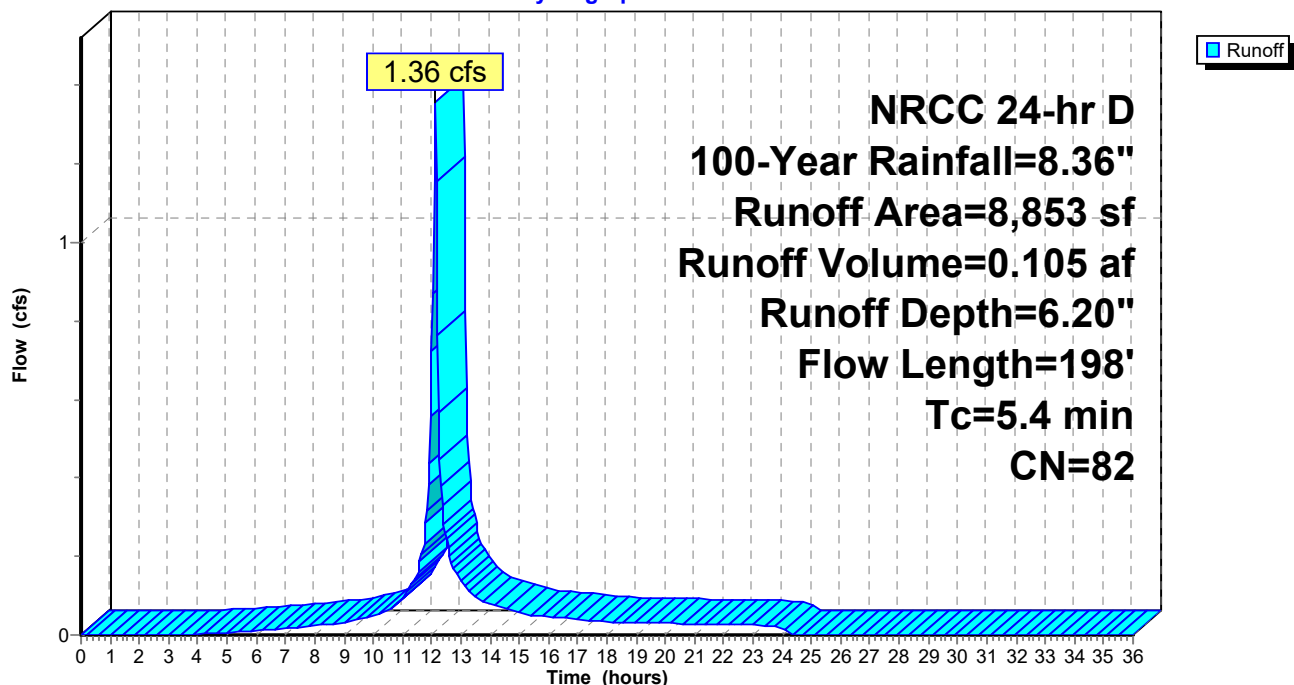
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 100-Year Rainfall=8.36"

	Area (sf)	CN	Description
*	5,691	98	Paved parking, HSG A
*	826	98	Cement Concrete Sidewalk, HSG A
	2,336	39	>75% Grass cover, Good, HSG A
	8,853	82	Weighted Average
	2,336		26.39% Pervious Area
	6,517		73.61% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.5	16	0.0500	0.08		Sheet Flow, GRASS Grass: Bermuda n= 0.410 P2= 3.13"
1.2	84	0.0150	1.17		Sheet Flow, PAVEMENT Smooth surfaces n= 0.011 P2= 3.13"
0.7	98	0.0150	2.49		Shallow Concentrated Flow, PAVEMENT Paved Kv= 20.3 fps
5.4	198	Total			

Subcatchment 36S: PR-30

Hydrograph



Summary for Subcatchment 37S: PR-31

Runoff = 1.58 cfs @ 12.12 hrs, Volume= 0.123 af, Depth= 6.44"
 Routed to Pond 44P : CMP Infiltration

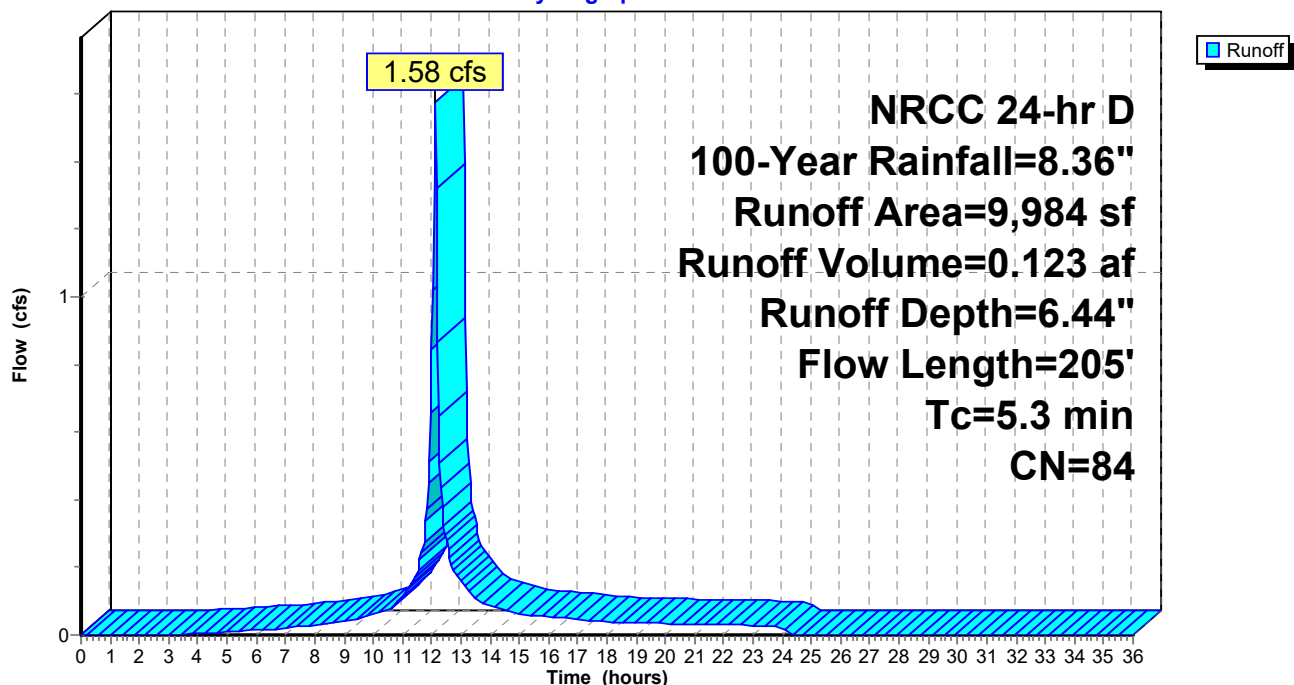
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 100-Year Rainfall=8.36"

	Area (sf)	CN	Description
*	6,479	98	Paved parking, HSG A
*	1,108	98	Cement Concrete Sidewalk, HSG A
	2,397	39	>75% Grass cover, Good, HSG A
	9,984	84	Weighted Average
	2,397		24.01% Pervious Area
	7,587		75.99% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.4	15	0.0500	0.07		Sheet Flow, GRASS Grass: Bermuda n= 0.410 P2= 3.13"
1.2	85	0.0150	1.17		Sheet Flow, PAVEMENT Smooth surfaces n= 0.011 P2= 3.13"
0.7	105	0.0150	2.49		Shallow Concentrated Flow, PAVEMENT Paved Kv= 20.3 fps
5.3	205	Total			

Subcatchment 37S: PR-31

Hydrograph



Summary for Subcatchment 38S: PR-32

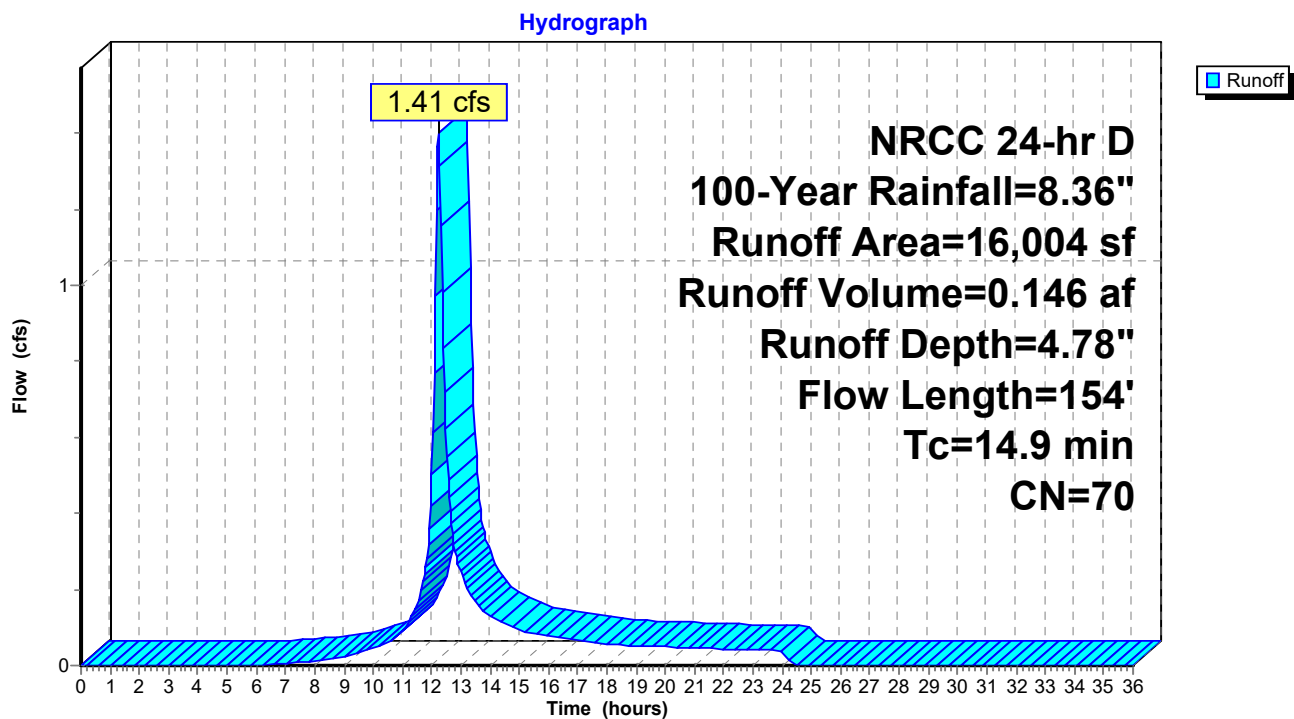
Runoff = 1.41 cfs @ 12.23 hrs, Volume= 0.146 af, Depth= 4.78"
 Routed to Pond 44P : CMP Infiltration

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 100-Year Rainfall=8.36"

	Area (sf)	CN	Description
*	6,711	98	Paved parking, HSG A
*	1,813	98	Cement Concrete Sidewalk, HSG A
	7,480	39	>75% Grass cover, Good, HSG A
	16,004	70	Weighted Average
	7,480		46.74% Pervious Area
	8,524		53.26% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.4	92	0.0500	0.11		Sheet Flow, GRASS Grass: Bermuda n= 0.410 P2= 3.13"
0.2	8	0.0200	0.82		Sheet Flow, PAVEMENT Smooth surfaces n= 0.011 P2= 3.13"
0.2	34	0.0500	3.35		Shallow Concentrated Flow, GRASS Grassed Waterway Kv= 15.0 fps
0.1	20	0.0200	2.87		Shallow Concentrated Flow, PAVEMENT Paved Kv= 20.3 fps
14.9	154	Total			

Subcatchment 38S: PR-32



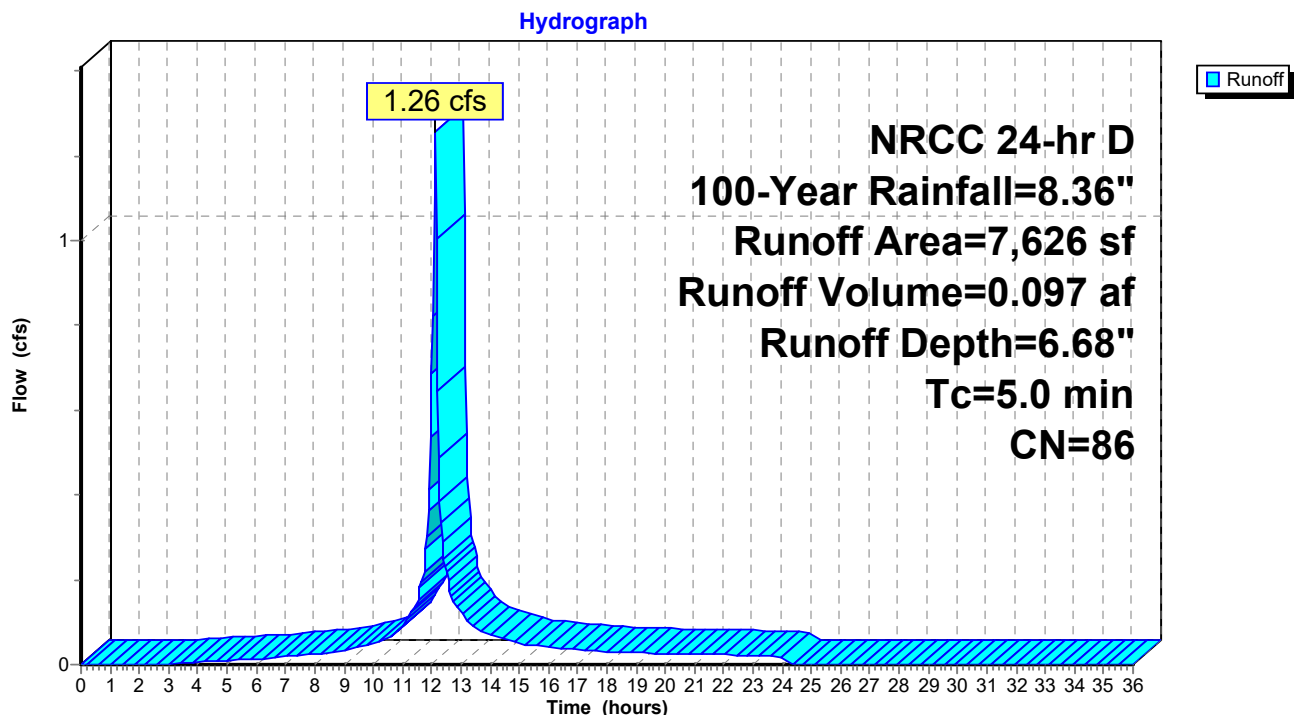
Summary for Subcatchment 39S: PR-33

Runoff = 1.26 cfs @ 12.11 hrs, Volume= 0.097 af, Depth= 6.68"
 Routed to Pond 44P : CMP Infiltration

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 100-Year Rainfall=8.36"

	Area (sf)	CN	Description
*	5,106	98	Paved parking, HSG A
*	920	98	Cement Concrete Sidewalk, HSG A
	1,600	39	>75% Grass cover, Good, HSG A
	7,626	86	Weighted Average
	1,600		20.98% Pervious Area
	6,026		79.02% Impervious Area

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

Subcatchment 39S: PR-33

Summary for Subcatchment 40S: PR-34

Runoff = 0.51 cfs @ 12.12 hrs, Volume= 0.042 af, Depth= 6.92"
 Routed to Pond 44P : CMP Infiltration

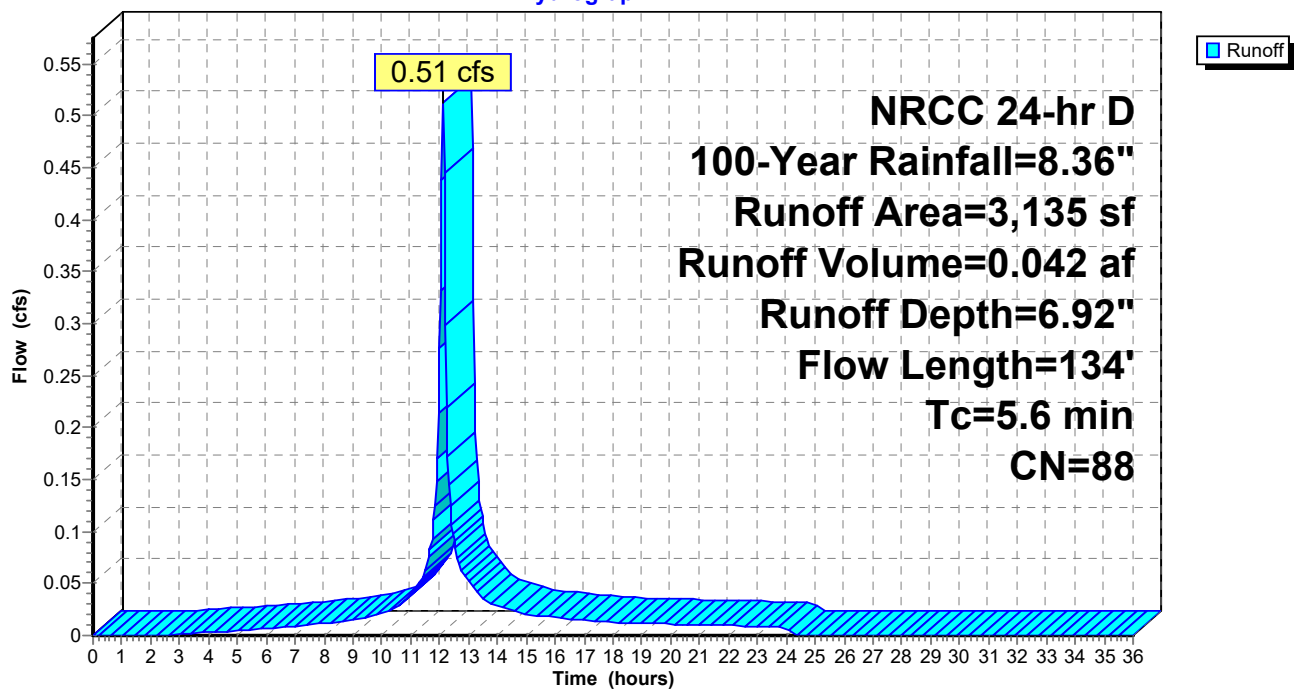
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 100-Year Rainfall=8.36"

	Area (sf)	CN	Description
*	2,389	98	Paved parking, HSG A
*	234	98	Cement Concrete Sidewalk, HSG A
	512	39	>75% Grass cover, Good, HSG A
	3,135	88	Weighted Average
	512		16.33% Pervious Area
	2,623		83.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.4	21	0.0500	0.08		Sheet Flow, GRASS Grass: Bermuda n= 0.410 P2= 3.13"
1.0	79	0.0200	1.30		Sheet Flow, PAVEMENT Smooth surfaces n= 0.011 P2= 3.13"
0.0	7	0.0500	3.35		Shallow Concentrated Flow, GRASS Grassed Waterway Kv= 15.0 fps
0.2	27	0.0200	2.87		Shallow Concentrated Flow, PAVEMENT Paved Kv= 20.3 fps
5.6	134	Total			

Subcatchment 40S: PR-34

Hydrograph



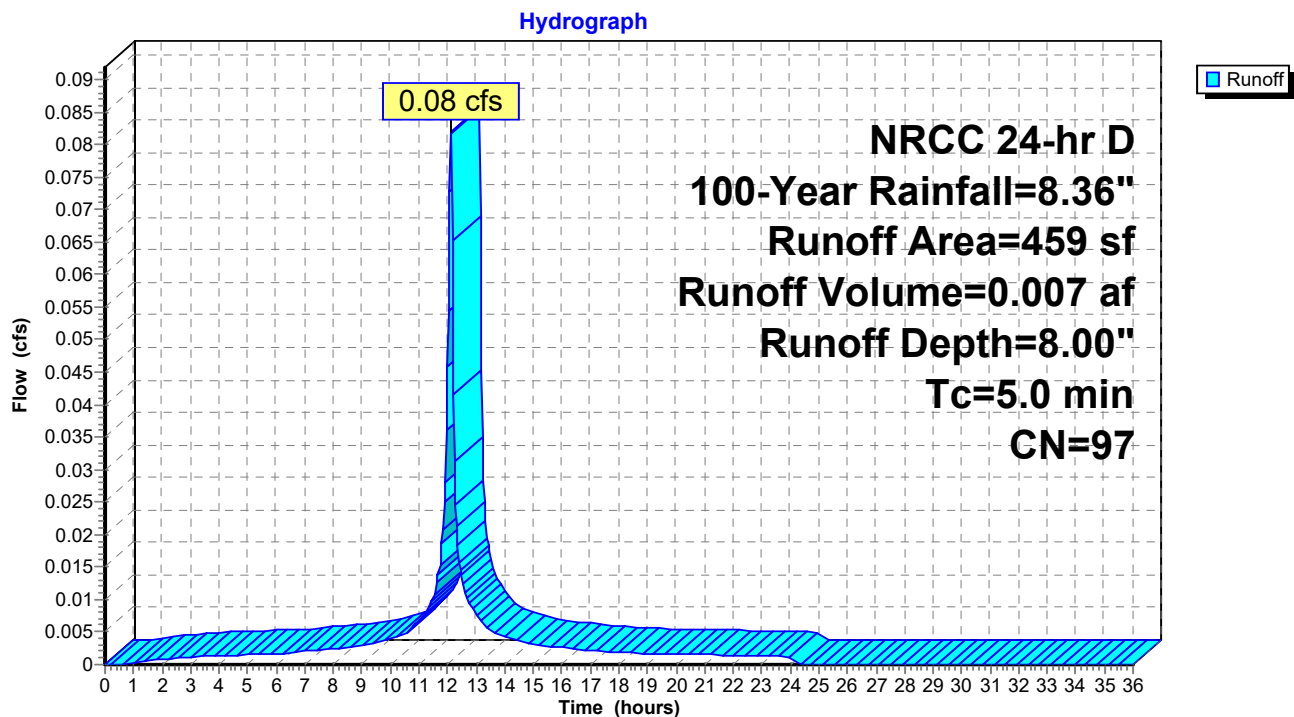
Summary for Subcatchment 41S: PR-35

Runoff = 0.08 cfs @ 12.11 hrs, Volume= 0.007 af, Depth= 8.00"
 Routed to Pond 44P : CMP Infiltration

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 100-Year Rainfall=8.36"

	Area (sf)	CN	Description
*	366	98	Paved parking, HSG A
*	86	98	Cement Concrete Sidewalk, HSG A
	7	39	>75% Grass cover, Good, HSG A
	459	97	Weighted Average
	7		1.53% Pervious Area
	452		98.47% Impervious Area

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

Subcatchment 41S: PR-35

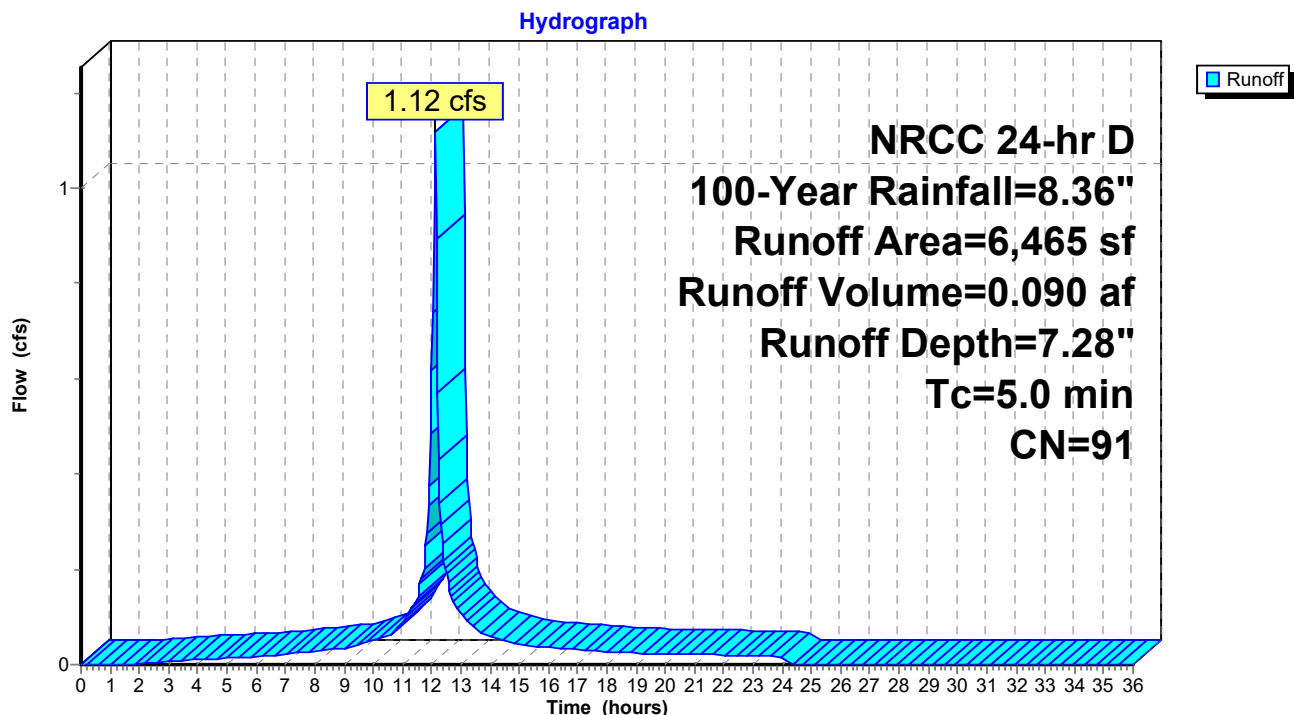
Summary for Subcatchment 42S: PR-36

Runoff = 1.12 cfs @ 12.11 hrs, Volume= 0.090 af, Depth= 7.28"
 Routed to Pond 44P : CMP Infiltration

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 100-Year Rainfall=8.36"

	Area (sf)	CN	Description
*	4,448	98	Paved parking, HSG A
*	1,207	98	Cement Concrete Sidewalk, HSG A
	810	39	>75% Grass cover, Good, HSG A
	6,465	91	Weighted Average
	810		12.53% Pervious Area
	5,655		87.47% Impervious Area

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

Subcatchment 42S: PR-36

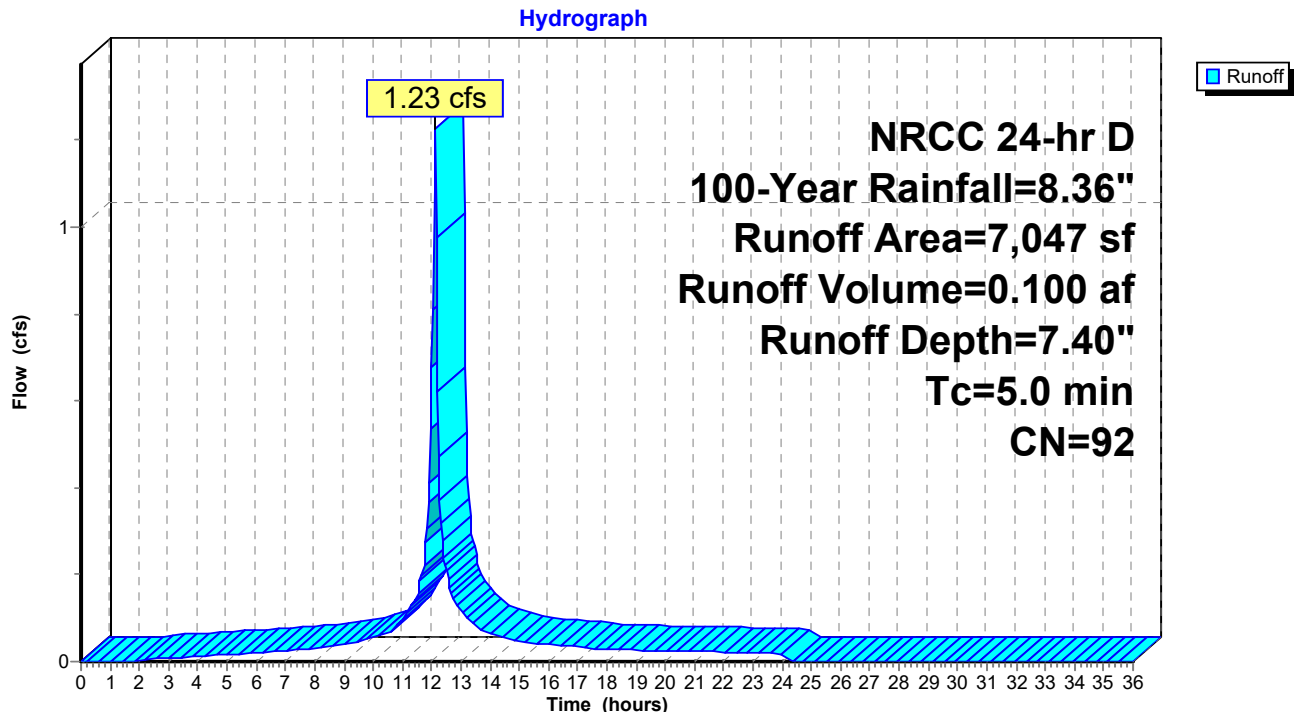
Summary for Subcatchment 43S: PR-37

Runoff = 1.23 cfs @ 12.11 hrs, Volume= 0.100 af, Depth= 7.40"
 Routed to Pond 44P : CMP Infiltration

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 NRCC 24-hr D 100-Year Rainfall=8.36"

	Area (sf)	CN	Description
*	5,177	98	Paved parking, HSG A
*	1,177	98	Cement Concrete Sidewalk, HSG A
	693	39	>75% Grass cover, Good, HSG A
	7,047	92	Weighted Average
	693		9.83% Pervious Area
	6,354		90.17% Impervious Area

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

Subcatchment 43S: PR-37

Summary for Pond 44P: CMP Infiltration

Inflow Area = 5.917 ac, 73.14% Impervious, Inflow Depth = 6.63" for 100-Year event
 Inflow = 38.48 cfs @ 12.12 hrs, Volume= 3.267 af
 Outflow = 23.99 cfs @ 12.20 hrs, Volume= 3.267 af, Atten= 38%, Lag= 5.0 min
 Discarded = 0.26 cfs @ 12.20 hrs, Volume= 0.291 af
 Primary = 23.73 cfs @ 12.20 hrs, Volume= 2.976 af
 Routed to Pond 45P : Rain Garden

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs / 3
 Peak Elev= 273.48' @ 12.20 hrs Surf.Area= 0.055 ac Storage= 0.266 af

Plug-Flow detention time= 10.3 min calculated for 3.263 af (100% of inflow)
 Center-of-Mass det. time= 10.4 min (803.2 - 792.8)

Volume	Invert	Avail.Storage	Storage Description
#1C	266.50'	0.081 af	17.00'W x 142.00'L x 7.00'H Field C 0.388 af Overall - 0.186 af Embedded = 0.202 af x 40.0% Voids
#2C	267.00'	0.186 af	CMP Round 72 x 12 Inside #1 Effective Size= 72.0"W x 72.0"H => 28.27 sf x 20.00'L = 565.5 cf Overall Size= 72.0"W x 72.0"H x 20.00'L Row Length Adjustment= +8.00' x 28.27 sf x 2 rows 15.00' Header x 28.27 sf x 2 = 848.2 cf Inside
0.267 af			Total Available Storage

Storage Group C created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	267.00'	18.0" Round Culvert L= 169.0' RCP, rounded edge headwall, Ke= 0.100 Inlet / Outlet Invert= 267.00' / 260.24' S= 0.0400 ' / ' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.77 sf
#2	Discarded	266.50'	2.410 in/hr Exfiltration over Wetted area

Discarded OutFlow Max=0.26 cfs @ 12.20 hrs HW=273.44' (Free Discharge)

↑ **2=Exfiltration** (Exfiltration Controls 0.26 cfs)

Primary OutFlow Max=23.69 cfs @ 12.20 hrs HW=273.44' TW=259.95' (Dynamic Tailwater)

↑ **1=Culvert** (Barrel Controls 23.69 cfs @ 13.41 fps)

Pond 44P: CMP Infiltration - Chamber Wizard Field C**Chamber Model = CMP Round 72 (Round Corrugated Metal Pipe)**

Effective Size= 72.0"W x 72.0"H => 28.27 sf x 20.00'L = 565.5 cf

Overall Size= 72.0"W x 72.0"H x 20.00'L

Row Length Adjustment= +8.00' x 28.27 sf x 2 rows

72.0" Wide + 36.0" Spacing = 108.0" C-C Row Spacing

6 Chambers/Row x 20.00' Long +8.00' Row Adjustment +6.00' Header x 2 = 140.00' Row Length +12.0"

End Stone x 2 = 142.00' Base Length

2 Rows x 72.0" Wide + 36.0" Spacing x 1 + 12.0" Side Stone x 2 = 17.00' Base Width

6.0" Stone Base + 72.0" Chamber Height + 6.0" Stone Cover = 7.00' Field Height

12 Chambers x 565.5 cf +8.00' Row Adjustment x 28.27 sf x 2 Rows + 15.00' Header x 28.27 sf x 2 =
8,086.5 cf Chamber Storage

16,898.0 cf Field - 8,086.5 cf Chambers = 8,811.5 cf Stone x 40.0% Voids = 3,524.6 cf Stone Storage

Chamber Storage + Stone Storage = 11,611.1 cf = 0.267 af

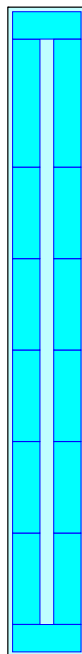
Overall Storage Efficiency = 68.7%

Overall System Size = 142.00' x 17.00' x 7.00'

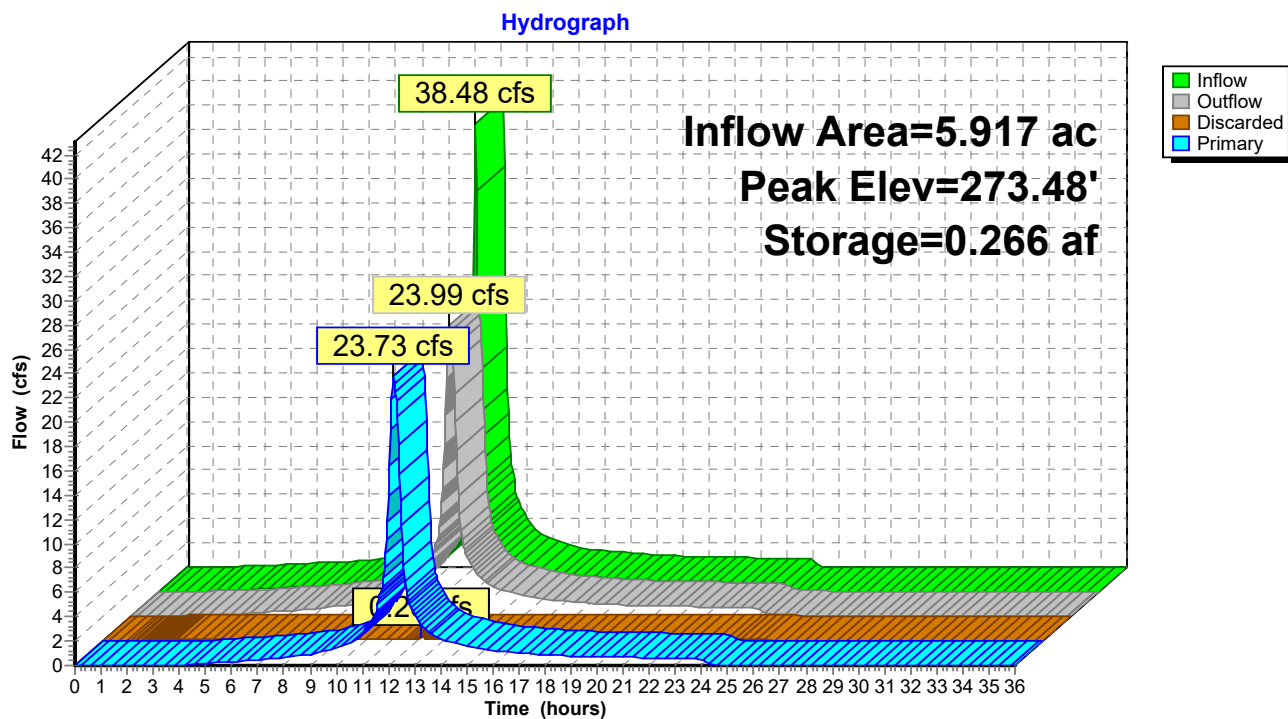
12 Chambers

625.9 cy Field

326.4 cy Stone



Pond 44P: CMP Infiltration



Stage-Area-Storage for Pond 44P: CMP Infiltration

Elevation (feet)	Wetted (acres)	Storage (acre-feet)	Elevation (feet)	Wetted (acres)	Storage (acre-feet)
266.50	0.055	0.000	271.80	0.094	0.213
266.60	0.056	0.002	271.90	0.095	0.217
266.70	0.057	0.004	272.00	0.096	0.221
266.80	0.058	0.007	272.10	0.096	0.225
266.90	0.058	0.009	272.20	0.097	0.229
267.00	0.059	0.011	272.30	0.098	0.233
267.10	0.060	0.014	272.40	0.098	0.236
267.20	0.061	0.017	272.50	0.099	0.240
267.30	0.061	0.020	272.60	0.100	0.243
267.40	0.062	0.023	272.70	0.101	0.247
267.50	0.063	0.027	272.80	0.101	0.250
267.60	0.063	0.030	272.90	0.102	0.253
267.70	0.064	0.034	273.00	0.103	0.255
267.80	0.065	0.038	273.10	0.104	0.258
267.90	0.066	0.042	273.20	0.104	0.260
268.00	0.066	0.045	273.30	0.105	0.262
268.10	0.067	0.049	273.40	0.106	0.264
268.20	0.068	0.054	273.50	0.107	0.267
268.30	0.069	0.058			
268.40	0.069	0.062			
268.50	0.070	0.066			
268.60	0.071	0.070			
268.70	0.071	0.075			
268.80	0.072	0.079			
268.90	0.073	0.083			
269.00	0.074	0.088			
269.10	0.074	0.092			
269.20	0.075	0.097			
269.30	0.076	0.101			
269.40	0.077	0.106			
269.50	0.077	0.110			
269.60	0.078	0.115			
269.70	0.079	0.120			
269.80	0.080	0.124			
269.90	0.080	0.129			
270.00	0.081	0.133			
270.10	0.082	0.138			
270.20	0.082	0.142			
270.30	0.083	0.147			
270.40	0.084	0.152			
270.50	0.085	0.156			
270.60	0.085	0.161			
270.70	0.086	0.165			
270.80	0.087	0.170			
270.90	0.088	0.174			
271.00	0.088	0.179			
271.10	0.089	0.183			
271.20	0.090	0.187			
271.30	0.090	0.192			
271.40	0.091	0.196			
271.50	0.092	0.200			
271.60	0.093	0.205			
271.70	0.093	0.209			

Summary for Pond 45P: Rain Garden

Inflow Area = 5.917 ac, 73.14% Impervious, Inflow Depth = 6.04" for 100-Year event
 Inflow = 23.73 cfs @ 12.20 hrs, Volume= 2.976 af
 Outflow = 22.67 cfs @ 12.28 hrs, Volume= 2.976 af, Atten= 4%, Lag= 4.5 min
 Discarded = 3.74 cfs @ 12.28 hrs, Volume= 2.084 af
 Primary = 18.93 cfs @ 12.28 hrs, Volume= 0.893 af
 Routed to Link 15L : DP-1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs / 3
 Peak Elev= 259.98' @ 12.28 hrs Surf.Area= 12,287 sf Storage= 15,523 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 24.5 min (825.4 - 800.8)

Volume	Invert	Avail.Storage	Storage Description
#1	255.50'	6,443 cf	Custom Stage Data (Irregular) Listed below (Recalc) 16,107 cf Overall x 40.0% Voids
#2	258.50'	10,400 cf	Custom Stage Data (Irregular) Listed below (Recalc)
		16,843 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
255.50	5,369	313.0	0	0	5,369
258.50	5,369	313.0	16,107	16,107	6,308

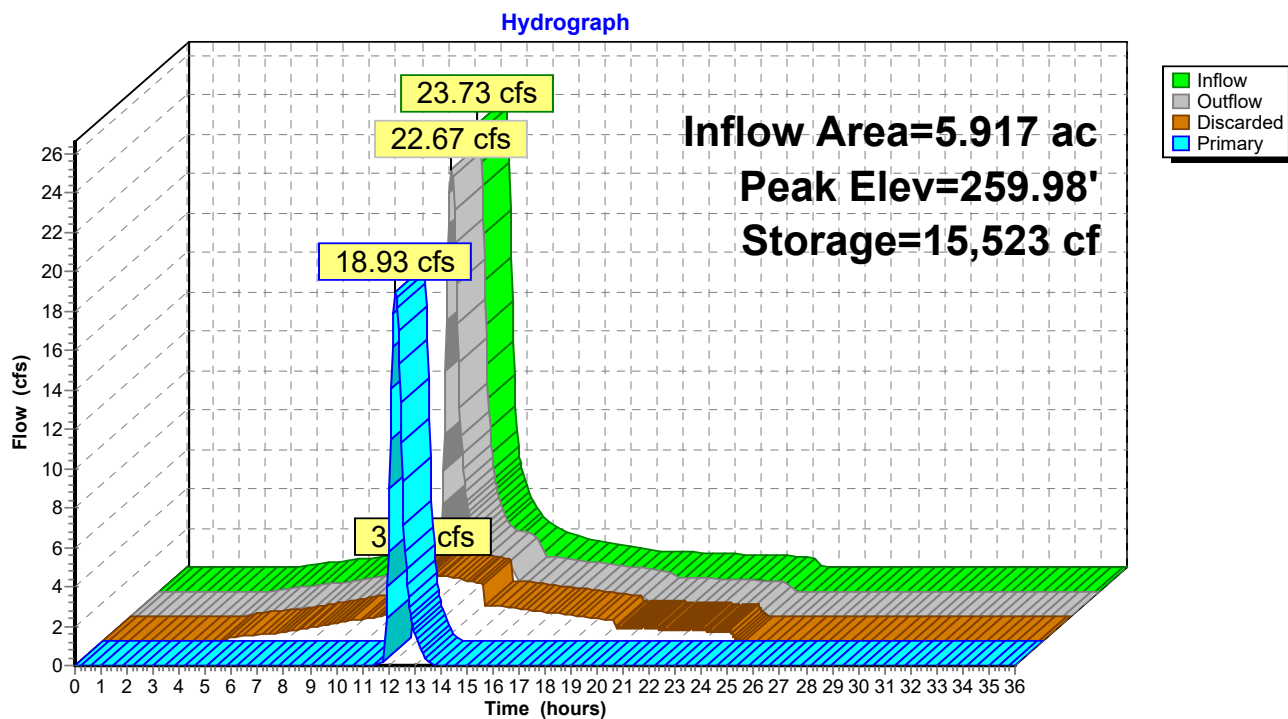
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
258.50	5,369	313.0	0	0	5,369
260.00	6,938	357.4	9,205	9,205	7,790
260.17	7,118	360.5	1,195	10,400	7,978

Device	Routing	Invert	Outlet Devices
#1	Primary	253.71'	24.0" Round Culvert L= 32.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 253.71' / 253.36' S= 0.0109 ' / ' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 3.14 sf
#2	Discarded	255.50'	8.270 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 251.50'
#3	Device 1	259.55'	2.0" x 2.0" Horiz. Orifice/Grate X 6.00 columns X 6 rows C= 0.600 Limited to weir flow at low heads
#4	Primary	259.05'	6.0' long x 0.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 Coef. (English) 2.80 2.92

Discarded OutFlow Max=3.74 cfs @ 12.28 hrs HW=259.98' (Free Discharge)
 ↳ **2=Exfiltration** (Controls 3.74 cfs)

Primary OutFlow Max=18.92 cfs @ 12.28 hrs HW=259.98' TW=0.00' (Dynamic Tailwater)
 ↳ **1=Culvert** (Passes 3.16 cfs of 27.42 cfs potential flow)
 ↳ **3=Orifice/Grate** (Orifice Controls 3.16 cfs @ 3.16 fps)
 ↳ **4=Broad-Crested Rectangular Weir** (Weir Controls 15.76 cfs @ 2.82 fps)

Pond 45P: Rain Garden



Stage-Area-Storage for Pond 45P: Rain Garden

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
255.50	5,369	0
255.60	5,369	215
255.70	5,369	430
255.80	5,369	644
255.90	5,369	859
256.00	5,369	1,074
256.10	5,369	1,289
256.20	5,369	1,503
256.30	5,369	1,718
256.40	5,369	1,933
256.50	5,369	2,148
256.60	5,369	2,362
256.70	5,369	2,577
256.80	5,369	2,792
256.90	5,369	3,007
257.00	5,369	3,221
257.10	5,369	3,436
257.20	5,369	3,651
257.30	5,369	3,866
257.40	5,369	4,080
257.50	5,369	4,295
257.60	5,369	4,510
257.70	5,369	4,725
257.80	5,369	4,939
257.90	5,369	5,154
258.00	5,369	5,369
258.10	5,369	5,584
258.20	5,369	5,799
258.30	5,369	6,013
258.40	5,369	6,228
258.50	10,738	6,443
258.60	10,836	6,985
258.70	10,936	7,536
258.80	11,036	8,098
258.90	11,137	8,670
259.00	11,239	9,252
259.10	11,341	9,844
259.20	11,445	10,446
259.30	11,550	11,059
259.40	11,655	11,682
259.50	11,762	12,316
259.60	11,869	12,961
259.70	11,977	13,616
259.80	12,086	14,282
259.90	12,196	14,960
260.00	12,307	15,648
260.10	12,413	16,347

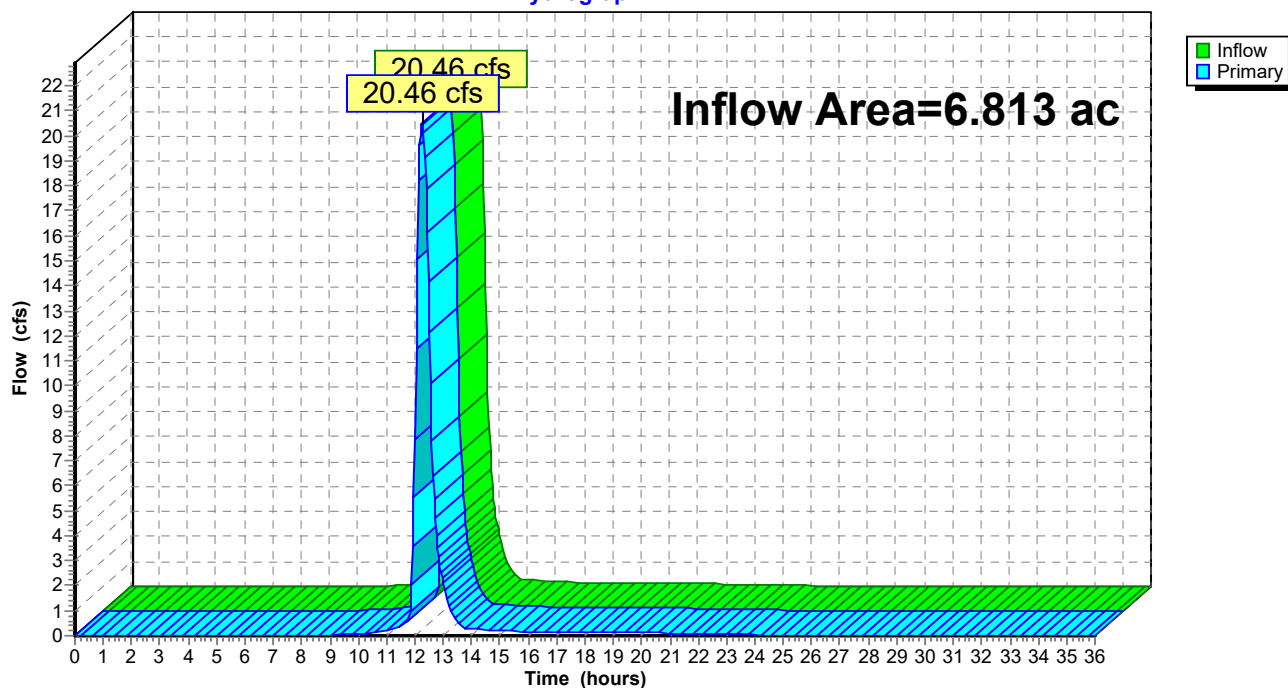
Summary for Link 15L: DP-1

Inflow Area = 6.813 ac, 69.19% Impervious, Inflow Depth = 2.11" for 100-Year event
Inflow = 20.46 cfs @ 12.25 hrs, Volume= 1.197 af
Primary = 20.46 cfs @ 12.25 hrs, Volume= 1.197 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs

Link 15L: DP-1

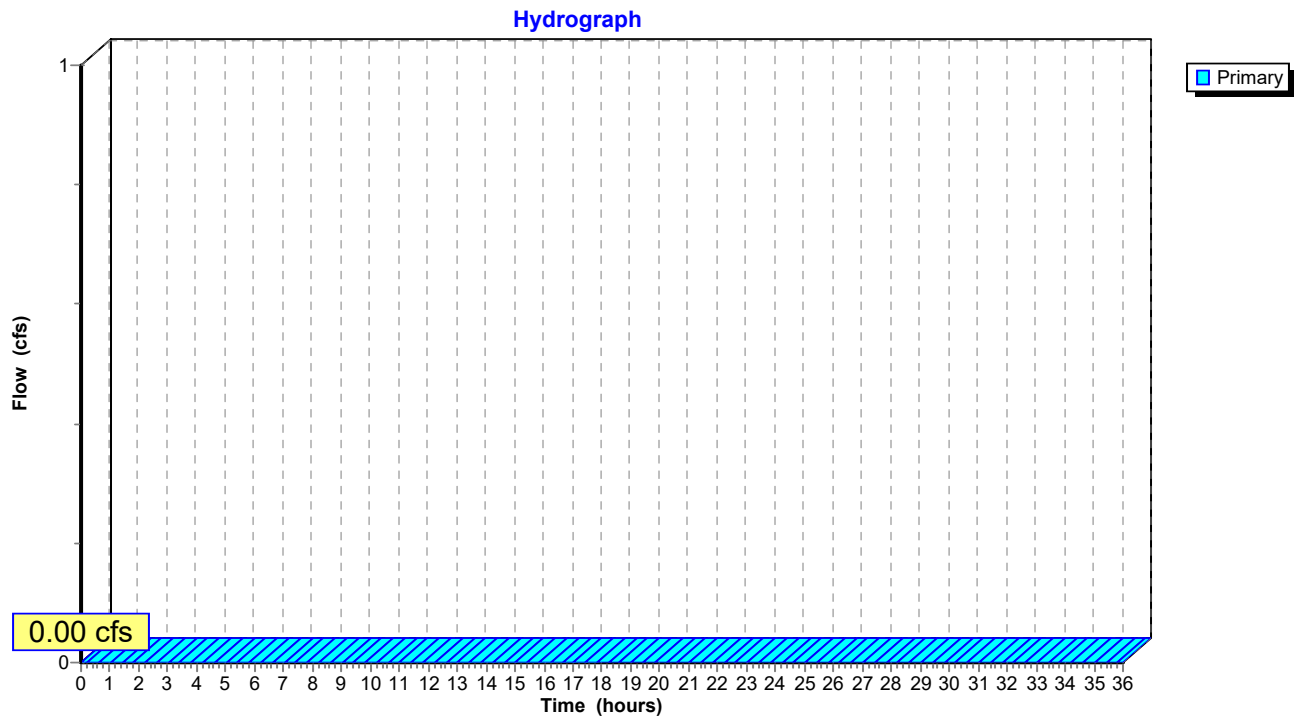
Hydrograph



Summary for Link 16L: DP-2

Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

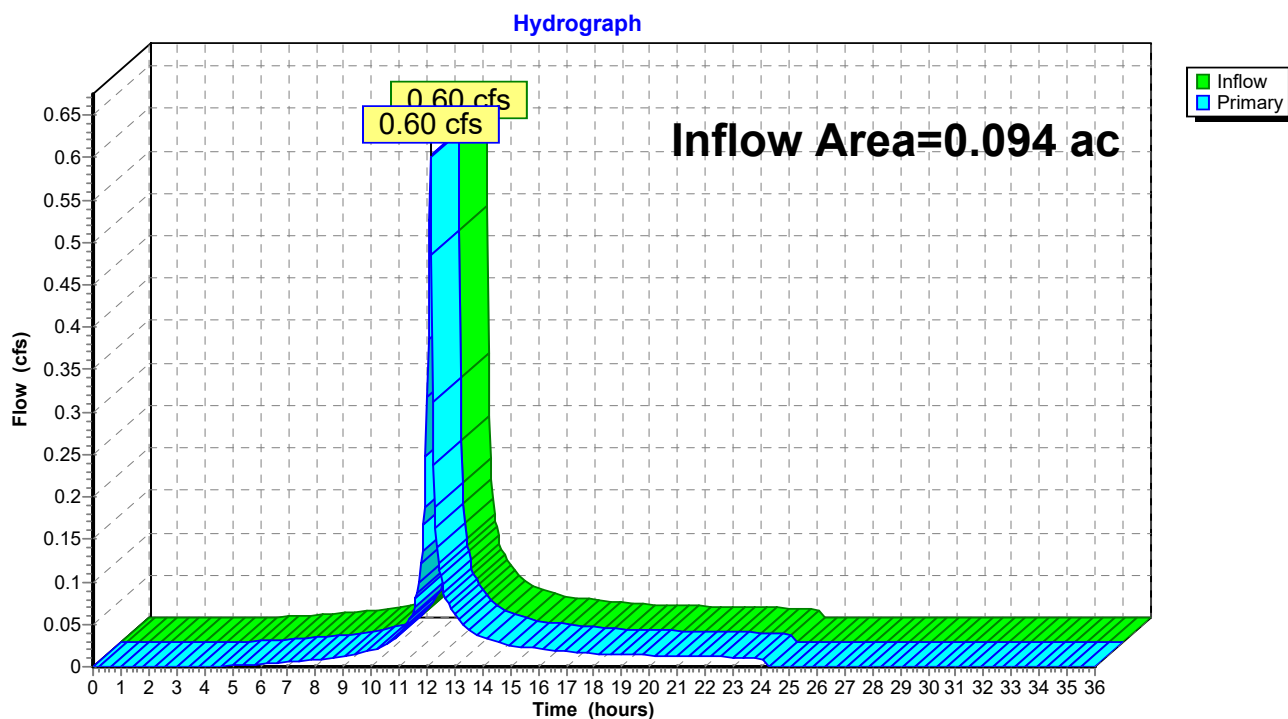
Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs

Link 16L: DP-2

Summary for Link 17L: DP-3

Inflow Area = 0.094 ac, 0.00% Impervious, Inflow Depth = 5.72" for 100-Year event
Inflow = 0.60 cfs @ 12.12 hrs, Volume= 0.045 af
Primary = 0.60 cfs @ 12.12 hrs, Volume= 0.045 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs

Link 17L: DP-3

B

Water Quality Data

Riprap Sizing Computations for King Street Commons

Taken from:

- FHWA Hydraulic Design of Energy Dissipators for Culverts and Channels (Chapter 10)
FHWA-NHI-06-086 July 2006
- NRCS Rock Outlet Protection 2012 Fact Sheet (attached)

By: P. Gunter - TEC, Inc. 2/21/2024

Checked By: C. Raymond - TEC, Inc. 2/21/2024

$$D_{50} = 0.2D \left(\frac{Q}{\sqrt{gD^{2.5}}} \right)^{4/3} \left(\frac{D}{TW} \right)$$

D_{50} = riprap size (ft)

Q = design discharge ($\frac{ft^3}{s}$)

Used 10-year storm peak flow from drainage calculations unless otherwise noted

D = culvert diameter (ft)

TW = tailwater depth (ft)

Use 0.4D as minimum

g = acceleration due to gravity ($32.2 \frac{ft}{s^2}$)

Table 10.1. Example Riprap Classes and Apron Dimensions

Class	D ₅₀ (mm)	D ₅₀ (in)	Apron Length ¹	Apron Depth
1	125	5	4D	3.5D ₅₀
2	150	6	4D	3.3D ₅₀
3	250	10	5D	2.4D ₅₀
4	350	14	6D	2.2D ₅₀
5	500	20	7D	2.0D ₅₀
6	550	22	8D	2.0D ₅₀

¹D is the culvert rise.

$$W_U = 3D$$

$$W_D = D + \text{Length}$$

W_U = upstream width (ft)

W_D = downstream width (ft)

FES-63

$$D_{50} = 0.2(1.5 \text{ ft}) \left(\frac{14.67 \frac{\text{ft}^3}{\text{s}}}{\sqrt{(32.2 \frac{\text{ft}}{\text{s}^2})(1.5 \text{ ft})^{2.5}}} \right)^{4/3} \left(\frac{1.5 \text{ ft}}{0.6 \text{ ft}} \right) = 1.35 \text{ feet} = 16.2 \text{ inches}$$

16.2 inches = Class 5 (Table 10.1) -> Class 5 min. = 20 inches

$$\text{Length} = 7D = 7(1.5 \text{ ft}) = 10.5 \text{ feet}$$

$$\text{Depth} = 2.0(D_{50}) = 2.0(20 \text{ in}) = 40 \text{ inches} = 3.3 \text{ feet}$$

$$W_U = 3(1.5 \text{ ft}) = 4.5 \text{ feet}$$

$$W_D = 1.5 \text{ ft} + 3.3 \text{ ft} = 4.8 \text{ feet}$$

TEC recommends the rip-rap apron be 11 feet long by 3.5 feet deep with an upstream width of 4.5 feet and a downstream width of 5 feet.

FES-69

$$D_{50} = 0.2(2.0 \text{ ft}) \left(\frac{6.62 \frac{\text{ft}^3}{\text{s}}}{\sqrt{(32.2 \frac{\text{ft}}{\text{s}^2})(2.0 \text{ ft})^{2.5}}} \right)^{4/3} \left(\frac{2.0 \text{ ft}}{0.8 \text{ ft}} \right) = 0.387 \text{ feet} = 4.64 \text{ inches}$$

4.62 inches = Class 1 (Table 10.1) -> Class 1 min. = 5 inches

$$\text{Length} = 4D = 4(2.0 \text{ ft}) = 8 \text{ feet}$$

$$\text{Depth} = 3.5(D_{50}) = 3.5(5 \text{ in}) = 17.5 \text{ inches} = 1.5 \text{ feet}$$

$$W_U = 3(2.0 \text{ ft}) = 6.0 \text{ feet}$$

$$W_D = 2.0 \text{ ft} + 8.0 \text{ ft} = 10.0 \text{ feet}$$

TEC recommends the rip-rap apron be 8.0 feet long by 1.5 feet deep with an upstream width of 6.0 feet and a downstream width of 10.0 feet.

Location: Treatment Train #1

A BMP ¹	B TSS Removal Rate ¹	C Starting TSS Load*	D Amount Removed (B*C)	E Remaining Load (C-D)
Street Sweeping	0.05	1.00	0.05	0.95
Deep Sump and Hooded Catch Basins	0.25	0.95	0.24	0.71
Water Quality Unit	0.87	0.71	0.62	0.09
Rain Garden	0.90	0.09	0.08	0.01

Total TSS Removal =

99%

Separate Form Needs
to be Completed for
Each Outlet or BMP
Train

Project: King Street Commons
Prepared By: TEC, Inc.
Date: 2/21/2024

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

Location: Treatment Train #2

A BMP ¹	B TSS Removal Rate ¹	C Starting TSS Load*	D Amount Removed (B*C)	E Remaining Load (C-D)
Street Sweeping	0.05	1.00	0.05	0.95
Deep Sump and Hooded Catch Basins	0.25	0.95	0.24	0.71
Water Quality Unit	0.99	0.71	0.71	0.01

Total TSS Removal =

99%

Separate Form Needs
to be Completed for
Each Outlet or BMP
Train

Project: King Street Commons
Prepared By: TEC, Inc.
Date: 2/21/2024

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

Hydrodynamic Separation Product Calculator

King Street Commons

WQU-56

CASCADE SEPARATOR CS-5

Project Information					
Project Name	king st			Option #	A
Country	UNITED_STATES	State	Massachusetts	City	Littleton

Contact Information			
First Name	Megan	Last Name	Cramton
Company	TEC, Inc.	Phone #	603-801-3997
Email	mcramton@theengineeringcorp.com		

Design Criteria					
Site Designation	WQU-56			Sizing Method	Net Annual
Screening Required?	No	Drainage Area (ac)	5.83	Peak Flow (cfs)	13.54
Groundwater Depth (ft)	>15	Pipe Invert Depth (ft)	5 - 10	Bedrock Depth (ft)	>15
Multiple Inlets?	No	Grate Inlet Required?	No	Pipe Size (in)	36.00
Required Particle Size Distribution?	No	90° between two inlets?	N/A	180° between inlet and outlet?	No
Runoff Coefficient	0.86	Rainfall Station	67 - Groveland, MA	TC (Min)	48

Treatment Selection					
Treatment Unit	CASCADE SEPARATOR	System Model	CS-5		
Target Removal	80%	Particle Size Distribution (PSD)	110	Predicted Net Annual Removal	86.99%

*Treatment flow rate calculated using annualized weighted calculation.

Hydrodynamic Separation Product Calculator

King Street Commons

WQU-56

CASCADE SEPARATOR CS-5

CASCADE SEPARATOR ESTIMATED NET ANNUAL SOLIDS LOAD REDUCTION BASED ON THE RATIONAL RAINFALL METHOD								
Rainfall Intensity ¹ (in/hr)	% Rainfall Volume ¹	Cumulative Rainfall Volume	Rainfall Volume Treated	Total Flowrate (cfs)	Treated Flowrate (cfs)	Hydraulic Loading Rate (%)	Removal Efficiency (%)	Incremental Removal (%)
0.0800	41.00%	41.00%	41.00%	0.4000	0.4000	9.15%	100.00%	41.04%
0.1600	23.90%	64.90%	23.90%	0.8000	0.8000	18.29%	94.71%	22.62%
0.2400	11.50%	76.40%	11.50%	1.2000	1.2000	27.44%	86.11%	9.93%
0.3200	7.40%	83.80%	7.40%	1.6000	1.6000	36.58%	77.51%	5.75%
0.4000	4.50%	88.30%	4.50%	2.0100	2.0100	45.96%	68.70%	3.06%
0.4800	2.90%	91.20%	2.90%	2.4100	2.4100	55.10%	60.11%	1.74%
0.5600	1.80%	93.00%	1.80%	2.8100	2.8100	64.25%	51.51%	0.92%
0.6400	1.20%	94.20%	1.20%	3.2100	3.2100	73.40%	42.90%	0.51%
0.7200	1.60%	95.80%	1.55%	3.6100	3.5000	80.03%	35.55%	0.57%
0.8000	0.80%	96.60%	0.70%	4.0100	3.5000	80.03%	32.01%	0.25%
1.0000	0.60%	97.20%	0.42%	5.0100	3.5000	80.03%	25.62%	0.15%
1.4000	1.40%	98.60%	0.70%	7.0200	3.5000	80.03%	18.28%	0.26%
1.8000	0.90%	99.50%	0.35%	9.0200	3.5000	80.03%	14.23%	0.13%
2.2000	0.50%	100.00%	0.16%	11.0300	3.5000	80.03%	11.64%	0.06%
								86.99%
Removal Efficiency Adjustment ² =								
Predicted % Annual Rainfall Treated =								98.08%
Predicted Net Annual Load Removal Efficiency =								86.99%
1 - Based on 7 years of data from NCDC station #3276, Groveland, Essex County, MA								
2 - Reduction due to use of 60-minute data for a site that has a time of concentration less than 30-minutes.								

*Treatment flow rate calculated using annualized weighted calculation.

Hydrodynamic Separation Product Calculator

King Street Commons

WQU-59

CASCADE SEPARATOR CS-4

Project Information					
Project Name	king st			Option #	A
Country	UNITED_STATES	State	Massachusetts	City	Littleton

Contact Information			
First Name	Megan	Last Name	Cramton
Company	TEC, Inc.	Phone #	603-801-3997
Email	mcramton@theengineeringcorp.com		

Design Criteria					
Site Designation	WQU-59			Sizing Method	Net Annual
Screening Required?	No	Drainage Area (ac)	0.34	Peak Flow (cfs)	2.59
Groundwater Depth (ft)	>15	Pipe Invert Depth (ft)	5 - 10	Bedrock Depth (ft)	>15
Multiple Inlets?	Yes	Grate Inlet Required?	No	Pipe Size (in)	12.00
Required Particle Size Distribution?	No	90° between two inlets?	Yes	180° between inlet and outlet?	No
Runoff Coefficient	0.93	Rainfall Station	67 - Groveland, MA	TC (Min)	5

Treatment Selection					
Treatment Unit	CASCADE SEPARATOR	System Model	CS-4		
Target Removal	80%	Particle Size Distribution (PSD)	110	Predicted Net Annual Removal	99.83%

*Treatment flow rate calculated using annualized weighted calculation.

Hydrodynamic Separation Product Calculator

King Street Commons

WQU-59

CASCADE SEPARATOR CS-4

CASCADE SEPARATOR ESTIMATED NET ANNUAL SOLIDS LOAD REDUCTION BASED ON THE RATIONAL RAINFALL METHOD								
Rainfall Intensity ¹ (in/hr)	% Rainfall Volume ¹	Cumulative Rainfall Volume	Rainfall Volume Treated	Total Flowrate (cfs)	Treated Flowrate (cfs)	Hydraulic Loading Rate (%)	Removal Efficiency (%)	Incremental Removal (%)
0.0800	41.00%	41.00%	41.00%	0.0300	0.0300	%	100.00%	41.04%
0.1600	23.90%	64.90%	23.90%	0.0500	0.0500	%	100.00%	23.88%
0.2400	11.50%	76.40%	11.50%	0.0800	0.0800	%	100.00%	11.53%
0.3200	7.40%	83.80%	7.40%	0.1000	0.1000	%	100.00%	7.42%
0.4000	4.50%	88.30%	4.50%	0.1300	0.1300	%	100.00%	4.45%
0.4800	2.90%	91.20%	2.90%	0.1500	0.1500	%	100.00%	2.90%
0.5600	1.80%	93.00%	1.80%	0.1800	0.1800	%	100.00%	1.78%
0.6400	1.20%	94.20%	1.20%	0.2000	0.2000	%	100.00%	1.18%
0.7200	1.60%	95.80%	1.60%	0.2300	0.2300	%	100.00%	1.60%
0.8000	0.80%	96.60%	0.80%	0.2500	0.2500	%	100.00%	0.79%
1.0000	0.60%	97.20%	0.60%	0.3200	0.3200	%	100.00%	0.57%
1.4000	1.40%	98.60%	1.40%	0.4400	0.4400	%	97.13%	1.40%
1.8000	0.90%	99.50%	0.90%	0.5700	0.5700	%	92.77%	0.84%
2.2000	0.50%	100.00%	0.50%	0.7000	0.7000	%	88.41%	0.45%
								99.83%
Removal Efficiency Adjustment ² =								
Predicted % Annual Rainfall Treated =								100.00%
Predicted Net Annual Load Removal Efficiency =								99.83%
1 - Based on 7 years of data from NCDC station #3276, Groveland, Essex County, MA								
2 - Reduction due to use of 60-minute data for a site that has a time of concentration less than 30-minutes.								

*Treatment flow rate calculated using annualized weighted calculation.

Hydrodynamic Separation Product Calculator

King Street Commons

WQU-66

CASCADE SEPARATOR CS-4

Project Information					
Project Name	king st			Option #	A
Country	UNITED_STATES	State	Massachusetts	City	Littleton

Contact Information			
First Name	Megan	Last Name	Cramton
Company	TEC, Inc.	Phone #	603-801-3997
Email	mcramton@theengineeringcorp.com		

Design Criteria					
Site Designation	WQU-66			Sizing Method	Net Annual
Screening Required?	No	Drainage Area (ac)	0.90	Peak Flow (cfs)	4.19
Groundwater Depth (ft)	>15	Pipe Invert Depth (ft)	5 - 10	Bedrock Depth (ft)	>15
Multiple Inlets?	Yes	Grate Inlet Required?	No	Pipe Size (in)	12.00
Required Particle Size Distribution?	No	90° between two inlets?	Yes	180° between inlet and outlet?	No
Runoff Coefficient	0.64	Rainfall Station	67 - Groveland, MA	TC (Min)	5

Treatment Selection					
Treatment Unit	CASCADE SEPARATOR	System Model	CS-4		
Target Removal	80%	Particle Size Distribution (PSD)	110	Predicted Net Annual Removal	99.30%

*Treatment flow rate calculated using annualized weighted calculation.

Hydrodynamic Separation Product Calculator

King Street Commons

WQU-66

CASCADE SEPARATOR CS-4

CASCADE SEPARATOR ESTIMATED NET ANNUAL SOLIDS LOAD REDUCTION BASED ON THE RATIONAL RAINFALL METHOD								
Rainfall Intensity ¹ (in/hr)	% Rainfall Volume ¹	Cumulative Rainfall Volume	Rainfall Volume Treated	Total Flowrate (cfs)	Treated Flowrate (cfs)	Hydraulic Loading Rate (%)	Removal Efficiency (%)	Incremental Removal (%)
0.0800	41.00%	41.00%	41.00%	0.0500	0.0500	%	100.00%	41.04%
0.1600	23.90%	64.90%	23.90%	0.0900	0.0900	%	100.00%	23.88%
0.2400	11.50%	76.40%	11.50%	0.1400	0.1400	%	100.00%	11.53%
0.3200	7.40%	83.80%	7.40%	0.1800	0.1800	%	100.00%	7.42%
0.4000	4.50%	88.30%	4.50%	0.2300	0.2300	%	100.00%	4.45%
0.4800	2.90%	91.20%	2.90%	0.2800	0.2800	%	100.00%	2.90%
0.5600	1.80%	93.00%	1.80%	0.3200	0.3200	%	100.00%	1.78%
0.6400	1.20%	94.20%	1.20%	0.3700	0.3700	%	99.48%	1.17%
0.7200	1.60%	95.80%	1.60%	0.4100	0.4100	%	98.14%	1.57%
0.8000	0.80%	96.60%	0.80%	0.4600	0.4600	%	96.47%	0.76%
1.0000	0.60%	97.20%	0.60%	0.5800	0.5800	%	92.43%	0.53%
1.4000	1.40%	98.60%	1.40%	0.8100	0.8100	%	84.72%	1.22%
1.8000	0.90%	99.50%	0.90%	1.0400	1.0400	%	77.00%	0.70%
2.2000	0.50%	100.00%	0.50%	1.2700	1.2700	%	69.27%	0.35%
								99.30%
Removal Efficiency Adjustment ² =								
Predicted % Annual Rainfall Treated =								100.00%
Predicted Net Annual Load Removal Efficiency =								99.30%
1 - Based on 7 years of data from NCDC station #3276, Groveland, Essex County, MA								
2 - Reduction due to use of 60-minute data for a site that has a time of concentration less than 30-minutes.								

*Treatment flow rate calculated using annualized weighted calculation.

C

NRCS Soil Resource Report



United States
Department of
Agriculture

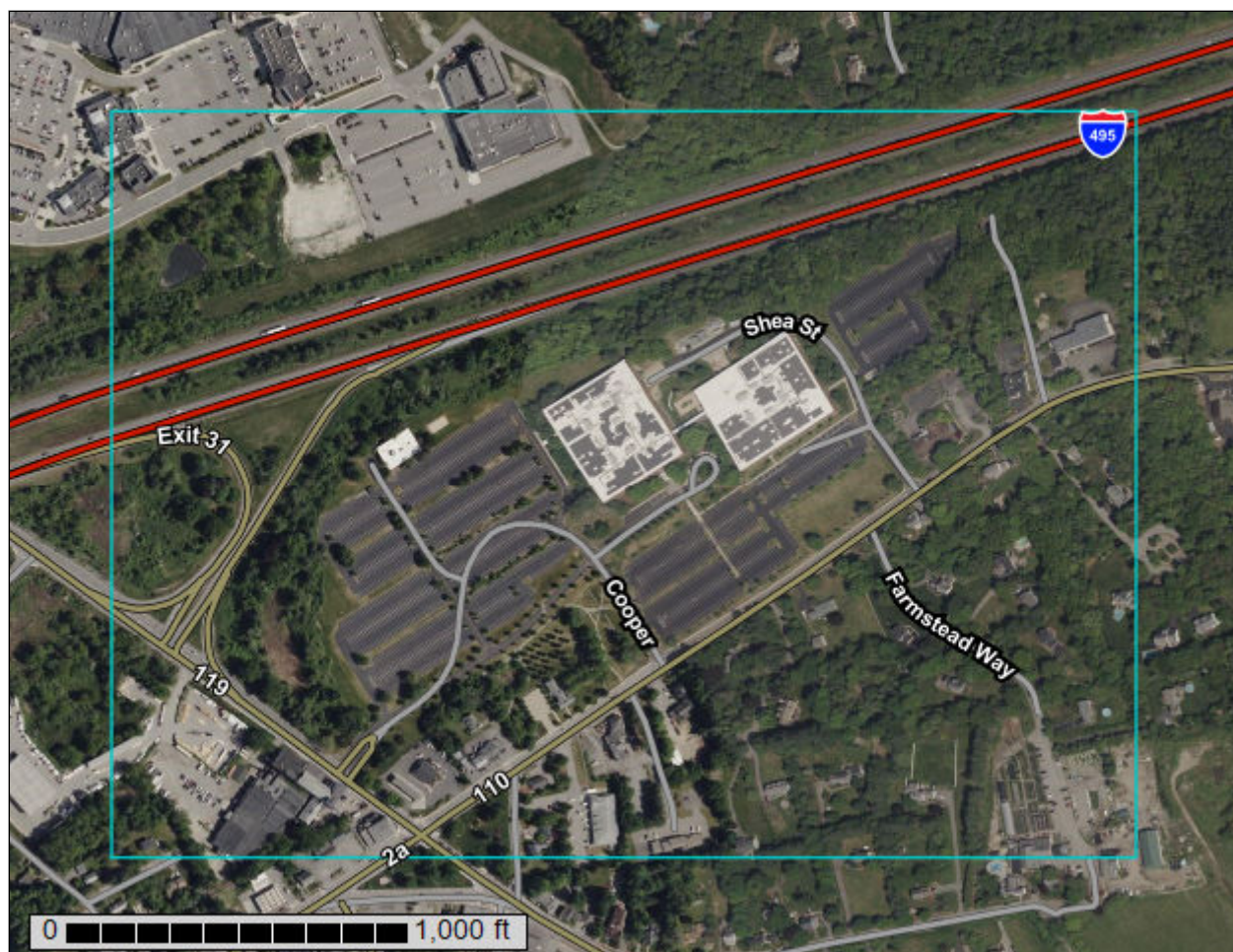
NRCS

Natural
Resources
Conservation
Service

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

Custom Soil Resource Report for **Middlesex County, Massachusetts**

550 King Street



August 15, 2023

Preface

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

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

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

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

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

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

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

Contents

Preface	2
How Soil Surveys Are Made	5
Soil Map	8
Soil Map.....	9
Legend.....	10
Map Unit Legend.....	11
Map Unit Descriptions.....	11
Middlesex County, Massachusetts.....	14
6A—Scarboro mucky fine sandy loam, 0 to 3 percent slopes.....	14
103C—Charlton-Hollis-Rock outcrop complex, 8 to 15 percent slopes.....	15
307B—Paxton fine sandy loam, 0 to 8 percent slopes, extremely stony....	18
307E—Paxton fine sandy loam, 25 to 35 percent slopes, extremely stony.....	20
310B—Woodbridge fine sandy loam, 3 to 8 percent slopes.....	21
310C—Woodbridge fine sandy loam, 8 to 15 percent slopes.....	23
311B—Woodbridge fine sandy loam, 0 to 8 percent slopes, very stony....	24
422B—Canton fine sandy loam, 0 to 8 percent slopes, extremely stony....	26
422C—Canton fine sandy loam, 8 to 15 percent slopes, extremely stony..	27
622C—Paxton-Urban land complex, 3 to 15 percent slopes.....	29
623C—Woodbridge-Urban land complex, 3 to 15 percent slopes.....	31
626B—Merrimac-Urban land complex, 0 to 8 percent slopes.....	33
654—Udorthents, loamy.....	35
655—Udorthents, wet substratum.....	36
656—Udorthents-Urban land complex.....	37
References	39

How Soil Surveys Are Made

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

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

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

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

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

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

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

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

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

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

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

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

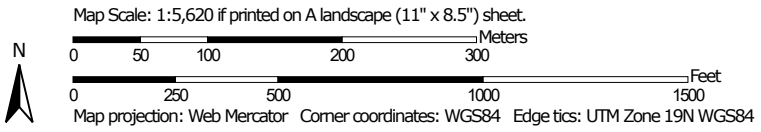
Custom Soil Resource Report

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

Soil Map

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

Custom Soil Resource Report Soil Map



Custom Soil Resource Report

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 1:25,000.

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 22, Sep 9, 2022

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
6A	Scarboro mucky fine sandy loam, 0 to 3 percent slopes	3.5	2.3%
103C	Charlton-Hollis-Rock outcrop complex, 8 to 15 percent slopes	0.2	0.1%
307B	Paxton fine sandy loam, 0 to 8 percent slopes, extremely stony	2.9	2.0%
307E	Paxton fine sandy loam, 25 to 35 percent slopes, extremely stony	4.1	2.7%
310B	Woodbridge fine sandy loam, 3 to 8 percent slopes	30.2	20.1%
310C	Woodbridge fine sandy loam, 8 to 15 percent slopes	8.8	5.8%
311B	Woodbridge fine sandy loam, 0 to 8 percent slopes, very stony	3.5	2.3%
422B	Canton fine sandy loam, 0 to 8 percent slopes, extremely stony	7.3	4.8%
422C	Canton fine sandy loam, 8 to 15 percent slopes, extremely stony	0.1	0.1%
622C	Paxton-Urban land complex, 3 to 15 percent slopes	10.3	6.9%
623C	Woodbridge-Urban land complex, 3 to 15 percent slopes	0.3	0.2%
626B	Merrimac-Urban land complex, 0 to 8 percent slopes	12.6	8.4%
654	Udorthents, loamy	3.2	2.1%
655	Udorthents, wet substratum	7.3	4.9%
656	Udorthents-Urban land complex	56.1	37.3%
Totals for Area of Interest		150.3	100.0%

Map Unit Descriptions

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

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named

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

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

Custom Soil Resource Report

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Middlesex County, Massachusetts

6A—Scarboro mucky fine sandy loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2svky
Elevation: 0 to 1,320 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

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

Description of Scarboro

Setting

Landform: Drainageways, outwash deltas, outwash terraces, depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope, tread, dip
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Sandy glaciofluvial deposits derived from schist and/or sandy glaciofluvial deposits derived from gneiss and/or sandy glaciofluvial deposits derived from granite

Typical profile

Oe - 0 to 3 inches: mucky peat
A - 3 to 11 inches: mucky fine sandy loam
Cg1 - 11 to 21 inches: sand
Cg2 - 21 to 65 inches: gravelly coarse sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (1.42 to 14.17 in/hr)
Depth to water table: About 0 to 2 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 4.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: A/D
Ecological site: F144AY031MA - Very Wet Outwash
Hydric soil rating: Yes

Minor Components

Swansea

Percent of map unit: 10 percent
Landform: Bogs, swamps
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Wareham

Percent of map unit: 5 percent
Landform: Depressions
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Walpole

Percent of map unit: 5 percent
Landform: Deltas, depressions, outwash terraces, depressions, outwash plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread, talf, dip
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

103C—Charlton-Hollis-Rock outcrop complex, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2wzp1
Elevation: 0 to 1,390 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Charlton, extremely stony, and similar soils: 50 percent
Hollis, extremely stony, and similar soils: 20 percent
Rock outcrop: 10 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Charlton, Extremely Stony

Setting

Landform: Ridges, hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex, linear

Custom Soil Resource Report

Across-slope shape: Convex

Parent material: Coarse-loamy melt-out till derived from granite, gneiss, and/or schist

Typical profile

Oe - 0 to 2 inches: moderately decomposed plant material

A - 2 to 4 inches: fine sandy loam

Bw - 4 to 27 inches: gravelly fine sandy loam

C - 27 to 65 inches: gravelly fine sandy loam

Properties and qualities

Slope: 8 to 15 percent

Surface area covered with cobbles, stones or boulders: 9.0 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Well drained

Runoff class: Low

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)

Available water supply, 0 to 60 inches: Moderate (about 8.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7s

Hydrologic Soil Group: B

Ecological site: F144AY034CT - Well Drained Till Uplands

Hydric soil rating: No

Description of Hollis, Extremely Stony

Setting

Landform: Ridges, hills

Landform position (two-dimensional): Summit, shoulder, backslope

Landform position (three-dimensional): Nose slope, side slope, crest

Down-slope shape: Convex

Across-slope shape: Linear, convex

Parent material: Coarse-loamy melt-out till derived from granite, gneiss, and/or schist

Typical profile

Oi - 0 to 2 inches: slightly decomposed plant material

A - 2 to 7 inches: gravelly fine sandy loam

Bw - 7 to 16 inches: gravelly fine sandy loam

2R - 16 to 26 inches: bedrock

Properties and qualities

Slope: 8 to 15 percent

Surface area covered with cobbles, stones or boulders: 9.0 percent

Depth to restrictive feature: 8 to 23 inches to lithic bedrock

Drainage class: Somewhat excessively drained

Runoff class: Very high

Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)

Depth to water table: More than 80 inches

Custom Soil Resource Report

Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Very low (about 2.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D
Ecological site: F144AY033MA - Shallow Dry Till Uplands
Hydric soil rating: No

Description of Rock Outcrop

Setting

Landform: Ridges, hills
Parent material: Igneous and metamorphic rock

Typical profile

R - 0 to 79 inches: bedrock

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: 0 inches to lithic bedrock
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: No

Minor Components

Woodbridge, extremely stony

Percent of map unit: 8 percent
Landform: Ground moraines, hills, drumlins
Landform position (two-dimensional): Backslope, footslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Canton, extremely stony

Percent of map unit: 5 percent
Landform: Moraines, hills, ridges
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex, linear
Across-slope shape: Convex
Hydric soil rating: No

Chatfield, extremely stony

Percent of map unit: 5 percent
Landform: Ridges, hills

Custom Soil Resource Report

Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Nose slope, side slope, crest
Down-slope shape: Convex
Across-slope shape: Linear, convex
Hydric soil rating: No

Ridgebury, extremely stony

Percent of map unit: 2 percent
Landform: Hills, drainageways, drumlins, depressions, ground moraines
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Head slope, base slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

307B—Paxton fine sandy loam, 0 to 8 percent slopes, extremely stony

Map Unit Setting

National map unit symbol: 2w675
Elevation: 0 to 1,580 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

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

Description of Paxton, Extremely Stony

Setting

Landform: Ground moraines, hills, drumlins
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Convex, linear
Across-slope shape: Linear, convex
Parent material: Coarse-loamy lodgment till derived from gneiss, granite, and/or schist

Typical profile

Oe - 0 to 2 inches: moderately decomposed plant material
A - 2 to 10 inches: fine sandy loam
Bw1 - 10 to 17 inches: fine sandy loam
Bw2 - 17 to 28 inches: fine sandy loam
Cd - 28 to 67 inches: gravelly fine sandy loam

Properties and qualities

Slope: 0 to 8 percent
Surface area covered with cobbles, stones or boulders: 9.0 percent
Depth to restrictive feature: 20 to 43 inches to densic material
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)
Depth to water table: About 18 to 37 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 4.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: C
Ecological site: F144AY007CT - Well Drained Dense Till Uplands
Hydric soil rating: No

Minor Components

Woodbridge, extremely stony

Percent of map unit: 10 percent
Landform: Hills, drumlins, ground moraines
Landform position (two-dimensional): Summit, backslope, footslope
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Charlton, extremely stony

Percent of map unit: 5 percent
Landform: Hills
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Ridgebury, extremely stony

Percent of map unit: 4 percent
Landform: Drumlins, drainageways, depressions, ground moraines, hills
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Head slope, base slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Whitman, extremely stony

Percent of map unit: 1 percent
Landform: Depressions
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

307E—Paxton fine sandy loam, 25 to 35 percent slopes, extremely stony

Map Unit Setting

National map unit symbol: 2w67q
Elevation: 0 to 1,400 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 145 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Paxton, extremely stony, and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Paxton, Extremely Stony

Setting

Landform: Ground moraines, hills, drumlins
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex, linear
Across-slope shape: Linear, convex
Parent material: Coarse-loamy lodgment till derived from gneiss, granite, and/or schist

Typical profile

Oe - 0 to 2 inches: moderately decomposed plant material
A - 2 to 10 inches: fine sandy loam
Bw1 - 10 to 17 inches: fine sandy loam
Bw2 - 17 to 28 inches: fine sandy loam
Cd - 28 to 67 inches: gravelly fine sandy loam

Properties and qualities

Slope: 25 to 35 percent
Surface area covered with cobbles, stones or boulders: 9.0 percent
Depth to restrictive feature: 20 to 43 inches to densic material
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)
Depth to water table: About 18 to 37 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 4.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s

Custom Soil Resource Report

Hydrologic Soil Group: C

Ecological site: F144AY007CT - Well Drained Dense Till Uplands

Hydric soil rating: No

Minor Components

Charlton, extremely stony

Percent of map unit: 8 percent

Landform: Hills

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Side slope

Down-slope shape: Convex

Across-slope shape: Convex

Hydric soil rating: No

Woodbridge, extremely stony

Percent of map unit: 1 percent

Landform: Hills, drumlins, ground moraines

Landform position (two-dimensional): Backslope, footslope

Landform position (three-dimensional): Side slope

Down-slope shape: Concave

Across-slope shape: Linear

Hydric soil rating: No

Chatfield, extremely stony

Percent of map unit: 1 percent

Landform: Ridges, hills

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Side slope

Down-slope shape: Convex

Across-slope shape: Convex

Hydric soil rating: No

310B—Woodbridge fine sandy loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2t2ql

Elevation: 0 to 1,470 feet

Mean annual precipitation: 36 to 71 inches

Mean annual air temperature: 39 to 55 degrees F

Frost-free period: 140 to 240 days

Farmland classification: All areas are prime farmland

Map Unit Composition

Woodbridge, fine sandy loam, and similar soils: 82 percent

Minor components: 18 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Woodbridge, Fine Sandy Loam

Setting

Landform: Ground moraines, drumlins, hills

Landform position (two-dimensional): Summit, backslope, footslope

Landform position (three-dimensional): Side slope

Down-slope shape: Concave

Across-slope shape: Linear

Parent material: Coarse-loamy lodgment till derived from gneiss, granite, and/or schist

Typical profile

Ap - 0 to 7 inches: fine sandy loam

Bw1 - 7 to 18 inches: fine sandy loam

Bw2 - 18 to 30 inches: fine sandy loam

Cd - 30 to 65 inches: gravelly fine sandy loam

Properties and qualities

Slope: 3 to 8 percent

Depth to restrictive feature: 20 to 39 inches to densic material

Drainage class: Moderately well drained

Runoff class: Medium

Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)

Depth to water table: About 18 to 30 inches

Frequency of flooding: None

Frequency of ponding: None

Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)

Available water supply, 0 to 60 inches: Low (about 3.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 2w

Hydrologic Soil Group: C/D

Ecological site: F144AY037MA - Moist Dense Till Uplands

Hydric soil rating: No

Minor Components

Paxton

Percent of map unit: 10 percent

Landform: Drumlins, ground moraines, hills

Landform position (two-dimensional): Summit, shoulder, backslope

Landform position (three-dimensional): Nose slope, side slope, crest

Down-slope shape: Convex, linear

Across-slope shape: Convex

Hydric soil rating: No

Ridgebury

Percent of map unit: 8 percent

Landform: Depressions, ground moraines, hills, drainageways

Landform position (two-dimensional): Toeslope, backslope, footslope

Landform position (three-dimensional): Base slope, head slope, dip

Down-slope shape: Concave

Across-slope shape: Concave

Hydric soil rating: Yes

310C—Woodbridge fine sandy loam, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2w689

Elevation: 0 to 1,370 feet

Mean annual precipitation: 36 to 71 inches

Mean annual air temperature: 39 to 55 degrees F

Frost-free period: 140 to 240 days

Farmland classification: Farmland of statewide importance

Map Unit Composition

Woodbridge and similar soils: 85 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Woodbridge

Setting

Landform: Ground moraines, hills, drumlins

Landform position (two-dimensional): Backslope, footslope

Landform position (three-dimensional): Side slope

Down-slope shape: Convex

Across-slope shape: Linear

Parent material: Coarse-loamy lodgment till derived from gneiss, granite, and/or schist

Typical profile

Ap - 0 to 7 inches: fine sandy loam

Bw1 - 7 to 18 inches: fine sandy loam

Bw2 - 18 to 30 inches: fine sandy loam

Cd - 30 to 65 inches: gravelly fine sandy loam

Properties and qualities

Slope: 8 to 15 percent

Depth to restrictive feature: 20 to 39 inches to densic material

Drainage class: Moderately well drained

Runoff class: Very high

Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)

Depth to water table: About 18 to 30 inches

Frequency of flooding: None

Frequency of ponding: None

Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)

Available water supply, 0 to 60 inches: Low (about 4.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 3e

Hydrologic Soil Group: C/D

Ecological site: F144AY037MA - Moist Dense Till Uplands

Custom Soil Resource Report

Hydric soil rating: No

Minor Components

Paxton

Percent of map unit: 10 percent
Landform: Ground moraines, hills, drumlins
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex, linear
Across-slope shape: Convex
Hydric soil rating: No

Ridgebury

Percent of map unit: 4 percent
Landform: Depressions, ground moraines, hills, drainageways, drumlins
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Head slope, base slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Sutton

Percent of map unit: 1 percent
Landform: Ground moraines, hills
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

311B—Woodbridge fine sandy loam, 0 to 8 percent slopes, very stony

Map Unit Setting

National map unit symbol: 2t2qr
Elevation: 0 to 1,440 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Woodbridge, very stony, and similar soils: 82 percent
Minor components: 18 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Woodbridge, Very Stony

Setting

Landform: Ground moraines, hills, drumlins
Landform position (two-dimensional): Summit, backslope, footslope

Custom Soil Resource Report

Landform position (three-dimensional): Side slope

Down-slope shape: Concave

Across-slope shape: Linear

Parent material: Coarse-loamy lodgment till derived from gneiss, granite, and/or schist

Typical profile

Oe - 0 to 2 inches: moderately decomposed plant material

A - 2 to 9 inches: fine sandy loam

Bw1 - 9 to 20 inches: fine sandy loam

Bw2 - 20 to 32 inches: fine sandy loam

Cd - 32 to 67 inches: gravelly fine sandy loam

Properties and qualities

Slope: 0 to 8 percent

Surface area covered with cobbles, stones or boulders: 1.6 percent

Depth to restrictive feature: 20 to 43 inches to densic material

Drainage class: Moderately well drained

Runoff class: Medium

Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)

Depth to water table: About 19 to 27 inches

Frequency of flooding: None

Frequency of ponding: None

Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)

Available water supply, 0 to 60 inches: Low (about 4.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 6s

Hydrologic Soil Group: C/D

Ecological site: F144AY037MA - Moist Dense Till Uplands

Hydric soil rating: No

Minor Components

Paxton, very stony

Percent of map unit: 10 percent

Landform: Ground moraines, hills, drumlins

Landform position (two-dimensional): Summit, shoulder, backslope

Landform position (three-dimensional): Side slope, crest

Down-slope shape: Convex, linear

Across-slope shape: Linear, convex

Hydric soil rating: No

Ridgebury, very stony

Percent of map unit: 8 percent

Landform: Hills, drainageways, drumlins, depressions, ground moraines

Landform position (two-dimensional): Toeslope

Landform position (three-dimensional): Head slope, base slope

Down-slope shape: Concave

Across-slope shape: Concave

Hydric soil rating: Yes

422B—Canton fine sandy loam, 0 to 8 percent slopes, extremely stony

Map Unit Setting

National map unit symbol: 2w818

Elevation: 0 to 1,180 feet

Mean annual precipitation: 36 to 71 inches

Mean annual air temperature: 39 to 55 degrees F

Frost-free period: 145 to 240 days

Farmland classification: Not prime farmland

Map Unit Composition

Canton, extremely stony, and similar soils: 80 percent

Minor components: 20 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Canton, Extremely Stony

Setting

Landform: Moraines, hills, ridges

Landform position (two-dimensional): Summit, shoulder, backslope

Landform position (three-dimensional): Nose slope, side slope, crest

Down-slope shape: Convex, linear

Across-slope shape: Convex

Parent material: Coarse-loamy over sandy melt-out till derived from gneiss, granite, and/or schist

Typical profile

Oi - 0 to 2 inches: slightly decomposed plant material

A - 2 to 5 inches: fine sandy loam

Bw1 - 5 to 16 inches: fine sandy loam

Bw2 - 16 to 22 inches: gravelly fine sandy loam

2C - 22 to 67 inches: gravelly loamy sand

Properties and qualities

Slope: 0 to 8 percent

Surface area covered with cobbles, stones or boulders: 9.0 percent

Depth to restrictive feature: 19 to 39 inches to strongly contrasting textural stratification

Drainage class: Well drained

Runoff class: Low

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)

Available water supply, 0 to 60 inches: Low (about 3.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Custom Soil Resource Report

Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: B
Ecological site: F144AY034CT - Well Drained Till Uplands
Hydric soil rating: No

Minor Components

Charlton, extremely stony

Percent of map unit: 6 percent
Landform: Ridges, ground moraines, hills
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Convex, linear
Across-slope shape: Convex
Hydric soil rating: No

Scituate, extremely stony

Percent of map unit: 6 percent
Landform: Hills, ground moraines, drumlins
Landform position (two-dimensional): Summit, backslope, footslope
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Convex, linear
Across-slope shape: Convex
Hydric soil rating: No

Montauk, extremely stony

Percent of map unit: 4 percent
Landform: Recessionial moraines, ground moraines, hills, drumlins
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Convex, linear
Across-slope shape: Convex
Hydric soil rating: No

Swansea

Percent of map unit: 4 percent
Landform: Marshes, depressions, bogs, swamps, kettles
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

422C—Canton fine sandy loam, 8 to 15 percent slopes, extremely stony

Map Unit Setting

National map unit symbol: 2w815
Elevation: 0 to 1,310 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 145 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Canton, extremely stony, and similar soils: 80 percent

Minor components: 20 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Canton, Extremely Stony

Setting

Landform: Moraines, hills, ridges

Landform position (two-dimensional): Summit, shoulder, backslope

Landform position (three-dimensional): Nose slope, side slope, crest

Down-slope shape: Convex, linear

Across-slope shape: Convex

Parent material: Coarse-loamy over sandy melt-out till derived from gneiss, granite, and/or schist

Typical profile

Oi - 0 to 2 inches: slightly decomposed plant material

A - 2 to 5 inches: fine sandy loam

Bw1 - 5 to 16 inches: fine sandy loam

Bw2 - 16 to 22 inches: gravelly fine sandy loam

2C - 22 to 67 inches: gravelly loamy sand

Properties and qualities

Slope: 8 to 15 percent

Surface area covered with cobbles, stones or boulders: 9.0 percent

Depth to restrictive feature: 19 to 39 inches to strongly contrasting textural stratification

Drainage class: Well drained

Runoff class: Low

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)

Available water supply, 0 to 60 inches: Low (about 3.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7s

Hydrologic Soil Group: B

Ecological site: F144AY034CT - Well Drained Till Uplands

Hydric soil rating: No

Minor Components

Scituate, extremely stony

Percent of map unit: 6 percent

Landform: Hills, drumlins, ground moraines

Landform position (two-dimensional): Backslope, footslope

Landform position (three-dimensional): Side slope

Down-slope shape: Convex, linear

Across-slope shape: Convex

Hydric soil rating: No

Montauk, extremely stony

Percent of map unit: 5 percent
Landform: Recessionial moraines, ground moraines, hills, drumlins
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex, linear
Across-slope shape: Convex
Hydric soil rating: No

Charlton, extremely stony

Percent of map unit: 5 percent
Landform: Ridges, ground moraines, hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex, linear
Across-slope shape: Convex
Hydric soil rating: No

Hollis, extremely stony

Percent of map unit: 4 percent
Landform: Ridges, hills
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Nose slope, side slope, crest
Down-slope shape: Convex
Across-slope shape: Linear, convex
Hydric soil rating: No

622C—Paxton-Urban land complex, 3 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2w67k
Elevation: 0 to 930 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 145 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Paxton and similar soils: 45 percent
Urban land: 35 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Paxton

Setting

Landform: Ground moraines, hills, drumlins
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Convex, linear

Custom Soil Resource Report

Across-slope shape: Convex

Parent material: Coarse-loamy lodgment till derived from gneiss, granite, and/or schist

Typical profile

Ap - 0 to 8 inches: fine sandy loam

Bw1 - 8 to 15 inches: fine sandy loam

Bw2 - 15 to 26 inches: fine sandy loam

Cd - 26 to 65 inches: gravelly fine sandy loam

Properties and qualities

Slope: 3 to 15 percent

Depth to restrictive feature: 20 to 39 inches to densic material

Drainage class: Well drained

Runoff class: Medium

Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)

Depth to water table: About 18 to 37 inches

Frequency of flooding: None

Frequency of ponding: None

Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)

Available water supply, 0 to 60 inches: Low (about 4.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 3e

Hydrologic Soil Group: C

Ecological site: F144AY007CT - Well Drained Dense Till Uplands

Hydric soil rating: No

Description of Urban Land

Typical profile

M - 0 to 10 inches: cemented material

Properties and qualities

Slope: 3 to 15 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

Woodbridge

Percent of map unit: 9 percent

Landform: Ground moraines, hills, drumlins

Landform position (two-dimensional): Summit, backslope, footslope

Landform position (three-dimensional): Side slope, crest

Down-slope shape: Concave

Across-slope shape: Linear

Custom Soil Resource Report

Hydric soil rating: No

Charlton

Percent of map unit: 6 percent

Landform: Hills

Landform position (two-dimensional): Summit, shoulder, backslope

Landform position (three-dimensional): Side slope, crest

Down-slope shape: Convex

Across-slope shape: Convex

Hydric soil rating: No

Udorthents

Percent of map unit: 4 percent

Down-slope shape: Linear

Across-slope shape: Linear

Hydric soil rating: No

Ridgebury

Percent of map unit: 1 percent

Landform: Drumlins, depressions, ground moraines, hills, drainageways

Landform position (two-dimensional): Footslope, toeslope

Landform position (three-dimensional): Head slope, base slope

Down-slope shape: Concave, linear

Across-slope shape: Concave, linear

Hydric soil rating: Yes

623C—Woodbridge-Urban land complex, 3 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2w68b

Elevation: 0 to 550 feet

Mean annual precipitation: 36 to 71 inches

Mean annual air temperature: 39 to 55 degrees F

Frost-free period: 145 to 240 days

Farmland classification: Not prime farmland

Map Unit Composition

Woodbridge and similar soils: 58 percent

Urban land: 28 percent

Minor components: 14 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Woodbridge

Setting

Landform: Ground moraines, hills, drumlins

Landform position (two-dimensional): Summit, backslope, footslope

Landform position (three-dimensional): Side slope, crest

Down-slope shape: Convex

Across-slope shape: Linear

Custom Soil Resource Report

Parent material: Coarse-loamy lodgment till derived from gneiss, granite, and/or schist

Typical profile

Ap - 0 to 7 inches: fine sandy loam
Bw1 - 7 to 18 inches: fine sandy loam
Bw2 - 18 to 30 inches: fine sandy loam
Cd - 30 to 65 inches: gravelly fine sandy loam

Properties and qualities

Slope: 3 to 15 percent
Depth to restrictive feature: 20 to 39 inches to densic material
Drainage class: Moderately well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)
Depth to water table: About 18 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 4.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C/D
Ecological site: F144AY037MA - Moist Dense Till Uplands
Hydric soil rating: No

Description of Urban Land

Typical profile

M - 0 to 10 inches: cemented material

Properties and qualities

Slope: 3 to 15 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

Paxton

Percent of map unit: 9 percent
Landform: Ground moraines, hills, drumlins
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Convex, linear
Across-slope shape: Convex
Hydric soil rating: No

Ridgebury

Percent of map unit: 5 percent
Landform: Hills, drainageways, drumlins, depressions, ground moraines
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Head slope, base slope
Down-slope shape: Concave, linear
Across-slope shape: Concave, linear
Hydric soil rating: Yes

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): Crest, side slope, 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

Custom Soil Resource Report

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

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

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

Hinckley

Percent of map unit: 5 percent

Landform: Deltas, kames, eskers, outwash plains

Custom Soil Resource Report

Landform position (two-dimensional): Summit, shoulder, backslope

Landform position (three-dimensional): Head slope, nose slope, crest, side slope, rise

Down-slope shape: Convex

Across-slope shape: Convex, linear

Hydric soil rating: No

654—Udorthents, loamy

Map Unit Setting

National map unit symbol: vr1l

Elevation: 0 to 3,000 feet

Mean annual precipitation: 32 to 50 inches

Mean annual air temperature: 45 to 50 degrees F

Frost-free period: 110 to 200 days

Farmland classification: Not prime farmland

Map Unit Composition

Udorthents, loamy, and similar soils: 80 percent

Minor components: 20 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Udorthents, Loamy

Setting

Parent material: Loamy alluvium and/or sandy glaciofluvial deposits and/or loamy glaciolacustrine deposits and/or loamy marine deposits and/or loamy basal till and/or loamy lodgment till

Properties and qualities

Depth to restrictive feature: More than 80 inches

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Minor Components

Udorthents, sandy

Percent of map unit: 10 percent

Hydric soil rating: No

Urban land

Percent of map unit: 5 percent

Landform position (two-dimensional): Footslope

Landform position (three-dimensional): Base slope

Down-slope shape: Linear

Across-slope shape: Linear

Udorthents, wet substratum

Percent of map unit: 5 percent

Hydric soil rating: Yes

655—Udorthents, wet substratum

Map Unit Setting

National map unit symbol: vr1n

Elevation: 0 to 3,000 feet

Mean annual precipitation: 32 to 54 inches

Mean annual air temperature: 43 to 54 degrees F

Frost-free period: 110 to 240 days

Farmland classification: Not prime farmland

Map Unit Composition

Udorthents, wet substratum, and similar soils: 85 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Udorthents, Wet Substratum

Setting

Parent material: Loamy alluvium and/or sandy glaciofluvial deposits and/or loamy glaciolacustrine deposits and/or loamy marine deposits and/or loamy basal till and/or loamy lodgment till

Properties and qualities

Slope: 0 to 8 percent

Depth to restrictive feature: More than 80 inches

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Minor Components

Urban land

Percent of map unit: 8 percent

Landform position (two-dimensional): Footslope

Landform position (three-dimensional): Base slope

Down-slope shape: Linear

Across-slope shape: Linear

Freetown

Percent of map unit: 4 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

Swansea

Percent of map unit: 3 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

656—Udorthents-Urban land complex

Map Unit Setting

National map unit symbol: 995k
Elevation: 0 to 3,000 feet
Mean annual precipitation: 32 to 54 inches
Mean annual air temperature: 43 to 54 degrees F
Frost-free period: 110 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Udorthents and similar soils: 45 percent
Urban land: 35 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Udorthents

Setting

Parent material: Loamy alluvium and/or sandy glaciofluvial deposits and/or loamy glaciolacustrine deposits and/or loamy marine deposits and/or loamy basal till and/or loamy lodgment till

Properties and qualities

Slope: 0 to 15 percent
Depth to restrictive feature: More than 80 inches
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None

Description of Urban Land

Setting

Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Excavated and filled land

Minor Components

Canton

Percent of map unit: 10 percent
Landform: Hills

Custom Soil Resource Report

Landform position (two-dimensional): Backslope, toeslope
Landform position (three-dimensional): Side slope, base slope
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

Merrimac

Percent of map unit: 5 percent
Landform: Terraces, plains
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Tread, rise
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Paxton

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Head slope, side slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

References

- American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.
- American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.
- Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.
- Federal Register. July 13, 1994. Changes in hydric soils of the United States.
- Federal Register. September 18, 2002. Hydric soils of the United States.
- Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.
- National Research Council. 1995. Wetlands: Characteristics and boundaries.
- Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_054262
- Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service, U.S. Department of Agriculture Handbook 436. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053577
- Soil Survey Staff. 2010. Keys to soil taxonomy. 11th edition. U.S. Department of Agriculture, Natural Resources Conservation Service. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053580
- Tiner, R.W., Jr. 1985. Wetlands of Delaware. U.S. Fish and Wildlife Service and Delaware Department of Natural Resources and Environmental Control, Wetlands Section.
- United States Army Corps of Engineers, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Waterways Experiment Station Technical Report Y-87-1.
- United States Department of Agriculture, Natural Resources Conservation Service. National forestry manual. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/home/?cid=nrcs142p2_053374
- United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. <http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelprdb1043084>

Custom Soil Resource Report

United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242

United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053624

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf

D

Operation & Maintenance Plan

Stormwater Management Operations and Maintenance Plan

KING STREET COMMONS MIXED-USE SUBDIVISION

**ASSESSORS MAP U08, LOT 10-0
550 KING STREET
LITTLETON, MASSACHUSETTS**

Prepared for:

550 King Street, LLC
280 Merrimack Street
Lawrence, MA 01843

Prepared by:

TEC, Inc.
282 Merrimack Street
Lawrence, MA 01843



August 22, 2023 Revised
February 21, 2024

Stormwater Management Operation and Maintenance Plan

August 22, 2023

Revised February 21, 2024

Name of Owner: 550 King Street, LLC
Name of Facility: King Street Commons
Location: 550 King Street, Littleton, MA

A detailed, written log of all scheduled preventative and corrective maintenance performed for the stormwater management measures must be kept by the Applicant, including a record of all inspections and copies of maintenance-related work orders. An "Inspection and Maintenance Check List" shall be maintained as a record of regularly scheduled inspection and maintenance items as outlined below for every year. Maintenance required and actions taken shall be recorded in an "Inspection and Maintenance Log". The funding, operation, and maintenance of all stormwater management Best Management Practices (BMPs) shall be provided by the Owners, or their appointee.

Maintenance routine and schedule: Routine inspections will be conducted on a monthly basis and thorough investigations will be conducted twice a year. Tasks that are common to all systems include regular removal of accumulated sediments, floatables and debris. Inspections will be conducted by a qualified person experienced in drainage design and stormwater management systems.

Subsurface systems have access points located within the parking lots and roadways for ease of access by both personnel and vehicles necessary for maintenance. The BMP locations allow for safe vehicle and pedestrian travel across the site during maintenance activities. Please see Figure 1 for the BMP locations and maintenance areas. The routine inspection and maintenance of BMPs will ensure public safety by preventing clogging and failure of the system.

Annual reports will be prepared detailing the status of the stormwater system and the maintenance performed. A copy of the annual report will be sent to the Town of Littleton Conservation Commission, if requested. Please refer to the Site Plans submitted to the Town of Littleton Conservation Commission for BMP locations.

The Owner agrees to comply with a minimum maintenance schedule as follows:

1. Inspection and cleaning of Rain Garden

The rain garden shall be inspected and cleared of trash monthly to maintain efficacy. The BMP shall be mulched and fertilized annually. Dead vegetation and pruning shall be done annually. All sediments shall be properly handled and disposed of in accordance with local, state, and federal guidelines and regulations.

2. Inspection and cleaning of catch basins

Catch basin grates shall be inspected monthly and cleared of debris to maintain inlet capacity. Sumps and inlets shall be cleaned four (4) times per year and inspected monthly. All sediments shall be properly handled and disposed of in accordance with local, state, and federal guidelines and regulations.

3. Inspection and cleaning of drainage pipes and manholes

All retained and proposed drainage pipes and manhole structures shall be inspected and cleaned of sediment at least every five (5) years or as required to maintain adequate functionality of the stormwater conveyance system. All sediments shall be properly handled and disposed of in accordance with local, state, and federal guidelines and regulations.

4. Annual cleaning of outlet control structure

Sumps and inlets shall be cleaned once per year and inspected on a monthly basis. All sediments shall be properly handled and disposed of in accordance with local, state, and federal guidelines and regulations.

5. Quarterly street sweeping of all parking lots and roadways

The parking lots and roadways shall be swept on a quarterly basis. Sweepings shall be concentrated in the late spring after winter sanding and late fall after the leaves have fallen.

6. Semi-annual inspection and maintenance of Contech Cascade Separator water quality units

The water quality units shall be inspected every six months (spring and fall) for the first year to determine oil and sediment accumulation rates. Subsequent inspections will be planned based on the first year's inspection observations, and after any oil or chemical spill. All maintenance including removal and disposal of sediments shall be performed at the time of inspection. All sediments shall be properly handled and disposed of in accordance with local, state, and federal guidelines and regulations. Please see the attached Cascade Separator® Inspection and Maintenance Guide provided by Contech.

7. Semi-annual inspection and maintenance of Contech CMP infiltration structure

The CMP detention structure shall be inspected every six months (spring and fall) for the first year. Subsequent inspection frequency shall be based on the first year's inspection observations, after any oil or chemical spill, and no less than once per year. All maintenance including removal and disposal of sediments shall be performed at the time of inspection. All sediments shall be properly handled and disposed of in accordance with local, state, and federal guidelines and regulations. Please see the attached Contech® CMP Detention Inspection and Maintenance Guide provided by Contech.

8. Landscaping

Landscaping will be inspected after every major storm event for two (2) months after seeding to ensure functionality. Thereafter, inspections should take place every six (6) months in the spring and fall and after severe storm events. Grass and mulched landscaping showing signs of wear and erosion will be re-loamed/re-seeded or re-mulched as necessary to prevent further erosion from taking place.

9. Snow Removal

Snow will be stored within the landscape islands onsite. Salting and/or sanding will be performed as necessary to promote the public's safety.

Public Safety Features

The stormwater infrastructure has been designed to collect and treat surface runoff from the development to prevent negative impacts to the resource area on site and groundwater. Measures shall be taken to prevent surface flooding and erosion as outlined in the Stormwater Operation and Maintenance Plan and the Site Plans.

The Long-Term Pollution Prevention Plan

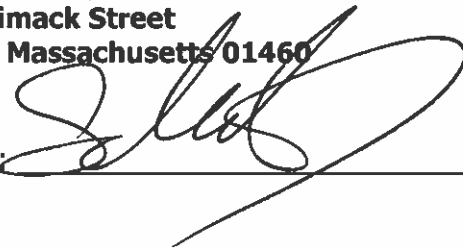
The Owner agrees to comply with the following Long-Term Pollution Prevention Plan to ensure long-term stormwater quality discharge from the site:

- Good housekeeping practices: The site will be maintained by the owners, including snow removal, de-icing, street sweeping and BMP inspection/maintenance.
- Provisions for storing materials and solid waste products inside or under cover: Residential, retail, and restaurant produced waste will be stored in dumpsters onsite prior to regularly scheduled removal. Hazardous wastes are not anticipated to be produced on this site.
- Vehicle washing controls: Vehicle washing is not anticipated as a reasonably foreseeable use of the site.
- Requirements for routine inspections and maintenance of stormwater BMPs: BMPs will be inspected and maintained by qualified personnel as described in the Stormwater Management Operation and Maintenance Plan.
- Spill prevention and response plans: There are no proposed uses at the site that would provide an opportunity for a spill of oil or hazardous materials, other than a sudden, catastrophic, vehicle failure. If a vehicle release is the result of an accident, the police and fire department will respond and address any release.
- Provisions for maintenance of lawns, gardens, and other landscaped areas: The owner will provide long-term maintenance for the landscaped areas and stormwater BMPs.
- Requirements for storage and use of fertilizers, herbicides, and pesticides: At this time there would be no foreseeable need for the storage of fertilizers, herbicides, and pesticides.
- Pet waste management provisions: Pet waste will be removed by individual dog owners. The site is not anticipated to host a large number of pets.
- Provisions for operation and management of septic systems: Not Applicable.
- Provisions for solid waste management: Solid waste will be stored in dumpsters onsite prior to regularly scheduled removal.
- Snow disposal and plowing plans relative to Wetland Resource Areas: No snow will be stored or disposed of in surrounding resource areas.

- Street sweeping schedules: The owner will be responsible for quarterly street sweeping with sweepings concentrated in the Spring and Fall as stated in the Operations and Maintenance Plan.
- Winter road salt and/or sand use and storage restrictions: Road salt and/or sand will be stored under cover in a subcatchment area that receives TSS treatment prior to drainage to the bordering vegetated wetlands.
- Street sweeping schedule: The owner will perform street sweeping that is consistent with the Town of Littleton's current scheduled sweeping.
- Provisions for prevention of illicit discharges to the stormwater management system: Only stormwater is proposed to be conveyed through the stormwater management system. No illicit materials will be permitted. The owners will be responsible to maintain this 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: The project location is not considered a LUHPPL.
- Training for staff or personnel involved with implementing Long-Term Pollution Prevention Plan: Prior to implementation of the LTPPP, the owners shall provide an on-site meeting with the maintenance personnel to present the contents and requirements of the Stormwater Operation and Maintenance Plan and the LTPPP.
- List of Emergency contacts for implementing Long-Term Pollution Prevention Plan:

**550 King Street, LLC
280 Merrimack Street
Littleton, Massachusetts 01460**

Signature: _____



**INSPECTION AND MAINTENANCE CHECK LIST –
King Street Commons at 550 King Street, Littleton, MA 01460**

For Year: _____

Inspection Item		Inspection Frequency*											
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
1	Rain Garden												
2	Catch Basin Inlet												
3	Drainage Pipes and Manholes	at least every 5 years											
4	Outlet Control Structure	at least 1 time per year											
6	Contech Cascade Separator Water Quality Units												
7	Contech CMP Infiltration												
8	Landscaping												
Maintenance Item		Maintenance Frequency*											
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
1	Rain Garden												
2	Catch Basin Cleaning	at least 4 times per year											
3	Drainage Pipes and Manholes	at least every 5 years											
4	Outlet Control Structure	at least once a year											
6	Street Sweeping	at least 4 times per year											
6	Contech Cascade Separator Water Quality Units												
7	Contech CMP Infiltration												
8	Landscaping	as needed, at least once a year											
9	Snow Removal												

* Actual time of inspecting and maintaining items may vary. Chart shall be used to indicate frequency of events.

** This chart shall be used in conjunction with the attached “Stormwater Management Operation and Maintenance Plan”, dated August 22, 2023 and revised January 19, 2024.

Name of Applicant: 550 King Street, LLC
Name of Project: King Street Commons
Location: 550 King Street, Littleton, MA 01460

Inspection and Maintenance Log

Inspection No.	Date	Inspections Performed	Maintenance Actions Taken
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			

Additional Sheets shall be added as needed

Cascade Separator[®] Inspection and Maintenance Guide



Maintenance

The Cascade Separator® system should be inspected at regular intervals and maintained when necessary to ensure optimum performance. The rate at which the system collects sediment and debris will depend upon on-site activities and site pollutant characteristics. For example, unstable soils or heavy winter sanding will cause the sediment storage sump to fill more quickly but regular sweeping of paved surfaces will slow accumulation.

Inspection

Inspection is the key to effective maintenance and is easily performed. Pollutant transport and deposition may vary from year to year and regular inspections will help ensure that the system is cleaned out at the appropriate time. At a minimum, inspections should be performed twice per year (i.e. spring and fall). However, more frequent inspections may be necessary in climates where winter sanding operations may lead to rapid accumulations, or in equipment wash-down areas. Installations should also be inspected more frequently where excessive amounts of trash are expected.

A visual inspection should ascertain that the system components are in working order and that there are no blockages or obstructions in the inlet chamber, flumes or outlet channel. The inspection should also quantify the accumulation of hydrocarbons, trash and sediment in the system. Measuring pollutant accumulation can be done with a calibrated dipstick, tape measure or other measuring instrument. If absorbent material is used for enhanced removal of hydrocarbons, the level of discoloration of the sorbent material should also be identified during inspection. It is useful and often required as part of an operating permit to keep a record of each inspection. A simple form for doing so is provided in this Inspection and Maintenance Guide.

Access to the Cascade Separator unit is typically achieved through one manhole access cover. The opening allows for inspection and cleanout of the center chamber (cylinder) and sediment storage sump, as well as inspection of the inlet chamber and slanted skirt. For large units, multiple manhole covers allow access to the chambers and sump.

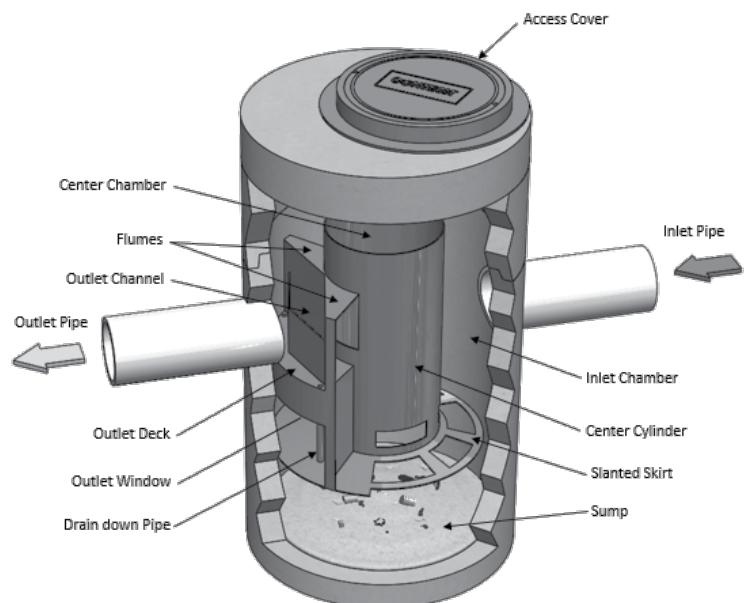
The Cascade Separator system should be cleaned before the level of sediment in the sump reaches the maximum sediment depth and/or when an appreciable level of hydrocarbons and trash has accumulated. If sorbent material is used, it must be replaced when significant discoloration has occurred. Performance may be impacted when maximum sediment storage capacity is exceeded. Contech recommends maintaining the system when sediment level reaches 50% of maximum storage volume. The level of sediment is easily determined by measuring the distance from the system outlet invert (standing water level) to the top of the sediment pile. To avoid underestimating the level of sediment in the chamber, the measuring device must be lowered to the top of the sediment pile carefully. Finer, silty particles at the top of the pile typically offer less resistance to the end of the rod than larger particles toward the bottom of the pile. Once this measurement is recorded, it should be compared to the chart in this document to determine if the height of the sediment pile off the bottom of the sump floor exceeds 50% of the maximum sediment storage.

Cleaning

Cleaning of a Cascade Separator system should be done during dry weather conditions when no flow is entering the system. The use of a vacuum truck is generally the most effective and convenient method of removing pollutants from the system. Simply remove the manhole cover and insert the vacuum tube down through the center chamber and into the sump. The system should be completely drained down and the sump fully evacuated of sediment. The areas outside the center chamber and the slanted skirt should also be washed off if pollutant build-up exists in these areas.

In installations where the risk of petroleum spills is small, liquid contaminants may not accumulate as quickly as sediment. However, the system should be cleaned out immediately in the event of an oil or gasoline spill. Motor oil and other hydrocarbons that accumulate on a more routine basis should be removed when an appreciable layer has been captured. To remove these pollutants, it may be preferable to use absorbent pads since they are usually less expensive to dispose than the oil/water emulsion that may be created by vacuuming the oily layer. Trash and debris can be netted out to separate it from the other pollutants. Then the system should be power washed to ensure it is free of trash and debris.

Manhole covers should be securely seated following cleaning activities to prevent leakage of runoff into the system from above and to ensure proper safety precautions. Confined space entry procedures need to be followed if physical access is required. Disposal of all material removed from the Cascade Separator system must be done in accordance with local regulations. In many locations, disposal of evacuated sediments may be handled in the same manner as disposal of sediments removed from catch basins or deep sump manholes. Check your local regulations for specific requirements on disposal. If any components are damaged, replacement parts can be ordered from the manufacturer.



Cascade Separator® Maintenance Indicators and Sediment Storage Capacities

Model Number	Diameter		Distance from Water Surface to Top of Sediment Pile		Sediment Storage Capacity	
	ft	m	ft	m	y ³	m ³
CS-3	3	0.9	1.5	0.5	0.4	0.3
CS-4	4	1.2	2.5	0.8	0.7	0.5
CS-5	5	1.3	3	0.9	1.1	0.8
CS-6	6	1.8	3.5	1	1.6	1.2
CS-8	8	2.4	4.8	1.4	2.8	2.1
CS-10	10	3.0	6.2	1.9	4.4	3.3
CS-12	12	3.6	7.5	2.3	6.3	4.8

Note: The information in the chart is for standard units. Units may have been designed with non-standard sediment storage depth.



A Cascade Separator unit can be easily cleaned in less than 30 minutes.



A vacuum truck excavates pollutants from the systems.

Cascade Separator® Inspection & Maintenance Log

[illegible]

1. The depth to sediment is determined by taking a measurement from the manhole outlet invert (standing water level) to the top of the sediment pile. Once this measurement is recorded, it should be compared to the chart in the maintenance guide to determine if the height of the sediment pile off the bottom of the sump floor exceeds 50% of the maximum sediment storage. Note: to avoid underestimating the volume of sediment in the chamber, the measuring device must be carefully lowered to the top of the sediment pile.
2. For optimum performance, the system should be cleaned out when the floating hydrocarbon layer accumulates to an appreciable thickness. In the event of an oil spill, the system should be cleaned immediately.

SUPPORT

- Drawings and specifications are available at www.ContechES.com.
- Site-specific design support is available from our engineers.

©2021 Contech Engineered Solutions LLC, a QUIKRETE Company

Contech Engineered Solutions LLC provides site solutions for the civil engineering industry. Contech's portfolio includes bridges, drainage, sanitary sewer, stormwater, and earth stabilization products. For information, visit www.ContechES.com or call 800.338.1122

NOTHING IN THIS CATALOG SHOULD BE CONSTRUED AS A WARRANTY. APPLICATIONS SUGGESTED HEREIN ARE DESCRIBED ONLY TO HELP READERS MAKE THEIR OWN EVALUATIONS AND DECISIONS, AND ARE NEITHER GUARANTEES NOR WARRANTIES OF SUITABILITY FOR ANY APPLICATION. CONTECH MAKES NO WARRANTY WHATSOEVER, EXPRESS OR IMPLIED, RELATED TO THE APPLICATIONS, MATERIALS, COATINGS, OR PRODUCTS DISCUSSED HEREIN. ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND ALL IMPLIED WARRANTIES OF FITNESS FOR ANY PARTICULAR PURPOSE ARE DISCLAIMED BY CONTECH. SEE CONTECH'S CONDITIONS OF SALE (AVAILABLE AT WWW.CONTECHES.COM/COS) FOR MORE INFORMATION.



800-925-5240
www.ContechES.com

Contech® CMP Detention Inspection and Maintenance Guide

Underground stormwater detention and infiltration systems must be inspected and maintained at regular intervals for purposes of performance and longevity.

Inspection

Inspection is the key to effective maintenance of CMP detention systems and is easily performed. Contech recommends ongoing, annual inspections. Sites with high trash load or small outlet control orifices may need more frequent inspections. The rate at which the system collects pollutants will depend more on-site specific activities rather than the size or configuration of the system.

Inspections should be performed more often in equipment washdown areas, in climates where sanding and/or salting operations take place, and in other various instances in which one would expect higher accumulations of sediment or abrasive/corrosive conditions. A record of each inspection is to be maintained for the life of the system.

Maintenance

CMP detention systems should be cleaned when an inspection reveals accumulated sediment or trash is clogging the discharge orifice. Accumulated sediment and trash can typically be evacuated through the manhole over the outlet orifice. If maintenance is not performed as recommended, sediment and trash may accumulate in front of the outlet orifice. Manhole covers should be securely seated following cleaning activities. Contech suggests that all systems be designed with an access/inspection manhole situated at or near the inlet and the outlet orifice. Should it be necessary to get inside the system to perform maintenance activities, all appropriate precautions regarding confined space entry and OSHA regulations should be followed.

Annual inspections are best practice for all underground systems. During this inspection if evidence of salting/de-icing agents is observed within the system, it is best practice for the system to be rinsed, including above the spring line soon after the spring thaw as part of the maintenance program for the system.

Maintaining an underground detention or infiltration system is easiest when there is no flow entering the system. For this reason, it is a good idea to schedule the cleanout during dry weather.

The foregoing inspection and maintenance efforts help ensure underground pipe systems used for stormwater storage continue to function as intended by identifying recommended regular inspection and maintenance practices. Inspection and maintenance related to the structural integrity of the pipe or the soundness of pipe joint connections is beyond the scope of this guide.

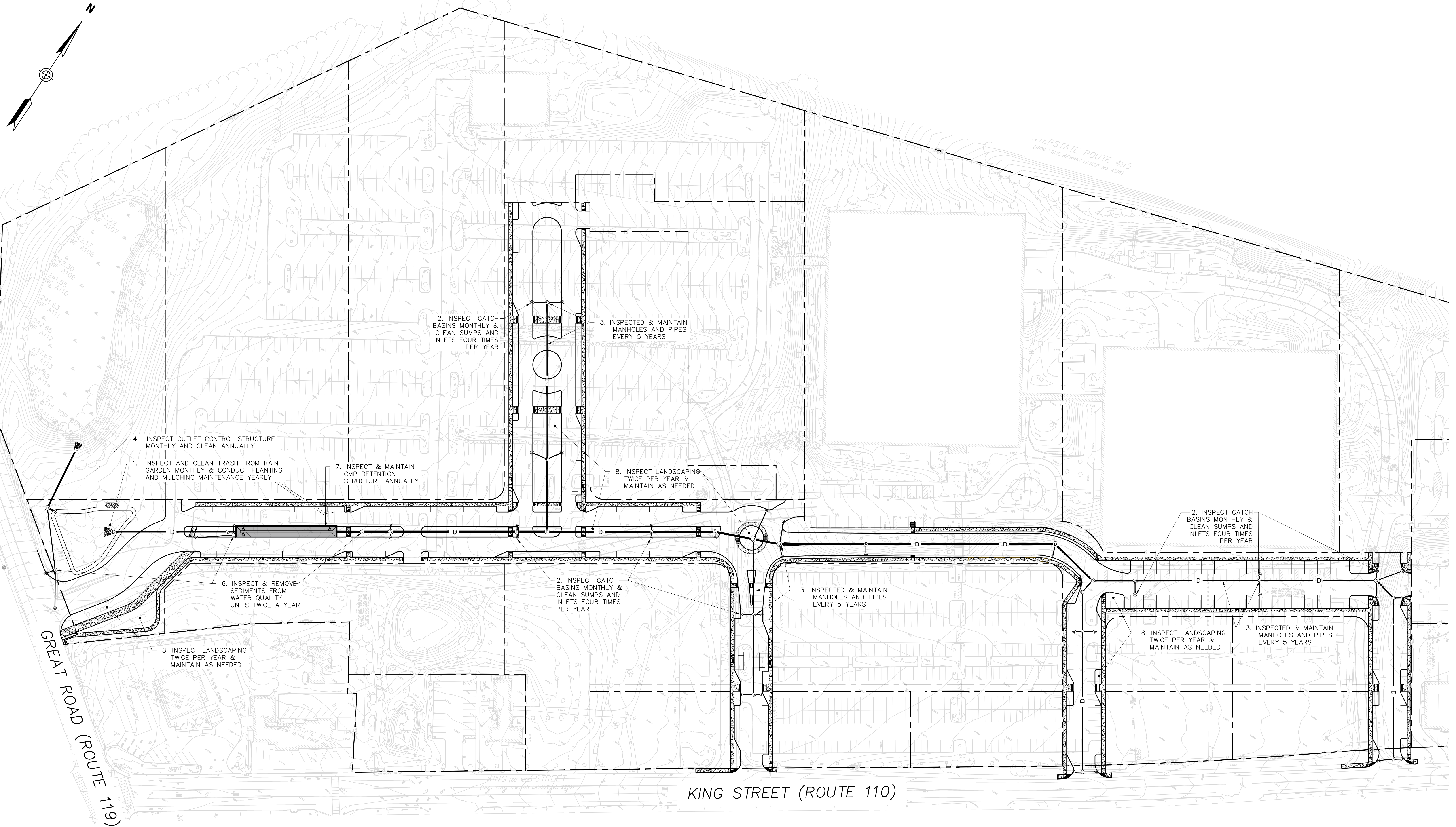


NOTHING IN THIS CATALOG SHOULD BE CONSTRUED AS A WARRANTY. APPLICATIONS SUGGESTED HEREIN ARE DESCRIBED ONLY TO HELP READERS MAKE THEIR OWN EVALUATIONS AND DECISIONS, AND ARE NEITHER GUARANTEES NOR WARRANTIES OF SUITABILITY FOR ANY APPLICATION. CONTECH MAKES NO WARRANTY WHATSOEVER, EXPRESS OR IMPLIED, RELATED TO THE APPLICATIONS, MATERIALS, COATINGS, OR PRODUCTS DISCUSSED HEREIN. ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND ALL IMPLIED WARRANTIES OF FITNESS FOR ANY PARTICULAR PURPOSE ARE DISCLAIMED BY CONTECH. SEE CONTECH'S CONDITIONS OF SALE (AVAILABLE AT WWW.CONTECHES.COM/COS) FOR MORE INFORMATION.

CONTECH®
CMP DETENTION SYSTEMS

CONTECH®
ENGINEERED SOLUTIONS

© 2019 CONTECH ENGINEERED SOLUTIONS LLC, A QUIKRETE COMPANY
ALL RIGHTS RESERVED. PRINTED IN USA.



O&M Site Plan

550 King Street
Littleton, Massachusetts

E

CPPP and Erosion Prevention & Sedimentation Control Plan

**CONSTRUCTION PERIOD POLLUTION PREVENTION AND
EROSION AND SEDIMENTATION CONTROL PLAN**

August 22, 2023

Revised February 21, 2024

Name of Owner: 550 King Street, LLC
Name of Facility: King Street Commons
Location: 550 King Street
Littleton, MA

This plan presents the minimum measures for the contractor to utilize in preparation of the Stormwater Pollution Prevention Plan (SWPPP) as required by the EPA National Pollutant Discharge Elimination System (NPDES) Construction General Permit. Contractor to provide SWPPP to the Conservation Commission and EPA at least fourteen (14) days prior to start of construction.

Good Housekeeping BMPs

Goals

Minimize the potential for contaminants to enter or runoff the site during construction activities. Fuel and other equipment related fluids will be properly stored. The Contractor shall establish secure storage areas that collect any spillage to meet requirements of the Town of Littleton Fire Department regarding the storage of flammable materials. The Contractor shall complete and submit the plans to the Engineer.

General Requirements

The following presents a proactive approach to all of the best management practices, erosion and sedimentation controls, mitigation measures, and monitoring activities for this Project.

Compost Filter Sock

A compost filter sock is a type of contained compost filter berm. It is a mesh tube filled with composted material that is placed perpendicular to sheet-flow runoff to control erosion and retain sediment in disturbed areas. The filter sock can be used in place of a traditional sediment and erosion control tool such as a silt fence or straw bale barrier.

Compost filter socks are flexible and can be placed along the perimeter of a site, or at intervals along a slope, to capture and treat stormwater that runs off as sheet flow. Filter socks can also be used on pavement as inlet protection for storm drains and to slow water flow in small ditches. Filter socks used for erosion control are usually 12 inches in diameter, although 8 inch, 18 inch, and 24 inch– diameter socks are used in some applications. The smaller, 8 inch–diameter filter socks are commonly used for stormwater inlet protection. The outer shell of a compost filter sock is typically biodegradable and can remain on pervious surfaces post construction versus having to be removed as construction waste.

Pavement Sweeping

Paved areas within the active construction site can be swept on a regular basis to remove larger sediment particles from construction activities. Pavement areas adjacent to the Site will be swept if dirt and debris is tracked from the construction site.

General Maintenance

Refer to the Inspection and Maintenance Checklist (at the end of this section) identifying inspection and maintenance measures for each specific practice.

The contractor or subcontractor will be responsible for implementing each control shown on the Plan. In accordance with EPA regulations, the contractor must sign a copy of a certification to verify that a plan has been prepared and that permit regulations are understood.

The onsite contractor will inspect all sediment and erosion control structures weekly and after each rainfall event meeting the minimum requirements as defined in the Plan. Records of the inspections will be prepared and maintained onsite by the contractor as required by the Plan.

- Silt shall be removed from behind barriers if greater than 6-inches deep, 2/3rds the height of the erosion control barrier, or as needed.
- Damaged or deteriorated items will be repaired immediately after identification.
- The underside of the compost filter sock should be kept in close contact with the earth and reset as necessary.
- Contractor to use rip-rap stone when necessary to manage stormwater during construction.
- Contractor to use erosion control blankets (ECBs) to stabilize sloped areas as necessary to minimize erosion during construction.
- Soil stockpiles in grass areas shall be enclosed by a silt fence and soil stockpiles in paved areas shall be enclosed by compost filter sock or straw bales. All soil stockpiles are to be covered with tarps.
- At a minimum establish good housekeeping BMPs for:
 - Material handling and waste management
 - Staging areas
 - Designate washout areas
 - Equipment vehicle fueling and maintenance

- Spill prevention and control

Erosion control structures shall remain in place until all disturbed earth has been securely stabilized. After removal of structures, disturbed areas shall be regraded and stabilized as necessary.

Spill Prevention and Control

The Contractor will actively maintain and manage the site activities with the procedures outlined in this Plan. In the event of petroleum or other deleterious substance spill, action will be taken by the Contractor to contain and remove the spill. The Contractor will comply with the relevant section(s) of the Oil Pollution Prevention Act, 40 CFR 112.7.

Responsibility

All project personnel share the responsibility for the initial control and reporting of the oil and other substance spill, especially the personnel that first discover the spill. The Site Safety and Health Officer (SSHO) will be responsible for determining the necessary safety equipment and for establishing safety practices to be followed by the Contractor during the clean-up operations. All personnel will be trained in the use of and location of this equipment, prior to the commencement of the construction.

The Contractor's goal is to provide effective, efficient and coordinated action to minimize or mitigate damages to the environment and public health and welfare from oil or other substance discharges, conforming to applicable federal, state, and local regulations, as well as other provisions and restrictions. In the event of spills or releases that may occur during the Project, a representative on-site qualified by OSHA training requirements (29 CFR 1910.120) for a Level 3 Hazmat Technician will be provided and will have the responsibility and authority for supervising the cleanup. If the representative determines that the clean-up operations are beyond the capacity of the Contractor, assistance shall be requested from its Subcontractor.

In the event of an emergency spill, the Contractor will be responsible for retaining the environmental Subcontractor. The selected environmental subcontractor will develop a Hazardous Materials Health and Safety Plan, which will be referenced when a spill or release is discovered, and the control of the spill or release is beyond the scope of the Spill Prevention Control and Countermeasure plan. The Contractor's Project Manager is responsible for giving the SSHO directions for initiating the Hazardous Materials Health and Safety Plan.

Alert and reporting procedures will become effective immediately upon observance and indication of a spill or discharge of oil or other substances on the project.

Reportable observations are:

1. Leaks or spills
2. Soils which are discolored or have an odor
3. Discharge of oil or other similar substances from drain pipes

The Engineer will be informed immediately of all substantial spills, releases, or other substance discharges. All telephone numbers for the Emergency Response agencies will

be posted on site. The Contractor or its Subcontractors will implement control and countermeasures immediately.

Fuel and Oil Delivery Trucks

The equipment superintendent or designee will monitor all truck unloading procedures to verify all hoses are tight and do not leak, and if necessary, will tighten, adjust, or replace them to prevent a release of any kind. In the event of a major spill, alert and initial report procedures will be implemented, and an emergency response contractor will be called in to perform the cleanup.

Equipment

Motorized equipment that require fuel and oil to operate will be inspected prior to the start of each work shift by the operator (in the field) to ensure there is no leakage of oil, fuel, or other material. Trucks will be inspected prior to use for potential leaks or drips. If a leak is found, repairs will be made immediately, and spillage will be cleaned up manually using sorbent material. Vehicles that are found to be leaking will be immediately taken out of service until repairs can be made.

Drum Storage

Drum storage, if any, will be located in a secure area within the Project limits away from environmental areas of concern. Petroleum liquids and other substances stored in drums will be kept in a drum container that consists of a drum rack and drip containment pan that is capable of containing 110% of the stored volume should the drum rupture.

Lubrication / Oil Maintenance

Replacement lubrication will be directly deposited from the lubrication truck to the equipment lubrication reservoir. No other container system will be used to transport oil to the equipment. Mobile equipment will be serviced off site or in the lay-down area. Equipment that cannot be moved will be serviced in the field. The Contractor will place a containment pan or absorbent below the service area prior to initiating service activities in the field. Waste disposal will be completed by the Contractor or by a waste disposal firm. Miscellaneous lubricants for operating equipment will be limited to daily quantities.

Spent Oil

Oil that has already been used on the job will be disposed of via a certified waste disposal firm. Spent oil will be stored in a labeled (hazardous waste signs) and vented fuel storage cell located at the staging area awaiting disposal by a certified waste disposal firm (i.e. Enpro, Inc.). The staging area will be located within the boundary of the project and inspected daily for leaks or spills. The storage cell will be bermed to contain 110% of the largest container or 10% of the total volume in storage, whichever is greater.

Special Oil Spill Equipment

Sorbent Pads

Sorbent pads will be available to absorb oil and petroleum compounds. If necessary, the pads will be used to absorb oil spills or leaks by placing them on the oil and giving

them antiquated time to absorb it. The sorbent pads will be stored in equipment box located in the maintenance area. The pads shall float and be water repellent, so they can absorb oil on water. Saturated/contaminated pads will be placed in an appropriate container and stored within the maintenance area. A certified waste disposal firm will dispose of the approved containers.

Sorbent Compound

The compound will be used for contaminants spilled on decks or hard surfaces. In most cases, it can be applied directly to spills, but if the spill is large, it can be used to form a dike around the spill to prevent further migration.

Construction and Erosion Control Sequencing Plan

1. Selectively remove vegetation for compost filter tube installation;
2. Install compost filter tube;
3. Install construction fencing at limits of work, and no-disturb/tree save areas, if any;
4. Stabilize construction entrances;
5. Prepare construction trailer/staging location;
6. Strip and stockpile topsoil and pavement;
7. Temporarily stabilize topsoil stockpiles (seed and silt fence (grassed area) or compost filter tube or straw bales (pavement area) around toe of slope);
8. Conduct earthwork cuts and fills to bring site to grade;
9. Construct utilities (water, sewer, storm drain, etc.);
10. Construct roadway/parking/sidewalk pavement areas through binder course;
11. Finish grade landscaping area;
12. Permanently stabilize landscaping areas with seed/landscaping;
13. Construct roadway/parking areas through top course; and
14. Remove all temporary soil erosion and sediment control measures upon permanent site stabilization and approval by the engineer and Town of Littleton.

Best Management Practices – Maintenance/Evaluation Checklist
Construction Practices

Best Management Practice	Inspection Frequency	Date Inspected	Inspector	Minimum Maintenance and Key Items to Check	Cleaning/Repair Needed	Date of Cleaning/Repair	Performed by
					☐ yes ☐ no (List Items)		
Compost Filter Sock	Inspect at least once per week and after each rainstorm of 0.25 inch or greater.			- Ensure that compost filter sock is intact and the area behind the sock is not filled with sediment. If there is excessive ponding behind the filter sock or accumulated sediments reach the top of the sock, an additional sock should be added on top or in front of the existing filter sock in these areas, without disturbing the soil or accumulated sediment. - If the filter sock was overtopped during a storm event, the operator should consider installing an additional filter sock on top of the original, placing an additional filter sock further up the slope.			
Catch Basin Silt Sack	Inspect at least once per week and after each rainstorm of 0.25 inch or greater.			Ensure that silt sack is intact. The silt sack should be removed, emptied, and replaced into the catch basin as needed for proper functioning.			
Pavement Sweeping	To be monitored as needed.			Paved areas within the active construction site can be swept on a regular basis to remove larger sediment particles from construction activities. Pavement areas adjacent to the Site will be swept if dirt and debris is tracked from the construction site.			

Stormwater Supervisor Contact Information:

F

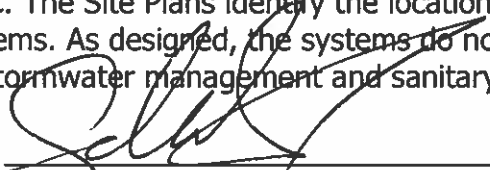
Illicit Discharge Compliance Statement

Illicit Discharge Compliance Statement

Name of Owner: 550 King Street, LLC
Name of Facility: King Street Commons Mixed-Use Development
Location: 550 King Street, Littleton, MA 01460

The Subdivision Plans and Drainage Report for the Proposed Site Development, located at 550 King Street, Littleton, MA, meets the requirements of Standard 10 of the Massachusetts Stormwater Handbook.

The Site Plans were prepared by qualified personnel at the direction of 550 King Street, LLC. The Site Plans identify the location of stormwater management and utility systems. As designed, the systems do not allow for any connections between stormwater management and sanitary sewer utilities.

Signature: 
(To be signed prior to occupancy)

G

Test Pit Logs



282 Merrimack Street, 2nd Floor
Lawrence, MA 01843
978.794.1792
TheEngineeringCorp.com
Create | Design | Innovate

Project: King Street Commons
Location: 550 King Street, Littleton, MA 01460

Client: 550 King Street, LLC
Address: 290 Merrimack Street, Lawrence, MA 01843

Date: 12/21/2023 **Wetlands:** 150'+ **Zone II:** 310'+ **Soil Symbol:** 626B **Soil Name:** Merrimac-Urban land Complex **Soil Class:** A

Test Pit: TP-1 **Elevation:** 259.5

Depth	Soil Horizon	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Soil Texture	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0-48"	Fill	-	-	-	-	-	-	-	-	-	Pipes, bricks, stone curbs, and stones
48-102"	2C	10YR 5/4	-	-	-	Gravelly Sand	35	20	SG	Loose	-

Loamy
glaciofluvial
Parent Material: deposits **Depth to Bedrock:** - **Standing Water:** 96" **ESHW:** -

Additional Notes:

Test Pit Performed by: William Burnham, E.I.T.

Soil Evaluator Number: 14752



282 Merrimack Street, 2nd Floor
Lawrence, MA 01843
978.794.1792
TheEngineeringCorp.com
Create | Design | Innovate

Project: King Street Commons
Location: 550 King Street, Littleton, MA 01460

Client: 550 King Street, LLC
Address: 290 Merrimack Street, Lawrence, MA 01843

Date: 12/21/2023 **Wetlands:** 115'+ **Zone II:** 260'+ **Soil Symbol:** 626B **Soil Name:** Merrimac-
Urban land Complex **Soil Class:** A

Test Pit: TP-2 **Elevation:** 257

Depth	Soil Horizon	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Soil Texture	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0-48"	Fill	-	-	-	-	-	-	-	-	-	Gravel, Sand, Stones, and Ash
48-50"	Apb	10YR 2/1	-	-	-	Sandy Loam	5	-	Massive	Friable	-
50-57"	Bw	10YR 3/6	-	-	-	Sandy Loam	10	-	Massive	Friable	-
57-96"	2C	10YR 5/4	-	-	-	Gravely Sand	35	20	SG	Loose	Large Stones

Loamy
glaciofluvial
Parent Material: deposits **Depth to Bedrock:** - **Standing Water:** 93" **ESHWG:** -

Additional Notes:

Test Pit Performed by: William Burnham, E.I.T.

Soil Evaluator Number: 14752



282 Merrimack Street, 2nd Floor
Lawrence, MA 01843
978.794.1792
TheEngineeringCorp.com
Create | Design | Innovate

Project: King Street Commons
Location: 550 King Street, Littleton, MA 01460

Client: 550 King Street, LLC
Address: 290 Merrimack Street, Lawrence, MA 01843

Date: 12/21/2023 **Wetlands:** 135'+ **Zone II:** 200'+ **Soil Symbol:** 626B **Soil Name:** Merrimac-
Urban land
Complex **Soil Class:** A

Test Pit: TP-3 **Elevation:** 260.5

Depth	Soil Horizon	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Soil Texture	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0-8"	Fill 1	-	-	-	-	-	-	-	-	-	Topsoil material
8-108"	Fill 2	10YR 8/4	-	-	-	Sand	10	-	SG	Loose	See add. notes

Loamy
glaciofluvial
Parent Material: deposits **Depth to Bedrock:** - **Standing Water:** - **ESHWG:** Not encountered

Additional Notes: Sand (Fill 2) collapsing around excavation, with no water observed. Test pit located approximately 50' away from existing leach field.

Test Pit Performed by: William Burnham, E.I.T.

Soil Evaluator Number: 14752



282 Merrimack Street, 2nd Floor
Lawrence, MA 01843
978.794.1792
TheEngineeringCorp.com
Create | Design | Innovate

Project: King Street Commons
Location: 550 King Street, Littleton, MA 01460

Client: 550 King Street, LLC
Address: 290 Merrimack Street, Lawrence, MA 01843

Date: 12/21/2023 **Wetlands:** 190'+ **Zone II:** 180'+ **Soil Symbol:** 656 **Soil Name:** Udorthents- Urban land Complex **Soil Class:** -

Test Pit: TP-4 **Elevation:** 262

Depth	Soil Horizon	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Soil Texture	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0-42"	Fill 1	-	-	-	-	-	-	-	-	-	Topsoil material
42-102"	Fill 2	10YR 8/4	-	-	-	Sand	5	-	SG	Loose	See add. notes

Loamy
alluvium &
glaciofluvial

Parent Material: deposits **Depth to Bedrock:** - **Standing Water:** - **ESHWG:** Not encountered

Additional Notes: Sand (Fill 2) collapsing around excavation, with no water observed. Test pit located approximately 30' away from existing leach field.

Test Pit Performed by: William Burnham, E.I.T.

Soil Evaluator Number: 14752



282 Merrimack Street, 2nd Floor
Lawrence, MA 01843
978.794.1792
TheEngineeringCorp.com
Create | Design | Innovate

Project: King Street Commons
Location: 550 King Street, Littleton, MA 01460

Client: 550 King Street, LLC
Address: 290 Merrimack Street, Lawrence, MA 01843

Date: 12/21/2023 **Wetlands:** 235'+ **Zone II:** 180'+ **Soil Symbol:** 656 **Soil Name:** Udorthents- Urban land Complex **Soil Class:** -

Test Pit: TP-5 **Elevation:** 262

Depth	Soil Horizon	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Soil Texture	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0-10"	Fill 1	-	-	-	-	-	-	-	-	-	Topsoil material
10-102"	Fill 2	10YR 4/3	-	-	-	Sand	30	10	SG	Loose	Gravel, stones, bricks, and filter fabric

Loamy
alluvium &
glaciofluvial

Parent Material: deposits **Depth to Bedrock:** - **Standing Water:** - **ESHWG:** 72"

Additional Notes: Filter fabric present at 72", with water seeping at all sides of filter fabric "layer". Majority of fill 2 material comprised on sand material.
Test Pit Located approximately 100' from existing leach field.

Test Pit Performed by: William Burnham, E.I.T.

Soil Evaluator Number: 14752



282 Merrimack Street, 2nd Floor
Lawrence, MA 01843
978.794.1792
TheEngineeringCorp.com
Create | Design | Innovate

Project: King Street Commons
Location: 550 King Street, Littleton, MA 01460

Client: 550 King Street, LLC
Address: 290 Merrimack Street, Lawrence, MA 01843

Date: 12/21/2023 **Wetlands:** 350'+ **Zone II:** 500'+ **Soil Symbol:** 656 **Soil Name:** Udorthents- Urban land Complex **Soil Class:** -

Test Pit: TP-6 **Elevation:** 267.5

Depth	Soil Horizon	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Soil Texture	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0-25"	Fill	-	-	-	-	-	-	-	-	-	Topsoil material
25-29"	Apb	10YR 2/1	-	-	-	Loamy Sand	5	-	Massive	Friable	-
29-37"	Bw	10YR 3/6	-	-	-	Loamy Sand	10	5	Massive	Friable	-
37-78"	2C	10YR 5/4	60"	7.5YR 6/8	10	Gravely Sand	40	10	SG	Loose	Very Gravely

Loamy
alluvium &
glaciofluvial

Parent Material: deposits **Depth to Bedrock:** - **Standing Water:** 70" **ESHWG:** 60"

Additional Notes: Redoximorphic features present at 60"

Test Pit Performed by: William Burnham, E.I.T.

Soil Evaluator Number: 14752



282 Merrimack Street, 2nd Floor
Lawrence, MA 01843
978.794.1792
TheEngineeringCorp.com
Create | Design | Innovate

Project: King Street Commons
Location: 550 King Street, Littleton, MA 01460

Client: 550 King Street, LLC
Address: 290 Merrimack Street, Lawrence, MA 01843

Date: 12/21/2023 **Wetlands:** 720'+ **Zone II:** 800'+ **Soil Symbol:** 310B **Soil Name:** Woodbridge fine sandy loam **Soil Class:** C/D

Test Pit: TP-7 **Elevation:** 284

Depth	Soil Horizon	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Soil Texture	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0-114"	Fill	-	-	-	-	-	-	-	-	-	See add. notes

Parent Material: Coarse-loamy lodgement till **Depth to Bedrock:** - **Standing Water:** 112" **ESHWG:** -

Additional Notes: Fill material made up of topsoil, stones, brick, branches, trash, and gravel.

Test Pit Performed by: William Burnham, E.I.T.

Soil Evaluator Number: 14752



282 Merrimack Street, 2nd Floor
Lawrence, MA 01843
978.794.1792
TheEngineeringCorp.com
Create | Design | Innovate

Project: King Street Commons
Location: 550 King Street, Littleton, MA 01460

Client: 550 King Street, LLC
Address: 290 Merrimack Street, Lawrence, MA 01843

Date: 1/3/2024 **Wetlands:** 730'+ **Zone II:** 850'+ **Soil Symbol:** 310B **Soil Name:** loam **Soil Class:** C/D

Woodbridge
fine sandy

Test Pit: TP-8 **Elevation:** 280

Depth	Soil Horizon	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Soil Texture	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0-6"	Fill 1	-	-	-	-	-	-	-	-	-	Topsoil material
6-24"	Fill 2	-	-	-	-	-	-	-	-	-	Dense material
24-44"	Apb	10YR 2/1	-	-	-	Loamy Sand	10	-	Massive	Friable	See add. notes
44-52"	Bw	10YR 4/6	-	-	-	Gravely Sand	30	10	SG	Loose	-
52-120"	Cd	10YR 4/4	-	-	-	Gravely Sand	30	40	SG	Loose	-

Parent Material: Coarse-loamy lodgement till **Depth to Bedrock:** - **Standing Water:** - **ESHWG:** Not encountered

Additional Notes: No signs of redoximorphic features within test pit. Dense layer (Cd) contained large boulders/stones. Apb layer contained a mixture of "natural" A-layer soil with topsoil fill material (similar to Fill 1).

Test Pit Performed by: William Burnham, E.I.T.

Soil Evaluator Number: 14752



282 Merrimack Street, 2nd Floor
Lawrence, MA 01843
978.794.1792
TheEngineeringCorp.com
Create | Design | Innovate

Project: King Street Commons
Location: 550 King Street, Littleton, MA 01460

Client: 550 King Street, LLC
Address: 290 Merrimack Street, Lawrence, MA 01843

Date: 1/3/2024 **Wetlands:** 770'+ **Zone II:** 900'+ **Soil Symbol:** 310B **Soil Name:** loam **Soil Class:** C/D

Woodbridge
fine sandy

Test Pit: TP-9 **Elevation:** 279.5

Depth	Soil Horizon	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Soil Texture	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0-6"	Fill 1	-	-	-	-	-	-	-	-	-	Topsoil material
6-54"	Fill 2	-	-	-	-	-	-	-	-	-	See add. notes
54-102"	Cd	10YR 4/4	58"	10YR 8/3	50	Gravely Sand	50	30	SG	Loose	-

Parent Material: Coarse-loamy lodgement till **Depth to Bedrock:** 102" **Standing Water:** - **ESHWG:** 58"

Additional Notes: Fill 2 contained large boulders and dense material. Dense, bedrock-like material reached at 102". Large gray depletions observed between 58-64", with the color of the depletions noted above.

Test Pit Performed by: William Burnham, E.I.T.

Soil Evaluator Number: 14752



282 Merrimack Street, 2nd Floor
Lawrence, MA 01843
978.794.1792
TheEngineeringCorp.com
Create | Design | Innovate

Project: King Street Commons
Location: 550 King Street, Littleton, MA 01460

Client: 550 King Street, LLC
Address: 290 Merrimack Street, Lawrence, MA 01843

Date: 1/3/2024 **Wetlands:** 800'+ **Zone II:** 950'+ **Soil Symbol:** 310B **Soil Name:** Woodbridge fine sandy loam **Soil Class:** C/D

Test Pit: TP-10 **Elevation:** 277

Depth	Soil Horizon	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Soil Texture	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0-8"	Ap	10YR 2/2	-	-	-	Loamy Sand	10	-	Massive	Friable	-
8-30"	Bw	10YR 5/4	-	-	-	Loamy Sand	20	-	Massive	Friable	-
30-84"	C	10YR 6/3	42"	10YR 5/6	5	Sand	30	20	SG	Loose	See add. notes

Parent Material: Coarse-loamy lodgement till **Depth to Bedrock:** - **Standing Water:** - **ESHWG:** 42"

Additional Notes: C horizon contained gravel, fine sand, and cobbles/stones. Sand collapsing around bottom of test pit. Thin redoximorphic feature line observed within C horizon.

Test Pit Performed by: William Burnham, E.I.T.

Soil Evaluator Number: 14752



282 Merrimack Street, 2nd Floor
Lawrence, MA 01843
978.794.1792
TheEngineeringCorp.com
Create | Design | Innovate

Project: King Street Commons
Location: 550 King Street, Littleton, MA 01460

Client: 550 King Street, LLC
Address: 290 Merrimack Street, Lawrence, MA 01843

Date: 1/3/2024 **Wetlands:** 850'+ **Zone II:** 1000'+ **Soil Symbol:** 310B **Soil Name:** Woodbridge fine sandy loam **Soil Class:** C/D

Test Pit: TP-11 **Elevation:** 277

Depth	Soil Horizon	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Soil Texture	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0-6"	Fill 1	-	-	-	-	-	-	-	-	-	Topsoil material
6-36"	Fill 2	-	-	-	-	-	-	-	-	-	See add. notes
36-102"	Cd	10YR 6/3	42"	5YR 4/6	10	Gravelly Sand	40	30	SG	Loose	See add. notes

Parent Material: Coarse-loamy lodgement till **Depth to Bedrock:** 102" **Standing Water:** - **ESHWG:** 42"

Additional Notes: Fill 2 contained sandy fill with organics present. Cd horizon contained large stones, gravel, and sand. Dense material located across bottom of test pit, with sandy collapsing in at bottom of test pit. Small amounts of trash present within Fill 1 material.

Test Pit Performed by: William Burnham, E.I.T.

Soil Evaluator Number: 14752



282 Merrimack Street, 2nd Floor
Lawrence, MA 01843
978.794.1792
TheEngineeringCorp.com
Create | Design | Innovate

Project: King Street Commons
Location: 550 King Street, Littleton, MA 01460

Client: 550 King Street, LLC
Address: 290 Merrimack Street, Lawrence, MA 01843

Date: 12/21/2023 **Wetlands:** 910'+ **Zone II:** 930'+ **Soil Symbol:** 622C **Soil Name:** Paxton-Urban land complex **Soil Class:** C

Test Pit: TP-12 **Elevation:** 289.5

Depth	Soil Horizon	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Soil Texture	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0-24"	Fill	-	-	-	-	-	-	-	-	-	Topsoil material
24"-90"	Cd	10YR 5/4	-	-	-	Sandy Loam	50	20	Massive	friable	-

Coarse-loamy
Parent Material: lodgement till **Depth to Bedrock:** - **Standing Water:** 88" **ESHWG:** 46"

Additional Notes: TP-12 approximately 20' off parking lot corner, and 15' from fence line. Water observed seeping from sidewall at 46"

Test Pit Performed by: William Burnham, E.I.T.

Soil Evaluator Number: 14752



282 Merrimack Street, 2nd Floor
Lawrence, MA 01843
978.794.1792
TheEngineeringCorp.com
Create | Design | Innovate

Project: King Street Commons
Location: 550 King Street, Littleton, MA 01460

Client: 550 King Street, LLC
Address: 290 Merrimack Street, Lawrence, MA 01843

Date: 1/3/2024 **Wetlands:** 950'+ **Zone II:** 1000'+ **Soil Symbol:** 656 **Soil Name:** Complex **Soil Class:** -

Udorthents-
Urban land

Test Pit: TP-13 **Elevation:** 289

Depth	Soil Horizon	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Soil Texture	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0-10"	Fill	-	-	-	-	-	-	-	-	-	Topsoil Material
10-90"	Cd	2.5Y 4/2	-	-	-	Gravelly Sandy Loam	50	10	Massive	Firm	See add. notes

Loamy
alluvium &
glaciofluvial

Parent Material: deposits **Depth to Bedrock:** - **Standing Water:** - **ESHWG:** Not encountered

Additional Notes: Side slopes of test pit started to collapse at bottom of excavation. Cd horizon contained dense, gravel filled soil.

Test Pit Performed by: William Burnham, E.I.T.

Soil Evaluator Number: 14752



282 Merrimack Street, 2nd Floor
Lawrence, MA 01843
978.794.1792
TheEngineeringCorp.com
Create | Design | Innovate

Project: King Street Commons
Location: 550 King Street, Littleton, MA 01460

Client: 550 King Street, LLC
Address: 290 Merrimack Street, Lawrence, MA 01843

Date: 1/3/2024 **Wetlands:** 350'+ **Zone II:** 1000'+ **Soil Symbol:** 656 **Soil Name:** Complex **Soil Class:** -

Udorthents-
Urban land

Test Pit: TP-14 **Elevation:** 287.5

Depth	Soil Horizon	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Soil Texture	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0-14"	Fill 1	-	-	-	-	-	-	-	-	-	Topsoil material
14-36"	Fill 2	-	-	-	-	-	-	-	-	-	See add. notes
36-40"	Apb	10YR 2/2	-	-	-	Loamy Sand	5	-	Massive	Friable	-
40-108"	C	10YR 4/4	44"	5YR 5/8	10	Sand	20	5	SG	Loose	-

Loamy
alluvium &
glaciofluvial

Parent Material: deposits **Depth to Bedrock:** - **Standing Water:** - **ESHWG:** 44"

Additional Notes: Fill 2 contains organic material, trash, old pipes, and stones. Redoximorphic features observed just below the Apb horizon.

Test Pit Performed by: William Burnham, E.I.T.

Soil Evaluator Number: 14752



282 Merrimack Street, 2nd Floor
Lawrence, MA 01843
978.794.1792
TheEngineeringCorp.com
Create | Design | Innovate

Project: King Street Commons
Location: 550 King Street, Littleton, MA 01460

Client: 550 King Street, LLC
Address: 290 Merrimack Street, Lawrence, MA 01843

Date: 1/3/2024 **Wetlands:** 300'+ **Zone II:** 1000'+ **Soil Symbol:** 656 **Soil Name:** Complex **Soil Class:** -

Udorthents-
Urban land

Test Pit: TP-15 **Elevation:** 282

Depth	Soil Horizon	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Soil Texture	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0-12"	Ap	10YR 2/1	-	-	-	Loamy Sand	5	-	Massive	Friable	-
12-30"	Bw	7.5YR 4/6	-	-	-	Loamy Sand	10	-	Massive	Friable	-
30-84"	C	10YR 4/4	48"	5YR 4/6	5	Gravelly Sand	40	10	Massive	Friable	-

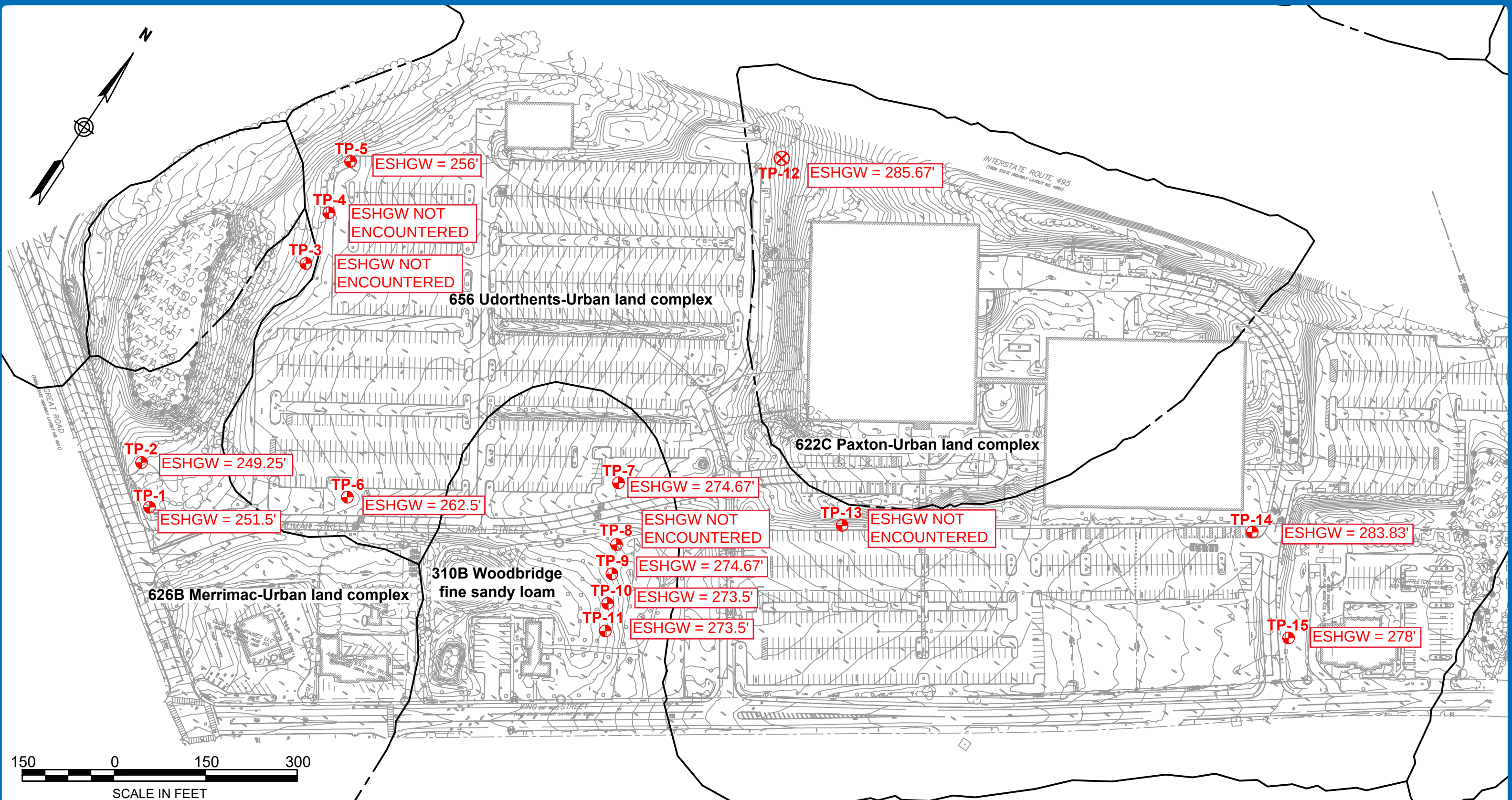
Loamy
alluvium &
glaciofluvial

Parent Material: deposits **Depth to Bedrock:** - **Standing Water:** 82" **ESHWG:** 48"

Additional Notes: Water was observed seeping at approximately 54".

Test Pit Performed by: William Burnham, E.I.T.

Soil Evaluator Number: 14752



NOTES:

- 1. TEST PITS SHALL BE CONDUCTED IN ACCORDANCE WITH THE MASSACHUSETTS STORMWATER HANDBOOK VOLUME 3 CHAPTER 1.

Test Pit Plan

King Street Commons
550 King Street
Littleton, Massachusetts
December 15, 2023