



MERIDIAN LAND SERVICES, INC.

CIVIL ENGINEERING | LAND SURVEYING | PERMITTING | SOIL & WETLAND MAPPING | SEPTIC DESIGN | ENVIRONMENTAL

Office: 31 Old Nashua Road, Suite 2, Amherst, NH 03031

Mailing: PO Box 118, Milford, NH 03055

Phone: 603-673-1441 * Fax 603-673-1584

www.MeridianLandServices.com

Stormwater Management Report

Subdivision of Lot F-34

Tax Map F Lot 34

Route 13

Brookline, New Hampshire 03033

Prepared for:

Federal Hill Properties, LLC

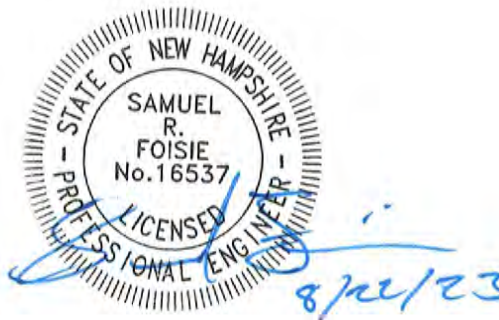
25 Merrit Parkway

Nashua, New Hampshire 03062

August 23, 2023

Prepared by: Noah C. Greene, EIT

Reviewed by: Samuel R. Foisie, PE





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Storm Water Management Report

Subdivision of Lot F-34

Map F Parcel 34

NH Route 13, Brookline, New Hampshire

I. Introduction

These drainage calculations have been prepared in support of the above referenced development project on tax parcel F-34 in Brookline, New Hampshire. The project will involve the construction of a 75-foot common driveway that will service the two lots.

II. Site Description

This site is located on Route 13, Brookline. The site consists of almost entirely forested land in its existing conditions. The property is located South of the intersection of Milford Street and NH Route 13.

The following are existing soil types for the offsite areas that were determined using United States Department of Agriculture (USDA) Natural Resource Conservation Service (NRCS) Web Soil Survey:

CmC	Canton Stony Fine Sandy Loam, 3 to 8 Percent Slopes	HSG B
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III. Drainage Design

To meet the requirements of the Town of Brookline, storm water generated from the proposed development is conveyed to two separate infiltration basins located downslope of the proposed development. The site was analyzed for the 25-year storm event.

Two observation points were analyzed to compare the peak flows generated by the existing site and the proposed development. Observation Point 'OP-1' represents the runoff generated from the northern half of the site from the centerline of the proposed common drive. The runoff from the common drive is conveyed via a roadside swale and culvert that outlets on the eastern side of the individual drives and is conveyed to the infiltration basin via a conveyance swale. The conveyance swale and pond are designed to capture the runoff from the common driveway and any proposed development on the site.

Observation Point 'OP-2' represents the runoff from the southern half of the site from the centerline of the proposed common drive. The runoff from the common drive is conveyed via a roadside swale and culvert that outlets on the eastern side of the individual drives and is conveyed to the infiltration basin via a conveyance swale. The conveyance swale and pond are designed to capture the runoff from the common driveway and any proposed development on the site.



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IV. Methodology

The quantity of runoff and the conveyance of that flow through the site are determined using the software package HydroCAD 10.20-2g by HydroCAD Software Solutions, LLC. HydroCAD is a computer aided design program for modeling storm water hydrology based on the Soil Conservation Service (SCS) TR-55 method combined with standard hydraulics calculations.

V. Summary

The proposed drainage design effectively mitigates runoff during the 25-year storm events. The runoff is effectively collected and discharged at a controlled rate. The proposed stormwater mitigation reduces peak flow rates generated from the site for all storms.

Summary tables below for pre- and post-development peak runoff rates are shown in the table below.

Table 1: Peak Rate of Stormwater Discharge Summary

Location	Q 25-YR (CFS)		
	Pre	Post	Δ
OP-1	2.71	2.56	-0.15
OP-2	1.54	1.44	-0.10

Extreme Precipitation Tables

Northeast Regional Climate Center

Data represents point estimates calculated from partial duration series. All precipitation amounts are displayed in inches.

Metadata for Point

Smoothing

State

Location

Latitude

Longitude

Elevation

Date/Time

Yes

New Hampshire

New Hampshire, United States

42.747 degrees North

71.667 degrees West

90 feet

Thu Aug 17 2023 09:39:02 GMT-0400 (Eastern Daylight Time)

Extreme Precipitation Estimates

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.28	0.43	0.53	0.69	0.87	1.09	1yr	0.75	1.02	1.26	1.58	1.99	2.52	2.79	1yr	2.23	2.68	3.10	3.82	4.42	1yr
2yr	0.34	0.52	0.64	0.85	1.06	1.34	2yr	0.92	1.22	1.54	1.93	2.41	3.01	3.36	2yr	2.66	3.23	3.74	4.46	5.08	2yr
5yr	0.40	0.62	0.77	1.04	1.33	1.68	5yr	1.15	1.53	1.95	2.44	3.03	3.76	4.26	5yr	3.33	4.09	4.74	5.60	6.29	5yr
10yr	0.45	0.70	0.89	1.20	1.57	2.00	10yr	1.35	1.81	2.33	2.91	3.61	4.45	5.09	10yr	3.94	4.90	5.67	6.66	7.39	10yr
25yr	0.53	0.84	1.07	1.47	1.95	2.52	25yr	1.69	2.26	2.93	3.67	4.54	5.57	6.46	25yr	4.93	6.22	7.19	8.37	9.16	25yr
50yr	0.59	0.95	1.22	1.72	2.31	3.01	50yr	2.00	2.67	3.52	4.40	5.42	6.61	7.74	50yr	5.85	7.45	8.61	9.96	10.78	50yr
100yr	0.68	1.10	1.42	2.01	2.74	3.58	100yr	2.37	3.17	4.19	5.24	6.45	7.85	9.29	100yr	6.95	8.93	10.31	11.85	12.69	100yr
200yr	0.77	1.26	1.64	2.35	3.25	4.27	200yr	2.80	3.75	5.01	6.26	7.69	9.32	11.14	200yr	8.25	10.71	12.35	14.10	14.95	200yr
500yr	0.93	1.53	2.00	2.90	4.07	5.39	500yr	3.51	4.70	6.33	7.91	9.69	11.70	14.19	500yr	10.36	13.64	15.70	17.76	18.56	500yr

Lower Confidence Limits

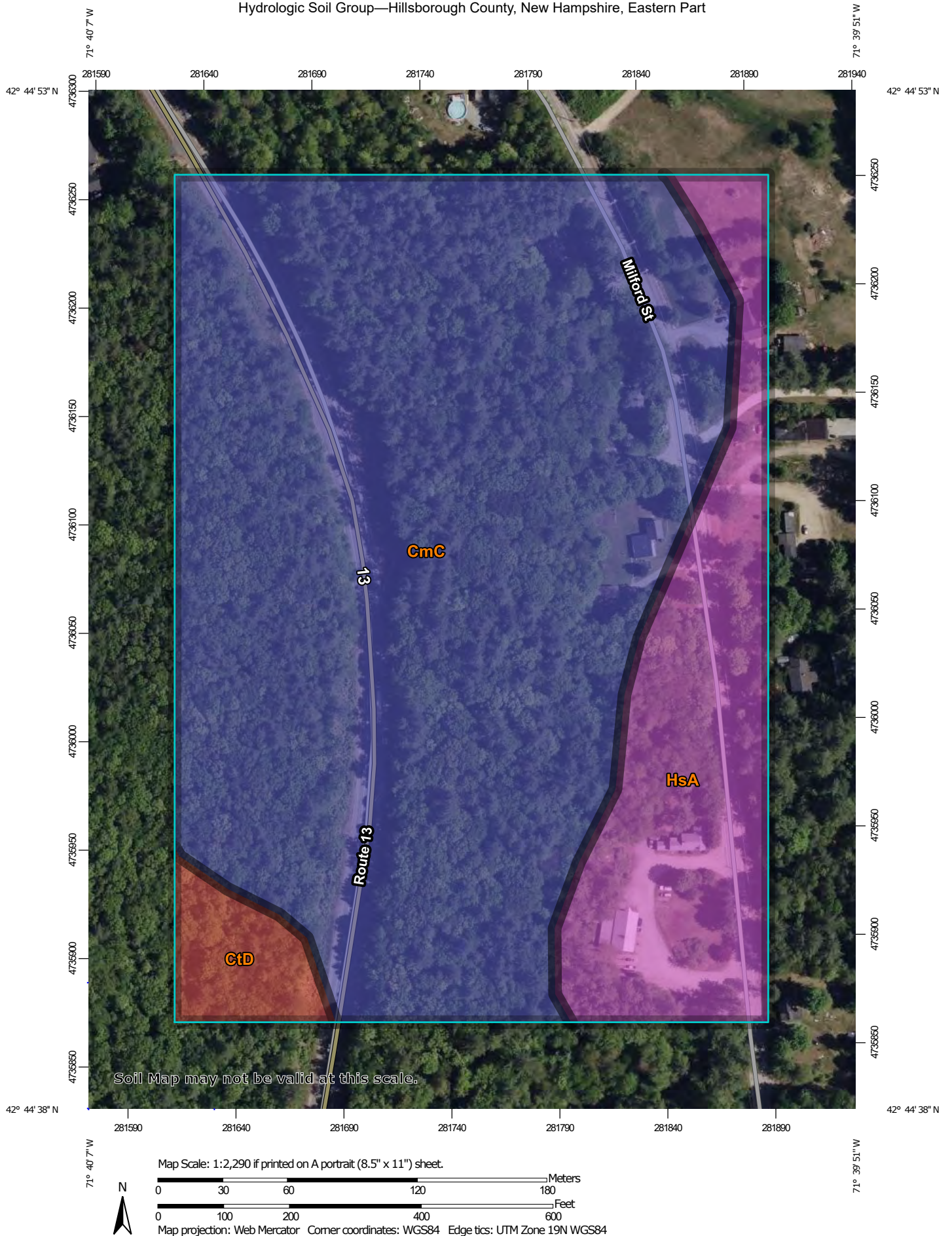
	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.21	0.32	0.39	0.53	0.65	0.77	1yr	0.56	0.75	0.99	1.36	1.68	2.24	2.40	1yr	1.98	2.30	2.61	3.38	3.69	1yr
2yr	0.32	0.49	0.61	0.82	1.02	1.21	2yr	0.88	1.18	1.37	1.77	2.27	2.93	3.27	2yr	2.59	3.14	3.63	4.35	4.95	2yr
5yr	0.36	0.55	0.69	0.94	1.20	1.41	5yr	1.04	1.38	1.64	2.12	2.71	3.53	3.96	5yr	3.13	3.81	4.40	5.23	5.89	5yr
10yr	0.40	0.61	0.75	1.05	1.36	1.58	10yr	1.17	1.54	1.77	2.41	3.07	4.09	4.58	10yr	3.62	4.41	5.08	6.01	6.71	10yr
25yr	0.45	0.68	0.85	1.21	1.59	1.83	25yr	1.37	1.79	2.04	2.87	3.61	4.89	5.56	25yr	4.33	5.34	6.15	7.23	7.97	25yr
50yr	0.48	0.73	0.91	1.31	1.76	2.06	50yr	1.52	2.01	2.29	3.28	4.08	5.63	6.44	50yr	4.99	6.20	7.09	8.31	9.08	50yr
100yr	0.51	0.78	0.97	1.41	1.93	2.31	100yr	1.67	2.26	2.56	3.19	4.63	6.51	7.47	100yr	5.76	7.18	8.17	9.55	10.34	100yr
200yr	0.55	0.83	1.06	1.53	2.14	2.60	200yr	1.84	2.54	2.85	3.53	5.28	7.52	8.68	200yr	6.66	8.35	9.42	10.98	11.79	200yr
500yr	0.61	0.91	1.17	1.71	2.43	3.05	500yr	2.09	2.98	3.32	4.06	6.31	9.14	10.61	500yr	8.09	10.20	11.36	13.19	14.00	500yr

Upper Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.32	0.49	0.60	0.80	0.99	1.17	1yr	0.85	1.15	1.31	1.71	2.12	2.69	3.00	1yr	2.38	2.89	3.45	4.24	4.78	1yr
2yr	0.36	0.56	0.69	0.93	1.15	1.33	2yr	0.99	1.30	1.50	1.94	2.48	3.10	3.48	2yr	2.74	3.35	3.87	4.60	5.24	2yr
5yr	0.44	0.67	0.84	1.15	1.46	1.71	5yr	1.26	1.67	1.89	2.41	3.01	3.99	4.56	5yr	3.53	4.38	5.06	5.99	6.70	5yr
10yr	0.51	0.79	0.98	1.37	1.77	2.09	10yr	1.53	2.04	2.37	2.87	3.57	4.84	5.62	10yr	4.29	5.40	6.23	7.31	8.09	10yr
25yr	0.65	0.99	1.24	1.77	2.32	2.73	25yr	2.01	2.67	3.10	3.62	4.44	6.25	7.37	25yr	5.53	7.09	8.22	9.54	10.38	25yr
50yr	0.78	1.19	1.48	2.13	2.87	3.35	50yr	2.47	3.27	3.79	4.33	5.24	7.59	9.07	50yr	6.72	8.72	10.15	11.69	12.55	50yr
100yr	0.94	1.42	1.78	2.57	3.52	4.11	100yr	3.04	4.02	4.65	5.91	6.18	9.23	11.16	100yr	8.17	10.73	12.53	14.31	15.17	100yr
200yr	1.13	1.70	2.15	3.11	4.34	5.03	200yr	3.74	4.92	5.68	7.22	7.31	11.21	13.73	200yr	9.92	13.20	15.49	17.55	18.37	200yr
500yr	1.45	2.15	2.77	4.02	5.72	6.55	500yr	4.94	6.40	7.42	9.42	9.10	14.47	18.07	500yr	12.81	17.38	20.51	22.98	23.65	500yr



Hydrologic Soil Group—Hillsborough County, New Hampshire, Eastern Part



MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

Soil Rating Polygons

 A
 A/D
 B
 B/D
 C
 C/D
 D
 Not rated or not available

Soil Rating Lines


 A
 A/D
 B
 B/D
 C
 C/D
 D
 Not rated or not available

Soil Rating Points

 A
 A/D
 B
 B/D

 C
 C/D
 D
 Not rated or not available


Water Features

 Streams and Canals

Transportation

 Rails
 Interstate Highways
 US Routes
 Major Roads
 Local Roads

Background

 Aerial Photography

MAP INFORMATION

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

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
 Web Soil Survey URL:
 Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Hillsborough County, New Hampshire, Eastern Part
 Survey Area Data: Version 25, Sep 12, 2022

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

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

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

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
CmC	Canton fine sandy loam, 8 to 15 percent slopes, very stony	B	20.5	77.0%
CtD	Chatfield-Hollis-Rock outcrop complex, 15 to 35 percent slopes	D	1.0	3.6%
HsA	Hinckley loamy sand, 0 to 3 percent slopes	A	5.2	19.4%
Totals for Area of Interest			26.7	100.0%

Description

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

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

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

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

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

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

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

Rating Options

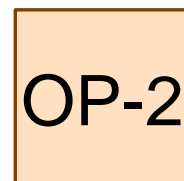
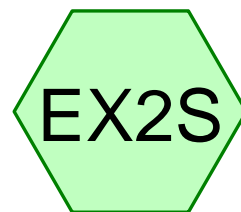
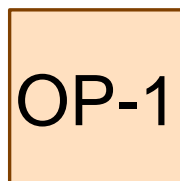
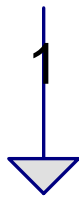
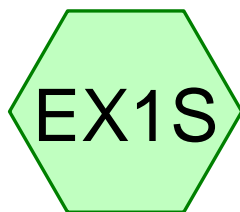
Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

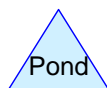
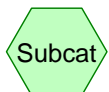
Tie-break Rule: Higher

Section 1.0: Existing Conditions

Routing Diagram
Area and Soils Listings
Design – 25-Year Storm



Observation Point 'OP-1' Observation Point 'OP-2'



Routing Diagram for 6115EX01

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6115EX01

Prepared by Meridian Land Services Inc

Printed 8/21/2023

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Page 2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.438	61	>75% Grass cover, Good HSG B (EX1S, EX2S)
2.968	55	Woods, Good HSG B (EX1S, EX2S)
3.406	56	TOTAL AREA

6115EX01

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Printed 8/21/2023

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Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
3.406	HSG B	EX1S, EX2S
0.000	HSG C	
0.000	HSG D	
0.000	Other	
3.406		TOTAL AREA

6115EX01*Type III 24-hr 25-Year Rainfall=5.57"*

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Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment EX1S: 1

Runoff Area=99,743 sf 0.00% Impervious Runoff Depth=1.35"

Flow Length=457' Slope=0.0980 '/' Tc=10.4 min CN=56 Runoff=2.71 cfs 0.257 af

Subcatchment EX2S: 2

Runoff Area=48,620 sf 0.00% Impervious Runoff Depth=1.35"

Flow Length=214' Slope=0.1034 '/' Tc=6.0 min CN=56 Runoff=1.54 cfs 0.125 af

Reach OP-1: Observation Point 'OP-1'

Inflow=2.71 cfs 0.257 af

Outflow=2.71 cfs 0.257 af

Reach OP-2: Observation Point 'OP-2'

Inflow=1.54 cfs 0.125 af

Outflow=1.54 cfs 0.125 af

Total Runoff Area = 3.406 ac Runoff Volume = 0.383 af Average Runoff Depth = 1.35"
100.00% Pervious = 3.406 ac 0.00% Impervious = 0.000 ac

Section 1.1: Existing Conditions,
25-Year Storm

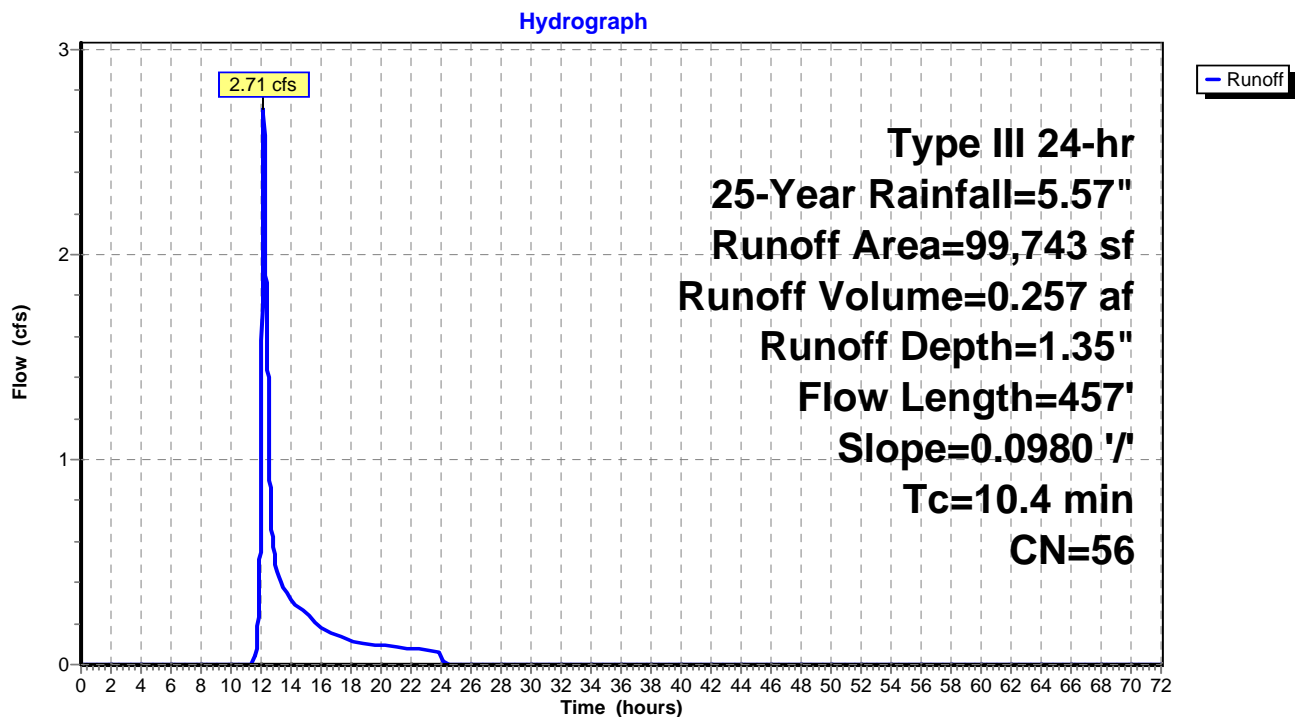
Summary for Subcatchment EX1S: 1

Runoff = 2.71 cfs @ 12.16 hrs, Volume= 0.257 af, Depth= 1.35"
 Routed to Reach OP-1 : Observation Point 'OP-1'

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 Type III 24-hr 25-Year Rainfall=5.57"

Area (sf)	CN	Description
87,955	55	Woods, Good HSG B
11,788	61	>75% Grass cover, Good HSG B
99,743	56	Weighted Average
99,743		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.4	457	0.0980	0.73		Lag/CN Method,

Subcatchment EX1S: 1

Summary for Subcatchment EX2S: 2

Runoff = 1.54 cfs @ 12.10 hrs, Volume= 0.125 af, Depth= 1.35"
 Routed to Reach OP-2 : Observation Point 'OP-2'

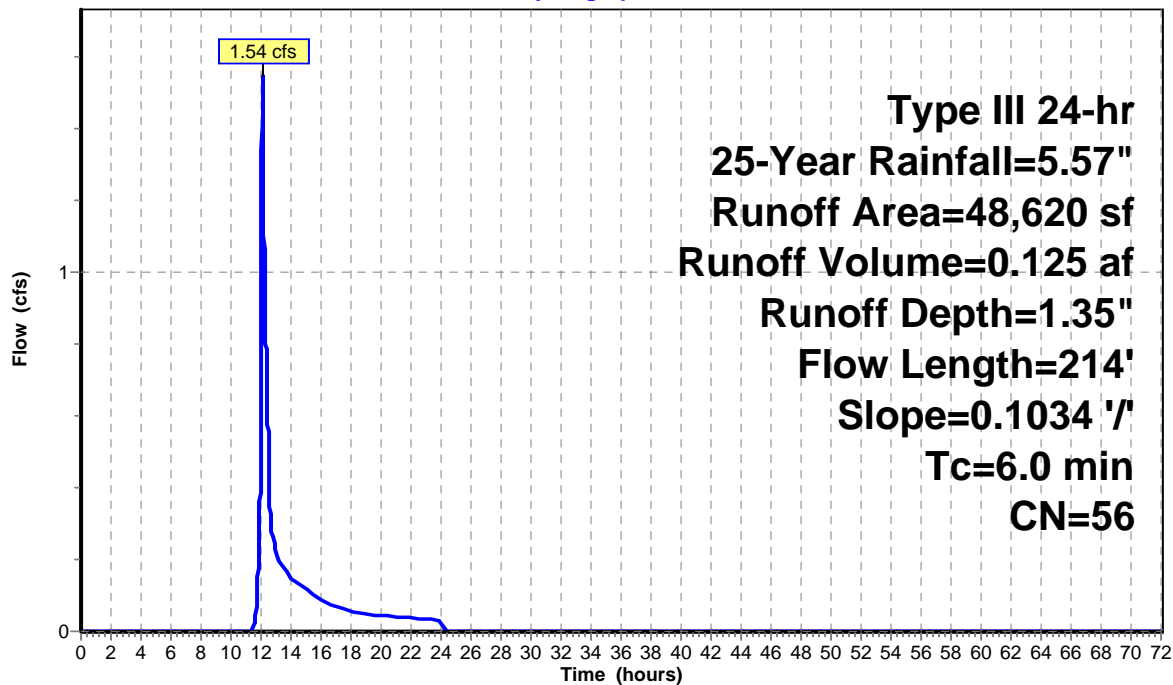
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 Type III 24-hr 25-Year Rainfall=5.57"

Area (sf)	CN	Description
41,324	55	Woods, Good HSG B
7,296	61	>75% Grass cover, Good HSG B
48,620	56	Weighted Average
48,620		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.5	214	0.1034	0.65		Lag/CN Method,
5.5	214	Total, Increased to minimum Tc = 6.0 min			

Subcatchment EX2S: 2

Hydrograph



Summary for Reach OP-1: Observation Point 'OP-1'

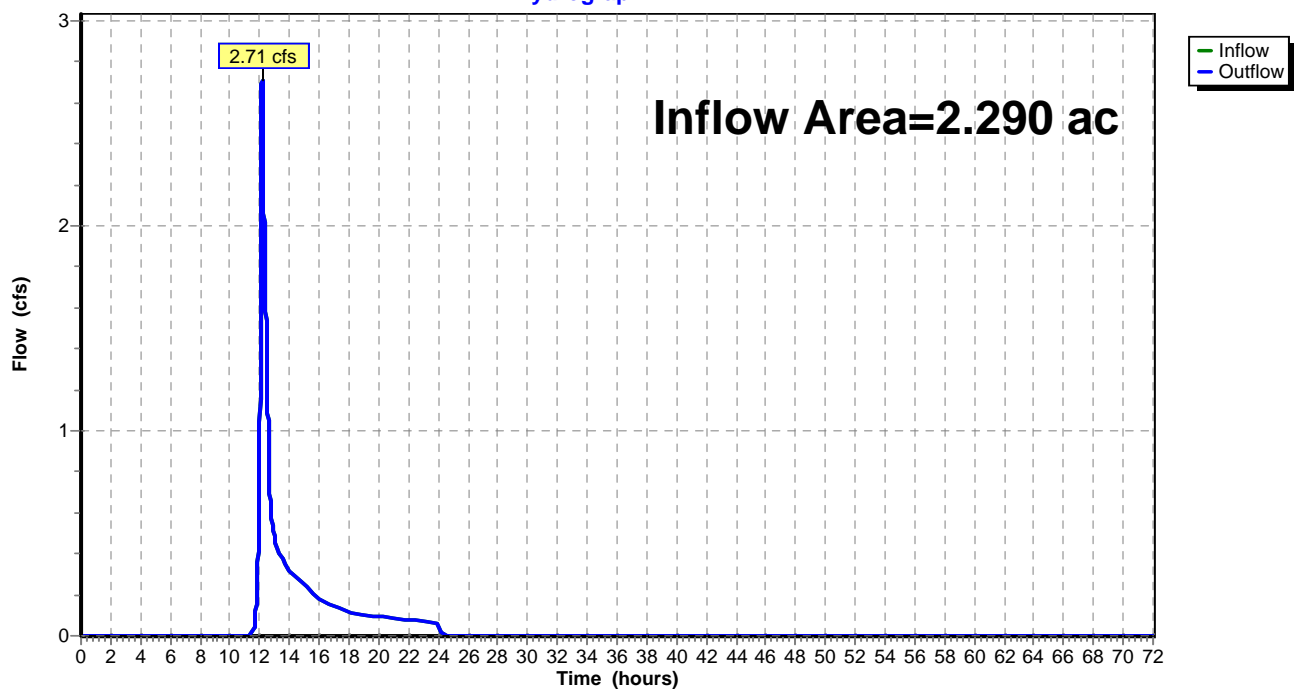
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 2.290 ac, 0.00% Impervious, Inflow Depth = 1.35" for 25-Year event
Inflow = 2.71 cfs @ 12.16 hrs, Volume= 0.257 af
Outflow = 2.71 cfs @ 12.16 hrs, Volume= 0.257 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Reach OP-1: Observation Point 'OP-1'

Hydrograph



Summary for Reach OP-2: Observation Point 'OP-2'

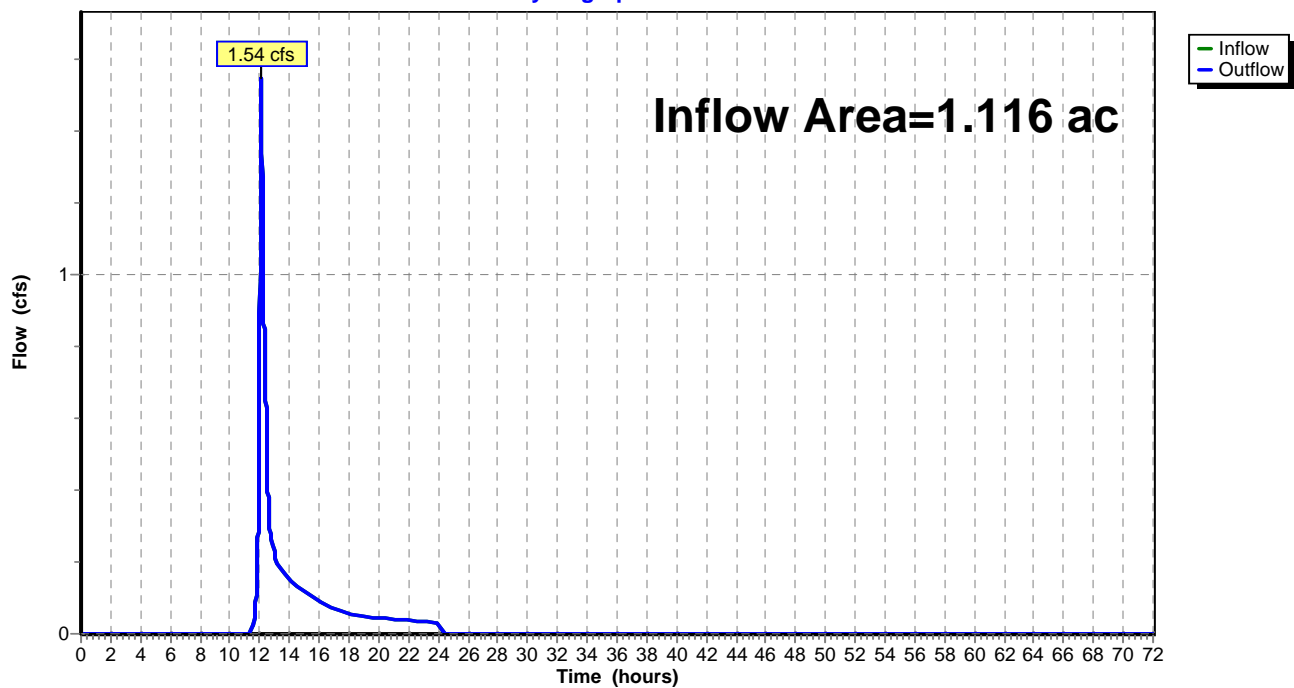
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.116 ac, 0.00% Impervious, Inflow Depth = 1.35" for 25-Year event
Inflow = 1.54 cfs @ 12.10 hrs, Volume= 0.125 af
Outflow = 1.54 cfs @ 12.10 hrs, Volume= 0.125 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

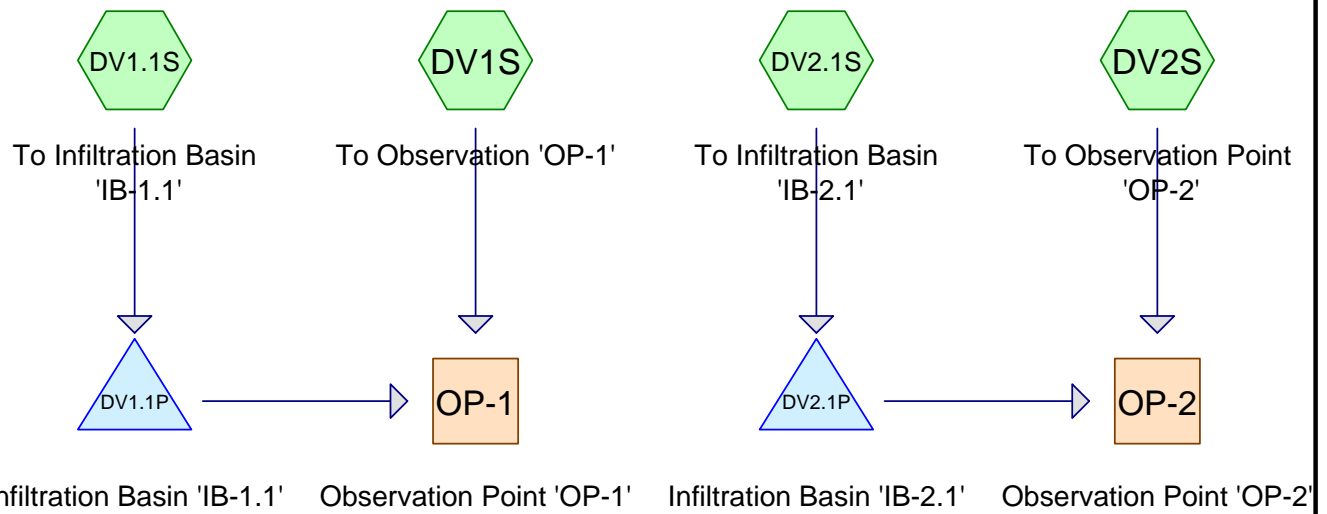
Reach OP-2: Observation Point 'OP-2'

Hydrograph



Section 2.0: Post-Developed Conditions

Routing Diagram
Area and Soils Listings
25-Year Storm Nodes



6115DV01

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Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.838	61	>75% Grass cover, Good HSG B (DV1.1S, DV1S, DV2.1S, DV2S)
0.089	98	Paved parking HSG B (DV1.1S, DV2.1S)
0.092	98	Roofs HSG B (DV1.1S, DV2.1S)
2.388	55	Woods, Good HSG B (DV1.1S, DV1S, DV2.1S, DV2S)
3.406	59	TOTAL AREA

6115DV01

Prepared by Meridian Land Services Inc

Printed 8/21/2023

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Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
3.406	HSG B	DV1.1S, DV1S, DV2.1S, DV2S
0.000	HSG C	
0.000	HSG D	
0.000	Other	
3.406		TOTAL AREA

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment DV1.1S: To Infiltration Runoff Area=23,666 sf 17.65% Impervious Runoff Depth=2.13"
 Flow Length=194' Slope=0.1097 '/' Tc=6.0 min CN=66 Runoff=1.32 cfs 0.096 af

Subcatchment DV1S: To Observation 'OP-1' Runoff Area=83,986 sf 0.00% Impervious Runoff Depth=1.35"
 Flow Length=368' Slope=0.0951 '/' Tc=8.9 min CN=56 Runoff=2.40 cfs 0.217 af

Subcatchment DV2.1S: To Infiltration Runoff Area=14,168 sf 26.03% Impervious Runoff Depth=2.38"
 Flow Length=153' Slope=0.1004 '/' Tc=6.0 min CN=69 Runoff=0.90 cfs 0.065 af

Subcatchment DV2S: To Observation Point Runoff Area=26,545 sf 0.00% Impervious Runoff Depth=1.35"
 Flow Length=214' Slope=0.1055 '/' Tc=6.0 min CN=56 Runoff=0.84 cfs 0.068 af

Reach OP-1: Observation Point 'OP-1' Inflow=2.56 cfs 0.238 af
 Outflow=2.56 cfs 0.238 af

Reach OP-2: Observation Point 'OP-2' Inflow=1.44 cfs 0.089 af
 Outflow=1.44 cfs 0.089 af

Pond DV1.1P: Infiltration Basin 'IB-1.1' Peak Elev=312.43' Storage=1,075 cf Inflow=1.32 cfs 0.096 af
 Discarded=0.10 cfs 0.075 af Primary=0.58 cfs 0.022 af Outflow=0.68 cfs 0.096 af

Pond DV2.1P: Infiltration Basin 'IB-2.1' Peak Elev=319.89' Storage=542 cf Inflow=0.90 cfs 0.065 af
 Discarded=0.06 cfs 0.044 af Primary=0.67 cfs 0.020 af Outflow=0.73 cfs 0.065 af

Total Runoff Area = 3.406 ac Runoff Volume = 0.446 af Average Runoff Depth = 1.57"
94.70% Pervious = 3.225 ac 5.30% Impervious = 0.181 ac

Section 2.1: Post-Developed Conditions,
25-Year Storm

Summary for Subcatchment DV1.1S: To Infiltration Basin 'IB-1.1'

Runoff = 1.32 cfs @ 12.09 hrs, Volume= 0.096 af, Depth= 2.13"
 Routed to Pond DV1.1P : Infiltration Basin 'IB-1.1'

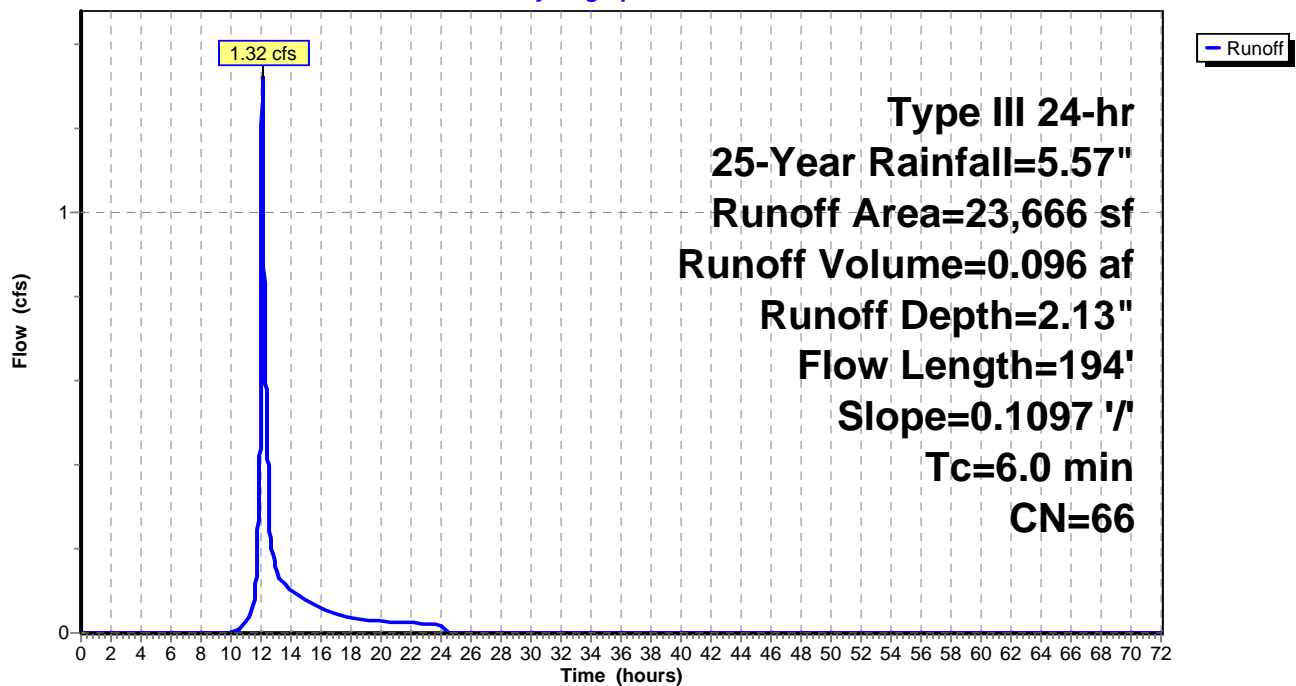
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 Type III 24-hr 25-Year Rainfall=5.57"

Area (sf)	CN	Description
5,642	55	Woods, Good HSG B
2,178	98	Paved parking HSG B
2,000	98	Roofs HSG B
13,846	61	>75% Grass cover, Good HSG B
23,666	66	Weighted Average
19,488		82.35% Pervious Area
4,178		17.65% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	194	0.1097	0.84		Lag/CN Method,
3.8	194	Total, Increased to minimum Tc = 6.0 min			

Subcatchment DV1.1S: To Infiltration Basin 'IB-1.1'

Hydrograph



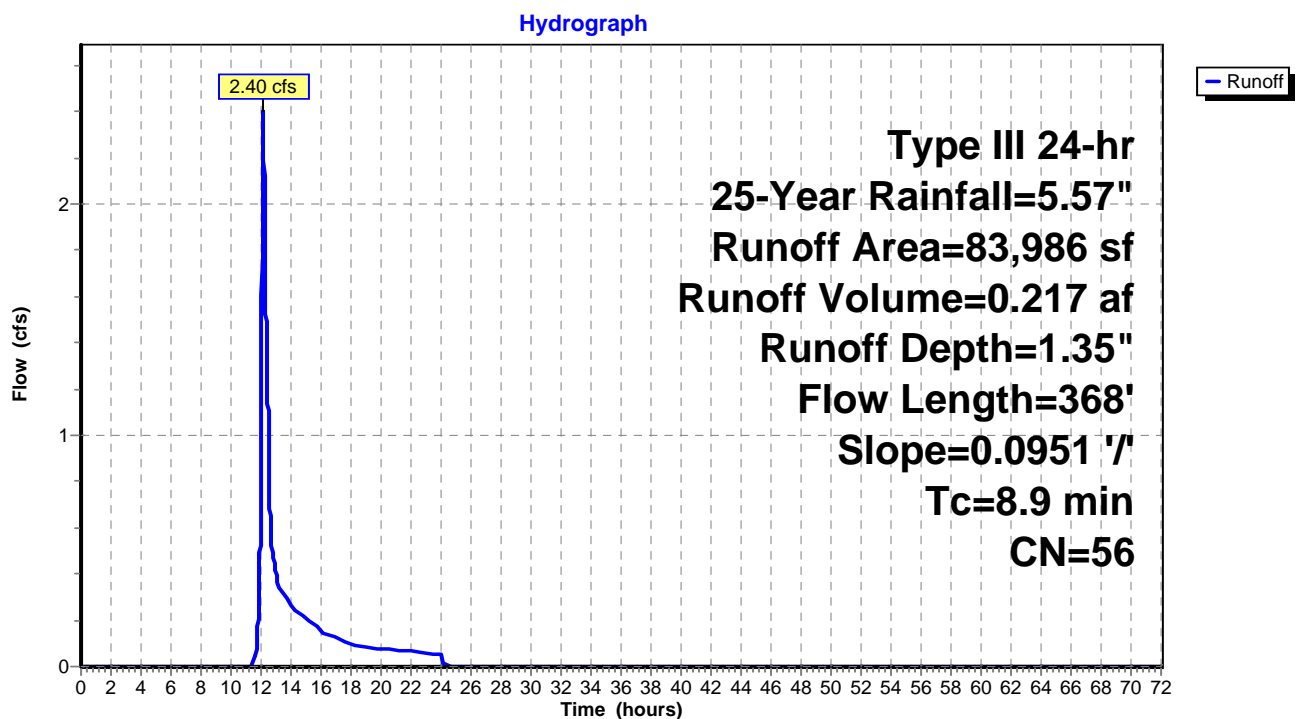
Summary for Subcatchment DV1S: To Observation 'OP-1'

Runoff = 2.40 cfs @ 12.14 hrs, Volume= 0.217 af, Depth= 1.35"
 Routed to Reach OP-1 : Observation Point 'OP-1'

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 Type III 24-hr 25-Year Rainfall=5.57"

Area (sf)	CN	Description
72,976	55	Woods, Good HSG B
11,010	61	>75% Grass cover, Good HSG B
83,986	56	Weighted Average
83,986		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.9	368	0.0951	0.69		Lag/CN Method,

Subcatchment DV1S: To Observation 'OP-1'

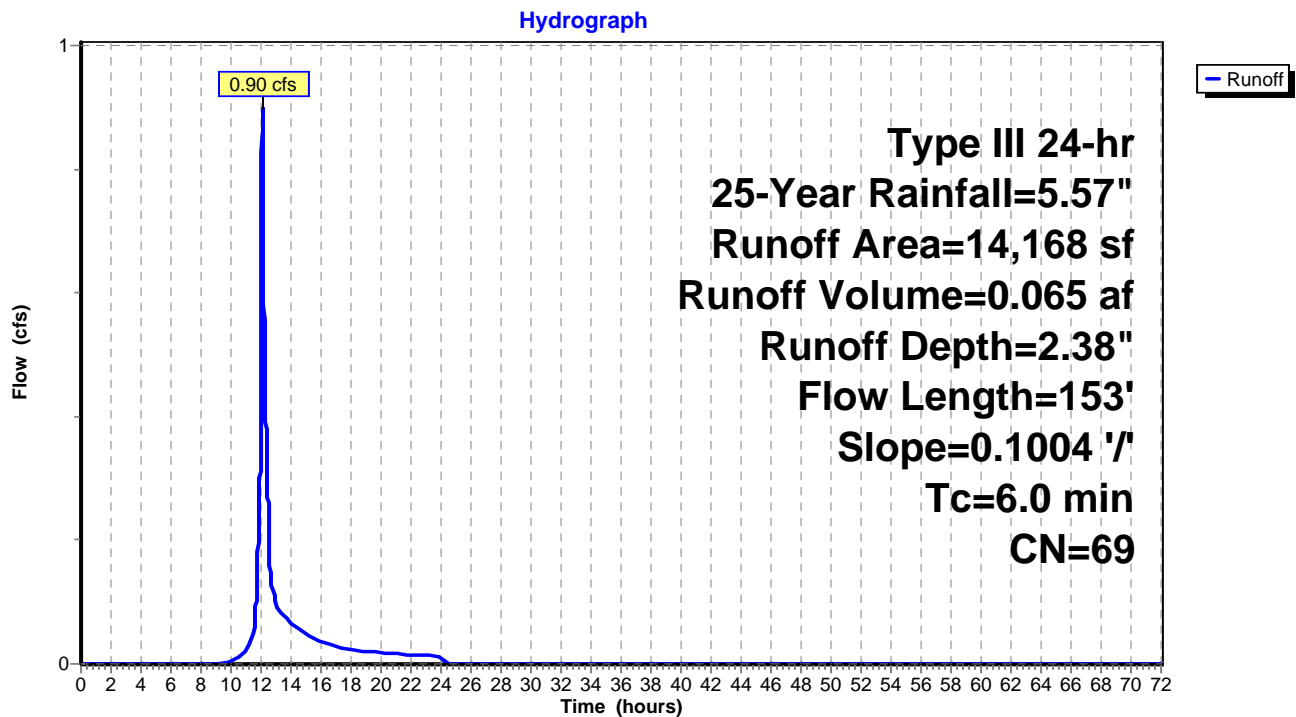
Summary for Subcatchment DV2.1S: To Infiltration Basin 'IB-2.1'

Runoff = 0.90 cfs @ 12.09 hrs, Volume= 0.065 af, Depth= 2.38"
 Routed to Pond DV2.1P : Infiltration Basin 'IB-2.1'

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 Type III 24-hr 25-Year Rainfall=5.57"

Area (sf)	CN	Description
2,691	55	Woods, Good HSG B
1,688	98	Paved parking HSG B
2,000	98	Roofs HSG B
7,789	61	>75% Grass cover, Good HSG B
14,168	69	Weighted Average
10,480		73.97% Pervious Area
3,688		26.03% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.1	153	0.1004	0.83		Lag/CN Method,
3.1	153	Total, Increased to minimum Tc = 6.0 min			

Subcatchment DV2.1S: To Infiltration Basin 'IB-2.1'

Summary for Subcatchment DV2S: To Observation Point 'OP-2'

Runoff = 0.84 cfs @ 12.10 hrs, Volume= 0.068 af, Depth= 1.35"
 Routed to Reach OP-2 : Observation Point 'OP-2'

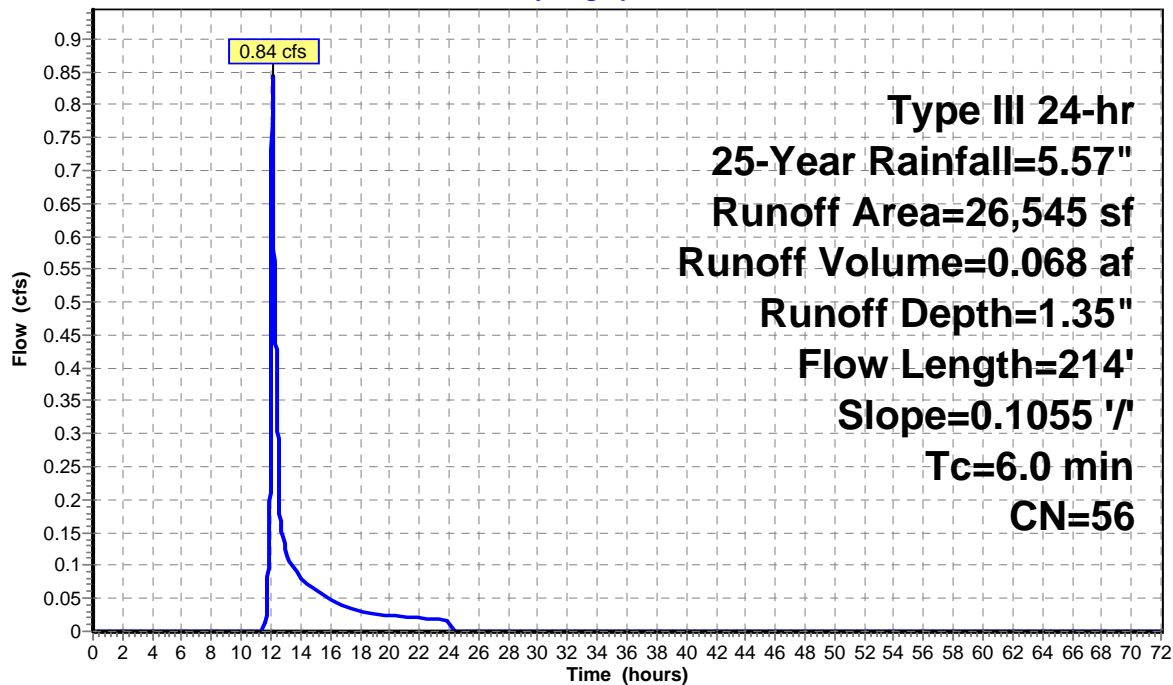
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 Type III 24-hr 25-Year Rainfall=5.57"

Area (sf)	CN	Description
22,692	55	Woods, Good HSG B
3,853	61	>75% Grass cover, Good HSG B
26,545	56	Weighted Average
26,545		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.5	214	0.1055	0.65		Lag/CN Method,
5.5	214	Total, Increased to minimum Tc = 6.0 min			

Subcatchment DV2S: To Observation Point 'OP-2'

Hydrograph



Summary for Reach OP-1: Observation Point 'OP-1'

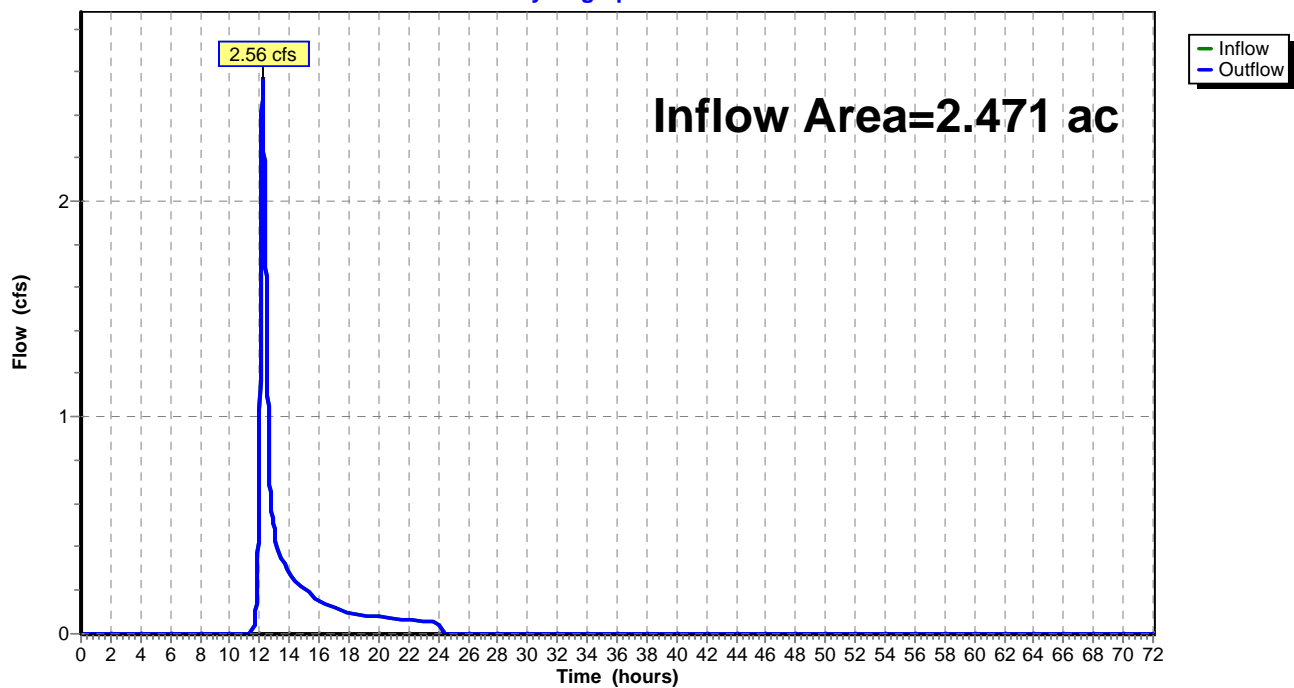
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 2.471 ac, 3.88% Impervious, Inflow Depth = 1.16" for 25-Year event
Inflow = 2.56 cfs @ 12.19 hrs, Volume= 0.238 af
Outflow = 2.56 cfs @ 12.19 hrs, Volume= 0.238 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Reach OP-1: Observation Point 'OP-1'

Hydrograph



Summary for Reach OP-2: Observation Point 'OP-2'

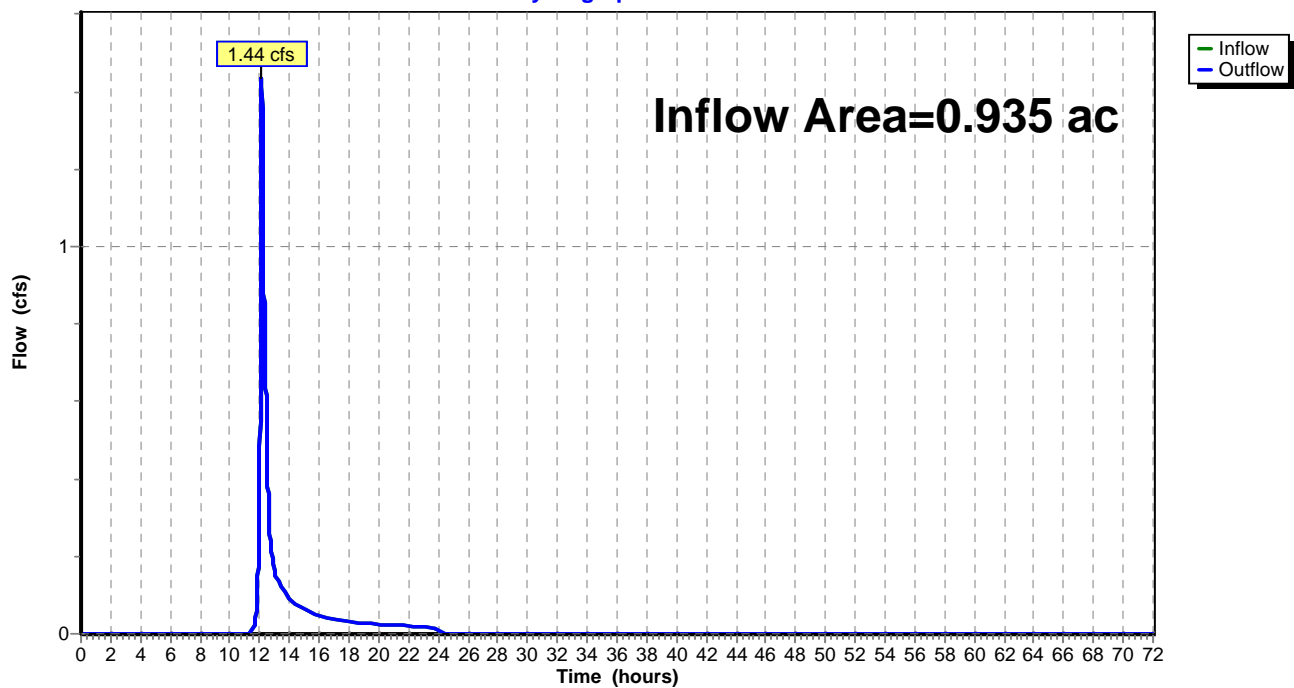
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.935 ac, 9.06% Impervious, Inflow Depth = 1.14" for 25-Year event
Inflow = 1.44 cfs @ 12.13 hrs, Volume= 0.089 af
Outflow = 1.44 cfs @ 12.13 hrs, Volume= 0.089 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Reach OP-2: Observation Point 'OP-2'

Hydrograph



Summary for Pond DV1.1P: Infiltration Basin 'IB-1.1'

Inflow Area = 0.543 ac, 17.65% Impervious, Inflow Depth = 2.13" for 25-Year event
 Inflow = 1.32 cfs @ 12.09 hrs, Volume= 0.096 af
 Outflow = 0.68 cfs @ 12.27 hrs, Volume= 0.096 af, Atten= 48%, Lag= 10.5 min
 Discarded = 0.10 cfs @ 12.27 hrs, Volume= 0.075 af
 Primary = 0.58 cfs @ 12.27 hrs, Volume= 0.022 af
 Routed to Reach OP-1 : Observation Point 'OP-1'

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 312.43' @ 12.27 hrs Surf.Area= 1,195 sf Storage= 1,075 cf

Plug-Flow detention time= 91.4 min calculated for 0.096 af (100% of inflow)
 Center-of-Mass det. time= 91.4 min (943.2 - 851.9)

Volume	Invert	Avail.Storage	Storage Description			
#1	311.00'	1,160 cf	Custom Stage Data (Irregular) Listed below (Recalc)			
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)	
311.00	353	183.2	0	0	353	
312.00	931	202.0	619	619	961	
312.50	1,241	211.5	541	1,160	1,290	

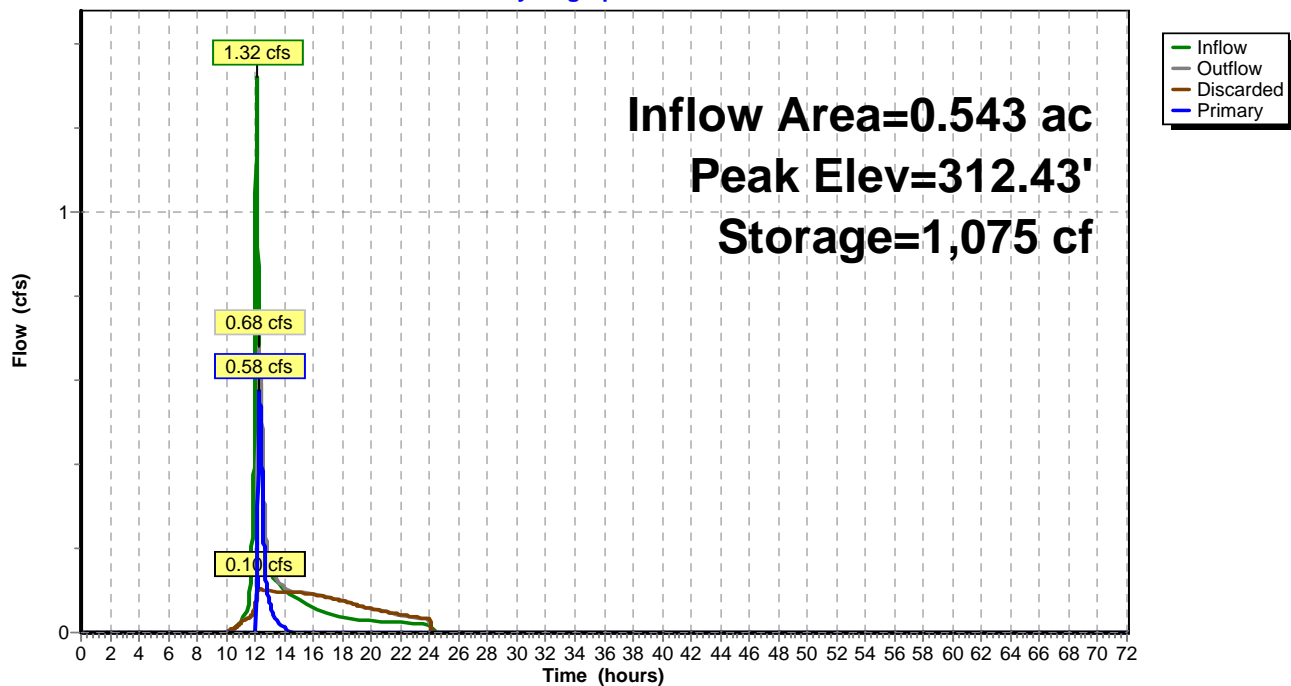
Device	Routing	Invert	Outlet Devices													
#1	Discarded	311.00'	3.750 in/hr Exfiltration over Surface area Phase-In= 0.01'													
#2	Primary	312.30'	5.0' long x 9.0' breadth Broad-Crested Rectangular Weir													
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00													
			2.50 3.00 3.50 4.00 4.50 5.00 5.50													
			Coef. (English) 2.46 2.55 2.70 2.69 2.68 2.68 2.68 2.67 2.64 2.64													
			2.64 2.65 2.64 2.65 2.65 2.66 2.67 2.69													

Discarded OutFlow Max=0.10 cfs @ 12.27 hrs HW=312.43' (Free Discharge)
 ↑**1=Exfiltration** (Exfiltration Controls 0.10 cfs)

Primary OutFlow Max=0.58 cfs @ 12.27 hrs HW=312.43' TW=0.00' (Dynamic Tailwater)
 ↑**2=Broad-Crested Rectangular Weir** (Weir Controls 0.58 cfs @ 0.89 fps)

Pond DV1.1P: Infiltration Basin 'IB-1.1'

Hydrograph



Summary for Pond DV2.1P: Infiltration Basin 'IB-2.1'

Inflow Area = 0.325 ac, 26.03% Impervious, Inflow Depth = 2.38" for 25-Year event
 Inflow = 0.90 cfs @ 12.09 hrs, Volume= 0.065 af
 Outflow = 0.73 cfs @ 12.15 hrs, Volume= 0.065 af, Atten= 18%, Lag= 3.5 min
 Discarded = 0.06 cfs @ 12.15 hrs, Volume= 0.044 af
 Primary = 0.67 cfs @ 12.15 hrs, Volume= 0.020 af
 Routed to Reach OP-2 : Observation Point 'OP-2'

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 319.89' @ 12.15 hrs Surf.Area= 732 sf Storage= 542 cf

Plug-Flow detention time= 63.7 min calculated for 0.065 af (100% of inflow)
 Center-of-Mass det. time= 63.7 min (908.1 - 844.4)

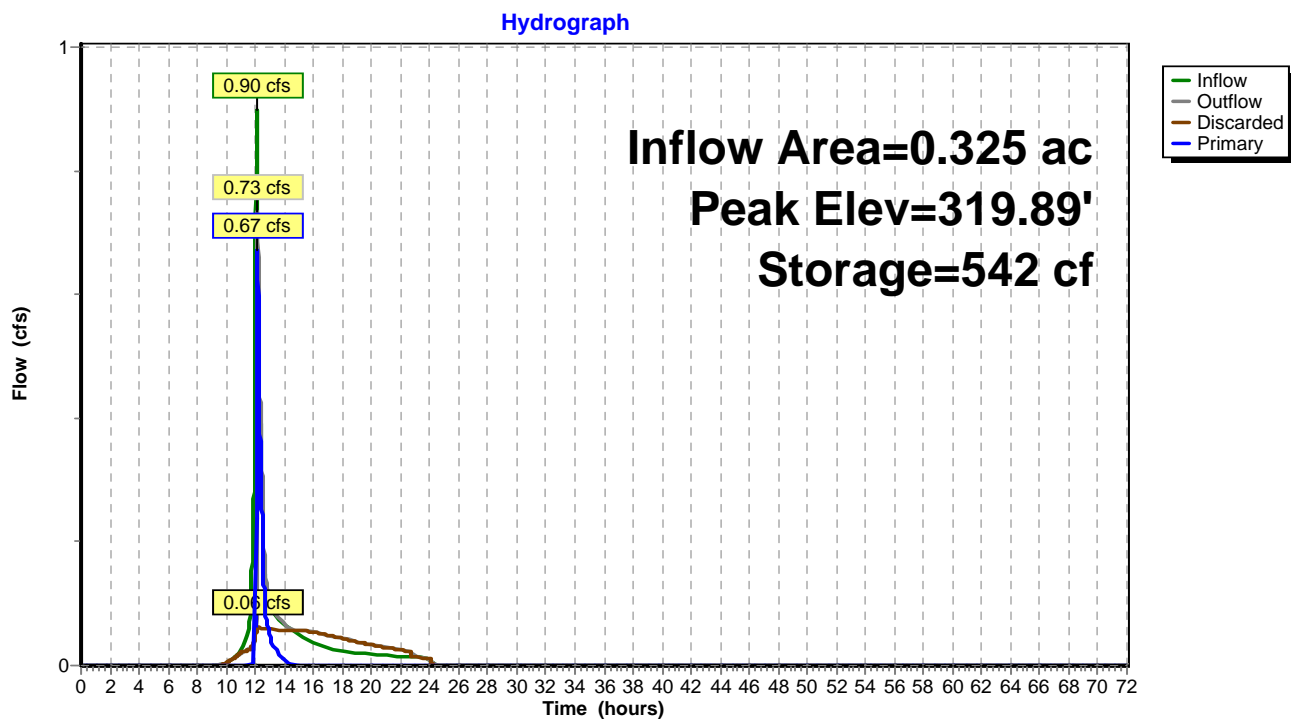
Volume	Invert	Avail.Storage	Storage Description											
#1	318.75'	837 cf	Custom Stage Data (Irregular) Listed below (Recalc)											
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)				Cum.Store (cubic-feet)				Wet.Area (sq-ft)			
318.75	257	135.2	0				0				257			
320.25	929	163.5	837				837				966			
Device	Routing	Invert	Outlet Devices											
#1	Discarded	318.75'	3.750 in/hr Exfiltration over Surface area Phase-In= 0.01'											
#2	Primary	319.75'	5.0' long x 9.0' breadth Broad-Crested Rectangular Weir											
			Head (feet)	0.20	0.40	0.60	0.80	1.00	1.20	1.40	1.60	1.80	2.00	
				2.50	3.00	3.50	4.00	4.50	5.00	5.50				
			Coef. (English)	2.46	2.55	2.70	2.69	2.68	2.68	2.67	2.64	2.64		
				2.64	2.65	2.64	2.65	2.65	2.66	2.67	2.69			

Discarded OutFlow Max=0.06 cfs @ 12.15 hrs HW=319.89' (Free Discharge)

↑**1=Exfiltration** (Exfiltration Controls 0.06 cfs)

Primary OutFlow Max=0.67 cfs @ 12.15 hrs HW=319.89' TW=0.00' (Dynamic Tailwater)

↑**2=Broad-Crested Rectangular Weir** (Weir Controls 0.67 cfs @ 0.93 fps)

Pond DV2.1P: Infiltration Basin 'IB-2.1'

Section 3.0: Drainage Area Plans

DRN-EX: Existing Conditions
DRN-DV: Developed Conditions