Stormwater Report

For

Autumn Hill Senior Village

FRANKLIN MA, 02038

Proposed Senior Village Development

January 26, 2024

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VOLUME 1 OF 1

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INTRODUCTION

This report presents a description along with supporting calculations for the stormwater runoff treatment and mitigation systems proposed for the senior village development as presented on a plan set entitled "Autumn Hill Senior Village Franklin, MA Site Plan" prepared by Legacy Engineering LLC with an original date of January 26, 2024. The development consists of 44 senior dwelling units.

EXISTING SITE

The proposed development lies on the easterly side of Summer Street in Franklin, totaling approximately 12.39 acres. The site predominately consists of woods, and borders Uncas Brook in the eastern corner.

SOILS

The soils conservation service maps (see Attachment H) indicate that the site is comprised of various soil types as follows:

Westerly Portions:

- Charlton Hollis (103C): A class B glacial soil.
- Hollis (104C): A class C soil.

Easterly Portions:

- Hollis (104D): An unclassified soil.

Soil testing conducted across the site indicated slightly different soils than the NRCS map. The northern and eastern portions of the site are comprised of class B soils with a small pocket of class D soils. The class D soils are due to the proximity of ledge to the surface. The western portion of the site is classified as class C.

GROUNDWATER CONDITIONS

On-site testing did not encounter groundwater in many of the test pits across the site. Where groundwater was encountered, it was usually within an inch or two of ledge. The only exception to this is at the front of the site at test pits 14 and 15, where groundwater was encountered 31" below the existing grade.

SOIL PERMEABILITY

For the purposes of this report and based on the soils present at the proposed stormwater infiltration facilities, Infiltration Basin #1 has an infiltration rate of 1.02 in/hr for sandy loam soils, while Infiltration Basins #2 & #3 have an infiltration rate of 2.41 for loamy sand soils.

FLOOD PLAIN

No portion of this site lies within a flood plain.

WETLAND PROTECTION ACT

The site borders Uncas Brook, however, no portion of the site to be developed lies within a wetland jurisdictional area.

PROPOSED DEVELOPMENT

The proposed construction consists of 13 multifamily residential buildings with a total of 42 units, along with all appurtenant driveways, landscaping, utilities, and stormwater management facilities. The two existing dwellings will remain on the site as the final 2 of the total 44 units.

MASSACHUSETTS STORMWATER MANAGEMENT STANDARDS

The stormwater management system design consists of a series of catch basins, manholes, and piping which collect runoff from the proposed development and the adjacent watersheds. These devices provide pretreatment prior to conveying stormwater into the various BMPs described herein. The stormwater management system is designed in accordance with the provisions of the DEP Stormwater Management Standards and Handbook, which are summarized below.

STANDARD 1 - New Stormwater Conveyances

No New Stormwater Conveyances (e.g. outfalls) May Discharge Untreated Stormwater Directly to or Cause Erosion in Wetlands or Waters of the Commonwealth. The proposed development complies with this standard.

The development includes two primary stormwater discharge points. Note the following:

- Design Point #1: Flow to Summer Street – In the existing condition, stormwater runoff flows uncontrolled to this design point from the existing dwellings (Units 1 & 16) and some forest area. In the proposed condition, the flow from the existing dwellings is largely unchanged. Concentrated flow from the development will be from overflow of Infiltration Basin #1. The facility outlet has been designed with a level spreader to dissipate the flow.

- Design Point #2: Flow to Uncas Brook – In the existing condition, runoff from wooded areas flows by sheet flow to the brook. In the proposed condition, runoff is collected into two infiltration facilities. The facility outlets have been designed with level spreaders to dissipate the flow before it reaches the wetlands. The undisturbed forest area between the development and the brook will further dissipate flows.

STANDARD 2 – Peak Discharge Rates

Stormwater Management Systems shall be designed so that the Post-Development Peak Discharge Rates do not Exceed Pre-Development Peak Discharge Rates. The proposed development complies with this standard.

In order to model pre and post peak discharges, a program called Hydrocad was used, which employs the TR-20 modeling system. The DEP Stormwater Management regulations require that the 2- and 10-year storms should be considered for peak rates and the 100-year storm for flooding considerations. The Town of Franklin additionally requires analysis of the 25-year storm for catch basins and related installations (although not for peak rate or volume calculations). The following theoretical storm events were used to model the site before and after the proposed activities occur[1]:

Design Storm	Rainfall
2-Year	3.36 inches
10-Year	5.22 inches
25-Year	6.37 inches
100-Year	8.15 inches

DESIGN POINT #1: Flow to Summer Street

Description of Existing Conditions: In the existing condition, Watershed E1 represents the uncontrolled runoff from the western portion of the site consisting of the existing dwellings and some woodland.

Description of Proposed Conditions: In the proposed condition, Watersheds P1a and P1b represent the runoff that is captured and infiltrated by Infiltration Basin #1. Watershed P1c represents the uncontrolled runoff to this design point.

[1] Rainfall depths are as specified by NOAA Atlas-14. Rainfall distribution is defined by the NRCC 24-hr, curve "D" storm type.

Summary of Peak Flow Rates to Design Point:

Design Storm (Year)	Peak Runoff Rate (cfs)		Volume of Runoff (ac-ft)	
	Existing	Proposed	Existing	Proposed
2	1.99	1.71	0.227	0.206
10	4.94	4.67	0.503	0.483
25	7.04	6.52	0.700	0.682
100	10.53	9.49	1.031	1.016

DESIGN POINT #2: Flow to Uncas Brook

Description of Existing Conditions: In the existing condition, Watershed E2 represents uncontrolled overland flow to Uncas Brook.

Description of Proposed Conditions: In the proposed condition, Watersheds P2a through P2g represent stormwater runoff that is captured and infiltrated by Infiltration Basin #2. Stormwater that is captured and infiltrated by Infiltration Basin #3 is represented by Watersheds P2h through P2l. Watersheds P2m and P2n represent the uncontrolled runoff that flows to the design point. This design point is further broken down into sub-design points to analyze the rate and volume of runoff to the northern abutter (which then flows to Uncas Brook).

Summary of Peak Flow Rates to Design Point:

Design Storm (Year)	Peak Runoff Rate (cfs)		Volume of Runoff (ac-ft)	
	Existing	Proposed	Existing	Proposed
2	1.50	1.13	0.304	0.221
10	8.05	6.88	0.949	0.850
25	13.31	11.16	1.459	1.353
100	22.51	21.35	2.360	2.267

In addition to the above analysis, this design point has also been split into two sub design points for the purpose of analyzing flows to the northern abutter at 486 Summer Street. The proposed design reduces both flow rate and volume to this abutter as shown in the table below.

Summary of Peak Flow Rates to the Northern Abutter (Sub-DP#2b):

Design Storm (Year)	Peak Runoff Rate (cfs)		Volume of Runoff (ac-ft)	
	Existing	Proposed	Existing	Proposed
2	0.49	0.26	0.112	0.038
10	3.04	0.96	0.364	0.102
25	5.12	2.12	0.565	0.189
100	8.78	7.60	0.922	0.438

STANDARD 3 - Loss of Annual Recharge

Loss of Annual Recharge to Groundwater shall be Eliminated or Minimized through the use of Environmentally Sensitive Site Design, Low Impact Development Techniques, Stormwater Best Management Practices, and Good Operation and Maintenance.

RECHARGE CALCULATIONS AND METHODS

The DEP Stormwater Management Standards typically require that a minimum volume of runoff (Required Recharge Volume, Rv) be recharged on the site based on soils conditions in accordance with the following table:

	Class A Soils	Class B Soils	Class C Soils	Class D Soils
Runoff Depth (d) to be Recharged	d = 0.60 inches	d = 0.35 inches	d = 0.25 inches	d = 0.10 inches

The Required Recharge Volume is calculated by multiplying the runoff depth to be recharged (d) for each soils class by the amount of impervious coverage (on the site) under the proposed condition.

STORMWATER INFILTRATION BASIN #1

Recharge required (Rv)=(Impervious coverage)*(depth to be recharged)

	Class A Soils	Class B Soils	Class C Soils	Class D Soils
On-Site Impervious Area	0 s.f.	0 s.f.	6,027 s.f.	0 s.f.
Required Recharge Volume (Rv)	0 c.f.	0 c.f.	126 c.f.	0 c.f.
Total Rv	126 c.f.			

Standard 3 requires that infiltration facilities be provided and sized in accordance with three acceptable methods; 1) the Static Method, 2) The Simple Dynamic Method, and 3) the Dynamic Field Method. Each method is summarized below.

Static Method: The Static Method simply requires that the proposed recharge facility contain a total raw volume (adjusted for void space if stone is used within the storage volume) equal to or greater than the Required Recharge Volume.

Simple Dynamic Method: The Simple Dynamic method allows for a very conservative inclusion of some of the recharge which occurs within the infiltration facility during the design storm in accordance with the following formula:

V – kTA = V′

Where

V is the Required Recharge Volume. If the infiltration facility also treats the Water Quality Volume, the greater of the two values is used.

k is the saturated hydraulic conductivity determined by the Rawls Rate (Table 2.3.3 of Volume 3, Chapter 1 of the Stormwater Handbook)

T is the allowable drawdown during the peak of the storm = 2 hours for this method

A is the basin bottom area

V′ is the minimum required storage volume of the infiltration facility when including 2 hours of recharge

This method allows the designer to include two hours of ongoing recharge during the design storm using a permeability rate (saturated hydraulic conductivity) selected based on the classification of the soil under the infiltration facility.

Dynamic Field Method: The Dynamic Field Method uses a more aggressive inclusion of on-going recharge from an infiltration facility during the design storm. This method is calculated using rainfall routing software (Hydrocad) and a truncated hydrograph which assumes that the Required Recharge Volume is loaded to the infiltration facility during a 12 hour period. For this method the design permeability rate must be based on in-situ permeability testing with a safety factor of 50% applied to the actual rate found.

For this infiltration facility, the Simple Dynamic Method has been utilized, which allows for 2 hours of ongoing recharge during the design storm. The required storage volume is calculated using the following values:

V – kTA = V′

Where:

V = 502 cubic feet (WQV)

K = 1.02 inches per hour = 0.085 feet per hour

T = 2 Hours

A = 1,424 square feet

502 c.f. – 0.085 in/hr * 2 hr * 1,424 s.f. = 260 c.f.

The infiltration basin has a storage volume of 438 c.f., which meets this requirement.

A secondary check is required to ensure that the Rv will recharge within at least 72 hours. A K value of 1.02 is used for drawdown design purposes since soils testing found sandy loam soils at this location. Using the following formula, the drawdown time is calculated:

$\text{Time}_{drawdown}$ = [WQV/(K x Bottom Area)]

Where:
WQV = 502 c.f.
K = 1.02 inches per hour = 0.085 feet per hour
Bottom Area = 1,424 s.f.

It is concluded that the drawdown time for the infiltrated volume is 4.1 hours, which satisfies this requirement.

Mounding Analysis:

A mounding analysis has been conducted and can be found in attachment L. The bottom of Infiltration Basin #1 is at elevation 411.2, with a seasonal high groundwater elevation below the basin at 408.8. The mound for the infiltration of the WQV of this basin is 1.2 feet.

STORMWATER INFILTRATION BASIN #2

Recharge required (Rv)=(Impervious coverage)*(depth to be recharged)

	Class A Soils	Class B Soils	Class C Soils	Class D Soils
On-Site Impervious Area	0 s.f.	37,400 s.f.	4,344 s.f.	3,121 s.f.
Required Recharge Volume (Rv)	0 c.f.	1,091 c.f.	91 c.f.	26 c.f.
Total Rv	1,207 c.f.			

For this infiltration facility, the Simple Dynamic Method has been utilized, which allows for 2 hours of ongoing recharge during the design storm. The required storage volume is calculated using the following values:
V – kTA = V'
Where:
V = 3,739 cubic feet (WQV)
K = 2.41 inches per hour = 0.201 feet per hour
T = 2 Hours

A = 4,363 square feet
3,739 c.f. – 0.20 in/hr * 2 hr * 4,363 s.f. = 1,986 c.f.

The infiltration basin has a storage volume of 2,200 c.f., which meets this requirement.

A secondary check is required to ensure that the Rv will recharge within at least 72 hours. A K value of 2.41 is used for drawdown design purposes since soils testing found loamy sand soils at this location. Using the following formula, the drawdown time is calculated:

$\text{Time}_{drawdown}$ = [WQV/(K x Bottom Area)]

Where:
WQV= 3,739 c.f.
K = 2.41 inches per hour = 0.201 feet per hour
Bottom Area = 4,363 s.f.

It is concluded that the drawdown time for the infiltrated volume is 4.3 hours, which satisfies this requirement.

Mounding Analysis:

Based on soils testing in the basin, seasonal high groundwater under the infiltration basin was not found to a depth of 371.4. With a proposed bottom elevation of 376.0, the proposed basin lies more than 4 feet above seasonal high groundwater. Thus, a mounding analysis is not required.

STORMWATER INFILTRATION BASIN #3

Recharge required (Rv)=(Impervious coverage)*(depth to be recharged)

	Class A Soils	Class B Soils	Class C Soils	Class D Soils
On-Site Impervious Area	0 s.f.	51,208 s.f.	0 s.f.	0 s.f.
Required Recharge Volume (Rv)	0 c.f.	1,494 c.f.	0 c.f.	0 c.f.
Total Rv	1,494 c.f.			

For this infiltration facility, the Simple Dynamic Method has been utilized, which allows for 2 hours of ongoing recharge during the design storm. The required storage volume is calculated using the following values:
V – kTA = V'
Where:

V = 4,267 cubic feet
K = 2.41 inches per hour = 0.201 feet per hour
T = 2 Hours
A = 3,755 s.f. * 40% voids = 1,502 s.f
4,267 c.f. – 0.201 in/hr * 2 hr * 1,502 s.f. = 3,664 c.f.
The infiltration basin has a storage volume of 3,900 c.f., which meets this requirement.

A secondary check is required to ensure that the Rv will recharge within at least 72 hours. A K value of 2.41 is used for drawdown design purposes since soils testing found sandy soils at this location. Using the following formula, the drawdown time is calculated:

$Time_{drawdown}$ = [Rv/(K x Bottom Area)]

Where:
WQV= 4,267 c.f.
K = 2.41 inches per hour = 0.201 feet per hour
Bottom Area = 1,502 s.f.

It is concluded that the drawdown time for the infiltrated volume is 14.1 hours, which satisfies this requirement.

Mounding Analysis:

Based on soils testing in the basin, seasonal high groundwater under the infiltration basin was not found to a depth of 374.0. With a proposed bottom elevation of 378.0, the proposed basin lies more than 4 feet above seasonal high groundwater. Thus, a mounding analysis is not required.

Capture Area Adjustment: All impervious surfaces are routed through infiltration BMPs except for some roof area, a portion of the beginning of the driveway, and the existing dwellings. A capture area adjustment is provided as follows:

- Total Proposed On-Site Impervious Coverage: 130,260 s.f.
- Treated Impervious Coverage: 102,100 s.f.
- Percent to Infiltration BMP: 78.4%
- Ratio: 1.28
- *Capture Area Adjusted Rv: 3,606 c.f.*

The total Rv treated between all infiltration facilities is 6,538 c.f., which greatly exceeds the required recharge volume.

STANDARD 4 - TSS Removal

Stormwater Management Systems shall be Designed to Remove 80% of Average Annual Post-Construction Load of Total Suspended Solids (TSS). This standard is met when:

a) A long-term pollution prevention plan is provided and implemented as required (refer to Attachment A),
b) Structural stormwater BMP's are provided as required, and
c) Pretreatment is provided as required.

The proposed stormwater management system has been designed to provide a series of Best Management Practices in accordance with the Stormwater Management Policy to remove the pollutants found in runoff as described below for each drainage sub-system.

WATER QUALITY VOLUME (WQV)

The Water Quality Volume represents the volume of water which must receive TSS removal treatment in order to comply with Standard 4. The water quality volume is calculated based on either 0.5 inches of runoff or 1.0 inches of runoff from all impervious surfaces on the site. 0.5 inches is used except in sensitive locations as described in the Stormwater Handbook. The Town of Franklin however requires that all new construction treat 1" of all impervious runoff. The total WQV for the site is split amongst the various BMP treatment trains as described below (or may not apply if the specific BMP's utilized do not use it as a sizing criteria). Using the following formula, the WQV is calculated:

WQV=(Proposed Impervious Area)*(1 in.)
WQV=(102,100 sq. ft.)*(1 in.)/(12 in/ft)=8,508 c.f.

As a partial redevelopment, the development is required to meet these requirements to the maximum extent practicable. The existing houses and associated impervious are not included in the calculations of this section as it is not practicable to capture and treat this runoff.

The section below demonstrates compliance with the WQV treatment requirements for each treatment facility.

PROPOSED BMP DESIGN

Deep Sump Catch Basins/First Defense Units:

All proposed deep sump catch basins have 4' sumps with hoods designed in accordance with the DEP Stormwater Handbook. Each structure represents one of the pretreatment BMP's in each treatment train and provides a 25% TSS removal credit. First defense units provide 80% TSS removal, information for which can be found in attachment N. Each 4′ diameter unit is capable of treating 1.5 cubic feet per second of runoff.

Infiltration Basins #1 & #3 are pretreated with a First Defense Units capable of treating the first 1″ of stormwater runoff. The flows to each of these units during a 1″ storm are as follows:

- FD 0+79 & FD A: 0.10 cfs
- FD B: 0.70 cfs

These flows are all within the 1.5 cfs treatment limit. HydroCAD calculations for these values can be found in Attachment N.

Sediment Forebay

In accordance with the DEP Handbook, a forebay is sized to hold 0.1″ of runoff from its tributary impervious area.

For Stormwater Infiltration Basin #1, the tributary impervious area is 6,027 s.f. and the minimum forebay volume is 50 cubic feet. With the water trapped behind the 6″ high checkdams at the piped outlets, the designed forebays will each contain 50 cubic feet as a conservative measure, meeting the requirement.

For Stormwater Infiltration Basin #3, the tributary impervious area is 51,208 s.f. and the minimum forebay volume is 427 cubic feet. With the water trapped behind the 6″ high checkdam at the piped outlet, the designed forebay will contain 427 cubic feet, meeting the requirement.

Stormwater Infiltration Basin:

Infiltration Basin#1:
The basin is designed with a total depth of 2.8 feet. Trapped infiltration water reaches a maximum depth of 0.3 feet (elevation of lowest basin outlet) and the maximum water level in the 100-year storm event is 1.61 feet, leaving 1.19 feet of freeboard.

Infiltration Basin#2:
The basin is designed with a total depth of 3.5 feet. Trapped infiltration water reaches a maximum depth of 0.5 feet (elevation of lowest basin outlet) and the maximum water level in the 100-year storm event is 2.30 feet, leaving 1.20 feet of freeboard.

Infiltration Basin#3:

The basin is designed with a depth of 4 feet along with additional stone storage below. Trapped infiltration water reaches a maximum depth of 0.5 feet (elevation of lowest basin outlet, not including stone storage) and the maximum water level in the 100-year storm event is 2.80 feet, leaving 1.20 feet of freeboard.

Infiltration Basins provide 80% TSS removal when including a pretreatment facility.

De Minimis Discharges

<u>Design Point #1</u>

The total proposed impervious runoff to Design Point #1 is 6,877 s.f. Of this, 850 s.f. of impervious surface is not treated. The untreated runoff meets the following requirements to be counted as De Minimis:

- Physical site constraints preclude installation of TSS treatment devices;
- Discharge from the impervious areas are less than 1 cfs in the 2-year storm;
- An average of at least 80% TSS removal is achieved for the site as a whole
    - The calculations are as follows:
      Treated Impervious Area: 6,027 s.f. @ 96% TSS removal
      Untreated Impervious Area: 850 s.f. @ 0% TSS removal

$$\frac{A*TSS}{\text{Total Area}} \qquad \frac{6{,}027 \text{ s.f.} * 0.960 + 850 \text{ s.f.} * 0}{6{,}877} = 84.1\%$$

- The stormwater in the previous calculation all discharges to the same design point;
- Erosion controls are placed at all outlets;
- Standards 2 and 3 are met;
- Pollution prevention measures are included in the SWPPP; and
- The untreated area of runoff has been reduced as much as is practicable.

<u>Design Point #2</u>

The total proposed impervious runoff to Design Point #2 is 105,744 s.f. Of this, 9,418 s.f. of impervious surface is not treated. The untreated runoff meets the following requirements to be counted as De Minimis:

- Physical site constraints preclude installation of TSS treatment devices;
- Discharge from the impervious areas are less than 1 cfs in the 2-year storm;
- An average of at least 80% TSS removal is achieved for the site as a whole
    - The calculations are as follows:
      Treated by Basin #2: 44,865 s.f. @ 96% TSS removal
      Treated by Basin #3: 51,208 s.f. @ 80% TSS removal

Untreated Impervious Area: 9,671 s.f. @ 0% TSS removal

A*TSS 44,865 s.f. * 0.96 + 51,208 s.f. * 0.80 * 9,671 s.f. * 0 = 80.9%
Total Area 105,744

- The stormwater in the previous calculation all discharges to the same design point;
- Erosion controls are placed at all outlets;
- Standards 2 and 3 are met;
- Pollution prevention measures are included in the SWPPP; and
- The untreated area of runoff has been reduced as much as is practicable.

TSS REMOVAL CALCULATIONS

In accordance with the DEP Stormwater Management Handbook, each of the drainage treatment trains has been analyzed for TSS removal. The required TSS removal calculation sheets are included in Attachment E and the following sections provide a narrative discussion of each.

Infiltration Basins:

Infiltration Basin #1 is preceded by a sediment forebay and First Defense Unit. When including one pretreatment device, the basin itself provides 80% TSS removal for a total TSS removal of 96% for this treatment train.

Infiltration Basin #2 is preceded by deep sump catch basins. When including one pretreatment device, the basin itself provides 80% removal for a total TSS removal of 80% TSS for this treatment train.

Infiltration Basin #3 is preceded by deep sump catch basins, a First Defense unit, and a sediment forebay. When including one pretreatment device, the basin itself provides 80% TSS removal for a total TSS removal of 97% for this treatment train.

STANDARD 5 - Land Uses with Higher Potential Pollutant Loads

For land uses with higher potential pollutant loads, source control and pollution prevention shall be implemented in accordance with the Massachusetts Stormwater Handbook to eliminate or reduce the discharge of stormwater runoff from such land uses to the maximum extent practicable. If, through source control and/or pollution prevention, all land uses with higher potential pollutant load cannot be completely protected from exposure to rain, snow, snow melt and stormwater runoff, the proponent shall use the specific structural stormwater BMP's determined by the Department to be suitable for such uses as provided in the Massachusetts Stormwater Handbook. Stormwater discharges from land uses with higher potential *pollutant loads shall also comply with the requirements of the Massachusetts Clean Waters Act, M.G.L. c. 21, §§ 26-53 and the regulations promulgated thereunder at 314 CMR 3.00, 314 CMR 4.00 and 314 CMR 5.00.*

This development is not a Land Use with Higher Potential Pollutant Loads.

STANDARD 6 – Critical Areas

Stormwater discharges within the Zone II or Interim Wellhead Protection Area of a public water supply and stormwater discharge near or to any other critical area requires the use of the specific source control and pollution prevention measures and the specific structural stormwater best management practices determined by the Department to be suitable for managing discharges to such area, as provided in the Massachusetts Stormwater Handbook. A discharge is near a critical area if there is a strong likelihood of a significant impact occurring to said area, taking into account site-specific factors. Stormwater discharges to Outstanding Resource Waters and Special Resource Waters shall be removed and set back from the receiving water or wetland and receive the highest and best practical method of treatment. A "stormwater discharge" as defined in 314 CMR 3.04(2)(a)1 or (b) to an Outstanding Resource Water or Special Resource Water shall comply with 314 CMR 3.00 and 314 CMR 4.00. Stormwater discharges to a Zone 1 or Zone A are prohibited unless essential to the operation of the public water supply.

This site does not lie within or discharge to a critical area.

STANDARD 7 - Redevelopment

A redevelopment project is required to meet the following Stormwater Management Standards only to the maximum extent practicable: Standard 2, Standard 3, and the pretreatment and structures stormwater best management practice requirements of Standards 4, 5, and 6. Existing stormwater discharges shall comply with Standard 1 only to the maximum extent practicable. A redevelopment project shall also comply with all other requirements of the Stormwater Management Standards and improve existing conditions.

The site contains two existing dwellings which are not proposed to be altered. These dwellings and the surrounding yard are considered redevelopment areas and are required to meet these standards only to the maximum extent practicable.

Only Standard 4 is not met for the existing impervious surfaces. It is not practicable to construct additional stormwater treatment facilities to capture and treat the runoff from these existing structures.

STANDARD 8 – Erosion Control

A plan to control construction-related impacts, including erosion, sedimentation, and other pollutant sources during construction and land disturbance activities (construction period erosion, sedimentation, and pollution prevention plan) shall be developed and implemented.

A construction activity NPDES Stormwater Pollution Prevention Plan has been prepared and included as Attachment D.

STANDARD 9 – Long-Term Operations and Maintenance Plan

A Long-Term Operations and Maintenance (O&M) Plan shall be developed and implemented to ensure that stormwater management systems function as designed.

A Drainage System Operations and Maintenance Plan has been prepared and included as Attachment A.

STANDARD 10 – Illicit Discharge Compliance

All illicit discharges to the stormwater management system are prohibited.

See Attachment C for the Illicit Discharge Compliance Statement.

ATTACHMENT A: Operations and Maintenance Plan

Operations & Maintenance Plan

For

Autumn Hill Senior Village

FRANKLIN MA, 02038

Proposed Senior Village Development

January 26, 2024

PREPARED BY:
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INTRODUCTION

This Operations and Maintenance Plan (hereinafter referred to "O&M Plan") is provided to ensure the long-term monitoring and maintenance of various components of the development's infrastructure. This O&M Plan includes the following provisions:

1. Stormwater System Operations and Maintenance
2. Integrated Pest Management Plan
3. Miscellaneous Provisions
4. Accidental Spill and Emergency Response Plan

The "Development" and the various components which are referenced in this O&M Plan are described on the site plan referenced below.

Project Name

Autumn Hill Senior Village

Project Location

496 Summer Street
Franklin, MA 02038

Operator Name and Address

Suejo Corp.
P.O. Box 934
Wrentham, MA 02093

References

This O&M Plan references other documents as follows:

Site Plan - Plans entitled "Autumn Hill Senior Village Franklin, MA" with an original date of January 26, 2024 (as may be amended), and prepared by Legacy Engineering LLC, hereinafter referred to as the "Site Plan".

Stormwater Report – Report entitled "Stormwater Report for Autumn Hill Senior Village" prepared by Legacy Engineering LLC with an original date of January 26, 2024 (as may be amended).

Site Description

The site is a senior village development consisting of 44 residential buildings located on 12.39 acres of land on Summer Street in Franklin and includes all appurtenant utility systems, landscape areas, and stormwater management systems. Those land areas are collectively referred to herein as the "Development."

Site Usage and Activities

Mullti-family senior residential buildings and associated appurtenances.

PART 1: STORMWATER SYSTEM OPERATIONS AND MAINTENANCE

In order to maximize the continued effectiveness of the Stormwater Management BMP's for the development, the following Operation and Maintenance requirements apply to all stormwater facilities within the extents of the Development. The stormwater facilities are depicted on the Site Plan and are hereinafter referred to as the "Stormwater Facilities."

Operations and Maintenance Responsibilities

The Operator or its designee shall be responsible for implementing all Operations and Maintenance (O&M) responsibilities.

Commencement of Operations and Maintenance Responsibilities

Operations and Maintenance tasks shall be commenced once each respective Stormwater Facility is fully constructed and is receiving runoff from the Development.

Operations and Maintenance Tasks

Deep Sump Catch Basins:

1. Deep sump catch basins shall be inspected daily during construction activities and all sediments and debris shall be removed four times per year unless the owner can determine through recorded observations that sediment accumulation does not warrant such frequent cleanings. If deep sump catch basin cleaning occurs less than four times per year, cleaning shall occur when two feet of sediments have accumulated in the sump and at least once per year.
2. Silt sacks shall be installed on all catch basins throughout the time of construction.
3. All sediments and hydrocarbons shall be disposed of off-site in accordance with all applicable local, state, and federal regulations.

Sediment Forebays:

1. Sediment forebays shall be inspected at least four times per year to insure proper operation (during a storm event).
2. Sediment forebays should be mowed and all clippings and debris removed at least twice per year. Debris shall be removed at more frequent intervals if warranted by extreme weather events.
3. Sediment should be removed when 3-inches of sediment accumulates anywhere in the forebay.
4. Remove woody vegetation, leaves, and other materials that would affect the life of the system or its operations.

Stormwater Infiltration Basin:

1. Stormwater basins shall be inspected at least twice per year to insure proper operation (during a storm event).
2. Inspections shall include ensuring that inlet, outlet, and splash pad rip-rap aprons are in good condition and that that interior wall systems are in good condition. Deficiencies shall be remedied immediately.
3. Inspections shall include an observation of the accumulation of sediment in the basin. Pretreatment BMPs are intended to capture and contain coarse sediments. Should indication of significant accumulation of sediments in the infiltration basin be observed, increased frequency of cleaning of the preceding sediment forebay and catch basins shall be implemented.
4. Inspections shall include ensuring that outlet structures are unobstructed and free-flowing per the Site Plan design specifications.
5. Inspections shall include ensuring that all berms are fully stabilized, structurally sound and not eroded. Deficiencies shall be remedied immediately.
6. Stormwater basins should be mowed and all clippings and debris removed at least twice per year. Debris shall be removed at more frequent intervals if warranted by extreme weather events. If wetland vegetation grows at the bottom of the stormwater basin, it shall only be mowed once per year at the beginning of the winter season.
7. Sediment should be removed at least once every 5 years or when 2-inches of sediment accumulates anywhere in the basin and disposed of off-site in accordance with all applicable local, state, and federal regulations. Two sedimentation markers shall be installed in the basin by a Registered Land Surveyors with a clear marking of the 2-inch accumulation line. It is recommended that stone bounds be installed with chiseled marks indicating the limit of accumulation, although other similarly permanent marking methods may be utilized.

Stormwater Treatment Units (shown on the Site Plan as "First Defense Units"): (maintenance tasks and frequency from manufacturer published data)

1. Stormwater Treatment units shall be inspected twice per year. Sediments and floating debris and petroleum products shall be removed with a vacuum truck when either the sediment depth reaches 6-inches or the floating depth of petroleum products reaches 3-inches. Sediment and floating debris removal shall occur at least once per year unless the Operator can demonstrate that sediment/floating debris accumulation does not achieve the thresholds noted above within a typical year. The Operator shall submit an analysis by a Registered Professional Engineer to the Planning Board explaining the basis for more infrequent cleaning.
2. All sediments and hydrocarbons shall be disposed of off-site in accordance with all applicable local, state, and federal regulations.

Stormwater Pipes, Inlets and Outfalls:

1. All stormwater inlets and outfalls shall be inspected twice per year.
2. Trash, leaves, debris and sediment shall be removed from inlets and outfalls as needed to keep them free flowing.

3. If inspections indicate that stormwater pipelines have become partially obstructed with trash, leaves, debris or sediment, the pipelines shall be cleaned by water jet truck and the obstructions removed and disposed of.

The various operations and maintenance schedule requirements listed above may be reduced in frequency by approval from the Town. Should such permission be desired, the Operator shall provide documentation of actual on-site maintenance observations by a qualified source (engineer or other qualified person meeting the approval of the Town) demonstrating that the particular Stormwater BMP in question does not warrant the specified frequency of inspection or maintenance activities.

Reporting Requirements

The following documentation shall be submitted no later than December 31st of each calendar year to the Town:

1. A statement, signed by an authorized representative of the Operator indicating that the requirements of this O&M Plan were performed during the previous calendar year. Where requirements were not met, a schedule for their completion shall be provided and a follow-up statement submitted when complete.
2. A list of the maintenance activities performed along with the approximate date of the work.
3. A list of the inspections performed along with a statement by each inspector summarizing the results of the inspections performed in accordance with this O&M plan.
4. Copies of appurtenant documentation supporting the completion of the O&M responsibilities such as copies of contracts and/or receipts with parties engaged to perform maintenance and inspection services.
5. A notation regarding whether there has been any change in the name and or contact information for the Operator.

Public Safety Features

The stormwater system has been designed to safely collect surface runoff from developed areas (as described on the Site Plan and Stormwater Report) by providing collections systems at regular intervals to prevent surface flooding and to treat that runoff in accordance with the provisions of the Massachusetts Stormwater Management Standards and Handbook.

PART 2: INTEGRATED PEST MANAGEMENT PLAN

Applicability

The Development shall adhere to this IPM in perpetuity, unless the conservation Commission releases the Operator from this obligation in writing.

Lawn Preparation and Installation

The following methods shall be employed for all lawn installation and replacements.

- Topsoil installed in lawn areas shall be installed to a minimum thickness of 4-inches. Installation shall be in a manner that minimizes compaction of the topsoil. Topsoil should include a minimum organic content of 18% in the top 4-inches. In areas where existing topsoil is limited or non-existent due to bedrock or hardpan, 6-24 inches of sandy loam topsoil should be spread with a minimum 18% organic content in the top 6-inches.
- Topsoil shall be tested for pH, organic content and mineral content including calcium, magnesium, potassium and sodium at the time of installation and supplements shall be added as recommended. Lime shall be added at the rates recommended by the soil test lab to bring topsoil pH within recommended levels.
- Seeding shall include at least three of the following turf types: Fine Fescue, Kentucky Bluegrass, Perennial Rye Grass, and Tall Fescue.
- Fertilizer application at the time of seeding shall not exceed 0.5 pounds per 1,000 square feet and shall be either organic or mineral.
- During the period of turf establishment (1-2 seasons after seeding), up to two broadleaf weed control applications per year may be applied to the entire lawn area to encourage the establishment of the turf and prevent weed infestations.

Mechanical Lawn Care Standards

The following maintenance guidelines shall be generally applied to lawn care, although specific adherence to every standard is not necessary. Adherence to these mechanical lawn care standards will encourage the development of a thick, dense, and healthy turf system which will ultimately result in fewer Lawn Care Treatment requirements.

- Lawn cutting height should be adjusted according to the season using the following as guidance:
    - May – June: 2.5″ Cut Height
    - July – August: 3-3.5″ Cut Height
    - September: 2.5-3″ Cut Height
    - October – November: 2″ Cut Height
- Lawn mowing should be at sufficient frequency such that not more than 1/3 of the leaf blade height is cut off.
- Aerate the lawn generally once per year in the mid-summer to mid-fall period. A second aeration in the spring may be appropriate for compact soils conditions.
- Dethatching is generally not necessary unless the thatch layer exceed ¾″.

Core Lawn Care Treatment Program

Each lawn shall adhere to the following lawn care practices and restrictions:

- A soil test shall be conducted at least once every two years to evaluate topsoil pH level and the necessary application of lime will be made to bring soil pH within recommended levels. Recommended topsoil pH levels are between 6.5 and 6.8. Soils testing shall also include organic content, mineral content, including calcium, magnesium, potassium and sodium, total cation exchange capacity, and hydrogen. Ideal base saturation percentages for these parameters are as follows:
  - Calcium: 68-70%
  - Magnesium: 15-20%
  - Potassium: 4.5-6%
  - Sodium: <3%
  - Other Bases: 4-8%
  - Hydrogen: 5-10%
- Fertilizer application shall be as-needed based on the results of the latest soils test, plant health, rooting characteristics, growth rate desired, and season. Fertilizer application shall not exceed five times per calendar year and the total quantity of fertilizer applied in any given year shall not result in the application of more than three pounds of nitrogen per 1,000 square feet with not more than one pound of nitrogen applied per 1,000 square feet in any single application. Nitrogen, in the form of fertilizer, should generally be applied in small increments to avoid nitrate leachate and runoff, undesired sprits in growth, and increase in pest population. Granular organic and/or organic/synthetic slow release fertilizers shall be used. The optimal use of fertilizers is to create an organic foundation for soil health and development which provides sufficient nutrients for controlled plant growth and avoiding subsurface and surface nutrient loss to groundwater or stormwater runoff.
- Except as noted below, only one application of crab-grass prevention product is permitted per year during March or April, and only in portions of the lawn in full sun which are prone to such infestations. The use of corn gluton (organic crab-grass control method) is permitted twice per year.
- At the time of fertilizer application, any accidental spillage onto impervious surfaces such as driveways, walkways, patios, and streets shall be swept up and either applied to the lawn or removed from the site.

Optional Maintenance Practices to be Applied as Needed

- Where topsoil testing demonstrates a deficiency, mineral or organic micro-nutrients may be added to achieve recommended levels.
- Generally, chemical pesticides should be used as a final option and the minimum amount necessary to achieve the desired result should be used. Non chemical means of pest control should be tried first. In the event of suspected pest problem, a visual inspection shall first be made by qualified personnel to confirm the presence of stressed vegetation, wildlife activity, pathogens, and other similar indicators. Should a pest problem be identified, the condition shall be monitored periodically such that if the problem subsides, treatment methods can stop as soon as possible thereafter.
- Root bio-stimulants from organic sources (examples include Roots, Organica, or PHC type products, which are brand names and which may change depending on market conditions) may be used as needed.
- Compost topdressing (1/8″ – ¼″ depth) may be applied as needed.

- Spot treatment of weeds and Crabgrass may be implemented at any time as needed, but only on a spot-treatment basis and only to those areas affected.
- Spot treatment for turf disease may be implemented at any time as needed, but only one a spot-treatment basis and only to those areas affected.
- Grub control products and similar products may be applied to localized areas only where grub activity is evident. Grub control may be applied when grub populations reach an average of 8 -10 grubs per square foot or if the plant/lawns are showing signs of stress from grub activity.
- One application of Imidacloprid (Merit) or similar products per year is permitted during June and July in areas where grub activity has historically occurred.
- Pesticides which are classified for Restricted Use pursuant to 333 CMR may only be applied by properly licensed or certified personnel or by individuals under the direct on-site supervision of properly licensed or certified personnel in accordance with 333 CMR.

PART 3: MISCELLANEOUS PROVISIONS

Good Housekeeping Controls

The following good housekeeping measures will be implemented in the day-to-day operation of the Development:

1. The site will be maintained in a neat and orderly manner.
2. Fertilizers and pesticide application shall be in accordance with manufacturer recommendations.
3. All waste materials from the development will be collected in dumpsters and removed from the site by properly licensed disposal companies.

Management of Deicing Chemicals and Snow

Management of on-site snow will be as follows:

1. The site shall be plowed as needed to maintain safe driving conditions. Snow will be stored in windrows along pavement edges and shall be piled in landscape strips as needed.
2. Snow will not be plowed into piles which block or obstruct stormwater management facilities.
3. Snow will not be plowed into piles at roadway intersections such that it would obstruct visibility for entering or exiting vehicles.
4. Deicing chemicals application will be as little as possible while provide a safe environment for vehicular operation and function.
5. At such time as snow accumulations exceed the capacity of on-site storage areas, such excess snow shall be removed from the site and disposed of in accordance with state, local, and federal laws and regulations.

Operator Training

The Operator is responsible for providing training for the staff that will be responsible for the implementation of this O&M Plan. Such training shall occur at least once annually.

Illicit Discharges

The Operator shall not allow non-stormwater discharges into the development's stormwater system. Any discovered non-stormwater discharges into the development's stormwater system shall be immediately disconnected.

Estimated Operations and Maintenance Budget

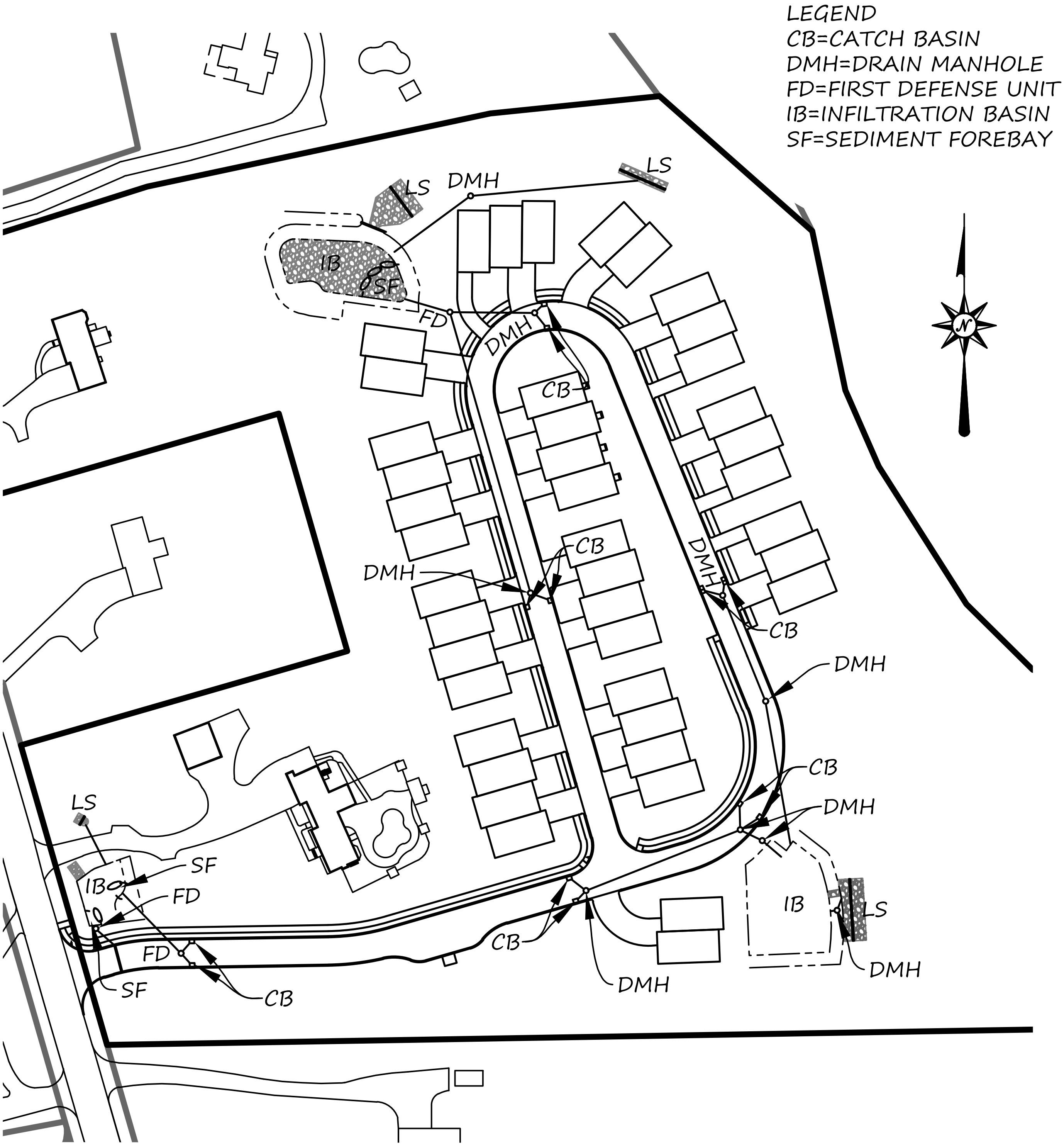
It is estimated that the regular annual maintenance tasks described herein will cost $4,000 per year (2023 value).

PART 4: ACCIDENTAL SPILL AND EMERGENCY RESPONSE PLAN

In the event of an accident within the boundaries of the Site, where significant gasoline or other petroleum products or other hazardous materials are released, the following procedure shall be followed in the order noted.

1. As quickly as possible, attempt to block the nearest stormwater catch basins if on a roadway, or if in proximity to wetlands, create a berm of soil downslope of the spill.
2. Immediately, and while the containment measures are implemented as described above, notify the following governmental entities and inform them of the type of spill that occurred:
   - Franklin Fire Department at 508-528-2323,
   - Franklin Board of Health at 508-520-4905,
   - Franklin Conservation Commission at 508-520-4929,
   - Mass. Department of Environmental Protection (DEP) Central Region at (508) 792-7650 (address is 8 New Bond Street, Worcester, MA 01606), and
   - National Response Center (NRC) at (800) 424-8802 (for spills that require such notification pursuant to 40 CFR Part 110, 40 CFR Part 117, and 40 CR Part 302).
3. Once the various emergency response teams have arrived at the site and if the spill occurs on a lot, the owner shall follow the instructions of the various governmental entities, which may include the following:
   - A clean up firm may need to be immediately contacted.
   - If the hazardous materials have entered the stormwater system, portions of it may need to be cleaned and restored per the DEP. All such activities shall be as specified by the DEP.

EXHIBIT 1 STORMWATER FACILITIES SITE PLAN



730 MAIN STREET
SUITE 2C
MILLIS, MA 02054
508-376-8883(o)

SHEET 1 OF 1

LEGACY ENGINEERING

AUTUMN HILL SENIOR VILLAGE O&M PLAN OF LAN IN FRANKLIN, MA

PLAN SCALE: 1"=120'

0' 120' 240'

REVISION	DATE

PLAN DATE: 2024-01-26

EXHIBIT 2 STORMWATER SYSTEM OPERATIONS AND MAINTENANCE LOG FORM

Stormwater System Operations and Maintenance Log

Year ________________

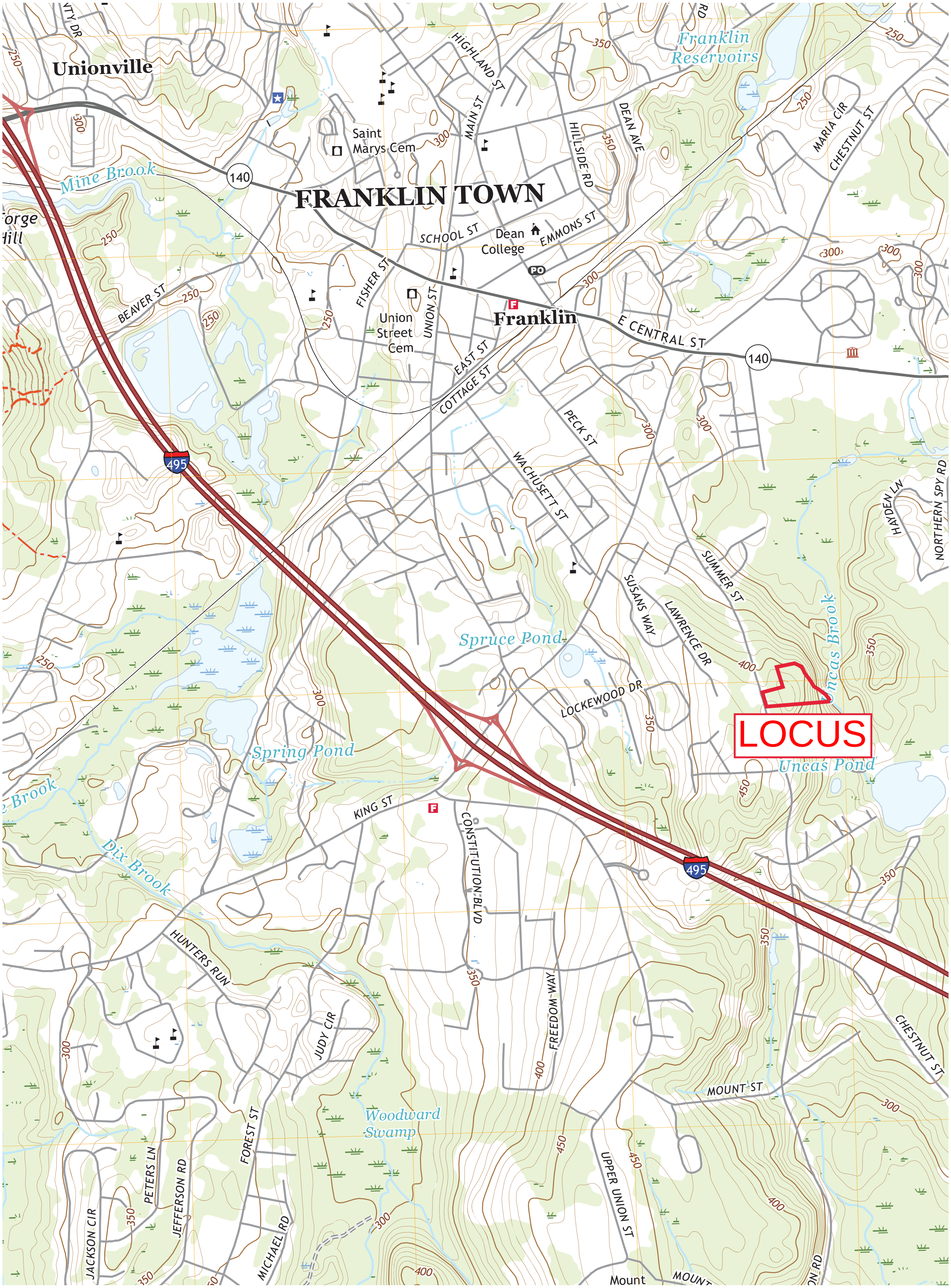
General Information	
Project Name	Autumn Hill Senior Village
Site Location	496 Summer Street Franklin, MA 02038
Inspector's Name	
Inspector's Title	
Inspector's Phone	
Signature of Operator at end of Year, Certifying that Work was Completed as Noted. Date:	

O&M Task Checklist

	O&M Activity	Date Completed	Notes/Comments
Deep Sump Catch Basins			
	1st Quarter Cleanout		
	2nd Quarter Cleanout		
	3rd Quarter Cleanout		
	4th Quarter Cleanout		
Sediment Forebay			
	1st Annual Inspection		
	2nd Annual Inspection		
	3rd Annual Inspection		
	4th Annual Inspection		
	1st Annual Mowing		
	2nd Annual Mowing		
	Sediment Rem. Req'd?		
Stormwater Infiltration Basin			
	1st Annual Inspection		
	2nd Annual Inspection		
	1st Annual Mowing		

	O&M Activity	Date Completed	Notes/Comments
	2nd Annual Mowing		
	Sediment Removal Req'd?		
First Defense Units			
	1st Inspection		
	2nd Inspection		
	Unit Cleaning		
Stormwater Pipes, Inlets and Outlets			
	1st Annual Inspection		
	2nd Annual inspection		

ATTACHMENT B: USGS MAP



Unionville
FRANKLIN TOWN
Franklin
Franklin Reservoirs
Mine Brook
Saint Marys Cem
Union Street Cem
Dean College
HIGHLAND ST
MAIN ST
DEAN AVE
HILLSIDE RD
MARIA CIR
CHESTNUT ST
SCHOOL ST
EMMONS ST
FISHER ST
UNION ST
EAST ST
COTTAGE ST
E CENTRAL ST
BEAVER ST
PECK ST
WACHUSETT ST
SUMMER ST
SUSANS WAY
LAWRENCE DR
LOCKEWOOD DR
HAYDEN LN
NORTHERN SPY RD
Spruce Pond
Spring Pond
Uncas Brook
Uncas Pond
LOCUS
KING ST
CONSTITUTION BLVD
Dix Brook
HUNTERS RUN
JUDY CIR
FREEDOM WAY
MOUNT ST
CHESTNUT ST
Woodward Swamp
FOREST ST
PETERS LN
JEFFERSON RD
JACKSON CIR
MICHAEL RD
UPPER UNION ST
Mount
140
495

ATTACHMENT C: Illicit Discharge Compliance Statement

ILLICIT DISCHARGE COMPLIANCE STATEMENT

Autumn Hill Senior Village
496 Summer Street
Franklin, MA

This statement is provided in accordance with the provisions of the Massachusetts Stormwater Management Standard 10 and of the Massachusetts Stormwater Management Handbook.

Note the following:

- All stormwater management systems contain no connection to the site's wastewater sewer system or to any other non-stormwater collection system.
- Groundwater collection systems on the site are not connected to the site's wastewater sewer system or to any other non-stormwater collection system.
- The facility's Operations & Maintenance Plan is designed to prevent any discharge of non-stormwater to the drainage system.
- Any illicit discharges identified during or after construction will be immediately disconnected.

Date: January 26, 2024

ATTACHMENT D: Construction Activity NPDES Stormwater Pollution Prevention Plan

Stormwater Pollution Prevention Plan (SWPPP)

For Construction Activities At:

Autumn Hill Senior Village
496 Summer Street
Franklin, MA 02038
774-572-1972

SWPPP Prepared For:

Suejo Corp.
Tim Jones
P.O. Box 934
Wrentham, MA 02093
774-571-1972
gracewooddevelopment@gmail.com

SWPPP Prepared By:

Legacy Engineering, LLC
730 Main Street, Suite 2C
Millis, MA 02054
508-376-8883
dan@legacy-ce.com

SWPPP Preparation Date:

01/26/2024

Estimated Project Dates:

Project Start Date: Insert Date

Project Completion Date: Insert Date

Contents

SECTION 1: CONTACT INFORMATION/RESPONSIBLE PARTIES

1.1 Operator(s) / Subcontractor(s)

Operator(s):

Suejo Corp.
Tim Jones
P.O. Box 934
Wrentham, MA 02093
774-571-1972

[Repeat as necessary.]

Subcontractor(s):

To Be Determined Prior to Construction
Insert Name
Insert Address
Insert City, State, Zip Code
Insert Telephone Number
Insert Fax/Email
Insert area of control (if more than one operator at site)

[Repeat as necessary.]

Emergency 24-Hour Contact:

To Be Determined Prior to Construction
Insert Name
Insert Telephone Number

1.2 Stormwater Team

Stormwater Team

Name and/or Position, and Contact	Responsibilities	I Have Completed Training Required by CGP Part 6.2	I Have Read the CGP and Understand the Applicable Requirements
Daniel Merrikin, P.E. President 508-376-8883 dan@legacy-ce.com	Design of stormwater controls	☒ Yes ☐ No	☒ Yes Date: 3/1/2022
Insert Name of Responsible Person Insert Position Insert Telephone Number Insert Email	Inspections of stormwater controls	☐ Yes ☒ No	☐ Yes Date: Click here to enter a date.
Insert Name of Responsible Person Insert Position Insert Telephone Number Insert Email	Installation, maintenance and/or repair of stormwater controls. Taking corrective actions	☐ Yes ☒ No	☐ Yes Date: Click here to enter a date.

[Insert or delete rows as necessary.]

Stormwater Team Members Who Conduct Inspections Pursuant to CGP Part 4

Name and/or Position and Contact	Training(s) Received	Date Training(s) Completed	If Training is a Non-EPA Training, Confirm that it Satisfies the Minimum Elements of CGP Part 6.3.b
Insert Name of Responsible Person Insert Position Insert Telephone Number Insert Email	Insert Title of Training Received	Date: Click here to enter a date.	☐ Principles and practices of erosion and sediment control and pollution prevention practices at construction sites ☐ Proper installation and maintenance of erosion and sediment controls and pollution prevention practices used at construction sites ☐ Performance of inspections, including the proper completion of required reports and documentation, consistent with the requirements of Part 4
Insert Name of Responsible Person Insert Position Insert Telephone Number Insert Email	Insert Title of Training Received	Date: Click here to enter a date.	☐ Principles and practices of erosion and sediment control and pollution prevention practices at construction sites ☐ Proper installation and maintenance of erosion and sediment controls and pollution prevention practices used at construction sites ☐ Performance of inspections, including the proper completion of required reports and documentation, consistent with the requirements of Part 4
Insert Name of Responsible Person Insert Position Insert Telephone Number Insert Email	Insert Title of Training Received	Date: Click here to enter a date.	☐ Principles and practices of erosion and sediment control and pollution prevention practices at construction sites ☐ Proper installation and maintenance of erosion and sediment controls and pollution prevention practices used at construction sites ☐ Performance of inspections, including the proper completion of required reports and documentation, consistent with the requirements of Part 4

[Insert or delete rows as necessary.]

SECTION 2: SITE EVALUATION, ASSESSMENT, AND PLANNING

2.1 Project/Site Information

Project Name and Address

Project/Site Name: Autumn Hill Senior Village
Street/Location: 496 Summer Street
City: Franklin
State: MA
ZIP Code: 02038
County or Similar Government Division: Norfolk

Project Latitude/Longitude

Latitude: 42.0670° N
(decimal degrees)

Longitude: - 71.3840 ° W
(decimal degrees)

Latitude/longitude data source: ☒ Map ☐ GPS ☐ Other (please specify): _______________

Horizontal Reference Datum: ☐ NAD 27 ☒ NAD 83 ☐ WGS 84

Additional Site Information

Is your site located on Indian country lands, or on a property of religious or cultural significance to an Indian Tribe? ☐ Yes ☒ No

If yes, provide the name of the Indian Tribe associated with the area of Indian country (including the name of Indian reservation if applicable), or if not in Indian country, provide the name of the Indian Tribe associated with the property: Not applicable

2.2 Discharge Information

Does your project/site discharge stormwater into a Municipal Separate Storm Sewer System (MS4)? ☒ Yes ☐ No

Are there any waters of the U.S. within 50 feet of your project's earth disturbances? ☐ Yes ☒ No

For each point of discharge, provide a point of discharge ID (a unique 3-digit ID, e.g., 001, 002), the name of the first receiving water that receives stormwater directly from the point of discharge and/or from the MS4 that the point of discharge discharges to, and the following receiving water information, if applicable:

Point of Discharge ID	Name of receiving water that receives stormwater discharge:	Is the receiving water impaired (on the CWA 303(d) list)?	If yes, list the pollutants that are causing the impairment:	Has a TMDL been completed for this receiving waterbody?	If yes, list TMDL Name and ID:	Pollutant(s) for which there is a TMDL:	Is this receiving water designated as a Tier 2, Tier 2.5, or Tier 3 water?	If yes, specify which Tier (2, 2.5, or 3)?
[001]	Uncas Brook	☐ Yes ☒ No		☐ Yes ☒ No			☐ Yes ☒ No	
[002]	Uncas Pond	☐ Yes ☒ No		☐ Yes ☒ No			☐ Yes ☒ No	
[003]	Insert Text Here	☐ Yes ☐ No		☐ Yes ☐ No			☐ Yes ☐ No	[INSERT "Tier 2", "Tier 2.5", or "Tier 3"]
[004]	Insert Text Here	☐ Yes ☐ No		☐ Yes ☐ No			☐ Yes ☐ No	[INSERT "Tier 2", "Tier 2.5", or "Tier 3"]
[005]	Insert Text Here	☐ Yes ☐ No		☐ Yes ☐ No			☐ Yes ☐ No	[INSERT "Tier 2", "Tier 2.5", or "Tier 3"]
[006]	Insert Text Here	☐ Yes ☐ No		☐ Yes ☐ No			☐ Yes ☐ No	[INSERT "Tier 2", "Tier 2.5", or "Tier 3"]

[Include additional rows or delete as necessary.]

2.3 Nature of the Construction Activities

General Description of Project

Provide a general description of the nature of your construction activities, including the age or dates of past renovations for structures that are undergoing demolition:

Construction of 42 senior residential units along with appurtenant driveways, landscape areas, utilities, and stormwater management systems.

If you are conducting earth-disturbing activities in response to a public emergency, document the cause of the public emergency *(e.g., mud slides, earthquake, extreme flooding conditions, widespread disruption in essential public services)*, information substantiating its occurrence *(e.g., State disaster declaration or similar State or local declaration)*, and a description of the construction necessary to reestablish affected public services:

- The work is not related to a public emergency

Business days and hours for the project: Monday through Saturday, 7:00 am to 9:00 pm

Size of Construction Site

Size of Property	12.39 Acres
Total Area Expected to be Disturbed by Construction Activities	6.00 Acres
Maximum Area Expected to be Disturbed at Any One Time, Including On-site and Off-site Construction Support Areas	4.25 Acres

[Repeat as necessary for individual project phases.]

Type of Construction Site *(check all that apply):*

☐ Single-Family Residential ☒ Multi-Family Residential ☐ Commercial ☐ Industrial

☐ Institutional ☐ Highway or Road ☐ Utility ☐ Other ___________________________

Will you be discharging dewatering water from your site? ☐ Yes ☒ No

If yes, will you be discharging dewatering water from a current or former Federal or State remediation site? ☐ Yes ☒ No

Pollutant-Generating Activities

List and describe all pollutant-generating activities and indicate for each activity the associated pollutants or pollutant constituents that could be discharged in stormwater from your construction site. Take into account where potential spills and leaks could occur that contribute pollutants to stormwater discharges, and any known hazardous or toxic substances, such as PCBs and asbestos, that will be disturbed during construction.

Pollutant-Generating Activity (e.g., paving operations; concrete, paint, and stucco washout and waste disposal; solid waste storage and disposal; and dewatering operations)	**Pollutants or Pollutant Constituents** (e.g., sediment, fertilizers, pesticides, paints, caulks, sealants, fluorescent light ballasts, contaminated substrates, solvents, fuels)
Paving operations	Asphalt
Concrete washout	Concrete byproducts
Solid waste storage and disposal	Solid waste, trash, construction debris, etc..

[Include additional rows or delete as necessary.]

Construction Support Activities *(only provide if applicable)*

Describe any construction support activities for the project (e.g., concrete or asphalt batch plants, equipment staging yards, material storage areas, excavated material disposal areas, borrow areas):

1. Equipment staging yards, including construction equipment (trucks, excavators, rollers, etc..)
2. Material storage areas, including site-related construction materials (pipes, manholes, fittings, etc…) and building related materials (concrete, wood, lumber, trim, siding, steel, roofing materials, etc…), and
3. Earthen materials stockpiles, including items like soil, crushed stone, sand, general fill, topsoil, etc…

Contact information for construction support activity:
To Be Determined
Insert Telephone No.
Insert Email
Insert Address And/Or Latitude/Longitude

[Repeat as necessary.]

2.4 Sequence and Estimated Dates of Construction Activities

Phase I

Infrastructure Construction	
Estimated Start Date of Construction Activities for this Phase	Insert Estimated Date
Estimated End Date of Construction Activities for this Phase	Insert Estimated Date
Estimated Date(s) of Application of Stabilization Measures for Areas of the Site Required to be Stabilized	Insert Estimated Date *[Add additional dates as necessary]*
Estimated Date(s) when Stormwater Controls will be Removed	Insert Estimated Date *[Add additional dates as necessary]*

Phase II

Building Construction	
Estimated Start Date of Construction Activities for this Phase	Insert Estimated Date
Estimated End Date of Construction Activities for this Phase	Insert Estimated Date
Estimated Date(s) of Application of Stabilization Measures for Areas of the Site Required to be Stabilized	Insert Estimated Date *[Add additional dates as necessary]*
Estimated Date(s) when Stormwater Controls will be Removed	Insert Estimated Date *[Add additional dates as necessary]*

[Repeat as needed.]

2.5 Authorized Non-Stormwater Discharges

List of Authorized Non-Stormwater Discharges Present at the Site

Authorized Non-Stormwater Discharge	**Will or May Occur at Your Site?**
Discharges from emergency fire-fighting activities	☐ Yes ☒ No
Fire hydrant flushings	☒ Yes ☐ No
Landscape irrigation	☒ Yes ☐ No
Water used to wash vehicles and equipment	☐ Yes ☒ No
Water used to control dust	☒ Yes ☐ No
Potable water including uncontaminated water line flushings	☒ Yes ☐ No
External building washdown (soaps/solvents are not used and external surfaces do not contain hazardous substances)	☒ Yes ☐ No
Pavement wash waters	☐ Yes ☒ No
Uncontaminated air conditioning or compressor condensate	☒ Yes ☐ No
Uncontaminated, non-turbid discharges of ground water or spring water	☒ Yes ☐ No
Foundation or footing drains	☒ Yes ☐ No
Uncontaminated construction dewatering water	☒ Yes ☐ No

(Note: You are required to identify the likely locations of these authorized non-stormwater discharges on your site map. See Section 2.6, below, of this SWPPP Template.)

2.6 *Site Maps*

The project "Site Maps" are comprised of a variety of documents which cumulatively contain the information required by the SWPPP. These documents include the full detailed site or subdivision plans ("site plan") (as applicable) and the stormwater report (if applicable).

SECTION 3: DOCUMENTATION OF COMPLIANCE WITH OTHER FEDERAL REQUIREMENTS

3.1 *Endangered Species Protection*

Eligibility Criterion

Following the process outlined in Appendix D, under which criterion are you eligible for coverage under this permit?

☒ **Criterion A**: No ESA-listed species and/or designated critical habitat present in action area. Using the process outlined in Appendix D of the CGP, you certify that ESA-listed species and designated critical habitat(s) under the jurisdiction of the USFWS or NMFS are not likely to occur in your site's "action area" as defined in Appendix A of the CGP. *Please Note: NMFS' jurisdiction includes ESA-listed marine and estuarine species that spawn in inland rivers.*

☒ Check to confirm you have provided documentation in your SWPPP as required by CGP Appendix D (Note: reliance on State resources is not acceptable; see CGP Appendix D).

3.2 *Historic Property Screening Process*

Appendix E, Step 1

Do you plan on installing any stormwater controls that require subsurface earth disturbance, including, but not limited to, any of the following stormwater controls at your site? Check all that apply below, and proceed to Appendix E, Step 2.

☐ Dike

☐ Berm

☒ Catch Basin

☐ Pond

☐ Constructed Site Drainage Feature (e.g., ditch, trench, perimeter drain, swale, etc.)

☐ Culvert

☐ Channel

☐ Other type of ground-disturbing stormwater control:

(Note: If you will not be installing any subsurface earth-disturbing stormwater controls, no further documentation is required for Section 3.2 of the Template.)

Appendix E, Step 2

If you answered yes in Step 1, have prior professional cultural resource surveys or other evaluations determined that historic properties do not exist, or have prior disturbances at the site have precluded the existence of historic properties? ☐ YES ☒ NO

- If yes, no further documentation is required for Section 3.2 of the Template and you may provide the prior documentation in your SWPPP.
  - Not applicable.
- If no, proceed to Appendix E, Step 3.

Appendix E, Step 3

If you answered no in Step 2, have you determined that your installation of subsurface earth-disturbing stormwater controls will have no effect on historic properties? ☒ YES ☐ NO

- If yes, provide documentation of the basis for your determination: A search on the MA Historical Commission website did not return any results for the site.
- If no, proceed to Appendix E, Step 4.

3.3 Safe Drinking Water Act Underground Injection Control Requirements

Do you plan to install any of the following controls? Check all that apply below.

☐ Infiltration trenches (if stormwater is directed to any bored, drilled, driven shaft or dug hole that is deeper than its widest surface dimension, or has a subsurface fluid distribution system)

☐ Commercially manufactured pre-cast or pre-built proprietary subsurface detention vaults, chambers, or other devices designed to capture and infiltrate stormwater flow

☐ Drywells, seepage pits, or improved sinkholes (if stormwater is directed to any bored, drilled, driven shaft or dug hole that is deeper than its widest surface dimension, or has a subsurface fluid distribution system)

Construction-stage erosion controls do not include the items noted above.

SECTION 4: EROSION AND SEDIMENT CONTROLS AND DEWATERING PRACTICES

4.1 Natural Buffers or Equivalent Sediment Controls

Buffer Compliance Alternatives

Are there any receiving waters within 50 feet of your project's earth disturbances? ☐ YES ☒ NO

4.2 Perimeter Controls

General

- Perimeter erosion and sediment control barriers will be provided, installed, and maintained downstream of all proposed construction activities in accordance with this Plan, the Site Plan, and all permits issued for the site development. Such controls must be installed before any earth-disturbing activities occur on the site in question. Erosion and sediment controls may be installed in phases so long as it precedes any earth-disturbing activities within the controls' upstream watershed.

- The proposed perimeter erosion controls will provide adequate protection. The ends of the perimeter controls shall extend upslope at a 45-degree angle to prevent stormwater from circumnavigating the edge of the perimeter control. After a storm event, erosion controls are to be extended where evidence of circumventing or undercutting of the perimeter control is found.
- Sediment shall be removed along such controls on a regular basis. In no case, shall sediment be allowed to reach a depth equal to one half of the above ground height of the erosion control device.

Specific Perimeter Controls

Compost Sock & Orange Snow Fence	
Description: Compost sock & orange snow fence	
Installation	Insert approximate date of installation
Maintenance Requirements	Remove sediment before it has accumulated to one-half of the above-ground height of any perimeter control. After a storm event, if there is evidence of stormwater circumventing or undercutting the perimeter control, extend controls and/or repair undercut areas to fix the problem.
Design Specifications	Refer to details on Site Plan

[Repeat as needed for individual perimeter controls.]

4.3 Sediment Track-Out

General

- Construction vehicles will use designated entry points for each site. Crushed stone or rip-rap entry/construction apron(s) will be installed and properly maintained during construction until the site is paved. All construction access will be via the construction entrances noted on the Site Plan. At construction entrances and in their general vicinity, existing roads will be kept clean and swept as needed to minimize the tracking of soils and dust from the site.

Specific Track-Out Controls

Construction Entrance	
Description: Crushed stone or rip-rap construction entrance	
Installation	Insert approximate date of installation
Maintenance Requirements	Where sediment has been tracked-out from your site onto paved roads, sidewalks, or other paved areas outside of your site, remove the deposited sediment by the end of the same business day in which the track-out occurs or by the end of the next business day if track-out occurs on a non-business day. Remove the track-out by sweeping, shoveling, or vacuuming these surfaces, or by using other similarly effective means of sediment removal. You are prohibited from hosing or sweeping tracked-out sediment into any constructed or natural site drainage feature, storm drain inlet, or receiving water.
Design Specifications	Refer to details on Site Plan

[Repeat as needed for individual track-out controls.]

4.4 Stockpiles or Land Clearing Debris Piles Comprised of Sediment or Soil

General

- Soil stockpiles to be left in place more than 24 hours shall be surrounded with a line of compost sock to prevent the piles from eroding into the site and to discourage on-site runoff from eroding the stockpiles. Soil stockpiles to be left in place more than 14 days shall be stabilized temporarily in accordance with this temporary stabilization provisions of this plan. Dust control measures shall be implemented to prevent wind erosion of the stockpiles.

Specific Stockpile Controls

Stockpile Perimeter Controls	
Description: Compost sock around stockpile area	
Installation	Insert approximate date of installation
Maintenance Requirements	Secure stockpiles to prevent erosion during rainfall events that may impact wetland resource areas. You are prohibited from hosing down or sweeping soil or sediment accumulated on pavement or other impervious surfaces into any constructed or natural site drainage feature, storm drain inlet, or receiving water.
Design Specifications	Refer to details on Site Plan

[Repeat as needed for individual stockpile controls.]

4.5 Minimize Dust

General

- Dust control measures will be implemented regularly to prevent the off-site deposition of wind-eroded soils. The principal form of dust control will be water application.

Specific Dust Controls

Water Application	
Description: Use of a water truck to spray down dry areas of disturbed ground to prevent dust generation.	
Installation	As needed
Maintenance Requirements	Apply as needed to prevent dust generation
Design Specifications	Water truck on-site

[Repeat as needed for individual dust controls.]

4.6 Minimize Steep Slope Disturbances

General

- Contractors must pay careful attention to steep slopes and must implement additional temporary erosion and sediment control measures during work on steep slopes to prevent erosion.

Specific Steep Slope Controls

Erosion Control Blankets	
Description: Installation of erosion control blankets	
Installation	Insert approximate date of installation
Maintenance Requirements	Replace or reinforce as needed to prevent erosion.
Design Specifications	New England Wetland Plants, Inc. ECS-2B or equal

Hydroseed	
Description: Hydroseed with tackifier	
Installation	Insert approximate date of installation
Maintenance Requirements	Ensure vegetation growth and supplement with additional hydroseed as needed.
Design Specifications	Slope control mix

[Repeat as needed for individual steep slope controls.]

4.7 Topsoil

General

- Topsoil generated from the site construction activities must either be stockpiled for reuse on site in accordance with the practices noted above, or shall be removed from the site for reuse on other sites. Topsoil may not be mixed with general fill.

Specific Topsoil Controls

Preserve Topsoil	
Description: Stockpile all topsoil from work areas and reuse on site or truck off-site for use on other sites.	
Installation	Insert approximate date of installation
Maintenance Requirements	None
Design Specifications	None

[Repeat as needed for individual topsoil controls.]

4.8 Soil Compaction

General

- Areas designated for final vegetative surfaces or construction-stage or final stormwater infiltration practices shall be protected from excessive compaction by restricting vehicle access and the types of equipment that may be used in such areas.

Specific Soil Compaction Controls

Access Restrictions	
Description: Prevent access by vehicles to areas that will be vegetated or used for stormwater infiltration once rough grading is complete.	
Installation	Various
Maintenance Requirements	Prevent vehicular access to affected areas
Design Specifications	None

Soil Conditioning	
Description: Prior to seeding/planting of such areas, exposed soil that has been compacted shall be loosened by tilling or other similar methods. Conditioning shall consist of deep tilling with a rotary tiller, disc harrowing, or manual loosening and re-grading with an excavator bucket. Conditioning shall extend to a depth of at least 12-inches.	
Installation	Insert approximate date of installation
Maintenance Requirements	Once conditioned, prevent re-compaction by excluding vehicular access
Design Specifications	None

[Repeat as needed for individual soil compaction controls.]

4.9 Storm Drain Inlets

General

- All storm drain system inlets inside of perimeter controls shall be protected with sediment control measures designed to remove sediment from stormwater prior to entering the inlet. Catch basins along the street frontage shall also be protected.

Specific Storm Drain Inlet Controls

Silt Sack	
Description: Install silt socks in downstream catch basin grates	
Installation	Insert approximate date of installation
Maintenance Requirements	Clean, or remove and replace, the inlet protection measures as sediment accumulates, the filter becomes clogged, and/or performance is compromised. Where there is evidence of sediment accumulation adjacent to the inlet protection measure, remove the deposited sediment by the end of the same business day in which it is found or by the end of the following business day if removal by the same business day is not feasible.
Design Specifications	Siltsack or equal

[Repeat as needed for individual storm drain inlet controls.]

4.10 Constructed Site Drainage Feature

General

- Where appropriate, temporary sediment traps will be installed at stormwater collection points. Each trap will include a rip-rap outlet apron to prevent discharge erosion.

Specific Constructed Site Drainage Features

Temporary Sediment Trap	
Description: Where shown on the site plan or where determined appropriate in the field, provide temporary sediment traps to collect and control construction-stage stormwater runoff.	
Installation	Insert approximate date of installation
Maintenance Requirements	Periodically inspect and remove accumulated sediments as needed to prevent the discharge of sediment from the traps. Remove accumulated sediment to maintain at least one-half of the design capacity and conduct all other appropriate maintenance to ensure the basin or impoundment remains in effective operating condition
Design Specifications	Refer to Site Plan

[Repeat as needed for individual constructed site drainage features.]

4.11 Sediment Basins or Similar Impoundments

General

- Where appropriate, temporary sediment traps will be installed at stormwater collection points. Each trap will include a rip-rap outlet apron to prevent discharge erosion.

Specific Sediment Basin Controls

Temporary Sediment Trap	
Description: Where shown on the site plan or where determined appropriate in the field, provide temporary sediment traps to collect and control construction-stage stormwater runoff.	
Installation	Insert approximate date of installation
Maintenance Requirements	Periodically inspect and remove accumulated sediments as needed to prevent the discharge of sediment from the traps. Remove accumulated sediment to maintain at least one-half of the design capacity and conduct all other appropriate maintenance to ensure the basin or impoundment remains in effective operating condition
Design Specifications	Refer to Site Plan

[Repeat as needed for individual sediment basin controls.]

4.12 Chemical Treatment

Soil Types

List all the soil types including soil types expected to be exposed during construction in areas of the project that will drain to chemical treatment systems and those expected to be found in fill material:

- Not applicable. No chemical treatment expected.

Treatment Chemicals

List all treatment chemicals that will be used at the site and explain why these chemicals are suited to the soil characteristics:

- Not applicable

Describe the dosage of all treatment chemicals you will use at the site or the methodology you will use to determine dosage:

- Not applicable

Provide information from any applicable Safety Data Sheets (SDS):

- Not applicable

Describe how each of the chemicals will be stored consistent with CGP Part 2.2.13c:

- Not applicable

Include references to applicable State or local requirements affecting the use of treatment chemicals, and copies of applicable manufacturer's specifications regarding the use of your specific treatment chemicals and/or chemical treatment systems:

- Not applicable

Special Controls for Cationic Treatment Chemicals (if applicable)
If the applicable EPA Regional Office authorized you to use cationic treatment chemicals, include the official EPA authorization letter or other communication, and identify the specific controls and implementation procedures designed to ensure that your use of cationic treatment chemicals will not lead to a discharge that does not meet water quality standards:

- Not applicable

Schematic Drawings of Stormwater Controls/Chemical Treatment Systems
Provide schematic drawings of any chemically-enhanced stormwater controls or chemical treatment systems to be used for application of treatment chemicals:

- Not applicable

Training
Describe the training that personnel who handle and apply chemicals have received prior to permit coverage, or will receive prior to the use of treatment chemicals:

- Not applicable

4.13 Dewatering Practices

General

- Dewatering is not expected to be needed. However, should dewatering be required, it will be pumped into a temporary dewatering pit or designated dewatering area to prevent any discharge of dewatering water to receiving waters. Should the discharge of dewatering waters to receiving waters be required, the requirements of section 2.4 and 3.0 of the CGP shall be adhered to, including required testing and reporting.

Specific Dewatering Practices

Temporary Dewatering Pit	
Description: Construction of temporary dewatering pit of suitable size and volume to contain anticipated dewatering volume. The pit can be excavated or can be created by the installation of earthen berms to create a containment area.	
Installation	Insert approximate date of installation
Maintenance Requirements	Maintain volume of temporary area as needed to contain discharge volume. For backwash water, either haul it away for disposal or return it to the beginning of the treatment process; replace and clean the filter media used in dewatering devices when the pressure differential equals or exceeds the manufacturer's specifications.
Design Specifications	None

[Repeat as needed for individual dewatering practices.]

4.14 Other Stormwater Controls

General

- None. Not applicable.

4.15 Site Stabilization

Total Amount of Land Disturbance Occurring at Any One Time

☒ *Five Acres or less*

☐ *More than Five Acres*

Use this template box if you are <u>not</u> located in an arid, semi-arid, or drought-stricken area and are not discharging to a sediment- or nutrient-impaired water or Tier 2, Tier 2.5, or Tier 3 water.

Temporary Vegetative Site Stabilization	
☒ *Vegetative* ☐ *Non-Vegetative* ☐ *Temporary* ☐ *Permanent*	
Description: ▪ Where seeded for temporary erosion control purposes, a minimum of 6 pounds per 1,000 square feet of seed will be applied along with an appropriate fertilizer (based on the time of year applied) or as necessary to obtain a 70% vegetative cover. Additional seeding will be completed if needed and periodic watering will also be employed if necessary. Where stabilization by the 14th day is precluded by snow cover, frozen ground conditions, or other similar circumstances, stabilization measures will be initiated as soon as practicable. ▪ For disturbed areas less than 5 acres, initiate within 14 days of completion of work and complete stabilization within 14 days of the initiation of stabilization measures.	
Installation	Insert approximate date of installation
Completion	Insert approximate completion date
Maintenance Requirements	Water periodically as needed to maintain vegetative cover
Design Specifications	Native grass seed mixture

Temporary Non-Vegetative Site Stabilization	
☐ *Vegetative* ☒ *Non-Vegetative* ☐ *Temporary* ☐ *Permanent*	
Description: ▪ Apply erosion control blankets, mulch, straw or stump grindings to disturbed areas. ▪ For disturbed areas less than 5 acres, initiate within 14 days of completion of work and complete stabilization within 14 days of the initiation of stabilization measures.	
Installation	Insert approximate date of installation
Completion	Insert approximate completion date
Maintenance Requirements	Maintain to ensure effective stabilization control
Design Specifications	Wood mulch, erosion control blankets, straw, and/or stump grindings.

Final Site Stabilization	
☒ *Vegetative* ☒ *Non-Vegetative* ☐ *Temporary* ☒ *Permanent*	
Description: ▪ Final site stabilization per the site plan including lawn and landscape areas, pavement, walkways and other final site features. ▪ For disturbed areas less than 5 acres, initiate within 14 days of completion of work and complete stabilization within 14 days of the initiation of stabilization measures.	
Installation	Insert approximate date of installation

Final Site Stabilization	
Completion	Insert approximate completion date
Maintenance Requirements	None
Design Specifications	Refer to site plan

[Repeat as needed for additional stabilization practices.]

Use this template box if you are discharging to a sediment- or nutrient-impaired water or to a water that is identified by your State, Tribe, or EPA as Tier 2, Tier 2.5, or Tier 3 for antidegradation purposes.

Temporary Vegetative Site Stabilization	
☒ *Vegetative* ☐ *Non-Vegetative* ☐ *Temporary* ☐ *Permanent*	
Description: ▪ Where seeded for temporary erosion control purposes, a minimum of 6 pounds per 1,000 square feet of seed will be applied along with an appropriate fertilizer (based on the time of year applied) or as necessary to obtain a 70% vegetative cover. Additional seeding will be completed if needed and periodic watering will also be employed if necessary. Where stabilization by the 14th day is precluded by snow cover, frozen ground conditions, or other similar circumstances, stabilization measures will be initiated as soon as practicable. ▪ For disturbed areas less than 5 acres, initiate within 7 days of completion of work and complete stabilization within 7 days of the initiation of stabilization measures.	
Installation	Insert approximate date of installation
Completion	Insert approximate completion date
Maintenance Requirements	Water periodically as needed to maintain vegetative cover
Design Specifications	Native grass seed mixture

Temporary Non-Vegetative Site Stabilization	
☐ *Vegetative* ☒ *Non-Vegetative* ☐ *Temporary* ☐ *Permanent*	
Description: ▪ Apply erosion control blankets, mulch, straw or stump grindings to disturbed areas. ▪ For disturbed areas less than 5 acres, initiate within 7 days of completion of work and complete stabilization within 7 days of the initiation of stabilization measures.	
Installation	Insert approximate date of installation
Completion	Insert approximate completion date
Maintenance Requirements	Maintain to ensure effective stabilization control
Design Specifications	Wood mulch, erosion control blankets, straw, and/or stump grindings.

Final Site Stabilization	
☐ *Vegetative* ☒ *Non-Vegetative* ☒ *Temporary* ☒ *Permanent*	
Description: ▪ Final site stabilization per the site plan including lawn and landscape areas, pavement, walkways and other final site features, ▪ Initiate within 7 days of completion of work and complete stabilization within 7 days of the initiation of stabilization measures	
Installation	Insert approximate date of installation
Completion	*(Must be completed as soon as practicable, but no later than seven calendar days after stabilization has been initiated)* Insert approximate completion date
Maintenance Requirements	None
Design Specifications	Refer to site plan

Use this template box if unforeseen circumstances have delayed the initiation and/or completion of vegetative stabilization. Note: You will not be able to include this information in your initial SWPPP. If you are affected by circumstances such as those described in CGP Part 2.2.14.b.ii, you will need to modify your SWPPP to include this information.

Insert name of site stabilization practice	
☐ *Vegetative* ☐ *Non-Vegetative* ☐ *Temporary* ☐ *Permanent*	
Description: ▪ Insert description of stabilization practice to be installed ▪ Note how design will meet requirements of Part 2.2.14.b.ii	
Justification	Insert description of circumstances that prevent you from meeting the deadlines required in CGP CGP Parts 2.2.14.a
Installation and completion schedule	**Vegetative Measures:** Describe the schedule you will follow for initiating and completing vegetative stabilization ▪ Approximate installation date: Insert approximate date ▪ Approximate completion date: Insert the approximate date
	Non-Vegetative Measures: *(Must be completed within 14 days of the cessation of construction if disturbing 5 acres or less; within 7 days if disturbing more than 5 acres)* ▪ Approximate installation date: Insert the approximate date ▪ Approximate completion date: Insert the approximate date
Maintenance Requirements	Insert maintenance requirements for the stabilization practice
Design Specifications	Include copies of design specifications here

[Repeat as needed for additional stabilization practices.]

SECTION 5: POLLUTION PREVENTION CONTROLS

5.1 Potential Sources of Pollution

Construction Site Pollutants

Insert text or use table below: To be determined at the time of construction

Pollutant-Generating Activity	**Pollutants or Pollutant Constituents** (That could be discharged if exposed to stormwater)	**Location on Site** (Or reference SWPPP site map where this is shown)

[Include additional rows as necessary.]

5.2 Spill Prevention and Response

(This portion of the document is written as if giving instructions to parties working on the property and/or the owner of the property)

In the event of an accident where significant gasoline or other petroleum products are released, the following procedure shall be followed in the order noted.

- ✓ Seek to contain the spill by constructing a berm of earthen or other materials around the spill site until the appropriate emergency response personnel has arrived. Seek to seal off any downstream stormwater facilities by earthen berms or the emergency spill kit materials.
- ✓ Immediately notify the following governmental entities and inform them of the type of spill that occurred:
  - o Franklin Fire Department at 508-528-2323,
  - o Franklin Board of Health at 508-520-4905,
  - o Franklin Conservation Commission at 508-520-4929,
  - o Mass. Department of Environmental Protection (DEP) Central Region at (508) 792-7650 (address is 8 New Bond Street, Worcester, MA 01606), and
  - o National Response Center (NRC) at (800) 424-8802 (for spills that require such notification pursuant to 40 CFR Part 110, 40 CFR Part 117, and 40 CR Part 302).
- ✓ Once the various emergency response teams have arrived at the site, the owner shall follow the instructions of the various governmental entities, which may include the following:
  - o A clean up firm may need to be immediately contacted.
  - o If the materials have remained trapped in the catch basins or proprietary stormwater treatment units, then these structures may be pumped out. All materials shall be removed by qualified personnel and disposed of in accordance with all applicable local, state, and federal regulations.

5.3 Fueling and Maintenance of Equipment or Vehicles

General

The Operator will designate a specific area of the site for fueling and overnight storage of vehicles on the site. Such area shall be located as far from wetlands areas and stormwater inlets as practicable and outside of the 100’ buffer zone. Refer to the Site Plan for vehicle storage area location(s).

All equipment stored on-site will be monitored for leaks and will receive regular preventative maintenance to reduce the chance of leakage. Where vehicle leaks are identified, drip pans and absorbent pads shall be employed until the leak can be repaired, which shall be completed as soon as practicable. The Operator will maintain a bag of chemical sorbent, absorbent pads and an emergency spill kit on the site at all times within one of the designated Staging Areas. A sign shall be posted at the entrance to each Staging Area noting the location of the emergency spill kit. Spill kits shall include the following at a minimum.

- o Universal chemical sorbent capable of absorbing up to 15 gallons of liquid.
- o Gloves and safety glasses,
- o Four chemical socks,
- o Four chemical pads,
- o Four chemical pillows, and
- o Four plastic disposal bags.

5.4 Washing of Equipment and Vehicles

General
- Vehicle or equipment washing is not allowed on-site.

5.5 Storage, Handling, and Disposal of Building Products, Materials, and Wastes

5.5.1 Building Materials and Building Products
(Note: Examples include asphalt sealants, copper flashing, roofing materials, adhesives, concrete admixtures, and gravel and mulch stockpiles.)

General
- The site will be maintained in a neat and orderly manner, with debris regularly disposed of.
- All products and materials stored on-site will be stored in a neat and orderly manner in appropriate containers. Building materials that may discharge pollutants if in contact with water must be stored under cover (i.e. under a roof or under plastic sheeting) to prevent contact with rainwater.
- Manufacturer recommendations relative to the proper storage, use, and disposal of products and materials will be followed.
- An effort will be made to minimize the on-site storage of excess construction materials. In all cases, materials will be removed from the site if unused for more than three months.
- When use of products and materials have been completed, any excess products and materials will be promptly removed from the site and/or properly disposed of in accordance with all applicable state and federal regulations.
- All equipment to be stored on-site will be stored in a neat and orderly manner and such equipment will only be stored in the designated equipment Staging Areas on the site.

5.5.2 Pesticides, Herbicides, Insecticides, Fertilizers, and Landscape Materials

General
- Such materials may not be stored on-site and shall only be brought on-site in the quantities needed for application. Application shall be in accordance with manufacturer recommendation. Disposal of excess products shall follow local, state and federal law.

5.5.3 Diesel Fuel, Oil, Hydraulic Fluids, Other Petroleum Products, and Other Chemicals

General
- Petroleum products may only be stored on-site in the limited quantities necessary for the ongoing work.
- All chemical containers must be watertight and closed, sealed, and secured when not in use.
- Outside storage must use a containment pallet or similar, to capture small leaks and spills.
- A spill kit must be readily available and in good working condition. Personnel must be available to respond immediately in the event of a leak or spill.
- Containers storing chemical with a storage capacity of 55 gallons or more must be stored more than 50 feet from receiving waters, drainage features, or inlets and must be provided with cover.

5.5.4 Hazardous or Toxic Waste
(Note: Examples include paints, caulks, sealants, fluorescent light ballasts, solvents, petroleum-based products, wood preservatives, additives, curing compounds, and acids.)

General

- The use of hazardous products during construction will be in accordance with manufacturer recommendations and established construction practices.
- Hazardous materials must be stored in a separately designated area, under cover, and within secondary storage containers designed to hold at least 110% of the volume of the substance in question.
- Hazardous products will be kept in their original containers until they are used, and the container labels will be kept on-site within a designated Staging Area until use of the product is no longer needed.
- Unused quantities of hazardous products will be removed from the site in accordance with all applicable state and federal regulations.
- Hazardous waste materials generated by the construction (if any) will be disposed of off-site in accordance with all applicable state and federal regulations pertaining to such disposal. The Site Manager will be informed of these requirements and will ensure that this provision is adhered to.
- Any spills of hazardous materials found on the site will be cleaned up immediately using dry-cleanup procedures and reported in accordance with procedures established by local, state, and federal regulations. Washdowns of spill areas is prohibited.
- The Site Manager will be properly trained in hazardous materials spill prevention and clean-up.

5.5.5 Construction and Domestic Waste

(Note: Examples include packaging materials, scrap construction materials, masonry products, timber, pipe and electrical cuttings, plastics, styrofoam, concrete, demolition debris, and other trash or discarded materials.)

General

- All waste materials from the site will be collected in dumpsters and disposed of off-site in accordance with all applicable state and federal regulations. The dumpster will be emptied as needed and the Operator will ensure that trash collection does not accumulate outside the dumpster. Trash and debris will be collected at least once per working day.
- Containers with lids shall be sealed at the end of each day. Containers without lids shall be covered with sheeting or a tarp. Cleanup trash and debris on the site at the end of each workday.

5.5.6 Sanitary Waste

General

- The Operator will keep a portable toilet on the site for the use of work personnel and shall dispose of the waste materials in accordance with local, state, and federal regulations. The portable toilet shall be located away from receiving waters, storm drains, and constructed or natural site drainage features.

5.6 Washing of Applicators and Containers used for Stucco, Paint, Concrete, Form Release Oils, Cutting Compounds, or Other Materials

General

- Any such wash water shall be directed into a leak-proof container and disposed of off-site in accordance with local, state and federal regulations.
- No liquid waste shall be allowed to enter drainage features and receiving waters or be allowed to infiltrate into the ground.

- Concrete trucks will only wash out or dump surplus concrete within areas designated by the Operator on the site in designated depressions to prevent uncontrolled migration of such materials. All such surplus concrete will be cleaned-up by crushing the concrete and either re-using it in the construction activities or by removing it from the site.
- Wash waters from concrete or stucco applications, or from paint brushes or other similar activities must be directed into a leak-proof container or pit designed to prevent overflows due to precipitation. Accumulated wastewater must be disposed of in accordance with all local, state, and federal regulations to the extent it is deemed hazardous. Washwater generating activities must be conducted as far away from wetlands areas and storm drain inlets as possible.

5.7 Application of Fertilizers

General

- Fertilizer shall be applied in accordance with the rates specified herein and in no case more than stipulated in the manufacturer's specifications.
- To the extent practicable, apply fertilizers in optimal seasons to maximize vegetation uptake and growth.
- Avoid applying fertilizers before heavy rains are expected and never apply to frozen ground or during winter conditions.
- Fertilizer may not be used in constructed or natural site drainage features.
- Fertilizers are not to be applied within buffer zones or within the Zone II for drinking water.

5.8 Other Pollution Prevention Practices

Instructions:

Describe any additional pollution prevention practices that do not fit into the above categories.

General

- Insert general description of the problem this control is designed to address

Specific Pollution Prevention Practices

Insert name of pollution prevention practice	
Description: Insert description of practice to be implemented	
Implementation	Insert approximate date of implementation
Maintenance Requirements	Insert maintenance requirements for the pollution prevention practice
Design Specifications	If applicable include copies of design specifications here

[Repeat as needed.]

SECTION 6: INSPECTION, MAINTENANCE, AND CORRECTIVE ACTION

6.1 Inspection Personnel and Procedures

Site Inspection Schedule

Select the inspection frequency(ies) that applies, based on CGP Parts 4.2, 4.3, or 4.4

(Note: you may be subject to different inspection frequencies in different areas of the site. Check all that apply and indicate which portion(s) of the site it applies to.)

Standard Frequency:

☐ Every 7 calendar days

☒ Every 14 calendar days and within 24 hours of either:

- A storm event that produces 0.25 inches or more of rain within a 24-hour period (including when there are multiple, smaller storms that alone produce less than 0.25 inches but together produce 0.25 inches or more in 24 hours), or
- A storm event that produces 0.25 inches or more of rain within a 24-hour period on the first day of a storm and continues to produce 0.25 inches or more of rain on subsequent days (you conduct an inspection within 24 hours of the first day of the storm and within 24 hours after the last day of the storm that produces 0.25 inches or more of rain (i.e., only two inspections would be required for such a storm event)), or
- A discharge caused by snowmelt from a storm event that produces 3.25 inches or more of snow within a 24-hour period.

Increased Frequency (if applicable):

For areas of sites discharging to sediment or nutrient-impaired waters or to waters designated as Tier 2, Tier 2.5, or Tier 3

☐ Every 7 days and within 24 hours of either:

- A storm event that produces 0.25 inches or more of rain within a 24-hour period, or
- A discharge caused by snowmelt from a storm event that produces 3.25 inches or more of snow within a 24-hour period.

Reduced Frequency (if applicable)

For stabilized areas

☐ Twice during first month, no more than 14 calendar days apart; then once per month after first month until permit coverage is terminated consistent with Part 9 in any area of your site where the stabilization steps in 2.2.14.a have been completed.

- Specify locations where stabilization steps have been completed
- Insert date that they were completed
  (Note: It is likely that you will not be able to include this in your initial SWPPP. If you qualify for this reduction (see CGP Part 4.4.1), you will need to modify your SWPPP to include this information. If construction activity resumes in this portion of the site at a later date, the inspection frequency immediately increases to that required in Parts 4.2 and 4.3, as applicable.)

For frozen conditions where construction activities are being conducted
☐ Once per month Insert beginning and ending dates of frozen conditions on your site: ▪ Beginning date of frozen conditions: Insert approximate date ▪ Ending date of frozen conditions: Insert approximate date
For frozen conditions where construction activities are suspended
☐ Inspections are temporarily suspended Insert beginning and ending dates of frozen conditions on your site: ▪ Beginning date of frozen conditions: Insert approximate date ▪ Ending date of frozen conditions: Insert approximate date

Dewatering Inspection Schedule

Select the inspection frequency that applies based on CGP Part 4.3.2

Dewatering Inspection
☐ Once per day on which the discharge of dewatering water occurs.

Rain Gauge Location (if applicable)
Specify location(s) of rain gauge to be used for determining whether a rain event of 0.25 inches or greater has occured (only applies to inspections conducted for Part 4.2.2, 4.3, or 4.4.2)

Inspection Report Forms
Insert a copy of any inspection report forms you will use here or in Appendix D of this SWPPP template

(Note: EPA has developed a sample inspection form that CGP operators can use. The form is available at https://www.epa.gov/npdes/stormwater-discharges-construction-activities#resources)

6.2 *Corrective Action*

Personnel Responsible for Corrective Actions
Tim Jones

Corrective Action Logs
See Appendix E

(Note: EPA has developed a sample corrective action log that CGP operators can use. The form is available at https://www.epa.gov/npdes/stormwater-discharges-construction-activities#resources)

6.3 *Delegation of Authority*

Instructions:

- Identify the individual(s) or positions within the company who have been delegated authority to sign inspection reports.
- Attach a copy of the signed delegation of authority (see example in Appendix J of this SWPPP Template.)
- For more on this topic, see Appendix G, Subsection 11 of EPA's CGP.

Duly Authorized Representative(s) or Position(s):

Suejo Corp.
Tim Jones
Insert Position
P. O. Box 934
Wrentham, MA 02093
774-571-1972
gracewooddevelopment@gmail.com

SECTION 7: TURBIDITY BENCHMARK MONITORING FOR DEWATERING DISCHARGES

Instructions (see CGP Part 3.3 and 7.2.8):

– If you are required to comply with the Part 3.3 turbidity benchmark monitoring requirements, describe the procedures you will follow to:
  - ✓ Collect and evaluate samples,
  - ✓ Report results to EPA and keep records of monitoring information, and
  - ✓ Take corrective action when necessary.

– Include the specific type of turbidity meter you will use for monitoring, as well as any manuals or manufacturer instructions on how to operate and calibrate the meter.

– Describe any coordinating arrangement you may have with any other permitted operators on the same site with respect to compliance with the turbidity monitoring requirements, including which parties are tasked with specific responsibilities.

– If EPA has approved of an alternate turbidity benchmark pursuant to Part 3.3.2.b, include any data and other documentation you relied on to request use of the specific alternative benchmark.

Procedures:

Collecting and evaluating samples	Describe how you will collect and evaluate samples
Reporting results and keeping monitoring information records	Describe how you will report results to EPA and keep monitoring information records
Taking corrective action when necessary	Describe how you will take corrective action when necesary

Turbidity Meter:

Type of turbidity meter	Insert the type of turbidity meter

Turbidity meter manuals and manufacturer instructions

Insert a copy of any manuals and manufacturer instructions in Appendix N of this SWPPP Template.

Coordinating Arrangements for Turbidity Monitoring (if applicable):

Permitted operator name	Insert operator name
Permitted operator NPDES ID	Insert operator NPDES ID
Coordinating Arrangement	Describe the coordinating arrangement including which parties are tasked with specifc responsibilities

[Repeat as necessary.]

Alternate turbidity benchmark (if applicable):

Alternate turbidity benchmark (NTU)	Insert alternate turbidity benchmark
Data and documentation used to request the alternate benchmark	Insert the data and documentation that was submitted to EPA to request the alternate benchmark

SECTION 8: CERTIFICATION AND NOTIFICATION

Instructions (CGP Appendix G, Part G.11.2):

- The following certification statement must be signed and dated by a person who meets the requirements of Appendix G, Part G.11.2.
- This certification must be re-signed in the event of a SWPPP Modification.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I have no personal knowledge that the information submitted is other than true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name: ______________________________ Title: ______________________________

Signature: ______________________________________ Date: __________________

[Repeat as needed for multiple construction operators at the site.]

SWPPP APPENDICES

Attach the following documentation to the SWPPP:

Appendix A – Site Maps

Appendix B – Copy of 2022 CGP

Appendix C – NOI and EPA Authorization Email

Appendix D – Site Inspection Form and Dewatering Inspection Form (if applicable)

Appendix E – Corrective Action Log

Appendix F – SWPPP Amendment Log

Appendix G – Subcontractor Certifications/Agreements

Appendix H – Grading and Stabilization Activities Log

Appendix I – Training Documentation

Appendix J – Delegation of Authority

Appendix K – Endangered Species Documentation

Appendix L – Historic Preservation Documentation

Appendix M – Rainfall Gauge Recording

Appendix N – Turbidity Meter Manual and Manufacturer's Instructions

Appendix A – Site Maps

An overview site map is included below. For detailed information, refer to the detailed project Site Plan/Subdivision Plan and any associated stormwater report.

Appendix B – Copy of 2022 CGP

INSERT COPY OF 2022 CGP

Appendix C – Copy of NOI and EPA Authorization Email

INSERT COPY OF NOI AND EPA'S AUTHORIZATION EMAIL PROVIDING COVERAGE UNDER THE CGP

Appendix D – Copy of Site and Dewatering Inspection Forms

Not expected to be applicable. Should it become necessary, utilize the EPA template available at https://www.epa.gov/npdes/construction-general-permit-resources-tools-and-templates

Appendix E – Copy of Corrective Action Log

The following corrective action log form will be used and is available at https://www.epa.gov/npdes/stormwater-discharges-construction-activities#resources

2022 CGP Corrective Action Log
Project Name:

____

NPDES ID Number:

____

Section A – Individual Completing this Log	
Name:	**Title:**
Company Name:	**Email:**
Address:	**Phone Number:**
Section B – Details of the Problem (CGP Part 5.4.1.a) Complete this section within 24 hours of discovering the condition that triggered corrective action.	
Date problem was first identified:	**Time problem was first identified**:
What site conditions triggered this corrective action? *(Check the box that applies. See instructions for a description of each triggering condition (1 thru 6).)* ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5a ☐ 5b ☐ 6	
Specific location where problem identified:	
Provide a description of the specific condition that triggered the need for corrective action and the cause (if identifiable):	
Section C – Corrective Action Completion (CGP Part 5.4.1.b) Complete this section within 24 hours after completing the corrective action.	
For site condition # 1, 2, 3, 4, or 6 (those not related to a dewatering discharge) confirm that you met the following deadlines (CGP Part 5.2.1):	
☐ Immediately took all reasonable steps to address the condition, including cleaning up any contaminated surfaces so the material will not discharge in subsequent storm events. **AND**	
☐ Completed corrective action by the close of the next business day, unless a new or replacement control, or significant repair, was required. **OR**	
☐ Completed corrective action within seven (7) calendar days from the time of discovery because a new or replacement control, or significant repair, was necessary to complete the installation of the new or modified control or complete the repair. **OR**	
☐ It was infeasible to complete the installation or repair within 7 calendar days from the time of discovery. Provide the following additional information:	

Explain why 7 calendar days was infeasible to complete the installation or repair:			
Provide your schedule for installing the stormwater control and making it operational as soon as feasible after the 7 calendar days:			
For site condition # 5a, 5b, or 6 (those related to a dewatering discharge), confirm that you met the following deadlines: ☐ Immediately took all reasonable steps to minimize or prevent the discharge of pollutants until a solution could be implemented, including shutting off the dewatering discharge as soon as possible depending on the severity of the condition taking safety considerations into account. ☐ Determined whether the dewatering controls were operating effectively and whether they were causing the conditions. ☐ Made any necessary adjustments, repairs, or replacements to the dewatering controls to lower the turbidity levels below the benchmark or remove the visible plume or sheen.			
Describe any modification(s) made as part of corrective action: (Insert additional rows below if applicable)	**Date of completion:**	**SWPPP update necessary?**	**If yes, date SWPPP was updated:**
1.		☐ Yes ☐ No	
2.		☐ Yes ☐ No	

Section D - Signature and Certification (CGP Part 5.4.2)	
"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information contained therein. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information contained is, to the best of my knowledge and belief, true, accurate, and complete. I have no personal knowledge that the information submitted is other than true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."	
MANDATORY: Signature of Operator or "Duly Authorized Representative:"	
Signature:	**Date:**
Printed Name:	**Affiliation:**
OPTIONAL: Signature of Contractor or Subcontractor	
Signature:	**Date:**
Printed Name:	**Affiliation:**

General Instructions

This Corrective Action Log Template is provided to assist you creating a corrective action log that complies with the minimum reporting requirements of Part 5.4 of the EPA's Construction General Permit (CGP). For each triggering condition on your site, you will need to fill out a separate corrective action log.

The entire form must be completed to be compliant with the requirements of the permit. (Note: In Section C, if you do not need the number of rows provided in the corrective action log, you may delete these or cross them off. Alternatively, if you need more space to describe any modifications, you may insert additional rows in the electronic version of this form or use the bottom of the page in the field version of this form.)

If you are covered under a State CGP, this template may be helpful in developing a log that can be used for that permit; however, you will likely need to modify this form to meet the specific requirements of any State-issued permit. If your permitting authority requires you to use a specific corrective action log, you should not use this template.

Instructions for Section A

Individual completing this form Enter the name of the person completing this log. Include the person's contact information (title, affiliated company name, address, email, and phone number).

Instructions for Section B

You must complete Section B within 24 hours of discovering the condition that triggered corrective action. (CGP Part 5.4)

When was the problem first discovered?
Specify the date and time when the triggering condition was first discovered.

What site conditions triggered this corrective action? (CGP Parts 5.1 and 5.3)
Check the box corresponding to the numbered triggering condition below that applies to your site.

1. A stormwater control needs a significant repair or a new or replacement control is needed, or, in accordance with Part Error! Reference source not found., you find it necessary to repeatedly (i.e., 3 or more times) conduct the same routine maintenance fix to the same control at the same location (unless you document in your inspection report under Part Error! Reference source not found. that the specific reoccurrence of this same problem should still be addressed as a routine maintenance fix under Part Error! Reference source not found.);
2. A stormwater control necessary to comply with the requirements of this permit was never installed, or was installed incorrectly;
3. Your discharges are not meeting applicable water quality standards;
4. A prohibited discharge has occurred (see Part 1.3);
5. During discharge from site dewatering activities:
    a. The weekly average of your turbidity monitoring results exceeds the 50 NTU benchmark (or alternate benchmark if approved by EPA pursuant to Part **Error! Reference source not found.**); or
    b. You observe or you are informed by EPA, State, or local authorities of the presence of any of the following at the point of discharge to a receiving water flowing through or immediately adjacent to your site and/or to constructed or natural site drainage features or storm drain inlets:
        - sediment plume
        - suspended solids
        - unusual color
        - presence of odor
        - decreased clarity
        - presence of foam
        - visible sheen on the water surface or visible oily deposits on the bottom or shoreline of the receiving water

6. EPA requires corrective action as a result of permit violations found during an inspection carried out under Part 4.8.

Provide a description of the problem (CGP Part 5.4.1.a)
Provide a summary description of the condition you found that triggered corrective action, the cause of the problem (if identifiable), and the specific location where it was found. Be as specific as possible about the location; it is recommended that you refer to a precise point on your site map.

Instructions for Section C

You must complete Section C within 24 hours after completing the correction action. (CGP Part 5.4)

Deadlines for completing corrective action for condition # 1, 2, 3, 4, or 6 (if not relating to a dewatering discharge) (CGP Part 5.2.1)
Check the box to confirm that you met the deadlines that apply to each triggering condition. You are always required to check the first box (i.e., Immediately took all reasonable steps to address the condition, including cleaning up any contaminated surfaces so the material will not discharge in subsequent storm events.). Only one of the next three boxes should be checked depending on the situation that applies to this corrective action.

Check the second box if the corrective action for this particular triggering condition does not require a new or replacement control, or a significant repair. These actions must be completed by the close of the next business day from the time of discovery of the condition.

Check the third box if the corrective action for this particular triggering condition requires a new or replacement control, or a significant repair. These actions must be completed by no later than seven calendar days from the time of discover of the condition.

Check the fourth box if the corrective action for this particular triggering condition requires a new or replacement control, or a significant repair, and if it is infeasible to complete the work within seven calendar days. Additionally, you will need to fill out the table below the checkbox that requires:

1. An explanation as to why it was infeasible to complete the installation or repair within seven calendar days of discovering the condition.
2. Provide the schedule you will adhere to for installing the stormwater control and making it operational as soon as feasible after the seventh day following discovery.

Note: Per Part 5.2.1.c, where these actions result in changes to any of the stormwater controls or procedures documented in your SWPPP, you must modify your SWPPP accordingly within seven calendar days of completing this work.

Deadlines for completing corrective action for condition # 5a, 5b, or 6 related to a dewatering discharge (CGP Part 5.2.2)
These deadlines apply to conditions relating to construction dewatering activities. Check the box to confirm that you met the deadlines that apply to each triggering condition. You are required to check all of the boxes in this section to indicate your compliance with the corrective action deadlines.

List of modification(s) to correct problem
Provide a list of modifications you completed to correct the problem.

Date of completion
Enter the date you completed the modification. The work must be completed by the deadline you indicated above.

SWPPP update necessary?
Check "Yes" or "No" to indicate if a SWPPP update is necessary consistent with Part 7.4.1.a in order to reflect changes implemented at your site. If "Yes," then enter the date you updated your SWPPP. The

SWPPP updates must be made within seven calendar days of completing a corrective action. (CGP Part 5.2.1.c)

Instructions for Section D

Each corrective action log entry must be signed and certified following completion of Section D to be considered complete. (CGP Part 5.4.2)

Operator or "Duly Authorized Representative" – MANDATORY (CGP Appendix G Part G.11.2 and CGP Appendix H Section X)

At a minimum, the corrective action log must be signed by either (1) the person who signed the NOI, or (2) a duly authorized representative of that person. The following requirements apply:

If the signatory will be the person who signed the NOI for permit coverage, as a reminder, that person must be one of the following types of individuals:

- *For a corporation*: By a responsible corporate officer. For the purpose of this subsection, a responsible corporate officer means: (i) a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy- or decision-making functions for the corporation, or (ii) the manager of one or more manufacturing, production, or operating facilities, provided, the manager is authorized to make management decisions which govern the operation of the regulated facility including having the explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive measures to assure long term environmental compliance with environmental laws and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for permit application requirements; and where authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.
- *For a partnership or sole proprietorship*: By a general partner or the proprietor, respectively.
- *For a municipality, State, Federal, or other public agency*: By either a principal executive officer or ranking elected official. For purposes of this subsection, a principal executive officer of a Federal agency includes (i) the chief executive officer of the agency, or (ii) a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., Regional Administrator of EPA).

If the signatory will be a duly authorized representative, the following requirements must be met:

- The authorization is made in writing by the person who signed the NOI (see above);
- The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity such as the position of plant manager, operator of a well or a well field, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the company. (A duly authorized representative may thus be either a named individual or any individual occupying a named position); and
- The signed and dated written authorization is included in the SWPPP. A copy must be submitted to EPA, if requested.

Sign, date and print your name and affiliation.

Contractor or Subcontractor - OPTIONAL

Where you rely on a contractor or subcontractor to complete this log and the associated corrective action, you should consider requiring the individual(s) to sign and certify each log entry. Note that this does not relieve you, the permitted operator, of the requirement to sign and certify the log as well. If applicable, sign, date, and print your name and affiliation.

Recordkeeping

Logs must be retained for at least 3 years from the date your permit coverage expires or is terminated. (CGP Part 5.4.4)

Keep copies of your signed corrective action log entries at the site or at an easily accessible location so that it can be made immediately available at the time of an on-site inspection or upon request by EPA. (CGP Part 5.4.3) Include a copy of the corrective action log in your SWPPP. (CGP Part 7.2.7.e)

Note

While EPA has made every effort to ensure the accuracy of all instructions contained in this template, it is the permit, not this template, that determines the actual obligations of regulated construction stormwater discharges. In the event of a conflict between this template and any corresponding provision of the CGP, you must abide by the requirements in the permit. EPA welcomes comments on this Corrective Action Log Template at any time and will consider those comments in any future revision. You may contact EPA for CGP-related inquiries at cgp@epa.gov

Appendix F – SWPPP Amendment Log

Instructions (see CGP Part 7.4):

- Create a log here of changes and updates to the SWPPP. You may use the table below to track these modifications.
- SWPPP modifications are required pursuant to CGP Part 7.4.1 in the following circumstances:
  - ✓ Whenever new operators become active in construction activities on your site, or you make changes to your construction plans, stormwater controls, or other activities at your site that are no longer accurately reflected in your SWPPP (this includes changes made in response to corrective actions triggered under CGP Part 5);
  - ✓ To reflect areas on your site map where operational control has been transferred (and the date of transfer) since initiating permit coverage;
  - ✓ If inspections or investigations determine that SWPPP modifications are necessary for compliance with this permit;
  - ✓ Where EPA determines it is necessary to install and/or implement additional controls at your site in order to meet requirements of the permit;
  - ✓ To reflect any revisions to applicable Federal, State, Tribal, or local requirements that affect the stormwater control measures implemented at the site; and
  - ✓ If applicable, if a change in chemical treatment systems or chemically-enhanced stormwater control is made, including use of a different treatment chemical, different dosage rate, or different area of application.

No.	Description of the Amendment	Date of Amendment	Amendment Prepared by [Name(s) and Title]
		INSERT DATE	
		INSERT DATE	
		INSERT DATE	
		INSERT DATE	
		INSERT DATE	
		INSERT DATE	
		INSERT DATE	
		INSERT DATE	

Appendix G – *Sample* Subcontractor Certifications/Agreements

SUBCONTRACTOR CERTIFICATION
STORMWATER POLLUTION PREVENTION PLAN

Project Number: ____

Project Title: ____

Operator(s): ____

As a subcontractor, you are required to comply with the Stormwater Pollution Prevention Plan (SWPPP) for any work that you perform on-site. Any person or group who violates any condition of the SWPPP may be subject to substantial penalties or loss of contract. You are encouraged to advise each of your employees working on this project of the requirements of the SWPPP. A copy of the SWPPP is available for your review at the office trailer.

Each subcontractor engaged in activities at the construction site that could impact stormwater must be identified and sign the following certification statement:

I certify under the penalty of law that I have read and understand the terms and conditions of the SWPPP for the above designated project and agree to follow the practices described in the SWPPP.

This certification is hereby signed in reference to the above named project:

Company: ____

Address: ____

Telephone Number: ____________________

Type of construction service to be provided: ______________________________

____

____

Signature: ____________________

Title: ____________________

Date: ____________________

Appendix H – Grading and Stabilization Activities Log

Date Grading Activity Initiated	**Description of Grading Activity**	**Description of Stabilization Measure and Location**	**Date Grading Activity Ceased** (Indicate Temporary or Permanent)	**Date When Stabilization Measures Initiated**
INSERT DATE			INSERT DATE ☐ Temporary ☐ Permanent	INSERT DATE
INSERT DATE			INSERT DATE ☐ Temporary ☐ Permanent	INSERT DATE
INSERT DATE			INSERT DATE ☐ Temporary ☐ Permanent	INSERT DATE
INSERT DATE			INSERT DATE ☐ Temporary ☐ Permanent	INSERT DATE
INSERT DATE			INSERT DATE ☐ Temporary ☐ Permanent	INSERT DATE
INSERT DATE			INSERT DATE ☐ Temporary ☐ Permanent	INSERT DATE
INSERT DATE			INSERT DATE ☐ Temporary ☐ Permanent	INSERT DATE
INSERT DATE			INSERT DATE ☐ Temporary ☐ Permanent	INSERT DATE

Appendix I –Training Documentation

INSERT DOCUMENTATION CONSISTENT WITH SWPPP TEMPLATE SECTION 1.2 AND CGP PART 7.2.2

Appendix J – *Sample* Delegation of Authority Form

Delegation of Authority

I, ________________________ (name), hereby designate the person or specifically described position below to be a duly authorized representative for the purpose of overseeing compliance with environmental requirements, including the EPA's Construction General Permit (CGP), at the ______________________________________ construction site. The designee is authorized to sign any reports, stormwater pollution prevention plans and all other documents required by the permit.

____ (name of person or position)
____ (company)
____ (address)
____ (city, State, zip)
____ (phone)

By signing this authorization, I confirm that I meet the requirements to make such a designation as set forth in Appendix G of EPA's CGP, and that the designee above meets the definition of a "duly authorized representative" as set forth in Appendix G.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I have no personal knowledge that the information submitted is other than true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name: ____

Company: ____

Title: ____

Signature: ____

Date: ____

Appendix K – Endangered Species Documentation

INSERT DOCUMENTATION CONSISTENT WITH SWPPP TEMPLATE SECTION 3.1 AND CGP APPENDIX D

Appendix L – Historic Properties Documentation

INSERT DOCUMENTATION CONSISTENT WITH SWPPP TEMPLATE SECTION 3.2 AND CGP APPENDIX E

Appendix M – Rainfall Gauge Recording

Not expected to be needed as it is expected that the Operator will rely on a weather station that is representative of the site location, but if this option is elected by the Operator, use the table below to record on-site rainfall gauge readings at the beginning and end of each work day.

Month/Year			Month/Year			Month/Year		
Day	Start time	End time	Day	Start time	End time	Day	Start time	End time
1			1			1		
2			2			2		
3			3			3		
4			4			4		
5			5			5		
6			6			6		
7			7			7		
8			8			8		
9			9			9		
10			10			10		
11			11			11		
12			12			12		
13			13			13		
14			14			14		
15			15			15		
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17			17			17		
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19			19			19		
20			20			20		
21			21			21		
22			22			22		
23			23			23		
24			24			24		
25			25			25		
26			26			26		
27			27			27		
28			28			28		
29			29			29		
30			30			30		
31			31			31		

Example Rainfall Gauge Recording

April 2022			May 2022			June 2022		
Day	7:00 am	4:400 pm	Day	7:00 am	4:00 pm	Day	7:00 am	4:00 pm
1	--	--	1	0.2	0	1	0	0.4
2	--	--	2	0	0	2	0	0
3	0	0	3	0.1	0.3	3	--	--
4	0	0.3	4	0	0	4	--	--
5	0	0	5	0	0	5	0	0

In this example (for only partial months), 0.25-inch rainfall inspections would have been conducted on April 4 and June 1.

Appendix N – Turbidity Monitoring Sampling Documentation

INSERT DOCUMENTATION CONSISTENT WITH SWPPP TEMPLATE SECTION 7.2.8 AND CGP PART 3.3.4

ATTACHMENT E: TSS Removal Calculation Sheets

INSTRUCTIONS: *Non-automated: Mar. 4, 2008*

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

Location: Infiltration Basin #1

TSS Removal Calculation Worksheet

A BMP1	B TSS Removal Rate1	C Starting TSS Load*	D Amount Removed (B*C)	E Remaining Load (C-D)
First Defense Unit	80%	1.00	80%	20%
Infiltration Basin with Sediment Forebay	80%	0.20	16%	4%

Total TSS Removal = 96%

Separate Form Needs to be Completed for Each Outlet or BMP Train

Project: Autumn Hill Senior Village
Prepared By: Legacy Engineering LLC
Date: January 26, 2024

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

INSTRUCTIONS: *Non-automated: Mar. 4, 2008*

Non-automated TSS Calculation Sheet must be used if Proprietary BMP Proposed
1. From Mass DEP Stormwater Handboook Vol. 1

Mass. Dept. of Environmental Protection

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

Location: Infiltration Basin #2

TSS Removal Calculation Worksheet

A BMP1	B TSS Removal Rate1	C Starting TSS Load*	D Amount Removed (B*C)	E Remaining Load (C-D)
Infiltration Basin with Deep Sump Catch Basin	80%	1.00	80%	20%

Total TSS Removal = 80%

Separate Form Needs to be Completed for Each Outlet or BMP Train

Project:	Autumn Hill Senior Village
Prepared By:	Legacy Engineering LLC
Date:	January 26, 2024

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

Non-automated: Mar. 4, 2008

INSTRUCTIONS:

1. Sheet is nonautomated. Print sheet and complete using hand calculations. Column A and B: See MassDEP Structural BMP Table

2. The calculations must be completed using the Column Headings specified in Chart and Not the Excel Column Headings
3. To complete Chart Column D, multiple Column B value within Row x Column C value within Row
4. To complete Chart Column E value, subtract Column D value within Row from Column C within Row
5. Total TSS Removal = Sum All Values in Column D

Location: Infiltration Basin #3

TSS Removal Calculation Worksheet

A BMP 1	B TSS Removal Rate 1	C Starting TSS Load*	D Amount Removed (B*C)	E Remaining Load (C-D)
Deep Sump Catch Basin	25%	1.00	25%	75%
First Defense Unit	80%	0.75	60%	15%
Infiltration Basin with Sediment Forebay	80%	0.15	12%	3%

Total TSS Removal = 97%

Separate Form Needs to be Completed for Each Outlet or BMP Train

Project: Autumn Hill Senior Village
Prepared By: Legacy Engineering LLC
Date: January 26, 2024

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

Non-automated TSS Calculation Sheet must be used if Proprietary BMP Proposed
1. From Mass DEP Stormwater Handboook Vol. 1

ATTACHMENT F: Stormwater Management Handbook Checklist

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

Checklist for Stormwater Report

A. Introduction

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

tab

return

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

The Stormwater Report must include:

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

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

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

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

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[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

COMMONWEALTH OF MASSACHUSETTS
DANIEL J.
MERRIKIN
CIVIL
No. 43309
REGISTERED
PROFESSIONAL ENGINEER

Digitally signed by Daniel J. Merrikin, P.E.
Date: 2024.01.29 14:40:21 -05'00'

Signature and Date

Checklist

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

☐ New development

☐ Redevelopment

☒ Mix of New Development and Redevelopment

Checklist for Stormwater Report

Checklist (continued)

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

☒ No disturbance to any Wetland Resource Areas

☐ Site Design Practices (e.g. clustered development, reduced frontage setbacks)

☐ Reduced Impervious Area (Redevelopment Only)

☒ Minimizing disturbance to existing trees and shrubs

☐ LID Site Design Credit Requested:

- ☐ Credit 1
- ☐ Credit 2
- ☐ Credit 3

☐ Use of “country drainage” versus curb and gutter conveyance and pipe

☐ Bioretention Cells (includes Rain Gardens)

☐ Constructed Stormwater Wetlands (includes Gravel Wetlands designs)

☐ Treebox Filter

☐ Water Quality Swale

☐ Grass Channel

☐ Green Roof

☐ Other (describe): ____________________

Standard 1: No New Untreated Discharges

☐ No new untreated discharges

☒ Outlets have been designed so there is no erosion or scour to wetlands and waters of the Commonwealth

☒ Supporting calculations specified in Volume 3 of the Massachusetts Stormwater Handbook included.

Checklist (continued)

Standard 2: Peak Rate Attenuation

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

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

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

Standard 3: Recharge

☒ Soil Analysis provided.

☒ Required Recharge Volume calculation provided.

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

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

☐ Static ☒ Simple Dynamic ☐ Dynamic Field[1]

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

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

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

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

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

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

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

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

Checklist (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 (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 (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 (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.

ATTACHMENT G: FEMA Firmette

National Flood Hazard Layer FIRMette

FEMA

71°23'20"W 42°4'15"N

71°22'43"W 42°3'48"N

Feet 1:6,000

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

Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020

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

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

MAP PANELS

- Digital Data Available
- No Digital Data Available
- Unmapped

N

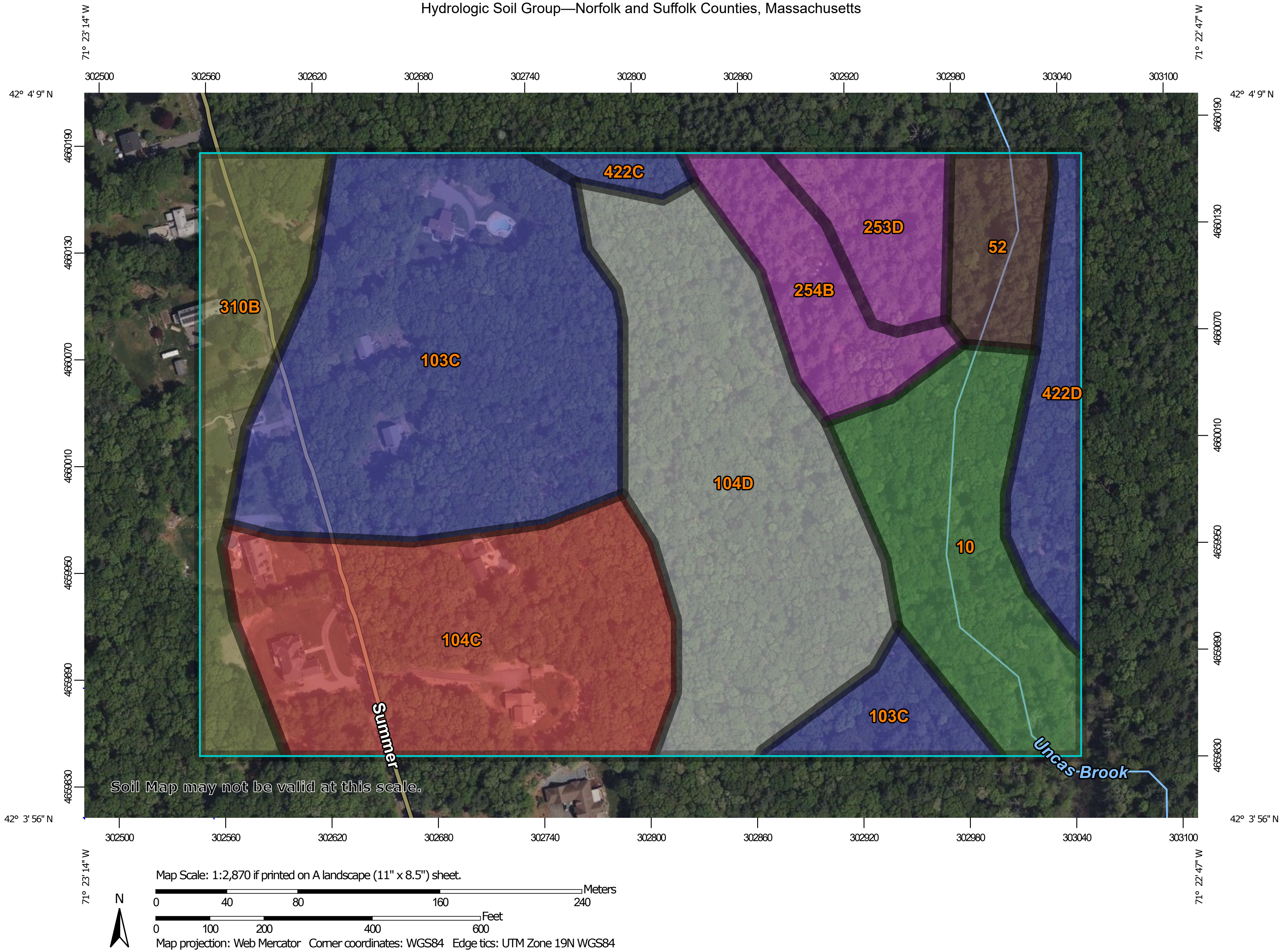
The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

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

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 10/27/2022 at 12:00 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

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

ATTACHMENT H: Soils Data



Map Scale: 1:2,870 if printed on A landscape (11" x 8.5") sheet.

Meters: 0, 40, 80, 160, 240

Feet: 0, 100, 200, 400, 600

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 19N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Lines

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Points

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:25,000.

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: Norfolk and Suffolk Counties, Massachusetts
Survey Area Data: Version 18, 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.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
10	Scarboro and Birdsall soils, 0 to 3 percent slopes	A/D	4.5	10.7%
52	Freetown muck, 0 to 1 percent slopes	B/D	1.5	3.5%
103C	Charlton-Hollis-Rock outcrop complex, 8 to 15 percent slopes	B	10.8	25.8%
104C	Hollis-Rock outcrop-Charlton complex, 0 to 15 percent slopes	D	7.5	18.0%
104D	Hollis-Rock outcrop-Charlton complex, 15 to 35 percent slopes		8.2	19.6%
253D	Hinckley loamy sand, 15 to 35 percent slopes	A	1.6	3.9%
254B	Merrimac fine sandy loam, 3 to 8 percent slopes	A	2.2	5.2%
310B	Woodbridge fine sandy loam, 3 to 8 percent slopes	C/D	3.3	7.8%
422C	Canton fine sandy loam, 8 to 15 percent slopes, extremely stony	B	0.4	0.9%
422D	Canton fine sandy loam, 15 to 35 percent slopes, extremely stony	B	1.9	4.5%
Totals for Area of Interest			**41.8**	**100.0%**

Description

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

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

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

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

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

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

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

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

DEEP OBSERVATION TEST HOLE SOIL LOG
496 SUMMER STREET, FRANKLIN MA 02038

Deep Observation Hole: OTH 1 **Date of Test Hole: October 28, 2022** **Soil Evaluation By: Daniel J. Merrikin, P.E.**
(Mass. Approved Soil Evaluator)

Depth (In.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
6”	A	10YR4/3				Loamy Sand	1%	<1%	Massive	V. Friable	
19”	Bw	10YR6/8				Sandy Loam	1%	1%	Massive	V. Friable	
95”	C	2.5Y6/4				Loamy Sand	3%	2%	Massive	V. Friable	Possible Refusal @ 90”

Additional Notes: Ground Elev.=402.9

<u>Groundwater Indicators Observed at Time of Testing:</u>

☐ Depth observed standing water in observation hole: None

☐ Depth to soil redoximorphic features (mottles): None

☐ Depth weeping from side of observation hole: None

DEEP OBSERVATION TEST HOLE SOIL LOG
496 SUMMER STREET, FRANKLIN MA 02038

Deep Observation Hole: OTH 2 **Date of Test Hole: October 28, 2022** **Soil Evaluation By: Daniel J. Merrikin, P.E.**
(Mass. Approved Soil Evaluator)

Depth (In.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
7”	A	10YR4/3				Loamy Sand	1%	<1%	Massive	V. Friable	
20”	Bw	10YR6/8				Loamy Sand	1%	1%	Massive	V. Friable	
80”	C	2.5Y6/4	78”	7.5Y6/8	5%	Loamy Sand	3%	2%	Massive	V. Friable	Refusal @ 80”

Additional Notes: Ground Elev.=389.6

Groundwater Indicators Observed at Time of Testing:

☐ Depth observed standing water in observation hole: None

☒ Depth to soil redoximorphic features (mottles): 78” (Elev.=383.1)

☐ Depth weeping from side of observation hole: None

DEEP OBSERVATION TEST HOLE SOIL LOG
496 SUMMER STREET, FRANKLIN MA 02038

Deep Observation Hole: OTH 3 **Date of Test Hole: October 28, 2022** **Soil Evaluation By: Daniel J. Merrikin, P.E.**
(Mass. Approved Soil Evaluator)

Depth (In.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
6”	A	10YR4/3				Loamy Sand	1%	1%	Massive	V. Friable	
28”	Bw	10YR6/8				Loamy Sand	3%	1%	Massive	V. Friable	
48”	C1	10YR6/6				Loamy Sand	1%	1%	Massive	V. Friable	
110”	C2	2.5Y6/4				LS/S	3%	4%	Massive	V. Friable	

Additional Notes: Ground Elev.=378.3

<u>Groundwater Indicators Observed at Time of Testing:</u>

☐ Depth observed standing water in observation hole: None

☐ Depth to soil redoximorphic features (mottles): None

☐ Depth weeping from side of observation hole: None

DEEP OBSERVATION TEST HOLE SOIL LOG
496 SUMMER STREET, FRANKLIN MA 02038

Deep Observation Hole: OTH 4 **Date of Test Hole: October 28, 2022** **Soil Evaluation By: Daniel J. Merrikin, P.E.**
(Mass. Approved Soil Evaluator)

Depth (In.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
5”	A	10YR4/3				Loamy Sand	1%	1%	Massive	V. Friable	
26”	Bw	10YR6/8				Loamy Sand	1%	1%	Massive	V. Friable	
50”	C1	10YR6/6				Loamy Sand	1%	1%	Massive	V. Friable	
120”	C2	2.5Y6/4				Med. Sand	7%	10%	Single Grain	Loose	

Additional Notes: Ground Elev.=377.6

<u>Groundwater Indicators Observed at Time of Testing:</u>

☐ Depth observed standing water in observation hole: None

☐ Depth to soil redoximorphic features (mottles): None

☐ Depth weeping from side of observation hole: None

DEEP OBSERVATION TEST HOLE SOIL LOG
496 SUMMER STREET, FRANKLIN MA 02038

Deep Observation Hole: OTH 5 **Date of Test Hole: October 28, 2022** **Soil Evaluation By: Daniel J. Merrikin, P.E.**
(Mass. Approved Soil Evaluator)

Depth (In.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
5”	A	10YR4/3				Loamy Sand	1%	1%	Massive	V. Friable	
26”	B	10YR6/8				Loamy Sand	1%	1%	Massive	V. Friable	
72”	C	2.5Y6/4				Loamy Sand	6%	10%	Massive	V. Friable	Boulders @ Bottom

Additional Notes: Ground Elev.=372.4

<u>Groundwater Indicators Observed at Time of Testing:</u>

☐ Depth observed standing water in observation hole: None

☐ Depth to soil redoximorphic features (mottles): None

☐ Depth weeping from side of observation hole: None

DEEP OBSERVATION TEST HOLE SOIL LOG
496 SUMMER STREET, FRANKLIN MA 02038

Deep Observation Hole: OTH 6 **Date of Test Hole: October 28, 2022** **Soil Evaluation By: Daniel J. Merrikin, P.E.**
(Mass. Approved Soil Evaluator)

Depth (In.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
5”	A	10YR4/3				Loamy Sand	1%	1%	Massive	V. Friable	
20”	Bw	10YR6/8				Loamy Sand	2%	1%	Massive	V. Friable	
110”	C	2.5Y6/4				Loamy Sand	3%	2%	Massive	V. Friable	

Additional Notes: Ground Elev.=392.0

<u>Groundwater Indicators Observed at Time of Testing:</u>

☐ Depth observed standing water in observation hole: None

☐ Depth to soil redoximorphic features (mottles): None

☐ Depth weeping from side of observation hole: None

DEEP OBSERVATION TEST HOLE SOIL LOG
496 SUMMER STREET, FRANKLIN MA 02038

Deep Observation Hole: OTH 7 **Date of Test Hole: October 28, 2022** **Soil Evaluation By: Daniel J. Merrikin, P.E.**
(Mass. Approved Soil Evaluator)

Depth (In.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
10”	A	10YR4/3				Loamy Sand	1%	1%	Massive	V. Friable	Refusal @ 10”

Additional Notes: Ground Elev.=399.2

Groundwater Indicators Observed at Time of Testing:

☐ Depth observed standing water in observation hole: None

☐ Depth to soil redoximorphic features (mottles): None

☐ Depth weeping from side of observation hole: None

DEEP OBSERVATION TEST HOLE SOIL LOG
496 SUMMER STREET, FRANKLIN MA 02038

Deep Observation Hole: OTH 8 **Date of Test Hole: October 28, 2022** **Soil Evaluation By: Daniel J. Merrikin, P.E.**
(Mass. Approved Soil Evaluator)

Depth (In.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
4”	A	10YR4/3				Loamy Sand	1%	1%	Massive	V. Friable	Surface Boulders
24”	Bw	10YR6/8				Loamy Sand	1%	1%	Massive	V. Friable	
94”	C	2.5Y6/4				Loamy Sand	4%	3%	Massive	V. Friable	

Additional Notes: Ground Elev.=351.7

<u>Groundwater Indicators Observed at Time of Testing:</u>

☐ Depth observed standing water in observation hole: None

☐ Depth to soil redoximorphic features (mottles): None

☐ Depth weeping from side of observation hole: None

DEEP OBSERVATION TEST HOLE SOIL LOG
496 SUMMER STREET, FRANKLIN MA 02038

Deep Observation Hole: OTH 9 **Date of Test Hole: October 28, 2022** **Soil Evaluation By: Daniel J. Merrikin, P.E.**
(Mass. Approved Soil Evaluator)

Depth (In.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
3”	A	10YR4/3				Loamy Sand	1%	1%	Massive	V. Friable	
18”	Bw	10YR6/8				Loamy Sand	2%	1%	Massive	V. Friable	
76”	C	2.5Y6/4				Loamy Sand	4%	6%	Massive	V. Friable	

Additional Notes: Ground Elev.=356.1

Groundwater Indicators Observed at Time of Testing:

☐ Depth observed standing water in observation hole: None

☐ Depth to soil redoximorphic features (mottles): None

☐ Depth weeping from side of observation hole: None

DEEP OBSERVATION TEST HOLE SOIL LOG
496 SUMMER STREET, FRANKLIN MA 02038

Deep Observation Hole: OTH 10 **Date of Test Hole: October 28, 2022** **Soil Evaluation By: Daniel J. Merrikin, P.E.**
(Mass. Approved Soil Evaluator)

Depth (In.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
3”	A	10YR4/3				Loamy Sand	1%	1%	Massive	V. Friable	
20”	Bw	10YR6/8				Loamy Sand	2%	1%	Massive	V. Friable	
96”	C	2.5Y6/4				Loamy Sand	3%	1%	Massive	V. Friable	

Additional Notes: Ground Elev.=375.8

<u>Groundwater Indicators Observed at Time of Testing:</u>

☐ Depth observed standing water in observation hole: None

☐ Depth to soil redoximorphic features (mottles): None

☐ Depth weeping from side of observation hole: None

DEEP OBSERVATION TEST HOLE SOIL LOG
496 SUMMER STREET, FRANKLIN MA 02038

Deep Observation Hole: OTH 11 **Date of Test Hole: October 28, 2022** **Soil Evaluation By: Daniel J. Merrikin, P.E.**
(Mass. Approved Soil Evaluator)

Depth (In.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
3”	A	10YR4/3				Loamy Sand	1%	1%	Massive	V. Friable	
21”	Bw	10YR6/8				Loamy Sand	1%	1%	Massive	V. Friable	
62”	C	2.5Y6/4				Loamy Sand	4%	2%	Massive	V. Friable	Likely Refusal @ 62”

Additional Notes: Ground Elev.=407.7

Groundwater Indicators Observed at Time of Testing:

☐ Depth observed standing water in observation hole: None

☐ Depth to soil redoximorphic features (mottles): None

☐ Depth weeping from side of observation hole: None

DEEP OBSERVATION TEST HOLE SOIL LOG
496 SUMMER STREET, FRANKLIN MA 02038

Deep Observation Hole: OTH 12 **Date of Test Hole: October 28, 2022** **Soil Evaluation By: Daniel J. Merrikin, P.E.**
(Mass. Approved Soil Evaluator)

Depth (In.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
4”	A	10YR4/3				Sandy Loam	1%	<1%	Massive	V. Friable	
20”	Bw	10YR6/6				Sandy Loam	1%	1%	Massive	V. Friable	
30”	C	2.5Y6/3				Loamy Sand	2%	1%	Massive	V. Friable	Refusal @ 30”

Additional Notes: Ground Elev.=424.3

<u>Groundwater Indicators Observed at Time of Testing:</u>

☐ Depth observed standing water in observation hole: None

☐ Depth to soil redoximorphic features (mottles): None

☐ Depth weeping from side of observation hole: None

DEEP OBSERVATION TEST HOLE SOIL LOG
496 SUMMER STREET, FRANKLIN MA 02038

Deep Observation Hole: OTH 13 **Date of Test Hole: October 28, 2022** **Soil Evaluation By: Daniel J. Merrikin, P.E.**
(Mass. Approved Soil Evaluator)

Depth (In.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
3”	A	10YR4/3				Loamy Sand	1%	<1%	Massive	V. Friable	
23”	Bw	10YR6/8				Loamy Sand	2%	2%	Massive	V. Friable	
72”	C	2.5Y6/4				Loamy Sand	3%	2%	Massive	V. Friable	

Additional Notes: Ground Elev.=420.2

Groundwater Indicators Observed at Time of Testing:

☐ Depth observed standing water in observation hole: None

☐ Depth to soil redoximorphic features (mottles): None

☐ Depth weeping from side of observation hole: None

DEEP OBSERVATION TEST HOLE SOIL LOG
496 SUMMER STREET, FRANKLIN MA 02038

Deep Observation Hole: OTH 14 **Date of Test Hole: October 28, 2022** **Soil Evaluation By: Daniel J. Merrikin, P.E.**
(Mass. Approved Soil Evaluator)

Depth (In.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
4”	A	10YR4/3				Loamy Sand	1%	1%	Massive	V. Friable	
24”	Bw	10YR6/8				LS/SL	1%	1%	Massive	V. Friable	
80”	C	2.5Y6/4	31”	7.5Y6/8	5%	LS/SL	2%	1%	Massive	V. Friable	

Additional Notes: Ground Elev.=411.2

Groundwater Indicators Observed at Time of Testing:

☐ Depth observed standing water in observation hole: None

☒ Depth to soil redoximorphic features (mottles): 31” (Elev.=408.6)

☐ Depth weeping from side of observation hole: None

DEEP OBSERVATION TEST HOLE SOIL LOG
496 SUMMER STREET, FRANKLIN MA 02038

Deep Observation Hole: OTH 15 **Date of Test Hole: October 28, 2022** **Soil Evaluation By: Daniel J. Merrikin, P.E.**
(Mass. Approved Soil Evaluator)

Depth (In.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
4”	A	10YR4/3				Loamy Sand	1%	1%	Massive	V. Friable	
24”	Bw	10YR6/8				LS/SL	1%	1%	Massive	V. Friable	
80”	C	2.5Y6/4	31”	7.5Y6/8	5%	LS/SL	2%	1%	Massive	V. Friable	

Additional Notes: Ground Elev.=411.4

Groundwater Indicators Observed at Time of Testing:

☐ Depth observed standing water in observation hole: None

☒ Depth to soil redoximorphic features (mottles): 31” (Elev.=408.8)

☐ Depth weeping from side of observation hole: None

DEEP OBSERVATION TEST HOLE SOIL LOG
496 SUMMER STREET, FRANKLIN MA 02038

Deep Observation Hole: OTH 16   Date of Test Hole: May 23, 2023   Soil Evaluation By: Daniel J. Merrikin, P.E.
(Mass. Approved Soil Evaluator)

Depth (In.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
4”	A	10YR4/3				Loamy Sand	1%	<1%	Massive	V. Friable	
30”	Bw	10YR6/8				Loamy Sand	2%	1%	Massive	V. Friable	
138”	C	2.5Y6/4				Loamy Sand/Sand	5%	2%	Massive	V. Friable	

Additional Notes: Ground Elev.=385.5

<u>Groundwater Indicators Observed at Time of Testing:</u>

☐ Depth observed standing water in observation hole: None

☐ Depth to soil redoximorphic features (mottles): None

☐ Depth weeping from side of observation hole: None

DEEP OBSERVATION TEST HOLE SOIL LOG
496 SUMMER STREET, FRANKLIN MA 02038

Deep Observation Hole: OTH 17 **Date of Test Hole: May 23, 2023** **Soil Evaluation By: Daniel J. Merrikin, P.E.**
(Mass. Approved Soil Evaluator)

Depth (In.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
4”	A	10YR4/3				Loamy Sand	1%	<1%	Massive	V. Friable	
31”	Bw	10YR6/8				Loamy Sand	1%	1%	Massive	V. Friable	
130”	C	2.5Y6/4				Loamy Sand/Sand	3%	4%	Massive	V. Friable	

Additional Notes: Ground Elev.=381.9

<u>Groundwater Indicators Observed at Time of Testing:</u>

☐ Depth observed standing water in observation hole: None

☒ Depth to soil redoximorphic features (mottles): None

☐ Depth weeping from side of observation hole: None

DEEP OBSERVATION TEST HOLE SOIL LOG
496 SUMMER STREET, FRANKLIN MA 02038

Deep Observation Hole: OTH 18 **Date of Test Hole: May 23, 2023** **Soil Evaluation By: Daniel J. Merrikin, P.E.**
(Mass. Approved Soil Evaluator)

Depth (In.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
5”	A	10YR4/3				Loamy Sand	1%	<1%	Massive	V. Friable	
29”	Bw	10YR6/8				Loamy Sand	1%	2%	Massive	V. Friable	Boulders
138”	C	2.5Y6/4				Loamy Sand/Sand	3%	2%	Massive	V. Friable	

Additional Notes: Ground Elev.=381.8

<u>Groundwater Indicators Observed at Time of Testing:</u>

☐ Depth observed standing water in observation hole: None

☐ Depth to soil redoximorphic features (mottles): None

☐ Depth weeping from side of observation hole: None

DEEP OBSERVATION TEST HOLE SOIL LOG
496 SUMMER STREET, FRANKLIN MA 02038

Deep Observation Hole: OTH 19 **Date of Test Hole: May 23, 2023** **Soil Evaluation By: Daniel J. Merrikin, P.E.**
(Mass. Approved Soil Evaluator)

Depth (In.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
4”	A	10YR4/3				Loamy Sand	1%	<1%	Massive	V. Friable	
25”	Bw	10YR6/8				Loamy Sand	1%	2%	Massive	V. Friable	
102”	C1	2.5Y6/4				Loamy Sand	3%	1%	Massive	V. Friable	

Additional Notes: Ground Elev.=388.4

<u>Groundwater Indicators Observed at Time of Testing:</u>

☐ Depth observed standing water in observation hole: None

☐ Depth to soil redoximorphic features (mottles): None

☐ Depth weeping from side of observation hole: None

DEEP OBSERVATION TEST HOLE SOIL LOG
496 SUMMER STREET, FRANKLIN MA 02038

Deep Observation Hole: OTH 20   Date of Test Hole: May 23, 2023   Soil Evaluation By: Daniel J. Merrikin, P.E.
(Mass. Approved Soil Evaluator)

Depth (In.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
3”	A	10YR4/3				Loamy Sand	<1%	<1%	Massive	V. Friable	
18”	Bw	10YR6/8				Loamy Sand	1%	<1%	Massive	V. Friable	
105”	C	2.5Y6/4				Loamy Sand	4%	2%	Massive	V. Friable	Likely refusal @ 105”

Additional Notes: Ground Elev.=380.0

Groundwater Indicators Observed at Time of Testing:

☐ Depth observed standing water in observation hole: None

☐ Depth to soil redoximorphic features (mottles): None

☐ Depth weeping from side of observation hole: None

DEEP OBSERVATION TEST HOLE SOIL LOG
496 SUMMER STREET, FRANKLIN MA 02038

Deep Observation Hole: OTH 21 **Date of Test Hole: May 23, 2023** **Soil Evaluation By: Daniel J. Merrikin, P.E.**
(Mass. Approved Soil Evaluator)

Depth (In.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
4”	A	10YR4/3				Loamy Sand	1%	<1%	Massive	V. Friable	
19”	Bw	10YR6/8				Loamy Sand	1%	1%	Massive	V. Friable	
115”	C	2.5Y6/4				Loamy Sand	4%	2%	Massive	V. Friable	Likely refusal @ 115”

Additional Notes: Ground Elev.=381.0

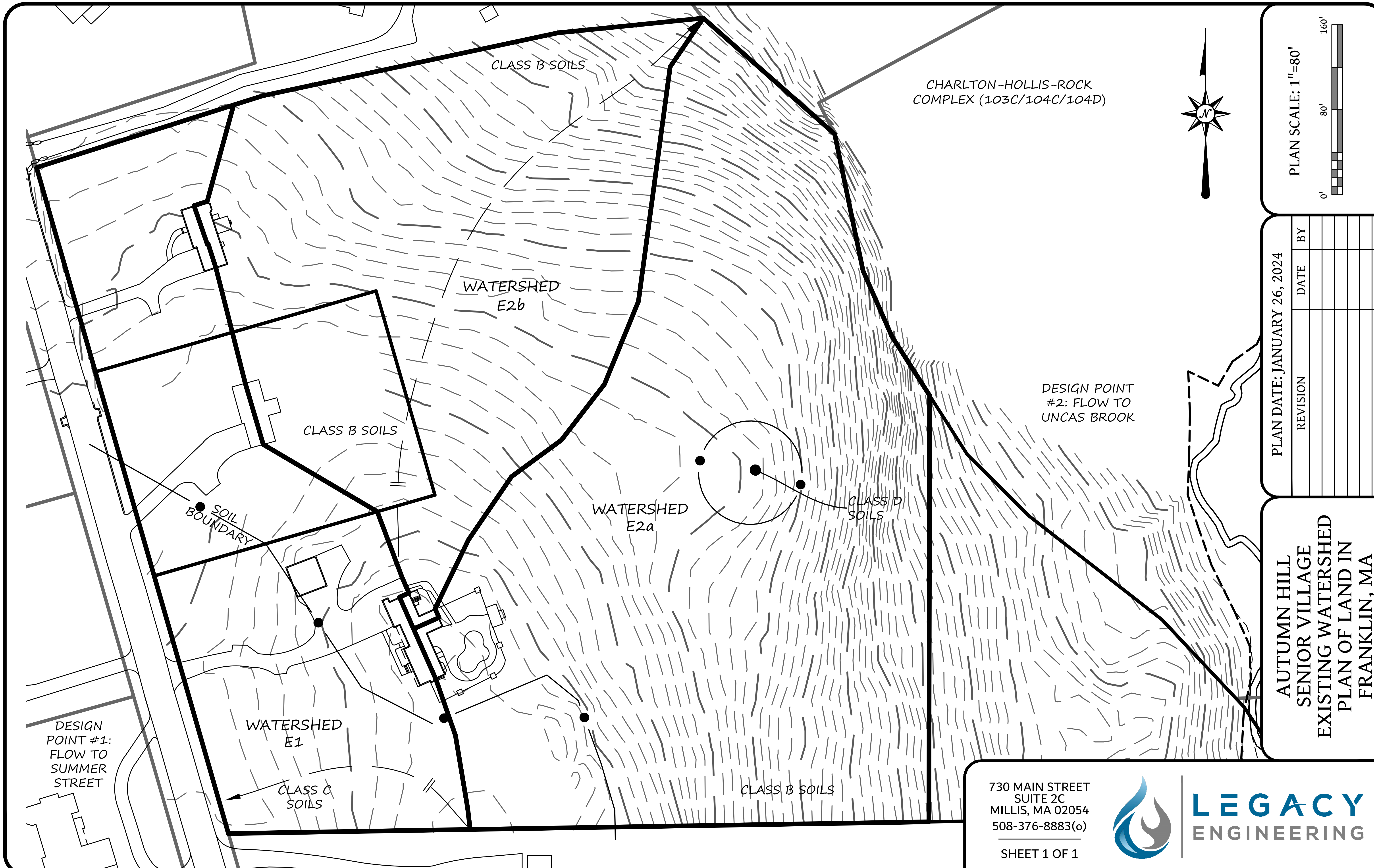
Groundwater Indicators Observed at Time of Testing:

☐ Depth observed standing water in observation hole: None

☐ Depth to soil redoximorphic features (mottles): None

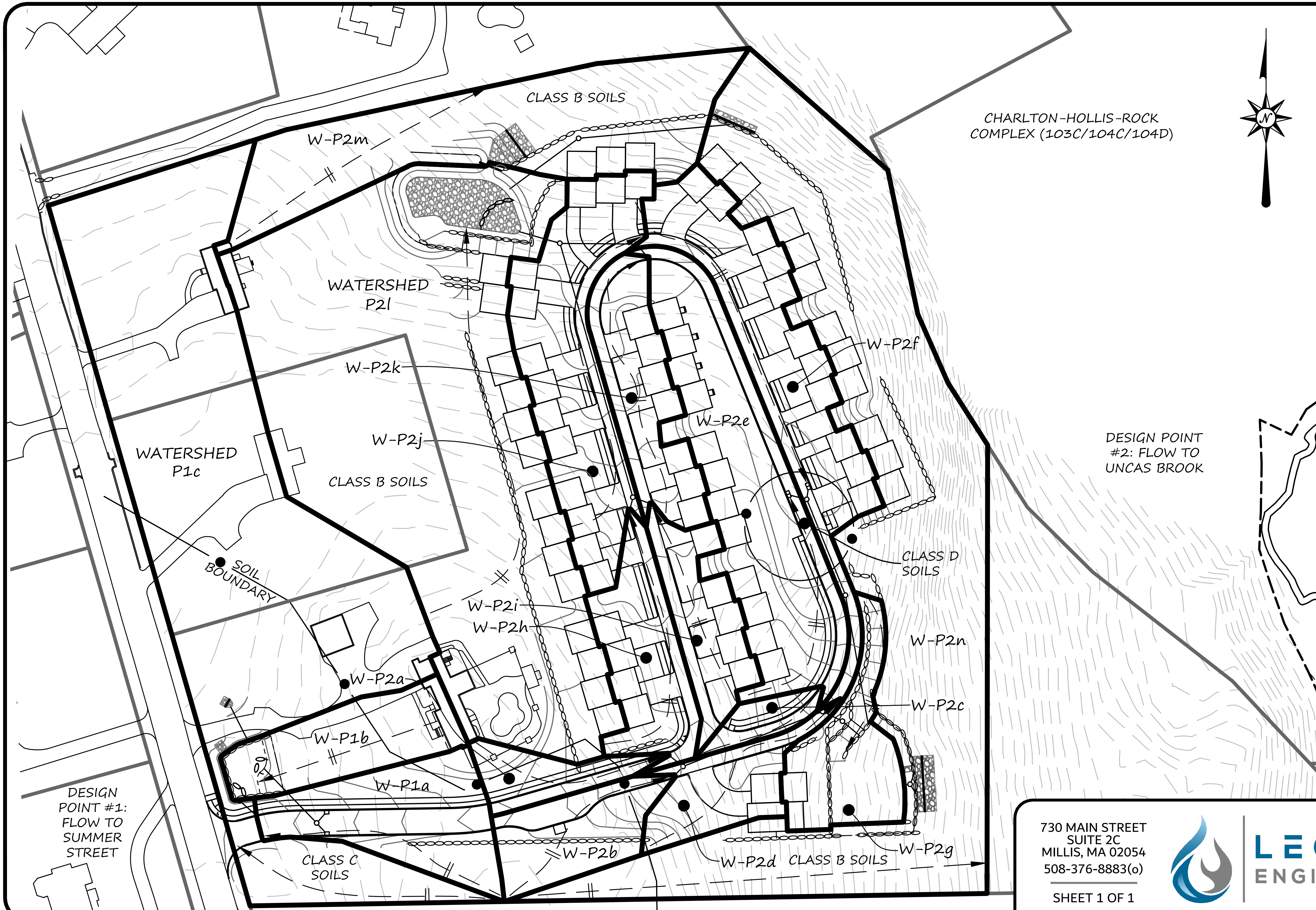
☐ Depth weeping from side of observation hole: None

ATTACHMENT I: Existing Watershed Plan



CLASS B SOILS
CHARLTON-HOLLIS-ROCK COMPLEX (103C/104C/104D)
WATERSHED E2b
CLASS B SOILS
SOIL BOUNDARY
WATERSHED E2a
CLASS D SOILS
DESIGN POINT #2: FLOW TO UNCAS BROOK
DESIGN POINT #1: FLOW TO SUMMER STREET
WATERSHED E1
CLASS C SOILS
CLASS B SOILS
PLAN SCALE: 1"=80'
0'
80'
160'
PLAN DATE: JANUARY 26, 2024
REVISION
DATE
BY
AUTUMN HILL SENIOR VILLAGE EXISTING WATERSHED PLAN OF LAND IN FRANKLIN, MA
730 MAIN STREET
SUITE 2C
MILLIS, MA 02054
508-376-8883(o)
SHEET 1 OF 1
LEGACY ENGINEERING

ATTACHMENT J: Proposed Watershed Plan



PLAN SCALE: 1"=80'

PLAN DATE: JANUARY 26, 2024

REVISION	DATE	BY

AUTUMN HILL SENIOR VILLAGE
PROPOSED WATERSHED
PLAN OF LAND IN
FRANKLIN, MA

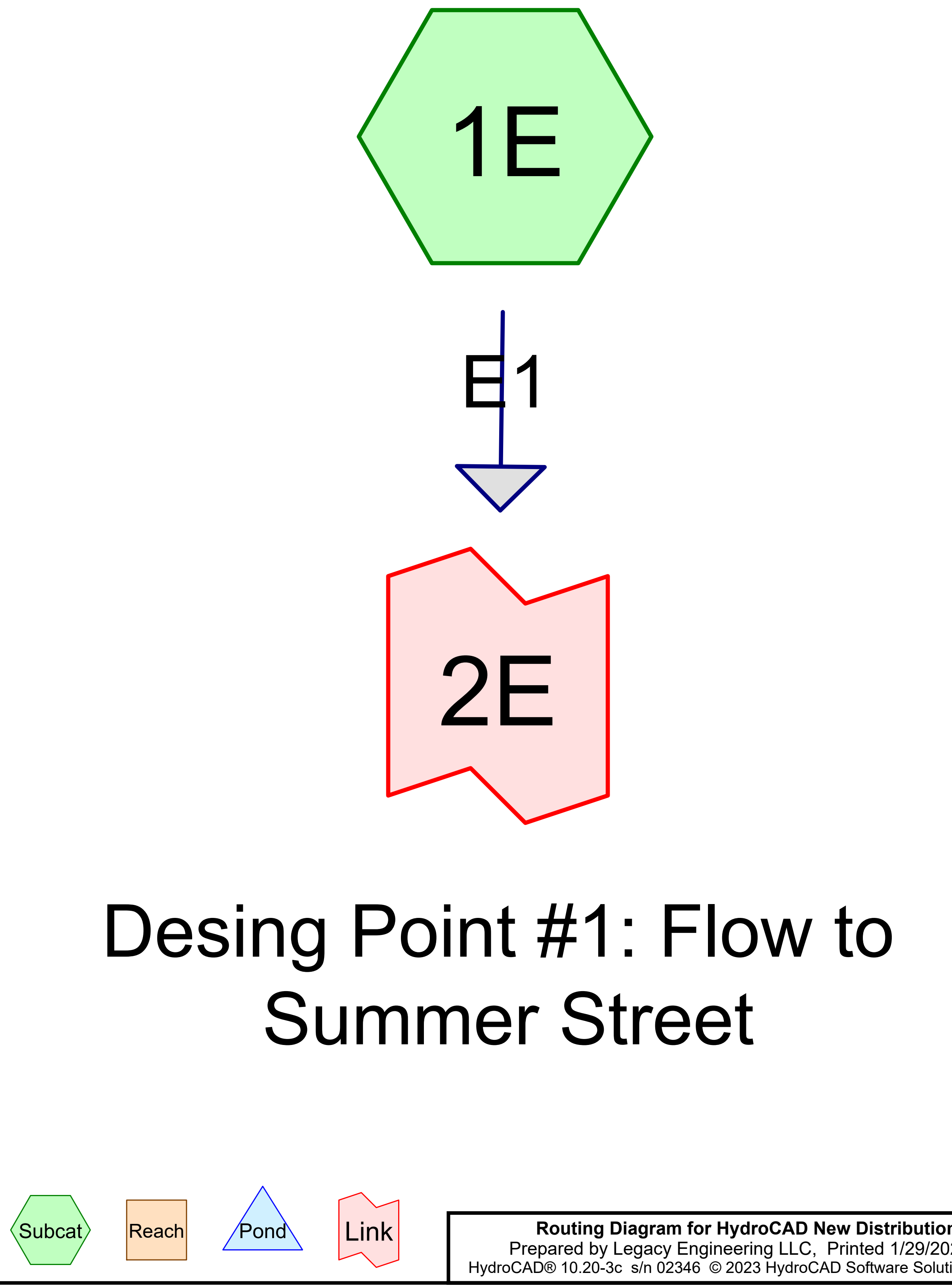
730 MAIN STREET
SUITE 2C
MILLIS, MA 02054
508-376-8883(o)

SHEET 1 OF 1

LEGACY ENGINEERING

ATTACHMENT K: Hydrocad Hydrology Calculations

DESIGN POINT #1: FLOW TO SUMMER STREET EXISTING CONDITIONS



Routing Diagram for HydroCAD New Distribution
Prepared by Legacy Engineering LLC, Printed 1/29/2024

Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-YR	NRCC 24-hr	D	Default	24.00	1	3.36	2
2	10-YR	NRCC 24-hr	D	Default	24.00	1	5.22	2
3	25-YR	NRCC 24-hr	D	Default	24.00	1	6.37	2
4	100-YR	NRCC 24-hr	D	Default	24.00	1	8.15	2

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.441	61	>75% Grass cover, Good HSG B (1E)
0.101	74	>75% Grass cover, Good, HSG C (1E)
0.207	98	Paved parking HSG B (1E)
0.070	98	Paved parking, HSG C (1E)
0.088	98	Roofs, HSG B (1E)
0.001	98	Roofs, HSG C (1E)
0.874	55	Woods, Good, HSG B (1E)
1.063	70	Woods, Good, HSG C (1E)
2.844	**68**	**TOTAL AREA**

Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1E: E1 Runoff Area=123,891 sf 12.84% Impervious Runoff Depth=0.96"
Flow Length=255' Tc=11.9 min CN=WQ Runoff=1.99 cfs 0.227 af

Link 2E: Desing Point #1: Flow to Summer Street Inflow=1.99 cfs 0.227 af
Primary=1.99 cfs 0.227 af

Total Runoff Area = 2.844 ac Runoff Volume = 0.227 af Average Runoff Depth = 0.96"
87.16% Pervious = 2.479 ac 12.84% Impervious = 0.365 ac

Summary for Subcatchment 1E: E1

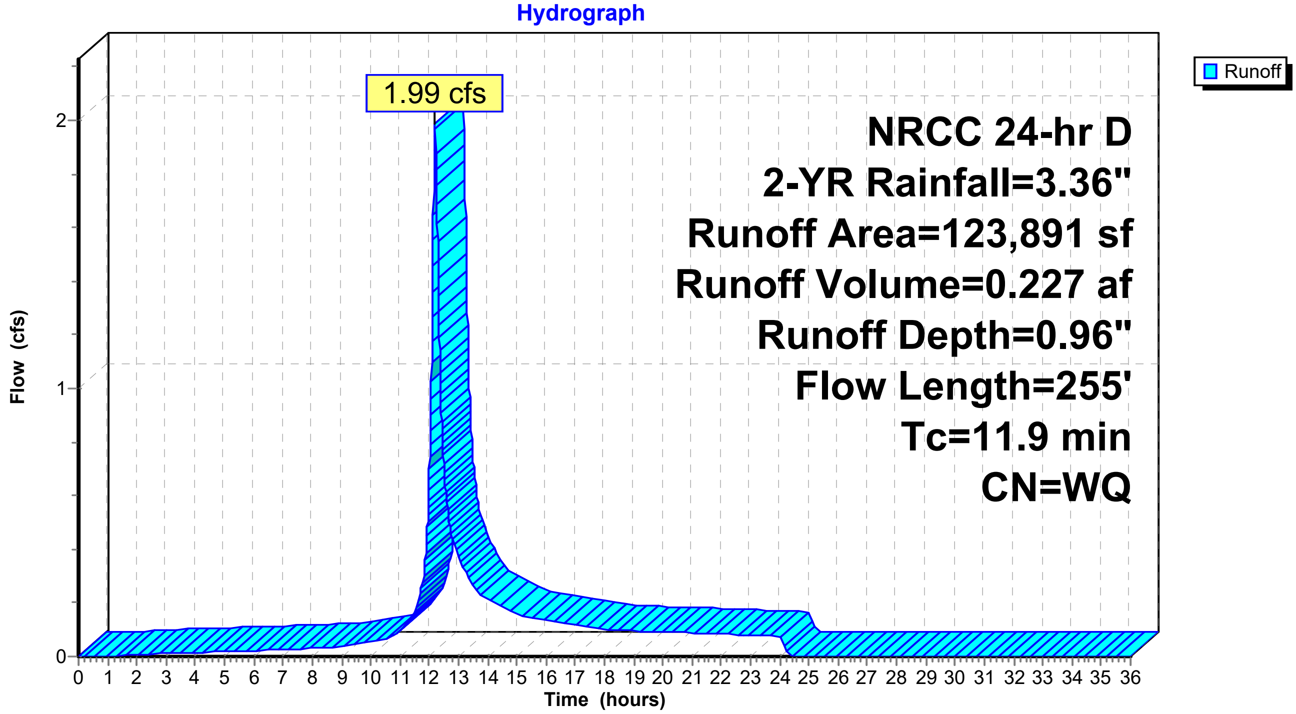
Runoff = 1.99 cfs @ 12.20 hrs, Volume= 0.227 af, Depth= 0.96"
Routed to Link 2E : Desing Point #1: Flow to Summer Street

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 2-YR Rainfall=3.36"

Area (sf)	CN	Description
9,006	98	Paved parking HSG B
3,049	98	Paved parking, HSG C
3,828	98	Roofs, HSG B
26	98	Roofs, HSG C
19,209	61	>75% Grass cover, Good HSG B
4,397	74	>75% Grass cover, Good, HSG C
38,089	55	Woods, Good, HSG B
46,287	70	Woods, Good, HSG C
123,891		Weighted Average
107,982		87.16% Pervious Area
15,909		12.84% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	51	0.0400	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.36"
2.6	204	0.0700	1.32		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
11.9	255	Total			

Subcatchment 1E: E1

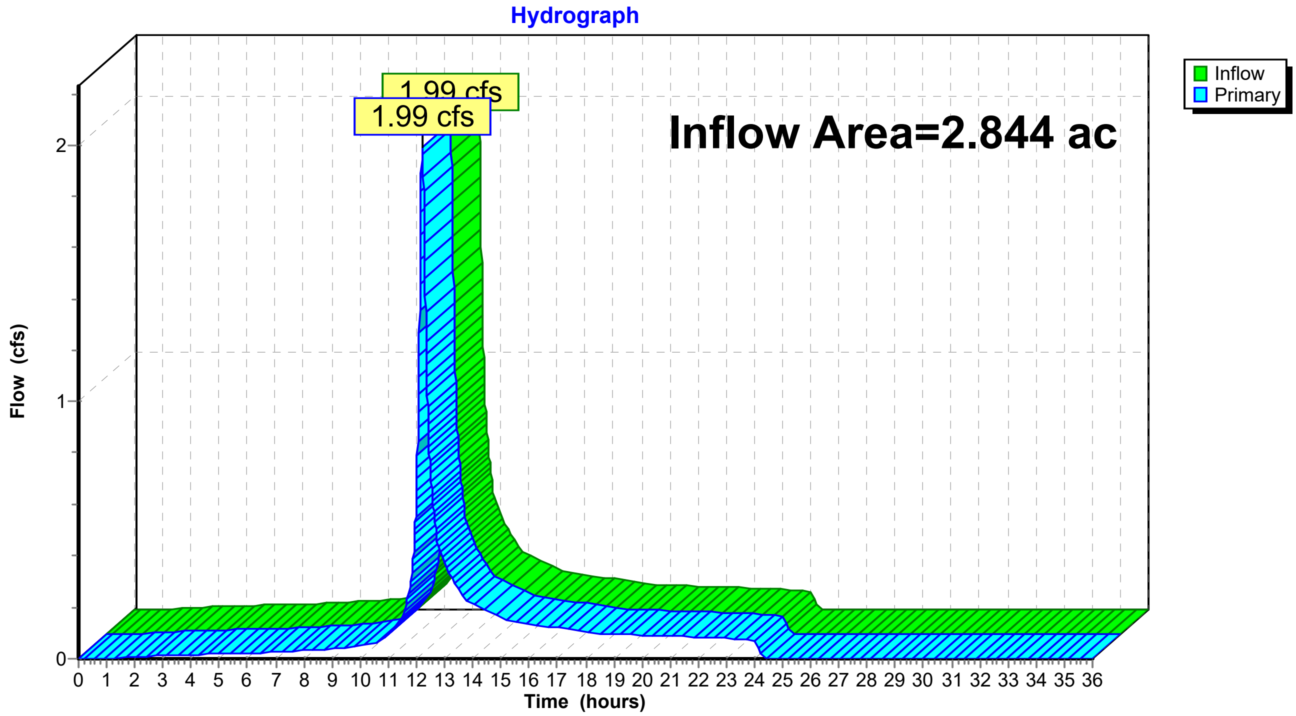


Summary for Link 2E: Desing Point #1: Flow to Summer Street

Inflow Area =	2.844 ac, 12.84% Impervious, Inflow Depth = 0.96" for 2-YR event		
Inflow =	1.99 cfs @ 12.20 hrs, Volume=	0.227 af	
Primary =	1.99 cfs @ 12.20 hrs, Volume=	0.227 af, Atten= 0%, Lag= 0.0 min	

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Link 2E: Desing Point #1: Flow to Summer Street



Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1E: E1 Runoff Area=123,891 sf 12.84% Impervious Runoff Depth=2.12"
Flow Length=255' Tc=11.9 min CN=WQ Runoff=4.94 cfs 0.503 af

Link 2E: Desing Point #1: Flow to Summer Street Inflow=4.94 cfs 0.503 af
Primary=4.94 cfs 0.503 af

Total Runoff Area = 2.844 ac Runoff Volume = 0.503 af Average Runoff Depth = 2.12"
87.16% Pervious = 2.479 ac 12.84% Impervious = 0.365 ac

Summary for Subcatchment 1E: E1

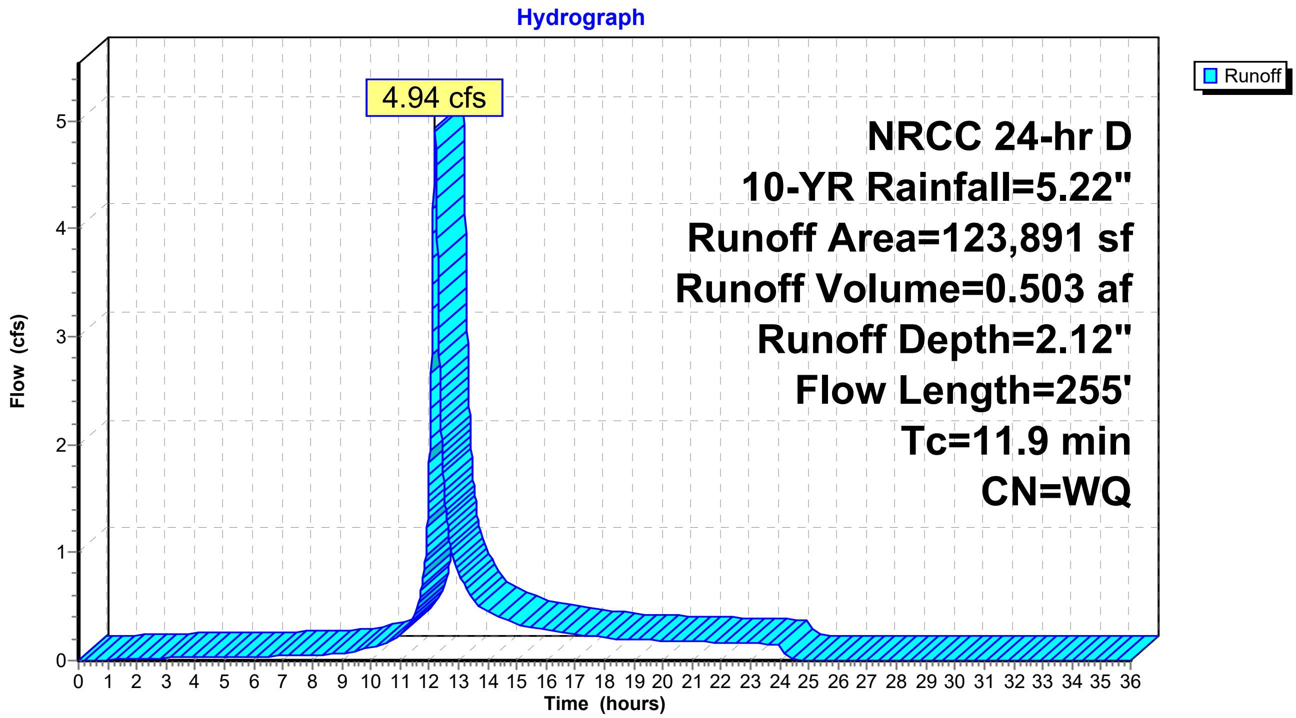
Runoff = 4.94 cfs @ 12.20 hrs, Volume= 0.503 af, Depth= 2.12"
Routed to Link 2E : Desing Point #1: Flow to Summer Street

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 10-YR Rainfall=5.22"

Area (sf)	CN	Description
9,006	98	Paved parking HSG B
3,049	98	Paved parking, HSG C
3,828	98	Roofs, HSG B
26	98	Roofs, HSG C
19,209	61	>75% Grass cover, Good HSG B
4,397	74	>75% Grass cover, Good, HSG C
38,089	55	Woods, Good, HSG B
46,287	70	Woods, Good, HSG C
123,891		Weighted Average
107,982		87.16% Pervious Area
15,909		12.84% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	51	0.0400	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.36"
2.6	204	0.0700	1.32		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
11.9	255	Total			

Subcatchment 1E: E1

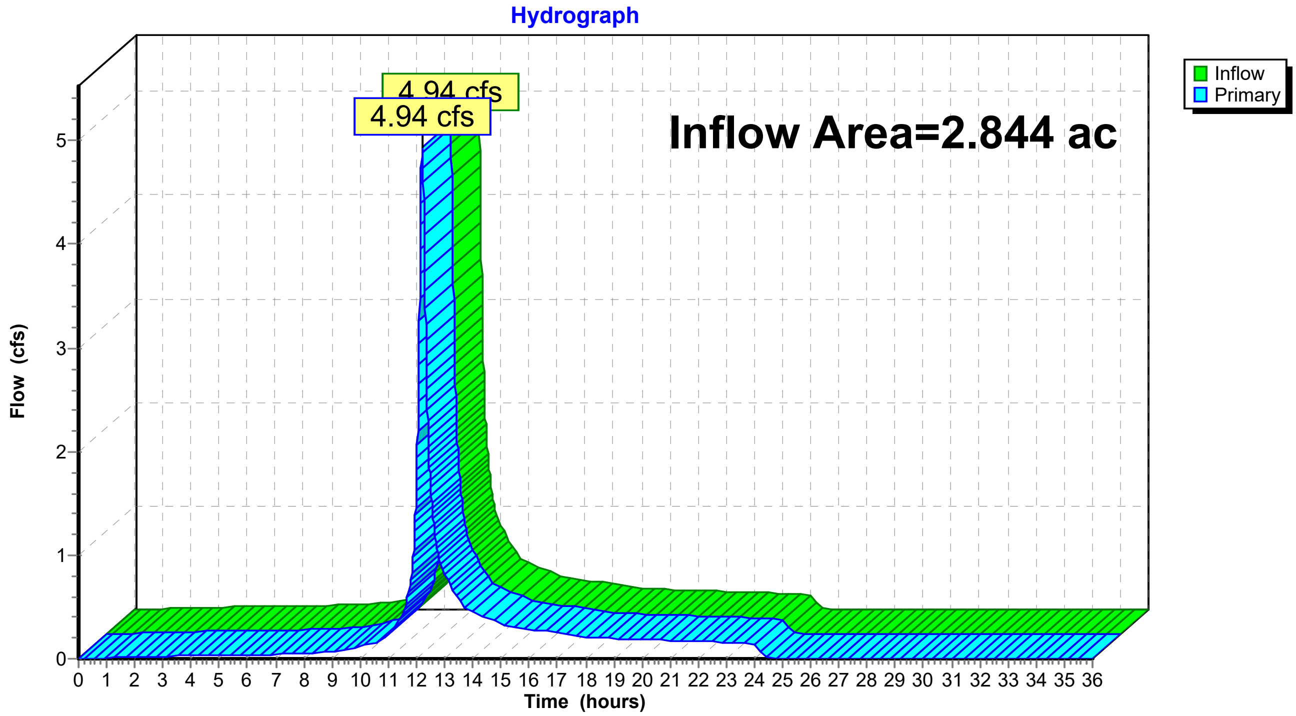


Summary for Link 2E: Desing Point #1: Flow to Summer Street

Inflow Area = 2.844 ac, 12.84% Impervious, Inflow Depth = 2.12" for 10-YR event
Inflow = 4.94 cfs @ 12.20 hrs, Volume= 0.503 af
Primary = 4.94 cfs @ 12.20 hrs, Volume= 0.503 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Link 2E: Desing Point #1: Flow to Summer Street



Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1E: E1 Runoff Area=123,891 sf 12.84% Impervious Runoff Depth=2.95"
Flow Length=255' Tc=11.9 min CN=WQ Runoff=7.04 cfs 0.700 af

Link 2E: Desing Point #1: Flow to Summer Street Inflow=7.04 cfs 0.700 af
Primary=7.04 cfs 0.700 af

Total Runoff Area = 2.844 ac Runoff Volume = 0.700 af Average Runoff Depth = 2.95"
87.16% Pervious = 2.479 ac 12.84% Impervious = 0.365 ac

Summary for Subcatchment 1E: E1

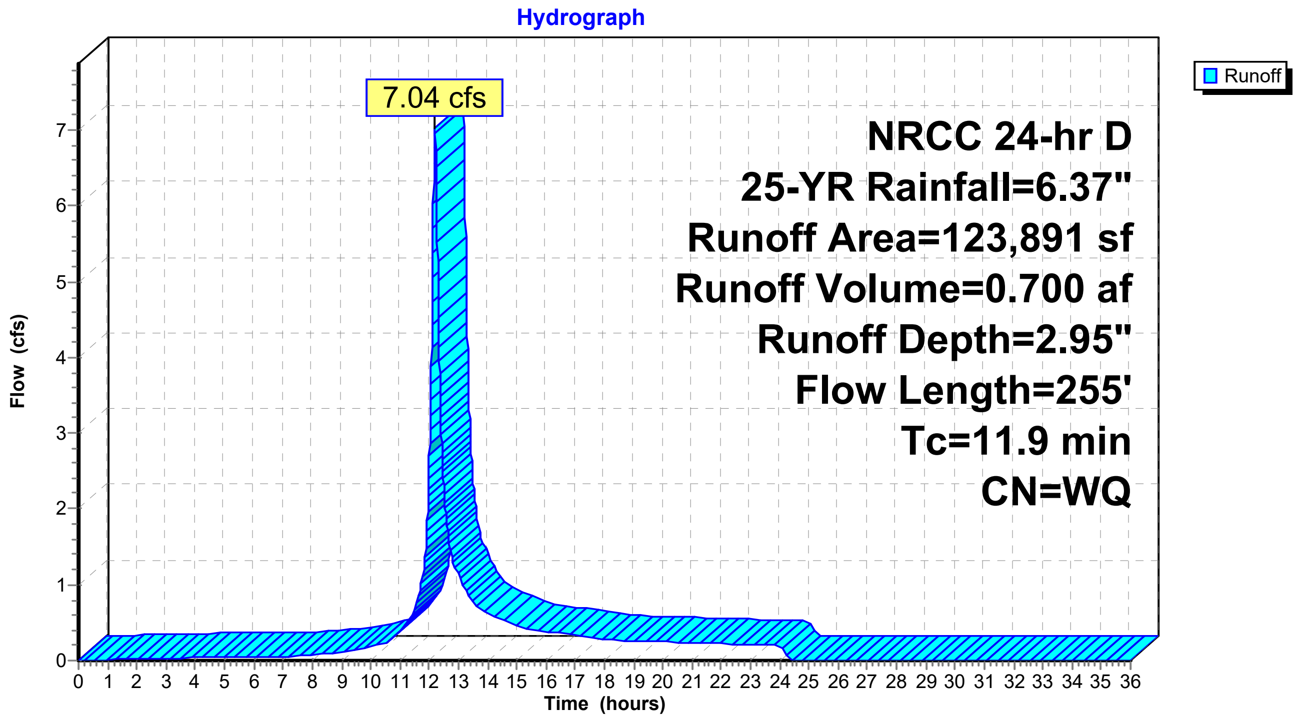
Runoff = 7.04 cfs @ 12.20 hrs, Volume= 0.700 af, Depth= 2.95"
Routed to Link 2E : Desing Point #1: Flow to Summer Street

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 25-YR Rainfall=6.37"

Area (sf)	CN	Description
9,006	98	Paved parking HSG B
3,049	98	Paved parking, HSG C
3,828	98	Roofs, HSG B
26	98	Roofs, HSG C
19,209	61	>75% Grass cover, Good HSG B
4,397	74	>75% Grass cover, Good, HSG C
38,089	55	Woods, Good, HSG B
46,287	70	Woods, Good, HSG C
123,891		Weighted Average
107,982		87.16% Pervious Area
15,909		12.84% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	51	0.0400	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.36"
2.6	204	0.0700	1.32		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
11.9	255	Total			

Subcatchment 1E: E1

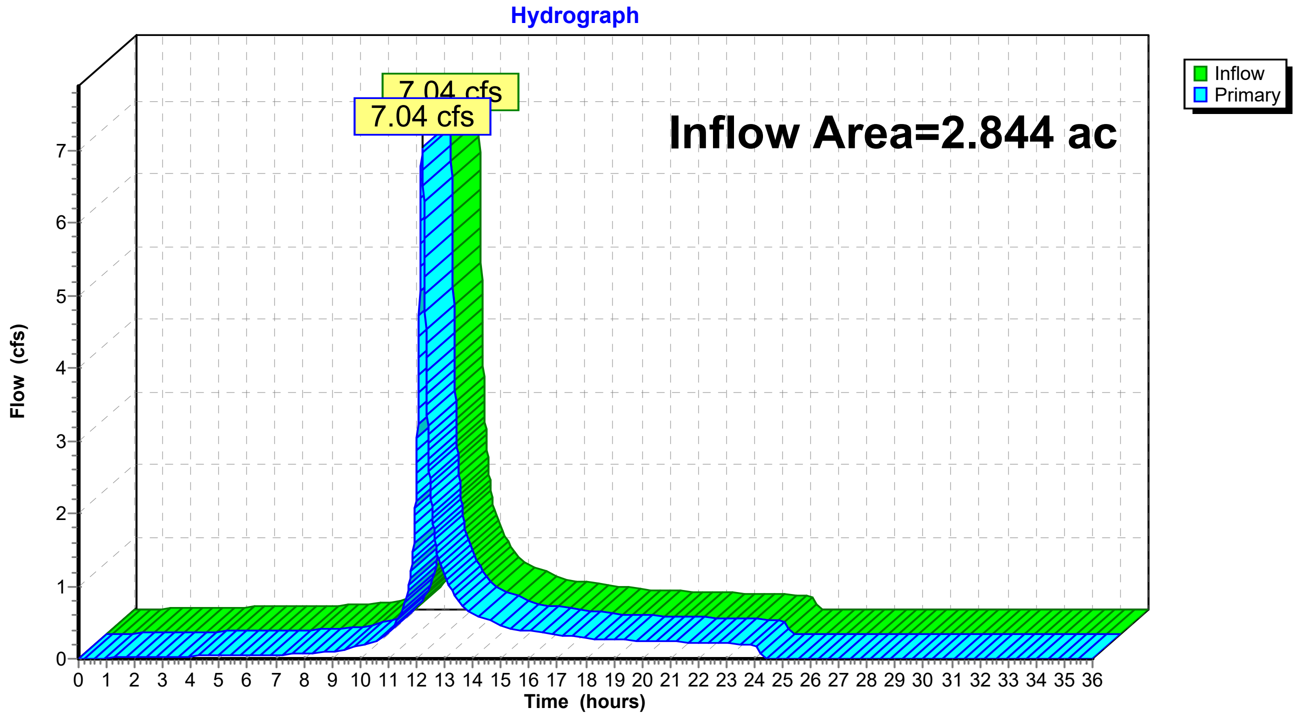


Summary for Link 2E: Desing Point #1: Flow to Summer Street

Inflow Area =	2.844 ac, 12.84% Impervious, Inflow Depth = 2.95"	for 25-YR event	
Inflow =	7.04 cfs @ 12.20 hrs, Volume=	0.700 af	
Primary =	7.04 cfs @ 12.20 hrs, Volume=	0.700 af, Atten= 0%, Lag= 0.0 min	

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Link 2E: Desing Point #1: Flow to Summer Street



Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1E: E1 Runoff Area=123,891 sf 12.84% Impervious Runoff Depth=4.35"
Flow Length=255' Tc=11.9 min CN=WQ Runoff=10.53 cfs 1.031 af

Link 2E: Desing Point #1: Flow to Summer Street Inflow=10.53 cfs 1.031 af
Primary=10.53 cfs 1.031 af

Total Runoff Area = 2.844 ac Runoff Volume = 1.031 af Average Runoff Depth = 4.35"
87.16% Pervious = 2.479 ac 12.84% Impervious = 0.365 ac

Summary for Subcatchment 1E: E1

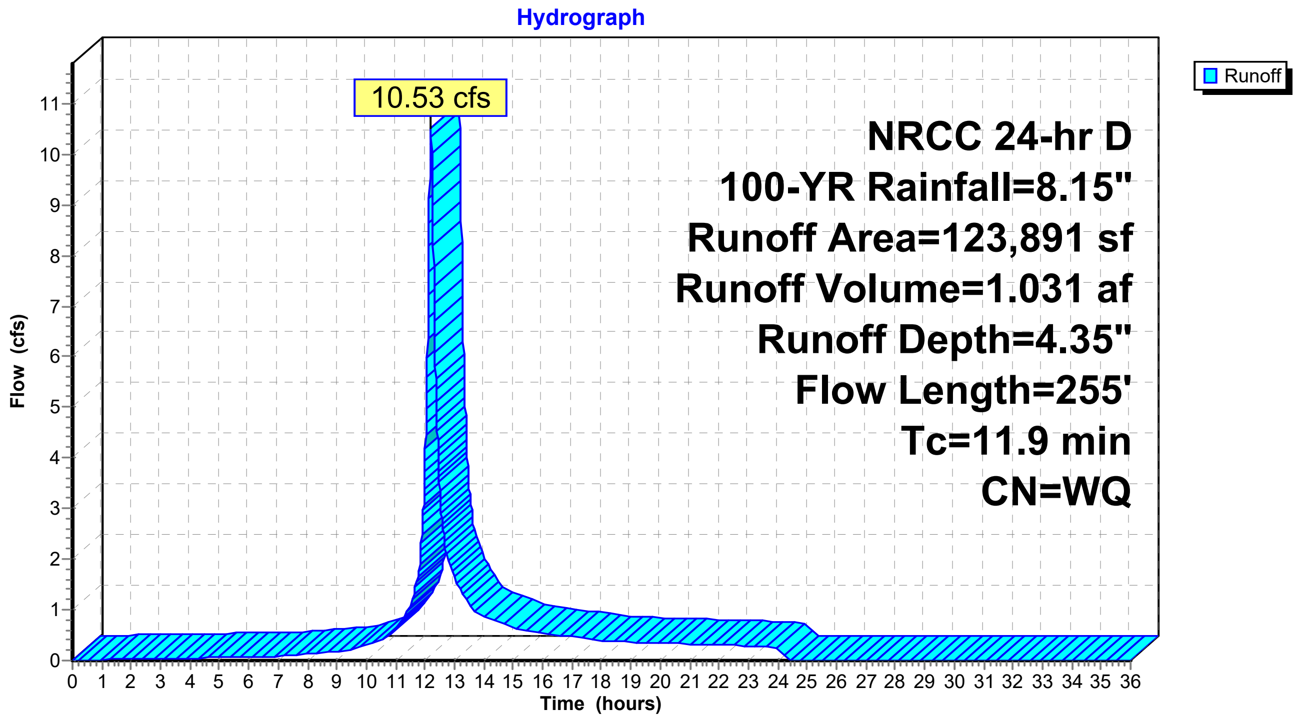
Runoff = 10.53 cfs @ 12.20 hrs, Volume= 1.031 af, Depth= 4.35"
Routed to Link 2E : Desing Point #1: Flow to Summer Street

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 100-YR Rainfall=8.15"

Area (sf)	CN	Description
9,006	98	Paved parking HSG B
3,049	98	Paved parking, HSG C
3,828	98	Roofs, HSG B
26	98	Roofs, HSG C
19,209	61	>75% Grass cover, Good HSG B
4,397	74	>75% Grass cover, Good, HSG C
38,089	55	Woods, Good, HSG B
46,287	70	Woods, Good, HSG C
123,891		Weighted Average
107,982		87.16% Pervious Area
15,909		12.84% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	51	0.0400	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.36"
2.6	204	0.0700	1.32		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
11.9	255	Total			

Subcatchment 1E: E1

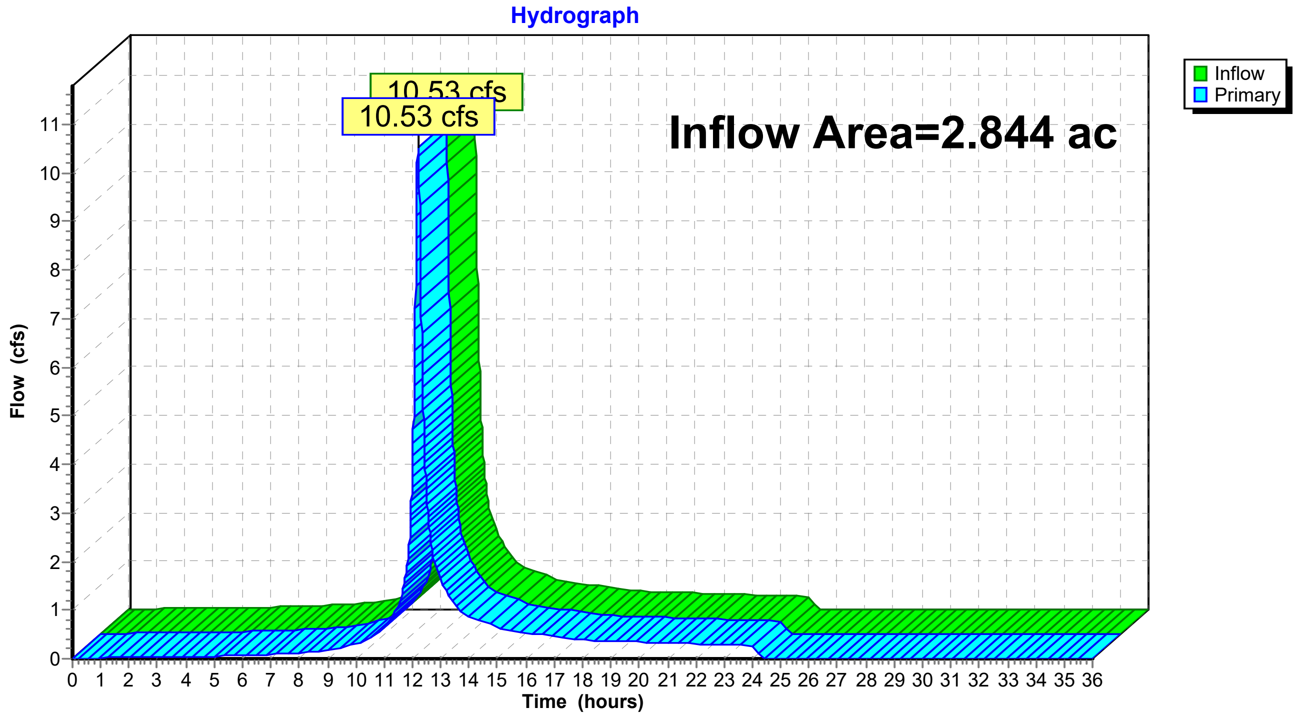


Summary for Link 2E: Desing Point #1: Flow to Summer Street

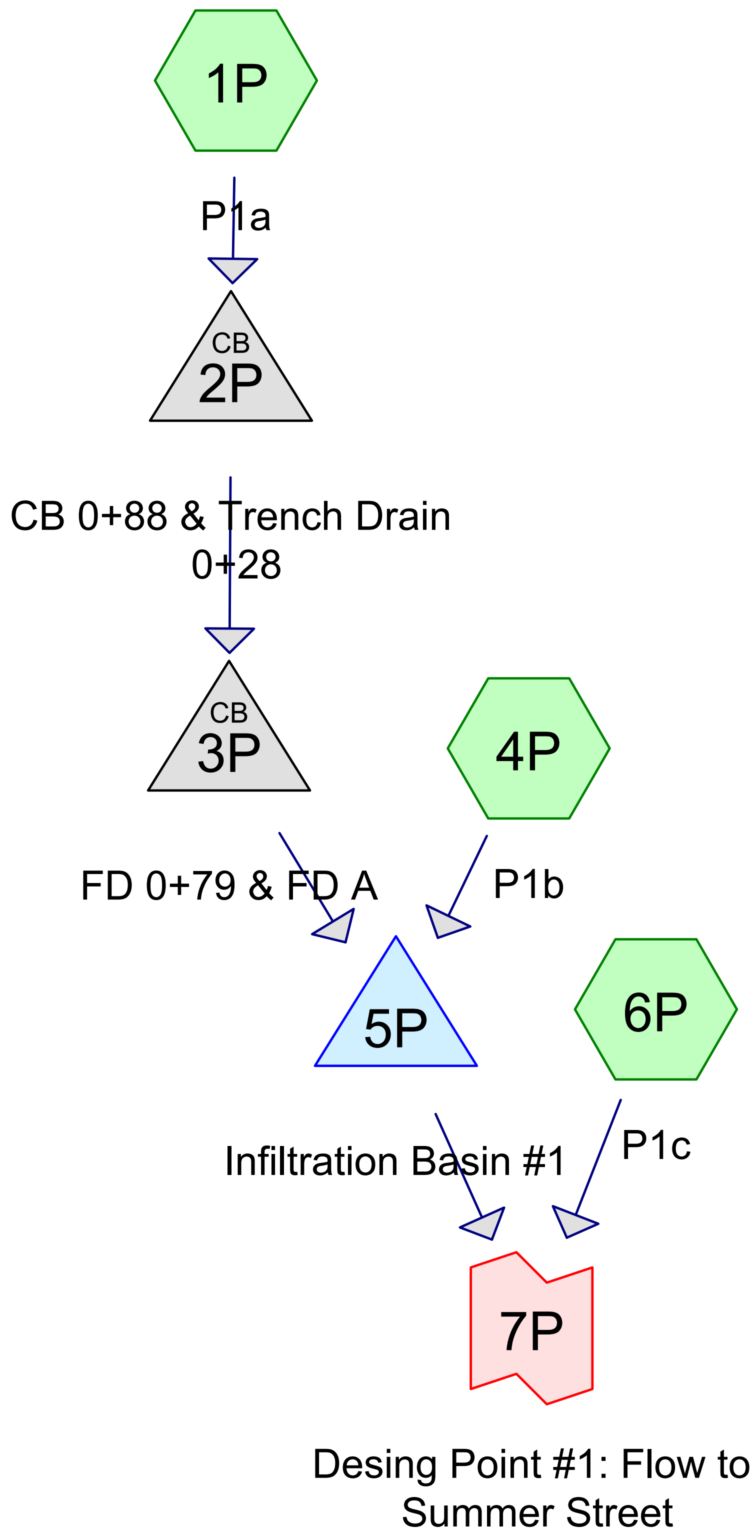
Inflow Area = 2.844 ac, 12.84% Impervious, Inflow Depth = 4.35" for 100-YR event
Inflow = 10.53 cfs @ 12.20 hrs, Volume= 1.031 af
Primary = 10.53 cfs @ 12.20 hrs, Volume= 1.031 af, Atten= 0%, Lag= 0.0 min

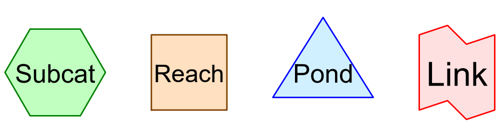
Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Link 2E: Desing Point #1: Flow to Summer Street



DESIGN POINT #1: FLOW TO SUMMER STREET PROPOSED CONDITIONS





Routing Diagram for HydroCAD New Distribution
Prepared by Legacy Engineering LLC, Printed 1/29/2024
HydroCAD® 10.20-3c s/n 02346 © 2023 HydroCAD Software Solutions LLC

Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-YR	NRCC 24-hr	D	Default	24.00	1	3.36	2
2	10-YR	NRCC 24-hr	D	Default	24.00	1	5.22	2
3	25-YR	NRCC 24-hr	D	Default	24.00	1	6.37	2
4	100-YR	NRCC 24-hr	D	Default	24.00	1	8.15	2

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.505	61	>75% Grass cover, Good HSG B (4P, 6P)
0.165	74	>75% Grass cover, Good HSG C (4P)
0.031	61	>75% Grass cover, Good, HSG B (1P)
0.273	74	>75% Grass cover, Good, HSG C (1P, 6P)
0.020	98	Paved parking HSG B (4P)
0.023	98	Paved parking HSG C (4P)
0.187	98	Paved parking, HSG B (6P)
0.205	98	Paved parking, HSG C (1P, 6P)
0.088	98	Roofs HSG B (4P, 6P)
0.001	98	Roofs, HSG C (6P)
0.779	55	Woods, Good, HSG B (6P)
0.568	70	Woods, Good, HSG C (1P, 6P)
2.844	**70**	**TOTAL AREA**

Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1P: P1a Runoff Area=16,284 sf 37.01% Impervious Runoff Depth=1.79"
Flow Length=225' Tc=10.2 min CN=WQ Runoff=0.57 cfs 0.056 af

Pond 2P: CB 0+88 & Trench Drain 0+28 Peak Elev=412.14' Inflow=0.57 cfs 0.056 af
12.0" Round Culvert n=0.011 L=9.0' S=0.0056 '/' Outflow=0.57 cfs 0.056 af

Pond 3P: FD 0+79 & FD A Peak Elev=412.02' Inflow=0.57 cfs 0.056 af
12.0" Round Culvert n=0.011 L=66.0' S=0.0053 '/' Outflow=0.57 cfs 0.056 af

Subcatchment 4P: P1b Runoff Area=12,836 sf 22.90% Impervious Runoff Depth=1.46"
Flow Length=169' Tc=8.1 min CN=WQ Runoff=0.40 cfs 0.036 af

Pond 5P: Infiltration Basin #1 Peak Elev=411.84' Storage=960 cf Inflow=0.96 cfs 0.092 af
Discarded=0.04 cfs 0.058 af Primary=0.36 cfs 0.034 af Outflow=0.39 cfs 0.092 af

Subcatchment 6P: P1c Runoff Area=94,773 sf 14.58% Impervious Runoff Depth=0.95"
Flow Length=229' Tc=11.5 min CN=WQ Runoff=1.50 cfs 0.172 af

Link 7P: Desing Point #1: Flow to Summer Street Inflow=1.71 cfs 0.206 af
Primary=1.71 cfs 0.206 af

Total Runoff Area = 2.844 ac Runoff Volume = 0.264 af Average Runoff Depth = 1.11"
81.61% Pervious = 2.321 ac 18.39% Impervious = 0.523 ac

Summary for Subcatchment 1P: P1a

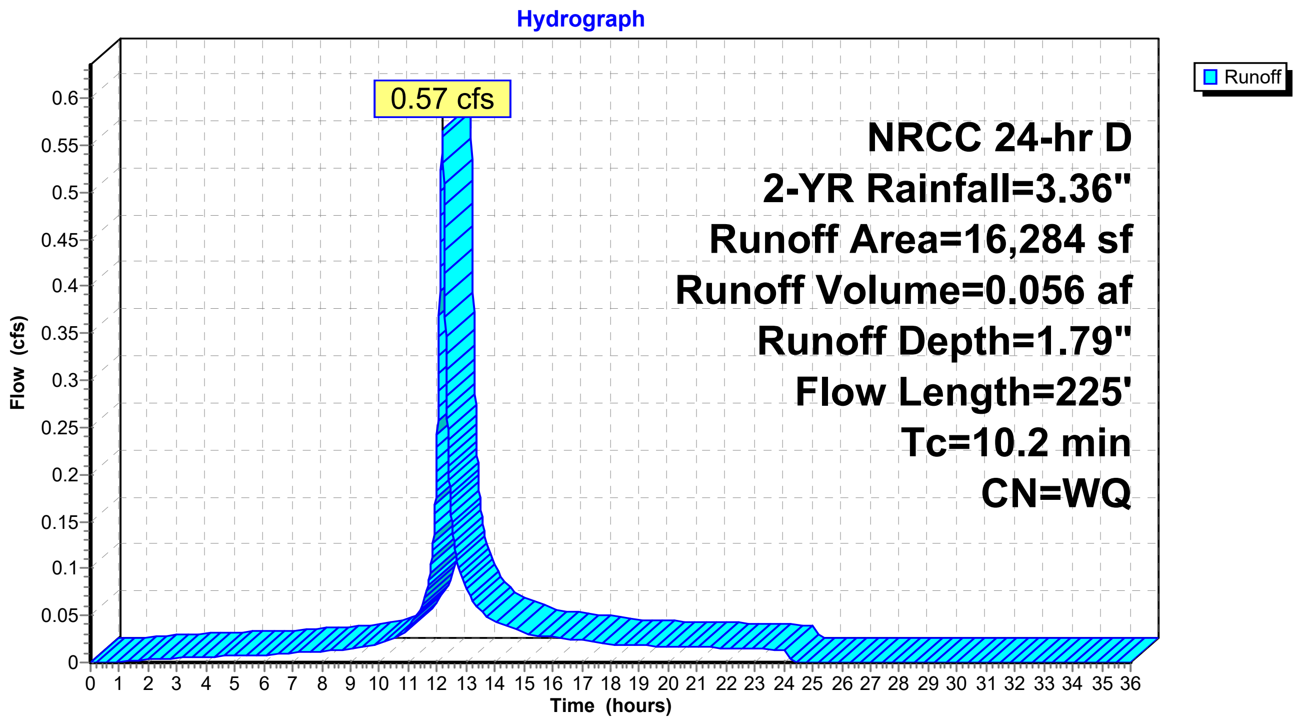
Runoff = 0.57 cfs @ 12.18 hrs, Volume= 0.056 af, Depth= 1.79"
Routed to Pond 2P : CB 0+88 & Trench Drain 0+28

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 2-YR Rainfall=3.36"

Area (sf)	CN	Description
2,939	70	Woods, Good, HSG C
6,027	98	Paved parking, HSG C
1,330	61	>75% Grass cover, Good, HSG B
5,988	74	>75% Grass cover, Good, HSG C
16,284		Weighted Average
10,257		62.99% Pervious Area
6,027		37.01% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	51	0.0400	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.36"
0.4	62	0.1100	2.32		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.5	112	0.0400	4.06		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
10.2	225	Total			

Subcatchment 1P: P1a



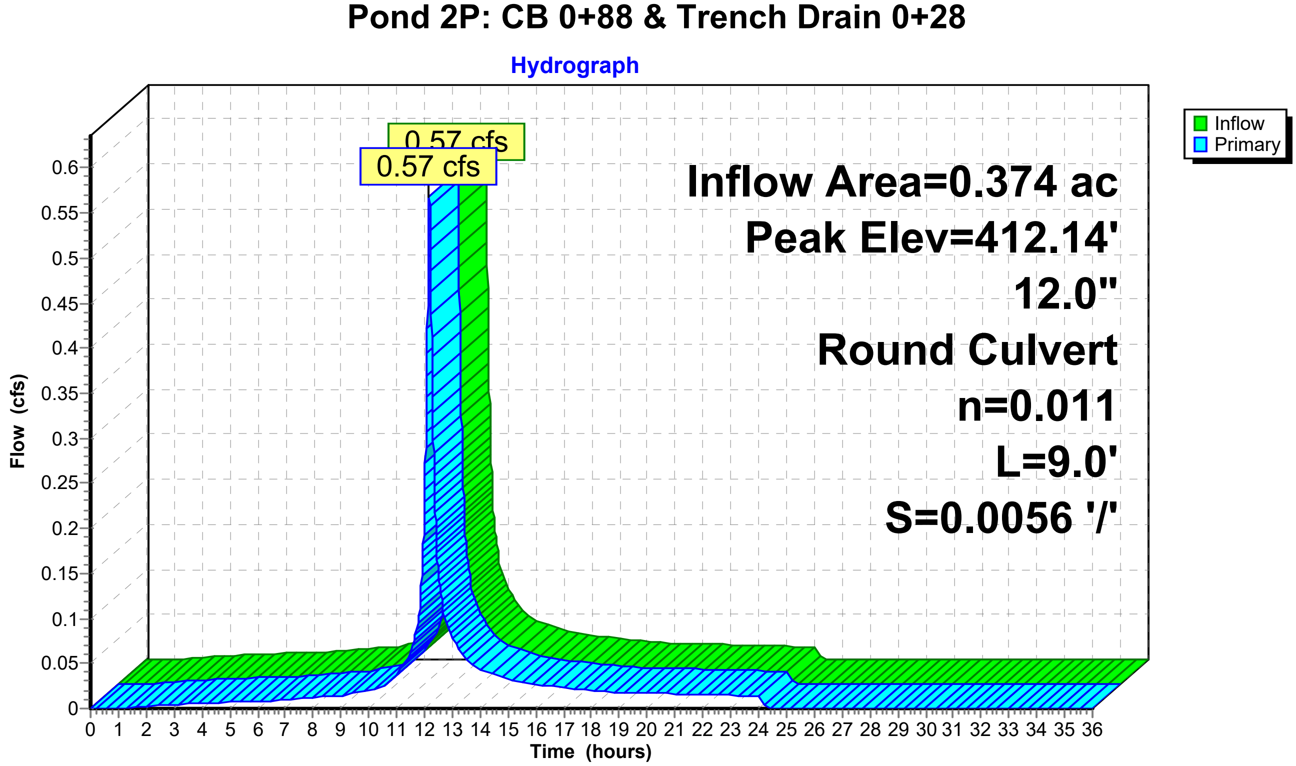
Summary for Pond 2P: CB 0+88 & Trench Drain 0+28

Inflow Area = 0.374 ac, 37.01% Impervious, Inflow Depth = 1.79" for 2-YR event
Inflow = 0.57 cfs @ 12.18 hrs, Volume= 0.056 af
Outflow = 0.57 cfs @ 12.18 hrs, Volume= 0.056 af, Atten= 0%, Lag= 0.0 min
Primary = 0.57 cfs @ 12.18 hrs, Volume= 0.056 af
Routed to Pond 3P : FD 0+79 & FD A

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 412.14' @ 12.19 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	411.65'	**12.0" Round Culvert** L= 9.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 411.65' / 411.60' S= 0.0056 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=0.55 cfs @ 12.18 hrs HW=412.13' TW=412.01' (Dynamic Tailwater)
└─**1=Culvert** (Outlet Controls 0.55 cfs @ 2.14 fps)



Summary for Pond 3P: FD 0+79 & FD A

Inflow Area =	0.374 ac, 37.01% Impervious, Inflow Depth = 1.79" for 2-YR event		
Inflow =	0.57 cfs @ 12.18 hrs, Volume=	0.056 af	
Outflow =	0.57 cfs @ 12.18 hrs, Volume=	0.056 af, Atten= 0%, Lag= 0.0 min	
Primary =	0.57 cfs @ 12.18 hrs, Volume=	0.056 af	

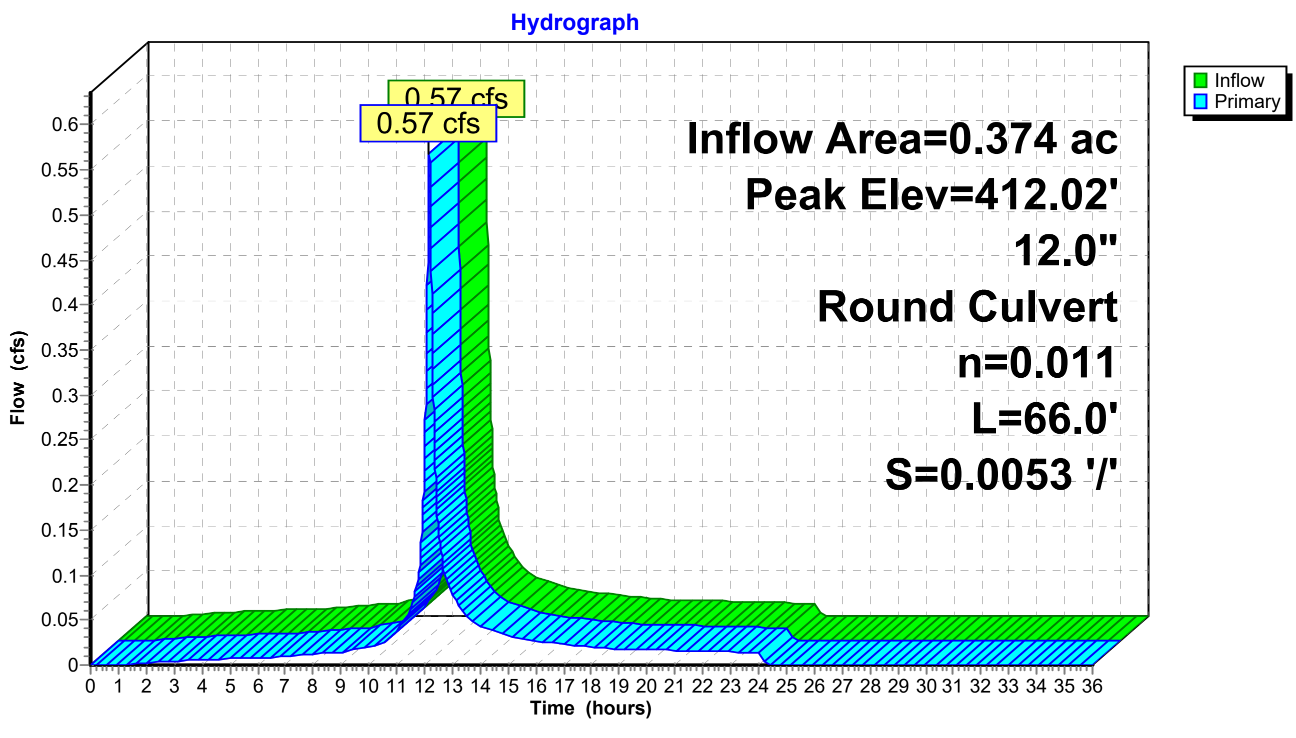
Routed to Pond 5P : Infiltration Basin #1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 412.02' @ 12.20 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	411.55'	**12.0" Round Culvert** L= 66.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 411.55' / 411.20' S= 0.0053 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=0.55 cfs @ 12.18 hrs HW=412.01' TW=411.71' (Dynamic Tailwater)
└**1=Culvert** (Outlet Controls 0.55 cfs @ 2.30 fps)

Pond 3P: FD 0+79 & FD A



Summary for Subcatchment 4P: P1b

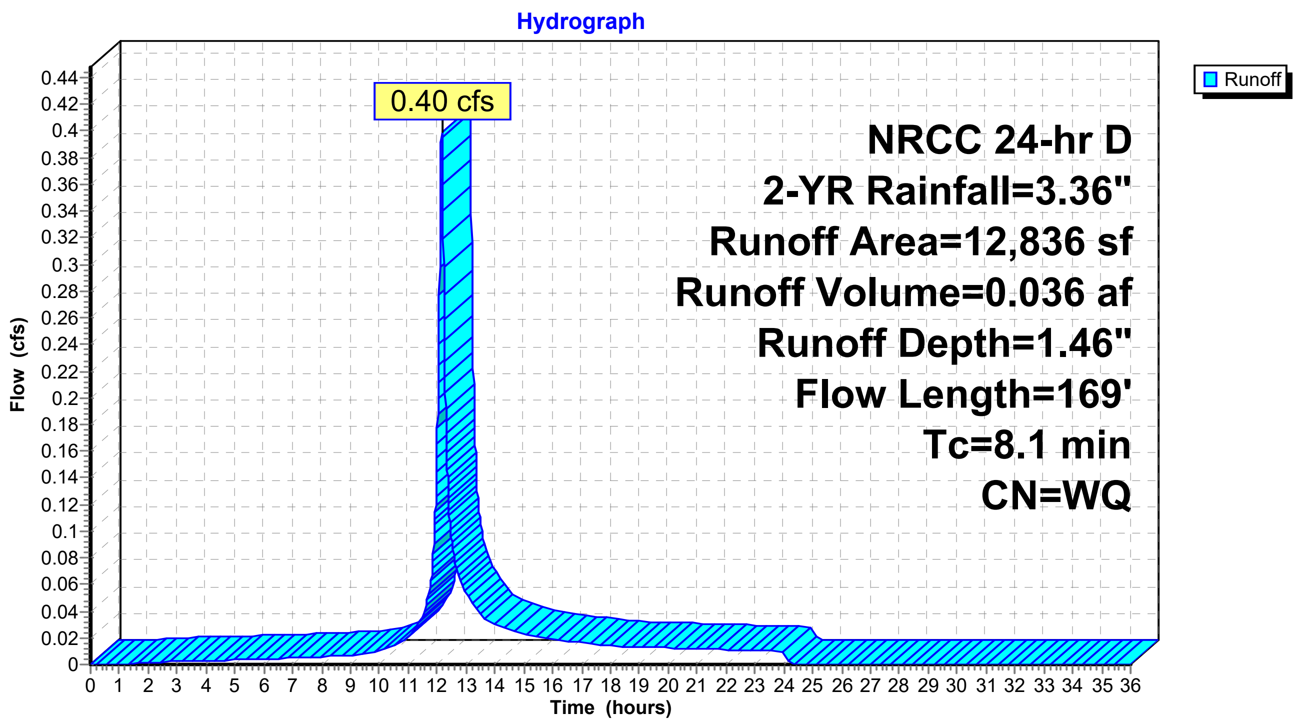
Runoff = 0.40 cfs @ 12.16 hrs, Volume= 0.036 af, Depth= 1.46"
Routed to Pond 5P : Infiltration Basin #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 2-YR Rainfall=3.36"

Area (sf)	CN	Description
866	98	Paved parking HSG B
1,075	98	Roofs HSG B
999	98	Paved parking HSG C
2,719	61	>75% Grass cover, Good HSG B
7,177	74	>75% Grass cover, Good HSG C
12,836		Weighted Average
9,896		77.10% Pervious Area
2,940		22.90% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.6	100	0.0900	0.22		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.36"
0.5	69	0.1000	2.21		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
8.1	169	Total			

Subcatchment 4P: P1b



Summary for Pond 5P: Infiltration Basin #1

Inflow Area = 0.669 ac, 30.79% Impervious, Inflow Depth = 1.64" for 2-YR event
Inflow = 0.96 cfs @ 12.16 hrs, Volume= 0.092 af
Outflow = 0.39 cfs @ 12.36 hrs, Volume= 0.092 af, Atten= 59%, Lag= 11.5 min
Discarded = 0.04 cfs @ 12.36 hrs, Volume= 0.058 af
Primary = 0.36 cfs @ 12.36 hrs, Volume= 0.034 af
Routed to Link 7P : Desing Point #1: Flow to Summer Street

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 411.84' @ 12.36 hrs Surf.Area= 1,574 sf Storage= 960 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 102.7 min (923.3 - 820.6)

Volume	Invert	Avail.Storage	Storage Description
#1	411.20'	4,950 cf	**Custom Stage Data (Irregular)**Listed below (Recalc)

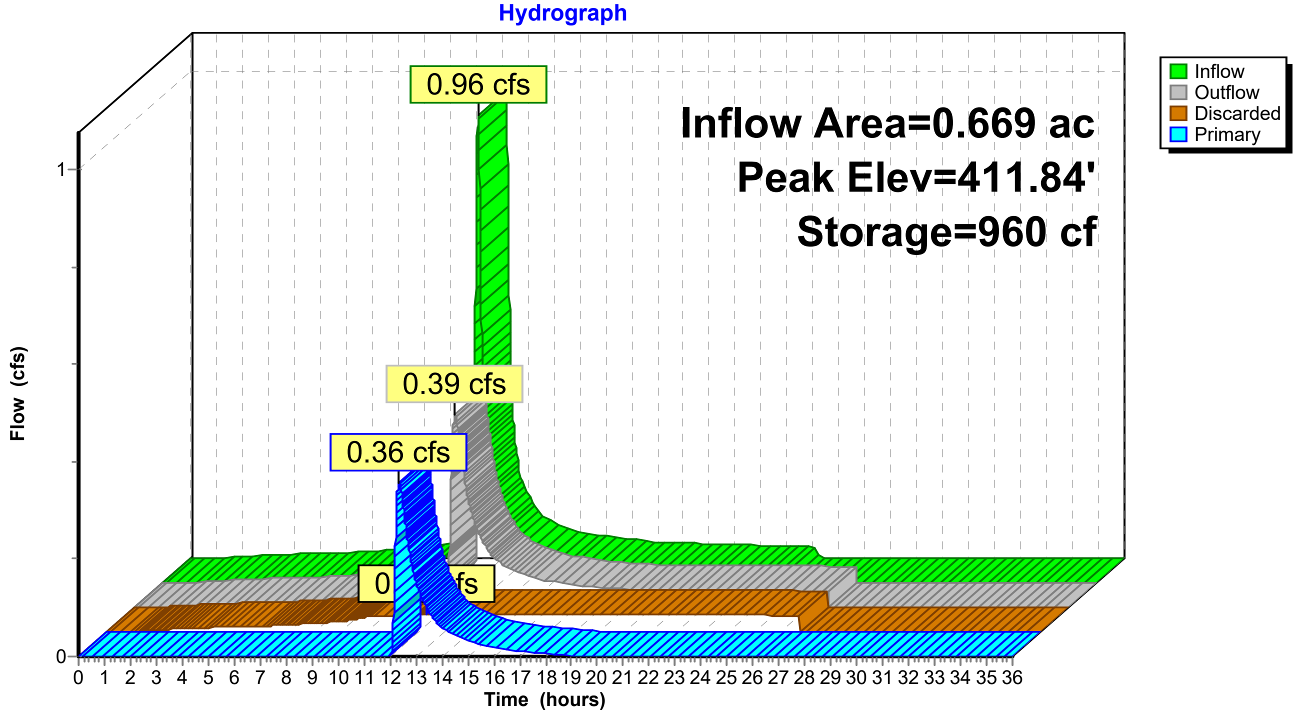
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
411.20	1,424	156.0	0	0	1,424
414.00	2,136	183.0	4,950	4,950	2,293

Device	Routing	Invert	Outlet Devices
#1	Primary	411.20'	**12.0" Round Culvert X 2.00** L= 36.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 411.20' / 410.50' S= 0.0194 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf
#2	Discarded	411.20'	**1.020 in/hr Exfiltration over Surface area**
#3	Device 1	411.50'	**8.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.04 cfs @ 12.36 hrs HW=411.84' (Free Discharge)
└─**2=Exfiltration** (Exfiltration Controls 0.04 cfs)

Primary OutFlow Max=0.36 cfs @ 12.36 hrs HW=411.84' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.36 cfs of 2.90 cfs potential flow)
  └─**3=Orifice/Grate** (Orifice Controls 0.36 cfs @ 1.99 fps)

Pond 5P: Infiltration Basin #1



Summary for Subcatchment 6P: P1c

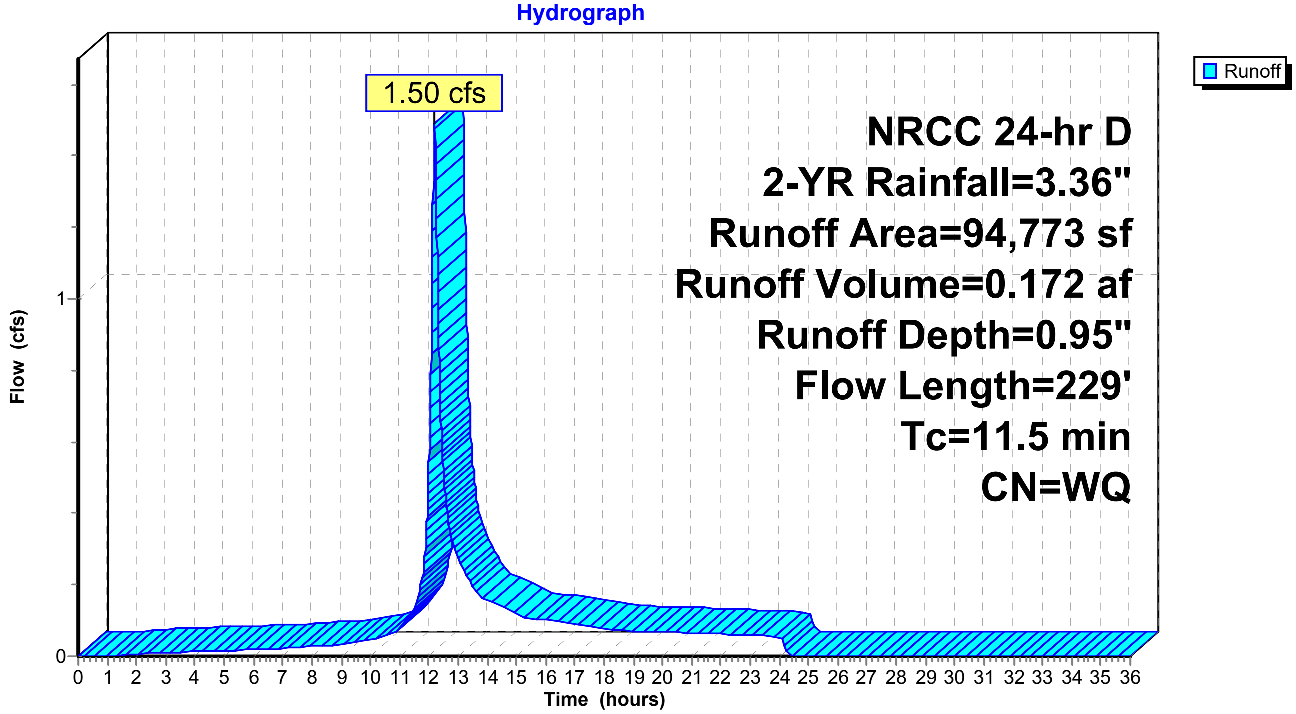
Runoff = 1.50 cfs @ 12.20 hrs, Volume= 0.172 af, Depth= 0.95"
Routed to Link 7P : Desing Point #1: Flow to Summer Street

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 2-YR Rainfall=3.36"

Area (sf)	CN	Description
8,137	98	Paved parking, HSG B
2,900	98	Paved parking, HSG C
2,753	98	Roofs HSG B
26	98	Roofs, HSG C
19,298	61	>75% Grass cover, Good HSG B
5,889	74	>75% Grass cover, Good, HSG C
33,955	55	Woods, Good, HSG B
21,815	70	Woods, Good, HSG C
94,773		Weighted Average
80,957		85.42% Pervious Area
13,816		14.58% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	51	0.0400	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.36"
2.2	178	0.0700	1.32		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
11.5	229	Total			

Subcatchment 6P: P1c

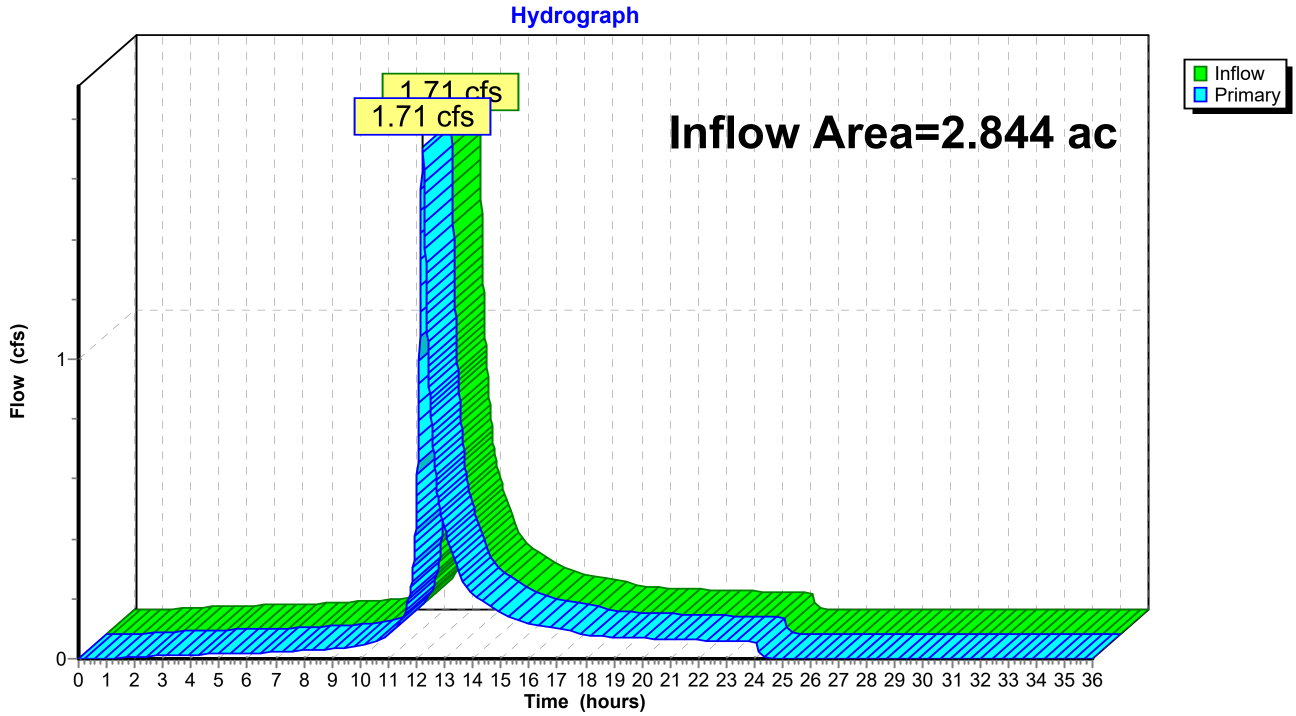


Summary for Link 7P: Desing Point #1: Flow to Summer Street

Inflow Area =	2.844 ac, 18.39% Impervious, Inflow Depth = 0.87"	for 2-YR event	
Inflow =	1.71 cfs @ 12.21 hrs, Volume=	0.206 af	
Primary =	1.71 cfs @ 12.21 hrs, Volume=	0.206 af, Atten= 0%, Lag= 0.0 min	

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Link 7P: Desing Point #1: Flow to Summer Street



Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1P: P1a Runoff Area=16,284 sf 37.01% Impervious Runoff Depth=3.30"
Flow Length=225' Tc=10.2 min CN=WQ Runoff=1.07 cfs 0.103 af

Pond 2P: CB 0+88 & Trench Drain 0+28 Peak Elev=412.45' Inflow=1.07 cfs 0.103 af
12.0" Round Culvert n=0.011 L=9.0' S=0.0056 '/' Outflow=1.07 cfs 0.103 af

Pond 3P: FD 0+79 & FD A Peak Elev=412.34' Inflow=1.07 cfs 0.103 af
12.0" Round Culvert n=0.011 L=66.0' S=0.0053 '/' Outflow=1.07 cfs 0.103 af

Subcatchment 4P: P1b Runoff Area=12,836 sf 22.90% Impervious Runoff Depth=2.88"
Flow Length=169' Tc=8.1 min CN=WQ Runoff=0.82 cfs 0.071 af

Pond 5P: Infiltration Basin #1 Peak Elev=412.22' Storage=1,569 cf Inflow=1.87 cfs 0.173 af
Discarded=0.04 cfs 0.069 af Primary=1.04 cfs 0.105 af Outflow=1.08 cfs 0.173 af

Subcatchment 6P: P1c Runoff Area=94,773 sf 14.58% Impervious Runoff Depth=2.09"
Flow Length=229' Tc=11.5 min CN=WQ Runoff=3.72 cfs 0.379 af

Link 7P: Desing Point #1: Flow to Summer Street Inflow=4.67 cfs 0.483 af
Primary=4.67 cfs 0.483 af

Total Runoff Area = 2.844 ac Runoff Volume = 0.552 af Average Runoff Depth = 2.33"
81.61% Pervious = 2.321 ac 18.39% Impervious = 0.523 ac

Summary for Subcatchment 1P: P1a

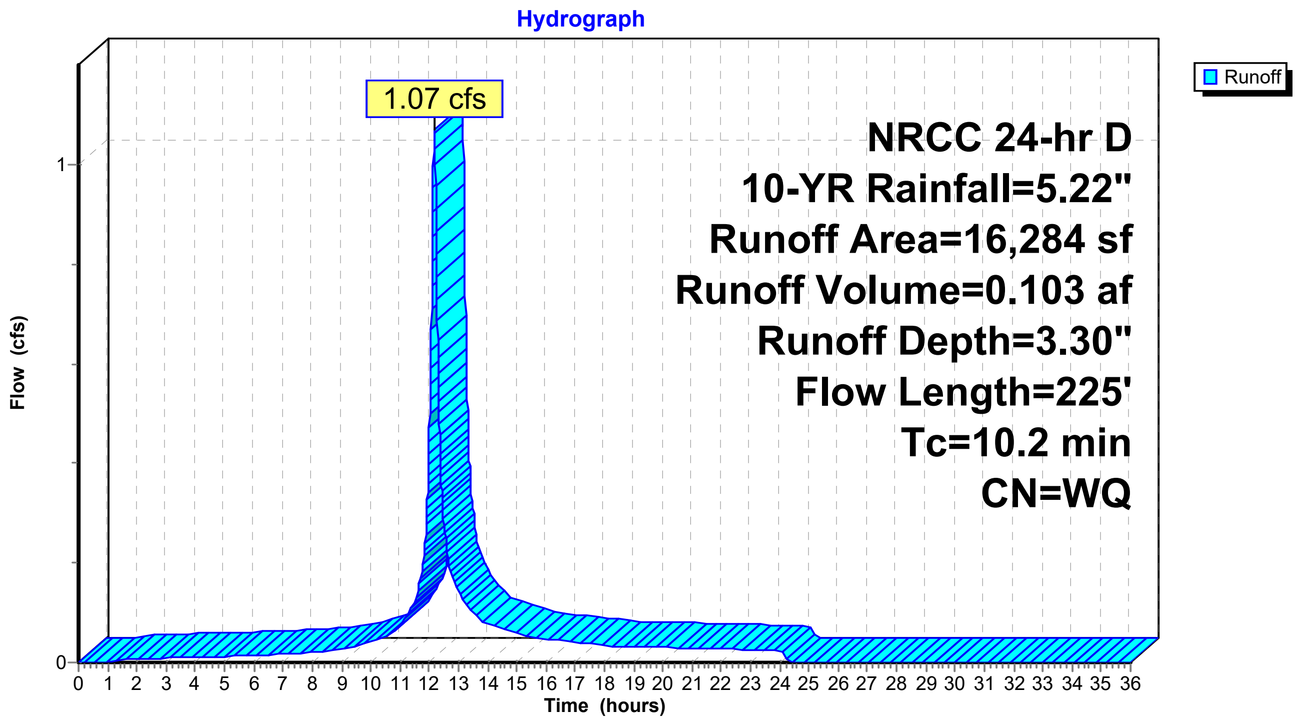
Runoff = 1.07 cfs @ 12.18 hrs, Volume= 0.103 af, Depth= 3.30"
Routed to Pond 2P : CB 0+88 & Trench Drain 0+28

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 10-YR Rainfall=5.22"

Area (sf)	CN	Description
2,939	70	Woods, Good, HSG C
6,027	98	Paved parking, HSG C
1,330	61	>75% Grass cover, Good, HSG B
5,988	74	>75% Grass cover, Good, HSG C
16,284		Weighted Average
10,257		62.99% Pervious Area
6,027		37.01% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	51	0.0400	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.36"
0.4	62	0.1100	2.32		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.5	112	0.0400	4.06		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
10.2	225	Total			

Subcatchment 1P: P1a



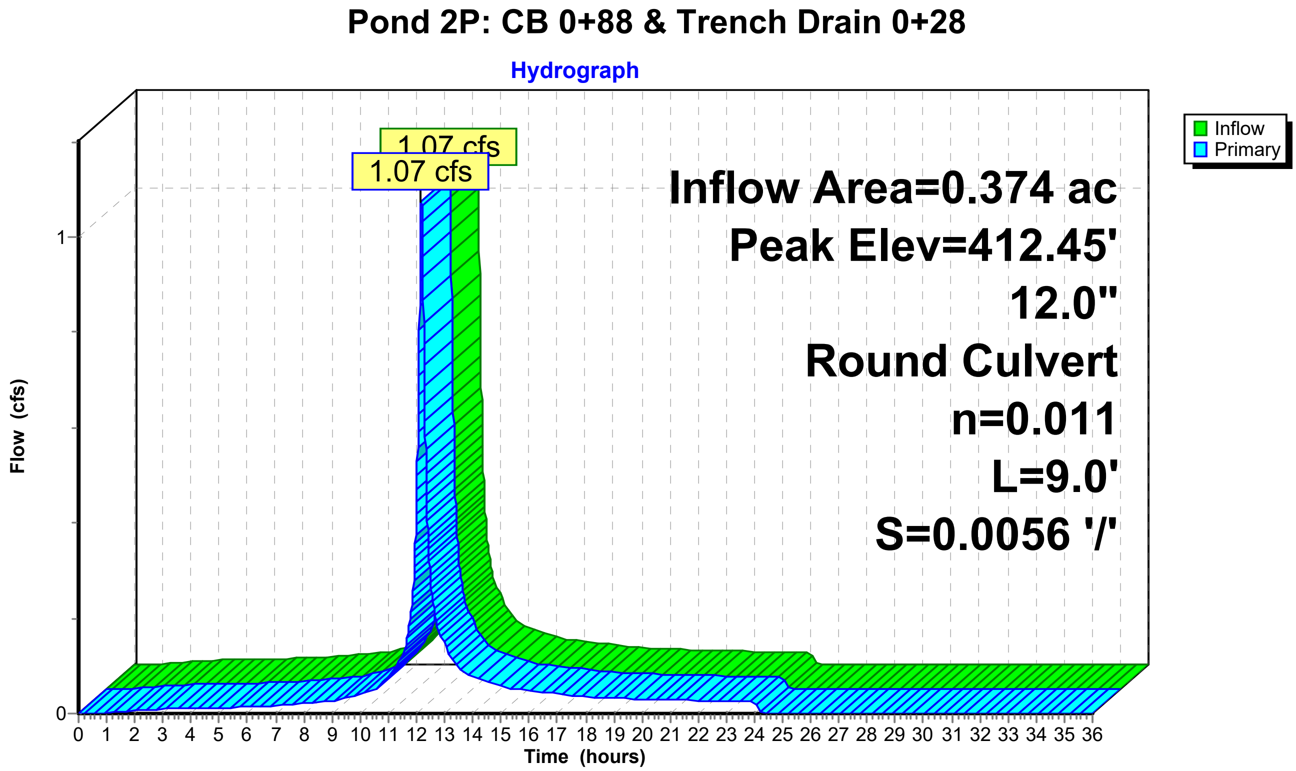
Summary for Pond 2P: CB 0+88 & Trench Drain 0+28

Inflow Area = 0.374 ac, 37.01% Impervious, Inflow Depth = 3.30" for 10-YR event
Inflow = 1.07 cfs @ 12.18 hrs, Volume= 0.103 af
Outflow = 1.07 cfs @ 12.18 hrs, Volume= 0.103 af, Atten= 0%, Lag= 0.0 min
Primary = 1.07 cfs @ 12.18 hrs, Volume= 0.103 af
Routed to Pond 3P : FD 0+79 & FD A

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 412.45' @ 12.20 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	411.65'	**12.0" Round Culvert** L= 9.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 411.65' / 411.60' S= 0.0056 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=1.01 cfs @ 12.18 hrs HW=412.44' TW=412.32' (Dynamic Tailwater)
└─**1=Culvert** (Outlet Controls 1.01 cfs @ 2.10 fps)



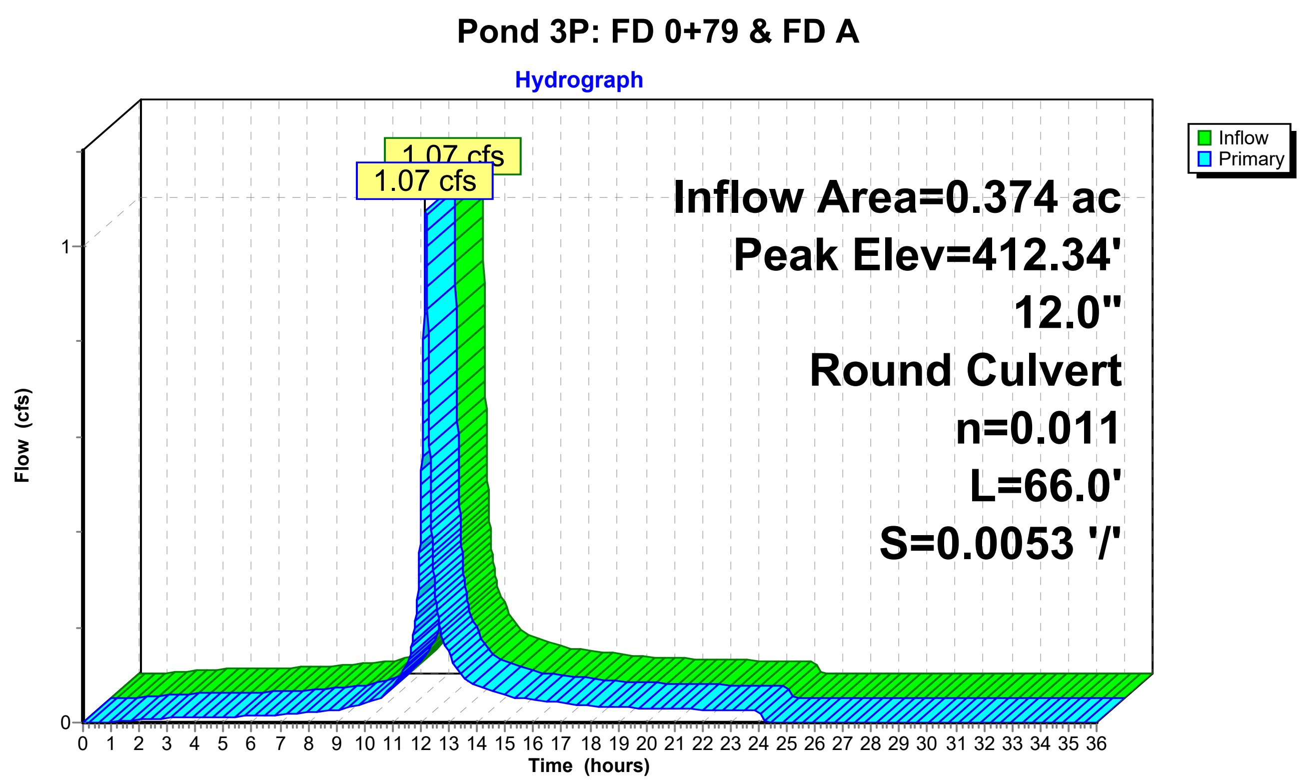
Summary for Pond 3P: FD 0+79 & FD A

Inflow Area = 0.374 ac, 37.01% Impervious, Inflow Depth = 3.30" for 10-YR event
Inflow = 1.07 cfs @ 12.18 hrs, Volume= 0.103 af
Outflow = 1.07 cfs @ 12.18 hrs, Volume= 0.103 af, Atten= 0%, Lag= 0.0 min
Primary = 1.07 cfs @ 12.18 hrs, Volume= 0.103 af
Routed to Pond 5P : Infiltration Basin #1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 412.34' @ 12.21 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	411.55'	**12.0" Round Culvert** L= 66.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 411.55' / 411.20' S= 0.0053 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=1.02 cfs @ 12.18 hrs HW=412.32' TW=412.11' (Dynamic Tailwater)
└─**1=Culvert** (Outlet Controls 1.02 cfs @ 2.17 fps)



Summary for Subcatchment 4P: P1b

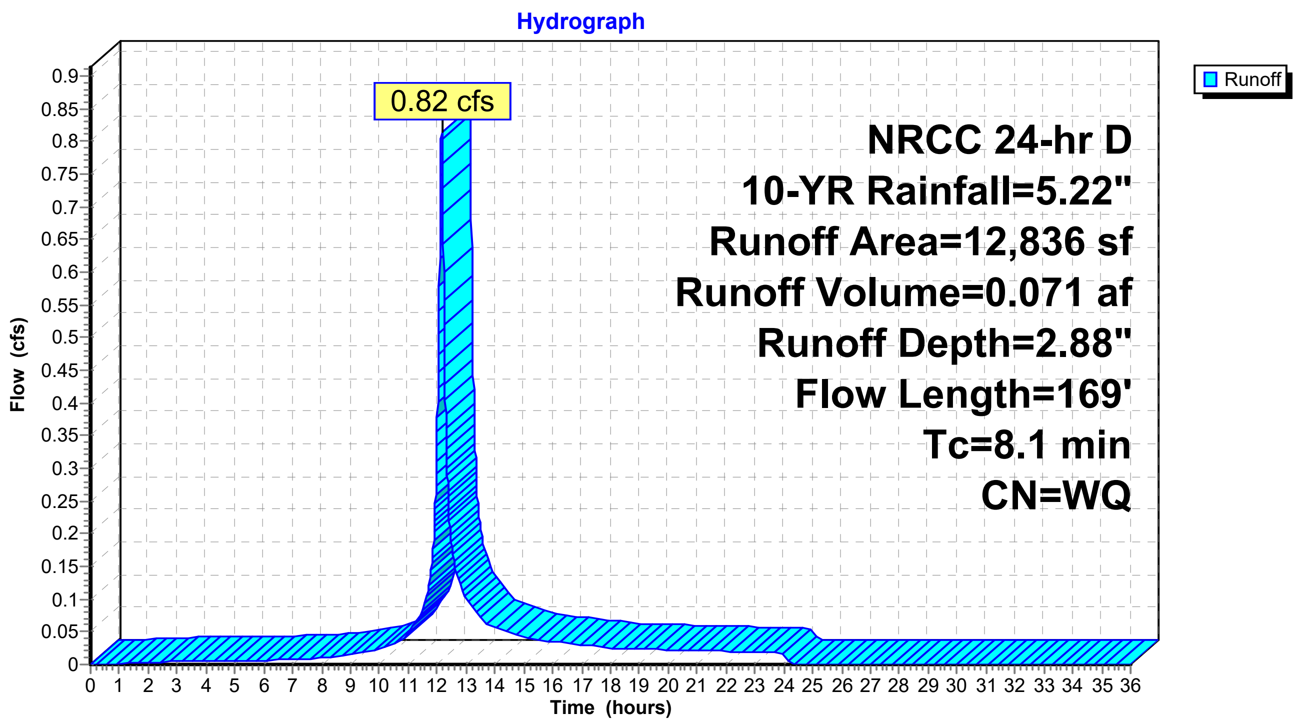
Runoff = 0.82 cfs @ 12.15 hrs, Volume= 0.071 af, Depth= 2.88"
Routed to Pond 5P : Infiltration Basin #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 10-YR Rainfall=5.22"

Area (sf)	CN	Description
866	98	Paved parking HSG B
1,075	98	Roofs HSG B
999	98	Paved parking HSG C
2,719	61	>75% Grass cover, Good HSG B
7,177	74	>75% Grass cover, Good HSG C
12,836		Weighted Average
9,896		77.10% Pervious Area
2,940		22.90% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.6	100	0.0900	0.22		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.36"
0.5	69	0.1000	2.21		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
8.1	169	Total			

Subcatchment 4P: P1b



Summary for Pond 5P: Infiltration Basin #1

Inflow Area = 0.669 ac, 30.79% Impervious, Inflow Depth = 3.11" for 10-YR event
Inflow = 1.87 cfs @ 12.16 hrs, Volume= 0.173 af
Outflow = 1.08 cfs @ 12.28 hrs, Volume= 0.173 af, Atten= 42%, Lag= 7.1 min
Discarded = 0.04 cfs @ 12.28 hrs, Volume= 0.069 af
Primary = 1.04 cfs @ 12.28 hrs, Volume= 0.105 af
Routed to Link 7P : Desing Point #1: Flow to Summer Street

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 412.22' @ 12.28 hrs Surf.Area= 1,666 sf Storage= 1,569 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 76.4 min (889.4 - 813.1)

Volume	Invert	Avail.Storage	Storage Description
#1	411.20'	4,950 cf	**Custom Stage Data (Irregular)**Listed below (Recalc)

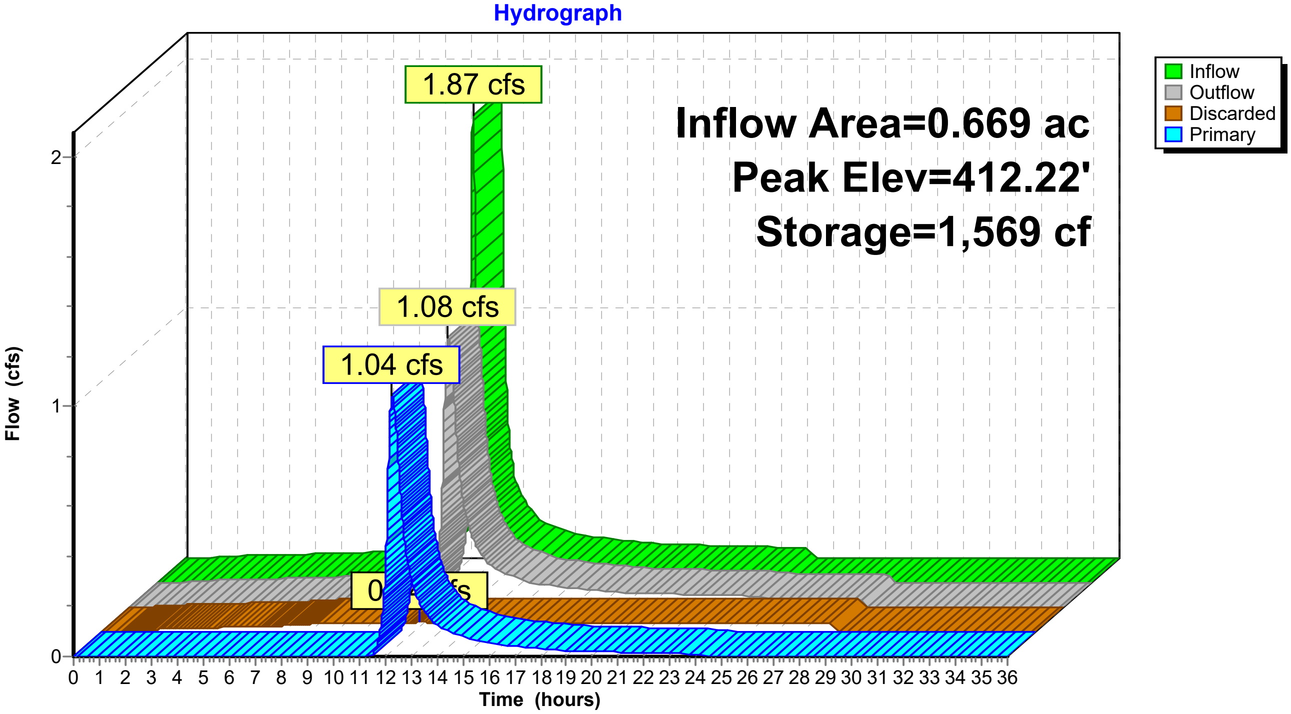
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
411.20	1,424	156.0	0	0	1,424
414.00	2,136	183.0	4,950	4,950	2,293

Device	Routing	Invert	Outlet Devices
#1	Primary	411.20'	**12.0" Round Culvert X 2.00** L= 36.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 411.20' / 410.50' S= 0.0194 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf
#2	Discarded	411.20'	**1.020 in/hr Exfiltration over Surface area**
#3	Device 1	411.50'	**8.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.04 cfs @ 12.28 hrs HW=412.22' (Free Discharge)
2=Exfiltration (Exfiltration Controls 0.04 cfs)

Primary OutFlow Max=1.04 cfs @ 12.28 hrs HW=412.22' TW=0.00' (Dynamic Tailwater)
1=Culvert (Passes 1.04 cfs of 5.44 cfs potential flow)
3=Orifice/Grate (Orifice Controls 1.04 cfs @ 2.98 fps)

Pond 5P: Infiltration Basin #1



Summary for Subcatchment 6P: P1c

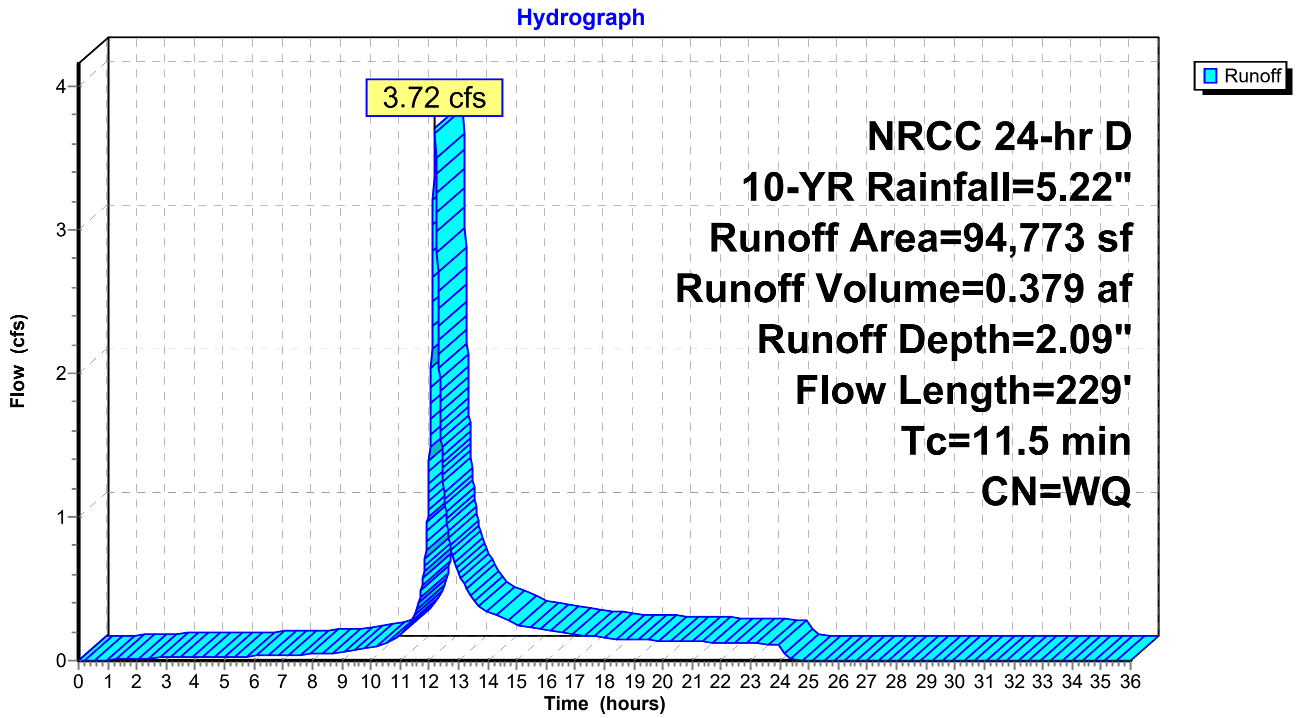
Runoff = 3.72 cfs @ 12.20 hrs, Volume= 0.379 af, Depth= 2.09"
Routed to Link 7P : Desing Point #1: Flow to Summer Street

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 10-YR Rainfall=5.22"

Area (sf)	CN	Description
8,137	98	Paved parking, HSG B
2,900	98	Paved parking, HSG C
2,753	98	Roofs HSG B
26	98	Roofs, HSG C
19,298	61	>75% Grass cover, Good HSG B
5,889	74	>75% Grass cover, Good, HSG C
33,955	55	Woods, Good, HSG B
21,815	70	Woods, Good, HSG C
94,773		Weighted Average
80,957		85.42% Pervious Area
13,816		14.58% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	51	0.0400	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.36"
2.2	178	0.0700	1.32		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
11.5	229	Total			

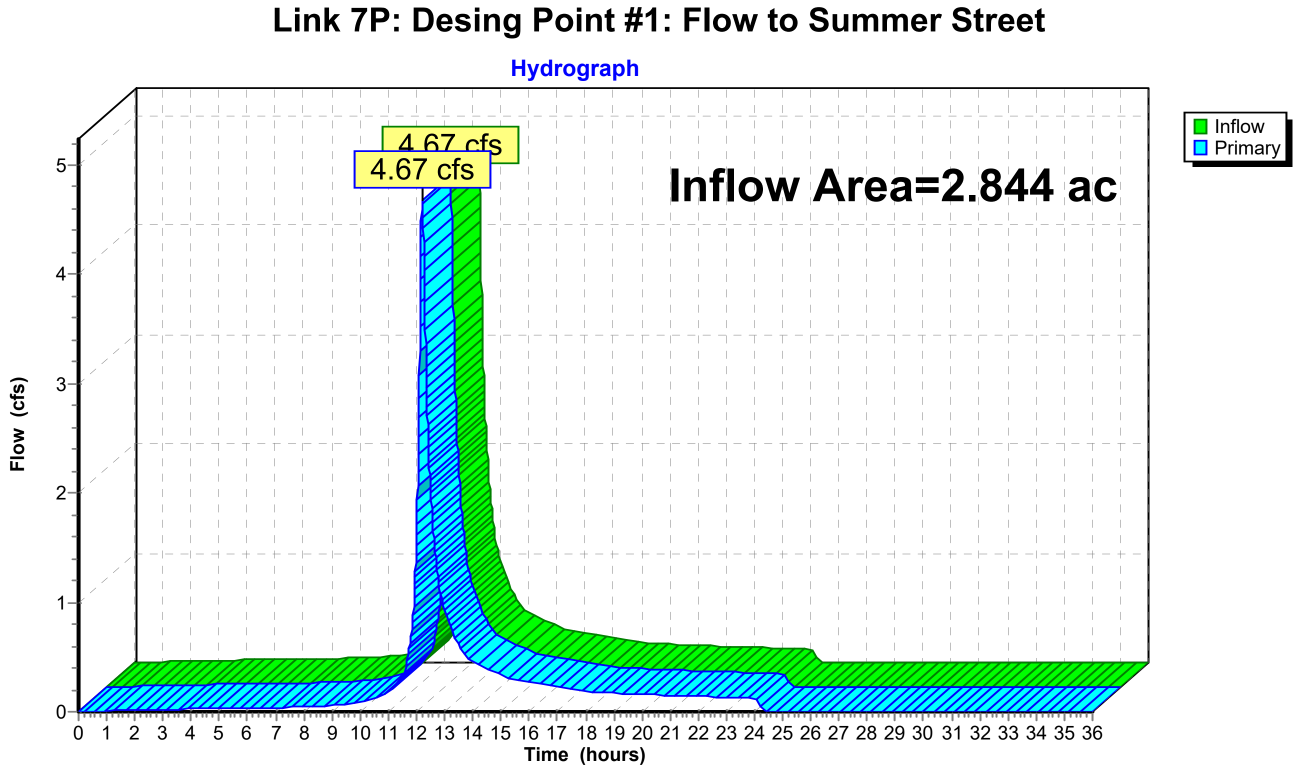
Subcatchment 6P: P1c



Summary for Link 7P: Desing Point #1: Flow to Summer Street

Inflow Area =	2.844 ac,	18.39% Impervious,	Inflow Depth = 2.04"	for 10-YR event
Inflow =	4.67 cfs @	12.20 hrs, Volume=	0.483 af	
Primary =	4.67 cfs @	12.20 hrs, Volume=	0.483 af,	Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs



Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1P: P1a Runoff Area=16,284 sf 37.01% Impervious Runoff Depth=4.30"
Flow Length=225' Tc=10.2 min CN=WQ Runoff=1.40 cfs 0.134 af

Pond 2P: CB 0+88 & Trench Drain 0+28 Peak Elev=412.65' Inflow=1.40 cfs 0.134 af
12.0" Round Culvert n=0.011 L=9.0' S=0.0056 '/' Outflow=1.40 cfs 0.134 af

Pond 3P: FD 0+79 & FD A Peak Elev=412.54' Inflow=1.40 cfs 0.134 af
12.0" Round Culvert n=0.011 L=66.0' S=0.0053 '/' Outflow=1.40 cfs 0.134 af

Subcatchment 4P: P1b Runoff Area=12,836 sf 22.90% Impervious Runoff Depth=3.84"
Flow Length=169' Tc=8.1 min CN=WQ Runoff=1.09 cfs 0.094 af

Pond 5P: Infiltration Basin #1 Peak Elev=412.44' Storage=1,955 cf Inflow=2.47 cfs 0.228 af
Discarded=0.04 cfs 0.073 af Primary=1.31 cfs 0.155 af Outflow=1.35 cfs 0.228 af

Subcatchment 6P: P1c Runoff Area=94,773 sf 14.58% Impervious Runoff Depth=2.91"
Flow Length=229' Tc=11.5 min CN=WQ Runoff=5.31 cfs 0.527 af

Link 7P: Desing Point #1: Flow to Summer Street Inflow=6.52 cfs 0.682 af
Primary=6.52 cfs 0.682 af

Total Runoff Area = 2.844 ac Runoff Volume = 0.755 af Average Runoff Depth = 3.19"
81.61% Pervious = 2.321 ac 18.39% Impervious = 0.523 ac

Summary for Subcatchment 1P: P1a

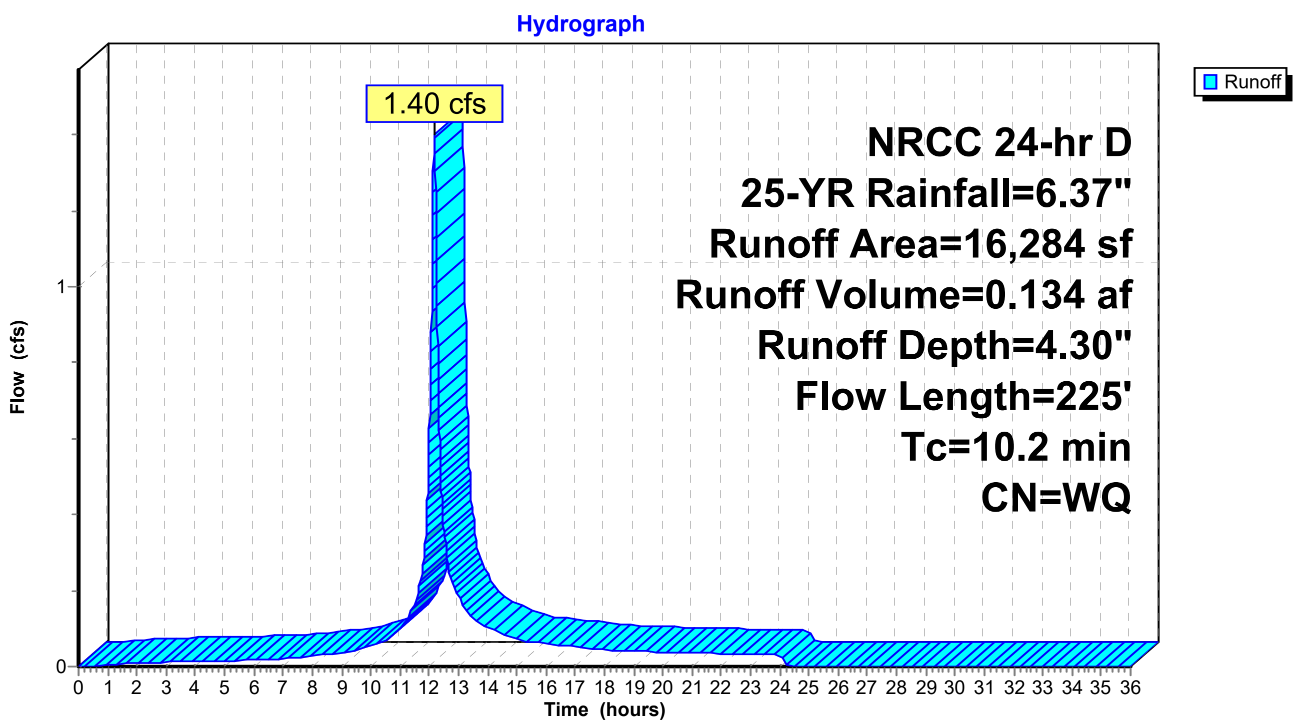
Runoff = 1.40 cfs @ 12.18 hrs, Volume= 0.134 af, Depth= 4.30"
Routed to Pond 2P : CB 0+88 & Trench Drain 0+28

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 25-YR Rainfall=6.37"

Area (sf)	CN	Description
2,939	70	Woods, Good, HSG C
6,027	98	Paved parking, HSG C
1,330	61	>75% Grass cover, Good, HSG B
5,988	74	>75% Grass cover, Good, HSG C
16,284		Weighted Average
10,257		62.99% Pervious Area
6,027		37.01% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	51	0.0400	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.36"
0.4	62	0.1100	2.32		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.5	112	0.0400	4.06		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
10.2	225	Total			

Subcatchment 1P: P1a



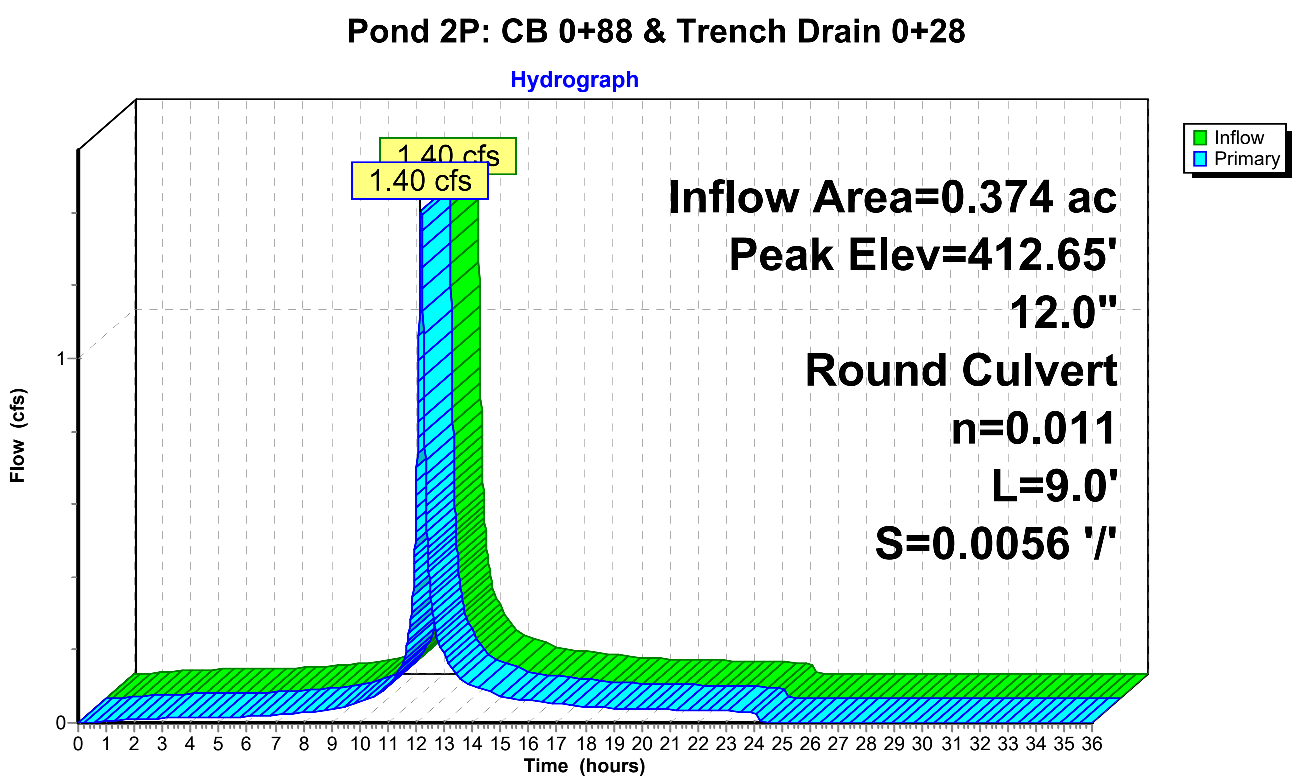
Summary for Pond 2P: CB 0+88 & Trench Drain 0+28

Inflow Area = 0.374 ac, 37.01% Impervious, Inflow Depth = 4.30" for 25-YR event
Inflow = 1.40 cfs @ 12.18 hrs, Volume= 0.134 af
Outflow = 1.40 cfs @ 12.18 hrs, Volume= 0.134 af, Atten= 0%, Lag= 0.0 min
Primary = 1.40 cfs @ 12.18 hrs, Volume= 0.134 af
Routed to Pond 3P : FD 0+79 & FD A

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 412.65' @ 12.21 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	411.65'	**12.0" Round Culvert** L= 9.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 411.65' / 411.60' S= 0.0056 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=1.30 cfs @ 12.18 hrs HW=412.62' TW=412.50' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 1.30 cfs @ 1.67 fps)



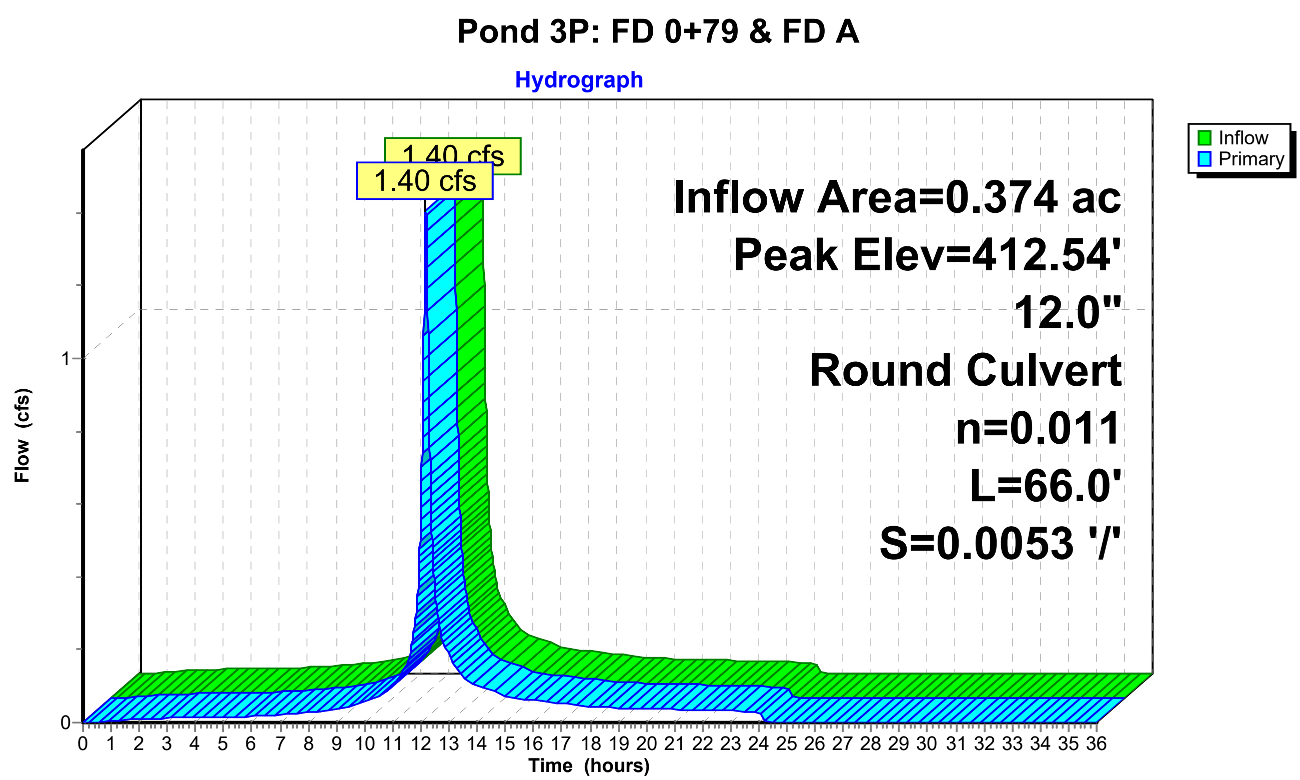
Summary for Pond 3P: FD 0+79 & FD A

Inflow Area = 0.374 ac, 37.01% Impervious, Inflow Depth = 4.30" for 25-YR event
Inflow = 1.40 cfs @ 12.18 hrs, Volume= 0.134 af
Outflow = 1.40 cfs @ 12.18 hrs, Volume= 0.134 af, Atten= 0%, Lag= 0.0 min
Primary = 1.40 cfs @ 12.18 hrs, Volume= 0.134 af
Routed to Pond 5P : Infiltration Basin #1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 412.54' @ 12.23 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	411.55'	**12.0" Round Culvert** L= 66.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 411.55' / 411.20' S= 0.0053 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=1.31 cfs @ 12.18 hrs HW=412.50' TW=412.30' (Dynamic Tailwater)
└**1=Culvert** (Outlet Controls 1.31 cfs @ 2.20 fps)



Summary for Subcatchment 4P: P1b

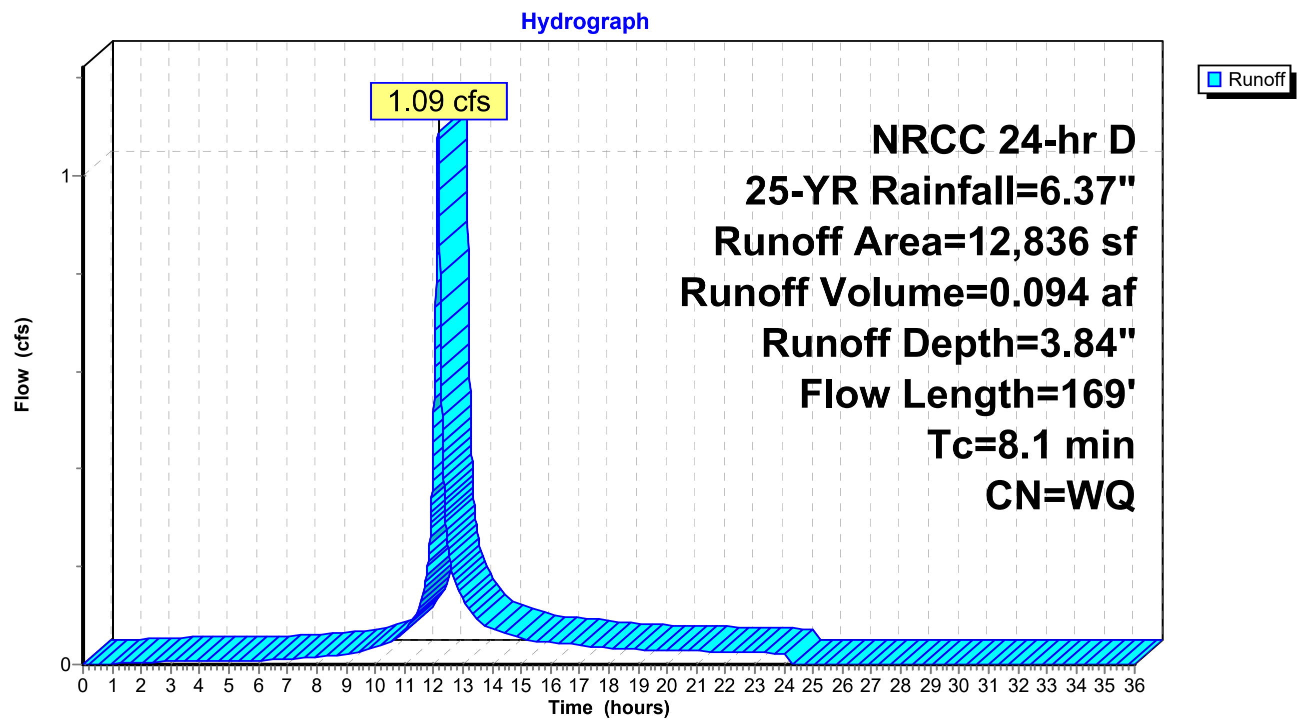
Runoff = 1.09 cfs @ 12.15 hrs, Volume= 0.094 af, Depth= 3.84"
Routed to Pond 5P : Infiltration Basin #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 25-YR Rainfall=6.37"

Area (sf)	CN	Description
866	98	Paved parking HSG B
1,075	98	Roofs HSG B
999	98	Paved parking HSG C
2,719	61	>75% Grass cover, Good HSG B
7,177	74	>75% Grass cover, Good HSG C
12,836		Weighted Average
9,896		77.10% Pervious Area
2,940		22.90% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.6	100	0.0900	0.22		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.36"
0.5	69	0.1000	2.21		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
8.1	169	Total			

Subcatchment 4P: P1b



Summary for Pond 5P: Infiltration Basin #1

Inflow Area = 0.669 ac, 30.79% Impervious, Inflow Depth = 4.10" for 25-YR event
Inflow = 2.47 cfs @ 12.16 hrs, Volume= 0.228 af
Outflow = 1.35 cfs @ 12.29 hrs, Volume= 0.228 af, Atten= 45%, Lag= 7.6 min
Discarded = 0.04 cfs @ 12.29 hrs, Volume= 0.073 af
Primary = 1.31 cfs @ 12.29 hrs, Volume= 0.155 af
Routed to Link 7P : Desing Point #1: Flow to Summer Street

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 412.44' @ 12.29 hrs Surf.Area= 1,723 sf Storage= 1,955 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 66.4 min (875.0 - 808.7)

Volume	Invert	Avail.Storage	Storage Description
#1	411.20'	4,950 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

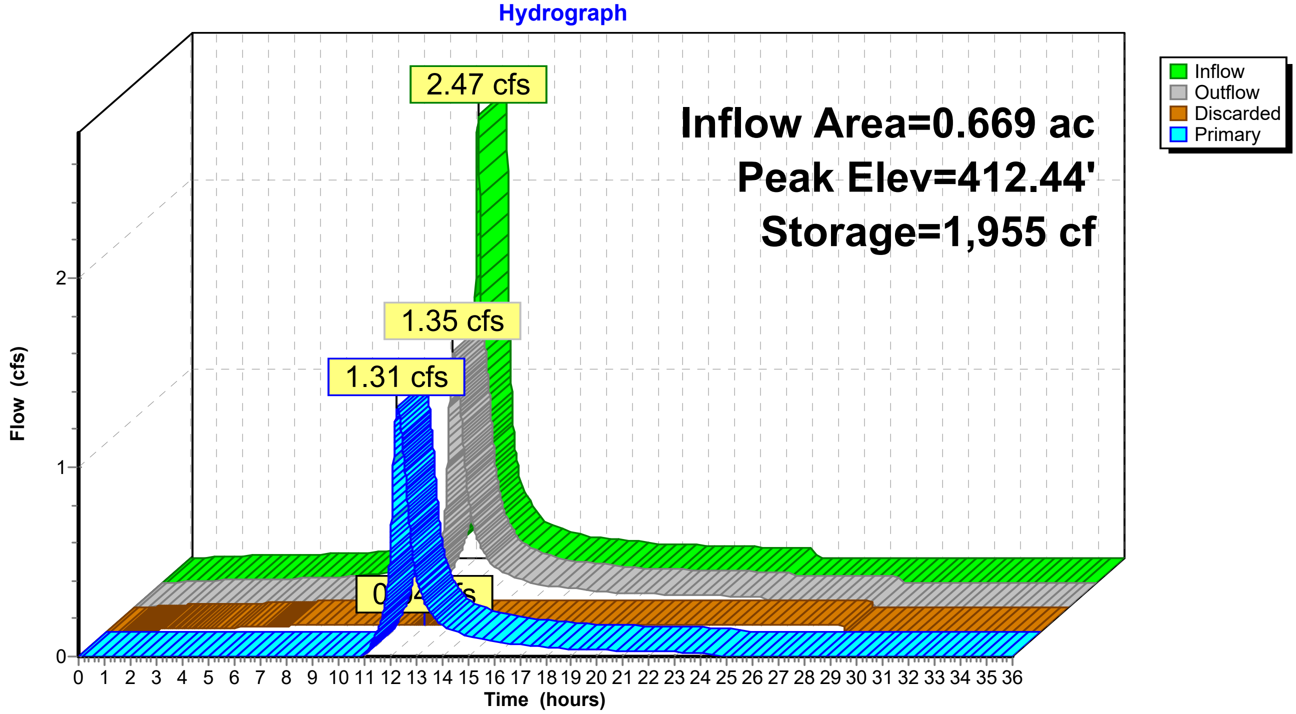
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
411.20	1,424	156.0	0	0	1,424
414.00	2,136	183.0	4,950	4,950	2,293

Device	Routing	Invert	Outlet Devices
#1	Primary	411.20'	**12.0" Round Culvert X 2.00** L= 36.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 411.20' / 410.50' S= 0.0194 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf
#2	Discarded	411.20'	**1.020 in/hr Exfiltration over Surface area**
#3	Device 1	411.50'	**8.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.04 cfs @ 12.29 hrs HW=412.44' (Free Discharge)
└─**2=Exfiltration** (Exfiltration Controls 0.04 cfs)

Primary OutFlow Max=1.31 cfs @ 12.29 hrs HW=412.44' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 1.31 cfs of 6.53 cfs potential flow)
  └─**3=Orifice/Grate** (Orifice Controls 1.31 cfs @ 3.76 fps)

Pond 5P: Infiltration Basin #1



Summary for Subcatchment 6P: P1c

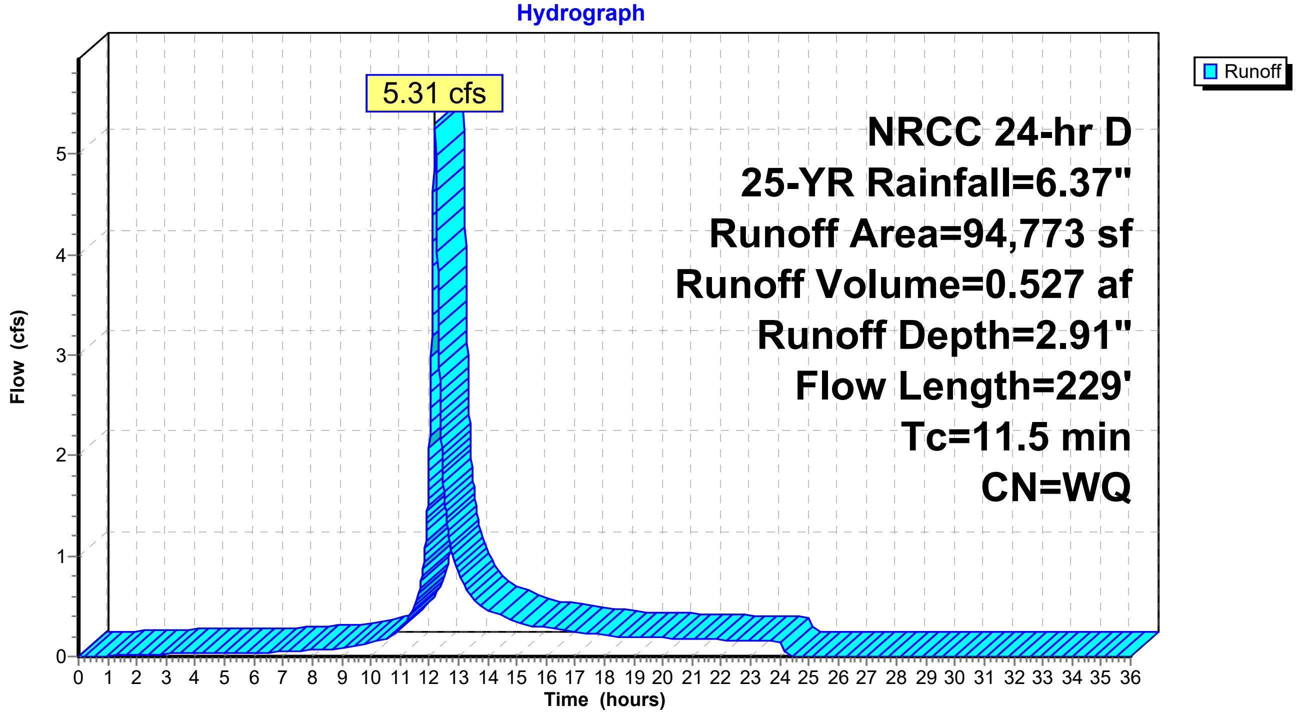
Runoff = 5.31 cfs @ 12.19 hrs, Volume= 0.527 af, Depth= 2.91"
Routed to Link 7P : Desing Point #1: Flow to Summer Street

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 25-YR Rainfall=6.37"

Area (sf)	CN	Description
8,137	98	Paved parking, HSG B
2,900	98	Paved parking, HSG C
2,753	98	Roofs HSG B
26	98	Roofs, HSG C
19,298	61	>75% Grass cover, Good HSG B
5,889	74	>75% Grass cover, Good, HSG C
33,955	55	Woods, Good, HSG B
21,815	70	Woods, Good, HSG C
94,773		Weighted Average
80,957		85.42% Pervious Area
13,816		14.58% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	51	0.0400	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.36"
2.2	178	0.0700	1.32		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
11.5	229	Total			

Subcatchment 6P: P1c

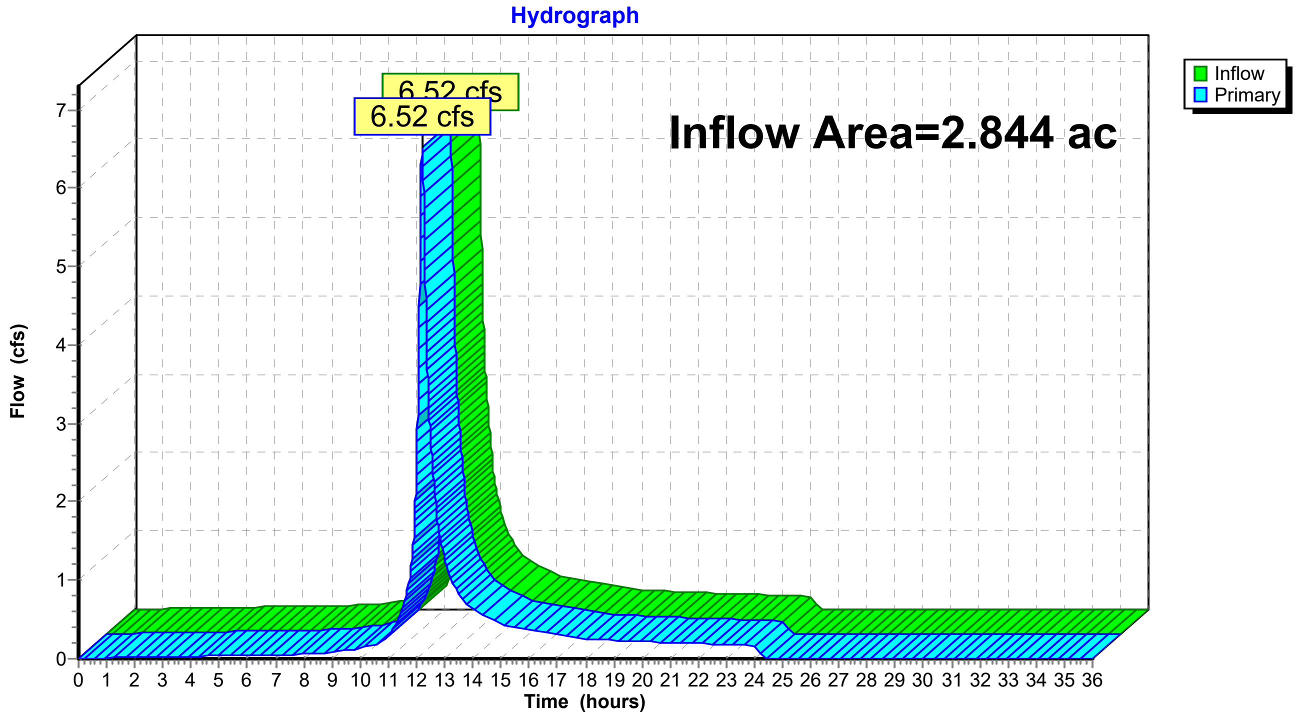


Summary for Link 7P: Desing Point #1: Flow to Summer Street

Inflow Area = 2.844 ac, 18.39% Impervious, Inflow Depth = 2.88" for 25-YR event
Inflow = 6.52 cfs @ 12.20 hrs, Volume= 0.682 af
Primary = 6.52 cfs @ 12.20 hrs, Volume= 0.682 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Link 7P: Desing Point #1: Flow to Summer Street



Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1P: P1a Runoff Area=16,284 sf 37.01% Impervious Runoff Depth=5.91"
Flow Length=225' Tc=10.2 min CN=WQ Runoff=1.93 cfs 0.184 af

Pond 2P: CB 0+88 & Trench Drain 0+28 Peak Elev=413.12' Inflow=1.93 cfs 0.184 af
12.0" Round Culvert n=0.011 L=9.0' S=0.0056 '/' Outflow=1.93 cfs 0.184 af

Pond 3P: FD 0+79 & FD A Peak Elev=412.93' Inflow=1.93 cfs 0.184 af
12.0" Round Culvert n=0.011 L=66.0' S=0.0053 '/' Outflow=1.93 cfs 0.184 af

Subcatchment 4P: P1b Runoff Area=12,836 sf 22.90% Impervious Runoff Depth=5.39"
Flow Length=169' Tc=8.1 min CN=WQ Runoff=1.54 cfs 0.132 af

Pond 5P: Infiltration Basin #1 Peak Elev=412.81' Storage=2,610 cf Inflow=3.44 cfs 0.317 af
Discarded=0.04 cfs 0.077 af Primary=1.67 cfs 0.239 af Outflow=1.71 cfs 0.317 af

Subcatchment 6P: P1c Runoff Area=94,773 sf 14.58% Impervious Runoff Depth=4.28"
Flow Length=229' Tc=11.5 min CN=WQ Runoff=7.97 cfs 0.777 af

Link 7P: Desing Point #1: Flow to Summer Street Inflow=9.49 cfs 1.016 af
Primary=9.49 cfs 1.016 af

Total Runoff Area = 2.844 ac Runoff Volume = 1.093 af Average Runoff Depth = 4.61"
81.61% Pervious = 2.321 ac 18.39% Impervious = 0.523 ac

Summary for Subcatchment 1P: P1a

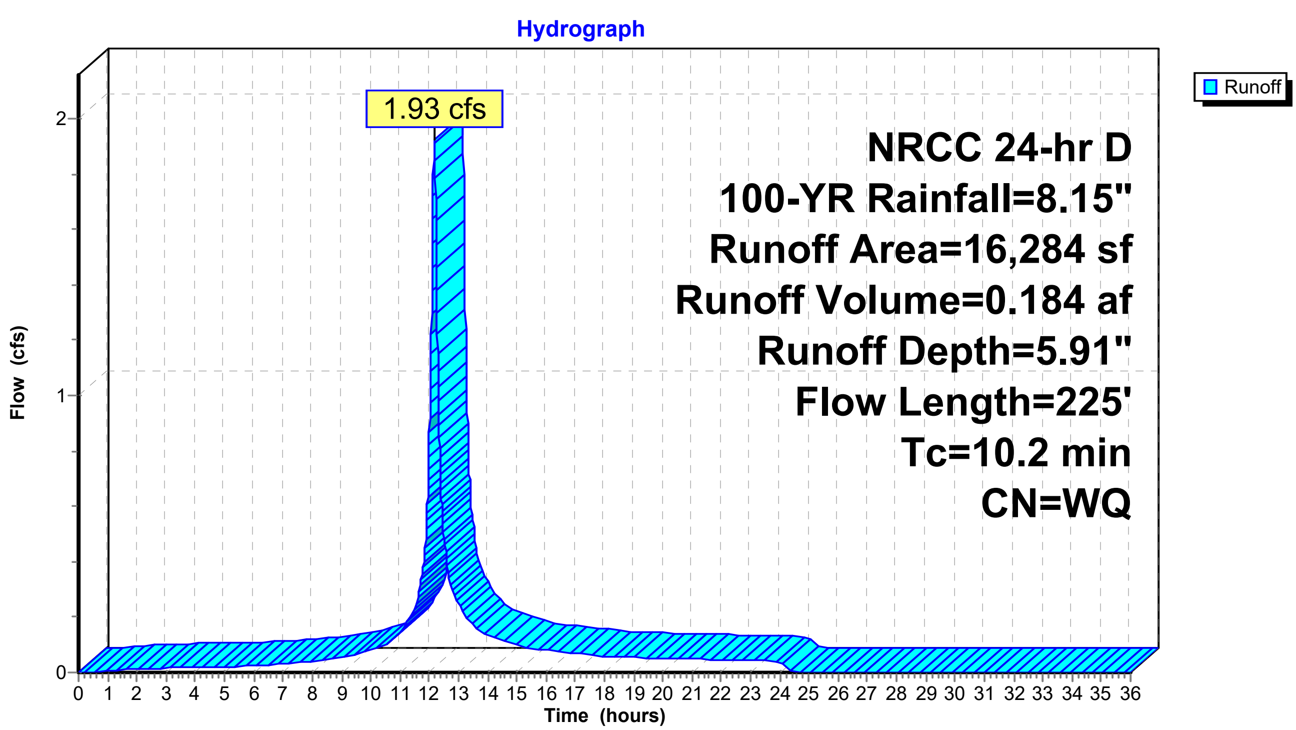
Runoff = 1.93 cfs @ 12.18 hrs, Volume= 0.184 af, Depth= 5.91"
Routed to Pond 2P : CB 0+88 & Trench Drain 0+28

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 100-YR Rainfall=8.15"

Area (sf)	CN	Description
2,939	70	Woods, Good, HSG C
6,027	98	Paved parking, HSG C
1,330	61	>75% Grass cover, Good, HSG B
5,988	74	>75% Grass cover, Good, HSG C
16,284		Weighted Average
10,257		62.99% Pervious Area
6,027		37.01% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	51	0.0400	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.36"
0.4	62	0.1100	2.32		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.5	112	0.0400	4.06		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
10.2	225	Total			

Subcatchment 1P: P1a



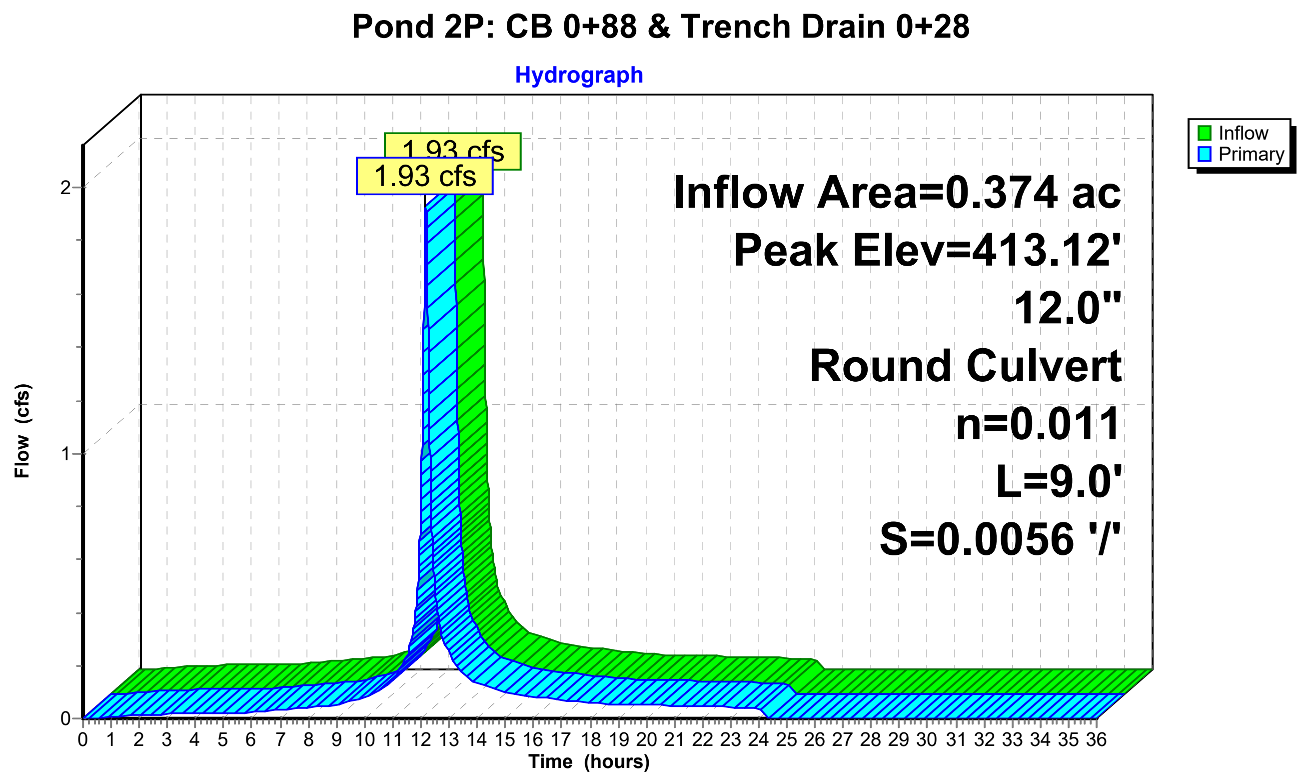
Summary for Pond 2P: CB 0+88 & Trench Drain 0+28

Inflow Area = 0.374 ac, 37.01% Impervious, Inflow Depth = 5.91" for 100-YR event
Inflow = 1.93 cfs @ 12.18 hrs, Volume= 0.184 af
Outflow = 1.93 cfs @ 12.18 hrs, Volume= 0.184 af, Atten= 0%, Lag= 0.0 min
Primary = 1.93 cfs @ 12.18 hrs, Volume= 0.184 af
Routed to Pond 3P : FD 0+79 & FD A

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 413.12' @ 12.21 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	411.65'	**12.0" Round Culvert** L= 9.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 411.65' / 411.60' S= 0.0056 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=1.78 cfs @ 12.18 hrs HW=413.03' TW=412.81' (Dynamic Tailwater)
1=Culvert (Inlet Controls 1.78 cfs @ 2.27 fps)



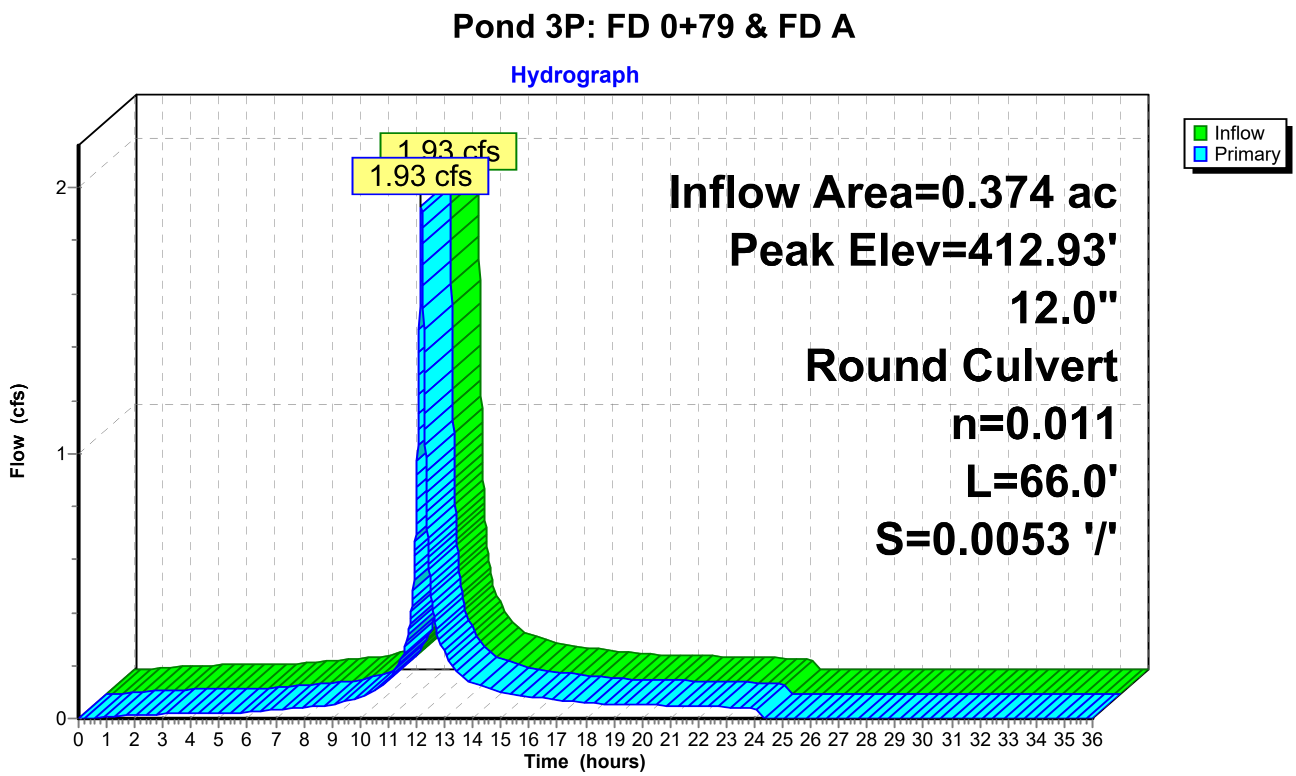
Summary for Pond 3P: FD 0+79 & FD A

Inflow Area = 0.374 ac, 37.01% Impervious, Inflow Depth = 5.91" for 100-YR event
Inflow = 1.93 cfs @ 12.18 hrs, Volume= 0.184 af
Outflow = 1.93 cfs @ 12.18 hrs, Volume= 0.184 af, Atten= 0%, Lag= 0.0 min
Primary = 1.93 cfs @ 12.18 hrs, Volume= 0.184 af
Routed to Pond 5P : Infiltration Basin #1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 412.93' @ 12.24 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	411.55'	**12.0" Round Culvert** L= 66.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 411.55' / 411.20' S= 0.0053 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=1.78 cfs @ 12.18 hrs HW=412.81' TW=412.58' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 1.78 cfs @ 2.32 fps)



Summary for Subcatchment 4P: P1b

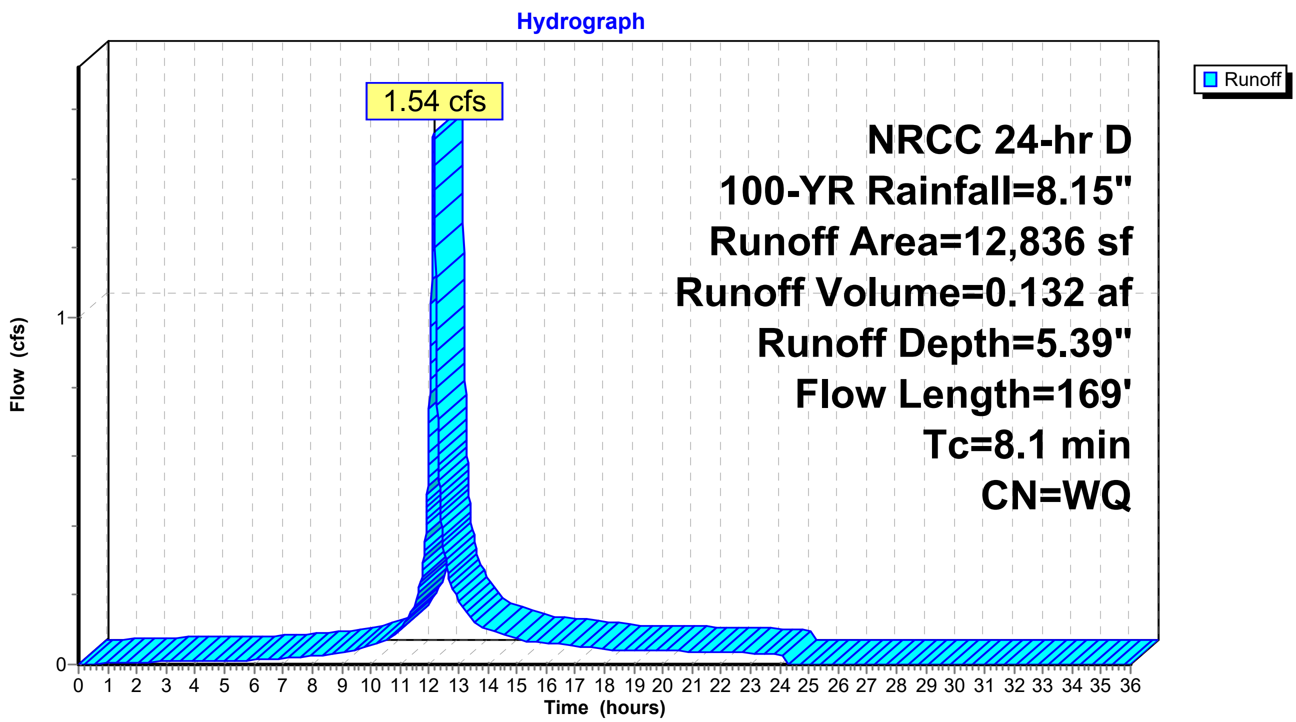
Runoff = 1.54 cfs @ 12.15 hrs, Volume= 0.132 af, Depth= 5.39"
Routed to Pond 5P : Infiltration Basin #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 100-YR Rainfall=8.15"

Area (sf)	CN	Description
866	98	Paved parking HSG B
1,075	98	Roofs HSG B
999	98	Paved parking HSG C
2,719	61	>75% Grass cover, Good HSG B
7,177	74	>75% Grass cover, Good HSG C
12,836		Weighted Average
9,896		77.10% Pervious Area
2,940		22.90% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.6	100	0.0900	0.22		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.36"
0.5	69	0.1000	2.21		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
8.1	169	Total			

Subcatchment 4P: P1b



Summary for Pond 5P: Infiltration Basin #1

Inflow Area = 0.669 ac, 30.79% Impervious, Inflow Depth = 5.68" for 100-YR event
Inflow = 3.44 cfs @ 12.16 hrs, Volume= 0.317 af
Outflow = 1.71 cfs @ 12.31 hrs, Volume= 0.317 af, Atten= 50%, Lag= 8.6 min
Discarded = 0.04 cfs @ 12.31 hrs, Volume= 0.077 af
Primary = 1.67 cfs @ 12.31 hrs, Volume= 0.239 af
Routed to Link 7P : Desing Point #1: Flow to Summer Street

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 412.81' @ 12.31 hrs Surf.Area= 1,817 sf Storage= 2,610 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 57.1 min (859.7 - 802.6)

Volume	Invert	Avail.Storage	Storage Description
#1	411.20'	4,950 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

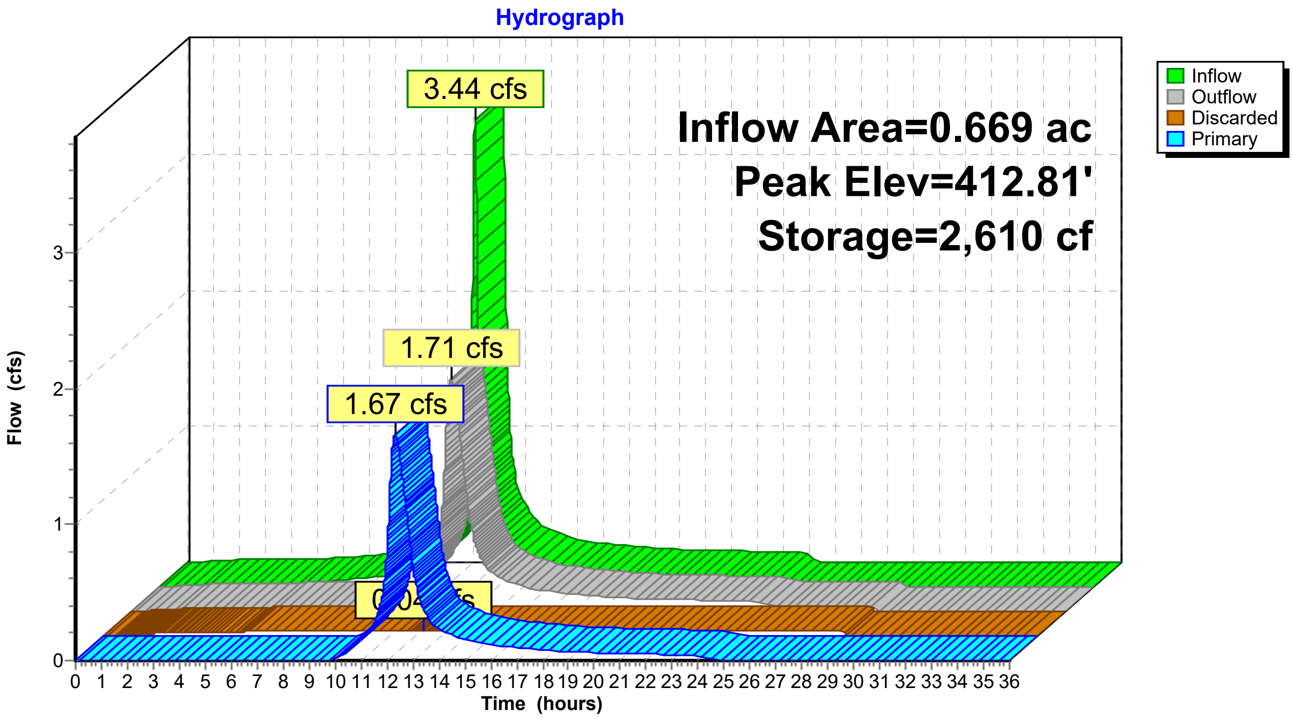
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
411.20	1,424	156.0	0	0	1,424
414.00	2,136	183.0	4,950	4,950	2,293

Device	Routing	Invert	Outlet Devices
#1	Primary	411.20'	**12.0" Round Culvert X 2.00** L= 36.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 411.20' / 410.50' S= 0.0194 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf
#2	Discarded	411.20'	**1.020 in/hr Exfiltration over Surface area**
#3	Device 1	411.50'	**8.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.04 cfs @ 12.31 hrs HW=412.81' (Free Discharge)
└─**2=Exfiltration** (Exfiltration Controls 0.04 cfs)

Primary OutFlow Max=1.66 cfs @ 12.31 hrs HW=412.81' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 1.66 cfs of 7.98 cfs potential flow)
  └─**3=Orifice/Grate** (Orifice Controls 1.66 cfs @ 4.77 fps)

Pond 5P: Infiltration Basin #1



Summary for Subcatchment 6P: P1c

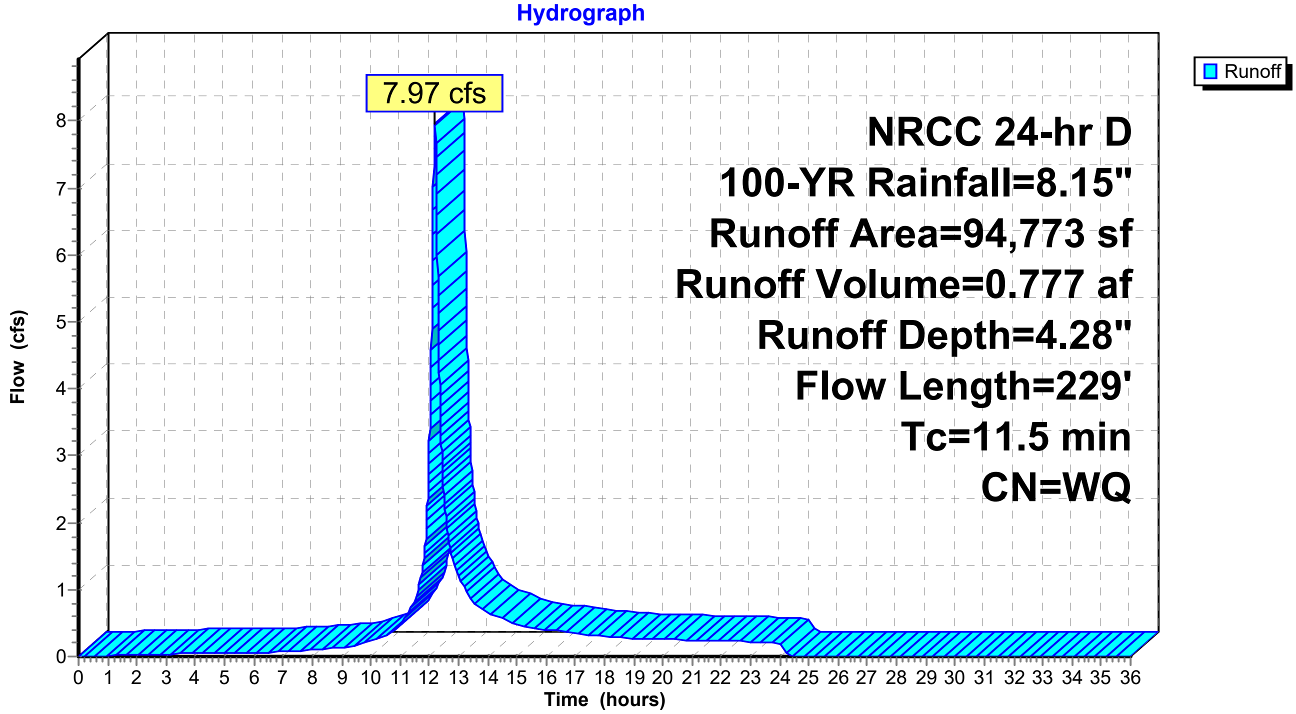
Runoff = 7.97 cfs @ 12.19 hrs, Volume= 0.777 af, Depth= 4.28"
Routed to Link 7P : Desing Point #1: Flow to Summer Street

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 100-YR Rainfall=8.15"

Area (sf)	CN	Description
8,137	98	Paved parking, HSG B
2,900	98	Paved parking, HSG C
2,753	98	Roofs HSG B
26	98	Roofs, HSG C
19,298	61	>75% Grass cover, Good HSG B
5,889	74	>75% Grass cover, Good, HSG C
33,955	55	Woods, Good, HSG B
21,815	70	Woods, Good, HSG C
94,773		Weighted Average
80,957		85.42% Pervious Area
13,816		14.58% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	51	0.0400	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.36"
2.2	178	0.0700	1.32		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
11.5	229	Total			

Subcatchment 6P: P1c

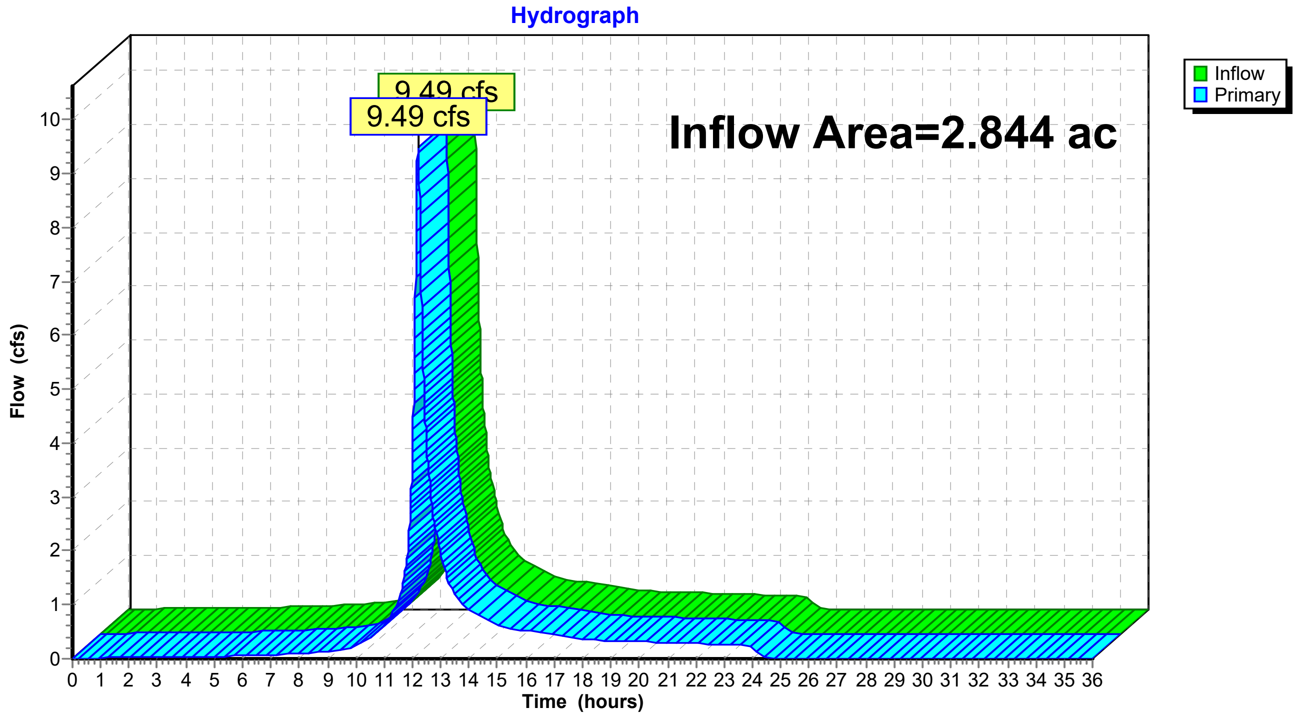


Summary for Link 7P: Desing Point #1: Flow to Summer Street

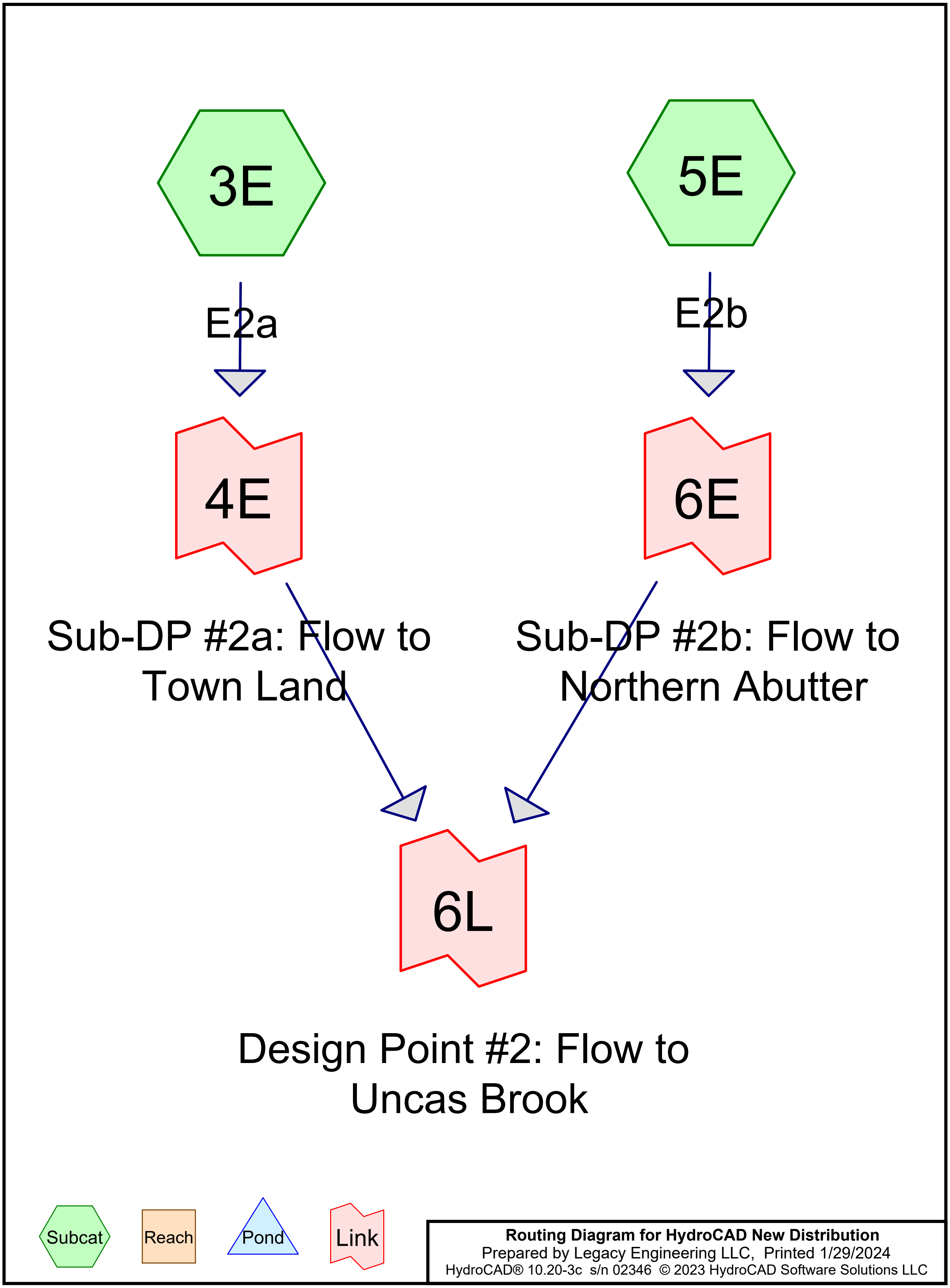
Inflow Area = 2.844 ac, 18.39% Impervious, Inflow Depth = 4.29" for 100-YR event
Inflow = 9.49 cfs @ 12.20 hrs, Volume= 1.016 af
Primary = 9.49 cfs @ 12.20 hrs, Volume= 1.016 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Link 7P: Desing Point #1: Flow to Summer Street



DESIGN POINT #2: FLOW TO UNCAS BROOK EXISTING CONDITIONS



3E
5E
E2a
E2b
4E
6E
Sub-DP #2a: Flow to Town Land
Sub-DP #2b: Flow to Northern Abutter
6L
Design Point #2: Flow to Uncas Brook
Subcat
Reach
Pond
Link
Routing Diagram for HydroCAD New Distribution
Prepared by Legacy Engineering LLC, Printed 1/29/2024
HydroCAD® 10.20-3c s/n 02346 © 2023 HydroCAD Software Solutions LLC

Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-YR	NRCC 24-hr	D	Default	24.00	1	3.36	2
2	10-YR	NRCC 24-hr	D	Default	24.00	1	5.22	2
3	25-YR	NRCC 24-hr	D	Default	24.00	1	6.37	2
4	100-YR	NRCC 24-hr	D	Default	24.00	1	8.15	2

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.480	61	>75% Grass cover, Good HSG B (3E, 5E)
0.027	74	>75% Grass cover, Good, HSG C (3E)
0.075	98	Paved parking HSG B (3E, 5E)
0.050	98	Roofs HSG B (5E)
0.020	98	Roofs, HSG B (3E)
3.217	55	Woods, Good HSG B (5E)
4.672	55	Woods, Good, HSG B (3E)
0.356	70	Woods, Good, HSG C (3E)
0.171	77	Woods, Good, HSG D (3E)
9.066	**57**	**TOTAL AREA**

Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 3E: E2a Runoff Area=236,411 sf 1.52% Impervious Runoff Depth=0.42"
Flow Length=615' Tc=14.4 min CN=WQ Runoff=1.01 cfs 0.192 af

Link 4E: Sub-DP #2a: Flow to Town Land Inflow=1.01 cfs 0.192 af
Primary=1.01 cfs 0.192 af

Subcatchment 5E: E2b Runoff Area=158,519 sf 1.71% Impervious Runoff Depth=0.37"
Flow Length=615' Tc=14.4 min CN=WQ Runoff=0.49 cfs 0.112 af

Link 6E: Sub-DP #2b: Flow to Northern Abutter Inflow=0.49 cfs 0.112 af
Primary=0.49 cfs 0.112 af

Link 6L: Design Point #2: Flow to Uncas Brook Inflow=1.50 cfs 0.304 af
Primary=1.50 cfs 0.304 af

Total Runoff Area = 9.066 ac Runoff Volume = 0.304 af Average Runoff Depth = 0.40"
98.41% Pervious = 8.922 ac 1.59% Impervious = 0.145 ac

Summary for Subcatchment 3E: E2a

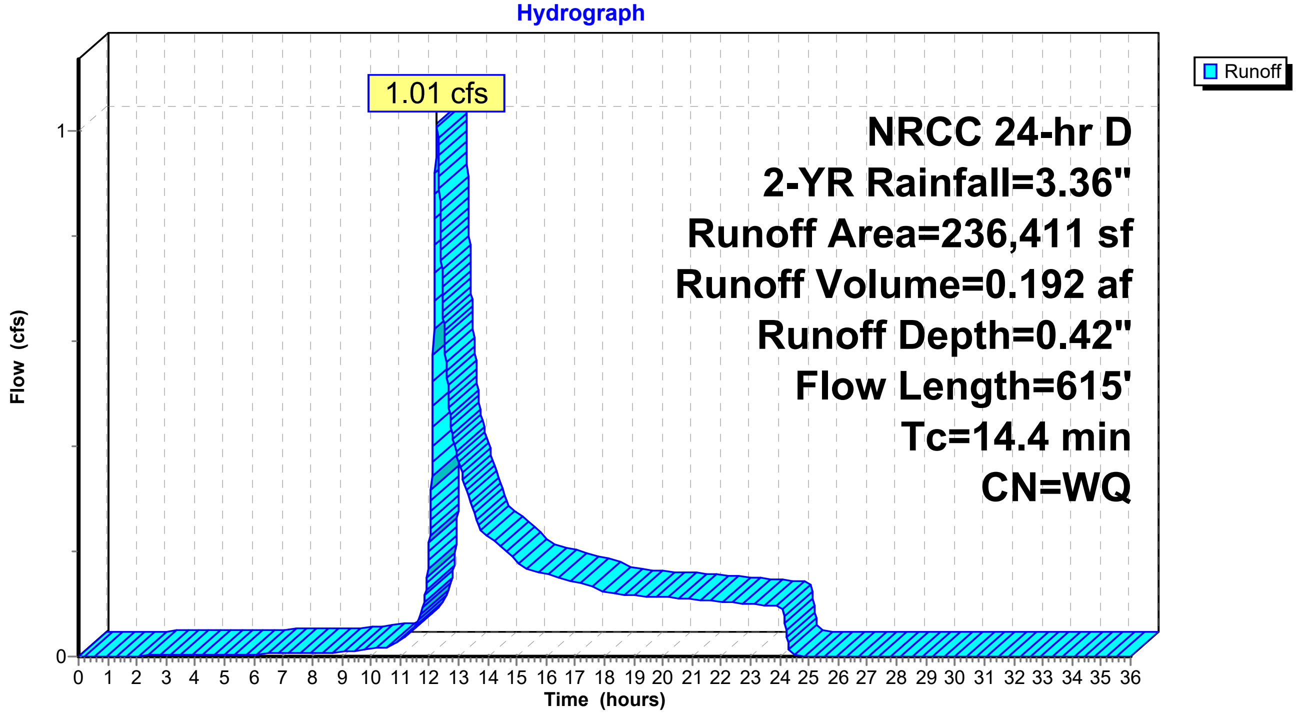
Runoff = 1.01 cfs @ 12.27 hrs, Volume= 0.192 af, Depth= 0.42"
Routed to Link 4E : Sub-DP #2a: Flow to Town Land

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 2-YR Rainfall=3.36"

Area (sf)	CN	Description
2,724	98	Paved parking HSG B
870	98	Roofs, HSG B
5,219	61	>75% Grass cover, Good HSG B
1,162	74	>75% Grass cover, Good, HSG C
203,499	55	Woods, Good, HSG B
15,496	70	Woods, Good, HSG C
7,441	77	Woods, Good, HSG D
236,411		Weighted Average
232,817		98.48% Pervious Area
3,594		1.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	68	0.0700	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.36"
5.1	547	0.1300	1.80		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
14.4	615	Total			

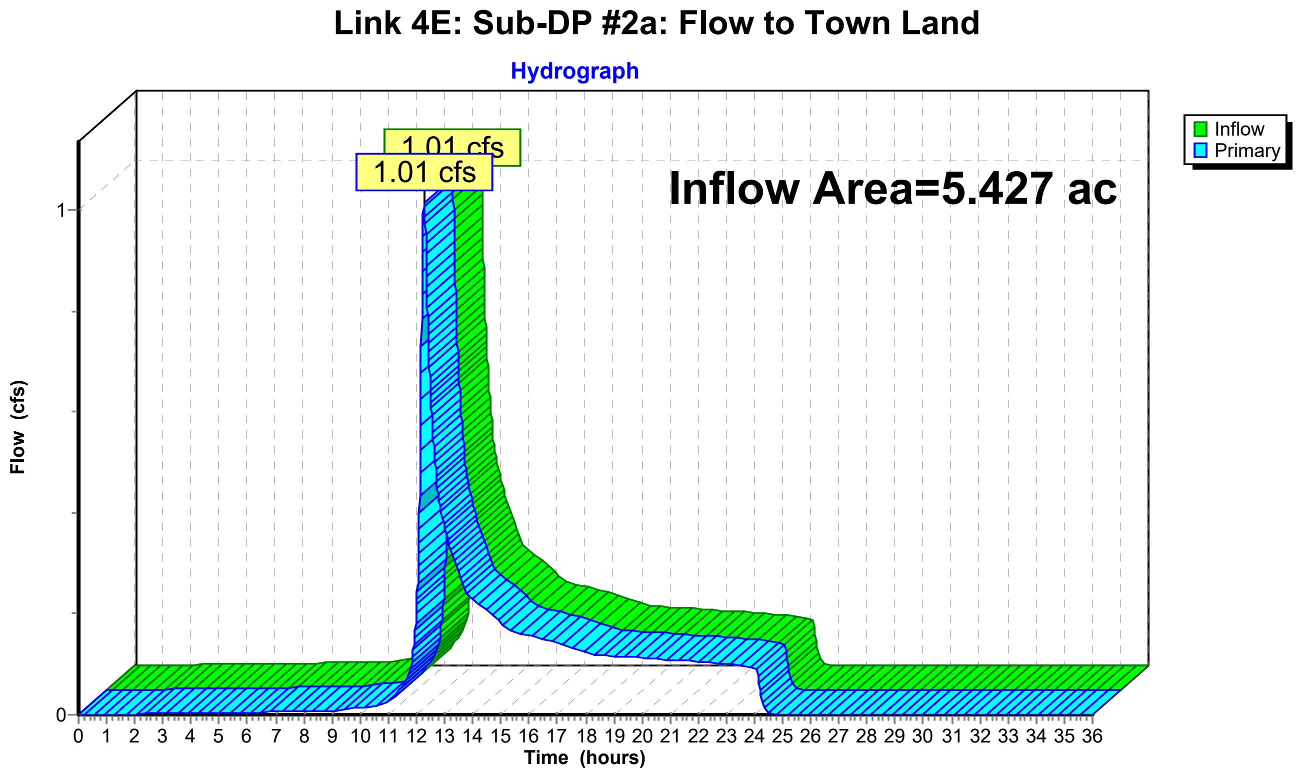
Subcatchment 3E: E2a



Summary for Link 4E: Sub-DP #2a: Flow to Town Land

Inflow Area = 5.427 ac, 1.52% Impervious, Inflow Depth = 0.42" for 2-YR event
Inflow = 1.01 cfs @ 12.27 hrs, Volume= 0.192 af
Primary = 1.01 cfs @ 12.27 hrs, Volume= 0.192 af, Atten= 0%, Lag= 0.0 min
Routed to Link 6L : Design Point #2: Flow to Uncas Brook

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs



Summary for Subcatchment 5E: E2b

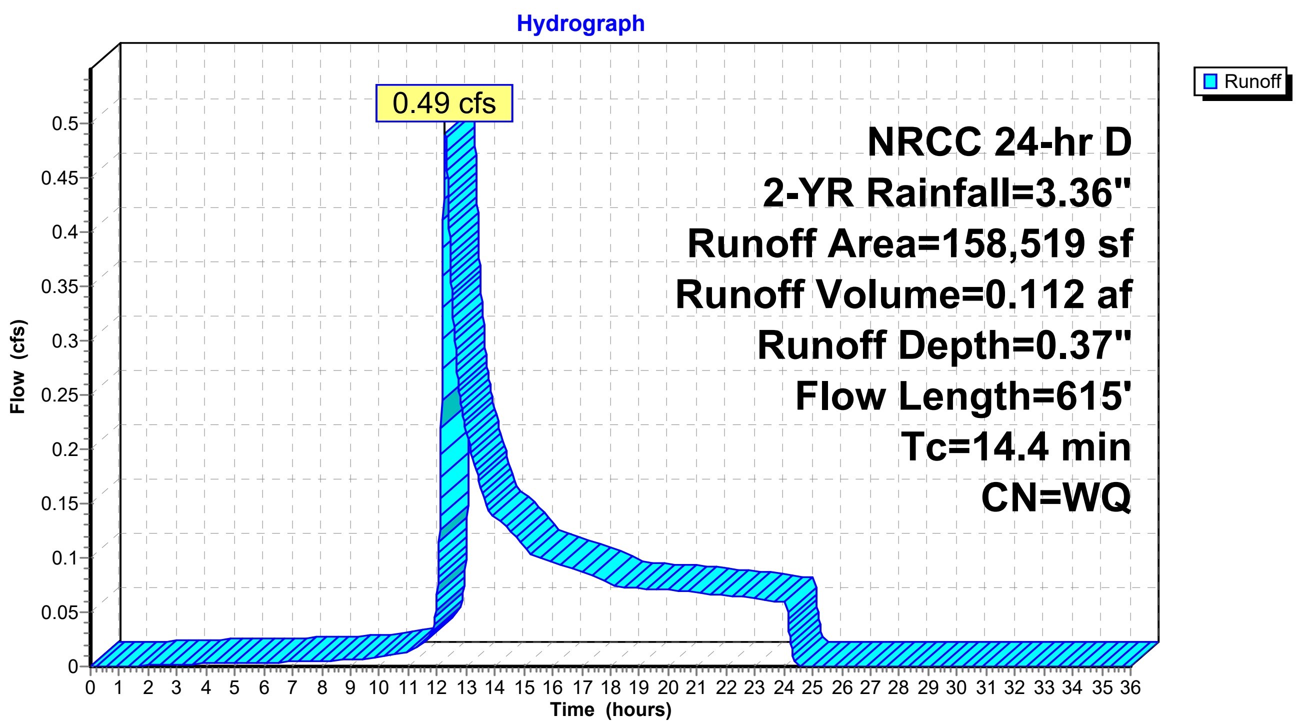
Runoff = 0.49 cfs @ 12.29 hrs, Volume= 0.112 af, Depth= 0.37"
Routed to Link 6E : Sub-DP #2b: Flow to Northern Abutter

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 2-YR Rainfall=3.36"

Area (sf)	CN	Description
525	98	Paved parking HSG B
2,180	98	Roofs HSG B
140,117	55	Woods, Good HSG B
15,697	61	>75% Grass cover, Good HSG B
158,519		Weighted Average
155,814		98.29% Pervious Area
2,705		1.71% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	68	0.0700	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.36"
5.1	547	0.1300	1.80		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
14.4	615	Total			

Subcatchment 5E: E2b

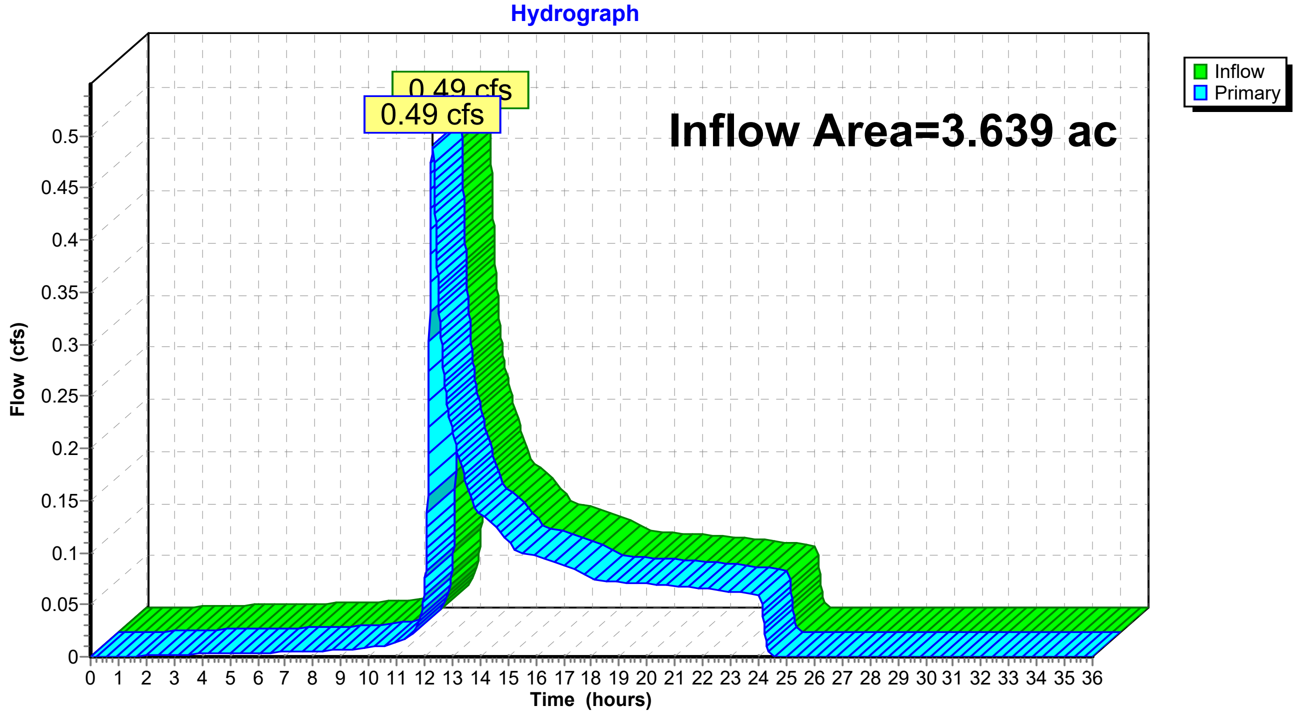


Summary for Link 6E: Sub-DP #2b: Flow to Northern Abutter

Inflow Area = 3.639 ac, 1.71% Impervious, Inflow Depth = 0.37" for 2-YR event
Inflow = 0.49 cfs @ 12.29 hrs, Volume= 0.112 af
Primary = 0.49 cfs @ 12.29 hrs, Volume= 0.112 af, Atten= 0%, Lag= 0.0 min
Routed to Link 6L : Design Point #2: Flow to Uncas Brook

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Link 6E: Sub-DP #2b: Flow to Northern Abutter

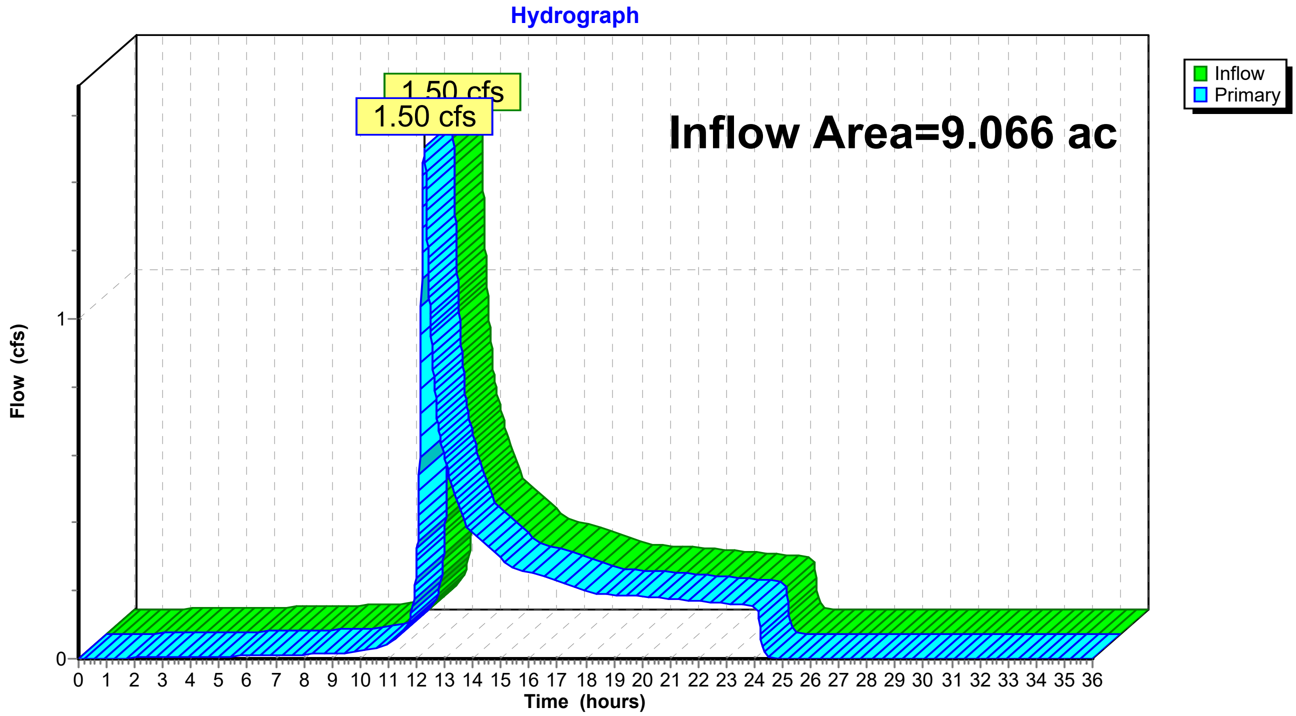


Summary for Link 6L: Design Point #2: Flow to Uncas Brook

Inflow Area =	9.066 ac,	1.59% Impervious,	Inflow Depth = 0.40"	for 2-YR event
Inflow =	1.50 cfs @	12.27 hrs, Volume=	0.304 af	
Primary =	1.50 cfs @	12.27 hrs, Volume=	0.304 af,	Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Link 6L: Design Point #2: Flow to Uncas Brook



Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 3E: E2a Runoff Area=236,411 sf 1.52% Impervious Runoff Depth=1.29"
Flow Length=615' Tc=14.4 min CN=WQ Runoff=5.01 cfs 0.585 af

Link 4E: Sub-DP #2a: Flow to Town Land Inflow=5.01 cfs 0.585 af
Primary=5.01 cfs 0.585 af

Subcatchment 5E: E2b Runoff Area=158,519 sf 1.71% Impervious Runoff Depth=1.20"
Flow Length=615' Tc=14.4 min CN=WQ Runoff=3.04 cfs 0.364 af

Link 6E: Sub-DP #2b: Flow to Northern Abutter Inflow=3.04 cfs 0.364 af
Primary=3.04 cfs 0.364 af

Link 6L: Design Point #2: Flow to Uncas Brook Inflow=8.05 cfs 0.949 af
Primary=8.05 cfs 0.949 af

Total Runoff Area = 9.066 ac Runoff Volume = 0.949 af Average Runoff Depth = 1.26"
98.41% Pervious = 8.922 ac 1.59% Impervious = 0.145 ac

Summary for Subcatchment 3E: E2a

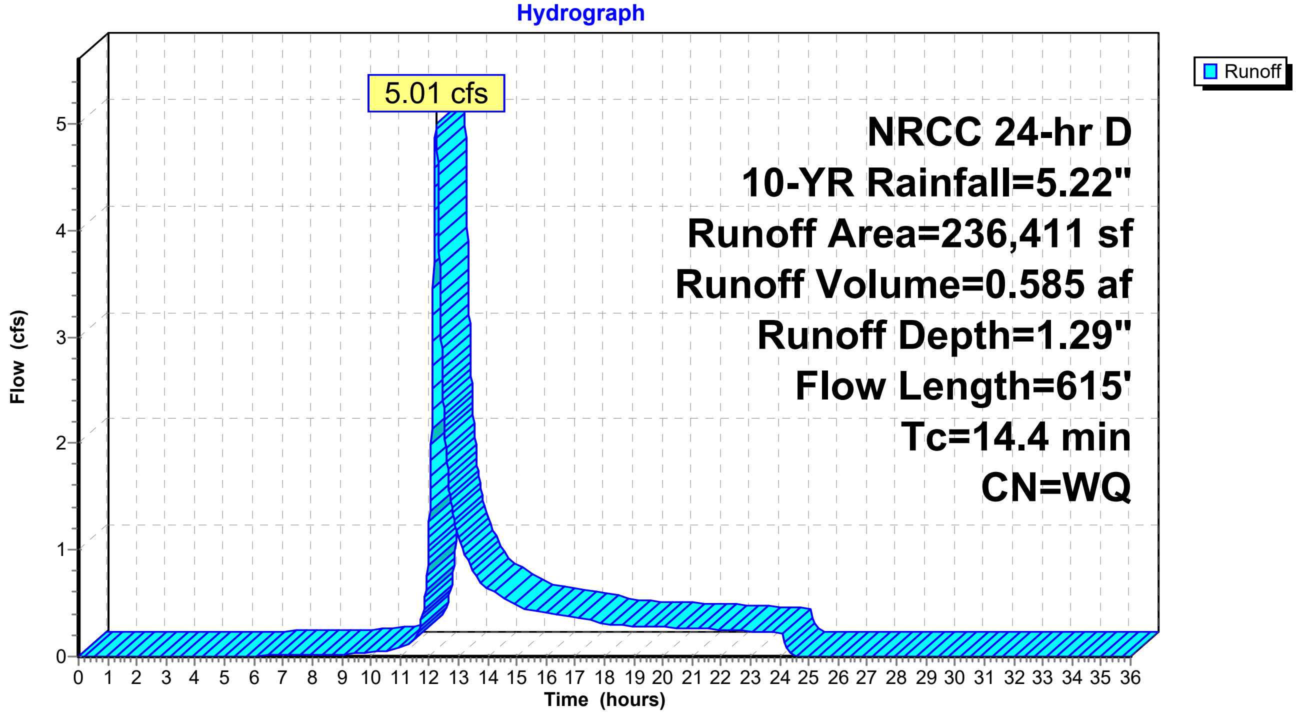
Runoff = 5.01 cfs @ 12.24 hrs, Volume= 0.585 af, Depth= 1.29"
Routed to Link 4E : Sub-DP #2a: Flow to Town Land

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 10-YR Rainfall=5.22"

Area (sf)	CN	Description
2,724	98	Paved parking HSG B
870	98	Roofs, HSG B
5,219	61	>75% Grass cover, Good HSG B
1,162	74	>75% Grass cover, Good, HSG C
203,499	55	Woods, Good, HSG B
15,496	70	Woods, Good, HSG C
7,441	77	Woods, Good, HSG D
236,411		Weighted Average
232,817		98.48% Pervious Area
3,594		1.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	68	0.0700	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.36"
5.1	547	0.1300	1.80		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
14.4	615	Total			

Subcatchment 3E: E2a

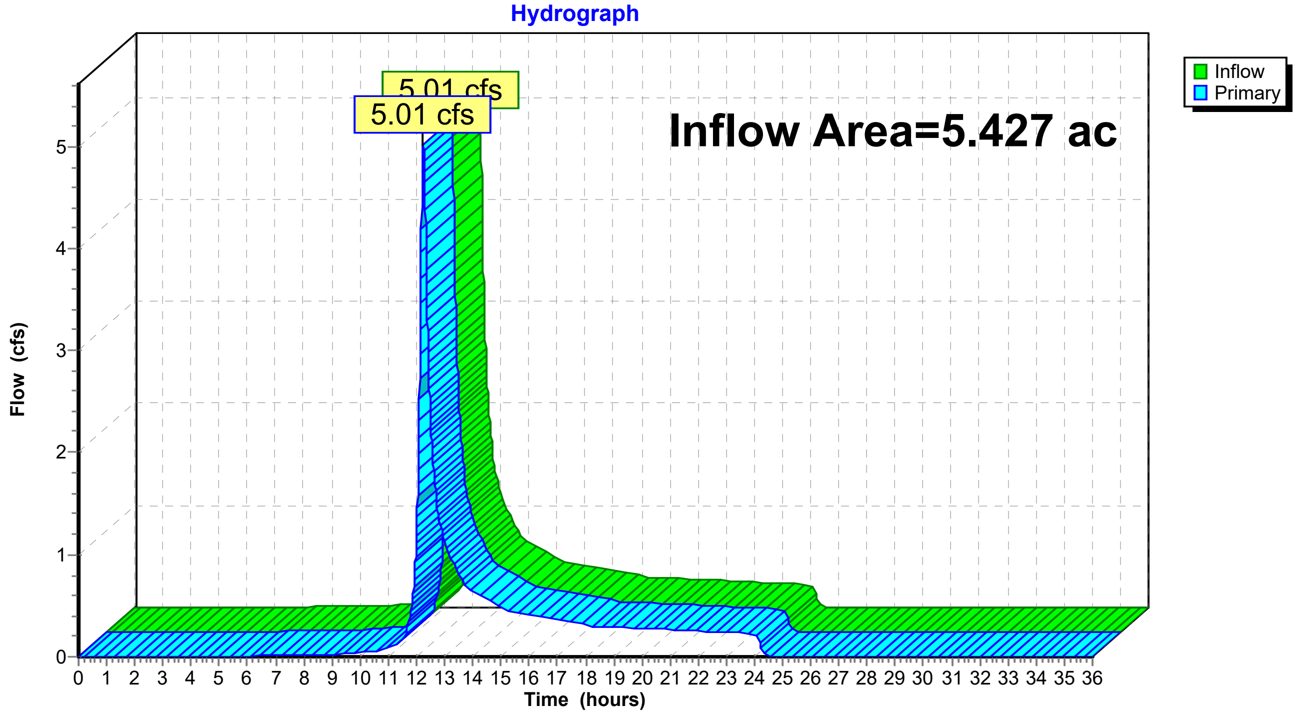


Summary for Link 4E: Sub-DP #2a: Flow to Town Land

Inflow Area = 5.427 ac, 1.52% Impervious, Inflow Depth = 1.29" for 10-YR event
Inflow = 5.01 cfs @ 12.24 hrs, Volume= 0.585 af
Primary = 5.01 cfs @ 12.24 hrs, Volume= 0.585 af, Atten= 0%, Lag= 0.0 min
Routed to Link 6L : Design Point #2: Flow to Uncas Brook

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Link 4E: Sub-DP #2a: Flow to Town Land



Summary for Subcatchment 5E: E2b

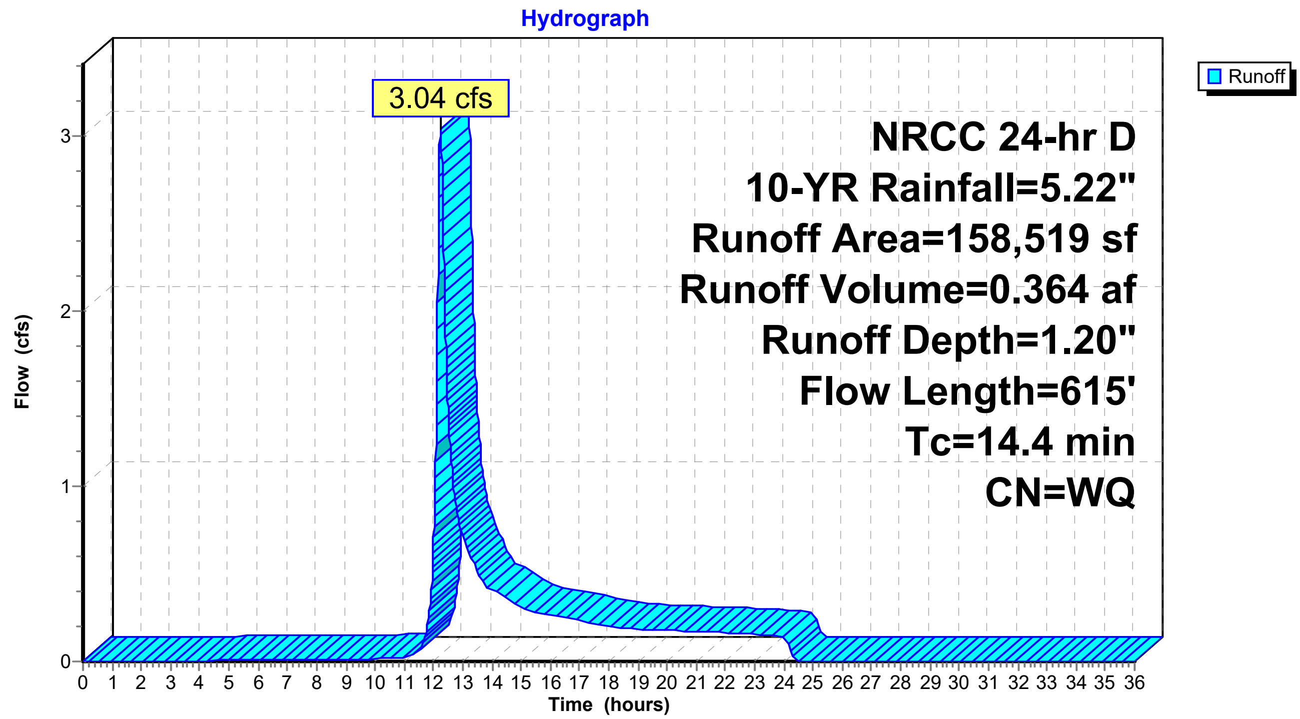
Runoff = 3.04 cfs @ 12.24 hrs, Volume= 0.364 af, Depth= 1.20"
Routed to Link 6E : Sub-DP #2b: Flow to Northern Abutter

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 10-YR Rainfall=5.22"

Area (sf)	CN	Description
525	98	Paved parking HSG B
2,180	98	Roofs HSG B
140,117	55	Woods, Good HSG B
15,697	61	>75% Grass cover, Good HSG B
158,519		Weighted Average
155,814		98.29% Pervious Area
2,705		1.71% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	68	0.0700	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.36"
5.1	547	0.1300	1.80		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
14.4	615	Total			

Subcatchment 5E: E2b

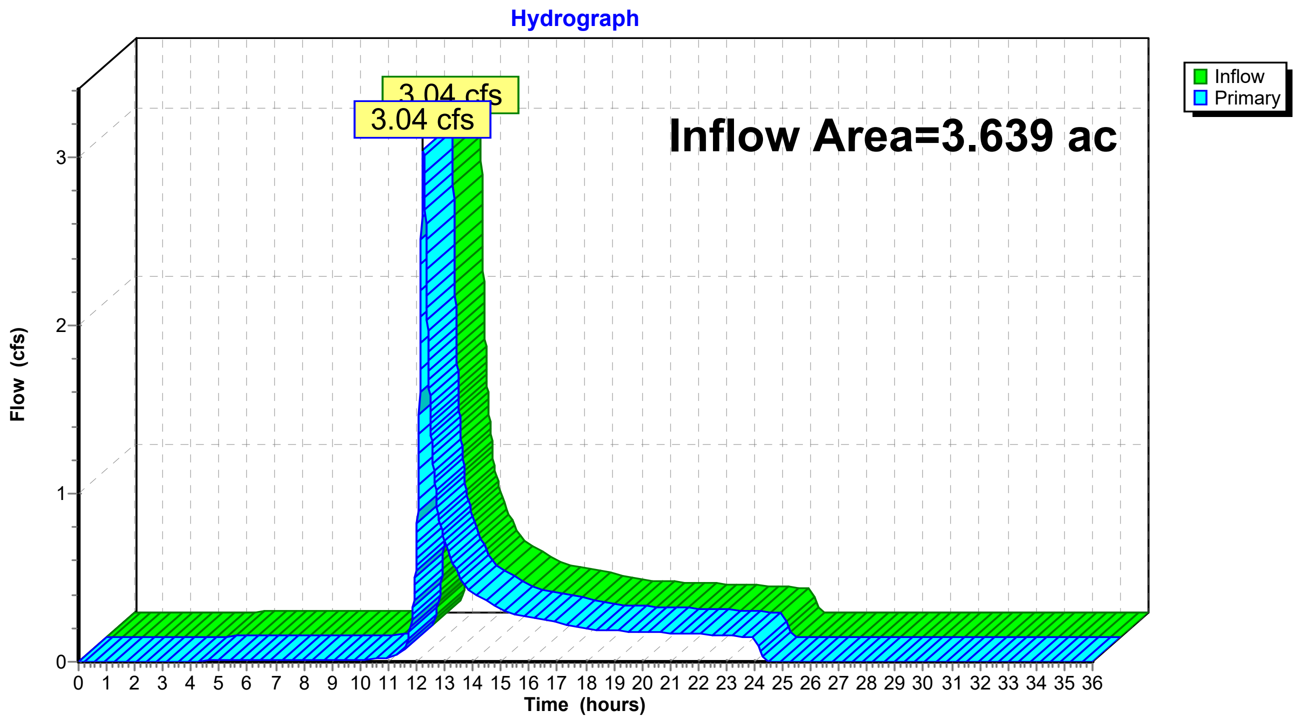


Summary for Link 6E: Sub-DP #2b: Flow to Northern Abutter

Inflow Area = 3.639 ac, 1.71% Impervious, Inflow Depth = 1.20" for 10-YR event
Inflow = 3.04 cfs @ 12.24 hrs, Volume= 0.364 af
Primary = 3.04 cfs @ 12.24 hrs, Volume= 0.364 af, Atten= 0%, Lag= 0.0 min
Routed to Link 6L : Design Point #2: Flow to Uncas Brook

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Link 6E: Sub-DP #2b: Flow to Northern Abutter

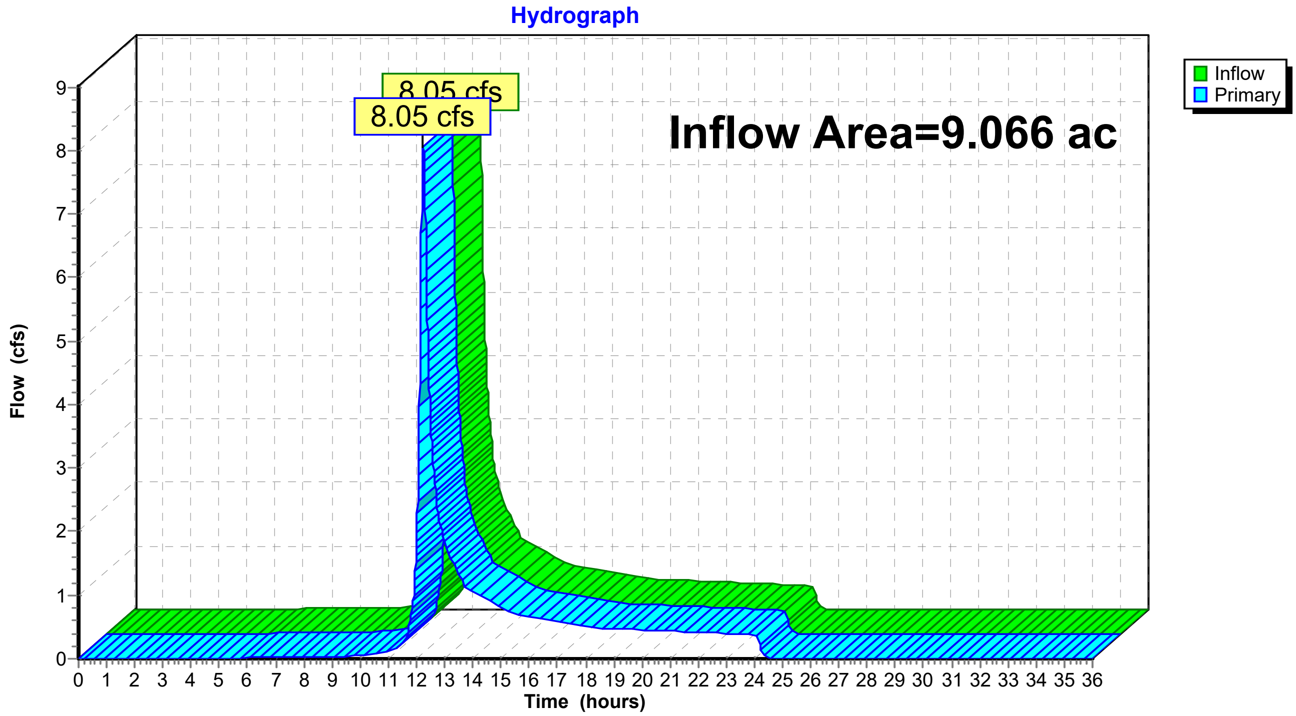


Summary for Link 6L: Design Point #2: Flow to Uncas Brook

Inflow Area =	9.066 ac,	1.59% Impervious, Inflow Depth = 1.26"	for 10-YR event	
Inflow =	8.05 cfs @	12.24 hrs, Volume=	0.949 af	
Primary =	8.05 cfs @	12.24 hrs, Volume=	0.949 af,	Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Link 6L: Design Point #2: Flow to Uncas Brook



Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 3E: E2a Runoff Area=236,411 sf 1.52% Impervious Runoff Depth=1.98"
Flow Length=615' Tc=14.4 min CN=WQ Runoff=8.19 cfs 0.894 af

Link 4E: Sub-DP #2a: Flow to Town Land Inflow=8.19 cfs 0.894 af
Primary=8.19 cfs 0.894 af

Subcatchment 5E: E2b Runoff Area=158,519 sf 1.71% Impervious Runoff Depth=1.86"
Flow Length=615' Tc=14.4 min CN=WQ Runoff=5.12 cfs 0.565 af

Link 6E: Sub-DP #2b: Flow to Northern Abutter Inflow=5.12 cfs 0.565 af
Primary=5.12 cfs 0.565 af

Link 6L: Design Point #2: Flow to Uncas Brook Inflow=13.31 cfs 1.459 af
Primary=13.31 cfs 1.459 af

Total Runoff Area = 9.066 ac Runoff Volume = 1.459 af Average Runoff Depth = 1.93"
98.41% Pervious = 8.922 ac 1.59% Impervious = 0.145 ac

Summary for Subcatchment 3E: E2a

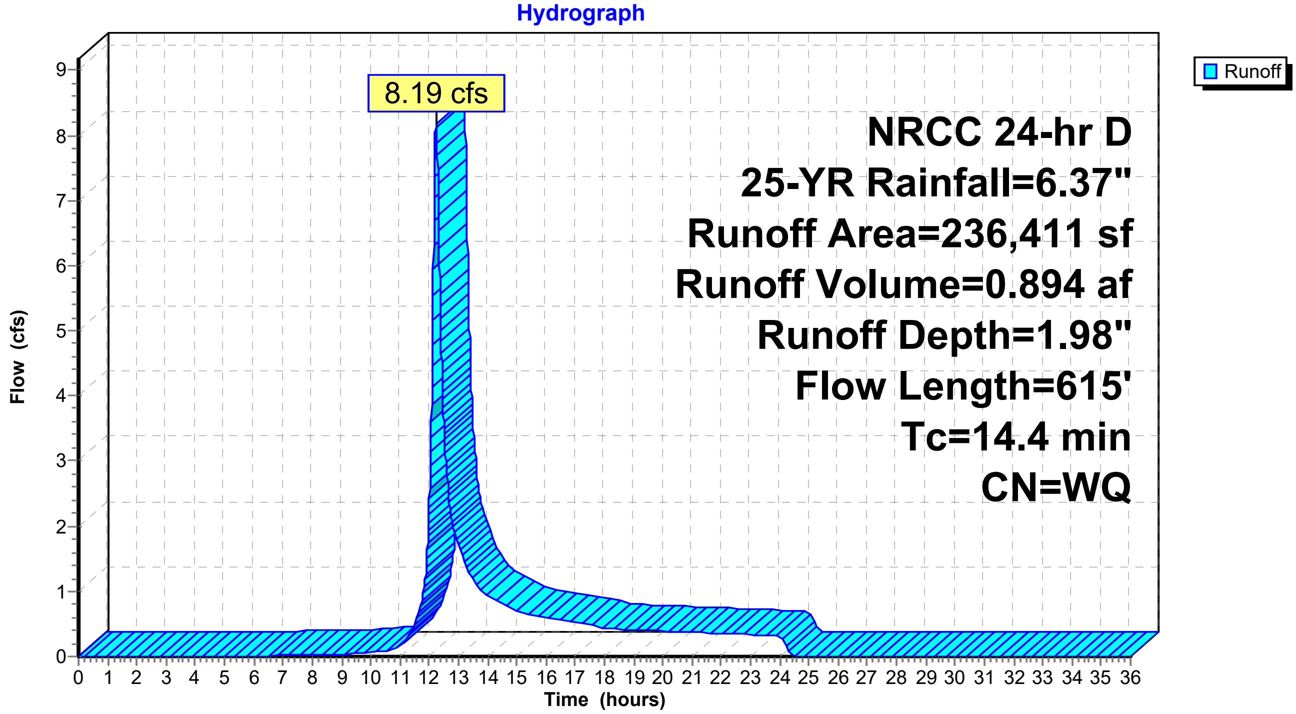
Runoff = 8.19 cfs @ 12.24 hrs, Volume= 0.894 af, Depth= 1.98"
Routed to Link 4E : Sub-DP #2a: Flow to Town Land

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 25-YR Rainfall=6.37"

Area (sf)	CN	Description
2,724	98	Paved parking HSG B
870	98	Roofs, HSG B
5,219	61	>75% Grass cover, Good HSG B
1,162	74	>75% Grass cover, Good, HSG C
203,499	55	Woods, Good, HSG B
15,496	70	Woods, Good, HSG C
7,441	77	Woods, Good, HSG D
236,411		Weighted Average
232,817		98.48% Pervious Area
3,594		1.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	68	0.0700	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.36"
5.1	547	0.1300	1.80		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
14.4	615	Total			

Subcatchment 3E: E2a



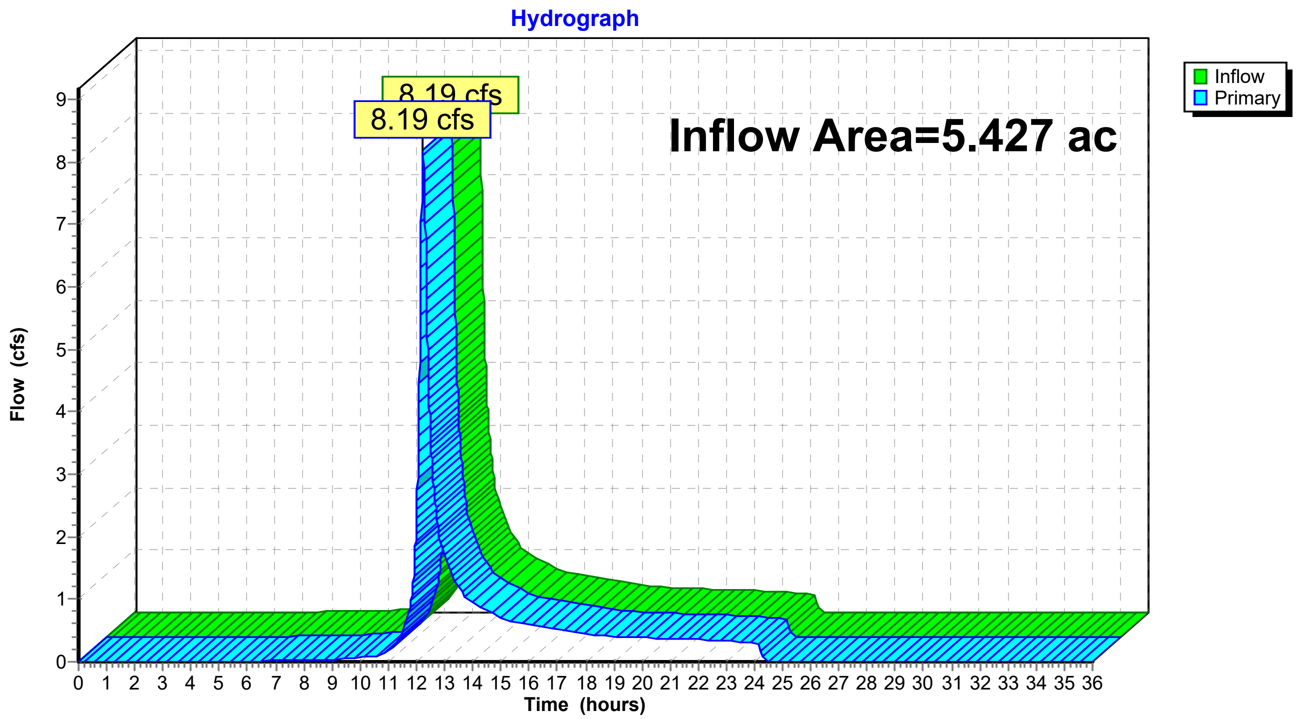
Summary for Link 4E: Sub-DP #2a: Flow to Town Land

Inflow Area =	5.427 ac,	1.52% Impervious,	Inflow Depth = 1.98"	for 25-YR event	
Inflow =	8.19 cfs @	12.24 hrs,	Volume=	0.894 af	
Primary =	8.19 cfs @	12.24 hrs,	Volume=	0.894 af,	Atten= 0%, Lag= 0.0 min

Routed to Link 6L : Design Point #2: Flow to Uncas Brook

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Link 4E: Sub-DP #2a: Flow to Town Land



Summary for Subcatchment 5E: E2b

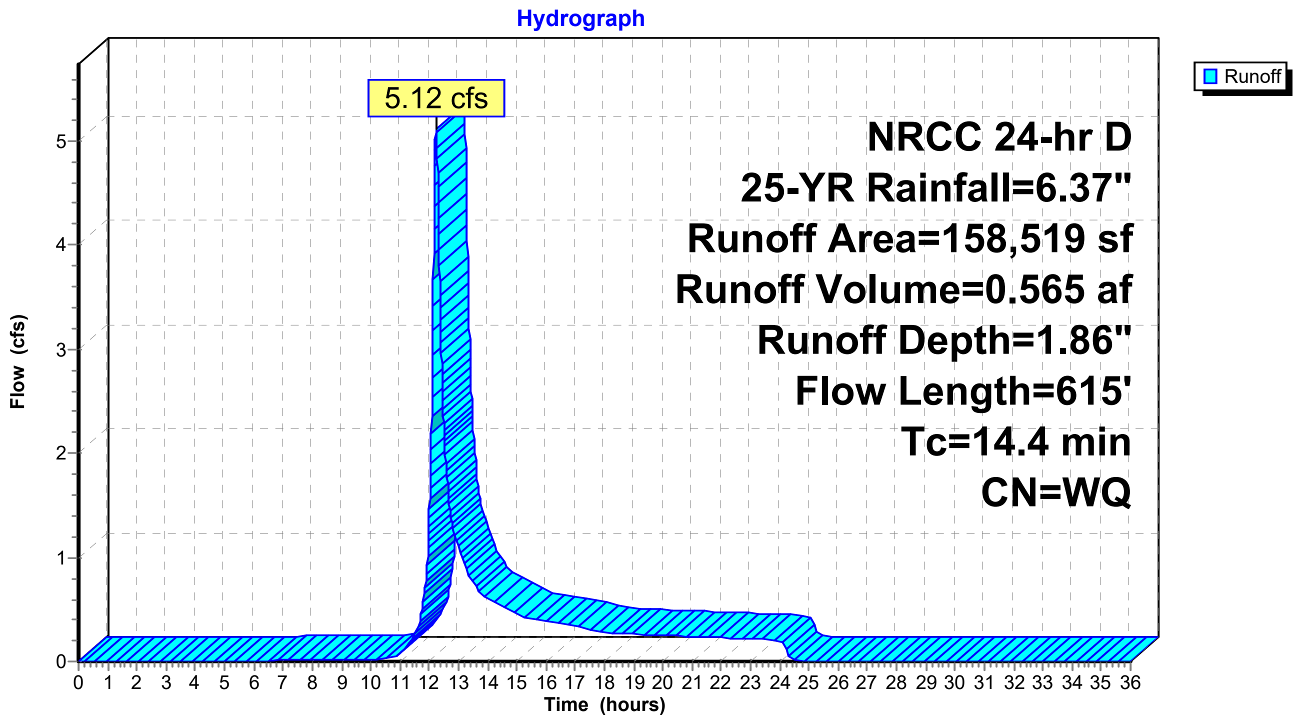
Runoff = 5.12 cfs @ 12.24 hrs, Volume= 0.565 af, Depth= 1.86"
Routed to Link 6E : Sub-DP #2b: Flow to Northern Abutter

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 25-YR Rainfall=6.37"

Area (sf)	CN	Description
525	98	Paved parking HSG B
2,180	98	Roofs HSG B
140,117	55	Woods, Good HSG B
15,697	61	>75% Grass cover, Good HSG B
158,519		Weighted Average
155,814		98.29% Pervious Area
2,705		1.71% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	68	0.0700	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.36"
5.1	547	0.1300	1.80		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
14.4	615	Total			

Subcatchment 5E: E2b

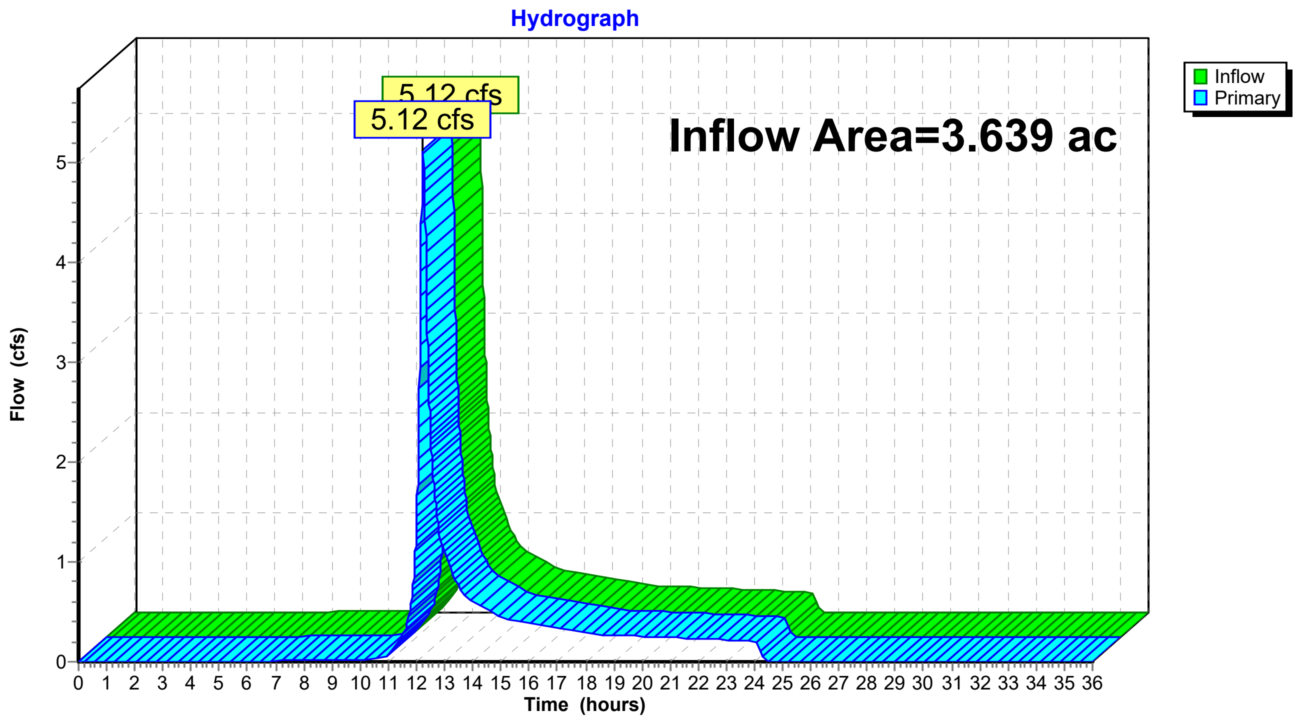


Summary for Link 6E: Sub-DP #2b: Flow to Northern Abutter

Inflow Area = 3.639 ac, 1.71% Impervious, Inflow Depth = 1.86" for 25-YR event
Inflow = 5.12 cfs @ 12.24 hrs, Volume= 0.565 af
Primary = 5.12 cfs @ 12.24 hrs, Volume= 0.565 af, Atten= 0%, Lag= 0.0 min
Routed to Link 6L : Design Point #2: Flow to Uncas Brook

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

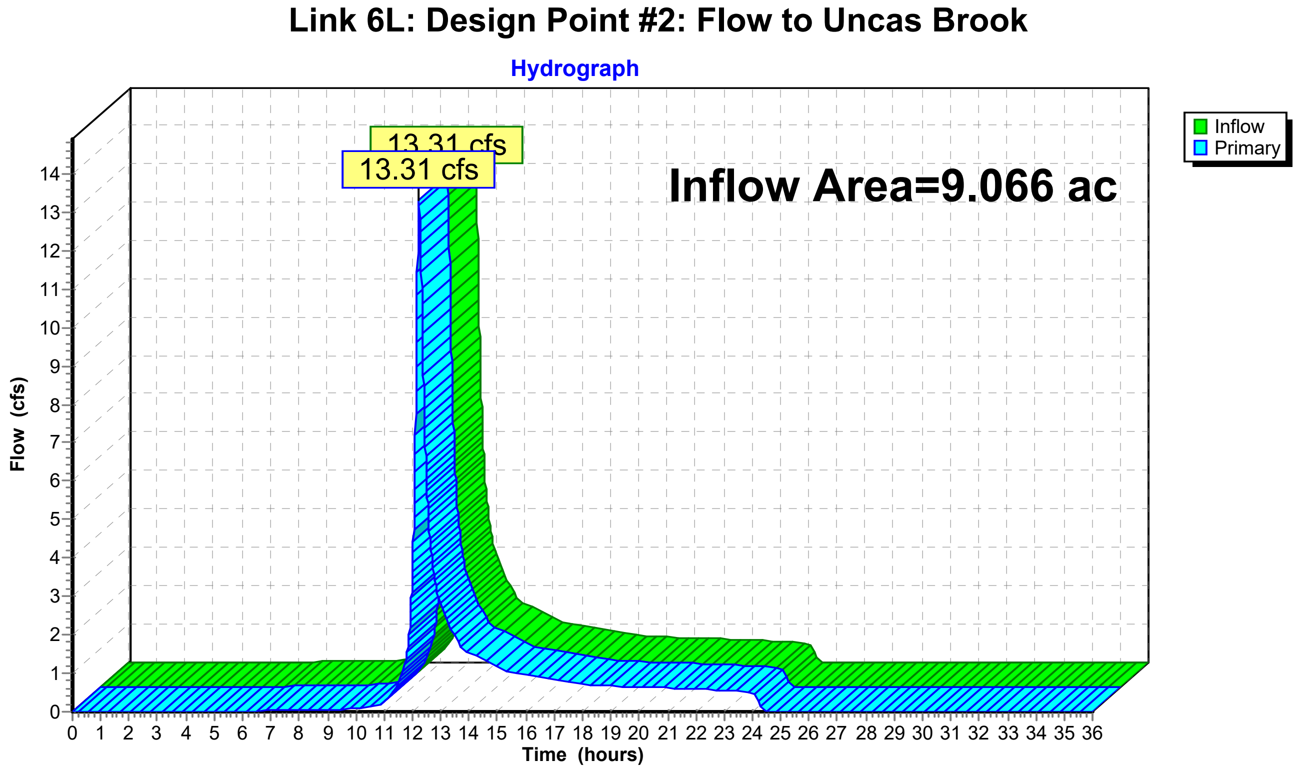
Link 6E: Sub-DP #2b: Flow to Northern Abutter



Summary for Link 6L: Design Point #2: Flow to Uncas Brook

Inflow Area =	9.066 ac,	1.59% Impervious,	Inflow Depth = 1.93"	for 25-YR event
Inflow =	13.31 cfs @	12.24 hrs, Volume=	1.459 af	
Primary =	13.31 cfs @	12.24 hrs, Volume=	1.459 af,	Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs



Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 3E: E2a Runoff Area=236,411 sf 1.52% Impervious Runoff Depth=3.18"
Flow Length=615' Tc=14.4 min CN=WQ Runoff=13.74 cfs 1.438 af

Link 4E: Sub-DP #2a: Flow to Town Land Inflow=13.74 cfs 1.438 af
Primary=13.74 cfs 1.438 af

Subcatchment 5E: E2b Runoff Area=158,519 sf 1.71% Impervious Runoff Depth=3.04"
Flow Length=615' Tc=14.4 min CN=WQ Runoff=8.78 cfs 0.922 af

Link 6E: Sub-DP #2b: Flow to Northern Abutter Inflow=8.78 cfs 0.922 af
Primary=8.78 cfs 0.922 af

Link 6L: Design Point #2: Flow to Uncas Brook Inflow=22.51 cfs 2.360 af
Primary=22.51 cfs 2.360 af

Total Runoff Area = 9.066 ac Runoff Volume = 2.360 af Average Runoff Depth = 3.12"
98.41% Pervious = 8.922 ac 1.59% Impervious = 0.145 ac

Summary for Subcatchment 3E: E2a

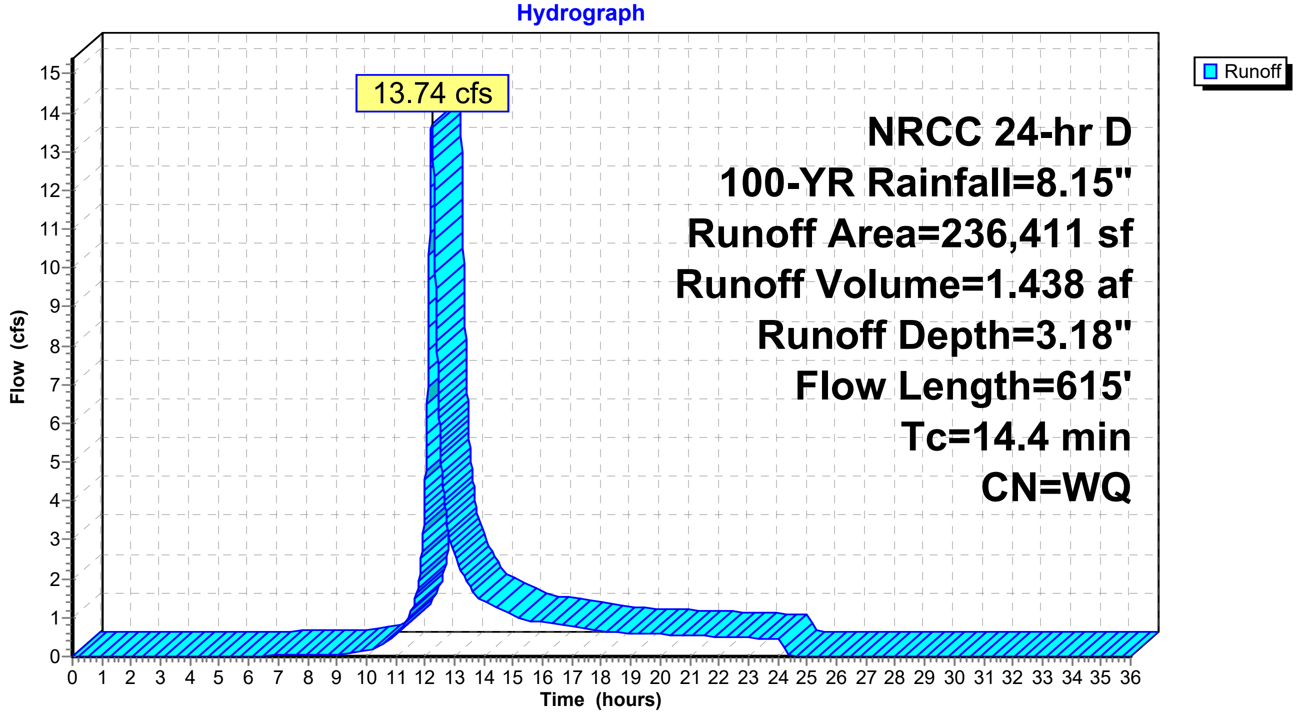
Runoff = 13.74 cfs @ 12.23 hrs, Volume= 1.438 af, Depth= 3.18"
Routed to Link 4E : Sub-DP #2a: Flow to Town Land

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 100-YR Rainfall=8.15"

Area (sf)	CN	Description
2,724	98	Paved parking HSG B
870	98	Roofs, HSG B
5,219	61	>75% Grass cover, Good HSG B
1,162	74	>75% Grass cover, Good, HSG C
203,499	55	Woods, Good, HSG B
15,496	70	Woods, Good, HSG C
7,441	77	Woods, Good, HSG D
236,411		Weighted Average
232,817		98.48% Pervious Area
3,594		1.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	68	0.0700	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.36"
5.1	547	0.1300	1.80		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
14.4	615	Total			

Subcatchment 3E: E2a

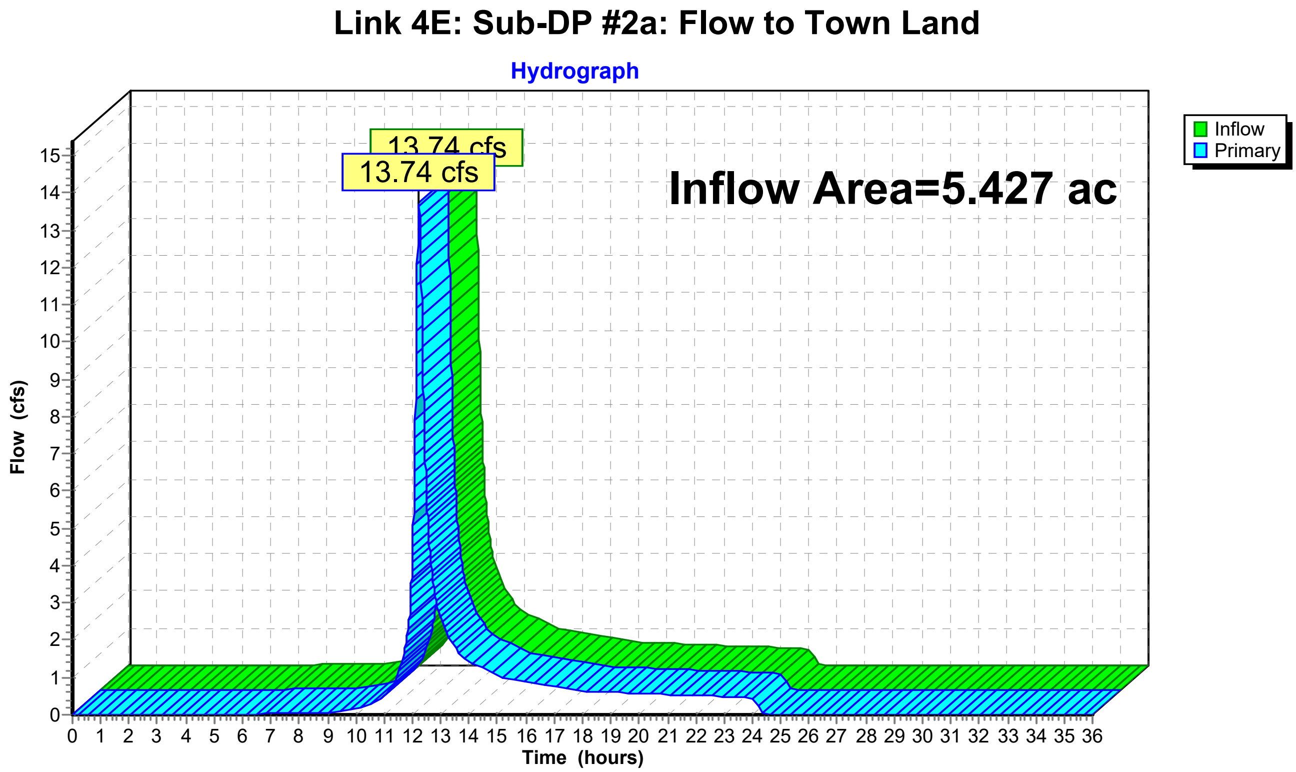


Summary for Link 4E: Sub-DP #2a: Flow to Town Land

Inflow Area =	5.427 ac,	1.52% Impervious,	Inflow Depth = 3.18"	for 100-YR event
Inflow =	13.74 cfs @	12.23 hrs, Volume=	1.438 af	
Primary =	13.74 cfs @	12.23 hrs, Volume=	1.438 af,	Atten= 0%, Lag= 0.0 min

Routed to Link 6L : Design Point #2: Flow to Uncas Brook

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs



Summary for Subcatchment 5E: E2b

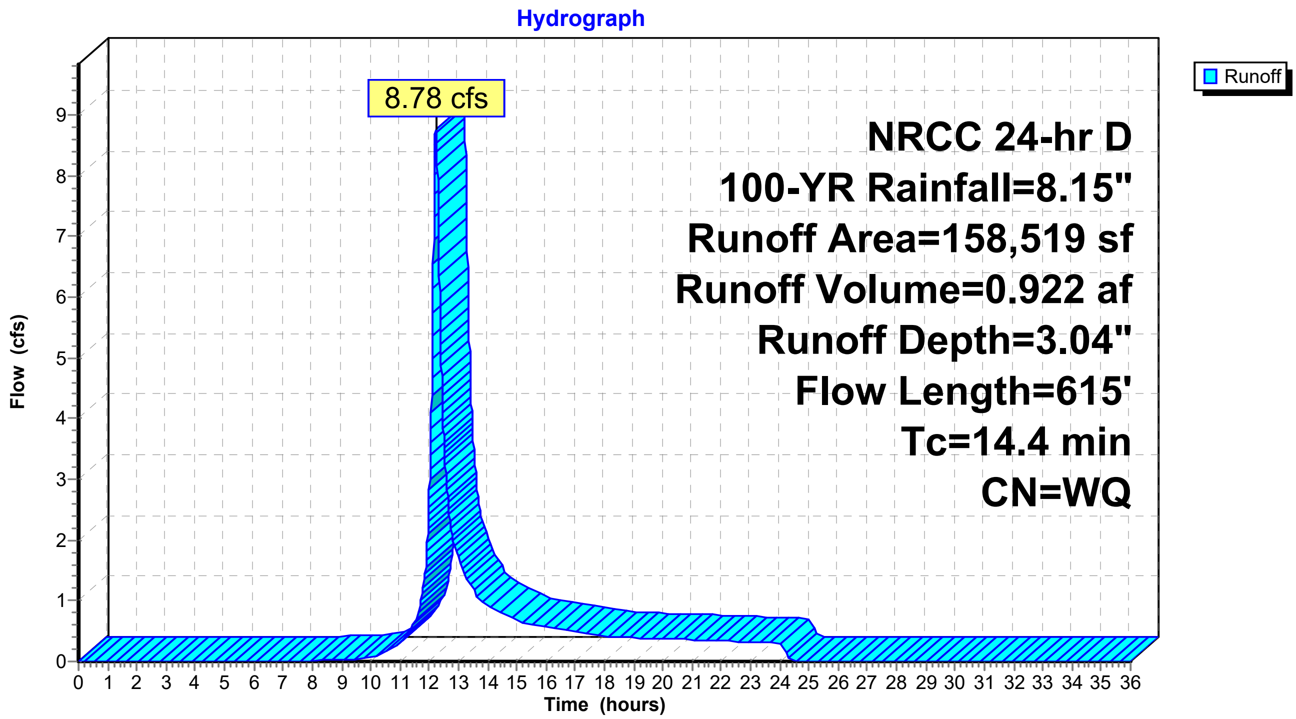
Runoff = 8.78 cfs @ 12.23 hrs, Volume= 0.922 af, Depth= 3.04"
Routed to Link 6E : Sub-DP #2b: Flow to Northern Abutter

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 100-YR Rainfall=8.15"

Area (sf)	CN	Description
525	98	Paved parking HSG B
2,180	98	Roofs HSG B
140,117	55	Woods, Good HSG B
15,697	61	>75% Grass cover, Good HSG B
158,519		Weighted Average
155,814		98.29% Pervious Area
2,705		1.71% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	68	0.0700	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.36"
5.1	547	0.1300	1.80		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
14.4	615	Total			

Subcatchment 5E: E2b

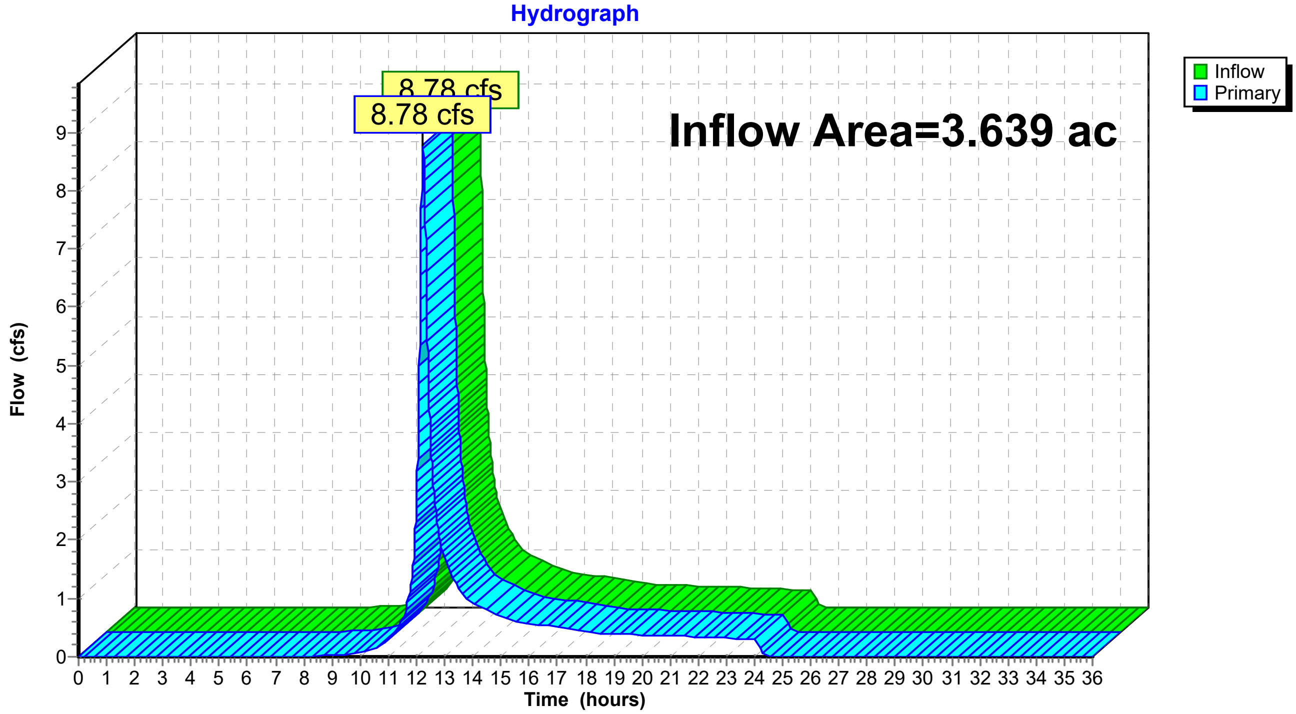


Summary for Link 6E: Sub-DP #2b: Flow to Northern Abutter

Inflow Area = 3.639 ac, 1.71% Impervious, Inflow Depth = 3.04" for 100-YR event
Inflow = 8.78 cfs @ 12.23 hrs, Volume= 0.922 af
Primary = 8.78 cfs @ 12.23 hrs, Volume= 0.922 af, Atten= 0%, Lag= 0.0 min
Routed to Link 6L : Design Point #2: Flow to Uncas Brook

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Link 6E: Sub-DP #2b: Flow to Northern Abutter

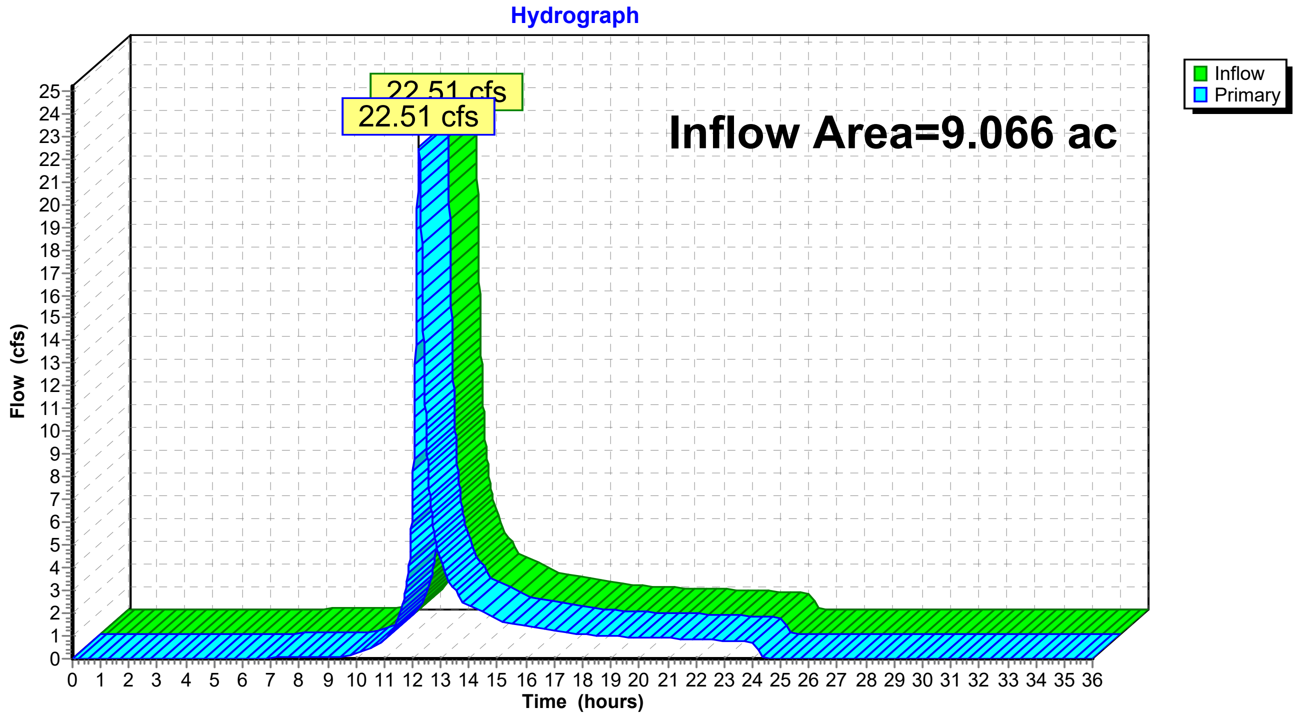


Summary for Link 6L: Design Point #2: Flow to Uncas Brook

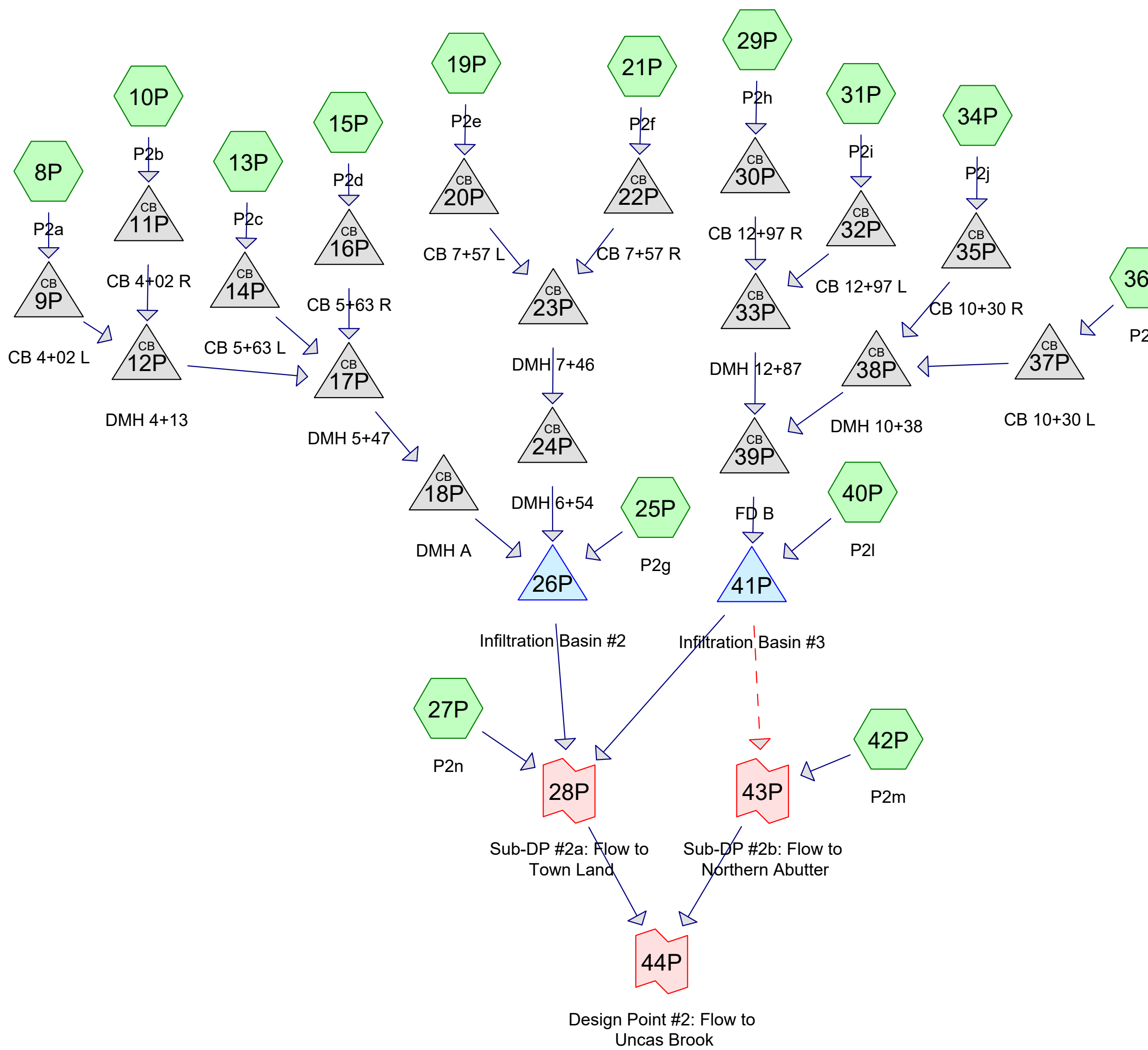
Inflow Area = 9.066 ac, 1.59% Impervious, Inflow Depth = 3.12" for 100-YR event
Inflow = 22.51 cfs @ 12.23 hrs, Volume= 2.360 af
Primary = 22.51 cfs @ 12.23 hrs, Volume= 2.360 af, Atten= 0%, Lag= 0.0 min

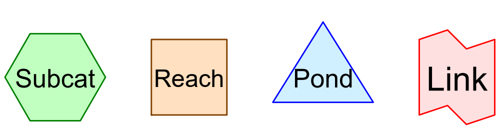
Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Link 6L: Design Point #2: Flow to Uncas Brook



DESIGN POINT #2: FLOW TO UNCAS BROOK PROPOSED CONDITIONS





Routing Diagram for HydroCAD New Distribution
Prepared by Legacy Engineering LLC, Printed 1/29/2024
HydroCAD® 10.20-3c s/n 02346 © 2023 HydroCAD Software Solutions LLC

Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-YR	NRCC 24-hr	D	Default	24.00	1	3.36	2
2	10-YR	NRCC 24-hr	D	Default	24.00	1	5.22	2
3	25-YR	NRCC 24-hr	D	Default	24.00	1	6.37	2
4	100-YR	NRCC 24-hr	D	Default	24.00	1	8.15	2

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
3.051	61	>75% Grass cover, Good HSG B (19P, 21P, 25P, 27P, 31P, 34P, 36P, 40P, 42P)
0.021	80	>75% Grass cover, Good HSG D (21P, 27P)
0.285	61	>75% Grass cover, Good, HSG B (8P, 10P, 13P, 15P, 29P)
0.129	74	>75% Grass cover, Good, HSG C (8P, 10P, 15P, 40P)
0.078	80	>75% Grass cover, Good, HSG D (19P)
0.804	98	Paved parking HSG B (19P, 21P, 31P, 34P, 36P, 40P)
0.039	98	Paved parking HSG D (21P)
0.272	98	Paved parking, HSG B (8P, 10P, 13P, 15P, 29P)
0.098	98	Paved parking, HSG C (8P, 10P)
0.032	98	Paved parking, HSG D (19P)
0.543	98	Roofs HSG B (25P, 27P, 34P, 36P, 42P)
0.779	98	Roofs, HSG B (15P, 19P, 21P, 29P, 31P, 40P)
0.002	98	Roofs, HSG C (10P)
0.001	98	Roofs, HSG D (19P)
1.355	55	Woods, Good HSG B (27P)
0.067	70	Woods, Good HSG C (27P)
1.425	55	Woods, Good, HSG B (15P, 40P, 42P)
0.087	70	Woods, Good, HSG C (10P, 15P)
9.066	**70**	**TOTAL AREA**

Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 8P: P2a Runoff Area=5,727 sf 44.23% Impervious Runoff Depth=1.86"
Flow Length=176' Slope=0.0800 '/' Tc=6.6 min CN=WQ Runoff=0.23 cfs 0.020 af

Pond 9P: CB 4+02 L Peak Elev=406.64' Inflow=0.23 cfs 0.020 af
12.0" Round Culvert n=0.011 L=13.0' S=0.0308 '/' Outflow=0.23 cfs 0.020 af

Subcatchment 10P: P2b Runoff Area=10,417 sf 25.78% Impervious Runoff Depth=1.53"
Flow Length=183' Tc=9.9 min CN=WQ Runoff=0.32 cfs 0.031 af

Pond 11P: CB 4+02 R Peak Elev=406.68' Inflow=0.32 cfs 0.031 af
12.0" Round Culvert n=0.011 L=8.0' S=0.0500 '/' Outflow=0.32 cfs 0.031 af

Pond 12P: DMH 4+13 Peak Elev=401.87' Inflow=0.54 cfs 0.051 af
12.0" Round Culvert n=0.011 L=130.0' S=0.0569 '/' Outflow=0.54 cfs 0.051 af

Subcatchment 13P: P2c Runoff Area=3,106 sf 63.52% Impervious Runoff Depth=2.17"
Flow Length=122' Slope=0.0700 '/' Tc=2.0 min CN=WQ Runoff=0.16 cfs 0.013 af

Pond 14P: CB 5+63 L Peak Elev=396.70' Inflow=0.16 cfs 0.013 af
12.0" Round Culvert n=0.011 L=17.0' S=0.0176 '/' Outflow=0.16 cfs 0.013 af

Subcatchment 15P: P2d Runoff Area=9,087 sf 49.69% Impervious Runoff Depth=1.81"
Flow Length=218' Tc=7.0 min CN=WQ Runoff=0.34 cfs 0.031 af

Pond 16P: CB 5+63 R Peak Elev=396.79' Inflow=0.34 cfs 0.031 af
12.0" Round Culvert n=0.011 L=15.0' S=0.0200 '/' Outflow=0.34 cfs 0.031 af

Pond 17P: DMH 5+47 Peak Elev=387.60' Inflow=0.96 cfs 0.095 af
12.0" Round Culvert n=0.011 L=16.0' S=0.0688 '/' Outflow=0.96 cfs 0.095 af

Pond 18P: DMH A Peak Elev=377.50' Inflow=0.96 cfs 0.095 af
12.0" Round Culvert n=0.011 L=18.0' S=0.0389 '/' Outflow=0.96 cfs 0.095 af

Subcatchment 19P: P2e Runoff Area=32,111 sf 44.13% Impervious Runoff Depth=1.77"
Flow Length=221' Tc=7.8 min CN=WQ Runoff=1.17 cfs 0.109 af

Pond 20P: CB 7+57 L Peak Elev=386.52' Inflow=1.17 cfs 0.109 af
15.0" Round Culvert n=0.011 L=13.0' S=0.0231 '/' Outflow=1.17 cfs 0.109 af

Subcatchment 21P: P2f Runoff Area=24,890 sf 72.31% Impervious Runoff Depth=2.43"
Flow Length=302' Tc=7.1 min CN=WQ Runoff=1.28 cfs 0.115 af

Pond 22P: CB 7+57 R Peak Elev=386.54' Inflow=1.28 cfs 0.115 af
15.0" Round Culvert n=0.011 L=6.0' S=0.0500 '/' Outflow=1.28 cfs 0.115 af

Pond 23P: DMH 7+46 Peak Elev=385.72' Inflow=2.44 cfs 0.224 af
18.0" Round Culvert n=0.011 L=88.0' S=0.0193 '/' Outflow=2.44 cfs 0.224 af

Pond 24P: DMH 6+54 Peak Elev=383.97' Inflow=2.44 cfs 0.224 af
18.0" Round Culvert n=0.011 L=115.0' S=0.0604 '/' Outflow=2.44 cfs 0.224 af

Subcatchment 25P: P2g Runoff Area=11,782 sf 8.39% Impervious Runoff Depth=0.73"
Flow Length=149' Slope=0.1300 '/' Tc=6.9 min CN=WQ Runoff=0.17 cfs 0.016 af

Pond 26P: Infiltration Basin #2 Peak Elev=376.87' Storage=3,843 cf Inflow=3.56 cfs 0.336 af
Discarded=0.25 cfs 0.288 af Primary=0.38 cfs 0.048 af Outflow=0.64 cfs 0.336 af

Subcatchment 27P: P2n Runoff Area=93,478 sf 8.12% Impervious Runoff Depth=0.61"
Flow Length=261' Tc=9.9 min CN=WQ Runoff=0.82 cfs 0.109 af

Link 28P: Sub-DP #2a: Flow to Town Land Inflow=0.89 cfs 0.184 af
Primary=0.89 cfs 0.184 af

Subcatchment 29P: P2h Runoff Area=12,912 sf 63.80% Impervious Runoff Depth=2.18"
Flow Length=254' Tc=10.2 min CN=WQ Runoff=0.53 cfs 0.054 af

Pond 30P: CB 12+97 R Peak Elev=398.86' Inflow=0.53 cfs 0.054 af
12.0" Round Culvert n=0.011 L=8.0' S=0.0250 '/' Outflow=0.53 cfs 0.054 af

Subcatchment 31P: P2i Runoff Area=10,135 sf 72.86% Impervious Runoff Depth=2.42"
Flow Length=188' Tc=10.2 min CN=WQ Runoff=0.46 cfs 0.047 af

Pond 32P: CB 12+97 L Peak Elev=398.84' Inflow=0.46 cfs 0.047 af
12.0" Round Culvert n=0.011 L=13.0' S=0.0154 '/' Outflow=0.46 cfs 0.047 af

Pond 33P: DMH 12+87 Peak Elev=397.81' Inflow=0.99 cfs 0.101 af
12.0" Round Culvert n=0.011 L=232.0' S=0.0593 '/' Outflow=0.99 cfs 0.101 af

Subcatchment 34P: P2j Runoff Area=25,375 sf 68.17% Impervious Runoff Depth=2.29"
Flow Length=315' Tc=7.3 min CN=WQ Runoff=1.22 cfs 0.111 af

Pond 35P: CB 10+30 R Peak Elev=389.93' Inflow=1.22 cfs 0.111 af
12.0" Round Culvert n=0.011 L=7.0' S=0.0286 '/' Outflow=1.22 cfs 0.111 af

Subcatchment 36P: P2k Runoff Area=13,475 sf 68.19% Impervious Runoff Depth=2.29"
Flow Length=246' Tc=10.4 min CN=WQ Runoff=0.57 cfs 0.059 af

Pond 37P: CB 10+30 L Peak Elev=389.79' Inflow=0.57 cfs 0.059 af
12.0" Round Culvert n=0.011 L=12.0' S=0.0167 '/' Outflow=0.57 cfs 0.059 af

Pond 38P: DMH 10+38 Peak Elev=389.65' Inflow=1.77 cfs 0.171 af
18.0" Round Culvert n=0.011 L=65.0' S=0.0623 '/' Outflow=1.77 cfs 0.171 af

Pond 39P: FD B Peak Elev=382.77' Inflow=2.73 cfs 0.271 af
18.0" Round Culvert n=0.011 L=32.0' S=0.0531 '/' Outflow=2.73 cfs 0.271 af

Subcatchment 40P: P2l Runoff Area=106,917 sf 14.27% Impervious Runoff Depth=0.80"
Flow Length=394' Tc=12.8 min CN=WQ Runoff=1.24 cfs 0.164 af

Pond 41P: Infiltration Basin #3 Peak Elev=380.88' Storage=5,123 cf Inflow=3.82 cfs 0.435 af
Discarded=0.46 cfs 0.408 af Primary=0.27 cfs 0.027 af Secondary=0.00 cfs 0.000 af Outflow=0.73 cfs 0.435 af

Subcatchment 42P: P2m Runoff Area=35,520 sf 5.86% Impervious Runoff Depth=0.55"
Flow Length=404' Tc=11.9 min CN=WQ Runoff=0.26 cfs 0.038 af

Link 43P: Sub-DP #2b: Flow to Northern Abutter Inflow=0.26 cfs 0.038 af
Primary=0.26 cfs 0.038 af

Link 44P: Design Point #2: Flow to Uncas Brook Inflow=1.13 cfs 0.221 af
Primary=1.13 cfs 0.221 af

Total Runoff Area = 9.066 ac Runoff Volume = 0.918 af Average Runoff Depth = 1.21"
71.67% Pervious = 6.498 ac 28.33% Impervious = 2.569 ac

Summary for Subcatchment 8P: P2a

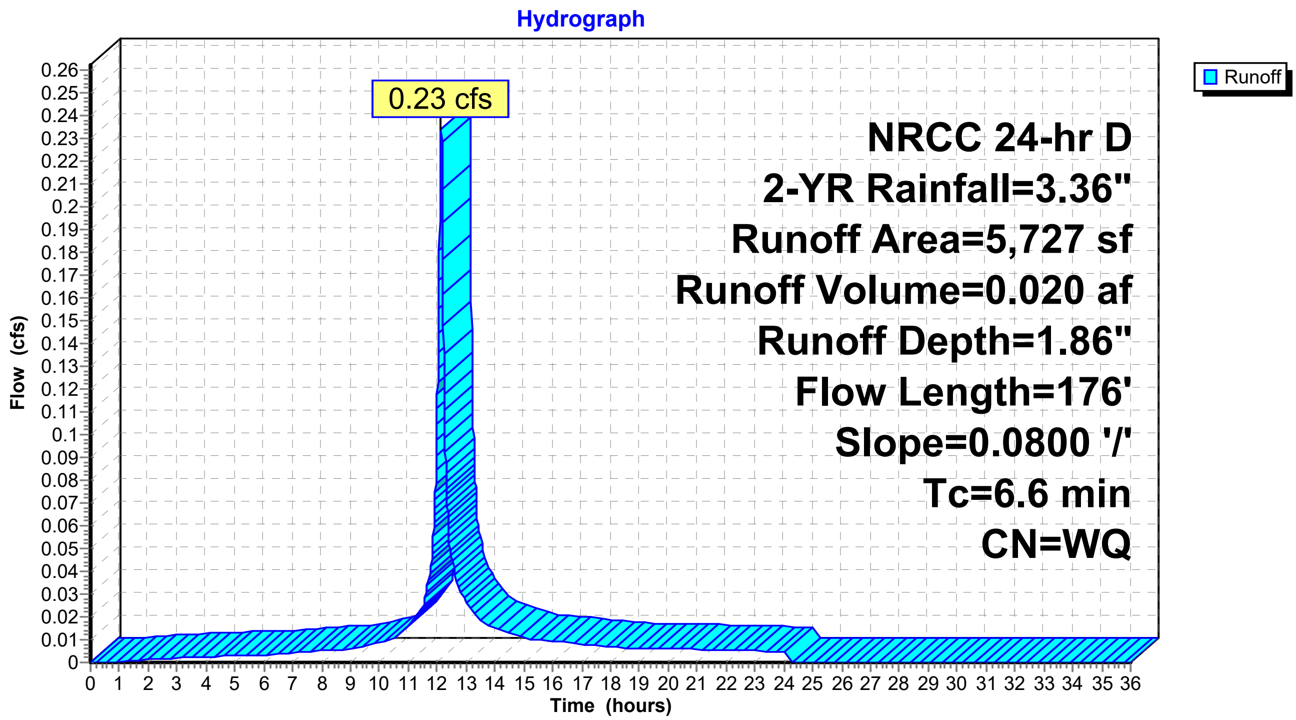
Runoff = 0.23 cfs @ 12.14 hrs, Volume= 0.020 af, Depth= 1.86"
Routed to Pond 9P : CB 4+02 L

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 2-YR Rainfall=3.36"

Area (sf)	CN	Description
495	98	Paved parking, HSG B
2,038	98	Paved parking, HSG C
1,469	61	>75% Grass cover, Good, HSG B
1,725	74	>75% Grass cover, Good, HSG C
5,727		Weighted Average
3,194		55.77% Pervious Area
2,533		44.23% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.1	71	0.0800	0.19		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.36"
0.3	29	0.0800	1.92		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.36"
0.2	76	0.0800	5.74		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
6.6	176	Total			

Subcatchment 8P: P2a



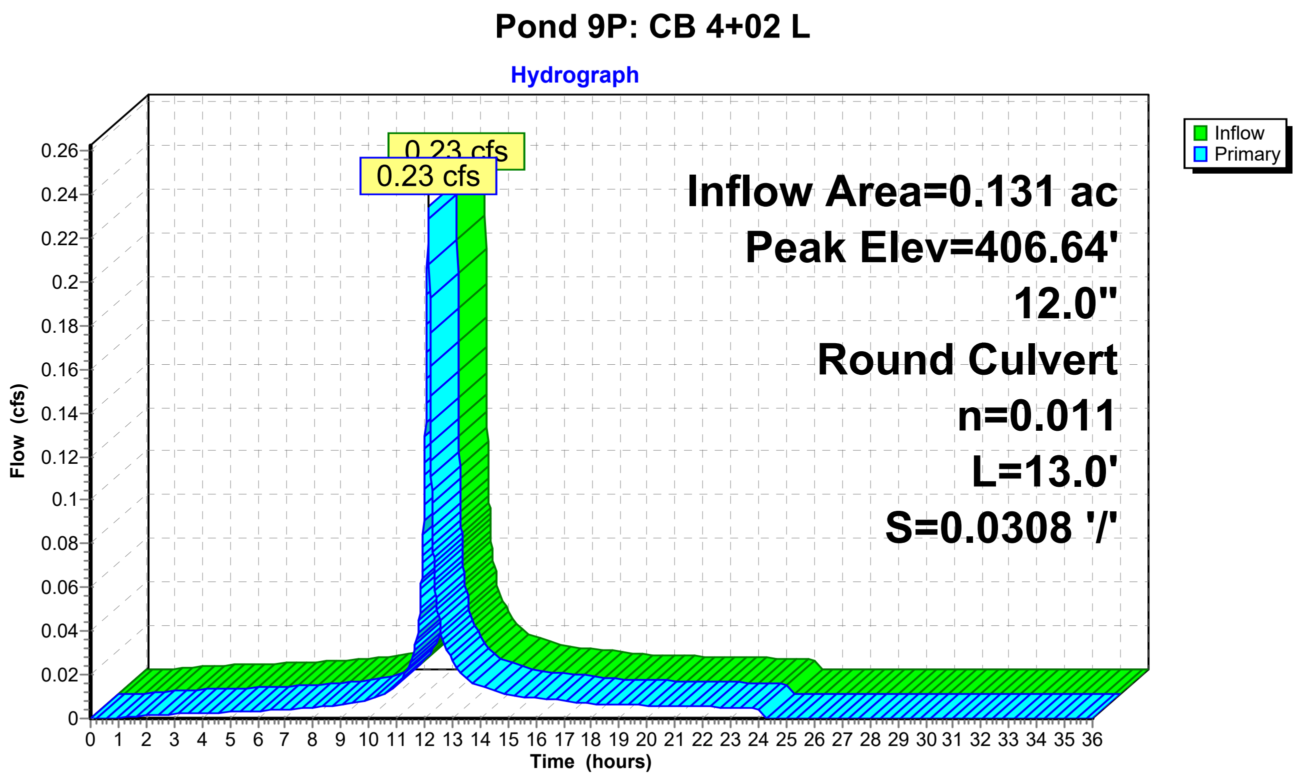
Summary for Pond 9P: CB 4+02 L

Inflow Area = 0.131 ac, 44.23% Impervious, Inflow Depth = 1.86" for 2-YR event
Inflow = 0.23 cfs @ 12.14 hrs, Volume= 0.020 af
Outflow = 0.23 cfs @ 12.14 hrs, Volume= 0.020 af, Atten= 0%, Lag= 0.0 min
Primary = 0.23 cfs @ 12.14 hrs, Volume= 0.020 af
Routed to Pond 12P : DMH 4+13

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 406.64' @ 12.14 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	406.40'	**12.0" Round Culvert** L= 13.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 406.40' / 406.00' S= 0.0308 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=0.23 cfs @ 12.14 hrs HW=406.64' TW=401.86' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.23 cfs @ 1.65 fps)



Summary for Subcatchment 10P: P2b

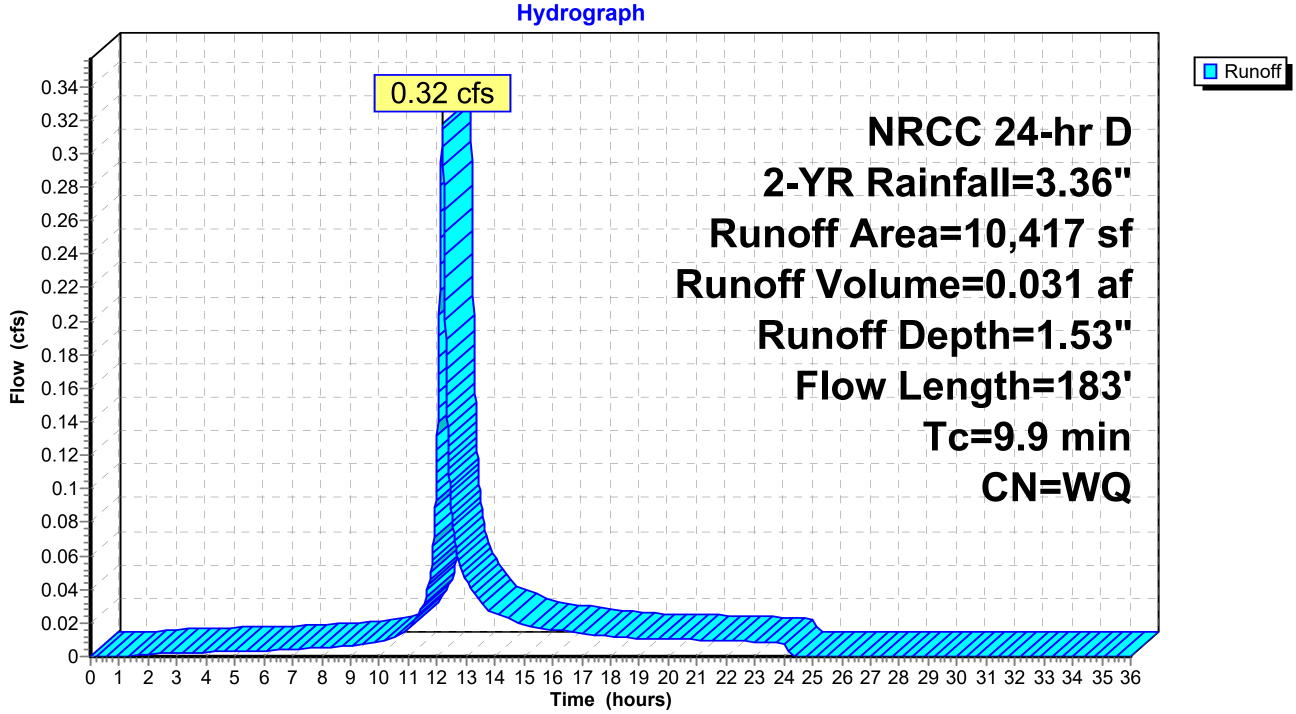
Runoff = 0.32 cfs @ 12.17 hrs, Volume= 0.031 af, Depth= 1.53"
Routed to Pond 11P : CB 4+02 R

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 2-YR Rainfall=3.36"

Area (sf)	CN	Description
380	98	Paved parking, HSG B
2,226	98	Paved parking, HSG C
709	61	>75% Grass cover, Good, HSG B
3,279	74	>75% Grass cover, Good, HSG C
3,743	70	Woods, Good, HSG C
80	98	Roofs, HSG C
10,417		Weighted Average
7,731		74.22% Pervious Area
2,686		25.78% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	51	0.0400	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.36"
0.3	34	0.0600	1.71		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.3	98	0.0800	5.74		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
9.9	183	Total			

Subcatchment 10P: P2b



Summary for Pond 11P: CB 4+02 R

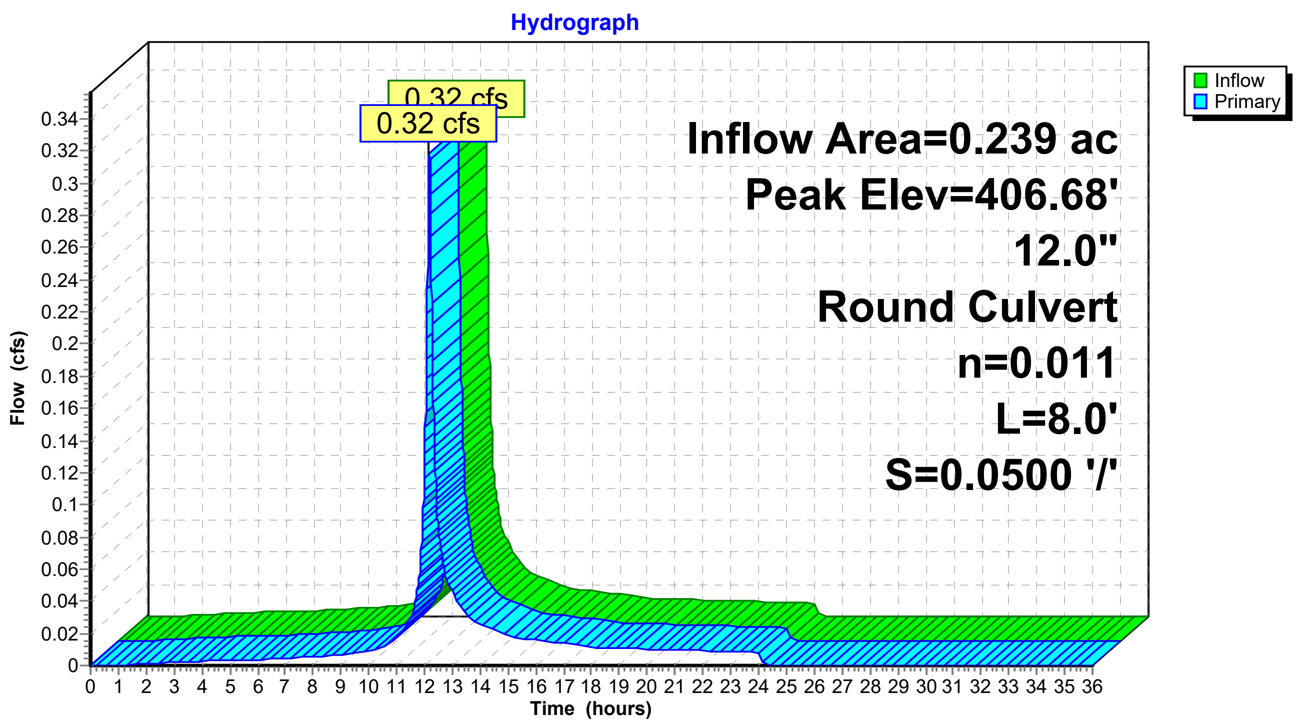
Inflow Area = 0.239 ac, 25.78% Impervious, Inflow Depth = 1.53" for 2-YR event
Inflow = 0.32 cfs @ 12.17 hrs, Volume= 0.031 af
Outflow = 0.32 cfs @ 12.17 hrs, Volume= 0.031 af, Atten= 0%, Lag= 0.0 min
Primary = 0.32 cfs @ 12.17 hrs, Volume= 0.031 af
Routed to Pond 12P : DMH 4+13

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 406.68' @ 12.17 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	406.40'	**12.0" Round Culvert** L= 8.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 406.40' / 406.00' S= 0.0500 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=0.32 cfs @ 12.17 hrs HW=406.68' TW=401.86' (Dynamic Tailwater)
└**1=Culvert** (Inlet Controls 0.32 cfs @ 1.79 fps)

Pond 11P: CB 4+02 R



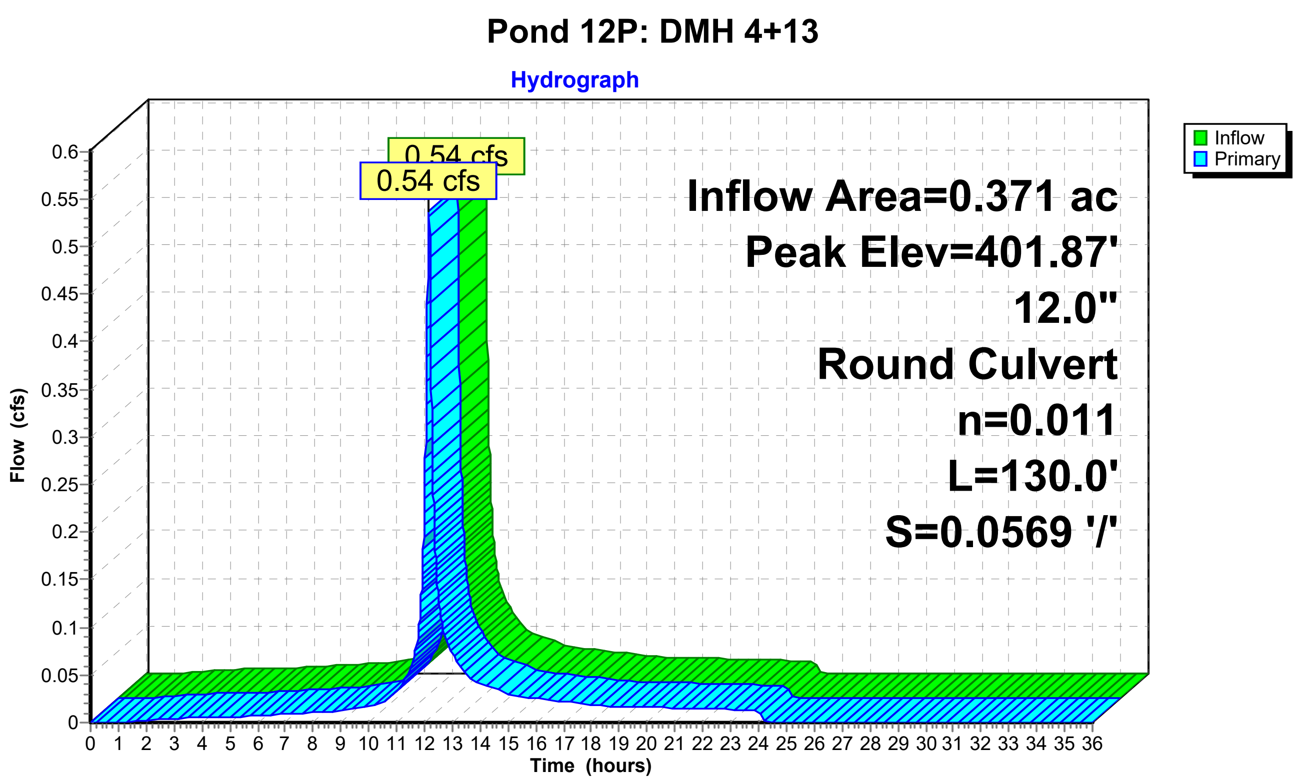
Summary for Pond 12P: DMH 4+13

Inflow Area = 0.371 ac, 32.33% Impervious, Inflow Depth = 1.65" for 2-YR event
Inflow = 0.54 cfs @ 12.15 hrs, Volume= 0.051 af
Outflow = 0.54 cfs @ 12.15 hrs, Volume= 0.051 af, Atten= 0%, Lag= 0.0 min
Primary = 0.54 cfs @ 12.15 hrs, Volume= 0.051 af
Routed to Pond 17P : DMH 5+47

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 401.87' @ 12.15 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	401.50'	**12.0" Round Culvert** L= 130.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 401.50' / 394.10' S= 0.0569 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=0.54 cfs @ 12.15 hrs HW=401.87' TW=387.60' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.54 cfs @ 2.06 fps)



Summary for Subcatchment 13P: P2c

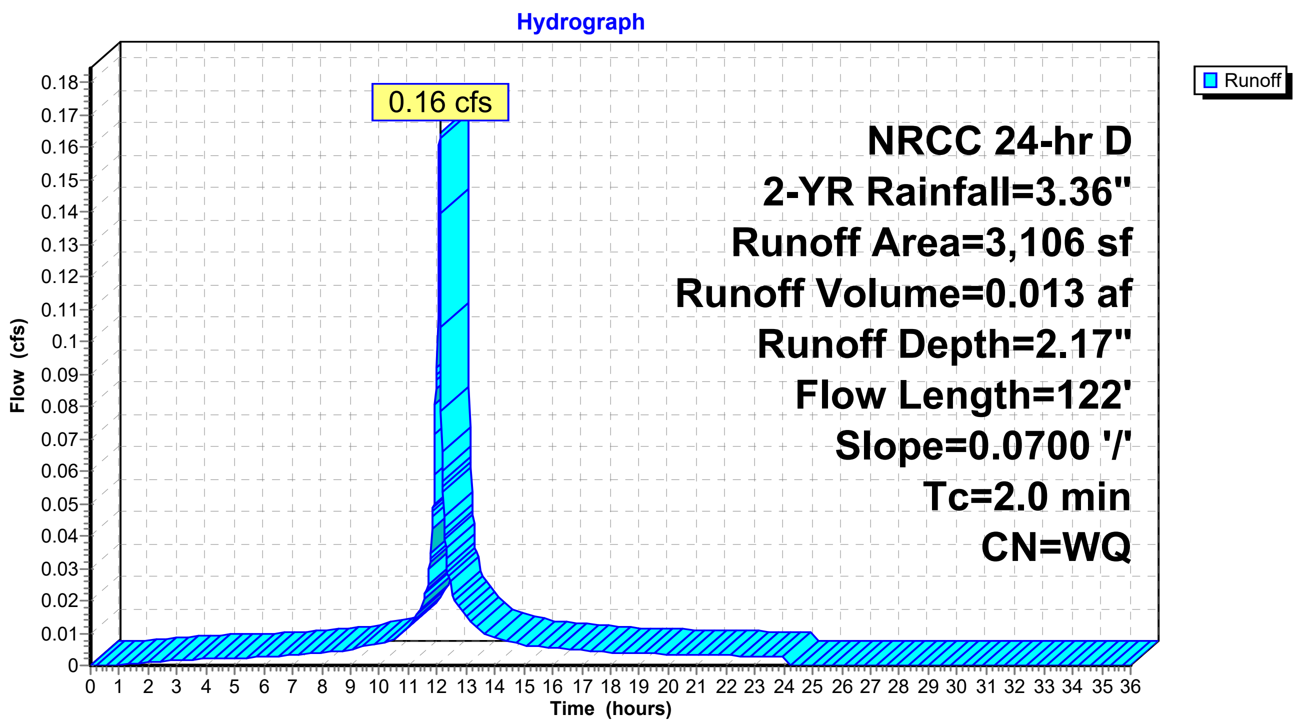
Runoff = 0.16 cfs @ 12.10 hrs, Volume= 0.013 af, Depth= 2.17"
Routed to Pond 14P : CB 5+63 L

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 2-YR Rainfall=3.36"

Area (sf)	CN	Description
1,973	98	Paved parking, HSG B
1,133	61	>75% Grass cover, Good, HSG B
3,106		Weighted Average
1,133		36.48% Pervious Area
1,973		63.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	100	0.0700	2.33		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.36"
0.1	22	0.0700	5.37		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.8	122	Total, Increased to minimum Tc = 2.0 min			

Subcatchment 13P: P2c



Summary for Pond 14P: CB 5+63 L

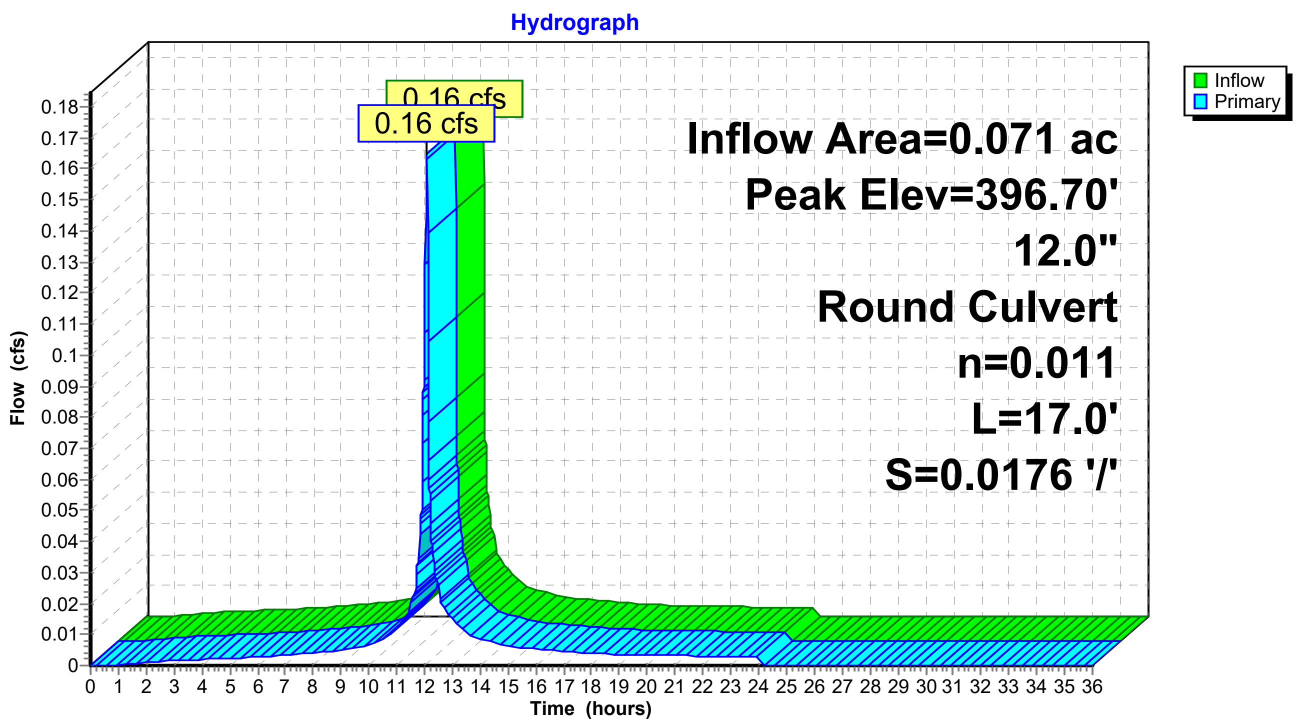
Inflow Area = 0.071 ac, 63.52% Impervious, Inflow Depth = 2.17" for 2-YR event
Inflow = 0.16 cfs @ 12.10 hrs, Volume= 0.013 af
Outflow = 0.16 cfs @ 12.10 hrs, Volume= 0.013 af, Atten= 0%, Lag= 0.0 min
Primary = 0.16 cfs @ 12.10 hrs, Volume= 0.013 af
Routed to Pond 17P : DMH 5+47

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 396.70' @ 12.10 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	396.50'	**12.0" Round Culvert** L= 17.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 396.50' / 396.20' S= 0.0176 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=0.16 cfs @ 12.10 hrs HW=396.70' TW=387.58' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.16 cfs @ 1.51 fps)

Pond 14P: CB 5+63 L



Summary for Subcatchment 15P: P2d

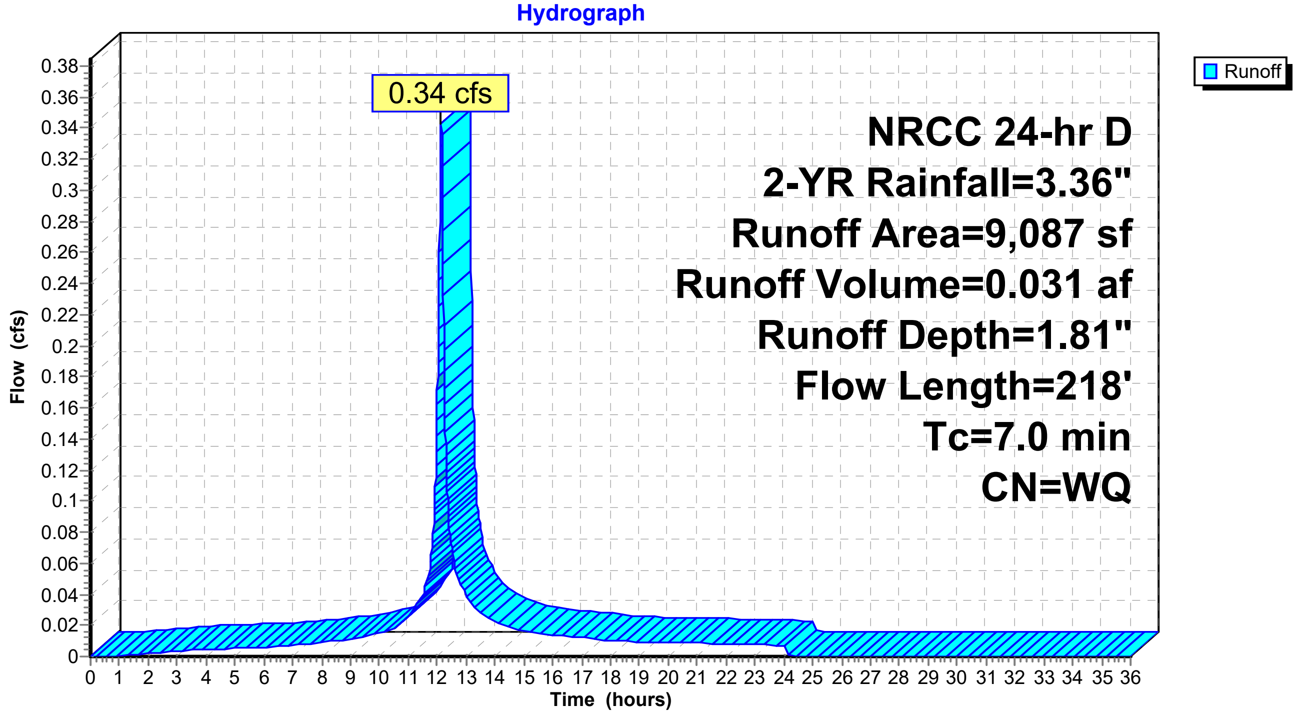
Runoff = 0.34 cfs @ 12.14 hrs, Volume= 0.031 af, Depth= 1.81"
Routed to Pond 16P : CB 5+63 R

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 2-YR Rainfall=3.36"

Area (sf)	CN	Description
3,344	98	Paved parking, HSG B
1,171	98	Roofs, HSG B
4,424	61	>75% Grass cover, Good, HSG B
12	74	>75% Grass cover, Good, HSG C
96	55	Woods, Good, HSG B
40	70	Woods, Good, HSG C
9,087		Weighted Average
4,572		50.31% Pervious Area
4,515		49.69% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.2	65	0.1700	0.26		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.36"
0.3	22	0.0300	1.22		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.36"
2.1	13	0.0400	0.11		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.36"
0.1	10	0.0700	1.85		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.3	108	0.0800	5.74		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
7.0	218	Total			

Subcatchment 15P: P2d



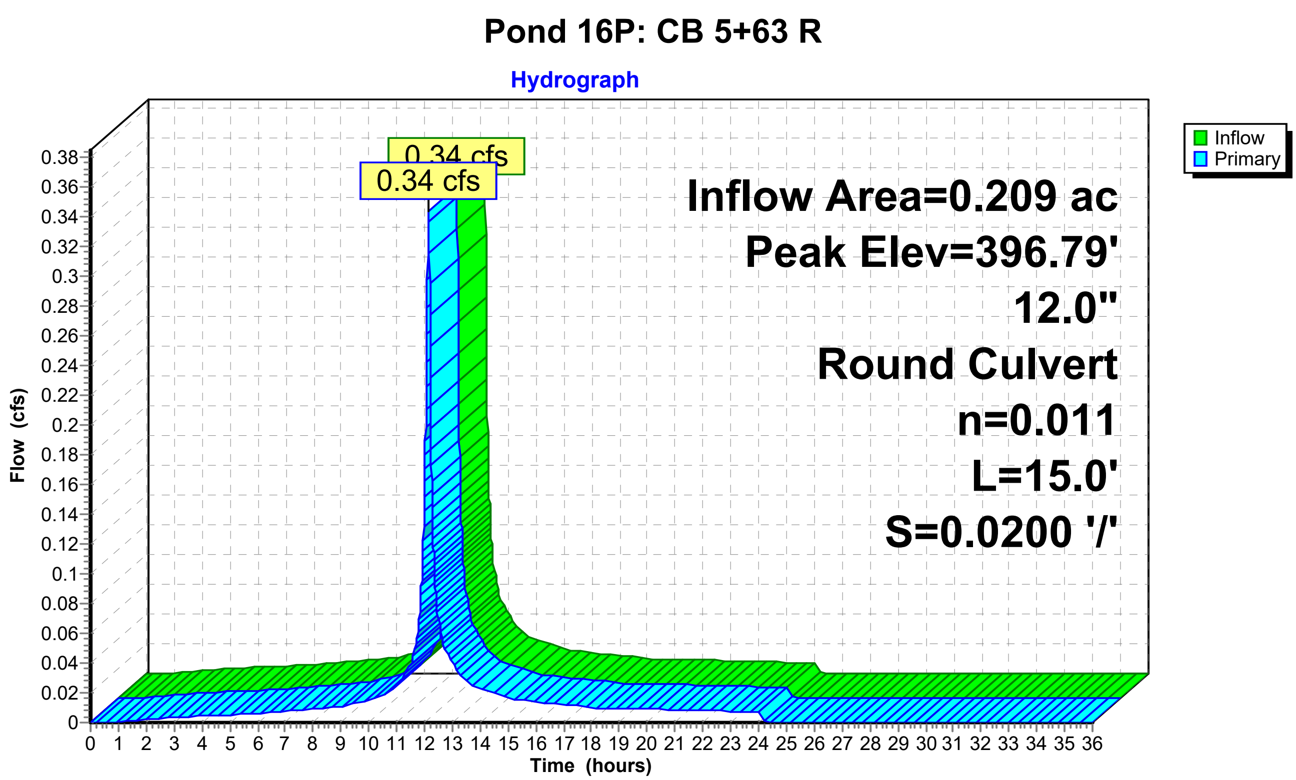
Summary for Pond 16P: CB 5+63 R

Inflow Area = 0.209 ac, 49.69% Impervious, Inflow Depth = 1.81" for 2-YR event
Inflow = 0.34 cfs @ 12.14 hrs, Volume= 0.031 af
Outflow = 0.34 cfs @ 12.14 hrs, Volume= 0.031 af, Atten= 0%, Lag= 0.0 min
Primary = 0.34 cfs @ 12.14 hrs, Volume= 0.031 af
Routed to Pond 17P : DMH 5+47

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 396.79' @ 12.14 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	396.50'	**12.0" Round Culvert** L= 15.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 396.50' / 396.20' S= 0.0200 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=0.34 cfs @ 12.14 hrs HW=396.79' TW=387.60' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.34 cfs @ 1.83 fps)



Summary for Pond 17P: DMH 5+47

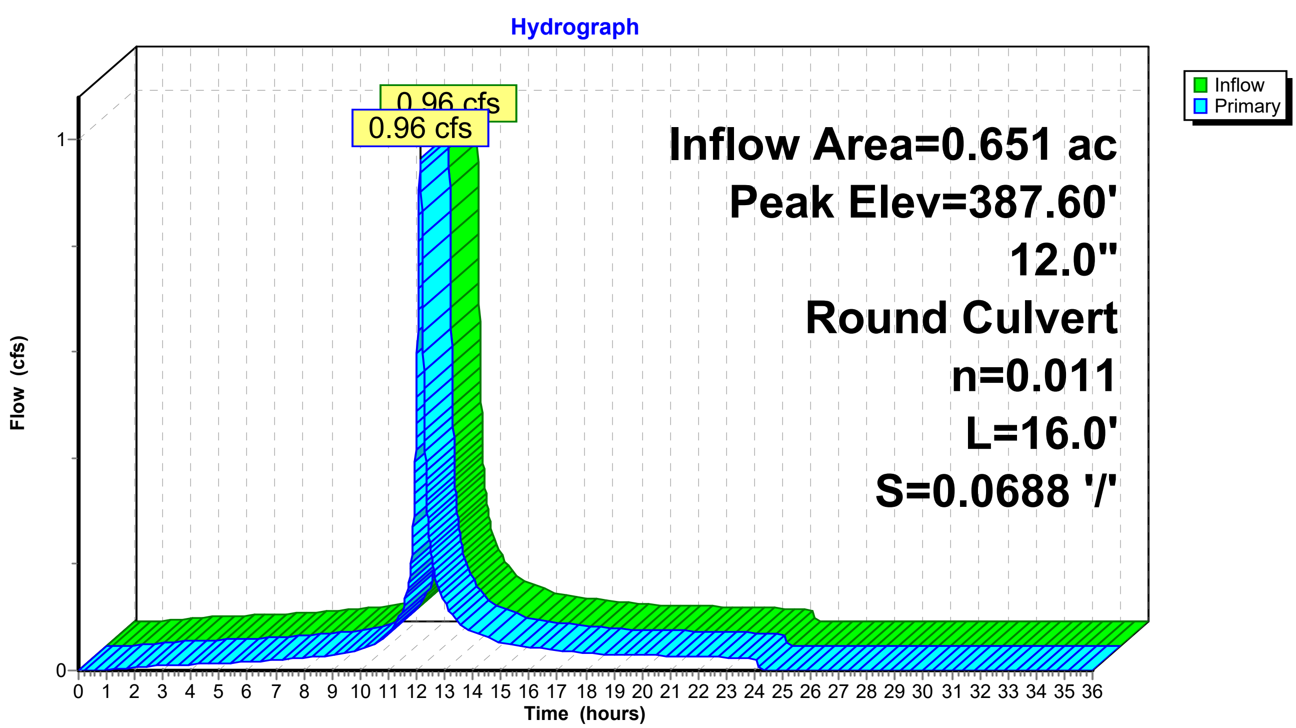
Inflow Area = 0.651 ac, 41.31% Impervious, Inflow Depth = 1.76" for 2-YR event
Inflow = 0.96 cfs @ 12.12 hrs, Volume= 0.095 af
Outflow = 0.96 cfs @ 12.12 hrs, Volume= 0.095 af, Atten= 0%, Lag= 0.0 min
Primary = 0.96 cfs @ 12.12 hrs, Volume= 0.095 af
Routed to Pond 18P : DMH A

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 387.60' @ 12.12 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	387.10'	**12.0" Round Culvert** L= 16.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 387.10' / 386.00' S= 0.0688 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=0.96 cfs @ 12.12 hrs HW=387.60' TW=377.50' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.96 cfs @ 2.42 fps)

Pond 17P: DMH 5+47



Summary for Pond 18P: DMH A

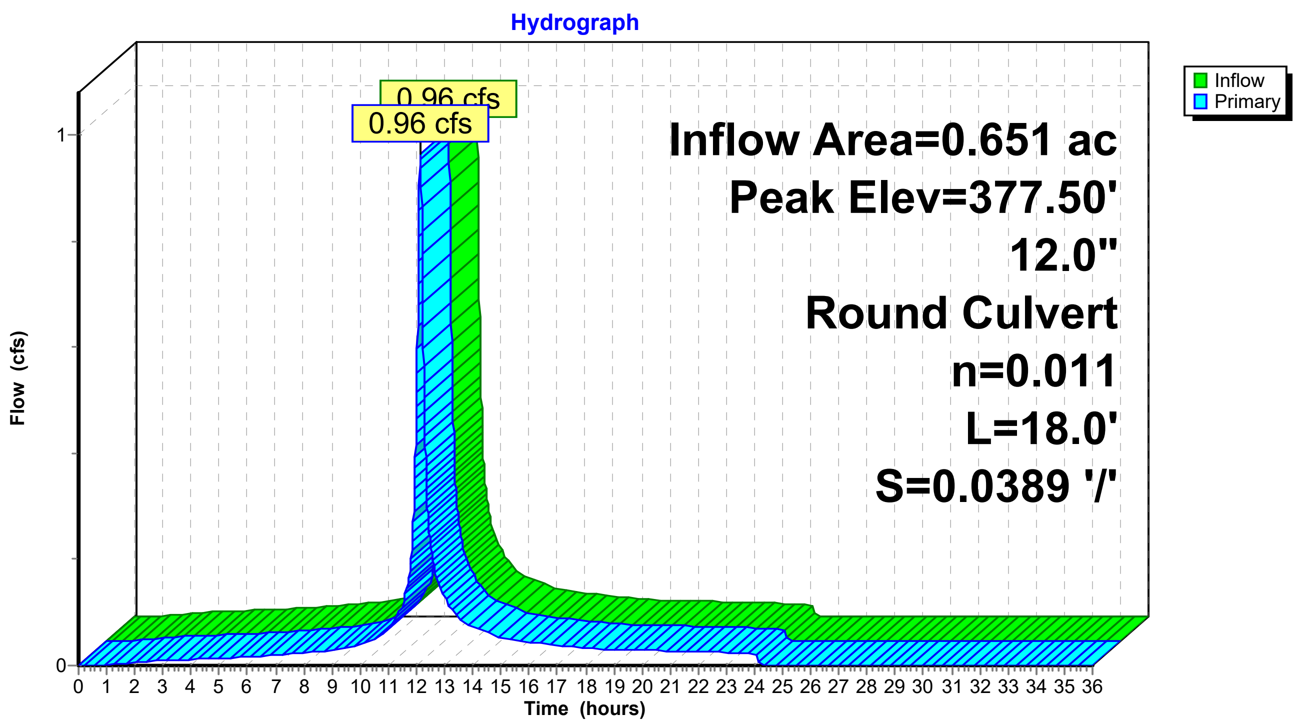
Inflow Area = 0.651 ac, 41.31% Impervious, Inflow Depth = 1.76" for 2-YR event
Inflow = 0.96 cfs @ 12.12 hrs, Volume= 0.095 af
Outflow = 0.96 cfs @ 12.12 hrs, Volume= 0.095 af, Atten= 0%, Lag= 0.0 min
Primary = 0.96 cfs @ 12.12 hrs, Volume= 0.095 af
Routed to Pond 26P : Infiltration Basin #2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 377.50' @ 12.12 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	377.00'	**12.0" Round Culvert** L= 18.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 377.00' / 376.30' S= 0.0389 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=0.96 cfs @ 12.12 hrs HW=377.50' TW=376.47' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 0.96 cfs @ 2.42 fps)

Pond 18P: DMH A



Summary for Subcatchment 19P: P2e

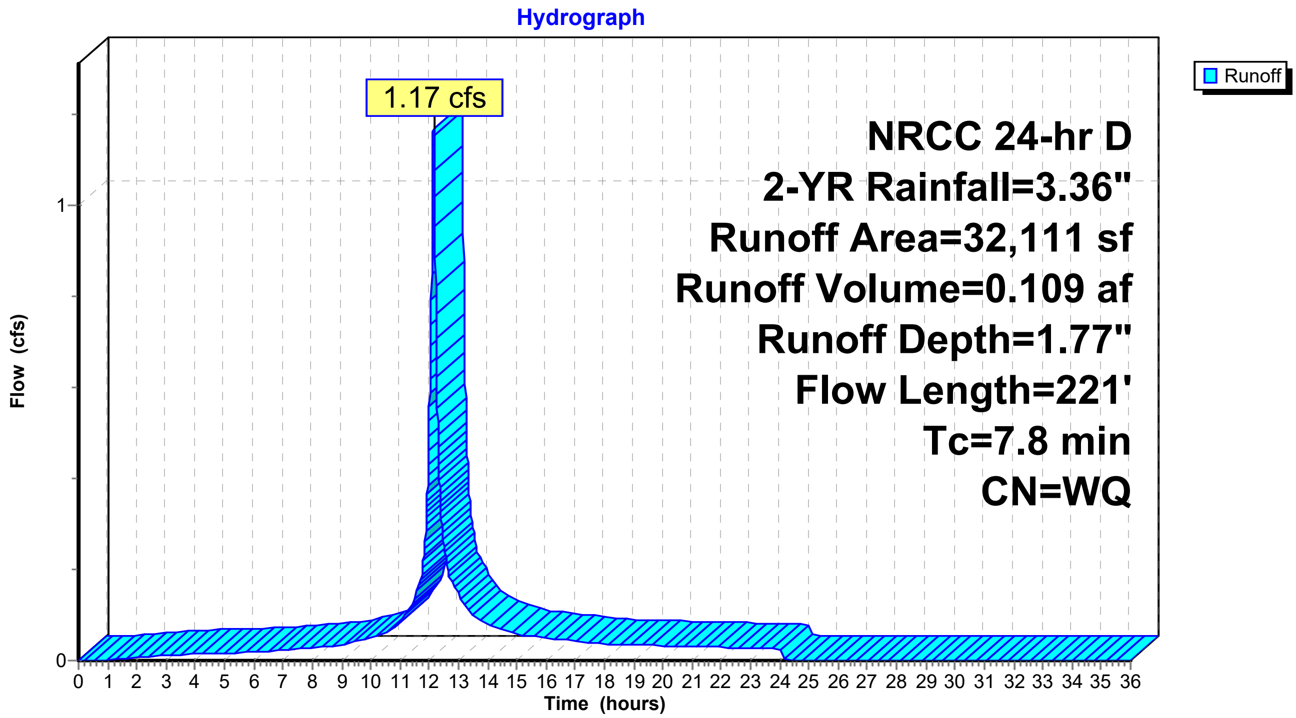
Runoff = 1.17 cfs @ 12.15 hrs, Volume= 0.109 af, Depth= 1.77"
Routed to Pond 20P : CB 7+57 L

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 2-YR Rainfall=3.36"

Area (sf)	CN	Description
4,995	98	Paved parking HSG B
1,377	98	Paved parking, HSG D
7,748	98	Roofs, HSG B
52	98	Roofs, HSG D
14,555	61	>75% Grass cover, Good HSG B
3,384	80	>75% Grass cover, Good, HSG D
32,111		Weighted Average
17,939		55.87% Pervious Area
14,172		44.13% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.8	100	0.1200	0.25		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.36"
0.6	27	0.0100	0.70		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.4	94	0.0400	4.06		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
7.8	221	Total			

Subcatchment 19P: P2e



Summary for Pond 20P: CB 7+57 L

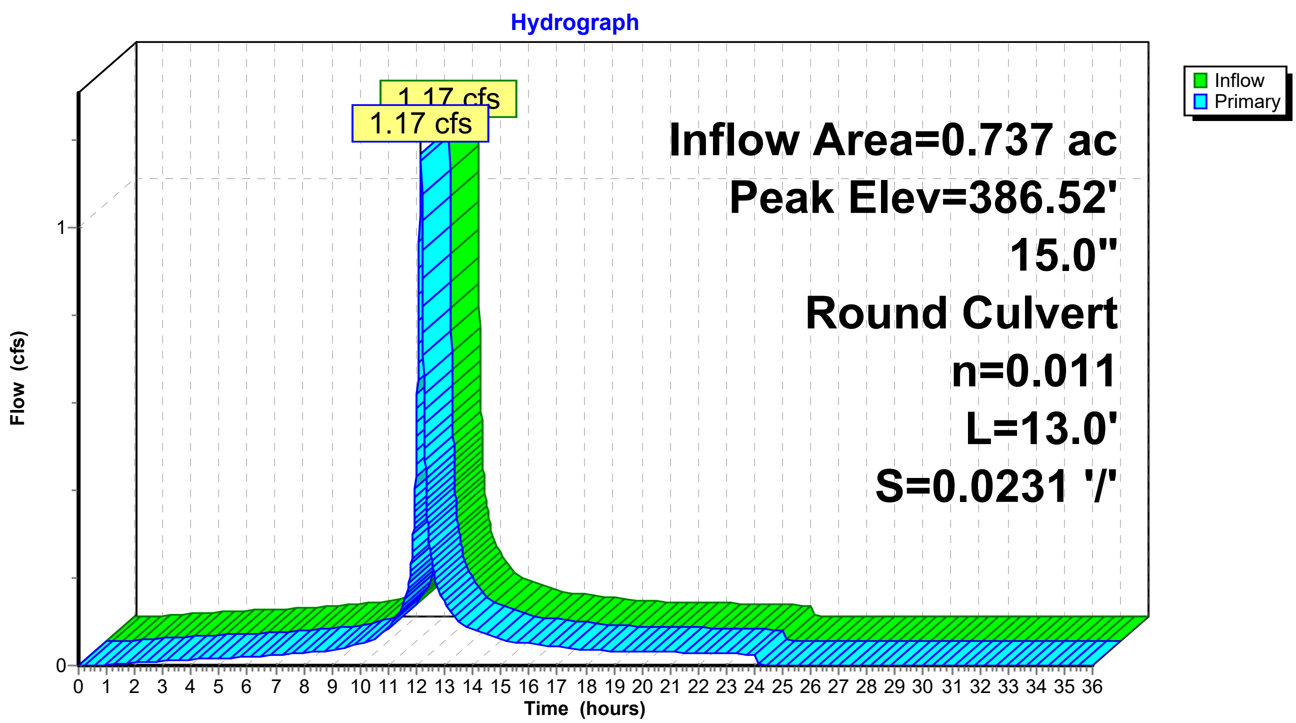
Inflow Area = 0.737 ac, 44.13% Impervious, Inflow Depth = 1.77" for 2-YR event
Inflow = 1.17 cfs @ 12.15 hrs, Volume= 0.109 af
Outflow = 1.17 cfs @ 12.15 hrs, Volume= 0.109 af, Atten= 0%, Lag= 0.0 min
Primary = 1.17 cfs @ 12.15 hrs, Volume= 0.109 af
Routed to Pond 23P : DMH 7+46

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 386.52' @ 12.15 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	386.00'	**15.0" Round Culvert** L= 13.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 386.00' / 385.70' S= 0.0231 '/' Cc= 0.900 n= 0.011, Flow Area= 1.23 sf

Primary OutFlow Max=1.17 cfs @ 12.15 hrs HW=386.52' TW=385.72' (Dynamic Tailwater)
1=Culvert (Inlet Controls 1.17 cfs @ 2.45 fps)

Pond 20P: CB 7+57 L



Summary for Subcatchment 21P: P2f

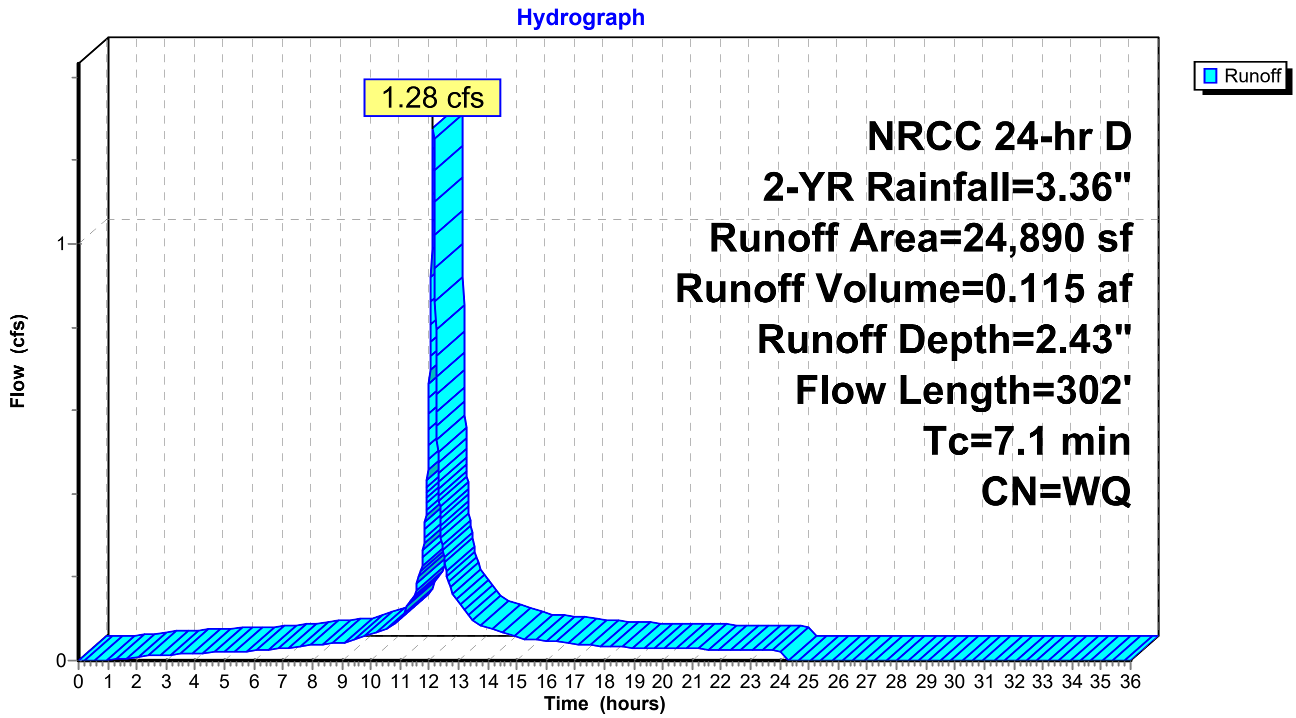
Runoff = 1.28 cfs @ 12.14 hrs, Volume= 0.115 af, Depth= 2.43"
Routed to Pond 22P : CB 7+57 R

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 2-YR Rainfall=3.36"

Area (sf)	CN	Description
9,156	98	Paved parking HSG B
1,692	98	Paved parking HSG D
7,150	98	Roofs, HSG B
6,334	61	>75% Grass cover, Good HSG B
558	80	>75% Grass cover, Good HSG D
24,890		Weighted Average
6,892		27.69% Pervious Area
17,998		72.31% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	23	0.0200	0.09		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.36"
1.1	77	0.0150	1.19		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.36"
1.7	202	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
7.1	302	Total			

Subcatchment 21P: P2f



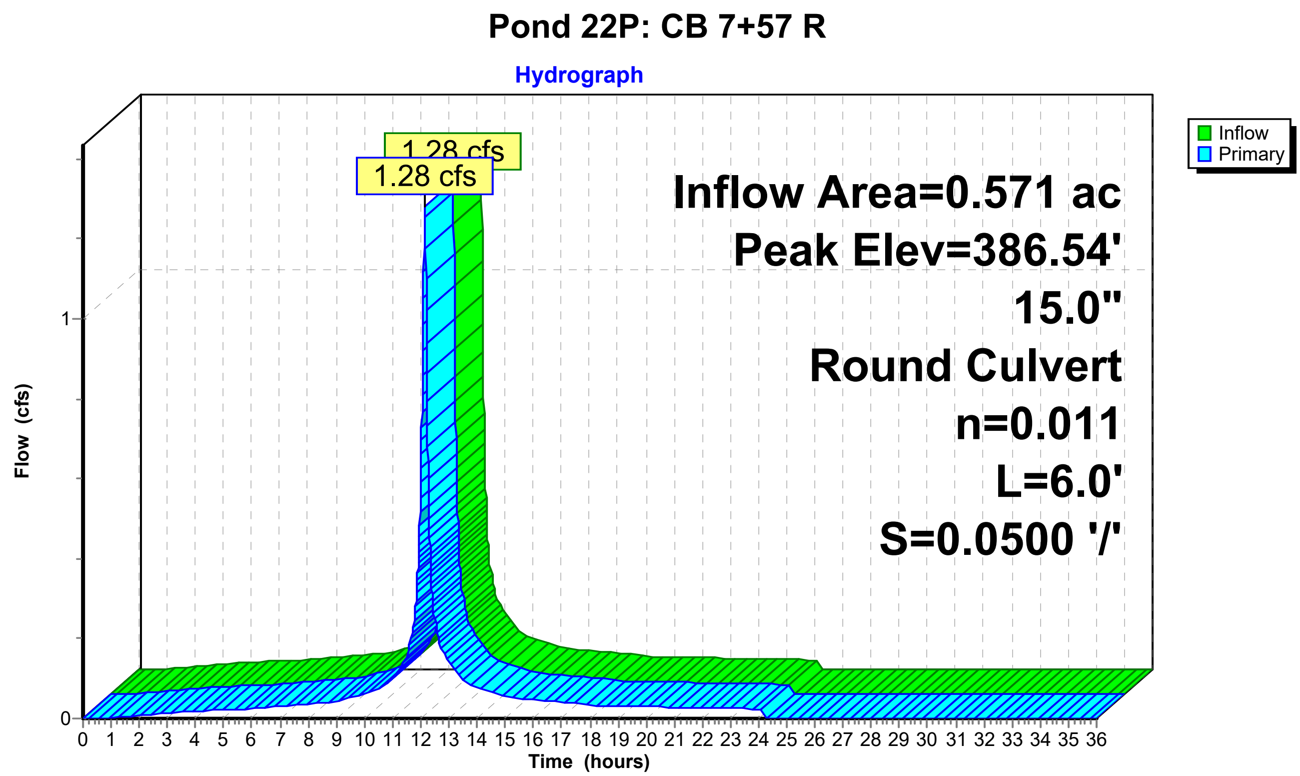
Summary for Pond 22P: CB 7+57 R

Inflow Area = 0.571 ac, 72.31% Impervious, Inflow Depth = 2.43" for 2-YR event
Inflow = 1.28 cfs @ 12.14 hrs, Volume= 0.115 af
Outflow = 1.28 cfs @ 12.14 hrs, Volume= 0.115 af, Atten= 0%, Lag= 0.0 min
Primary = 1.28 cfs @ 12.14 hrs, Volume= 0.115 af
Routed to Pond 23P : DMH 7+46

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 386.54' @ 12.14 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	386.00'	**15.0" Round Culvert** L= 6.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 386.00' / 385.70' S= 0.0500 '/' Cc= 0.900 n= 0.011, Flow Area= 1.23 sf

Primary OutFlow Max=1.28 cfs @ 12.14 hrs HW=386.54' TW=385.72' (Dynamic Tailwater)
1=Culvert (Inlet Controls 1.28 cfs @ 2.51 fps)



Summary for Pond 23P: DMH 7+46

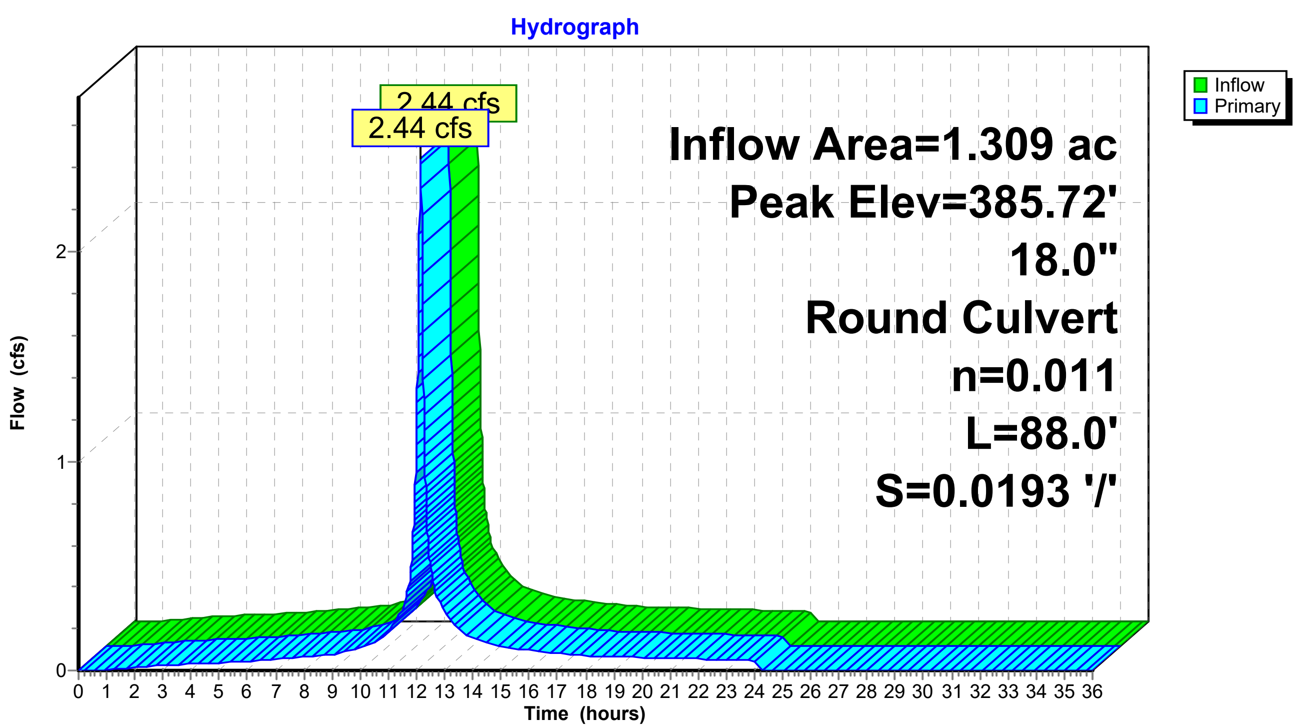
Inflow Area = 1.309 ac, 56.44% Impervious, Inflow Depth = 2.06" for 2-YR event
Inflow = 2.44 cfs @ 12.15 hrs, Volume= 0.224 af
Outflow = 2.44 cfs @ 12.15 hrs, Volume= 0.224 af, Atten= 0%, Lag= 0.0 min
Primary = 2.44 cfs @ 12.15 hrs, Volume= 0.224 af
Routed to Pond 24P : DMH 6+54

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 385.72' @ 12.15 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	385.00'	**18.0" Round Culvert** L= 88.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 385.00' / 383.30' S= 0.0193 '/' Cc= 0.900 n= 0.011, Flow Area= 1.77 sf

Primary OutFlow Max=2.44 cfs @ 12.15 hrs HW=385.72' TW=383.97' (Dynamic Tailwater)
1=Culvert (Inlet Controls 2.44 cfs @ 2.89 fps)

Pond 23P: DMH 7+46



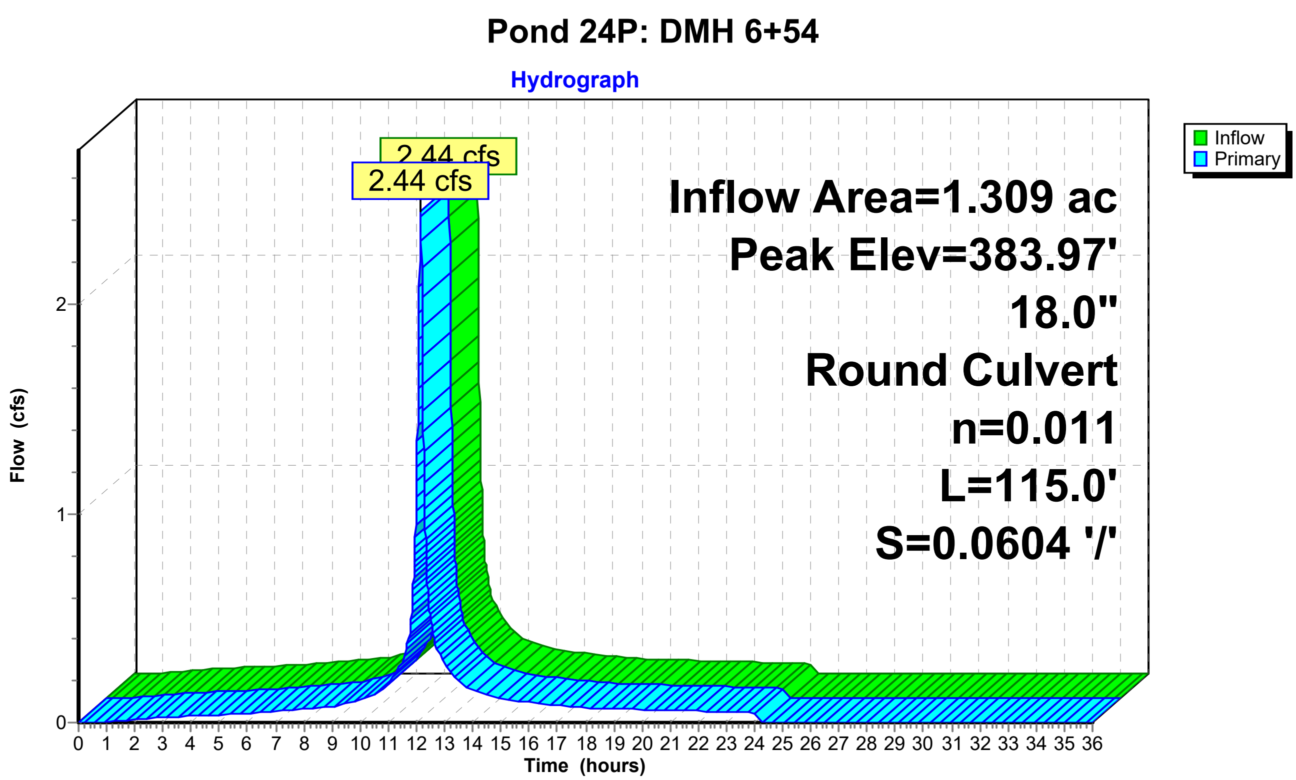
Summary for Pond 24P: DMH 6+54

Inflow Area = 1.309 ac, 56.44% Impervious, Inflow Depth = 2.06" for 2-YR event
Inflow = 2.44 cfs @ 12.15 hrs, Volume= 0.224 af
Outflow = 2.44 cfs @ 12.15 hrs, Volume= 0.224 af, Atten= 0%, Lag= 0.0 min
Primary = 2.44 cfs @ 12.15 hrs, Volume= 0.224 af
Routed to Pond 26P : Infiltration Basin #2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 383.97' @ 12.15 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	383.25'	**18.0" Round Culvert** L= 115.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 383.25' / 376.30' S= 0.0604 '/' Cc= 0.900 n= 0.011, Flow Area= 1.77 sf

Primary OutFlow Max=2.44 cfs @ 12.15 hrs HW=383.97' TW=376.53' (Dynamic Tailwater)
1=Culvert (Inlet Controls 2.44 cfs @ 2.89 fps)



Summary for Subcatchment 25P: P2g

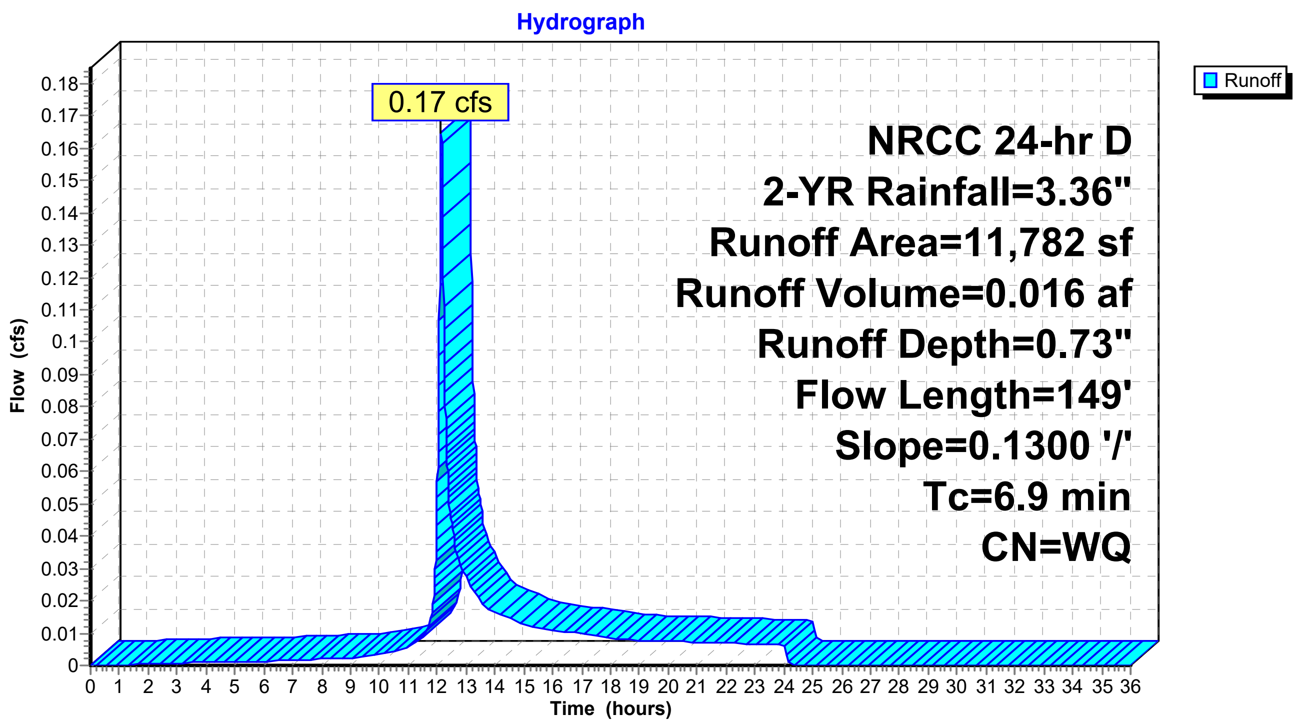
Runoff = 0.17 cfs @ 12.15 hrs, Volume= 0.016 af, Depth= 0.73"
Routed to Pond 26P : Infiltration Basin #2

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 2-YR Rainfall=3.36"

Area (sf)	CN	Description
988	98	Roofs HSG B
10,794	61	>75% Grass cover, Good HSG B
11,782		Weighted Average
10,794		91.61% Pervious Area
988		8.39% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.6	100	0.1300	0.25		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.36"
0.3	49	0.1300	2.52		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
6.9	149	Total			

Subcatchment 25P: P2g



Summary for Pond 26P: Infiltration Basin #2

Inflow Area = 2.230 ac, 46.20% Impervious, Inflow Depth = 1.81" for 2-YR event
Inflow = 3.56 cfs @ 12.14 hrs, Volume= 0.336 af
Outflow = 0.64 cfs @ 12.61 hrs, Volume= 0.336 af, Atten= 82%, Lag= 28.1 min
Discarded = 0.25 cfs @ 12.61 hrs, Volume= 0.288 af
Primary = 0.38 cfs @ 12.61 hrs, Volume= 0.048 af
Routed to Link 28P : Sub-DP #2a: Flow to Town Land

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 376.87' @ 12.61 hrs Surf.Area= 4,495 sf Storage= 3,843 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 77.1 min (870.7 - 793.5)

Volume	Invert	Avail.Storage	Storage Description
#1	376.00'	16,211 cf	**Custom Stage Data (Irregular)**Listed below (Recalc)

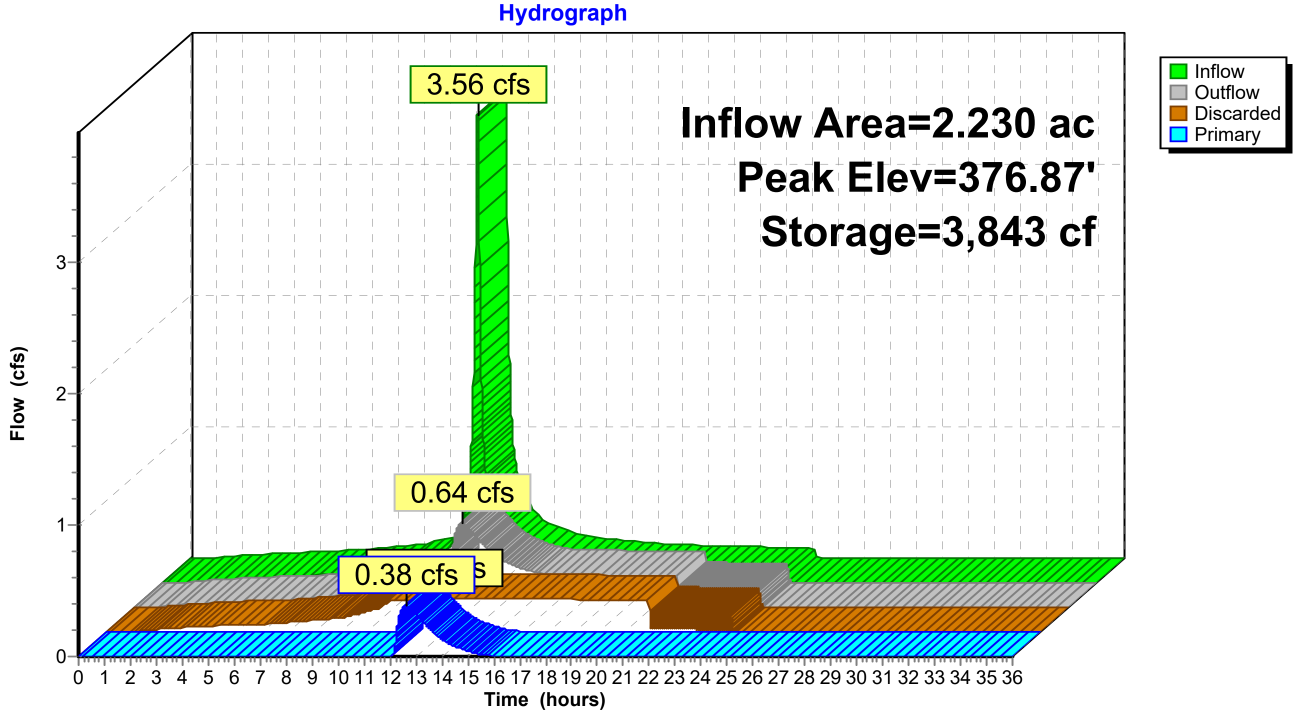
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
376.00	4,363	266.0	0	0	4,363
379.50	4,906	278.0	16,211	16,211	5,448

Device	Routing	Invert	Outlet Devices
#1	Discarded	376.00'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	376.50'	**15.0" Round Culvert** L= 3.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 376.50' / 376.50' S= 0.0000 '/' Cc= 0.900 n= 0.011, Flow Area= 1.23 sf

Discarded OutFlow Max=0.25 cfs @ 12.61 hrs HW=376.87' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.25 cfs)

Primary OutFlow Max=0.38 cfs @ 12.61 hrs HW=376.87' TW=0.00' (Dynamic Tailwater)
└─**2=Culvert** (Barrel Controls 0.38 cfs @ 1.91 fps)

Pond 26P: Infiltration Basin #2



Summary for Subcatchment 27P: P2n

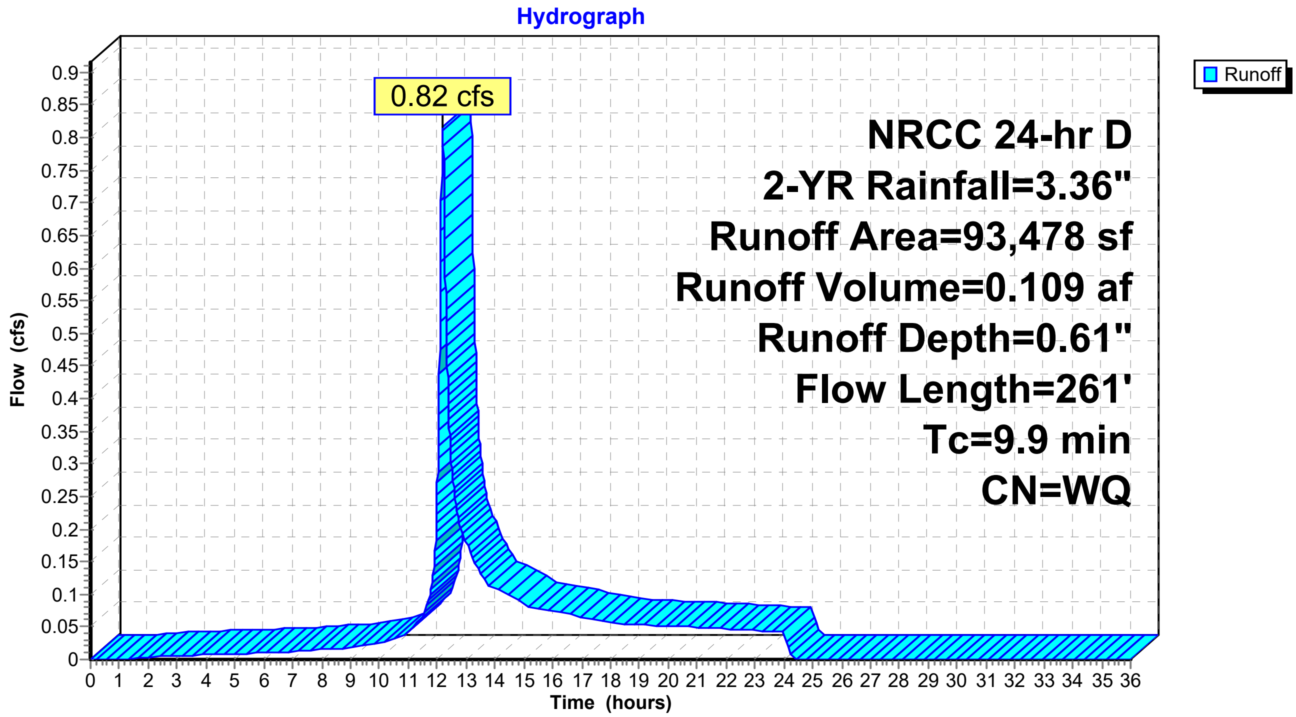
Runoff = 0.82 cfs @ 12.18 hrs, Volume= 0.109 af, Depth= 0.61"
Routed to Link 28P : Sub-DP #2a: Flow to Town Land

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 2-YR Rainfall=3.36"

Area (sf)	CN	Description
59,016	55	Woods, Good HSG B
7,591	98	Roofs HSG B
2,898	70	Woods, Good HSG C
23,595	61	>75% Grass cover, Good HSG B
378	80	>75% Grass cover, Good HSG D
93,478		Weighted Average
85,887		91.88% Pervious Area
7,591		8.12% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	100	0.0710	0.20		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.36"
1.5	161	0.1200	1.73		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
9.9	261	Total			

Subcatchment 27P: P2n

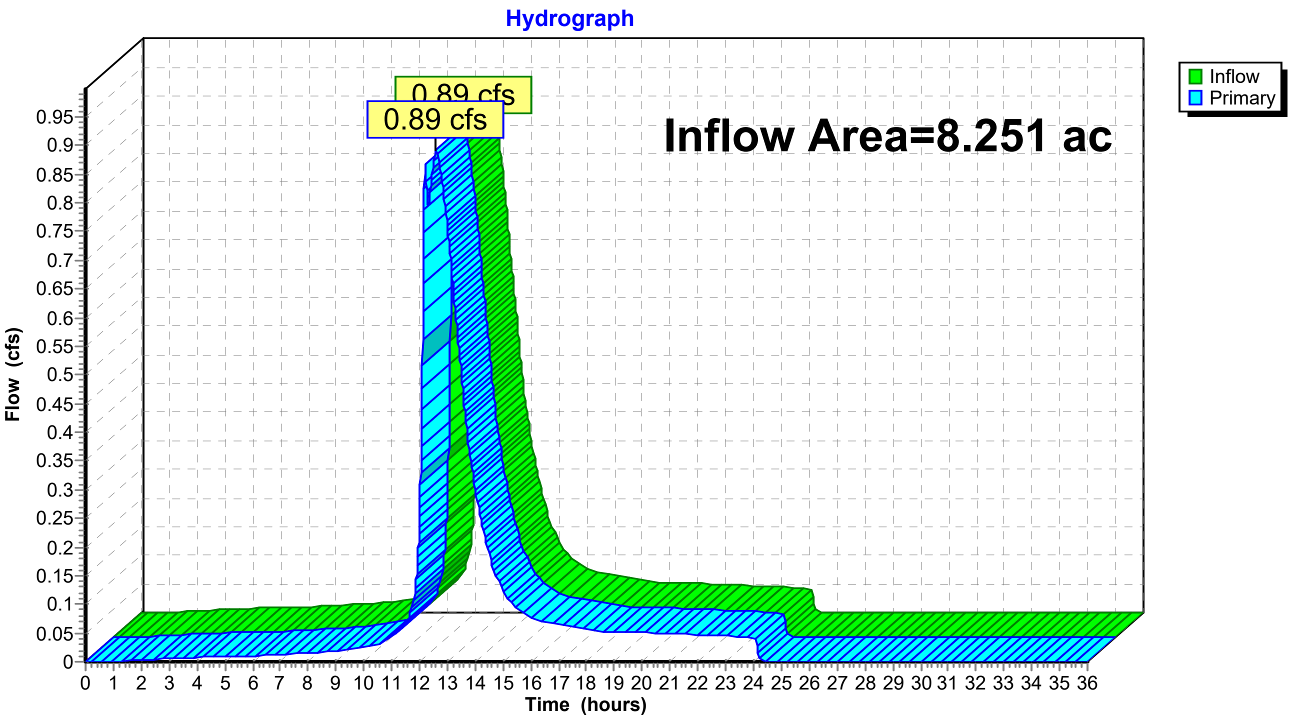


Summary for Link 28P: Sub-DP #2a: Flow to Town Land

Inflow Area = 8.251 ac, 30.56% Impervious, Inflow Depth = 0.27" for 2-YR event
Inflow = 0.89 cfs @ 12.59 hrs, Volume= 0.184 af
Primary = 0.89 cfs @ 12.59 hrs, Volume= 0.184 af, Atten= 0%, Lag= 0.0 min
Routed to Link 44P : Design Point #2: Flow to Uncas Brook

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Link 28P: Sub-DP #2a: Flow to Town Land



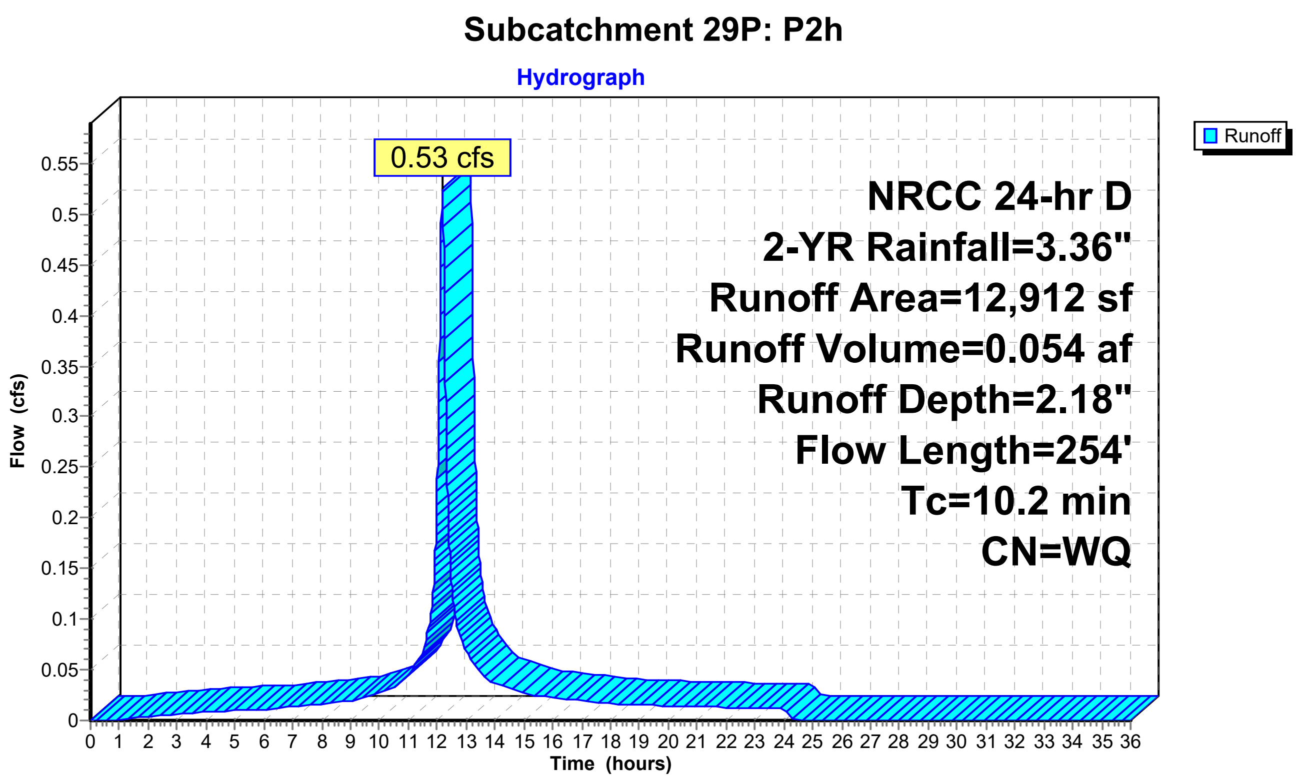
Summary for Subcatchment 29P: P2h

Runoff = 0.53 cfs @ 12.18 hrs, Volume= 0.054 af, Depth= 2.18"
Routed to Pond 30P : CB 12+97 R

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 2-YR Rainfall=3.36"

Area (sf)	CN	Description
5,638	98	Paved parking, HSG B
2,600	98	Roofs, HSG B
4,674	61	>75% Grass cover, Good, HSG B
12,912		Weighted Average
4,674		36.20% Pervious Area
8,238		63.80% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	80	0.0350	0.14		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.36"
0.9	174	0.0250	3.21		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
10.2	254	Total			



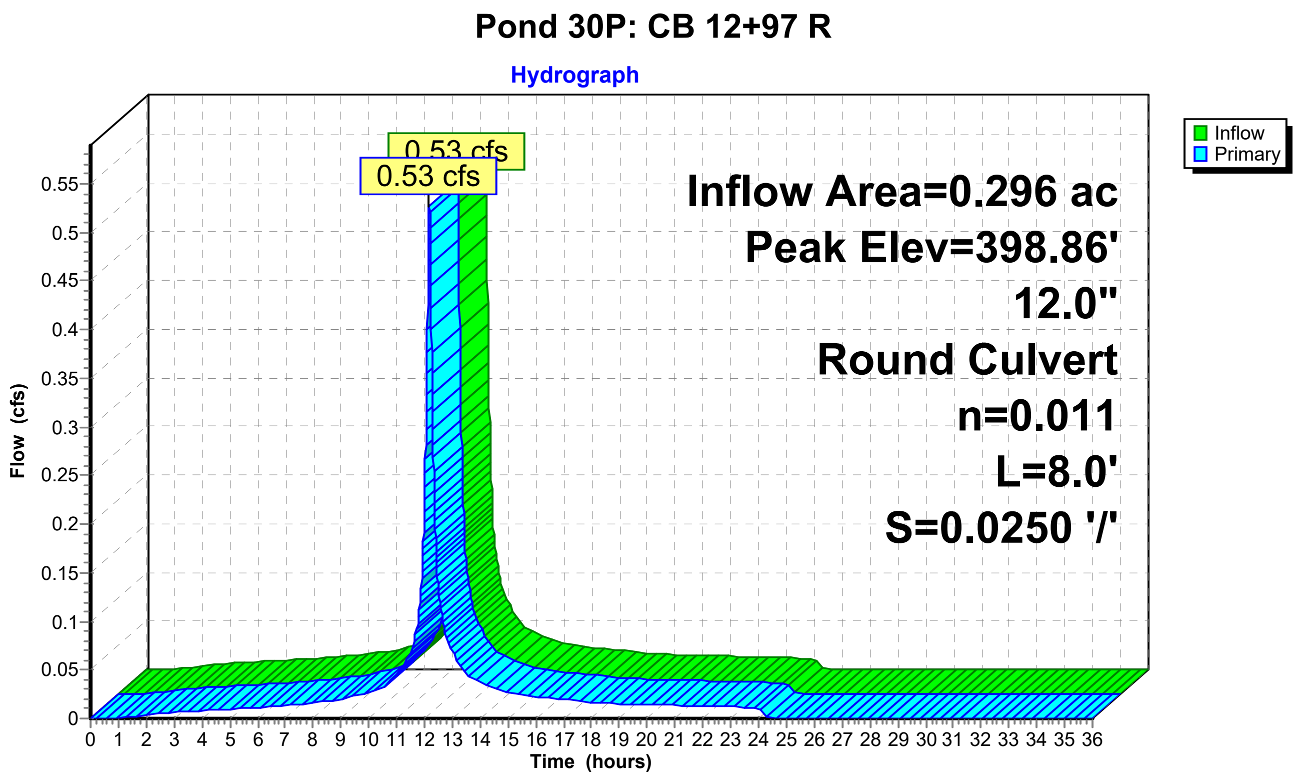
Summary for Pond 30P: CB 12+97 R

Inflow Area = 0.296 ac, 63.80% Impervious, Inflow Depth = 2.18" for 2-YR event
Inflow = 0.53 cfs @ 12.18 hrs, Volume= 0.054 af
Outflow = 0.53 cfs @ 12.18 hrs, Volume= 0.054 af, Atten= 0%, Lag= 0.0 min
Primary = 0.53 cfs @ 12.18 hrs, Volume= 0.054 af
Routed to Pond 33P : DMH 12+87

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 398.86' @ 12.18 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	398.50'	**12.0" Round Culvert** L= 8.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 398.50' / 398.30' S= 0.0250 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=0.53 cfs @ 12.18 hrs HW=398.86' TW=397.81' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 0.53 cfs @ 2.05 fps)



Summary for Subcatchment 31P: P2i

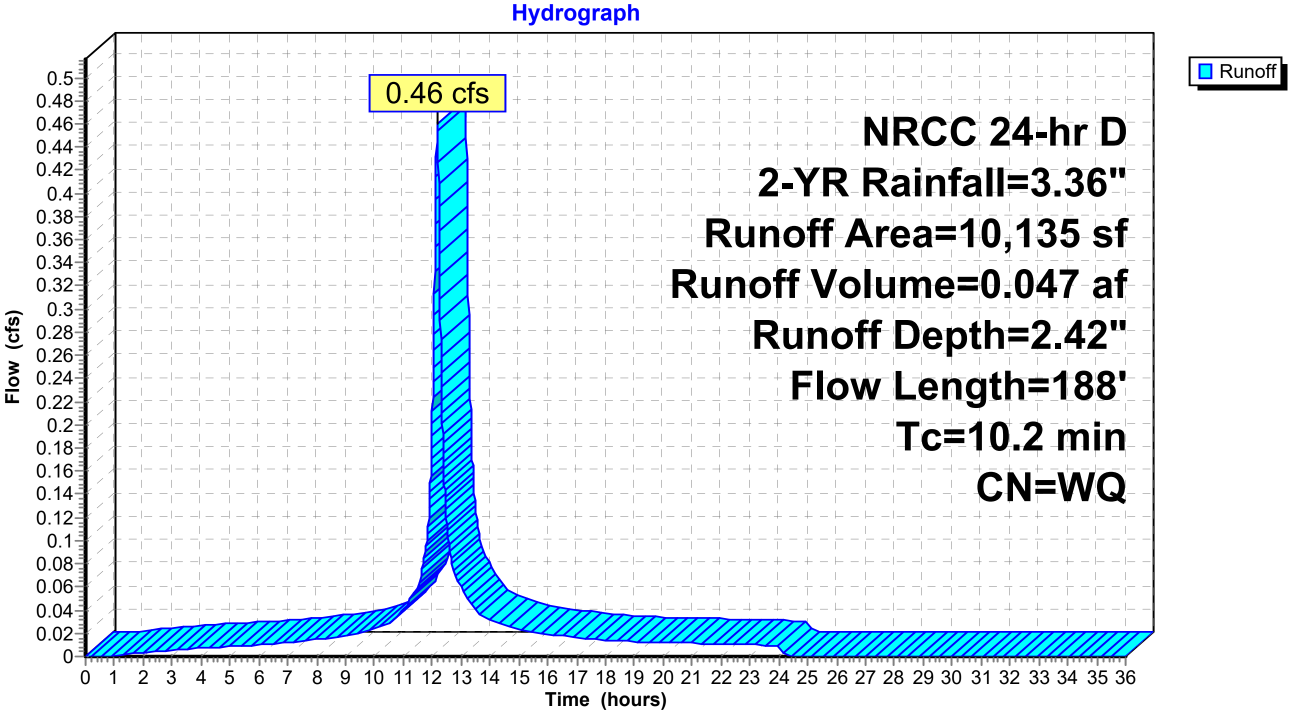
Runoff = 0.46 cfs @ 12.17 hrs, Volume= 0.047 af, Depth= 2.42"
Routed to Pond 32P : CB 12+97 L

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 2-YR Rainfall=3.36"

Area (sf)	CN	Description
4,134	98	Paved parking HSG B
3,250	98	Roofs, HSG B
2,751	61	>75% Grass cover, Good HSG B
10,135		Weighted Average
2,751		27.14% Pervious Area
7,384		72.86% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.2	25	0.0250	0.10		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.36"
0.3	22	0.0250	1.14		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.36"
4.7	29	0.0250	0.10		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.36"
0.0	12	0.0400	4.06		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.4	37	0.0400	1.40		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.1	22	0.0400	4.06		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.5	41	0.0400	1.40		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
10.2	188	Total			

Subcatchment 31P: P2i



Summary for Pond 32P: CB 12+97 L

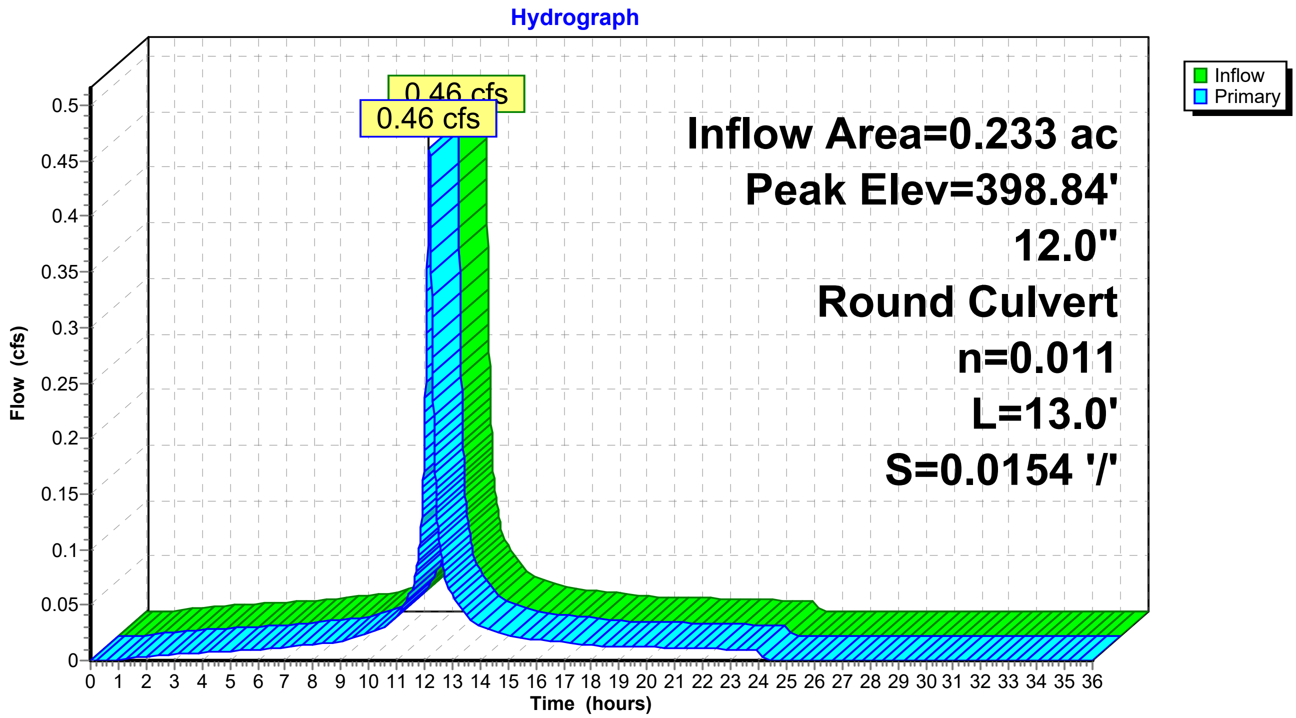
Inflow Area = 0.233 ac, 72.86% Impervious, Inflow Depth = 2.42" for 2-YR event
Inflow = 0.46 cfs @ 12.17 hrs, Volume= 0.047 af
Outflow = 0.46 cfs @ 12.17 hrs, Volume= 0.047 af, Atten= 0%, Lag= 0.0 min
Primary = 0.46 cfs @ 12.17 hrs, Volume= 0.047 af
Routed to Pond 33P : DMH 12+87

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 398.84' @ 12.17 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	398.50'	**12.0" Round Culvert** L= 13.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 398.50' / 398.30' S= 0.0154 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=0.46 cfs @ 12.17 hrs HW=398.84' TW=397.81' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 0.46 cfs @ 1.98 fps)

Pond 32P: CB 12+97 L



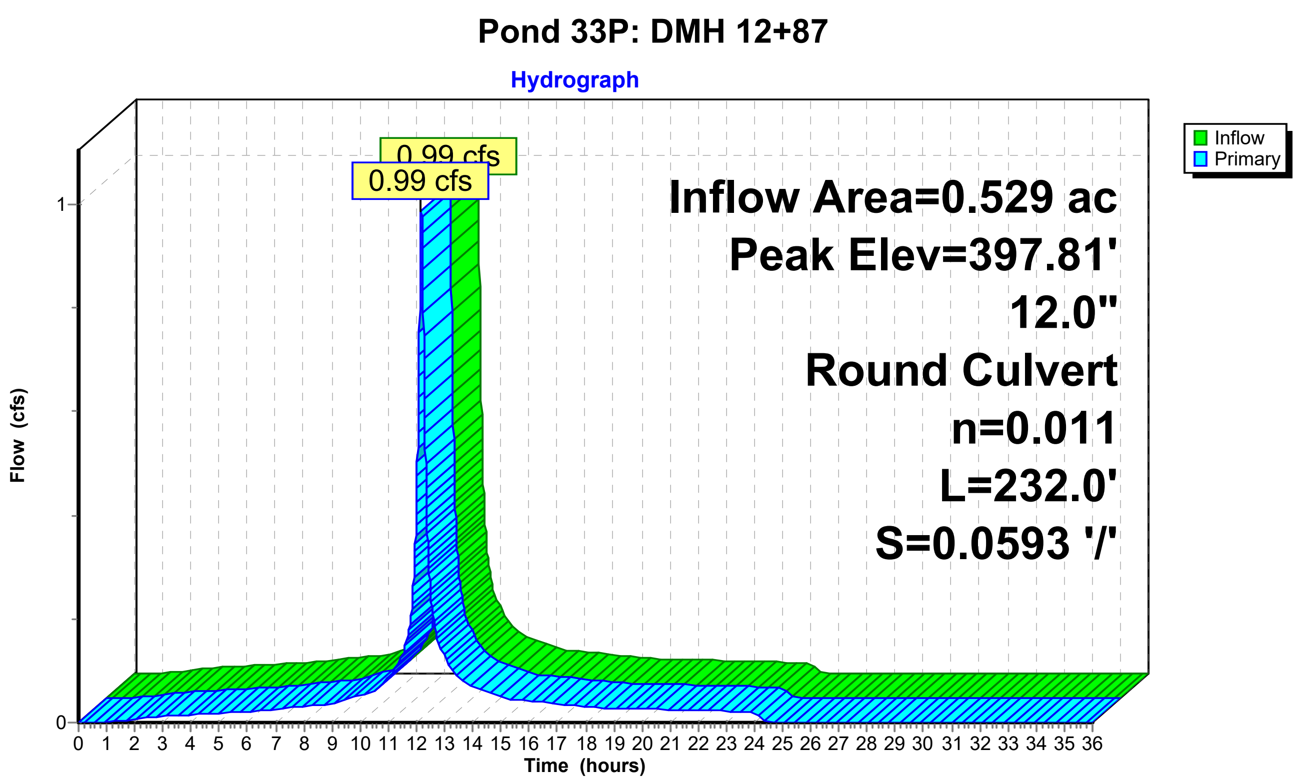
Summary for Pond 33P: DMH 12+87

Inflow Area = 0.529 ac, 67.78% Impervious, Inflow Depth = 2.28" for 2-YR event
Inflow = 0.99 cfs @ 12.17 hrs, Volume= 0.101 af
Outflow = 0.99 cfs @ 12.17 hrs, Volume= 0.101 af, Atten= 0%, Lag= 0.0 min
Primary = 0.99 cfs @ 12.17 hrs, Volume= 0.101 af
Routed to Pond 39P : FD B

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 397.81' @ 12.17 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	397.30'	**12.0" Round Culvert** L= 232.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 397.30' / 383.55' S= 0.0593 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=0.99 cfs @ 12.17 hrs HW=397.81' TW=382.76' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.99 cfs @ 2.44 fps)



Summary for Subcatchment 34P: P2j

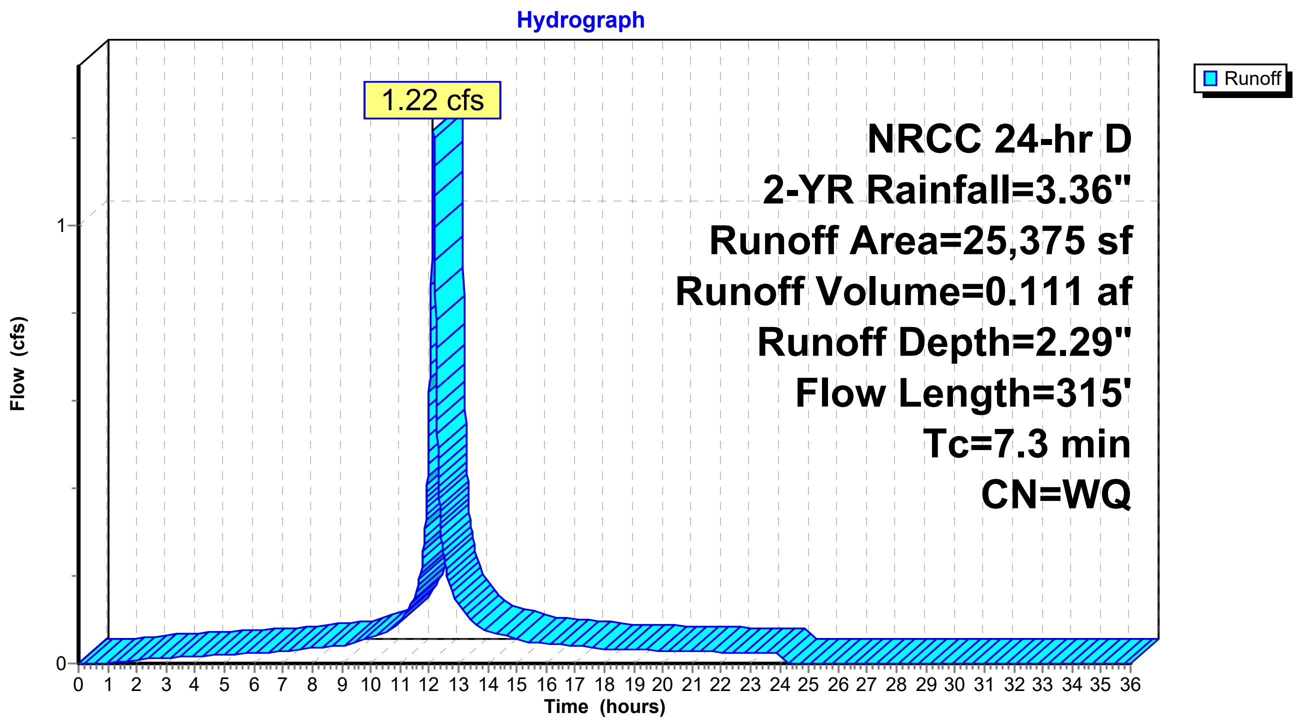
Runoff = 1.22 cfs @ 12.14 hrs, Volume= 0.111 af, Depth= 2.29"
Routed to Pond 35P : CB 10+30 R

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 2-YR Rainfall=3.36"

Area (sf)	CN	Description
8,847	98	Paved parking HSG B
8,450	98	Roofs HSG B
8,078	61	>75% Grass cover, Good HSG B
25,375		Weighted Average
8,078		31.83% Pervious Area
17,297		68.17% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.1	56	0.0500	0.15		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.36"
1.2	259	0.0300	3.52		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
7.3	315	Total			

Subcatchment 34P: P2j



Summary for Pond 35P: CB 10+30 R

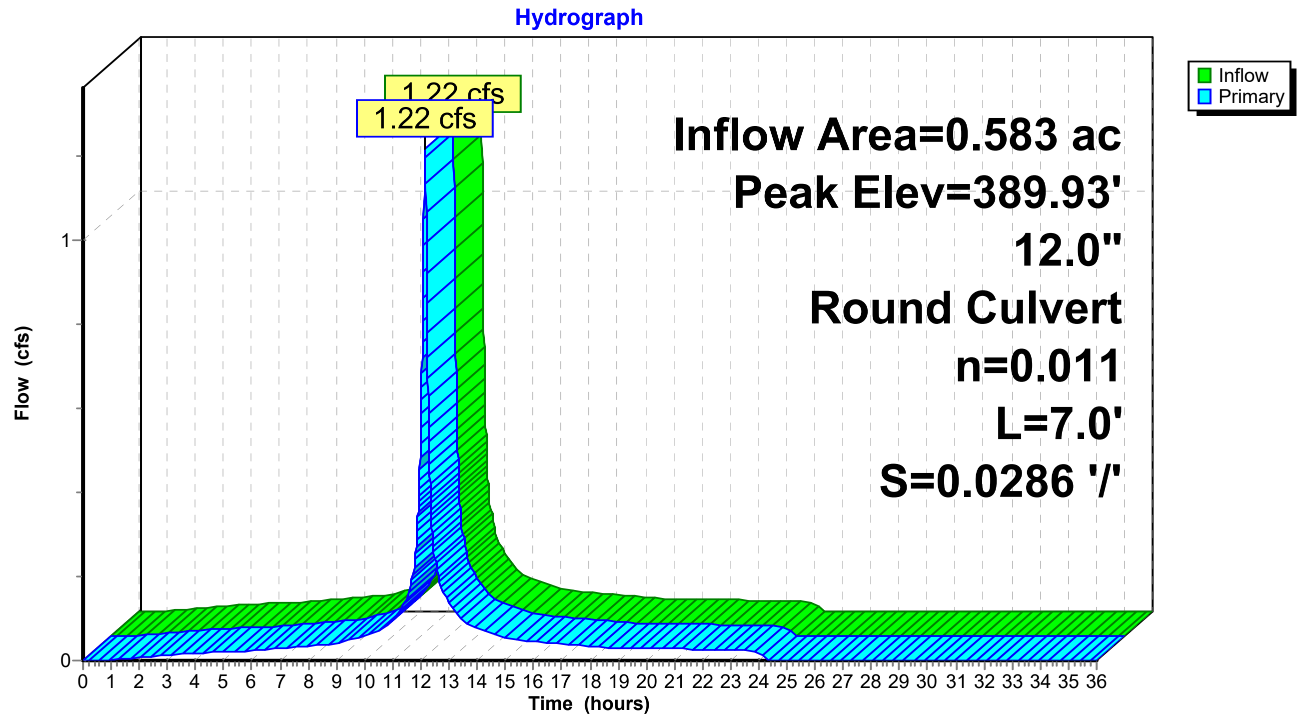
Inflow Area = 0.583 ac, 68.17% Impervious, Inflow Depth = 2.29" for 2-YR event
Inflow = 1.22 cfs @ 12.14 hrs, Volume= 0.111 af
Outflow = 1.22 cfs @ 12.14 hrs, Volume= 0.111 af, Atten= 0%, Lag= 0.0 min
Primary = 1.22 cfs @ 12.14 hrs, Volume= 0.111 af
Routed to Pond 38P : DMH 10+38

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 389.93' @ 12.15 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	389.30'	**12.0" Round Culvert** L= 7.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 389.30' / 389.10' S= 0.0286 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=1.20 cfs @ 12.14 hrs HW=389.93' TW=389.65' (Dynamic Tailwater)
└─**1=Culvert** (Outlet Controls 1.20 cfs @ 3.28 fps)

Pond 35P: CB 10+30 R



Summary for Subcatchment 36P: P2k

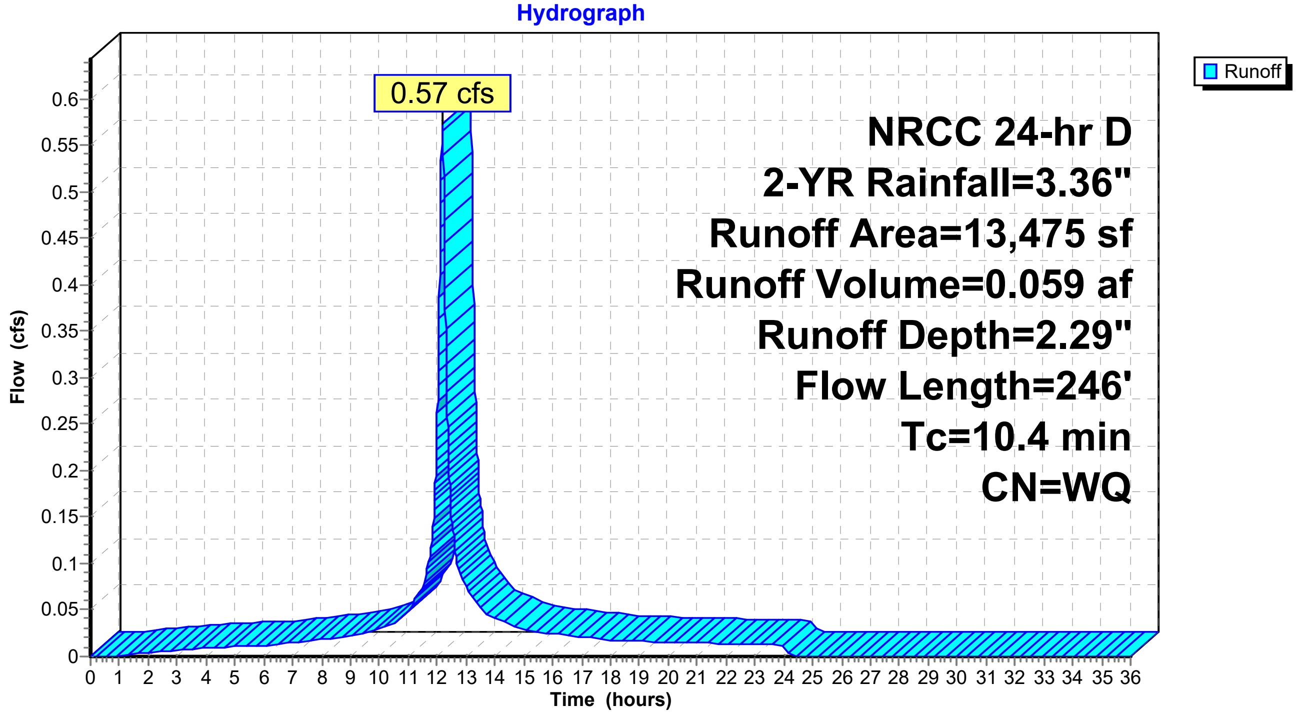
Runoff = 0.57 cfs @ 12.18 hrs, Volume= 0.059 af, Depth= 2.29"
Routed to Pond 37P : CB 10+30 L

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 2-YR Rainfall=3.36"

Area (sf)	CN	Description
4,639	98	Paved parking HSG B
4,550	98	Roofs HSG B
4,286	61	>75% Grass cover, Good HSG B
13,475		Weighted Average
4,286		31.81% Pervious Area
9,189		68.19% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.8	21	0.0500	0.13		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.36"
0.2	22	0.0500	1.50		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.36"
3.4	27	0.0500	0.13		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.36"
0.2	12	0.0500	1.33		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.36"
2.4	18	0.0500	0.12		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.36"
0.2	15	0.0500	1.57		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.1	22	0.0500	4.54		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.3	29	0.0400	1.40		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.0	12	0.0400	4.06		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.4	24	0.0200	0.99		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.4	44	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
10.4	246	Total			

Subcatchment 36P: P2k



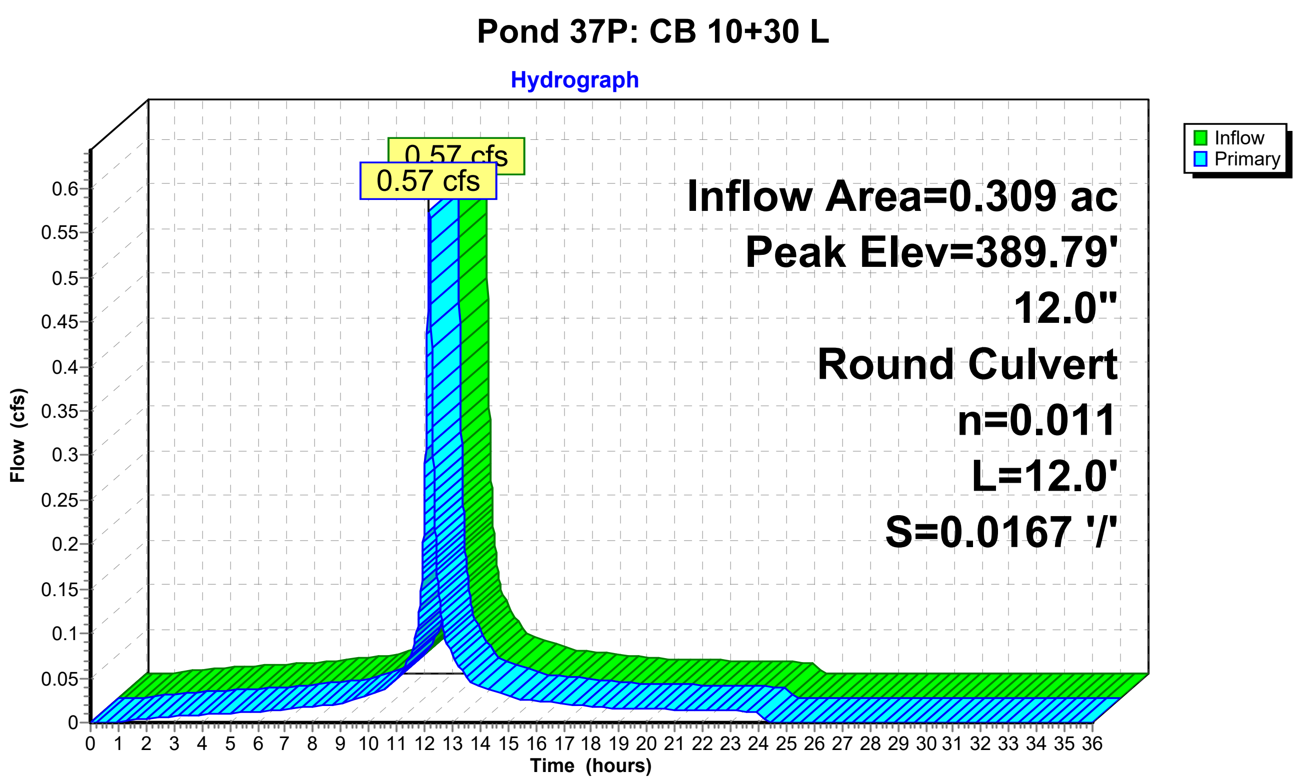
Summary for Pond 37P: CB 10+30 L

Inflow Area = 0.309 ac, 68.19% Impervious, Inflow Depth = 2.29" for 2-YR event
Inflow = 0.57 cfs @ 12.18 hrs, Volume= 0.059 af
Outflow = 0.57 cfs @ 12.18 hrs, Volume= 0.059 af, Atten= 0%, Lag= 0.0 min
Primary = 0.57 cfs @ 12.18 hrs, Volume= 0.059 af
Routed to Pond 38P : DMH 10+38

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 389.79' @ 12.17 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	389.30'	**12.0" Round Culvert** L= 12.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 389.30' / 389.10' S= 0.0167 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=0.59 cfs @ 12.18 hrs HW=389.79' TW=389.64' (Dynamic Tailwater)
└─**1=Culvert** (Outlet Controls 0.59 cfs @ 2.28 fps)



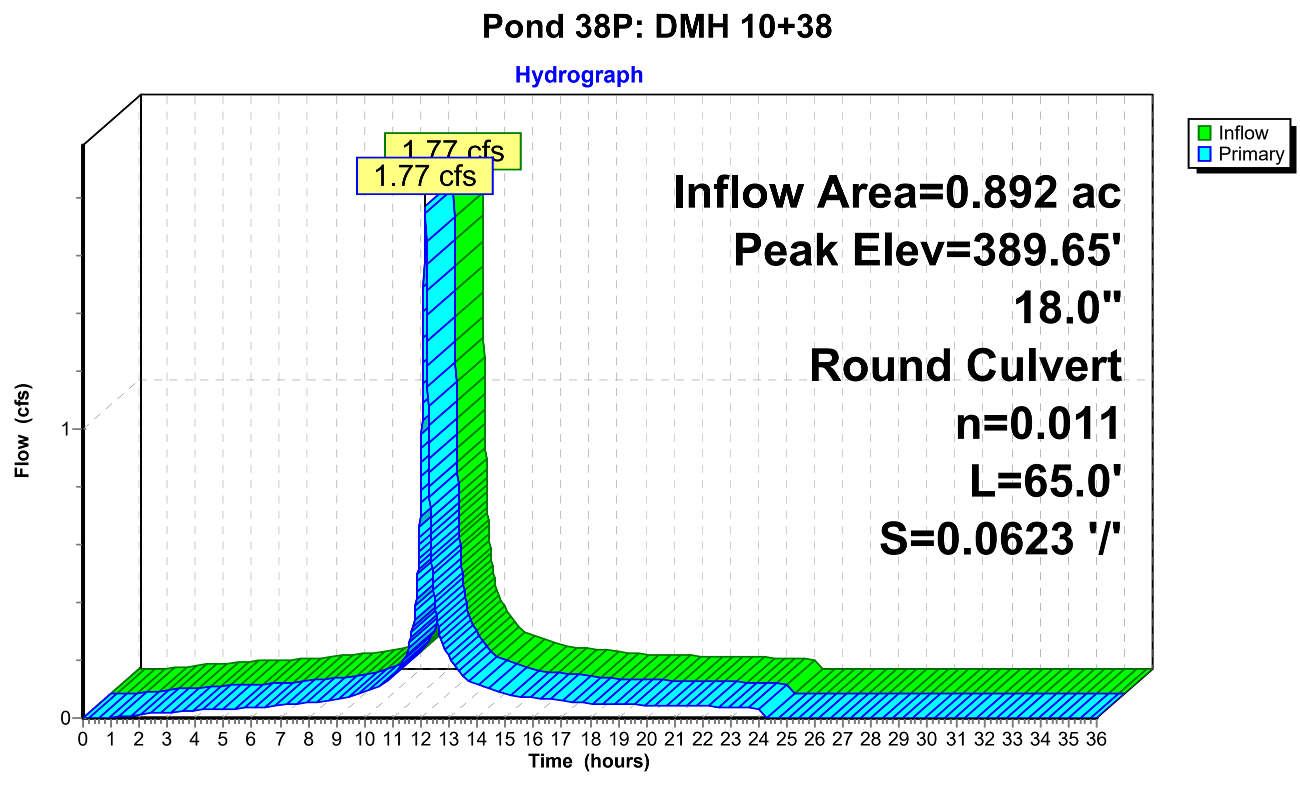
Summary for Pond 38P: DMH 10+38

Inflow Area = 0.892 ac, 68.18% Impervious, Inflow Depth = 2.29" for 2-YR event
Inflow = 1.77 cfs @ 12.15 hrs, Volume= 0.171 af
Outflow = 1.77 cfs @ 12.15 hrs, Volume= 0.171 af, Atten= 0%, Lag= 0.0 min
Primary = 1.77 cfs @ 12.15 hrs, Volume= 0.171 af
Routed to Pond 39P : FD B

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 389.65' @ 12.15 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	389.05'	**18.0" Round Culvert** L= 65.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 389.05' / 385.00' S= 0.0623 '/' Cc= 0.900 n= 0.011, Flow Area= 1.77 sf

Primary OutFlow Max=1.77 cfs @ 12.15 hrs HW=389.65' TW=382.77' (Dynamic Tailwater)
1=Culvert (Inlet Controls 1.77 cfs @ 2.65 fps)



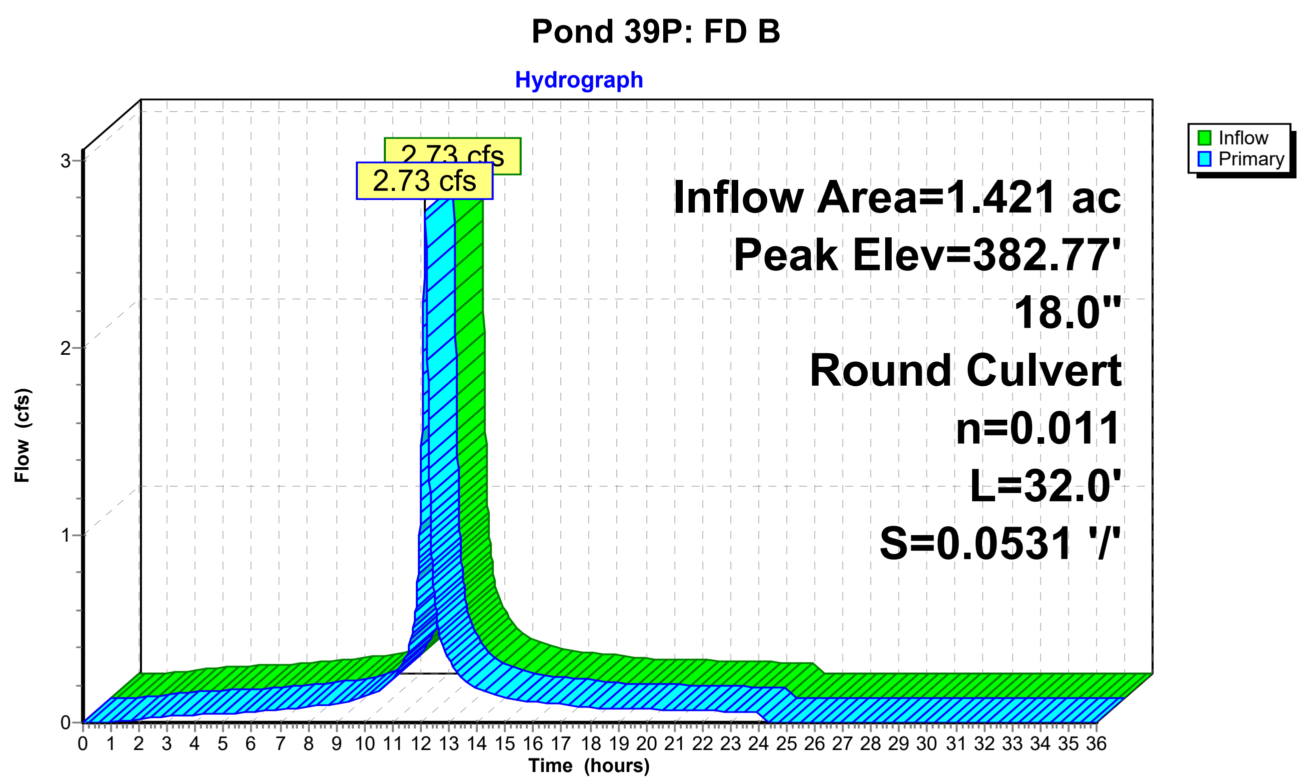
Summary for Pond 39P: FD B

Inflow Area = 1.421 ac, 68.03% Impervious, Inflow Depth = 2.29" for 2-YR event
Inflow = 2.73 cfs @ 12.16 hrs, Volume= 0.271 af
Outflow = 2.73 cfs @ 12.16 hrs, Volume= 0.271 af, Atten= 0%, Lag= 0.0 min
Primary = 2.73 cfs @ 12.16 hrs, Volume= 0.271 af
Routed to Pond 41P : Infiltration Basin #3

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 382.77' @ 12.16 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	382.00'	**18.0" Round Culvert** L= 32.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 382.00' / 380.30' S= 0.0531 '/' Cc= 0.900 n= 0.011, Flow Area= 1.77 sf

Primary OutFlow Max=2.72 cfs @ 12.16 hrs HW=382.77' TW=380.32' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 2.72 cfs @ 2.99 fps)



Summary for Subcatchment 40P: P2I

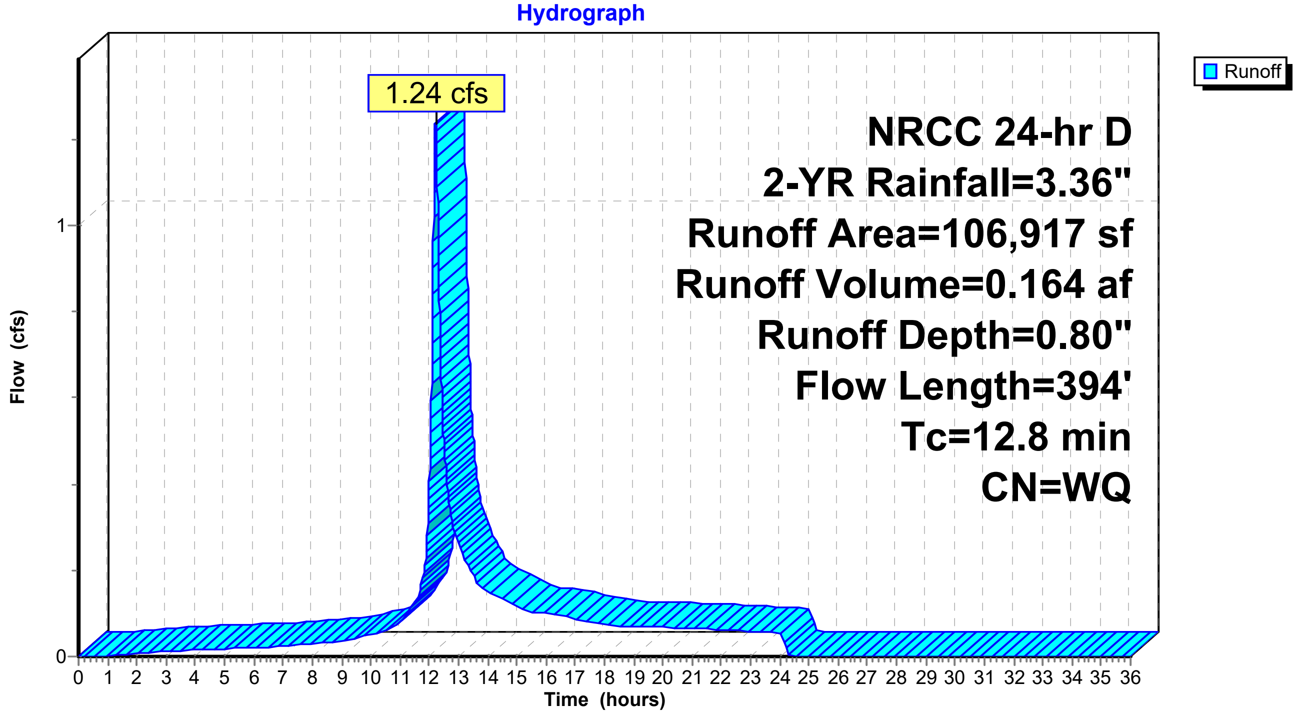
Runoff = 1.24 cfs @ 12.22 hrs, Volume= 0.164 af, Depth= 0.80"
Routed to Pond 41P : Infiltration Basin #3

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 2-YR Rainfall=3.36"

Area (sf)	CN	Description
3,235	98	Paved parking HSG B
12,020	98	Roofs, HSG B
47,471	61	>75% Grass cover, Good HSG B
617	74	>75% Grass cover, Good, HSG C
43,574	55	Woods, Good, HSG B
106,917		Weighted Average
91,662		85.73% Pervious Area
15,255		14.27% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	72	0.0800	0.13		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.36"
0.4	35	0.0800	1.41		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.1	287	0.0500	1.57		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
12.8	394	Total			

Subcatchment 40P: P2I



Summary for Pond 41P: Infiltration Basin #3

Inflow Area = 3.875 ac, 33.98% Impervious, Inflow Depth = 1.35" for 2-YR event
Inflow = 3.82 cfs @ 12.17 hrs, Volume= 0.435 af
Outflow = 0.73 cfs @ 12.76 hrs, Volume= 0.435 af, Atten= 81%, Lag= 35.7 min
Discarded = 0.46 cfs @ 12.76 hrs, Volume= 0.408 af
Primary = 0.27 cfs @ 12.76 hrs, Volume= 0.027 af
Routed to Link 28P : Sub-DP #2a: Flow to Town Land
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Link 43P : Sub-DP #2b: Flow to Northern Abutter

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 380.88' @ 12.76 hrs Surf.Area= 8,237 sf Storage= 5,123 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 81.9 min (888.4 - 806.5)

Volume	Invert	Avail.Storage	Storage Description
#1	380.00'	22,220 cf	**Custom Stage Data (Irregular)**Listed below (Recalc)
#2	378.00'	1,502 cf	**Custom Stage Data (Irregular)**Listed below (Recalc) 3,755 cf Overall x 40.0% Voids
		23,722 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
380.00	3,755	261.0	0	0	3,755
384.00	7,576	358.0	22,220	22,220	8,691

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
378.00	3,755	261.0	0	0	3,755
379.00	3,755	261.0	3,755	3,755	4,016

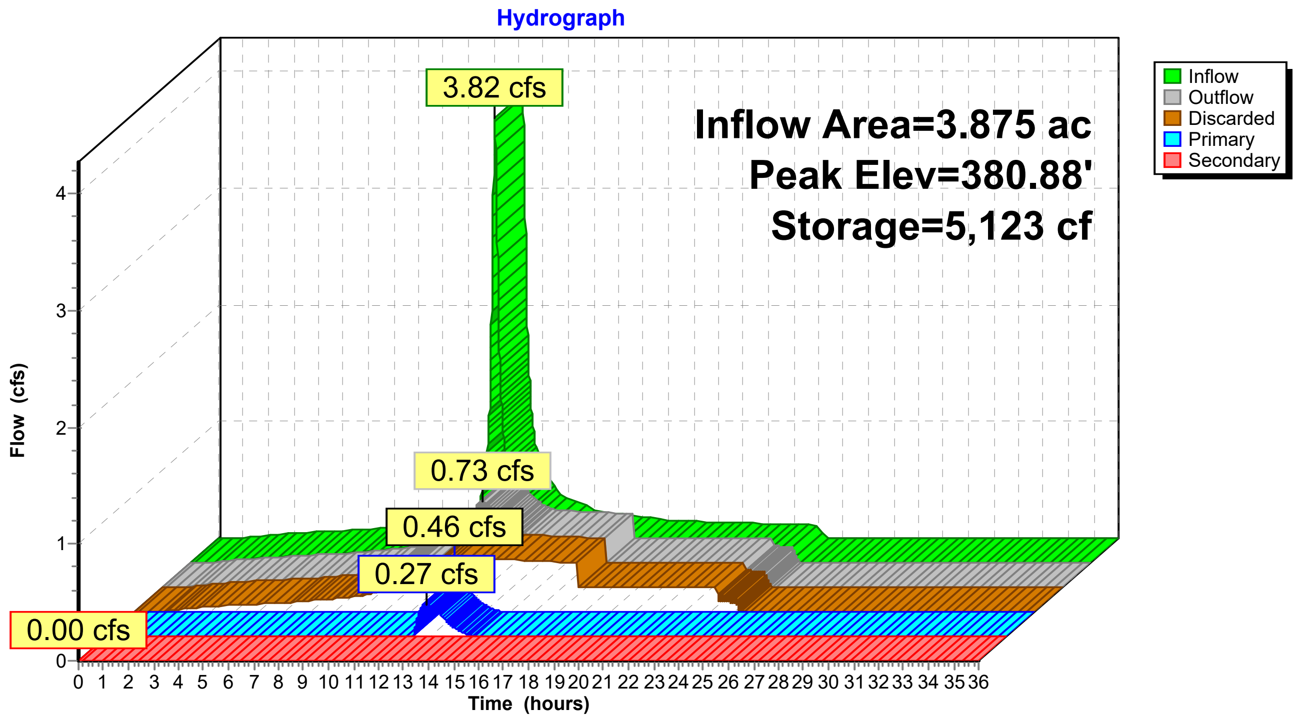
Device	Routing	Invert	Outlet Devices
#1	Discarded	378.00'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	380.40'	**12.0" Round Culvert** L= 214.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 380.40' / 358.00' S= 0.1047 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf
#3	Device 2	380.60'	**9.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Secondary	382.00'	**Custom Weir/Orifice, Cv= 2.62 (C= 3.28)** Elev. (feet) 382.00 383.50 383.50 384.00 Width (feet) 2.50 2.50 20.00 20.00

Discarded OutFlow Max=0.46 cfs @ 12.76 hrs HW=380.88' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.46 cfs)

Primary OutFlow Max=0.27 cfs @ 12.76 hrs HW=380.88' TW=0.00' (Dynamic Tailwater)
└─**2=Culvert** (Passes 0.27 cfs of 0.88 cfs potential flow)
  └─**3=Orifice/Grate** (Orifice Controls 0.27 cfs @ 1.80 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=378.00' TW=0.00' (Dynamic Tailwater)
└─**4=Custom Weir/Orifice** (Controls 0.00 cfs)

Pond 41P: Infiltration Basin #3



Summary for Subcatchment 42P: P2m

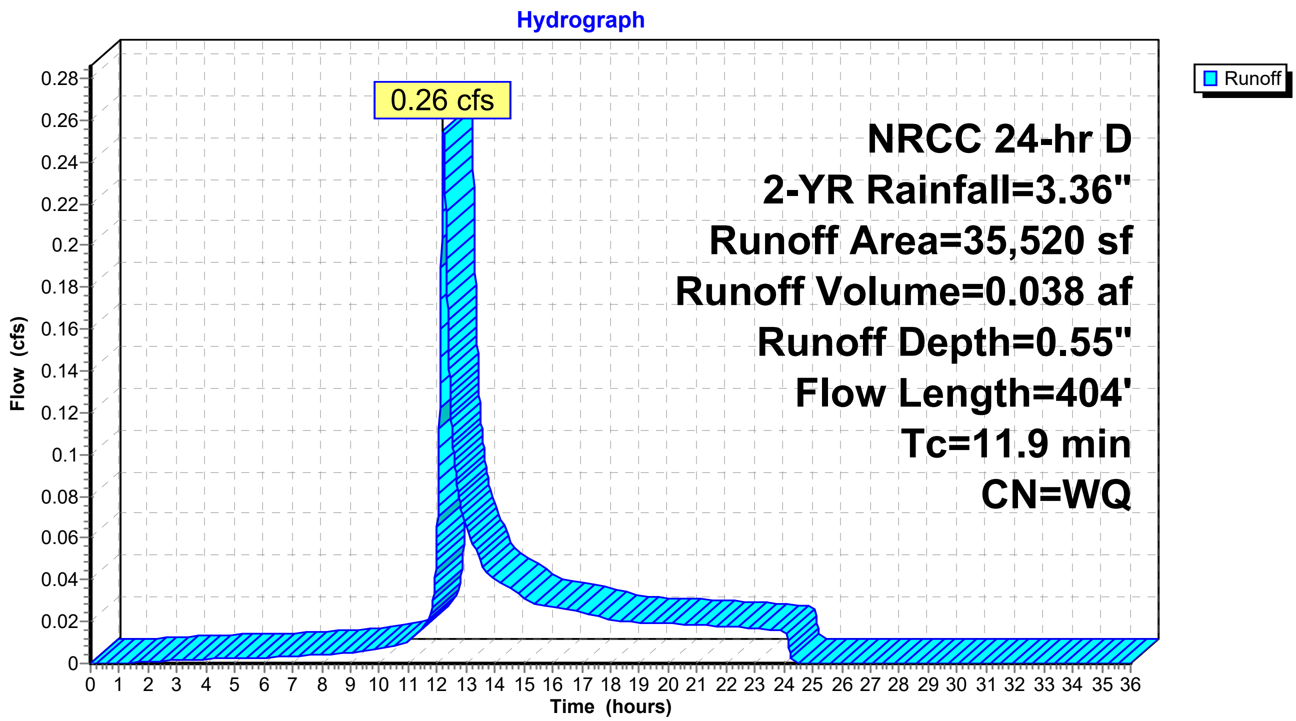
Runoff = 0.26 cfs @ 12.22 hrs, Volume= 0.038 af, Depth= 0.55"
Routed to Link 43P : Sub-DP #2b: Flow to Northern Abutter

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 2-YR Rainfall=3.36"

	Area (sf)	CN	Description
*	2,080	98	Roofs HSG B
	15,055	61	>75% Grass cover, Good HSG B
	18,385	55	Woods, Good, HSG B
	35,520		Weighted Average
	33,440		94.14% Pervious Area
	2,080		5.86% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	51	0.0400	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.36"
2.6	353	0.2100	2.29		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
11.9	404	Total			

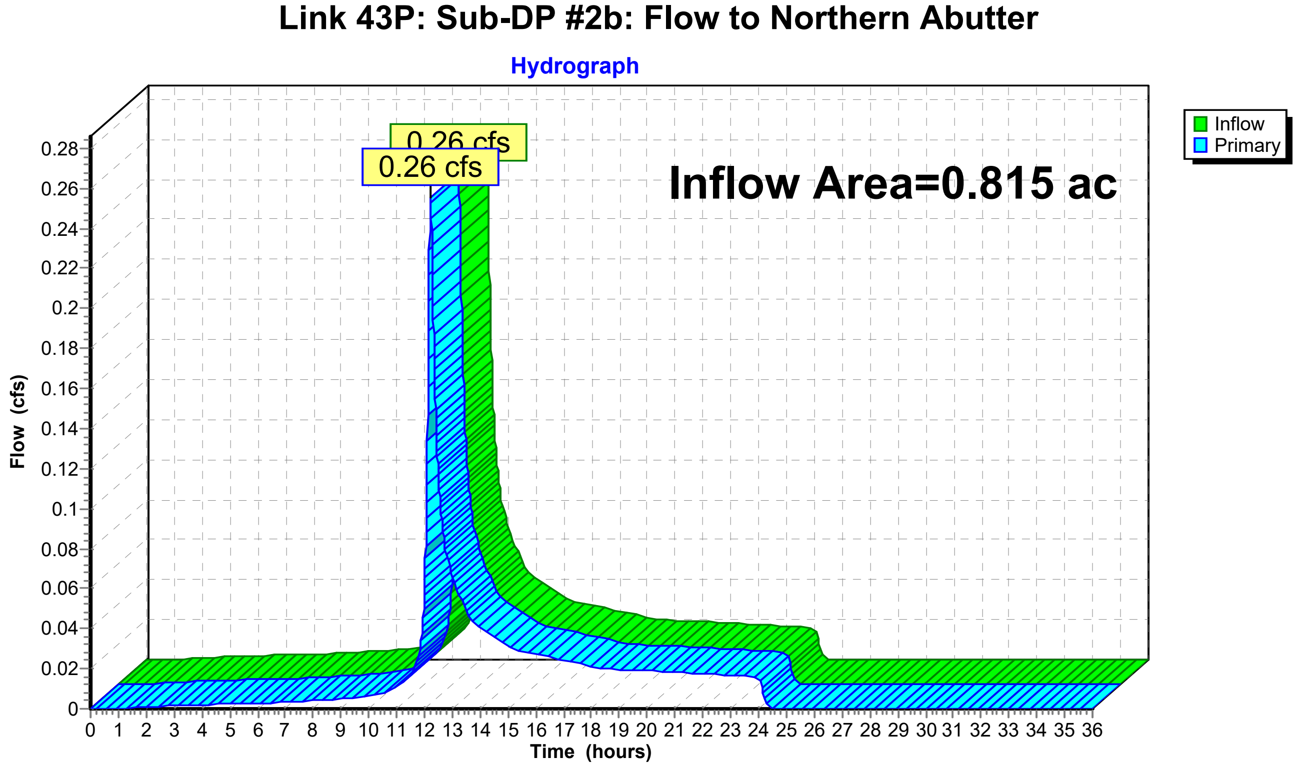
Subcatchment 42P: P2m



Summary for Link 43P: Sub-DP #2b: Flow to Northern Abutter

Inflow Area = 0.815 ac, 5.86% Impervious, Inflow Depth = 0.55" for 2-YR event
Inflow = 0.26 cfs @ 12.22 hrs, Volume= 0.038 af
Primary = 0.26 cfs @ 12.22 hrs, Volume= 0.038 af, Atten= 0%, Lag= 0.0 min
Routed to Link 44P : Design Point #2: Flow to Uncas Brook

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

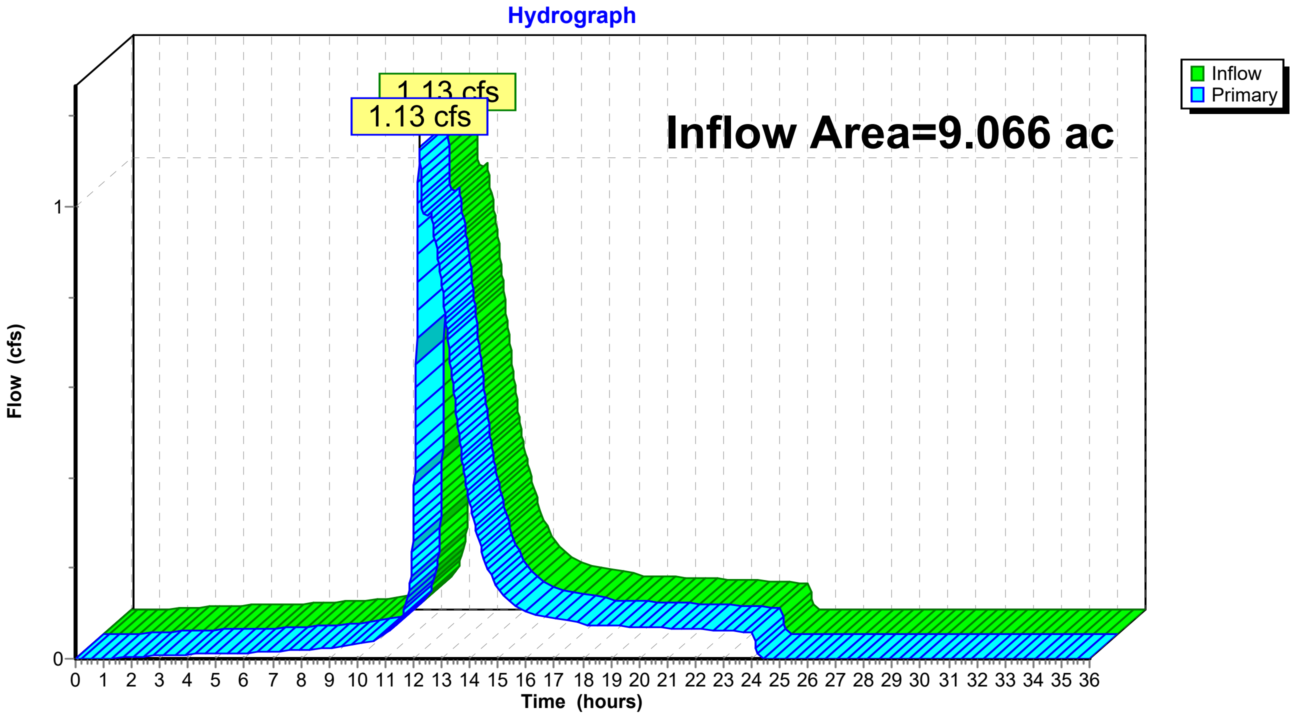


Summary for Link 44P: Design Point #2: Flow to Uncas Brook

Inflow Area = 9.066 ac, 28.33% Impervious, Inflow Depth = 0.29" for 2-YR event
Inflow = 1.13 cfs @ 12.21 hrs, Volume= 0.221 af
Primary = 1.13 cfs @ 12.21 hrs, Volume= 0.221 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Link 44P: Design Point #2: Flow to Uncas Brook



Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 8P: P2a Runoff Area=5,727 sf 44.23% Impervious Runoff Depth=3.35"
Flow Length=176' Slope=0.0800 '/' Tc=6.6 min CN=WQ Runoff=0.43 cfs 0.037 af

Pond 9P: CB 4+02 L Peak Elev=406.73' Inflow=0.43 cfs 0.037 af
12.0" Round Culvert n=0.011 L=13.0' S=0.0308 '/' Outflow=0.43 cfs 0.037 af

Subcatchment 10P: P2b Runoff Area=10,417 sf 25.78% Impervious Runoff Depth=2.98"
Flow Length=183' Tc=9.9 min CN=WQ Runoff=0.64 cfs 0.059 af

Pond 11P: CB 4+02 R Peak Elev=406.80' Inflow=0.64 cfs 0.059 af
12.0" Round Culvert n=0.011 L=8.0' S=0.0500 '/' Outflow=0.64 cfs 0.059 af

Pond 12P: DMH 4+13 Peak Elev=402.03' Inflow=1.04 cfs 0.096 af
12.0" Round Culvert n=0.011 L=130.0' S=0.0569 '/' Outflow=1.04 cfs 0.096 af

Subcatchment 13P: P2c Runoff Area=3,106 sf 63.52% Impervious Runoff Depth=3.71"
Flow Length=122' Slope=0.0700 '/' Tc=2.0 min CN=WQ Runoff=0.28 cfs 0.022 af

Pond 14P: CB 5+63 L Peak Elev=396.76' Inflow=0.28 cfs 0.022 af
12.0" Round Culvert n=0.011 L=17.0' S=0.0176 '/' Outflow=0.28 cfs 0.022 af

Subcatchment 15P: P2d Runoff Area=9,087 sf 49.69% Impervious Runoff Depth=3.23"
Flow Length=218' Tc=7.0 min CN=WQ Runoff=0.63 cfs 0.056 af

Pond 16P: CB 5+63 R Peak Elev=396.90' Inflow=0.63 cfs 0.056 af
12.0" Round Culvert n=0.011 L=15.0' S=0.0200 '/' Outflow=0.63 cfs 0.056 af

Pond 17P: DMH 5+47 Peak Elev=387.84' Inflow=1.81 cfs 0.174 af
12.0" Round Culvert n=0.011 L=16.0' S=0.0688 '/' Outflow=1.81 cfs 0.174 af

Pond 18P: DMH A Peak Elev=377.74' Inflow=1.81 cfs 0.174 af
12.0" Round Culvert n=0.011 L=18.0' S=0.0389 '/' Outflow=1.81 cfs 0.174 af

Subcatchment 19P: P2e Runoff Area=32,111 sf 44.13% Impervious Runoff Depth=3.21"
Flow Length=221' Tc=7.8 min CN=WQ Runoff=2.18 cfs 0.197 af

Pond 20P: CB 7+57 L Peak Elev=386.73' Inflow=2.18 cfs 0.197 af
15.0" Round Culvert n=0.011 L=13.0' S=0.0231 '/' Outflow=2.18 cfs 0.197 af

Subcatchment 21P: P2f Runoff Area=24,890 sf 72.31% Impervious Runoff Depth=4.05"
Flow Length=302' Tc=7.1 min CN=WQ Runoff=2.14 cfs 0.193 af

Pond 22P: CB 7+57 R Peak Elev=386.73' Inflow=2.14 cfs 0.193 af
15.0" Round Culvert n=0.011 L=6.0' S=0.0500 '/' Outflow=2.14 cfs 0.193 af

Pond 23P: DMH 7+46 Peak Elev=386.01' Inflow=4.32 cfs 0.390 af
18.0" Round Culvert n=0.011 L=88.0' S=0.0193 '/' Outflow=4.32 cfs 0.390 af

Pond 24P: DMH 6+54 Peak Elev=384.26' Inflow=4.32 cfs 0.390 af
18.0" Round Culvert n=0.011 L=115.0' S=0.0604 '/' Outflow=4.32 cfs 0.390 af

Subcatchment 25P: P2g Runoff Area=11,782 sf 8.39% Impervious Runoff Depth=1.79"
Flow Length=149' Slope=0.1300 '/' Tc=6.9 min CN=WQ Runoff=0.48 cfs 0.040 af

Pond 26P: Infiltration Basin #2 Peak Elev=377.45' Storage=6,490 cf Inflow=6.60 cfs 0.605 af
Discarded=0.26 cfs 0.387 af Primary=2.28 cfs 0.218 af Outflow=2.53 cfs 0.605 af

Subcatchment 27P: P2n Runoff Area=93,478 sf 8.12% Impervious Runoff Depth=1.55"
Flow Length=261' Tc=9.9 min CN=WQ Runoff=2.82 cfs 0.278 af

Link 28P: Sub-DP #2a: Flow to Town Land Inflow=5.94 cfs 0.748 af
Primary=5.94 cfs 0.748 af

Subcatchment 29P: P2h Runoff Area=12,912 sf 63.80% Impervious Runoff Depth=3.72"
Flow Length=254' Tc=10.2 min CN=WQ Runoff=0.91 cfs 0.092 af

Pond 30P: CB 12+97 R Peak Elev=398.99' Inflow=0.91 cfs 0.092 af
12.0" Round Culvert n=0.011 L=8.0' S=0.0250 '/' Outflow=0.91 cfs 0.092 af

Subcatchment 31P: P2i Runoff Area=10,135 sf 72.86% Impervious Runoff Depth=4.04"
Flow Length=188' Tc=10.2 min CN=WQ Runoff=0.77 cfs 0.078 af

Pond 32P: CB 12+97 L Peak Elev=398.96' Inflow=0.77 cfs 0.078 af
12.0" Round Culvert n=0.011 L=13.0' S=0.0154 '/' Outflow=0.77 cfs 0.078 af

Pond 33P: DMH 12+87 Peak Elev=398.00' Inflow=1.68 cfs 0.170 af
12.0" Round Culvert n=0.011 L=232.0' S=0.0593 '/' Outflow=1.68 cfs 0.170 af

Subcatchment 34P: P2j Runoff Area=25,375 sf 68.17% Impervious Runoff Depth=3.88"
Flow Length=315' Tc=7.3 min CN=WQ Runoff=2.07 cfs 0.188 af

Pond 35P: CB 10+30 R Peak Elev=390.20' Inflow=2.07 cfs 0.188 af
12.0" Round Culvert n=0.011 L=7.0' S=0.0286 '/' Outflow=2.07 cfs 0.188 af

Subcatchment 36P: P2k Runoff Area=13,475 sf 68.19% Impervious Runoff Depth=3.88"
Flow Length=246' Tc=10.4 min CN=WQ Runoff=0.98 cfs 0.100 af

Pond 37P: CB 10+30 L Peak Elev=390.01' Inflow=0.98 cfs 0.100 af
12.0" Round Culvert n=0.011 L=12.0' S=0.0167 '/' Outflow=0.98 cfs 0.100 af

Pond 38P: DMH 10+38 Peak Elev=389.86' Inflow=3.00 cfs 0.288 af
18.0" Round Culvert n=0.011 L=65.0' S=0.0623 '/' Outflow=3.00 cfs 0.288 af

Pond 39P: FD B Peak Elev=383.06' Inflow=4.65 cfs 0.458 af
18.0" Round Culvert n=0.011 L=32.0' S=0.0531 '/' Outflow=4.65 cfs 0.458 af

Subcatchment 40P: P2l Runoff Area=106,917 sf 14.27% Impervious Runoff Depth=1.84"
Flow Length=394' Tc=12.8 min CN=WQ Runoff=3.43 cfs 0.376 af

Pond 41P: Infiltration Basin #3 Peak Elev=381.77' Storage=9,444 cf Inflow=7.77 cfs 0.834 af
Discarded=0.50 cfs 0.582 af Primary=1.89 cfs 0.252 af Secondary=0.00 cfs 0.000 af Outflow=2.40 cfs 0.834 af

Subcatchment 42P: P2m Runoff Area=35,520 sf 5.86% Impervious Runoff Depth=1.49"
Flow Length=404' Tc=11.9 min CN=WQ Runoff=0.96 cfs 0.102 af

Link 43P: Sub-DP #2b: Flow to Northern Abutter Inflow=0.96 cfs 0.102 af
Primary=0.96 cfs 0.102 af

Link 44P: Design Point #2: Flow to Uncas Brook Inflow=6.88 cfs 0.850 af
Primary=6.88 cfs 0.850 af

Total Runoff Area = 9.066 ac Runoff Volume = 1.818 af Average Runoff Depth = 2.41"
71.67% Pervious = 6.498 ac 28.33% Impervious = 2.569 ac

Summary for Subcatchment 8P: P2a

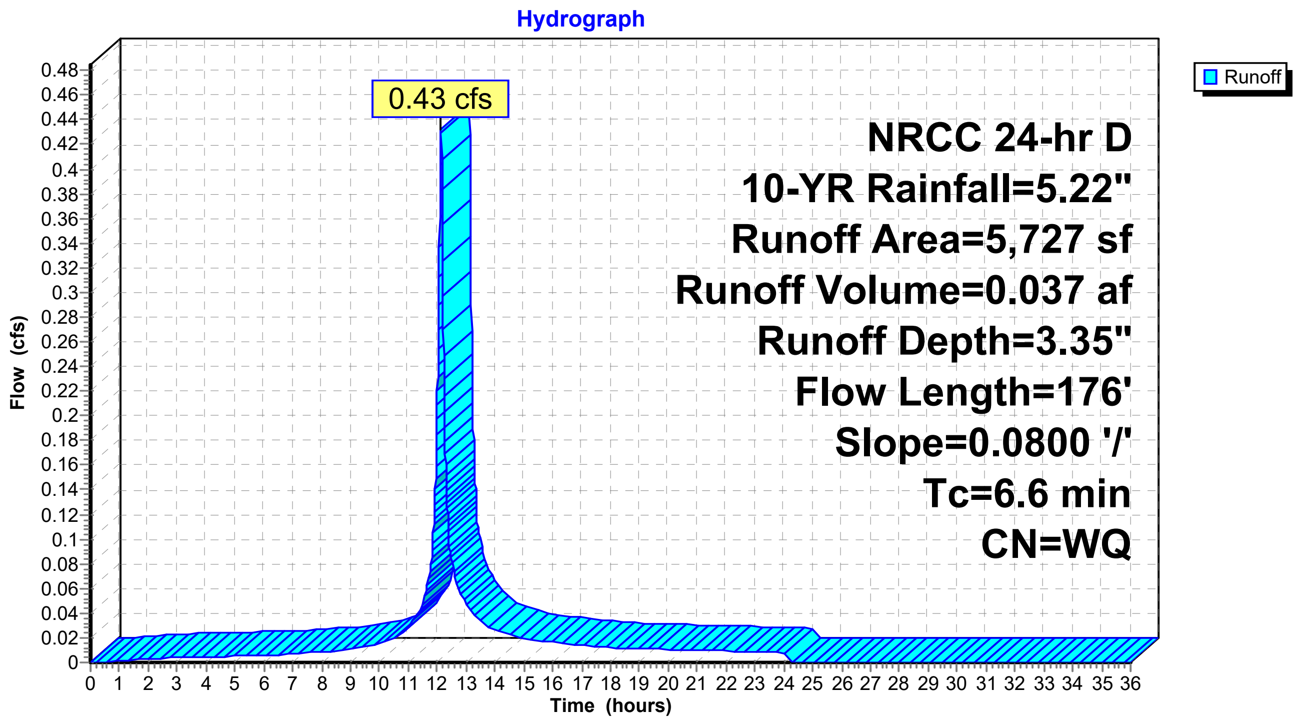
Runoff = 0.43 cfs @ 12.14 hrs, Volume= 0.037 af, Depth= 3.35"
Routed to Pond 9P : CB 4+02 L

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 10-YR Rainfall=5.22"

Area (sf)	CN	Description
495	98	Paved parking, HSG B
2,038	98	Paved parking, HSG C
1,469	61	>75% Grass cover, Good, HSG B
1,725	74	>75% Grass cover, Good, HSG C
5,727		Weighted Average
3,194		55.77% Pervious Area
2,533		44.23% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.1	71	0.0800	0.19		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.36"
0.3	29	0.0800	1.92		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.36"
0.2	76	0.0800	5.74		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
6.6	176	Total			

Subcatchment 8P: P2a



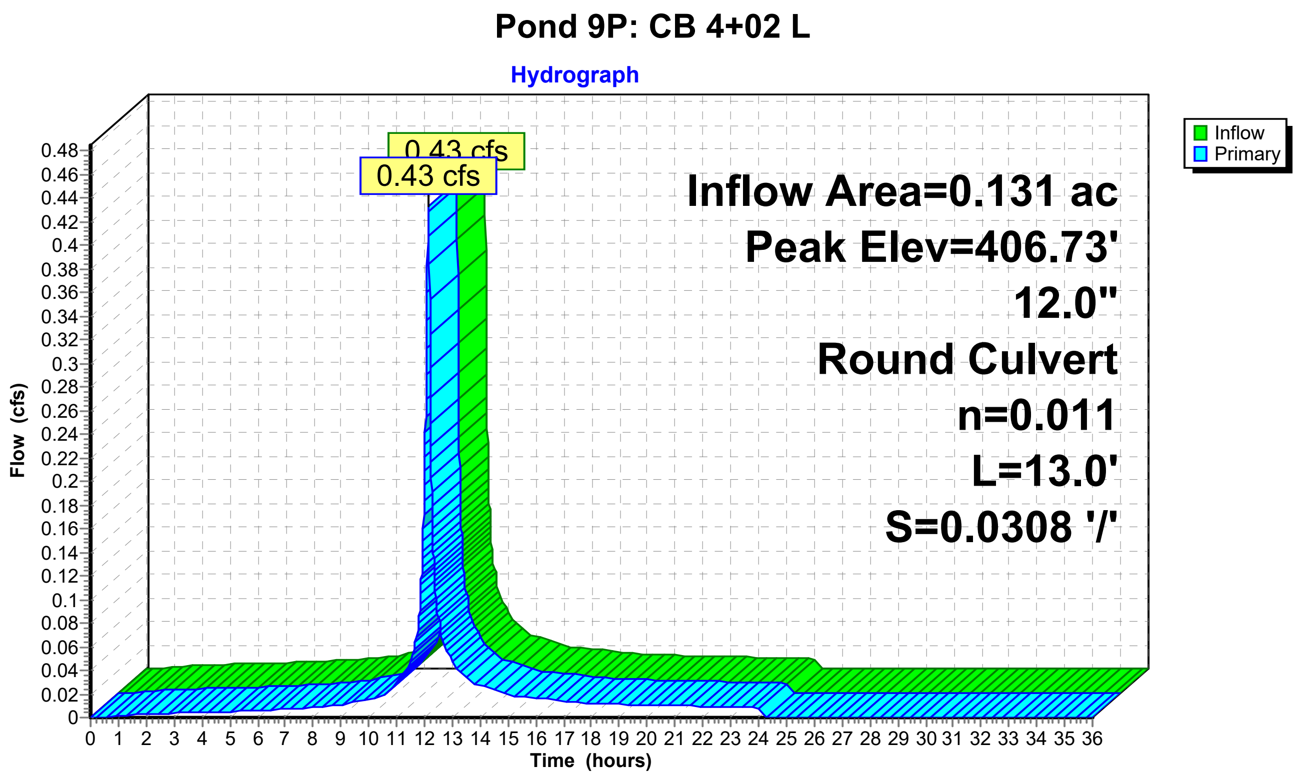
Summary for Pond 9P: CB 4+02 L

Inflow Area = 0.131 ac, 44.23% Impervious, Inflow Depth = 3.35" for 10-YR event
Inflow = 0.43 cfs @ 12.14 hrs, Volume= 0.037 af
Outflow = 0.43 cfs @ 12.14 hrs, Volume= 0.037 af, Atten= 0%, Lag= 0.0 min
Primary = 0.43 cfs @ 12.14 hrs, Volume= 0.037 af
Routed to Pond 12P : DMH 4+13

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 406.73' @ 12.14 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	406.40'	**12.0" Round Culvert** L= 13.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 406.40' / 406.00' S= 0.0308 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=0.43 cfs @ 12.14 hrs HW=406.73' TW=402.02' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.43 cfs @ 1.94 fps)



Summary for Subcatchment 10P: P2b

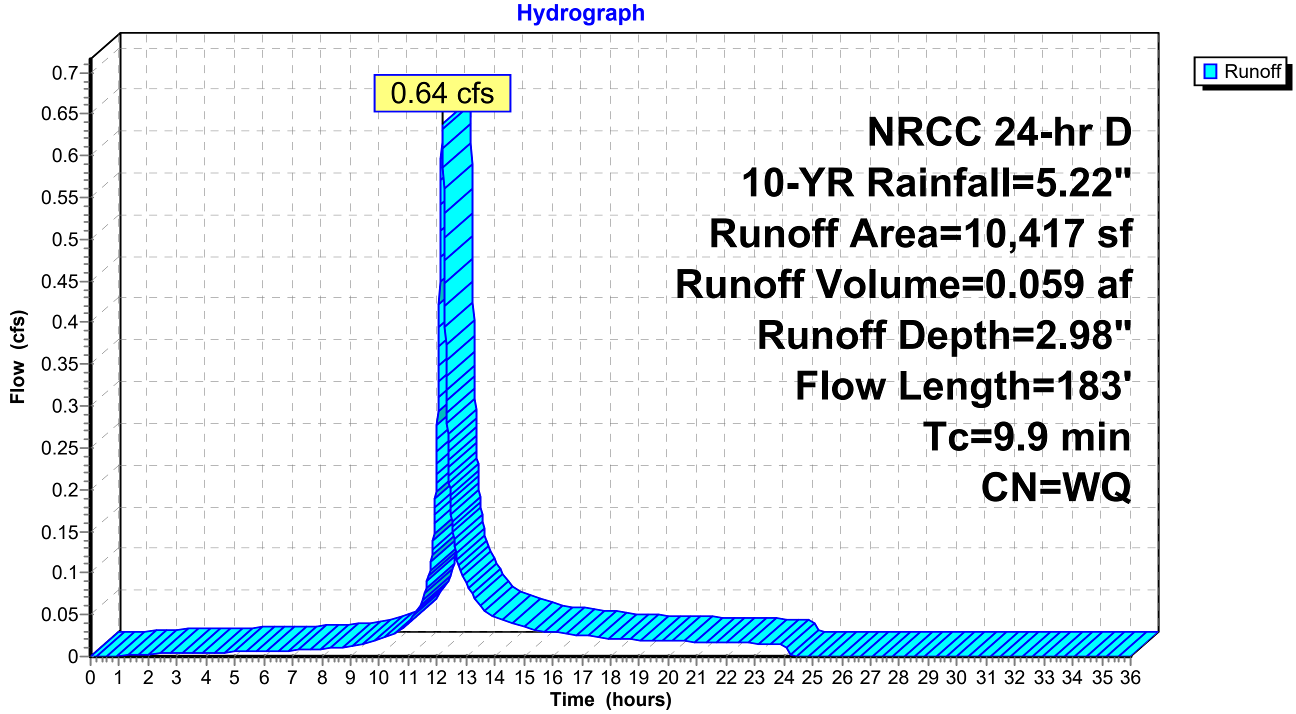
Runoff = 0.64 cfs @ 12.17 hrs, Volume= 0.059 af, Depth= 2.98"
Routed to Pond 11P : CB 4+02 R

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 10-YR Rainfall=5.22"

Area (sf)	CN	Description
380	98	Paved parking, HSG B
2,226	98	Paved parking, HSG C
709	61	>75% Grass cover, Good, HSG B
3,279	74	>75% Grass cover, Good, HSG C
3,743	70	Woods, Good, HSG C
80	98	Roofs, HSG C
10,417		Weighted Average
7,731		74.22% Pervious Area
2,686		25.78% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	51	0.0400	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.36"
0.3	34	0.0600	1.71		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.3	98	0.0800	5.74		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
9.9	183	Total			

Subcatchment 10P: P2b



Summary for Pond 11P: CB 4+02 R

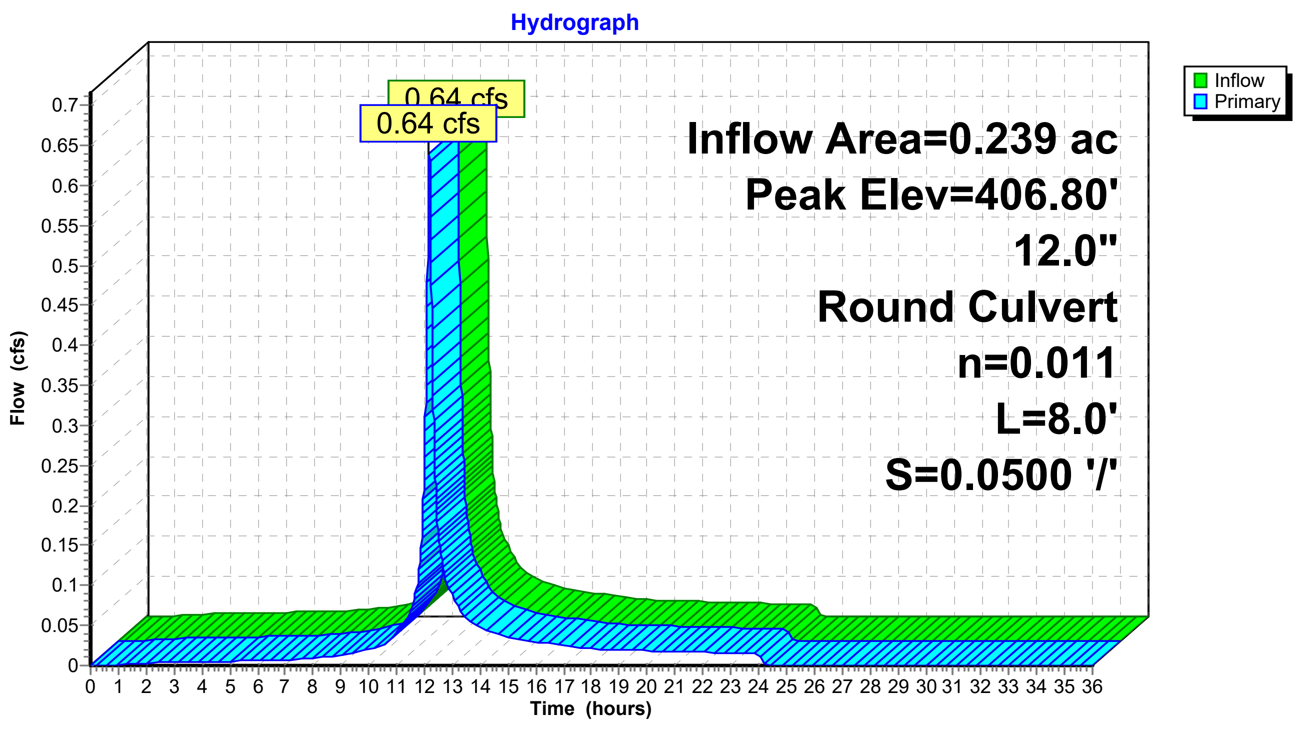
Inflow Area = 0.239 ac, 25.78% Impervious, Inflow Depth = 2.98" for 10-YR event
Inflow = 0.64 cfs @ 12.17 hrs, Volume= 0.059 af
Outflow = 0.64 cfs @ 12.17 hrs, Volume= 0.059 af, Atten= 0%, Lag= 0.0 min
Primary = 0.64 cfs @ 12.17 hrs, Volume= 0.059 af
Routed to Pond 12P : DMH 4+13

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 406.80' @ 12.17 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	406.40'	**12.0" Round Culvert** L= 8.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 406.40' / 406.00' S= 0.0500 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=0.64 cfs @ 12.17 hrs HW=406.80' TW=402.02' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.64 cfs @ 2.16 fps)

Pond 11P: CB 4+02 R



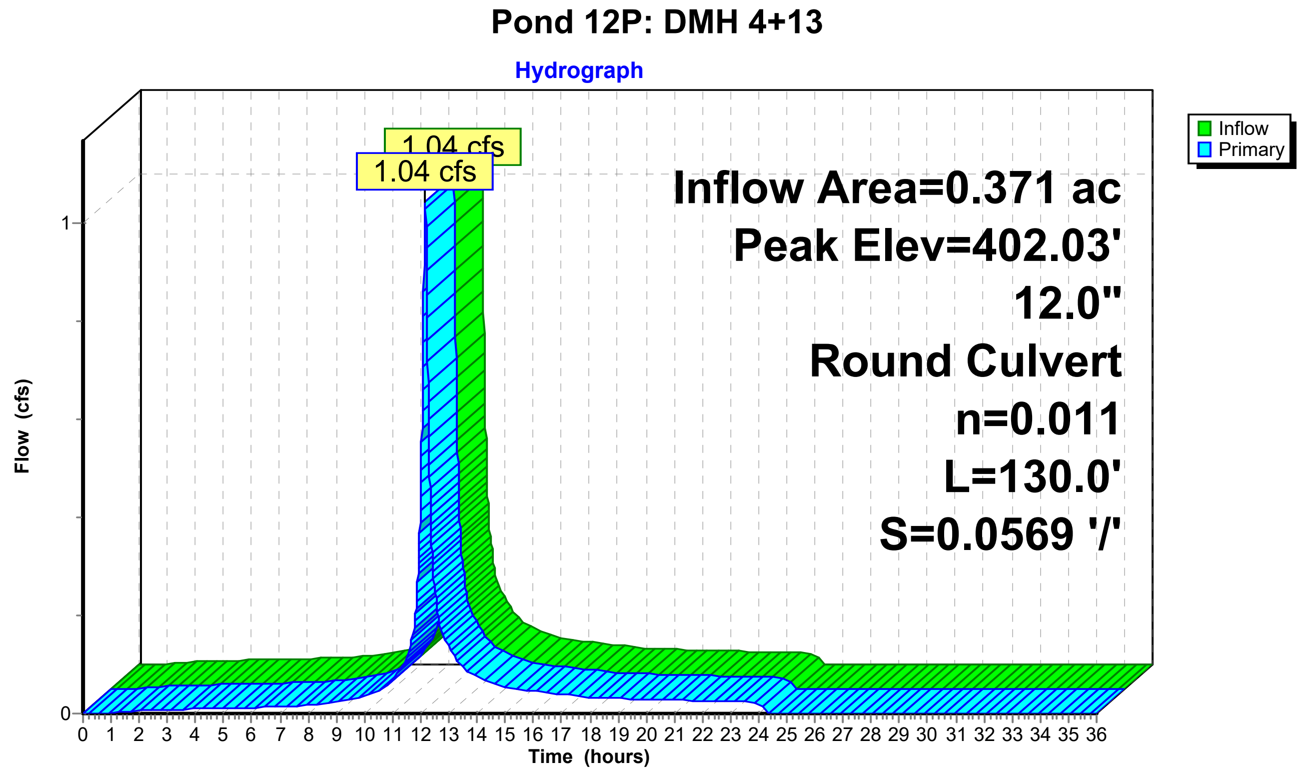
Summary for Pond 12P: DMH 4+13

Inflow Area = 0.371 ac, 32.33% Impervious, Inflow Depth = 3.11" for 10-YR event
Inflow = 1.04 cfs @ 12.15 hrs, Volume= 0.096 af
Outflow = 1.04 cfs @ 12.15 hrs, Volume= 0.096 af, Atten= 0%, Lag= 0.0 min
Primary = 1.04 cfs @ 12.15 hrs, Volume= 0.096 af
Routed to Pond 17P : DMH 5+47

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 402.03' @ 12.15 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	401.50'	**12.0" Round Culvert** L= 130.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 401.50' / 394.10' S= 0.0569 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=1.04 cfs @ 12.15 hrs HW=402.03' TW=387.83' (Dynamic Tailwater)
1=Culvert (Inlet Controls 1.04 cfs @ 2.47 fps)



Summary for Subcatchment 13P: P2c

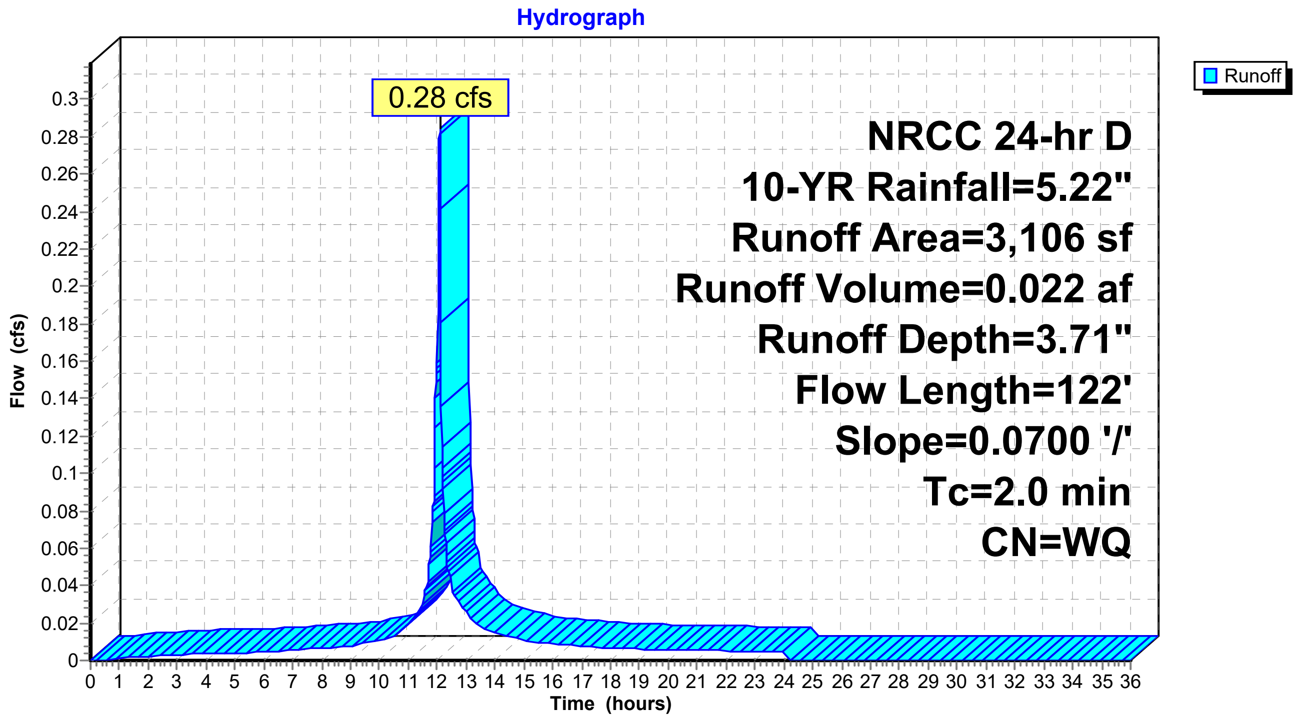
Runoff = 0.28 cfs @ 12.10 hrs, Volume= 0.022 af, Depth= 3.71"
Routed to Pond 14P : CB 5+63 L

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 10-YR Rainfall=5.22"

Area (sf)	CN	Description
1,973	98	Paved parking, HSG B
1,133	61	>75% Grass cover, Good, HSG B
3,106		Weighted Average
1,133		36.48% Pervious Area
1,973		63.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	100	0.0700	2.33		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.36"
0.1	22	0.0700	5.37		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.8	122	Total, Increased to minimum Tc = 2.0 min			

Subcatchment 13P: P2c



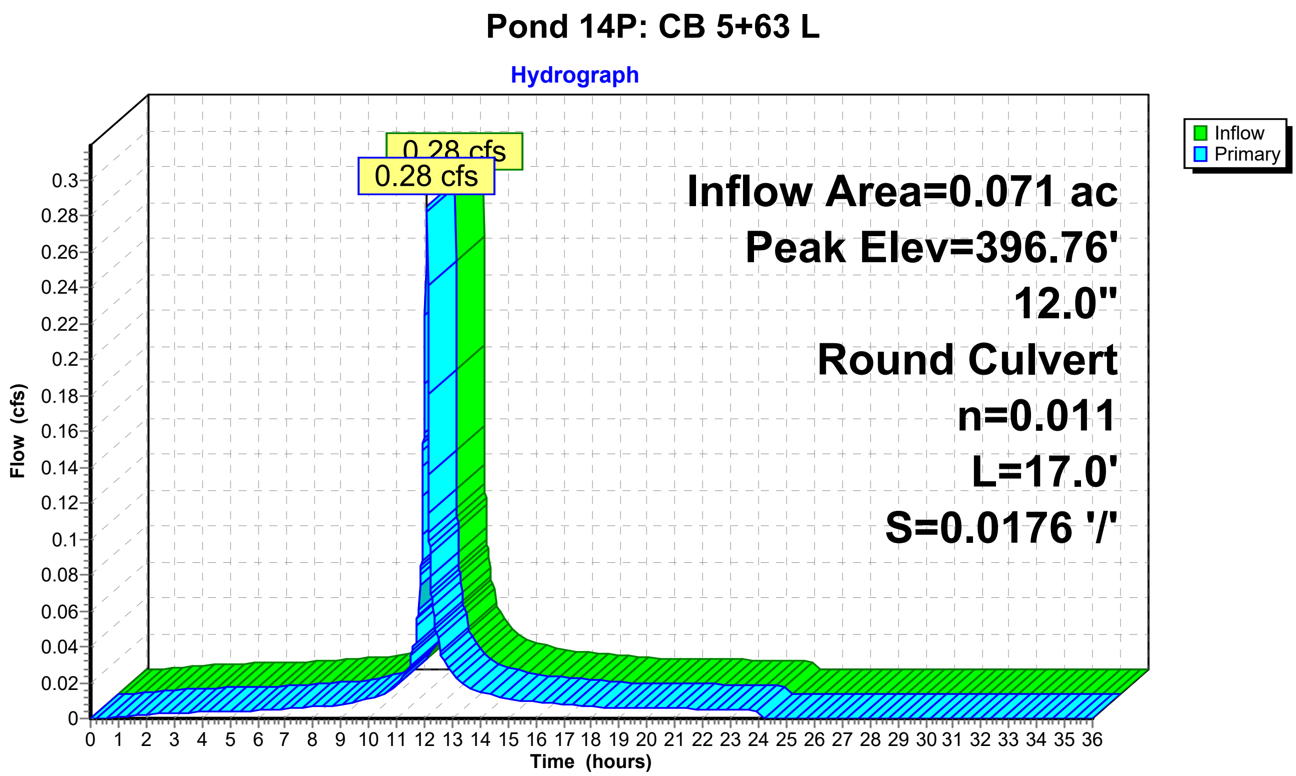
Summary for Pond 14P: CB 5+63 L

Inflow Area = 0.071 ac, 63.52% Impervious, Inflow Depth = 3.71" for 10-YR event
Inflow = 0.28 cfs @ 12.10 hrs, Volume= 0.022 af
Outflow = 0.28 cfs @ 12.10 hrs, Volume= 0.022 af, Atten= 0%, Lag= 0.0 min
Primary = 0.28 cfs @ 12.10 hrs, Volume= 0.022 af
Routed to Pond 17P : DMH 5+47

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 396.76' @ 12.10 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	396.50'	**12.0" Round Culvert** L= 17.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 396.50' / 396.20' S= 0.0176 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=0.28 cfs @ 12.10 hrs HW=396.76' TW=387.80' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.28 cfs @ 1.74 fps)



Summary for Subcatchment 15P: P2d

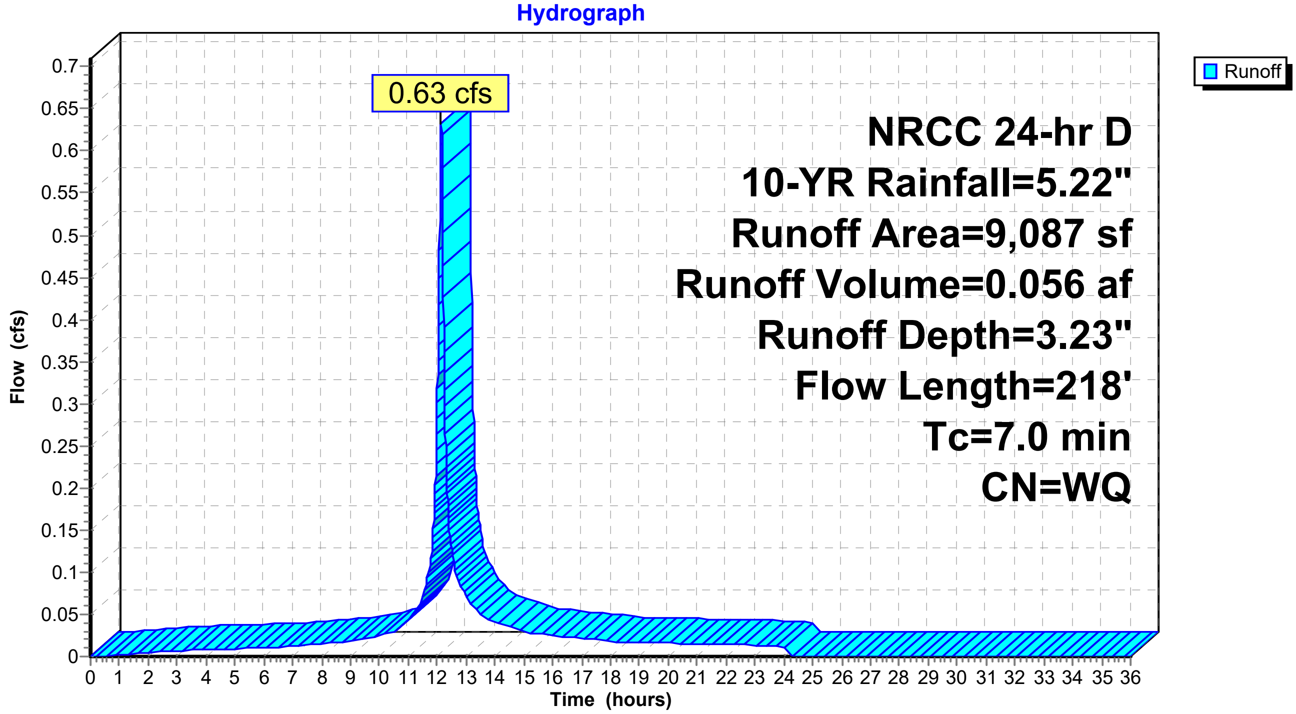
Runoff = 0.63 cfs @ 12.14 hrs, Volume= 0.056 af, Depth= 3.23"
Routed to Pond 16P : CB 5+63 R

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 10-YR Rainfall=5.22"

Area (sf)	CN	Description
3,344	98	Paved parking, HSG B
1,171	98	Roofs, HSG B
4,424	61	>75% Grass cover, Good, HSG B
12	74	>75% Grass cover, Good, HSG C
96	55	Woods, Good, HSG B
40	70	Woods, Good, HSG C
9,087		Weighted Average
4,572		50.31% Pervious Area
4,515		49.69% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.2	65	0.1700	0.26		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.36"
0.3	22	0.0300	1.22		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.36"
2.1	13	0.0400	0.11		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.36"
0.1	10	0.0700	1.85		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.3	108	0.0800	5.74		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
7.0	218	Total			

Subcatchment 15P: P2d



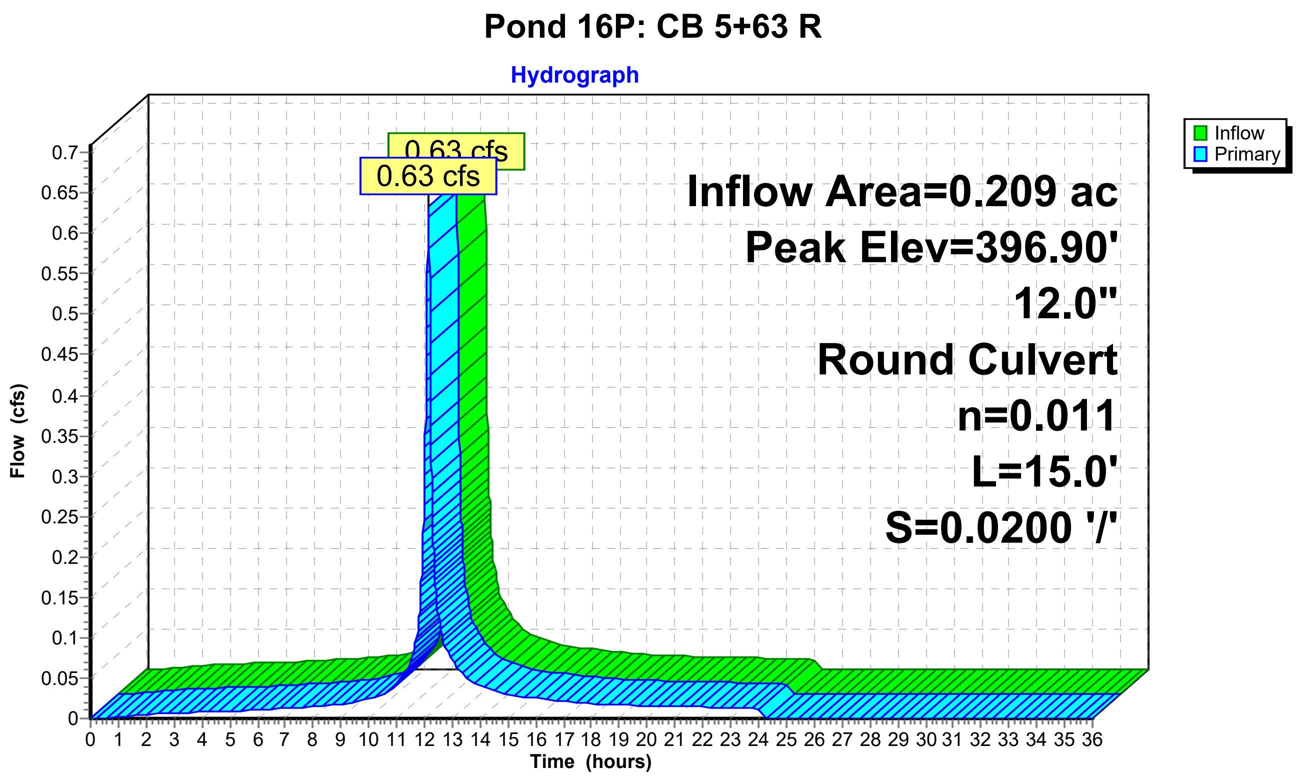
Summary for Pond 16P: CB 5+63 R

Inflow Area = 0.209 ac, 49.69% Impervious, Inflow Depth = 3.23" for 10-YR event
Inflow = 0.63 cfs @ 12.14 hrs, Volume= 0.056 af
Outflow = 0.63 cfs @ 12.14 hrs, Volume= 0.056 af, Atten= 0%, Lag= 0.0 min
Primary = 0.63 cfs @ 12.14 hrs, Volume= 0.056 af
Routed to Pond 17P : DMH 5+47

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 396.90' @ 12.14 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	396.50'	**12.0" Round Culvert** L= 15.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 396.50' / 396.20' S= 0.0200 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=0.63 cfs @ 12.14 hrs HW=396.90' TW=387.83' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.63 cfs @ 2.15 fps)



Summary for Pond 17P: DMH 5+47

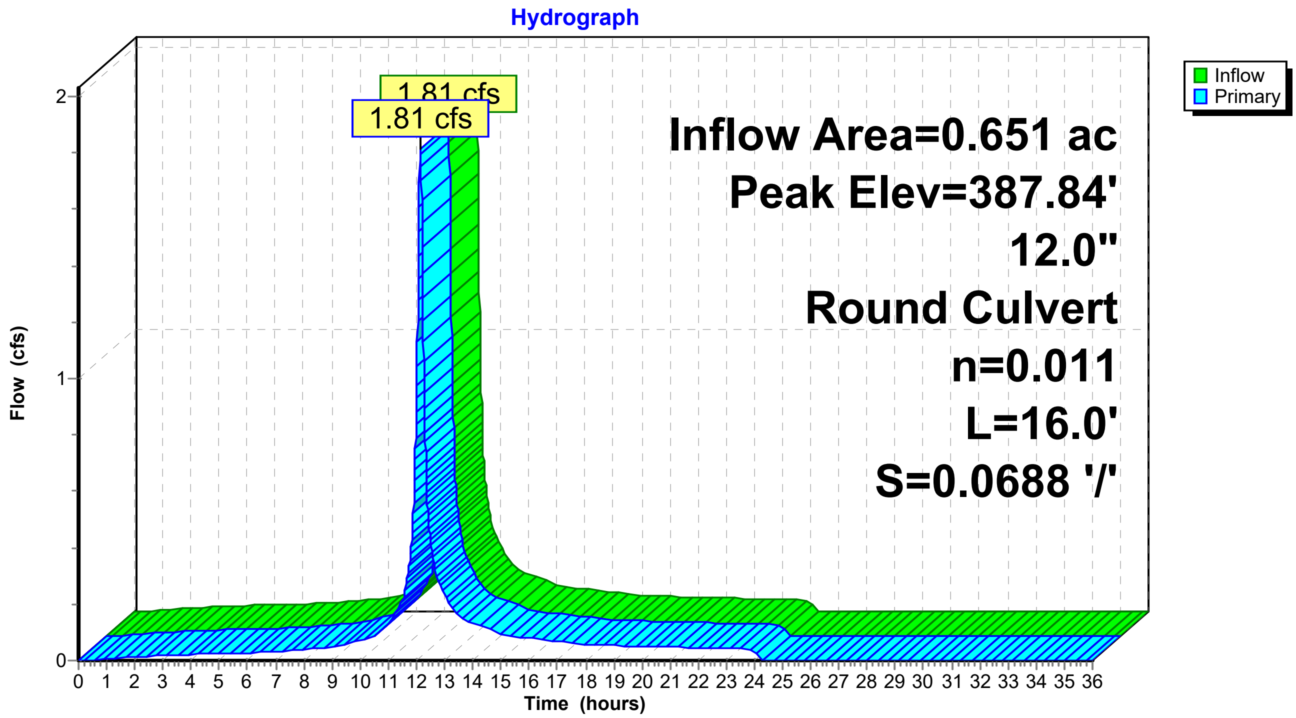
Inflow Area = 0.651 ac, 41.31% Impervious, Inflow Depth = 3.22" for 10-YR event
Inflow = 1.81 cfs @ 12.12 hrs, Volume= 0.174 af
Outflow = 1.81 cfs @ 12.12 hrs, Volume= 0.174 af, Atten= 0%, Lag= 0.0 min
Primary = 1.81 cfs @ 12.12 hrs, Volume= 0.174 af
Routed to Pond 18P : DMH A

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 387.84' @ 12.12 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	387.10'	**12.0" Round Culvert** L= 16.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 387.10' / 386.00' S= 0.0688 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=1.81 cfs @ 12.12 hrs HW=387.84' TW=377.74' (Dynamic Tailwater)
1=Culvert (Inlet Controls 1.81 cfs @ 2.92 fps)

Pond 17P: DMH 5+47



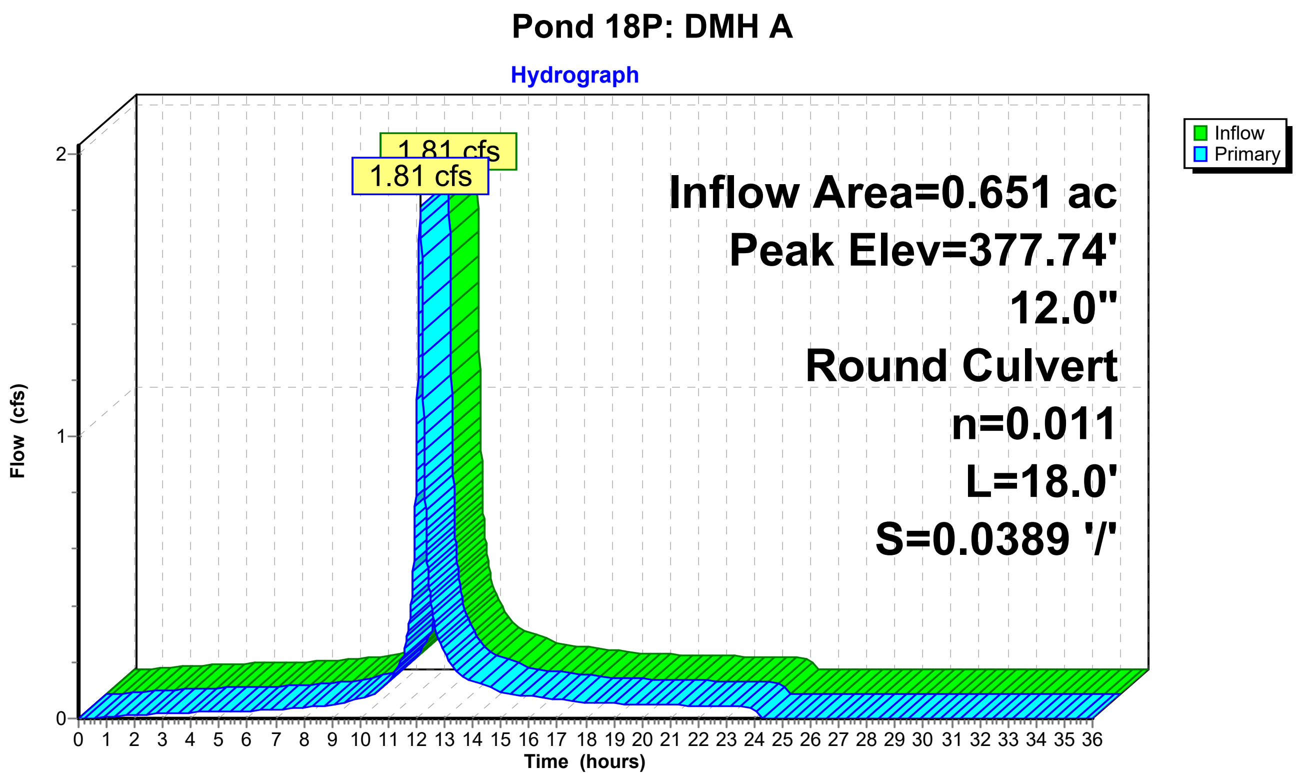
Summary for Pond 18P: DMH A

Inflow Area = 0.651 ac, 41.31% Impervious, Inflow Depth = 3.22" for 10-YR event
Inflow = 1.81 cfs @ 12.12 hrs, Volume= 0.174 af
Outflow = 1.81 cfs @ 12.12 hrs, Volume= 0.174 af, Atten= 0%, Lag= 0.0 min
Primary = 1.81 cfs @ 12.12 hrs, Volume= 0.174 af
Routed to Pond 26P : Infiltration Basin #2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 377.74' @ 12.12 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	377.00'	**12.0" Round Culvert** L= 18.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 377.00' / 376.30' S= 0.0389 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=1.81 cfs @ 12.12 hrs HW=377.74' TW=377.07' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 1.81 cfs @ 2.92 fps)



Summary for Subcatchment 19P: P2e

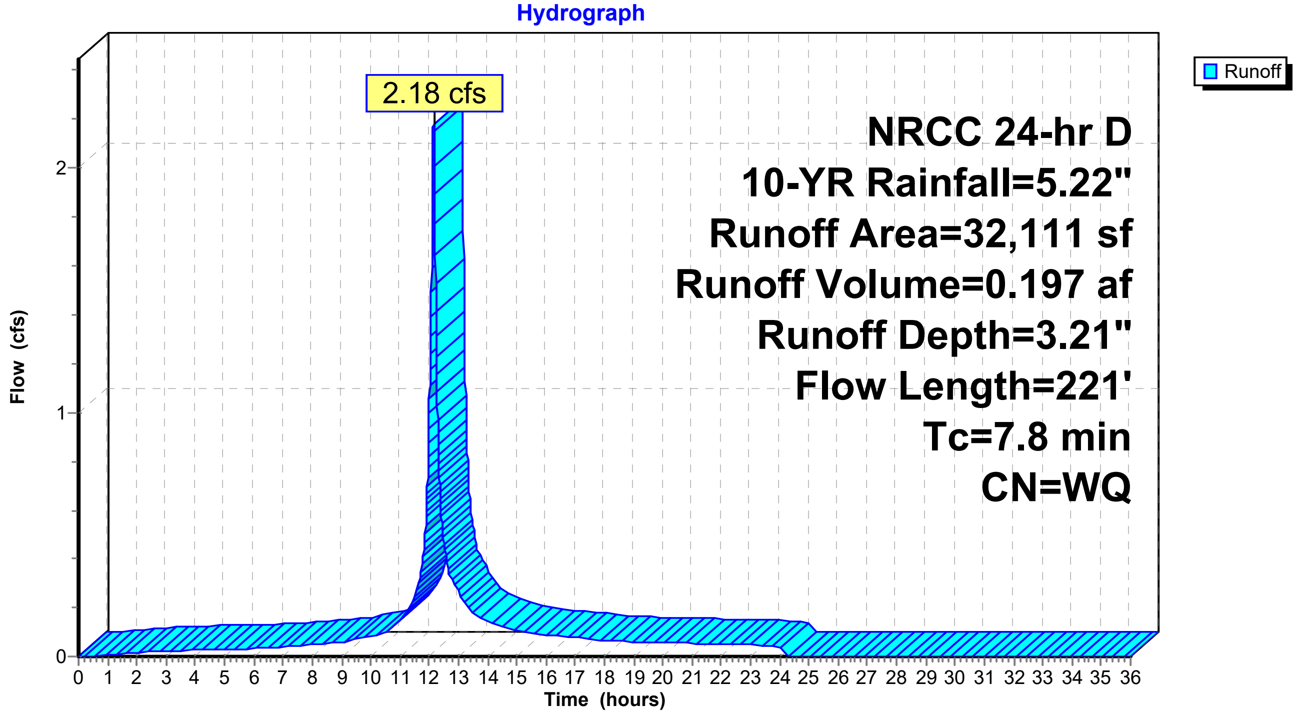
Runoff = 2.18 cfs @ 12.15 hrs, Volume= 0.197 af, Depth= 3.21"
Routed to Pond 20P : CB 7+57 L

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 10-YR Rainfall=5.22"

Area (sf)	CN	Description
4,995	98	Paved parking HSG B
1,377	98	Paved parking, HSG D
7,748	98	Roofs, HSG B
52	98	Roofs, HSG D
14,555	61	>75% Grass cover, Good HSG B
3,384	80	>75% Grass cover, Good, HSG D
32,111		Weighted Average
17,939		55.87% Pervious Area
14,172		44.13% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.8	100	0.1200	0.25		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.36"
0.6	27	0.0100	0.70		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.4	94	0.0400	4.06		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
7.8	221	Total			

Subcatchment 19P: P2e



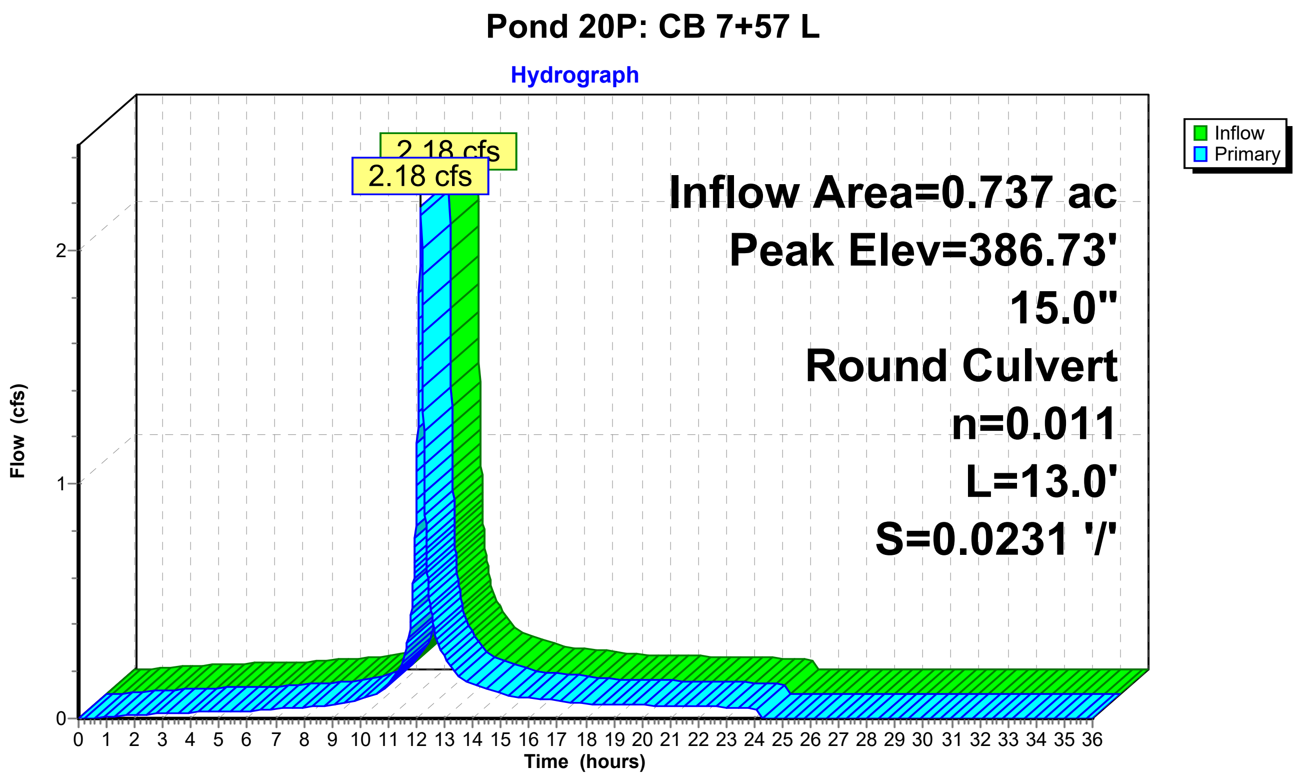
Summary for Pond 20P: CB 7+57 L

Inflow Area = 0.737 ac, 44.13% Impervious, Inflow Depth = 3.21" for 10-YR event
Inflow = 2.18 cfs @ 12.15 hrs, Volume= 0.197 af
Outflow = 2.18 cfs @ 12.15 hrs, Volume= 0.197 af, Atten= 0%, Lag= 0.0 min
Primary = 2.18 cfs @ 12.15 hrs, Volume= 0.197 af
Routed to Pond 23P : DMH 7+46

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 386.73' @ 12.15 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	386.00'	**15.0" Round Culvert** L= 13.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 386.00' / 385.70' S= 0.0231 '/' Cc= 0.900 n= 0.011, Flow Area= 1.23 sf

Primary OutFlow Max=2.18 cfs @ 12.15 hrs HW=386.73' TW=386.01' (Dynamic Tailwater)
└**1=Culvert** (Inlet Controls 2.18 cfs @ 2.92 fps)



Summary for Subcatchment 21P: P2f

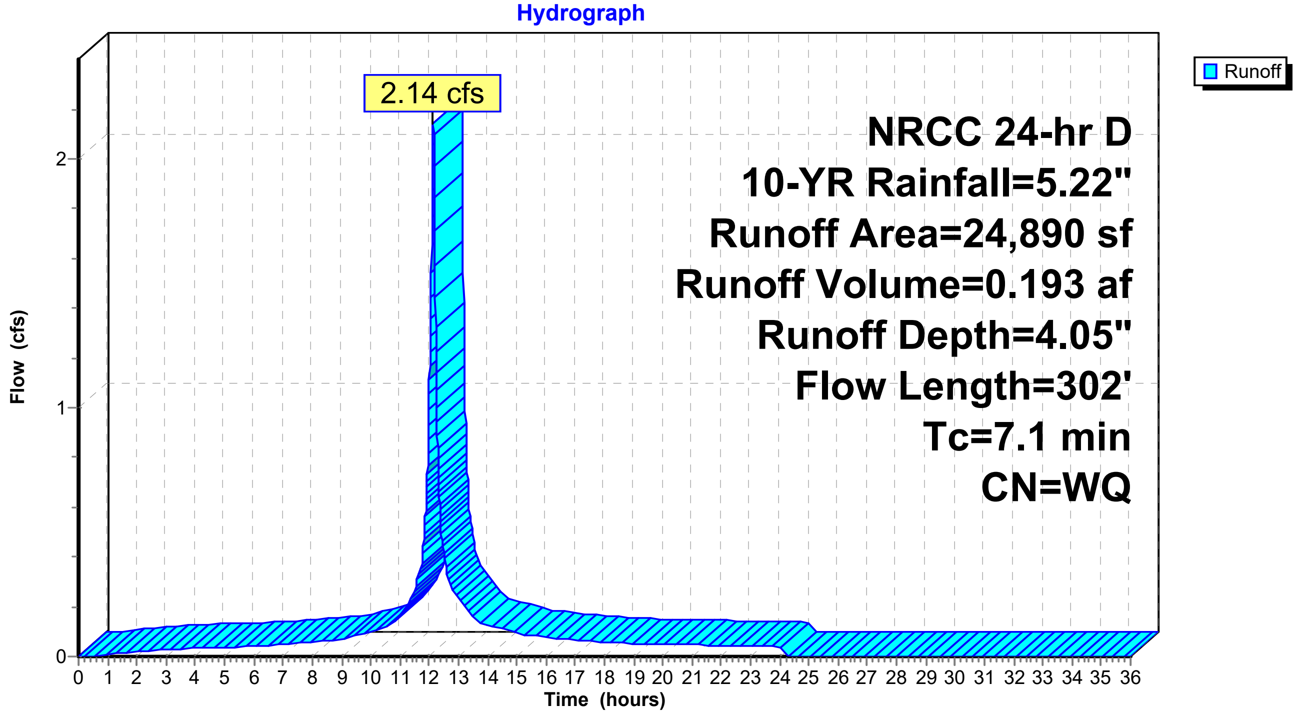
Runoff = 2.14 cfs @ 12.14 hrs, Volume= 0.193 af, Depth= 4.05"
Routed to Pond 22P : CB 7+57 R

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 10-YR Rainfall=5.22"

Area (sf)	CN	Description
9,156	98	Paved parking HSG B
1,692	98	Paved parking HSG D
7,150	98	Roofs, HSG B
6,334	61	>75% Grass cover, Good HSG B
558	80	>75% Grass cover, Good HSG D
24,890		Weighted Average
6,892		27.69% Pervious Area
17,998		72.31% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	23	0.0200	0.09		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.36"
1.1	77	0.0150	1.19		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.36"
1.7	202	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
7.1	302	Total			

Subcatchment 21P: P2f



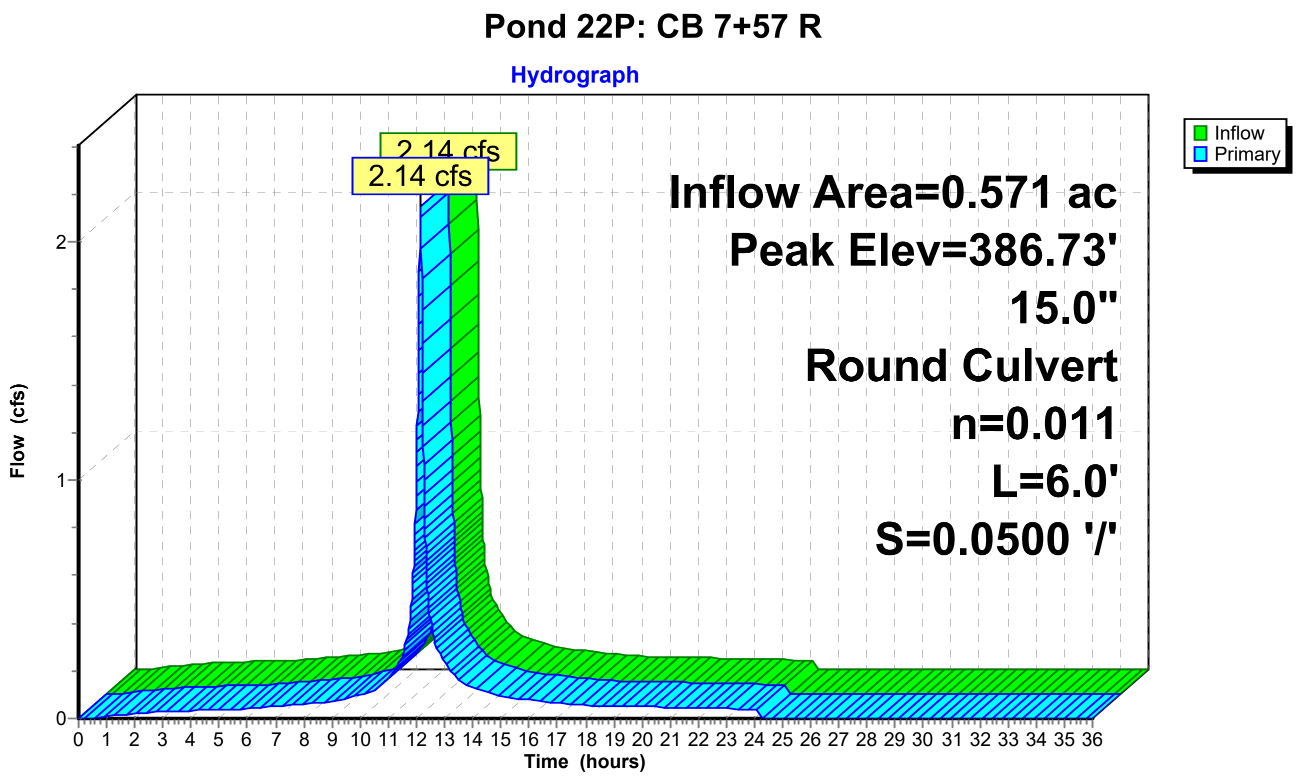
Summary for Pond 22P: CB 7+57 R

Inflow Area = 0.571 ac, 72.31% Impervious, Inflow Depth = 4.05" for 10-YR event
Inflow = 2.14 cfs @ 12.14 hrs, Volume= 0.193 af
Outflow = 2.14 cfs @ 12.14 hrs, Volume= 0.193 af, Atten= 0%, Lag= 0.0 min
Primary = 2.14 cfs @ 12.14 hrs, Volume= 0.193 af
Routed to Pond 23P : DMH 7+46

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 386.73' @ 12.14 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	386.00'	**15.0" Round Culvert** L= 6.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 386.00' / 385.70' S= 0.0500 '/' Cc= 0.900 n= 0.011, Flow Area= 1.23 sf

Primary OutFlow Max=2.14 cfs @ 12.14 hrs HW=386.73' TW=386.01' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 2.14 cfs @ 2.90 fps)



Summary for Pond 23P: DMH 7+46

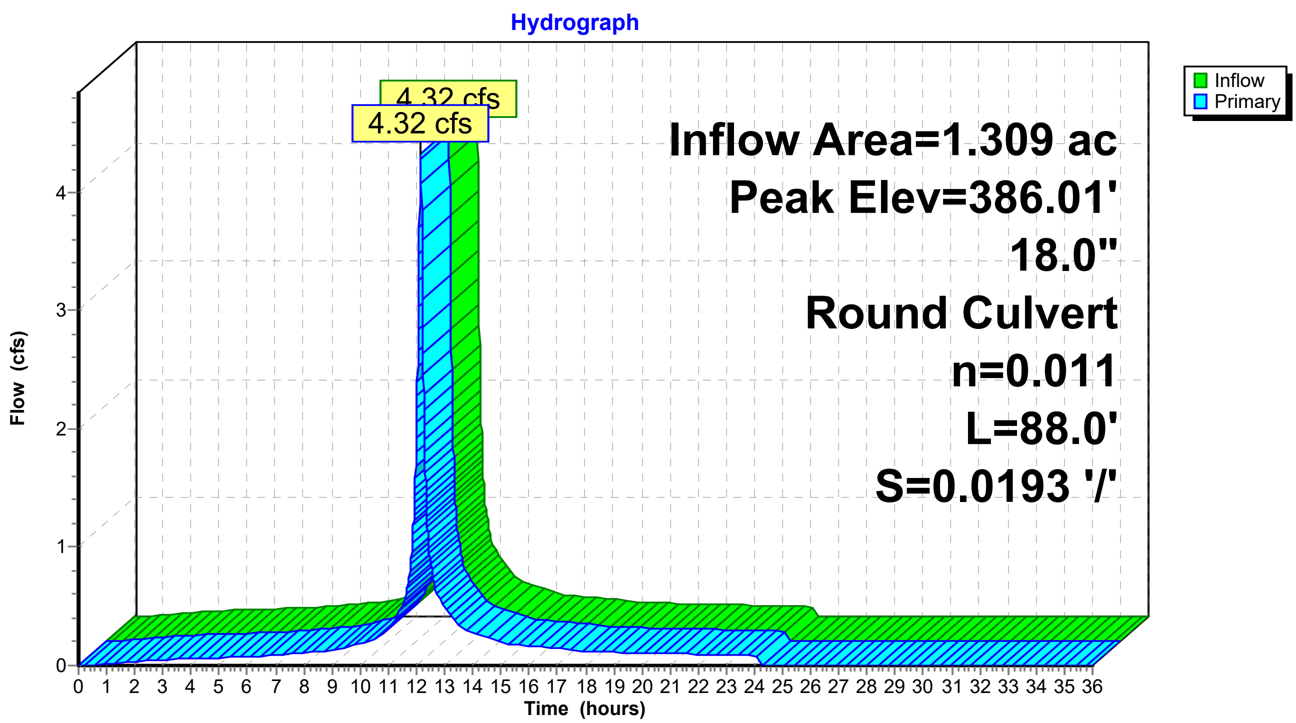
Inflow Area = 1.309 ac, 56.44% Impervious, Inflow Depth = 3.58" for 10-YR event
Inflow = 4.32 cfs @ 12.15 hrs, Volume= 0.390 af
Outflow = 4.32 cfs @ 12.15 hrs, Volume= 0.390 af, Atten= 0%, Lag= 0.0 min
Primary = 4.32 cfs @ 12.15 hrs, Volume= 0.390 af
Routed to Pond 24P : DMH 6+54

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 386.01' @ 12.15 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	385.00'	**18.0" Round Culvert** L= 88.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 385.00' / 383.30' S= 0.0193 '/' Cc= 0.900 n= 0.011, Flow Area= 1.77 sf

Primary OutFlow Max=4.31 cfs @ 12.15 hrs HW=386.01' TW=384.26' (Dynamic Tailwater)
1=Culvert (Inlet Controls 4.31 cfs @ 3.42 fps)

Pond 23P: DMH 7+46



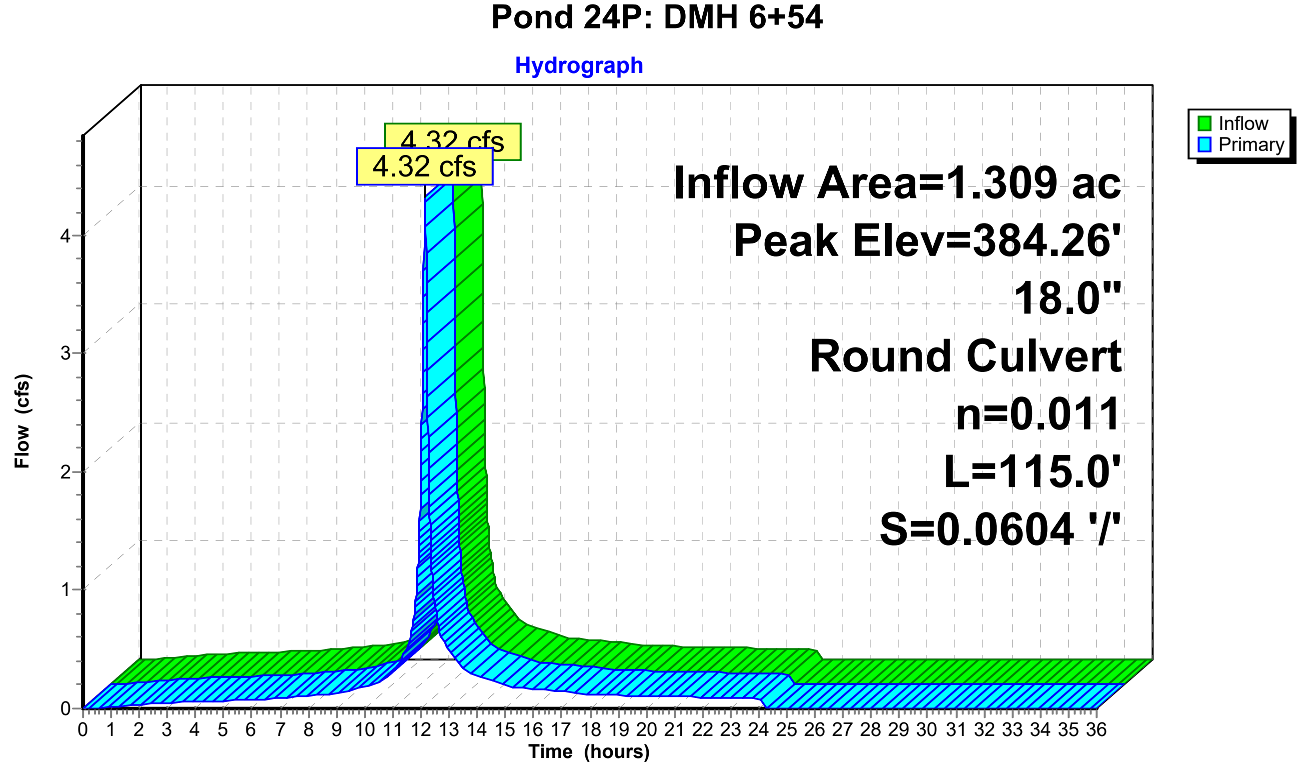
Summary for Pond 24P: DMH 6+54

Inflow Area = 1.309 ac, 56.44% Impervious, Inflow Depth = 3.58" for 10-YR event
Inflow = 4.32 cfs @ 12.15 hrs, Volume= 0.390 af
Outflow = 4.32 cfs @ 12.15 hrs, Volume= 0.390 af, Atten= 0%, Lag= 0.0 min
Primary = 4.32 cfs @ 12.15 hrs, Volume= 0.390 af
Routed to Pond 26P : Infiltration Basin #2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 384.26' @ 12.15 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	383.25'	**18.0" Round Culvert** L= 115.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 383.25' / 376.30' S= 0.0604 '/' Cc= 0.900 n= 0.011, Flow Area= 1.77 sf

Primary OutFlow Max=4.31 cfs @ 12.15 hrs HW=384.26' TW=377.16' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 4.31 cfs @ 3.42 fps)



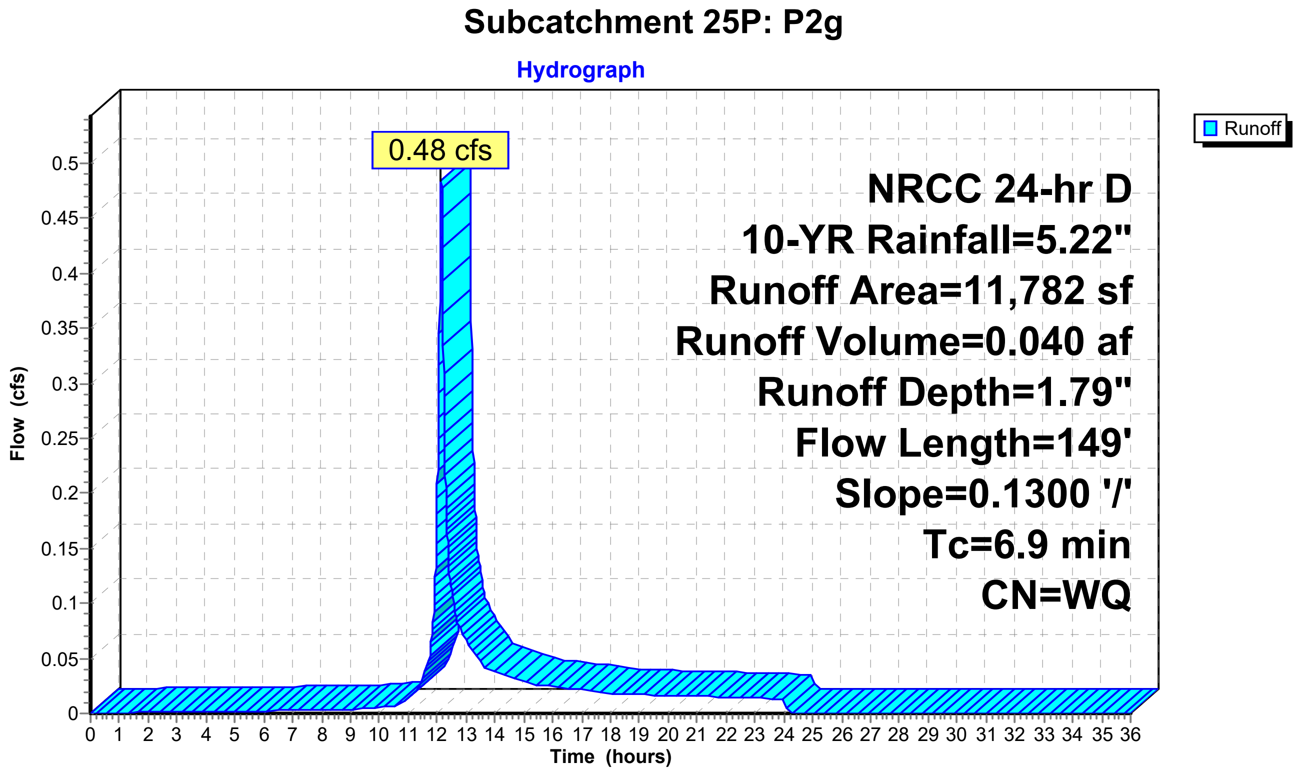
Summary for Subcatchment 25P: P2g

Runoff = 0.48 cfs @ 12.14 hrs, Volume= 0.040 af, Depth= 1.79"
Routed to Pond 26P : Infiltration Basin #2

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 10-YR Rainfall=5.22"

Area (sf)	CN	Description
988	98	Roofs HSG B
10,794	61	>75% Grass cover, Good HSG B
11,782		Weighted Average
10,794		91.61% Pervious Area
988		8.39% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.6	100	0.1300	0.25		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.36"
0.3	49	0.1300	2.52		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
6.9	149	Total			



Summary for Pond 26P: Infiltration Basin #2

Inflow Area = 2.230 ac, 46.20% Impervious, Inflow Depth = 3.26" for 10-YR event
Inflow = 6.60 cfs @ 12.14 hrs, Volume= 0.605 af
Outflow = 2.53 cfs @ 12.31 hrs, Volume= 0.605 af, Atten= 62%, Lag= 10.2 min
Discarded = 0.26 cfs @ 12.31 hrs, Volume= 0.387 af
Primary = 2.28 cfs @ 12.31 hrs, Volume= 0.218 af
Routed to Link 28P : Sub-DP #2a: Flow to Town Land

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 377.45' @ 12.31 hrs Surf.Area= 4,584 sf Storage= 6,490 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 77.6 min (868.8 - 791.2)

Volume	Invert	Avail.Storage	Storage Description
#1	376.00'	16,211 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

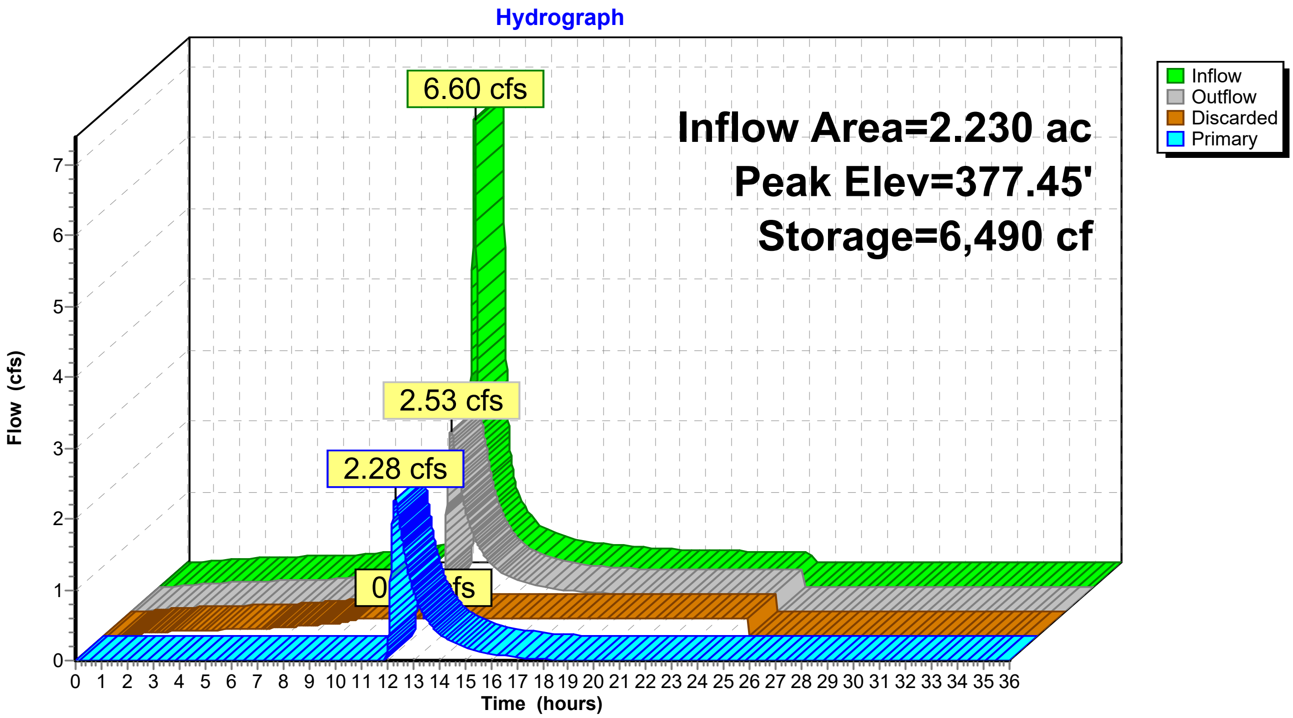
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
376.00	4,363	266.0	0	0	4,363
379.50	4,906	278.0	16,211	16,211	5,448

Device	Routing	Invert	Outlet Devices
#1	Discarded	376.00'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	376.50'	**15.0" Round Culvert** L= 3.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 376.50' / 376.50' S= 0.0000 '/' Cc= 0.900 n= 0.011, Flow Area= 1.23 sf

Discarded OutFlow Max=0.26 cfs @ 12.31 hrs HW=377.45' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.26 cfs)

Primary OutFlow Max=2.28 cfs @ 12.31 hrs HW=377.45' TW=0.00' (Dynamic Tailwater)
2=Culvert (Barrel Controls 2.28 cfs @ 3.15 fps)

Pond 26P: Infiltration Basin #2



Summary for Subcatchment 27P: P2n

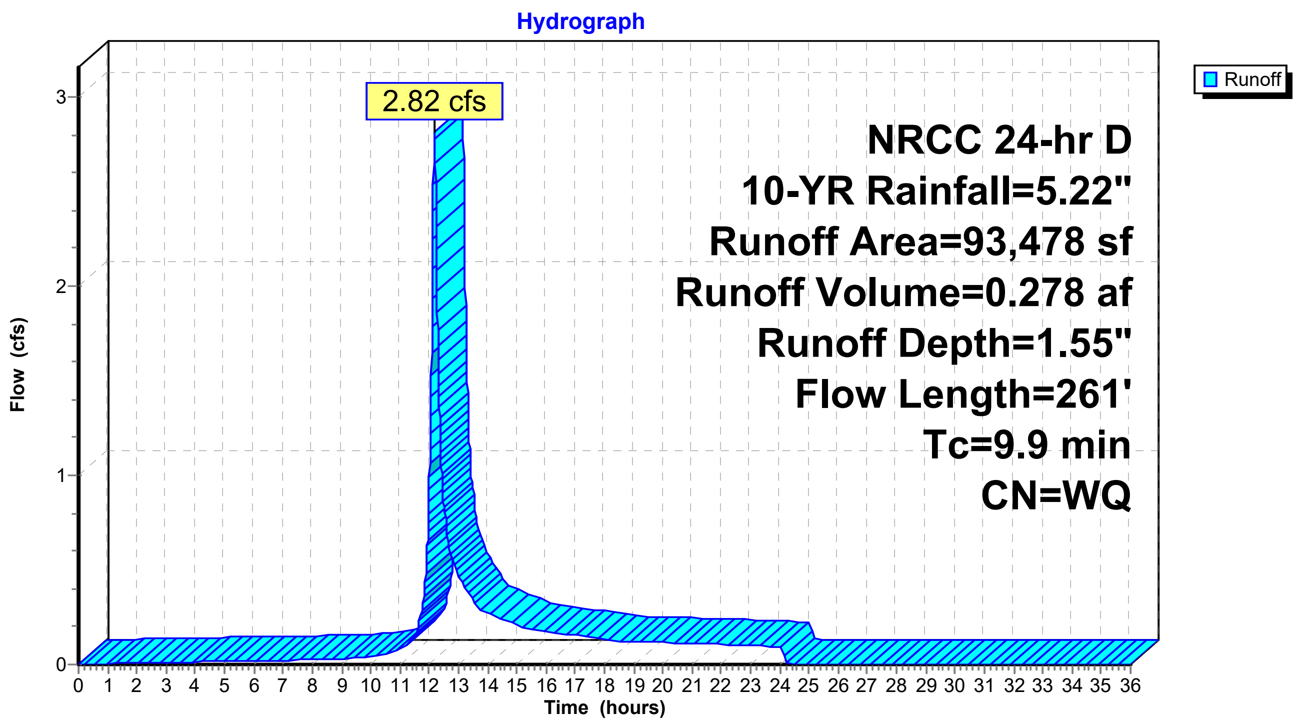
Runoff = 2.82 cfs @ 12.18 hrs, Volume= 0.278 af, Depth= 1.55"
Routed to Link 28P : Sub-DP #2a: Flow to Town Land

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 10-YR Rainfall=5.22"

Area (sf)	CN	Description
59,016	55	Woods, Good HSG B
7,591	98	Roofs HSG B
2,898	70	Woods, Good HSG C
23,595	61	>75% Grass cover, Good HSG B
378	80	>75% Grass cover, Good HSG D
93,478		Weighted Average
85,887		91.88% Pervious Area
7,591		8.12% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	100	0.0710	0.20		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.36"
1.5	161	0.1200	1.73		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
9.9	261	Total			

Subcatchment 27P: P2n

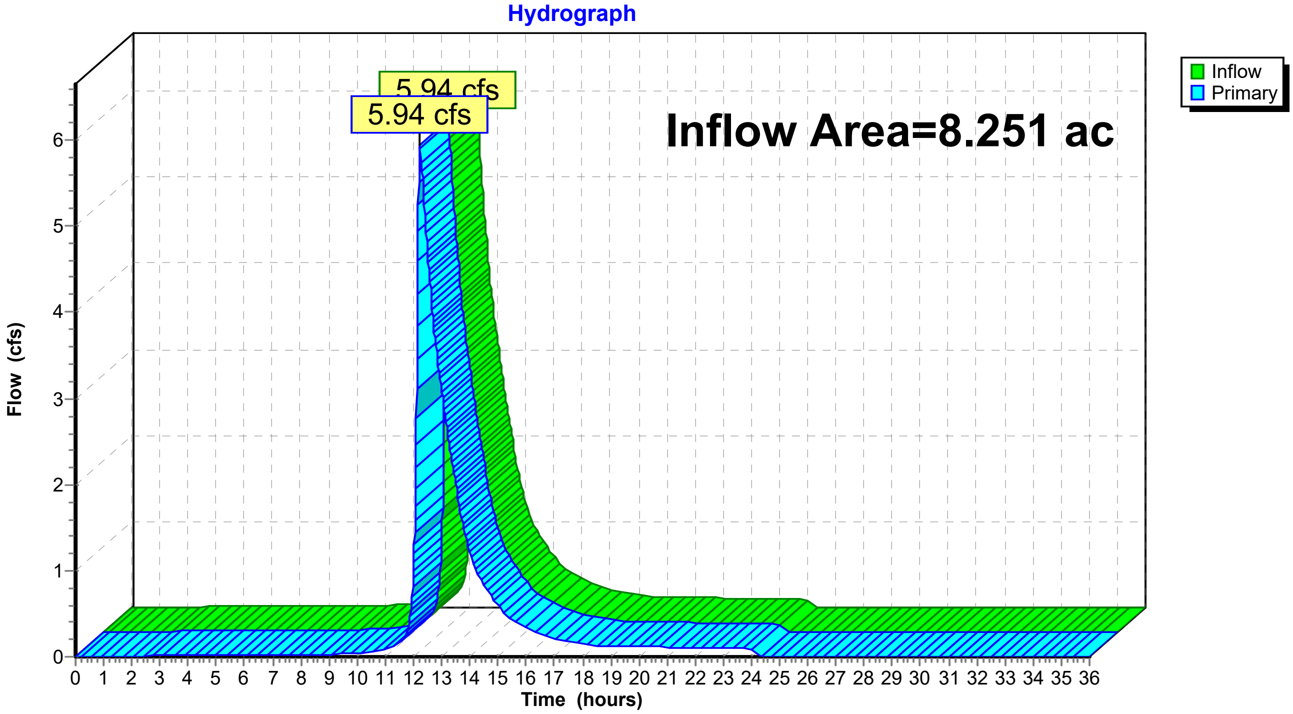


Summary for Link 28P: Sub-DP #2a: Flow to Town Land

Inflow Area = 8.251 ac, 30.56% Impervious, Inflow Depth = 1.09" for 10-YR event
Inflow = 5.94 cfs @ 12.23 hrs, Volume= 0.748 af
Primary = 5.94 cfs @ 12.23 hrs, Volume= 0.748 af, Atten= 0%, Lag= 0.0 min
Routed to Link 44P : Design Point #2: Flow to Uncas Brook

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Link 28P: Sub-DP #2a: Flow to Town Land



Summary for Subcatchment 29P: P2h

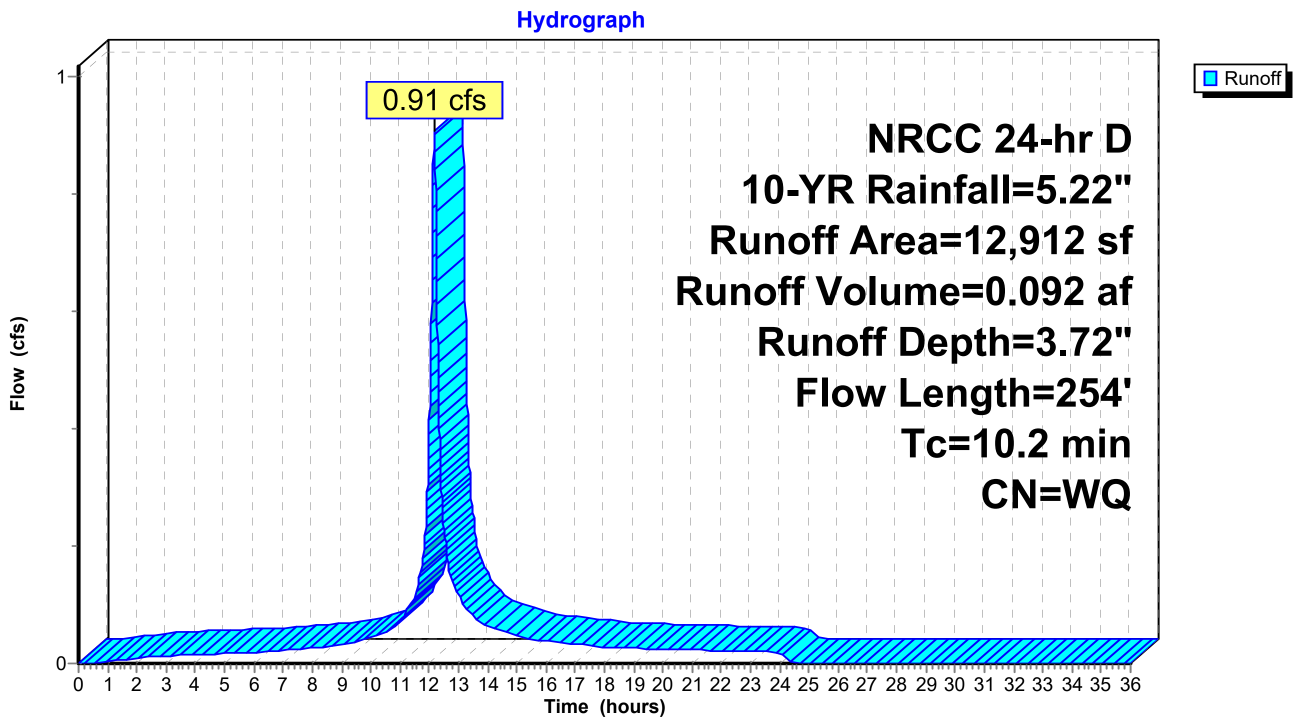
Runoff = 0.91 cfs @ 12.17 hrs, Volume= 0.092 af, Depth= 3.72"
Routed to Pond 30P : CB 12+97 R

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 10-YR Rainfall=5.22"

Area (sf)	CN	Description
5,638	98	Paved parking, HSG B
2,600	98	Roofs, HSG B
4,674	61	>75% Grass cover, Good, HSG B
12,912		Weighted Average
4,674		36.20% Pervious Area
8,238		63.80% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	80	0.0350	0.14		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.36"
0.9	174	0.0250	3.21		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
10.2	254	Total			

Subcatchment 29P: P2h



Summary for Pond 30P: CB 12+97 R

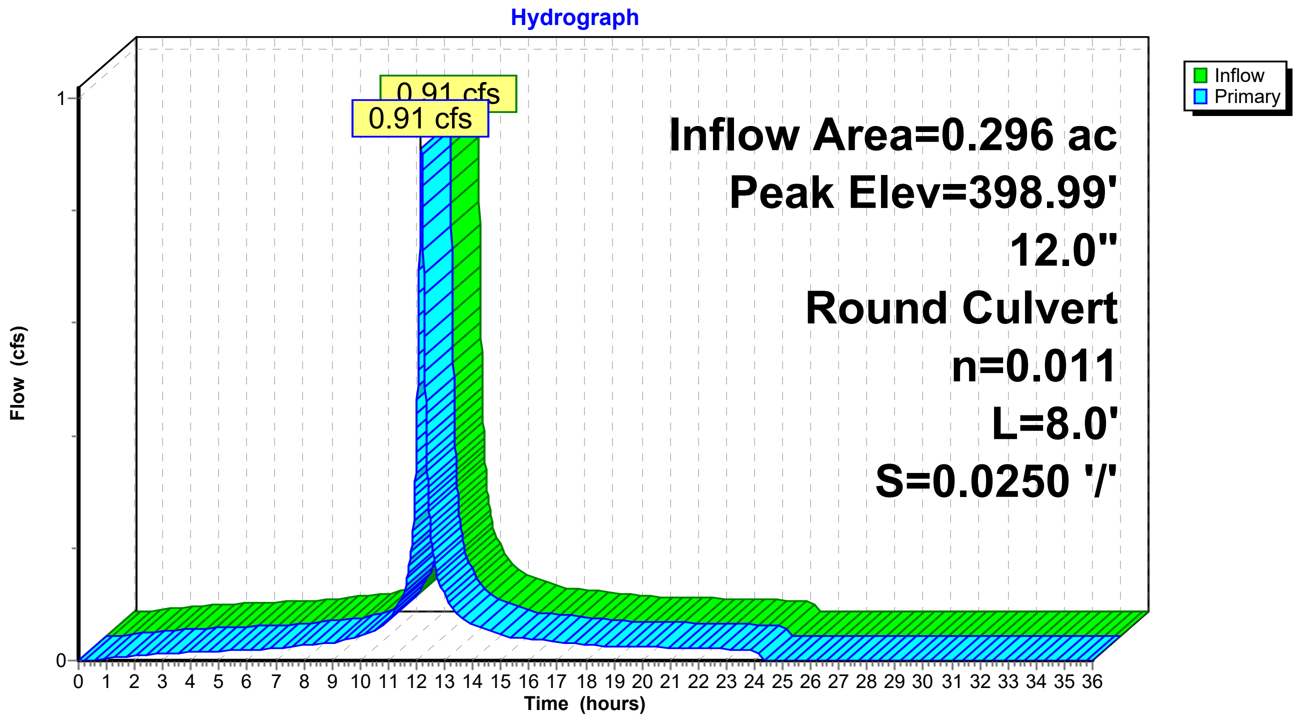
Inflow Area = 0.296 ac, 63.80% Impervious, Inflow Depth = 3.72" for 10-YR event
Inflow = 0.91 cfs @ 12.17 hrs, Volume= 0.092 af
Outflow = 0.91 cfs @ 12.17 hrs, Volume= 0.092 af, Atten= 0%, Lag= 0.0 min
Primary = 0.91 cfs @ 12.17 hrs, Volume= 0.092 af
Routed to Pond 33P : DMH 12+87

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 398.99' @ 12.17 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	398.50'	**12.0" Round Culvert** L= 8.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 398.50' / 398.30' S= 0.0250 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=0.91 cfs @ 12.17 hrs HW=398.99' TW=398.00' (Dynamic Tailwater)
1=Culvert (Barrel Controls 0.91 cfs @ 3.46 fps)

Pond 30P: CB 12+97 R



Summary for Subcatchment 31P: P2i

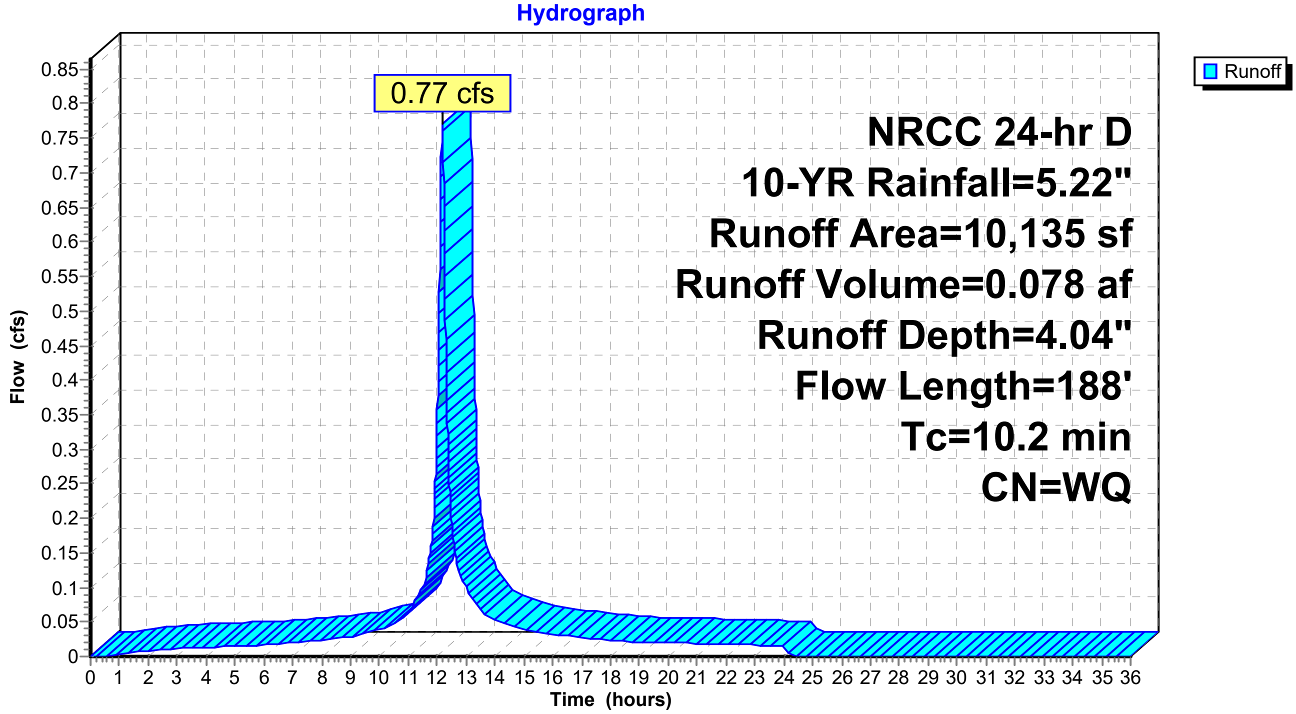
Runoff = 0.77 cfs @ 12.17 hrs, Volume= 0.078 af, Depth= 4.04"
Routed to Pond 32P : CB 12+97 L

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 10-YR Rainfall=5.22"

Area (sf)	CN	Description
4,134	98	Paved parking HSG B
3,250	98	Roofs, HSG B
2,751	61	>75% Grass cover, Good HSG B
10,135		Weighted Average
2,751		27.14% Pervious Area
7,384		72.86% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.2	25	0.0250	0.10		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.36"
0.3	22	0.0250	1.14		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.36"
4.7	29	0.0250	0.10		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.36"
0.0	12	0.0400	4.06		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.4	37	0.0400	1.40		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.1	22	0.0400	4.06		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.5	41	0.0400	1.40		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
10.2	188	Total			

Subcatchment 31P: P2i



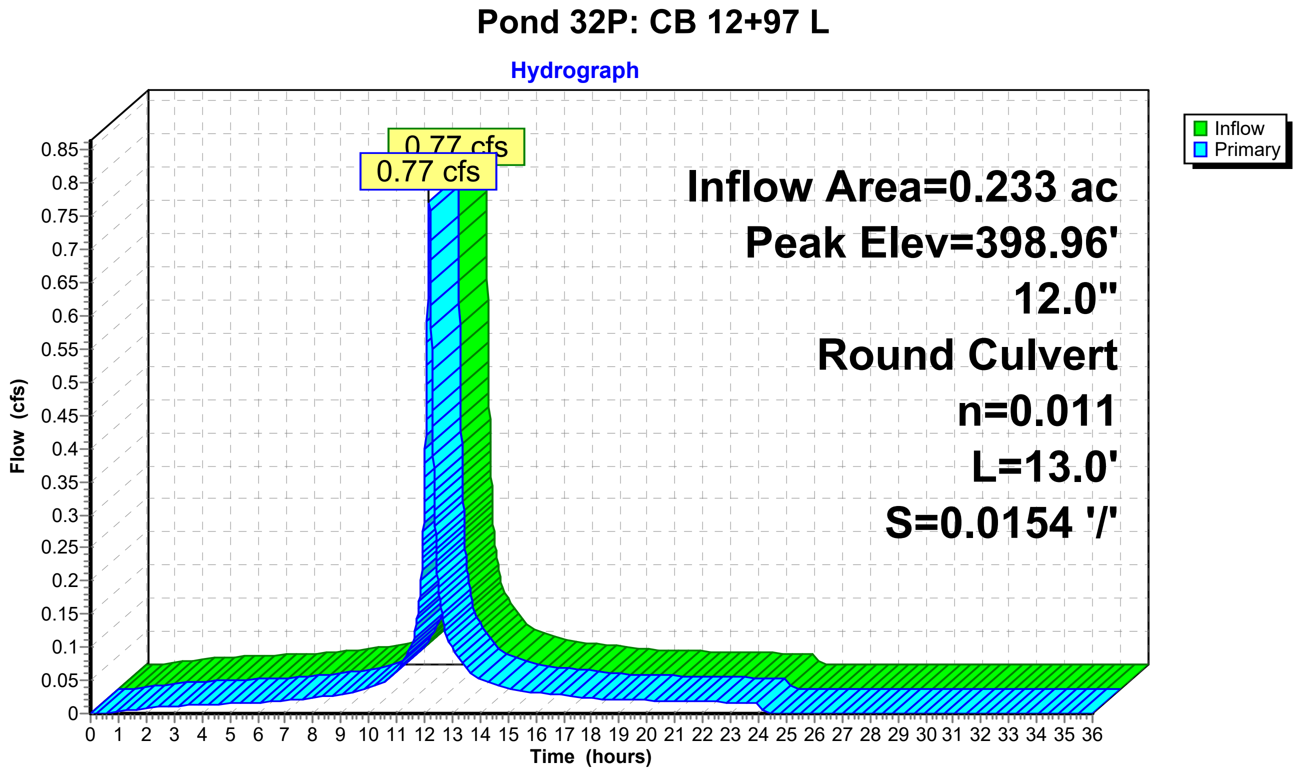
Summary for Pond 32P: CB 12+97 L

Inflow Area = 0.233 ac, 72.86% Impervious, Inflow Depth = 4.04" for 10-YR event
Inflow = 0.77 cfs @ 12.17 hrs, Volume= 0.078 af
Outflow = 0.77 cfs @ 12.17 hrs, Volume= 0.078 af, Atten= 0%, Lag= 0.0 min
Primary = 0.77 cfs @ 12.17 hrs, Volume= 0.078 af
Routed to Pond 33P : DMH 12+87

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 398.96' @ 12.17 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	398.50'	**12.0" Round Culvert** L= 13.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 398.50' / 398.30' S= 0.0154 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=0.77 cfs @ 12.17 hrs HW=398.96' TW=398.00' (Dynamic Tailwater)
└─**1=Culvert** (Barrel Controls 0.77 cfs @ 3.24 fps)



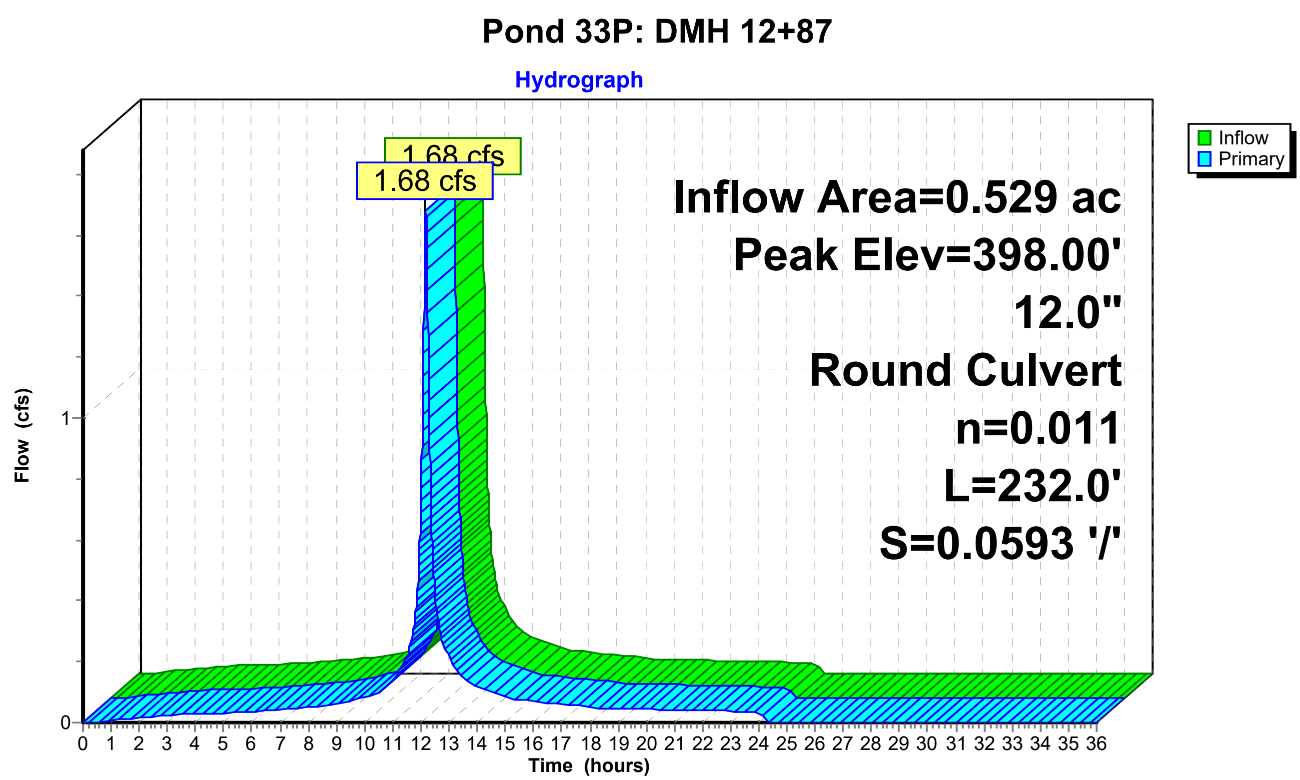
Summary for Pond 33P: DMH 12+87

Inflow Area = 0.529 ac, 67.78% Impervious, Inflow Depth = 3.86" for 10-YR event
Inflow = 1.68 cfs @ 12.17 hrs, Volume= 0.170 af
Outflow = 1.68 cfs @ 12.17 hrs, Volume= 0.170 af, Atten= 0%, Lag= 0.0 min
Primary = 1.68 cfs @ 12.17 hrs, Volume= 0.170 af
Routed to Pond 39P : FD B

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 398.00' @ 12.17 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	397.30'	**12.0" Round Culvert** L= 232.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 397.30' / 383.55' S= 0.0593 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=1.68 cfs @ 12.17 hrs HW=398.00' TW=383.04' (Dynamic Tailwater)
1=Culvert (Inlet Controls 1.68 cfs @ 2.85 fps)



Summary for Subcatchment 34P: P2j

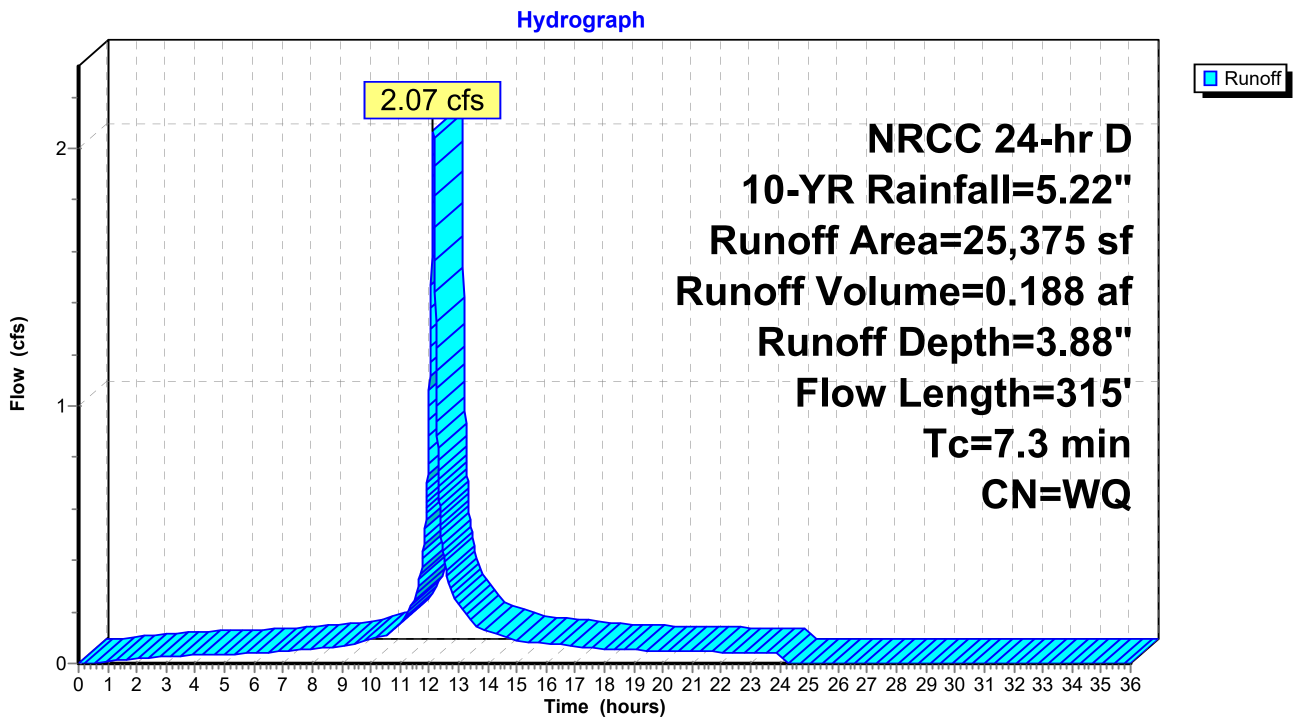
Runoff = 2.07 cfs @ 12.14 hrs, Volume= 0.188 af, Depth= 3.88"
Routed to Pond 35P : CB 10+30 R

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 10-YR Rainfall=5.22"

Area (sf)	CN	Description
8,847	98	Paved parking HSG B
8,450	98	Roofs HSG B
8,078	61	>75% Grass cover, Good HSG B
25,375		Weighted Average
8,078		31.83% Pervious Area
17,297		68.17% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.1	56	0.0500	0.15		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.36"
1.2	259	0.0300	3.52		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
7.3	315	Total			

Subcatchment 34P: P2j



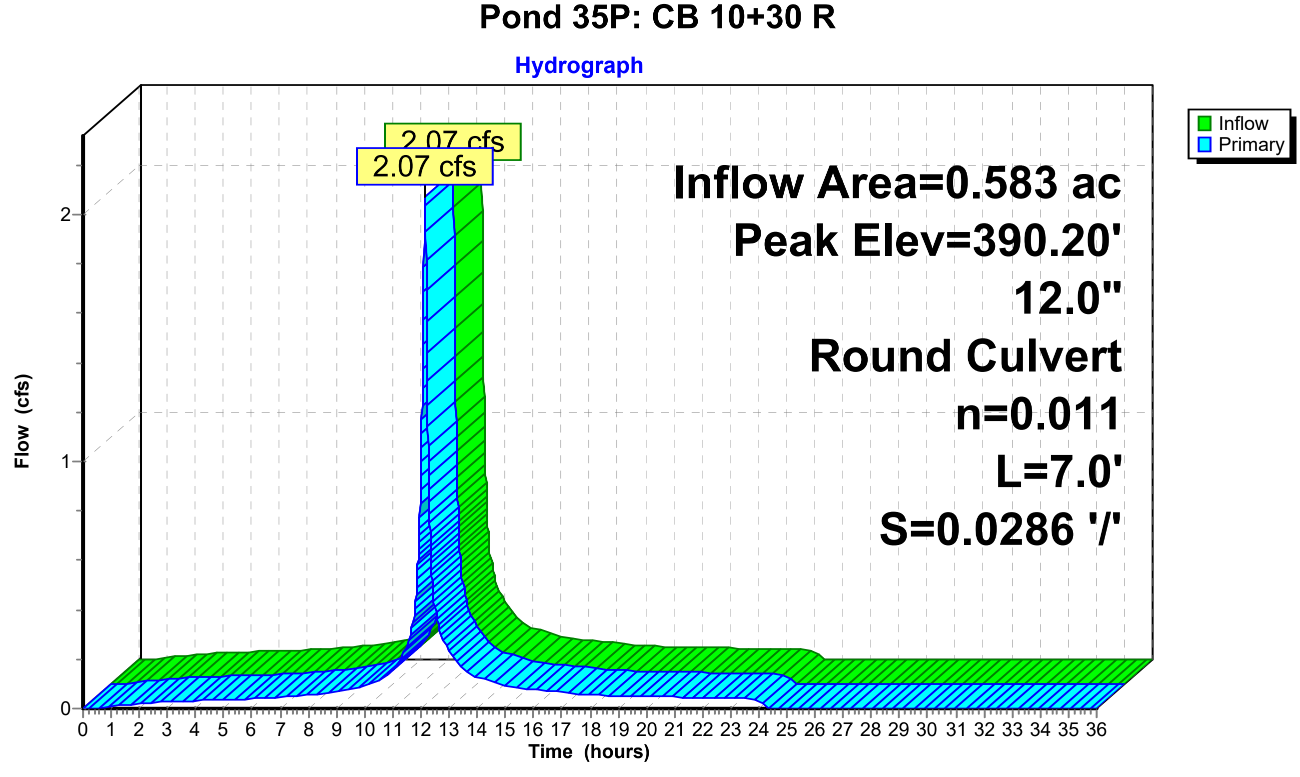
Summary for Pond 35P: CB 10+30 R

Inflow Area = 0.583 ac, 68.17% Impervious, Inflow Depth = 3.88" for 10-YR event
Inflow = 2.07 cfs @ 12.14 hrs, Volume= 0.188 af
Outflow = 2.07 cfs @ 12.14 hrs, Volume= 0.188 af, Atten= 0%, Lag= 0.0 min
Primary = 2.07 cfs @ 12.14 hrs, Volume= 0.188 af
Routed to Pond 38P : DMH 10+38

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 390.20' @ 12.15 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	389.30'	**12.0" Round Culvert** L= 7.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 389.30' / 389.10' S= 0.0286 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=2.04 cfs @ 12.14 hrs HW=390.20' TW=389.86' (Dynamic Tailwater)
1=Culvert (Outlet Controls 2.04 cfs @ 3.64 fps)



Summary for Subcatchment 36P: P2k

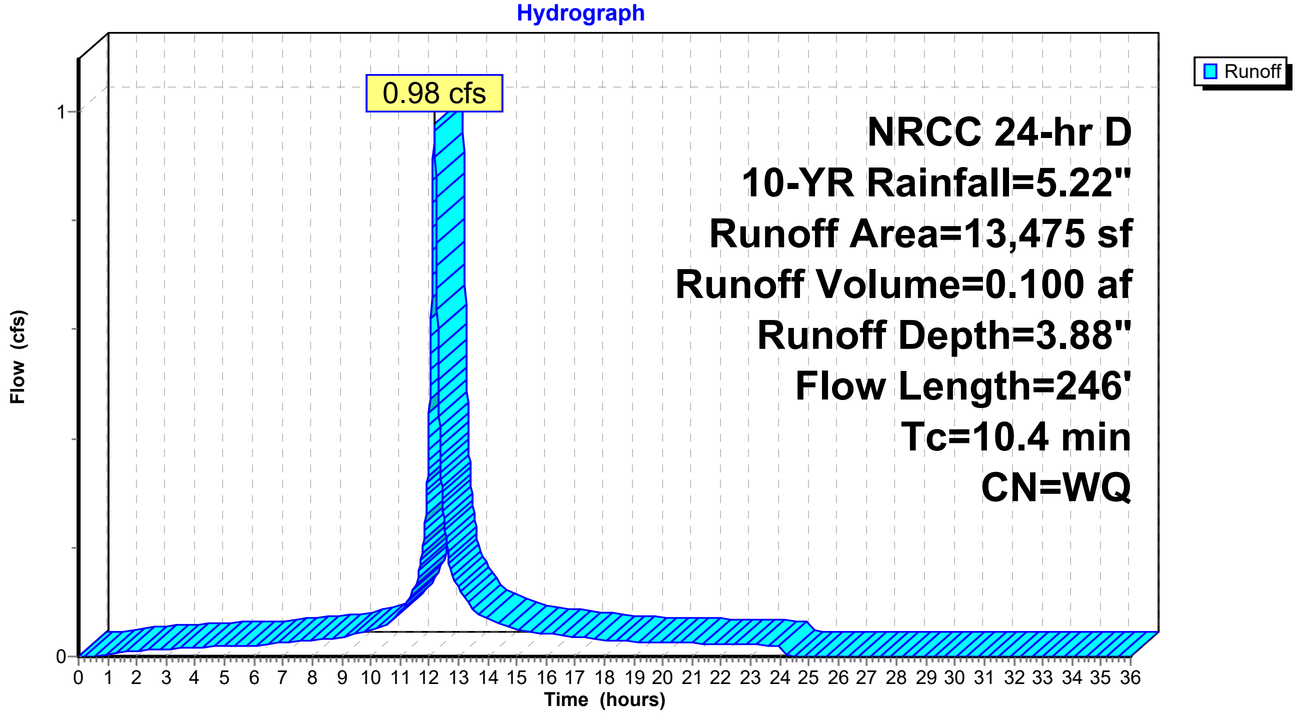
Runoff = 0.98 cfs @ 12.18 hrs, Volume= 0.100 af, Depth= 3.88"
Routed to Pond 37P : CB 10+30 L

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 10-YR Rainfall=5.22"

Area (sf)	CN	Description
4,639	98	Paved parking HSG B
4,550	98	Roofs HSG B
4,286	61	>75% Grass cover, Good HSG B
13,475		Weighted Average
4,286		31.81% Pervious Area
9,189		68.19% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.8	21	0.0500	0.13		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.36"
0.2	22	0.0500	1.50		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.36"
3.4	27	0.0500	0.13		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.36"
0.2	12	0.0500	1.33		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.36"
2.4	18	0.0500	0.12		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.36"
0.2	15	0.0500	1.57		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.1	22	0.0500	4.54		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.3	29	0.0400	1.40		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.0	12	0.0400	4.06		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.4	24	0.0200	0.99		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.4	44	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
10.4	246	Total			

Subcatchment 36P: P2k



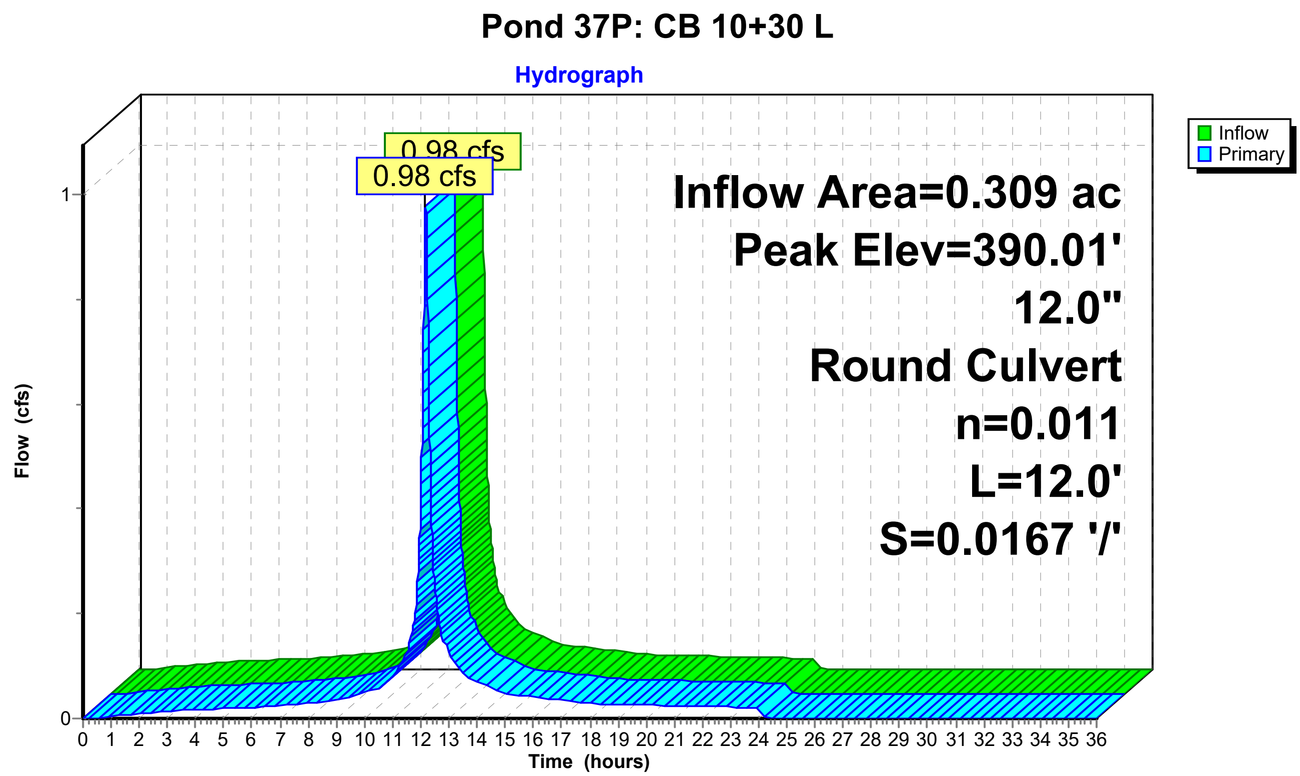
Summary for Pond 37P: CB 10+30 L

Inflow Area = 0.309 ac, 68.19% Impervious, Inflow Depth = 3.88" for 10-YR event
Inflow = 0.98 cfs @ 12.18 hrs, Volume= 0.100 af
Outflow = 0.98 cfs @ 12.18 hrs, Volume= 0.100 af, Atten= 0%, Lag= 0.0 min
Primary = 0.98 cfs @ 12.18 hrs, Volume= 0.100 af
Routed to Pond 38P : DMH 10+38

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 390.01' @ 12.17 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	389.30'	**12.0" Round Culvert** L= 12.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 389.30' / 389.10' S= 0.0167 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=1.02 cfs @ 12.18 hrs HW=390.00' TW=389.84' (Dynamic Tailwater)
└─**1=Culvert** (Outlet Controls 1.02 cfs @ 2.44 fps)



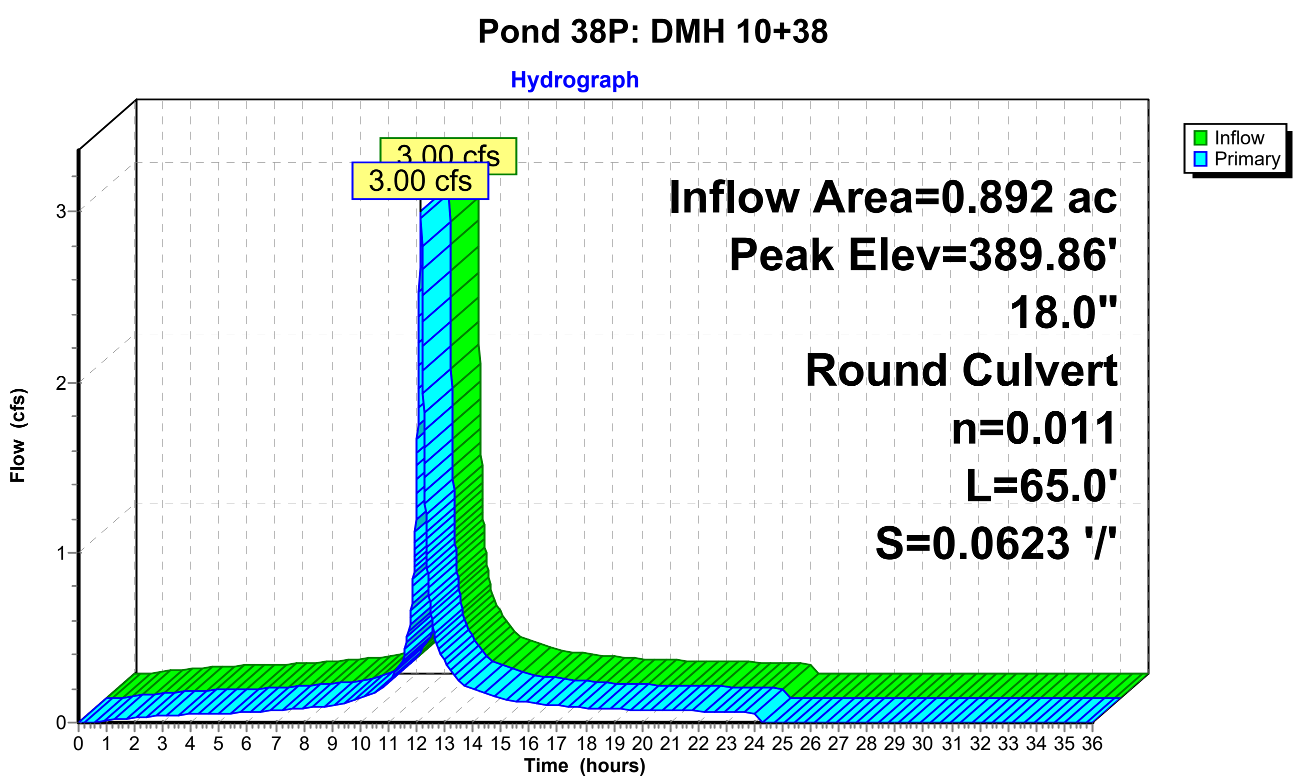
Summary for Pond 38P: DMH 10+38

Inflow Area = 0.892 ac, 68.18% Impervious, Inflow Depth = 3.88" for 10-YR event
Inflow = 3.00 cfs @ 12.15 hrs, Volume= 0.288 af
Outflow = 3.00 cfs @ 12.15 hrs, Volume= 0.288 af, Atten= 0%, Lag= 0.0 min
Primary = 3.00 cfs @ 12.15 hrs, Volume= 0.288 af
Routed to Pond 39P : FD B

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 389.86' @ 12.15 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	389.05'	**18.0" Round Culvert** L= 65.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 389.05' / 385.00' S= 0.0623 '/' Cc= 0.900 n= 0.011, Flow Area= 1.77 sf

Primary OutFlow Max=3.00 cfs @ 12.15 hrs HW=389.86' TW=383.05' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 3.00 cfs @ 3.07 fps)



Summary for Pond 39P: FD B

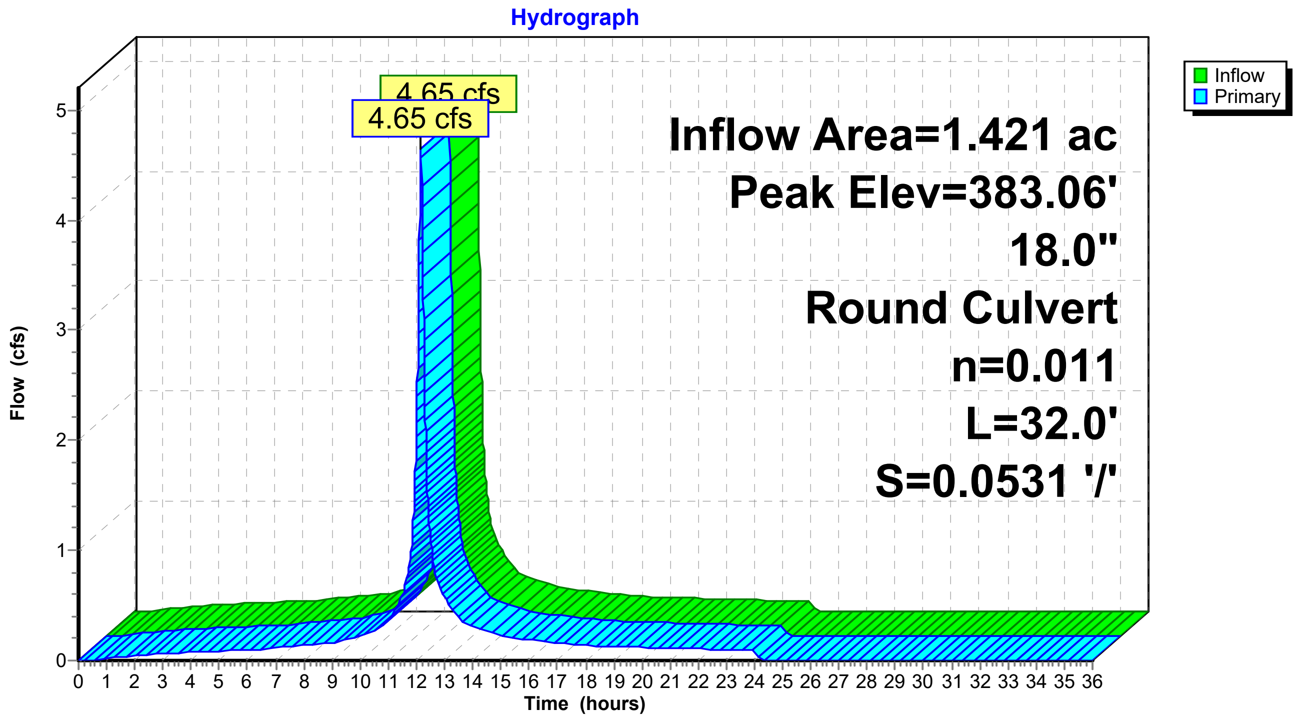
Inflow Area = 1.421 ac, 68.03% Impervious, Inflow Depth = 3.87" for 10-YR event
Inflow = 4.65 cfs @ 12.16 hrs, Volume= 0.458 af
Outflow = 4.65 cfs @ 12.16 hrs, Volume= 0.458 af, Atten= 0%, Lag= 0.0 min
Primary = 4.65 cfs @ 12.16 hrs, Volume= 0.458 af
Routed to Pond 41P : Infiltration Basin #3

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 383.06' @ 12.16 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	382.00'	**18.0" Round Culvert** L= 32.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 382.00' / 380.30' S= 0.0531 '/' Cc= 0.900 n= 0.011, Flow Area= 1.77 sf

Primary OutFlow Max=4.64 cfs @ 12.16 hrs HW=383.05' TW=381.11' (Dynamic Tailwater)
1=Culvert (Inlet Controls 4.64 cfs @ 3.50 fps)

Pond 39P: FD B



Summary for Subcatchment 40P: P2I

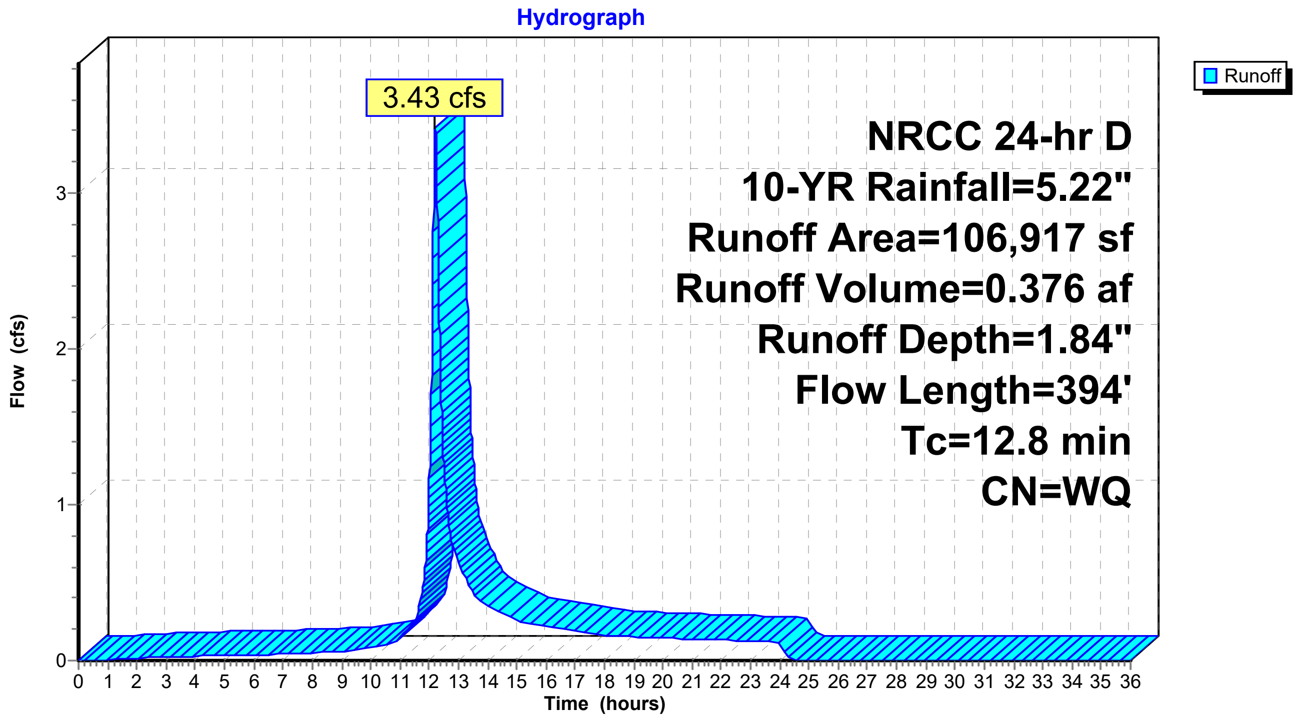
Runoff = 3.43 cfs @ 12.21 hrs, Volume= 0.376 af, Depth= 1.84"
Routed to Pond 41P : Infiltration Basin #3

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 10-YR Rainfall=5.22"

Area (sf)	CN	Description
3,235	98	Paved parking HSG B
12,020	98	Roofs, HSG B
47,471	61	>75% Grass cover, Good HSG B
617	74	>75% Grass cover, Good, HSG C
43,574	55	Woods, Good, HSG B
106,917		Weighted Average
91,662		85.73% Pervious Area
15,255		14.27% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	72	0.0800	0.13		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.36"
0.4	35	0.0800	1.41		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.1	287	0.0500	1.57		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
12.8	394	Total			

Subcatchment 40P: P2I



Summary for Pond 41P: Infiltration Basin #3

Inflow Area = 3.875 ac, 33.98% Impervious, Inflow Depth = 2.58" for 10-YR event
Inflow = 7.77 cfs @ 12.17 hrs, Volume= 0.834 af
Outflow = 2.40 cfs @ 12.49 hrs, Volume= 0.834 af, Atten= 69%, Lag= 19.2 min
Discarded = 0.50 cfs @ 12.49 hrs, Volume= 0.582 af
Primary = 1.89 cfs @ 12.49 hrs, Volume= 0.252 af
Routed to Link 28P : Sub-DP #2a: Flow to Town Land
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Link 43P : Sub-DP #2b: Flow to Northern Abutter

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 381.77' @ 12.49 hrs Surf.Area= 9,034 sf Storage= 9,444 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 82.7 min (892.4 - 809.6)

Volume	Invert	Avail.Storage	Storage Description
#1	380.00'	22,220 cf	**Custom Stage Data (Irregular)**Listed below (Recalc)
#2	378.00'	1,502 cf	**Custom Stage Data (Irregular)**Listed below (Recalc) 3,755 cf Overall x 40.0% Voids
		23,722 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
380.00	3,755	261.0	0	0	3,755
384.00	7,576	358.0	22,220	22,220	8,691

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
378.00	3,755	261.0	0	0	3,755
379.00	3,755	261.0	3,755	3,755	4,016

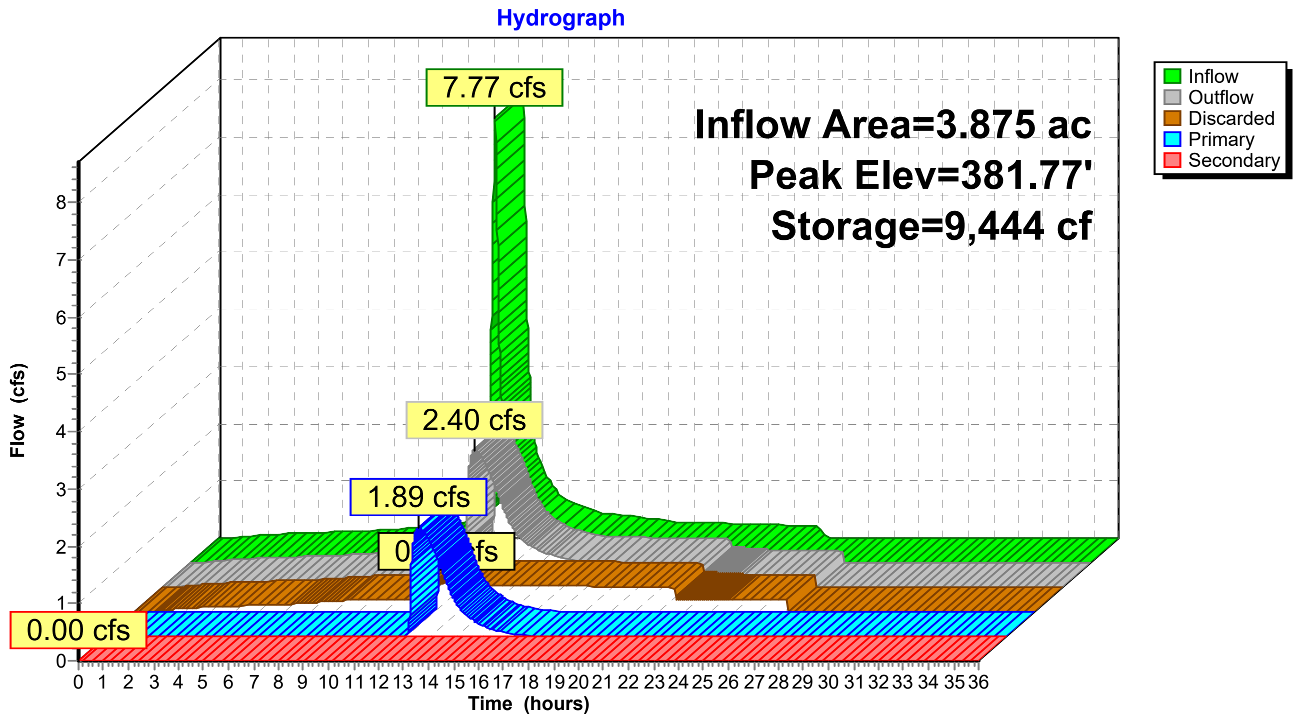
Device	Routing	Invert	Outlet Devices
#1	Discarded	378.00'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	380.40'	**12.0" Round Culvert** L= 214.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 380.40' / 358.00' S= 0.1047 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf
#3	Device 2	380.60'	**9.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Secondary	382.00'	**Custom Weir/Orifice, Cv= 2.62 (C= 3.28)** Elev. (feet) 382.00 383.50 383.50 384.00 Width (feet) 2.50 2.50 20.00 20.00

Discarded OutFlow Max=0.50 cfs @ 12.49 hrs HW=381.77' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.50 cfs)

Primary OutFlow Max=1.89 cfs @ 12.49 hrs HW=381.77' TW=0.00' (Dynamic Tailwater)
└─**2=Culvert** (Passes 1.89 cfs of 3.52 cfs potential flow)
  └─**3=Orifice/Grate** (Orifice Controls 1.89 cfs @ 4.28 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=378.00' TW=0.00' (Dynamic Tailwater)
└─**4=Custom Weir/Orifice** (Controls 0.00 cfs)

Pond 41P: Infiltration Basin #3



Summary for Subcatchment 42P: P2m

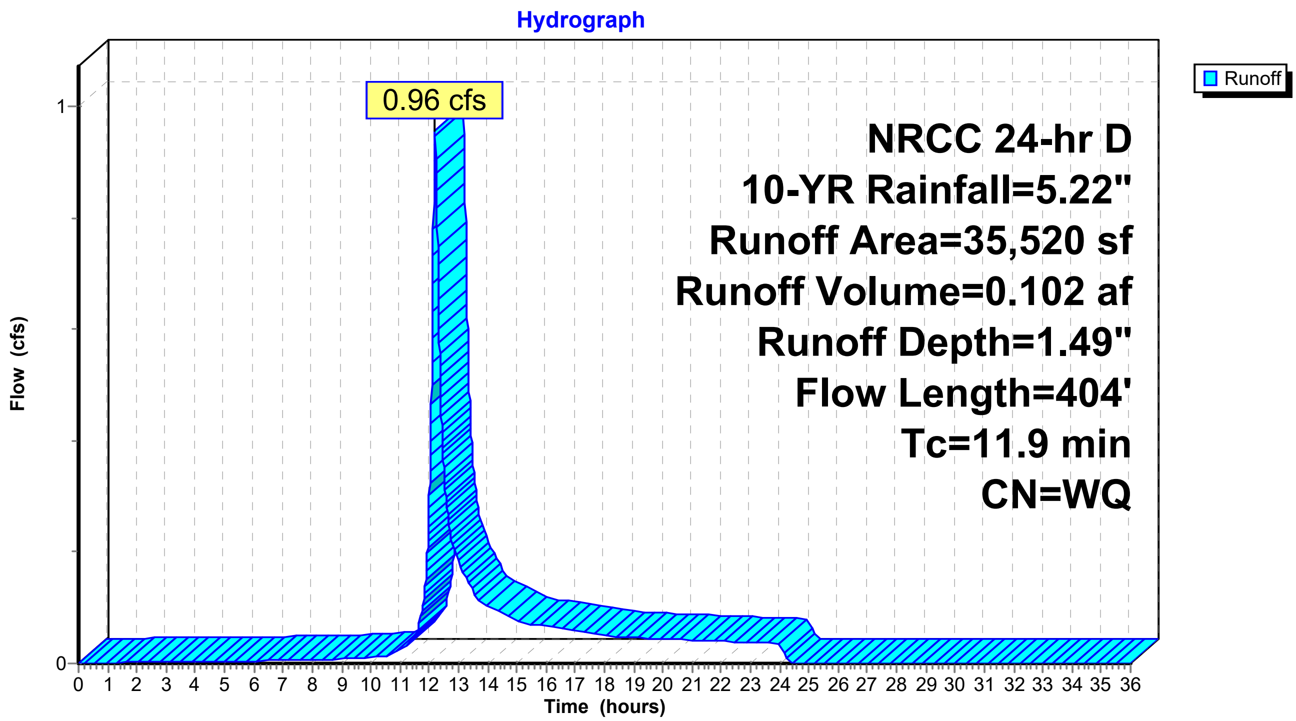
Runoff = 0.96 cfs @ 12.20 hrs, Volume= 0.102 af, Depth= 1.49"
Routed to Link 43P : Sub-DP #2b: Flow to Northern Abutter

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 10-YR Rainfall=5.22"

	Area (sf)	CN	Description
*	2,080	98	Roofs HSG B
	15,055	61	>75% Grass cover, Good HSG B
	18,385	55	Woods, Good, HSG B
	35,520		Weighted Average
	33,440		94.14% Pervious Area
	2,080		5.86% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	51	0.0400	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.36"
2.6	353	0.2100	2.29		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
11.9	404	Total			

Subcatchment 42P: P2m

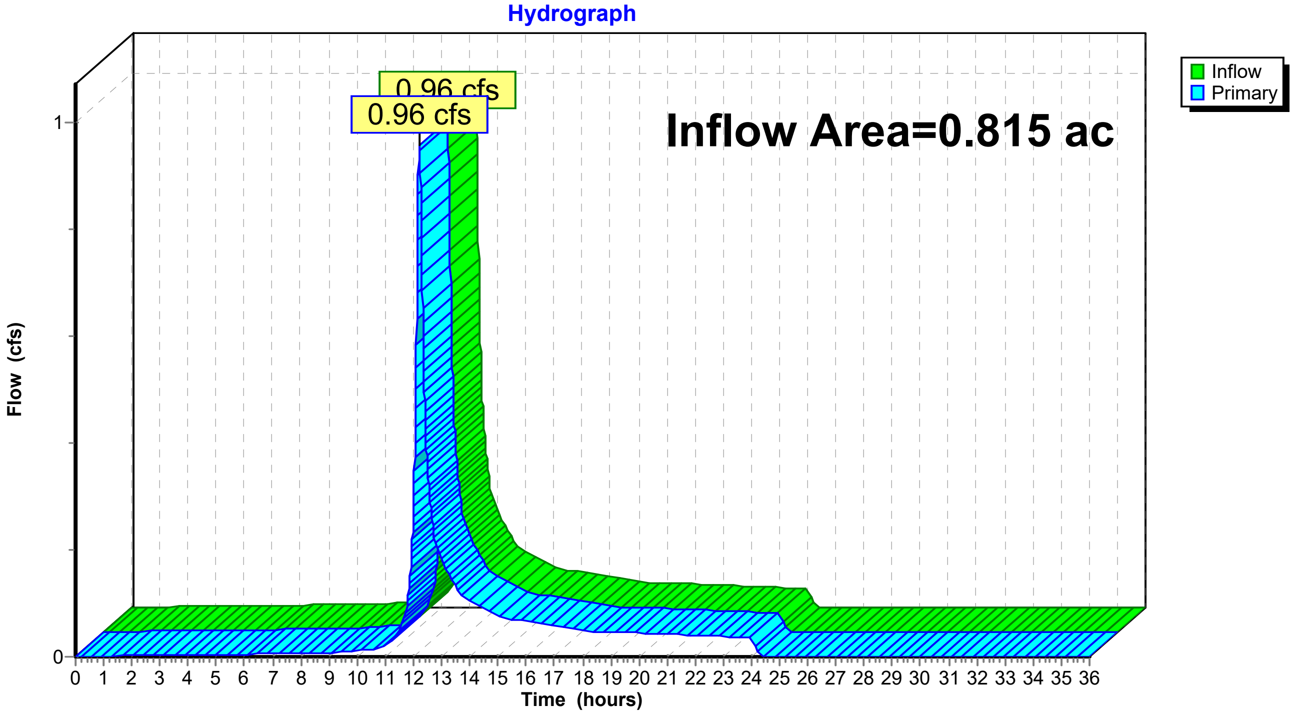


Summary for Link 43P: Sub-DP #2b: Flow to Northern Abutter

Inflow Area = 0.815 ac, 5.86% Impervious, Inflow Depth = 1.49" for 10-YR event
Inflow = 0.96 cfs @ 12.20 hrs, Volume= 0.102 af
Primary = 0.96 cfs @ 12.20 hrs, Volume= 0.102 af, Atten= 0%, Lag= 0.0 min
Routed to Link 44P : Design Point #2: Flow to Uncas Brook

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Link 43P: Sub-DP #2b: Flow to Northern Abutter

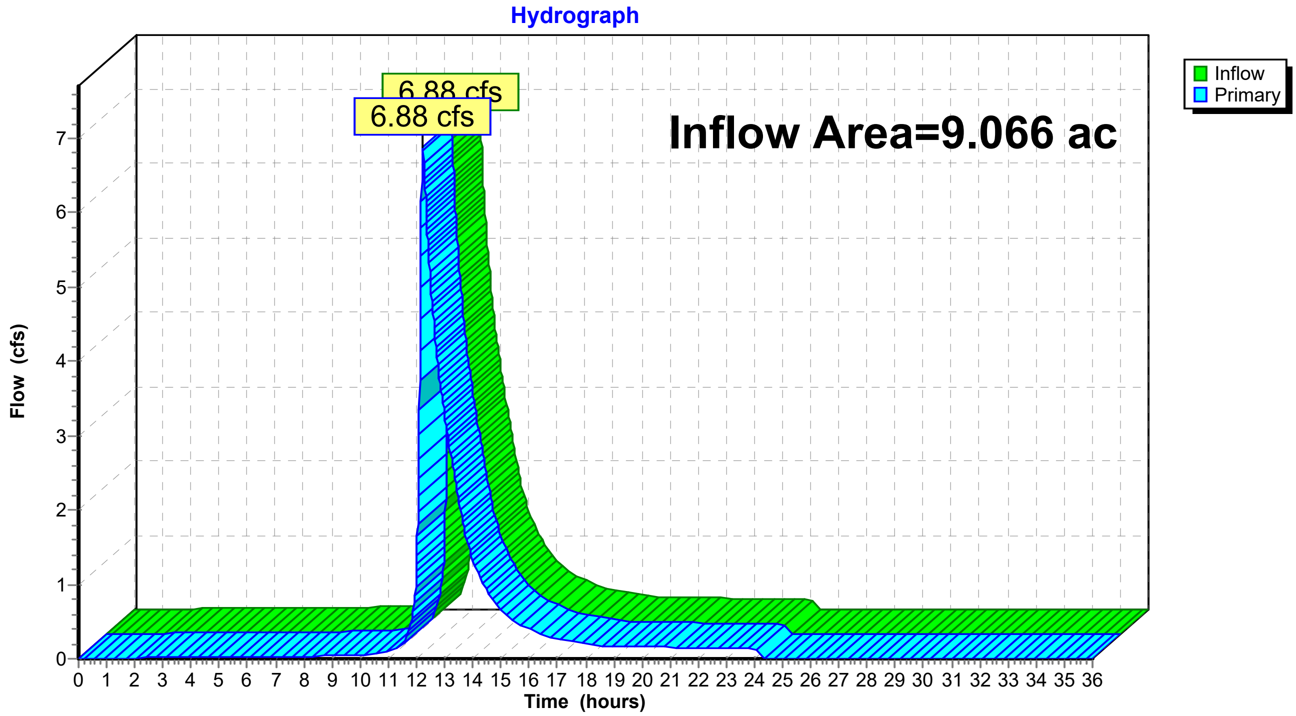


Summary for Link 44P: Design Point #2: Flow to Uncas Brook

Inflow Area = 9.066 ac, 28.33% Impervious, Inflow Depth = 1.12" for 10-YR event
Inflow = 6.88 cfs @ 12.22 hrs, Volume= 0.850 af
Primary = 6.88 cfs @ 12.22 hrs, Volume= 0.850 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Link 44P: Design Point #2: Flow to Uncas Brook



Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 8P: P2a Runoff Area=5,727 sf 44.23% Impervious Runoff Depth=4.34"
Flow Length=176' Slope=0.0800 '/' Tc=6.6 min CN=WQ Runoff=0.56 cfs 0.048 af

Pond 9P: CB 4+02 L Peak Elev=406.78' Inflow=0.56 cfs 0.048 af
12.0" Round Culvert n=0.011 L=13.0' S=0.0308 '/' Outflow=0.56 cfs 0.048 af

Subcatchment 10P: P2b Runoff Area=10,417 sf 25.78% Impervious Runoff Depth=3.95"
Flow Length=183' Tc=9.9 min CN=WQ Runoff=0.85 cfs 0.079 af

Pond 11P: CB 4+02 R Peak Elev=406.87' Inflow=0.85 cfs 0.079 af
12.0" Round Culvert n=0.011 L=8.0' S=0.0500 '/' Outflow=0.85 cfs 0.079 af

Pond 12P: DMH 4+13 Peak Elev=402.12' Inflow=1.38 cfs 0.126 af
12.0" Round Culvert n=0.011 L=130.0' S=0.0569 '/' Outflow=1.38 cfs 0.126 af

Subcatchment 13P: P2c Runoff Area=3,106 sf 63.52% Impervious Runoff Depth=4.72"
Flow Length=122' Slope=0.0700 '/' Tc=2.0 min CN=WQ Runoff=0.36 cfs 0.028 af

Pond 14P: CB 5+63 L Peak Elev=396.80' Inflow=0.36 cfs 0.028 af
12.0" Round Culvert n=0.011 L=17.0' S=0.0176 '/' Outflow=0.36 cfs 0.028 af

Subcatchment 15P: P2d Runoff Area=9,087 sf 49.69% Impervious Runoff Depth=4.18"
Flow Length=218' Tc=7.0 min CN=WQ Runoff=0.83 cfs 0.073 af

Pond 16P: CB 5+63 R Peak Elev=396.96' Inflow=0.83 cfs 0.073 af
12.0" Round Culvert n=0.011 L=15.0' S=0.0200 '/' Outflow=0.83 cfs 0.073 af

Pond 17P: DMH 5+47 Peak Elev=387.99' Inflow=2.38 cfs 0.227 af
12.0" Round Culvert n=0.011 L=16.0' S=0.0688 '/' Outflow=2.38 cfs 0.227 af

Pond 18P: DMH A Peak Elev=377.98' Inflow=2.38 cfs 0.227 af
12.0" Round Culvert n=0.011 L=18.0' S=0.0389 '/' Outflow=2.38 cfs 0.227 af

Subcatchment 19P: P2e Runoff Area=32,111 sf 44.13% Impervious Runoff Depth=4.16"
Flow Length=221' Tc=7.8 min CN=WQ Runoff=2.86 cfs 0.256 af

Pond 20P: CB 7+57 L Peak Elev=386.87' Inflow=2.86 cfs 0.256 af
15.0" Round Culvert n=0.011 L=13.0' S=0.0231 '/' Outflow=2.86 cfs 0.256 af

Subcatchment 21P: P2f Runoff Area=24,890 sf 72.31% Impervious Runoff Depth=5.10"
Flow Length=302' Tc=7.1 min CN=WQ Runoff=2.70 cfs 0.243 af

Pond 22P: CB 7+57 R Peak Elev=386.83' Inflow=2.70 cfs 0.243 af
15.0" Round Culvert n=0.011 L=6.0' S=0.0500 '/' Outflow=2.70 cfs 0.243 af

Pond 23P: DMH 7+46 Peak Elev=386.18' Inflow=5.55 cfs 0.499 af
18.0" Round Culvert n=0.011 L=88.0' S=0.0193 '/' Outflow=5.55 cfs 0.499 af

Pond 24P: DMH 6+54 Peak Elev=384.43' Inflow=5.55 cfs 0.499 af
18.0" Round Culvert n=0.011 L=115.0' S=0.0604 '/' Outflow=5.55 cfs 0.499 af

Subcatchment 25P: P2g Runoff Area=11,782 sf 8.39% Impervious Runoff Depth=2.58"
Flow Length=149' Slope=0.1300 '/' Tc=6.9 min CN=WQ Runoff=0.72 cfs 0.058 af

Pond 26P: Infiltration Basin #2 Peak Elev=377.80' Storage=8,113 cf Inflow=8.62 cfs 0.784 af
Discarded=0.26 cfs 0.432 af Primary=3.80 cfs 0.352 af Outflow=4.06 cfs 0.784 af

Subcatchment 27P: P2n Runoff Area=93,478 sf 8.12% Impervious Runoff Depth=2.28"
Flow Length=261' Tc=9.9 min CN=WQ Runoff=4.34 cfs 0.407 af

Link 28P: Sub-DP #2a: Flow to Town Land Inflow=9.66 cfs 1.164 af
Primary=9.66 cfs 1.164 af

Subcatchment 29P: P2h Runoff Area=12,912 sf 63.80% Impervious Runoff Depth=4.73"
Flow Length=254' Tc=10.2 min CN=WQ Runoff=1.16 cfs 0.117 af

Pond 30P: CB 12+97 R Peak Elev=399.07' Inflow=1.16 cfs 0.117 af
12.0" Round Culvert n=0.011 L=8.0' S=0.0250 '/' Outflow=1.16 cfs 0.117 af

Subcatchment 31P: P2i Runoff Area=10,135 sf 72.86% Impervious Runoff Depth=5.08"
Flow Length=188' Tc=10.2 min CN=WQ Runoff=0.97 cfs 0.098 af

Pond 32P: CB 12+97 L Peak Elev=399.03' Inflow=0.97 cfs 0.098 af
12.0" Round Culvert n=0.011 L=13.0' S=0.0154 '/' Outflow=0.97 cfs 0.098 af

Pond 33P: DMH 12+87 Peak Elev=398.12' Inflow=2.13 cfs 0.215 af
12.0" Round Culvert n=0.011 L=232.0' S=0.0593 '/' Outflow=2.13 cfs 0.215 af

Subcatchment 34P: P2j Runoff Area=25,375 sf 68.17% Impervious Runoff Depth=4.90"
Flow Length=315' Tc=7.3 min CN=WQ Runoff=2.63 cfs 0.238 af

Pond 35P: CB 10+30 R Peak Elev=390.46' Inflow=2.63 cfs 0.238 af
12.0" Round Culvert n=0.011 L=7.0' S=0.0286 '/' Outflow=2.63 cfs 0.238 af

Subcatchment 36P: P2k Runoff Area=13,475 sf 68.19% Impervious Runoff Depth=4.90"
Flow Length=246' Tc=10.4 min CN=WQ Runoff=1.24 cfs 0.126 af

Pond 37P: CB 10+30 L Peak Elev=390.13' Inflow=1.24 cfs 0.126 af
12.0" Round Culvert n=0.011 L=12.0' S=0.0167 '/' Outflow=1.24 cfs 0.126 af

Pond 38P: DMH 10+38 Peak Elev=389.98' Inflow=3.81 cfs 0.364 af
18.0" Round Culvert n=0.011 L=65.0' S=0.0623 '/' Outflow=3.81 cfs 0.364 af

Pond 39P: FD B Peak Elev=383.24' Inflow=5.89 cfs 0.579 af
18.0" Round Culvert n=0.011 L=32.0' S=0.0531 '/' Outflow=5.89 cfs 0.579 af

Subcatchment 40P: P2l Runoff Area=106,917 sf 14.27% Impervious Runoff Depth=2.60"
Flow Length=394' Tc=12.8 min CN=WQ Runoff=5.05 cfs 0.533 af

Pond 41P: Infiltration Basin #3 Peak Elev=382.30' Storage=12,412 cf Inflow=10.55 cfs 1.112 af
Discarded=0.53 cfs 0.668 af Primary=2.45 cfs 0.405 af Secondary=1.37 cfs 0.038 af Outflow=4.35 cfs 1.112 af

Subcatchment 42P: P2m Runoff Area=35,520 sf 5.86% Impervious Runoff Depth=2.21"
Flow Length=404' Tc=11.9 min CN=WQ Runoff=1.49 cfs 0.150 af

Link 43P: Sub-DP #2b: Flow to Northern Abutter Inflow=2.12 cfs 0.189 af
Primary=2.12 cfs 0.189 af

Link 44P: Design Point #2: Flow to Uncas Brook Inflow=11.16 cfs 1.353 af
Primary=11.16 cfs 1.353 af

Total Runoff Area = 9.066 ac Runoff Volume = 2.453 af Average Runoff Depth = 3.25"
71.67% Pervious = 6.498 ac 28.33% Impervious = 2.569 ac

Summary for Subcatchment 8P: P2a

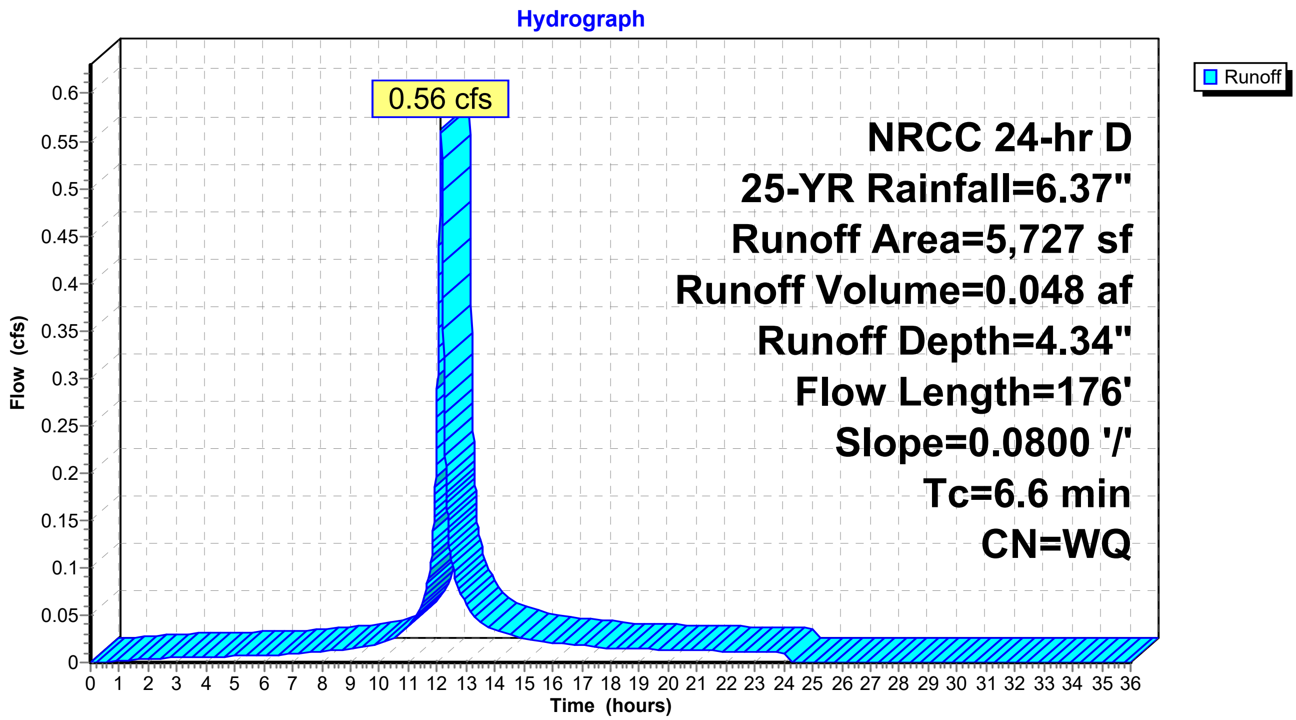
Runoff = 0.56 cfs @ 12.14 hrs, Volume= 0.048 af, Depth= 4.34"
Routed to Pond 9P : CB 4+02 L

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 25-YR Rainfall=6.37"

Area (sf)	CN	Description
495	98	Paved parking, HSG B
2,038	98	Paved parking, HSG C
1,469	61	>75% Grass cover, Good, HSG B
1,725	74	>75% Grass cover, Good, HSG C
5,727		Weighted Average
3,194		55.77% Pervious Area
2,533		44.23% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.1	71	0.0800	0.19		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.36"
0.3	29	0.0800	1.92		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.36"
0.2	76	0.0800	5.74		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
6.6	176	Total			

Subcatchment 8P: P2a



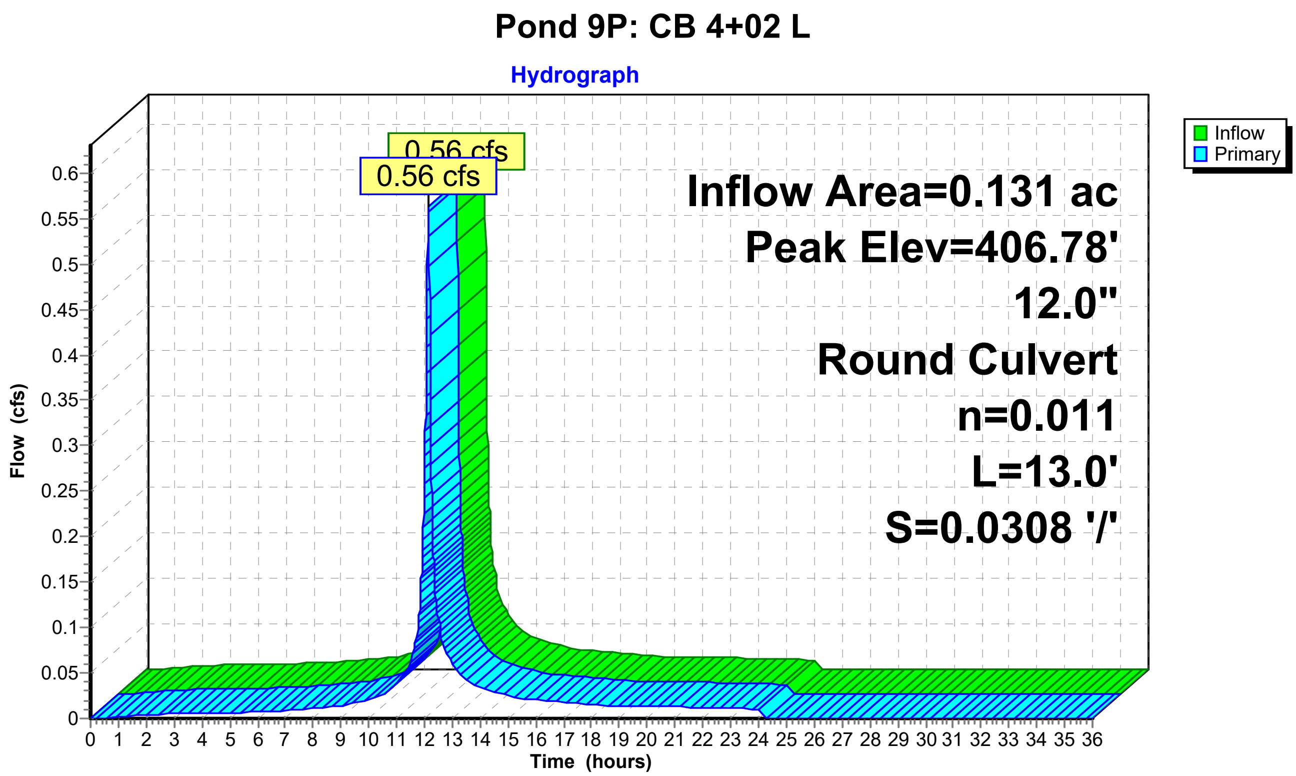
Summary for Pond 9P: CB 4+02 L

Inflow Area = 0.131 ac, 44.23% Impervious, Inflow Depth = 4.34" for 25-YR event
Inflow = 0.56 cfs @ 12.14 hrs, Volume= 0.048 af
Outflow = 0.56 cfs @ 12.14 hrs, Volume= 0.048 af, Atten= 0%, Lag= 0.0 min
Primary = 0.56 cfs @ 12.14 hrs, Volume= 0.048 af
Routed to Pond 12P : DMH 4+13

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 406.78' @ 12.14 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	406.40'	**12.0" Round Culvert** L= 13.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 406.40' / 406.00' S= 0.0308 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=0.56 cfs @ 12.14 hrs HW=406.78' TW=402.11' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 0.56 cfs @ 2.09 fps)



Summary for Subcatchment 10P: P2b

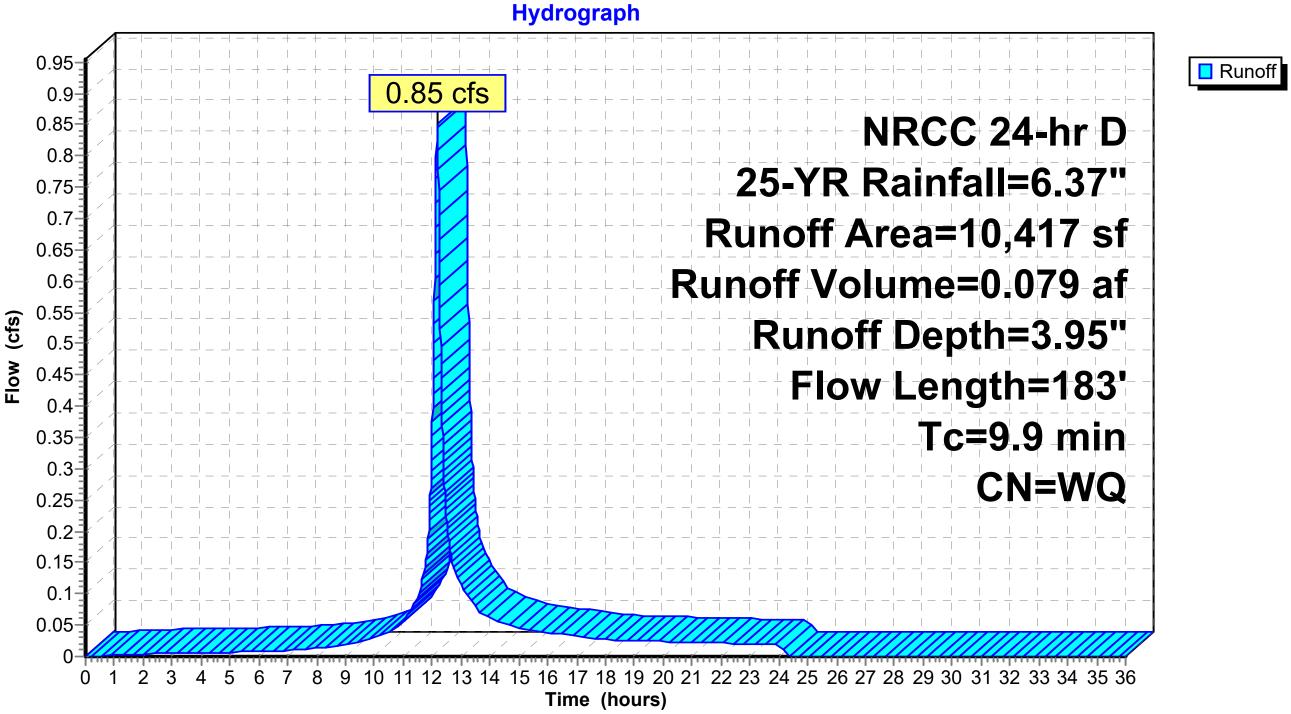
Runoff = 0.85 cfs @ 12.17 hrs, Volume= 0.079 af, Depth= 3.95"
Routed to Pond 11P : CB 4+02 R

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 25-YR Rainfall=6.37"

Area (sf)	CN	Description
380	98	Paved parking, HSG B
2,226	98	Paved parking, HSG C
709	61	>75% Grass cover, Good, HSG B
3,279	74	>75% Grass cover, Good, HSG C
3,743	70	Woods, Good, HSG C
80	98	Roofs, HSG C
10,417		Weighted Average
7,731		74.22% Pervious Area
2,686		25.78% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	51	0.0400	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.36"
0.3	34	0.0600	1.71		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.3	98	0.0800	5.74		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
9.9	183	Total			

Subcatchment 10P: P2b



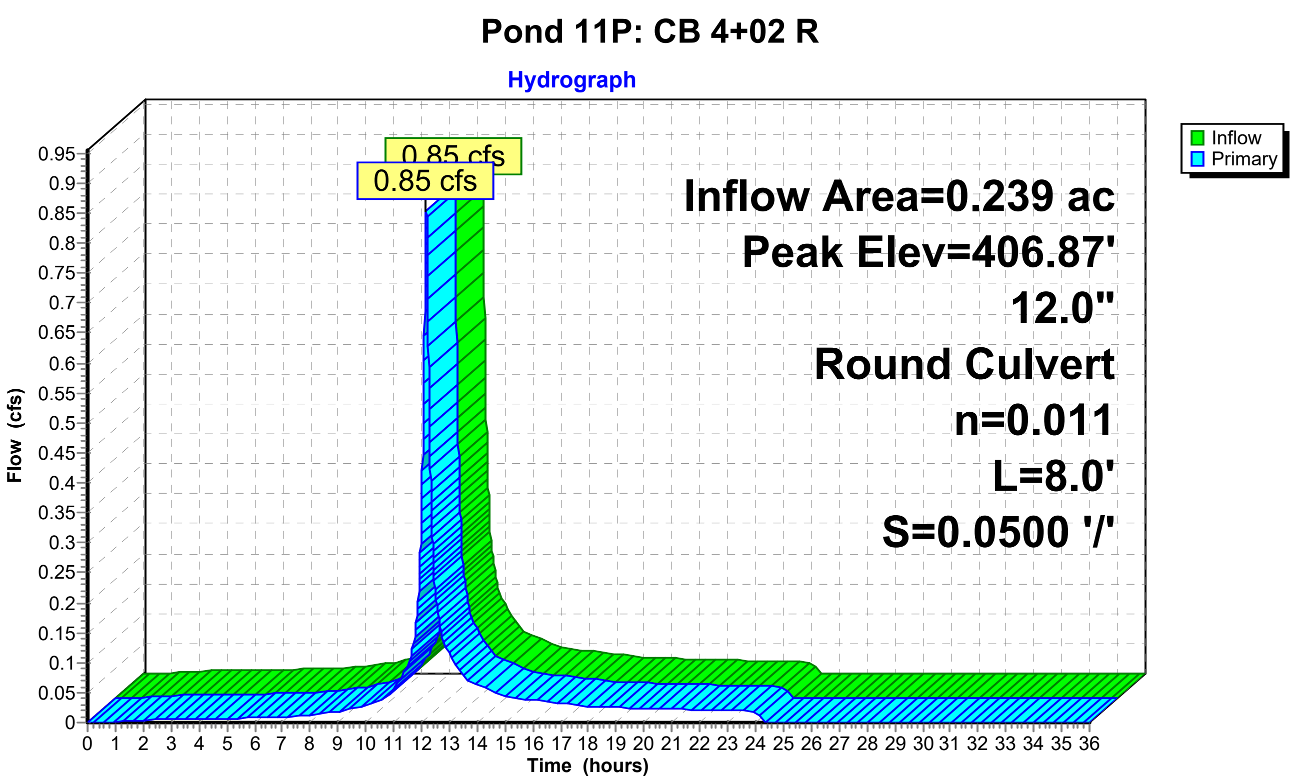
Summary for Pond 11P: CB 4+02 R

Inflow Area = 0.239 ac, 25.78% Impervious, Inflow Depth = 3.95" for 25-YR event
Inflow = 0.85 cfs @ 12.17 hrs, Volume= 0.079 af
Outflow = 0.85 cfs @ 12.17 hrs, Volume= 0.079 af, Atten= 0%, Lag= 0.0 min
Primary = 0.85 cfs @ 12.17 hrs, Volume= 0.079 af
Routed to Pond 12P : DMH 4+13

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 406.87' @ 12.17 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	406.40'	**12.0" Round Culvert** L= 8.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 406.40' / 406.00' S= 0.0500 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=0.85 cfs @ 12.17 hrs HW=406.87' TW=402.11' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 0.85 cfs @ 2.34 fps)



Summary for Pond 12P: DMH 4+13

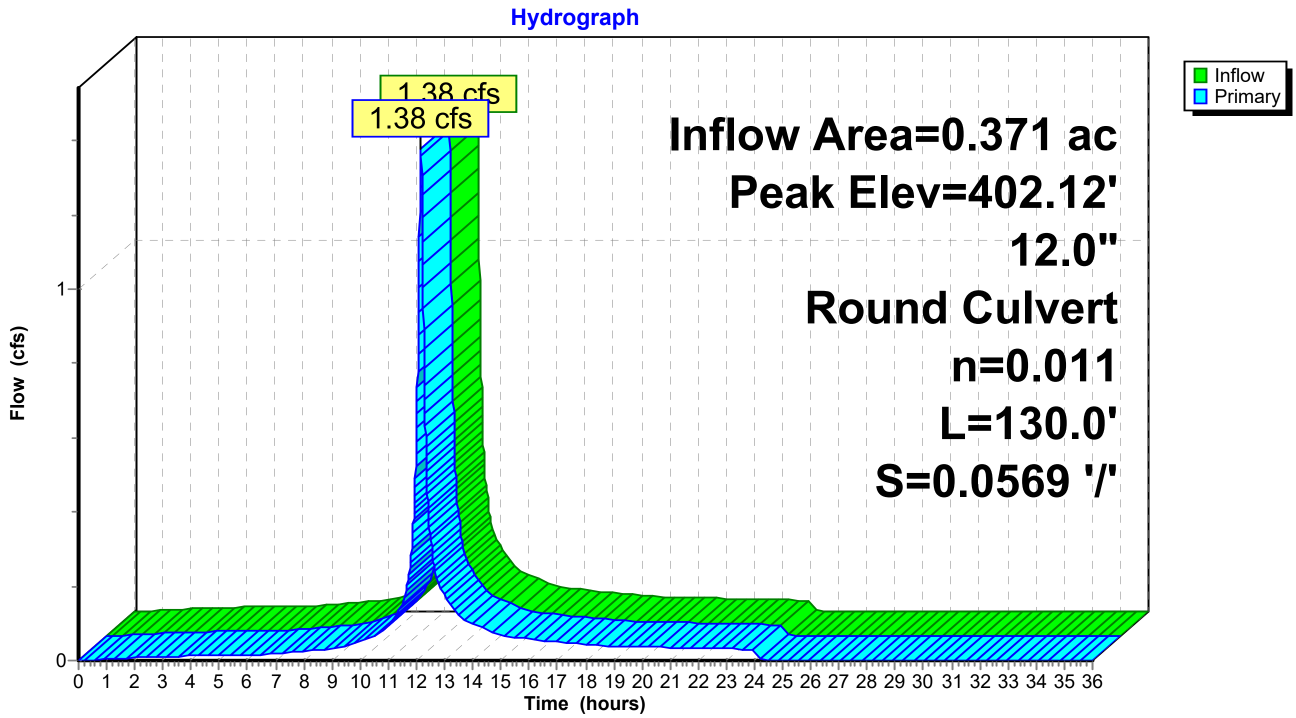
Inflow Area = 0.371 ac, 32.33% Impervious, Inflow Depth = 4.09" for 25-YR event
Inflow = 1.38 cfs @ 12.15 hrs, Volume= 0.126 af
Outflow = 1.38 cfs @ 12.15 hrs, Volume= 0.126 af, Atten= 0%, Lag= 0.0 min
Primary = 1.38 cfs @ 12.15 hrs, Volume= 0.126 af
Routed to Pond 17P : DMH 5+47

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 402.12' @ 12.15 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	401.50'	**12.0" Round Culvert** L= 130.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 401.50' / 394.10' S= 0.0569 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=1.38 cfs @ 12.15 hrs HW=402.12' TW=387.98' (Dynamic Tailwater)
1=Culvert (Inlet Controls 1.38 cfs @ 2.68 fps)

Pond 12P: DMH 4+13



Summary for Subcatchment 13P: P2c

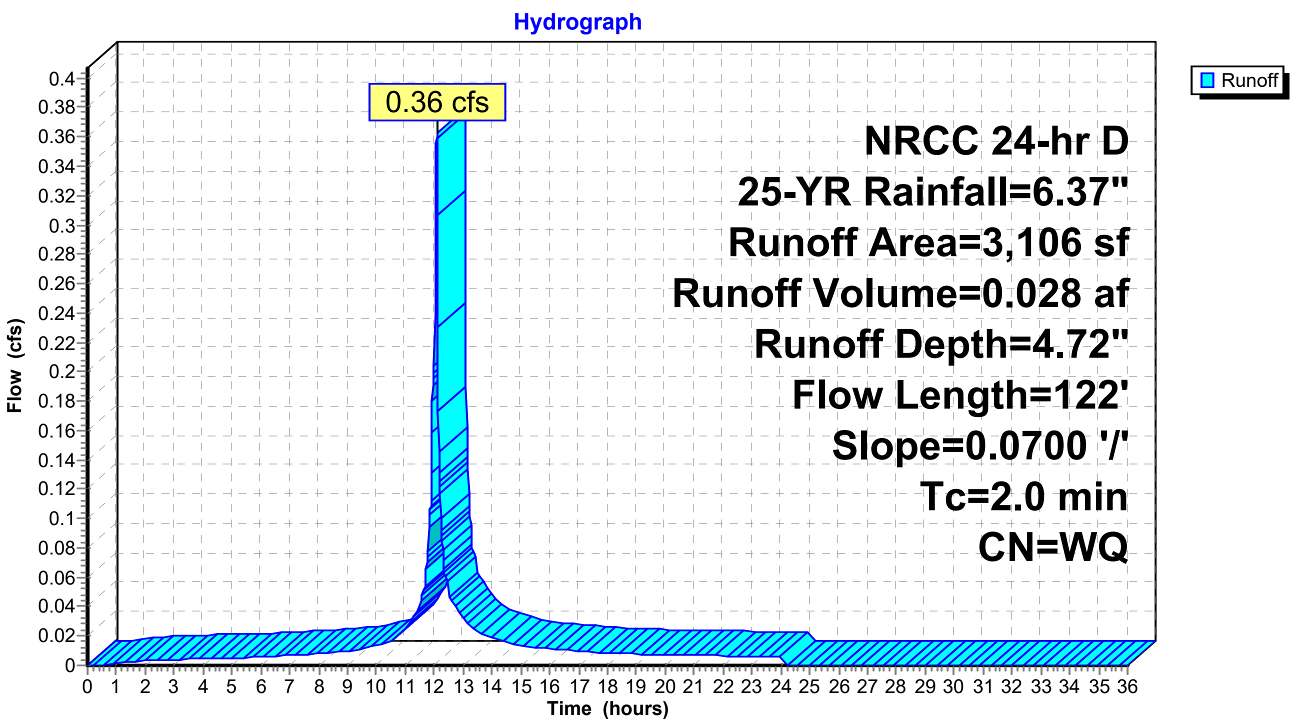
Runoff = 0.36 cfs @ 12.10 hrs, Volume= 0.028 af, Depth= 4.72"
Routed to Pond 14P : CB 5+63 L

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 25-YR Rainfall=6.37"

Area (sf)	CN	Description
1,973	98	Paved parking, HSG B
1,133	61	>75% Grass cover, Good, HSG B
3,106		Weighted Average
1,133		36.48% Pervious Area
1,973		63.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	100	0.0700	2.33		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.36"
0.1	22	0.0700	5.37		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.8	122	Total, Increased to minimum Tc = 2.0 min			

Subcatchment 13P: P2c



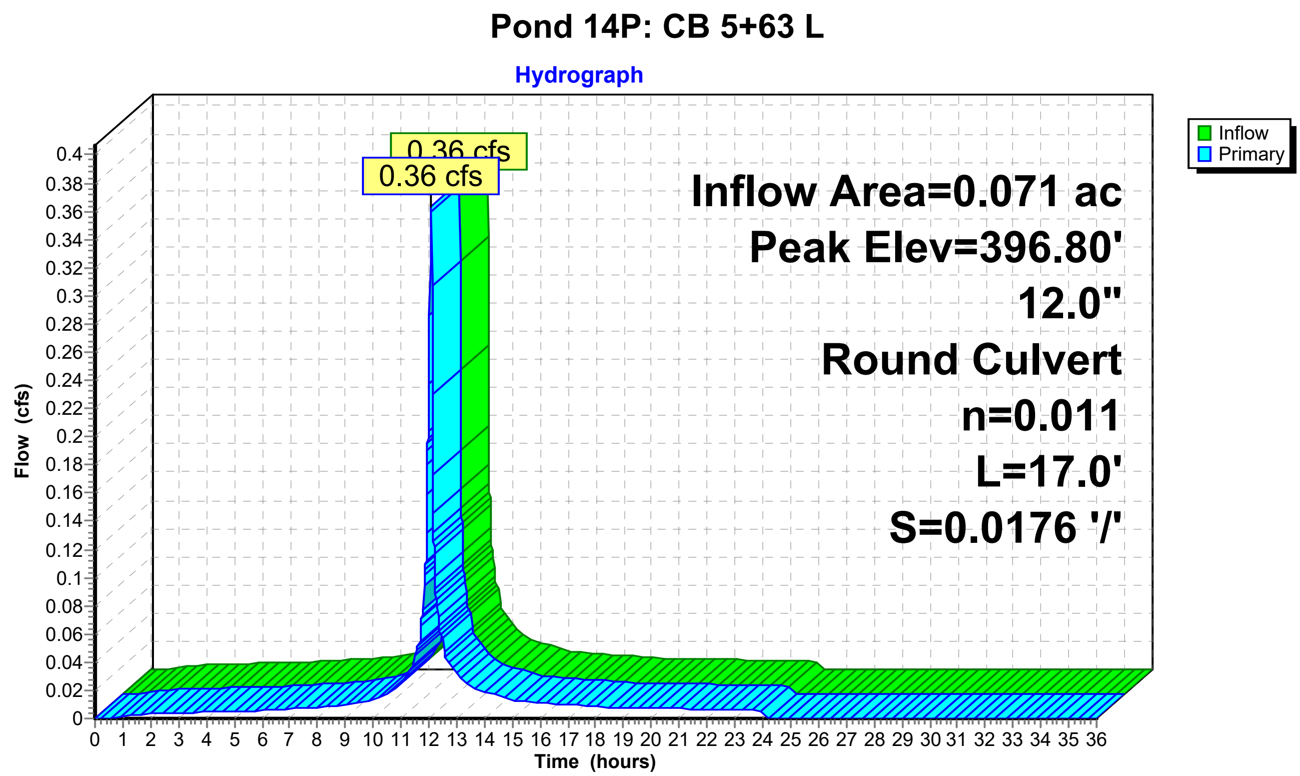
Summary for Pond 14P: CB 5+63 L

Inflow Area = 0.071 ac, 63.52% Impervious, Inflow Depth = 4.72" for 25-YR event
Inflow = 0.36 cfs @ 12.10 hrs, Volume= 0.028 af
Outflow = 0.36 cfs @ 12.10 hrs, Volume= 0.028 af, Atten= 0%, Lag= 0.0 min
Primary = 0.36 cfs @ 12.10 hrs, Volume= 0.028 af
Routed to Pond 17P : DMH 5+47

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 396.80' @ 12.10 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	396.50'	**12.0" Round Culvert** L= 17.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 396.50' / 396.20' S= 0.0176 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=0.36 cfs @ 12.10 hrs HW=396.80' TW=387.94' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 0.36 cfs @ 1.86 fps)



Summary for Subcatchment 15P: P2d

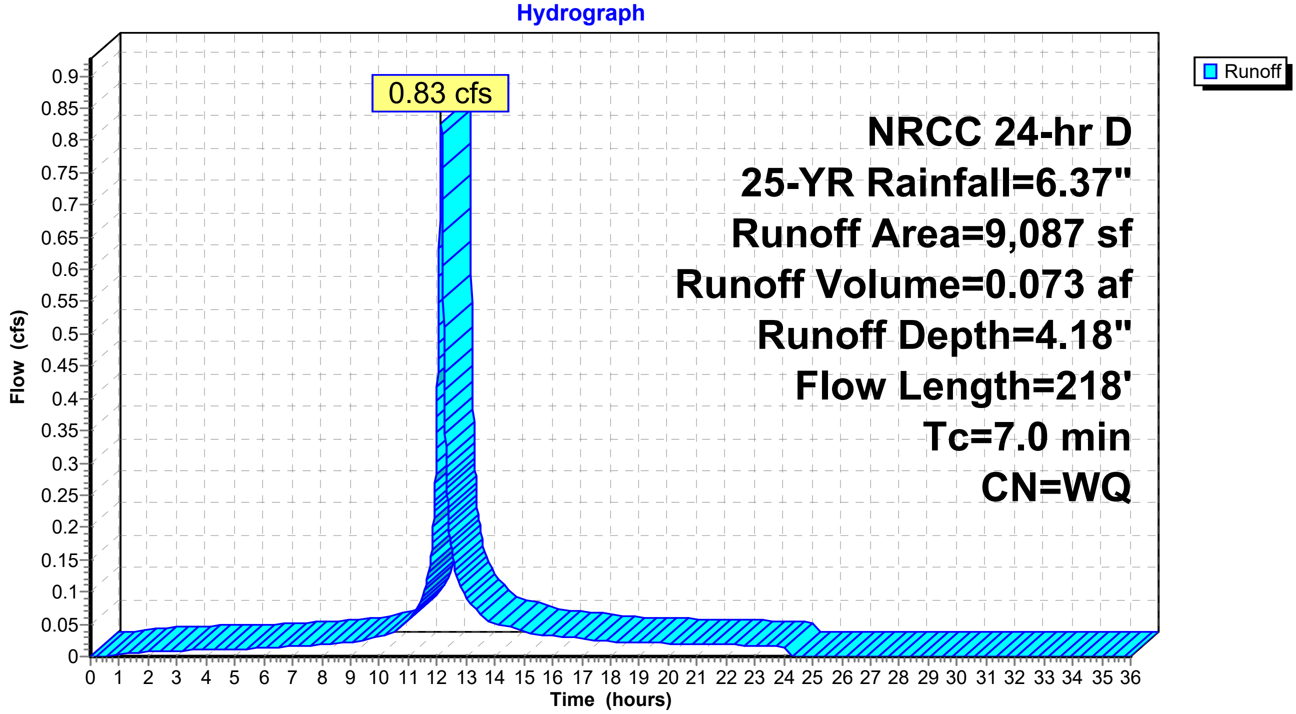
Runoff = 0.83 cfs @ 12.14 hrs, Volume= 0.073 af, Depth= 4.18"
Routed to Pond 16P : CB 5+63 R

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 25-YR Rainfall=6.37"

Area (sf)	CN	Description
3,344	98	Paved parking, HSG B
1,171	98	Roofs, HSG B
4,424	61	>75% Grass cover, Good, HSG B
12	74	>75% Grass cover, Good, HSG C
96	55	Woods, Good, HSG B
40	70	Woods, Good, HSG C
9,087		Weighted Average
4,572		50.31% Pervious Area
4,515		49.69% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.2	65	0.1700	0.26		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.36"
0.3	22	0.0300	1.22		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.36"
2.1	13	0.0400	0.11		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.36"
0.1	10	0.0700	1.85		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.3	108	0.0800	5.74		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
7.0	218	Total			

Subcatchment 15P: P2d



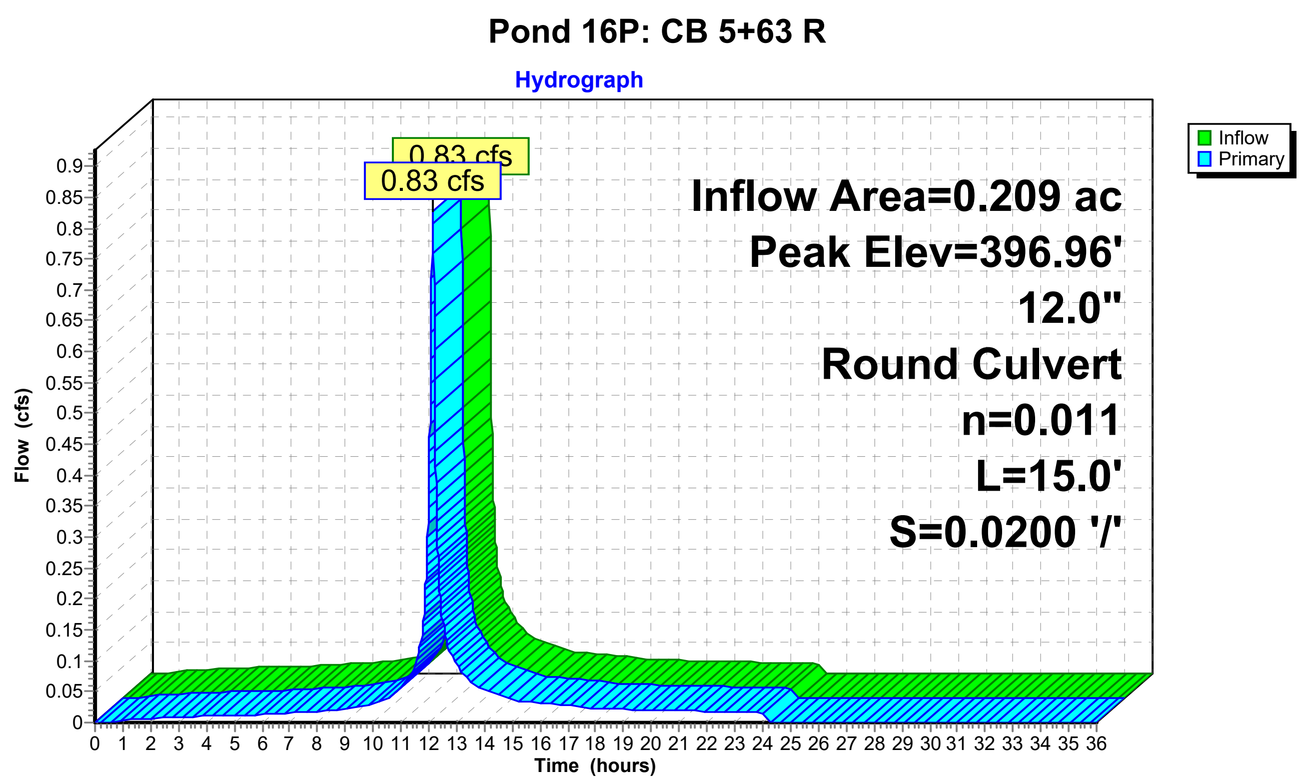
Summary for Pond 16P: CB 5+63 R

Inflow Area = 0.209 ac, 49.69% Impervious, Inflow Depth = 4.18" for 25-YR event
Inflow = 0.83 cfs @ 12.14 hrs, Volume= 0.073 af
Outflow = 0.83 cfs @ 12.14 hrs, Volume= 0.073 af, Atten= 0%, Lag= 0.0 min
Primary = 0.83 cfs @ 12.14 hrs, Volume= 0.073 af
Routed to Pond 17P : DMH 5+47

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 396.96' @ 12.14 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	396.50'	**12.0" Round Culvert** L= 15.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 396.50' / 396.20' S= 0.0200 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=0.83 cfs @ 12.14 hrs HW=396.96' TW=387.99' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.83 cfs @ 2.32 fps)



Summary for Pond 17P: DMH 5+47

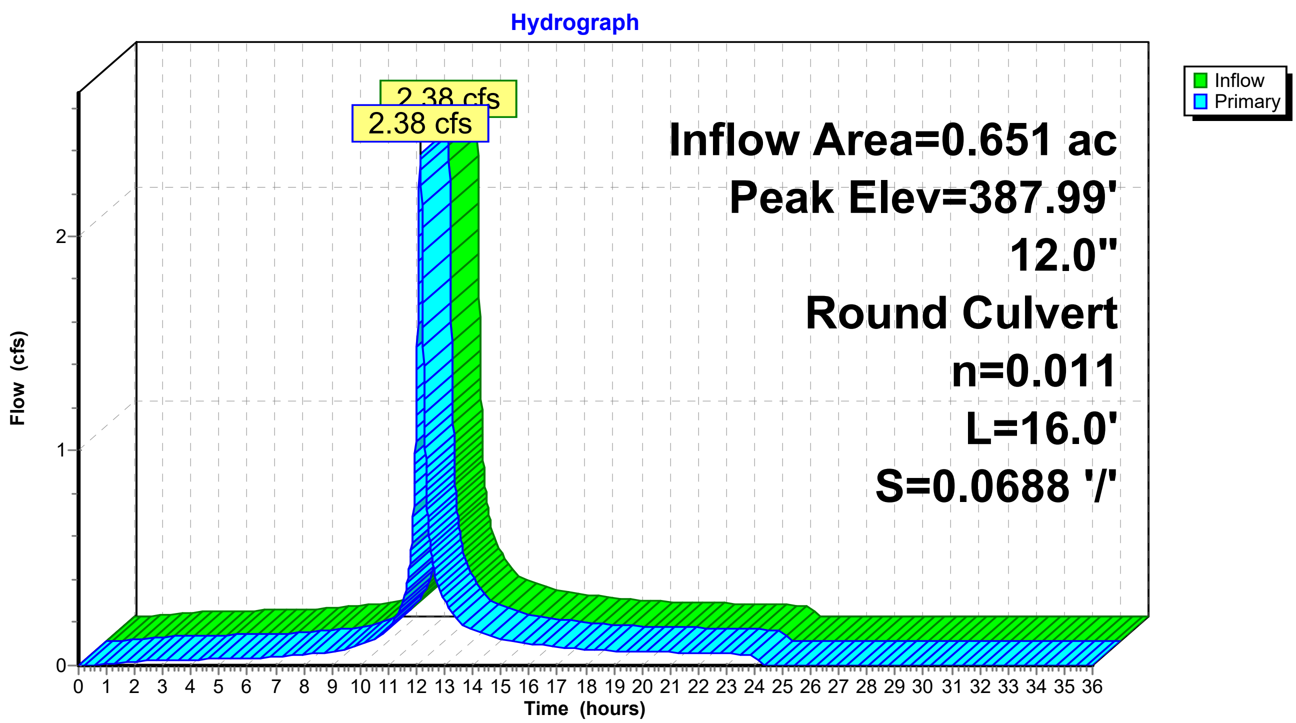
Inflow Area = 0.651 ac, 41.31% Impervious, Inflow Depth = 4.19" for 25-YR event
Inflow = 2.38 cfs @ 12.12 hrs, Volume= 0.227 af
Outflow = 2.38 cfs @ 12.12 hrs, Volume= 0.227 af, Atten= 0%, Lag= 0.0 min
Primary = 2.38 cfs @ 12.12 hrs, Volume= 0.227 af
Routed to Pond 18P : DMH A

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 387.99' @ 12.12 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	387.10'	**12.0" Round Culvert** L= 16.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 387.10' / 386.00' S= 0.0688 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=2.37 cfs @ 12.12 hrs HW=387.99' TW=377.90' (Dynamic Tailwater)
1=Culvert (Inlet Controls 2.37 cfs @ 3.21 fps)

Pond 17P: DMH 5+47



Summary for Pond 18P: DMH A

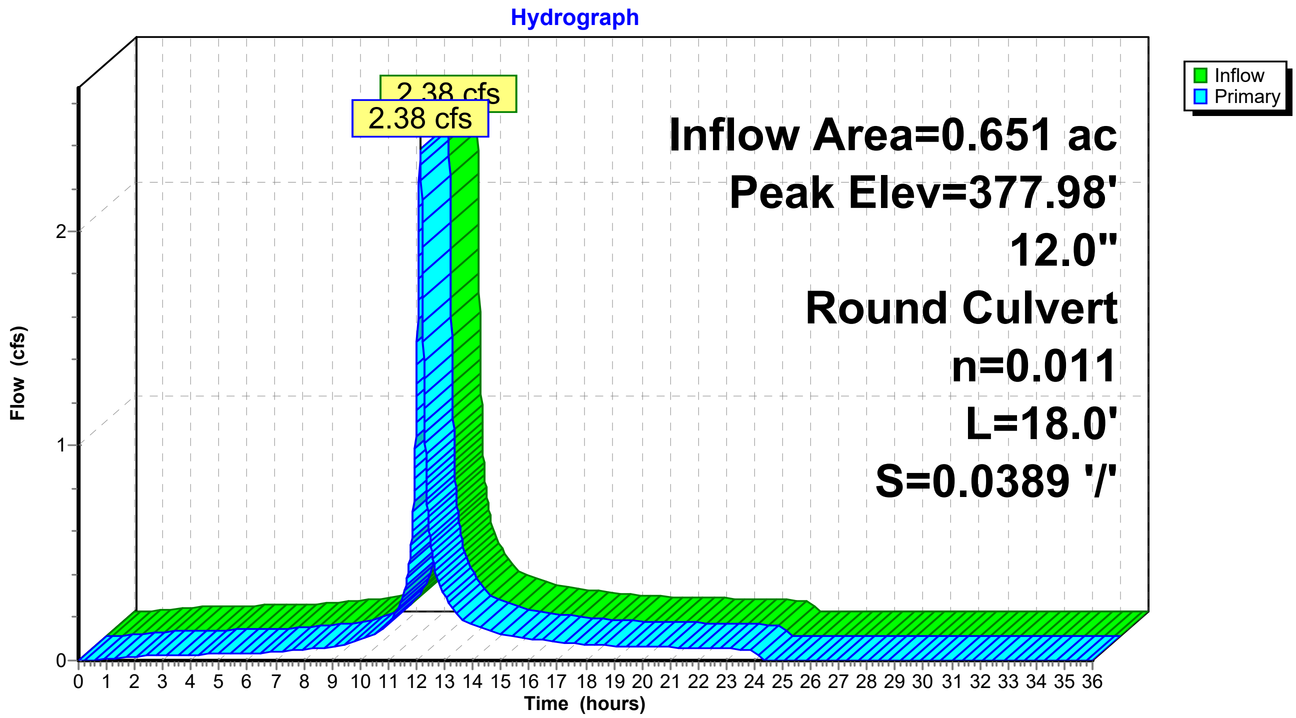
Inflow Area = 0.651 ac, 41.31% Impervious, Inflow Depth = 4.19" for 25-YR event
Inflow = 2.38 cfs @ 12.12 hrs, Volume= 0.227 af
Outflow = 2.38 cfs @ 12.12 hrs, Volume= 0.227 af, Atten= 0%, Lag= 0.0 min
Primary = 2.38 cfs @ 12.12 hrs, Volume= 0.227 af
Routed to Pond 26P : Infiltration Basin #2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 377.98' @ 12.19 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	377.00'	**12.0" Round Culvert** L= 18.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 377.00' / 376.30' S= 0.0389 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=2.26 cfs @ 12.12 hrs HW=377.90' TW=377.44' (Dynamic Tailwater)
1=Culvert (Outlet Controls 2.26 cfs @ 4.02 fps)

Pond 18P: DMH A



Summary for Subcatchment 19P: P2e

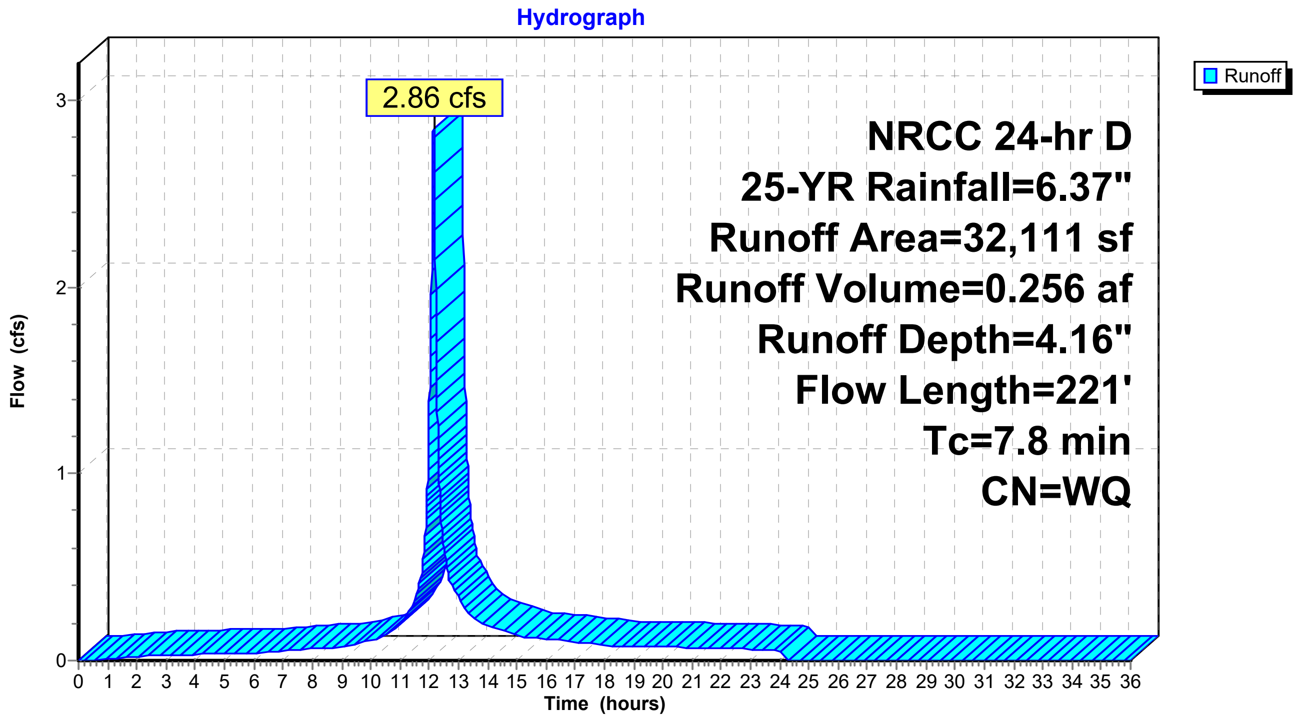
Runoff = 2.86 cfs @ 12.15 hrs, Volume= 0.256 af, Depth= 4.16"
Routed to Pond 20P : CB 7+57 L

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 25-YR Rainfall=6.37"

Area (sf)	CN	Description
4,995	98	Paved parking HSG B
1,377	98	Paved parking, HSG D
7,748	98	Roofs, HSG B
52	98	Roofs, HSG D
14,555	61	>75% Grass cover, Good HSG B
3,384	80	>75% Grass cover, Good, HSG D
32,111		Weighted Average
17,939		55.87% Pervious Area
14,172		44.13% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.8	100	0.1200	0.25		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.36"
0.6	27	0.0100	0.70		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.4	94	0.0400	4.06		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
7.8	221	Total			

Subcatchment 19P: P2e



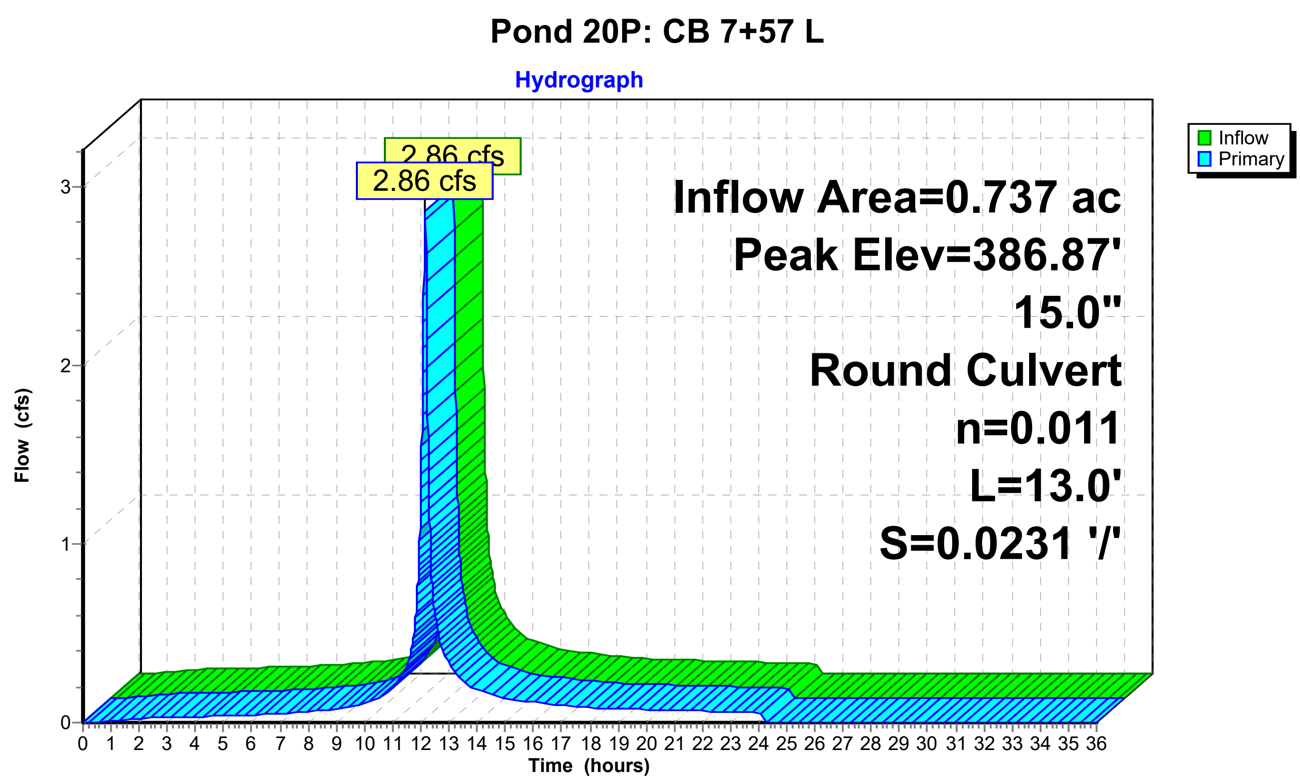
Summary for Pond 20P: CB 7+57 L

Inflow Area = 0.737 ac, 44.13% Impervious, Inflow Depth = 4.16" for 25-YR event
Inflow = 2.86 cfs @ 12.15 hrs, Volume= 0.256 af
Outflow = 2.86 cfs @ 12.15 hrs, Volume= 0.256 af, Atten= 0%, Lag= 0.0 min
Primary = 2.86 cfs @ 12.15 hrs, Volume= 0.256 af
Routed to Pond 23P : DMH 7+46

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 386.87' @ 12.15 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	386.00'	**15.0" Round Culvert** L= 13.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 386.00' / 385.70' S= 0.0231 '/' Cc= 0.900 n= 0.011, Flow Area= 1.23 sf

Primary OutFlow Max=2.86 cfs @ 12.15 hrs HW=386.87' TW=386.18' (Dynamic Tailwater)
1=Culvert (Barrel Controls 2.86 cfs @ 4.41 fps)



Summary for Subcatchment 21P: P2f

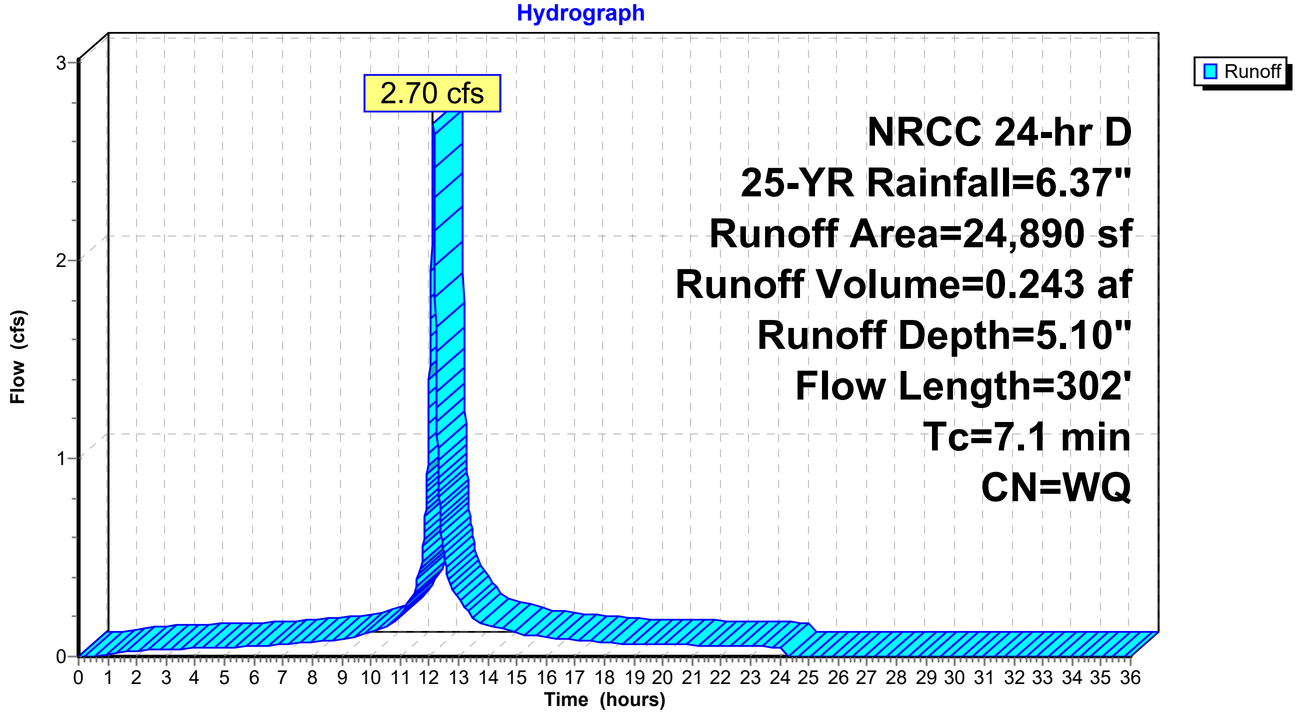
Runoff = 2.70 cfs @ 12.14 hrs, Volume= 0.243 af, Depth= 5.10"
Routed to Pond 22P : CB 7+57 R

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 25-YR Rainfall=6.37"

Area (sf)	CN	Description
9,156	98	Paved parking HSG B
1,692	98	Paved parking HSG D
7,150	98	Roofs, HSG B
6,334	61	>75% Grass cover, Good HSG B
558	80	>75% Grass cover, Good HSG D
24,890		Weighted Average
6,892		27.69% Pervious Area
17,998		72.31% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	23	0.0200	0.09		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.36"
1.1	77	0.0150	1.19		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.36"
1.7	202	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
7.1	302	Total			

Subcatchment 21P: P2f



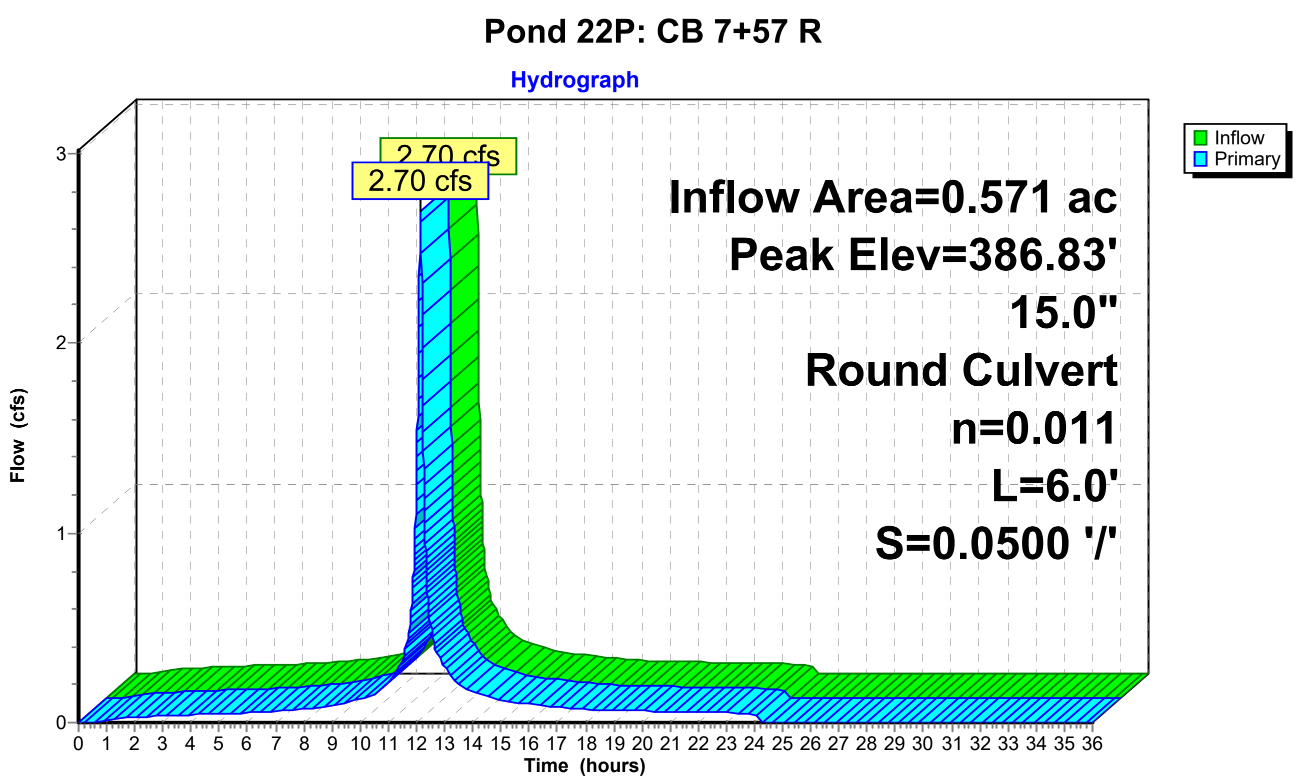
Summary for Pond 22P: CB 7+57 R

Inflow Area = 0.571 ac, 72.31% Impervious, Inflow Depth = 5.10" for 25-YR event
Inflow = 2.70 cfs @ 12.14 hrs, Volume= 0.243 af
Outflow = 2.70 cfs @ 12.14 hrs, Volume= 0.243 af, Atten= 0%, Lag= 0.0 min
Primary = 2.70 cfs @ 12.14 hrs, Volume= 0.243 af
Routed to Pond 23P : DMH 7+46

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 386.83' @ 12.14 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	386.00'	**15.0" Round Culvert** L= 6.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 386.00' / 385.70' S= 0.0500 '/' Cc= 0.900 n= 0.011, Flow Area= 1.23 sf

Primary OutFlow Max=2.69 cfs @ 12.14 hrs HW=386.83' TW=386.18' (Dynamic Tailwater)
1=Culvert (Inlet Controls 2.69 cfs @ 3.11 fps)



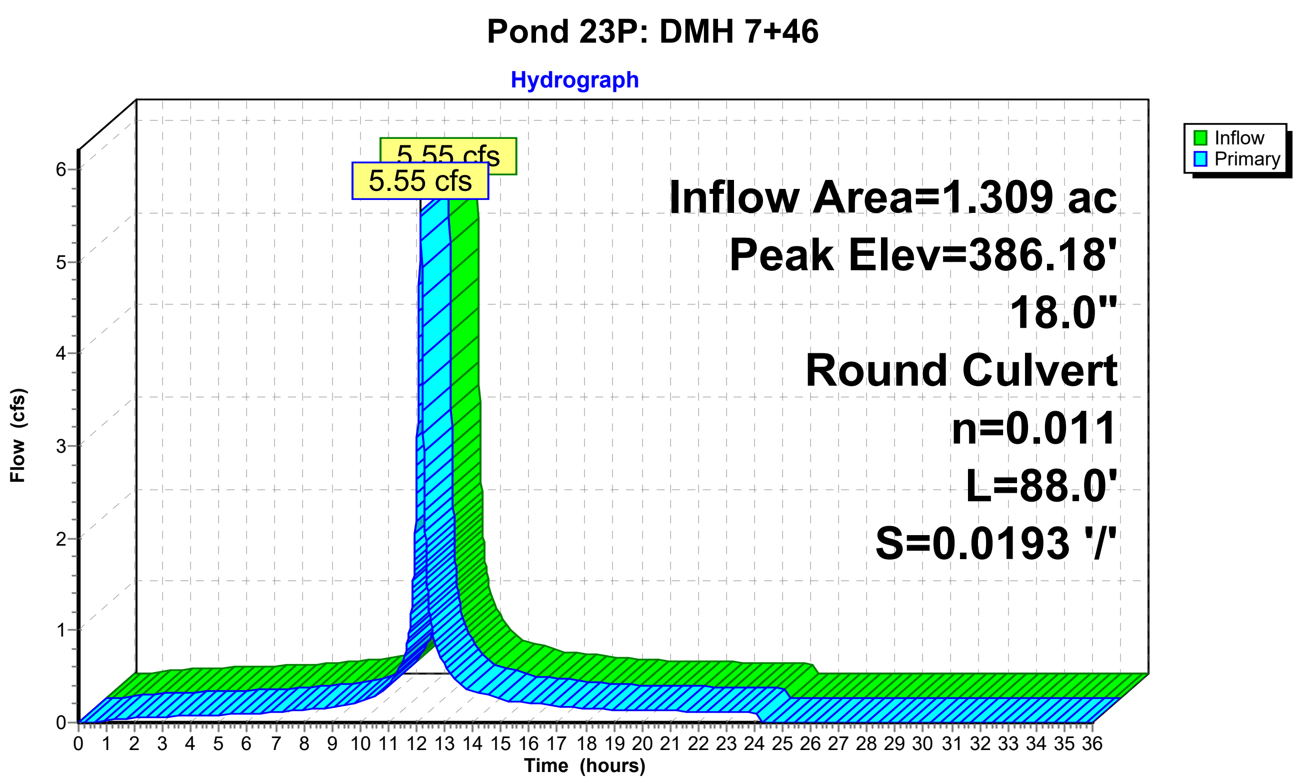
Summary for Pond 23P: DMH 7+46

Inflow Area = 1.309 ac, 56.44% Impervious, Inflow Depth = 4.57" for 25-YR event
Inflow = 5.55 cfs @ 12.14 hrs, Volume= 0.499 af
Outflow = 5.55 cfs @ 12.14 hrs, Volume= 0.499 af, Atten= 0%, Lag= 0.0 min
Primary = 5.55 cfs @ 12.14 hrs, Volume= 0.499 af
Routed to Pond 24P : DMH 6+54

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 386.18' @ 12.14 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	385.00'	**18.0" Round Culvert** L= 88.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 385.00' / 383.30' S= 0.0193 '/' Cc= 0.900 n= 0.011, Flow Area= 1.77 sf

Primary OutFlow Max=5.53 cfs @ 12.14 hrs HW=386.18' TW=384.43' (Dynamic Tailwater)
└**1=Culvert** (Inlet Controls 5.53 cfs @ 3.70 fps)



Summary for Pond 24P: DMH 6+54

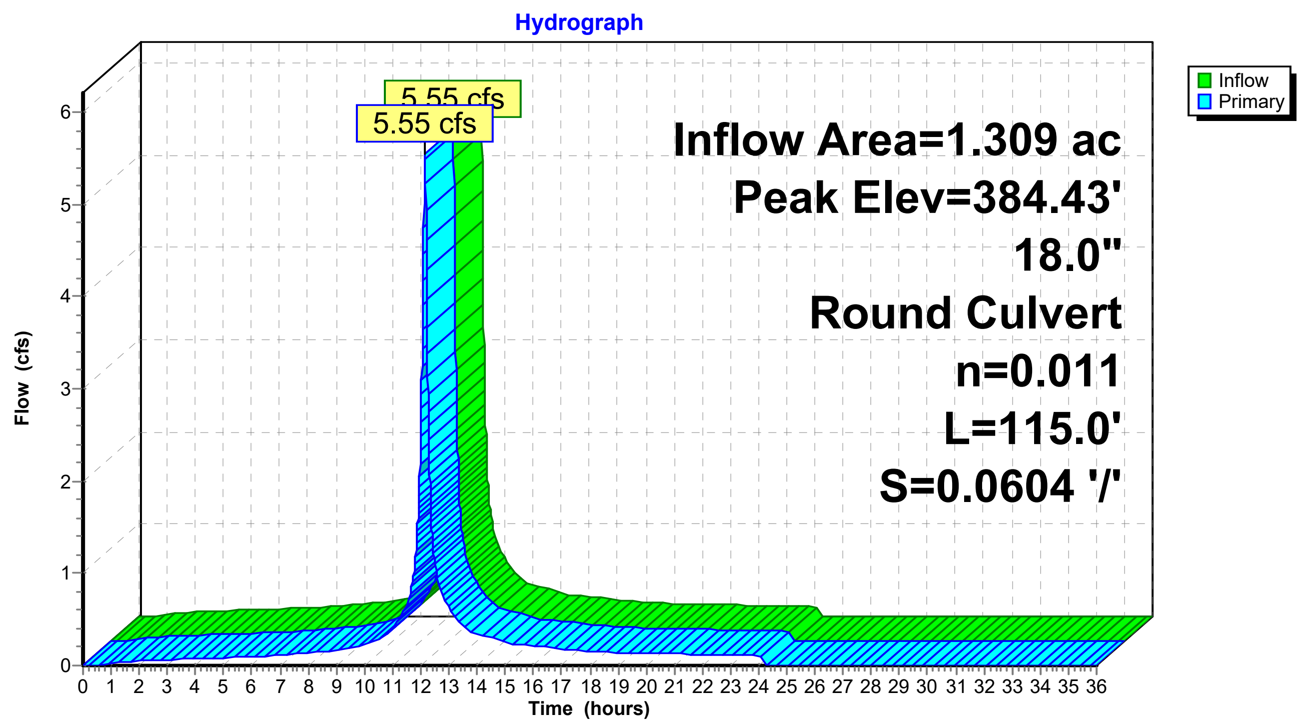
Inflow Area = 1.309 ac, 56.44% Impervious, Inflow Depth = 4.57" for 25-YR event
Inflow = 5.55 cfs @ 12.14 hrs, Volume= 0.499 af
Outflow = 5.55 cfs @ 12.14 hrs, Volume= 0.499 af, Atten= 0%, Lag= 0.0 min
Primary = 5.55 cfs @ 12.14 hrs, Volume= 0.499 af
Routed to Pond 26P : Infiltration Basin #2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 384.43' @ 12.14 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	383.25'	**18.0" Round Culvert** L= 115.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 383.25' / 376.30' S= 0.0604 '/' Cc= 0.900 n= 0.011, Flow Area= 1.77 sf

Primary OutFlow Max=5.53 cfs @ 12.14 hrs HW=384.43' TW=377.53' (Dynamic Tailwater)
1=Culvert (Inlet Controls 5.53 cfs @ 3.70 fps)

Pond 24P: DMH 6+54



Summary for Subcatchment 25P: P2g

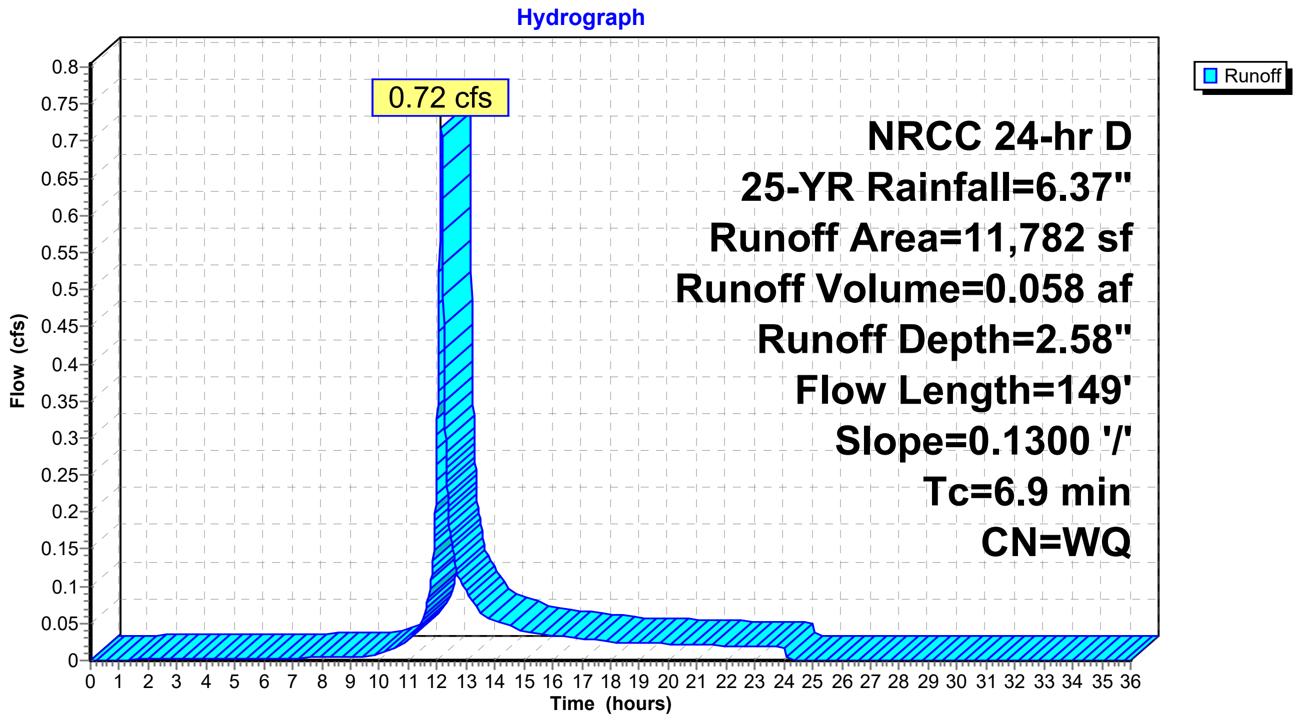
Runoff = 0.72 cfs @ 12.14 hrs, Volume= 0.058 af, Depth= 2.58"
Routed to Pond 26P : Infiltration Basin #2

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 25-YR Rainfall=6.37"

Area (sf)	CN	Description
988	98	Roofs HSG B
10,794	61	>75% Grass cover, Good HSG B
11,782		Weighted Average
10,794		91.61% Pervious Area
988		8.39% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.6	100	0.1300	0.25		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.36"
0.3	49	0.1300	2.52		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
6.9	149	Total			

Subcatchment 25P: P2g



Summary for Pond 26P: Infiltration Basin #2

Inflow Area = 2.230 ac, 46.20% Impervious, Inflow Depth = 4.22" for 25-YR event
Inflow = 8.62 cfs @ 12.14 hrs, Volume= 0.784 af
Outflow = 4.06 cfs @ 12.27 hrs, Volume= 0.784 af, Atten= 53%, Lag= 7.9 min
Discarded = 0.26 cfs @ 12.27 hrs, Volume= 0.432 af
Primary = 3.80 cfs @ 12.27 hrs, Volume= 0.352 af
Routed to Link 28P : Sub-DP #2a: Flow to Town Land

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 377.80' @ 12.27 hrs Surf.Area= 4,639 sf Storage= 8,113 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 75.9 min (865.2 - 789.3)

Volume	Invert	Avail.Storage	Storage Description
#1	376.00'	16,211 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

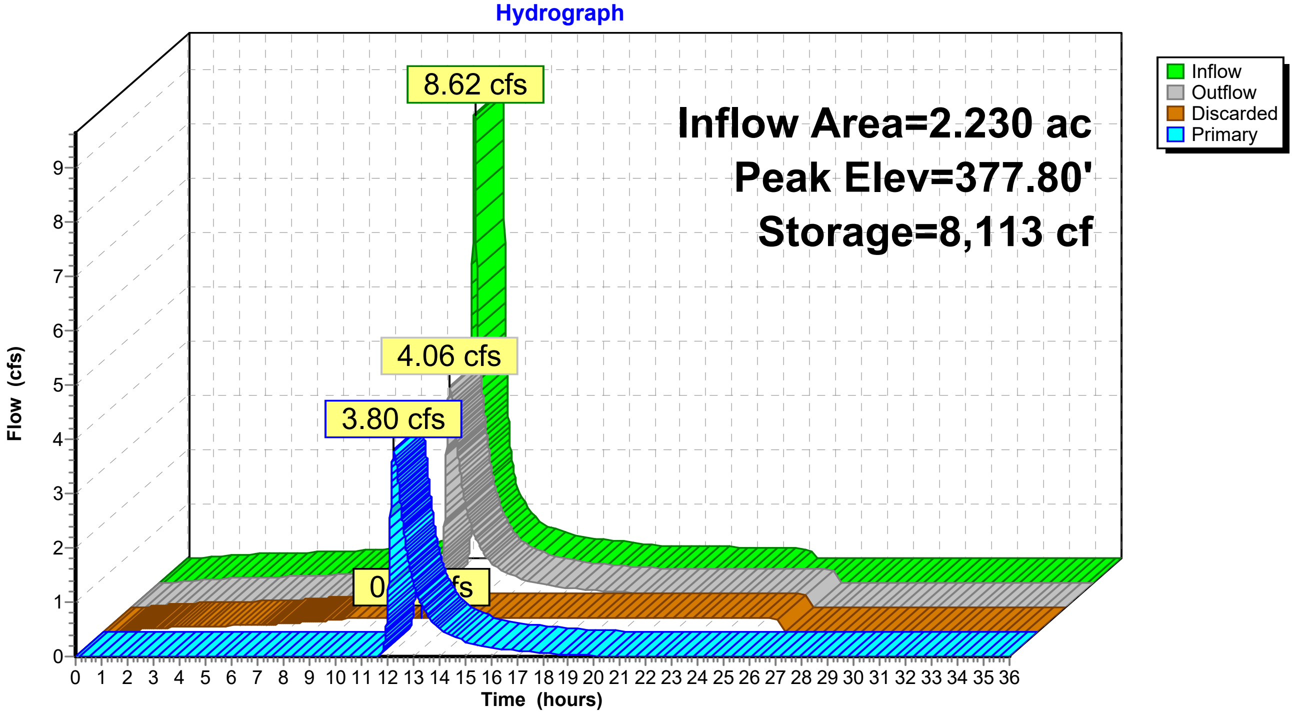
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
376.00	4,363	266.0	0	0	4,363
379.50	4,906	278.0	16,211	16,211	5,448

Device	Routing	Invert	Outlet Devices
#1	Discarded	376.00'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	376.50'	**15.0" Round Culvert** L= 3.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 376.50' / 376.50' S= 0.0000 '/' Cc= 0.900 n= 0.011, Flow Area= 1.23 sf

Discarded OutFlow Max=0.26 cfs @ 12.27 hrs HW=377.80' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.26 cfs)

Primary OutFlow Max=3.80 cfs @ 12.27 hrs HW=377.80' TW=0.00' (Dynamic Tailwater)
└─**2=Culvert** (Barrel Controls 3.80 cfs @ 3.69 fps)

Pond 26P: Infiltration Basin #2



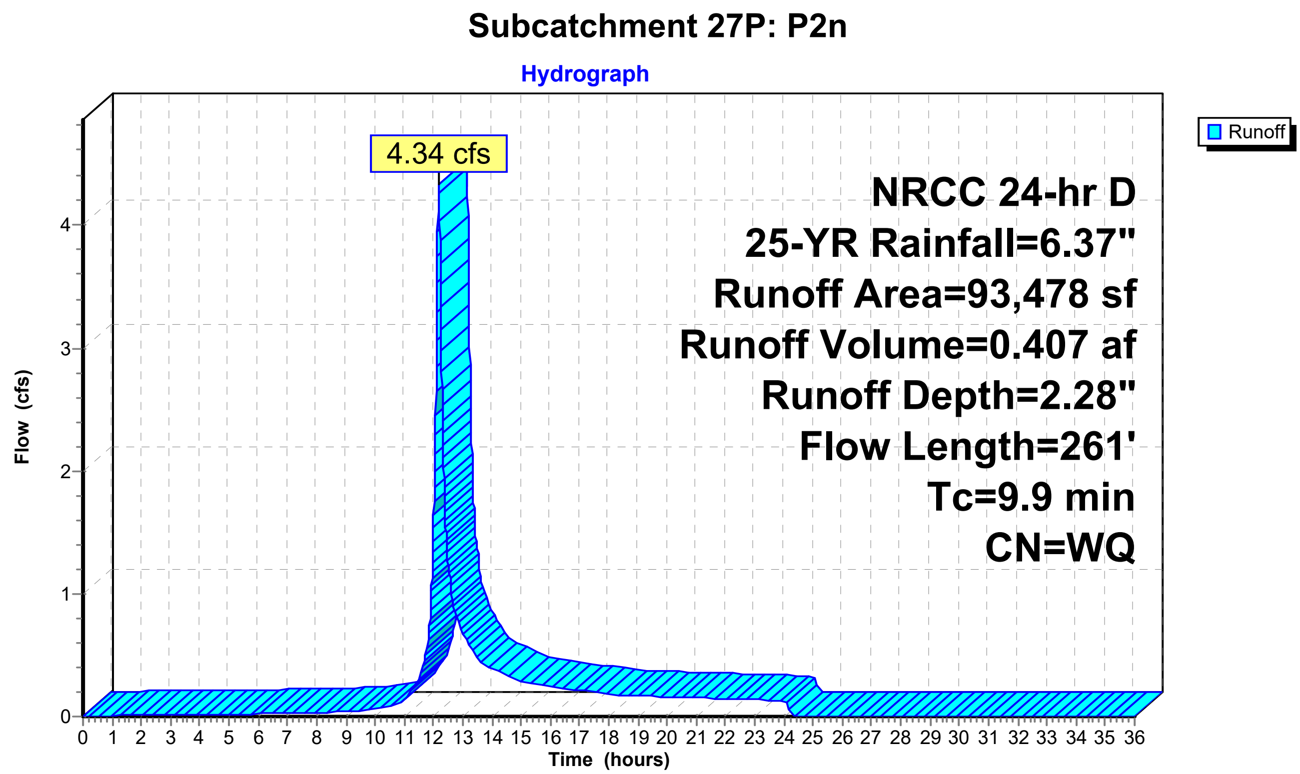
Summary for Subcatchment 27P: P2n

Runoff = 4.34 cfs @ 12.18 hrs, Volume= 0.407 af, Depth= 2.28"
Routed to Link 28P : Sub-DP #2a: Flow to Town Land

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 25-YR Rainfall=6.37"

Area (sf)	CN	Description
59,016	55	Woods, Good HSG B
7,591	98	Roofs HSG B
2,898	70	Woods, Good HSG C
23,595	61	>75% Grass cover, Good HSG B
378	80	>75% Grass cover, Good HSG D
93,478		Weighted Average
85,887		91.88% Pervious Area
7,591		8.12% Impervious Area

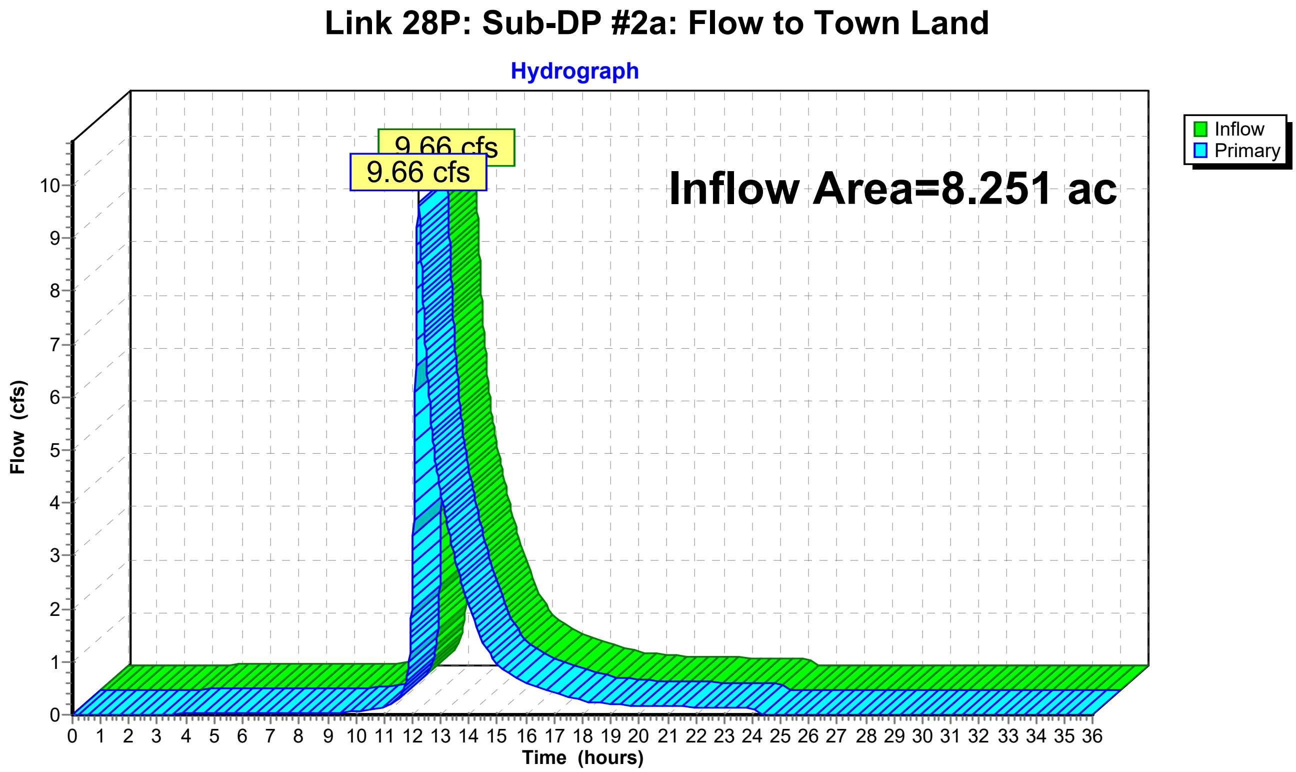
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	100	0.0710	0.20		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.36"
1.5	161	0.1200	1.73		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
9.9	261	Total			



Summary for Link 28P: Sub-DP #2a: Flow to Town Land

Inflow Area = 8.251 ac, 30.56% Impervious, Inflow Depth = 1.69" for 25-YR event
Inflow = 9.66 cfs @ 12.21 hrs, Volume= 1.164 af
Primary = 9.66 cfs @ 12.21 hrs, Volume= 1.164 af, Atten= 0%, Lag= 0.0 min
Routed to Link 44P : Design Point #2: Flow to Uncas Brook

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs



Summary for Subcatchment 29P: P2h

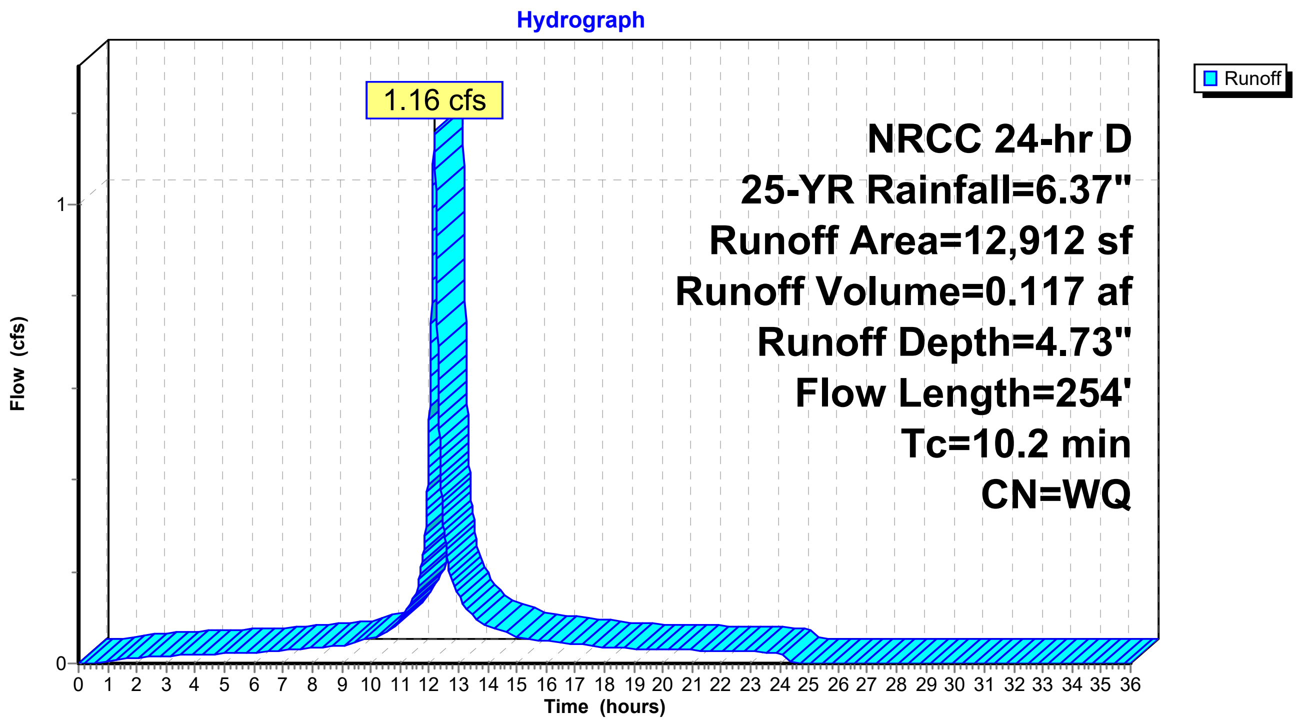
Runoff = 1.16 cfs @ 12.17 hrs, Volume= 0.117 af, Depth= 4.73"
Routed to Pond 30P : CB 12+97 R

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 25-YR Rainfall=6.37"

Area (sf)	CN	Description
5,638	98	Paved parking, HSG B
2,600	98	Roofs, HSG B
4,674	61	>75% Grass cover, Good, HSG B
12,912		Weighted Average
4,674		36.20% Pervious Area
8,238		63.80% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	80	0.0350	0.14		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.36"
0.9	174	0.0250	3.21		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
10.2	254	Total			

Subcatchment 29P: P2h



Summary for Pond 30P: CB 12+97 R

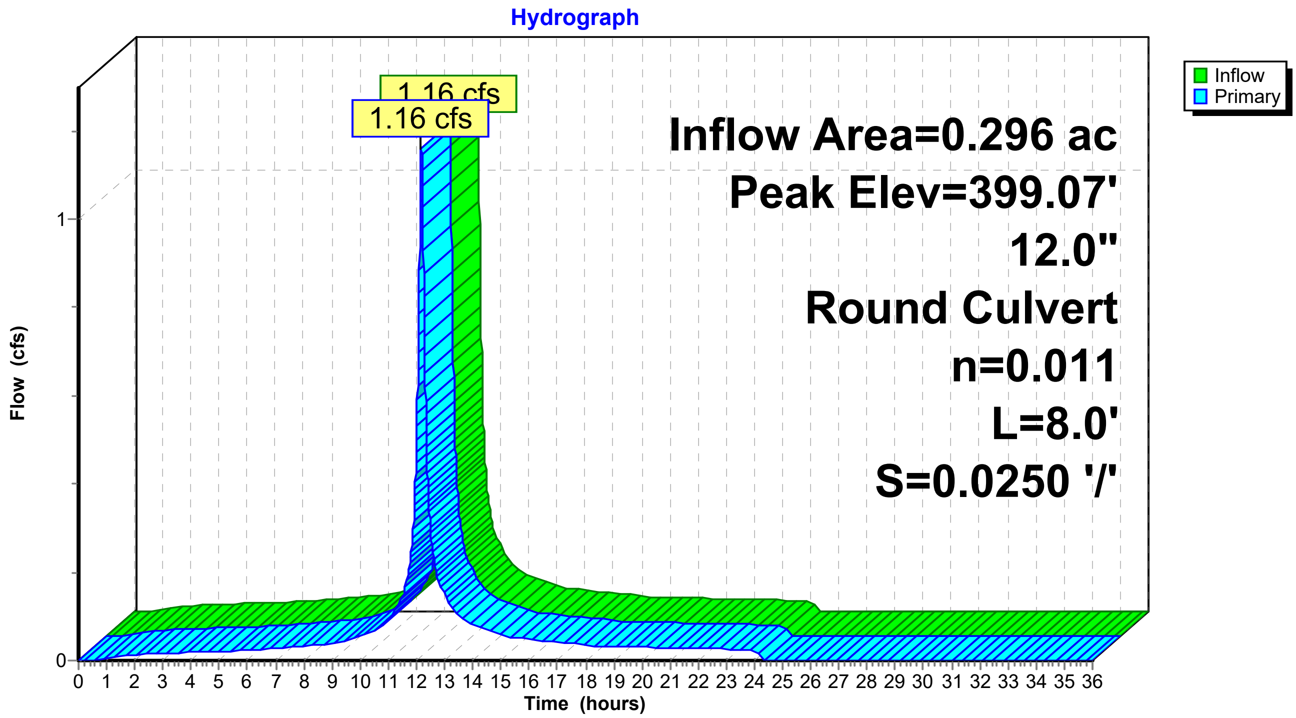
Inflow Area = 0.296 ac, 63.80% Impervious, Inflow Depth = 4.73" for 25-YR event
Inflow = 1.16 cfs @ 12.17 hrs, Volume= 0.117 af
Outflow = 1.16 cfs @ 12.17 hrs, Volume= 0.117 af, Atten= 0%, Lag= 0.0 min
Primary = 1.16 cfs @ 12.17 hrs, Volume= 0.117 af
Routed to Pond 33P : DMH 12+87

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 399.07' @ 12.17 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	398.50'	**12.0" Round Culvert** L= 8.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 398.50' / 398.30' S= 0.0250 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=1.16 cfs @ 12.17 hrs HW=399.07' TW=398.12' (Dynamic Tailwater)
1=Culvert (Barrel Controls 1.16 cfs @ 3.60 fps)

Pond 30P: CB 12+97 R



Summary for Subcatchment 31P: P2i

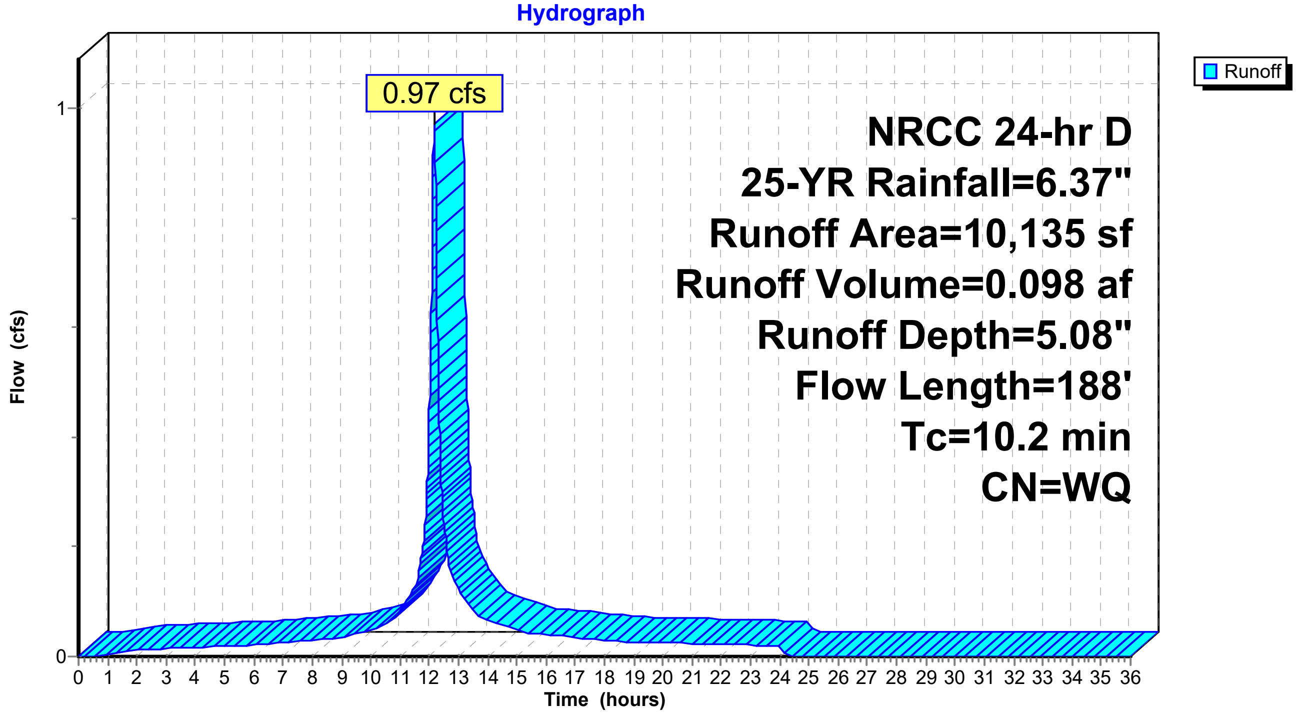
Runoff = 0.97 cfs @ 12.17 hrs, Volume= 0.098 af, Depth= 5.08"
Routed to Pond 32P : CB 12+97 L

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 25-YR Rainfall=6.37"

Area (sf)	CN	Description
4,134	98	Paved parking HSG B
3,250	98	Roofs, HSG B
2,751	61	>75% Grass cover, Good HSG B
10,135		Weighted Average
2,751		27.14% Pervious Area
7,384		72.86% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.2	25	0.0250	0.10		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.36"
0.3	22	0.0250	1.14		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.36"
4.7	29	0.0250	0.10		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.36"
0.0	12	0.0400	4.06		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.4	37	0.0400	1.40		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.1	22	0.0400	4.06		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.5	41	0.0400	1.40		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
10.2	188	Total			

Subcatchment 31P: P2i



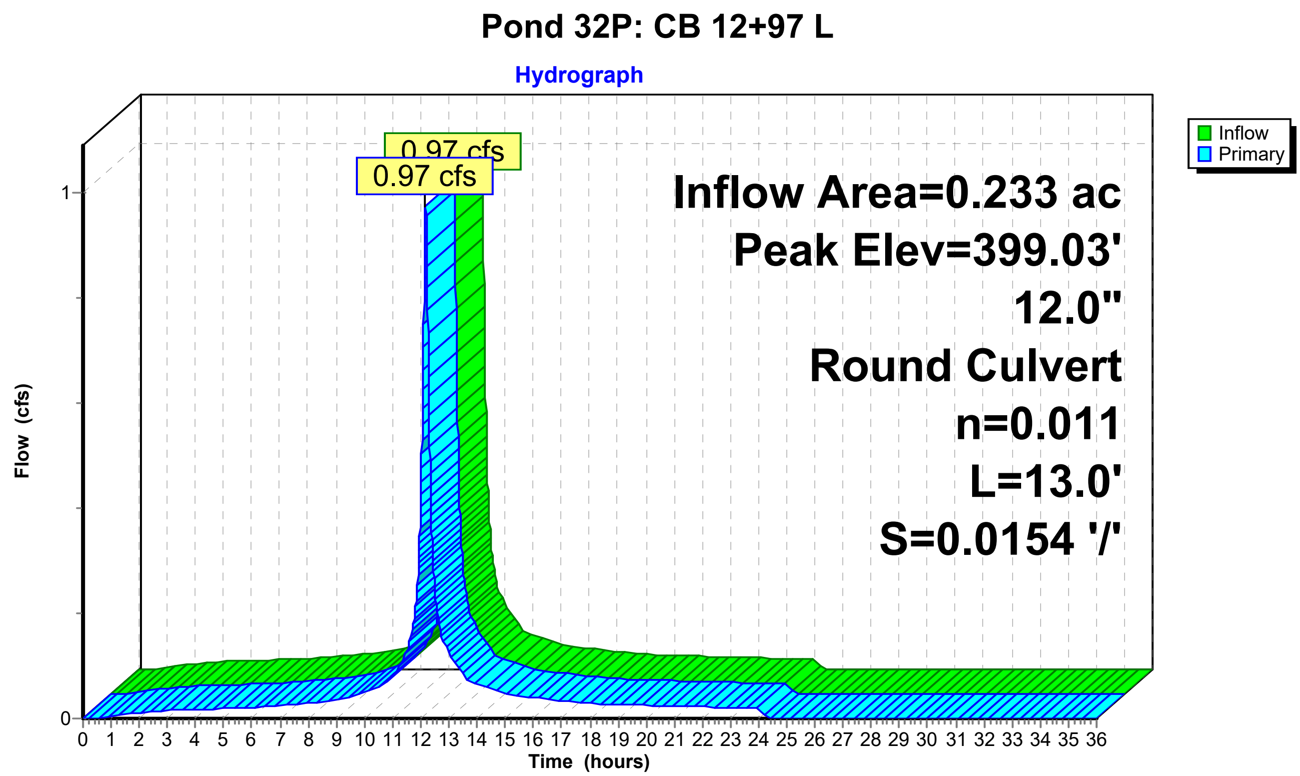
Summary for Pond 32P: CB 12+97 L

Inflow Area = 0.233 ac, 72.86% Impervious, Inflow Depth = 5.08" for 25-YR event
Inflow = 0.97 cfs @ 12.17 hrs, Volume= 0.098 af
Outflow = 0.97 cfs @ 12.17 hrs, Volume= 0.098 af, Atten= 0%, Lag= 0.0 min
Primary = 0.97 cfs @ 12.17 hrs, Volume= 0.098 af
Routed to Pond 33P : DMH 12+87

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 399.03' @ 12.17 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	398.50'	**12.0" Round Culvert** L= 13.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 398.50' / 398.30' S= 0.0154 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=0.97 cfs @ 12.17 hrs HW=399.02' TW=398.12' (Dynamic Tailwater)
└─**1=Culvert** (Barrel Controls 0.97 cfs @ 3.38 fps)



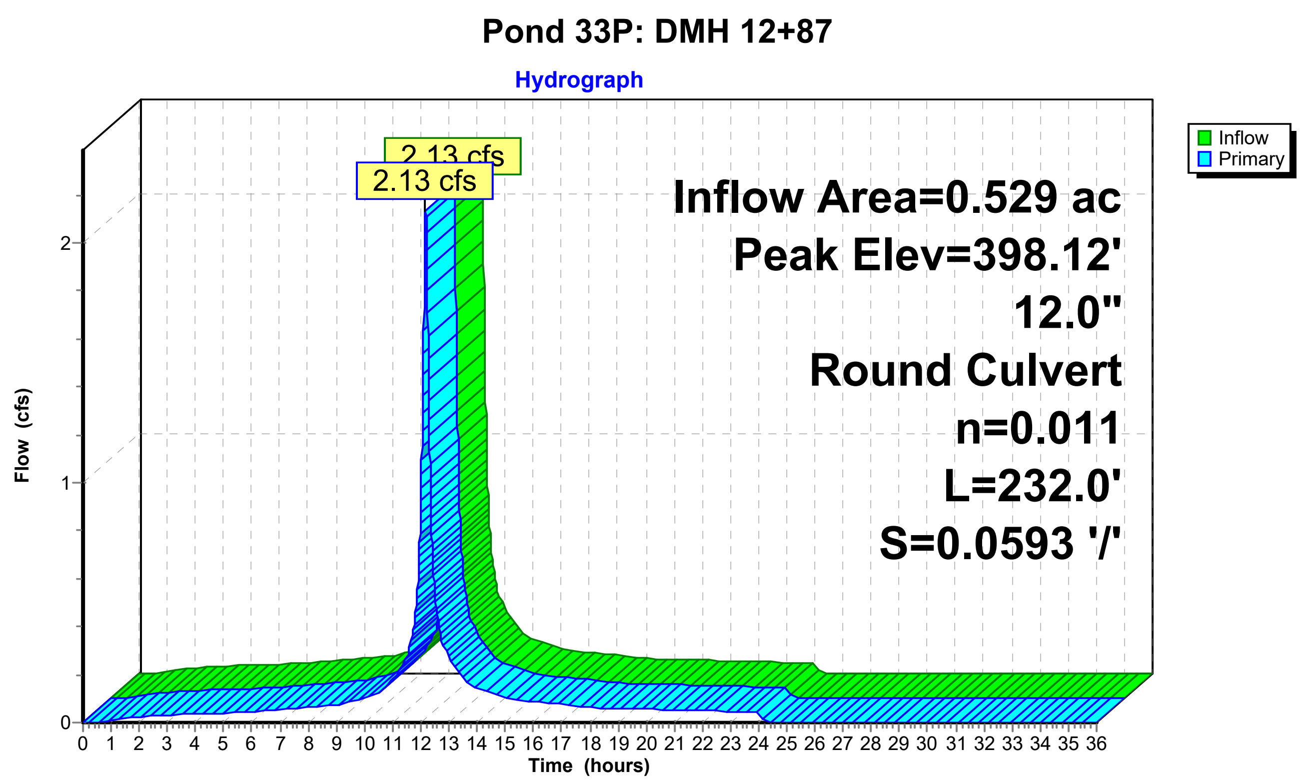
Summary for Pond 33P: DMH 12+87

Inflow Area = 0.529 ac, 67.78% Impervious, Inflow Depth = 4.88" for 25-YR event
Inflow = 2.13 cfs @ 12.17 hrs, Volume= 0.215 af
Outflow = 2.13 cfs @ 12.17 hrs, Volume= 0.215 af, Atten= 0%, Lag= 0.0 min
Primary = 2.13 cfs @ 12.17 hrs, Volume= 0.215 af
Routed to Pond 39P : FD B

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 398.12' @ 12.17 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	397.30'	**12.0" Round Culvert** L= 232.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 397.30' / 383.55' S= 0.0593 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=2.13 cfs @ 12.17 hrs HW=398.12' TW=383.21' (Dynamic Tailwater)
1=Culvert (Inlet Controls 2.13 cfs @ 3.09 fps)



Summary for Subcatchment 34P: P2j

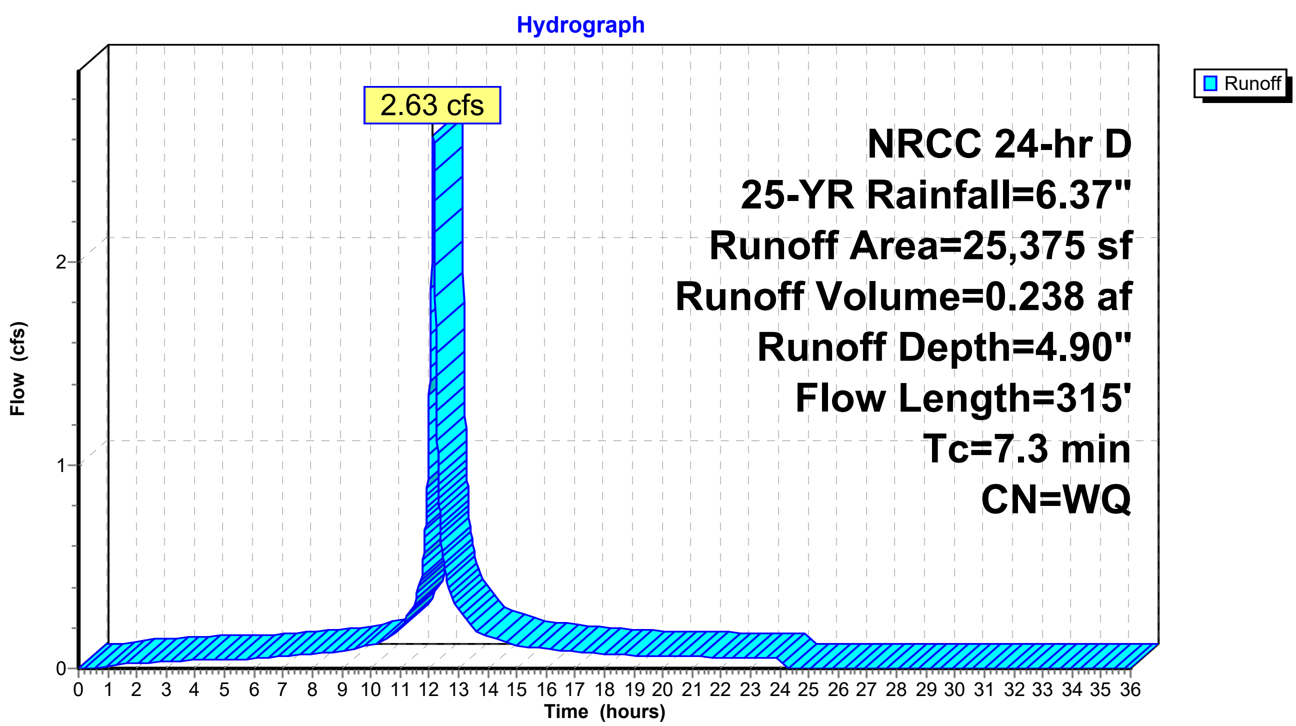
Runoff = 2.63 cfs @ 12.14 hrs, Volume= 0.238 af, Depth= 4.90"
Routed to Pond 35P : CB 10+30 R

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 25-YR Rainfall=6.37"

Area (sf)	CN	Description
8,847	98	Paved parking HSG B
8,450	98	Roofs HSG B
8,078	61	>75% Grass cover, Good HSG B
25,375		Weighted Average
8,078		31.83% Pervious Area
17,297		68.17% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.1	56	0.0500	0.15		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.36"
1.2	259	0.0300	3.52		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
7.3	315	Total			

Subcatchment 34P: P2j



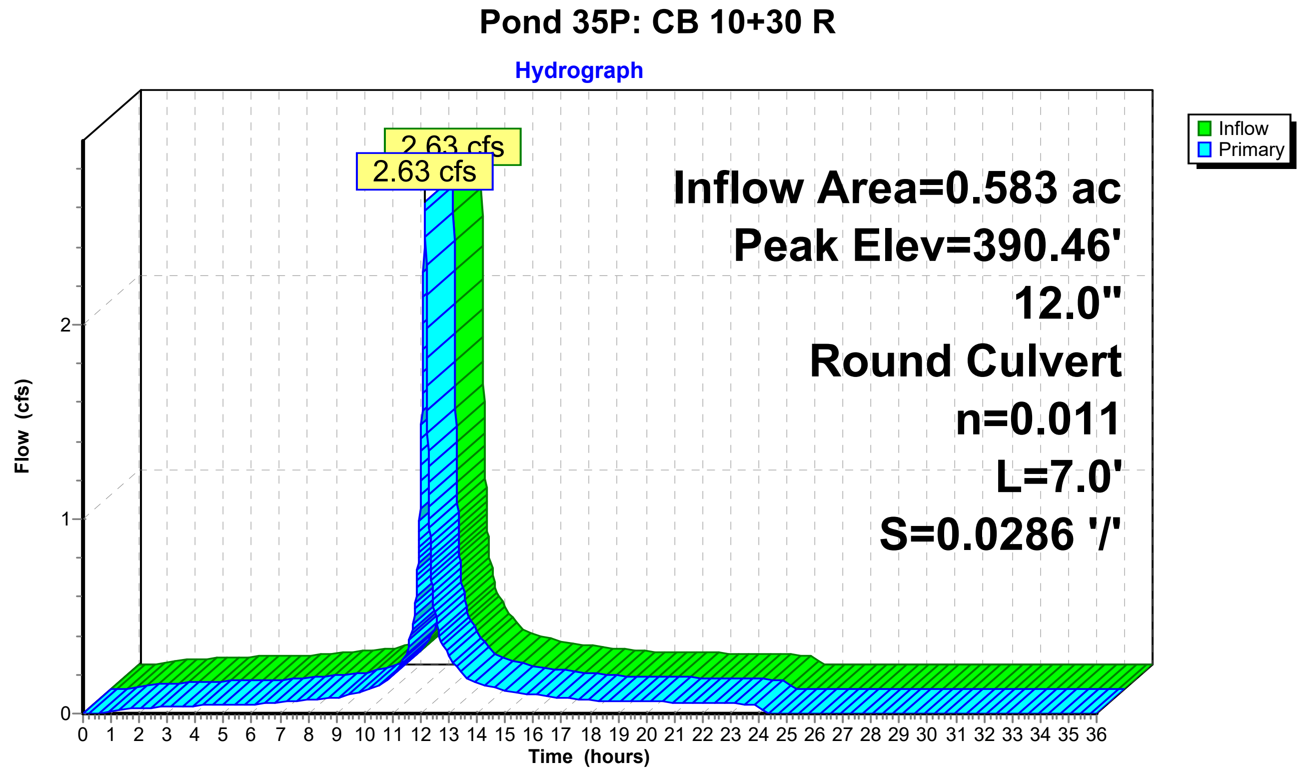
Summary for Pond 35P: CB 10+30 R

Inflow Area = 0.583 ac, 68.17% Impervious, Inflow Depth = 4.90" for 25-YR event
Inflow = 2.63 cfs @ 12.14 hrs, Volume= 0.238 af
Outflow = 2.63 cfs @ 12.14 hrs, Volume= 0.238 af, Atten= 0%, Lag= 0.0 min
Primary = 2.63 cfs @ 12.14 hrs, Volume= 0.238 af
Routed to Pond 38P : DMH 10+38

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 390.46' @ 12.15 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	389.30'	**12.0" Round Culvert** L= 7.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 389.30' / 389.10' S= 0.0286 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=2.59 cfs @ 12.14 hrs HW=390.45' TW=389.98' (Dynamic Tailwater)
1=Culvert (Inlet Controls 2.59 cfs @ 3.30 fps)



Summary for Subcatchment 36P: P2k

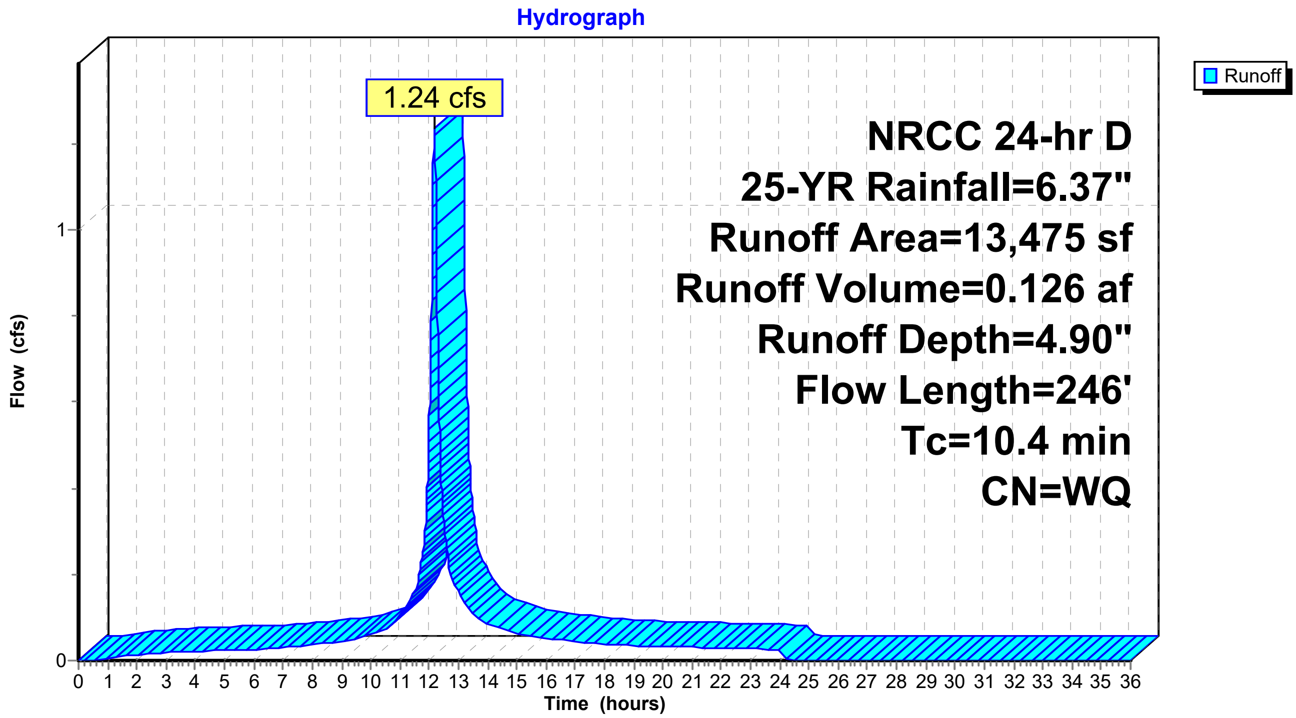
Runoff = 1.24 cfs @ 12.18 hrs, Volume= 0.126 af, Depth= 4.90"
Routed to Pond 37P : CB 10+30 L

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 25-YR Rainfall=6.37"

Area (sf)	CN	Description
4,639	98	Paved parking HSG B
4,550	98	Roofs HSG B
4,286	61	>75% Grass cover, Good HSG B
13,475		Weighted Average
4,286		31.81% Pervious Area
9,189		68.19% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.8	21	0.0500	0.13		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.36"
0.2	22	0.0500	1.50		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.36"
3.4	27	0.0500	0.13		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.36"
0.2	12	0.0500	1.33		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.36"
2.4	18	0.0500	0.12		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.36"
0.2	15	0.0500	1.57		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.1	22	0.0500	4.54		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.3	29	0.0400	1.40		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.0	12	0.0400	4.06		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.4	24	0.0200	0.99		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.4	44	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
10.4	246	Total			

Subcatchment 36P: P2k



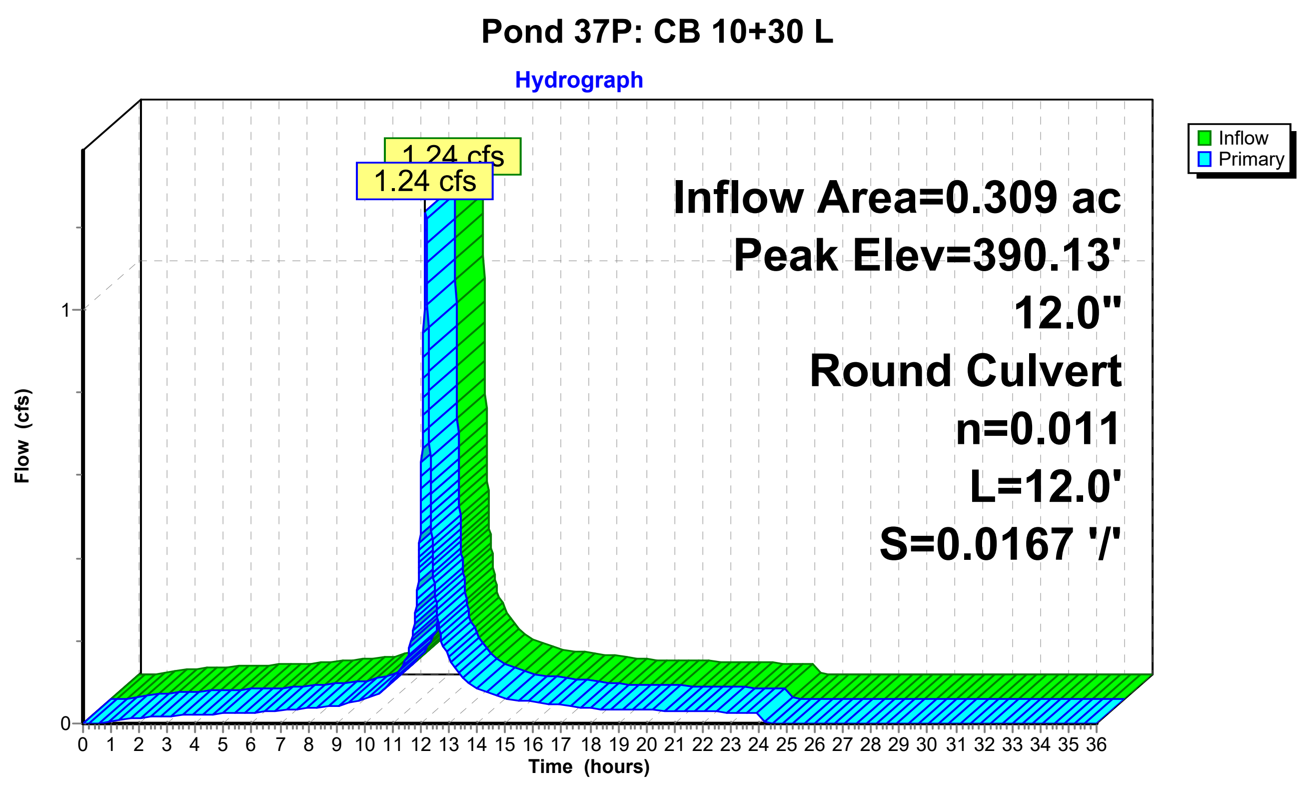
Summary for Pond 37P: CB 10+30 L

Inflow Area = 0.309 ac, 68.19% Impervious, Inflow Depth = 4.90" for 25-YR event
Inflow = 1.24 cfs @ 12.18 hrs, Volume= 0.126 af
Outflow = 1.24 cfs @ 12.18 hrs, Volume= 0.126 af, Atten= 0%, Lag= 0.0 min
Primary = 1.24 cfs @ 12.18 hrs, Volume= 0.126 af
Routed to Pond 38P : DMH 10+38

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 390.13' @ 12.16 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	389.30'	**12.0" Round Culvert** L= 12.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 389.30' / 389.10' S= 0.0167 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=1.31 cfs @ 12.18 hrs HW=390.13' TW=389.96' (Dynamic Tailwater)
└**1=Culvert** (Outlet Controls 1.31 cfs @ 2.54 fps)



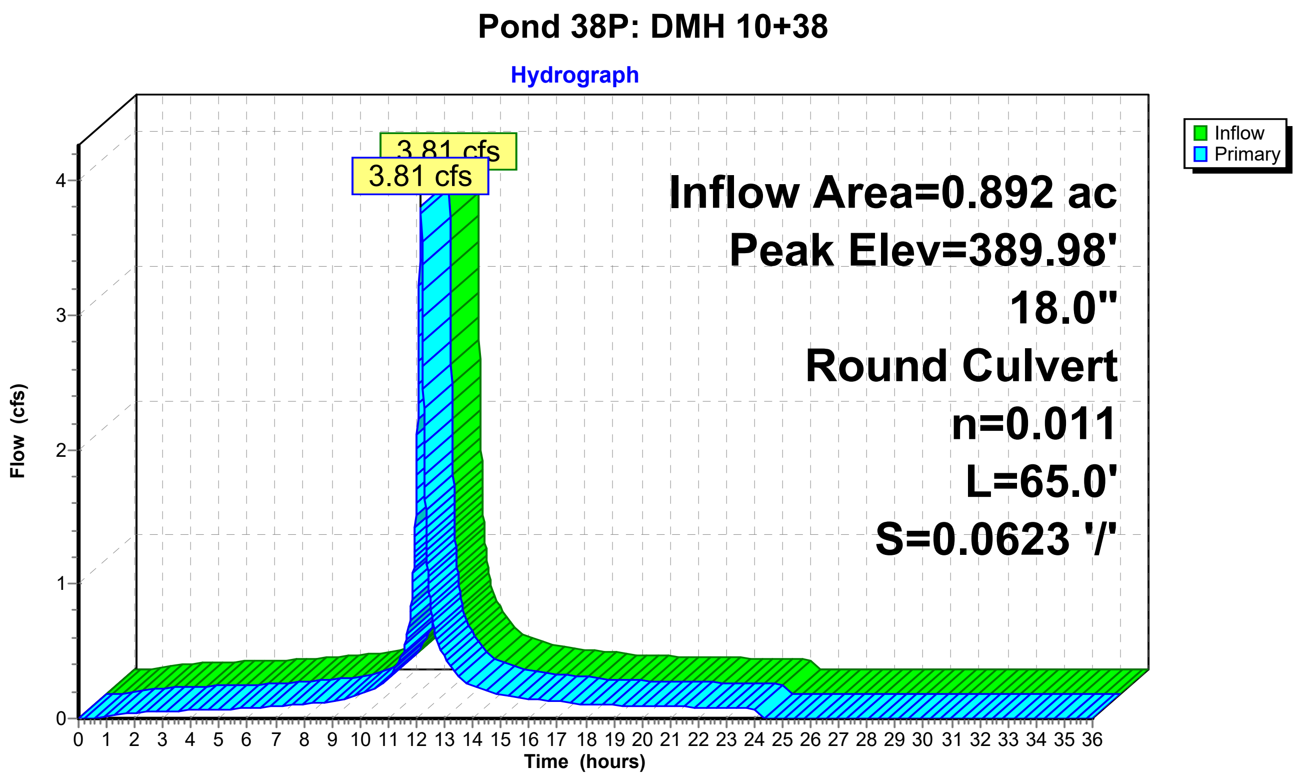
Summary for Pond 38P: DMH 10+38

Inflow Area = 0.892 ac, 68.18% Impervious, Inflow Depth = 4.90" for 25-YR event
Inflow = 3.81 cfs @ 12.15 hrs, Volume= 0.364 af
Outflow = 3.81 cfs @ 12.15 hrs, Volume= 0.364 af, Atten= 0%, Lag= 0.0 min
Primary = 3.81 cfs @ 12.15 hrs, Volume= 0.364 af
Routed to Pond 39P : FD B

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 389.98' @ 12.15 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	389.05'	**18.0" Round Culvert** L= 65.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 389.05' / 385.00' S= 0.0623 '/' Cc= 0.900 n= 0.011, Flow Area= 1.77 sf

Primary OutFlow Max=3.81 cfs @ 12.15 hrs HW=389.98' TW=383.23' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 3.81 cfs @ 3.29 fps)



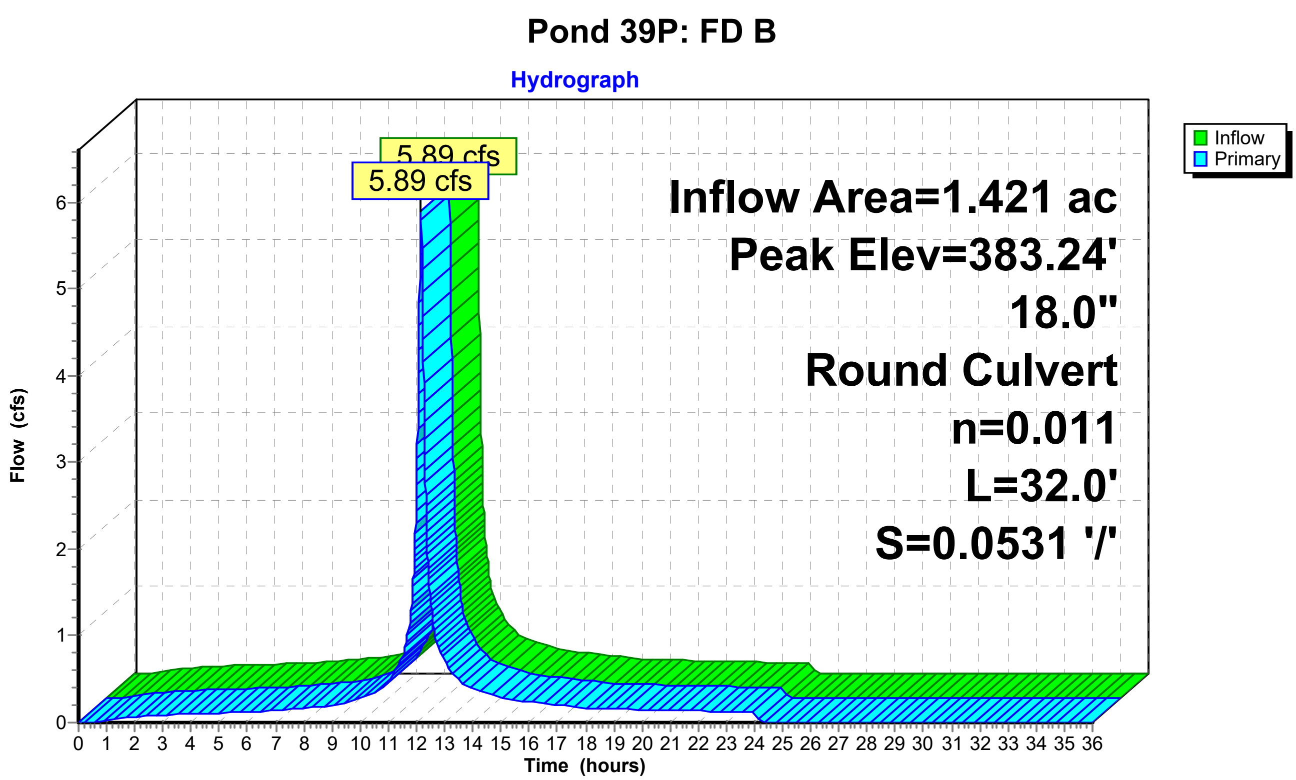
Summary for Pond 39P: FD B

Inflow Area = 1.421 ac, 68.03% Impervious, Inflow Depth = 4.89" for 25-YR event
Inflow = 5.89 cfs @ 12.16 hrs, Volume= 0.579 af
Outflow = 5.89 cfs @ 12.16 hrs, Volume= 0.579 af, Atten= 0%, Lag= 0.0 min
Primary = 5.89 cfs @ 12.16 hrs, Volume= 0.579 af
Routed to Pond 41P : Infiltration Basin #3

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 383.24' @ 12.16 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	382.00'	**18.0" Round Culvert** L= 32.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 382.00' / 380.30' S= 0.0531 '/' Cc= 0.900 n= 0.011, Flow Area= 1.77 sf

Primary OutFlow Max=5.88 cfs @ 12.16 hrs HW=383.23' TW=381.61' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 5.88 cfs @ 3.78 fps)



Summary for Subcatchment 40P: P2I

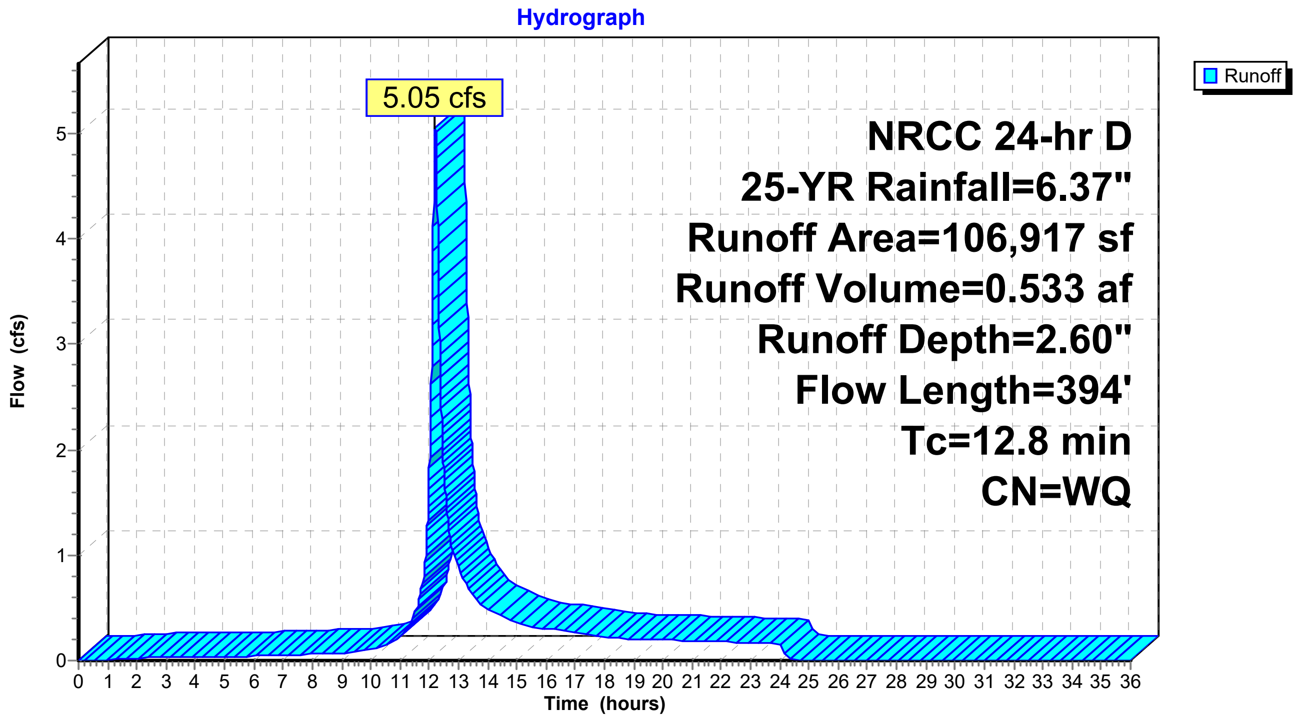
Runoff = 5.05 cfs @ 12.21 hrs, Volume= 0.533 af, Depth= 2.60"
Routed to Pond 41P : Infiltration Basin #3

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 25-YR Rainfall=6.37"

Area (sf)	CN	Description
3,235	98	Paved parking HSG B
12,020	98	Roofs, HSG B
47,471	61	>75% Grass cover, Good HSG B
617	74	>75% Grass cover, Good, HSG C
43,574	55	Woods, Good, HSG B
106,917		Weighted Average
91,662		85.73% Pervious Area
15,255		14.27% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	72	0.0800	0.13		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.36"
0.4	35	0.0800	1.41		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.1	287	0.0500	1.57		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
12.8	394	Total			

Subcatchment 40P: P2I



Summary for Pond 41P: Infiltration Basin #3

Inflow Area = 3.875 ac, 33.98% Impervious, Inflow Depth = 3.44" for 25-YR event
Inflow = 10.55 cfs @ 12.18 hrs, Volume= 1.112 af
Outflow = 4.35 cfs @ 12.40 hrs, Volume= 1.112 af, Atten= 59%, Lag= 13.8 min
Discarded = 0.53 cfs @ 12.40 hrs, Volume= 0.668 af
Primary = 2.45 cfs @ 12.40 hrs, Volume= 0.405 af
Routed to Link 28P : Sub-DP #2a: Flow to Town Land
Secondary = 1.37 cfs @ 12.40 hrs, Volume= 0.038 af
Routed to Link 43P : Sub-DP #2b: Flow to Northern Abutter

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 382.30' @ 12.40 hrs Surf.Area= 9,548 sf Storage= 12,412 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 80.5 min (889.6 - 809.1)

Volume	Invert	Avail.Storage	Storage Description
#1	380.00'	22,220 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)
#2	378.00'	1,502 cf	**Custom Stage Data (Irregular)** Listed below (Recalc) 3,755 cf Overall x 40.0% Voids
		23,722 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
380.00	3,755	261.0	0	0	3,755
384.00	7,576	358.0	22,220	22,220	8,691

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
378.00	3,755	261.0	0	0	3,755
379.00	3,755	261.0	3,755	3,755	4,016

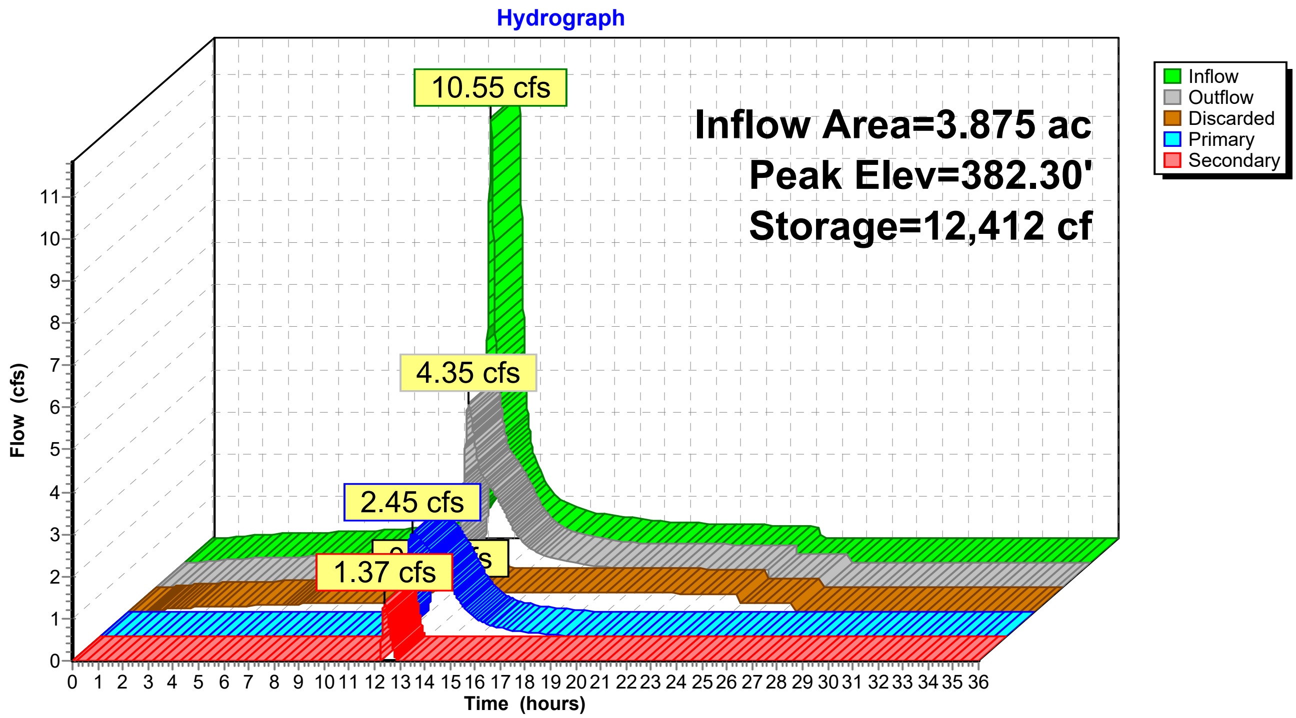
Device	Routing	Invert	Outlet Devices
#1	Discarded	378.00'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	380.40'	**12.0" Round Culvert** L= 214.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 380.40' / 358.00' S= 0.1047 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf
#3	Device 2	380.60'	**9.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Secondary	382.00'	**Custom Weir/Orifice, Cv= 2.62 (C= 3.28)** Elev. (feet) 382.00 383.50 383.50 384.00 Width (feet) 2.50 2.50 20.00 20.00

Discarded OutFlow Max=0.53 cfs @ 12.40 hrs HW=382.30' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.53 cfs)

Primary OutFlow Max=2.45 cfs @ 12.40 hrs HW=382.30' TW=0.00' (Dynamic Tailwater)
└─**2=Culvert** (Passes 2.45 cfs of 4.48 cfs potential flow)
  └─**3=Orifice/Grate** (Orifice Controls 2.45 cfs @ 5.55 fps)

Secondary OutFlow Max=1.36 cfs @ 12.40 hrs HW=382.30' TW=0.00' (Dynamic Tailwater)
└─**4=Custom Weir/Orifice** (Weir Controls 1.36 cfs @ 1.80 fps)

Pond 41P: Infiltration Basin #3



Summary for Subcatchment 42P: P2m

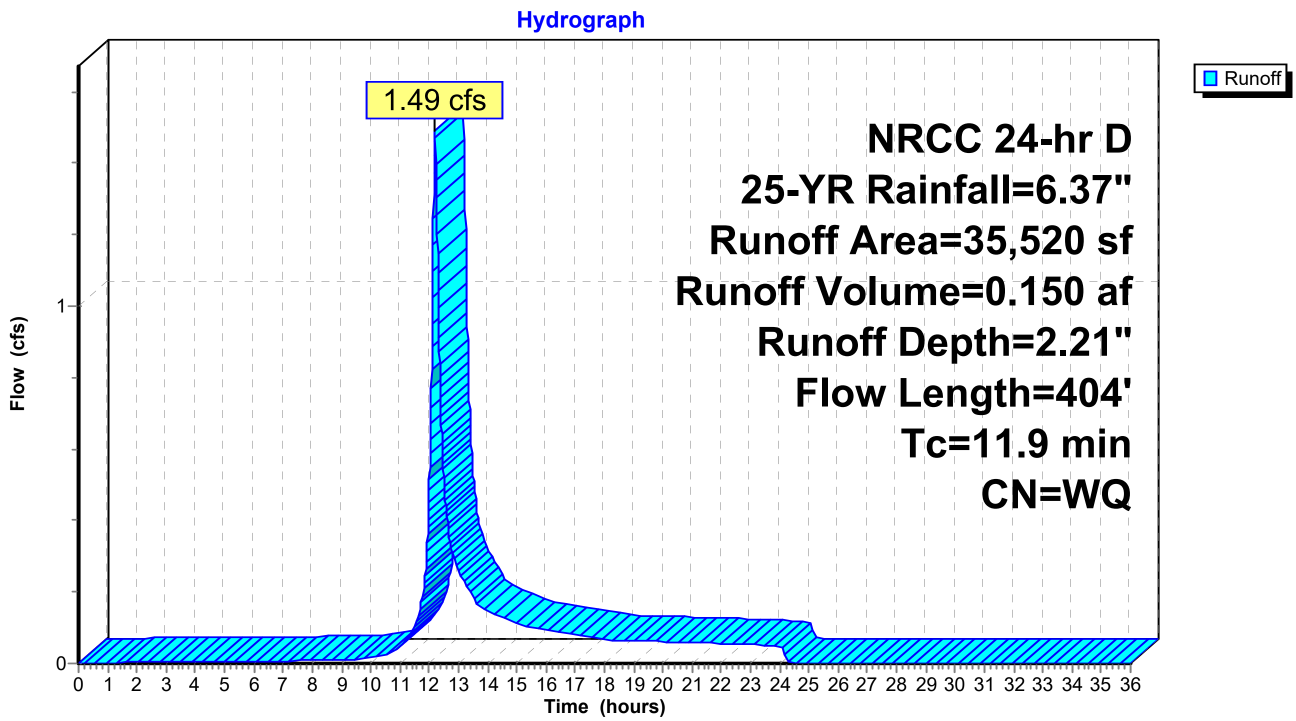
Runoff = 1.49 cfs @ 12.20 hrs, Volume= 0.150 af, Depth= 2.21"
Routed to Link 43P : Sub-DP #2b: Flow to Northern Abutter

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 25-YR Rainfall=6.37"

	Area (sf)	CN	Description
*	2,080	98	Roofs HSG B
	15,055	61	>75% Grass cover, Good HSG B
	18,385	55	Woods, Good, HSG B
	35,520		Weighted Average
	33,440		94.14% Pervious Area
	2,080		5.86% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	51	0.0400	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.36"
2.6	353	0.2100	2.29		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
11.9	404	Total			

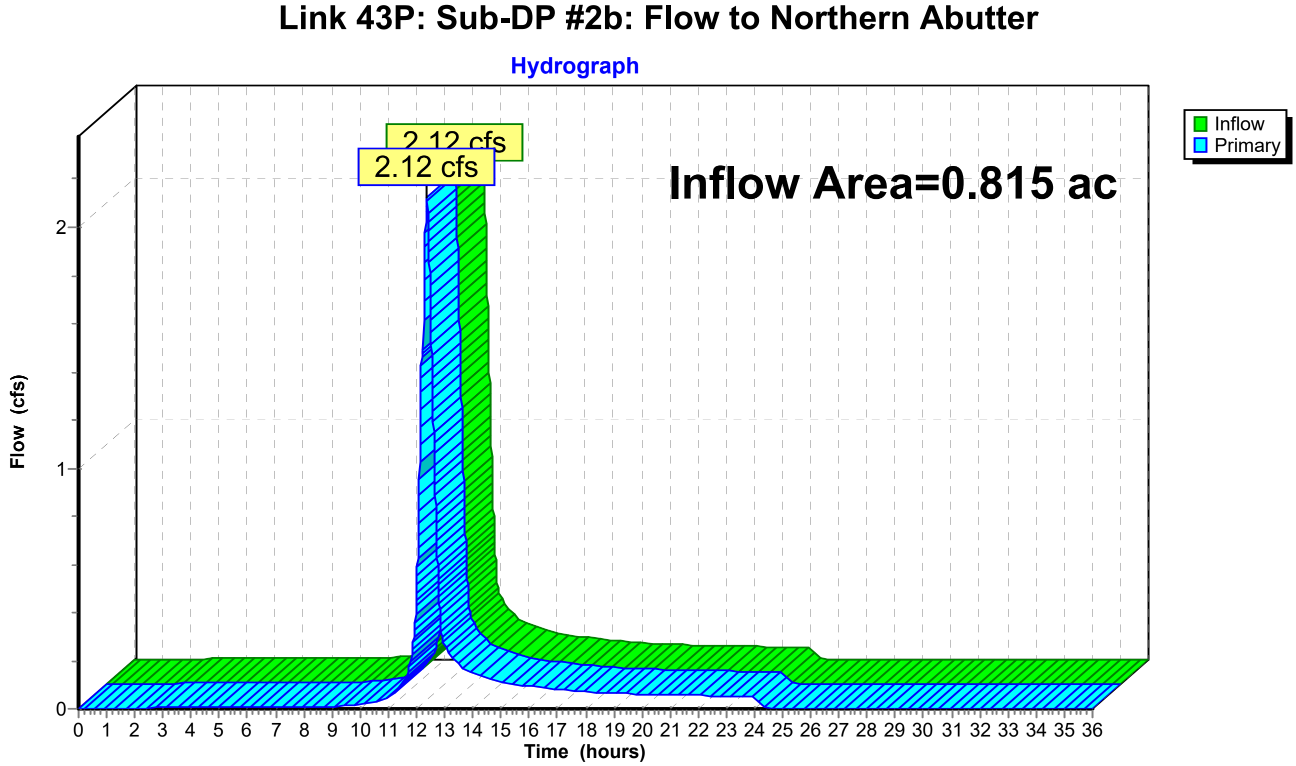
Subcatchment 42P: P2m



Summary for Link 43P: Sub-DP #2b: Flow to Northern Abutter

Inflow Area = 0.815 ac, 5.86% Impervious, Inflow Depth = 2.78" for 25-YR event
Inflow = 2.12 cfs @ 12.37 hrs, Volume= 0.189 af
Primary = 2.12 cfs @ 12.37 hrs, Volume= 0.189 af, Atten= 0%, Lag= 0.0 min
Routed to Link 44P : Design Point #2: Flow to Uncas Brook

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

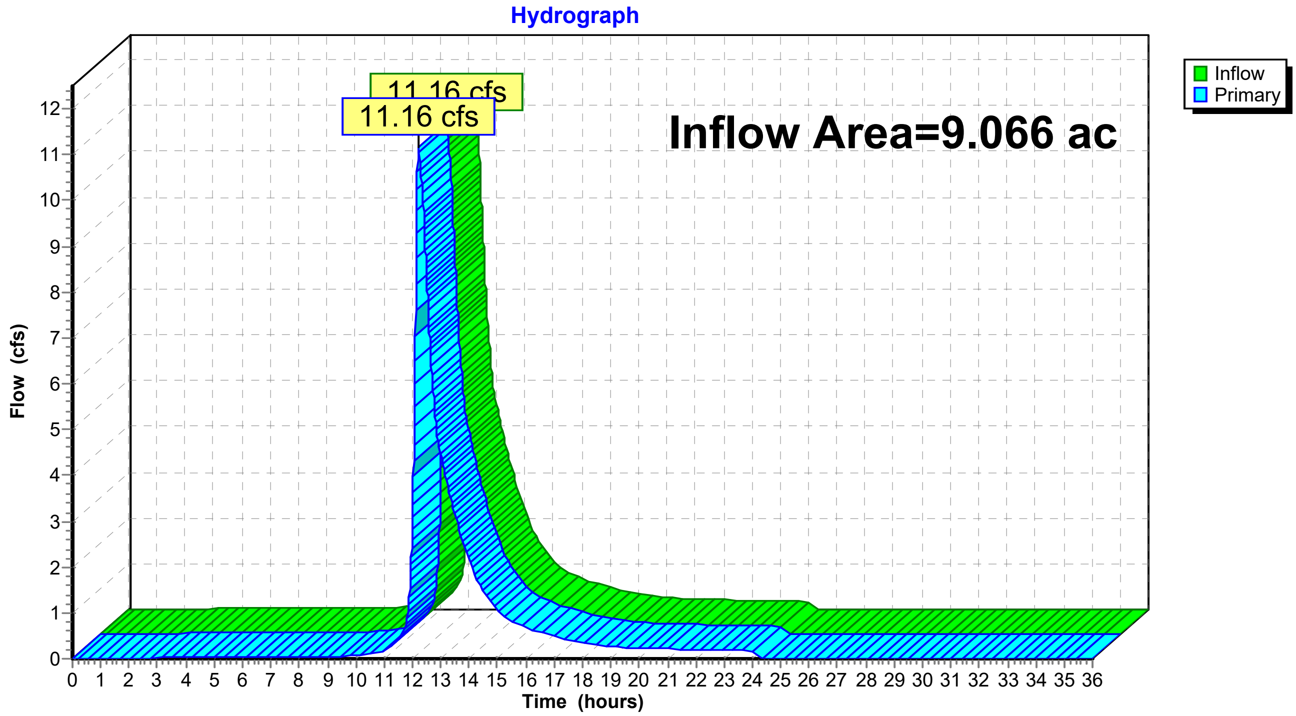


Summary for Link 44P: Design Point #2: Flow to Uncas Brook

Inflow Area = 9.066 ac, 28.33% Impervious, Inflow Depth = 1.79" for 25-YR event
Inflow = 11.16 cfs @ 12.20 hrs, Volume= 1.353 af
Primary = 11.16 cfs @ 12.20 hrs, Volume= 1.353 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Link 44P: Design Point #2: Flow to Uncas Brook



Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 8P: P2a Runoff Area=5,727 sf 44.23% Impervious Runoff Depth=5.94"
Flow Length=176' Slope=0.0800 '/' Tc=6.6 min CN=WQ Runoff=0.77 cfs 0.065 af

Pond 9P: CB 4+02 L Peak Elev=406.85' Inflow=0.77 cfs 0.065 af
12.0" Round Culvert n=0.011 L=13.0' S=0.0308 '/' Outflow=0.77 cfs 0.065 af

Subcatchment 10P: P2b Runoff Area=10,417 sf 25.78% Impervious Runoff Depth=5.53"
Flow Length=183' Tc=9.9 min CN=WQ Runoff=1.19 cfs 0.110 af

Pond 11P: CB 4+02 R Peak Elev=406.97' Inflow=1.19 cfs 0.110 af
12.0" Round Culvert n=0.011 L=8.0' S=0.0500 '/' Outflow=1.19 cfs 0.110 af

Pond 12P: DMH 4+13 Peak Elev=402.26' Inflow=1.91 cfs 0.175 af
12.0" Round Culvert n=0.011 L=130.0' S=0.0569 '/' Outflow=1.91 cfs 0.175 af

Subcatchment 13P: P2c Runoff Area=3,106 sf 63.52% Impervious Runoff Depth=6.32"
Flow Length=122' Slope=0.0700 '/' Tc=2.0 min CN=WQ Runoff=0.49 cfs 0.038 af

Pond 14P: CB 5+63 L Peak Elev=396.85' Inflow=0.49 cfs 0.038 af
12.0" Round Culvert n=0.011 L=17.0' S=0.0176 '/' Outflow=0.49 cfs 0.038 af

Subcatchment 15P: P2d Runoff Area=9,087 sf 49.69% Impervious Runoff Depth=5.72"
Flow Length=218' Tc=7.0 min CN=WQ Runoff=1.14 cfs 0.099 af

Pond 16P: CB 5+63 R Peak Elev=397.06' Inflow=1.14 cfs 0.099 af
12.0" Round Culvert n=0.011 L=15.0' S=0.0200 '/' Outflow=1.14 cfs 0.099 af

Pond 17P: DMH 5+47 Peak Elev=388.36' Inflow=3.29 cfs 0.312 af
12.0" Round Culvert n=0.011 L=16.0' S=0.0688 '/' Outflow=3.29 cfs 0.312 af

Pond 18P: DMH A Peak Elev=378.75' Inflow=3.29 cfs 0.312 af
12.0" Round Culvert n=0.011 L=18.0' S=0.0389 '/' Outflow=3.29 cfs 0.312 af

Subcatchment 19P: P2e Runoff Area=32,111 sf 44.13% Impervious Runoff Depth=5.71"
Flow Length=221' Tc=7.8 min CN=WQ Runoff=3.94 cfs 0.351 af

Pond 20P: CB 7+57 L Peak Elev=387.09' Inflow=3.94 cfs 0.351 af
15.0" Round Culvert n=0.011 L=13.0' S=0.0231 '/' Outflow=3.94 cfs 0.351 af

Subcatchment 21P: P2f Runoff Area=24,890 sf 72.31% Impervious Runoff Depth=6.75"
Flow Length=302' Tc=7.1 min CN=WQ Runoff=3.57 cfs 0.322 af

Pond 22P: CB 7+57 R Peak Elev=387.02' Inflow=3.57 cfs 0.322 af
15.0" Round Culvert n=0.011 L=6.0' S=0.0500 '/' Outflow=3.57 cfs 0.322 af

Pond 23P: DMH 7+46 Peak Elev=386.53' Inflow=7.51 cfs 0.673 af
18.0" Round Culvert n=0.011 L=88.0' S=0.0193 '/' Outflow=7.51 cfs 0.673 af

Pond 24P: DMH 6+54 Peak Elev=384.78' Inflow=7.51 cfs 0.673 af
18.0" Round Culvert n=0.011 L=115.0' S=0.0604 '/' Outflow=7.51 cfs 0.673 af

Subcatchment 25P: P2g Runoff Area=11,782 sf 8.39% Impervious Runoff Depth=3.92"
Flow Length=149' Slope=0.1300 '/' Tc=6.9 min CN=WQ Runoff=1.11 cfs 0.088 af

Pond 26P: Infiltration Basin #2 Peak Elev=378.30' Storage=10,462 cf Inflow=11.87 cfs 1.073 af
Discarded=0.26 cfs 0.478 af Primary=5.89 cfs 0.595 af Outflow=6.16 cfs 1.073 af

Subcatchment 27P: P2n Runoff Area=93,478 sf 8.12% Impervious Runoff Depth=3.53"
Flow Length=261' Tc=9.9 min CN=WQ Runoff=6.96 cfs 0.631 af

Link 28P: Sub-DP #2a: Flow to Town Land Inflow=14.88 cfs 1.829 af
Primary=14.88 cfs 1.829 af

Subcatchment 29P: P2h Runoff Area=12,912 sf 63.80% Impervious Runoff Depth=6.34"
Flow Length=254' Tc=10.2 min CN=WQ Runoff=1.56 cfs 0.156 af

Pond 30P: CB 12+97 R Peak Elev=399.19' Inflow=1.56 cfs 0.156 af
12.0" Round Culvert n=0.011 L=8.0' S=0.0250 '/' Outflow=1.56 cfs 0.156 af

Subcatchment 31P: P2i Runoff Area=10,135 sf 72.86% Impervious Runoff Depth=6.73"
Flow Length=188' Tc=10.2 min CN=WQ Runoff=1.29 cfs 0.130 af

Pond 32P: CB 12+97 L Peak Elev=399.13' Inflow=1.29 cfs 0.130 af
12.0" Round Culvert n=0.011 L=13.0' S=0.0154 '/' Outflow=1.29 cfs 0.130 af

Pond 33P: DMH 12+87 Peak Elev=398.37' Inflow=2.85 cfs 0.287 af
12.0" Round Culvert n=0.011 L=232.0' S=0.0593 '/' Outflow=2.85 cfs 0.287 af

Subcatchment 34P: P2j Runoff Area=25,375 sf 68.17% Impervious Runoff Depth=6.53"
Flow Length=315' Tc=7.3 min CN=WQ Runoff=3.51 cfs 0.317 af

Pond 35P: CB 10+30 R Peak Elev=391.02' Inflow=3.51 cfs 0.317 af
12.0" Round Culvert n=0.011 L=7.0' S=0.0286 '/' Outflow=3.51 cfs 0.317 af

Subcatchment 36P: P2k Runoff Area=13,475 sf 68.19% Impervious Runoff Depth=6.53"
Flow Length=246' Tc=10.4 min CN=WQ Runoff=1.65 cfs 0.168 af

Pond 37P: CB 10+30 L Peak Elev=390.36' Inflow=1.65 cfs 0.168 af
12.0" Round Culvert n=0.011 L=12.0' S=0.0167 '/' Outflow=1.65 cfs 0.168 af

Pond 38P: DMH 10+38 Peak Elev=390.17' Inflow=5.08 cfs 0.485 af
18.0" Round Culvert n=0.011 L=65.0' S=0.0623 '/' Outflow=5.08 cfs 0.485 af

Pond 39P: FD B Peak Elev=383.60' Inflow=7.87 cfs 0.772 af
18.0" Round Culvert n=0.011 L=32.0' S=0.0531 '/' Outflow=7.87 cfs 0.772 af

Subcatchment 40P: P2l Runoff Area=106,917 sf 14.27% Impervious Runoff Depth=3.91"
Flow Length=394' Tc=12.8 min CN=WQ Runoff=7.82 cfs 0.801 af

Pond 41P: Infiltration Basin #3 Peak Elev=382.80' Storage=15,412 cf Inflow=15.16 cfs 1.573 af
Discarded=0.56 cfs 0.768 af Primary=2.87 cfs 0.603 af Secondary=5.86 cfs 0.202 af Outflow=9.29 cfs 1.573 af

Subcatchment 42P: P2m Runoff Area=35,520 sf 5.86% Impervious Runoff Depth=3.47"
Flow Length=404' Tc=11.9 min CN=WQ Runoff=2.42 cfs 0.236 af

Link 43P: Sub-DP #2b: Flow to Northern Abutter Inflow=7.60 cfs 0.438 af
Primary=7.60 cfs 0.438 af

Link 44P: Design Point #2: Flow to Uncas Brook Inflow=21.35 cfs 2.267 af
Primary=21.35 cfs 2.267 af

Total Runoff Area = 9.066 ac Runoff Volume = 3.513 af Average Runoff Depth = 4.65"
71.67% Pervious = 6.498 ac 28.33% Impervious = 2.569 ac

Summary for Subcatchment 8P: P2a

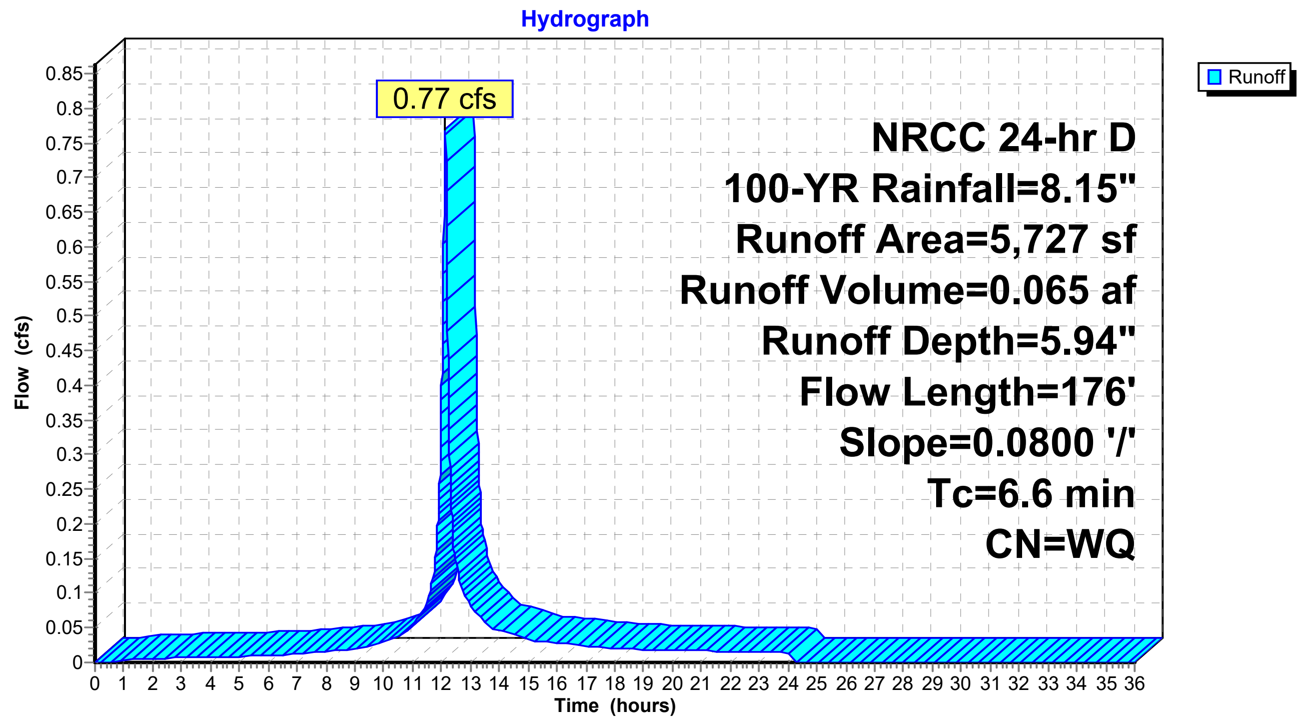
Runoff = 0.77 cfs @ 12.14 hrs, Volume= 0.065 af, Depth= 5.94"
Routed to Pond 9P : CB 4+02 L

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 100-YR Rainfall=8.15"

Area (sf)	CN	Description
495	98	Paved parking, HSG B
2,038	98	Paved parking, HSG C
1,469	61	>75% Grass cover, Good, HSG B
1,725	74	>75% Grass cover, Good, HSG C
5,727		Weighted Average
3,194		55.77% Pervious Area
2,533		44.23% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.1	71	0.0800	0.19		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.36"
0.3	29	0.0800	1.92		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.36"
0.2	76	0.0800	5.74		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
6.6	176	Total			

Subcatchment 8P: P2a



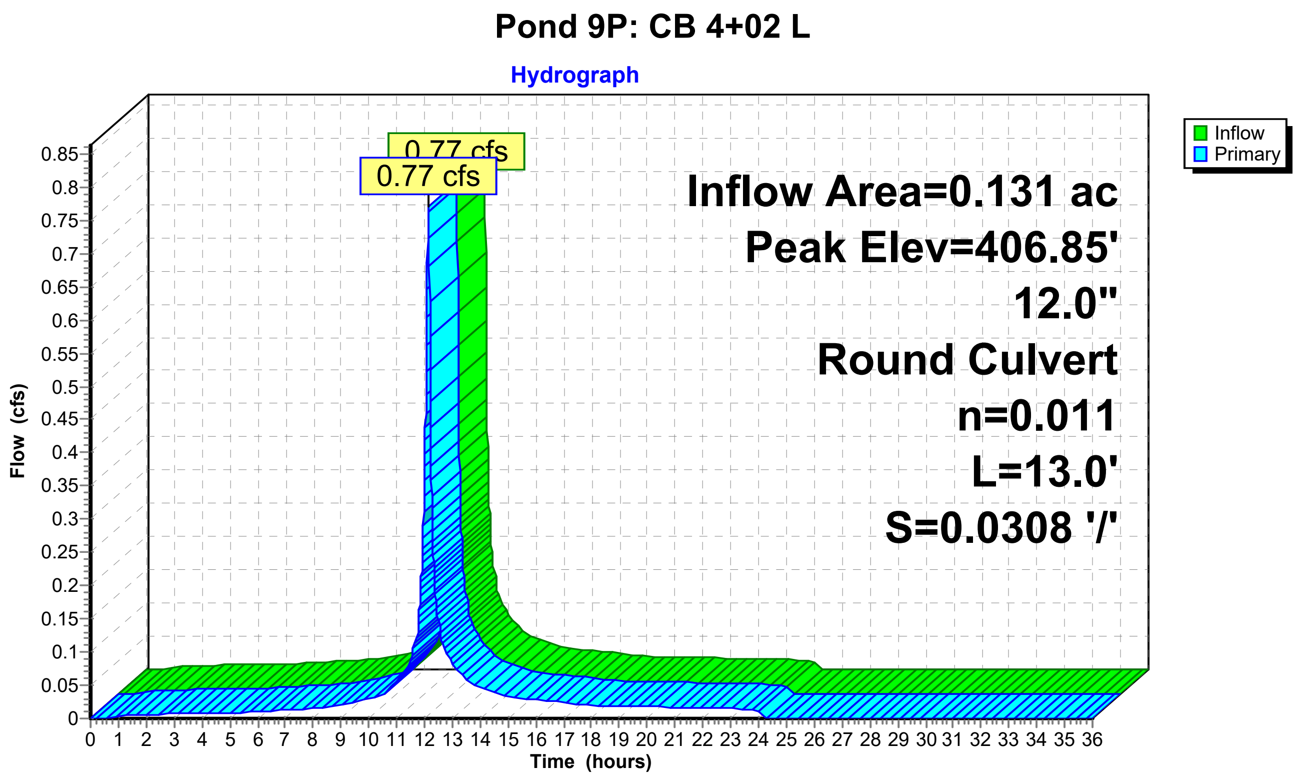
Summary for Pond 9P: CB 4+02 L

Inflow Area = 0.131 ac, 44.23% Impervious, Inflow Depth = 5.94" for 100-YR event
Inflow = 0.77 cfs @ 12.14 hrs, Volume= 0.065 af
Outflow = 0.77 cfs @ 12.14 hrs, Volume= 0.065 af, Atten= 0%, Lag= 0.0 min
Primary = 0.77 cfs @ 12.14 hrs, Volume= 0.065 af
Routed to Pond 12P : DMH 4+13

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 406.85' @ 12.14 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	406.40'	**12.0" Round Culvert** L= 13.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 406.40' / 406.00' S= 0.0308 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=0.77 cfs @ 12.14 hrs HW=406.85' TW=402.25' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 0.77 cfs @ 2.27 fps)



Summary for Subcatchment 10P: P2b

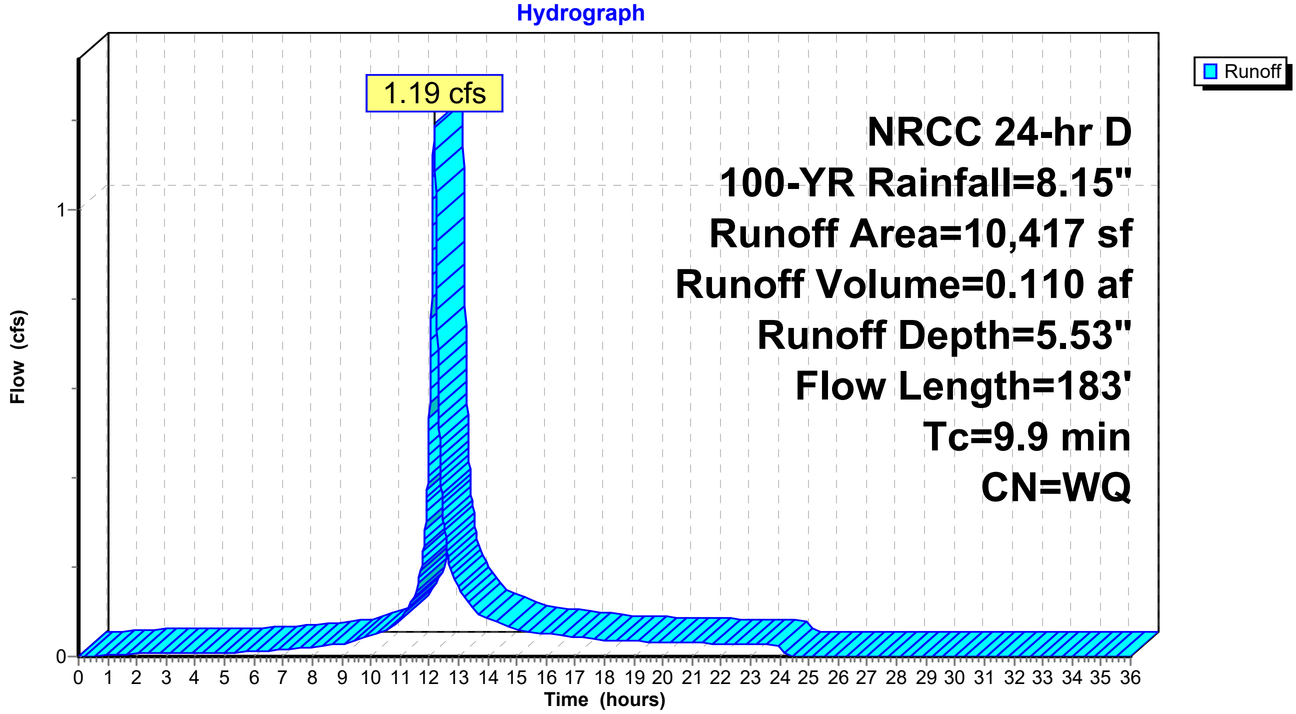
Runoff = 1.19 cfs @ 12.17 hrs, Volume= 0.110 af, Depth= 5.53"
Routed to Pond 11P : CB 4+02 R

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 100-YR Rainfall=8.15"

Area (sf)	CN	Description
380	98	Paved parking, HSG B
2,226	98	Paved parking, HSG C
709	61	>75% Grass cover, Good, HSG B
3,279	74	>75% Grass cover, Good, HSG C
3,743	70	Woods, Good, HSG C
80	98	Roofs, HSG C
10,417		Weighted Average
7,731		74.22% Pervious Area
2,686		25.78% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	51	0.0400	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.36"
0.3	34	0.0600	1.71		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.3	98	0.0800	5.74		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
9.9	183	Total			

Subcatchment 10P: P2b



Summary for Pond 11P: CB 4+02 R

Inflow Area =	0.239 ac,	25.78% Impervious,	Inflow Depth =	5.53"	for 100-YR event
Inflow =	1.19 cfs @	12.17 hrs,	Volume=	0.110 af	
Outflow =	1.19 cfs @	12.17 hrs,	Volume=	0.110 af,	Atten= 0%, Lag= 0.0 min
Primary =	1.19 cfs @	12.17 hrs,	Volume=	0.110 af	

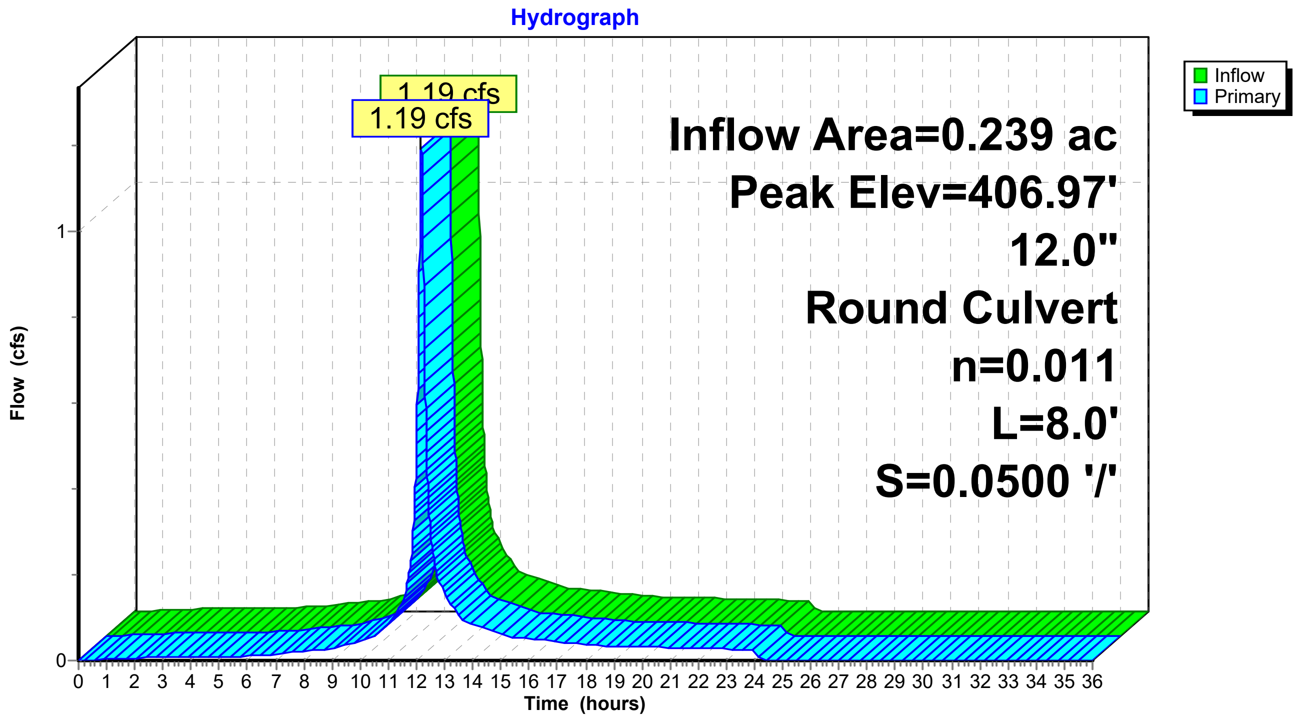
Routed to Pond 12P : DMH 4+13

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 406.97' @ 12.17 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	406.40'	**12.0" Round Culvert** L= 8.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 406.40' / 406.00' S= 0.0500 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=1.19 cfs @ 12.17 hrs HW=406.97' TW=402.25' (Dynamic Tailwater)
└**1=Culvert** (Inlet Controls 1.19 cfs @ 2.57 fps)

Pond 11P: CB 4+02 R



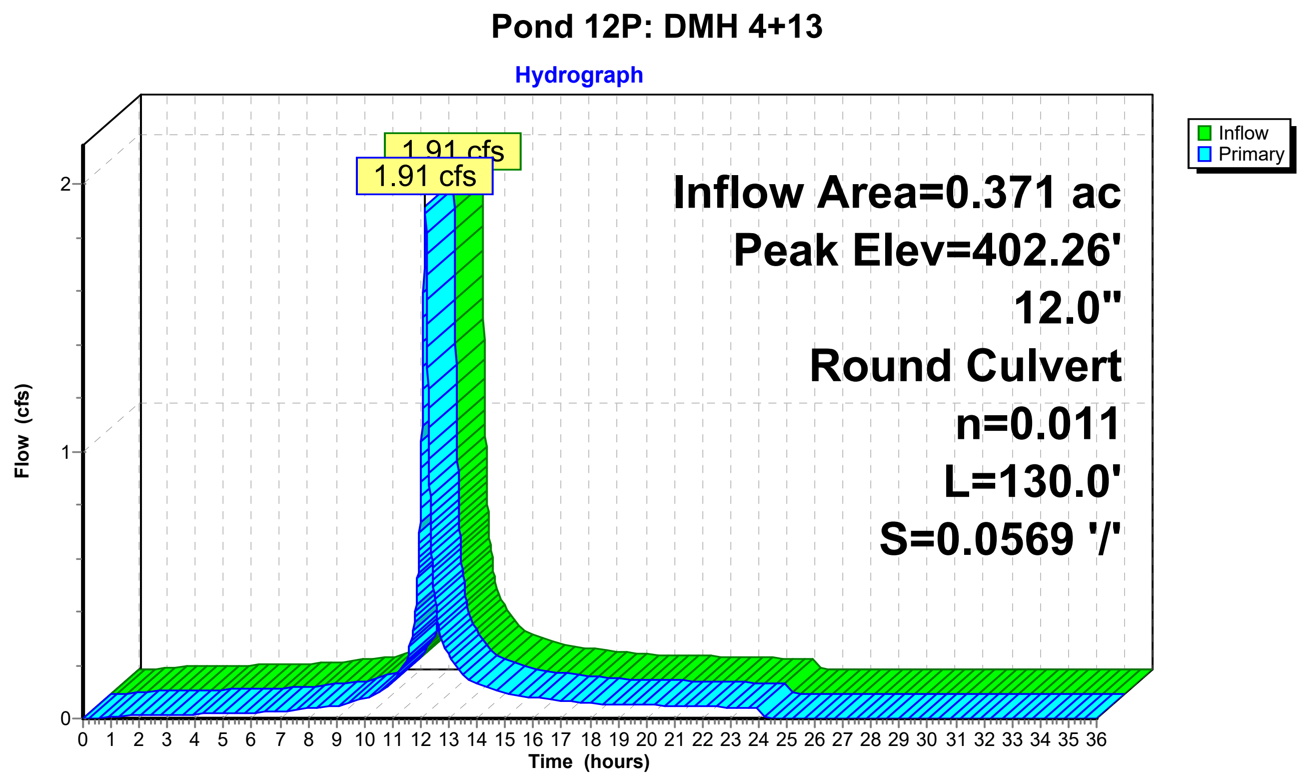
Summary for Pond 12P: DMH 4+13

Inflow Area = 0.371 ac, 32.33% Impervious, Inflow Depth = 5.67" for 100-YR event
Inflow = 1.91 cfs @ 12.15 hrs, Volume= 0.175 af
Outflow = 1.91 cfs @ 12.15 hrs, Volume= 0.175 af, Atten= 0%, Lag= 0.0 min
Primary = 1.91 cfs @ 12.15 hrs, Volume= 0.175 af
Routed to Pond 17P : DMH 5+47

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 402.26' @ 12.15 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	401.50'	**12.0" Round Culvert** L= 130.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 401.50' / 394.10' S= 0.0569 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=1.91 cfs @ 12.15 hrs HW=402.26' TW=388.33' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 1.91 cfs @ 2.97 fps)



Summary for Subcatchment 13P: P2c

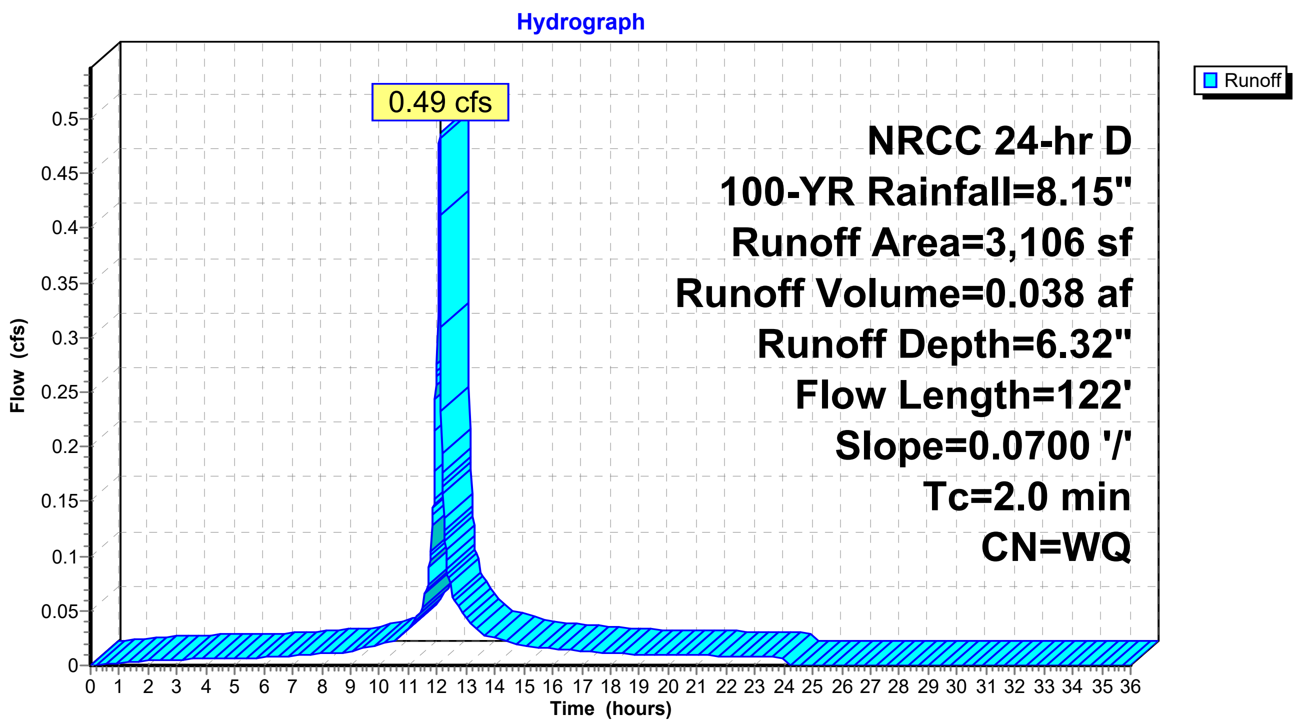
Runoff = 0.49 cfs @ 12.10 hrs, Volume= 0.038 af, Depth= 6.32"
Routed to Pond 14P : CB 5+63 L

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 100-YR Rainfall=8.15"

Area (sf)	CN	Description
1,973	98	Paved parking, HSG B
1,133	61	>75% Grass cover, Good, HSG B
3,106		Weighted Average
1,133		36.48% Pervious Area
1,973		63.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	100	0.0700	2.33		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.36"
0.1	22	0.0700	5.37		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.8	122	Total, Increased to minimum Tc = 2.0 min			

Subcatchment 13P: P2c



Summary for Pond 14P: CB 5+63 L

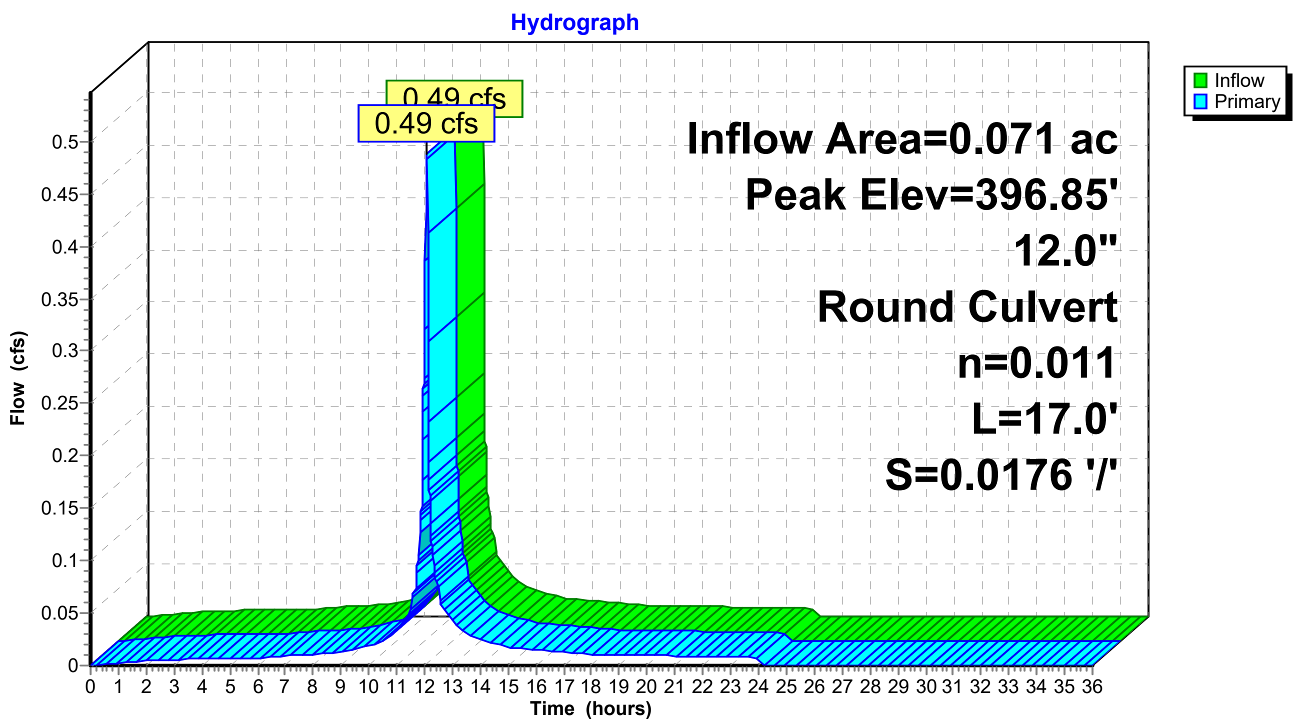
Inflow Area = 0.071 ac, 63.52% Impervious, Inflow Depth = 6.32" for 100-YR event
Inflow = 0.49 cfs @ 12.10 hrs, Volume= 0.038 af
Outflow = 0.49 cfs @ 12.10 hrs, Volume= 0.038 af, Atten= 0%, Lag= 0.0 min
Primary = 0.49 cfs @ 12.10 hrs, Volume= 0.038 af
Routed to Pond 17P : DMH 5+47

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 396.85' @ 12.10 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	396.50'	**12.0" Round Culvert** L= 17.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 396.50' / 396.20' S= 0.0176 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=0.49 cfs @ 12.10 hrs HW=396.85' TW=388.24' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 0.49 cfs @ 2.01 fps)

Pond 14P: CB 5+63 L



Summary for Subcatchment 15P: P2d

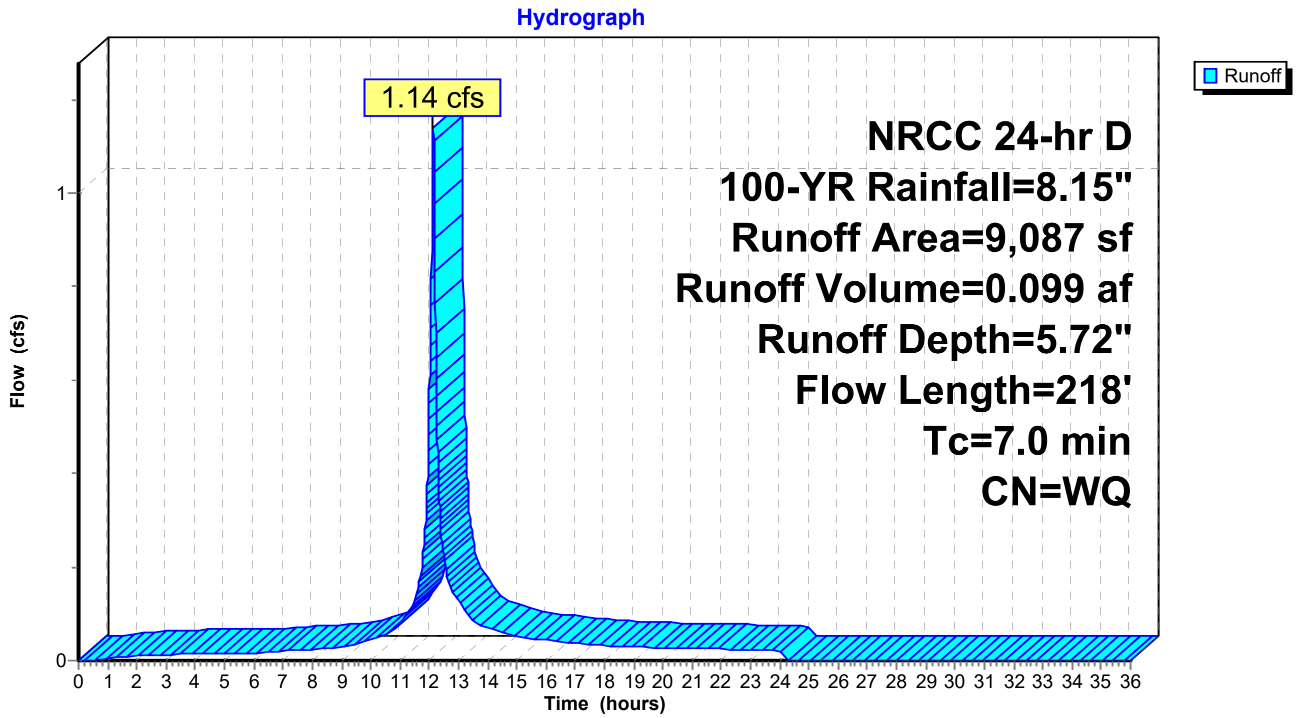
Runoff = 1.14 cfs @ 12.14 hrs, Volume= 0.099 af, Depth= 5.72"
Routed to Pond 16P : CB 5+63 R

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 100-YR Rainfall=8.15"

Area (sf)	CN	Description
3,344	98	Paved parking, HSG B
1,171	98	Roofs, HSG B
4,424	61	>75% Grass cover, Good, HSG B
12	74	>75% Grass cover, Good, HSG C
96	55	Woods, Good, HSG B
40	70	Woods, Good, HSG C
9,087		Weighted Average
4,572		50.31% Pervious Area
4,515		49.69% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.2	65	0.1700	0.26		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.36"
0.3	22	0.0300	1.22		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.36"
2.1	13	0.0400	0.11		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.36"
0.1	10	0.0700	1.85		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.3	108	0.0800	5.74		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
7.0	218	Total			

Subcatchment 15P: P2d



Summary for Pond 16P: CB 5+63 R

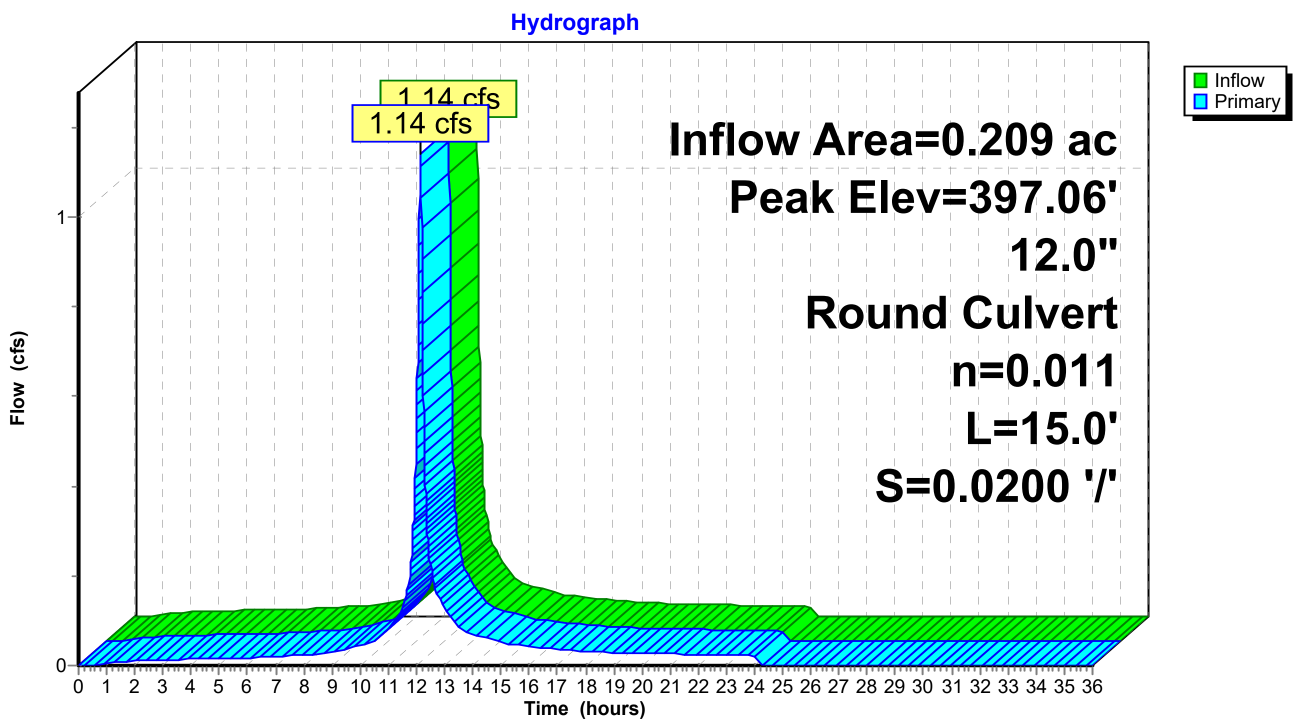
Inflow Area = 0.209 ac, 49.69% Impervious, Inflow Depth = 5.72" for 100-YR event
Inflow = 1.14 cfs @ 12.14 hrs, Volume= 0.099 af
Outflow = 1.14 cfs @ 12.14 hrs, Volume= 0.099 af, Atten= 0%, Lag= 0.0 min
Primary = 1.14 cfs @ 12.14 hrs, Volume= 0.099 af
Routed to Pond 17P : DMH 5+47

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 397.06' @ 12.14 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	396.50'	**12.0" Round Culvert** L= 15.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 396.50' / 396.20' S= 0.0200 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=1.14 cfs @ 12.14 hrs HW=397.06' TW=388.34' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 1.14 cfs @ 2.54 fps)

Pond 16P: CB 5+63 R



Summary for Pond 17P: DMH 5+47

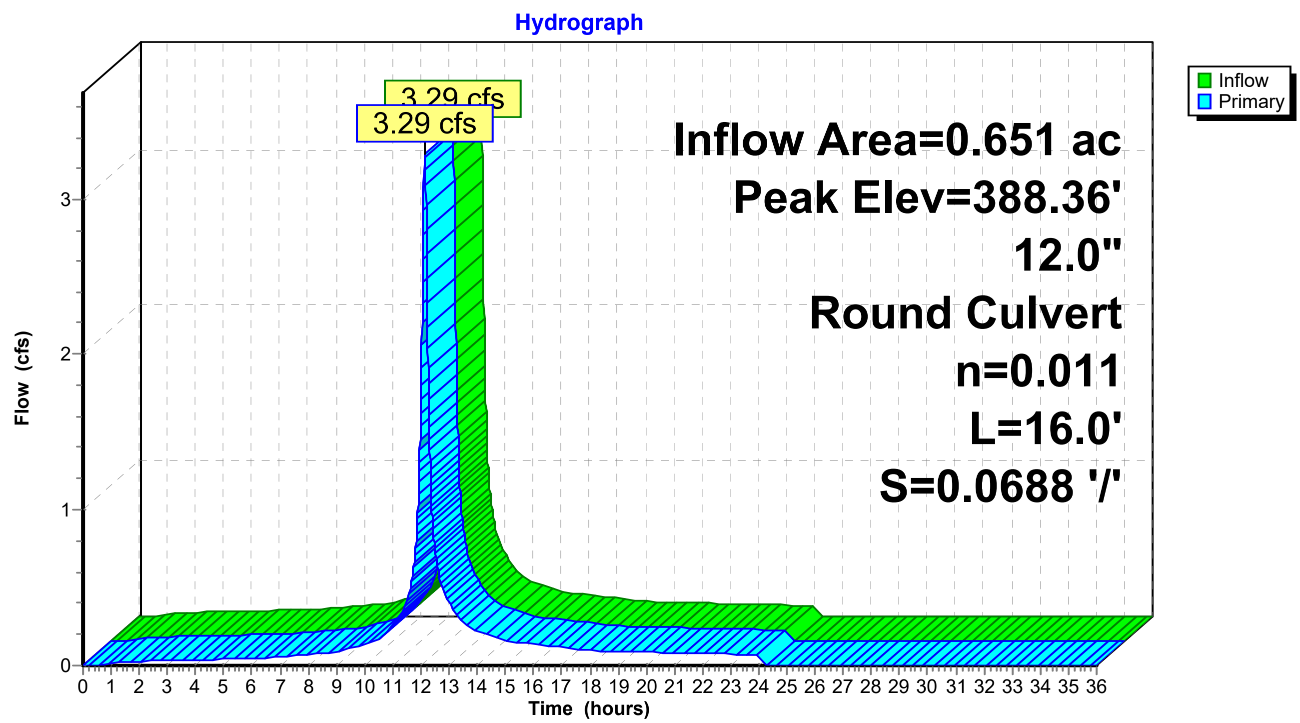
Inflow Area = 0.651 ac, 41.31% Impervious, Inflow Depth = 5.76" for 100-YR event
Inflow = 3.29 cfs @ 12.12 hrs, Volume= 0.312 af
Outflow = 3.29 cfs @ 12.12 hrs, Volume= 0.312 af, Atten= 0%, Lag= 0.0 min
Primary = 3.29 cfs @ 12.12 hrs, Volume= 0.312 af
Routed to Pond 18P : DMH A

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 388.36' @ 12.12 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	387.10'	**12.0" Round Culvert** L= 16.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 387.10' / 386.00' S= 0.0688 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=3.28 cfs @ 12.12 hrs HW=388.35' TW=378.59' (Dynamic Tailwater)
1=Culvert (Inlet Controls 3.28 cfs @ 4.17 fps)

Pond 17P: DMH 5+47



Summary for Pond 18P: DMH A

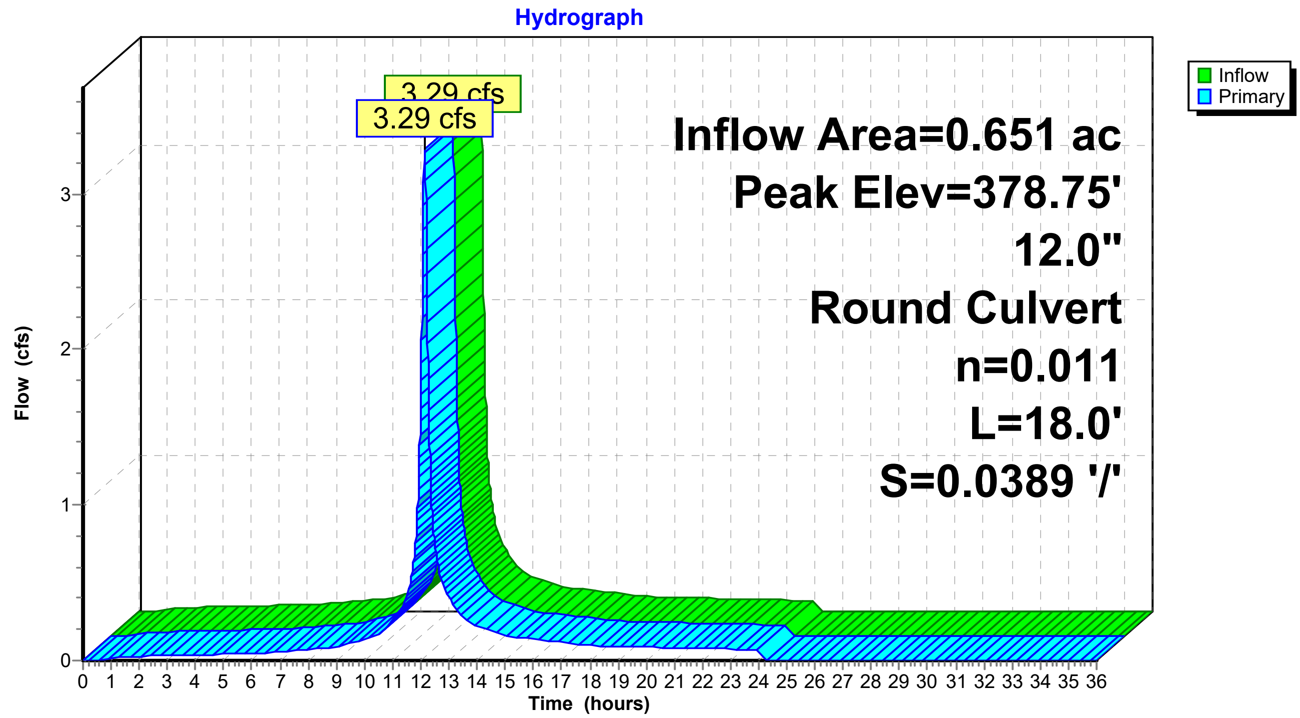
Inflow Area = 0.651 ac, 41.31% Impervious, Inflow Depth = 5.76" for 100-YR event
Inflow = 3.29 cfs @ 12.12 hrs, Volume= 0.312 af
Outflow = 3.29 cfs @ 12.12 hrs, Volume= 0.312 af, Atten= 0%, Lag= 0.0 min
Primary = 3.29 cfs @ 12.12 hrs, Volume= 0.312 af
Routed to Pond 26P : Infiltration Basin #2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 378.75' @ 12.17 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	377.00'	**12.0" Round Culvert** L= 18.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 377.00' / 376.30' S= 0.0389 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=3.16 cfs @ 12.12 hrs HW=378.59' TW=377.89' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 3.16 cfs @ 4.02 fps)

Pond 18P: DMH A



Summary for Subcatchment 19P: P2e

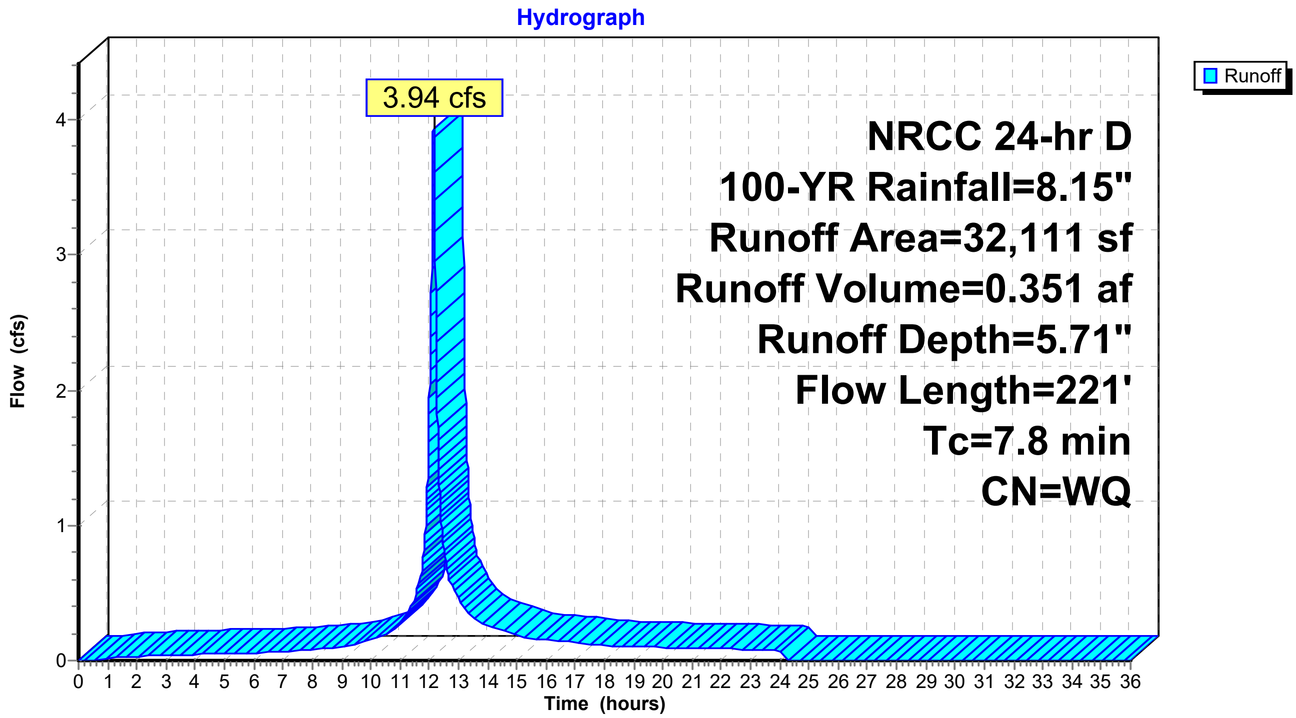
Runoff = 3.94 cfs @ 12.15 hrs, Volume= 0.351 af, Depth= 5.71"
Routed to Pond 20P : CB 7+57 L

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 100-YR Rainfall=8.15"

Area (sf)	CN	Description
4,995	98	Paved parking HSG B
1,377	98	Paved parking, HSG D
7,748	98	Roofs, HSG B
52	98	Roofs, HSG D
14,555	61	>75% Grass cover, Good HSG B
3,384	80	>75% Grass cover, Good, HSG D
32,111		Weighted Average
17,939		55.87% Pervious Area
14,172		44.13% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.8	100	0.1200	0.25		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.36"
0.6	27	0.0100	0.70		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.4	94	0.0400	4.06		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
7.8	221	Total			

Subcatchment 19P: P2e



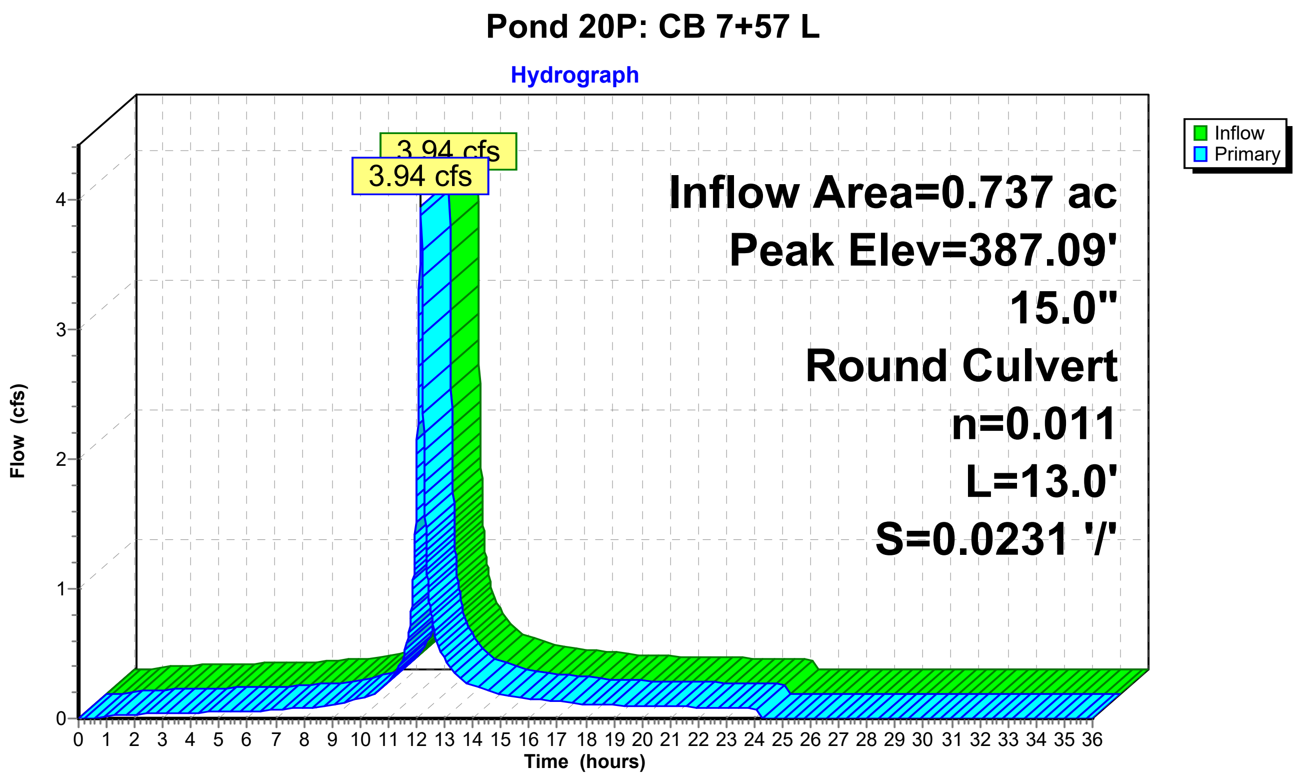
Summary for Pond 20P: CB 7+57 L

Inflow Area = 0.737 ac, 44.13% Impervious, Inflow Depth = 5.71" for 100-YR event
Inflow = 3.94 cfs @ 12.15 hrs, Volume= 0.351 af
Outflow = 3.94 cfs @ 12.15 hrs, Volume= 0.351 af, Atten= 0%, Lag= 0.0 min
Primary = 3.94 cfs @ 12.15 hrs, Volume= 0.351 af
Routed to Pond 23P : DMH 7+46

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 387.09' @ 12.15 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	386.00'	**15.0" Round Culvert** L= 13.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 386.00' / 385.70' S= 0.0231 '/' Cc= 0.900 n= 0.011, Flow Area= 1.23 sf

Primary OutFlow Max=3.94 cfs @ 12.15 hrs HW=387.09' TW=386.52' (Dynamic Tailwater)
1=Culvert (Outlet Controls 3.94 cfs @ 4.64 fps)



Summary for Subcatchment 21P: P2f

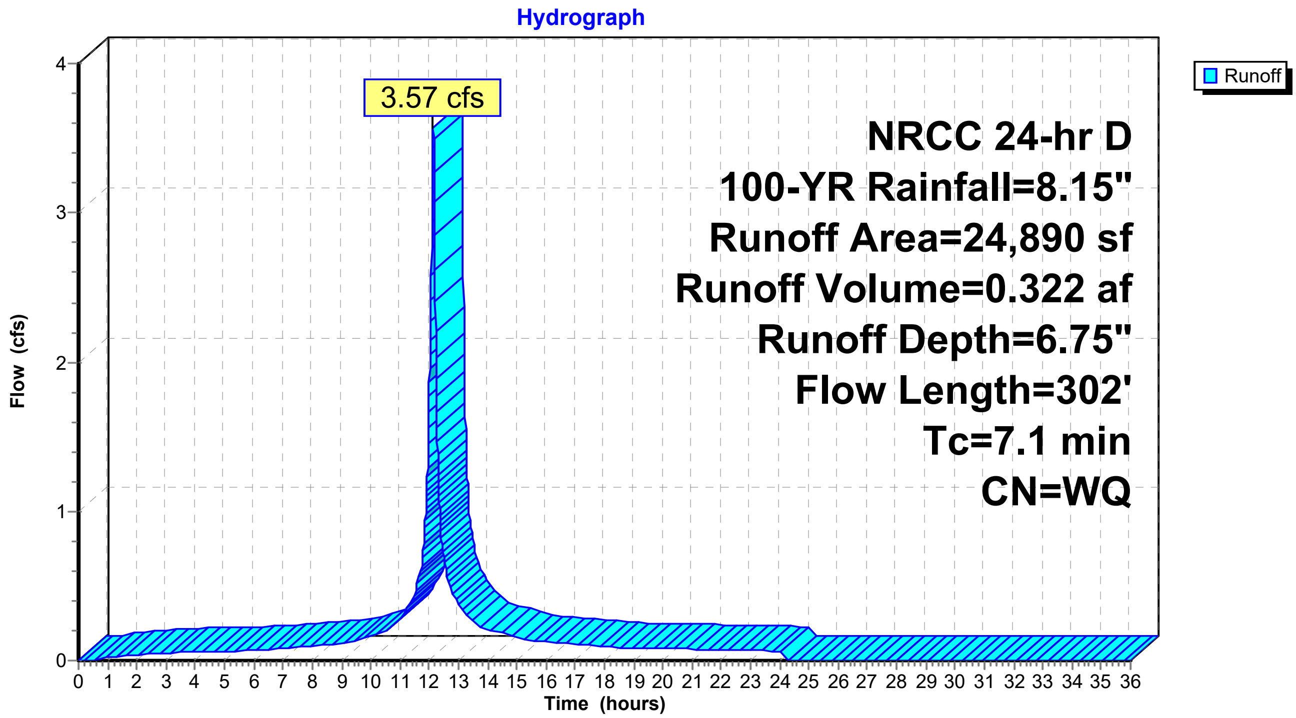
Runoff = 3.57 cfs @ 12.14 hrs, Volume= 0.322 af, Depth= 6.75"
Routed to Pond 22P : CB 7+57 R

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 100-YR Rainfall=8.15"

Area (sf)	CN	Description
9,156	98	Paved parking HSG B
1,692	98	Paved parking HSG D
7,150	98	Roofs, HSG B
6,334	61	>75% Grass cover, Good HSG B
558	80	>75% Grass cover, Good HSG D
24,890		Weighted Average
6,892		27.69% Pervious Area
17,998		72.31% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	23	0.0200	0.09		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.36"
1.1	77	0.0150	1.19		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.36"
1.7	202	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
7.1	302	Total			

Subcatchment 21P: P2f



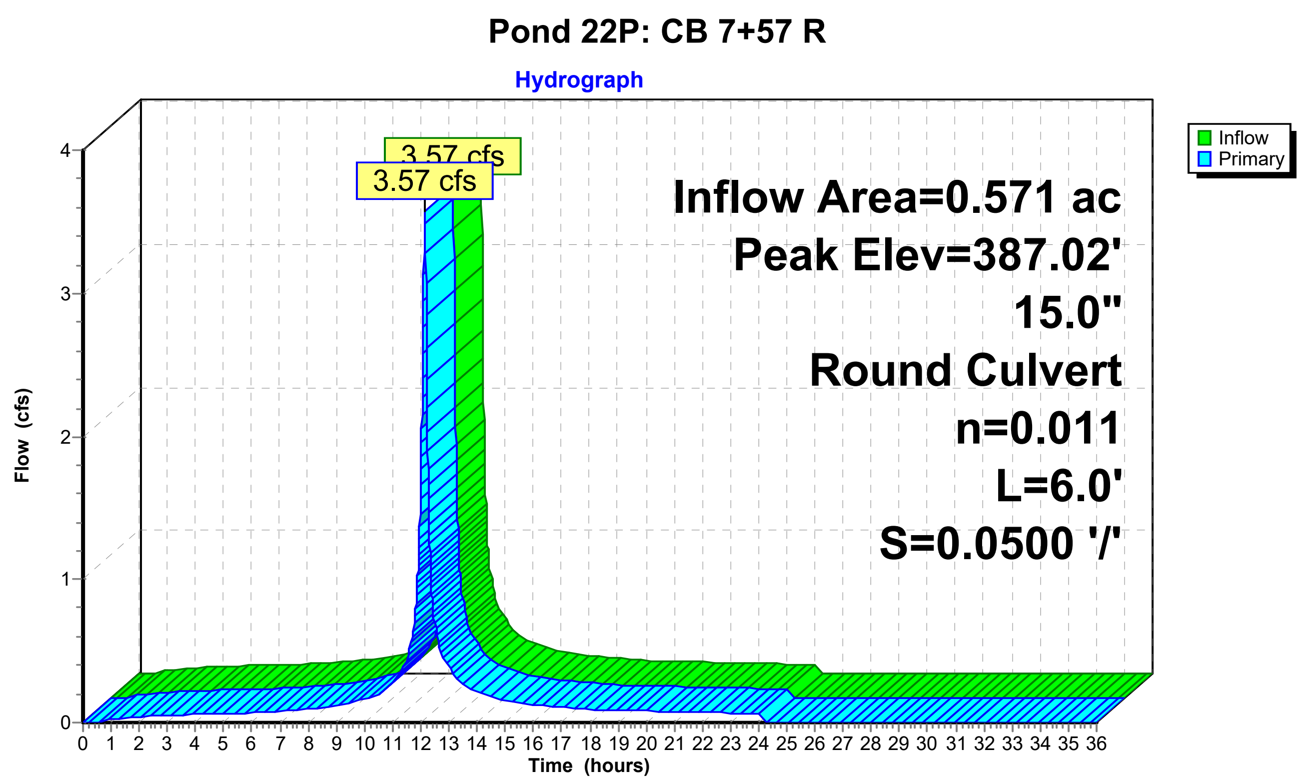
Summary for Pond 22P: CB 7+57 R

Inflow Area = 0.571 ac, 72.31% Impervious, Inflow Depth = 6.75" for 100-YR event
Inflow = 3.57 cfs @ 12.14 hrs, Volume= 0.322 af
Outflow = 3.57 cfs @ 12.14 hrs, Volume= 0.322 af, Atten= 0%, Lag= 0.0 min
Primary = 3.57 cfs @ 12.14 hrs, Volume= 0.322 af
Routed to Pond 23P : DMH 7+46

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 387.02' @ 12.15 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	386.00'	**15.0" Round Culvert** L= 6.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 386.00' / 385.70' S= 0.0500 '/' Cc= 0.900 n= 0.011, Flow Area= 1.23 sf

Primary OutFlow Max=3.47 cfs @ 12.14 hrs HW=387.01' TW=386.52' (Dynamic Tailwater)
1=Culvert (Outlet Controls 3.47 cfs @ 4.45 fps)



Summary for Pond 23P: DMH 7+46

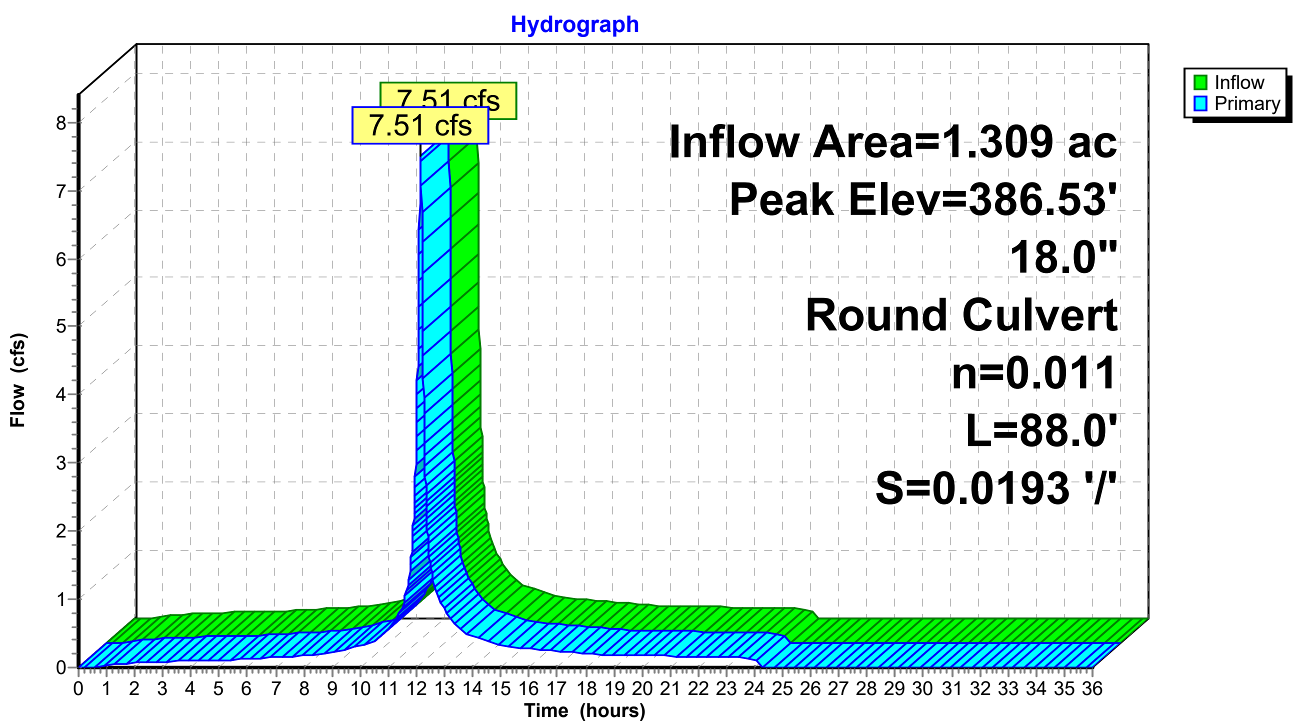
Inflow Area = 1.309 ac, 56.44% Impervious, Inflow Depth = 6.17" for 100-YR event
Inflow = 7.51 cfs @ 12.14 hrs, Volume= 0.673 af
Outflow = 7.51 cfs @ 12.14 hrs, Volume= 0.673 af, Atten= 0%, Lag= 0.0 min
Primary = 7.51 cfs @ 12.14 hrs, Volume= 0.673 af
Routed to Pond 24P : DMH 6+54

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 386.53' @ 12.14 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	385.00'	**18.0" Round Culvert** L= 88.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 385.00' / 383.30' S= 0.0193 '/' Cc= 0.900 n= 0.011, Flow Area= 1.77 sf

Primary OutFlow Max=7.49 cfs @ 12.14 hrs HW=386.52' TW=384.77' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 7.49 cfs @ 4.24 fps)

Pond 23P: DMH 7+46



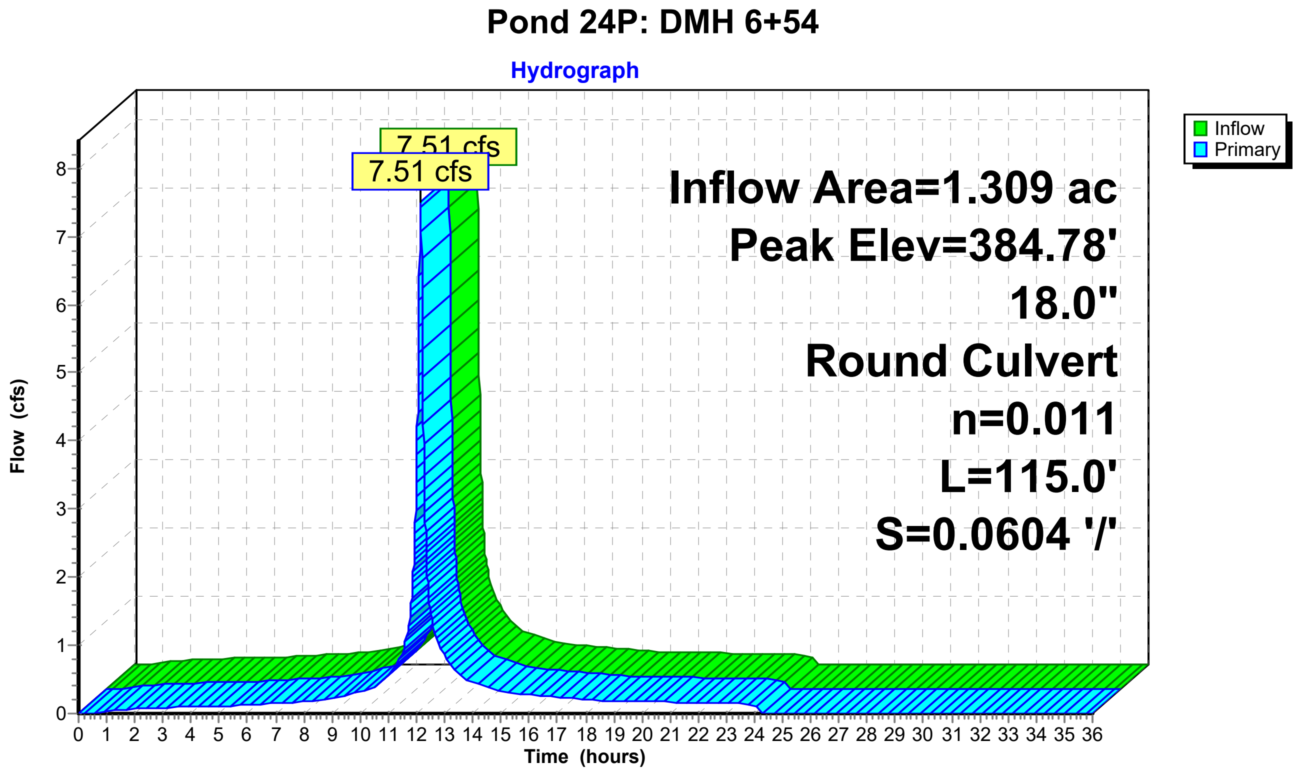
Summary for Pond 24P: DMH 6+54

Inflow Area = 1.309 ac, 56.44% Impervious, Inflow Depth = 6.17" for 100-YR event
Inflow = 7.51 cfs @ 12.14 hrs, Volume= 0.673 af
Outflow = 7.51 cfs @ 12.14 hrs, Volume= 0.673 af, Atten= 0%, Lag= 0.0 min
Primary = 7.51 cfs @ 12.14 hrs, Volume= 0.673 af
Routed to Pond 26P : Infiltration Basin #2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 384.78' @ 12.14 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	383.25'	**18.0" Round Culvert** L= 115.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 383.25' / 376.30' S= 0.0604 '/' Cc= 0.900 n= 0.011, Flow Area= 1.77 sf

Primary OutFlow Max=7.49 cfs @ 12.14 hrs HW=384.77' TW=378.00' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 7.49 cfs @ 4.24 fps)



Summary for Subcatchment 25P: P2g

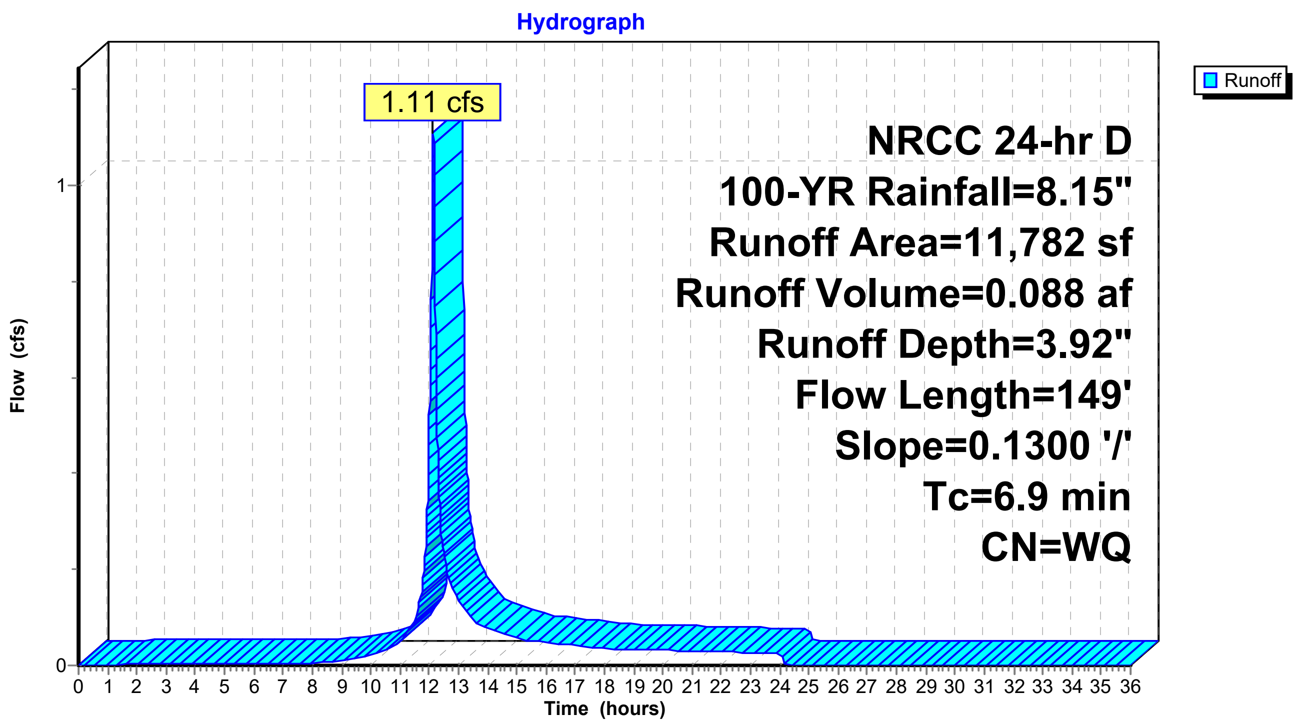
Runoff = 1.11 cfs @ 12.14 hrs, Volume= 0.088 af, Depth= 3.92"
Routed to Pond 26P : Infiltration Basin #2

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 100-YR Rainfall=8.15"

Area (sf)	CN	Description
988	98	Roofs HSG B
10,794	61	>75% Grass cover, Good HSG B
11,782		Weighted Average
10,794		91.61% Pervious Area
988		8.39% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.6	100	0.1300	0.25		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.36"
0.3	49	0.1300	2.52		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
6.9	149	Total			

Subcatchment 25P: P2g



Summary for Pond 26P: Infiltration Basin #2

Inflow Area = 2.230 ac, 46.20% Impervious, Inflow Depth = 5.78" for 100-YR event
Inflow = 11.87 cfs @ 12.14 hrs, Volume= 1.073 af
Outflow = 6.16 cfs @ 12.26 hrs, Volume= 1.073 af, Atten= 48%, Lag= 6.9 min
Discarded = 0.26 cfs @ 12.26 hrs, Volume= 0.478 af
Primary = 5.89 cfs @ 12.26 hrs, Volume= 0.595 af
Routed to Link 28P : Sub-DP #2a: Flow to Town Land

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 378.30' @ 12.26 hrs Surf.Area= 4,717 sf Storage= 10,462 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 69.8 min (856.2 - 786.4)

Volume	Invert	Avail.Storage	Storage Description
#1	376.00'	16,211 cf	**Custom Stage Data (Irregular)**Listed below (Recalc)

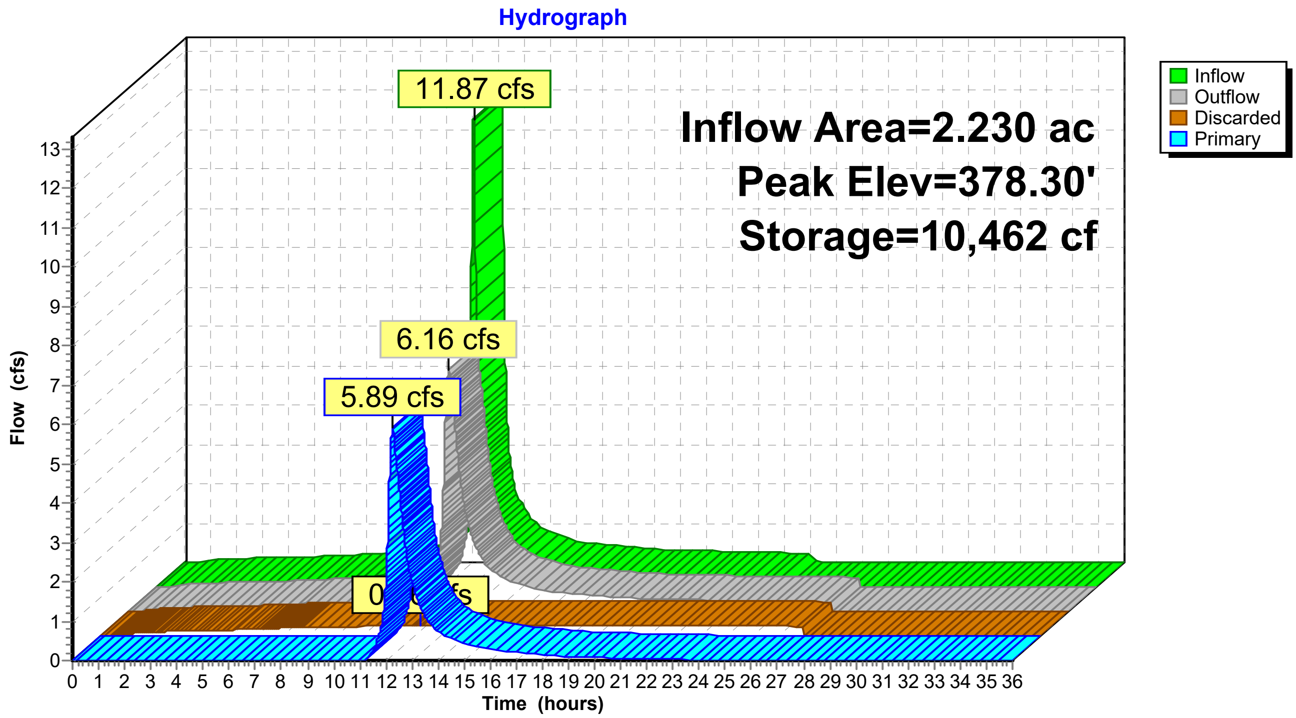
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
376.00	4,363	266.0	0	0	4,363
379.50	4,906	278.0	16,211	16,211	5,448

Device	Routing	Invert	Outlet Devices
#1	Discarded	376.00'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	376.50'	**15.0" Round Culvert** L= 3.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 376.50' / 376.50' S= 0.0000 '/' Cc= 0.900 n= 0.011, Flow Area= 1.23 sf

Discarded OutFlow Max=0.26 cfs @ 12.26 hrs HW=378.30' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.26 cfs)

Primary OutFlow Max=5.89 cfs @ 12.26 hrs HW=378.30' TW=0.00' (Dynamic Tailwater)
└─**2=Culvert** (Barrel Controls 5.89 cfs @ 4.80 fps)

Pond 26P: Infiltration Basin #2



Summary for Subcatchment 27P: P2n

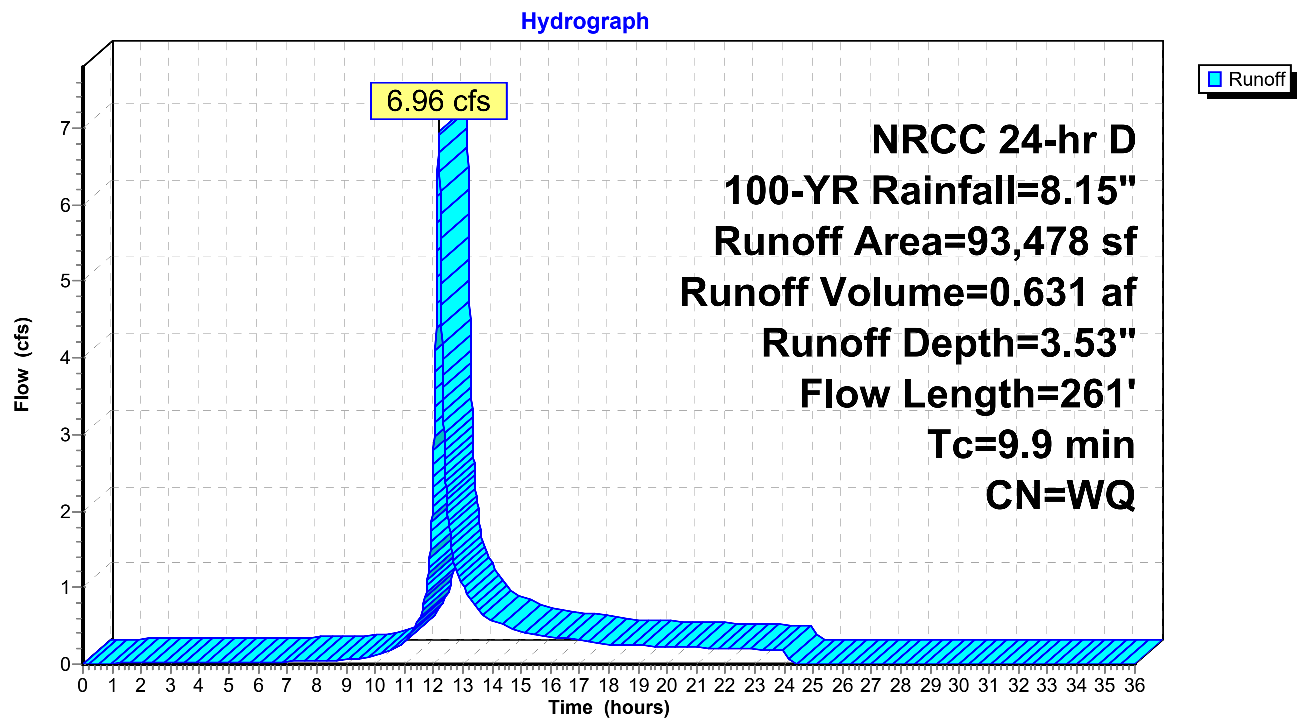
Runoff = 6.96 cfs @ 12.18 hrs, Volume= 0.631 af, Depth= 3.53"
Routed to Link 28P : Sub-DP #2a: Flow to Town Land

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 100-YR Rainfall=8.15"

Area (sf)	CN	Description
59,016	55	Woods, Good HSG B
7,591	98	Roofs HSG B
2,898	70	Woods, Good HSG C
23,595	61	>75% Grass cover, Good HSG B
378	80	>75% Grass cover, Good HSG D
93,478		Weighted Average
85,887		91.88% Pervious Area
7,591		8.12% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	100	0.0710	0.20		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.36"
1.5	161	0.1200	1.73		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
9.9	261	Total			

Subcatchment 27P: P2n

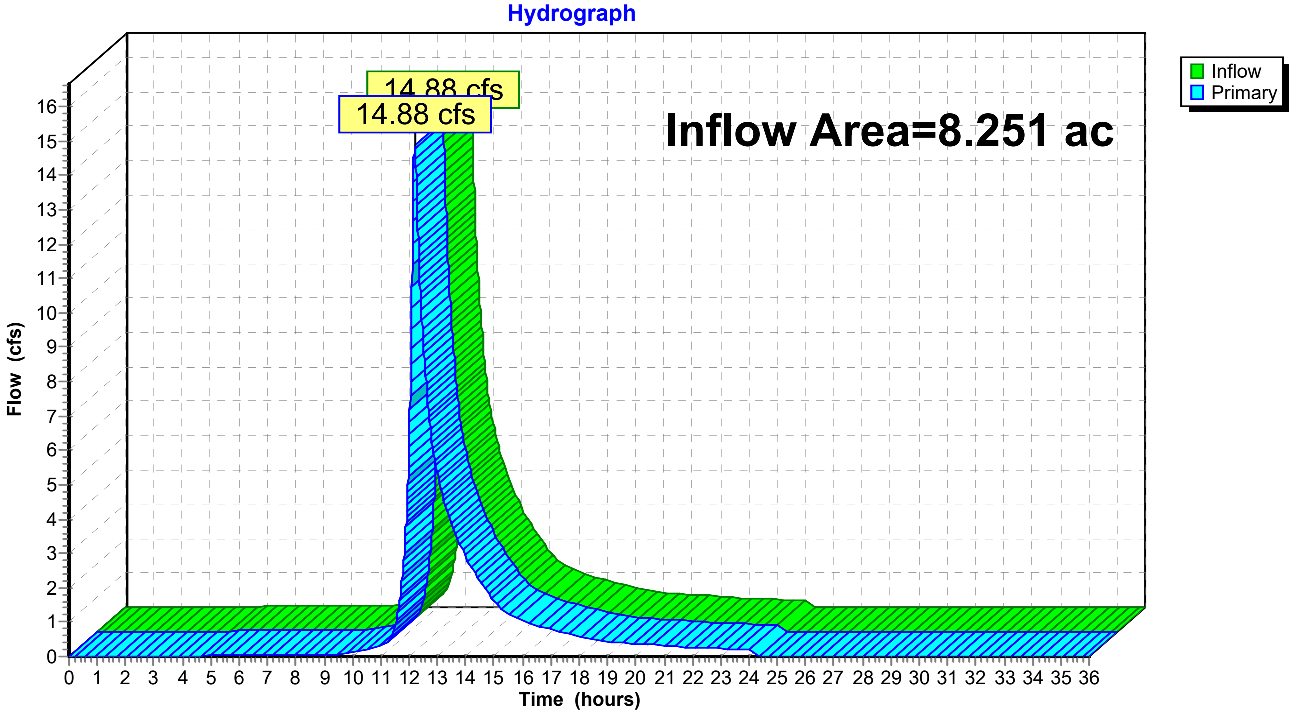


Summary for Link 28P: Sub-DP #2a: Flow to Town Land

Inflow Area = 8.251 ac, 30.56% Impervious, Inflow Depth = 2.66" for 100-YR event
Inflow = 14.88 cfs @ 12.20 hrs, Volume= 1.829 af
Primary = 14.88 cfs @ 12.20 hrs, Volume= 1.829 af, Atten= 0%, Lag= 0.0 min
Routed to Link 44P : Design Point #2: Flow to Uncas Brook

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Link 28P: Sub-DP #2a: Flow to Town Land



Summary for Subcatchment 29P: P2h

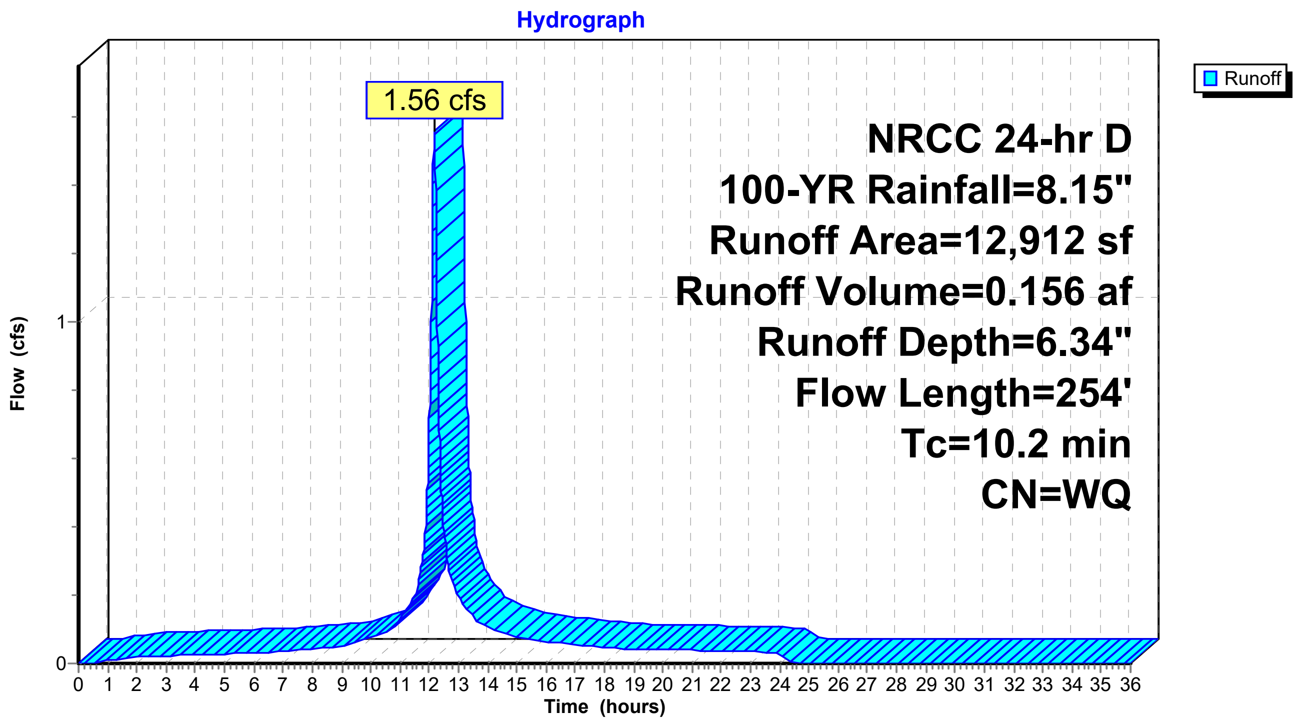
Runoff = 1.56 cfs @ 12.17 hrs, Volume= 0.156 af, Depth= 6.34"
Routed to Pond 30P : CB 12+97 R

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 100-YR Rainfall=8.15"

Area (sf)	CN	Description
5,638	98	Paved parking, HSG B
2,600	98	Roofs, HSG B
4,674	61	>75% Grass cover, Good, HSG B
12,912		Weighted Average
4,674		36.20% Pervious Area
8,238		63.80% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	80	0.0350	0.14		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.36"
0.9	174	0.0250	3.21		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
10.2	254	Total			

Subcatchment 29P: P2h



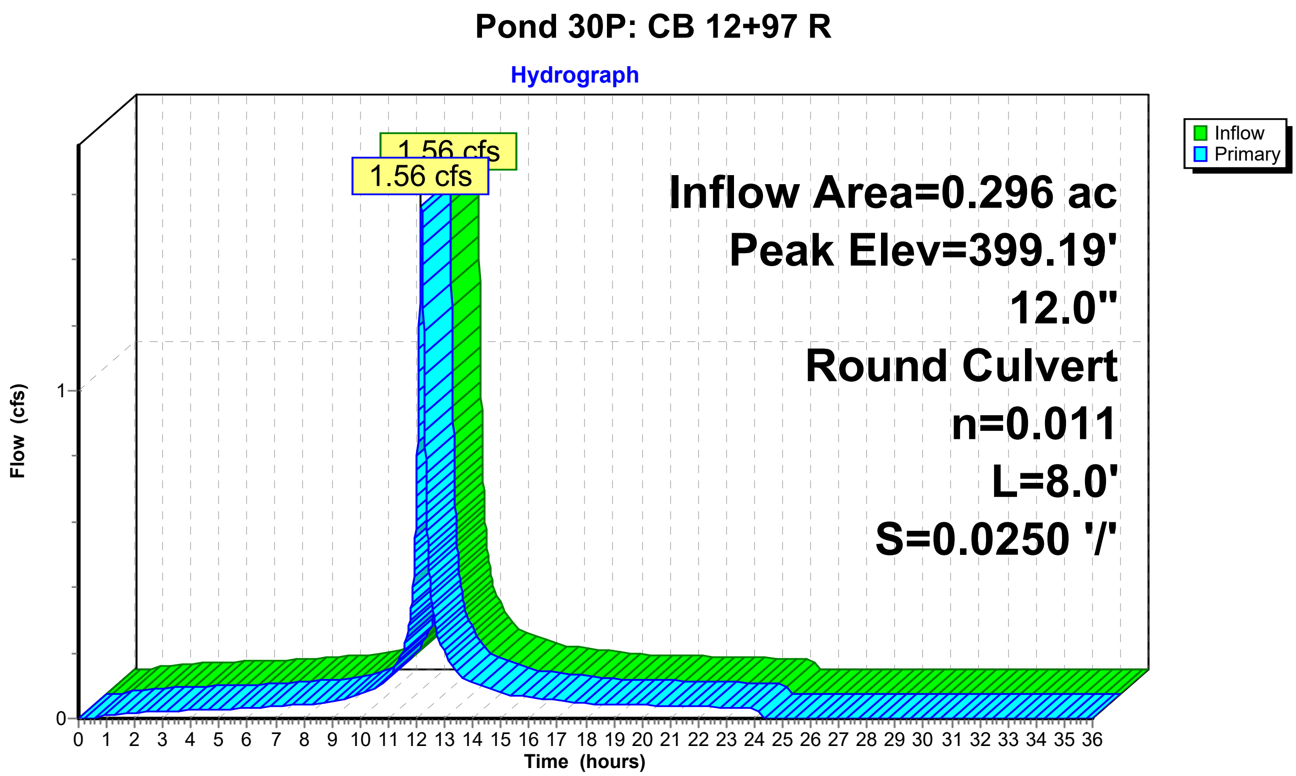
Summary for Pond 30P: CB 12+97 R

Inflow Area = 0.296 ac, 63.80% Impervious, Inflow Depth = 6.34" for 100-YR event
Inflow = 1.56 cfs @ 12.17 hrs, Volume= 0.156 af
Outflow = 1.56 cfs @ 12.17 hrs, Volume= 0.156 af, Atten= 0%, Lag= 0.0 min
Primary = 1.56 cfs @ 12.17 hrs, Volume= 0.156 af
Routed to Pond 33P : DMH 12+87

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 399.19' @ 12.17 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	398.50'	**12.0" Round Culvert** L= 8.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 398.50' / 398.30' S= 0.0250 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=1.56 cfs @ 12.17 hrs HW=399.19' TW=398.37' (Dynamic Tailwater)
└─**1=Culvert** (Barrel Controls 1.56 cfs @ 3.79 fps)



Summary for Subcatchment 31P: P2i

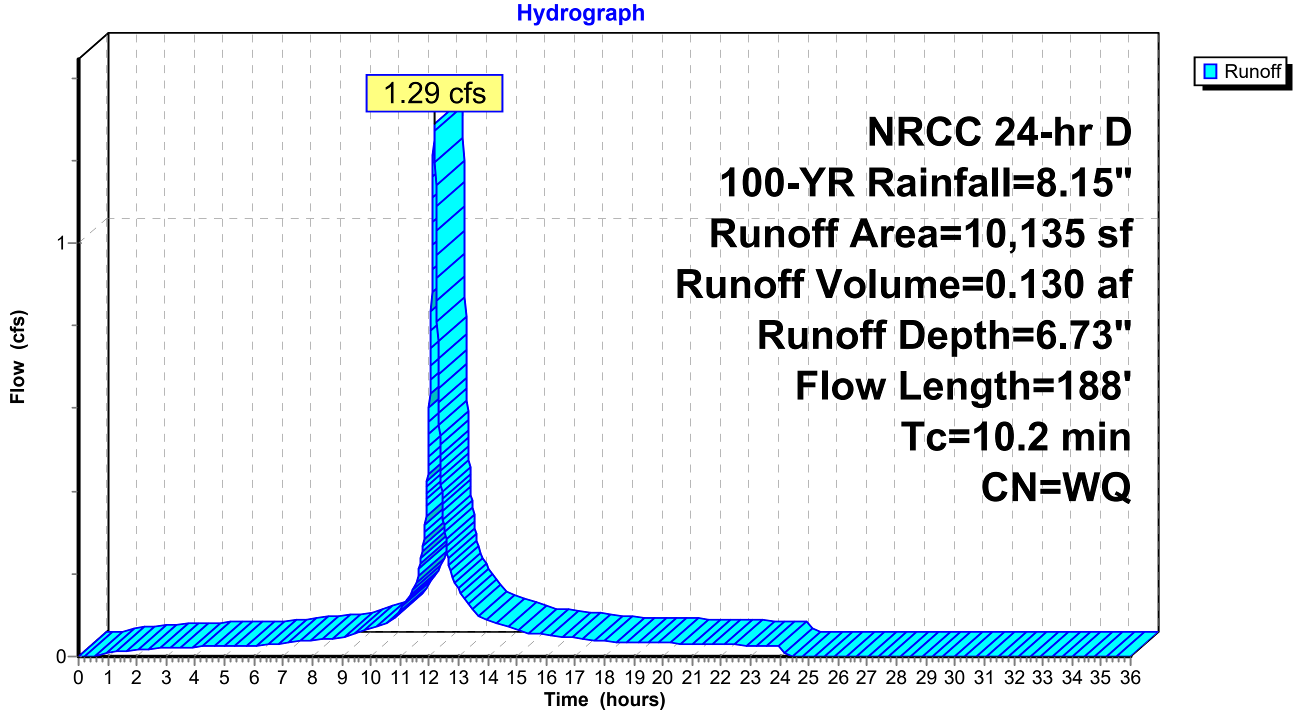
Runoff = 1.29 cfs @ 12.17 hrs, Volume= 0.130 af, Depth= 6.73"
Routed to Pond 32P : CB 12+97 L

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 100-YR Rainfall=8.15"

Area (sf)	CN	Description
4,134	98	Paved parking HSG B
3,250	98	Roofs, HSG B
2,751	61	>75% Grass cover, Good HSG B
10,135		Weighted Average
2,751		27.14% Pervious Area
7,384		72.86% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.2	25	0.0250	0.10		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.36"
0.3	22	0.0250	1.14		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.36"
4.7	29	0.0250	0.10		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.36"
0.0	12	0.0400	4.06		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.4	37	0.0400	1.40		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.1	22	0.0400	4.06		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.5	41	0.0400	1.40		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
10.2	188	Total			

Subcatchment 31P: P2i



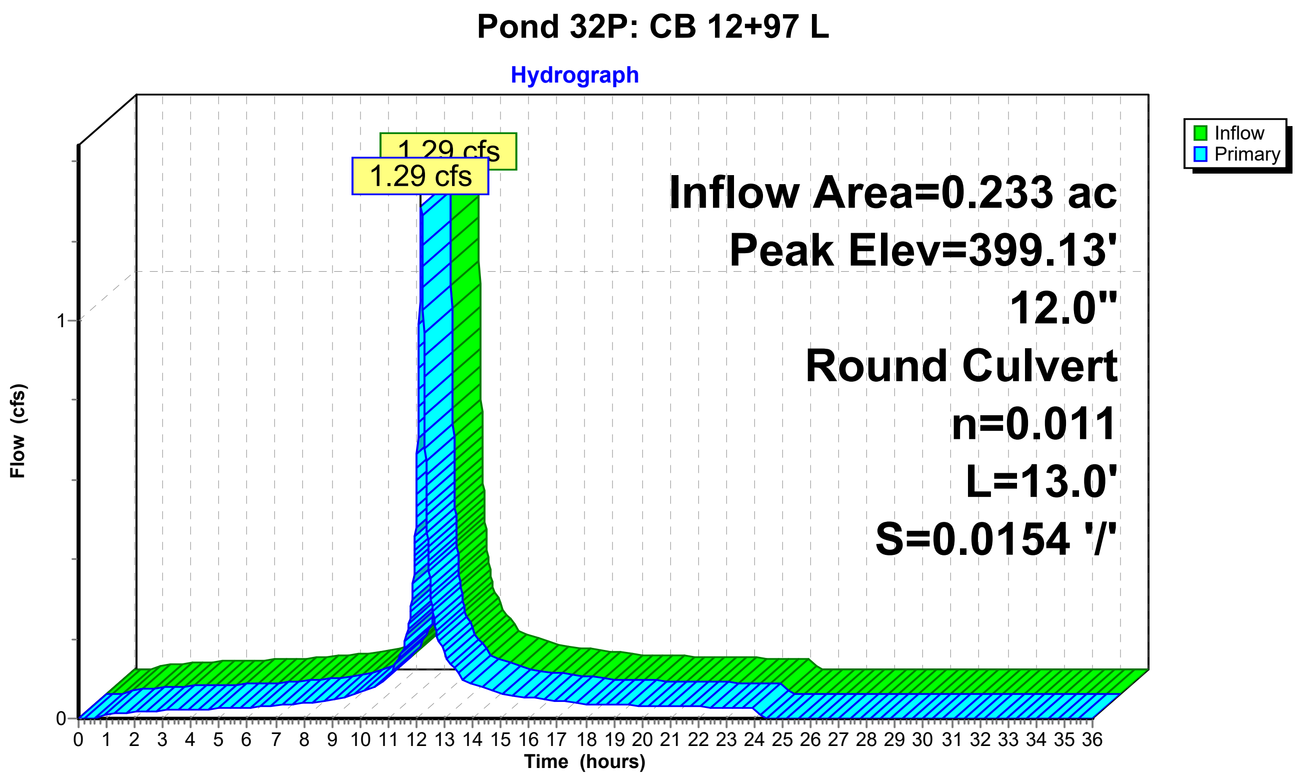
Summary for Pond 32P: CB 12+97 L

Inflow Area = 0.233 ac, 72.86% Impervious, Inflow Depth = 6.73" for 100-YR event
Inflow = 1.29 cfs @ 12.17 hrs, Volume= 0.130 af
Outflow = 1.29 cfs @ 12.17 hrs, Volume= 0.130 af, Atten= 0%, Lag= 0.0 min
Primary = 1.29 cfs @ 12.17 hrs, Volume= 0.130 af
Routed to Pond 33P : DMH 12+87

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 399.13' @ 12.17 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	398.50'	**12.0" Round Culvert** L= 13.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 398.50' / 398.30' S= 0.0154 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=1.29 cfs @ 12.17 hrs HW=399.12' TW=398.37' (Dynamic Tailwater)
1=Culvert (Barrel Controls 1.29 cfs @ 3.56 fps)



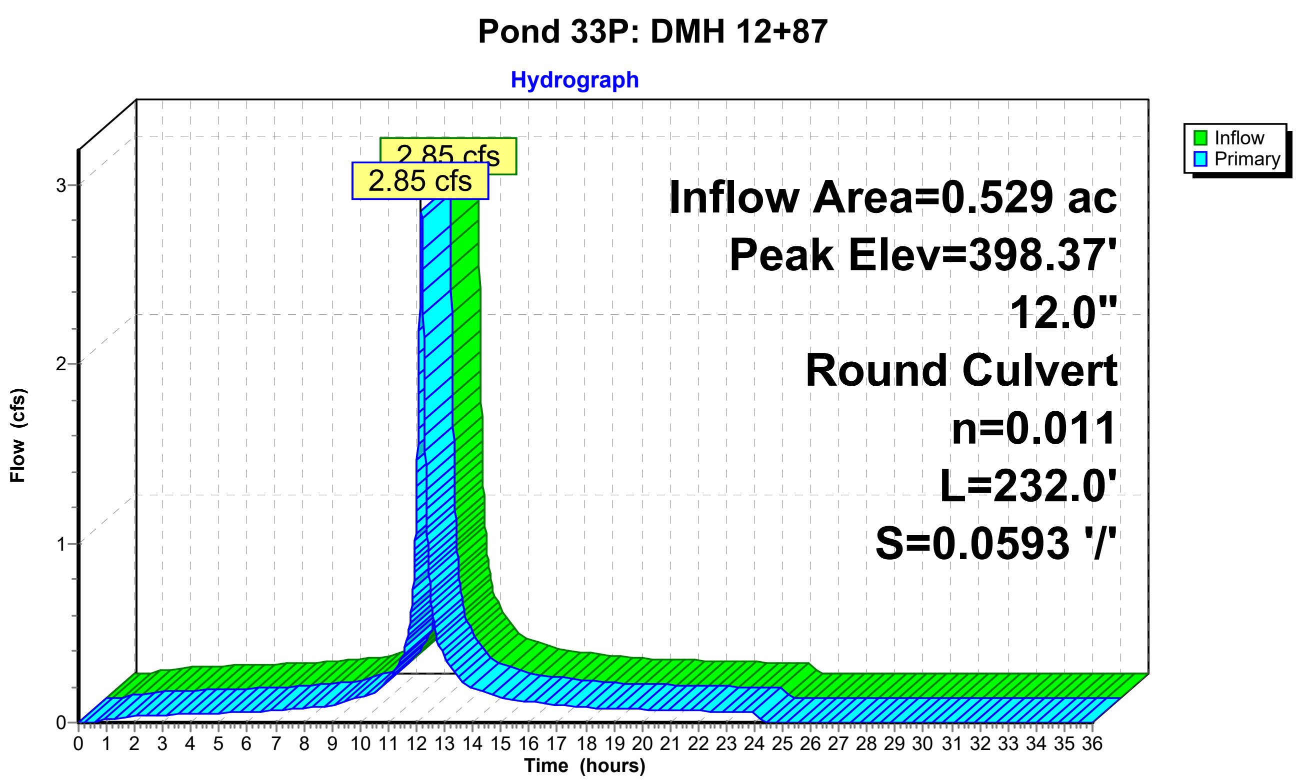
Summary for Pond 33P: DMH 12+87

Inflow Area = 0.529 ac, 67.78% Impervious, Inflow Depth = 6.51" for 100-YR event
Inflow = 2.85 cfs @ 12.17 hrs, Volume= 0.287 af
Outflow = 2.85 cfs @ 12.17 hrs, Volume= 0.287 af, Atten= 0%, Lag= 0.0 min
Primary = 2.85 cfs @ 12.17 hrs, Volume= 0.287 af
Routed to Pond 39P : FD B

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 398.37' @ 12.17 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	397.30'	**12.0" Round Culvert** L= 232.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 397.30' / 383.55' S= 0.0593 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=2.85 cfs @ 12.17 hrs HW=398.37' TW=383.56' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 2.85 cfs @ 3.62 fps)



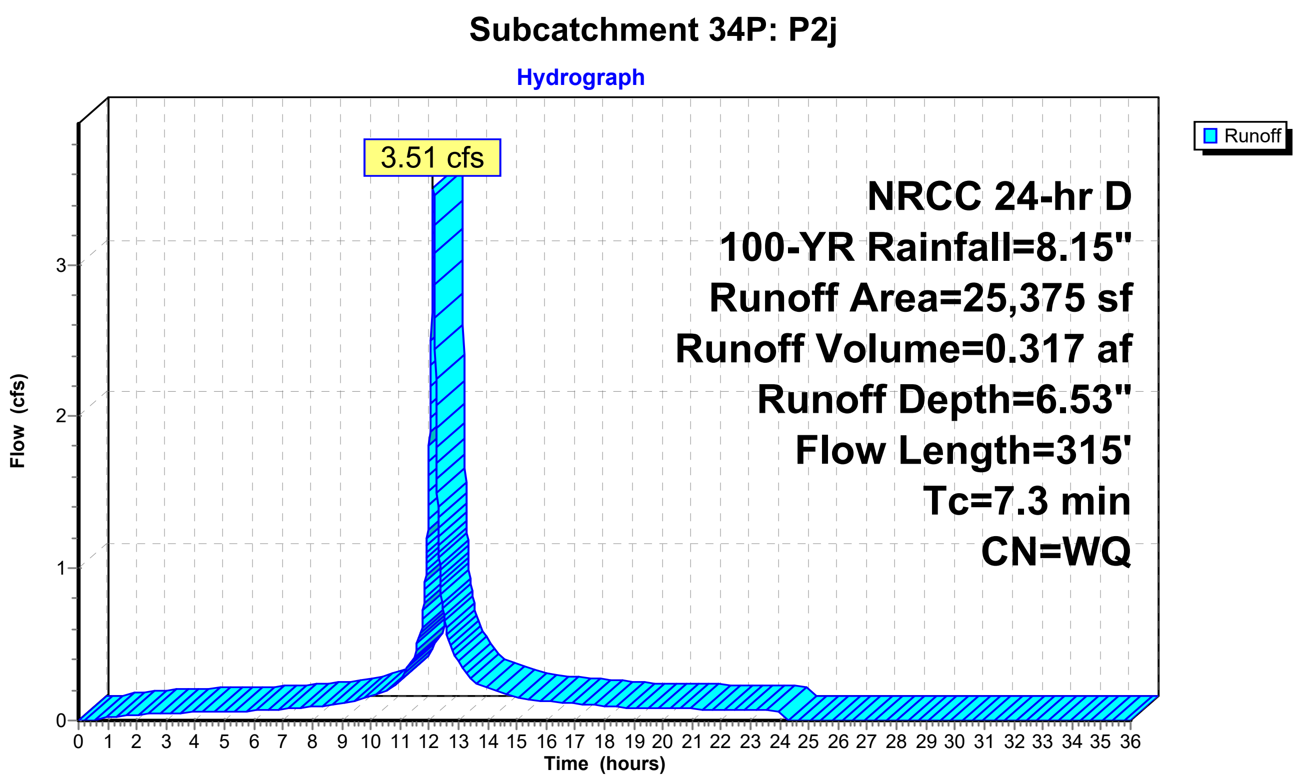
Summary for Subcatchment 34P: P2j

Runoff = 3.51 cfs @ 12.14 hrs, Volume= 0.317 af, Depth= 6.53"
Routed to Pond 35P : CB 10+30 R

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 100-YR Rainfall=8.15"

Area (sf)	CN	Description
8,847	98	Paved parking HSG B
8,450	98	Roofs HSG B
8,078	61	>75% Grass cover, Good HSG B
25,375		Weighted Average
8,078		31.83% Pervious Area
17,297		68.17% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.1	56	0.0500	0.15		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.36"
1.2	259	0.0300	3.52		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
7.3	315	Total			



Summary for Pond 35P: CB 10+30 R

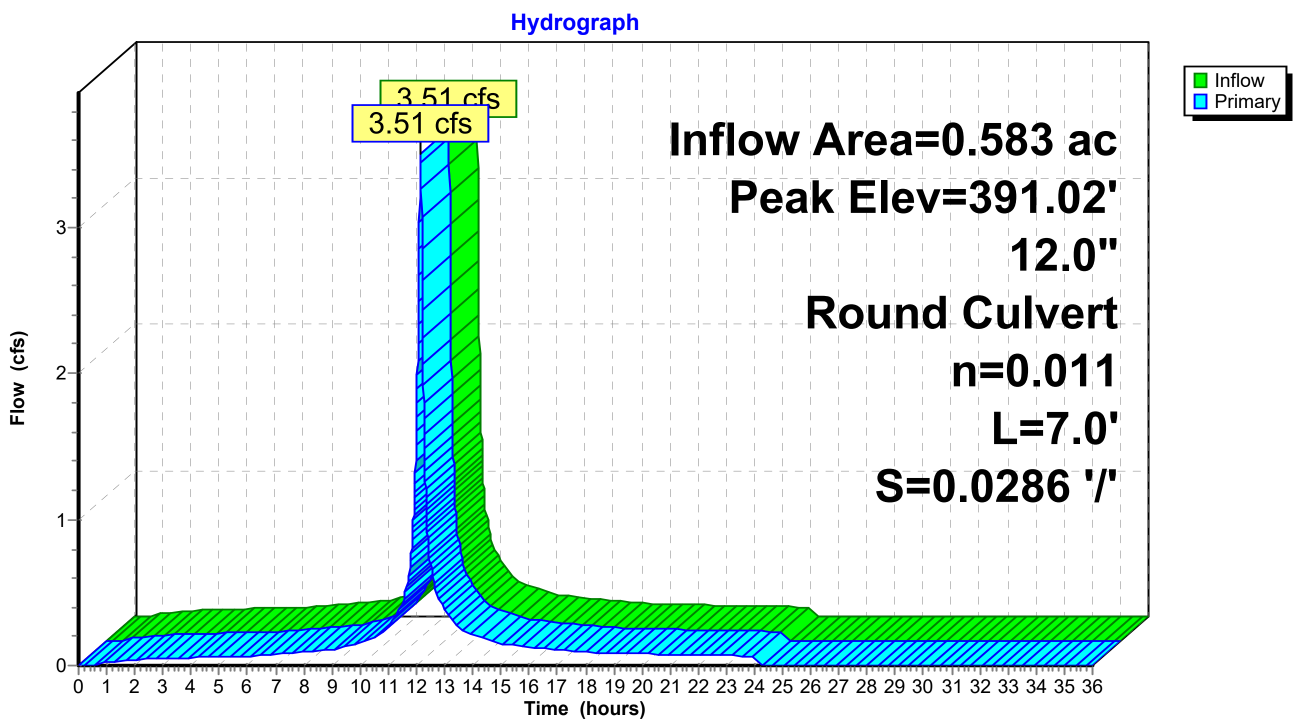
Inflow Area = 0.583 ac, 68.17% Impervious, Inflow Depth = 6.53" for 100-YR event
Inflow = 3.51 cfs @ 12.14 hrs, Volume= 0.317 af
Outflow = 3.51 cfs @ 12.14 hrs, Volume= 0.317 af, Atten= 0%, Lag= 0.0 min
Primary = 3.51 cfs @ 12.14 hrs, Volume= 0.317 af
Routed to Pond 38P : DMH 10+38

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 391.02' @ 12.15 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	389.30'	**12.0" Round Culvert** L= 7.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 389.30' / 389.10' S= 0.0286 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=3.47 cfs @ 12.14 hrs HW=391.01' TW=390.16' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 3.47 cfs @ 4.42 fps)

Pond 35P: CB 10+30 R



Summary for Subcatchment 36P: P2k

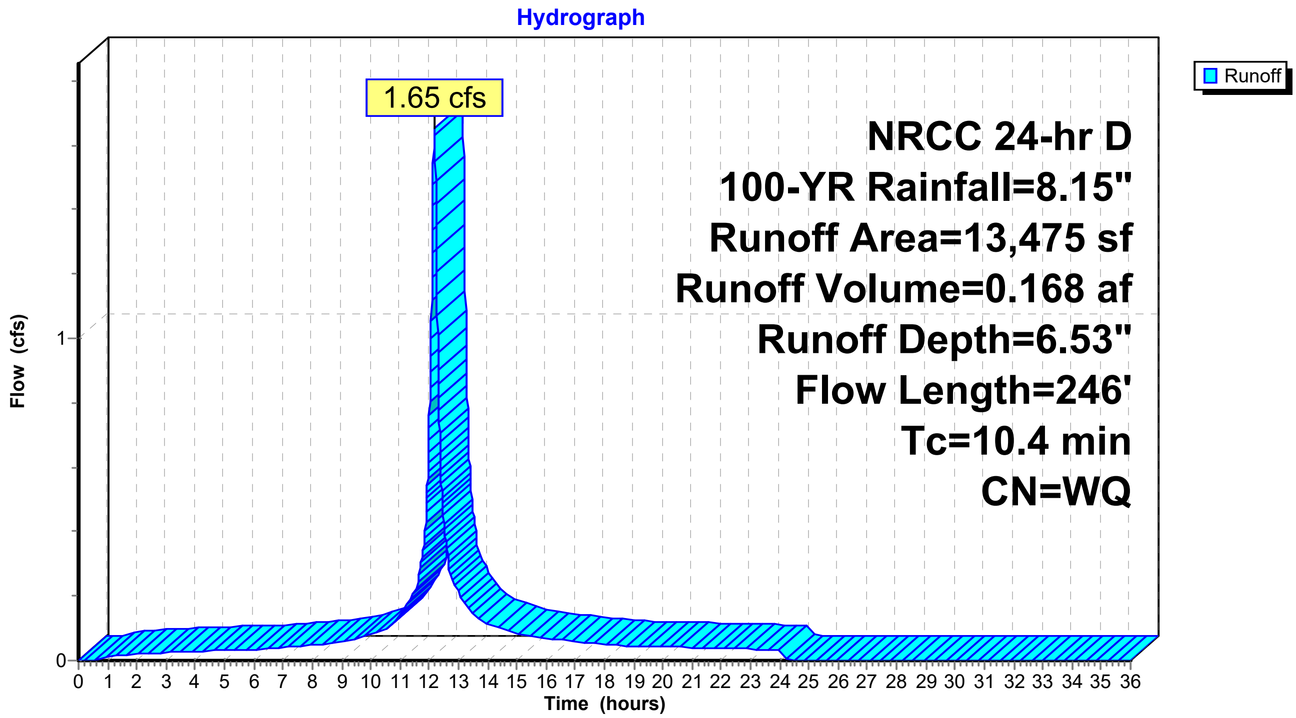
Runoff = 1.65 cfs @ 12.18 hrs, Volume= 0.168 af, Depth= 6.53"
Routed to Pond 37P : CB 10+30 L

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 100-YR Rainfall=8.15"

Area (sf)	CN	Description
4,639	98	Paved parking HSG B
4,550	98	Roofs HSG B
4,286	61	>75% Grass cover, Good HSG B
13,475		Weighted Average
4,286		31.81% Pervious Area
9,189		68.19% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.8	21	0.0500	0.13		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.36"
0.2	22	0.0500	1.50		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.36"
3.4	27	0.0500	0.13		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.36"
0.2	12	0.0500	1.33		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.36"
2.4	18	0.0500	0.12		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.36"
0.2	15	0.0500	1.57		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.1	22	0.0500	4.54		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.3	29	0.0400	1.40		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.0	12	0.0400	4.06		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.4	24	0.0200	0.99		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.4	44	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
10.4	246	Total			

Subcatchment 36P: P2k



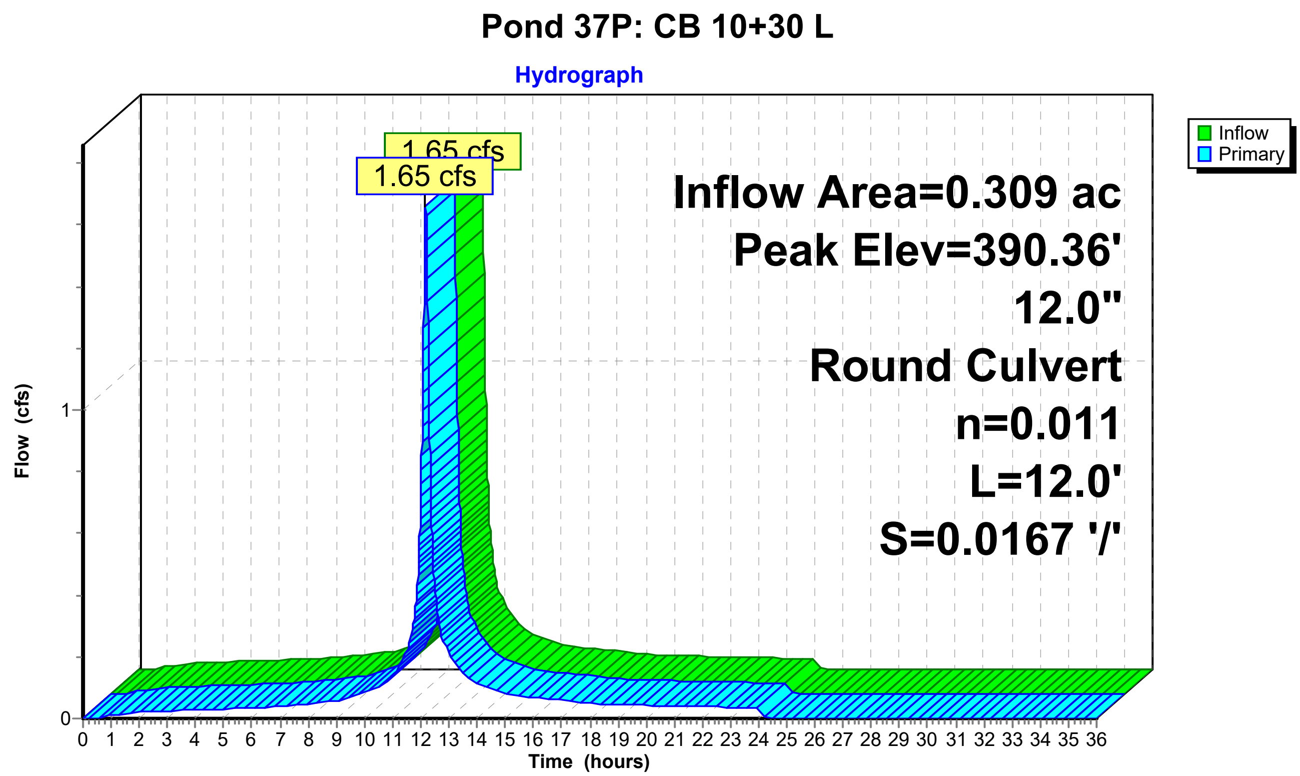
Summary for Pond 37P: CB 10+30 L

Inflow Area = 0.309 ac, 68.19% Impervious, Inflow Depth = 6.53" for 100-YR event
Inflow = 1.65 cfs @ 12.18 hrs, Volume= 0.168 af
Outflow = 1.65 cfs @ 12.18 hrs, Volume= 0.168 af, Atten= 0%, Lag= 0.0 min
Primary = 1.65 cfs @ 12.18 hrs, Volume= 0.168 af
Routed to Pond 38P : DMH 10+38

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 390.36' @ 12.16 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	389.30'	**12.0" Round Culvert** L= 12.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 389.30' / 389.10' S= 0.0167 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=1.75 cfs @ 12.18 hrs HW=390.34' TW=390.13' (Dynamic Tailwater)
1=Culvert (Inlet Controls 1.75 cfs @ 2.22 fps)



Summary for Pond 38P: DMH 10+38

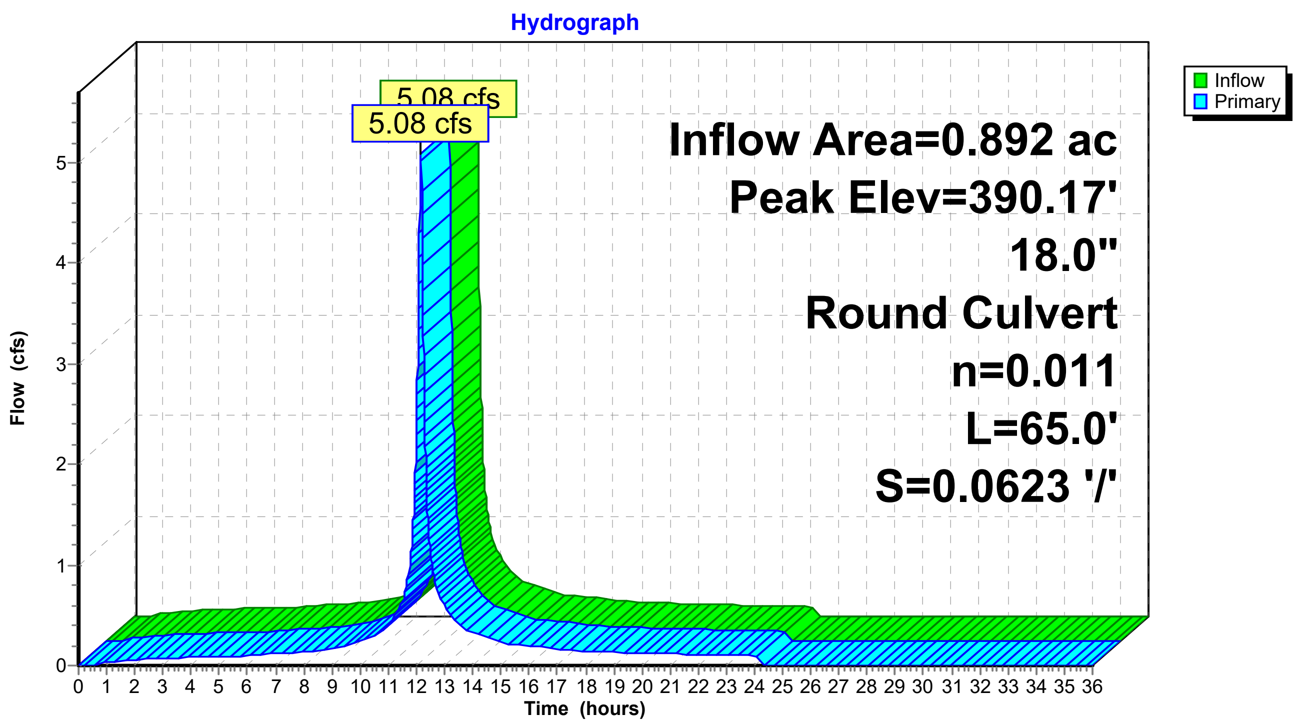
Inflow Area = 0.892 ac, 68.18% Impervious, Inflow Depth = 6.53" for 100-YR event
Inflow = 5.08 cfs @ 12.15 hrs, Volume= 0.485 af
Outflow = 5.08 cfs @ 12.15 hrs, Volume= 0.485 af, Atten= 0%, Lag= 0.0 min
Primary = 5.08 cfs @ 12.15 hrs, Volume= 0.485 af
Routed to Pond 39P : FD B

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 390.17' @ 12.15 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	389.05'	**18.0" Round Culvert** L= 65.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 389.05' / 385.00' S= 0.0623 '/' Cc= 0.900 n= 0.011, Flow Area= 1.77 sf

Primary OutFlow Max=5.08 cfs @ 12.15 hrs HW=390.17' TW=383.60' (Dynamic Tailwater)
1=Culvert (Inlet Controls 5.08 cfs @ 3.60 fps)

Pond 38P: DMH 10+38



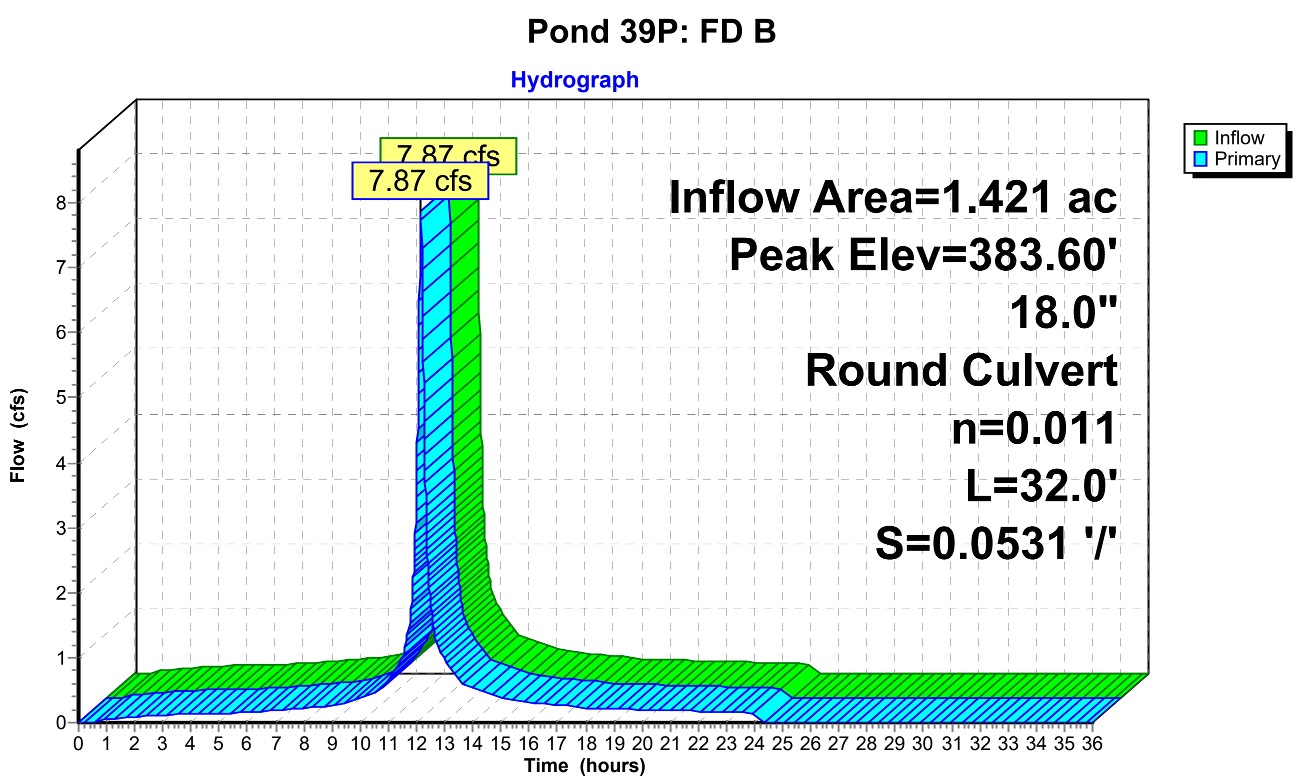
Summary for Pond 39P: FD B

Inflow Area = 1.421 ac, 68.03% Impervious, Inflow Depth = 6.52" for 100-YR event
Inflow = 7.87 cfs @ 12.16 hrs, Volume= 0.772 af
Outflow = 7.87 cfs @ 12.16 hrs, Volume= 0.772 af, Atten= 0%, Lag= 0.0 min
Primary = 7.87 cfs @ 12.16 hrs, Volume= 0.772 af
Routed to Pond 41P : Infiltration Basin #3

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 383.60' @ 12.16 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	382.00'	**18.0" Round Culvert** L= 32.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 382.00' / 380.30' S= 0.0531 '/' Cc= 0.900 n= 0.011, Flow Area= 1.77 sf

Primary OutFlow Max=7.85 cfs @ 12.16 hrs HW=383.60' TW=382.30' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 7.85 cfs @ 4.44 fps)



Summary for Subcatchment 40P: P2I

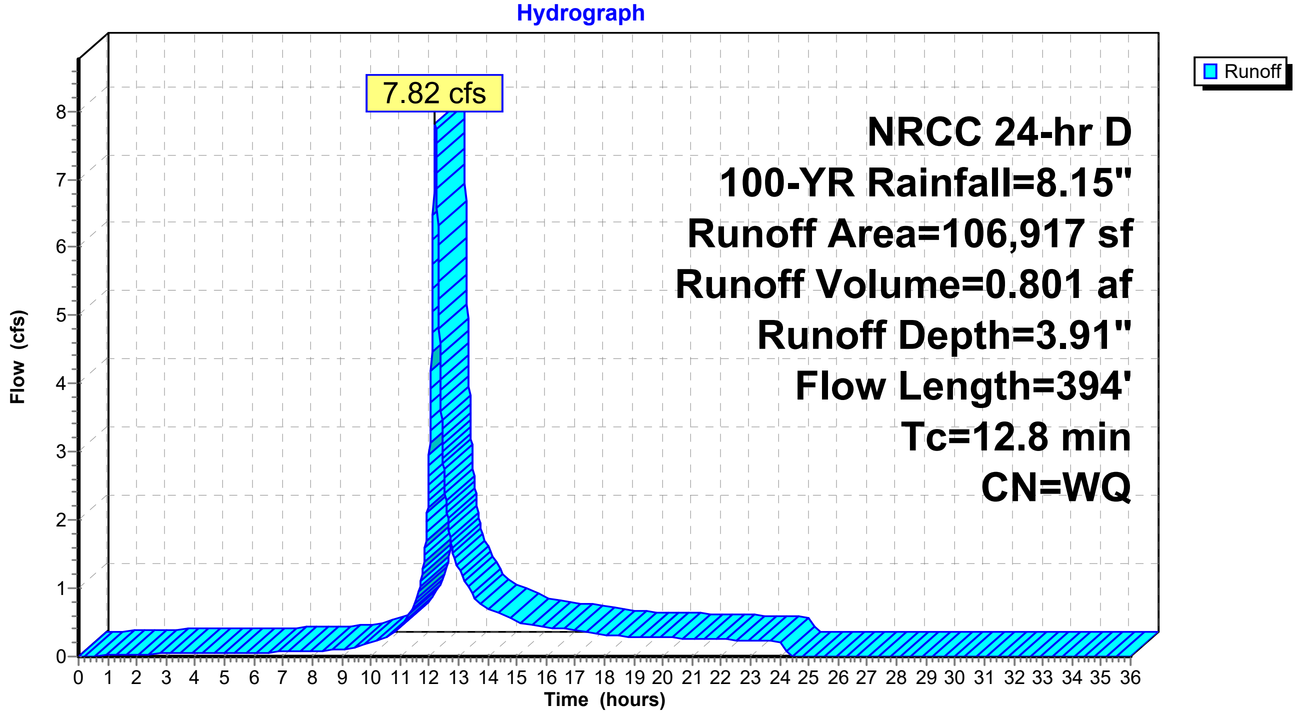
Runoff = 7.82 cfs @ 12.21 hrs, Volume= 0.801 af, Depth= 3.91"
Routed to Pond 41P : Infiltration Basin #3

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 100-YR Rainfall=8.15"

Area (sf)	CN	Description
3,235	98	Paved parking HSG B
12,020	98	Roofs, HSG B
47,471	61	>75% Grass cover, Good HSG B
617	74	>75% Grass cover, Good, HSG C
43,574	55	Woods, Good, HSG B
106,917		Weighted Average
91,662		85.73% Pervious Area
15,255		14.27% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	72	0.0800	0.13		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.36"
0.4	35	0.0800	1.41		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.1	287	0.0500	1.57		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
12.8	394	Total			

Subcatchment 40P: P2I



Summary for Pond 41P: Infiltration Basin #3

Inflow Area = 3.875 ac, 33.98% Impervious, Inflow Depth = 4.87" for 100-YR event
Inflow = 15.16 cfs @ 12.18 hrs, Volume= 1.573 af
Outflow = 9.29 cfs @ 12.31 hrs, Volume= 1.573 af, Atten= 39%, Lag= 8.2 min
Discarded = 0.56 cfs @ 12.31 hrs, Volume= 0.768 af
Primary = 2.87 cfs @ 12.31 hrs, Volume= 0.603 af
Routed to Link 28P : Sub-DP #2a: Flow to Town Land
Secondary = 5.86 cfs @ 12.31 hrs, Volume= 0.202 af
Routed to Link 43P : Sub-DP #2b: Flow to Northern Abutter

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 382.80' @ 12.31 hrs Surf.Area= 10,045 sf Storage= 15,412 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 75.3 min (882.4 - 807.0)

Volume	Invert	Avail.Storage	Storage Description
#1	380.00'	22,220 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)
#2	378.00'	1,502 cf	**Custom Stage Data (Irregular)** Listed below (Recalc) 3,755 cf Overall x 40.0% Voids
		23,722 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
380.00	3,755	261.0	0	0	3,755
384.00	7,576	358.0	22,220	22,220	8,691

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
378.00	3,755	261.0	0	0	3,755
379.00	3,755	261.0	3,755	3,755	4,016

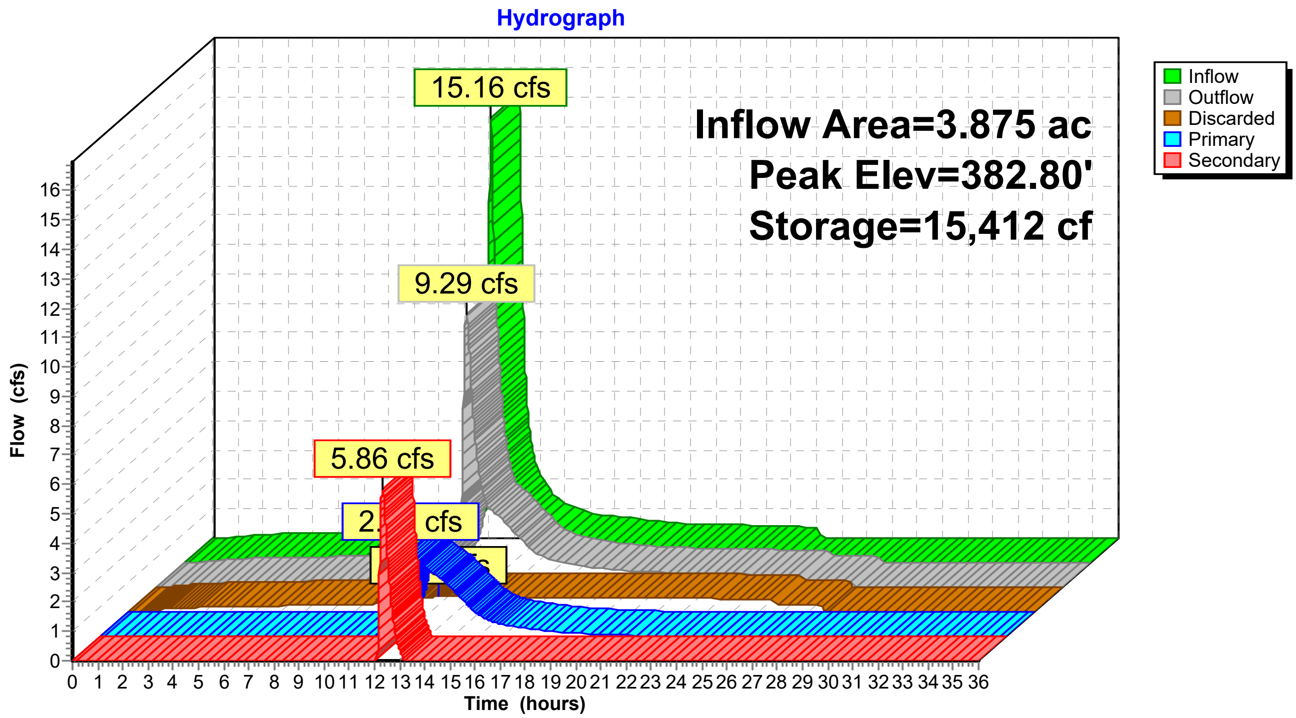
Device	Routing	Invert	Outlet Devices
#1	Discarded	378.00'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	380.40'	**12.0" Round Culvert** L= 214.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 380.40' / 358.00' S= 0.1047 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf
#3	Device 2	380.60'	**9.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Secondary	382.00'	**Custom Weir/Orifice, Cv= 2.62 (C= 3.28)** Elev. (feet) 382.00 383.50 383.50 384.00 Width (feet) 2.50 2.50 20.00 20.00

Discarded OutFlow Max=0.56 cfs @ 12.31 hrs HW=382.80' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.56 cfs)

Primary OutFlow Max=2.87 cfs @ 12.31 hrs HW=382.80' TW=0.00' (Dynamic Tailwater)
└─**2=Culvert** (Passes 2.87 cfs of 5.21 cfs potential flow)
  └─**3=Orifice/Grate** (Orifice Controls 2.87 cfs @ 6.50 fps)

Secondary OutFlow Max=5.85 cfs @ 12.31 hrs HW=382.80' TW=0.00' (Dynamic Tailwater)
└─**4=Custom Weir/Orifice** (Weir Controls 5.85 cfs @ 2.93 fps)

Pond 41P: Infiltration Basin #3



Summary for Subcatchment 42P: P2m

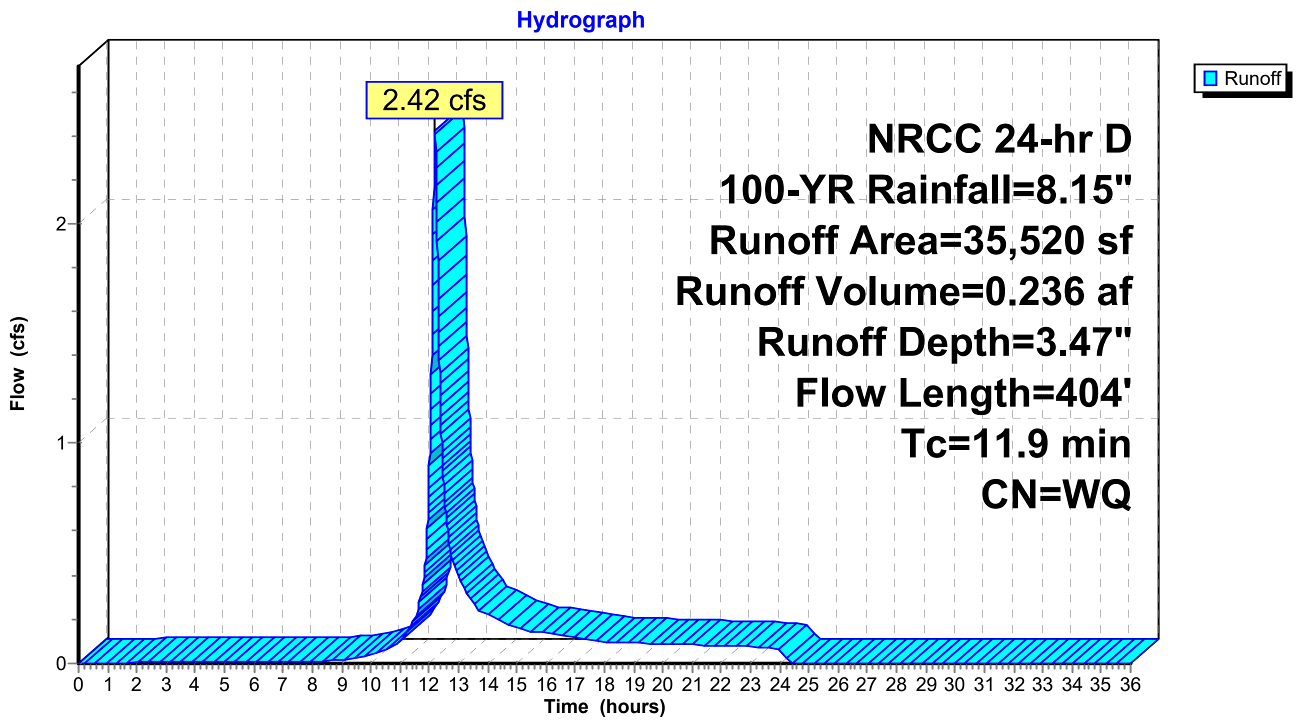
Runoff = 2.42 cfs @ 12.20 hrs, Volume= 0.236 af, Depth= 3.47"
Routed to Link 43P : Sub-DP #2b: Flow to Northern Abutter

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 100-YR Rainfall=8.15"

	Area (sf)	CN	Description
*	2,080	98	Roofs HSG B
	15,055	61	>75% Grass cover, Good HSG B
	18,385	55	Woods, Good, HSG B
	35,520		Weighted Average
	33,440		94.14% Pervious Area
	2,080		5.86% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	51	0.0400	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.36"
2.6	353	0.2100	2.29		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
11.9	404	Total			

Subcatchment 42P: P2m

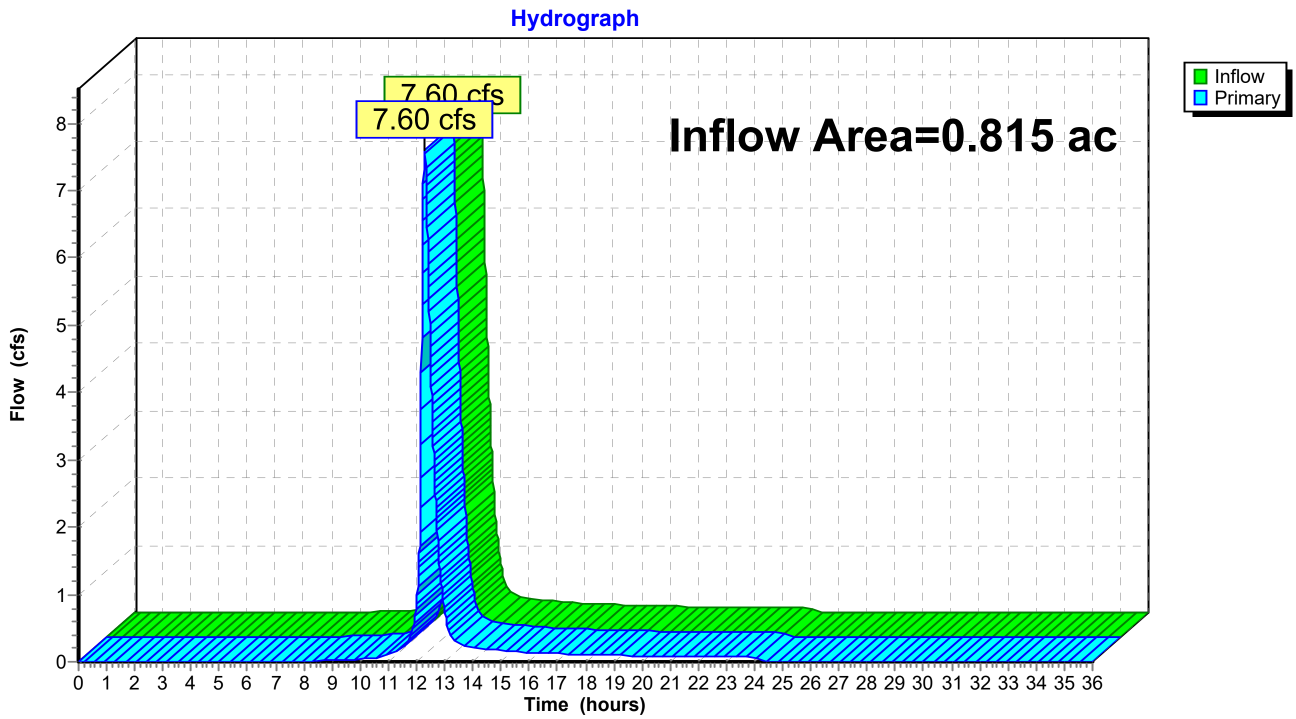


Summary for Link 43P: Sub-DP #2b: Flow to Northern Abutter

Inflow Area = 0.815 ac, 5.86% Impervious, Inflow Depth = 6.44" for 100-YR event
Inflow = 7.60 cfs @ 12.29 hrs, Volume= 0.438 af
Primary = 7.60 cfs @ 12.29 hrs, Volume= 0.438 af, Atten= 0%, Lag= 0.0 min
Routed to Link 44P : Design Point #2: Flow to Uncas Brook

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Link 43P: Sub-DP #2b: Flow to Northern Abutter

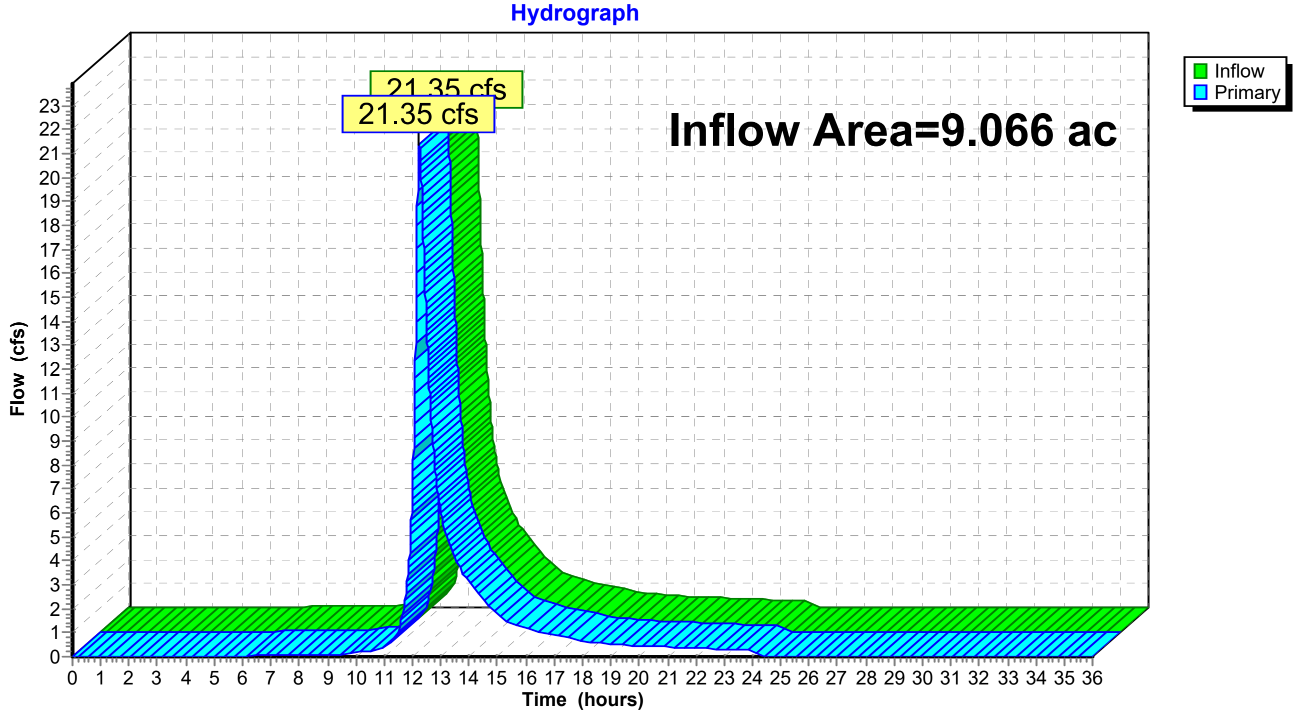


Summary for Link 44P: Design Point #2: Flow to Uncas Brook

Inflow Area = 9.066 ac, 28.33% Impervious, Inflow Depth = 3.00" for 100-YR event
Inflow = 21.35 cfs @ 12.24 hrs, Volume= 2.267 af
Primary = 21.35 cfs @ 12.24 hrs, Volume= 2.267 af, Atten= 0%, Lag= 0.0 min

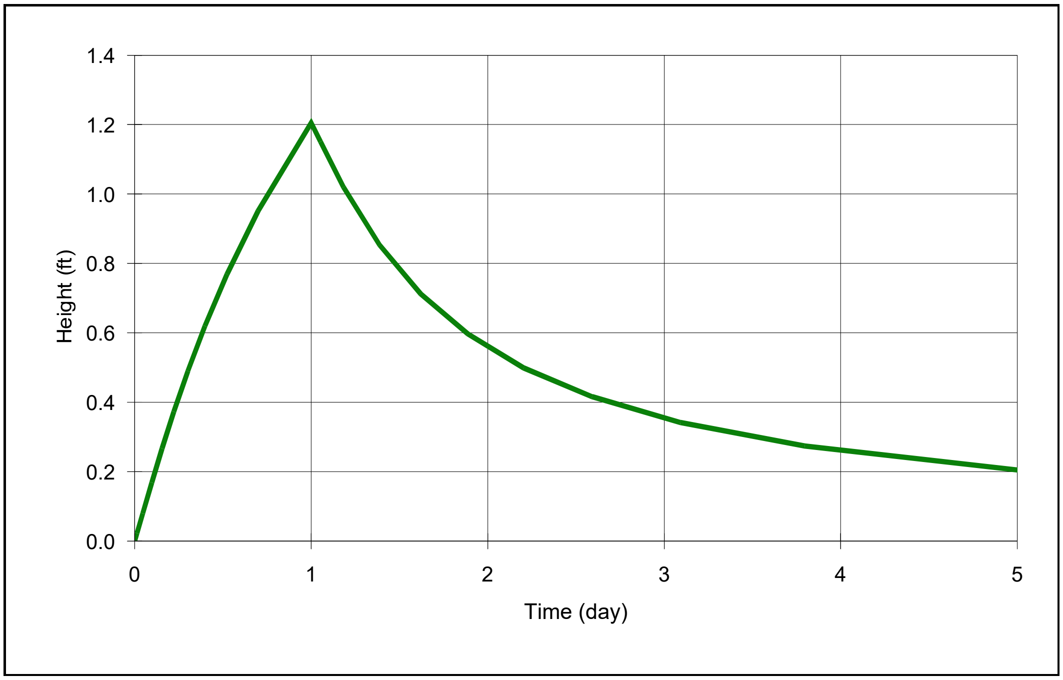
Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Link 44P: Design Point #2: Flow to Uncas Brook



ATTACHMENT L: Mounding Calculations

Groundwater Mounding Analysis (Hantush's Method using Glover's Solution)



COMPANY: Legacy Engineering

PROJECT: Infiltration Basin #1

ANALYST: Daniel J. Merrikin, P.E.

DATE: 8/22/2023 TIME: 9:26:53 AM

INPUT PARAMETERS

Application rate: 0.35 c.ft/day/sq. ft
Duration of application: 1 day
Total simulation time: 5 day
Fillable porosity: 0.2
Hydraulic conductivity: 2 ft/day
Initial saturated thickness: 20 ft
Length of application area: 45 ft
Width of application area: 31.6 ft
Constant head boundary used at: 200 ft
Groundwater mounding @
X coordinate: 0 ft
Y coordinate: 0 ft
Total volume applied: 497.7 cft

MODEL RESULTS

Time (day)	Mound Height (ft)
0	0
0	0.02
0	0.08
0.1	0.17
0.2	0.27
0.2	0.37
0.3	0.49
0.4	0.62
0.5	0.77
0.7	0.95
1	1.2
1.1	1.15
1.2	1.02
1.4	0.85
1.6	0.71
1.9	0.6
2.2	0.5
2.6	0.42
3.1	0.34
3.8	0.27
5	0.2

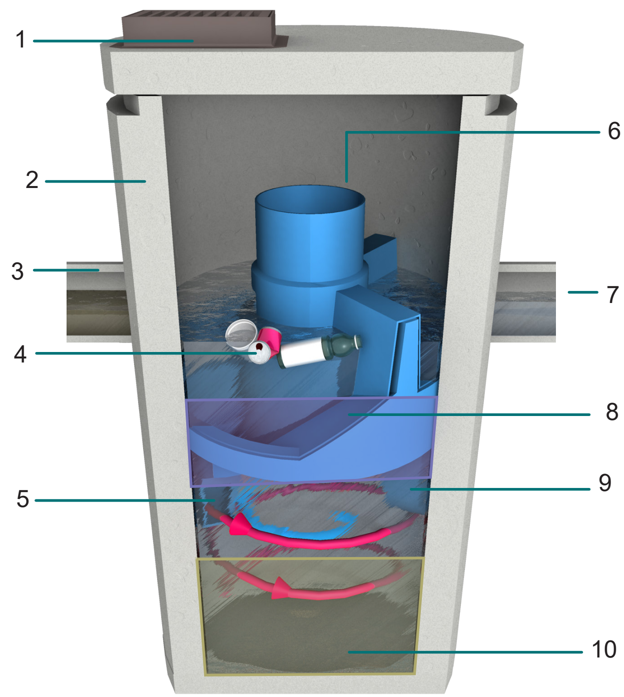
ATTACHMENT M: First Defense Proprietary Treatment Units

First Defense® High Capacity

A Simple Solution for your Trickiest Sites

Verified by NJCAT and NJDEP

Fig.1 The First Defense® High Capacity has internal components designed to efficiently capture pollutants and prevent washout at peak flows.



Components

1. Inlet Grate (optional)
2. Precast chamber
3. Inlet Pipe (optional)
4. Floatables Draw Off Slot (not pictured)
5. Inlet Chute
6. Internal Bypass
7. Outlet pipe
8. Oil and Floatables Storage
9. Outlet chute
10. Sediment Storage Sump

Product Profile

The First Defense® High Capacity is an enhanced vortex separator that combines an effective stormwater treatment chamber with an integral peak flow bypass. It efficiently removes sediment total suspended solids (TSS), trash and hydrocarbons from stormwater runoff without washing out previously captured pollutants. The First Defense® High Capacity is available in several model configurations to accommodate a wide range of pipe sizes, peak flows and depth constraints (**Table 1**, next page).

Applications

- Stormwater treatment at the point of entry into the drainage line
- Sites constrained by space, topography or drainage profiles with limited slope and depth of cover
- Retrofit installations where stormwater treatment is placed on or tied into an existing storm drain line
- Pretreatment for filters, infiltration and storage

Advantages

- Inlet options include surface grate or multiple inlet pipes
- Integral high capacity bypass conveys large peak flows without the need for “offline” arrangements using separate junction manholes
- Proven to prevent pollutant washout at up to 450% of its treatment flow
- Long flow path through the device ensures a long residence time within the treatment chamber, enhancing pollutant settling
- Delivered to site pre-assembled and ready for installation

How it Works

The First Defense® High Capacity has internal components designed to remove and retain gross debris, total suspended solids (TSS) and hydrocarbons (**Fig.1**).

Contaminated stormwater runoff enters the inlet chute from a surface grate and/or inlet pipe. The inlet chute introduces flow into the chamber tangentially to create a low energy vortex flow regime (magenta arrow) that directs sediment into the sump while oils, floating trash and debris rise to the surface.

Treated stormwater exits through a submerged outlet chute located opposite to the direction of the rotating flow (blue arrow). Enhanced vortex separation is provided by forcing the rotating flow within the vessel to follow the longest path possible rather than directly from inlet to outlet.

Higher flows bypass the treatment chamber to prevent turbulence and washout of captured pollutants. An internal bypass conveys infrequent peak flows directly to the outlet eliminating the need for, and expense of, external bypass control structures. A floatables draw off slot functions to convey floatables into the treatment chamber prior to bypass.

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First Defense® High Capacity

Sizing & Design

This adaptable online treatment system works easily with large pipes, multiple inlet pipes, inlet grates and now, contains a high capacity bypass for the conveyance of large peak flows. Designed with site flexibility in mind, the First Defense® High Capacity allows engineers to maximize available site space without compromising treatment level.

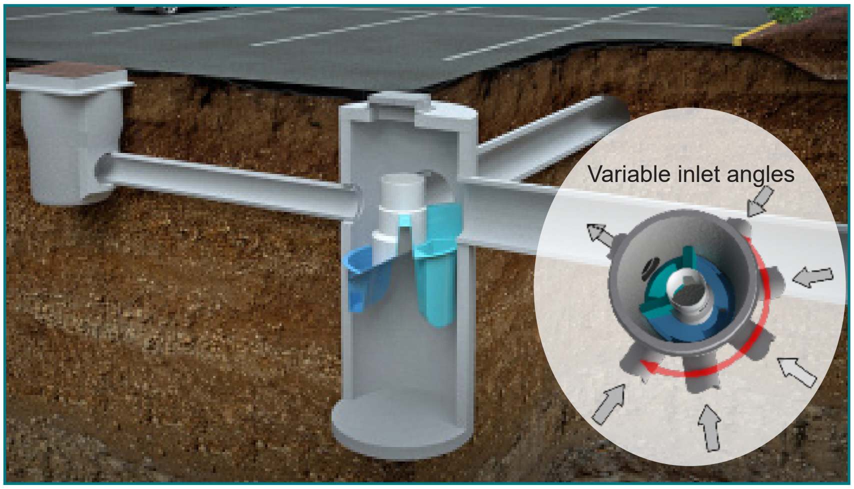

Fig 2. Works with multiple inlet pipes and grates

Inspection and Maintenance

Nobody maintains our systems better than we do. To ensure optimal, ongoing device performance, be sure to recommend Hydro International as a preferred service and maintenance provider to your clients.

Call **1 (800) 848-2706** to schedule an inspection and cleanout or learn more at **hydro-int.com/service**

Sizing Calculator for Engineers

This simple online tool will recommend the best separatror, model size and online/offline arrangement based on site-specific data entered by the user.

Go to hydro-int.com/sizing to access the tool.

Fig 3. Maintenance is done with a vactor truck

Table 1. First Defense® High Capacity Design Criteria.

First Defense® High Capacity Model Number	Diameter	Typical TSS Treatment Flow Rates		Peak Online Flow Rate	Maximum Pipe Diameter[1]	Oil Storage Capacity	Typical Sediment Storage Capacity[2]	Minimum Distance from Outlet Invert to Top of Rim[3]	Standard Distance from Outlet Invert to Sump Floor
		NJDEP Certified	110µm						
	(ft / m)	(cfs / L/s)	(cfs / L/s)	(cfs / L/s)	(in / mm)	(gal / L)	(yd^3 / m^3)	(ft / m)	(ft / m)
FD-3HC	3 / 0.9	0.84 / 23.7	1.06 / 45.3	15 / 424	18 / 457	125 / 473	0.4 / 0.3	2.0 - 3.5 / 0.6 - 1.0	3.71 / 1.13
FD-4HC	4 / 1.2	1.50 / 42.4	1.88 / 50.9	18 / 510	24 / 600	191 / 723	0.7 / 0.5	2.3 - 3.9 / 0.7 - 1.2	4.97 / 1.5
FD-5HC	5 / 1.5	2.34 / 66.2	2.94 / 82.1	20 / 566	24 / 600	300 / 1135	1.1 / .84	2.5 - 4.5 / 0.7 - 1.3	5.19 / 1.5
FD-6HC	6 / 1.8	3.38 / 95.7	4.23 / 133.9	32 / 906	30 / 750	496 / 1,878	1.6 / 1.2	3.0 - 5.1 / 0.9 - 1.6	5.97 / 1.8
FD-8HC	8 / 2.4	6.00 / 169.9	7.52 / 212.9	50 / 1,415	48 / 1219	1120 / 4239	2.8 / 2.1	3.0 - 6.0 / 0.9 -1.8	7.40 / 2.2

[1]Contact Hydro International when larger pipe sizes are required.
[2]Contact Hydro International when custom sediment storage capacity is required.
[3]Minimum distance for models depends on pipe diameter.

Technical Abstract
First Defense®

Hydro International

Performance Verification of TSS Removal with OK-110 Silica Sand

The First Defense® is a cost competitive device used to capture oil, debris and sediment from stormwater runoff. Commonly used as a pre-treatment device, the First Defense® effectively captures the bulk of the pollutant load when used upstream of more sensitive treatment devices such as infiltration systems.

The First Defense® is equally well suited as a stand alone treatment device for use on space constrained sites. Whereas pretreatment devices are used to capture gross solids, stand alone treatment devices must remove gross solids and finer particles. Stand alone treatment units must also prevent pollutant washout during intense storm events, as there is no additional treatment system downstream to capture pollutants scoured from the upstream system before runoff is discharged to the environment.

The First Defense® uses the principles of rotational flow to provide greater capture efficiency of fine suspended solids as compared to that of conventional gravity separation chambers. Furthermore, its unique internal bypass prevents washout of captured pollutants during intense storm flows. Flows exceeding the design treatment flow rate are diverted away from the pollutant storage sump through an enclosed bypass chute. This arrangement protects captured pollutants from high scour velocities during high-intensity rainfall without requiring the use of an additional bypass junction manhole (Fig.1).

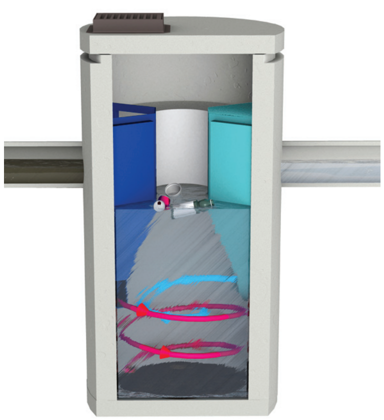

Fig.1 The First Defense® captures fine sediments as well as gross pollutants, making it an effective stand-alone treatment device for space constrained sites.

Performance Test Objectives and Protocols

To evaluate the treatment performance of the First Defense®, a 4-ft diameter unit was tested at Hydro International's hydraulics laboratory in Portland, ME. The primary objectives were to: 1) independently verify the removal efficiency of Total Suspended Solids (TSS) with a fine particle size gradation, and 2) verify that the First Defense® protects previously captured pollutants from washout during high-flow bypass mode.

TSS removal tests were conducted according to the Maine Department of Environmental Protection (MEDEP) Test Protocols, which specify OK-110 sediment as the test pollutant (Fig.2).

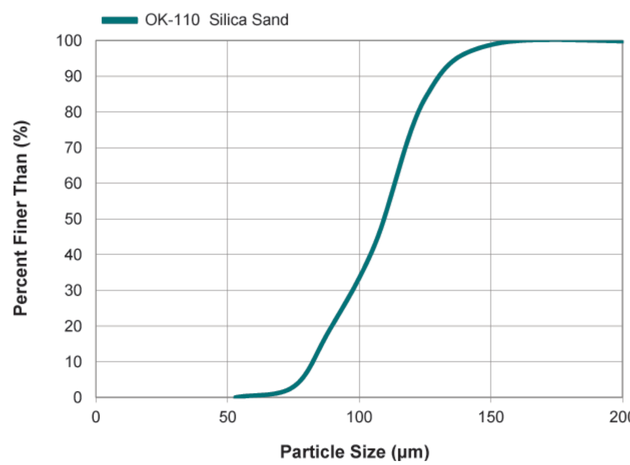

Fig.2 Particle size distribution of the OK-110 silica blend, which contains a large fraction of fine particle sizes that are targeted by stand-alone stormwater treatment devices.

Washout tests were conducted in conformance with the 2009 New Jersey DEP protocols for Hydrodynamic Separators, which require pre-loading the sump of the test unit to 50% capacity with OK-110 (Fig.3).

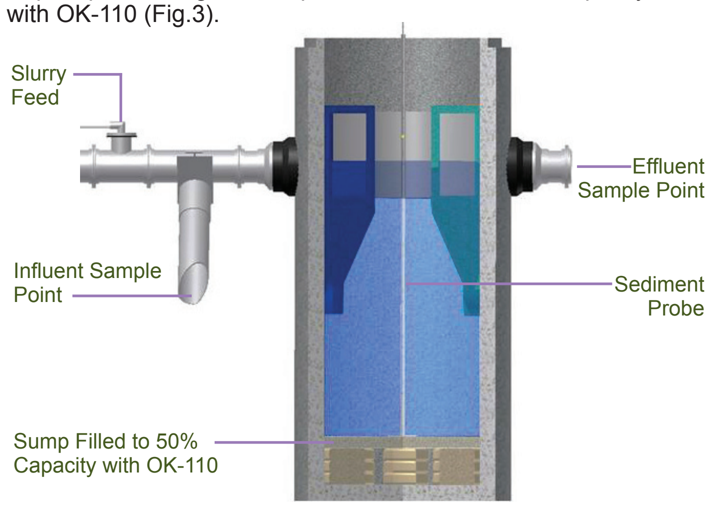

Fig.3 The 4-ft First Defense® was tested with its sump pre-loaded to 50% capacity with OK-110 sediment.

First Defense®

Washout Test Procedures

Washout tests were conducted at multiple flow rates ranging from 0.88 to 3.8 cfs. At each tested flow rate, clean water from a 23,000 gallon reservoir was pumped to the First Defense® for 15 minutes (Fig.4).

At the conclusion of the test run, the sediment depth was measured and compared to the initial depth. Results showed no measureable decrease in the depth of sediment pre-loaded in the sump.

The first round of retention results were confirmed by retesting at the same flow rates while measuring changes in effluent concentrations. While pumping clean water from the reservoir through the pre-loaded sump for 25 minutes at each flow rate, influent and effluent samples were collected at 5-minute intervals. The samples were analyzed for TSS by an independent, state-certified laboratory utilizing APHA SM2540D.

The analytical results for all test runs showed non-detectable levels of TSS.

A representative from the University of New Hampshire Stormwater Center observed all of the washout tests as an independent witness. This witness reviewed data analysis and quality control procedures of the external laboratory used for sample analysis, and provided a written report to independently verify the observations.

TSS Removal Efficiency Test Procedures

TSS removal efficiency tests were run at 0.7 cfs, the targeted Design Treatment Flow Rate of the 4-ft First Defense®. A slurry mixture of F-60 was pumped into the clean water pipeline conveying water from a 23,000 gal reservoir to the First Defense® (Fig.4).

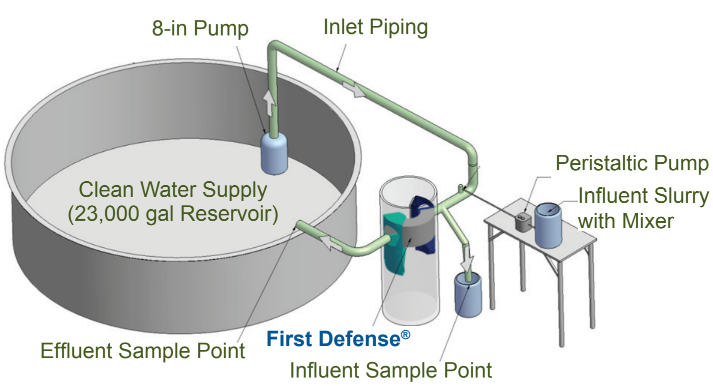

Fig.4 The First Defense® was tested at Hydro International's Portland, Maine test facility.

Influent and effluent samples were taken at pre-determined intervals spaced by residence time. All samples had a minimum volume of 500 mL. Background influent and effluent samples were collected and analyzed to ensure clean water supplied from the reservoir did not exceed non-detectable concentrations of 4 mg/L TSS.

Samples were independently analyzed for TSS using APHA SM2540D by an accredited third party laboratory.

Test Results

Overall, the First Defense® met and exceeded the scour test requirements of the NJDEP protocol, showing no measurable effluent TSS concentration and no measurable decrease in depth of the pre-loaded sediment at flows up to 500% of the model's Design Treatment Flow Rate.

Overall, the test results show that the First Defense® exceeds 94% removal for the mean flow rate of 0.65 cfs (293 gpm), and would be expected to exceed 90% removal at the target flow rate of 0.71 cfs (Table 1). These tests were independently witnessed and reported by Jeff Dennis of the Maine DEP. As stated in his written assessment:

"All paired sample removal efficiencies exceeded 80%, as did their mean whether or not they were adjusted for background concentrations, so it is very clear that at 290 gpm, a 4-ft diameter First Defense® unit can remove at least 80% of OK-110 grade silica sand, and seems to be able to remove more than 90% at this flow."

Table 1. OK-110 Sediment Removal Efficiency.

Test Run	Flow Rate	Influent TSS Concentration	Effluent TSS Concentration	Removal Efficiency
	(cfs)	(mg/L)	(mg/L)	(%)
1	0.61	299.8	13.7	95.4
2	0.73	268.6	16.8	93.7
3	0.67	189.1	12.6	93.3
4	0.66	279.1	15.8	94.3
5	0.58	291.1	17.3	94.1
6	0.63	267.2	15.8	94.1
Mean	0.65	265.5	15.2	94.2

Conclusions

The results confirm that the First Defense® effectively captures fine sediment at its treatment flow rate, and that fine sediments captured in the pollutant storage sump are protected from washout during intense storm events. This confirms that the First Defense® is a suitable stand-alone stormwater treatment device for sites where larger treatment systems are not practical solutions.

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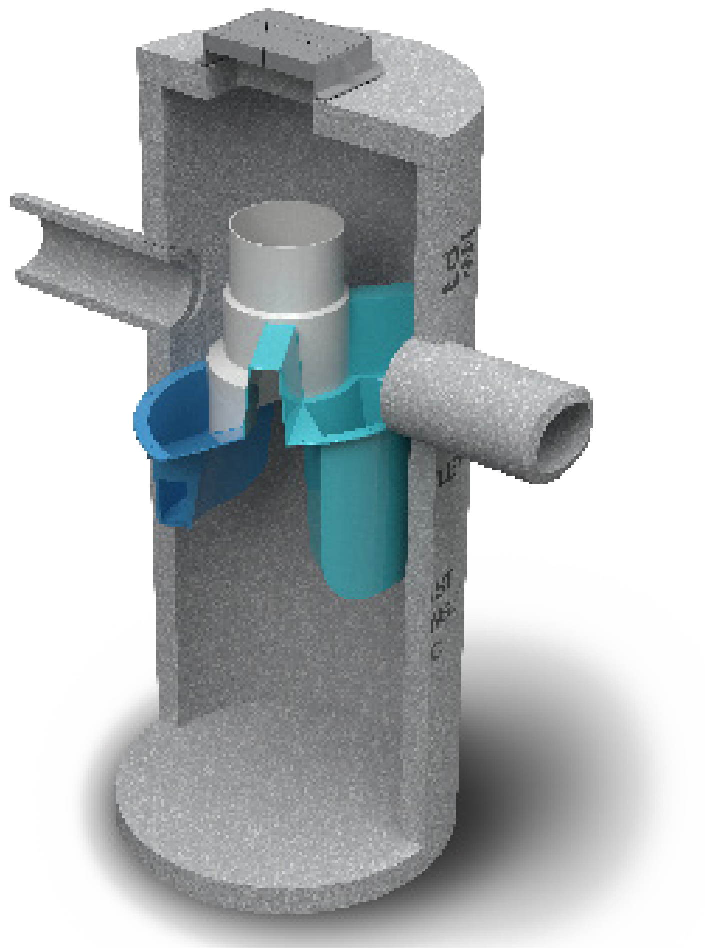


Operation and Maintenance Manual

First Defense® High Capacity and First Defense® Optimum

Vortex Separator for Stormwater Treatment

Table of Contents

Hydro International (Stormwater), 94 Hutchins Drive, Portland ME 04102
Tel: (207) 756-6200 Fax: (207) 756-6212 Web: www.hydro-int.com

I. First Defense® by Hydro International

Introduction

The First Defense® is an enhanced vortex separator that combines an effective and economical stormwater treatment chamber with an integral peak flow bypass. It efficiently removes total suspended solids (TSS), trash and hydrocarbons from stormwater runoff without washing out previously captured pollutants. The First Defense® is available in several model configurations to accommodate a wide range of pipe sizes, peak flows and depth constraints.

The two product models described in this guide are the First Defense® High Capacity and the First Defense® Optimum; they are inspected and maintained identically.

Operation

The First Defense® operates on simple fluid hydraulics. It is self-activating, has no moving parts, no external power requirement and is fabricated with durable non-corrosive components. No manual procedures are required to operate the unit and maintenance is limited to monitoring accumulations of stored pollutants and periodic clean-outs. The First Defense® has been designed to allow for easy and safe access for inspection, monitoring and clean-out procedures. Neither entry into the unit nor removal of the internal components is necessary for maintenance, thus safety concerns related to confined-space-entry are avoided.

Pollutant Capture and Retention

The internal components of the First Defense® have been designed to optimize pollutant capture. Sediment is captured and retained in the base of the unit, while oil and floatables are stored on the water surface in the inner volume (Fig.1).

The pollutant storage volumes are isolated from the built-in bypass chamber to prevent washout during high-flow storm events. The sump of the First Defense® retains a standing water level between storm events. This ensures a quiescent flow regime at the onset of a storm, preventing resuspension and washout of pollutants captured during previous events.

Accessories such as oil absorbent pads are available for enhanced oil removal and storage. Due to the separation of the oil and floatable storage volume from the outlet, the potential for washout of stored pollutants between clean-outs is minimized.

Applications

- Stormwater treatment at the point of entry into the drainage line
- Sites constrained by space, topography or drainage profiles with limited slope and depth of cover
- Retrofit installations where stormwater treatment is placed on or tied into an existing storm drain line
- Pretreatment for filters, infiltration and storage

Advantages

- Inlet options include surface grate or multiple inlet pipes
- Integral high capacity bypass conveys large peak flows without the need for “offline” arrangements using separate junction manholes
- Long flow path through the device ensures a long residence time within the treatment chamber, enhancing pollutant settling
- Delivered to site pre-assembled and ready for installation

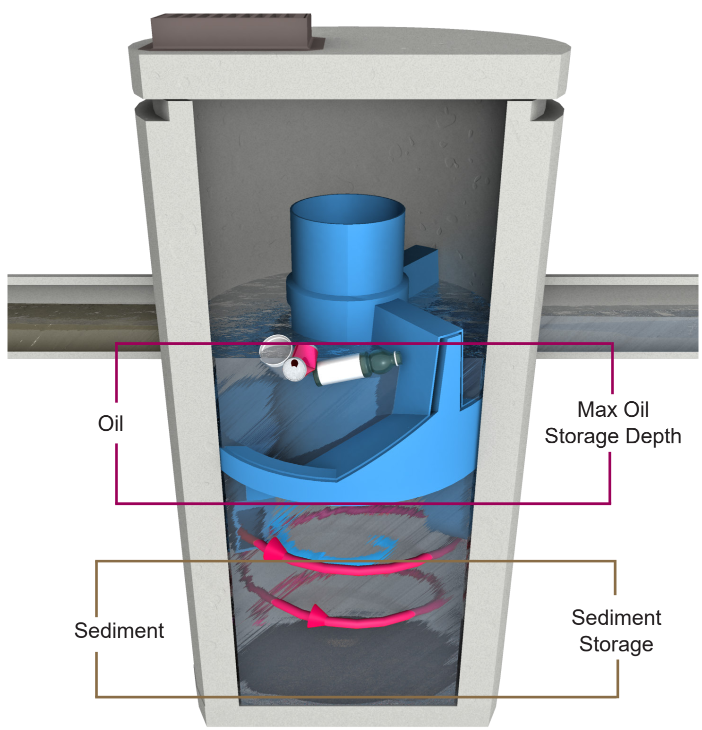


Fig.1 Pollutant storage volumes in the First Defense®.

II. Model Sizes & Configurations

The First Defense® inlet and internal bypass arrangements are available in several model sizes and configurations. The components have modified geometries allowing greater design flexibility to accommodate various site constraints.

All First Defense® models include the internal components that are designed to remove and retain total suspended solids (TSS), gross solids, floatable trash and hydrocarbons (Fig.2). First Defense® model sizes (diameter) are shown in Table 1.

III. Maintenance

First Defense® Components

1. **Built-In Bypass**
2. **Inlet Pipe**
3. **Inlet Chute**
4. **Floatables Draw-off Port**
5. **Outlet Pipe**
6. **Floatables Storage**
7. **Sediment Storage**
8. **Inlet Grate or Cover**

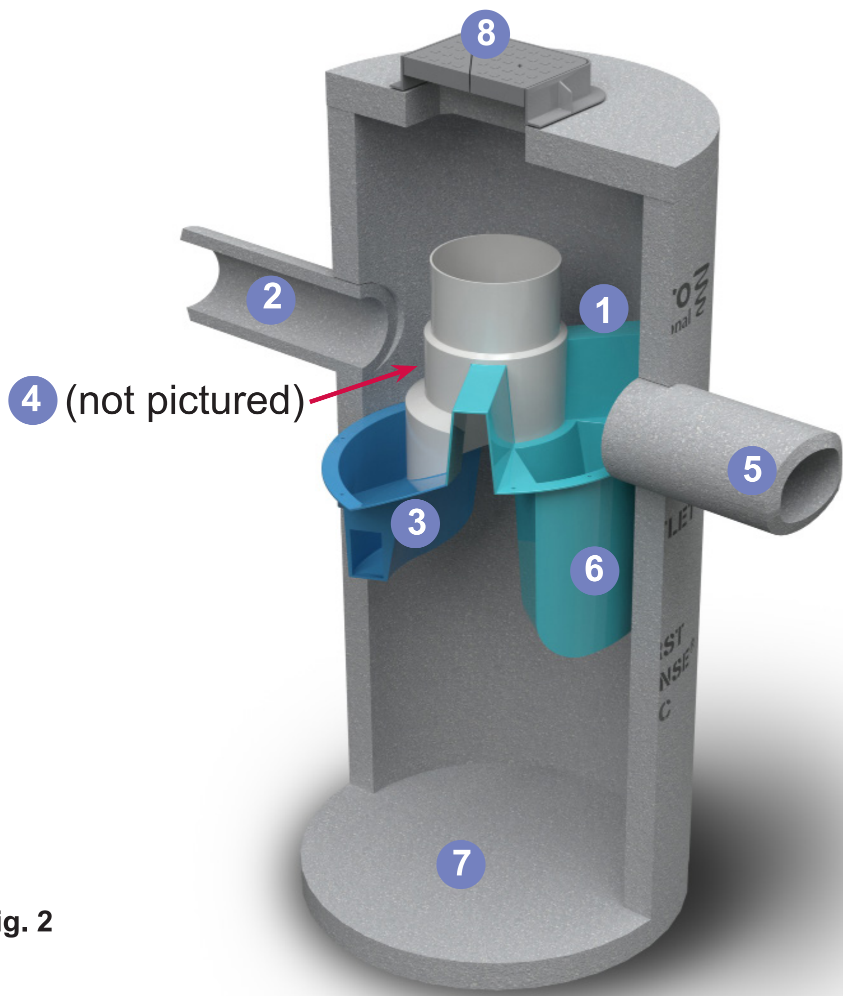


Fig. 2

Table 1

First Defense® Model Sizes
(ft / m) diameter
3 / 0.9
4 / 1.2
5 / 1.5
6 / 1.8
7 / 2.1
8 / 2.4
10 / 3.0

Overview

The First Defense® protects the environment by removing a wide range of pollutants from stormwater runoff. Periodic removal of these captured pollutants is essential to the continuous, long-term functioning of the First Defense®. The First Defense® will capture and retain sediment and oil until the sediment and oil storage volumes are full to capacity. When sediment and oil storage capacities are reached, the First Defense® will no longer be able to store removed sediment and oil.

The First Defense® allows for easy and safe inspection, monitoring and clean-out procedures. A commercially or municipally owned sump-vac is used to remove captured sediment and floatables. Access ports are located in the top of the manhole.

Maintenance events may include Inspection, Oil & Floatables Removal, and Sediment Removal. Maintenance events do not require entry into the First Defense®, nor do they require the internal components of the First Defense® to be removed. In the case of inspection and floatables removal, a vactor truck is not required. However, a vactor truck is required if the maintenance event is to include oil removal and/or sediment removal.

Maintenance Equipment Considerations

The internal components of the First Defense® have a centrally located circular shaft through which the sediment storage sump can be accessed with a sump vac hose. The open diameter of this access shaft is 15 inches in diameter (Fig.3). Therefore, the nozzle fitting of any vactor hose used for maintenance should be less than 15 inches in diameter.

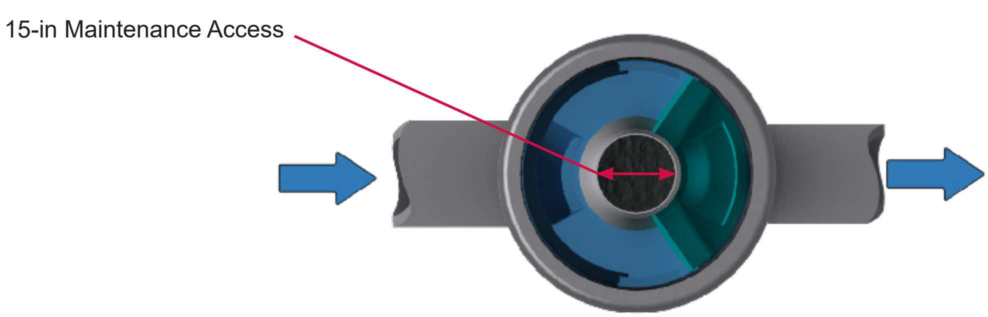


Fig.3 The central opening to the sump of the First Defense®is 15 inches in diameter.

Determining Your Maintenance Schedule

The frequency of clean out is determined in the field after installation. During the first year of operation, the unit should be inspected every six months to determine the rate of sediment and floatables accumulation. A simple probe such as a Sludge-Judge® can be used to determine the level of accumulated solids stored in the sump. This information can be recorded in the maintenance log (see page 9) to establish a routine maintenance schedule.

The vactor procedure, including both sediment and oil / flotables removal, for First Defense® typically takes less than 30 minutes and removes a combined water/oil volume of about 765 gallons.

Inspection Procedures

1. Set up any necessary safety equipment around the access port or grate of the First Defense® as stipulated by local ordinances. Safety equipment should notify passing pedestrian and road traffic that work is being done.

2. Remove the grate or lid to the manhole.

3. Without entering the vessel, look down into the chamber to inspect the inside. Make note of any irregularities. Fig.4 shows the standing water level that should be observed.

4. Without entering the vessel, use the pole with the skimmer net to remove floatables and loose debris from the components and water surface.

5. Using a sediment probe such as a Sludge Judge®, measure the depth of sediment that has collected in the sump of the vessel.

6. On the Maintenance Log (see page 9), record the date, unit location, estimated volume of floatables and gross debris removed, and the depth of sediment measured. Also note any apparent irregularities such as damaged components or blockages.

7. Securely replace the grate or lid.

8. Take down safety equipment.

9. Notify Hydro International of any irregularities noted during inspection.

Fig.4 Floatables are removed with a vactor hose

Floatables and Sediment Clean Out

Floatables clean out is typically done in conjunction with sediment removal. A commercially or municipally owned sump-vac is used to remove captured sediment and floatables (Fig.4).

Floatables and loose debris can also be netted with a skimmer and pole. The access port located at the top of the manhole provides unobstructed access for a vactor hose to be lowered to the base of the sump.

Scheduling

- Floatables and sump clean out are typically conducted once a year during any season.

- Floatables and sump clean out should occur as soon as possible following a spill in the contributing drainage area.

Recommended Equipment

- Safety Equipment (traffic cones, etc)
- Crow bar or other tool to remove grate or lid
- Pole with skimmer or net (if only floatables are being removed)
- Sediment probe (such as a Sludge Judge®)
- Vactor truck (flexible hose recommended)
- First Defense® Maintenance Log

Floatables and Sediment Clean Out Procedures

1. Set up any necessary safety equipment around the access port or grate of the First Defense® as stipulated by local ordinances. Safety equipment should notify passing pedestrian and road traffic that work is being done.

2. Remove the grate or lid to the manhole.

3. Without entering the vessel, look down into the chamber to inspect the inside. Make note of any irregularities.

4. Remove oil and floatables stored on the surface of the water with the vactor hose or with the skimmer or net

5. Using a sediment probe such as a Sludge Judge®, measure the depth of sediment that has collected in the sump of the vessel and record it in the Maintenance Log (page 9).

6. Once all floatables have been removed, drop the vactor hose to the base of the sump. Vactor out the sediment and gross debris off the sump floor

7. Retract the vactor hose from the vessel.

8. On the Maintenance Log provided by Hydro International, record the date, unit location, estimated volume of floatables and gross debris removed, and the depth of sediment measured. Also note any apparent irregularities such as damaged components, blockages, or irregularly high or low water levels.

9. Securely replace the grate or lid.

Maintenance at a Glance

Inspection	- Regularly during first year of installation - Every 6 months after the first year of installation
Oil and Floatables Removal	- Once per year, with sediment removal - Following a spill in the drainage area
Sediment Removal	- Once per year or as needed - Following a spill in the drainage area
NOTE: For most clean outs the entire volume of liquid does not need to be removed from the manhole. Only remove the first few inches of oils and floatables from the water surface to reduce the total volume of liquid removed during a clean out.	

Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	1-IN	NRCC 24-hr	D	Default	24.00	1	1.00	2

Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Pond 3P: FD 0+79 & FD A Peak Elev=411.72' Inflow=0.10 cfs 0.009 af
12.0" Round Culvert n=0.011 L=66.0' S=0.0053 '/' Outflow=0.10 cfs 0.009 af

Pond 39P: FD B Peak Elev=382.37' Inflow=0.70 cfs 0.064 af
18.0" Round Culvert n=0.011 L=32.0' S=0.0531 '/' Outflow=0.70 cfs 0.064 af

Summary for Pond 3P: FD 0+79 & FD A

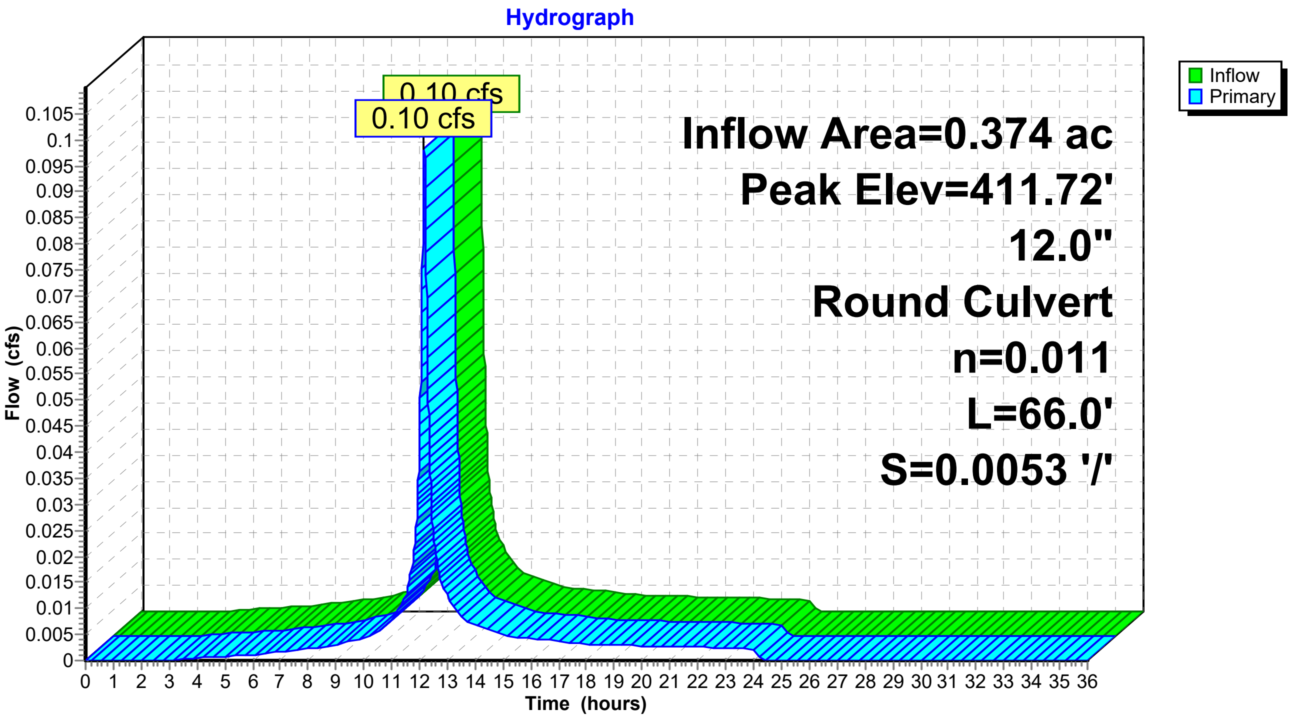
Inflow Area = 0.374 ac, 37.01% Impervious, Inflow Depth = 0.30" for 1-IN event
Inflow = 0.10 cfs @ 12.17 hrs, Volume= 0.009 af
Outflow = 0.10 cfs @ 12.17 hrs, Volume= 0.009 af, Atten= 0%, Lag= 0.0 min
Primary = 0.10 cfs @ 12.17 hrs, Volume= 0.009 af
Routed to Pond 5P : Infiltration Basin #1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 411.72' @ 12.17 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	411.55'	**12.0" Round Culvert** L= 66.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 411.55' / 411.20' S= 0.0053 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=0.10 cfs @ 12.17 hrs HW=411.72' TW=411.24' (Dynamic Tailwater)
└─**1=Culvert** (Barrel Controls 0.10 cfs @ 1.73 fps)

Pond 3P: FD 0+79 & FD A



Summary for Pond 39P: FD B

Inflow Area = 1.421 ac, 68.03% Impervious, Inflow Depth = 0.54" for 1-IN event
Inflow = 0.70 cfs @ 12.16 hrs, Volume= 0.064 af
Outflow = 0.70 cfs @ 12.16 hrs, Volume= 0.064 af, Atten= 0%, Lag= 0.0 min
Primary = 0.70 cfs @ 12.16 hrs, Volume= 0.064 af
Routed to Pond 41P : Infiltration Basin #3

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 382.37' @ 12.16 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	382.00'	**18.0" Round Culvert** L= 32.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 382.00' / 380.30' S= 0.0531 '/' Cc= 0.900 n= 0.011, Flow Area= 1.77 sf

Primary OutFlow Max=0.70 cfs @ 12.16 hrs HW=382.37' TW=378.20' (Dynamic Tailwater)
└**1=Culvert** (Inlet Controls 0.70 cfs @ 2.07 fps)

Pond 39P: FD B