STORMWATER REPORT

Definitive Subdivision
Hillside Park
(0 Swains Pond avenue)
Melrose, Massachusetts

December 4, 2019
February 20, 2020 (Addendum for Pond 1P)
March 11, 2020 (Peer Review & DPW Comments)

Applicant
0 Swains Pond Avenue Realty Trust
142 Hagget's Pond Road
Andover, MA 01810

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W&S Project Data
MELR-0029
DhillsideR2.dwg
WSDhillsideR2.dwg
Existing.hcp
ProposedR.hcp
p:\MELR-0029(HIllside Park)\drainage\stormwater_reportR2.docx

WILLIAMS & SPARAGES
ENGINEERS | PLANNERS | SURVEYORS

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1 | Mitigative Drainage Analysis

1.0 Purpose

The purpose of this analysis is to compare the pre-development watershed condition to the post development watershed condition for the project located at the proposed Hillside Park subdivision at 0 Swains Pond Avenue, Melrose, MA. This is accomplished by analyzing the surface runoff rates to the limit of watershed analysis as shown on the accompanying watershed maps. The result of this analysis is presented below in the Peak Rate of Runoff tables.

2.0 Introduction

The subject property is located on the easterly side of Swains Pond Avenue, to the northeast of the existing residential properties on Maple Terrace, to the west of the residential and Town properties located on Hillside Park and to the south of Town properties located off of Swains Pond Avenue.

The property is located within the SR-A zoning district according to the Town's current zoning map. The property lies outside of the FEMA flood hazard area, (Zone AE) as shown on flood insurance rate map number 25017C0433E effective date June 4, 2010.

The property is currently undeveloped with the exception of a paved driveway which provides access from Maple Terrace to the existing homes on Hillside Park, a 40-foot wide private way. The property is largely vegetated with deciduous and coniferous tree cover. There are Bordering Vegetated Wetlands (BVW) located in the east and southeast corners of the property as well as an intermittent stream which conveys the surficial discharge from the wetlands to the existing headwall located on the northside of Maple Terrace. The headwall then conveys the runoff under Maple Terrace to a granite headwall on the southside of the roadway via twelve (12") inch culvert where it is tributary to a wetland.

Site topography varies in elevation from approximately 183 in the middle of the site to elevation 74 at the property boundary line intersection with Maple Terrace. There are large portions of the site that are covered with ledge outcrops and boulders.

The proposal is to develop the site by constructing nine (9) single family homes that will be accessed by a forty (40) foot wide roadway with a cul-de-sac. Each lot will have a paved driveway, landscaping and associated utilities. Subsurface roof recharge chambers will be installed for the roof areas shown on the accompanying watershed map. The main drainage system consists of deep sump catch basins with hoods, sediment and oil separators, underground piping network and three (3) subsurface infiltration structures for the mitigation and treatment of stormwater runoff. There will also be a ten (10) foot wide box culvert installed under the roadway to convey the runoff that is transmitted through the intermittent stream.

3.0 Existing Condition Soils Analysis

In order to model the excess runoff for both the existing and proposed watershed condition, the parent soils on site were mapped using the Web Soil Survey (WSS) made available on the United States Department of Agriculture (USDA) National Resources Conservation Service (NRCS) website. The WSS provides vital soil data and information such as Hydrologic Soil Group (HSG), which is then input into a mathematical model to generate runoff curve numbers.

The user inputs soil cover type as well as the hydrologic soil group to generate a weighted curve number (CN) and also uses the topography of the land to generate a time of concentration (Tc) from which the stormwater runoff rate and volume can be calculated for a given watershed for comparison.

The soils present on site are comprised of Charlton Urban Land -Hollis Complex with HSG "A", Merrimac-Urban Land Complex with HSG "A" and Rock outcrop-Hollis Complex no hydrologic soil group rating, we have assumed "D" for the comparative purposes of this analysis.

Williams & Sparages has also performed some additional soil testing in order to explore for areas that we have used for stormwater management areas in the proposed design based on soil texture and depth to refusal. Additional soil testing may be required for areas where roof recharge systems are proposed.

4.0 Stormwater Modeling Methodology

The mathematical model used in this analysis is computed using the stormwater modeling software HydroCAD, v10.00, developed by HydroCAD Software Solutions LLC. HydroCAD is a program used to model the hydrology and hydraulics of stormwater runoff and is based largely on programs and techniques developed by the NRCS, specifically TR-20 and TR-55 as well as other hydraulic calculation methods.

HydroCAD allows the user, for a given rainfall event, to generate runoff hydrographs for single or multiple watersheds and is used to determine if a given drainage system is adequate under the desired conditions and to predict flooding or other hydraulic impacts at specified locations such as erosion.

Four design storm events are analyzed and the results presented in Table 1.0 below for the 2-year, 10-year and 100-year storm events for comparison.

5.0 Pre-Development Watershed

The pre-development watershed areas are as a result of analyzing the existing topography on site as well as the tributary areas thereto for comparison with the post-development condition.

Comparison location 1L represents surficial flow tributary to the southside of Maple Terrace. Comparison location 2L represents the surficial flow tributary to existing catch basin 1 which then discharges to the northside of Swains Pond Avenue from out site and the down-gradient areas. Comparison location 3L represents the total flow from within the limit of watershed analysis for comparison with the proposed condition development.

The total watershed area within the limit of watershed analysis is 26.2 acres.

Using the methods described in the stormwater modeling methodology above, runoff curve numbers and times of concentration are generated for each watershed for the pre-development condition to be used for comparison with the post-development condition described below. A schematic of the mathematical model and the results of the calculations for the 2-year, 10-year and 100-year Type III, 24-hour storm events are included in this analysis.

6.0 Post-Development Watershed

Similar to the pre-development watershed, watershed sub catchments have been generated based on the proposed grading as well as the tributary areas thereto for comparison with the pre-development condition.

As explained above, Comparison location 1L represents surficial flow tributary to the southside of Maple Terrace. Comparison location 2L represents the surficial flow tributary to existing catch basin 1 which then discharges to the northside of Swains Pond Avenue from out site and the down-gradient areas. Comparison location 3L represents the total flow from within the limit of watershed analysis for comparison with the pre-development condition.

Stormwater runoff from on-site paved areas will generally be collected by deep sump catch basins with hoods/traps, discharge to a sediment and oil separator unit for additional pre-treatment and then discharge via closed pipe system to the subsurface infiltration structures. The only exception is the runoff from the cul-de-sac which will discharge to a stone infiltration trench at the bottom of the retaining wall at the rear of lots 3 and 4.

Post-development provides for the construction of three (3) sub-surface infiltration basins, and specific roof areas that will have separate subsurface recharge chambers which will provide peak rate of runoff mitigation, water quality, groundwater recharge and phosphorus removal in the volume provided below the outlet devices.

Using the methods described in the stormwater modeling methodology above, runoff curve numbers and times of concentration were generated for each watershed for the proposed condition to be used for comparison with the existing condition. A schematic of the mathematical model and the results of the calculations for the 2-year, 10-year, and 100-year, Type III, 24-hour storm events are included in this analysis.

7.0 Compliance with DEP Stormwater Management Standards

Standard 1

No new stormwater conveyances (e.g. outfalls) may discharge untreated stormwater directly to or cause erosion in wetlands or waters of the Commonwealth.

New stormwater runoff requiring treatment will be treated prior to being discharged towards the selected edges of comparison. New stormwater outfalls will discharge across rip-rap aprons or spillways providing protection from scour/erosion.

Standard 2

Stormwater management systems shall be designed so that post-development peak discharge rates do not exceed pre-development peak discharge rates. This Standard may be waived for discharges to land subject to coastal storm flowage as defined in 310 CMR 10.04.

See Table 1 below which demonstrates the post-development peak discharge rates are less than or equal to the pre-development peak discharge rates.

Standard 3

Loss of annual recharge to groundwater shall be eliminated or minimized through the use of infiltration measures including environmentally sensitive site design, low impact development techniques, stormwater best management practices, and good operation and maintenance. At a minimum, the annual recharge from the post-development site shall approximate the annual recharge from the pre-development conditions based on soil type. This Standard is met when the stormwater management system is designed to infiltrate the required recharge volume as determined in accordance with the Massachusetts Stormwater Handbook.

The project site is analyzed using Hydrologic Soil Groups A & D for surficial stormwater runoff. Groundwater recharge is provided by three (3) sub-surface infiltration structures, an infiltration trench and specific portions of proposed roof areas discharge into separate subsurface recharge chambers. It should be noted that there are large areas of ledge, boulders and ledge outcroppings in the existing condition which do not provide groundwater recharge.

Standard 4

Stormwater management systems shall be designed to remove 80% of the average annual post-construction load of Total Suspended Solids (TSS). This Standard is met when:

a. Suitable practices for source control and pollution prevention are identified in a long-term pollution prevention plan, and thereafter are implemented and maintained;
b. Structural stormwater best management practices are sized to capture the required water quality volume determined in accordance with the Massachusetts Stormwater Handbook; and
c. Pretreatment is provided in accordance with the Massachusetts Stormwater Handbook

The project will utilize deep-sump catch basins with a hood/trap and a sediment forebay to collect and pre-treat stormwater runoff prior to discharging to the surface infiltration basin.

It should be noted that runoff from certain types of roof areas are considered "clean" by DEP and therefore do not require treatment. We have assumed that the roof types to be installed for this project will satisfy DEP's criteria.

The project site does not lie within a Zone II or Interim Wellhead Protection Area; therefore, the required water quality volume is based on a runoff of one-half inch (1/2").

Standard 5

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

This project is not considered a LUHPPL.

Standard 6

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

The project site does not lie within a Zone II or Interim Wellhead Protection Area.

Standard 7

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

This project is not considered a redevelopment.

Standard 8

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

Refer to Section 6 Stormwater Pollution Prevention Plan (SWPPP) and Construction Period Erosion, Sedimentation and Pollution Prevention Plan.

Standard 9

A long-term operation and maintenance plan shall be developed and implemented to ensure that stormwater management systems function as designed.

Refer to Section 4 Long Term Operation and Maintenance Plan (O&M).

Standard 10

All illicit discharges to the stormwater management system are prohibited.

Illicit Discharge Compliance Statement

No connection between the stormwater and wastewater management systems is proposed. Per requirements of Standard 10 it is herein stated that there are no proposed illicit discharges into the Stormwater Management System to be constructed as shown on the Definitive Plans.

8.0 Conclusion

Examining the following Peak Rate of Runoff and Basin Performance table the proposed stormwater management system is effective for mitigating the peak flow rates from the limit of the watershed analysis for the 2, 10 and 100-year storm events.

Table 1.0: Total Peak Rate of Runoff from within limit of watershed analysis | Comparison Location 3L

Description	2 Year	10 Year	100 Year	Calculated 100 Year Bypass	100 Year Total
Existing Peak Rate of Runoff (cfs)	5.5	14.9	32.0	N.A.	32.0
Proposed Peak Rate of Runoff (cfs)	4.9	12.6	27.9	+1.69 =	29.59
Difference	**-0.6**	**-2.3**	**-4.1**		**-2.41**

Table 2.0: Peak Rate of Runoff to southside of Maple Terrace | Comparison Location 1L

Description	2 Year	10 Year	100 Year	Calculated 100 Year Bypass	100 Year Total
Existing Peak Rate of Runoff (cfs)	2.9	8.8	19.3	N.A.	19.3
Proposed Peak Rate of Runoff (cfs)	2.2	6.5	15.9	+1.69 =	17.59
Difference	**-0.7**	**-2.3**	**-3.4**		**-1.71**

Table 3.0: Peak Rate of Runoff to northside of Swains Pond Avenue | Comparison Location 2L (No Change) – No Bypass calculations for this comparison location

Description	2 Year	10 Year			100 Year
Existing Peak Rate of Runoff (cfs)	2.7	6.6			13.3
Proposed Peak Rate of Runoff (cfs)	2.7	6.5			12.8
Difference	**0.0**	**-0.1**			**-0.5**

Table 4.0: Stormwater Management Area 1P |Subsurface Infiltration Basin Performance Table (Lot 9) – No Change

		Peak Rates of Outflow (cfs)				
24 Hour Type III Storm event	Peak Rate of Inflow (cfs)	Total (cfs)	Exfiltration (cfs)	12″ Culvert (cfs)		Peak Water Level (ft)
2 year	0.76	0.13	0.13	0.0		80.63
10 year	1.96	0.32	0.13	0.19		81.37
100 year	4.05	0.68	0.13	0.5		82.85

Table 5.0: Stormwater Management Area 2P | Subsurface Infiltration Basin Performance Table (Station 3+50) – No Change

24 Hour Type III Storm event	Peak Rate of Inflow (cfs)	Peak Rates of Outflow (cfs)				Peak Water Level (ft)
		Total (cfs)	Exfiltration (cfs)	8″ Culvert (cfs)		
2 year	0.68	0.02	0.02	0.0		108.27
10 year	1.15	0.30	0.02	0.27		108.79
100 year	1.82	1.20	0.02	1.17		109.32

Table 6.0: Stormwater Management Area 3P | Subsurface Infiltration Basin Performance Table (Rear of Lot 7) – No Change

24 Hour Type III Storm event	Peak Rate of Inflow (cfs)	Peak Rates of Outflow (cfs)				Peak Water Level (ft)
		Total (cfs)	Exfiltration (cfs)	12″ Culvert (cfs)		
2 year	0.83	0.04	0.04	0.0		123.30
10 year	1.36	0.15	0.04	0.12		123.91
100 year	2.12	1.10	0.04	1.06		124.28

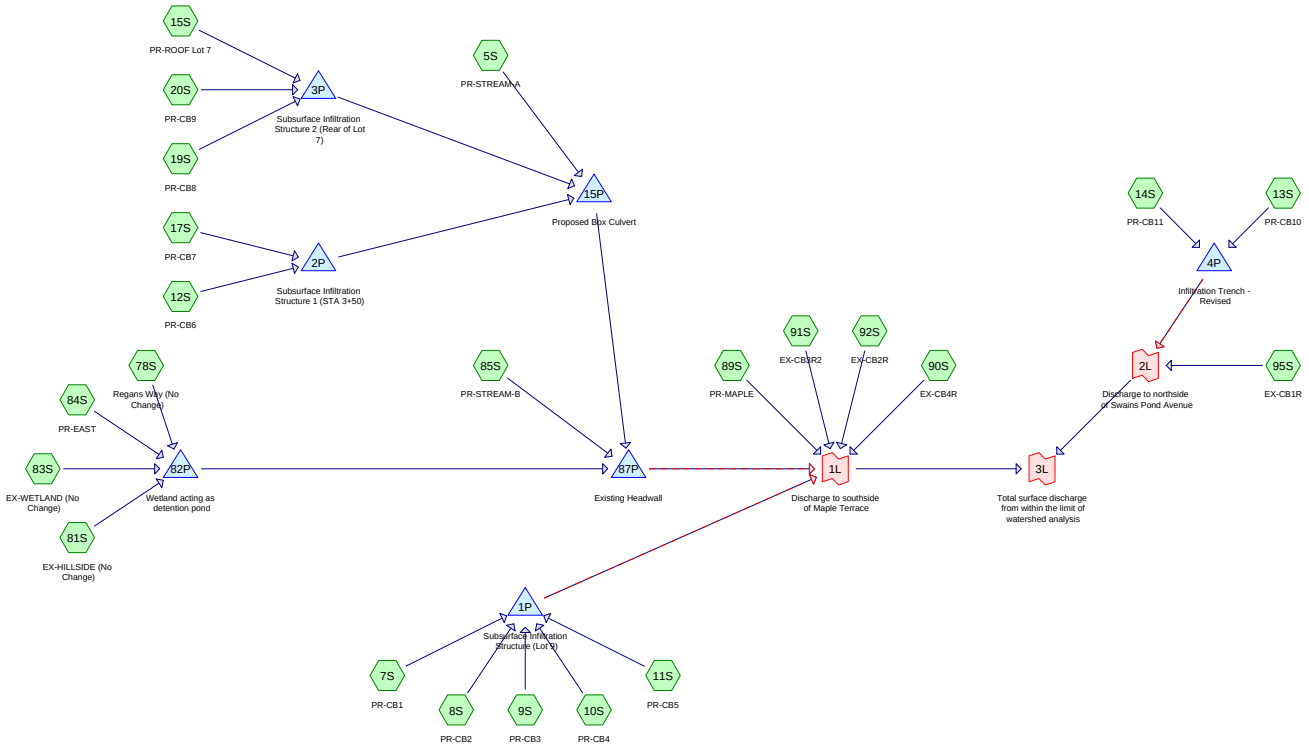
Table 7.0: Stormwater Management Area 4P | Infiltration Trench Performance Table (Increased Capacity from Previous Report)

24 Hour Type III Storm event	Peak Rate of Inflow (cfs)	Peak Rates of Outflow (cfs)				Peak Water Level (ft)
		Total (cfs)	Exfiltration (cfs)	6″ Culverts (cfs)	65′L Spillway (cfs)	
2 year	1.19	1.17	0.01	1.15	0.00	123.42
10 year	1.95	1.85	0.01	1.84	0.00	123.67
100 year	3.04	2.79	0.01	2.77	0.00	124.20

9.0 HydroCAD Data

Existing Condition – No Change
(We have omitted HydroCAD printouts from this revision to conserve paper)

Proposed Condition



Subcat Reach Pond Link

Routing Diagram for ProposedR

Prepared by HP Inc., Printed 3/16/2020

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
23,301	54	1/2 acre lots, 25% imp, HSG A (85S, 92S)
54,267	61	1/4 acre lots, 38% imp, HSG A (5S, 92S)
16,280	77	1/8 acre lots, 65% imp, HSG A (85S, 89S, 92S)
43,974	39	>75% Grass cover, Good, HSG A (7S, 8S, 9S, 10S, 11S, 85S, 89S, 90S, 91S)
103,263	80	>75% Grass cover, Good, HSG D (5S, 10S, 11S, 12S, 13S, 14S, 17S, 19S, 20S, 78S, 84S, 85S, 92S, 95S)
17,621	61	Existing 1/4 acre lots, 38% imp, HSG A (7S, 9S)
1,000	98	Ledge outcrops, HSG D (84S)
8,612	98	Ledge, HSG A (85S, 92S, 95S)
70,305	98	Ledge, HSG D (5S, 78S, 81S, 95S)
37,588	98	Paved parking, HSG A (5S, 7S, 8S, 9S, 10S, 11S, 89S, 90S, 91S, 92S, 95S)
23,502	98	Paved parking, HSG D (5S, 10S, 11S, 12S, 13S, 14S, 17S, 19S, 20S)
1,015	98	Roofs, HSG A (7S, 10S, 85S)
4,120	98	Roofs, HSG D (12S, 15S, 17S, 19S, 92S)
343	98	Unconnected roofs, HSG A (91S)
2,250	98	Unconnected roofs, HSG D (78S)
82,969	30	Woods, Good, HSG A (5S, 7S, 8S, 85S, 89S, 91S, 92S, 95S)
642,148	77	Woods, Good, HSG D (5S, 78S, 81S, 83S, 84S, 95S)
1,132,558	**74**	**TOTAL AREA**

Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
285,970	HSG A	5S, 7S, 8S, 9S, 10S, 11S, 85S, 89S, 90S, 91S, 92S, 95S
0	HSG B	
0	HSG C	
846,588	HSG D	5S, 10S, 11S, 12S, 13S, 14S, 15S, 17S, 19S, 20S, 78S, 81S, 83S, 84S, 85S, 92S, 95S
0	Other	
1,132,558		**TOTAL AREA**

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	1P	77.00	73.00	80.0	0.0500	0.010	12.0	0.0	0.0
2	2P	108.50	106.50	16.0	0.1250	0.010	8.0	0.0	0.0
3	3P	123.75	122.00	16.0	0.1094	0.010	12.0	0.0	0.0
4	4P	123.00	122.50	6.0	0.0833	0.010	6.0	0.0	0.0
5	15P	99.50	98.30	43.0	0.0279	0.012	120.0	38.0	0.0
6	87P	73.04	72.75	6.5	0.0446	0.013	12.0	0.0	0.0

Summary for Subcatchment 5S: PR-STREAM-A

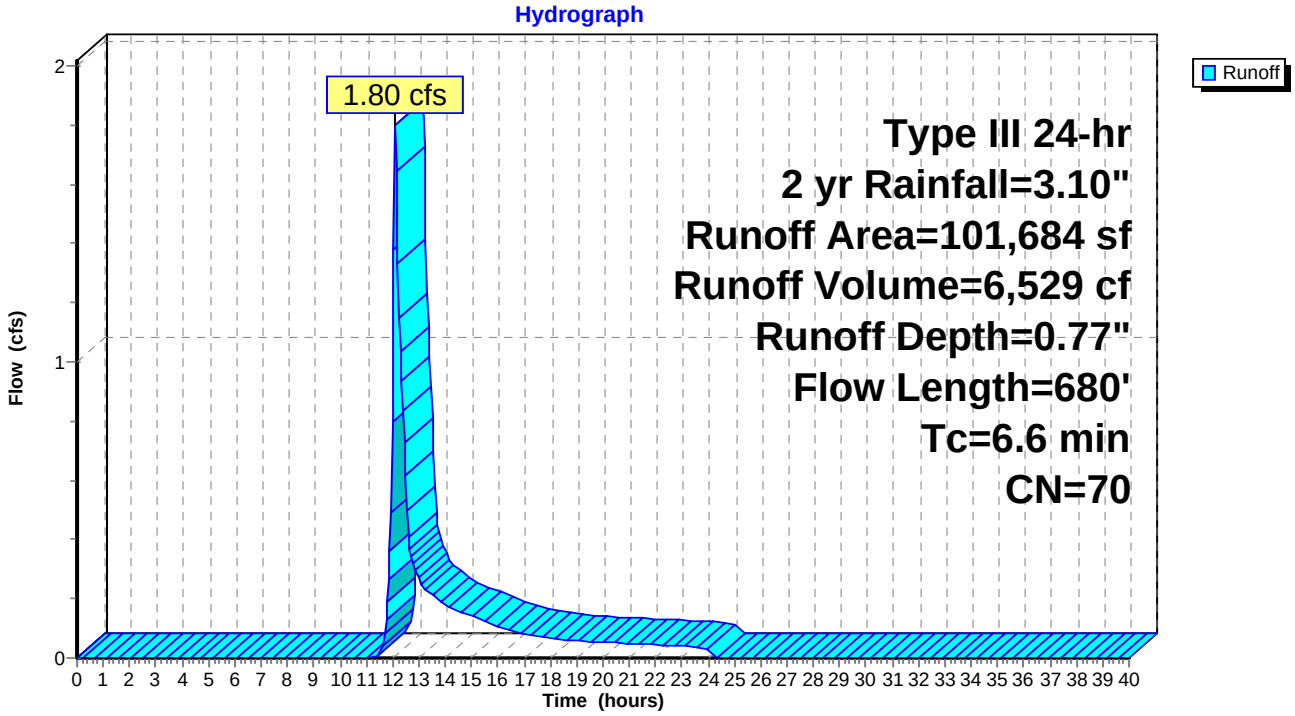
Runoff = 1.80 cfs @ 12.11 hrs, Volume= 6,529 cf, Depth= 0.77"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 yr Rainfall=3.10"

	Area (sf)	CN	Description
*	1,835	98	Ledge, HSG D
	39,112	77	Woods, Good, HSG D
	6,166	30	Woods, Good, HSG A
	2,458	98	Paved parking, HSG A
	105	98	Paved parking, HSG D
	34,008	61	1/4 acre lots, 38% imp, HSG A
	18,000	80	>75% Grass cover, Good, HSG D
	101,684	70	Weighted Average
	84,363		82.97% Pervious Area
	17,321		17.03% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	50	0.2000	0.17		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
0.2	120	0.2800	8.52		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.6	155	0.0400	4.06		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.1	25	0.0800	4.55		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.7	330	0.0900	7.86	15.72	**Channel Flow,** Area= 2.0 sf Perim= 5.2' r= 0.38' n= 0.030
6.6	680	Total			

Subcatchment 5S: PR-STREAM-A



Summary for Subcatchment 7S: PR-CB1

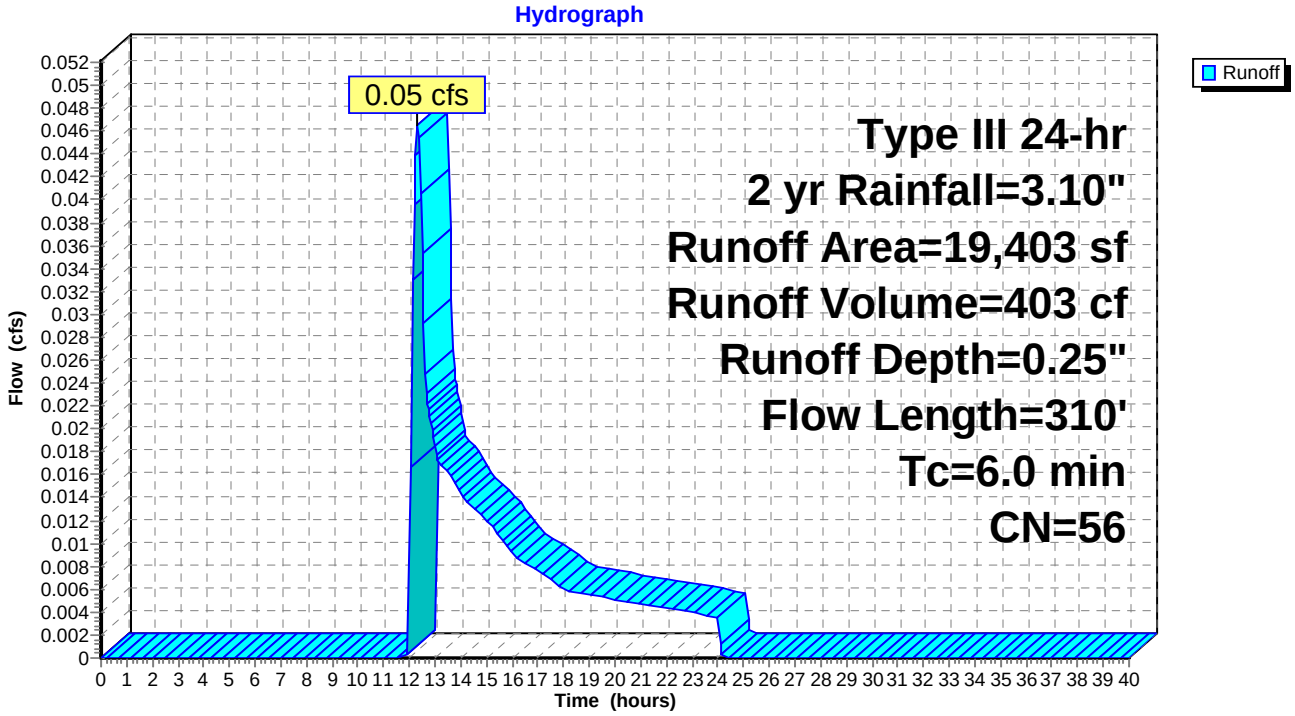
Runoff = 0.05 cfs @ 12.33 hrs, Volume= 403 cf, Depth= 0.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 yr Rainfall=3.10"

	Area (sf)	CN	Description
	477	98	Roofs, HSG A
	1,000	30	Woods, Good, HSG A
	10,306	39	>75% Grass cover, Good, HSG A
	3,987	98	Paved parking, HSG A
*	3,633	61	Existing 1/4 acre lots, 38% imp, HSG A
	19,403	56	Weighted Average
	13,558		69.88% Pervious Area
	5,845		30.12% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.8	50	0.3500	0.46		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
0.1	35	0.3500	9.52		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.0	15	0.5000	11.38		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.3	25	0.0100	1.61		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.1	25	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.1	50	0.3300	9.25		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.3	110	0.1200	7.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
2.7	310	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 7S: PR-CB1



Summary for Subcatchment 8S: PR-CB2

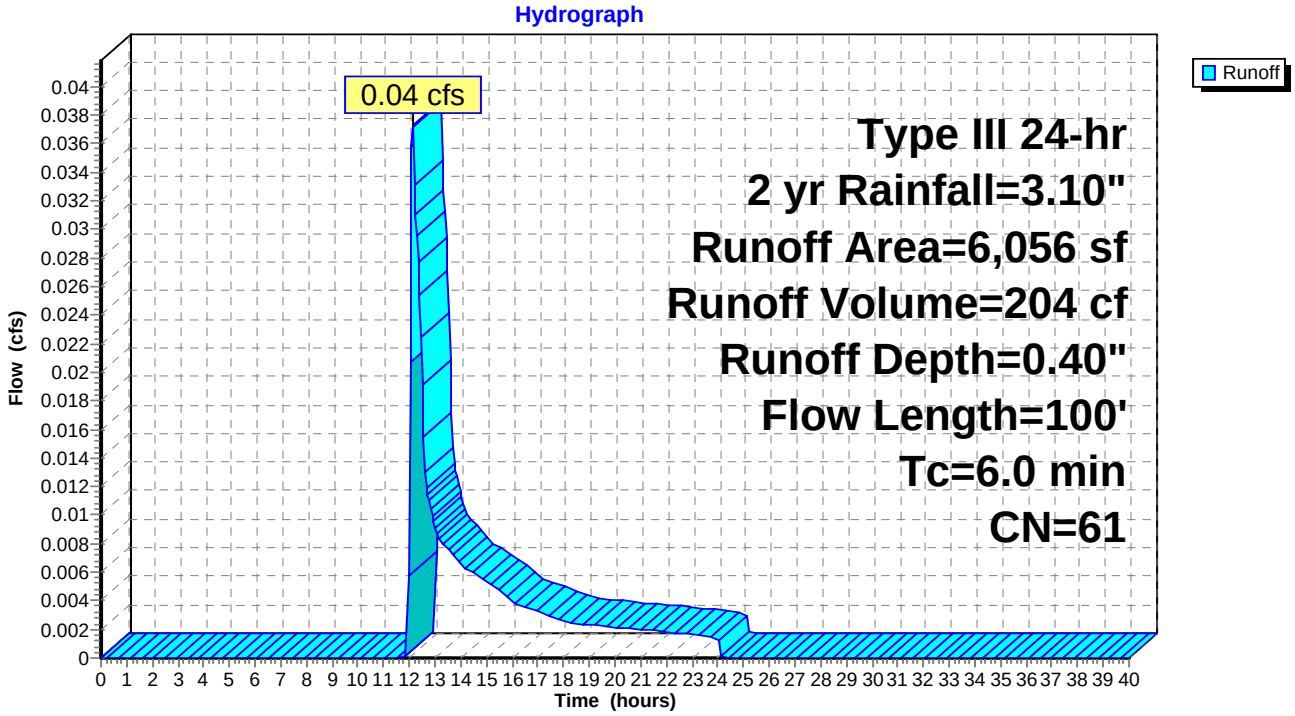
Runoff = 0.04 cfs @ 12.14 hrs, Volume= 204 cf, Depth= 0.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 yr Rainfall=3.10"

Area (sf)	CN	Description
1,000	30	Woods, Good, HSG A
2,606	39	>75% Grass cover, Good, HSG A
2,450	98	Paved parking, HSG A
6,056	61	Weighted Average
3,606		59.54% Pervious Area
2,450		40.46% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.9	50	0.3300	0.45		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
0.0	15	0.3300	9.25		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.0	15	0.1100	5.34		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.0	20	0.1200	7.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.9	100	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 8S: PR-CB2



Summary for Subcatchment 9S: PR-CB3

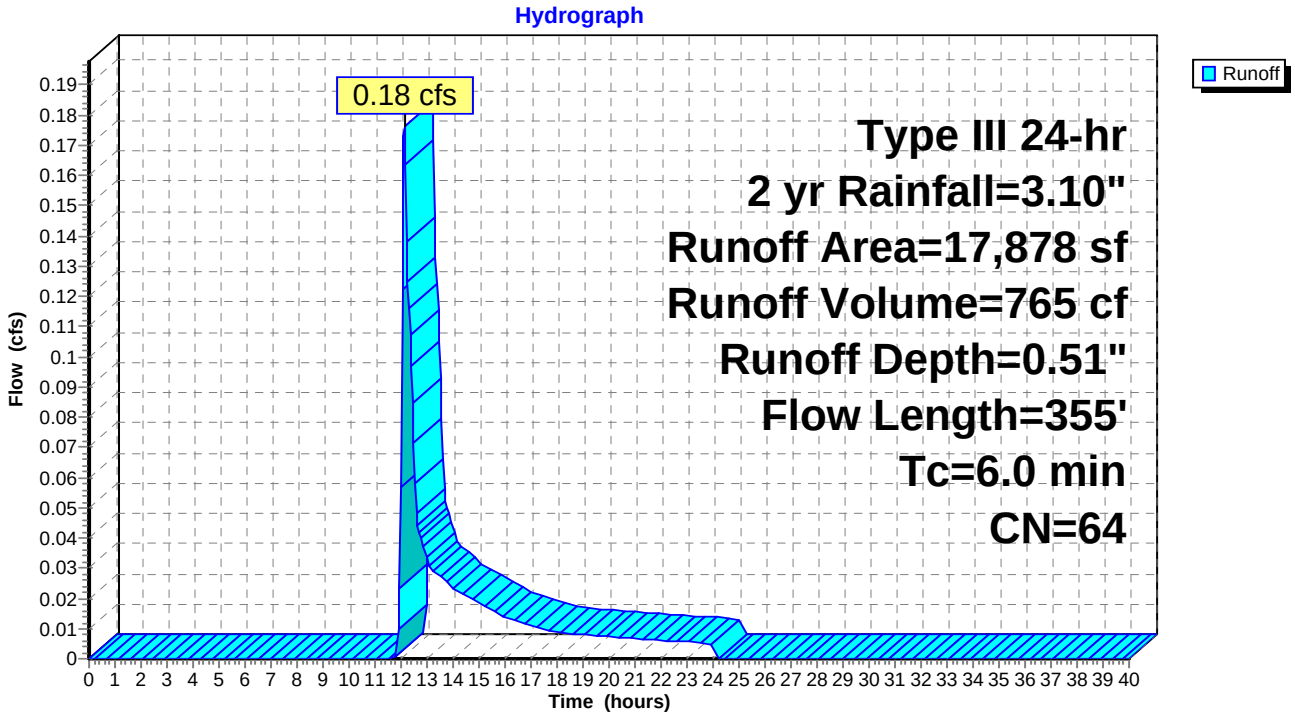
Runoff = 0.18 cfs @ 12.12 hrs, Volume= 765 cf, Depth= 0.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 yr Rainfall=3.10"

	Area (sf)	CN	Description
	1,425	39	>75% Grass cover, Good, HSG A
	2,465	98	Paved parking, HSG A
*	13,988	61	Existing 1/4 acre lots, 38% imp, HSG A
	17,878	64	Weighted Average
	10,098		56.48% Pervious Area
	7,780		43.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.3	50	0.0800	0.25		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
0.5	150	0.0800	4.55		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.3	155	0.1350	7.46		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
4.1	355	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 9S: PR-CB3



Summary for Subcatchment 10S: PR-CB4

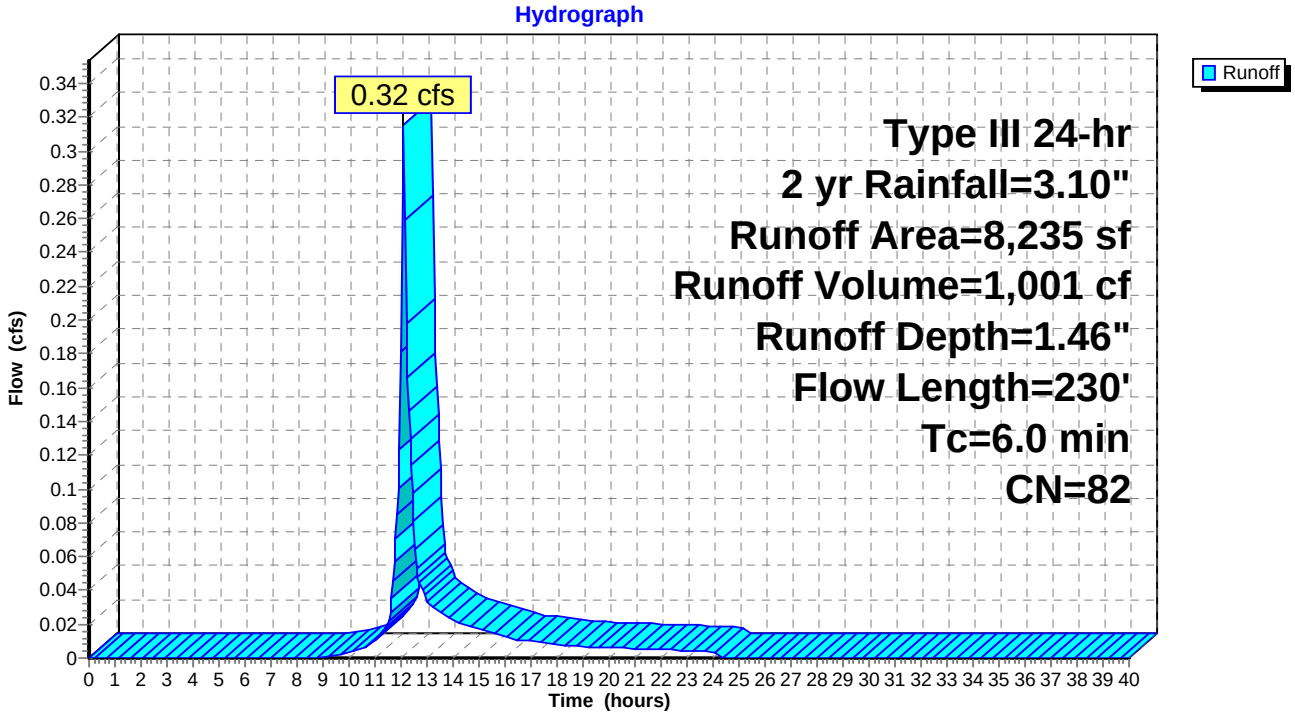
Runoff = 0.32 cfs @ 12.09 hrs, Volume= 1,001 cf, Depth= 1.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 yr Rainfall=3.10"

Area (sf)	CN	Description
794	39	>75% Grass cover, Good, HSG A
441	98	Paved parking, HSG A
255	98	Roofs, HSG A
2,019	98	Paved parking, HSG D
4,726	80	>75% Grass cover, Good, HSG D
8,235	82	Weighted Average
5,520		67.03% Pervious Area
2,715		32.97% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.4	50	0.1800	0.35		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
0.1	45	0.1800	6.83		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.4	135	0.1000	6.42		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
2.9	230	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 10S: PR-CB4



Summary for Subcatchment 11S: PR-CB5

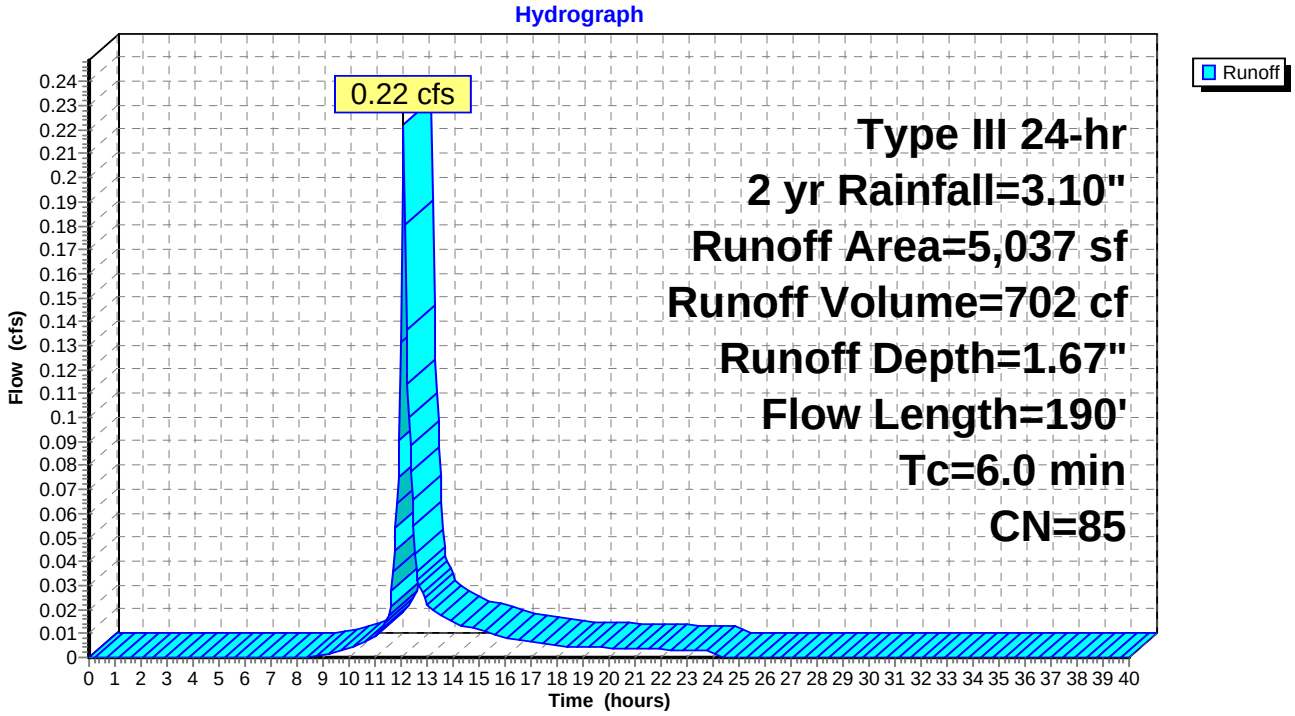
Runoff = 0.22 cfs @ 12.09 hrs, Volume= 702 cf, Depth= 1.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 yr Rainfall=3.10"

Area (sf)	CN	Description
808	39	>75% Grass cover, Good, HSG A
2,348	98	Paved parking, HSG A
1,023	98	Paved parking, HSG D
858	80	>75% Grass cover, Good, HSG D
5,037	85	Weighted Average
1,666		33.08% Pervious Area
3,371		66.92% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.4	25	0.0200	1.03		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.10"
0.4	165	0.1200	7.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.8	190	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 11S: PR-CB5



Summary for Subcatchment 12S: PR-CB6

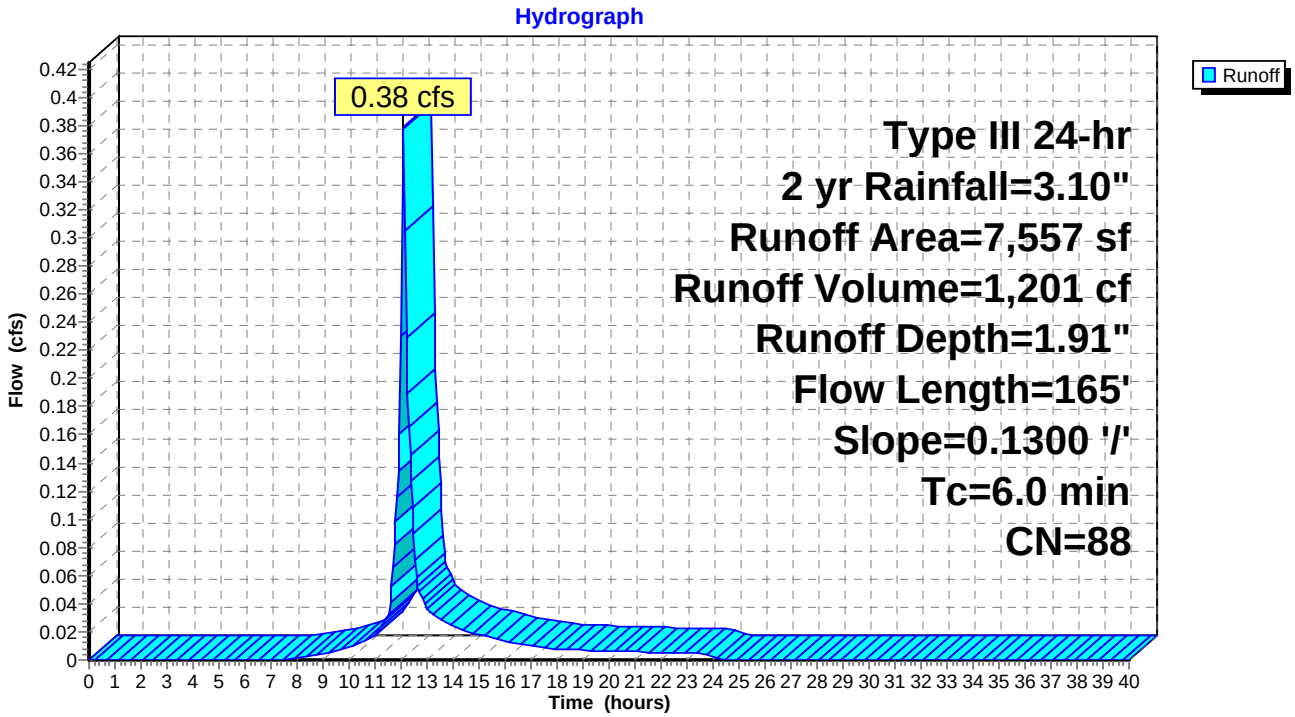
Runoff = 0.38 cfs @ 12.09 hrs, Volume= 1,201 cf, Depth= 1.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 yr Rainfall=3.10"

Area (sf)	CN	Description
864	98	Roofs, HSG D
2,416	98	Paved parking, HSG D
4,277	80	>75% Grass cover, Good, HSG D
7,557	88	Weighted Average
4,277		56.60% Pervious Area
3,280		43.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.7	50	0.1300	0.31		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
0.3	115	0.1300	7.32		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
3.0	165	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 12S: PR-CB6



Summary for Subcatchment 13S: PR-CB10

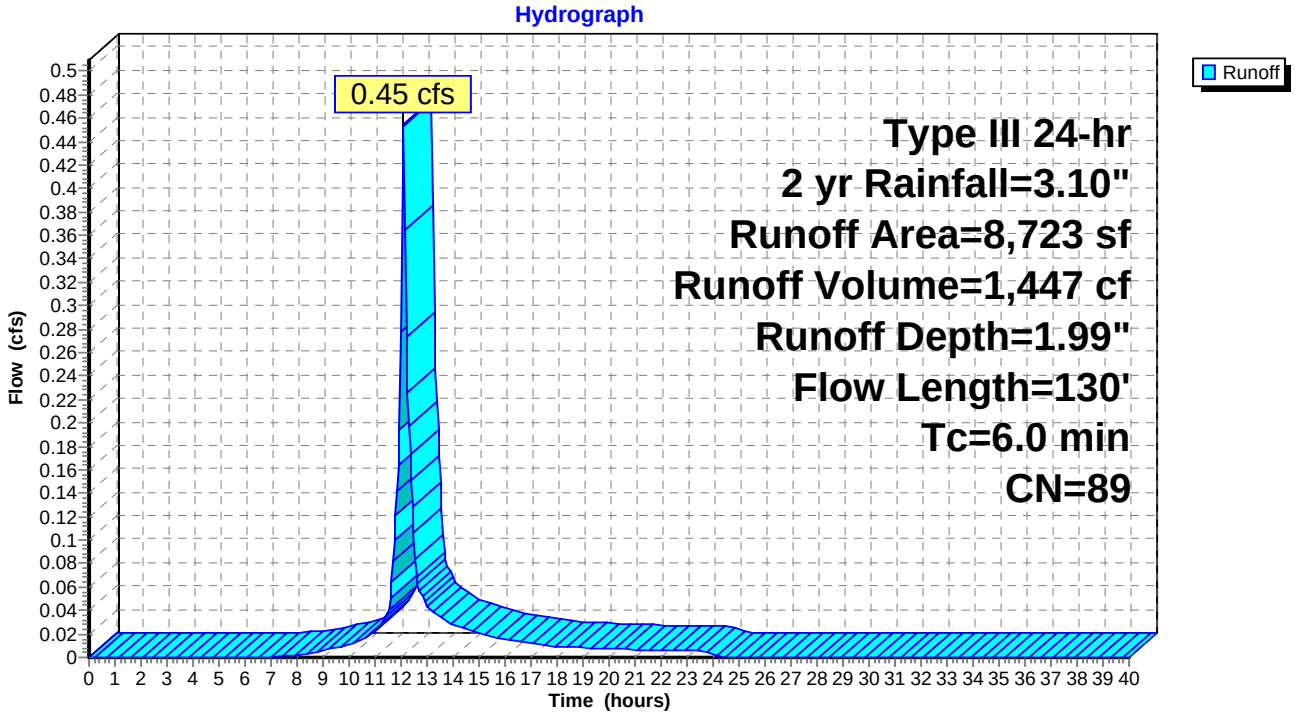
Runoff = 0.45 cfs @ 12.09 hrs, Volume= 1,447 cf, Depth= 1.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 yr Rainfall=3.10"

Area (sf)	CN	Description
4,436	98	Paved parking, HSG D
4,287	80	>75% Grass cover, Good, HSG D
8,723	89	Weighted Average
4,287		49.15% Pervious Area
4,436		50.85% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.0	50	0.0500	0.21		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
0.4	80	0.0300	3.52		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
4.4	130	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 13S: PR-CB10



Summary for Subcatchment 14S: PR-CB11

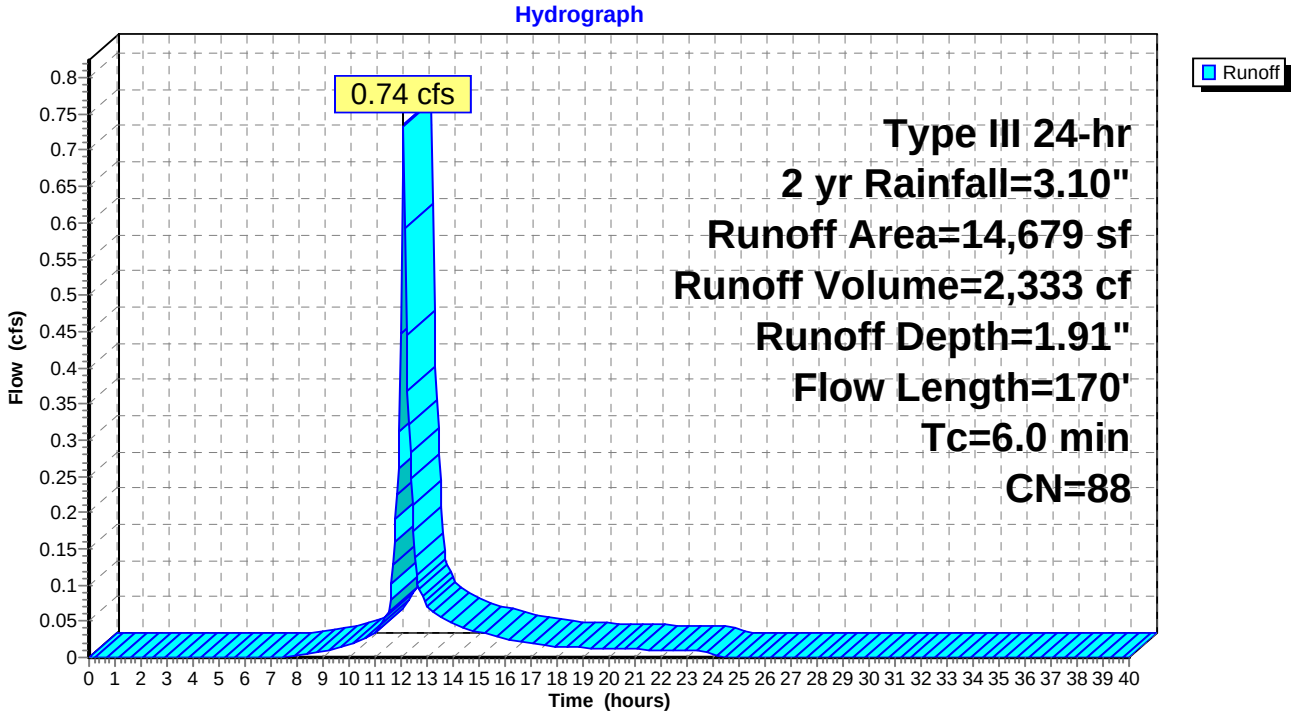
Runoff = 0.74 cfs @ 12.09 hrs, Volume= 2,333 cf, Depth= 1.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 yr Rainfall=3.10"

Area (sf)	CN	Description
6,347	98	Paved parking, HSG D
8,332	80	>75% Grass cover, Good, HSG D
14,679	88	Weighted Average
8,332		56.76% Pervious Area
6,347		43.24% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.9	50	0.0300	0.17		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
0.2	45	0.0670	4.17		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.4	75	0.0300	3.52		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
5.5	170	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 14S: PR-CB11



Summary for Subcatchment 15S: PR-ROOF Lot 7

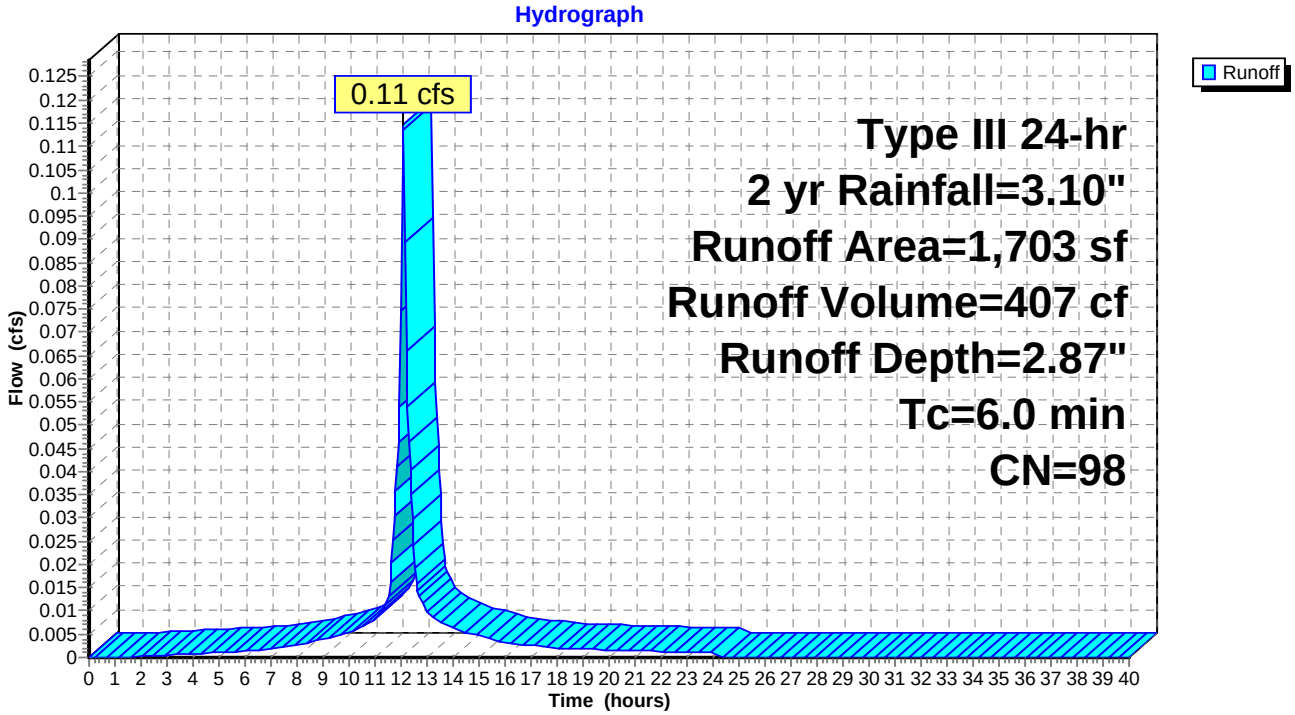
Runoff = 0.11 cfs @ 12.09 hrs, Volume= 407 cf, Depth= 2.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 yr Rainfall=3.10"

Area (sf)	CN	Description
1,703	98	Roofs, HSG D
1,703		100.00% Impervious Area

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

Subcatchment 15S: PR-ROOF Lot 7



Summary for Subcatchment 17S: PR-CB7

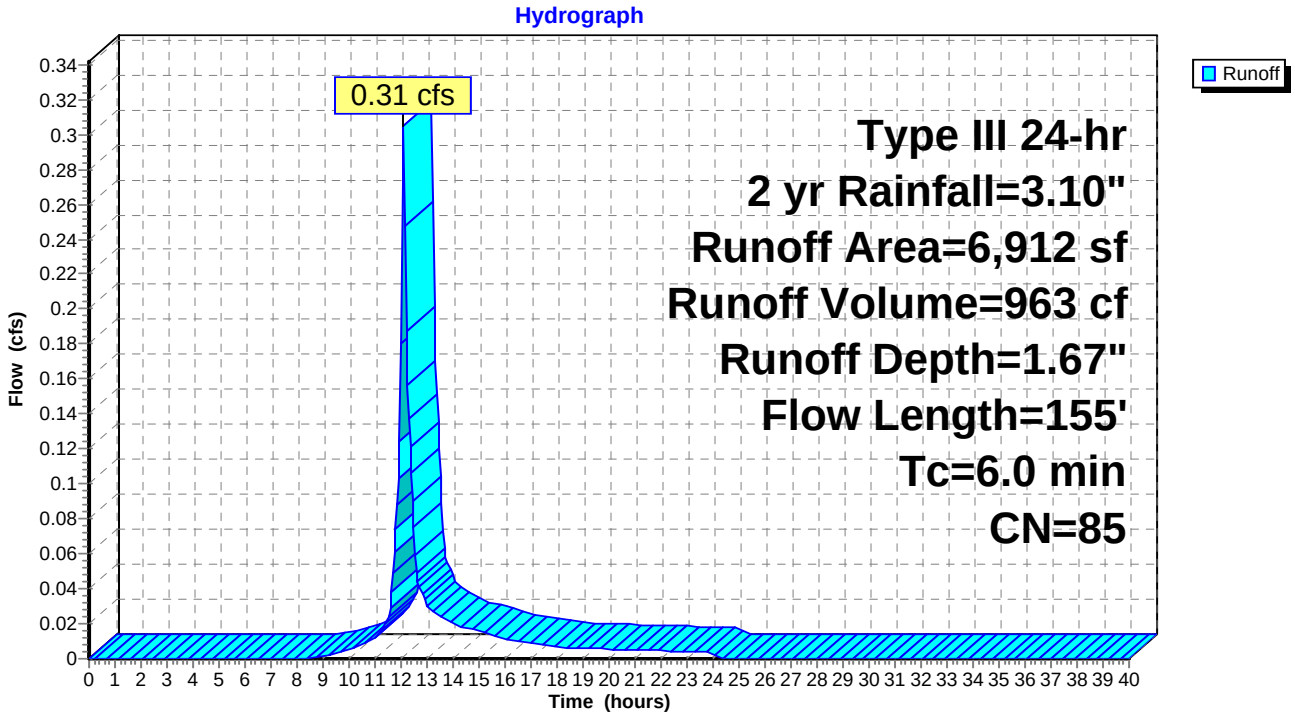
Runoff = 0.31 cfs @ 12.09 hrs, Volume= 963 cf, Depth= 1.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 yr Rainfall=3.10"

Area (sf)	CN	Description
145	98	Roofs, HSG D
1,786	98	Paved parking, HSG D
4,981	80	>75% Grass cover, Good, HSG D
6,912	85	Weighted Average
4,981		72.06% Pervious Area
1,931		27.94% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.0	50	0.1000	0.28		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
0.1	40	0.1300	5.80		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.2	65	0.1300	5.80		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
3.3	155	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 17S: PR-CB7



Summary for Subcatchment 19S: PR-CB8

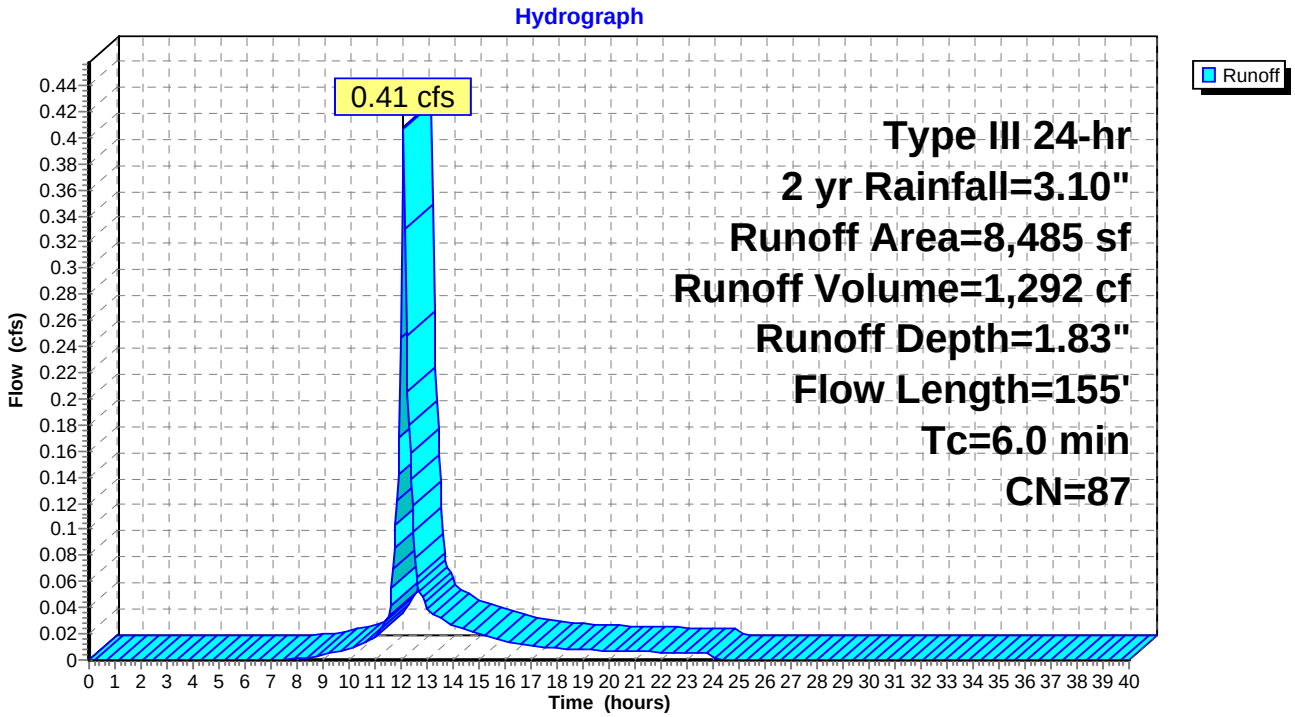
Runoff = 0.41 cfs @ 12.09 hrs, Volume= 1,292 cf, Depth= 1.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 yr Rainfall=3.10"

Area (sf)	CN	Description
2,761	98	Paved parking, HSG D
5,155	80	>75% Grass cover, Good, HSG D
569	98	Roofs, HSG D
8,485	87	Weighted Average
5,155		60.75% Pervious Area
3,330		39.25% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.1	50	0.0900	0.27		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
0.3	105	0.1000	6.42		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
3.4	155	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 19S: PR-CB8



Summary for Subcatchment 20S: PR-CB9

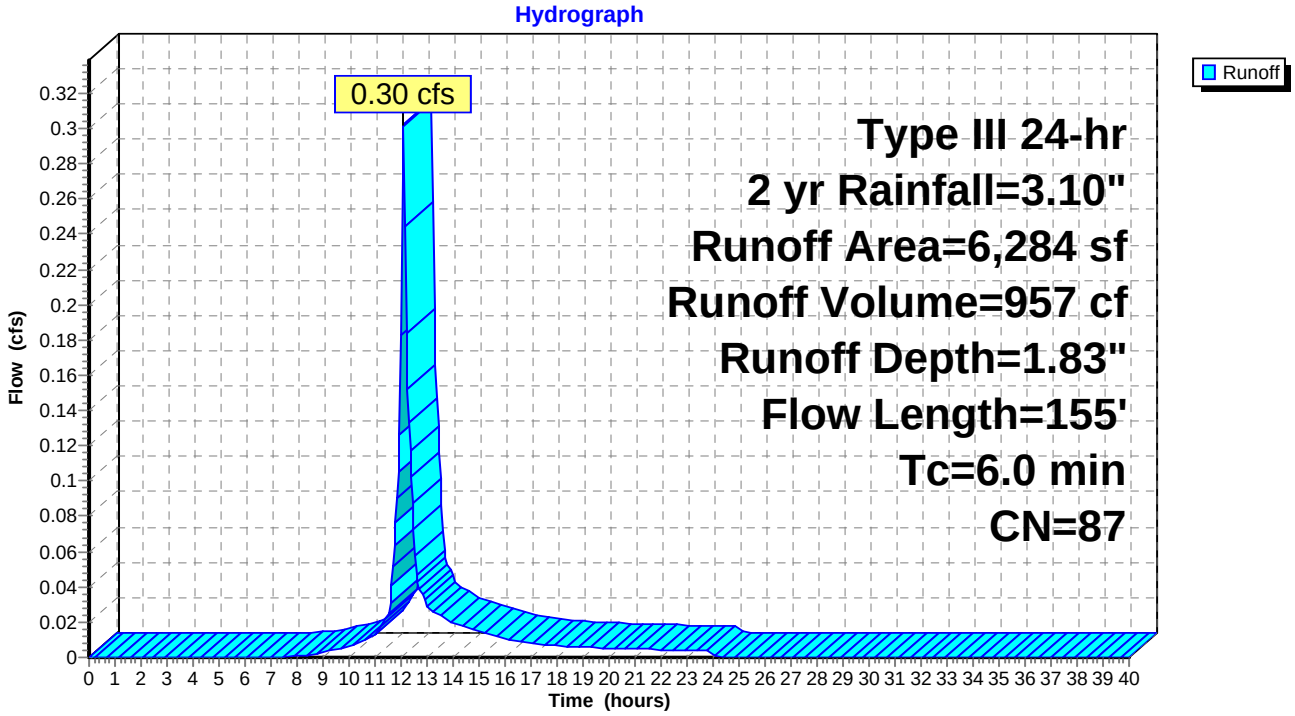
Runoff = 0.30 cfs @ 12.09 hrs, Volume= 957 cf, Depth= 1.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 yr Rainfall=3.10"

Area (sf)	CN	Description
2,609	98	Paved parking, HSG D
3,675	80	>75% Grass cover, Good, HSG D
6,284	87	Weighted Average
3,675		58.48% Pervious Area
2,609		41.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.3	55	0.0950	0.28		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
0.3	100	0.0800	5.74		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
3.6	155	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 20S: PR-CB9



Summary for Subcatchment 78S: Regans Way (No Change)

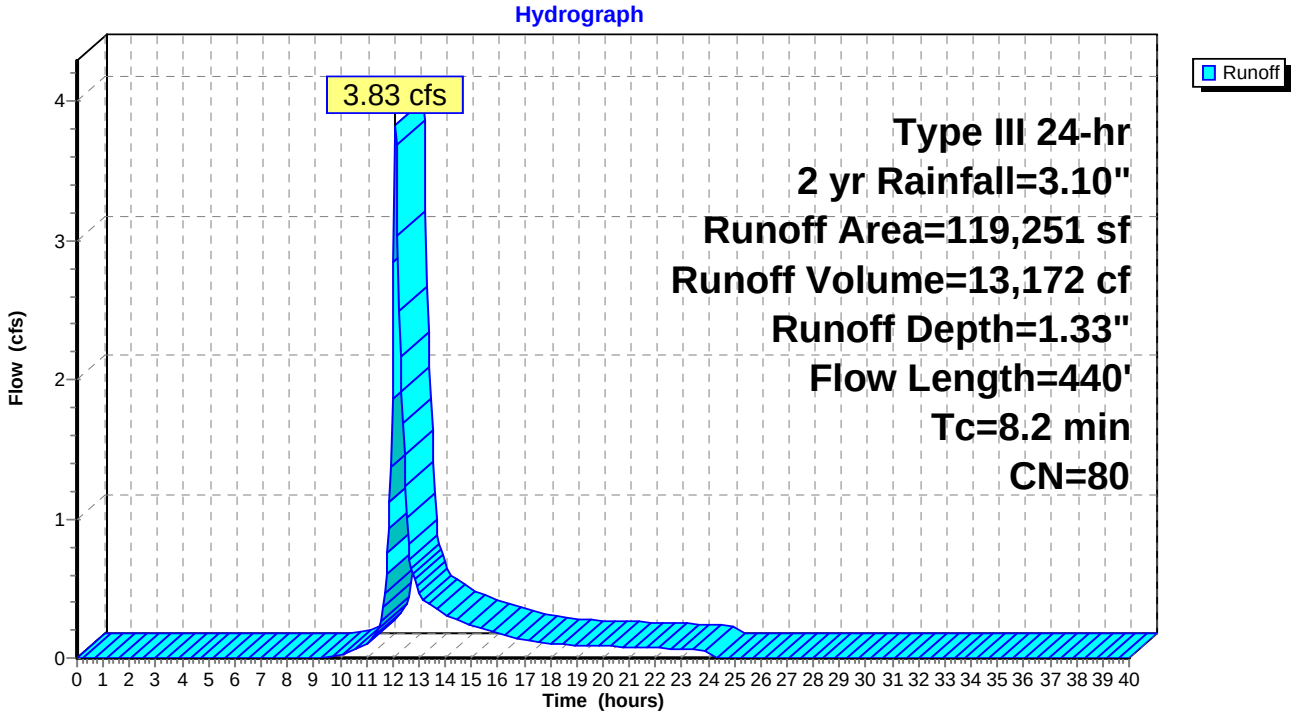
Runoff = 3.83 cfs @ 12.12 hrs, Volume= 13,172 cf, Depth= 1.33"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 yr Rainfall=3.10"

	Area (sf)	CN	Description
*	14,850	98	Ledge, HSG D
	83,151	77	Woods, Good, HSG D
	19,000	80	>75% Grass cover, Good, HSG D
	2,250	98	Unconnected roofs, HSG D
	119,251	80	Weighted Average
	102,151		85.66% Pervious Area
	17,100		14.34% Impervious Area
	2,250		13.16% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.9	100	0.3500	0.24		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
0.1	50	0.1600	6.44		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.7	100	0.0200	2.28		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.5	190	0.1900	7.02		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
8.2	440	Total			

Subcatchment 78S: Regans Way (No Change)



Summary for Subcatchment 81S: EX-HILLSIDE (No Change)

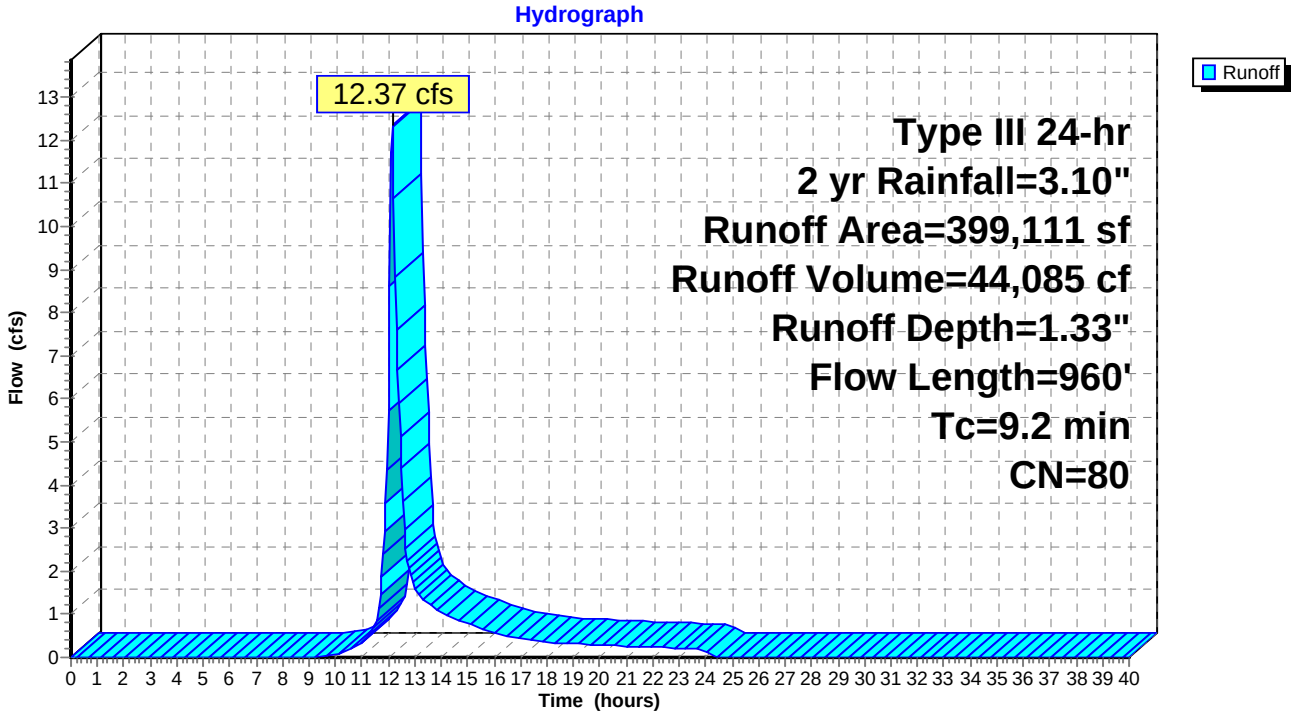
Runoff = 12.37 cfs @ 12.14 hrs, Volume= 44,085 cf, Depth= 1.33"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 yr Rainfall=3.10"

	Area (sf)	CN	Description
*	47,893	98	Ledge, HSG D
	351,218	77	Woods, Good, HSG D
	399,111	80	Weighted Average
	351,218		88.00% Pervious Area
	47,893		12.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	50	0.2000	0.17		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
4.2	910	0.0500	3.60		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
9.2	960	Total			

Subcatchment 81S: EX-HILLSIDE (No Change)



Summary for Subcatchment 83S: EX-WETLAND (No Change)

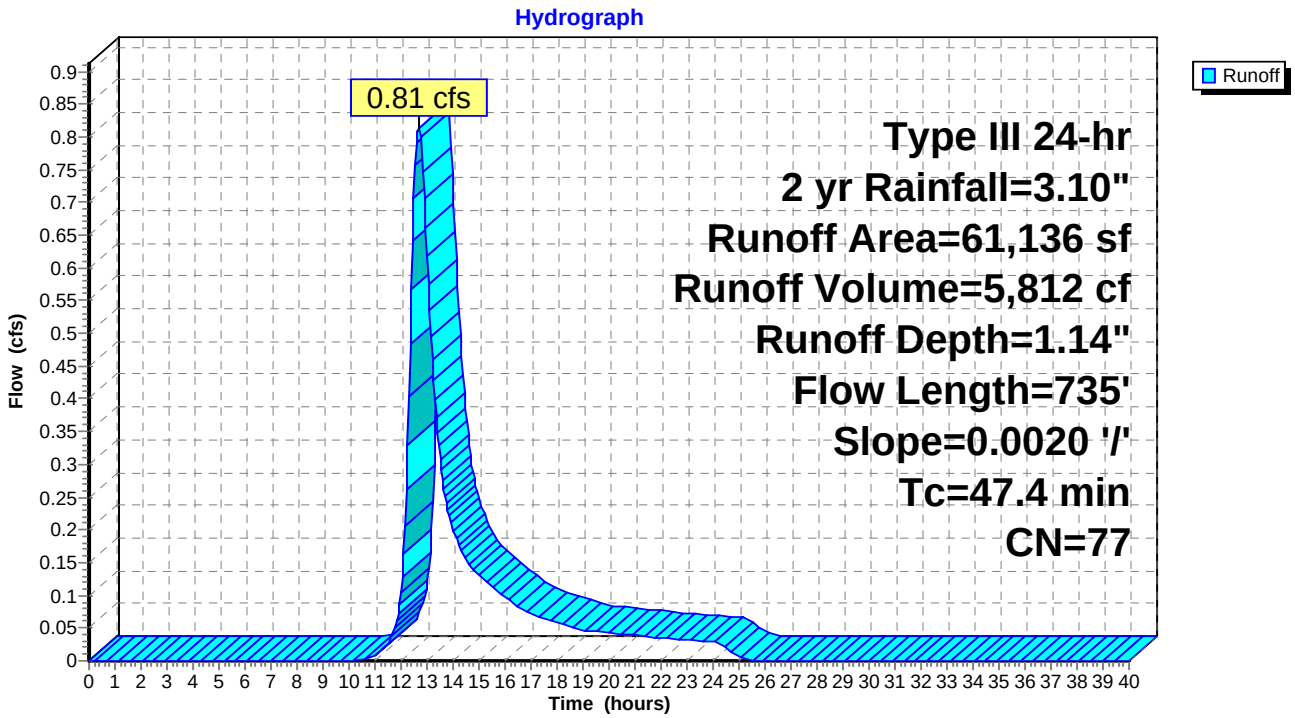
Runoff = 0.81 cfs @ 12.69 hrs, Volume= 5,812 cf, Depth= 1.14"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 yr Rainfall=3.10"

Area (sf)	CN	Description
61,136	77	Woods, Good, HSG D
61,136		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
31.5	50	0.0020	0.03		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
15.9	685	0.0020	0.72		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
47.4	735	Total			

Subcatchment 83S: EX-WETLAND (No Change)



Summary for Subcatchment 84S: PR-EAST

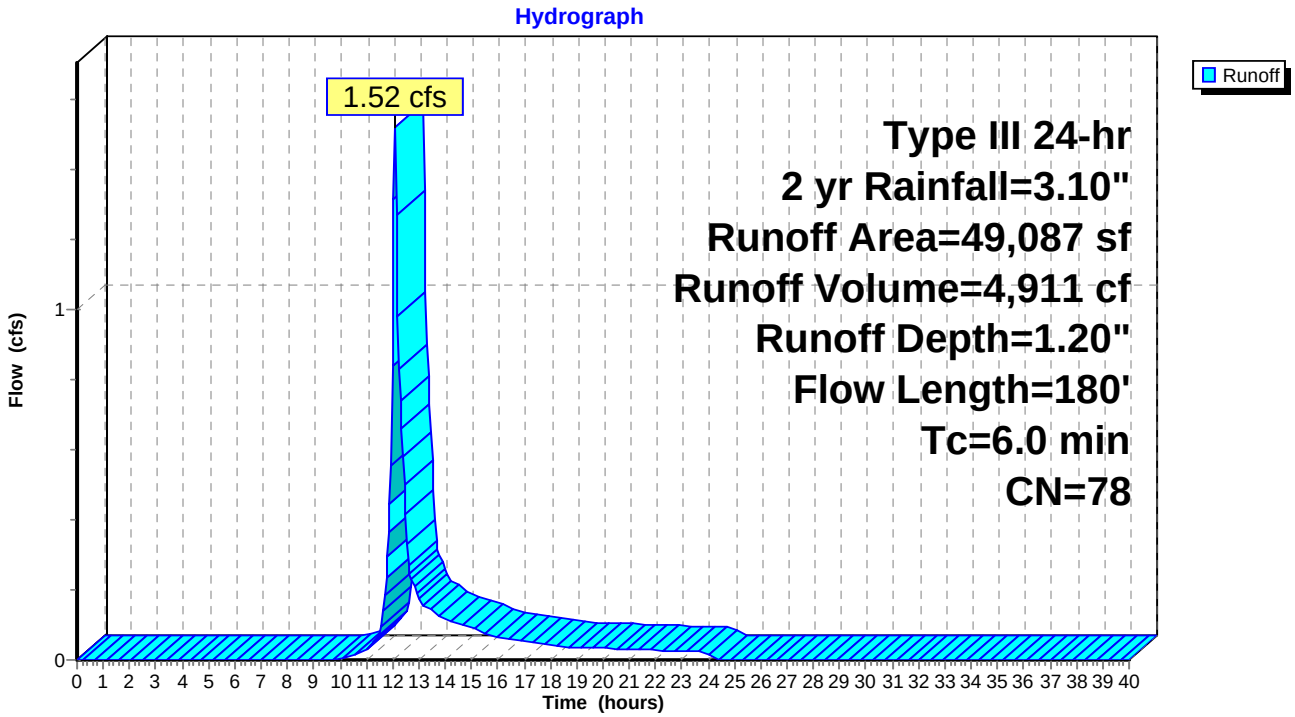
Runoff = 1.52 cfs @ 12.10 hrs, Volume= 4,911 cf, Depth= 1.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 yr Rainfall=3.10"

	Area (sf)	CN	Description
	37,087	77	Woods, Good, HSG D
*	1,000	98	Ledge outcrops, HSG D
	11,000	80	>75% Grass cover, Good, HSG D
	49,087	78	Weighted Average
	48,087		97.96% Pervious Area
	1,000		2.04% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.3	50	0.0800	0.25		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
0.4	130	0.0900	4.83		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
3.7	180	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 84S: PR-EAST



Summary for Subcatchment 85S: PR-STREAM-B

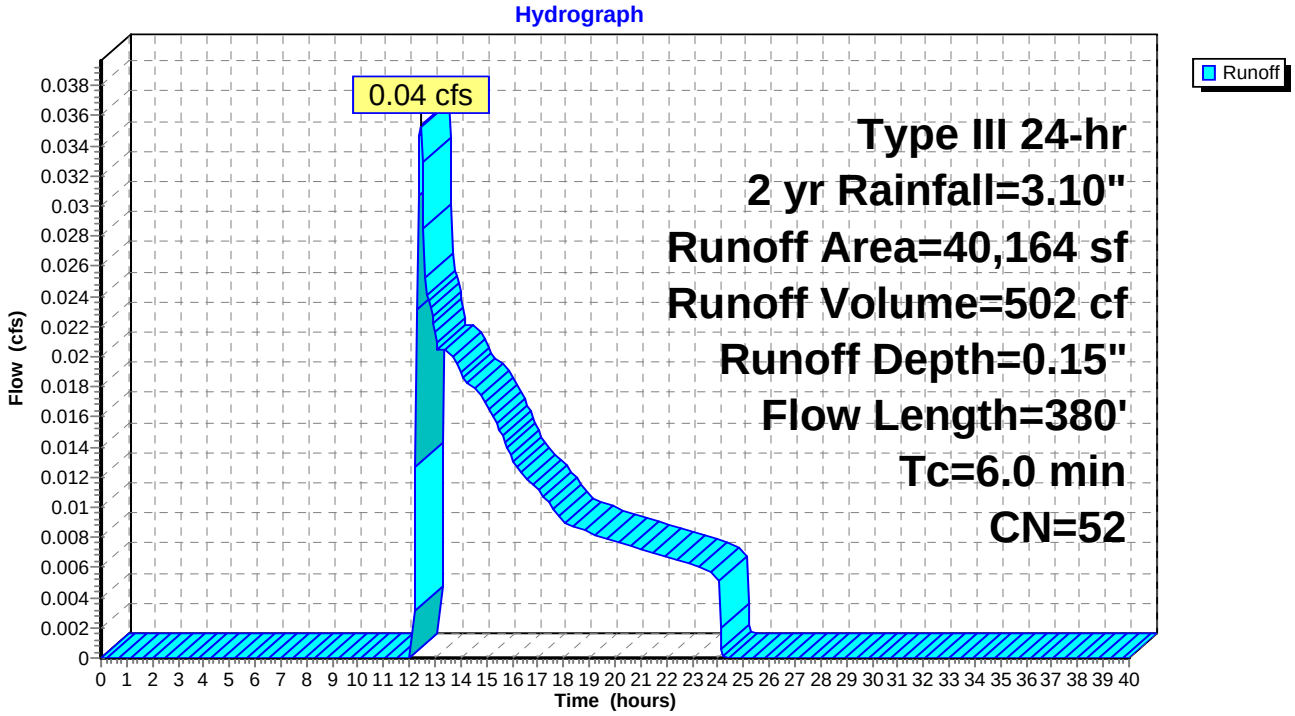
Runoff = 0.04 cfs @ 12.43 hrs, Volume= 502 cf, Depth= 0.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 yr Rainfall=3.10"

	Area (sf)	CN	Description
*	600	98	Ledge, HSG A
	9,383	30	Woods, Good, HSG A
	9,259	77	1/8 acre lots, 65% imp, HSG A
	11,261	54	1/2 acre lots, 25% imp, HSG A
	283	98	Roofs, HSG A
	378	80	>75% Grass cover, Good, HSG D
	9,000	39	>75% Grass cover, Good, HSG A
	40,164	52	Weighted Average
	30,447		75.81% Pervious Area
	9,717		24.19% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.4	50	0.1800	0.35		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
0.3	150	0.2700	8.37		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.3	180	0.0700	11.19	67.12	**Channel Flow,** Area= 6.0 sf Perim= 10.0' r= 0.60' n= 0.025
3.0	380	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 85S: PR-STREAM-B



Summary for Subcatchment 89S: PR-MAPLE

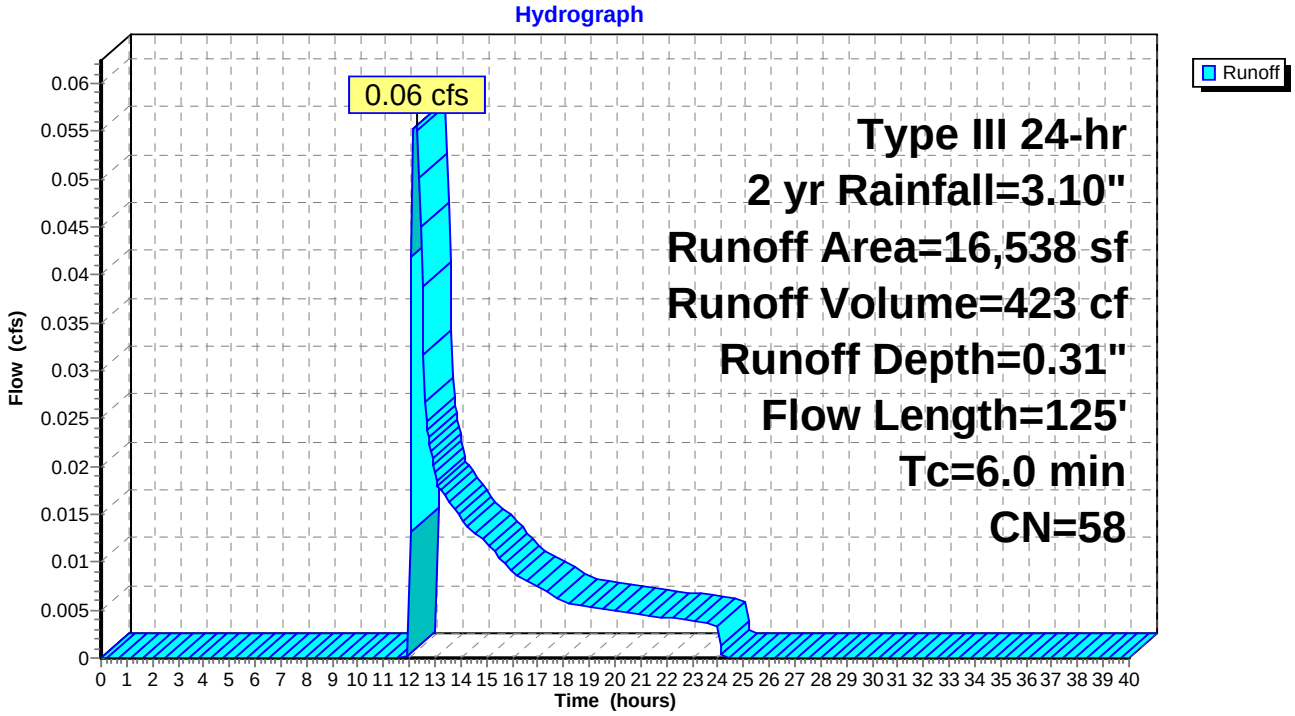
Runoff = 0.06 cfs @ 12.26 hrs, Volume= 423 cf, Depth= 0.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 yr Rainfall=3.10"

Area (sf)	CN	Description
4,000	30	Woods, Good, HSG A
3,444	98	Paved parking, HSG A
3,688	77	1/8 acre lots, 65% imp, HSG A
5,406	39	>75% Grass cover, Good, HSG A
16,538	58	Weighted Average
10,697		64.68% Pervious Area
5,841		35.32% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.2	50	0.2200	0.38		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
0.1	55	0.2200	7.55		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.0	10	0.0800	5.74		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.1	10	0.0240	3.14		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
2.4	125	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 89S: PR-MAPLE



Summary for Subcatchment 90S: EX-CB4R

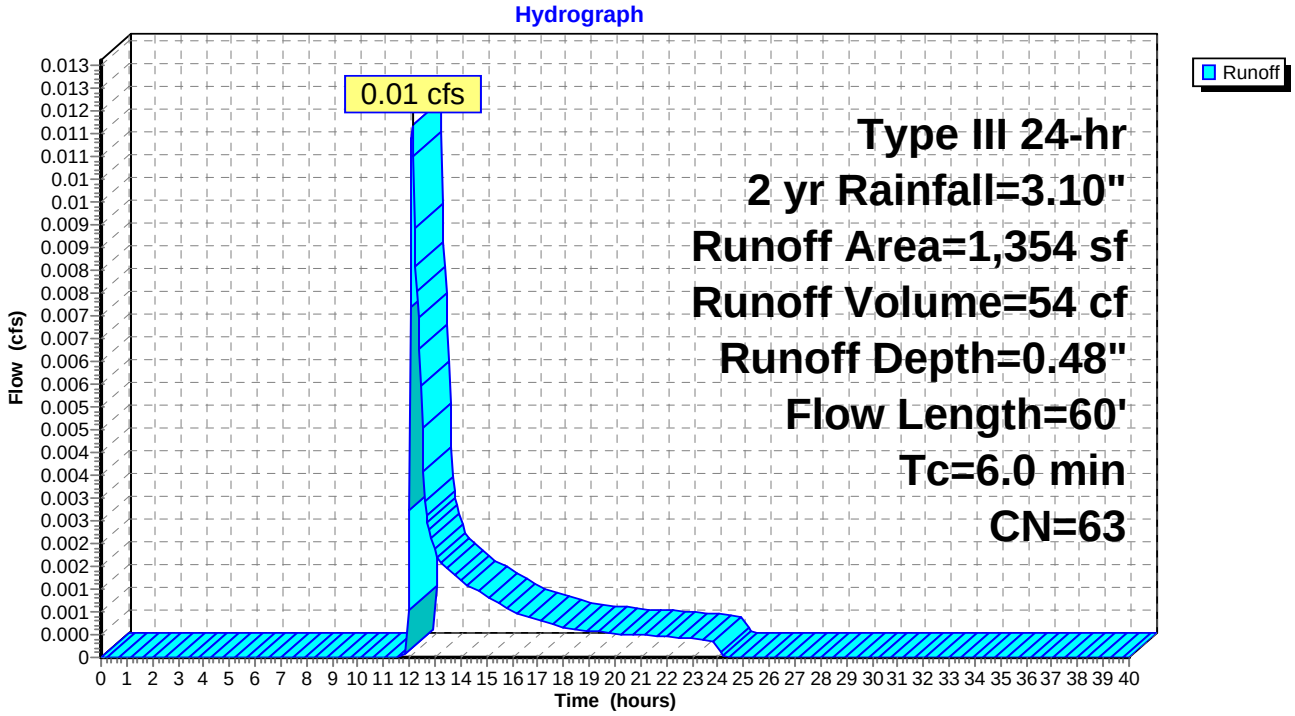
Runoff = 0.01 cfs @ 12.12 hrs, Volume= 54 cf, Depth= 0.48"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 yr Rainfall=3.10"

Area (sf)	CN	Description
814	39	>75% Grass cover, Good, HSG A
540	98	Paved parking, HSG A
1,354	63	Weighted Average
814		60.12% Pervious Area
540		39.88% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.7	40	0.2800	0.40		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
0.1	20	0.0900	6.09		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.8	60	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 90S: EX-CB4R



Summary for Subcatchment 91S: EX-CB3R2

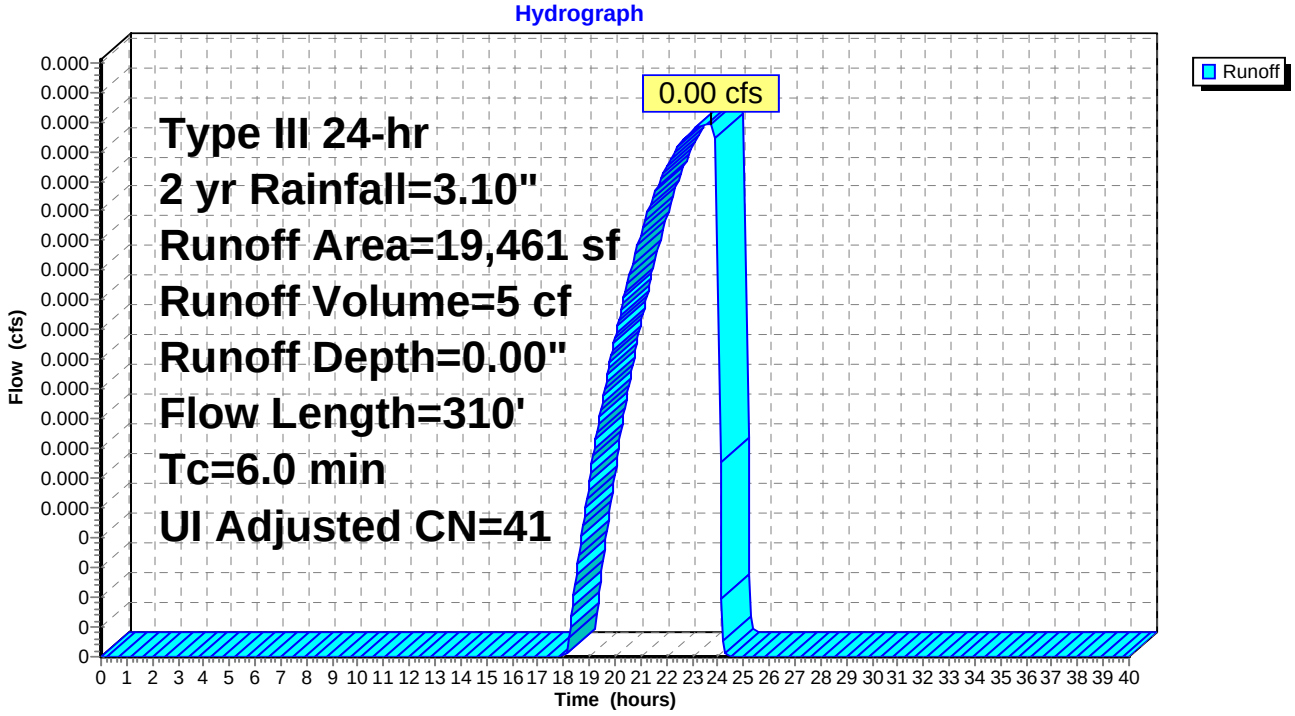
Runoff = 0.00 cfs @ 23.77 hrs, Volume= 5 cf, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 yr Rainfall=3.10"

Area (sf)	CN	Adj	Description
1,303	98		Paved parking, HSG A
12,815	39		>75% Grass cover, Good, HSG A
343	98		Unconnected roofs, HSG A
5,000	30		Woods, Good, HSG A
19,461	42	41	Weighted Average, UI Adjusted
17,815			91.54% Pervious Area
1,646			8.46% Impervious Area
343			20.84% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.6	50	0.2400	0.18		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
0.5	260	0.3300	9.25		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
5.1	310	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 91S: EX-CB3R2



Summary for Subcatchment 92S: EX-CB2R

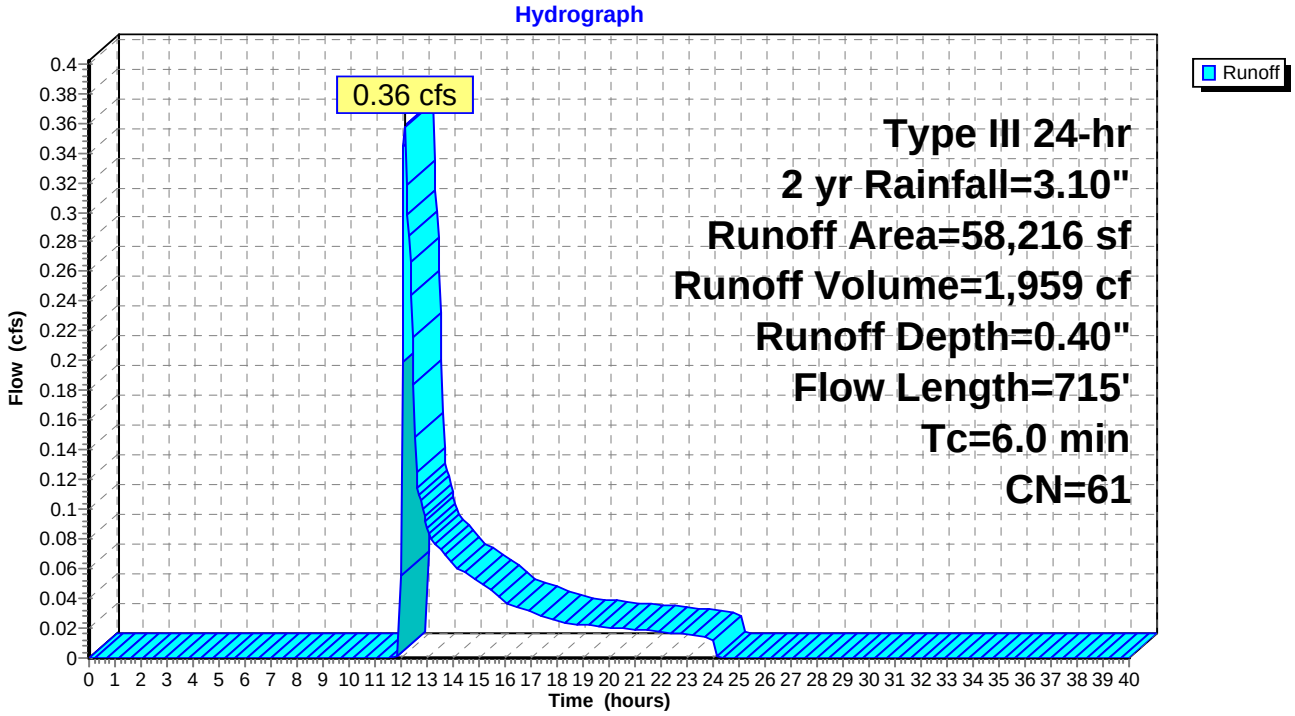
Runoff = 0.36 cfs @ 12.14 hrs, Volume= 1,959 cf, Depth= 0.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 yr Rainfall=3.10"

	Area (sf)	CN	Description
	10,719	30	Woods, Good, HSG A
	8,032	98	Paved parking, HSG A
	3,333	77	1/8 acre lots, 65% imp, HSG A
*	400	98	Ledge, HSG A
	12,040	54	1/2 acre lots, 25% imp, HSG A
	20,259	61	1/4 acre lots, 38% imp, HSG A
	2,594	80	>75% Grass cover, Good, HSG D
	839	98	Roofs, HSG D
	58,216	61	Weighted Average
	36,070		61.96% Pervious Area
	22,146		38.04% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.4	50	0.1800	0.35		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
0.2	125	0.3500	9.52		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
2.7	540	0.0260	3.27		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
5.3	715	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 92S: EX-CB2R



Summary for Subcatchment 95S: EX-CB1R

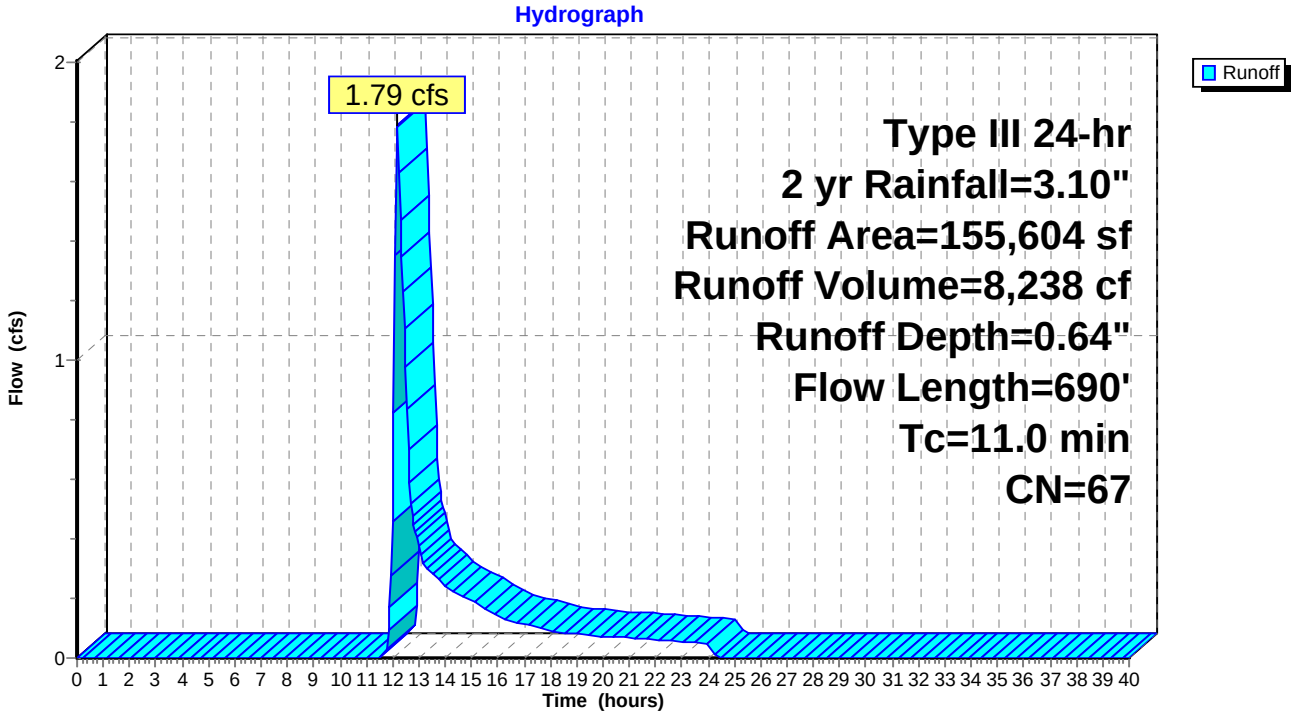
Runoff = 1.79 cfs @ 12.19 hrs, Volume= 8,238 cf, Depth= 0.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 yr Rainfall=3.10"

	Area (sf)	CN	Description
	45,701	30	Woods, Good, HSG A
	70,444	77	Woods, Good, HSG D
	10,120	98	Paved parking, HSG A
*	7,612	98	Ledge, HSG A
*	5,727	98	Ledge, HSG D
	16,000	80	>75% Grass cover, Good, HSG D
	155,604	67	Weighted Average
	132,145		84.92% Pervious Area
	23,459		15.08% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.5	50	0.0100	0.11		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
0.9	90	0.0100	1.61		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.8	310	0.1700	6.64		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
1.8	240	0.0120	2.22		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
11.0	690	Total			

Subcatchment 95S: EX-CB1R



Summary for Pond 1P: Subsurface Infiltration Structure (Lot 9)

Inflow Area = 56,609 sf, 39.15% Impervious, Inflow Depth = 0.65" for 2 yr event
Inflow = 0.76 cfs @ 12.11 hrs, Volume= 3,074 cf
Outflow = 0.13 cfs @ 12.00 hrs, Volume= 3,076 cf, Atten= 83%, Lag= 0.0 min
Discarded = 0.13 cfs @ 12.00 hrs, Volume= 3,076 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 80.63' @ 12.86 hrs Surf.Area= 2,390 sf Storage= 741 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 40.0 min (912.3 - 872.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	80.00'	2,015 cf	**40.17'W x 59.50'L x 3.54'H Field A** 8,464 cf Overall - 3,427 cf Embedded = 5,037 cf x 40.0% Voids
#2A	80.50'	3,427 cf	**Cultec R-330XLHD** x 64 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 8 rows
		5,442 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	77.00'	**12.0" Round Culvert** L= 80.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 77.00' / 73.00' S= 0.0500 '/' Cc= 0.900 n= 0.010, Flow Area= 0.79 sf
#2	Device 1	81.00'	**4.0" Vert. Orifice/Grate** C= 0.600
#3	Discarded	80.00'	**2.410 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.13 cfs @ 12.00 hrs HW=80.06' (Free Discharge)
└**3=Exfiltration** (Exfiltration Controls 0.13 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=80.00' TW=0.00' (Dynamic Tailwater)
└**1=Culvert** (Passes 0.00 cfs of 5.98 cfs potential flow)
└**2=Orifice/Grate** (Controls 0.00 cfs)

Pond 1P: Subsurface Infiltration Structure (Lot 9) - Chamber Wizard Field A

Chamber Model = Cultec R-330XLHD (Cultec Recharger® 330XLHD)
Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf
Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap
Row Length Adjustment= +1.50' x 7.45 sf x 8 rows

52.0" Wide + 6.0" Spacing = 58.0" C-C Row Spacing

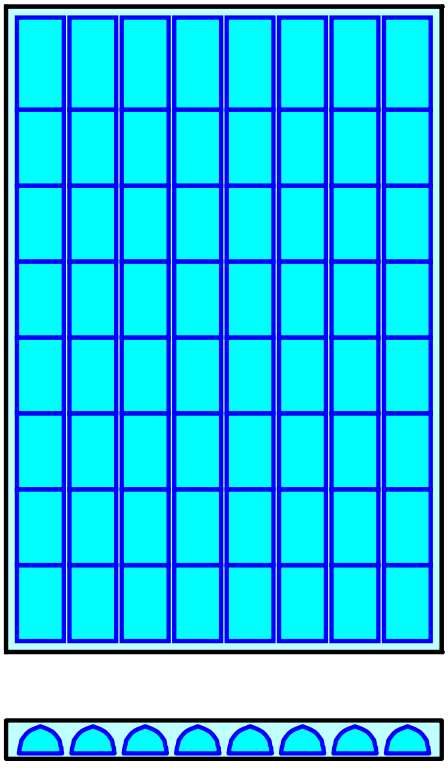
8 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 57.50' Row Length +12.0" End Stone x 2 = 59.50' Base Length
8 Rows x 52.0" Wide + 6.0" Spacing x 7 + 12.0" Side Stone x 2 = 40.17' Base Width
6.0" Base + 30.5" Chamber Height + 6.0" Cover = 3.54' Field Height

64 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 8 Rows = 3,427.5 cf Chamber Storage

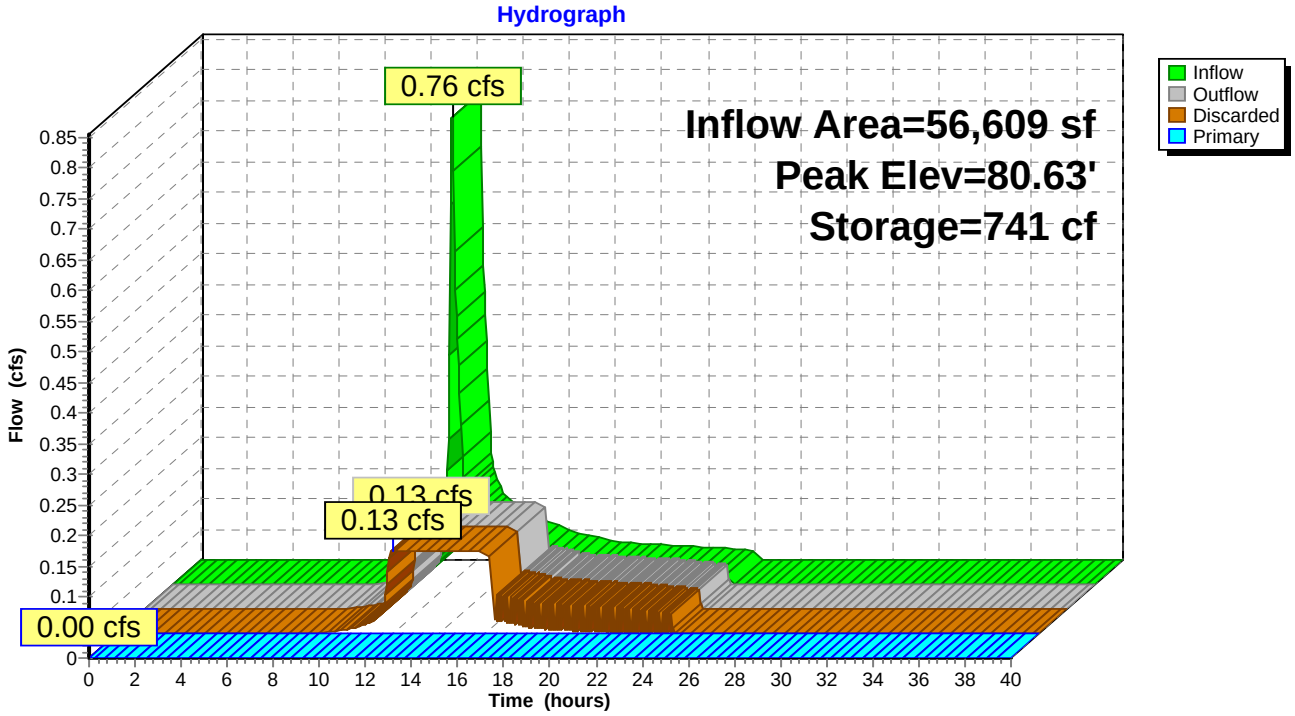
8,464.3 cf Field - 3,427.5 cf Chambers = 5,036.8 cf Stone x 40.0% Voids = 2,014.7 cf Stone Storage

Chamber Storage + Stone Storage = 5,442.2 cf = 0.125 af
Overall Storage Efficiency = 64.3%
Overall System Size = 59.50' x 40.17' x 3.54'

64 Chambers
313.5 cy Field
186.5 cy Stone



Pond 1P: Subsurface Infiltration Structure (Lot 9)



Summary for Pond 2P: Subsurface Infiltration Structure 1 (STA 3+50)

Inflow Area = 14,469 sf, 36.01% Impervious, Inflow Depth = 1.80" for 2 yr event
Inflow = 0.68 cfs @ 12.09 hrs, Volume= 2,165 cf
Outflow = 0.02 cfs @ 11.30 hrs, Volume= 2,166 cf, Atten= 97%, Lag= 0.0 min
Discarded = 0.02 cfs @ 11.30 hrs, Volume= 2,166 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 108.27' @ 16.05 hrs Surf.Area= 988 sf Storage= 1,252 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 526.7 min (1,348.0 - 821.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	106.46'	856 cf	**25.67'W x 38.50'L x 3.54'H Field A** 3,500 cf Overall - 1,360 cf Embedded = 2,140 cf x 40.0% Voids
#2A	106.96'	1,360 cf	**Cultec R-330XLHD** x 25 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 5 rows
		2,216 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	106.46'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	108.50'	**8.0" Round Culvert** L= 16.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 108.50' / 106.50' S= 0.1250 '/' Cc= 0.900 n= 0.010, Flow Area= 0.35 sf

Discarded OutFlow Max=0.02 cfs @ 11.30 hrs HW=106.50' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=106.46' TW=99.50' (Dynamic Tailwater)
↑**2=Culvert** (Controls 0.00 cfs)

Pond 2P: Subsurface Infiltration Structure 1 (STA 3+50) - Chamber Wizard Field A

Chamber Model = Cultec R-330XLHD (Cultec Recharger® 330XLHD)
Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf
Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap
Row Length Adjustment= +1.50' x 7.45 sf x 5 rows

52.0" Wide + 6.0" Spacing = 58.0" C-C Row Spacing

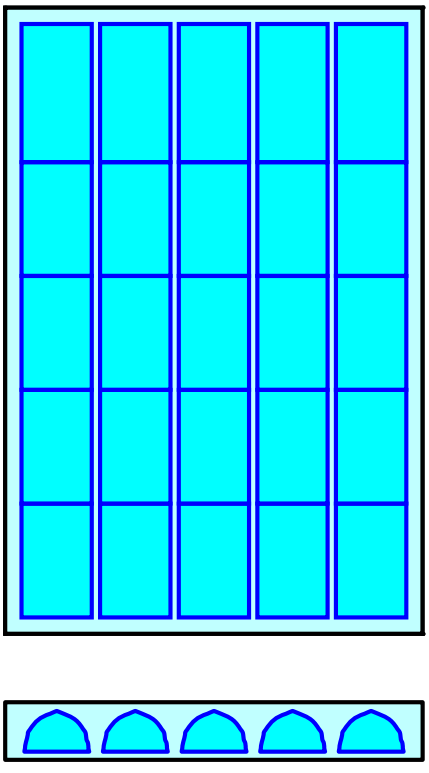
5 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 36.50' Row Length +12.0" End Stone x 2 = 38.50' Base Length
5 Rows x 52.0" Wide + 6.0" Spacing x 4 + 12.0" Side Stone x 2 = 25.67' Base Width
6.0" Base + 30.5" Chamber Height + 6.0" Cover = 3.54' Field Height

25 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 5 Rows = 1,359.8 cf Chamber Storage

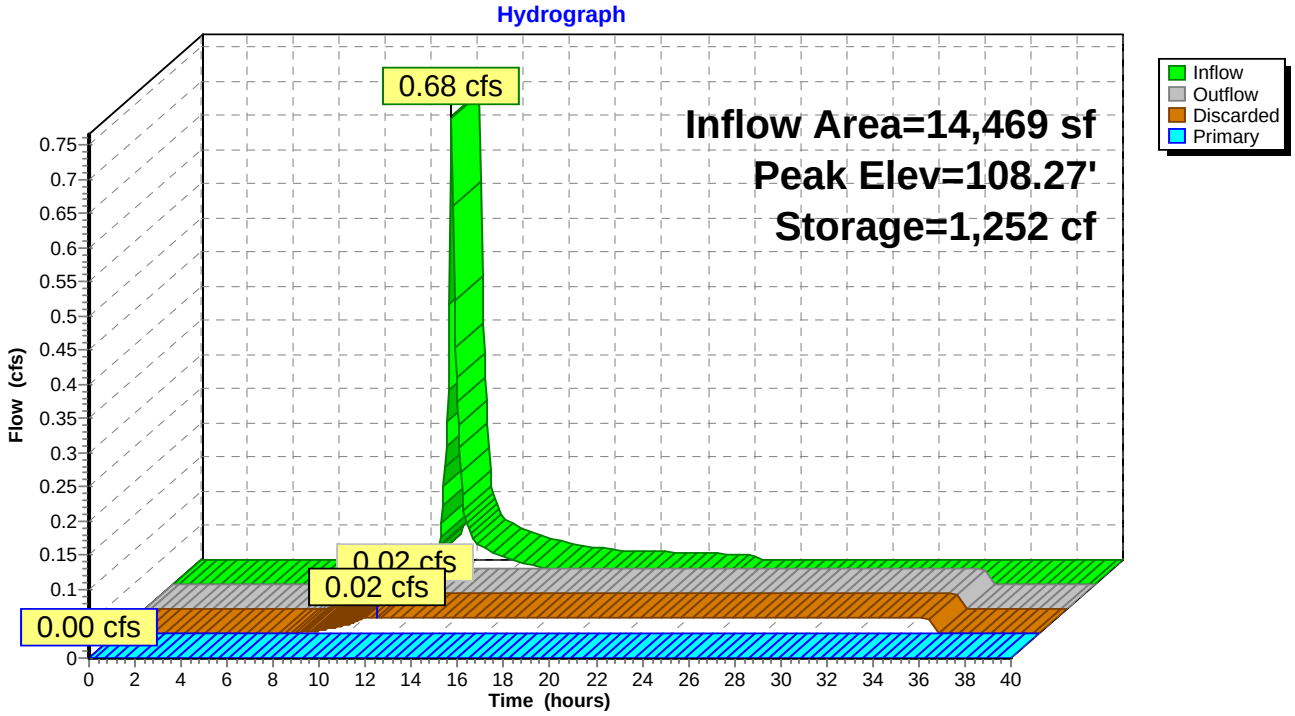
3,499.8 cf Field - 1,359.8 cf Chambers = 2,139.9 cf Stone x 40.0% Voids = 856.0 cf Stone Storage

Chamber Storage + Stone Storage = 2,215.8 cf = 0.051 af
Overall Storage Efficiency = 63.3%
Overall System Size = 38.50' x 25.67' x 3.54'

25 Chambers
129.6 cy Field
79.3 cy Stone



Pond 2P: Subsurface Infiltration Structure 1 (STA 3+50)



Summary for Pond 3P: Subsurface Infiltration Structure 2 (Rear of Lot 7)

Inflow Area = 16,472 sf, 46.39% Impervious, Inflow Depth = 1.93" for 2 yr event
Inflow = 0.83 cfs @ 12.09 hrs, Volume= 2,655 cf
Outflow = 0.04 cfs @ 11.45 hrs, Volume= 2,658 cf, Atten= 96%, Lag= 0.0 min
Discarded = 0.04 cfs @ 11.45 hrs, Volume= 2,658 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 123.30' @ 15.29 hrs Surf.Area= 1,527 sf Storage= 1,371 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 363.8 min (1,174.3 - 810.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	121.96'	1,307 cf	**25.67'W x 59.50'L x 3.54'H Field A** 5,409 cf Overall - 2,142 cf Embedded = 3,267 cf x 40.0% Voids
#2A	122.46'	2,142 cf	**Cultec R-330XLHD** x 40 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 5 rows
		3,449 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	121.96'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	123.75'	**12.0" Round Culvert** L= 16.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 123.75' / 122.00' S= 0.1094 '/' Cc= 0.900 n= 0.010, Flow Area= 0.79 sf

Discarded OutFlow Max=0.04 cfs @ 11.45 hrs HW=122.00' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.04 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=121.96' TW=99.50' (Dynamic Tailwater)
↑**2=Culvert** (Controls 0.00 cfs)

Pond 3P: Subsurface Infiltration Structure 2 (Rear of Lot 7) - Chamber Wizard Field A

Chamber Model = Cultec R-330XLHD (Cultec Recharger® 330XLHD)
Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf
Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap
Row Length Adjustment= +1.50' x 7.45 sf x 5 rows

52.0" Wide + 6.0" Spacing = 58.0" C-C Row Spacing

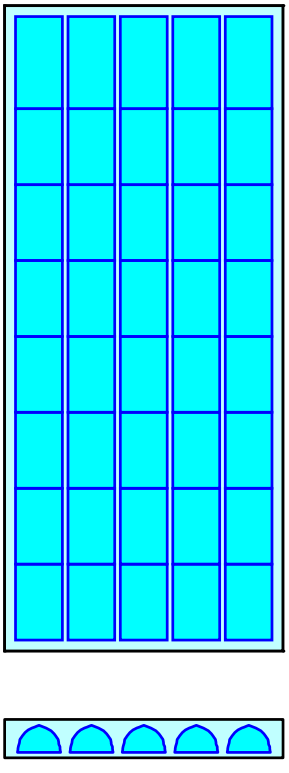
8 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 57.50' Row Length +12.0" End Stone x 2 = 59.50' Base Length
5 Rows x 52.0" Wide + 6.0" Spacing x 4 + 12.0" Side Stone x 2 = 25.67' Base Width
6.0" Base + 30.5" Chamber Height + 6.0" Cover = 3.54' Field Height

40 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 5 Rows = 2,142.2 cf Chamber Storage

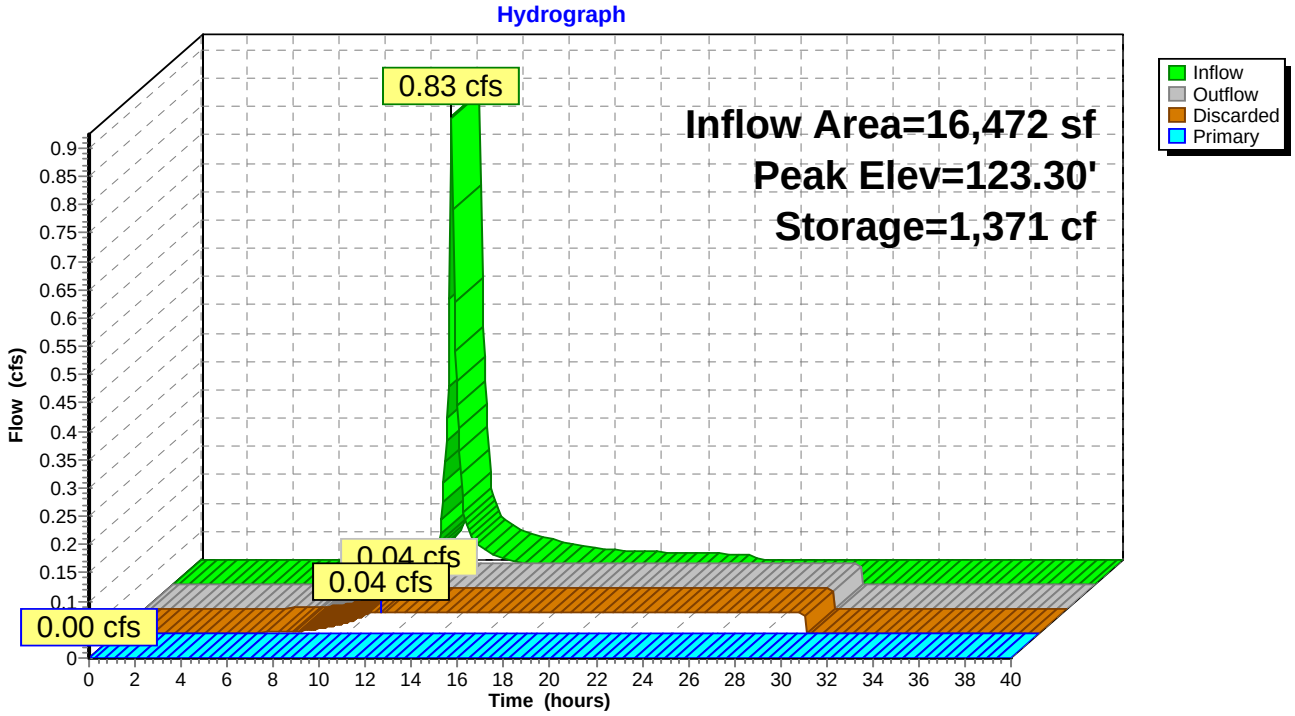
5,408.7 cf Field - 2,142.2 cf Chambers = 3,266.6 cf Stone x 40.0% Voids = 1,306.6 cf Stone Storage

Chamber Storage + Stone Storage = 3,448.8 cf = 0.079 af
Overall Storage Efficiency = 63.8%
Overall System Size = 59.50' x 25.67' x 3.54'

40 Chambers
200.3 cy Field
121.0 cy Stone



Pond 3P: Subsurface Infiltration Structure 2 (Rear of Lot 7)



Summary for Pond 4P: Infiltration Trench - Revised

Inflow Area = 23,402 sf, 46.08% Impervious, Inflow Depth = 1.94" for 2 yr event
Inflow = 1.19 cfs @ 12.09 hrs, Volume= 3,780 cf
Outflow = 1.17 cfs @ 12.11 hrs, Volume= 3,781 cf, Atten= 2%, Lag= 1.0 min
Discarded = 0.01 cfs @ 9.70 hrs, Volume= 1,346 cf
Primary = 1.15 cfs @ 12.11 hrs, Volume= 2,435 cf
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 123.42' @ 12.11 hrs Surf.Area= 627 sf Storage= 606 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 141.5 min (956.3 - 814.8)

Volume	Invert	Avail.Storage	Storage Description
#1	121.00'	878 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc) 2,195 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
121.00	627	0	0
122.00	627	627	627
123.00	627	627	1,254
124.00	627	627	1,881
124.50	627	314	2,195

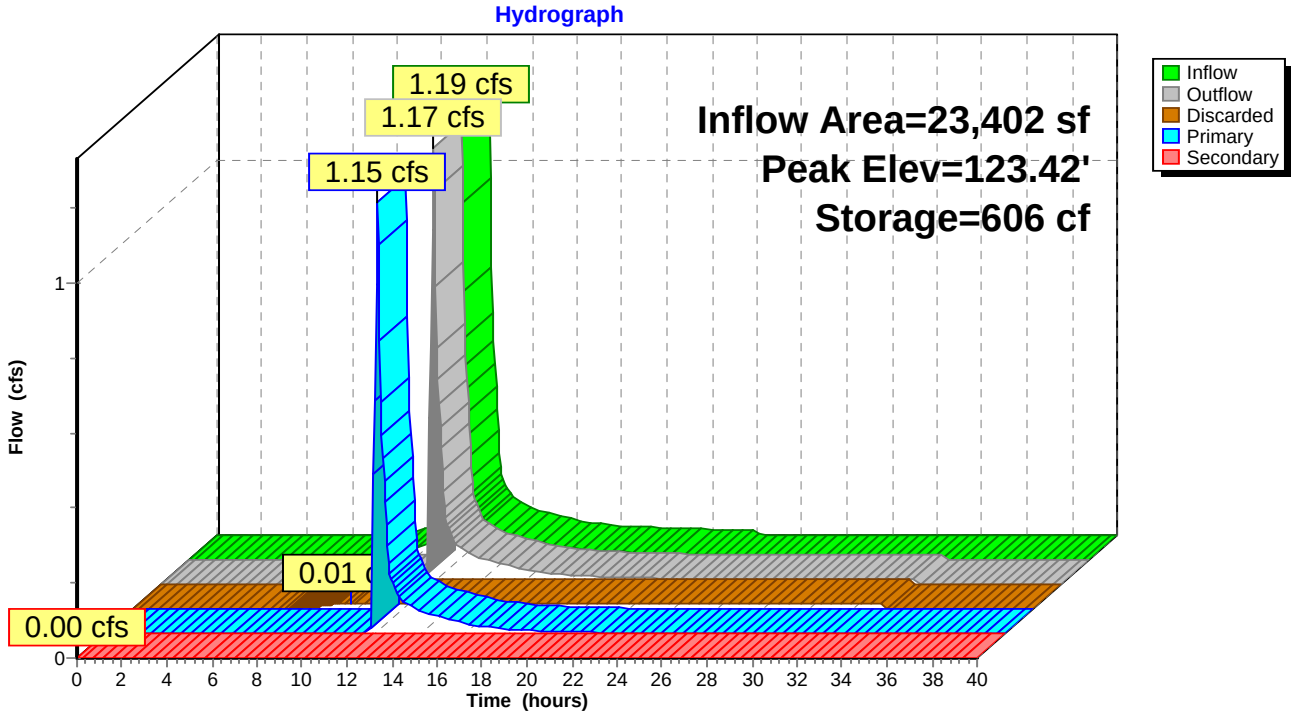
Device	Routing	Invert	Outlet Devices
#1	Secondary	124.50'	**65.0' long x 1.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32
#2	Discarded	121.00'	**1.020 in/hr Exfiltration over Surface area**
#3	Primary	123.00'	**6.0" Round Culvert X 3.00** L= 6.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 123.00' / 122.50' S= 0.0833 '/' Cc= 0.900 n= 0.010, Flow Area= 0.20 sf

Discarded OutFlow Max=0.01 cfs @ 9.70 hrs HW=121.04' (Free Discharge)
└**2=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=1.13 cfs @ 12.11 hrs HW=123.41' TW=0.00' (Dynamic Tailwater)
└**3=Culvert** (Inlet Controls 1.13 cfs @ 2.18 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=121.00' TW=0.00' (Dynamic Tailwater)
└**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 4P: Infiltration Trench - Revised



Summary for Pond 15P: Proposed Box Culvert

Inflow Area = 132,625 sf, 22.75% Impervious, Inflow Depth = 0.59" for 2 yr event
Inflow = 1.80 cfs @ 12.11 hrs, Volume= 6,529 cf
Outflow = 1.80 cfs @ 12.11 hrs, Volume= 6,529 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.80 cfs @ 12.11 hrs, Volume= 6,529 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 99.65' @ 12.11 hrs Surf.Area= 6 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (878.7 - 878.7)

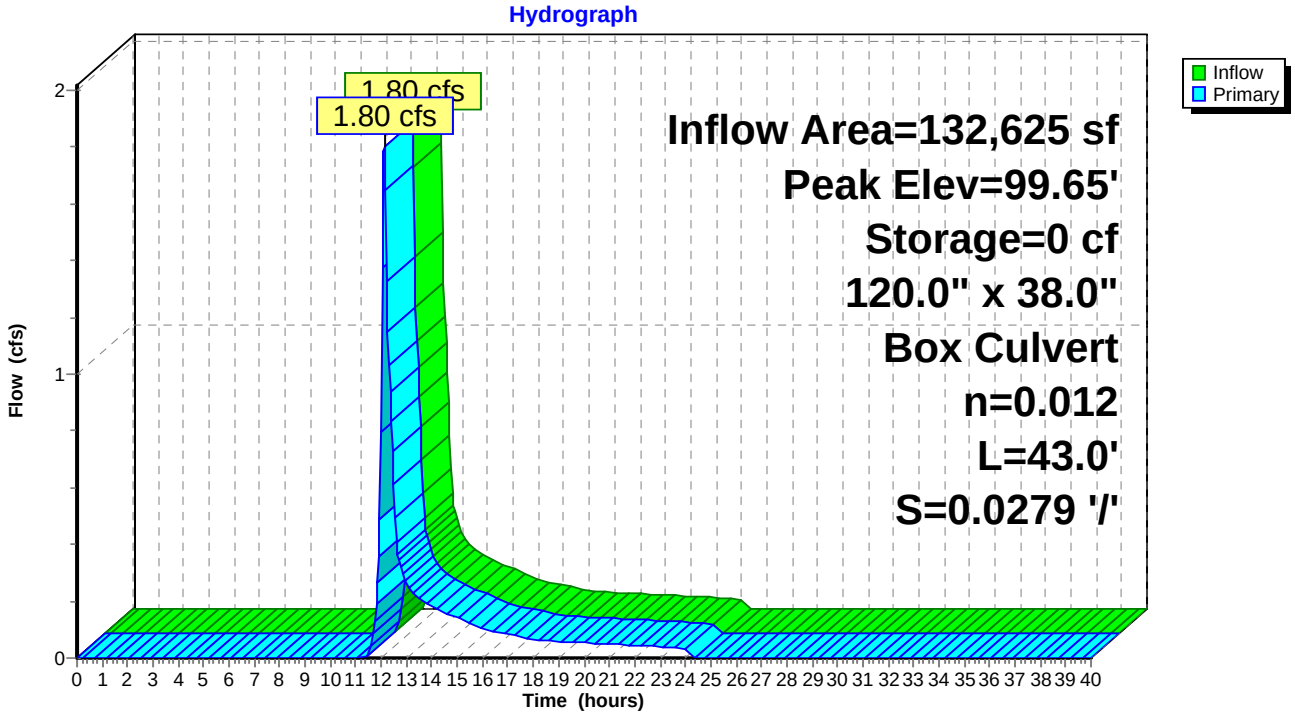
Volume	Invert	Avail.Storage	Storage Description
#1	99.50'	3,618 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
99.50	0	0	0
100.00	20	5	5
101.00	100	60	65
102.00	250	175	240
102.50	390	160	400
102.70	475	87	487
103.00	500	146	633
104.00	815	658	1,290
105.00	1,170	993	2,283
106.00	1,500	1,335	3,618

Device	Routing	Invert	Outlet Devices
#1	Primary	99.50'	**120.0" W x 38.0" H Box Culvert** L= 43.0' Box, headwall w/3 square edges, Ke= 0.500 Inlet / Outlet Invert= 99.50' / 98.30' S= 0.0279 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 31.67 sf

Primary OutFlow Max=1.75 cfs @ 12.11 hrs HW=99.64' TW=73.76' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 1.75 cfs @ 1.22 fps)

Pond 15P: Proposed Box Culvert



Summary for Pond 82P: Wetland acting as detention pond

Inflow Area = 628,585 sf, 10.50% Impervious, Inflow Depth = 1.30" for 2 yr event
Inflow = 17.69 cfs @ 12.13 hrs, Volume= 67,980 cf
Outflow = 0.11 cfs @ 24.16 hrs, Volume= 11,445 cf, Atten= 99%, Lag= 721.9 min
Discarded = 0.11 cfs @ 24.16 hrs, Volume= 11,445 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 131.30' @ 24.16 hrs Surf.Area= 51,483 sf Storage= 62,553 cf

Plug-Flow detention time= 800.8 min calculated for 11,431 cf (17% of inflow)
Center-of-Mass det. time= 653.7 min (1,505.0 - 851.3)

Volume	Invert	Avail.Storage	Storage Description
#1	130.00'	218,068 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

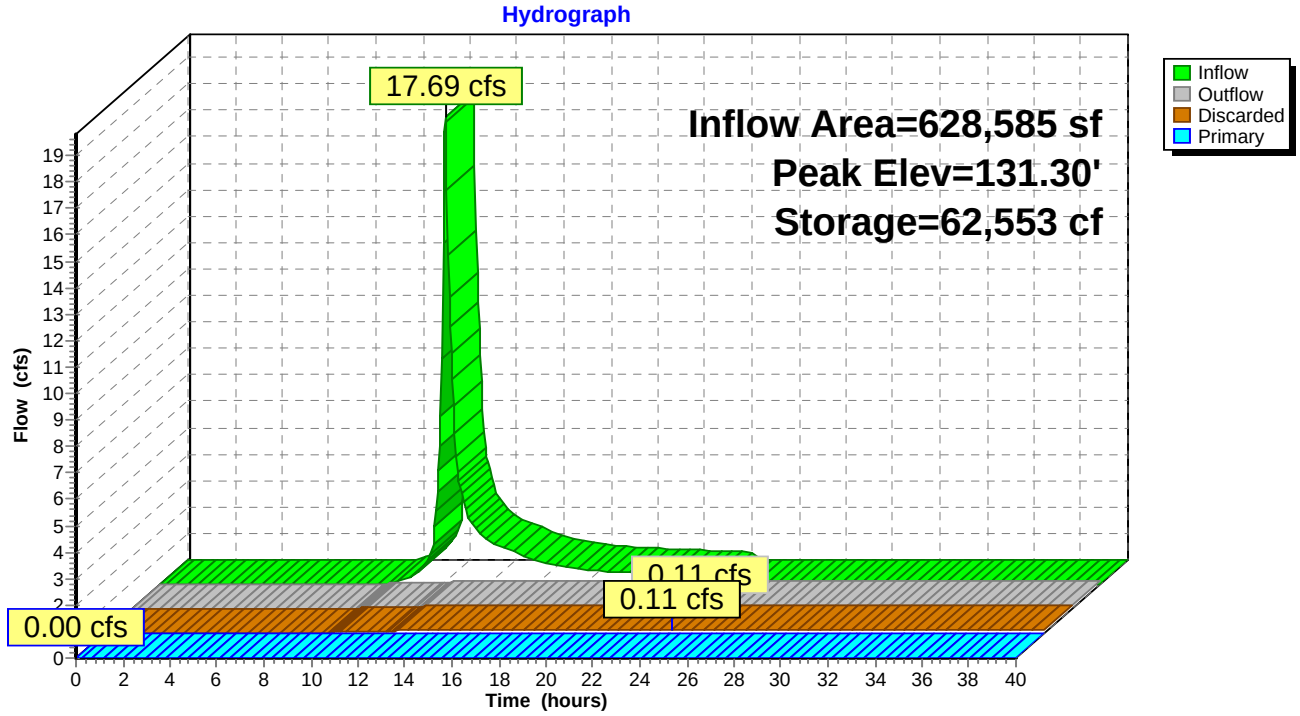
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
130.00	45,000	0	0
131.00	50,000	47,500	47,500
132.00	55,000	52,500	100,000
133.00	60,000	57,500	157,500
134.00	61,136	60,568	218,068

Device	Routing	Invert	Outlet Devices
#1	Discarded	130.00'	**0.090 in/hr Exfiltration over Surface area**
#2	Primary	132.40'	**30.0' long x 12.0' 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) 2.57 2.62 2.70 2.67 2.66 2.67 2.66 2.64

Discarded OutFlow Max=0.11 cfs @ 24.16 hrs HW=131.30' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.11 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=130.00' TW=73.00' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 82P: Wetland acting as detention pond



Summary for Pond 87P: Existing Headwall

Inflow Area = 801,374 sf, 13.21% Impervious, Inflow Depth = 0.11" for 2 yr event
Inflow = 1.80 cfs @ 12.11 hrs, Volume= 7,031 cf
Outflow = 1.79 cfs @ 12.12 hrs, Volume= 7,031 cf, Atten= 0%, Lag= 0.2 min
Primary = 1.79 cfs @ 12.12 hrs, Volume= 7,031 cf
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 73.77' @ 12.12 hrs Surf.Area= 52 sf Storage= 20 cf

Plug-Flow detention time= 0.2 min calculated for 7,022 cf (100% of inflow)
Center-of-Mass det. time= 0.2 min (887.1 - 887.0)

Volume	Invert	Avail.Storage	Storage Description
#1	73.00'	100 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

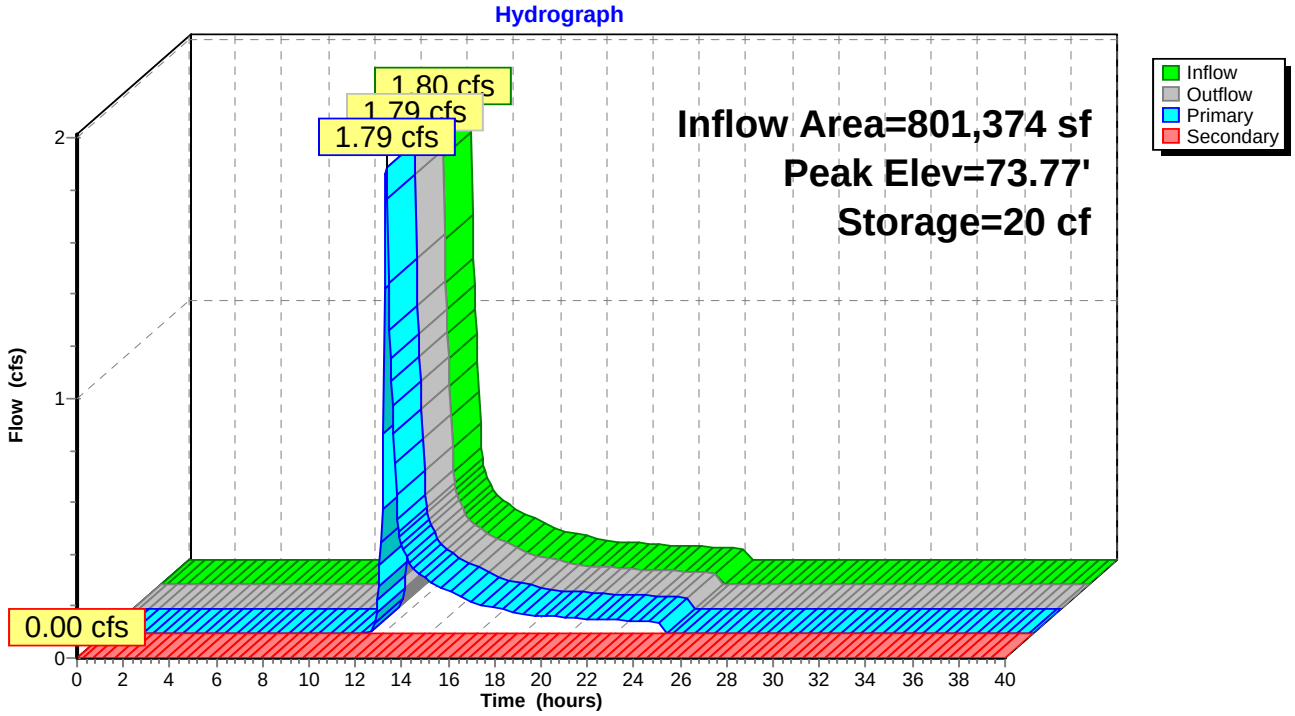
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
73.00	0	0	0
73.75	50	19	19
74.00	75	16	34
74.20	250	33	67
74.33	260	33	100

Device	Routing	Invert	Outlet Devices
#1	Primary	73.04'	**12.0" Round Culvert** L= 6.5' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 73.04' / 72.75' S= 0.0446 '/' Cc= 0.900 n= 0.013 Cast iron, coated, Flow Area= 0.79 sf
#2	Secondary	74.00'	**6.0' long x 2.0' 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 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

Primary OutFlow Max=1.74 cfs @ 12.12 hrs HW=73.76' TW=0.00' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 1.74 cfs @ 2.88 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=73.00' TW=0.00' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 87P: Existing Headwall

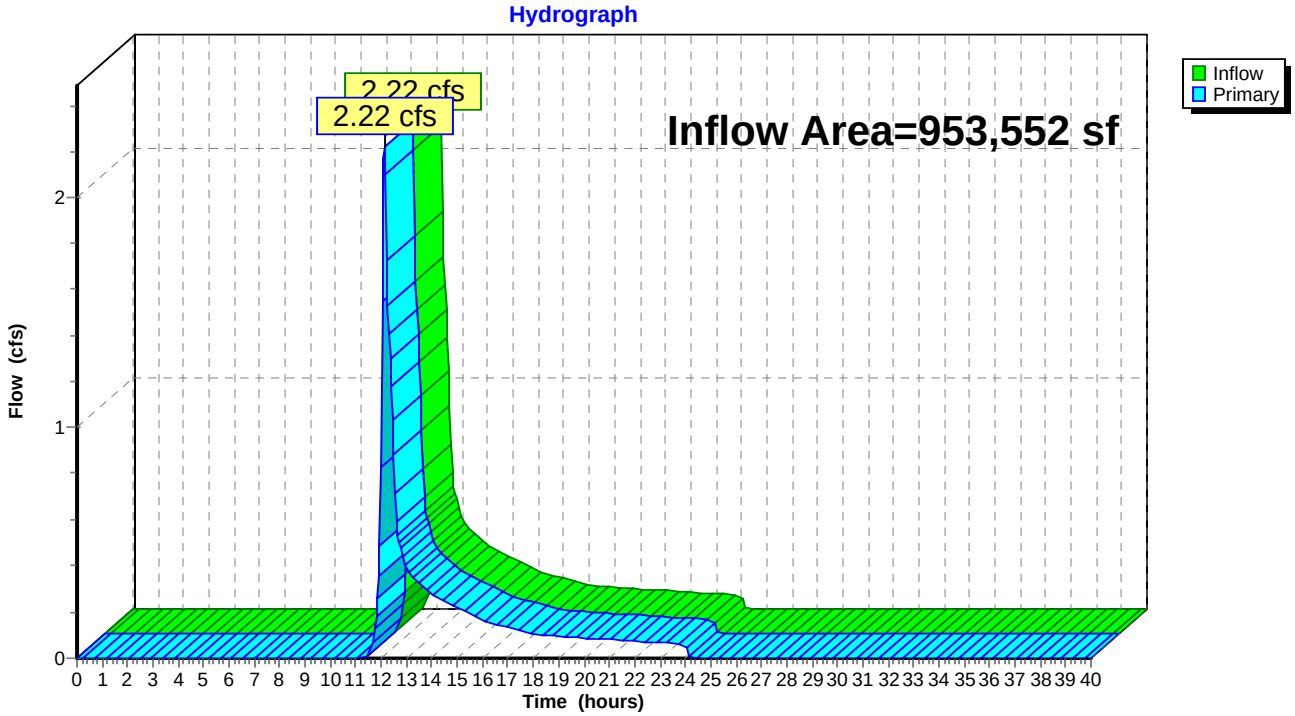


Summary for Link 1L: Discharge to southside of Maple Terrace

Inflow Area = 953,552 sf, 16.59% Impervious, Inflow Depth = 0.12" for 2 yr event
Inflow = 2.22 cfs @ 12.12 hrs, Volume= 9,472 cf
Primary = 2.22 cfs @ 12.12 hrs, Volume= 9,472 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs

Link 1L: Discharge to southside of Maple Terrace

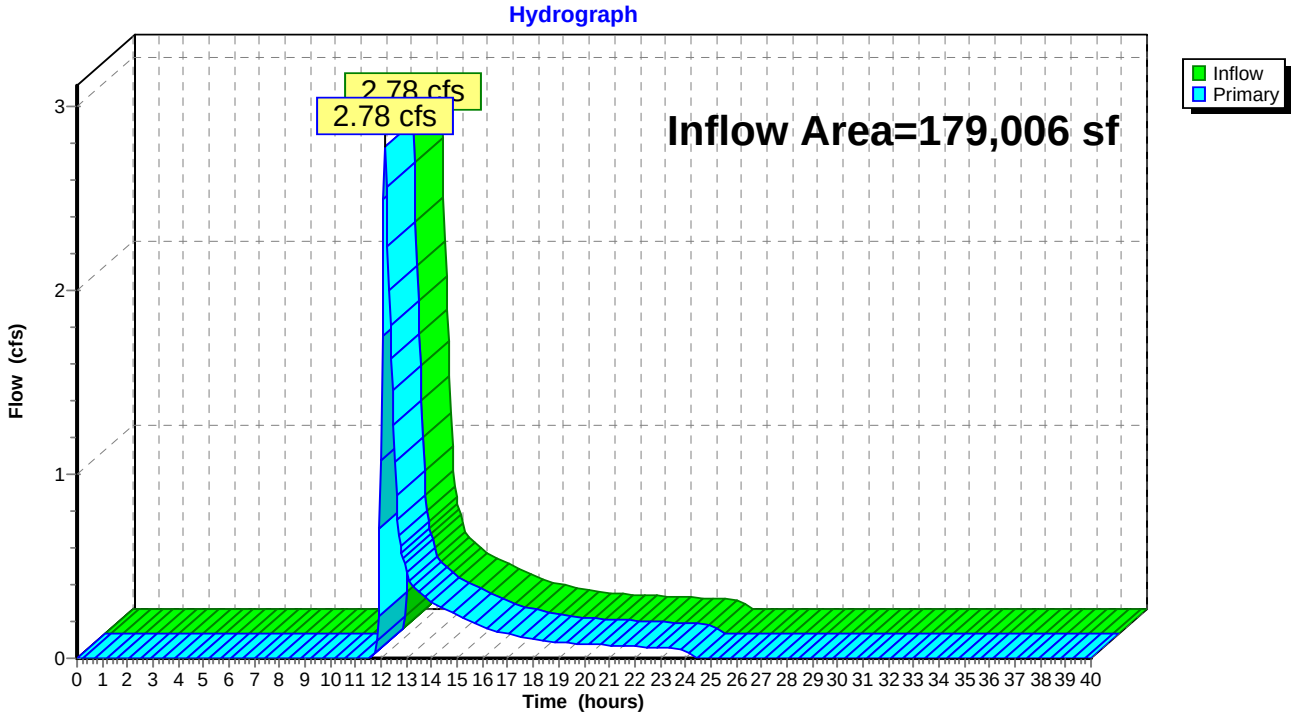


Summary for Link 2L: Discharge to northside of Swains Pond Avenue

Inflow Area = 179,006 sf, 19.13% Impervious, Inflow Depth = 0.72" for 2 yr event
Inflow = 2.78 cfs @ 12.15 hrs, Volume= 10,674 cf
Primary = 2.78 cfs @ 12.15 hrs, Volume= 10,674 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs

Link 2L: Discharge to northside of Swains Pond Avenue

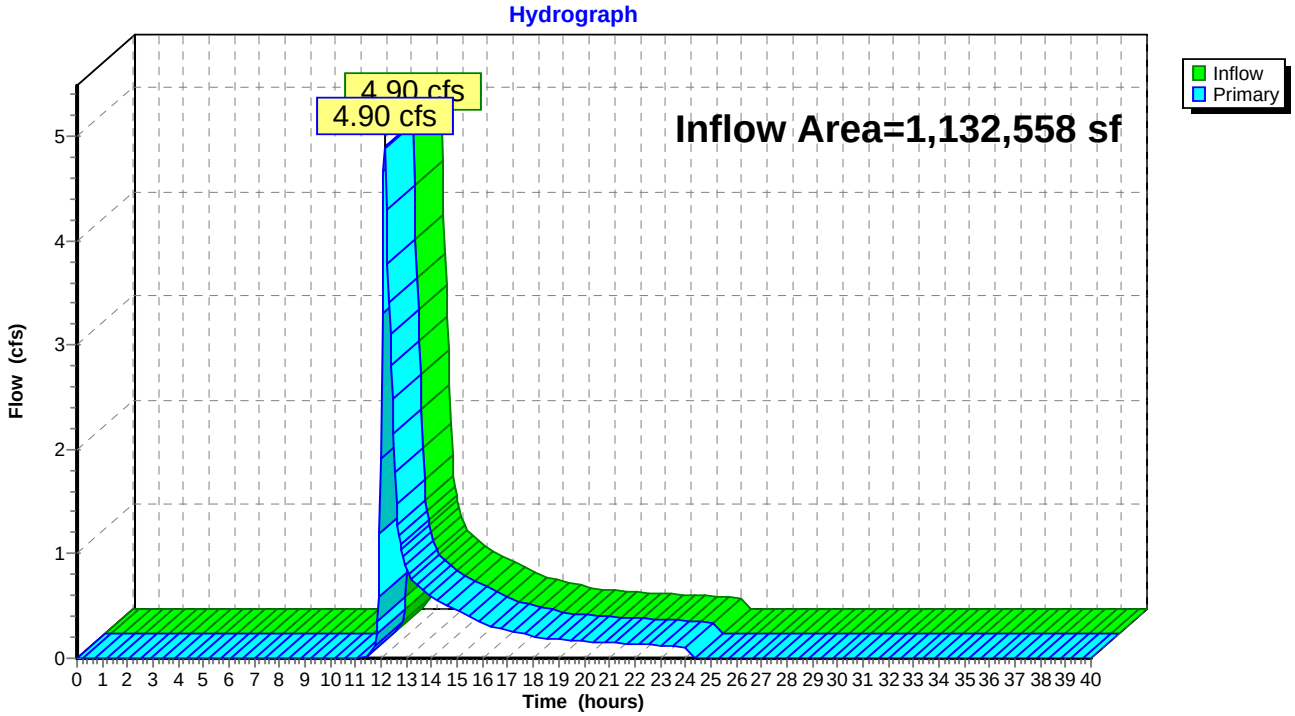


Summary for Link 3L: Total surface discharge from within the limit of watershed analysis

Inflow Area = 1,132,558 sf, 16.99% Impervious, Inflow Depth = 0.21" for 2 yr event
Inflow = 4.90 cfs @ 12.14 hrs, Volume= 20,145 cf
Primary = 4.90 cfs @ 12.14 hrs, Volume= 20,145 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs

Link 3L: Total surface discharge from within the limit of watershed analysis



Summary for Subcatchment 5S: PR-STREAM-A

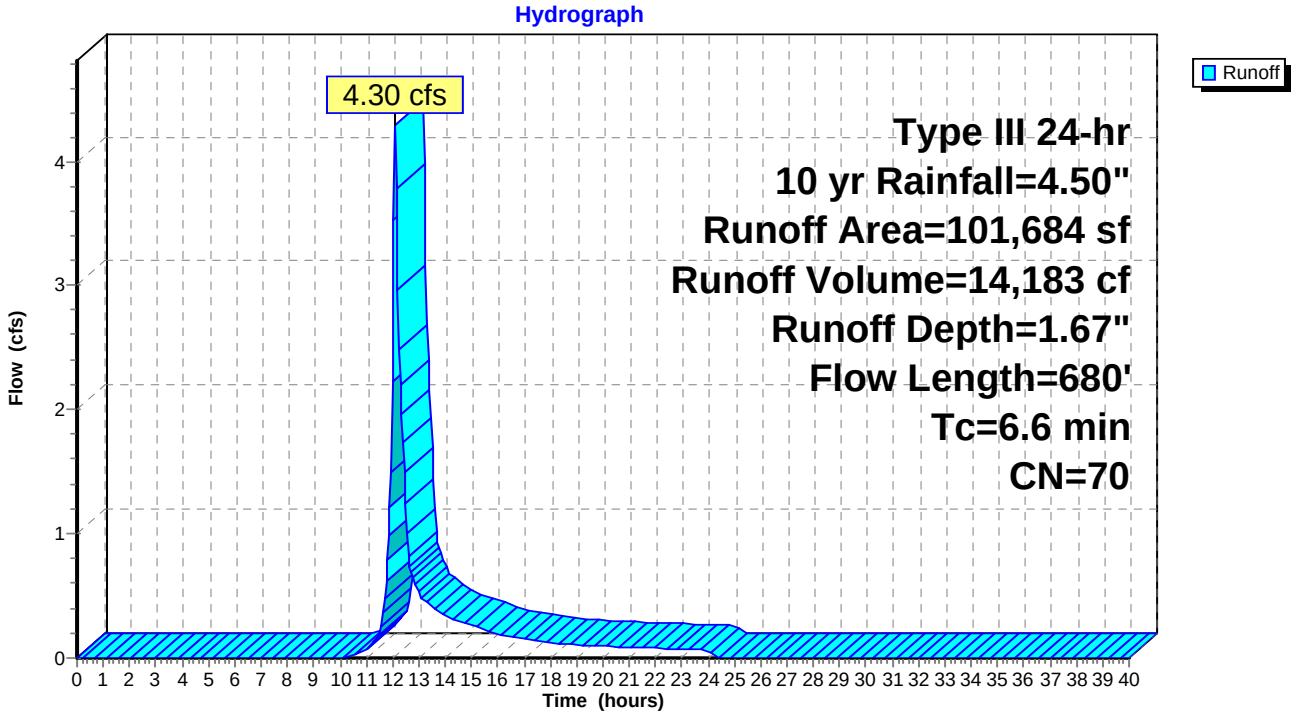
Runoff = 4.30 cfs @ 12.11 hrs, Volume= 14,183 cf, Depth= 1.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 yr Rainfall=4.50"

	Area (sf)	CN	Description
*	1,835	98	Ledge, HSG D
	39,112	77	Woods, Good, HSG D
	6,166	30	Woods, Good, HSG A
	2,458	98	Paved parking, HSG A
	105	98	Paved parking, HSG D
	34,008	61	1/4 acre lots, 38% imp, HSG A
	18,000	80	>75% Grass cover, Good, HSG D
	101,684	70	Weighted Average
	84,363		82.97% Pervious Area
	17,321		17.03% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	50	0.2000	0.17		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
0.2	120	0.2800	8.52		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.6	155	0.0400	4.06		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.1	25	0.0800	4.55		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.7	330	0.0900	7.86	15.72	**Channel Flow,** Area= 2.0 sf Perim= 5.2' r= 0.38' n= 0.030
6.6	680	Total			

Subcatchment 5S: PR-STREAM-A



Summary for Subcatchment 7S: PR-CB1

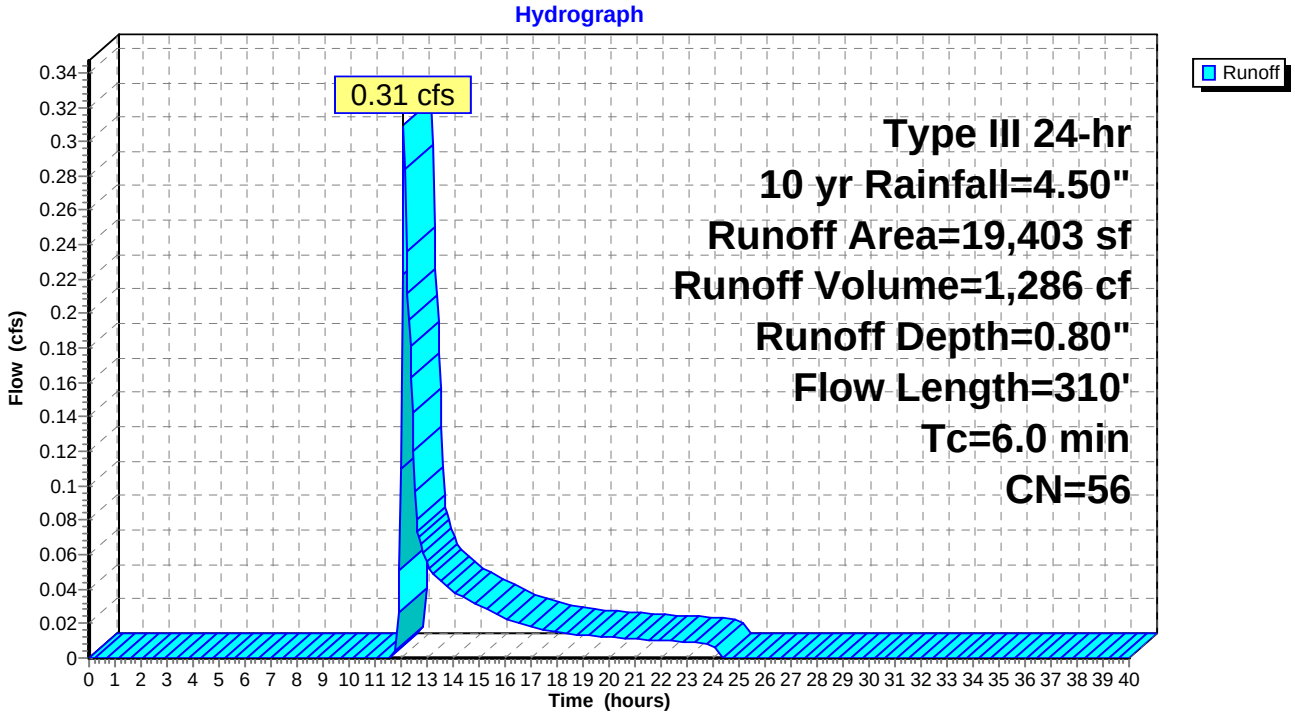
Runoff = 0.31 cfs @ 12.11 hrs, Volume= 1,286 cf, Depth= 0.80"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 yr Rainfall=4.50"

	Area (sf)	CN	Description
	477	98	Roofs, HSG A
	1,000	30	Woods, Good, HSG A
	10,306	39	>75% Grass cover, Good, HSG A
	3,987	98	Paved parking, HSG A
*	3,633	61	Existing 1/4 acre lots, 38% imp, HSG A
	19,403	56	Weighted Average
	13,558		69.88% Pervious Area
	5,845		30.12% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.8	50	0.3500	0.46		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
0.1	35	0.3500	9.52		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.0	15	0.5000	11.38		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.3	25	0.0100	1.61		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.1	25	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.1	50	0.3300	9.25		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.3	110	0.1200	7.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
2.7	310	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 7S: PR-CB1



Summary for Subcatchment 8S: PR-CB2

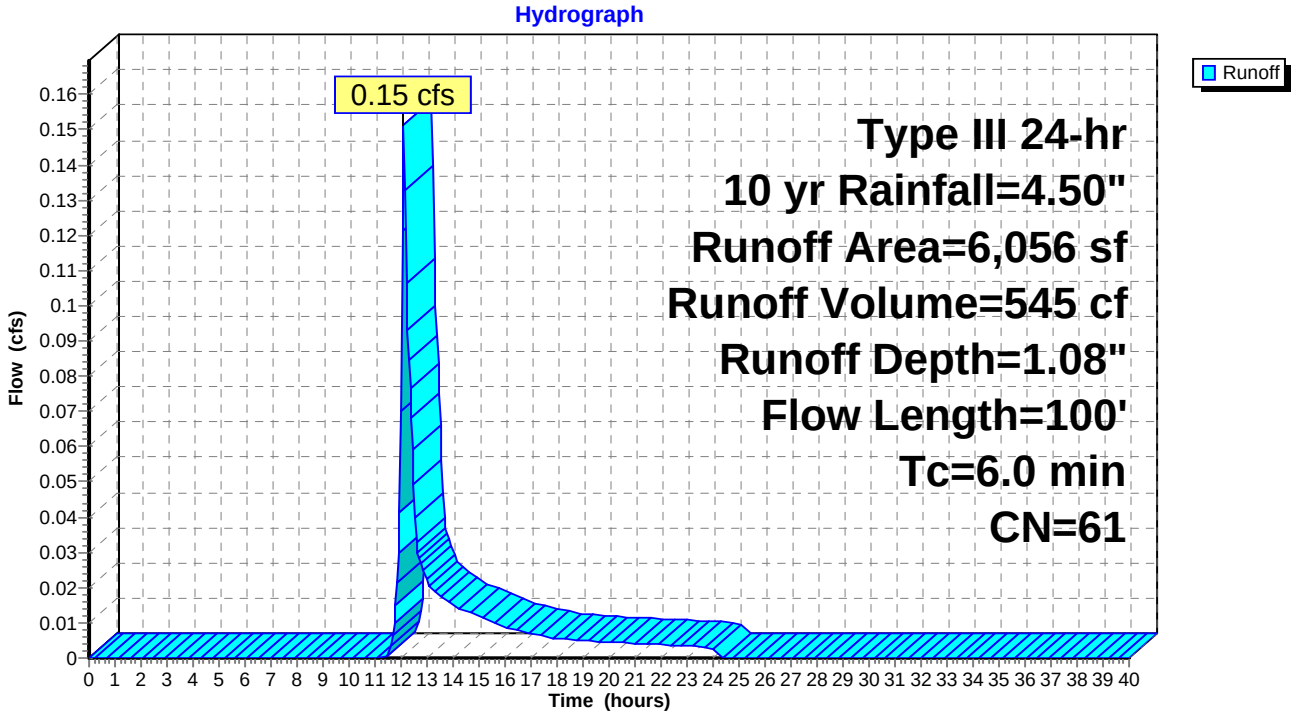
Runoff = 0.15 cfs @ 12.11 hrs, Volume= 545 cf, Depth= 1.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 yr Rainfall=4.50"

Area (sf)	CN	Description
1,000	30	Woods, Good, HSG A
2,606	39	>75% Grass cover, Good, HSG A
2,450	98	Paved parking, HSG A
6,056	61	Weighted Average
3,606		59.54% Pervious Area
2,450		40.46% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.9	50	0.3300	0.45		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
0.0	15	0.3300	9.25		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.0	15	0.1100	5.34		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.0	20	0.1200	7.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.9	100	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 8S: PR-CB2



Summary for Subcatchment 9S: PR-CB3

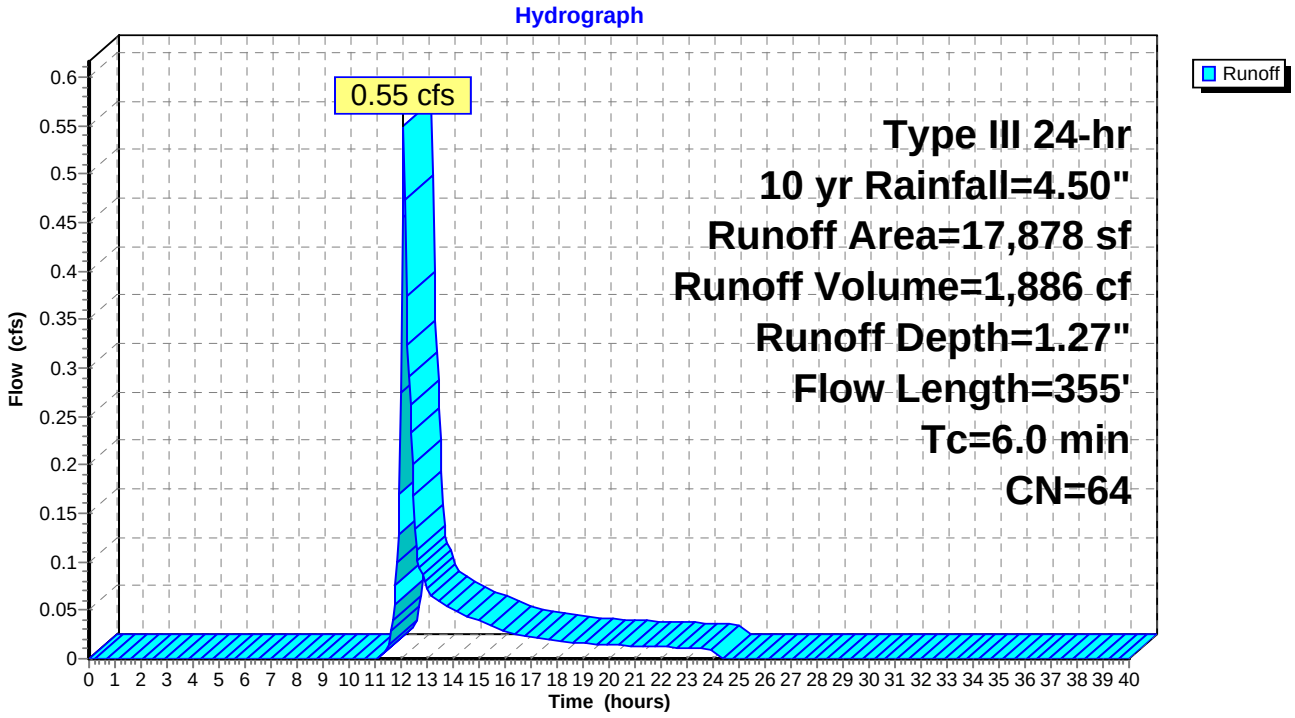
Runoff = 0.55 cfs @ 12.10 hrs, Volume= 1,886 cf, Depth= 1.27"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 yr Rainfall=4.50"

	Area (sf)	CN	Description
	1,425	39	>75% Grass cover, Good, HSG A
	2,465	98	Paved parking, HSG A
*	13,988	61	Existing 1/4 acre lots, 38% imp, HSG A
	17,878	64	Weighted Average
	10,098		56.48% Pervious Area
	7,780		43.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.3	50	0.0800	0.25		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
0.5	150	0.0800	4.55		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.3	155	0.1350	7.46		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
4.1	355	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 9S: PR-CB3



Summary for Subcatchment 10S: PR-CB4

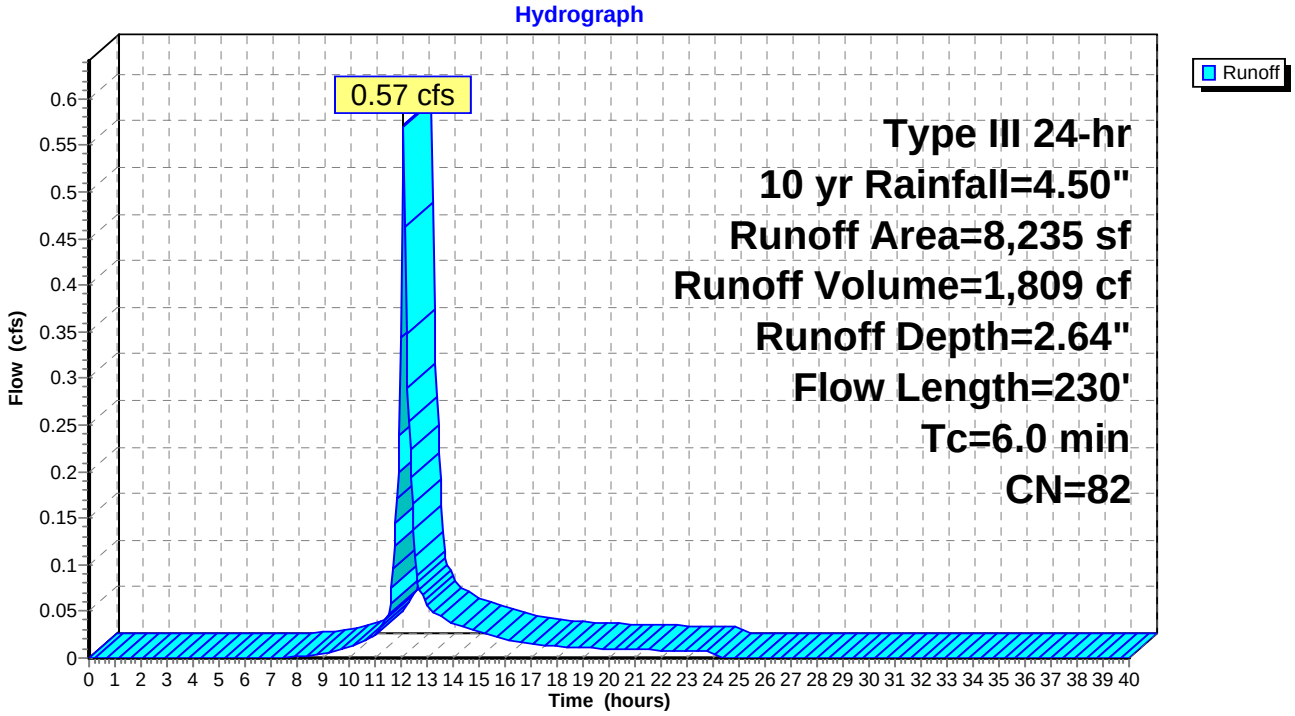
Runoff = 0.57 cfs @ 12.09 hrs, Volume= 1,809 cf, Depth= 2.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 yr Rainfall=4.50"

Area (sf)	CN	Description
794	39	>75% Grass cover, Good, HSG A
441	98	Paved parking, HSG A
255	98	Roofs, HSG A
2,019	98	Paved parking, HSG D
4,726	80	>75% Grass cover, Good, HSG D
8,235	82	Weighted Average
5,520		67.03% Pervious Area
2,715		32.97% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.4	50	0.1800	0.35		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
0.1	45	0.1800	6.83		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.4	135	0.1000	6.42		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
2.9	230	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 10S: PR-CB4



Summary for Subcatchment 11S: PR-CB5

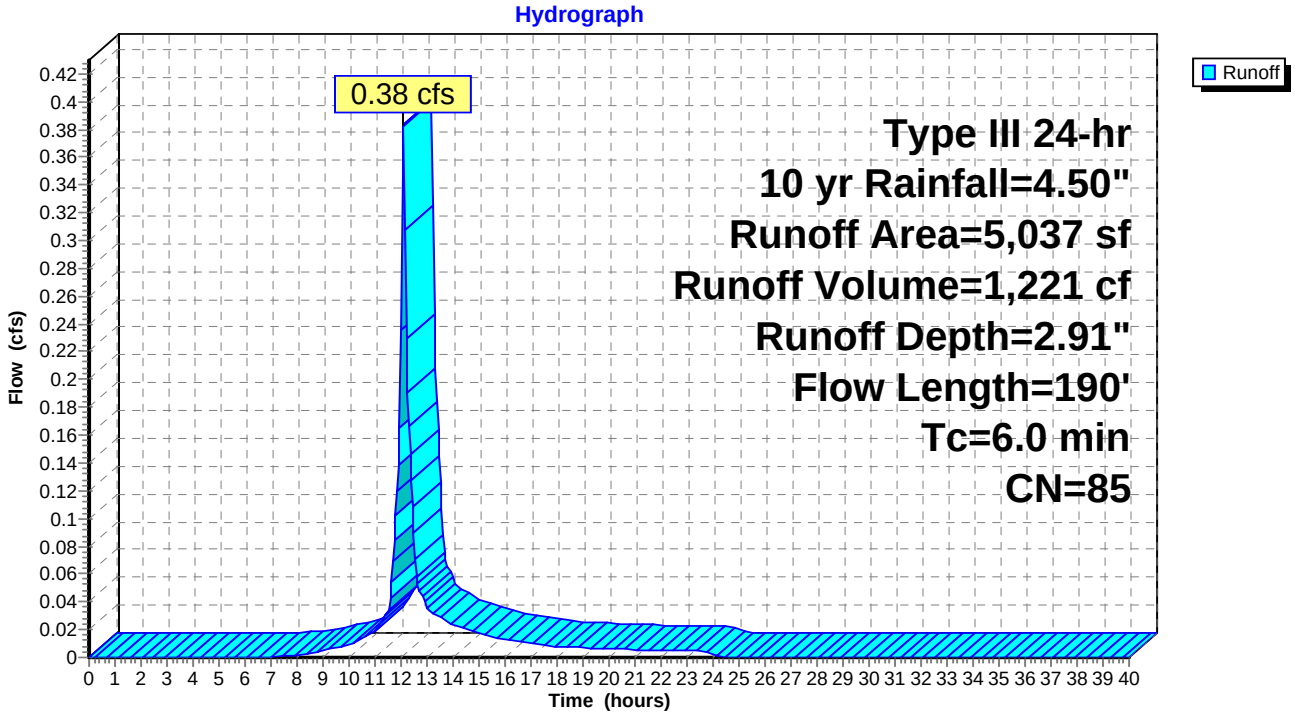
Runoff = 0.38 cfs @ 12.09 hrs, Volume= 1,221 cf, Depth= 2.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 yr Rainfall=4.50"

Area (sf)	CN	Description
808	39	>75% Grass cover, Good, HSG A
2,348	98	Paved parking, HSG A
1,023	98	Paved parking, HSG D
858	80	>75% Grass cover, Good, HSG D
5,037	85	Weighted Average
1,666		33.08% Pervious Area
3,371		66.92% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.4	25	0.0200	1.03		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.10"
0.4	165	0.1200	7.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.8	190	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 11S: PR-CB5



Summary for Subcatchment 12S: PR-CB6

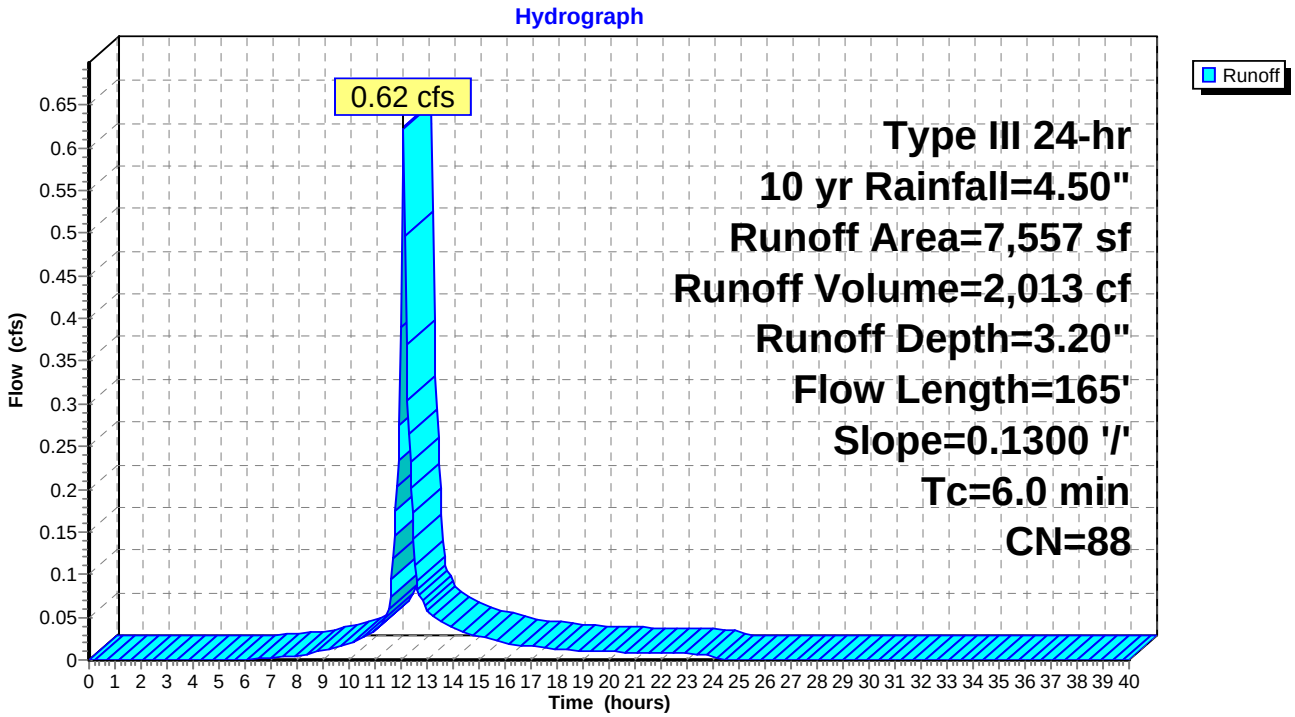
Runoff = 0.62 cfs @ 12.09 hrs, Volume= 2,013 cf, Depth= 3.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 yr Rainfall=4.50"

Area (sf)	CN	Description
864	98	Roofs, HSG D
2,416	98	Paved parking, HSG D
4,277	80	>75% Grass cover, Good, HSG D
7,557	88	Weighted Average
4,277		56.60% Pervious Area
3,280		43.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.7	50	0.1300	0.31		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
0.3	115	0.1300	7.32		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
3.0	165	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 12S: PR-CB6



Summary for Subcatchment 13S: PR-CB10

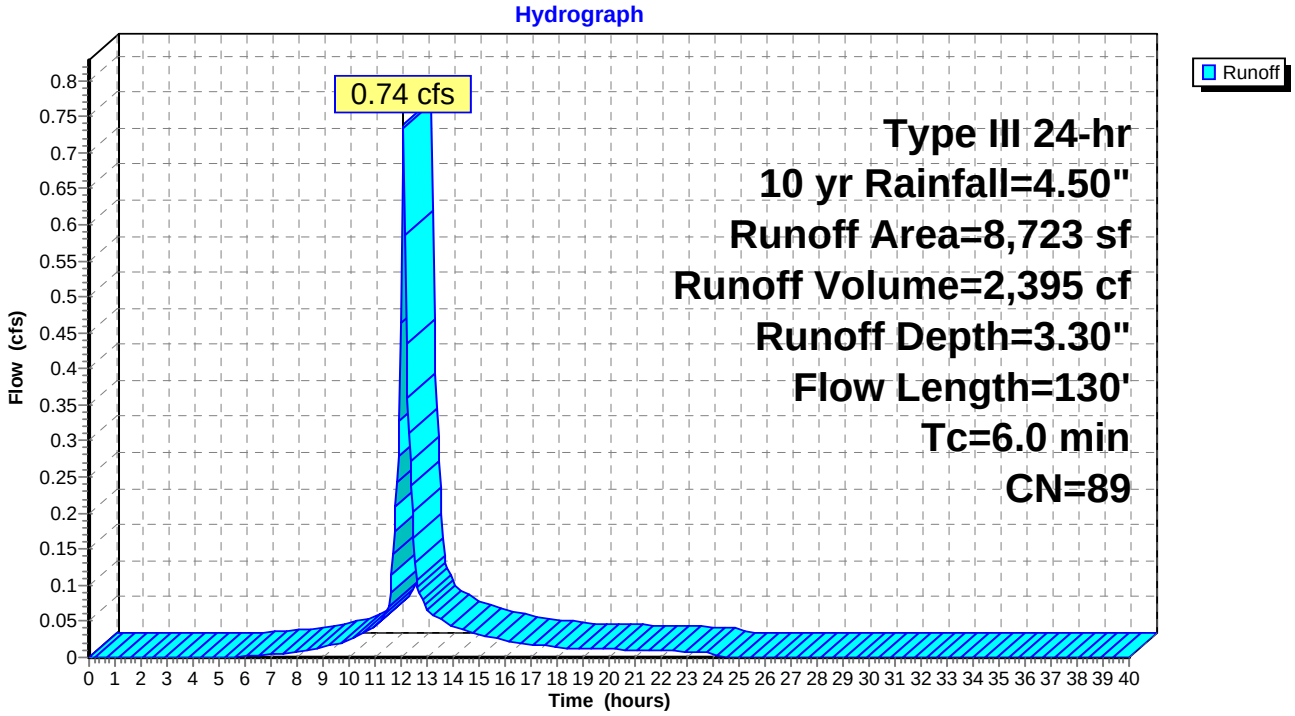
Runoff = 0.74 cfs @ 12.09 hrs, Volume= 2,395 cf, Depth= 3.30"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 yr Rainfall=4.50"

Area (sf)	CN	Description
4,436	98	Paved parking, HSG D
4,287	80	>75% Grass cover, Good, HSG D
8,723	89	Weighted Average
4,287		49.15% Pervious Area
4,436		50.85% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.0	50	0.0500	0.21		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
0.4	80	0.0300	3.52		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
4.4	130	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 13S: PR-CB10



Summary for Subcatchment 14S: PR-CB11

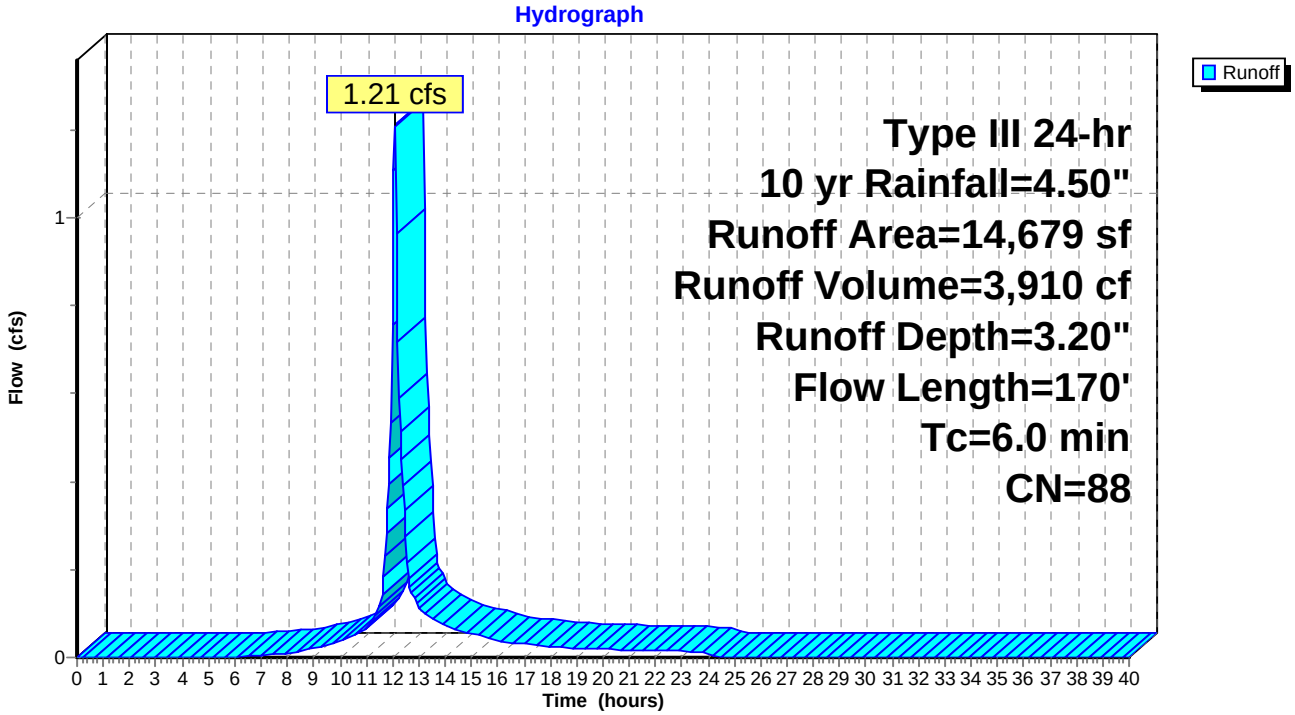
Runoff = 1.21 cfs @ 12.09 hrs, Volume= 3,910 cf, Depth= 3.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 yr Rainfall=4.50"

Area (sf)	CN	Description
6,347	98	Paved parking, HSG D
8,332	80	>75% Grass cover, Good, HSG D
14,679	88	Weighted Average
8,332		56.76% Pervious Area
6,347		43.24% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.9	50	0.0300	0.17		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
0.2	45	0.0670	4.17		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.4	75	0.0300	3.52		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
5.5	170	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 14S: PR-CB11



Summary for Subcatchment 15S: PR-ROOF Lot 7

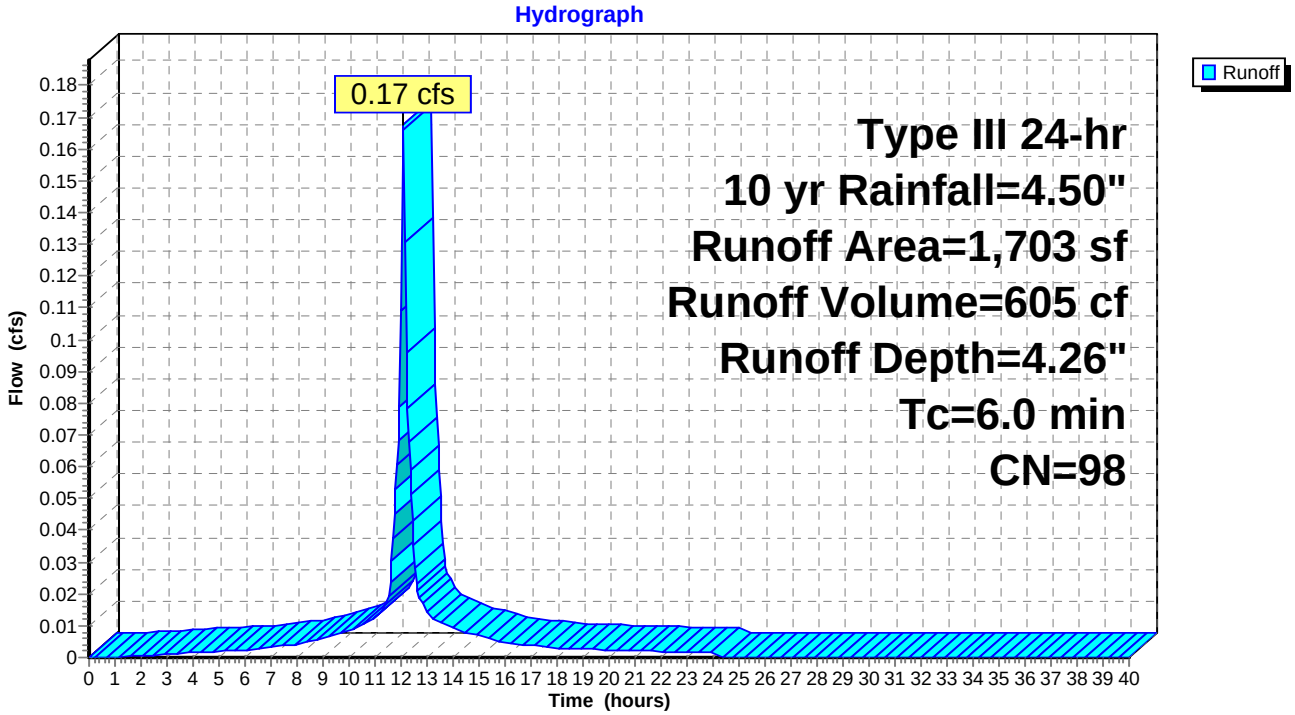
Runoff = 0.17 cfs @ 12.09 hrs, Volume= 605 cf, Depth= 4.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 yr Rainfall=4.50"

Area (sf)	CN	Description
1,703	98	Roofs, HSG D
1,703		100.00% Impervious Area

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

Subcatchment 15S: PR-ROOF Lot 7



Summary for Subcatchment 17S: PR-CB7

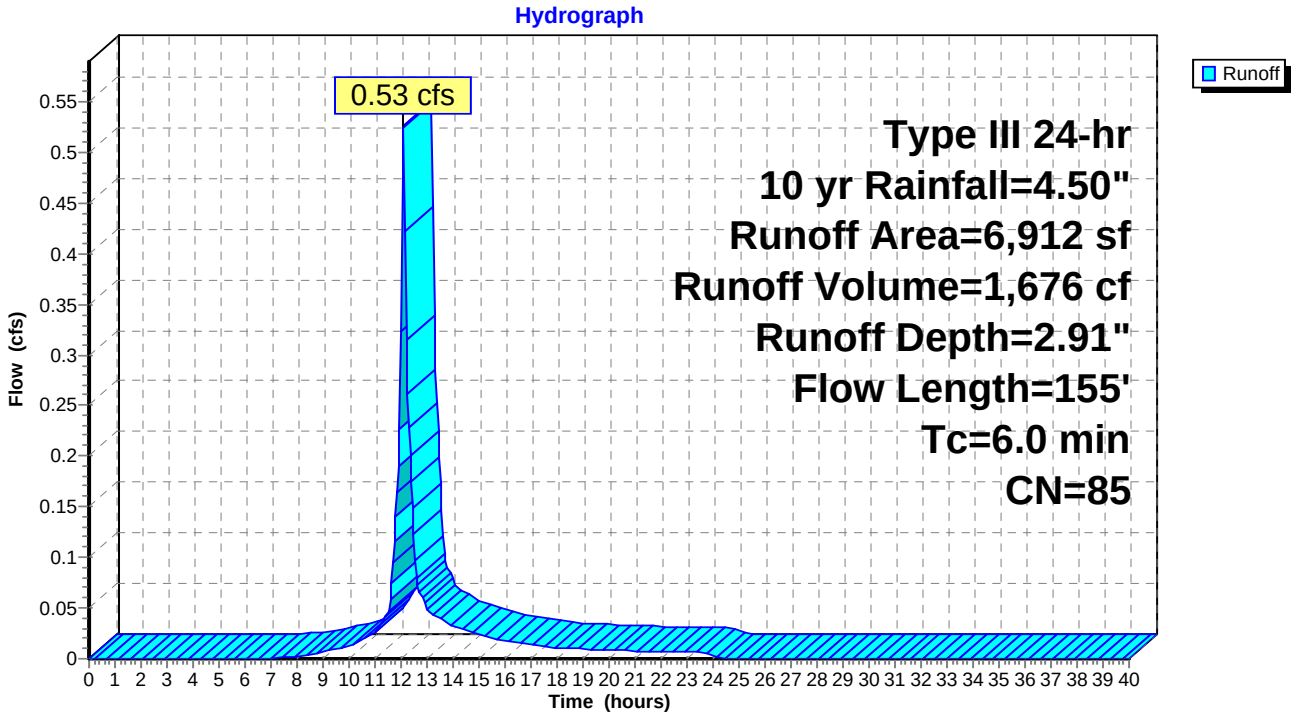
Runoff = 0.53 cfs @ 12.09 hrs, Volume= 1,676 cf, Depth= 2.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 yr Rainfall=4.50"

Area (sf)	CN	Description
145	98	Roofs, HSG D
1,786	98	Paved parking, HSG D
4,981	80	>75% Grass cover, Good, HSG D
6,912	85	Weighted Average
4,981		72.06% Pervious Area
1,931		27.94% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.0	50	0.1000	0.28		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
0.1	40	0.1300	5.80		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.2	65	0.1300	5.80		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
3.3	155	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 17S: PR-CB7



Summary for Subcatchment 19S: PR-CB8

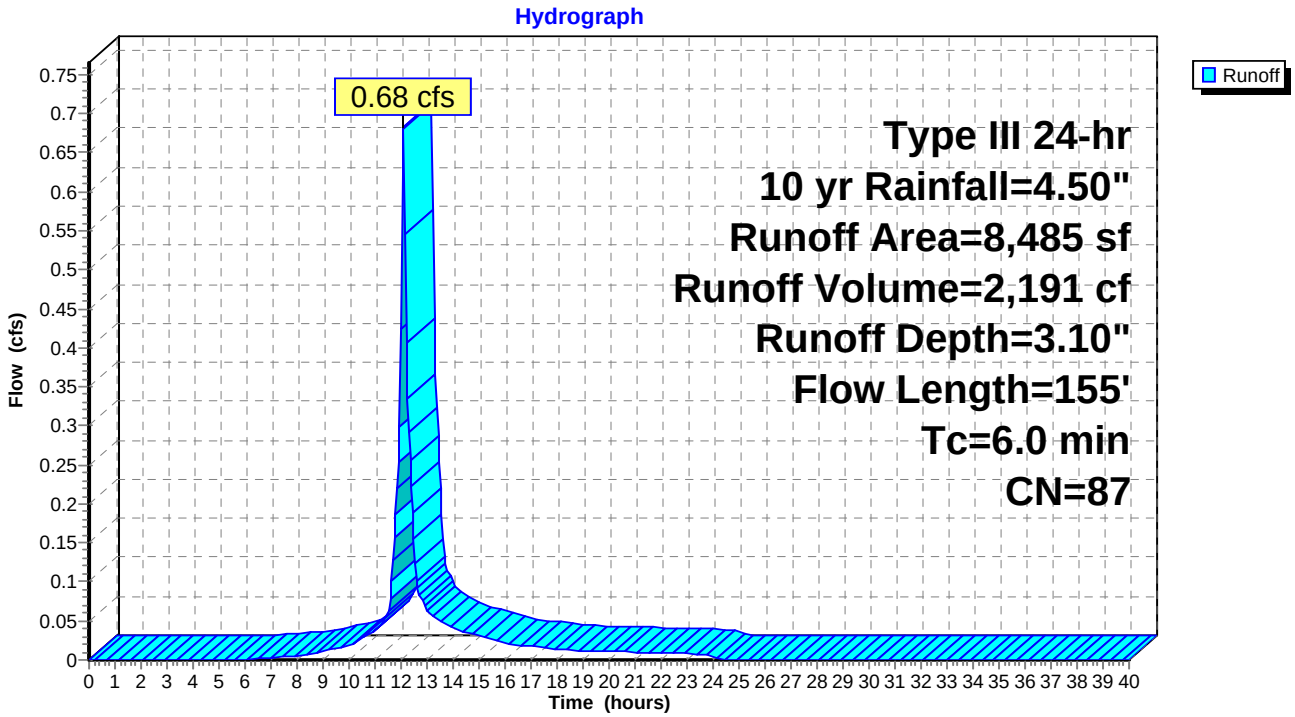
Runoff = 0.68 cfs @ 12.09 hrs, Volume= 2,191 cf, Depth= 3.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 yr Rainfall=4.50"

Area (sf)	CN	Description
2,761	98	Paved parking, HSG D
5,155	80	>75% Grass cover, Good, HSG D
569	98	Roofs, HSG D
8,485	87	Weighted Average
5,155		60.75% Pervious Area
3,330		39.25% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.1	50	0.0900	0.27		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
0.3	105	0.1000	6.42		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
3.4	155	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 19S: PR-CB8



Summary for Subcatchment 20S: PR-CB9

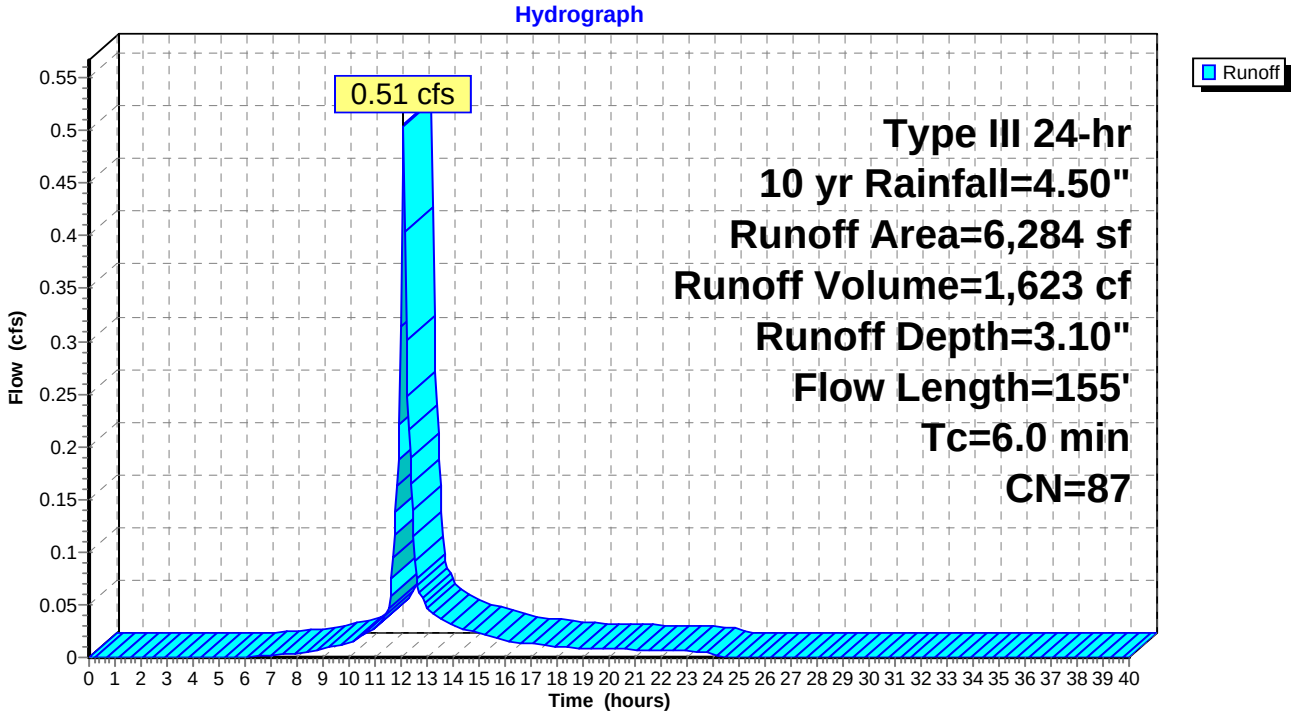
Runoff = 0.51 cfs @ 12.09 hrs, Volume= 1,623 cf, Depth= 3.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 yr Rainfall=4.50"

Area (sf)	CN	Description
2,609	98	Paved parking, HSG D
3,675	80	>75% Grass cover, Good, HSG D
6,284	87	Weighted Average
3,675		58.48% Pervious Area
2,609		41.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.3	55	0.0950	0.28		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
0.3	100	0.0800	5.74		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
3.6	155	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 20S: PR-CB9



Summary for Subcatchment 78S: Regans Way (No Change)

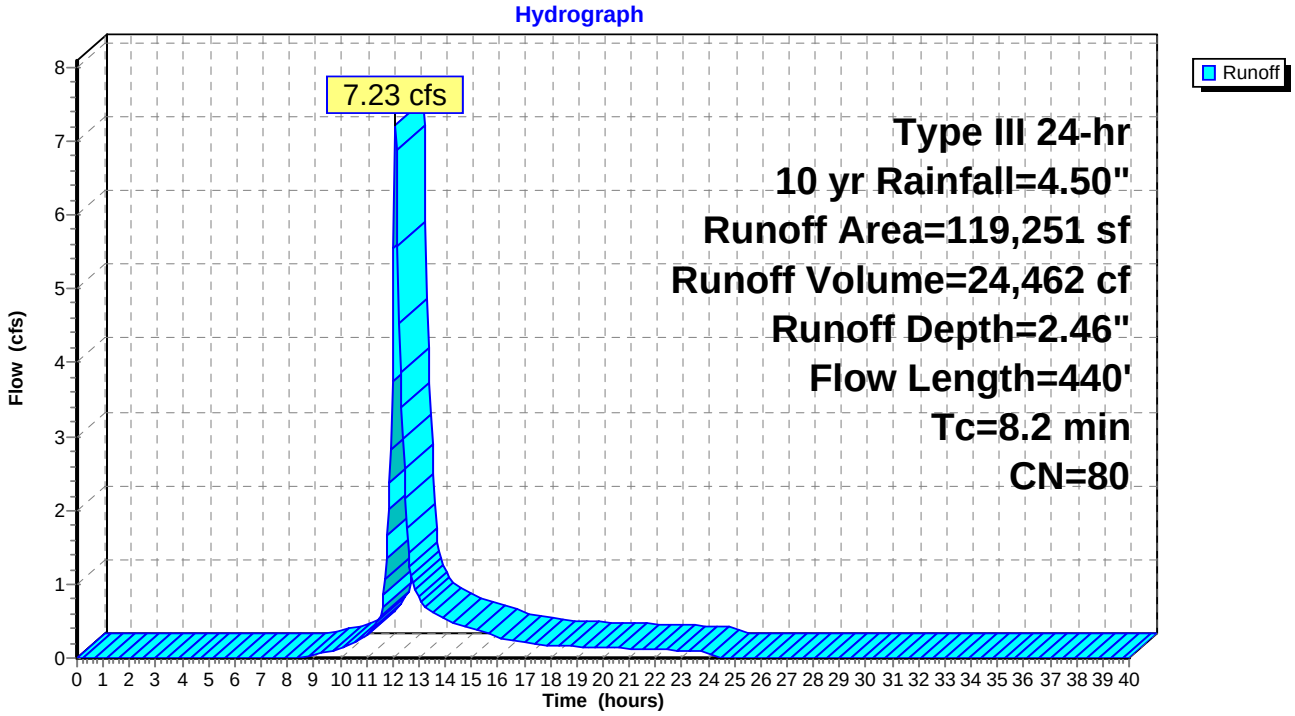
Runoff = 7.23 cfs @ 12.12 hrs, Volume= 24,462 cf, Depth= 2.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 yr Rainfall=4.50"

	Area (sf)	CN	Description
*	14,850	98	Ledge, HSG D
	83,151	77	Woods, Good, HSG D
	19,000	80	>75% Grass cover, Good, HSG D
	2,250	98	Unconnected roofs, HSG D
	119,251	80	Weighted Average
	102,151		85.66% Pervious Area
	17,100		14.34% Impervious Area
	2,250		13.16% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.9	100	0.3500	0.24		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
0.1	50	0.1600	6.44		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.7	100	0.0200	2.28		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.5	190	0.1900	7.02		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
8.2	440	Total			

Subcatchment 78S: Regans Way (No Change)



Summary for Subcatchment 81S: EX-HILLSIDE (No Change)

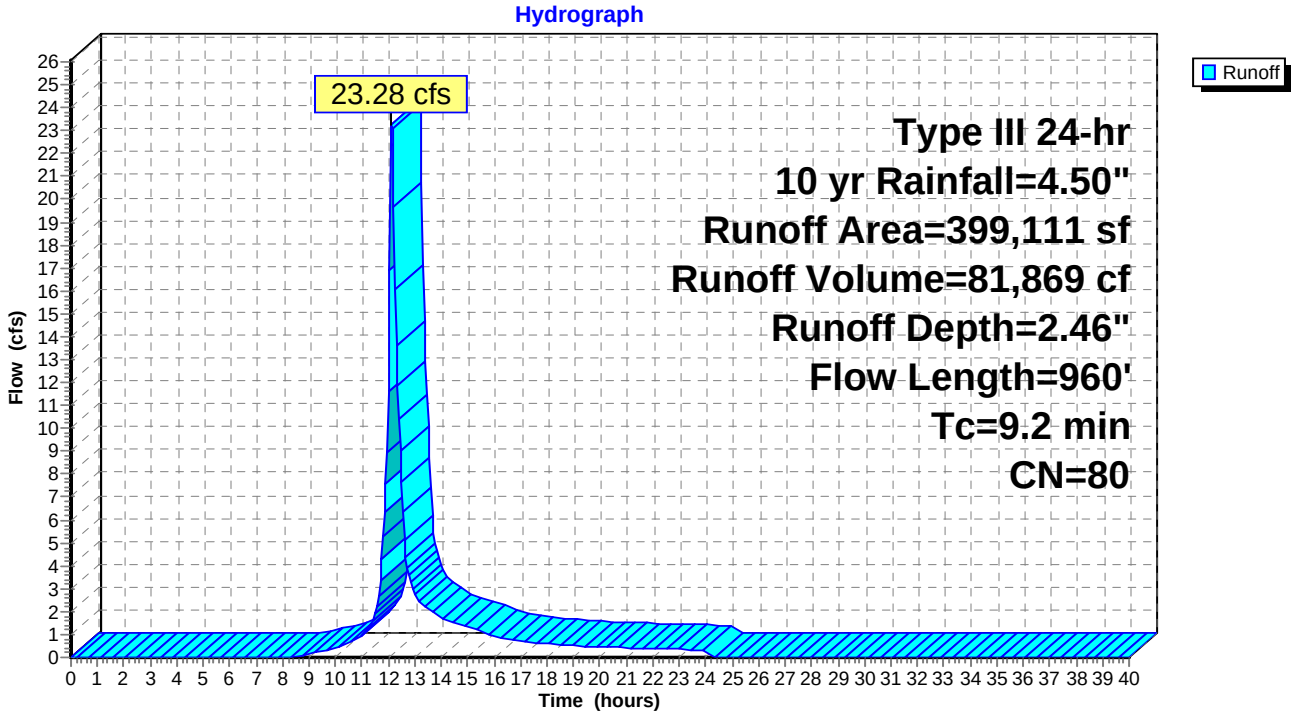
Runoff = 23.28 cfs @ 12.13 hrs, Volume= 81,869 cf, Depth= 2.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 yr Rainfall=4.50"

	Area (sf)	CN	Description
*	47,893	98	Ledge, HSG D
	351,218	77	Woods, Good, HSG D
	399,111	80	Weighted Average
	351,218		88.00% Pervious Area
	47,893		12.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	50	0.2000	0.17		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
4.2	910	0.0500	3.60		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
9.2	960	Total			

Subcatchment 81S: EX-HILLSIDE (No Change)



Summary for Subcatchment 83S: EX-WETLAND (No Change)

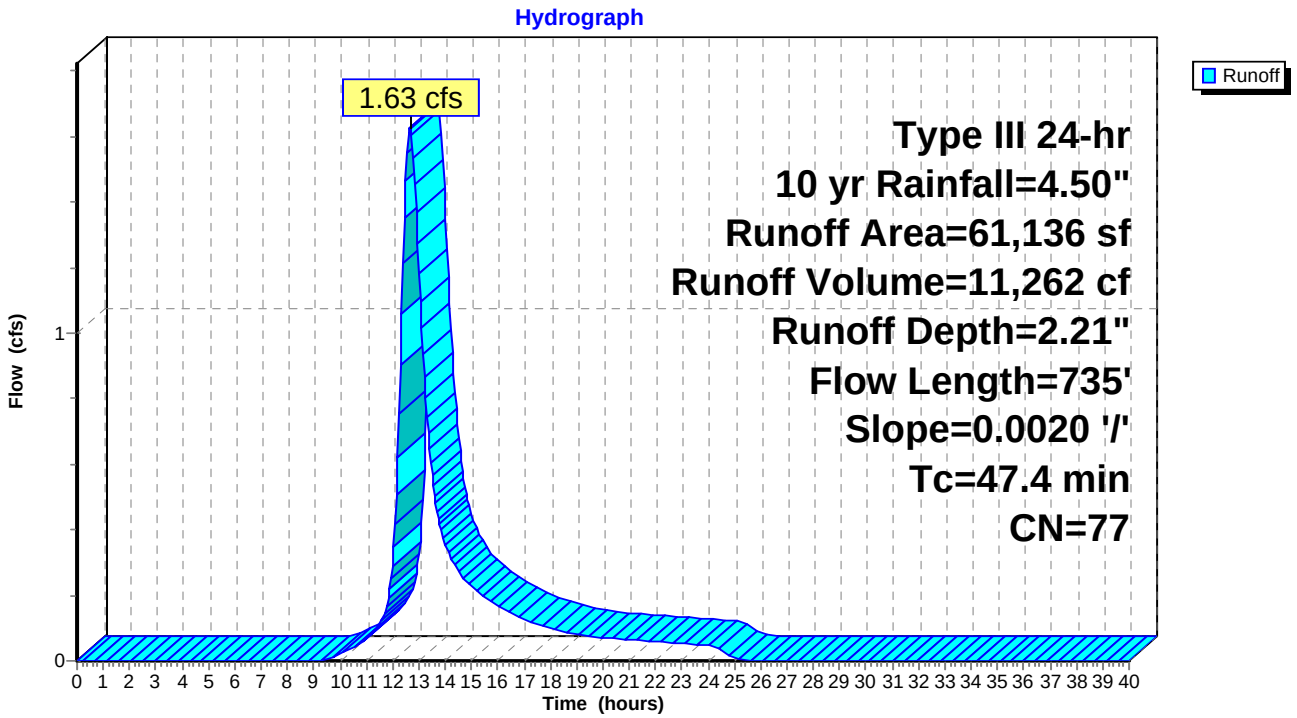
Runoff = 1.63 cfs @ 12.67 hrs, Volume= 11,262 cf, Depth= 2.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 yr Rainfall=4.50"

Area (sf)	CN	Description
61,136	77	Woods, Good, HSG D
61,136		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
31.5	50	0.0020	0.03		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
15.9	685	0.0020	0.72		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
47.4	735	Total			

Subcatchment 83S: EX-WETLAND (No Change)



Summary for Subcatchment 84S: PR-EAST

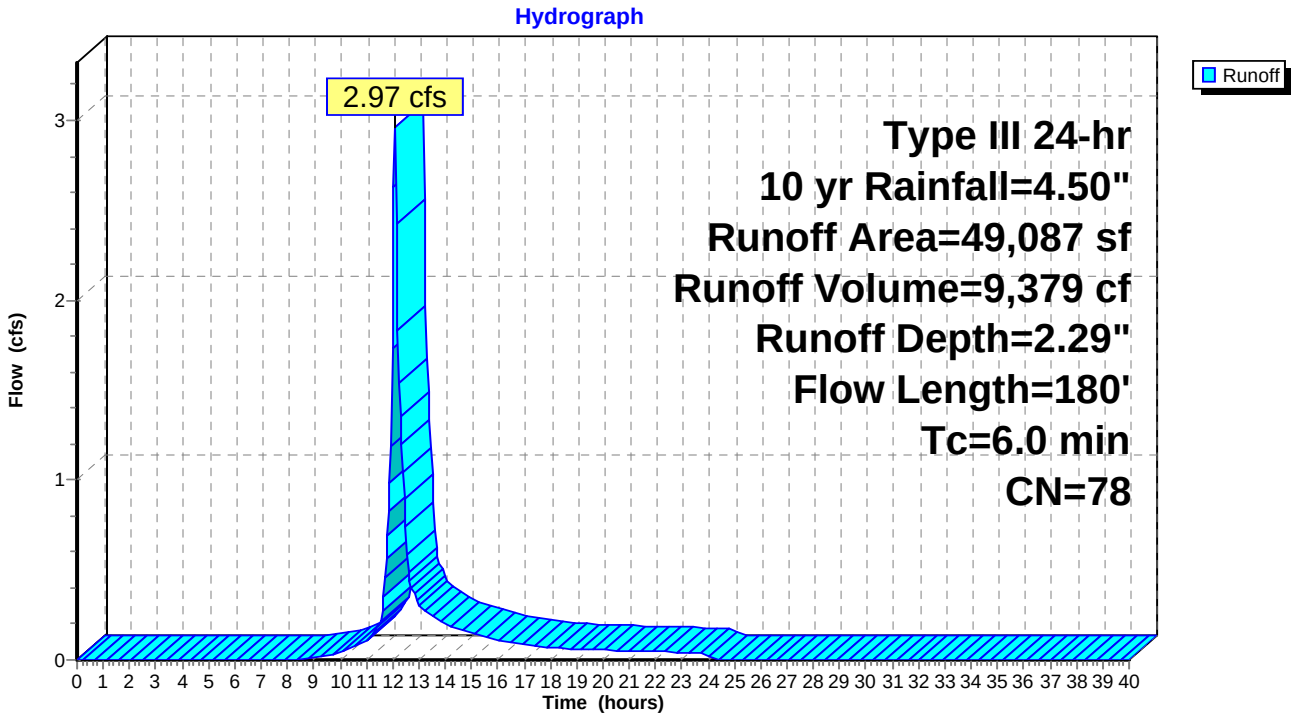
Runoff = 2.97 cfs @ 12.09 hrs, Volume= 9,379 cf, Depth= 2.29"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 yr Rainfall=4.50"

	Area (sf)	CN	Description
	37,087	77	Woods, Good, HSG D
*	1,000	98	Ledge outcrops, HSG D
	11,000	80	>75% Grass cover, Good, HSG D
	49,087	78	Weighted Average
	48,087		97.96% Pervious Area
	1,000		2.04% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.3	50	0.0800	0.25		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
0.4	130	0.0900	4.83		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
3.7	180	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 84S: PR-EAST



Summary for Subcatchment 85S: PR-STREAM-B

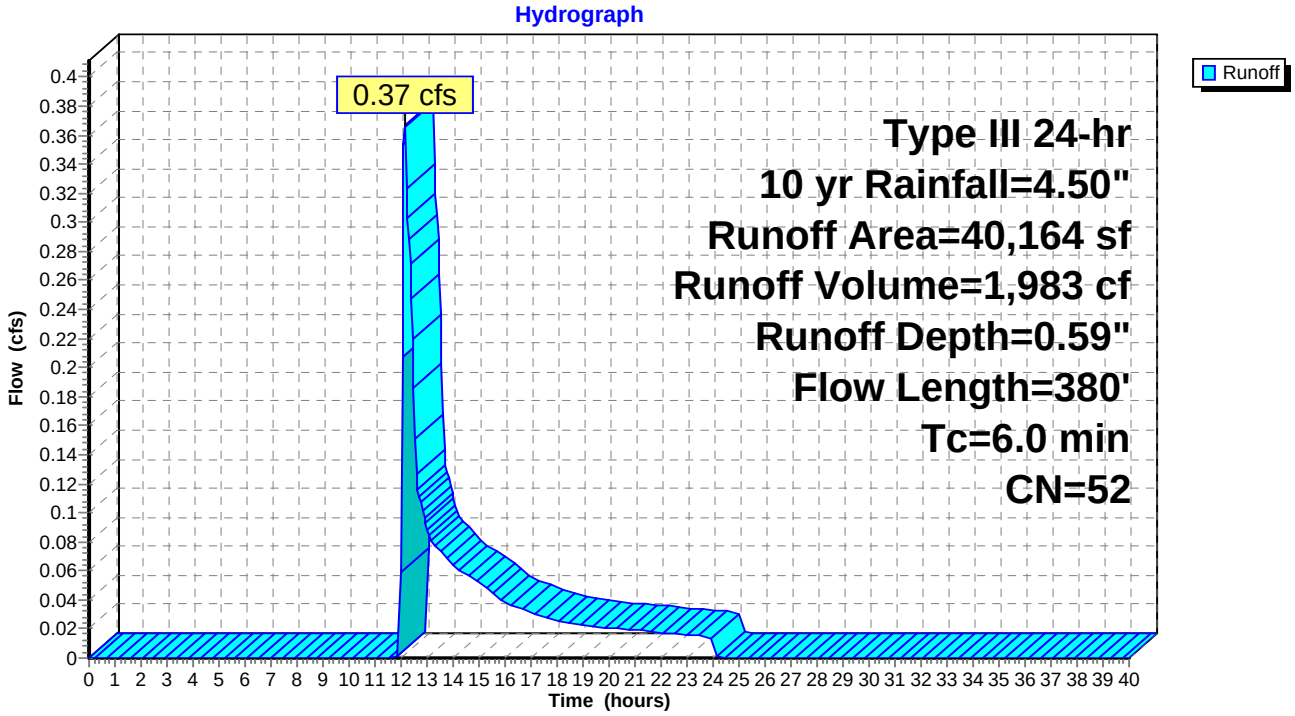
Runoff = 0.37 cfs @ 12.14 hrs, Volume= 1,983 cf, Depth= 0.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 yr Rainfall=4.50"

	Area (sf)	CN	Description
*	600	98	Ledge, HSG A
	9,383	30	Woods, Good, HSG A
	9,259	77	1/8 acre lots, 65% imp, HSG A
	11,261	54	1/2 acre lots, 25% imp, HSG A
	283	98	Roofs, HSG A
	378	80	>75% Grass cover, Good, HSG D
	9,000	39	>75% Grass cover, Good, HSG A
	40,164	52	Weighted Average
	30,447		75.81% Pervious Area
	9,717		24.19% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.4	50	0.1800	0.35		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
0.3	150	0.2700	8.37		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.3	180	0.0700	11.19	67.12	**Channel Flow,** Area= 6.0 sf Perim= 10.0' r= 0.60' n= 0.025
3.0	380	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 85S: PR-STREAM-B



Summary for Subcatchment 89S: PR-MAPLE

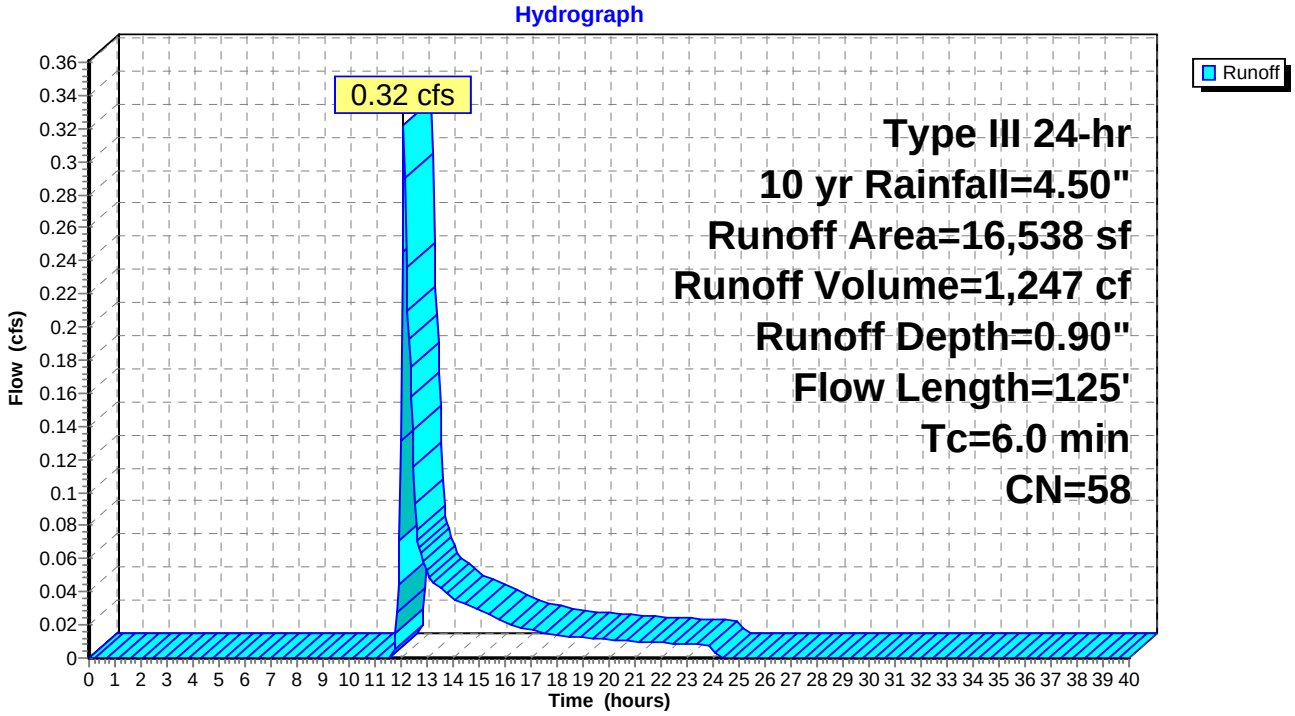
Runoff = 0.32 cfs @ 12.11 hrs, Volume= 1,247 cf, Depth= 0.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 yr Rainfall=4.50"

Area (sf)	CN	Description
4,000	30	Woods, Good, HSG A
3,444	98	Paved parking, HSG A
3,688	77	1/8 acre lots, 65% imp, HSG A
5,406	39	>75% Grass cover, Good, HSG A
16,538	58	Weighted Average
10,697		64.68% Pervious Area
5,841		35.32% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.2	50	0.2200	0.38		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
0.1	55	0.2200	7.55		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.0	10	0.0800	5.74		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.1	10	0.0240	3.14		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
2.4	125	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 89S: PR-MAPLE



Summary for Subcatchment 90S: EX-CB4R

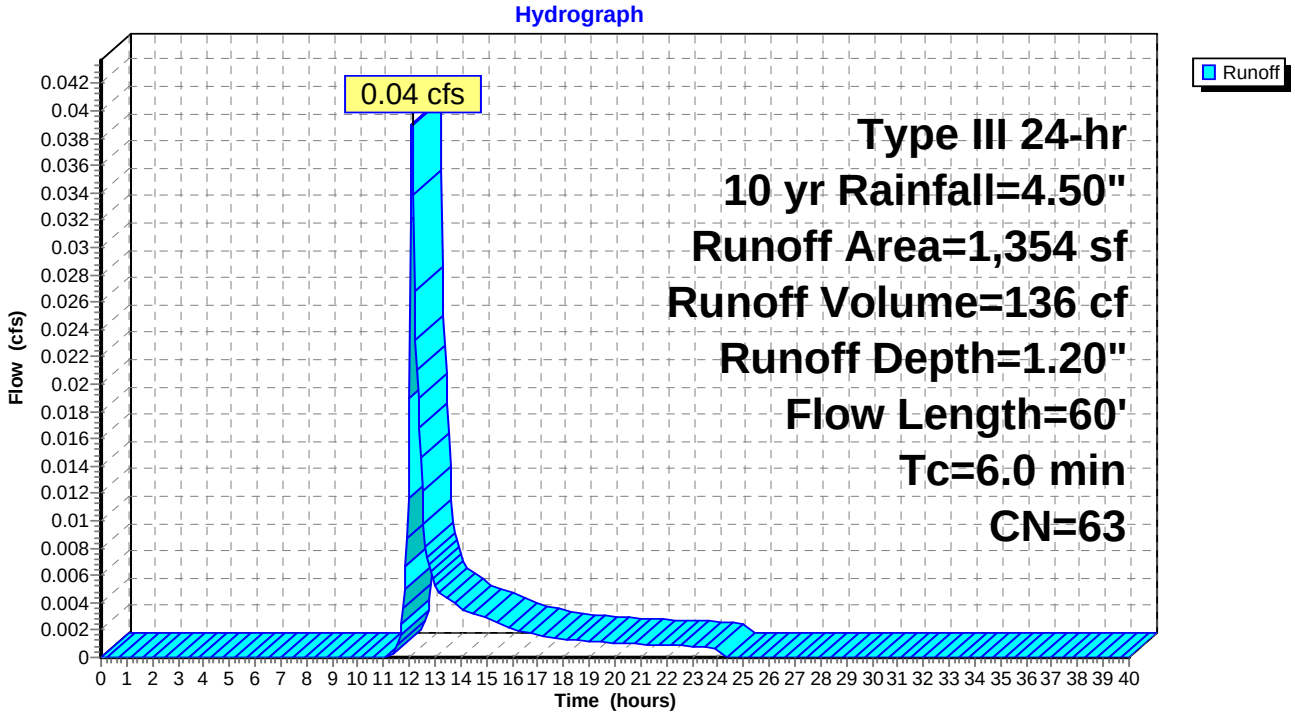
Runoff = 0.04 cfs @ 12.10 hrs, Volume= 136 cf, Depth= 1.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 yr Rainfall=4.50"

Area (sf)	CN	Description
814	39	>75% Grass cover, Good, HSG A
540	98	Paved parking, HSG A
1,354	63	Weighted Average
814		60.12% Pervious Area
540		39.88% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.7	40	0.2800	0.40		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
0.1	20	0.0900	6.09		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.8	60	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 90S: EX-CB4R



Summary for Subcatchment 91S: EX-CB3R2

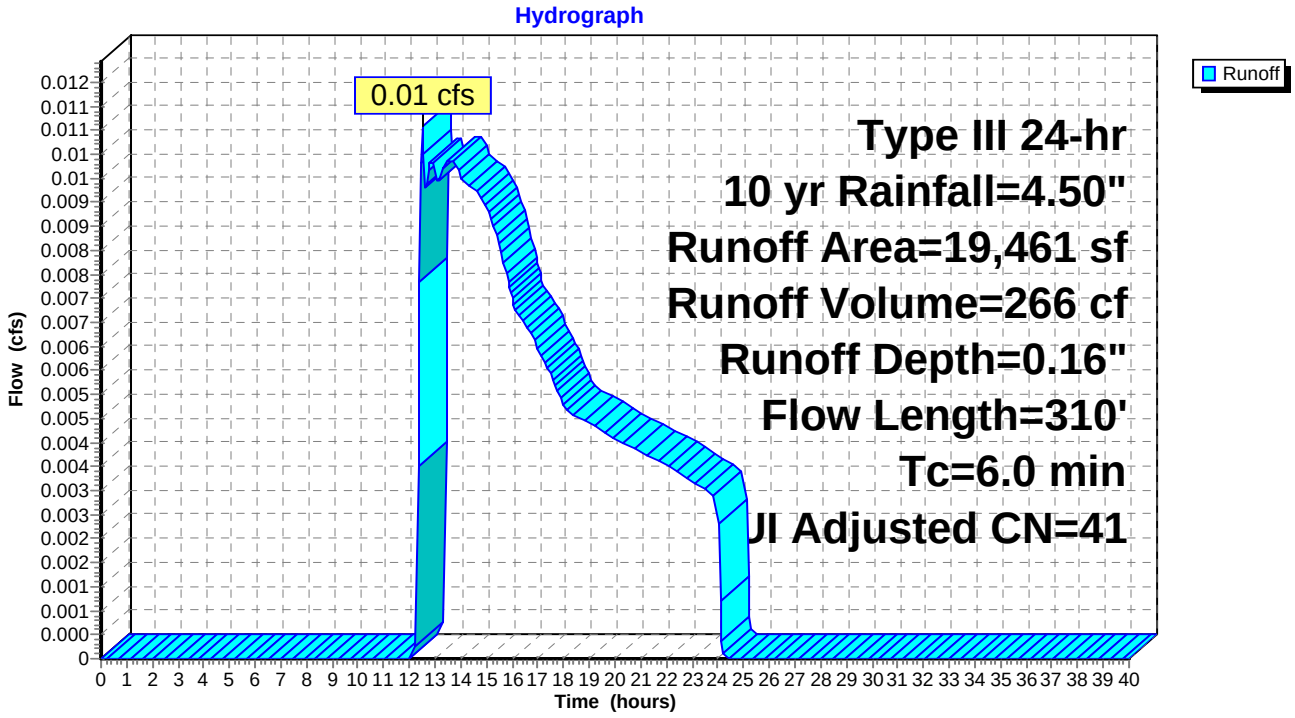
Runoff = 0.01 cfs @ 12.50 hrs, Volume= 266 cf, Depth= 0.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 yr Rainfall=4.50"

Area (sf)	CN	Adj	Description
1,303	98		Paved parking, HSG A
12,815	39		>75% Grass cover, Good, HSG A
343	98		Unconnected roofs, HSG A
5,000	30		Woods, Good, HSG A
19,461	42	41	Weighted Average, UI Adjusted
17,815			91.54% Pervious Area
1,646			8.46% Impervious Area
343			20.84% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.6	50	0.2400	0.18		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
0.5	260	0.3300	9.25		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
5.1	310	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 91S: EX-CB3R2



Summary for Subcatchment 92S: EX-CB2R

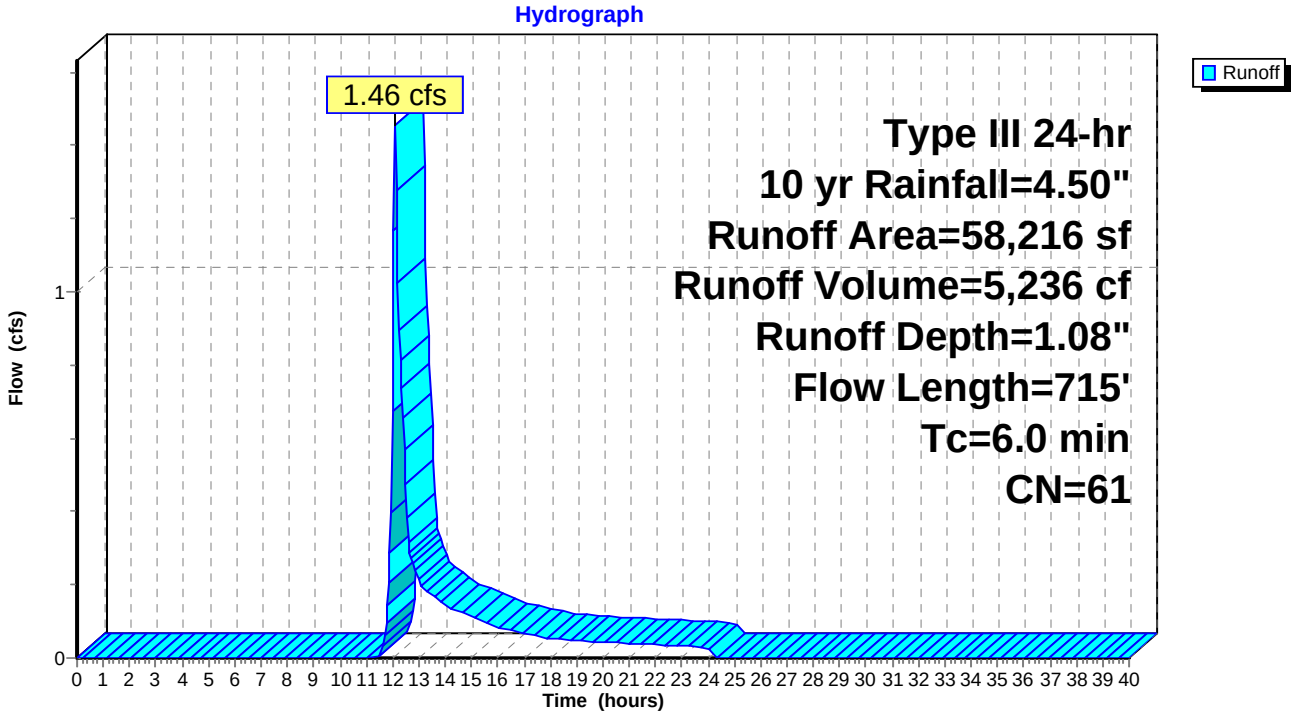
Runoff = 1.46 cfs @ 12.11 hrs, Volume= 5,236 cf, Depth= 1.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 yr Rainfall=4.50"

	Area (sf)	CN	Description
	10,719	30	Woods, Good, HSG A
	8,032	98	Paved parking, HSG A
	3,333	77	1/8 acre lots, 65% imp, HSG A
*	400	98	Ledge, HSG A
	12,040	54	1/2 acre lots, 25% imp, HSG A
	20,259	61	1/4 acre lots, 38% imp, HSG A
	2,594	80	>75% Grass cover, Good, HSG D
	839	98	Roofs, HSG D
	58,216	61	Weighted Average
	36,070		61.96% Pervious Area
	22,146		38.04% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.4	50	0.1800	0.35		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
0.2	125	0.3500	9.52		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
2.7	540	0.0260	3.27		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
5.3	715	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 92S: EX-CB2R



Summary for Subcatchment 95S: EX-CB1R

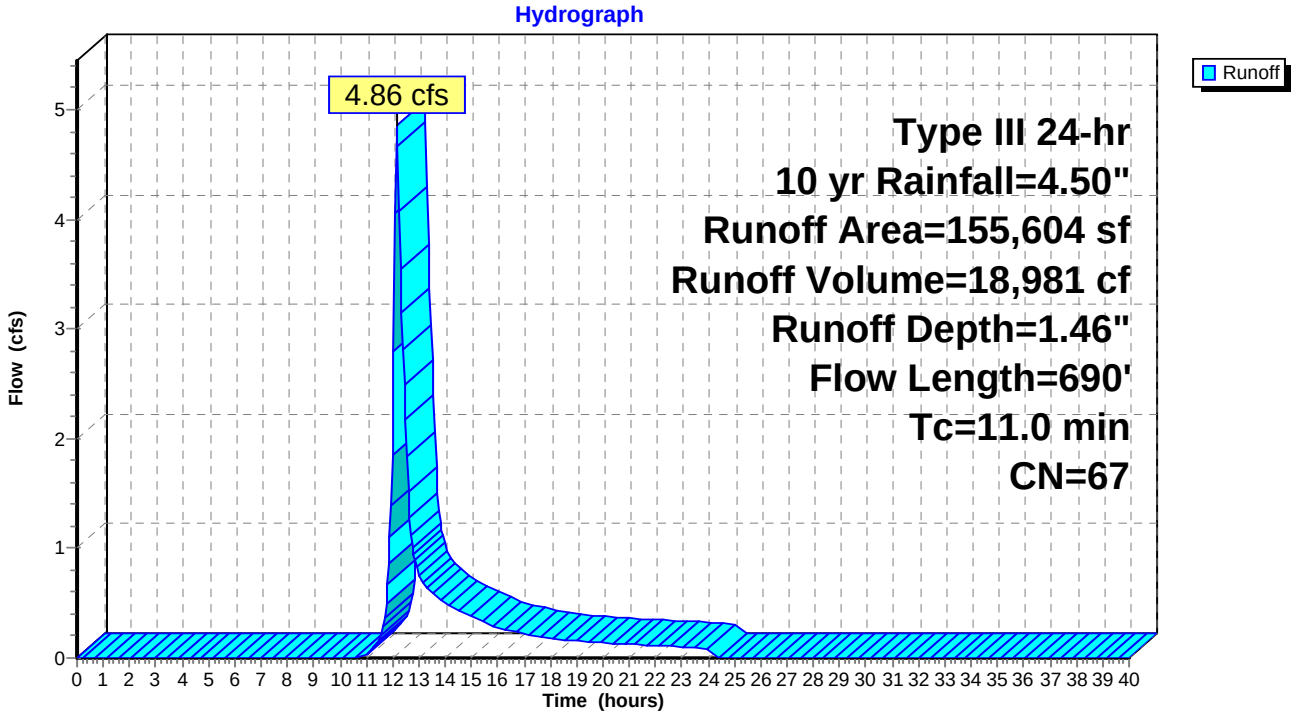
Runoff = 4.86 cfs @ 12.17 hrs, Volume= 18,981 cf, Depth= 1.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 yr Rainfall=4.50"

	Area (sf)	CN	Description
	45,701	30	Woods, Good, HSG A
	70,444	77	Woods, Good, HSG D
	10,120	98	Paved parking, HSG A
*	7,612	98	Ledge, HSG A
*	5,727	98	Ledge, HSG D
	16,000	80	>75% Grass cover, Good, HSG D
	155,604	67	Weighted Average
	132,145		84.92% Pervious Area
	23,459		15.08% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.5	50	0.0100	0.11		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
0.9	90	0.0100	1.61		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.8	310	0.1700	6.64		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
1.8	240	0.0120	2.22		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
11.0	690	Total			

Subcatchment 95S: EX-CB1R



Summary for Pond 1P: Subsurface Infiltration Structure (Lot 9)

Inflow Area = 56,609 sf, 39.15% Impervious, Inflow Depth = 1.43" for 10 yr event
Inflow = 1.96 cfs @ 12.10 hrs, Volume= 6,746 cf
Outflow = 0.32 cfs @ 12.69 hrs, Volume= 6,747 cf, Atten= 84%, Lag= 35.6 min
Discarded = 0.13 cfs @ 11.80 hrs, Volume= 5,528 cf
Primary = 0.19 cfs @ 12.69 hrs, Volume= 1,218 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 81.37' @ 12.69 hrs Surf.Area= 2,390 sf Storage= 2,229 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 111.1 min (964.0 - 852.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	80.00'	2,015 cf	**40.17'W x 59.50'L x 3.54'H Field A** 8,464 cf Overall - 3,427 cf Embedded = 5,037 cf x 40.0% Voids
#2A	80.50'	3,427 cf	**Cultec R-330XLHD** x 64 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 8 rows
		5,442 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	77.00'	**12.0" Round Culvert** L= 80.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 77.00' / 73.00' S= 0.0500 '/' Cc= 0.900 n= 0.010, Flow Area= 0.79 sf
#2	Device 1	81.00'	**4.0" Vert. Orifice/Grate** C= 0.600
#3	Discarded	80.00'	**2.410 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.13 cfs @ 11.80 hrs HW=80.07' (Free Discharge)
└**3=Exfiltration** (Exfiltration Controls 0.13 cfs)

Primary OutFlow Max=0.19 cfs @ 12.69 hrs HW=81.37' TW=0.00' (Dynamic Tailwater)
└**1=Culvert** (Passes 0.19 cfs of 7.44 cfs potential flow)
└**2=Orifice/Grate** (Orifice Controls 0.19 cfs @ 2.17 fps)

Pond 1P: Subsurface Infiltration Structure (Lot 9) - Chamber Wizard Field A

Chamber Model = Cultec R-330XLHD (Cultec Recharger® 330XLHD)
Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf
Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap
Row Length Adjustment= +1.50' x 7.45 sf x 8 rows

52.0" Wide + 6.0" Spacing = 58.0" C-C Row Spacing

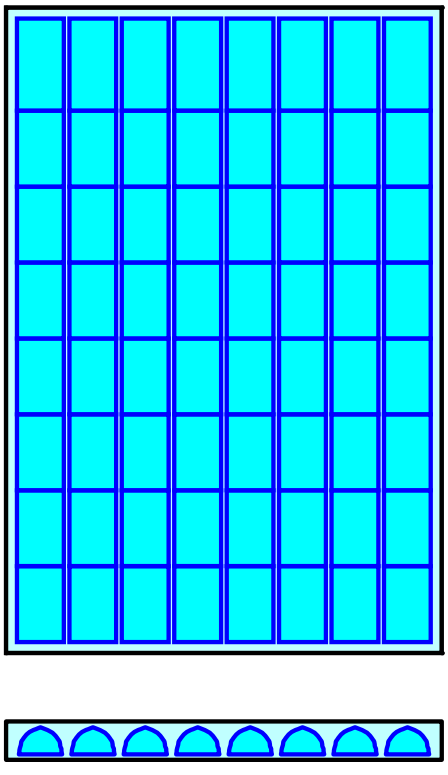
8 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 57.50' Row Length +12.0" End Stone x 2 = 59.50' Base Length
8 Rows x 52.0" Wide + 6.0" Spacing x 7 + 12.0" Side Stone x 2 = 40.17' Base Width
6.0" Base + 30.5" Chamber Height + 6.0" Cover = 3.54' Field Height

64 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 8 Rows = 3,427.5 cf Chamber Storage

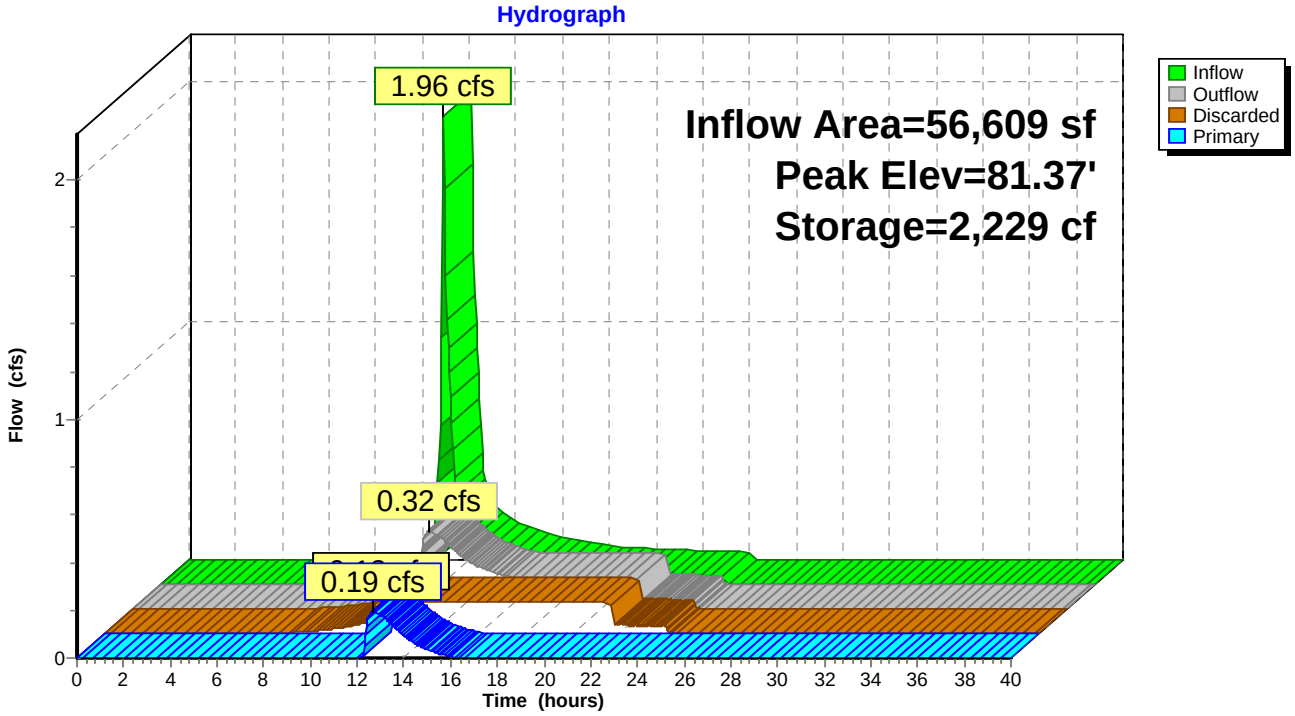
8,464.3 cf Field - 3,427.5 cf Chambers = 5,036.8 cf Stone x 40.0% Voids = 2,014.7 cf Stone Storage

Chamber Storage + Stone Storage = 5,442.2 cf = 0.125 af
Overall Storage Efficiency = 64.3%
Overall System Size = 59.50' x 40.17' x 3.54'

64 Chambers
313.5 cy Field
186.5 cy Stone



Pond 1P: Subsurface Infiltration Structure (Lot 9)



Summary for Pond 2P: Subsurface Infiltration Structure 1 (STA 3+50)

Inflow Area = 14,469 sf, 36.01% Impervious, Inflow Depth = 3.06" for 10 yr event
Inflow = 1.15 cfs @ 12.09 hrs, Volume= 3,688 cf
Outflow = 0.30 cfs @ 12.47 hrs, Volume= 3,690 cf, Atten= 74%, Lag= 23.0 min
Discarded = 0.02 cfs @ 10.15 hrs, Volume= 2,632 cf
Primary = 0.27 cfs @ 12.47 hrs, Volume= 1,058 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 108.79' @ 12.47 hrs Surf.Area= 988 sf Storage= 1,630 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 449.3 min (1,255.6 - 806.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	106.46'	856 cf	**25.67'W x 38.50'L x 3.54'H Field A** 3,500 cf Overall - 1,360 cf Embedded = 2,140 cf x 40.0% Voids
#2A	106.96'	1,360 cf	**Cultec R-330XLHD** x 25 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 5 rows
		2,216 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	106.46'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	108.50'	**8.0" Round Culvert** L= 16.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 108.50' / 106.50' S= 0.1250 '/' Cc= 0.900 n= 0.010, Flow Area= 0.35 sf

Discarded OutFlow Max=0.02 cfs @ 10.15 hrs HW=106.50' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.27 cfs @ 12.47 hrs HW=108.79' TW=99.64' (Dynamic Tailwater)
└**2=Culvert** (Inlet Controls 0.27 cfs @ 1.84 fps)

Pond 2P: Subsurface Infiltration Structure 1 (STA 3+50) - Chamber Wizard Field A

Chamber Model = Cultec R-330XLHD (Cultec Recharger® 330XLHD)
Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf
Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap
Row Length Adjustment= +1.50' x 7.45 sf x 5 rows

52.0" Wide + 6.0" Spacing = 58.0" C-C Row Spacing

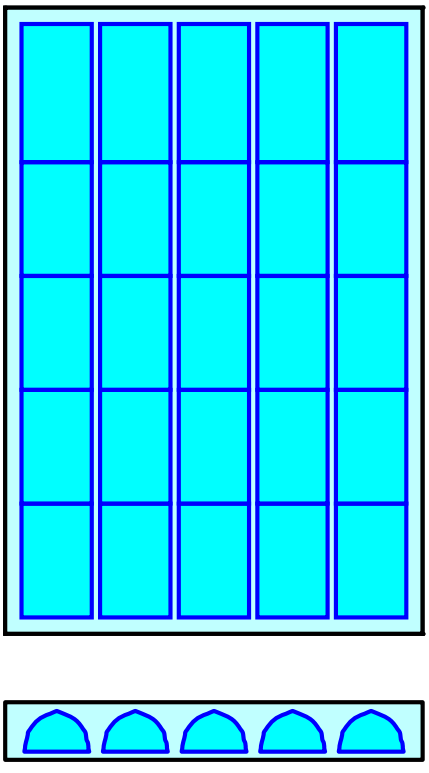
5 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 36.50' Row Length +12.0" End Stone x 2 = 38.50' Base Length
5 Rows x 52.0" Wide + 6.0" Spacing x 4 + 12.0" Side Stone x 2 = 25.67' Base Width
6.0" Base + 30.5" Chamber Height + 6.0" Cover = 3.54' Field Height

25 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 5 Rows = 1,359.8 cf Chamber Storage

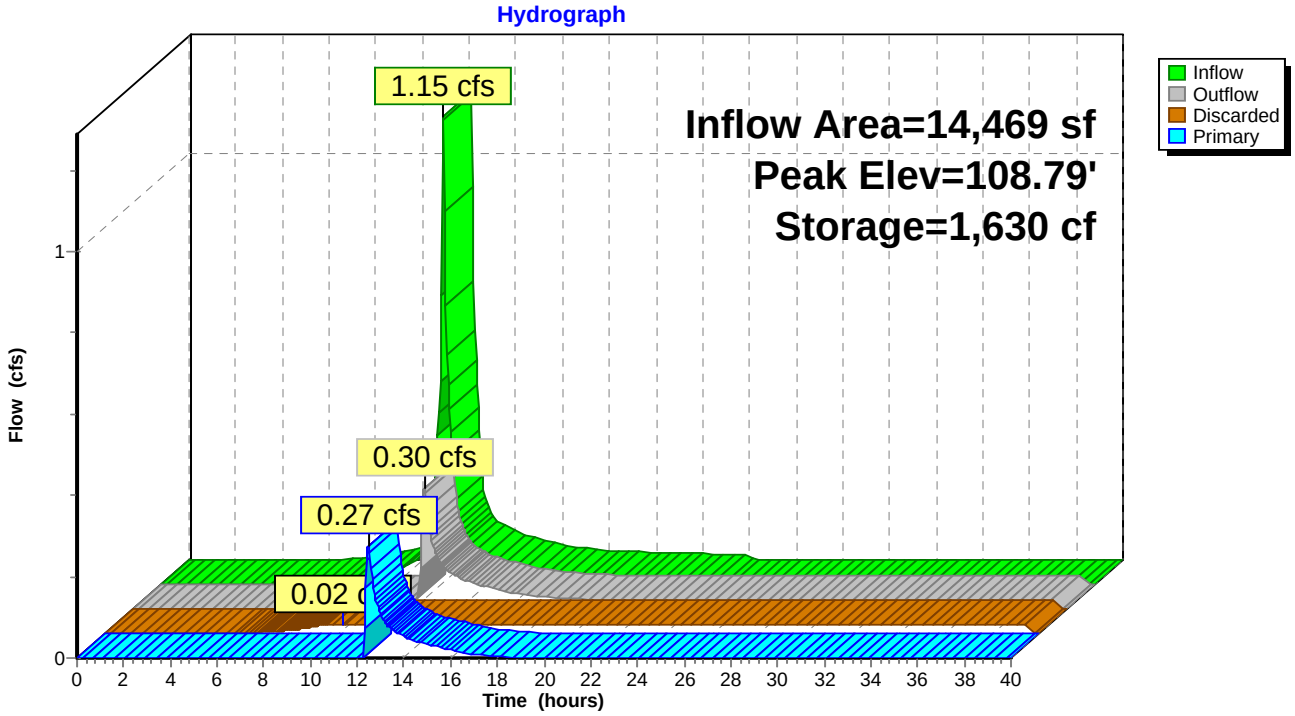
3,499.8 cf Field - 1,359.8 cf Chambers = 2,139.9 cf Stone x 40.0% Voids = 856.0 cf Stone Storage

Chamber Storage + Stone Storage = 2,215.8 cf = 0.051 af
Overall Storage Efficiency = 63.3%
Overall System Size = 38.50' x 25.67' x 3.54'

25 Chambers
129.6 cy Field
79.3 cy Stone



Pond 2P: Subsurface Infiltration Structure 1 (STA 3+50)



Summary for Pond 3P: Subsurface Infiltration Structure 2 (Rear of Lot 7)

Inflow Area = 16,472 sf, 46.39% Impervious, Inflow Depth = 3.22" for 10 yr event
Inflow = 1.36 cfs @ 12.09 hrs, Volume= 4,419 cf
Outflow = 0.15 cfs @ 12.82 hrs, Volume= 4,421 cf, Atten= 89%, Lag= 43.5 min
Discarded = 0.04 cfs @ 10.45 hrs, Volume= 3,659 cf
Primary = 0.12 cfs @ 12.82 hrs, Volume= 762 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 123.91' @ 12.82 hrs Surf.Area= 1,527 sf Storage= 2,119 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 441.9 min (1,239.5 - 797.6)

Volume	Invert	Avail.Storage	Storage Description
#1A	121.96'	1,307 cf	**25.67'W x 59.50'L x 3.54'H Field A** 5,409 cf Overall - 2,142 cf Embedded = 3,267 cf x 40.0% Voids
#2A	122.46'	2,142 cf	**Cultec R-330XLHD** x 40 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 5 rows
		3,449 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	121.96'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	123.75'	**12.0" Round Culvert** L= 16.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 123.75' / 122.00' S= 0.1094 '/' Cc= 0.900 n= 0.010, Flow Area= 0.79 sf

Discarded OutFlow Max=0.04 cfs @ 10.45 hrs HW=122.00' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.04 cfs)

Primary OutFlow Max=0.12 cfs @ 12.82 hrs HW=123.91' TW=99.59' (Dynamic Tailwater)
↑**2=Culvert** (Inlet Controls 0.12 cfs @ 1.38 fps)

Pond 3P: Subsurface Infiltration Structure 2 (Rear of Lot 7) - Chamber Wizard Field A

Chamber Model = Cultec R-330XLHD (Cultec Recharger® 330XLHD)
Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf
Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap
Row Length Adjustment= +1.50' x 7.45 sf x 5 rows

52.0" Wide + 6.0" Spacing = 58.0" C-C Row Spacing

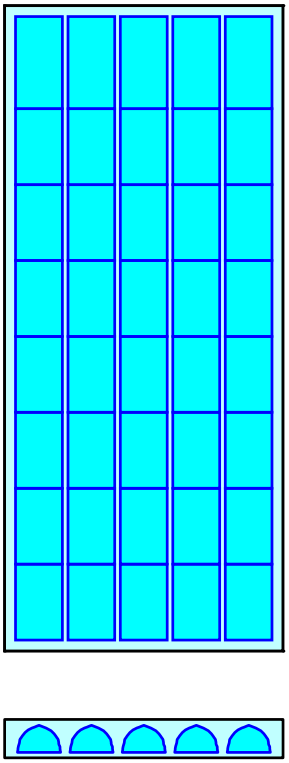
8 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 57.50' Row Length +12.0" End Stone x 2 = 59.50' Base Length
5 Rows x 52.0" Wide + 6.0" Spacing x 4 + 12.0" Side Stone x 2 = 25.67' Base Width
6.0" Base + 30.5" Chamber Height + 6.0" Cover = 3.54' Field Height

40 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 5 Rows = 2,142.2 cf Chamber Storage

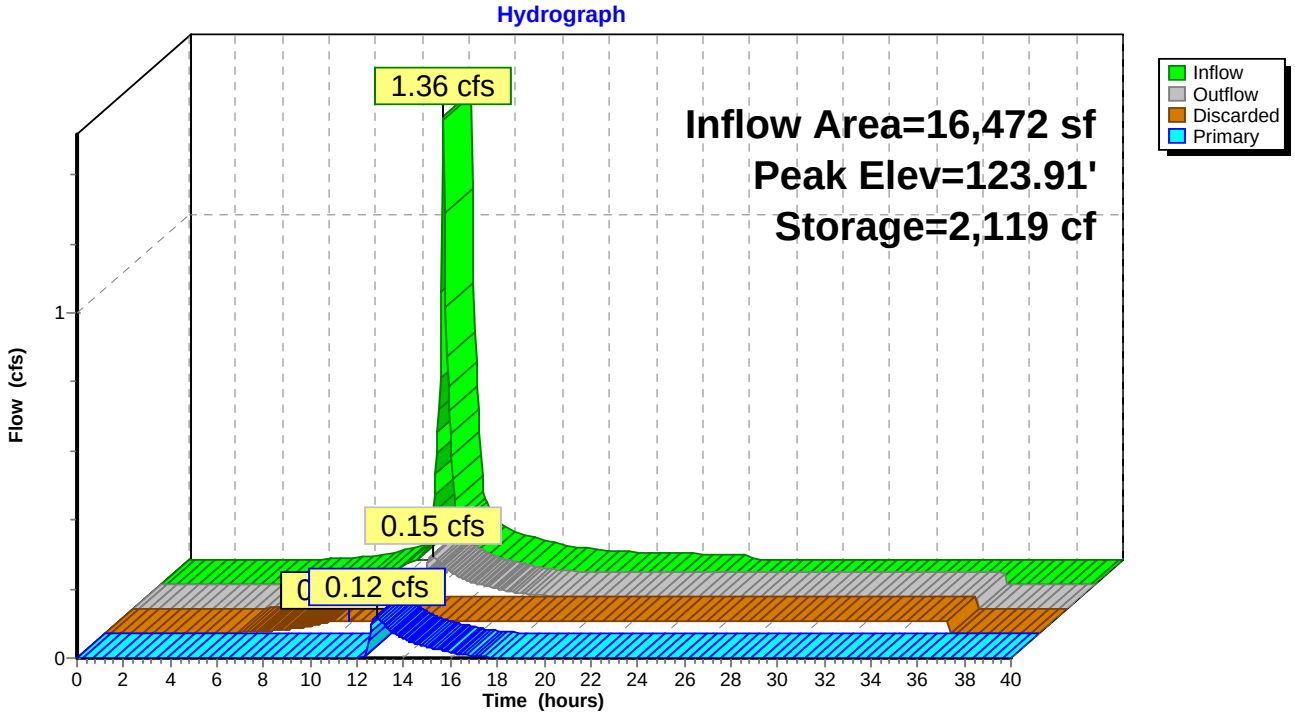
5,408.7 cf Field - 2,142.2 cf Chambers = 3,266.6 cf Stone x 40.0% Voids = 1,306.6 cf Stone Storage

Chamber Storage + Stone Storage = 3,448.8 cf = 0.079 af
Overall Storage Efficiency = 63.8%
Overall System Size = 59.50' x 25.67' x 3.54'

40 Chambers
200.3 cy Field
121.0 cy Stone



Pond 3P: Subsurface Infiltration Structure 2 (Rear of Lot 7)



Summary for Pond 4P: Infiltration Trench - Revised

Inflow Area = 23,402 sf, 46.08% Impervious, Inflow Depth = 3.23" for 10 yr event
Inflow = 1.95 cfs @ 12.09 hrs, Volume= 6,305 cf
Outflow = 1.85 cfs @ 12.11 hrs, Volume= 6,306 cf, Atten= 5%, Lag= 1.5 min
Discarded = 0.01 cfs @ 8.40 hrs, Volume= 1,436 cf
Primary = 1.84 cfs @ 12.11 hrs, Volume= 4,870 cf
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 123.67' @ 12.11 hrs Surf.Area= 627 sf Storage= 669 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 91.6 min (891.9 - 800.4)

Volume	Invert	Avail.Storage	Storage Description
#1	121.00'	878 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc) 2,195 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
121.00	627	0	0
122.00	627	627	627
123.00	627	627	1,254
124.00	627	627	1,881
124.50	627	314	2,195

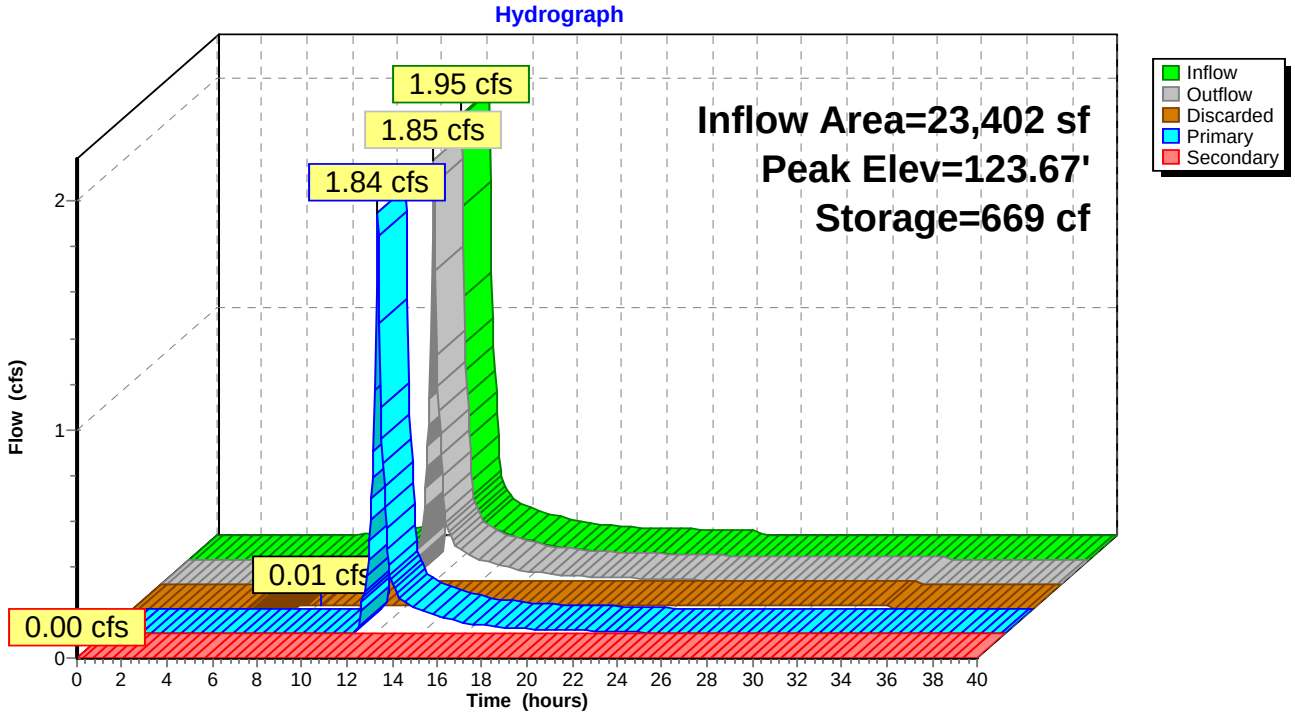
Device	Routing	Invert	Outlet Devices
#1	Secondary	124.50'	**65.0' long x 1.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32
#2	Discarded	121.00'	**1.020 in/hr Exfiltration over Surface area**
#3	Primary	123.00'	**6.0" Round Culvert X 3.00** L= 6.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 123.00' / 122.50' S= 0.0833 '/' Cc= 0.900 n= 0.010, Flow Area= 0.20 sf

Discarded OutFlow Max=0.01 cfs @ 8.40 hrs HW=121.04' (Free Discharge)
└**2=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=1.80 cfs @ 12.11 hrs HW=123.65' TW=0.00' (Dynamic Tailwater)
└**3=Culvert** (Inlet Controls 1.80 cfs @ 3.05 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=121.00' TW=0.00' (Dynamic Tailwater)
└**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 4P: Infiltration Trench - Revised



Summary for Pond 15P: Proposed Box Culvert

Inflow Area = 132,625 sf, 22.75% Impervious, Inflow Depth = 1.45" for 10 yr event
Inflow = 4.30 cfs @ 12.11 hrs, Volume= 16,003 cf
Outflow = 4.30 cfs @ 12.11 hrs, Volume= 16,003 cf, Atten= 0%, Lag= 0.0 min
Primary = 4.30 cfs @ 12.11 hrs, Volume= 16,003 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 99.76' @ 12.11 hrs Surf.Area= 10 sf Storage= 1 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (850.9 - 850.9)

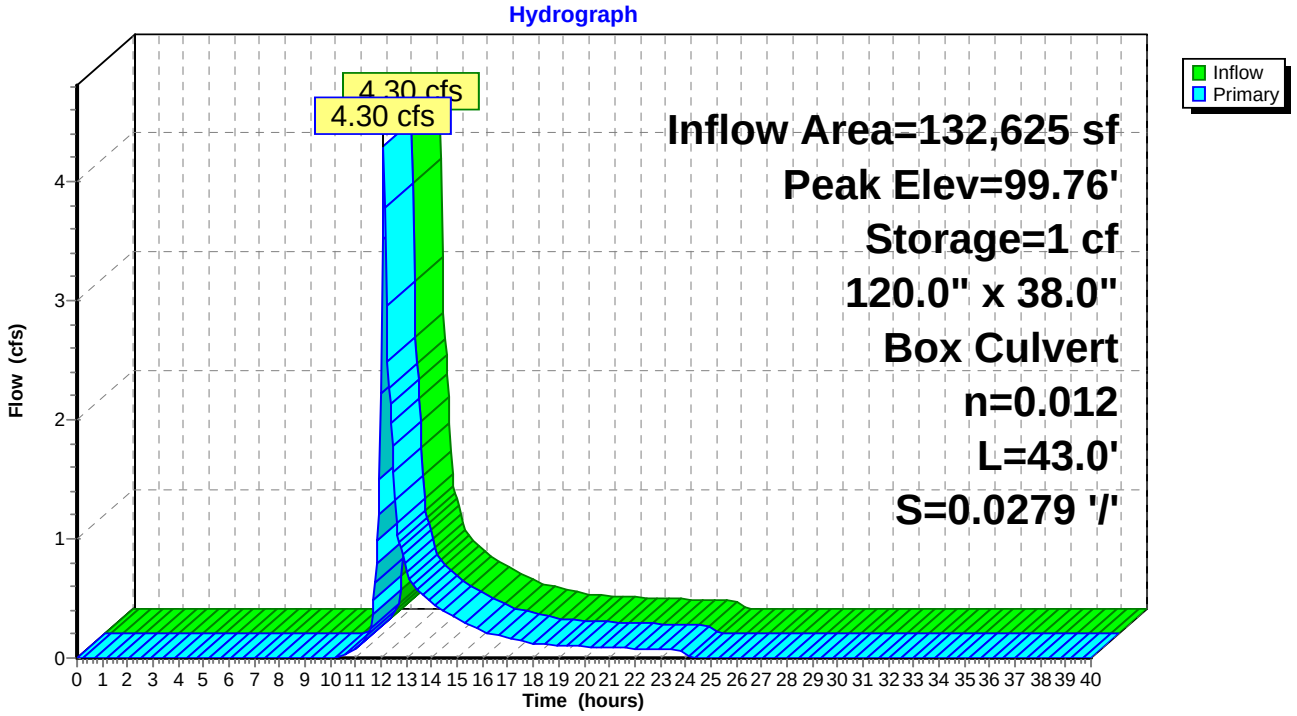
Volume	Invert	Avail.Storage	Storage Description
#1	99.50'	3,618 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
99.50	0	0	0
100.00	20	5	5
101.00	100	60	65
102.00	250	175	240
102.50	390	160	400
102.70	475	87	487
103.00	500	146	633
104.00	815	658	1,290
105.00	1,170	993	2,283
106.00	1,500	1,335	3,618

Device	Routing	Invert	Outlet Devices
#1	Primary	99.50'	**120.0" W x 38.0" H Box Culvert** L= 43.0' Box, headwall w/3 square edges, Ke= 0.500 Inlet / Outlet Invert= 99.50' / 98.30' S= 0.0279 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 31.67 sf

Primary OutFlow Max=4.24 cfs @ 12.11 hrs HW=99.76' TW=74.21' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 4.24 cfs @ 1.63 fps)

Pond 15P: Proposed Box Culvert



Summary for Pond 82P: Wetland acting as detention pond

Inflow Area = 628,585 sf, 10.50% Impervious, Inflow Depth = 2.42" for 10 yr event
Inflow = 33.50 cfs @ 12.13 hrs, Volume= 126,972 cf
Outflow = 0.12 cfs @ 24.20 hrs, Volume= 13,009 cf, Atten= 100%, Lag= 724.6 min
Discarded = 0.12 cfs @ 24.20 hrs, Volume= 13,009 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 132.37' @ 24.20 hrs Surf.Area= 56,839 sf Storage= 120,572 cf

Plug-Flow detention time= 817.8 min calculated for 13,009 cf (10% of inflow)
Center-of-Mass det. time= 642.7 min (1,476.0 - 833.3)

Volume	Invert	Avail.Storage	Storage Description
#1	130.00'	218,068 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

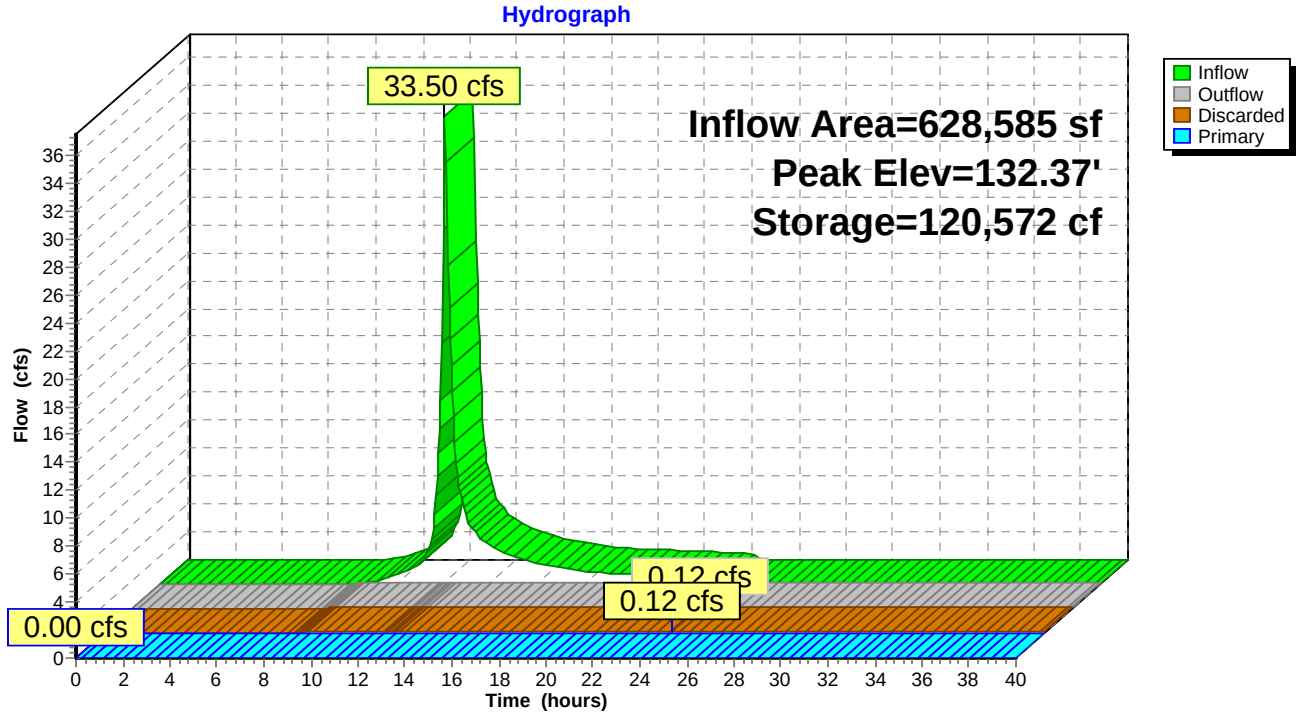
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
130.00	45,000	0	0
131.00	50,000	47,500	47,500
132.00	55,000	52,500	100,000
133.00	60,000	57,500	157,500
134.00	61,136	60,568	218,068

Device	Routing	Invert	Outlet Devices
#1	Discarded	130.00'	**0.090 in/hr Exfiltration over Surface area**
#2	Primary	132.40'	**30.0' long x 12.0' 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) 2.57 2.62 2.70 2.67 2.66 2.67 2.66 2.64

Discarded OutFlow Max=0.12 cfs @ 24.20 hrs HW=132.37' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.12 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=130.00' TW=73.00' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 82P: Wetland acting as detention pond



Summary for Pond 87P: Existing Headwall

Inflow Area = 801,374 sf, 13.21% Impervious, Inflow Depth = 0.27" for 10 yr event
Inflow = 4.66 cfs @ 12.11 hrs, Volume= 17,986 cf
Outflow = 4.65 cfs @ 12.11 hrs, Volume= 17,986 cf, Atten= 0%, Lag= 0.3 min
Primary = 3.11 cfs @ 12.11 hrs, Volume= 17,261 cf
Secondary = 1.54 cfs @ 12.11 hrs, Volume= 725 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 74.22' @ 12.11 hrs Surf.Area= 251 sf Storage= 71 cf

Plug-Flow detention time= 0.2 min calculated for 17,964 cf (100% of inflow)
Center-of-Mass det. time= 0.2 min (858.5 - 858.3)

Volume	Invert	Avail.Storage	Storage Description
#1	73.00'	100 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

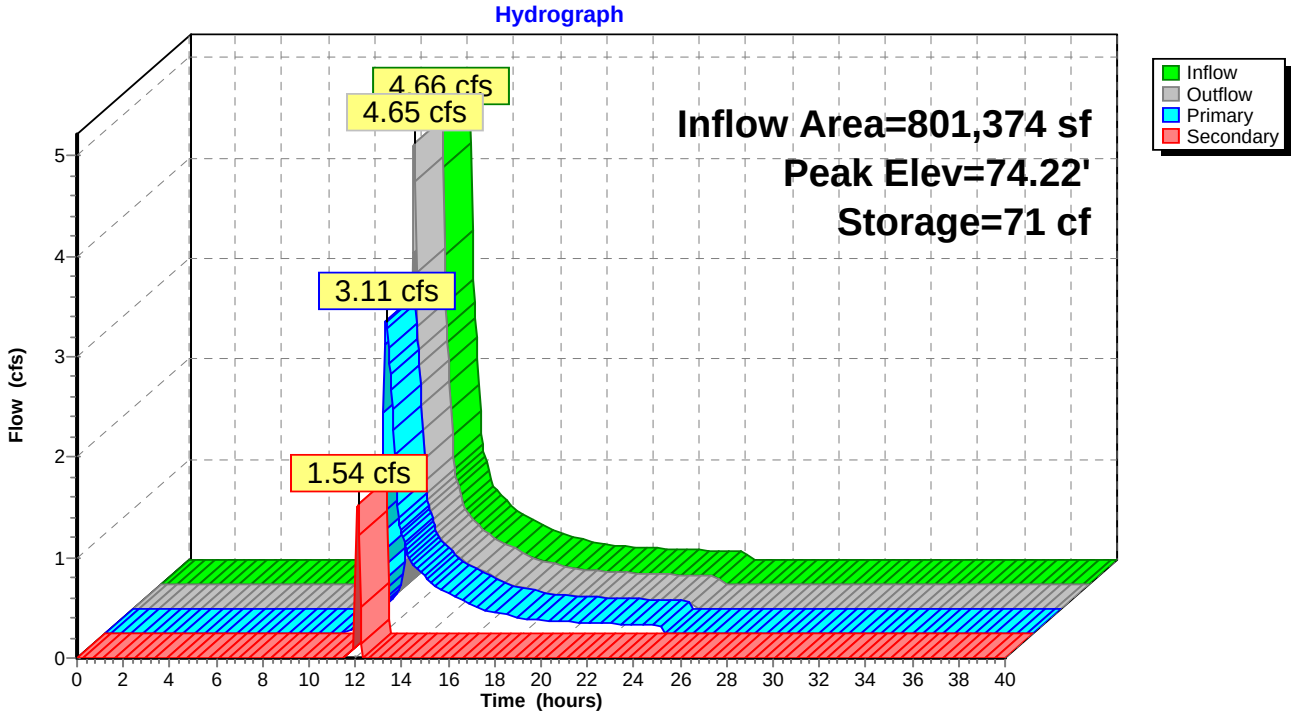
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
73.00	0	0	0
73.75	50	19	19
74.00	75	16	34
74.20	250	33	67
74.33	260	33	100

Device	Routing	Invert	Outlet Devices
#1	Primary	73.04'	**12.0" Round Culvert** L= 6.5' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 73.04' / 72.75' S= 0.0446 '/' Cc= 0.900 n= 0.013 Cast iron, coated, Flow Area= 0.79 sf
#2	Secondary	74.00'	**6.0' long x 2.0' 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 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

Primary OutFlow Max=3.09 cfs @ 12.11 hrs HW=74.21' TW=0.00' (Dynamic Tailwater)
1=Culvert (Inlet Controls 3.09 cfs @ 3.93 fps)

Secondary OutFlow Max=1.43 cfs @ 12.11 hrs HW=74.21' TW=0.00' (Dynamic Tailwater)
2=Broad-Crested Rectangular Weir (Weir Controls 1.43 cfs @ 1.15 fps)

Pond 87P: Existing Headwall

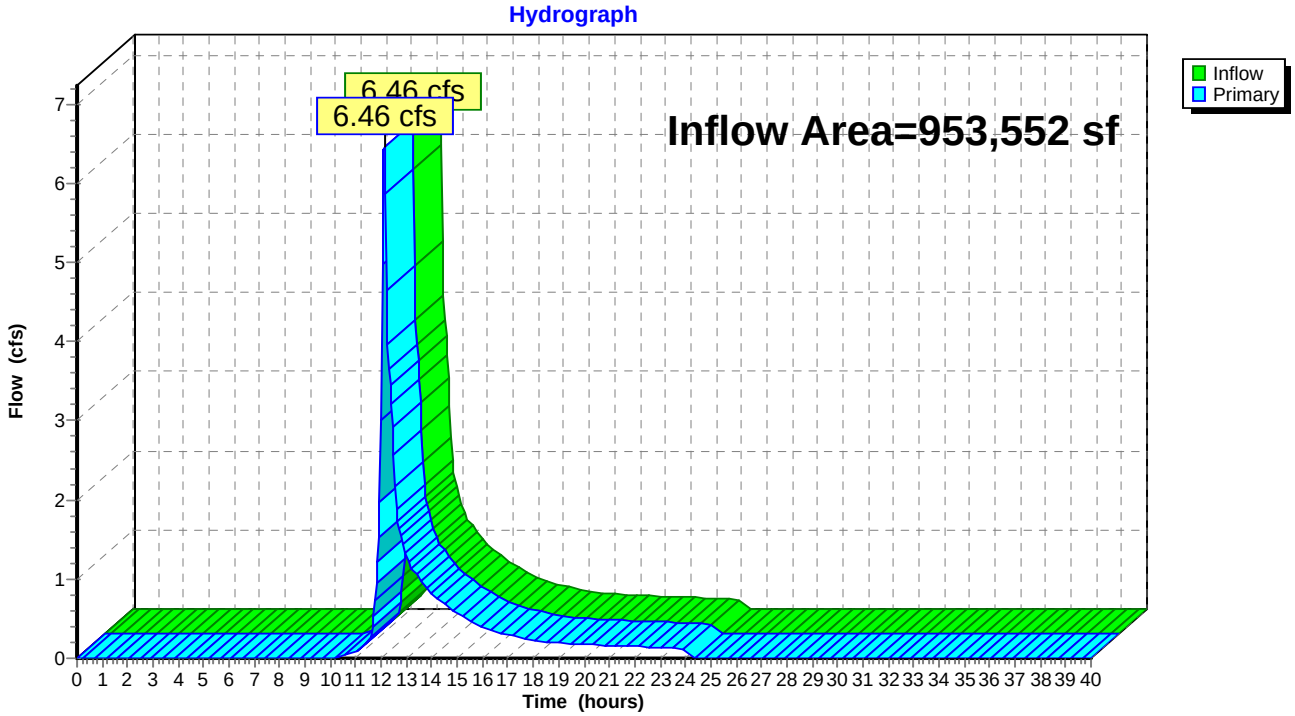


Summary for Link 1L: Discharge to southside of Maple Terrace

Inflow Area = 953,552 sf, 16.59% Impervious, Inflow Depth = 0.33" for 10 yr event
Inflow = 6.46 cfs @ 12.11 hrs, Volume= 26,090 cf
Primary = 6.46 cfs @ 12.11 hrs, Volume= 26,090 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs

Link 1L: Discharge to southside of Maple Terrace

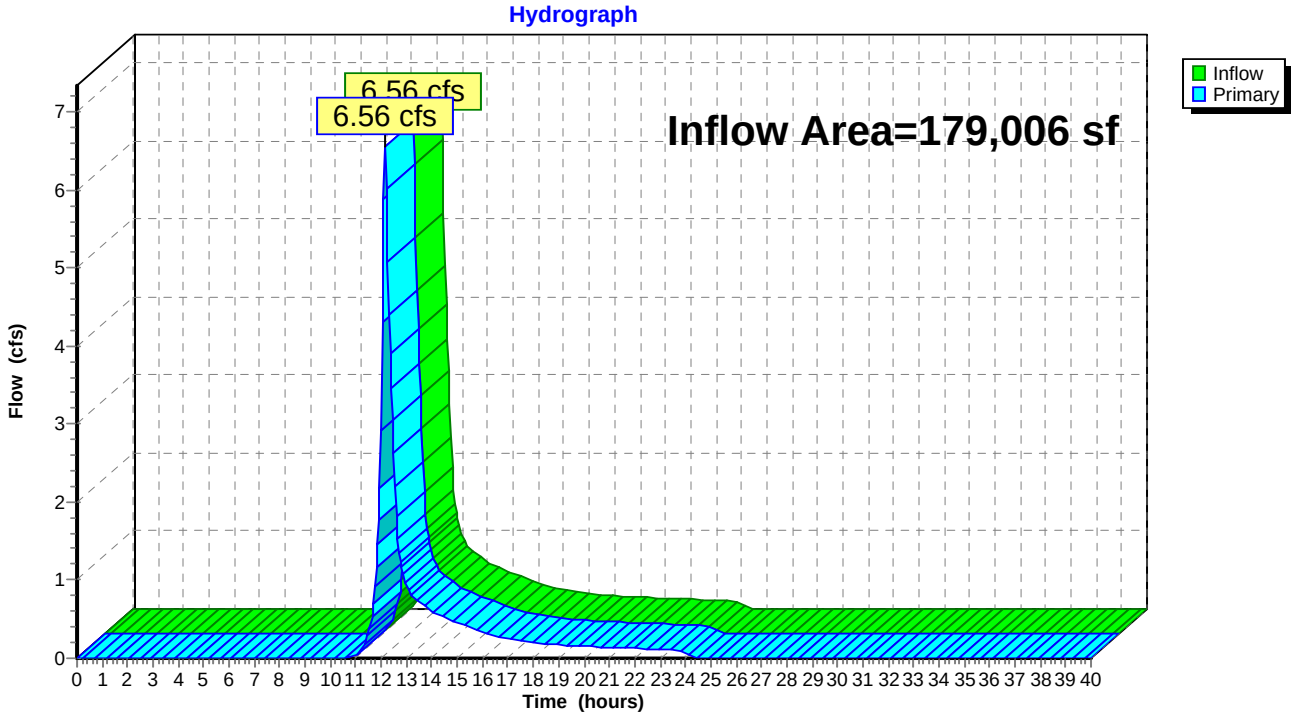


Summary for Link 2L: Discharge to northside of Swains Pond Avenue

Inflow Area = 179,006 sf, 19.13% Impervious, Inflow Depth = 1.60" for 10 yr event
Inflow = 6.56 cfs @ 12.15 hrs, Volume= 23,850 cf
Primary = 6.56 cfs @ 12.15 hrs, Volume= 23,850 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs

Link 2L: Discharge to northside of Swains Pond Avenue

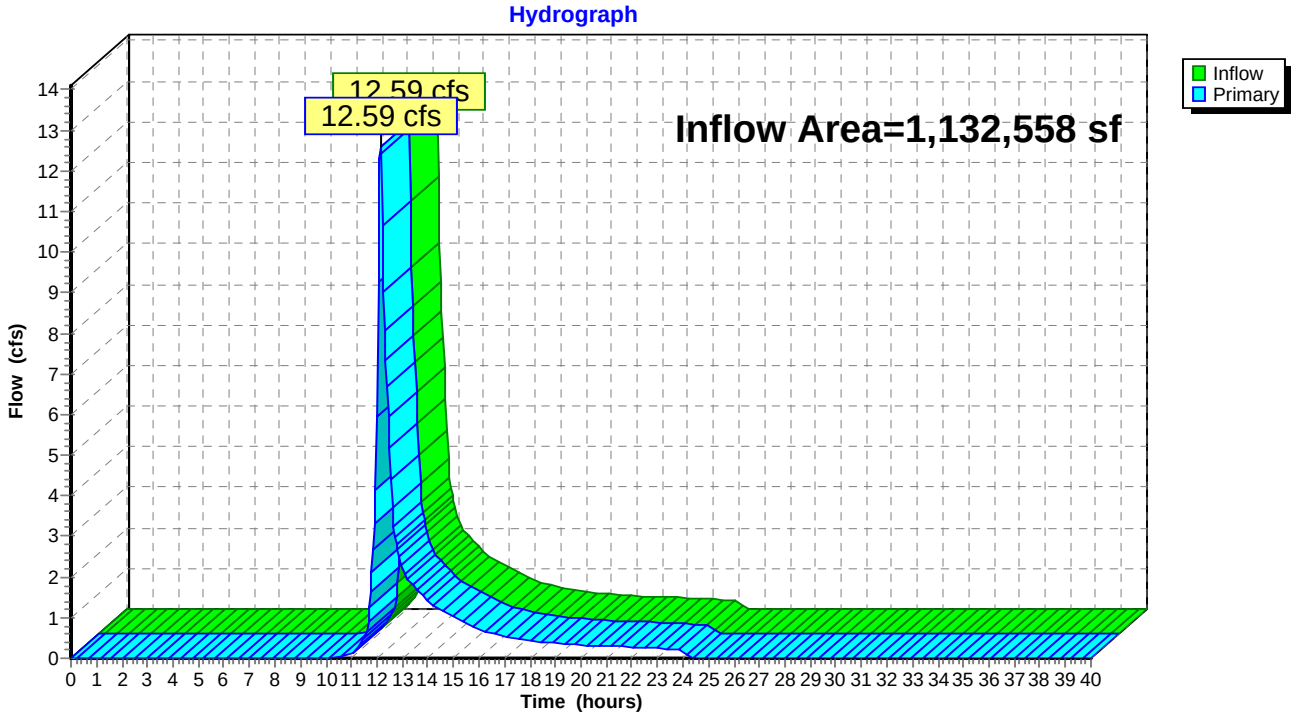


Summary for Link 3L: Total surface discharge from within the limit of watershed analysis

Inflow Area = 1,132,558 sf, 16.99% Impervious, Inflow Depth = 0.53" for 10 yr event
Inflow = 12.59 cfs @ 12.13 hrs, Volume= 49,940 cf
Primary = 12.59 cfs @ 12.13 hrs, Volume= 49,940 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs

Link 3L: Total surface discharge from within the limit of watershed analysis



Summary for Subcatchment 5S: PR-STREAM-A

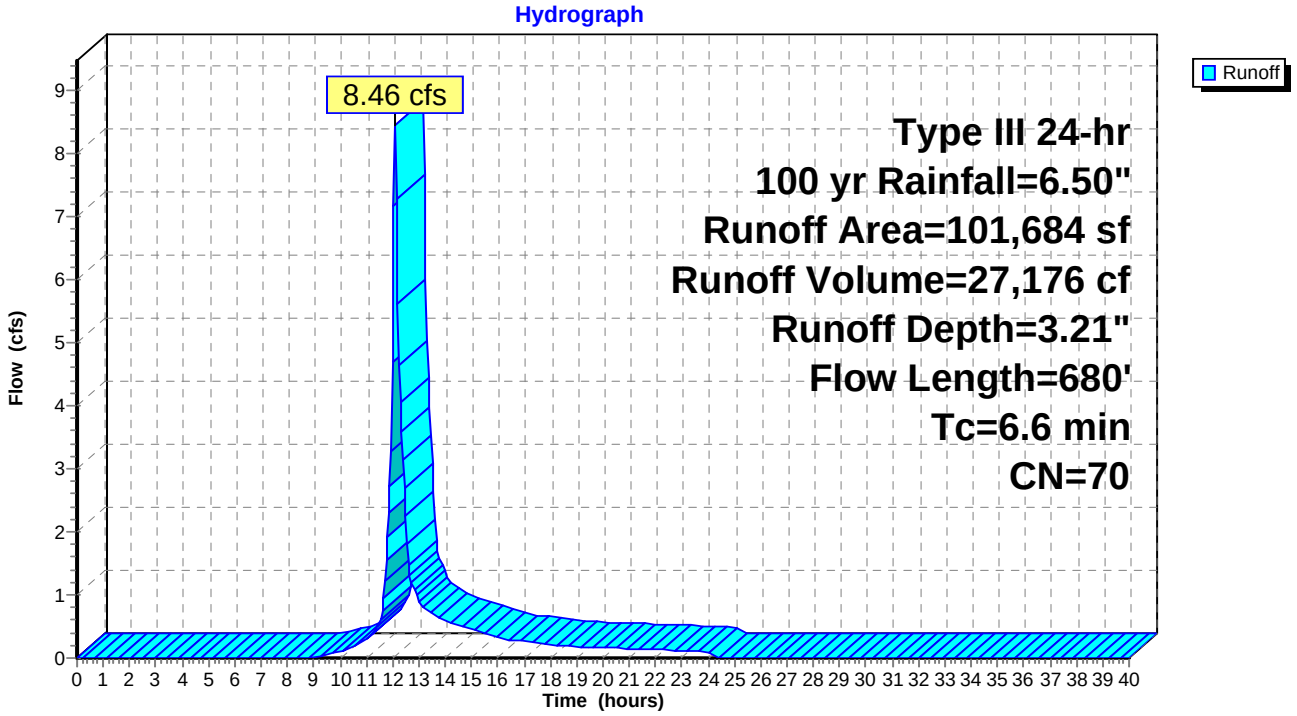
Runoff = 8.46 cfs @ 12.10 hrs, Volume= 27,176 cf, Depth= 3.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 yr Rainfall=6.50"

	Area (sf)	CN	Description
*	1,835	98	Ledge, HSG D
	39,112	77	Woods, Good, HSG D
	6,166	30	Woods, Good, HSG A
	2,458	98	Paved parking, HSG A
	105	98	Paved parking, HSG D
	34,008	61	1/4 acre lots, 38% imp, HSG A
	18,000	80	>75% Grass cover, Good, HSG D
	101,684	70	Weighted Average
	84,363		82.97% Pervious Area
	17,321		17.03% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	50	0.2000	0.17		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
0.2	120	0.2800	8.52		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.6	155	0.0400	4.06		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.1	25	0.0800	4.55		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.7	330	0.0900	7.86	15.72	**Channel Flow,** Area= 2.0 sf Perim= 5.2' r= 0.38' n= 0.030
6.6	680	Total			

Subcatchment 5S: PR-STREAM-A



Summary for Subcatchment 7S: PR-CB1

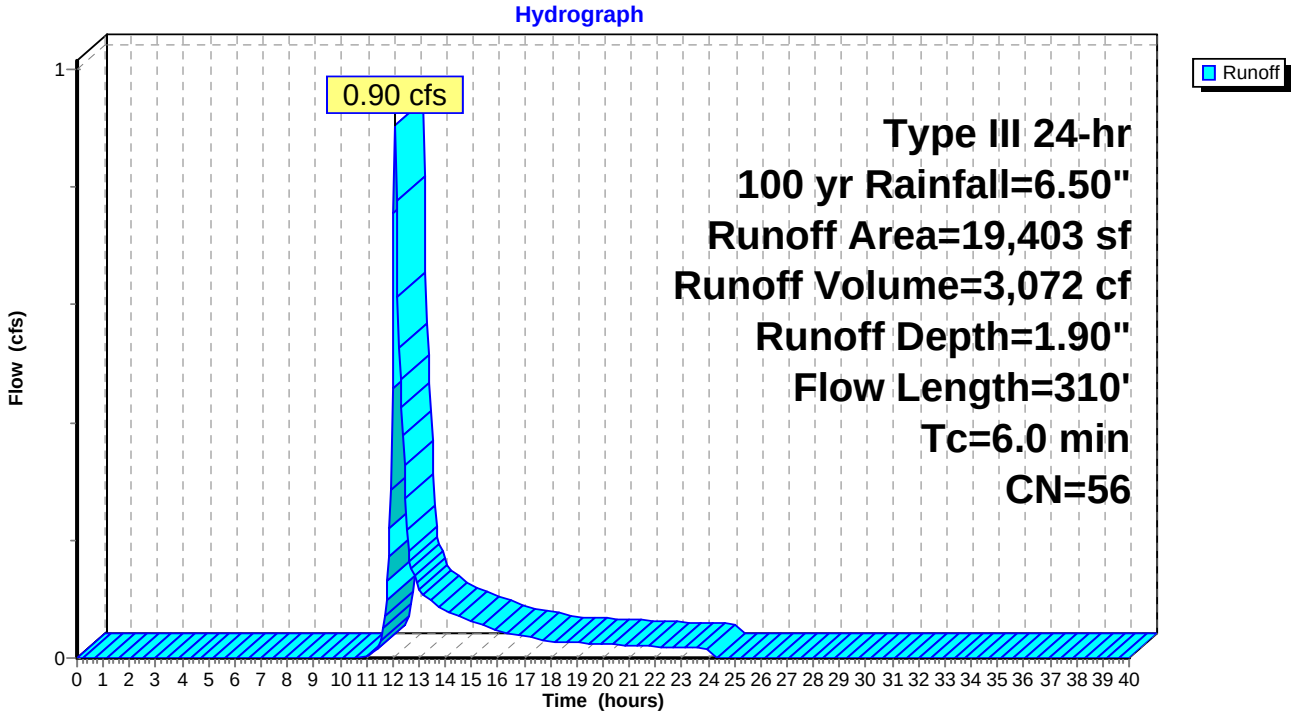
Runoff = 0.90 cfs @ 12.10 hrs, Volume= 3,072 cf, Depth= 1.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 yr Rainfall=6.50"

	Area (sf)	CN	Description
	477	98	Roofs, HSG A
	1,000	30	Woods, Good, HSG A
	10,306	39	>75% Grass cover, Good, HSG A
	3,987	98	Paved parking, HSG A
*	3,633	61	Existing 1/4 acre lots, 38% imp, HSG A
	19,403	56	Weighted Average
	13,558		69.88% Pervious Area
	5,845		30.12% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.8	50	0.3500	0.46		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
0.1	35	0.3500	9.52		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.0	15	0.5000	11.38		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.3	25	0.0100	1.61		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.1	25	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.1	50	0.3300	9.25		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.3	110	0.1200	7.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
2.7	310	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 7S: PR-CB1



Summary for Subcatchment 8S: PR-CB2

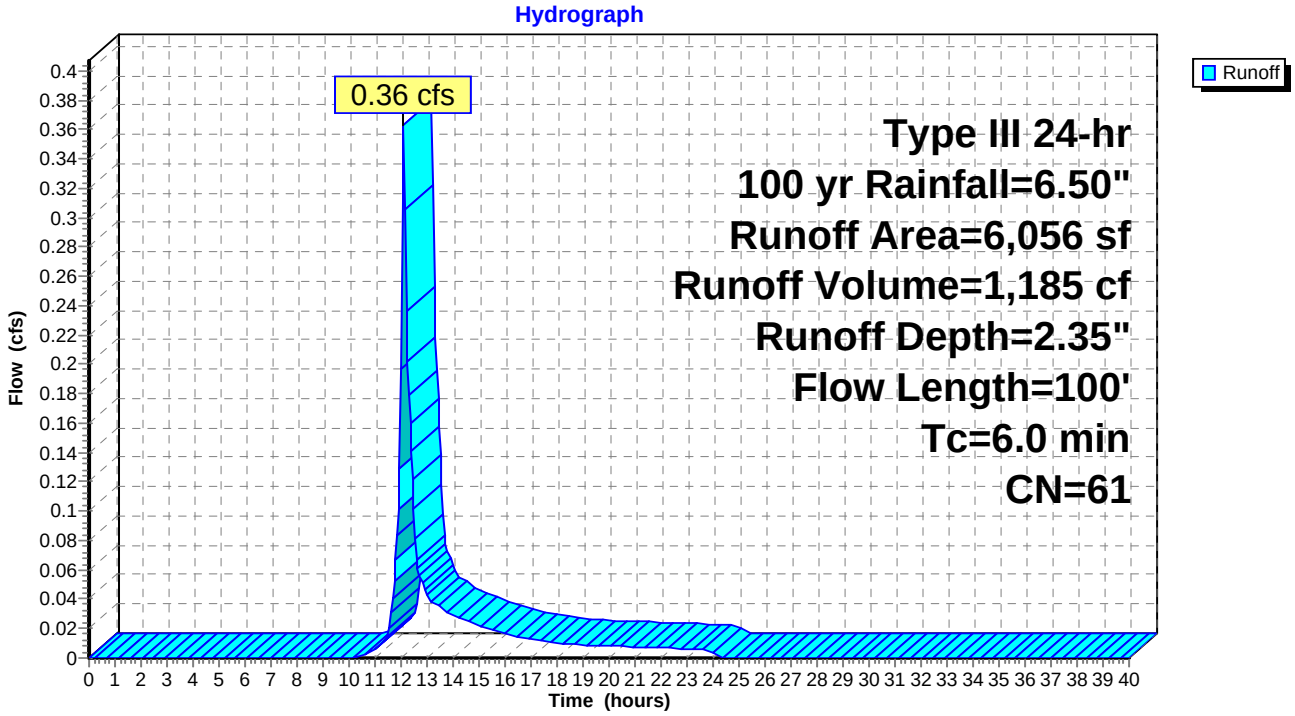
Runoff = 0.36 cfs @ 12.10 hrs, Volume= 1,185 cf, Depth= 2.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 yr Rainfall=6.50"

Area (sf)	CN	Description
1,000	30	Woods, Good, HSG A
2,606	39	>75% Grass cover, Good, HSG A
2,450	98	Paved parking, HSG A
6,056	61	Weighted Average
3,606		59.54% Pervious Area
2,450		40.46% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.9	50	0.3300	0.45		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
0.0	15	0.3300	9.25		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.0	15	0.1100	5.34		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.0	20	0.1200	7.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.9	100	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 8S: PR-CB2



Summary for Subcatchment 9S: PR-CB3

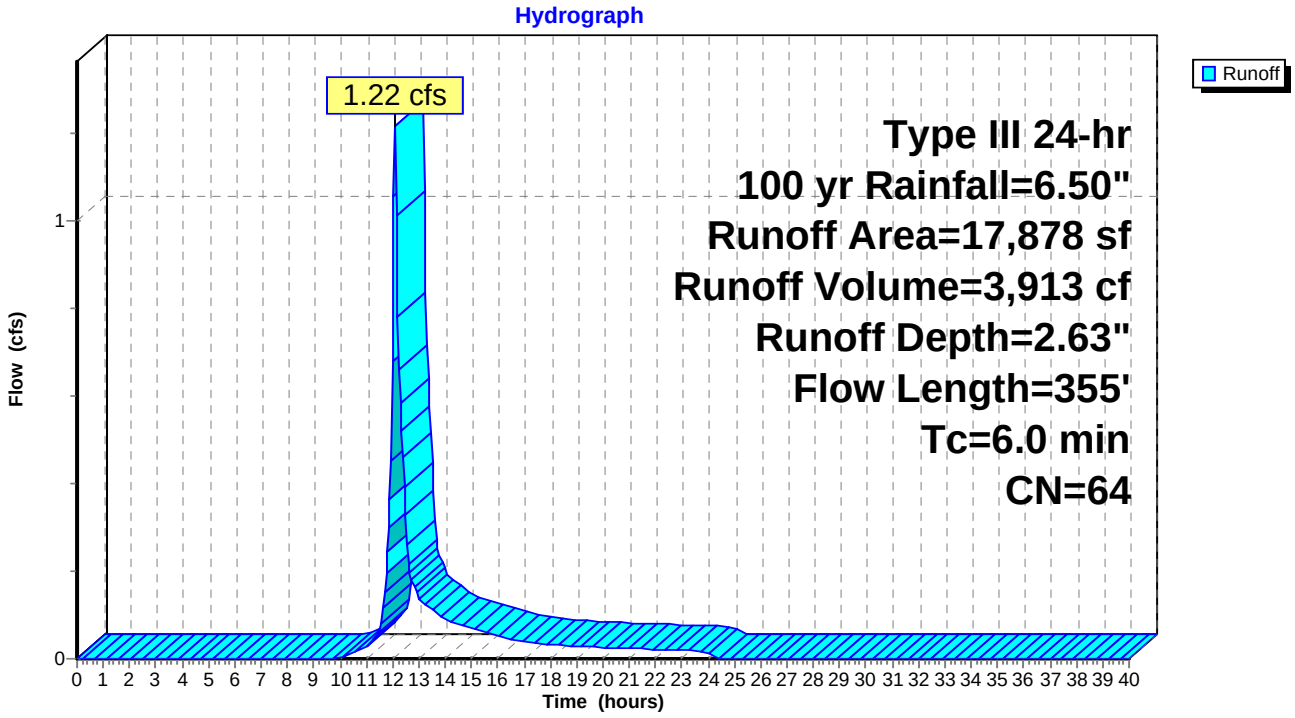
Runoff = 1.22 cfs @ 12.10 hrs, Volume= 3,913 cf, Depth= 2.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 yr Rainfall=6.50"

	Area (sf)	CN	Description
	1,425	39	>75% Grass cover, Good, HSG A
	2,465	98	Paved parking, HSG A
*	13,988	61	Existing 1/4 acre lots, 38% imp, HSG A
	17,878	64	Weighted Average
	10,098		56.48% Pervious Area
	7,780		43.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.3	50	0.0800	0.25		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
0.5	150	0.0800	4.55		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.3	155	0.1350	7.46		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
4.1	355	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 9S: PR-CB3



Summary for Subcatchment 10S: PR-CB4

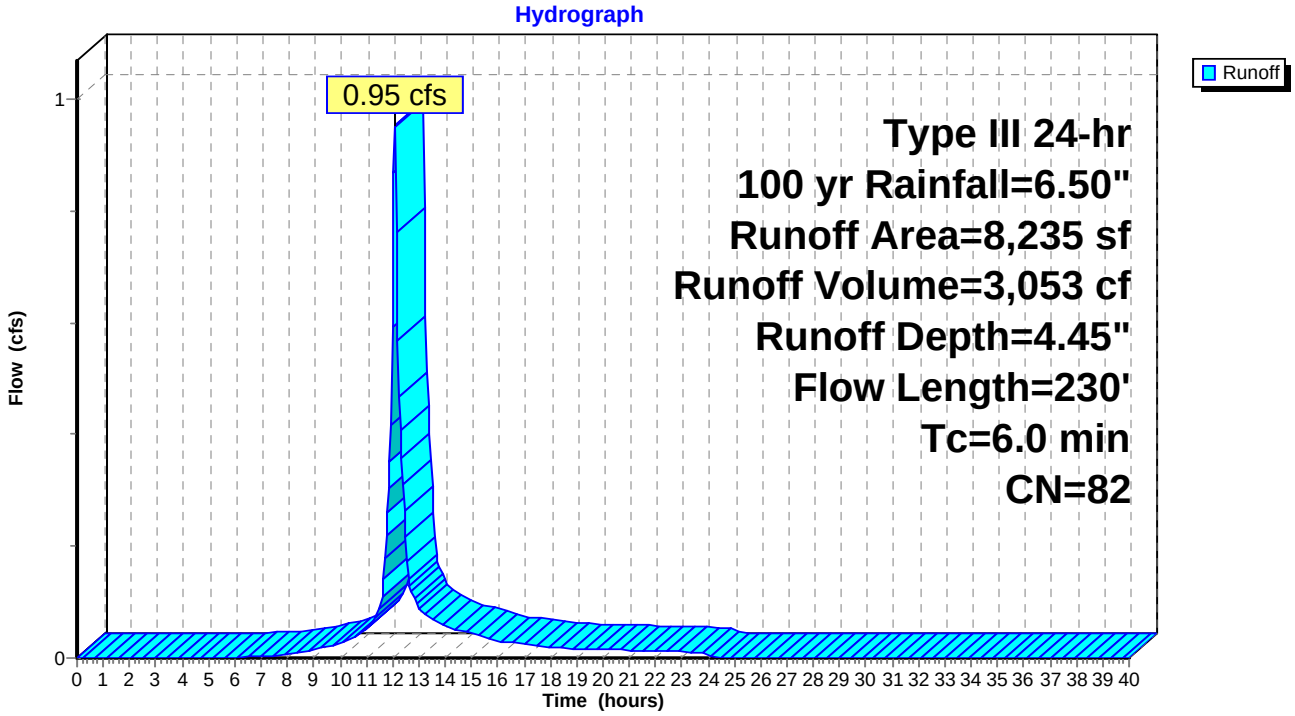
Runoff = 0.95 cfs @ 12.09 hrs, Volume= 3,053 cf, Depth= 4.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 yr Rainfall=6.50"

Area (sf)	CN	Description
794	39	>75% Grass cover, Good, HSG A
441	98	Paved parking, HSG A
255	98	Roofs, HSG A
2,019	98	Paved parking, HSG D
4,726	80	>75% Grass cover, Good, HSG D
8,235	82	Weighted Average
5,520		67.03% Pervious Area
2,715		32.97% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.4	50	0.1800	0.35		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
0.1	45	0.1800	6.83		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.4	135	0.1000	6.42		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
2.9	230	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 10S: PR-CB4



Summary for Subcatchment 11S: PR-CB5

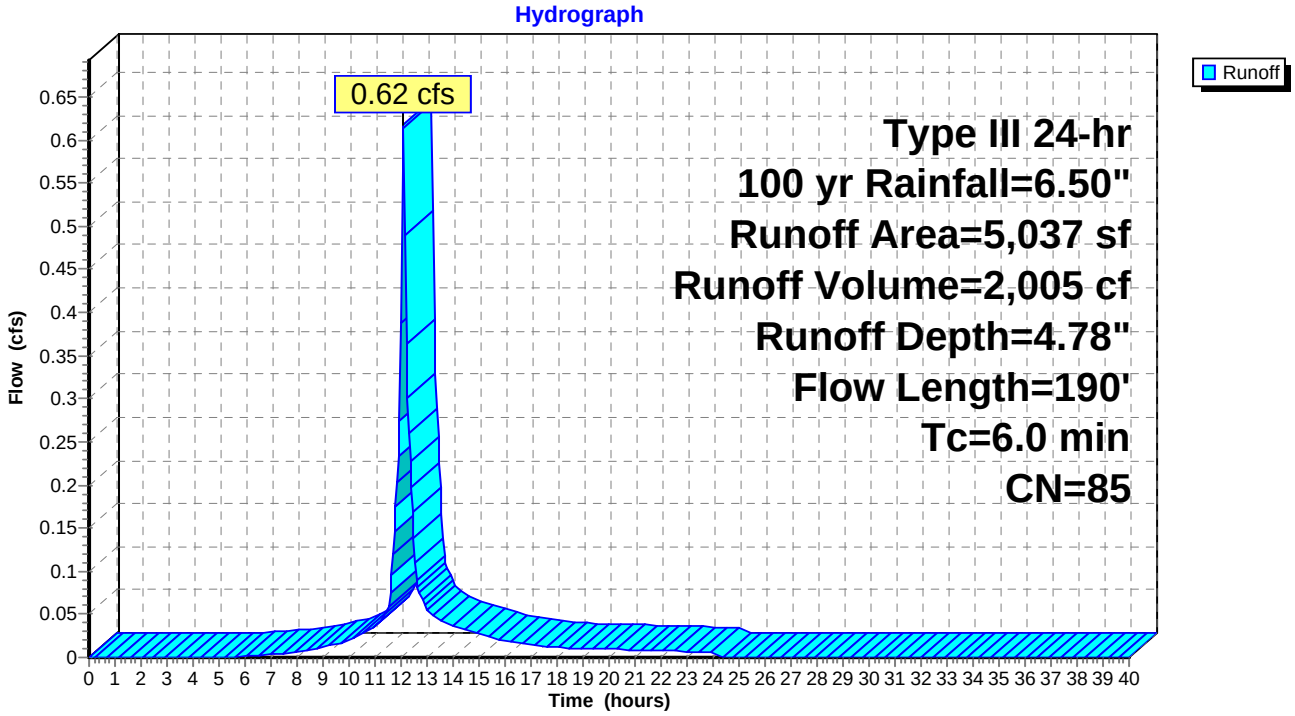
Runoff = 0.62 cfs @ 12.09 hrs, Volume= 2,005 cf, Depth= 4.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 yr Rainfall=6.50"

Area (sf)	CN	Description
808	39	>75% Grass cover, Good, HSG A
2,348	98	Paved parking, HSG A
1,023	98	Paved parking, HSG D
858	80	>75% Grass cover, Good, HSG D
5,037	85	Weighted Average
1,666		33.08% Pervious Area
3,371		66.92% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.4	25	0.0200	1.03		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.10"
0.4	165	0.1200	7.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.8	190	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 11S: PR-CB5



Summary for Subcatchment 12S: PR-CB6

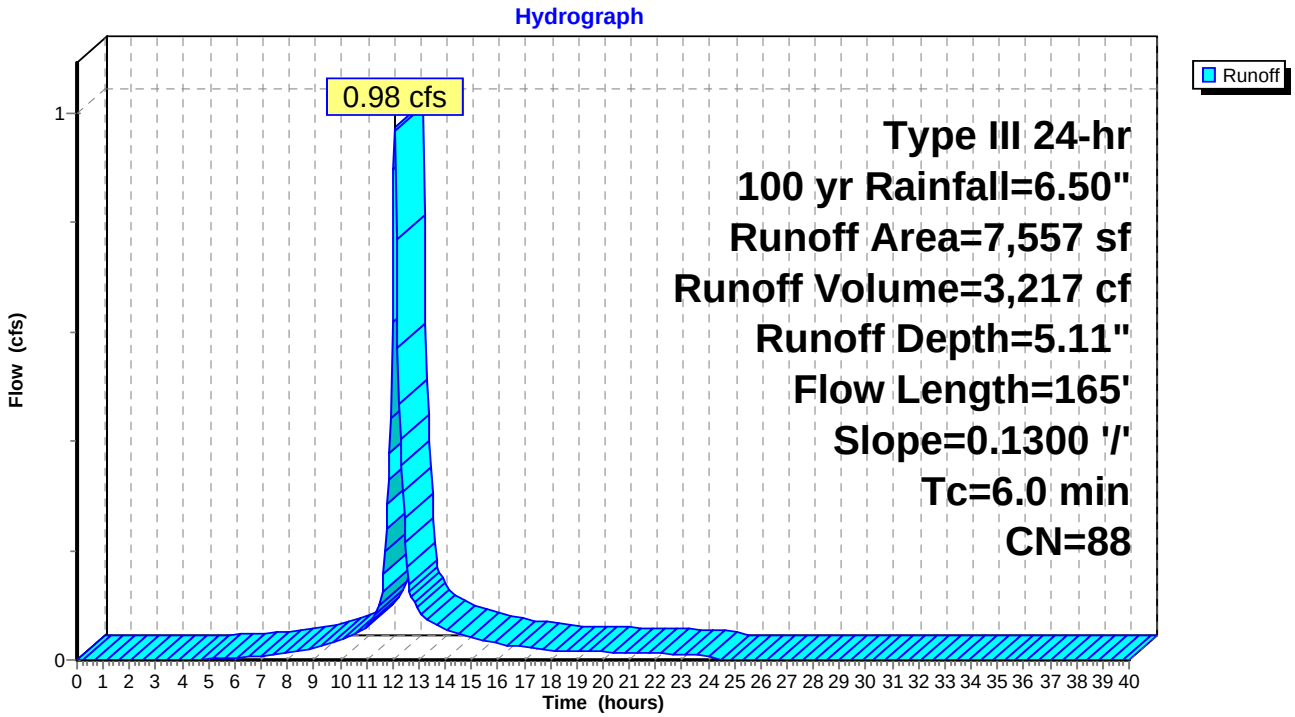
Runoff = 0.98 cfs @ 12.09 hrs, Volume= 3,217 cf, Depth= 5.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 yr Rainfall=6.50"

Area (sf)	CN	Description
864	98	Roofs, HSG D
2,416	98	Paved parking, HSG D
4,277	80	>75% Grass cover, Good, HSG D
7,557	88	Weighted Average
4,277		56.60% Pervious Area
3,280		43.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.7	50	0.1300	0.31		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
0.3	115	0.1300	7.32		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
3.0	165	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 12S: PR-CB6



Summary for Subcatchment 13S: PR-CB10

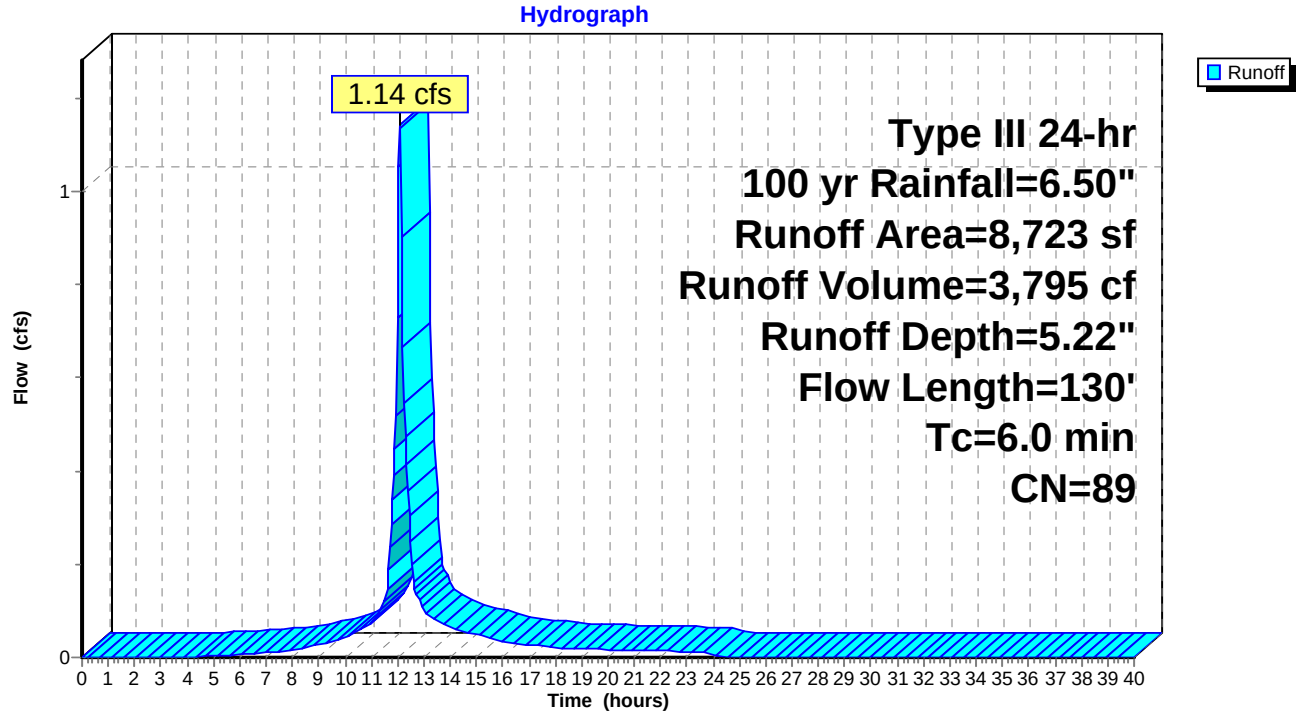
Runoff = 1.14 cfs @ 12.09 hrs, Volume= 3,795 cf, Depth= 5.22"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 yr Rainfall=6.50"

Area (sf)	CN	Description
4,436	98	Paved parking, HSG D
4,287	80	>75% Grass cover, Good, HSG D
8,723	89	Weighted Average
4,287		49.15% Pervious Area
4,436		50.85% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.0	50	0.0500	0.21		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
0.4	80	0.0300	3.52		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
4.4	130	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 13S: PR-CB10



Summary for Subcatchment 14S: PR-CB11

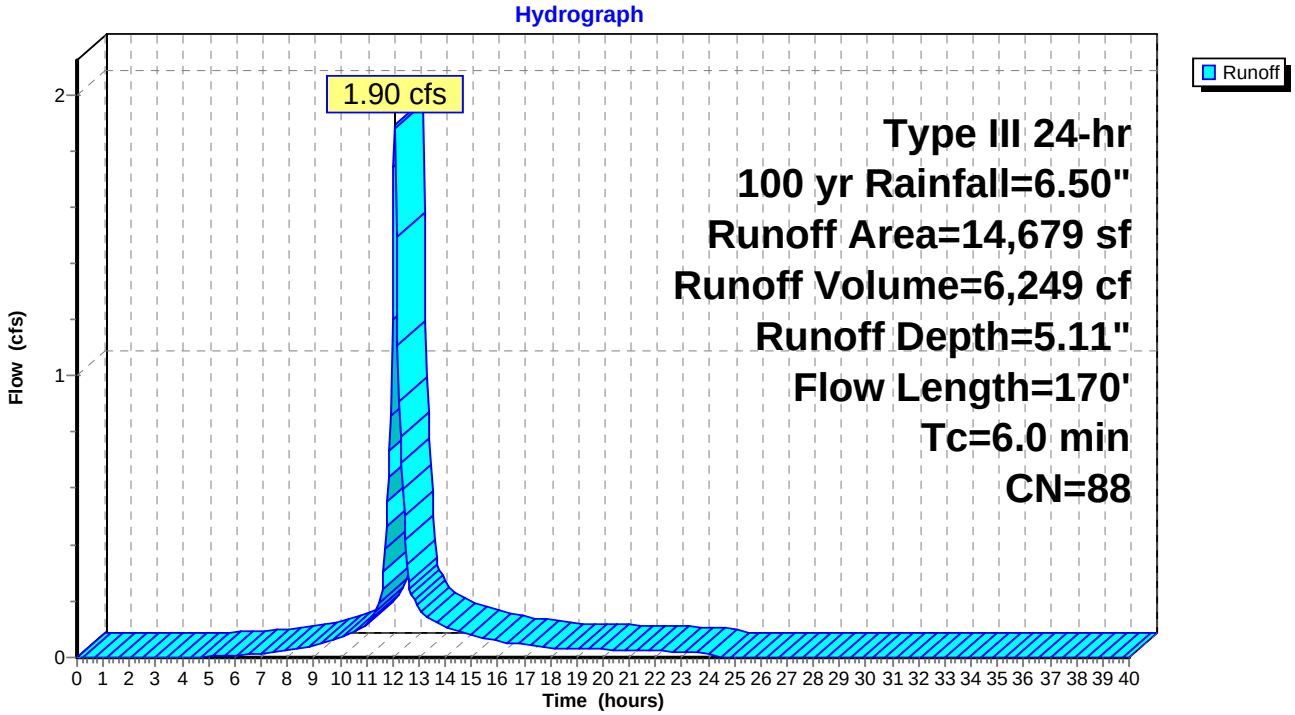
Runoff = 1.90 cfs @ 12.09 hrs, Volume= 6,249 cf, Depth= 5.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 yr Rainfall=6.50"

Area (sf)	CN	Description
6,347	98	Paved parking, HSG D
8,332	80	>75% Grass cover, Good, HSG D
14,679	88	Weighted Average
8,332		56.76% Pervious Area
6,347		43.24% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.9	50	0.0300	0.17		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
0.2	45	0.0670	4.17		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.4	75	0.0300	3.52		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
5.5	170	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 14S: PR-CB11



Summary for Subcatchment 15S: PR-ROOF Lot 7

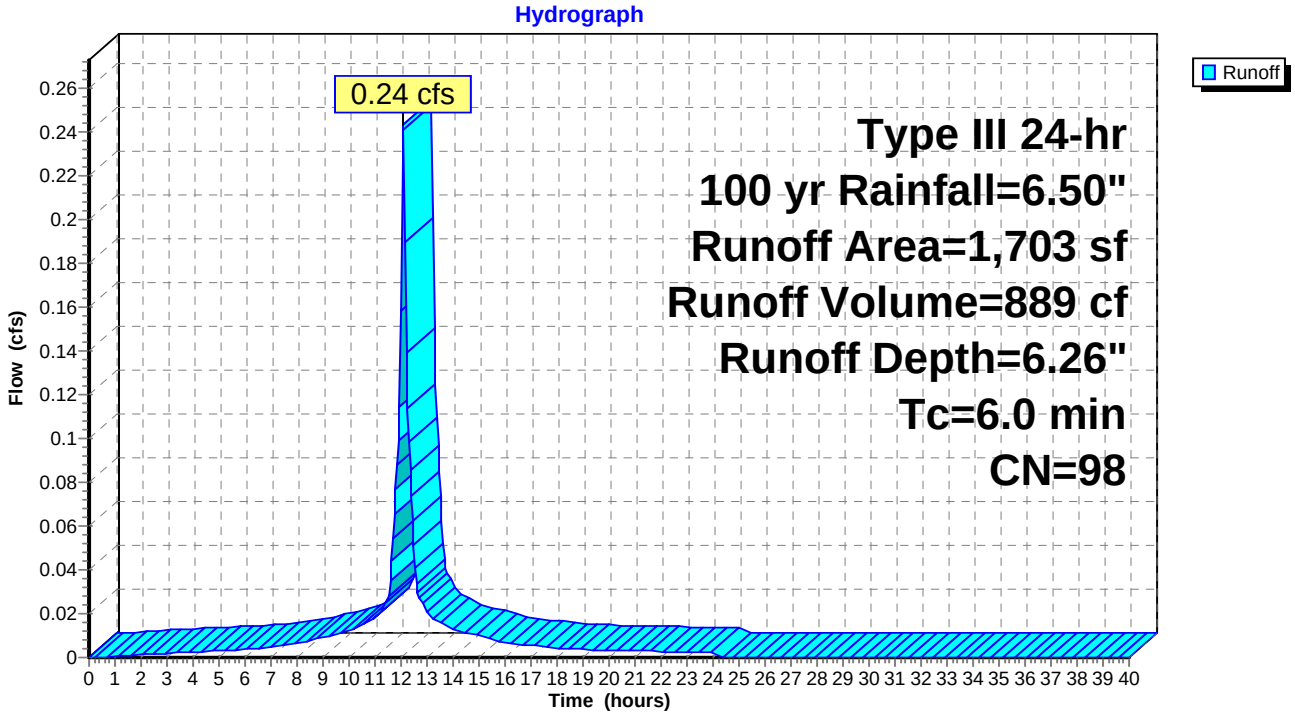
Runoff = 0.24 cfs @ 12.09 hrs, Volume= 889 cf, Depth= 6.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 yr Rainfall=6.50"

Area (sf)	CN	Description
1,703	98	Roofs, HSG D
1,703		100.00% Impervious Area

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

Subcatchment 15S: PR-ROOF Lot 7



Summary for Subcatchment 17S: PR-CB7

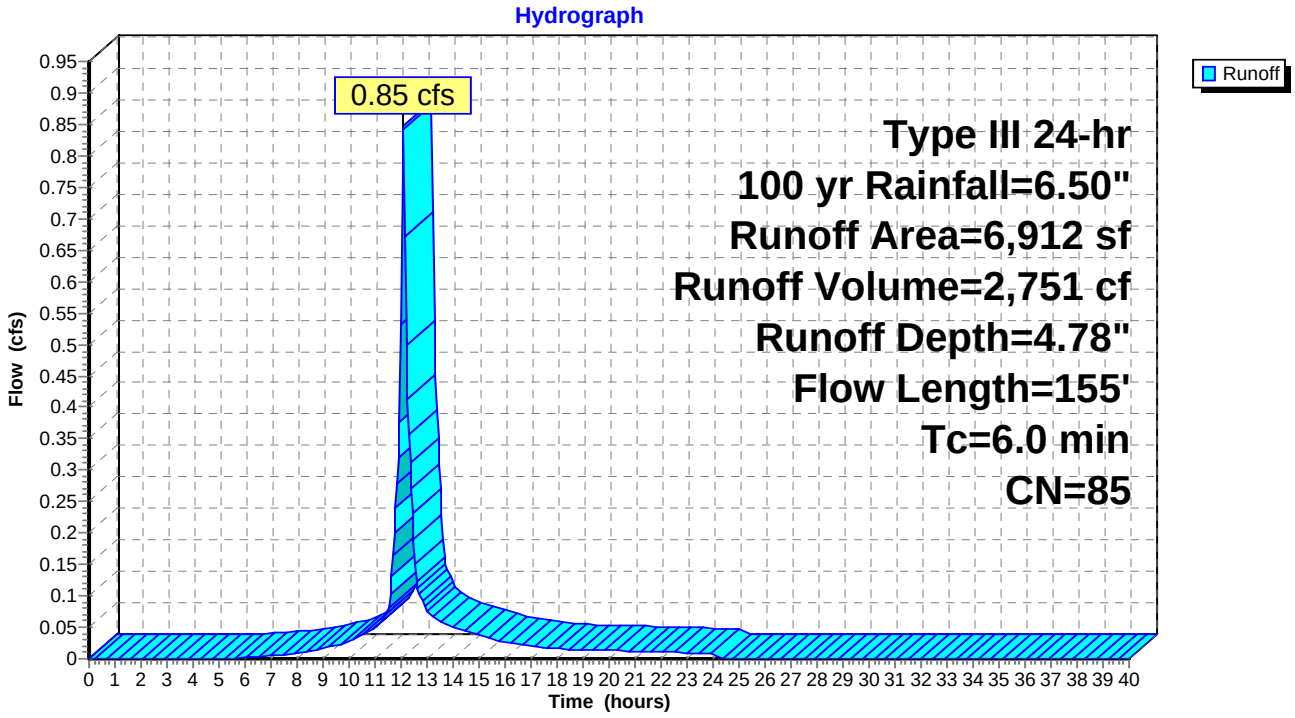
Runoff = 0.85 cfs @ 12.09 hrs, Volume= 2,751 cf, Depth= 4.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 yr Rainfall=6.50"

Area (sf)	CN	Description
145	98	Roofs, HSG D
1,786	98	Paved parking, HSG D
4,981	80	>75% Grass cover, Good, HSG D
6,912	85	Weighted Average
4,981		72.06% Pervious Area
1,931		27.94% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.0	50	0.1000	0.28		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
0.1	40	0.1300	5.80		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.2	65	0.1300	5.80		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
3.3	155	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 17S: PR-CB7



Summary for Subcatchment 19S: PR-CB8

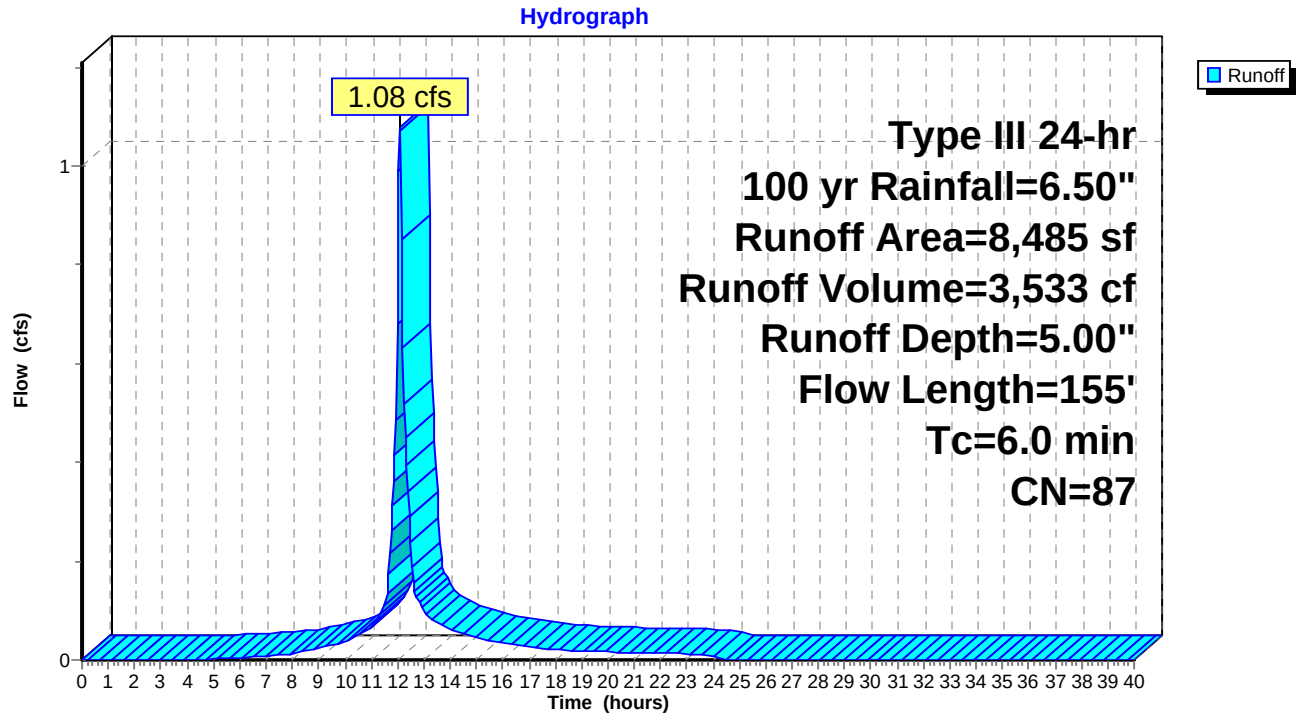
Runoff = 1.08 cfs @ 12.09 hrs, Volume= 3,533 cf, Depth= 5.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 yr Rainfall=6.50"

Area (sf)	CN	Description
2,761	98	Paved parking, HSG D
5,155	80	>75% Grass cover, Good, HSG D
569	98	Roofs, HSG D
8,485	87	Weighted Average
5,155		60.75% Pervious Area
3,330		39.25% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.1	50	0.0900	0.27		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
0.3	105	0.1000	6.42		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
3.4	155	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 19S: PR-CB8



Summary for Subcatchment 20S: PR-CB9

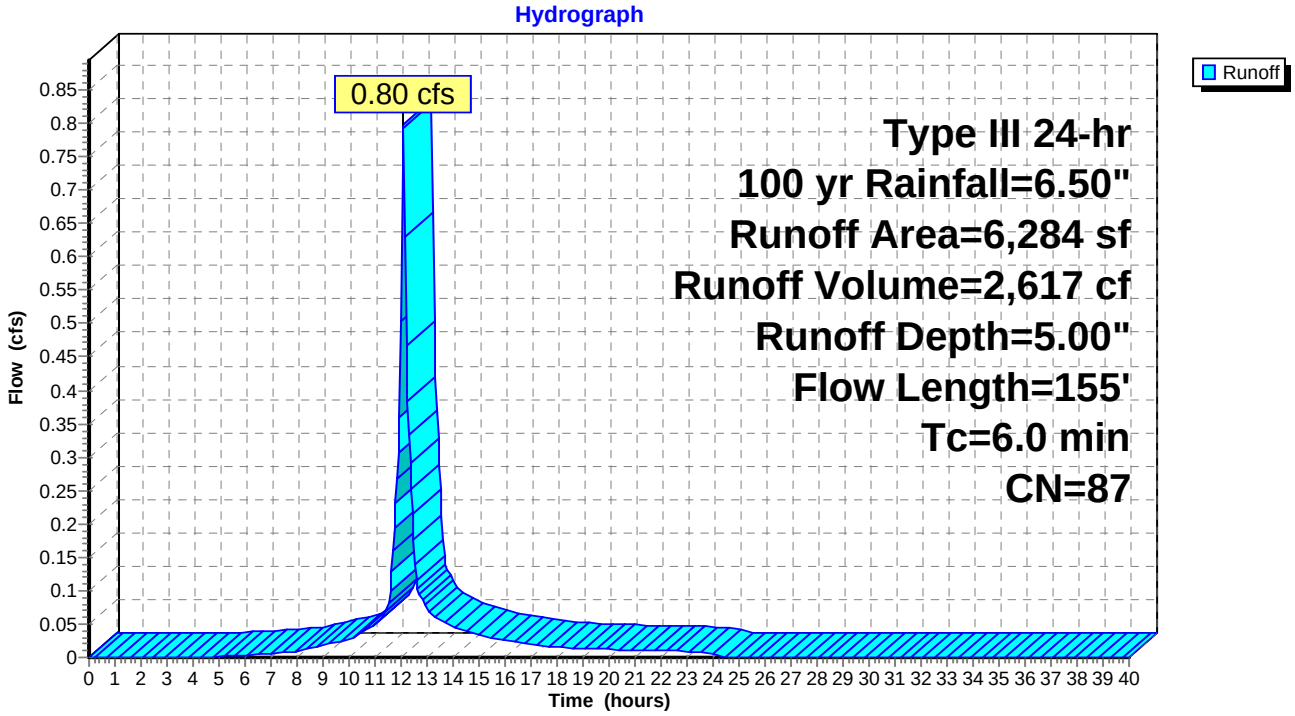
Runoff = 0.80 cfs @ 12.09 hrs, Volume= 2,617 cf, Depth= 5.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 yr Rainfall=6.50"

Area (sf)	CN	Description
2,609	98	Paved parking, HSG D
3,675	80	>75% Grass cover, Good, HSG D
6,284	87	Weighted Average
3,675		58.48% Pervious Area
2,609		41.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.3	55	0.0950	0.28		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
0.3	100	0.0800	5.74		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
3.6	155	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 20S: PR-CB9



Summary for Subcatchment 78S: Regans Way (No Change)

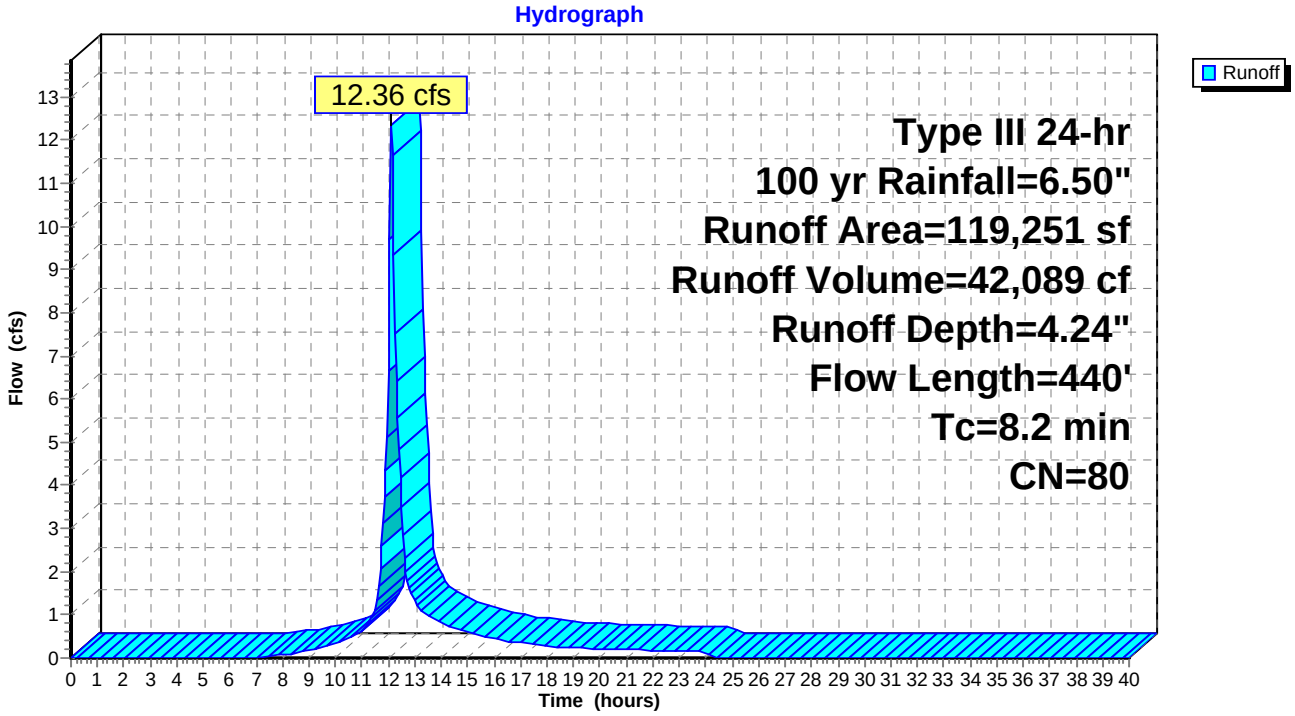
Runoff = 12.36 cfs @ 12.12 hrs, Volume= 42,089 cf, Depth= 4.24"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 yr Rainfall=6.50"

	Area (sf)	CN	Description
*	14,850	98	Ledge, HSG D
	83,151	77	Woods, Good, HSG D
	19,000	80	>75% Grass cover, Good, HSG D
	2,250	98	Unconnected roofs, HSG D
	119,251	80	Weighted Average
	102,151		85.66% Pervious Area
	17,100		14.34% Impervious Area
	2,250		13.16% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.9	100	0.3500	0.24		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
0.1	50	0.1600	6.44		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.7	100	0.0200	2.28		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.5	190	0.1900	7.02		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
8.2	440	Total			

Subcatchment 78S: Regans Way (No Change)



Summary for Subcatchment 81S: EX-HILLSIDE (No Change)

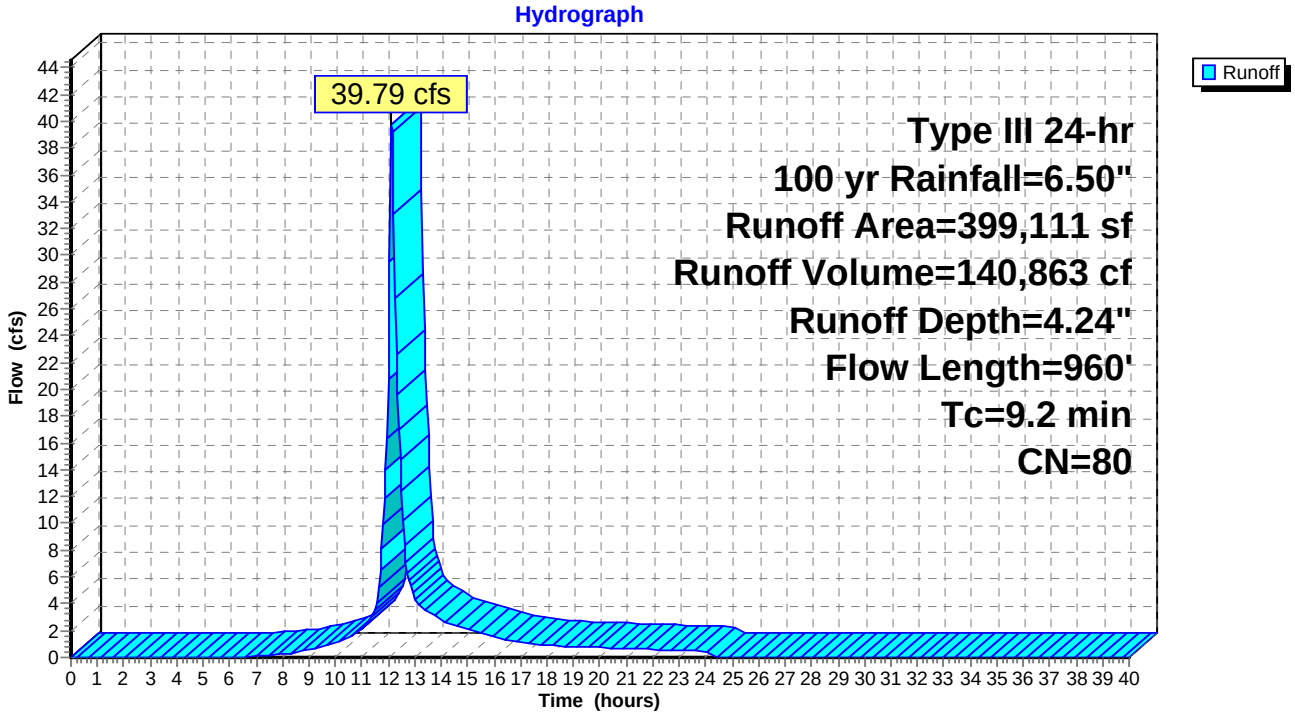
Runoff = 39.79 cfs @ 12.13 hrs, Volume= 140,863 cf, Depth= 4.24"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 yr Rainfall=6.50"

	Area (sf)	CN	Description
*	47,893	98	Ledge, HSG D
	351,218	77	Woods, Good, HSG D
	399,111	80	Weighted Average
	351,218		88.00% Pervious Area
	47,893		12.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	50	0.2000	0.17		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
4.2	910	0.0500	3.60		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
9.2	960	Total			

Subcatchment 81S: EX-HILLSIDE (No Change)



Summary for Subcatchment 83S: EX-WETLAND (No Change)

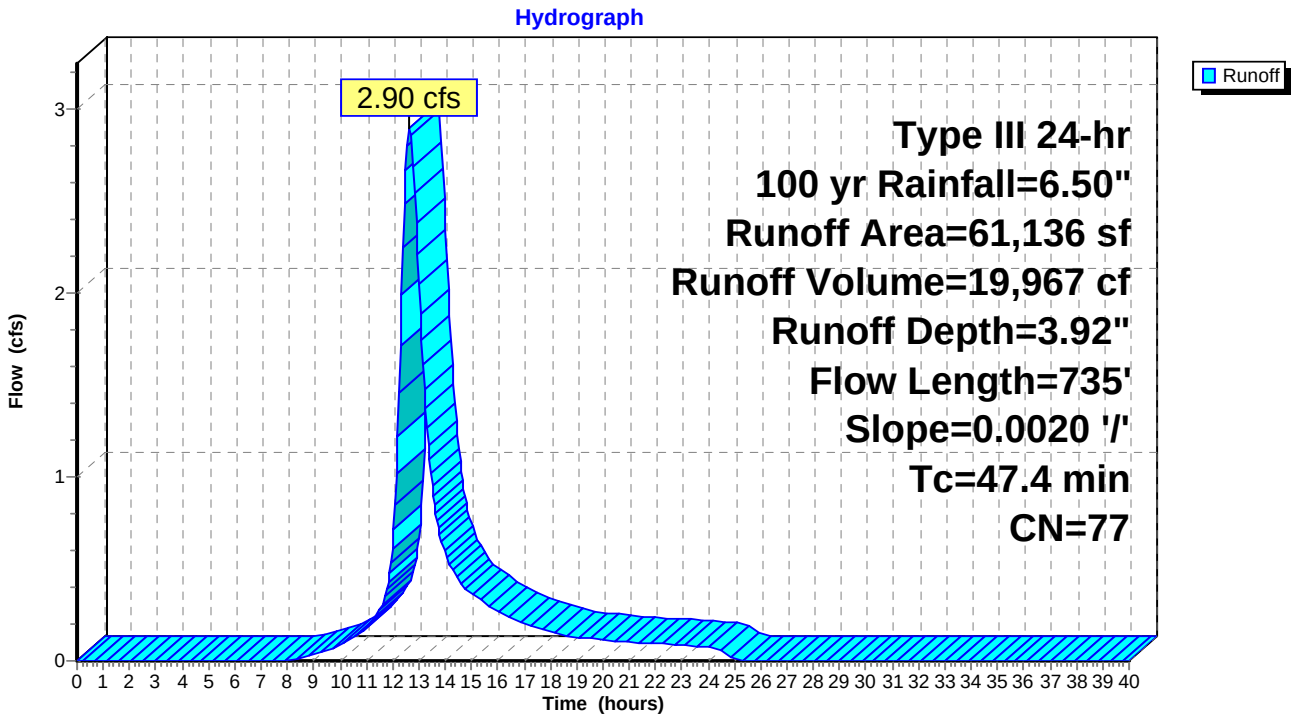
Runoff = 2.90 cfs @ 12.65 hrs, Volume= 19,967 cf, Depth= 3.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 yr Rainfall=6.50"

Area (sf)	CN	Description
61,136	77	Woods, Good, HSG D
61,136		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
31.5	50	0.0020	0.03		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
15.9	685	0.0020	0.72		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
47.4	735	Total			

Subcatchment 83S: EX-WETLAND (No Change)



Summary for Subcatchment 84S: PR-EAST

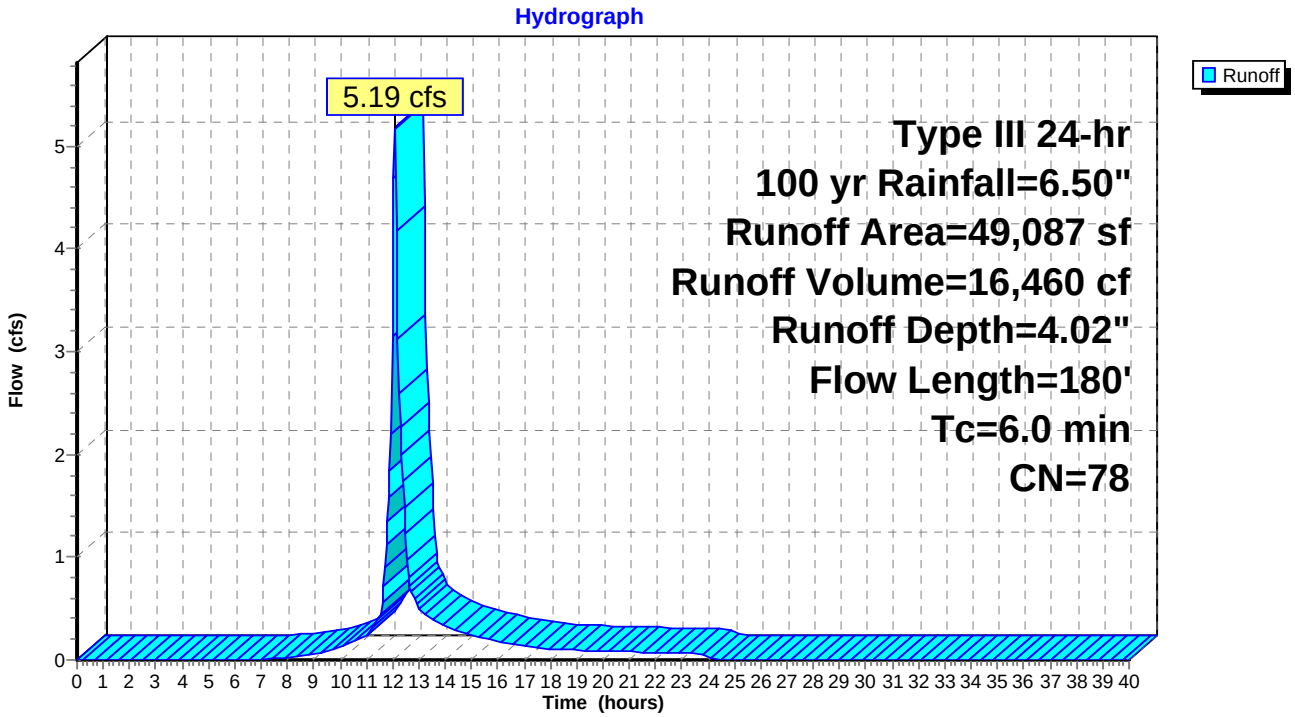
Runoff = 5.19 cfs @ 12.09 hrs, Volume= 16,460 cf, Depth= 4.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 yr Rainfall=6.50"

	Area (sf)	CN	Description
	37,087	77	Woods, Good, HSG D
*	1,000	98	Ledge outcrops, HSG D
	11,000	80	>75% Grass cover, Good, HSG D
	49,087	78	Weighted Average
	48,087		97.96% Pervious Area
	1,000		2.04% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.3	50	0.0800	0.25		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
0.4	130	0.0900	4.83		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
3.7	180	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 84S: PR-EAST



Summary for Subcatchment 85S: PR-STREAM-B

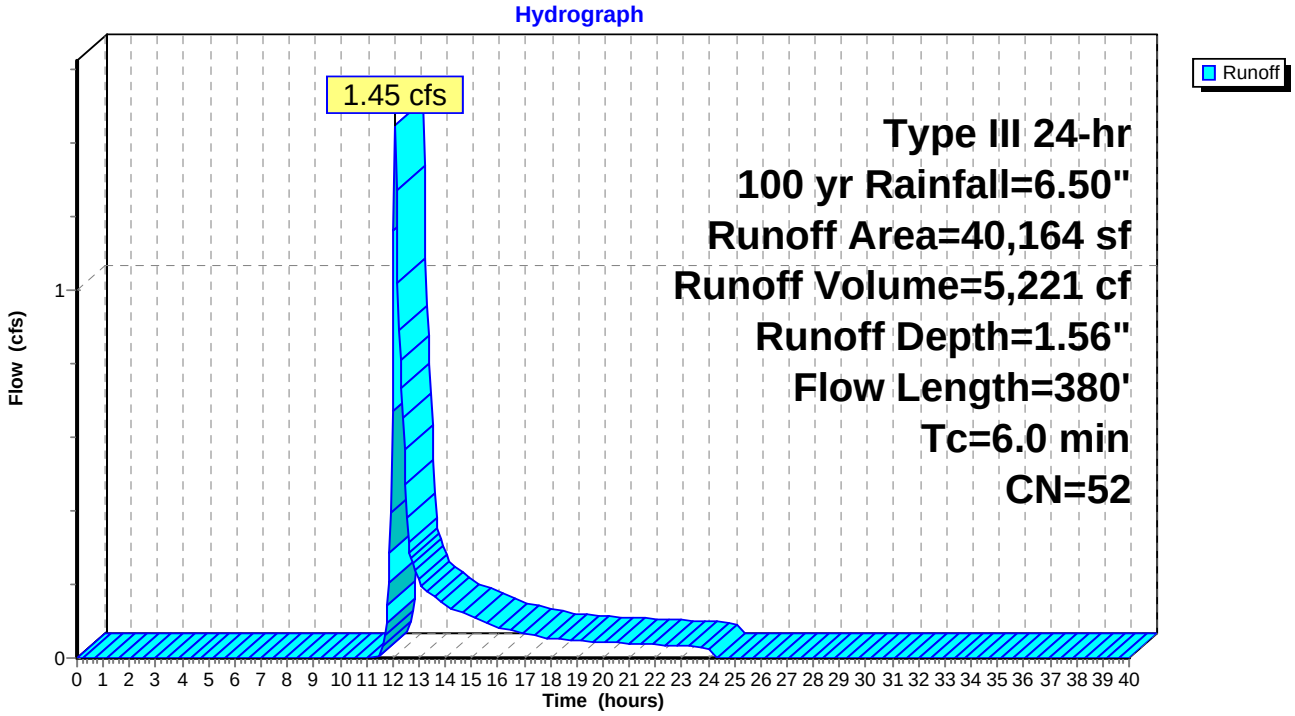
Runoff = 1.45 cfs @ 12.11 hrs, Volume= 5,221 cf, Depth= 1.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 yr Rainfall=6.50"

	Area (sf)	CN	Description
*	600	98	Ledge, HSG A
	9,383	30	Woods, Good, HSG A
	9,259	77	1/8 acre lots, 65% imp, HSG A
	11,261	54	1/2 acre lots, 25% imp, HSG A
	283	98	Roofs, HSG A
	378	80	>75% Grass cover, Good, HSG D
	9,000	39	>75% Grass cover, Good, HSG A
	40,164	52	Weighted Average
	30,447		75.81% Pervious Area
	9,717		24.19% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.4	50	0.1800	0.35		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
0.3	150	0.2700	8.37		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.3	180	0.0700	11.19	67.12	**Channel Flow,** Area= 6.0 sf Perim= 10.0' r= 0.60' n= 0.025
3.0	380	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 85S: PR-STREAM-B



Summary for Subcatchment 89S: PR-MAPLE

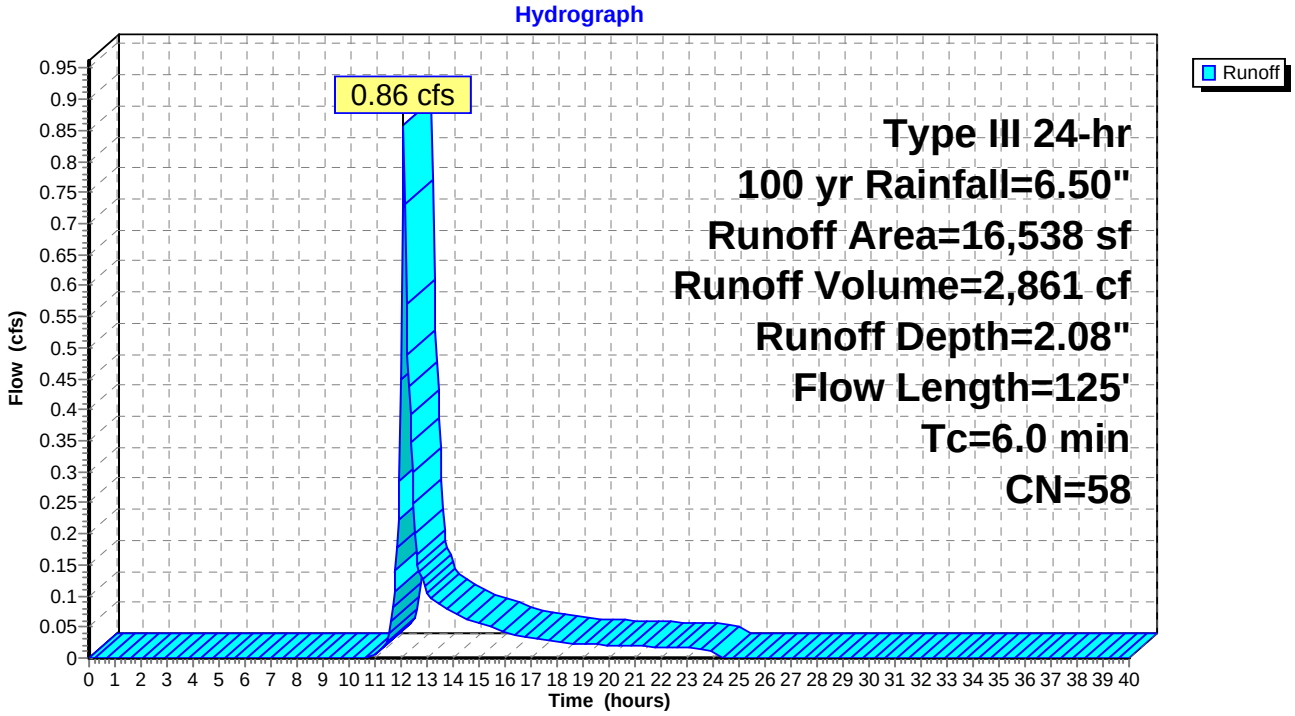
Runoff = 0.86 cfs @ 12.10 hrs, Volume= 2,861 cf, Depth= 2.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 yr Rainfall=6.50"

Area (sf)	CN	Description
4,000	30	Woods, Good, HSG A
3,444	98	Paved parking, HSG A
3,688	77	1/8 acre lots, 65% imp, HSG A
5,406	39	>75% Grass cover, Good, HSG A
16,538	58	Weighted Average
10,697		64.68% Pervious Area
5,841		35.32% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.2	50	0.2200	0.38		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
0.1	55	0.2200	7.55		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.0	10	0.0800	5.74		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.1	10	0.0240	3.14		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
2.4	125	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 89S: PR-MAPLE



Summary for Subcatchment 90S: EX-CB4R

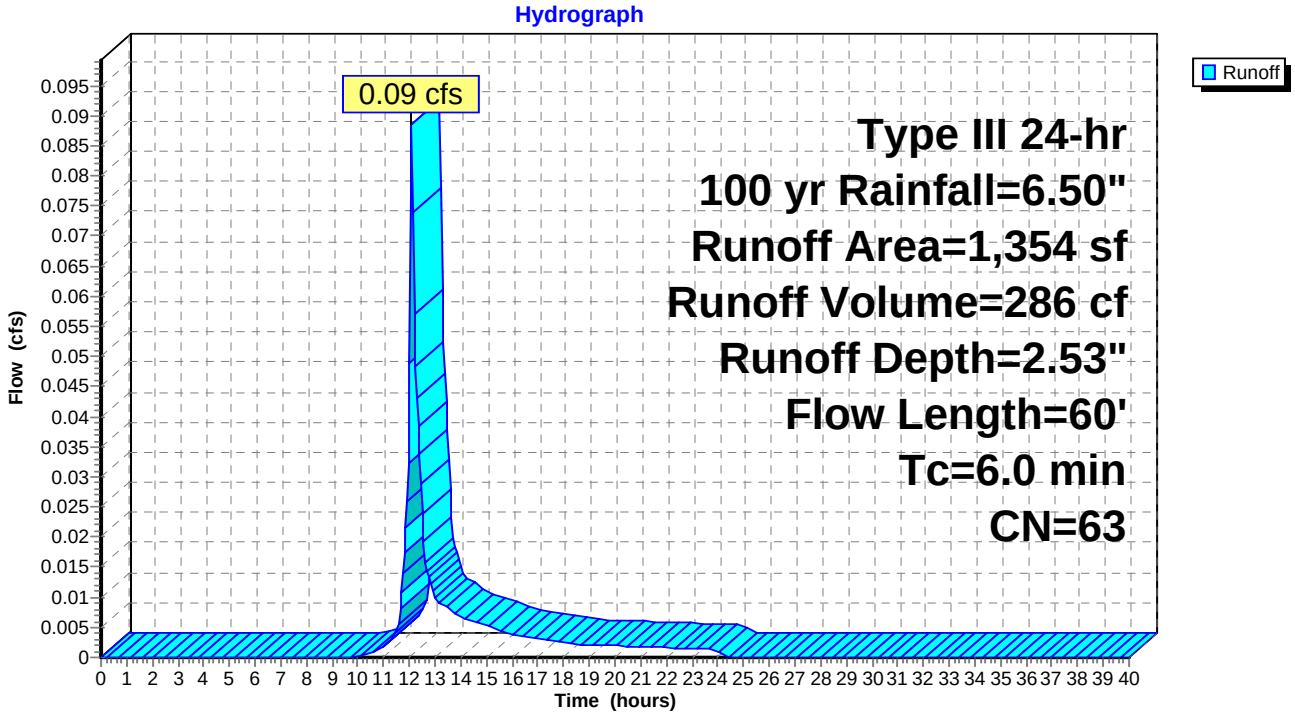
Runoff = 0.09 cfs @ 12.10 hrs, Volume= 286 cf, Depth= 2.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 yr Rainfall=6.50"

Area (sf)	CN	Description
814	39	>75% Grass cover, Good, HSG A
540	98	Paved parking, HSG A
1,354	63	Weighted Average
814		60.12% Pervious Area
540		39.88% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.7	40	0.2800	0.40		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
0.1	20	0.0900	6.09		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.8	60	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 90S: EX-CB4R



Summary for Subcatchment 91S: EX-CB3R2

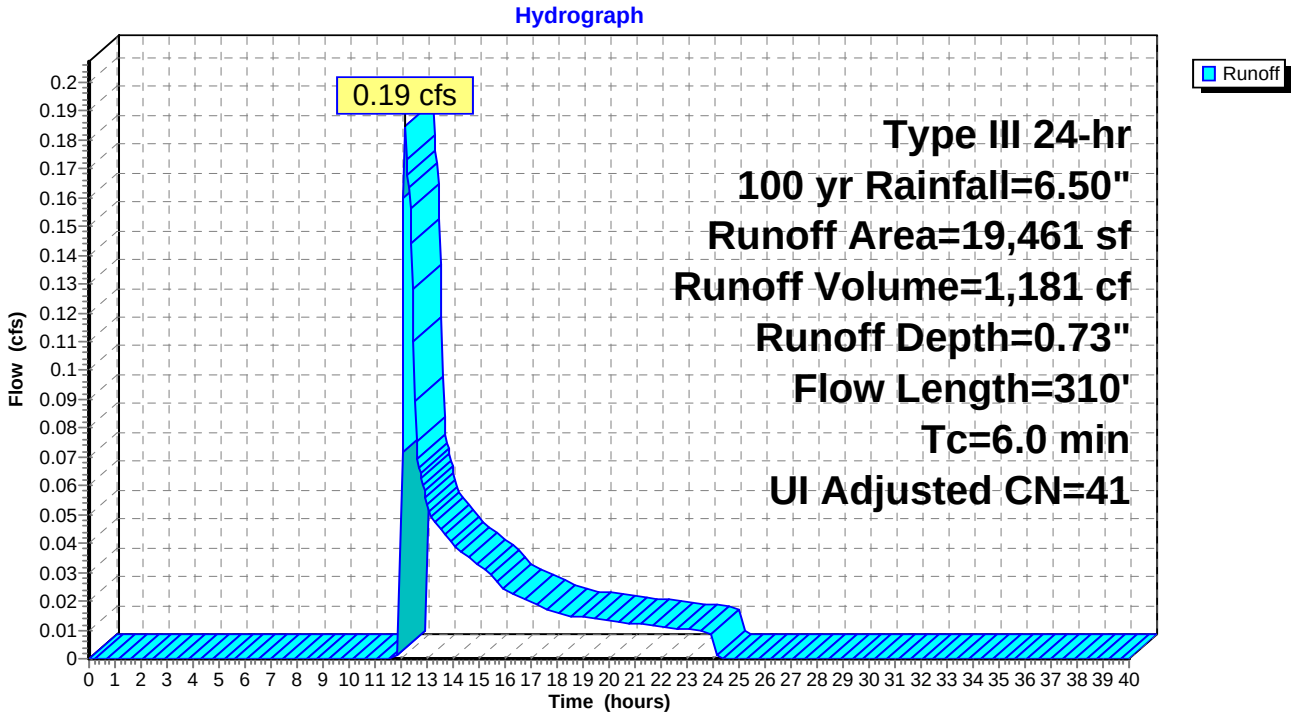
Runoff = 0.19 cfs @ 12.16 hrs, Volume= 1,181 cf, Depth= 0.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 yr Rainfall=6.50"

Area (sf)	CN	Adj	Description
1,303	98		Paved parking, HSG A
12,815	39		>75% Grass cover, Good, HSG A
343	98		Unconnected roofs, HSG A
5,000	30		Woods, Good, HSG A
19,461	42	41	Weighted Average, UI Adjusted
17,815			91.54% Pervious Area
1,646			8.46% Impervious Area
343			20.84% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.6	50	0.2400	0.18		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
0.5	260	0.3300	9.25		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
5.1	310	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 91S: EX-CB3R2



Summary for Subcatchment 92S: EX-CB2R

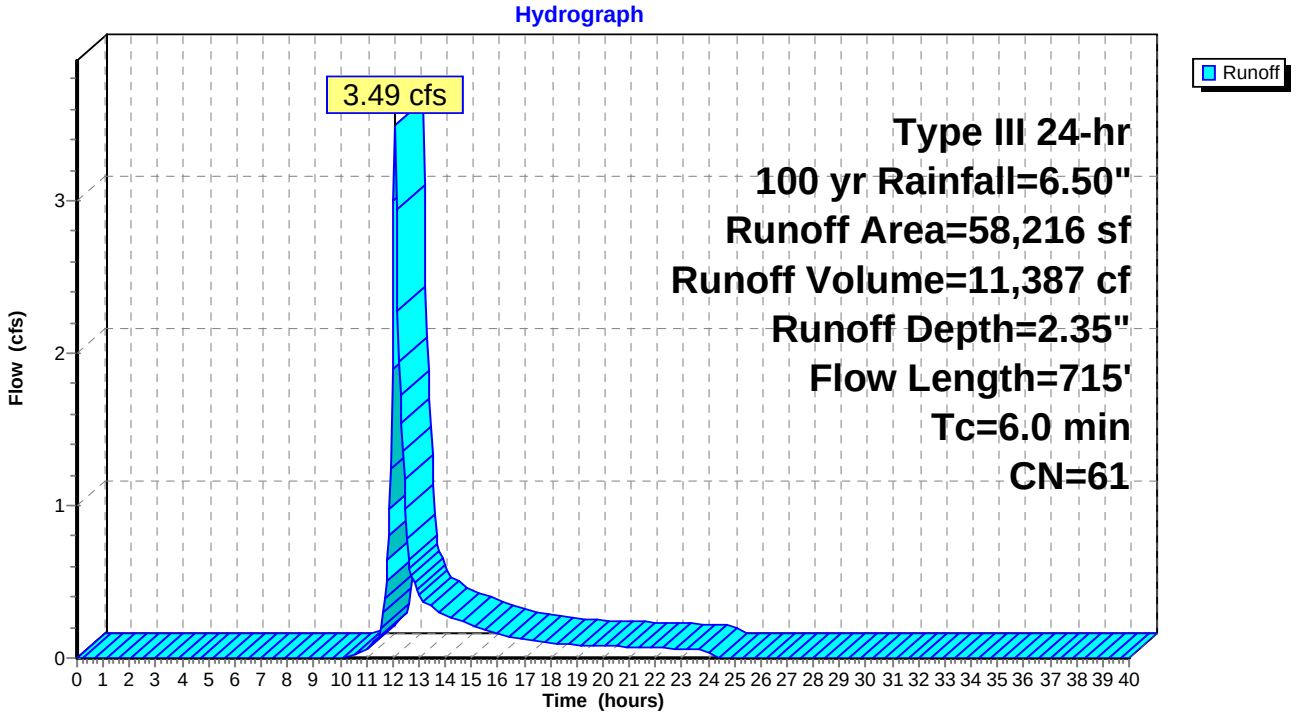
Runoff = 3.49 cfs @ 12.10 hrs, Volume= 11,387 cf, Depth= 2.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 yr Rainfall=6.50"

	Area (sf)	CN	Description
	10,719	30	Woods, Good, HSG A
	8,032	98	Paved parking, HSG A
	3,333	77	1/8 acre lots, 65% imp, HSG A
*	400	98	Ledge, HSG A
	12,040	54	1/2 acre lots, 25% imp, HSG A
	20,259	61	1/4 acre lots, 38% imp, HSG A
	2,594	80	>75% Grass cover, Good, HSG D
	839	98	Roofs, HSG D
	58,216	61	Weighted Average
	36,070		61.96% Pervious Area
	22,146		38.04% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.4	50	0.1800	0.35		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
0.2	125	0.3500	9.52		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
2.7	540	0.0260	3.27		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
5.3	715	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 92S: EX-CB2R



Summary for Subcatchment 95S: EX-CB1R

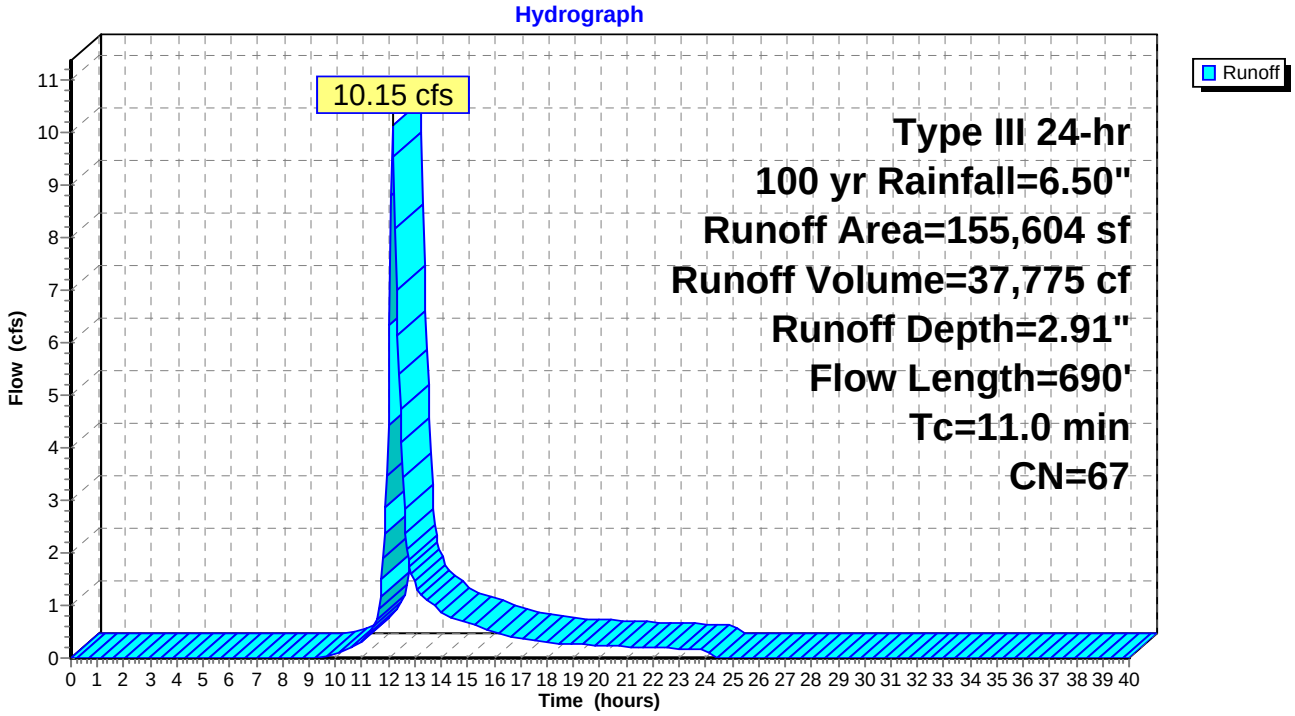
Runoff = 10.15 cfs @ 12.16 hrs, Volume= 37,775 cf, Depth= 2.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 yr Rainfall=6.50"

	Area (sf)	CN	Description
	45,701	30	Woods, Good, HSG A
	70,444	77	Woods, Good, HSG D
	10,120	98	Paved parking, HSG A
*	7,612	98	Ledge, HSG A
*	5,727	98	Ledge, HSG D
	16,000	80	>75% Grass cover, Good, HSG D
	155,604	67	Weighted Average
	132,145		84.92% Pervious Area
	23,459		15.08% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.5	50	0.0100	0.11		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
0.9	90	0.0100	1.61		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.8	310	0.1700	6.64		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
1.8	240	0.0120	2.22		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
11.0	690	Total			

Subcatchment 95S: EX-CB1R



Summary for Pond 1P: Subsurface Infiltration Structure (Lot 9)

Inflow Area = 56,609 sf, 39.15% Impervious, Inflow Depth = 2.80" for 100 yr event
Inflow = 4.05 cfs @ 12.10 hrs, Volume= 13,228 cf
Outflow = 0.68 cfs @ 12.62 hrs, Volume= 13,230 cf, Atten= 83%, Lag= 31.2 min
Discarded = 0.13 cfs @ 11.40 hrs, Volume= 7,171 cf
Primary = 0.55 cfs @ 12.62 hrs, Volume= 6,060 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 82.85' @ 12.62 hrs Surf.Area= 2,390 sf Storage= 4,769 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 111.9 min (948.0 - 836.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	80.00'	2,015 cf	**40.17'W x 59.50'L x 3.54'H Field A** 8,464 cf Overall - 3,427 cf Embedded = 5,037 cf x 40.0% Voids
#2A	80.50'	3,427 cf	**Cultec R-330XLHD** x 64 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 8 rows
		5,442 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	77.00'	**12.0" Round Culvert** L= 80.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 77.00' / 73.00' S= 0.0500 '/' Cc= 0.900 n= 0.010, Flow Area= 0.79 sf
#2	Device 1	81.00'	**4.0" Vert. Orifice/Grate** C= 0.600
#3	Discarded	80.00'	**2.410 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.13 cfs @ 11.40 hrs HW=80.04' (Free Discharge)
└**3=Exfiltration** (Exfiltration Controls 0.13 cfs)

Primary OutFlow Max=0.55 cfs @ 12.62 hrs HW=82.85' TW=0.00' (Dynamic Tailwater)
└**1=Culvert** (Passes 0.55 cfs of 8.75 cfs potential flow)
└**2=Orifice/Grate** (Orifice Controls 0.55 cfs @ 6.25 fps)

Pond 1P: Subsurface Infiltration Structure (Lot 9) - Chamber Wizard Field A

Chamber Model = Cultec R-330XLHD (Cultec Recharger® 330XLHD)
Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf
Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap
Row Length Adjustment= +1.50' x 7.45 sf x 8 rows

52.0" Wide + 6.0" Spacing = 58.0" C-C Row Spacing

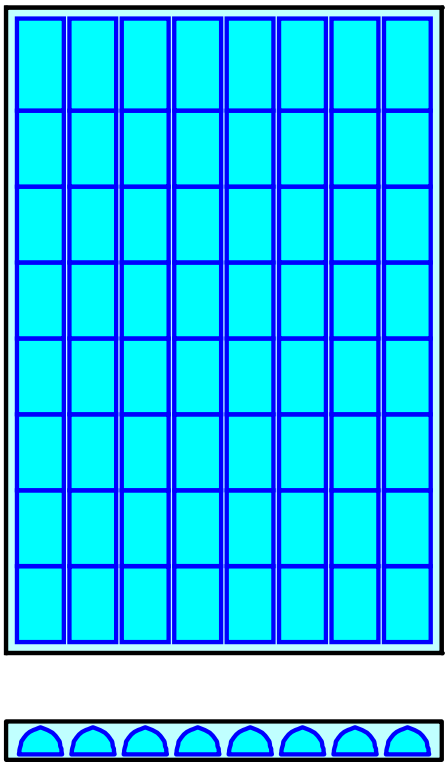
8 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 57.50' Row Length +12.0" End Stone x 2 = 59.50' Base Length
8 Rows x 52.0" Wide + 6.0" Spacing x 7 + 12.0" Side Stone x 2 = 40.17' Base Width
6.0" Base + 30.5" Chamber Height + 6.0" Cover = 3.54' Field Height

64 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 8 Rows = 3,427.5 cf Chamber Storage

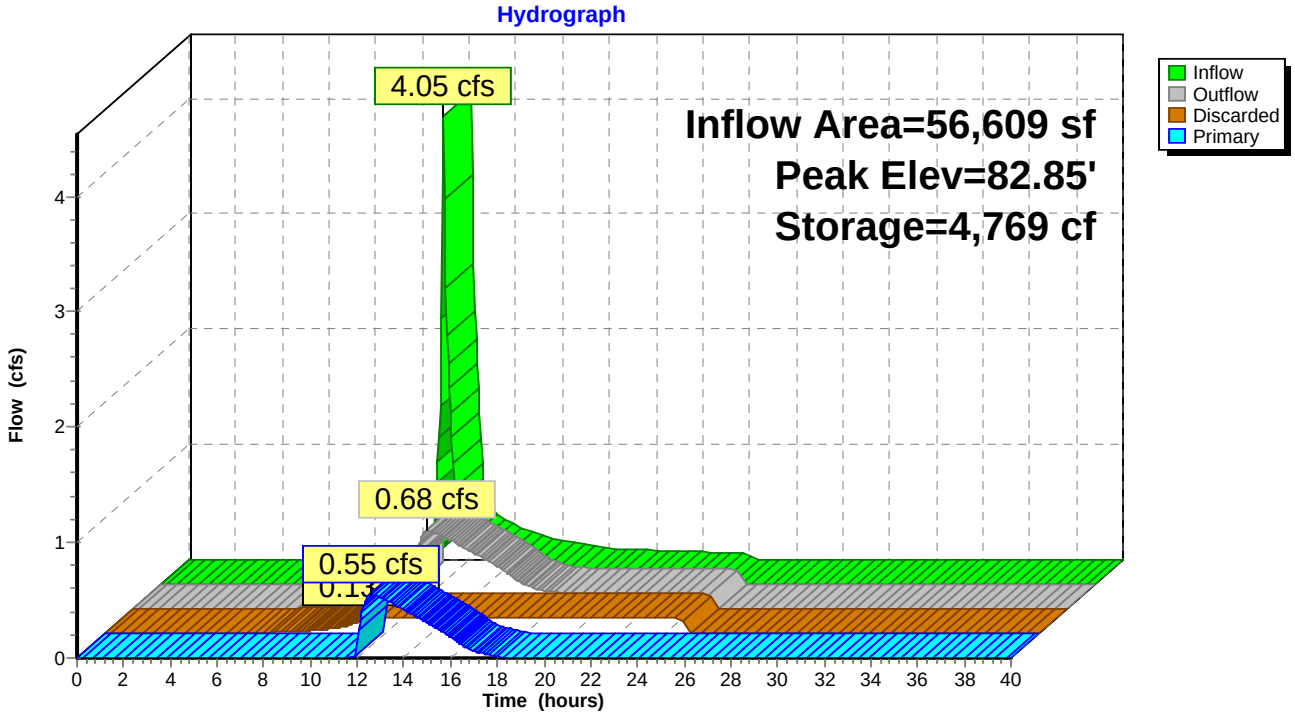
8,464.3 cf Field - 3,427.5 cf Chambers = 5,036.8 cf Stone x 40.0% Voids = 2,014.7 cf Stone Storage

Chamber Storage + Stone Storage = 5,442.2 cf = 0.125 af
Overall Storage Efficiency = 64.3%
Overall System Size = 59.50' x 40.17' x 3.54'

64 Chambers
313.5 cy Field
186.5 cy Stone



Pond 1P: Subsurface Infiltration Structure (Lot 9)



Summary for Pond 2P: Subsurface Infiltration Structure 1 (STA 3+50)

Inflow Area = 14,469 sf, 36.01% Impervious, Inflow Depth = 4.95" for 100 yr event
Inflow = 1.82 cfs @ 12.09 hrs, Volume= 5,968 cf
Outflow = 1.20 cfs @ 12.19 hrs, Volume= 5,895 cf, Atten= 34%, Lag= 6.1 min
Discarded = 0.02 cfs @ 8.85 hrs, Volume= 2,798 cf
Primary = 1.17 cfs @ 12.19 hrs, Volume= 3,098 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 109.32' @ 12.19 hrs Surf.Area= 988 sf Storage= 1,942 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 293.6 min (1,086.5 - 792.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	106.46'	856 cf	**25.67'W x 38.50'L x 3.54'H Field A** 3,500 cf Overall - 1,360 cf Embedded = 2,140 cf x 40.0% Voids
#2A	106.96'	1,360 cf	**Cultec R-330XLHD** x 25 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 5 rows
		2,216 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	106.46'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	108.50'	**8.0" Round Culvert** L= 16.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 108.50' / 106.50' S= 0.1250 '/' Cc= 0.900 n= 0.010, Flow Area= 0.35 sf

Discarded OutFlow Max=0.02 cfs @ 8.85 hrs HW=106.50' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=1.17 cfs @ 12.19 hrs HW=109.31' TW=99.90' (Dynamic Tailwater)
↑**2=Culvert** (Inlet Controls 1.17 cfs @ 3.34 fps)

Pond 2P: Subsurface Infiltration Structure 1 (STA 3+50) - Chamber Wizard Field A

Chamber Model = Cultec R-330XLHD (Cultec Recharger® 330XLHD)
Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf
Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap
Row Length Adjustment= +1.50' x 7.45 sf x 5 rows

52.0" Wide + 6.0" Spacing = 58.0" C-C Row Spacing

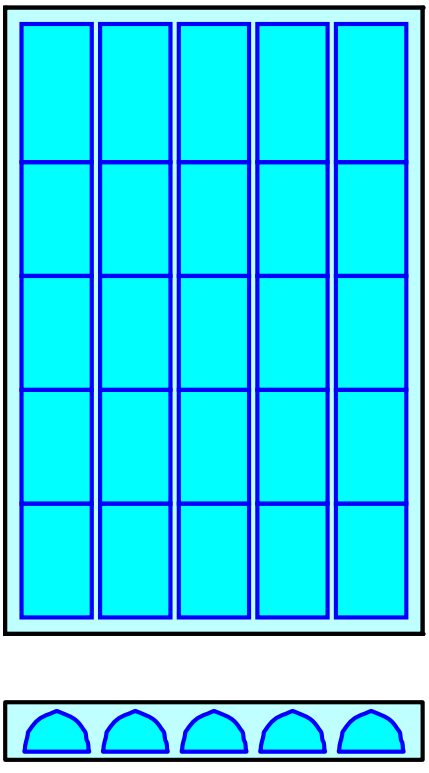
5 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 36.50' Row Length +12.0" End Stone x 2 = 38.50' Base Length
5 Rows x 52.0" Wide + 6.0" Spacing x 4 + 12.0" Side Stone x 2 = 25.67' Base Width
6.0" Base + 30.5" Chamber Height + 6.0" Cover = 3.54' Field Height

25 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 5 Rows = 1,359.8 cf Chamber Storage

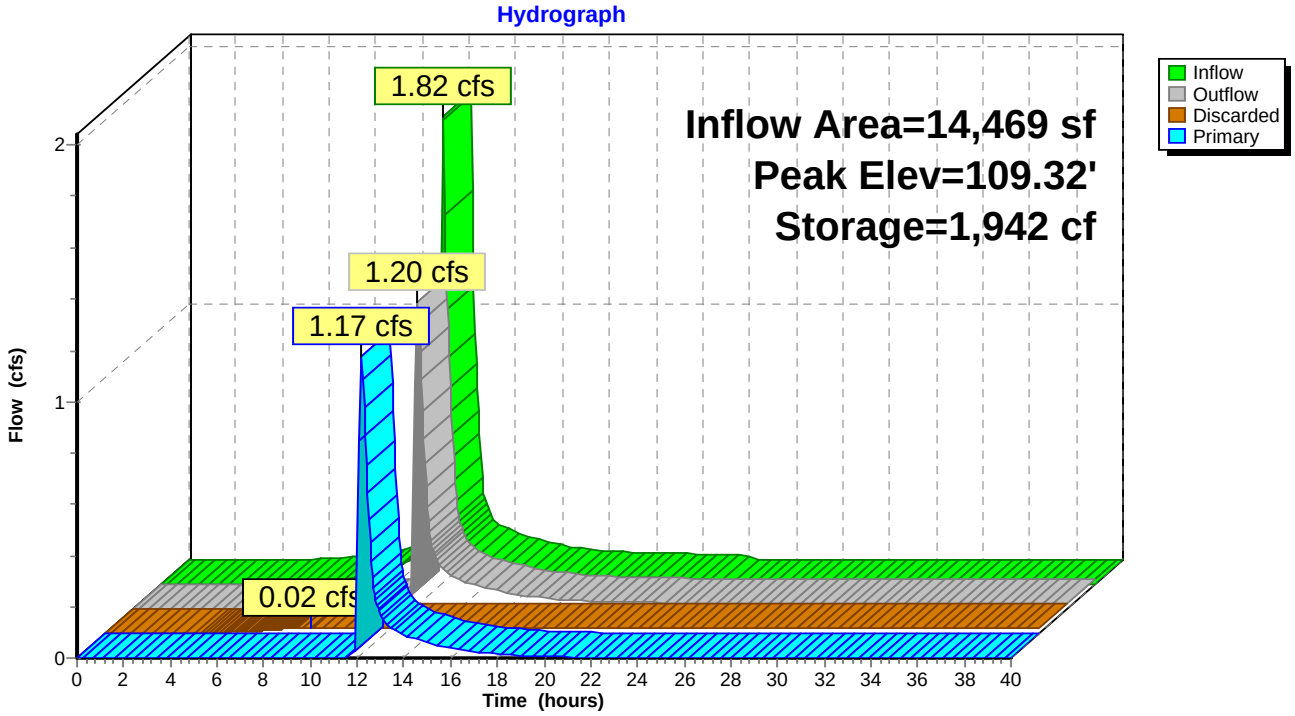
3,499.8 cf Field - 1,359.8 cf Chambers = 2,139.9 cf Stone x 40.0% Voids = 856.0 cf Stone Storage

Chamber Storage + Stone Storage = 2,215.8 cf = 0.051 af
Overall Storage Efficiency = 63.3%
Overall System Size = 38.50' x 25.67' x 3.54'

25 Chambers
129.6 cy Field
79.3 cy Stone



Pond 2P: Subsurface Infiltration Structure 1 (STA 3+50)



Summary for Pond 3P: Subsurface Infiltration Structure 2 (Rear of Lot 7)

Inflow Area = 16,472 sf, 46.39% Impervious, Inflow Depth = 5.13" for 100 yr event
Inflow = 2.12 cfs @ 12.09 hrs, Volume= 7,039 cf
Outflow = 1.10 cfs @ 12.24 hrs, Volume= 7,041 cf, Atten= 48%, Lag= 9.1 min
Discarded = 0.04 cfs @ 9.15 hrs, Volume= 4,067 cf
Primary = 1.06 cfs @ 12.24 hrs, Volume= 2,973 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 124.28' @ 12.24 hrs Surf.Area= 1,527 sf Storage= 2,529 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 320.1 min (1,105.9 - 785.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	121.96'	1,307 cf	**25.67'W x 59.50'L x 3.54'H Field A** 5,409 cf Overall - 2,142 cf Embedded = 3,267 cf x 40.0% Voids
#2A	122.46'	2,142 cf	**Cultec R-330XLHD** x 40 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 5 rows
		3,449 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	121.96'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	123.75'	**12.0" Round Culvert** L= 16.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 123.75' / 122.00' S= 0.1094 '/' Cc= 0.900 n= 0.010, Flow Area= 0.79 sf

Discarded OutFlow Max=0.04 cfs @ 9.15 hrs HW=122.00' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.04 cfs)

Primary OutFlow Max=1.05 cfs @ 12.24 hrs HW=124.28' TW=99.86' (Dynamic Tailwater)
└**2=Culvert** (Inlet Controls 1.05 cfs @ 2.48 fps)

Pond 3P: Subsurface Infiltration Structure 2 (Rear of Lot 7) - Chamber Wizard Field A

Chamber Model = Cultec R-330XLHD (Cultec Recharger® 330XLHD)
Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf
Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap
Row Length Adjustment= +1.50' x 7.45 sf x 5 rows

52.0" Wide + 6.0" Spacing = 58.0" C-C Row Spacing

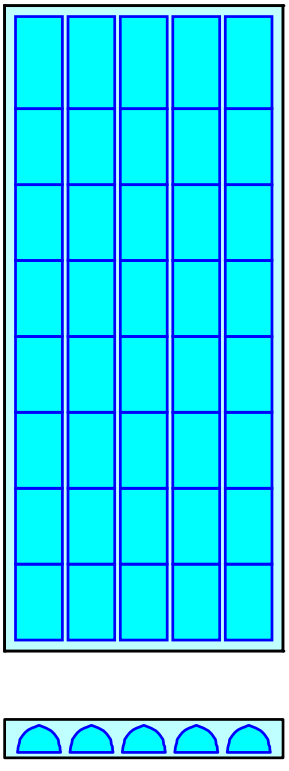
8 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 57.50' Row Length +12.0" End Stone x 2 = 59.50' Base Length
5 Rows x 52.0" Wide + 6.0" Spacing x 4 + 12.0" Side Stone x 2 = 25.67' Base Width
6.0" Base + 30.5" Chamber Height + 6.0" Cover = 3.54' Field Height

40 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 5 Rows = 2,142.2 cf Chamber Storage

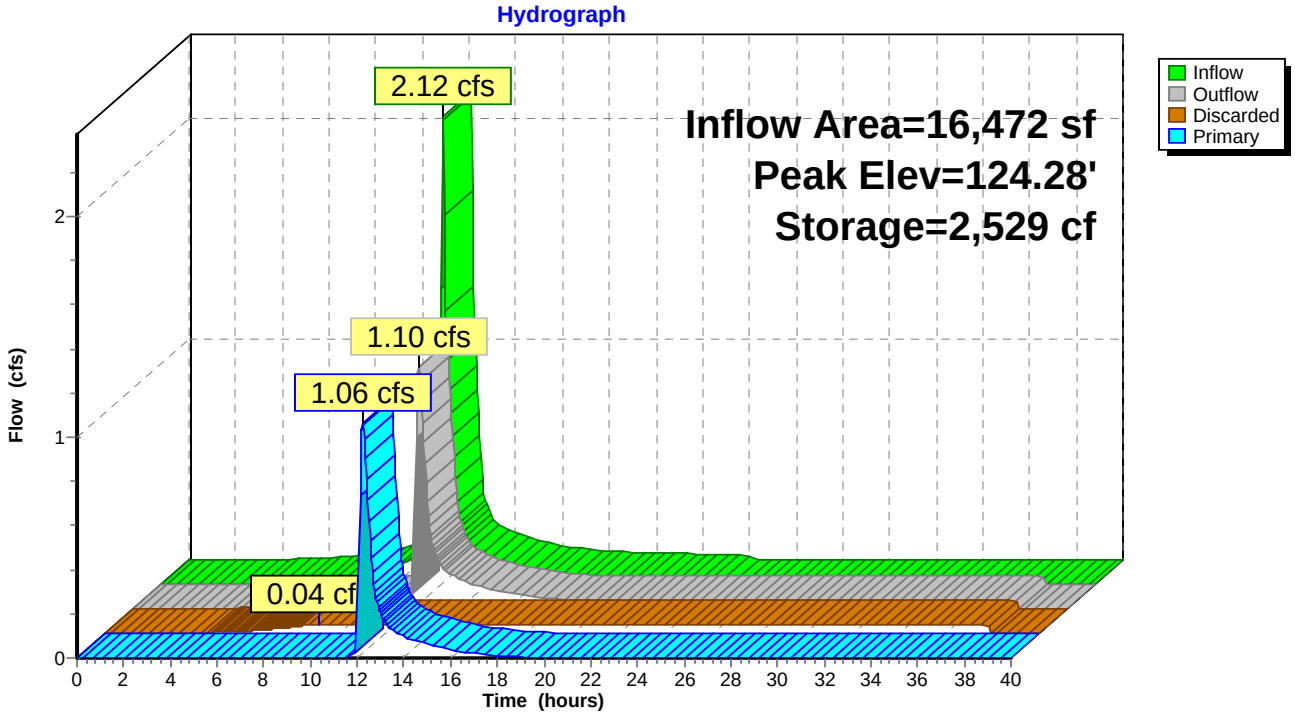
5,408.7 cf Field - 2,142.2 cf Chambers = 3,266.6 cf Stone x 40.0% Voids = 1,306.6 cf Stone Storage

Chamber Storage + Stone Storage = 3,448.8 cf = 0.079 af
Overall Storage Efficiency = 63.8%
Overall System Size = 59.50' x 25.67' x 3.54'

40 Chambers
200.3 cy Field
121.0 cy Stone



Pond 3P: Subsurface Infiltration Structure 2 (Rear of Lot 7)



Summary for Pond 4P: Infiltration Trench - Revised

Inflow Area = 23,402 sf, 46.08% Impervious, Inflow Depth = 5.15" for 100 yr event
Inflow = 3.04 cfs @ 12.09 hrs, Volume= 10,044 cf
Outflow = 2.79 cfs @ 12.12 hrs, Volume= 10,045 cf, Atten= 8%, Lag= 2.1 min
Discarded = 0.01 cfs @ 6.85 hrs, Volume= 1,524 cf
Primary = 2.77 cfs @ 12.12 hrs, Volume= 8,521 cf
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 124.20' @ 12.12 hrs Surf.Area= 627 sf Storage= 803 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 62.6 min (850.1 - 787.6)

Volume	Invert	Avail.Storage	Storage Description
#1	121.00'	878 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc) 2,195 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
121.00	627	0	0
122.00	627	627	627
123.00	627	627	1,254
124.00	627	627	1,881
124.50	627	314	2,195

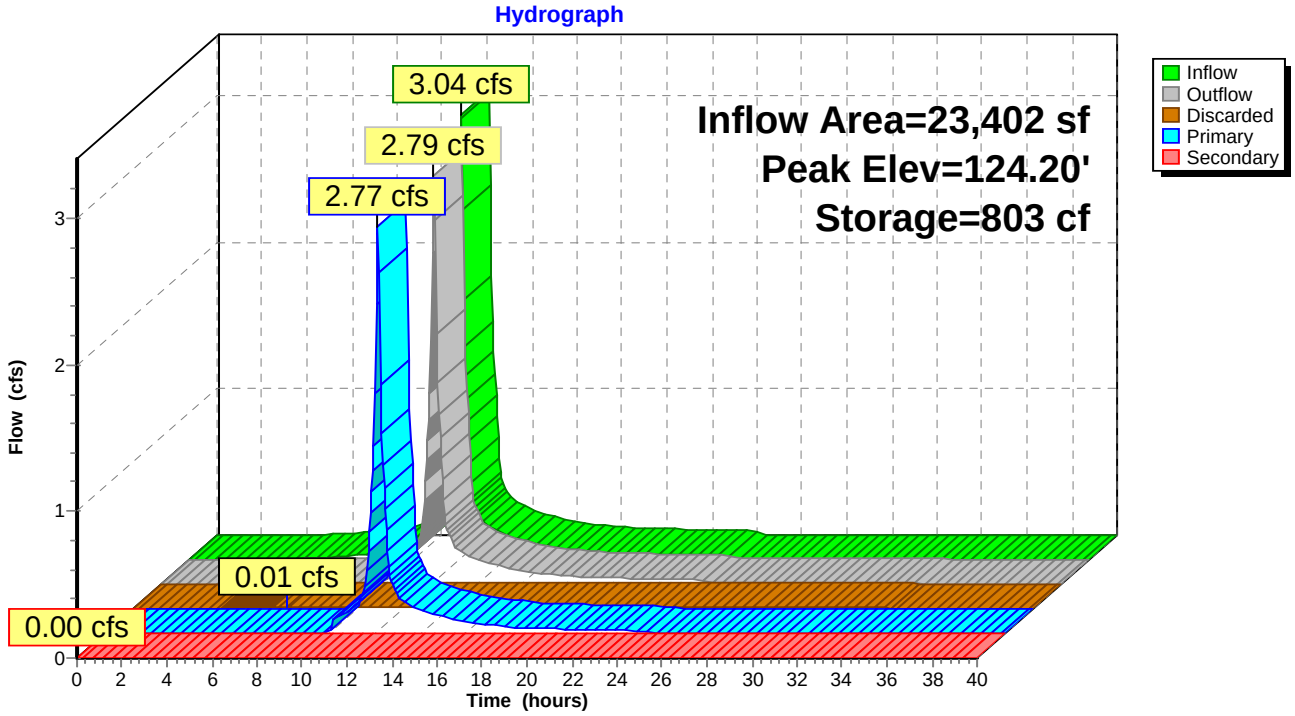
Device	Routing	Invert	Outlet Devices
#1	Secondary	124.50'	**65.0' long x 1.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32
#2	Discarded	121.00'	**1.020 in/hr Exfiltration over Surface area**
#3	Primary	123.00'	**6.0" Round Culvert X 3.00** L= 6.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 123.00' / 122.50' S= 0.0833 '/' Cc= 0.900 n= 0.010, Flow Area= 0.20 sf

Discarded OutFlow Max=0.01 cfs @ 6.85 hrs HW=121.04' (Free Discharge)
└**2=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=2.71 cfs @ 12.12 hrs HW=124.16' TW=0.00' (Dynamic Tailwater)
└**3=Culvert** (Inlet Controls 2.71 cfs @ 4.60 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=121.00' TW=0.00' (Dynamic Tailwater)
└**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 4P: Infiltration Trench - Revised



Summary for Pond 15P: Proposed Box Culvert

Inflow Area = 132,625 sf, 22.75% Impervious, Inflow Depth = 3.01" for 100 yr event
Inflow = 9.66 cfs @ 12.12 hrs, Volume= 33,247 cf
Outflow = 9.66 cfs @ 12.12 hrs, Volume= 33,247 cf, Atten= 0%, Lag= 0.0 min
Primary = 9.66 cfs @ 12.12 hrs, Volume= 33,247 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 99.95' @ 12.12 hrs Surf.Area= 18 sf Storage= 4 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (828.5 - 828.5)

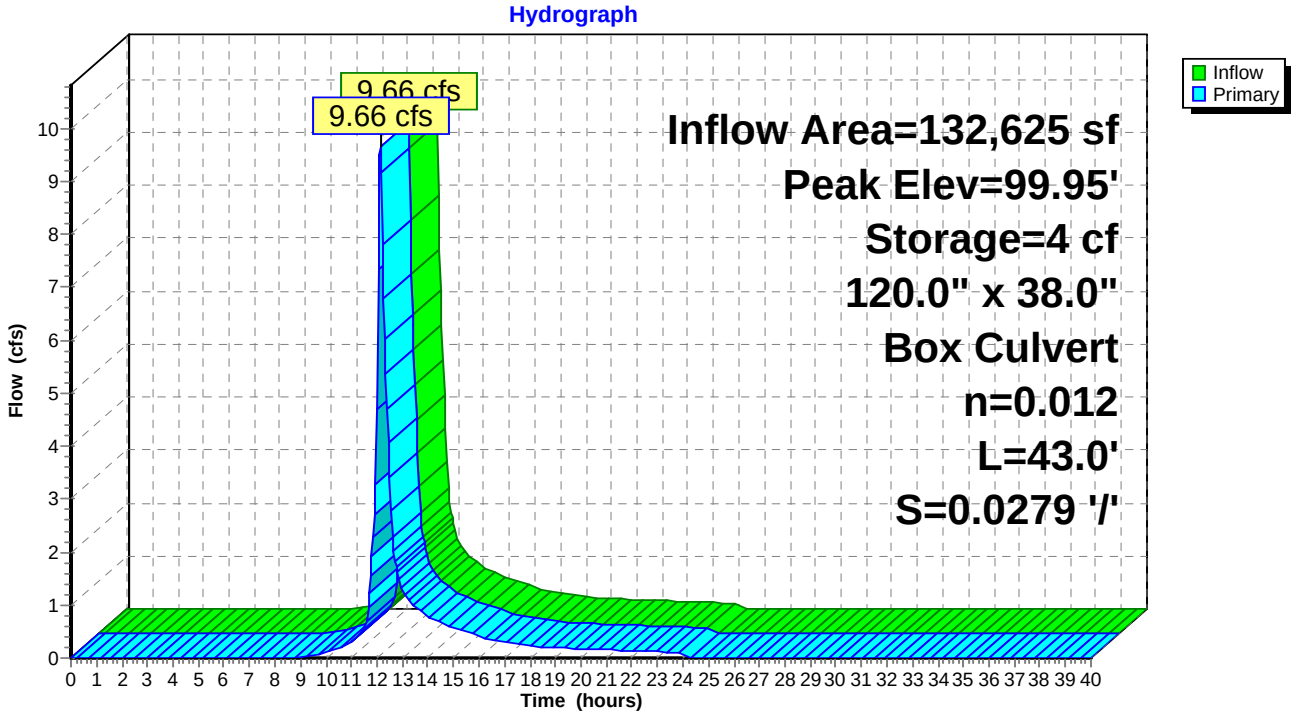
Volume	Invert	Avail.Storage	Storage Description
#1	99.50'	3,618 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
99.50	0	0	0
100.00	20	5	5
101.00	100	60	65
102.00	250	175	240
102.50	390	160	400
102.70	475	87	487
103.00	500	146	633
104.00	815	658	1,290
105.00	1,170	993	2,283
106.00	1,500	1,335	3,618

Device	Routing	Invert	Outlet Devices
#1	Primary	99.50'	**120.0" W x 38.0" H Box Culvert** L= 43.0' Box, headwall w/3 square edges, Ke= 0.500 Inlet / Outlet Invert= 99.50' / 98.30' S= 0.0279 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 31.67 sf

Primary OutFlow Max=9.37 cfs @ 12.12 hrs HW=99.94' TW=74.58' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 9.37 cfs @ 2.13 fps)

Pond 15P: Proposed Box Culvert



Summary for Pond 82P: Wetland acting as detention pond

Inflow Area = 628,585 sf, 10.50% Impervious, Inflow Depth = 4.19" for 100 yr event
Inflow = 58.02 cfs @ 12.12 hrs, Volume= 219,379 cf
Outflow = 6.32 cfs @ 13.32 hrs, Volume= 102,683 cf, Atten= 89%, Lag= 71.9 min
Discarded = 0.12 cfs @ 13.32 hrs, Volume= 13,782 cf
Primary = 6.20 cfs @ 13.32 hrs, Volume= 88,901 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 132.59' @ 13.32 hrs Surf.Area= 57,931 sf Storage= 133,105 cf

Plug-Flow detention time= 343.4 min calculated for 102,555 cf (47% of inflow)
Center-of-Mass det. time= 227.5 min (1,045.2 - 817.7)

Volume	Invert	Avail.Storage	Storage Description
#1	130.00'	218,068 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

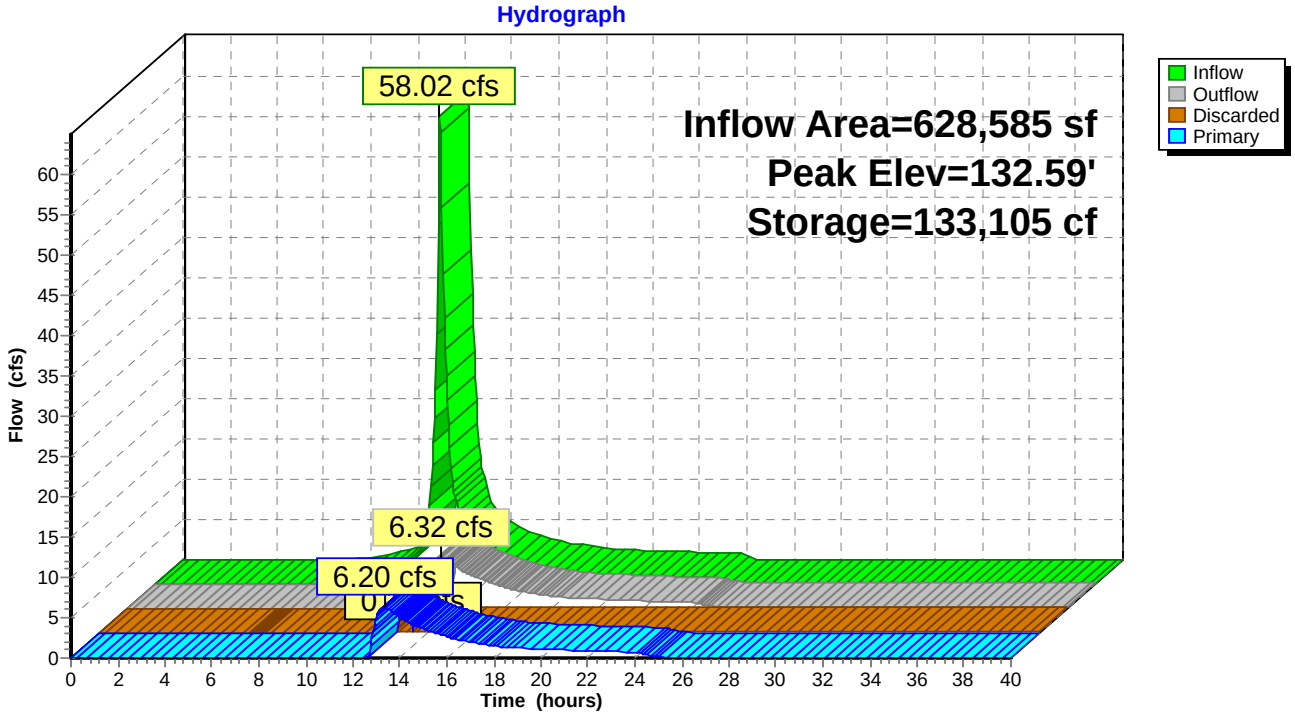
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
130.00	45,000	0	0
131.00	50,000	47,500	47,500
132.00	55,000	52,500	100,000
133.00	60,000	57,500	157,500
134.00	61,136	60,568	218,068

Device	Routing	Invert	Outlet Devices
#1	Discarded	130.00'	**0.090 in/hr Exfiltration over Surface area**
#2	Primary	132.40'	**30.0' long x 12.0' 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) 2.57 2.62 2.70 2.67 2.66 2.67 2.66 2.64

Discarded OutFlow Max=0.12 cfs @ 13.32 hrs HW=132.59' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.12 cfs)

Primary OutFlow Max=6.20 cfs @ 13.32 hrs HW=132.59' TW=74.40' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 6.20 cfs @ 1.11 fps)

Pond 82P: Wetland acting as detention pond



Summary for Pond 87P: Existing Headwall

Inflow Area = 801,374 sf, 13.21% Impervious, Inflow Depth = 1.91" for 100 yr event
Inflow = 11.10 cfs @ 12.12 hrs, Volume= 127,369 cf
Outflow = 11.08 cfs @ 12.12 hrs, Volume= 127,369 cf, Atten= 0%, Lag= 0.0 min
Primary = 3.89 cfs @ 12.12 hrs, Volume= 95,343 cf
Secondary = 7.20 cfs @ 12.12 hrs, Volume= 32,026 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 74.60' @ 12.12 hrs Surf.Area= 260 sf Storage= 100 cf

Plug-Flow detention time= 0.7 min calculated for 127,369 cf (100% of inflow)
Center-of-Mass det. time= 0.2 min (940.6 - 940.4)

Volume	Invert	Avail.Storage	Storage Description
#1	73.00'	100 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

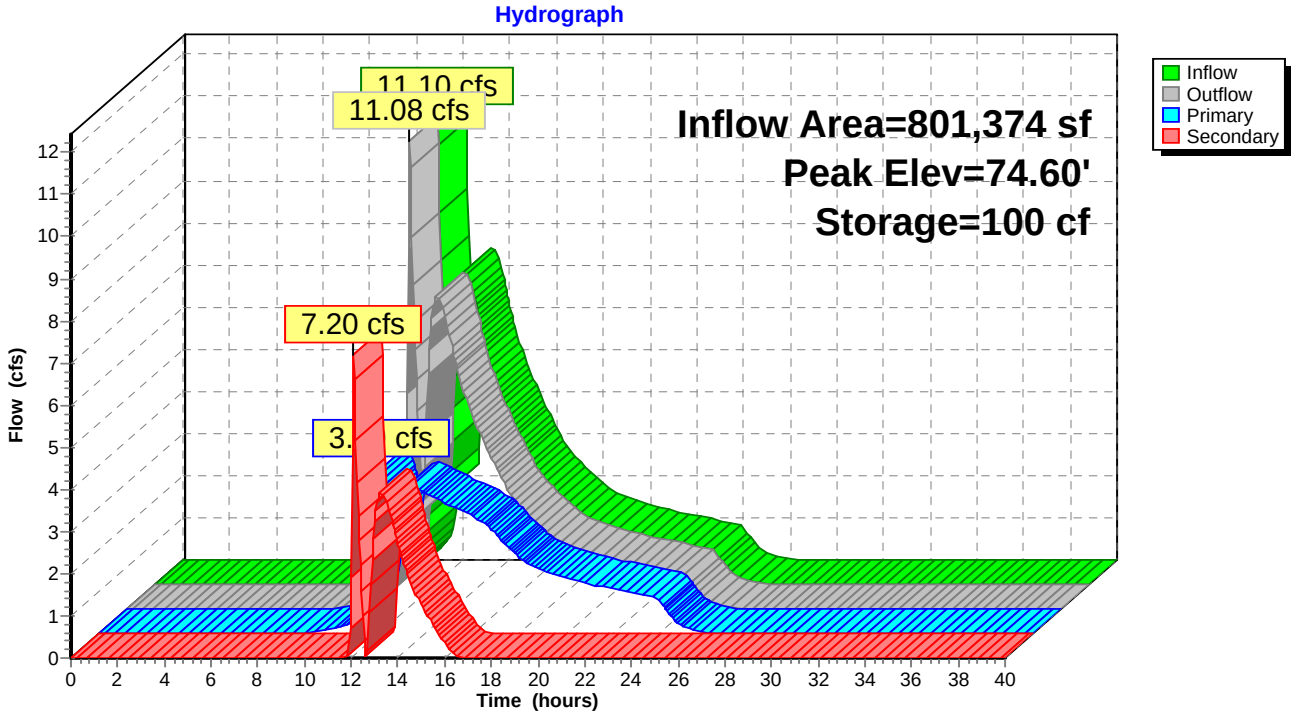
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
73.00	0	0	0
73.75	50	19	19
74.00	75	16	34
74.20	250	33	67
74.33	260	33	100

Device	Routing	Invert	Outlet Devices
#1	Primary	73.04'	**12.0" Round Culvert** L= 6.5' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 73.04' / 72.75' S= 0.0446 '/' Cc= 0.900 n= 0.013 Cast iron, coated, Flow Area= 0.79 sf
#2	Secondary	74.00'	**6.0' long x 2.0' 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 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

Primary OutFlow Max=3.86 cfs @ 12.12 hrs HW=74.58' TW=0.00' (Dynamic Tailwater)
1=Culvert (Inlet Controls 3.86 cfs @ 4.91 fps)

Secondary OutFlow Max=6.91 cfs @ 12.12 hrs HW=74.58' TW=0.00' (Dynamic Tailwater)
2=Broad-Crested Rectangular Weir (Weir Controls 6.91 cfs @ 1.99 fps)

Pond 87P: Existing Headwall

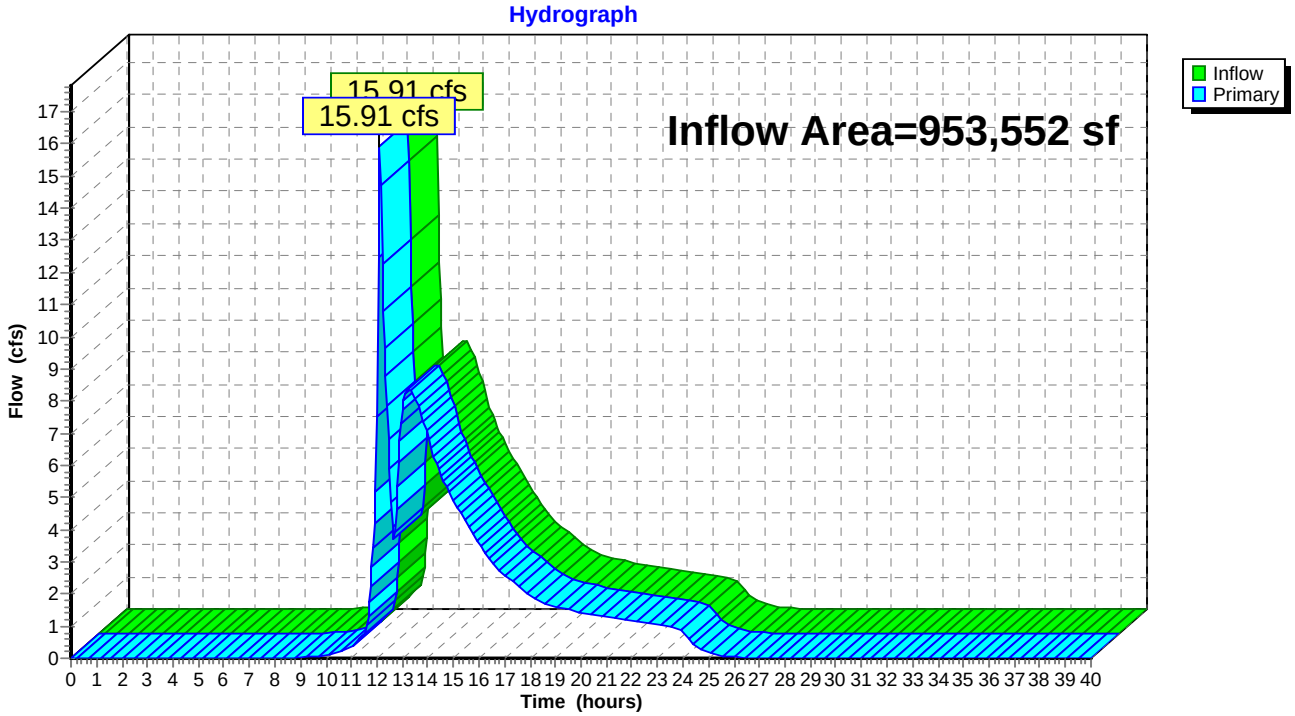


Summary for Link 1L: Discharge to southside of Maple Terrace

Inflow Area = 953,552 sf, 16.59% Impervious, Inflow Depth = 1.88" for 100 yr event
Inflow = 15.91 cfs @ 12.11 hrs, Volume= 149,144 cf
Primary = 15.91 cfs @ 12.11 hrs, Volume= 149,144 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs

Link 1L: Discharge to southside of Maple Terrace

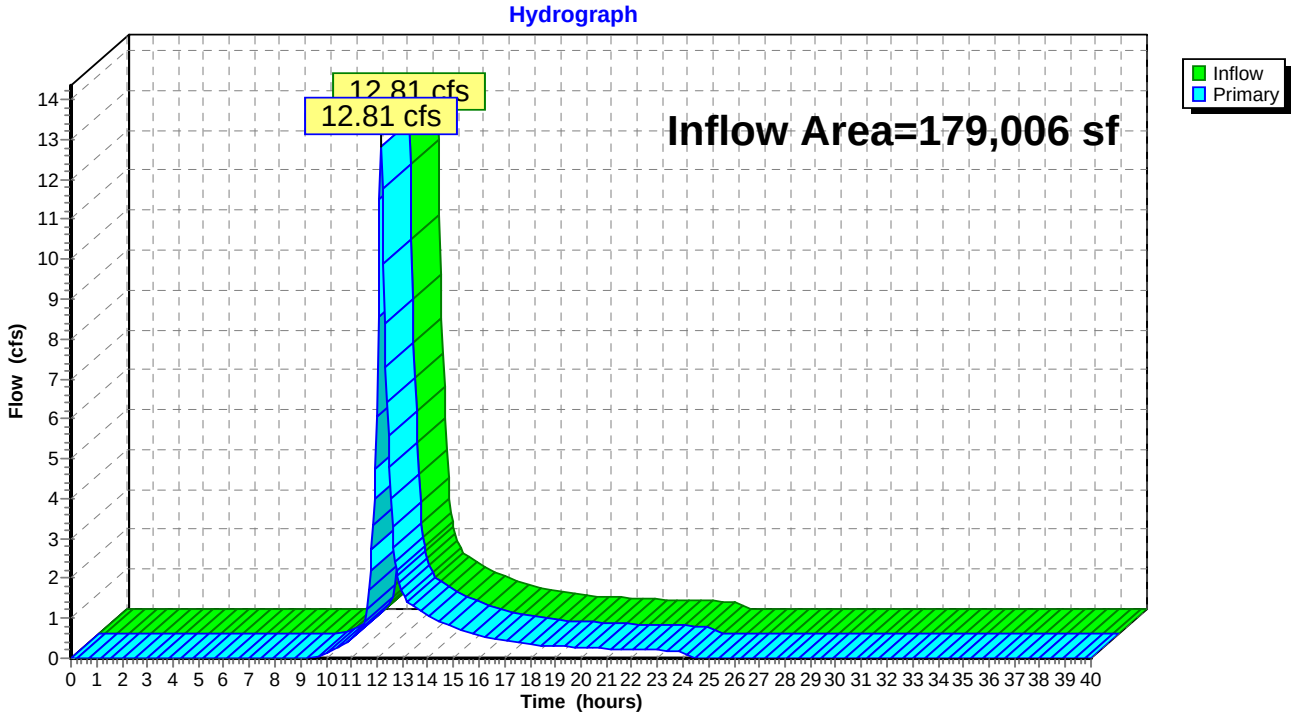


Summary for Link 2L: Discharge to northside of Swains Pond Avenue

Inflow Area = 179,006 sf, 19.13% Impervious, Inflow Depth = 3.10" for 100 yr event
Inflow = 12.81 cfs @ 12.15 hrs, Volume= 46,296 cf
Primary = 12.81 cfs @ 12.15 hrs, Volume= 46,296 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs

Link 2L: Discharge to northside of Swains Pond Avenue

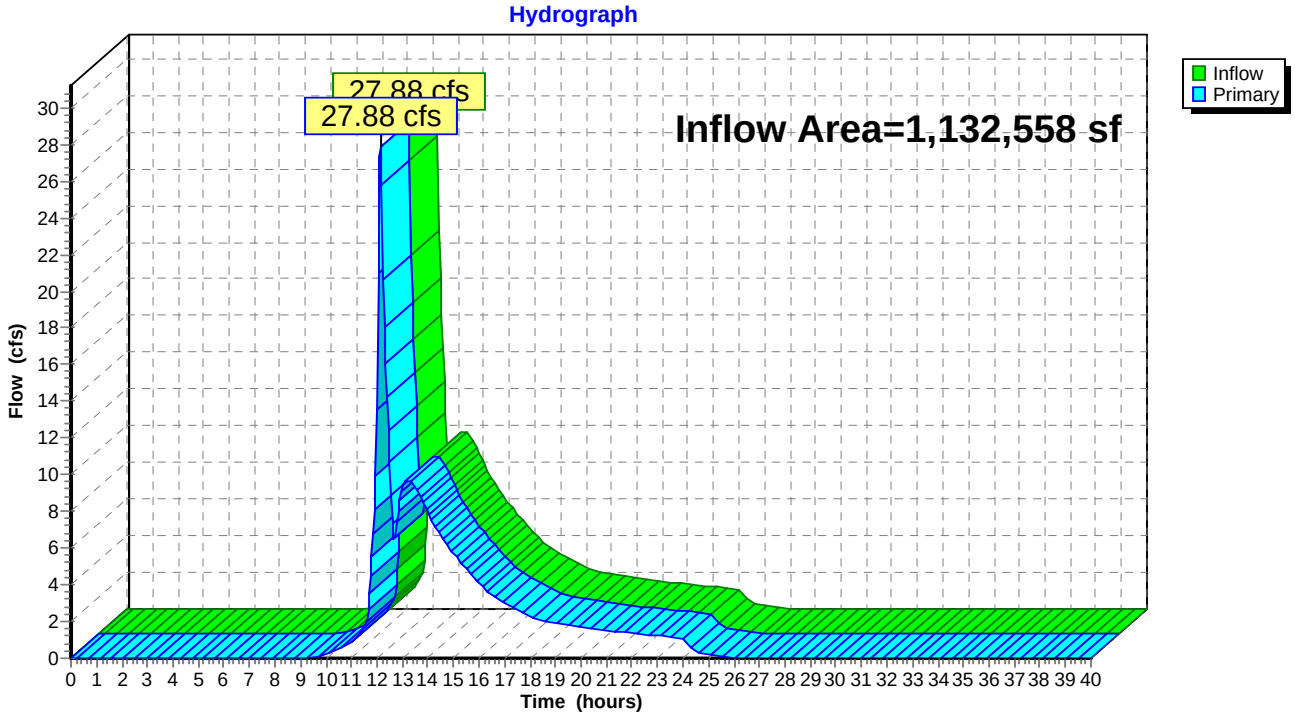


Summary for Link 3L: Total surface discharge from within the limit of watershed analysis

Inflow Area = 1,132,558 sf, 16.99% Impervious, Inflow Depth = 2.07" for 100 yr event
Inflow = 27.88 cfs @ 12.13 hrs, Volume= 195,440 cf
Primary = 27.88 cfs @ 12.13 hrs, Volume= 195,440 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs

Link 3L: Total surface discharge from within the limit of watershed analysis



2 | *Stormwater Report Compliance Calculations*

1.0 Standard 1 | No Untreated Discharges Or Erosion To Wetlands

Untreated Discharges

To document compliance that new discharges are adequately treated refer to calculations for Standards 4 through 6.

Erosion to Wetlands

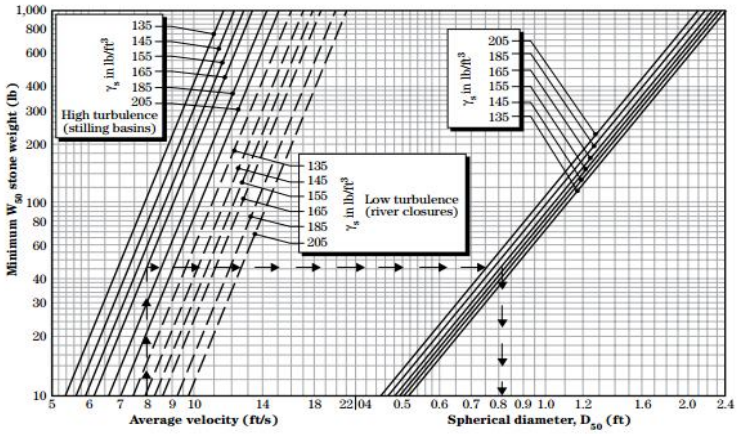
Flow exiting the subsurface infiltration structure Pond 4P discharges across a rip-rap apron. For minimum stone size based on a maximum of Q_{100} = 2.71 cfs, V_{max}= 4.60 ft/s, see the following graphical solution to the Isbash Curve.

Given the velocity of 4.60 ft/s a D_{50} of 6 inches is recommended for a γ_s of 165 lb/ft^3.

Technical Supplement 14C | **Stone Sizing Criteria** | **Part 654 National Engineering Handbook**

Figure TS14C–6 Graphical solution for Isbash technique

(a)



Basic equations :

$$V_c = C\left[2g\left(\frac{\gamma_s - \gamma_w}{\gamma_w}\right)\right]^{\frac{1}{2}} (D_{50})^{\frac{1}{2}}$$

$$D_{50} = \left(\frac{8W_{50}}{\pi\gamma_s}\right)^{\frac{1}{3}}$$

where:
- V = Velocity, ft/s
- γ_s = Specific stone weight, lb/ft^3
- γ_w = Specific weight of water, 62.5 lb/ft^3
- W_{50} = Weight of stone, subscript denotes Percent of total weight of material containing stone of less weight
- D_{50} = Spherical diameter of stone having the same weight as W_{50}
- C = Isbash constant (0.86 for high turbulence level flow and 1.20 for low turbulence level flow)
- g = Acceleration of gravity, ft/s^2

Stone stability velocity vs. stone diameter

Hydraulic design chart 712–1 (Sheet 1 of 2)

TS14C–4 (210–VI–NEH, August 2007)

2.0 Standard 2 | Peak Rate Attenuation

Refer to Peak Rate of Runoff table below (see Mitigative Drainage Analysis)

Table 1.0: Total Peak Rate of Runoff from within limit of watershed analysis | Comparison Location 3L

Description	2 Year	10 Year	100 Year	Calculated 100 Year Bypass	100 Year Total
Existing Peak Rate of Runoff (cfs)	5.5	14.9	32.0	N.A.	32.0
Proposed Peak Rate of Runoff (cfs)	4.9	12.6	27.9	+1.69 =	29.59
Difference	**-0.6**	**-2.3**	**-4.1**		**-2.41**

3.0 Standard 3 | Stormwater Recharge

Recharge Volume:

$R_{v\ required}$ = (Impervious Area) (F)

Site consists of Hydrologic Soils Group A: F_C = 0.60 in.
Group D: Fc = 0.10 in.

***Site Impervious Area Draining to Recharge Facilities*:**

Stormwater Management Area 1P (Subsurface Infiltration Basin – Lot 9) – No Change

$A_{imp\ A\ soils}$ = 12,766 ft²
$R_{v\ required}$ = [(12,766) (0.60)/12] = 638.3 ft³

$A_{imp\ D\ soils}$ = 3,042 ft²
$R_{v\ required}$ = [(3042) (0.10)/12] = 25.3 ft³

Total $R_{v\ required}$ = 638.3 + 25.3 = 663.6 ft³
$R_{v\ provided}$ = 1,495 ft³ (volume below 4" orifice); Therefore Okay

Stormwater Management Area 2P (Subsurface Infiltration Structure 1)- No Change

$A_{imp\ D\ soils}$ = 5,211 ft²
$R_{v\ required}$ = [(5,211) (0.10)/12] = 43.4 ft³

$R_{v\ provided}$ = 1,423 ft³ (volume below 8" culvert); Therefore Okay

Stormwater Management Area 3P (Subsurface Infiltration Structure 2)-No Change

$A_{imp\ D\ soils}$ = 5,033 ft²
$R_{v\ required}$ = [(5033) (0.10)/12] = 41.9 ft³

$R_{v\ provided}$ = 1,926 ft³ (volume below 12" culvert); Therefore Okay

Stormwater Management Area 4P (Infiltration Trench) – No change to tributary impervious area but trench has Increased Capacity

$A_{imp\ D\ soils}$ = 10,783 ft²
$R_{v\ required}$ = [(10,783) (0.10)/12] = 89.9 ft³

$R_{v\ provided}$ = 502 ft³ (volume below 6" culverts); Therefore Okay

Roof Recharge Areas where shown on Watershed Map
(See basic designs on revised Definitive Plans. Final designs to be provided after house designed and prior to the issuance of a building permit)

Total Area of Roof to be directly infiltrated = 9,849 ft² (As shown on Watershed Map Approx. only)
$A_{imp\ A\ soils}$ = 2,589 ft² (roof area)
$R_{v\ required}$ = [(2,589) (0.60)/12] = 129.5 ft³

$A_{imp\ D\ soils}$ = 7,260 ft² (roof area)
$R_{v\ required}$ = [(7,260) (0.10)/12] = 60.5 ft³

Total $R_{v\ required}$ = 129.5 + 60.5 = 190.0 ft³

$R_{v\ provided}$ = >190.0 ft³ (total chamber storage volume)

Capture Area Adjustment – No Change
Total proposed impervious area: 52,680 ft²
Roof=13,268 ft²
Pavement=39,412 ft²
Site impervious areas draining to recharge facilities: 49,050 ft²
Ratio of total impervious area to site impervious areas draining to recharge facilities:
(52,680/49,050) = 1.07

Total Recharge Volume Required – No Change
$R_{v\ required}$ = 1P + 2P + 3P + 4P = 838.8 ft³ (See above calculations)
Adjusted minimum required recharge volume = [(838.8) (1.07)] = 897.5 ft³

Total Recharge Volume Provided
$R_{v\ provided}$ = 1P + 2P + 3P + 4P = 5,364 ft³ (See above calculations – does not include roof recharge)

5,346 ft³ > 897.5 ft³; Therefore Okay

Capture Area Percentage: - No Change
Site impervious areas draining to recharge facilities: 49,050 ft²
Total impervious area: 52,680 ft²
Percent Captured: [(49,050/52,680)] (100) = 93.1 > 65%; Therefore Okay

Drawdown Within 72 Hours:

$T_{drawdown}$ = [$R_{v\ total}$ / (K)(Bottom Area)]

Stormwater Management Area 1P

$R_{v\ 1P}$ = 1,495 ft^3 (Assume water level up to 4" orifice to be conservative)
K = 2.41 in/hr (Rawls Rate for HSG A soils)
Bottom Area = 2390 ft^2 (see Mitigative Drainage Analysis)
$T_{drawdown}$ = 1495 / [(2.41) (2390)/12] = 3.1 hours < 72 hours

Stormwater Management Area 2P – No Change

$R_{v\ 2P}$ = 1,423 ft^3 (Assume water level up to 8" culvert to be conservative)
K = 1.02 in/hr (Rawls Rate for sandy loam soils, see test pit log for TH 19-3)
Bottom Area = 988 ft^2 (see Mitigative Drainage Analysis)
$T_{drawdown}$ = 1,423 / [(1.02) (988)/12] = 16.9 hours < 72 hours

Stormwater Management Area 3P – No Change

$R_{v\ 3P}$ = 1,926 ft^3 (Assume water level up to 12" culvert to be conservative)
K = 1.02 in/hr (Rawls Rate for sandy loam soils, see test pit log for TH 19-2)
Bottom Area = 1,527 ft^2 (see Mitigative Drainage Analysis)
$T_{drawdown}$ = 1,926 / [(1.02) (1527)/12] = 14.8 hours < 72 hours

Stormwater Management Area 4P

$R_{v\ 4P}$ = 502 ft^3 (Assume water level up to 6" culverts to be conservative)
K = 1.02 in/hr (Rawls Rate for sandy loam soils)
Bottom Area = 627 ft^2 (see Mitigative Drainage Analysis)
$T_{drawdown}$ = 502 / [(1.02) (627)/12] = 9.4 hours < 72 hours

4.0 Standard 4 | Water Quality

Water Quality:

Water quality is provided through three structural stormwater best management practices.

1) Deep Sump Catch Basins with Hood/Trap
2) Sediment & Oil Separators
3) Stone infiltration trench
4) Lawn (vegetated) buffer strips
5) Subsurface Infiltration Structures

Water Quality Volume:

$V_{wq\ required}$ = (A_{imp})(D_{wq})
D_{WQ} = 0.5 in

Stormwater Management Area 1P

$V_{wq\ required}$ = [(15,808) (0.5)/12] = 658.7 ft^3
$V_{wq\ provided}$ = 1,495 ft^3 (volume below 4" orifice); Therefore Okay

Stormwater Management Area 2P
$V_{wq\ required}$ = [(5,211) (0.5)/12] = 217.1 ft³
$R_{v\ provided}$ = 1,423 ft³ (volume below 8″ culvert); Therefore Okay

Stormwater Management Area 3P
$V_{wq\ required}$ = [(5,033) (0.5)/12] = 209.7 ft³
$R_{v\ provided}$ = 1,926 ft³ (volume below 12″ culvert); Therefore Okay

Stormwater Management Area 4P – Revised to add additional capacity from last report
$V_{wq\ required}$ = [(10,783) (0.5)/12] = 449.3 ft³
$R_{v\ provided}$ = 502 ft³ (volume below 6″ culverts); Therefore Okay

TSS Removal:

Pretreatment Chain 1 (Pond 1P) = 44%

- Deep Sump Catch Basins w/hoods = 25%
- Sediment/Oil Separator = 25%

Treatment Chain 1 (Pond 1P) = 80%

- Sub-Surface Infiltration Basin = 80%

Total TSS Removal = 85% (Same as Pond 2P & 3P – See TSS Removal spreadsheets below)

Pretreatment Chain 2 (Pond 2P) = 44%

- Deep Sump Catch Basins w/hoods = 25%
- Sediment/Oil Separator = 25%

Treatment Chain 2 (Pond 2P) = 80%

- Sub-Surface Infiltration Basin = 80%

Total TSS Removal = 85% (No change)

TSS Removal Calculation Worksheet

Location: Pretreatment Chain 2 Pond 2P

B BMP[1]	C TSS Removal Rate[1]	D Starting TSS Load*	E Amount Removed (C*D)	F Remaining Load (D-E)
Deep Sump and Hooded Catch Basin	0.25	1.00	0.25	0.75
Oil Grit Separator	0.25	0.75	0.19	0.56
	0.00	0.56	0.00	0.56
	0.00	0.56	0.00	0.56
	0.00	0.56	0.00	0.56

Total TSS Removal = 44%

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

Project: MELR-0029
Prepared By: PMB
Date: December 30 2019

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

TSS Removal Calculation Worksheet

Location: Treatment Chain 2 Pond 2P

B BMP[1]	C TSS Removal Rate[1]	D Starting TSS Load*	E Amount Removed (C*D)	F Remaining Load (D-E)
Deep Sump and Hooded Catch Basin	0.25	1.00	0.25	0.75
Subsurface Infiltration Structure	0.80	0.75	0.60	0.15
	0.00	0.15	0.00	0.15
	0.00	0.15	0.00	0.15
	0.00	0.15	0.00	0.15

Total TSS Removal = 85%

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

Project: MELR-0029
Prepared By: PMB
Date: December 30 2019

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

Pretreatment Chain 3 (Pond 3P) = 44%

- Deep Sump Catch Basin with Hood = 25%
- Sediment/Oil Separator = 25%

Treatment Chain 3 (SWMA3P) = 80%

- Subsurface Infiltration Basin = 80%

Total TSS Removal = 85% (No Change)

Location: Pretreatment Chain 3 Pond 3P

TSS Removal Calculation Worksheet

B BMP[1]	C TSS Removal Rate[1]	D Starting TSS Load*	E Amount Removed (C*D)	F Remaining Load (D-E)
Deep Sump and Hooded Catch Basin	0.25	1.00	0.25	0.75
Oil Grit Separator	0.25	0.75	0.19	0.56
	0.00	0.56	0.00	0.56
	0.00	0.56	0.00	0.56
	0.00	0.56	0.00	0.56

Total TSS Removal = 44%

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

Project: MELR-0029
Prepared By: PMB
Date: December 30 2019

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

TSS Removal Calculation Worksheet

Location: Treatment Chain 3 Pond 3P

B BMP[1]	C TSS Removal Rate[1]	D Starting TSS Load*	E Amount Removed (C*D)	F Remaining Load (D-E)
Deep Sump and Hooded Catch Basin	0.25	1.00	0.25	0.75
Subsurface Infiltration Structure	0.80	0.75	0.60	0.15
	0.00	0.15	0.00	0.15
	0.00	0.15	0.00	0.15
	0.00	0.15	0.00	0.15

Total TSS Removal = 85%

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

Project: MELR-0029
Prepared By: PMB
Date: December 30 2019

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

Pretreatment Chain 4 (Pond 4P) = 44%

- Deep Sump Catch Basin with Hood = 25%
- Sediment/Oil Separator = 25%

Treatment Chain 4 (Pond 4P) = 80%

- Infiltration Trench = 80%

Total TSS Removal = 85% (No Change)

TSS Removal Calculation Worksheet

Location: Pretreatment Chain 4 Pond 4P

B BMP[1]	C TSS Removal Rate[1]	D Starting TSS Load*	E Amount Removed (C*D)	F Remaining Load (D-E)
Deep Sump and Hooded Catch Basin	0.25	1.00	0.25	0.75
Oil Grit Separator	0.25	0.75	0.19	0.56
	0.00	0.56	0.00	0.56
	0.00	0.56	0.00	0.56
	0.00	0.56	0.00	0.56

Total TSS Removal = 44%

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

Project: MELR-0029
Prepared By: PMB
Date: December 30 2019

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

Location: Treatment Chain 4 Pond 4P

TSS Removal Calculation Worksheet

B BMP[1]	C TSS Removal Rate[1]	D Starting TSS Load*	E Amount Removed (C*D)	F Remaining Load (D-E)
Deep Sump and Hooded Catch Basin	0.25	1.00	0.25	0.75
Infiltration Trench	0.80	0.75	0.60	0.15
	0.00	0.15	0.00	0.15
	0.00	0.15	0.00	0.15
	0.00	0.15	0.00	0.15

Total TSS Removal = 85%

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

Project: MELR-0029
Prepared By: PMB
Date: December 30 2019

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

Phosphorus Load Reduction:

The Phosphorous Load Reduction calculation is limited to watershed boundaries tributary to stormwater management areas.

Stormwater Management Area 1P			
IA - Impervious Area Characteristics			
Subcatchment	Land Use	Area ft²	HSG
6S	HDR	343	A
7S	HDR	4464	A
8S	HDR	2450	A
9S	HDR	2465	A
10S	HDR	696	A
10S	HDR	2019	D
11S	HDR	2348	A
11S	HDR	1023	D
Total		15,808	

Stormwater Management Area 1P			
PA - Pervious Area Characteristics			
Subcatchment	Land Use	Area ft²	HSG
6S	HDR	14754	A
7S	HDR	11306	A
8S	HDR	3606	A
9S	HDR	1425	A
10S	HDR	794	A
10S	HDR	4726	D
11S	HDR	808	A
11S	HDR	858	D
Total		38,277	

BMP Volume = 1,040 ft^3 (provided below lowest hydraulic outlet device)
$BMP\ Volume_{(IA\text{-}in)1}$ = [(1,040 ft^3)(12 in/ft)]/(15,808 ft^2) = 0.79 in
Interpolated runoff depth for A Soils & D Soils for 0.79 inches of rain = 0.09 in (Table 3-3)

$BMP\ Volume_{(PA\text{-}ft^3)}$ = (38277 ft^2)(0.09 in)/(12 in/ft) = 287 ft^3
$BMP\ Volume_{(IA\text{-}ft^3)1}$ = (1040 ft^3 – 287 ft^3) = 753 ft^3
$BMP\ Volume_{(IA\text{-}in)2}$ = (753 ft^3)(12 in/ft)/(15808 ft^2) = 0.57 in
% Difference **= [**(0.79 in – 0.57 in)/(0.57 in)](100) = 38.6% > 5% ∴ Recalculate using 0.57 in

Interpolated runoff depth for A Soils & D Soils for 0.57 inches of rain = 0.06 in (Table 3-3)
$BMP\ Volume_{(PA\text{-}ft^3)}$ = (38277 ft^2)(0.06 in)/(12 in/ft) = 191 ft^3
$BMP\ Volume_{(IA\text{-}ft^3)2}$ = (1040 ft^3 – 191 ft^3) = 849 ft^3
$BMP\ Volume_{(IA\text{-}in)3}$ = (849 ft^3)(12 in/ft)/(15808 ft^2) = 0.64 in
% Difference **= [**(0.64 in – 0.57 in)/(0.64 in)](100) = 10.9% > 5% ∴ Recalculate using 0.64 in

Interpolated runoff depth for A Soils & D Soils for 0.64 inches of rain = 0.07 in (Table 3-3)
$BMP\ Volume_{(PA\text{-}ft^3)}$ = (38277 ft^2)(0.07 in)/(12 in/ft) = 223 ft^3

BMP Volume$_{(IA\text{-}ft^3)3}$ = (1040 ft^3 – 223 ft^3) = 817 ft^3
BMP Volume$_{(IA\text{-}in)4}$ = (817 ft^3)(12 in/ft)/(15808 ft^2) = 0.62 in
% Difference **= [**(0.64 in – 0.62 in)/(0.62 in)](100) = 3.2% < 5% ∴ OKAY

BMP Reduction$_{(\%\text{-}P)}$ = 94% (from Table 3-14, Appendix F of the MA MS4 General Permit)
BMP Load = [(15808 ft^2)/(43560 ft^2/acre)](2.32 lbs/acre/year) +
[(38277 ft^2)/(43560 ft^2/acre)](0.03 lbs/acre/year) = 0.87 lbs/year
BMP Reduction$_{(lbs\text{-}P)}$ = (0.87 lbs/year)(0.94) = 0.82 lbs/year

Stormwater Management Area 2P			
IA - Impervious Area Characteristics			
Subcatchment	Land Use	Area ft^2	HSG
12S	HDR	3280	D
17S	HDR	1931	D
Total		5211	

Stormwater Management Area 2P			
PA - Pervious Area Characteristics			
Subcatchment	Land Use	Area ft^2	HSG
12S	HDR	4277	D
17S	HDR	4981	D
Total		9258	

BMP Volume = 1,423 ft^3 (provided below lowest hydraulic outlet device)
BMP Volume$_{(IA\text{-}in)1}$ = [(1,423 ft^3)(12 in/ft)]/(5211 ft^2) = 3.28 in (See Table 3-3)
Given the calculated inches of runoff from the contributing impervious area is greater than 2″ it is assumed 100% phosphorus reduction is achieved.

Stormwater Management Area 3P			
IA - Impervious Area Characteristics			
Subcatchment	Land Use	Area ft^2	HSG
15S	HDR	1703	D
19S	HDR	3330	D
20S	HDR	2609	D
Total		7642	

Stormwater Management Area 3P			
PA - Pervious Area Characteristics			
Subcatchment	Land Use	Area ft^2	HSG
19S	HDR	5155	D
20S	HDR	3675	D
Total		8830	

BMP Volume = 1,926 ft^3 (volume below 12″ culvert)
BMP Volume$_{(IA\text{-}in)1}$ = [(1926 ft^3)(12 in/ft)]/(7642 ft^2) = 3.02 in
Given the calculated inches of runoff from the contributing impervious area is great than 2″ it is assumed 100% phosphorus reduction is achieved.

Stormwater Management Area 4P			
IA - Impervious Area Characteristics			
Subcatchment	Land Use	Area ft²	HSG
13S	HDR	4436	D
14S	HDR	6347	D
Total		10783	

Stormwater Management Area 4P			
PA - Pervious Area Characteristics			
Subcatchment	Land Use	Area ft²	HSG
13S	HDR	4287	D
14S	HDR	8332	A
Total		12619	

BMP Volume = 502 ft^3 (provided below lowest hydraulic outlet devices)
$BMP\ Volume_{(IA\text{-}in)1}$ = [(502 ft^3)(12 in/ft)]/(10783 ft^2) = 0.56 in
Interpolated runoff depth for D Soils for 0.56 inches of rain = 0.11 in (Table 3-3)

$BMP\ Volume_{(PA\text{-}ft^3)}$ = (12619 ft^2)(0.11 in)/(12 in/ft) = 116 ft^3
$BMP\ Volume_{(IA\text{-}ft^3)1}$ = (502 ft^3 – 116 ft^3) = 386 ft^3
$BMP\ Volume_{(IA\text{-}in)2}$ = (386 ft^3)(12 in/ft)/(10783 ft^2) = 0.43 in
% Difference **= [**(0.58 in – 0.43 in)/(0.43 in)](100) = 34.8% > 5% ∴ Recalculate using 0.43 in

Interpolated runoff depth for D Soils for 0.43 inches of rain = 0.075 in (Table 3-3)
$BMP\ Volume_{(PA\text{-}ft^3)}$ = (12619 ft^2)(0.075 in)/(12 in/ft) = 79 ft^3
$BMP\ Volume_{(IA\text{-}ft^3)2}$ = (502 ft^3 – 79 ft^3) = 423 ft^3
$BMP\ Volume_{(IA\text{-}in)3}$ = (423 ft^3)(12 in/ft)/(10783 ft^2) = 0.47 in
% Difference **= [**(0.47 in – 0.45 in)/(0.47 in)](100) = 4.2% < 5% ∴ Okay

$BMP\ Reduction_{(\%\text{-}P)}$ = 79% (from Table 3-14, Appendix F of the MA MS4 General Permit)
BMP Load = [(10783 ft^2)/(43560 ft^2/acre)](2.32 lbs/acre/year) +
[(12619 ft^2)/(43560 ft^2/acre)](0.03 lbs/acre/year) = 0.58 lbs/year
$BMP\ Reduction_{(lbs\text{-}P)}$ = (0.58 lbs/year)(0.79) = 0.46 lbs/year

5.0 Standard 5 | Land Uses with Higher Potential Pollutant Loading

This project is not considered a LUHPPL.

6.0 Standard 6 | Critical Areas

The project site is not a LUHPPL or within a Zone II or Interim Wellhead Protection Area. Infiltration basins and a subsurface infiltration structure are the specific structural stormwater best management practices selected to manage discharge.

7.0 Standard 7 |Redevelopment

This project is not considered a redevelopment.

8.0 Standard 8 | Construction Period Controls

Refer to Section 6 Construction Period Pollution Prevention Plan and Erosion & Sedimentation Control.

9.0 Standard 9 | Long Term Operation And Maintenance Plan

Refer to Section 4 Long Term Operation and Maintenance Plan.

10.0 Standard 10 |Illicit Discharges To Drainage System

There are no proposed illicit discharges into the Stormwater Management Systems to be constructed as shown on the site plan.

Hillside Park - Pipe Capacity Analysis

HY-8 Analysis Results

Culvert Summary Table - Culvert to Trench (4P)

Culvert Crossing: Crossing 1

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth(ft)	Outlet Control Depth(ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)	
1.19	1.19	135.24	0.66	0.0*	1-S2n	0.27	0.46	0.28	124.25	6.26	0.00	2 Year Storm
1.38	1.38	135.30	0.72	0.0*	1-S2n	0.30	0.50	0.31	124.25	6.50	0.00	
1.56	1.56	135.36	0.78	0.0*	1-S2n	0.32	0.53	0.33	124.25	6.75	0.00	
1.74	1.74	135.42	0.84	0.0*	1-S2n	0.34	0.56	0.35	124.25	6.94	0.00	
1.93	1.93	135.47	0.89	0.0*	1-S2n	0.35	0.59	0.37	124.25	7.11	0.00	
1.95	1.95	135.48	0.90	0.0*	1-S2n	0.36	0.59	0.37	124.25	7.14	0.00	10 Year Storm
2.30	2.30	135.58	1.00	0.0*	5-S2n	0.39	0.65	0.41	124.25	7.46	0.00	
2.48	2.48	135.64	1.06	0.0*	5-S2n	0.41	0.67	0.42	124.25	7.60	0.00	
2.67	2.67	135.70	1.12	0.0*	5-S2n	0.42	0.70	0.44	124.25	7.74	0.00	
2.86	2.86	135.77	1.19	0.0*	5-S2n	0.44	0.72	0.46	124.25	7.88	0.00	
3.04	3.04	135.84	1.26	0.0*	5-S2n	0.45	0.74	0.47	124.25	8.01	0.00	100 Year Storm

For 100 Year Storm the Q=3.04 cfs from Sediment/Oil Separator 4 to the drop DMH 7 before reaching the Infiltration Trench (4P)

The calculated headwater elevation = 135.84 ft

Center Rim of SOS4 = 137.95 > 135.84; Therefore no over topping

Rims of Double Grate CB's 10 & 11 = 137.53 > 135.84; Therefore no over topping

Conclusion: The 12" HDPE from SOS4 to DMH 7 has adequate capacity for the design flow up to and including the 100-year storm event with the pipe acting under inlet control and normal flow profile with no surcharging of the manholes or catch basin grates

Hillside Park - Pipe Capacity Analysis

HY-8 Analysis Results

Culvert Summary Table - Culvert to Pond 3P

Culvert Crossing: Crossing 2

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth(ft)	Outlet Control Depth(ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)	
0.83	0.83	124.75	0.53	0.13	1-JS1t	0.33	0.38	0.68	0.68	1.42	0.00	2 Year Storm
0.96	0.96	124.80	0.58	0.15	1-JS1t	0.36	0.41	0.68	0.68	1.64	0.00	
1.09	1.09	124.85	0.63	0.17	1-JS1t	0.38	0.44	0.68	0.68	1.86	0.00	
1.22	1.22	124.90	0.68	0.20	1-JS1t	0.41	0.47	0.68	0.68	2.08	0.00	
1.35	1.35	124.94	0.72	0.23	1-JS1t	0.43	0.49	0.68	0.68	2.30	0.00	
1.36	1.36	124.94	0.72	0.23	1-JS1t	0.44	0.49	0.68	0.68	2.32	0.00	10 Year Storm
1.60	1.60	125.02	0.80	0.30	1-JS1t	0.48	0.54	0.68	0.68	2.74	0.00	
1.73	1.73	125.06	0.84	0.34	1-JS1t	0.50	0.56	0.68	0.68	2.96	0.00	
1.86	1.86	125.10	0.88	0.39	1-JS1t	0.52	0.58	0.68	0.68	3.18	0.00	
1.99	1.99	125.14	0.92	0.43	1-S2n	0.55	0.60	0.55	0.68	4.40	0.00	
2.12	2.12	125.18	0.96	0.48	1-S2n	0.57	0.62	0.57	0.68	4.47	0.00	100 Year Storm

For 100 Year Storm the Q=2.12 cfs from Sediment/Oil Separator 3 t the DMH inlet to subsurface infiltration structure Pond 3P

We assumed a worse-case scenario in that when the elevation of the water in the structure is at its highest, the flow in the pipe will be at the maximum flow rate. Therefore, we input the calculated water elevation = 124.28 into the model as the Tailwater and ran the analysis.

The calculated headwater elevation = 125.18 ft

Center Rim of SOS3 = 127.92 ft > 125.18 ; Therefore no over topping

Rims of Double Grate CB's 8 & 9 = 127.99 > 125.18; Therefore no over topping

Conclusion: The 12" HDPE from SOS3 to the DMH Inlet to Pond 3P has adequate capacity for the design flow up to and including the 100-year storm evenet with the pipe acting under inlet control and normal flow profile with no surcharging of the manholes or catch basin grates.

Hillside Park - Pipe Capacity Analysis

HY-8 Analysis Results

Culvert Summary Table - Culvert to Pond 2P

Culvert Crossing: Crossing 3

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth(ft)	Outlet Control Depth(ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)	
0.68	0.68	115.52	0.40	0.0*	1-S2n	0.12	0.34	0.16	-5.80	8.62	0.00	2 Year Storm
0.79	0.79	115.56	0.44	0.00	1-S2n	0.13	0.37	0.17	-5.80	8.89	0.00	
0.91	0.91	115.59	0.47	0.01	1-S2n	0.14	0.40	0.19	-5.80	8.87	0.00	
1.02	1.02	115.63	0.51	0.02	1-S2n	0.15	0.42	0.20	-5.80	9.08	0.00	
1.14	1.14	115.67	0.55	0.03	1-S2n	0.15	0.45	0.21	-5.80	9.07	0.00	
1.15	1.15	115.67	0.55	0.03	1-S2n	0.15	0.45	0.21	-5.80	9.09	0.00	10 Year Storm
1.36	1.36	115.75	0.63	0.05	1-S2n	0.17	0.49	0.24	-5.80	9.22	0.00	
1.48	1.48	115.78	0.66	0.07	1-S2n	0.17	0.51	0.25	-5.80	9.36	0.00	
1.59	1.59	115.82	0.70	0.08	1-S2n	0.18	0.53	0.26	-5.80	9.38	0.00	
1.71	1.71	115.85	0.73	0.09	1-S2n	0.19	0.55	0.27	-5.80	9.48	0.00	
→ 1.82	1.82	115.89	0.77	0.11	1-S2n	0.19	0.57	0.29	-5.80	9.49	0.00	100 Year Storm

For 100 Year Storm Q=1.82 cfs from SOS 2 to drop DMH 8 and into subsurface infiltration structure Pond 2P.

The calculated headwater elevation for 12" HDPE from SOS2 into DMH = 115.89 feet

Center Rim of SOS 2 = 117.96 > 115.89; Therefore no over topping

Rims of Double grate CB's 6 & 7 = 118.07 > 115.89; Therefore no over topping

Because there is a 5' drop in the manhole the 100 year water level in Pond 2P will not have any tail water effect on the flow coming into DMH 8 from SOS 2.

Conclusion: The 12" HDPE from SOS2 to DMH 8 and into Pond 2P has adequate capacity for the design flow up to and including the 100-year storm event with the pipe acting under inlet control and normal profile with no surcharging of the manholes and catch basin grates.

Hillside Park - Pipe Capacity Analysis

HY-8 Analysis Results

Culvert Summary Table - Culvert to Pond 1P

Culvert Crossing: Crossing 4

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth(ft)	Outlet Control Depth(ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)	
0.76	0.76	83.71	0.50	0.18	1-S2n	0.26	0.36	0.28	-0.15	4.16	0.00	2 Year Storm
1.09	1.09	83.84	0.63	0.28	1-S2n	0.31	0.44	0.34	-0.15	4.49	0.00	
1.42	1.42	83.95	0.74	0.39	1-S2n	0.36	0.50	0.39	-0.15	4.78	0.00	
1.75	1.75	84.05	0.84	0.49	1-S2n	0.41	0.56	0.44	-0.15	5.02	0.00	
1.96	1.96	84.12	0.91	0.56	1-S2n	0.43	0.59	0.47	-0.15	5.17	0.00	10 Year Storm
2.41	2.41	84.25	1.04	0.72	5-S2n	0.49	0.66	0.54	-0.15	5.44	0.00	
2.73	2.73	84.36	1.15	0.85	5-S2n	0.53	0.71	0.58	-0.15	5.62	0.00	
3.06	3.06	84.48	1.27	0.98	5-S2n	0.56	0.75	0.62	-0.15	5.80	0.00	
3.39	3.39	84.61	1.40	1.22	5-S2n	0.60	0.78	0.66	-0.15	5.96	0.00	
3.72	3.72	84.76	1.55	1.35	5-S2n	0.64	0.82	0.70	-0.15	6.13	0.00	
4.05	4.05	84.92	1.71	1.48	5-S2n	0.68	0.85	0.74	-0.15	6.30	0.00	100 Year Storm

For 100 Year Storm the Q=4.05 from DMH 3 through SOS1 and into subsurface infiltration Pond 1P

We assumed a worse-case scenario in that when the elevation of the water in the structure is at its highest, the flow in the pipe will be at the maximum flow rate. Therefore, we input the calculated water elevation = 82.85 into the model as the Tailwater and ran the analysis.

The calculated headwater elevation = 84.92

Rims of SOS1 = 87.0 > 84.92; Therefore no over topping

Rim of DMH 3 = 87.24 > 84.92; Therefore no over topping

Rims of Double Grate CB's 1 & 2 = 85.78 > 84.92; Therefore no over topping

Conclusion: The 12" HDPE from DMH 3 to SOS1 and Pond 1P has adequate capacity for the design flow up to and including the 100-year storm event with the pipe acting under inlet control and normal profile with no surcharging of the manholes or catch basin grates.

Hillside Park - Pipe Capacity Analysis

HY-8 Analysis Results

Culvert Summary Table - Culvert from DMH 1 to headwall

Culvert Crossing: Crossing 5

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth(ft)	Outlet Control Depth(ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
0.06	0.06	80.43	8.23~	0.18	7-M2c	0.08	0.06	0.06	-0.10	3.38	0.00
0.17	0.17	72.43	0.23	0.0*	1-S2n	0.13	0.16	0.14	-0.10	2.60	0.00
0.27	0.27	72.49	0.29	0.11	1-S2n	0.17	0.21	0.18	-0.10	2.96	0.00
0.32	0.32	72.52	0.32	0.13	1-S2n	0.18	0.23	0.19	-0.10	3.03	0.00
0.49	0.49	72.60	0.40	0.20	1-S2n	0.22	0.28	0.24	-0.10	3.34	0.00
0.59	0.59	72.64	0.44	0.23	1-S2n	0.25	0.32	0.26	-0.10	3.50	0.00
0.70	0.70	72.68	0.48	0.27	1-S2n	0.27	0.34	0.29	-0.10	3.64	0.00
0.81	0.81	72.72	0.52	0.30	1-S2n	0.29	0.37	0.31	-0.10	3.76	0.00
0.92	0.92	72.76	0.56	0.34	1-S2n	0.31	0.40	0.33	-0.10	3.87	0.00
1.02	1.02	72.81	0.61	0.37	1-S2n	0.33	0.42	0.35	-0.10	3.99	0.00
1.13	1.13	72.84	0.64	0.40	1-S2n	0.34	0.45	0.37	-0.10	4.09	0.00

For 100 Year Storm Q=1.13 cfs from DMH 1 to the proposed headwall on the south side of Maple Terrace which then discharges to an existing channel flowing to the south west.

While there will be a headwater at the upstream end of the existing 12" corrugated metal pipe (which is to be replaced with a Class V 12" Reinforced Concrete Pipe) elevation = 74.60 The calculated headwater elevation of the proposed 12" HDPE will not be affected by it as they are not connected. The calculated headwater in DMH 1= 72.84 feet.

Rim of DMH 1 = 74.87 > 72.84; Therefore no over topping

Rim of DMH 2 = 75.1 > 72.84; Therefore no over topping

Rim of DGCB 12 = 76 +/- > 72.84; Therefore no over topping

Rim of DGCB 13 = 74.1 > 72.84; Therefore no over topping

Rim of Outlet Control Structure 1 = 84.5 > 72.84; Therefore no over topping

Hydraulic Analysis Report

Project Data

Project Title: Hillside Park
Designer: PMB
Project Date: Tuesday, March 10, 2020
Project Units: U.S. Customary Units
Notes:

Curb and Gutter Analysis: cb1

Notes:

Gutter Input Parameters

Longitudinal Slope of Road: 0.1200 ft/ft
Cross-Slope of Pavement: 0.0210 ft/ft
Depressed Gutter Geometry
Cross-Slope of Gutter: 0.0250 ft/ft
Manning's n: 0.0150
Gutter Width: 2.0000 ft
Design Flow: 0.9000 cfs

Gutter Result Parameters

Width of Spread: 3.9766 ft
Gutter Depression: 0.0960 in
Area of Flow: 0.1740 ft^2
Eo (Gutter Flow to Total Flow): 0.8590
Gutter Depth at Curb: 1.0981 in

Inlet Input Parameters

Inlet Location: Inlet on Grade
Inlet Type: Grate
Grate Type: Curved vane
Grate Width: 2.0000 ft
Grate Length: 4.0000 ft
Local Depression: 0.0000 in

Inlet Result Parameters

Intercepted Flow: 0.7921 cfs
Bypass Flow: 0.1079 cfs
Approach Velocity: 5.1713 ft/s

Splash-over Velocity: 8.9472 ft/s

Efficiency: 0.8802

Hydraulic Analysis Report

Project Data

Project Title: Hillside Park

Designer: PMB

Project Date: Tuesday, March 10, 2020

Project Units: U.S. Customary Units

Notes:

Curb and Gutter Analysis: cb 2

Notes:

Gutter Input Parameters

Longitudinal Slope of Road: 0.1200 ft/ft

Cross-Slope of Pavement: 0.0210 ft/ft

Depressed Gutter Geometry

Cross-Slope of Gutter: 0.0250 ft/ft

Manning's n: 0.0150

Gutter Width: 2.0000 ft

Design Flow: 0.3600 cfs

Gutter Result Parameters

Width of Spread: 2.7314 ft

Gutter Depression: 0.0960 in

Area of Flow: 0.0863 ft^2

Eo (Gutter Flow to Total Flow): 0.9752

Gutter Depth at Curb: 0.7843 in

Inlet Input Parameters

Inlet Location: Inlet on Grade

Inlet Type: Grate

Grate Type: Curved vane

Grate Width: 2.0000 ft

Grate Length: 4.0000 ft

Local Depression: 0.0000 in

Inlet Result Parameters

Intercepted Flow: 0.3529 cfs

Bypass Flow: 0.0071 cfs

Approach Velocity: 4.1698 ft/s

Splash-over Velocity: 8.9472 ft/s

Efficiency: 0.9803

Hydraulic Analysis Report

Project Data

Project Title: Hillside Park

Designer: PMB

Project Date: Tuesday, March 10, 2020

Project Units: U.S. Customary Units

Curb and Gutter Analysis: cb 3

Notes:

Gutter Input Parameters

Longitudinal Slope of Road: 0.1200 ft/ft

Cross-Slope of Pavement: 0.0210 ft/ft

Depressed Gutter Geometry

Cross-Slope of Gutter: 0.0250 ft/ft

Manning's n: 0.0150

Gutter Width: 2.0000 ft

Design Flow: 1.2200 cfs

Gutter Result Parameters

Width of Spread: 4.4878 ft

Gutter Depression: 0.0960 in

Area of Flow: 0.2195 ft^2

Eo (Gutter Flow to Total Flow): 0.8079

Gutter Depth at Curb: 1.2269 in

Inlet Input Parameters

Inlet Location: Inlet on Grade

Inlet Type: Grate

Grate Type: Curved vane

Grate Width: 2.0000 ft

Grate Length: 2.0000 ft

Local Depression: 0.0000 in

Inlet Result Parameters

Intercepted Flow: 0.9928 cfs

Bypass Flow: 0.2272 cfs

Approach Velocity: 5.5588 ft/s

Splash-over Velocity: 5.9184 ft/s

Efficiency: 0.8137

Hydraulic Analysis Report

Project Data

Project Title: Hillside Park

Designer: PMB

Project Date: Tuesday, March 10, 2020

Project Units: U.S. Customary Units

Notes:

Curb and Gutter Analysis: cb 4

Notes:

Gutter Input Parameters

Longitudinal Slope of Road: 0.1200 ft/ft

Cross-Slope of Pavement: 0.0210 ft/ft

Depressed Gutter Geometry

Cross-Slope of Gutter: 0.0250 ft/ft

Manning's n: 0.0150

Gutter Width: 2.0000 ft

Design Flow: 0.9500 cfs

Gutter Result Parameters

Width of Spread: 4.0634 ft

Gutter Depression: 0.0960 in

Area of Flow: 0.1814 ft^2

Eo (Gutter Flow to Total Flow): 0.8502

Gutter Depth at Curb: 1.1200 in

Inlet Input Parameters

Inlet Location: Inlet on Grade

Inlet Type: Grate

Grate Type: Curved vane

Grate Width: 2.0000 ft

Grate Length: 4.0000 ft

Local Depression: 0.0000 in

Inlet Result Parameters

Intercepted Flow: 0.8286 cfs

Bypass Flow: 0.1214 cfs

Approach Velocity: 5.2379 ft/s

Splash-over Velocity: 8.9472 ft/s

Efficiency: 0.8722

Hydraulic Analysis Report

Project Data

Project Title: Hillside Park

Designer: PMB

Project Date: Tuesday, March 10, 2020

Project Units: U.S. Customary Units

Notes:

Curb and Gutter Analysis: cb 6

Notes:

Gutter Input Parameters

Longitudinal Slope of Road: 0.1200 ft/ft

Cross-Slope of Pavement: 0.0210 ft/ft

Depressed Gutter Geometry

Cross-Slope of Gutter: 0.0250 ft/ft

Manning's n: 0.0150

Gutter Width: 2.0000 ft

Design Flow: 0.9800 cfs

Gutter Result Parameters

Width of Spread: 4.1141 ft

Gutter Depression: 0.0960 in

Area of Flow: 0.1857 ft^2

Eo (Gutter Flow to Total Flow): 0.8451

Gutter Depth at Curb: 1.1328 in

Inlet Input Parameters

Inlet Location: Inlet on Grade

Inlet Type: Grate

Grate Type: Curved vane

Grate Width: 2.0000 ft

Grate Length: 4.0000 ft

Local Depression: 0.0000 in

Inlet Result Parameters

Intercepted Flow: 0.8502 cfs

Bypass Flow: 0.1298 cfs

Approach Velocity: 5.2767 ft/s

Splash-over Velocity: 8.9472 ft/s

Efficiency: 0.8676

Hydraulic Analysis Report

Project Data

Project Title: Hillside Park

Designer: PMB

Project Date: Tuesday, March 10, 2020

Project Units: U.S. Customary Units

Notes:

Curb and Gutter Analysis: cb 5

Notes:

Gutter Input Parameters

Longitudinal Slope of Road: 0.1200 ft/ft

Cross-Slope of Pavement: 0.0210 ft/ft

Depressed Gutter Geometry

Cross-Slope of Gutter: 0.0250 ft/ft

Manning's n: 0.0150

Gutter Width: 2.0000 ft

Design Flow: 0.6200 cfs

Gutter Result Parameters

Width of Spread: 3.4213 ft

Gutter Depression: 0.0960 in

Area of Flow: 0.1309 ft^2

Eo (Gutter Flow to Total Flow): 0.9151

Gutter Depth at Curb: 0.9582 in

Inlet Input Parameters

Inlet Location: Inlet in Sag

Percent Clogging: 0.0000 %

Inlet Type: Grate

Grate Type: P - 1-1/8

Grate Width: 2.0000 ft

Grate Length: 4.0000 ft

Local Depression: 0.0000 in

Inlet Result Parameters

Perimeter: 8.0000 ft

Effective Perimeter: 8.0000 ft

Area: 4.8000 ft^2

Effective Area: 4.8000 ft^2

Depth at center of grate: 0.0874 ft

Computed Width of Spread at Sag: 4.9709 ft

Flow type: Weir Flow

Efficiency: 1.0000

Hydraulic Analysis Report

Project Data

Project Title: Hillside Park
Designer: PMB
Project Date: Tuesday, March 10, 2020
Project Units: U.S. Customary Units
Notes:

Curb and Gutter Analysis: cb 7

Notes:

Gutter Input Parameters

Longitudinal Slope of Road: 0.1200 ft/ft
Cross-Slope of Pavement: 0.0210 ft/ft
Depressed Gutter Geometry
Cross-Slope of Gutter: 0.0250 ft/ft
Manning's n: 0.0150
Gutter Width: 2.0000 ft
Design Flow: 0.8500 cfs

Gutter Result Parameters

Width of Spread: 3.8866 ft
Gutter Depression: 0.0960 in
Area of Flow: 0.1666 ft^2
Eo (Gutter Flow to Total Flow): 0.8682
Gutter Depth at Curb: 1.0754 in

Inlet Input Parameters

Inlet Location: Inlet on Grade
Inlet Type: Grate
Grate Type: Curved vane
Grate Width: 2.0000 ft
Grate Length: 4.0000 ft
Local Depression: 0.0000 in

Inlet Result Parameters

Intercepted Flow: 0.7551 cfs
Bypass Flow: 0.0949 cfs
Approach Velocity: 5.1018 ft/s

Splash-over Velocity: 8.9472 ft/s

Efficiency: 0.8884

Hydraulic Analysis Report

Project Data

Project Title: Hillside Park

Designer: PMB

Project Date: Tuesday, March 10, 2020

Project Units: U.S. Customary Units

Notes:

Curb and Gutter Analysis: cb 8

Notes:

Gutter Input Parameters

Longitudinal Slope of Road: 0.1200 ft/ft

Cross-Slope of Pavement: 0.0210 ft/ft

Depressed Gutter Geometry

Cross-Slope of Gutter: 0.0250 ft/ft

Manning's n: 0.0150

Gutter Width: 2.0000 ft

Design Flow: 1.0800 cfs

Gutter Result Parameters

Width of Spread: 4.2762 ft

Gutter Depression: 0.0960 in

Area of Flow: 0.2000 ft^2

Eo (Gutter Flow to Total Flow): 0.8288

Gutter Depth at Curb: 1.1736 in

Inlet Input Parameters

Inlet Location: Inlet on Grade

Inlet Type: Grate

Grate Type: Curved vane

Grate Width: 2.0000 ft

Grate Length: 4.0000 ft

Local Depression: 0.0000 in

Inlet Result Parameters

Intercepted Flow: 0.9210 cfs

Bypass Flow: 0.1590 cfs

Approach Velocity: 5.3998 ft/s

Splash-over Velocity: 8.9472 ft/s

Efficiency: 0.8528

Hydraulic Analysis Report

Project Data

Project Title: Hillside Park

Designer: PMB

Project Date: Tuesday, March 10, 2020

Project Units: U.S. Customary Units

Notes:

Curb and Gutter Analysis: cb 9

Notes:

Gutter Input Parameters

Longitudinal Slope of Road: 0.0120 ft/ft

Cross-Slope of Pavement: 0.0210 ft/ft

Depressed Gutter Geometry

Cross-Slope of Gutter: 0.0250 ft/ft

Manning's n: 0.0150

Gutter Width: 2.0000 ft

Design Flow: 0.8000 cfs

Gutter Result Parameters

Width of Spread: 5.9674 ft

Gutter Depression: 0.0960 in

Area of Flow: 0.3819 ft^2

Eo (Gutter Flow to Total Flow): 0.6781

Gutter Depth at Curb: 1.5998 in

Inlet Input Parameters

Inlet Location: Inlet on Grade

Inlet Type: Grate

Grate Type: Curved vane

Grate Width: 2.0000 ft

Grate Length: 4.0000 ft

Local Depression: 0.0000 in

Inlet Result Parameters

Intercepted Flow: 0.6643 cfs

Bypass Flow: 0.1357 cfs

Approach Velocity: 2.0948 ft/s

Splash-over Velocity: 8.9472 ft/s

Efficiency: 0.8303

Hydraulic Analysis Report

Project Data

Project Title: Hillside Park

Designer: DMB

Project Date: Tuesday, March 10, 2020

Project Units: U.S. Customary Units

Notes:

Curb and Gutter Analysis: cb 10

Notes:

Gutter Input Parameters

Longitudinal Slope of Road: 0.0680 ft/ft

Cross-Slope of Pavement: 0.0210 ft/ft

Depressed Gutter Geometry

Cross-Slope of Gutter: 0.0250 ft/ft

Manning's n: 0.0150

Gutter Width: 2.0000 ft

Design Flow: 1.1400 cfs

Gutter Result Parameters

Width of Spread: 4.8864 ft

Gutter Depression: 0.0960 in

Area of Flow: 0.2587 ft^2

Eo (Gutter Flow to Total Flow): 0.7699

Gutter Depth at Curb: 1.3274 in

Inlet Input Parameters

Inlet Location: Inlet on Grade

Inlet Type: Grate

Grate Type: P - 1-7/8

Grate Width: 2.0000 ft

Grate Length: 4.0000 ft

Local Depression: 0.0000 in

Inlet Result Parameters

Intercepted Flow: 0.9276 cfs

Bypass Flow: 0.2124 cfs

Approach Velocity: 4.4065 ft/s

Splash-over Velocity: 11.5138 ft/s

Efficiency: 0.8137

Hydraulic Analysis Report

Project Data

Project Title: Hillside Park

Designer: PMB

Project Date: Tuesday, March 10, 2020

Project Units: U.S. Customary Units

Notes:

Curb and Gutter Analysis: cb 11

Notes:

Gutter Input Parameters

Longitudinal Slope of Road: 0.0680 ft/ft

Cross-Slope of Pavement: 0.0210 ft/ft

Depressed Gutter Geometry

Cross-Slope of Gutter: 0.0250 ft/ft

Manning's n: 0.0150

Gutter Width: 2.0000 ft

Design Flow: 1.9000 cfs

Gutter Result Parameters

Width of Spread: 5.9621 ft

Gutter Depression: 0.0960 in

Area of Flow: 0.3812 ft^2

Eo (Gutter Flow to Total Flow): 0.6786

Gutter Depth at Curb: 1.5984 in

Inlet Input Parameters

Inlet Location: Inlet on Grade

Inlet Type: Grate

Grate Type: Curved vane

Grate Width: 2.0000 ft

Grate Length: 4.0000 ft

Local Depression: 0.0000 in

Inlet Result Parameters

Intercepted Flow: 1.3861 cfs

Bypass Flow: 0.5139 cfs

Approach Velocity: 4.9838 ft/s

Splash-over Velocity: 8.9472 ft/s

Efficiency: 0.7295

3 | MassDEP Stormwater Checklist

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

Checklist for Stormwater Report

A. Introduction

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

The Stormwater Report must include:

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

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

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

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

[1] The Stormwater Report may also include the Illicit Discharge Compliance Statement required by Standard 10. If not included in the Stormwater Report, the Illicit Discharge Compliance Statement must be submitted prior to the discharge of stormwater runoff to the post-construction best management practices.

[2] For some complex projects, it may not be possible to include the Construction Period Erosion and Sedimentation Control Plan in the Stormwater Report. In that event, the issuing authority has the discretion to issue an Order of Conditions that approves the project and includes a condition requiring the proponent to submit the Construction Period Erosion and Sedimentation Control Plan before commencing any land disturbance activity on the site.

B. Stormwater Checklist and Certification

The following checklist is intended to serve as a guide for applicants as to the elements that ordinarily need to be addressed in a complete Stormwater Report. The checklist is also intended to provide conservation commissions and other reviewing authorities with a summary of the components necessary for a comprehensive Stormwater Report that addresses the ten Stormwater Standards.

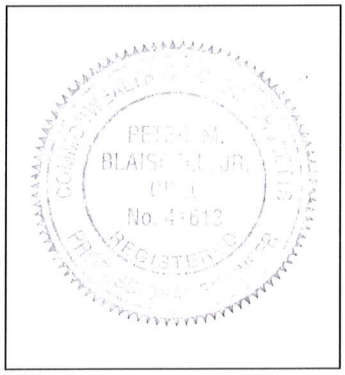
Note: Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that the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

A complete checklist must include the Certification set forth below signed by the Registered Professional Engineer who prepared the Stormwater Report.

Registered Professional Engineer's Certification

I have reviewed the Stormwater Report, including the soil evaluation, computations, Long-term Pollution Prevention Plan, the Construction Period Erosion and Sedimentation Control Plan (if included), the Long-term Post-Construction Operation and Maintenance Plan, the Illicit Discharge Compliance Statement (if included) and the plans showing the stormwater management system, and have determined that they have been prepared in accordance with the requirements of the Stormwater Management Standards as further elaborated by the Massachusetts Stormwater Handbook. I have also determined that the information presented in the Stormwater Checklist is accurate and that the information presented in the Stormwater Report accurately reflects conditions at the site as of the date of this permit application.

Registered Professional Engineer Block and Signature



Signature and Date 3/17/2020

Checklist

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

☒ New development

☐ Redevelopment

☐ Mix of New Development and Redevelopment

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

☐ No disturbance to any Wetland Resource Areas

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

☐ Reduced Impervious Area (Redevelopment Only)

☐ Minimizing disturbance to existing trees and shrubs

☐ LID Site Design Credit Requested:

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

☐ Use of "country drainage" versus curb and gutter conveyance and pipe

☐ Bioretention Cells (includes Rain Gardens)

☐ Constructed Stormwater Wetlands (includes Gravel Wetlands designs)

☐ Treebox Filter

☐ Water Quality Swale

☐ Grass Channel

☐ Green Roof

☒ Other (describe): (Reduced pavement width from 32' to 24'; Subsurface infiltration structures for roadway runoff, Infiltration Trench for roadway runoff, roof recharge systems)

Standard 1: No New Untreated Discharges

☒ No new untreated discharges

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

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

Standard 2: Peak Rate Attenuation

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

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

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

Standard 3: Recharge

☒ Soil Analysis provided.

☒ Required Recharge Volume calculation provided.

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

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

☒ Static ☐ Simple Dynamic ☐ Dynamic Field[1]

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

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

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

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

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

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

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

☐ The infiltration BMP is used to attenuate peak flows during storms greater than or equal to the 10-year 24-hour storm and separation to seasonal high groundwater is less than 4 feet and a mounding analysis is provided.

☐ Documentation is provided showing that infiltration BMPs do not adversely impact nearby wetland resource areas.

Standard 4: Water Quality

The Long-Term Pollution Prevention Plan typically includes the following:

- Good housekeeping practices;
- Provisions for storing materials and waste products inside or under cover;
- Vehicle washing controls;
- Requirements for routine inspections and maintenance of stormwater BMPs;
- Spill prevention and response plans;
- Provisions for maintenance of lawns, gardens, and other landscaped areas;
- Requirements for storage and use of fertilizers, herbicides, and pesticides;
- Pet waste management provisions;
- Provisions for operation and management of septic systems;
- Provisions for solid waste management;
- Snow disposal and plowing plans relative to Wetland Resource Areas;
- Winter Road Salt and/or Sand Use and Storage restrictions;
- Street sweeping schedules;
- Provisions for prevention of illicit discharges to the stormwater management system;
- Documentation that Stormwater BMPs are designed to provide for shutdown and containment in the event of a spill or discharges to or near critical areas or from LUHPPL;
- Training for staff or personnel involved with implementing Long-Term Pollution Prevention Plan;
- List of Emergency contacts for implementing Long-Term Pollution Prevention Plan.

☒ A Long-Term Pollution Prevention Plan is attached to Stormwater Report and is included as an attachment to the Wetlands Notice of Intent.

☐ Treatment BMPs subject to the 44% TSS removal pretreatment requirement and the one-inch rule for calculating the water quality volume are included, and discharge:

- ☐ is within the Zone II or Interim Wellhead Protection Area
- ☐ is near or to other critical areas
- ☐ is within soils with a rapid infiltration rate (greater than 2.4 inches per hour)
- ☐ involves runoff from land uses with higher potential pollutant loads.

☐ The Required Water Quality Volume is reduced through use of the LID site Design Credits.

☒ Calculations documenting that the treatment train meets the 80% TSS removal requirement and, if applicable, the 44% TSS removal pretreatment requirement, are provided.

☒ The BMP is sized (and calculations provided) based on:

- ☒ The ½" or 1" Water Quality Volume or
- ☐ The equivalent flow rate associated with the Water Quality Volume and documentation is provided showing that the BMP treats the required water quality volume.

☐ The applicant proposes to use proprietary BMPs, and documentation supporting use of proprietary BMP and proposed TSS removal rate is provided. This documentation may be in the form of the propriety BMP checklist found in Volume 2, Chapter 4 of the Massachusetts Stormwater Handbook and submitting copies of the TARP Report, STEP Report, and/or other third-party studies verifying performance of the proprietary BMPs.

☐ A TMDL exists that indicates a need to reduce pollutants other than TSS and documentation showing that the BMPs selected are consistent with the TMDL is provided.

Standard 5: Land Uses With Higher Potential Pollutant Loads (LUHPPLs) (Not Applicable)

☐ The NPDES Multi-Sector General Permit covers the land use and the Stormwater Pollution Prevention Plan (SWPPP) has been included with the Stormwater Report.

☐ The NPDES Multi-Sector General Permit covers the land use and the SWPPP will be submitted ***prior to*** the discharge of stormwater to the post-construction stormwater BMPs.

☐ The NPDES Multi-Sector General Permit does ***not*** cover the land use.

☐ LUHPPLs are located at the site and industry specific source control and pollution prevention measures have been proposed to reduce or eliminate the exposure of LUHPPLs to rain, snow, snow melt and runoff, and been included in the long-term Pollution Prevention Plan.

☐ All exposure has been eliminated.

☐ All exposure has ***not*** been eliminated and all BMPs selected are on MassDEP LUHPPL list.

☐ The LUHPPL has the potential to generate runoff with moderate to higher concentrations of oil and grease (e.g. all parking lots with >1000 vehicle trips per day) and the treatment train includes an oil grit separator, a filtering bioretention area, a sand filter or equivalent.

Standard 6: Critical Areas (Not Applicable)

☐ The discharge is near or to a critical area and the treatment train includes only BMPs that MassDEP has approved for stormwater discharges to or near that particular class of critical area.

☐ Critical areas and BMPs are identified in the Stormwater Report.

Standard 7: Redevelopments and Other Projects Subject to the Standards only to the maximum extent practicable (Not Applicable)

☐ The project is subject to the Stormwater Management Standards only to the maximum Extent Practicable as a:

- ☐ Limited Project
- ☐ Small Residential Projects: 5-9 single family houses or 5-9 units in a multi-family development provided there is no discharge that may potentially affect a critical area.
- ☐ Small Residential Projects: 2-4 single family houses or 2-4 units in a multi-family development with a discharge to a critical area
- ☐ Marina and/or boatyard provided the hull painting, service and maintenance areas are protected from exposure to rain, snow, snow melt and runoff
- ☐ Bike Path and/or Foot Path
- ☐ Redevelopment Project
- ☐ Redevelopment portion of mix of new and redevelopment.

☐ Certain standards are not fully met (Standard No. 1, 8, 9, and 10 must always be fully met) and an explanation of why these standards are not met is contained in the Stormwater Report.

☐ The project involves redevelopment and a description of all measures that have been taken to improve existing conditions is provided in the Stormwater Report. The redevelopment checklist found in Volume 2 Chapter 3 of the Massachusetts Stormwater Handbook may be used to document that the proposed stormwater management system (a) complies with Standards 2, 3 and the pretreatment and structural BMP requirements of Standards 4-6 to the maximum extent practicable and (b) improves existing conditions.

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

A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan must include the following information:

- Narrative;
- Construction Period Operation and Maintenance Plan;
- Names of Persons or Entity Responsible for Plan Compliance;
- Construction Period Pollution Prevention Measures;
- Erosion and Sedimentation Control Plan Drawings;
- Detail drawings and specifications for erosion control BMPs, including sizing calculations;
- Vegetation Planning;
- Site Development Plan;
- Construction Sequencing Plan;
- Sequencing of Erosion and Sedimentation Controls;
- Operation and Maintenance of Erosion and Sedimentation Controls;
- Inspection Schedule;
- Maintenance Schedule;
- Inspection and Maintenance Log Form.

☒ A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan containing the information set forth above has been included in the Stormwater Report.

☐ The project is highly complex and information is included in the Stormwater Report that explains why it is not possible to submit the Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan with the application. A Construction Period Pollution Prevention and Erosion and Sedimentation Control has ***not*** been included in the Stormwater Report but will be submitted ***before*** land disturbance begins.

☐ The project is ***not*** covered by a NPDES Construction General Permit.

☐ The project is covered by a NPDES Construction General Permit and a copy of the SWPPP is in the Stormwater Report.

☒ The project is covered by a NPDES Construction General Permit but no SWPPP been submitted. The SWPPP will be submitted BEFORE land disturbance begins.

Standard 9: Operation and Maintenance Plan

☒ The Post Construction Operation and Maintenance Plan is included in the Stormwater Report and includes the following information:

☒ Name of the stormwater management system owners;

☒ Party responsible for operation and maintenance;

☒ Schedule for implementation of routine and non-routine maintenance tasks;

☒ Plan showing the location of all stormwater BMPs maintenance access areas (See Subdivision Plan);

☐ Description and delineation of public safety features;

☐ Estimated operation and maintenance budget; and

☒ Operation and Maintenance Log Form.

☐ The responsible party is ***not*** the owner of the parcel where the BMP is located and the Stormwater Report includes the following submissions:

- ☐ A copy of the legal instrument (deed, homeowner's association, utility trust or other legal entity) that establishes the terms of and legal responsibility for the operation and maintenance of the project site stormwater BMPs;
- ☐ A plan and easement deed that allows site access for the legal entity to operate and maintain BMP functions.

Standard 10: Prohibition of Illicit Discharges

☐ The Long-Term Pollution Prevention Plan includes measures to prevent illicit discharges;

☒ An Illicit Discharge Compliance Statement is attached; (See section 7.0 of the Mitigative Drainage Analysis)

☐ NO Illicit Discharge Compliance Statement is attached but will be submitted ***prior to*** the discharge of any stormwater to post-construction BMPs.

Watershed & Soils Map
HILLSIDE PARK
MELROSE, MA

SCALE: 1" = 60' (0' 30' 60' 120')

DATE: DECEMBER 4, 2019
Revised: February 20, 2020
Revised: March 11, 2020

PROPOSED CONDITION

WILLIAMS & SPARAGES
ENGINEERS | PLANNERS | SURVEYORS
189 NORTH MAIN STREET
SUITE 101
MIDDLETON, MA 01949
PHONE: (978) 539-8088
FAX: (978) 539-8200
WSENGINEERS.COM

COMMONWEALTH OF MASSACHUSETTS
PETER M. BLAISDELL, JR.
CIVIL
No. 41613
REGISTERED PROFESSIONAL ENGINEER

(3/16/2020)

LEGEND OF SYMBOLS

PROPOSED WATERSHED BOUNDARY
EXISTING SOIL BOUNDARY
TIME OF CONCENTRATION FLOW PATH
HYDROLOGIC SOIL GROUP — HSG A
COMPARISON BOUNDARY DESIGNATION — 1L

N

LC CASE 3936

EX-CB1R
155,604 S.F.
CN=67
Tc=11.0 MIN.

EXCLUDED ROOF AREAS DIRECTLY INFILTRATED (TYP)

PR-CB10
8,723 S.F.
CN=89
Tc=6.0 MIN

PR-CB11
4,679 S.F.
CN=88
Tc=6.0 MIN

PR-CB8
8,485 S.F.
CN=87
Tc=6.0 MIN

PR-CB9
6,284 S.F.
CN=87
Tc=6.0 MIN

PR-CB6
7,557 S.F.
CN=87
Tc=6.0 MIN

PR-CB7
6,912 S.F.
CN=85
Tc=6.0 MIN

PR-CB4
6,435 S.F.
CN=82
Tc=6.0 MIN

EX-CB2R
58,216 S.F.
CN=61
Tc=6.0 MIN

PR-CB5
5,037 S.F.
CN=85
Tc=6.0 MIN

PR-STREAM-B
40,164 S.F.
CN=52
Tc=6.6 MIN

PR-MAPLE
16,539 S.F.
CN=58
Tc=6.0 MIN

PR-CB2
6,956 S.F.
CN=61
Tc=6.0 MIN

PR-CB1
19,903 S.F.
CN=56
Tc=6.0 MIN

PR-CB3
17,878 S.F.
CN=64
Tc=6.0 MIN

EX-CB3R2
19,461 S.F.
CN=42
Tc=6.0 MIN

EX-CB4R
1,354 S.F.
CN=83
Tc=6.0 MIN

PR-EAST
49,087 S.F.
CN=78
Tc=6.0 MIN

EX-WETLAND
61,136 S.F.
CN=77
Tc=47.4 MIN
(NO CHANGE)

EX-HILLSIDE
399,111 S.F.
CN=80
Tc=9.2 MIN
(NO CHANGE)

PR-ROOF
Lot 7
1,703 S.F.
CN=98
Tc=6.0 MIN

PR-STREAM-A
101,684 S.F.
CN=70
Tc=6.6 MIN

HILLSIDE PARK
(40' WIDE PRIVATE)

MILLER STREET

SWANS POND AVENUE

MAPLE TERRACE

MAP UNIT SYMBOL: 1
MAP UNIT NAME: WATER
HYDROLOGIC SOIL GROUP: N.R.

MAP UNIT SYMBOL: 631C
MAP UNIT NAME: CHARLTON-URBAN LAND-HOLLIS COMPLEX
3 TO 35 PERCENT SLOPES, ROCKY
HYDROLOGIC SOIL GROUP: A

MAP UNIT SYMBOL: 105E
MAP UNIT NAME: ROCK OUTCROP-HOLLIS COMPLEX
3 TO 35 PERCENT SLOPES
HYDROLOGIC SOIL GROUP: N.R. ASSUME D FOR ANALYSIS

MAP UNIT SYMBOL: 105E
MAP UNIT NAME: ROCK OUTCROP-HOLLIS COMPLEX
3 TO 35 PERCENT SLOPES
HYDROLOGIC SOIL GROUP: N.R. ASSUME D FOR ANALYSIS

MAP UNIT SYMBOL: 631C
MAP UNIT NAME: CHARLTON-URBAN LAND-HOLLIS COMPLEX
3 TO 35 PERCENT SLOPES, ROCKY
HYDROLOGIC SOIL GROUP: A

MAP UNIT SYMBOL: 626B
MAP UNIT NAME: MERRIMAC-URBAN LAND COMPLEX
0 TO 8 PERCENT SLOPES
HYDROLOGIC SOIL GROUP: A

MAP UNIT SYMBOL: 52A
MAP UNIT NAME: FRESTOWN MUCK
0 TO 1 PERCENT SLOPES
HYDROLOGIC SOIL GROUP: B/D

MAP UNIT SYMBOL: 104C
MAP UNIT NAME: HOLLIS-ROCK OUTCROP COMPLEX
0 TO 15 PERCENT SLOPES
HYDROLOGIC SOIL GROUP: D

INSET SCALE: 1" = 60'

APPROXIMATE BORDERING VEGETATED WETLANDS FROM GIS

BORDERING ETLANDS FROM GIS

EX-HILLSIDE
399,111 S.F.
CN=80
Tc=9.2 MIN

PR-3R
119,251 S.F.
CN=80
Tc=8.2 min

HILLSIDE PARK

MILLER STREET