



Wareham WPCF Improvements- Phase 2 Stormwater Report

TOWN OF WAREHAM

November 02, 2023

→ The Power of Commitment

Marc Drainville



A circular professional seal for Marc Drainville, a Registered Professional Engineer in the Commonwealth of Massachusetts. The seal contains the text: 'COMMONWEALTH OF MASSACHUSETTS', 'MARC DRAINVILLE ENVIRONMENTAL', 'No. 43294', and 'REGISTERED PROFESSIONAL ENGINEER'. There is a handwritten '116b' to the right of the seal.

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1. Introduction

1.1 Purpose of This Report

This Stormwater Management Report has been prepared to demonstrate compliance with Article XI (Stormwater Management and Illicit Discharge) of the Wareham Town Bylaw and Article 12 (Performance Standards) Sections 1260 thru 1271 of the Wareham Zoning Bylaw. This report also shows that the proposed stormwater design for the Wareham WPCF Improvements-Phase 2 project meets the intent of the Massachusetts Department of Environmental Protection (MassDEP) Stormwater Management Standards and is in accordance with the Massachusetts Wetlands Protection Act Regulations (310 CMR 10.00) and Water Quality Certification Regulations (314 CMR 9.00).

2. Project Narrative

2.1 Background

This stormwater management report is prepared as part of the proposed Wareham Wastewater Pollution Control Facility (WPCF) expansion project, located at 6 Tony's Lane. This report provides a summary of the existing stormwater management systems and the proposed stormwater best management practices (BMPs), in addition to the pre- and post-construction site conditions and practices that will be implemented to reduce untreated discharge and infiltration of stormwater runoff.

As this is a proposed redevelopment project located outside of the Environmental Protection Agency's (EPA) jurisdiction, the proposed drainage improvements and installations have been designed to conform to the Town of Wareham's stormwater management standards (Article 12) which meet or exceed the State requirements. In accordance with the Massachusetts Stormwater Handbook Standard 5, the proposed BMPs improve water quality by providing storage and treatment for the first one inch (1.0") of runoff from proposed impervious surfaces. Information for the proposed stormwater controls and the operations and maintenance plans are provided in this report.

Stormwater runoff was evaluated for the 2-year, 10-year, 25-year, 50-year, and 100-year Type III, 24-hour storm for both existing and proposed conditions. All stormwater management systems were sized to retain, at minimum, the first one inch (1.0") of runoff for proposed conditions. Existing and proposed conditions were modeled using HydroCAD software (Version 10.2), which combines USDA Soil Conservation Service hydrology and hydraulic techniques (commonly known as SCS TR-55 and TR-20) to generate hydrographs. The rainfall amounts used for calculating runoff for the storm events were obtained from Northeast Regional Climate Center (NRCC).

2.2 Existing Conditions

The existing site includes drainage systems that convey stormwater to both wet and dry drainage basins around the site. The eastern part of the WPCF has a network of catch basins that are piped into a large depression located north of Equalization Basins 3 and 4, and west of the existing Biofilters. In the center of the site adjacent to Aeration Tank 3 to the east and west, there are two depressions with leaching catch basins at the bottom. At the northern part of the site, by the entrance from Tony's Lane, is a large depression that collects runoff from the small parking lot in front of the Administration Building and from a wooded area to the northeast. To the southwest of the Filter building, there is a large depression that collects runoff conveyed through a network of catch basins and is discharged through a concrete flared end section. This area is named Stormwater Infiltration Basin 1 (SIB-1) and was approved for modifications at a Wareham Conservation Commission hearing on September 20, 2023. There are several other stormwater management systems throughout the site, but none of these systems or sub-watersheds will be altered or receive any additional runoff as a result of the project and are therefore not considered in this report.

See Attachment 2 for calculations and Attachment 5 for the existing and new stormwater management system drainage maps.

2.3 Proposed Conditions

The proposed project consists of the following stormwater infiltration basins (SIB) and other stormwater management BMPs:

SIB-1 (See sheet C-00504) is an existing wet infiltration basin located to the southwest of the Filter Building and collects runoff conveyed through a network of catch basins located to the west of the Filter Building and is discharged through a concrete flared end section. SIB-1 will be modified to include a new flared end section (FES) discharging runoff collected from drainage area 5 (DA5) in a deep sump hooded catch basin (CB). Runoff will be conveyed through 18-inch high density polyethylene (HDPE) pipes and two drainage manholes (MH). At the point of discharge, there will be a rip rap apron to reduce the flow rate into the SIB. The depth of the existing basin is over 15-feet and will not produce any overflows in the 100-year storm event. The existing overflow pipe discharging to the Agawam River will be capped and abandoned.

SIB-2 (See sheet C-00106) is located to the southwest of Sludge Holding Tank 3. SIB-2 is an existing depression with a subsurface leaching catch basin. This system will be retrofitted with three leaching pits to account for additional runoff from added impervious area and runoff being conveyed to the system in 18-inch HDPE pipes originating from existing catch basins located in DA6 and DA6B. There will be a MH installed prior to discharge to the new leach pits.

SIB-3 (See sheet C-00109) is located to the west of the new Alkalinity Building and adjacent to the driveway. SIB-3 is an improvement to the existing depression and leaching catch basin. The depression will remain the same in depth but will be re-graded and three leaching pits will be added to accommodate additional flow from added impervious surface area. Overflows will be contained within the depression and will infiltrate over time.

SIB-4 (See sheet C-00111) is a wet infiltration basin located to the east of the Vehicle Storage Building and collects runoff from the added impervious surfaces. The system will have sediment forebays installed at points of heavy inflow. Subsurface drainage will include a domed grate inlet surrounded with crushed stone that feeds to leach pits and allows for equalization. As an added measure, an overflow spillway will direct overflow to an existing stormwater depression to the southwest of the new Vehicle Storage Building. A rip rap apron will be installed on the slope to remove sediment prior to overflow discharge.

See Attachment 2 for calculations and Attachment 5 for the existing and new stormwater management system drainage maps and Model reports.

3. Stormwater Standards

3.1 Standard 1 – No New Untreated Discharges

The project will utilize discharge points that are not directed to defined wetlands. The proposed designs will convey runoff to either constructed drainage basins or sub-surface infiltration structures initially before any point discharge.

3.2 Standard 2 – Peak Rate Attenuation

The existing stormwater management systems consist of drainage basins and collection systems. The collection systems are an interconnected network of catch basins that are piped directly to a large depression near the Equalization Basins (SIB-1).

The new stormwater management systems will provide peak rate attenuation through detention and infiltration. The post-development peak discharge rates do not exceed the pre-development peak discharge rates for the 2-year 24-

hour storm or the 10-year 24-hour storm as the proposed systems are increasing storage volume and infiltration capabilities that exceed those of the existing system. The addition of flow into SIB-1 will increase the peak inflow discharge, but the basin has the volume to store and infiltrate runoff during peak conditions. No off-site flooding will occur during the 100-year 24-hour storm.

See Attachment 2 for calculations and Attachment 5 for the existing and new stormwater management system drainage maps and model reports.

Table 1 Peak Flow Pre-Construction

Discharge Point	2-Year 24-Hour Storm (cfs)			
	Pre-Construction		Post-Construction	
	Inflow	Outflow	Inflow	Outflow
SIB-1	0.35	0.26	0.35	0.26
SIB-2	0.02	0.01	0.94	1.04
SIB-3	0.09	0.02	0.09	0.01
SIB-4	NA	NA	0.12	0.03

Table 2 Peak Flow Pre-Construction

Discharge Point	10-Year 24-Hour Storm (cfs)			
	Pre-Construction		Post-Construction	
	Inflow	Outflow	Inflow	Outflow
SIB-1	1.23	0.55	1.36	0.55
SIB-2	0.23	0.14	1.88	1.87
SIB-3	0.25	0.04	0.25	0.03
SIB-4	NA	NA	0.82	0.21

Table 3 Impervious Area Changes

Location	Pre-Construction Impervious Area (SF)	Post-Construction Impervious Area (SF)	Net Change in Impervious Area (SF)
Wareham WPCF Site	59,784	82,850	23,066

3.3 Standard 3 – Recharge

The existing drainage systems did not include infiltration infrastructure other than the large depression and leaching catch basins. The DEP Stormwater Management Standards require that a minimum volume of runoff (Required Recharge Volume, Rv) be recharged on the site based on the soil conditions in accordance with the following table.

Table 4 Recharge Volume Standards

Hydrologic Soil Group	Inches of Runoff
A	0.60
B	0.35
C	0.25
D	0.10

The Required Recharge Volume (Rv) is calculated by multiplying the runoff depth to be recharged by the amount of impervious area on site under the proposed condition. Based on the USDA Web Soil Survey (Attachment 3), the soils on the site were identified as Hydrologic Group A (HSG). According to the Massachusetts Stormwater Handbook (Standards), 0.60 inches is the required depth of runoff to be recharged for HSGA. However, the Town of Wareham’s bylaws require that redevelopment projects be designed to retain “the volume of runoff equivalent to, or greater than, eighty-one-hundredths (0.8) inch multiplied by the total post-construction impervious surface area on the site.” Therefore, 0.80 inches was used for this calculation. As shown in the following section (3.4), this requirement is met and exceeded by using the water quality storage volume as the design point.

Required Recharge Volume Calculation:

$$R_v = F * \text{Impervious Area}$$

Where: R_v = Required Recharge Volume (cf)

F = Target Depth Factor associated with Hydrologic Soil Group (From the Web Soil Survey)(inches)

Impervious Area = Pavement and Rooftop Area on Site (sf)

Table 5 summarizes the Rawls rate for sand and loamy sand, both of which are found within the project site.

Table 5 1982 Rawls Rate

Texture Class	NRCS Hydrologic Soil Group (HSG)	Infiltration Rate (inches/hour)
Sand	A	8.3
Loamy Sand	A	2.4

The maximum discharge velocity for the site is between 8.3 inches per hour and 2.4 inches per hour depending on the texture class of the soil.

Table 6 shows the results for the required recharge volume calculation for the project area.

Table 6 Required Recharge

Soil Group	Target Depth Factor (in.)	Post-Construction Impervious Area (SF)	Required Recharge Volume (CF)	Recharge Volume Achieved (CF) 25-Year Storm
A	0.8	82,850	5,523	7,229 CF

A total of 5,523 CF is required for recharge.

The required recharge volume is achieved through reutilization of the existing SIBs and by adding recharge capacity to sub-watersheds in locations where there was added impervious surface area.

Mounding Analysis - Hantush Equation Input, USGS Spreadsheet. See Attachment 2.

The native soils present in the vicinity of the infiltration BMPs are a mix of sand and loamy sand. Therefore, the applicable Rawls Rate used for drawdown calculations was 8.3 inches/hour for the leaching pits and SIBs. There is a maximum 72-hour drawdown time allowed by MassDEP.

Required Drawdown Calculation:

$$\text{Drawdown} = D \div IR$$

Where: D = Depth of water to be infiltrated

IR = Rawls Rate

See Attachment 2 for detailed calculations and model reports.

3.4 Standard 4 – Water Quality

The proposed stormwater management systems are designed to remove 80% of average annual post-construction total suspended solids (TSS) from the required water quality volume (1-inch runoff from impervious areas). Best management practices such as infiltration basins and leaching pits were incorporated into the design to provide proper TSS removal.

The proposed subsurface infiltration systems include a treatment train of BMPs that has been designed to provide 80% TSS removal for stormwater runoff from the proposed roadway and driveways. The deep sump catch basins provide 25% TSS removal as pretreatment and the leaching structures provide 80% TSS removal, which yields a total TSS Removal of 85% for the BMP train. The SIBs can provide 90% TSS removal, and the sediment forebays are capable of a TSS removal of 50%. The stormwater systems are designed to store and recharge the 25-year storm runoff volume. Table 7 shows the results of the storage volume calculation for the project area.

Required Storage Volume Calculation:

$$R_v = F * Impervious Area$$

Where: R_v = Storage Volume (cf)

F = Target Depth Factor associated with Hydrologic Soil Group (From the Web Soil Survey)(inches)

$Impervious Area$ = Pavement and Rooftop Area on Site (sf)

Table 7 Water Quality Volume

Soil Group	Target Depth Factor (in.)	Post-Construction Impervious Area (SF)	Required Water Quality Volume (CF)	Storage Volume Achieved (CF) 25-Year Storm
A	1.0	82,850	6,904	7,229

Adherence to Standard 4 requires the submission of a long-term pollution prevention plan. This plan details how pollutants and sediment will be kept from entering the stormwater management systems, thus ensuring the water quality threshold is continually being met. A Long-Term Pollution Prevention Plan is attached to the Stormwater Report.

See Attachment 2 for detailed calculations and Attachment 5 for model reports.

3.5 Standard 5 – Land Users with Higher Potential Pollutant Loads (LUHPPLs)

The site, because it is a wastewater treatment facility, has been considered a LUHPPL for the basis of design. Specific scour control and pollution prevention have been incorporated into the design and include appropriate BMPs, 1-inch Water Quality Volume, and 44% pretreatment prior to discharge (see Attachment 4).

3.6 Standard 6 – Critical Areas

The areas of the site undergoing proposed work are not considered critical areas.

3.7 Standard 7 – Redevelopments and Other Projects Subject to the Standards Only to the Maximum Extent Practicable

This project was previously developed and is considered a “redevelopment project”. Since the site is located outside of the EPA jurisdiction, the design complies with the Wareham bylaw Article 12.

3.8 Standard 8 – Construction Period Pollution Prevention and Erosion and Sedimentation Control

An erosion and sedimentation control plan (during construction) has been developed and is included in the engineered plan set.

3.8.1 Minimize Disturbed Area and Protect Natural Features and Soil

Runoff resulting from flow over exposed soils or stockpiles will flow first primarily through hay bales or silt socks where appropriate. The primary pollutant of concern is sediment, and these structural measures will efficiently capture sediment. Any topsoil stripped during construction will be stockpiled off-site and surrounded by hay bales. The stockpile locations will be determined by the contractor and will not interfere with construction and areas of concentrated flows or pavement. No stockpiles of materials will be allowed onsite. Contractors are required to load removed materials into trucks to minimize the storage of soil onsite.

3.8.2 Stabilize Soils

Temporary seeding and mulching of areas disturbed during construction will be conducted during the restoration phase.

3.8.3 Establish Perimeter Controls and Sediment Barriers

Straw wattles will be installed between resource areas and proposed work and will be installed prior to the start of construction. They will be inspected weekly and immediately following a storm event to ensure that they are intact and functioning properly. If erosion and sedimentation control measures are damaged, they will be replaced immediately and noted on plans. All accumulated sediment will be removed from the base of the erosion control if it reaches one-third the height of the controls and will be hauled off-site and legally disposed of.

3.9 Standard 9 – Operation and Maintenance Plan

The infiltration systems will be owned by the Town of Wareham, who will be responsible for the operation and maintenance of the system. For the proposed system to perform as designed, maintenance on the stormwater management systems shall be conducted according to the Maintenance Schedule found in Table 6.

A long-term operation and maintenance manual will be developed to ensure that the stormwater management systems will function as designed.

Table 8 Maintenance Schedule for Stormwater Systems

System	Activity	Frequency
Deep Sump Catch Basins	Inspect units	After every major storm, at least monthly
	Clean units	Twice per year

System	Activity	Frequency
Leaching Pits	Inspect inlets and remove debris that might clog system	Twice per year
	Inspect for mosquitos	As needed
Infiltration Basins	Inspect wetland during growing and non-growing season	Twice a year for the first three years after construction
	Clean out forebays	Once a year

3.10 Standard 10 – Prohibition of Illicit Discharges

The Town of Wareham is subject to coverage under the NPDES General Permit for Stormwater Discharges from Small Municipal Separate Storm Sewer Systems (MS4 Permit), which requires the Town to remove any known and prohibit any potential illicit discharges.

4. Scope and Limitations

This report: has been prepared by GHD for TOWN OF WAREHAM and may only be used and relied on by TOWN OF WAREHAM for the purpose agreed between GHD and TOWN OF WAREHAM as set out in this report.

GHD otherwise disclaims responsibility to any person other than TOWN OF WAREHAM arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

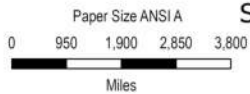
The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report. GHD disclaims liability arising from any of the assumptions being incorrect.

Accessibility of documents

If this report is required to be accessible in any other format, this can be provided by GHD upon request and at an additional cost if necessary.

Attachment 1

Locus Map



Scale: 1:24,000



Wareham WPCF
Wareham WPCF Improvements-Phase 2

Project No. 12609515
Revision No. -
Date 11/02/2023

Map Projection: Mercator Auxiliary Sphere
Horizontal Datum: WGS 1984
Grid: WGS 1984 Web Mercator Auxiliary Sphere

Locus Map

Attachment 1

Attachment 2

Calculations

Calculations:
Drawdown

$$Time_{drawdown} = \frac{R_V}{(K)(Bottom\ Area)}$$

Where: $R_V = Storage\ Volume$

$K = Saturated\ Hydraulic\ Conductivity$

$Bottom\ Area = Bottom\ Area\ of\ Recharge\ Structure$

SIB 1:

$$Time_{drawdown} = \frac{2,880\ cf}{\left(2.41\ \frac{in}{hr}\right)(2,664\ sf)}$$

SIB 2:

$$Time_{drawdown} = \frac{1,187\ cf}{\left(2.41\ \frac{in}{hr}\right)(393\ sf)}$$

$$Time_{drawdown} = 15.0\ hrs$$

SIB 3:

$$Time_{drawdown} = \frac{1,578\ cf}{\left(2.41\ \frac{in}{hr}\right)(817\ sf)}$$

$$Time_{drawdown} = 9.6\ hrs$$

SIB 4:

$$Time_{drawdown} = \frac{3,477\ cf}{\left(2.41\ \frac{in}{hr}\right)(1,416\ sf)}$$

$$Time_{drawdown} = 12.2\ hrs$$

Riprap SIB-1

$$V_0 = \frac{Q}{A}$$

Where: $V_0 =$ Pipe outlet velocity

$Q =$ Flow rate

$A =$ Cross sectional area of flow

$$1.13 \frac{ft}{s} = \frac{0.99 cfs}{0.88 sf}$$

$$y_0 = y_n = 0.75 ft$$

Where: $Y_0 =$ Effective depth

$$\frac{h_s}{y_0} = 0.86 \left(\frac{d_{50}}{y_0} \right)^{-0.55} \left(\frac{V_0}{\sqrt{gy_e}} \right) - C_0$$

Where: $h_s =$ Sump depth

$d_{50} =$ Riprap stone diameter

$C_0 =$ Tailwater parameter

$V_0 =$ Pipe outlet velocity

$g =$ gravitational acceleration

$Y_0 =$ Effective depth

$$h_s = 1.5 ft$$

$$d_{50} = 6 in$$

$$L_B = L_s$$

$$L_s = 10(h_s)$$

Where: $L_B =$ Total basin length

$L_s =$ Length of channel

$h_s =$ Sump depth

$$L_B = 15 ft$$

$$W_B = W_0 + 2 \left(\frac{L_B}{3} \right)$$

$$W_0 = 5 ft$$

Where: $L_B =$ Total basin length

$W_B =$ Basin width at discharge

$W_0 =$ Basin width at entry

$$W_B = 15 ft$$

INSTRUCTIONS:

1. In BMP Column, click on Blue Cell to Activate Drop Down Menu
2. Select BMP from Drop Down Menu
3. After BMP is selected, TSS Removal and other Columns are automatically completed.

Version 1, Automated: Mar. 4, 2008

Location:

TSS Removal Calculation Worksheet

	B BMP ¹	C TSS Removal Rate ¹	D Starting TSS Load*	E Amount Removed (C*D)	F Remaining Load (D-E)
	Deep Sump and Hooded Catch Basin	0.25	1.00	0.25	0.75
	Sediment Forebay	0.25	0.75	0.19	0.56
	Wet Basin	0.80	0.56	0.45	0.11
		0.00	0.11	0.00	0.11
		0.00	0.11	0.00	0.11

Total TSS Removal =

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

Project:
 Prepared By:
 Date:

*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 MassDEP Stormwater Handbook Vol. 1

INSTRUCTIONS:

1. In BMP Column, click on Blue Cell to Activate Drop Down Menu
2. Select BMP from Drop Down Menu
3. After BMP is selected, TSS Removal and other Columns are automatically completed.

Version 1, Automated: Mar. 4, 2008

Location:

TSS Removal Calculation Worksheet

B BMP ¹	C TSS Removal Rate ¹	D Starting TSS Load*	E Amount Removed (C*D)	F Remaining Load (D-E)
Deep Sump and Hooded Catch Basin	0.25	1.00	0.25	0.75
Sediment Forebay	0.25	0.75	0.19	0.56
Dry Detention Basin	0.00	0.56	0.00	0.56
Subsurface Infiltration Structure	0.80	0.56	0.45	0.11
	0.00	0.11	0.00	0.11

Total TSS Removal =

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

Project:
 Prepared By:
 Date:

*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 MassDEP Stormwater Handbook Vol. 1

INSTRUCTIONS:

1. In BMP Column, click on Blue Cell to Activate Drop Down Menu
2. Select BMP from Drop Down Menu
3. After BMP is selected, TSS Removal and other Columns are automatically completed.

Version 1, Automated: Mar. 4, 2008

Location:

TSS Removal Calculation Worksheet

	B BMP ¹	C TSS Removal Rate ¹	D Starting TSS Load*	E Amount Removed (C*D)	F Remaining Load (D-E)
	Sediment Forebay	0.25	1.00	0.25	0.75
	Deep Sump and Hooded Catch Basin	0.25	0.75	0.19	0.56
	Dry Detention Basin	0.00	0.56	0.00	0.56
	Subsurface Infiltration Structure	0.80	0.56	0.45	0.11
		0.00	0.11	0.00	0.11

Total TSS Removal =

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

Project:
 Prepared By:
 Date:

*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 MassDEP Stormwater Handbook Vol. 1

INSTRUCTIONS:

1. In BMP Column, click on Blue Cell to Activate Drop Down Menu
2. Select BMP from Drop Down Menu
3. After BMP is selected, TSS Removal and other Columns are automatically completed.

Version 1, Automated: Mar. 4, 2008

Location:

TSS Removal Calculation Worksheet

	B BMP ¹	C TSS Removal Rate ¹	D Starting TSS Load*	E Amount Removed (C*D)	F Remaining Load (D-E)
	Sediment Forebay	0.25	1.00	0.25	0.75
	Deep Sump and Hooded Catch Basin	0.25	0.75	0.19	0.56
	Dry Detention Basin	0.00	0.56	0.00	0.56
	Subsurface Infiltration Structure	0.80	0.56	0.45	0.11
		0.00	0.11	0.00	0.11

Total TSS Removal =

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

Project:
 Prepared By:
 Date:

*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 MassDEP Stormwater Handbook Vol. 1

This spreadsheet will calculate the height of a groundwater mound beneath a stormwater infiltration basin. More information can be found in the U.S. Geological Survey Scientific Investigations Report 2010-5102 "Simulation of groundwater mounding beneath hypothetical stormwater infiltration basins".

The user must specify infiltration rate (R), specific yield (Sy), horizontal hydraulic conductivity (Kh), basin dimensions (x, y), duration of infiltration period (t), and the initial thickness of the saturated zone (hi(0)), height of the water table if the bottom of the aquifer is the datum. For a square basin the half width equals the half length (x = y). For a rectangular basin, if the user wants the water-table changes perpendicular to the long side, specify x as the short dimension and y as the long dimension. Conversely, if the user wants the values perpendicular to the short side, specify y as the short dimension, x as the long dimension. All distances are from the center of the basin. Users can change the distances from the center of the basin at which water-table aquifer thickness are calculated.

Cells highlighted in yellow are values that can be changed by the user. Cells highlighted in red are output values based on user-specified inputs. **The user MUST click the blue "Re-Calculate Now" button each time ANY of the user-specified inputs are changed** otherwise necessary iterations to converge on the correct solution will not be done and values shown will be incorrect. Use consistent units for all input values (for example, feet and days)

Input Values

17.3000	R
0.310	Sy
134.48	K
20.000	x
45.000	y
3.000	t
60.000	hi(0)

use consistent units (e.g. feet & days **or** inches & hours)

Recharge (infiltration) rate (feet/day)
Specific yield, Sy (dimensionless, between 0 and 1)
Horizontal hydraulic conductivity, Kh (feet/day)*
1/2 length of basin (x direction, in feet)
1/2 width of basin (y direction, in feet)
duration of infiltration period (days)
initial thickness of saturated zone (feet)

Conversion Table

		inch/hour	feet/day
		0.67	1.33
hours	days	2.00	4.00
		36	1.50

In the report accompanying this spreadsheet (USGS SIR 2010-5102), vertical soil permeability (ft/d) is assumed to be one-tenth horizontal hydraulic conductivity (ft/d).

63.495	h(max)
3.495	Δh(max)

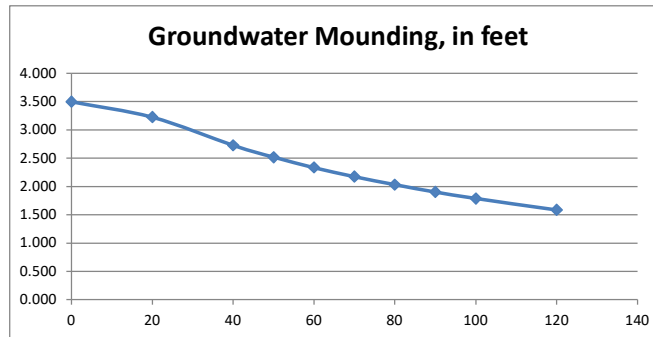
maximum thickness of saturated zone (beneath center of basin at end of infiltration period)
maximum groundwater mounding (beneath center of basin at end of infiltration period)

Ground-water Mounding, in feet Distance from center of basin in x direction, in feet

3.495	0
3.223	20
2.726	40
2.516	50
2.334	60
2.173	70
2.030	80
1.902	90
1.787	100
1.586	120



Re-Calculate Now



Disclaimer

This spreadsheet solving the Hantush (1967) equation for ground-water mounding beneath an infiltration basin is made available to the general public as a convenience for those wishing to replicate values documented in the USGS Scientific Investigations Report 2010-5102 "Groundwater mounding beneath hypothetical stormwater infiltration basins" or to calculate values based on user-specified site conditions. Any changes made to the spreadsheet (other than values identified as user-specified) after transmission from the USGS could have unintended, undesirable consequences. These consequences could include, but may not be limited to: erroneous output, numerical instabilities, and violations of underlying assumptions that are inherent in results presented in the accompanying USGS published report. The USGS assumes no responsibility for the consequences of any changes made to the spreadsheet. If changes are made to the spreadsheet, the user is responsible for documenting the changes and justifying the results and conclusions.

Attachment 3

Soil Survey



United States
Department of
Agriculture

NRCS

Natural
Resources
Conservation
Service

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

Custom Soil Resource Report for Plymouth County, Massachusetts

Wareham WPCF



Preface

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

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

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

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

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

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

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How Soil Surveys Are Made

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

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

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

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

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

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

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

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

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

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

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

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

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

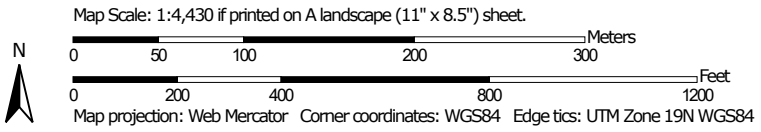
Soil Map

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

Custom Soil Resource Report Soil Map




Soil Map may not be valid at this scale.



MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)




















Soils







 Soil Map Unit Polygons

 Soil Map Unit Lines


 Soil Map Unit Points

Special Point Features






-  Blowout
-  Borrow Pit
-  Clay Spot
-  Closed Depression
-  Gravel Pit
-  Gravelly Spot
-  Landfill
-  Lava Flow
-  Marsh or swamp
-  Mine or Quarry
-  Miscellaneous Water
-  Perennial Water
-  Rock Outcrop
-  Saline Spot
-  Sandy Spot
-  Severely Eroded Spot
-  Sinkhole
-  Slide or Slip
-  Sodic Spot

-  Spoil Area
-  Stony Spot
-  Very Stony Spot
-  Wet Spot
-  Other
-  Special Line Features


Water Features

 Streams and Canals

Transportation

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

Background

 Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:12,000.

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: Plymouth County, Massachusetts
 Survey Area Data: Version 15, 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: Jun 10, 2022—Jun 30, 2022

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

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
1	Water	4.8	10.8%
66A	Ipswich - Pawcatuck - Matunuck complex, 0 to 2 percent slopes, very frequently flooded	1.7	3.7%
255B	Windsor loamy sand, 3 to 8 percent slopes	13.9	31.2%
256A	Deerfield loamy fine sand, 0 to 3 percent slopes	0.0	0.1%
607	Water, saline	2.3	5.2%
608	Water, ocean	0.7	1.6%
637B	Carver - Urban land complex, 0 to 8 percent slopes	7.9	17.6%
702C	Udipsamments, 8 to 15 percent slopes	13.3	29.8%
Totals for Area of Interest		44.7	100.0%

Map Unit Descriptions

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

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

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

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

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Plymouth County, Massachusetts

1—Water

Map Unit Setting

National map unit symbol: bd0b
Elevation: 0 to 330 feet
Mean annual precipitation: 41 to 54 inches
Mean annual air temperature: 43 to 54 degrees F
Frost-free period: 145 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Water: 98 percent
Minor components: 2 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Minor Components

Swansea

Percent of map unit: 1 percent
Landform: Depressions, marshes, swamps, bogs, kettles
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Freetown

Percent of map unit: 1 percent
Landform: Depressions, swamps, kettles, marshes, bogs
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

66A—Ipswich - Pawcatuck - Matunuck complex, 0 to 2 percent slopes, very frequently flooded

Map Unit Setting

National map unit symbol: 2tyqm
Elevation: 0 to 10 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 250 days
Farmland classification: Not prime farmland

Map Unit Composition

Ipswich and similar soils: 50 percent

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Pawcatuck and similar soils: 25 percent
Matunuck and similar soils: 15 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ipswich

Setting

Landform: Tidal marshes
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Partially- decomposed herbaceous organic material

Typical profile

Oe - 0 to 42 inches: mucky peat
Oa - 42 to 59 inches: muck

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to very high (0.14 to 99.90 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: Very frequent
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Maximum salinity: Nonsaline to strongly saline (1.0 to 112.0 mmhos/cm)
Sodium adsorption ratio, maximum: 20.0
Available water supply, 0 to 60 inches: Very high (about 26.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8w
Hydrologic Soil Group: A/D
Ecological site: R144AY001CT - Tidal Salt Low Marsh mesic very frequently flooded, R144AY002CT - Tidal Salt High Marsh mesic very frequently flooded
Hydric soil rating: Yes

Description of Pawcatuck

Setting

Landform: Tidal marshes
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Partially- decomposed herbaceous organic material over sandy mineral material

Typical profile

Oe - 0 to 46 inches: mucky peat
Cg - 46 to 60 inches: mucky sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches

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Drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to very high (0.14 to 99.90 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: Very frequent
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Maximum salinity: Nonsaline to strongly saline (1.0 to 112.0 mmhos/cm)
Sodium adsorption ratio, maximum: 20.0
Available water supply, 0 to 60 inches: Very high (about 21.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8w
Hydrologic Soil Group: A/D
Ecological site: R144AY001CT - Tidal Salt Low Marsh mesic very frequently flooded, R144AY002CT - Tidal Salt High Marsh mesic very frequently flooded
Hydric soil rating: Yes

Description of Matunuck

Setting

Landform: Tidal marshes
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Partially- decomposed herbaceous organic material over glaciofluvial deposits and/or sandy marine deposits

Typical profile

Oe - 0 to 12 inches: mucky peat
Cg - 12 to 72 inches: sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to very high (0.14 to 99.90 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: Very frequent
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Maximum salinity: Nonsaline to strongly saline (1.0 to 112.0 mmhos/cm)
Sodium adsorption ratio, maximum: 20.0
Available water supply, 0 to 60 inches: Moderate (about 8.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8w
Hydrologic Soil Group: A/D
Ecological site: R144AY001CT - Tidal Salt Low Marsh mesic very frequently flooded, R144AY002CT - Tidal Salt High Marsh mesic very frequently flooded
Hydric soil rating: Yes

Minor Components

Hooksan

Percent of map unit: 5 percent
Landform: Dunes
Landform position (three-dimensional): Rise
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Succotash

Percent of map unit: 5 percent
Landform: Spits on back-barrier flats
Landform position (three-dimensional): Rise
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

255B—Windsor loamy sand, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2svkf
Elevation: 0 to 1,210 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Windsor, loamy sand, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Windsor, Loamy Sand

Setting

Landform: Dunes, outwash plains, deltas, outwash terraces
Landform position (three-dimensional): Tread, riser
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Parent material: Loose sandy glaciofluvial deposits derived from granite and/or loose sandy glaciofluvial deposits derived from schist and/or loose sandy glaciofluvial deposits derived from gneiss

Typical profile

O - 0 to 1 inches: moderately decomposed plant material
A - 1 to 3 inches: loamy sand

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Bw - 3 to 25 inches: loamy sand

C - 25 to 65 inches: sand

Properties and qualities

Slope: 3 to 8 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Excessively drained

Runoff class: Low

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 99.90 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)

Available water supply, 0 to 60 inches: Low (about 4.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 2s

Hydrologic Soil Group: A

Ecological site: F144AY022MA - Dry Outwash

Hydric soil rating: No

Minor Components

Hinckley, loamy sand

Percent of map unit: 10 percent

Landform: Deltas, kames, eskers, outwash plains

Landform position (two-dimensional): Summit, shoulder, backslope

Landform position (three-dimensional): Head slope, nose slope, side slope, crest, rise

Down-slope shape: Convex

Across-slope shape: Convex, linear

Hydric soil rating: No

Deerfield, loamy sand

Percent of map unit: 5 percent

Landform: Deltas, terraces, outwash plains

Landform position (two-dimensional): Footslope

Landform position (three-dimensional): Tread, tal

Down-slope shape: Linear

Across-slope shape: Linear

Hydric soil rating: No

256A—Deerfield loamy fine sand, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2xfg8

Elevation: 0 to 1,100 feet

Mean annual precipitation: 36 to 71 inches

Mean annual air temperature: 39 to 55 degrees F

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Frost-free period: 145 to 240 days

Farmland classification: Farmland of statewide importance

Map Unit Composition

Deerfield and similar soils: 85 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Deerfield

Setting

Landform: Outwash terraces, outwash deltas, outwash plains, kame terraces

Landform position (three-dimensional): Tread

Down-slope shape: Concave, convex, linear

Across-slope shape: Convex, linear, concave

Parent material: Sandy outwash derived from granite, gneiss, and/or quartzite

Typical profile

Ap - 0 to 9 inches: loamy fine sand

Bw - 9 to 25 inches: loamy fine sand

BC - 25 to 33 inches: fine sand

Cg - 33 to 60 inches: sand

Properties and qualities

Slope: 0 to 3 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Moderately well drained

Runoff class: Negligible

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 99.90 in/hr)

Depth to water table: About 15 to 37 inches

Frequency of flooding: None

Frequency of ponding: None

Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)

Sodium adsorption ratio, maximum: 11.0

Available water supply, 0 to 60 inches: Moderate (about 6.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 2w

Hydrologic Soil Group: A

Ecological site: F144AY027MA - Moist Sandy Outwash

Hydric soil rating: No

Minor Components

Windsor

Percent of map unit: 7 percent

Landform: Outwash terraces, kame terraces, outwash deltas, outwash plains

Landform position (three-dimensional): Tread

Down-slope shape: Concave, convex, linear

Across-slope shape: Convex, linear, concave

Hydric soil rating: No

Wareham

Percent of map unit: 5 percent

Landform: Drainageways, depressions

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Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Sudbury

Percent of map unit: 2 percent
Landform: Outwash plains, kame terraces, outwash deltas, outwash terraces
Landform position (three-dimensional): Tread
Down-slope shape: Concave, convex, linear
Across-slope shape: Convex, linear, concave
Hydric soil rating: No

Ninigret

Percent of map unit: 1 percent
Landform: Outwash terraces, kame terraces, outwash plains
Landform position (three-dimensional): Tread
Down-slope shape: Linear, convex
Across-slope shape: Concave, convex
Hydric soil rating: No

607—Water, saline

Map Unit Setting

National map unit symbol: bqv1
Elevation: 0 to 20 feet
Mean annual precipitation: 41 to 54 inches
Mean annual air temperature: 43 to 54 degrees F
Frost-free period: 145 to 240 days

Map Unit Composition

Water, saline: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Minor Components

Beaches, sandy surface

Percent of map unit: 5 percent
Landform: Shores, beaches, barrier beaches, back-barrier beaches
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Riser
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: Unranked

608—Water, ocean

Map Unit Setting

National map unit symbol: bqv2

Elevation: 0 to 70 feet

Mean annual precipitation: 41 to 54 inches

Mean annual air temperature: 43 to 54 degrees F

Frost-free period: 145 to 240 days

Map Unit Composition

Water, ocean: 95 percent

Minor components: 5 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Minor Components

Beaches, sandy

Percent of map unit: 5 percent

Landform: Shores, beaches, barrier beaches, back-barrier beaches

Landform position (two-dimensional): Footslope

Landform position (three-dimensional): Riser

Down-slope shape: Convex

Across-slope shape: Linear

Hydric soil rating: Unranked

637B—Carver - Urban land complex, 0 to 8 percent slopes

Map Unit Setting

National map unit symbol: 9y58

Elevation: 0 to 390 feet

Mean annual precipitation: 41 to 54 inches

Mean annual air temperature: 43 to 54 degrees F

Frost-free period: 145 to 240 days

Farmland classification: Not prime farmland

Map Unit Composition

Carver and similar soils: 45 percent

Urban land: 40 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Carver

Setting

Landform: Moraines, pitted outwash plains, outwash plains

Landform position (two-dimensional): Summit, shoulder

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Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Sandy glaciofluvial deposits

Typical profile

O_i - 0 to 2 inches: slightly decomposed plant material
O_e - 2 to 3 inches: moderately decomposed plant material
A - 3 to 7 inches: coarse sand
E - 7 to 10 inches: coarse sand
Bw₁ - 10 to 15 inches: coarse sand
Bw₂ - 15 to 28 inches: coarse sand
BC - 28 to 32 inches: coarse sand
C - 32 to 67 inches: coarse sand

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (K_{sat}): Moderately high to very high (1.42 to 14.17 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 2.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: A
Ecological site: F149BY005MA - Dry Outwash
Hydric soil rating: No

Minor Components

Udipsamments

Percent of map unit: 10 percent
Landform: Dikes
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Linear, convex
Across-slope shape: Linear
Hydric soil rating: No

Merrimac

Percent of map unit: 5 percent
Landform: Kames, terraces, outwash plains
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

702C—Udipsamments, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: bd03
Elevation: 0 to 390 feet
Mean annual precipitation: 41 to 54 inches
Mean annual air temperature: 43 to 54 degrees F
Frost-free period: 145 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

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

Description of Udipsamments

Setting

Landform: Dikes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear, convex
Across-slope shape: Linear
Parent material: Sandy human transported material over sandy and gravelly glaciofluvial deposits

Typical profile

^Ap - 0 to 9 inches: loamy sand
C1 - 9 to 22 inches: sand
C2 - 22 to 49 inches: coarse sand
C3 - 49 to 54 inches: sand
C4 - 54 to 79 inches: coarse sand

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 14.17 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: A
Ecological site: F149BY100NY - Urban Site Complex

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Hydric soil rating: No

Minor Components

Udipsamments

Percent of map unit: 10 percent

Landform: Dikes

Landform position (two-dimensional): Summit

Landform position (three-dimensional): Tread

Down-slope shape: Linear, convex

Across-slope shape: Linear

Hydric soil rating: No

Udipsamments, wet substratum

Percent of map unit: 5 percent

Landform: Dikes

Landform position (two-dimensional): Footslope

Landform position (three-dimensional): Tread

Down-slope shape: Linear, convex

Across-slope shape: Linear

Hydric soil rating: No

Udorthents, loamy

Percent of map unit: 5 percent

Landform position (three-dimensional): Tread

Down-slope shape: Linear

Across-slope shape: Linear

Hydric soil rating: No

Soil Information for All Uses

Soil Reports

The Soil Reports section includes various formatted tabular and narrative reports (tables) containing data for each selected soil map unit and each component of each unit. No aggregation of data has occurred as is done in reports in the Soil Properties and Qualities and Suitabilities and Limitations sections.

The reports contain soil interpretive information as well as basic soil properties and qualities. A description of each report (table) is included.

Soil Physical Properties

This folder contains a collection of tabular reports that present soil physical properties. The reports (tables) include all selected map units and components for each map unit. Soil physical properties are measured or inferred from direct observations in the field or laboratory. Examples of soil physical properties include percent clay, organic matter, saturated hydraulic conductivity, available water capacity, and bulk density.

Engineering Properties

This table gives the engineering classifications and the range of engineering properties for the layers of each soil in the survey area.

Hydrologic soil group is a group of soils having similar runoff potential under similar storm and cover conditions. The criteria for determining Hydrologic soil group is found in the National Engineering Handbook, Chapter 7 issued May 2007 (<http://directives.sc.egov.usda.gov/OpenNonWebContent.aspx?content=17757.wba>). Listing HSGs by soil map unit component and not by soil series is a new concept for the engineers. Past engineering references contained lists of HSGs by soil series. Soil series are continually being defined and redefined, and the list of soil series names changes so frequently as to make the task of maintaining a single national list virtually impossible. Therefore, the criteria is now used to calculate the HSG using the component soil properties and no such national series lists will be maintained. All such references are obsolete and their use should be discontinued. Soil properties that influence runoff potential are those that influence the minimum rate of infiltration for a bare soil after prolonged wetting and when not frozen. These properties are depth to a seasonal high water table, saturated hydraulic conductivity after prolonged wetting, and depth to a layer with a very slow water transmission

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rate. Changes in soil properties caused by land management or climate changes also cause the hydrologic soil group to change. The influence of ground cover is treated independently. There are four hydrologic soil groups, A, B, C, and D, and three dual groups, A/D, B/D, and C/D. In the dual groups, the first letter is for drained areas and the second letter is for undrained areas.

The four hydrologic soil groups are described in the following paragraphs:

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.

Depth to the upper and lower boundaries of each layer is indicated.

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is 15 percent or more, an appropriate modifier is added, for example, "gravelly."

Classification of the soils is determined according to the Unified soil classification system (ASTM, 2005) and the system adopted by the American Association of State Highway and Transportation Officials (AASHTO, 2004).

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to particle-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, CL-ML.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of particle-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group

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index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest.

Percentage of rock fragments larger than 10 inches in diameter and 3 to 10 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage. Three values are provided to identify the expected Low (L), Representative Value (R), and High (H).

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an oven-dry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field. Three values are provided to identify the expected Low (L), Representative Value (R), and High (H).

Liquid limit and plasticity index (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination. Three values are provided to identify the expected Low (L), Representative Value (R), and High (H).

References:

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

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Absence of an entry indicates that the data were not estimated. The asterisk '*' denotes the representative texture; other possible textures follow the dash. The criteria for determining the hydrologic soil group for individual soil components is found in the National Engineering Handbook, Chapter 7 issued May 2007(<http://directives.sc.egov.usda.gov/OpenNonWebContent.aspx?content=17757.wba>). Three values are provided to identify the expected Low (L), Representative Value (R), and High (H).

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Engineering Properties—Plymouth County, Massachusetts														
Map unit symbol and soil name	Pct. of map unit	Hydrologic group	Depth	USDA texture	Classification		Pct Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
					Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
			<i>In</i>				<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>
66A—Ipswich - Pawcatuck - Matunuck complex, 0 to 2 percent slopes, very frequently flooded														
Ipswich	50	A/D	0-42	Peat, muck, mucky peat	PT	A-8	0- 0- 0	0- 0- 0	—	—	—	—	—	—
			42-59	Peat, muck, mucky peat	PT	A-8	0- 0- 0	0- 0- 0	—	—	—	—	—	—
Pawcatuck	25	A/D	0-46	Mucky peat, peat, muck	PT	A-8	0- 0- 0	0- 0- 0	—	—	—	—	—	—
			46-60	Mucky loamy sand, mucky fine sand, mucky coarse sand, coarse sand, fine sand, mucky loamy fine sand, loamy sand, loamy fine sand, sand, mucky sand	SP-SM, SW, SP	A-2-4, A-1-b, A-3	0- 0- 0	0- 0- 0	80-100-100	60-100-100	36-72-90	1- 3- 8	0-0 -62	NP-0 -2
Matunuck	15	A/D	0-12	Mucky peat, peat, muck	PT	A-8	0- 0- 0	0- 0- 0	—	—	—	—	—	—

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Engineering Properties—Plymouth County, Massachusetts														
Map unit symbol and soil name	Pct. of map unit	Hydrologic group	Depth	USDA texture	Classification		Pct Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
					Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
			<i>In</i>				<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>
			12-72	Mucky fine sandy loam, loamy sand, sandy loam, mucky sand, fine sandy loam, coarse sand, fine sand, mucky loamy sand, mucky fine sand, mucky coarse sand, loamy fine sand, mucky sandy loam, mucky loamy fine sand, sand	SP-SM, SW, SP	A-2-4, A-1-b, A-3	0- 0- 0	0- 0- 0	90-100-100	80-100-100	48-72-97	1- 3- 20	0-0 -39	NP-0 -3

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Engineering Properties—Plymouth County, Massachusetts														
Map unit symbol and soil name	Pct. of map unit	Hydrologic group	Depth	USDA texture	Classification		Pct Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
					Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
			<i>In</i>				<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>
255B—Windsor loamy sand, 3 to 8 percent slopes														
Windsor, loamy sand	85	A	0-1	Slightly decomposed plant material, highly decomposed plant material, moderately decomposed plant material	PT	A-8	0- 0- 0	0- 0- 0	—	—	—	—	—	—
			1-3	Loamy sand, loamy fine sand, fine sand, sand	SW-SM, SP-SM, SM	A-2-4	0- 0- 0	0- 0- 0	85-100-100	70-100-100	50-83-100	12-25-37	0-0 -30	NP-0 -2
			3-25	Loamy sand, loamy fine sand, fine sand, sand, coarse sand, loamy coarse sand	SW-SM, SP-SM, SM	A-2-4, A-3	0- 0- 0	0- 0- 0	86-100-100	72-100-100	45-75-98	10-22-36	0-0 -23	NP-0 -4
			25-65	Loamy fine sand, fine sand, sand, loamy sand, coarse sand, gravelly coarse sand	SW-SM, SW, SP-SM, SM, SP	A-2-4, A-1-b, A-3	0- 0- 0	0- 0- 0	81-100-100	63-100-100	40-78-100	4-12- 33	0-0 -20	NP-0 -4

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Engineering Properties—Plymouth County, Massachusetts														
Map unit symbol and soil name	Pct. of map unit	Hydrologic group	Depth	USDA texture	Classification		Pct Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
					Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
			<i>In</i>				<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>
256A—Deerfield loamy fine sand, 0 to 3 percent slopes														
Deerfield	85	A	0-9	Fine sandy loam, loamy sand, fine sand, sand, sandy loam, loamy fine sand	SC-SM, SM	A-2-4, A-4	0- 0- 0	0- 0- 0	86-100-100	72-100-100	62-88-95	21-32-39	0-0 -38	NP-0 -5
			9-25	Loamy sand, fine sand, sand, coarse sand, loamy fine sand	SC-SM, SM	A-2-4, A-4	0- 0- 0	0- 0- 0	86-100-100	72-100-100	62-88-95	22-32-39	0-0 -24	NP-0 -5
			25-33	Loamy sand, loamy fine sand, fine sand, coarse sand, sand	SC-SM, SM	A-2-4	0- 0- 0	0- 0- 0	87-100-100	74-100-100	67-92-100	13-19-27	0-0 -20	NP-0 -5
			33-60	Loamy sand, fine sand, loamy fine sand, gravelly sand, coarse sand, stratified gravelly sand to sand, sand	SW-SM, SC-SM, SP-SC, SW, SP-SM, SW-SC, SM, SP	A-2-4, A-1-b, A-3	0- 0- 0	0- 0- 0	78-100-100	56-85-100	43-67-86	4- 9- 17	0-0 -20	NP-0 -5

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Engineering Properties—Plymouth County, Massachusetts														
Map unit symbol and soil name	Pct. of map unit	Hydrologic group	Depth	USDA texture	Classification		Pct Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
					Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
			<i>In</i>				<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>
637B—Carver - Urban land complex, 0 to 8 percent slopes														
Carver	45	A	0-2	Slightly decomposed plant material	PT	A-8	0- 0- 0	0- 0- 0	100-100-100	100-100-100	100-100-100	100-100-100	—	—
			2-3	Moderately decomposed plant material	PT	A-8	0- 0- 0	0- 0- 0	100-100-100	100-100-100	100-100-100	100-100-100	—	—
			3-7	Coarse sand	SP-SM, SP	A-2-4, A-1-b, A-3	0- 0- 0	0- 0- 0	100-100-100	90-100-100	15-35-60	0- 5- 10	15-16-16	NP
			7-10	Coarse sand, sand, gravelly loamy coarse sand	SP-SM, SM, SP	A-2-4, A-1-b, A-3	0- 0- 0	0- 0- 0	100-100-100	90-100-100	15-35-65	0- 5- 20	13-13-13	NP
			10-15	Gravelly loamy coarse sand, coarse sand, sand	SP-SM, SM, SP	A-2-4, A-1-b, A-3, A-4	0- 0- 4	0- 0- 6	90-100-100	70-100-100	15-35-70	0- 5- 45	15-15-70	NP
			15-28	Gravelly loamy coarse sand, coarse sand, sand	SP-SM, SM, SP	A-2-4, A-1-b, A-3, A-4	0- 0- 4	0- 0- 6	90-100-100	70-100-100	15-35-70	0- 5- 45	15-15-70	NP
			28-32	Gravelly loamy coarse sand, coarse sand, sand	SP-SM, SM, SP	A-2-4, A-1-b, A-3, A-4	0- 0- 4	0- 0- 6	90-100-100	70-100-100	15-35-70	0- 5- 45	15-15-70	NP
			32-67	Coarse sand, sand	SP-SM, SP	A-2-4, A-1-b, A-3	0- 0- 4	0- 0- 6	90-100-100	70-100-100	15-45-55	0- 5- 10	15-15-15	NP

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Engineering Properties—Plymouth County, Massachusetts														
Map unit symbol and soil name	Pct. of map unit	Hydrologic group	Depth	USDA texture	Classification		Pct Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
					Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
			<i>In</i>				<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>
702C— Udipsamments, 8 to 15 percent slopes														
Udipsamments	80	A	0-9	Loamy sand	SM	A-2-4, A-1-b	0- 0- 0	0- 0- 0	85-93-1 00	75-88-1 00	40-55- 70	15-23- 30	0-15 -16	NP
			9-22	Coarse sand, sand, fine sand, loamy coarse sand, loamy sand	SP-SM, SM, SP	A-2-4, A-1-b, A-3, A-4	0- 0- 0	0- 0- 0	70-85-1 00	50-75-1 00	10-50- 90	0-25- 50	0-15 -16	NP
			22-49	Sand, coarse sand, fine sand, loamy coarse sand, loamy sand	SP-SM, SM, SP	A-2-4, A-1-b, A-3, A-4	0- 0- 0	0- 0- 0	70-85-1 00	50-75-1 00	10-50- 90	0-25- 50	0-15 -16	NP
			49-54	Sand, coarse sand, fine sand, loamy coarse sand, loamy sand	SP-SM, SM, SP	A-2-4, A-1-b, A-3, A-4	0- 0- 0	0- 0- 0	70-85-1 00	50-75-1 00	10-50- 90	0-25- 50	0-15 -16	NP
			54-79	Sand, coarse sand, fine sand, loamy coarse sand, loamy sand	SP-SM, SM, SP	A-2-4, A-1-b, A-3, A-4	0- 0- 0	0- 0- 0	70-85-1 00	50-75-1 00	10-50- 90	0-25- 50	0-15 -16	NP

Physical Soil Properties

This table shows estimates of some physical characteristics and features that affect soil behavior. These estimates are given for the layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Depth to the upper and lower boundaries of each layer is indicated.

Particle size is the effective diameter of a soil particle as measured by sedimentation, sieving, or micrometric methods. Particle sizes are expressed as classes with specific effective diameter class limits. The broad classes are sand, silt, and clay, ranging from the larger to the smaller.

Sand as a soil separate consists of mineral soil particles that are 0.05 millimeter to 2 millimeters in diameter. In this table, the estimated sand content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

Silt as a soil separate consists of mineral soil particles that are 0.002 to 0.05 millimeter in diameter. In this table, the estimated silt content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of sand, silt, and clay affects the physical behavior of a soil. Particle size is important for engineering and agronomic interpretations, for determination of soil hydrologic qualities, and for soil classification.

The amount and kind of clay affect the fertility and physical condition of the soil and the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, saturated hydraulic conductivity (*K_{sat}*), plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Moist bulk density is the weight of soil (oven-dry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at 1/3- or 1/10-bar (33kPa or 10kPa) moisture tension. Weight is determined after the soil is dried at 105 degrees C. In the table, the estimated moist bulk density of each soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute linear extensibility, shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. Depending on soil texture, a bulk density of more than 1.4 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Saturated hydraulic conductivity (K_{sat}) refers to the ease with which pores in a saturated soil transmit water. The estimates in the table are expressed in terms of micrometers per second. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Saturated hydraulic conductivity (*K_{sat}*) is considered in the design of soil drainage systems and septic tank absorption fields.

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Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each soil layer. The capacity varies, depending on soil properties that affect retention of water. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Linear extensibility refers to the change in length of an unconfined clod as moisture content is decreased from a moist to a dry state. It is an expression of the volume change between the water content of the clod at 1/3- or 1/10-bar tension (33kPa or 10kPa tension) and oven dryness. The volume change is reported in the table as percent change for the whole soil. The amount and type of clay minerals in the soil influence volume change.

Linear extensibility is used to determine the shrink-swell potential of soils. The shrink-swell potential is low if the soil has a linear extensibility of less than 3 percent; moderate if 3 to 6 percent; high if 6 to 9 percent; and very high if more than 9 percent. If the linear extensibility is more than 3, shrinking and swelling can cause damage to buildings, roads, and other structures and to plant roots. Special design commonly is needed.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In this table, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter. The content of organic matter in a soil can be maintained by returning crop residue to the soil.

Organic matter has a positive effect on available water capacity, water infiltration, soil organism activity, and tilth. It is a source of nitrogen and other nutrients for crops and soil organisms.

Erosion factors are shown in the table as the K factor (K_w and K_f) and the T factor. Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) and the Revised Universal Soil Loss Equation (RUSLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter and on soil structure and K_{sat} . Values of K range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor K_w indicates the erodibility of the whole soil. The estimates are modified by the presence of rock fragments.

Erosion factor K_f indicates the erodibility of the fine-earth fraction, or the material less than 2 millimeters in size.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind and/or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Wind erodibility groups are made up of soils that have similar properties affecting their susceptibility to wind erosion in cultivated areas. The soils assigned to group 1 are the most susceptible to wind erosion, and those assigned to group 8 are the least susceptible. The groups are described in the "National Soil Survey Handbook."

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Wind erodibility index is a numerical value indicating the susceptibility of soil to wind erosion, or the tons per acre per year that can be expected to be lost to wind erosion. There is a close correlation between wind erosion and the texture of the surface layer, the size and durability of surface clods, rock fragments, organic matter, and a calcareous reaction. Soil moisture and frozen soil layers also influence wind erosion.

Reference:

United States Department of Agriculture, Natural Resources Conservation Service.
National soil survey handbook, title 430-VI. (<http://soils.usda.gov>)

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Three values are provided to identify the expected Low (L), Representative Value (R), and High (H).

Physical Soil Properties—Plymouth County, Massachusetts														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	<i>In</i>	<i>Pct</i>	<i>Pct</i>	<i>Pct</i>	<i>g/cc</i>	<i>micro m/sec</i>	<i>In/In</i>	<i>Pct</i>	<i>Pct</i>					
1—Water														
Water	—	—	—	—	—	—	—	—	—					
66A—Ipswich - Pawcatuck - Matunuck complex, 0 to 2 percent slopes, very frequently flooded														
Ipswich	0-42	0- 0- 40	0- 0- 45	0- 0- 20	0.05-0.26-0.29	1.00-55.00-705.00	0.38-0.45-0.50	—	29.0-64.0-90.0			1	8	0
	42-59	0- 0- 40	0- 0- 45	0- 0- 20	0.05-0.26-0.29	1.00-55.00-705.00	0.38-0.45-0.50	—	29.0-64.0-90.0					
Pawcatuck	0-46	0- 0- 40	0- 0- 45	0- 0- 14	0.05-0.26-0.29	1.00-55.00-705.00	0.38-0.45-0.50	—	29.0-64.0-90.0			1	8	0
	46-60	90-99- 99	0- 1- 9	0- 1- 6	0.71-1.18-1.65	100.00-402.50-705.00	0.01-0.05-0.16	0.0- 0.0- 0.5	5.0-10.0-20.0	.02	.02			
Matunuck	0-12	0- 0- 40	0- 0- 45	0- 0- 14	0.05-0.26-0.29	1.00-55.00-705.00	0.30-0.45-0.60	—	29.0-64.0-90.0			1	8	0
	12-72	50-99- 99	0- 1- 44	0- 1- 6	0.71-1.18-1.65	100.00-402.50-705.00	0.01-0.06-0.16	0.0- 0.0- 0.6	0.0- 3.0-10.0	.02	.02			

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Physical Soil Properties—Plymouth County, Massachusetts														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	<i>In</i>	<i>Pct</i>	<i>Pct</i>	<i>Pct</i>	<i>g/cc</i>	<i>micro m/sec</i>	<i>In/In</i>	<i>Pct</i>	<i>Pct</i>					
255B—Windsor loamy sand, 3 to 8 percent slopes														
Windsor, loamy sand	0-1	—	—	—	0.20-0.40-0.60	10.00-100.00-705.00	0.17-0.21-0.38	—	75.0-95.0-99.5			5	2	134
	1-3	75-85-92	5-14-23	0-1-5	1.19-1.36-1.49	10.00-100.00-705.00	0.05-0.11-0.12	0.0-0.1-0.4	0.6-4.1-6.0	.15	.15			
	3-25	70-85-98	0-14-30	0-1-8	1.42-1.51-1.58	10.00-100.00-705.00	0.02-0.09-0.11	0.0-0.1-0.6	0.1-0.6-2.0	.15	.15			
	25-65	70-94-100	0-6-30	0-0-8	1.48-1.57-1.84	10.00-100.00-705.00	0.02-0.06-0.11	0.0-0.0-0.7	0.0-0.1-0.5	.02	.02			
256A—Deerfield loamy fine sand, 0 to 3 percent slopes														
Deerfield	0-9	62-80-100	0-18-35	0-2-9	1.19-1.48-1.52	10.00-100.00-705.00	0.08-0.14-0.23	0.0-0.0-0.8	0.6-2.5-8.1	.20	.20	5	2	134
	9-25	74-80-100	0-18-25	0-2-9	1.42-1.53-1.58	10.00-100.00-705.00	0.05-0.13-0.22	0.0-0.0-0.5	0.1-0.4-1.8	.24	.24			
	25-33	74-93-100	0-6-25	0-1-9	1.48-1.67-1.84	10.00-100.00-705.00	0.05-0.12-0.14	0.0-0.0-0.3	0.0-0.1-0.3	.10	.10			
	33-60	74-94-100	0-4-25	0-2-9	1.48-1.67-1.84	10.00-100.00-705.00	0.05-0.08-0.14	0.0-0.0-0.3	0.0-0.1-0.3	.02	.02			
607—Water, saline														
Water, saline	—	—	—	—	—	—	—	—	—					

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Physical Soil Properties—Plymouth County, Massachusetts														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	<i>In</i>	<i>Pct</i>	<i>Pct</i>	<i>Pct</i>	<i>g/cc</i>	<i>micro m/sec</i>	<i>In/In</i>	<i>Pct</i>	<i>Pct</i>					
608—Water, ocean														
Water, ocean	—	—	—	—	—	—	—	—	—					
637B—Carver - Urban land complex, 0 to 8 percent slopes														
Carver	0-2	0- 0- 0	0- 0- 0	0- 0- 0	0.30-0.50-0.60	10.00-100.00-100.00	0.08-0.12-0.40	—	45.0-80.0-95.0			5	1	180
	2-3	0- 0- 0	0- 0- 0	0- 0- 0	0.30-0.50-0.60	10.00-50.00-100.00	0.08-0.12-0.40	—	45.0-60.0-95.0					
	3-7	92-95- 99	1- 3- 4	0- 2- 4	1.30-1.40-1.50	10.00-700.00-703.00	0.04-0.04-0.06	0.0- 0.2- 2.9	1.0- 3.4- 4.0	.02	.02			
	7-10	83-95- 98	2- 4- 15	0- 1- 2	1.30-1.40-1.50	10.00-700.00-703.00	0.04-0.04-0.08	0.0- 0.2- 2.9	0.5- 0.8- 1.0	.02	.02			
	10-15	72-95- 99	1- 2- 22	1- 3- 6	1.30-1.40-1.50	10.00-700.00-703.00	0.04-0.04-0.08	0.0- 0.2- 2.9	0.5- 0.5- 1.0	.02	.02			
	15-28	72-95- 99	1- 2- 22	1- 3- 6	1.30-1.40-1.50	10.00-700.00-703.00	0.04-0.04-0.08	0.0- 0.2- 2.9	0.5- 0.5- 1.0	.02	.02			
	28-32	72-95- 99	1- 4- 22	0- 1- 2	1.30-1.40-1.50	10.00-700.00-703.00	0.04-0.04-0.08	0.0- 0.2- 2.9	0.2- 0.2- 1.0	.02	.02			
	32-67	92-95-100	0- 5- 6	0- 1- 1	1.30-1.40-1.50	10.00-700.00-703.00	0.04-0.04-0.06	0.0- 0.2- 2.9	0.0- 0.1- 0.5	.02	.02			
Urban land	—	—	—	—	—	—	—	—	—					

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Physical Soil Properties—Plymouth County, Massachusetts														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	<i>In</i>	<i>Pct</i>	<i>Pct</i>	<i>Pct</i>	<i>g/cc</i>	<i>micro m/sec</i>	<i>In/In</i>	<i>Pct</i>	<i>Pct</i>					
702C— Udipsamments, 8 to 15 percent slopes														
Udipsamments	0-9	76-81- 85	15-17- 19	0- 2- 5	1.30-1.50-1.70	10.00-50.00-100.00	0.05-0.06-0.08	0.0- 1.5- 2.9	0.5- 1.5- 3.0	.24	.24	5	2	134
	9-22	76-98-100	0- 2- 19	0- 1- 5	1.30-1.50-1.70	10.00-300.00-705.00	0.02-0.05-0.08	0.0- 1.5- 2.9	0.0- 0.1- 0.5	.02	.02			
	22-49	76-93-100	0- 7- 19	0- 1- 5	1.30-1.50-1.70	10.00-300.00-705.00	0.02-0.05-0.08	0.0- 1.5- 2.9	0.0- 0.1- 0.5	.02	.02			
	49-54	76-98-100	0- 2- 19	0- 1- 5	1.30-1.50-1.70	10.00-300.00-705.00	0.02-0.05-0.08	0.0- 1.5- 2.9	0.0- 0.1- 0.5	.02	.02			
	54-79	76-93-100	0- 7- 19	0- 1- 5	1.30-1.50-1.70	10.00-300.00-705.00	0.02-0.05-0.08	0.0- 1.5- 2.9	0.0- 0.1- 0.5	.02	.02			

Water Features

This folder contains tabular reports that present soil hydrology information. The reports (tables) include all selected map units and components for each map unit. Water Features include ponding frequency, flooding frequency, and depth to water table.

Hydrologic Soil Group and Surface Runoff

This table gives estimates of various soil water features. The estimates are used in land use planning that involves engineering considerations.

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 four hydrologic soil groups are:

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.

Surface runoff refers to the loss of water from an area by flow over the land surface. Surface runoff classes are based on slope, climate, and vegetative cover. The concept indicates relative runoff for very specific conditions. It is assumed that the surface of the soil is bare and that the retention of surface water resulting from irregularities in the ground surface is minimal. The classes are negligible, very low, low, medium, high, and very high.

Report—Hydrologic Soil Group and Surface Runoff

Absence of an entry indicates that the data were not estimated. The dash indicates no documented presence.

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Hydrologic Soil Group and Surface Runoff—Plymouth County, Massachusetts			
Map symbol and soil name	Pct. of map unit	Surface Runoff	Hydrologic Soil Group
1—Water			
Water	98	— —	
66A—Ipswich - Pawcatuck - Matunuck complex, 0 to 2 percent slopes, very frequently flooded			
Ipswich	50	Negligible	A/D
Pawcatuck	25	Negligible	A/D
Matunuck	15	Negligible	A/D
255B—Windsor loamy sand, 3 to 8 percent slopes			
Windsor, loamy sand	85	Low	A
256A—Deerfield loamy fine sand, 0 to 3 percent slopes			
Deerfield	85	Negligible	A
607—Water, saline			
Water, saline	95	— —	
608—Water, ocean			
Water, ocean	95	— —	
637B—Carver - Urban land complex, 0 to 8 percent slopes			
Carver	45	Very low	A
Urban land	40	— —	
702C—Udipsamments, 8 to 15 percent slopes			
Udipsamments	80	Very low	A

Water Features

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The four hydrologic soil groups are:

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

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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.

Surface runoff refers to the loss of water from an area by flow over the land surface. Surface runoff classes are based on slope, climate, and vegetative cover. The concept indicates relative runoff for very specific conditions. It is assumed that the surface of the soil is bare and that the retention of surface water resulting from irregularities in the ground surface is minimal. The classes are negligible, very low, low, medium, high, and very high.

The *months* in the table indicate the portion of the year in which a water table, ponding, and/or flooding is most likely to be a concern.

Water table refers to a saturated zone in the soil. The water features table indicates, by month, depth to the top (*upper limit*) and base (*lower limit*) of the saturated zone in most years. Estimates of the upper and lower limits are based mainly on observations of the water table at selected sites and on evidence of a saturated zone, namely grayish colors or mottles (redoximorphic features) in the soil. A saturated zone that lasts for less than a month is not considered a water table. The kind of water table, apparent or perched, is given if a seasonal high water table exists in the soil. A water table is perched if free water is restricted from moving downward in the soil by a restrictive feature, in most cases a hardpan; there is a dry layer of soil underneath a wet layer. A water table is apparent if free water is present in all horizons from its upper boundary to below 2 meters or to the depth of observation. The water table kind listed is for the first major component in the map unit.

Ponding is standing water in a closed depression. Unless a drainage system is installed, the water is removed only by percolation, transpiration, or evaporation. The table indicates *surface water depth* and the *duration* and *frequency* of ponding. Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, *long* if 7 to 30 days, and *very long* if more than 30 days. Frequency is expressed as none, rare, occasional, and frequent. *None* means that ponding is not probable; *rare* that it is unlikely but possible under unusual weather conditions (the chance of ponding is nearly 0 percent to 5 percent in any year); *occasional* that it occurs, on the average, once or less in 2 years (the chance of ponding is 5 to 50 percent in any year); and *frequent* that it occurs, on the average, more than once in 2 years (the chance of ponding is more than 50 percent in any year).

Flooding is the temporary inundation of an area caused by overflowing streams, by runoff from adjacent slopes, or by tides. Water standing for short periods after rainfall or snowmelt is not considered flooding, and water standing in swamps and marshes is considered ponding rather than flooding.

Duration and *frequency* are estimated. Duration is expressed as *extremely brief* if 0.1 hour to 4 hours, *very brief* if 4 hours to 2 days, *brief* if 2 to 7 days, *long* if 7 to 30 days, and *very long* if more than 30 days. Frequency is expressed as none, very rare, rare, occasional, frequent, and very frequent. *None* means that flooding is not probable; *very rare* that it is very unlikely but possible under extremely unusual

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weather conditions (the chance of flooding is less than 1 percent in any year); *rare* that it is unlikely but possible under unusual weather conditions (the chance of flooding is 1 to 5 percent in any year); *occasional* that it occurs infrequently under normal weather conditions (the chance of flooding is 5 to 50 percent in any year); *frequent* that it is likely to occur often under normal weather conditions (the chance of flooding is more than 50 percent in any year but is less than 50 percent in all months in any year); and *very frequent* that it is likely to occur very often under normal weather conditions (the chance of flooding is more than 50 percent in all months of any year).

The information is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and little or no horizon development.

Also considered are local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

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Map unit symbol and soil name	Hydrologic group	Surface runoff	Most likely months	Water table			Ponding			Flooding	
				Upper limit	Lower limit	Kind	Surface depth	Duration	Frequency	Duration	Frequency
				<i>Ft</i>	<i>Ft</i>		<i>Ft</i>				
1—Water											
Water				—	—	—	—	—	—	—	
66A—Ipswich - Pawcatuck - Matunuck complex, 0 to 2 percent slopes, very frequently flooded											
Ipswich	A/D	Negligible	Jan-Dec	0.0	6.0	Apparent	—	—	None	Very brief (4 to 48 hours)	Very frequent
Pawcatuck	A/D	Negligible	Jan-Dec	0.0	6.0	Apparent	—	—	None	Very brief (4 to 48 hours)	Very frequent
Matunuck	A/D	Negligible	Jan-Dec	0.0	6.0	Apparent	—	—	None	Very brief (4 to 48 hours)	Very frequent
255B—Windsor loamy sand, 3 to 8 percent slopes											
Windsor, loamy sand	A	Low	Jan-Dec	—	—	—	—	—	None	—	None
256A—Deerfield loamy fine sand, 0 to 3 percent slopes											
Deerfield	A	Negligible	Jan-Jun	1.2-3.1	4.9-6.0	Apparent	—	—	None	—	None
			Jul-Oct	—	—	—	—	—	None	—	None
			Nov-Dec	1.2-3.1	4.9-6.0	Apparent	—	—	None	—	None
607—Water, saline											
Water, saline				—	—	—	—	—	—	—	
608—Water, ocean											
Water, ocean				—	—	—	—	—	—	—	
637B—Carver - Urban land complex, 0 to 8 percent slopes											
Carver	A	Very low	Jan-Dec	—	—	—	—	—	None	—	None
Urban land				—	—	—	—	—	—	—	
702C—Udipsamments, 8 to 15 percent slopes											
Udipsamments	A	Very low	Jan-Dec	—	—	—	—	—	None	—	None

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Attachment 4

Long-Term Pollution Prevention Plan



Wareham WPCF Improvements- Phase 2 Long-term Pollution Prevention Plan

TOWN OF WAREHAM

November 02, 2023

→ The Power of Commitment

Project name		TOWN OF WAREHAM WPCF IMPROV PH II					
Document title		Wareham WPCF Improvements- Phase 2 Long-term Pollution Prevention Plan					
Project number		12609515					
File name		Wareham WPCF Long-term Pollution Prevention Plan.docx					
Status Code	Revision	Author	Reviewer		Approved for issue		
			Name	Signature	Name	Signature	Date
S4	1	Eric Woodbury	Marc Drainville				
[Status code]							
[Status code]							
[Status code]							
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1. Good Housekeeping BMPs

1.1 Material Handling and Waste Management

General Good Housekeeping Practices. The following good housekeeping practices will be followed on site during and following the construction project:

1. An effort will be made to store only enough products required to do the job.
2. All construction materials allowed to be stored on site will be stored in a neat, orderly manner and, if possible, under a roof or in a containment area. At a minimum, all containers will be stored with their lids on when not in use. Drip pans shall be provided under all dispensers.
3. Products will be kept in their original containers with the original manufacturer's label in legible conditions.
4. Substances will not be mixed with one another unless recommended by the manufacturer.
5. Whenever possible, a product will be completely used before disposing of the container.
6. Manufacturer's recommendations for proper use and disposal will be followed.

Spill Response. The following measures will be taken to respond to a spill on site:

1. Manufacturer's recommended methods for clean-up shall be followed.
2. Spills should be cleaned up immediately after discovery.
3. The spill area shall be kept well-ventilated and personnel shall wear appropriate protective clothing to prevent injury from contact with hazardous substance.
4. Spills of toxic or hazardous material shall be reported to the appropriate state and/or local authority in accordance with local and/or state regulations.

Hazardous Products. The following measures will be used to reduce the risks associated with hazardous materials:

1. Products will be kept in original containers with the original labels in legible condition.
2. Original labels and Materials Safety Data Sheets (MSDS) will be procured and used for each material.
3. If surplus product must be disposed of, manufacturers' or local/state/federal recommended methods for proper disposal will be followed.

Hazardous Wastes. All hazardous waste materials will be disposed of in the manner specified by local, state, and/or federal regulations and by the manufacturer of such products.

Product-Specific Practices. The following product-specific practices shall be adhered to at the project site:

1. **Petroleum Products.** Petroleum products will be stored in tightly sealed, clearly labeled containers. Any petroleum storage tanks used on site will have a dike or berm containment structure constructed around it to contain any spills which may occur. Drip pans shall be provided for all dispensers. Any asphalt substances used on site will be applied according to the manufacturer's recommendations.

2. **Paints, Paint Solvents, and Cleaning Solvents.** All containers will be tightly sealed and stored when not in use. Excess paint and solvents shall be properly disposed of according to manufacturer's instructions or state and federal regulations.
3. **Solid and Construction Wastes.** All waste materials will be collected and stored in a securely lidded metal dumpster rented from a local waste management company licensed to do business in Massachusetts. The dumpster will comply with all local and state solid waste management regulations.

All waste dumpsters and roll-off containers will be located in an area where the likelihood of the containers contributing to stormwater discharges is negligible. If required, additional BMPs must be implemented—such as sandbags around the base—to prevent wastes from contributing to stormwater discharges. No waste containers will be allowed on site due to limited space, but can be located at the offsite staging area.
4. **Sanitary Wastes.** All sanitary waste will be collected from the portable units by a licensed portable facility provider in complete compliance with local and state regulation. All sanitary waste units will be located in an area where the likelihood of the unit contributing to stormwater discharges is negligible. If required, additional BMPs must be implemented—such as sandbags around the base—to prevent wastes from contributing to stormwater discharges.
5. **Contaminated Soils.** Any contaminated soils resulting from spills of materials with hazardous properties during construction activities will be contained and cleaned up immediately in accordance with applicable state and federal regulations.

1.2 Establish Proper Equipment/Vehicle Fueling and Maintenance Practices

Following construction, no vehicle fueling shall be completed at the sites. All major equipment/vehicle maintenance or repairs will be performed off-site.

1.3 Control Equipment/Vehicle Washing

All equipment and vehicle washing will be performed off-site.

2. Inspections

2.1 Inspections

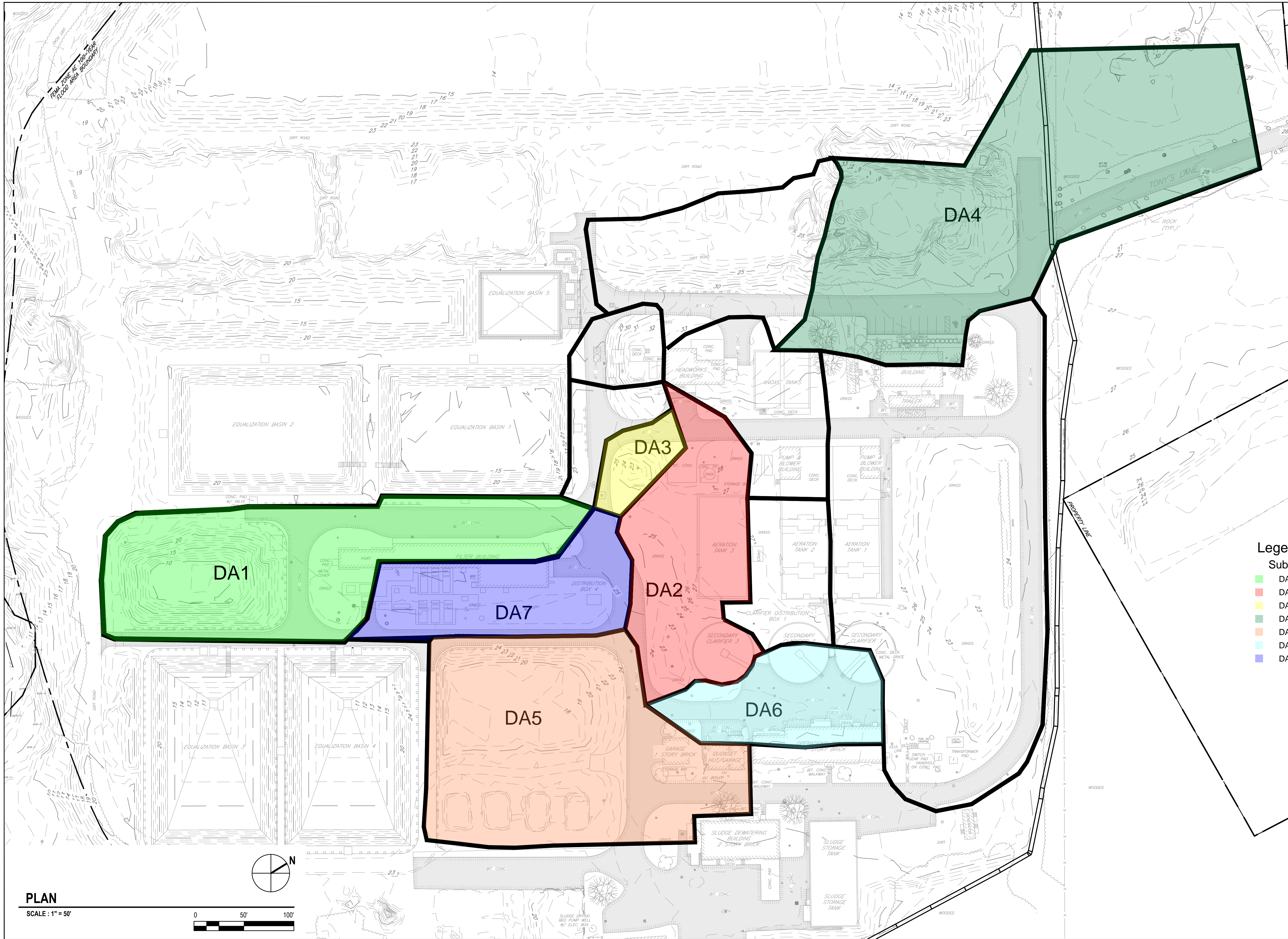
Inspections of the installed structures shall be conducted per the schedule outlined in the Stormwater Report. Any imperfections noted during inspections shall be addressed in order to make sure the installed structures and systems continue to perform as designed.

2.2 Street Sweeping

The existing paved areas on the site shall be swept free of sediment and debris.

Attachment 5

**Stormwater Management Plan Set and
HydroCAD Reports**



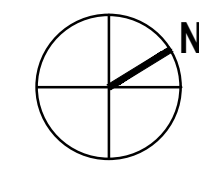
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	EXISTING INTERMEDIATE CONTOURS
	EXISTING TANKS
	EXISTING STRUCTURE
	EXISTING PAVING
	EXISTING FENCE
	EXISTING GUIDE RAIL
	EXISTING TREES
	EXISTING TREE LINE
	EXISTING ITEM TO BE REMOVED

Legend Subject

	DA1
	DA2
	DA3
	DA4
	DA5
	DA6
	DA7

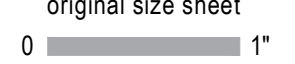
PLAN
SCALE: 1" = 50'



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No.	Issue	Checked	Approved	Date
Author	J. STROBERT	Drafting Check	M. WIESTLING	Project Manager
Designer	E. WOODBURY	Design Check	P. BOGGS	Project Director
			M. DRAINVILLE	

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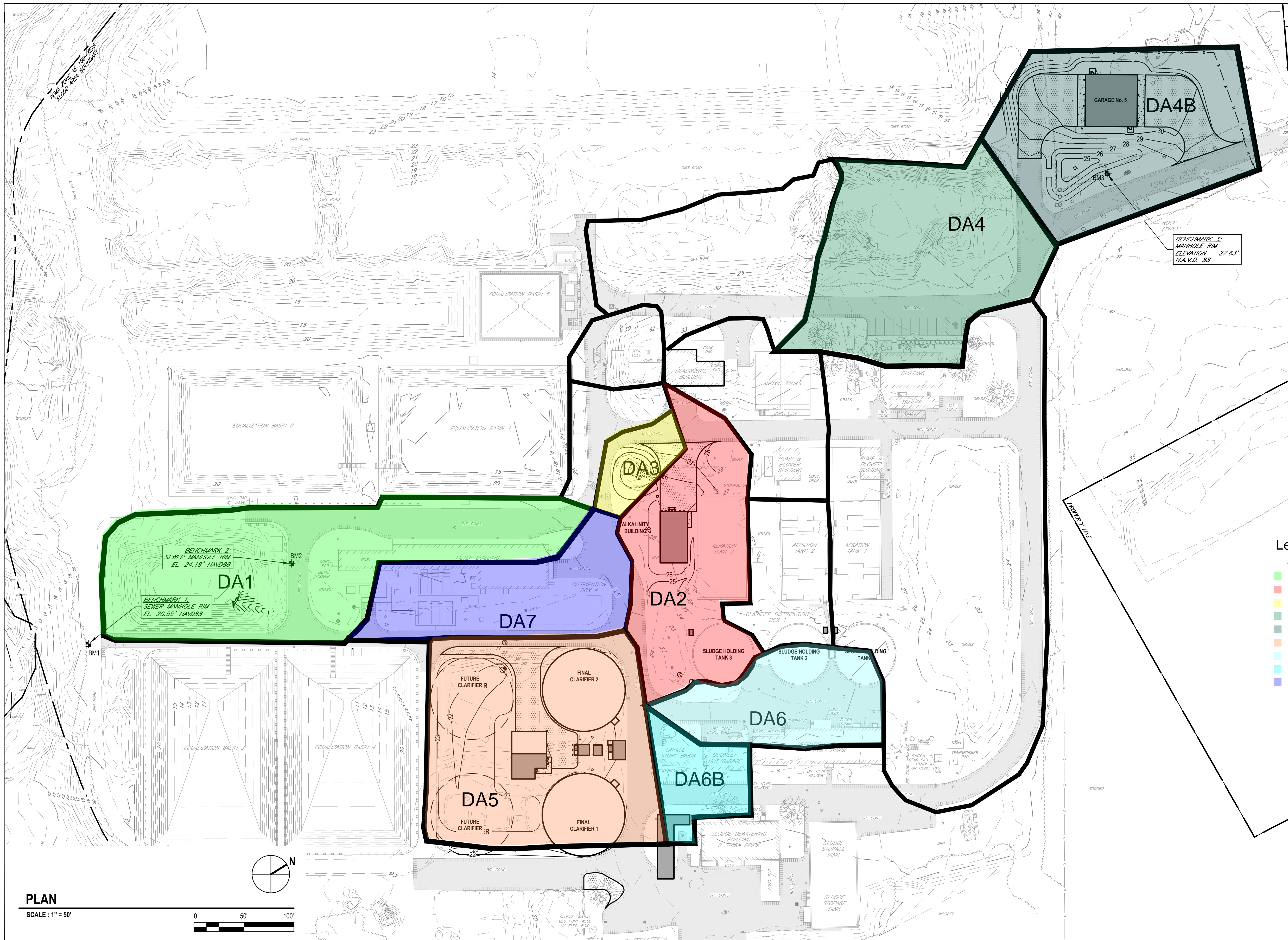
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Project	WATER POLLUTION CONTROL FACILITY IMPROVEMENTS - PHASE 2
Project No.	12609515
Date	
Scale	AS SHOWN

Title	EXISTING CONDITIONS DRAINAGE AREA MAP
Sheet No.	FIGURE
Size	ANSI D



LEGEND

- EXISTING INDEX CONTOURS
- EXISTING INTERMEDIATE CONTOURS
- EXISTING TANKS
- EXISTING STRUCTURE
- EXISTING PAVING
- EXISTING FENCE
- EXISTING GUIDE RAIL
- EXISTING TREES
- EXISTING TREE LINE

- STRUCTURE
- PAVING
- CONCRETE
- FENCE

Legend Subject

- DA1
- DA2
- DA3
- DA4
- DA4B
- DA5
- DA6
- DA6B
- DA7

PLAN
SCALE: 1" = 50'

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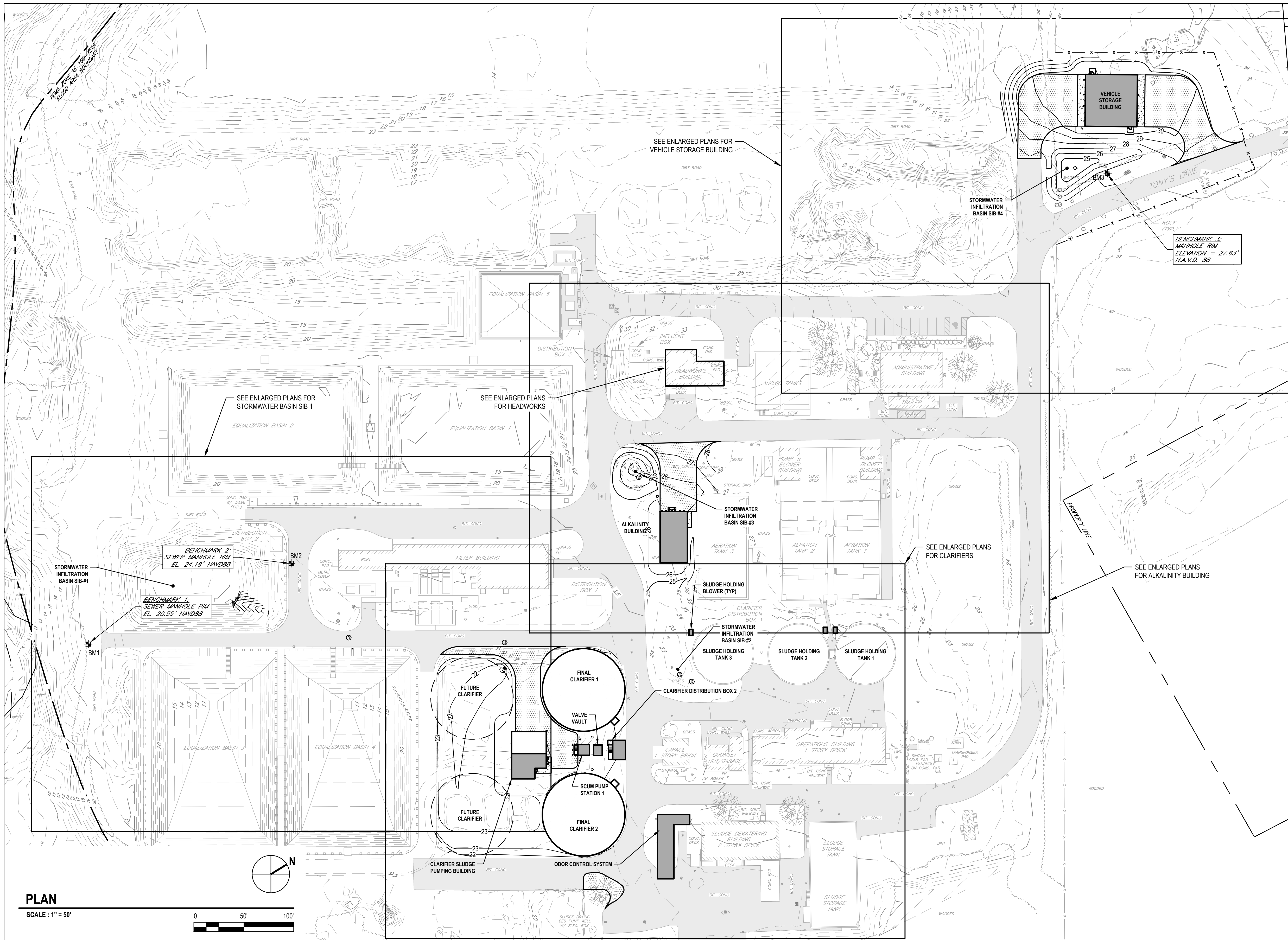


Client **TOWN OF WAREHAM, MA**
Project **WATER POLLUTION CONTROL FACILITY IMPROVEMENTS - PHASE 2**

Title **PROPOSED CONDITIONS DRAINAGE AREA MAP**

Project No. **12609515** Date _____ Scale **AS SHOWN**

Sheet No. **FIGURE** Size **ANSI D**



LEGEND

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	EXISTING INTERMEDIATE CONTOURS
	EXISTING TANKS
	EXISTING STRUCTURE
	EXISTING PAVING
	EXISTING FENCE
	EXISTING GUIDE RAIL
	EXISTING TREES
	EXISTING TREE LINE
	STRUCTURE
	PAVING
	CONCRETE
	FENCE

SHEET GENERAL NOTES

1.

SHEET KEYNOTES

1.

PLAN
SCALE: 1" = 50'

A SITE PLAN REVIEW			
No.	Issue	MRW	MD
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Author	J. STROBERT	Project Manager	M. KRIEGER
Designer	E. WOODBURY	Design Check	P. BOGGS
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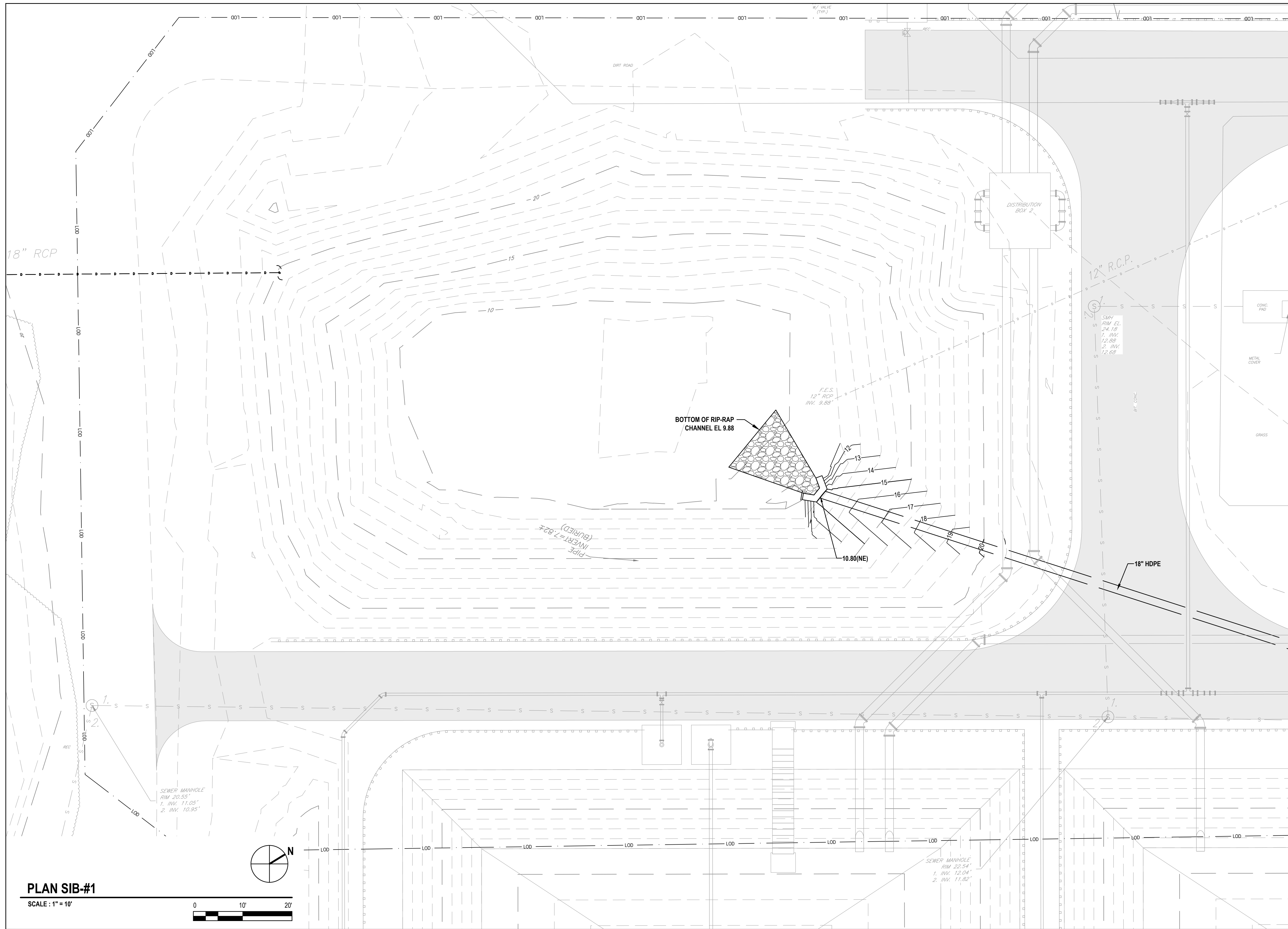
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Project No.	12609515
Date	
Scale	AS SHOWN

Title	OVERALL SITE PLAN
Sheet No.	C-00103



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- EXISTING TREE LINE
- STRUCTURE
- PAVING
- CONCRETE
- FENCE

SHEET GENERAL NOTES

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SHEET KEYNOTES

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PLAN SIB-#1
 SCALE: 1" = 10'

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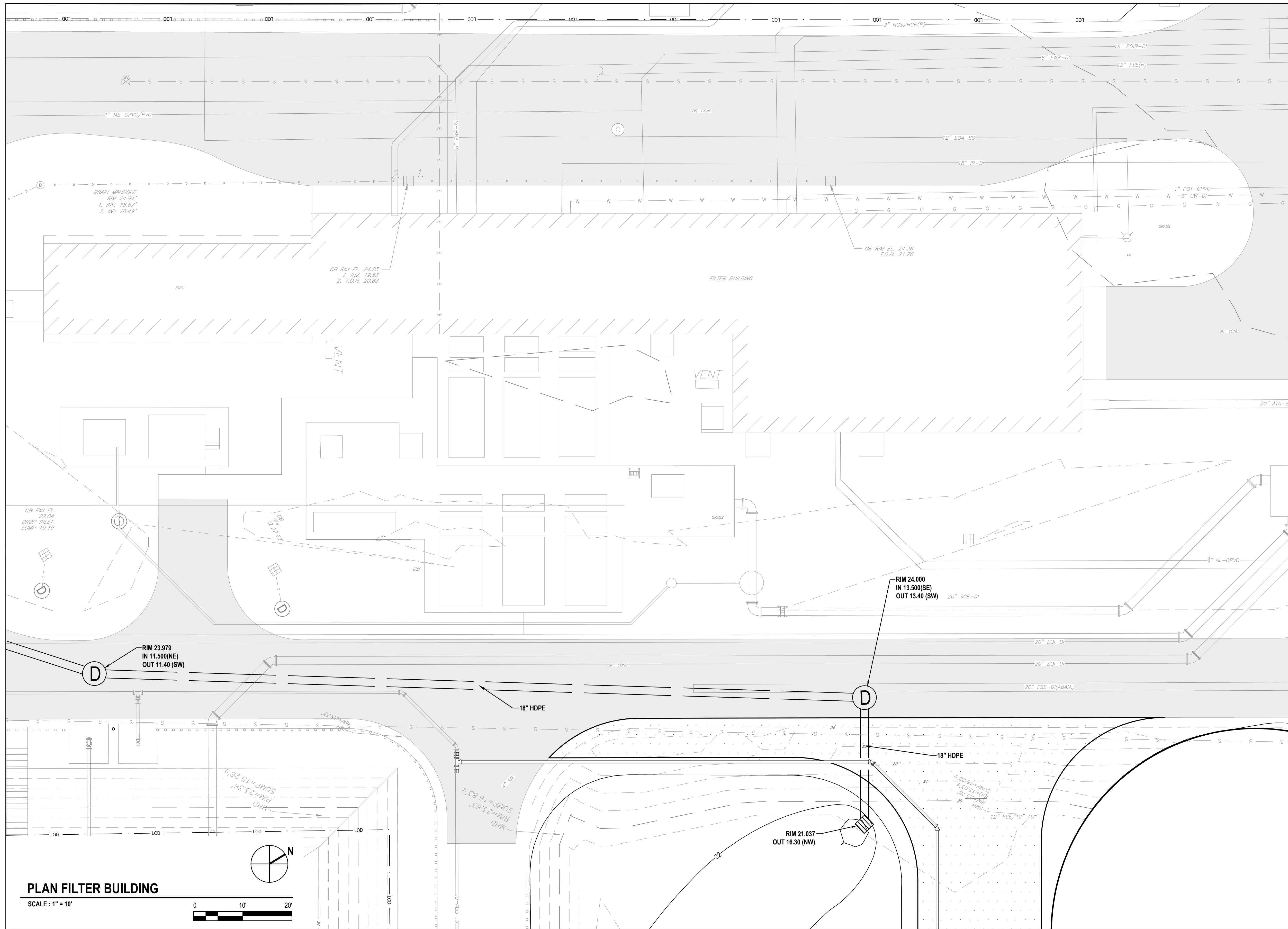
Project No. **12609515**

Date

Scale **AS SHOWN**

Title **STORMWATER BASIN DETAIL**

Sheet No. **C-00504**



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- STRUCTURE
- PAVING
- CONCRETE
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SHEET GENERAL NOTES

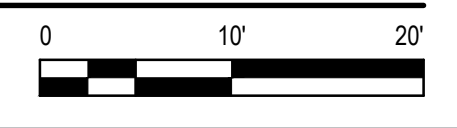
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SHEET KEYNOTES

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PLAN FILTER BUILDING

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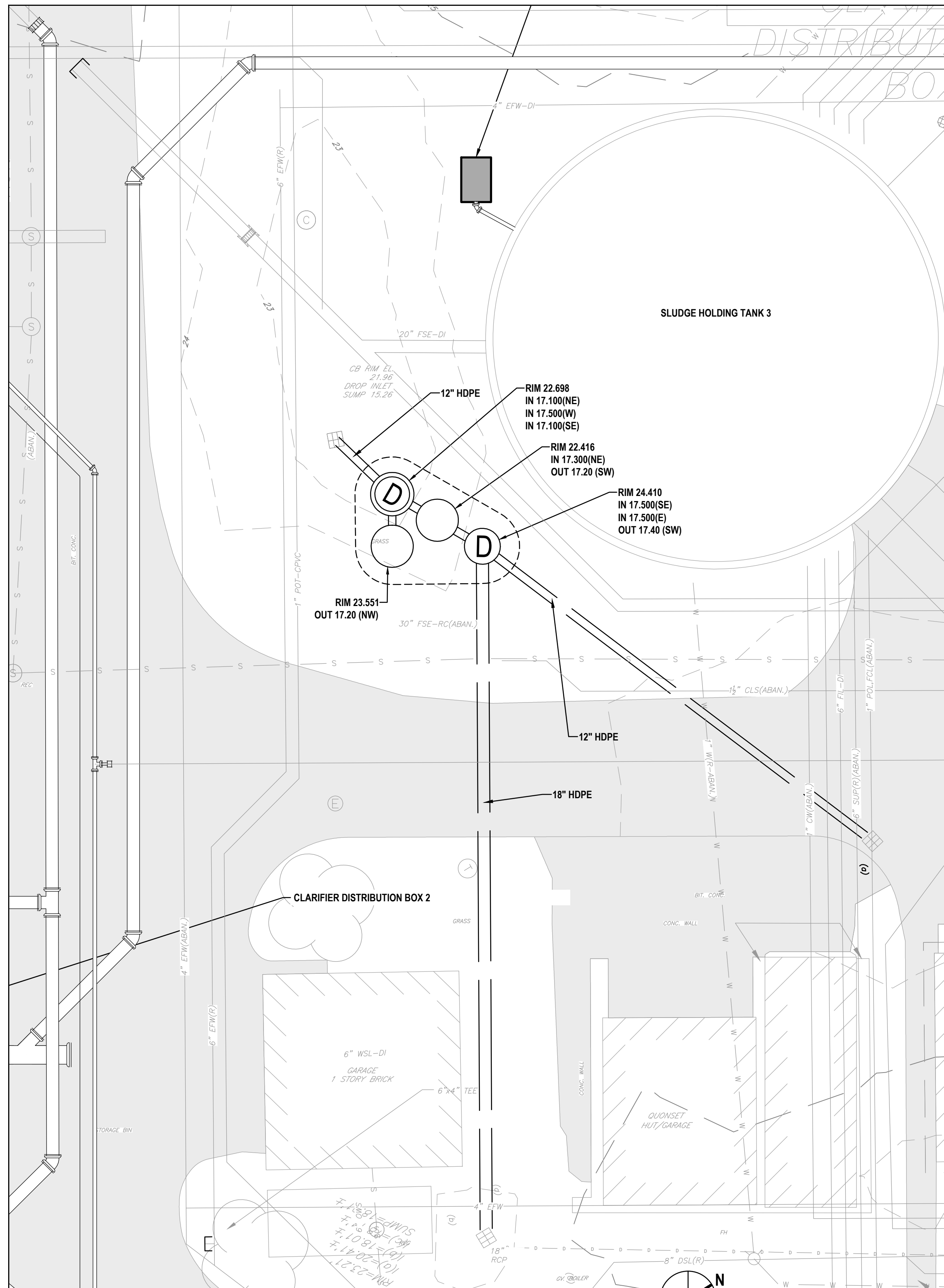


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Project **WATER POLLUTION CONTROL FACILITY IMPROVEMENTS - PHASE 2**

Title **STORMWATER BASIN DETAIL**

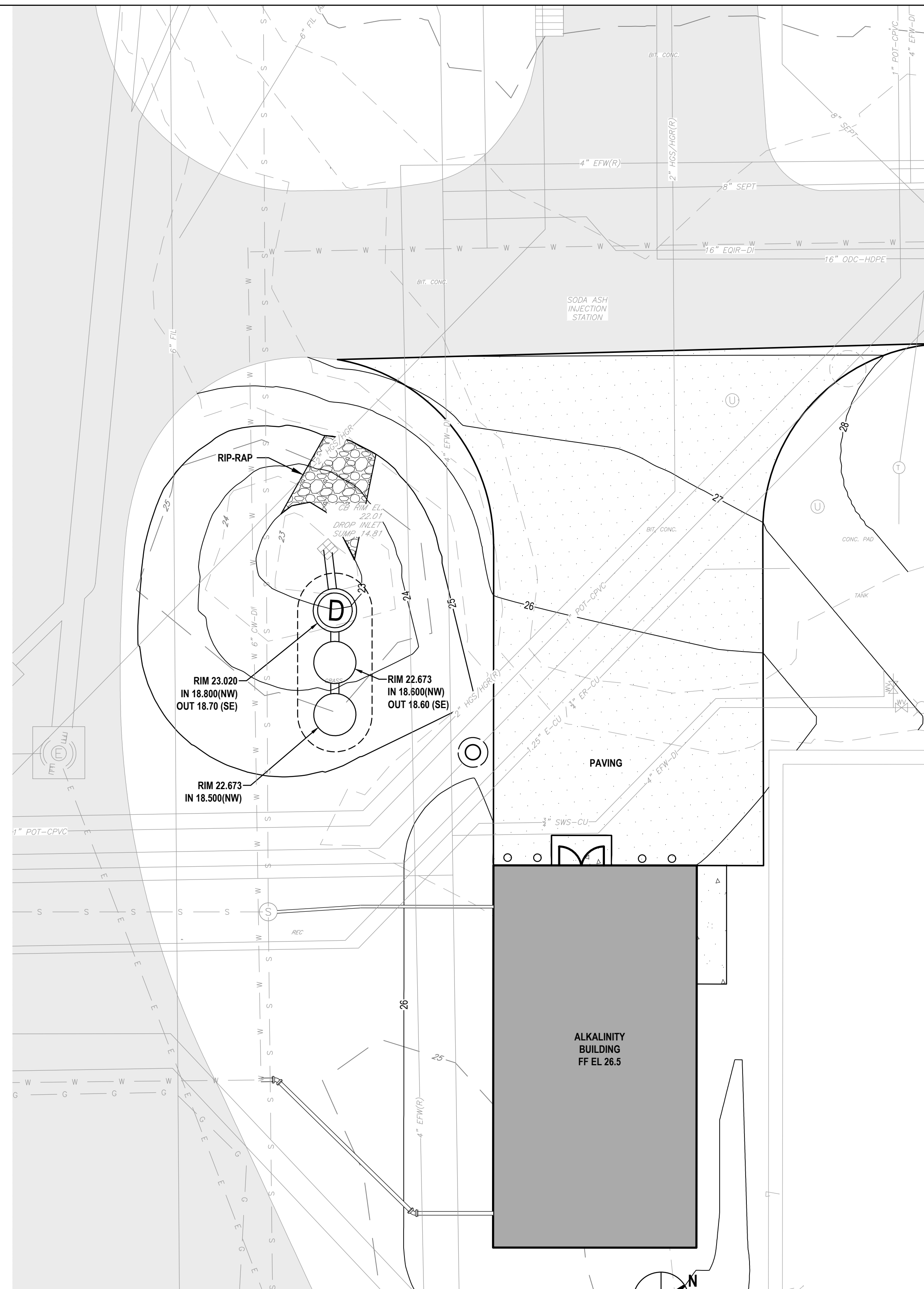
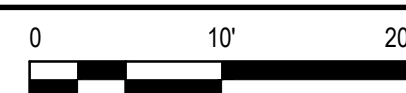
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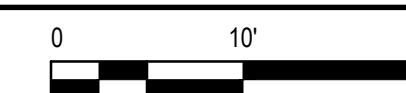
PLAN SIB-#2

SCALE: 1" = 10'



PLAN SIB-#3

SCALE: 1" = 10'



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- EXISTING TREE LINE
- STRUCTURE
- PAVING
- CONCRETE
- FENCE

SHEET GENERAL NOTES

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SHEET KEYNOTES

1.

A SITE PLAN REVIEW		MRW	MD	OCT-25-2023
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Designer	E. WOODBURY	Design Check	P. BOGGS	Project Director
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Project No. **12609515**

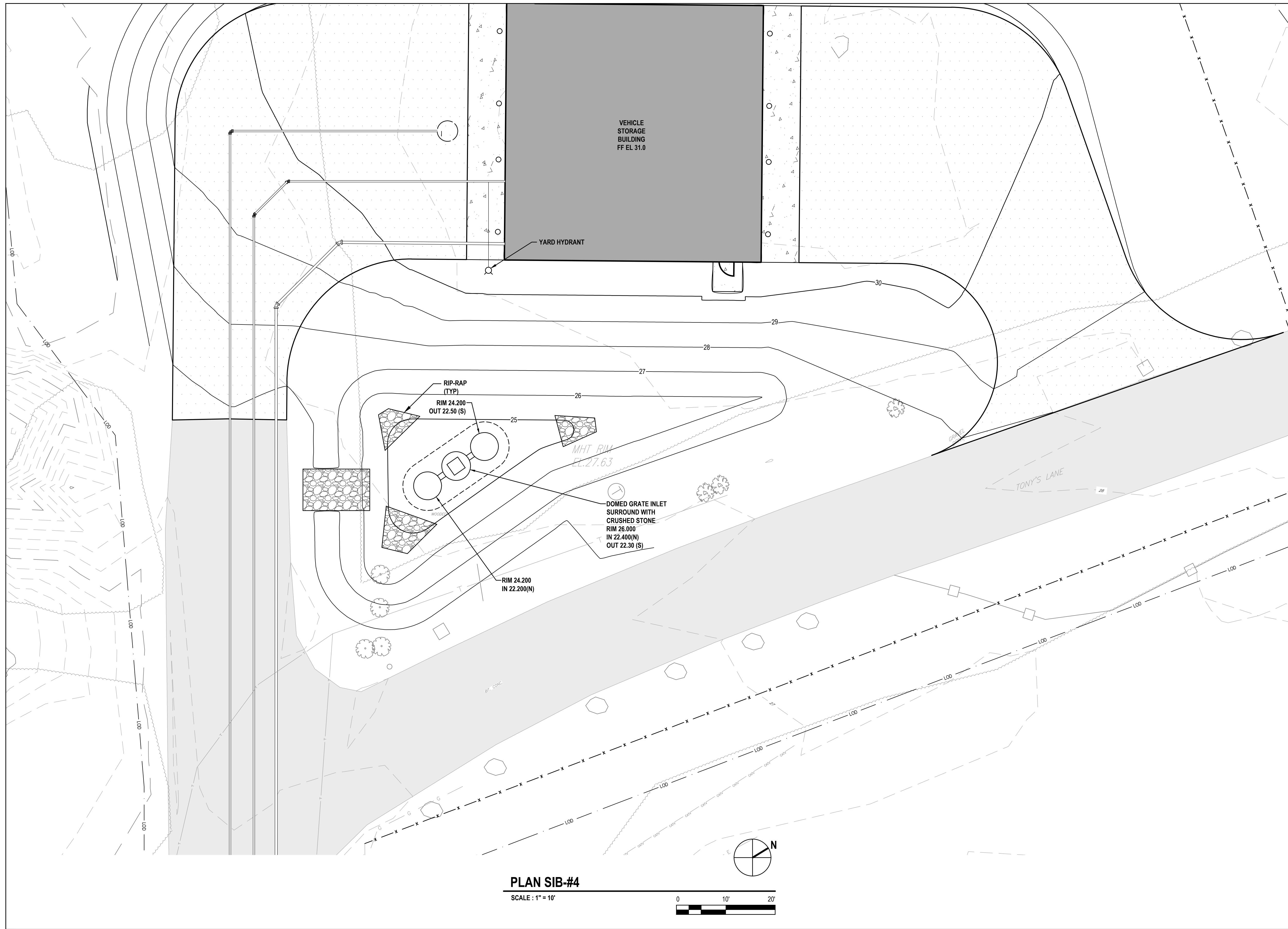
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Title **STORMWATER BASIN DETAIL**

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SHEET GENERAL NOTES

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SHEET KEYNOTES

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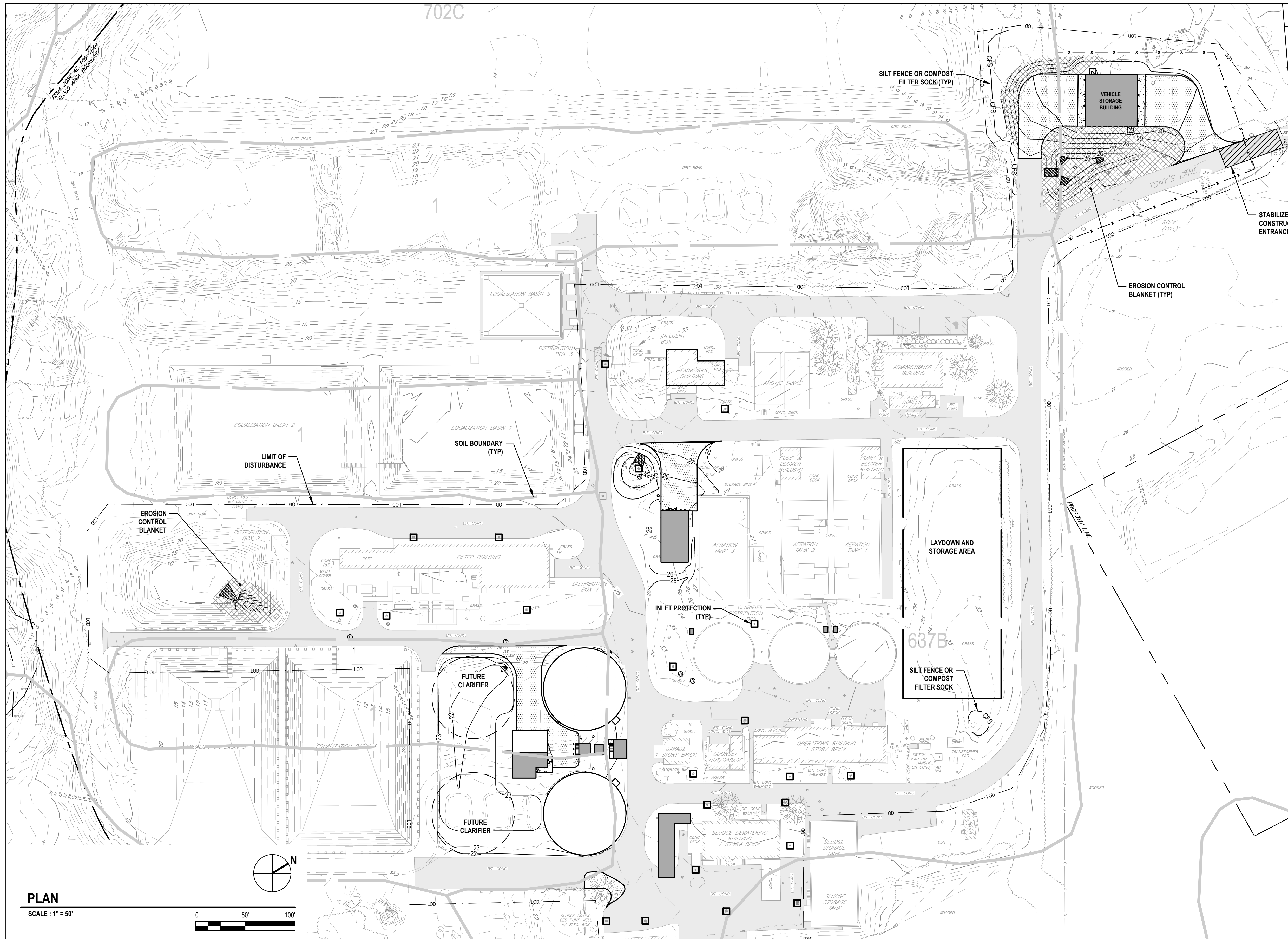
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Project No.	12609515
Date	
Scale	AS SHOWN

Title	STORMWATER BASIN DETAIL
Sheet No.	C-00507
Size	ANSI D



LEGEND

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SHEET GENERAL NOTES

1.

SHEET KEYNOTES

1.

PLAN
SCALE: 1" = 50'

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Project No. **12609515**

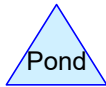
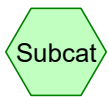
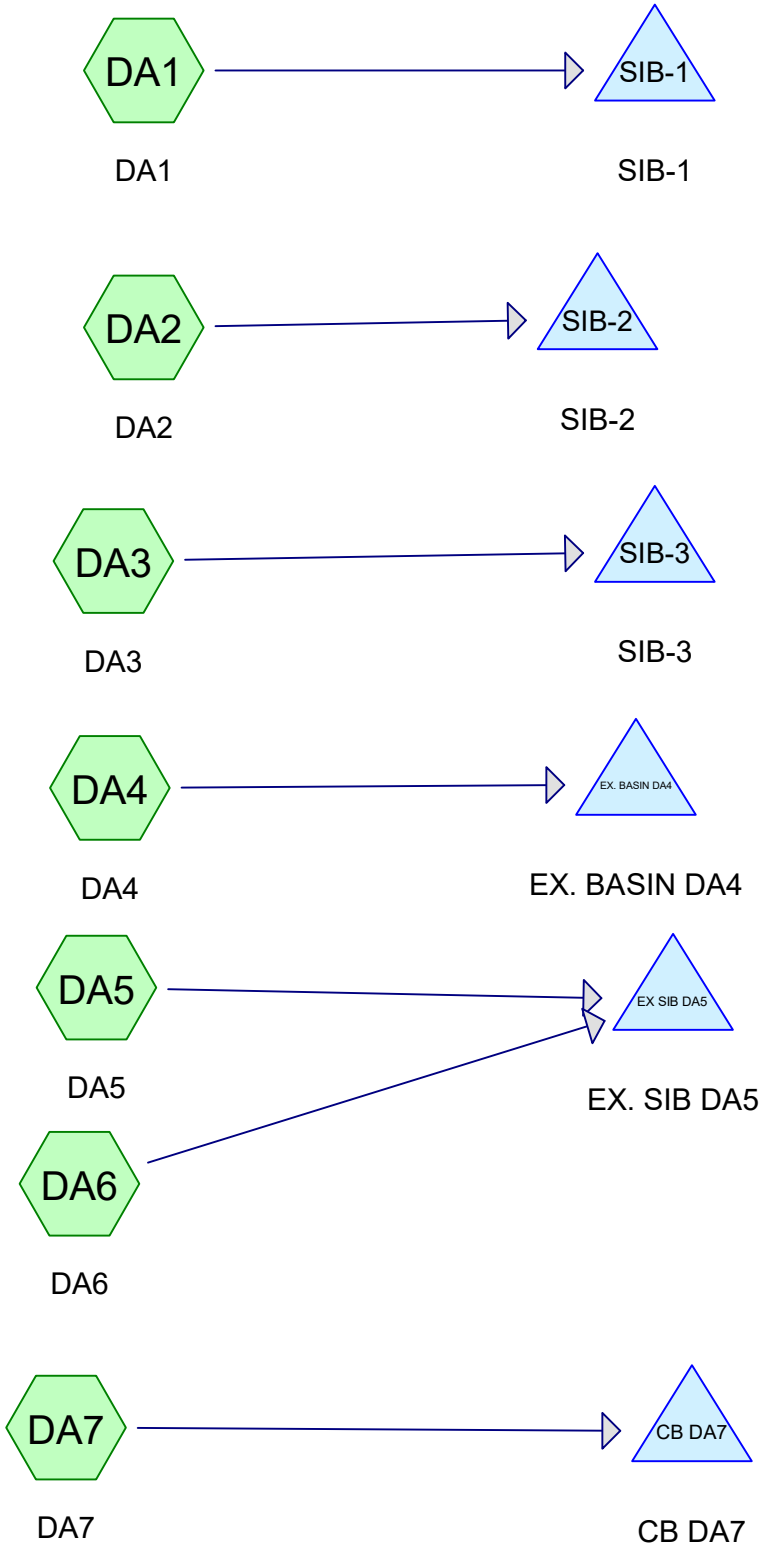
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Title **EROSION CONTROL SITE PLAN**

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Page 2

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	1-Year	Type III 24-hr		Default	24.00	1	2.78	2
2	2-Year	Type III 24-hr		Default	24.00	1	3.35	2
3	5-Year	Type III 24-hr		Default	24.00	1	4.18	2
4	10-Year	Type III 24-hr		Default	24.00	1	4.95	2
5	25-Year	Type III 24-hr		Default	24.00	1	6.19	2
6	50-Year	Type III 24-hr		Default	24.00	1	7.33	2
7	100-Year	Type III 24-hr		Default	24.00	1	8.68	2

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Page 3

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.694	98	(DA1, DA6)
0.805	39	(DA1, DA6)
1.083	39	>75% Grass cover, Good, HSG A (DA2, DA3, DA5, DA7)
1.516	30	Brush, Good, HSG A (DA4)
0.488	98	IMPERVIOUS (DA3, DA5)
0.116	98	Impervious (DA2)
0.756	58	Meadow, non-grazed, HSG B (DA5)
0.285	98	Paved parking, HSG A (DA7)
0.239	98	ROAD (DA4)
0.061	30	Woods, Good, HSG A (DA4)
6.043	57	TOTAL AREA

Wareham Pre Construction

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Page 4

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	0.000	1.499	1.499		DA1, DA6
1.083	0.000	0.000	0.000	0.000	1.083	>75% Grass cover, Good	DA2, DA3, DA5, DA7
1.516	0.000	0.000	0.000	0.000	1.516	Brush, Good	DA4
0.000	0.000	0.000	0.000	0.488	0.488	IMPERVIOUS	DA3, DA5
0.000	0.000	0.000	0.000	0.116	0.116	Impervious	DA2
0.000	0.756	0.000	0.000	0.000	0.756	Meadow, non-grazed	DA5
0.285	0.000	0.000	0.000	0.000	0.285	Paved parking	DA7
0.000	0.000	0.000	0.000	0.239	0.239	ROAD	DA4
0.061	0.000	0.000	0.000	0.000	0.061	Woods, Good	DA4
2.946	0.756	0.000	0.000	2.341	6.043	TOTAL AREA	

Wareham Pre Construction

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Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Width (inches)	Diam/Height (inches)	Inside-Fill (inches)	Node Name
1	DA1	0.00	0.00	91.0	0.1500	0.013	0.0	18.0	0.0	

Wareham Pre Construction

Type III 24-hr 1-Year Rainfall=2.78"

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Time span=3.00-48.00 hrs, dt=0.05 hrs, 901 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment DA1: DA1 Runoff Area=47,720 sf 36.62% Impervious Runoff Depth=0.29"
Flow Length=191' Tc=12.7 min CN=61 Runoff=0.15 cfs 0.026 af

Subcatchment DA2: DA2 Runoff Area=29,170 sf 17.26% Impervious Runoff Depth=0.04"
Flow Length=264' Tc=11.2 min CN=49 Runoff=0.00 cfs 0.002 af

Subcatchment DA3: DA3 Runoff Area=5,342 sf 44.81% Impervious Runoff Depth=0.41"
Flow Length=88' Tc=0.9 min CN=65 Runoff=0.04 cfs 0.004 af

Subcatchment DA4: DA4 Runoff Area=79,094 sf 13.14% Impervious Runoff Depth=0.00"
Flow Length=400' Tc=4.8 min CN=39 Runoff=0.00 cfs 0.000 af

Subcatchment DA5: DA5 Runoff Area=62,200 sf 30.35% Impervious Runoff Depth=0.48"
Flow Length=225' Tc=2.4 min CN=67 Runoff=0.67 cfs 0.057 af

Subcatchment DA6: DA6 Runoff Area=17,571 sf 72.63% Impervious Runoff Depth=1.21"
Flow Length=125' Slope=0.0100 '/' Tc=5.8 min CN=82 Runoff=0.56 cfs 0.041 af

Subcatchment DA7: DA7 Runoff Area=22,134 sf 56.17% Impervious Runoff Depth=0.68"
Flow Length=200' Slope=0.0100 '/' Tc=14.2 min CN=72 Runoff=0.27 cfs 0.029 af

Pond CB DA7: CB DA7 Inflow=0.27 cfs 0.029 af
Primary=0.27 cfs 0.029 af

Pond EX SIB DA5: EX. SIB DA5 Peak Elev=18.02' Storage=168 cf Inflow=1.20 cfs 0.098 af
Outflow=1.08 cfs 0.098 af

Pond EX. BASIN DA4: EX. BASIN DA4 Peak Elev=16.00' Storage=0 cf Inflow=0.00 cfs 0.000 af
Discarded=0.00 cfs 0.000 af Secondary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.000 af

Pond SIB-1: SIB-1 Peak Elev=10.03' Storage=83 cf Inflow=0.15 cfs 0.026 af
Discarded=0.12 cfs 0.026 af Secondary=0.00 cfs 0.000 af Outflow=0.12 cfs 0.026 af

Pond SIB-2: SIB-2 Peak Elev=14.34' Storage=20 cf Inflow=0.00 cfs 0.002 af
Discarded=0.00 cfs 0.002 af Secondary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.002 af

Pond SIB-3: SIB-3 Peak Elev=14.64' Storage=36 cf Inflow=0.04 cfs 0.004 af
Discarded=0.01 cfs 0.004 af Secondary=0.00 cfs 0.000 af Outflow=0.01 cfs 0.004 af

Total Runoff Area = 6.043 ac Runoff Volume = 0.159 af Average Runoff Depth = 0.32"
69.85% Pervious = 4.221 ac 30.15% Impervious = 1.822 ac

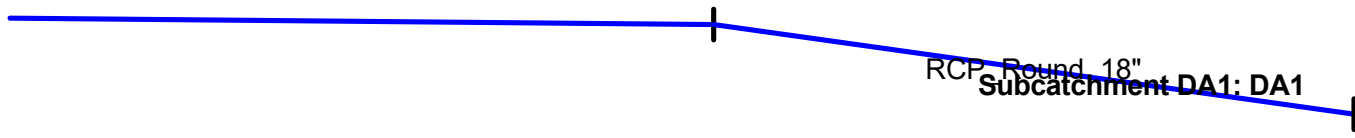
Summary for Subcatchment DA1: DA1

Runoff = 0.15 cfs @ 12.37 hrs, Volume= 0.026 af, Depth= 0.29"
 Routed to Pond SIB-1 : SIB-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-48.00 hrs, dt= 0.05 hrs
 Type III 24-hr 1-Year Rainfall=2.78"

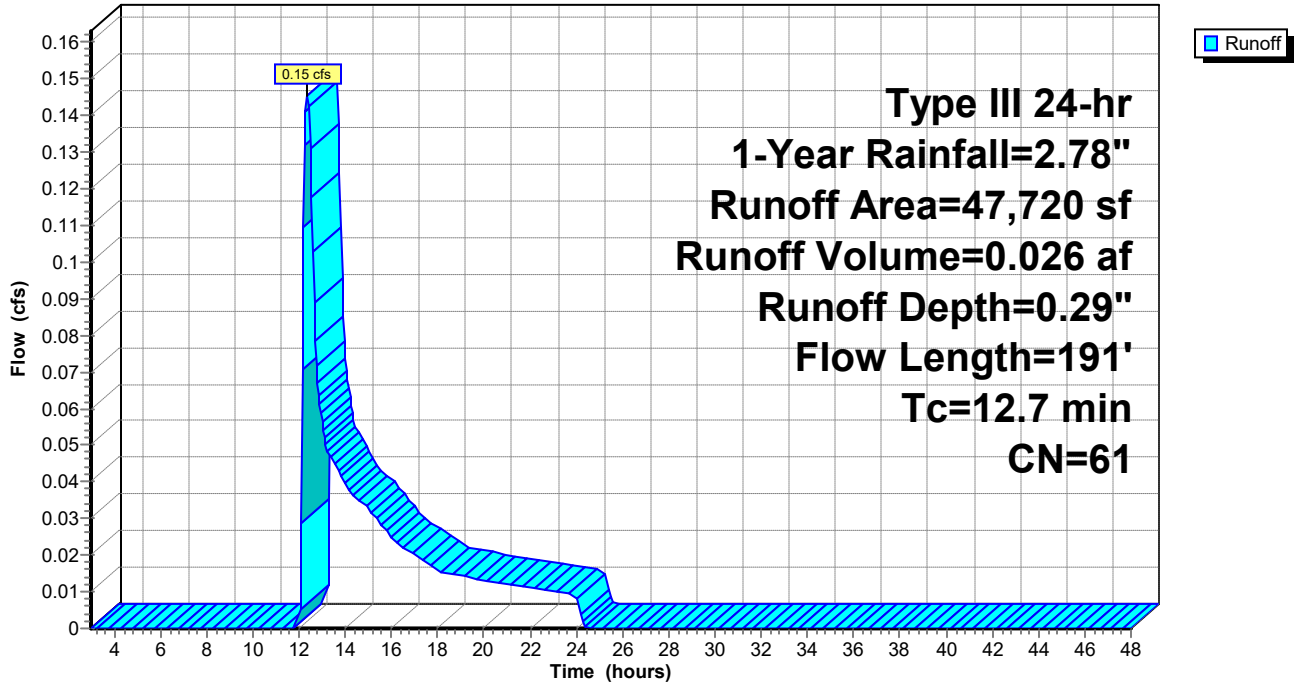
	Area (sf)	CN	Description
*	17,477	98	
*	30,243	39	
	47,720	61	Weighted Average
	30,243		63.38% Pervious Area
	17,477		36.62% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.6	100	0.0100	0.13		Sheet Flow, Grass: Short n= 0.150 P2= 3.35"
0.1	91	0.1500	23.02	40.68	Pipe Channel, RCP_Round 18" 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
12.7	191	Total			



Subcatchment DA1: DA1

Hydrograph



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Type III 24-hr 1-Year Rainfall=2.78"

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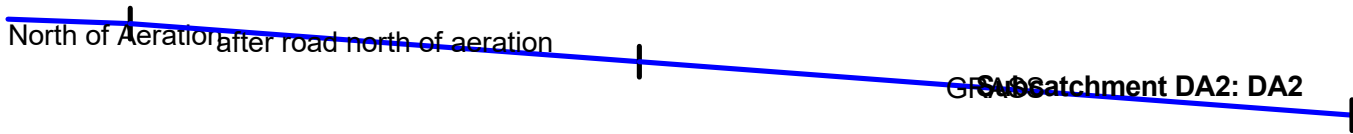
Summary for Subcatchment DA2: DA2

Runoff = 0.00 cfs @ 15.28 hrs, Volume= 0.002 af, Depth= 0.04"
 Routed to Pond SIB-2 : SIB-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-48.00 hrs, dt= 0.05 hrs
 Type III 24-hr 1-Year Rainfall=2.78"

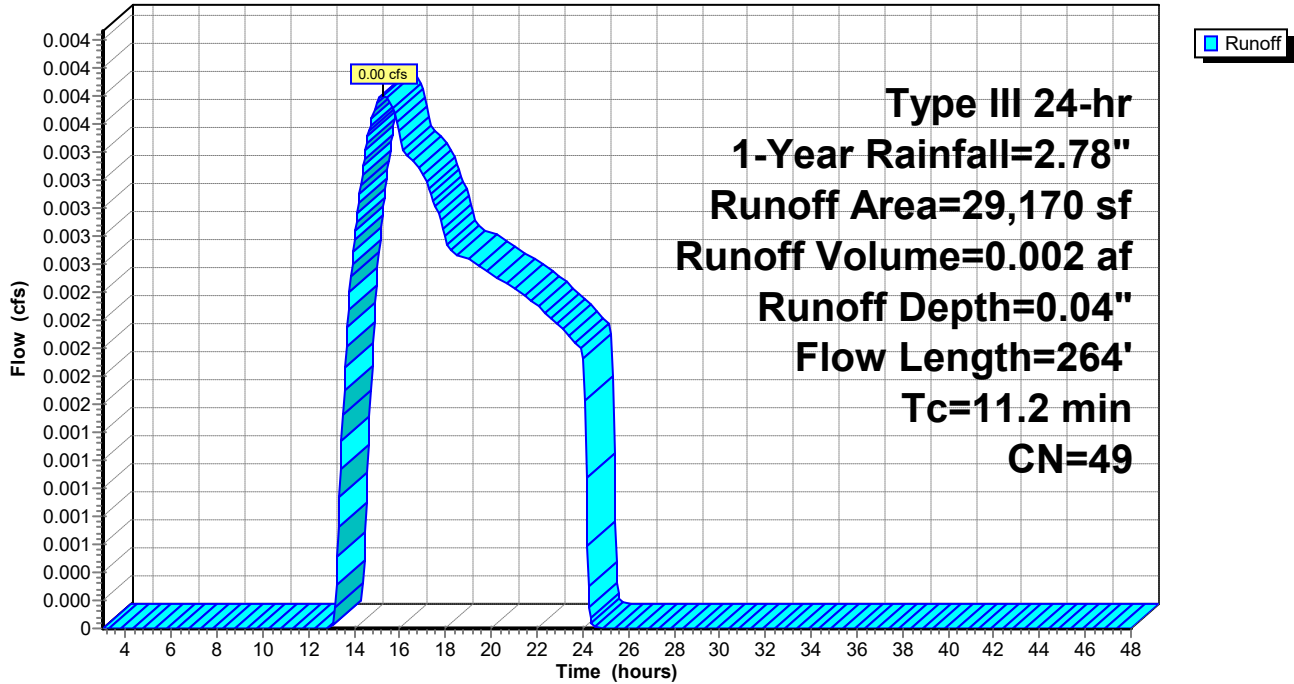
Area (sf)	CN	Description
* 5,035	98	Impervious
24,135	39	>75% Grass cover, Good, HSG A
29,170	49	Weighted Average
24,135		82.74% Pervious Area
5,035		17.26% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	24	0.0100	0.80		Sheet Flow, North of Aeration Smooth surfaces n= 0.011 P2= 3.35"
9.6	100	0.0200	0.17		Sheet Flow, after road north of aeration Grass: Short n= 0.150 P2= 3.35"
1.1	140	0.0200	2.12		Shallow Concentrated Flow, GRASS Grassed Waterway Kv= 15.0 fps
11.2	264	Total			



Subcatchment DA2: DA2

Hydrograph



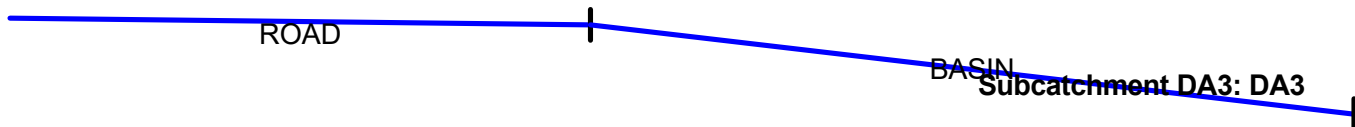
Summary for Subcatchment DA3: DA3

Runoff = 0.04 cfs @ 12.05 hrs, Volume= 0.004 af, Depth= 0.41"
 Routed to Pond SIB-3 : SIB-3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-48.00 hrs, dt= 0.05 hrs
 Type III 24-hr 1-Year Rainfall=2.78"

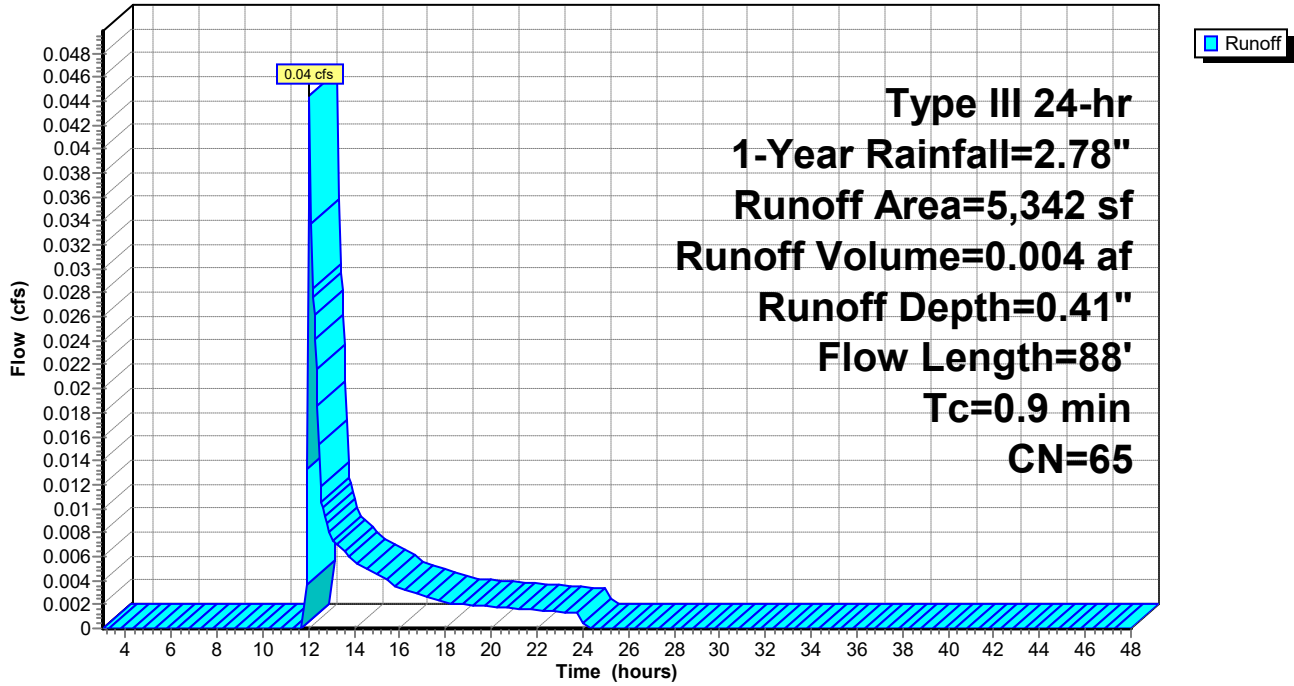
Area (sf)	CN	Description
* 2,394	98	IMPERVIOUS
2,948	39	>75% Grass cover, Good, HSG A
5,342	65	Weighted Average
2,948		55.19% Pervious Area
2,394		44.81% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	38	0.0100	0.88		Sheet Flow, ROAD Smooth surfaces n= 0.011 P2= 3.35"
0.2	50	0.1000	5.09		Shallow Concentrated Flow, BASIN Unpaved Kv= 16.1 fps
0.9	88	Total			



Subcatchment DA3: DA3

Hydrograph



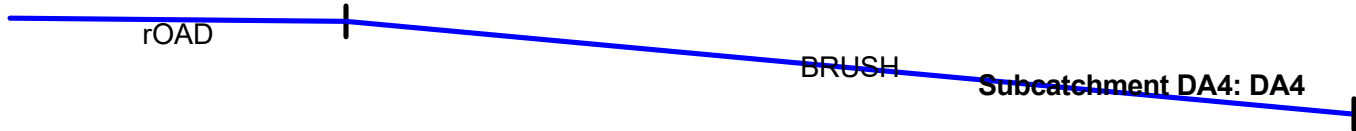
Summary for Subcatchment DA4: DA4

Runoff = 0.00 cfs @ 3.00 hrs, Volume= 0.000 af, Depth= 0.00"
 Routed to Pond EX. BASIN DA4 : EX. BASIN DA4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-48.00 hrs, dt= 0.05 hrs
 Type III 24-hr 1-Year Rainfall=2.78"

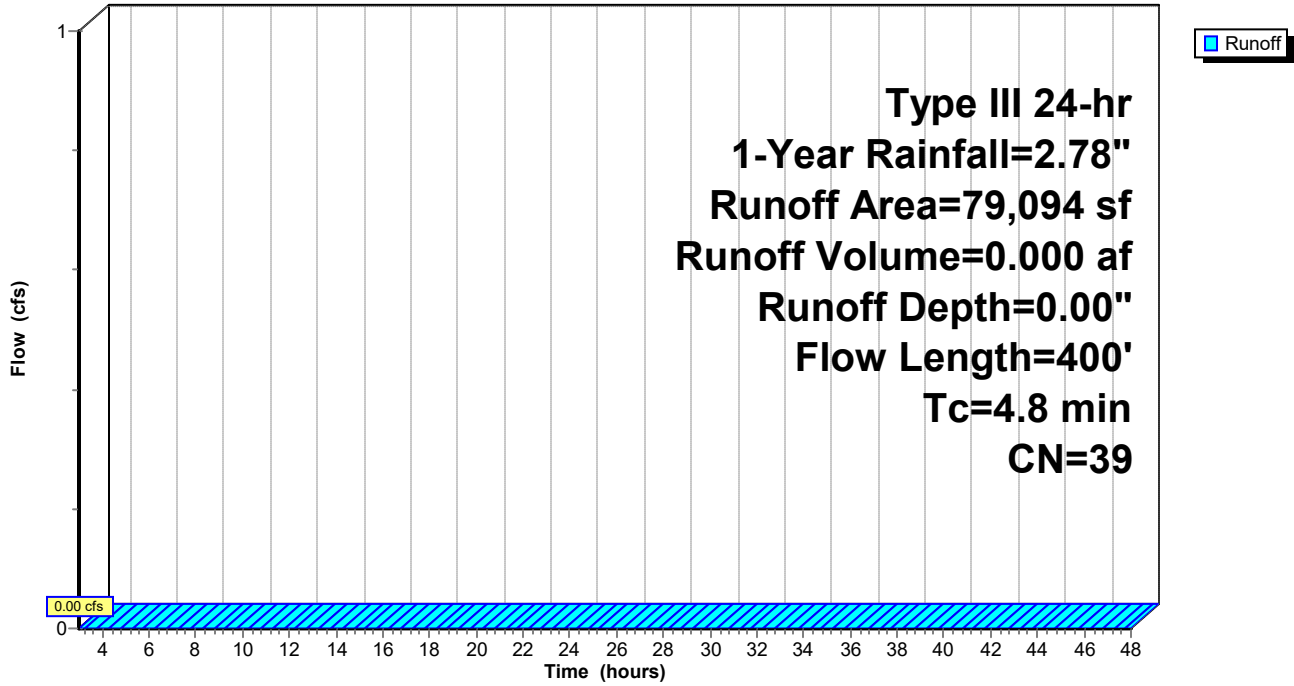
Area (sf)	CN	Description
66,054	30	Brush, Good, HSG A
* 10,390	98	ROAD
2,650	30	Woods, Good, HSG A
79,094	39	Weighted Average
68,704		86.86% Pervious Area
10,390		13.14% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.6	100	0.0100	1.07		Sheet Flow, rOAD Smooth surfaces n= 0.011 P2= 3.35"
3.2	300	0.1000	1.58		Shallow Concentrated Flow, BRUSH Woodland Kv= 5.0 fps
4.8	400	Total			



Subcatchment DA4: DA4

Hydrograph



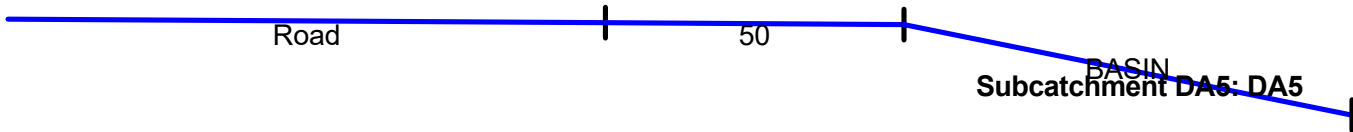
Summary for Subcatchment DA5: DA5

Runoff = 0.67 cfs @ 12.06 hrs, Volume= 0.057 af, Depth= 0.48"
 Routed to Pond EX SIB DA5 : EX. SIB DA5

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-48.00 hrs, dt= 0.05 hrs
 Type III 24-hr 1-Year Rainfall=2.78"

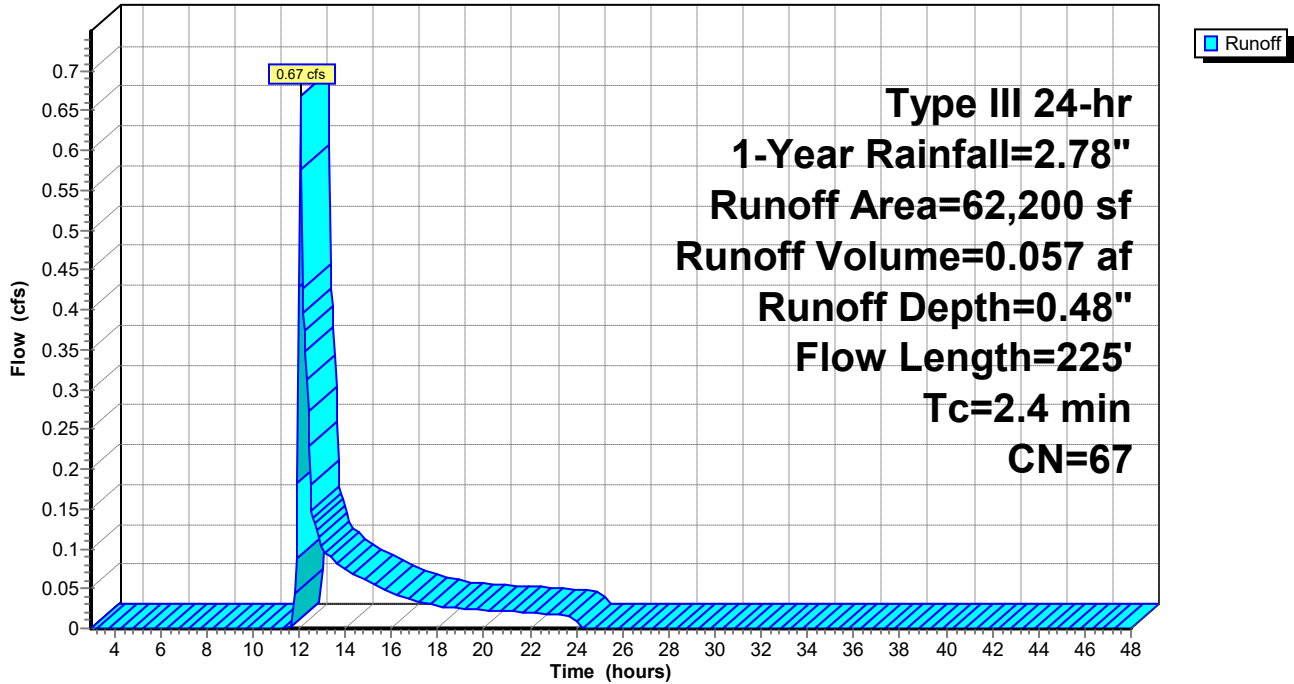
Area (sf)	CN	Description
* 18,875	98	IMPERVIOUS
32,940	58	Meadow, non-grazed, HSG B
10,385	39	>75% Grass cover, Good, HSG A
62,200	67	Weighted Average
43,325		69.65% Pervious Area
18,875		30.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.6	100	0.0100	1.07		Sheet Flow, Road Smooth surfaces n= 0.011 P2= 3.35"
0.4	50	0.0100	2.03		Shallow Concentrated Flow, 50 Paved Kv= 20.3 fps
0.4	75	0.3300	2.87		Shallow Concentrated Flow, BASIN Woodland Kv= 5.0 fps
2.4	225	Total			



Subcatchment DA5: DA5

Hydrograph



Summary for Subcatchment DA6: DA6

Runoff = 0.56 cfs @ 12.09 hrs, Volume= 0.041 af, Depth= 1.21"
 Routed to Pond EX SIB DA5 : EX. SIB DA5

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-48.00 hrs, dt= 0.05 hrs
 Type III 24-hr 1-Year Rainfall=2.78"

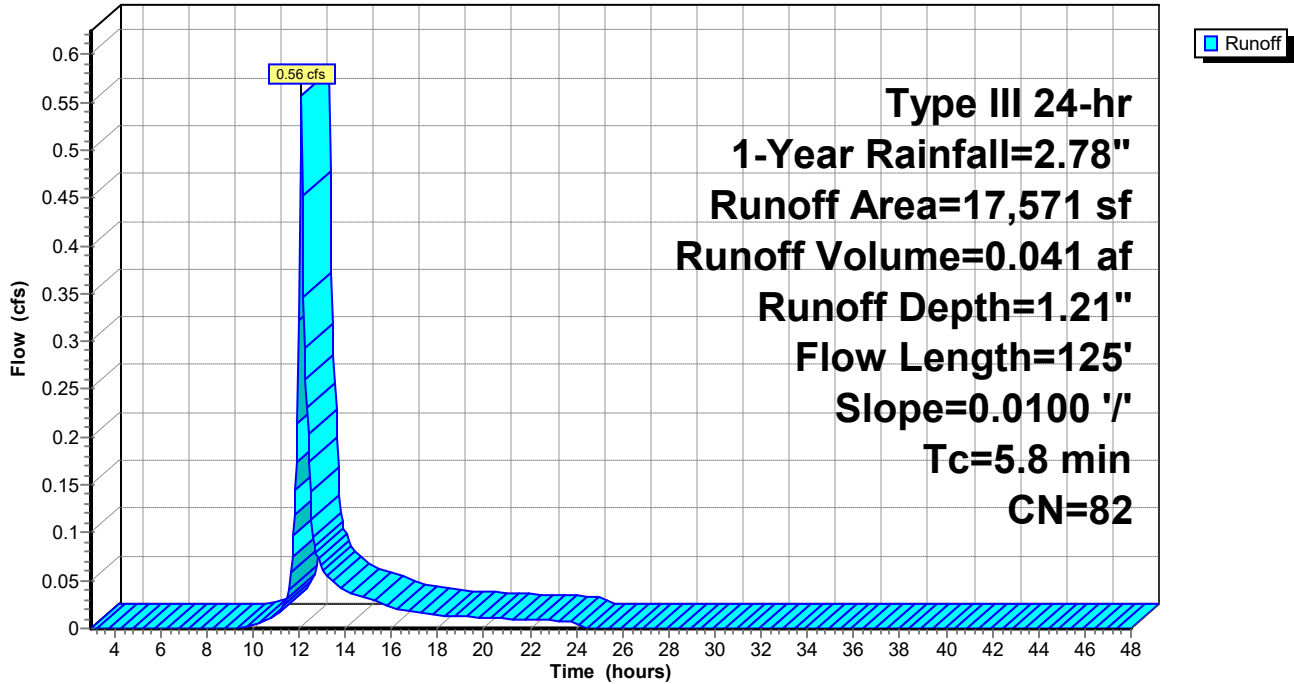
Area (sf)	CN	Description
* 12,762	98	
* 4,809	39	
17,571	82	Weighted Average
4,809		27.37% Pervious Area
12,762		72.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.6	100	0.0100	1.07		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.35"
4.2	25	0.0100	0.10		Sheet Flow, Grass: Short n= 0.150 P2= 3.35"
5.8	125	Total			



Subcatchment DA6: DA6

Hydrograph



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Type III 24-hr 1-Year Rainfall=2.78"

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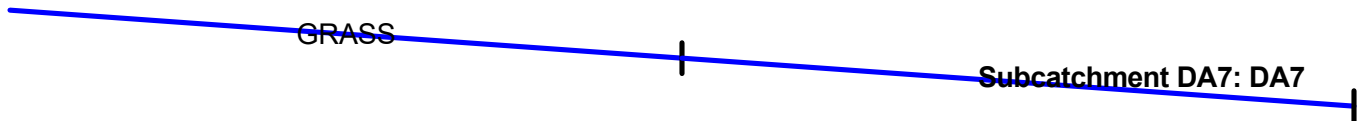
Summary for Subcatchment DA7: DA7

Runoff = 0.27 cfs @ 12.22 hrs, Volume= 0.029 af, Depth= 0.68"
 Routed to Pond CB DA7 : CB DA7

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-48.00 hrs, dt= 0.05 hrs
 Type III 24-hr 1-Year Rainfall=2.78"

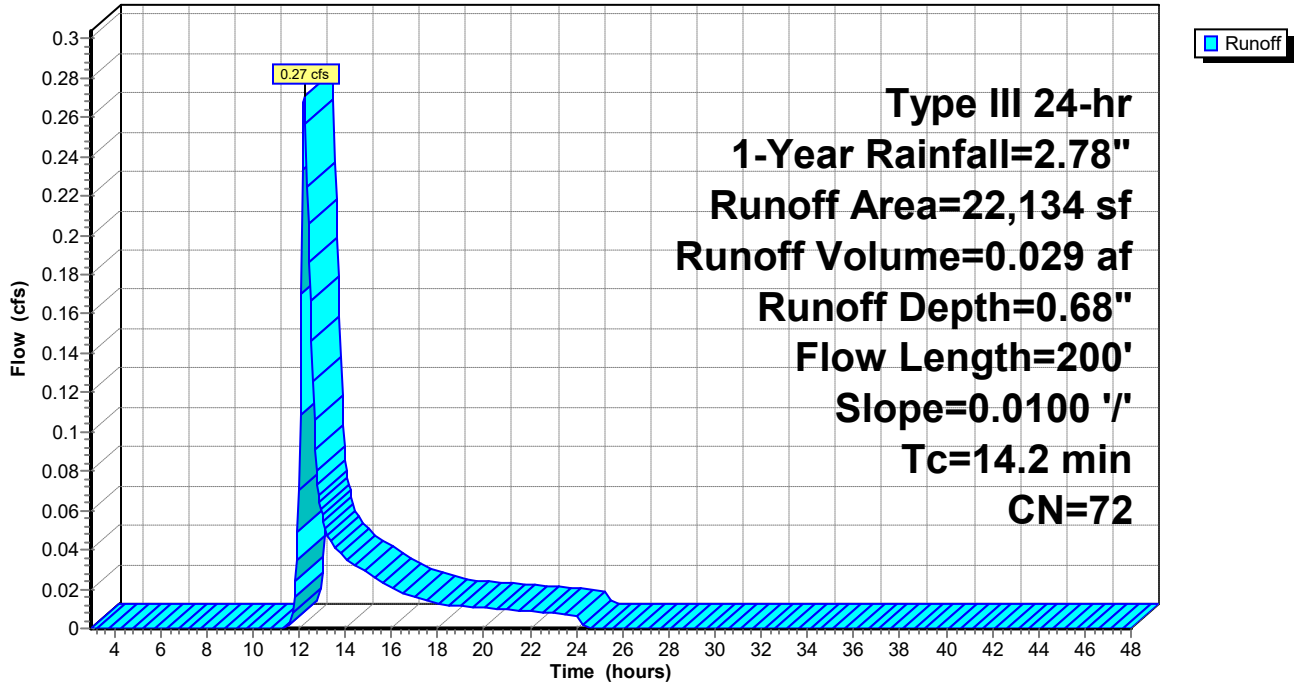
Area (sf)	CN	Description
9,701	39	>75% Grass cover, Good, HSG A
12,433	98	Paved parking, HSG A
22,134	72	Weighted Average
9,701		43.83% Pervious Area
12,433		56.17% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.6	100	0.0100	0.13		Sheet Flow, GRASS Grass: Short n= 0.150 P2= 3.35"
1.6	100	0.0100	1.07		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.35"
14.2	200	Total			



Subcatchment DA7: DA7

Hydrograph



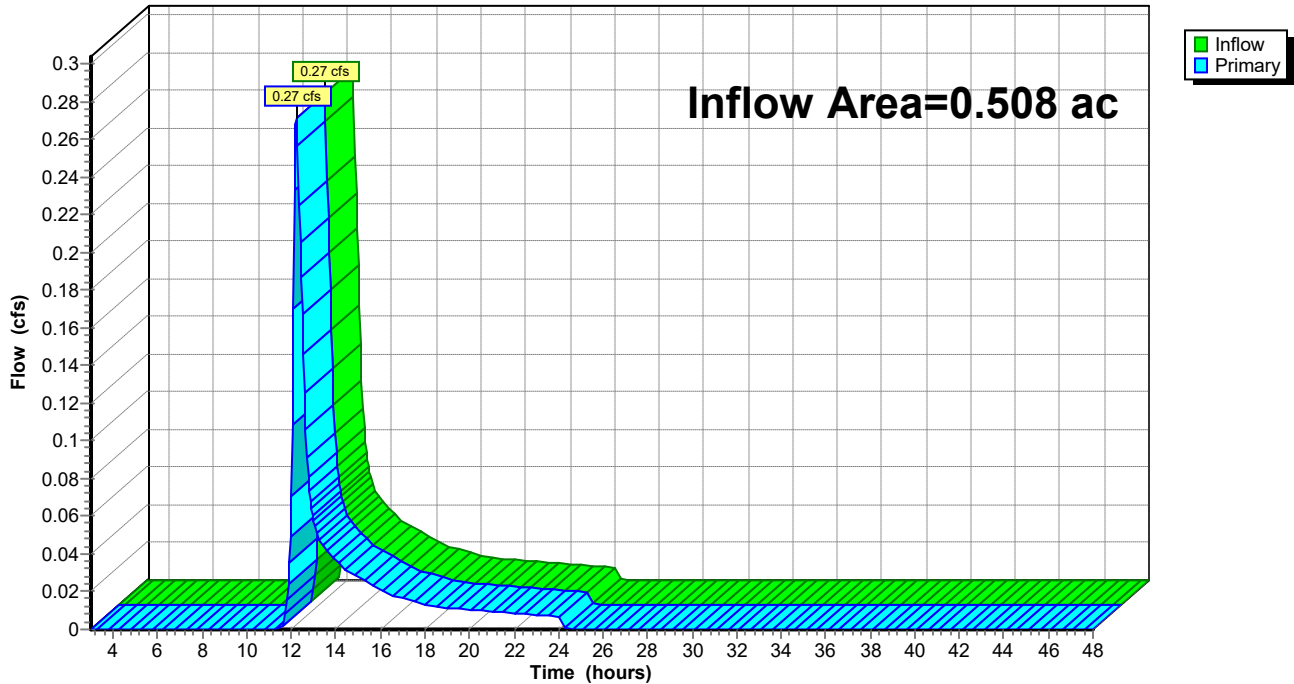
Summary for Pond CB DA7: CB DA7

Inflow Area = 0.508 ac, 56.17% Impervious, Inflow Depth = 0.68" for 1-Year event
Inflow = 0.27 cfs @ 12.22 hrs, Volume= 0.029 af
Primary = 0.27 cfs @ 12.22 hrs, Volume= 0.029 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 3.00-48.00 hrs, dt= 0.05 hrs

Pond CB DA7: CB DA7

Hydrograph



Summary for Pond EX SIB DA5: EX. SIB DA5

Inflow Area = 1.831 ac, 39.66% Impervious, Inflow Depth = 0.64" for 1-Year event
 Inflow = 1.20 cfs @ 12.07 hrs, Volume= 0.098 af
 Outflow = 1.08 cfs @ 12.12 hrs, Volume= 0.098 af, Atten= 10%, Lag= 2.7 min
 Discarded = 1.08 cfs @ 12.12 hrs, Volume= 0.098 af

Routing by Stor-Ind method, Time Span= 3.00-48.00 hrs, dt= 0.05 hrs
 Peak Elev= 18.02' @ 12.12 hrs Surf.Area= 8,651 sf Storage= 168 cf

Plug-Flow detention time= 2.6 min calculated for 0.098 af (100% of inflow)
 Center-of-Mass det. time= 2.6 min (877.4 - 874.8)

Volume	Invert	Avail.Storage	Storage Description
#1	18.00'	34,414 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
18.00	8,621	0	0	8,621
19.00	10,223	9,411	9,411	10,259
20.00	12,600	11,391	20,801	12,666
21.00	14,650	13,612	34,414	14,758

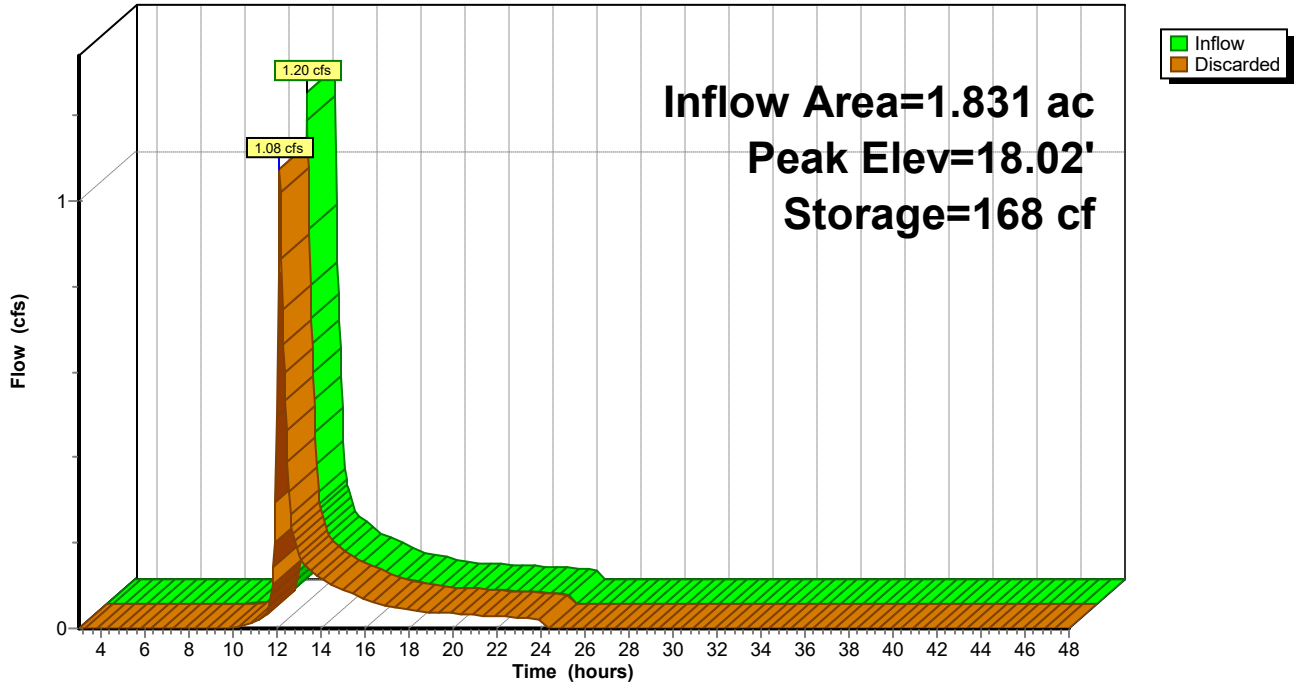
Device	Routing	Invert	Outlet Devices
#1	Discarded	18.00'	8.270 in/hr Exfiltration over Surface area Phase-In= 0.01'

Discarded OutFlow Max=1.66 cfs @ 12.12 hrs HW=18.02' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 1.66 cfs)



Pond EX SIB DA5: EX. SIB DA5

Hydrograph



Summary for Pond EX. BASIN DA4: EX. BASIN DA4

Inflow Area = 1.816 ac, 13.14% Impervious, Inflow Depth = 0.00" for 1-Year event
 Inflow = 0.00 cfs @ 3.00 hrs, Volume= 0.000 af
 Outflow = 0.00 cfs @ 3.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
 Discarded = 0.00 cfs @ 3.00 hrs, Volume= 0.000 af
 Secondary = 0.00 cfs @ 3.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 3.00-48.00 hrs, dt= 0.05 hrs / 3
 Peak Elev= 16.00' @ 3.00 hrs Surf.Area= 1,025 sf Storage= 0 cf

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

Volume	Invert	Avail.Storage	Storage Description
#1	16.00'	2,708 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
16.00	1,025	0	0	1,025
17.00	4,866	2,708	2,708	4,870

Device	Routing	Invert	Outlet Devices
#1	Discarded	16.00'	2.410 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Secondary	16.90'	360.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

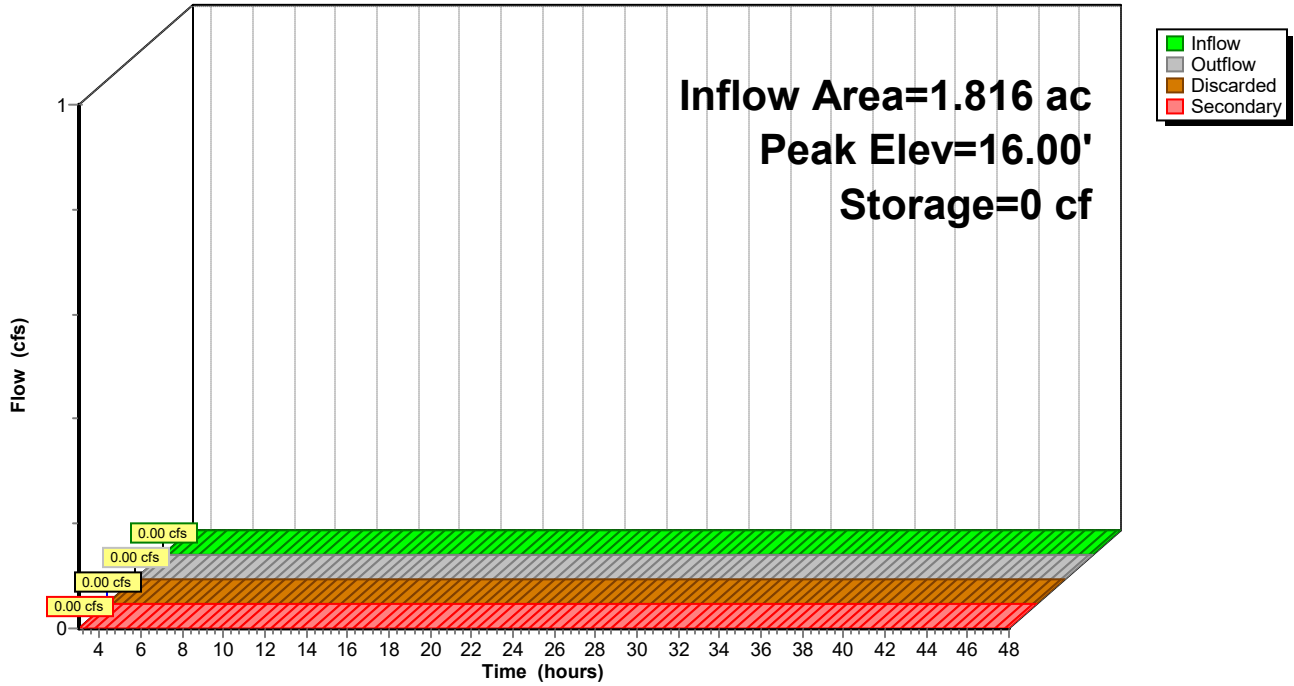
Discarded OutFlow Max=0.00 cfs @ 3.00 hrs HW=16.00' (Free Discharge)
 ↑1=Exfiltration (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 3.00 hrs HW=16.00' (Free Discharge)
 ↑2=Orifice/Grate (Controls 0.00 cfs)



Pond EX. BASIN DA4: EX. BASIN DA4

Hydrograph



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Type III 24-hr 1-Year Rainfall=2.78"

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Summary for Pond SIB-1: SIB-1

Inflow Area = 1.096 ac, 36.62% Impervious, Inflow Depth = 0.29" for 1-Year event
 Inflow = 0.15 cfs @ 12.37 hrs, Volume= 0.026 af
 Outflow = 0.12 cfs @ 12.55 hrs, Volume= 0.026 af, Atten= 20%, Lag= 11.0 min
 Discarded = 0.12 cfs @ 12.55 hrs, Volume= 0.026 af
 Secondary = 0.00 cfs @ 3.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 3.00-48.00 hrs, dt= 0.05 hrs
 Peak Elev= 10.03' @ 12.55 hrs Surf.Area= 2,684 sf Storage= 83 cf

Plug-Flow detention time= 12.1 min calculated for 0.026 af (100% of inflow)
 Center-of-Mass det. time= 12.0 min (953.7 - 941.7)

Volume	Invert	Avail.Storage	Storage Description
#1	10.00'	123,382 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
10.00	2,664	0	0
11.00	3,306	2,985	2,985
12.00	4,005	3,656	6,641
13.00	4,760	4,383	11,023
14.00	5,572	5,166	16,189
15.00	6,440	6,006	22,195
16.00	7,365	6,903	29,098
17.00	8,347	7,856	36,954
18.00	9,385	8,866	45,820
19.00	10,480	9,933	55,752
20.00	11,630	11,055	66,807
21.00	12,837	12,234	79,041
22.00	14,101	13,469	92,510
23.00	15,422	14,762	107,271
24.00	16,800	16,111	123,382

Device	Routing	Invert	Outlet Devices
#1	Discarded	10.00'	8.270 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Secondary	23.90'	360.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.51 cfs @ 12.55 hrs HW=10.03' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.51 cfs)

Secondary OutFlow Max=0.00 cfs @ 3.00 hrs HW=10.00' (Free Discharge)
 ↑2=Orifice/Grate (Controls 0.00 cfs)

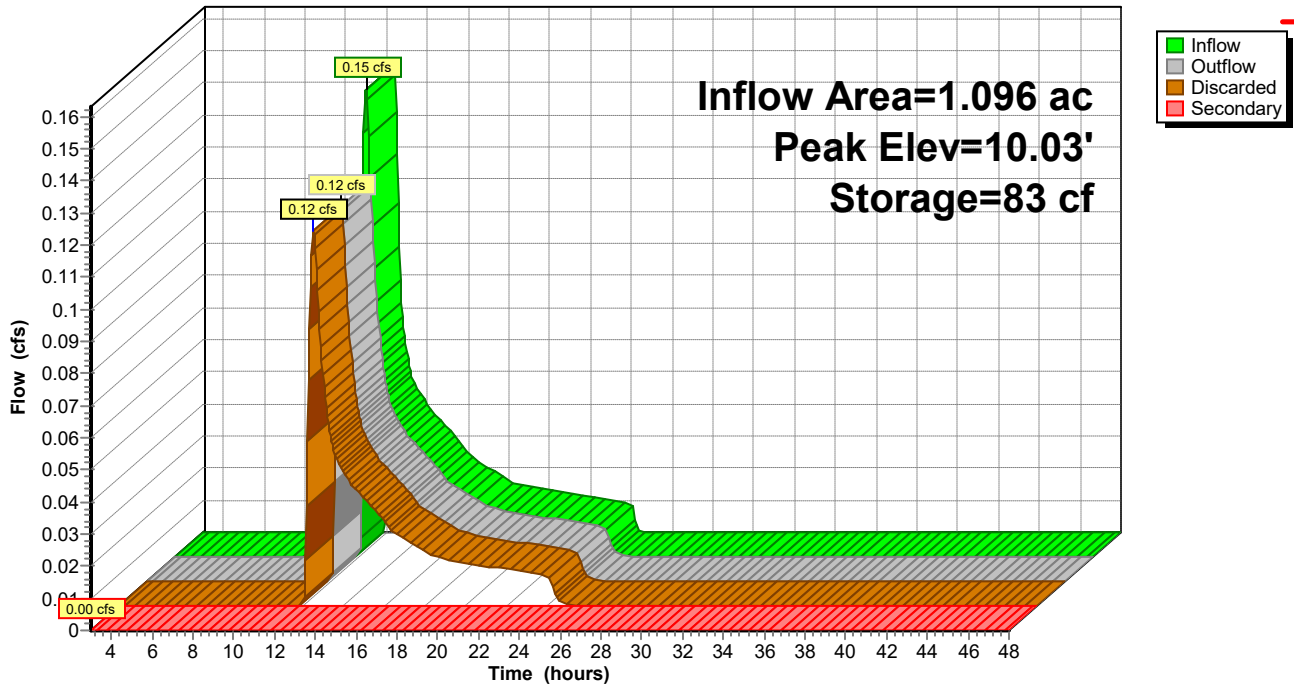
Pond SIB-1: SIB-1

Orifice/Grate

Exfiltration

Pond SIB-1: SIB-1

Hydrograph



Summary for Pond SIB-2: SIB-2

Inflow Area = 0.670 ac, 17.26% Impervious, Inflow Depth = 0.04" for 1-Year event
 Inflow = 0.00 cfs @ 15.28 hrs, Volume= 0.002 af
 Outflow = 0.00 cfs @ 17.71 hrs, Volume= 0.002 af, Atten= 23%, Lag= 145.4 min
 Discarded = 0.00 cfs @ 17.71 hrs, Volume= 0.002 af
 Secondary = 0.00 cfs @ 3.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 3.00-48.00 hrs, dt= 0.05 hrs / 4
 Peak Elev= 14.34' @ 17.71 hrs Surf.Area= 100 sf Storage= 20 cf

Plug-Flow detention time= 115.4 min calculated for 0.002 af (100% of inflow)
 Center-of-Mass det. time= 115.1 min (1,214.2 - 1,099.1)

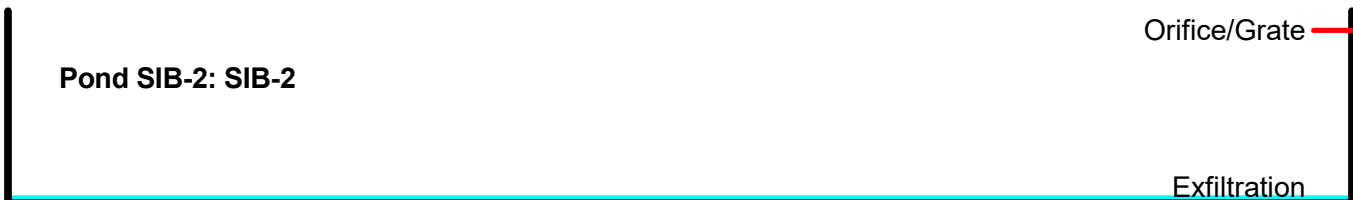
Volume	Invert	Avail.Storage	Storage Description
#1	13.96'	148 cf	10.00'W x 10.00'L x 6.00'H Prismaoid 600 cf Overall - 231 cf Embedded = 369 cf x 40.0% Voids
#2	13.96'	170 cf	6.00'D x 6.00'H Vertical Cone/Cylinder Inside #1 231 cf Overall - 6.0" Wall Thickness = 170 cf
#3	19.96'	9 cf	2.00'D x 3.00'H Vertical Cone/Cylinder -Impervious
#4	22.96'	1,578 cf	Custom Stage Data (Irregular) Listed below (Recalc)
		1,905 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
22.96	817	126.0	0	0	817
24.00	2,350	206.0	1,578	1,578	2,938

Device	Routing	Invert	Outlet Devices
#1	Secondary	23.00'	2.0" x 2.0" Horiz. Orifice/Grate X 6.00 columns X 6 rows C= 0.600 Limited to weir flow at low heads
#2	Discarded	13.96'	8.270 in/hr Exfiltration over Wetted area from 13.96' - 23.00' Excluded Wetted area = 100 sf Phase-In= 0.01'

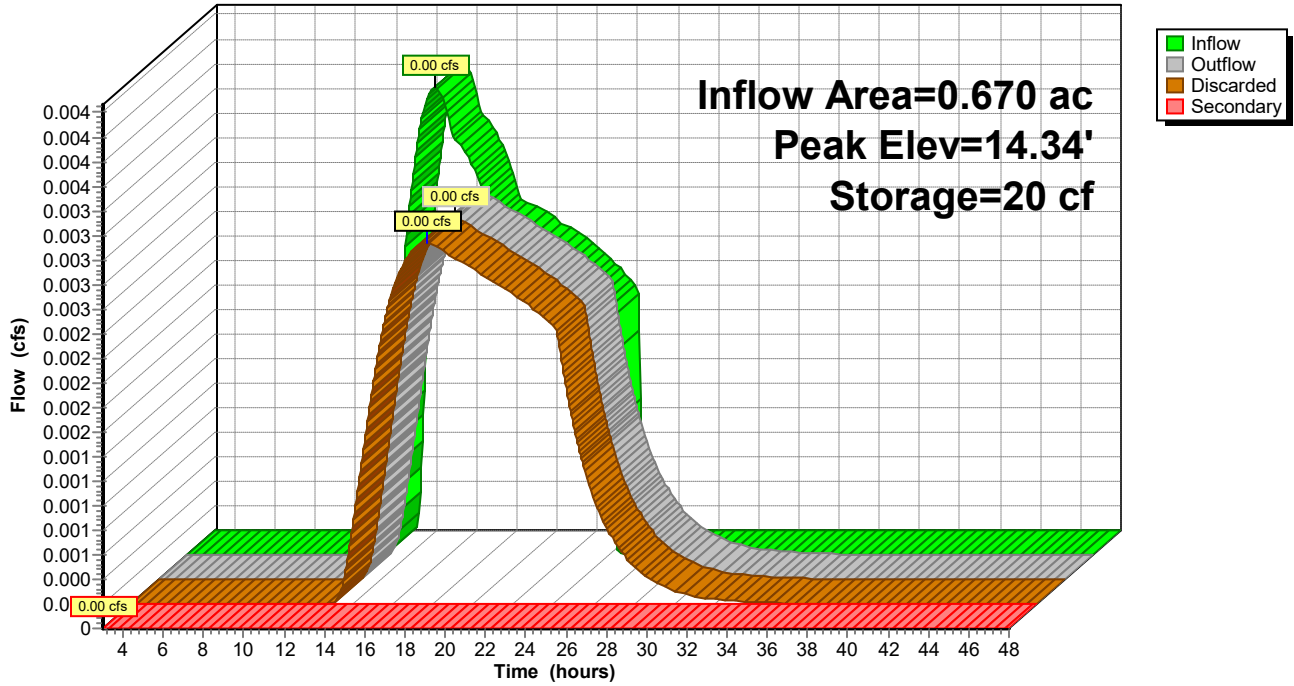
Discarded OutFlow Max=0.00 cfs @ 17.71 hrs HW=14.34' (Free Discharge)
 ↑ **2=Exfiltration** (Exfiltration Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 3.00 hrs HW=13.96' (Free Discharge)
 ↑ **1=Orifice/Grate** (Controls 0.00 cfs)



Pond SIB-2: SIB-2

Hydrograph



Summary for Pond SIB-3: SIB-3

Inflow Area = 0.123 ac, 44.81% Impervious, Inflow Depth = 0.41" for 1-Year event
 Inflow = 0.04 cfs @ 12.05 hrs, Volume= 0.004 af
 Outflow = 0.01 cfs @ 12.54 hrs, Volume= 0.004 af, Atten= 76%, Lag= 29.7 min
 Discarded = 0.01 cfs @ 12.54 hrs, Volume= 0.004 af
 Secondary = 0.00 cfs @ 3.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 3.00-48.00 hrs, dt= 0.05 hrs / 4
 Peak Elev= 14.64' @ 12.54 hrs Surf.Area= 100 sf Storage= 36 cf

Plug-Flow detention time= 31.9 min calculated for 0.004 af (100% of inflow)
 Center-of-Mass det. time= 32.1 min (938.2 - 906.1)

Volume	Invert	Avail.Storage	Storage Description
#1	13.96'	148 cf	10.00'W x 10.00'L x 6.00'H Prismatic 600 cf Overall - 231 cf Embedded = 369 cf x 40.0% Voids
#2	13.96'	170 cf	6.00'D x 6.00'H Vertical Cone/Cylinder Inside #1 231 cf Overall - 6.0" Wall Thickness = 170 cf
#3	19.96'	9 cf	2.00'D x 3.00'H Vertical Cone/Cylinder -Impervious
#4	22.96'	878 cf	Custom Stage Data (Irregular) Listed below (Recalc)
		1,204 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
22.96	83	37.0	0	0	83
24.00	393	75.0	228	228	427
25.00	947	117.0	650	878	1,076

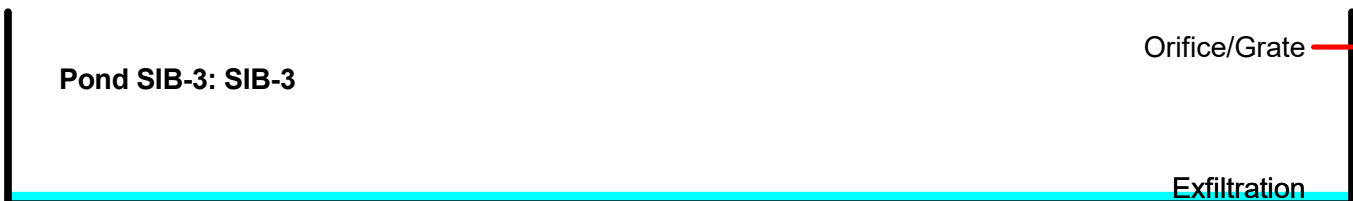
Device	Routing	Invert	Outlet Devices
#1	Secondary	23.00'	2.0" x 2.0" Horiz. Orifice/Grate X 6.00 columns X 6 rows C= 0.600 Limited to weir flow at low heads
#2	Discarded	13.96'	8.270 in/hr Exfiltration over Wetted area from 13.96' - 23.00' Excluded Wetted area = 100 sf Phase-In= 0.01'
#3	Discarded	13.96'	2.414 in/hr Exfiltration over Surface area Phase-In= 0.01'

Discarded OutFlow Max=0.01 cfs @ 12.54 hrs HW=14.64' (Free Discharge)

- ↑ 2=Exfiltration (Exfiltration Controls 0.01 cfs)
- ↑ 3=Exfiltration (Exfiltration Controls 0.01 cfs)

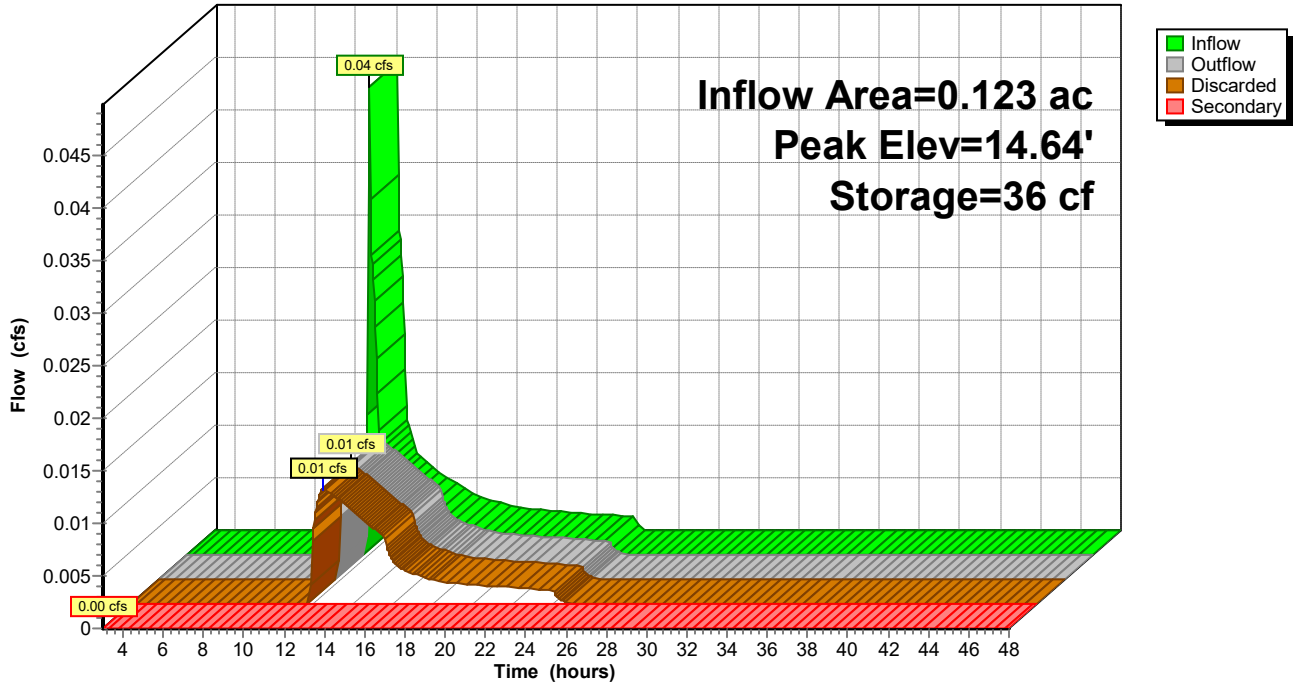
Secondary OutFlow Max=0.00 cfs @ 3.00 hrs HW=13.96' (Free Discharge)

- ↑ 1=Orifice/Grate (Controls 0.00 cfs)



Pond SIB-3: SIB-3

Hydrograph



Wareham Pre Construction

Type III 24-hr 2-Year Rainfall=3.35"

Prepared by GHD, Inc

Printed 11/1/2023

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Time span=3.00-48.00 hrs, dt=0.05 hrs, 901 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment DA1: DA1 Runoff Area=47,720 sf 36.62% Impervious Runoff Depth=0.51"
 Flow Length=191' Tc=12.7 min CN=61 Runoff=0.35 cfs 0.046 af

Subcatchment DA2: DA2 Runoff Area=29,170 sf 17.26% Impervious Runoff Depth=0.14"
 Flow Length=264' Tc=11.2 min CN=49 Runoff=0.02 cfs 0.008 af

Subcatchment DA3: DA3 Runoff Area=5,342 sf 44.81% Impervious Runoff Depth=0.67"
 Flow Length=88' Tc=0.9 min CN=65 Runoff=0.09 cfs 0.007 af

Subcatchment DA4: DA4 Runoff Area=79,094 sf 13.14% Impervious Runoff Depth=0.00"
 Flow Length=400' Tc=4.8 min CN=39 Runoff=0.00 cfs 0.000 af

Subcatchment DA5: DA5 Runoff Area=62,200 sf 30.35% Impervious Runoff Depth=0.77"
 Flow Length=225' Tc=2.4 min CN=67 Runoff=1.23 cfs 0.091 af

Subcatchment DA6: DA6 Runoff Area=17,571 sf 72.63% Impervious Runoff Depth=1.66"
 Flow Length=125' Slope=0.0100 '/' Tc=5.8 min CN=82 Runoff=0.77 cfs 0.056 af

Subcatchment DA7: DA7 Runoff Area=22,134 sf 56.17% Impervious Runoff Depth=1.02"
 Flow Length=200' Slope=0.0100 '/' Tc=14.2 min CN=72 Runoff=0.44 cfs 0.043 af

Pond CB DA7: CB DA7 Inflow=0.44 cfs 0.043 af
 Primary=0.44 cfs 0.043 af

Pond EX SIB DA5: EX. SIB DA5 Peak Elev=18.03' Storage=280 cf Inflow=1.95 cfs 0.147 af
 Outflow=1.69 cfs 0.147 af

Pond EX. BASIN DA4: EX. BASIN DA4 Peak Elev=16.00' Storage=0 cf Inflow=0.00 cfs 0.000 af
 Discarded=0.00 cfs 0.000 af Secondary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.000 af

Pond SIB-1: SIB-1 Peak Elev=10.07' Storage=188 cf Inflow=0.35 cfs 0.046 af
 Discarded=0.26 cfs 0.046 af Secondary=0.00 cfs 0.000 af Outflow=0.26 cfs 0.046 af

Pond SIB-2: SIB-2 Peak Elev=15.27' Storage=69 cf Inflow=0.02 cfs 0.008 af
 Discarded=0.01 cfs 0.008 af Secondary=0.00 cfs 0.000 af Outflow=0.01 cfs 0.008 af

Pond SIB-3: SIB-3 Peak Elev=15.44' Storage=78 cf Inflow=0.09 cfs 0.007 af
 Discarded=0.02 cfs 0.007 af Secondary=0.00 cfs 0.000 af Outflow=0.02 cfs 0.007 af

Total Runoff Area = 6.043 ac Runoff Volume = 0.252 af Average Runoff Depth = 0.50"
69.85% Pervious = 4.221 ac 30.15% Impervious = 1.822 ac

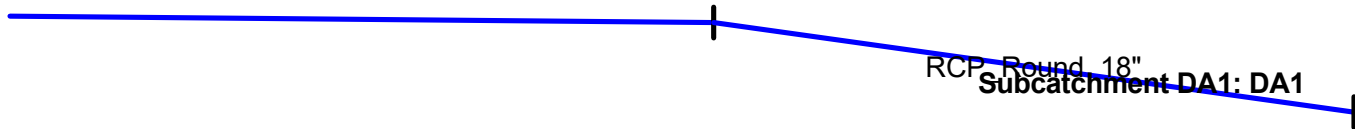
Summary for Subcatchment DA1: DA1

Runoff = 0.35 cfs @ 12.24 hrs, Volume= 0.046 af, Depth= 0.51"
 Routed to Pond SIB-1 : SIB-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-48.00 hrs, dt= 0.05 hrs
 Type III 24-hr 2-Year Rainfall=3.35"

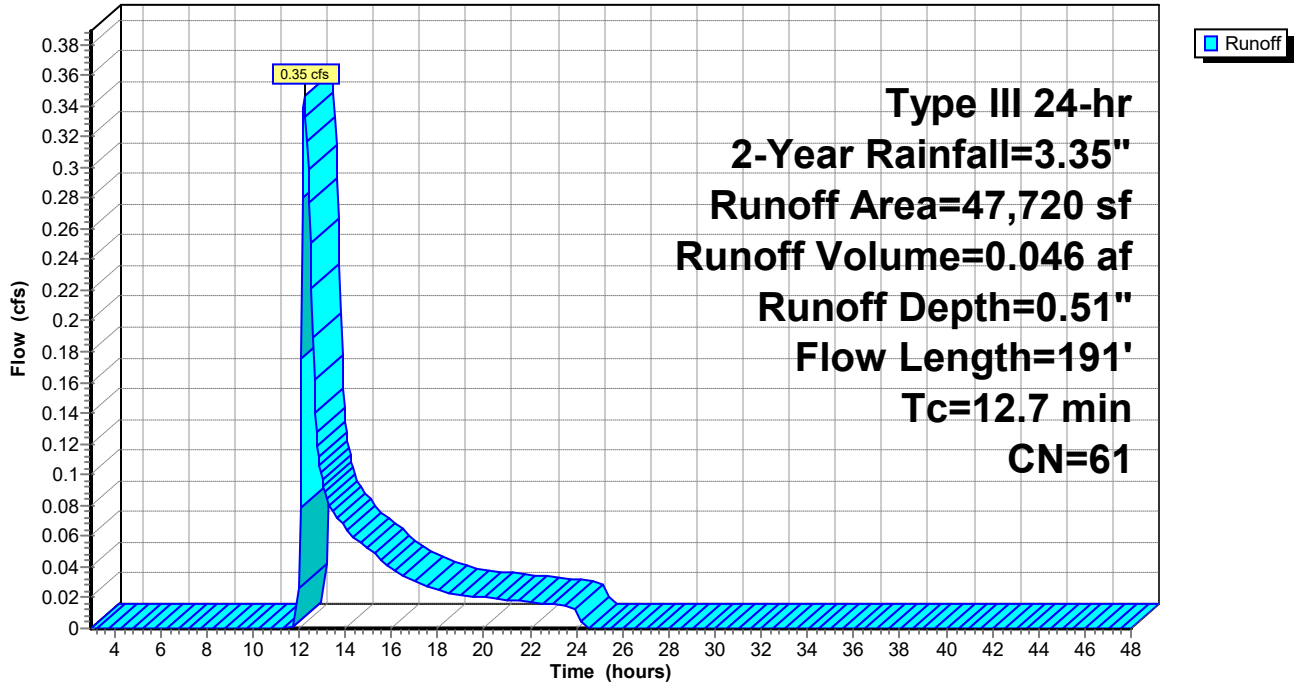
Area (sf)	CN	Description
* 17,477	98	
* 30,243	39	
47,720	61	Weighted Average
30,243		63.38% Pervious Area
17,477		36.62% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.6	100	0.0100	0.13		Sheet Flow, Grass: Short n= 0.150 P2= 3.35"
0.1	91	0.1500	23.02	40.68	Pipe Channel, RCP_Round 18" 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
12.7	191	Total			



Subcatchment DA1: DA1

Hydrograph



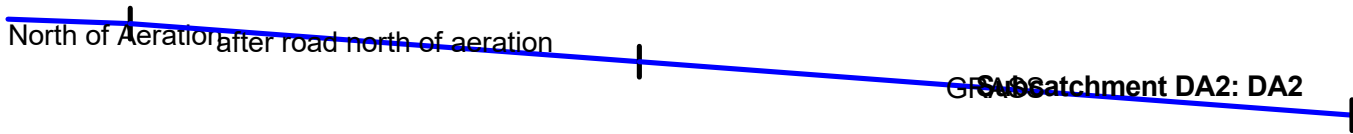
Summary for Subcatchment DA2: DA2

Runoff = 0.02 cfs @ 12.56 hrs, Volume= 0.008 af, Depth= 0.14"
 Routed to Pond SIB-2 : SIB-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-48.00 hrs, dt= 0.05 hrs
 Type III 24-hr 2-Year Rainfall=3.35"

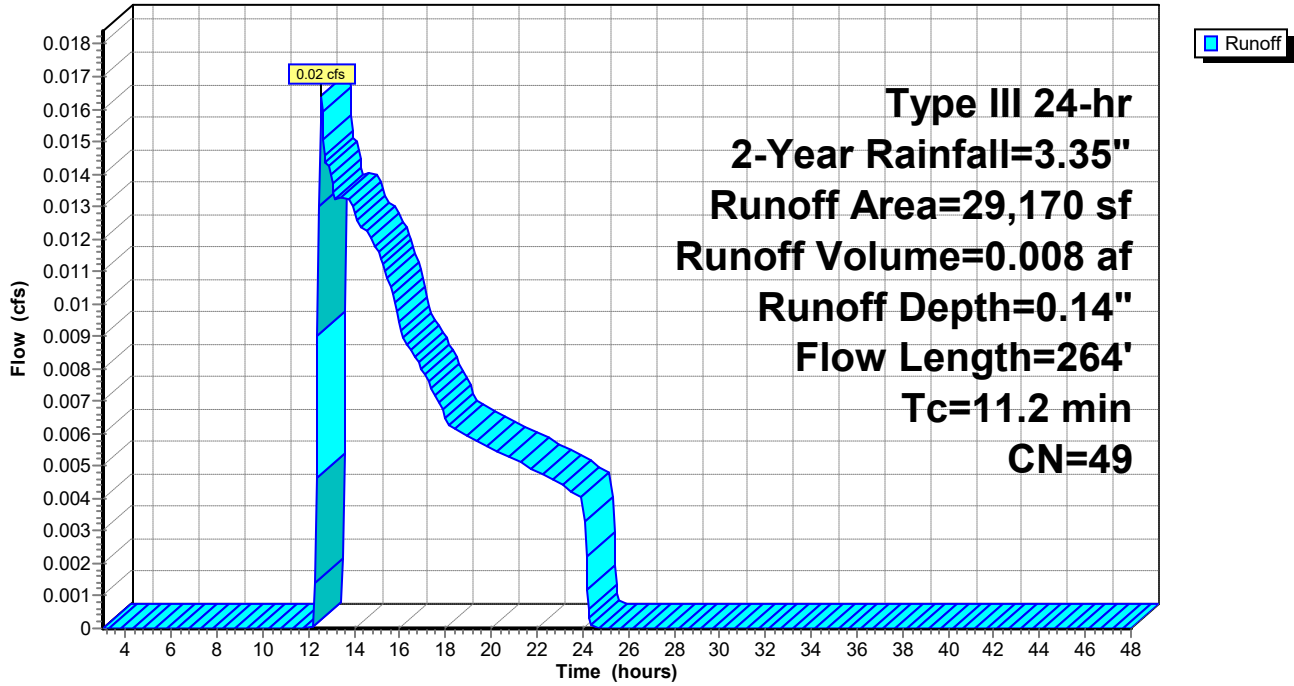
Area (sf)	CN	Description
* 5,035	98	Impervious
24,135	39	>75% Grass cover, Good, HSG A
29,170	49	Weighted Average
24,135		82.74% Pervious Area
5,035		17.26% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	24	0.0100	0.80		Sheet Flow, North of Aeration Smooth surfaces n= 0.011 P2= 3.35"
9.6	100	0.0200	0.17		Sheet Flow, after road north of aeration Grass: Short n= 0.150 P2= 3.35"
1.1	140	0.0200	2.12		Shallow Concentrated Flow, GRASS Grassed Waterway Kv= 15.0 fps
11.2	264	Total			



Subcatchment DA2: DA2

Hydrograph



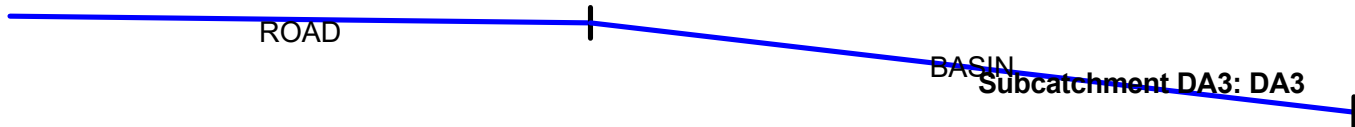
Summary for Subcatchment DA3: DA3

Runoff = 0.09 cfs @ 12.04 hrs, Volume= 0.007 af, Depth= 0.67"
 Routed to Pond SIB-3 : SIB-3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-48.00 hrs, dt= 0.05 hrs
 Type III 24-hr 2-Year Rainfall=3.35"

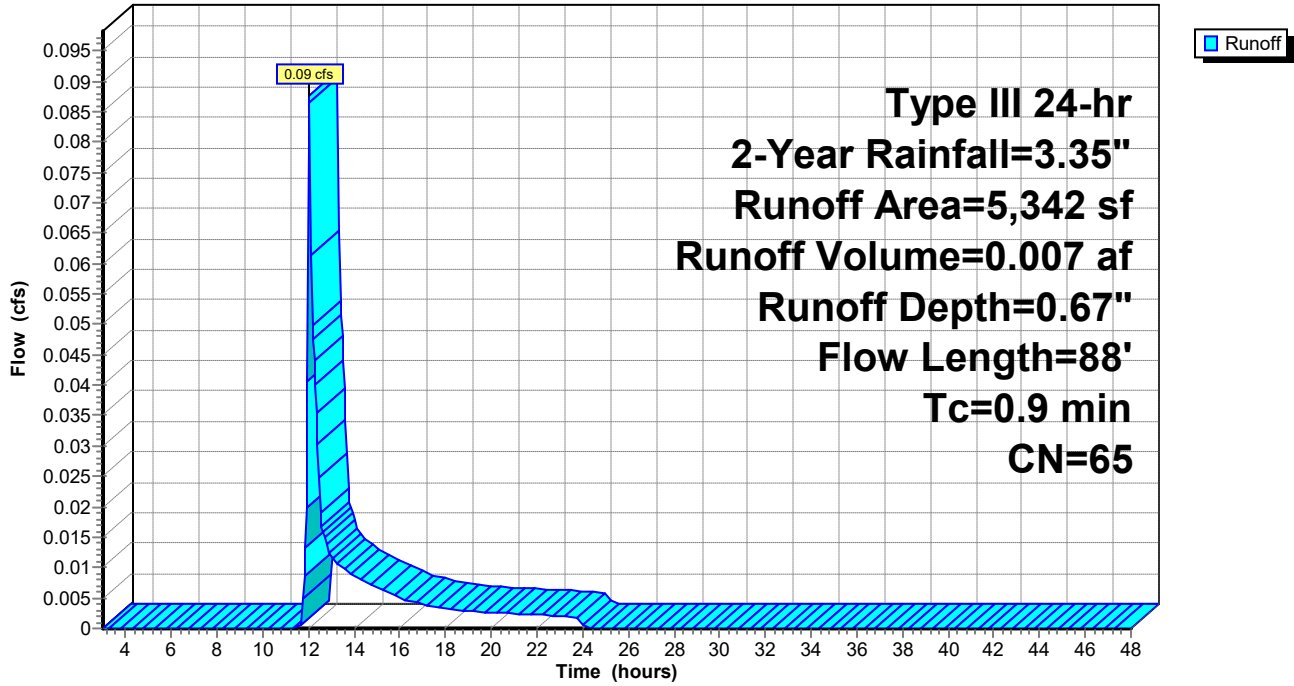
	Area (sf)	CN	Description
*	2,394	98	IMPERVIOUS
	2,948	39	>75% Grass cover, Good, HSG A
	5,342	65	Weighted Average
	2,948		55.19% Pervious Area
	2,394		44.81% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	38	0.0100	0.88		Sheet Flow, ROAD Smooth surfaces n= 0.011 P2= 3.35"
0.2	50	0.1000	5.09		Shallow Concentrated Flow, BASIN Unpaved Kv= 16.1 fps
0.9	88	Total			



Subcatchment DA3: DA3

Hydrograph



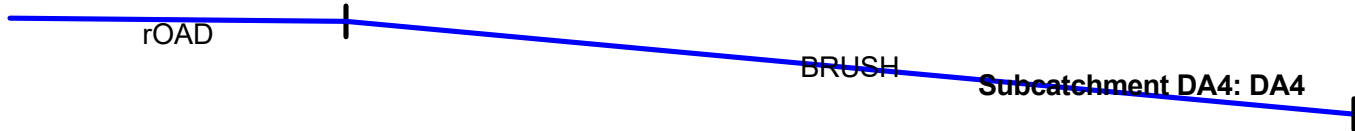
Summary for Subcatchment DA4: DA4

Runoff = 0.00 cfs @ 23.95 hrs, Volume= 0.000 af, Depth= 0.00"
 Routed to Pond EX. BASIN DA4 : EX. BASIN DA4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-48.00 hrs, dt= 0.05 hrs
 Type III 24-hr 2-Year Rainfall=3.35"

Area (sf)	CN	Description
66,054	30	Brush, Good, HSG A
* 10,390	98	ROAD
2,650	30	Woods, Good, HSG A
79,094	39	Weighted Average
68,704		86.86% Pervious Area
10,390		13.14% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.6	100	0.0100	1.07		Sheet Flow, rOAD Smooth surfaces n= 0.011 P2= 3.35"
3.2	300	0.1000	1.58		Shallow Concentrated Flow, BRUSH Woodland Kv= 5.0 fps
4.8	400	Total			



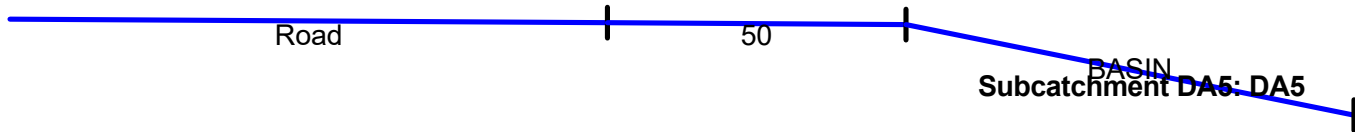
Summary for Subcatchment DA5: DA5

Runoff = 1.23 cfs @ 12.05 hrs, Volume= 0.091 af, Depth= 0.77"
 Routed to Pond EX SIB DA5 : EX. SIB DA5

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-48.00 hrs, dt= 0.05 hrs
 Type III 24-hr 2-Year Rainfall=3.35"

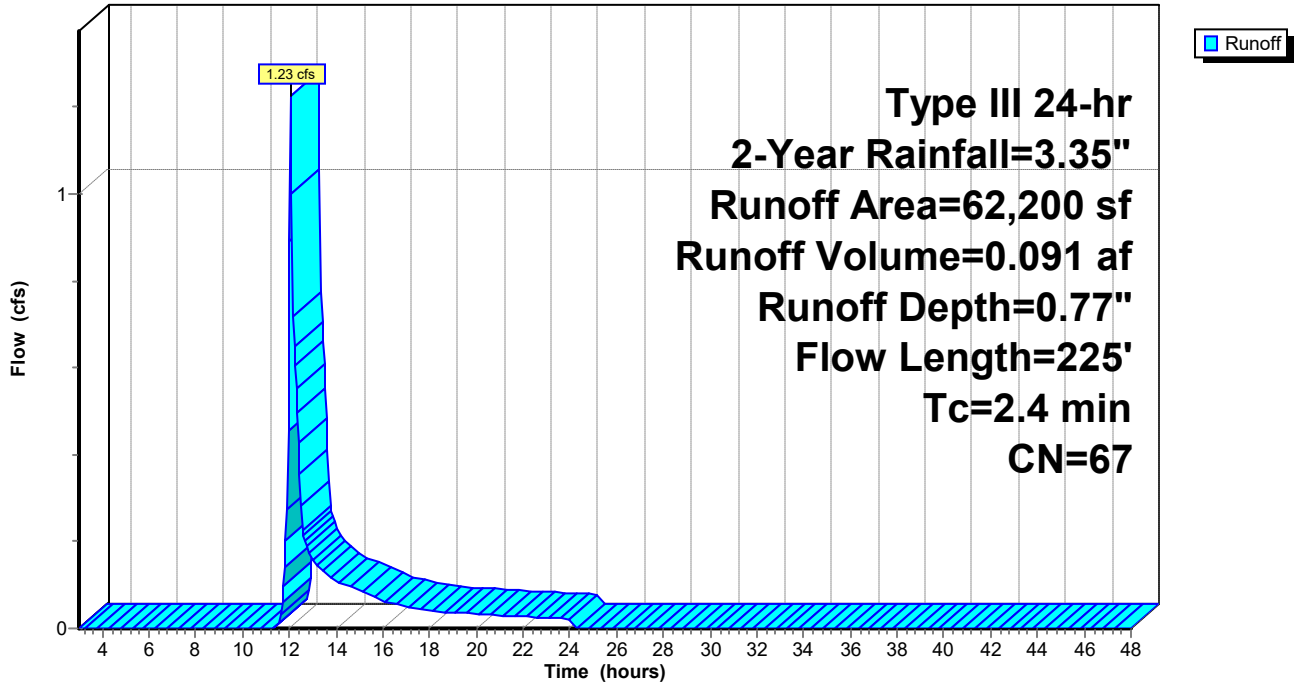
Area (sf)	CN	Description
* 18,875	98	IMPERVIOUS
32,940	58	Meadow, non-grazed, HSG B
10,385	39	>75% Grass cover, Good, HSG A
62,200	67	Weighted Average
43,325		69.65% Pervious Area
18,875		30.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.6	100	0.0100	1.07		Sheet Flow, Road Smooth surfaces n= 0.011 P2= 3.35"
0.4	50	0.0100	2.03		Shallow Concentrated Flow, 50 Paved Kv= 20.3 fps
0.4	75	0.3300	2.87		Shallow Concentrated Flow, BASIN Woodland Kv= 5.0 fps
2.4	225	Total			



Subcatchment DA5: DA5

Hydrograph



Summary for Subcatchment DA6: DA6

Runoff = 0.77 cfs @ 12.09 hrs, Volume= 0.056 af, Depth= 1.66"
 Routed to Pond EX SIB DA5 : EX. SIB DA5

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-48.00 hrs, dt= 0.05 hrs
 Type III 24-hr 2-Year Rainfall=3.35"

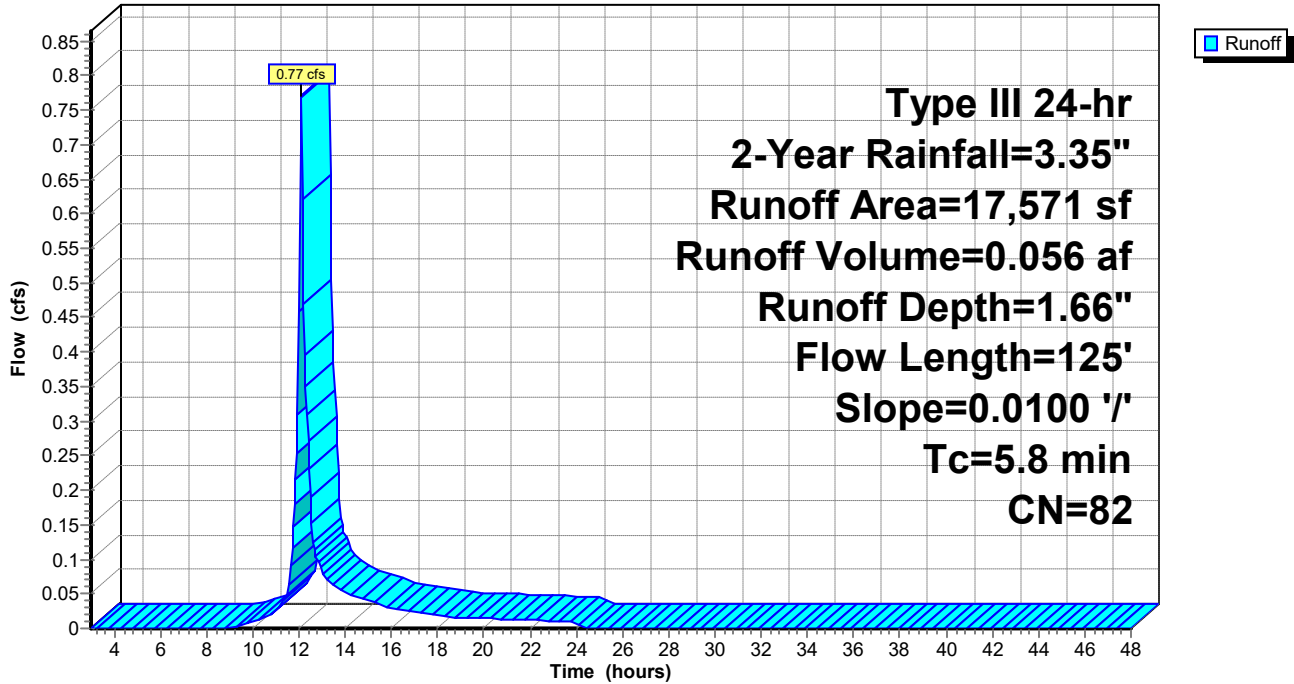
Area (sf)	CN	Description
* 12,762	98	
* 4,809	39	
17,571	82	Weighted Average
4,809		27.37% Pervious Area
12,762		72.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.6	100	0.0100	1.07		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.35"
4.2	25	0.0100	0.10		Sheet Flow, Grass: Short n= 0.150 P2= 3.35"
5.8	125	Total			



Subcatchment DA6: DA6

Hydrograph



Wareham Pre Construction

Prepared by GHD, Inc

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Type III 24-hr 2-Year Rainfall=3.35"

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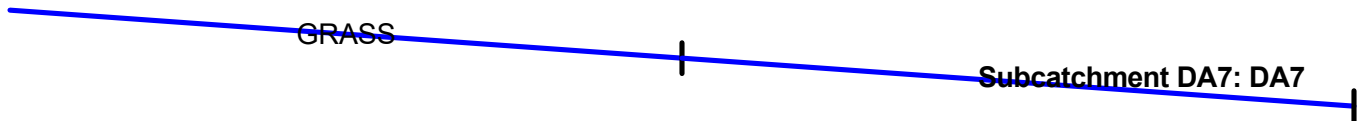
Summary for Subcatchment DA7: DA7

Runoff = 0.44 cfs @ 12.22 hrs, Volume= 0.043 af, Depth= 1.02"
 Routed to Pond CB DA7 : CB DA7

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-48.00 hrs, dt= 0.05 hrs
 Type III 24-hr 2-Year Rainfall=3.35"

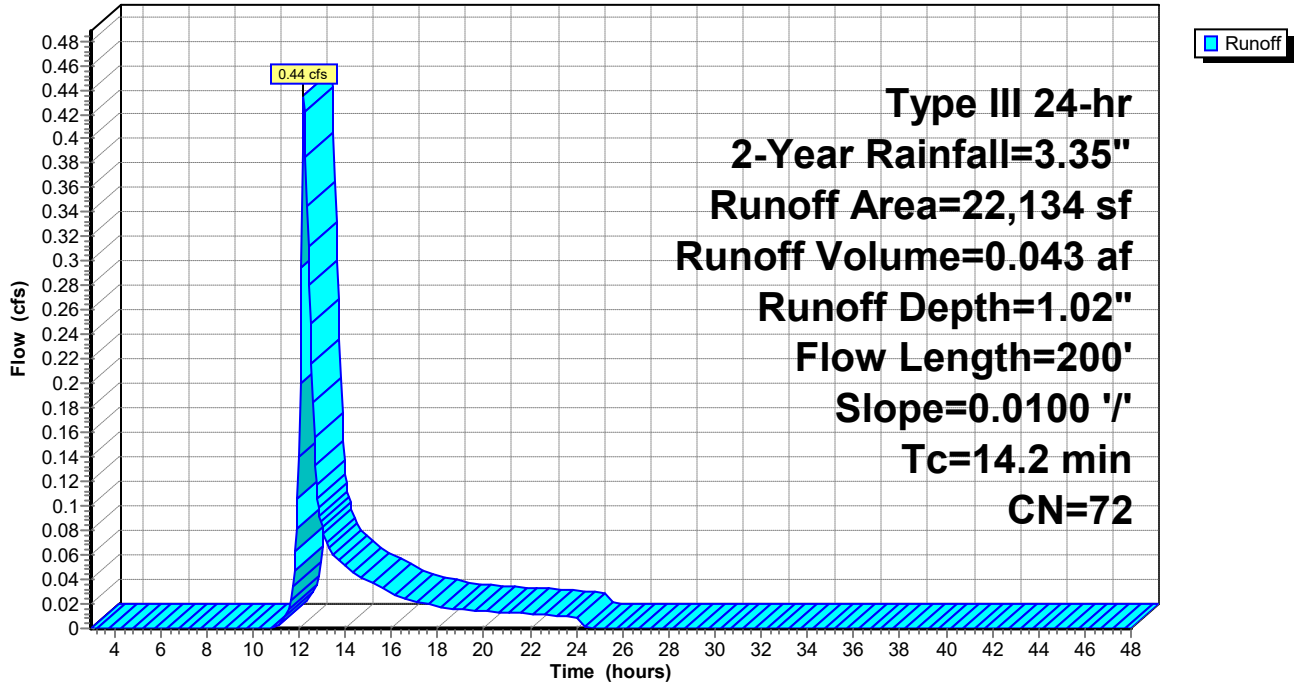
Area (sf)	CN	Description
9,701	39	>75% Grass cover, Good, HSG A
12,433	98	Paved parking, HSG A
22,134	72	Weighted Average
9,701		43.83% Pervious Area
12,433		56.17% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.6	100	0.0100	0.13		Sheet Flow, GRASS Grass: Short n= 0.150 P2= 3.35"
1.6	100	0.0100	1.07		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.35"
14.2	200	Total			



Subcatchment DA7: DA7

Hydrograph



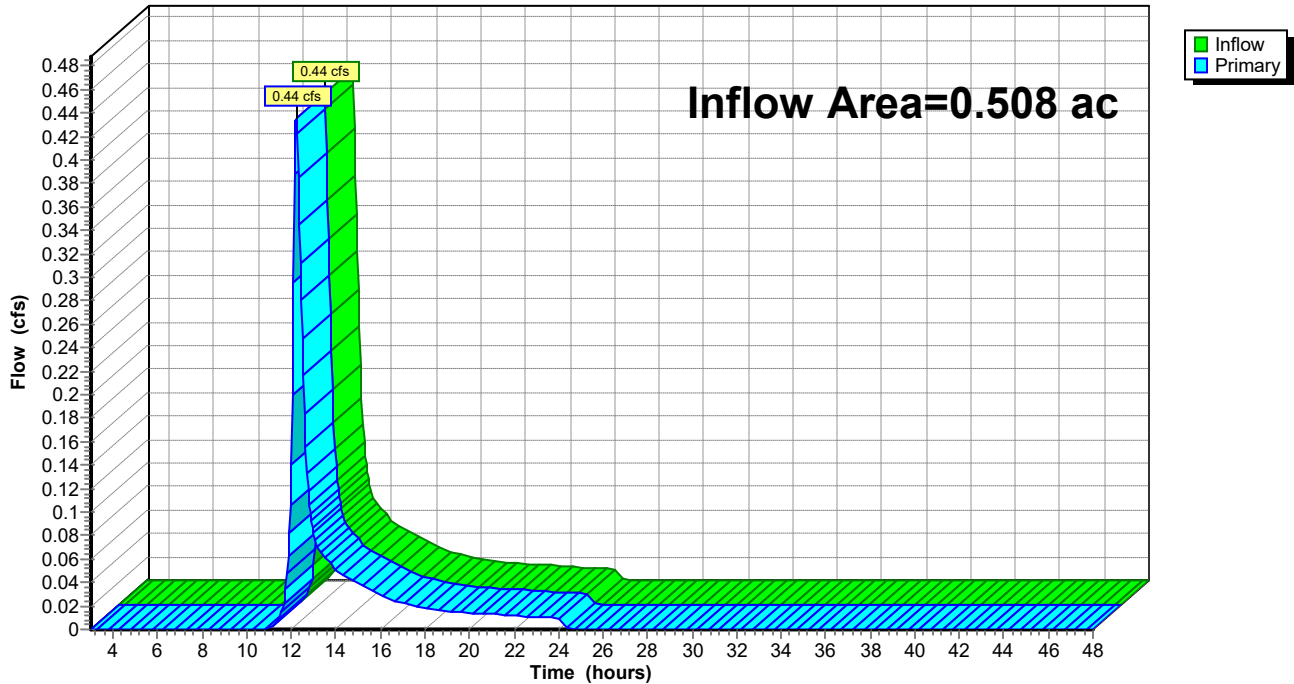
Summary for Pond CB DA7: CB DA7

Inflow Area = 0.508 ac, 56.17% Impervious, Inflow Depth = 1.02" for 2-Year event
Inflow = 0.44 cfs @ 12.22 hrs, Volume= 0.043 af
Primary = 0.44 cfs @ 12.22 hrs, Volume= 0.043 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 3.00-48.00 hrs, dt= 0.05 hrs

Pond CB DA7: CB DA7

Hydrograph



Summary for Pond EX SIB DA5: EX. SIB DA5

Inflow Area = 1.831 ac, 39.66% Impervious, Inflow Depth = 0.96" for 2-Year event
 Inflow = 1.95 cfs @ 12.06 hrs, Volume= 0.147 af
 Outflow = 1.69 cfs @ 12.12 hrs, Volume= 0.147 af, Atten= 14%, Lag= 3.6 min
 Discarded = 1.69 cfs @ 12.12 hrs, Volume= 0.147 af

Routing by Stor-Ind method, Time Span= 3.00-48.00 hrs, dt= 0.05 hrs
 Peak Elev= 18.03' @ 12.11 hrs Surf.Area= 8,671 sf Storage= 280 cf

Plug-Flow detention time= 2.6 min calculated for 0.147 af (100% of inflow)
 Center-of-Mass det. time= 2.6 min (865.0 - 862.4)

Volume	Invert	Avail.Storage	Storage Description
#1	18.00'	34,414 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
18.00	8,621	0	0	8,621
19.00	10,223	9,411	9,411	10,259
20.00	12,600	11,391	20,801	12,666
21.00	14,650	13,612	34,414	14,758

Device	Routing	Invert	Outlet Devices
#1	Discarded	18.00'	8.270 in/hr Exfiltration over Surface area Phase-In= 0.01'

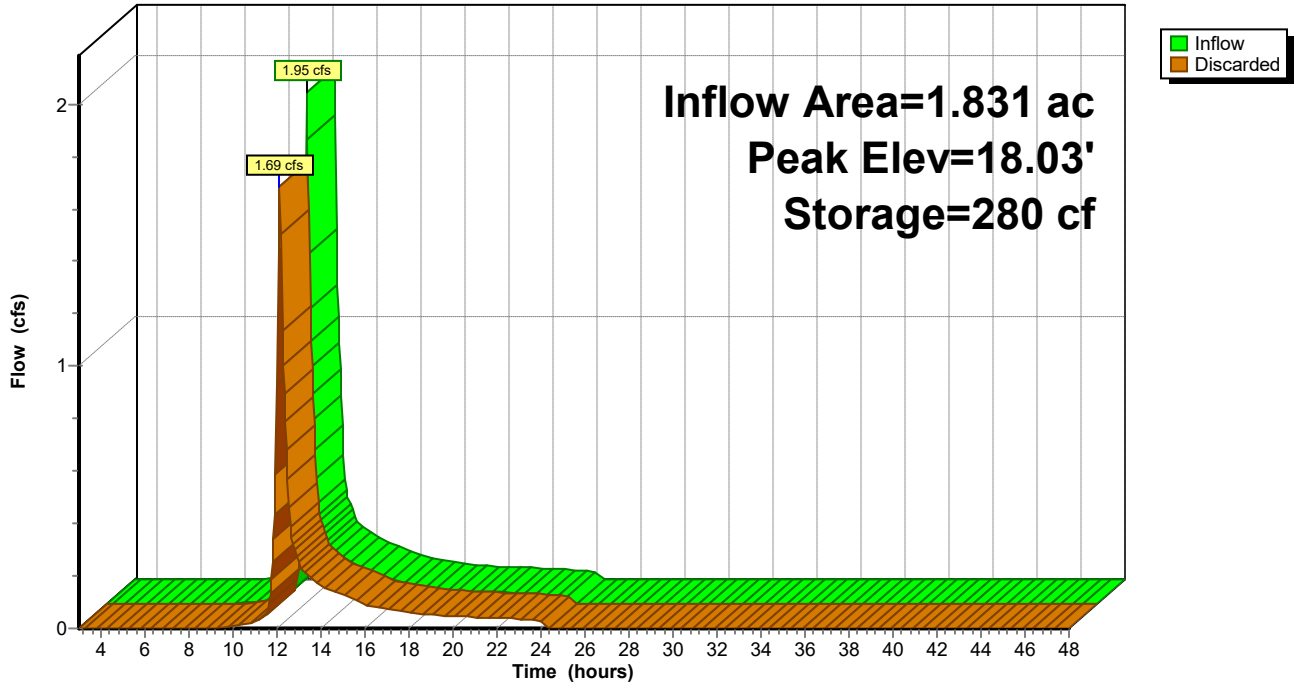
Discarded OutFlow Max=1.66 cfs @ 12.12 hrs HW=18.03' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 1.66 cfs)

Pond EX SIB DA5: EX. SIB DA5

Exfiltration

Pond EX SIB DA5: EX. SIB DA5

Hydrograph



Summary for Pond EX. BASIN DA4: EX. BASIN DA4

Inflow Area = 1.816 ac, 13.14% Impervious, Inflow Depth = 0.00" for 2-Year event
 Inflow = 0.00 cfs @ 23.95 hrs, Volume= 0.000 af
 Outflow = 0.00 cfs @ 23.95 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
 Discarded = 0.00 cfs @ 23.95 hrs, Volume= 0.000 af
 Secondary = 0.00 cfs @ 3.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 3.00-48.00 hrs, dt= 0.05 hrs / 3
 Peak Elev= 16.00' @ 23.95 hrs Surf.Area= 1,026 sf Storage= 0 cf

Plug-Flow detention time= 3.0 min calculated for 0.000 af (100% of inflow)
 Center-of-Mass det. time= 3.0 min (1,317.4 - 1,314.5)

Volume	Invert	Avail.Storage	Storage Description
#1	16.00'	2,708 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
16.00	1,025	0	0	1,025
17.00	4,866	2,708	2,708	4,870

Device	Routing	Invert	Outlet Devices
#1	Discarded	16.00'	2.410 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Secondary	16.90'	360.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

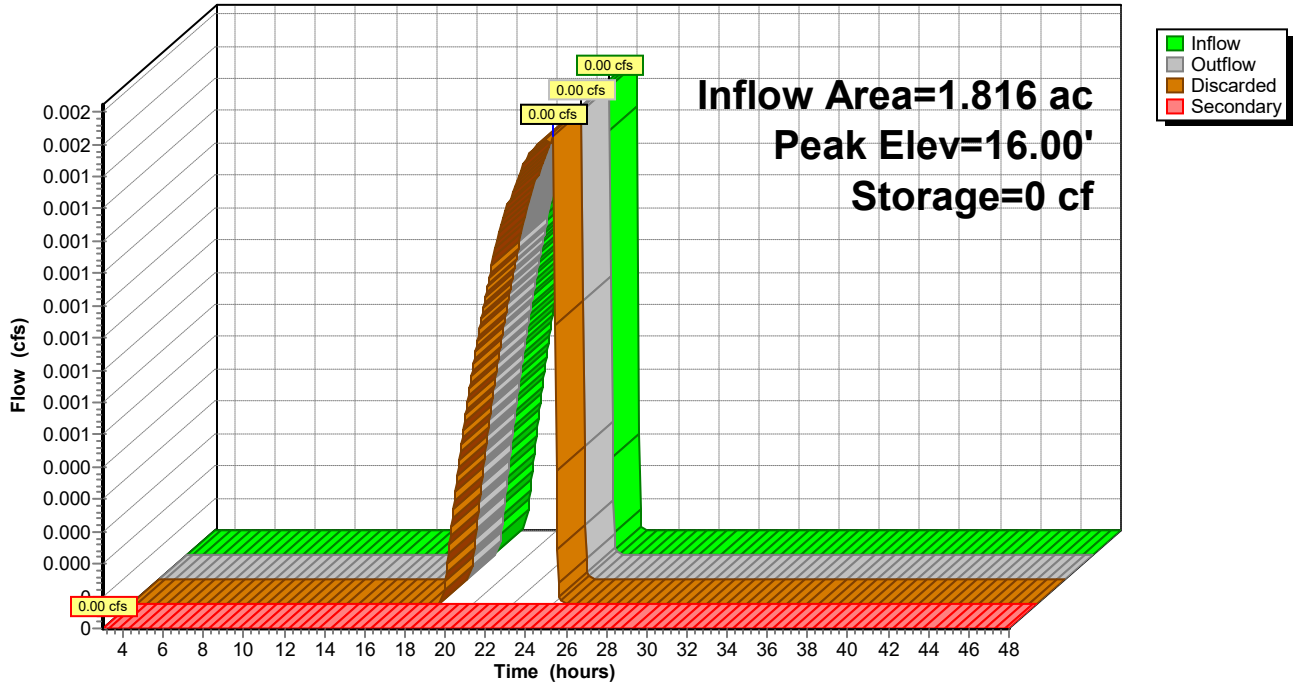
Discarded OutFlow Max=0.00 cfs @ 23.95 hrs HW=16.00' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 3.00 hrs HW=16.00' (Free Discharge)
 ↑2=Orifice/Grate (Controls 0.00 cfs)



Pond EX. BASIN DA4: EX. BASIN DA4

Hydrograph



Summary for Pond SIB-1: SIB-1

Inflow Area = 1.096 ac, 36.62% Impervious, Inflow Depth = 0.51" for 2-Year event
 Inflow = 0.35 cfs @ 12.24 hrs, Volume= 0.046 af
 Outflow = 0.26 cfs @ 12.48 hrs, Volume= 0.046 af, Atten= 24%, Lag= 14.1 min
 Discarded = 0.26 cfs @ 12.48 hrs, Volume= 0.046 af
 Secondary = 0.00 cfs @ 3.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 3.00-48.00 hrs, dt= 0.05 hrs
 Peak Elev= 10.07' @ 12.48 hrs Surf.Area= 2,709 sf Storage= 188 cf

Plug-Flow detention time= 12.1 min calculated for 0.046 af (100% of inflow)
 Center-of-Mass det. time= 12.0 min (927.3 - 915.3)

Volume	Invert	Avail.Storage	Storage Description
#1	10.00'	123,382 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
10.00	2,664	0	0
11.00	3,306	2,985	2,985
12.00	4,005	3,656	6,641
13.00	4,760	4,383	11,023
14.00	5,572	5,166	16,189
15.00	6,440	6,006	22,195
16.00	7,365	6,903	29,098
17.00	8,347	7,856	36,954
18.00	9,385	8,866	45,820
19.00	10,480	9,933	55,752
20.00	11,630	11,055	66,807
21.00	12,837	12,234	79,041
22.00	14,101	13,469	92,510
23.00	15,422	14,762	107,271
24.00	16,800	16,111	123,382

Device	Routing	Invert	Outlet Devices
#1	Discarded	10.00'	8.270 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Secondary	23.90'	360.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

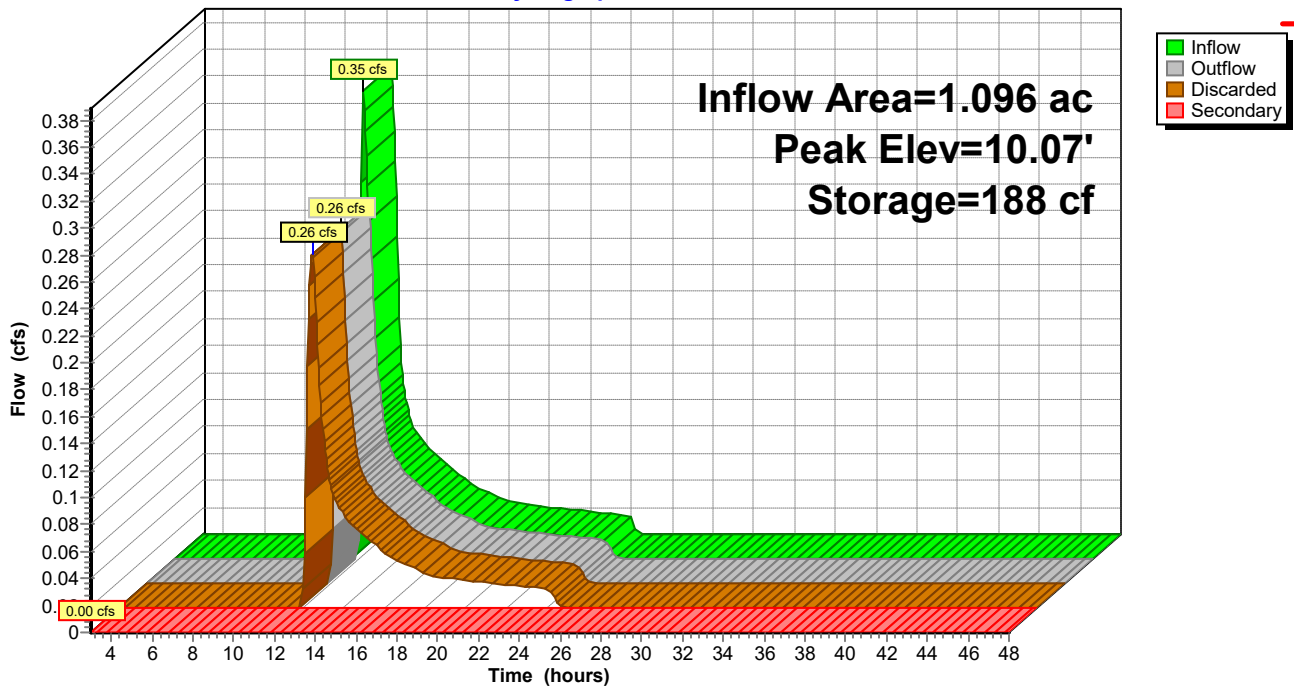
Discarded OutFlow Max=0.52 cfs @ 12.48 hrs HW=10.07' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.52 cfs)

Secondary OutFlow Max=0.00 cfs @ 3.00 hrs HW=10.00' (Free Discharge)
 ↑2=Orifice/Grate (Controls 0.00 cfs)



Pond SIB-1: SIB-1

Hydrograph



Summary for Pond SIB-2: SIB-2

Inflow Area = 0.670 ac, 17.26% Impervious, Inflow Depth = 0.14" for 2-Year event
 Inflow = 0.02 cfs @ 12.56 hrs, Volume= 0.008 af
 Outflow = 0.01 cfs @ 15.78 hrs, Volume= 0.008 af, Atten= 39%, Lag= 193.3 min
 Discarded = 0.01 cfs @ 15.78 hrs, Volume= 0.008 af
 Secondary = 0.00 cfs @ 3.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 3.00-48.00 hrs, dt= 0.05 hrs / 4
 Peak Elev= 15.27' @ 15.78 hrs Surf.Area= 100 sf Storage= 69 cf

Plug-Flow detention time= 114.5 min calculated for 0.008 af (100% of inflow)
 Center-of-Mass det. time= 115.1 min (1,127.9 - 1,012.8)

Volume	Invert	Avail.Storage	Storage Description
#1	13.96'	148 cf	10.00'W x 10.00'L x 6.00'H Prismatic 600 cf Overall - 231 cf Embedded = 369 cf x 40.0% Voids
#2	13.96'	170 cf	6.00'D x 6.00'H Vertical Cone/Cylinder Inside #1 231 cf Overall - 6.0" Wall Thickness = 170 cf
#3	19.96'	9 cf	2.00'D x 3.00'H Vertical Cone/Cylinder -Impervious
#4	22.96'	1,578 cf	Custom Stage Data (Irregular) Listed below (Recalc)
		1,905 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
22.96	817	126.0	0	0	817
24.00	2,350	206.0	1,578	1,578	2,938

Device	Routing	Invert	Outlet Devices
#1	Secondary	23.00'	2.0" x 2.0" Horiz. Orifice/Grate X 6.00 columns X 6 rows C= 0.600 Limited to weir flow at low heads
#2	Discarded	13.96'	8.270 in/hr Exfiltration over Wetted area from 13.96' - 23.00' Excluded Wetted area = 100 sf Phase-In= 0.01'

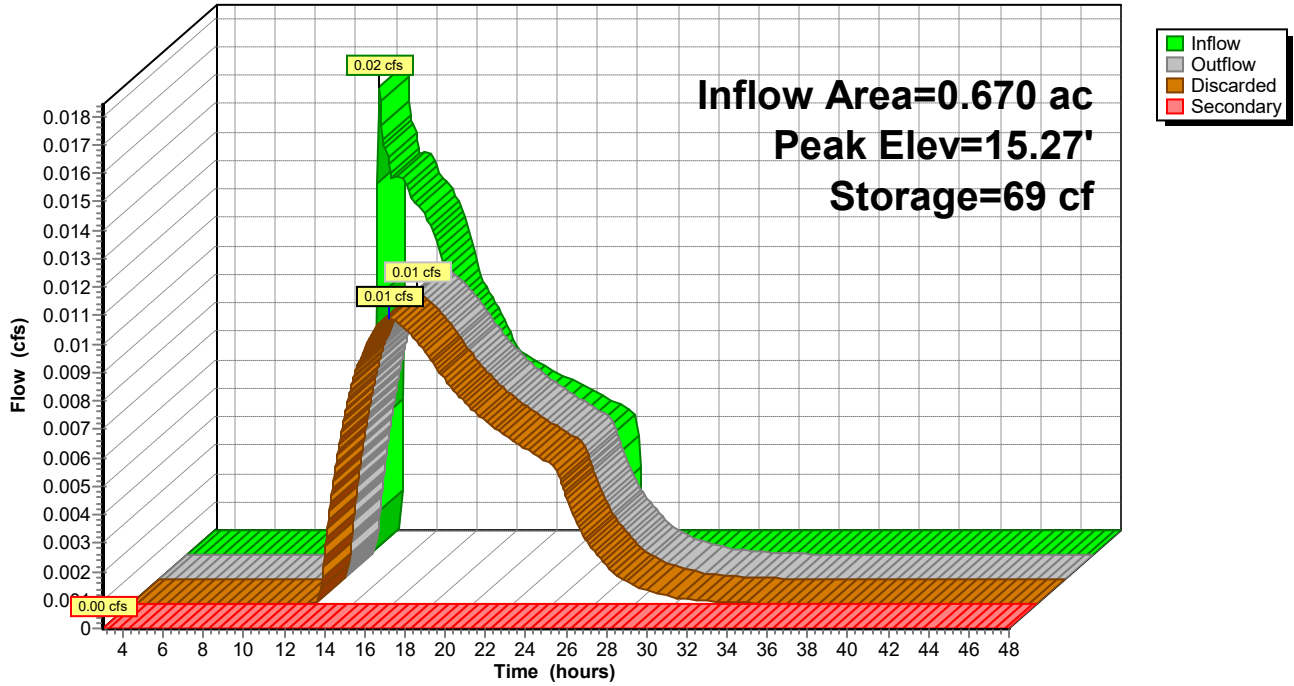
Discarded OutFlow Max=0.01 cfs @ 15.78 hrs HW=15.27' (Free Discharge)
 ↑ **2=Exfiltration** (Exfiltration Controls 0.01 cfs)

Secondary OutFlow Max=0.00 cfs @ 3.00 hrs HW=13.96' (Free Discharge)
 ↑ **1=Orifice/Grate** (Controls 0.00 cfs)



Pond SIB-2: SIB-2

Hydrograph



Summary for Pond SIB-3: SIB-3

Inflow Area = 0.123 ac, 44.81% Impervious, Inflow Depth = 0.67" for 2-Year event
 Inflow = 0.09 cfs @ 12.04 hrs, Volume= 0.007 af
 Outflow = 0.02 cfs @ 12.56 hrs, Volume= 0.007 af, Atten= 81%, Lag= 31.4 min
 Discarded = 0.02 cfs @ 12.56 hrs, Volume= 0.007 af
 Secondary = 0.00 cfs @ 3.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 3.00-48.00 hrs, dt= 0.05 hrs / 4
 Peak Elev= 15.44' @ 12.56 hrs Surf.Area= 100 sf Storage= 78 cf

Plug-Flow detention time= 50.0 min calculated for 0.007 af (100% of inflow)
 Center-of-Mass det. time= 50.0 min (936.2 - 886.2)

Volume	Invert	Avail.Storage	Storage Description
#1	13.96'	148 cf	10.00'W x 10.00'L x 6.00'H Prismatic 600 cf Overall - 231 cf Embedded = 369 cf x 40.0% Voids
#2	13.96'	170 cf	6.00'D x 6.00'H Vertical Cone/Cylinder Inside #1 231 cf Overall - 6.0" Wall Thickness = 170 cf
#3	19.96'	9 cf	2.00'D x 3.00'H Vertical Cone/Cylinder -Impervious
#4	22.96'	878 cf	Custom Stage Data (Irregular) Listed below (Recalc)
		1,204 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
22.96	83	37.0	0	0	83
24.00	393	75.0	228	228	427
25.00	947	117.0	650	878	1,076

Device	Routing	Invert	Outlet Devices
#1	Secondary	23.00'	2.0" x 2.0" Horiz. Orifice/Grate X 6.00 columns X 6 rows C= 0.600 Limited to weir flow at low heads
#2	Discarded	13.96'	8.270 in/hr Exfiltration over Wetted area from 13.96' - 23.00' Excluded Wetted area = 100 sf Phase-In= 0.01'
#3	Discarded	13.96'	2.414 in/hr Exfiltration over Surface area Phase-In= 0.01'

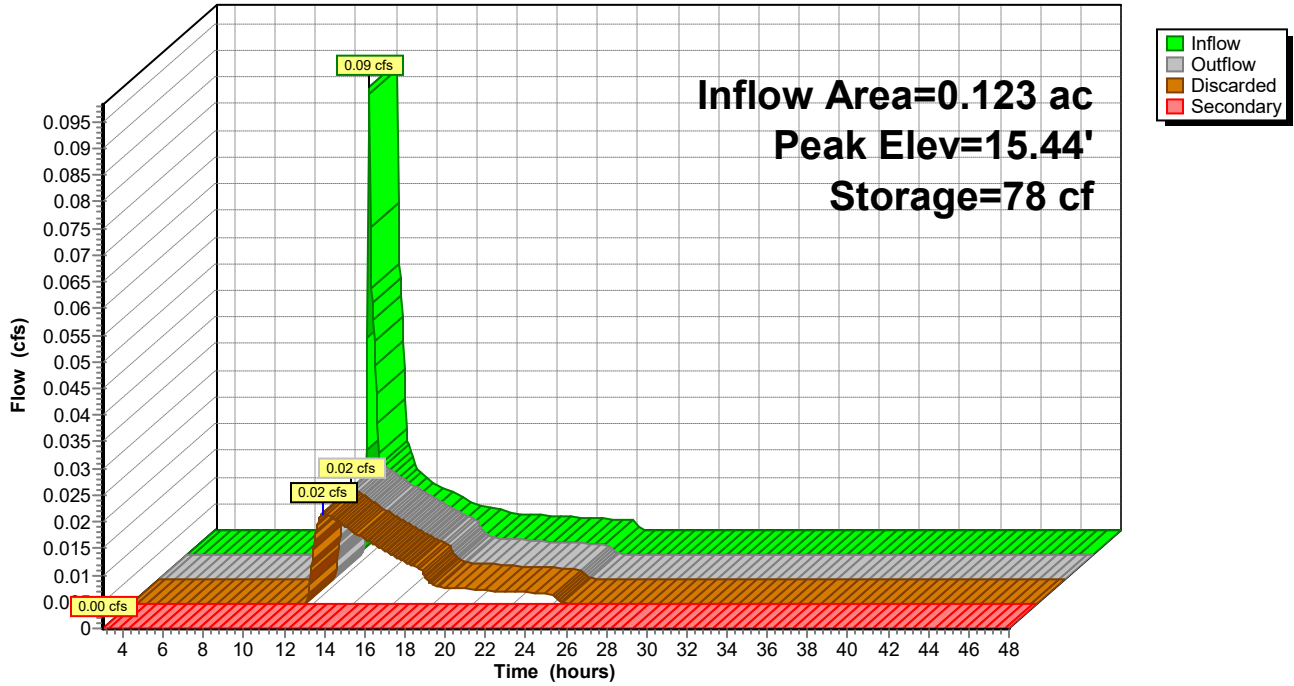
Discarded OutFlow Max=0.02 cfs @ 12.56 hrs HW=15.44' (Free Discharge)
 ↑ 2=Exfiltration (Exfiltration Controls 0.01 cfs)
 ↓ 3=Exfiltration (Exfiltration Controls 0.01 cfs)

Secondary OutFlow Max=0.00 cfs @ 3.00 hrs HW=13.96' (Free Discharge)
 ↑ 1=Orifice/Grate (Controls 0.00 cfs)



Pond SIB-3: SIB-3

Hydrograph



Wareham Pre Construction

Type III 24-hr 5-Year Rainfall=4.18"

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Time span=3.00-48.00 hrs, dt=0.05 hrs, 901 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment DA1: DA1 Runoff Area=47,720 sf 36.62% Impervious Runoff Depth=0.91"
 Flow Length=191' Tc=12.7 min CN=61 Runoff=0.77 cfs 0.083 af

Subcatchment DA2: DA2 Runoff Area=29,170 sf 17.26% Impervious Runoff Depth=0.35"
 Flow Length=264' Tc=11.2 min CN=49 Runoff=0.10 cfs 0.020 af

Subcatchment DA3: DA3 Runoff Area=5,342 sf 44.81% Impervious Runoff Depth=1.13"
 Flow Length=88' Tc=0.9 min CN=65 Runoff=0.16 cfs 0.012 af

Subcatchment DA4: DA4 Runoff Area=79,094 sf 13.14% Impervious Runoff Depth=0.07"
 Flow Length=400' Tc=4.8 min CN=39 Runoff=0.02 cfs 0.010 af

Subcatchment DA5: DA5 Runoff Area=62,200 sf 30.35% Impervious Runoff Depth=1.26"
 Flow Length=225' Tc=2.4 min CN=67 Runoff=2.18 cfs 0.150 af

Subcatchment DA6: DA6 Runoff Area=17,571 sf 72.63% Impervious Runoff Depth=2.36"
 Flow Length=125' Slope=0.0100 '/' Tc=5.8 min CN=82 Runoff=1.10 cfs 0.079 af

Subcatchment DA7: DA7 Runoff Area=22,134 sf 56.17% Impervious Runoff Depth=1.59"
 Flow Length=200' Slope=0.0100 '/' Tc=14.2 min CN=72 Runoff=0.70 cfs 0.067 af

Pond CB DA7: CB DA7 Inflow=0.70 cfs 0.067 af
 Primary=0.70 cfs 0.067 af

Pond EX SIB DA5: EX. SIB DA5 Peak Elev=18.10' Storage=871 cf Inflow=3.19 cfs 0.229 af
 Outflow=1.68 cfs 0.229 af

Pond EX. BASIN DA4: EX. BASIN DA4 Peak Elev=16.00' Storage=3 cf Inflow=0.02 cfs 0.010 af
 Discarded=0.02 cfs 0.010 af Secondary=0.00 cfs 0.000 af Outflow=0.02 cfs 0.010 af

Pond SIB-1: SIB-1 Peak Elev=10.15' Storage=404 cf Inflow=0.77 cfs 0.083 af
 Discarded=0.53 cfs 0.083 af Secondary=0.00 cfs 0.000 af Outflow=0.53 cfs 0.083 af

Pond SIB-2: SIB-2 Peak Elev=17.67' Storage=196 cf Inflow=0.10 cfs 0.020 af
 Discarded=0.03 cfs 0.020 af Secondary=0.00 cfs 0.000 af Outflow=0.03 cfs 0.020 af

Pond SIB-3: SIB-3 Peak Elev=16.91' Storage=156 cf Inflow=0.16 cfs 0.012 af
 Discarded=0.03 cfs 0.012 af Secondary=0.00 cfs 0.000 af Outflow=0.03 cfs 0.012 af

Total Runoff Area = 6.043 ac Runoff Volume = 0.420 af Average Runoff Depth = 0.83"
69.85% Pervious = 4.221 ac 30.15% Impervious = 1.822 ac

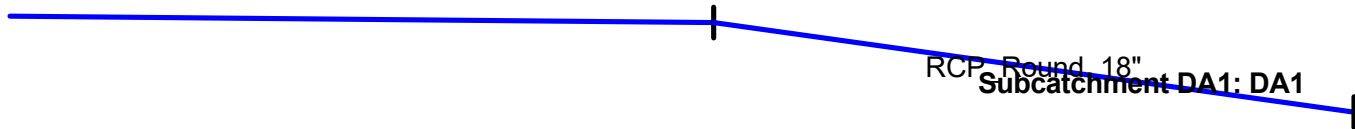
Summary for Subcatchment DA1: DA1

Runoff = 0.77 cfs @ 12.21 hrs, Volume= 0.083 af, Depth= 0.91"
 Routed to Pond SIB-1 : SIB-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-48.00 hrs, dt= 0.05 hrs
 Type III 24-hr 5-Year Rainfall=4.18"

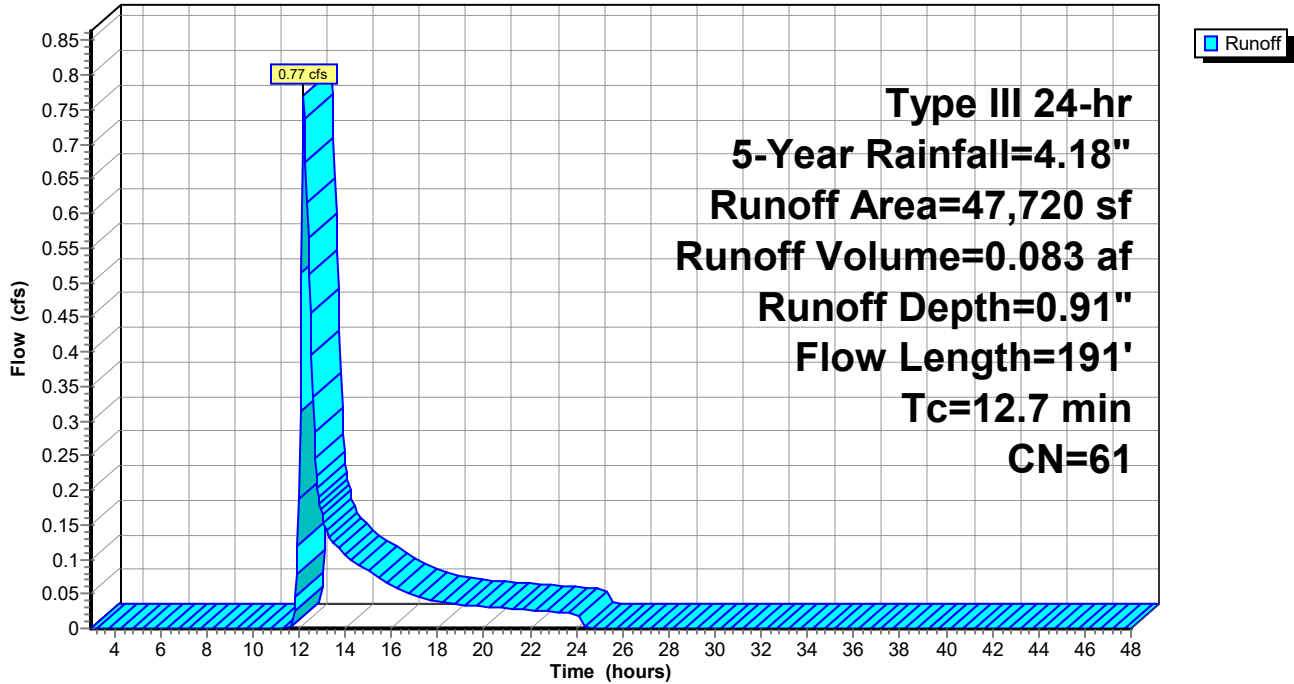
Area (sf)	CN	Description
* 17,477	98	
* 30,243	39	
47,720	61	Weighted Average
30,243		63.38% Pervious Area
17,477		36.62% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.6	100	0.0100	0.13		Sheet Flow, Grass: Short n= 0.150 P2= 3.35"
0.1	91	0.1500	23.02	40.68	Pipe Channel, RCP_Round 18" 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
12.7	191	Total			



Subcatchment DA1: DA1

Hydrograph



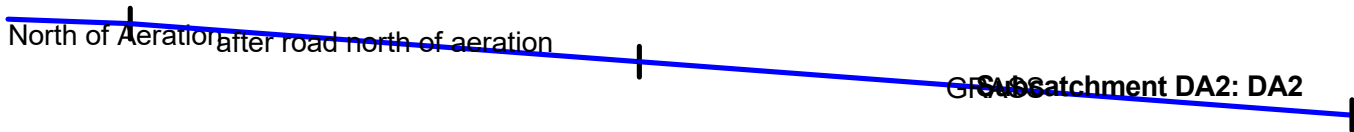
Summary for Subcatchment DA2: DA2

Runoff = 0.10 cfs @ 12.40 hrs, Volume= 0.020 af, Depth= 0.35"
 Routed to Pond SIB-2 : SIB-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-48.00 hrs, dt= 0.05 hrs
 Type III 24-hr 5-Year Rainfall=4.18"

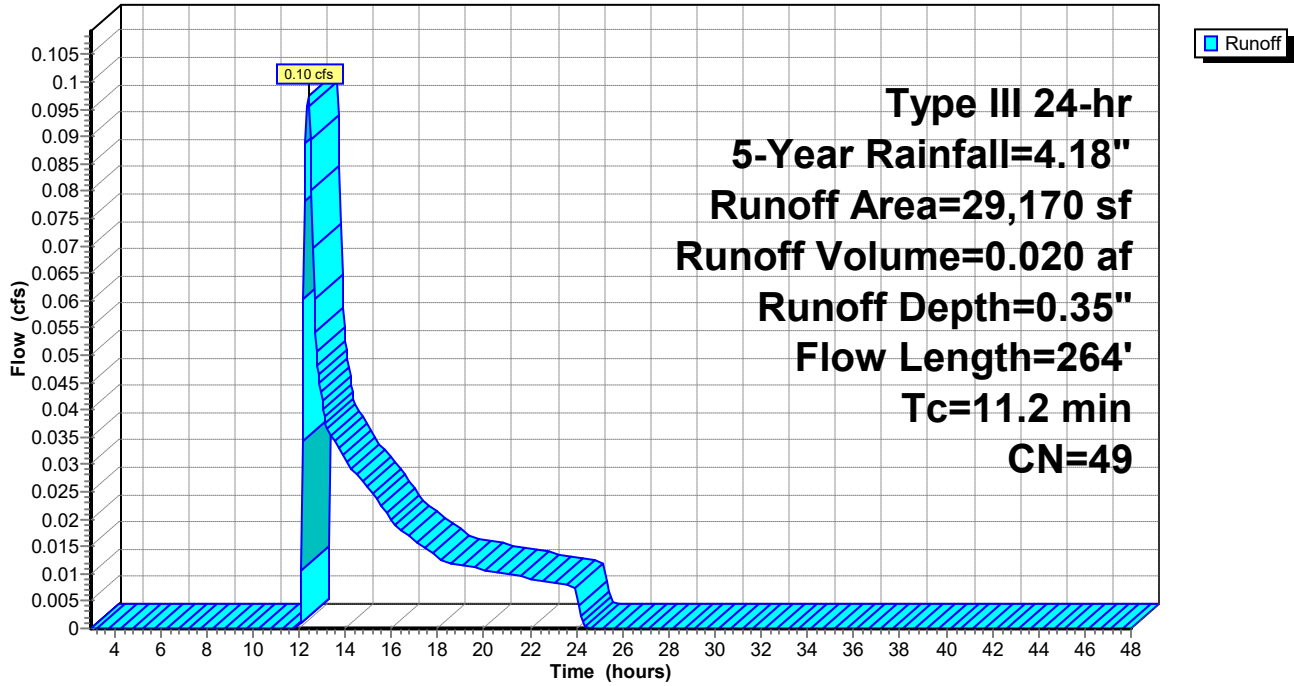
Area (sf)	CN	Description
* 5,035	98	Impervious
24,135	39	>75% Grass cover, Good, HSG A
29,170	49	Weighted Average
24,135		82.74% Pervious Area
5,035		17.26% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	24	0.0100	0.80		Sheet Flow, North of Aeration Smooth surfaces n= 0.011 P2= 3.35"
9.6	100	0.0200	0.17		Sheet Flow, after road north of aeration Grass: Short n= 0.150 P2= 3.35"
1.1	140	0.0200	2.12		Shallow Concentrated Flow, GRASS Grassed Waterway Kv= 15.0 fps
11.2	264	Total			



Subcatchment DA2: DA2

Hydrograph



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Type III 24-hr 5-Year Rainfall=4.18"

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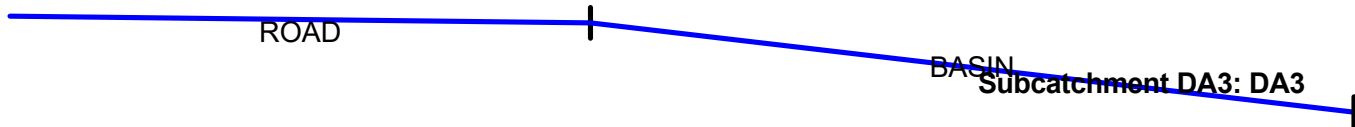
Summary for Subcatchment DA3: DA3

Runoff = 0.16 cfs @ 12.03 hrs, Volume= 0.012 af, Depth= 1.13"
 Routed to Pond SIB-3 : SIB-3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-48.00 hrs, dt= 0.05 hrs
 Type III 24-hr 5-Year Rainfall=4.18"

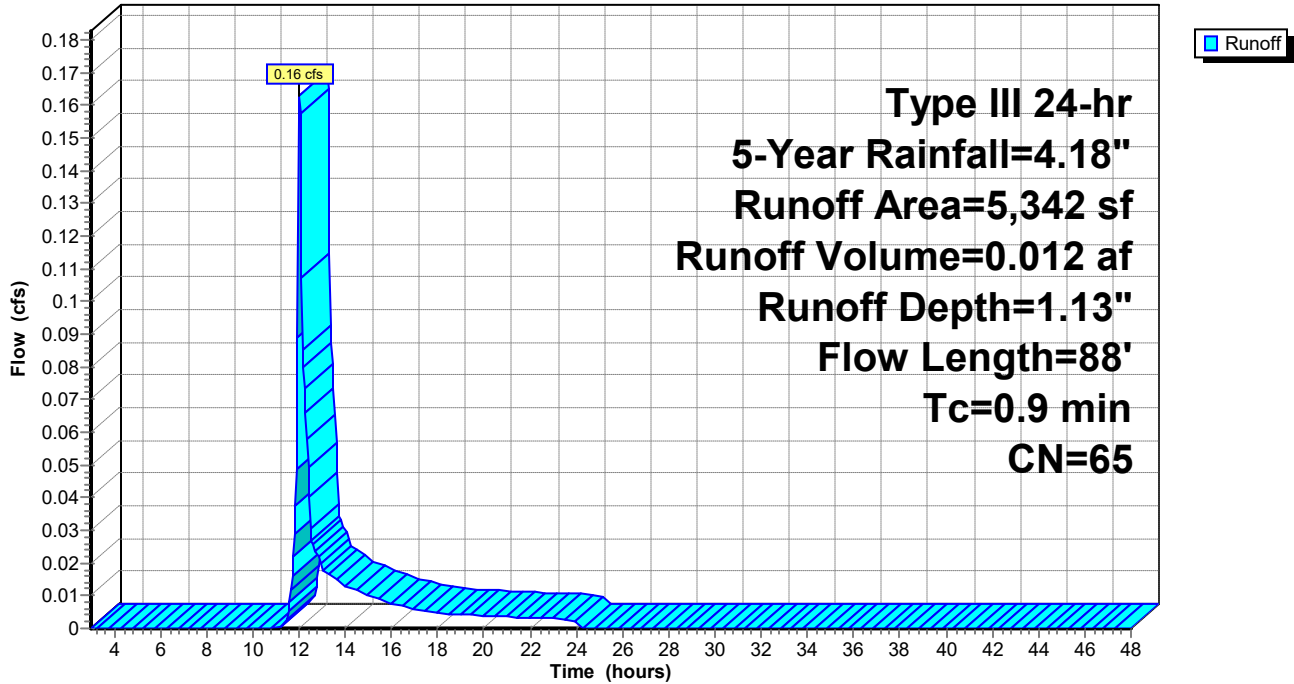
Area (sf)	CN	Description
* 2,394	98	IMPERVIOUS
2,948	39	>75% Grass cover, Good, HSG A
5,342	65	Weighted Average
2,948		55.19% Pervious Area
2,394		44.81% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	38	0.0100	0.88		Sheet Flow, ROAD Smooth surfaces n= 0.011 P2= 3.35"
0.2	50	0.1000	5.09		Shallow Concentrated Flow, BASIN Unpaved Kv= 16.1 fps
0.9	88	Total			



Subcatchment DA3: DA3

Hydrograph



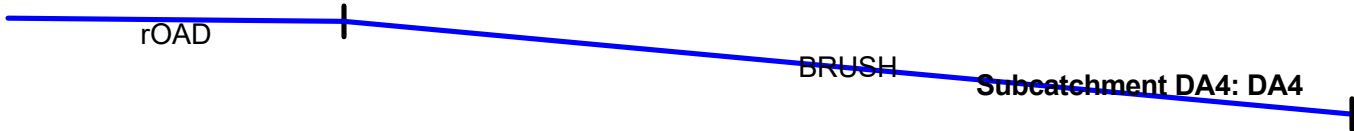
Summary for Subcatchment DA4: DA4

Runoff = 0.02 cfs @ 15.18 hrs, Volume= 0.010 af, Depth= 0.07"
 Routed to Pond EX. BASIN DA4 : EX. BASIN DA4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-48.00 hrs, dt= 0.05 hrs
 Type III 24-hr 5-Year Rainfall=4.18"

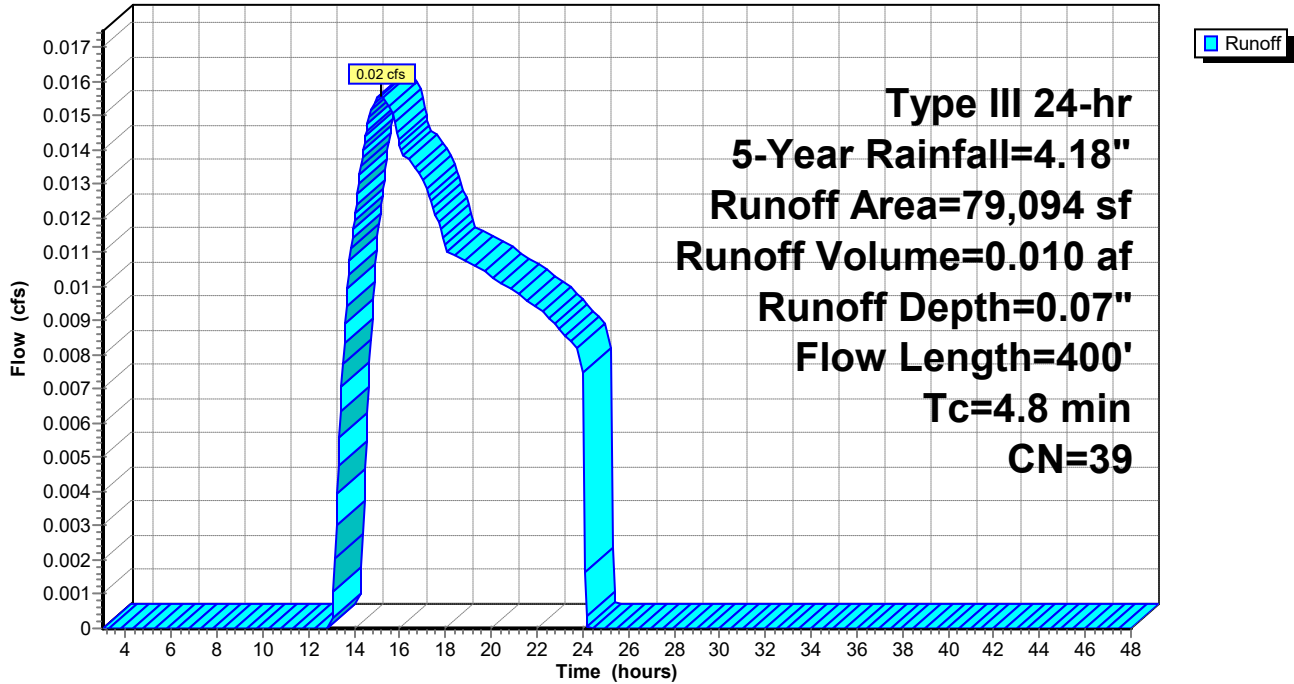
Area (sf)	CN	Description
66,054	30	Brush, Good, HSG A
* 10,390	98	ROAD
2,650	30	Woods, Good, HSG A
79,094	39	Weighted Average
68,704		86.86% Pervious Area
10,390		13.14% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.6	100	0.0100	1.07		Sheet Flow, rOAD Smooth surfaces n= 0.011 P2= 3.35"
3.2	300	0.1000	1.58		Shallow Concentrated Flow, BRUSH Woodland Kv= 5.0 fps
4.8	400	Total			



Subcatchment DA4: DA4

Hydrograph



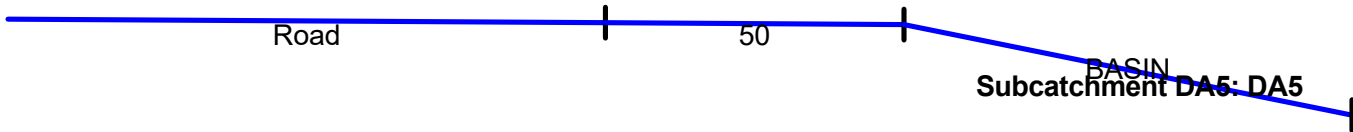
Summary for Subcatchment DA5: DA5

Runoff = 2.18 cfs @ 12.05 hrs, Volume= 0.150 af, Depth= 1.26"
 Routed to Pond EX SIB DA5 : EX. SIB DA5

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-48.00 hrs, dt= 0.05 hrs
 Type III 24-hr 5-Year Rainfall=4.18"

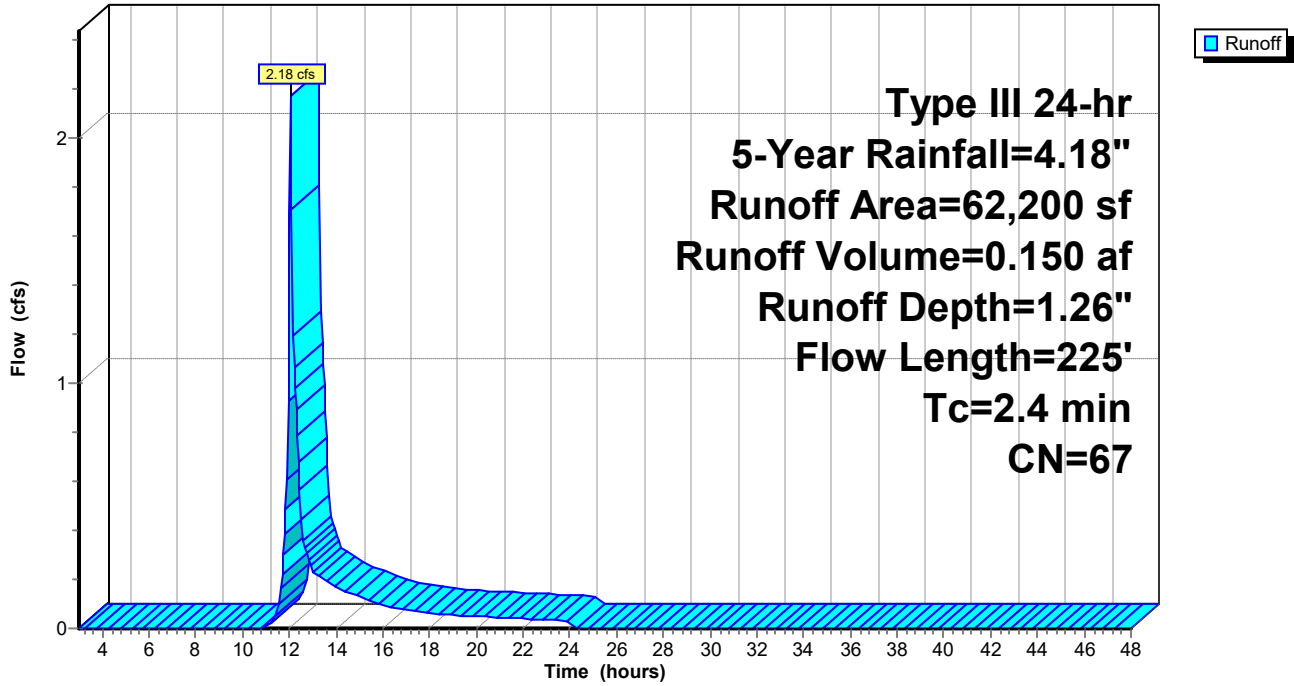
Area (sf)	CN	Description
* 18,875	98	IMPERVIOUS
32,940	58	Meadow, non-grazed, HSG B
10,385	39	>75% Grass cover, Good, HSG A
62,200	67	Weighted Average
43,325		69.65% Pervious Area
18,875		30.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.6	100	0.0100	1.07		Sheet Flow, Road Smooth surfaces n= 0.011 P2= 3.35"
0.4	50	0.0100	2.03		Shallow Concentrated Flow, 50 Paved Kv= 20.3 fps
0.4	75	0.3300	2.87		Shallow Concentrated Flow, BASIN Woodland Kv= 5.0 fps
2.4	225	Total			



Subcatchment DA5: DA5

Hydrograph



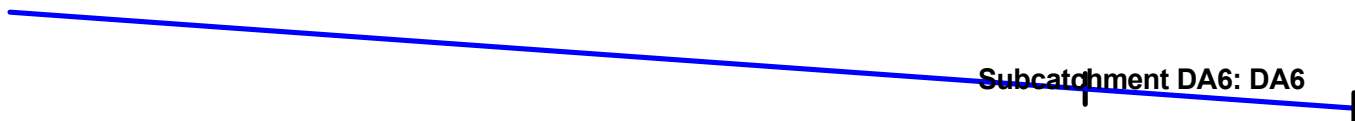
Summary for Subcatchment DA6: DA6

Runoff = 1.10 cfs @ 12.09 hrs, Volume= 0.079 af, Depth= 2.36"
 Routed to Pond EX SIB DA5 : EX. SIB DA5

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-48.00 hrs, dt= 0.05 hrs
 Type III 24-hr 5-Year Rainfall=4.18"

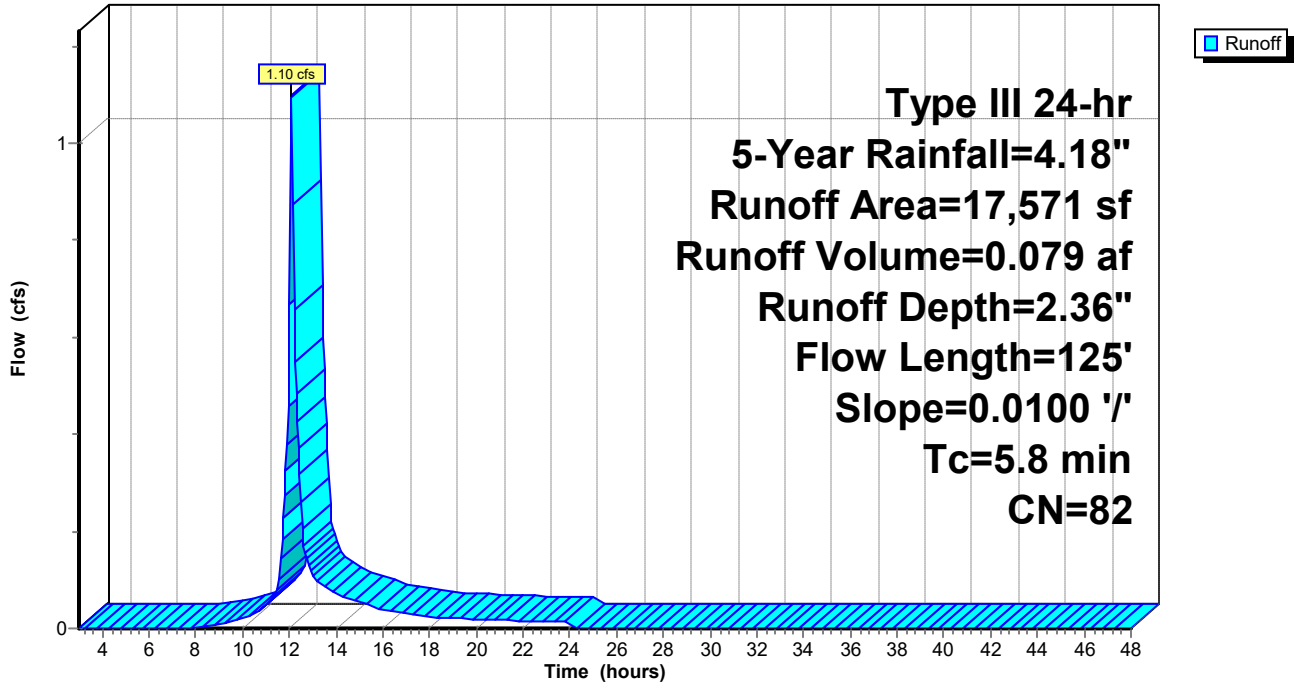
Area (sf)	CN	Description
* 12,762	98	
* 4,809	39	
17,571	82	Weighted Average
4,809		27.37% Pervious Area
12,762		72.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.6	100	0.0100	1.07		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.35"
4.2	25	0.0100	0.10		Sheet Flow, Grass: Short n= 0.150 P2= 3.35"
5.8	125	Total			



Subcatchment DA6: DA6

Hydrograph



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Type III 24-hr 5-Year Rainfall=4.18"

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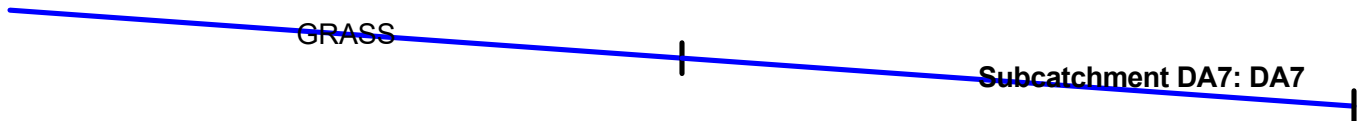
Summary for Subcatchment DA7: DA7

Runoff = 0.70 cfs @ 12.21 hrs, Volume= 0.067 af, Depth= 1.59"
 Routed to Pond CB DA7 : CB DA7

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-48.00 hrs, dt= 0.05 hrs
 Type III 24-hr 5-Year Rainfall=4.18"

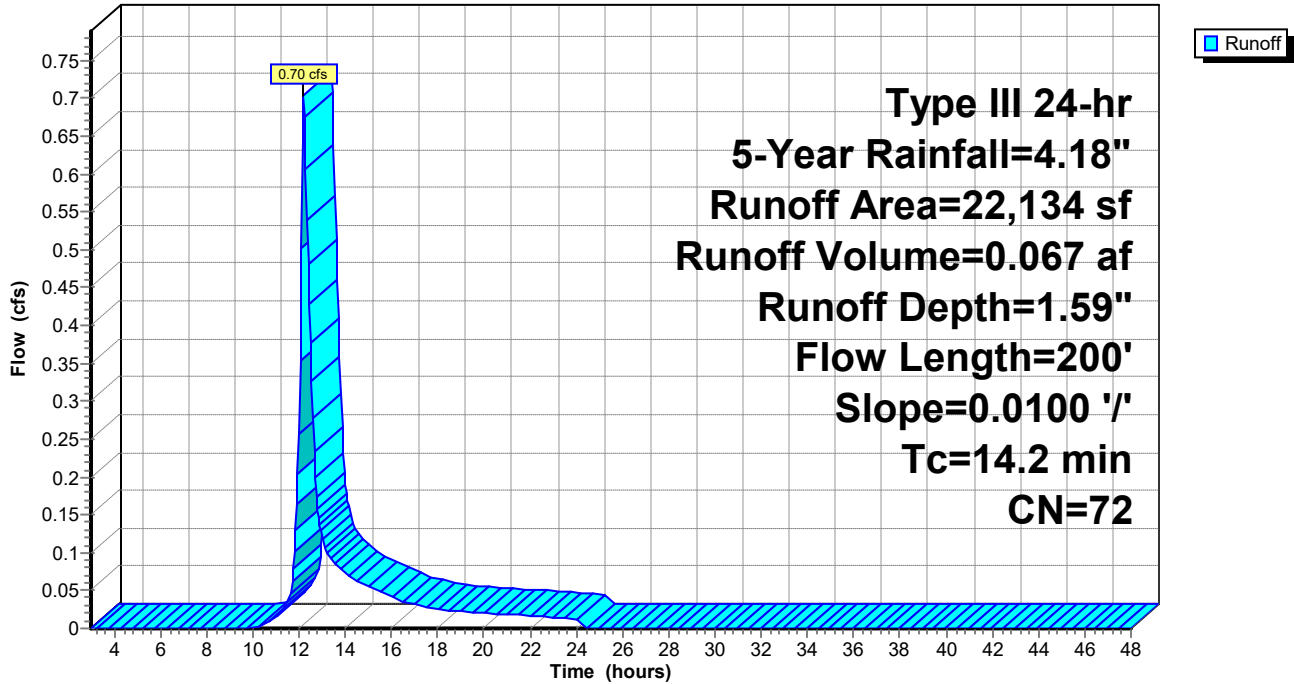
Area (sf)	CN	Description
9,701	39	>75% Grass cover, Good, HSG A
12,433	98	Paved parking, HSG A
22,134	72	Weighted Average
9,701		43.83% Pervious Area
12,433		56.17% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.6	100	0.0100	0.13		Sheet Flow, GRASS Grass: Short n= 0.150 P2= 3.35"
1.6	100	0.0100	1.07		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.35"
14.2	200	Total			



Subcatchment DA7: DA7

Hydrograph



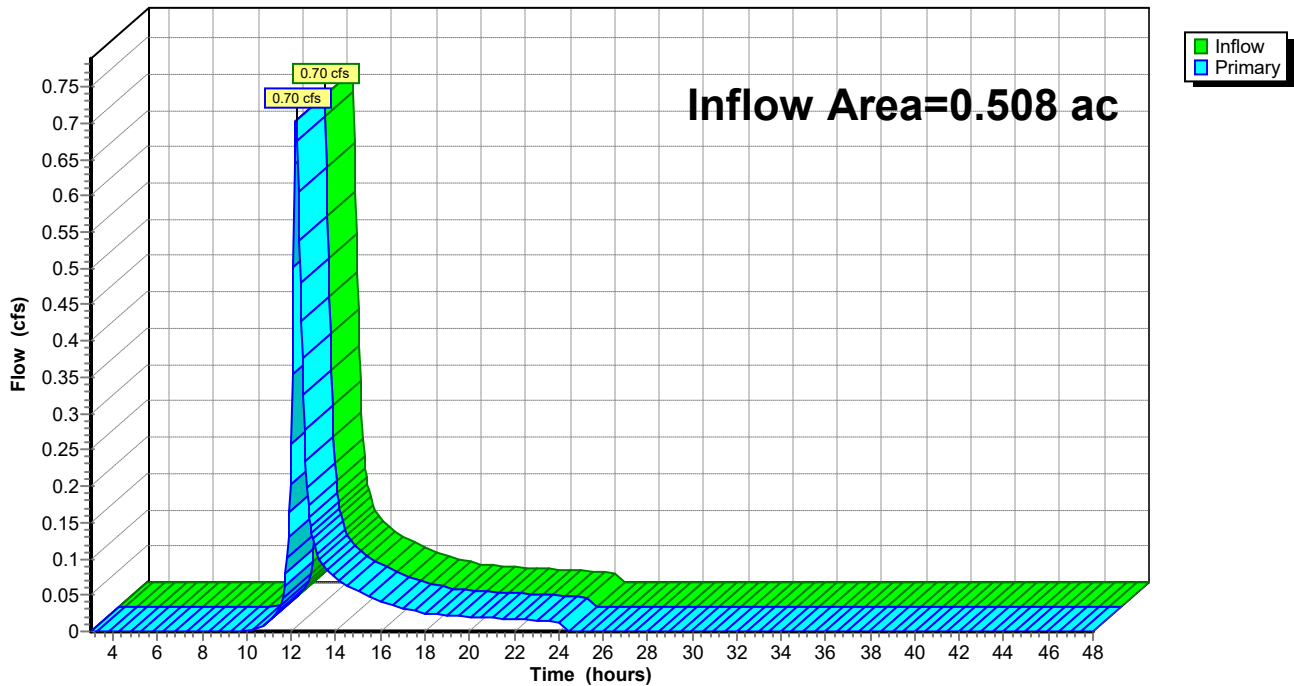
Summary for Pond CB DA7: CB DA7

Inflow Area = 0.508 ac, 56.17% Impervious, Inflow Depth = 1.59" for 5-Year event
Inflow = 0.70 cfs @ 12.21 hrs, Volume= 0.067 af
Primary = 0.70 cfs @ 12.21 hrs, Volume= 0.067 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 3.00-48.00 hrs, dt= 0.05 hrs

Pond CB DA7: CB DA7

Hydrograph



Summary for Pond EX SIB DA5: EX. SIB DA5

Inflow Area = 1.831 ac, 39.66% Impervious, Inflow Depth = 1.50" for 5-Year event
 Inflow = 3.19 cfs @ 12.06 hrs, Volume= 0.229 af
 Outflow = 1.68 cfs @ 12.22 hrs, Volume= 0.229 af, Atten= 47%, Lag= 9.3 min
 Discarded = 1.68 cfs @ 12.22 hrs, Volume= 0.229 af

Routing by Stor-Ind method, Time Span= 3.00-48.00 hrs, dt= 0.05 hrs
 Peak Elev= 18.10' @ 12.22 hrs Surf.Area= 8,775 sf Storage= 871 cf

Plug-Flow detention time= 3.9 min calculated for 0.229 af (100% of inflow)
 Center-of-Mass det. time= 3.9 min (853.5 - 849.6)

Volume	Invert	Avail.Storage	Storage Description
#1	18.00'	34,414 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
18.00	8,621	0	0	8,621
19.00	10,223	9,411	9,411	10,259
20.00	12,600	11,391	20,801	12,666
21.00	14,650	13,612	34,414	14,758

Device	Routing	Invert	Outlet Devices
#1	Discarded	18.00'	8.270 in/hr Exfiltration over Surface area Phase-In= 0.01'

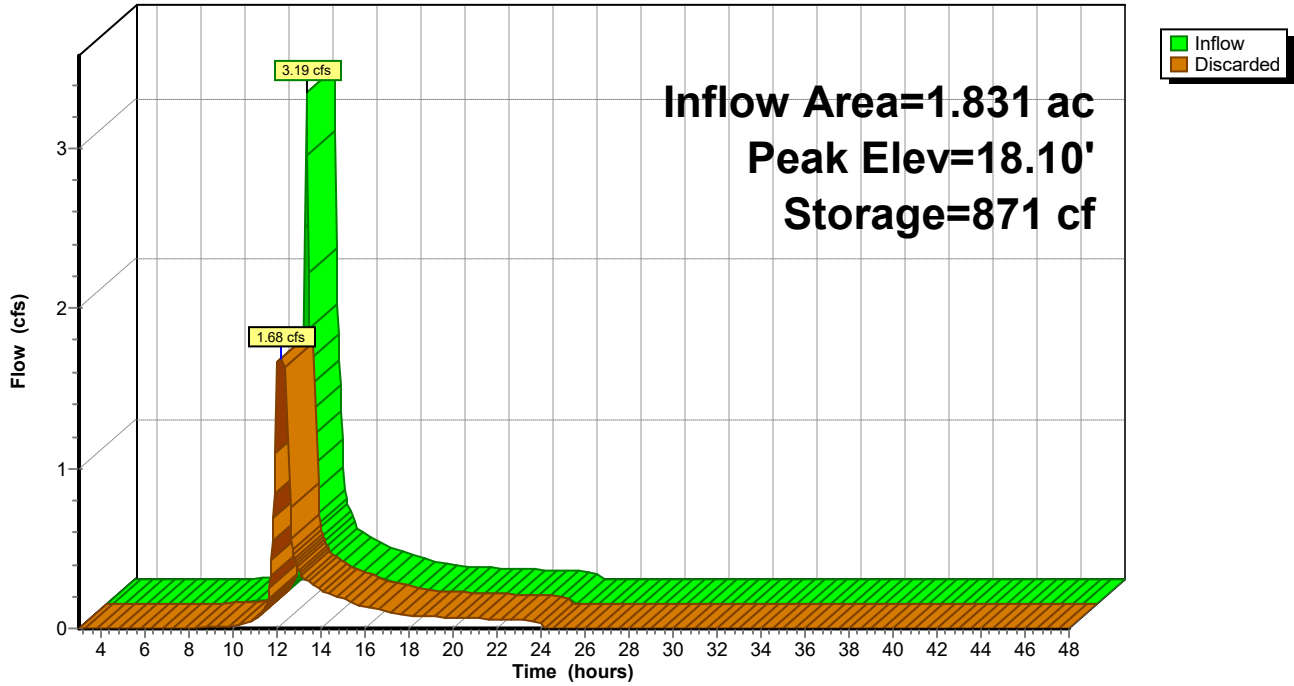
Discarded OutFlow Max=1.68 cfs @ 12.22 hrs HW=18.10' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 1.68 cfs)

Pond EX SIB DA5: EX. SIB DA5

Exfiltration

Pond EX SIB DA5: EX. SIB DA5

Hydrograph



Summary for Pond EX. BASIN DA4: EX. BASIN DA4

Inflow Area = 1.816 ac, 13.14% Impervious, Inflow Depth = 0.07" for 5-Year event
 Inflow = 0.02 cfs @ 15.18 hrs, Volume= 0.010 af
 Outflow = 0.02 cfs @ 15.23 hrs, Volume= 0.010 af, Atten= 0%, Lag= 3.2 min
 Discarded = 0.02 cfs @ 15.23 hrs, Volume= 0.010 af
 Secondary = 0.00 cfs @ 3.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 3.00-48.00 hrs, dt= 0.05 hrs / 3
 Peak Elev= 16.00' @ 15.23 hrs Surf.Area= 1,031 sf Storage= 3 cf

Plug-Flow detention time= 2.9 min calculated for 0.010 af (100% of inflow)
 Center-of-Mass det. time= 3.0 min (1,095.8 - 1,092.9)

Volume	Invert	Avail.Storage	Storage Description
#1	16.00'	2,708 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
16.00	1,025	0	0	1,025
17.00	4,866	2,708	2,708	4,870

Device	Routing	Invert	Outlet Devices
#1	Discarded	16.00'	2.410 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Secondary	16.90'	360.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

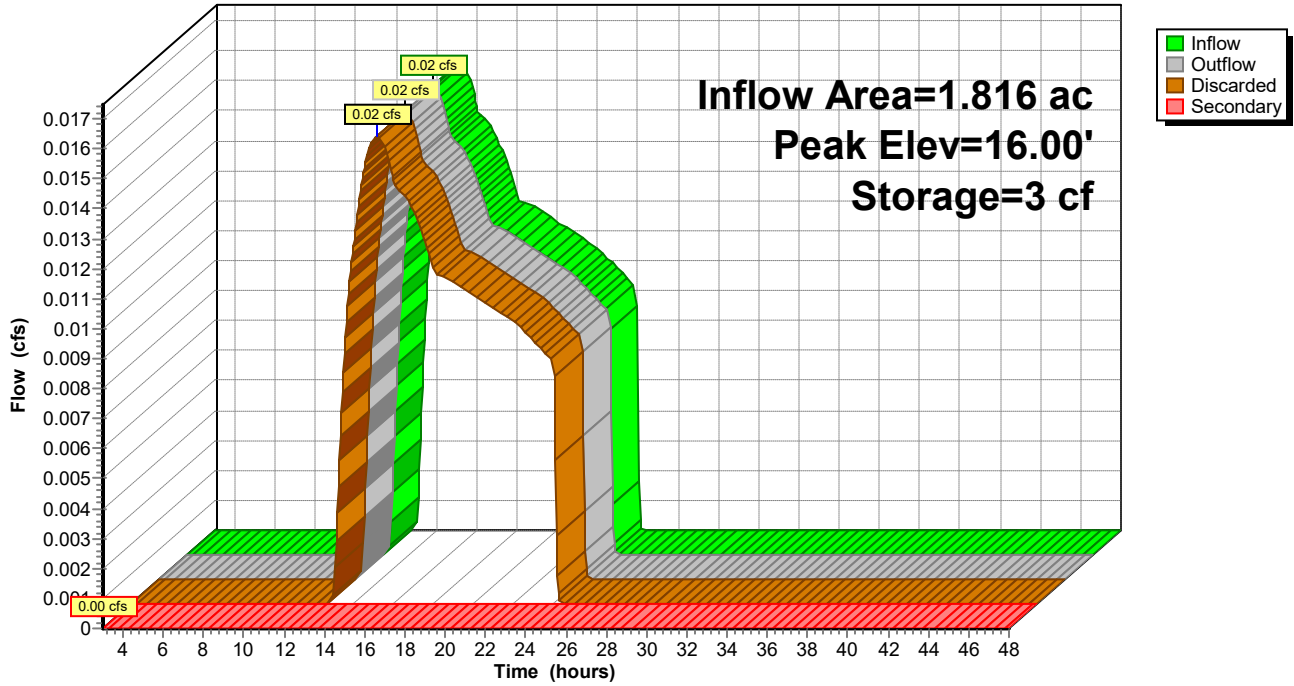
Discarded OutFlow Max=0.02 cfs @ 15.23 hrs HW=16.00' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.02 cfs)

Secondary OutFlow Max=0.00 cfs @ 3.00 hrs HW=16.00' (Free Discharge)
 ↑2=Orifice/Grate (Controls 0.00 cfs)



Pond EX. BASIN DA4: EX. BASIN DA4

Hydrograph



Wareham Pre Construction

Type III 24-hr 5-Year Rainfall=4.18"

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Summary for Pond SIB-1: SIB-1

Inflow Area = 1.096 ac, 36.62% Impervious, Inflow Depth = 0.91" for 5-Year event
 Inflow = 0.77 cfs @ 12.21 hrs, Volume= 0.083 af
 Outflow = 0.53 cfs @ 12.43 hrs, Volume= 0.083 af, Atten= 31%, Lag= 13.4 min
 Discarded = 0.53 cfs @ 12.43 hrs, Volume= 0.083 af
 Secondary = 0.00 cfs @ 3.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 3.00-48.00 hrs, dt= 0.05 hrs
 Peak Elev= 10.15' @ 12.43 hrs Surf.Area= 2,760 sf Storage= 404 cf

Plug-Flow detention time= 12.0 min calculated for 0.083 af (100% of inflow)
 Center-of-Mass det. time= 12.1 min (904.8 - 892.7)

Volume	Invert	Avail.Storage	Storage Description
#1	10.00'	123,382 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
10.00	2,664	0	0
11.00	3,306	2,985	2,985
12.00	4,005	3,656	6,641
13.00	4,760	4,383	11,023
14.00	5,572	5,166	16,189
15.00	6,440	6,006	22,195
16.00	7,365	6,903	29,098
17.00	8,347	7,856	36,954
18.00	9,385	8,866	45,820
19.00	10,480	9,933	55,752
20.00	11,630	11,055	66,807
21.00	12,837	12,234	79,041
22.00	14,101	13,469	92,510
23.00	15,422	14,762	107,271
24.00	16,800	16,111	123,382

Device	Routing	Invert	Outlet Devices
#1	Discarded	10.00'	8.270 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Secondary	23.90'	360.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

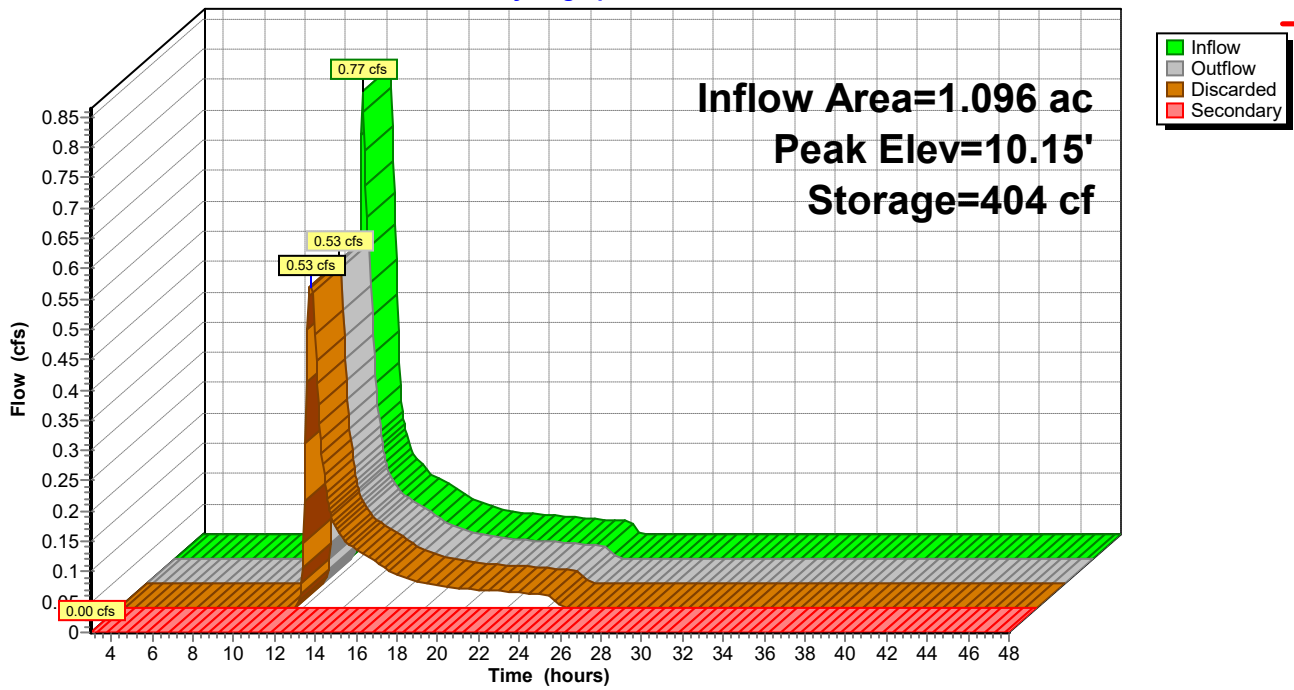
Discarded OutFlow Max=0.53 cfs @ 12.43 hrs HW=10.15' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.53 cfs)

Secondary OutFlow Max=0.00 cfs @ 3.00 hrs HW=10.00' (Free Discharge)
 ↑2=Orifice/Grate (Controls 0.00 cfs)



Pond SIB-1: SIB-1

Hydrograph



Summary for Pond SIB-2: SIB-2

Inflow Area = 0.670 ac, 17.26% Impervious, Inflow Depth = 0.35" for 5-Year event
 Inflow = 0.10 cfs @ 12.40 hrs, Volume= 0.020 af
 Outflow = 0.03 cfs @ 14.39 hrs, Volume= 0.020 af, Atten= 71%, Lag= 119.5 min
 Discarded = 0.03 cfs @ 14.39 hrs, Volume= 0.020 af
 Secondary = 0.00 cfs @ 3.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 3.00-48.00 hrs, dt= 0.05 hrs / 4
 Peak Elev= 17.67' @ 14.39 hrs Surf.Area= 100 sf Storage= 196 cf

Plug-Flow detention time= 115.5 min calculated for 0.020 af (100% of inflow)
 Center-of-Mass det. time= 115.1 min (1,069.9 - 954.8)

Volume	Invert	Avail.Storage	Storage Description
#1	13.96'	148 cf	10.00'W x 10.00'L x 6.00'H Prismaoid 600 cf Overall - 231 cf Embedded = 369 cf x 40.0% Voids
#2	13.96'	170 cf	6.00'D x 6.00'H Vertical Cone/Cylinder Inside #1 231 cf Overall - 6.0" Wall Thickness = 170 cf
#3	19.96'	9 cf	2.00'D x 3.00'H Vertical Cone/Cylinder -Impervious
#4	22.96'	1,578 cf	Custom Stage Data (Irregular) Listed below (Recalc)
		1,905 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
22.96	817	126.0	0	0	817
24.00	2,350	206.0	1,578	1,578	2,938

Device	Routing	Invert	Outlet Devices
#1	Secondary	23.00'	2.0" x 2.0" Horiz. Orifice/Grate X 6.00 columns X 6 rows C= 0.600 Limited to weir flow at low heads
#2	Discarded	13.96'	8.270 in/hr Exfiltration over Wetted area from 13.96' - 23.00' Excluded Wetted area = 100 sf Phase-In= 0.01'

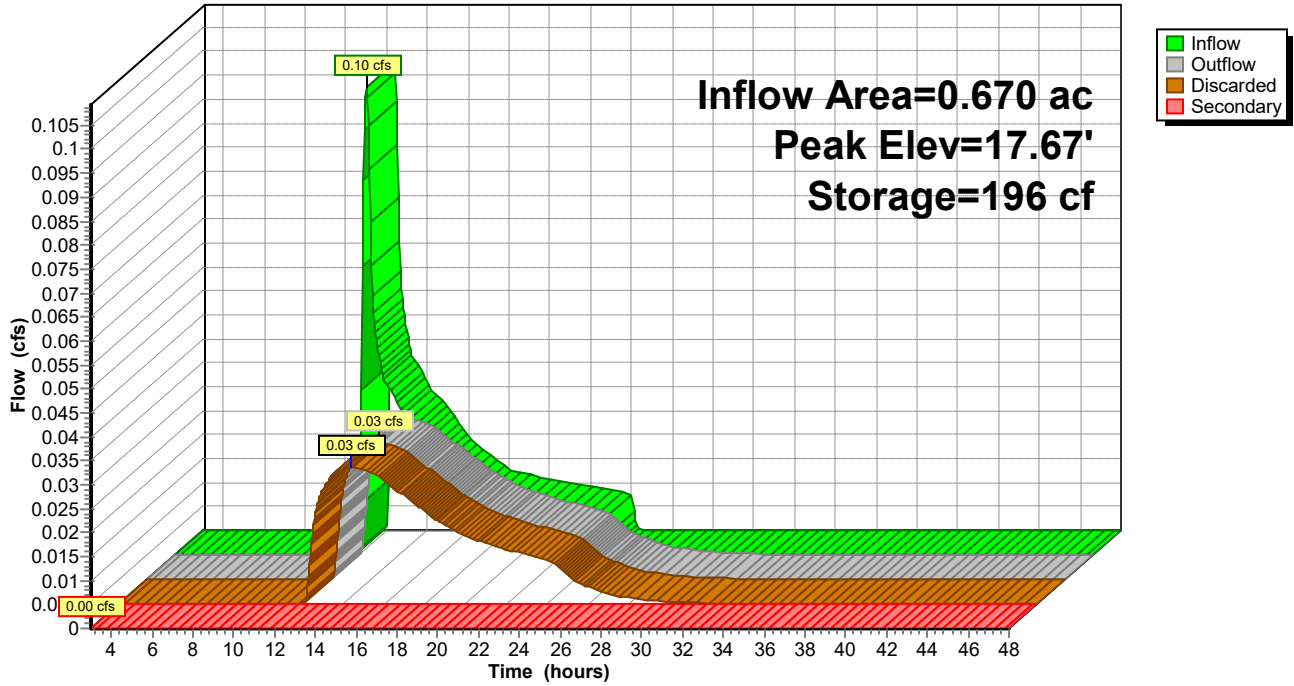
Discarded OutFlow Max=0.03 cfs @ 14.39 hrs HW=17.67' (Free Discharge)
 ↑**2=Exfiltration** (Exfiltration Controls 0.03 cfs)

Secondary OutFlow Max=0.00 cfs @ 3.00 hrs HW=13.96' (Free Discharge)
 ↑**1=Orifice/Grate** (Controls 0.00 cfs)



Pond SIB-2: SIB-2

Hydrograph



Wareham Pre Construction

Type III 24-hr 5-Year Rainfall=4.18"

Prepared by GHD, Inc

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Summary for Pond SIB-3: SIB-3

Inflow Area = 0.123 ac, 44.81% Impervious, Inflow Depth = 1.13" for 5-Year event
 Inflow = 0.16 cfs @ 12.03 hrs, Volume= 0.012 af
 Outflow = 0.03 cfs @ 12.54 hrs, Volume= 0.012 af, Atten= 83%, Lag= 30.6 min
 Discarded = 0.03 cfs @ 12.54 hrs, Volume= 0.012 af
 Secondary = 0.00 cfs @ 3.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 3.00-48.00 hrs, dt= 0.05 hrs / 4
 Peak Elev= 16.91' @ 12.54 hrs Surf.Area= 100 sf Storage= 156 cf

Plug-Flow detention time= 66.9 min calculated for 0.012 af (100% of inflow)
 Center-of-Mass det. time= 66.9 min (935.0 - 868.1)

Volume	Invert	Avail.Storage	Storage Description
#1	13.96'	148 cf	10.00'W x 10.00'L x 6.00'H Prismaoid 600 cf Overall - 231 cf Embedded = 369 cf x 40.0% Voids
#2	13.96'	170 cf	6.00'D x 6.00'H Vertical Cone/Cylinder Inside #1 231 cf Overall - 6.0" Wall Thickness = 170 cf
#3	19.96'	9 cf	2.00'D x 3.00'H Vertical Cone/Cylinder -Impervious
#4	22.96'	878 cf	Custom Stage Data (Irregular) Listed below (Recalc)
		1,204 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
22.96	83	37.0	0	0	83
24.00	393	75.0	228	228	427
25.00	947	117.0	650	878	1,076

Device	Routing	Invert	Outlet Devices
#1	Secondary	23.00'	2.0" x 2.0" Horiz. Orifice/Grate X 6.00 columns X 6 rows C= 0.600 Limited to weir flow at low heads
#2	Discarded	13.96'	8.270 in/hr Exfiltration over Wetted area from 13.96' - 23.00' Excluded Wetted area = 100 sf Phase-In= 0.01'
#3	Discarded	13.96'	2.414 in/hr Exfiltration over Surface area Phase-In= 0.01'

Discarded OutFlow Max=0.03 cfs @ 12.54 hrs HW=16.91' (Free Discharge)

- ↑ 2=Exfiltration (Exfiltration Controls 0.02 cfs)
- ↑ 3=Exfiltration (Exfiltration Controls 0.01 cfs)

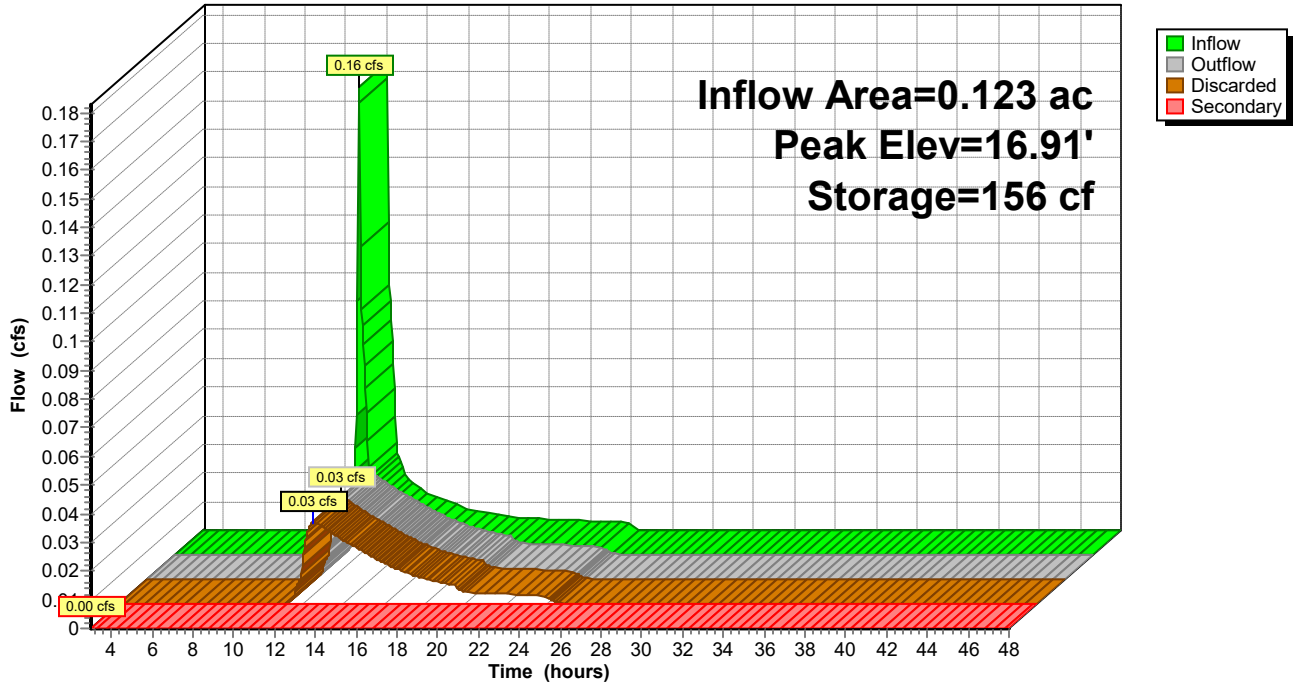
Secondary OutFlow Max=0.00 cfs @ 3.00 hrs HW=13.96' (Free Discharge)

- ↑ 1=Orifice/Grate (Controls 0.00 cfs)



Pond SIB-3: SIB-3

Hydrograph



Wareham Pre Construction

Type III 24-hr 10-Year Rainfall=4.95"

Prepared by GHD, Inc

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Time span=3.00-48.00 hrs, dt=0.05 hrs, 901 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment DA1: DA1 Runoff Area=47,720 sf 36.62% Impervious Runoff Depth=1.34"
 Flow Length=191' Tc=12.7 min CN=61 Runoff=1.23 cfs 0.122 af

Subcatchment DA2: DA2 Runoff Area=29,170 sf 17.26% Impervious Runoff Depth=0.62"
 Flow Length=264' Tc=11.2 min CN=49 Runoff=0.23 cfs 0.035 af

Subcatchment DA3: DA3 Runoff Area=5,342 sf 44.81% Impervious Runoff Depth=1.62"
 Flow Length=88' Tc=0.9 min CN=65 Runoff=0.25 cfs 0.017 af

Subcatchment DA4: DA4 Runoff Area=79,094 sf 13.14% Impervious Runoff Depth=0.19"
 Flow Length=400' Tc=4.8 min CN=39 Runoff=0.06 cfs 0.029 af

Subcatchment DA5: DA5 Runoff Area=62,200 sf 30.35% Impervious Runoff Depth=1.77"
 Flow Length=225' Tc=2.4 min CN=67 Runoff=3.16 cfs 0.210 af

Subcatchment DA6: DA6 Runoff Area=17,571 sf 72.63% Impervious Runoff Depth=3.03"
 Flow Length=125' Slope=0.0100 '/' Tc=5.8 min CN=82 Runoff=1.41 cfs 0.102 af

Subcatchment DA7: DA7 Runoff Area=22,134 sf 56.17% Impervious Runoff Depth=2.16"
 Flow Length=200' Slope=0.0100 '/' Tc=14.2 min CN=72 Runoff=0.97 cfs 0.091 af

Pond CB DA7: CB DA7 Inflow=0.97 cfs 0.091 af
 Primary=0.97 cfs 0.091 af

Pond EX SIB DA5: EX. SIB DA5 Peak Elev=18.21' Storage=1,863 cf Inflow=4.46 cfs 0.312 af
 Outflow=1.71 cfs 0.312 af

Pond EX. BASIN DA4: EX. BASIN DA4 Peak Elev=16.01' Storage=10 cf Inflow=0.06 cfs 0.029 af
 Discarded=0.06 cfs 0.029 af Secondary=0.00 cfs 0.000 af Outflow=0.06 cfs 0.029 af

Pond SIB-1: SIB-1 Peak Elev=10.33' Storage=928 cf Inflow=1.23 cfs 0.122 af
 Discarded=0.55 cfs 0.122 af Secondary=0.00 cfs 0.000 af Outflow=0.55 cfs 0.122 af

Pond SIB-2: SIB-2 Peak Elev=22.93' Storage=327 cf Inflow=0.23 cfs 0.035 af
 Discarded=0.14 cfs 0.035 af Secondary=0.00 cfs 0.000 af Outflow=0.14 cfs 0.035 af

Pond SIB-3: SIB-3 Peak Elev=18.53' Storage=241 cf Inflow=0.25 cfs 0.017 af
 Discarded=0.04 cfs 0.017 af Secondary=0.00 cfs 0.000 af Outflow=0.04 cfs 0.017 af

Total Runoff Area = 6.043 ac Runoff Volume = 0.606 af Average Runoff Depth = 1.20"
69.85% Pervious = 4.221 ac 30.15% Impervious = 1.822 ac

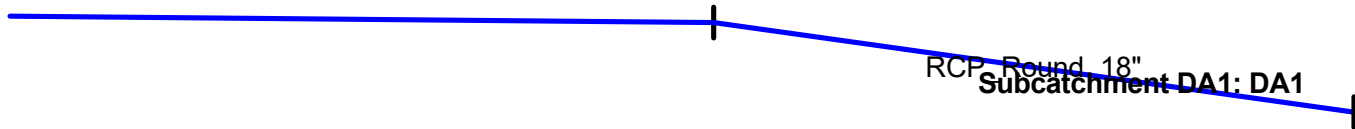
Summary for Subcatchment DA1: DA1

Runoff = 1.23 cfs @ 12.20 hrs, Volume= 0.122 af, Depth= 1.34"
 Routed to Pond SIB-1 : SIB-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-48.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-Year Rainfall=4.95"

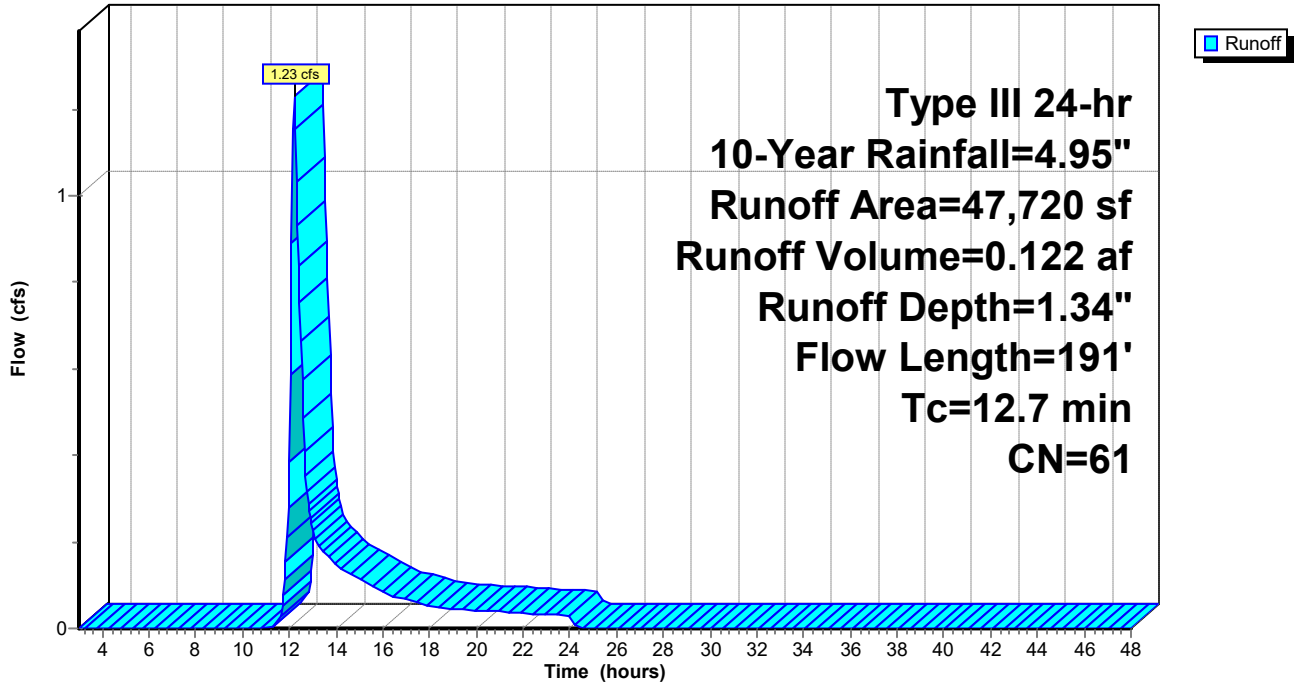
	Area (sf)	CN	Description
*	17,477	98	
*	30,243	39	
	47,720	61	Weighted Average
	30,243		63.38% Pervious Area
	17,477		36.62% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.6	100	0.0100	0.13		Sheet Flow, Grass: Short n= 0.150 P2= 3.35"
0.1	91	0.1500	23.02	40.68	Pipe Channel, RCP_Round 18" 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
12.7	191	Total			



Subcatchment DA1: DA1

Hydrograph



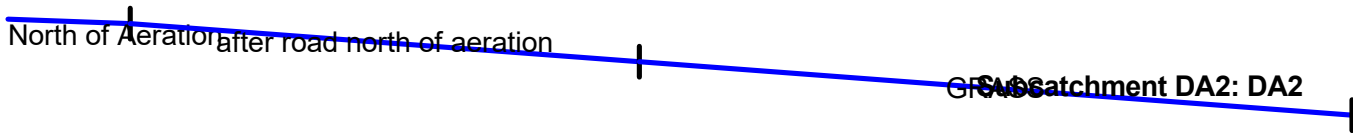
Summary for Subcatchment DA2: DA2

Runoff = 0.23 cfs @ 12.25 hrs, Volume= 0.035 af, Depth= 0.62"
 Routed to Pond SIB-2 : SIB-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-48.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-Year Rainfall=4.95"

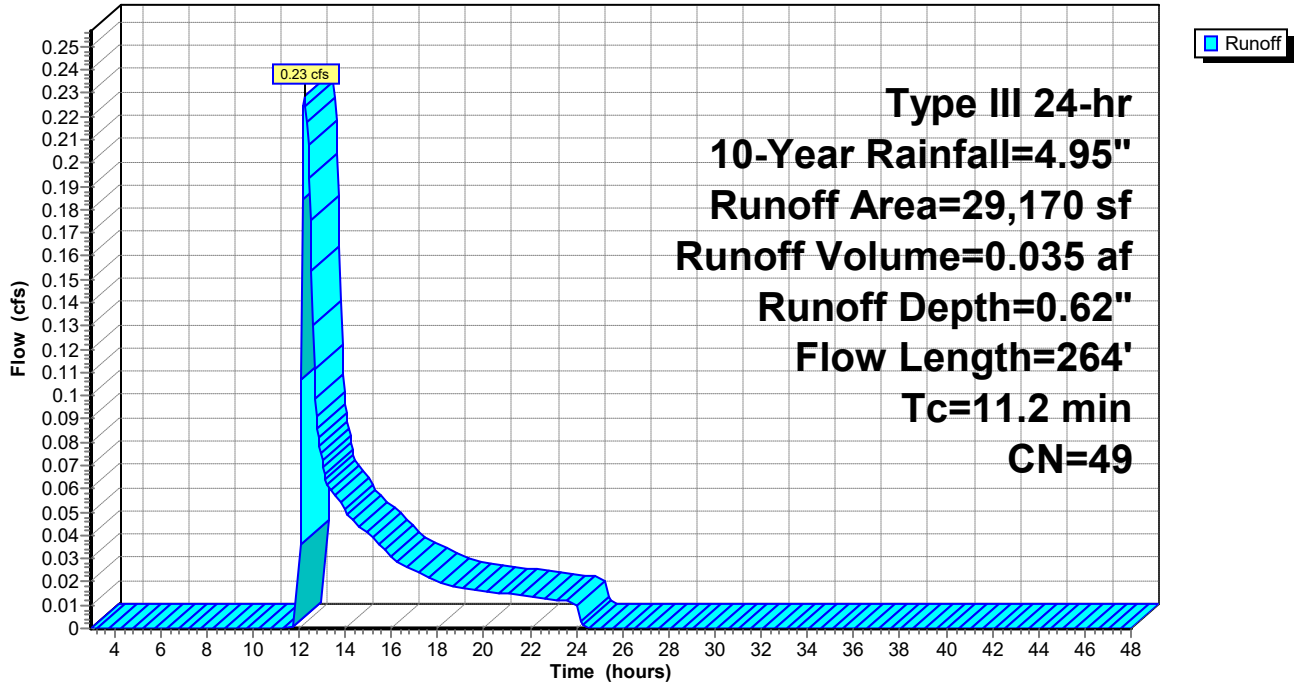
Area (sf)	CN	Description
* 5,035	98	Impervious
24,135	39	>75% Grass cover, Good, HSG A
29,170	49	Weighted Average
24,135		82.74% Pervious Area
5,035		17.26% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	24	0.0100	0.80		Sheet Flow, North of Aeration Smooth surfaces n= 0.011 P2= 3.35"
9.6	100	0.0200	0.17		Sheet Flow, after road north of aeration Grass: Short n= 0.150 P2= 3.35"
1.1	140	0.0200	2.12		Shallow Concentrated Flow, GRASS Grassed Waterway Kv= 15.0 fps
11.2	264	Total			



Subcatchment DA2: DA2

Hydrograph



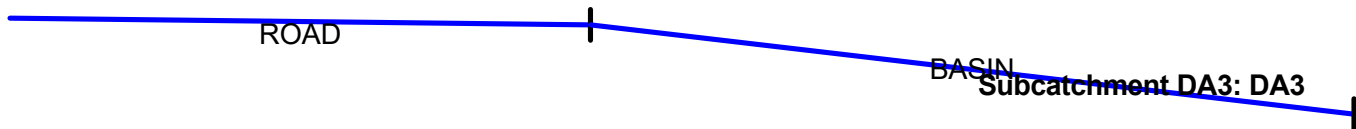
Summary for Subcatchment DA3: DA3

Runoff = 0.25 cfs @ 12.02 hrs, Volume= 0.017 af, Depth= 1.62"
 Routed to Pond SIB-3 : SIB-3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-48.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-Year Rainfall=4.95"

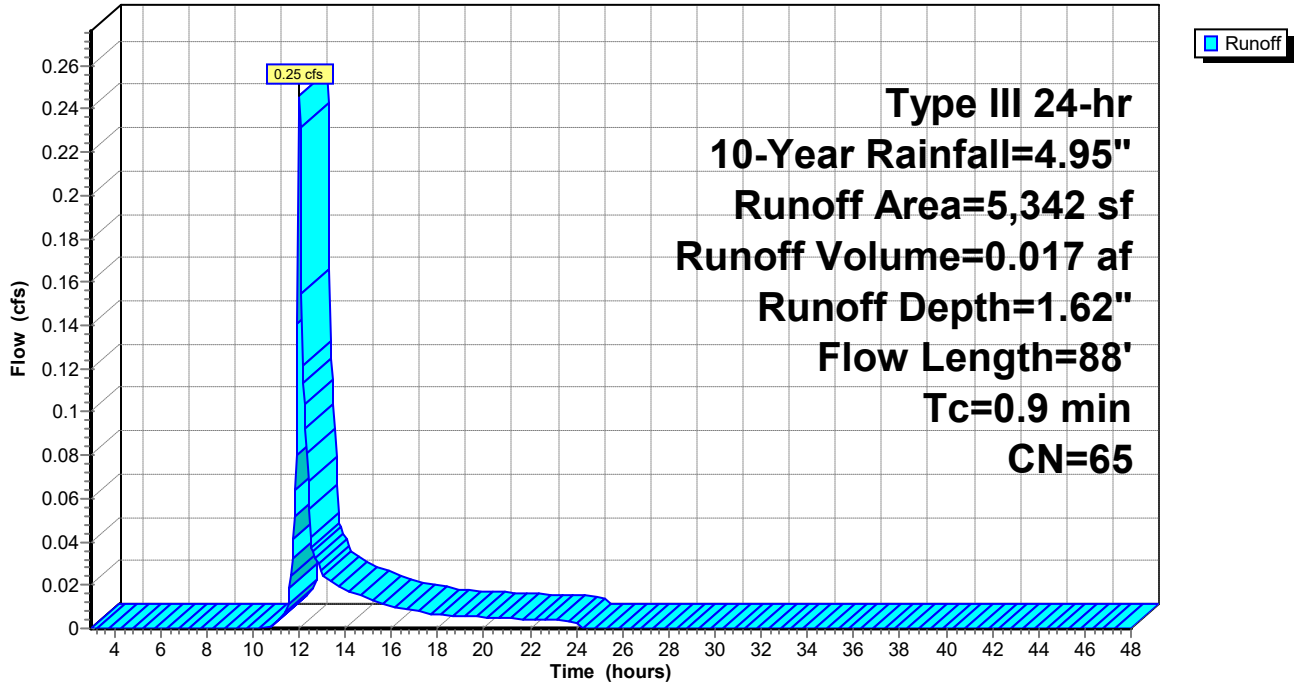
Area (sf)	CN	Description
* 2,394	98	IMPERVIOUS
2,948	39	>75% Grass cover, Good, HSG A
5,342	65	Weighted Average
2,948		55.19% Pervious Area
2,394		44.81% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	38	0.0100	0.88		Sheet Flow, ROAD Smooth surfaces n= 0.011 P2= 3.35"
0.2	50	0.1000	5.09		Shallow Concentrated Flow, BASIN Unpaved Kv= 16.1 fps
0.9	88	Total			



Subcatchment DA3: DA3

Hydrograph



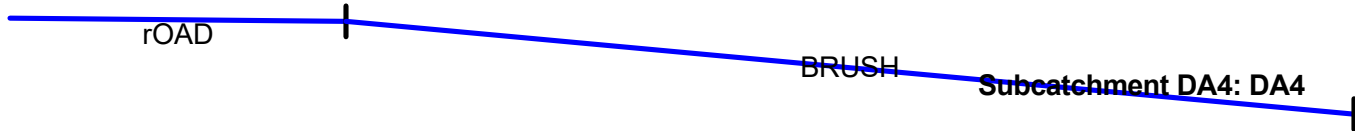
Summary for Subcatchment DA4: DA4

Runoff = 0.06 cfs @ 12.47 hrs, Volume= 0.029 af, Depth= 0.19"
 Routed to Pond EX. BASIN DA4 : EX. BASIN DA4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-48.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-Year Rainfall=4.95"

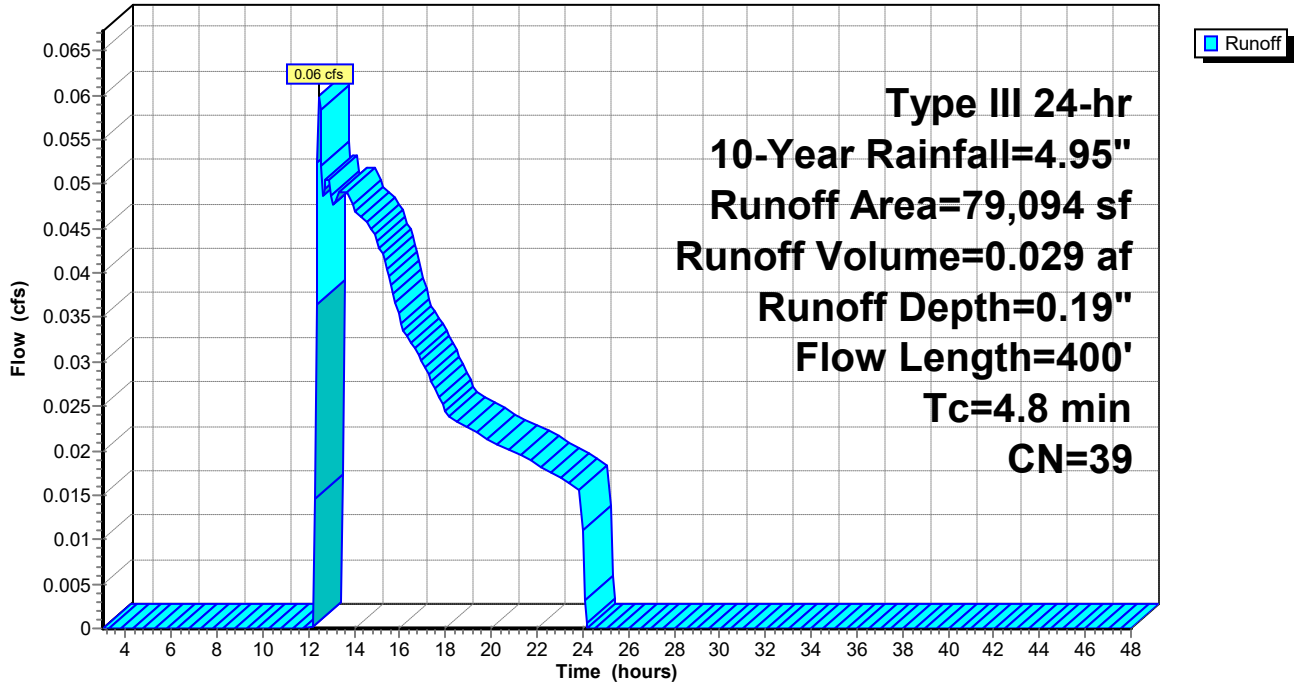
Area (sf)	CN	Description
66,054	30	Brush, Good, HSG A
* 10,390	98	ROAD
2,650	30	Woods, Good, HSG A
79,094	39	Weighted Average
68,704		86.86% Pervious Area
10,390		13.14% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.6	100	0.0100	1.07		Sheet Flow, rOAD Smooth surfaces n= 0.011 P2= 3.35"
3.2	300	0.1000	1.58		Shallow Concentrated Flow, BRUSH Woodland Kv= 5.0 fps
4.8	400	Total			



Subcatchment DA4: DA4

Hydrograph



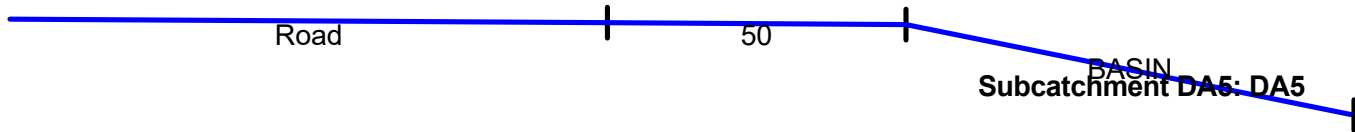
Summary for Subcatchment DA5: DA5

Runoff = 3.16 cfs @ 12.05 hrs, Volume= 0.210 af, Depth= 1.77"
 Routed to Pond EX SIB DA5 : EX. SIB DA5

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-48.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-Year Rainfall=4.95"

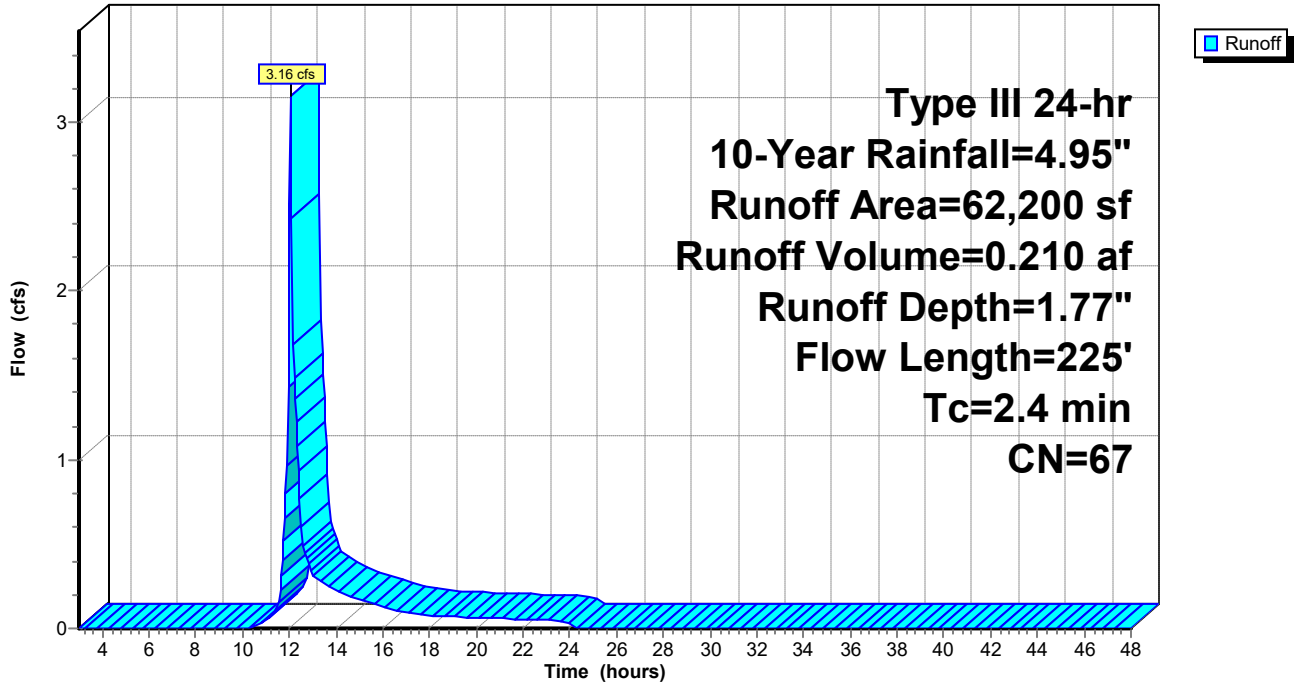
Area (sf)	CN	Description
* 18,875	98	IMPERVIOUS
32,940	58	Meadow, non-grazed, HSG B
10,385	39	>75% Grass cover, Good, HSG A
62,200	67	Weighted Average
43,325		69.65% Pervious Area
18,875		30.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.6	100	0.0100	1.07		Sheet Flow, Road Smooth surfaces n= 0.011 P2= 3.35"
0.4	50	0.0100	2.03		Shallow Concentrated Flow, 50 Paved Kv= 20.3 fps
0.4	75	0.3300	2.87		Shallow Concentrated Flow, BASIN Woodland Kv= 5.0 fps
2.4	225	Total			



Subcatchment DA5: DA5

Hydrograph



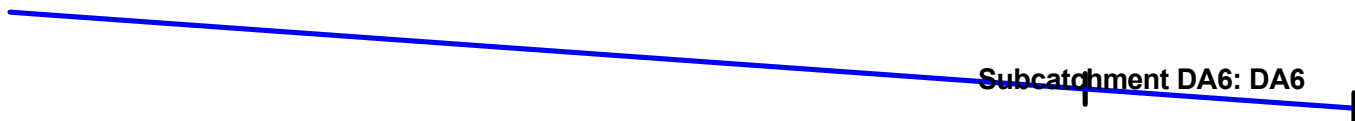
Summary for Subcatchment DA6: DA6

Runoff = 1.41 cfs @ 12.09 hrs, Volume= 0.102 af, Depth= 3.03"
 Routed to Pond EX SIB DA5 : EX. SIB DA5

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-48.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-Year Rainfall=4.95"

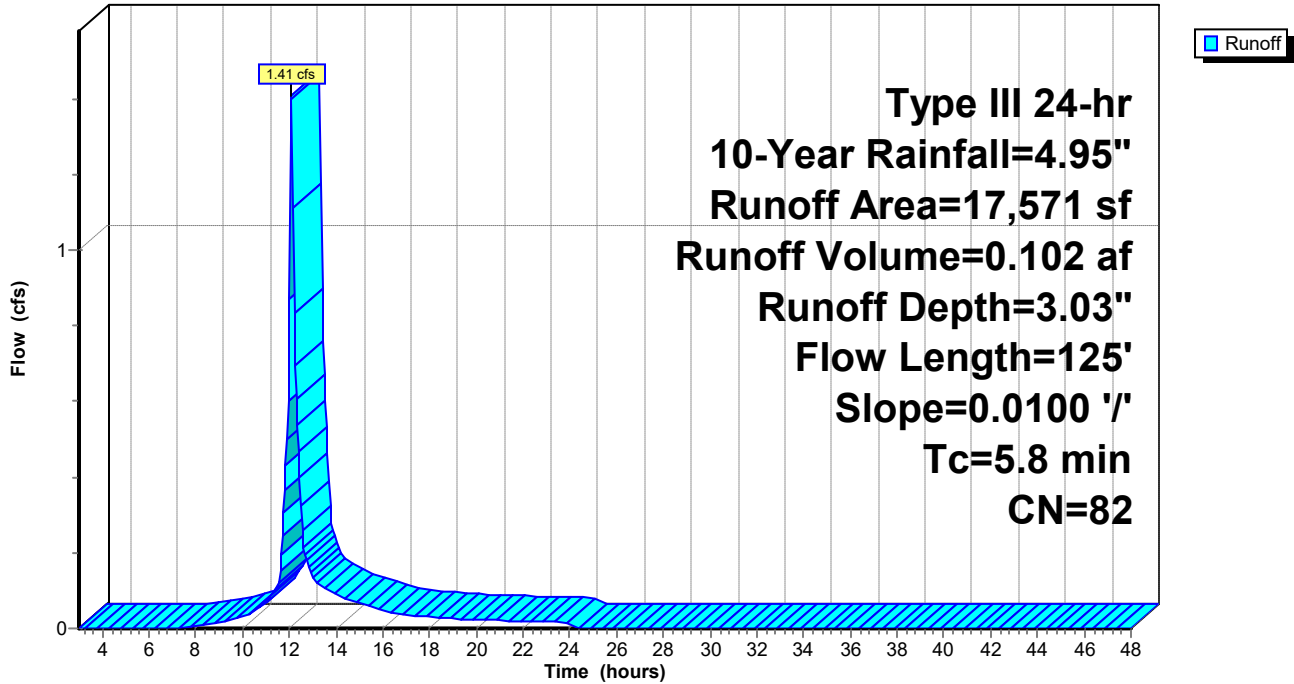
Area (sf)	CN	Description
* 12,762	98	
* 4,809	39	
17,571	82	Weighted Average
4,809		27.37% Pervious Area
12,762		72.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.6	100	0.0100	1.07		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.35"
4.2	25	0.0100	0.10		Sheet Flow, Grass: Short n= 0.150 P2= 3.35"
5.8	125	Total			



Subcatchment DA6: DA6

Hydrograph



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Type III 24-hr 10-Year Rainfall=4.95"

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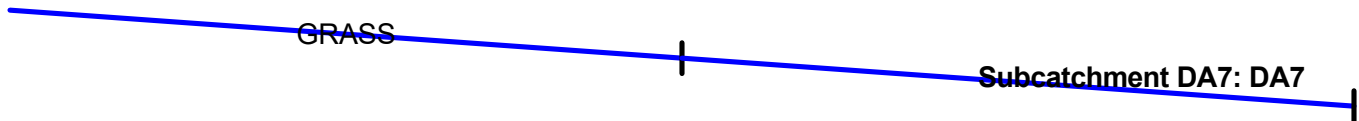
Summary for Subcatchment DA7: DA7

Runoff = 0.97 cfs @ 12.21 hrs, Volume= 0.091 af, Depth= 2.16"
 Routed to Pond CB DA7 : CB DA7

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-48.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-Year Rainfall=4.95"

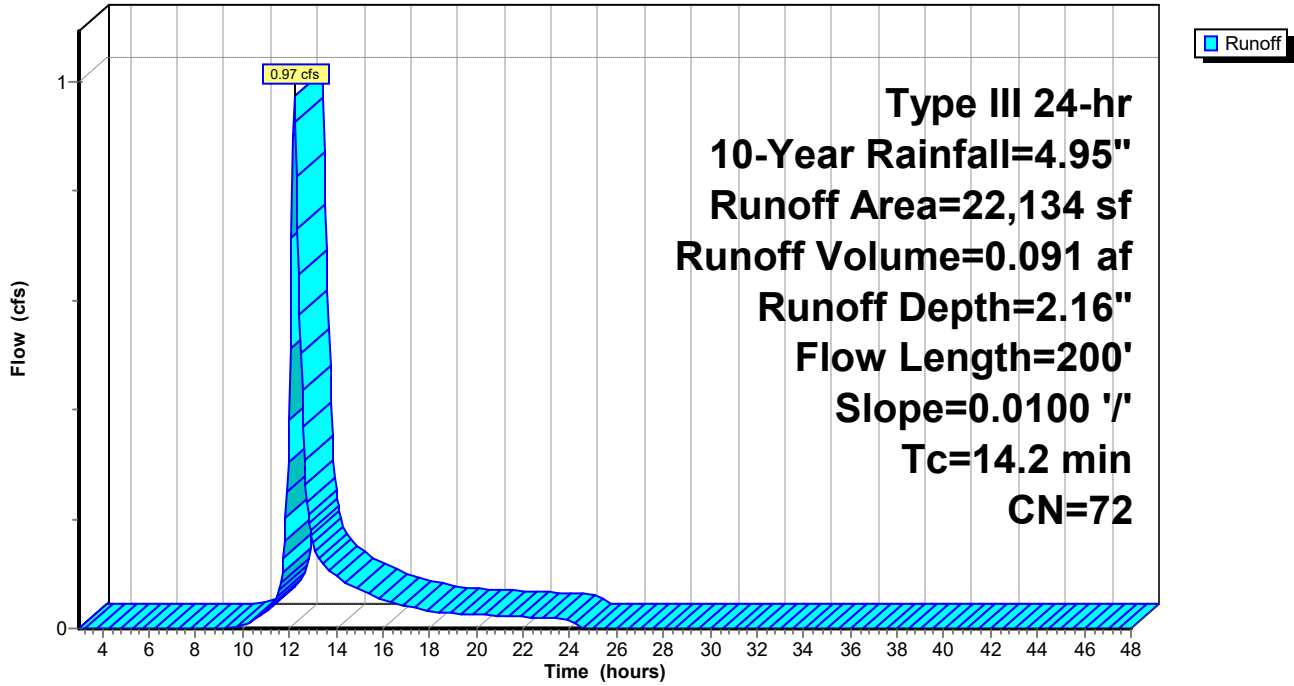
Area (sf)	CN	Description
9,701	39	>75% Grass cover, Good, HSG A
12,433	98	Paved parking, HSG A
22,134	72	Weighted Average
9,701		43.83% Pervious Area
12,433		56.17% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.6	100	0.0100	0.13		Sheet Flow, GRASS Grass: Short n= 0.150 P2= 3.35"
1.6	100	0.0100	1.07		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.35"
14.2	200	Total			



Subcatchment DA7: DA7

Hydrograph



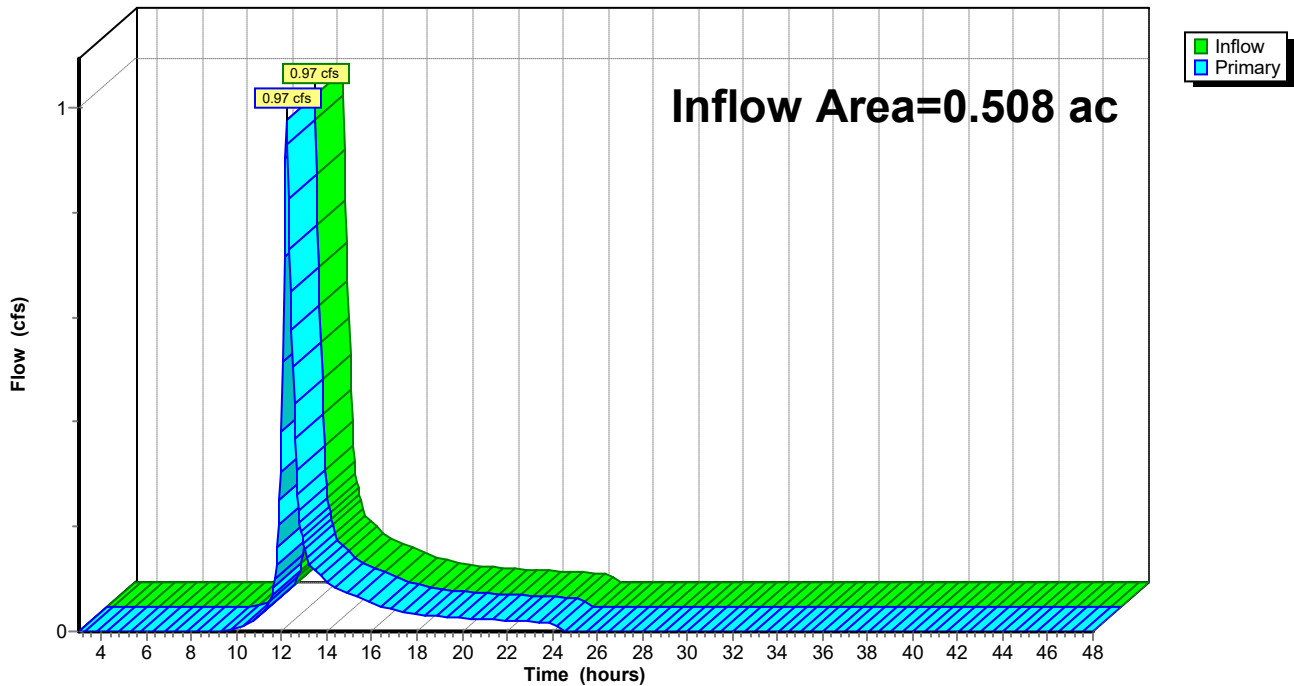
Summary for Pond CB DA7: CB DA7

Inflow Area = 0.508 ac, 56.17% Impervious, Inflow Depth = 2.16" for 10-Year event
Inflow = 0.97 cfs @ 12.21 hrs, Volume= 0.091 af
Primary = 0.97 cfs @ 12.21 hrs, Volume= 0.091 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 3.00-48.00 hrs, dt= 0.05 hrs

Pond CB DA7: CB DA7

Hydrograph



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Type III 24-hr 10-Year Rainfall=4.95"

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Summary for Pond EX SIB DA5: EX. SIB DA5

Inflow Area = 1.831 ac, 39.66% Impervious, Inflow Depth = 2.05" for 10-Year event
 Inflow = 4.46 cfs @ 12.06 hrs, Volume= 0.312 af
 Outflow = 1.71 cfs @ 12.33 hrs, Volume= 0.312 af, Atten= 62%, Lag= 16.3 min
 Discarded = 1.71 cfs @ 12.33 hrs, Volume= 0.312 af

Routing by Stor-Ind method, Time Span= 3.00-48.00 hrs, dt= 0.05 hrs
 Peak Elev= 18.21' @ 12.33 hrs Surf.Area= 8,949 sf Storage= 1,863 cf

Plug-Flow detention time= 6.6 min calculated for 0.312 af (100% of inflow)
 Center-of-Mass det. time= 6.6 min (847.5 - 840.9)

Volume	Invert	Avail.Storage	Storage Description
#1	18.00'	34,414 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
18.00	8,621	0	0	8,621
19.00	10,223	9,411	9,411	10,259
20.00	12,600	11,391	20,801	12,666
21.00	14,650	13,612	34,414	14,758

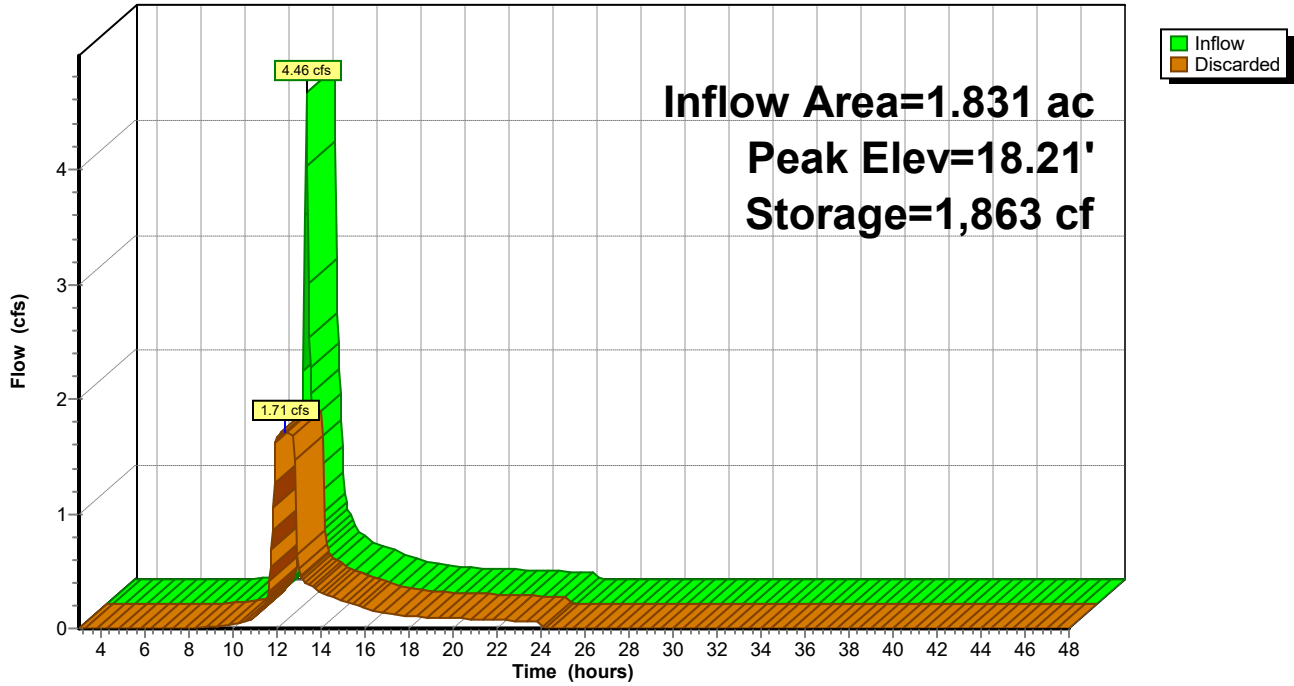
Device	Routing	Invert	Outlet Devices
#1	Discarded	18.00'	8.270 in/hr Exfiltration over Surface area Phase-In= 0.01'

Discarded OutFlow Max=1.71 cfs @ 12.33 hrs HW=18.21' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 1.71 cfs)



Pond EX SIB DA5: EX. SIB DA5

Hydrograph



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Summary for Pond EX. BASIN DA4: EX. BASIN DA4

Inflow Area = 1.816 ac, 13.14% Impervious, Inflow Depth = 0.19" for 10-Year event
 Inflow = 0.06 cfs @ 12.47 hrs, Volume= 0.029 af
 Outflow = 0.06 cfs @ 12.52 hrs, Volume= 0.029 af, Atten= 7%, Lag= 3.2 min
 Discarded = 0.06 cfs @ 12.52 hrs, Volume= 0.029 af
 Secondary = 0.00 cfs @ 3.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 3.00-48.00 hrs, dt= 0.05 hrs / 3
 Peak Elev= 16.01' @ 12.52 hrs Surf.Area= 1,048 sf Storage= 10 cf

Plug-Flow detention time= 2.9 min calculated for 0.029 af (100% of inflow)
 Center-of-Mass det. time= 3.0 min (1,015.8 - 1,012.8)

Volume	Invert	Avail.Storage	Storage Description
#1	16.00'	2,708 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
16.00	1,025	0	0	1,025
17.00	4,866	2,708	2,708	4,870

Device	Routing	Invert	Outlet Devices
#1	Discarded	16.00'	2.410 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Secondary	16.90'	360.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

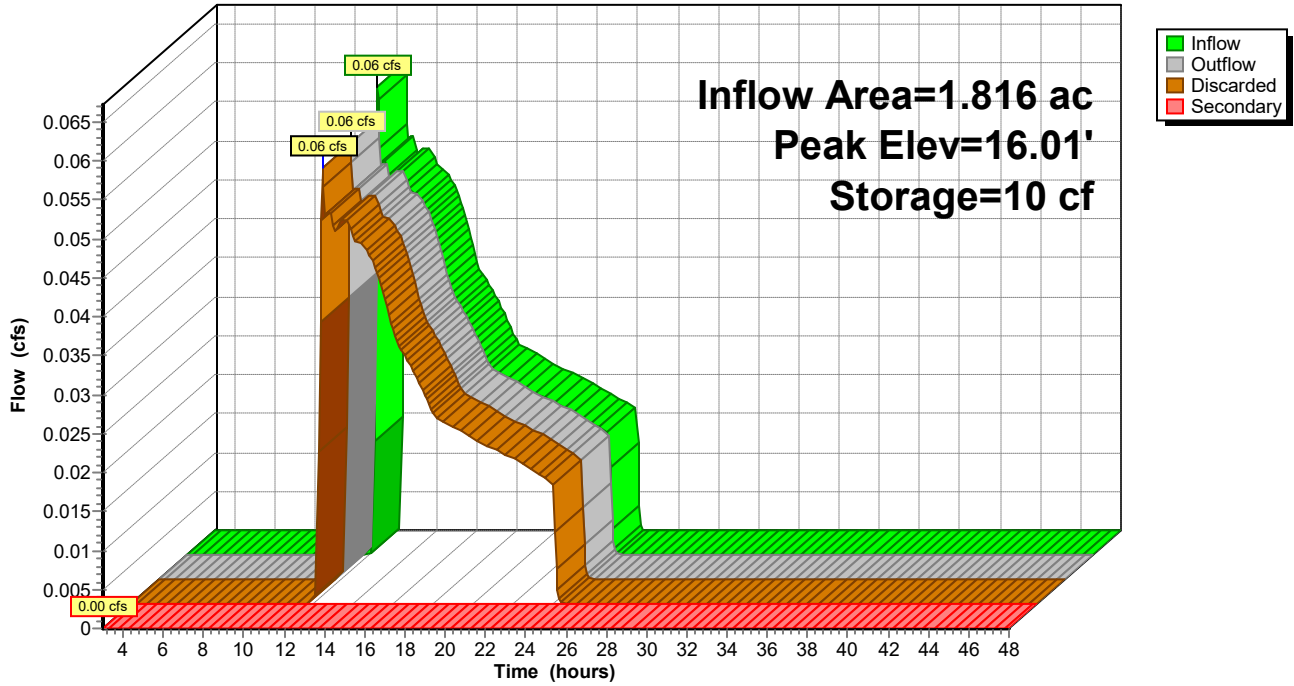
Discarded OutFlow Max=0.06 cfs @ 12.52 hrs HW=16.01' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.06 cfs)

Secondary OutFlow Max=0.00 cfs @ 3.00 hrs HW=16.00' (Free Discharge)
 ↑2=Orifice/Grate (Controls 0.00 cfs)



Pond EX. BASIN DA4: EX. BASIN DA4

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Summary for Pond SIB-1: SIB-1

Inflow Area = 1.096 ac, 36.62% Impervious, Inflow Depth = 1.34" for 10-Year event
 Inflow = 1.23 cfs @ 12.20 hrs, Volume= 0.122 af
 Outflow = 0.55 cfs @ 12.56 hrs, Volume= 0.122 af, Atten= 55%, Lag= 21.8 min
 Discarded = 0.55 cfs @ 12.56 hrs, Volume= 0.122 af
 Secondary = 0.00 cfs @ 3.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 3.00-48.00 hrs, dt= 0.05 hrs
 Peak Elev= 10.33' @ 12.56 hrs Surf.Area= 2,879 sf Storage= 928 cf

Plug-Flow detention time= 15.8 min calculated for 0.122 af (100% of inflow)
 Center-of-Mass det. time= 15.8 min (895.1 - 879.3)

Volume	Invert	Avail.Storage	Storage Description
#1	10.00'	123,382 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
10.00	2,664	0	0
11.00	3,306	2,985	2,985
12.00	4,005	3,656	6,641
13.00	4,760	4,383	11,023
14.00	5,572	5,166	16,189
15.00	6,440	6,006	22,195
16.00	7,365	6,903	29,098
17.00	8,347	7,856	36,954
18.00	9,385	8,866	45,820
19.00	10,480	9,933	55,752
20.00	11,630	11,055	66,807
21.00	12,837	12,234	79,041
22.00	14,101	13,469	92,510
23.00	15,422	14,762	107,271
24.00	16,800	16,111	123,382

Device	Routing	Invert	Outlet Devices
#1	Discarded	10.00'	8.270 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Secondary	23.90'	360.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

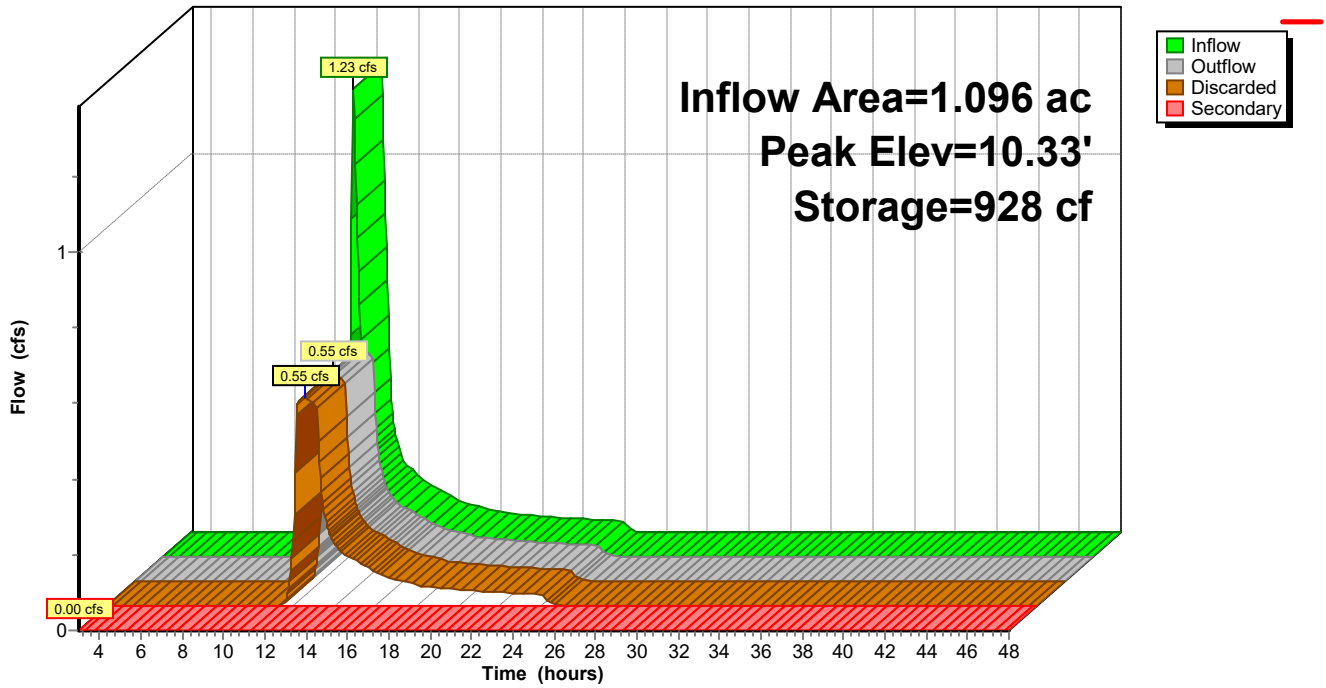
Discarded OutFlow Max=0.55 cfs @ 12.56 hrs HW=10.33' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.55 cfs)

Secondary OutFlow Max=0.00 cfs @ 3.00 hrs HW=10.00' (Free Discharge)
 ↑2=Orifice/Grate (Controls 0.00 cfs)



Pond SIB-1: SIB-1

Hydrograph



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Summary for Pond SIB-2: SIB-2

Inflow Area = 0.670 ac, 17.26% Impervious, Inflow Depth = 0.62" for 10-Year event
 Inflow = 0.23 cfs @ 12.25 hrs, Volume= 0.035 af
 Outflow = 0.14 cfs @ 12.67 hrs, Volume= 0.035 af, Atten= 39%, Lag= 24.9 min
 Discarded = 0.14 cfs @ 12.67 hrs, Volume= 0.035 af
 Secondary = 0.00 cfs @ 3.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 3.00-48.00 hrs, dt= 0.05 hrs / 4
 Peak Elev= 22.93' @ 12.65 hrs Surf.Area= 100 sf Storage= 327 cf

Plug-Flow detention time= 98.6 min calculated for 0.035 af (100% of inflow)
 Center-of-Mass det. time= 105.6 min (1,032.1 - 926.5)

Volume	Invert	Avail.Storage	Storage Description
#1	13.96'	148 cf	10.00'W x 10.00'L x 6.00'H Prismatic 600 cf Overall - 231 cf Embedded = 369 cf x 40.0% Voids
#2	13.96'	170 cf	6.00'D x 6.00'H Vertical Cone/Cylinder Inside #1 231 cf Overall - 6.0" Wall Thickness = 170 cf
#3	19.96'	9 cf	2.00'D x 3.00'H Vertical Cone/Cylinder -Impervious
#4	22.96'	1,578 cf	Custom Stage Data (Irregular) Listed below (Recalc)
		1,905 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
22.96	817	126.0	0	0	817
24.00	2,350	206.0	1,578	1,578	2,938

Device	Routing	Invert	Outlet Devices
#1	Secondary	23.00'	2.0" x 2.0" Horiz. Orifice/Grate X 6.00 columns X 6 rows C= 0.600 Limited to weir flow at low heads
#2	Discarded	13.96'	8.270 in/hr Exfiltration over Wetted area from 13.96' - 23.00' Excluded Wetted area = 100 sf Phase-In= 0.01'

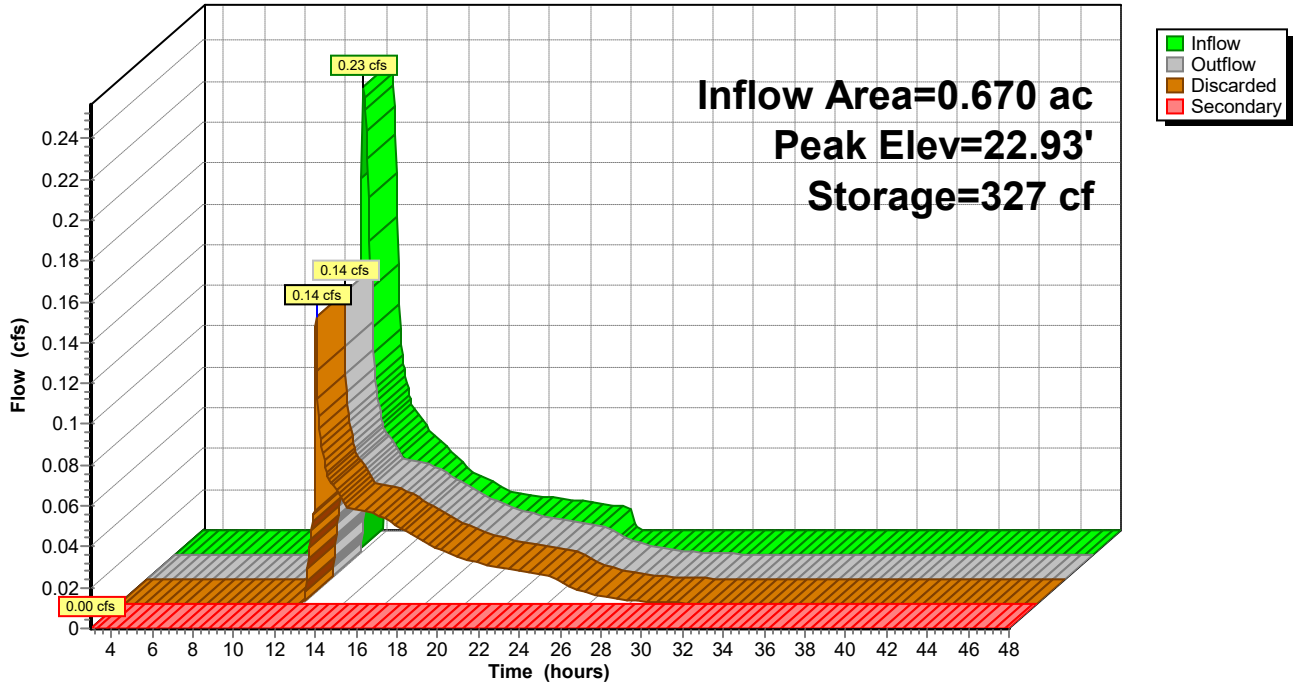
Discarded OutFlow Max=0.05 cfs @ 12.67 hrs HW=22.93' (Free Discharge)
 ↑**2=Exfiltration** (Exfiltration Controls 0.05 cfs)

Secondary OutFlow Max=0.00 cfs @ 3.00 hrs HW=13.96' (Free Discharge)
 ↑**1=Orifice/Grate** (Controls 0.00 cfs)



Pond SIB-2: SIB-2

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Summary for Pond SIB-3: SIB-3

Inflow Area = 0.123 ac, 44.81% Impervious, Inflow Depth = 1.62" for 10-Year event
 Inflow = 0.25 cfs @ 12.02 hrs, Volume= 0.017 af
 Outflow = 0.04 cfs @ 12.52 hrs, Volume= 0.017 af, Atten= 84%, Lag= 29.8 min
 Discarded = 0.04 cfs @ 12.52 hrs, Volume= 0.017 af
 Secondary = 0.00 cfs @ 3.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 3.00-48.00 hrs, dt= 0.05 hrs / 4
 Peak Elev= 18.53' @ 12.52 hrs Surf.Area= 100 sf Storage= 241 cf

Plug-Flow detention time= 76.6 min calculated for 0.017 af (100% of inflow)
 Center-of-Mass det. time= 76.6 min (933.3 - 856.8)

Volume	Invert	Avail.Storage	Storage Description
#1	13.96'	148 cf	10.00'W x 10.00'L x 6.00'H Prismatic 600 cf Overall - 231 cf Embedded = 369 cf x 40.0% Voids
#2	13.96'	170 cf	6.00'D x 6.00'H Vertical Cone/Cylinder Inside #1 231 cf Overall - 6.0" Wall Thickness = 170 cf
#3	19.96'	9 cf	2.00'D x 3.00'H Vertical Cone/Cylinder -Impervious
#4	22.96'	878 cf	Custom Stage Data (Irregular) Listed below (Recalc)
		1,204 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
22.96	83	37.0	0	0	83
24.00	393	75.0	228	228	427
25.00	947	117.0	650	878	1,076

Device	Routing	Invert	Outlet Devices
#1	Secondary	23.00'	2.0" x 2.0" Horiz. Orifice/Grate X 6.00 columns X 6 rows C= 0.600 Limited to weir flow at low heads
#2	Discarded	13.96'	8.270 in/hr Exfiltration over Wetted area from 13.96' - 23.00' Excluded Wetted area = 100 sf Phase-In= 0.01'
#3	Discarded	13.96'	2.414 in/hr Exfiltration over Surface area Phase-In= 0.01'

Discarded OutFlow Max=0.04 cfs @ 12.52 hrs HW=18.52' (Free Discharge)

- ↑ 2=Exfiltration (Exfiltration Controls 0.03 cfs)
- ↑ 3=Exfiltration (Exfiltration Controls 0.01 cfs)

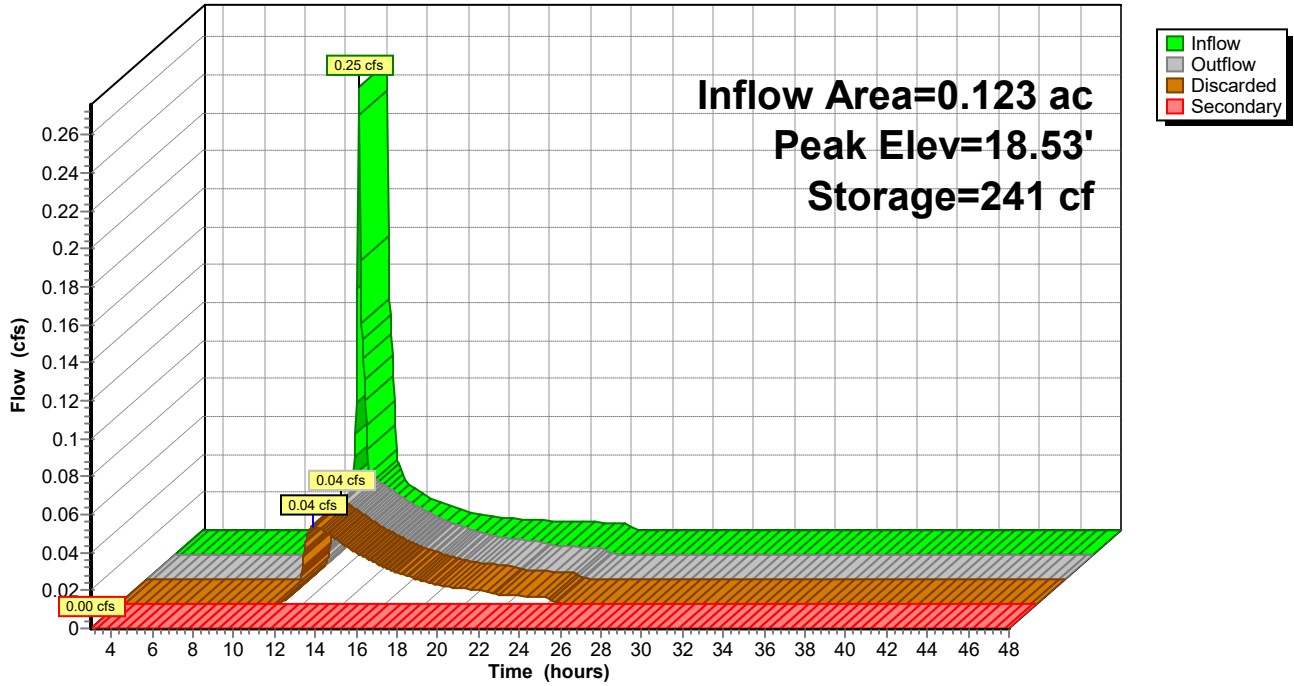
Secondary OutFlow Max=0.00 cfs @ 3.00 hrs HW=13.96' (Free Discharge)

- ↑ 1=Orifice/Grate (Controls 0.00 cfs)



Pond SIB-3: SIB-3

Hydrograph



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Time span=3.00-48.00 hrs, dt=0.05 hrs, 901 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment DA1: DA1 Runoff Area=47,720 sf 36.62% Impervious Runoff Depth=2.13"
 Flow Length=191' Tc=12.7 min CN=61 Runoff=2.08 cfs 0.195 af

Subcatchment DA2: DA2 Runoff Area=29,170 sf 17.26% Impervious Runoff Depth=1.16"
 Flow Length=264' Tc=11.2 min CN=49 Runoff=0.59 cfs 0.065 af

Subcatchment DA3: DA3 Runoff Area=5,342 sf 44.81% Impervious Runoff Depth=2.49"
 Flow Length=88' Tc=0.9 min CN=65 Runoff=0.39 cfs 0.025 af

Subcatchment DA4: DA4 Runoff Area=79,094 sf 13.14% Impervious Runoff Depth=0.50"
 Flow Length=400' Tc=4.8 min CN=39 Runoff=0.39 cfs 0.076 af

Subcatchment DA5: DA5 Runoff Area=62,200 sf 30.35% Impervious Runoff Depth=2.67"
 Flow Length=225' Tc=2.4 min CN=67 Runoff=4.87 cfs 0.318 af

Subcatchment DA6: DA6 Runoff Area=17,571 sf 72.63% Impervious Runoff Depth=4.16"
 Flow Length=125' Slope=0.0100 '/' Tc=5.8 min CN=82 Runoff=1.92 cfs 0.140 af

Subcatchment DA7: DA7 Runoff Area=22,134 sf 56.17% Impervious Runoff Depth=3.15"
 Flow Length=200' Slope=0.0100 '/' Tc=14.2 min CN=72 Runoff=1.44 cfs 0.133 af

Pond CB DA7: CB DA7 Inflow=1.44 cfs 0.133 af
 Primary=1.44 cfs 0.133 af

Pond EX SIB DA5: EX. SIB DA5 Peak Elev=18.45' Storage=4,053 cf Inflow=6.64 cfs 0.458 af
 Outflow=1.79 cfs 0.458 af

Pond EX. BASIN DA4: EX. BASIN DA4 Peak Elev=16.37' Storage=574 cf Inflow=0.39 cfs 0.076 af
 Discarded=0.12 cfs 0.076 af Secondary=0.00 cfs 0.000 af Outflow=0.12 cfs 0.076 af

Pond SIB-1: SIB-1 Peak Elev=10.74' Storage=2,151 cf Inflow=2.08 cfs 0.195 af
 Discarded=0.60 cfs 0.195 af Secondary=0.00 cfs 0.000 af Outflow=0.60 cfs 0.195 af

Pond SIB-2: SIB-2 Peak Elev=23.02' Storage=377 cf Inflow=0.59 cfs 0.065 af
 Discarded=0.21 cfs 0.059 af Secondary=0.30 cfs 0.006 af Outflow=0.51 cfs 0.065 af

Pond SIB-3: SIB-3 Peak Elev=23.01' Storage=331 cf Inflow=0.39 cfs 0.025 af
 Discarded=0.07 cfs 0.024 af Secondary=0.14 cfs 0.001 af Outflow=0.21 cfs 0.026 af

Total Runoff Area = 6.043 ac Runoff Volume = 0.952 af Average Runoff Depth = 1.89"
69.85% Pervious = 4.221 ac 30.15% Impervious = 1.822 ac

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Type III 24-hr 25-Year Rainfall=6.19"

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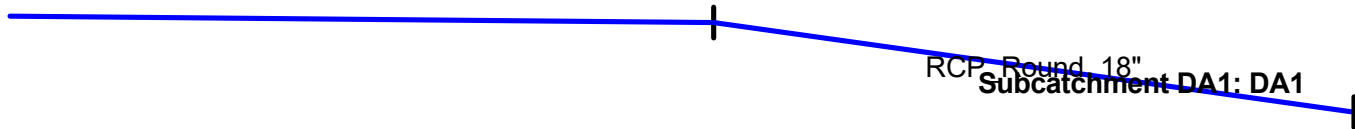
Summary for Subcatchment DA1: DA1

Runoff = 2.08 cfs @ 12.19 hrs, Volume= 0.195 af, Depth= 2.13"
 Routed to Pond SIB-1 : SIB-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-48.00 hrs, dt= 0.05 hrs
 Type III 24-hr 25-Year Rainfall=6.19"

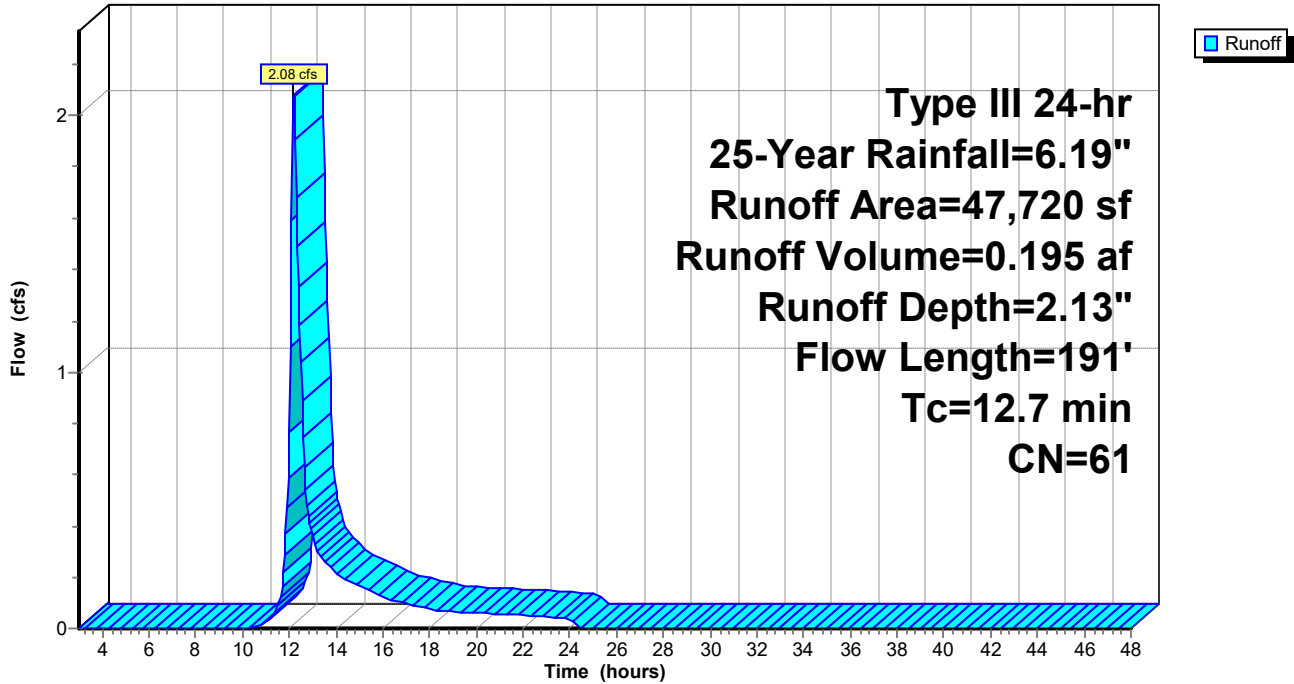
	Area (sf)	CN	Description
*	17,477	98	
*	30,243	39	
	47,720	61	Weighted Average
	30,243		63.38% Pervious Area
	17,477		36.62% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.6	100	0.0100	0.13		Sheet Flow, Grass: Short n= 0.150 P2= 3.35"
0.1	91	0.1500	23.02	40.68	Pipe Channel, RCP_Round 18" 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
12.7	191	Total			



Subcatchment DA1: DA1

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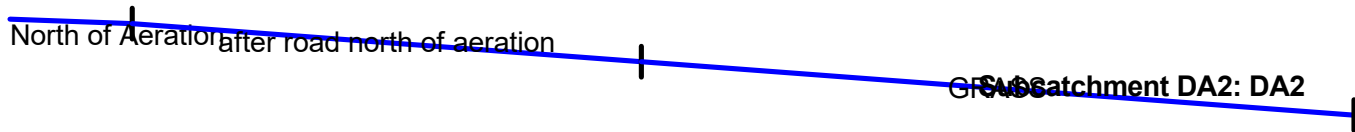
Summary for Subcatchment DA2: DA2

Runoff = 0.59 cfs @ 12.20 hrs, Volume= 0.065 af, Depth= 1.16"
 Routed to Pond SIB-2 : SIB-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-48.00 hrs, dt= 0.05 hrs
 Type III 24-hr 25-Year Rainfall=6.19"

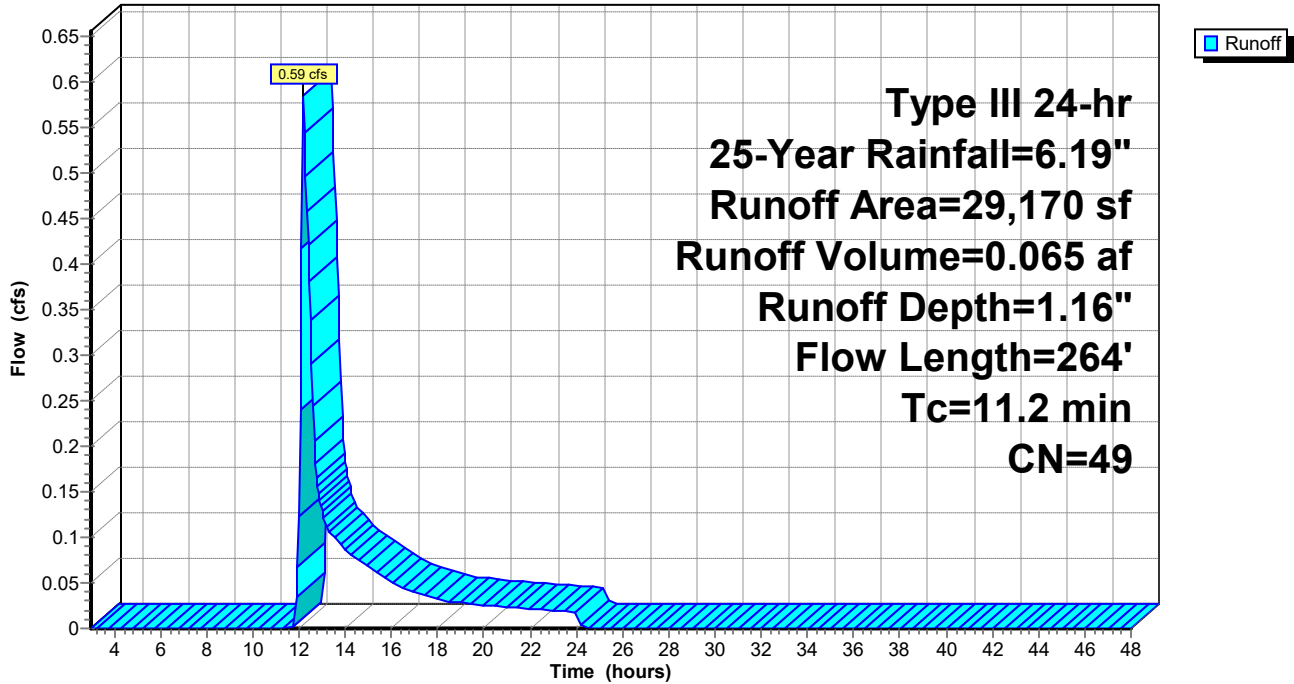
Area (sf)	CN	Description
* 5,035	98	Impervious
24,135	39	>75% Grass cover, Good, HSG A
29,170	49	Weighted Average
24,135		82.74% Pervious Area
5,035		17.26% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	24	0.0100	0.80		Sheet Flow, North of Aeration Smooth surfaces n= 0.011 P2= 3.35"
9.6	100	0.0200	0.17		Sheet Flow, after road north of aeration Grass: Short n= 0.150 P2= 3.35"
1.1	140	0.0200	2.12		Shallow Concentrated Flow, GRASS Grassed Waterway Kv= 15.0 fps
11.2	264	Total			



Subcatchment DA2: DA2

Hydrograph



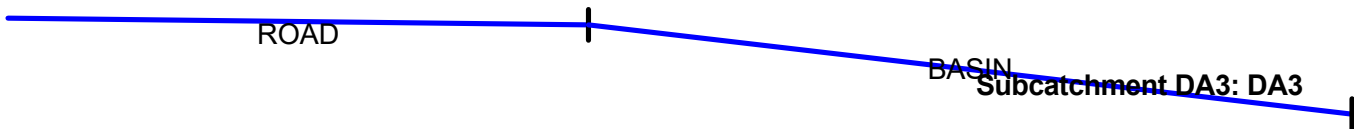
Summary for Subcatchment DA3: DA3

Runoff = 0.39 cfs @ 12.02 hrs, Volume= 0.025 af, Depth= 2.49"
 Routed to Pond SIB-3 : SIB-3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-48.00 hrs, dt= 0.05 hrs
 Type III 24-hr 25-Year Rainfall=6.19"

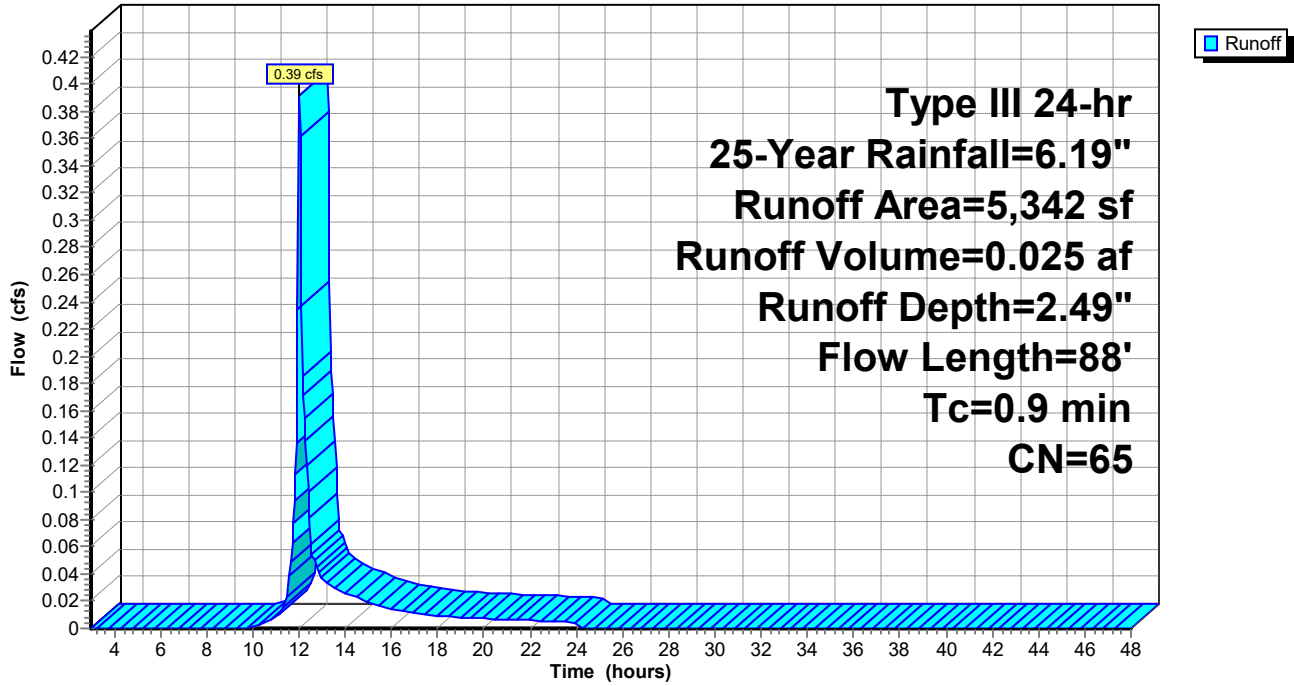
Area (sf)	CN	Description
* 2,394	98	IMPERVIOUS
2,948	39	>75% Grass cover, Good, HSG A
5,342	65	Weighted Average
2,948		55.19% Pervious Area
2,394		44.81% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	38	0.0100	0.88		Sheet Flow, ROAD Smooth surfaces n= 0.011 P2= 3.35"
0.2	50	0.1000	5.09		Shallow Concentrated Flow, BASIN Unpaved Kv= 16.1 fps
0.9	88	Total			



Subcatchment DA3: DA3

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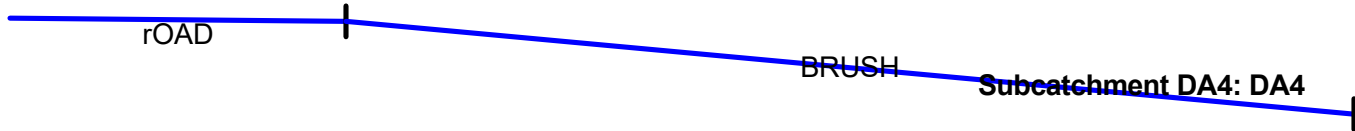
Summary for Subcatchment DA4: DA4

Runoff = 0.39 cfs @ 12.31 hrs, Volume= 0.076 af, Depth= 0.50"
 Routed to Pond EX. BASIN DA4 : EX. BASIN DA4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-48.00 hrs, dt= 0.05 hrs
 Type III 24-hr 25-Year Rainfall=6.19"

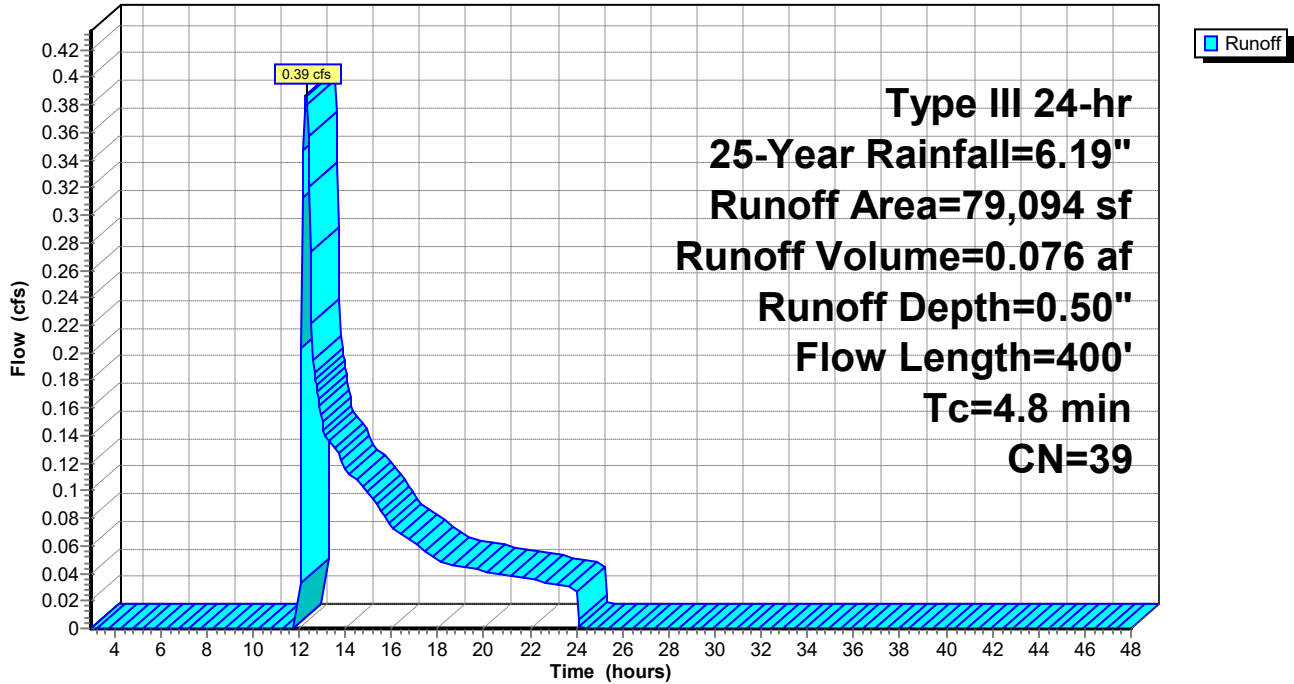
Area (sf)	CN	Description
66,054	30	Brush, Good, HSG A
* 10,390	98	ROAD
2,650	30	Woods, Good, HSG A
79,094	39	Weighted Average
68,704		86.86% Pervious Area
10,390		13.14% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.6	100	0.0100	1.07		Sheet Flow, rOAD Smooth surfaces n= 0.011 P2= 3.35"
3.2	300	0.1000	1.58		Shallow Concentrated Flow, BRUSH Woodland Kv= 5.0 fps
4.8	400	Total			



Subcatchment DA4: DA4

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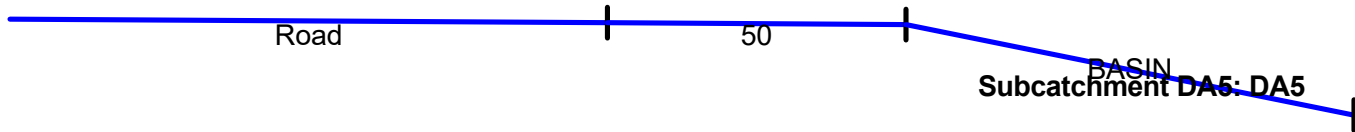
Summary for Subcatchment DA5: DA5

Runoff = 4.87 cfs @ 12.05 hrs, Volume= 0.318 af, Depth= 2.67"
 Routed to Pond EX SIB DA5 : EX. SIB DA5

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-48.00 hrs, dt= 0.05 hrs
 Type III 24-hr 25-Year Rainfall=6.19"

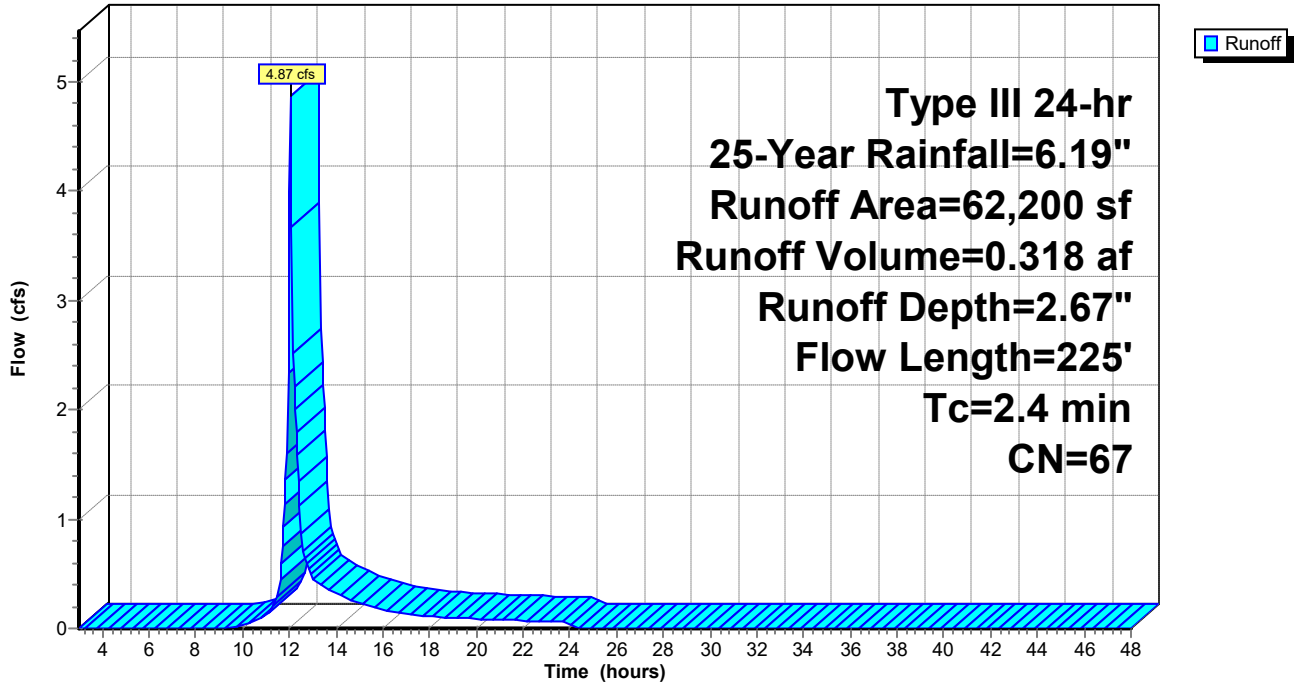
Area (sf)	CN	Description
* 18,875	98	IMPERVIOUS
32,940	58	Meadow, non-grazed, HSG B
10,385	39	>75% Grass cover, Good, HSG A
62,200	67	Weighted Average
43,325		69.65% Pervious Area
18,875		30.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.6	100	0.0100	1.07		Sheet Flow, Road Smooth surfaces n= 0.011 P2= 3.35"
0.4	50	0.0100	2.03		Shallow Concentrated Flow, 50 Paved Kv= 20.3 fps
0.4	75	0.3300	2.87		Shallow Concentrated Flow, BASIN Woodland Kv= 5.0 fps
2.4	225	Total			



Subcatchment DA5: DA5

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Summary for Subcatchment DA6: DA6

Runoff = 1.92 cfs @ 12.09 hrs, Volume= 0.140 af, Depth= 4.16"
 Routed to Pond EX SIB DA5 : EX. SIB DA5

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-48.00 hrs, dt= 0.05 hrs
 Type III 24-hr 25-Year Rainfall=6.19"

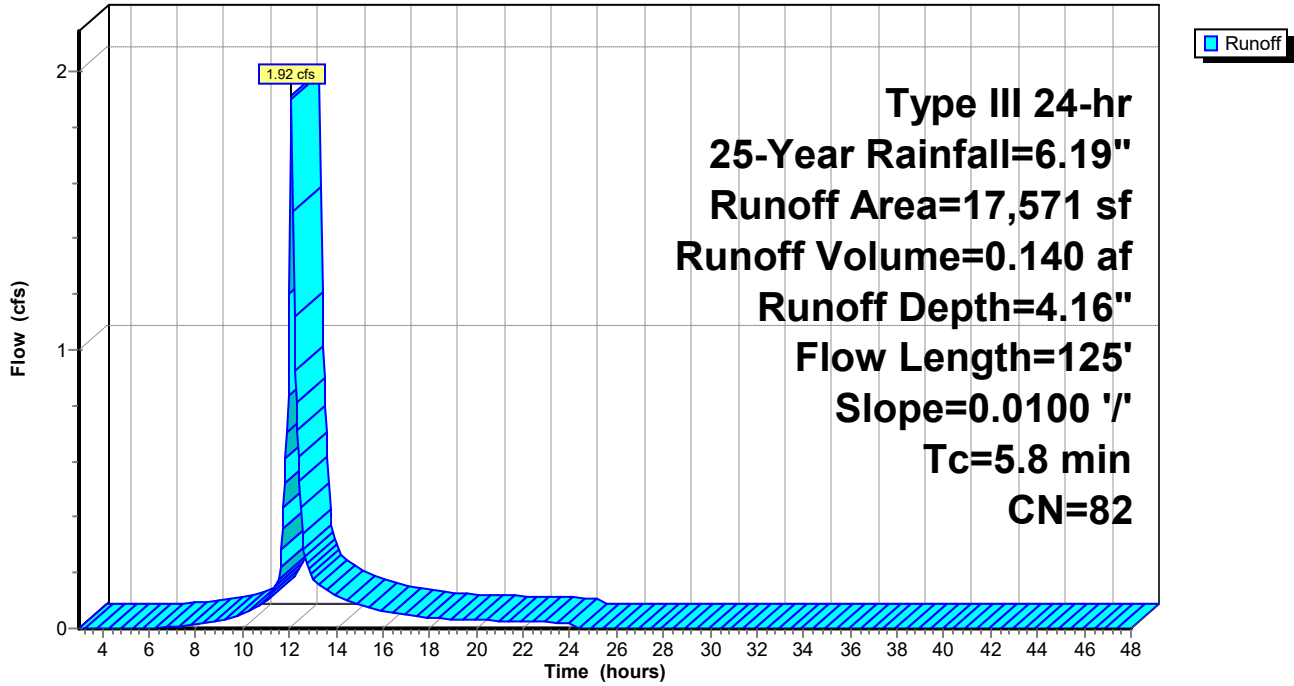
Area (sf)	CN	Description
* 12,762	98	
* 4,809	39	
17,571	82	Weighted Average
4,809		27.37% Pervious Area
12,762		72.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.6	100	0.0100	1.07		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.35"
4.2	25	0.0100	0.10		Sheet Flow, Grass: Short n= 0.150 P2= 3.35"
5.8	125	Total			



Subcatchment DA6: DA6

Hydrograph



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Type III 24-hr 25-Year Rainfall=6.19"

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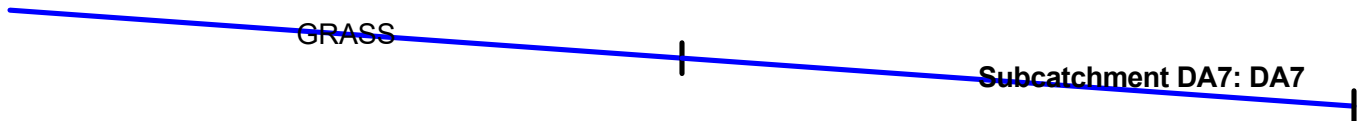
Summary for Subcatchment DA7: DA7

Runoff = 1.44 cfs @ 12.20 hrs, Volume= 0.133 af, Depth= 3.15"
 Routed to Pond CB DA7 : CB DA7

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-48.00 hrs, dt= 0.05 hrs
 Type III 24-hr 25-Year Rainfall=6.19"

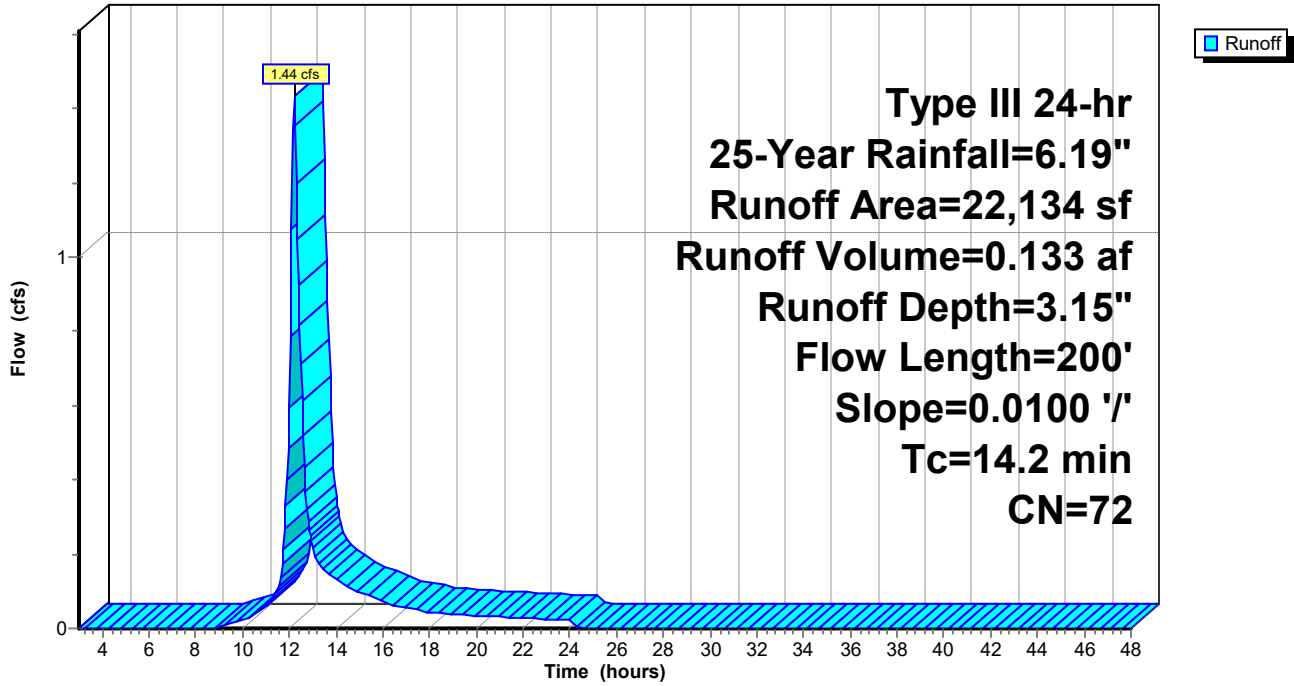
Area (sf)	CN	Description
9,701	39	>75% Grass cover, Good, HSG A
12,433	98	Paved parking, HSG A
22,134	72	Weighted Average
9,701		43.83% Pervious Area
12,433		56.17% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.6	100	0.0100	0.13		Sheet Flow, GRASS Grass: Short n= 0.150 P2= 3.35"
1.6	100	0.0100	1.07		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.35"
14.2	200	Total			



Subcatchment DA7: DA7

Hydrograph



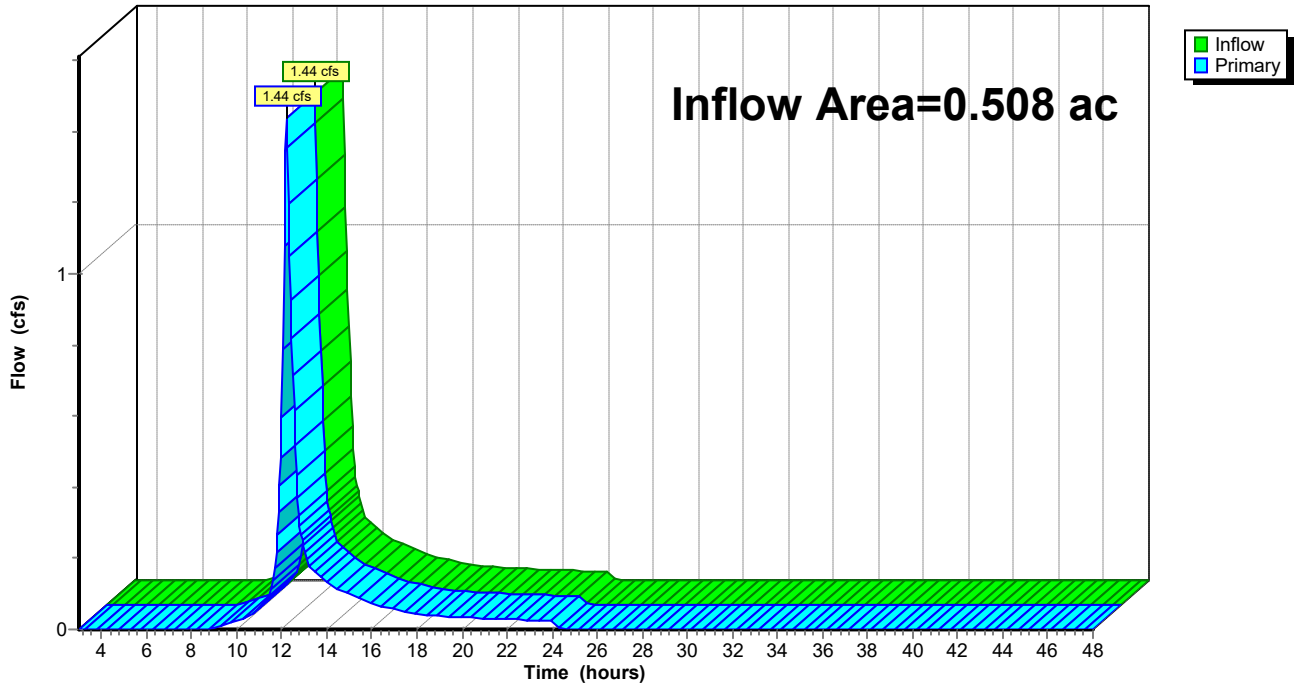
Summary for Pond CB DA7: CB DA7

Inflow Area = 0.508 ac, 56.17% Impervious, Inflow Depth = 3.15" for 25-Year event
Inflow = 1.44 cfs @ 12.20 hrs, Volume= 0.133 af
Primary = 1.44 cfs @ 12.20 hrs, Volume= 0.133 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 3.00-48.00 hrs, dt= 0.05 hrs

Pond CB DA7: CB DA7

Hydrograph



Summary for Pond EX SIB DA5: EX. SIB DA5

Inflow Area = 1.831 ac, 39.66% Impervious, Inflow Depth = 3.00" for 25-Year event
 Inflow = 6.64 cfs @ 12.05 hrs, Volume= 0.458 af
 Outflow = 1.79 cfs @ 12.43 hrs, Volume= 0.458 af, Atten= 73%, Lag= 22.4 min
 Discarded = 1.79 cfs @ 12.43 hrs, Volume= 0.458 af

Routing by Stor-Ind method, Time Span= 3.00-48.00 hrs, dt= 0.05 hrs
 Peak Elev= 18.45' @ 12.43 hrs Surf.Area= 9,328 sf Storage= 4,053 cf

Plug-Flow detention time= 13.3 min calculated for 0.458 af (100% of inflow)
 Center-of-Mass det. time= 13.3 min (843.6 - 830.3)

Volume	Invert	Avail.Storage	Storage Description
#1	18.00'	34,414 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
18.00	8,621	0	0	8,621
19.00	10,223	9,411	9,411	10,259
20.00	12,600	11,391	20,801	12,666
21.00	14,650	13,612	34,414	14,758

Device	Routing	Invert	Outlet Devices
#1	Discarded	18.00'	8.270 in/hr Exfiltration over Surface area Phase-In= 0.01'

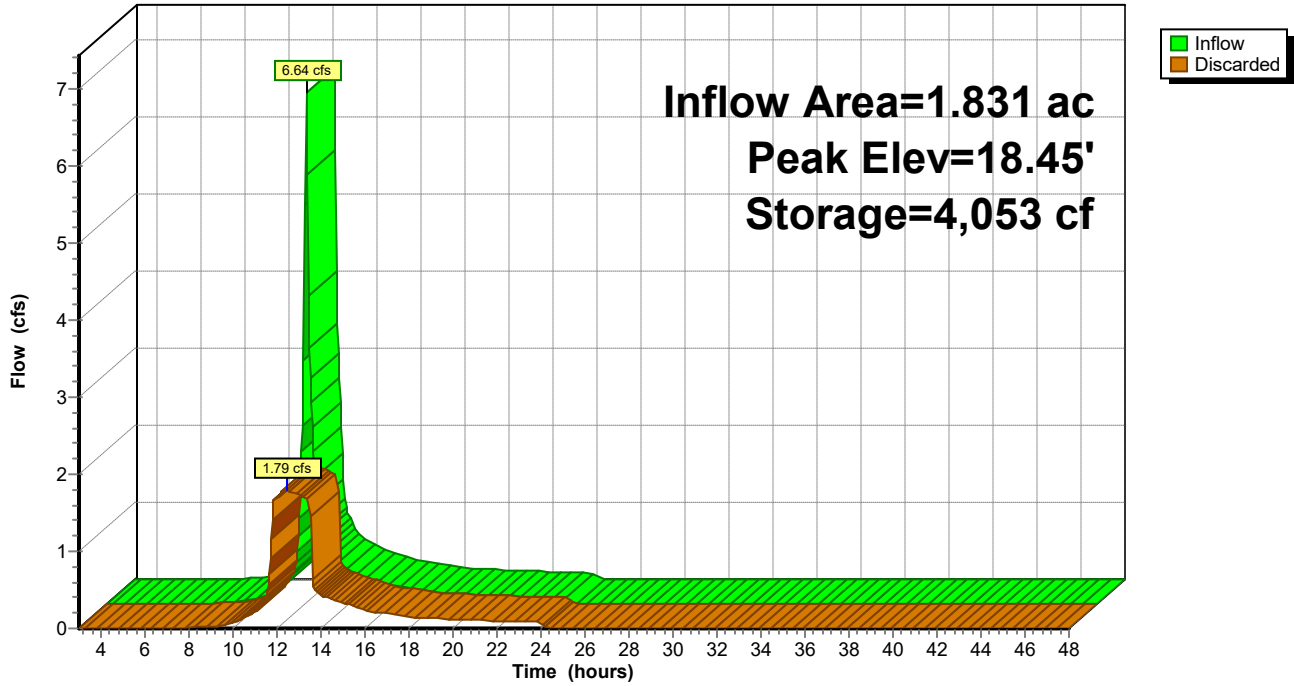
Discarded OutFlow Max=1.79 cfs @ 12.43 hrs HW=18.45' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 1.79 cfs)

Pond EX SIB DA5: EX. SIB DA5

Exfiltration

Pond EX SIB DA5: EX. SIB DA5

Hydrograph



Summary for Pond EX. BASIN DA4: EX. BASIN DA4

Inflow Area = 1.816 ac, 13.14% Impervious, Inflow Depth = 0.50" for 25-Year event
 Inflow = 0.39 cfs @ 12.31 hrs, Volume= 0.076 af
 Outflow = 0.12 cfs @ 13.94 hrs, Volume= 0.076 af, Atten= 69%, Lag= 98.2 min
 Discarded = 0.12 cfs @ 13.94 hrs, Volume= 0.076 af
 Secondary = 0.00 cfs @ 3.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 3.00-48.00 hrs, dt= 0.05 hrs / 3
 Peak Elev= 16.37' @ 13.94 hrs Surf.Area= 2,123 sf Storage= 574 cf

Plug-Flow detention time= 51.7 min calculated for 0.076 af (100% of inflow)
 Center-of-Mass det. time= 51.7 min (1,003.5 - 951.8)

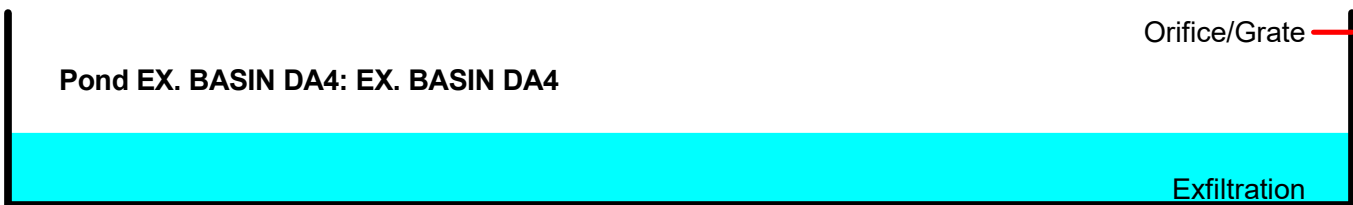
Volume	Invert	Avail.Storage	Storage Description
#1	16.00'	2,708 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
16.00	1,025	0	0	1,025
17.00	4,866	2,708	2,708	4,870

Device	Routing	Invert	Outlet Devices
#1	Discarded	16.00'	2.410 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Secondary	16.90'	360.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

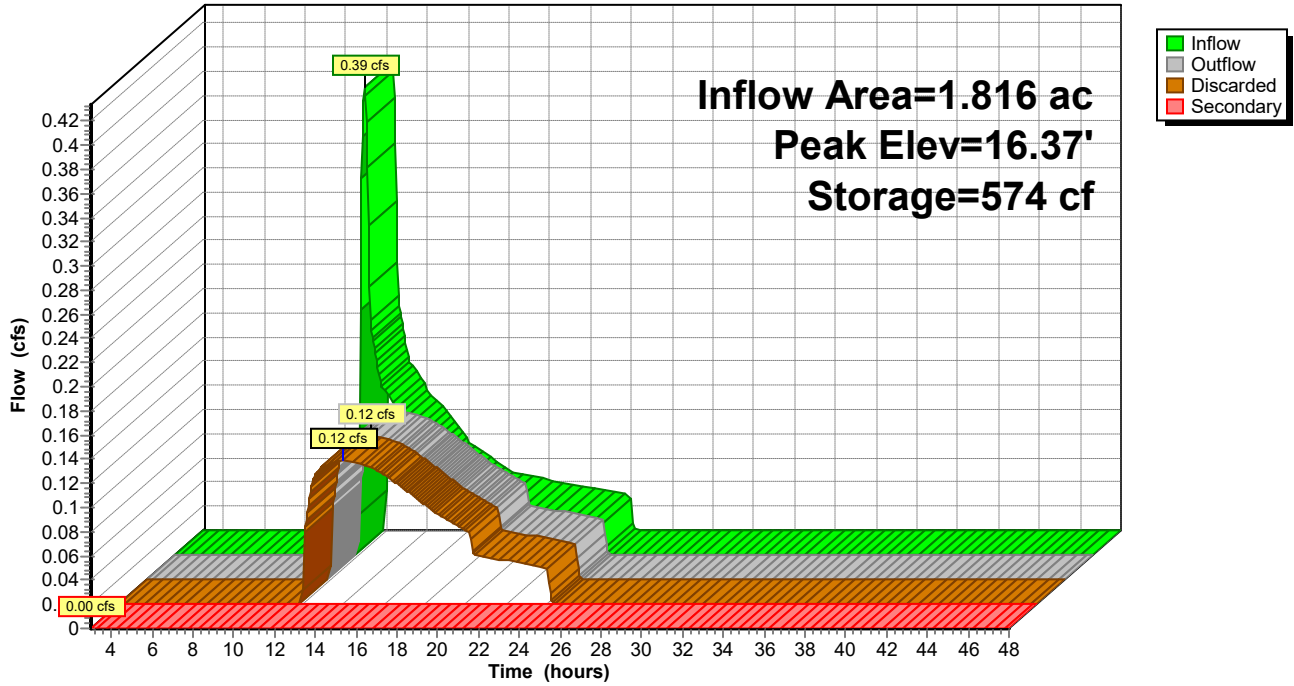
Discarded OutFlow Max=0.12 cfs @ 13.94 hrs HW=16.37' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.12 cfs)

Secondary OutFlow Max=0.00 cfs @ 3.00 hrs HW=16.00' (Free Discharge)
 ↑2=Orifice/Grate (Controls 0.00 cfs)



Pond EX. BASIN DA4: EX. BASIN DA4

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Summary for Pond SIB-1: SIB-1

Inflow Area = 1.096 ac, 36.62% Impervious, Inflow Depth = 2.13" for 25-Year event
 Inflow = 2.08 cfs @ 12.19 hrs, Volume= 0.195 af
 Outflow = 0.60 cfs @ 12.67 hrs, Volume= 0.195 af, Atten= 71%, Lag= 28.5 min
 Discarded = 0.60 cfs @ 12.67 hrs, Volume= 0.195 af
 Secondary = 0.00 cfs @ 3.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 3.00-48.00 hrs, dt= 0.05 hrs
 Peak Elev= 10.74' @ 12.67 hrs Surf.Area= 3,140 sf Storage= 2,151 cf

Plug-Flow detention time= 28.7 min calculated for 0.195 af (100% of inflow)
 Center-of-Mass det. time= 28.5 min (893.0 - 864.5)

Volume	Invert	Avail.Storage	Storage Description
#1	10.00'	123,382 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
10.00	2,664	0	0
11.00	3,306	2,985	2,985
12.00	4,005	3,656	6,641
13.00	4,760	4,383	11,023
14.00	5,572	5,166	16,189
15.00	6,440	6,006	22,195
16.00	7,365	6,903	29,098
17.00	8,347	7,856	36,954
18.00	9,385	8,866	45,820
19.00	10,480	9,933	55,752
20.00	11,630	11,055	66,807
21.00	12,837	12,234	79,041
22.00	14,101	13,469	92,510
23.00	15,422	14,762	107,271
24.00	16,800	16,111	123,382

Device	Routing	Invert	Outlet Devices
#1	Discarded	10.00'	8.270 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Secondary	23.90'	360.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

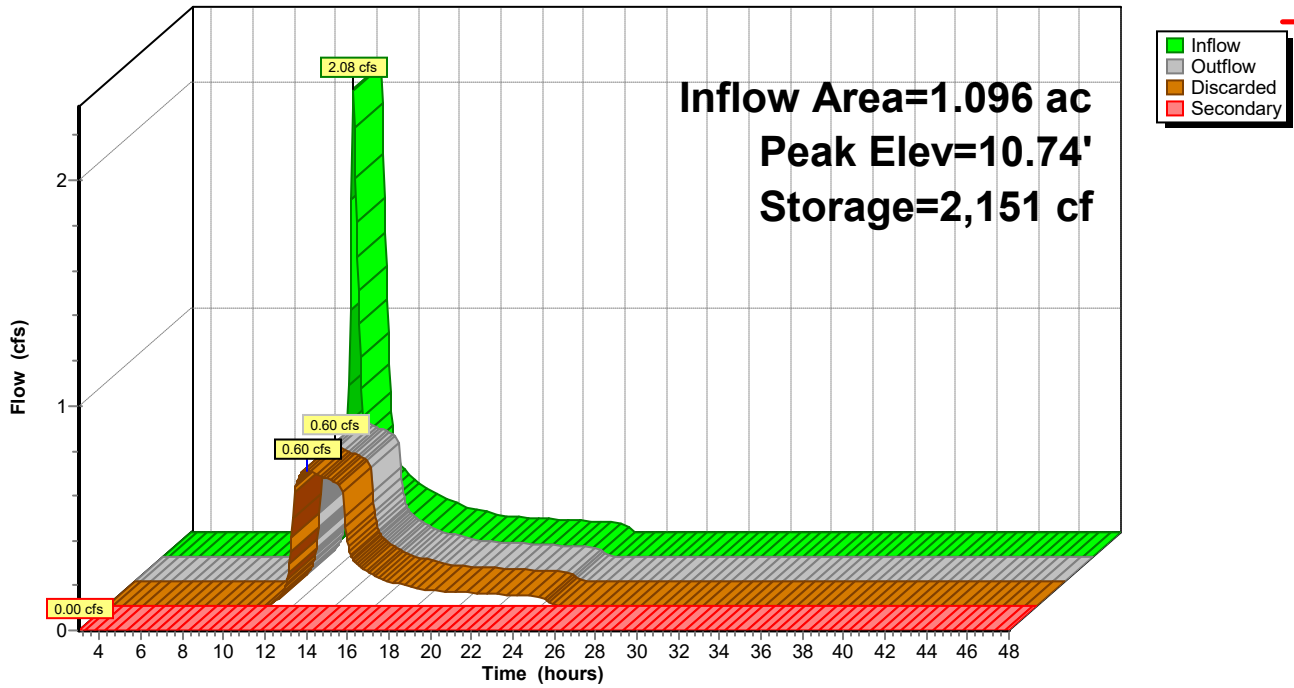
Discarded OutFlow Max=0.60 cfs @ 12.67 hrs HW=10.74' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.60 cfs)

Secondary OutFlow Max=0.00 cfs @ 3.00 hrs HW=10.00' (Free Discharge)
 ↑2=Orifice/Grate (Controls 0.00 cfs)



Pond SIB-1: SIB-1

Hydrograph



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Summary for Pond SIB-2: SIB-2

Inflow Area = 0.670 ac, 17.26% Impervious, Inflow Depth = 1.16" for 25-Year event
 Inflow = 0.59 cfs @ 12.20 hrs, Volume= 0.065 af
 Outflow = 0.51 cfs @ 12.31 hrs, Volume= 0.065 af, Atten= 13%, Lag= 7.1 min
 Discarded = 0.21 cfs @ 12.25 hrs, Volume= 0.059 af
 Secondary = 0.30 cfs @ 12.31 hrs, Volume= 0.006 af

Routing by Stor-Ind method, Time Span= 3.00-48.00 hrs, dt= 0.05 hrs / 4
 Peak Elev= 23.02' @ 12.30 hrs Surf.Area= 982 sf Storage= 377 cf

Plug-Flow detention time= 68.3 min calculated for 0.065 af (100% of inflow)
 Center-of-Mass det. time= 73.1 min (973.2 - 900.1)

Volume	Invert	Avail.Storage	Storage Description
#1	13.96'	148 cf	10.00'W x 10.00'L x 6.00'H Prismatic 600 cf Overall - 231 cf Embedded = 369 cf x 40.0% Voids
#2	13.96'	170 cf	6.00'D x 6.00'H Vertical Cone/Cylinder Inside #1 231 cf Overall - 6.0" Wall Thickness = 170 cf
#3	19.96'	9 cf	2.00'D x 3.00'H Vertical Cone/Cylinder -Impervious
#4	22.96'	1,578 cf	Custom Stage Data (Irregular) Listed below (Recalc)
		1,905 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
22.96	817	126.0	0	0	817
24.00	2,350	206.0	1,578	1,578	2,938

Device	Routing	Invert	Outlet Devices
#1	Secondary	23.00'	2.0" x 2.0" Horiz. Orifice/Grate X 6.00 columns X 6 rows C= 0.600 Limited to weir flow at low heads
#2	Discarded	13.96'	8.270 in/hr Exfiltration over Wetted area from 13.96' - 23.00' Excluded Wetted area = 100 sf Phase-In= 0.01'

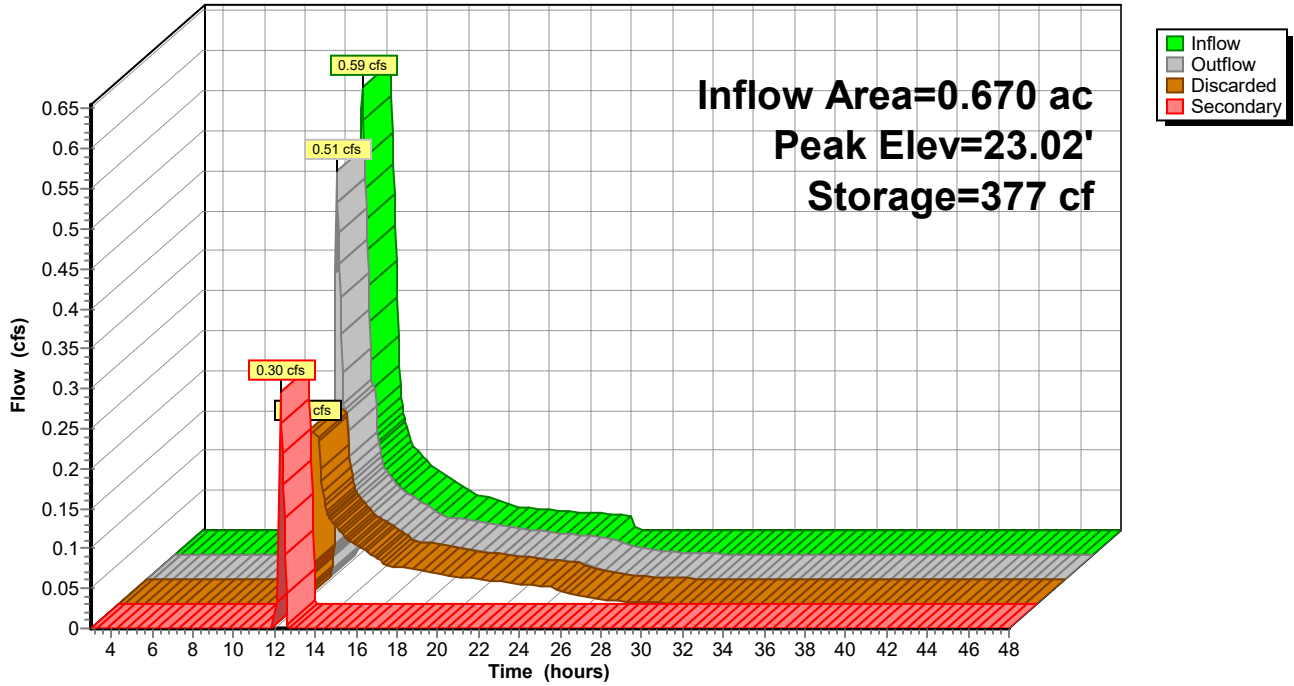
Discarded OutFlow Max=0.21 cfs @ 12.25 hrs HW=23.01' (Free Discharge)
 ↑**2=Exfiltration** (Exfiltration Controls 0.21 cfs)

Secondary OutFlow Max=0.19 cfs @ 12.31 hrs HW=23.02' (Free Discharge)
 ↑**1=Orifice/Grate** (Weir Controls 0.19 cfs @ 0.44 fps)



Pond SIB-2: SIB-2

Hydrograph



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Summary for Pond SIB-3: SIB-3

Inflow Area = 0.123 ac, 44.81% Impervious, Inflow Depth = 2.49" for 25-Year event
 Inflow = 0.39 cfs @ 12.02 hrs, Volume= 0.025 af
 Outflow = 0.21 cfs @ 12.21 hrs, Volume= 0.026 af, Atten= 46%, Lag= 11.6 min
 Discarded = 0.07 cfs @ 12.20 hrs, Volume= 0.024 af
 Secondary = 0.14 cfs @ 12.21 hrs, Volume= 0.001 af

Routing by Stor-Ind method, Time Span= 3.00-48.00 hrs, dt= 0.05 hrs / 4
 Peak Elev= 23.01' @ 12.20 hrs Surf.Area= 193 sf Storage= 331 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 76.0 min (919.7 - 843.7)

Volume	Invert	Avail.Storage	Storage Description
#1	13.96'	148 cf	10.00'W x 10.00'L x 6.00'H Prismaoid 600 cf Overall - 231 cf Embedded = 369 cf x 40.0% Voids
#2	13.96'	170 cf	6.00'D x 6.00'H Vertical Cone/Cylinder Inside #1 231 cf Overall - 6.0" Wall Thickness = 170 cf
#3	19.96'	9 cf	2.00'D x 3.00'H Vertical Cone/Cylinder -Impervious
#4	22.96'	878 cf	Custom Stage Data (Irregular) Listed below (Recalc)
		1,204 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
22.96	83	37.0	0	0	83
24.00	393	75.0	228	228	427
25.00	947	117.0	650	878	1,076

Device	Routing	Invert	Outlet Devices
#1	Secondary	23.00'	2.0" x 2.0" Horiz. Orifice/Grate X 6.00 columns X 6 rows C= 0.600 Limited to weir flow at low heads
#2	Discarded	13.96'	8.270 in/hr Exfiltration over Wetted area from 13.96' - 23.00' Excluded Wetted area = 100 sf Phase-In= 0.01'
#3	Discarded	13.96'	2.414 in/hr Exfiltration over Surface area Phase-In= 0.01'

Discarded OutFlow Max=0.07 cfs @ 12.20 hrs HW=23.01' (Free Discharge)

- ↑ 2=Exfiltration (Exfiltration Controls 0.06 cfs)
- ↑ 3=Exfiltration (Exfiltration Controls 0.01 cfs)

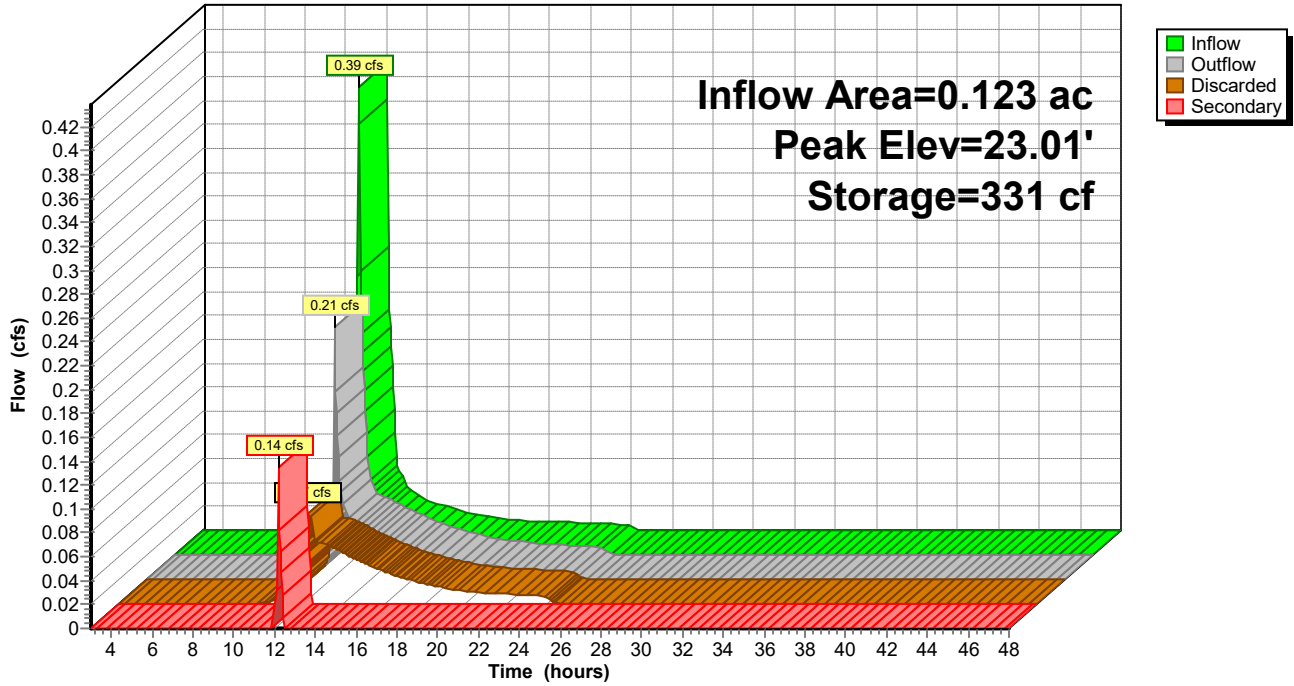
Secondary OutFlow Max=0.12 cfs @ 12.21 hrs HW=23.01' (Free Discharge)

- ↑ 1=Orifice/Grate (Weir Controls 0.12 cfs @ 0.37 fps)



Pond SIB-3: SIB-3

Hydrograph



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Type III 24-hr 50-Year Rainfall=7.33"

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Time span=3.00-48.00 hrs, dt=0.05 hrs, 901 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment DA1: DA1 Runoff Area=47,720 sf 36.62% Impervious Runoff Depth=2.94"
 Flow Length=191' Tc=12.7 min CN=61 Runoff=2.94 cfs 0.269 af

Subcatchment DA2: DA2 Runoff Area=29,170 sf 17.26% Impervious Runoff Depth=1.76"
 Flow Length=264' Tc=11.2 min CN=49 Runoff=0.99 cfs 0.098 af

Subcatchment DA3: DA3 Runoff Area=5,342 sf 44.81% Impervious Runoff Depth=3.36"
 Flow Length=88' Tc=0.9 min CN=65 Runoff=0.54 cfs 0.034 af

Subcatchment DA4: DA4 Runoff Area=79,094 sf 13.14% Impervious Runoff Depth=0.89"
 Flow Length=400' Tc=4.8 min CN=39 Runoff=1.08 cfs 0.135 af

Subcatchment DA5: DA5 Runoff Area=62,200 sf 30.35% Impervious Runoff Depth=3.57"
 Flow Length=225' Tc=2.4 min CN=67 Runoff=6.55 cfs 0.425 af

Subcatchment DA6: DA6 Runoff Area=17,571 sf 72.63% Impervious Runoff Depth=5.23"
 Flow Length=125' Slope=0.0100 '/' Tc=5.8 min CN=82 Runoff=2.38 cfs 0.176 af

Subcatchment DA7: DA7 Runoff Area=22,134 sf 56.17% Impervious Runoff Depth=4.11"
 Flow Length=200' Slope=0.0100 '/' Tc=14.2 min CN=72 Runoff=1.88 cfs 0.174 af

Pond CB DA7: CB DA7 Inflow=1.88 cfs 0.174 af
 Primary=1.88 cfs 0.174 af

Pond EX SIB DA5: EX. SIB DA5 Peak Elev=18.71' Storage=6,496 cf Inflow=8.75 cfs 0.601 af
 Outflow=1.86 cfs 0.601 af

Pond EX. BASIN DA4: EX. BASIN DA4 Peak Elev=16.72' Storage=1,541 cf Inflow=1.08 cfs 0.135 af
 Discarded=0.20 cfs 0.135 af Secondary=0.00 cfs 0.000 af Outflow=0.20 cfs 0.135 af

Pond SIB-1: SIB-1 Peak Elev=11.16' Storage=3,522 cf Inflow=2.94 cfs 0.269 af
 Discarded=0.65 cfs 0.269 af Secondary=0.00 cfs 0.000 af Outflow=0.65 cfs 0.269 af

Pond SIB-2: SIB-2 Peak Elev=23.05' Storage=404 cf Inflow=0.99 cfs 0.098 af
 Discarded=0.21 cfs 0.078 af Secondary=0.76 cfs 0.020 af Outflow=0.98 cfs 0.098 af

Pond SIB-3: SIB-3 Peak Elev=23.05' Storage=335 cf Inflow=0.54 cfs 0.034 af
 Discarded=0.07 cfs 0.029 af Secondary=0.61 cfs 0.007 af Outflow=0.69 cfs 0.036 af

Total Runoff Area = 6.043 ac Runoff Volume = 1.311 af Average Runoff Depth = 2.60"
69.85% Pervious = 4.221 ac 30.15% Impervious = 1.822 ac

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Type III 24-hr 50-Year Rainfall=7.33"

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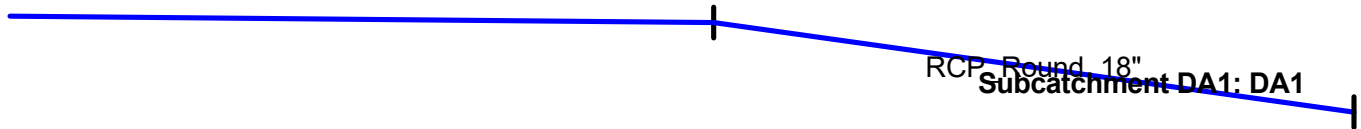
Summary for Subcatchment DA1: DA1

Runoff = 2.94 cfs @ 12.19 hrs, Volume= 0.269 af, Depth= 2.94"
 Routed to Pond SIB-1 : SIB-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-48.00 hrs, dt= 0.05 hrs
 Type III 24-hr 50-Year Rainfall=7.33"

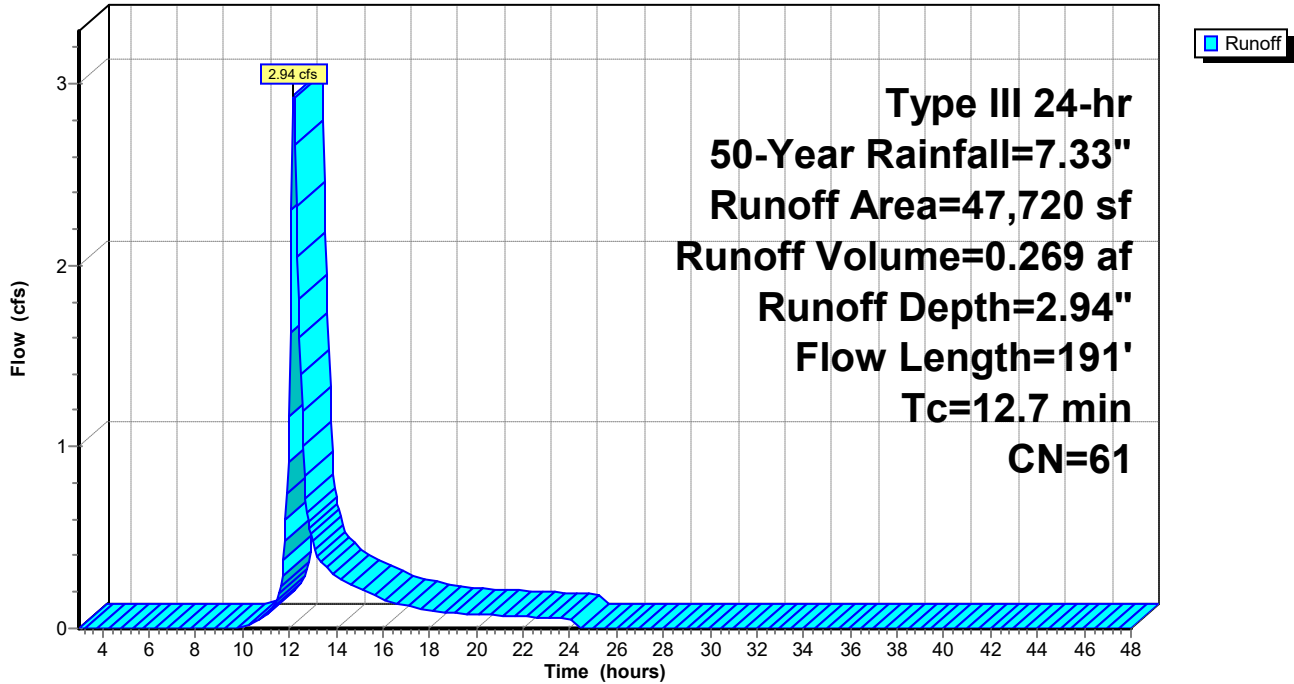
Area (sf)	CN	Description
* 17,477	98	
* 30,243	39	
47,720	61	Weighted Average
30,243		63.38% Pervious Area
17,477		36.62% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.6	100	0.0100	0.13		Sheet Flow, Grass: Short n= 0.150 P2= 3.35"
0.1	91	0.1500	23.02	40.68	Pipe Channel, RCP_Round 18" 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
12.7	191	Total			



Subcatchment DA1: DA1

Hydrograph



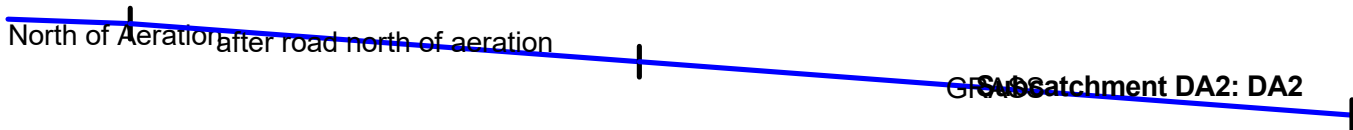
Summary for Subcatchment DA2: DA2

Runoff = 0.99 cfs @ 12.18 hrs, Volume= 0.098 af, Depth= 1.76"
 Routed to Pond SIB-2 : SIB-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-48.00 hrs, dt= 0.05 hrs
 Type III 24-hr 50-Year Rainfall=7.33"

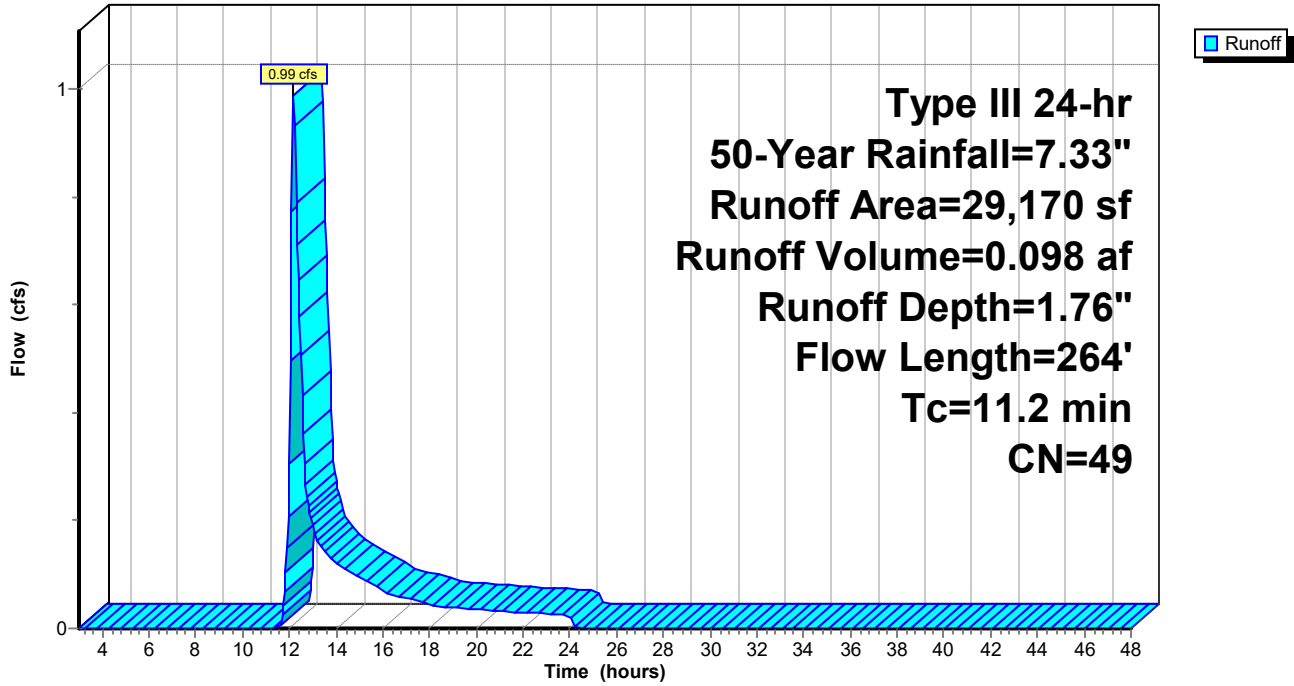
Area (sf)	CN	Description
* 5,035	98	Impervious
24,135	39	>75% Grass cover, Good, HSG A
29,170	49	Weighted Average
24,135		82.74% Pervious Area
5,035		17.26% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	24	0.0100	0.80		Sheet Flow, North of Aeration Smooth surfaces n= 0.011 P2= 3.35"
9.6	100	0.0200	0.17		Sheet Flow, after road north of aeration Grass: Short n= 0.150 P2= 3.35"
1.1	140	0.0200	2.12		Shallow Concentrated Flow, GRASS Grassed Waterway Kv= 15.0 fps
11.2	264	Total			



Subcatchment DA2: DA2

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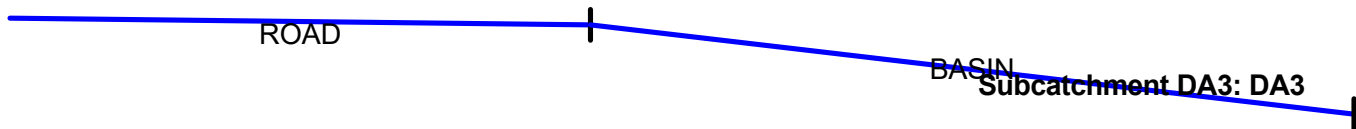
Summary for Subcatchment DA3: DA3

Runoff = 0.54 cfs @ 12.02 hrs, Volume= 0.034 af, Depth= 3.36"
 Routed to Pond SIB-3 : SIB-3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-48.00 hrs, dt= 0.05 hrs
 Type III 24-hr 50-Year Rainfall=7.33"

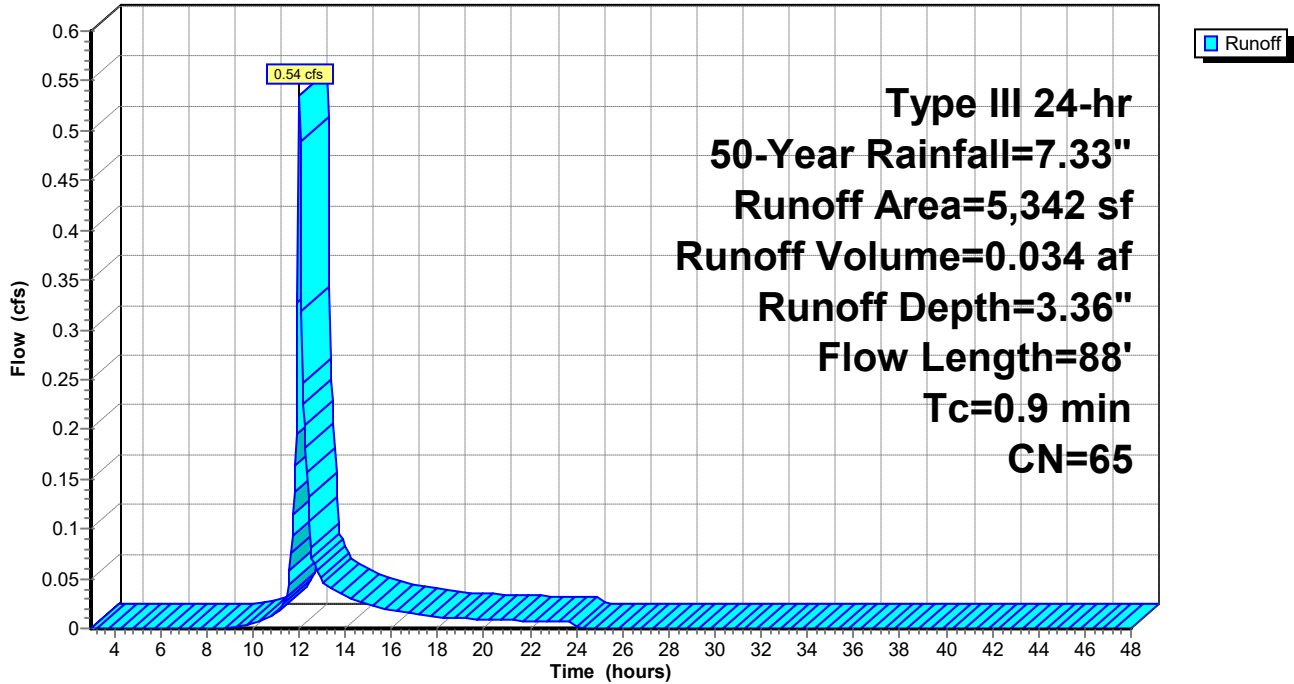
Area (sf)	CN	Description
* 2,394	98	IMPERVIOUS
2,948	39	>75% Grass cover, Good, HSG A
5,342	65	Weighted Average
2,948		55.19% Pervious Area
2,394		44.81% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	38	0.0100	0.88		Sheet Flow, ROAD Smooth surfaces n= 0.011 P2= 3.35"
0.2	50	0.1000	5.09		Shallow Concentrated Flow, BASIN Unpaved Kv= 16.1 fps
0.9	88	Total			



Subcatchment DA3: DA3

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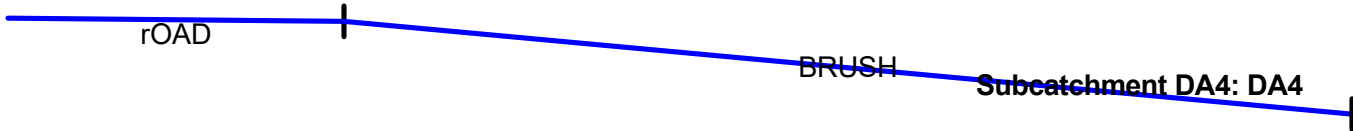
Summary for Subcatchment DA4: DA4

Runoff = 1.08 cfs @ 12.12 hrs, Volume= 0.135 af, Depth= 0.89"
 Routed to Pond EX. BASIN DA4 : EX. BASIN DA4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-48.00 hrs, dt= 0.05 hrs
 Type III 24-hr 50-Year Rainfall=7.33"

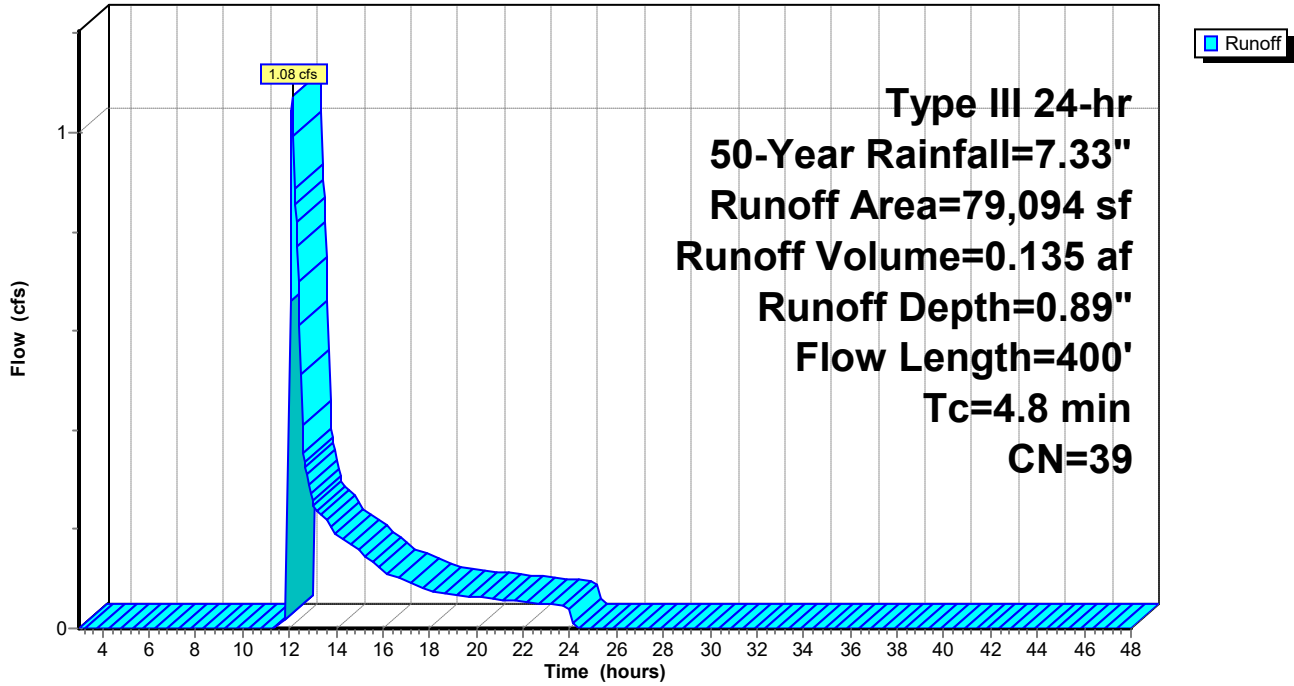
Area (sf)	CN	Description
66,054	30	Brush, Good, HSG A
* 10,390	98	ROAD
2,650	30	Woods, Good, HSG A
79,094	39	Weighted Average
68,704		86.86% Pervious Area
10,390		13.14% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.6	100	0.0100	1.07		Sheet Flow, rOAD Smooth surfaces n= 0.011 P2= 3.35"
3.2	300	0.1000	1.58		Shallow Concentrated Flow, BRUSH Woodland Kv= 5.0 fps
4.8	400	Total			



Subcatchment DA4: DA4

Hydrograph



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Type III 24-hr 50-Year Rainfall=7.33"

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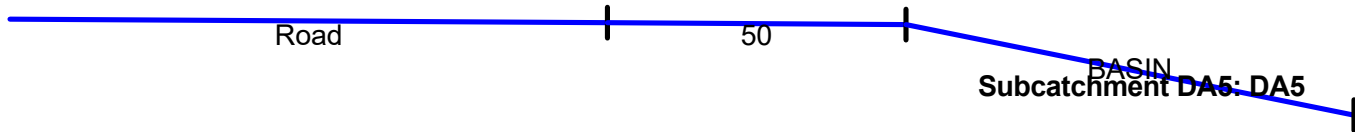
Summary for Subcatchment DA5: DA5

Runoff = 6.55 cfs @ 12.05 hrs, Volume= 0.425 af, Depth= 3.57"
 Routed to Pond EX SIB DA5 : EX. SIB DA5

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-48.00 hrs, dt= 0.05 hrs
 Type III 24-hr 50-Year Rainfall=7.33"

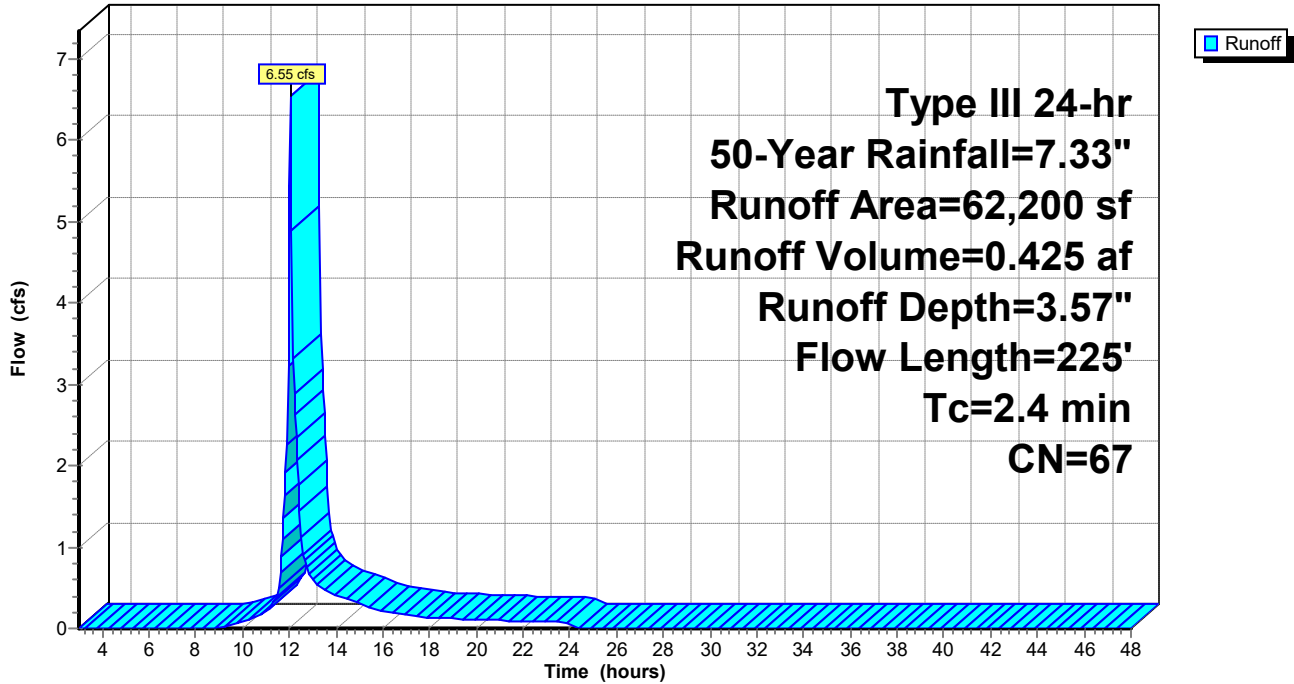
Area (sf)	CN	Description
* 18,875	98	IMPERVIOUS
32,940	58	Meadow, non-grazed, HSG B
10,385	39	>75% Grass cover, Good, HSG A
62,200	67	Weighted Average
43,325		69.65% Pervious Area
18,875		30.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.6	100	0.0100	1.07		Sheet Flow, Road Smooth surfaces n= 0.011 P2= 3.35"
0.4	50	0.0100	2.03		Shallow Concentrated Flow, 50 Paved Kv= 20.3 fps
0.4	75	0.3300	2.87		Shallow Concentrated Flow, BASIN Woodland Kv= 5.0 fps
2.4	225	Total			



Subcatchment DA5: DA5

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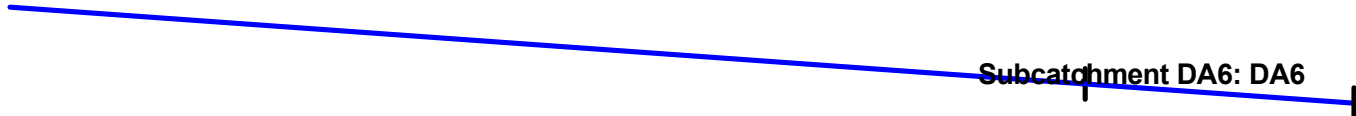
Summary for Subcatchment DA6: DA6

Runoff = 2.38 cfs @ 12.09 hrs, Volume= 0.176 af, Depth= 5.23"
 Routed to Pond EX SIB DA5 : EX. SIB DA5

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-48.00 hrs, dt= 0.05 hrs
 Type III 24-hr 50-Year Rainfall=7.33"

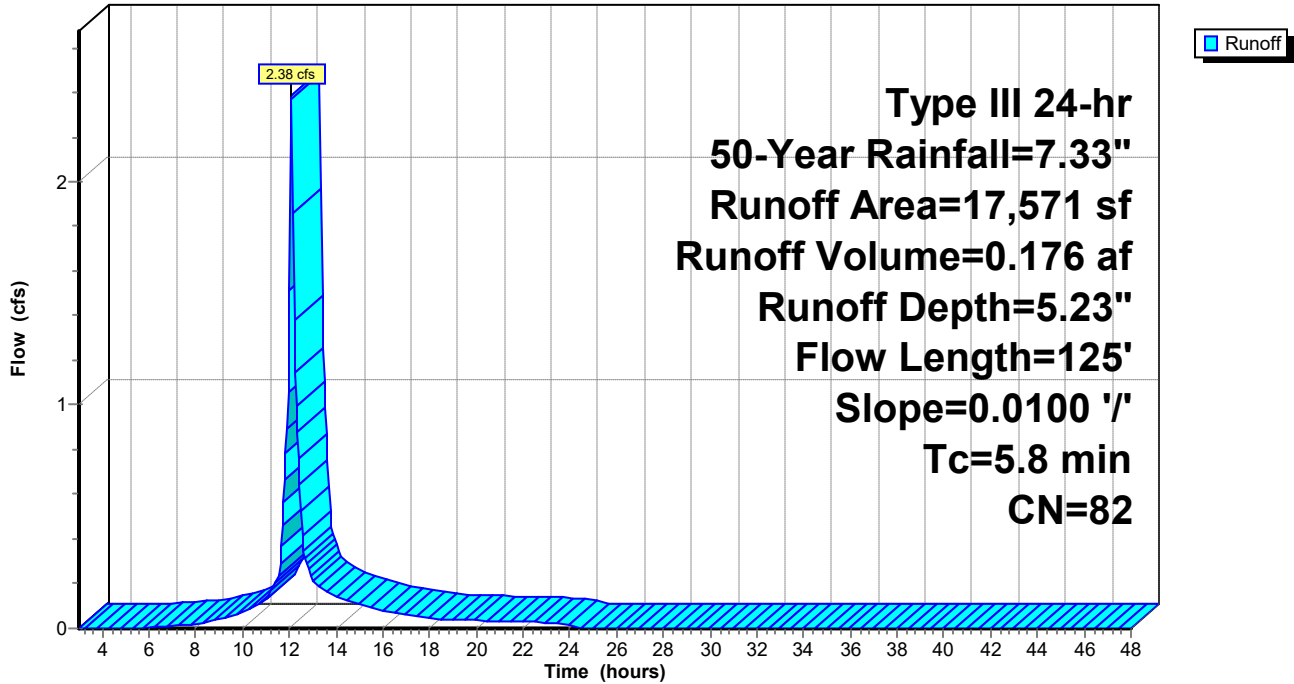
Area (sf)	CN	Description
* 12,762	98	
* 4,809	39	
17,571	82	Weighted Average
4,809		27.37% Pervious Area
12,762		72.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.6	100	0.0100	1.07		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.35"
4.2	25	0.0100	0.10		Sheet Flow, Grass: Short n= 0.150 P2= 3.35"
5.8	125	Total			



Subcatchment DA6: DA6

Hydrograph



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Type III 24-hr 50-Year Rainfall=7.33"

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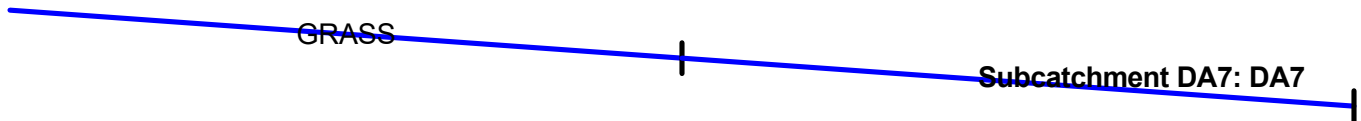
Summary for Subcatchment DA7: DA7

Runoff = 1.88 cfs @ 12.20 hrs, Volume= 0.174 af, Depth= 4.11"
 Routed to Pond CB DA7 : CB DA7

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-48.00 hrs, dt= 0.05 hrs
 Type III 24-hr 50-Year Rainfall=7.33"

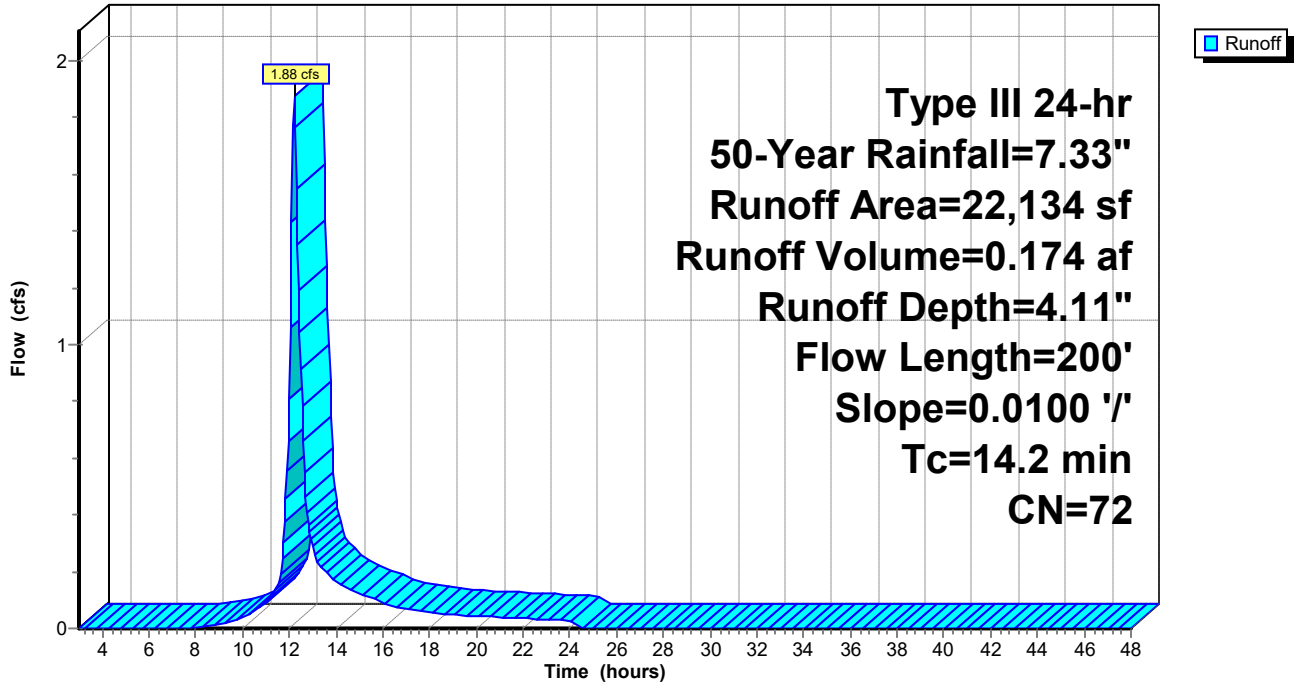
Area (sf)	CN	Description
9,701	39	>75% Grass cover, Good, HSG A
12,433	98	Paved parking, HSG A
22,134	72	Weighted Average
9,701		43.83% Pervious Area
12,433		56.17% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.6	100	0.0100	0.13		Sheet Flow, GRASS Grass: Short n= 0.150 P2= 3.35"
1.6	100	0.0100	1.07		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.35"
14.2	200	Total			



Subcatchment DA7: DA7

Hydrograph



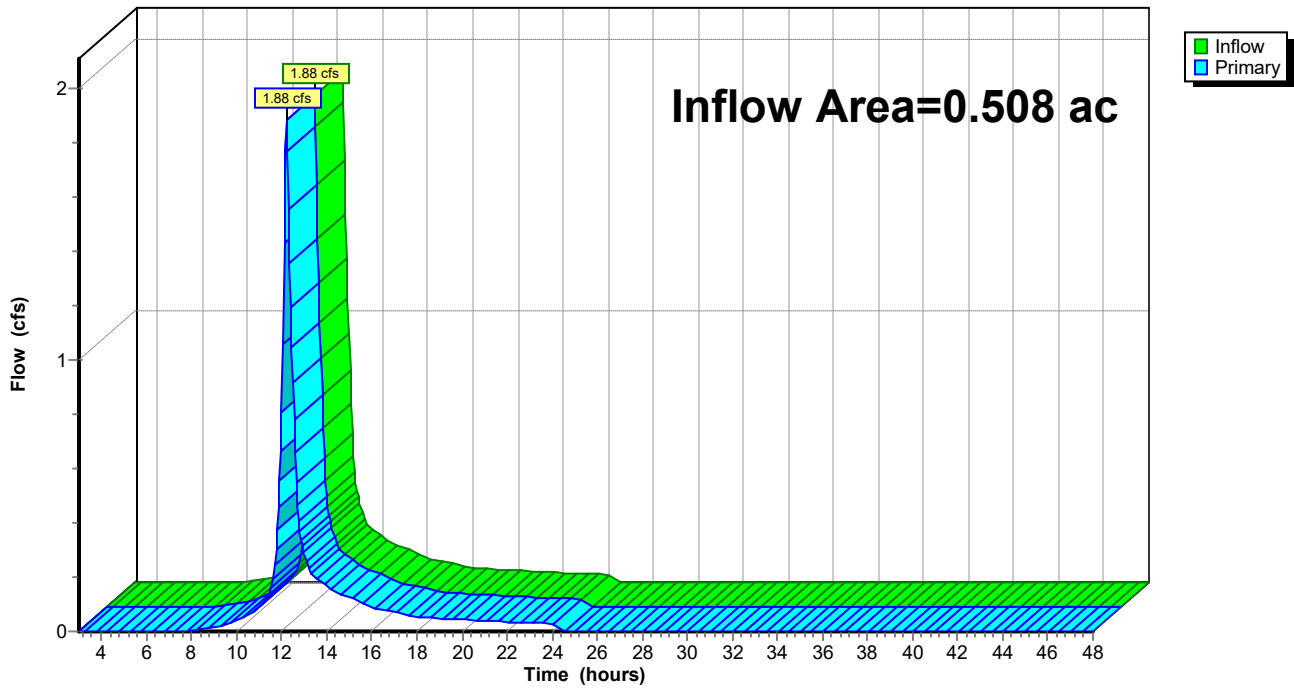
Summary for Pond CB DA7: CB DA7

Inflow Area = 0.508 ac, 56.17% Impervious, Inflow Depth = 4.11" for 50-Year event
Inflow = 1.88 cfs @ 12.20 hrs, Volume= 0.174 af
Primary = 1.88 cfs @ 12.20 hrs, Volume= 0.174 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 3.00-48.00 hrs, dt= 0.05 hrs

Pond CB DA7: CB DA7

Hydrograph



Wareham Pre Construction

Type III 24-hr 50-Year Rainfall=7.33"

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Summary for Pond EX SIB DA5: EX. SIB DA5

Inflow Area = 1.831 ac, 39.66% Impervious, Inflow Depth = 3.94" for 50-Year event
 Inflow = 8.75 cfs @ 12.05 hrs, Volume= 0.601 af
 Outflow = 1.86 cfs @ 12.48 hrs, Volume= 0.601 af, Atten= 79%, Lag= 25.4 min
 Discarded = 1.86 cfs @ 12.48 hrs, Volume= 0.601 af

Routing by Stor-Ind method, Time Span= 3.00-48.00 hrs, dt= 0.05 hrs
 Peak Elev= 18.71' @ 12.48 hrs Surf.Area= 9,741 sf Storage= 6,496 cf

Plug-Flow detention time= 21.7 min calculated for 0.600 af (100% of inflow)
 Center-of-Mass det. time= 21.7 min (844.6 - 822.9)

Volume	Invert	Avail.Storage	Storage Description
#1	18.00'	34,414 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
18.00	8,621	0	0	8,621
19.00	10,223	9,411	9,411	10,259
20.00	12,600	11,391	20,801	12,666
21.00	14,650	13,612	34,414	14,758

Device	Routing	Invert	Outlet Devices
#1	Discarded	18.00'	8.270 in/hr Exfiltration over Surface area Phase-In= 0.01'

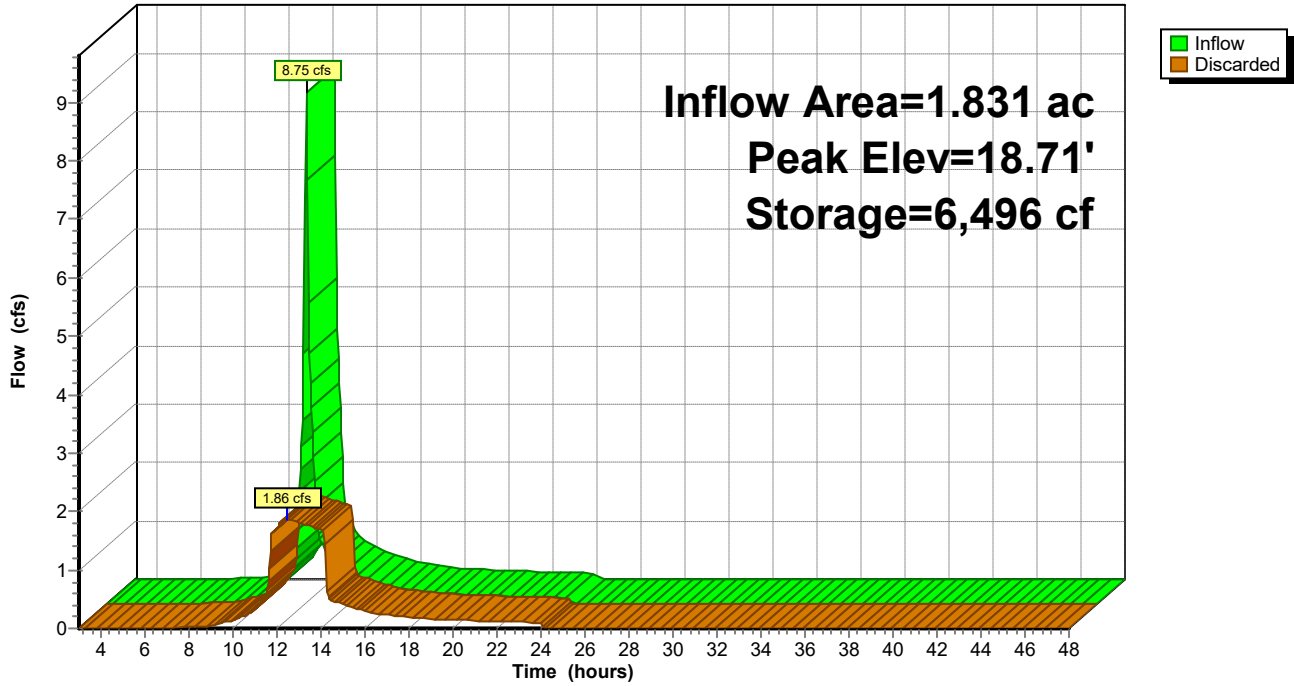
Discarded OutFlow Max=1.86 cfs @ 12.48 hrs HW=18.71' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 1.86 cfs)

Pond EX SIB DA5: EX. SIB DA5

Exfiltration

Pond EX SIB DA5: EX. SIB DA5

Hydrograph



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Type III 24-hr 50-Year Rainfall=7.33"

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Summary for Pond EX. BASIN DA4: EX. BASIN DA4

Inflow Area = 1.816 ac, 13.14% Impervious, Inflow Depth = 0.89" for 50-Year event
 Inflow = 1.08 cfs @ 12.12 hrs, Volume= 0.135 af
 Outflow = 0.20 cfs @ 13.93 hrs, Volume= 0.135 af, Atten= 82%, Lag= 108.7 min
 Discarded = 0.20 cfs @ 13.93 hrs, Volume= 0.135 af
 Secondary = 0.00 cfs @ 3.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 3.00-48.00 hrs, dt= 0.05 hrs / 3
 Peak Elev= 16.72' @ 13.93 hrs Surf.Area= 3,502 sf Storage= 1,541 cf

Plug-Flow detention time= 98.4 min calculated for 0.134 af (100% of inflow)
 Center-of-Mass det. time= 98.4 min (1,021.1 - 922.7)

Volume	Invert	Avail.Storage	Storage Description
#1	16.00'	2,708 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
16.00	1,025	0	0	1,025
17.00	4,866	2,708	2,708	4,870

Device	Routing	Invert	Outlet Devices
#1	Discarded	16.00'	2.410 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Secondary	16.90'	360.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

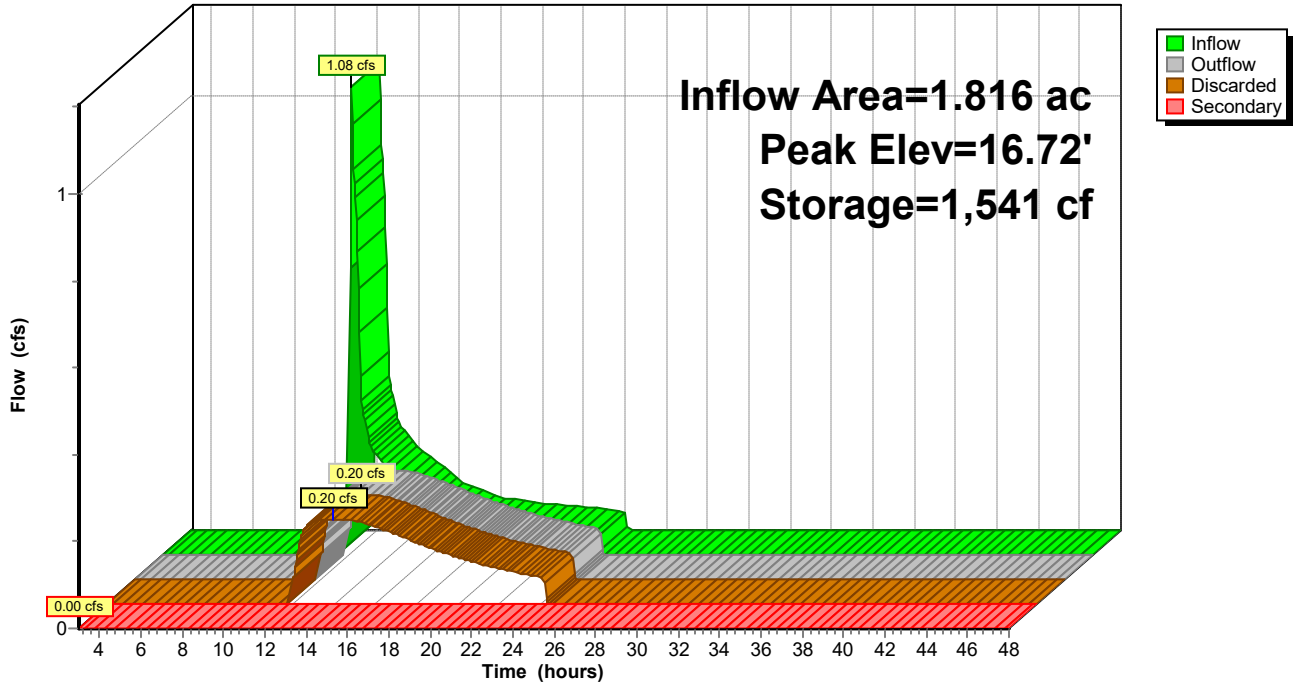
Discarded OutFlow Max=0.20 cfs @ 13.93 hrs HW=16.72' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.20 cfs)

Secondary OutFlow Max=0.00 cfs @ 3.00 hrs HW=16.00' (Free Discharge)
 ↑2=Orifice/Grate (Controls 0.00 cfs)



Pond EX. BASIN DA4: EX. BASIN DA4

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Type III 24-hr 50-Year Rainfall=7.33"

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Summary for Pond SIB-1: SIB-1

Inflow Area = 1.096 ac, 36.62% Impervious, Inflow Depth = 2.94" for 50-Year event
 Inflow = 2.94 cfs @ 12.19 hrs, Volume= 0.269 af
 Outflow = 0.65 cfs @ 12.74 hrs, Volume= 0.269 af, Atten= 78%, Lag= 33.4 min
 Discarded = 0.65 cfs @ 12.74 hrs, Volume= 0.269 af
 Secondary = 0.00 cfs @ 3.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 3.00-48.00 hrs, dt= 0.05 hrs
 Peak Elev= 11.16' @ 12.74 hrs Surf.Area= 3,418 sf Storage= 3,522 cf

Plug-Flow detention time= 44.9 min calculated for 0.269 af (100% of inflow)
 Center-of-Mass det. time= 44.8 min (899.6 - 854.8)

Volume	Invert	Avail.Storage	Storage Description
#1	10.00'	123,382 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
10.00	2,664	0	0
11.00	3,306	2,985	2,985
12.00	4,005	3,656	6,641
13.00	4,760	4,383	11,023
14.00	5,572	5,166	16,189
15.00	6,440	6,006	22,195
16.00	7,365	6,903	29,098
17.00	8,347	7,856	36,954
18.00	9,385	8,866	45,820
19.00	10,480	9,933	55,752
20.00	11,630	11,055	66,807
21.00	12,837	12,234	79,041
22.00	14,101	13,469	92,510
23.00	15,422	14,762	107,271
24.00	16,800	16,111	123,382

Device	Routing	Invert	Outlet Devices
#1	Discarded	10.00'	8.270 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Secondary	23.90'	360.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

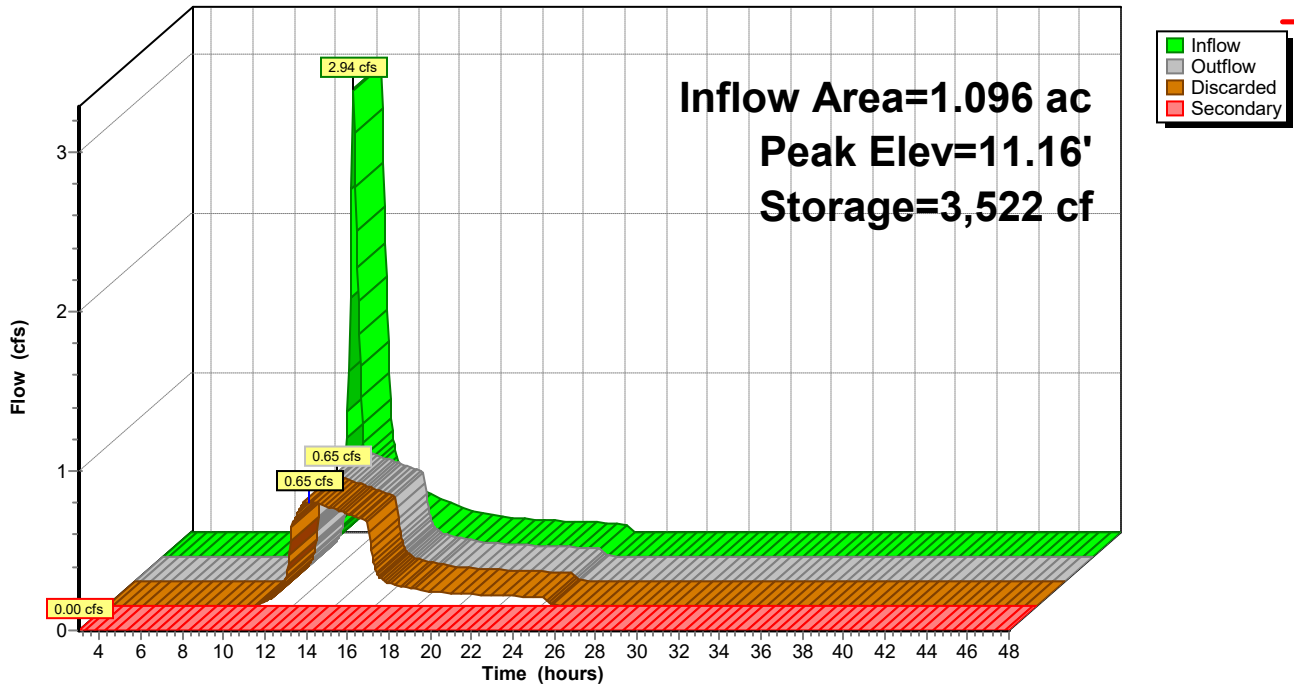
Discarded OutFlow Max=0.65 cfs @ 12.74 hrs HW=11.16' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.65 cfs)

Secondary OutFlow Max=0.00 cfs @ 3.00 hrs HW=10.00' (Free Discharge)
 ↑2=Orifice/Grate (Controls 0.00 cfs)



Pond SIB-1: SIB-1

Hydrograph



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Type III 24-hr 50-Year Rainfall=7.33"

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Summary for Pond SIB-2: SIB-2

Inflow Area = 0.670 ac, 17.26% Impervious, Inflow Depth = 1.76" for 50-Year event
 Inflow = 0.99 cfs @ 12.18 hrs, Volume= 0.098 af
 Outflow = 0.98 cfs @ 12.21 hrs, Volume= 0.098 af, Atten= 1%, Lag= 2.0 min
 Discarded = 0.21 cfs @ 12.15 hrs, Volume= 0.078 af
 Secondary = 0.76 cfs @ 12.21 hrs, Volume= 0.020 af

Routing by Stor-Ind method, Time Span= 3.00-48.00 hrs, dt= 0.05 hrs / 4
 Peak Elev= 23.05' @ 12.20 hrs Surf.Area= 1,017 sf Storage= 404 cf

Plug-Flow detention time= 53.1 min calculated for 0.098 af (100% of inflow)
 Center-of-Mass det. time= 56.0 min (941.1 - 885.1)

Volume	Invert	Avail.Storage	Storage Description
#1	13.96'	148 cf	10.00'W x 10.00'L x 6.00'H Prismaoid 600 cf Overall - 231 cf Embedded = 369 cf x 40.0% Voids
#2	13.96'	170 cf	6.00'D x 6.00'H Vertical Cone/Cylinder Inside #1 231 cf Overall - 6.0" Wall Thickness = 170 cf
#3	19.96'	9 cf	2.00'D x 3.00'H Vertical Cone/Cylinder -Impervious
#4	22.96'	1,578 cf	Custom Stage Data (Irregular) Listed below (Recalc)
		1,905 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
22.96	817	126.0	0	0	817
24.00	2,350	206.0	1,578	1,578	2,938

Device	Routing	Invert	Outlet Devices
#1	Secondary	23.00'	2.0" x 2.0" Horiz. Orifice/Grate X 6.00 columns X 6 rows C= 0.600 Limited to weir flow at low heads
#2	Discarded	13.96'	8.270 in/hr Exfiltration over Wetted area from 13.96' - 23.00' Excluded Wetted area = 100 sf Phase-In= 0.01'

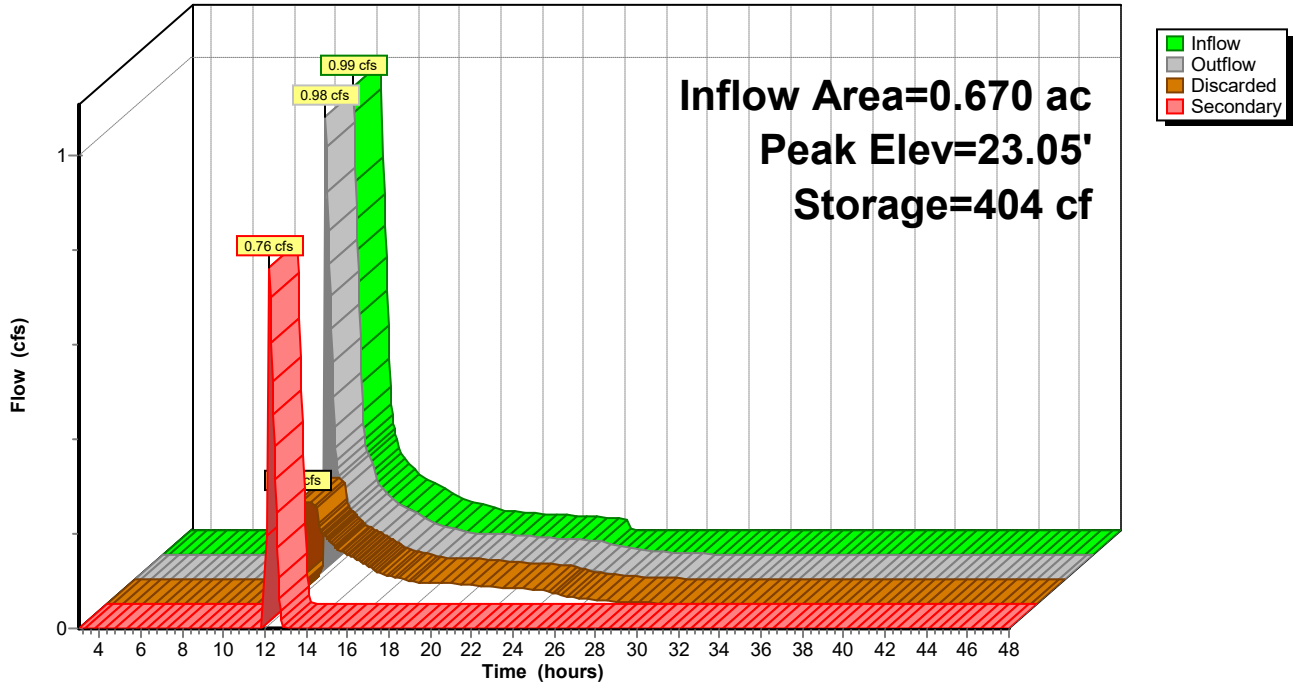
Discarded OutFlow Max=0.21 cfs @ 12.15 hrs HW=23.04' (Free Discharge)
 ↑2=Exfiltration (Exfiltration Controls 0.21 cfs)

Secondary OutFlow Max=0.82 cfs @ 12.21 hrs HW=23.05' (Free Discharge)
 ↑1=Orifice/Grate (Weir Controls 0.82 cfs @ 0.71 fps)



Pond SIB-2: SIB-2

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Type III 24-hr 50-Year Rainfall=7.33"

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Summary for Pond SIB-3: SIB-3

Inflow Area = 0.123 ac, 44.81% Impervious, Inflow Depth = 3.36" for 50-Year event
 Inflow = 0.54 cfs @ 12.02 hrs, Volume= 0.034 af
 Outflow = 0.69 cfs @ 12.06 hrs, Volume= 0.036 af, Atten= 0%, Lag= 2.4 min
 Discarded = 0.07 cfs @ 12.05 hrs, Volume= 0.029 af
 Secondary = 0.61 cfs @ 12.06 hrs, Volume= 0.007 af

Routing by Stor-Ind method, Time Span= 3.00-48.00 hrs, dt= 0.05 hrs / 4
 Peak Elev= 23.05' @ 12.05 hrs Surf.Area= 200 sf Storage= 335 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 63.4 min (898.3 - 834.9)

Volume	Invert	Avail.Storage	Storage Description
#1	13.96'	148 cf	10.00'W x 10.00'L x 6.00'H Prismatic 600 cf Overall - 231 cf Embedded = 369 cf x 40.0% Voids
#2	13.96'	170 cf	6.00'D x 6.00'H Vertical Cone/Cylinder Inside #1 231 cf Overall - 6.0" Wall Thickness = 170 cf
#3	19.96'	9 cf	2.00'D x 3.00'H Vertical Cone/Cylinder -Impervious
#4	22.96'	878 cf	Custom Stage Data (Irregular) Listed below (Recalc)
		1,204 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
22.96	83	37.0	0	0	83
24.00	393	75.0	228	228	427
25.00	947	117.0	650	878	1,076

Device	Routing	Invert	Outlet Devices
#1	Secondary	23.00'	2.0" x 2.0" Horiz. Orifice/Grate X 6.00 columns X 6 rows C= 0.600 Limited to weir flow at low heads
#2	Discarded	13.96'	8.270 in/hr Exfiltration over Wetted area from 13.96' - 23.00' Excluded Wetted area = 100 sf Phase-In= 0.01'
#3	Discarded	13.96'	2.414 in/hr Exfiltration over Surface area Phase-In= 0.01'

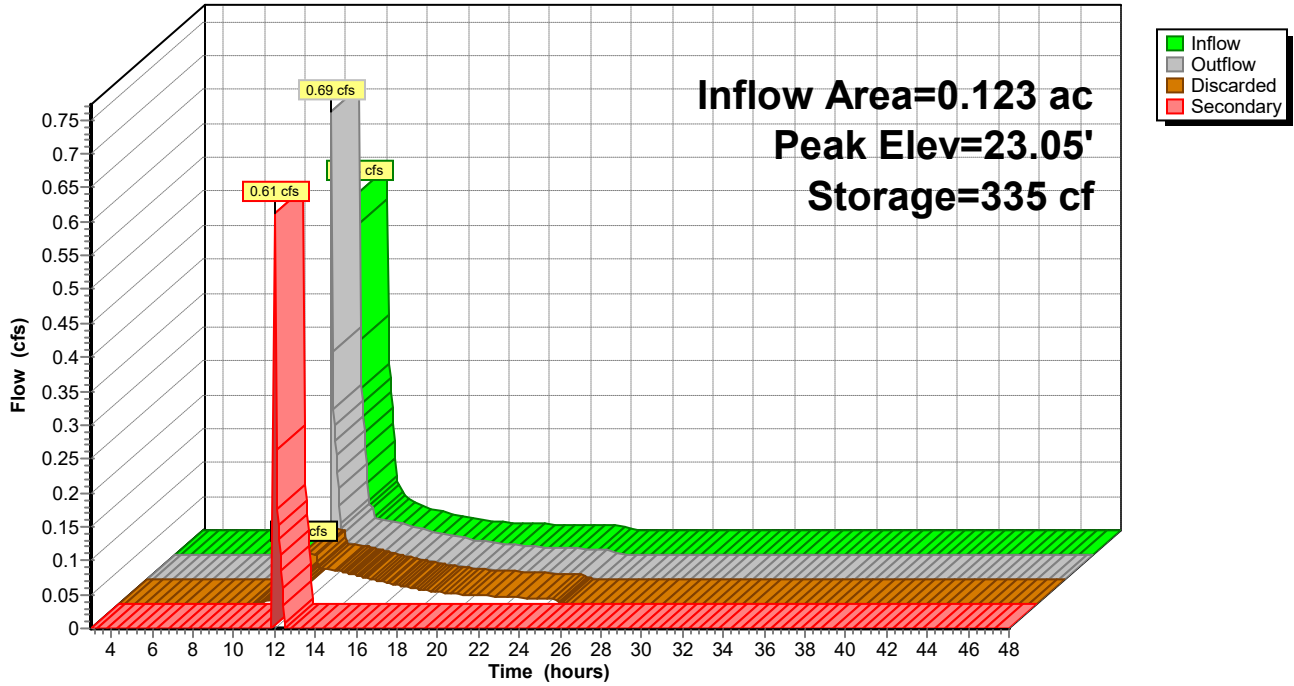
Discarded OutFlow Max=0.07 cfs @ 12.05 hrs HW=23.05' (Free Discharge)
 ↑ 2=Exfiltration (Exfiltration Controls 0.06 cfs)
 ↓ 3=Exfiltration (Exfiltration Controls 0.01 cfs)

Secondary OutFlow Max=0.72 cfs @ 12.06 hrs HW=23.04' (Free Discharge)
 ↑ 1=Orifice/Grate (Weir Controls 0.72 cfs @ 0.68 fps)



Pond SIB-3: SIB-3

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Type III 24-hr 100-Year Rainfall=8.68"

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Time span=3.00-48.00 hrs, dt=0.05 hrs, 901 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment DA1: DA1 Runoff Area=47,720 sf 36.62% Impervious Runoff Depth=3.97"
 Flow Length=191' Tc=12.7 min CN=61 Runoff=4.02 cfs 0.363 af

Subcatchment DA2: DA2 Runoff Area=29,170 sf 17.26% Impervious Runoff Depth=2.56"
 Flow Length=264' Tc=11.2 min CN=49 Runoff=1.55 cfs 0.143 af

Subcatchment DA3: DA3 Runoff Area=5,342 sf 44.81% Impervious Runoff Depth=4.45"
 Flow Length=88' Tc=0.9 min CN=65 Runoff=0.71 cfs 0.045 af

Subcatchment DA4: DA4 Runoff Area=79,094 sf 13.14% Impervious Runoff Depth=1.45"
 Flow Length=400' Tc=4.8 min CN=39 Runoff=2.32 cfs 0.220 af

Subcatchment DA5: DA5 Runoff Area=62,200 sf 30.35% Impervious Runoff Depth=4.69"
 Flow Length=225' Tc=2.4 min CN=67 Runoff=8.62 cfs 0.558 af

Subcatchment DA6: DA6 Runoff Area=17,571 sf 72.63% Impervious Runoff Depth=6.51"
 Flow Length=125' Slope=0.0100 '/' Tc=5.8 min CN=82 Runoff=2.94 cfs 0.219 af

Subcatchment DA7: DA7 Runoff Area=22,134 sf 56.17% Impervious Runoff Depth=5.30"
 Flow Length=200' Slope=0.0100 '/' Tc=14.2 min CN=72 Runoff=2.42 cfs 0.224 af

Pond CB DA7: CB DA7 Inflow=2.42 cfs 0.224 af
 Primary=2.42 cfs 0.224 af

Pond EX SIB DA5: EX. SIB DA5 Peak Elev=19.03' Storage=9,702 cf Inflow=11.32 cfs 0.777 af
 Outflow=1.97 cfs 0.777 af

Pond EX. BASIN DA4: EX. BASIN DA4 Peak Elev=16.92' Storage=2,330 cf Inflow=2.32 cfs 0.220 af
 Discarded=0.25 cfs 0.192 af Secondary=0.78 cfs 0.027 af Outflow=1.03 cfs 0.220 af

Pond SIB-1: SIB-1 Peak Elev=11.67' Storage=5,375 cf Inflow=4.02 cfs 0.363 af
 Discarded=0.72 cfs 0.363 af Secondary=0.00 cfs 0.000 af Outflow=0.72 cfs 0.363 af

Pond SIB-2: SIB-2 Peak Elev=23.08' Storage=436 cf Inflow=1.55 cfs 0.143 af
 Discarded=0.21 cfs 0.099 af Secondary=1.29 cfs 0.044 af Outflow=1.51 cfs 0.143 af

Pond SIB-3: SIB-3 Peak Elev=23.04' Storage=334 cf Inflow=0.71 cfs 0.045 af
 Discarded=0.07 cfs 0.034 af Secondary=0.60 cfs 0.011 af Outflow=0.67 cfs 0.045 af

Total Runoff Area = 6.043 ac Runoff Volume = 1.772 af Average Runoff Depth = 3.52"
69.85% Pervious = 4.221 ac 30.15% Impervious = 1.822 ac

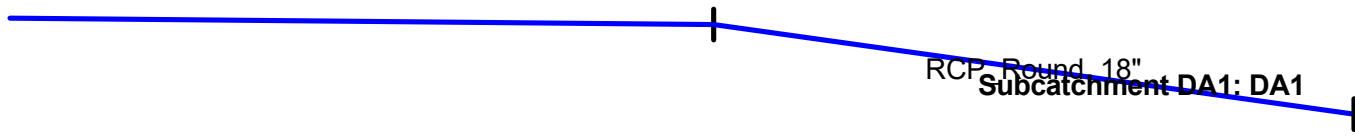
Summary for Subcatchment DA1: DA1

Runoff = 4.02 cfs @ 12.18 hrs, Volume= 0.363 af, Depth= 3.97"
 Routed to Pond SIB-1 : SIB-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-48.00 hrs, dt= 0.05 hrs
 Type III 24-hr 100-Year Rainfall=8.68"

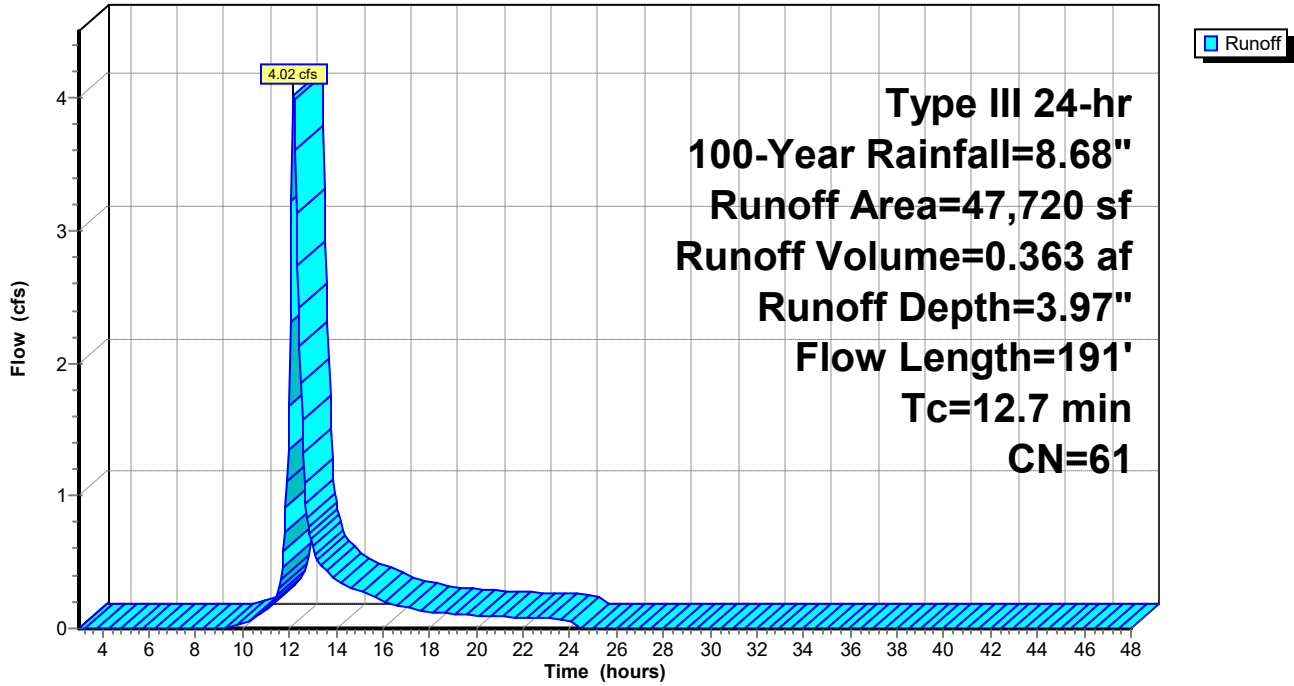
Area (sf)	CN	Description
* 17,477	98	
* 30,243	39	
47,720	61	Weighted Average
30,243		63.38% Pervious Area
17,477		36.62% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.6	100	0.0100	0.13		Sheet Flow, Grass: Short n= 0.150 P2= 3.35"
0.1	91	0.1500	23.02	40.68	Pipe Channel, RCP_Round 18" 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
12.7	191	Total			



Subcatchment DA1: DA1

Hydrograph



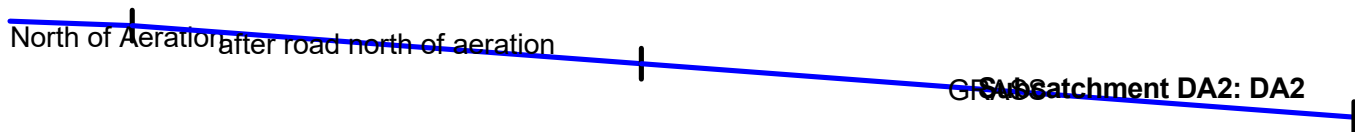
Summary for Subcatchment DA2: DA2

Runoff = 1.55 cfs @ 12.17 hrs, Volume= 0.143 af, Depth= 2.56"
 Routed to Pond SIB-2 : SIB-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-48.00 hrs, dt= 0.05 hrs
 Type III 24-hr 100-Year Rainfall=8.68"

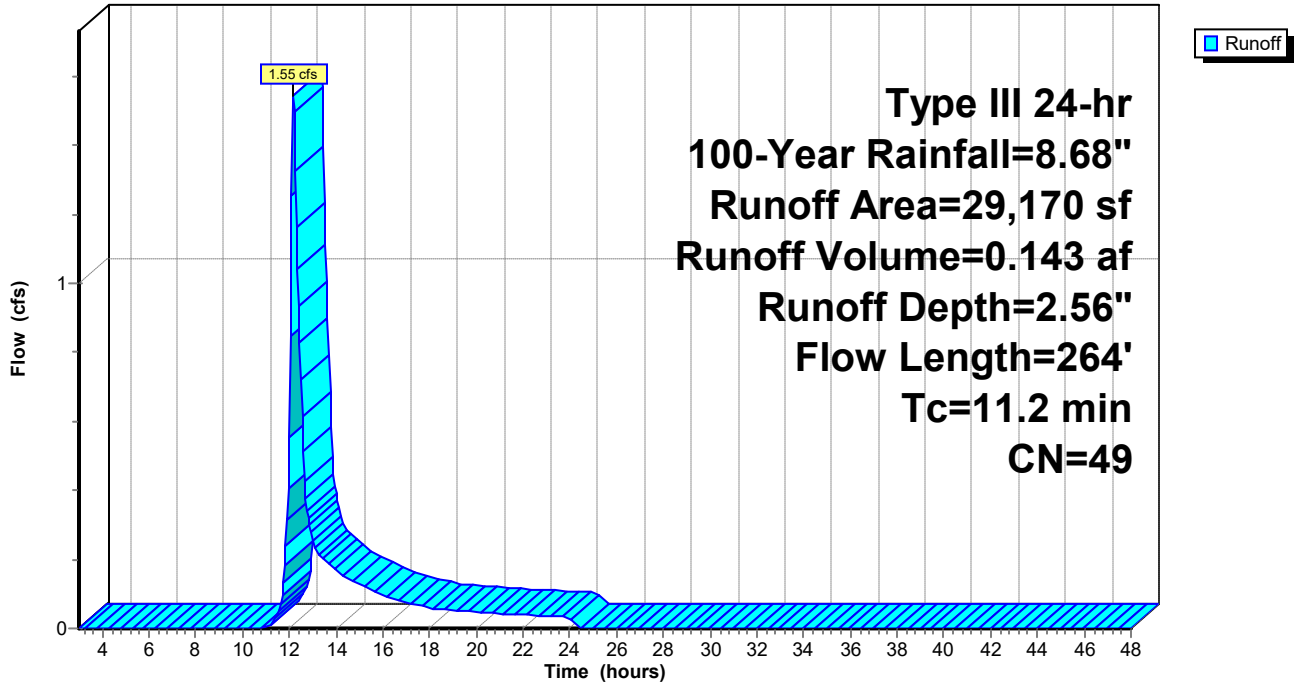
Area (sf)	CN	Description
* 5,035	98	Impervious
24,135	39	>75% Grass cover, Good, HSG A
29,170	49	Weighted Average
24,135		82.74% Pervious Area
5,035		17.26% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	24	0.0100	0.80		Sheet Flow, North of Aeration Smooth surfaces n= 0.011 P2= 3.35"
9.6	100	0.0200	0.17		Sheet Flow, after road north of aeration Grass: Short n= 0.150 P2= 3.35"
1.1	140	0.0200	2.12		Shallow Concentrated Flow, GRASS Grassed Waterway Kv= 15.0 fps
11.2	264	Total			



Subcatchment DA2: DA2

Hydrograph



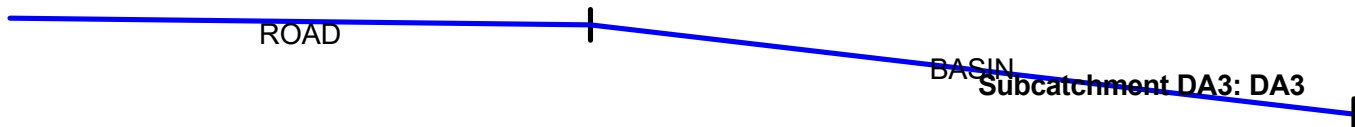
Summary for Subcatchment DA3: DA3

Runoff = 0.71 cfs @ 12.02 hrs, Volume= 0.045 af, Depth= 4.45"
 Routed to Pond SIB-3 : SIB-3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-48.00 hrs, dt= 0.05 hrs
 Type III 24-hr 100-Year Rainfall=8.68"

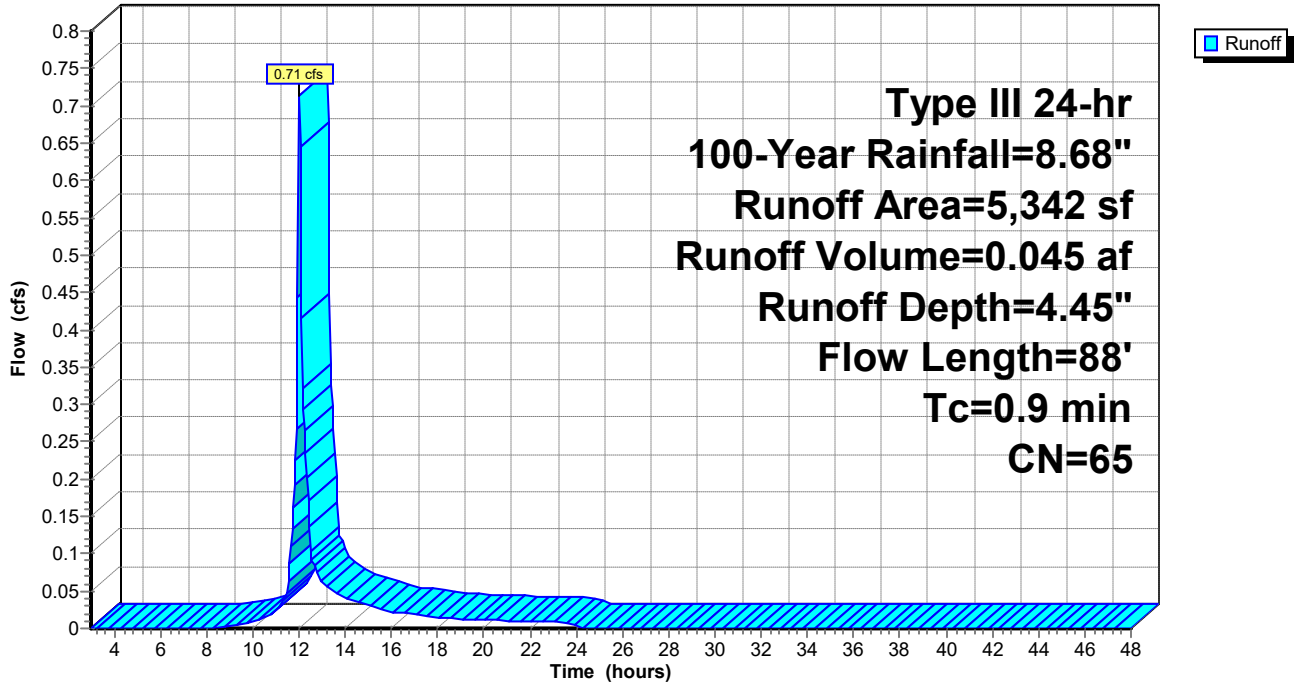
	Area (sf)	CN	Description
*	2,394	98	IMPERVIOUS
	2,948	39	>75% Grass cover, Good, HSG A
	5,342	65	Weighted Average
	2,948		55.19% Pervious Area
	2,394		44.81% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	38	0.0100	0.88		Sheet Flow, ROAD Smooth surfaces n= 0.011 P2= 3.35"
0.2	50	0.1000	5.09		Shallow Concentrated Flow, BASIN Unpaved Kv= 16.1 fps
0.9	88	Total			



Subcatchment DA3: DA3

Hydrograph



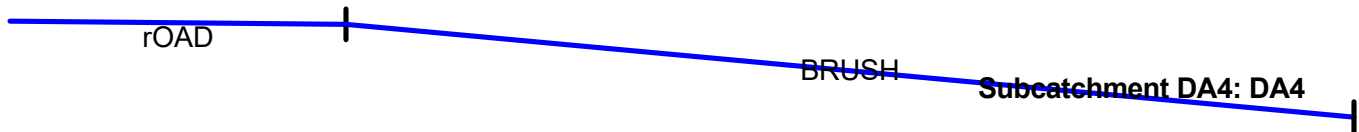
Summary for Subcatchment DA4: DA4

Runoff = 2.32 cfs @ 12.10 hrs, Volume= 0.220 af, Depth= 1.45"
 Routed to Pond EX. BASIN DA4 : EX. BASIN DA4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-48.00 hrs, dt= 0.05 hrs
 Type III 24-hr 100-Year Rainfall=8.68"

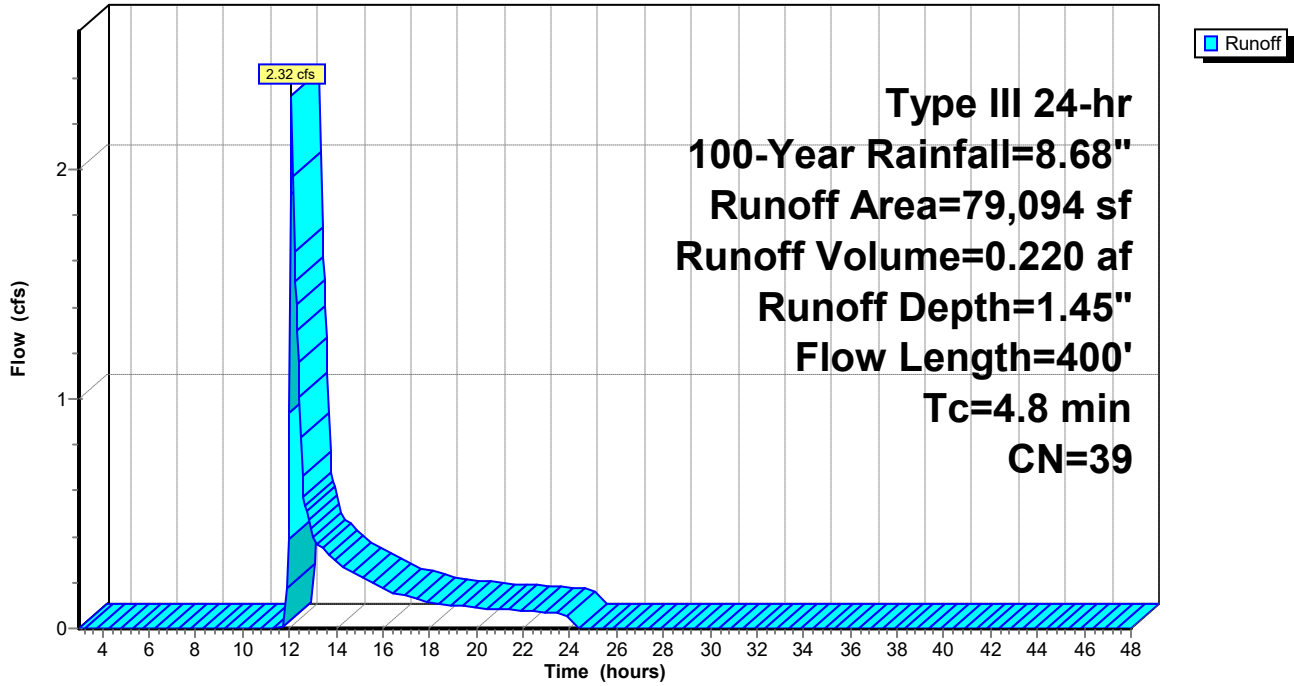
Area (sf)	CN	Description
66,054	30	Brush, Good, HSG A
* 10,390	98	ROAD
2,650	30	Woods, Good, HSG A
79,094	39	Weighted Average
68,704		86.86% Pervious Area
10,390		13.14% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.6	100	0.0100	1.07		Sheet Flow, rOAD Smooth surfaces n= 0.011 P2= 3.35"
3.2	300	0.1000	1.58		Shallow Concentrated Flow, BRUSH Woodland Kv= 5.0 fps
4.8	400	Total			



Subcatchment DA4: DA4

Hydrograph



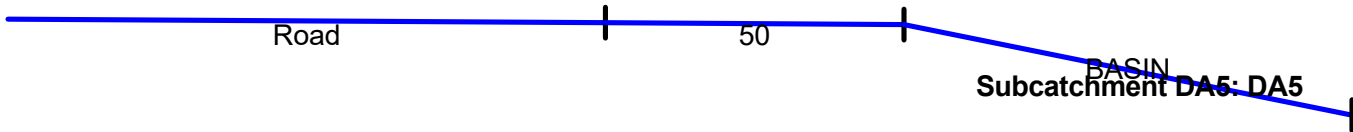
Summary for Subcatchment DA5: DA5

Runoff = 8.62 cfs @ 12.04 hrs, Volume= 0.558 af, Depth= 4.69"
 Routed to Pond EX SIB DA5 : EX. SIB DA5

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-48.00 hrs, dt= 0.05 hrs
 Type III 24-hr 100-Year Rainfall=8.68"

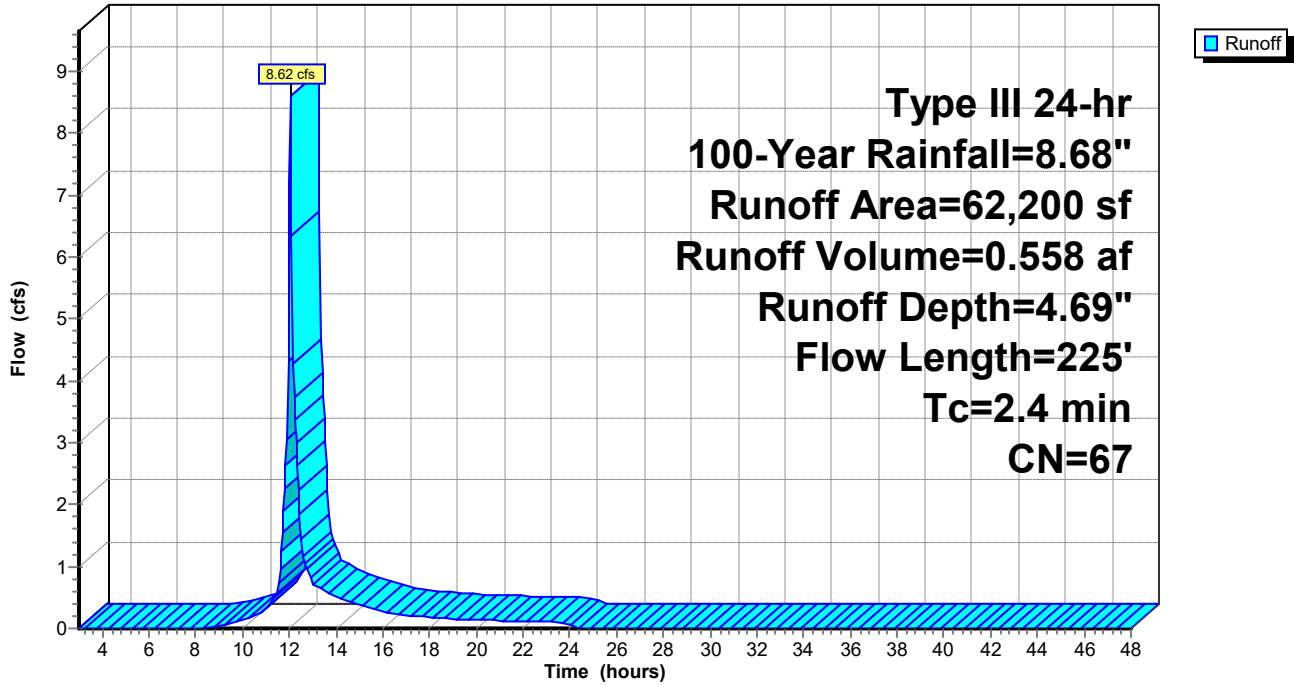
Area (sf)	CN	Description
* 18,875	98	IMPERVIOUS
32,940	58	Meadow, non-grazed, HSG B
10,385	39	>75% Grass cover, Good, HSG A
62,200	67	Weighted Average
43,325		69.65% Pervious Area
18,875		30.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.6	100	0.0100	1.07		Sheet Flow, Road Smooth surfaces n= 0.011 P2= 3.35"
0.4	50	0.0100	2.03		Shallow Concentrated Flow, 50 Paved Kv= 20.3 fps
0.4	75	0.3300	2.87		Shallow Concentrated Flow, BASIN Woodland Kv= 5.0 fps
2.4	225	Total			



Subcatchment DA5: DA5

Hydrograph



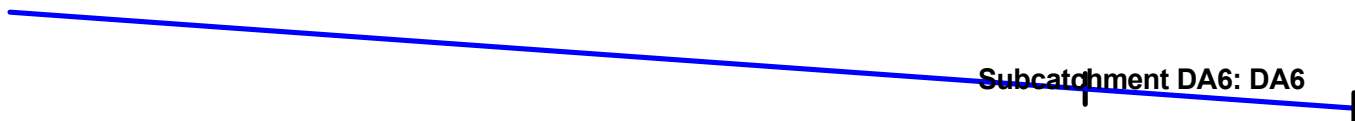
Summary for Subcatchment DA6: DA6

Runoff = 2.94 cfs @ 12.09 hrs, Volume= 0.219 af, Depth= 6.51"
 Routed to Pond EX SIB DA5 : EX. SIB DA5

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-48.00 hrs, dt= 0.05 hrs
 Type III 24-hr 100-Year Rainfall=8.68"

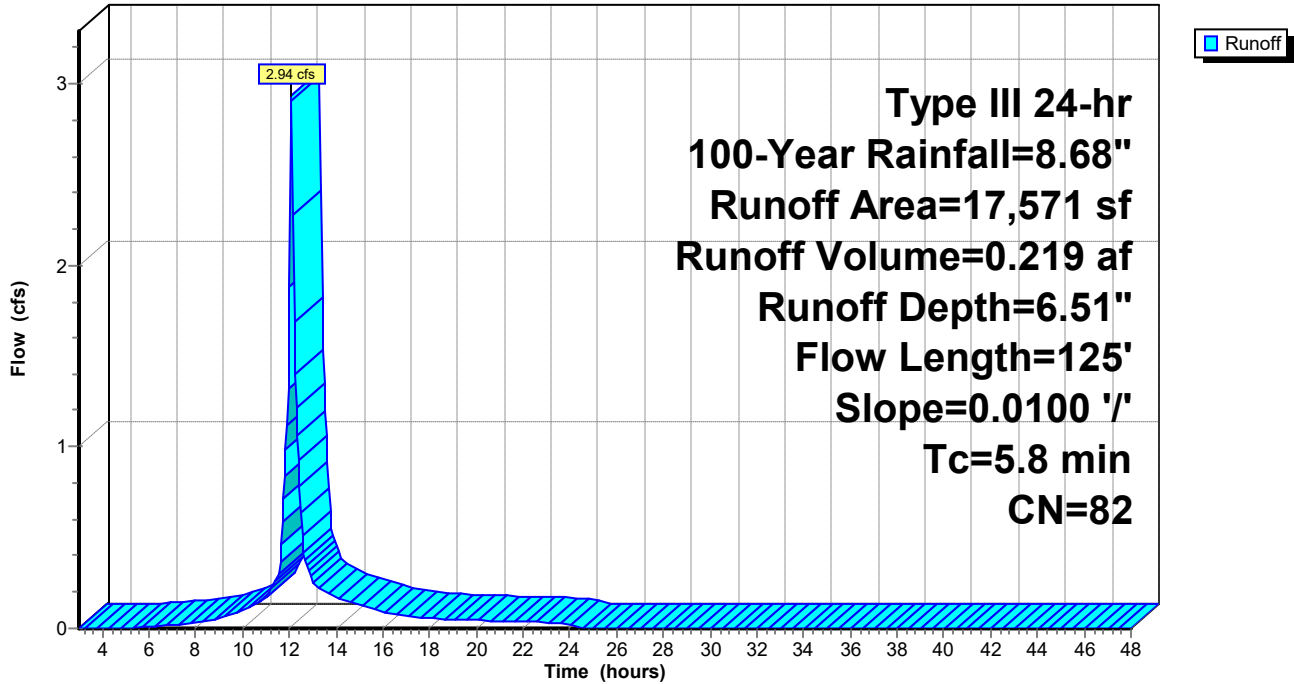
Area (sf)	CN	Description
* 12,762	98	
* 4,809	39	
17,571	82	Weighted Average
4,809		27.37% Pervious Area
12,762		72.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.6	100	0.0100	1.07		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.35"
4.2	25	0.0100	0.10		Sheet Flow, Grass: Short n= 0.150 P2= 3.35"
5.8	125	Total			



Subcatchment DA6: DA6

Hydrograph



Wareham Pre Construction

Type III 24-hr 100-Year Rainfall=8.68"

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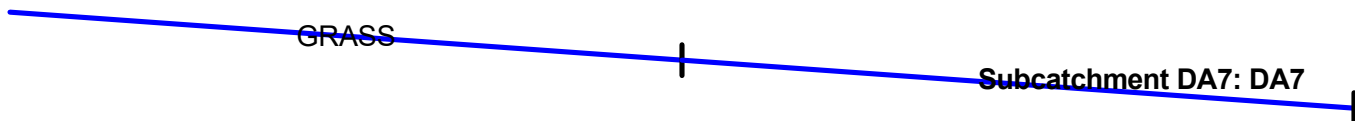
Summary for Subcatchment DA7: DA7

Runoff = 2.42 cfs @ 12.20 hrs, Volume= 0.224 af, Depth= 5.30"
 Routed to Pond CB DA7 : CB DA7

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-48.00 hrs, dt= 0.05 hrs
 Type III 24-hr 100-Year Rainfall=8.68"

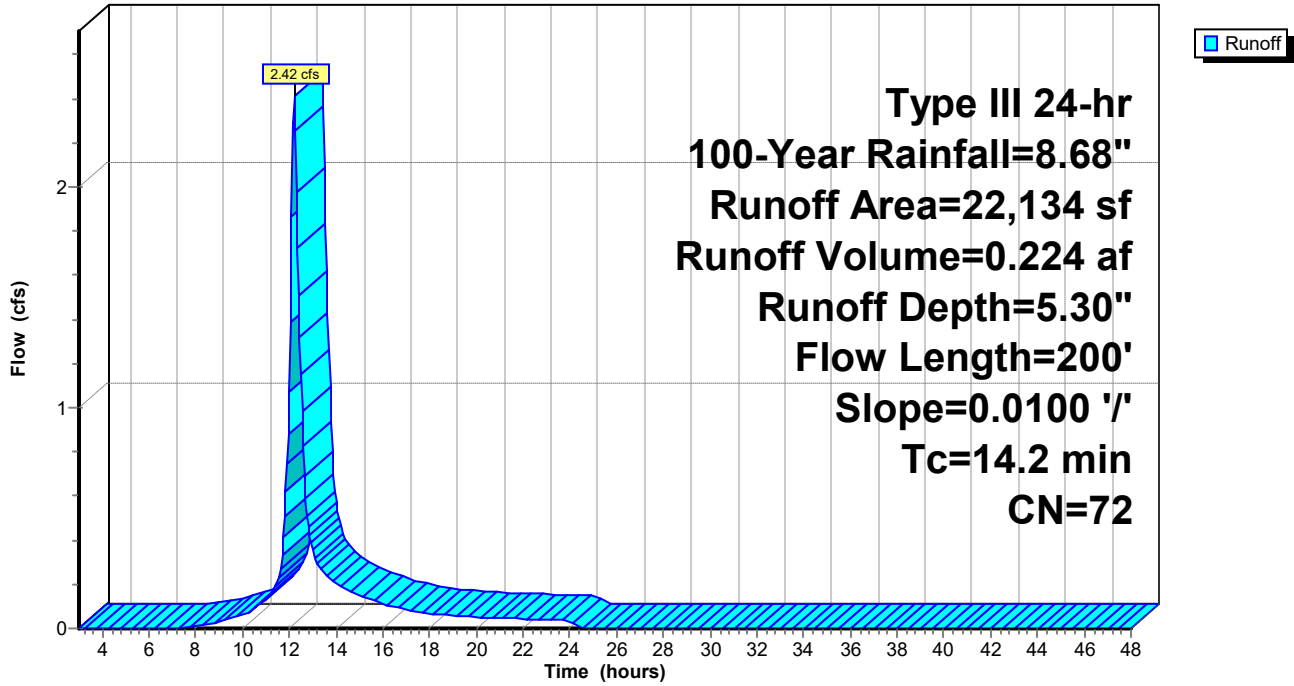
Area (sf)	CN	Description
9,701	39	>75% Grass cover, Good, HSG A
12,433	98	Paved parking, HSG A
22,134	72	Weighted Average
9,701		43.83% Pervious Area
12,433		56.17% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.6	100	0.0100	0.13		Sheet Flow, GRASS Grass: Short n= 0.150 P2= 3.35"
1.6	100	0.0100	1.07		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.35"
14.2	200	Total			



Subcatchment DA7: DA7

Hydrograph



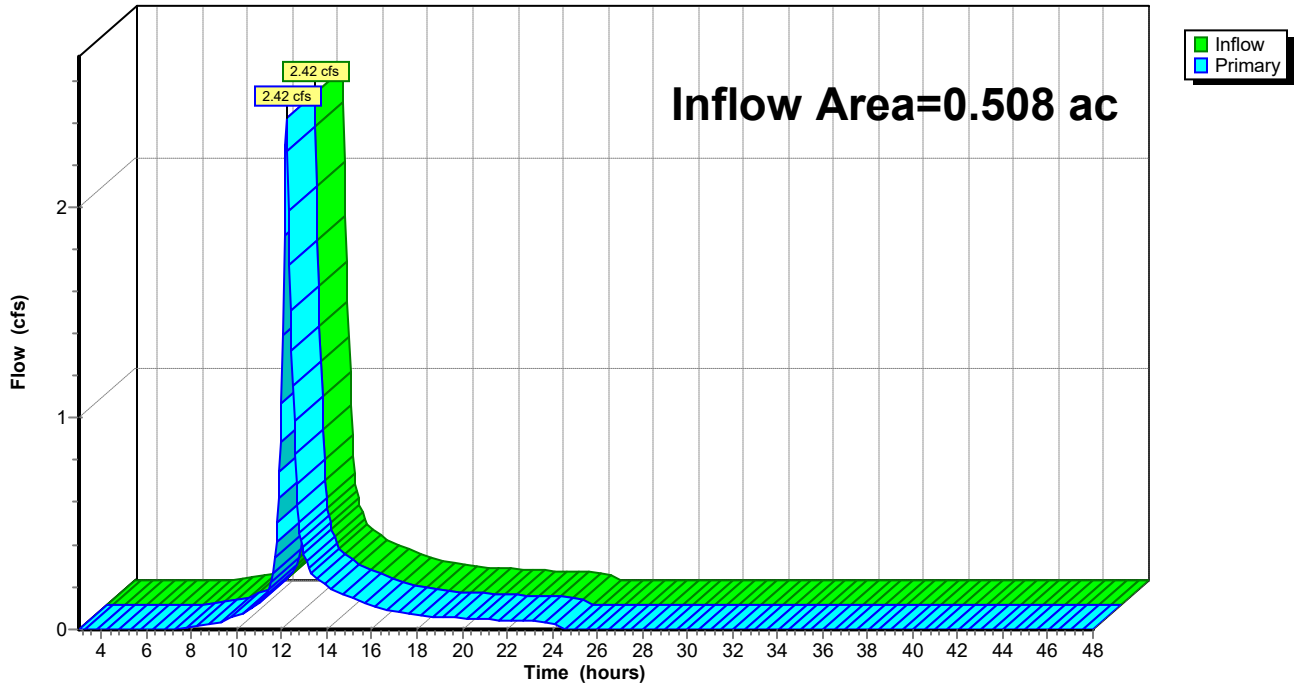
Summary for Pond CB DA7: CB DA7

Inflow Area = 0.508 ac, 56.17% Impervious, Inflow Depth = 5.30" for 100-Year event
Inflow = 2.42 cfs @ 12.20 hrs, Volume= 0.224 af
Primary = 2.42 cfs @ 12.20 hrs, Volume= 0.224 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 3.00-48.00 hrs, dt= 0.05 hrs

Pond CB DA7: CB DA7

Hydrograph



Summary for Pond EX SIB DA5: EX. SIB DA5

Inflow Area = 1.831 ac, 39.66% Impervious, Inflow Depth = 5.09" for 100-Year event
 Inflow = 11.32 cfs @ 12.05 hrs, Volume= 0.777 af
 Outflow = 1.97 cfs @ 12.51 hrs, Volume= 0.777 af, Atten= 83%, Lag= 27.8 min
 Discarded = 1.97 cfs @ 12.51 hrs, Volume= 0.777 af

Routing by Stor-Ind method, Time Span= 3.00-48.00 hrs, dt= 0.05 hrs
 Peak Elev= 19.03' @ 12.51 hrs Surf.Area= 10,287 sf Storage= 9,702 cf

Plug-Flow detention time= 33.4 min calculated for 0.776 af (100% of inflow)
 Center-of-Mass det. time= 33.4 min (849.3 - 815.9)

Volume	Invert	Avail.Storage	Storage Description
#1	18.00'	34,414 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
18.00	8,621	0	0	8,621
19.00	10,223	9,411	9,411	10,259
20.00	12,600	11,391	20,801	12,666
21.00	14,650	13,612	34,414	14,758

Device	Routing	Invert	Outlet Devices
#1	Discarded	18.00'	8.270 in/hr Exfiltration over Surface area Phase-In= 0.01'

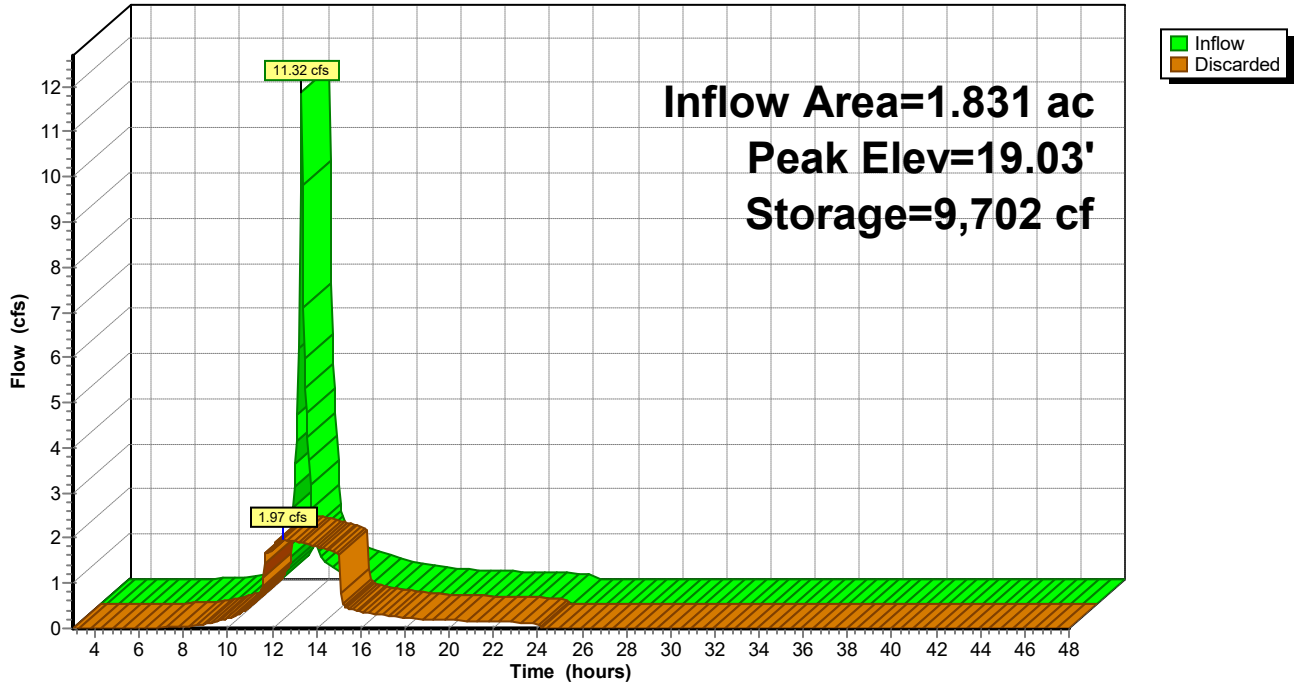
Discarded OutFlow Max=1.97 cfs @ 12.51 hrs HW=19.03' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 1.97 cfs)

Pond EX SIB DA5: EX. SIB DA5

Exfiltration

Pond EX SIB DA5: EX. SIB DA5

Hydrograph



Summary for Pond EX. BASIN DA4: EX. BASIN DA4

Inflow Area = 1.816 ac, 13.14% Impervious, Inflow Depth = 1.45" for 100-Year event
 Inflow = 2.32 cfs @ 12.10 hrs, Volume= 0.220 af
 Outflow = 1.03 cfs @ 12.47 hrs, Volume= 0.220 af, Atten= 56%, Lag= 22.0 min
 Discarded = 0.25 cfs @ 12.47 hrs, Volume= 0.192 af
 Secondary = 0.78 cfs @ 12.47 hrs, Volume= 0.027 af

Routing by Stor-Ind method, Time Span= 3.00-48.00 hrs, dt= 0.05 hrs / 3
 Peak Elev= 16.92' @ 12.47 hrs Surf.Area= 4,447 sf Storage= 2,330 cf

Plug-Flow detention time= 111.0 min calculated for 0.220 af (100% of inflow)
 Center-of-Mass det. time= 110.4 min (1,011.8 - 901.4)

Volume	Invert	Avail.Storage	Storage Description
#1	16.00'	2,708 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
16.00	1,025	0	0	1,025
17.00	4,866	2,708	2,708	4,870

Device	Routing	Invert	Outlet Devices
#1	Discarded	16.00'	2.410 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Secondary	16.90'	360.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

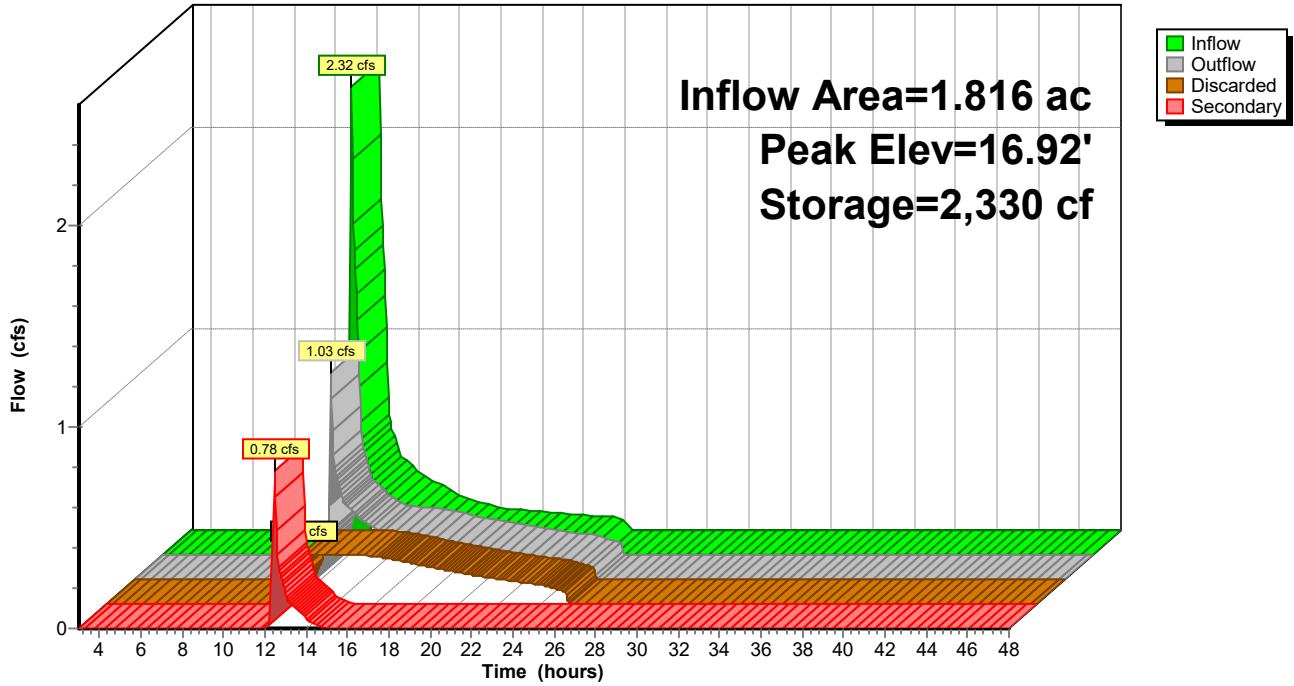
Discarded OutFlow Max=0.25 cfs @ 12.47 hrs HW=16.92' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.25 cfs)

Secondary OutFlow Max=0.68 cfs @ 12.47 hrs HW=16.92' (Free Discharge)
 ↑2=Orifice/Grate (Weir Controls 0.68 cfs @ 0.43 fps)



Pond EX. BASIN DA4: EX. BASIN DA4

Hydrograph



Wareham Pre Construction

Type III 24-hr 100-Year Rainfall=8.68"

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Summary for Pond SIB-1: SIB-1

Inflow Area = 1.096 ac, 36.62% Impervious, Inflow Depth = 3.97" for 100-Year event
 Inflow = 4.02 cfs @ 12.18 hrs, Volume= 0.363 af
 Outflow = 0.72 cfs @ 12.84 hrs, Volume= 0.363 af, Atten= 82%, Lag= 39.6 min
 Discarded = 0.72 cfs @ 12.84 hrs, Volume= 0.363 af
 Secondary = 0.00 cfs @ 3.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 3.00-48.00 hrs, dt= 0.05 hrs
 Peak Elev= 11.67' @ 12.84 hrs Surf.Area= 3,778 sf Storage= 5,375 cf

Plug-Flow detention time= 66.3 min calculated for 0.363 af (100% of inflow)
 Center-of-Mass det. time= 66.1 min (912.1 - 846.0)

Volume	Invert	Avail.Storage	Storage Description
#1	10.00'	123,382 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
10.00	2,664	0	0
11.00	3,306	2,985	2,985
12.00	4,005	3,656	6,641
13.00	4,760	4,383	11,023
14.00	5,572	5,166	16,189
15.00	6,440	6,006	22,195
16.00	7,365	6,903	29,098
17.00	8,347	7,856	36,954
18.00	9,385	8,866	45,820
19.00	10,480	9,933	55,752
20.00	11,630	11,055	66,807
21.00	12,837	12,234	79,041
22.00	14,101	13,469	92,510
23.00	15,422	14,762	107,271
24.00	16,800	16,111	123,382

Device	Routing	Invert	Outlet Devices
#1	Discarded	10.00'	8.270 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Secondary	23.90'	360.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

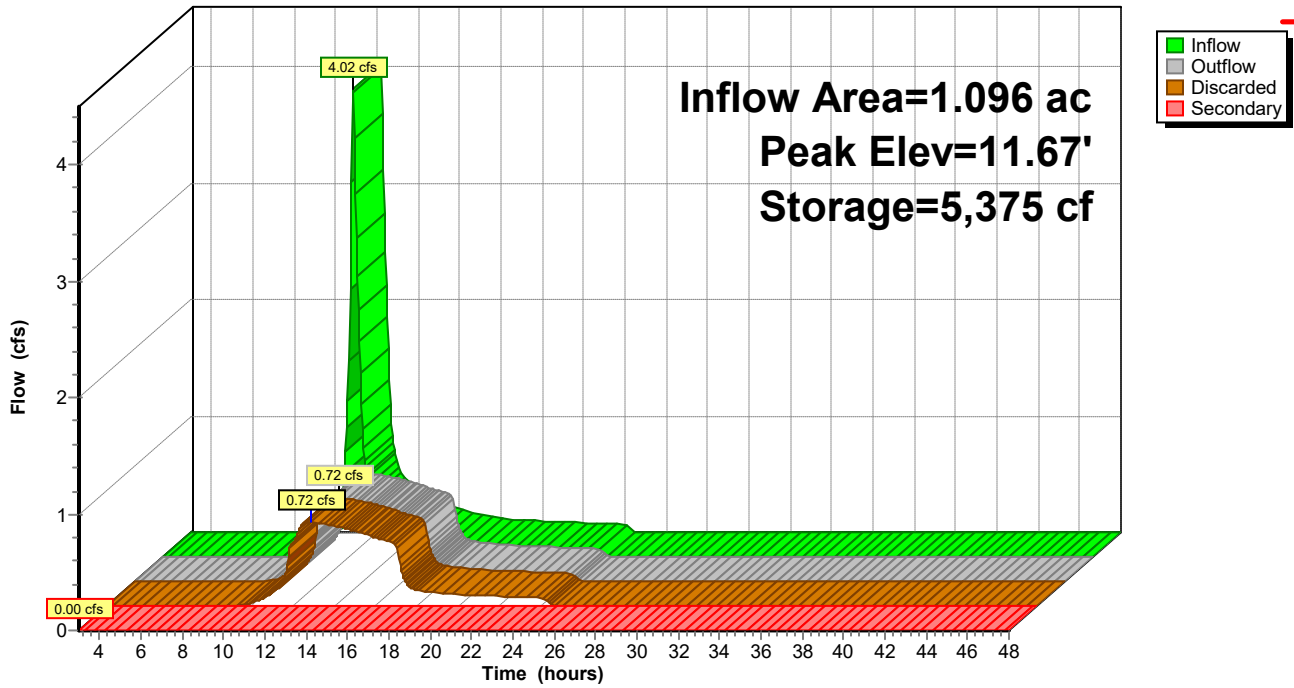
Discarded OutFlow Max=0.72 cfs @ 12.84 hrs HW=11.67' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.72 cfs)

Secondary OutFlow Max=0.00 cfs @ 3.00 hrs HW=10.00' (Free Discharge)
 ↑2=Orifice/Grate (Controls 0.00 cfs)



Pond SIB-1: SIB-1

Hydrograph



Wareham Pre Construction

Type III 24-hr 100-Year Rainfall=8.68"

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Summary for Pond SIB-2: SIB-2

Inflow Area = 0.670 ac, 17.26% Impervious, Inflow Depth = 2.56" for 100-Year event
 Inflow = 1.55 cfs @ 12.17 hrs, Volume= 0.143 af
 Outflow = 1.51 cfs @ 12.19 hrs, Volume= 0.143 af, Atten= 3%, Lag= 1.3 min
 Discarded = 0.21 cfs @ 12.05 hrs, Volume= 0.099 af
 Secondary = 1.29 cfs @ 12.19 hrs, Volume= 0.044 af

Routing by Stor-Ind method, Time Span= 3.00-48.00 hrs, dt= 0.05 hrs / 4
 Peak Elev= 23.08' @ 12.19 hrs Surf.Area= 1,057 sf Storage= 436 cf

Plug-Flow detention time= 42.6 min calculated for 0.143 af (100% of inflow)
 Center-of-Mass det. time= 43.6 min (916.2 - 872.7)

Volume	Invert	Avail.Storage	Storage Description
#1	13.96'	148 cf	10.00'W x 10.00'L x 6.00'H Prismatic 600 cf Overall - 231 cf Embedded = 369 cf x 40.0% Voids
#2	13.96'	170 cf	6.00'D x 6.00'H Vertical Cone/Cylinder Inside #1 231 cf Overall - 6.0" Wall Thickness = 170 cf
#3	19.96'	9 cf	2.00'D x 3.00'H Vertical Cone/Cylinder -Impervious
#4	22.96'	1,578 cf	Custom Stage Data (Irregular) Listed below (Recalc)
		1,905 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
22.96	817	126.0	0	0	817
24.00	2,350	206.0	1,578	1,578	2,938

Device	Routing	Invert	Outlet Devices
#1	Secondary	23.00'	2.0" x 2.0" Horiz. Orifice/Grate X 6.00 columns X 6 rows C= 0.600 Limited to weir flow at low heads
#2	Discarded	13.96'	8.270 in/hr Exfiltration over Wetted area from 13.96' - 23.00' Excluded Wetted area = 100 sf Phase-In= 0.01'

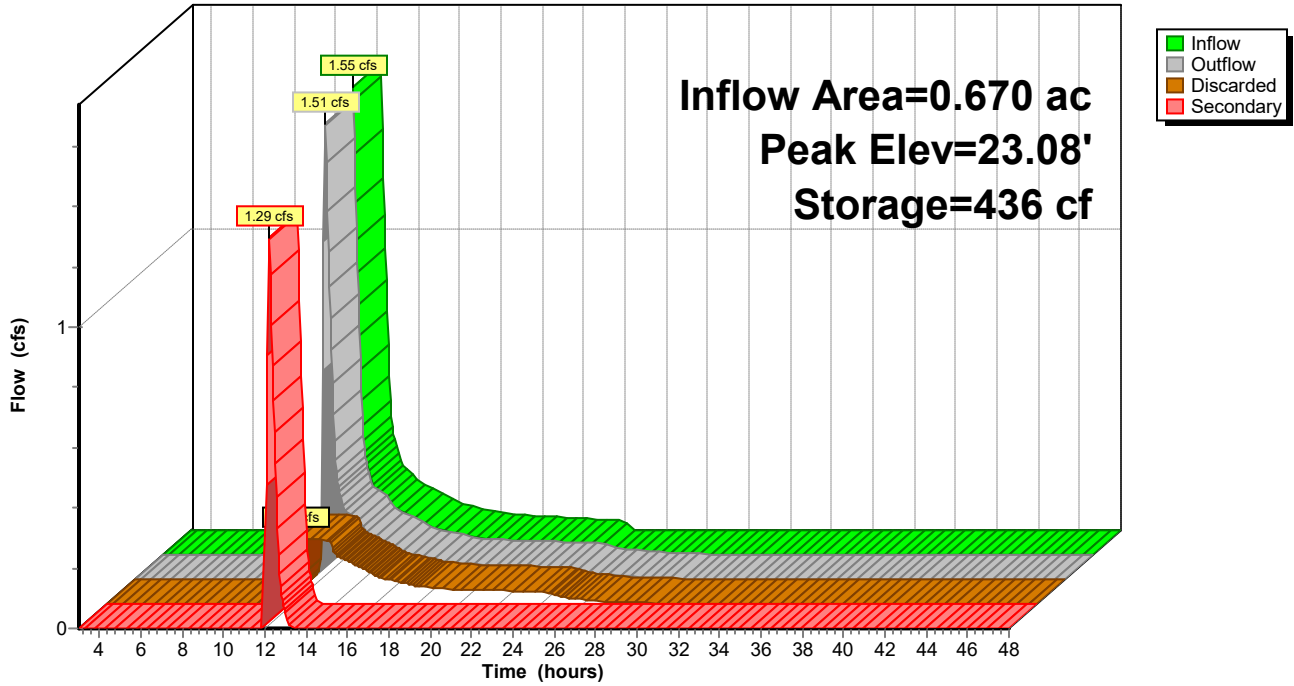
Discarded OutFlow Max=0.21 cfs @ 12.05 hrs HW=23.03' (Free Discharge)
 ↑**2=Exfiltration** (Exfiltration Controls 0.21 cfs)

Secondary OutFlow Max=1.38 cfs @ 12.19 hrs HW=23.08' (Free Discharge)
 ↑**1=Orifice/Grate** (Orifice Controls 1.38 cfs @ 1.38 fps)



Pond SIB-2: SIB-2

Hydrograph



Summary for Pond SIB-3: SIB-3

Inflow Area = 0.123 ac, 44.81% Impervious, Inflow Depth = 4.45" for 100-Year event
 Inflow = 0.71 cfs @ 12.02 hrs, Volume= 0.045 af
 Outflow = 0.67 cfs @ 12.03 hrs, Volume= 0.045 af, Atten= 6%, Lag= 0.5 min
 Discarded = 0.07 cfs @ 12.05 hrs, Volume= 0.034 af
 Secondary = 0.60 cfs @ 12.03 hrs, Volume= 0.011 af

Routing by Stor-Ind method, Time Span= 3.00-48.00 hrs, dt= 0.05 hrs / 4
 Peak Elev= 23.04' @ 12.05 hrs Surf.Area= 200 sf Storage= 334 cf

Plug-Flow detention time= 67.6 min calculated for 0.045 af (99% of inflow)
 Center-of-Mass det. time= 64.3 min (891.1 - 826.7)

Volume	Invert	Avail.Storage	Storage Description
#1	13.96'	148 cf	10.00'W x 10.00'L x 6.00'H Prismatic 600 cf Overall - 231 cf Embedded = 369 cf x 40.0% Voids
#2	13.96'	170 cf	6.00'D x 6.00'H Vertical Cone/Cylinder Inside #1 231 cf Overall - 6.0" Wall Thickness = 170 cf
#3	19.96'	9 cf	2.00'D x 3.00'H Vertical Cone/Cylinder -Impervious
#4	22.96'	878 cf	Custom Stage Data (Irregular) Listed below (Recalc)
		1,204 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
22.96	83	37.0	0	0	83
24.00	393	75.0	228	228	427
25.00	947	117.0	650	878	1,076

Device	Routing	Invert	Outlet Devices
#1	Secondary	23.00'	2.0" x 2.0" Horiz. Orifice/Grate X 6.00 columns X 6 rows C= 0.600 Limited to weir flow at low heads
#2	Discarded	13.96'	8.270 in/hr Exfiltration over Wetted area from 13.96' - 23.00' Excluded Wetted area = 100 sf Phase-In= 0.01'
#3	Discarded	13.96'	2.414 in/hr Exfiltration over Surface area Phase-In= 0.01'

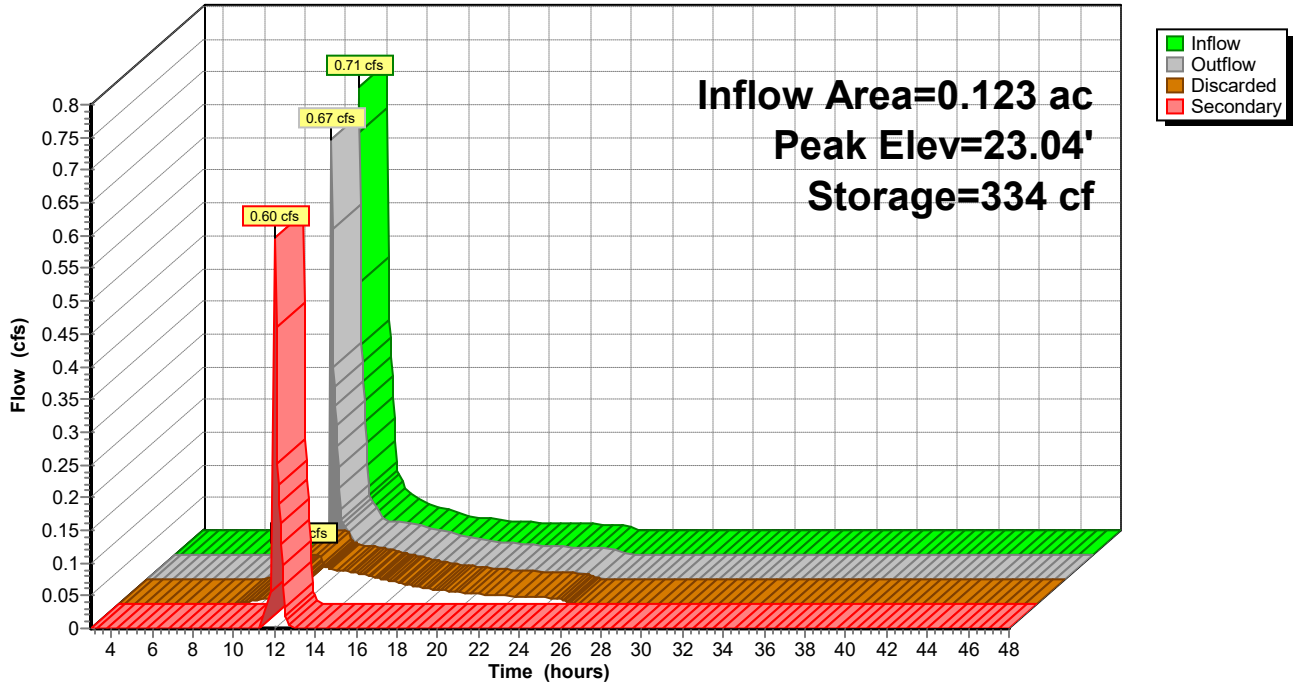
Discarded OutFlow Max=0.07 cfs @ 12.05 hrs HW=23.04' (Free Discharge)
 ↑ 2=Exfiltration (Exfiltration Controls 0.06 cfs)
 ↓ 3=Exfiltration (Exfiltration Controls 0.01 cfs)

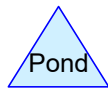
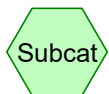
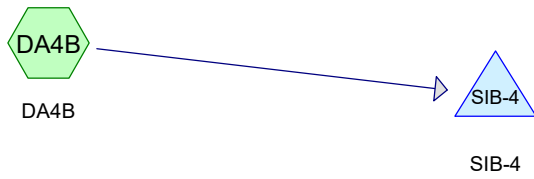
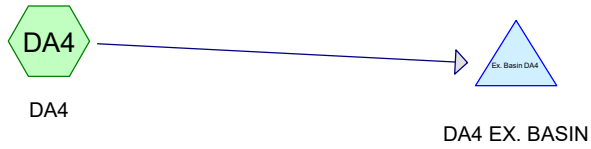
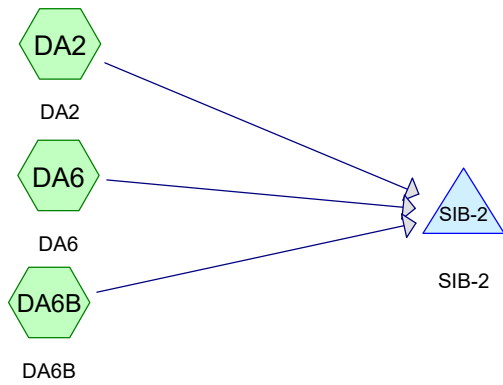
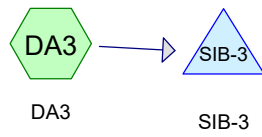
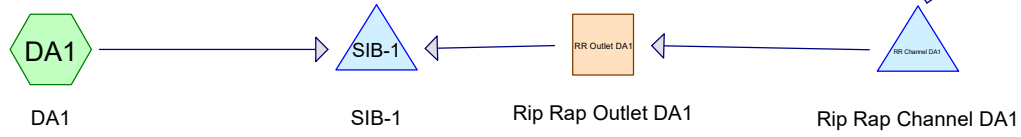
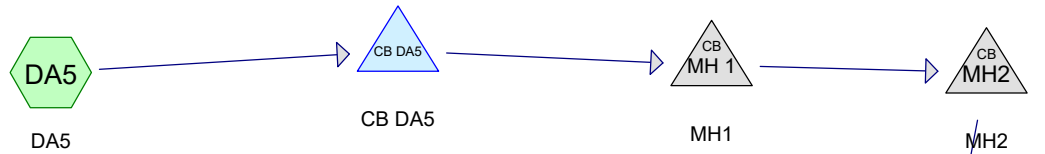
Secondary OutFlow Max=0.74 cfs @ 12.03 hrs HW=23.04' (Free Discharge)
 ↑ 1=Orifice/Grate (Weir Controls 0.74 cfs @ 0.69 fps)



Pond SIB-3: SIB-3

Hydrograph





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Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	1-Year	Type III 24-hr		Default	24.00	1	2.78	2
2	2-Year	Type III 24-hr		Default	24.00	1	3.35	2
3	5-Year	Type III 24-hr		Default	24.00	1	4.18	2
4	10-Year	Type III 24-hr		Default	24.00	1	4.95	2
5	25-Year	Type III 24-hr		Default	24.00	1	6.19	2
6	50-Year	Type III 24-hr		Default	24.00	1	7.33	2
7	100-Year	Type III 24-hr		Default	24.00	1	8.68	2

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Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.694	98	(DA1, DA6)
0.805	39	(DA1, DA6)
0.938	39	>75% Grass cover, Good, HSG A (DA2, DA3, DA6B, DA7)
1.261	30	Brush, Good, HSG A (DA4, DA4B)
0.702	39	GRASSED AREA (DA5)
0.156	98	IMPERVIOUS (DA3, DA6B)
0.116	98	Impervious (DA2)
0.285	98	Paved parking, HSG A (DA7)
0.929	98	ROAD (DA4, DA4B, DA5)
5.886	59	TOTAL AREA

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Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	0.000	1.499	1.499		DA1, DA6
0.938	0.000	0.000	0.000	0.000	0.938	>75% Grass cover, Good	DA2, DA3, DA6B, DA7
1.261	0.000	0.000	0.000	0.000	1.261	Brush, Good	DA4, DA4B
0.000	0.000	0.000	0.000	0.702	0.702	GRASSED AREA	DA5
0.000	0.000	0.000	0.000	0.156	0.156	IMPERVIOUS	DA3, DA6B
0.000	0.000	0.000	0.000	0.116	0.116	Impervious	DA2
0.285	0.000	0.000	0.000	0.000	0.285	Paved parking	DA7
0.000	0.000	0.000	0.000	0.929	0.929	ROAD	DA4, DA4B, DA5
2.484	0.000	0.000	0.000	3.402	5.886	TOTAL AREA	

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Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Width (inches)	Diam/Height (inches)	Inside-Fill (inches)	Node Name
1	DA1	0.00	0.00	91.0	0.1500	0.013	0.0	18.0	0.0	
2	CB DA5	16.30	14.80	25.6	0.0586	0.012	0.0	18.0	0.0	
3	MH 1	14.70	11.50	156.1	0.0205	0.012	0.0	18.0	0.0	
4	MH2	11.40	10.80	118.9	0.0050	0.012	0.0	18.0	0.0	

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Type III 24-hr 1-Year Rainfall=2.78"

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Time span=3.00-30.00 hrs, dt=0.05 hrs, 541 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment DA1: DA1	Runoff Area=47,720 sf 36.62% Impervious Runoff Depth=0.29" Flow Length=191' Tc=12.7 min CN=61 Runoff=0.15 cfs 0.026 af
Subcatchment DA2: DA2	Runoff Area=29,170 sf 17.26% Impervious Runoff Depth=0.04" Flow Length=264' Tc=11.2 min CN=49 Runoff=0.00 cfs 0.002 af
Subcatchment DA3: DA3	Runoff Area=5,342 sf 44.81% Impervious Runoff Depth=0.41" Flow Length=88' Tc=0.9 min CN=65 Runoff=0.04 cfs 0.004 af
Subcatchment DA4: DA4	Runoff Area=39,760 sf 24.90% Impervious Runoff Depth=0.02" Tc=5.0 min CN=47 Runoff=0.00 cfs 0.002 af
Subcatchment DA4B: DA4B	Runoff Area=39,330 sf 36.30% Impervious Runoff Depth=0.14" Tc=5.0 min CN=55 Runoff=0.03 cfs 0.011 af
Subcatchment DA5: DA5	Runoff Area=46,882 sf 34.79% Impervious Runoff Depth=0.26" Flow Length=250' Tc=11.3 min CN=60 Runoff=0.12 cfs 0.023 af
Subcatchment DA6: DA6	Runoff Area=17,571 sf 72.63% Impervious Runoff Depth=1.21" Flow Length=125' Slope=0.0100 '/' Tc=5.8 min CN=82 Runoff=0.56 cfs 0.041 af
Subcatchment DA6B: DA6B	Runoff Area=8,464 sf 51.98% Impervious Runoff Depth=0.60" Flow Length=150' Slope=0.0100 '/' Tc=1.8 min CN=70 Runoff=0.13 cfs 0.010 af
Subcatchment DA7: DA7	Runoff Area=22,134 sf 56.17% Impervious Runoff Depth=0.68" Flow Length=200' Slope=0.0100 '/' Tc=14.2 min CN=72 Runoff=0.27 cfs 0.029 af
Reach RR Outlet DA1: Rip Rap Outlet	Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af n=0.078 L=15.0' S=0.0667 '/' Capacity=11.80 cfs Outflow=0.00 cfs 0.000 af
Pond CB DA5: CB DA5	Peak Elev=16.42' Storage=147 cf Inflow=0.12 cfs 0.023 af Discarded=0.02 cfs 0.019 af Primary=0.07 cfs 0.004 af Secondary=0.00 cfs 0.000 af Outflow=0.09 cfs 0.023 af
Pond CB DA7: CB DA7	Inflow=0.27 cfs 0.029 af Primary=0.27 cfs 0.029 af
Pond Ex. Basin DA4: DA4 EX. BASIN	Peak Elev=16.00' Storage=0 cf Inflow=0.00 cfs 0.002 af Discarded=0.00 cfs 0.002 af Secondary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.002 af
Pond MH 1: MH1	Peak Elev=14.82' Inflow=0.07 cfs 0.004 af Primary=0.07 cfs 0.004 af Secondary=0.00 cfs 0.000 af Outflow=0.07 cfs 0.004 af
Pond MH2: MH2	Peak Elev=10.85' Inflow=0.07 cfs 0.004 af Primary=0.07 cfs 0.004 af Secondary=0.00 cfs 0.000 af Outflow=0.07 cfs 0.004 af
Pond RR Channel DA1: Rip Rap Channel DA1	Peak Elev=10.86' Storage=2 cf Inflow=0.07 cfs 0.004 af Discarded=0.00 cfs 0.001 af Primary=0.06 cfs 0.003 af Outflow=0.06 cfs 0.004 af

Wareham Post Construction

Type III 24-hr 1-Year Rainfall=2.78"

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Pond SIB-1: SIB-1

Peak Elev=10.03' Storage=83 cf Inflow=0.15 cfs 0.026 af
Discarded=0.12 cfs 0.026 af Secondary=0.00 cfs 0.000 af Outflow=0.12 cfs 0.026 af

Pond SIB-2: SIB-2

Peak Elev=23.01' Storage=841 cf Inflow=0.66 cfs 0.053 af
Discarded=0.10 cfs 0.051 af Secondary=0.13 cfs 0.001 af Outflow=0.23 cfs 0.052 af

Pond SIB-3: SIB-3

Peak Elev=14.40' Storage=59 cf Inflow=0.04 cfs 0.004 af
Discarded=0.01 cfs 0.004 af Secondary=0.00 cfs 0.000 af Outflow=0.01 cfs 0.004 af

Pond SIB-4: SIB-4

Peak Elev=17.82' Storage=140 cf Inflow=0.03 cfs 0.011 af
Discarded=0.01 cfs 0.010 af Secondary=0.00 cfs 0.000 af Outflow=0.01 cfs 0.010 af

Total Runoff Area = 5.886 ac Runoff Volume = 0.147 af Average Runoff Depth = 0.30"
62.95% Pervious = 3.705 ac 37.05% Impervious = 2.181 ac

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Type III 24-hr 1-Year Rainfall=2.78"

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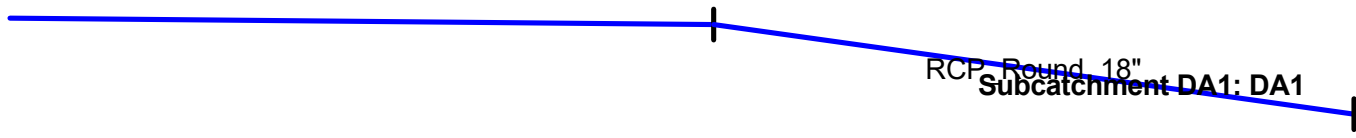
Summary for Subcatchment DA1: DA1

Runoff = 0.15 cfs @ 12.37 hrs, Volume= 0.026 af, Depth= 0.29"
 Routed to Pond SIB-1 : SIB-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs
 Type III 24-hr 1-Year Rainfall=2.78"

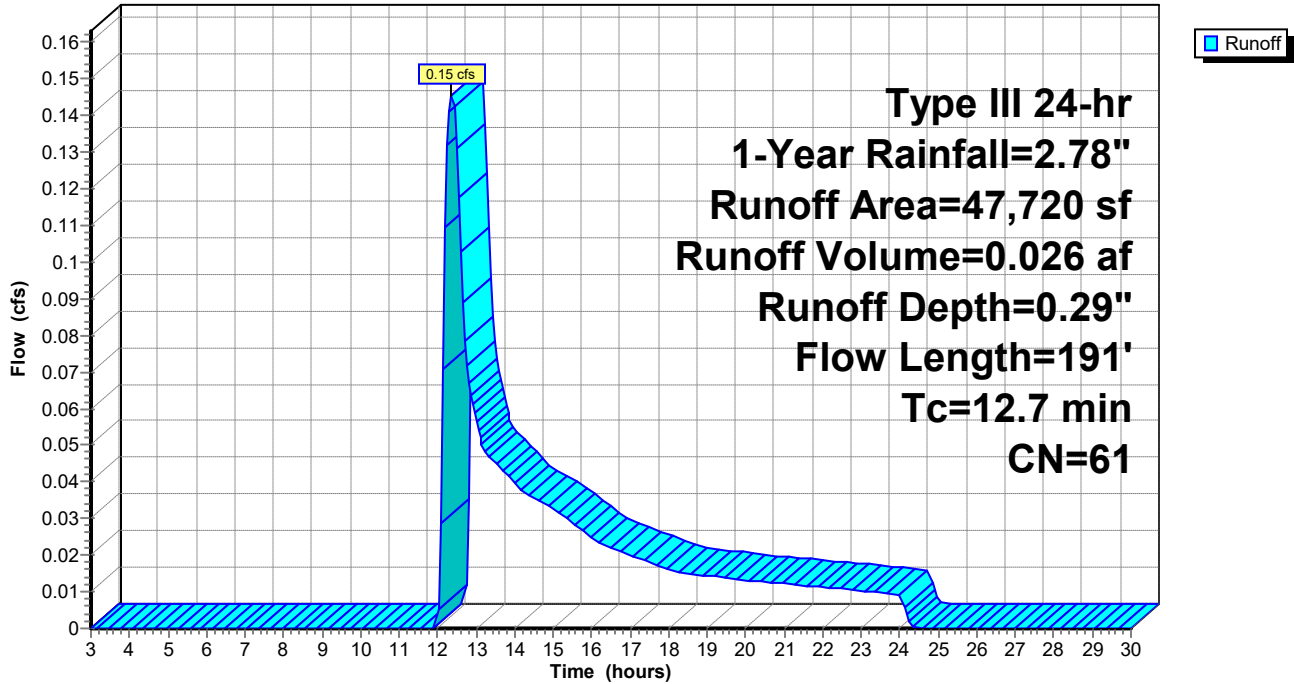
Area (sf)	CN	Description
* 17,477	98	
* 30,243	39	
47,720	61	Weighted Average
30,243		63.38% Pervious Area
17,477		36.62% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.6	100	0.0100	0.13		Sheet Flow, Grass: Short n= 0.150 P2= 3.35"
0.1	91	0.1500	23.02	40.68	Pipe Channel, RCP_Round 18" 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
12.7	191	Total			



Subcatchment DA1: DA1

Hydrograph



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Type III 24-hr 1-Year Rainfall=2.78"

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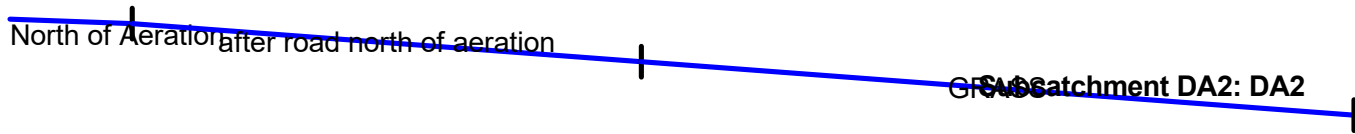
Summary for Subcatchment DA2: DA2

Runoff = 0.00 cfs @ 15.28 hrs, Volume= 0.002 af, Depth= 0.04"
 Routed to Pond SIB-2 : SIB-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs
 Type III 24-hr 1-Year Rainfall=2.78"

Area (sf)	CN	Description
* 5,035	98	Impervious
24,135	39	>75% Grass cover, Good, HSG A
29,170	49	Weighted Average
24,135		82.74% Pervious Area
5,035		17.26% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	24	0.0100	0.80		Sheet Flow, North of Aeration Smooth surfaces n= 0.011 P2= 3.35"
9.6	100	0.0200	0.17		Sheet Flow, after road north of aeration Grass: Short n= 0.150 P2= 3.35"
1.1	140	0.0200	2.12		Shallow Concentrated Flow, GRASS Grassed Waterway Kv= 15.0 fps
11.2	264	Total			



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Type III 24-hr 1-Year Rainfall=2.78"

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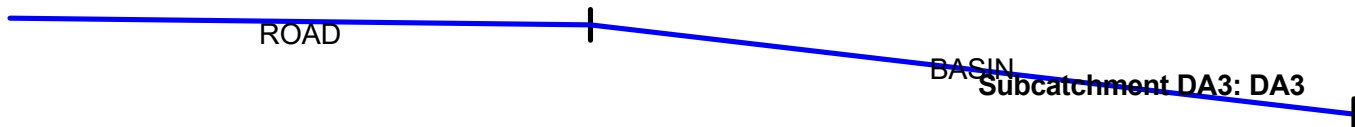
Summary for Subcatchment DA3: DA3

Runoff = 0.04 cfs @ 12.05 hrs, Volume= 0.004 af, Depth= 0.41"
 Routed to Pond SIB-3 : SIB-3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs
 Type III 24-hr 1-Year Rainfall=2.78"

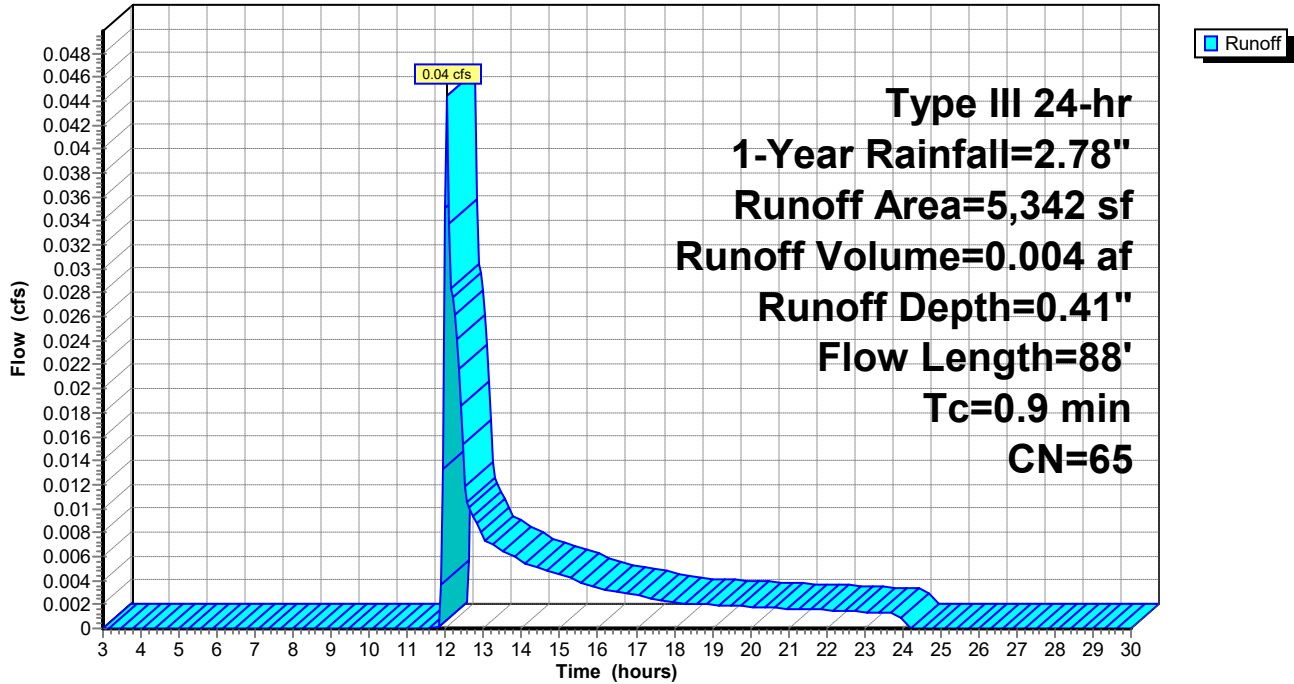
Area (sf)	CN	Description
* 2,394	98	IMPERVIOUS
2,948	39	>75% Grass cover, Good, HSG A
5,342	65	Weighted Average
2,948		55.19% Pervious Area
2,394		44.81% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	38	0.0100	0.88		Sheet Flow, ROAD Smooth surfaces n= 0.011 P2= 3.35"
0.2	50	0.1000	5.09		Shallow Concentrated Flow, BASIN Unpaved Kv= 16.1 fps
0.9	88	Total			



Subcatchment DA3: DA3

Hydrograph



Summary for Subcatchment DA4: DA4

Runoff = 0.00 cfs @ 16.86 hrs, Volume= 0.002 af, Depth= 0.02"
 Routed to Pond Ex. Basin DA4 : DA4 EX. BASIN

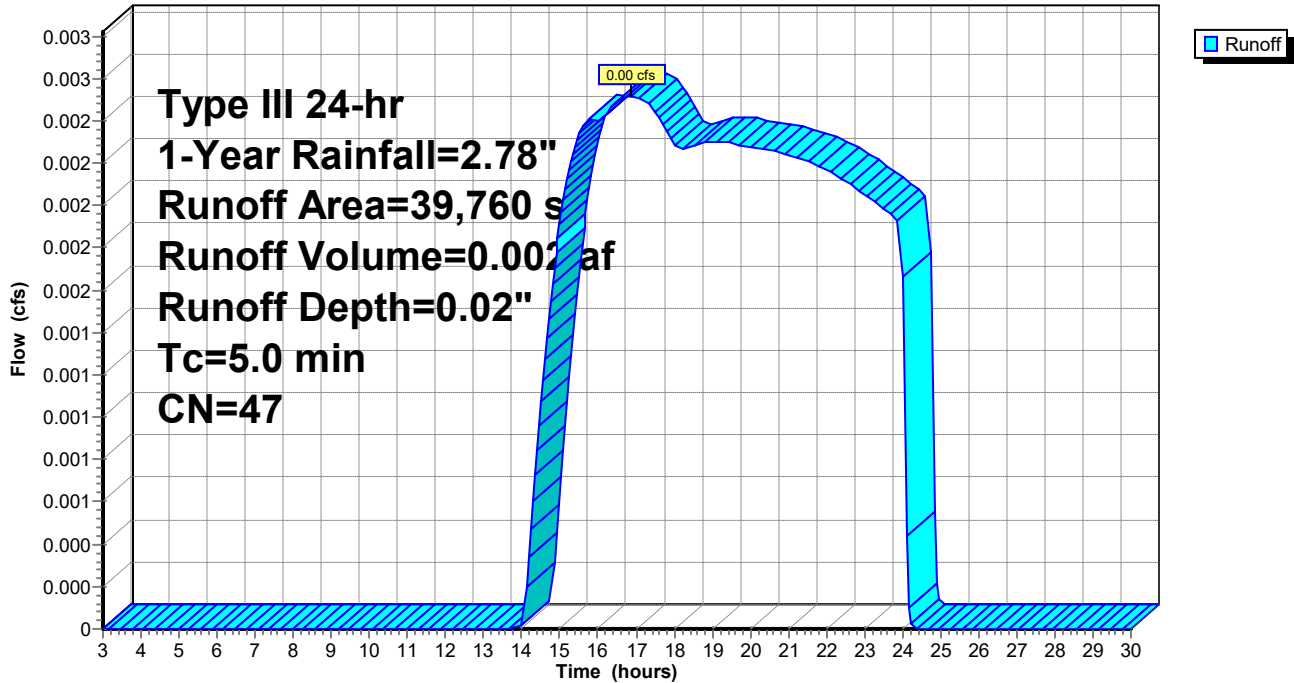
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs
 Type III 24-hr 1-Year Rainfall=2.78"

Area (sf)	CN	Description
29,860	30	Brush, Good, HSG A
* 9,900	98	ROAD
39,760	47	Weighted Average
29,860		75.10% Pervious Area
9,900		24.90% Impervious Area

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

Subcatchment DA4: DA4

Hydrograph



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Type III 24-hr 1-Year Rainfall=2.78"

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Summary for Subcatchment DA4B: DA4B

Runoff = 0.03 cfs @ 12.41 hrs, Volume= 0.011 af, Depth= 0.14"
 Routed to Pond SIB-4 : SIB-4

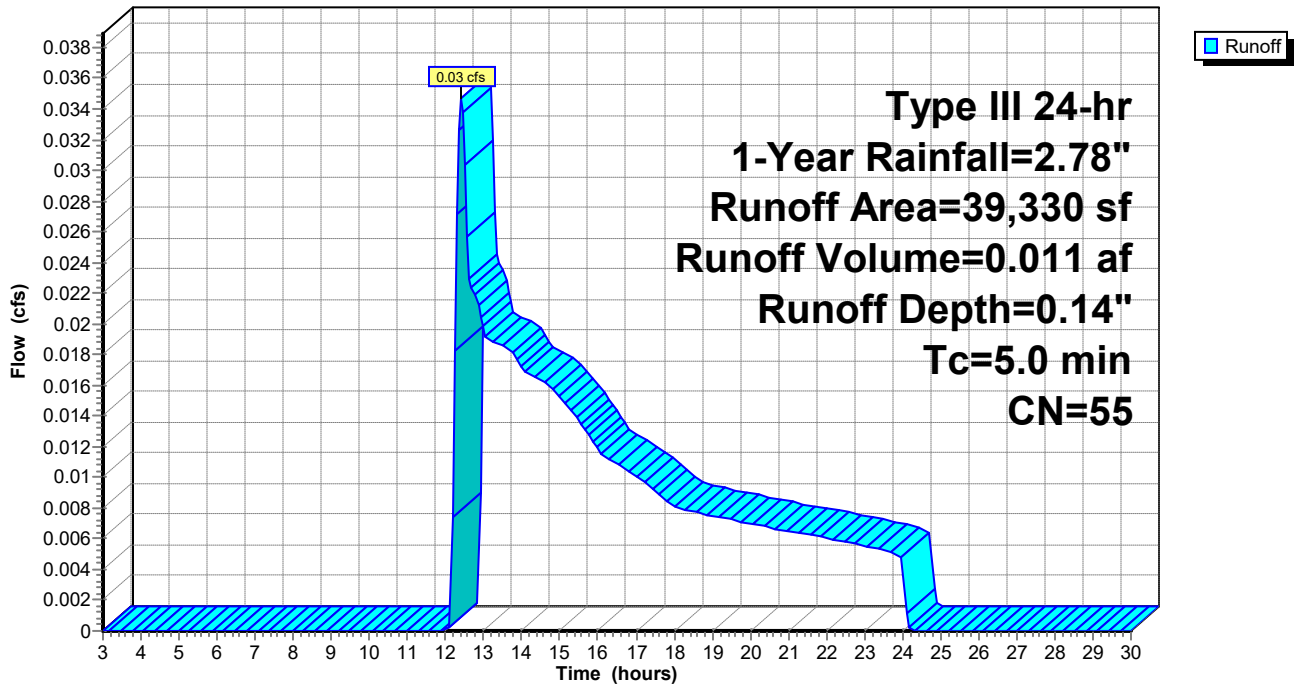
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs
 Type III 24-hr 1-Year Rainfall=2.78"

Area (sf)	CN	Description
25,053	30	Brush, Good, HSG A
* 14,277	98	ROAD
39,330	55	Weighted Average
25,053		63.70% Pervious Area
14,277		36.30% Impervious Area

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

Subcatchment DA4B: DA4B

Hydrograph



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Type III 24-hr 1-Year Rainfall=2.78"

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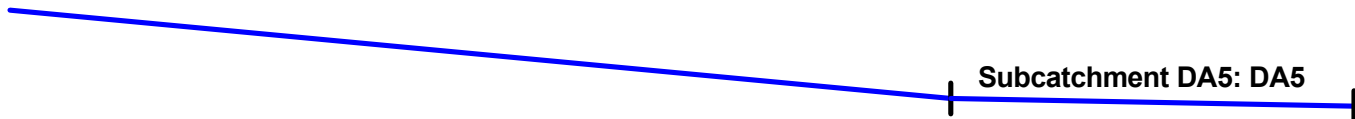
Summary for Subcatchment DA5: DA5

Runoff = 0.12 cfs @ 12.38 hrs, Volume= 0.023 af, Depth= 0.26"
 Routed to Pond CB DA5 : CB DA5

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs
 Type III 24-hr 1-Year Rainfall=2.78"

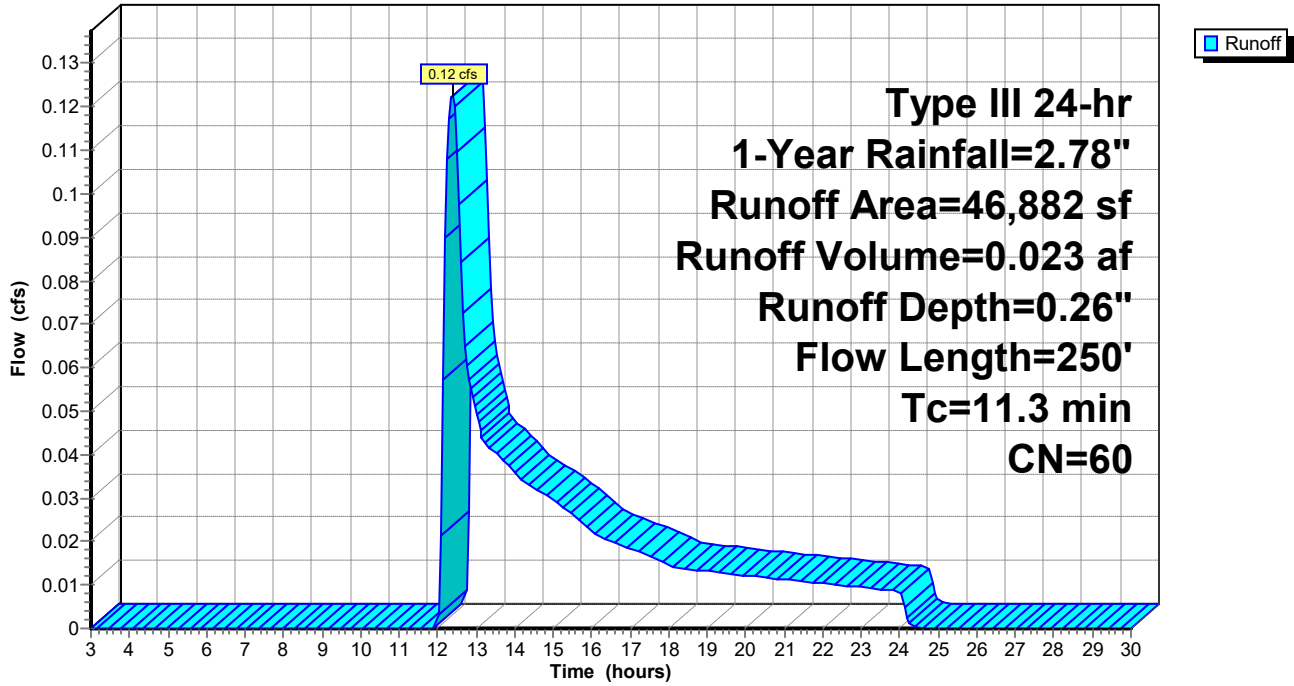
	Area (sf)	CN	Description
*	16,312	98	ROAD
*	30,570	39	GRASSED AREA
	46,882	60	Weighted Average
	30,570		65.21% Pervious Area
	16,312		34.79% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.3	175	0.0500	2.27		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.35"
10.0	75	0.0100	0.12		Sheet Flow, Grass: Short n= 0.150 P2= 3.35"
11.3	250	Total			



Subcatchment DA5: DA5

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Type III 24-hr 1-Year Rainfall=2.78"

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Summary for Subcatchment DA6: DA6

Runoff = 0.56 cfs @ 12.09 hrs, Volume= 0.041 af, Depth= 1.21"
 Routed to Pond SIB-2 : SIB-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs
 Type III 24-hr 1-Year Rainfall=2.78"

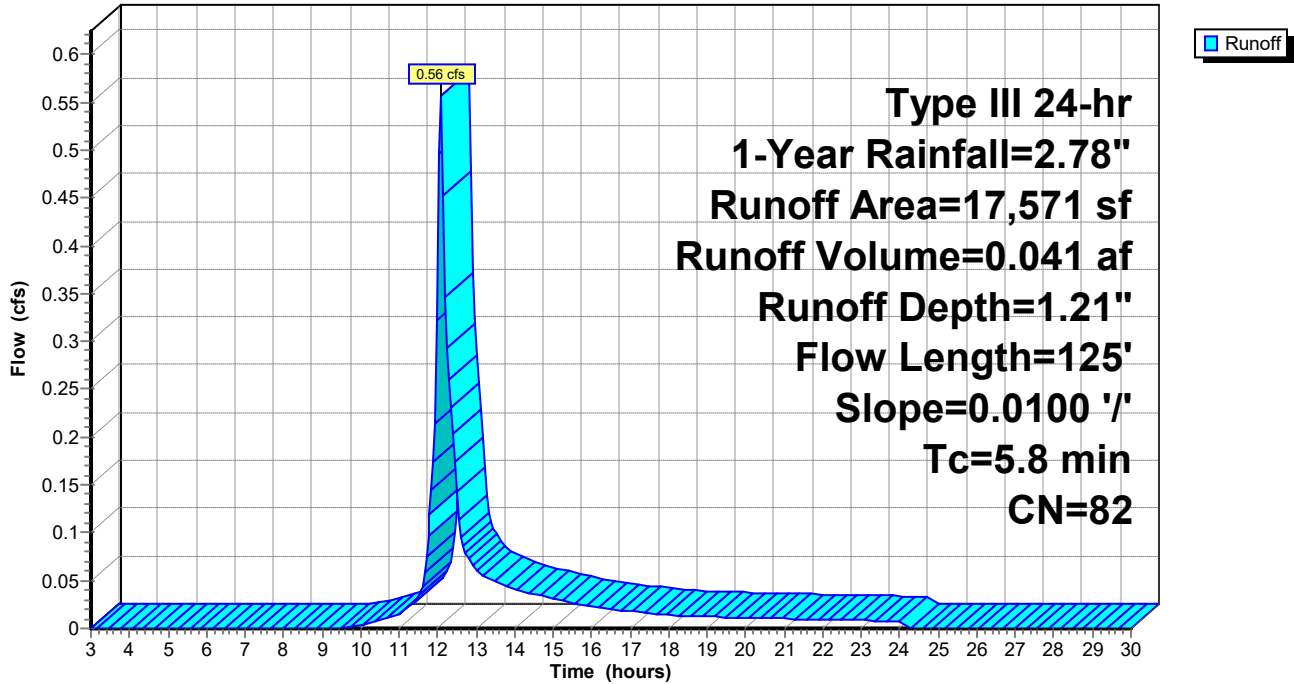
Area (sf)	CN	Description
* 12,762	98	
* 4,809	39	
17,571	82	Weighted Average
4,809		27.37% Pervious Area
12,762		72.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.6	100	0.0100	1.07		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.35"
4.2	25	0.0100	0.10		Sheet Flow, Grass: Short n= 0.150 P2= 3.35"
5.8	125	Total			



Subcatchment DA6: DA6

Hydrograph



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Type III 24-hr 1-Year Rainfall=2.78"

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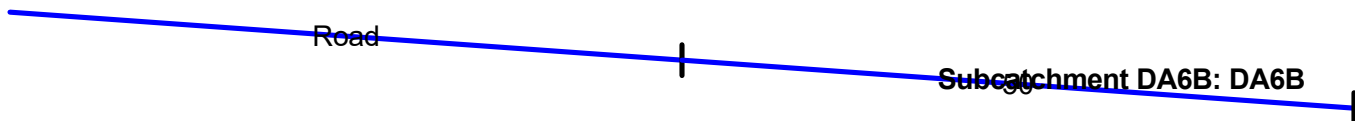
Summary for Subcatchment DA6B: DA6B

Runoff = 0.13 cfs @ 12.05 hrs, Volume= 0.010 af, Depth= 0.60"
 Routed to Pond SIB-2 : SIB-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs
 Type III 24-hr 1-Year Rainfall=2.78"

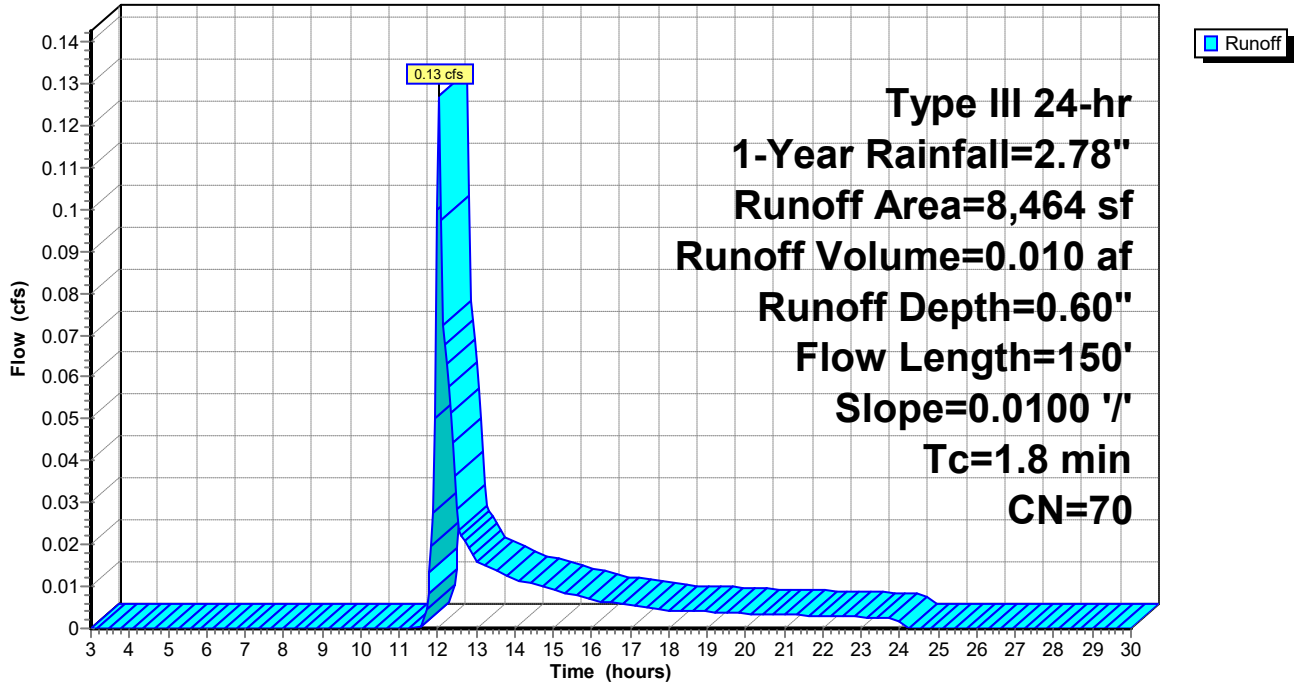
Area (sf)	CN	Description
* 4,400	98	IMPERVIOUS
4,064	39	>75% Grass cover, Good, HSG A
8,464	70	Weighted Average
4,064		48.02% Pervious Area
4,400		51.98% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	75	0.0100	1.01		Sheet Flow, Road Smooth surfaces n= 0.011 P2= 3.35"
0.6	75	0.0100	2.03		Shallow Concentrated Flow, 50 Paved Kv= 20.3 fps
1.8	150	Total			



Subcatchment DA6B: DA6B

Hydrograph



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Type III 24-hr 1-Year Rainfall=2.78"

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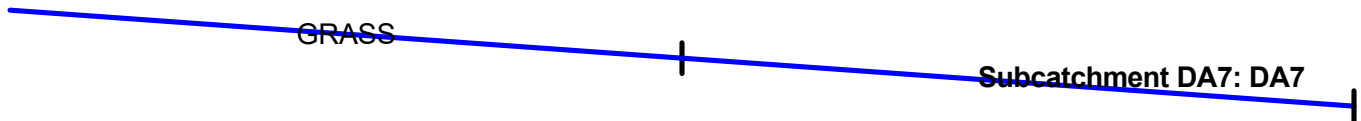
Summary for Subcatchment DA7: DA7

Runoff = 0.27 cfs @ 12.22 hrs, Volume= 0.029 af, Depth= 0.68"
 Routed to Pond CB DA7 : CB DA7

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs
 Type III 24-hr 1-Year Rainfall=2.78"

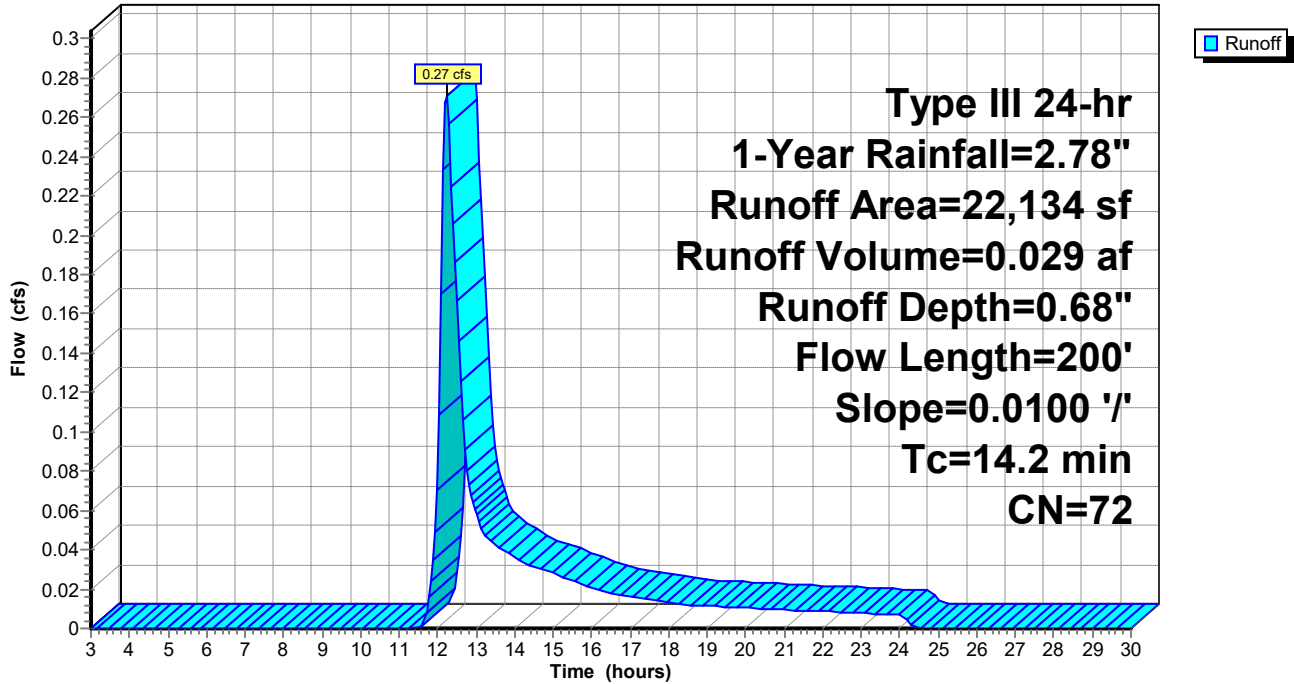
Area (sf)	CN	Description
9,701	39	>75% Grass cover, Good, HSG A
12,433	98	Paved parking, HSG A
22,134	72	Weighted Average
9,701		43.83% Pervious Area
12,433		56.17% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.6	100	0.0100	0.13		Sheet Flow, GRASS Grass: Short n= 0.150 P2= 3.35"
1.6	100	0.0100	1.07		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.35"
14.2	200	Total			



Subcatchment DA7: DA7

Hydrograph



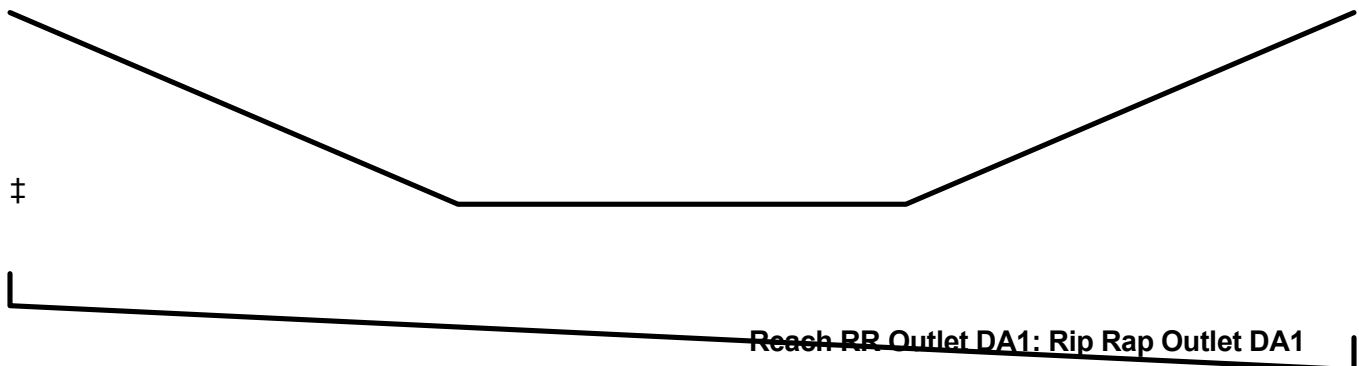
Summary for Reach RR Outlet DA1: Rip Rap Outlet DA1

Inflow Area = 1.076 ac, 34.79% Impervious, Inflow Depth = 0.00" for 1-Year event
Inflow = 0.00 cfs @ 3.00 hrs, Volume= 0.000 af, Incl. 1.00 cfs Inflow Loss
Outflow = 0.00 cfs @ 3.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
Routed to Pond SIB-1 : SIB-1

Routing by Stor-Ind+Trans method, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs / 3
Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

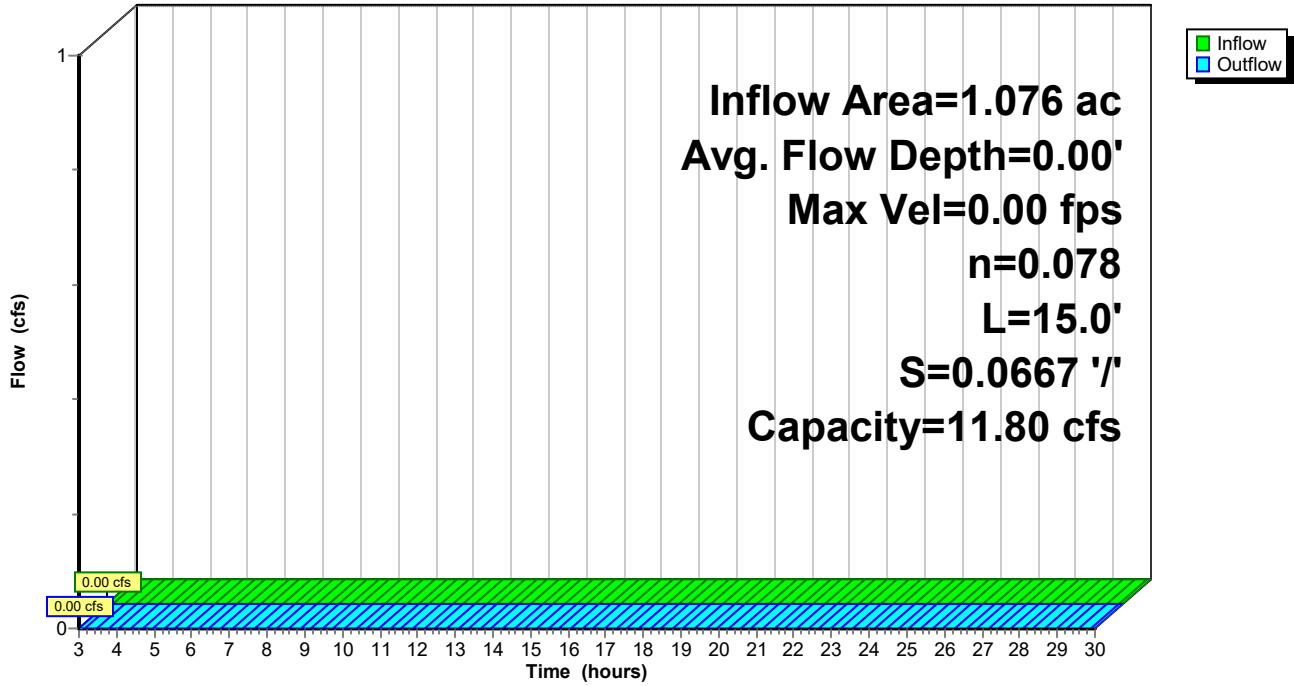
Peak Storage= 0 cf @ 3.00 hrs
Average Depth at Peak Storage= 0.00'
Bank-Full Depth= 0.50' Flow Area= 5.0 sf, Capacity= 11.80 cfs

5.00' x 0.50' deep channel, n= 0.078 Riprap, 12-inch
Side Slope Z-value= 10.0 '/' Top Width= 15.00'
Length= 15.0' Slope= 0.0667 '/'
Inlet Invert= 10.80', Outlet Invert= 9.80'



Reach RR Outlet DA1: Rip Rap Outlet DA1

Hydrograph



Summary for Pond CB DA5: CB DA5

Inflow Area = 1.076 ac, 34.79% Impervious, Inflow Depth = 0.26" for 1-Year event
 Inflow = 0.12 cfs @ 12.38 hrs, Volume= 0.023 af
 Outflow = 0.09 cfs @ 12.62 hrs, Volume= 0.023 af, Atten= 27%, Lag= 14.4 min
 Discarded = 0.02 cfs @ 12.60 hrs, Volume= 0.019 af
 Primary = 0.07 cfs @ 12.62 hrs, Volume= 0.004 af
 Routed to Pond MH 1 : MH1
 Secondary = 0.00 cfs @ 3.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs / 4
 Peak Elev= 16.42' @ 12.60 hrs Surf.Area= 28 sf Storage= 147 cf

Plug-Flow detention time= 76.7 min calculated for 0.023 af (100% of inflow)
 Center-of-Mass det. time= 75.7 min (1,023.4 - 947.7)

Volume	Invert	Avail.Storage	Storage Description
#1	11.23'	302 cf	6.00'D x 10.67'H Vertical Cone/Cylinder
#2	22.00'	6,068 cf	Custom Stage Data (Conic) Listed below (Recalc)
		6,370 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
22.00	2,240	0	0	2,240
23.00	11,000	6,068	6,068	11,004

Device	Routing	Invert	Outlet Devices
#1	Discarded	11.23'	8.270 in/hr Exfiltration over Wetted area Phase-In= 0.01'
#2	Primary	16.30'	18.0" Round CMP_Round 18" L= 25.6' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 16.30' / 14.80' S= 0.0586 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf
#3	Secondary	22.90'	70.0" x 140.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#4	Secondary	21.80'	2.0" x 2.0" Horiz. Orifice/Grate X 8.00 columns X 8 rows C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.02 cfs @ 12.60 hrs HW=16.42' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.06 cfs @ 12.62 hrs HW=16.41' (Free Discharge)
 ↑2=CMP_Round 18" (Inlet Controls 0.06 cfs @ 0.91 fps)

Secondary OutFlow Max=0.00 cfs @ 3.00 hrs HW=11.23' (Free Discharge)
 ↑3=Orifice/Grate (Controls 0.00 cfs)
 ↑4=Orifice/Grate (Controls 0.00 cfs)

Wareham Post Construction

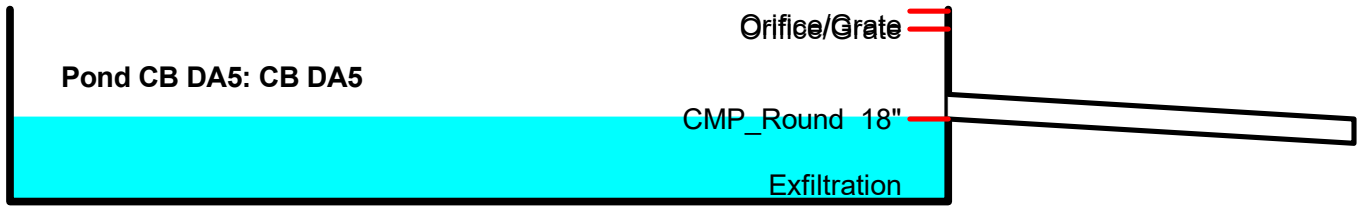
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Type III 24-hr 1-Year Rainfall=2.78"

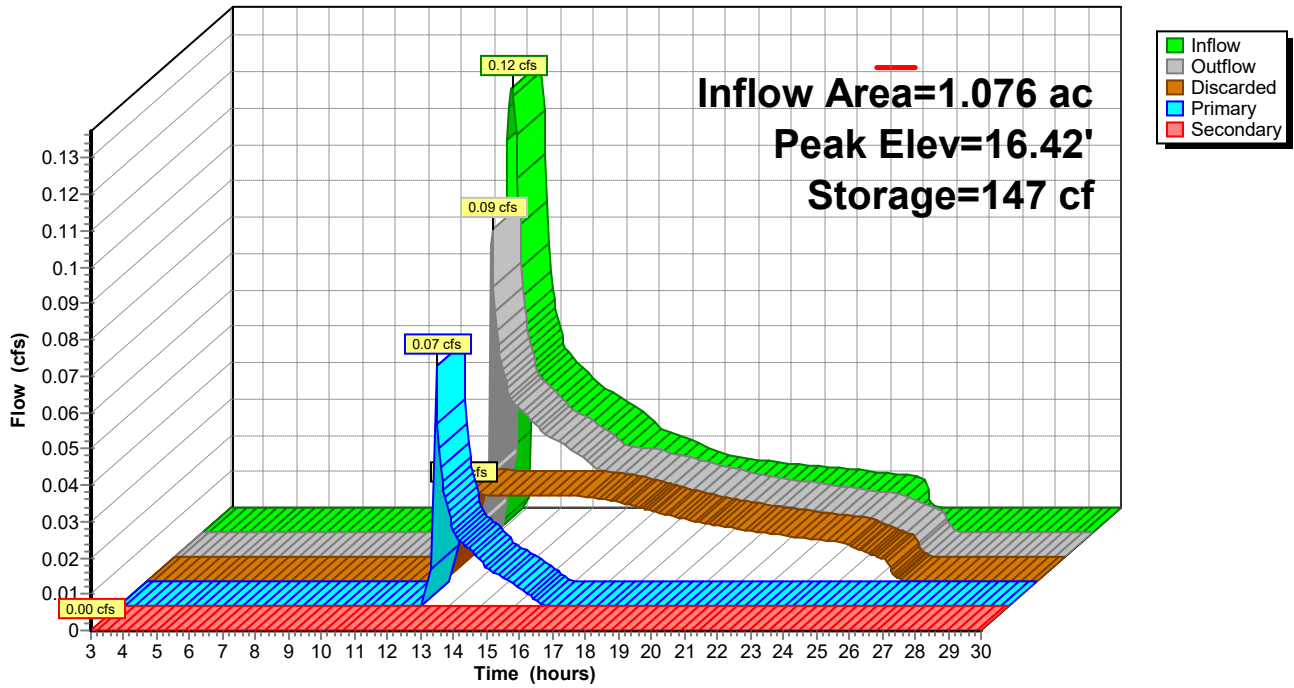
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Pond CB DA5: CB DA5

Hydrograph



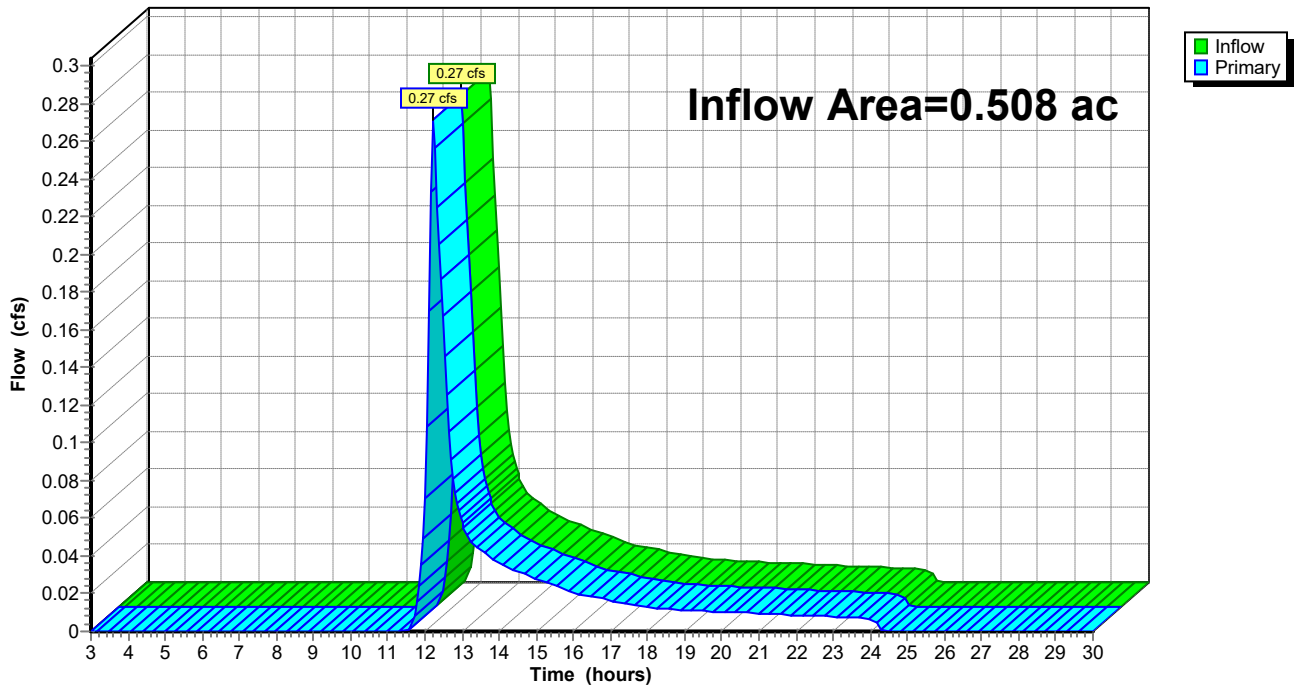
Summary for Pond CB DA7: CB DA7

Inflow Area = 0.508 ac, 56.17% Impervious, Inflow Depth = 0.68" for 1-Year event
Inflow = 0.27 cfs @ 12.22 hrs, Volume= 0.029 af
Primary = 0.27 cfs @ 12.22 hrs, Volume= 0.029 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs

Pond CB DA7: CB DA7

Hydrograph



Summary for Pond Ex. Basin DA4: DA4 EX. BASIN

Inflow Area = 0.913 ac, 24.90% Impervious, Inflow Depth = 0.02" for 1-Year event
 Inflow = 0.00 cfs @ 16.86 hrs, Volume= 0.002 af
 Outflow = 0.00 cfs @ 16.92 hrs, Volume= 0.002 af, Atten= 0%, Lag= 3.4 min
 Discarded = 0.00 cfs @ 16.92 hrs, Volume= 0.002 af
 Secondary = 0.00 cfs @ 3.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs / 3
 Peak Elev= 16.00' @ 16.92 hrs Surf.Area= 1,026 sf Storage= 0 cf

Plug-Flow detention time= 2.9 min calculated for 0.002 af (100% of inflow)
 Center-of-Mass det. time= 3.0 min (1,153.8 - 1,150.8)

Volume	Invert	Avail.Storage	Storage Description
#1	16.00'	2,708 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
16.00	1,025	0	0	1,025
17.00	4,866	2,708	2,708	4,870

Device	Routing	Invert	Outlet Devices
#1	Discarded	16.00'	2.410 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Secondary	16.90'	360.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

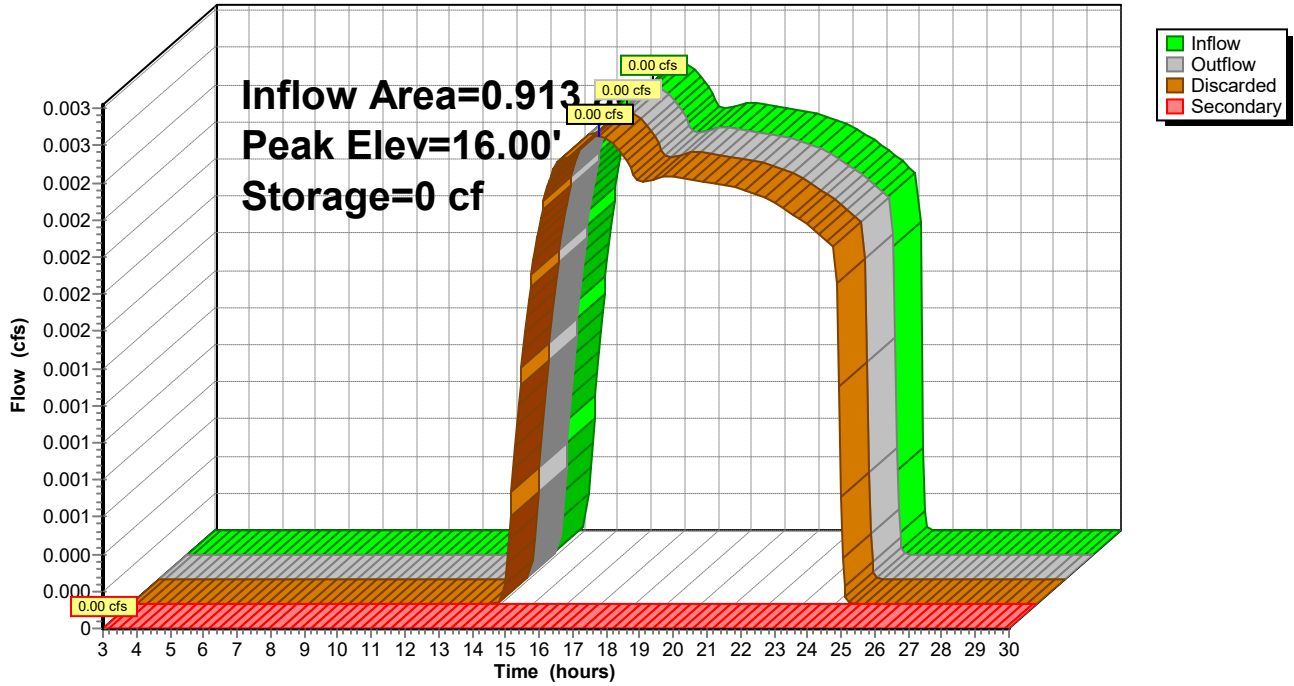
Discarded OutFlow Max=0.00 cfs @ 16.92 hrs HW=16.00' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 3.00 hrs HW=16.00' (Free Discharge)
 ↑2=Orifice/Grate (Controls 0.00 cfs)



Pond Ex. Basin DA4: DA4 EX. BASIN

Hydrograph



Summary for Pond MH 1: MH1

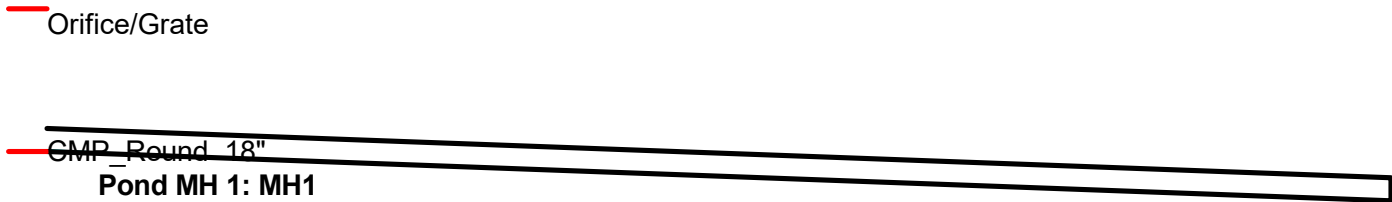
Inflow Area = 1.076 ac, 34.79% Impervious, Inflow Depth = 0.04" for 1-Year event
 Inflow = 0.07 cfs @ 12.62 hrs, Volume= 0.004 af
 Outflow = 0.07 cfs @ 12.62 hrs, Volume= 0.004 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.07 cfs @ 12.62 hrs, Volume= 0.004 af
 Routed to Pond MH2 : MH2
 Secondary = 0.00 cfs @ 3.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs
 Peak Elev= 14.82' @ 12.62 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	14.70'	18.0" Round CMP_Round 18" L= 156.1' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 14.70' / 11.50' S= 0.0205 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf
#2	Secondary	24.00'	24.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

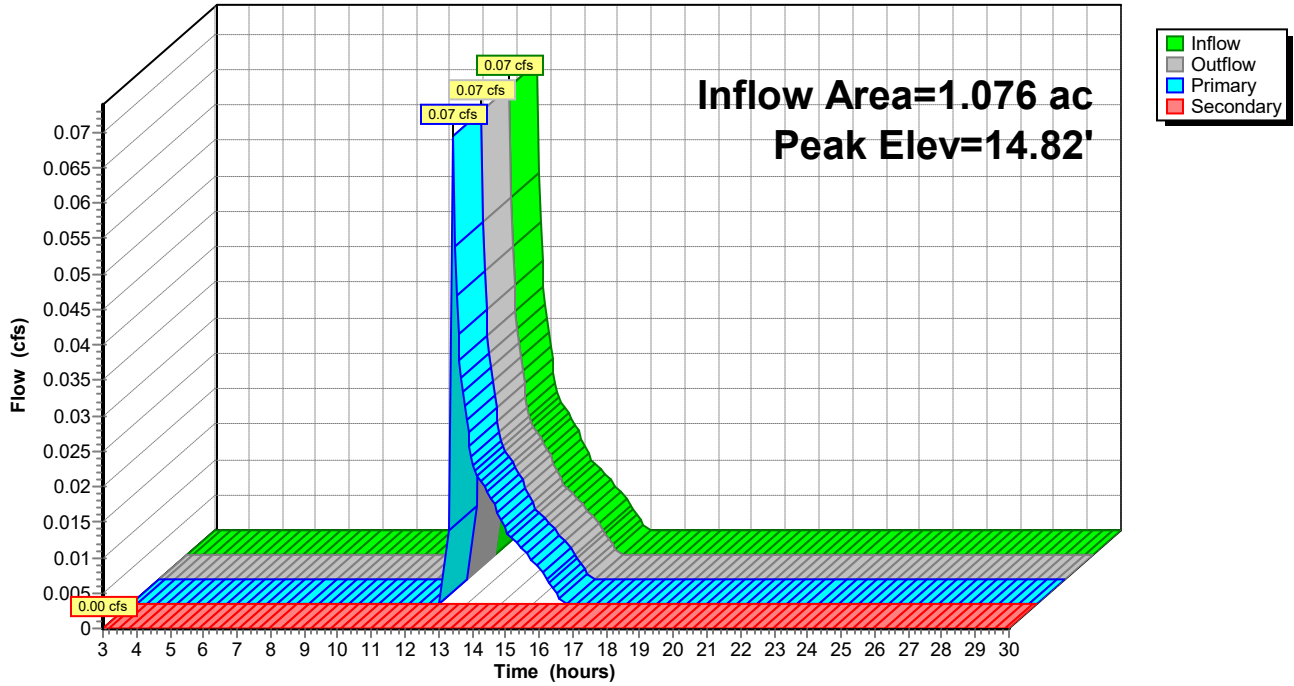
Primary OutFlow Max=0.05 cfs @ 12.62 hrs HW=14.81' (Free Discharge)
 ↑1=CMP_Round 18" (Inlet Controls 0.05 cfs @ 0.89 fps)

Secondary OutFlow Max=0.00 cfs @ 3.00 hrs HW=14.70' (Free Discharge)
 ↑2=Orifice/Grate (Controls 0.00 cfs)



Pond MH 1: MH1

Hydrograph



Summary for Pond MH2: MH2

Inflow Area = 1.076 ac, 34.79% Impervious, Inflow Depth = 0.04" for 1-Year event
 Inflow = 0.07 cfs @ 12.62 hrs, Volume= 0.004 af
 Outflow = 0.07 cfs @ 12.62 hrs, Volume= 0.004 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.07 cfs @ 12.62 hrs, Volume= 0.004 af
 Routed to Pond RR Channel DA1 : Rip Rap Channel DA1
 Secondary = 0.00 cfs @ 3.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs
 Peak Elev= 10.85' @ 12.62 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	11.40'	18.0" Round CMP_Round 18" L= 118.9' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 11.40' / 10.80' S= 0.0050 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf
#2	Secondary	24.00'	24.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Primary	10.80'	15.00' long x 6.00' breadth x 1.00' high Rock Fill Rock Diam.= 12.000", S.D.= 1.000", Voids= 40.0%

Primary OutFlow Max=0.03 cfs @ 12.62 hrs HW=10.84' (Free Discharge)

- ↑ 1=CMP_Round 18" (Controls 0.00 cfs)
- ↑ 3=Rock Fill (Rockfill Controls 0.03 cfs @ 0.10 fps)

Secondary OutFlow Max=0.00 cfs @ 3.00 hrs HW=10.80' (Free Discharge)

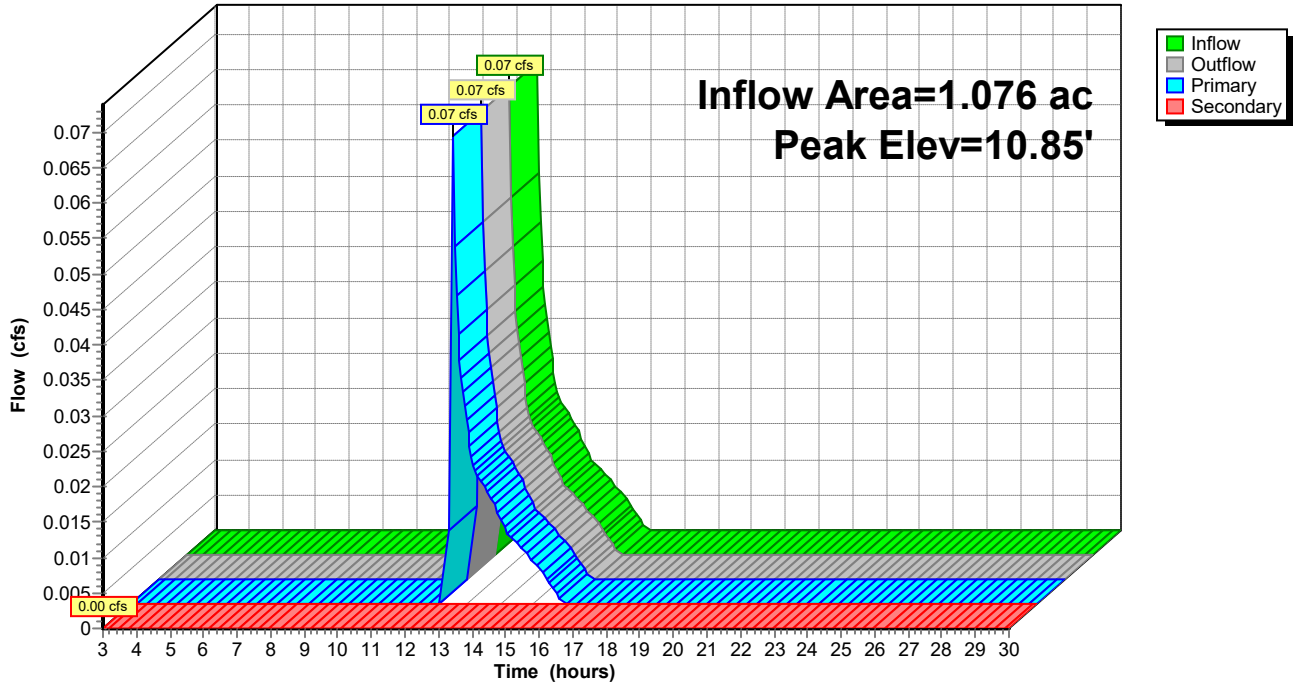
- ↑ 2=Orifice/Grate (Controls 0.00 cfs)

Orifice/Grate

~~RR Channel MH2: MH2~~

Pond MH2: MH2

Hydrograph



Summary for Pond RR Channel DA1: Rip Rap Channel DA1

Inflow Area = 1.076 ac, 34.79% Impervious, Inflow Depth = 0.04" for 1-Year event
 Inflow = 0.07 cfs @ 12.62 hrs, Volume= 0.004 af
 Outflow = 0.06 cfs @ 12.62 hrs, Volume= 0.004 af, Atten= 9%, Lag= 0.3 min
 Discarded = 0.00 cfs @ 12.60 hrs, Volume= 0.001 af
 Primary = 0.06 cfs @ 12.62 hrs, Volume= 0.003 af

Routed to Reach RR Outlet DA1 : Rip Rap Outlet DA1

Routing by Stor-Ind method, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs / 3
 Peak Elev= 10.86' @ 12.62 hrs Surf.Area= 70 sf Storage= 2 cf

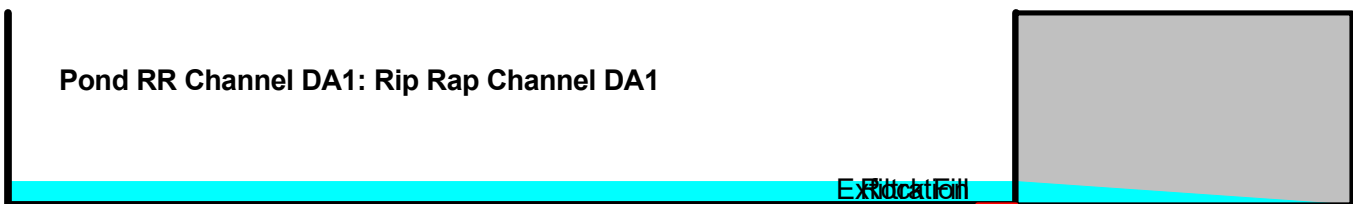
Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 0.5 min (810.2 - 809.7)

Volume	Invert	Avail.Storage	Storage Description
#1	10.80'	10 cf	60.0"W x 6.0"H x 15.00'L Parabolic Arch 25 cf Overall x 40.0% Voids

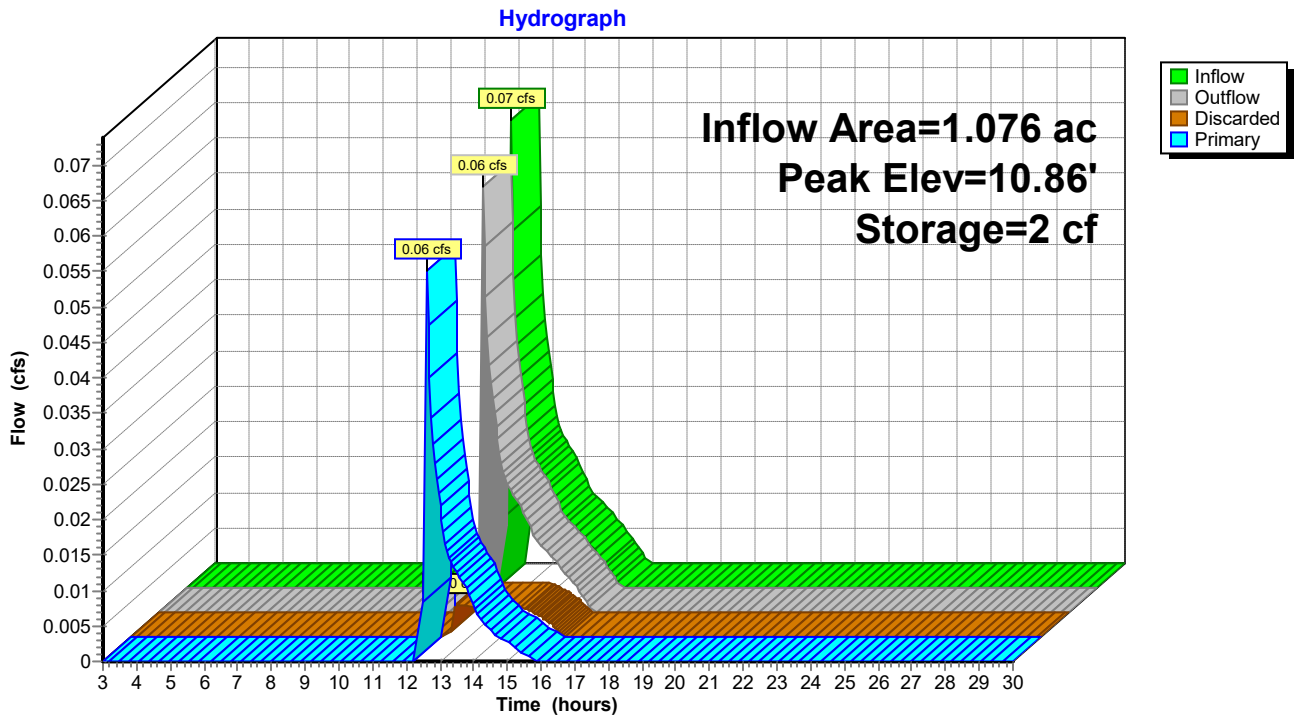
Device	Routing	Invert	Outlet Devices
#1	Discarded	10.80'	2.410 in/hr Exfiltration over Wetted area Phase-In= 0.01'
#2	Primary	10.80'	15.00' long x 5.00' breadth x 0.50' high Rock Fill Rock Diam.= 12.000", S.D.= 1.000", Voids= 40.0%

Discarded OutFlow Max=0.00 cfs @ 12.60 hrs HW=10.85' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.00 cfs)

Primary OutFlow Max=0.05 cfs @ 12.62 hrs HW=10.85' (Free Discharge)
 ↑2=Rock Fill (Rockfill Controls 0.05 cfs @ 0.12 fps)



Pond RR Channel DA1: Rip Rap Channel DA1



Wareham Post Construction

Type III 24-hr 1-Year Rainfall=2.78"

Prepared by GHD, Inc

Printed 11/1/2023

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Summary for Pond SIB-1: SIB-1

Inflow Area = 2.172 ac, 35.72% Impervious, Inflow Depth = 0.14" for 1-Year event
 Inflow = 0.15 cfs @ 12.37 hrs, Volume= 0.026 af
 Outflow = 0.12 cfs @ 12.55 hrs, Volume= 0.026 af, Atten= 20%, Lag= 11.0 min
 Discarded = 0.12 cfs @ 12.55 hrs, Volume= 0.026 af
 Secondary = 0.00 cfs @ 3.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs
 Peak Elev= 10.03' @ 12.55 hrs Surf.Area= 2,683 sf Storage= 83 cf

Plug-Flow detention time= 12.0 min calculated for 0.026 af (100% of inflow)
 Center-of-Mass det. time= 12.0 min (953.7 - 941.7)

Volume	Invert	Avail.Storage	Storage Description
#1	10.00'	123,310 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
10.00	2,664	0	0	2,664
11.00	3,306	2,979	2,979	3,334
12.00	4,005	3,650	6,629	4,066
13.00	4,760	4,377	11,006	4,856
14.00	5,572	5,161	16,167	5,707
15.00	6,440	6,001	22,168	6,617
16.00	7,365	6,897	29,065	7,588
17.00	8,347	7,851	36,916	8,619
18.00	9,385	8,861	45,777	9,709
19.00	10,480	9,927	55,704	10,860
20.00	11,630	11,050	66,754	12,069
21.00	12,837	12,229	78,983	13,338
22.00	14,101	13,464	92,447	14,667
23.00	15,422	14,757	107,203	16,057
24.00	16,800	16,106	123,310	17,506

Device	Routing	Invert	Outlet Devices
#1	Discarded	10.00'	8.270 in/hr Exfiltration over Wetted area Phase-In= 0.01'
#2	Secondary	23.90'	360.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

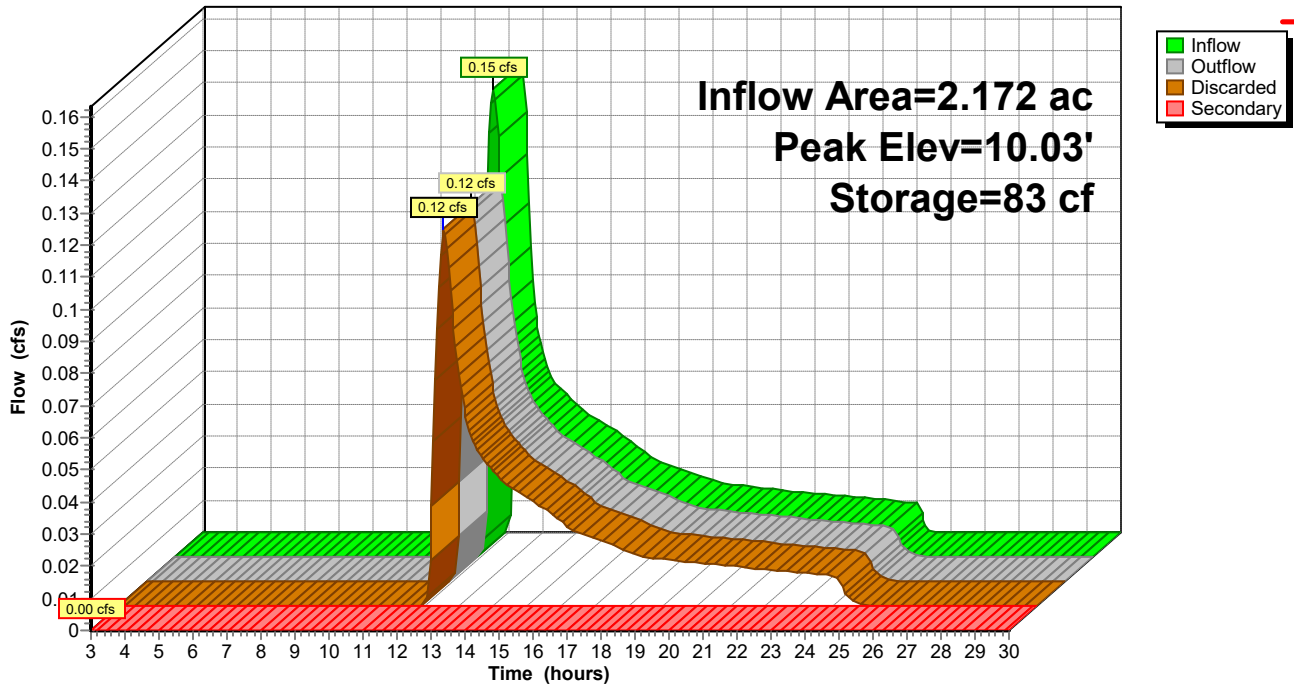
Discarded OutFlow Max=0.51 cfs @ 12.55 hrs HW=10.03' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.51 cfs)

Secondary OutFlow Max=0.00 cfs @ 3.00 hrs HW=10.00' (Free Discharge)
 ↑2=Orifice/Grate (Controls 0.00 cfs)



Pond SIB-1: SIB-1

Hydrograph



Summary for Pond SIB-2: SIB-2

Inflow Area = 1.267 ac, 40.21% Impervious, Inflow Depth = 0.50" for 1-Year event
 Inflow = 0.66 cfs @ 12.08 hrs, Volume= 0.053 af
 Outflow = 0.23 cfs @ 12.46 hrs, Volume= 0.052 af, Atten= 66%, Lag= 22.7 min
 Discarded = 0.10 cfs @ 12.45 hrs, Volume= 0.051 af
 Secondary = 0.13 cfs @ 12.46 hrs, Volume= 0.001 af

Routing by Stor-Ind method, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs / 4
 Peak Elev= 23.01' @ 12.45 hrs Surf.Area= 333 sf Storage= 841 cf

Plug-Flow detention time= 161.2 min calculated for 0.052 af (99% of inflow)
 Center-of-Mass det. time= 156.8 min (1,019.2 - 862.4)

Volume	Invert	Avail.Storage	Storage Description
#1	13.96'	299 cf	10.00'W x 24.00'L x 6.00'H Prismaoid 1,440 cf Overall - 693 cf Embedded = 747 cf x 40.0% Voids
#2	13.96'	509 cf	6.00'D x 6.00'H Vertical Cone/Cylinder x 3 Inside #1 693 cf Overall - 6.0" Wall Thickness = 509 cf
#3	19.96'	28 cf	2.00'D x 3.00'H Vertical Cone/Cylinder x 3 -Impervious
#4	22.96'	878 cf	Custom Stage Data (Conic) Listed below (Recalc)
		1,714 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
22.96	83	0	0	83
24.00	393	228	228	398
25.00	947	650	878	959

Device	Routing	Invert	Outlet Devices
#1	Secondary	23.00'	2.0" x 2.0" Horiz. Orifice/Grate X 6.00 columns X 6 rows C= 0.600 Limited to weir flow at low heads
#2	Discarded	13.96'	8.270 in/hr Exfiltration over Wetted area from 13.96' - 23.00' Excluded Wetted area = 240 sf Phase-In= 0.01'

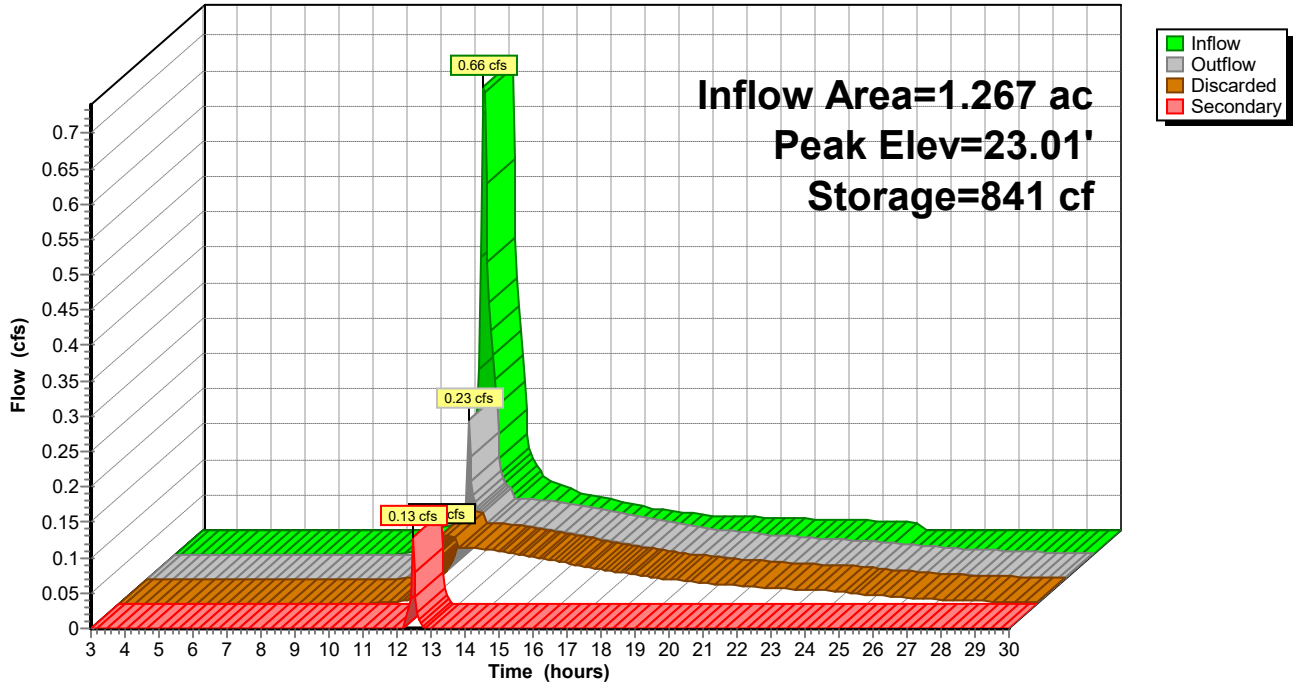
Discarded OutFlow Max=0.10 cfs @ 12.45 hrs HW=23.01' (Free Discharge)
 ↑**2=Exfiltration** (Exfiltration Controls 0.10 cfs)

Secondary OutFlow Max=0.11 cfs @ 12.46 hrs HW=23.01' (Free Discharge)
 ↑**1=Orifice/Grate** (Weir Controls 0.11 cfs @ 0.36 fps)



Pond SIB-2: SIB-2

Hydrograph



Summary for Pond SIB-3: SIB-3

Inflow Area = 0.123 ac, 44.81% Impervious, Inflow Depth = 0.41" for 1-Year event
 Inflow = 0.04 cfs @ 12.05 hrs, Volume= 0.004 af
 Outflow = 0.01 cfs @ 13.93 hrs, Volume= 0.004 af, Atten= 87%, Lag= 112.7 min
 Discarded = 0.01 cfs @ 13.93 hrs, Volume= 0.004 af
 Secondary = 0.00 cfs @ 3.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs / 4
 Peak Elev= 14.40' @ 13.93 hrs Surf.Area= 240 sf Storage= 59 cf

Plug-Flow detention time= 167.1 min calculated for 0.004 af (99% of inflow)
 Center-of-Mass det. time= 160.8 min (1,067.0 - 906.1)

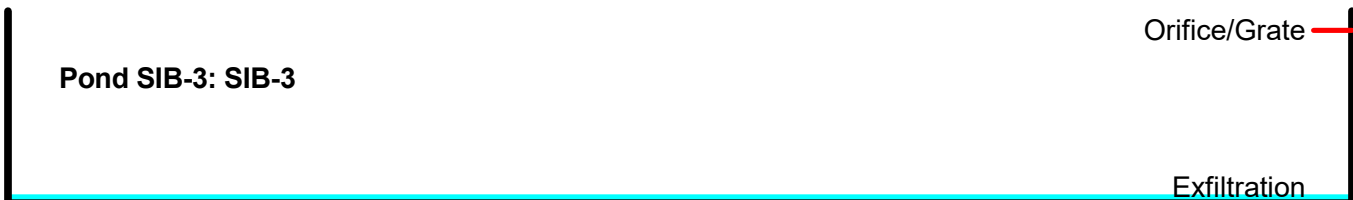
Volume	Invert	Avail.Storage	Storage Description
#1	13.96'	299 cf	10.00'W x 24.00'L x 6.00'H Prismaticoid 1,440 cf Overall - 693 cf Embedded = 747 cf x 40.0% Voids
#2	13.96'	509 cf	6.00'D x 6.00'H Vertical Cone/Cylinder x 3 Inside #1 693 cf Overall - 6.0" Wall Thickness = 509 cf
#3	19.96'	28 cf	2.00'D x 3.00'H Vertical Cone/Cylinder x 3 -Impervious
#4	22.96'	1,578 cf	Custom Stage Data (Irregular) Listed below (Recalc)
		2,414 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
22.96	817	126.0	0	0	817
24.00	2,350	206.0	1,578	1,578	2,938

Device	Routing	Invert	Outlet Devices
#1	Secondary	23.00'	2.0" x 2.0" Horiz. Orifice/Grate X 6.00 columns X 6 rows C= 0.600 Limited to weir flow at low heads
#2	Discarded	13.96'	8.270 in/hr Exfiltration over Wetted area from 13.96' - 23.00' Excluded Wetted area = 240 sf Phase-In= 0.01'

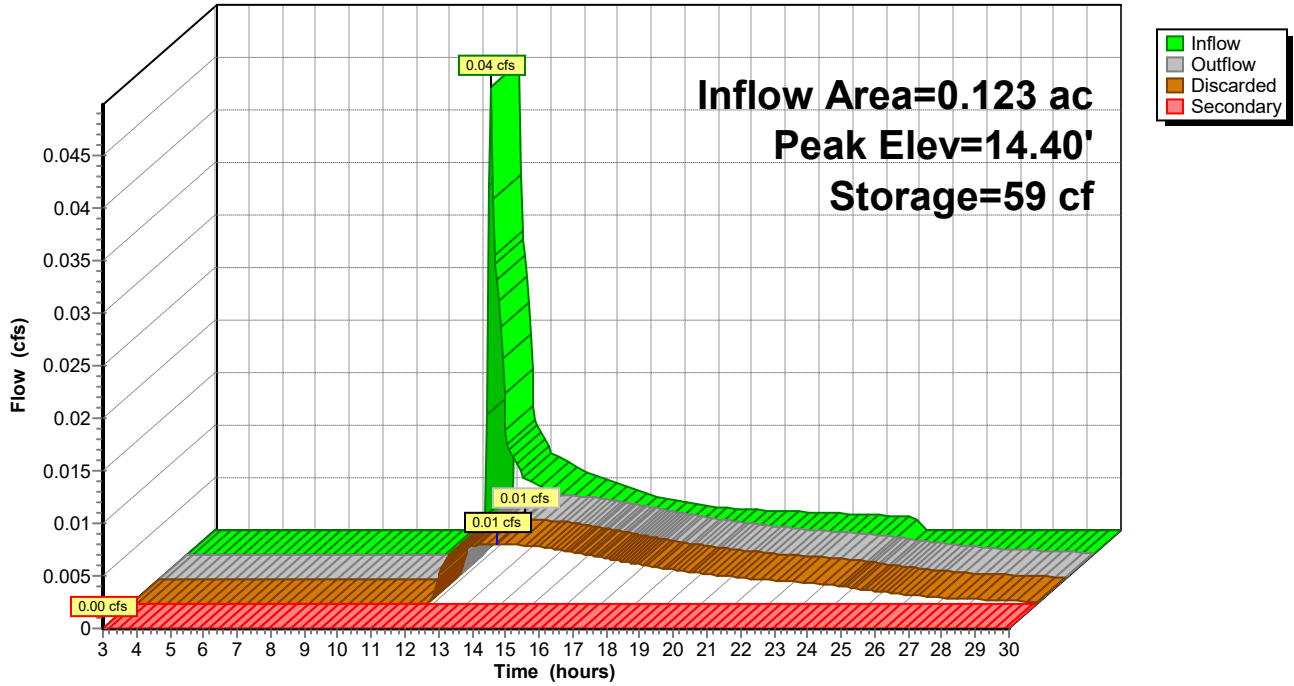
Discarded OutFlow Max=0.01 cfs @ 13.93 hrs HW=14.40' (Free Discharge)
 ↑ **2=Exfiltration** (Exfiltration Controls 0.01 cfs)

Secondary OutFlow Max=0.00 cfs @ 3.00 hrs HW=13.96' (Free Discharge)
 ↑ **1=Orifice/Grate** (Controls 0.00 cfs)



Pond SIB-3: SIB-3

Hydrograph



Summary for Pond SIB-4: SIB-4

Inflow Area = 0.903 ac, 36.30% Impervious, Inflow Depth = 0.14" for 1-Year event
 Inflow = 0.03 cfs @ 12.41 hrs, Volume= 0.011 af
 Outflow = 0.01 cfs @ 15.98 hrs, Volume= 0.010 af, Atten= 66%, Lag= 214.2 min
 Discarded = 0.01 cfs @ 15.98 hrs, Volume= 0.010 af
 Secondary = 0.00 cfs @ 3.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs / 4
 Peak Elev= 17.82' @ 15.98 hrs Surf.Area= 170 sf Storage= 140 cf

Plug-Flow detention time= 193.9 min calculated for 0.010 af (92% of inflow)
 Center-of-Mass det. time= 159.3 min (1,149.0 - 989.7)

Volume	Invert	Avail.Storage	Storage Description
#1	16.33'	248 cf	10.00'W x 17.00'L x 6.67'H Prismaoid 1,134 cf Overall - 513 cf Embedded = 621 cf x 40.0% Voids
#2	16.33'	377 cf	6.00'D x 6.67'H Vertical Cone/Cylinder x 2 Inside #1 513 cf Overall - 6.0" Wall Thickness = 377 cf
#3	23.00'	0 cf	2.00'D x 2.00'H Vertical Cone/Cylinder 6 cf Overall x 0.0% Voids
#4	25.00'	2,852 cf	Custom Stage Data (Conic) Listed below (Recalc)
		3,477 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
25.00	514	0	0	514
26.00	1,416	928	928	1,422
27.00	2,482	1,924	2,852	2,500

Device	Routing	Invert	Outlet Devices
#1	Discarded	16.67'	8.270 in/hr Exfiltration over Wetted area above 16.67' Excluded Wetted area = 188 sf Phase-In= 0.01'
#2	Secondary	26.90'	528.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

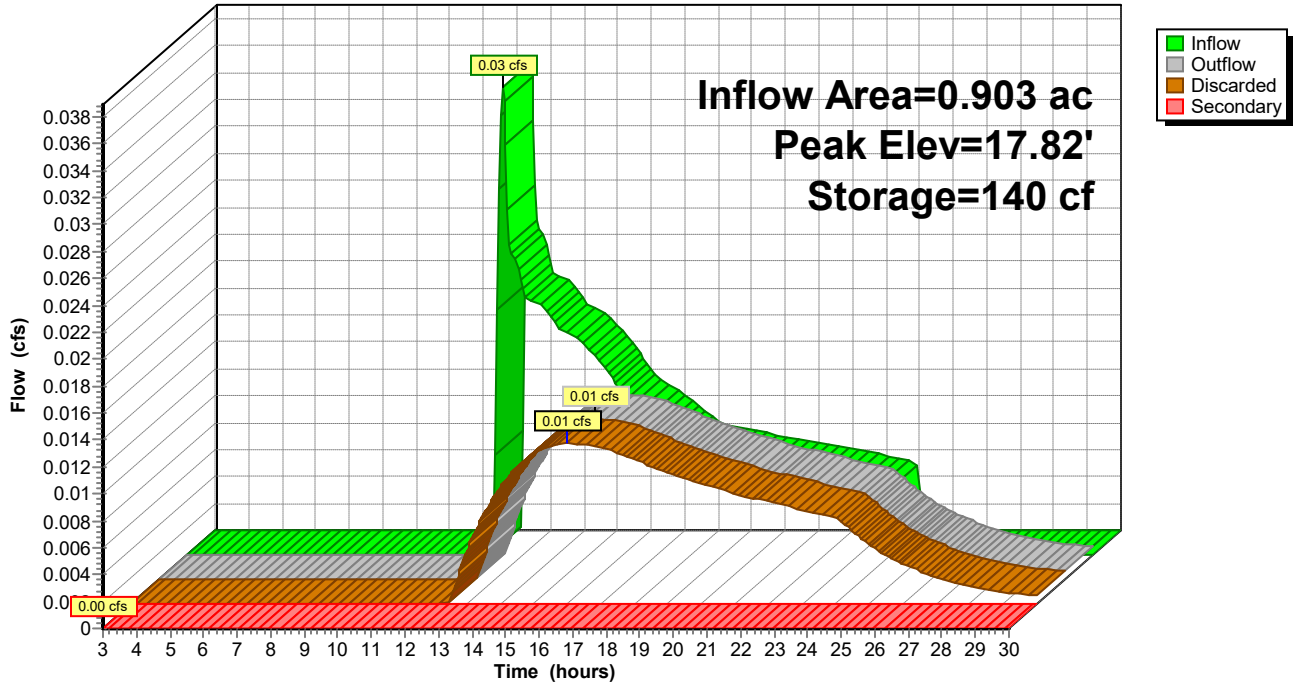
Discarded OutFlow Max=0.01 cfs @ 15.98 hrs HW=17.82' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.01 cfs)

Secondary OutFlow Max=0.00 cfs @ 3.00 hrs HW=16.33' (Free Discharge)
 ↑2=Orifice/Grate (Controls 0.00 cfs)



Pond SIB-4: SIB-4

Hydrograph



Wareham Post Construction

Type III 24-hr 2-Year Rainfall=3.35"

Prepared by GHD, Inc

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Time span=3.00-30.00 hrs, dt=0.05 hrs, 541 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment DA1: DA1	Runoff Area=47,720 sf 36.62% Impervious Runoff Depth=0.51" Flow Length=191' Tc=12.7 min CN=61 Runoff=0.35 cfs 0.046 af
Subcatchment DA2: DA2	Runoff Area=29,170 sf 17.26% Impervious Runoff Depth=0.14" Flow Length=264' Tc=11.2 min CN=49 Runoff=0.02 cfs 0.008 af
Subcatchment DA3: DA3	Runoff Area=5,342 sf 44.81% Impervious Runoff Depth=0.67" Flow Length=88' Tc=0.9 min CN=65 Runoff=0.09 cfs 0.007 af
Subcatchment DA4: DA4	Runoff Area=39,760 sf 24.90% Impervious Runoff Depth=0.10" Tc=5.0 min CN=47 Runoff=0.01 cfs 0.007 af
Subcatchment DA4B: DA4B	Runoff Area=39,330 sf 36.30% Impervious Runoff Depth=0.30" Tc=5.0 min CN=55 Runoff=0.12 cfs 0.022 af
Subcatchment DA5: DA5	Runoff Area=46,882 sf 34.79% Impervious Runoff Depth=0.47" Flow Length=250' Tc=11.3 min CN=60 Runoff=0.31 cfs 0.042 af
Subcatchment DA6: DA6	Runoff Area=17,571 sf 72.63% Impervious Runoff Depth=1.66" Flow Length=125' Slope=0.0100 '/' Tc=5.8 min CN=82 Runoff=0.77 cfs 0.056 af
Subcatchment DA6B: DA6B	Runoff Area=8,464 sf 51.98% Impervious Runoff Depth=0.92" Flow Length=150' Slope=0.0100 '/' Tc=1.8 min CN=70 Runoff=0.21 cfs 0.015 af
Subcatchment DA7: DA7	Runoff Area=22,134 sf 56.17% Impervious Runoff Depth=1.02" Flow Length=200' Slope=0.0100 '/' Tc=14.2 min CN=72 Runoff=0.44 cfs 0.043 af
Reach RR Outlet DA1: Rip Rap Outlet	Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af n=0.078 L=15.0' S=0.0667 '/' Capacity=11.80 cfs Outflow=0.00 cfs 0.000 af
Pond CB DA5: CB DA5	Peak Elev=16.56' Storage=151 cf Inflow=0.31 cfs 0.042 af Discarded=0.02 cfs 0.024 af Primary=0.33 cfs 0.019 af Secondary=0.00 cfs 0.000 af Outflow=0.35 cfs 0.042 af
Pond CB DA7: CB DA7	Inflow=0.44 cfs 0.043 af Primary=0.44 cfs 0.043 af
Pond Ex. Basin DA4: DA4 EX. BASIN	Peak Elev=16.00' Storage=2 cf Inflow=0.01 cfs 0.007 af Discarded=0.01 cfs 0.007 af Secondary=0.00 cfs 0.000 af Outflow=0.01 cfs 0.007 af
Pond MH 1: MH1	Peak Elev=14.99' Inflow=0.33 cfs 0.019 af Primary=0.33 cfs 0.019 af Secondary=0.00 cfs 0.000 af Outflow=0.33 cfs 0.019 af
Pond MH2: MH2	Peak Elev=11.01' Inflow=0.33 cfs 0.019 af Primary=0.33 cfs 0.019 af Secondary=0.00 cfs 0.000 af Outflow=0.33 cfs 0.019 af
Pond RR Channel DA1: Rip Rap Channel DA1	Peak Elev=10.99' Storage=5 cf Inflow=0.33 cfs 0.019 af Discarded=0.01 cfs 0.002 af Primary=0.31 cfs 0.017 af Outflow=0.31 cfs 0.019 af

Wareham Post Construction

Type III 24-hr 2-Year Rainfall=3.35"

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Pond SIB-1: SIB-1

Peak Elev=10.07' Storage=188 cf Inflow=0.35 cfs 0.046 af
Discarded=0.26 cfs 0.046 af Secondary=0.00 cfs 0.000 af Outflow=0.26 cfs 0.046 af

Pond SIB-2: SIB-2

Peak Elev=23.07' Storage=846 cf Inflow=0.94 cfs 0.078 af
Discarded=0.10 cfs 0.064 af Secondary=0.94 cfs 0.015 af Outflow=1.04 cfs 0.079 af

Pond SIB-3: SIB-3

Peak Elev=14.74' Storage=105 cf Inflow=0.09 cfs 0.007 af
Discarded=0.01 cfs 0.007 af Secondary=0.00 cfs 0.000 af Outflow=0.01 cfs 0.007 af

Pond SIB-4: SIB-4

Peak Elev=19.38' Storage=286 cf Inflow=0.12 cfs 0.022 af
Discarded=0.03 cfs 0.021 af Secondary=0.00 cfs 0.000 af Outflow=0.03 cfs 0.021 af

Total Runoff Area = 5.886 ac Runoff Volume = 0.247 af Average Runoff Depth = 0.50"
62.95% Pervious = 3.705 ac 37.05% Impervious = 2.181 ac

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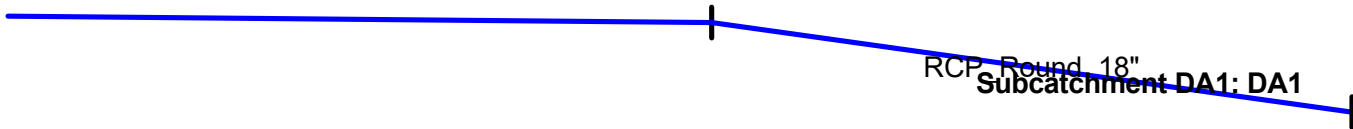
Summary for Subcatchment DA1: DA1

Runoff = 0.35 cfs @ 12.24 hrs, Volume= 0.046 af, Depth= 0.51"
 Routed to Pond SIB-1 : SIB-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs
 Type III 24-hr 2-Year Rainfall=3.35"

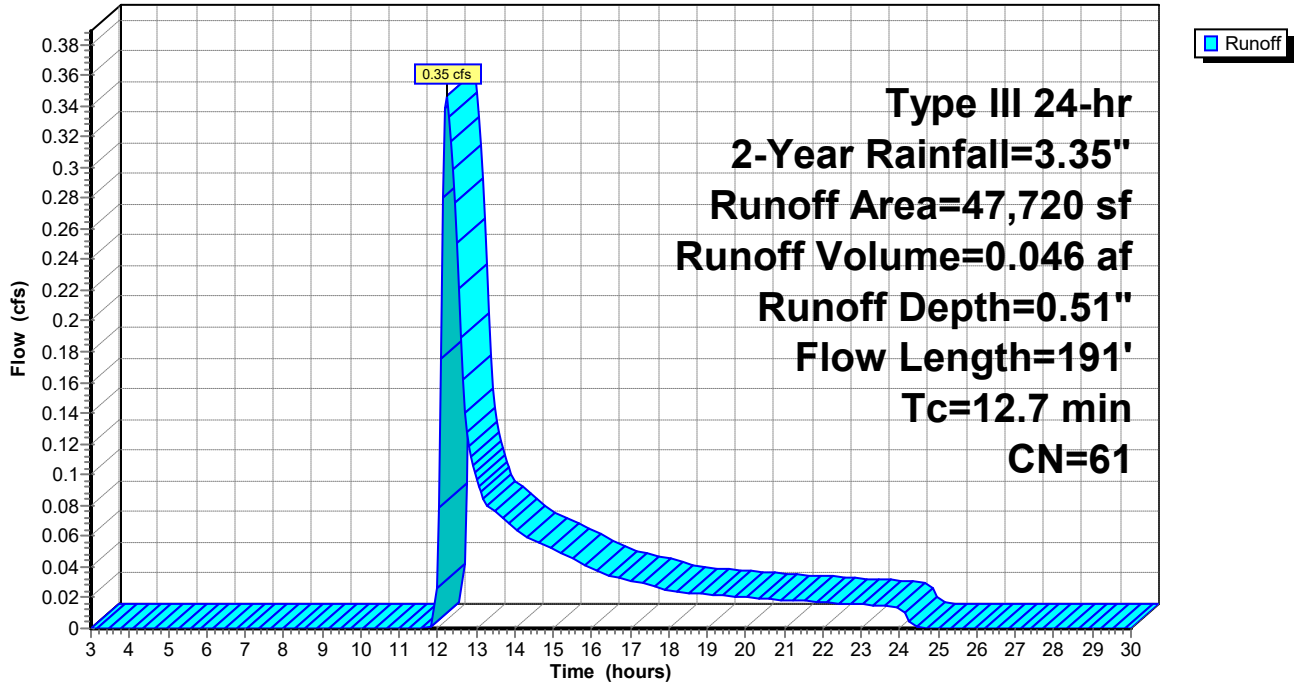
Area (sf)	CN	Description
* 17,477	98	
* 30,243	39	
47,720	61	Weighted Average
30,243		63.38% Pervious Area
17,477		36.62% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.6	100	0.0100	0.13		Sheet Flow, Grass: Short n= 0.150 P2= 3.35"
0.1	91	0.1500	23.02	40.68	Pipe Channel, RCP_Round 18" 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
12.7	191	Total			



Subcatchment DA1: DA1

Hydrograph



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Type III 24-hr 2-Year Rainfall=3.35"

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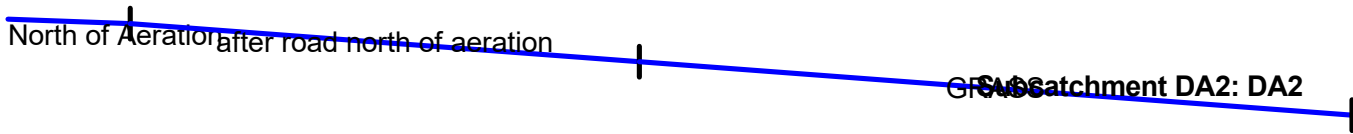
Summary for Subcatchment DA2: DA2

Runoff = 0.02 cfs @ 12.56 hrs, Volume= 0.008 af, Depth= 0.14"
 Routed to Pond SIB-2 : SIB-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs
 Type III 24-hr 2-Year Rainfall=3.35"

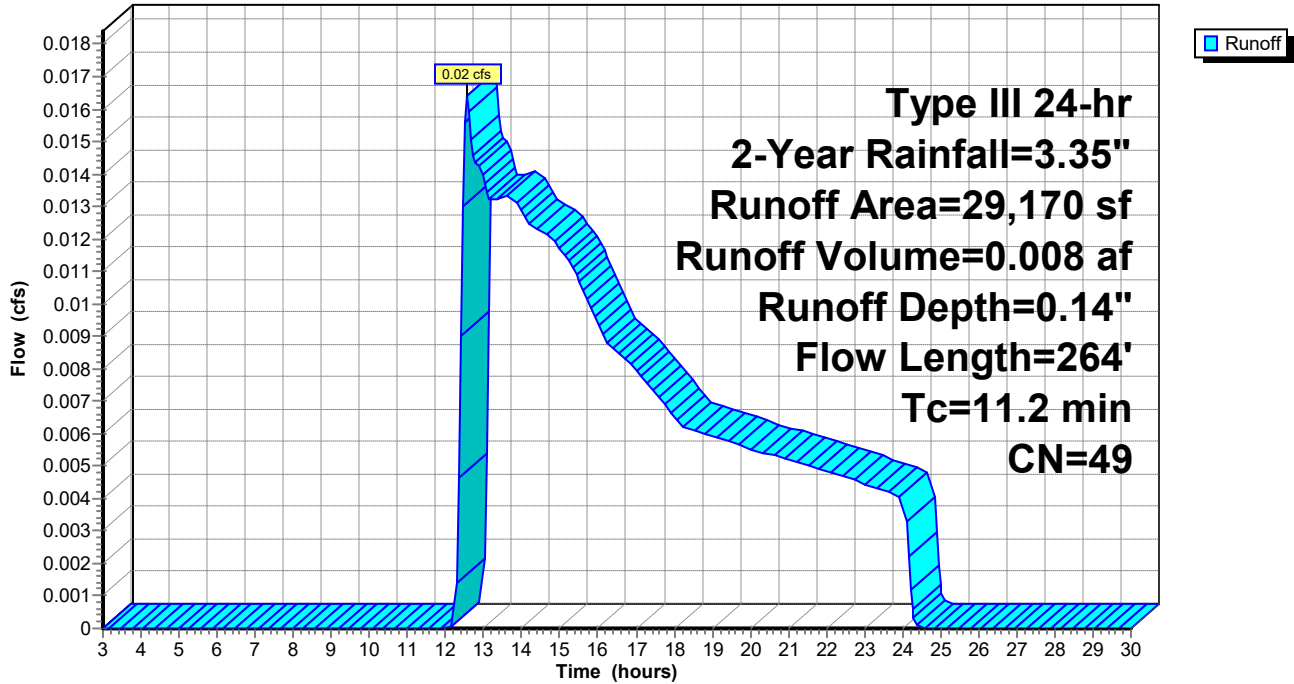
Area (sf)	CN	Description
* 5,035	98	Impervious
24,135	39	>75% Grass cover, Good, HSG A
29,170	49	Weighted Average
24,135		82.74% Pervious Area
5,035		17.26% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	24	0.0100	0.80		Sheet Flow, North of Aeration Smooth surfaces n= 0.011 P2= 3.35"
9.6	100	0.0200	0.17		Sheet Flow, after road north of aeration Grass: Short n= 0.150 P2= 3.35"
1.1	140	0.0200	2.12		Shallow Concentrated Flow, GRASS Grassed Waterway Kv= 15.0 fps
11.2	264	Total			



Subcatchment DA2: DA2

Hydrograph



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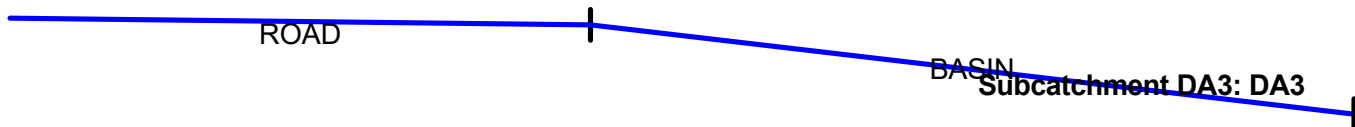
Summary for Subcatchment DA3: DA3

Runoff = 0.09 cfs @ 12.04 hrs, Volume= 0.007 af, Depth= 0.67"
 Routed to Pond SIB-3 : SIB-3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs
 Type III 24-hr 2-Year Rainfall=3.35"

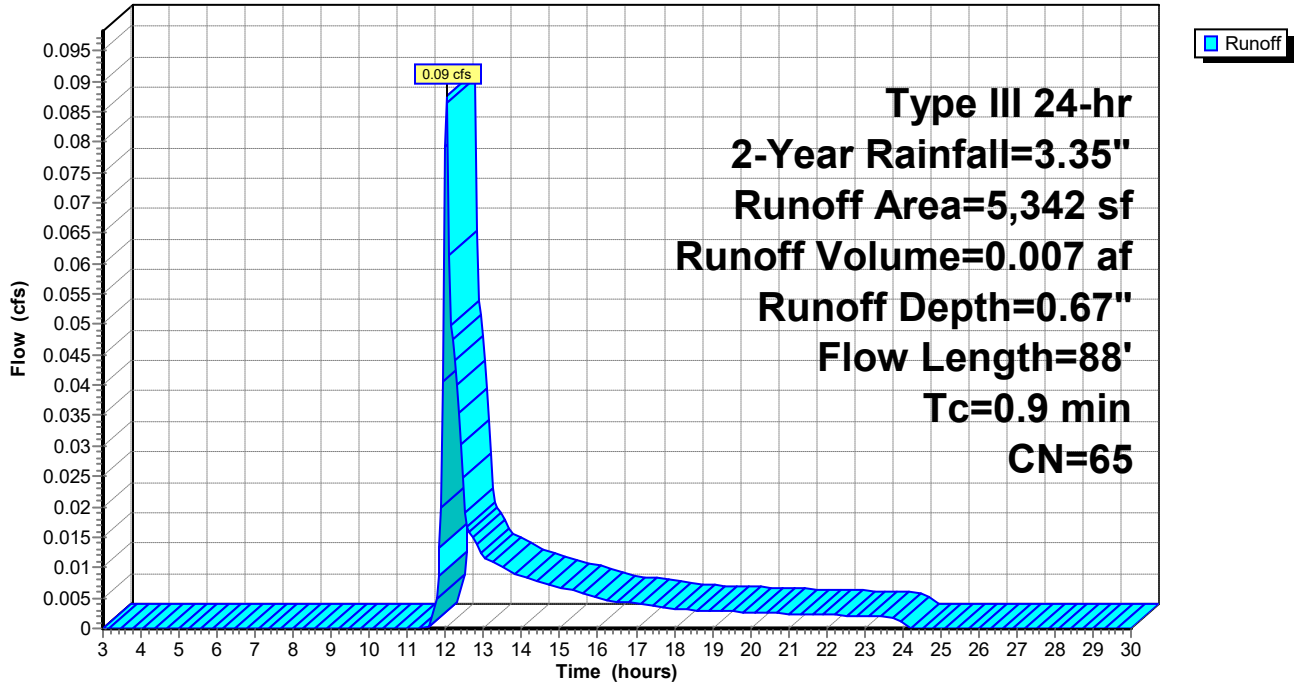
	Area (sf)	CN	Description
*	2,394	98	IMPERVIOUS
	2,948	39	>75% Grass cover, Good, HSG A
	5,342	65	Weighted Average
	2,948		55.19% Pervious Area
	2,394		44.81% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	38	0.0100	0.88		Sheet Flow, ROAD Smooth surfaces n= 0.011 P2= 3.35"
0.2	50	0.1000	5.09		Shallow Concentrated Flow, BASIN Unpaved Kv= 16.1 fps
0.9	88	Total			



Subcatchment DA3: DA3

Hydrograph



Summary for Subcatchment DA4: DA4

Runoff = 0.01 cfs @ 13.79 hrs, Volume= 0.007 af, Depth= 0.10"
 Routed to Pond Ex. Basin DA4 : DA4 EX. BASIN

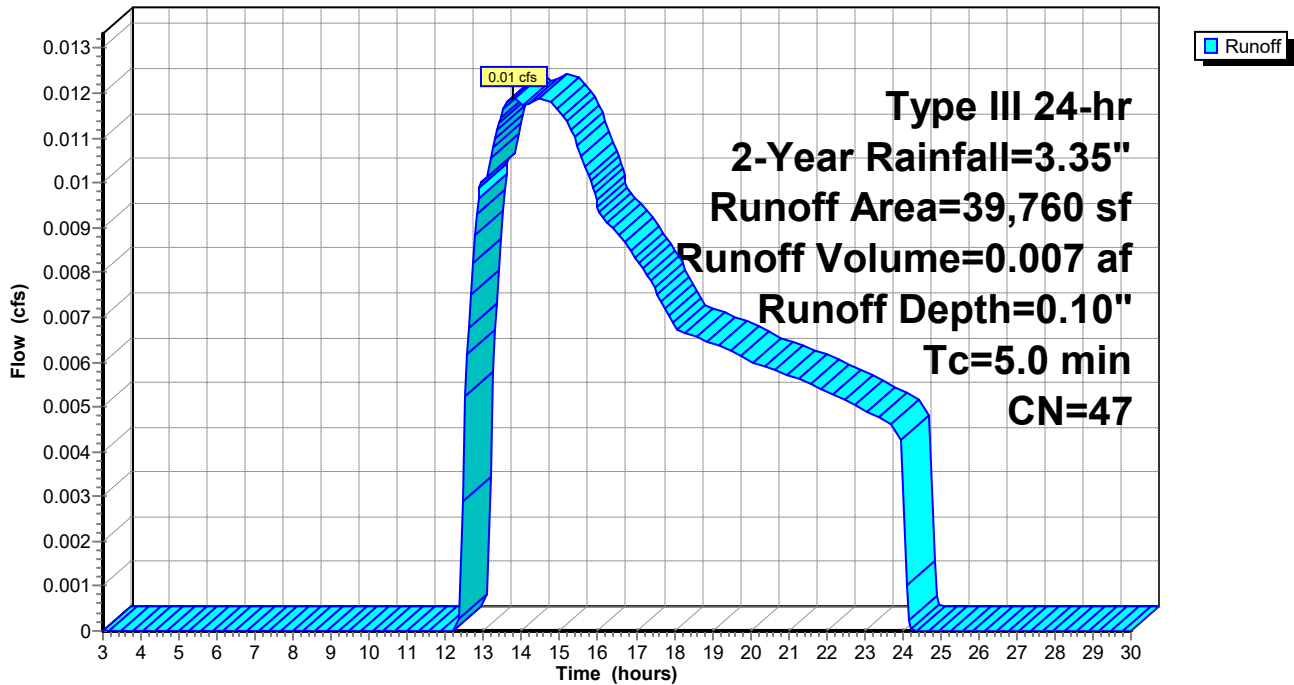
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs
 Type III 24-hr 2-Year Rainfall=3.35"

Area (sf)	CN	Description
29,860	30	Brush, Good, HSG A
* 9,900	98	ROAD
39,760	47	Weighted Average
29,860		75.10% Pervious Area
9,900		24.90% Impervious Area

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

Subcatchment DA4: DA4

Hydrograph



Summary for Subcatchment DA4B: DA4B

Runoff = 0.12 cfs @ 12.29 hrs, Volume= 0.022 af, Depth= 0.30"
 Routed to Pond SIB-4 : SIB-4

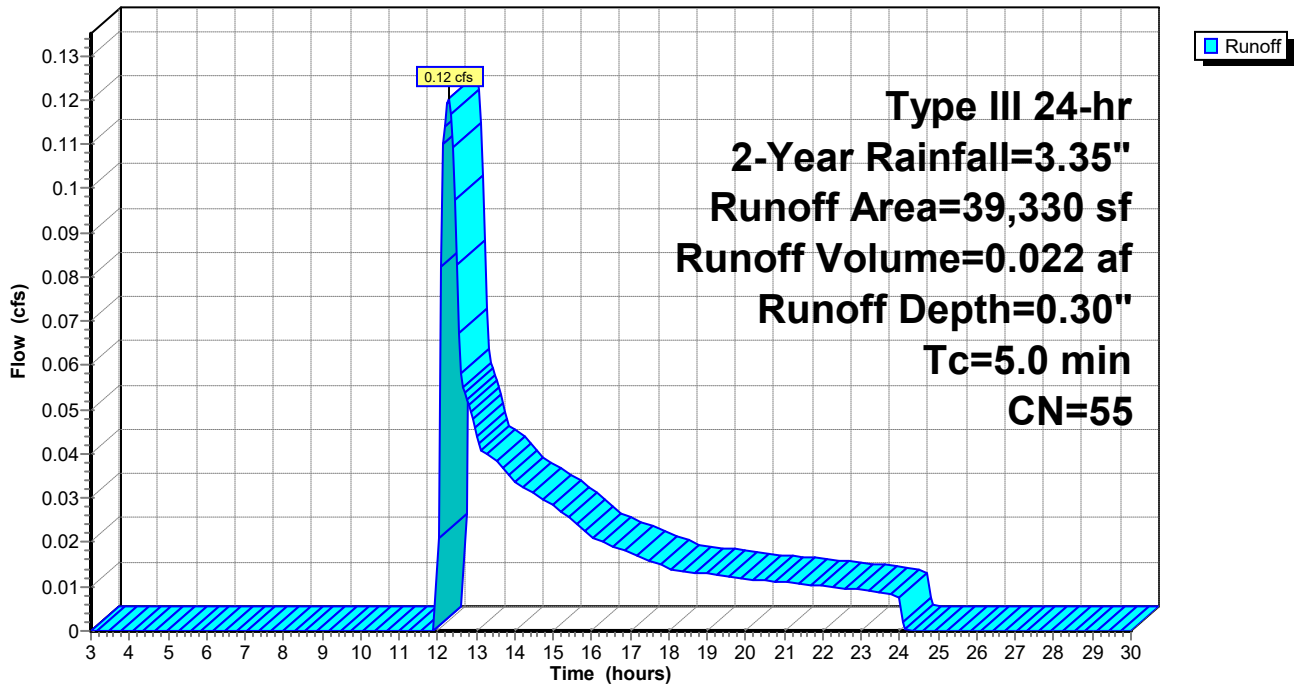
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs
 Type III 24-hr 2-Year Rainfall=3.35"

Area (sf)	CN	Description
25,053	30	Brush, Good, HSG A
* 14,277	98	ROAD
39,330	55	Weighted Average
25,053		63.70% Pervious Area
14,277		36.30% Impervious Area

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

Subcatchment DA4B: DA4B

Hydrograph



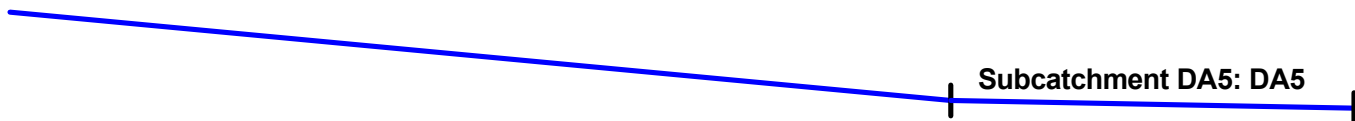
Summary for Subcatchment DA5: DA5

Runoff = 0.31 cfs @ 12.22 hrs, Volume= 0.042 af, Depth= 0.47"
 Routed to Pond CB DA5 : CB DA5

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs
 Type III 24-hr 2-Year Rainfall=3.35"

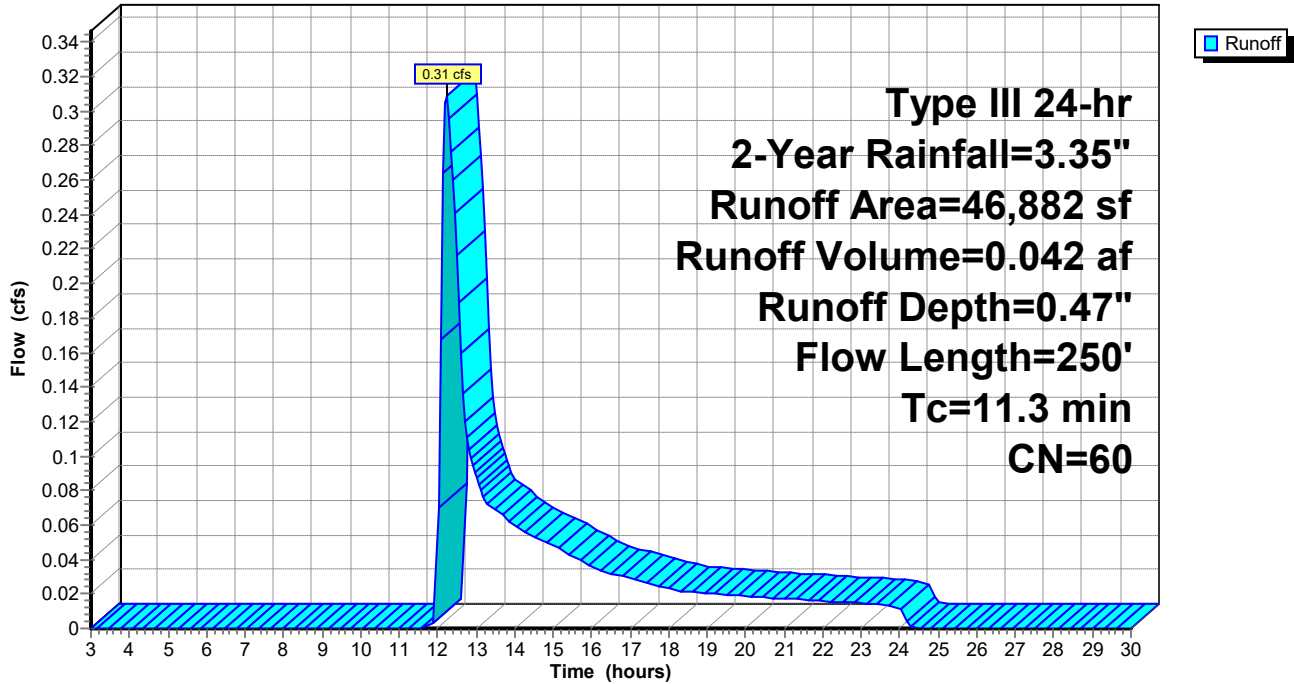
	Area (sf)	CN	Description
*	16,312	98	ROAD
*	30,570	39	GRASSED AREA
	46,882	60	Weighted Average
	30,570		65.21% Pervious Area
	16,312		34.79% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.3	175	0.0500	2.27		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.35"
10.0	75	0.0100	0.12		Sheet Flow, Grass: Short n= 0.150 P2= 3.35"
11.3	250	Total			



Subcatchment DA5: DA5

Hydrograph



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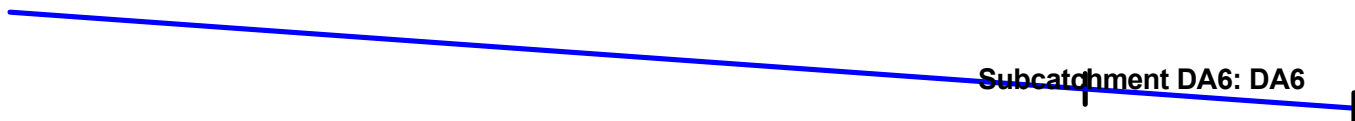
Summary for Subcatchment DA6: DA6

Runoff = 0.77 cfs @ 12.09 hrs, Volume= 0.056 af, Depth= 1.66"
 Routed to Pond SIB-2 : SIB-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs
 Type III 24-hr 2-Year Rainfall=3.35"

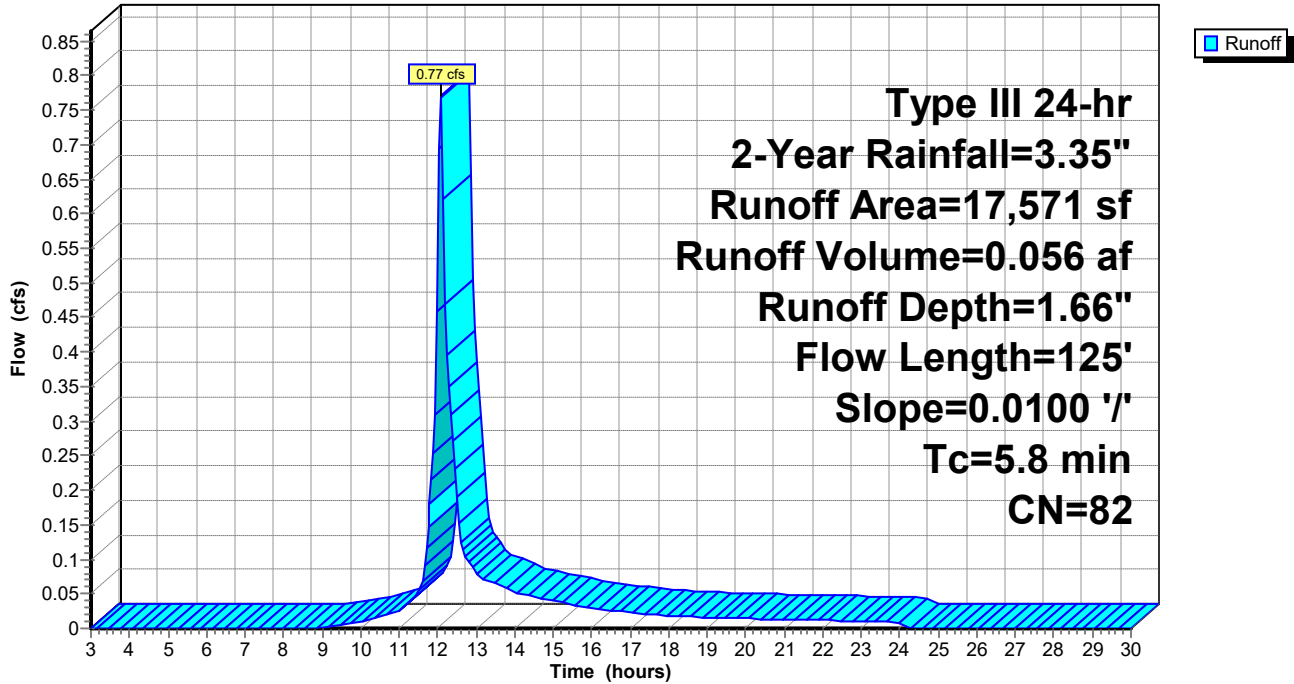
	Area (sf)	CN	Description
*	12,762	98	
*	4,809	39	
	17,571	82	Weighted Average
	4,809		27.37% Pervious Area
	12,762		72.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.6	100	0.0100	1.07		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.35"
4.2	25	0.0100	0.10		Sheet Flow, Grass: Short n= 0.150 P2= 3.35"
5.8	125	Total			



Subcatchment DA6: DA6

Hydrograph



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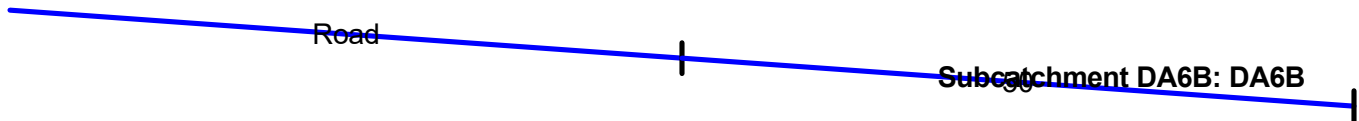
Summary for Subcatchment DA6B: DA6B

Runoff = 0.21 cfs @ 12.04 hrs, Volume= 0.015 af, Depth= 0.92"
 Routed to Pond SIB-2 : SIB-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs
 Type III 24-hr 2-Year Rainfall=3.35"

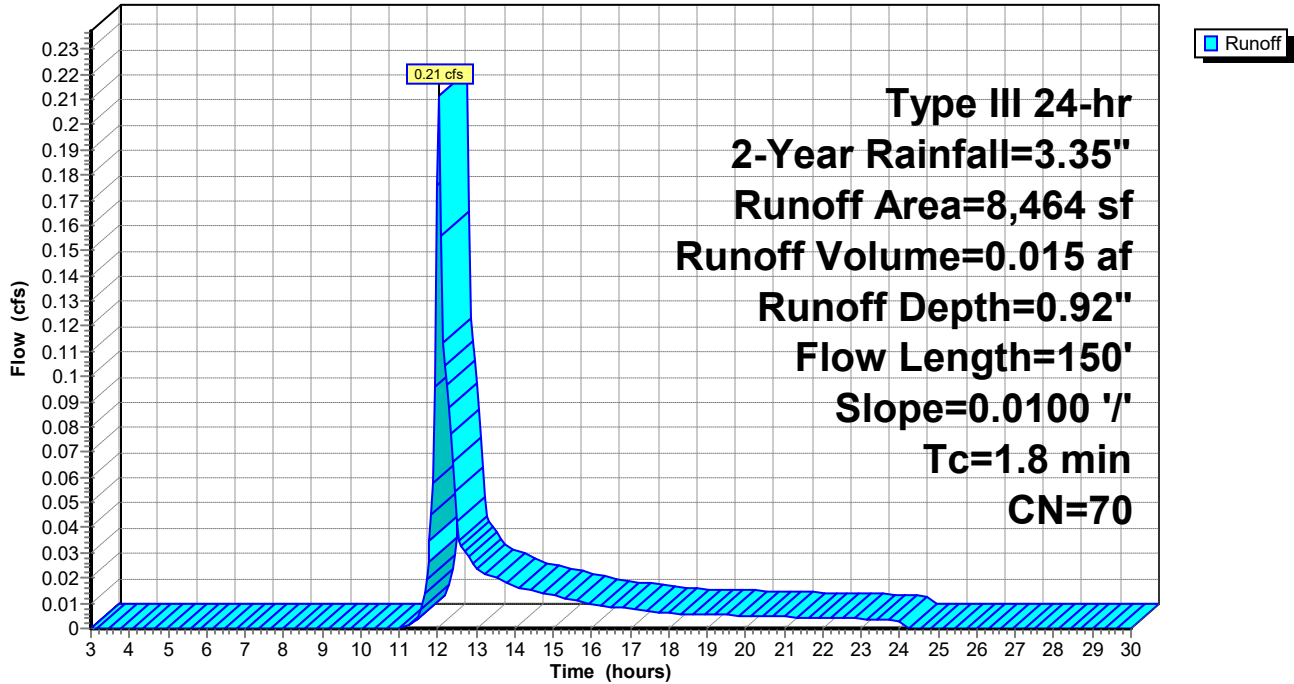
Area (sf)	CN	Description
* 4,400	98	IMPERVIOUS
4,064	39	>75% Grass cover, Good, HSG A
8,464	70	Weighted Average
4,064		48.02% Pervious Area
4,400		51.98% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	75	0.0100	1.01		Sheet Flow, Road Smooth surfaces n= 0.011 P2= 3.35"
0.6	75	0.0100	2.03		Shallow Concentrated Flow, 50 Paved Kv= 20.3 fps
1.8	150	Total			



Subcatchment DA6B: DA6B

Hydrograph



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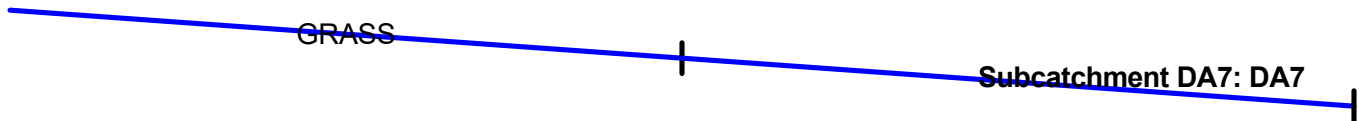
Summary for Subcatchment DA7: DA7

Runoff = 0.44 cfs @ 12.22 hrs, Volume= 0.043 af, Depth= 1.02"
 Routed to Pond CB DA7 : CB DA7

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs
 Type III 24-hr 2-Year Rainfall=3.35"

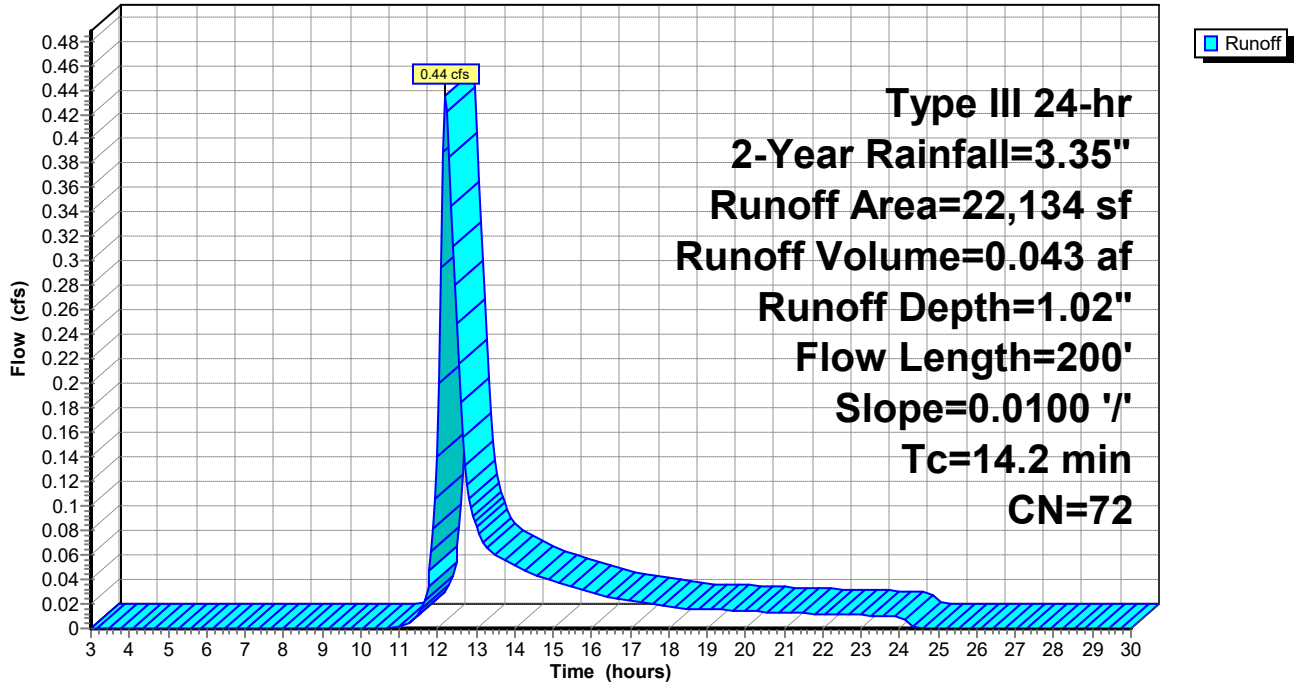
Area (sf)	CN	Description
9,701	39	>75% Grass cover, Good, HSG A
12,433	98	Paved parking, HSG A
22,134	72	Weighted Average
9,701		43.83% Pervious Area
12,433		56.17% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.6	100	0.0100	0.13		Sheet Flow, GRASS Grass: Short n= 0.150 P2= 3.35"
1.6	100	0.0100	1.07		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.35"
14.2	200	Total			



Subcatchment DA7: DA7

Hydrograph



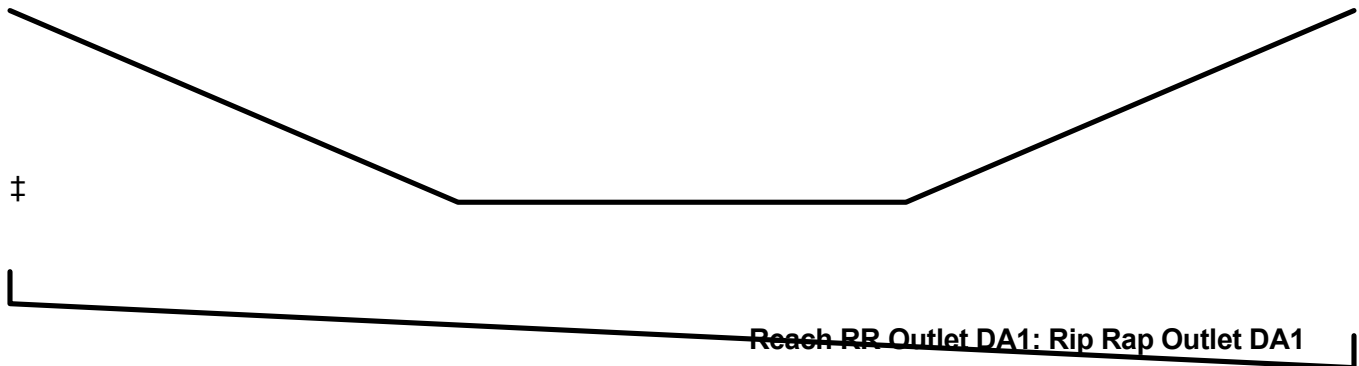
Summary for Reach RR Outlet DA1: Rip Rap Outlet DA1

Inflow Area = 1.076 ac, 34.79% Impervious, Inflow Depth = 0.00" for 2-Year event
Inflow = 0.00 cfs @ 3.00 hrs, Volume= 0.000 af, Incl. 1.00 cfs Inflow Loss
Outflow = 0.00 cfs @ 3.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
Routed to Pond SIB-1 : SIB-1

Routing by Stor-Ind+Trans method, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs / 3
Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

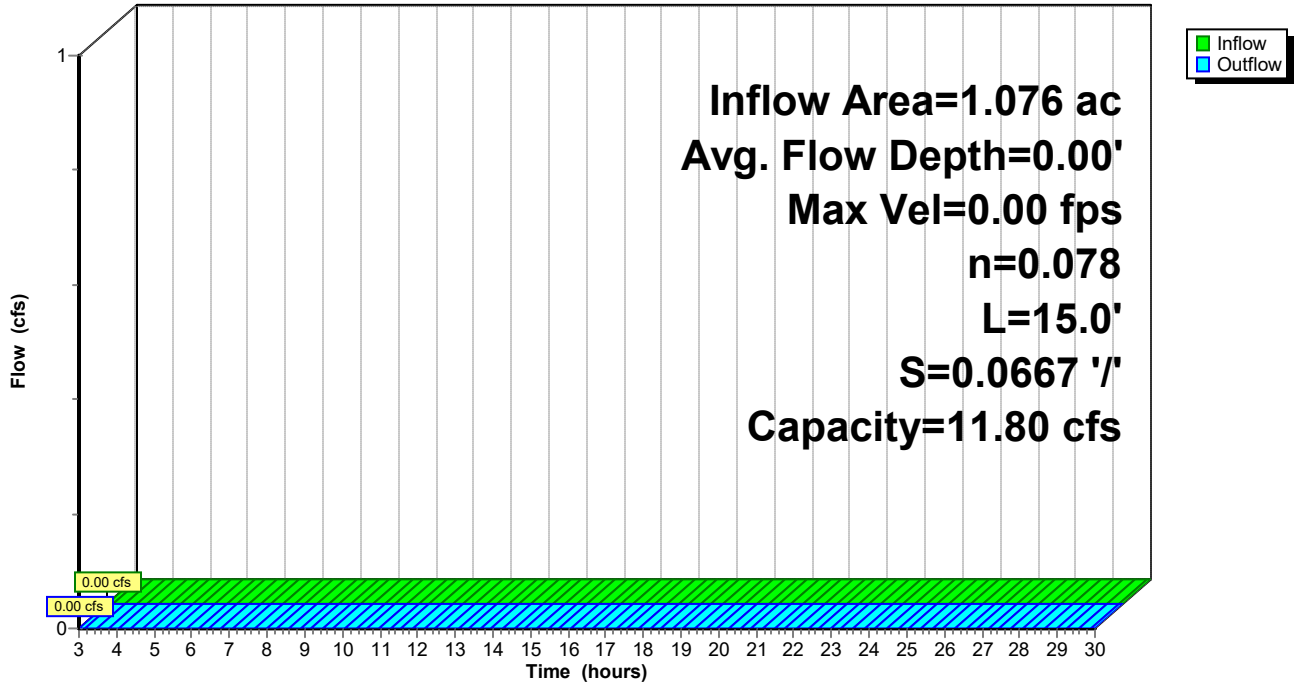
Peak Storage= 0 cf @ 3.00 hrs
Average Depth at Peak Storage= 0.00'
Bank-Full Depth= 0.50' Flow Area= 5.0 sf, Capacity= 11.80 cfs

5.00' x 0.50' deep channel, n= 0.078 Riprap, 12-inch
Side Slope Z-value= 10.0 '/' Top Width= 15.00'
Length= 15.0' Slope= 0.0667 '/'
Inlet Invert= 10.80', Outlet Invert= 9.80'



Reach RR Outlet DA1: Rip Rap Outlet DA1

Hydrograph



Summary for Pond CB DA5: CB DA5

Inflow Area = 1.076 ac, 34.79% Impervious, Inflow Depth = 0.47" for 2-Year event
 Inflow = 0.31 cfs @ 12.22 hrs, Volume= 0.042 af
 Outflow = 0.35 cfs @ 12.27 hrs, Volume= 0.042 af, Atten= 0%, Lag= 2.9 min
 Discarded = 0.02 cfs @ 12.25 hrs, Volume= 0.024 af
 Primary = 0.33 cfs @ 12.27 hrs, Volume= 0.019 af
 Routed to Pond MH 1 : MH1
 Secondary = 0.00 cfs @ 3.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs / 4
 Peak Elev= 16.56' @ 12.25 hrs Surf.Area= 28 sf Storage= 151 cf

Plug-Flow detention time= 46.7 min calculated for 0.042 af (100% of inflow)
 Center-of-Mass det. time= 51.7 min (970.9 - 919.2)

Volume	Invert	Avail.Storage	Storage Description
#1	11.23'	302 cf	6.00'D x 10.67'H Vertical Cone/Cylinder
#2	22.00'	6,068 cf	Custom Stage Data (Conic) Listed below (Recalc)
		6,370 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
22.00	2,240	0	0	2,240
23.00	11,000	6,068	6,068	11,004

Device	Routing	Invert	Outlet Devices
#1	Discarded	11.23'	8.270 in/hr Exfiltration over Wetted area Phase-In= 0.01'
#2	Primary	16.30'	18.0" Round CMP_Round 18" L= 25.6' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 16.30' / 14.80' S= 0.0586 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf
#3	Secondary	22.90'	70.0" x 140.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#4	Secondary	21.80'	2.0" x 2.0" Horiz. Orifice/Grate X 8.00 columns X 8 rows C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.02 cfs @ 12.25 hrs HW=16.56' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.28 cfs @ 12.27 hrs HW=16.56' (Free Discharge)
 ↑2=CMP_Round 18" (Inlet Controls 0.28 cfs @ 1.37 fps)

Secondary OutFlow Max=0.00 cfs @ 3.00 hrs HW=11.23' (Free Discharge)
 ↑3=Orifice/Grate (Controls 0.00 cfs)
 ↑4=Orifice/Grate (Controls 0.00 cfs)

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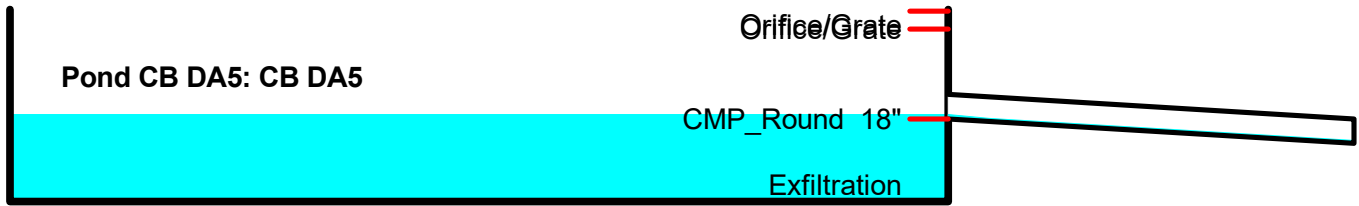
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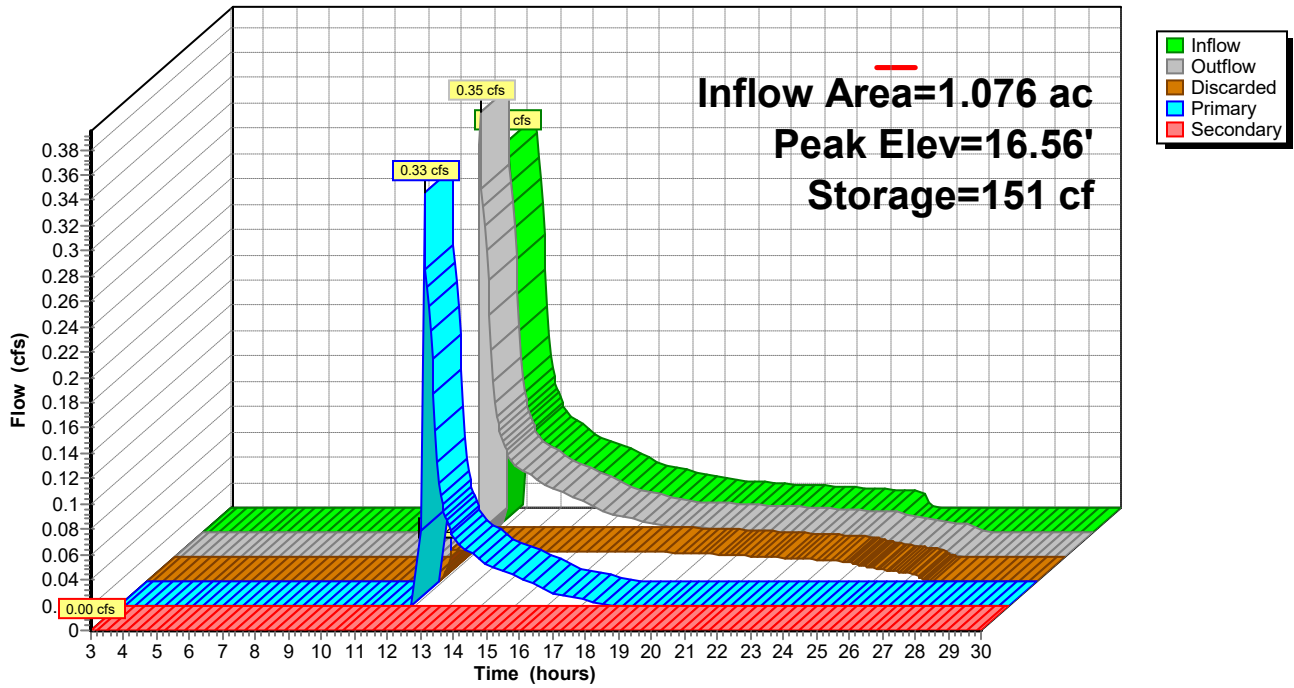
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Pond CB DA5: CB DA5

Hydrograph



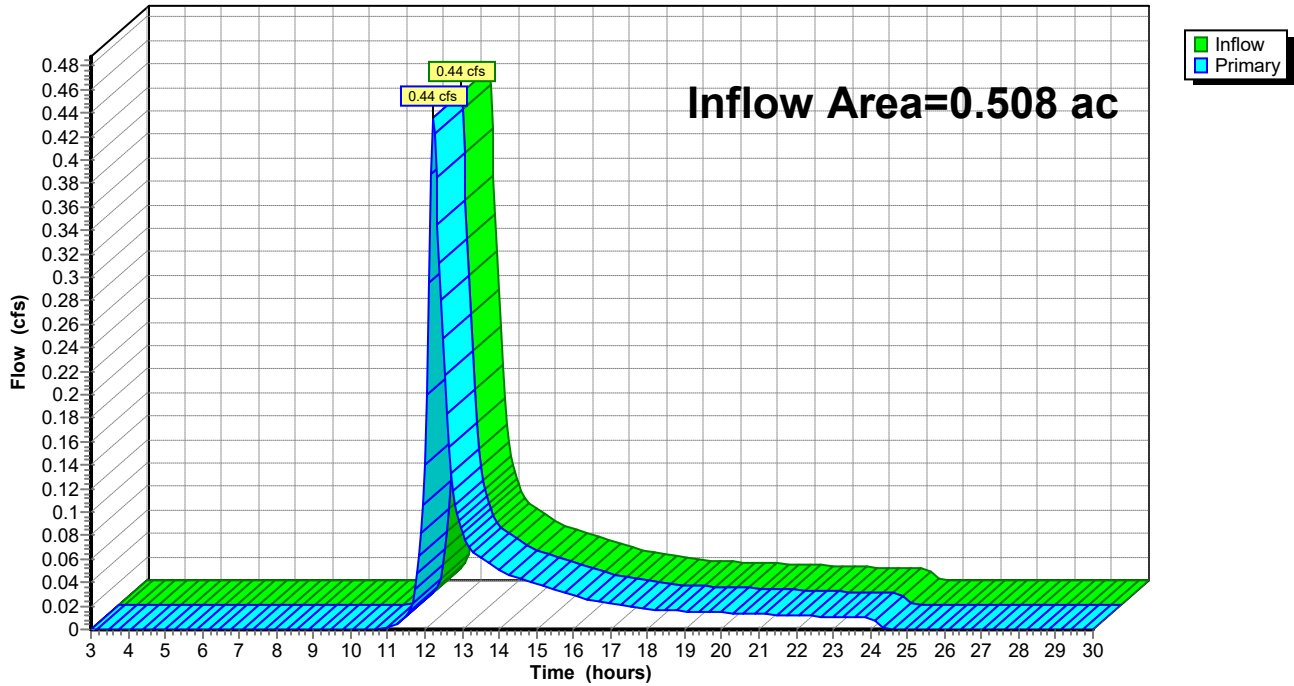
Summary for Pond CB DA7: CB DA7

Inflow Area = 0.508 ac, 56.17% Impervious, Inflow Depth = 1.02" for 2-Year event
Inflow = 0.44 cfs @ 12.22 hrs, Volume= 0.043 af
Primary = 0.44 cfs @ 12.22 hrs, Volume= 0.043 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs

Pond CB DA7: CB DA7

Hydrograph



Summary for Pond Ex. Basin DA4: DA4 EX. BASIN

Inflow Area = 0.913 ac, 24.90% Impervious, Inflow Depth = 0.10" for 2-Year event
 Inflow = 0.01 cfs @ 13.79 hrs, Volume= 0.007 af
 Outflow = 0.01 cfs @ 13.84 hrs, Volume= 0.007 af, Atten= 0%, Lag= 3.0 min
 Discarded = 0.01 cfs @ 13.84 hrs, Volume= 0.007 af
 Secondary = 0.00 cfs @ 3.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs / 3
 Peak Elev= 16.00' @ 13.84 hrs Surf.Area= 1,030 sf Storage= 2 cf

Plug-Flow detention time= 3.0 min calculated for 0.007 af (100% of inflow)
 Center-of-Mass det. time= 3.0 min (1,041.1 - 1,038.2)

Volume	Invert	Avail.Storage	Storage Description
#1	16.00'	2,708 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
16.00	1,025	0	0	1,025
17.00	4,866	2,708	2,708	4,870

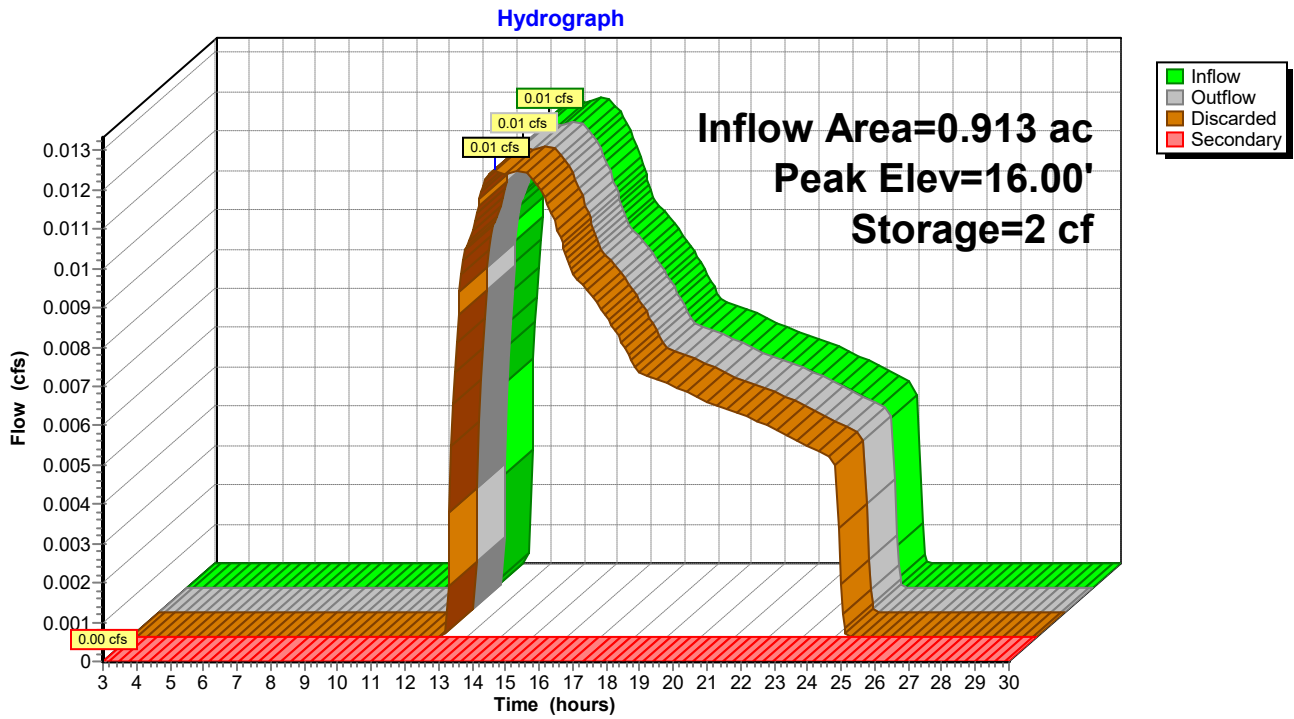
Device	Routing	Invert	Outlet Devices
#1	Discarded	16.00'	2.410 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Secondary	16.90'	360.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.01 cfs @ 13.84 hrs HW=16.00' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.01 cfs)

Secondary OutFlow Max=0.00 cfs @ 3.00 hrs HW=16.00' (Free Discharge)
 ↑2=Orifice/Grate (Controls 0.00 cfs)



Pond Ex. Basin DA4: DA4 EX. BASIN



Summary for Pond MH 1: MH1

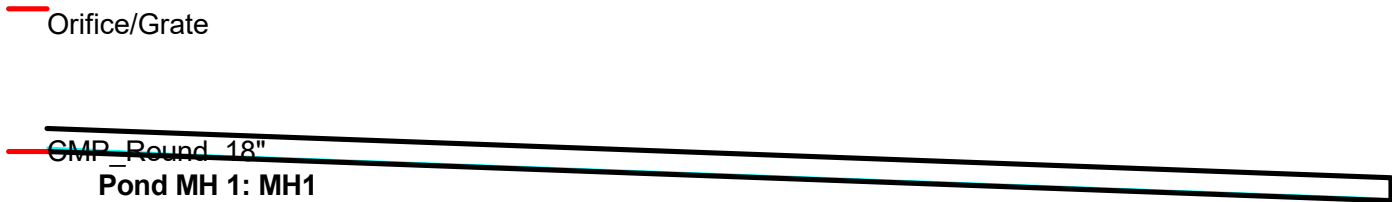
Inflow Area = 1.076 ac, 34.79% Impervious, Inflow Depth = 0.21" for 2-Year event
 Inflow = 0.33 cfs @ 12.27 hrs, Volume= 0.019 af
 Outflow = 0.33 cfs @ 12.27 hrs, Volume= 0.019 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.33 cfs @ 12.27 hrs, Volume= 0.019 af
 Routed to Pond MH2 : MH2
 Secondary = 0.00 cfs @ 3.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs
 Peak Elev= 14.99' @ 12.27 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	14.70'	18.0" Round CMP_Round 18" L= 156.1' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 14.70' / 11.50' S= 0.0205 ' / Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf
#2	Secondary	24.00'	24.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

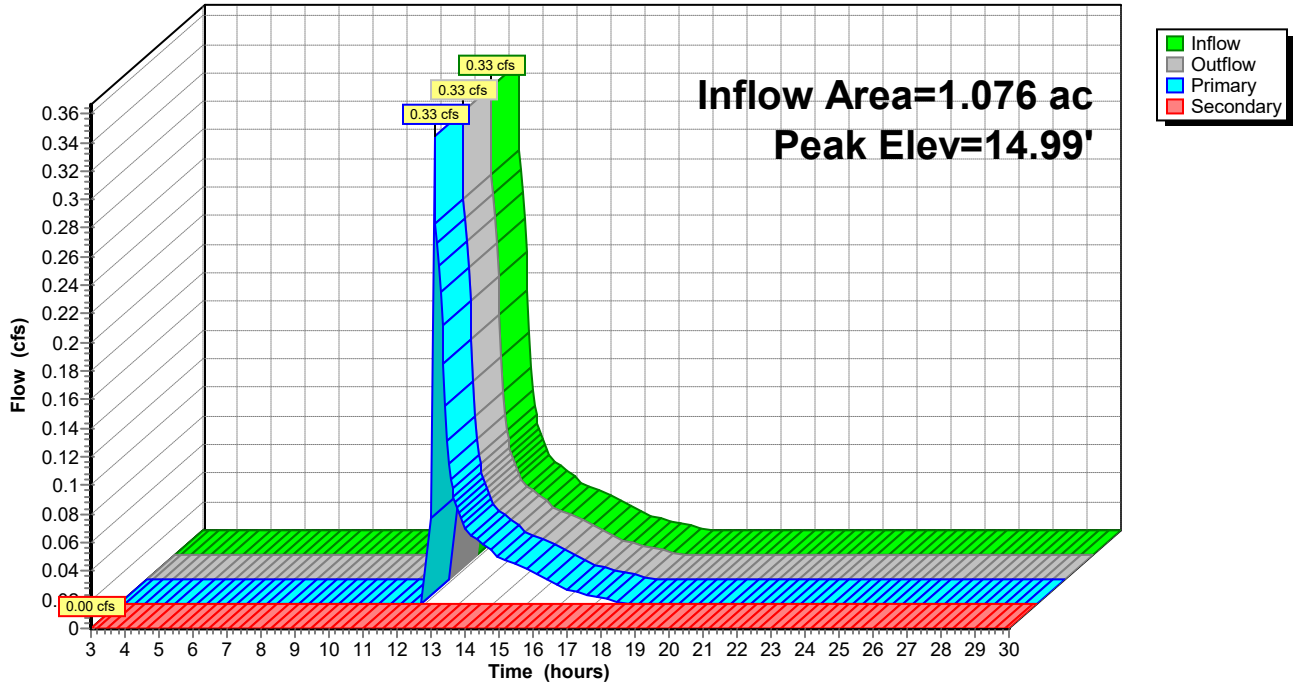
Primary OutFlow Max=0.28 cfs @ 12.27 hrs HW=14.96' (Free Discharge)
 ↑1=CMP_Round 18" (Inlet Controls 0.28 cfs @ 1.37 fps)

Secondary OutFlow Max=0.00 cfs @ 3.00 hrs HW=14.70' (Free Discharge)
 ↑2=Orifice/Grate (Controls 0.00 cfs)



Pond MH 1: MH1

Hydrograph



Summary for Pond MH2: MH2

Inflow Area = 1.076 ac, 34.79% Impervious, Inflow Depth = 0.21" for 2-Year event
 Inflow = 0.33 cfs @ 12.27 hrs, Volume= 0.019 af
 Outflow = 0.33 cfs @ 12.27 hrs, Volume= 0.019 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.33 cfs @ 12.27 hrs, Volume= 0.019 af
 Routed to Pond RR Channel DA1 : Rip Rap Channel DA1
 Secondary = 0.00 cfs @ 3.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs
 Peak Elev= 11.01' @ 12.27 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	11.40'	18.0" Round CMP_Round 18" L= 118.9' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 11.40' / 10.80' S= 0.0050 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf
#2	Secondary	24.00'	24.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Primary	10.80'	15.00' long x 6.00' breadth x 1.00' high Rock Fill Rock Diam.= 12.000", S.D.= 1.000", Voids= 40.0%

Primary OutFlow Max=0.27 cfs @ 12.27 hrs HW=10.98' (Free Discharge)
 ↑ 1=CMP_Round 18" (Controls 0.00 cfs)
 ↓ 3=Rock Fill (Rockfill Controls 0.27 cfs @ 0.20 fps)

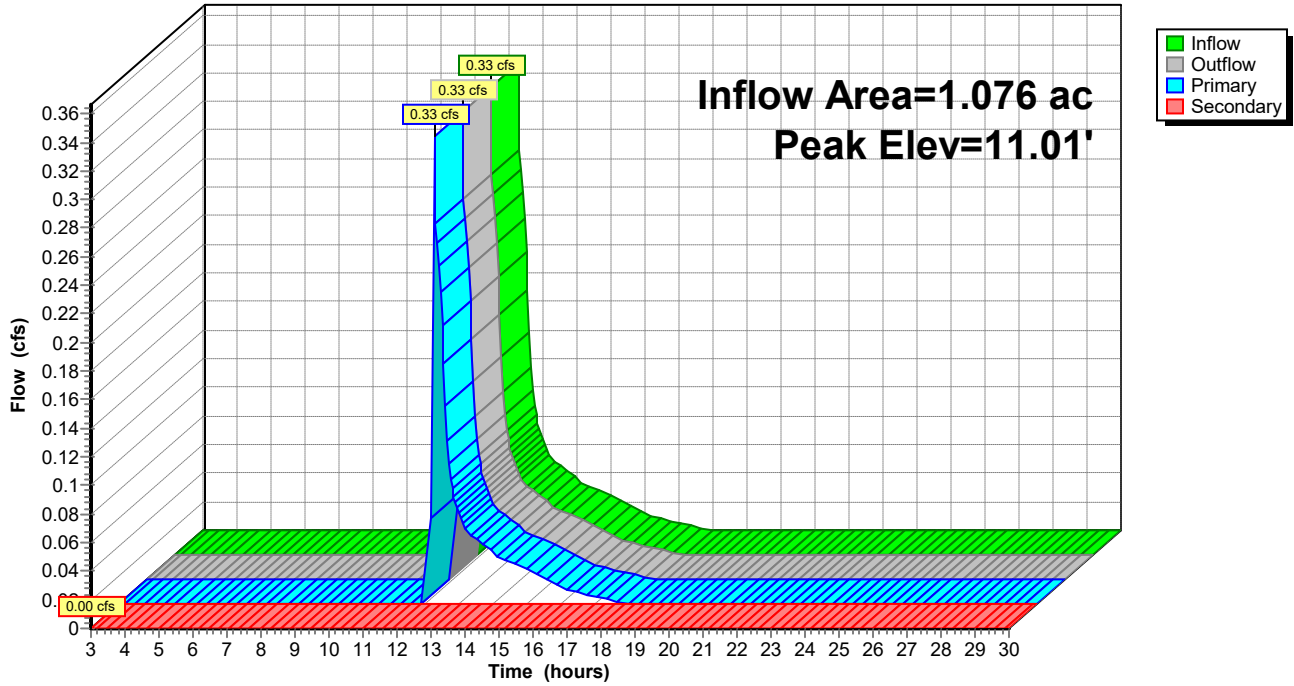
Secondary OutFlow Max=0.00 cfs @ 3.00 hrs HW=10.80' (Free Discharge)
 ↑ 2=Orifice/Grate (Controls 0.00 cfs)

Orifice/Grate

~~RR Channel MH2: MH2~~

Pond MH2: MH2

Hydrograph



Summary for Pond RR Channel DA1: Rip Rap Channel DA1

Inflow Area = 1.076 ac, 34.79% Impervious, Inflow Depth = 0.21" for 2-Year event
 Inflow = 0.33 cfs @ 12.27 hrs, Volume= 0.019 af
 Outflow = 0.31 cfs @ 12.27 hrs, Volume= 0.019 af, Atten= 4%, Lag= 0.2 min
 Discarded = 0.01 cfs @ 12.25 hrs, Volume= 0.002 af
 Primary = 0.31 cfs @ 12.27 hrs, Volume= 0.017 af
 Routed to Reach RR Outlet DA1 : Rip Rap Outlet DA1

Routing by Stor-Ind method, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs / 3
 Peak Elev= 10.99' @ 12.27 hrs Surf.Area= 59 sf Storage= 5 cf

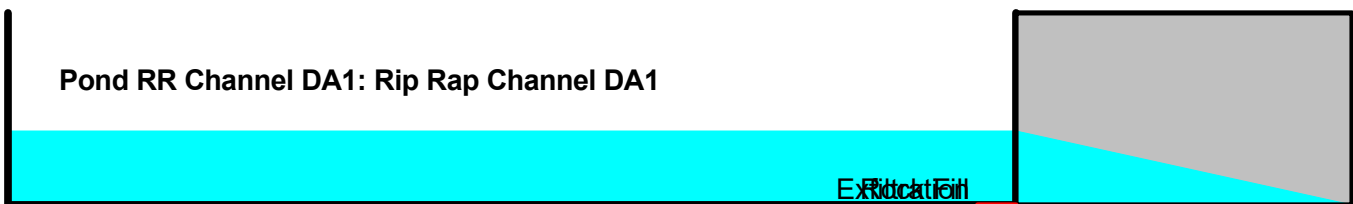
Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 0.3 min (804.1 - 803.8)

Volume	Invert	Avail.Storage	Storage Description
#1	10.80'	10 cf	60.0"W x 6.0"H x 15.00'L Parabolic Arch 25 cf Overall x 40.0% Voids

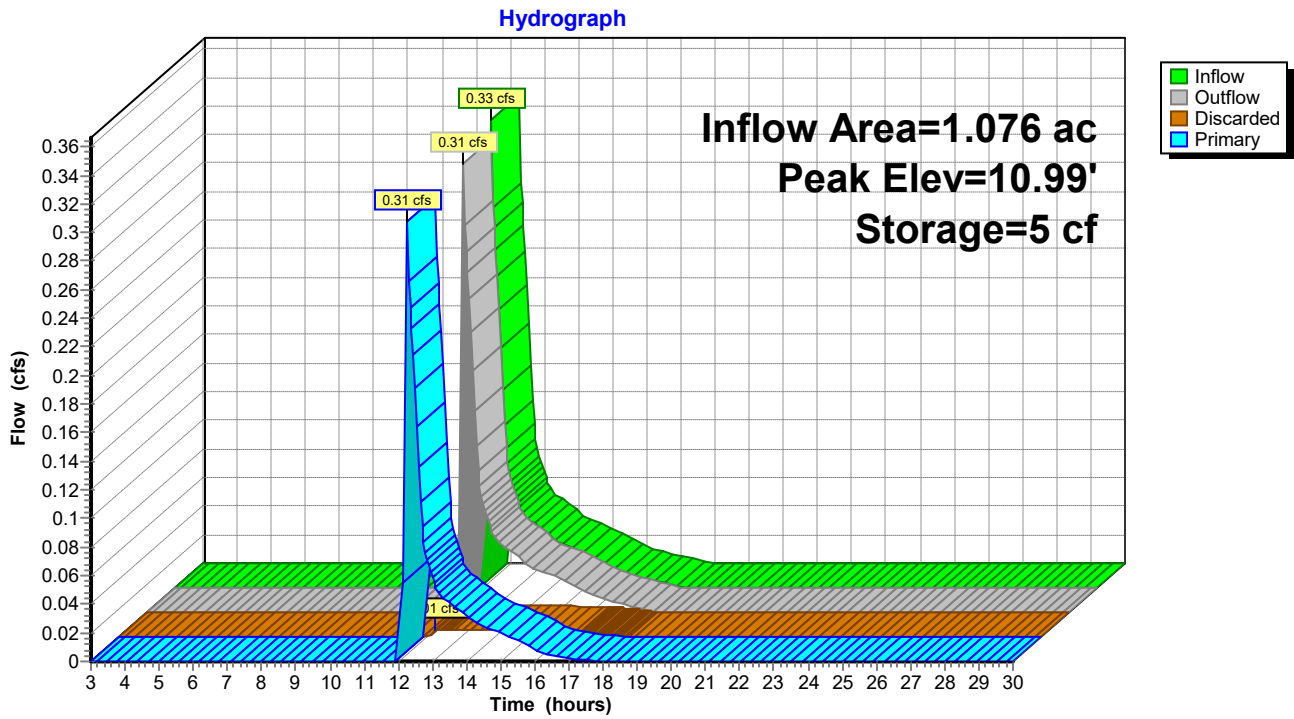
Device	Routing	Invert	Outlet Devices
#1	Discarded	10.80'	2.410 in/hr Exfiltration over Wetted area Phase-In= 0.01'
#2	Primary	10.80'	15.00' long x 5.00' breadth x 0.50' high Rock Fill Rock Diam.= 12.000", S.D.= 1.000", Voids= 40.0%

Discarded OutFlow Max=0.01 cfs @ 12.25 hrs HW=10.97' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.27 cfs @ 12.27 hrs HW=10.97' (Free Discharge)
 ↑2=Rock Fill (Rockfill Controls 0.27 cfs @ 0.21 fps)



Pond RR Channel DA1: Rip Rap Channel DA1



Wareham Post Construction

Type III 24-hr 2-Year Rainfall=3.35"

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Summary for Pond SIB-1: SIB-1

Inflow Area = 2.172 ac, 35.72% Impervious, Inflow Depth = 0.26" for 2-Year event
 Inflow = 0.35 cfs @ 12.24 hrs, Volume= 0.046 af
 Outflow = 0.26 cfs @ 12.48 hrs, Volume= 0.046 af, Atten= 24%, Lag= 14.1 min
 Discarded = 0.26 cfs @ 12.48 hrs, Volume= 0.046 af
 Secondary = 0.00 cfs @ 3.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs
 Peak Elev= 10.07' @ 12.48 hrs Surf.Area= 2,707 sf Storage= 188 cf

Plug-Flow detention time= 12.2 min calculated for 0.046 af (100% of inflow)
 Center-of-Mass det. time= 12.0 min (927.3 - 915.3)

Volume	Invert	Avail.Storage	Storage Description
#1	10.00'	123,310 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
10.00	2,664	0	0	2,664
11.00	3,306	2,979	2,979	3,334
12.00	4,005	3,650	6,629	4,066
13.00	4,760	4,377	11,006	4,856
14.00	5,572	5,161	16,167	5,707
15.00	6,440	6,001	22,168	6,617
16.00	7,365	6,897	29,065	7,588
17.00	8,347	7,851	36,916	8,619
18.00	9,385	8,861	45,777	9,709
19.00	10,480	9,927	55,704	10,860
20.00	11,630	11,050	66,754	12,069
21.00	12,837	12,229	78,983	13,338
22.00	14,101	13,464	92,447	14,667
23.00	15,422	14,757	107,203	16,057
24.00	16,800	16,106	123,310	17,506

Device	Routing	Invert	Outlet Devices
#1	Discarded	10.00'	8.270 in/hr Exfiltration over Wetted area Phase-In= 0.01'
#2	Secondary	23.90'	360.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

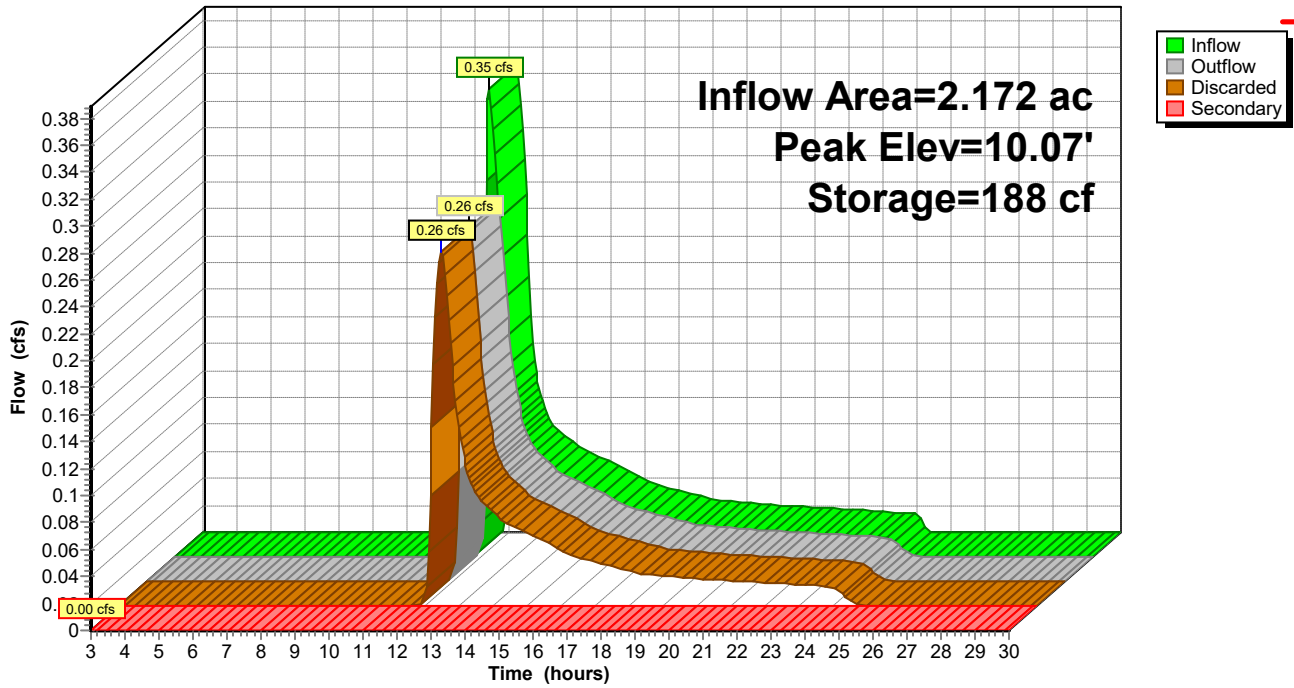
Discarded OutFlow Max=0.52 cfs @ 12.48 hrs HW=10.07' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.52 cfs)

Secondary OutFlow Max=0.00 cfs @ 3.00 hrs HW=10.00' (Free Discharge)
 ↑2=Orifice/Grate (Controls 0.00 cfs)



Pond SIB-1: SIB-1

Hydrograph



Wareham Post Construction

Type III 24-hr 2-Year Rainfall=3.35"

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Summary for Pond SIB-2: SIB-2

Inflow Area = 1.267 ac, 40.21% Impervious, Inflow Depth = 0.74" for 2-Year event
 Inflow = 0.94 cfs @ 12.08 hrs, Volume= 0.078 af
 Outflow = 1.04 cfs @ 12.16 hrs, Volume= 0.079 af, Atten= 0%, Lag= 4.8 min
 Discarded = 0.10 cfs @ 12.15 hrs, Volume= 0.064 af
 Secondary = 0.94 cfs @ 12.16 hrs, Volume= 0.015 af

Routing by Stor-Ind method, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs / 4
 Peak Elev= 23.07' @ 12.15 hrs Surf.Area= 345 sf Storage= 846 cf

Plug-Flow detention time= 112.3 min calculated for 0.078 af (100% of inflow)
 Center-of-Mass det. time= 122.9 min (980.9 - 858.0)

Volume	Invert	Avail.Storage	Storage Description
#1	13.96'	299 cf	10.00'W x 24.00'L x 6.00'H Prismatic 1,440 cf Overall - 693 cf Embedded = 747 cf x 40.0% Voids
#2	13.96'	509 cf	6.00'D x 6.00'H Vertical Cone/Cylinder x 3 Inside #1 693 cf Overall - 6.0" Wall Thickness = 509 cf
#3	19.96'	28 cf	2.00'D x 3.00'H Vertical Cone/Cylinder x 3 -Impervious
#4	22.96'	878 cf	Custom Stage Data (Conic) Listed below (Recalc)
		1,714 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
22.96	83	0	0	83
24.00	393	228	228	398
25.00	947	650	878	959

Device	Routing	Invert	Outlet Devices
#1	Secondary	23.00'	2.0" x 2.0" Horiz. Orifice/Grate X 6.00 columns X 6 rows C= 0.600 Limited to weir flow at low heads
#2	Discarded	13.96'	8.270 in/hr Exfiltration over Wetted area from 13.96' - 23.00' Excluded Wetted area = 240 sf Phase-In= 0.01'

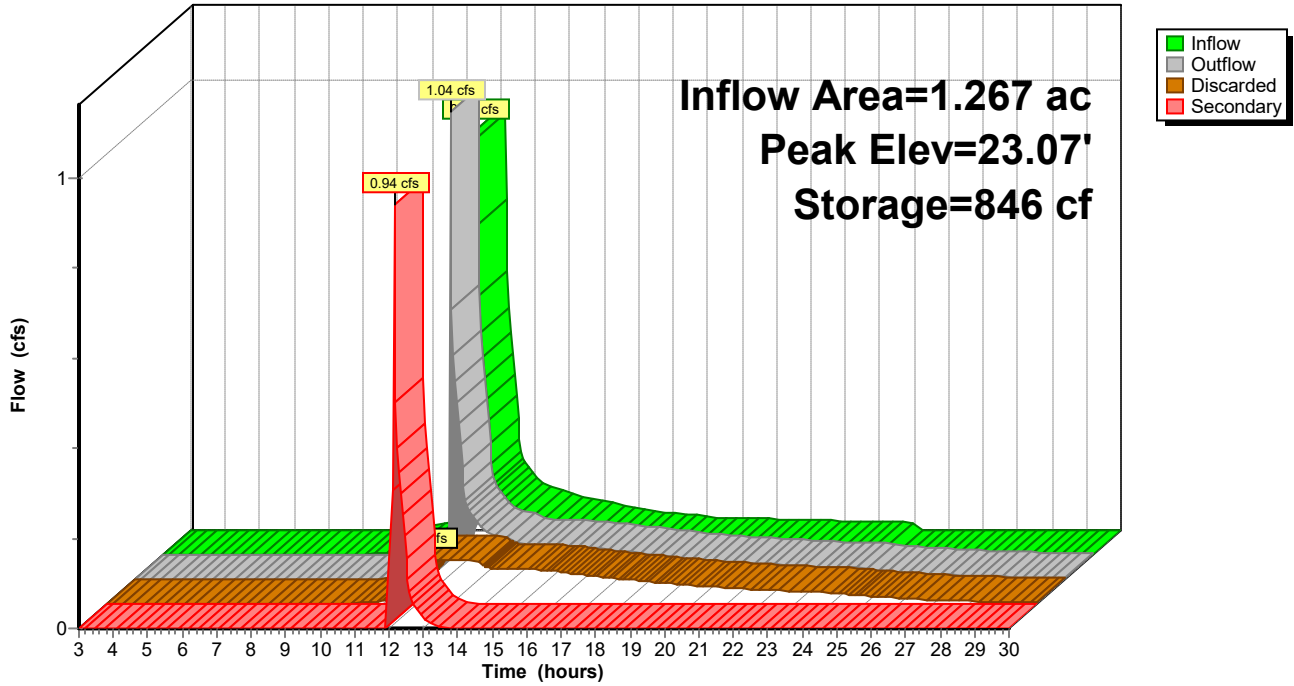
Discarded OutFlow Max=0.10 cfs @ 12.15 hrs HW=23.07' (Free Discharge)
 ↑ **2=Exfiltration** (Exfiltration Controls 0.10 cfs)

Secondary OutFlow Max=1.21 cfs @ 12.16 hrs HW=23.06' (Free Discharge)
 ↑ **1=Orifice/Grate** (Orifice Controls 1.21 cfs @ 1.21 fps)



Pond SIB-2: SIB-2

Hydrograph



Summary for Pond SIB-3: SIB-3

Inflow Area = 0.123 ac, 44.81% Impervious, Inflow Depth = 0.67" for 2-Year event
 Inflow = 0.09 cfs @ 12.04 hrs, Volume= 0.007 af
 Outflow = 0.01 cfs @ 13.47 hrs, Volume= 0.007 af, Atten= 88%, Lag= 86.1 min
 Discarded = 0.01 cfs @ 13.47 hrs, Volume= 0.007 af
 Secondary = 0.00 cfs @ 3.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs / 4
 Peak Elev= 14.74' @ 13.47 hrs Surf.Area= 240 sf Storage= 105 cf

Plug-Flow detention time= 167.6 min calculated for 0.007 af (99% of inflow)
 Center-of-Mass det. time= 161.8 min (1,048.0 - 886.2)

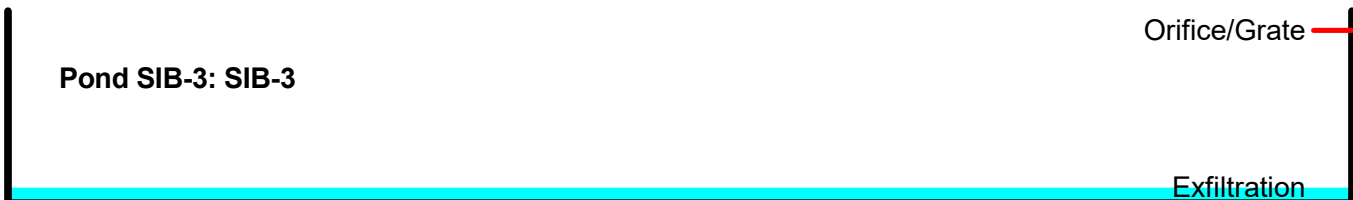
Volume	Invert	Avail.Storage	Storage Description
#1	13.96'	299 cf	10.00'W x 24.00'L x 6.00'H Prismaoid 1,440 cf Overall - 693 cf Embedded = 747 cf x 40.0% Voids
#2	13.96'	509 cf	6.00'D x 6.00'H Vertical Cone/Cylinder x 3 Inside #1 693 cf Overall - 6.0" Wall Thickness = 509 cf
#3	19.96'	28 cf	2.00'D x 3.00'H Vertical Cone/Cylinder x 3 -Impervious
#4	22.96'	1,578 cf	Custom Stage Data (Irregular) Listed below (Recalc)
		2,414 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
22.96	817	126.0	0	0	817
24.00	2,350	206.0	1,578	1,578	2,938

Device	Routing	Invert	Outlet Devices
#1	Secondary	23.00'	2.0" x 2.0" Horiz. Orifice/Grate X 6.00 columns X 6 rows C= 0.600 Limited to weir flow at low heads
#2	Discarded	13.96'	8.270 in/hr Exfiltration over Wetted area from 13.96' - 23.00' Excluded Wetted area = 240 sf Phase-In= 0.01'

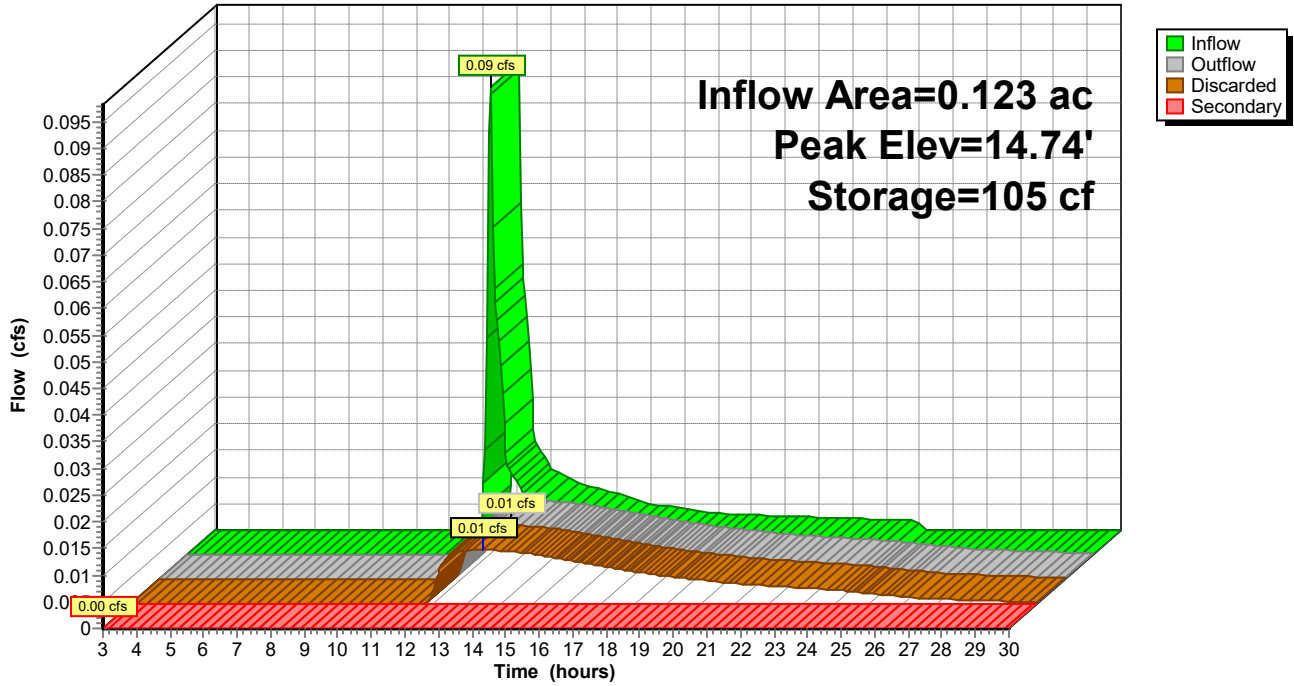
Discarded OutFlow Max=0.01 cfs @ 13.47 hrs HW=14.74' (Free Discharge)
 ↑ **2=Exfiltration** (Exfiltration Controls 0.01 cfs)

Secondary OutFlow Max=0.00 cfs @ 3.00 hrs HW=13.96' (Free Discharge)
 ↑ **1=Orifice/Grate** (Controls 0.00 cfs)



Pond SIB-3: SIB-3

Hydrograph



Summary for Pond SIB-4: SIB-4

Inflow Area = 0.903 ac, 36.30% Impervious, Inflow Depth = 0.30" for 2-Year event
 Inflow = 0.12 cfs @ 12.29 hrs, Volume= 0.022 af
 Outflow = 0.03 cfs @ 15.04 hrs, Volume= 0.021 af, Atten= 77%, Lag= 165.3 min
 Discarded = 0.03 cfs @ 15.04 hrs, Volume= 0.021 af
 Secondary = 0.00 cfs @ 3.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs / 4
 Peak Elev= 19.38' @ 15.04 hrs Surf.Area= 170 sf Storage= 286 cf

Plug-Flow detention time= 169.9 min calculated for 0.021 af (96% of inflow)
 Center-of-Mass det. time= 150.0 min (1,095.3 - 945.3)

Volume	Invert	Avail.Storage	Storage Description
#1	16.33'	248 cf	10.00'W x 17.00'L x 6.67'H Prismatic 1,134 cf Overall - 513 cf Embedded = 621 cf x 40.0% Voids
#2	16.33'	377 cf	6.00'D x 6.67'H Vertical Cone/Cylinder x 2 Inside #1 513 cf Overall - 6.0" Wall Thickness = 377 cf
#3	23.00'	0 cf	2.00'D x 2.00'H Vertical Cone/Cylinder 6 cf Overall x 0.0% Voids
#4	25.00'	2,852 cf	Custom Stage Data (Conic) Listed below (Recalc)
		3,477 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
25.00	514	0	0	514
26.00	1,416	928	928	1,422
27.00	2,482	1,924	2,852	2,500

Device	Routing	Invert	Outlet Devices
#1	Discarded	16.67'	8.270 in/hr Exfiltration over Wetted area above 16.67' Excluded Wetted area = 188 sf Phase-In= 0.01'
#2	Secondary	26.90'	528.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

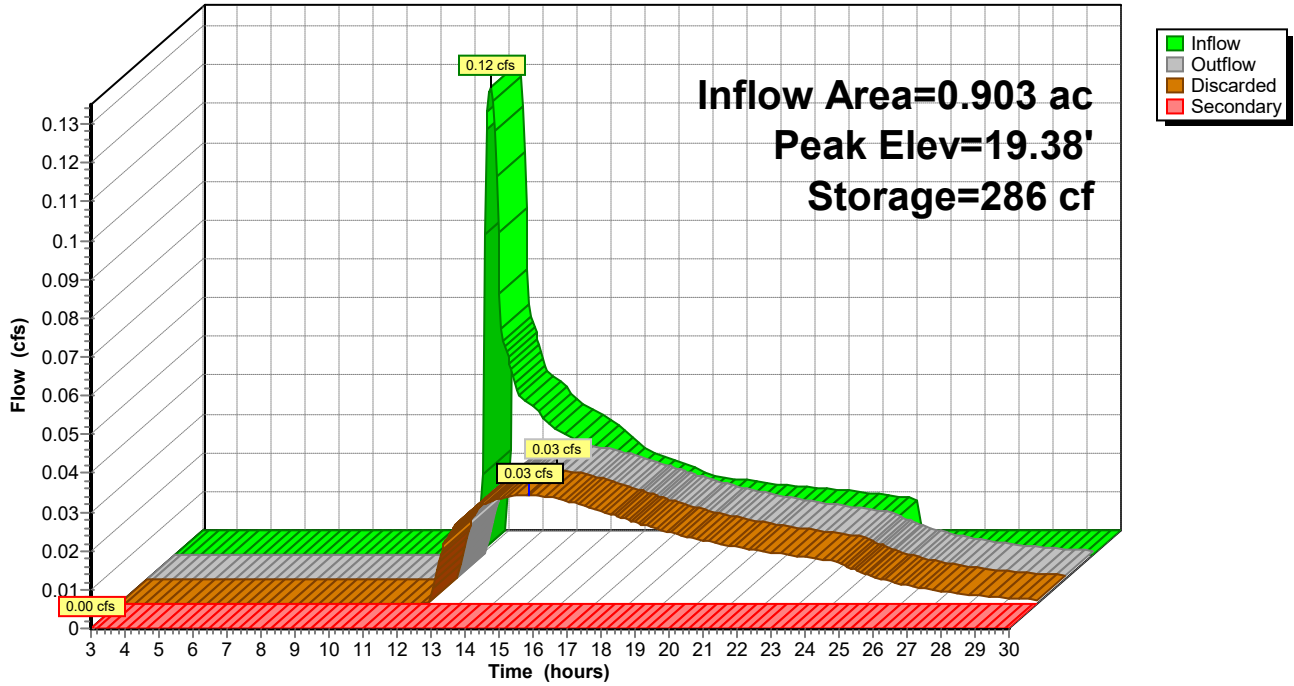
Discarded OutFlow Max=0.03 cfs @ 15.04 hrs HW=19.38' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.03 cfs)

Secondary OutFlow Max=0.00 cfs @ 3.00 hrs HW=16.33' (Free Discharge)
 ↑2=Orifice/Grate (Controls 0.00 cfs)



Pond SIB-4: SIB-4

Hydrograph



Wareham Post Construction

Type III 24-hr 5-Year Rainfall=4.18"

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Time span=3.00-30.00 hrs, dt=0.05 hrs, 541 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment DA1: DA1	Runoff Area=47,720 sf 36.62% Impervious Runoff Depth=0.91" Flow Length=191' Tc=12.7 min CN=61 Runoff=0.77 cfs 0.083 af
Subcatchment DA2: DA2	Runoff Area=29,170 sf 17.26% Impervious Runoff Depth=0.35" Flow Length=264' Tc=11.2 min CN=49 Runoff=0.10 cfs 0.020 af
Subcatchment DA3: DA3	Runoff Area=5,342 sf 44.81% Impervious Runoff Depth=1.13" Flow Length=88' Tc=0.9 min CN=65 Runoff=0.16 cfs 0.012 af
Subcatchment DA4: DA4	Runoff Area=39,760 sf 24.90% Impervious Runoff Depth=0.28" Tc=5.0 min CN=47 Runoff=0.09 cfs 0.021 af
Subcatchment DA4B: DA4B	Runoff Area=39,330 sf 36.30% Impervious Runoff Depth=0.60" Tc=5.0 min CN=55 Runoff=0.43 cfs 0.045 af
Subcatchment DA5: DA5	Runoff Area=46,882 sf 34.79% Impervious Runoff Depth=0.85" Flow Length=250' Tc=11.3 min CN=60 Runoff=0.72 cfs 0.076 af
Subcatchment DA6: DA6	Runoff Area=17,571 sf 72.63% Impervious Runoff Depth=2.36" Flow Length=125' Slope=0.0100 '/' Tc=5.8 min CN=82 Runoff=1.10 cfs 0.079 af
Subcatchment DA6B: DA6B	Runoff Area=8,464 sf 51.98% Impervious Runoff Depth=1.45" Flow Length=150' Slope=0.0100 '/' Tc=1.8 min CN=70 Runoff=0.35 cfs 0.023 af
Subcatchment DA7: DA7	Runoff Area=22,134 sf 56.17% Impervious Runoff Depth=1.59" Flow Length=200' Slope=0.0100 '/' Tc=14.2 min CN=72 Runoff=0.70 cfs 0.067 af
Reach RR Outlet DA1: Rip Rap Outlet	Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af n=0.078 L=15.0' S=0.0667 '/' Capacity=11.80 cfs Outflow=0.00 cfs 0.000 af
Pond CB DA5: CB DA5	Peak Elev=16.71' Storage=155 cf Inflow=0.72 cfs 0.076 af Discarded=0.03 cfs 0.027 af Primary=0.69 cfs 0.050 af Secondary=0.00 cfs 0.000 af Outflow=0.71 cfs 0.077 af
Pond CB DA7: CB DA7	Inflow=0.70 cfs 0.067 af Primary=0.70 cfs 0.067 af
Pond Ex. Basin DA4: DA4 EX. BASIN	Peak Elev=16.04' Storage=37 cf Inflow=0.09 cfs 0.021 af Discarded=0.06 cfs 0.021 af Secondary=0.00 cfs 0.000 af Outflow=0.06 cfs 0.021 af
Pond MH 1: MH1	Peak Elev=15.11' Inflow=0.69 cfs 0.050 af Primary=0.69 cfs 0.050 af Secondary=0.00 cfs 0.000 af Outflow=0.69 cfs 0.050 af
Pond MH2: MH2	Peak Elev=11.13' Inflow=0.69 cfs 0.050 af Primary=0.69 cfs 0.050 af Secondary=0.00 cfs 0.000 af Outflow=0.69 cfs 0.050 af
Pond RR Channel DA1: Rip Rap Channel DA1	Peak Elev=11.11' Storage=8 cf Inflow=0.69 cfs 0.050 af Discarded=0.01 cfs 0.003 af Primary=0.68 cfs 0.047 af Outflow=0.69 cfs 0.050 af

Wareham Post Construction

Type III 24-hr 5-Year Rainfall=4.18"

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Pond SIB-1: SIB-1

Peak Elev=10.15' Storage=404 cf Inflow=0.77 cfs 0.083 af
Discarded=0.53 cfs 0.083 af Secondary=0.00 cfs 0.000 af Outflow=0.53 cfs 0.083 af

Pond SIB-2: SIB-2

Peak Elev=23.09' Storage=849 cf Inflow=1.38 cfs 0.122 af
Discarded=0.10 cfs 0.079 af Secondary=1.25 cfs 0.042 af Outflow=1.35 cfs 0.121 af

Pond SIB-3: SIB-3

Peak Elev=15.38' Storage=192 cf Inflow=0.16 cfs 0.012 af
Discarded=0.02 cfs 0.011 af Secondary=0.00 cfs 0.000 af Outflow=0.02 cfs 0.011 af

Pond SIB-4: SIB-4

Peak Elev=22.91' Storage=617 cf Inflow=0.43 cfs 0.045 af
Discarded=0.06 cfs 0.044 af Secondary=0.00 cfs 0.000 af Outflow=0.06 cfs 0.044 af

Total Runoff Area = 5.886 ac Runoff Volume = 0.427 af Average Runoff Depth = 0.87"
62.95% Pervious = 3.705 ac 37.05% Impervious = 2.181 ac

Wareham Post Construction

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Type III 24-hr 5-Year Rainfall=4.18"

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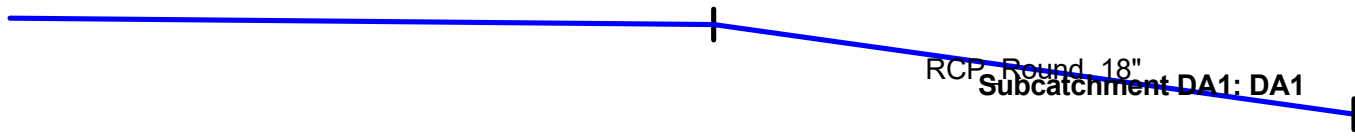
Summary for Subcatchment DA1: DA1

Runoff = 0.77 cfs @ 12.21 hrs, Volume= 0.083 af, Depth= 0.91"
 Routed to Pond SIB-1 : SIB-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs
 Type III 24-hr 5-Year Rainfall=4.18"

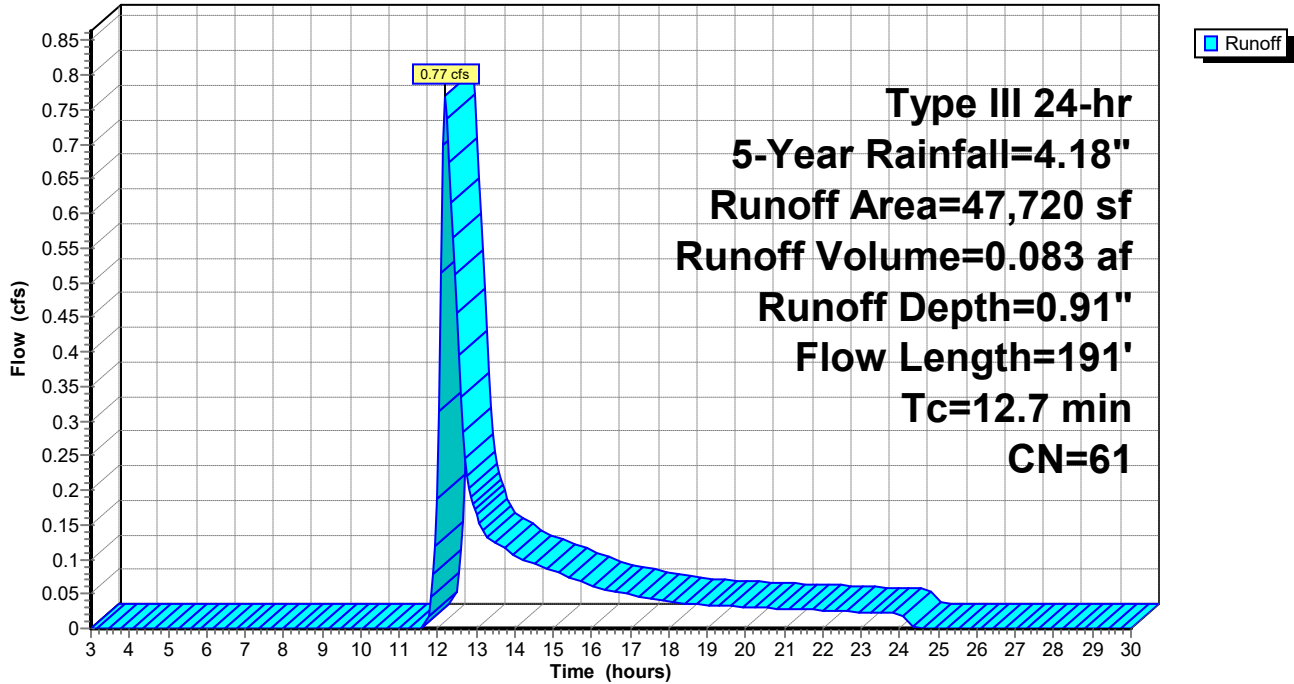
Area (sf)	CN	Description
* 17,477	98	
* 30,243	39	
47,720	61	Weighted Average
30,243		63.38% Pervious Area
17,477		36.62% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.6	100	0.0100	0.13		Sheet Flow, Grass: Short n= 0.150 P2= 3.35"
0.1	91	0.1500	23.02	40.68	Pipe Channel, RCP_Round 18" 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
12.7	191	Total			



Subcatchment DA1: DA1

Hydrograph



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Type III 24-hr 5-Year Rainfall=4.18"

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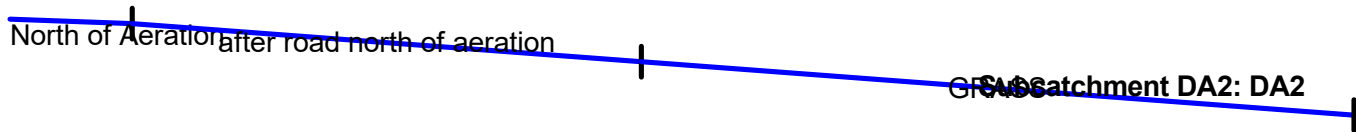
Summary for Subcatchment DA2: DA2

Runoff = 0.10 cfs @ 12.40 hrs, Volume= 0.020 af, Depth= 0.35"
 Routed to Pond SIB-2 : SIB-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs
 Type III 24-hr 5-Year Rainfall=4.18"

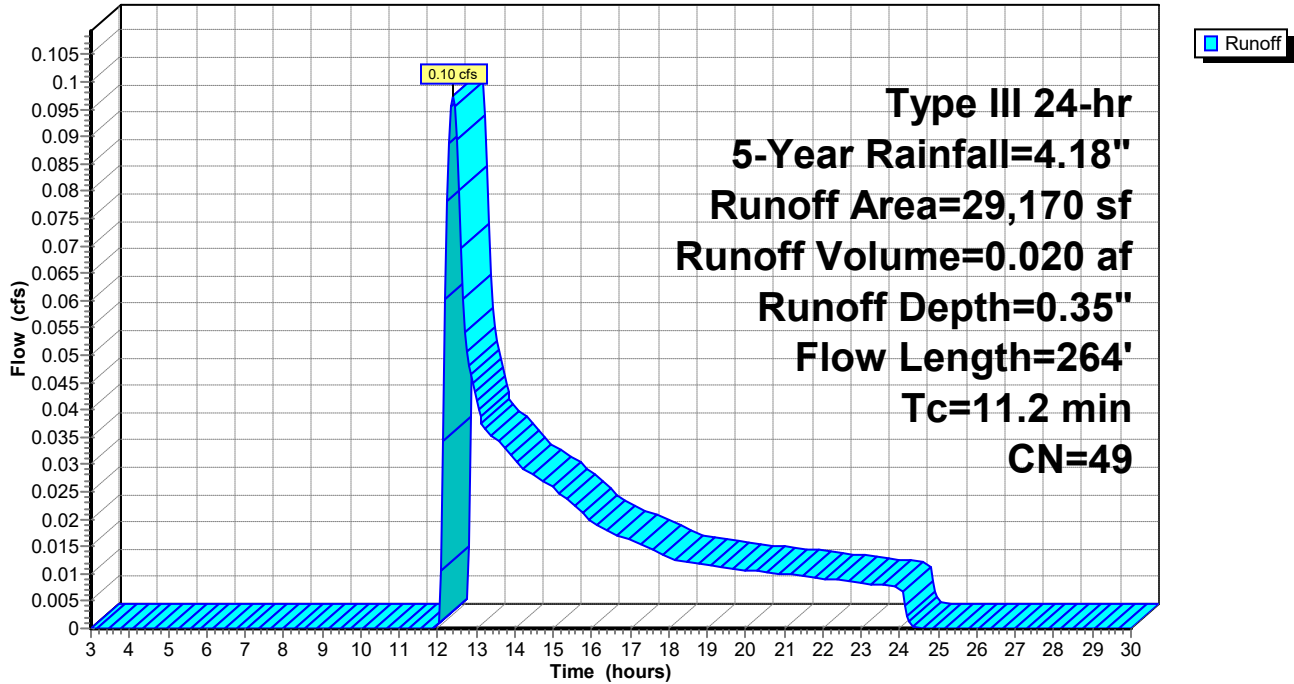
Area (sf)	CN	Description
* 5,035	98	Impervious
24,135	39	>75% Grass cover, Good, HSG A
29,170	49	Weighted Average
24,135		82.74% Pervious Area
5,035		17.26% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	24	0.0100	0.80		Sheet Flow, North of Aeration Smooth surfaces n= 0.011 P2= 3.35"
9.6	100	0.0200	0.17		Sheet Flow, after road north of aeration Grass: Short n= 0.150 P2= 3.35"
1.1	140	0.0200	2.12		Shallow Concentrated Flow, GRASS Grassed Waterway Kv= 15.0 fps
11.2	264	Total			



Subcatchment DA2: DA2

Hydrograph



Wareham Post Construction

Type III 24-hr 5-Year Rainfall=4.18"

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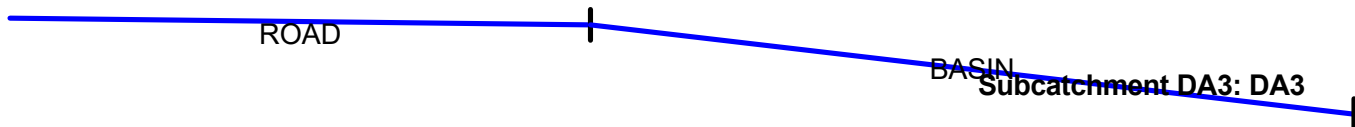
Summary for Subcatchment DA3: DA3

Runoff = 0.16 cfs @ 12.03 hrs, Volume= 0.012 af, Depth= 1.13"
 Routed to Pond SIB-3 : SIB-3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs
 Type III 24-hr 5-Year Rainfall=4.18"

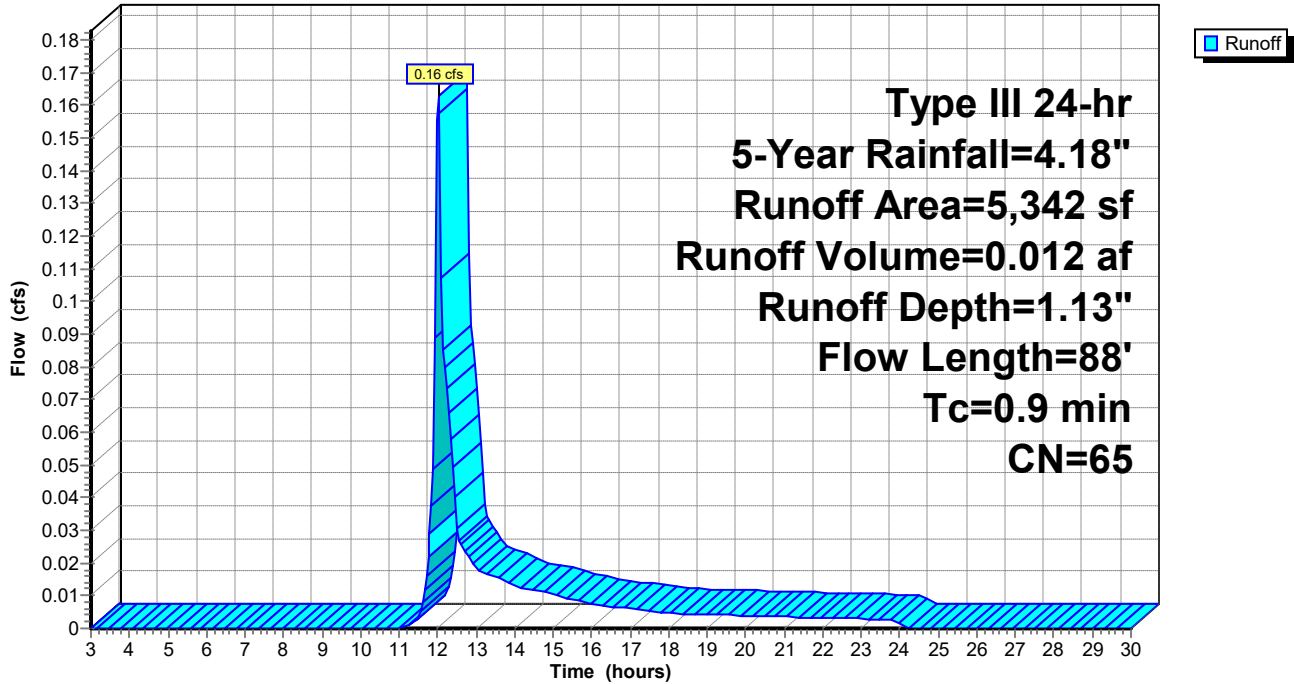
Area (sf)	CN	Description
* 2,394	98	IMPERVIOUS
2,948	39	>75% Grass cover, Good, HSG A
5,342	65	Weighted Average
2,948		55.19% Pervious Area
2,394		44.81% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	38	0.0100	0.88		Sheet Flow, ROAD Smooth surfaces n= 0.011 P2= 3.35"
0.2	50	0.1000	5.09		Shallow Concentrated Flow, BASIN Unpaved Kv= 16.1 fps
0.9	88	Total			



Subcatchment DA3: DA3

Hydrograph



Summary for Subcatchment DA4: DA4

Runoff = 0.09 cfs @ 12.35 hrs, Volume= 0.021 af, Depth= 0.28"
 Routed to Pond Ex. Basin DA4 : DA4 EX. BASIN

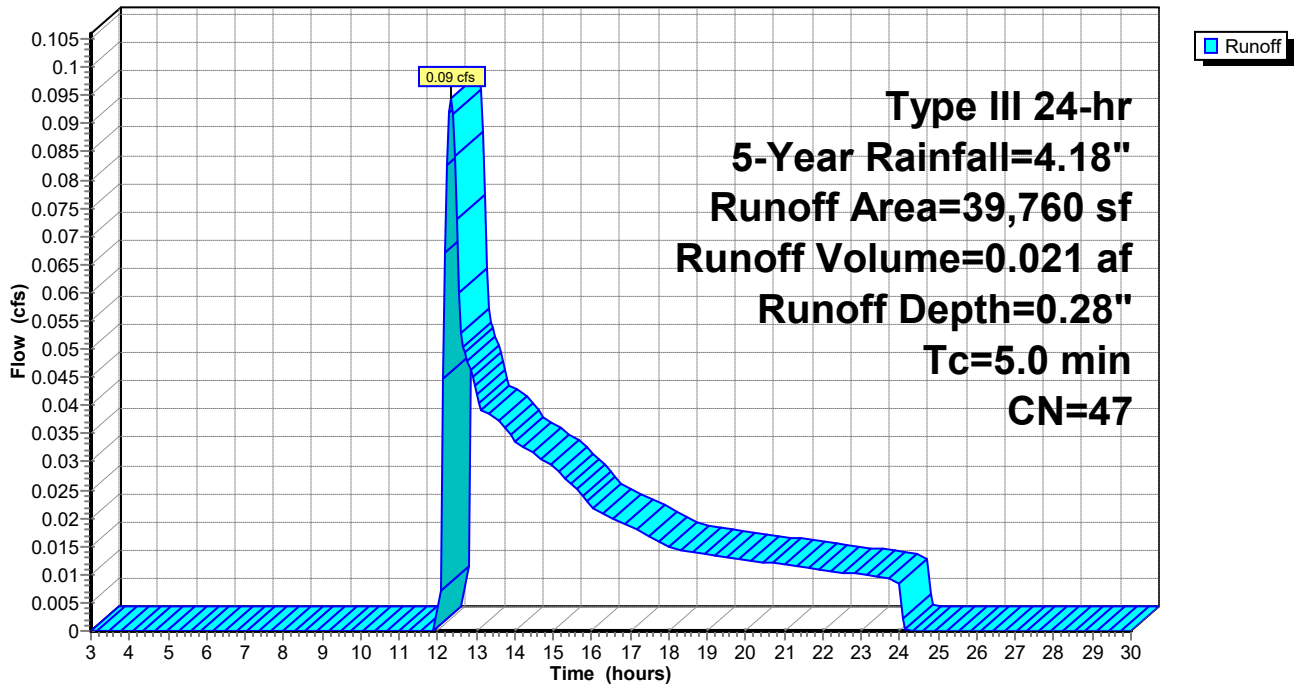
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs
 Type III 24-hr 5-Year Rainfall=4.18"

Area (sf)	CN	Description
29,860	30	Brush, Good, HSG A
* 9,900	98	ROAD
39,760	47	Weighted Average
29,860		75.10% Pervious Area
9,900		24.90% Impervious Area

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

Subcatchment DA4: DA4

Hydrograph



Summary for Subcatchment DA4B: DA4B

Runoff = 0.43 cfs @ 12.11 hrs, Volume= 0.045 af, Depth= 0.60"
 Routed to Pond SIB-4 : SIB-4

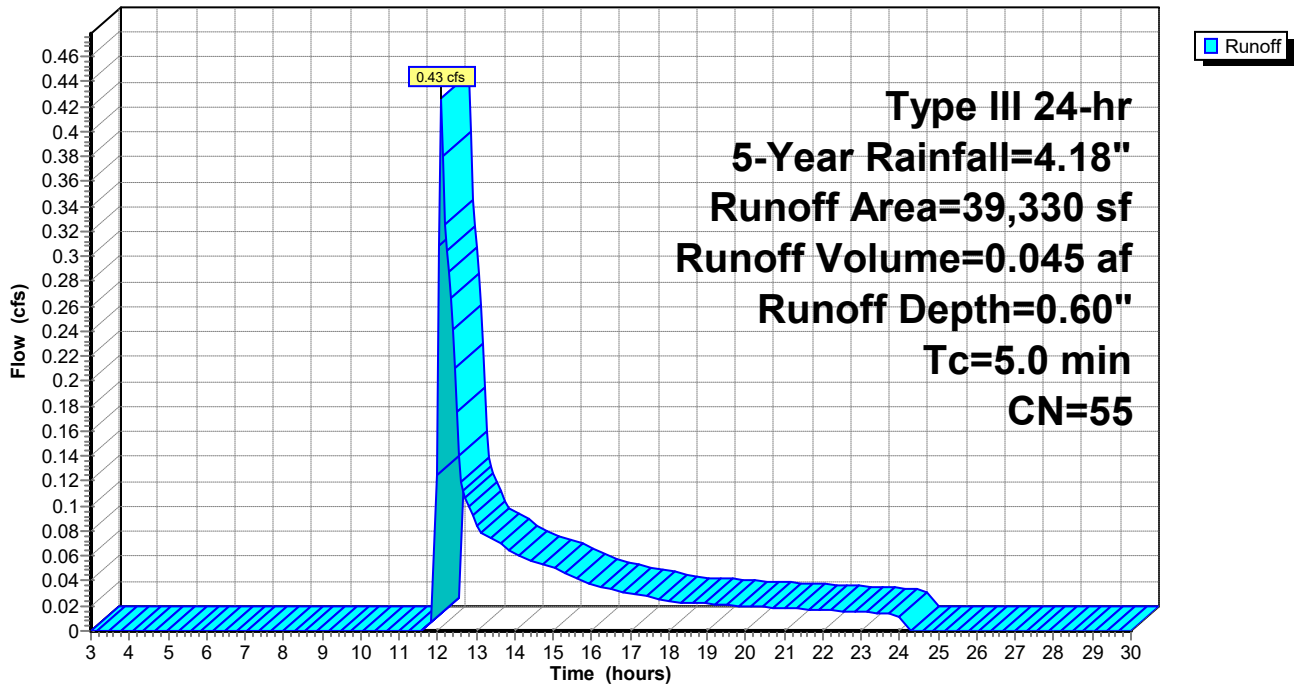
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs
 Type III 24-hr 5-Year Rainfall=4.18"

Area (sf)	CN	Description
25,053	30	Brush, Good, HSG A
* 14,277	98	ROAD
39,330	55	Weighted Average
25,053		63.70% Pervious Area
14,277		36.30% Impervious Area

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

Subcatchment DA4B: DA4B

Hydrograph



Wareham Post Construction

Type III 24-hr 5-Year Rainfall=4.18"

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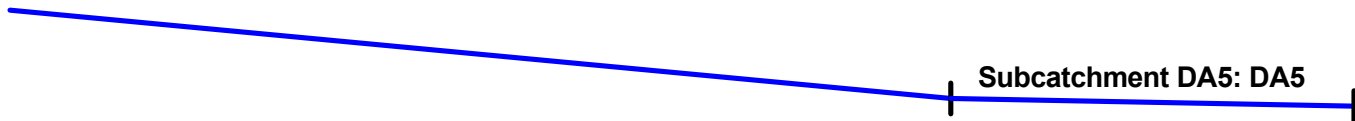
Summary for Subcatchment DA5: DA5

Runoff = 0.72 cfs @ 12.19 hrs, Volume= 0.076 af, Depth= 0.85"
 Routed to Pond CB DA5 : CB DA5

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs
 Type III 24-hr 5-Year Rainfall=4.18"

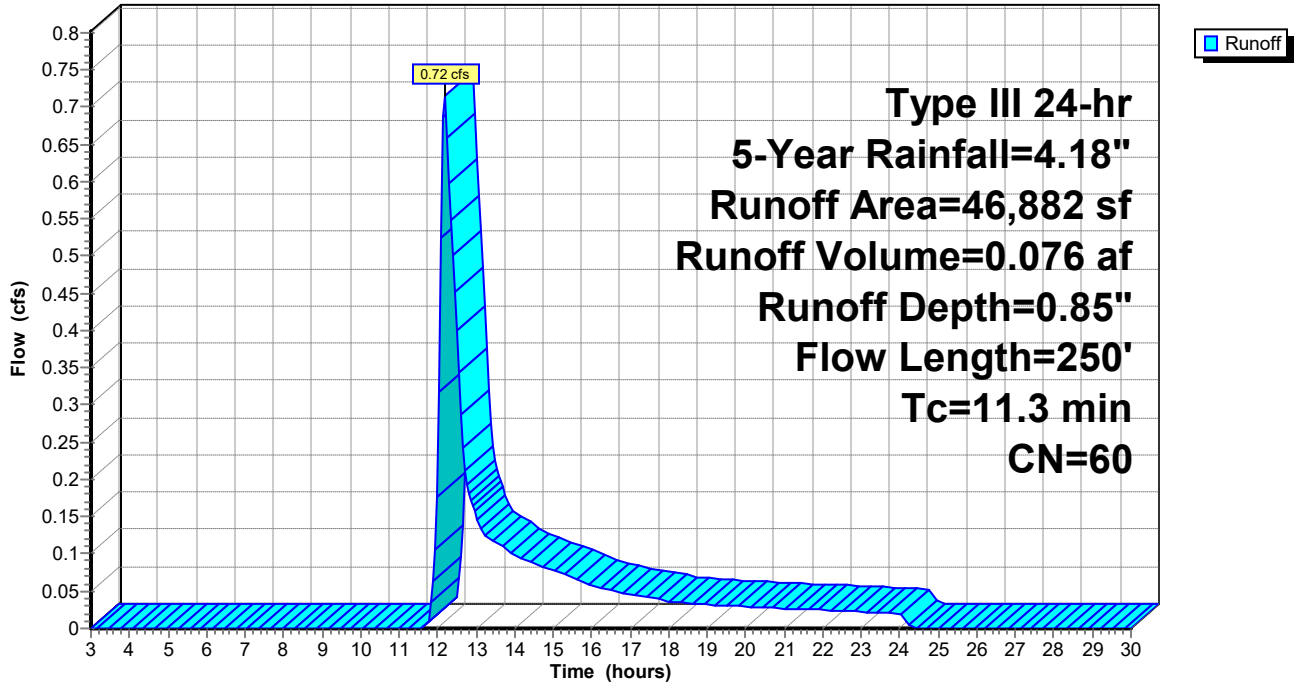
	Area (sf)	CN	Description
*	16,312	98	ROAD
*	30,570	39	GRASSED AREA
	46,882	60	Weighted Average
	30,570		65.21% Pervious Area
	16,312		34.79% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.3	175	0.0500	2.27		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.35"
10.0	75	0.0100	0.12		Sheet Flow, Grass: Short n= 0.150 P2= 3.35"
11.3	250	Total			



Subcatchment DA5: DA5

Hydrograph



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Type III 24-hr 5-Year Rainfall=4.18"

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Summary for Subcatchment DA6: DA6

Runoff = 1.10 cfs @ 12.09 hrs, Volume= 0.079 af, Depth= 2.36"
 Routed to Pond SIB-2 : SIB-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs
 Type III 24-hr 5-Year Rainfall=4.18"

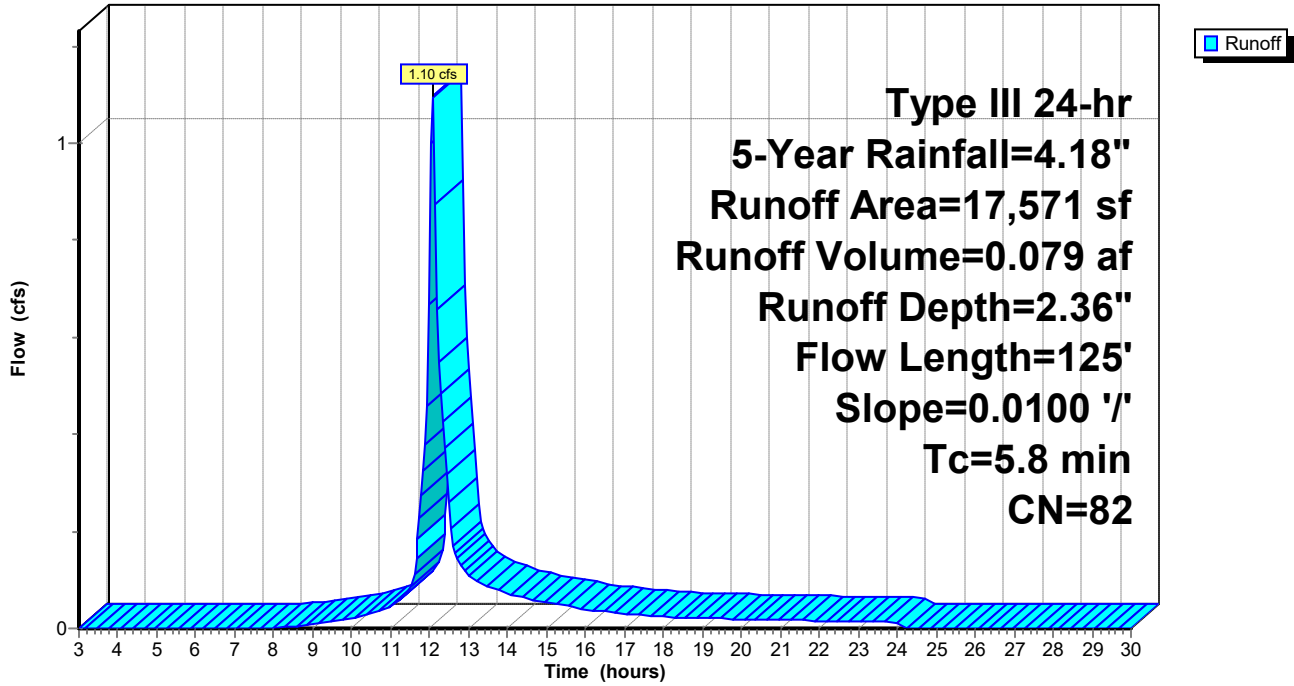
Area (sf)	CN	Description
* 12,762	98	
* 4,809	39	
17,571	82	Weighted Average
4,809		27.37% Pervious Area
12,762		72.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.6	100	0.0100	1.07		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.35"
4.2	25	0.0100	0.10		Sheet Flow, Grass: Short n= 0.150 P2= 3.35"
5.8	125	Total			



Subcatchment DA6: DA6

Hydrograph



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Type III 24-hr 5-Year Rainfall=4.18"

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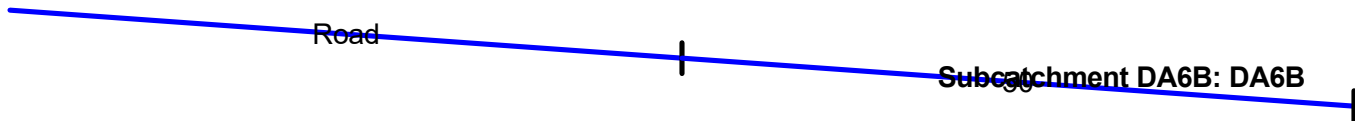
Summary for Subcatchment DA6B: DA6B

Runoff = 0.35 cfs @ 12.04 hrs, Volume= 0.023 af, Depth= 1.45"
 Routed to Pond SIB-2 : SIB-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs
 Type III 24-hr 5-Year Rainfall=4.18"

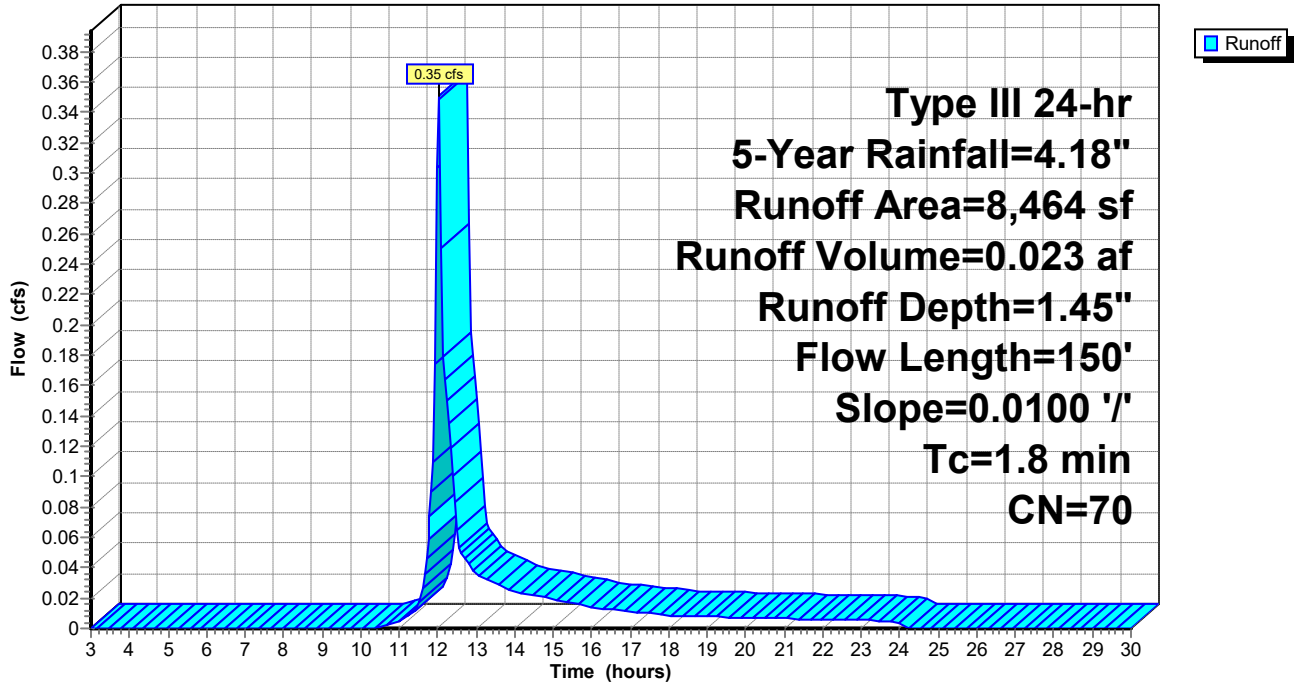
	Area (sf)	CN	Description
*	4,400	98	IMPERVIOUS
	4,064	39	>75% Grass cover, Good, HSG A
	8,464	70	Weighted Average
	4,064		48.02% Pervious Area
	4,400		51.98% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	75	0.0100	1.01		Sheet Flow, Road Smooth surfaces n= 0.011 P2= 3.35"
0.6	75	0.0100	2.03		Shallow Concentrated Flow, 50 Paved Kv= 20.3 fps
1.8	150	Total			



Subcatchment DA6B: DA6B

Hydrograph



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Type III 24-hr 5-Year Rainfall=4.18"

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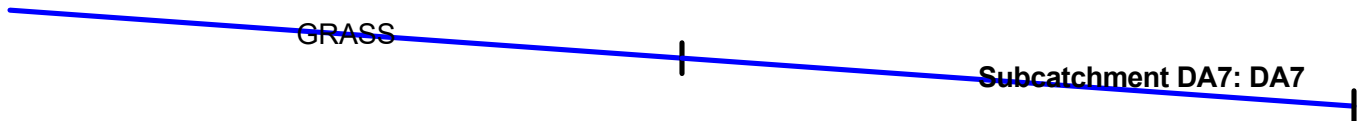
Summary for Subcatchment DA7: DA7

Runoff = 0.70 cfs @ 12.21 hrs, Volume= 0.067 af, Depth= 1.59"
 Routed to Pond CB DA7 : CB DA7

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs
 Type III 24-hr 5-Year Rainfall=4.18"

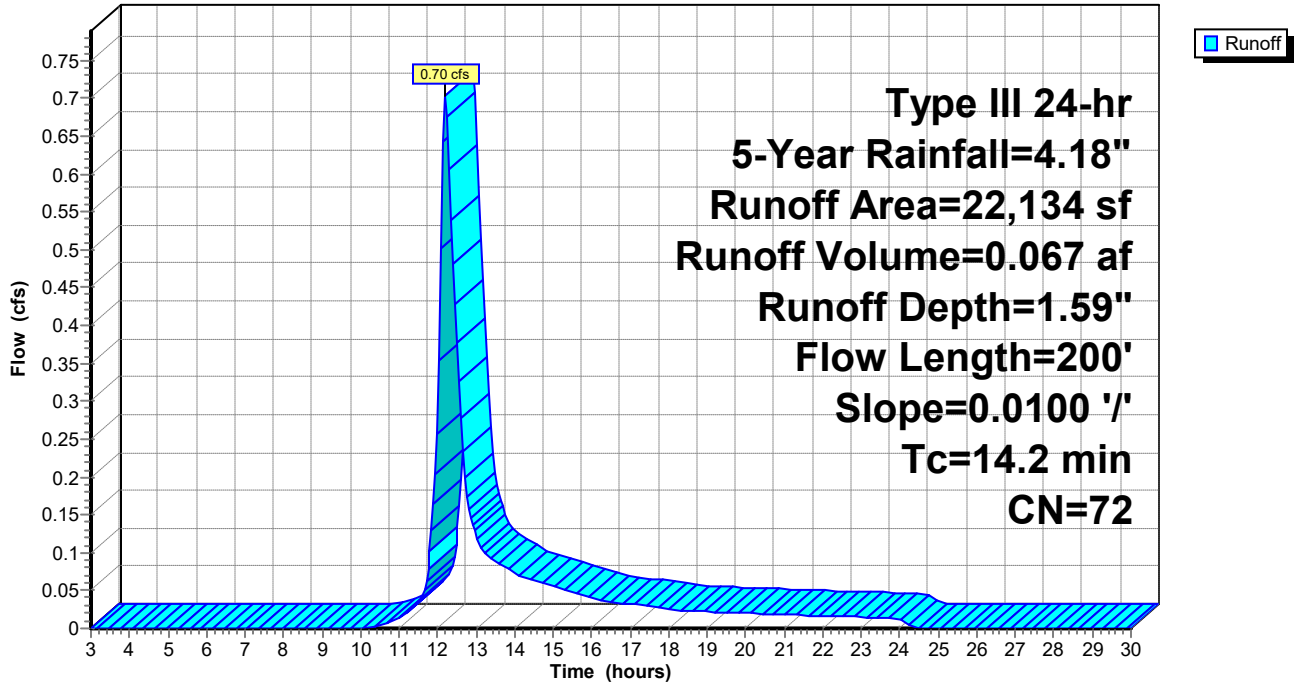
Area (sf)	CN	Description
9,701	39	>75% Grass cover, Good, HSG A
12,433	98	Paved parking, HSG A
22,134	72	Weighted Average
9,701		43.83% Pervious Area
12,433		56.17% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.6	100	0.0100	0.13		Sheet Flow, GRASS Grass: Short n= 0.150 P2= 3.35"
1.6	100	0.0100	1.07		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.35"
14.2	200	Total			



Subcatchment DA7: DA7

Hydrograph



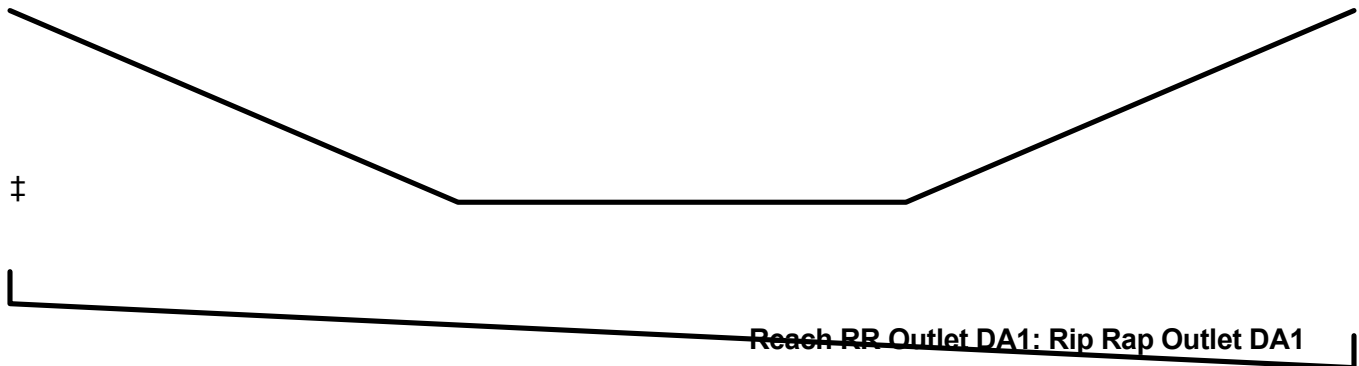
Summary for Reach RR Outlet DA1: Rip Rap Outlet DA1

Inflow Area = 1.076 ac, 34.79% Impervious, Inflow Depth = 0.00" for 5-Year event
Inflow = 0.00 cfs @ 3.00 hrs, Volume= 0.000 af, Incl. 1.00 cfs Inflow Loss
Outflow = 0.00 cfs @ 3.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
Routed to Pond SIB-1 : SIB-1

Routing by Stor-Ind+Trans method, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs / 3
Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

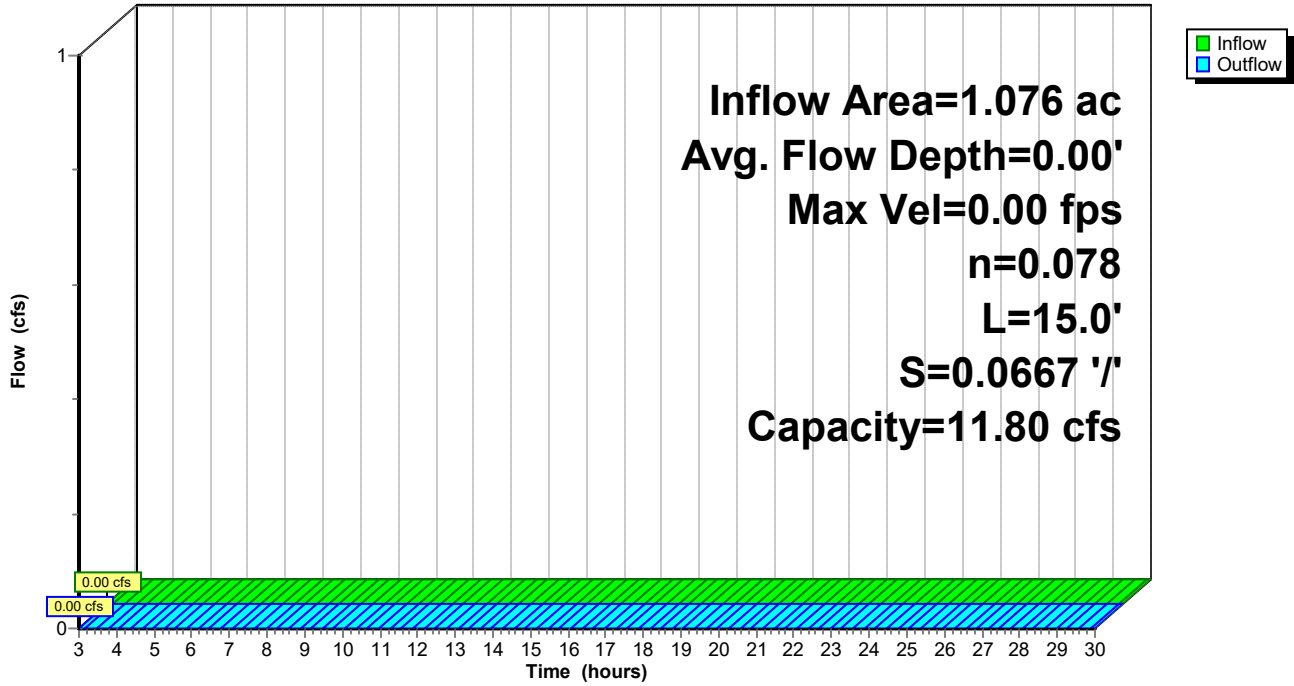
Peak Storage= 0 cf @ 3.00 hrs
Average Depth at Peak Storage= 0.00'
Bank-Full Depth= 0.50' Flow Area= 5.0 sf, Capacity= 11.80 cfs

5.00' x 0.50' deep channel, n= 0.078 Riprap, 12-inch
Side Slope Z-value= 10.0 '/' Top Width= 15.00'
Length= 15.0' Slope= 0.0667 '/'
Inlet Invert= 10.80', Outlet Invert= 9.80'



Reach RR Outlet DA1: Rip Rap Outlet DA1

Hydrograph



Summary for Pond CB DA5: CB DA5

Inflow Area = 1.076 ac, 34.79% Impervious, Inflow Depth = 0.85" for 5-Year event
 Inflow = 0.72 cfs @ 12.19 hrs, Volume= 0.076 af
 Outflow = 0.71 cfs @ 12.19 hrs, Volume= 0.077 af, Atten= 0%, Lag= 0.2 min
 Discarded = 0.03 cfs @ 12.19 hrs, Volume= 0.027 af
 Primary = 0.69 cfs @ 12.19 hrs, Volume= 0.050 af
 Routed to Pond MH 1 : MH1
 Secondary = 0.00 cfs @ 3.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs / 4
 Peak Elev= 16.71' @ 12.19 hrs Surf.Area= 28 sf Storage= 155 cf

Plug-Flow detention time= 25.9 min calculated for 0.076 af (100% of inflow)
 Center-of-Mass det. time= 32.6 min (927.8 - 895.2)

Volume	Invert	Avail.Storage	Storage Description
#1	11.23'	302 cf	6.00'D x 10.67'H Vertical Cone/Cylinder
#2	22.00'	6,068 cf	Custom Stage Data (Conic) Listed below (Recalc)
		6,370 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
22.00	2,240	0	0	2,240
23.00	11,000	6,068	6,068	11,004

Device	Routing	Invert	Outlet Devices
#1	Discarded	11.23'	8.270 in/hr Exfiltration over Wetted area Phase-In= 0.01'
#2	Primary	16.30'	18.0" Round CMP_Round 18" L= 25.6' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 16.30' / 14.80' S= 0.0586 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf
#3	Secondary	22.90'	70.0" x 140.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#4	Secondary	21.80'	2.0" x 2.0" Horiz. Orifice/Grate X 8.00 columns X 8 rows C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.03 cfs @ 12.19 hrs HW=16.71' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.03 cfs)

Primary OutFlow Max=0.67 cfs @ 12.19 hrs HW=16.71' (Free Discharge)
 ↑2=CMP_Round 18" (Inlet Controls 0.67 cfs @ 1.72 fps)

Secondary OutFlow Max=0.00 cfs @ 3.00 hrs HW=11.23' (Free Discharge)
 ↑3=Orifice/Grate (Controls 0.00 cfs)
 ↑4=Orifice/Grate (Controls 0.00 cfs)

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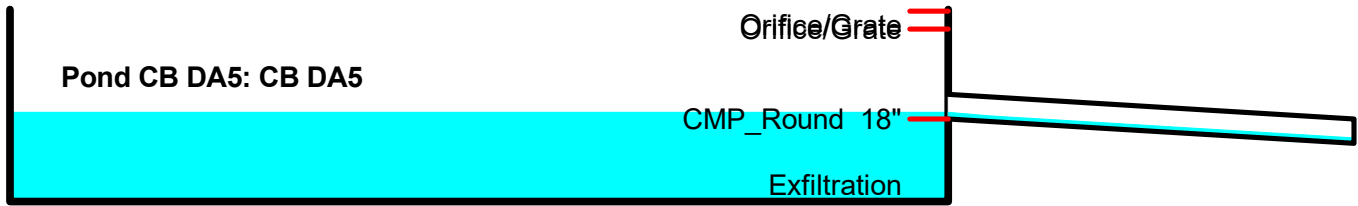
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Type III 24-hr 5-Year Rainfall=4.18"

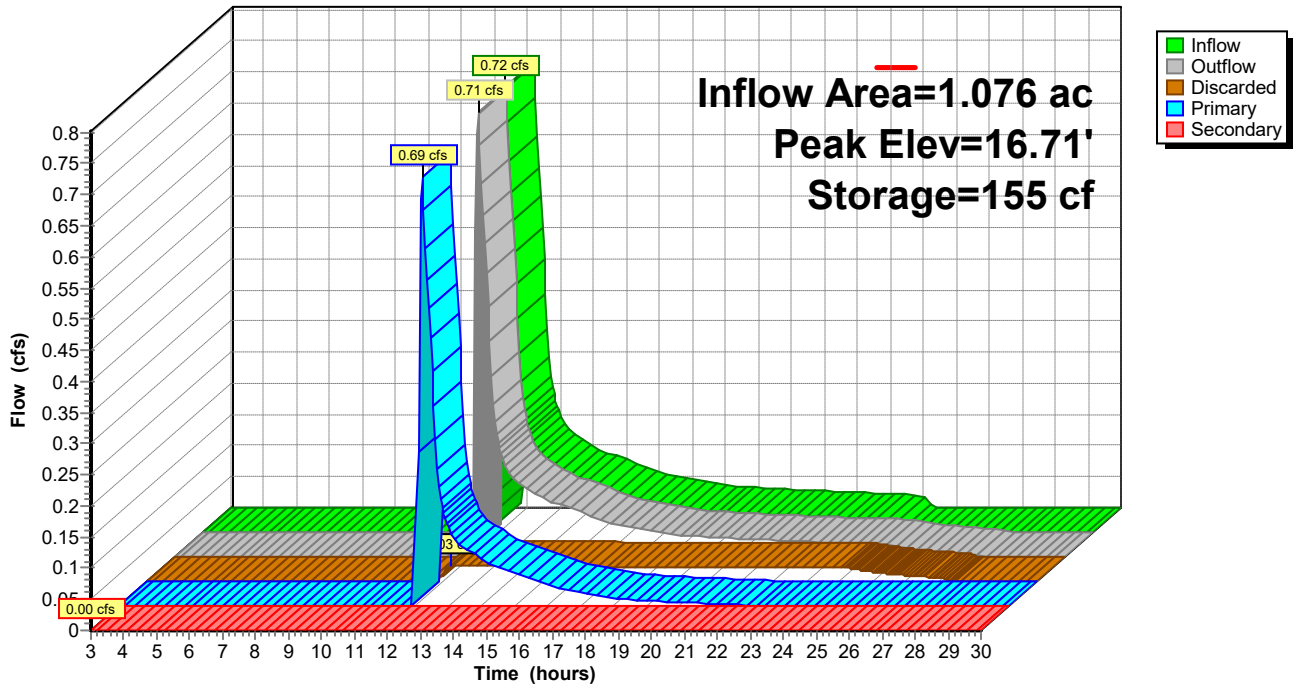
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Pond CB DA5: CB DA5

Hydrograph



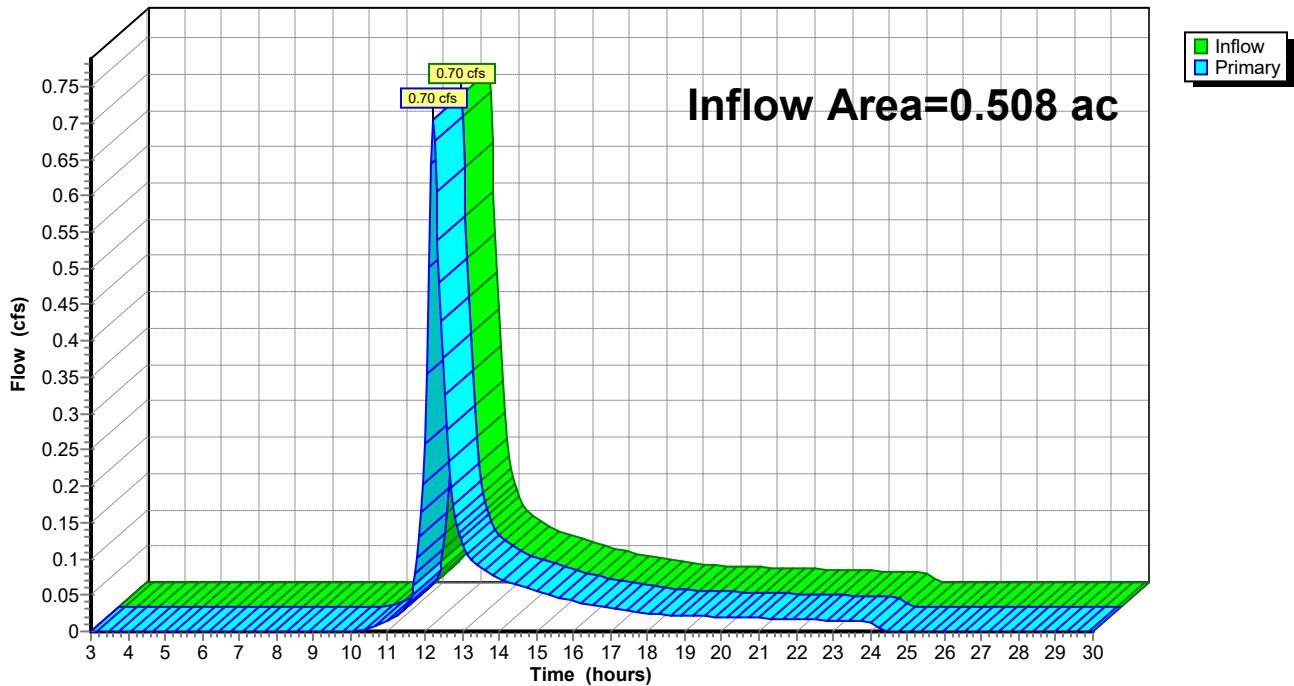
Summary for Pond CB DA7: CB DA7

Inflow Area = 0.508 ac, 56.17% Impervious, Inflow Depth = 1.59" for 5-Year event
Inflow = 0.70 cfs @ 12.21 hrs, Volume= 0.067 af
Primary = 0.70 cfs @ 12.21 hrs, Volume= 0.067 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs

Pond CB DA7: CB DA7

Hydrograph



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Type III 24-hr 5-Year Rainfall=4.18"

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Summary for Pond Ex. Basin DA4: DA4 EX. BASIN

Inflow Area = 0.913 ac, 24.90% Impervious, Inflow Depth = 0.28" for 5-Year event
 Inflow = 0.09 cfs @ 12.35 hrs, Volume= 0.021 af
 Outflow = 0.06 cfs @ 12.55 hrs, Volume= 0.021 af, Atten= 34%, Lag= 11.9 min
 Discarded = 0.06 cfs @ 12.55 hrs, Volume= 0.021 af
 Secondary = 0.00 cfs @ 3.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs / 3
 Peak Elev= 16.04' @ 12.55 hrs Surf.Area= 1,111 sf Storage= 37 cf

Plug-Flow detention time= 3.8 min calculated for 0.021 af (100% of inflow)
 Center-of-Mass det. time= 3.8 min (970.3 - 966.5)

Volume	Invert	Avail.Storage	Storage Description
#1	16.00'	2,708 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
16.00	1,025	0	0	1,025
17.00	4,866	2,708	2,708	4,870

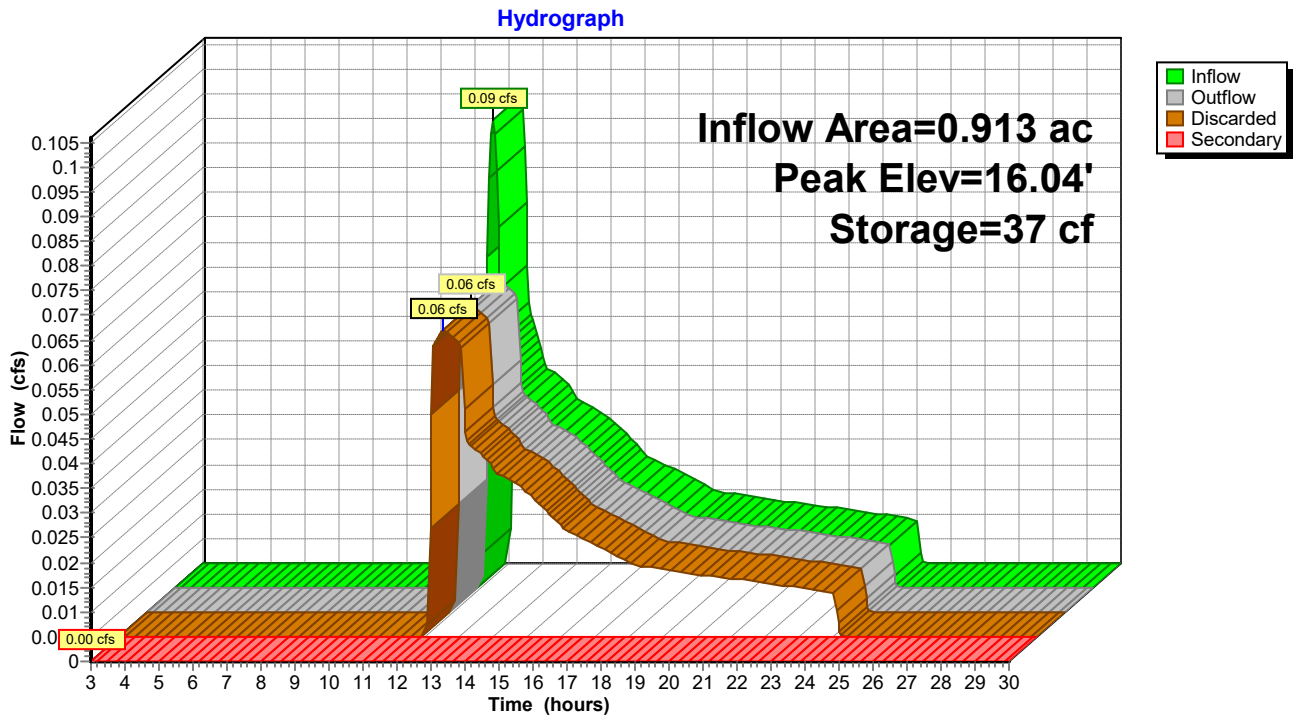
Device	Routing	Invert	Outlet Devices
#1	Discarded	16.00'	2.410 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Secondary	16.90'	360.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.06 cfs @ 12.55 hrs HW=16.03' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.06 cfs)

Secondary OutFlow Max=0.00 cfs @ 3.00 hrs HW=16.00' (Free Discharge)
 ↑2=Orifice/Grate (Controls 0.00 cfs)



Pond Ex. Basin DA4: DA4 EX. BASIN



Summary for Pond MH 1: MH1

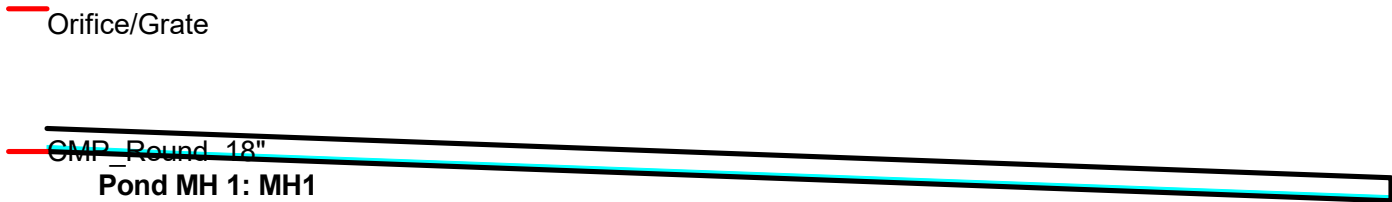
Inflow Area = 1.076 ac, 34.79% Impervious, Inflow Depth = 0.56" for 5-Year event
 Inflow = 0.69 cfs @ 12.19 hrs, Volume= 0.050 af
 Outflow = 0.69 cfs @ 12.19 hrs, Volume= 0.050 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.69 cfs @ 12.19 hrs, Volume= 0.050 af
 Routed to Pond MH2 : MH2
 Secondary = 0.00 cfs @ 3.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs
 Peak Elev= 15.11' @ 12.19 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	14.70'	18.0" Round CMP_Round 18" L= 156.1' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 14.70' / 11.50' S= 0.0205 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf
#2	Secondary	24.00'	24.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

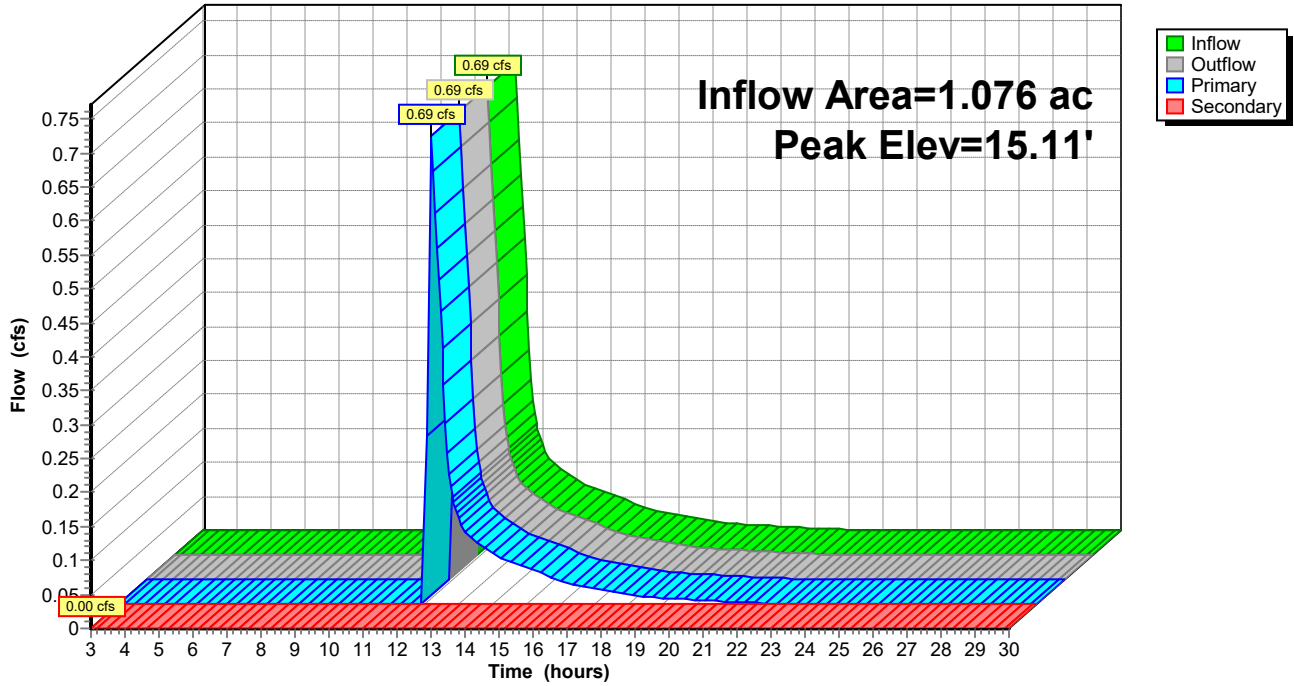
Primary OutFlow Max=0.68 cfs @ 12.19 hrs HW=15.11' (Free Discharge)
 ↑1=CMP_Round 18" (Inlet Controls 0.68 cfs @ 1.72 fps)

Secondary OutFlow Max=0.00 cfs @ 3.00 hrs HW=14.70' (Free Discharge)
 ↑2=Orifice/Grate (Controls 0.00 cfs)



Pond MH 1: MH1

Hydrograph



Summary for Pond MH2: MH2

Inflow Area = 1.076 ac, 34.79% Impervious, Inflow Depth = 0.56" for 5-Year event
 Inflow = 0.69 cfs @ 12.19 hrs, Volume= 0.050 af
 Outflow = 0.69 cfs @ 12.19 hrs, Volume= 0.050 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.69 cfs @ 12.19 hrs, Volume= 0.050 af
 Routed to Pond RR Channel DA1 : Rip Rap Channel DA1
 Secondary = 0.00 cfs @ 3.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs
 Peak Elev= 11.13' @ 12.19 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	11.40'	18.0" Round CMP_Round 18" L= 118.9' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 11.40' / 10.80' S= 0.0050 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf
#2	Secondary	24.00'	24.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Primary	10.80'	15.00' long x 6.00' breadth x 1.00' high Rock Fill Rock Diam.= 12.000", S.D.= 1.000", Voids= 40.0%

Primary OutFlow Max=0.67 cfs @ 12.19 hrs HW=11.13' (Free Discharge)
 ↑1=CMP_Round 18" (Controls 0.00 cfs)
 ↓3=Rock Fill (Rockfill Controls 0.67 cfs @ 0.27 fps)

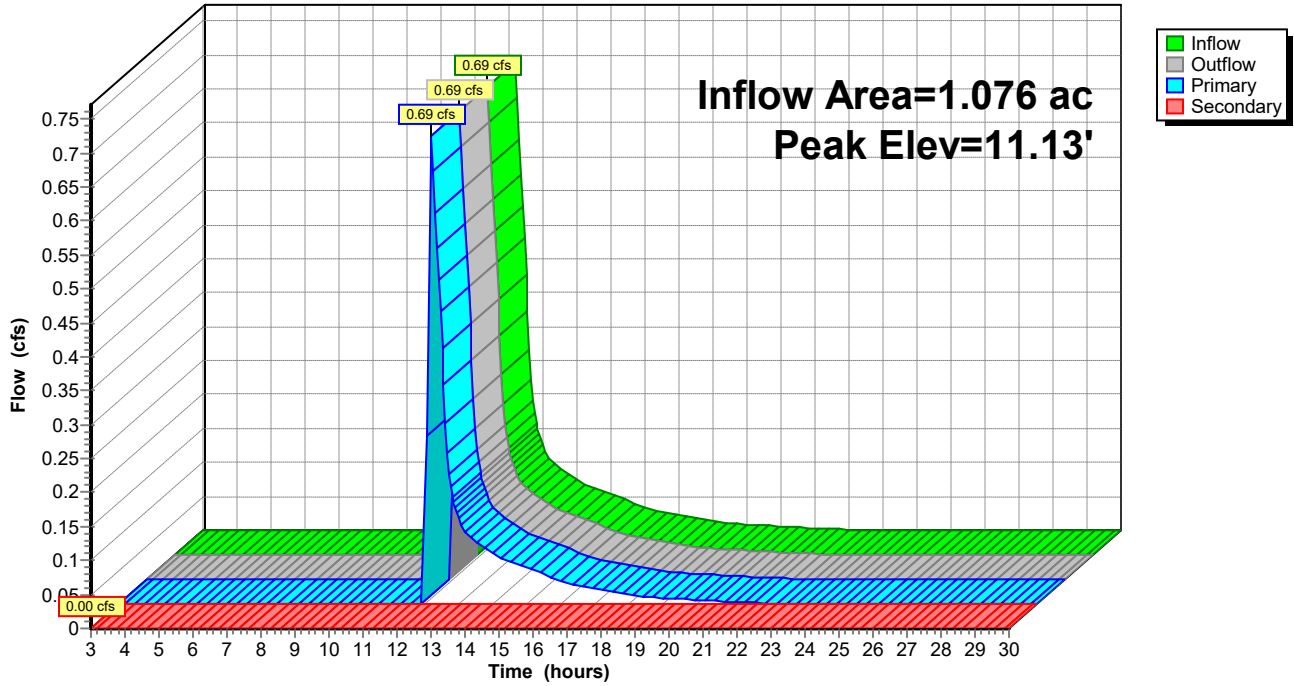
Secondary OutFlow Max=0.00 cfs @ 3.00 hrs HW=10.80' (Free Discharge)
 ↑2=Orifice/Grate (Controls 0.00 cfs)

Orifice/Grate

~~RR Channel MH2: MH2~~

Pond MH2: MH2

Hydrograph



Summary for Pond RR Channel DA1: Rip Rap Channel DA1

Inflow Area = 1.076 ac, 34.79% Impervious, Inflow Depth = 0.56" for 5-Year event
 Inflow = 0.69 cfs @ 12.19 hrs, Volume= 0.050 af
 Outflow = 0.69 cfs @ 12.20 hrs, Volume= 0.050 af, Atten= 0%, Lag= 0.0 min
 Discarded = 0.01 cfs @ 12.20 hrs, Volume= 0.003 af
 Primary = 0.68 cfs @ 12.20 hrs, Volume= 0.047 af

Routed to Reach RR Outlet DA1 : Rip Rap Outlet DA1

Routing by Stor-Ind method, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs / 3
 Peak Elev= 11.11' @ 12.20 hrs Surf.Area= 46 sf Storage= 8 cf

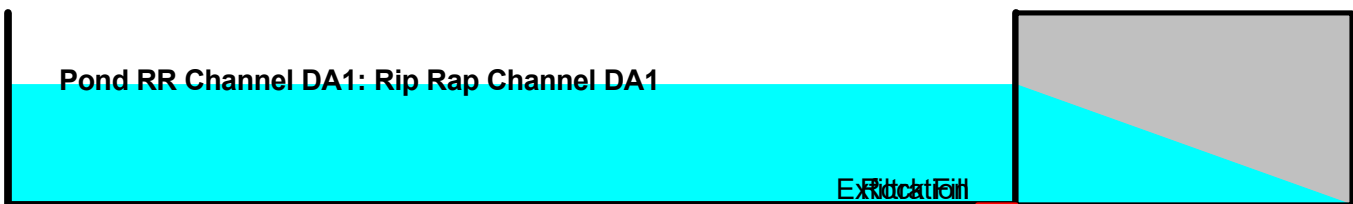
Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 0.2 min (817.6 - 817.4)

Volume	Invert	Avail.Storage	Storage Description
#1	10.80'	10 cf	60.0"W x 6.0"H x 15.00'L Parabolic Arch 25 cf Overall x 40.0% Voids

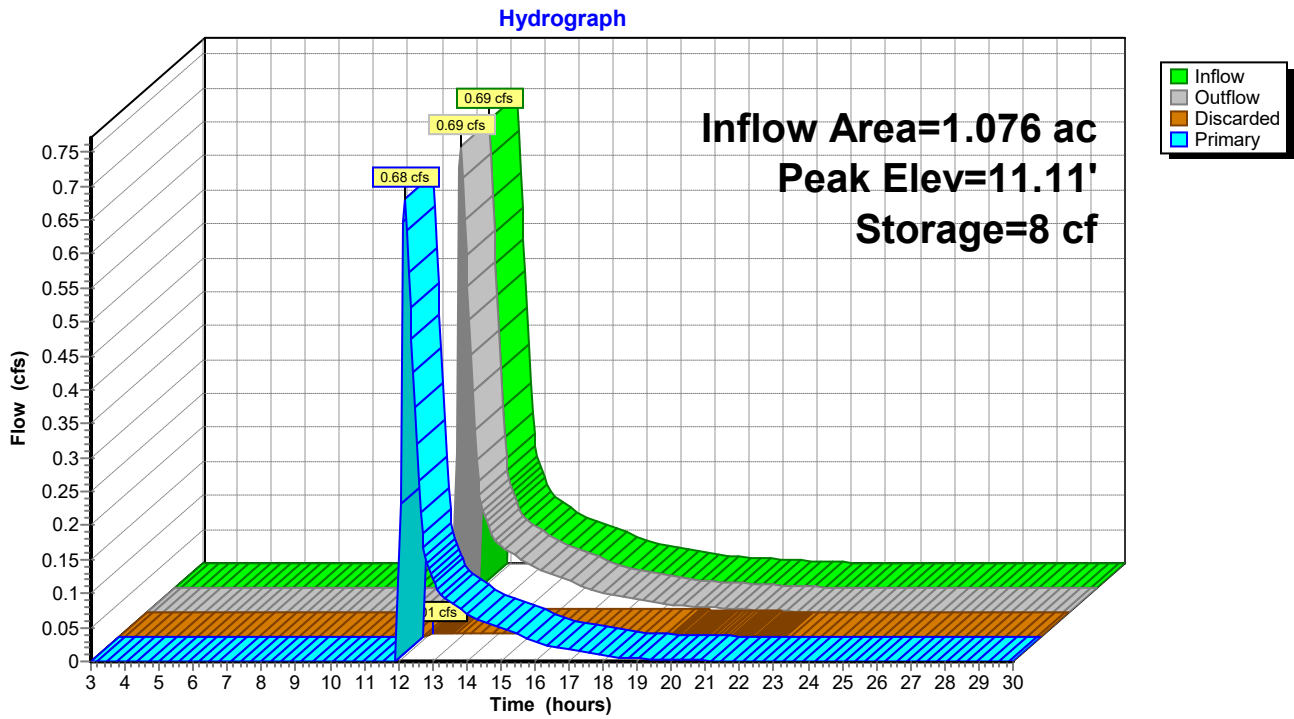
Device	Routing	Invert	Outlet Devices
#1	Discarded	10.80'	2.410 in/hr Exfiltration over Wetted area Phase-In= 0.01'
#2	Primary	10.80'	15.00' long x 5.00' breadth x 0.50' high Rock Fill Rock Diam.= 12.000", S.D.= 1.000", Voids= 40.0%

Discarded OutFlow Max=0.01 cfs @ 12.20 hrs HW=11.11' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.68 cfs @ 12.20 hrs HW=11.11' (Free Discharge)
 ↑2=Rock Fill (Rockfill Controls 0.68 cfs @ 0.29 fps)



Pond RR Channel DA1: Rip Rap Channel DA1



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Summary for Pond SIB-1: SIB-1

Inflow Area = 2.172 ac, 35.72% Impervious, Inflow Depth = 0.46" for 5-Year event
 Inflow = 0.77 cfs @ 12.21 hrs, Volume= 0.083 af
 Outflow = 0.53 cfs @ 12.43 hrs, Volume= 0.083 af, Atten= 31%, Lag= 13.4 min
 Discarded = 0.53 cfs @ 12.43 hrs, Volume= 0.083 af
 Secondary = 0.00 cfs @ 3.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs
 Peak Elev= 10.15' @ 12.43 hrs Surf.Area= 2,755 sf Storage= 404 cf

Plug-Flow detention time= 12.3 min calculated for 0.083 af (100% of inflow)
 Center-of-Mass det. time= 12.0 min (904.7 - 892.7)

Volume	Invert	Avail.Storage	Storage Description
#1	10.00'	123,310 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
10.00	2,664	0	0	2,664
11.00	3,306	2,979	2,979	3,334
12.00	4,005	3,650	6,629	4,066
13.00	4,760	4,377	11,006	4,856
14.00	5,572	5,161	16,167	5,707
15.00	6,440	6,001	22,168	6,617
16.00	7,365	6,897	29,065	7,588
17.00	8,347	7,851	36,916	8,619
18.00	9,385	8,861	45,777	9,709
19.00	10,480	9,927	55,704	10,860
20.00	11,630	11,050	66,754	12,069
21.00	12,837	12,229	78,983	13,338
22.00	14,101	13,464	92,447	14,667
23.00	15,422	14,757	107,203	16,057
24.00	16,800	16,106	123,310	17,506

Device	Routing	Invert	Outlet Devices
#1	Discarded	10.00'	8.270 in/hr Exfiltration over Wetted area Phase-In= 0.01'
#2	Secondary	23.90'	360.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

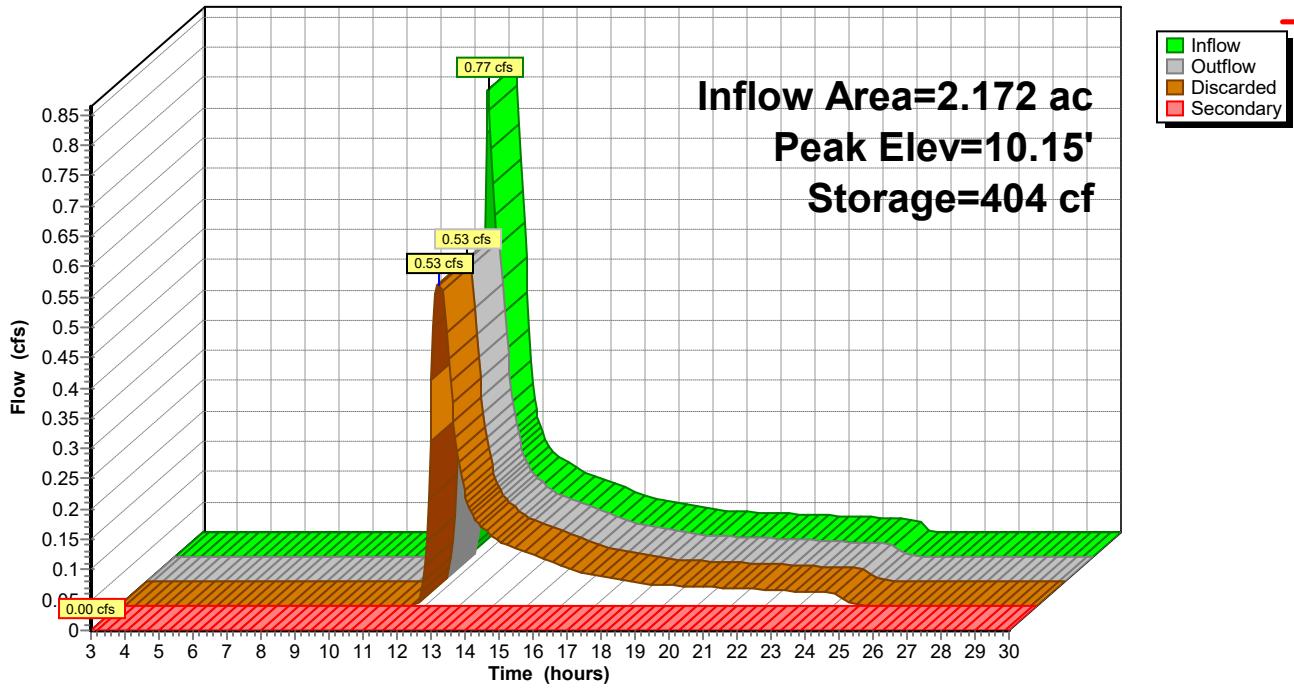
Discarded OutFlow Max=0.53 cfs @ 12.43 hrs HW=10.15' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.53 cfs)

Secondary OutFlow Max=0.00 cfs @ 3.00 hrs HW=10.00' (Free Discharge)
 ↑2=Orifice/Grate (Controls 0.00 cfs)



Pond SIB-1: SIB-1

Hydrograph



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Summary for Pond SIB-2: SIB-2

Inflow Area = 1.267 ac, 40.21% Impervious, Inflow Depth = 1.16" for 5-Year event
 Inflow = 1.38 cfs @ 12.08 hrs, Volume= 0.122 af
 Outflow = 1.35 cfs @ 12.09 hrs, Volume= 0.121 af, Atten= 3%, Lag= 1.0 min
 Discarded = 0.10 cfs @ 12.05 hrs, Volume= 0.079 af
 Secondary = 1.25 cfs @ 12.09 hrs, Volume= 0.042 af

Routing by Stor-Ind method, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs / 4
 Peak Elev= 23.09' @ 12.10 hrs Surf.Area= 350 sf Storage= 849 cf

Plug-Flow detention time= 106.8 min calculated for 0.120 af (98% of inflow)
 Center-of-Mass det. time= 99.4 min (950.0 - 850.6)

Volume	Invert	Avail.Storage	Storage Description
#1	13.96'	299 cf	10.00'W x 24.00'L x 6.00'H Prismatic 1,440 cf Overall - 693 cf Embedded = 747 cf x 40.0% Voids
#2	13.96'	509 cf	6.00'D x 6.00'H Vertical Cone/Cylinder x 3 Inside #1 693 cf Overall - 6.0" Wall Thickness = 509 cf
#3	19.96'	28 cf	2.00'D x 3.00'H Vertical Cone/Cylinder x 3 -Impervious
#4	22.96'	878 cf	Custom Stage Data (Conic) Listed below (Recalc)
		1,714 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
22.96	83	0	0	83
24.00	393	228	228	398
25.00	947	650	878	959

Device	Routing	Invert	Outlet Devices
#1	Secondary	23.00'	2.0" x 2.0" Horiz. Orifice/Grate X 6.00 columns X 6 rows C= 0.600 Limited to weir flow at low heads
#2	Discarded	13.96'	8.270 in/hr Exfiltration over Wetted area from 13.96' - 23.00' Excluded Wetted area = 240 sf Phase-In= 0.01'

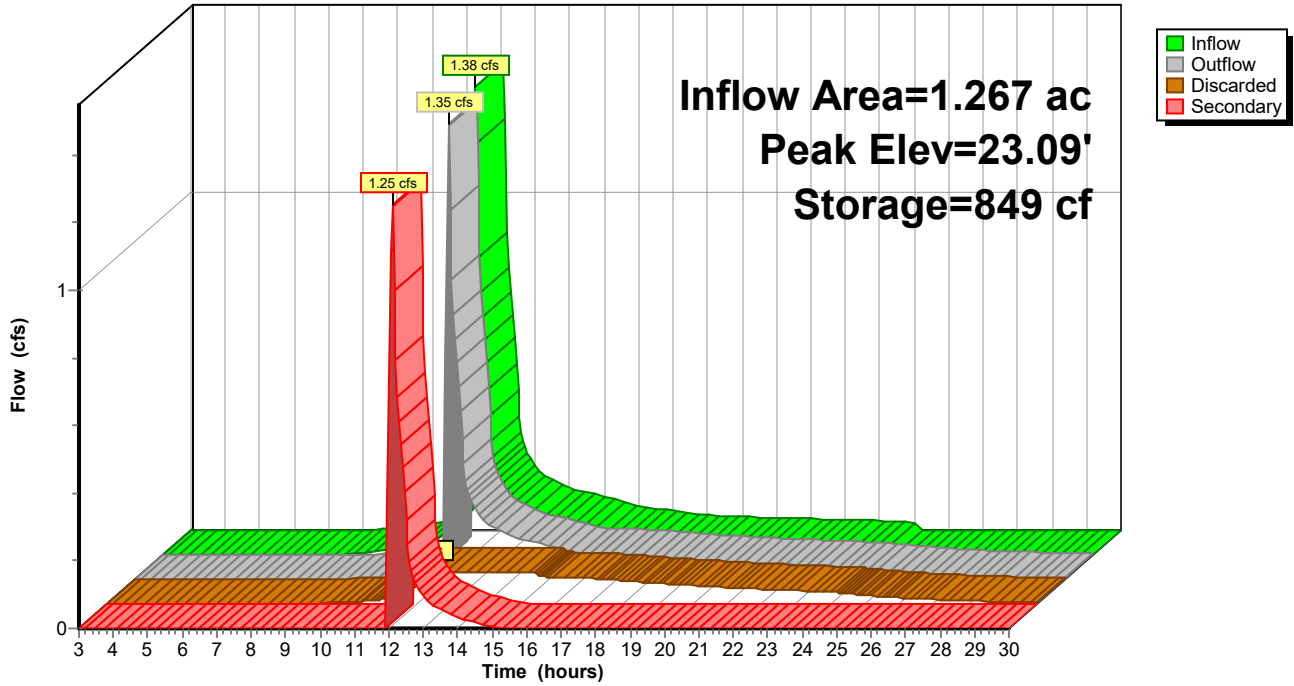
Discarded OutFlow Max=0.10 cfs @ 12.05 hrs HW=23.08' (Free Discharge)
 ↑ **2=Exfiltration** (Exfiltration Controls 0.10 cfs)

Secondary OutFlow Max=1.45 cfs @ 12.09 hrs HW=23.09' (Free Discharge)
 ↑ **1=Orifice/Grate** (Orifice Controls 1.45 cfs @ 1.45 fps)



Pond SIB-2: SIB-2

Hydrograph



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Summary for Pond SIB-3: SIB-3

Inflow Area = 0.123 ac, 44.81% Impervious, Inflow Depth = 1.13" for 5-Year event
 Inflow = 0.16 cfs @ 12.03 hrs, Volume= 0.012 af
 Outflow = 0.02 cfs @ 12.99 hrs, Volume= 0.011 af, Atten= 89%, Lag= 57.9 min
 Discarded = 0.02 cfs @ 12.99 hrs, Volume= 0.011 af
 Secondary = 0.00 cfs @ 3.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs / 4
 Peak Elev= 15.38' @ 12.99 hrs Surf.Area= 240 sf Storage= 192 cf

Plug-Flow detention time= 168.4 min calculated for 0.011 af (99% of inflow)
 Center-of-Mass det. time= 162.6 min (1,030.7 - 868.1)

Volume	Invert	Avail.Storage	Storage Description
#1	13.96'	299 cf	10.00'W x 24.00'L x 6.00'H Prismaticoid 1,440 cf Overall - 693 cf Embedded = 747 cf x 40.0% Voids
#2	13.96'	509 cf	6.00'D x 6.00'H Vertical Cone/Cylinder x 3 Inside #1 693 cf Overall - 6.0" Wall Thickness = 509 cf
#3	19.96'	28 cf	2.00'D x 3.00'H Vertical Cone/Cylinder x 3 -Impervious
#4	22.96'	1,578 cf	Custom Stage Data (Irregular) Listed below (Recalc)
		2,414 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
22.96	817	126.0	0	0	817
24.00	2,350	206.0	1,578	1,578	2,938

Device	Routing	Invert	Outlet Devices
#1	Secondary	23.00'	2.0" x 2.0" Horiz. Orifice/Grate X 6.00 columns X 6 rows C= 0.600 Limited to weir flow at low heads
#2	Discarded	13.96'	8.270 in/hr Exfiltration over Wetted area from 13.96' - 23.00' Excluded Wetted area = 240 sf Phase-In= 0.01'

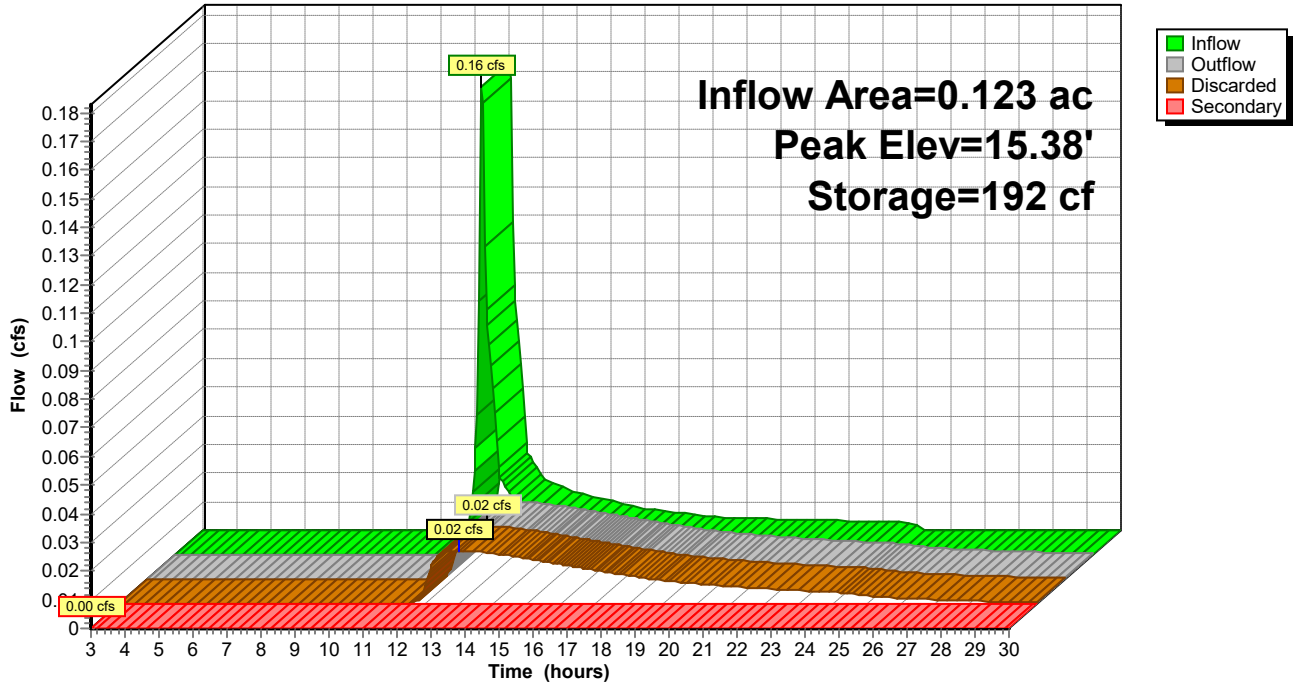
Discarded OutFlow Max=0.02 cfs @ 12.99 hrs HW=15.38' (Free Discharge)
 ↑ **2=Exfiltration** (Exfiltration Controls 0.02 cfs)

Secondary OutFlow Max=0.00 cfs @ 3.00 hrs HW=13.96' (Free Discharge)
 ↑ **1=Orifice/Grate** (Controls 0.00 cfs)



Pond SIB-3: SIB-3

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Summary for Pond SIB-4: SIB-4

Inflow Area = 0.903 ac, 36.30% Impervious, Inflow Depth = 0.60" for 5-Year event
 Inflow = 0.43 cfs @ 12.11 hrs, Volume= 0.045 af
 Outflow = 0.06 cfs @ 13.88 hrs, Volume= 0.044 af, Atten= 85%, Lag= 106.3 min
 Discarded = 0.06 cfs @ 13.88 hrs, Volume= 0.044 af
 Secondary = 0.00 cfs @ 3.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs / 4
 Peak Elev= 22.91' @ 13.88 hrs Surf.Area= 170 sf Storage= 617 cf

Plug-Flow detention time= 159.4 min calculated for 0.044 af (98% of inflow)
 Center-of-Mass det. time= 146.9 min (1,058.1 - 911.2)

Volume	Invert	Avail.Storage	Storage Description
#1	16.33'	248 cf	10.00'W x 17.00'L x 6.67'H Prismatoid 1,134 cf Overall - 513 cf Embedded = 621 cf x 40.0% Voids
#2	16.33'	377 cf	6.00'D x 6.67'H Vertical Cone/Cylinder x 2 Inside #1 513 cf Overall - 6.0" Wall Thickness = 377 cf
#3	23.00'	0 cf	2.00'D x 2.00'H Vertical Cone/Cylinder 6 cf Overall x 0.0% Voids
#4	25.00'	2,852 cf	Custom Stage Data (Conic) Listed below (Recalc)
		3,477 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
25.00	514	0	0	514
26.00	1,416	928	928	1,422
27.00	2,482	1,924	2,852	2,500

Device	Routing	Invert	Outlet Devices
#1	Discarded	16.67'	8.270 in/hr Exfiltration over Wetted area above 16.67' Excluded Wetted area = 188 sf Phase-In= 0.01'
#2	Secondary	26.90'	528.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

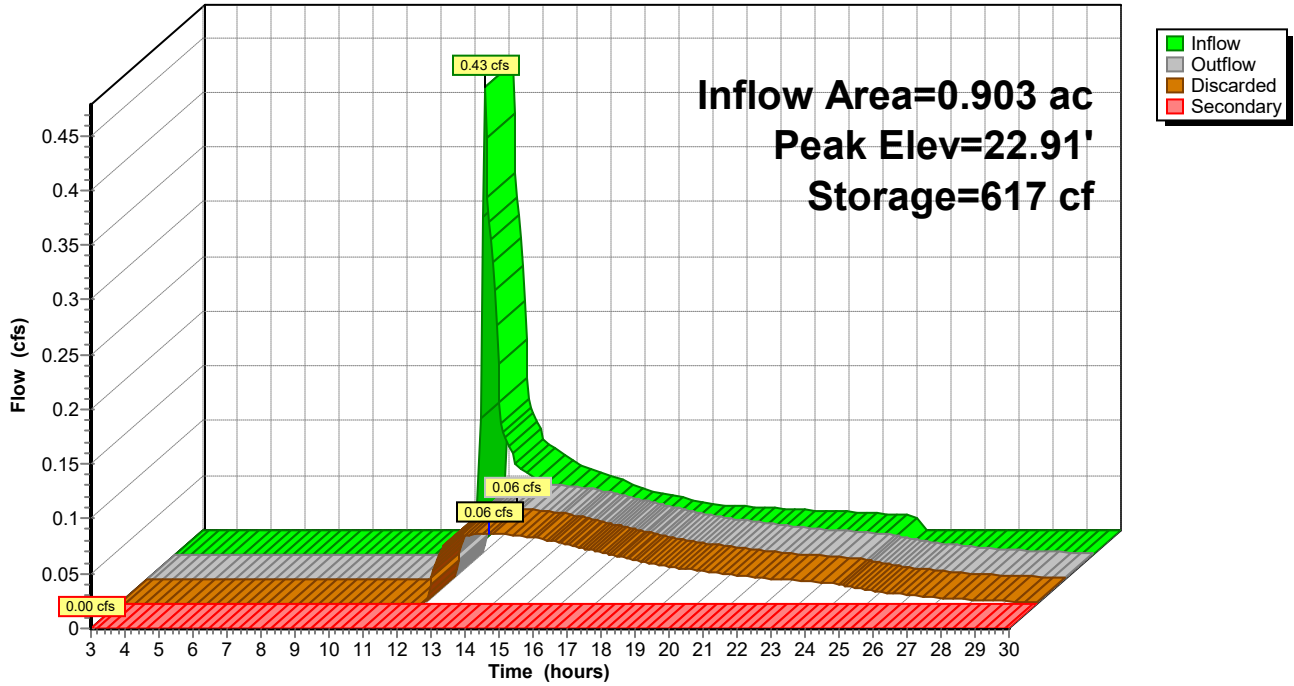
Discarded OutFlow Max=0.06 cfs @ 13.88 hrs HW=22.91' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.06 cfs)

Secondary OutFlow Max=0.00 cfs @ 3.00 hrs HW=16.33' (Free Discharge)
 ↑2=Orifice/Grate (Controls 0.00 cfs)



Pond SIB-4: SIB-4

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Time span=3.00-30.00 hrs, dt=0.05 hrs, 541 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment DA1: DA1	Runoff Area=47,720 sf 36.62% Impervious Runoff Depth=1.34" Flow Length=191' Tc=12.7 min CN=61 Runoff=1.23 cfs 0.122 af
Subcatchment DA2: DA2	Runoff Area=29,170 sf 17.26% Impervious Runoff Depth=0.62" Flow Length=264' Tc=11.2 min CN=49 Runoff=0.23 cfs 0.035 af
Subcatchment DA3: DA3	Runoff Area=5,342 sf 44.81% Impervious Runoff Depth=1.62" Flow Length=88' Tc=0.9 min CN=65 Runoff=0.25 cfs 0.017 af
Subcatchment DA4: DA4	Runoff Area=39,760 sf 24.90% Impervious Runoff Depth=0.52" Tc=5.0 min CN=47 Runoff=0.25 cfs 0.040 af
Subcatchment DA4B: DA4B	Runoff Area=39,330 sf 36.30% Impervious Runoff Depth=0.96" Tc=5.0 min CN=55 Runoff=0.82 cfs 0.072 af
Subcatchment DA5: DA5	Runoff Area=46,882 sf 34.79% Impervious Runoff Depth=1.27" Flow Length=250' Tc=11.3 min CN=60 Runoff=1.17 cfs 0.114 af
Subcatchment DA6: DA6	Runoff Area=17,571 sf 72.63% Impervious Runoff Depth=3.03" Flow Length=125' Slope=0.0100 '/' Tc=5.8 min CN=82 Runoff=1.41 cfs 0.102 af
Subcatchment DA6B: DA6B	Runoff Area=8,464 sf 51.98% Impervious Runoff Depth=2.00" Flow Length=150' Slope=0.0100 '/' Tc=1.8 min CN=70 Runoff=0.49 cfs 0.032 af
Subcatchment DA7: DA7	Runoff Area=22,134 sf 56.17% Impervious Runoff Depth=2.16" Flow Length=200' Slope=0.0100 '/' Tc=14.2 min CN=72 Runoff=0.97 cfs 0.091 af
Reach RR Outlet DA1: Rip Rap Outlet	Avg. Flow Depth=0.04' Max Vel=0.56 fps Inflow=0.13 cfs 0.001 af n=0.078 L=15.0' S=0.0667 '/' Capacity=11.80 cfs Outflow=0.12 cfs 0.001 af
Pond CB DA5: CB DA5	Peak Elev=16.84' Storage=159 cf Inflow=1.17 cfs 0.114 af Discarded=0.03 cfs 0.028 af Primary=1.14 cfs 0.086 af Secondary=0.00 cfs 0.000 af Outflow=1.17 cfs 0.114 af
Pond CB DA7: CB DA7	Inflow=0.97 cfs 0.091 af Primary=0.97 cfs 0.091 af
Pond Ex. Basin DA4: DA4 EX. BASIN	Peak Elev=16.20' Storage=256 cf Inflow=0.25 cfs 0.040 af Discarded=0.09 cfs 0.040 af Secondary=0.00 cfs 0.000 af Outflow=0.09 cfs 0.040 af
Pond MH 1: MH1	Peak Elev=15.24' Inflow=1.14 cfs 0.086 af Primary=1.14 cfs 0.086 af Secondary=0.00 cfs 0.000 af Outflow=1.14 cfs 0.086 af
Pond MH2: MH2	Peak Elev=11.27' Inflow=1.14 cfs 0.086 af Primary=1.14 cfs 0.086 af Secondary=0.00 cfs 0.000 af Outflow=1.14 cfs 0.086 af
Pond RR Channel DA1: Rip Rap Channel DA1	Peak Elev=11.24' Storage=10 cf Inflow=1.14 cfs 0.086 af Discarded=0.01 cfs 0.004 af Primary=1.13 cfs 0.082 af Outflow=1.14 cfs 0.086 af

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Pond SIB-1: SIB-1

Peak Elev=10.35' Storage=970 cf Inflow=1.36 cfs 0.123 af
Discarded=0.55 cfs 0.123 af Secondary=0.00 cfs 0.000 af Outflow=0.55 cfs 0.123 af

Pond SIB-2: SIB-2

Peak Elev=23.13' Storage=854 cf Inflow=1.88 cfs 0.169 af
Discarded=0.10 cfs 0.090 af Secondary=1.77 cfs 0.077 af Outflow=1.87 cfs 0.167 af

Pond SIB-3: SIB-3

Peak Elev=16.10' Storage=288 cf Inflow=0.25 cfs 0.017 af
Discarded=0.03 cfs 0.016 af Secondary=0.00 cfs 0.000 af Outflow=0.03 cfs 0.016 af

Pond SIB-4: SIB-4

Peak Elev=25.32' Storage=828 cf Inflow=0.82 cfs 0.072 af
Discarded=0.21 cfs 0.068 af Secondary=0.00 cfs 0.000 af Outflow=0.21 cfs 0.068 af

Total Runoff Area = 5.886 ac Runoff Volume = 0.625 af Average Runoff Depth = 1.27"
62.95% Pervious = 3.705 ac 37.05% Impervious = 2.181 ac

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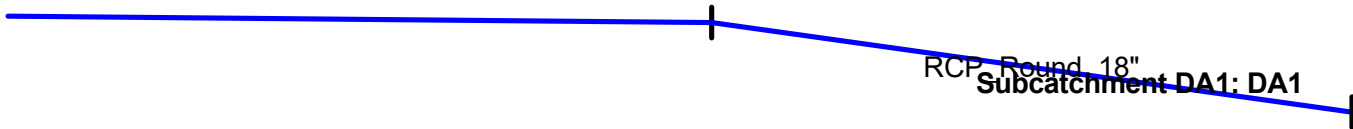
Summary for Subcatchment DA1: DA1

Runoff = 1.23 cfs @ 12.20 hrs, Volume= 0.122 af, Depth= 1.34"
 Routed to Pond SIB-1 : SIB-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-Year Rainfall=4.95"

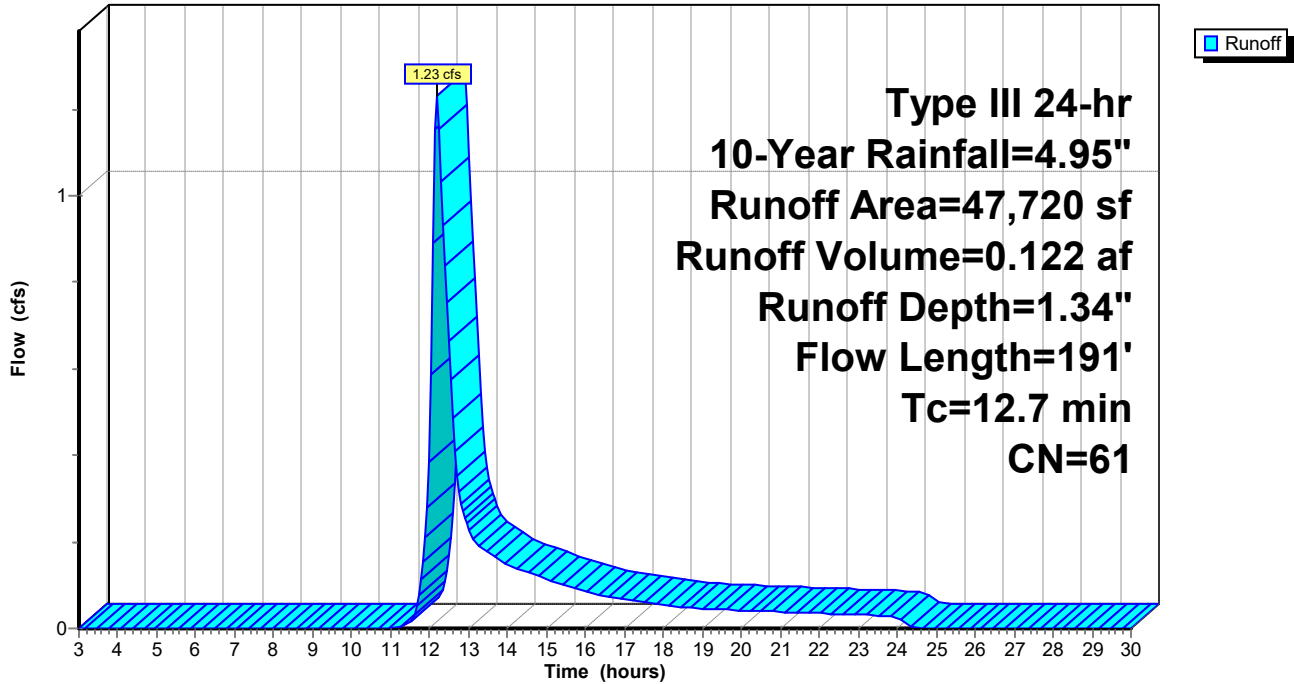
Area (sf)	CN	Description
* 17,477	98	
* 30,243	39	
47,720	61	Weighted Average
30,243		63.38% Pervious Area
17,477		36.62% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.6	100	0.0100	0.13		Sheet Flow, Grass: Short n= 0.150 P2= 3.35"
0.1	91	0.1500	23.02	40.68	Pipe Channel, RCP_Round 18" 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
12.7	191	Total			



Subcatchment DA1: DA1

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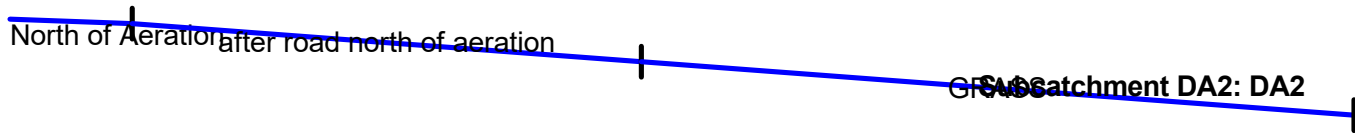
Summary for Subcatchment DA2: DA2

Runoff = 0.23 cfs @ 12.25 hrs, Volume= 0.035 af, Depth= 0.62"
 Routed to Pond SIB-2 : SIB-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-Year Rainfall=4.95"

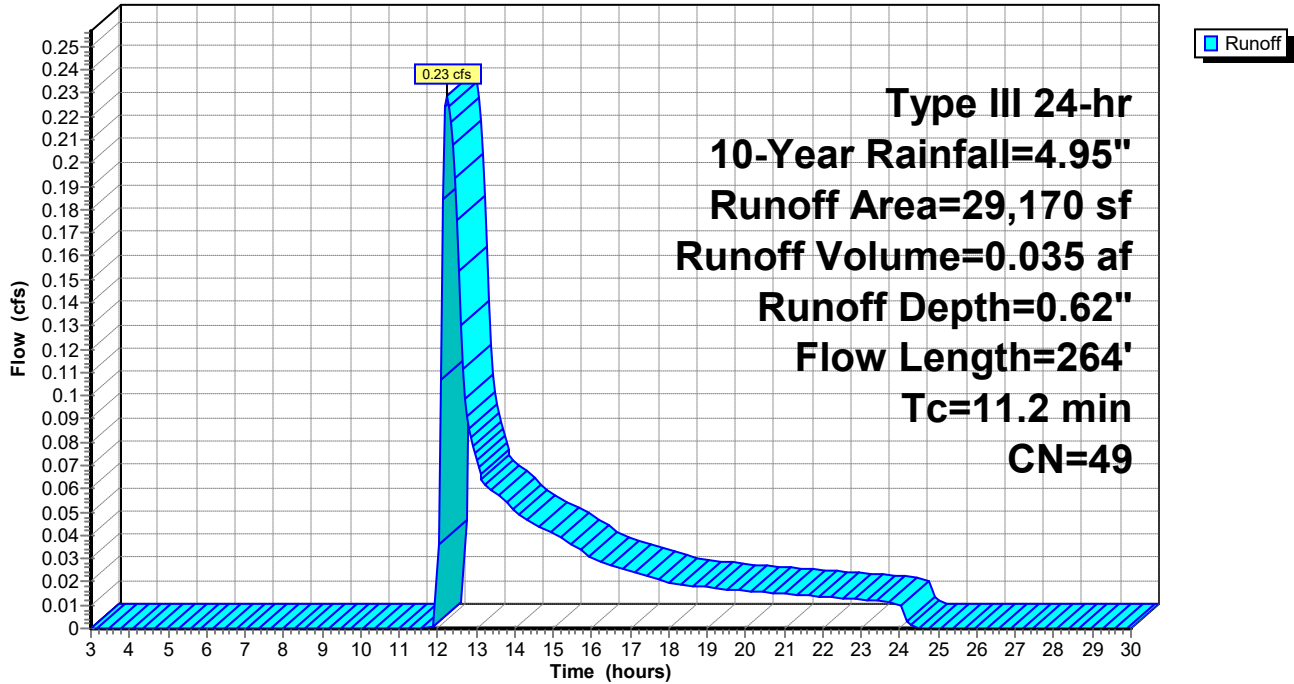
Area (sf)	CN	Description
* 5,035	98	Impervious
24,135	39	>75% Grass cover, Good, HSG A
29,170	49	Weighted Average
24,135		82.74% Pervious Area
5,035		17.26% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	24	0.0100	0.80		Sheet Flow, North of Aeration Smooth surfaces n= 0.011 P2= 3.35"
9.6	100	0.0200	0.17		Sheet Flow, after road north of aeration Grass: Short n= 0.150 P2= 3.35"
1.1	140	0.0200	2.12		Shallow Concentrated Flow, GRASS Grassed Waterway Kv= 15.0 fps
11.2	264	Total			



Subcatchment DA2: DA2

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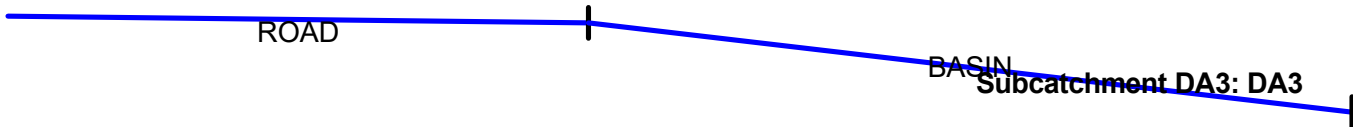
Summary for Subcatchment DA3: DA3

Runoff = 0.25 cfs @ 12.02 hrs, Volume= 0.017 af, Depth= 1.62"
 Routed to Pond SIB-3 : SIB-3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-Year Rainfall=4.95"

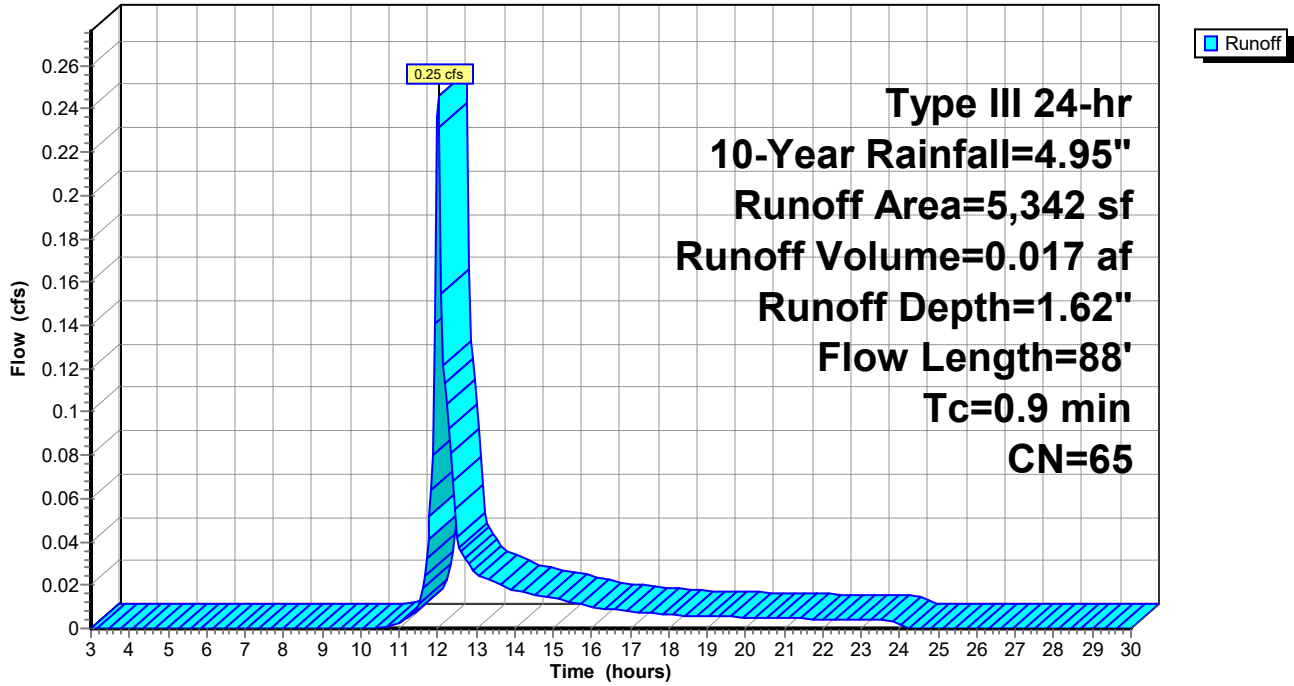
Area (sf)	CN	Description
* 2,394	98	IMPERVIOUS
2,948	39	>75% Grass cover, Good, HSG A
5,342	65	Weighted Average
2,948		55.19% Pervious Area
2,394		44.81% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	38	0.0100	0.88		Sheet Flow, ROAD Smooth surfaces n= 0.011 P2= 3.35"
0.2	50	0.1000	5.09		Shallow Concentrated Flow, BASIN Unpaved Kv= 16.1 fps
0.9	88	Total			



Subcatchment DA3: DA3

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Summary for Subcatchment DA4: DA4

Runoff = 0.25 cfs @ 12.15 hrs, Volume= 0.040 af, Depth= 0.52"
 Routed to Pond Ex. Basin DA4 : DA4 EX. BASIN

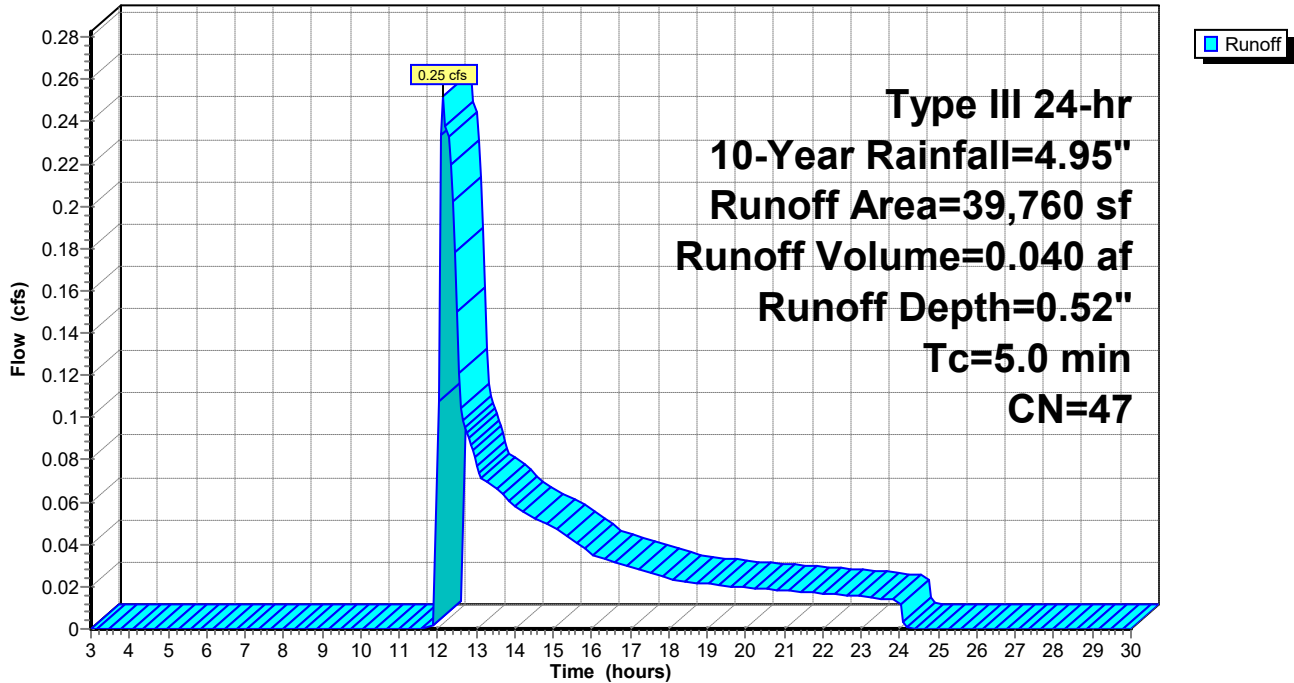
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-Year Rainfall=4.95"

Area (sf)	CN	Description
29,860	30	Brush, Good, HSG A
* 9,900	98	ROAD
39,760	47	Weighted Average
29,860		75.10% Pervious Area
9,900		24.90% Impervious Area

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

Subcatchment DA4: DA4

Hydrograph



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Type III 24-hr 10-Year Rainfall=4.95"

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Summary for Subcatchment DA4B: DA4B

Runoff = 0.82 cfs @ 12.10 hrs, Volume= 0.072 af, Depth= 0.96"
 Routed to Pond SIB-4 : SIB-4

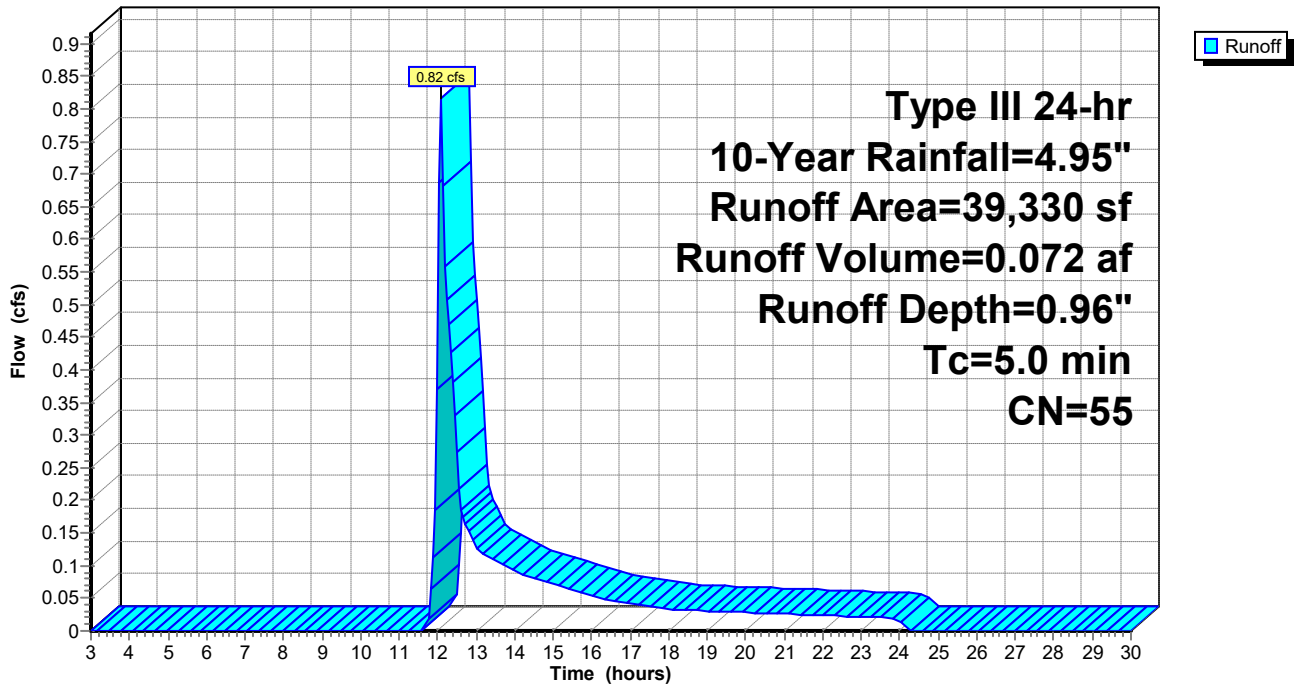
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-Year Rainfall=4.95"

Area (sf)	CN	Description
25,053	30	Brush, Good, HSG A
* 14,277	98	ROAD
39,330	55	Weighted Average
25,053		63.70% Pervious Area
14,277		36.30% Impervious Area

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

Subcatchment DA4B: DA4B

Hydrograph



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Type III 24-hr 10-Year Rainfall=4.95"

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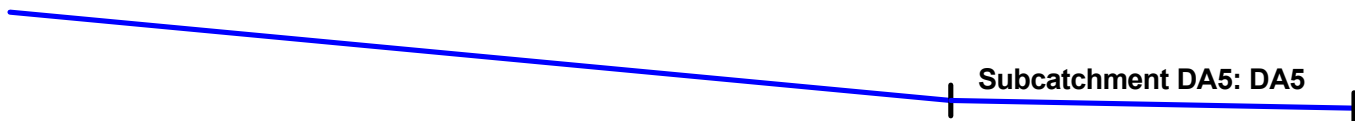
Summary for Subcatchment DA5: DA5

Runoff = 1.17 cfs @ 12.18 hrs, Volume= 0.114 af, Depth= 1.27"
 Routed to Pond CB DA5 : CB DA5

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-Year Rainfall=4.95"

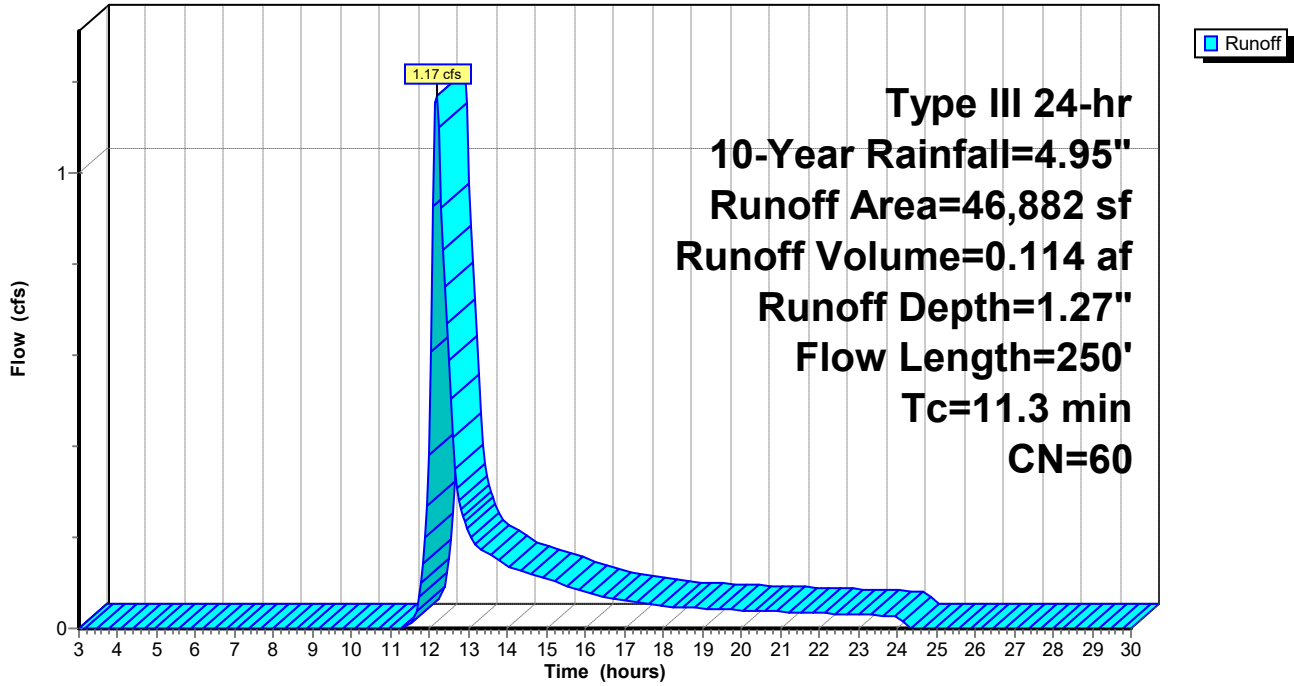
Area (sf)	CN	Description
* 16,312	98	ROAD
* 30,570	39	GRASSED AREA
46,882	60	Weighted Average
30,570		65.21% Pervious Area
16,312		34.79% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.3	175	0.0500	2.27		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.35"
10.0	75	0.0100	0.12		Sheet Flow, Grass: Short n= 0.150 P2= 3.35"
11.3	250	Total			



Subcatchment DA5: DA5

Hydrograph



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Summary for Subcatchment DA6: DA6

Runoff = 1.41 cfs @ 12.09 hrs, Volume= 0.102 af, Depth= 3.03"
 Routed to Pond SIB-2 : SIB-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-Year Rainfall=4.95"

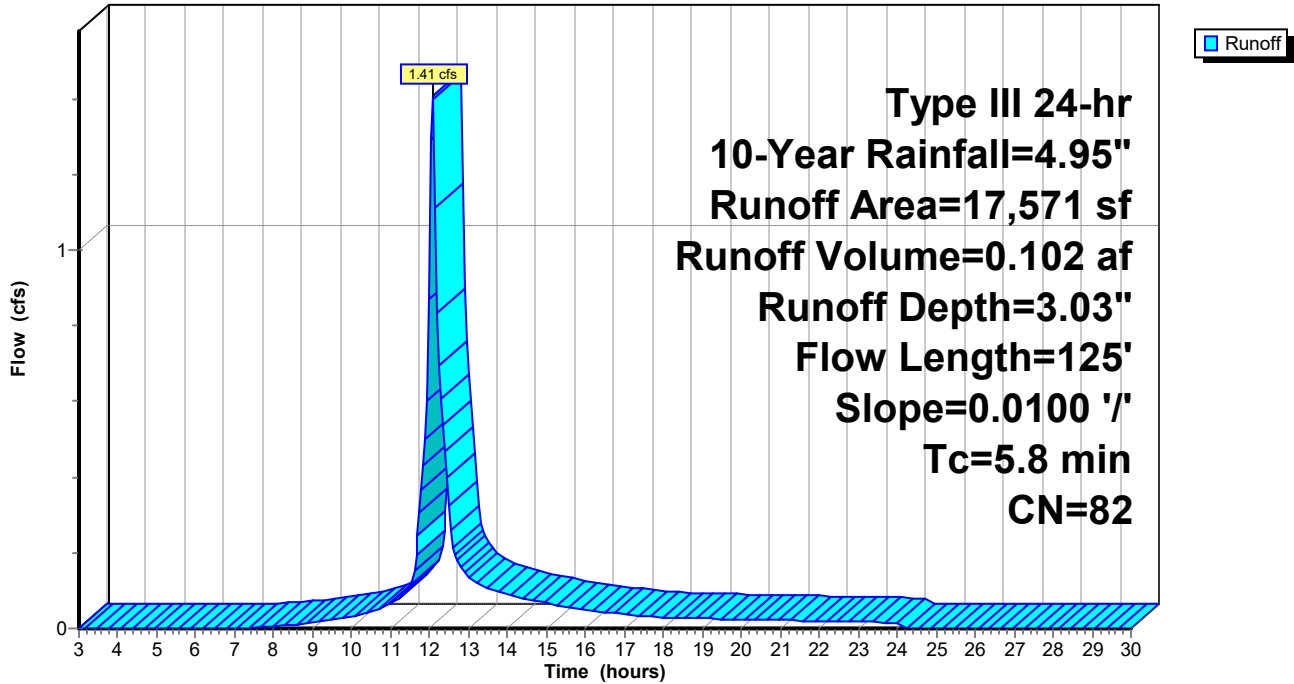
Area (sf)	CN	Description
* 12,762	98	
* 4,809	39	
17,571	82	Weighted Average
4,809		27.37% Pervious Area
12,762		72.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.6	100	0.0100	1.07		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.35"
4.2	25	0.0100	0.10		Sheet Flow, Grass: Short n= 0.150 P2= 3.35"
5.8	125	Total			



Subcatchment DA6: DA6

Hydrograph



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Type III 24-hr 10-Year Rainfall=4.95"

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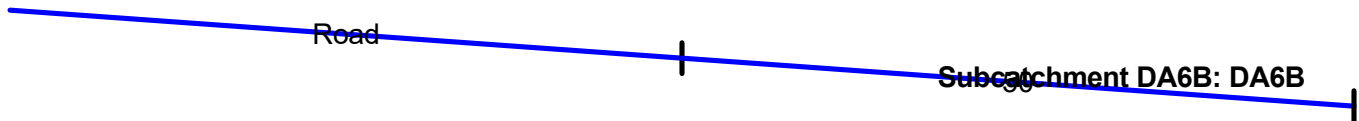
Summary for Subcatchment DA6B: DA6B

Runoff = 0.49 cfs @ 12.04 hrs, Volume= 0.032 af, Depth= 2.00"
 Routed to Pond SIB-2 : SIB-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-Year Rainfall=4.95"

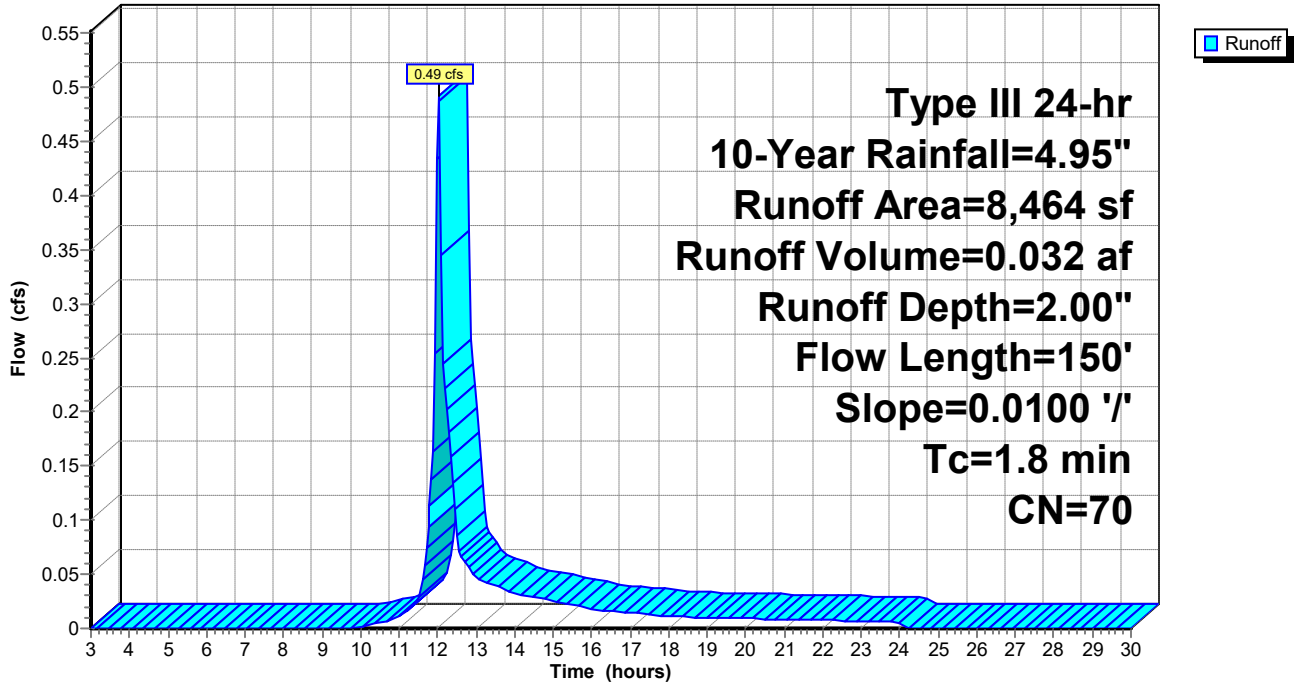
	Area (sf)	CN	Description
*	4,400	98	IMPERVIOUS
	4,064	39	>75% Grass cover, Good, HSG A
	8,464	70	Weighted Average
	4,064		48.02% Pervious Area
	4,400		51.98% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	75	0.0100	1.01		Sheet Flow, Road Smooth surfaces n= 0.011 P2= 3.35"
0.6	75	0.0100	2.03		Shallow Concentrated Flow, 50 Paved Kv= 20.3 fps
1.8	150	Total			



Subcatchment DA6B: DA6B

Hydrograph



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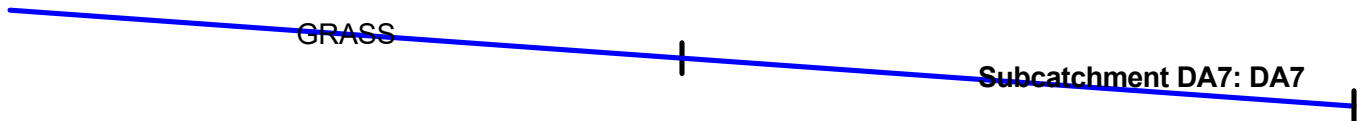
Summary for Subcatchment DA7: DA7

Runoff = 0.97 cfs @ 12.21 hrs, Volume= 0.091 af, Depth= 2.16"
 Routed to Pond CB DA7 : CB DA7

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-Year Rainfall=4.95"

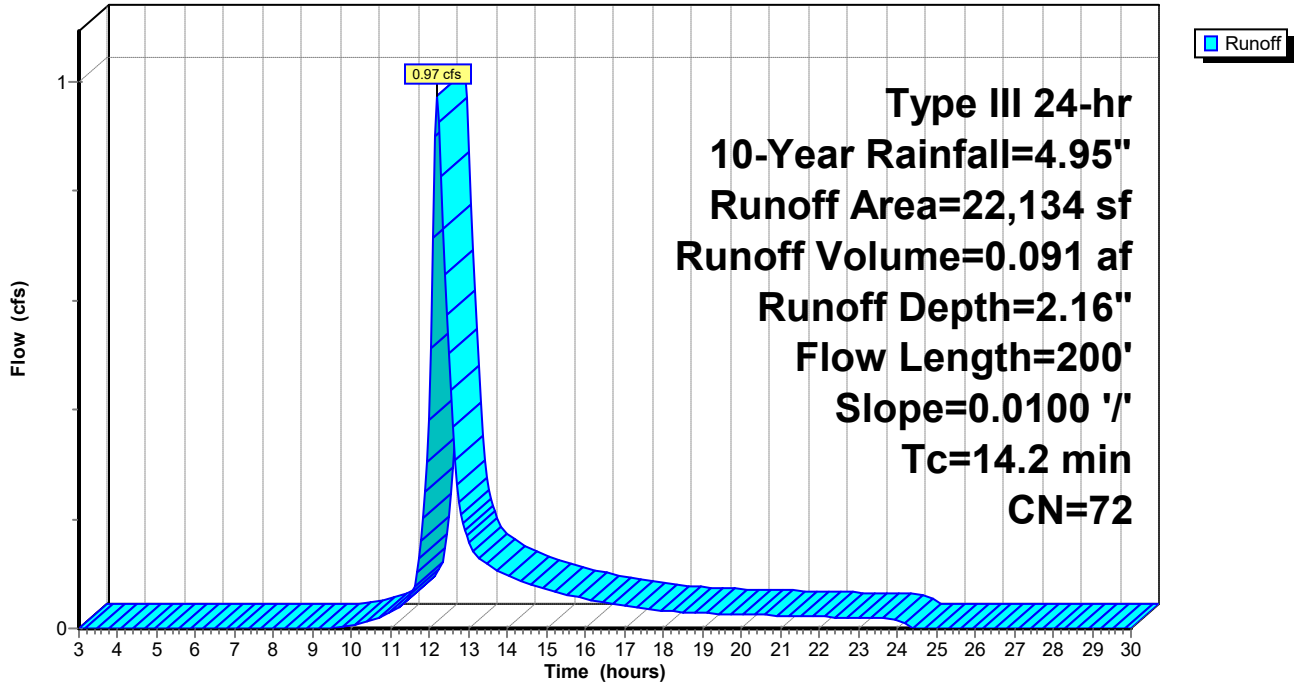
Area (sf)	CN	Description
9,701	39	>75% Grass cover, Good, HSG A
12,433	98	Paved parking, HSG A
22,134	72	Weighted Average
9,701		43.83% Pervious Area
12,433		56.17% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.6	100	0.0100	0.13		Sheet Flow, GRASS Grass: Short n= 0.150 P2= 3.35"
1.6	100	0.0100	1.07		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.35"
14.2	200	Total			



Subcatchment DA7: DA7

Hydrograph



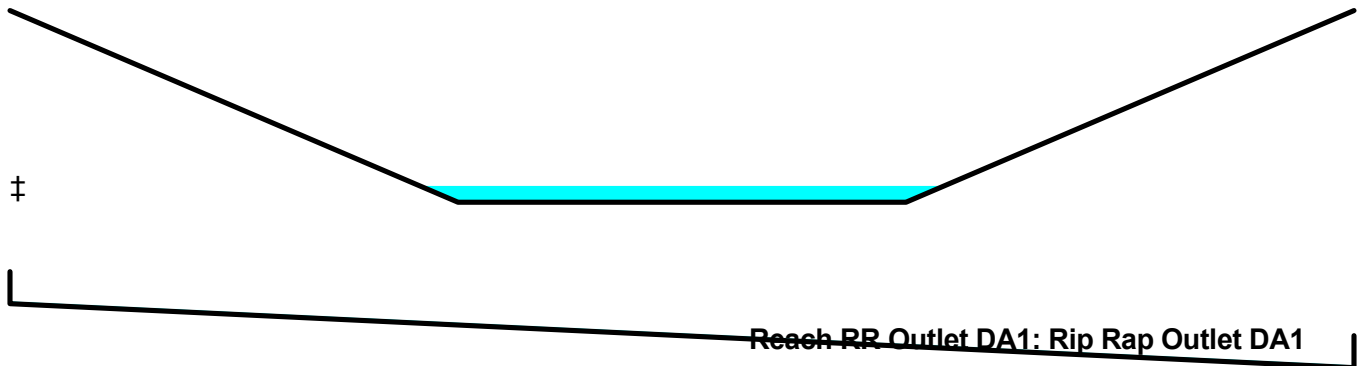
Summary for Reach RR Outlet DA1: Rip Rap Outlet DA1

Inflow Area = 1.076 ac, 34.79% Impervious, Inflow Depth = 0.01" for 10-Year event
Inflow = 0.13 cfs @ 12.18 hrs, Volume= 0.001 af, Incl. 1.00 cfs Inflow Loss
Outflow = 0.12 cfs @ 12.19 hrs, Volume= 0.001 af, Atten= 9%, Lag= 0.6 min
Routed to Pond SIB-1 : SIB-1

Routing by Stor-Ind+Trans method, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs / 3
Max. Velocity= 0.56 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 0.28 fps, Avg. Travel Time= 0.9 min

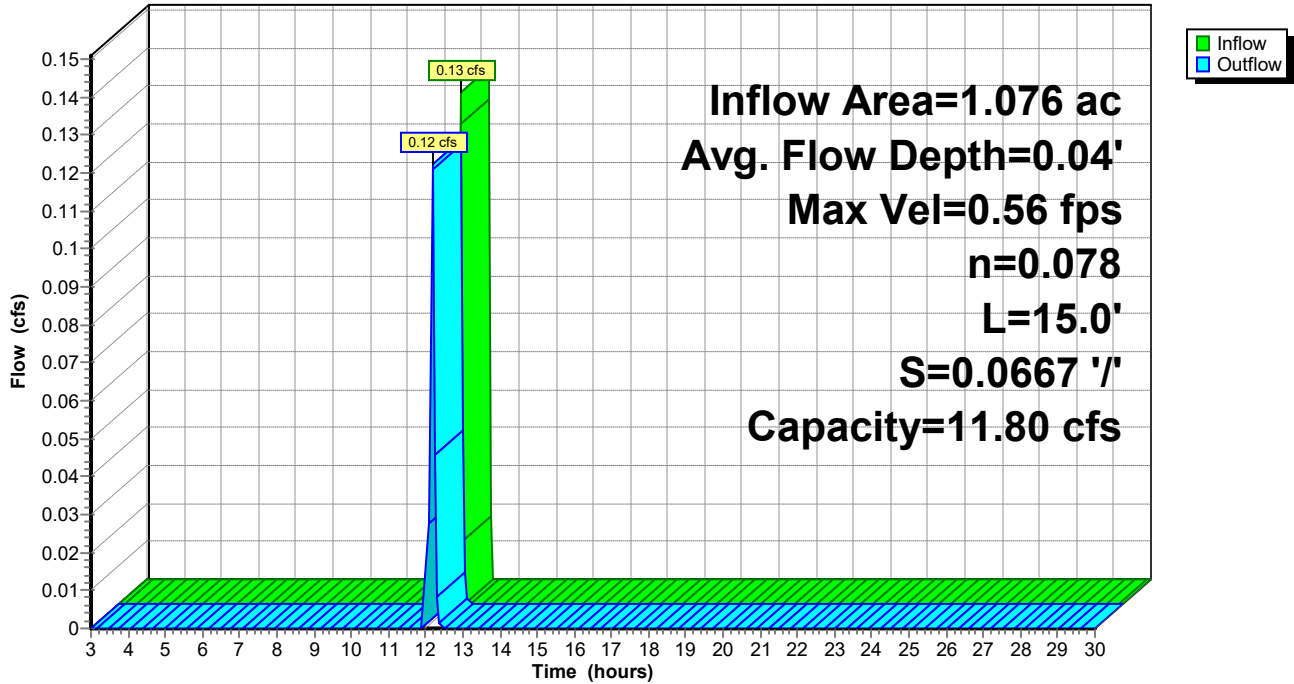
Peak Storage= 3 cf @ 12.19 hrs
Average Depth at Peak Storage= 0.04' , Surface Width= 5.85'
Bank-Full Depth= 0.50' Flow Area= 5.0 sf, Capacity= 11.80 cfs

5.00' x 0.50' deep channel, n= 0.078 Riprap, 12-inch
Side Slope Z-value= 10.0 ' / ' Top Width= 15.00'
Length= 15.0' Slope= 0.0667 ' / '
Inlet Invert= 10.80', Outlet Invert= 9.80'



Reach RR Outlet DA1: Rip Rap Outlet DA1

Hydrograph



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Summary for Pond CB DA5: CB DA5

Inflow Area = 1.076 ac, 34.79% Impervious, Inflow Depth = 1.27" for 10-Year event
 Inflow = 1.17 cfs @ 12.18 hrs, Volume= 0.114 af
 Outflow = 1.17 cfs @ 12.18 hrs, Volume= 0.114 af, Atten= 0%, Lag= 0.2 min
 Discarded = 0.03 cfs @ 12.18 hrs, Volume= 0.028 af
 Primary = 1.14 cfs @ 12.18 hrs, Volume= 0.086 af
 Routed to Pond MH 1 : MH1
 Secondary = 0.00 cfs @ 3.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs / 4
 Peak Elev= 16.84' @ 12.18 hrs Surf.Area= 28 sf Storage= 159 cf

Plug-Flow detention time= 22.9 min calculated for 0.114 af (100% of inflow)
 Center-of-Mass det. time= 23.7 min (904.8 - 881.1)

Volume	Invert	Avail.Storage	Storage Description
#1	11.23'	302 cf	6.00'D x 10.67'H Vertical Cone/Cylinder
#2	22.00'	6,068 cf	Custom Stage Data (Conic) Listed below (Recalc)
		6,370 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
22.00	2,240	0	0	2,240
23.00	11,000	6,068	6,068	11,004

Device	Routing	Invert	Outlet Devices
#1	Discarded	11.23'	8.270 in/hr Exfiltration over Wetted area Phase-In= 0.01'
#2	Primary	16.30'	18.0" Round CMP_Round 18" L= 25.6' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 16.30' / 14.80' S= 0.0586 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf
#3	Secondary	22.90'	70.0" x 140.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#4	Secondary	21.80'	2.0" x 2.0" Horiz. Orifice/Grate X 8.00 columns X 8 rows C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.03 cfs @ 12.18 hrs HW=16.84' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.03 cfs)

Primary OutFlow Max=1.12 cfs @ 12.18 hrs HW=16.84' (Free Discharge)
 ↑2=CMP_Round 18" (Inlet Controls 1.12 cfs @ 1.97 fps)

Secondary OutFlow Max=0.00 cfs @ 3.00 hrs HW=11.23' (Free Discharge)
 ↑3=Orifice/Grate (Controls 0.00 cfs)
 ↑4=Orifice/Grate (Controls 0.00 cfs)

Wareham Post Construction

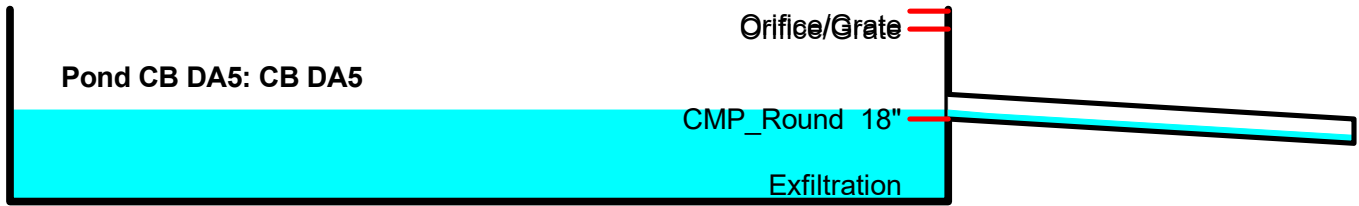
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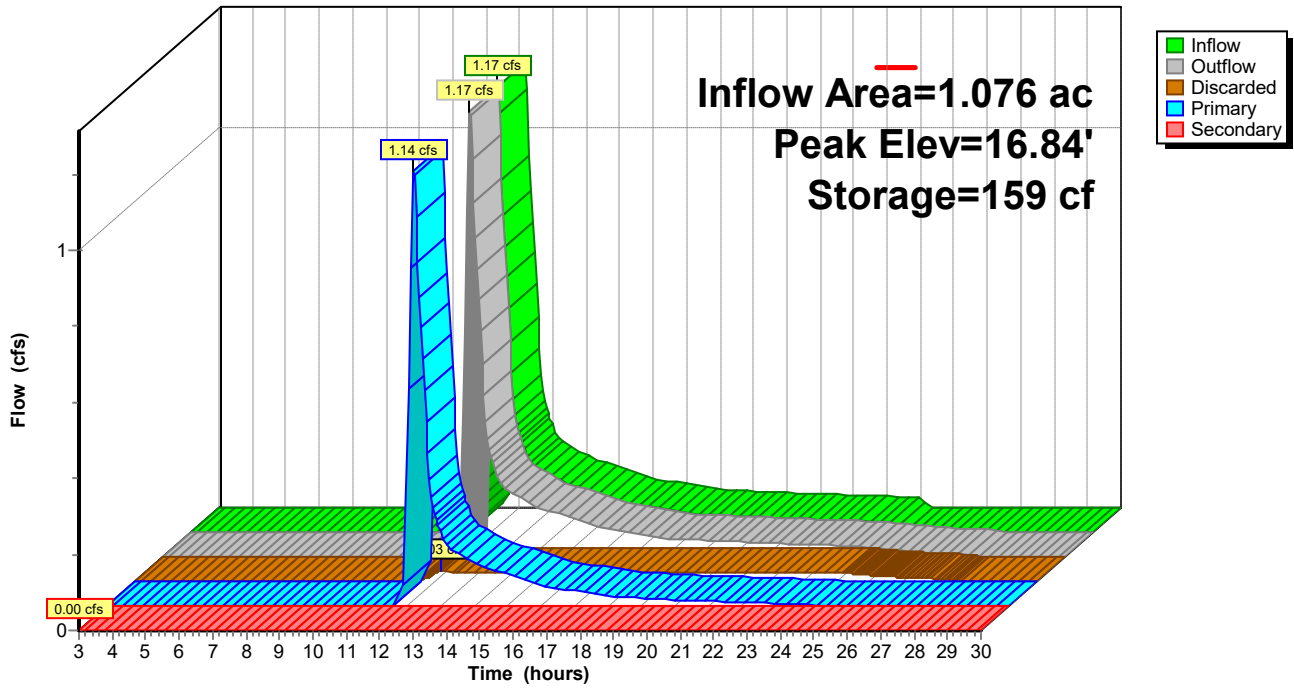
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Pond CB DA5: CB DA5

Hydrograph



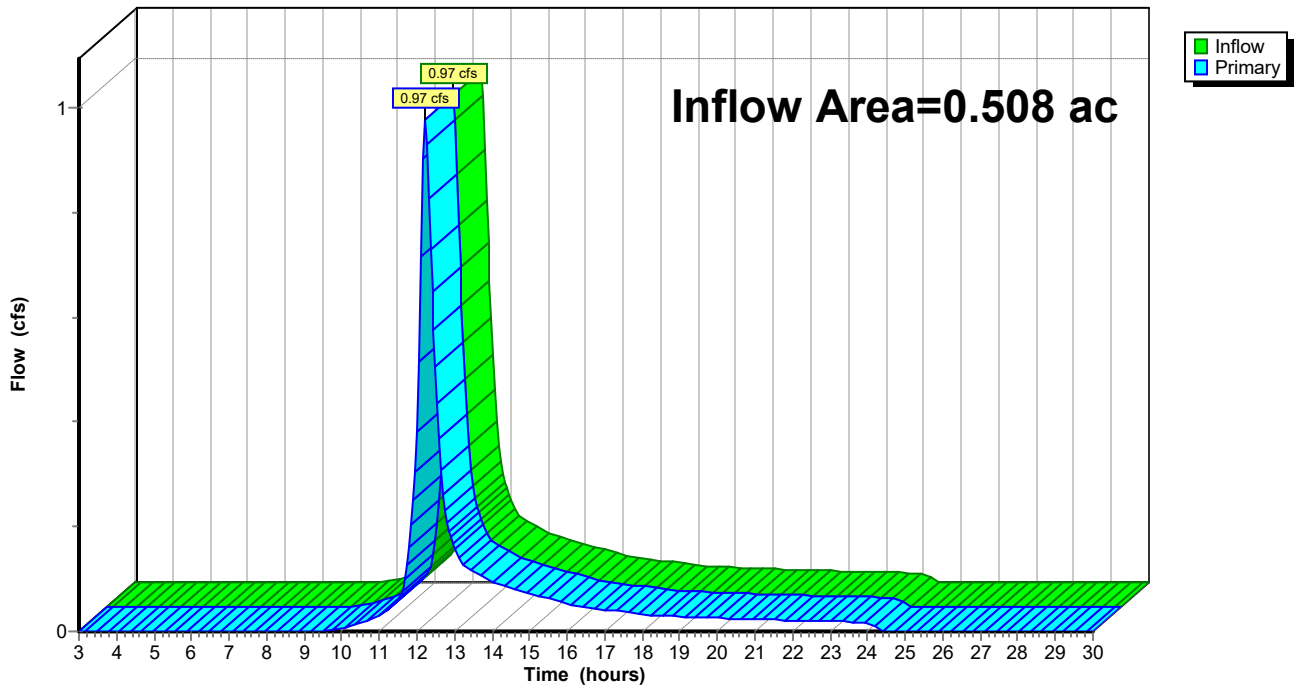
Summary for Pond CB DA7: CB DA7

Inflow Area = 0.508 ac, 56.17% Impervious, Inflow Depth = 2.16" for 10-Year event
Inflow = 0.97 cfs @ 12.21 hrs, Volume= 0.091 af
Primary = 0.97 cfs @ 12.21 hrs, Volume= 0.091 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs

Pond CB DA7: CB DA7

Hydrograph



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Summary for Pond Ex. Basin DA4: DA4 EX. BASIN

Inflow Area = 0.913 ac, 24.90% Impervious, Inflow Depth = 0.52" for 10-Year event
 Inflow = 0.25 cfs @ 12.15 hrs, Volume= 0.040 af
 Outflow = 0.09 cfs @ 12.85 hrs, Volume= 0.040 af, Atten= 65%, Lag= 41.8 min
 Discarded = 0.09 cfs @ 12.85 hrs, Volume= 0.040 af
 Secondary = 0.00 cfs @ 3.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs / 3
 Peak Elev= 16.20' @ 12.85 hrs Surf.Area= 1,563 sf Storage= 256 cf

Plug-Flow detention time= 23.0 min calculated for 0.039 af (100% of inflow)
 Center-of-Mass det. time= 23.0 min (955.9 - 933.0)

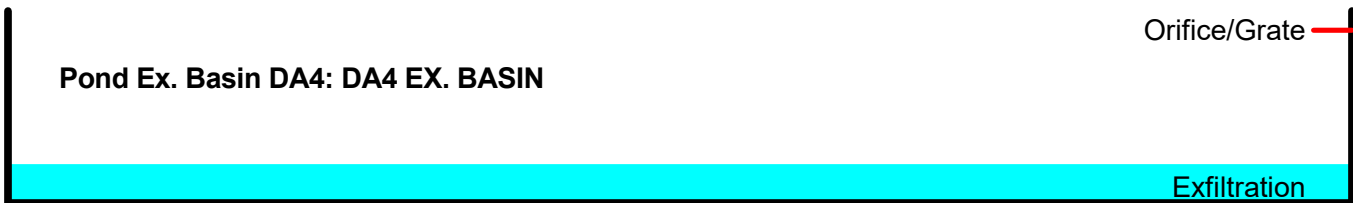
Volume	Invert	Avail.Storage	Storage Description
#1	16.00'	2,708 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
16.00	1,025	0	0	1,025
17.00	4,866	2,708	2,708	4,870

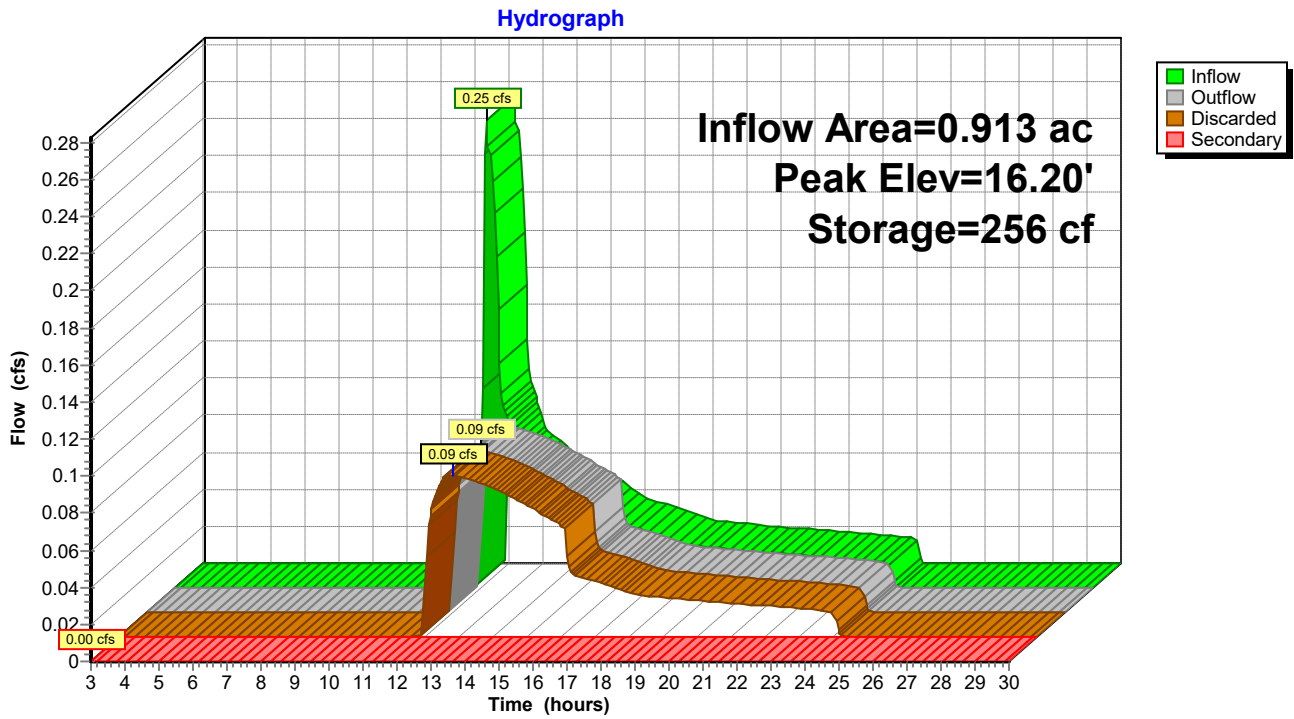
Device	Routing	Invert	Outlet Devices
#1	Discarded	16.00'	2.410 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Secondary	16.90'	360.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.09 cfs @ 12.85 hrs HW=16.20' (Free Discharge)
 ↑1=**Exfiltration** (Exfiltration Controls 0.09 cfs)

Secondary OutFlow Max=0.00 cfs @ 3.00 hrs HW=16.00' (Free Discharge)
 ↑2=**Orifice/Grate** (Controls 0.00 cfs)



Pond Ex. Basin DA4: DA4 EX. BASIN



Summary for Pond MH 1: MH1

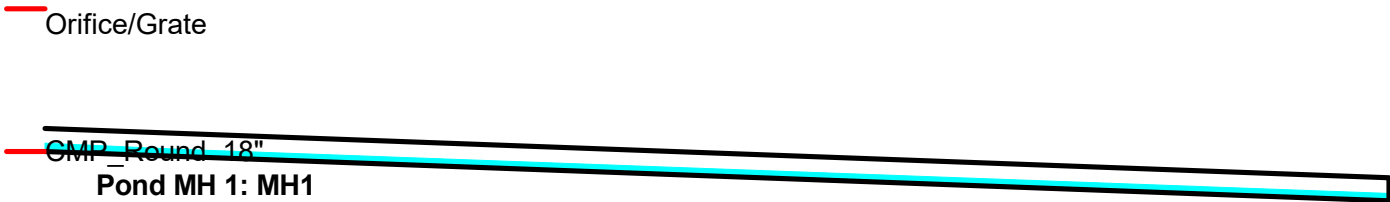
Inflow Area = 1.076 ac, 34.79% Impervious, Inflow Depth = 0.96" for 10-Year event
 Inflow = 1.14 cfs @ 12.18 hrs, Volume= 0.086 af
 Outflow = 1.14 cfs @ 12.18 hrs, Volume= 0.086 af, Atten= 0%, Lag= 0.0 min
 Primary = 1.14 cfs @ 12.18 hrs, Volume= 0.086 af
 Routed to Pond MH2 : MH2
 Secondary = 0.00 cfs @ 3.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs
 Peak Elev= 15.24' @ 12.18 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	14.70'	18.0" Round CMP_Round 18" L= 156.1' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 14.70' / 11.50' S= 0.0205 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf
#2	Secondary	24.00'	24.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

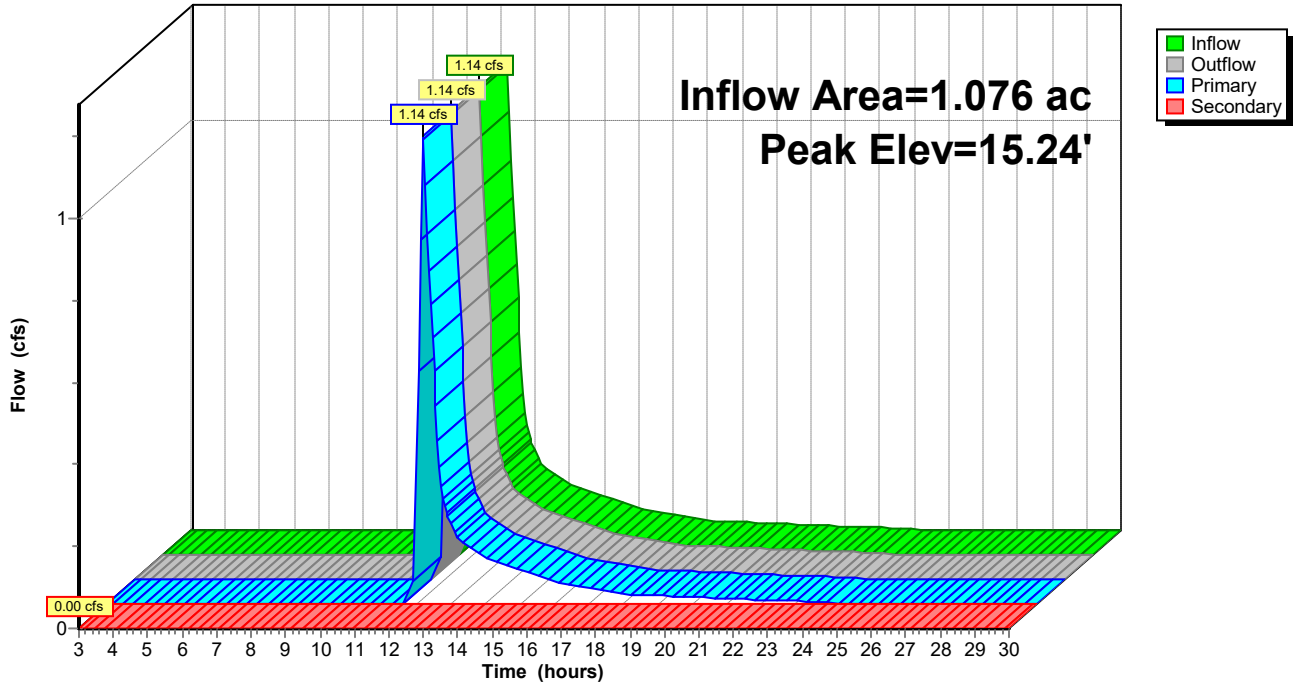
Primary OutFlow Max=1.12 cfs @ 12.18 hrs HW=15.24' (Free Discharge)
 ↑1=CMP_Round 18" (Inlet Controls 1.12 cfs @ 1.97 fps)

Secondary OutFlow Max=0.00 cfs @ 3.00 hrs HW=14.70' (Free Discharge)
 ↑2=Orifice/Grate (Controls 0.00 cfs)



Pond MH 1: MH1

Hydrograph



Summary for Pond MH2: MH2

Inflow Area = 1.076 ac, 34.79% Impervious, Inflow Depth = 0.96" for 10-Year event
 Inflow = 1.14 cfs @ 12.18 hrs, Volume= 0.086 af
 Outflow = 1.14 cfs @ 12.18 hrs, Volume= 0.086 af, Atten= 0%, Lag= 0.0 min
 Primary = 1.14 cfs @ 12.18 hrs, Volume= 0.086 af
 Routed to Pond RR Channel DA1 : Rip Rap Channel DA1
 Secondary = 0.00 cfs @ 3.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs
 Peak Elev= 11.27' @ 12.18 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	11.40'	18.0" Round CMP_Round 18" L= 118.9' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 11.40' / 10.80' S= 0.0050 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf
#2	Secondary	24.00'	24.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Primary	10.80'	15.00' long x 6.00' breadth x 1.00' high Rock Fill Rock Diam.= 12.000", S.D.= 1.000", Voids= 40.0%

Primary OutFlow Max=1.12 cfs @ 12.18 hrs HW=11.26' (Free Discharge)

- ↑ 1=CMP_Round 18" (Controls 0.00 cfs)
- ↑ 3=Rock Fill (Rockfill Controls 1.12 cfs @ 0.32 fps)

Secondary OutFlow Max=0.00 cfs @ 3.00 hrs HW=10.80' (Free Discharge)

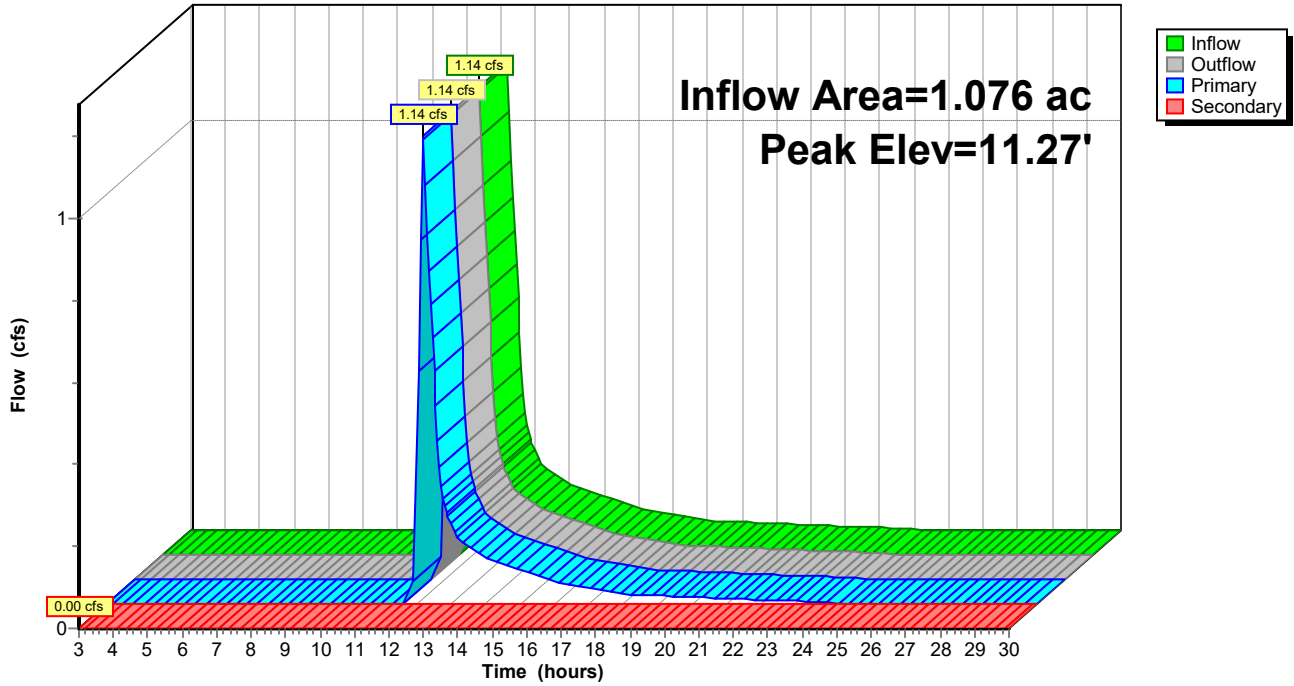
- ↑ 2=Orifice/Grate (Controls 0.00 cfs)

Orifice/Grate

~~RR Channel MH2: MH2~~

Pond MH2: MH2

Hydrograph



Summary for Pond RR Channel DA1: Rip Rap Channel DA1

Inflow Area = 1.076 ac, 34.79% Impervious, Inflow Depth = 0.96" for 10-Year event
 Inflow = 1.14 cfs @ 12.18 hrs, Volume= 0.086 af
 Outflow = 1.14 cfs @ 12.18 hrs, Volume= 0.086 af, Atten= 0%, Lag= 0.1 min
 Discarded = 0.01 cfs @ 12.18 hrs, Volume= 0.004 af
 Primary = 1.13 cfs @ 12.18 hrs, Volume= 0.082 af

Routed to Reach RR Outlet DA1 : Rip Rap Outlet DA1

Routing by Stor-Ind method, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs / 3
 Peak Elev= 11.24' @ 12.18 hrs Surf.Area= 26 sf Storage= 10 cf

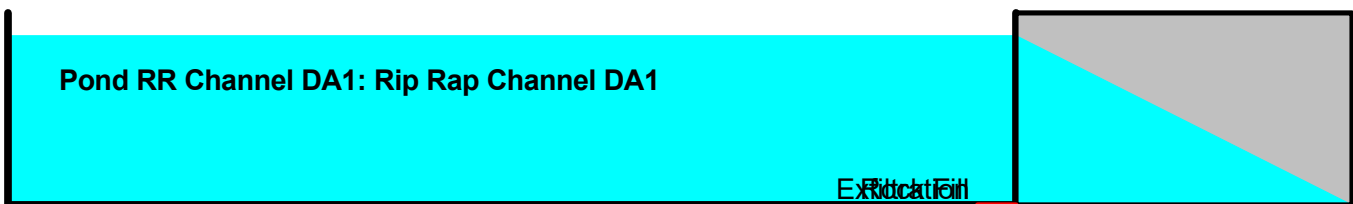
Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 0.2 min (832.3 - 832.0)

Volume	Invert	Avail.Storage	Storage Description
#1	10.80'	10 cf	60.0"W x 6.0"H x 15.00'L Parabolic Arch 25 cf Overall x 40.0% Voids

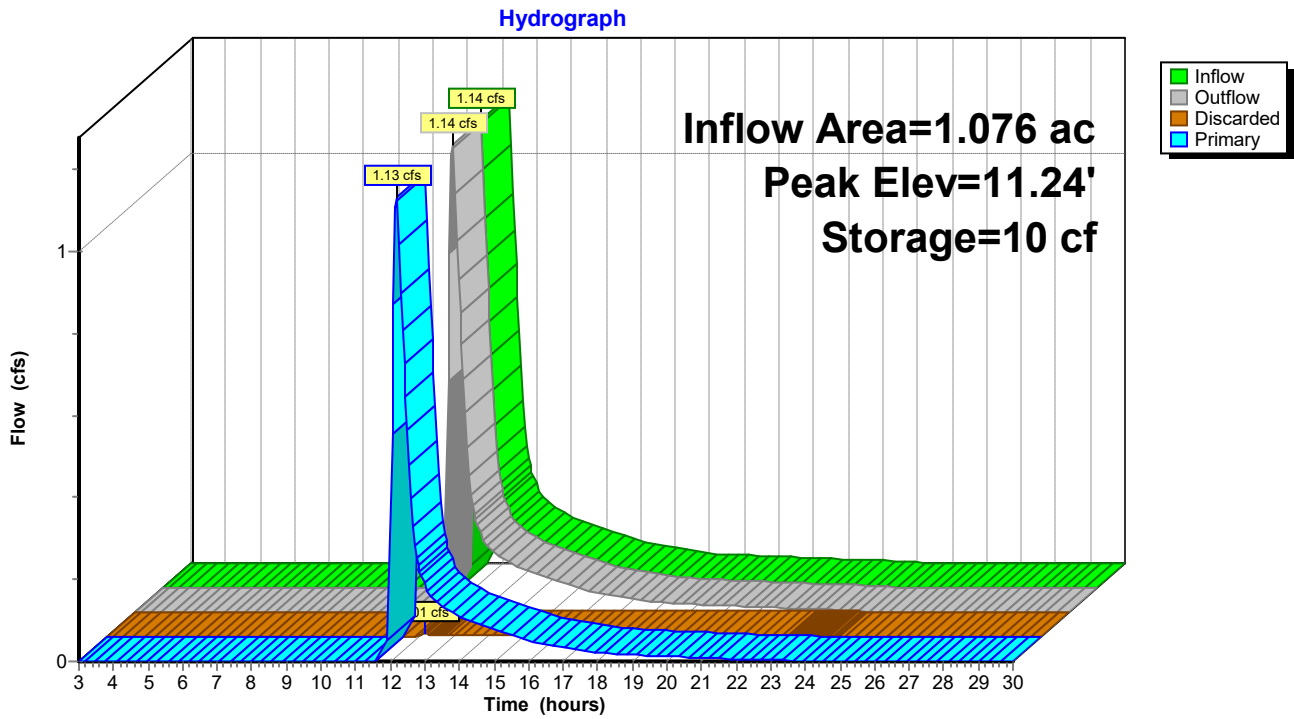
Device	Routing	Invert	Outlet Devices
#1	Discarded	10.80'	2.410 in/hr Exfiltration over Wetted area Phase-In= 0.01'
#2	Primary	10.80'	15.00' long x 5.00' breadth x 0.50' high Rock Fill Rock Diam.= 12.000", S.D.= 1.000", Voids= 40.0%

Discarded OutFlow Max=0.01 cfs @ 12.18 hrs HW=11.24' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=1.12 cfs @ 12.18 hrs HW=11.24' (Free Discharge)
 ↑2=Rock Fill (Rockfill Controls 1.12 cfs @ 0.34 fps)



Pond RR Channel DA1: Rip Rap Channel DA1



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Summary for Pond SIB-1: SIB-1

Inflow Area = 2.172 ac, 35.72% Impervious, Inflow Depth = 0.68" for 10-Year event
 Inflow = 1.36 cfs @ 12.20 hrs, Volume= 0.123 af
 Outflow = 0.55 cfs @ 12.56 hrs, Volume= 0.123 af, Atten= 59%, Lag= 22.0 min
 Discarded = 0.55 cfs @ 12.56 hrs, Volume= 0.123 af
 Secondary = 0.00 cfs @ 3.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs
 Peak Elev= 10.35' @ 12.56 hrs Surf.Area= 2,881 sf Storage= 970 cf

Plug-Flow detention time= 16.2 min calculated for 0.123 af (100% of inflow)
 Center-of-Mass det. time= 16.2 min (894.2 - 878.0)

Volume	Invert	Avail.Storage	Storage Description		
#1	10.00'	123,310 cf	Custom Stage Data (Conic) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)	
10.00	2,664	0	0	2,664	
11.00	3,306	2,979	2,979	3,334	
12.00	4,005	3,650	6,629	4,066	
13.00	4,760	4,377	11,006	4,856	
14.00	5,572	5,161	16,167	5,707	
15.00	6,440	6,001	22,168	6,617	
16.00	7,365	6,897	29,065	7,588	
17.00	8,347	7,851	36,916	8,619	
18.00	9,385	8,861	45,777	9,709	
19.00	10,480	9,927	55,704	10,860	
20.00	11,630	11,050	66,754	12,069	
21.00	12,837	12,229	78,983	13,338	
22.00	14,101	13,464	92,447	14,667	
23.00	15,422	14,757	107,203	16,057	
24.00	16,800	16,106	123,310	17,506	

Device	Routing	Invert	Outlet Devices	
#1	Discarded	10.00'	8.270 in/hr Exfiltration over Wetted area	Phase-In= 0.01'
#2	Secondary	23.90'	360.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads	

Discarded OutFlow Max=0.55 cfs @ 12.56 hrs HW=10.35' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.55 cfs)

Secondary OutFlow Max=0.00 cfs @ 3.00 hrs HW=10.00' (Free Discharge)
 ↑2=Orifice/Grate (Controls 0.00 cfs)

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Type III 24-hr 10-Year Rainfall=4.95"

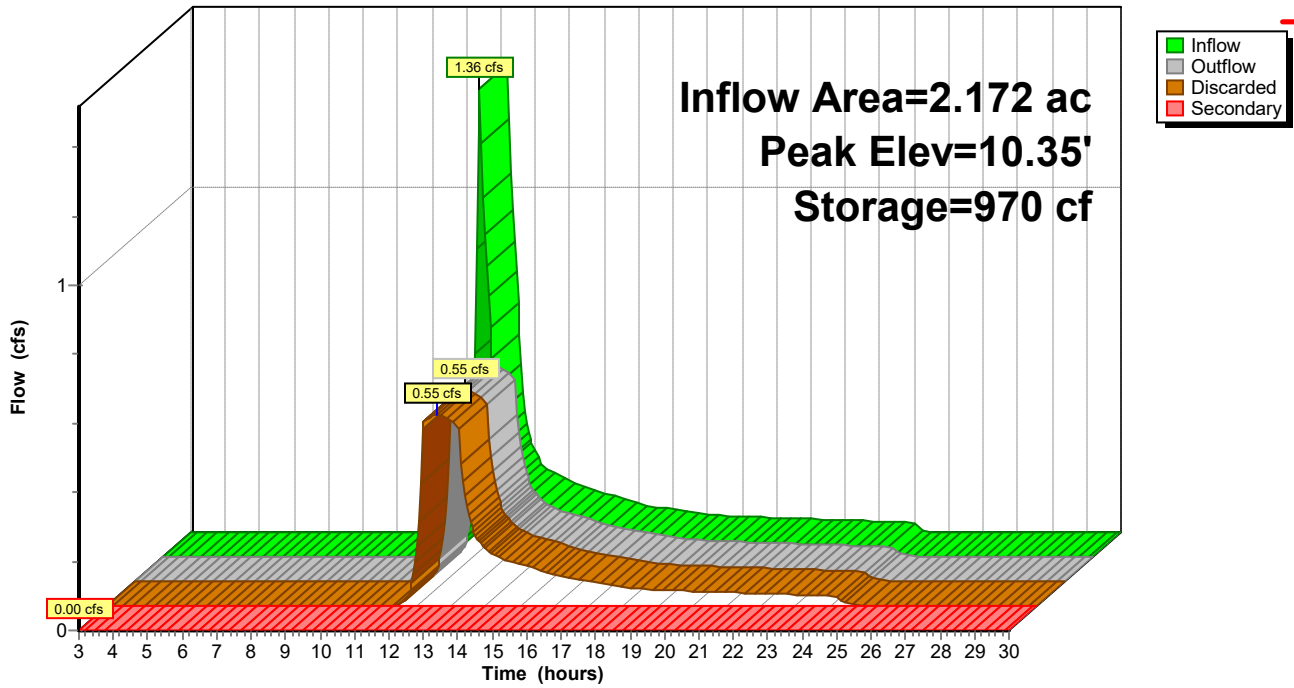
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Pond SIB-1: SIB-1

Hydrograph



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Summary for Pond SIB-2: SIB-2

Inflow Area = 1.267 ac, 40.21% Impervious, Inflow Depth = 1.60" for 10-Year event
 Inflow = 1.88 cfs @ 12.08 hrs, Volume= 0.169 af
 Outflow = 1.87 cfs @ 12.08 hrs, Volume= 0.167 af, Atten= 1%, Lag= 0.2 min
 Discarded = 0.10 cfs @ 11.95 hrs, Volume= 0.090 af
 Secondary = 1.77 cfs @ 12.08 hrs, Volume= 0.077 af

Routing by Stor-Ind method, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs / 4
 Peak Elev= 23.13' @ 12.09 hrs Surf.Area= 359 sf Storage= 854 cf

Plug-Flow detention time= 86.4 min calculated for 0.167 af (99% of inflow)
 Center-of-Mass det. time= 80.4 min (924.7 - 844.4)

Volume	Invert	Avail.Storage	Storage Description
#1	13.96'	299 cf	10.00'W x 24.00'L x 6.00'H Prismatic 1,440 cf Overall - 693 cf Embedded = 747 cf x 40.0% Voids
#2	13.96'	509 cf	6.00'D x 6.00'H Vertical Cone/Cylinder x 3 Inside #1 693 cf Overall - 6.0" Wall Thickness = 509 cf
#3	19.96'	28 cf	2.00'D x 3.00'H Vertical Cone/Cylinder x 3 -Impervious
#4	22.96'	878 cf	Custom Stage Data (Conic) Listed below (Recalc)
		1,714 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
22.96	83	0	0	83
24.00	393	228	228	398
25.00	947	650	878	959

Device	Routing	Invert	Outlet Devices
#1	Secondary	23.00'	2.0" x 2.0" Horiz. Orifice/Grate X 6.00 columns X 6 rows C= 0.600 Limited to weir flow at low heads
#2	Discarded	13.96'	8.270 in/hr Exfiltration over Wetted area from 13.96' - 23.00' Excluded Wetted area = 240 sf Phase-In= 0.01'

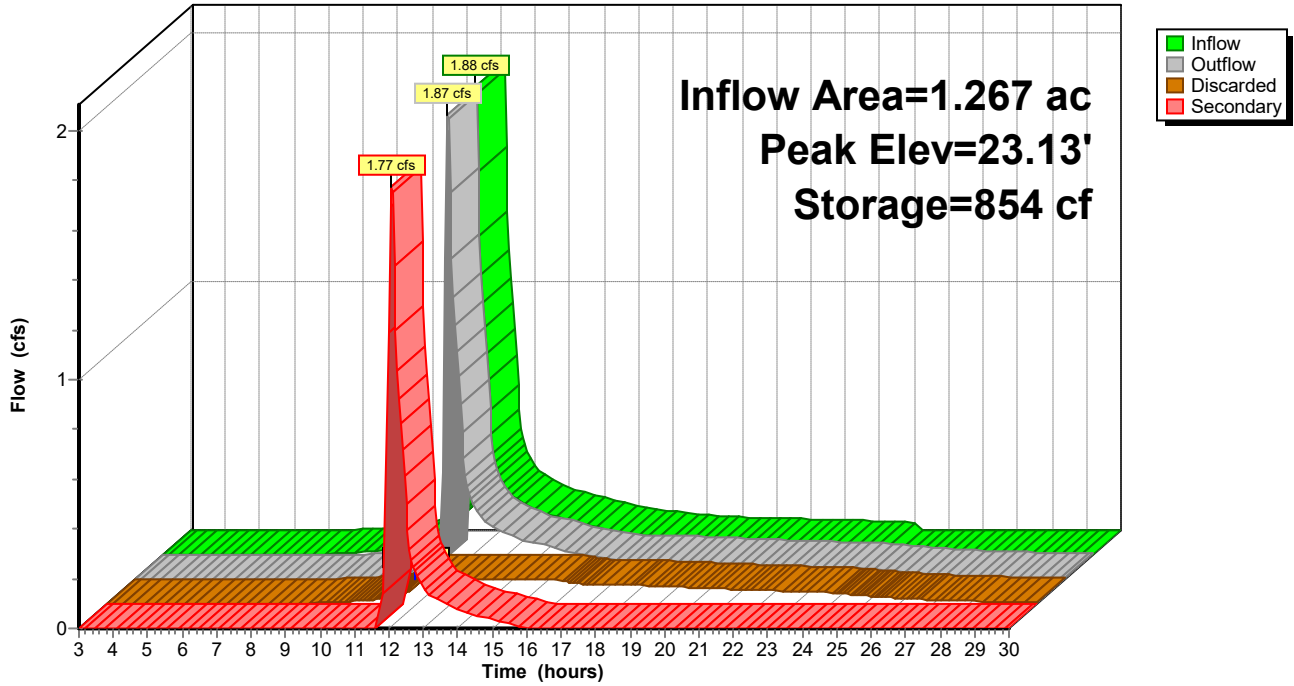
Discarded OutFlow Max=0.10 cfs @ 11.95 hrs HW=23.05' (Free Discharge)
 ↑2=Exfiltration (Exfiltration Controls 0.10 cfs)

Secondary OutFlow Max=1.74 cfs @ 12.08 hrs HW=23.13' (Free Discharge)
 ↑1=Orifice/Grate (Orifice Controls 1.74 cfs @ 1.74 fps)



Pond SIB-2: SIB-2

Hydrograph



Summary for Pond SIB-3: SIB-3

Inflow Area = 0.123 ac, 44.81% Impervious, Inflow Depth = 1.62" for 10-Year event
 Inflow = 0.25 cfs @ 12.02 hrs, Volume= 0.017 af
 Outflow = 0.03 cfs @ 12.90 hrs, Volume= 0.016 af, Atten= 89%, Lag= 52.5 min
 Discarded = 0.03 cfs @ 12.90 hrs, Volume= 0.016 af
 Secondary = 0.00 cfs @ 3.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs / 4
 Peak Elev= 16.10' @ 12.90 hrs Surf.Area= 240 sf Storage= 288 cf

Plug-Flow detention time= 168.3 min calculated for 0.016 af (99% of inflow)
 Center-of-Mass det. time= 163.1 min (1,019.9 - 856.8)

Volume	Invert	Avail.Storage	Storage Description
#1	13.96'	299 cf	10.00'W x 24.00'L x 6.00'H Prismaoid 1,440 cf Overall - 693 cf Embedded = 747 cf x 40.0% Voids
#2	13.96'	509 cf	6.00'D x 6.00'H Vertical Cone/Cylinder x 3 Inside #1 693 cf Overall - 6.0" Wall Thickness = 509 cf
#3	19.96'	28 cf	2.00'D x 3.00'H Vertical Cone/Cylinder x 3 -Impervious
#4	22.96'	1,578 cf	Custom Stage Data (Irregular) Listed below (Recalc)
		2,414 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
22.96	817	126.0	0	0	817
24.00	2,350	206.0	1,578	1,578	2,938

Device	Routing	Invert	Outlet Devices
#1	Secondary	23.00'	2.0" x 2.0" Horiz. Orifice/Grate X 6.00 columns X 6 rows C= 0.600 Limited to weir flow at low heads
#2	Discarded	13.96'	8.270 in/hr Exfiltration over Wetted area from 13.96' - 23.00' Excluded Wetted area = 240 sf Phase-In= 0.01'

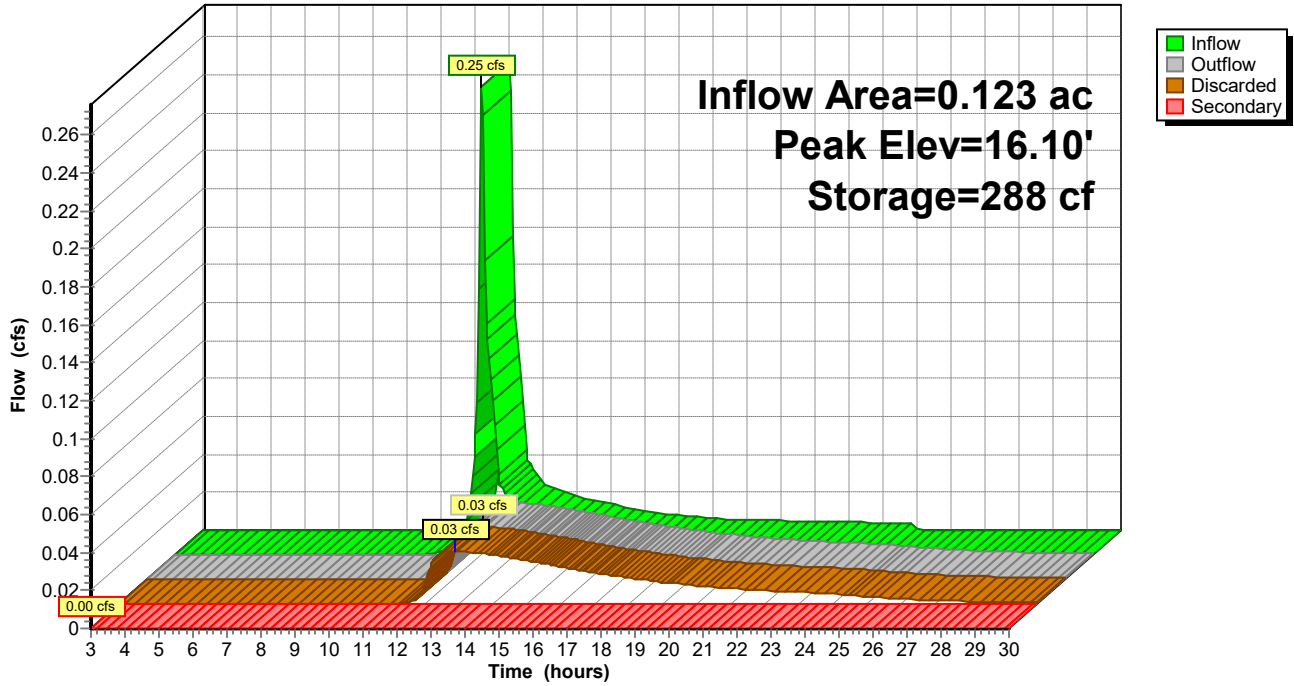
Discarded OutFlow Max=0.03 cfs @ 12.90 hrs HW=16.10' (Free Discharge)
 ↑2=Exfiltration (Exfiltration Controls 0.03 cfs)

Secondary OutFlow Max=0.00 cfs @ 3.00 hrs HW=13.96' (Free Discharge)
 ↑1=Orifice/Grate (Controls 0.00 cfs)



Pond SIB-3: SIB-3

Hydrograph



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Summary for Pond SIB-4: SIB-4

Inflow Area = 0.903 ac, 36.30% Impervious, Inflow Depth = 0.96" for 10-Year event
 Inflow = 0.82 cfs @ 12.10 hrs, Volume= 0.072 af
 Outflow = 0.21 cfs @ 12.56 hrs, Volume= 0.068 af, Atten= 74%, Lag= 27.7 min
 Discarded = 0.21 cfs @ 12.56 hrs, Volume= 0.068 af
 Secondary = 0.00 cfs @ 3.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs / 4
 Peak Elev= 25.32' @ 12.56 hrs Surf.Area= 928 sf Storage= 828 cf

Plug-Flow detention time= 146.9 min calculated for 0.068 af (95% of inflow)
 Center-of-Mass det. time= 119.8 min (1,012.5 - 892.7)

Volume	Invert	Avail.Storage	Storage Description
#1	16.33'	248 cf	10.00'W x 17.00'L x 6.67'H Prismaoid 1,134 cf Overall - 513 cf Embedded = 621 cf x 40.0% Voids
#2	16.33'	377 cf	6.00'D x 6.67'H Vertical Cone/Cylinder x 2 Inside #1 513 cf Overall - 6.0" Wall Thickness = 377 cf
#3	23.00'	0 cf	2.00'D x 2.00'H Vertical Cone/Cylinder 6 cf Overall x 0.0% Voids
#4	25.00'	2,852 cf	Custom Stage Data (Conic) Listed below (Recalc)
		3,477 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
25.00	514	0	0	514
26.00	1,416	928	928	1,422
27.00	2,482	1,924	2,852	2,500

Device	Routing	Invert	Outlet Devices
#1	Discarded	16.67'	8.270 in/hr Exfiltration over Wetted area above 16.67' Excluded Wetted area = 188 sf Phase-In= 0.01'
#2	Secondary	26.90'	528.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

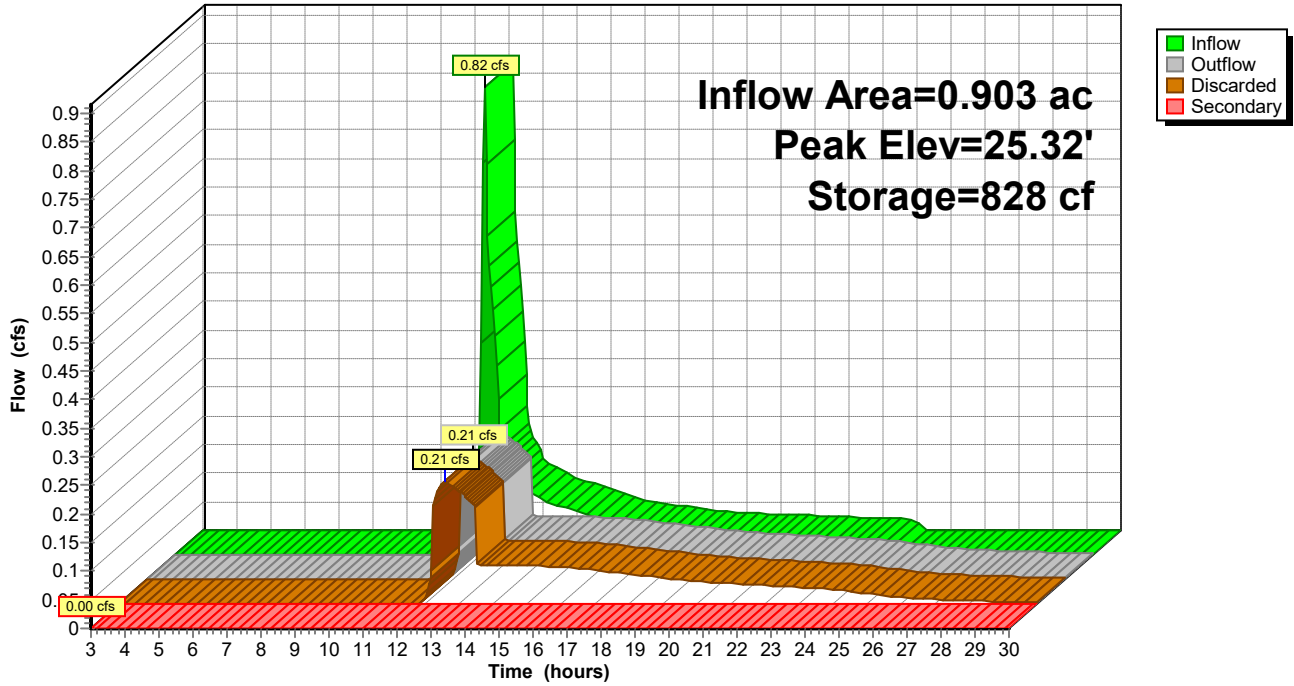
Discarded OutFlow Max=0.21 cfs @ 12.56 hrs HW=25.32' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.21 cfs)

Secondary OutFlow Max=0.00 cfs @ 3.00 hrs HW=16.33' (Free Discharge)
 ↑2=Orifice/Grate (Controls 0.00 cfs)



Pond SIB-4: SIB-4

Hydrograph



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Type III 24-hr 25-Year Rainfall=6.19"

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Time span=3.00-30.00 hrs, dt=0.05 hrs, 541 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment DA1: DA1	Runoff Area=47,720 sf 36.62% Impervious Runoff Depth=2.13" Flow Length=191' Tc=12.7 min CN=61 Runoff=2.08 cfs 0.195 af
Subcatchment DA2: DA2	Runoff Area=29,170 sf 17.26% Impervious Runoff Depth=1.16" Flow Length=264' Tc=11.2 min CN=49 Runoff=0.59 cfs 0.065 af
Subcatchment DA3: DA3	Runoff Area=5,342 sf 44.81% Impervious Runoff Depth=2.49" Flow Length=88' Tc=0.9 min CN=65 Runoff=0.39 cfs 0.025 af
Subcatchment DA4: DA4	Runoff Area=39,760 sf 24.90% Impervious Runoff Depth=1.02" Tc=5.0 min CN=47 Runoff=0.80 cfs 0.077 af
Subcatchment DA4B: DA4B	Runoff Area=39,330 sf 36.30% Impervious Runoff Depth=1.63" Tc=5.0 min CN=55 Runoff=1.57 cfs 0.123 af
Subcatchment DA5: DA5	Runoff Area=46,882 sf 34.79% Impervious Runoff Depth=2.05" Flow Length=250' Tc=11.3 min CN=60 Runoff=2.04 cfs 0.184 af
Subcatchment DA6: DA6	Runoff Area=17,571 sf 72.63% Impervious Runoff Depth=4.16" Flow Length=125' Slope=0.0100 '/' Tc=5.8 min CN=82 Runoff=1.92 cfs 0.140 af
Subcatchment DA6B: DA6B	Runoff Area=8,464 sf 51.98% Impervious Runoff Depth=2.96" Flow Length=150' Slope=0.0100 '/' Tc=1.8 min CN=70 Runoff=0.74 cfs 0.048 af
Subcatchment DA7: DA7	Runoff Area=22,134 sf 56.17% Impervious Runoff Depth=3.15" Flow Length=200' Slope=0.0100 '/' Tc=14.2 min CN=72 Runoff=1.44 cfs 0.133 af
Reach RR Outlet DA1: Rip Rap Outlet	Avg. Flow Depth=0.14' Max Vel=1.13 fps Inflow=0.99 cfs 0.018 af n=0.078 L=15.0' S=0.0667 '/' Capacity=11.80 cfs Outflow=0.96 cfs 0.018 af
Pond CB DA5: CB DA5	Peak Elev=17.04' Storage=164 cf Inflow=2.04 cfs 0.184 af Discarded=0.03 cfs 0.029 af Primary=2.00 cfs 0.155 af Secondary=0.00 cfs 0.000 af Outflow=2.03 cfs 0.184 af
Pond CB DA7: CB DA7	Inflow=1.44 cfs 0.133 af Primary=1.44 cfs 0.133 af
Pond Ex. Basin DA4: DA4 EX. BASIN	Peak Elev=16.50' Storage=870 cf Inflow=0.80 cfs 0.077 af Discarded=0.14 cfs 0.077 af Secondary=0.00 cfs 0.000 af Outflow=0.14 cfs 0.077 af
Pond MH 1: MH1	Peak Elev=15.44' Inflow=2.00 cfs 0.155 af Primary=2.00 cfs 0.155 af Secondary=0.00 cfs 0.000 af Outflow=2.00 cfs 0.155 af
Pond MH2: MH2	Peak Elev=11.48' Inflow=2.00 cfs 0.155 af Primary=2.00 cfs 0.155 af Secondary=0.00 cfs 0.000 af Outflow=2.00 cfs 0.155 af
Pond RR Channel DA1: Rip Rap Channel DA1	Peak Elev=11.85' Storage=10 cf Inflow=2.00 cfs 0.155 af Discarded=0.01 cfs 0.005 af Primary=1.99 cfs 0.150 af Outflow=2.00 cfs 0.155 af

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Pond SIB-1: SIB-1

Peak Elev=10.97' Storage=2,879 cf Inflow=3.03 cfs 0.213 af
Discarded=0.63 cfs 0.213 af Secondary=0.00 cfs 0.000 af Outflow=0.63 cfs 0.213 af

Pond SIB-2: SIB-2

Peak Elev=23.32' Storage=880 cf Inflow=2.85 cfs 0.253 af
Discarded=0.10 cfs 0.106 af Secondary=2.71 cfs 0.145 af Outflow=2.81 cfs 0.251 af

Pond SIB-3: SIB-3

Peak Elev=17.42' Storage=466 cf Inflow=0.39 cfs 0.025 af
Discarded=0.05 cfs 0.025 af Secondary=0.00 cfs 0.000 af Outflow=0.05 cfs 0.025 af

Pond SIB-4: SIB-4

Peak Elev=26.04' Storage=1,614 cf Inflow=1.57 cfs 0.123 af
Discarded=0.35 cfs 0.121 af Secondary=0.00 cfs 0.000 af Outflow=0.35 cfs 0.121 af

Total Runoff Area = 5.886 ac Runoff Volume = 0.990 af Average Runoff Depth = 2.02"
62.95% Pervious = 3.705 ac 37.05% Impervious = 2.181 ac

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Type III 24-hr 25-Year Rainfall=6.19"

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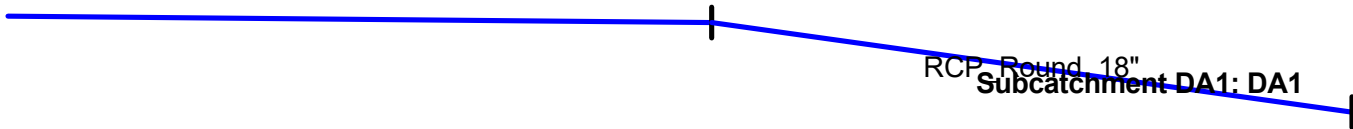
Summary for Subcatchment DA1: DA1

Runoff = 2.08 cfs @ 12.19 hrs, Volume= 0.195 af, Depth= 2.13"
 Routed to Pond SIB-1 : SIB-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs
 Type III 24-hr 25-Year Rainfall=6.19"

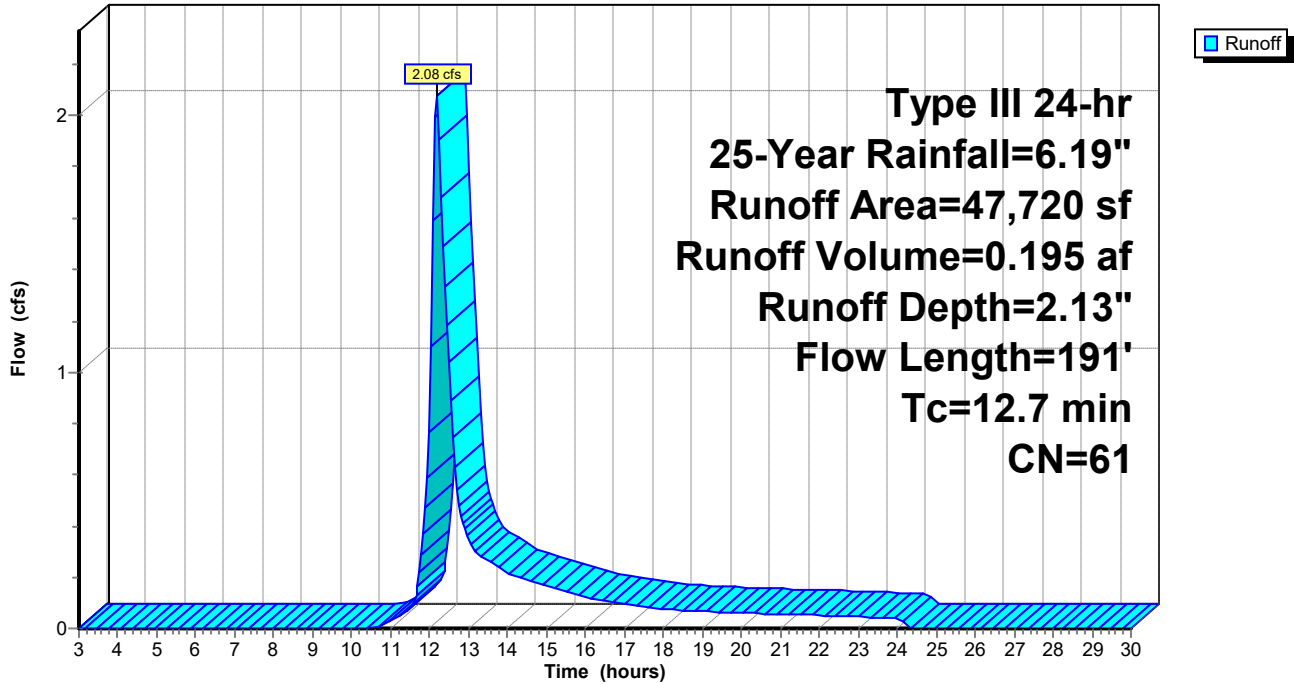
Area (sf)	CN	Description
* 17,477	98	
* 30,243	39	
47,720	61	Weighted Average
30,243		63.38% Pervious Area
17,477		36.62% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.6	100	0.0100	0.13		Sheet Flow, Grass: Short n= 0.150 P2= 3.35"
0.1	91	0.1500	23.02	40.68	Pipe Channel, RCP_Round 18" 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
12.7	191	Total			



Subcatchment DA1: DA1

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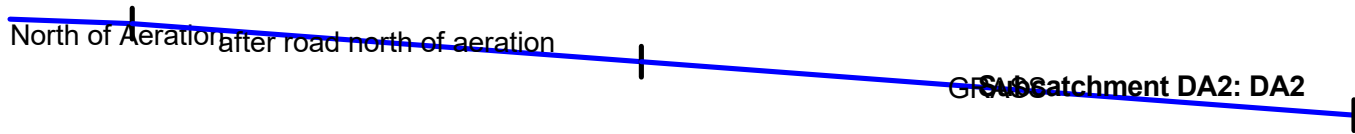
Summary for Subcatchment DA2: DA2

Runoff = 0.59 cfs @ 12.20 hrs, Volume= 0.065 af, Depth= 1.16"
 Routed to Pond SIB-2 : SIB-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs
 Type III 24-hr 25-Year Rainfall=6.19"

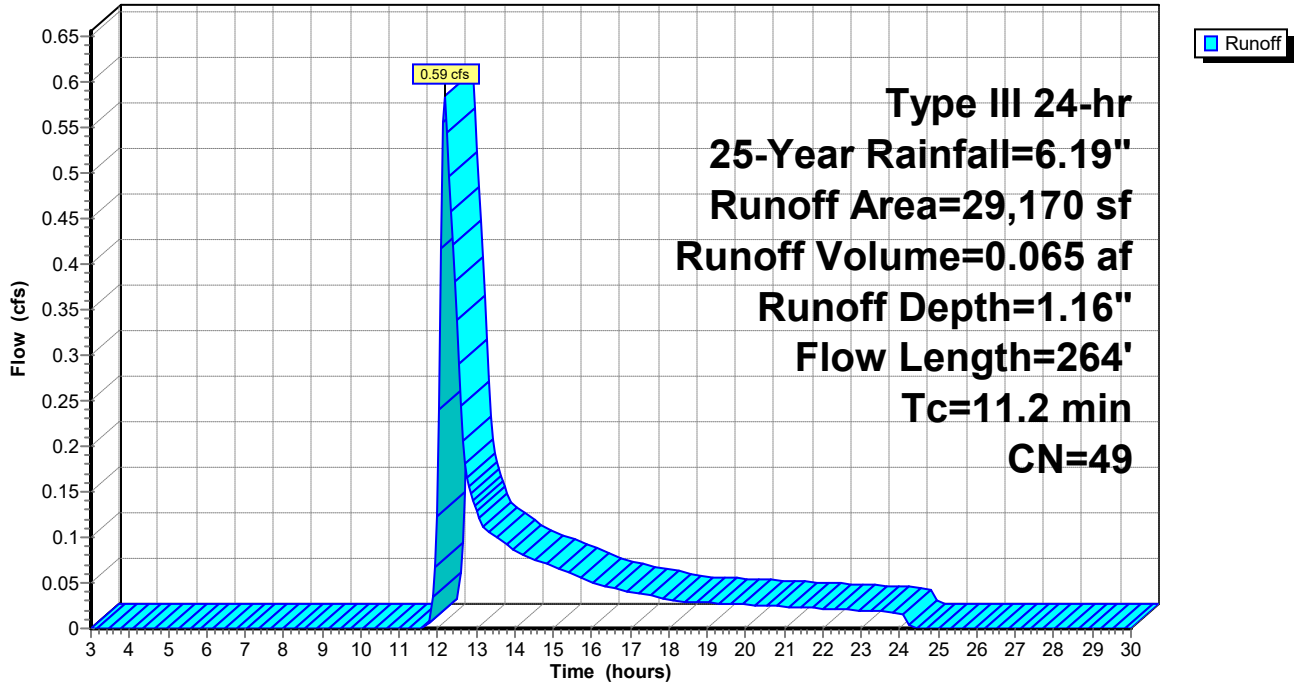
Area (sf)	CN	Description
* 5,035	98	Impervious
24,135	39	>75% Grass cover, Good, HSG A
29,170	49	Weighted Average
24,135		82.74% Pervious Area
5,035		17.26% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	24	0.0100	0.80		Sheet Flow, North of Aeration Smooth surfaces n= 0.011 P2= 3.35"
9.6	100	0.0200	0.17		Sheet Flow, after road north of aeration Grass: Short n= 0.150 P2= 3.35"
1.1	140	0.0200	2.12		Shallow Concentrated Flow, GRASS Grassed Waterway Kv= 15.0 fps
11.2	264	Total			



Subcatchment DA2: DA2

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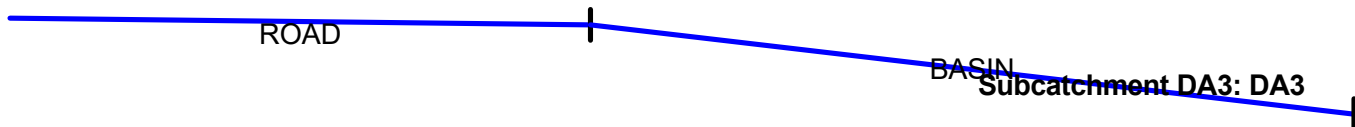
Summary for Subcatchment DA3: DA3

Runoff = 0.39 cfs @ 12.02 hrs, Volume= 0.025 af, Depth= 2.49"
 Routed to Pond SIB-3 : SIB-3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs
 Type III 24-hr 25-Year Rainfall=6.19"

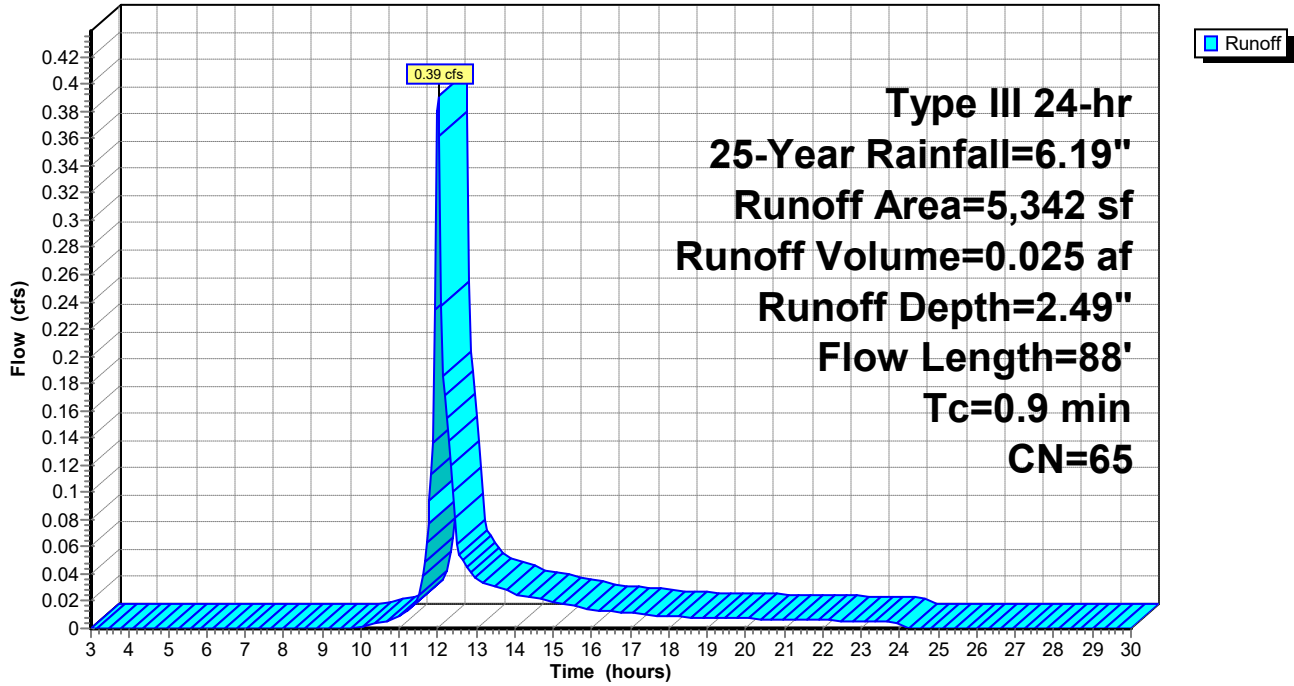
Area (sf)	CN	Description
* 2,394	98	IMPERVIOUS
2,948	39	>75% Grass cover, Good, HSG A
5,342	65	Weighted Average
2,948		55.19% Pervious Area
2,394		44.81% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	38	0.0100	0.88		Sheet Flow, ROAD Smooth surfaces n= 0.011 P2= 3.35"
0.2	50	0.1000	5.09		Shallow Concentrated Flow, BASIN Unpaved Kv= 16.1 fps
0.9	88	Total			



Subcatchment DA3: DA3

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Type III 24-hr 25-Year Rainfall=6.19"

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Summary for Subcatchment DA4: DA4

Runoff = 0.80 cfs @ 12.11 hrs, Volume= 0.077 af, Depth= 1.02"
 Routed to Pond Ex. Basin DA4 : DA4 EX. BASIN

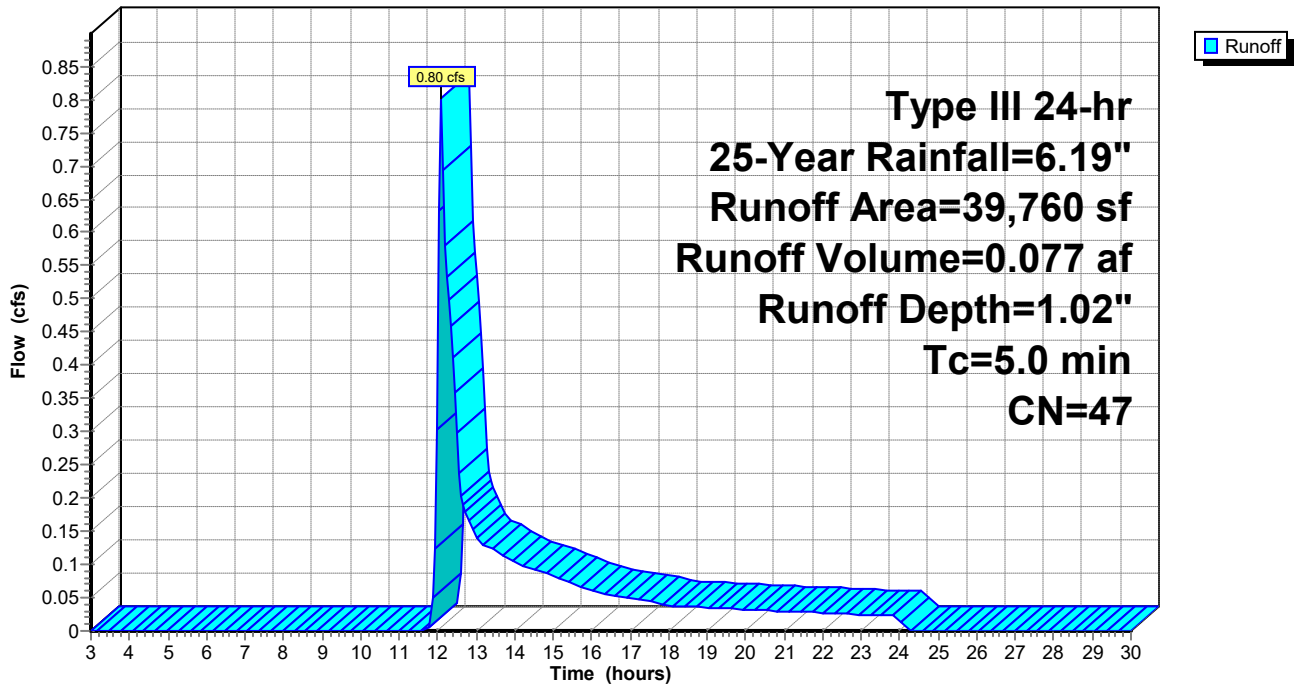
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs
 Type III 24-hr 25-Year Rainfall=6.19"

Area (sf)	CN	Description
29,860	30	Brush, Good, HSG A
* 9,900	98	ROAD
39,760	47	Weighted Average
29,860		75.10% Pervious Area
9,900		24.90% Impervious Area

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

Subcatchment DA4: DA4

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Type III 24-hr 25-Year Rainfall=6.19"

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Summary for Subcatchment DA4B: DA4B

Runoff = 1.57 cfs @ 12.09 hrs, Volume= 0.123 af, Depth= 1.63"
 Routed to Pond SIB-4 : SIB-4

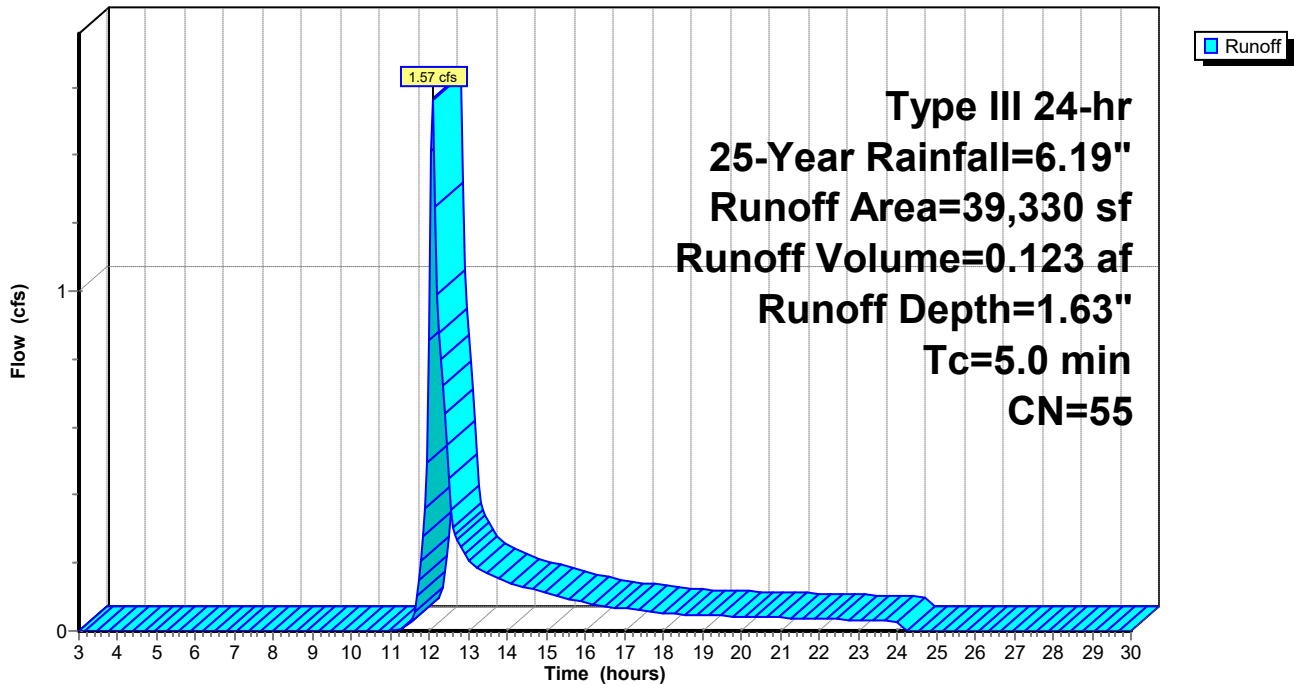
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs
 Type III 24-hr 25-Year Rainfall=6.19"

Area (sf)	CN	Description
25,053	30	Brush, Good, HSG A
* 14,277	98	ROAD
39,330	55	Weighted Average
25,053		63.70% Pervious Area
14,277		36.30% Impervious Area

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

Subcatchment DA4B: DA4B

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Type III 24-hr 25-Year Rainfall=6.19"

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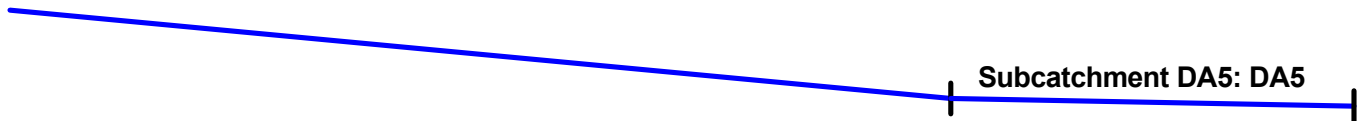
Summary for Subcatchment DA5: DA5

Runoff = 2.04 cfs @ 12.17 hrs, Volume= 0.184 af, Depth= 2.05"
 Routed to Pond CB DA5 : CB DA5

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs
 Type III 24-hr 25-Year Rainfall=6.19"

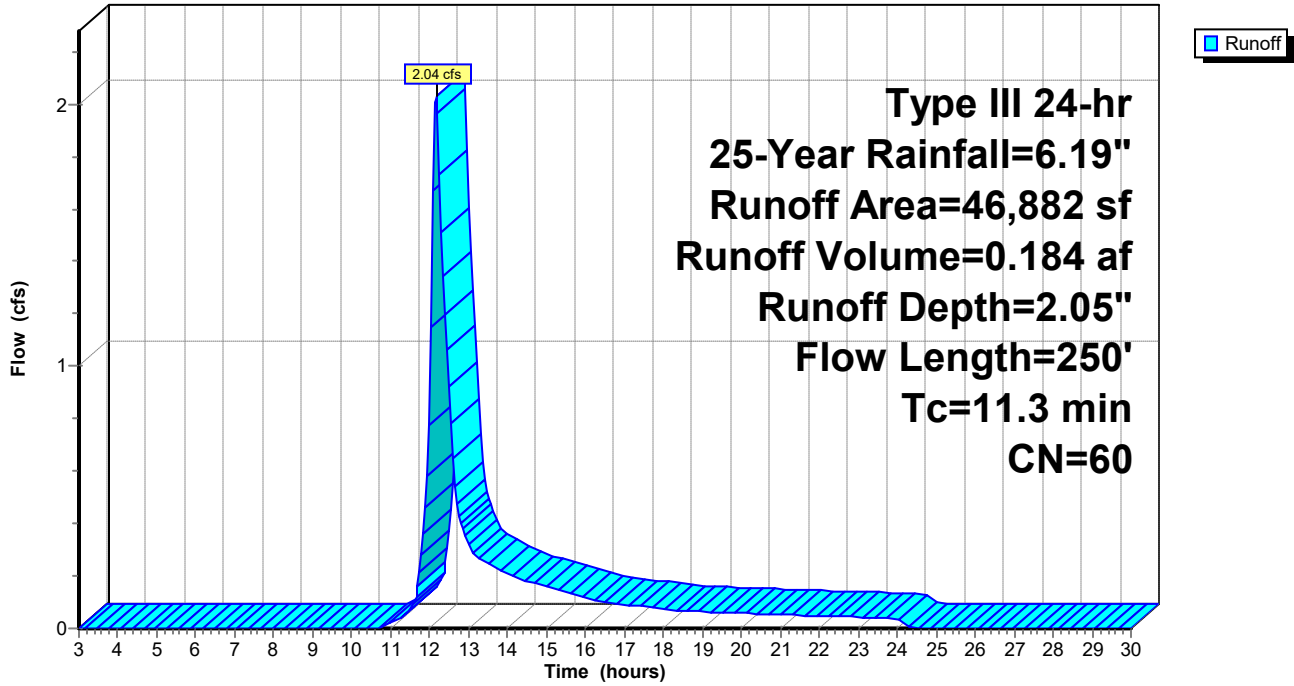
Area (sf)	CN	Description
* 16,312	98	ROAD
* 30,570	39	GRASSED AREA
46,882	60	Weighted Average
30,570		65.21% Pervious Area
16,312		34.79% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.3	175	0.0500	2.27		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.35"
10.0	75	0.0100	0.12		Sheet Flow, Grass: Short n= 0.150 P2= 3.35"
11.3	250	Total			



Subcatchment DA5: DA5

Hydrograph



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Type III 24-hr 25-Year Rainfall=6.19"

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Summary for Subcatchment DA6: DA6

Runoff = 1.92 cfs @ 12.09 hrs, Volume= 0.140 af, Depth= 4.16"
 Routed to Pond SIB-2 : SIB-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs
 Type III 24-hr 25-Year Rainfall=6.19"

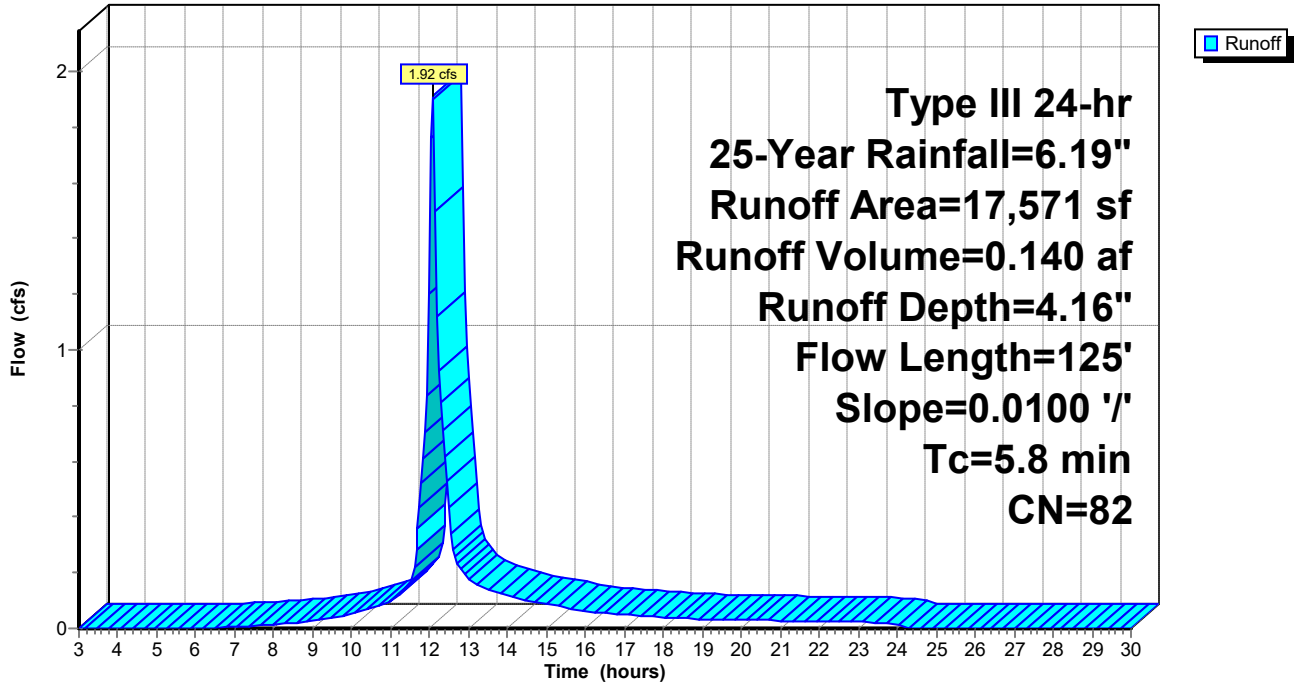
Area (sf)	CN	Description
* 12,762	98	
* 4,809	39	
17,571	82	Weighted Average
4,809		27.37% Pervious Area
12,762		72.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.6	100	0.0100	1.07		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.35"
4.2	25	0.0100	0.10		Sheet Flow, Grass: Short n= 0.150 P2= 3.35"
5.8	125	Total			



Subcatchment DA6: DA6

Hydrograph



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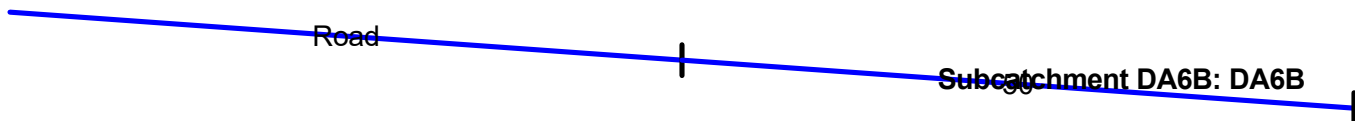
Summary for Subcatchment DA6B: DA6B

Runoff = 0.74 cfs @ 12.04 hrs, Volume= 0.048 af, Depth= 2.96"
 Routed to Pond SIB-2 : SIB-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs
 Type III 24-hr 25-Year Rainfall=6.19"

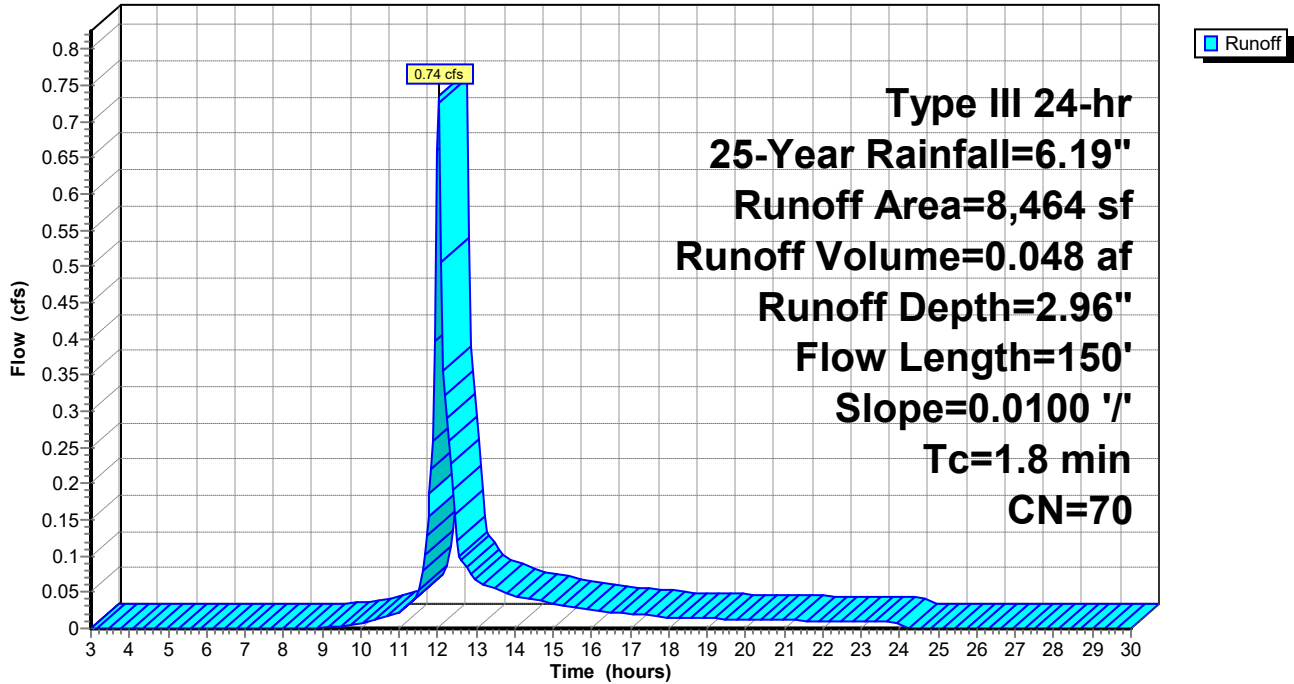
Area (sf)	CN	Description
* 4,400	98	IMPERVIOUS
4,064	39	>75% Grass cover, Good, HSG A
8,464	70	Weighted Average
4,064		48.02% Pervious Area
4,400		51.98% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	75	0.0100	1.01		Sheet Flow, Road Smooth surfaces n= 0.011 P2= 3.35"
0.6	75	0.0100	2.03		Shallow Concentrated Flow, 50 Paved Kv= 20.3 fps
1.8	150	Total			



Subcatchment DA6B: DA6B

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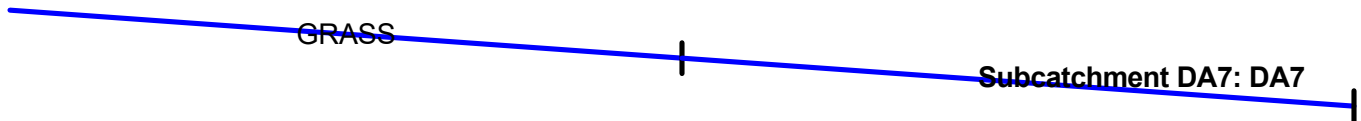
Summary for Subcatchment DA7: DA7

Runoff = 1.44 cfs @ 12.20 hrs, Volume= 0.133 af, Depth= 3.15"
 Routed to Pond CB DA7 : CB DA7

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs
 Type III 24-hr 25-Year Rainfall=6.19"

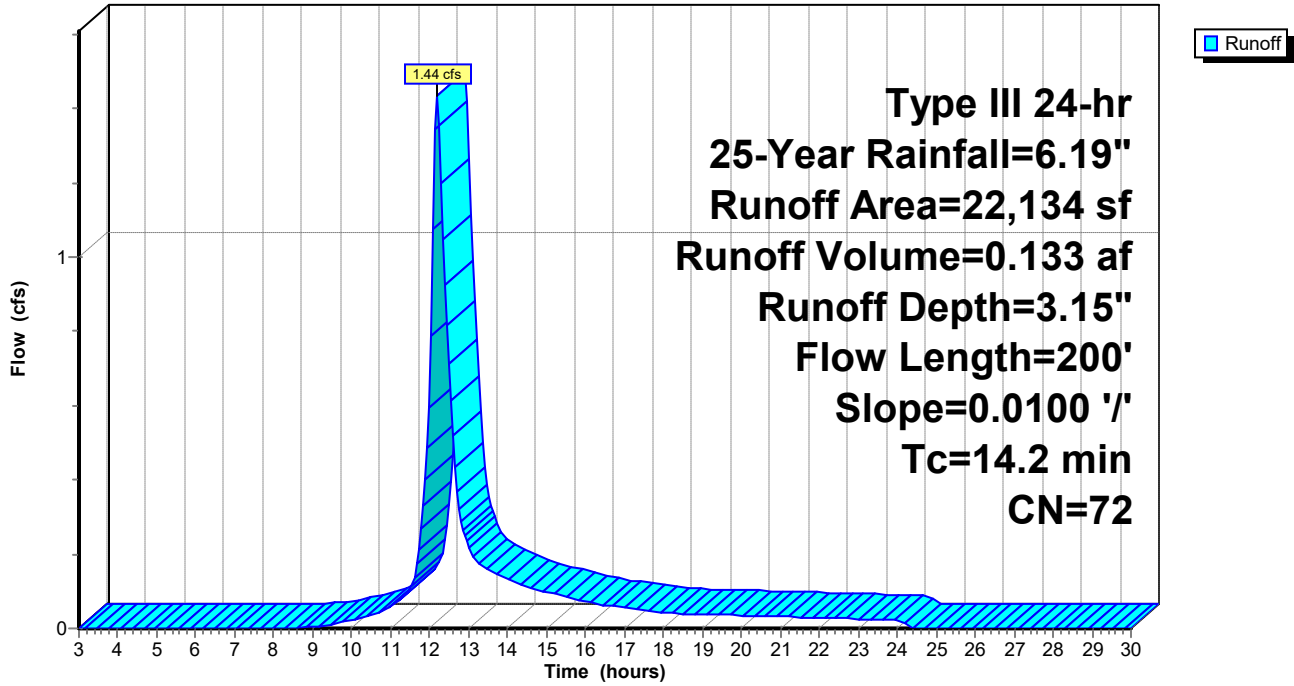
Area (sf)	CN	Description
9,701	39	>75% Grass cover, Good, HSG A
12,433	98	Paved parking, HSG A
22,134	72	Weighted Average
9,701		43.83% Pervious Area
12,433		56.17% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.6	100	0.0100	0.13		Sheet Flow, GRASS Grass: Short n= 0.150 P2= 3.35"
1.6	100	0.0100	1.07		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.35"
14.2	200	Total			



Subcatchment DA7: DA7

Hydrograph



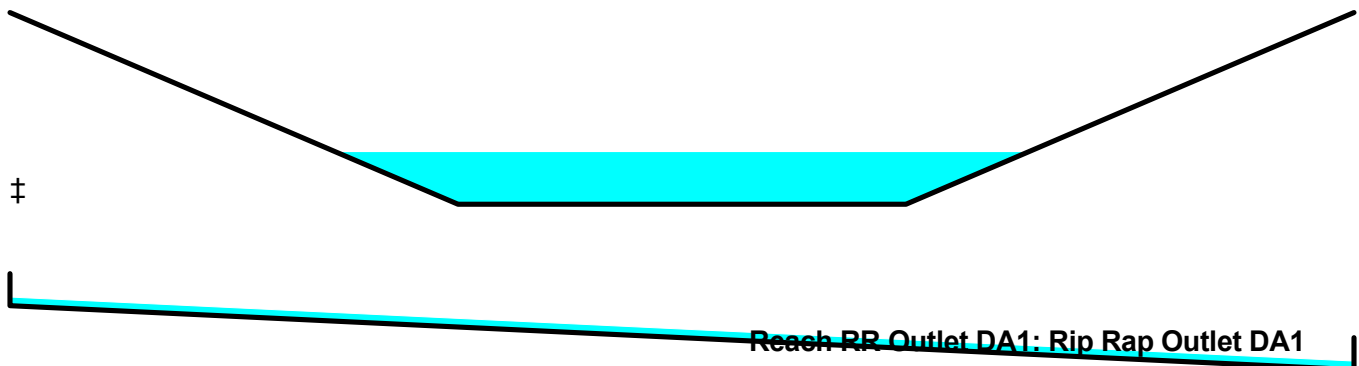
Summary for Reach RR Outlet DA1: Rip Rap Outlet DA1

Inflow Area = 1.076 ac, 34.79% Impervious, Inflow Depth = 0.20" for 25-Year event
Inflow = 0.99 cfs @ 12.17 hrs, Volume= 0.018 af, Incl. 1.00 cfs Inflow Loss
Outflow = 0.96 cfs @ 12.18 hrs, Volume= 0.018 af, Atten= 4%, Lag= 0.5 min
Routed to Pond SIB-1 : SIB-1

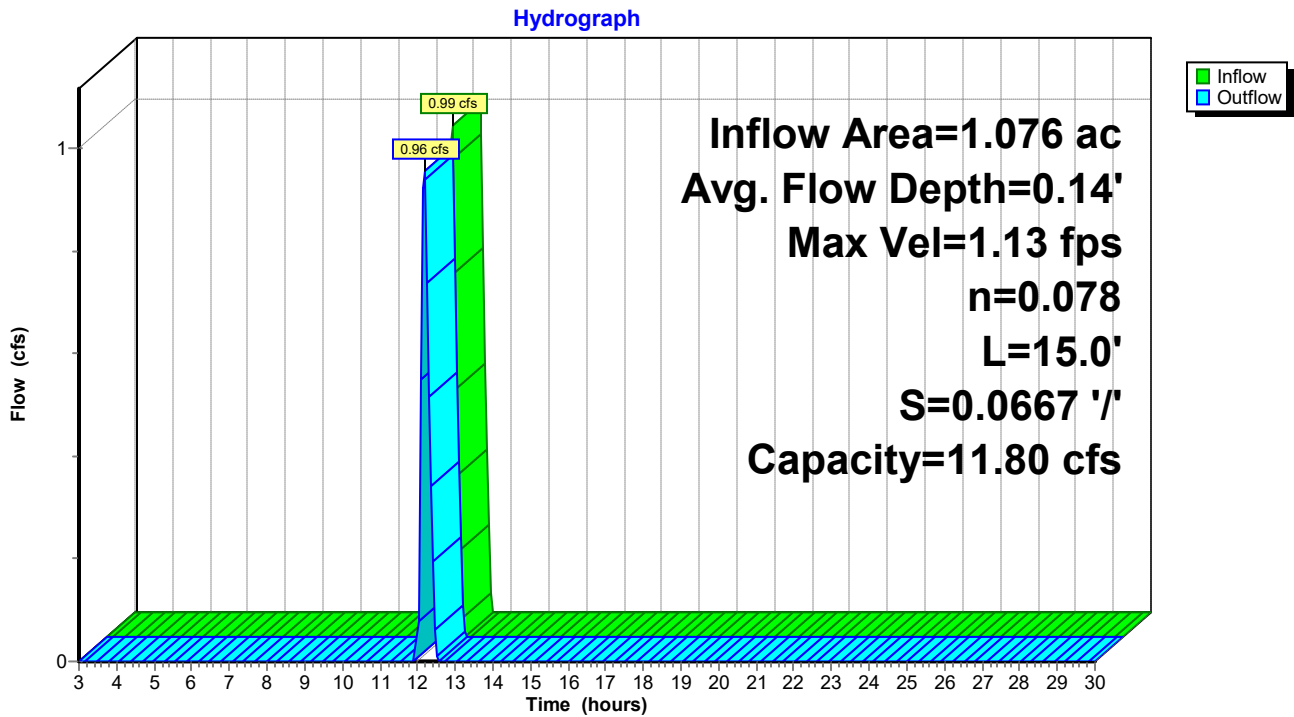
Routing by Stor-Ind+Trans method, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs / 3
Max. Velocity= 1.13 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 0.62 fps, Avg. Travel Time= 0.4 min

Peak Storage= 13 cf @ 12.17 hrs
Average Depth at Peak Storage= 0.14' , Surface Width= 7.73'
Bank-Full Depth= 0.50' Flow Area= 5.0 sf, Capacity= 11.80 cfs

5.00' x 0.50' deep channel, n= 0.078 Riprap, 12-inch
Side Slope Z-value= 10.0 ' / ' Top Width= 15.00'
Length= 15.0' Slope= 0.0667 ' / '
Inlet Invert= 10.80', Outlet Invert= 9.80'



Reach RR Outlet DA1: Rip Rap Outlet DA1



Summary for Pond CB DA5: CB DA5

Inflow Area = 1.076 ac, 34.79% Impervious, Inflow Depth = 2.05" for 25-Year event
 Inflow = 2.04 cfs @ 12.17 hrs, Volume= 0.184 af
 Outflow = 2.03 cfs @ 12.17 hrs, Volume= 0.184 af, Atten= 0%, Lag= 0.1 min
 Discarded = 0.03 cfs @ 12.17 hrs, Volume= 0.029 af
 Primary = 2.00 cfs @ 12.17 hrs, Volume= 0.155 af
 Routed to Pond MH 1 : MH1
 Secondary = 0.00 cfs @ 3.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs / 4
 Peak Elev= 17.04' @ 12.17 hrs Surf.Area= 28 sf Storage= 164 cf

Plug-Flow detention time= 14.4 min calculated for 0.183 af (100% of inflow)
 Center-of-Mass det. time= 15.3 min (881.0 - 865.8)

Volume	Invert	Avail.Storage	Storage Description
#1	11.23'	302 cf	6.00'D x 10.67'H Vertical Cone/Cylinder
#2	22.00'	6,068 cf	Custom Stage Data (Conic) Listed below (Recalc)
		6,370 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
22.00	2,240	0	0	2,240
23.00	11,000	6,068	6,068	11,004

Device	Routing	Invert	Outlet Devices
#1	Discarded	11.23'	8.270 in/hr Exfiltration over Wetted area Phase-In= 0.01'
#2	Primary	16.30'	18.0" Round CMP_Round 18" L= 25.6' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 16.30' / 14.80' S= 0.0586 ' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf
#3	Secondary	22.90'	70.0" x 140.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#4	Secondary	21.80'	2.0" x 2.0" Horiz. Orifice/Grate X 8.00 columns X 8 rows C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.03 cfs @ 12.17 hrs HW=17.03' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.03 cfs)

Primary OutFlow Max=1.95 cfs @ 12.17 hrs HW=17.03' (Free Discharge)
 ↑2=CMP_Round 18" (Inlet Controls 1.95 cfs @ 2.29 fps)

Secondary OutFlow Max=0.00 cfs @ 3.00 hrs HW=11.23' (Free Discharge)
 ↑3=Orifice/Grate (Controls 0.00 cfs)
 ↑4=Orifice/Grate (Controls 0.00 cfs)

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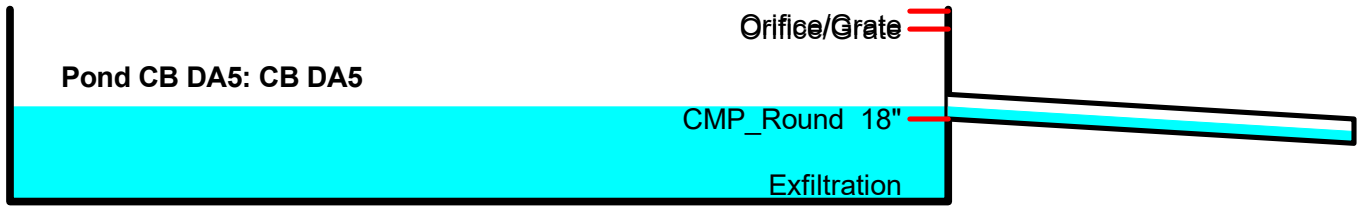
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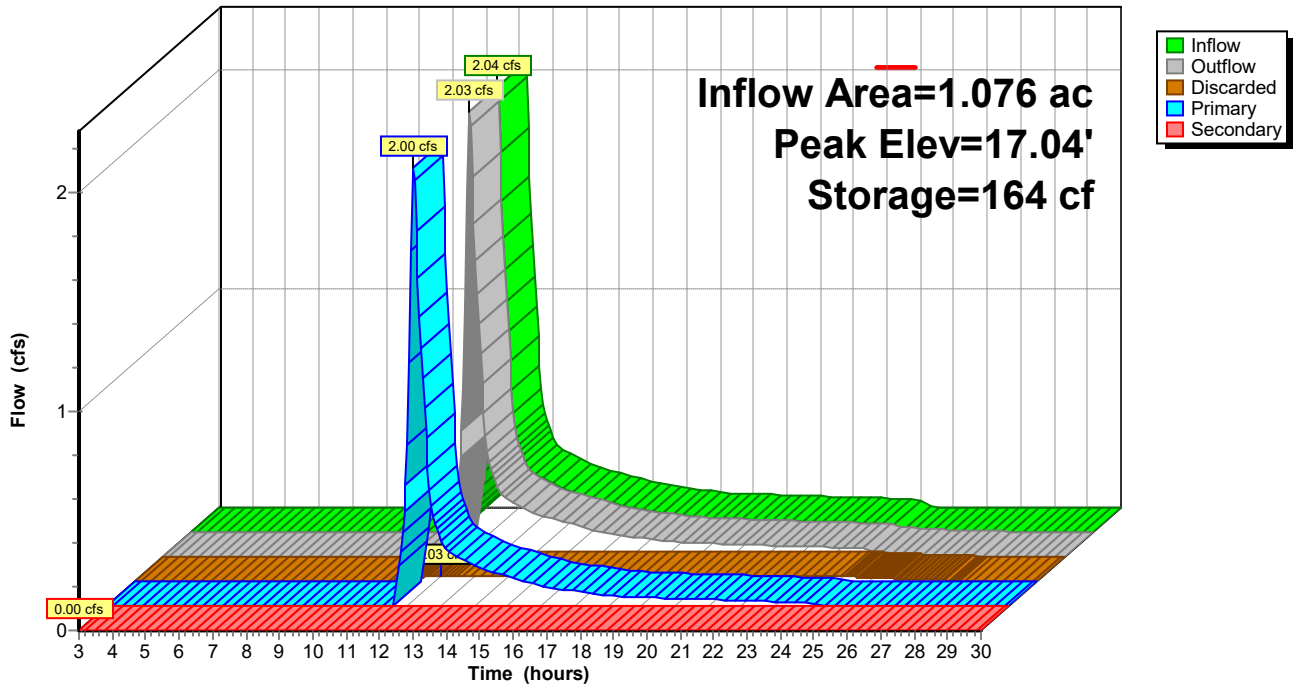
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Pond CB DA5: CB DA5

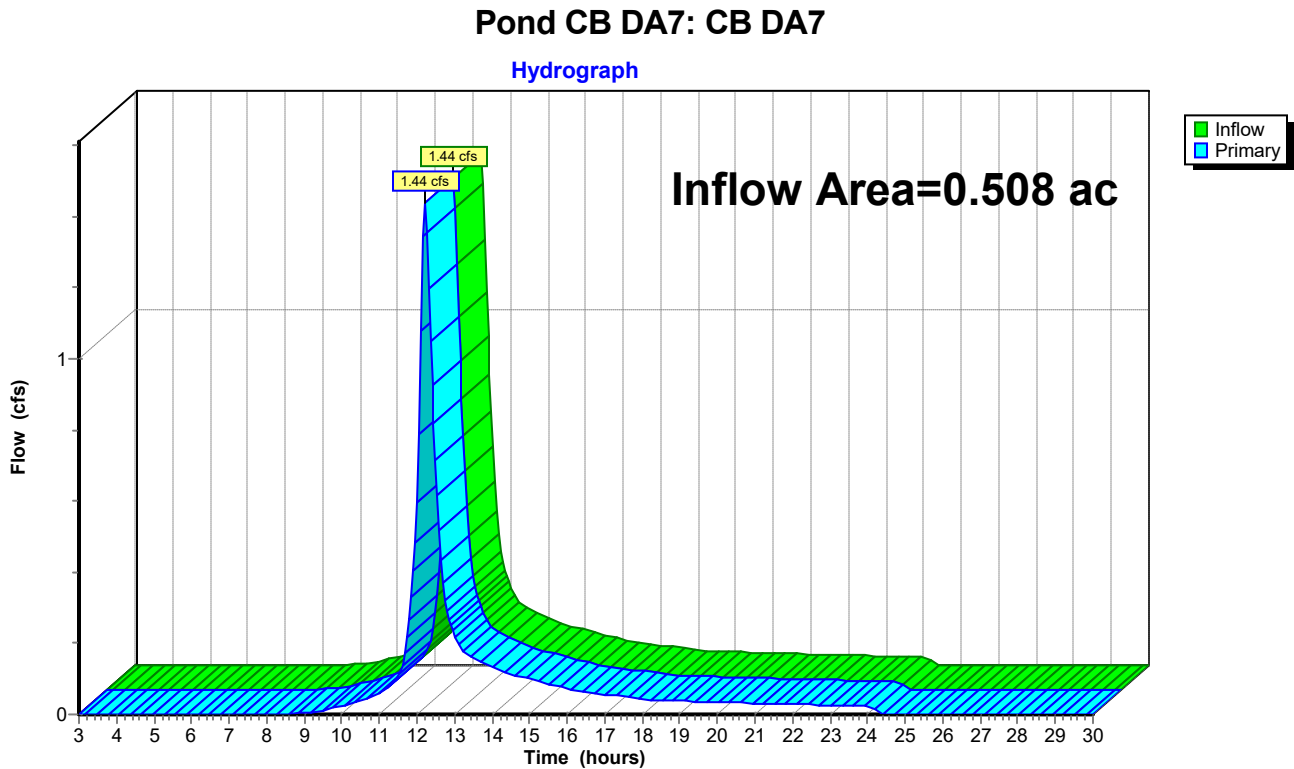
Hydrograph



Summary for Pond CB DA7: CB DA7

Inflow Area = 0.508 ac, 56.17% Impervious, Inflow Depth = 3.15" for 25-Year event
Inflow = 1.44 cfs @ 12.20 hrs, Volume= 0.133 af
Primary = 1.44 cfs @ 12.20 hrs, Volume= 0.133 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs



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Summary for Pond Ex. Basin DA4: DA4 EX. BASIN

Inflow Area = 0.913 ac, 24.90% Impervious, Inflow Depth = 1.02" for 25-Year event
 Inflow = 0.80 cfs @ 12.11 hrs, Volume= 0.077 af
 Outflow = 0.14 cfs @ 13.00 hrs, Volume= 0.077 af, Atten= 82%, Lag= 53.5 min
 Discarded = 0.14 cfs @ 13.00 hrs, Volume= 0.077 af
 Secondary = 0.00 cfs @ 3.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs / 3
 Peak Elev= 16.50' @ 13.00 hrs Surf.Area= 2,584 sf Storage= 870 cf

Plug-Flow detention time= 63.6 min calculated for 0.077 af (100% of inflow)
 Center-of-Mass det. time= 63.6 min (966.3 - 902.8)

Volume	Invert	Avail.Storage	Storage Description
#1	16.00'	2,708 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
16.00	1,025	0	0	1,025
17.00	4,866	2,708	2,708	4,870

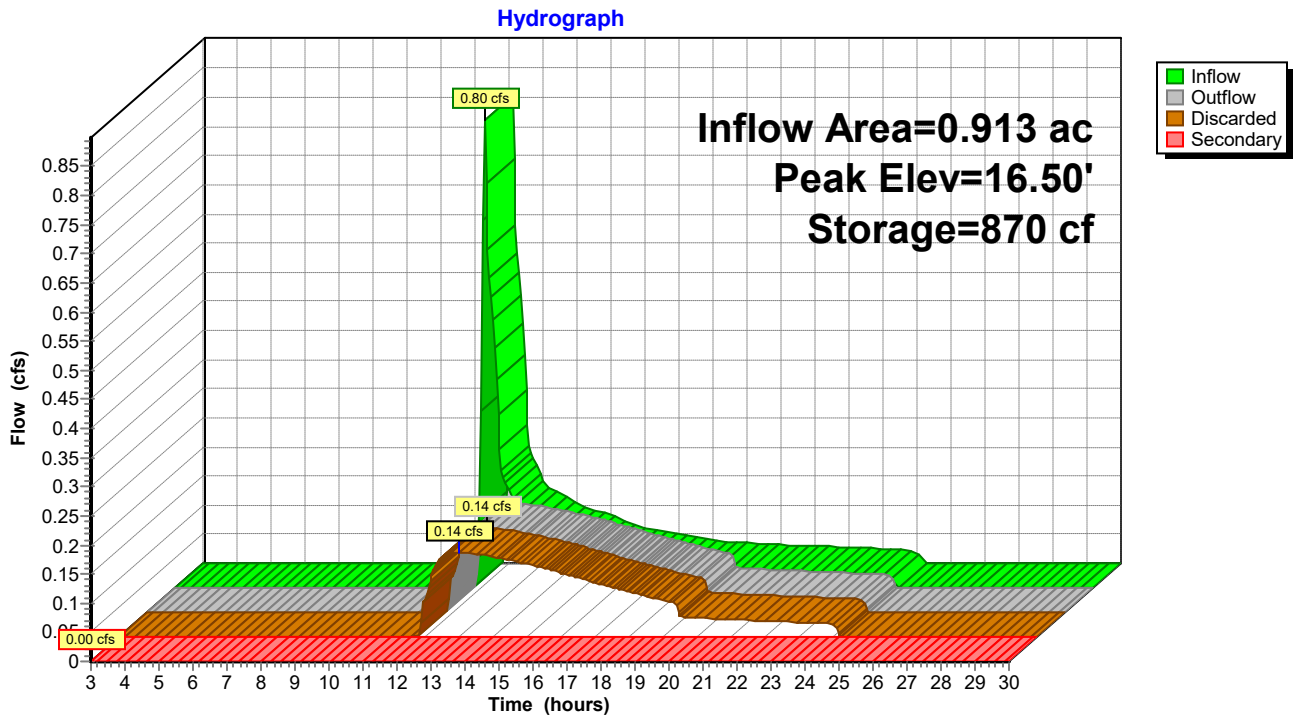
Device	Routing	Invert	Outlet Devices
#1	Discarded	16.00'	2.410 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Secondary	16.90'	360.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.14 cfs @ 13.00 hrs HW=16.50' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.14 cfs)

Secondary OutFlow Max=0.00 cfs @ 3.00 hrs HW=16.00' (Free Discharge)
 ↑2=Orifice/Grate (Controls 0.00 cfs)



Pond Ex. Basin DA4: DA4 EX. BASIN



Summary for Pond MH 1: MH1

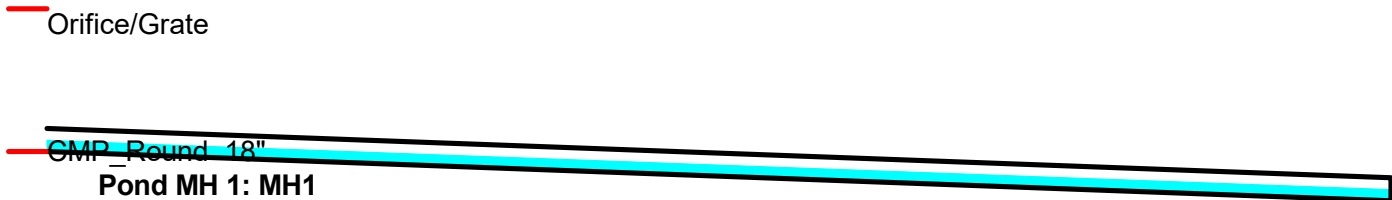
Inflow Area = 1.076 ac, 34.79% Impervious, Inflow Depth = 1.72" for 25-Year event
 Inflow = 2.00 cfs @ 12.17 hrs, Volume= 0.155 af
 Outflow = 2.00 cfs @ 12.17 hrs, Volume= 0.155 af, Atten= 0%, Lag= 0.0 min
 Primary = 2.00 cfs @ 12.17 hrs, Volume= 0.155 af
 Routed to Pond MH2 : MH2
 Secondary = 0.00 cfs @ 3.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs
 Peak Elev= 15.44' @ 12.17 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	14.70'	18.0" Round CMP_Round 18" L= 156.1' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 14.70' / 11.50' S= 0.0205 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf
#2	Secondary	24.00'	24.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

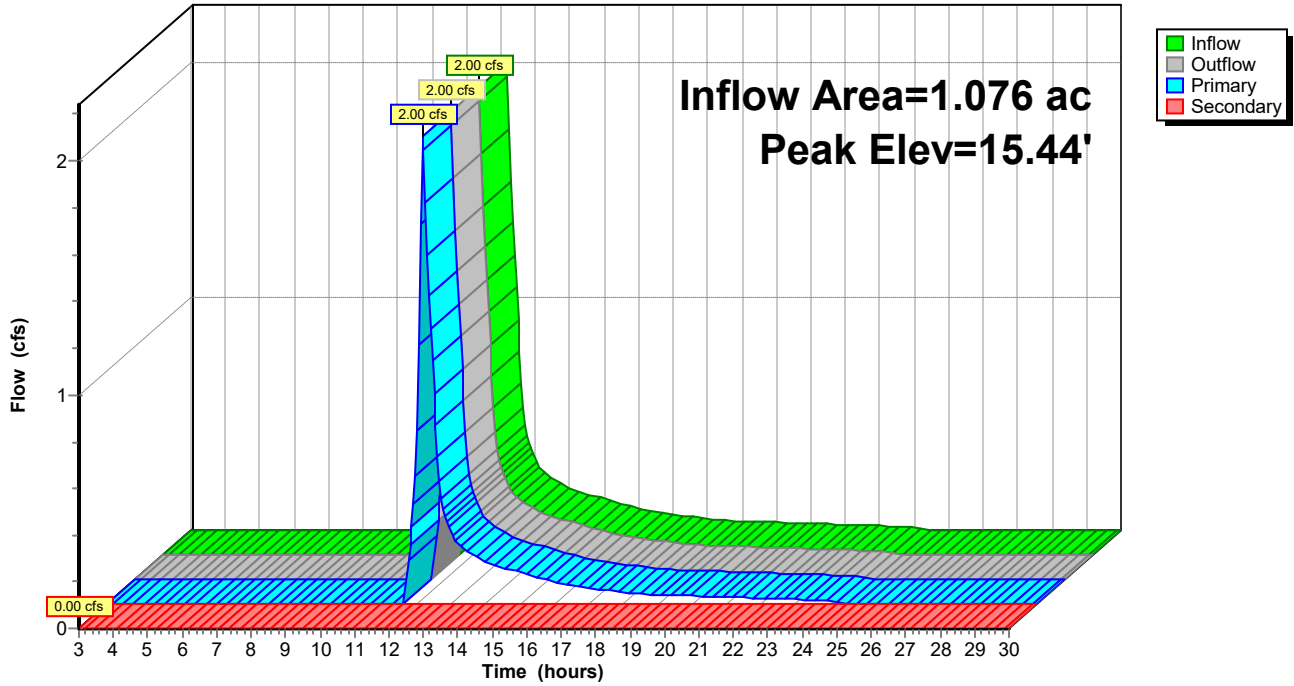
Primary OutFlow Max=1.95 cfs @ 12.17 hrs HW=15.43' (Free Discharge)
 ↑1=CMP_Round 18" (Inlet Controls 1.95 cfs @ 2.29 fps)

Secondary OutFlow Max=0.00 cfs @ 3.00 hrs HW=14.70' (Free Discharge)
 ↑2=Orifice/Grate (Controls 0.00 cfs)



Pond MH 1: MH1

Hydrograph



Summary for Pond MH2: MH2

Inflow Area = 1.076 ac, 34.79% Impervious, Inflow Depth = 1.72" for 25-Year event
 Inflow = 2.00 cfs @ 12.17 hrs, Volume= 0.155 af
 Outflow = 2.00 cfs @ 12.17 hrs, Volume= 0.155 af, Atten= 0%, Lag= 0.0 min
 Primary = 2.00 cfs @ 12.17 hrs, Volume= 0.155 af
 Routed to Pond RR Channel DA1 : Rip Rap Channel DA1
 Secondary = 0.00 cfs @ 3.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs
 Peak Elev= 11.48' @ 12.17 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	11.40'	18.0" Round CMP_Round 18" L= 118.9' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 11.40' / 10.80' S= 0.0050 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf
#2	Secondary	24.00'	24.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Primary	10.80'	15.00' long x 6.00' breadth x 1.00' high Rock Fill Rock Diam.= 12.000", S.D.= 1.000", Voids= 40.0%

Primary OutFlow Max=1.95 cfs @ 12.17 hrs HW=11.47' (Free Discharge)
 ↑1=CMP_Round 18" (Barrel Controls 0.02 cfs @ 0.91 fps)
 ↓3=Rock Fill (Rockfill Controls 1.93 cfs @ 0.39 fps)

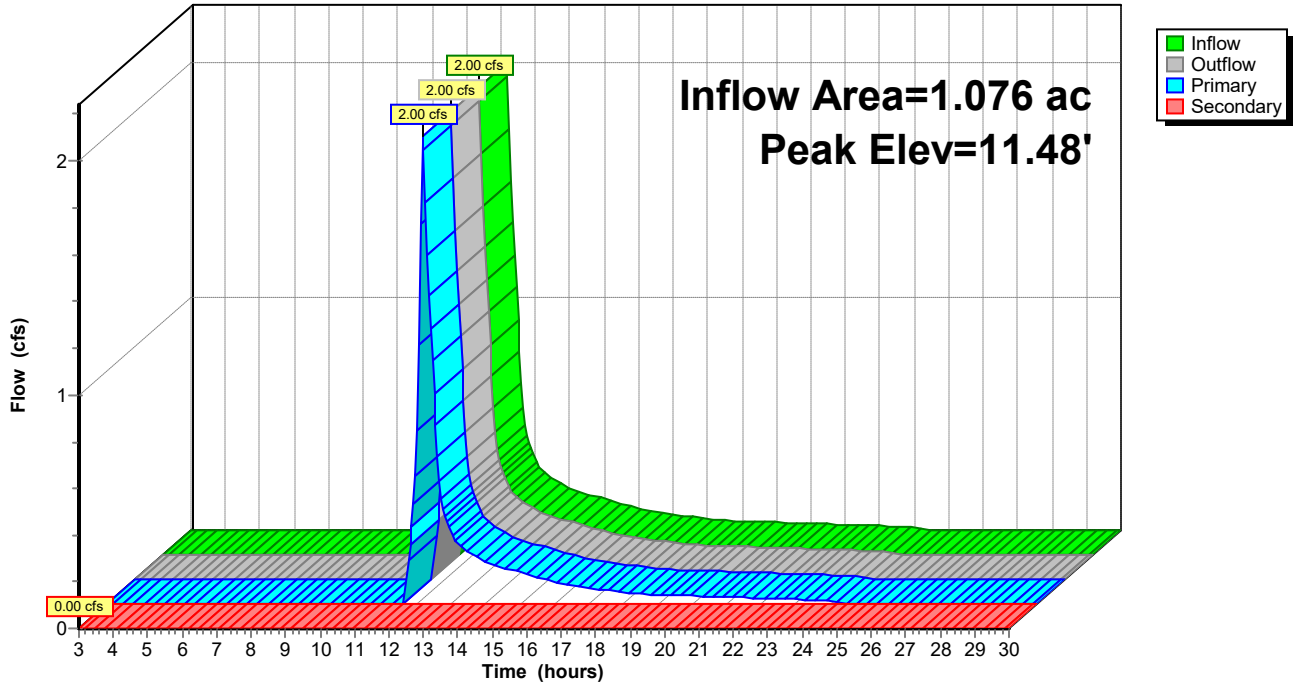
Secondary OutFlow Max=0.00 cfs @ 3.00 hrs HW=10.80' (Free Discharge)
 ↑2=Orifice/Grate (Controls 0.00 cfs)

— Orifice/Grate

~~RR Channel MH2: MH2~~

Pond MH2: MH2

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Summary for Pond RR Channel DA1: Rip Rap Channel DA1

Inflow Area = 1.076 ac, 34.79% Impervious, Inflow Depth = 1.72" for 25-Year event
 Inflow = 2.00 cfs @ 12.17 hrs, Volume= 0.155 af
 Outflow = 2.00 cfs @ 12.17 hrs, Volume= 0.155 af, Atten= 0%, Lag= 0.0 min
 Discarded = 0.01 cfs @ 12.10 hrs, Volume= 0.005 af
 Primary = 1.99 cfs @ 12.17 hrs, Volume= 0.150 af

Routed to Reach RR Outlet DA1 : Rip Rap Outlet DA1

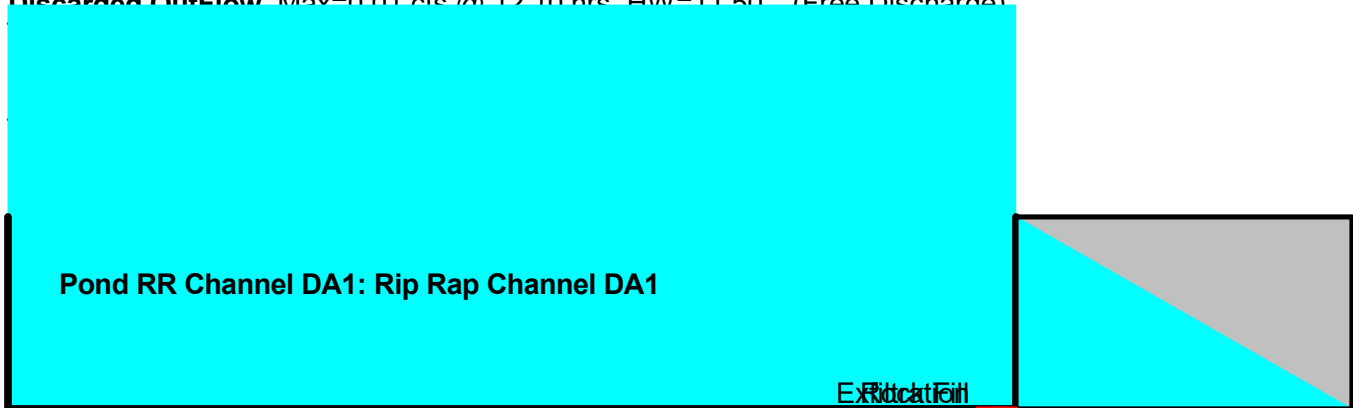
Routing by Stor-Ind method, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs / 3
 Peak Elev= 11.85' @ 12.17 hrs Storage= 10 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 0.2 min (837.1 - 836.9)

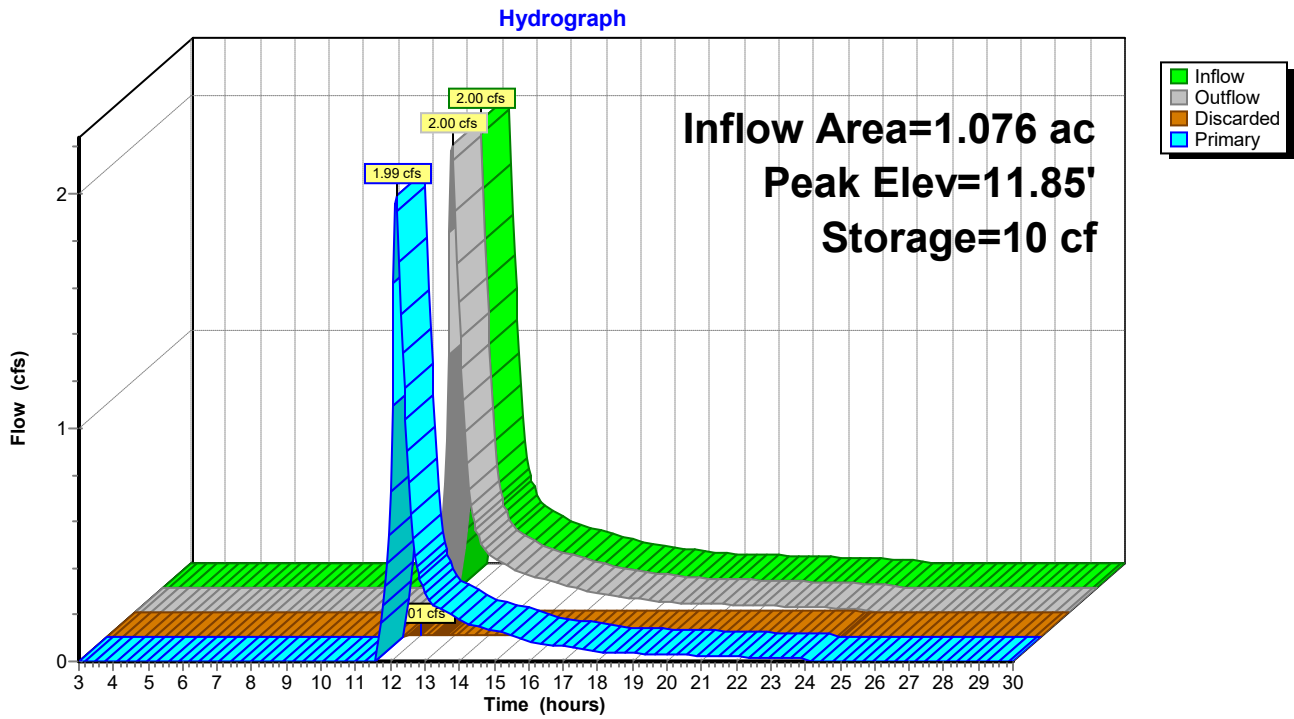
Volume	Invert	Avail.Storage	Storage Description
#1	10.80'	10 cf	60.0"W x 6.0"H x 15.00'L Parabolic Arch 25 cf Overall x 40.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Discarded	10.80'	2.410 in/hr Exfiltration over Wetted area Phase-In= 0.01'
#2	Primary	10.80'	15.00' long x 5.00' breadth x 0.50' high Rock Fill Rock Diam.= 12.000", S.D.= 1.000", Voids= 40.0%

Discarded OutFlow: Max=0.01 cfs @ 12.10 hrs HW=11.50' (Free Discharge)



Pond RR Channel DA1: Rip Rap Channel DA1



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Summary for Pond SIB-1: SIB-1

Inflow Area = 2.172 ac, 35.72% Impervious, Inflow Depth = 1.18" for 25-Year event
 Inflow = 3.03 cfs @ 12.19 hrs, Volume= 0.213 af
 Outflow = 0.63 cfs @ 12.65 hrs, Volume= 0.213 af, Atten= 79%, Lag= 27.9 min
 Discarded = 0.63 cfs @ 12.65 hrs, Volume= 0.213 af
 Secondary = 0.00 cfs @ 3.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs
 Peak Elev= 10.97' @ 12.65 hrs Surf.Area= 3,285 sf Storage= 2,879 cf

Plug-Flow detention time= 36.9 min calculated for 0.212 af (100% of inflow)
 Center-of-Mass det. time= 36.9 min (890.3 - 853.4)

Volume	Invert	Avail.Storage	Storage Description
#1	10.00'	123,310 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
10.00	2,664	0	0	2,664
11.00	3,306	2,979	2,979	3,334
12.00	4,005	3,650	6,629	4,066
13.00	4,760	4,377	11,006	4,856
14.00	5,572	5,161	16,167	5,707
15.00	6,440	6,001	22,168	6,617
16.00	7,365	6,897	29,065	7,588
17.00	8,347	7,851	36,916	8,619
18.00	9,385	8,861	45,777	9,709
19.00	10,480	9,927	55,704	10,860
20.00	11,630	11,050	66,754	12,069
21.00	12,837	12,229	78,983	13,338
22.00	14,101	13,464	92,447	14,667
23.00	15,422	14,757	107,203	16,057
24.00	16,800	16,106	123,310	17,506

Device	Routing	Invert	Outlet Devices
#1	Discarded	10.00'	8.270 in/hr Exfiltration over Wetted area Phase-In= 0.01'
#2	Secondary	23.90'	360.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.63 cfs @ 12.65 hrs HW=10.97' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.63 cfs)

Secondary OutFlow Max=0.00 cfs @ 3.00 hrs HW=10.00' (Free Discharge)
 ↑2=Orifice/Grate (Controls 0.00 cfs)

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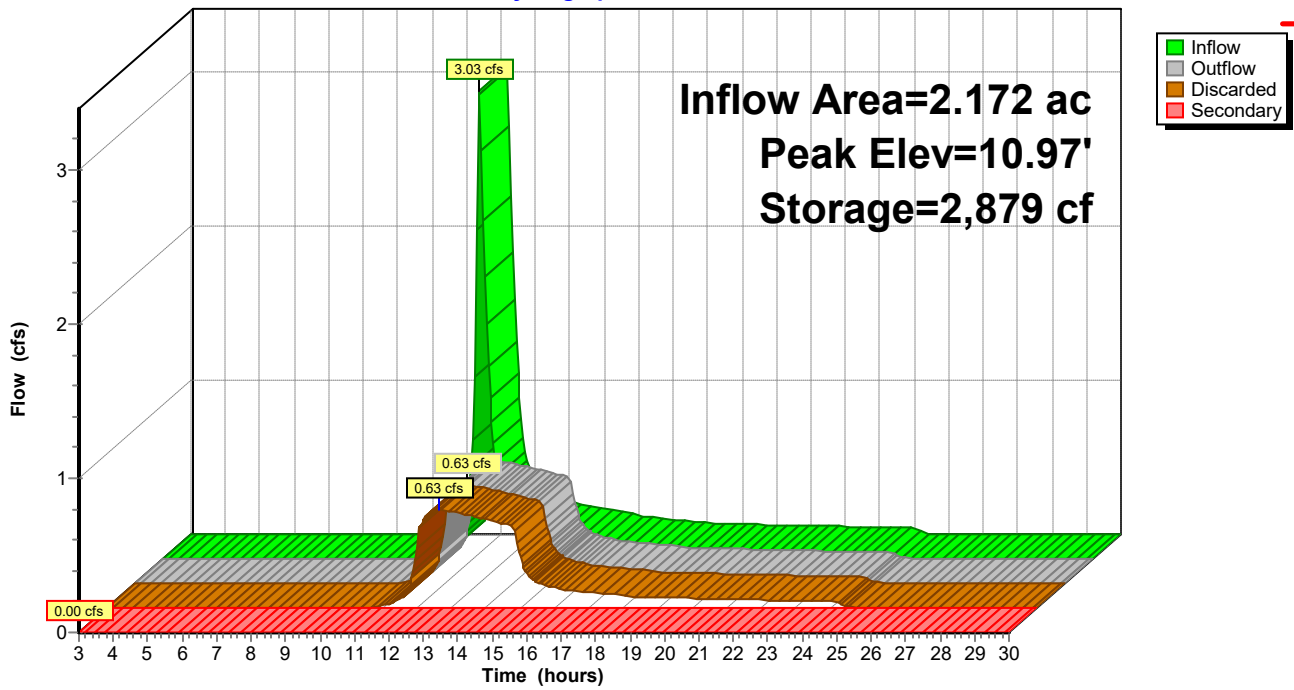
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Pond SIB-1: SIB-1

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Summary for Pond SIB-2: SIB-2

Inflow Area = 1.267 ac, 40.21% Impervious, Inflow Depth = 2.39" for 25-Year event
 Inflow = 2.85 cfs @ 12.08 hrs, Volume= 0.253 af
 Outflow = 2.81 cfs @ 12.09 hrs, Volume= 0.251 af, Atten= 1%, Lag= 0.6 min
 Discarded = 0.10 cfs @ 11.75 hrs, Volume= 0.106 af
 Secondary = 2.71 cfs @ 12.09 hrs, Volume= 0.145 af

Routing by Stor-Ind method, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs / 4
 Peak Elev= 23.32' @ 12.09 hrs Surf.Area= 404 sf Storage= 880 cf

Plug-Flow detention time= 65.1 min calculated for 0.250 af (99% of inflow)
 Center-of-Mass det. time= 61.0 min (897.1 - 836.1)

Volume	Invert	Avail.Storage	Storage Description
#1	13.96'	299 cf	10.00'W x 24.00'L x 6.00'H Prismatic 1,440 cf Overall - 693 cf Embedded = 747 cf x 40.0% Voids
#2	13.96'	509 cf	6.00'D x 6.00'H Vertical Cone/Cylinder x 3 Inside #1 693 cf Overall - 6.0" Wall Thickness = 509 cf
#3	19.96'	28 cf	2.00'D x 3.00'H Vertical Cone/Cylinder x 3 -Impervious
#4	22.96'	878 cf	Custom Stage Data (Conic) Listed below (Recalc)
		1,714 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
22.96	83	0	0	83
24.00	393	228	228	398
25.00	947	650	878	959

Device	Routing	Invert	Outlet Devices
#1	Secondary	23.00'	2.0" x 2.0" Horiz. Orifice/Grate X 6.00 columns X 6 rows C= 0.600 Limited to weir flow at low heads
#2	Discarded	13.96'	8.270 in/hr Exfiltration over Wetted area from 13.96' - 23.00' Excluded Wetted area = 240 sf Phase-In= 0.01'

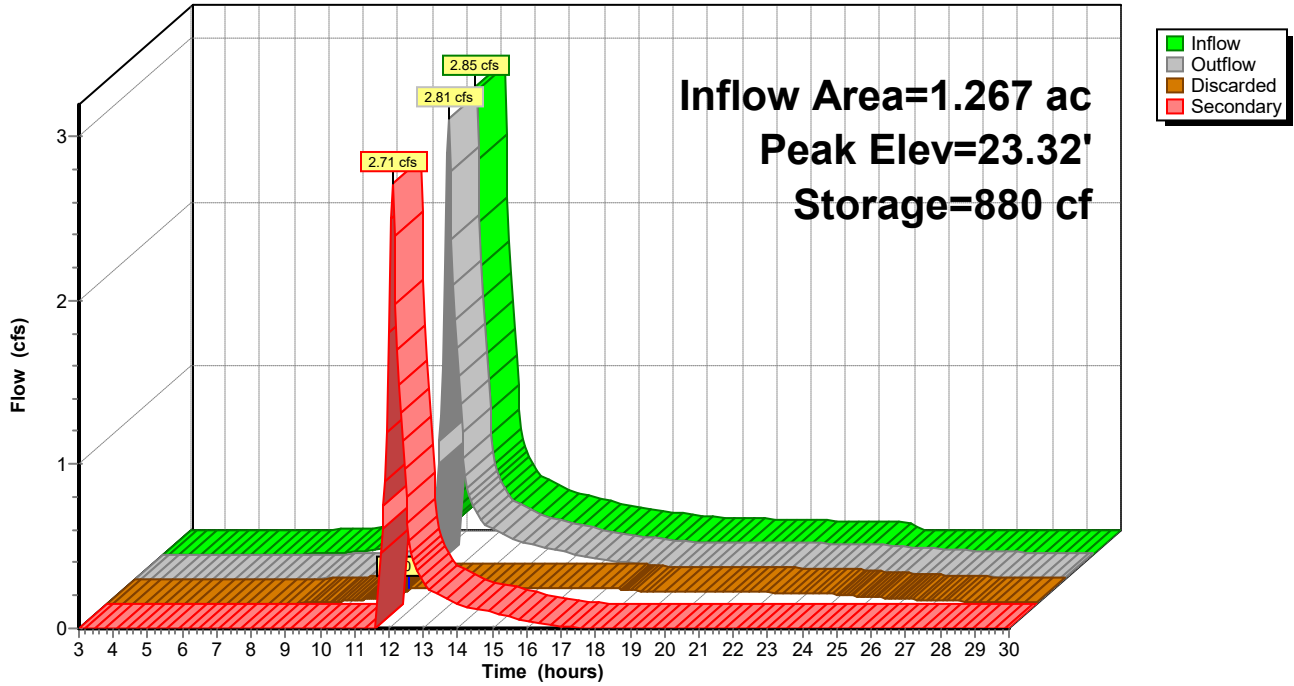
Discarded OutFlow Max=0.10 cfs @ 11.75 hrs HW=23.04' (Free Discharge)
 ↳ **2=Exfiltration** (Exfiltration Controls 0.10 cfs)

Secondary OutFlow Max=2.70 cfs @ 12.09 hrs HW=23.31' (Free Discharge)
 ↳ **1=Orifice/Grate** (Orifice Controls 2.70 cfs @ 2.70 fps)



Pond SIB-2: SIB-2

Hydrograph



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Type III 24-hr 25-Year Rainfall=6.19"

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Summary for Pond SIB-3: SIB-3

Inflow Area = 0.123 ac, 44.81% Impervious, Inflow Depth = 2.49" for 25-Year event
 Inflow = 0.39 cfs @ 12.02 hrs, Volume= 0.025 af
 Outflow = 0.05 cfs @ 12.79 hrs, Volume= 0.025 af, Atten= 89%, Lag= 46.2 min
 Discarded = 0.05 cfs @ 12.79 hrs, Volume= 0.025 af
 Secondary = 0.00 cfs @ 3.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs / 4
 Peak Elev= 17.42' @ 12.79 hrs Surf.Area= 240 sf Storage= 466 cf

Plug-Flow detention time= 168.9 min calculated for 0.025 af (99% of inflow)
 Center-of-Mass det. time= 163.7 min (1,007.4 - 843.7)

Volume	Invert	Avail.Storage	Storage Description
#1	13.96'	299 cf	10.00'W x 24.00'L x 6.00'H Prismatic 1,440 cf Overall - 693 cf Embedded = 747 cf x 40.0% Voids
#2	13.96'	509 cf	6.00'D x 6.00'H Vertical Cone/Cylinder x 3 Inside #1 693 cf Overall - 6.0" Wall Thickness = 509 cf
#3	19.96'	28 cf	2.00'D x 3.00'H Vertical Cone/Cylinder x 3 -Impervious
#4	22.96'	1,578 cf	Custom Stage Data (Irregular) Listed below (Recalc)
		2,414 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
22.96	817	126.0	0	0	817
24.00	2,350	206.0	1,578	1,578	2,938

Device	Routing	Invert	Outlet Devices
#1	Secondary	23.00'	2.0" x 2.0" Horiz. Orifice/Grate X 6.00 columns X 6 rows C= 0.600 Limited to weir flow at low heads
#2	Discarded	13.96'	8.270 in/hr Exfiltration over Wetted area from 13.96' - 23.00' Excluded Wetted area = 240 sf Phase-In= 0.01'

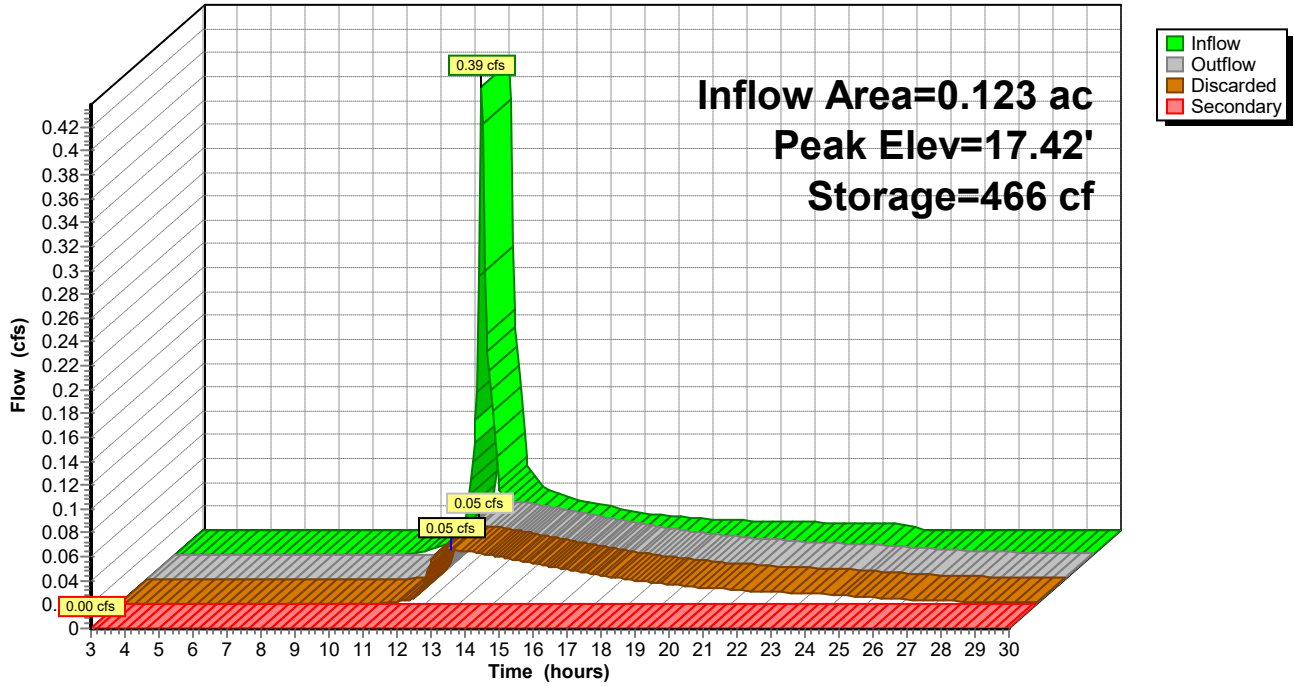
Discarded OutFlow Max=0.05 cfs @ 12.79 hrs HW=17.42' (Free Discharge)
 ↑ **2=Exfiltration** (Exfiltration Controls 0.05 cfs)

Secondary OutFlow Max=0.00 cfs @ 3.00 hrs HW=13.96' (Free Discharge)
 ↑ **1=Orifice/Grate** (Controls 0.00 cfs)



Pond SIB-3: SIB-3

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Summary for Pond SIB-4: SIB-4

Inflow Area = 0.903 ac, 36.30% Impervious, Inflow Depth = 1.63" for 25-Year event
 Inflow = 1.57 cfs @ 12.09 hrs, Volume= 0.123 af
 Outflow = 0.35 cfs @ 12.56 hrs, Volume= 0.121 af, Atten= 78%, Lag= 28.3 min
 Discarded = 0.35 cfs @ 12.56 hrs, Volume= 0.121 af
 Secondary = 0.00 cfs @ 3.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs / 4
 Peak Elev= 26.04' @ 12.56 hrs Surf.Area= 1,628 sf Storage= 1,614 cf

Plug-Flow detention time= 100.0 min calculated for 0.121 af (99% of inflow)
 Center-of-Mass det. time= 95.1 min (968.9 - 873.8)

Volume	Invert	Avail.Storage	Storage Description
#1	16.33'	248 cf	10.00'W x 17.00'L x 6.67'H Prismatic 1,134 cf Overall - 513 cf Embedded = 621 cf x 40.0% Voids
#2	16.33'	377 cf	6.00'D x 6.67'H Vertical Cone/Cylinder x 2 Inside #1 513 cf Overall - 6.0" Wall Thickness = 377 cf
#3	23.00'	0 cf	2.00'D x 2.00'H Vertical Cone/Cylinder 6 cf Overall x 0.0% Voids
#4	25.00'	2,852 cf	Custom Stage Data (Conic) Listed below (Recalc)
		3,477 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
25.00	514	0	0	514
26.00	1,416	928	928	1,422
27.00	2,482	1,924	2,852	2,500

Device	Routing	Invert	Outlet Devices
#1	Discarded	16.67'	8.270 in/hr Exfiltration over Wetted area above 16.67' Excluded Wetted area = 188 sf Phase-In= 0.01'
#2	Secondary	26.90'	528.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

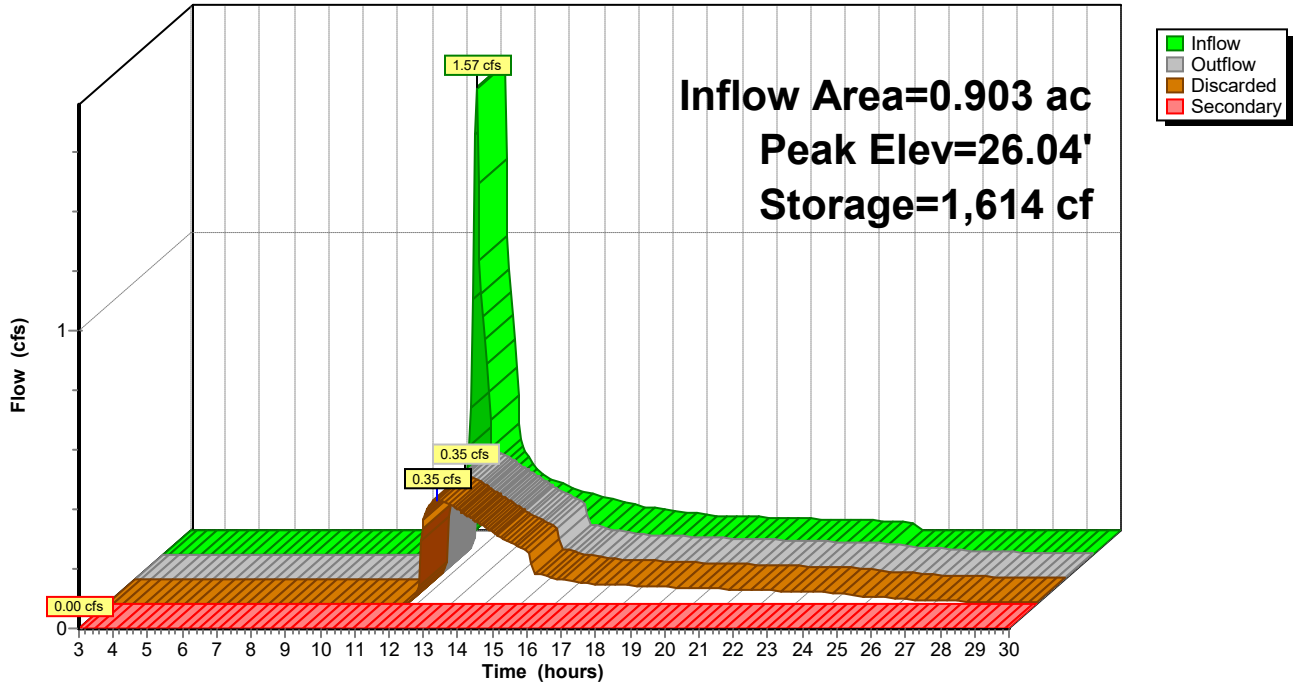
Discarded OutFlow Max=0.35 cfs @ 12.56 hrs HW=26.04' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.35 cfs)

Secondary OutFlow Max=0.00 cfs @ 3.00 hrs HW=16.33' (Free Discharge)
 ↑2=Orifice/Grate (Controls 0.00 cfs)



Pond SIB-4: SIB-4

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Type III 24-hr 50-Year Rainfall=7.33"

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Time span=3.00-30.00 hrs, dt=0.05 hrs, 541 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment DA1: DA1	Runoff Area=47,720 sf 36.62% Impervious Runoff Depth=2.94" Flow Length=191' Tc=12.7 min CN=61 Runoff=2.94 cfs 0.269 af
Subcatchment DA2: DA2	Runoff Area=29,170 sf 17.26% Impervious Runoff Depth=1.76" Flow Length=264' Tc=11.2 min CN=49 Runoff=0.99 cfs 0.098 af
Subcatchment DA3: DA3	Runoff Area=5,342 sf 44.81% Impervious Runoff Depth=3.36" Flow Length=88' Tc=0.9 min CN=65 Runoff=0.54 cfs 0.034 af
Subcatchment DA4: DA4	Runoff Area=39,760 sf 24.90% Impervious Runoff Depth=1.57" Tc=5.0 min CN=47 Runoff=1.43 cfs 0.120 af
Subcatchment DA4B: DA4B	Runoff Area=39,330 sf 36.30% Impervious Runoff Depth=2.34" Tc=5.0 min CN=55 Runoff=2.35 cfs 0.176 af
Subcatchment DA5: DA5	Runoff Area=46,882 sf 34.79% Impervious Runoff Depth=2.84" Flow Length=250' Tc=11.3 min CN=60 Runoff=2.90 cfs 0.255 af
Subcatchment DA6: DA6	Runoff Area=17,571 sf 72.63% Impervious Runoff Depth=5.23" Flow Length=125' Slope=0.0100 '/' Tc=5.8 min CN=82 Runoff=2.38 cfs 0.176 af
Subcatchment DA6B: DA6B	Runoff Area=8,464 sf 51.98% Impervious Runoff Depth=3.89" Flow Length=150' Slope=0.0100 '/' Tc=1.8 min CN=70 Runoff=0.97 cfs 0.063 af
Subcatchment DA7: DA7	Runoff Area=22,134 sf 56.17% Impervious Runoff Depth=4.11" Flow Length=200' Slope=0.0100 '/' Tc=14.2 min CN=72 Runoff=1.88 cfs 0.174 af
Reach RR Outlet DA1: Rip Rap Outlet	Avg. Flow Depth=0.19' Max Vel=1.38 fps Inflow=1.86 cfs 0.043 af n=0.078 L=15.0' S=0.0667 '/' Capacity=11.80 cfs Outflow=1.83 cfs 0.043 af
Pond CB DA5: CB DA5	Peak Elev=17.21' Storage=169 cf Inflow=2.90 cfs 0.255 af Discarded=0.03 cfs 0.030 af Primary=2.87 cfs 0.224 af Secondary=0.00 cfs 0.000 af Outflow=2.89 cfs 0.255 af
Pond CB DA7: CB DA7	Inflow=1.88 cfs 0.174 af Primary=1.88 cfs 0.174 af
Pond Ex. Basin DA4: DA4 EX. BASIN	Peak Elev=16.75' Storage=1,648 cf Inflow=1.43 cfs 0.120 af Discarded=0.20 cfs 0.120 af Secondary=0.00 cfs 0.000 af Outflow=0.20 cfs 0.120 af
Pond MH 1: MH1	Peak Elev=15.61' Inflow=2.87 cfs 0.224 af Primary=2.87 cfs 0.224 af Secondary=0.00 cfs 0.000 af Outflow=2.87 cfs 0.224 af
Pond MH2: MH2	Peak Elev=11.62' Inflow=2.87 cfs 0.224 af Primary=2.87 cfs 0.224 af Secondary=0.00 cfs 0.000 af Outflow=2.87 cfs 0.224 af
Pond RR Channel DA1: Rip Rap Channel DA1	Peak Elev=12.95' Storage=10 cf Inflow=2.87 cfs 0.224 af Discarded=0.01 cfs 0.005 af Primary=2.86 cfs 0.219 af Outflow=2.86 cfs 0.224 af

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Pond SIB-1: SIB-1

Peak Elev=11.65' Storage=5,255 cf Inflow=4.74 cfs 0.311 af
Discarded=0.73 cfs 0.311 af Secondary=0.00 cfs 0.000 af Outflow=0.73 cfs 0.311 af

Pond SIB-2: SIB-2

Peak Elev=23.57' Storage=930 cf Inflow=3.82 cfs 0.337 af
Discarded=0.10 cfs 0.118 af Secondary=3.64 cfs 0.217 af Outflow=3.73 cfs 0.335 af

Pond SIB-3: SIB-3

Peak Elev=18.76' Storage=647 cf Inflow=0.54 cfs 0.034 af
Discarded=0.06 cfs 0.034 af Secondary=0.00 cfs 0.000 af Outflow=0.06 cfs 0.034 af

Pond SIB-4: SIB-4

Peak Elev=26.60' Storage=2,570 cf Inflow=2.35 cfs 0.176 af
Discarded=0.46 cfs 0.176 af Secondary=0.00 cfs 0.000 af Outflow=0.46 cfs 0.176 af

Total Runoff Area = 5.886 ac Runoff Volume = 1.364 af Average Runoff Depth = 2.78"
62.95% Pervious = 3.705 ac 37.05% Impervious = 2.181 ac

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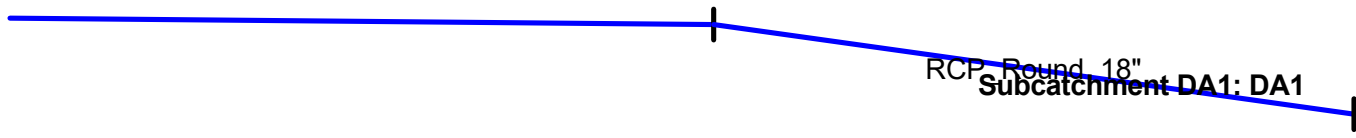
Summary for Subcatchment DA1: DA1

Runoff = 2.94 cfs @ 12.19 hrs, Volume= 0.269 af, Depth= 2.94"
 Routed to Pond SIB-1 : SIB-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs
 Type III 24-hr 50-Year Rainfall=7.33"

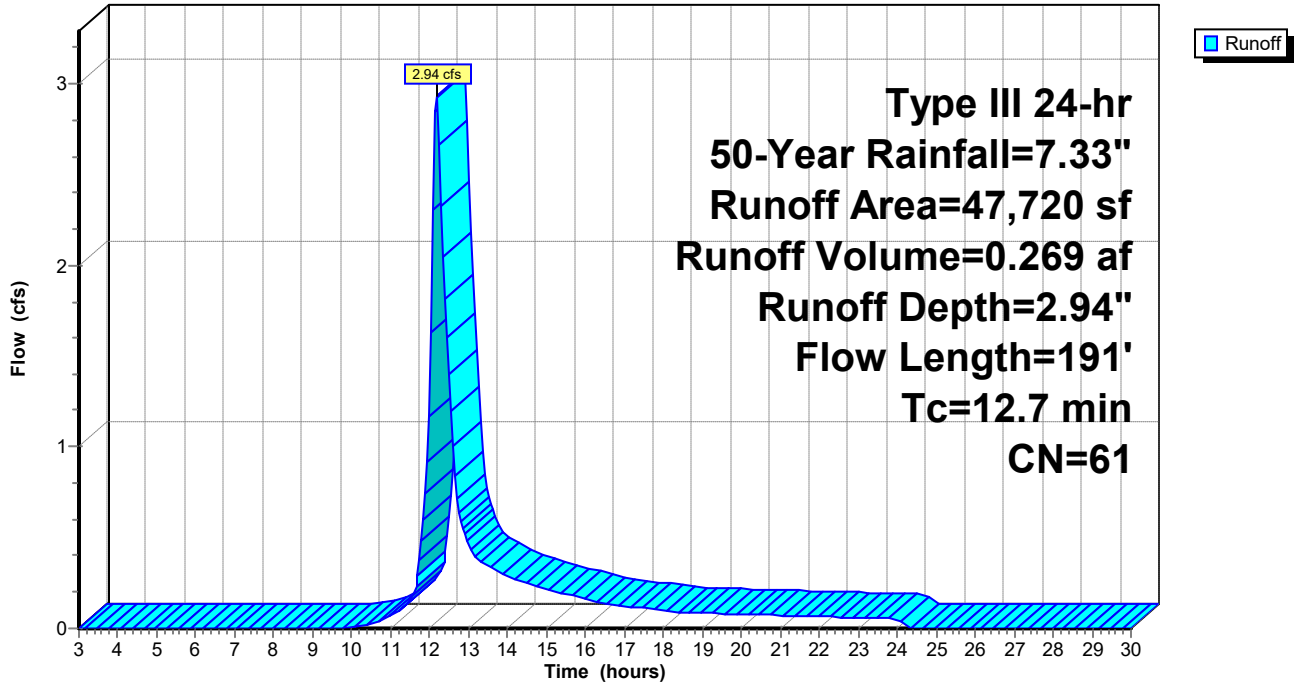
Area (sf)	CN	Description
* 17,477	98	
* 30,243	39	
47,720	61	Weighted Average
30,243		63.38% Pervious Area
17,477		36.62% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.6	100	0.0100	0.13		Sheet Flow, Grass: Short n= 0.150 P2= 3.35"
0.1	91	0.1500	23.02	40.68	Pipe Channel, RCP_Round 18" 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
12.7	191	Total			



Subcatchment DA1: DA1

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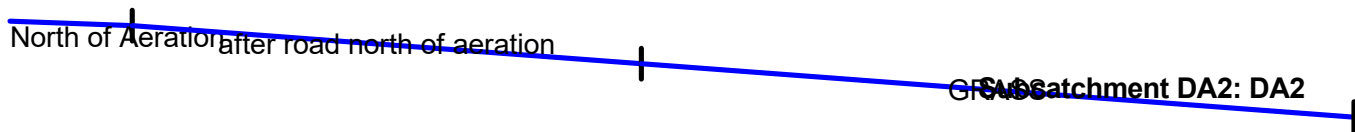
Summary for Subcatchment DA2: DA2

Runoff = 0.99 cfs @ 12.18 hrs, Volume= 0.098 af, Depth= 1.76"
 Routed to Pond SIB-2 : SIB-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs
 Type III 24-hr 50-Year Rainfall=7.33"

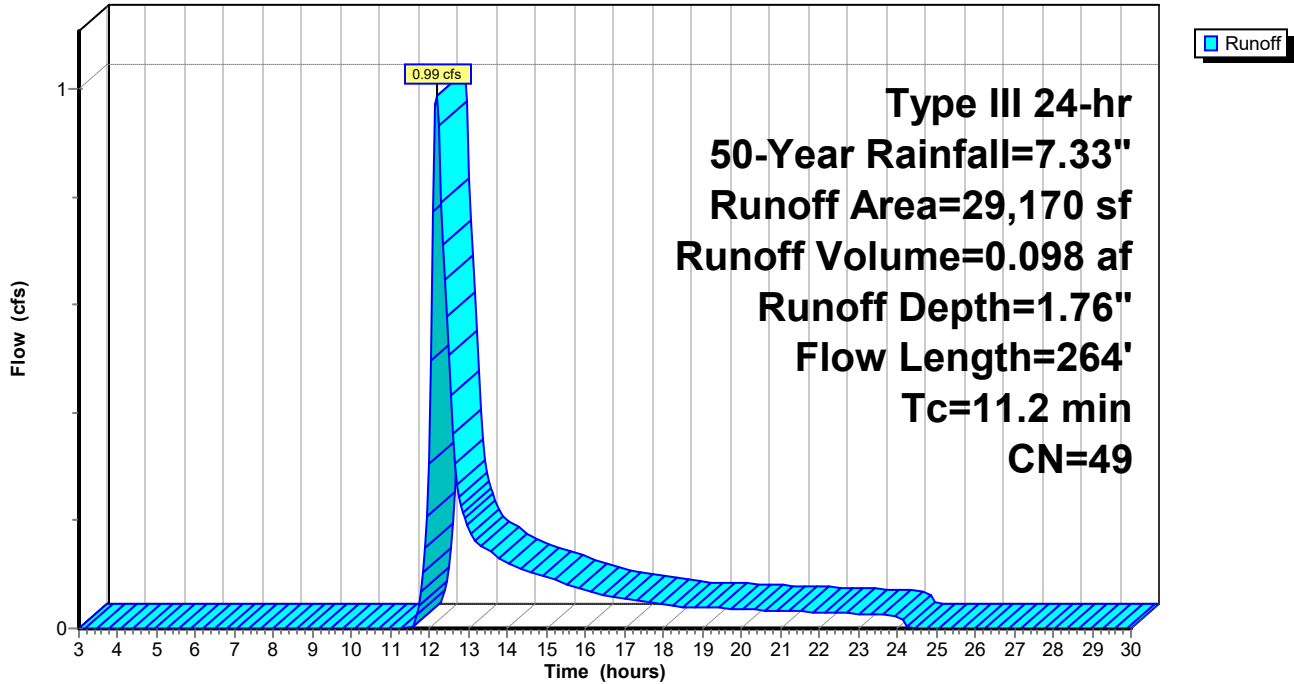
Area (sf)	CN	Description
* 5,035	98	Impervious
24,135	39	>75% Grass cover, Good, HSG A
29,170	49	Weighted Average
24,135		82.74% Pervious Area
5,035		17.26% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	24	0.0100	0.80		Sheet Flow, North of Aeration Smooth surfaces n= 0.011 P2= 3.35"
9.6	100	0.0200	0.17		Sheet Flow, after road north of aeration Grass: Short n= 0.150 P2= 3.35"
1.1	140	0.0200	2.12		Shallow Concentrated Flow, GRASS Grassed Waterway Kv= 15.0 fps
11.2	264	Total			



Subcatchment DA2: DA2

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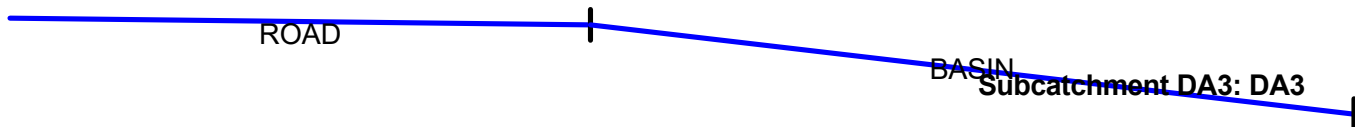
Summary for Subcatchment DA3: DA3

Runoff = 0.54 cfs @ 12.02 hrs, Volume= 0.034 af, Depth= 3.36"
 Routed to Pond SIB-3 : SIB-3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs
 Type III 24-hr 50-Year Rainfall=7.33"

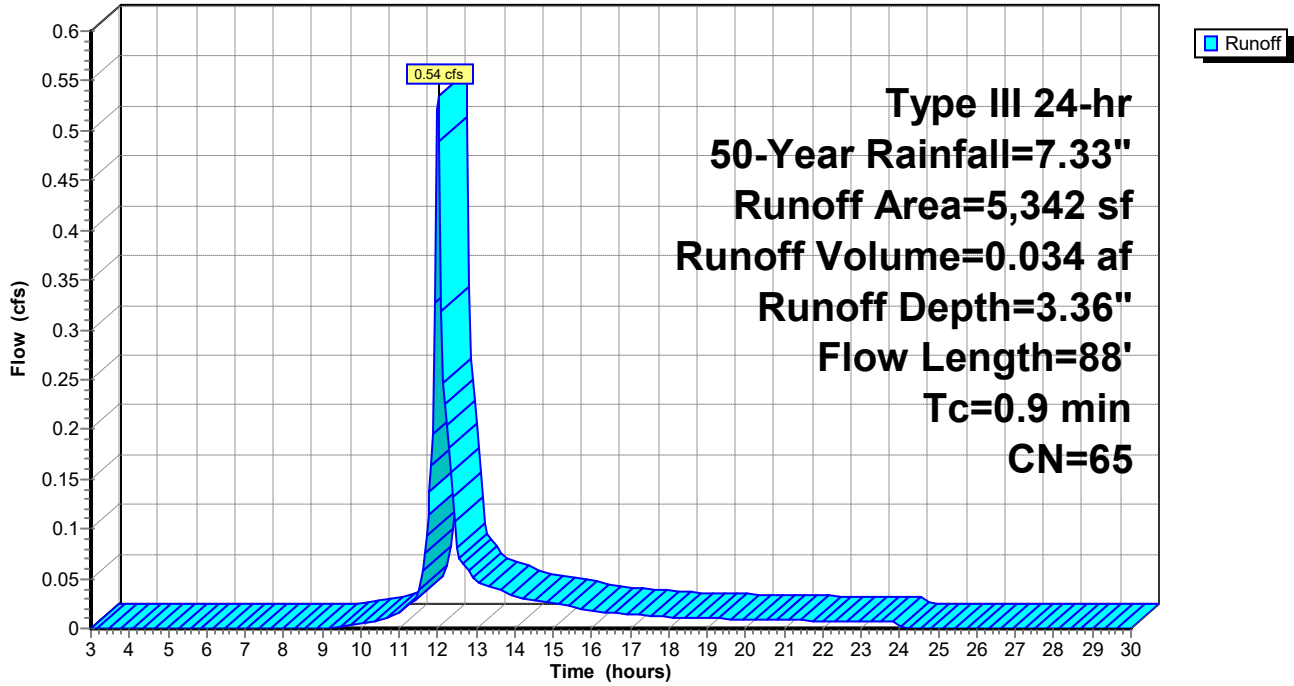
Area (sf)	CN	Description
* 2,394	98	IMPERVIOUS
2,948	39	>75% Grass cover, Good, HSG A
5,342	65	Weighted Average
2,948		55.19% Pervious Area
2,394		44.81% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	38	0.0100	0.88		Sheet Flow, ROAD Smooth surfaces n= 0.011 P2= 3.35"
0.2	50	0.1000	5.09		Shallow Concentrated Flow, BASIN Unpaved Kv= 16.1 fps
0.9	88	Total			



Subcatchment DA3: DA3

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Summary for Subcatchment DA4: DA4

Runoff = 1.43 cfs @ 12.10 hrs, Volume= 0.120 af, Depth= 1.57"
 Routed to Pond Ex. Basin DA4 : DA4 EX. BASIN

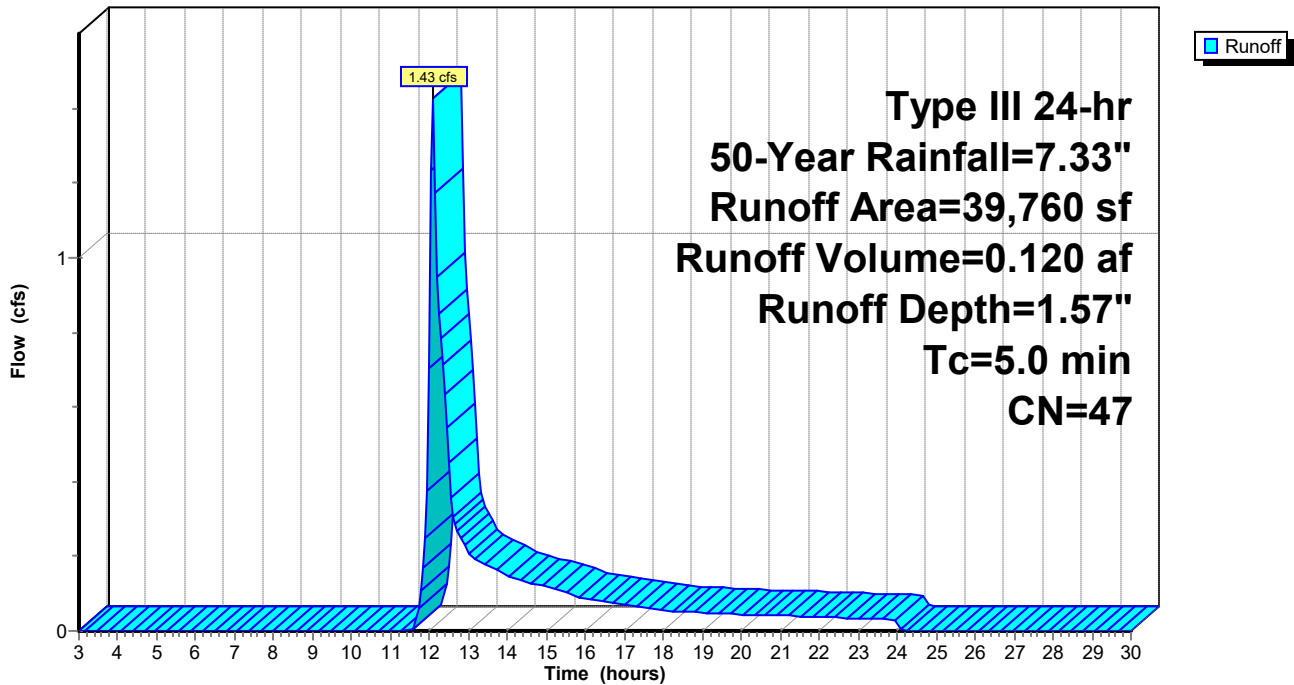
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs
 Type III 24-hr 50-Year Rainfall=7.33"

Area (sf)	CN	Description
29,860	30	Brush, Good, HSG A
* 9,900	98	ROAD
39,760	47	Weighted Average
29,860		75.10% Pervious Area
9,900		24.90% Impervious Area

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

Subcatchment DA4: DA4

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Summary for Subcatchment DA4B: DA4B

Runoff = 2.35 cfs @ 12.09 hrs, Volume= 0.176 af, Depth= 2.34"
 Routed to Pond SIB-4 : SIB-4

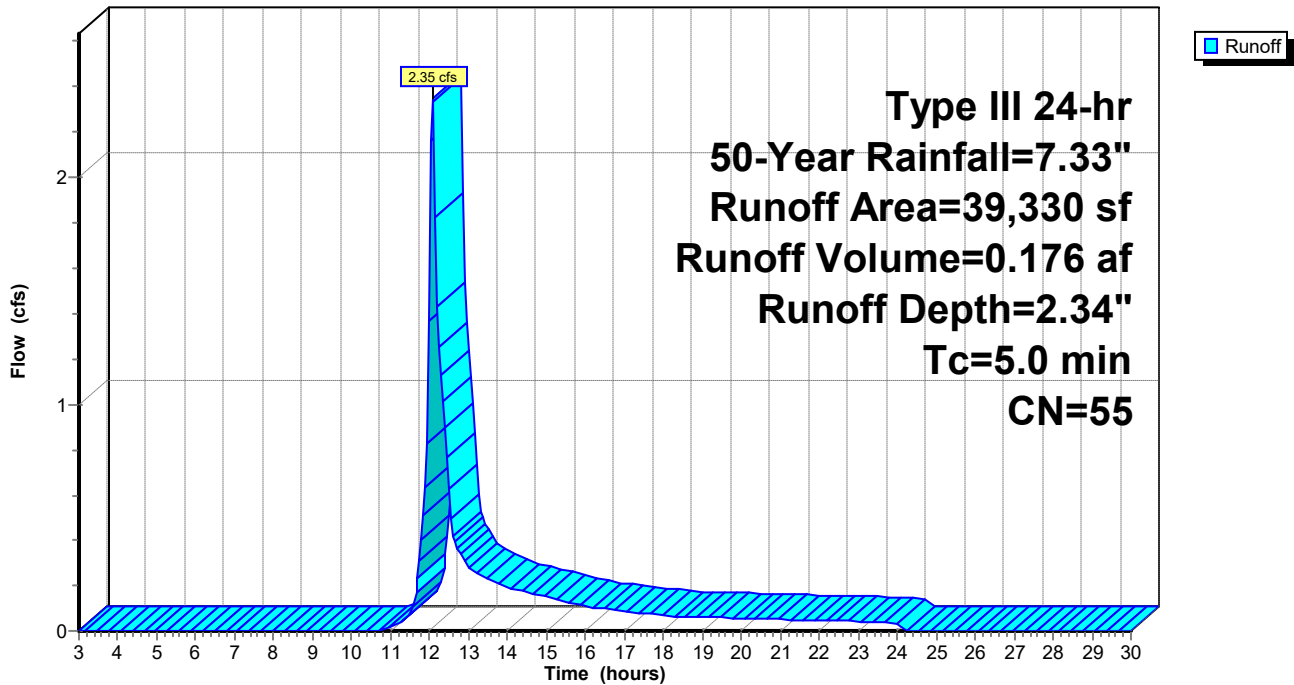
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs
 Type III 24-hr 50-Year Rainfall=7.33"

Area (sf)	CN	Description
25,053	30	Brush, Good, HSG A
* 14,277	98	ROAD
39,330	55	Weighted Average
25,053		63.70% Pervious Area
14,277		36.30% Impervious Area

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

Subcatchment DA4B: DA4B

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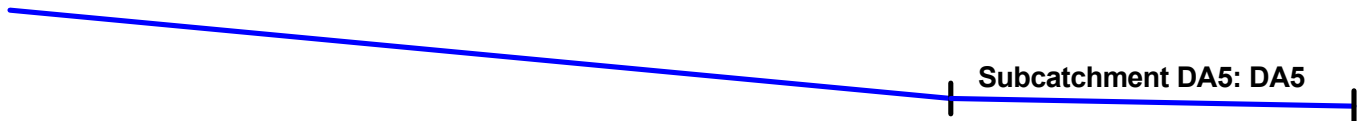
Summary for Subcatchment DA5: DA5

Runoff = 2.90 cfs @ 12.17 hrs, Volume= 0.255 af, Depth= 2.84"
 Routed to Pond CB DA5 : CB DA5

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs
 Type III 24-hr 50-Year Rainfall=7.33"

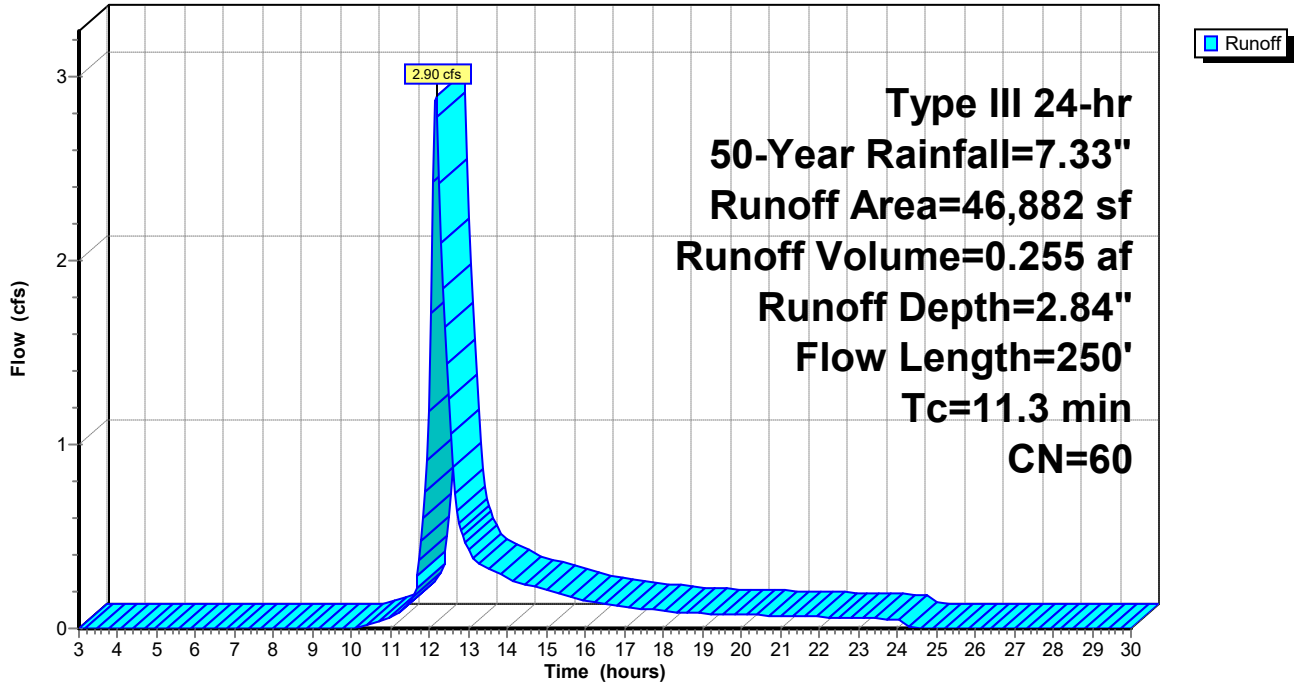
Area (sf)	CN	Description
* 16,312	98	ROAD
* 30,570	39	GRASSED AREA
46,882	60	Weighted Average
30,570		65.21% Pervious Area
16,312		34.79% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.3	175	0.0500	2.27		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.35"
10.0	75	0.0100	0.12		Sheet Flow, Grass: Short n= 0.150 P2= 3.35"
11.3	250	Total			



Subcatchment DA5: DA5

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Summary for Subcatchment DA6: DA6

Runoff = 2.38 cfs @ 12.09 hrs, Volume= 0.176 af, Depth= 5.23"
 Routed to Pond SIB-2 : SIB-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs
 Type III 24-hr 50-Year Rainfall=7.33"

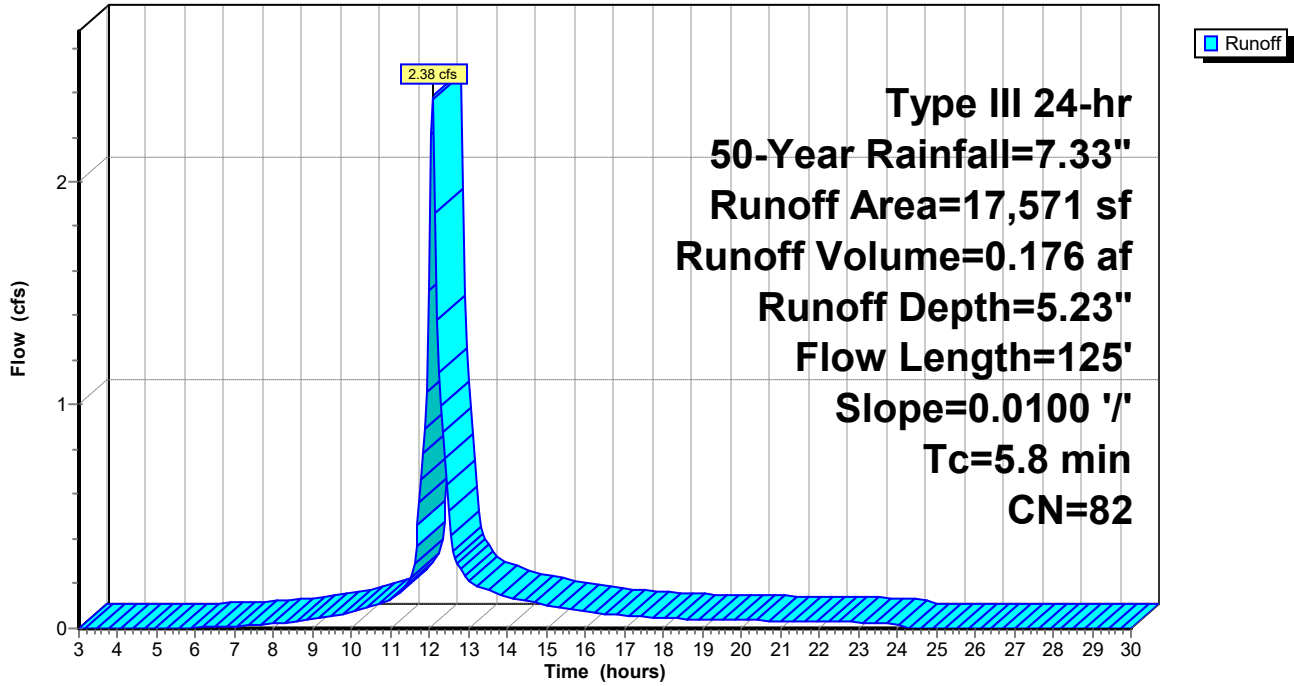
Area (sf)	CN	Description
* 12,762	98	
* 4,809	39	
17,571	82	Weighted Average
4,809		27.37% Pervious Area
12,762		72.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.6	100	0.0100	1.07		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.35"
4.2	25	0.0100	0.10		Sheet Flow, Grass: Short n= 0.150 P2= 3.35"
5.8	125	Total			



Subcatchment DA6: DA6

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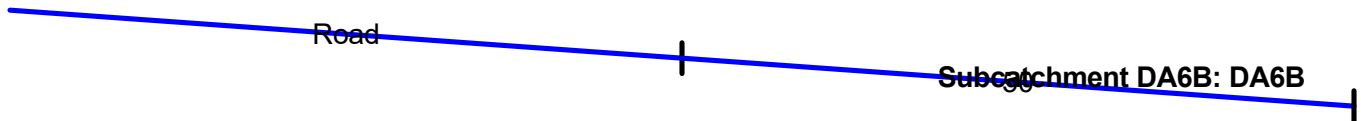
Summary for Subcatchment DA6B: DA6B

Runoff = 0.97 cfs @ 12.04 hrs, Volume= 0.063 af, Depth= 3.89"
 Routed to Pond SIB-2 : SIB-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs
 Type III 24-hr 50-Year Rainfall=7.33"

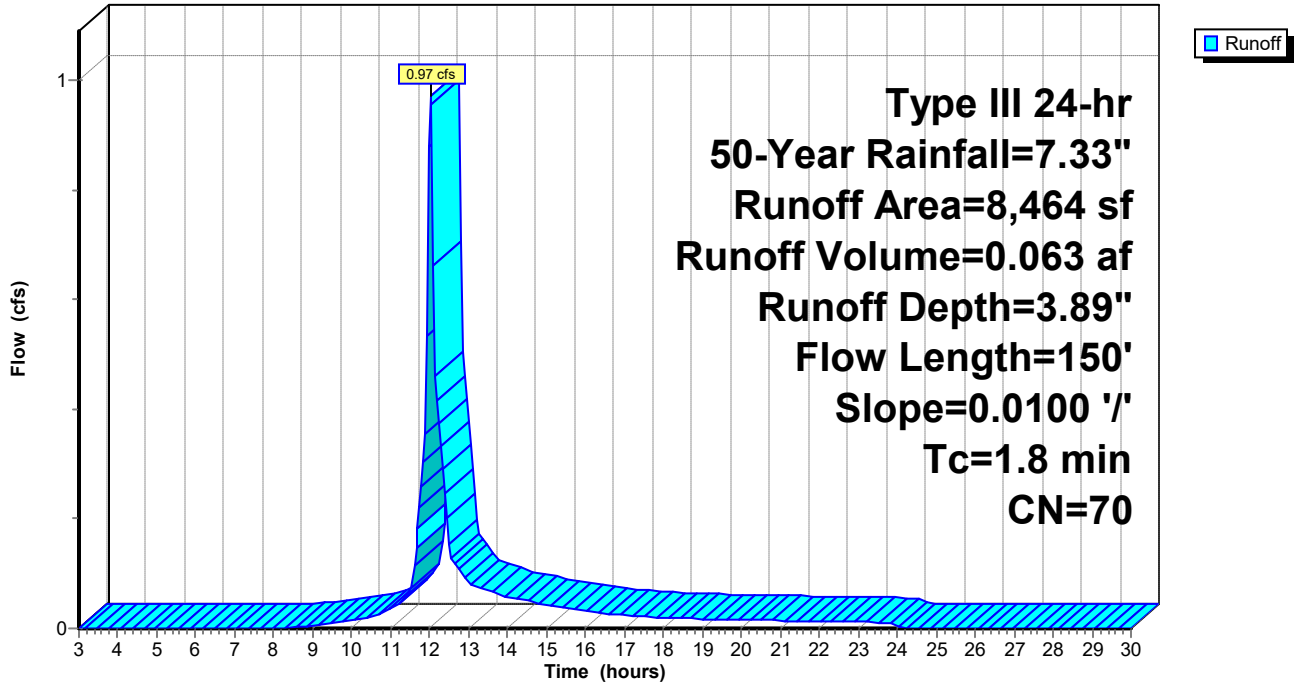
Area (sf)	CN	Description
* 4,400	98	IMPERVIOUS
4,064	39	>75% Grass cover, Good, HSG A
8,464	70	Weighted Average
4,064		48.02% Pervious Area
4,400		51.98% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	75	0.0100	1.01		Sheet Flow, Road Smooth surfaces n= 0.011 P2= 3.35"
0.6	75	0.0100	2.03		Shallow Concentrated Flow, 50 Paved Kv= 20.3 fps
1.8	150	Total			



Subcatchment DA6B: DA6B

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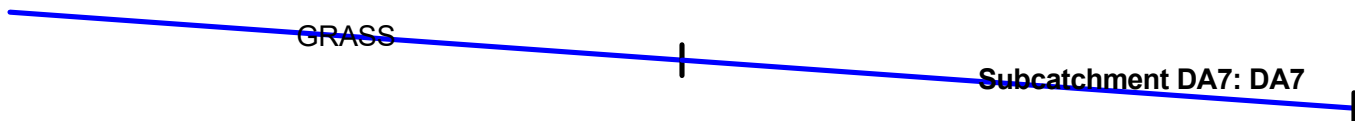
Summary for Subcatchment DA7: DA7

Runoff = 1.88 cfs @ 12.20 hrs, Volume= 0.174 af, Depth= 4.11"
 Routed to Pond CB DA7 : CB DA7

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs
 Type III 24-hr 50-Year Rainfall=7.33"

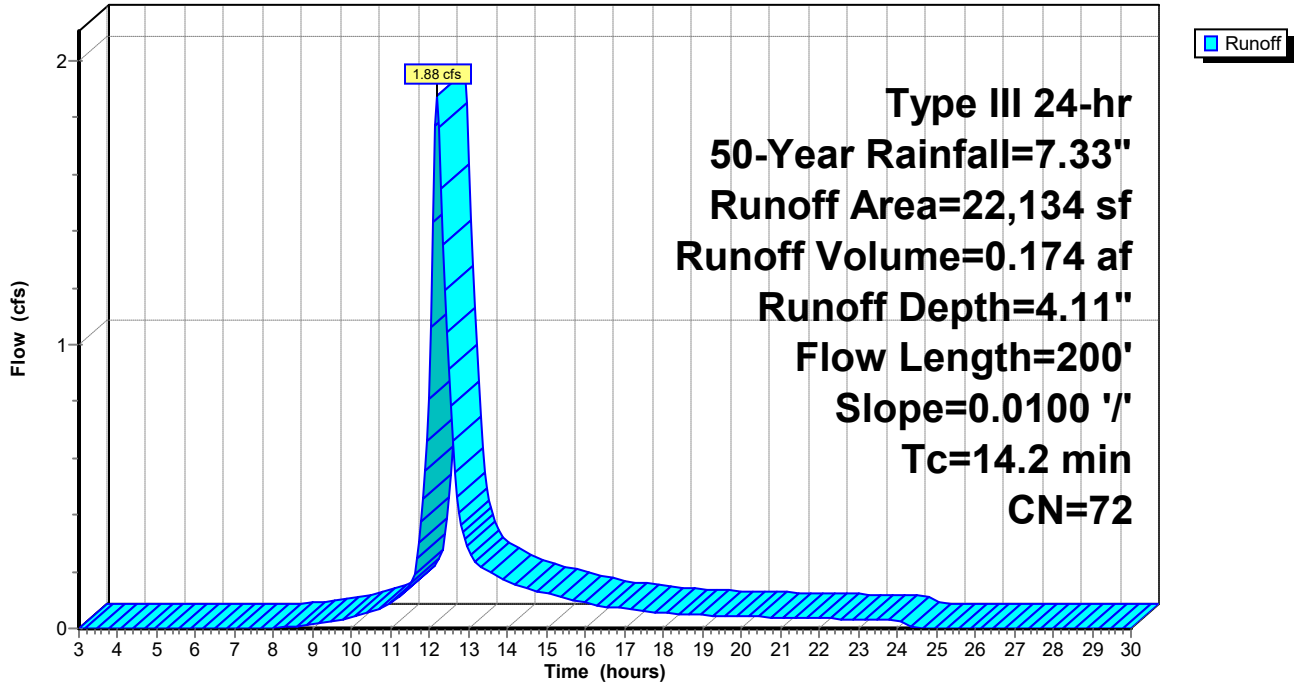
Area (sf)	CN	Description
9,701	39	>75% Grass cover, Good, HSG A
12,433	98	Paved parking, HSG A
22,134	72	Weighted Average
9,701		43.83% Pervious Area
12,433		56.17% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.6	100	0.0100	0.13		Sheet Flow, GRASS Grass: Short n= 0.150 P2= 3.35"
1.6	100	0.0100	1.07		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.35"
14.2	200	Total			



Subcatchment DA7: DA7

Hydrograph



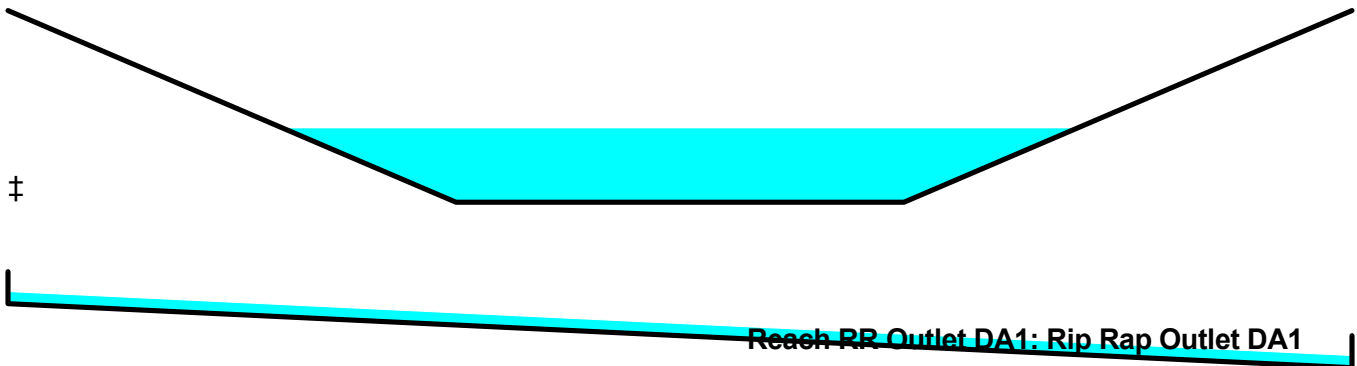
Summary for Reach RR Outlet DA1: Rip Rap Outlet DA1

Inflow Area = 1.076 ac, 34.79% Impervious, Inflow Depth = 0.48" for 50-Year event
Inflow = 1.86 cfs @ 12.17 hrs, Volume= 0.043 af, Incl. 1.00 cfs Inflow Loss
Outflow = 1.83 cfs @ 12.17 hrs, Volume= 0.043 af, Atten= 1%, Lag= 0.3 min
Routed to Pond SIB-1 : SIB-1

Routing by Stor-Ind+Trans method, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs / 3
Max. Velocity= 1.38 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 0.79 fps, Avg. Travel Time= 0.3 min

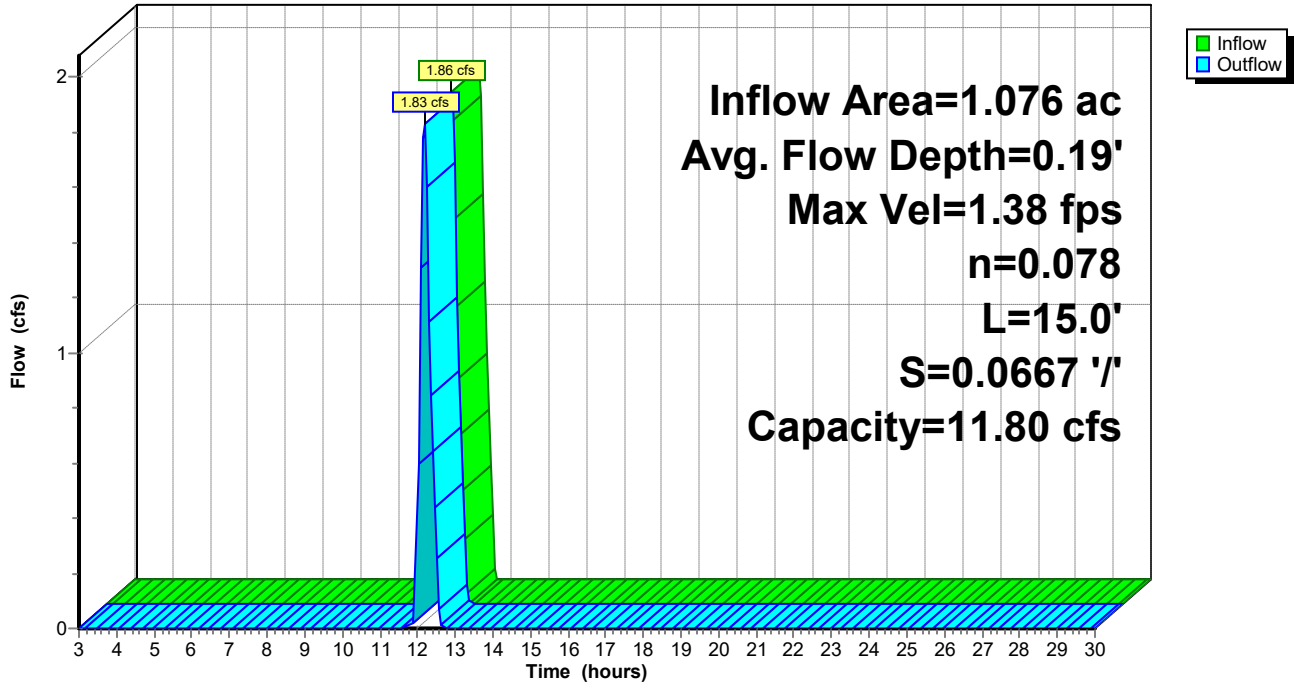
Peak Storage= 20 cf @ 12.17 hrs
Average Depth at Peak Storage= 0.19' , Surface Width= 8.85'
Bank-Full Depth= 0.50' Flow Area= 5.0 sf, Capacity= 11.80 cfs

5.00' x 0.50' deep channel, n= 0.078 Riprap, 12-inch
Side Slope Z-value= 10.0 ' Top Width= 15.00'
Length= 15.0' Slope= 0.0667 '
Inlet Invert= 10.80', Outlet Invert= 9.80'



Reach RR Outlet DA1: Rip Rap Outlet DA1

Hydrograph



Summary for Pond CB DA5: CB DA5

Inflow Area = 1.076 ac, 34.79% Impervious, Inflow Depth = 2.84" for 50-Year event
 Inflow = 2.90 cfs @ 12.17 hrs, Volume= 0.255 af
 Outflow = 2.89 cfs @ 12.17 hrs, Volume= 0.255 af, Atten= 0%, Lag= 0.1 min
 Discarded = 0.03 cfs @ 12.17 hrs, Volume= 0.030 af
 Primary = 2.87 cfs @ 12.17 hrs, Volume= 0.224 af
 Routed to Pond MH 1 : MH1
 Secondary = 0.00 cfs @ 3.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs / 4
 Peak Elev= 17.21' @ 12.17 hrs Surf.Area= 28 sf Storage= 169 cf

Plug-Flow detention time= 11.1 min calculated for 0.254 af (100% of inflow)
 Center-of-Mass det. time= 11.6 min (867.4 - 855.8)

Volume	Invert	Avail.Storage	Storage Description
#1	11.23'	302 cf	6.00'D x 10.67'H Vertical Cone/Cylinder
#2	22.00'	6,068 cf	Custom Stage Data (Conic) Listed below (Recalc)
		6,370 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
22.00	2,240	0	0	2,240
23.00	11,000	6,068	6,068	11,004

Device	Routing	Invert	Outlet Devices
#1	Discarded	11.23'	8.270 in/hr Exfiltration over Wetted area Phase-In= 0.01'
#2	Primary	16.30'	18.0" Round CMP_Round 18" L= 25.6' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 16.30' / 14.80' S= 0.0586 ' / Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf
#3	Secondary	22.90'	70.0" x 140.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#4	Secondary	21.80'	2.0" x 2.0" Horiz. Orifice/Grate X 8.00 columns X 8 rows C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.03 cfs @ 12.17 hrs HW=17.20' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.03 cfs)

Primary OutFlow Max=2.80 cfs @ 12.17 hrs HW=17.20' (Free Discharge)
 ↑2=CMP_Round 18" (Inlet Controls 2.80 cfs @ 2.54 fps)

Secondary OutFlow Max=0.00 cfs @ 3.00 hrs HW=11.23' (Free Discharge)
 ↑3=Orifice/Grate (Controls 0.00 cfs)
 ↑4=Orifice/Grate (Controls 0.00 cfs)

Wareham Post Construction

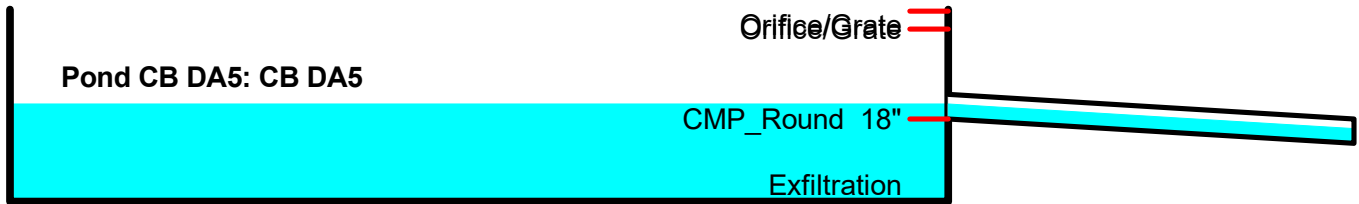
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Type III 24-hr 50-Year Rainfall=7.33"

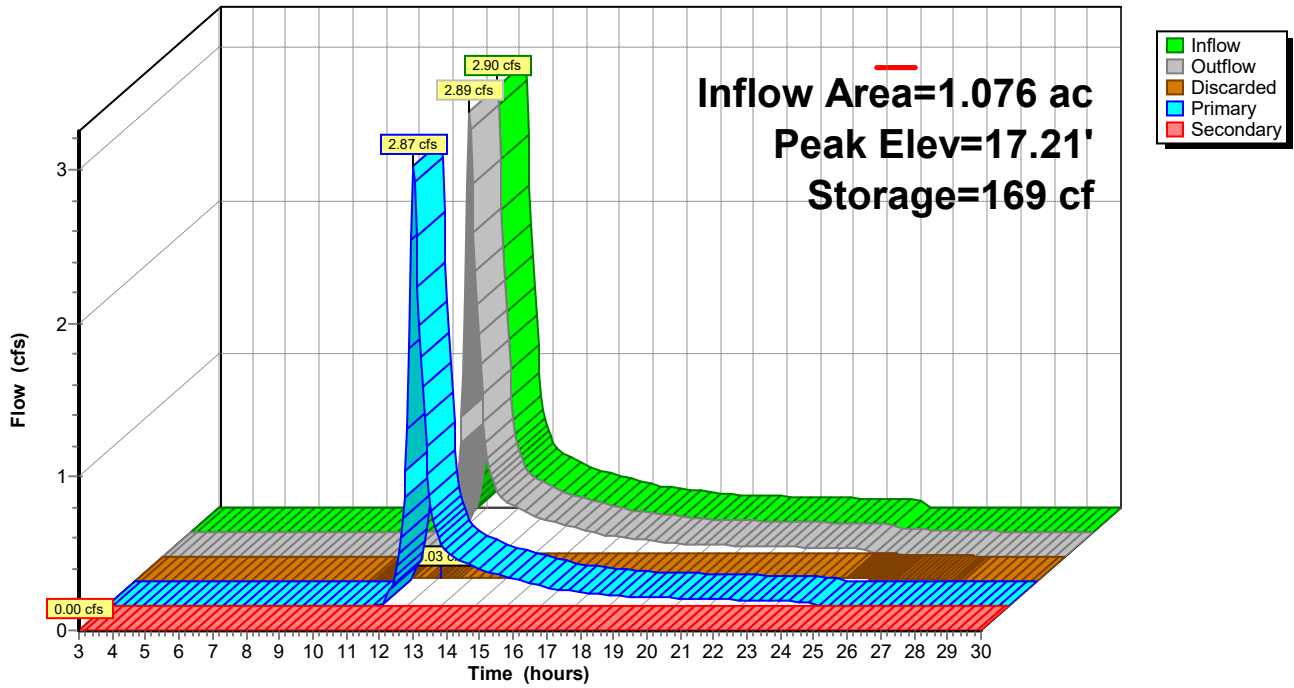
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Pond CB DA5: CB DA5

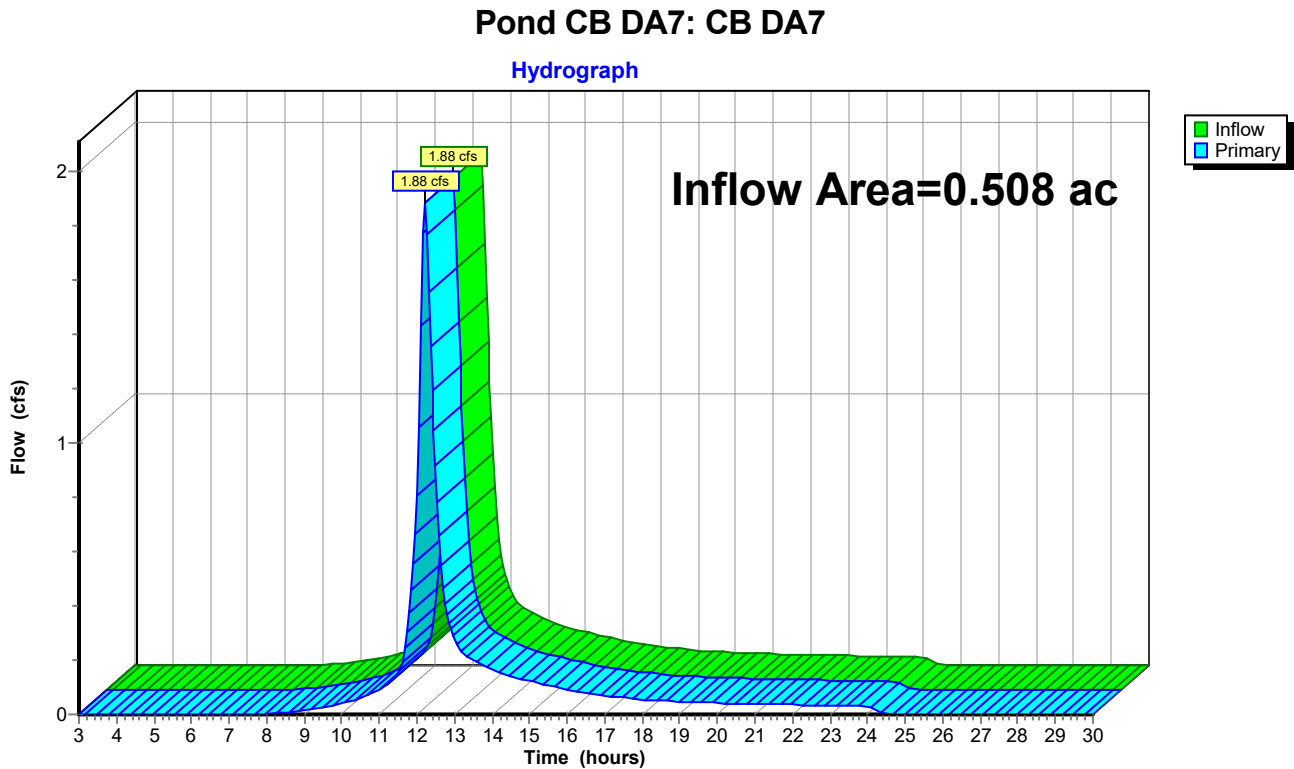
Hydrograph



Summary for Pond CB DA7: CB DA7

Inflow Area = 0.508 ac, 56.17% Impervious, Inflow Depth = 4.11" for 50-Year event
Inflow = 1.88 cfs @ 12.20 hrs, Volume= 0.174 af
Primary = 1.88 cfs @ 12.20 hrs, Volume= 0.174 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs



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Summary for Pond Ex. Basin DA4: DA4 EX. BASIN

Inflow Area = 0.913 ac, 24.90% Impervious, Inflow Depth = 1.57" for 50-Year event
 Inflow = 1.43 cfs @ 12.10 hrs, Volume= 0.120 af
 Outflow = 0.20 cfs @ 13.05 hrs, Volume= 0.120 af, Atten= 86%, Lag= 57.3 min
 Discarded = 0.20 cfs @ 13.05 hrs, Volume= 0.120 af
 Secondary = 0.00 cfs @ 3.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs / 3
 Peak Elev= 16.75' @ 13.05 hrs Surf.Area= 3,638 sf Storage= 1,648 cf

Plug-Flow detention time= 95.1 min calculated for 0.120 af (100% of inflow)
 Center-of-Mass det. time= 95.0 min (981.0 - 886.1)

Volume	Invert	Avail.Storage	Storage Description
#1	16.00'	2,708 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
16.00	1,025	0	0	1,025
17.00	4,866	2,708	2,708	4,870

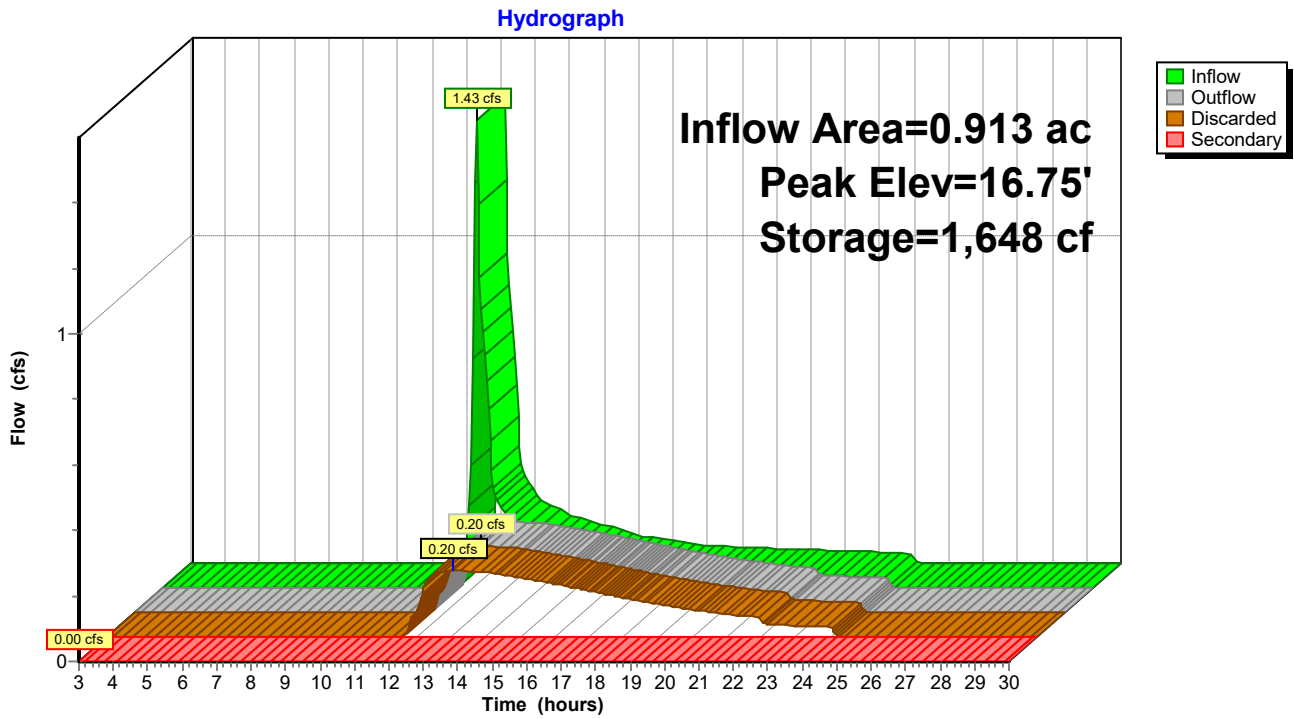
Device	Routing	Invert	Outlet Devices
#1	Discarded	16.00'	2.410 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Secondary	16.90'	360.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.20 cfs @ 13.05 hrs HW=16.75' (Free Discharge)
 ↑1=**Exfiltration** (Exfiltration Controls 0.20 cfs)

Secondary OutFlow Max=0.00 cfs @ 3.00 hrs HW=16.00' (Free Discharge)
 ↑2=**Orifice/Grate** (Controls 0.00 cfs)



Pond Ex. Basin DA4: DA4 EX. BASIN



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Summary for Pond MH 1: MH1

Inflow Area = 1.076 ac, 34.79% Impervious, Inflow Depth = 2.50" for 50-Year event
 Inflow = 2.87 cfs @ 12.17 hrs, Volume= 0.224 af
 Outflow = 2.87 cfs @ 12.17 hrs, Volume= 0.224 af, Atten= 0%, Lag= 0.0 min
 Primary = 2.87 cfs @ 12.17 hrs, Volume= 0.224 af
 Routed to Pond MH2 : MH2
 Secondary = 0.00 cfs @ 3.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs
 Peak Elev= 15.61' @ 12.17 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	14.70'	18.0" Round CMP_Round 18" L= 156.1' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 14.70' / 11.50' S= 0.0205 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf
#2	Secondary	24.00'	24.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=2.80 cfs @ 12.17 hrs HW=15.60' (Free Discharge)
 ↑1=CMP_Round 18" (Inlet Controls 2.80 cfs @ 2.55 fps)

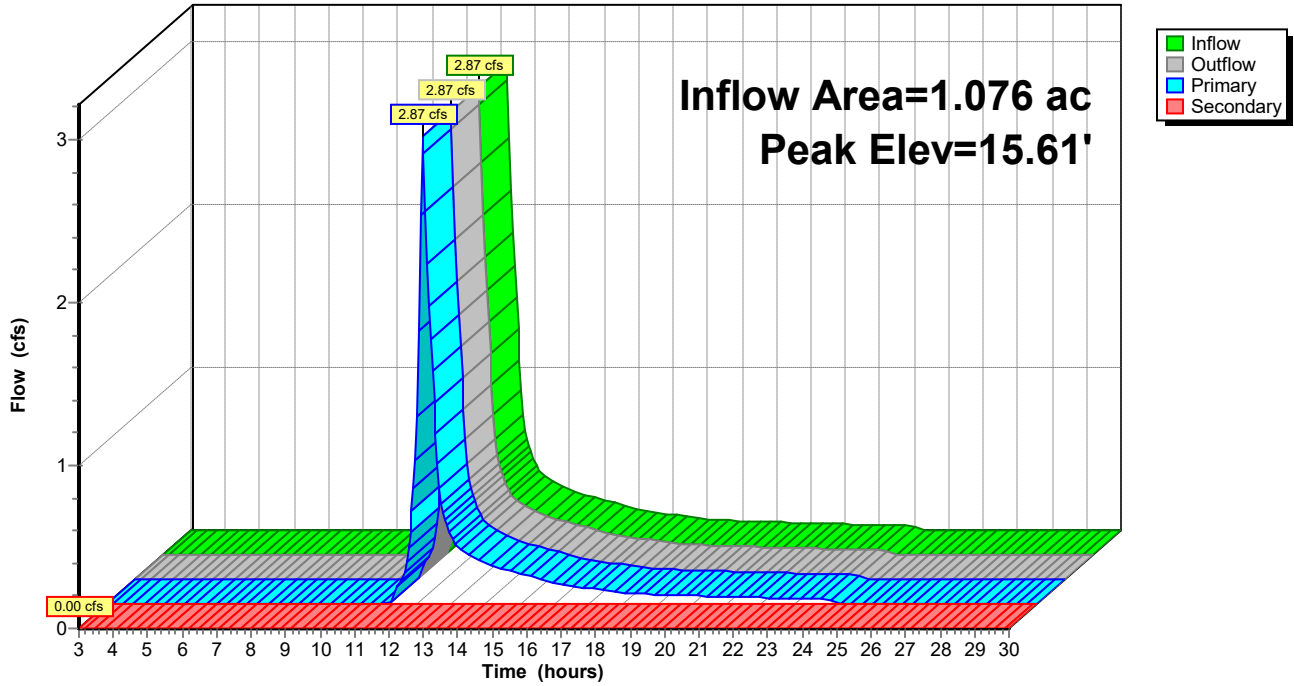
Secondary OutFlow Max=0.00 cfs @ 3.00 hrs HW=14.70' (Free Discharge)
 ↑2=Orifice/Grate (Controls 0.00 cfs)

Orifice/Grate



Pond MH 1: MH1

Hydrograph



Summary for Pond MH2: MH2

Inflow Area = 1.076 ac, 34.79% Impervious, Inflow Depth = 2.50" for 50-Year event
 Inflow = 2.87 cfs @ 12.17 hrs, Volume= 0.224 af
 Outflow = 2.87 cfs @ 12.17 hrs, Volume= 0.224 af, Atten= 0%, Lag= 0.0 min
 Primary = 2.87 cfs @ 12.17 hrs, Volume= 0.224 af
 Routed to Pond RR Channel DA1 : Rip Rap Channel DA1
 Secondary = 0.00 cfs @ 3.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs
 Peak Elev= 11.62' @ 12.17 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	11.40'	18.0" Round CMP_Round 18" L= 118.9' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 11.40' / 10.80' S= 0.0050 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf
#2	Secondary	24.00'	24.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Primary	10.80'	15.00' long x 6.00' breadth x 1.00' high Rock Fill Rock Diam.= 12.000", S.D.= 1.000", Voids= 40.0%

Primary OutFlow Max=2.79 cfs @ 12.17 hrs HW=11.61' (Free Discharge)
 ↑1=CMP_Round 18" (Barrel Controls 0.19 cfs @ 1.87 fps)
 ↓3=Rock Fill (Rockfill Controls 2.60 cfs @ 0.43 fps)

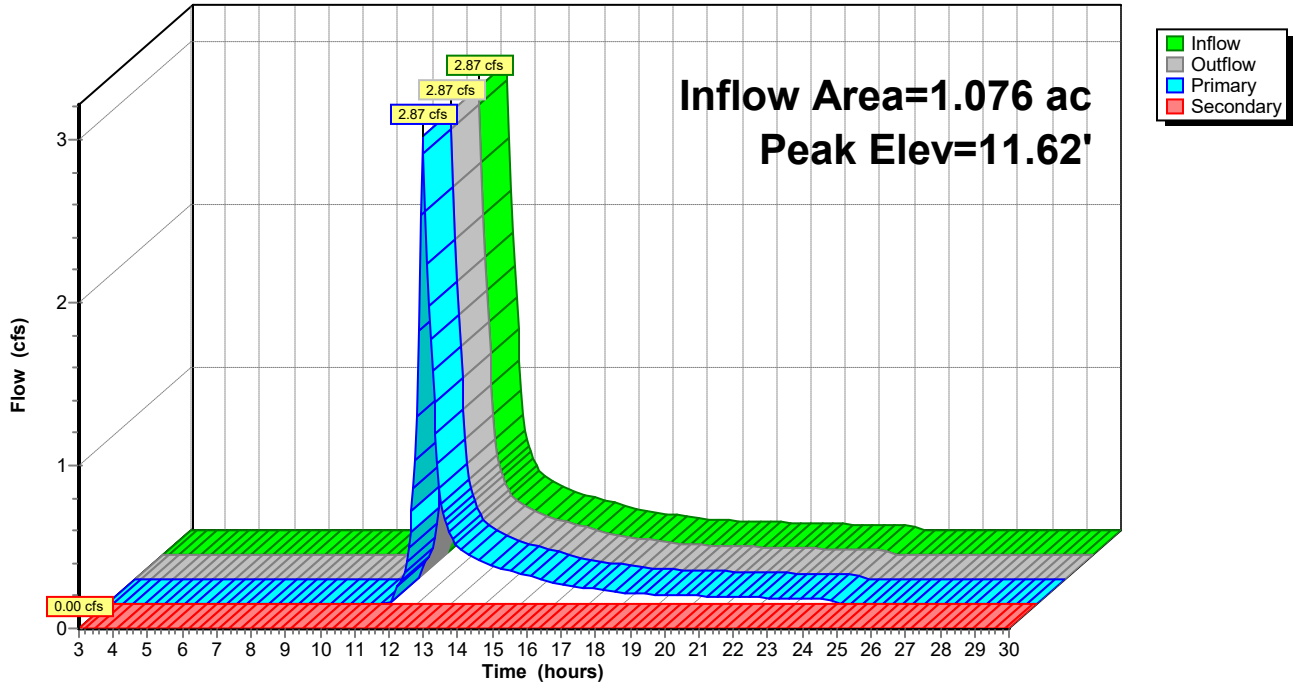
Secondary OutFlow Max=0.00 cfs @ 3.00 hrs HW=10.80' (Free Discharge)
 ↑2=Orifice/Grate (Controls 0.00 cfs)

— Orifice/Grate



Pond MH2: MH2

Hydrograph

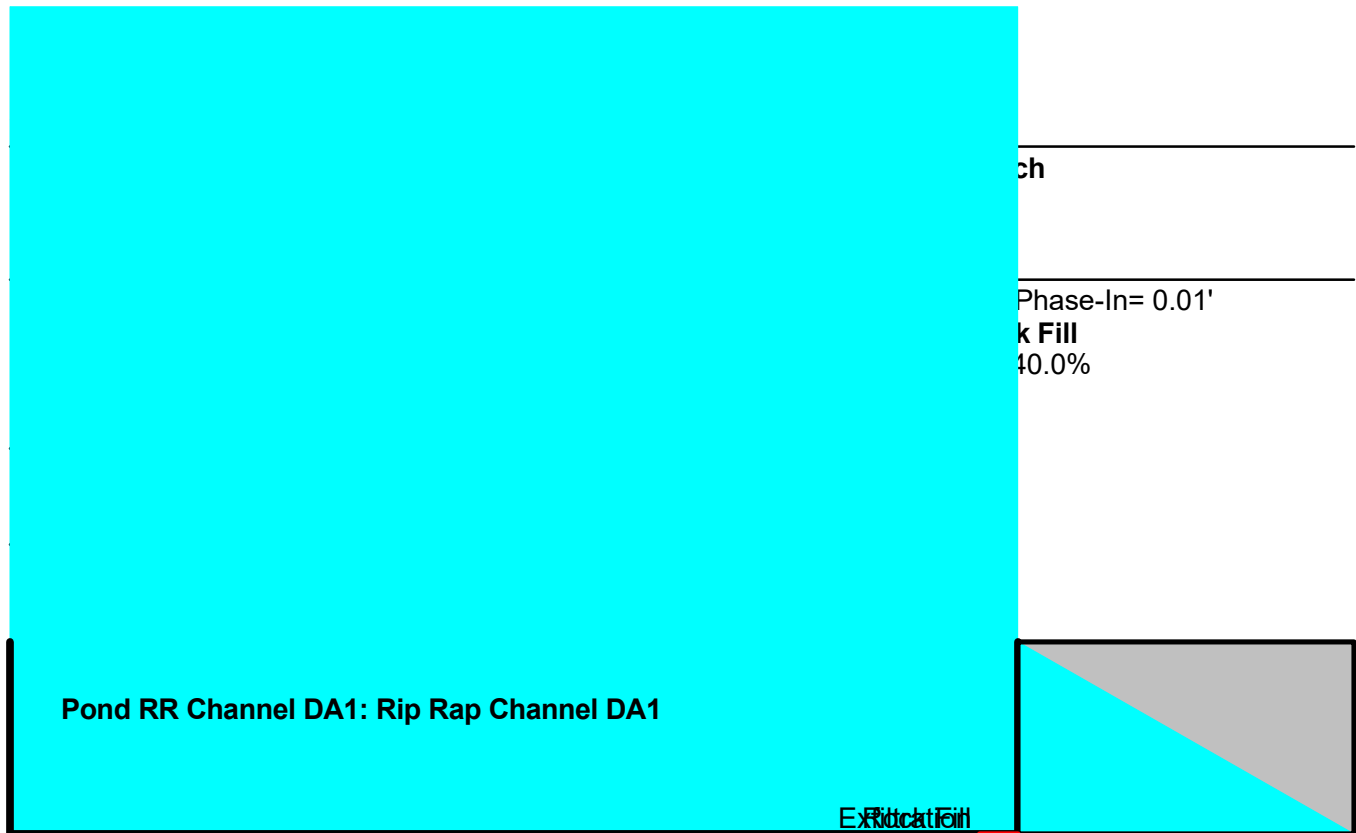


Summary for Pond RR Channel DA1: Rip Rap Channel DA1

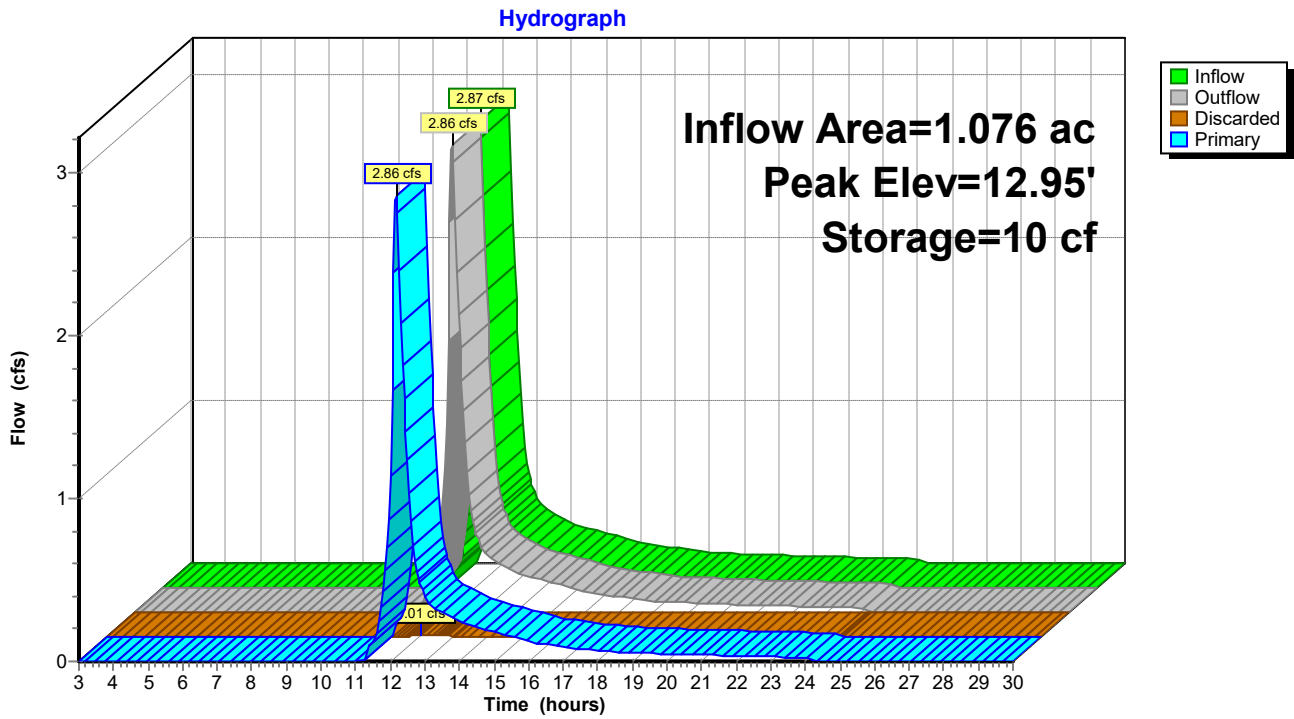
Inflow Area = 1.076 ac, 34.79% Impervious, Inflow Depth = 2.50" for 50-Year event
Inflow = 2.87 cfs @ 12.17 hrs, Volume= 0.224 af
Outflow = 2.86 cfs @ 12.17 hrs, Volume= 0.224 af, Atten= 0%, Lag= 0.0 min
Discarded = 0.01 cfs @ 12.05 hrs, Volume= 0.005 af
Primary = 2.86 cfs @ 12.17 hrs, Volume= 0.219 af

Routed to Reach RR Outlet DA1 : Rip Rap Outlet DA1

Routing by Stor-Ind method, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 12.95' @ 12.17 hrs Storage= 10 cf



Pond RR Channel DA1: Rip Rap Channel DA1



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Summary for Pond SIB-1: SIB-1

Inflow Area = 2.172 ac, 35.72% Impervious, Inflow Depth = 1.72" for 50-Year event
 Inflow = 4.74 cfs @ 12.18 hrs, Volume= 0.311 af
 Outflow = 0.73 cfs @ 12.70 hrs, Volume= 0.311 af, Atten= 85%, Lag= 31.3 min
 Discarded = 0.73 cfs @ 12.70 hrs, Volume= 0.311 af
 Secondary = 0.00 cfs @ 3.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs
 Peak Elev= 11.65' @ 12.70 hrs Surf.Area= 3,749 sf Storage= 5,255 cf

Plug-Flow detention time= 63.4 min calculated for 0.311 af (100% of inflow)
 Center-of-Mass det. time= 63.4 min (901.5 - 838.2)

Volume	Invert	Avail.Storage	Storage Description
#1	10.00'	123,310 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
10.00	2,664	0	0	2,664
11.00	3,306	2,979	2,979	3,334
12.00	4,005	3,650	6,629	4,066
13.00	4,760	4,377	11,006	4,856
14.00	5,572	5,161	16,167	5,707
15.00	6,440	6,001	22,168	6,617
16.00	7,365	6,897	29,065	7,588
17.00	8,347	7,851	36,916	8,619
18.00	9,385	8,861	45,777	9,709
19.00	10,480	9,927	55,704	10,860
20.00	11,630	11,050	66,754	12,069
21.00	12,837	12,229	78,983	13,338
22.00	14,101	13,464	92,447	14,667
23.00	15,422	14,757	107,203	16,057
24.00	16,800	16,106	123,310	17,506

Device	Routing	Invert	Outlet Devices
#1	Discarded	10.00'	8.270 in/hr Exfiltration over Wetted area Phase-In= 0.01'
#2	Secondary	23.90'	360.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.73 cfs @ 12.70 hrs HW=11.65' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.73 cfs)

Secondary OutFlow Max=0.00 cfs @ 3.00 hrs HW=10.00' (Free Discharge)
 ↑2=Orifice/Grate (Controls 0.00 cfs)

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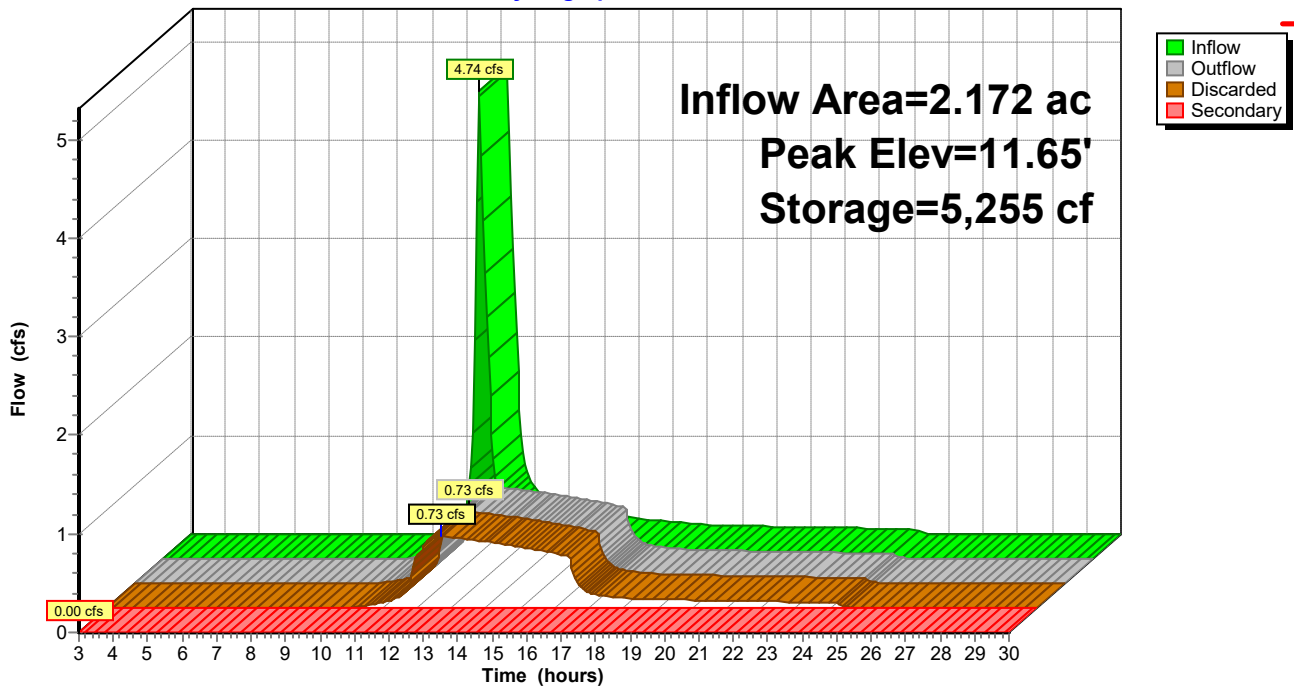
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Pond SIB-1: SIB-1

Hydrograph



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Summary for Pond SIB-2: SIB-2

Inflow Area = 1.267 ac, 40.21% Impervious, Inflow Depth = 3.19" for 50-Year event
 Inflow = 3.82 cfs @ 12.09 hrs, Volume= 0.337 af
 Outflow = 3.73 cfs @ 12.10 hrs, Volume= 0.335 af, Atten= 2%, Lag= 1.0 min
 Discarded = 0.10 cfs @ 11.50 hrs, Volume= 0.118 af
 Secondary = 3.64 cfs @ 12.10 hrs, Volume= 0.217 af

Routing by Stor-Ind method, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs / 4
 Peak Elev= 23.57' @ 12.10 hrs Surf.Area= 477 sf Storage= 930 cf

Plug-Flow detention time= 53.7 min calculated for 0.335 af (99% of inflow)
 Center-of-Mass det. time= 49.5 min (879.5 - 830.0)

Volume	Invert	Avail.Storage	Storage Description
#1	13.96'	299 cf	10.00'W x 24.00'L x 6.00'H Prismaoid 1,440 cf Overall - 693 cf Embedded = 747 cf x 40.0% Voids
#2	13.96'	509 cf	6.00'D x 6.00'H Vertical Cone/Cylinder x 3 Inside #1 693 cf Overall - 6.0" Wall Thickness = 509 cf
#3	19.96'	28 cf	2.00'D x 3.00'H Vertical Cone/Cylinder x 3 -Impervious
#4	22.96'	878 cf	Custom Stage Data (Conic) Listed below (Recalc)
		1,714 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
22.96	83	0	0	83
24.00	393	228	228	398
25.00	947	650	878	959

Device	Routing	Invert	Outlet Devices
#1	Secondary	23.00'	2.0" x 2.0" Horiz. Orifice/Grate X 6.00 columns X 6 rows C= 0.600 Limited to weir flow at low heads
#2	Discarded	13.96'	8.270 in/hr Exfiltration over Wetted area from 13.96' - 23.00' Excluded Wetted area = 240 sf Phase-In= 0.01'

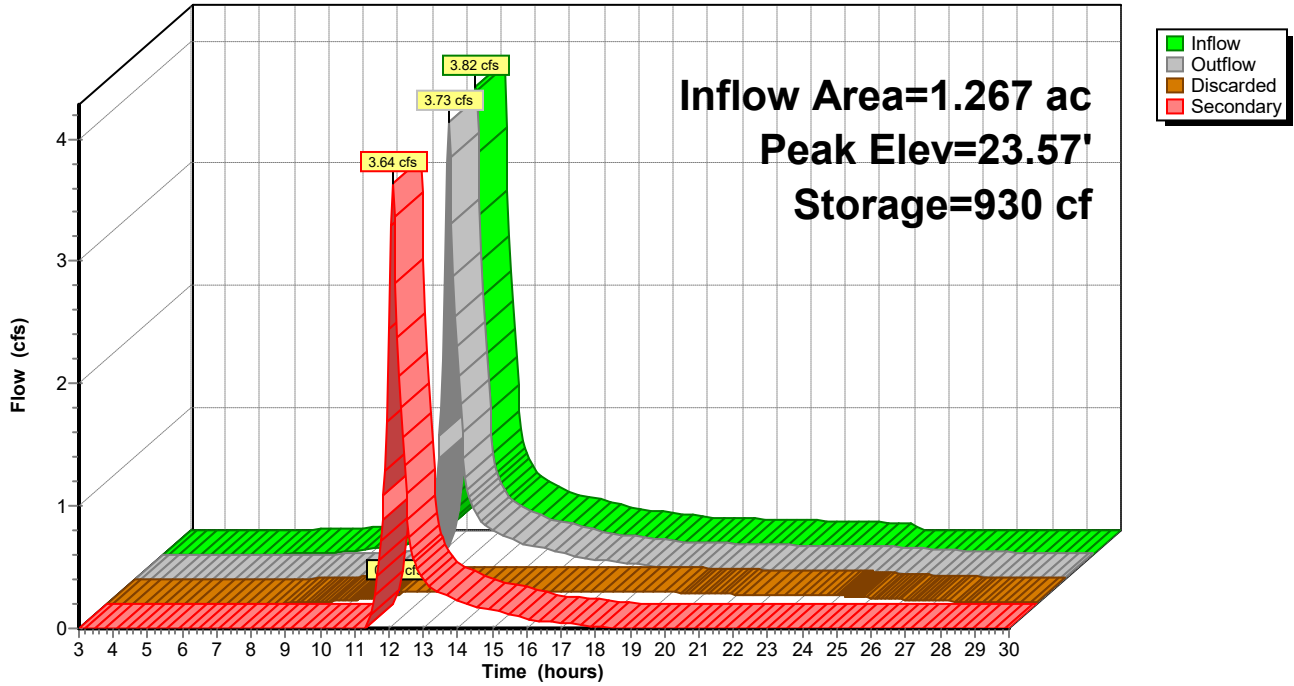
Discarded OutFlow Max=0.10 cfs @ 11.50 hrs HW=23.02' (Free Discharge)
 ↑**2=Exfiltration** (Exfiltration Controls 0.10 cfs)

Secondary OutFlow Max=3.62 cfs @ 12.10 hrs HW=23.57' (Free Discharge)
 ↑**1=Orifice/Grate** (Orifice Controls 3.62 cfs @ 3.62 fps)



Pond SIB-2: SIB-2

Hydrograph



Summary for Pond SIB-3: SIB-3

Inflow Area = 0.123 ac, 44.81% Impervious, Inflow Depth = 3.36" for 50-Year event
 Inflow = 0.54 cfs @ 12.02 hrs, Volume= 0.034 af
 Outflow = 0.06 cfs @ 12.72 hrs, Volume= 0.034 af, Atten= 88%, Lag= 41.8 min
 Discarded = 0.06 cfs @ 12.72 hrs, Volume= 0.034 af
 Secondary = 0.00 cfs @ 3.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs / 4
 Peak Elev= 18.76' @ 12.72 hrs Surf.Area= 240 sf Storage= 647 cf

Plug-Flow detention time= 169.1 min calculated for 0.034 af (99% of inflow)
 Center-of-Mass det. time= 164.0 min (999.0 - 834.9)

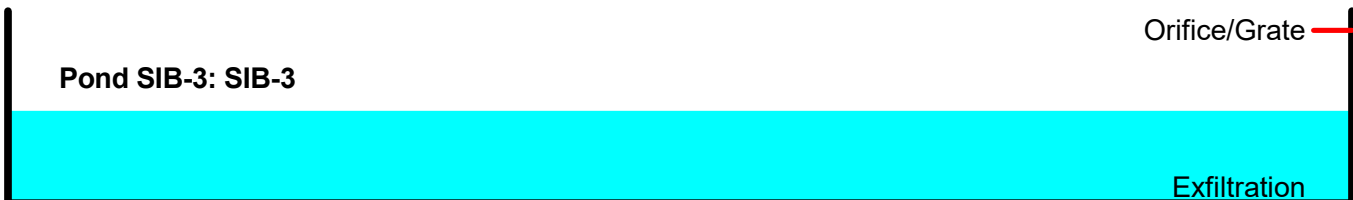
Volume	Invert	Avail.Storage	Storage Description
#1	13.96'	299 cf	10.00'W x 24.00'L x 6.00'H Prismaoid 1,440 cf Overall - 693 cf Embedded = 747 cf x 40.0% Voids
#2	13.96'	509 cf	6.00'D x 6.00'H Vertical Cone/Cylinder x 3 Inside #1 693 cf Overall - 6.0" Wall Thickness = 509 cf
#3	19.96'	28 cf	2.00'D x 3.00'H Vertical Cone/Cylinder x 3 -Impervious
#4	22.96'	1,578 cf	Custom Stage Data (Irregular) Listed below (Recalc)
		2,414 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
22.96	817	126.0	0	0	817
24.00	2,350	206.0	1,578	1,578	2,938

Device	Routing	Invert	Outlet Devices
#1	Secondary	23.00'	2.0" x 2.0" Horiz. Orifice/Grate X 6.00 columns X 6 rows C= 0.600 Limited to weir flow at low heads
#2	Discarded	13.96'	8.270 in/hr Exfiltration over Wetted area from 13.96' - 23.00' Excluded Wetted area = 240 sf Phase-In= 0.01'

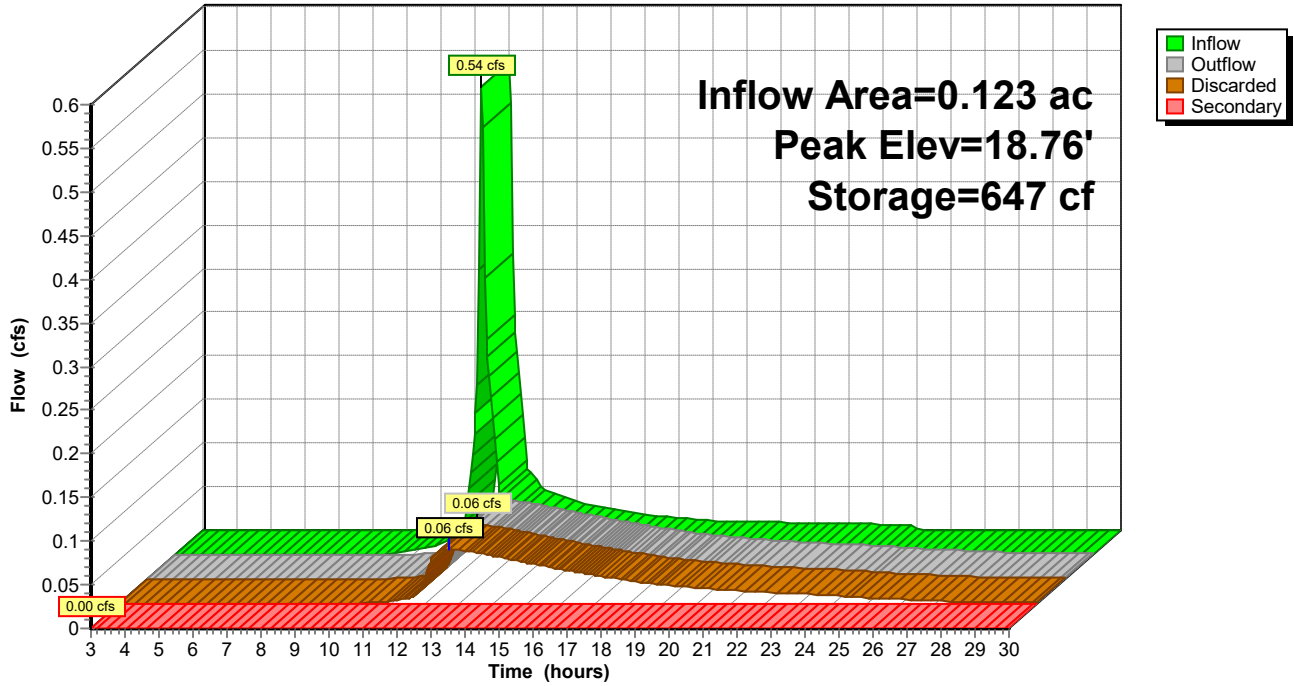
Discarded OutFlow Max=0.06 cfs @ 12.72 hrs HW=18.76' (Free Discharge)
 ↑ **2=Exfiltration** (Exfiltration Controls 0.06 cfs)

Secondary OutFlow Max=0.00 cfs @ 3.00 hrs HW=13.96' (Free Discharge)
 ↑ **1=Orifice/Grate** (Controls 0.00 cfs)



Pond SIB-3: SIB-3

Hydrograph



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Summary for Pond SIB-4: SIB-4

Inflow Area = 0.903 ac, 36.30% Impervious, Inflow Depth = 2.34" for 50-Year event
 Inflow = 2.35 cfs @ 12.09 hrs, Volume= 0.176 af
 Outflow = 0.46 cfs @ 12.58 hrs, Volume= 0.176 af, Atten= 81%, Lag= 29.3 min
 Discarded = 0.46 cfs @ 12.58 hrs, Volume= 0.176 af
 Secondary = 0.00 cfs @ 3.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs / 4
 Peak Elev= 26.60' @ 12.58 hrs Surf.Area= 2,189 sf Storage= 2,570 cf

Plug-Flow detention time= 93.9 min calculated for 0.176 af (100% of inflow)
 Center-of-Mass det. time= 93.8 min (956.0 - 862.2)

Volume	Invert	Avail.Storage	Storage Description
#1	16.33'	248 cf	10.00'W x 17.00'L x 6.67'H Prismatic 1,134 cf Overall - 513 cf Embedded = 621 cf x 40.0% Voids
#2	16.33'	377 cf	6.00'D x 6.67'H Vertical Cone/Cylinder x 2 Inside #1 513 cf Overall - 6.0" Wall Thickness = 377 cf
#3	23.00'	0 cf	2.00'D x 2.00'H Vertical Cone/Cylinder 6 cf Overall x 0.0% Voids
#4	25.00'	2,852 cf	Custom Stage Data (Conic) Listed below (Recalc)
		3,477 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
25.00	514	0	0	514
26.00	1,416	928	928	1,422
27.00	2,482	1,924	2,852	2,500

Device	Routing	Invert	Outlet Devices
#1	Discarded	16.67'	8.270 in/hr Exfiltration over Wetted area above 16.67' Excluded Wetted area = 188 sf Phase-In= 0.01'
#2	Secondary	26.90'	528.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

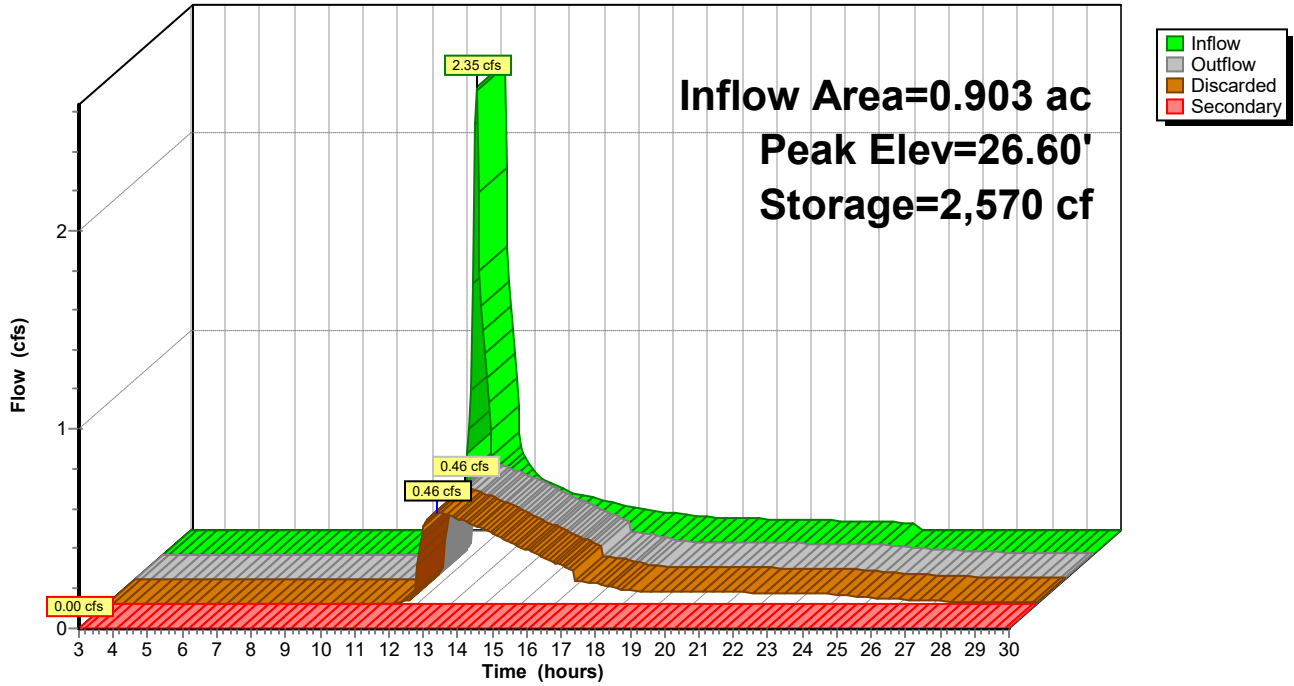
Discarded OutFlow Max=0.46 cfs @ 12.58 hrs HW=26.60' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.46 cfs)

Secondary OutFlow Max=0.00 cfs @ 3.00 hrs HW=16.33' (Free Discharge)
 ↑2=Orifice/Grate (Controls 0.00 cfs)



Pond SIB-4: SIB-4

Hydrograph



Wareham Post Construction

Type III 24-hr 100-Year Rainfall=8.68"

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Time span=3.00-30.00 hrs, dt=0.05 hrs, 541 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment DA1: DA1	Runoff Area=47,720 sf 36.62% Impervious Runoff Depth=3.97" Flow Length=191' Tc=12.7 min CN=61 Runoff=4.02 cfs 0.363 af
Subcatchment DA2: DA2	Runoff Area=29,170 sf 17.26% Impervious Runoff Depth=2.56" Flow Length=264' Tc=11.2 min CN=49 Runoff=1.55 cfs 0.143 af
Subcatchment DA3: DA3	Runoff Area=5,342 sf 44.81% Impervious Runoff Depth=4.45" Flow Length=88' Tc=0.9 min CN=65 Runoff=0.71 cfs 0.045 af
Subcatchment DA4: DA4	Runoff Area=39,760 sf 24.90% Impervious Runoff Depth=2.33" Tc=5.0 min CN=47 Runoff=2.28 cfs 0.177 af
Subcatchment DA4B: DA4B	Runoff Area=39,330 sf 36.30% Impervious Runoff Depth=3.26" Tc=5.0 min CN=55 Runoff=3.37 cfs 0.245 af
Subcatchment DA5: DA5	Runoff Area=46,882 sf 34.79% Impervious Runoff Depth=3.85" Flow Length=250' Tc=11.3 min CN=60 Runoff=4.00 cfs 0.345 af
Subcatchment DA6: DA6	Runoff Area=17,571 sf 72.63% Impervious Runoff Depth=6.51" Flow Length=125' Slope=0.0100 '/' Tc=5.8 min CN=82 Runoff=2.94 cfs 0.219 af
Subcatchment DA6B: DA6B	Runoff Area=8,464 sf 51.98% Impervious Runoff Depth=5.05" Flow Length=150' Slope=0.0100 '/' Tc=1.8 min CN=70 Runoff=1.26 cfs 0.082 af
Subcatchment DA7: DA7	Runoff Area=22,134 sf 56.17% Impervious Runoff Depth=5.30" Flow Length=200' Slope=0.0100 '/' Tc=14.2 min CN=72 Runoff=2.42 cfs 0.224 af
Reach RR Outlet DA1: Rip Rap Outlet	Avg. Flow Depth=0.25' Max Vel=1.59 fps Inflow=2.95 cfs 0.079 af n=0.078 L=15.0' S=0.0667 '/' Capacity=11.80 cfs Outflow=2.92 cfs 0.079 af
Pond CB DA5: CB DA5	Peak Elev=17.41' Storage=175 cf Inflow=4.00 cfs 0.345 af Discarded=0.03 cfs 0.032 af Primary=3.96 cfs 0.314 af Secondary=0.00 cfs 0.000 af Outflow=3.99 cfs 0.346 af
Pond CB DA7: CB DA7	Inflow=2.42 cfs 0.224 af Primary=2.42 cfs 0.224 af
Pond Ex. Basin DA4: DA4 EX. BASIN	Peak Elev=16.92' Storage=2,314 cf Inflow=2.28 cfs 0.177 af Discarded=0.25 cfs 0.163 af Secondary=0.60 cfs 0.014 af Outflow=0.85 cfs 0.177 af
Pond MH 1: MH1	Peak Elev=15.81' Inflow=3.96 cfs 0.314 af Primary=3.96 cfs 0.314 af Secondary=0.00 cfs 0.000 af Outflow=3.96 cfs 0.314 af
Pond MH2: MH2	Peak Elev=11.78' Inflow=3.96 cfs 0.314 af Primary=3.96 cfs 0.314 af Secondary=0.00 cfs 0.000 af Outflow=3.96 cfs 0.314 af
Pond RR Channel DA1: Rip Rap Channel DA1	Peak Elev=14.93' Storage=10 cf Inflow=3.96 cfs 0.314 af Discarded=0.01 cfs 0.005 af Primary=3.95 cfs 0.308 af Outflow=3.96 cfs 0.314 af

Wareham Post Construction

Type III 24-hr 100-Year Rainfall=8.68"

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Pond SIB-1: SIB-1

Peak Elev=12.47' Storage=8,572 cf Inflow=6.95 cfs 0.442 af
Discarded=0.85 cfs 0.442 af Secondary=0.00 cfs 0.000 af Outflow=0.85 cfs 0.442 af

Pond SIB-2: SIB-2

Peak Elev=23.95' Storage=1,046 cf Inflow=5.04 cfs 0.443 af
Discarded=0.10 cfs 0.128 af Secondary=4.70 cfs 0.313 af Outflow=4.80 cfs 0.441 af

Pond SIB-3: SIB-3

Peak Elev=22.93' Storage=836 cf Inflow=0.71 cfs 0.045 af
Discarded=0.17 cfs 0.045 af Secondary=0.00 cfs 0.000 af Outflow=0.17 cfs 0.045 af

Pond SIB-4: SIB-4

Peak Elev=26.91' Storage=3,252 cf Inflow=3.37 cfs 0.245 af
Discarded=0.53 cfs 0.224 af Secondary=1.12 cfs 0.015 af Outflow=1.65 cfs 0.240 af

Total Runoff Area = 5.886 ac Runoff Volume = 1.844 af Average Runoff Depth = 3.76"
62.95% Pervious = 3.705 ac 37.05% Impervious = 2.181 ac

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Type III 24-hr 100-Year Rainfall=8.68"

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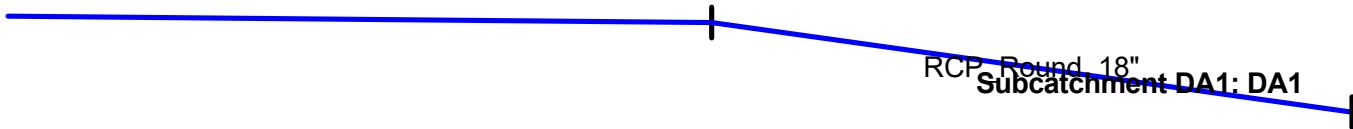
Summary for Subcatchment DA1: DA1

Runoff = 4.02 cfs @ 12.18 hrs, Volume= 0.363 af, Depth= 3.97"
 Routed to Pond SIB-1 : SIB-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs
 Type III 24-hr 100-Year Rainfall=8.68"

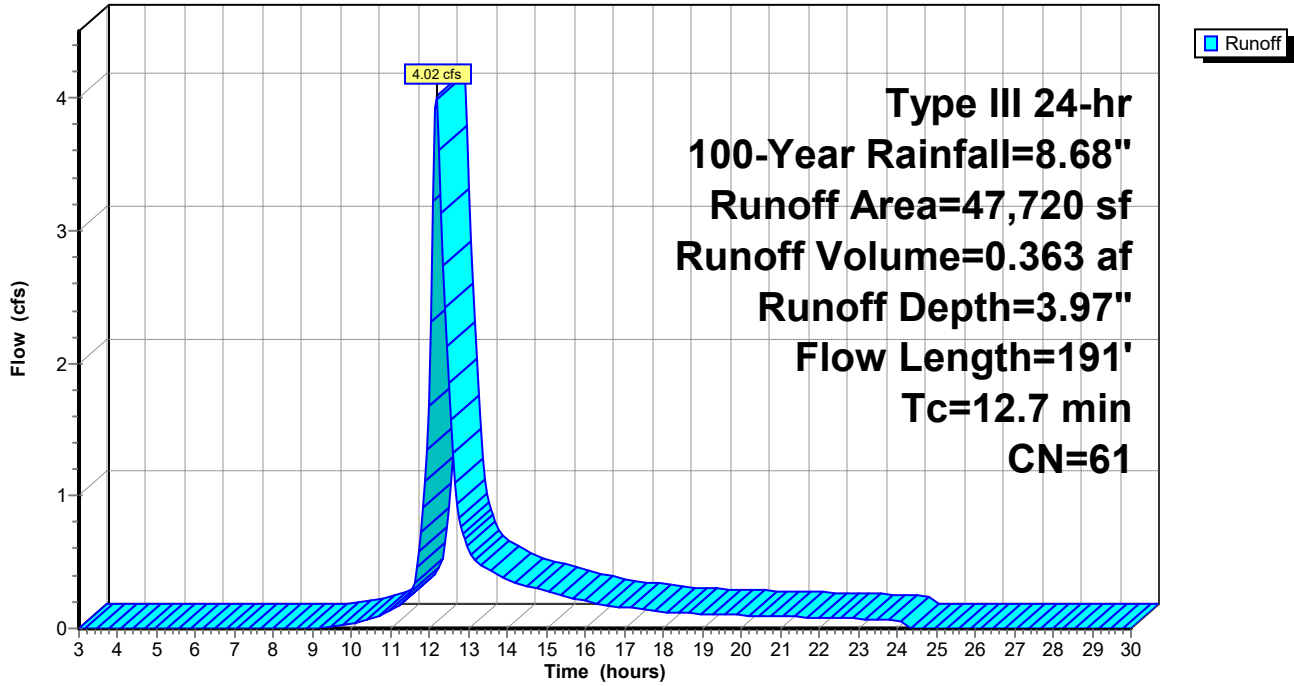
Area (sf)	CN	Description
* 17,477	98	
* 30,243	39	
47,720	61	Weighted Average
30,243		63.38% Pervious Area
17,477		36.62% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.6	100	0.0100	0.13		Sheet Flow, Grass: Short n= 0.150 P2= 3.35"
0.1	91	0.1500	23.02	40.68	Pipe Channel, RCP_Round 18" 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
12.7	191	Total			



Subcatchment DA1: DA1

Hydrograph



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Type III 24-hr 100-Year Rainfall=8.68"

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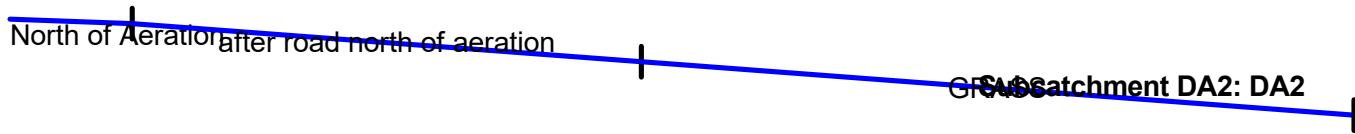
Summary for Subcatchment DA2: DA2

Runoff = 1.55 cfs @ 12.17 hrs, Volume= 0.143 af, Depth= 2.56"
 Routed to Pond SIB-2 : SIB-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs
 Type III 24-hr 100-Year Rainfall=8.68"

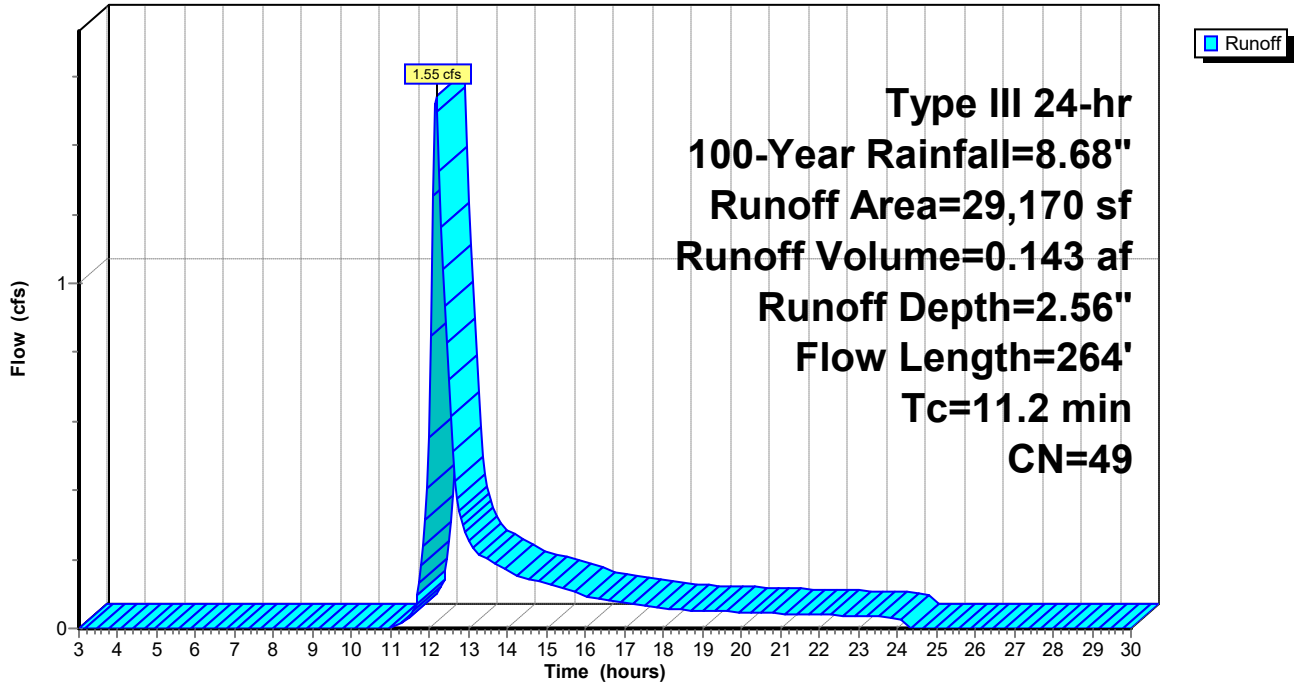
Area (sf)	CN	Description
* 5,035	98	Impervious
24,135	39	>75% Grass cover, Good, HSG A
29,170	49	Weighted Average
24,135		82.74% Pervious Area
5,035		17.26% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	24	0.0100	0.80		Sheet Flow, North of Aeration Smooth surfaces n= 0.011 P2= 3.35"
9.6	100	0.0200	0.17		Sheet Flow, after road north of aeration Grass: Short n= 0.150 P2= 3.35"
1.1	140	0.0200	2.12		Shallow Concentrated Flow, GRASS Grassed Waterway Kv= 15.0 fps
11.2	264	Total			



Subcatchment DA2: DA2

Hydrograph



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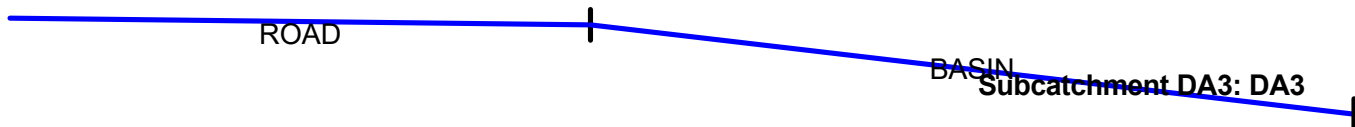
Summary for Subcatchment DA3: DA3

Runoff = 0.71 cfs @ 12.02 hrs, Volume= 0.045 af, Depth= 4.45"
 Routed to Pond SIB-3 : SIB-3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs
 Type III 24-hr 100-Year Rainfall=8.68"

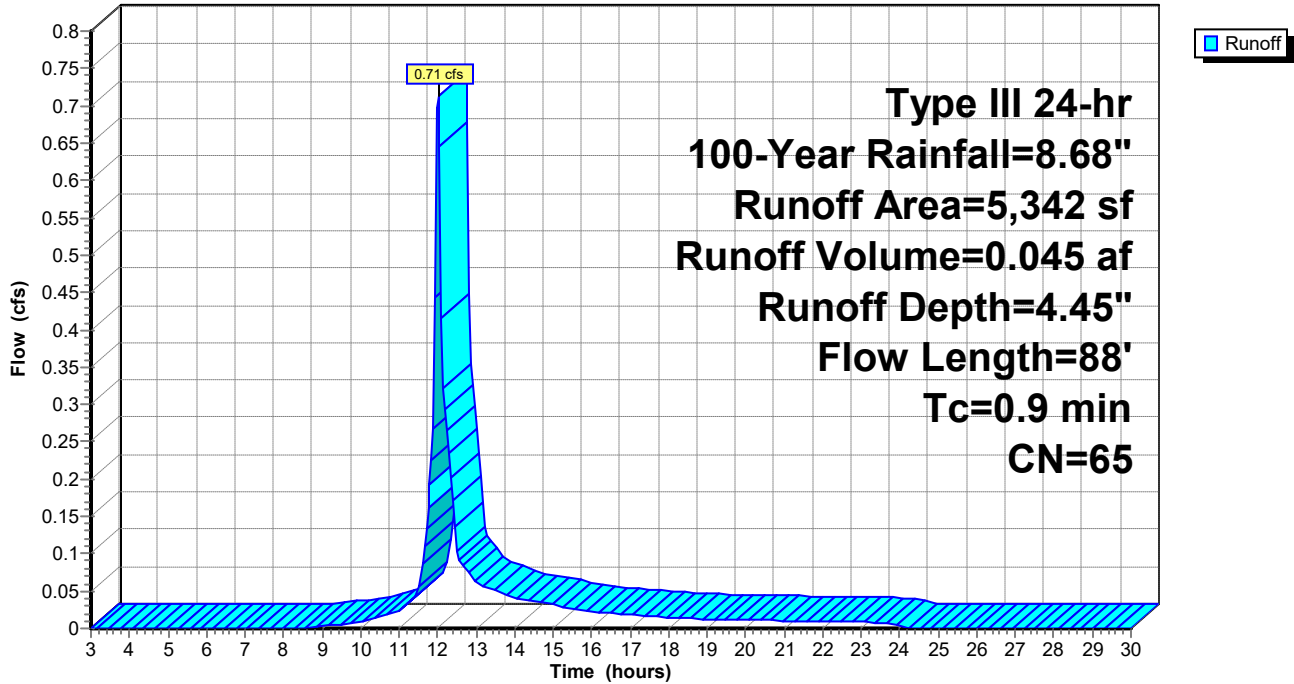
Area (sf)	CN	Description
* 2,394	98	IMPERVIOUS
2,948	39	>75% Grass cover, Good, HSG A
5,342	65	Weighted Average
2,948		55.19% Pervious Area
2,394		44.81% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	38	0.0100	0.88		Sheet Flow, ROAD Smooth surfaces n= 0.011 P2= 3.35"
0.2	50	0.1000	5.09		Shallow Concentrated Flow, BASIN Unpaved Kv= 16.1 fps
0.9	88	Total			



Subcatchment DA3: DA3

Hydrograph



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Type III 24-hr 100-Year Rainfall=8.68"

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Summary for Subcatchment DA4: DA4

Runoff = 2.28 cfs @ 12.09 hrs, Volume= 0.177 af, Depth= 2.33"
 Routed to Pond Ex. Basin DA4 : DA4 EX. BASIN

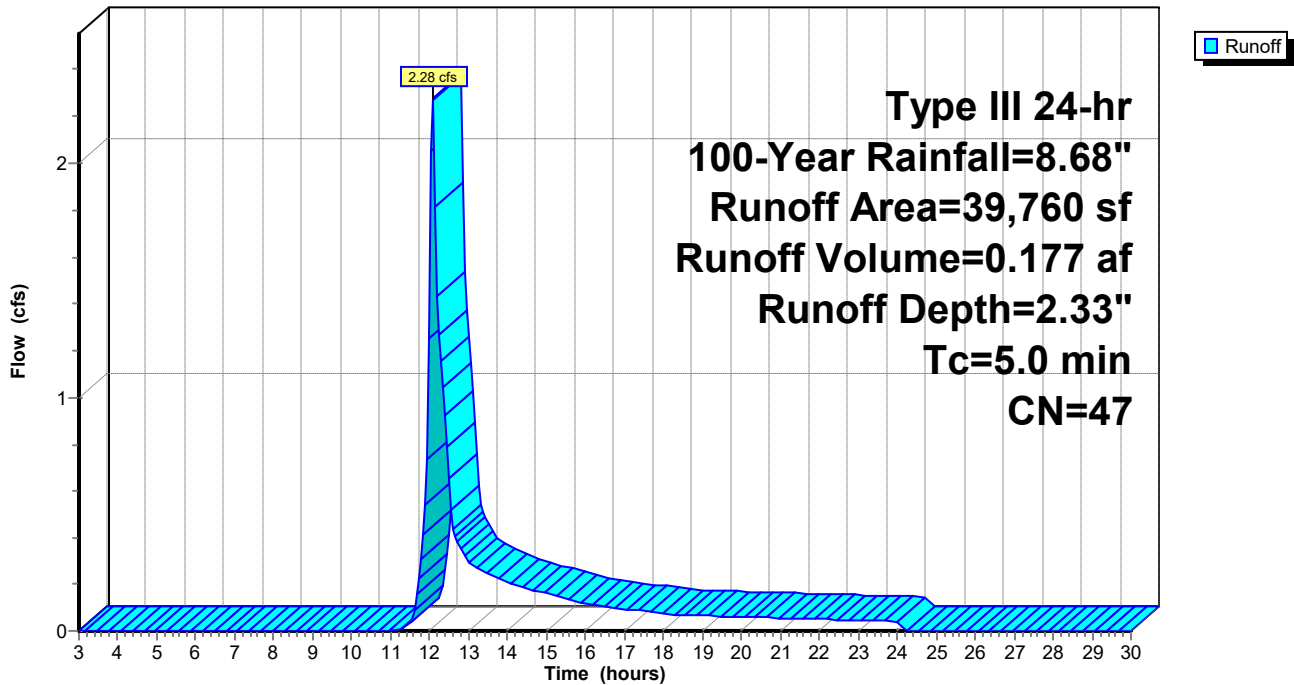
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs
 Type III 24-hr 100-Year Rainfall=8.68"

Area (sf)	CN	Description
29,860	30	Brush, Good, HSG A
* 9,900	98	ROAD
39,760	47	Weighted Average
29,860		75.10% Pervious Area
9,900		24.90% Impervious Area

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

Subcatchment DA4: DA4

Hydrograph



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Type III 24-hr 100-Year Rainfall=8.68"

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Summary for Subcatchment DA4B: DA4B

Runoff = 3.37 cfs @ 12.08 hrs, Volume= 0.245 af, Depth= 3.26"
 Routed to Pond SIB-4 : SIB-4

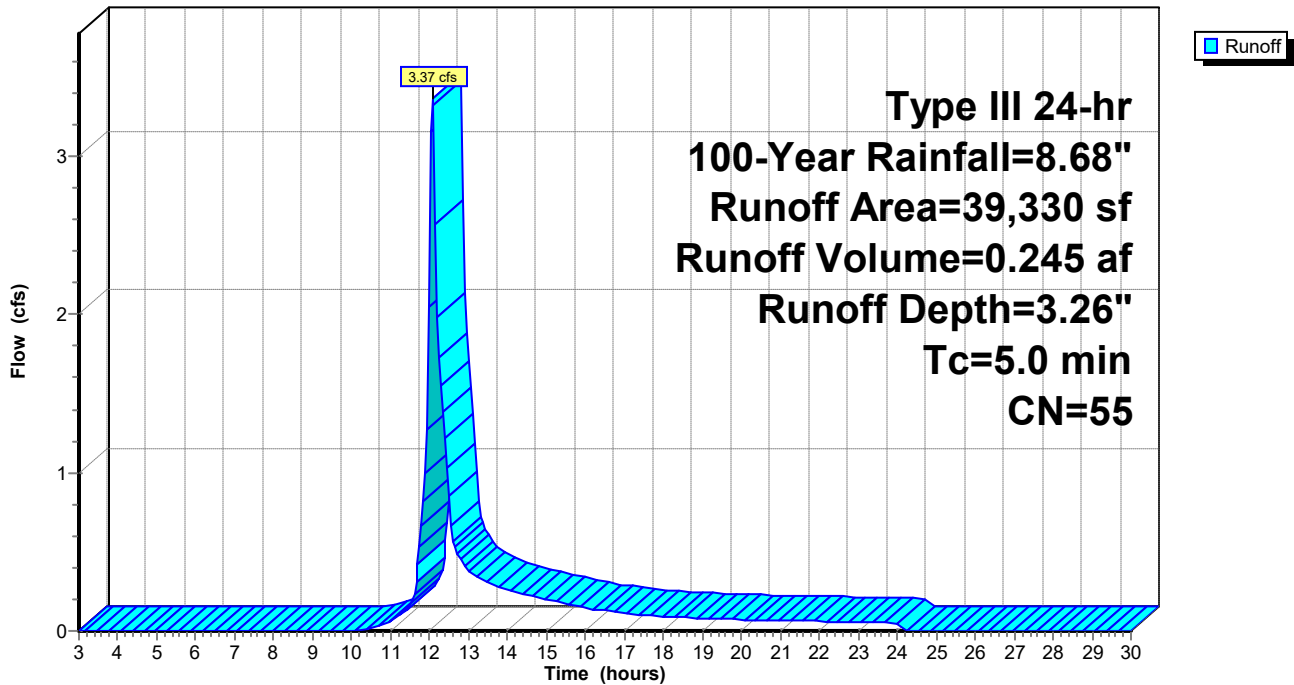
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs
 Type III 24-hr 100-Year Rainfall=8.68"

Area (sf)	CN	Description
25,053	30	Brush, Good, HSG A
* 14,277	98	ROAD
39,330	55	Weighted Average
25,053		63.70% Pervious Area
14,277		36.30% Impervious Area

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

Subcatchment DA4B: DA4B

Hydrograph



Wareham Post Construction

Type III 24-hr 100-Year Rainfall=8.68"

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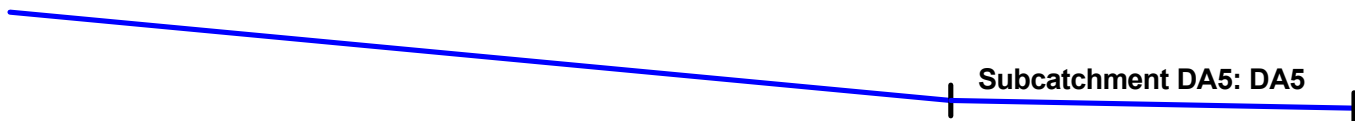
Summary for Subcatchment DA5: DA5

Runoff = 4.00 cfs @ 12.16 hrs, Volume= 0.345 af, Depth= 3.85"
 Routed to Pond CB DA5 : CB DA5

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs
 Type III 24-hr 100-Year Rainfall=8.68"

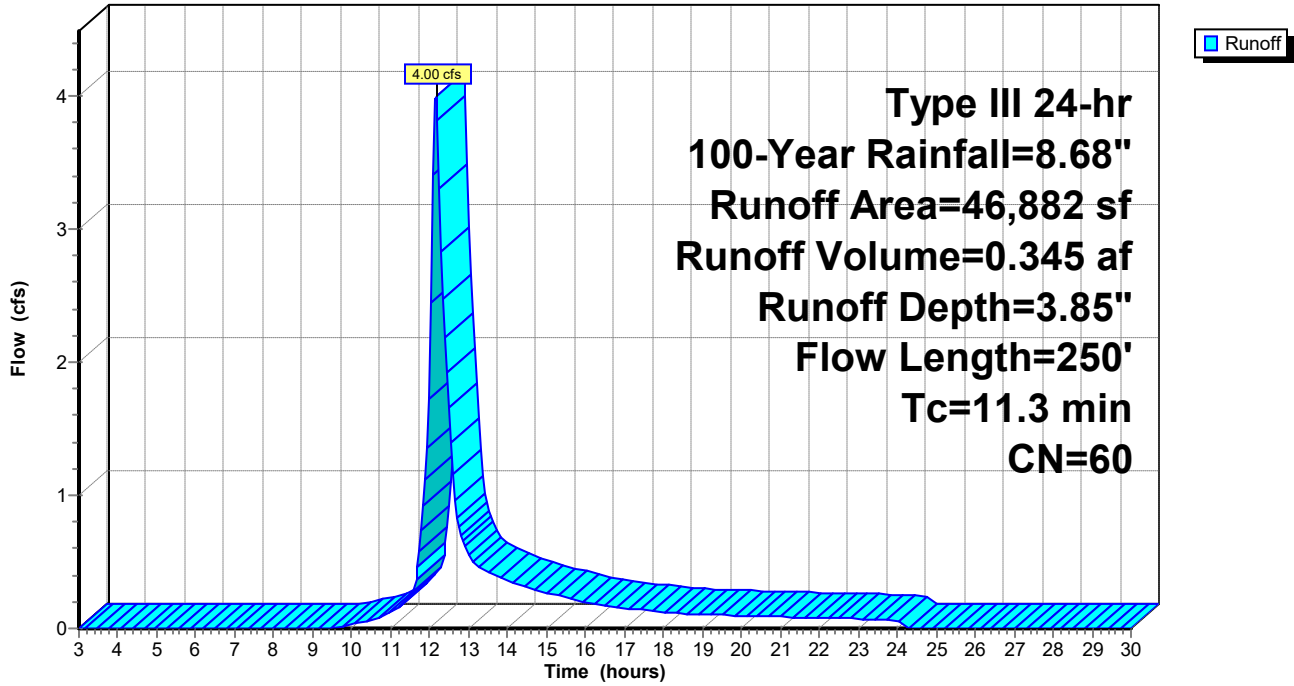
	Area (sf)	CN	Description
*	16,312	98	ROAD
*	30,570	39	GRASSED AREA
	46,882	60	Weighted Average
	30,570		65.21% Pervious Area
	16,312		34.79% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.3	175	0.0500	2.27		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.35"
10.0	75	0.0100	0.12		Sheet Flow, Grass: Short n= 0.150 P2= 3.35"
11.3	250	Total			



Subcatchment DA5: DA5

Hydrograph



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Type III 24-hr 100-Year Rainfall=8.68"

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Summary for Subcatchment DA6: DA6

Runoff = 2.94 cfs @ 12.09 hrs, Volume= 0.219 af, Depth= 6.51"
 Routed to Pond SIB-2 : SIB-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs
 Type III 24-hr 100-Year Rainfall=8.68"

Area (sf)	CN	Description
* 12,762	98	
* 4,809	39	
17,571	82	Weighted Average
4,809		27.37% Pervious Area
12,762		72.63% Impervious Area

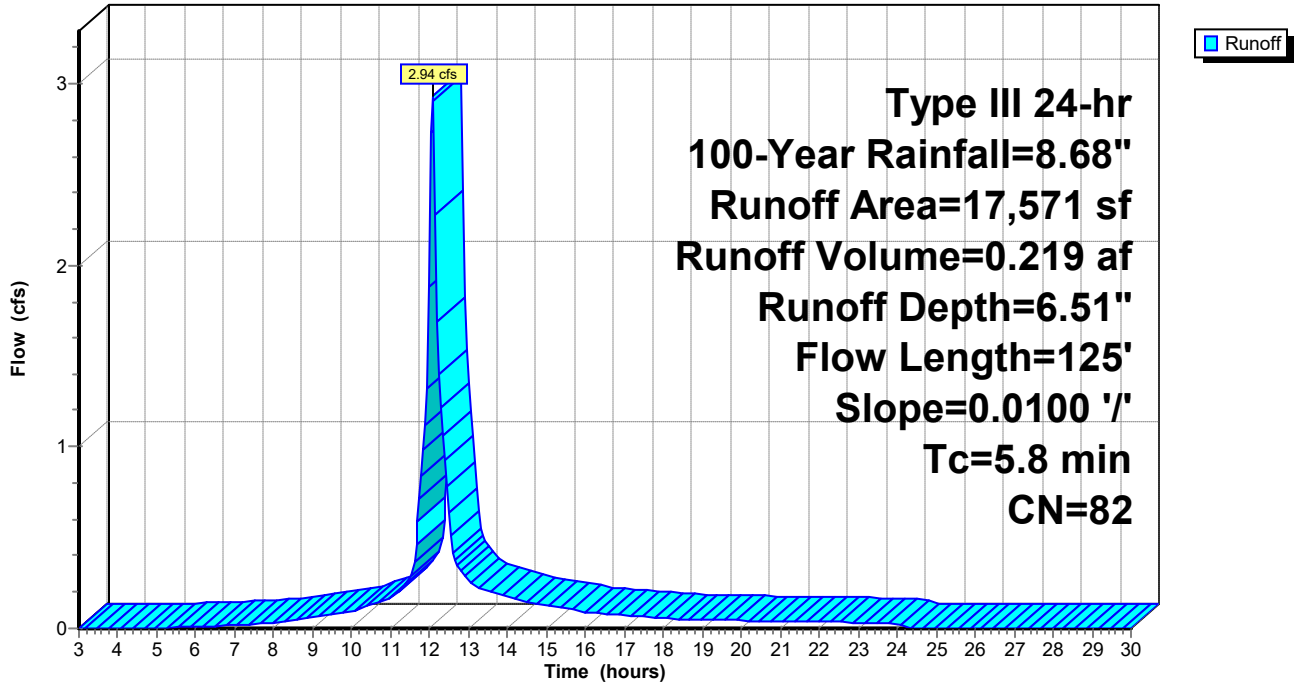
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.6	100	0.0100	1.07		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.35"
4.2	25	0.0100	0.10		Sheet Flow, Grass: Short n= 0.150 P2= 3.35"
5.8	125	Total			



Subcatchment DA6: DA6

Subcatchment DA6: DA6

Hydrograph



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Type III 24-hr 100-Year Rainfall=8.68"

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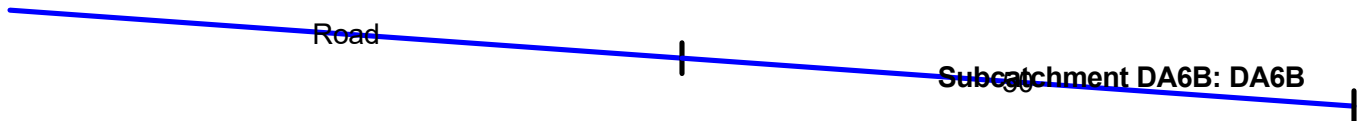
Summary for Subcatchment DA6B: DA6B

Runoff = 1.26 cfs @ 12.03 hrs, Volume= 0.082 af, Depth= 5.05"
 Routed to Pond SIB-2 : SIB-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs
 Type III 24-hr 100-Year Rainfall=8.68"

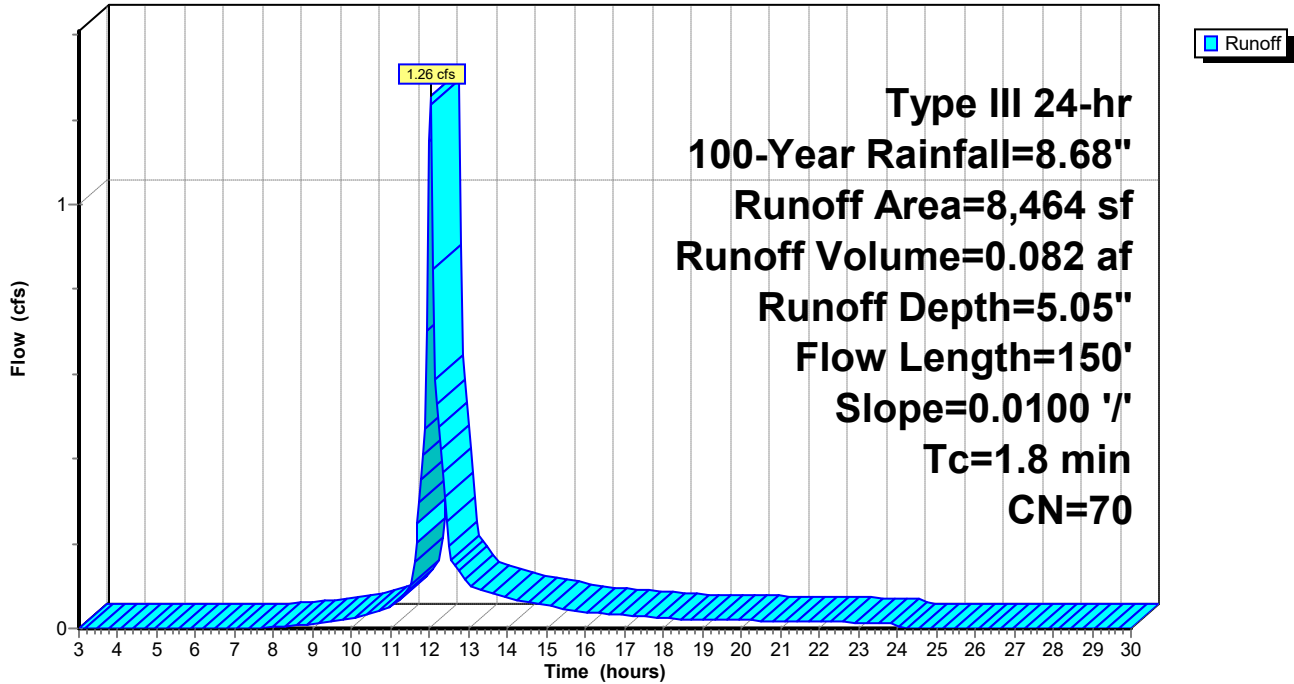
	Area (sf)	CN	Description
*	4,400	98	IMPERVIOUS
	4,064	39	>75% Grass cover, Good, HSG A
	8,464	70	Weighted Average
	4,064		48.02% Pervious Area
	4,400		51.98% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	75	0.0100	1.01		Sheet Flow, Road Smooth surfaces n= 0.011 P2= 3.35"
0.6	75	0.0100	2.03		Shallow Concentrated Flow, 50 Paved Kv= 20.3 fps
1.8	150	Total			



Subcatchment DA6B: DA6B

Hydrograph



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Type III 24-hr 100-Year Rainfall=8.68"

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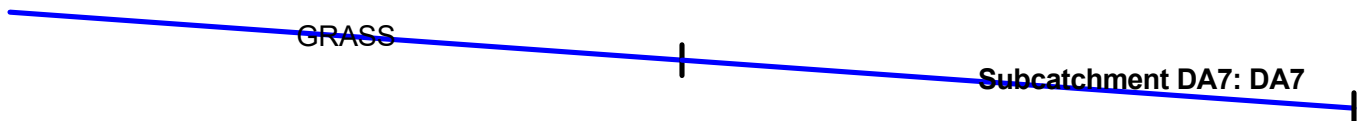
Summary for Subcatchment DA7: DA7

Runoff = 2.42 cfs @ 12.20 hrs, Volume= 0.224 af, Depth= 5.30"
 Routed to Pond CB DA7 : CB DA7

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs
 Type III 24-hr 100-Year Rainfall=8.68"

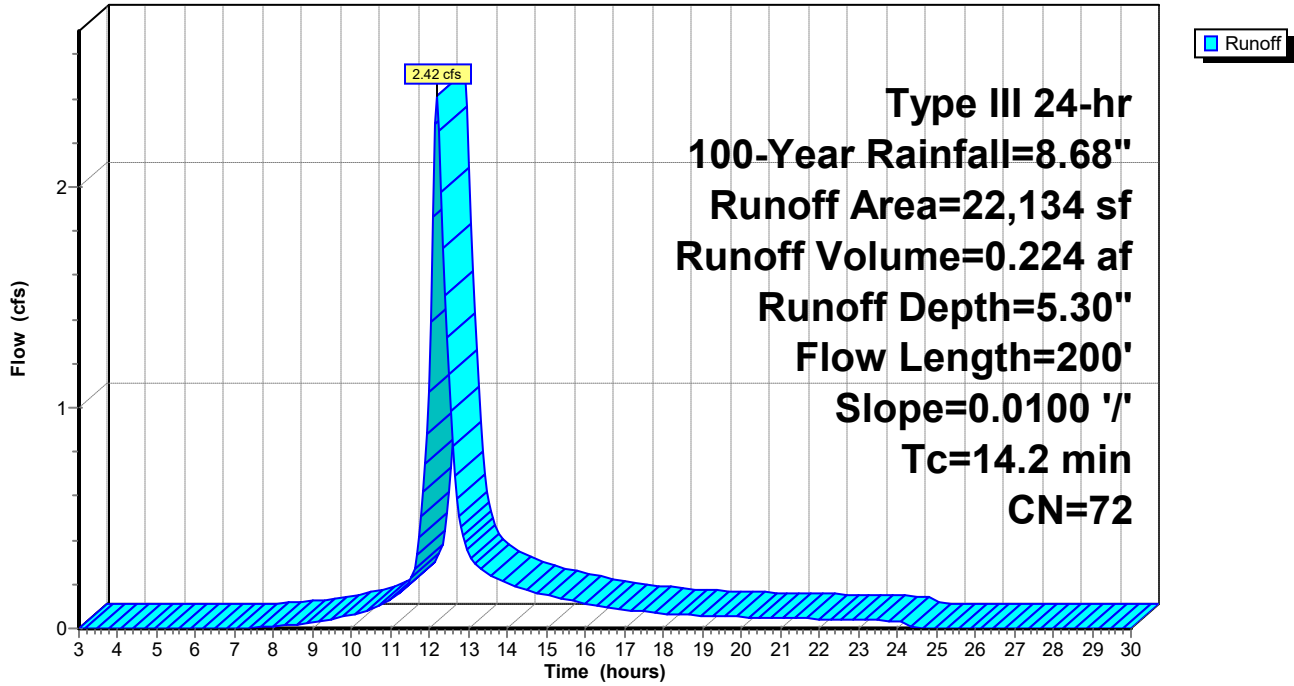
Area (sf)	CN	Description
9,701	39	>75% Grass cover, Good, HSG A
12,433	98	Paved parking, HSG A
22,134	72	Weighted Average
9,701		43.83% Pervious Area
12,433		56.17% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.6	100	0.0100	0.13		Sheet Flow, GRASS Grass: Short n= 0.150 P2= 3.35"
1.6	100	0.0100	1.07		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.35"
14.2	200	Total			



Subcatchment DA7: DA7

Hydrograph



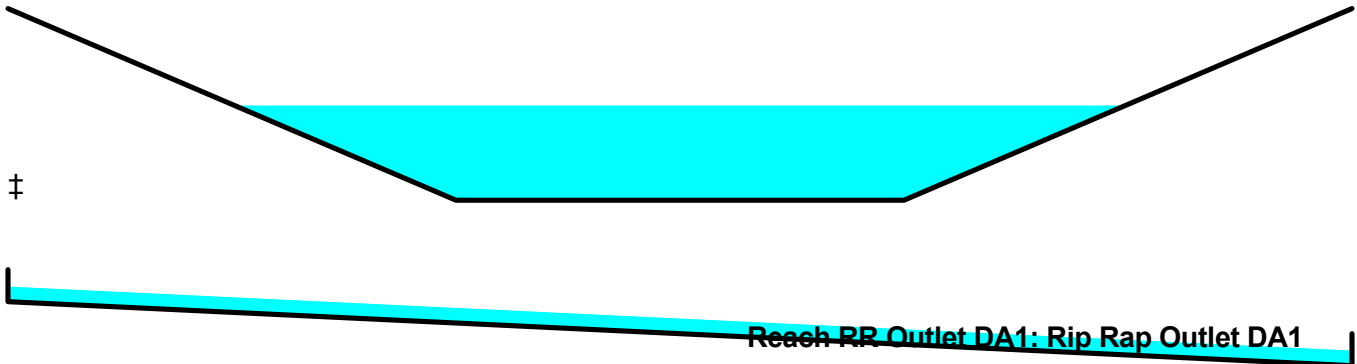
Summary for Reach RR Outlet DA1: Rip Rap Outlet DA1

Inflow Area = 1.076 ac, 34.79% Impervious, Inflow Depth = 0.89" for 100-Year event
Inflow = 2.95 cfs @ 12.16 hrs, Volume= 0.079 af, Incl. 1.00 cfs Inflow Loss
Outflow = 2.92 cfs @ 12.17 hrs, Volume= 0.079 af, Atten= 1%, Lag= 0.3 min
Routed to Pond SIB-1 : SIB-1

Routing by Stor-Ind+Trans method, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs / 3
Max. Velocity= 1.59 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 0.93 fps, Avg. Travel Time= 0.3 min

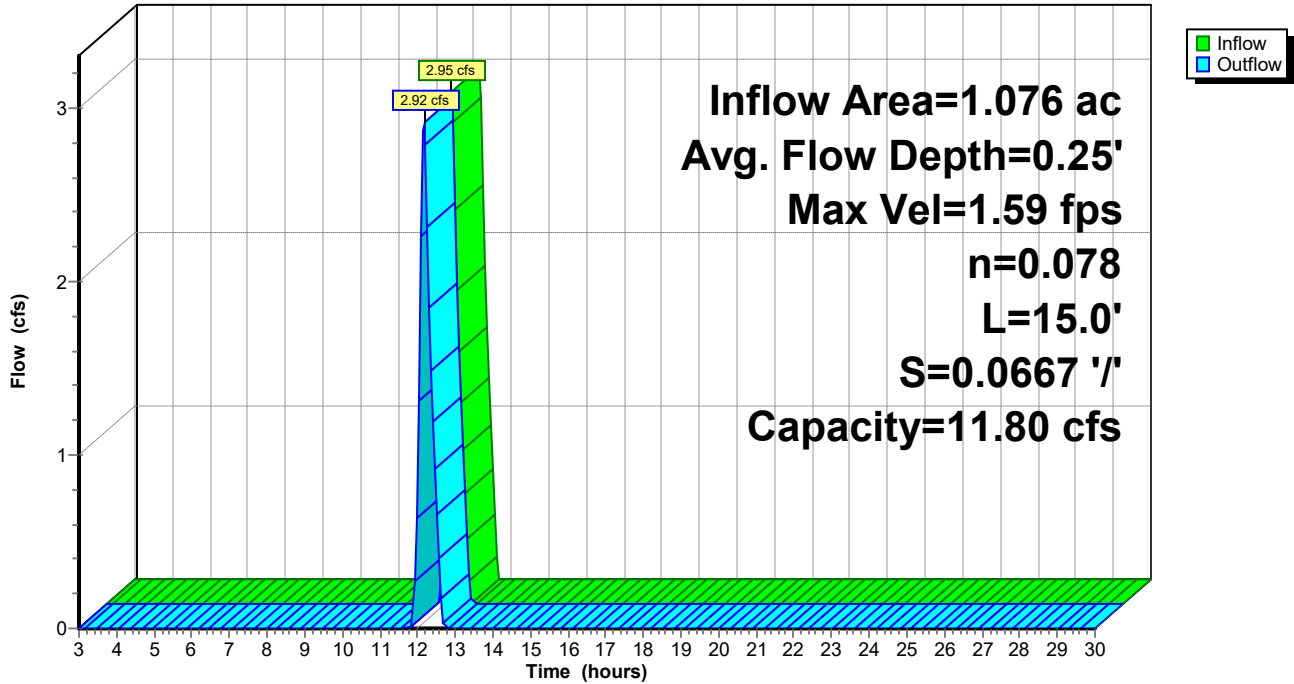
Peak Storage= 28 cf @ 12.17 hrs
Average Depth at Peak Storage= 0.25' , Surface Width= 9.94'
Bank-Full Depth= 0.50' Flow Area= 5.0 sf, Capacity= 11.80 cfs

5.00' x 0.50' deep channel, n= 0.078 Riprap, 12-inch
Side Slope Z-value= 10.0 ' / ' Top Width= 15.00'
Length= 15.0' Slope= 0.0667 ' / '
Inlet Invert= 10.80', Outlet Invert= 9.80'



Reach RR Outlet DA1: Rip Rap Outlet DA1

Hydrograph



Summary for Pond CB DA5: CB DA5

Inflow Area = 1.076 ac, 34.79% Impervious, Inflow Depth = 3.85" for 100-Year event
 Inflow = 4.00 cfs @ 12.16 hrs, Volume= 0.345 af
 Outflow = 3.99 cfs @ 12.16 hrs, Volume= 0.346 af, Atten= 0%, Lag= 0.1 min
 Discarded = 0.03 cfs @ 12.16 hrs, Volume= 0.032 af
 Primary = 3.96 cfs @ 12.16 hrs, Volume= 0.314 af
 Routed to Pond MH 1 : MH1
 Secondary = 0.00 cfs @ 3.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs / 4
 Peak Elev= 17.41' @ 12.16 hrs Surf.Area= 28 sf Storage= 175 cf

Plug-Flow detention time= 8.5 min calculated for 0.345 af (100% of inflow)
 Center-of-Mass det. time= 8.9 min (855.7 - 846.8)

Volume	Invert	Avail.Storage	Storage Description
#1	11.23'	302 cf	6.00'D x 10.67'H Vertical Cone/Cylinder
#2	22.00'	6,068 cf	Custom Stage Data (Conic) Listed below (Recalc)
		6,370 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
22.00	2,240	0	0	2,240
23.00	11,000	6,068	6,068	11,004

Device	Routing	Invert	Outlet Devices
#1	Discarded	11.23'	8.270 in/hr Exfiltration over Wetted area Phase-In= 0.01'
#2	Primary	16.30'	18.0" Round CMP_Round 18" L= 25.6' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 16.30' / 14.80' S= 0.0586 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf
#3	Secondary	22.90'	70.0" x 140.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#4	Secondary	21.80'	2.0" x 2.0" Horiz. Orifice/Grate X 8.00 columns X 8 rows C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.03 cfs @ 12.16 hrs HW=17.40' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.03 cfs)

Primary OutFlow Max=3.99 cfs @ 12.16 hrs HW=17.40' (Free Discharge)
 ↑2=CMP_Round 18" (Inlet Controls 3.89 cfs @ 2.81 fps)

Secondary OutFlow Max=0.00 cfs @ 3.00 hrs HW=11.23' (Free Discharge)
 ↑3=Orifice/Grate (Controls 0.00 cfs)
 ↑4=Orifice/Grate (Controls 0.00 cfs)

Wareham Post Construction

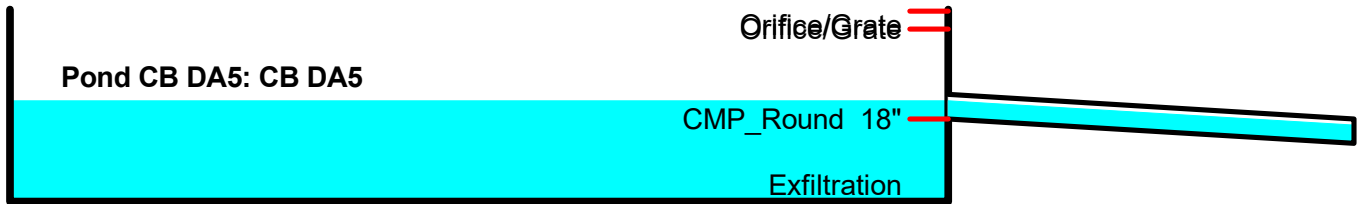
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Type III 24-hr 100-Year Rainfall=8.68"

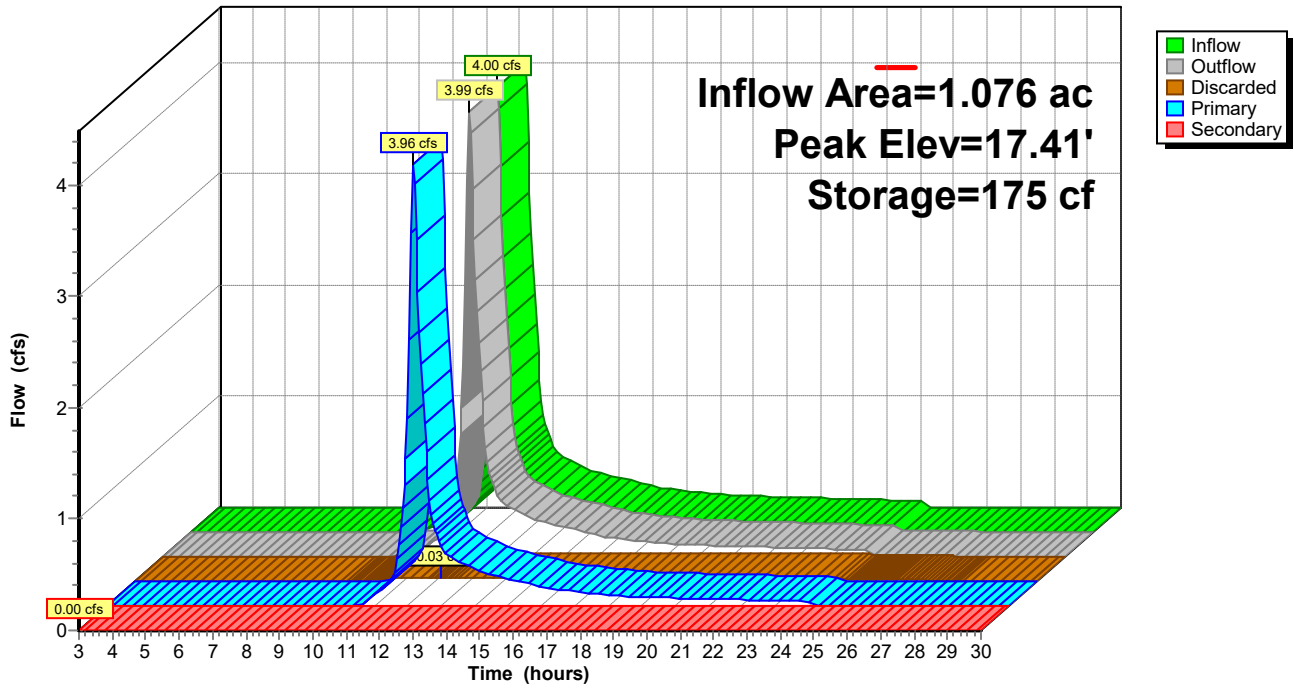
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Pond CB DA5: CB DA5

Hydrograph



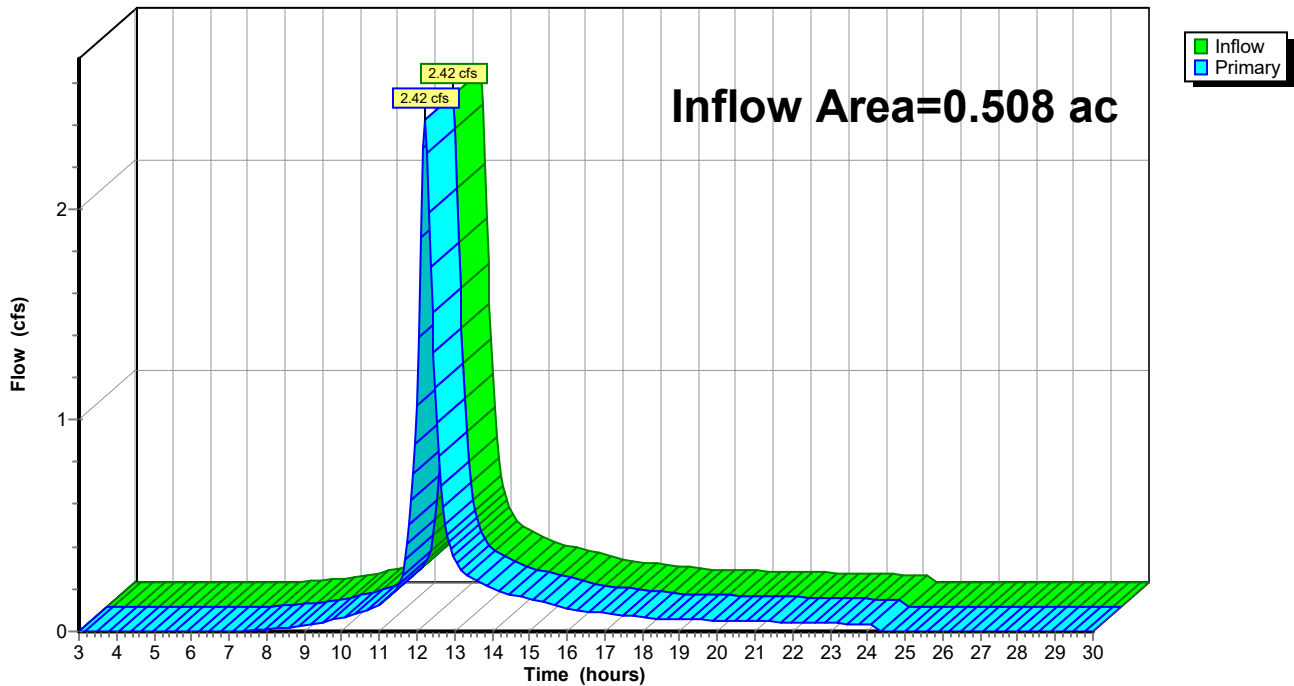
Summary for Pond CB DA7: CB DA7

Inflow Area = 0.508 ac, 56.17% Impervious, Inflow Depth = 5.30" for 100-Year event
Inflow = 2.42 cfs @ 12.20 hrs, Volume= 0.224 af
Primary = 2.42 cfs @ 12.20 hrs, Volume= 0.224 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs

Pond CB DA7: CB DA7

Hydrograph



Summary for Pond Ex. Basin DA4: DA4 EX. BASIN

Inflow Area = 0.913 ac, 24.90% Impervious, Inflow Depth = 2.33" for 100-Year event
 Inflow = 2.28 cfs @ 12.09 hrs, Volume= 0.177 af
 Outflow = 0.85 cfs @ 12.43 hrs, Volume= 0.177 af, Atten= 63%, Lag= 20.1 min
 Discarded = 0.25 cfs @ 12.43 hrs, Volume= 0.163 af
 Secondary = 0.60 cfs @ 12.43 hrs, Volume= 0.014 af

Routing by Stor-Ind method, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs / 3
 Peak Elev= 16.92' @ 12.43 hrs Surf.Area= 4,430 sf Storage= 2,314 cf

Plug-Flow detention time= 108.2 min calculated for 0.177 af (100% of inflow)
 Center-of-Mass det. time= 107.5 min (980.0 - 872.6)

Volume	Invert	Avail.Storage	Storage Description
#1	16.00'	2,708 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
16.00	1,025	0	0	1,025
17.00	4,866	2,708	2,708	4,870

Device	Routing	Invert	Outlet Devices
#1	Discarded	16.00'	2.410 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Secondary	16.90'	360.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.25 cfs @ 12.43 hrs HW=16.91' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.25 cfs)

Secondary OutFlow Max=0.56 cfs @ 12.43 hrs HW=16.91' (Free Discharge)
 ↑2=Orifice/Grate (Weir Controls 0.56 cfs @ 0.40 fps)

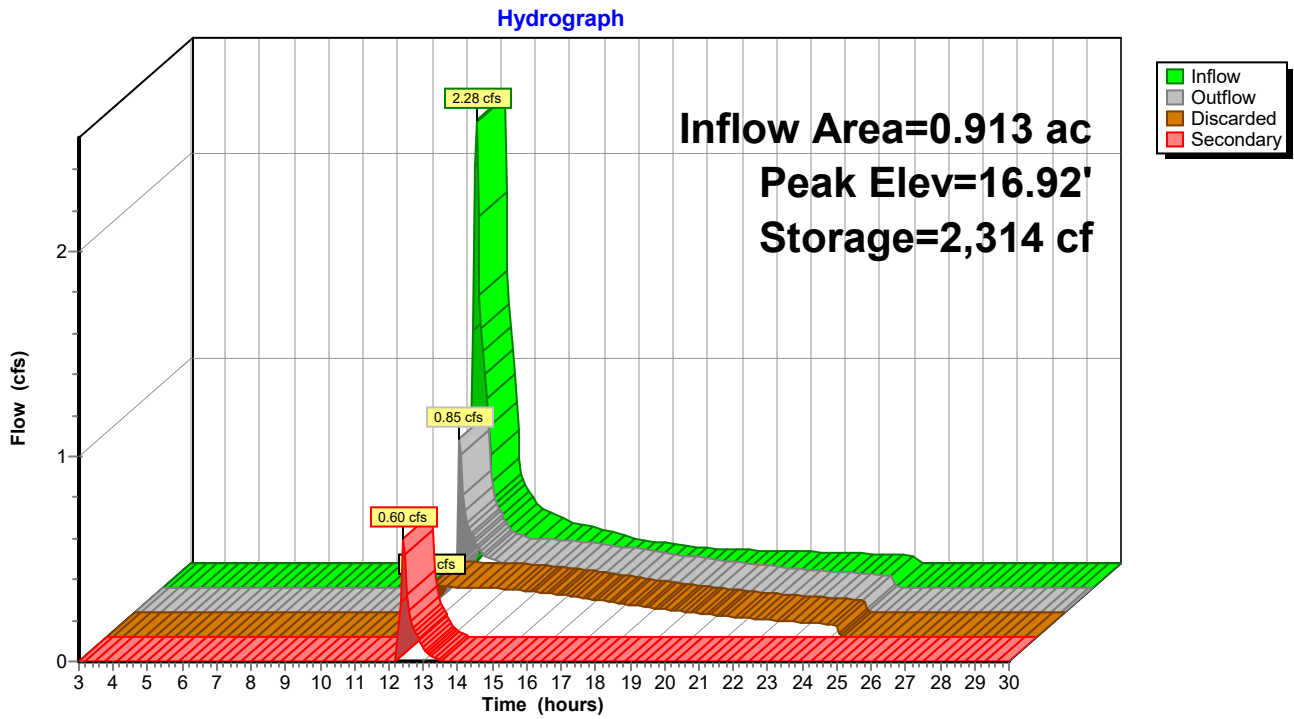


Pond Ex. Basin DA4: DA4 EX. BASIN

Orifice/Grate

Exfiltration

Pond Ex. Basin DA4: DA4 EX. BASIN



Summary for Pond MH 1: MH1

Inflow Area = 1.076 ac, 34.79% Impervious, Inflow Depth = 3.50" for 100-Year event
 Inflow = 3.96 cfs @ 12.16 hrs, Volume= 0.314 af
 Outflow = 3.96 cfs @ 12.16 hrs, Volume= 0.314 af, Atten= 0%, Lag= 0.0 min
 Primary = 3.96 cfs @ 12.16 hrs, Volume= 0.314 af
 Routed to Pond MH2 : MH2
 Secondary = 0.00 cfs @ 3.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs
 Peak Elev= 15.81' @ 12.16 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	14.70'	18.0" Round CMP_Round 18" L= 156.1' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 14.70' / 11.50' S= 0.0205 ' / Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf
#2	Secondary	24.00'	24.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=3.89 cfs @ 12.16 hrs HW=15.79' (Free Discharge)
 ↑1=CMP_Round 18" (Inlet Controls 3.89 cfs @ 2.81 fps)

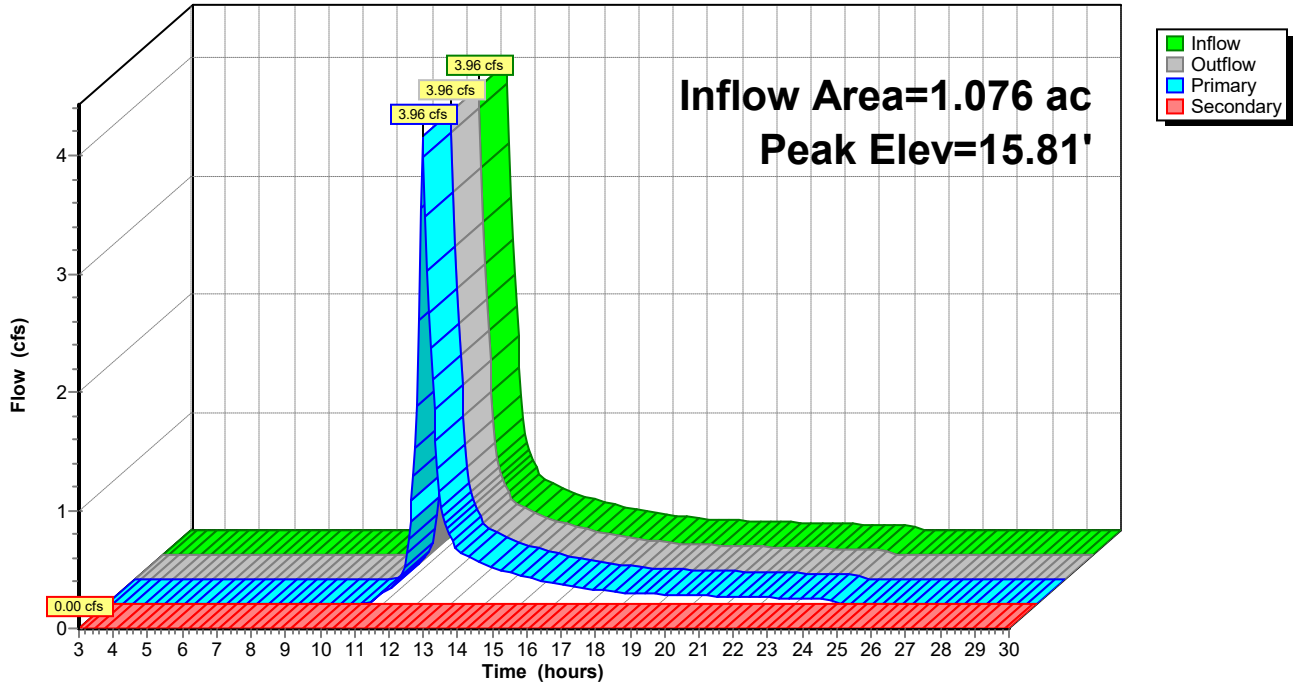
Secondary OutFlow Max=0.00 cfs @ 3.00 hrs HW=14.70' (Free Discharge)
 ↑2=Orifice/Grate (Controls 0.00 cfs)

Orifice/Grate



Pond MH 1: MH1

Hydrograph



Summary for Pond MH2: MH2

Inflow Area = 1.076 ac, 34.79% Impervious, Inflow Depth = 3.50" for 100-Year event
 Inflow = 3.96 cfs @ 12.16 hrs, Volume= 0.314 af
 Outflow = 3.96 cfs @ 12.16 hrs, Volume= 0.314 af, Atten= 0%, Lag= 0.0 min
 Primary = 3.96 cfs @ 12.16 hrs, Volume= 0.314 af
 Routed to Pond RR Channel DA1 : Rip Rap Channel DA1
 Secondary = 0.00 cfs @ 3.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs
 Peak Elev= 11.78' @ 12.16 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	11.40'	18.0" Round CMP_Round 18" L= 118.9' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 11.40' / 10.80' S= 0.0050 ' / ' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf
#2	Secondary	24.00'	24.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Primary	10.80'	15.00' long x 6.00' breadth x 1.00' high Rock Fill Rock Diam.= 12.000", S.D.= 1.000", Voids= 40.0%

Primary OutFlow Max=3.94 cfs @ 12.16 hrs HW=11.77' (Free Discharge)
 ↑1=CMP_Round 18" (Barrel Controls 0.56 cfs @ 2.54 fps)
 ↓3=Rock Fill (Rockfill Controls 3.37 cfs @ 0.46 fps)

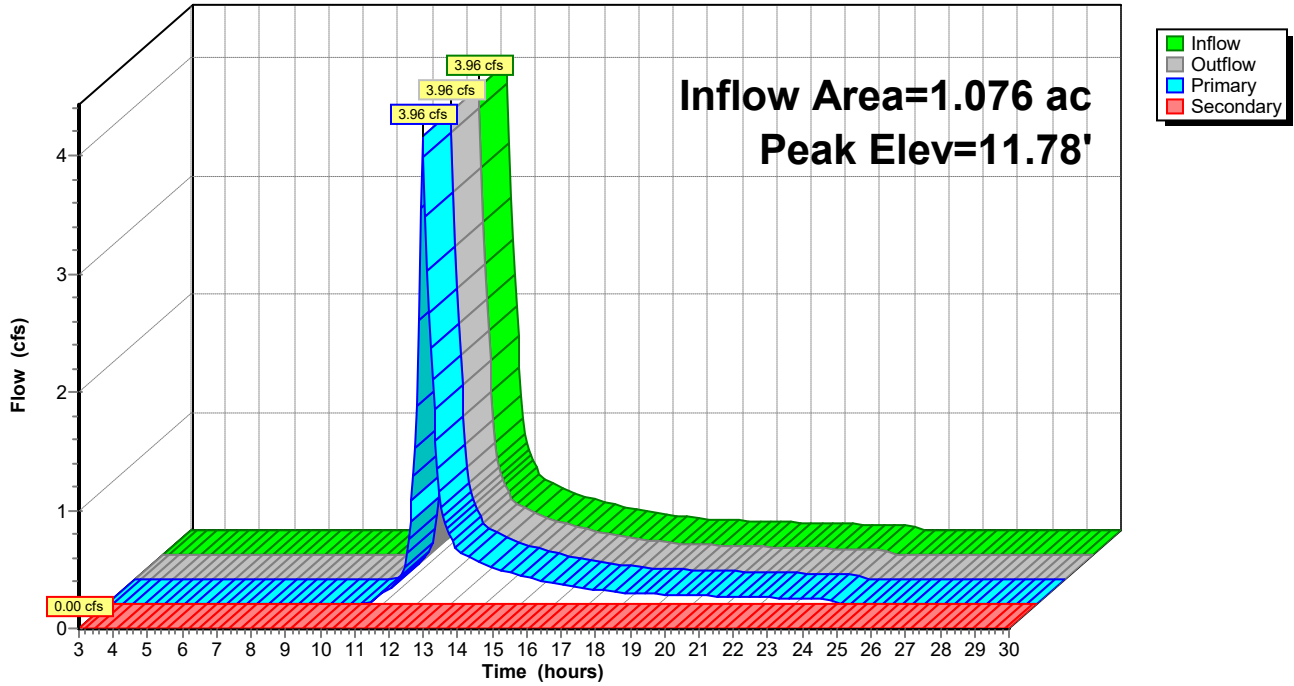
Secondary OutFlow Max=0.00 cfs @ 3.00 hrs HW=10.80' (Free Discharge)
 ↑2=Orifice/Grate (Controls 0.00 cfs)

Orifice/Grate



Pond MH2: MH2

Hydrograph



nel DA1

100-Year event

%, Lag= 0.0 min

ch

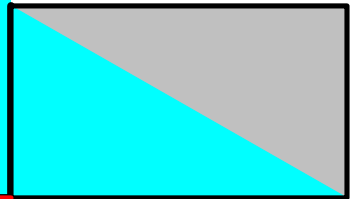
Phase-In= 0.01'

k Fill

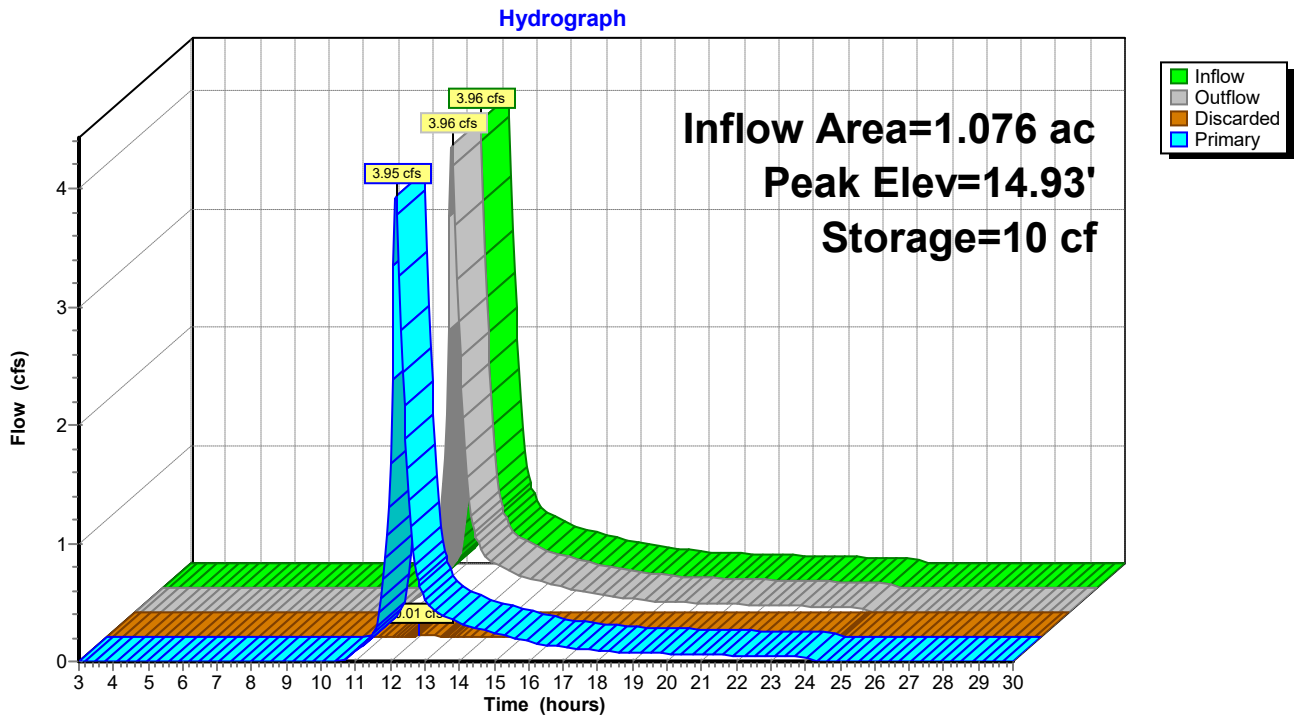
40.0%

Pond RR Channel DA1: Rip Rap Channel DA1

Exit to fill



Pond RR Channel DA1: Rip Rap Channel DA1



Wareham Post Construction

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Summary for Pond SIB-1: SIB-1

Inflow Area = 2.172 ac, 35.72% Impervious, Inflow Depth = 2.44" for 100-Year event
 Inflow = 6.95 cfs @ 12.17 hrs, Volume= 0.442 af
 Outflow = 0.85 cfs @ 12.75 hrs, Volume= 0.442 af, Atten= 88%, Lag= 34.4 min
 Discarded = 0.85 cfs @ 12.75 hrs, Volume= 0.442 af
 Secondary = 0.00 cfs @ 3.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs
 Peak Elev= 12.47' @ 12.75 hrs Surf.Area= 4,348 sf Storage= 8,572 cf

Plug-Flow detention time= 95.8 min calculated for 0.441 af (100% of inflow)
 Center-of-Mass det. time= 95.7 min (921.5 - 825.8)

Volume	Invert	Avail.Storage	Storage Description
#1	10.00'	123,310 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
10.00	2,664	0	0	2,664
11.00	3,306	2,979	2,979	3,334
12.00	4,005	3,650	6,629	4,066
13.00	4,760	4,377	11,006	4,856
14.00	5,572	5,161	16,167	5,707
15.00	6,440	6,001	22,168	6,617
16.00	7,365	6,897	29,065	7,588
17.00	8,347	7,851	36,916	8,619
18.00	9,385	8,861	45,777	9,709
19.00	10,480	9,927	55,704	10,860
20.00	11,630	11,050	66,754	12,069
21.00	12,837	12,229	78,983	13,338
22.00	14,101	13,464	92,447	14,667
23.00	15,422	14,757	107,203	16,057
24.00	16,800	16,106	123,310	17,506

Device	Routing	Invert	Outlet Devices
#1	Discarded	10.00'	8.270 in/hr Exfiltration over Wetted area Phase-In= 0.01'
#2	Secondary	23.90'	360.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.85 cfs @ 12.75 hrs HW=12.47' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.85 cfs)

Secondary OutFlow Max=0.00 cfs @ 3.00 hrs HW=10.00' (Free Discharge)
 ↑2=Orifice/Grate (Controls 0.00 cfs)

Wareham Post Construction

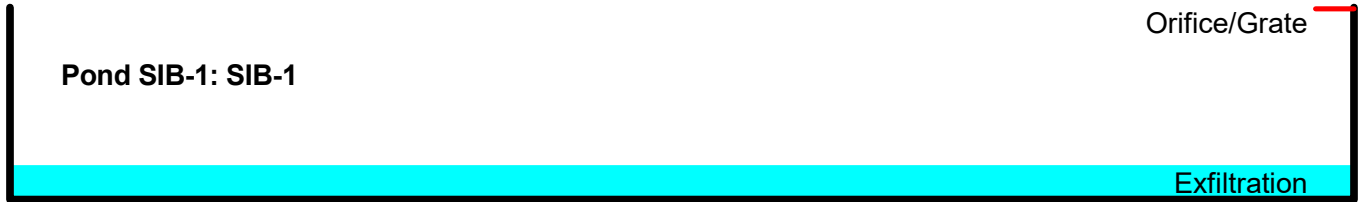
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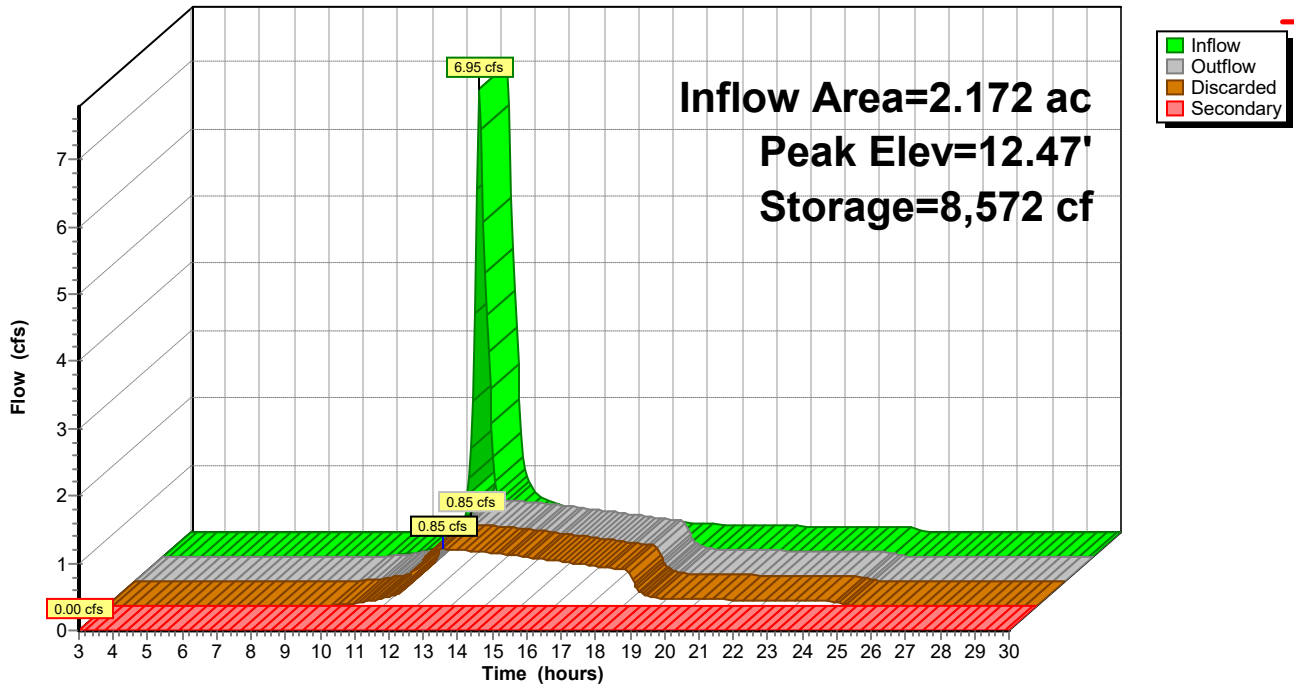
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Pond SIB-1: SIB-1

Hydrograph



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Type III 24-hr 100-Year Rainfall=8.68"

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Summary for Pond SIB-2: SIB-2

Inflow Area = 1.267 ac, 40.21% Impervious, Inflow Depth = 4.20" for 100-Year event
 Inflow = 5.04 cfs @ 12.09 hrs, Volume= 0.443 af
 Outflow = 4.80 cfs @ 12.12 hrs, Volume= 0.441 af, Atten= 5%, Lag= 1.8 min
 Discarded = 0.10 cfs @ 11.05 hrs, Volume= 0.128 af
 Secondary = 4.70 cfs @ 12.12 hrs, Volume= 0.313 af

Routing by Stor-Ind method, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs / 4
 Peak Elev= 23.95' @ 12.12 hrs Surf.Area= 614 sf Storage= 1,046 cf

Plug-Flow detention time= 43.5 min calculated for 0.441 af (99% of inflow)
 Center-of-Mass det. time= 39.7 min (863.8 - 824.2)

Volume	Invert	Avail.Storage	Storage Description
#1	13.96'	299 cf	10.00'W x 24.00'L x 6.00'H Prismatic 1,440 cf Overall - 693 cf Embedded = 747 cf x 40.0% Voids
#2	13.96'	509 cf	6.00'D x 6.00'H Vertical Cone/Cylinder x 3 Inside #1 693 cf Overall - 6.0" Wall Thickness = 509 cf
#3	19.96'	28 cf	2.00'D x 3.00'H Vertical Cone/Cylinder x 3 -Impervious
#4	22.96'	878 cf	Custom Stage Data (Conic) Listed below (Recalc)
		1,714 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
22.96	83	0	0	83
24.00	393	228	228	398
25.00	947	650	878	959

Device	Routing	Invert	Outlet Devices
#1	Secondary	23.00'	2.0" x 2.0" Horiz. Orifice/Grate X 6.00 columns X 6 rows C= 0.600 Limited to weir flow at low heads
#2	Discarded	13.96'	8.270 in/hr Exfiltration over Wetted area from 13.96' - 23.00' Excluded Wetted area = 240 sf Phase-In= 0.01'

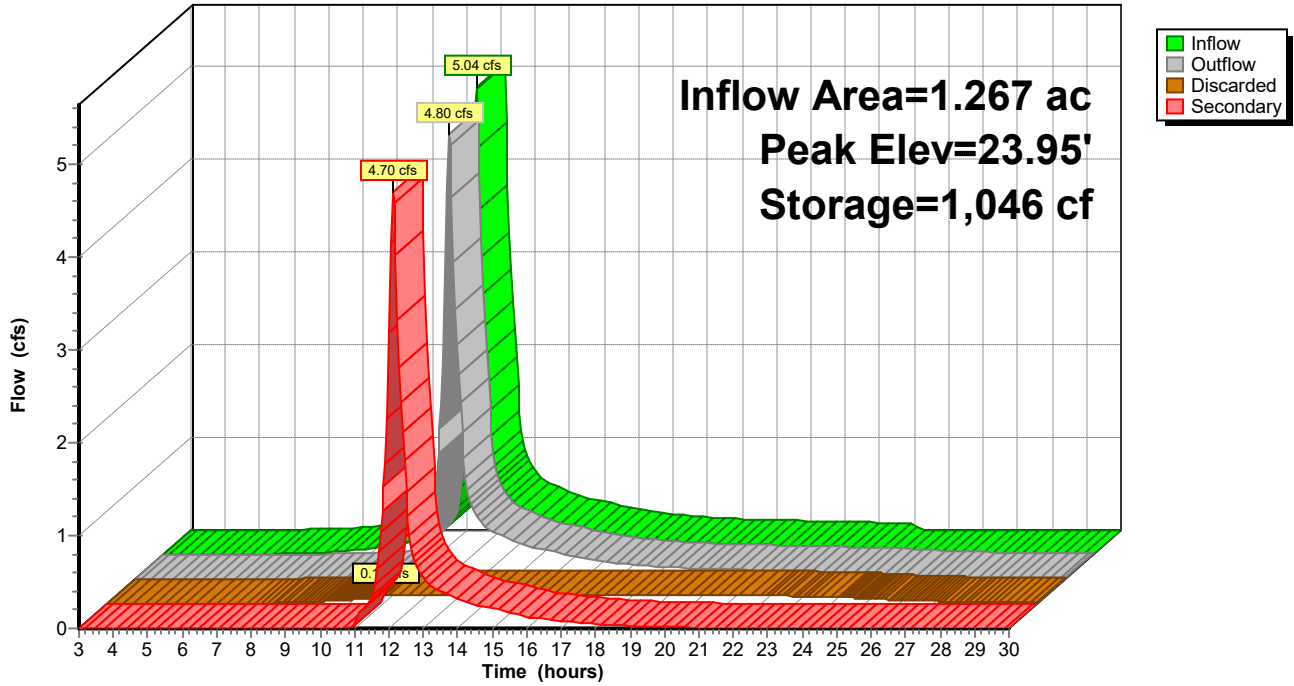
Discarded OutFlow Max=0.10 cfs @ 11.05 hrs HW=23.01' (Free Discharge)
 ↑ **2=Exfiltration** (Exfiltration Controls 0.10 cfs)

Secondary OutFlow Max=4.64 cfs @ 12.12 hrs HW=23.93' (Free Discharge)
 ↑ **1=Orifice/Grate** (Orifice Controls 4.64 cfs @ 4.64 fps)



Pond SIB-2: SIB-2

Hydrograph



Wareham Post Construction

Type III 24-hr 100-Year Rainfall=8.68"

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Summary for Pond SIB-3: SIB-3

Inflow Area = 0.123 ac, 44.81% Impervious, Inflow Depth = 4.45" for 100-Year event
 Inflow = 0.71 cfs @ 12.02 hrs, Volume= 0.045 af
 Outflow = 0.17 cfs @ 12.41 hrs, Volume= 0.045 af, Atten= 76%, Lag= 23.8 min
 Discarded = 0.17 cfs @ 12.41 hrs, Volume= 0.045 af
 Secondary = 0.00 cfs @ 3.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs / 4
 Peak Elev= 22.93' @ 12.40 hrs Surf.Area= 240 sf Storage= 836 cf

Plug-Flow detention time= 170.3 min calculated for 0.045 af (99% of inflow)
 Center-of-Mass det. time= 162.2 min (988.9 - 826.7)

Volume	Invert	Avail.Storage	Storage Description
#1	13.96'	299 cf	10.00'W x 24.00'L x 6.00'H Prismaoid 1,440 cf Overall - 693 cf Embedded = 747 cf x 40.0% Voids
#2	13.96'	509 cf	6.00'D x 6.00'H Vertical Cone/Cylinder x 3 Inside #1 693 cf Overall - 6.0" Wall Thickness = 509 cf
#3	19.96'	28 cf	2.00'D x 3.00'H Vertical Cone/Cylinder x 3 -Impervious
#4	22.96'	1,578 cf	Custom Stage Data (Irregular) Listed below (Recalc)
		2,414 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
22.96	817	126.0	0	0	817
24.00	2,350	206.0	1,578	1,578	2,938

Device	Routing	Invert	Outlet Devices
#1	Secondary	23.00'	2.0" x 2.0" Horiz. Orifice/Grate X 6.00 columns X 6 rows C= 0.600 Limited to weir flow at low heads
#2	Discarded	13.96'	8.270 in/hr Exfiltration over Wetted area from 13.96' - 23.00' Excluded Wetted area = 240 sf Phase-In= 0.01'

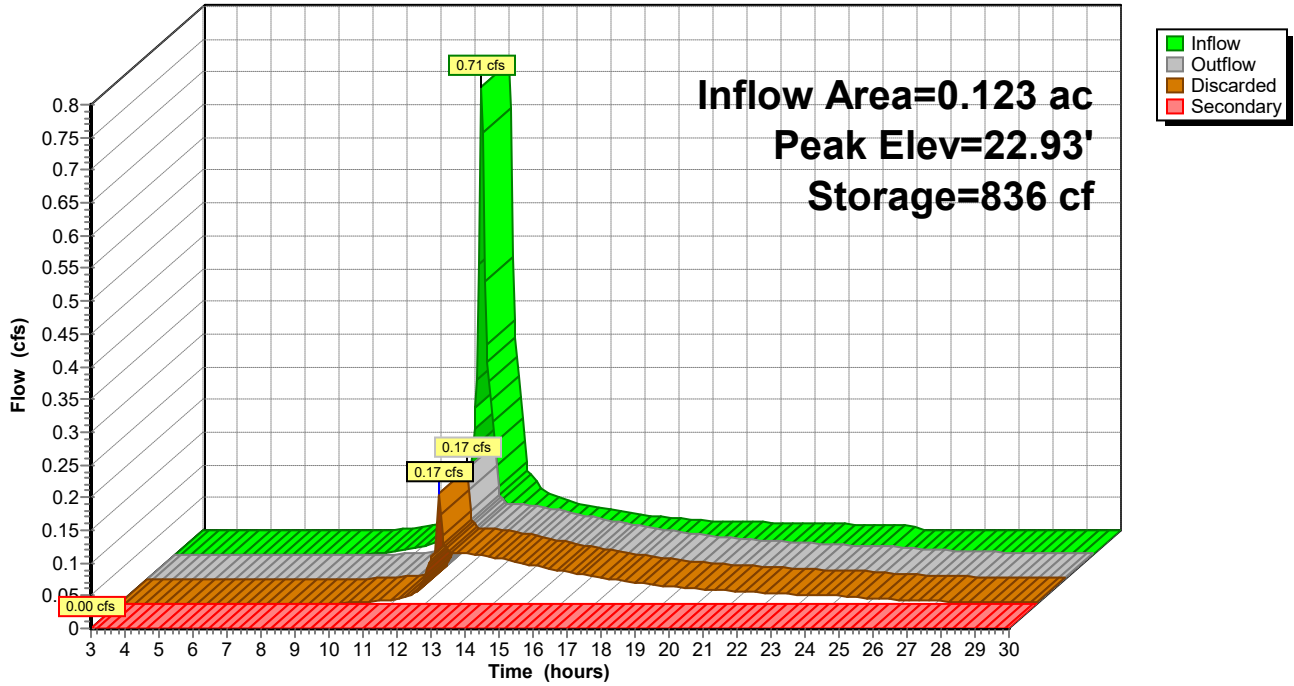
Discarded OutFlow Max=0.08 cfs @ 12.41 hrs HW=22.93' (Free Discharge)
 ↑2=Exfiltration (Exfiltration Controls 0.08 cfs)

Secondary OutFlow Max=0.00 cfs @ 3.00 hrs HW=13.96' (Free Discharge)
 ↑1=Orifice/Grate (Controls 0.00 cfs)



Pond SIB-3: SIB-3

Hydrograph



Summary for Pond SIB-4: SIB-4

Inflow Area = 0.903 ac, 36.30% Impervious, Inflow Depth = 3.26" for 100-Year event
 Inflow = 3.37 cfs @ 12.08 hrs, Volume= 0.245 af
 Outflow = 1.65 cfs @ 12.32 hrs, Volume= 0.240 af, Atten= 51%, Lag= 14.0 min
 Discarded = 0.53 cfs @ 12.30 hrs, Volume= 0.224 af
 Secondary = 1.12 cfs @ 12.32 hrs, Volume= 0.015 af

Routing by Stor-Ind method, Time Span= 3.00-30.00 hrs, dt= 0.05 hrs / 4
 Peak Elev= 26.91' @ 12.30 hrs Surf.Area= 2,544 sf Storage= 3,252 cf

Plug-Flow detention time= 98.0 min calculated for 0.239 af (98% of inflow)
 Center-of-Mass det. time= 85.9 min (937.9 - 852.0)

Volume	Invert	Avail.Storage	Storage Description
#1	16.33'	248 cf	10.00'W x 17.00'L x 6.67'H Prismaoid 1,134 cf Overall - 513 cf Embedded = 621 cf x 40.0% Voids
#2	16.33'	377 cf	6.00'D x 6.67'H Vertical Cone/Cylinder x 2 Inside #1 513 cf Overall - 6.0" Wall Thickness = 377 cf
#3	23.00'	0 cf	2.00'D x 2.00'H Vertical Cone/Cylinder 6 cf Overall x 0.0% Voids
#4	25.00'	2,852 cf	Custom Stage Data (Conic) Listed below (Recalc)
		3,477 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
25.00	514	0	0	514
26.00	1,416	928	928	1,422
27.00	2,482	1,924	2,852	2,500

Device	Routing	Invert	Outlet Devices
#1	Discarded	16.67'	8.270 in/hr Exfiltration over Wetted area above 16.67' Excluded Wetted area = 188 sf Phase-In= 0.01'
#2	Secondary	26.90'	528.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

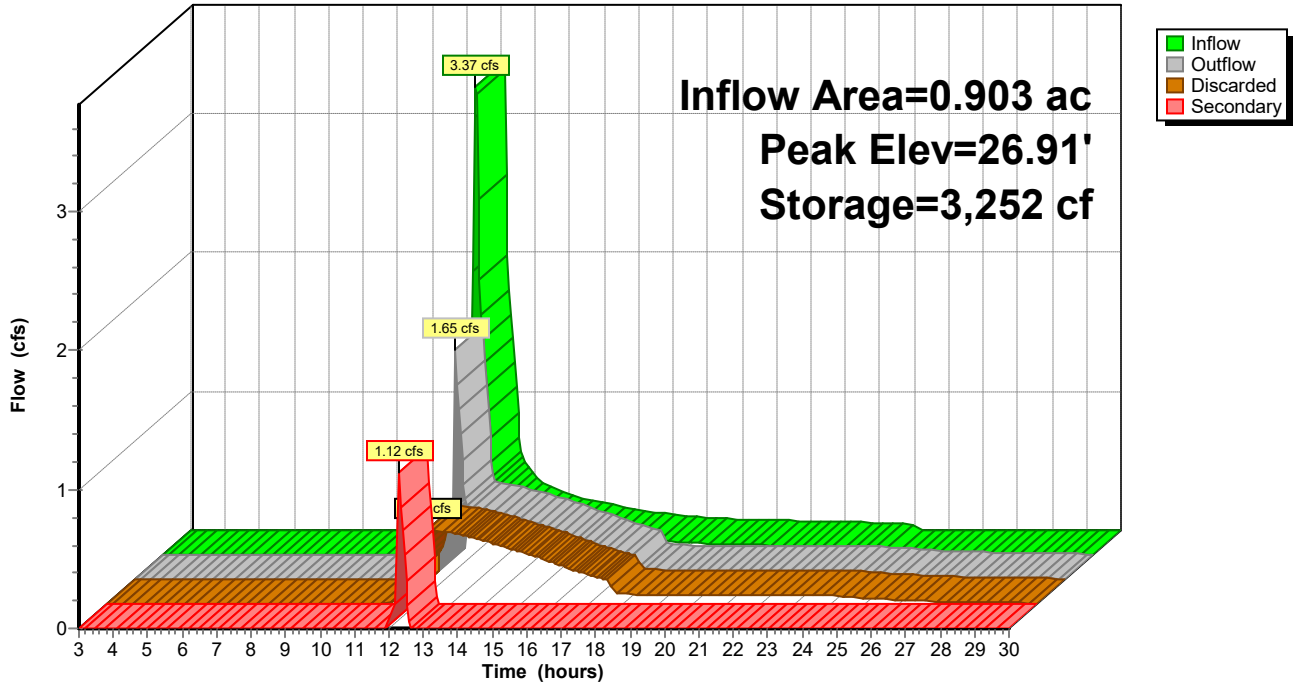
Discarded OutFlow Max=0.53 cfs @ 12.30 hrs HW=26.91' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.53 cfs)

Secondary OutFlow Max=0.26 cfs @ 12.32 hrs HW=26.91' (Free Discharge)
 ↑2=Orifice/Grate (Weir Controls 0.26 cfs @ 0.27 fps)



Pond SIB-4: SIB-4

Hydrograph





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