DRAINAGE & STORMWATER MANAGEMENT REPORT

Prepared for

PROPOSED MULTI-FAMILY DEVELOPMENT
WARE ROAD & PINEVILLE ROAD
KILLINGLY, CT

August 2023
Revised to December 2023

Prepared for

JPF Rentals, LLC

Prepared by

Killingly Engineering Associates
Civil Engineering & Surveying

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CT License #22834

Introduction

JPF Rentals, LLC. has submitted a proposal to the Town of Killingly to develop 4 acres of land with frontage on Ware Road and Pineville Road to permit construction of a multi-family residential development. The portion of the property to be developed is currently wooded and undeveloped and drainage from the site currently flows in 3 directions and rate of discharge has been compared in each direction. The design utilizes a combination of sheet flow, grassed swales, a closed drainage system of catch basins and piping and a stormwater detention/infiltration basin.

Summary

According to the USDA-SCS Soil Survey, approximately half of the soils on site consist of excessively drained Hinckley sands and gravels which are associated with hydrologic soil group ñAò. The reminder of the site consists of Sudbury and Canton/Charlton fine sandy loams which are ñBò. The project strives to maintain the existing radial drainage patterns for post development conditions but curbing and catch basins will be utilized to collect roadway stormwater and convey it to the proposed stormwater basin where it will be treated, infiltrated and discharged by an engineered outlet structure.

The calculations utilized HydroCAD® Stormwater Modeling System, a computer model, to analyze pre-and post-development drainage conditions, and to aid in the design of the stormwater detention system. The model used the Soil Conservation Service TR-20 method with a Type III 24-hour rainfall to calculate the runoff. The 2 through 100-year frequency storms were analyzed to evaluate peak runoff for pre-and post-construction conditions. Tables 1-5 summarize our findings for pre and post construction flows toward the adjacent properties and stormwater basin:

Table 1. Existing & Proposed Peak Flows from Drainage Area 1 (East)

Design Storm	Depth (in)	Existing peak	Proposed peak	Difference
2-Year	3.37	0.32 CFS	0.11 CFS	-0.21 CFS
5-Year	4.28	0.78 CFS	0.27 CFS	-0.51 CFS
10-Year	5.04	1.24 CFS	0.42 CFS	-0.82 CFS
25-Year	6.09	1.94 CFS	0.65 CFS	-1.29 CFS
50-Year	6.87	2.50 CFS	0.84 CFS	-1.66 CFS
100-Year	7.70	3.13 CFS	1.05 CFS	-2.08 CFS

As shown by the computations, the post development peak runoff rates are lower than pre-construction rates. This is a result of the design capturing roof discharge from proposed buildings via yard drains and redirecting it south to the proposed stormwater collection system and stormwater basin. The post-development drainage area is significantly reduced as a result.

Table 2. Existing & Proposed Peak Flows from Drainage Area 2 (Southwest)

Design Storm	Depth (in)	Existing peak	Proposed peak	Difference
2-Year	3.37	0.00 CFS	0.00 CFS	0.00 CFS
5-Year	4.28	0.01 CFS	0.00 CFS	-0.01 CFS
10-Year	5.04	0.04 CFS	0.00 CFS	-0.04 CFS
25-Year	6.09	0.16 CFS	0.00 CFS	-0.16 CFS
50-Year	6.87	0.39 CFS	0.00 CFS	-0.39 CFS
100-Year	7.70	0.73 CFS	0.00 CFS	-0.73 CFS

As shown by the summary, runoff to the southwest is essentially eliminated due to re-routing of runoff to the proposed stormwater basin. Approximately 3,500 square feet of wooded terrain sloped to the southwest will continue to drain in the southwest direction and is immeasurable.

Table 3 summarize peak discharge rates to the existing town stormwater system along Pineville Road;

Table 3. Existing & Proposed Peak Flows from Drainage Area 3 (Southwest)

Design Storm	Depth (in)	Existing peak	Proposed peak	Difference
2-Year	3.37	0.16 CFS	0.19 CFS	+0.03 CFS
5-Year	4.28	0.37 CFS	0.31 CFS	-0.06 CFS
10-Year	5.04	0.62 CFS	0.42 CFS	-0.20 CFS
25-Year	6.09	0.97 CFS	0.57 CFS	-0.40 CFS
50-Year	6.87	1.26 CFS	0.69 CFS	-0.57 CFS
100-Year	7.70	1.58 CFS	0.82 CFS	-0.76 CFS

As shown, peak runoff rates are slightly higher for the 2-year storm and are reduced for all other storms. The design proposes to install a pair of catch basins at the driveway/Pineville Road intersection which will be connected to an existing catch basin located approximately in Pineville Road that ultimately discharges to the 5-Mile River. The entrance at Pineville Road will be for emergency access only and it will be a gravel drive. The bulk of stormwater runoff from the remainder of the site will be contained and infiltrated into the excessively drained soils in the area of the stormwater basin. Based upon test holes conducted on site, we have assumed the ability to infiltrate in only the southernmost portion of the basin, up to elevation 329.0. Although there will likely be some degree of infiltration at higher elevations within the basin, we have not accounted for that in the computations. The excessively drained Hinckley soils are rated to infiltrate at 105 micrometers per second which converts to 14 inches per hour. The computations assume a conservative rate of 5 inches per hour.

Drainage Area 4 is essentially sheet flow from toward Ware Road. The existing conditions in this area consist of broken pavement and two residences; the existing groundcover is sparse. By slightly reducing the drainage area that discharges to Ware Road, routing some stormwater to the proposed stormwater basin, and improving the quality of the vegetated surfaces, we can demonstrate reductions in peak runoff rates in the direction of Ware Road. Table 4 below summarizes the reductions.

Table 4. Existing & Proposed Peak Flows from Drainage Area 4 (Ware Road)

Design Storm	Depth (in)	Existing peak	Proposed peak	Difference
2-Year	3.37	1.26 CFS	0.79 CFS	-0.47 CFS
5-Year	4.28	1.78 CFS	1.19 CFS	-0.59 CFS
10-Year	5.04	2.21 CFS	1.53 CFS	-0.68 CFS
25-Year	6.09	2.81 CFS	2.02 CFS	-0.79 CFS
50-Year	6.87	3.25 CFS	2.38 CFS	-0.87 CFS
100-Year	7.70	3.72 CFS	2.77 CFS	-0.95 CFS

Per Chapter 7 of the Connecticut DEEP Stormwater Quality Manual

Section 7.4.1 Water Quality Volume

Basin 1 Water Quality Volume (WQV)

WQV = (1ò)(R)(A)/12

R = 0.05 + 0.009(I) I = % Impervious = 27.2%

R = 0.05 + 0.009(27.2) = 0.2948

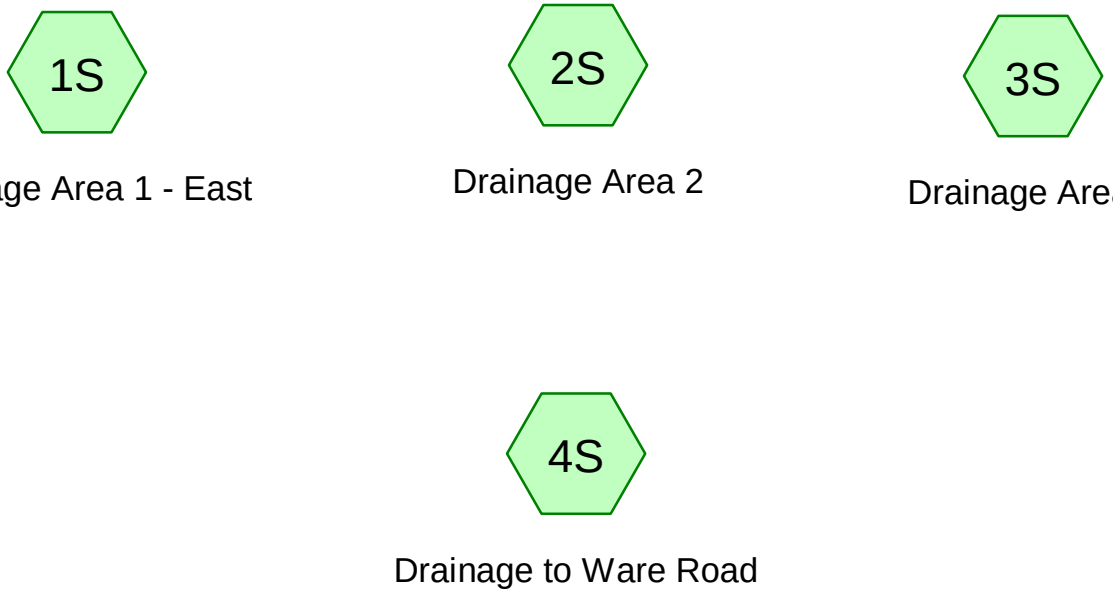
A = 3.34 acres (developed area)

WQV = (1ò) (0.2948) (3.34) / 12 = 0.082 ac-ft = 3,574 c.f.

20,983 c.f. total WQV provided to basin elevation 332.0

HYDROCAD CALCULATIONS

EXISTING CONDITIONS



Subcat Reach Pond Link

Routing Diagram for Existing Conditions

Prepared by Killingly Engineering Associates, LLC, Printed 1/2/2024

Summary for Subcatchment 1S: Drainage Area 1 - East

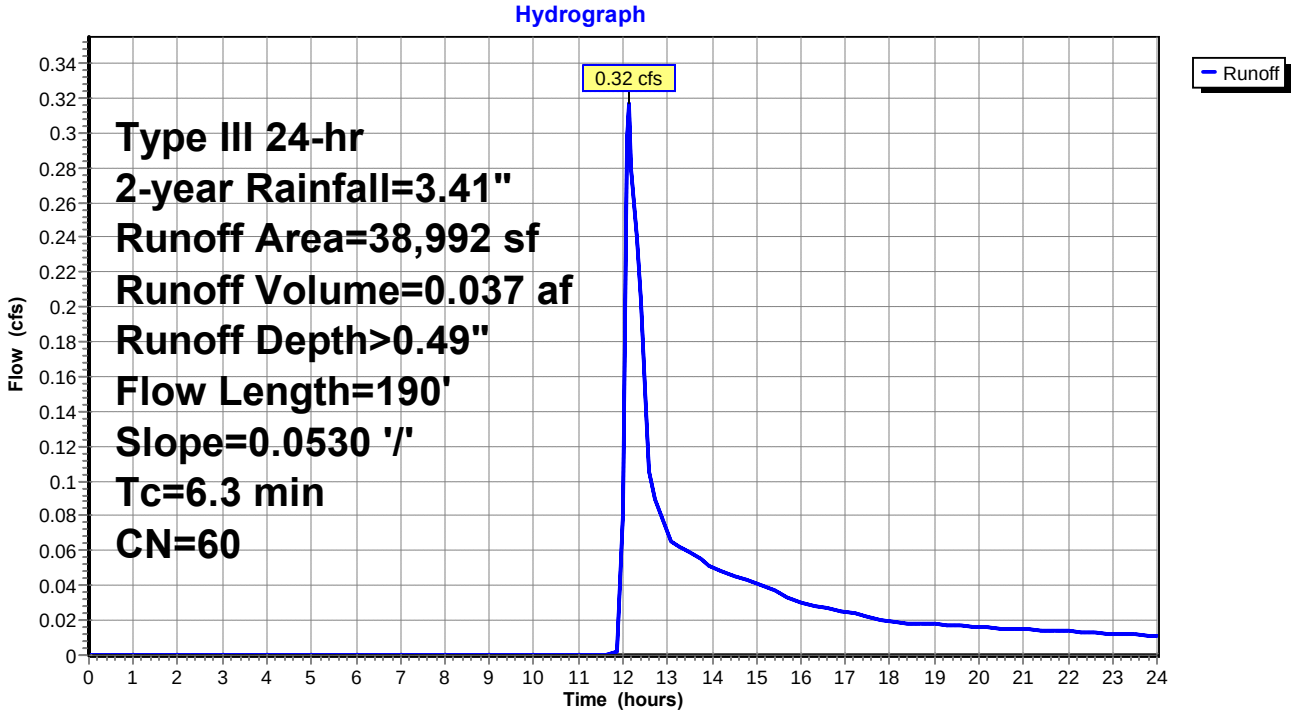
Runoff = 0.32 cfs @ 12.14 hrs, Volume= 0.037 af, Depth> 0.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 2-year Rainfall=3.41"

Area (sf)	CN	Description
38,992	60	Woods, Fair, HSG B
38,992		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.3	190	0.0530	0.50		**Lag/CN Method, Tc-1**

Subcatchment 1S: Drainage Area 1 - East



Summary for Subcatchment 2S: Drainage Area 2

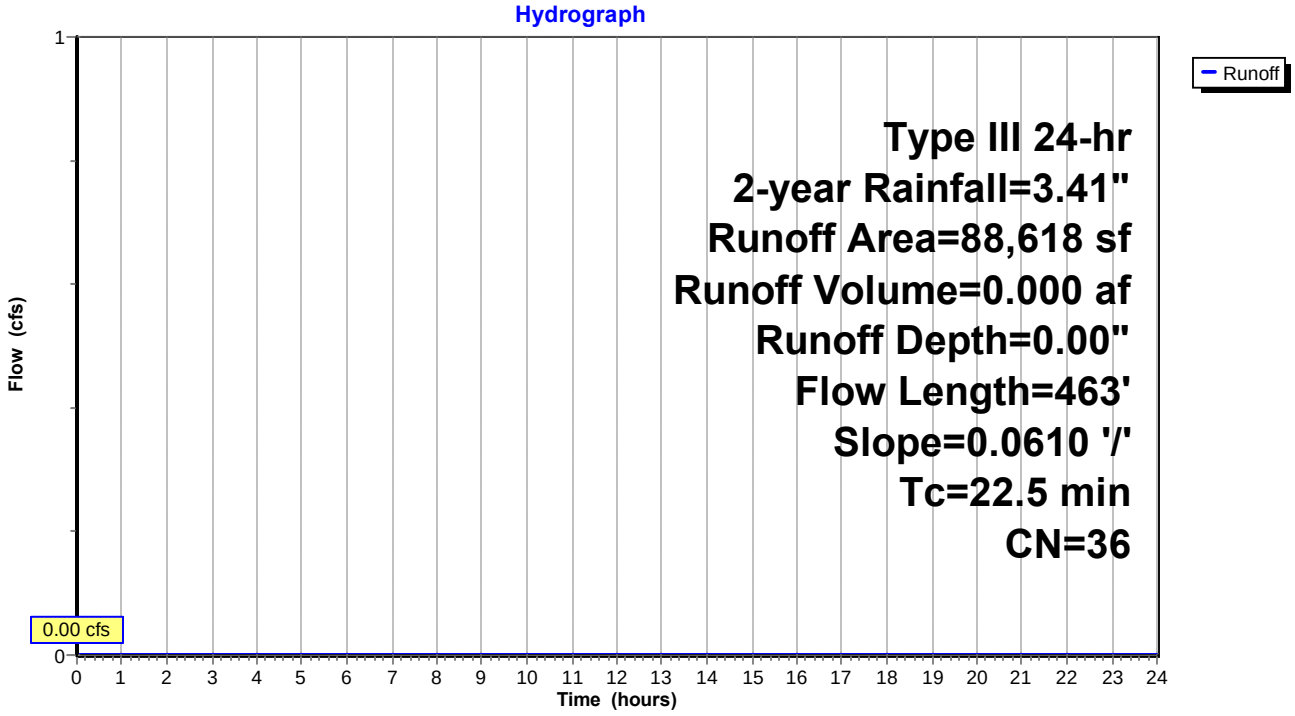
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 2-year Rainfall=3.41"

Area (sf)	CN	Description
88,618	36	Woods, Fair, HSG A
88,618		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.5	463	0.0610	0.34		**Lag/CN Method, Tc-2**

Subcatchment 2S: Drainage Area 2



Summary for Subcatchment 3S: Drainage Area 3

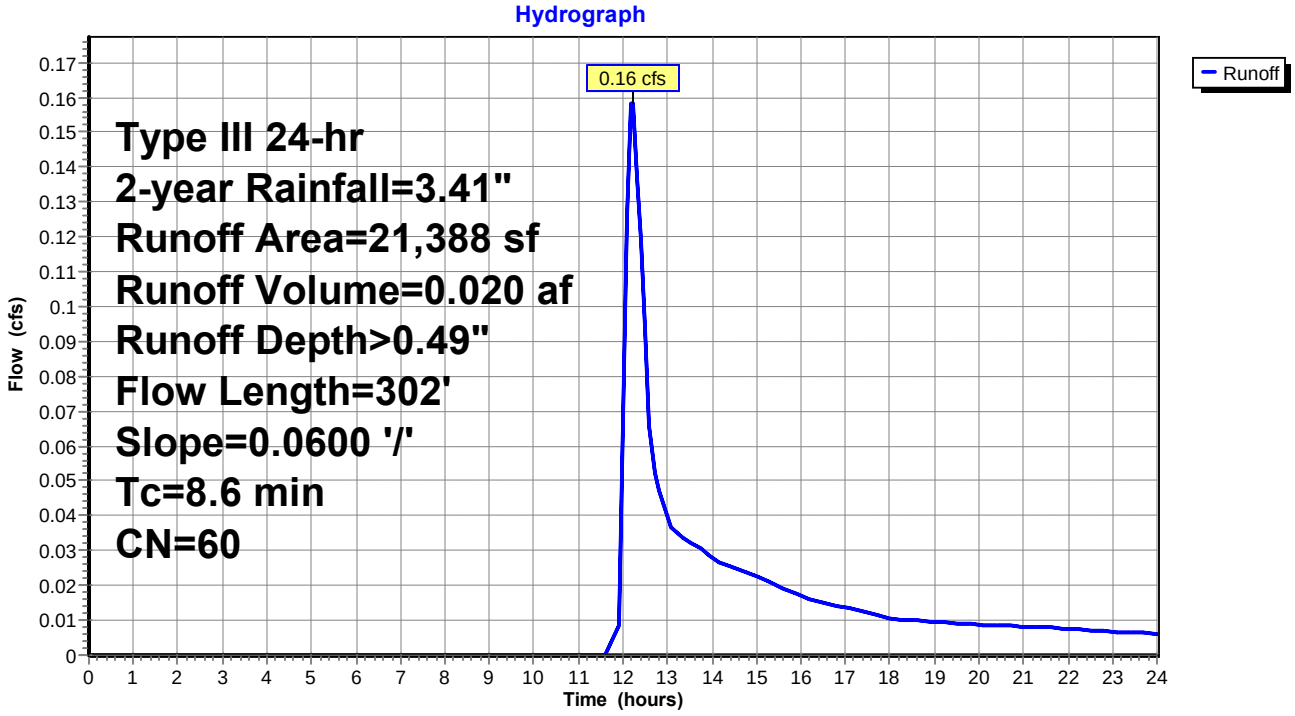
Runoff = 0.16 cfs @ 12.21 hrs, Volume= 0.020 af, Depth> 0.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 2-year Rainfall=3.41"

Area (sf)	CN	Description
21,388	60	Woods, Fair, HSG B
21,388		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.6	302	0.0600	0.58		**Lag/CN Method, Tc-3**

Subcatchment 3S: Drainage Area 3



Summary for Subcatchment 4S: Drainage to Ware Road

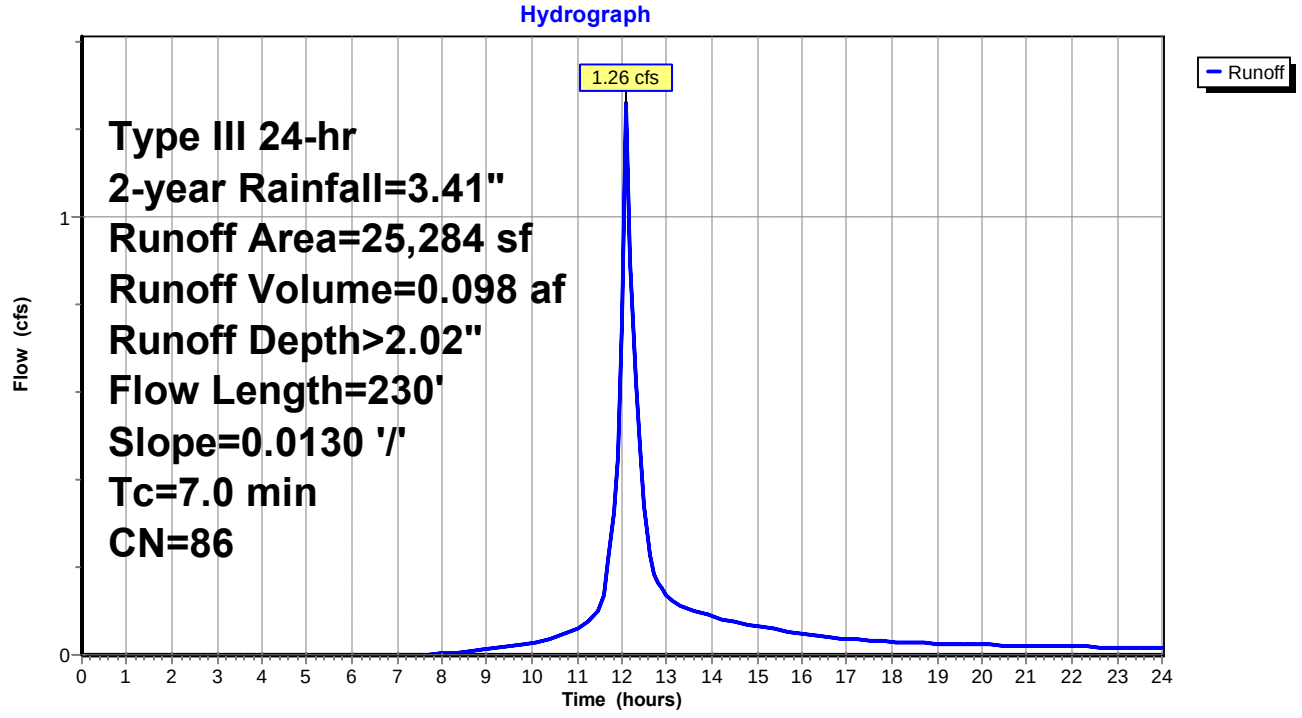
Runoff = 1.26 cfs @ 12.11 hrs, Volume= 0.098 af, Depth> 2.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 2-year Rainfall=3.41"

	Area (sf)	CN	Description
*	9,827	98	Pavement & roof, HSG B
	15,457	79	<50% Grass cover, Poor, HSG B
	25,284	86	Weighted Average
	15,457		61.13% Pervious Area
	9,827		38.87% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0	230	0.0130	0.54		**Lag/CN Method, Tc-4**

Subcatchment 4S: Drainage to Ware Road



Summary for Subcatchment 1S: Drainage Area 1 - East

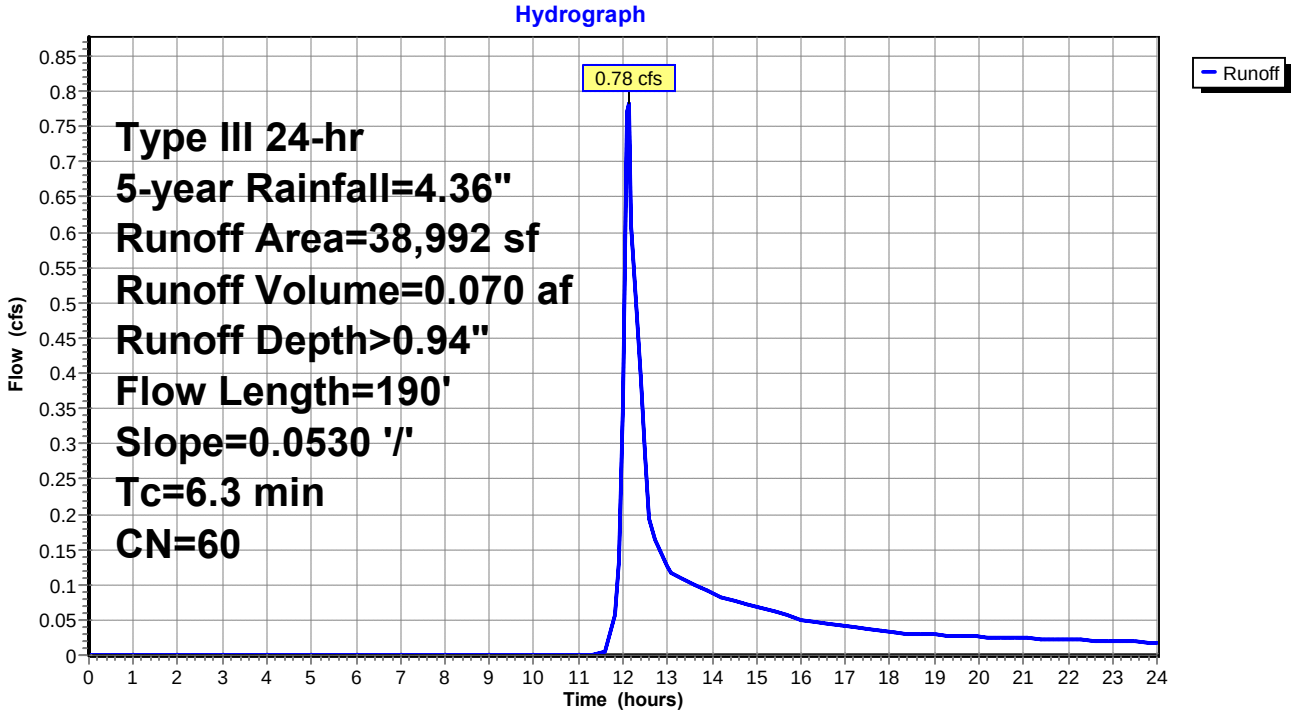
Runoff = 0.78 cfs @ 12.12 hrs, Volume= 0.070 af, Depth> 0.94"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 5-year Rainfall=4.36"

Area (sf)	CN	Description
38,992	60	Woods, Fair, HSG B
38,992		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.3	190	0.0530	0.50		**Lag/CN Method, Tc-1**

Subcatchment 1S: Drainage Area 1 - East



Summary for Subcatchment 2S: Drainage Area 2

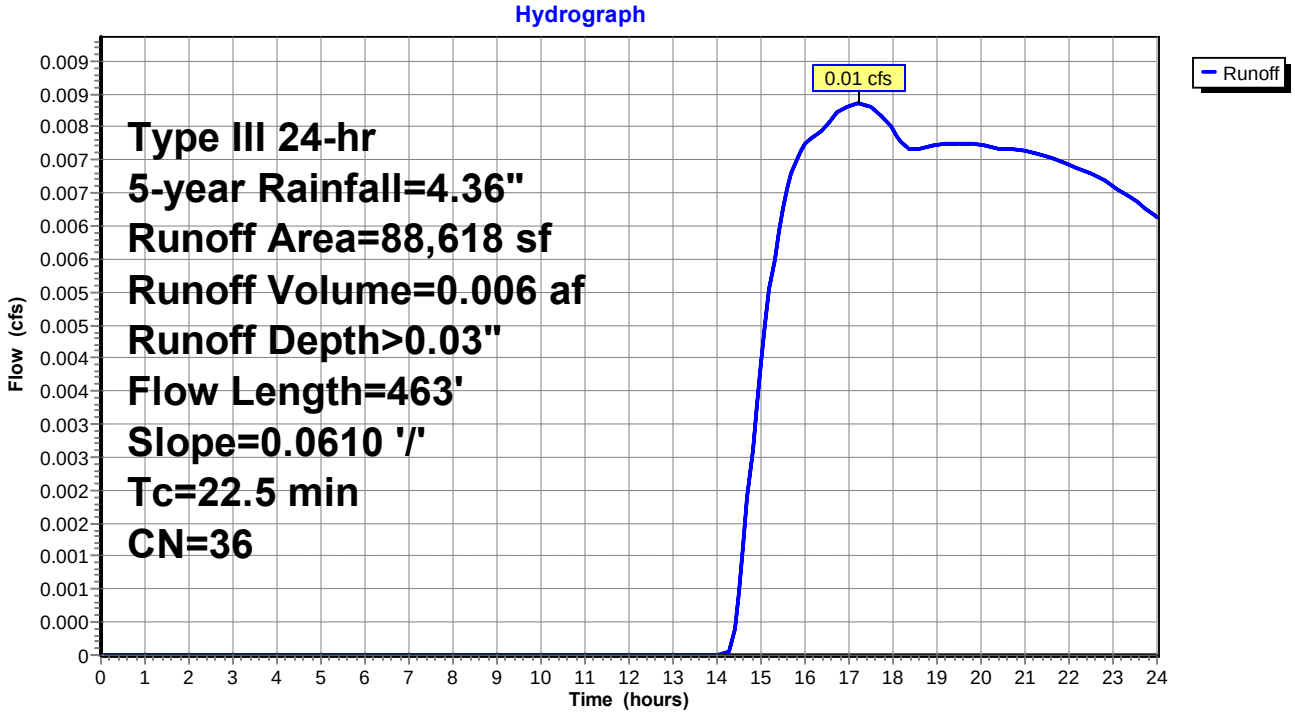
Runoff = 0.01 cfs @ 17.21 hrs, Volume= 0.006 af, Depth> 0.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 5-year Rainfall=4.36"

Area (sf)	CN	Description
88,618	36	Woods, Fair, HSG A
88,618		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.5	463	0.0610	0.34		**Lag/CN Method, Tc-2**

Subcatchment 2S: Drainage Area 2



Summary for Subcatchment 3S: Drainage Area 3

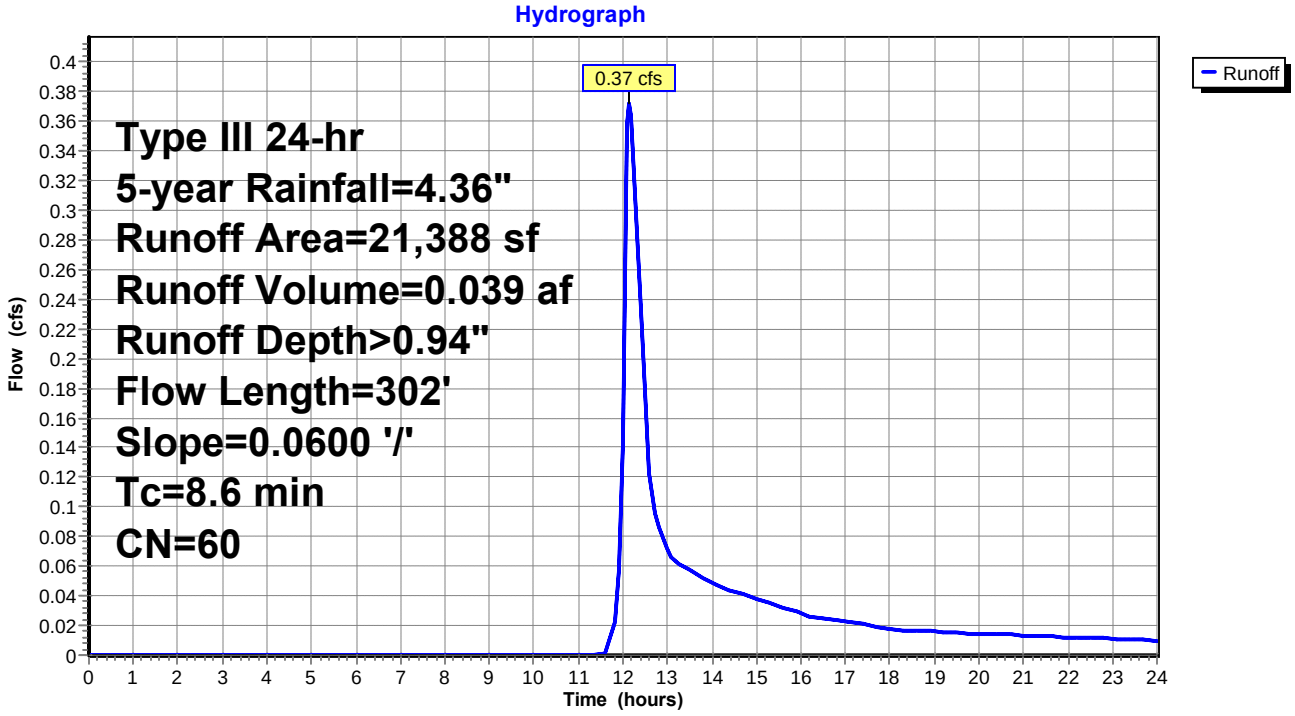
Runoff = 0.37 cfs @ 12.16 hrs, Volume= 0.039 af, Depth> 0.94"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 5-year Rainfall=4.36"

Area (sf)	CN	Description
21,388	60	Woods, Fair, HSG B
21,388		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.6	302	0.0600	0.58		**Lag/CN Method, Tc-3**

Subcatchment 3S: Drainage Area 3



Summary for Subcatchment 4S: Drainage to Ware Road

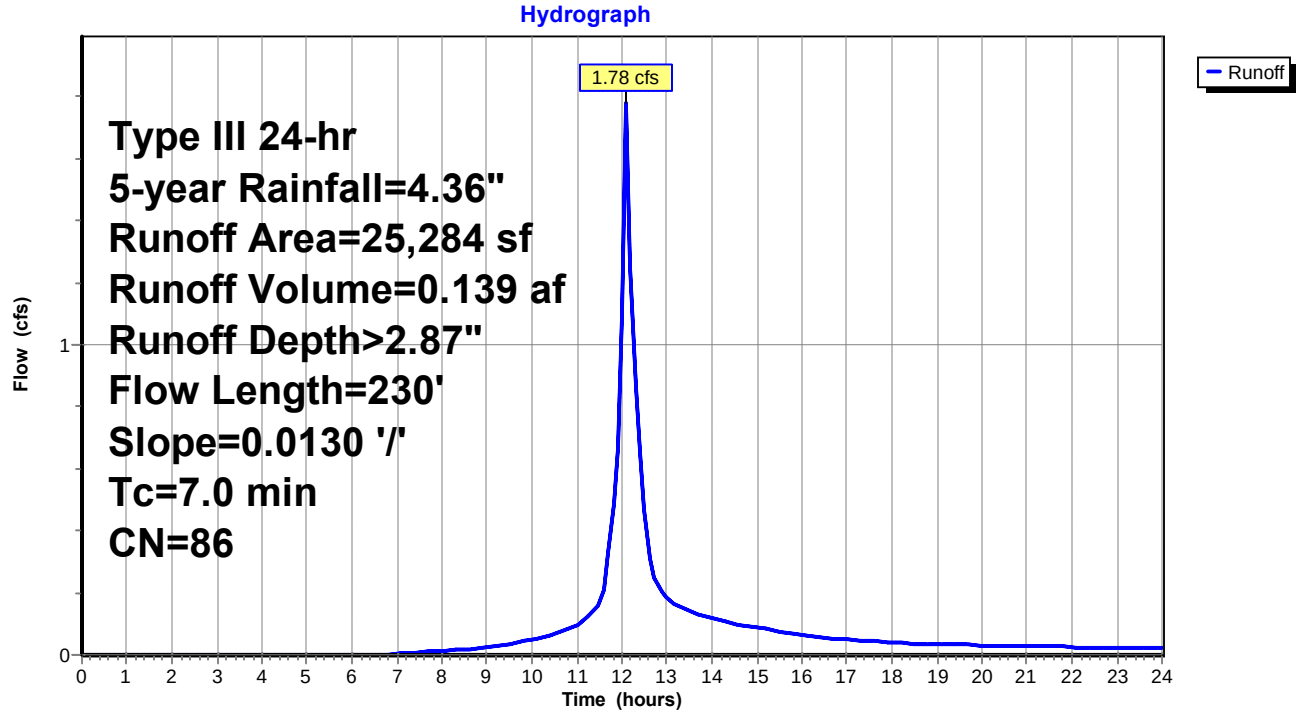
Runoff = 1.78 cfs @ 12.11 hrs, Volume= 0.139 af, Depth> 2.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 5-year Rainfall=4.36"

	Area (sf)	CN	Description
*	9,827	98	Pavement & roof, HSG B
	15,457	79	<50% Grass cover, Poor, HSG B
	25,284	86	Weighted Average
	15,457		61.13% Pervious Area
	9,827		38.87% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0	230	0.0130	0.54		**Lag/CN Method, Tc-4**

Subcatchment 4S: Drainage to Ware Road



Summary for Subcatchment 1S: Drainage Area 1 - East

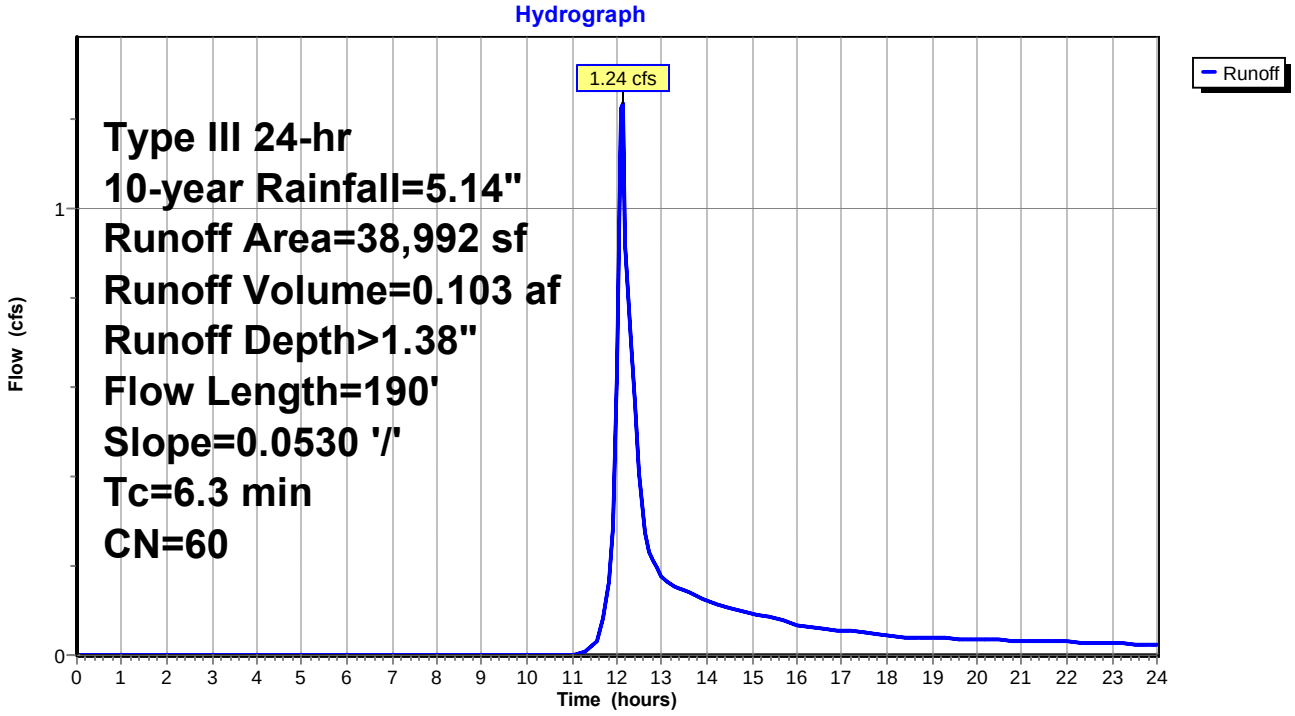
Runoff = 1.24 cfs @ 12.12 hrs, Volume= 0.103 af, Depth> 1.38"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 10-year Rainfall=5.14"

Area (sf)	CN	Description
38,992	60	Woods, Fair, HSG B
38,992		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.3	190	0.0530	0.50		**Lag/CN Method, Tc-1**

Subcatchment 1S: Drainage Area 1 - East



Summary for Subcatchment 2S: Drainage Area 2

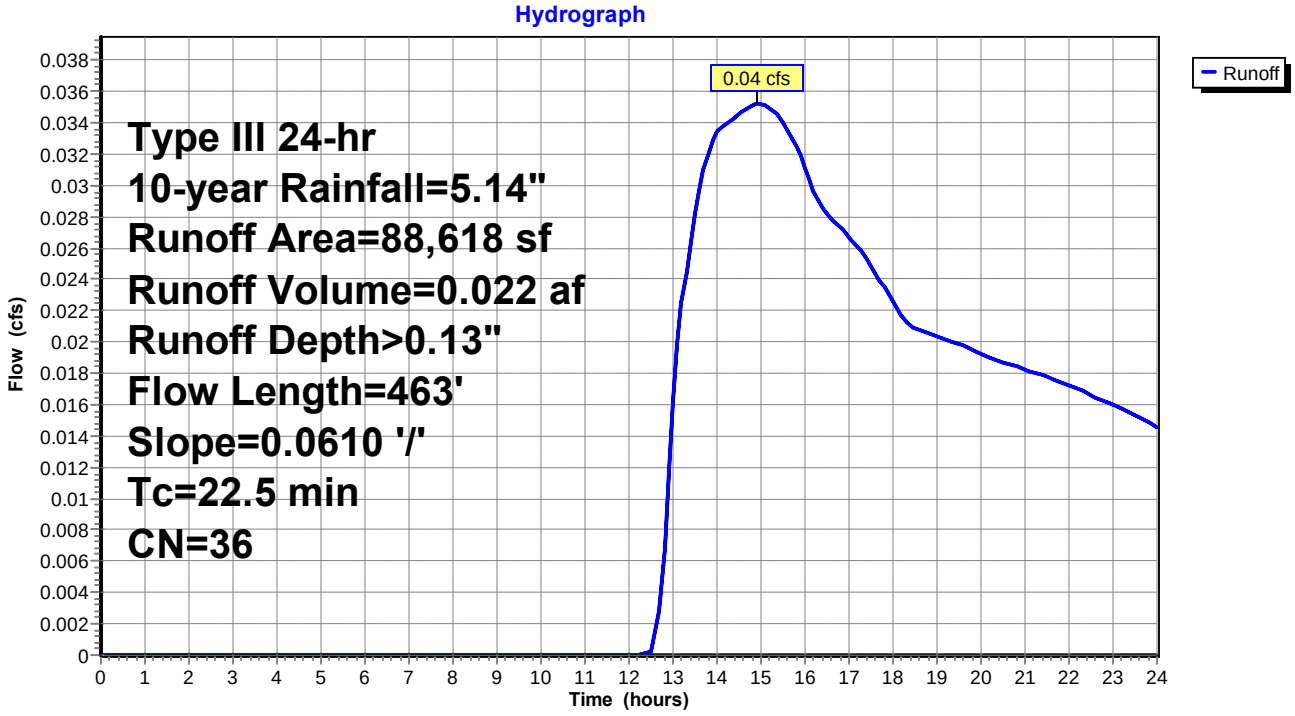
Runoff = 0.04 cfs @ 14.93 hrs, Volume= 0.022 af, Depth> 0.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 10-year Rainfall=5.14"

Area (sf)	CN	Description
88,618	36	Woods, Fair, HSG A
88,618		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.5	463	0.0610	0.34		**Lag/CN Method, Tc-2**

Subcatchment 2S: Drainage Area 2



Summary for Subcatchment 3S: Drainage Area 3

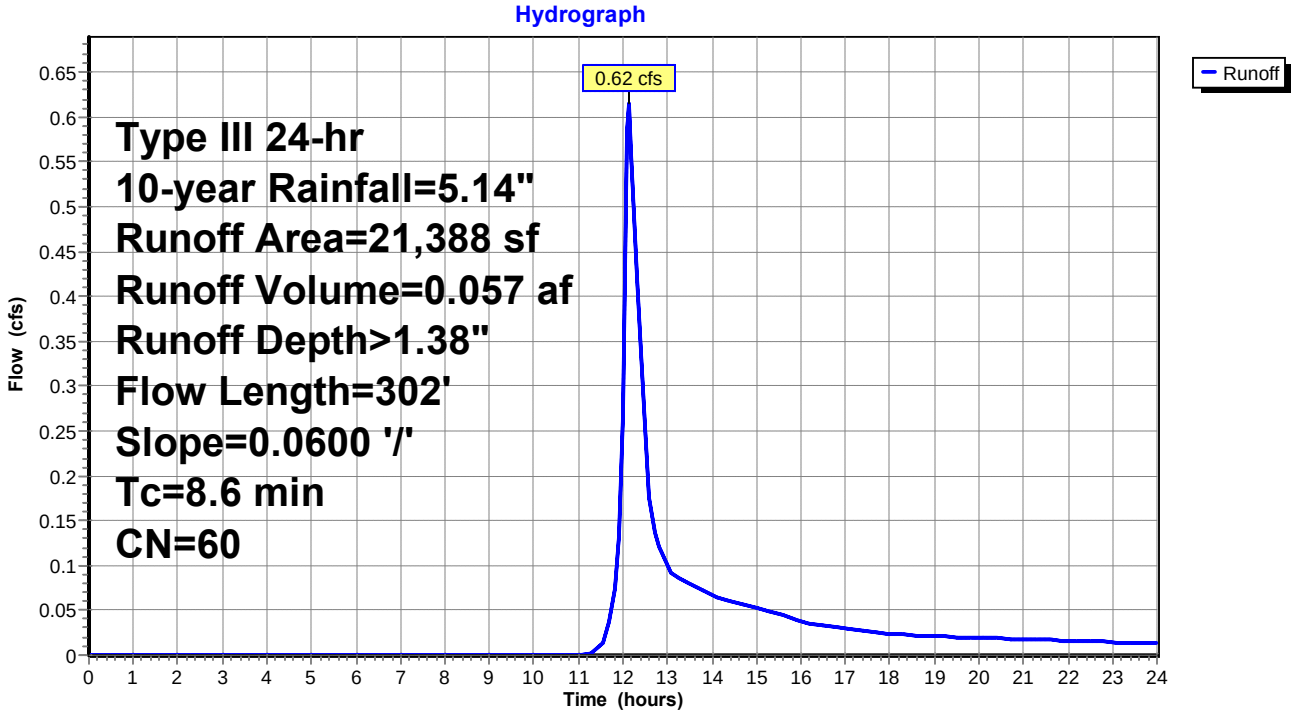
Runoff = 0.62 cfs @ 12.14 hrs, Volume= 0.057 af, Depth> 1.38"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 10-year Rainfall=5.14"

Area (sf)	CN	Description
21,388	60	Woods, Fair, HSG B
21,388		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.6	302	0.0600	0.58		**Lag/CN Method, Tc-3**

Subcatchment 3S: Drainage Area 3



Summary for Subcatchment 4S: Drainage to Ware Road

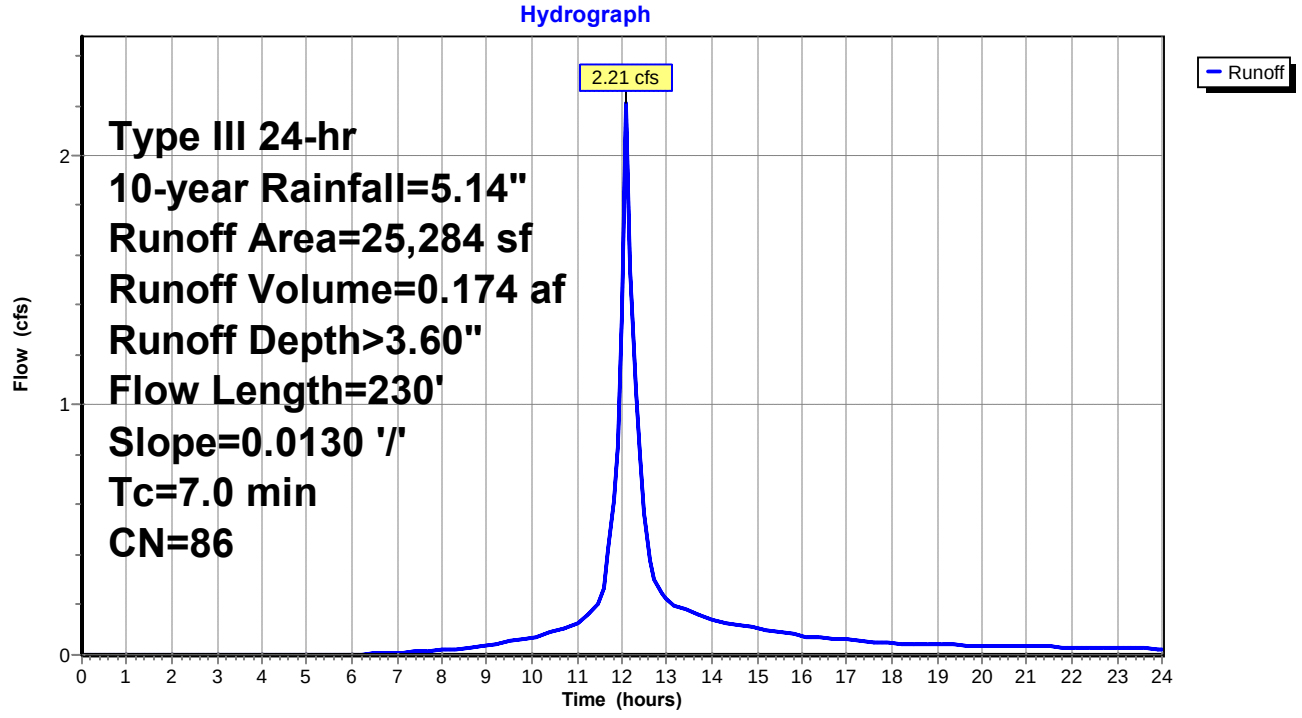
Runoff = 2.21 cfs @ 12.11 hrs, Volume= 0.174 af, Depth> 3.60"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 10-year Rainfall=5.14"

	Area (sf)	CN	Description
*	9,827	98	Pavement & roof, HSG B
	15,457	79	<50% Grass cover, Poor, HSG B
	25,284	86	Weighted Average
	15,457		61.13% Pervious Area
	9,827		38.87% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0	230	0.0130	0.54		**Lag/CN Method, Tc-4**

Subcatchment 4S: Drainage to Ware Road



Summary for Subcatchment 1S: Drainage Area 1 - East

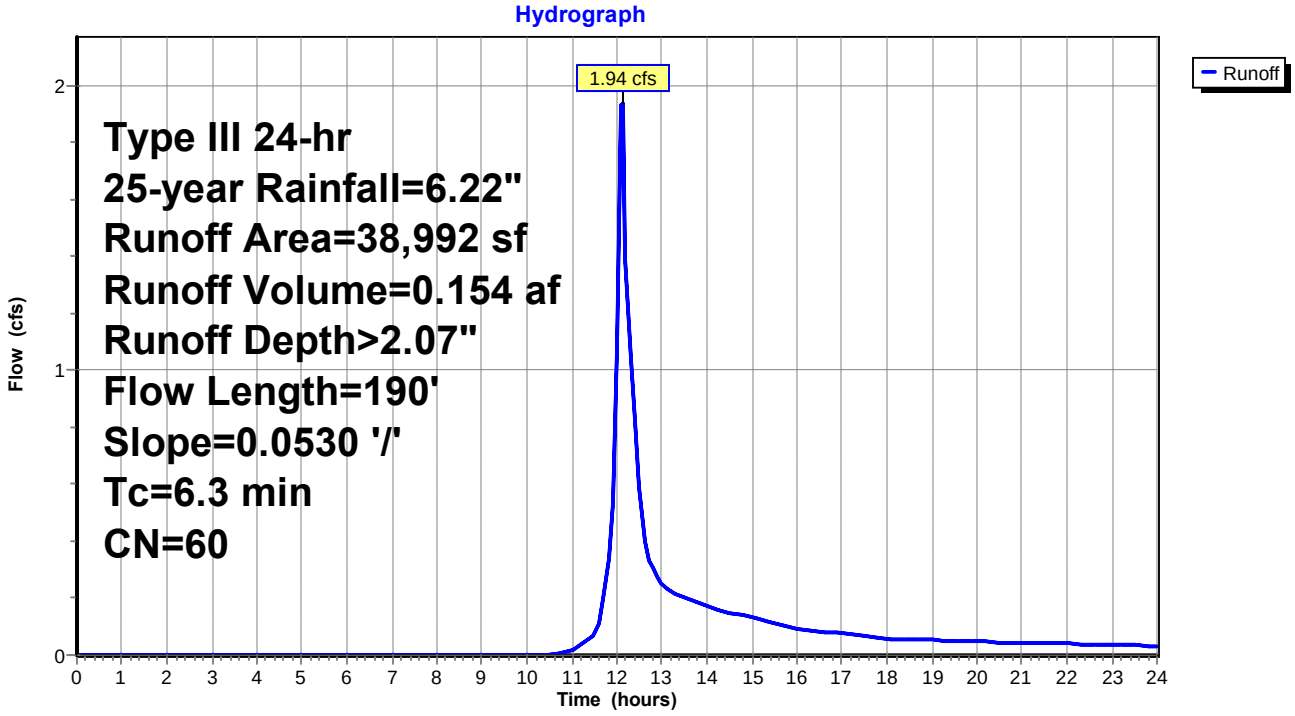
Runoff = 1.94 cfs @ 12.11 hrs, Volume= 0.154 af, Depth> 2.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 25-year Rainfall=6.22"

Area (sf)	CN	Description
38,992	60	Woods, Fair, HSG B
38,992		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.3	190	0.0530	0.50		**Lag/CN Method, Tc-1**

Subcatchment 1S: Drainage Area 1 - East



Summary for Subcatchment 2S: Drainage Area 2

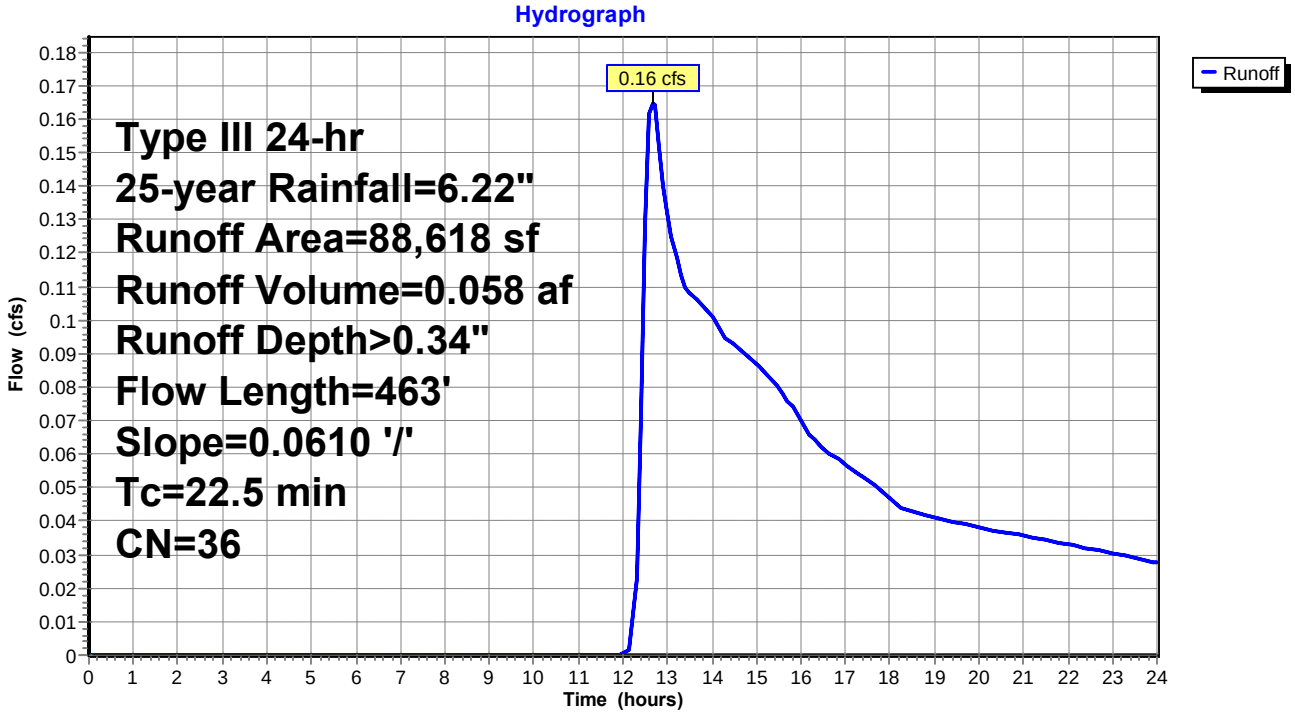
Runoff = 0.16 cfs @ 12.67 hrs, Volume= 0.058 af, Depth> 0.34"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 25-year Rainfall=6.22"

Area (sf)	CN	Description
88,618	36	Woods, Fair, HSG A
88,618		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.5	463	0.0610	0.34		**Lag/CN Method, Tc-2**

Subcatchment 2S: Drainage Area 2



Summary for Subcatchment 3S: Drainage Area 3

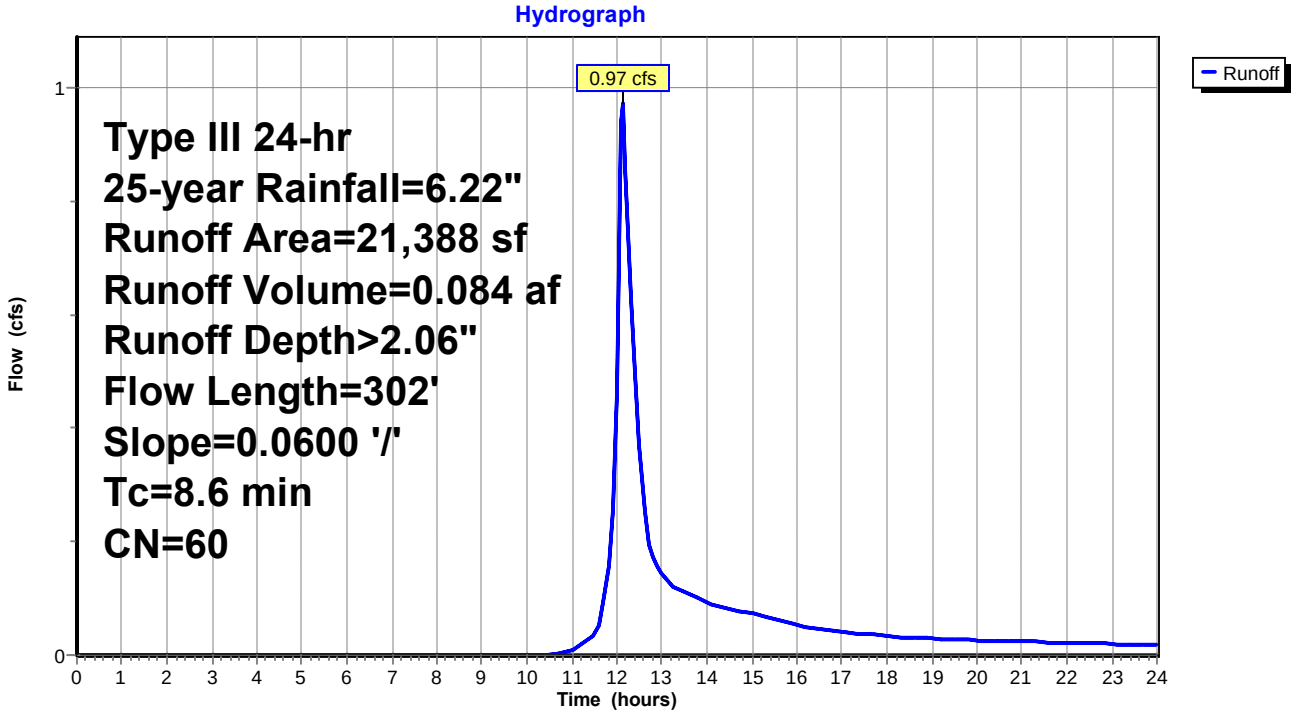
Runoff = 0.97 cfs @ 12.14 hrs, Volume= 0.084 af, Depth> 2.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 25-year Rainfall=6.22"

Area (sf)	CN	Description
21,388	60	Woods, Fair, HSG B
21,388		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.6	302	0.0600	0.58		**Lag/CN Method, Tc-3**

Subcatchment 3S: Drainage Area 3



Summary for Subcatchment 4S: Drainage to Ware Road

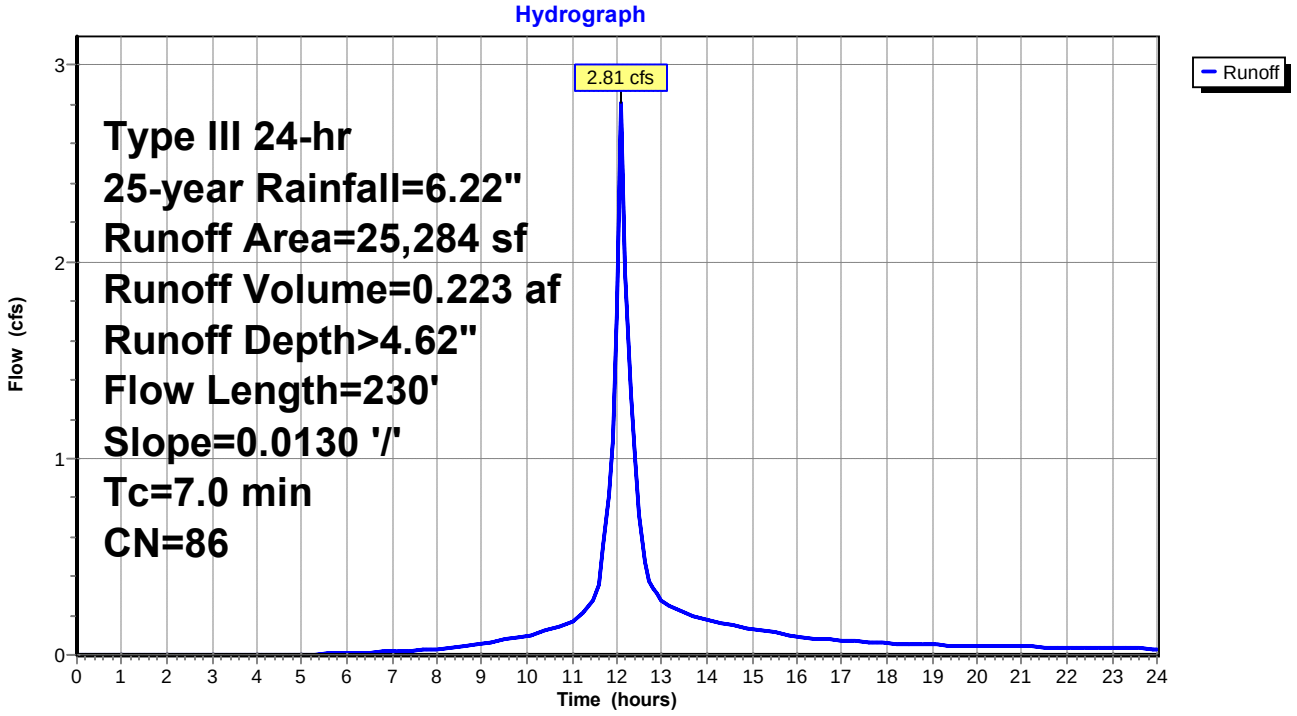
Runoff = 2.81 cfs @ 12.10 hrs, Volume= 0.223 af, Depth> 4.62"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 25-year Rainfall=6.22"

	Area (sf)	CN	Description
*	9,827	98	Pavement & roof, HSG B
	15,457	79	<50% Grass cover, Poor, HSG B
	25,284	86	Weighted Average
	15,457		61.13% Pervious Area
	9,827		38.87% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0	230	0.0130	0.54		**Lag/CN Method, Tc-4**

Subcatchment 4S: Drainage to Ware Road



Summary for Subcatchment 1S: Drainage Area 1 - East

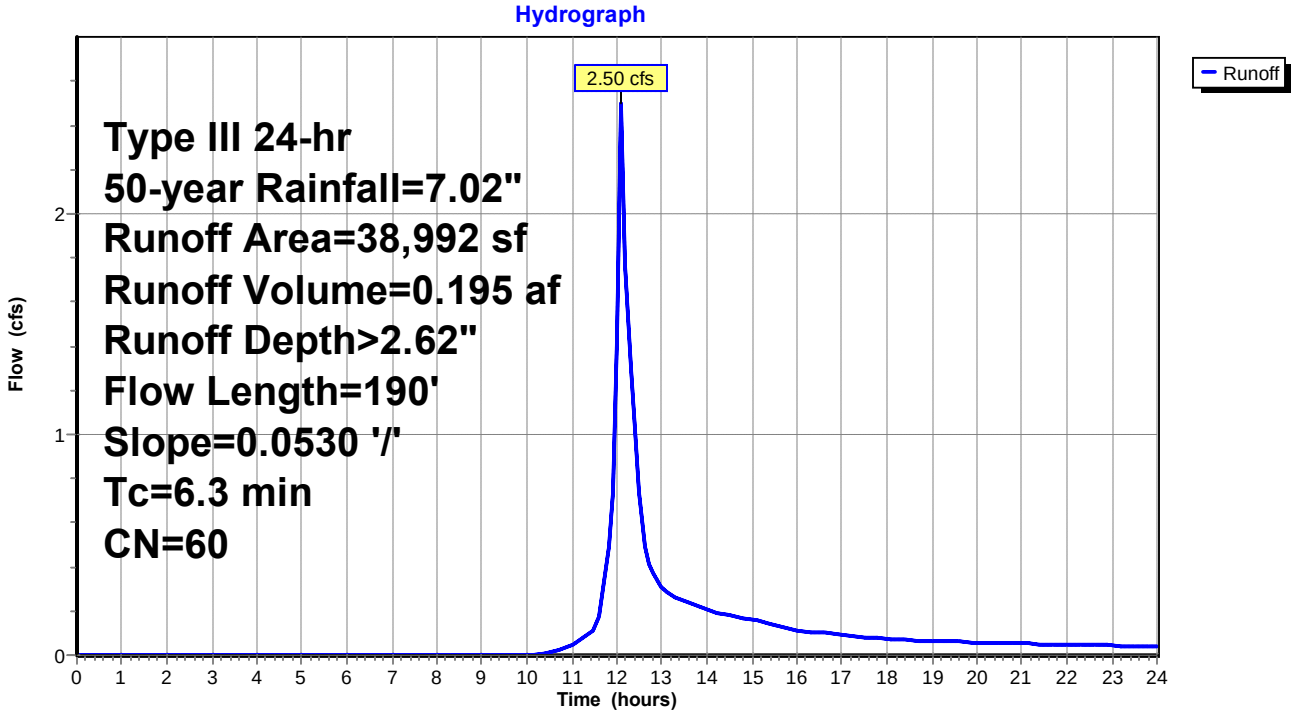
Runoff = 2.50 cfs @ 12.11 hrs, Volume= 0.195 af, Depth> 2.62"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 50-year Rainfall=7.02"

Area (sf)	CN	Description
38,992	60	Woods, Fair, HSG B
38,992		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.3	190	0.0530	0.50		**Lag/CN Method, Tc-1**

Subcatchment 1S: Drainage Area 1 - East



Summary for Subcatchment 2S: Drainage Area 2

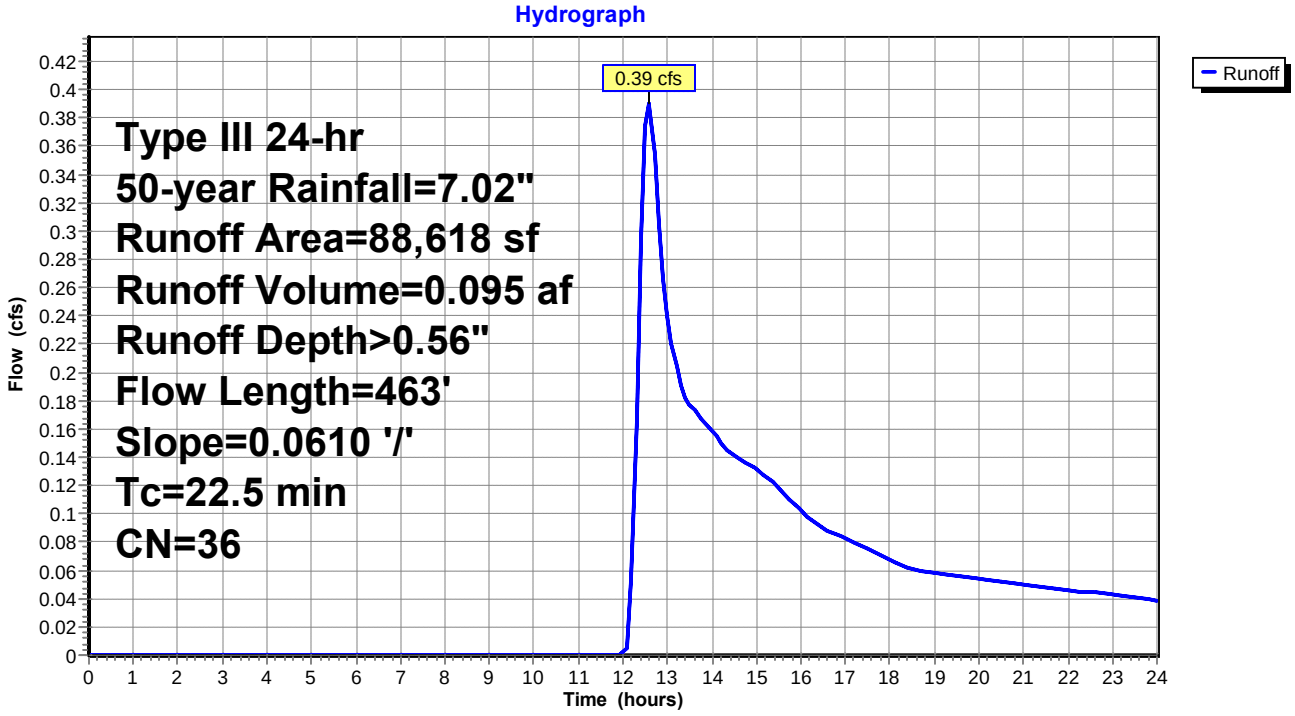
Runoff = 0.39 cfs @ 12.58 hrs, Volume= 0.095 af, Depth> 0.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 50-year Rainfall=7.02"

Area (sf)	CN	Description
88,618	36	Woods, Fair, HSG A
88,618		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.5	463	0.0610	0.34		**Lag/CN Method, Tc-2**

Subcatchment 2S: Drainage Area 2



Summary for Subcatchment 3S: Drainage Area 3

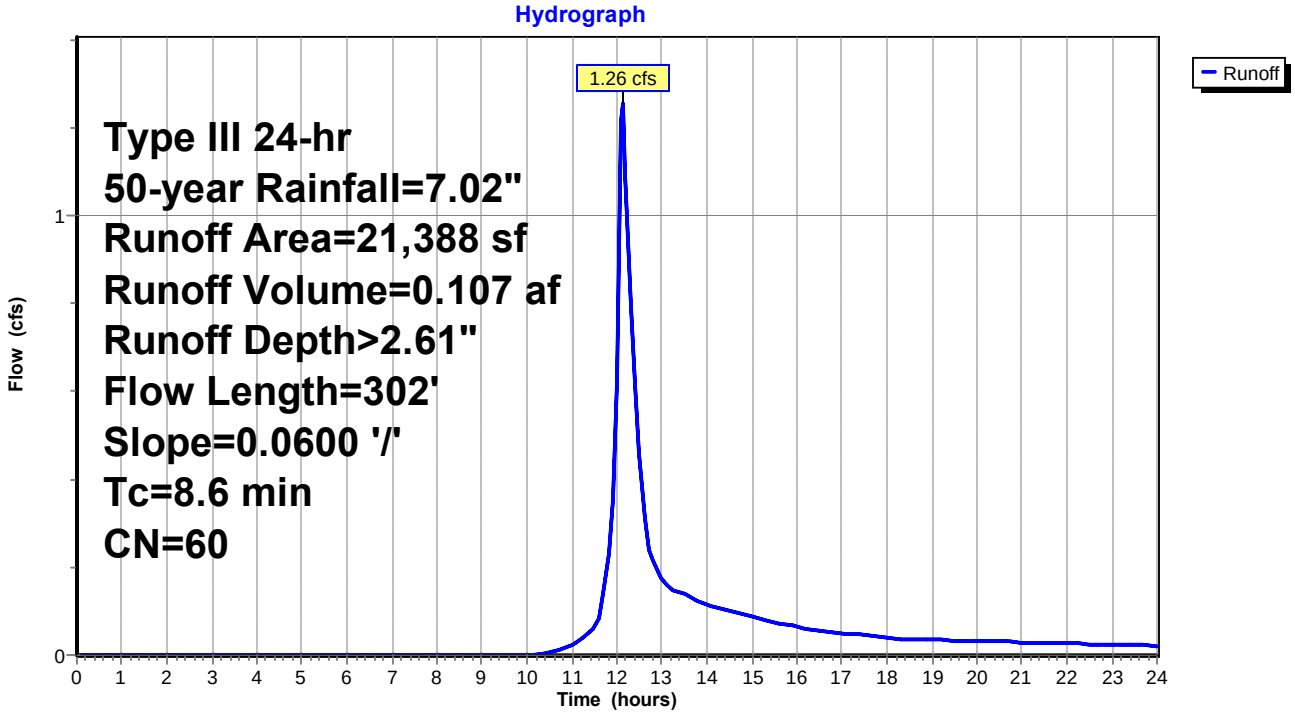
Runoff = 1.26 cfs @ 12.13 hrs, Volume= 0.107 af, Depth> 2.61"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 50-year Rainfall=7.02"

Area (sf)	CN	Description
21,388	60	Woods, Fair, HSG B
21,388		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.6	302	0.0600	0.58		**Lag/CN Method, Tc-3**

Subcatchment 3S: Drainage Area 3



Summary for Subcatchment 4S: Drainage to Ware Road

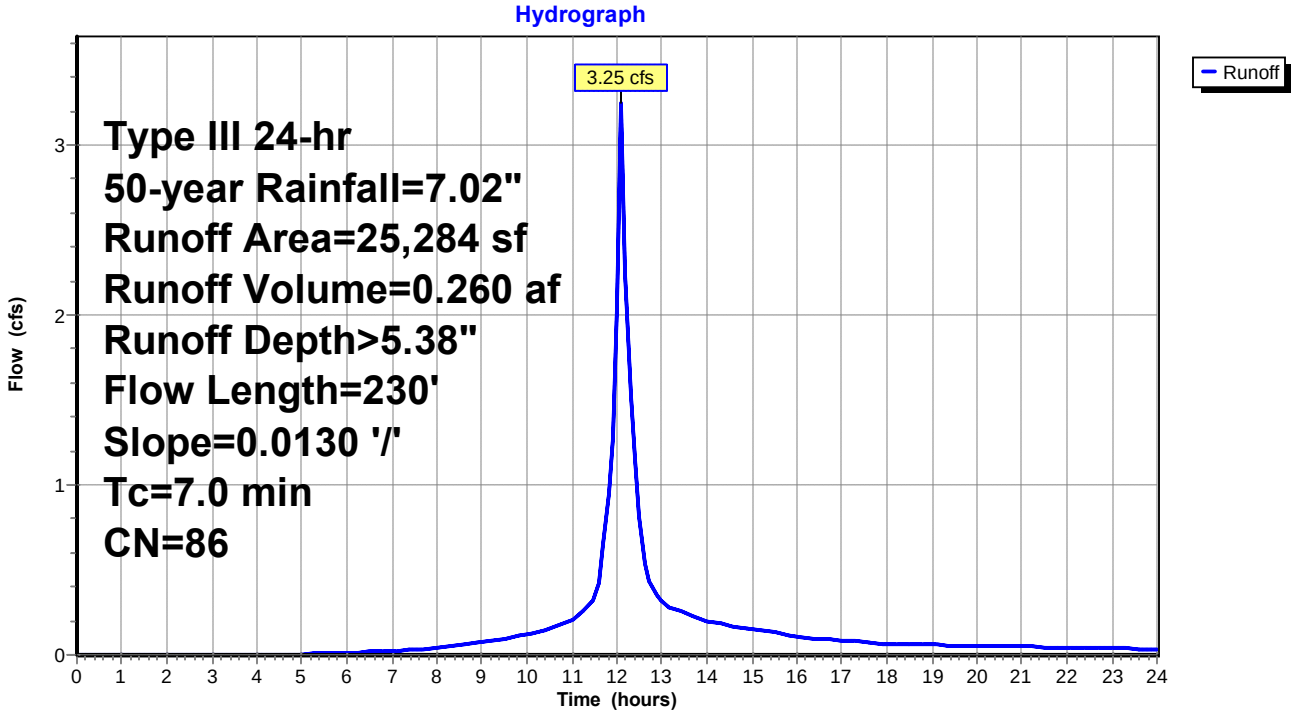
Runoff = 3.25 cfs @ 12.10 hrs, Volume= 0.260 af, Depth> 5.38"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 50-year Rainfall=7.02"

	Area (sf)	CN	Description
*	9,827	98	Pavement & roof, HSG B
	15,457	79	<50% Grass cover, Poor, HSG B
	25,284	86	Weighted Average
	15,457		61.13% Pervious Area
	9,827		38.87% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0	230	0.0130	0.54		**Lag/CN Method, Tc-4**

Subcatchment 4S: Drainage to Ware Road



Summary for Subcatchment 1S: Drainage Area 1 - East

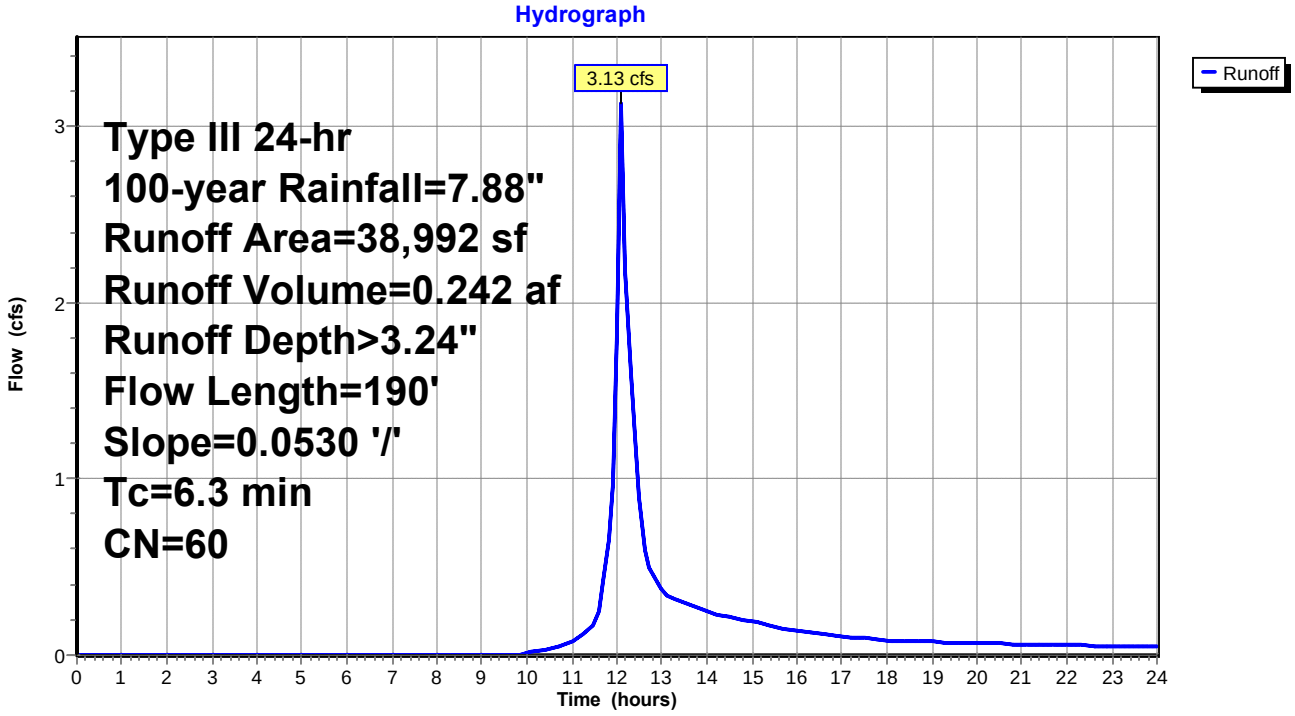
Runoff = 3.13 cfs @ 12.11 hrs, Volume= 0.242 af, Depth> 3.24"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 100-year Rainfall=7.88"

Area (sf)	CN	Description
38,992	60	Woods, Fair, HSG B
38,992		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.3	190	0.0530	0.50		**Lag/CN Method, Tc-1**

Subcatchment 1S: Drainage Area 1 - East



Summary for Subcatchment 2S: Drainage Area 2

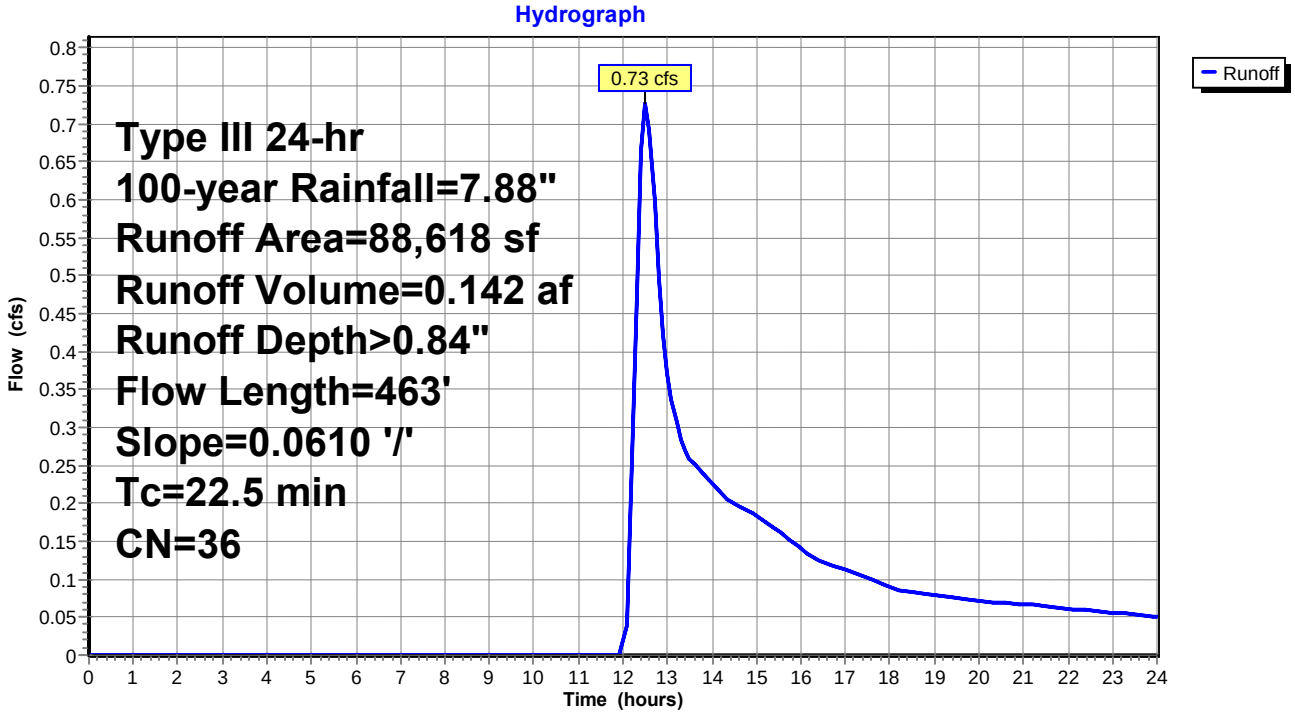
Runoff = 0.73 cfs @ 12.52 hrs, Volume= 0.142 af, Depth> 0.84"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 100-year Rainfall=7.88"

Area (sf)	CN	Description
88,618	36	Woods, Fair, HSG A
88,618		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.5	463	0.0610	0.34		**Lag/CN Method, Tc-2**

Subcatchment 2S: Drainage Area 2



Summary for Subcatchment 3S: Drainage Area 3

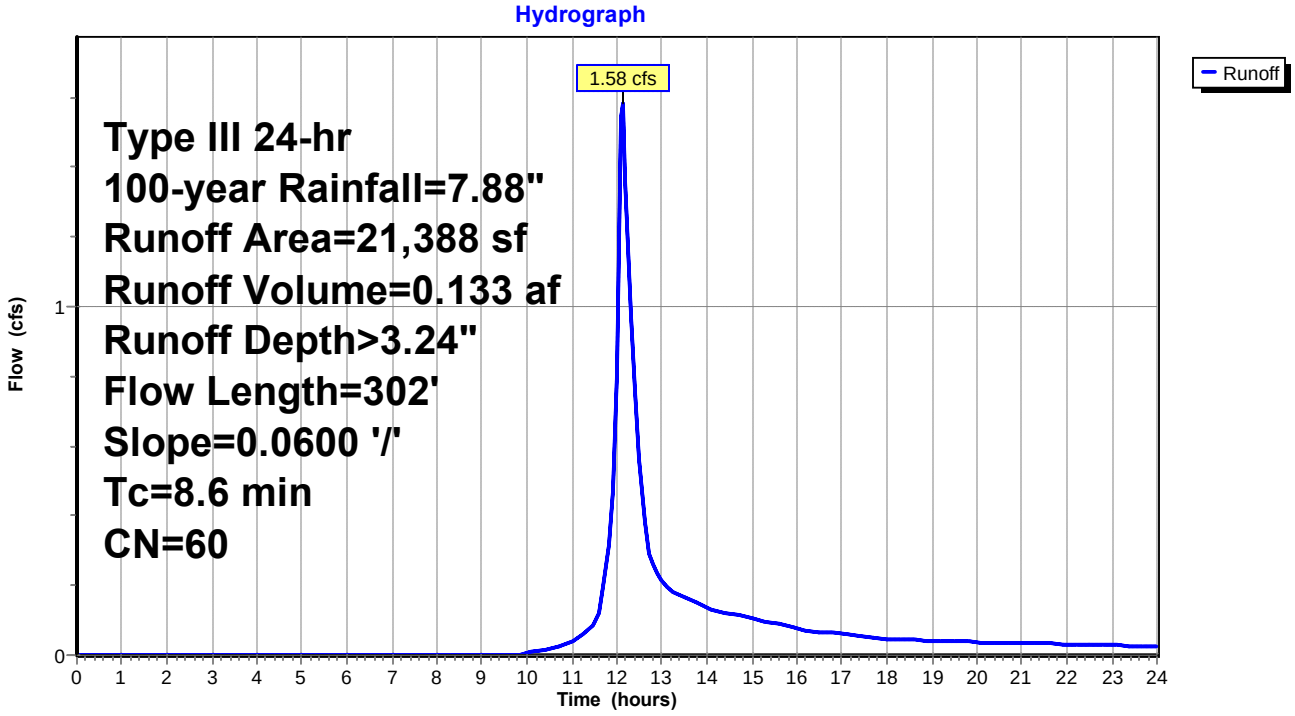
Runoff = 1.58 cfs @ 12.13 hrs, Volume= 0.133 af, Depth> 3.24"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 100-year Rainfall=7.88"

Area (sf)	CN	Description
21,388	60	Woods, Fair, HSG B
21,388		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.6	302	0.0600	0.58		**Lag/CN Method, Tc-3**

Subcatchment 3S: Drainage Area 3



Summary for Subcatchment 4S: Drainage to Ware Road

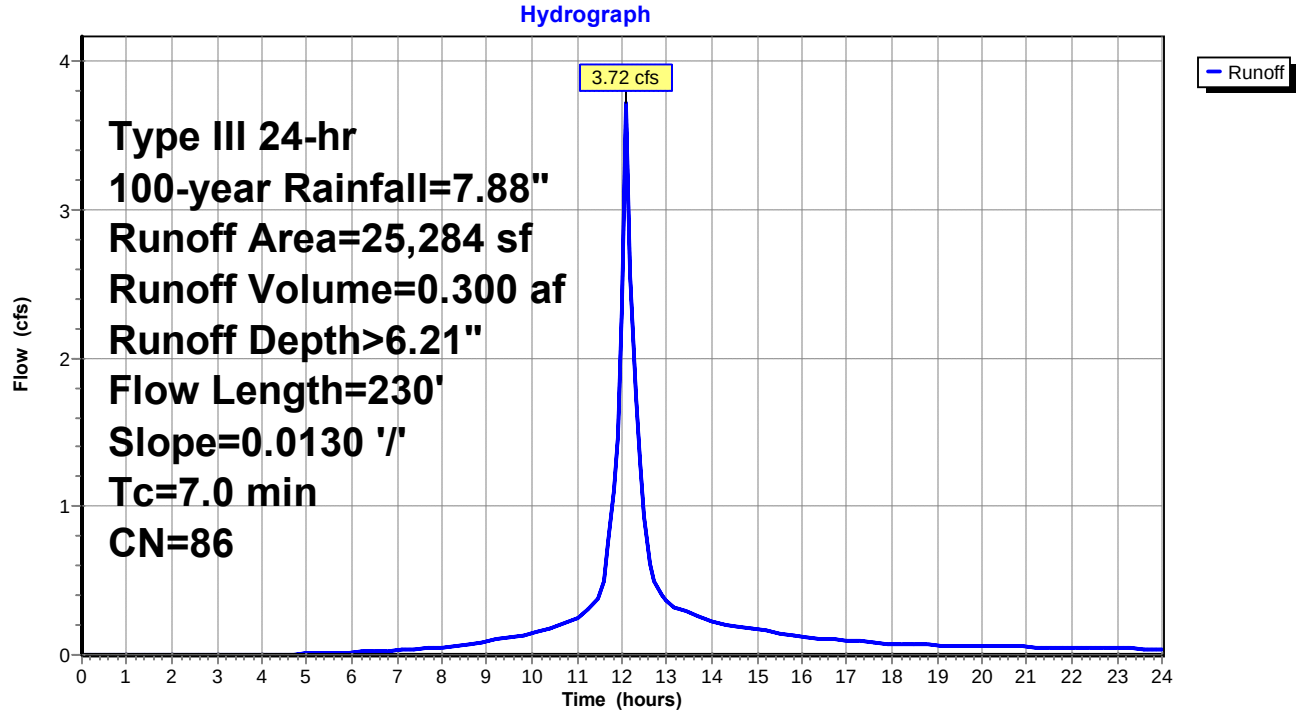
Runoff = 3.72 cfs @ 12.10 hrs, Volume= 0.300 af, Depth> 6.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 100-year Rainfall=7.88"

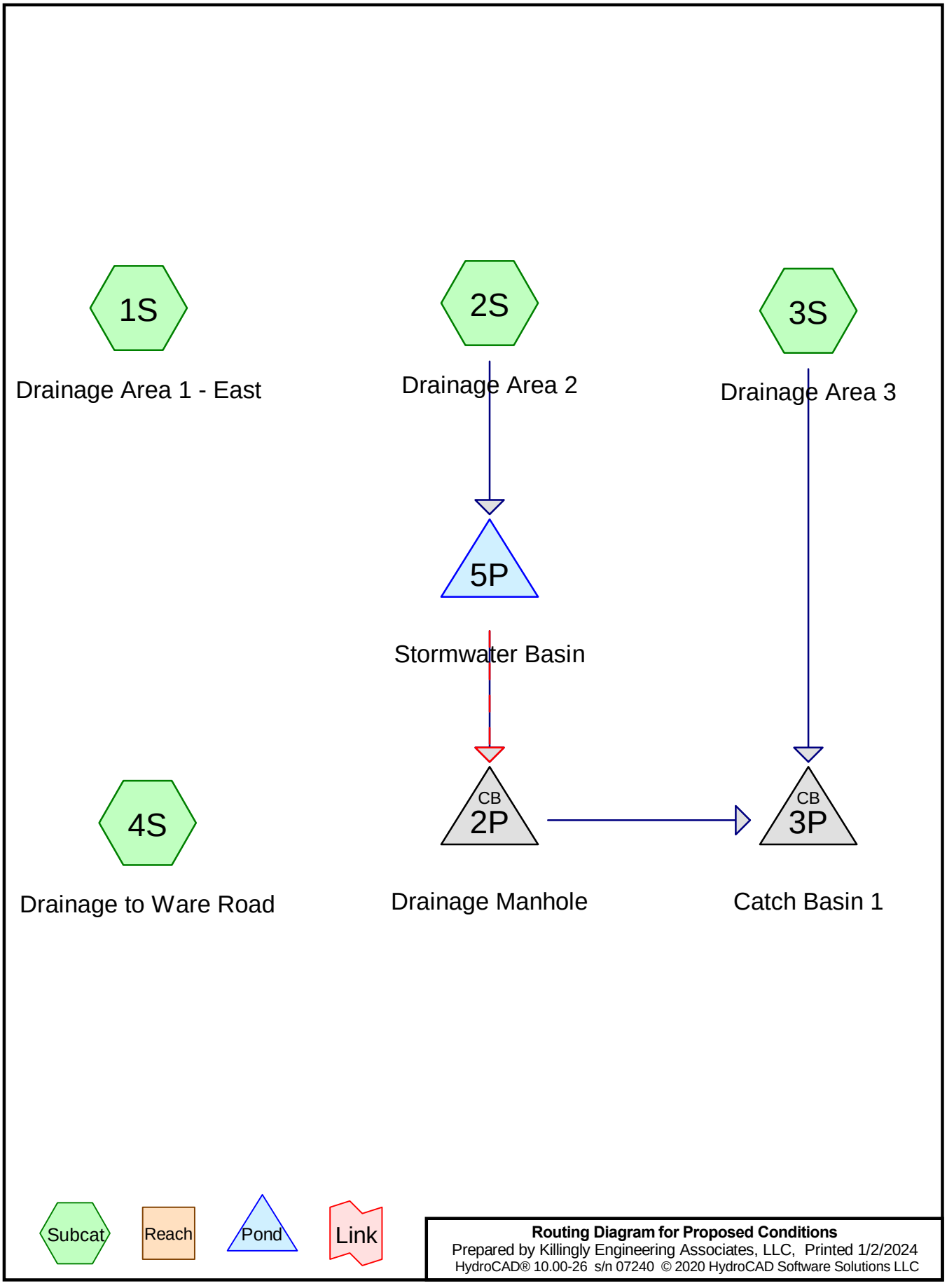
	Area (sf)	CN	Description
*	9,827	98	Pavement & roof, HSG B
	15,457	79	<50% Grass cover, Poor, HSG B
	25,284	86	Weighted Average
	15,457		61.13% Pervious Area
	9,827		38.87% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0	230	0.0130	0.54		**Lag/CN Method, Tc-4**

Subcatchment 4S: Drainage to Ware Road



PROPOSED CONDITIONS



Routing Diagram for Proposed Conditions

Prepared by Killingly Engineering Associates, LLC, Printed 1/2/2024

Summary for Subcatchment 1S: Drainage Area 1 - East

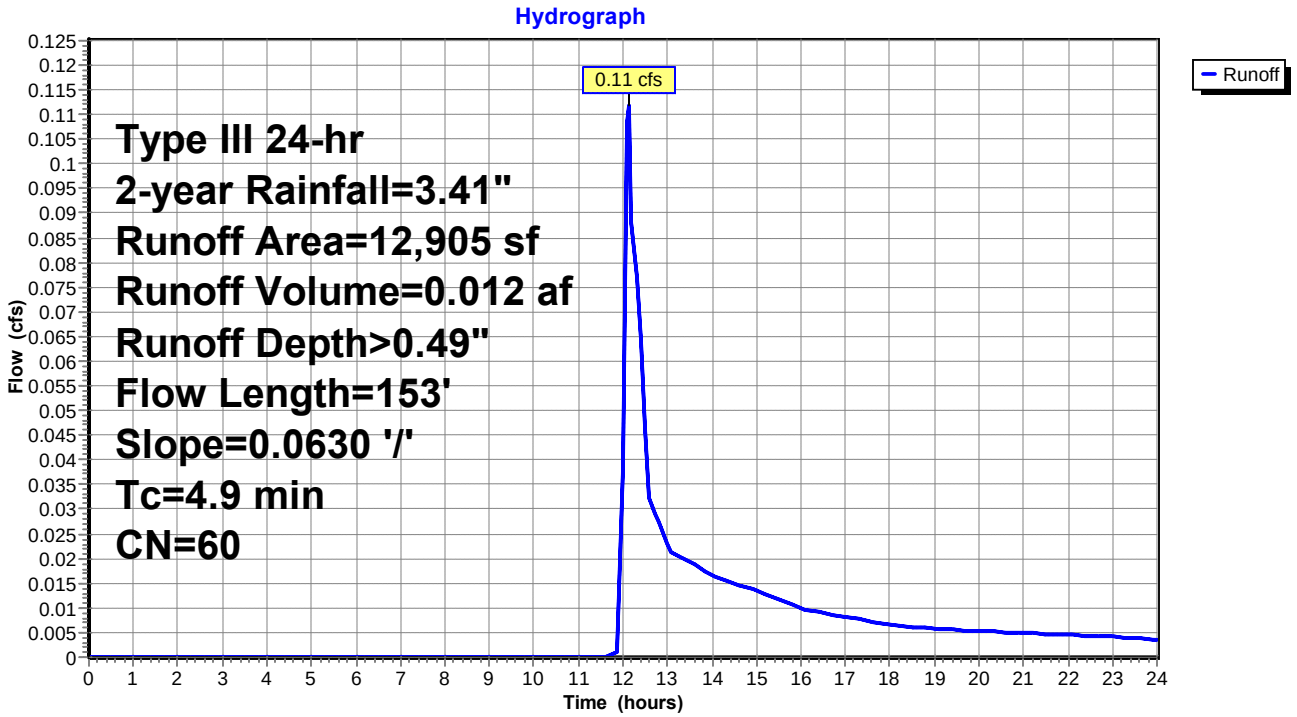
Runoff = 0.11 cfs @ 12.13 hrs, Volume= 0.012 af, Depth> 0.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 2-year Rainfall=3.41"

Area (sf)	CN	Description
11,105	60	Woods, Fair, HSG B
1,800	61	>75% Grass cover, Good, HSG B
12,905	60	Weighted Average
12,905		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.9	153	0.0630	0.52		**Lag/CN Method, Tc-1**

Subcatchment 1S: Drainage Area 1 - East



Summary for Subcatchment 2S: Drainage Area 2

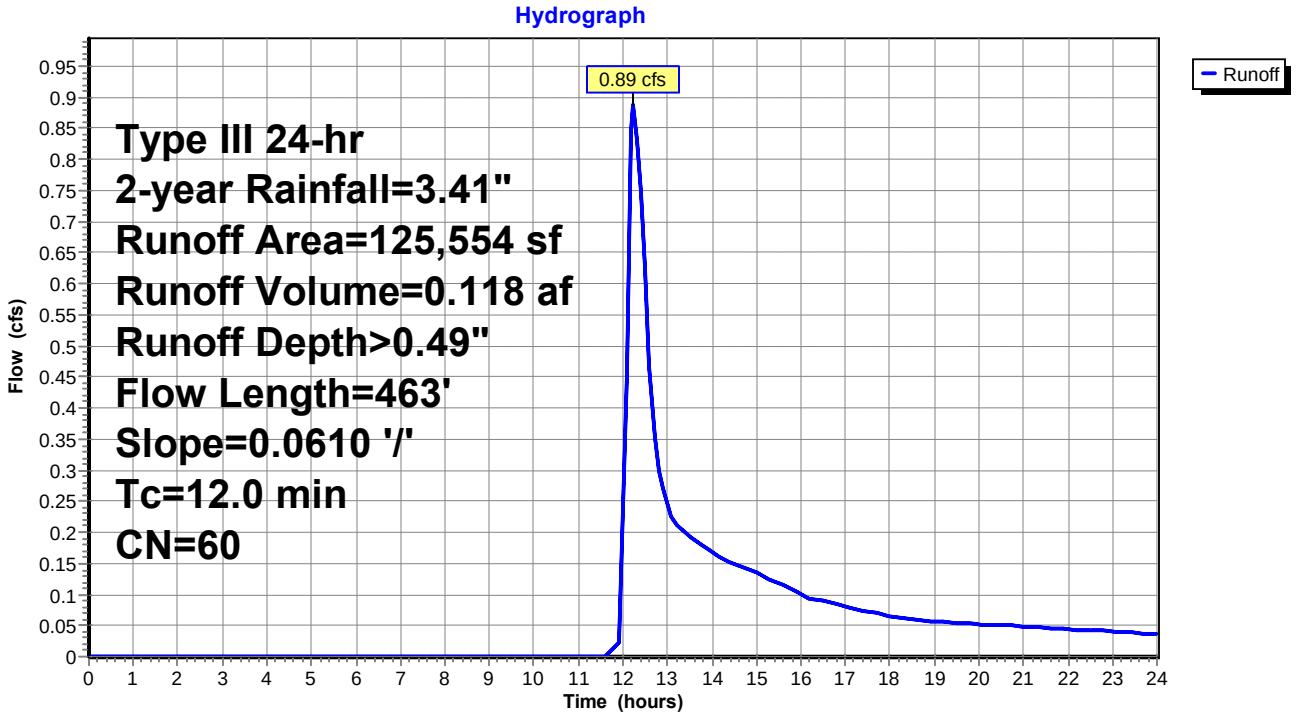
Runoff = 0.89 cfs @ 12.25 hrs, Volume= 0.118 af, Depth> 0.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 2-year Rainfall=3.41"

	Area (sf)	CN	Description
	13,400	36	Woods, Fair, HSG A
*	35,880	98	Paved / Roof
	25,170	61	>75% Grass cover, Good, HSG B
	51,104	39	>75% Grass cover, Good, HSG A
	125,554	60	Weighted Average
	89,674		71.42% Pervious Area
	35,880		28.58% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.0	463	0.0610	0.64		**Lag/CN Method, Tc-2**

Subcatchment 2S: Drainage Area 2



Summary for Subcatchment 3S: Drainage Area 3

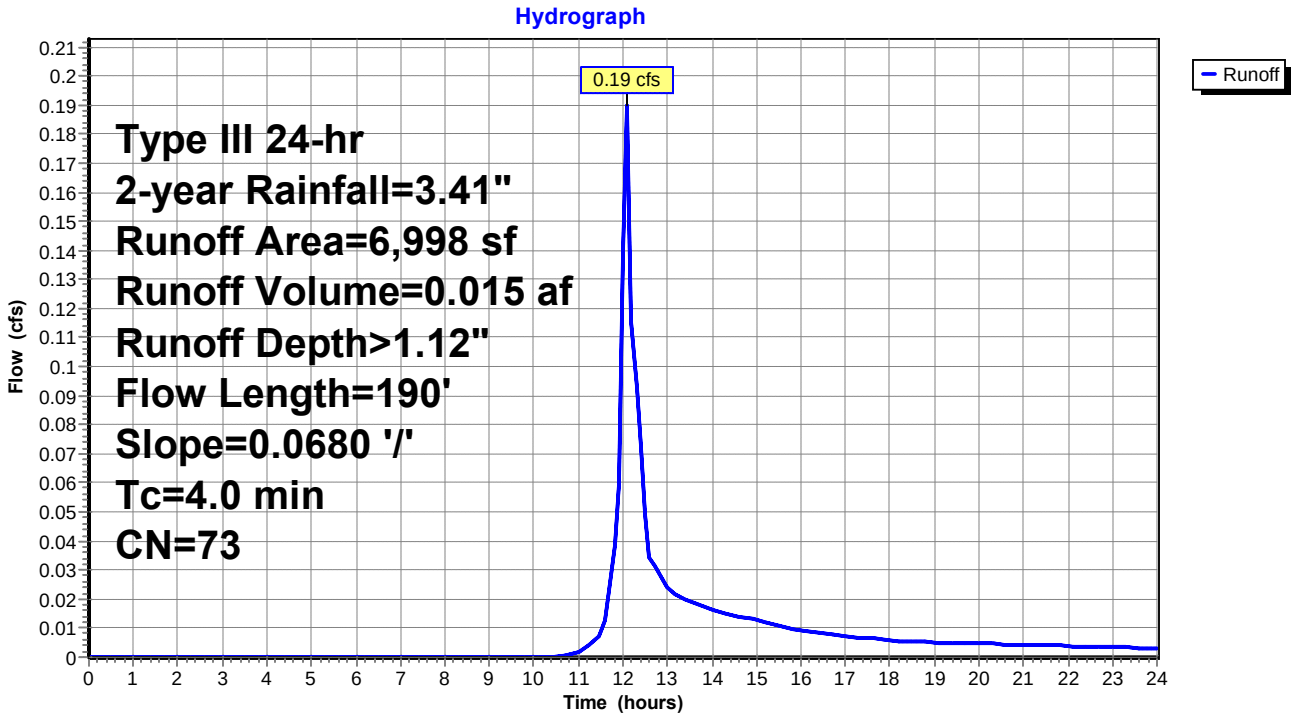
Runoff = 0.19 cfs @ 12.09 hrs, Volume= 0.015 af, Depth> 1.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 2-year Rainfall=3.41"

Area (sf)	CN	Description
3,318	60	Woods, Fair, HSG B
3,680	85	Gravel roads, HSG B
6,998	73	Weighted Average
6,998		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.0	190	0.0680	0.80		**Lag/CN Method, Tc-3**

Subcatchment 3S: Drainage Area 3



Summary for Subcatchment 4S: Drainage to Ware Road

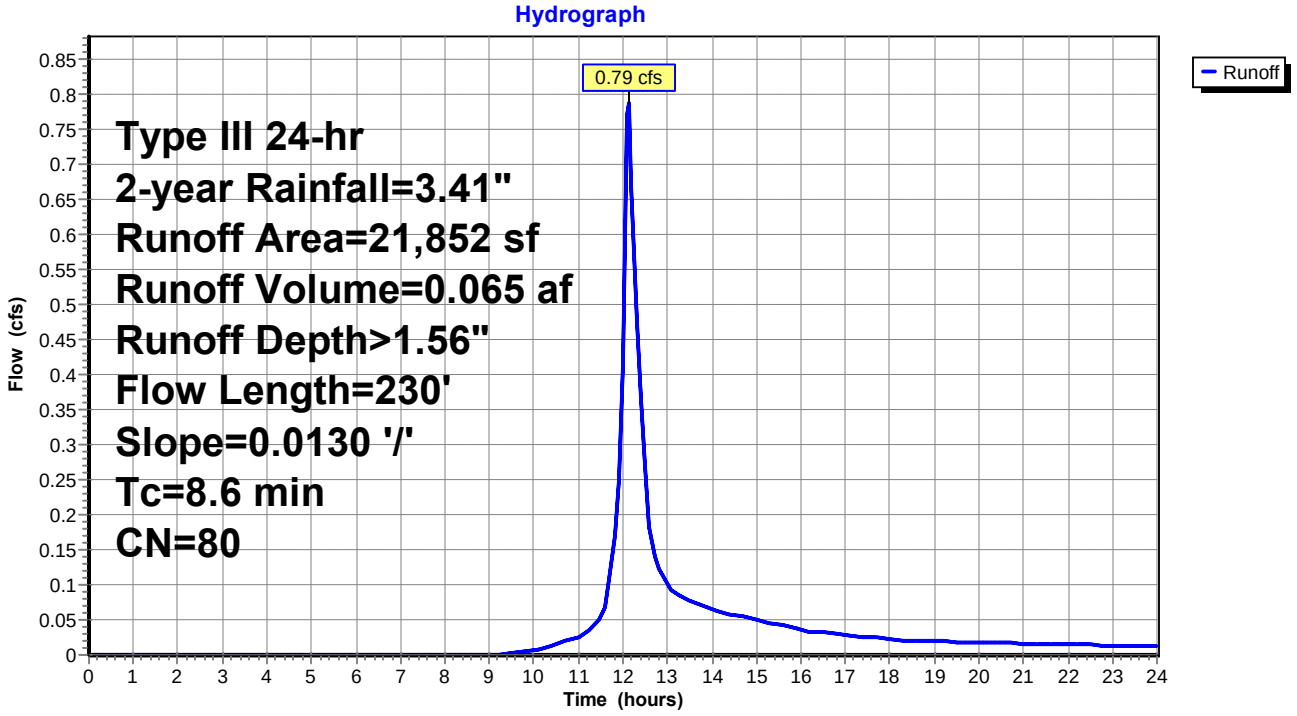
Runoff = 0.79 cfs @ 12.13 hrs, Volume= 0.065 af, Depth> 1.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 2-year Rainfall=3.41"

	Area (sf)	CN	Description
*	8,550	98	Pavement & roof, HSG B
	13,302	69	50-75% Grass cover, Fair, HSG B
	21,852	80	Weighted Average
	13,302		60.87% Pervious Area
	8,550		39.13% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.6	230	0.0130	0.45		**Lag/CN Method, Tc-4**

Subcatchment 4S: Drainage to Ware Road



Summary for Pond 2P: Drainage Manhole

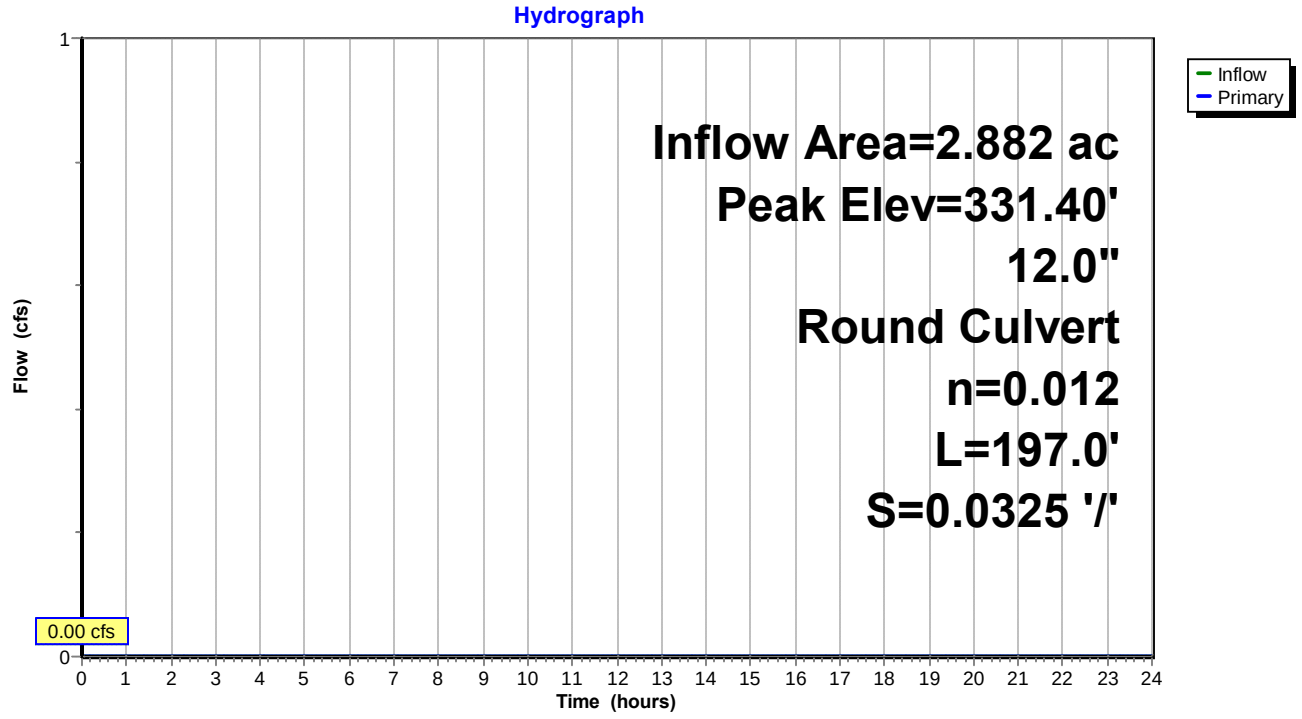
Inflow Area = 2.882 ac, 28.58% Impervious, Inflow Depth = 0.00" for 2-year event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Peak Elev= 331.40' @ 0.00 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	331.40'	**12.0" Round Culvert** L= 197.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 331.40' / 325.00' S= 0.0325 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=331.40' (Free Discharge)
1=Culvert (Controls 0.00 cfs)

Pond 2P: Drainage Manhole



Summary for Pond 3P: Catch Basin 1

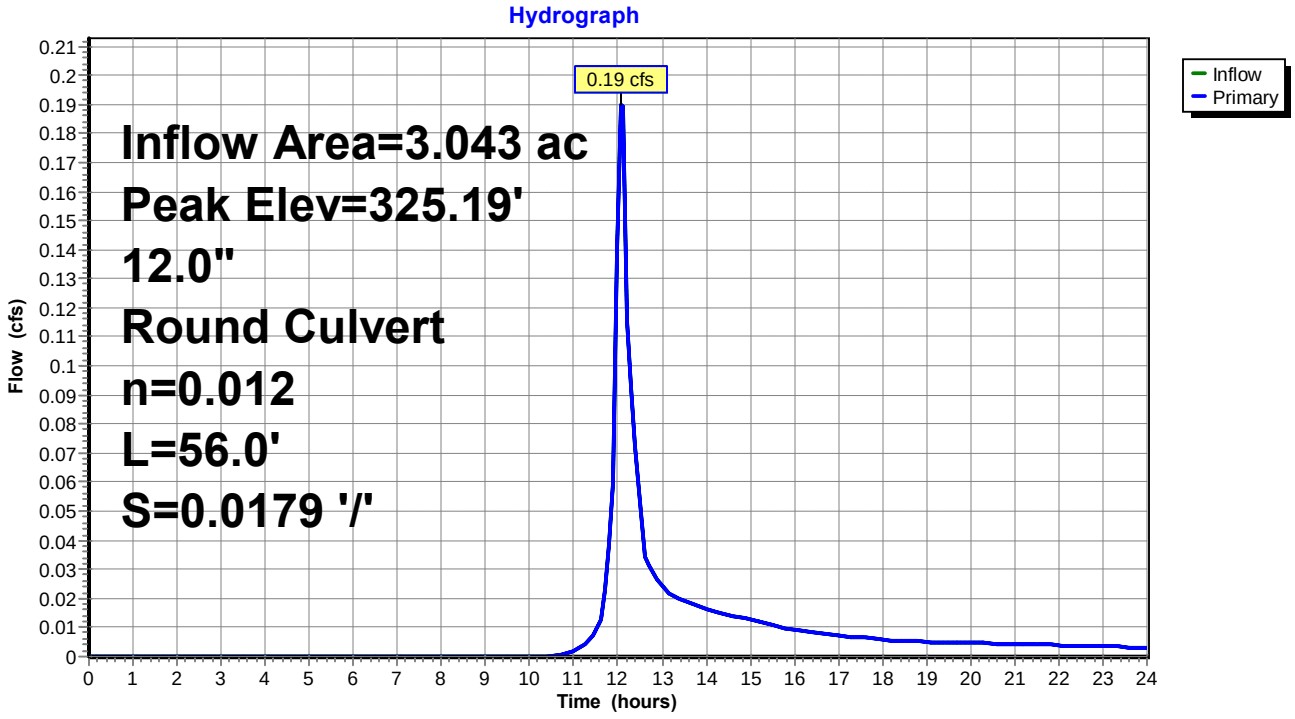
Inflow Area = 3.043 ac, 27.07% Impervious, Inflow Depth > 0.06" for 2-year event
Inflow = 0.19 cfs @ 12.09 hrs, Volume= 0.015 af
Outflow = 0.19 cfs @ 12.09 hrs, Volume= 0.015 af, Atten= 0%, Lag= 0.0 min
Primary = 0.19 cfs @ 12.09 hrs, Volume= 0.015 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Peak Elev= 325.19' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	325.00'	**12.0" Round Culvert** L= 56.0' RCP, groove end w/headwall, Ke= 0.200 Inlet / Outlet Invert= 325.00' / 324.00' S= 0.0179 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.18 cfs @ 12.09 hrs HW=325.19' (Free Discharge)
1=Culvert (Inlet Controls 0.18 cfs @ 1.83 fps)

Pond 3P: Catch Basin 1



Summary for Pond 5P: Stormwater Basin

Inflow Area = 2.882 ac, 28.58% Impervious, Inflow Depth > 0.49" for 2-year event
Inflow = 0.89 cfs @ 12.25 hrs, Volume= 0.118 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Discarded = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Peak Elev= 329.46' @ 24.00 hrs Surf.Area= 3,943 sf Storage= 5,135 cf

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

Volume	Invert	Avail.Storage	Storage Description
#1	326.00'	37,412 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
326.00	420	0	0
328.00	1,390	1,810	1,810
329.00	2,350	1,870	3,680
330.00	5,795	4,073	7,753
332.00	7,435	13,230	20,983
333.00	8,207	7,821	28,804
334.00	9,010	8,609	37,412

Device	Routing	Invert	Outlet Devices
#1	Discarded	329.00'	**5.000 in/hr Exfiltration over Surface area from 329.00' - 329.00'** Excluded Surface area = 2,350 sf
#2	Primary	332.00'	**12.0" Round Culvert** L= 18.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 332.00' / 331.50' S= 0.0278 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#3	Device 1	332.00'	**4.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	333.00'	**6.0" Vert. Orifice/Grate** C= 0.600
#5	Secondary	334.00'	**12.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#6	Tertiary	334.00'	**5.0' long x 15.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

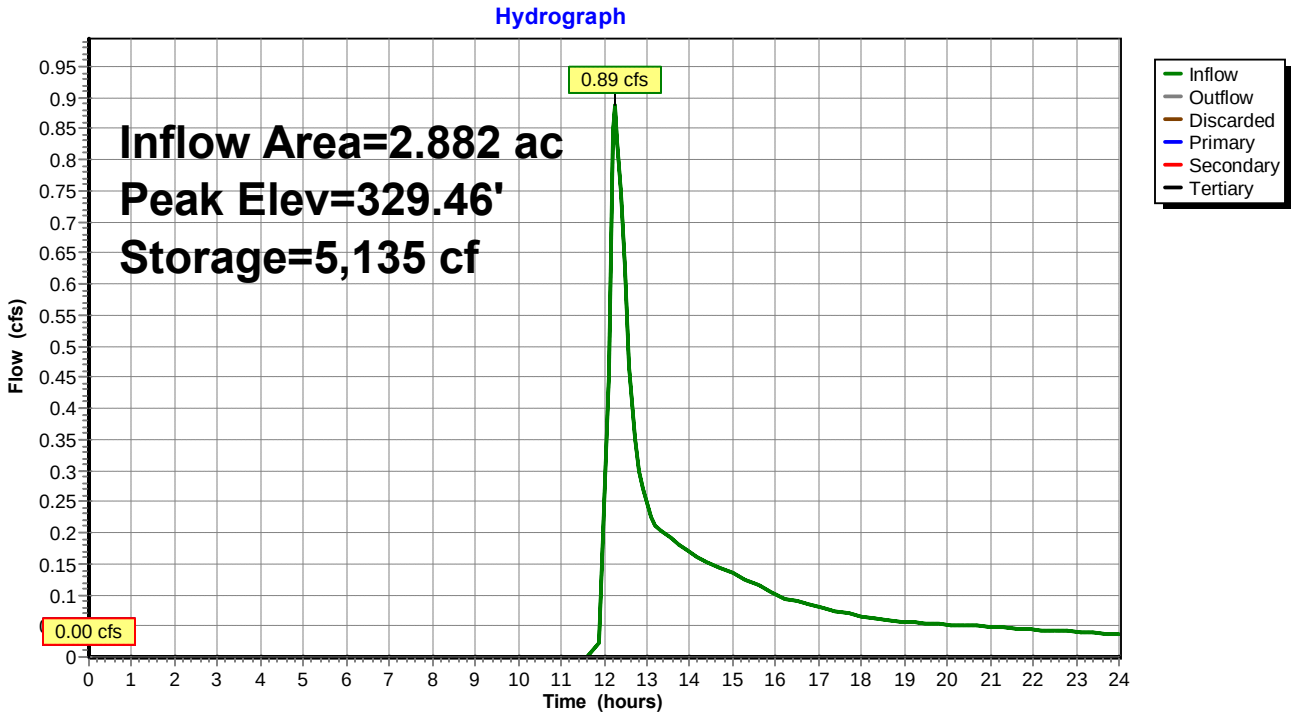
Discarded OutFlow Max=0.00 cfs @ 0.00 hrs HW=326.00' (Free Discharge)
└**1=Exfiltration** (Controls 0.00 cfs)
  └**3=Orifice/Grate** (Controls 0.00 cfs)
  └**4=Orifice/Grate** (Controls 0.00 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=326.00' (Free Discharge)
└**2=Culvert** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=326.00' (Free Discharge)
└**5=Orifice/Grate** (Controls 0.00 cfs)

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=326.00' (Free Discharge)
└**6=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 5P: Stormwater Basin



Summary for Subcatchment 1S: Drainage Area 1 - East

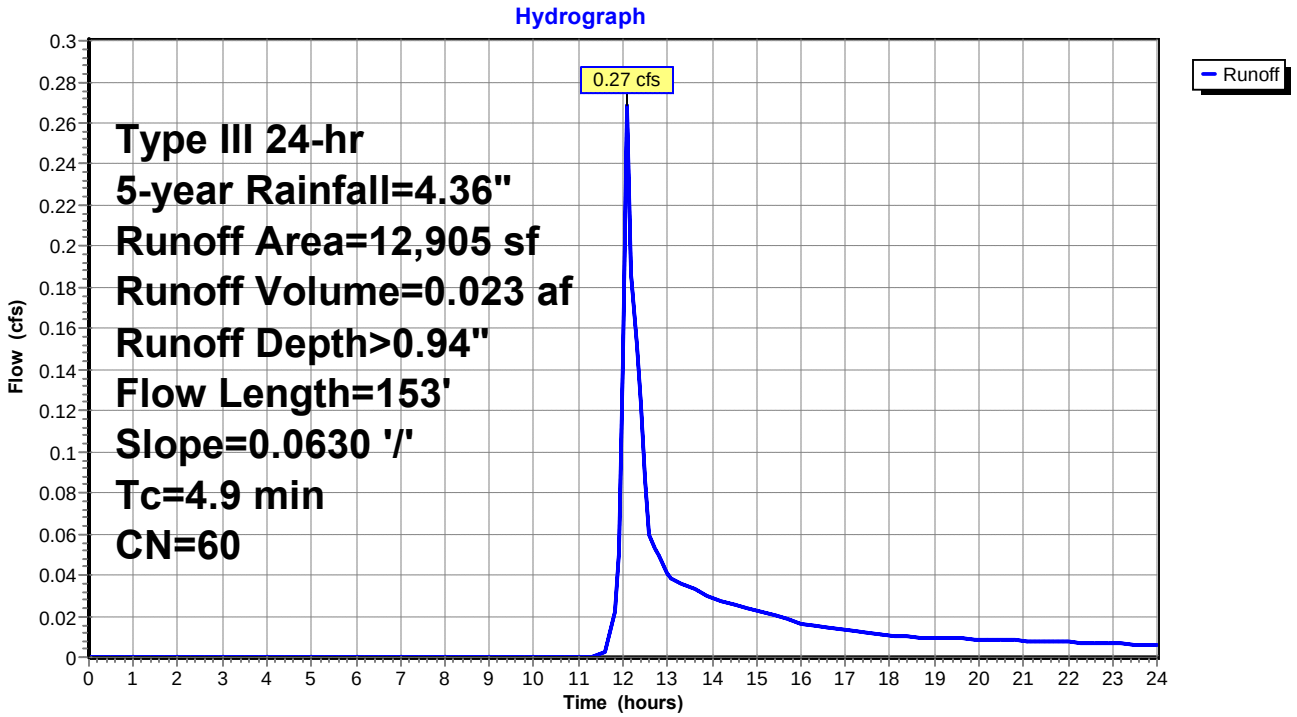
Runoff = 0.27 cfs @ 12.11 hrs, Volume= 0.023 af, Depth> 0.94"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 5-year Rainfall=4.36"

Area (sf)	CN	Description
11,105	60	Woods, Fair, HSG B
1,800	61	>75% Grass cover, Good, HSG B
12,905	60	Weighted Average
12,905		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.9	153	0.0630	0.52		**Lag/CN Method, Tc-1**

Subcatchment 1S: Drainage Area 1 - East



Summary for Subcatchment 2S: Drainage Area 2

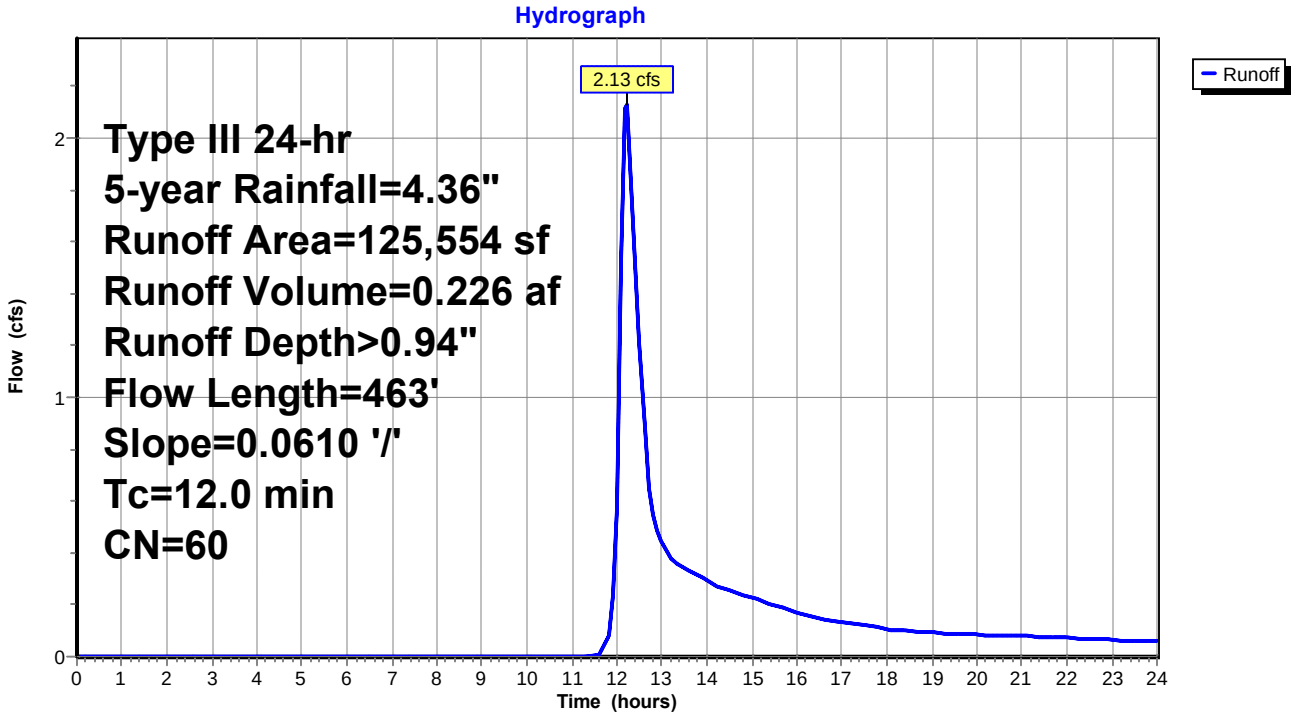
Runoff = 2.13 cfs @ 12.22 hrs, Volume= 0.226 af, Depth> 0.94"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 5-year Rainfall=4.36"

	Area (sf)	CN	Description
	13,400	36	Woods, Fair, HSG A
*	35,880	98	Paved / Roof
	25,170	61	>75% Grass cover, Good, HSG B
	51,104	39	>75% Grass cover, Good, HSG A
	125,554	60	Weighted Average
	89,674		71.42% Pervious Area
	35,880		28.58% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.0	463	0.0610	0.64		**Lag/CN Method, Tc-2**

Subcatchment 2S: Drainage Area 2



Summary for Subcatchment 3S: Drainage Area 3

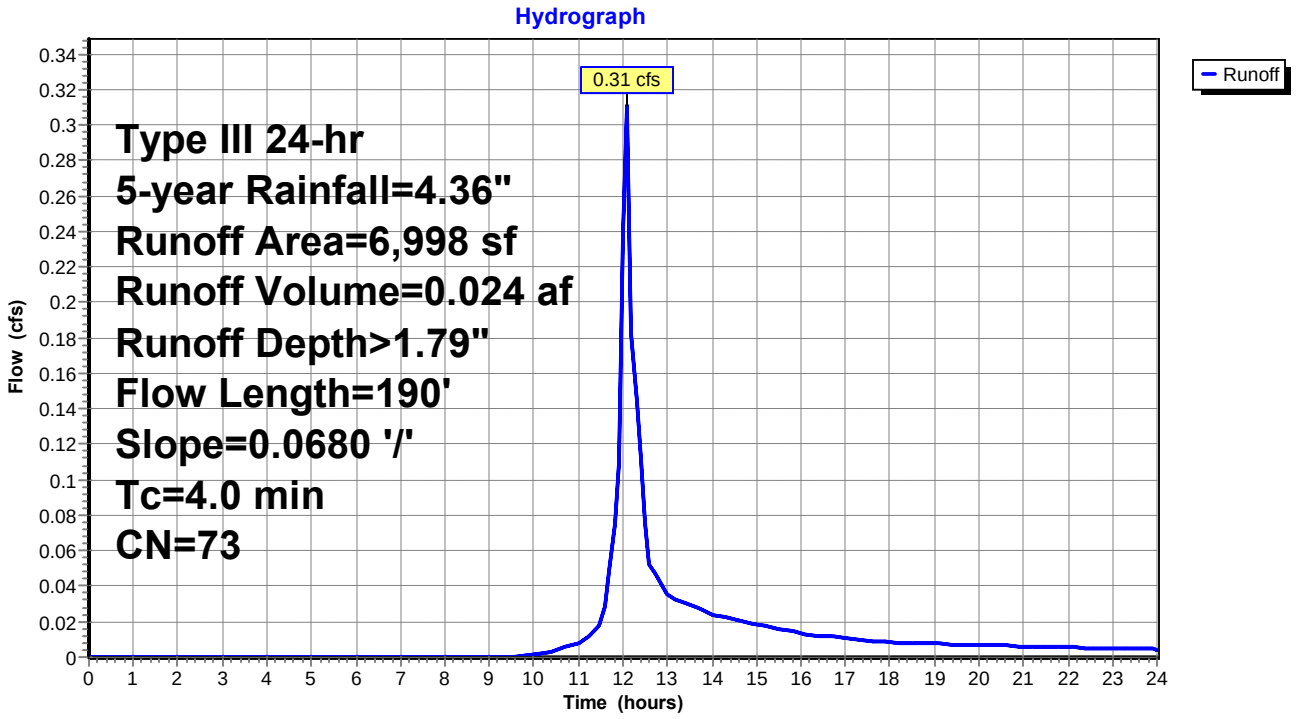
Runoff = 0.31 cfs @ 12.09 hrs, Volume= 0.024 af, Depth> 1.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 5-year Rainfall=4.36"

Area (sf)	CN	Description
3,318	60	Woods, Fair, HSG B
3,680	85	Gravel roads, HSG B
6,998	73	Weighted Average
6,998		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.0	190	0.0680	0.80		**Lag/CN Method, Tc-3**

Subcatchment 3S: Drainage Area 3



Summary for Subcatchment 4S: Drainage to Ware Road

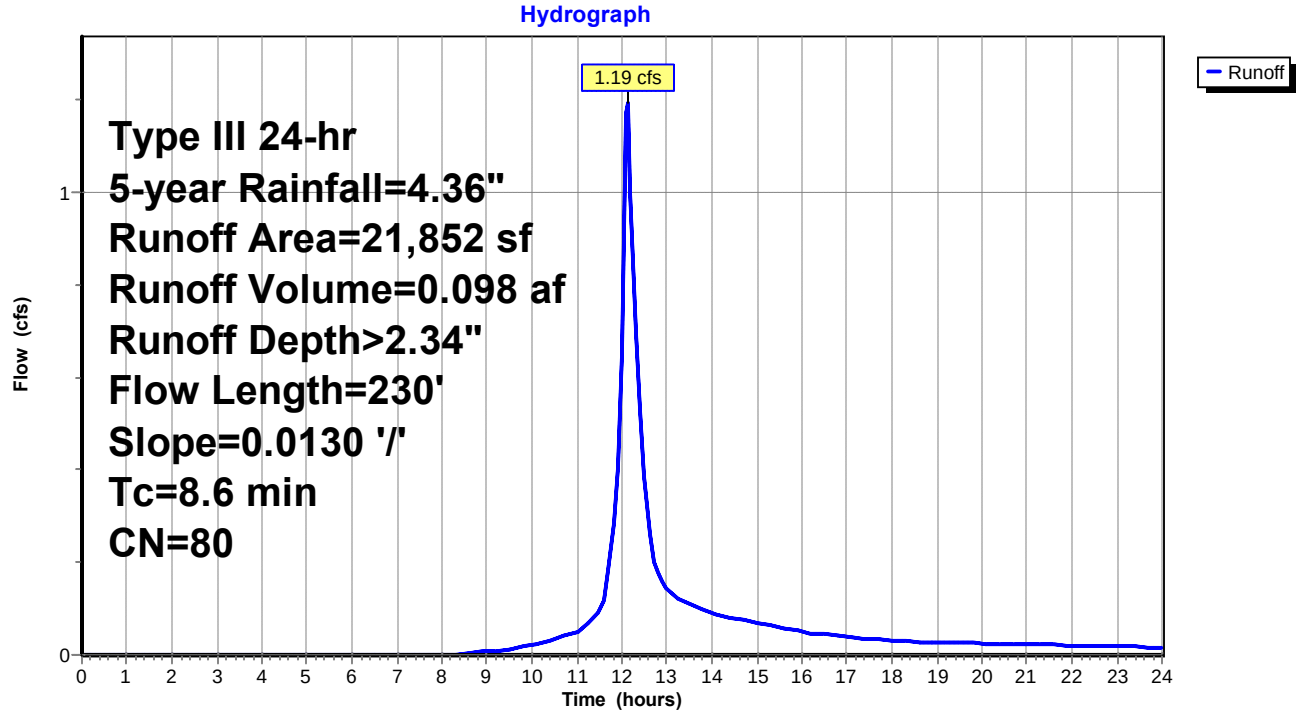
Runoff = 1.19 cfs @ 12.13 hrs, Volume= 0.098 af, Depth> 2.34"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 5-year Rainfall=4.36"

	Area (sf)	CN	Description
*	8,550	98	Pavement & roof, HSG B
	13,302	69	50-75% Grass cover, Fair, HSG B
	21,852	80	Weighted Average
	13,302		60.87% Pervious Area
	8,550		39.13% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.6	230	0.0130	0.45		**Lag/CN Method, Tc-4**

Subcatchment 4S: Drainage to Ware Road



Summary for Pond 2P: Drainage Manhole

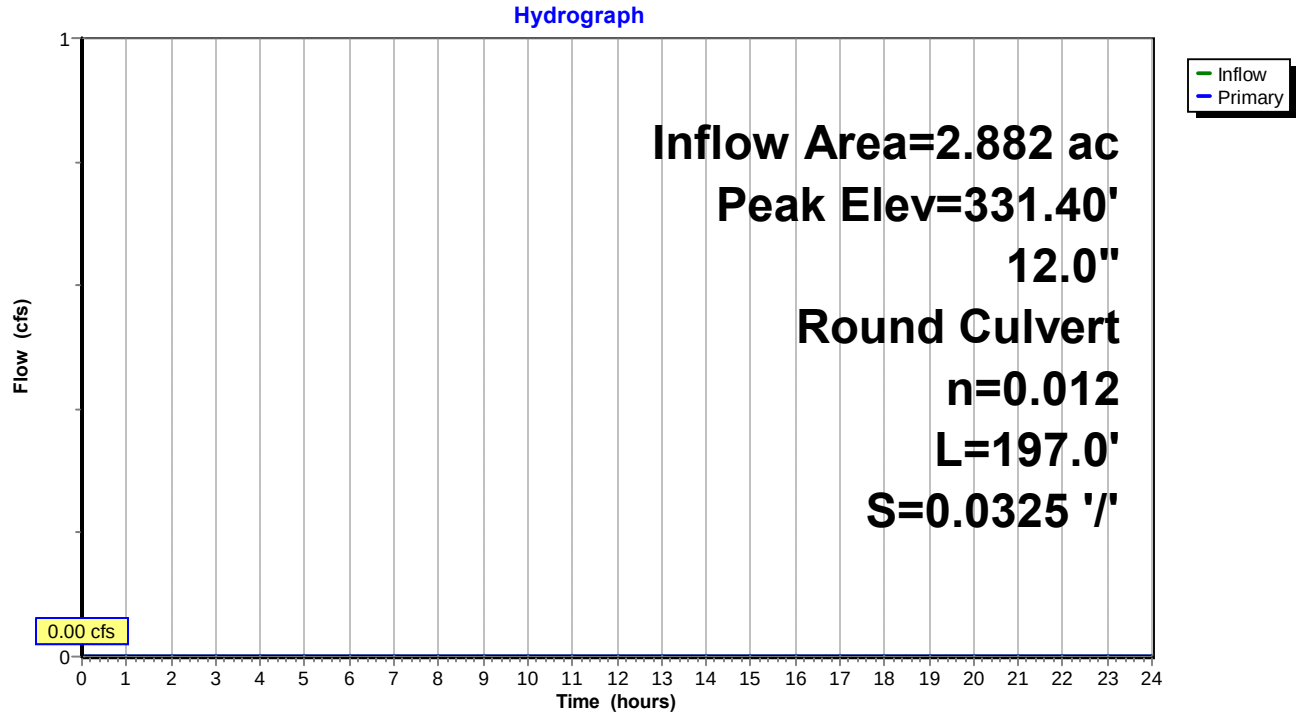
Inflow Area = 2.882 ac, 28.58% Impervious, Inflow Depth = 0.00" for 5-year event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Peak Elev= 331.40' @ 0.00 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	331.40'	**12.0" Round Culvert** L= 197.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 331.40' / 325.00' S= 0.0325 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=331.40' (Free Discharge)
1=Culvert (Controls 0.00 cfs)

Pond 2P: Drainage Manhole



Summary for Pond 3P: Catch Basin 1

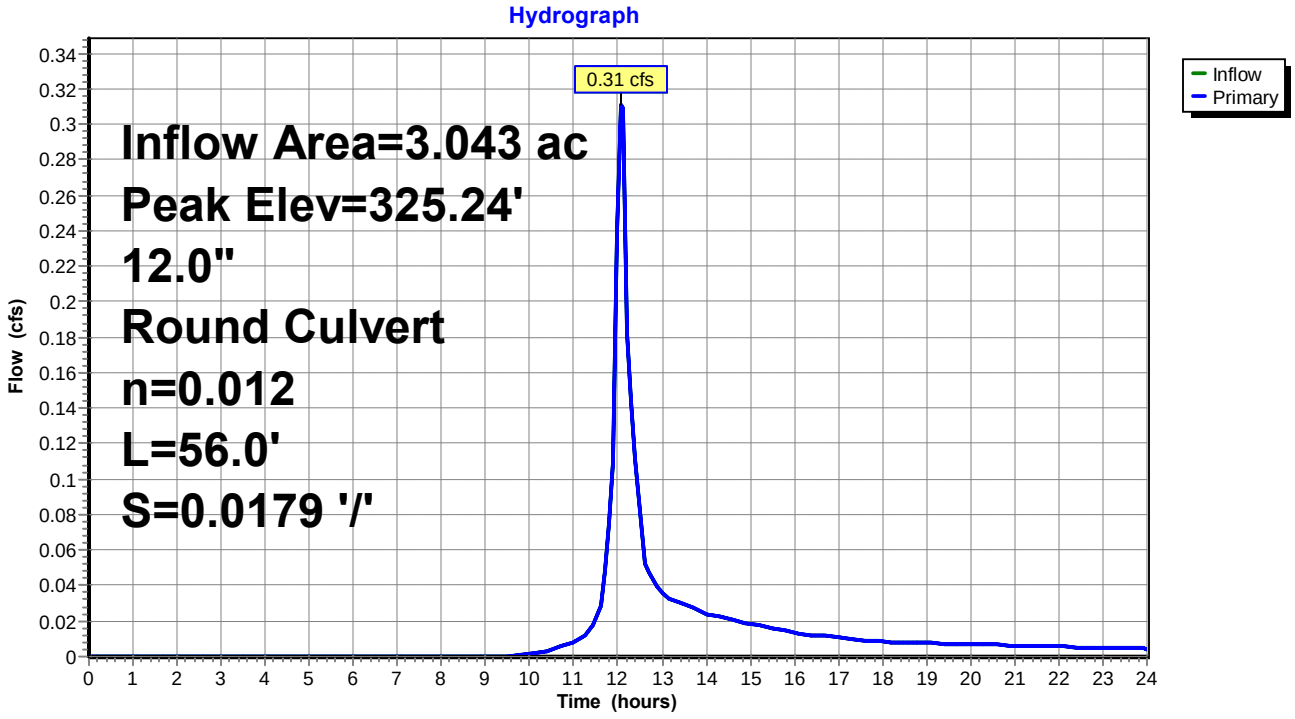
Inflow Area = 3.043 ac, 27.07% Impervious, Inflow Depth > 0.09" for 5-year event
Inflow = 0.31 cfs @ 12.09 hrs, Volume= 0.024 af
Outflow = 0.31 cfs @ 12.09 hrs, Volume= 0.024 af, Atten= 0%, Lag= 0.0 min
Primary = 0.31 cfs @ 12.09 hrs, Volume= 0.024 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Peak Elev= 325.24' @ 12.08 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	325.00'	**12.0" Round Culvert** L= 56.0' RCP, groove end w/headwall, Ke= 0.200 Inlet / Outlet Invert= 325.00' / 324.00' S= 0.0179 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.30 cfs @ 12.09 hrs HW=325.24' (Free Discharge)
1=Culvert (Inlet Controls 0.30 cfs @ 2.08 fps)

Pond 3P: Catch Basin 1



Summary for Pond 5P: Stormwater Basin

Inflow Area = 2.882 ac, 28.58% Impervious, Inflow Depth > 0.94" for 5-year event
Inflow = 2.13 cfs @ 12.22 hrs, Volume= 0.226 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Discarded = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Peak Elev= 330.35' @ 24.00 hrs Surf.Area= 6,084 sf Storage= 9,849 cf

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

Volume	Invert	Avail.Storage	Storage Description
#1	326.00'	37,412 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
326.00	420	0	0
328.00	1,390	1,810	1,810
329.00	2,350	1,870	3,680
330.00	5,795	4,073	7,753
332.00	7,435	13,230	20,983
333.00	8,207	7,821	28,804
334.00	9,010	8,609	37,412

Device	Routing	Invert	Outlet Devices
#1	Discarded	329.00'	**5.000 in/hr Exfiltration over Surface area from 329.00' - 329.00'** Excluded Surface area = 2,350 sf
#2	Primary	332.00'	**12.0" Round Culvert** L= 18.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 332.00' / 331.50' S= 0.0278 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#3	Device 1	332.00'	**4.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	333.00'	**6.0" Vert. Orifice/Grate** C= 0.600
#5	Secondary	334.00'	**12.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#6	Tertiary	334.00'	**5.0' long x 15.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

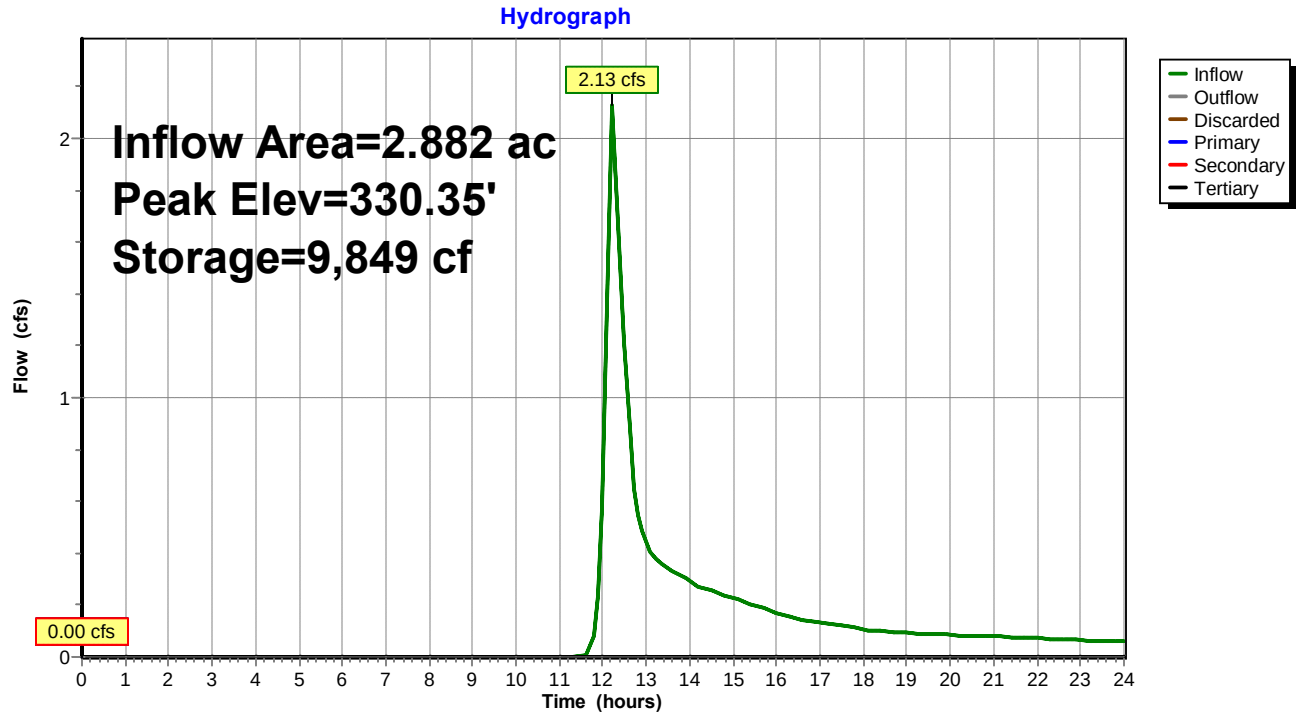
Discarded OutFlow Max=0.00 cfs @ 0.00 hrs HW=326.00' (Free Discharge)
└**1=Exfiltration** (Controls 0.00 cfs)
└**3=Orifice/Grate** (Controls 0.00 cfs)
└**4=Orifice/Grate** (Controls 0.00 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=326.00' (Free Discharge)
└**2=Culvert** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=326.00' (Free Discharge)
└**5=Orifice/Grate** (Controls 0.00 cfs)

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=326.00' (Free Discharge)
└**6=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 5P: Stormwater Basin



Summary for Subcatchment 1S: Drainage Area 1 - East

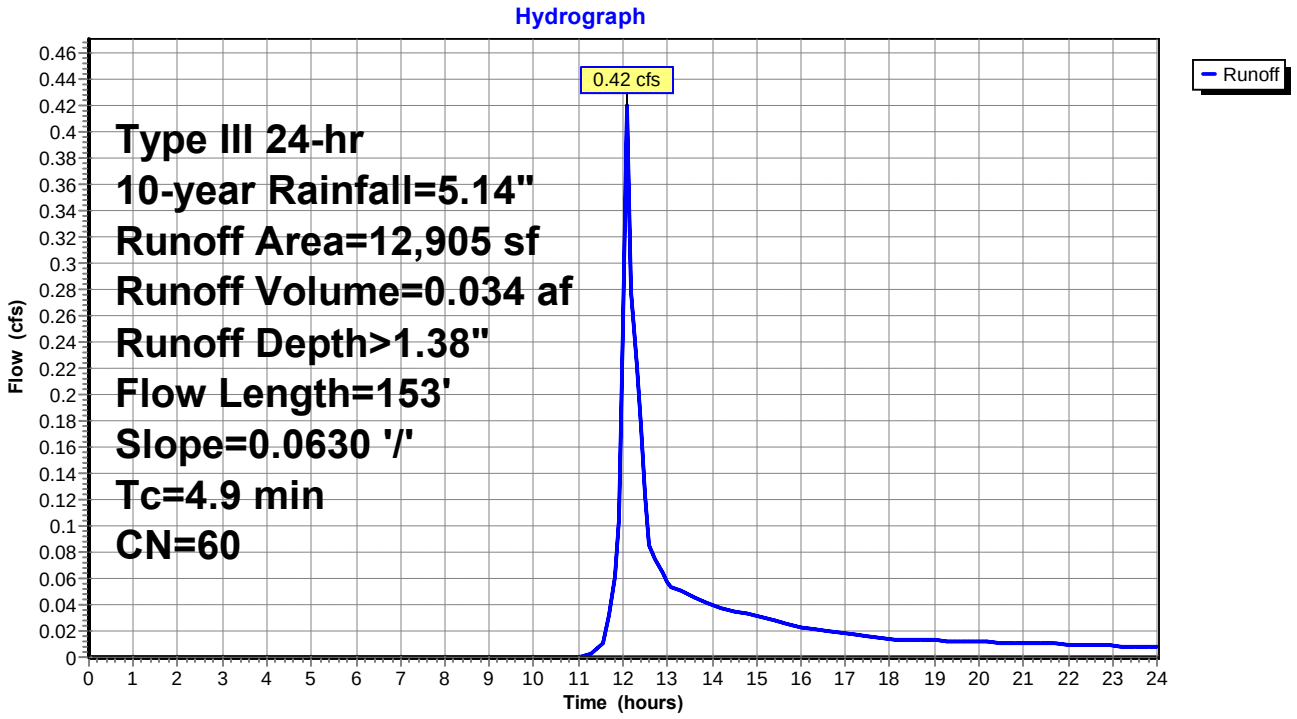
Runoff = 0.42 cfs @ 12.10 hrs, Volume= 0.034 af, Depth> 1.38"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 10-year Rainfall=5.14"

Area (sf)	CN	Description
11,105	60	Woods, Fair, HSG B
1,800	61	>75% Grass cover, Good, HSG B
12,905	60	Weighted Average
12,905		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.9	153	0.0630	0.52		**Lag/CN Method, Tc-1**

Subcatchment 1S: Drainage Area 1 - East



Summary for Subcatchment 2S: Drainage Area 2

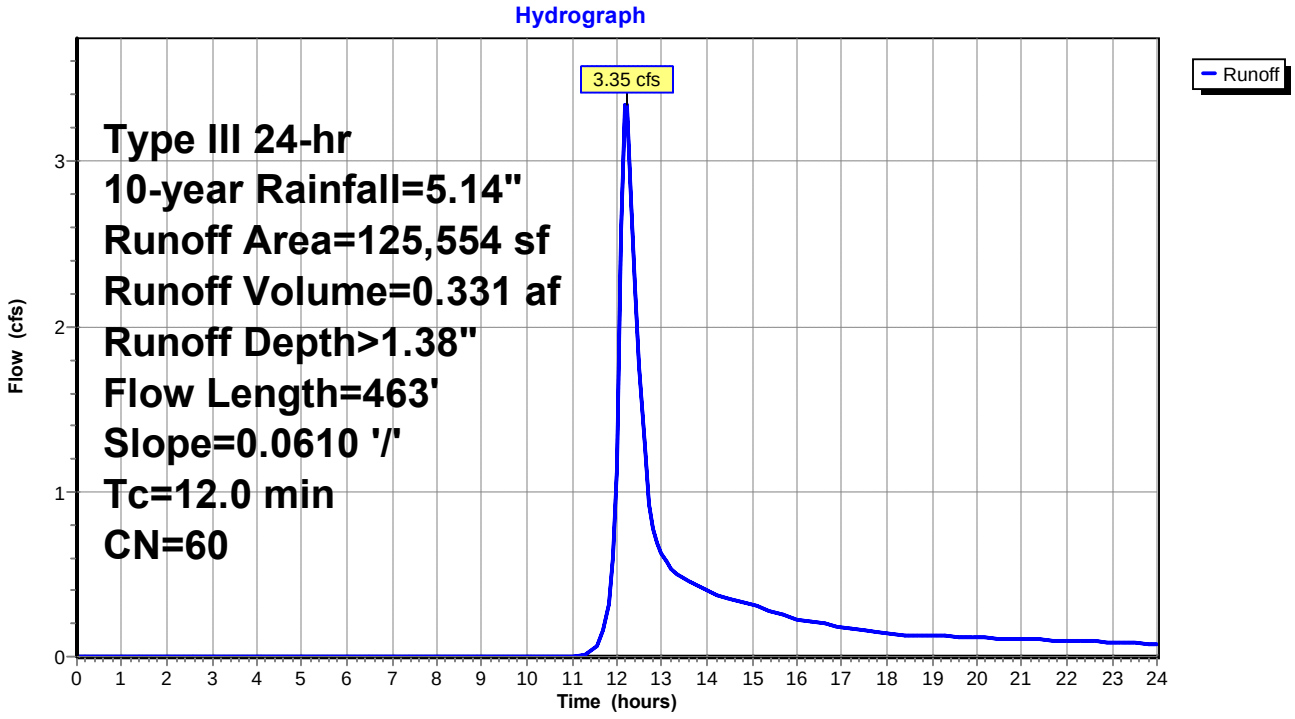
Runoff = 3.35 cfs @ 12.21 hrs, Volume= 0.331 af, Depth> 1.38"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 10-year Rainfall=5.14"

	Area (sf)	CN	Description
	13,400	36	Woods, Fair, HSG A
*	35,880	98	Paved / Roof
	25,170	61	>75% Grass cover, Good, HSG B
	51,104	39	>75% Grass cover, Good, HSG A
	125,554	60	Weighted Average
	89,674		71.42% Pervious Area
	35,880		28.58% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.0	463	0.0610	0.64		**Lag/CN Method, Tc-2**

Subcatchment 2S: Drainage Area 2



Summary for Subcatchment 3S: Drainage Area 3

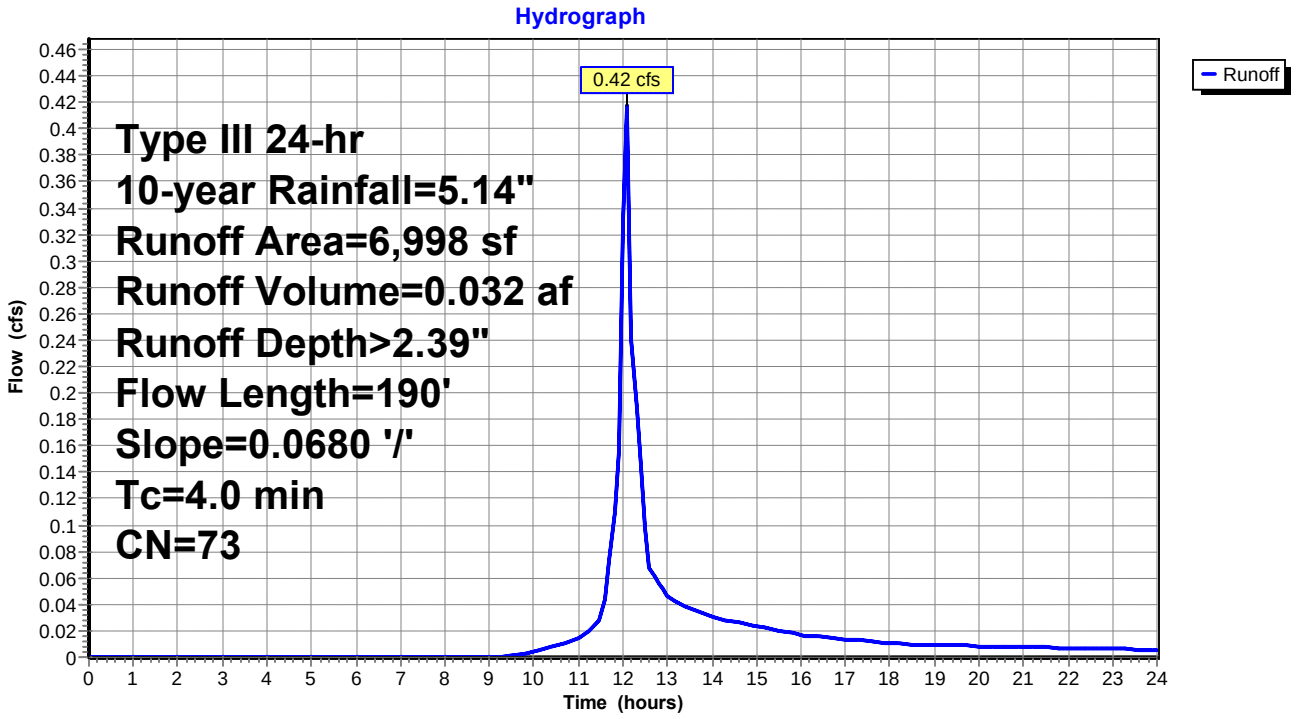
Runoff = 0.42 cfs @ 12.08 hrs, Volume= 0.032 af, Depth> 2.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 10-year Rainfall=5.14"

Area (sf)	CN	Description
3,318	60	Woods, Fair, HSG B
3,680	85	Gravel roads, HSG B
6,998	73	Weighted Average
6,998		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.0	190	0.0680	0.80		**Lag/CN Method, Tc-3**

Subcatchment 3S: Drainage Area 3



Summary for Subcatchment 4S: Drainage to Ware Road

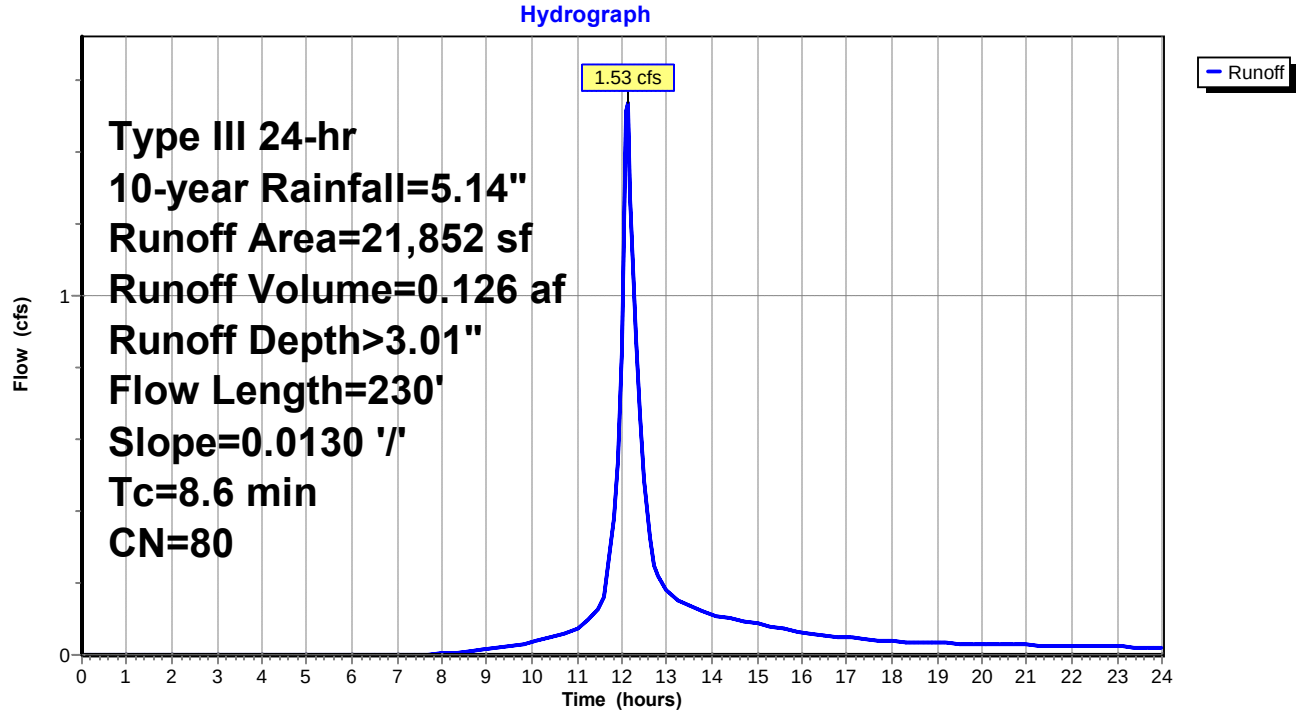
Runoff = 1.53 cfs @ 12.12 hrs, Volume= 0.126 af, Depth> 3.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 10-year Rainfall=5.14"

	Area (sf)	CN	Description
*	8,550	98	Pavement & roof, HSG B
	13,302	69	50-75% Grass cover, Fair, HSG B
	21,852	80	Weighted Average
	13,302		60.87% Pervious Area
	8,550		39.13% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.6	230	0.0130	0.45		**Lag/CN Method, Tc-4**

Subcatchment 4S: Drainage to Ware Road



Summary for Pond 2P: Drainage Manhole

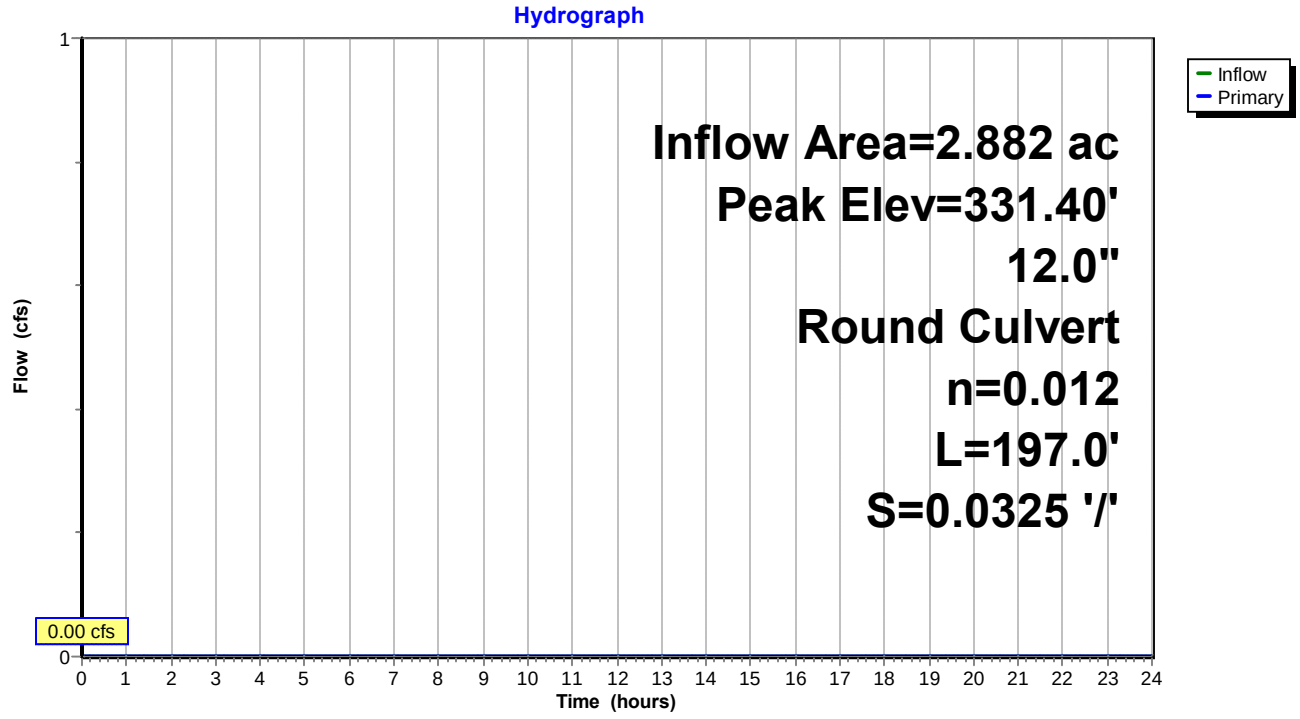
Inflow Area = 2.882 ac, 28.58% Impervious, Inflow Depth = 0.00" for 10-year event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Peak Elev= 331.40' @ 0.00 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	331.40'	**12.0" Round Culvert** L= 197.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 331.40' / 325.00' S= 0.0325 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=331.40' (Free Discharge)
1=Culvert (Controls 0.00 cfs)

Pond 2P: Drainage Manhole



Summary for Pond 3P: Catch Basin 1

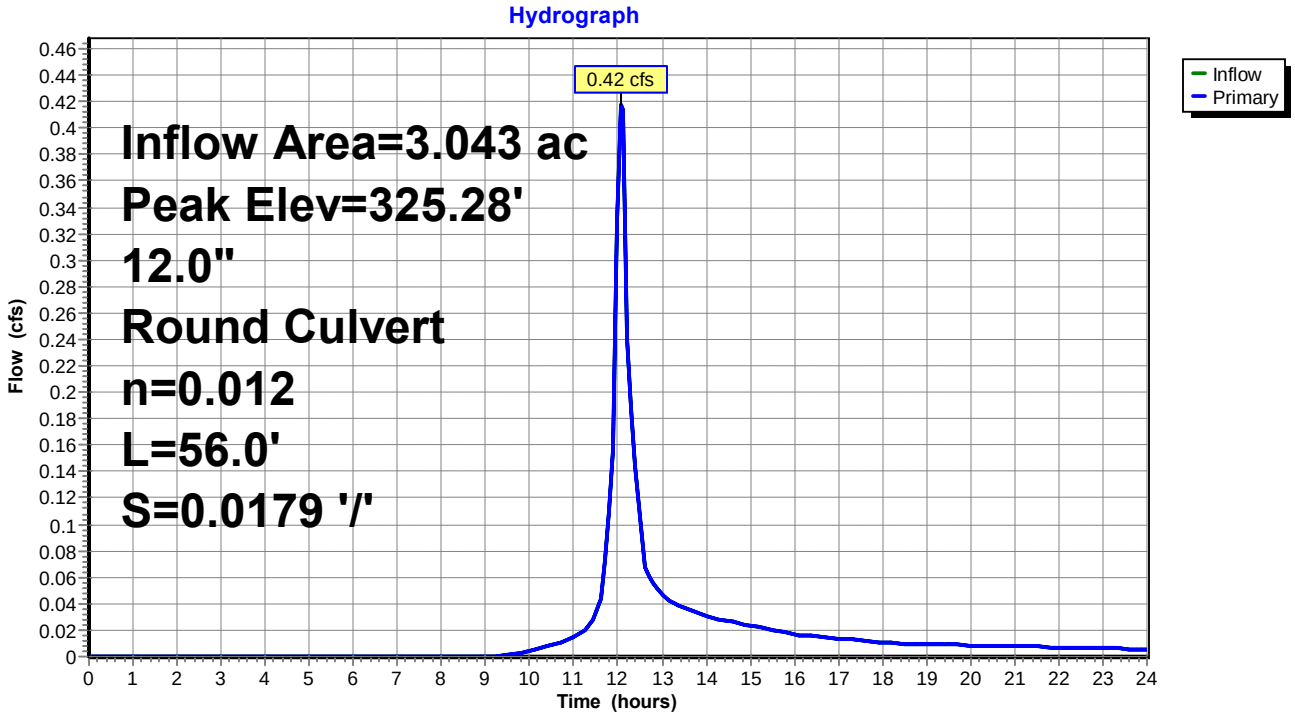
Inflow Area = 3.043 ac, 27.07% Impervious, Inflow Depth > 0.13" for 10-year event
Inflow = 0.42 cfs @ 12.08 hrs, Volume= 0.032 af
Outflow = 0.42 cfs @ 12.08 hrs, Volume= 0.032 af, Atten= 0%, Lag= 0.0 min
Primary = 0.42 cfs @ 12.08 hrs, Volume= 0.032 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Peak Elev= 325.28' @ 12.08 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	325.00'	**12.0" Round Culvert** L= 56.0' RCP, groove end w/headwall, Ke= 0.200 Inlet / Outlet Invert= 325.00' / 324.00' S= 0.0179 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.40 cfs @ 12.08 hrs HW=325.28' (Free Discharge)
1=Culvert (Inlet Controls 0.40 cfs @ 2.24 fps)

Pond 3P: Catch Basin 1



Summary for Pond 5P: Stormwater Basin

Inflow Area = 2.882 ac, 28.58% Impervious, Inflow Depth > 1.38" for 10-year event
Inflow = 3.35 cfs @ 12.21 hrs, Volume= 0.331 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Discarded = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Peak Elev= 331.07' @ 24.00 hrs Surf.Area= 6,673 sf Storage= 14,424 cf

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

Volume	Invert	Avail.Storage	Storage Description
#1	326.00'	37,412 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
326.00	420	0	0
328.00	1,390	1,810	1,810
329.00	2,350	1,870	3,680
330.00	5,795	4,073	7,753
332.00	7,435	13,230	20,983
333.00	8,207	7,821	28,804
334.00	9,010	8,609	37,412

Device	Routing	Invert	Outlet Devices
#1	Discarded	329.00'	**5.000 in/hr Exfiltration over Surface area from 329.00' - 329.00'** Excluded Surface area = 2,350 sf
#2	Primary	332.00'	**12.0" Round Culvert** L= 18.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 332.00' / 331.50' S= 0.0278 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#3	Device 1	332.00'	**4.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	333.00'	**6.0" Vert. Orifice/Grate** C= 0.600
#5	Secondary	334.00'	**12.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#6	Tertiary	334.00'	**5.0' long x 15.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

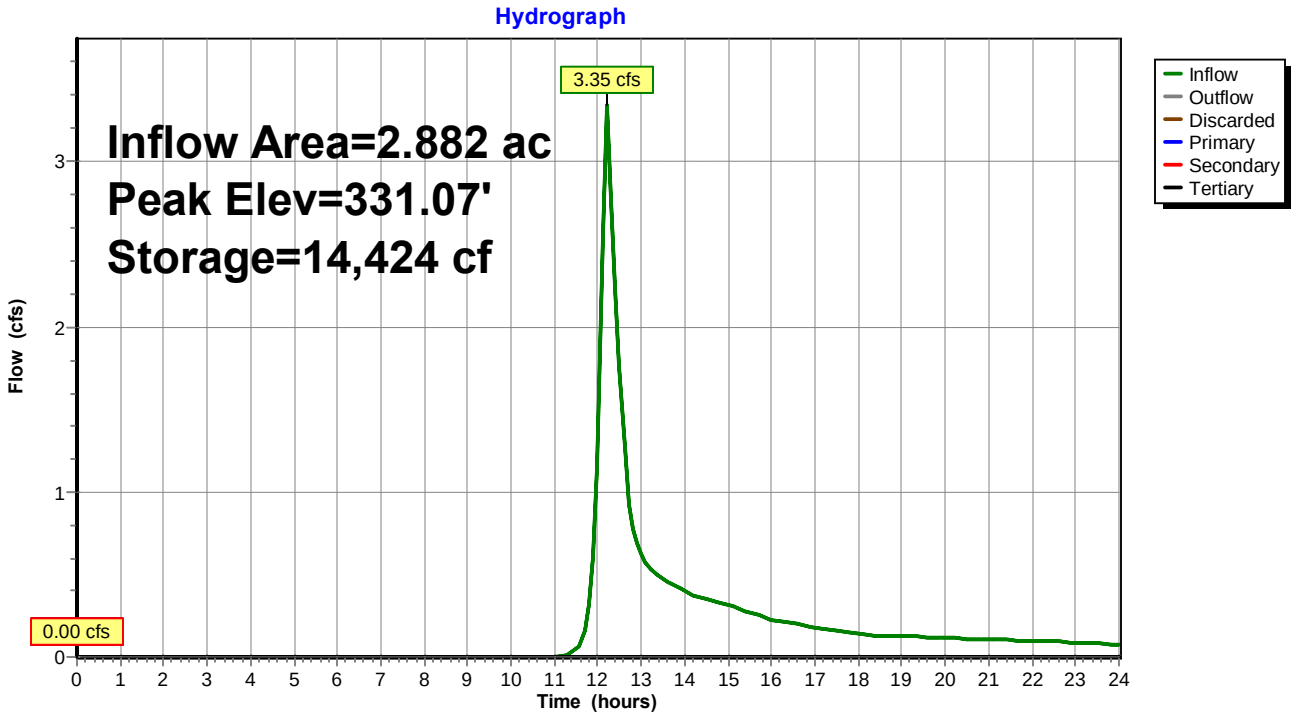
Discarded OutFlow Max=0.00 cfs @ 0.00 hrs HW=326.00' (Free Discharge)
└**1=Exfiltration** (Controls 0.00 cfs)
└**3=Orifice/Grate** (Controls 0.00 cfs)
└**4=Orifice/Grate** (Controls 0.00 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=326.00' (Free Discharge)
└**2=Culvert** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=326.00' (Free Discharge)
└**5=Orifice/Grate** (Controls 0.00 cfs)

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=326.00' (Free Discharge)
└**6=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 5P: Stormwater Basin



Summary for Subcatchment 1S: Drainage Area 1 - East

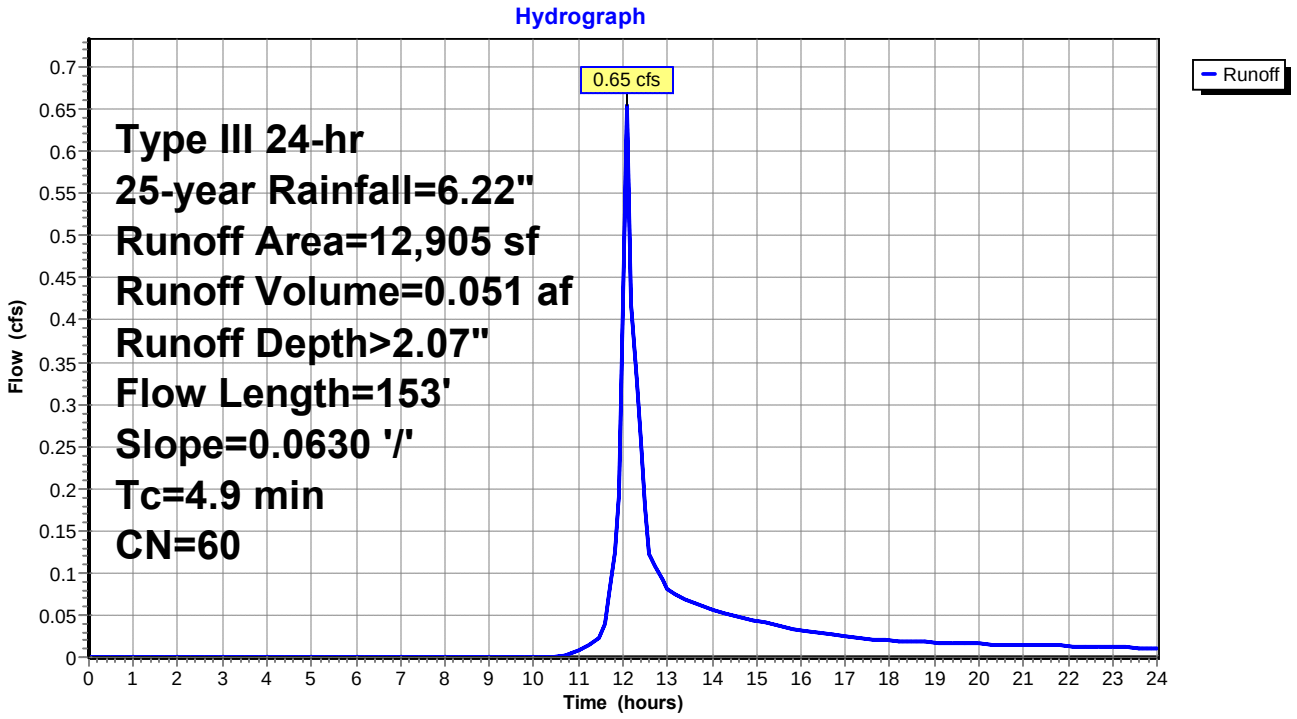
Runoff = 0.65 cfs @ 12.10 hrs, Volume= 0.051 af, Depth> 2.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 25-year Rainfall=6.22"

Area (sf)	CN	Description
11,105	60	Woods, Fair, HSG B
1,800	61	>75% Grass cover, Good, HSG B
12,905	60	Weighted Average
12,905		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.9	153	0.0630	0.52		**Lag/CN Method, Tc-1**

Subcatchment 1S: Drainage Area 1 - East



Summary for Subcatchment 2S: Drainage Area 2

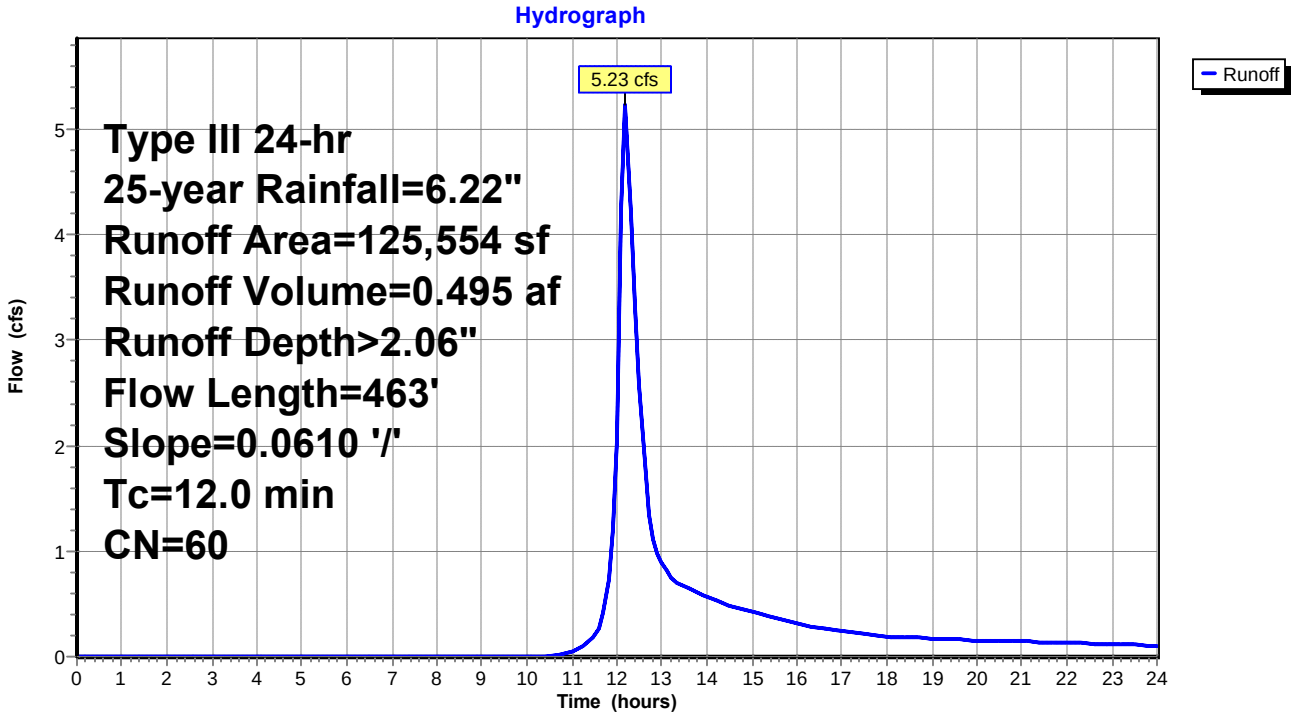
Runoff = 5.23 cfs @ 12.20 hrs, Volume= 0.495 af, Depth> 2.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 25-year Rainfall=6.22"

	Area (sf)	CN	Description
	13,400	36	Woods, Fair, HSG A
*	35,880	98	Paved / Roof
	25,170	61	>75% Grass cover, Good, HSG B
	51,104	39	>75% Grass cover, Good, HSG A
	125,554	60	Weighted Average
	89,674		71.42% Pervious Area
	35,880		28.58% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.0	463	0.0610	0.64		**Lag/CN Method, Tc-2**

Subcatchment 2S: Drainage Area 2



Summary for Subcatchment 3S: Drainage Area 3

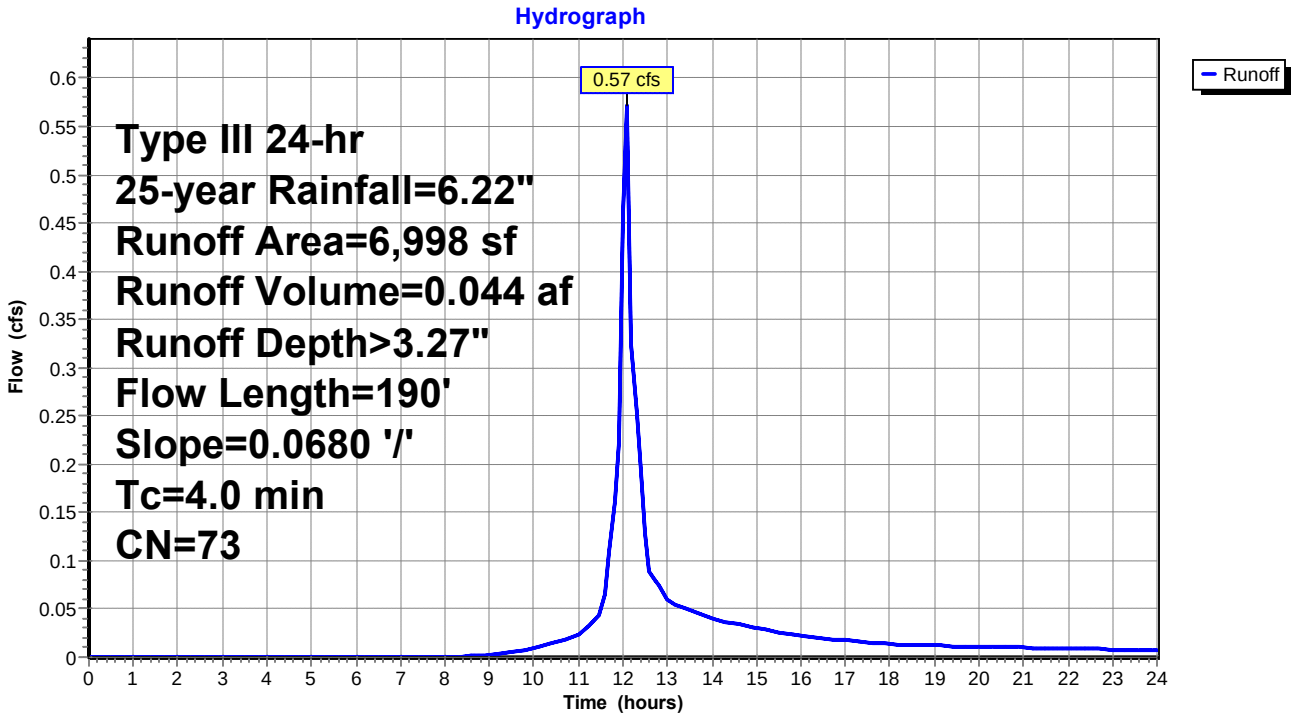
Runoff = 0.57 cfs @ 12.08 hrs, Volume= 0.044 af, Depth> 3.27"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 25-year Rainfall=6.22"

Area (sf)	CN	Description
3,318	60	Woods, Fair, HSG B
3,680	85	Gravel roads, HSG B
6,998	73	Weighted Average
6,998		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.0	190	0.0680	0.80		**Lag/CN Method, Tc-3**

Subcatchment 3S: Drainage Area 3



Summary for Subcatchment 4S: Drainage to Ware Road

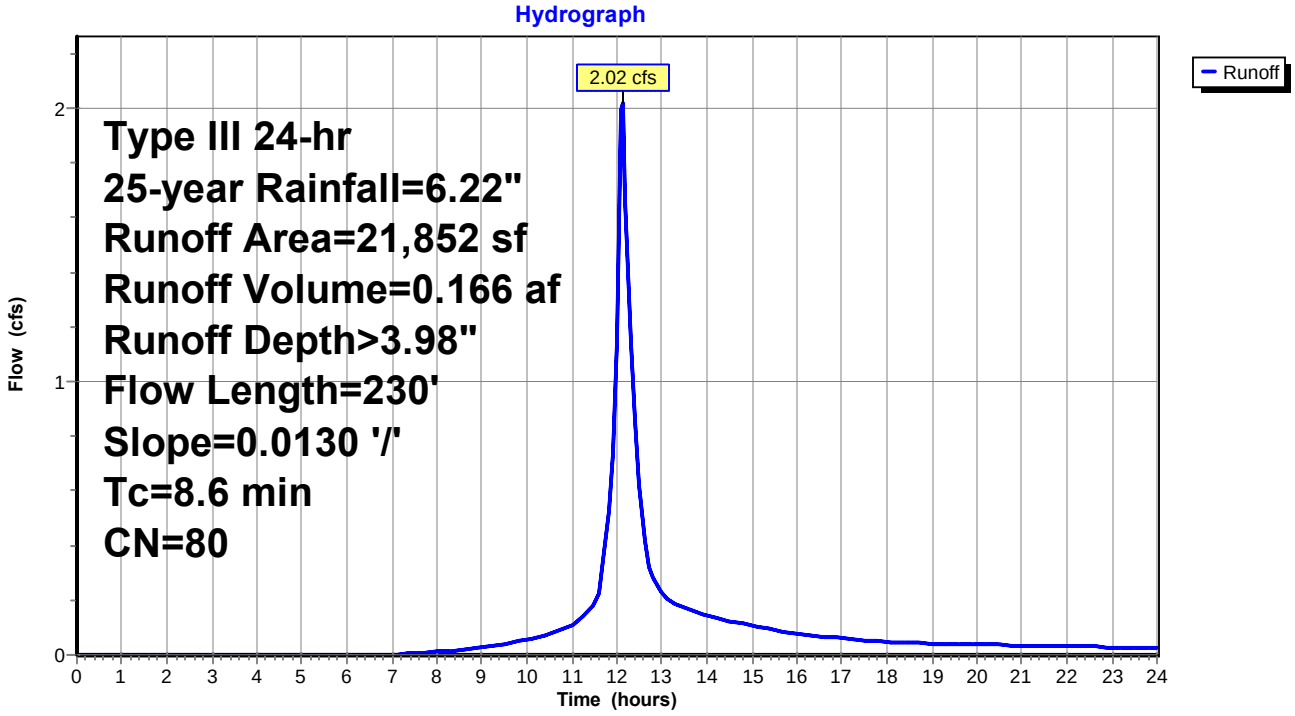
Runoff = 2.02 cfs @ 12.12 hrs, Volume= 0.166 af, Depth> 3.98"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 25-year Rainfall=6.22"

	Area (sf)	CN	Description
*	8,550	98	Pavement & roof, HSG B
	13,302	69	50-75% Grass cover, Fair, HSG B
	21,852	80	Weighted Average
	13,302		60.87% Pervious Area
	8,550		39.13% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.6	230	0.0130	0.45		**Lag/CN Method, Tc-4**

Subcatchment 4S: Drainage to Ware Road



Summary for Pond 2P: Drainage Manhole

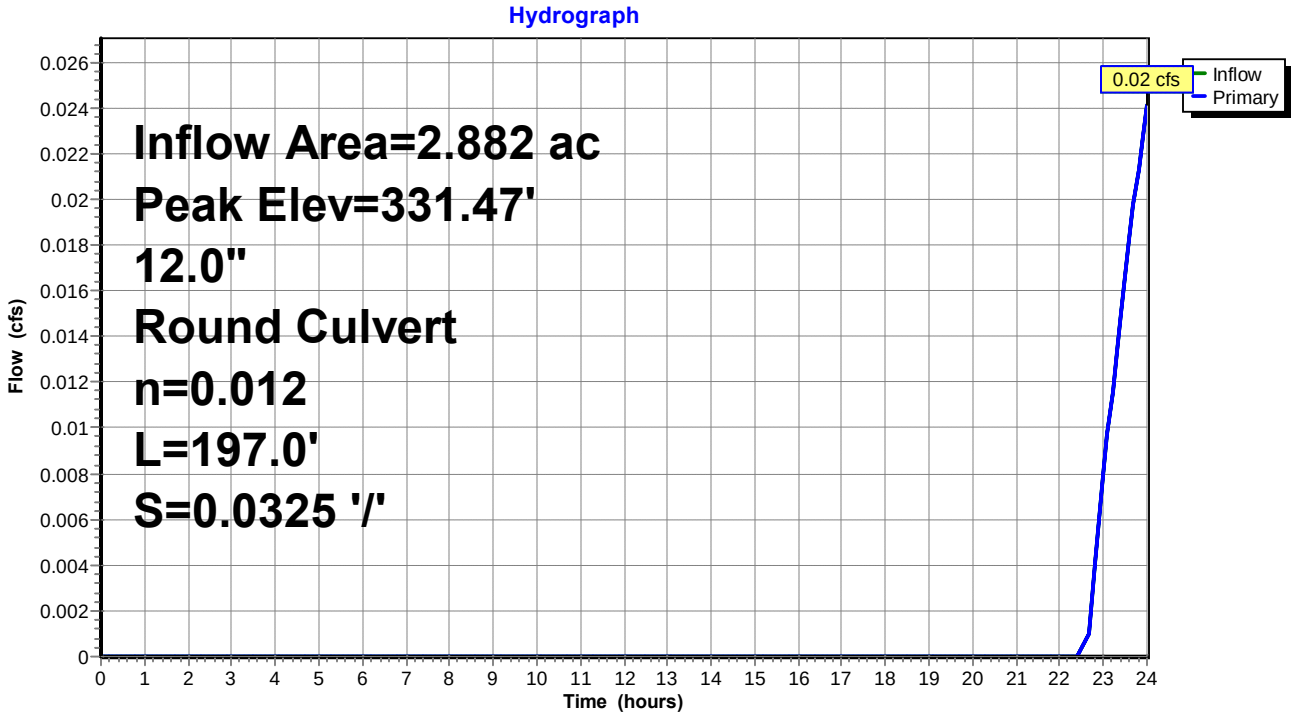
Inflow Area = 2.882 ac, 28.58% Impervious, Inflow Depth > 0.01" for 25-year event
Inflow = 0.02 cfs @ 24.00 hrs, Volume= 0.002 af
Outflow = 0.02 cfs @ 24.00 hrs, Volume= 0.002 af, Atten= 0%, Lag= 0.0 min
Primary = 0.02 cfs @ 24.00 hrs, Volume= 0.002 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Peak Elev= 331.47' @ 24.00 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	331.40'	**12.0" Round Culvert** L= 197.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 331.40' / 325.00' S= 0.0325 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.02 cfs @ 24.00 hrs HW=331.47' (Free Discharge)
1=Culvert (Inlet Controls 0.02 cfs @ 0.92 fps)

Pond 2P: Drainage Manhole



Summary for Pond 3P: Catch Basin 1

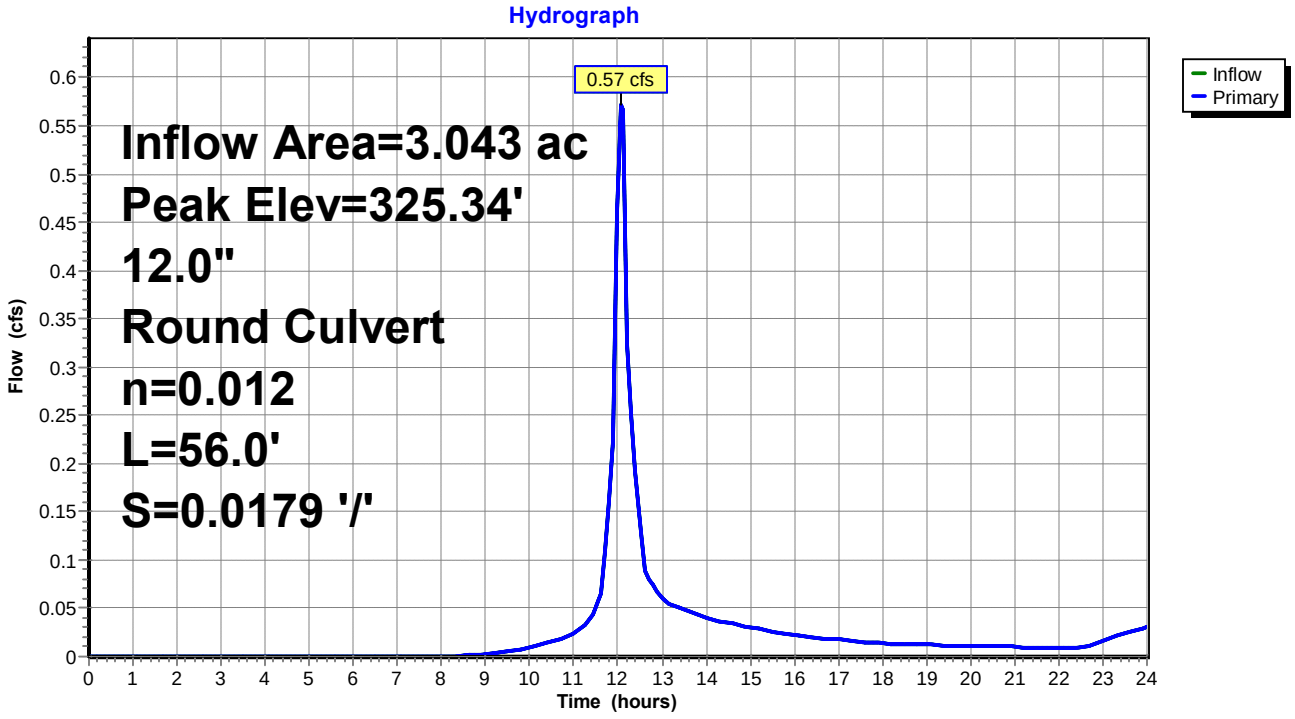
Inflow Area = 3.043 ac, 27.07% Impervious, Inflow Depth > 0.18" for 25-year event
Inflow = 0.57 cfs @ 12.08 hrs, Volume= 0.045 af
Outflow = 0.57 cfs @ 12.08 hrs, Volume= 0.045 af, Atten= 0%, Lag= 0.0 min
Primary = 0.57 cfs @ 12.08 hrs, Volume= 0.045 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Peak Elev= 325.34' @ 12.08 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	325.00'	**12.0" Round Culvert** L= 56.0' RCP, groove end w/headwall, Ke= 0.200 Inlet / Outlet Invert= 325.00' / 324.00' S= 0.0179 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.54 cfs @ 12.08 hrs HW=325.33' (Free Discharge)
1=Culvert (Inlet Controls 0.54 cfs @ 2.43 fps)

Pond 3P: Catch Basin 1



Summary for Pond 5P: Stormwater Basin

Inflow Area = 2.882 ac, 28.58% Impervious, Inflow Depth > 2.06" for 25-year event
Inflow = 5.23 cfs @ 12.20 hrs, Volume= 0.495 af
Outflow = 0.02 cfs @ 24.00 hrs, Volume= 0.002 af, Atten= 100%, Lag= 708.0 min
Discarded = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Primary = 0.02 cfs @ 24.00 hrs, Volume= 0.002 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Peak Elev= 332.07' @ 24.00 hrs Surf.Area= 7,488 sf Storage= 21,491 cf

Plug-Flow detention time= 752.6 min calculated for 0.002 af (0% of inflow)
Center-of-Mass det. time= 548.3 min (1,413.0 - 864.8)

Volume	Invert	Avail.Storage	Storage Description
#1	326.00'	37,412 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
326.00	420	0	0
328.00	1,390	1,810	1,810
329.00	2,350	1,870	3,680
330.00	5,795	4,073	7,753
332.00	7,435	13,230	20,983
333.00	8,207	7,821	28,804
334.00	9,010	8,609	37,412

Device	Routing	Invert	Outlet Devices
#1	Discarded	329.00'	**5.000 in/hr Exfiltration over Surface area from 329.00' - 329.00'** Excluded Surface area = 2,350 sf
#2	Primary	332.00'	**12.0" Round Culvert** L= 18.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 332.00' / 331.50' S= 0.0278 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#3	Device 1	332.00'	**4.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	333.00'	**6.0" Vert. Orifice/Grate** C= 0.600
#5	Secondary	334.00'	**12.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#6	Tertiary	334.00'	**5.0' long x 15.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

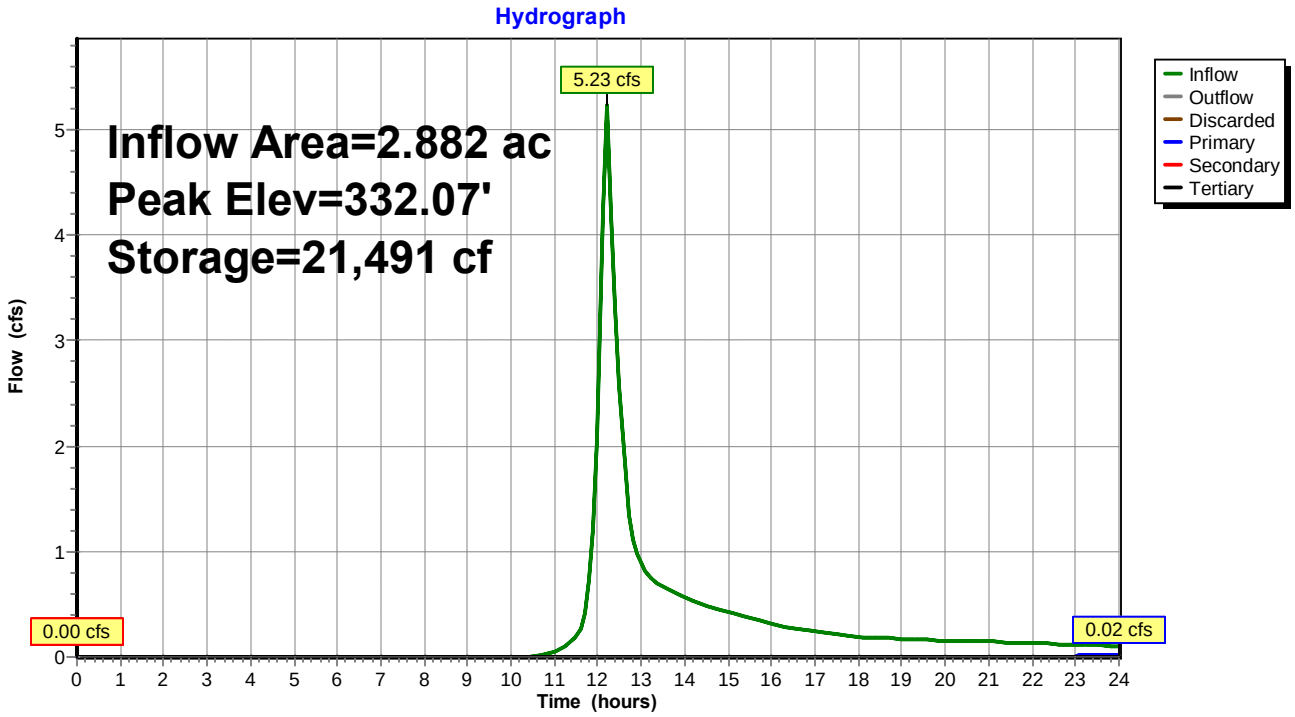
Discarded OutFlow Max=0.00 cfs @ 0.00 hrs HW=326.00' (Free Discharge)
└**1=Exfiltration** (Controls 0.00 cfs)
  └**3=Orifice/Grate** (Controls 0.00 cfs)
  └**4=Orifice/Grate** (Controls 0.00 cfs)

Primary OutFlow Max=0.02 cfs @ 24.00 hrs HW=332.07' (Free Discharge)
└**2=Culvert** (Inlet Controls 0.02 cfs @ 0.89 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=326.00' (Free Discharge)
└**5=Orifice/Grate** (Controls 0.00 cfs)

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=326.00' (Free Discharge)
└**6=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 5P: Stormwater Basin



Summary for Subcatchment 1S: Drainage Area 1 - East

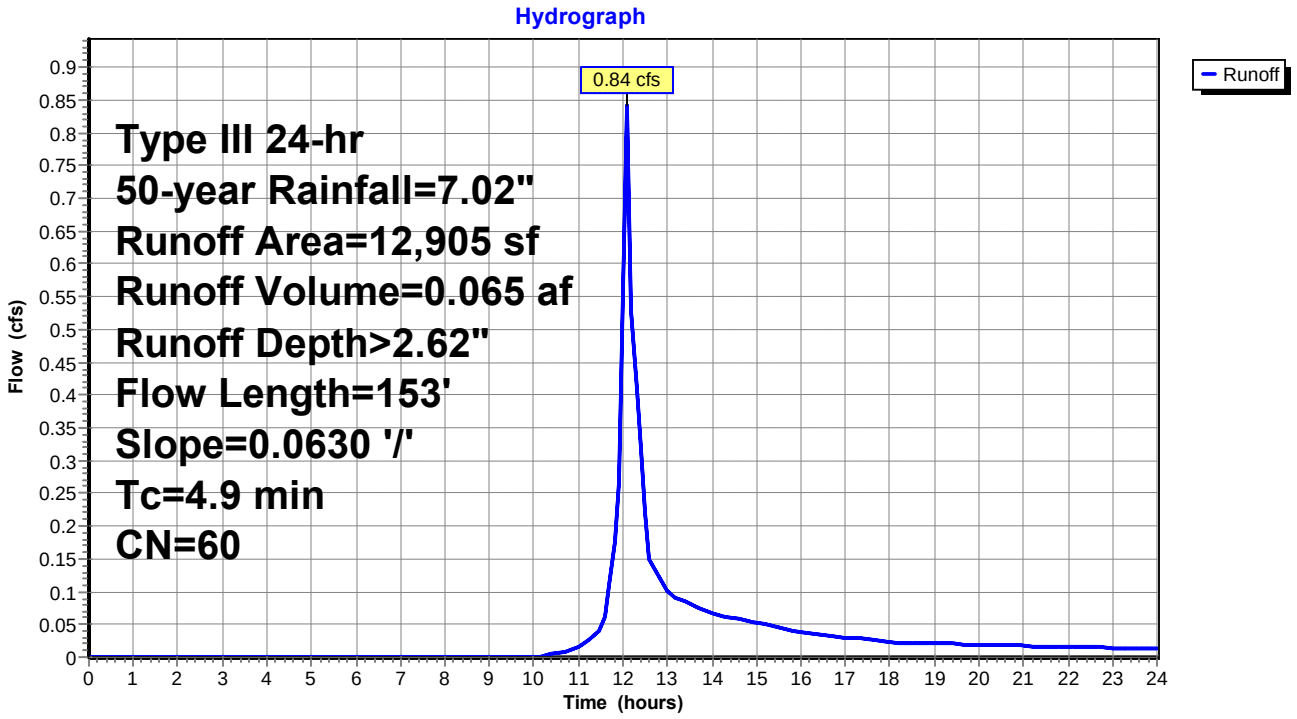
Runoff = 0.84 cfs @ 12.10 hrs, Volume= 0.065 af, Depth> 2.62"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 50-year Rainfall=7.02"

Area (sf)	CN	Description
11,105	60	Woods, Fair, HSG B
1,800	61	>75% Grass cover, Good, HSG B
12,905	60	Weighted Average
12,905		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.9	153	0.0630	0.52		**Lag/CN Method, Tc-1**

Subcatchment 1S: Drainage Area 1 - East



Summary for Subcatchment 2S: Drainage Area 2

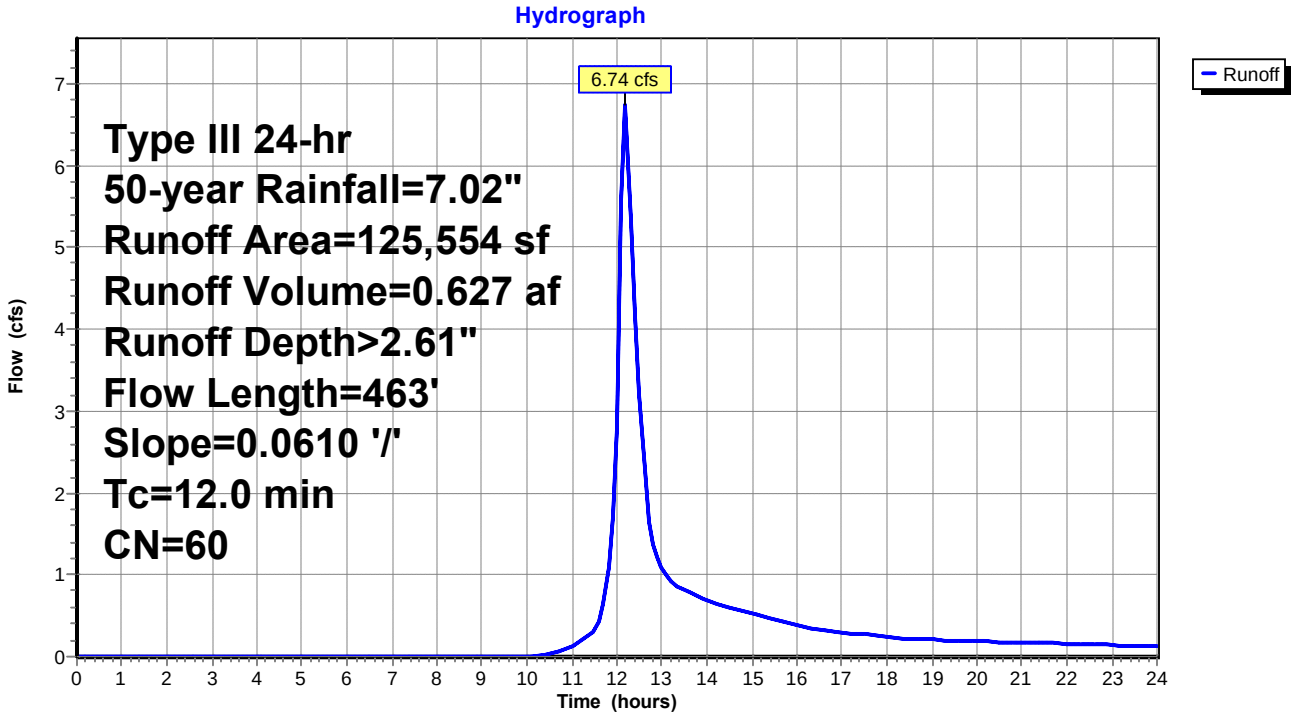
Runoff = 6.74 cfs @ 12.20 hrs, Volume= 0.627 af, Depth> 2.61"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 50-year Rainfall=7.02"

	Area (sf)	CN	Description
	13,400	36	Woods, Fair, HSG A
*	35,880	98	Paved / Roof
	25,170	61	>75% Grass cover, Good, HSG B
	51,104	39	>75% Grass cover, Good, HSG A
	125,554	60	Weighted Average
	89,674		71.42% Pervious Area
	35,880		28.58% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.0	463	0.0610	0.64		**Lag/CN Method, Tc-2**

Subcatchment 2S: Drainage Area 2



Summary for Subcatchment 3S: Drainage Area 3

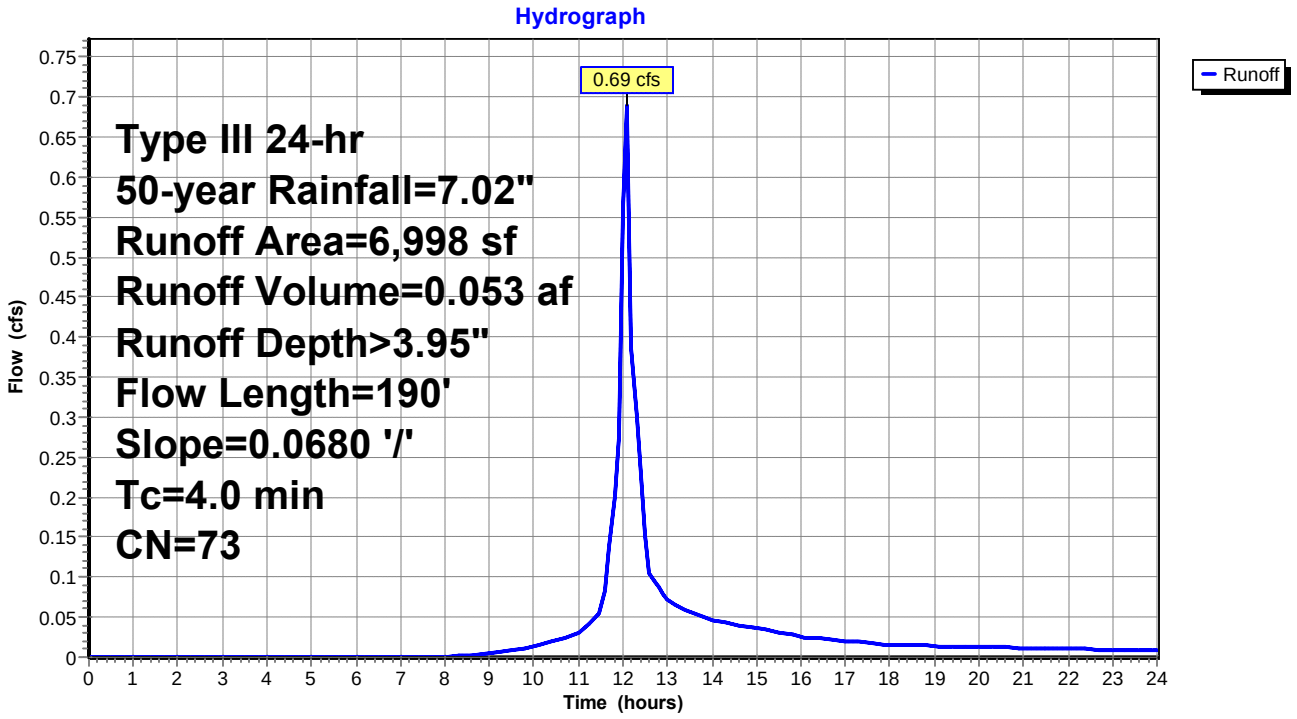
Runoff = 0.69 cfs @ 12.08 hrs, Volume= 0.053 af, Depth> 3.95"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 50-year Rainfall=7.02"

Area (sf)	CN	Description
3,318	60	Woods, Fair, HSG B
3,680	85	Gravel roads, HSG B
6,998	73	Weighted Average
6,998		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.0	190	0.0680	0.80		**Lag/CN Method, Tc-3**

Subcatchment 3S: Drainage Area 3



Summary for Subcatchment 4S: Drainage to Ware Road

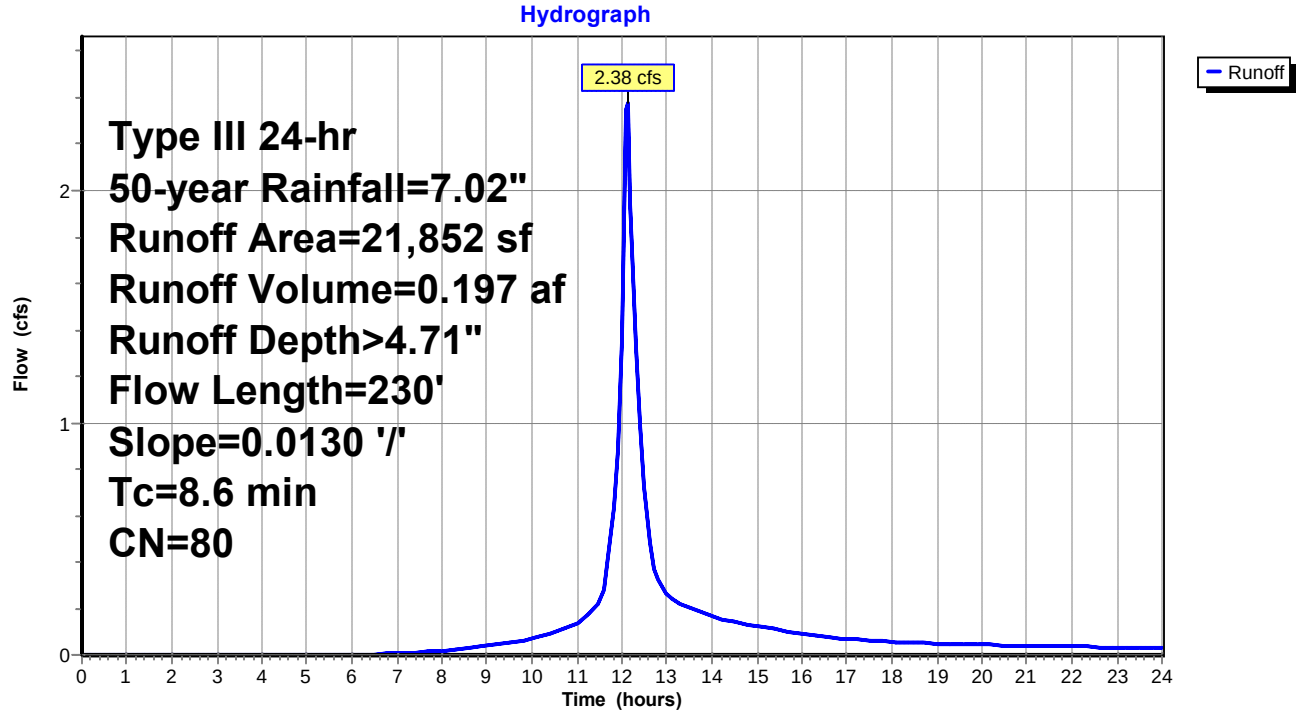
Runoff = 2.38 cfs @ 12.12 hrs, Volume= 0.197 af, Depth> 4.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 50-year Rainfall=7.02"

	Area (sf)	CN	Description
*	8,550	98	Pavement & roof, HSG B
	13,302	69	50-75% Grass cover, Fair, HSG B
	21,852	80	Weighted Average
	13,302		60.87% Pervious Area
	8,550		39.13% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.6	230	0.0130	0.45		**Lag/CN Method, Tc-4**

Subcatchment 4S: Drainage to Ware Road



Summary for Pond 2P: Drainage Manhole

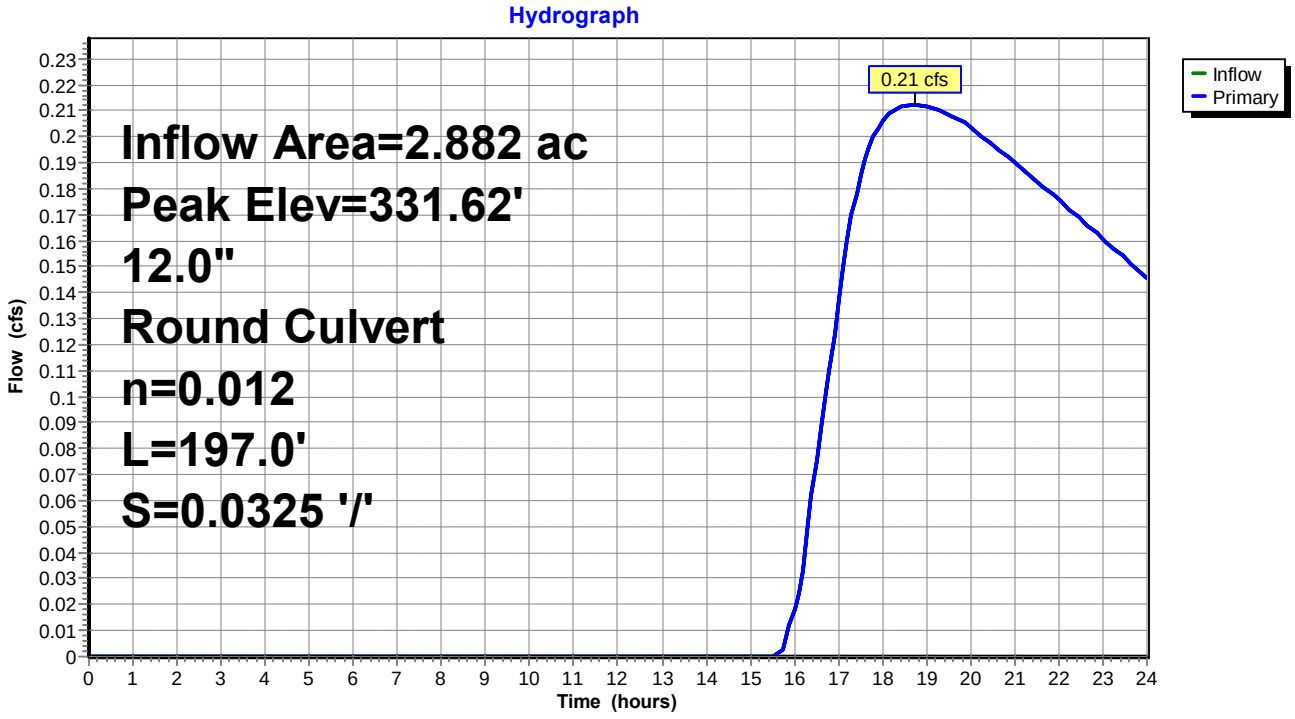
Inflow Area = 2.882 ac, 28.58% Impervious, Inflow Depth > 0.48" for 50-year event
Inflow = 0.21 cfs @ 18.74 hrs, Volume= 0.115 af
Outflow = 0.21 cfs @ 18.74 hrs, Volume= 0.115 af, Atten= 0%, Lag= 0.0 min
Primary = 0.21 cfs @ 18.74 hrs, Volume= 0.115 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Peak Elev= 331.62' @ 18.74 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	331.40'	**12.0" Round Culvert** L= 197.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 331.40' / 325.00' S= 0.0325 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.21 cfs @ 18.74 hrs HW=331.62' (Free Discharge)
1=Culvert (Inlet Controls 0.21 cfs @ 1.61 fps)

Pond 2P: Drainage Manhole



Summary for Pond 3P: Catch Basin 1

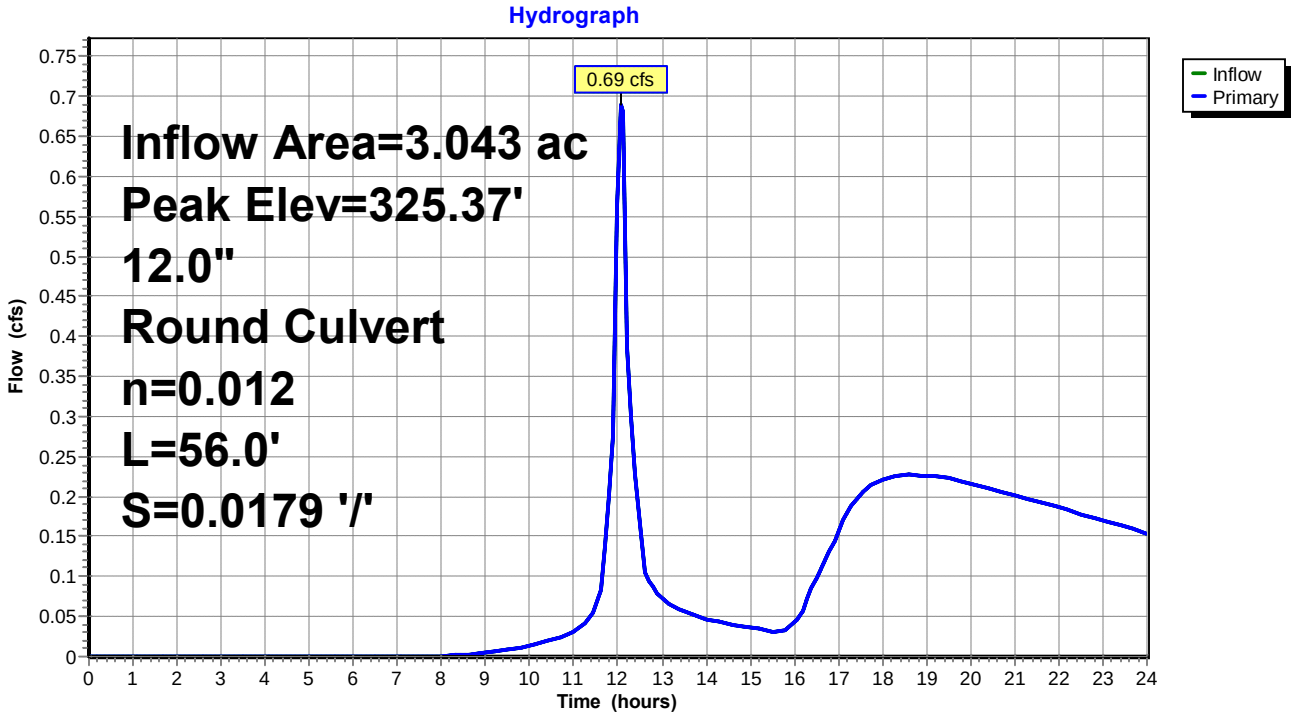
Inflow Area = 3.043 ac, 27.07% Impervious, Inflow Depth > 0.66" for 50-year event
Inflow = 0.69 cfs @ 12.08 hrs, Volume= 0.167 af
Outflow = 0.69 cfs @ 12.08 hrs, Volume= 0.167 af, Atten= 0%, Lag= 0.0 min
Primary = 0.69 cfs @ 12.08 hrs, Volume= 0.167 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Peak Elev= 325.37' @ 12.08 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	325.00'	**12.0" Round Culvert** L= 56.0' RCP, groove end w/headwall, Ke= 0.200 Inlet / Outlet Invert= 325.00' / 324.00' S= 0.0179 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.65 cfs @ 12.08 hrs HW=325.36' (Free Discharge)
1=Culvert (Inlet Controls 0.65 cfs @ 2.56 fps)

Pond 3P: Catch Basin 1



Summary for Pond 5P: Stormwater Basin

Inflow Area = 2.882 ac, 28.58% Impervious, Inflow Depth > 2.61" for 50-year event
Inflow = 6.74 cfs @ 12.20 hrs, Volume= 0.627 af
Outflow = 0.21 cfs @ 18.74 hrs, Volume= 0.115 af, Atten= 97%, Lag= 392.9 min
Discarded = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Primary = 0.21 cfs @ 18.74 hrs, Volume= 0.115 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Peak Elev= 332.22' @ 18.74 hrs Surf.Area= 7,606 sf Storage= 22,653 cf

Plug-Flow detention time= 496.2 min calculated for 0.115 af (18% of inflow)
Center-of-Mass det. time= 352.2 min (1,209.8 - 857.6)

Volume	Invert	Avail.Storage	Storage Description
#1	326.00'	37,412 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
326.00	420	0	0
328.00	1,390	1,810	1,810
329.00	2,350	1,870	3,680
330.00	5,795	4,073	7,753
332.00	7,435	13,230	20,983
333.00	8,207	7,821	28,804
334.00	9,010	8,609	37,412

Device	Routing	Invert	Outlet Devices
#1	Discarded	329.00'	**5.000 in/hr Exfiltration over Surface area from 329.00' - 329.00'** Excluded Surface area = 2,350 sf
#2	Primary	332.00'	**12.0" Round Culvert** L= 18.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 332.00' / 331.50' S= 0.0278 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#3	Device 1	332.00'	**4.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	333.00'	**6.0" Vert. Orifice/Grate** C= 0.600
#5	Secondary	334.00'	**12.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#6	Tertiary	334.00'	**5.0' long x 15.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

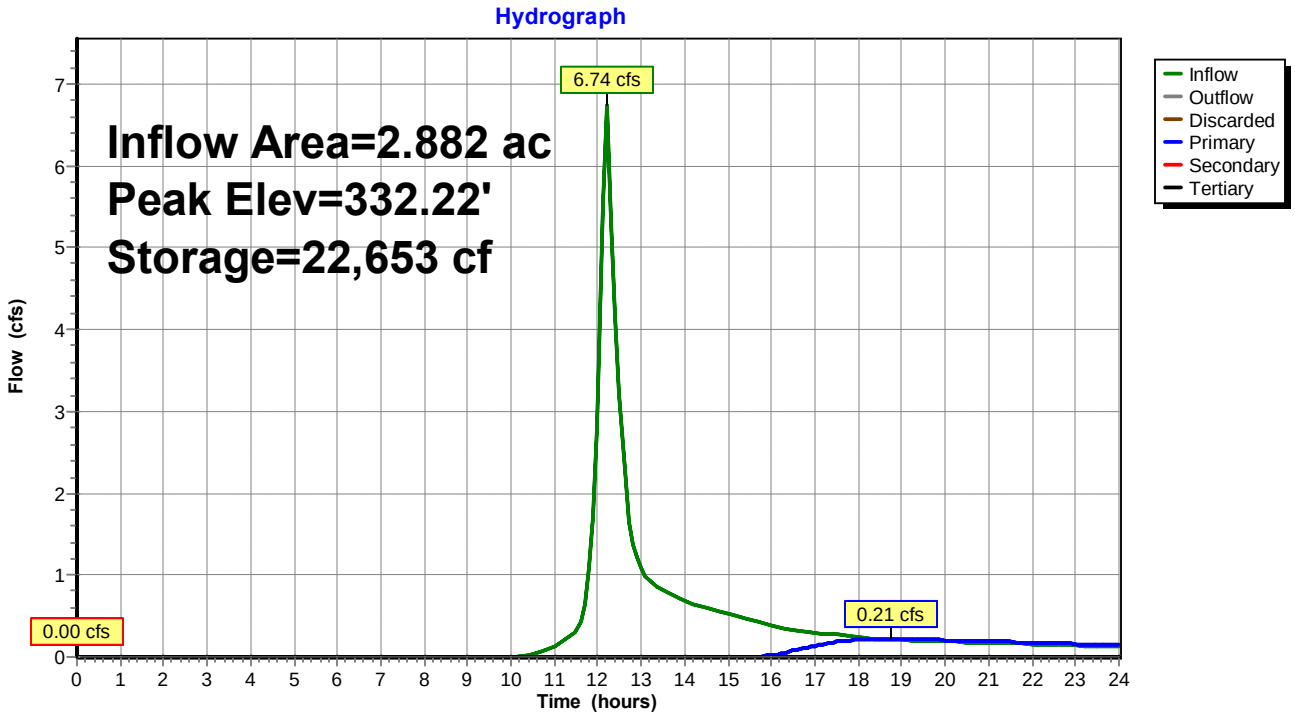
Discarded OutFlow Max=0.00 cfs @ 0.00 hrs HW=326.00' (Free Discharge)
└**1=Exfiltration** (Controls 0.00 cfs)
  └**3=Orifice/Grate** (Controls 0.00 cfs)
  └**4=Orifice/Grate** (Controls 0.00 cfs)

Primary OutFlow Max=0.21 cfs @ 18.74 hrs HW=332.22' (Free Discharge)
└**2=Culvert** (Inlet Controls 0.21 cfs @ 1.60 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=326.00' (Free Discharge)
└**5=Orifice/Grate** (Controls 0.00 cfs)

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=326.00' (Free Discharge)
└**6=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 5P: Stormwater Basin



Summary for Subcatchment 1S: Drainage Area 1 - East

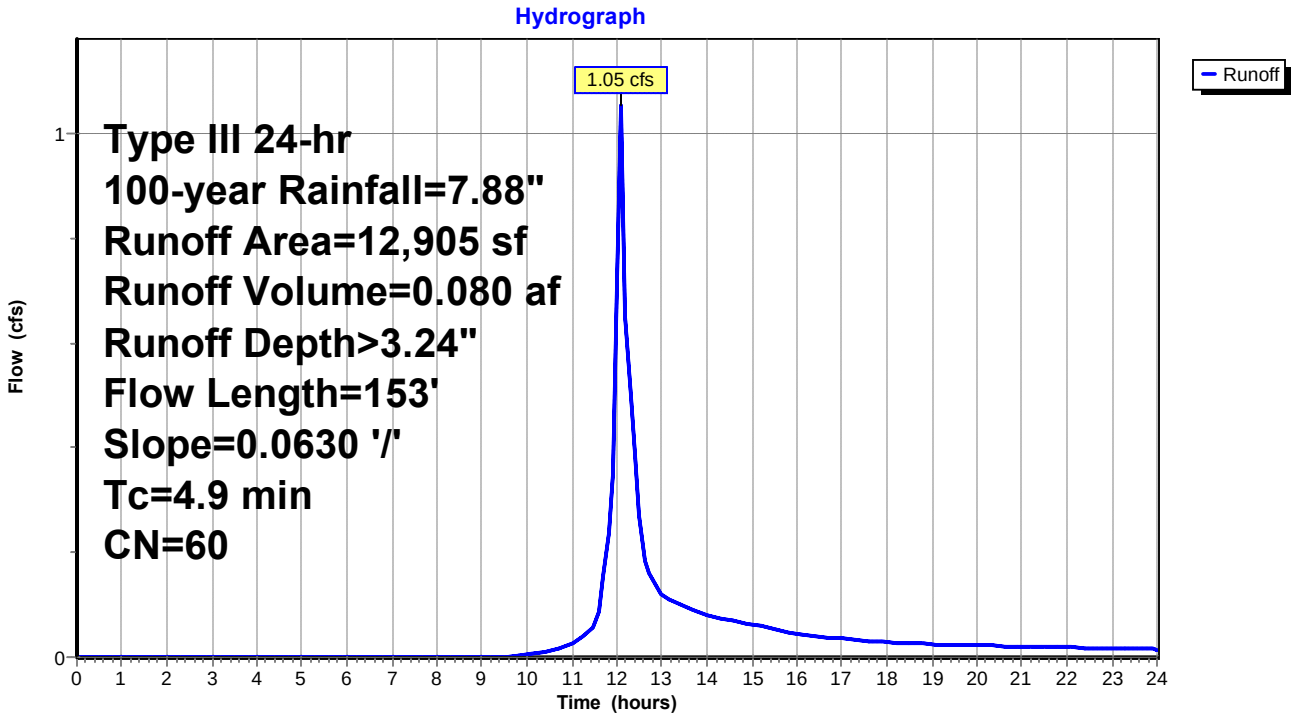
Runoff = 1.05 cfs @ 12.10 hrs, Volume= 0.080 af, Depth> 3.24"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 100-year Rainfall=7.88"

Area (sf)	CN	Description
11,105	60	Woods, Fair, HSG B
1,800	61	>75% Grass cover, Good, HSG B
12,905	60	Weighted Average
12,905		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.9	153	0.0630	0.52		**Lag/CN Method, Tc-1**

Subcatchment 1S: Drainage Area 1 - East



Summary for Subcatchment 2S: Drainage Area 2

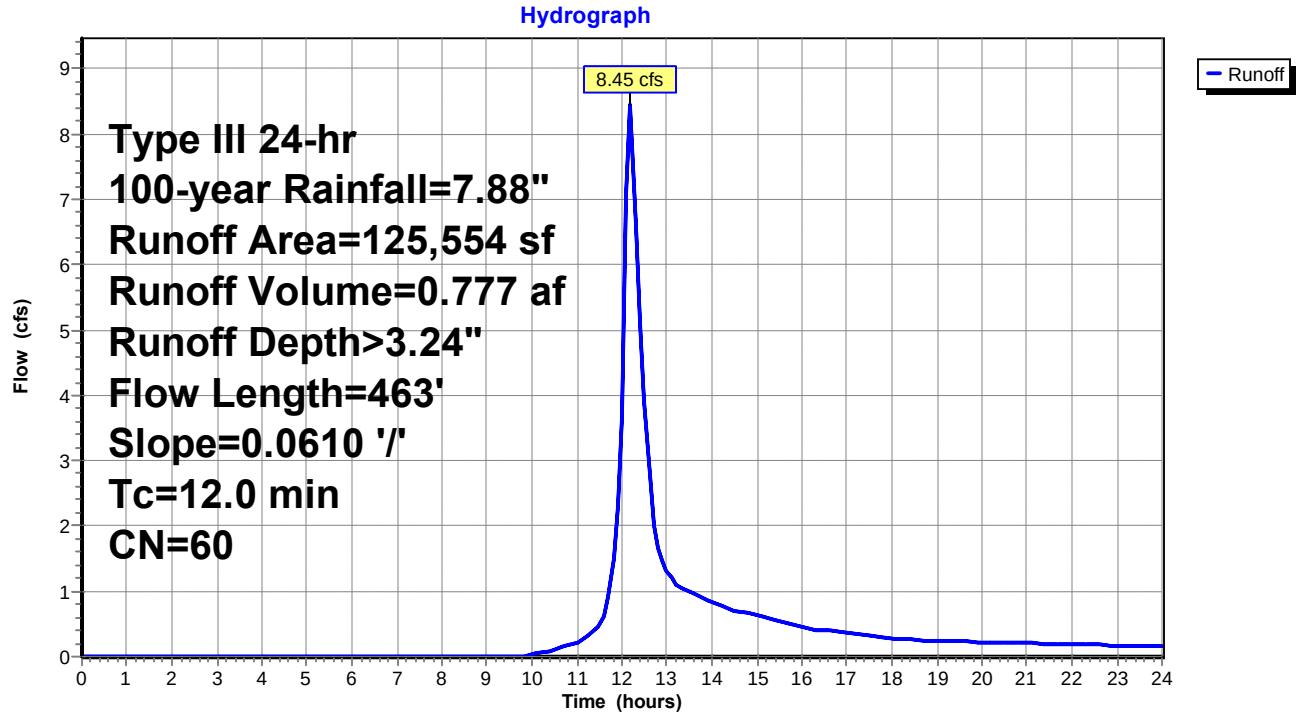
Runoff = 8.45 cfs @ 12.19 hrs, Volume= 0.777 af, Depth> 3.24"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 100-year Rainfall=7.88"

	Area (sf)	CN	Description
	13,400	36	Woods, Fair, HSG A
*	35,880	98	Paved / Roof
	25,170	61	>75% Grass cover, Good, HSG B
	51,104	39	>75% Grass cover, Good, HSG A
	125,554	60	Weighted Average
	89,674		71.42% Pervious Area
	35,880		28.58% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.0	463	0.0610	0.64		**Lag/CN Method, Tc-2**

Subcatchment 2S: Drainage Area 2



Summary for Subcatchment 3S: Drainage Area 3

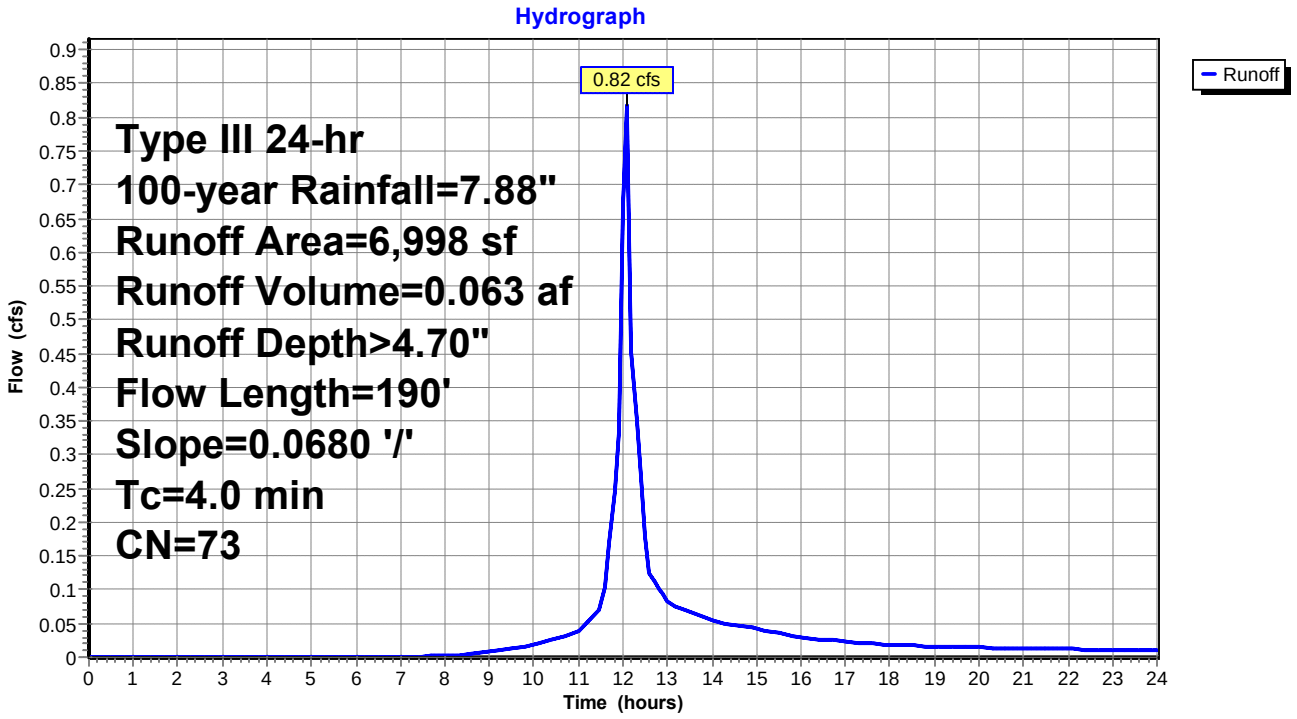
Runoff = 0.82 cfs @ 12.08 hrs, Volume= 0.063 af, Depth> 4.70"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 100-year Rainfall=7.88"

Area (sf)	CN	Description
3,318	60	Woods, Fair, HSG B
3,680	85	Gravel roads, HSG B
6,998	73	Weighted Average
6,998		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.0	190	0.0680	0.80		**Lag/CN Method, Tc-3**

Subcatchment 3S: Drainage Area 3



Summary for Subcatchment 4S: Drainage to Ware Road

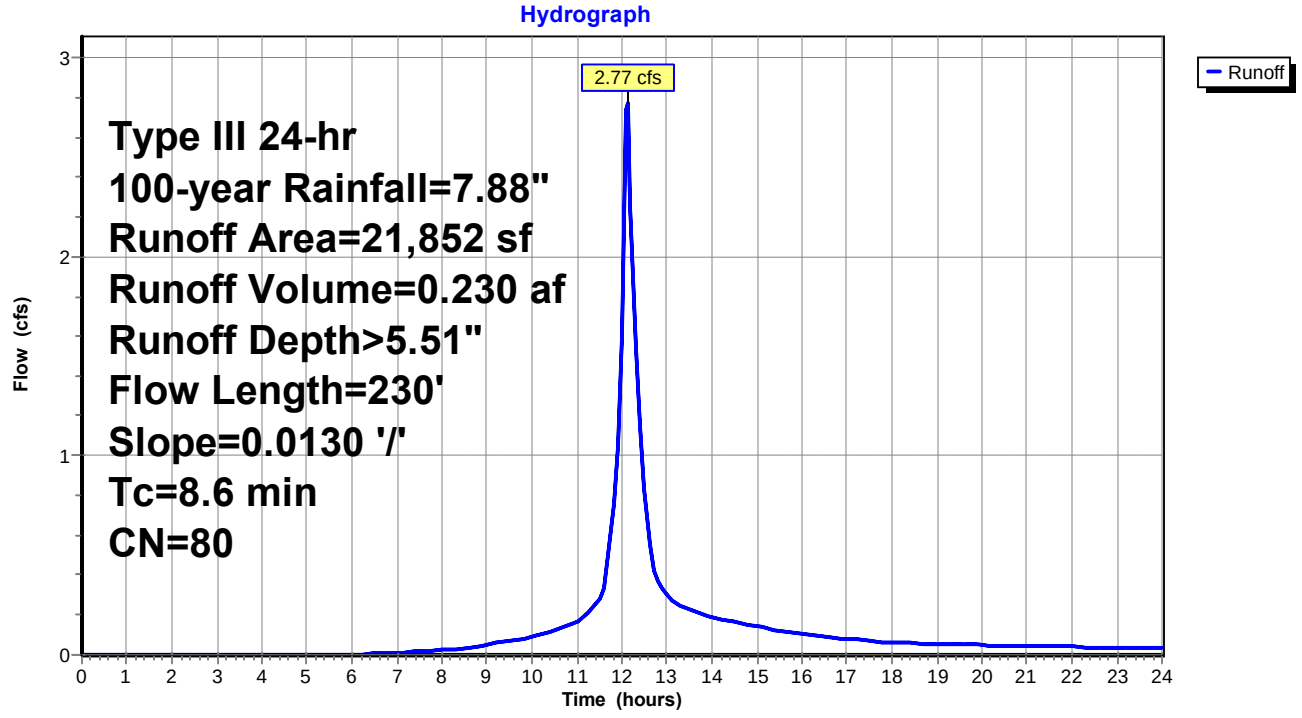
Runoff = 2.77 cfs @ 12.12 hrs, Volume= 0.230 af, Depth> 5.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 100-year Rainfall=7.88"

	Area (sf)	CN	Description
*	8,550	98	Pavement & roof, HSG B
	13,302	69	50-75% Grass cover, Fair, HSG B
	21,852	80	Weighted Average
	13,302		60.87% Pervious Area
	8,550		39.13% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.6	230	0.0130	0.45		**Lag/CN Method, Tc-4**

Subcatchment 4S: Drainage to Ware Road



Summary for Pond 2P: Drainage Manhole

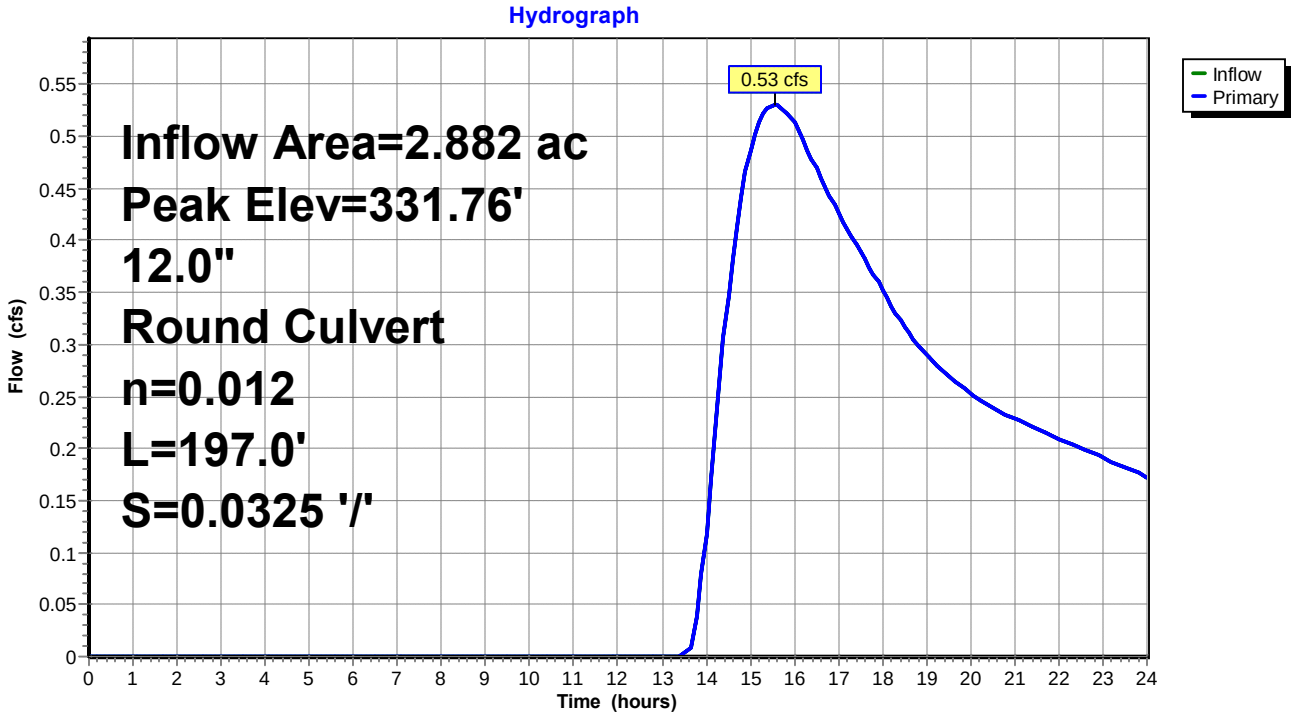
Inflow Area = 2.882 ac, 28.58% Impervious, Inflow Depth > 1.09" for 100-year event
Inflow = 0.53 cfs @ 15.57 hrs, Volume= 0.262 af
Outflow = 0.53 cfs @ 15.57 hrs, Volume= 0.262 af, Atten= 0%, Lag= 0.0 min
Primary = 0.53 cfs @ 15.57 hrs, Volume= 0.262 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Peak Elev= 331.76' @ 15.57 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	331.40'	**12.0" Round Culvert** L= 197.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 331.40' / 325.00' S= 0.0325 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.53 cfs @ 15.57 hrs HW=331.76' (Free Discharge)
1=Culvert (Inlet Controls 0.53 cfs @ 2.05 fps)

Pond 2P: Drainage Manhole



Summary for Pond 3P: Catch Basin 1

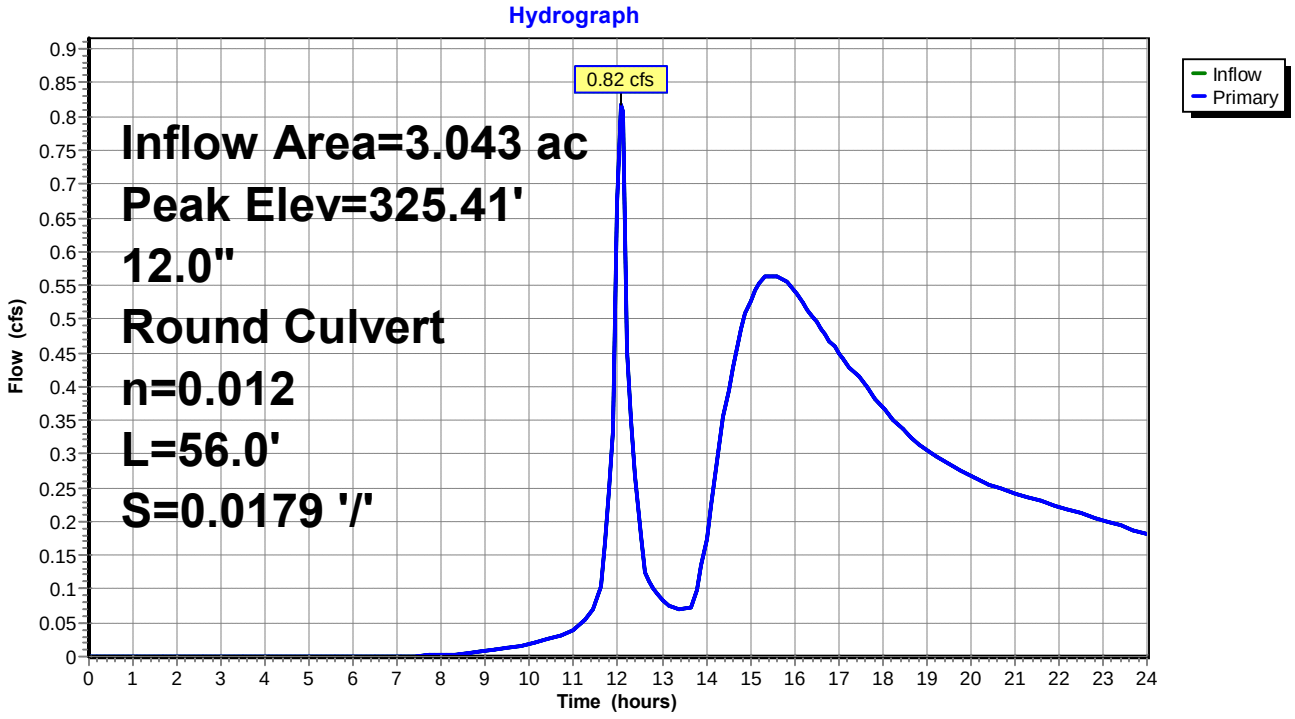
Inflow Area = 3.043 ac, 27.07% Impervious, Inflow Depth > 1.28" for 100-year event
Inflow = 0.82 cfs @ 12.08 hrs, Volume= 0.325 af
Outflow = 0.82 cfs @ 12.08 hrs, Volume= 0.325 af, Atten= 0%, Lag= 0.0 min
Primary = 0.82 cfs @ 12.08 hrs, Volume= 0.325 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Peak Elev= 325.41' @ 12.08 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	325.00'	**12.0" Round Culvert** L= 56.0' RCP, groove end w/headwall, Ke= 0.200 Inlet / Outlet Invert= 325.00' / 324.00' S= 0.0179 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.78 cfs @ 12.08 hrs HW=325.40' (Free Discharge)
1=Culvert (Inlet Controls 0.78 cfs @ 2.68 fps)

Pond 3P: Catch Basin 1



Summary for Pond 5P: Stormwater Basin

Inflow Area = 2.882 ac, 28.58% Impervious, Inflow Depth > 3.24" for 100-year event
Inflow = 8.45 cfs @ 12.19 hrs, Volume= 0.777 af
Outflow = 0.53 cfs @ 15.57 hrs, Volume= 0.262 af, Atten= 94%, Lag= 202.6 min
Discarded = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Primary = 0.53 cfs @ 15.57 hrs, Volume= 0.262 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Peak Elev= 332.36' @ 15.57 hrs Surf.Area= 7,715 sf Storage= 23,727 cf

Plug-Flow detention time= 369.0 min calculated for 0.262 af (34% of inflow)
Center-of-Mass det. time= 237.3 min (1,088.6 - 851.3)

Volume	Invert	Avail.Storage	Storage Description
#1	326.00'	37,412 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
326.00	420	0	0
328.00	1,390	1,810	1,810
329.00	2,350	1,870	3,680
330.00	5,795	4,073	7,753
332.00	7,435	13,230	20,983
333.00	8,207	7,821	28,804
334.00	9,010	8,609	37,412

Device	Routing	Invert	Outlet Devices
#1	Discarded	329.00'	**5.000 in/hr Exfiltration over Surface area from 329.00' - 329.00'** Excluded Surface area = 2,350 sf
#2	Primary	332.00'	**12.0" Round Culvert** L= 18.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 332.00' / 331.50' S= 0.0278 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#3	Device 1	332.00'	**4.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	333.00'	**6.0" Vert. Orifice/Grate** C= 0.600
#5	Secondary	334.00'	**12.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#6	Tertiary	334.00'	**5.0' long x 15.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

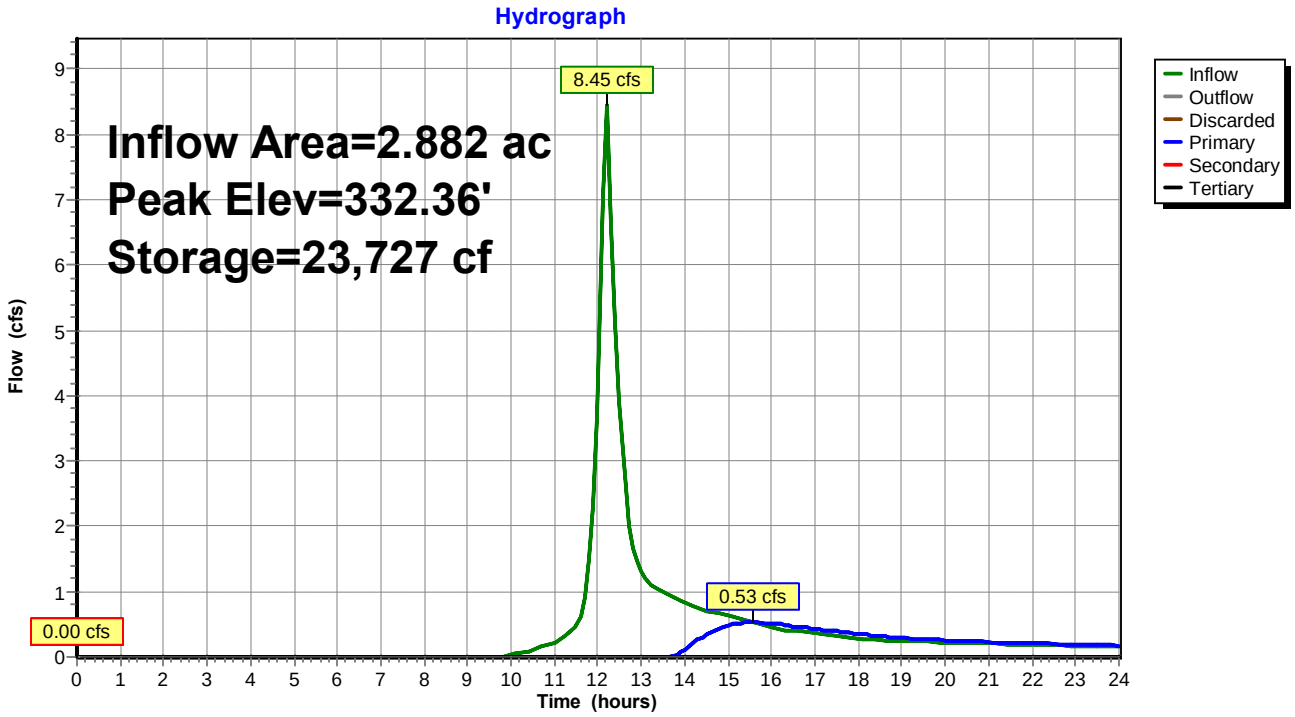
Discarded OutFlow Max=0.00 cfs @ 0.00 hrs HW=326.00' (Free Discharge)
└**1=Exfiltration** (Controls 0.00 cfs)
  └**3=Orifice/Grate** (Controls 0.00 cfs)
  └**4=Orifice/Grate** (Controls 0.00 cfs)

Primary OutFlow Max=0.53 cfs @ 15.57 hrs HW=332.36' (Free Discharge)
└**2=Culvert** (Inlet Controls 0.53 cfs @ 2.05 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=326.00' (Free Discharge)
└**5=Orifice/Grate** (Controls 0.00 cfs)

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=326.00' (Free Discharge)
└**6=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 5P: Stormwater Basin



SUPPORTING DOCUMENTATION

NOAA Point Precipitation Estimates
Web Soil Survey

NOAA Atlas 14, Volume 10, Version 3
Location name: Dayville, Connecticut, USA*
Latitude: 41.8768°, Longitude: -71.8643°
Elevation: 326 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sandra Pavlovic, Michael St. Laurent, Carl Trypaluk, Dale Unruh, Orlan Wilhite

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**0.331** (0.259-0.420)	**0.395** (0.308-0.500)	**0.499** (0.388-0.635)	**0.585** (0.452-0.748)	**0.703** (0.525-0.936)	**0.793** (0.580-1.08)	**0.885** (0.628-1.24)	**0.986** (0.665-1.42)	**1.13** (0.731-1.68)	**1.24** (0.785-1.88)
10-min	**0.469** (0.366-0.594)	**0.559** (0.436-0.709)	**0.706** (0.548-0.898)	**0.828** (0.639-1.06)	**0.996** (0.744-1.32)	**1.12** (0.821-1.52)	**1.25** (0.889-1.76)	**1.40** (0.942-2.01)	**1.60** (1.04-2.38)	**1.76** (1.11-2.67)
15-min	**0.552** (0.431-0.699)	**0.658** (0.513-0.834)	**0.831** (0.645-1.06)	**0.974** (0.752-1.25)	**1.17** (0.875-1.56)	**1.32** (0.966-1.79)	**1.48** (1.05-2.07)	**1.64** (1.11-2.37)	**1.88** (1.22-2.80)	**2.07** (1.31-3.14)
30-min	**0.776** (0.605-0.983)	**0.924** (0.720-1.17)	**1.17** (0.905-1.48)	**1.37** (1.06-1.75)	**1.64** (1.23-2.19)	**1.85** (1.36-2.51)	**2.07** (1.47-2.90)	**2.30** (1.55-3.32)	**2.63** (1.71-3.92)	**2.89** (1.83-4.39)
60-min	**0.999** (0.780-1.27)	**1.19** (0.927-1.51)	**1.50** (1.17-1.91)	**1.76** (1.36-2.25)	**2.11** (1.58-2.81)	**2.38** (1.74-3.23)	**2.66** (1.89-3.74)	**2.96** (2.00-4.26)	**3.38** (2.20-5.04)	**3.72** (2.36-5.65)
2-hr	**1.28** (1.00-1.61)	**1.51** (1.19-1.91)	**1.90** (1.48-2.40)	**2.22** (1.73-2.82)	**2.66** (2.00-3.54)	**2.99** (2.21-4.06)	**3.34** (2.40-4.71)	**3.76** (2.54-5.37)	**4.36** (2.83-6.45)	**4.87** (3.09-7.34)
3-hr	**1.47** (1.16-1.85)	**1.74** (1.37-2.19)	**2.19** (1.71-2.76)	**2.56** (1.99-3.24)	**3.06** (2.32-4.06)	**3.44** (2.55-4.66)	**3.84** (2.78-5.41)	**4.33** (2.93-6.17)	**5.06** (3.30-7.46)	**5.69** (3.62-8.54)
6-hr	**1.88** (1.49-2.34)	**2.23** (1.76-2.78)	**2.80** (2.21-3.51)	**3.28** (2.57-4.13)	**3.94** (3.00-5.19)	**4.43** (3.30-5.97)	**4.95** (3.60-6.95)	**5.60** (3.80-7.93)	**6.58** (4.30-9.63)	**7.42** (4.73-11.1)
12-hr	**2.37** (1.89-2.94)	**2.83** (2.25-3.51)	**3.59** (2.85-4.47)	**4.22** (3.32-5.28)	**5.08** (3.88-6.65)	**5.72** (4.29-7.66)	**6.42** (4.67-8.93)	**7.24** (4.94-10.2)	**8.50** (5.57-12.4)	**9.56** (6.12-14.2)
24-hr	**2.82** (2.26-3.48)	**3.41** (2.73-4.20)	**4.36** (3.48-5.40)	**5.15** (4.09-6.41)	**6.24** (4.80-8.12)	**7.05** (5.31-9.38)	**7.92** (5.80-11.0)	**8.96** (6.14-12.5)	**10.5** (6.92-15.2)	**11.8** (7.60-17.4)
2-day	**3.18** (2.56-3.89)	**3.87** (3.12-4.74)	**5.00** (4.02-6.15)	**5.94** (4.74-7.35)	**7.24** (5.59-9.37)	**8.20** (6.20-10.8)	**9.23** (6.79-12.7)	**10.5** (7.20-14.6)	**12.4** (8.16-17.8)	**14.0** (9.00-20.4)
3-day	**3.44** (2.79-4.20)	**4.20** (3.39-5.12)	**5.43** (4.37-6.65)	**6.45** (5.16-7.94)	**7.85** (6.08-10.1)	**8.89** (6.75-11.7)	**10.0** (7.39-13.7)	**11.4** (7.84-15.7)	**13.4** (8.88-19.2)	**15.2** (9.81-22.1)
4-day	**3.69** (2.99-4.49)	**4.49** (3.64-5.46)	**5.79** (4.67-7.07)	**6.87** (5.51-8.44)	**8.36** (6.49-10.7)	**9.46** (7.20-12.4)	**10.6** (7.88-14.6)	**12.1** (8.35-16.7)	**14.3** (9.46-20.4)	**16.2** (10.4-23.5)
7-day	**4.37** (3.57-5.30)	**5.27** (4.29-6.38)	**6.73** (5.46-8.18)	**7.94** (6.40-9.71)	**9.61** (7.50-12.3)	**10.8** (8.28-14.2)	**12.2** (9.04-16.6)	**13.8** (9.56-19.0)	**16.3** (10.8-23.1)	**18.4** (11.9-26.5)
10-day	**5.07** (4.15-6.12)	**6.02** (4.92-7.27)	**7.57** (6.16-9.18)	**8.86** (7.16-10.8)	**10.6** (8.31-13.5)	**11.9** (9.14-15.5)	**13.4** (9.91-18.0)	**15.0** (10.4-20.6)	**17.6** (11.7-24.8)	**19.7** (12.8-28.3)
20-day	**7.28** (5.99-8.72)	**8.29** (6.82-9.95)	**9.95** (8.15-12.0)	**11.3** (9.22-13.7)	**13.2** (10.4-16.6)	**14.7** (11.2-18.8)	**16.1** (11.9-21.3)	**17.7** (12.4-24.1)	**20.0** (13.4-28.0)	**21.7** (14.1-31.1)
30-day	**9.13** (7.54-10.9)	**10.2** (8.39-12.2)	**11.9** (9.75-14.2)	**13.3** (10.8-16.0)	**15.2** (11.9-19.0)	**16.7** (12.8-21.2)	**18.2** (13.4-23.7)	**19.7** (13.8-26.6)	**21.6** (14.5-30.1)	**23.0** (15.0-32.8)
45-day	**11.4** (9.47-13.6)	**12.5** (10.3-14.9)	**14.2** (11.7-17.0)	**15.7** (12.8-18.8)	**17.7** (13.9-21.9)	**19.2** (14.7-24.2)	**20.7** (15.2-26.7)	**22.1** (15.6-29.6)	**23.7** (16.0-32.9)	**24.8** (16.2-35.2)
60-day	**13.3** (11.1-15.8)	**14.4** (12.0-17.1)	**16.2** (13.4-19.3)	**17.7** (14.5-21.2)	**19.7** (15.6-24.3)	**21.4** (16.4-26.7)	**22.9** (16.8-29.3)	**24.1** (17.0-32.3)	**25.6** (17.3-35.4)	**26.5** (17.4-37.5)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

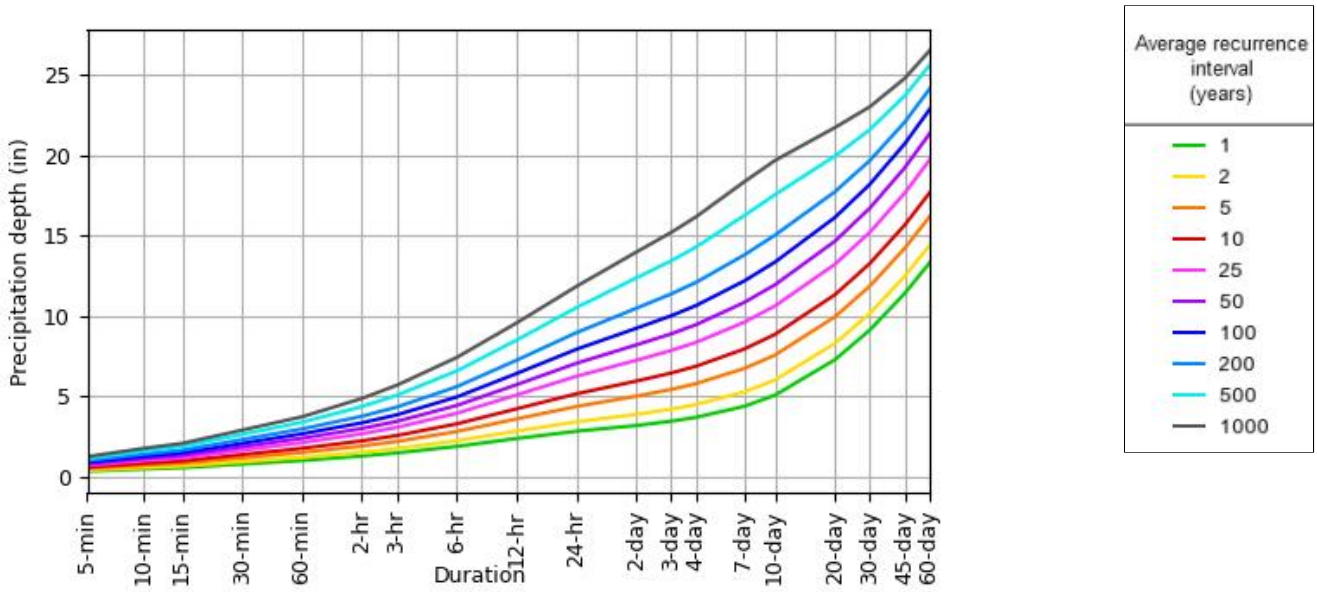
Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

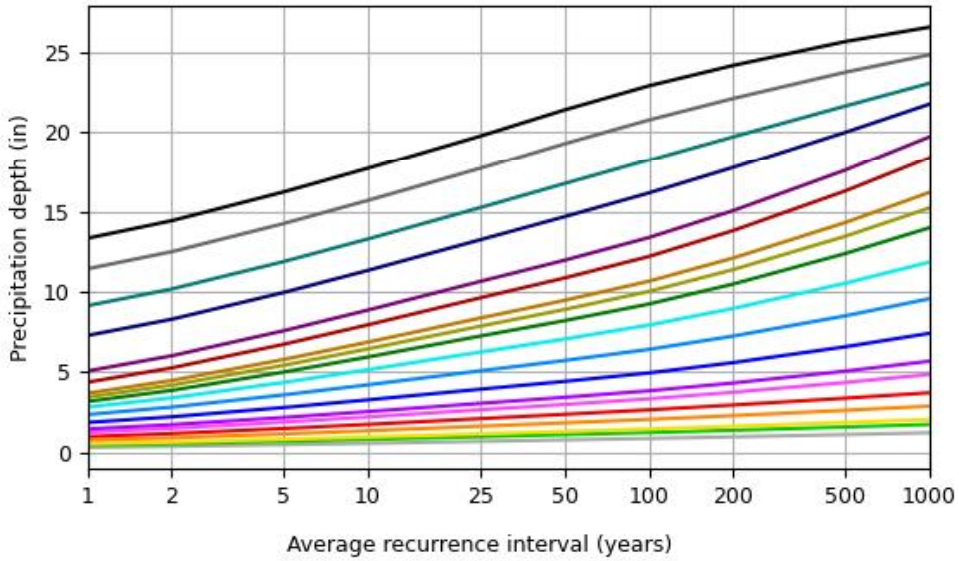
Please refer to NOAA Atlas 14 document for more information.

Back to Top

PF graphical

PDS-based depth-duration-frequency (DDF) curves
Latitude: 41.8768°, Longitude: -71.8643°





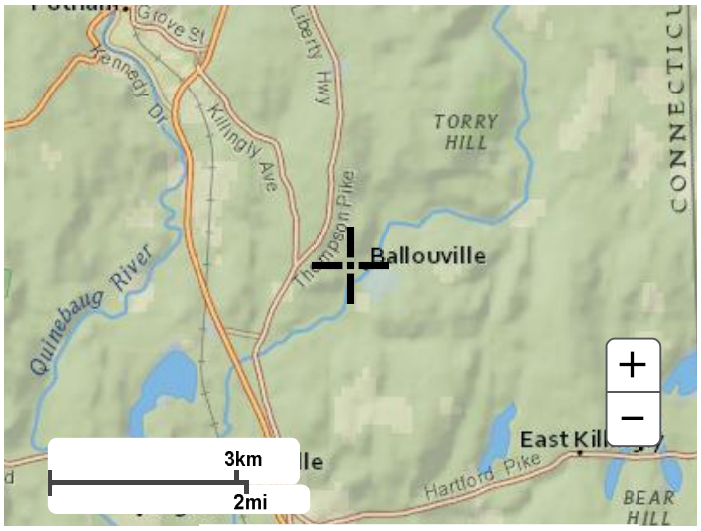
NOAA Atlas 14, Volume 10, Version 3

Created (GMT): Fri Sep 1 12:58:22 2023

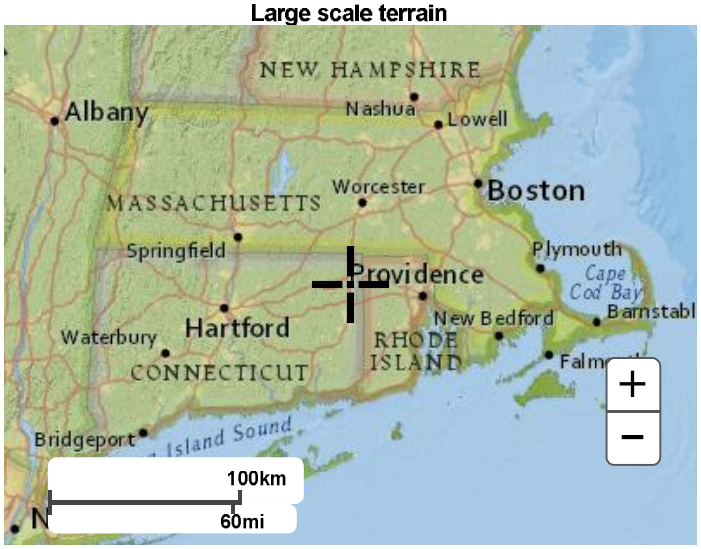
Back to Top

Maps & aerials

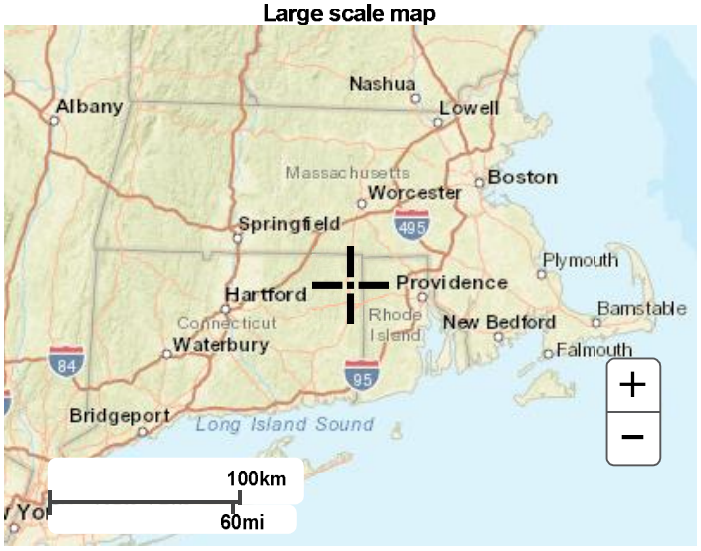
Small scale terrain



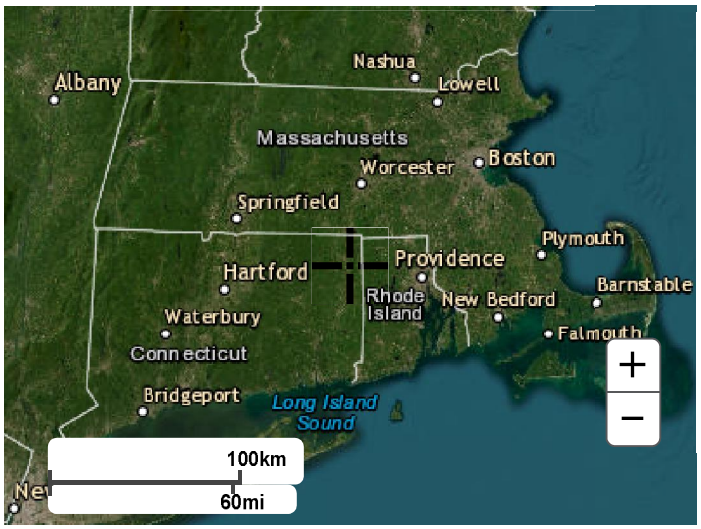
Large scale terrain



Large scale map



Large scale aerial

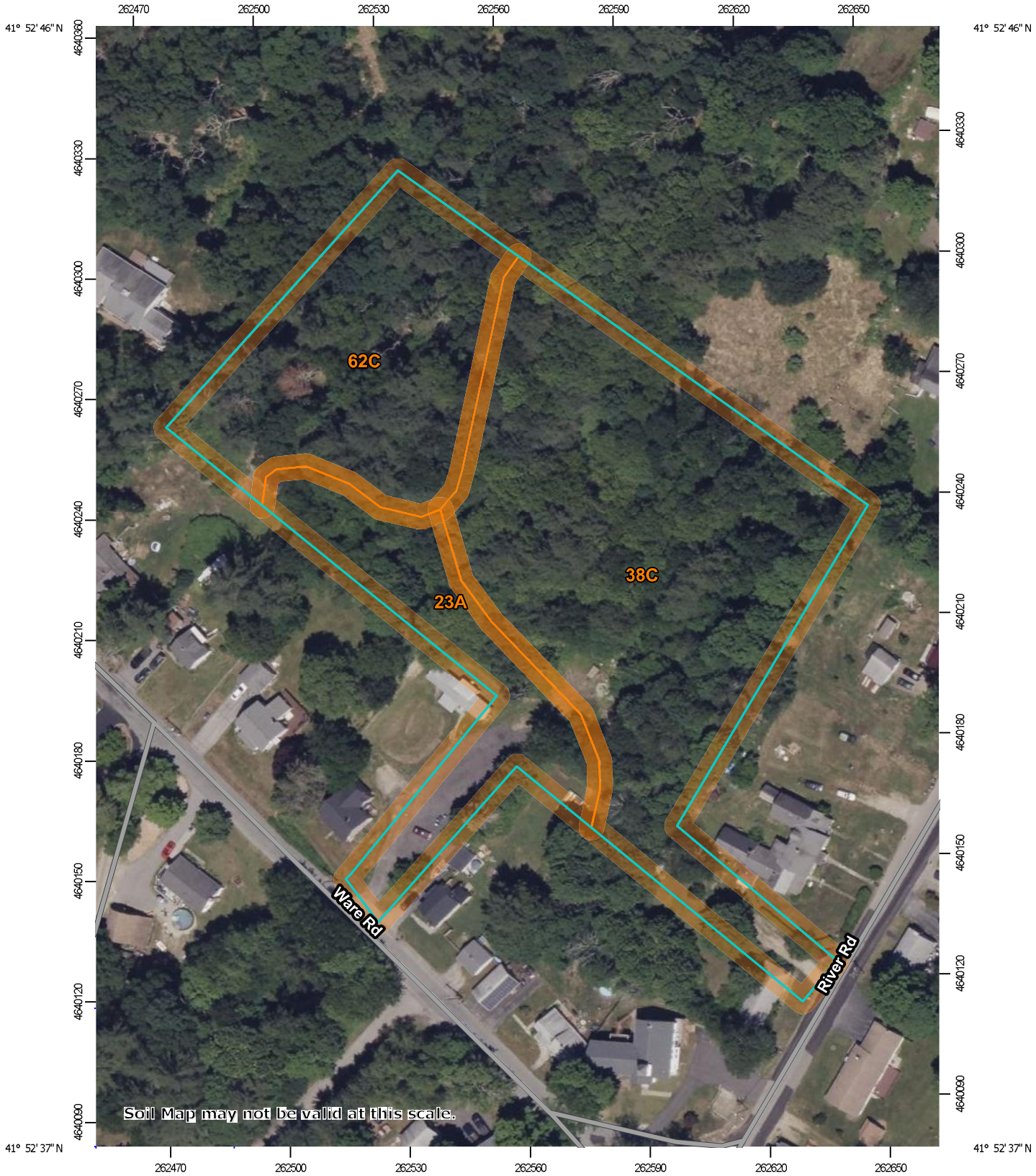


Back to Top

US Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

Disclaimer

Soil Map—State of Connecticut
(JPF Rentals, LLC)



Map Scale: 1:1,360 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 20 40 80 120

Feet: 0 50 100 200 300

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

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

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

Background
- Aerial Photography

MAP INFORMATION

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

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: State of Connecticut
Survey Area Data: Version 22, Sep 12, 2022

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

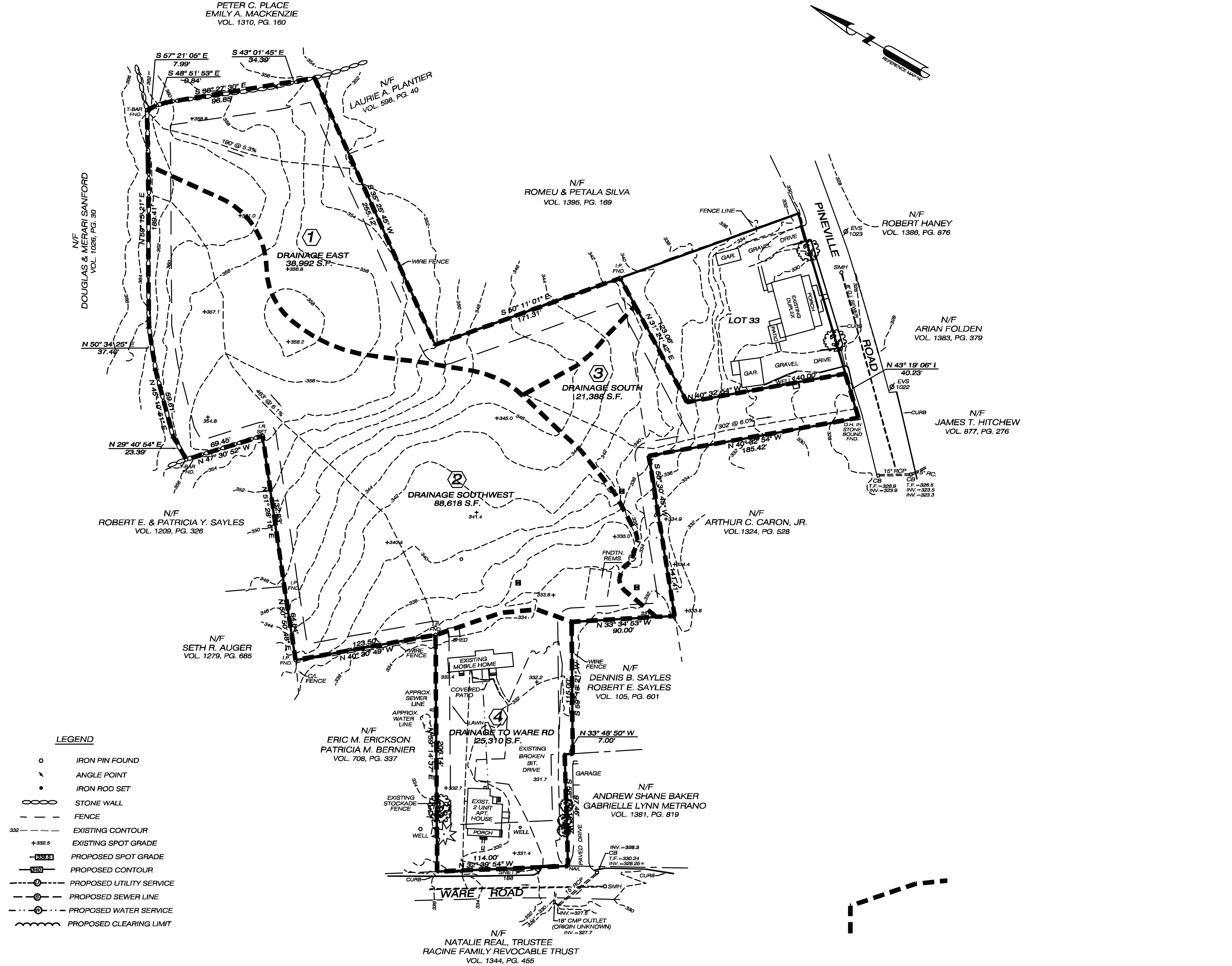
Date(s) aerial images were photographed: Jun 14, 2022—Jul 1, 2022

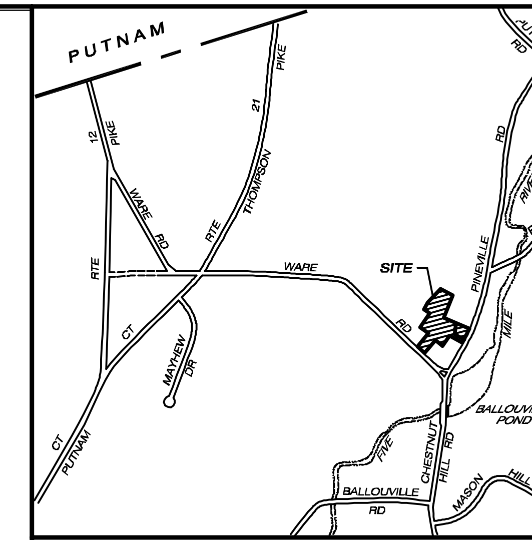
The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
23A	Sudbury sandy loam, 0 to 5 percent slopes	0.7	17.1%
38C	Hinckley loamy sand, 3 to 15 percent slopes	2.2	56.5%
62C	Canton and Charlton fine sandy loams, 3 to 15 percent slopes, extremely stony	1.0	26.4%
Totals for Area of Interest		**3.9**	**100.0%**

DRAINAGE AREA PLANS





LOCATION MAP 1" = 1000'

EXISTING CONDITIONS
DRAINAGE AREA PLAN

PREPARED FOR

JPF RENTALS, LLC

WARE ROAD & PINEVILLE ROAD

KILLINGLY, CONNECTICUT

DATE: JULY 2023

SCALE: 1" = 40'

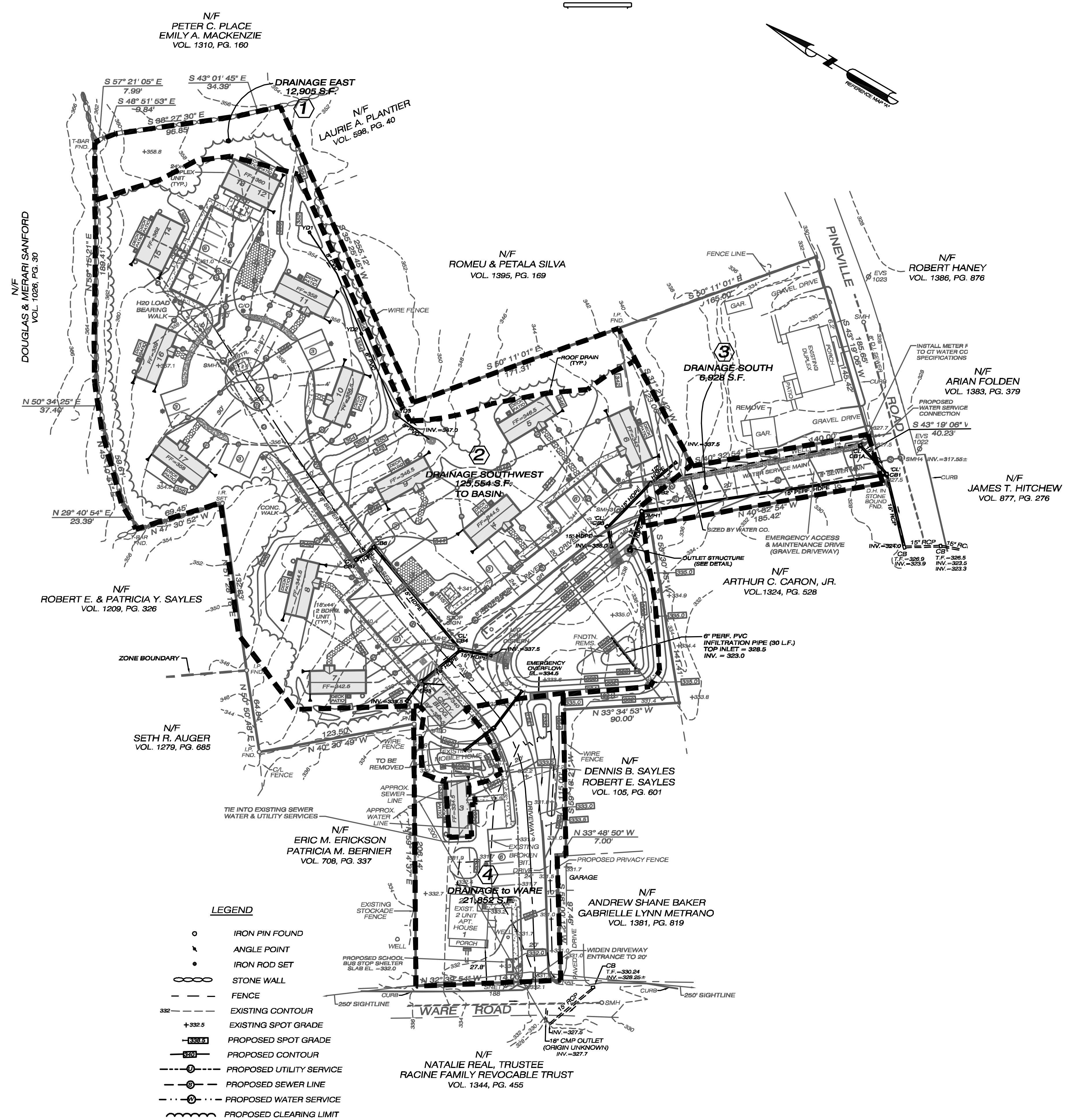
0 20' 40' 80' 120'

SURVEYING • MAPPING • PLOT PLANS • TOPOGRAPHY • SUBDIVISION • LAND RECORD RESEARCH
pc survey associates llc
email: pcsurvey@snet.net
63 SNAKE MEADOW RD
KILLINGLY, CT 06239
860 774 6230

SHEET NO: 1 OF 2

REVISED:

JOB NO: 23004 | F.B. NO: 231 | DRAWN BY: P.A.T. | MAP NO:



PINEVILLE VILLAS

GENERAL LOCATION SURVEY

DRAINAGE PLAN

PROPOSED MULTI-FAMILY DEVELOPMENT

PREPARED FOR

JPF RENTALS, LLC

WARE ROAD & PINEVILLE ROAD

KILLINGLY, CONNECTICUT

DATE: SEPTEMBER 2023

SCALE: 1" = 40'

0 20' 40' 80' 120'

SURVEYING • MAPPING • PLOT PLANS • TOPOGRAPHY • SUBDIVISION • LAND RECORD RESEARCH

pc survey associates llc
email: pcsurvey@snet.net
63 SNAKE MEADOW RD
KILLINGLY, CT 06239
860 774 6230

SHEET NO: 2 OF 2

REVISED: 10/20/23

11/20/23 - TOWN COMMENTS

JOB NO: 23004 | F.B. NO: 231 | DRAWN BY: P.A.T. | MAP NO:

Killingly Engineering Associates
114 Westcott Road
P.O. Box 421
Dayville, Connecticut 06241
860 779 7299
NORMAND THIBEAULT, JR., P.E. No. 22834 DATE