

ENGINEER'S REPORT

for

Sawyer's Landing
Dodge Road & Sweet Home Road
Town of Amherst, Erie County, New York

Prepared for

Sawyer's Landing LLC

c/o Severyn Development
43 Central Ave Suite #300
Lancaster, NY 14086

Prepared by

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Buffalo, NY 14203

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February 2021

Revised 3/31/2026



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Section 1 - Location & Description

This project is a development of a 17.4-acre site located on the north side of Dodge Road, west of Sweet Home Road in the Town of Amherst. Both Dodge Road and Sweet Home Road are Erie County roads. Proposed is the construction of one (1) 4-story apartment building with 127 units, one (1) 4-story self-storage building and (87) 2-story townhomes. A bike trail will be constructed on site; this trail will connect to the existing Town of Amherst bike trail on the south side of Dodge Road. The approximately 1-acre westerly portion will remain undisturbed and be deed restricted as permanent open space. The site is currently undeveloped consisting of woods and mixed vegetation. NYSDEC and Federal wetlands were delineated on site by Earth Dimensions, Inc. Approximately 6.1 acres of Federal and 1.2 acres of NYSDEC wetlands have been permitted to be impacted. The proposed site development area to be disturbed for this project is approximately 16.4 acres.

Section 2 - Water Service

A new 8" D.I. combined service will be tapped off the existing 24" D.I.P. ECWA water main along the north side of Dodge Road at the northern portion of the project site. Following the tap, the 8" D.I. service will continue north into the site where it will enter into a Hot-Box enclosure. Within the Hot-Box enclosure an 8" meter (by ECWA) and an 8" Watts 957 RPZ will be installed. Similarly, a second 8" D.I. combined service will be tapped off the existing 24" ECWA main at the southern portion of the site along Dodge Road. As with the first installation, following the tap, the 8" D.I. service will continue northeast into the site where it will enter a hotbox with the same 8" meter (by ECWA) and 8" Watts 957 RPZ. The services will exit the Hot-Box enclosures and then transition into 8" AWWA C-900 PVC. The services will run throughout the site to provide both domestic and fire service to the proposed buildings. Heat & light for testing will be provided in the areas of the meters & RPZs to prevent freezing. Drainage due to testing or failure will be to the exterior through a drain, drainage will be away from the enclosures. The owner will be responsible for keeping the drainage ports clear of snow and debris. A total of 5 (five) proposed fire hydrants shall be installed around the site to provide fire protection coverage. There are no existing water services to this site, and therefore none to be killed/abandoned per ECWA requirements.

Domestic Summary:

Peak Operating Demand:	127.86 gpm
Water Main:	24" on Dodge Road
Static Pressure:	105 psi (per ECWA, 98 psi residual)
Friction Loss:	0.0 psi
Loss through meter/RPZ:	13.0 psi
Elevation Loss:	0.0 psi
Pressure after RPZ & Meter:	92 psi
Pressure at 4 th floor:	76.8 psi

Repairs to all devices will be made during off hours, dual backflow preventers are not required. The site is not located in a 100-year flood plain. Disinfection of the water

on the north side of Dodge Road. This pipe flows to the Erie County system on Sweet Home Road. The portion that flows east flows to the offsite wetlands.

Currently Dodge Road does not have a drainage system. A series of catch basins and pipes will be installed in the green area on the north side of Dodge Road to collect the road drainage. The west portion of this system will connect to the existing closed drainage system on Sweet Home Road. The east portion will be discharged to the Ellicott Creek diversion channel using an existing discharge point. This new system will also convey the proposed discharge from the site as described below.

The proposed onsite storm sewer system consists of smooth interior and perforated HDPE pipes connected by a series of catch basins, manholes and yard drains. The site is split into a storm water management area on the east and west sides.

West Side

The west side of the site has a bioretention area which portions of the westerly area will discharge to. This bioretention area along with the remainder of the west portion of the site will be discharged to the underground detention area. Note that the yard drains installed along the north property line discharge to the underground detention area. An outlet structure in the SW portion of this area will control runoff to at or below existing runoff flow rates. The discharge from the outlet control structure will be discharged to the new system on Dodge Road which flows to the Sweet Home Road system.

East Side

The east side of the site has a bioretention area and wet detention pond which this portion of the site discharges to. The NE portion of the site discharges to a forebay which spills into the main micropool portion of the wet detention basin. The SE portion of the site discharges to the bioretention area which also spills into the main micropool portion of the site. An outlet control structure is in the SE portion of the micropool and controls the discharge from this storm water management area. Spillways are also located on the east side of the micropool which will discharge the existing wetlands to the east and not cut off all flow from the site into this area. The discharge from the outlet control structure will be discharged to the new system on Dodge Road which flows to the Ellicott Creek diversion channel.

The bioretention areas and wet detention pond for the project area are sized to provide 100% of the required Runoff Reduction Volume (RRv) and Water Quality Volume (WQv) treatment for the overall site in accordance with Chapter 4 of the NYSDEC Stormwater design manual. The soils in the vicinity of the bioretention areas are mainly USDA hydrologic group 'D' and therefore the system will be installed with underdrains per NYSDEC requirements. The bioretention areas will consist of 6" and 8" perforated HDPE underdrains in 12" of drainage gravel, followed by filter fabric and 2.5' minimum of planting soil. Overflow yard drains will be installed to allow 6" maximum temporary ponding for RRv treatment. The east bioretention area (area #1) spills into the wet detention pond and the underdrain pipe ties together with the pond discharge and flows to Dodge Road. The east bioretention areas (area #2) has a catch basin to act as the

spillway. This catch basin and the underdrain pipes discharge to the underground detention area.

Storm Sewer Summary Tables

WATER QUALITY SUMMARY:

WQ_v REQUIRED = 32,891 CF (0.755 AC-FT)
 MIN RR_v REQUIRED = 6,273 CF (0.144 AC-FT)

RR_v PROVIDED WITH BIORETENTION = 5,919 CF + 8,734 CF = 14,653 CF
 WQ_v PROVIDED IN SMA #1 = 152,678 CF

TOTAL WQ_v PROVIDED = 14,653 CF + 152,678 CF = 167,331 CF

STORM WATER MANAGEMENT AREA #1 SUMMARY:

FOREBAY #1

TOP OF BASIN EL. = 576.80
 PERMANENT WATER EL. = 575.00
 AQUATIC BENCH EL. = 574.50
 BOTTOM OF BASIN EL. = 569.00

MICROPOOL

TOP OF BASIN EL. = 576.80
 PERMANENT WATER EL. = 575.00
 AQUATIC BENCH EL. = 574.50
 BOTTOM OF BASIN EL. = 563.00

BIORETENTION AREA SUMMARY

AREA	RIM ELEV.	BOTTOM ELEV.	AREA
#1	576.50 576.00		9,925 SF
#2	575.50 575.00		8,798 SF
TOTAL PROVIDED = 18,723 SF			

EAST OUTLET TO ELLICOTT CREEK DIVERSION CHANNEL SUMMARY:

STORM EVENT	PRIMARY DISCHARGE *	SPILLWAY DISCHARGE **	SMA #1 ELEVATION
1 YR	3.24 CFS	0 CFS	575.24
2 YR	3.32 CFS	0 CFS	575.34
5 YR	3.49 CFS	0 CFS	575.49
10 YR	3.65 CFS	0 CFS	575.65
25 YR	3.84 CFS	0 CFS	575.90
50 YR	3.96 CFS	0.13 CFS	576.13
100 YR	4.08 CFS	5.58 CFS	576.25

* PRIMARY DISCHARGE IS TO DODGE ROAD FROM THE BASIN AND THE BIORETENTION AREA #1

** SPILLWAY DISCHARGE IS TO THE WETLANDS TO THE EAST

WEST OUTLET TO SWEET HOME ROAD SUMMARY:

STORM EVENT	PROPOSED DISCHARGE	SMA #2 ELEVATION
1 YR	0.45 CFS	570.36
2 YR	0.89 CFS	570.59
5 YR	1.25 CFS	571.08
10 YR	1.53 CFS	571.58
25 YR	3.24 CFS	572.20
50 YR	4.02 CFS	572.26
100 YR	4.55 CFS	572.67

STORMWATER MANAGEMENT AREA #2 SUMMARY:

UNDERGROUND DETENTION:

(286) ADS STORMTECH SC-740 CHAMBERS

TOP OF STONE ELEV. = 573.00

TOP OF CHAMBER ELEV. = 572.50

BOTTOM OF CHAMBER ELEV. = 570.00

BOTTOM OF STONE ELEV. = 569.50

TOTAL STORAGE = 22,086 CF

Appendix A

Sanitary Sewer and Water Demand Calculations

CARMINA WOOD MORRIS, D.P.C.

487 MAIN STREET, SUITE 500

BUFFALO, NEW YORK, 14203

(716) 842-3165

FAX (716) 842-0263

Project No.: 24-4034

Date: Rev. 3/23/2026

Project Name: Sawyer's Landing

Project Address: Sweet Home Road and Dodge Road - Amherst, NY

Subject: Sanitary Sewer Demand Calcs

Sheet: 1 of 1

Sanitary Sewage Demand Calculations:Self-Storage Building

15 gal/d/employee x 5 employees = 75 gpd *use 15 gallons per employee (Self-Storage)

Apartment Building

110 gal/d/unit x 6 units = 660 gpd *use 110 gallons per day per 1-bedroom unit

220 gal/d/unit x 121 units = 26,620 gpd *use 220 gallons per day per 2-bedroom unit

Townhomes

220 gal/d/unit x 63 units = 13,860 gpd *use 220 gallons per day per 2-bedroom unit

220 gal/d/unit x 24 units = 5,280 gpd *use 220 gallons per day per 2-bedroom unit

Total Site Sanitary Demand: = 46,495 gpd

= 0.046 MGD

Find Peak Sanitary Demand: = 0.072 cfsPeaking Factor based on Population:

Total demand: 46,495 gpd / 100 gpcd = 465 per capita

Population (P) = 465 people

Peaking Factor: $(18 + \sqrt{P}) / (4 + \sqrt{P})$ where P is in thousands

Peaking Factor = 3.99

Peak Sanitary Demand = 46,495 x 3.99 = 185,527 gpd

= 0.186 MGD

= 0.287 cfs

Required Infiltration and Inflow Mitigation:

Peak Sanitary Flow = 185,527 gpd = 128.84 gpm

4:1 offset flow per NYSDEC requirements = 128.8 x 4 = 515.35 gpm req'd

Mitigation Credit = \$250 /gpm

Mitigation Agreement Amount = \$128,838.18

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Project No.: 24-4034 Date: Rev. 3/23/2026
 Project Name: Sawyer's Landing
 Project Address: Sweet Home Road and Dodge Road - Amherst, NY
 Subject: Sanitary Sewer & Water Demand Calcs
 Sheet: 2 of 2

Water Demand Calculations (domestic):

Proposed Site:

$$Q = 46,495 \text{ gpd} \times 1.1 = 51,145 \text{ gpd} \quad \text{*use 110\% of sewage demand}$$

*use 1.8 peaking factor and assume a 12 hour day

$$51,145 \text{ gpd} \times 1 \text{ day}/12 \text{ hr} \times 1 \text{ hr}/60 \text{ min} = 71.03 \text{ gpm}$$

$$71.03 \text{ gpm} \times 1.8 = 127.86 \text{ gpm} \quad Q_{\text{peak}}$$

Headlosses:

$$Q_{\text{peak}} = 127.86 \text{ gpm}$$

$$\text{Pipe} = 8 \text{ inch Ductile Iron} \quad C = 140$$

$$\text{Length} = 33 \text{ LF (approx. distance from tap to RPZ)}$$

$$H_L = \frac{10.44 L Q^{1.85}}{C^{1.85} D^{4.866}} = \frac{10.44(33)(127.86)^{1.85}}{(140)^{1.85} (8)^{4.866}} = 0.01 \text{ ft} = 0.01 \text{ psi}$$

$$\Delta \text{ elev} = 0 \text{ ft} = 0.00 \text{ psi}$$

$$\text{Loss through meter} = 1 \text{ psi}$$

$$\text{Loss through RPZ} = 12 \text{ psi}$$

$$\text{Total Losses} = 13.0 \text{ psi}$$

$$\text{Static Pressure} = 105 \text{ psi} \quad (\text{per ECWA - residual pressure 98 psi})$$

$$\text{Residual Pressure Following RPZ} = 105 - 13.0 = 92.0 \text{ psi} \quad (\text{available after rpz \& meter})$$

Residual Pressure 30" above 4th Floor

$$\Delta \text{ elev} = 35 \text{ ft} = 15.16 \text{ psi}$$

$$\text{Residual Pressure 30" above 4th Floor} = 92.0 - 15.16 = 76.8 \text{ psi}$$

Water Demand Calculations (fire):

Headlosses to furthest hydrant, assume 1,000 gpm for fire flow at hydrant @ 20 psi minimum

$$Q_{\text{peak}} = 1000.00 \text{ gpm}$$

$$\text{Pipe} = 8 \text{ inch C-900 PVC} \quad C = 140$$

$$\text{Length} = 1,293 \text{ LF (approx. distance from RPZ to hydrant)}$$

$$H_L = \frac{10.44 L Q^{1.85}}{C^{1.85} D^{4.866}} = \frac{10.44(1,293)(1,000)^{1.85}}{(140)^{1.85} (8)^{4.866}} = 20.68 \text{ ft} = 8.95 \text{ psi}$$

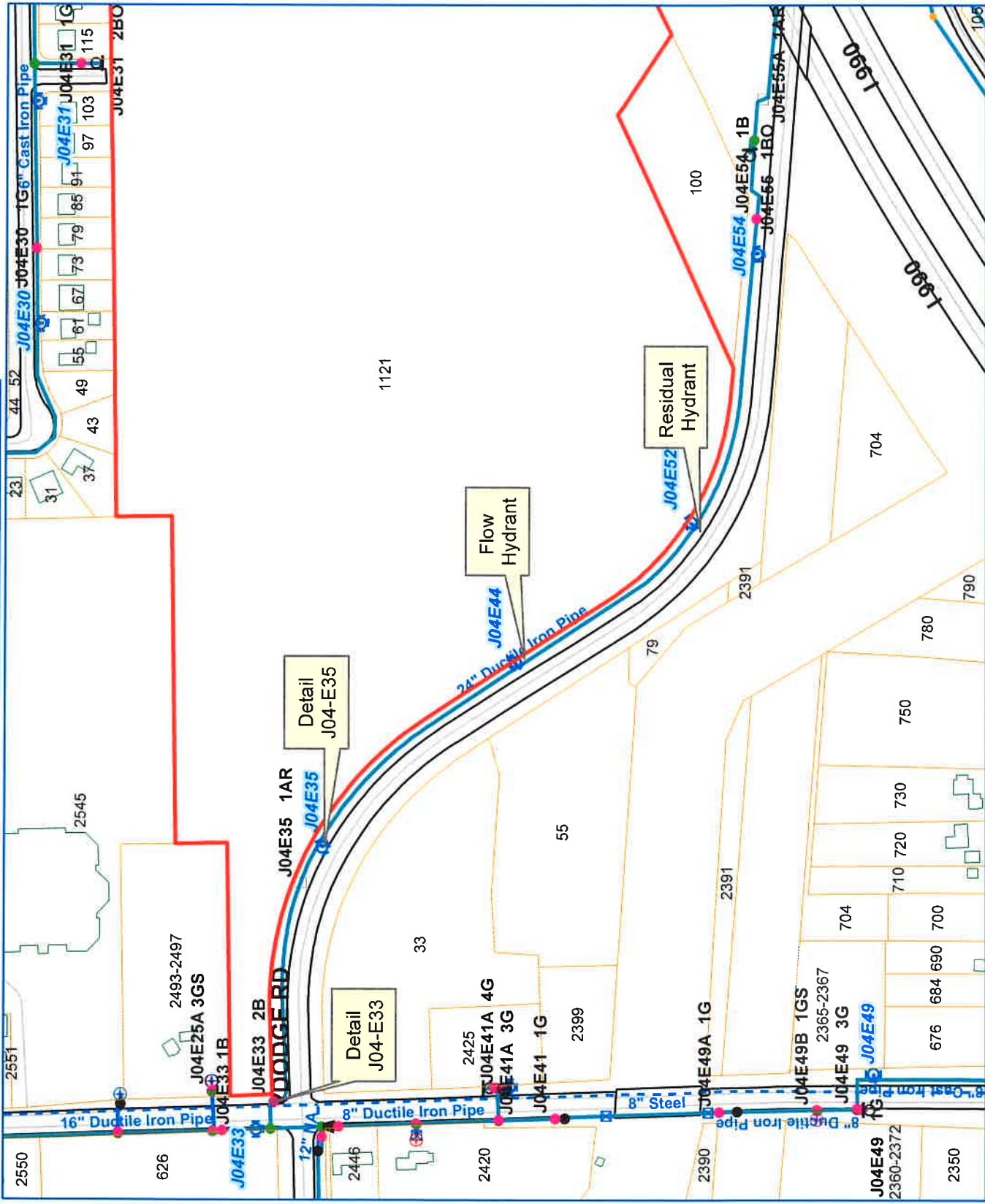
$$\Delta \text{ elev} = 1.1 \text{ ft} = 0.48 \text{ psi}$$

$$\text{Total Losses} = 9.4 \text{ psi}$$

$$\text{Static Pressure} = 0 \text{ psi} \quad (\text{per ECWA - residual pressure 98 psi})$$

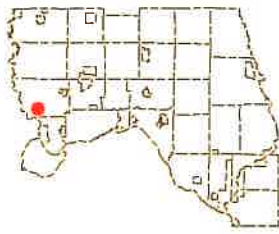
$$\text{Residual Pressure Following hydrant} = 92.0 - 9.4 = 82.6 \text{ psi} \quad (\text{available after furthest hydrant})$$

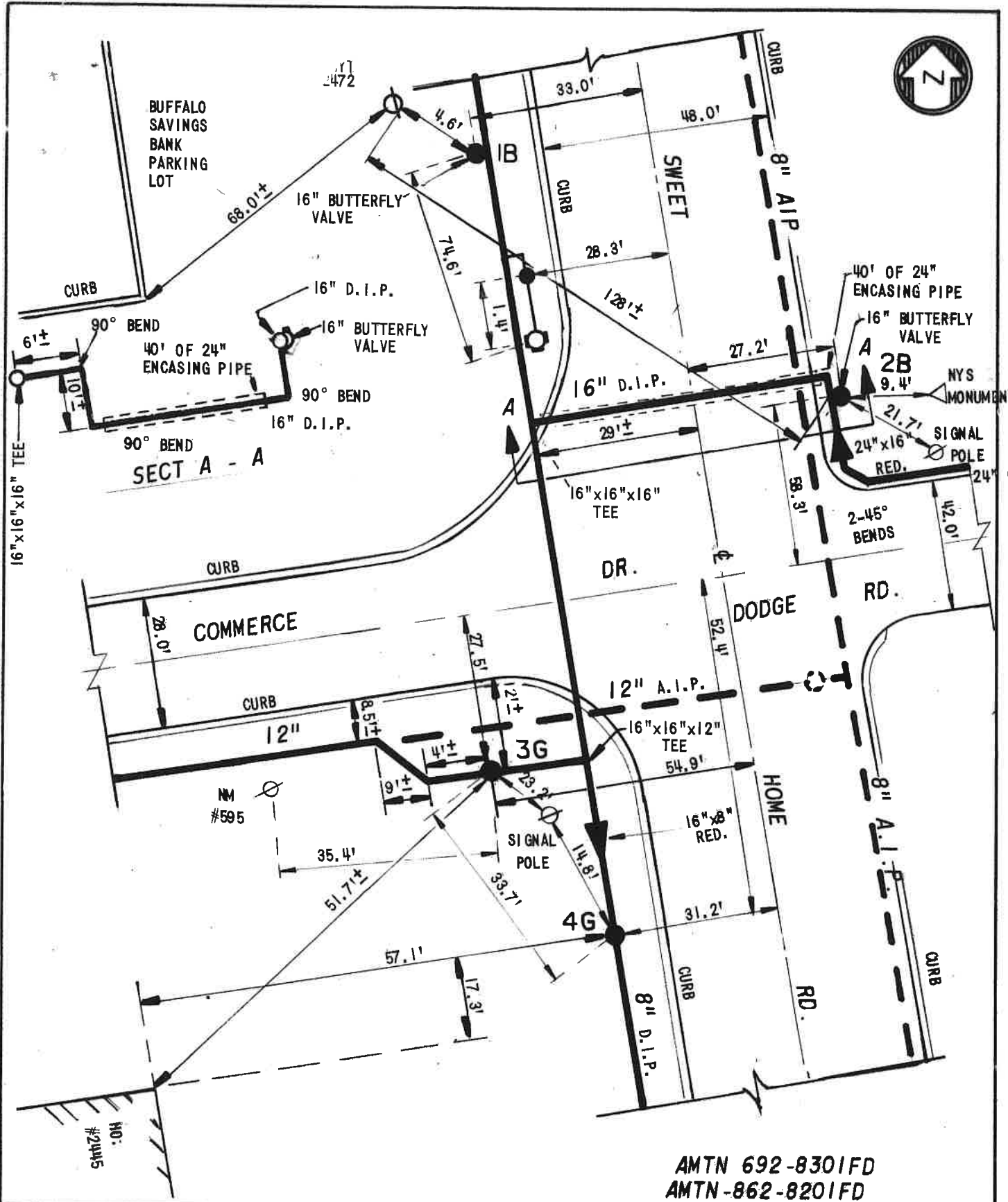
1121 Dodge Rd., AMTN



1 inch = 300 feet

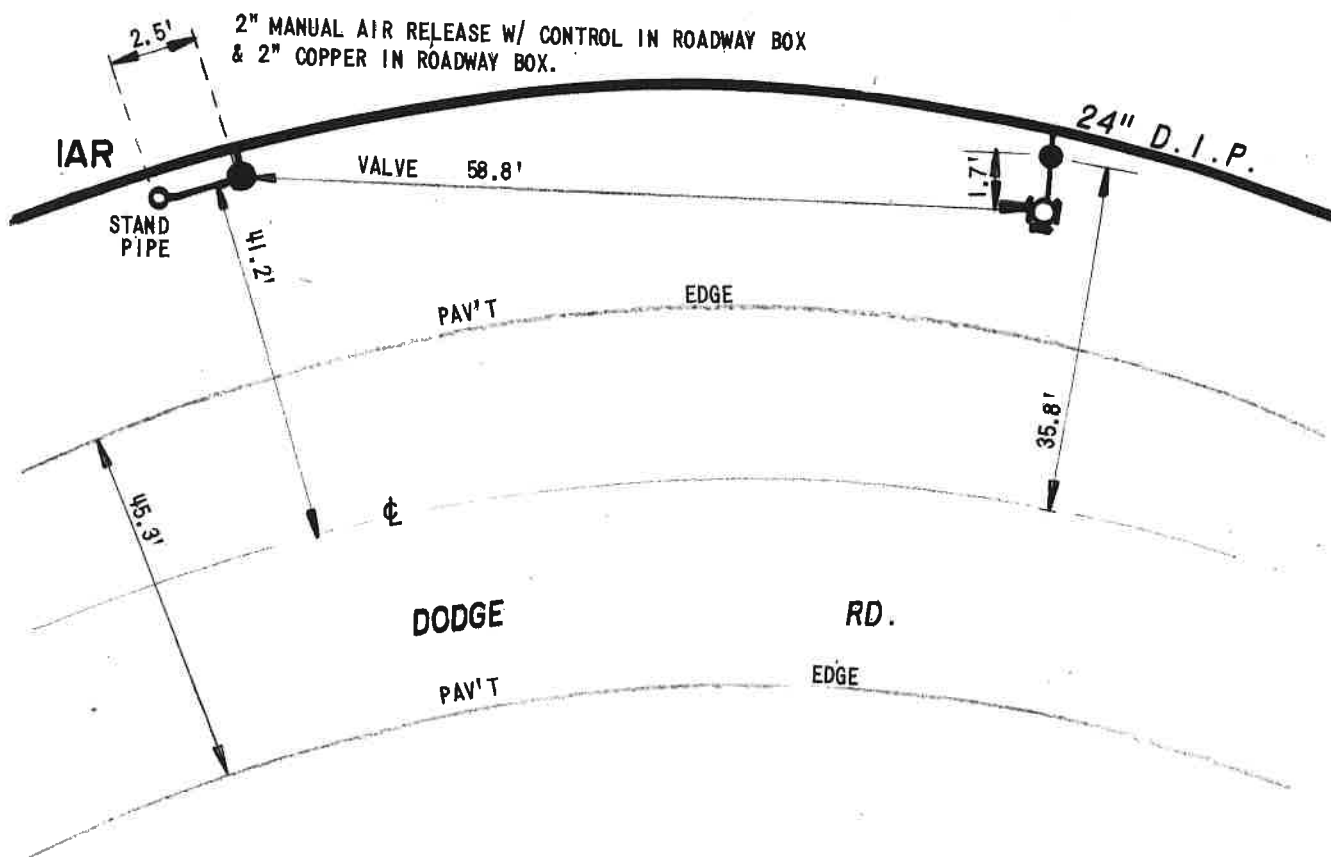
Legend:





AMTN 692-8301FD
 AMTN-862-8201FD

<p>ERIE COUNTY WATER AUTHORITY BUFFALO, NEW YORK</p>	REVISED DR. BY: RLS	TOWN OF AMHERST W.D 15C	JO4-E33 DETAIL SHEET NO.
	DATE: 6-30-06		
	NOT TO SCALE		



AMTN-692-8301-FD
SHEET 1

EC **ERIE COUNTY**
WA **WATER AUTHORITY**
BUFFALO, NEW YORK

REVISED
DR. BY: **RLS**
DATE: **6-30-06**
NOT TO SCALE

TOWN OF AMHERST
W.D. 15C

J04-E35

DETAIL SHEET NO.

Performed By: JRS & DPZ

Comments: HYDRANT FLOW TEST REQUESTED BY BILL GROFF
PRATT & HUTH, PHONE: 633-4844, FAX: 633-4940

Dischrg Coef: .90 Elvtn Usgs(ft): Static(psi): 105 Residual(psi): 98 Required Residual Pressure(psi): 20
Gallons Used.: 7,680 Total Flow(gpm): 2,558 Flow at Reqd Resid Pressure: 9,850

Flow Hydrants:

C	Flow Hyd	Flow Hydrant Address	Main/Branch	Nzle	Size	Pitot	Flow	Comments
-	J04 E44	DODGE RD	24"/6"	1:	2.50	58.0	1,279	
		2ND HYD E/O SWEET HOME RD		2:	2.50	58.0	1,279	
				3:				Tot Flow: 2,558

Bottom

I=Flow Hydrant Inquiry

ENTER=Continue F3=Exit F6=Maintain Test F7=Test Hydrant Inquiry F15=Print Test Information

Appendix B

Storm Sewer System Drainage Calculations

Green Infrastructure & Water Quality Calculations

Step 2 - Calculate Water Quality Volume

Is this project subject to Section 4.3 of the NYS Design Manual for Enhanced Phosphorus Removal? No

What is the nature of this construction project? Redevelopment with increase in impervious area

Design Point: _____
 P= 1.00 inches Enter 90% Rainfall Event as P

Calculate Required WQv

Drainage Area Number	Contributing Area (Acres)	Impervious Area (Acres)	Percent Impervious %	Rv	WQv (cf)	SMP Description
1						
2	5.68	2.90	51	0.51	10,505	
3	1.90	1.03	54	0.54	3,710	
4	2.55	1.67	65	0.64	5,919	Filtration Bioretention
5	0.12	0.00	0	0.05	0	
6	0.18	0.03	17	0.20	131	
7	1.15	0.00	0	0.05	0	
8						
9						
10	0.84	0.00	0	0.05	0	Filtration Bioretention
11	5.00	3.47	69	0.67	12,244	Filtration Bioretention
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						
Total	17.42	9.10	52	0.52	32891	Required WQv

Step 4 - Calculate Minimum RRv Required

Enter the Soils Data for the site

Hydrologic Soil Group	Acres	S
A		55%
B		40%
C		30%
D	9.10	20%
Total Area	9.1	

Calculate the Minimum RRv

S =	0.20	
Impervious =	9.10	<i>acres</i>
Precipitation	1.00	<i>inches</i>
Rv	0.95	
Minimum RRv	0.144	<i>af</i>
	6273	<i>cf</i>

Filtration Bioretention (F-5)

Design Point:							
Enter Site Data For Drainage Area to be Treated by Practice							
Drainage Area Number	Contributing Area (Acres)	Impervious Area (Acres)	Percent Impervious %	Rv	WQv (cf)	Precipitation (in)	Description
4	2.55	1.67	65	0.64	5,919	1.00	Filtration Bioretention
Design Criteria							
Enter underlying soil infiltration rate (based on geotechnical testing, refer to Appendix D)			0.05	Underdrains required			
Is the contributing area to the practice a stormwater hotspot?			No				
Is the practice the first in series for treatment of a Level 1 (Infiltration Restricted) hotspot?			No				
Is contributing area greater than max. contributing area?			No				
Enter depth to seasonal high water table (ft)			2				
Enter depth to bedrock (ft)			2				
Is pretreatment provided, in conformance with Section 6.4.3.1			Yes				
Enter average height of ponding (ft)			0.25				
Enter depth of surface layer (inches)			3				
Enter depth of filter media (ft)			2.5				
Enter depth of drainage layer (inches)			10				
Enter slope of maintenance access (%)			1				
Enter width of maintenance access (ft)			12				
Sizing Criteria							
				Value	Units	Notes	
Permeability Flow Rate			k	1	ft/day		
Filter Time			tf	2	days		
Required Filter Area			Af	2690	sf		
Enter Provided Filter Area			Af	8798	sf		
Recalculated Water Quality Volume (based on provided filter area)			WQv calc	19355.6	cf		
Calculate Runoff Reduction							
RRv Provided		5,919	cf				
WQv Treated		0	cf	This is the portion of the WQv that is not reduced in the practice.			

Filtration Bioretention (F-5)

Design Point:							
Enter Site Data For Drainage Area to be Treated by Practice							
Drainage Area Number	Contributing Area (Acres)	Impervious Area (Acres)	Percent Impervious %	Rv	WQv (cf)	Precipitation (in)	Description
11	5.00	3.47	69	0.67	12,244	1.00	Filtration
Design Criteria							
Enter underlying soil infiltration rate (based on geotechnical testing, refer to Appendix D)			0.05	Underdrains required			
Is the contributing area to the practice a stormwater hotspot?			No				
Is the practice the first in series for treatment of a Level 1 (Infiltration Restricted) hotspot?			No				
Is contributing area greater than max. contributing area?			No				
Enter depth to seasonal high water table (ft)			2				
Enter depth to bedrock (ft)			2				
Is pretreatment provided, in conformance with Section 6.4.3.1			Yes				
Enter average height of ponding (ft)			0.25				
Enter depth of surface layer (inches)			3				
Enter depth of filter media (ft)			2.5				
Enter depth of drainage layer (inches)			10				
Enter slope of maintenance access (%)			1				
Enter width of maintenance access (ft)			12				
Sizing Criteria							
				Value	Units	Notes	
Permeability Flow Rate			k	1	ft/day		
Filter Time			tf	2	days		
Required Filter Area			Af	5565	sf		
Enter Provided Filter Area			Af	9925	sf		
Recalculated Water Quality Volume (based on provided filter area)			WQv calc	21835	cf		
Calculate Runoff Reduction							
RRv Provided	8,734	cf					
WQv Treated	3510	cf	This is the portion of the WQv that is not reduced in the practice.				

21.011 Proposed (Updated Runoff Areas 3-24-26)

Type II 24-hr 100-Year Rainfall=5.28"

Prepared by Carmina Wood Design

Printed 3/26/2026

HydroCAD® 10.20-7a s/n 05019 © 2025 HydroCAD Software Solutions LLC

Stage-Area-Storage for Pond 2P WQ: WQv (SMA #1)

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
563.00	710	0	573.40	26,803	91,262
563.20	798	151	573.60	27,772	96,720
563.40	887	319	573.80	28,741	102,371
563.60	975	506	574.00	29,710	108,216
563.80	1,064	709	574.20	35,611	114,748
564.00	1,152	931	574.40	41,511	122,460
564.20	1,267	1,173	574.60	47,412	131,353
564.40	1,381	1,438	574.80	53,312	141,425
564.60	1,496	1,725	575.00	59,213	152,678
564.80	1,610	2,036			
565.00	1,725	2,370			
565.20	1,866	2,729			
565.40	2,007	3,116			
565.60	2,148	3,531			
565.80	2,289	3,975			
566.00	2,430	4,447			
566.20	2,604	4,950			
566.40	2,779	5,489			
566.60	2,953	6,062			
566.80	3,128	6,670			
567.00	3,302	7,313			
567.20	3,519	7,995			
567.40	3,736	8,721			
567.60	3,952	9,489			
567.80	4,169	10,301			
568.00	4,386	11,157			
568.20	5,076	12,103			
568.40	5,767	13,188			
568.60	6,457	14,410			
568.80	7,148	15,770			
569.00	7,838	17,269			
569.20	8,590	18,912			
569.40	9,341	20,705			
569.60	10,093	22,648			
569.80	10,844	24,742			
570.00	11,596	26,986			
570.20	12,398	29,385			
570.40	13,200	31,945			
570.60	14,002	34,665			
570.80	14,804	37,546			
571.00	15,606	40,587			
571.20	16,506	43,798			
571.40	17,406	47,189			
571.60	18,306	50,761			
571.80	19,206	54,512			
572.00	20,106	58,443			
572.20	21,058	62,559			
572.40	22,010	66,866			
572.60	22,961	71,363			
572.80	23,913	76,051			
573.00	24,865	80,929			
573.20	25,834	85,998			

Runoff Maps & Event Tables

21.011 Existing

Prepared by Carmina Wood Design

HydroCAD® 10.20-7a s/n 05019 © 2025 HydroCAD Software Solutions LLC

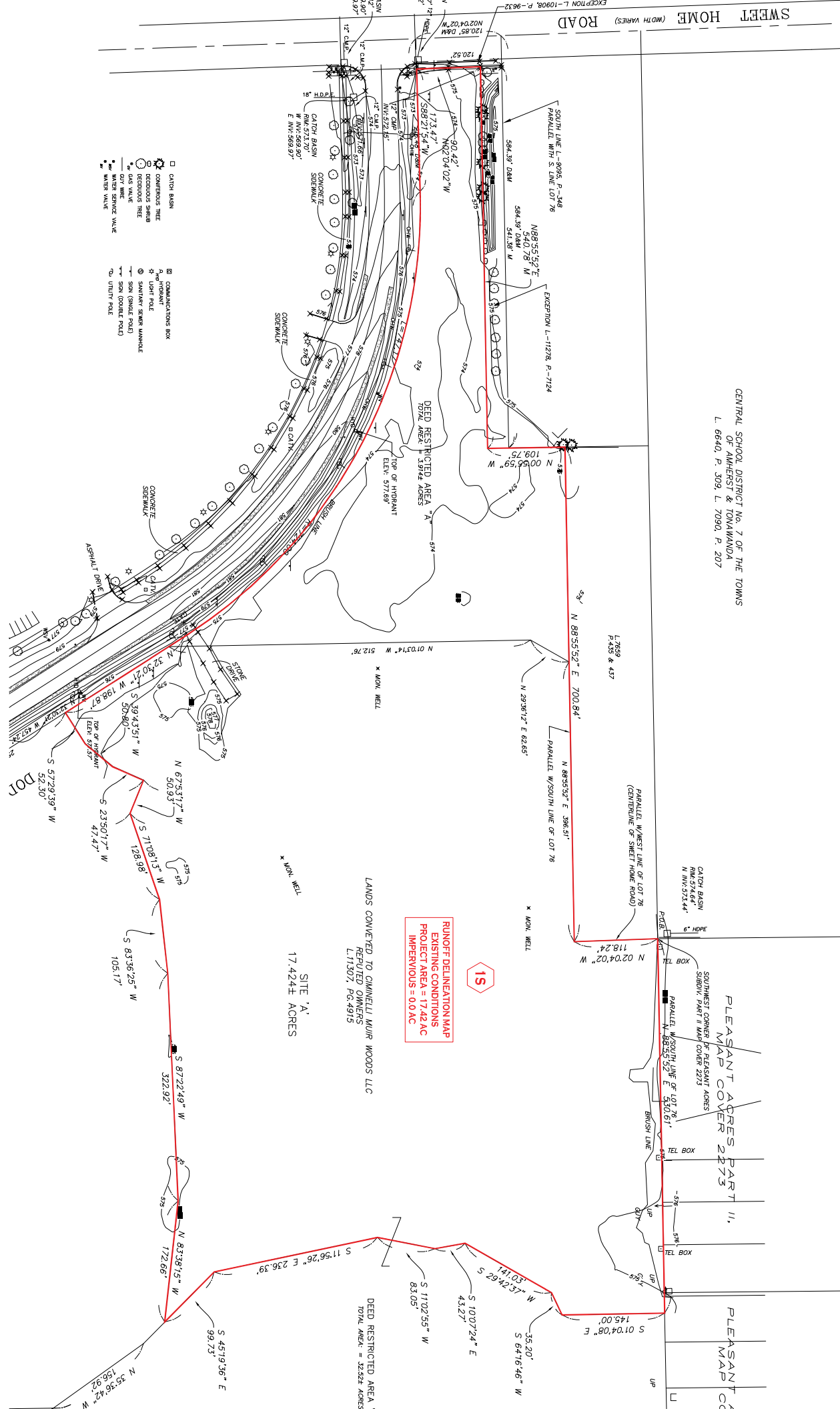
Type II 24-hr 100-Year Rainfall=5.28"

Printed 3/31/2026

Events for Subcatchment 1S: Existing

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
1-Year	1.86	2.28	0.811	0.56
2-Year	2.20	3.33	1.138	0.78
5-Year	2.70	5.03	1.666	1.15
10-Year	3.15	6.68	2.175	1.50
25-Year	3.87	9.45	3.038	2.09
50-Year	4.52	12.04	3.853	2.65
100-Year	5.28	15.15	4.836	3.33

CENTRAL SCHOOL DISTRICT No. 7 OF THE TOWNS
OF AMHERST & TONAWANDA
L. 6640, P. 309, L. 7090, P. 207



RUNOFF DELINEATION MAP
EXISTING CONDITIONS
PROJECT AREA = 17.42 AC
IMPERVIOUS = 0.0 AC

15

LANDS CONVEYED TO GINNELL MUIR WOODS LLC
REPUTED OWNERS
L. 11307, PG. 4915

SITE 'A'
17.424± ACRES

DEED RESTRICTED AREA
TOTAL AREA = 322± ACRES

- CATCH BASIN
- CONCRETE TREE
- RESIDUOUS TREE
- SANITARY SEWER MANHOLE
- SIGN (SINGLE POLE)
- SIGN (DOUBLE POLE)
- UTILITY POLE
- WATER SERVICE VALVE
- WATER VALVE

- COMMUNICATIONS BOX
- AIR JUNCTION
- LIGHT POLE
- SANITARY SEWER MANHOLE
- SIGN (SINGLE POLE)
- SIGN (DOUBLE POLE)
- UTILITY POLE
- WATER SERVICE VALVE
- WATER VALVE

21.011 Proposed

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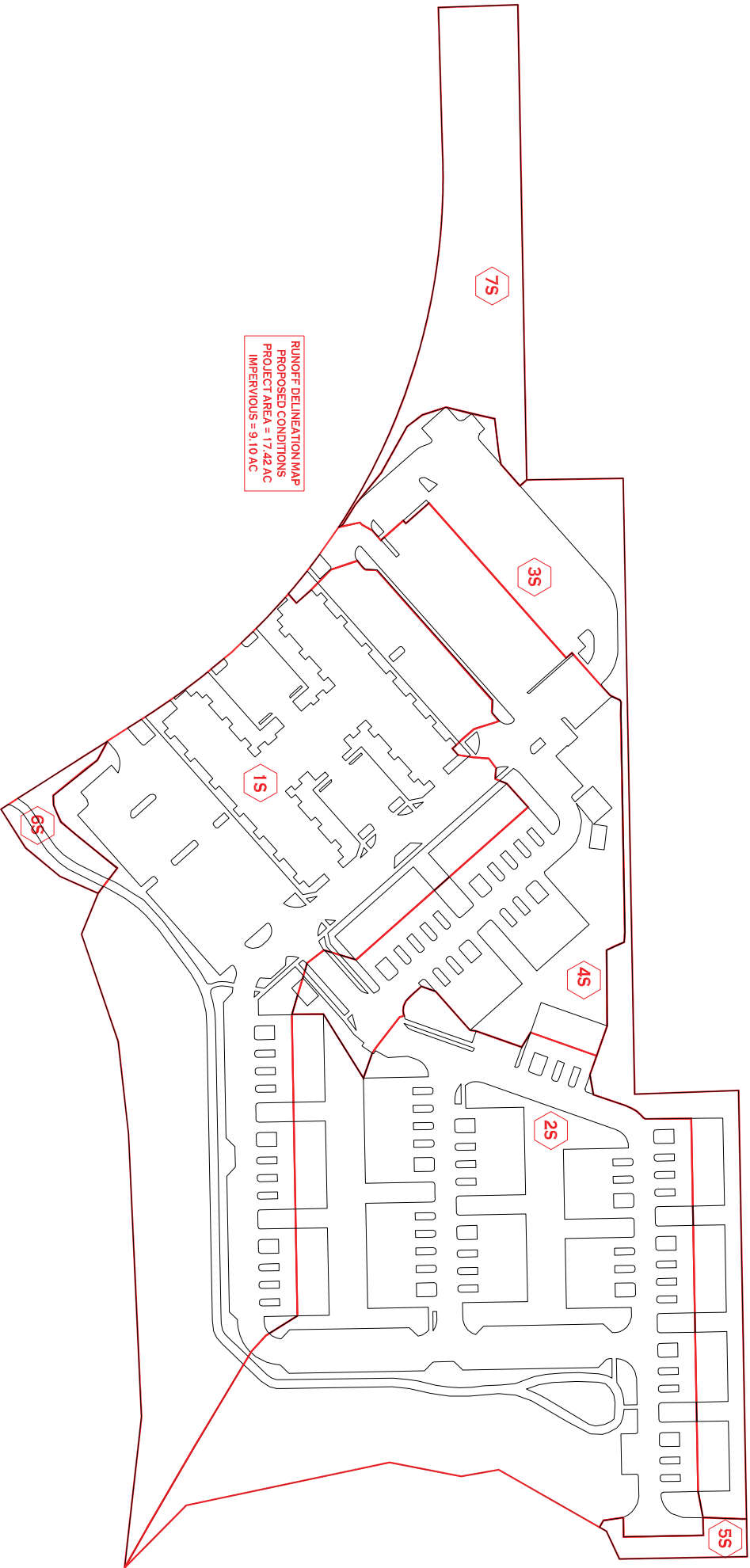
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Type II 24-hr 100-Year Rainfall=5.28"

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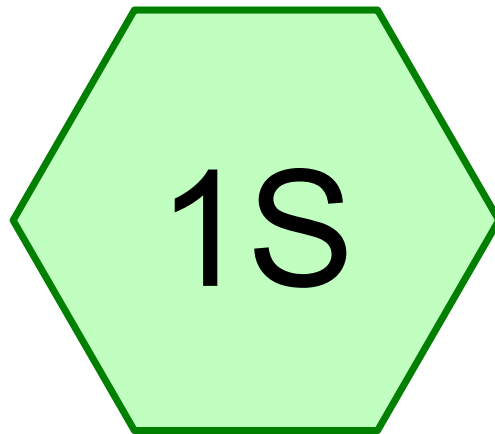
Events for Link 2L: Total Outflow from Proposed Site

Event	Inflow (cfs)	Primary (cfs)	Elevation (feet)
1-Year	3.55	3.55	0.00
2-Year	4.28	4.28	0.00
5-Year	4.92	4.92	0.00
10-Year	5.44	5.44	0.00
25-Year	6.64	6.64	0.00
50-Year	8.59	8.59	0.00
100-Year	14.88	14.88	0.00

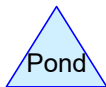
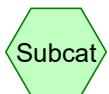


RUNOFF DELINEATION MAP
PROPOSED CONDITIONS
PROJECT AREA = 17.42 AC
IMPERVIOUS = 9.10 AC

Existing HydroCAD Analysis



Existing



21.011 Existing

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Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	1-Year	Type II 24-hr		Default	24.00	1	1.86	2
2	2-Year	Type II 24-hr		Default	24.00	1	2.20	2
3	5-Year	Type II 24-hr		Default	24.00	1	2.70	2
4	10-Year	Type II 24-hr		Default	24.00	1	3.15	2
5	25-Year	Type II 24-hr		Default	24.00	1	3.87	2
6	50-Year	Type II 24-hr		Default	24.00	1	4.52	2
7	100-Year	Type II 24-hr		Default	24.00	1	5.28	2

21.011 Existing

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Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
17.424	82	Woods/grass comb., Fair, HSG D (1S)
17.424	82	TOTAL AREA

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Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
17.424	HSG D	1S
0.000	Other	
17.424		TOTAL AREA

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Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	17.424	0.000	17.424	Woods/grass comb., Fair	1S
0.000	0.000	0.000	17.424	0.000	17.424	TOTAL AREA	

21.011 Existing

Type II 24-hr 1-Year Rainfall=1.86"

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Time span=0.00-50.00 hrs, dt=0.05 hrs, 1001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Existing

Runoff Area=17.424 ac 0.00% Impervious Runoff Depth=0.56"
Flow Length=1,100' Slope=0.0020 '/' Tc=155.2 min CN=82 Runoff=2.28 cfs 0.811 af

Total Runoff Area = 17.424 ac Runoff Volume = 0.811 af Average Runoff Depth = 0.56"
100.00% Pervious = 17.424 ac 0.00% Impervious = 0.000 ac

21.011 Existing

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Type II 24-hr 1-Year Rainfall=1.86"

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Summary for Subcatchment 1S: Existing

Runoff = 2.28 cfs @ 13.99 hrs, Volume= 0.811 af, Depth= 0.56"
 Routed to nonexistent node 17P

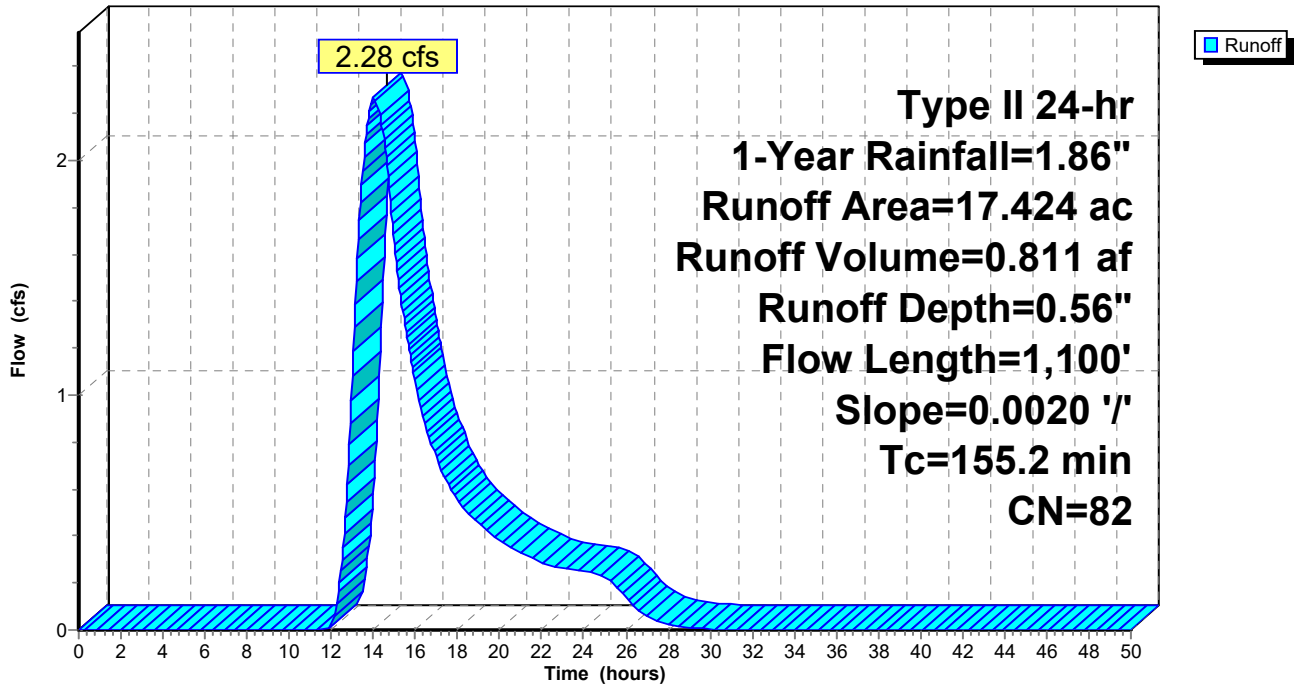
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.05 hrs
 Type II 24-hr 1-Year Rainfall=1.86"

Area (ac)	CN	Description
17.424	82	Woods/grass comb., Fair, HSG D
17.424		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
84.4	150	0.0020	0.03		Sheet Flow, Woods
70.8	950	0.0020	0.22		Shallow Concentrated Flow, Woods
					Woodland Kv= 5.0 fps
155.2	1,100	Total			

Subcatchment 1S: Existing

Hydrograph



21.011 Existing

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Type II 24-hr 2-Year Rainfall=2.20"

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Time span=0.00-50.00 hrs, dt=0.05 hrs, 1001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Existing

Runoff Area=17.424 ac 0.00% Impervious Runoff Depth=0.78"
Flow Length=1,100' Slope=0.0020 '/' Tc=155.2 min CN=82 Runoff=3.33 cfs 1.138 af

Total Runoff Area = 17.424 ac Runoff Volume = 1.138 af Average Runoff Depth = 0.78"
100.00% Pervious = 17.424 ac 0.00% Impervious = 0.000 ac

21.011 Existing

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Type II 24-hr 2-Year Rainfall=2.20"

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Summary for Subcatchment 1S: Existing

Runoff = 3.33 cfs @ 13.97 hrs, Volume= 1.138 af, Depth= 0.78"
 Routed to nonexistent node 17P

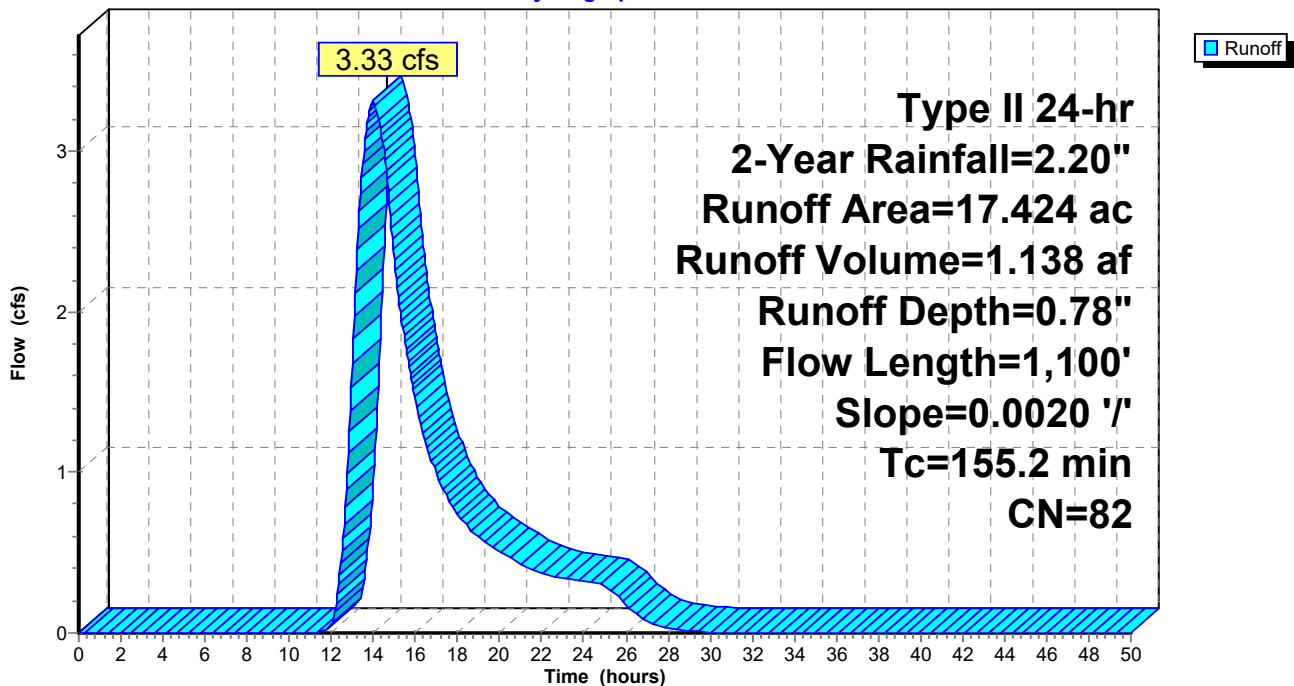
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.05 hrs
 Type II 24-hr 2-Year Rainfall=2.20"

Area (ac)	CN	Description
17.424	82	Woods/grass comb., Fair, HSG D
17.424		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
84.4	150	0.0020	0.03		Sheet Flow, Woods Woods: Light underbrush n= 0.400 P2= 2.50"
70.8	950	0.0020	0.22		Shallow Concentrated Flow, Woods Woodland Kv= 5.0 fps
155.2	1,100	Total			

Subcatchment 1S: Existing

Hydrograph



21.011 Existing

Type II 24-hr 5-Year Rainfall=2.70"

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Time span=0.00-50.00 hrs, dt=0.05 hrs, 1001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Existing

Runoff Area=17.424 ac 0.00% Impervious Runoff Depth=1.15"
Flow Length=1,100' Slope=0.0020 '/' Tc=155.2 min CN=82 Runoff=5.03 cfs 1.666 af

Total Runoff Area = 17.424 ac Runoff Volume = 1.666 af Average Runoff Depth = 1.15"
100.00% Pervious = 17.424 ac 0.00% Impervious = 0.000 ac

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Type II 24-hr 5-Year Rainfall=2.70"

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Summary for Subcatchment 1S: Existing

Runoff = 5.03 cfs @ 13.96 hrs, Volume= 1.666 af, Depth= 1.15"
 Routed to nonexistent node 17P

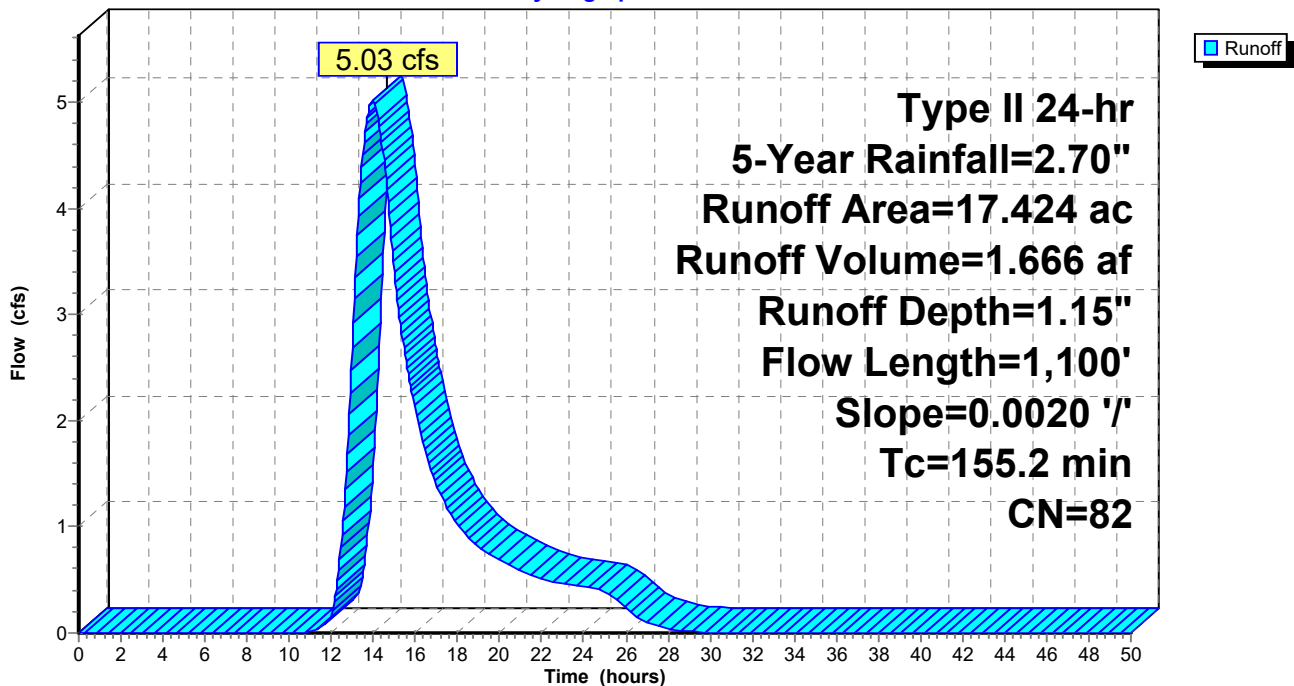
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.05 hrs
 Type II 24-hr 5-Year Rainfall=2.70"

Area (ac)	CN	Description
17.424	82	Woods/grass comb., Fair, HSG D
17.424		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
84.4	150	0.0020	0.03		Sheet Flow, Woods
70.8	950	0.0020	0.22		Shallow Concentrated Flow, Woods
					Woodland Kv= 5.0 fps
155.2	1,100	Total			

Subcatchment 1S: Existing

Hydrograph



21.011 Existing

Type II 24-hr 10-Year Rainfall=3.15"

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Time span=0.00-50.00 hrs, dt=0.05 hrs, 1001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Existing

Runoff Area=17.424 ac 0.00% Impervious Runoff Depth=1.50"
Flow Length=1,100' Slope=0.0020 '/' Tc=155.2 min CN=82 Runoff=6.68 cfs 2.175 af

Total Runoff Area = 17.424 ac Runoff Volume = 2.175 af Average Runoff Depth = 1.50"
100.00% Pervious = 17.424 ac 0.00% Impervious = 0.000 ac

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Type II 24-hr 10-Year Rainfall=3.15"

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Summary for Subcatchment 1S: Existing

Runoff = 6.68 cfs @ 13.95 hrs, Volume= 2.175 af, Depth= 1.50"
 Routed to nonexistent node 17P

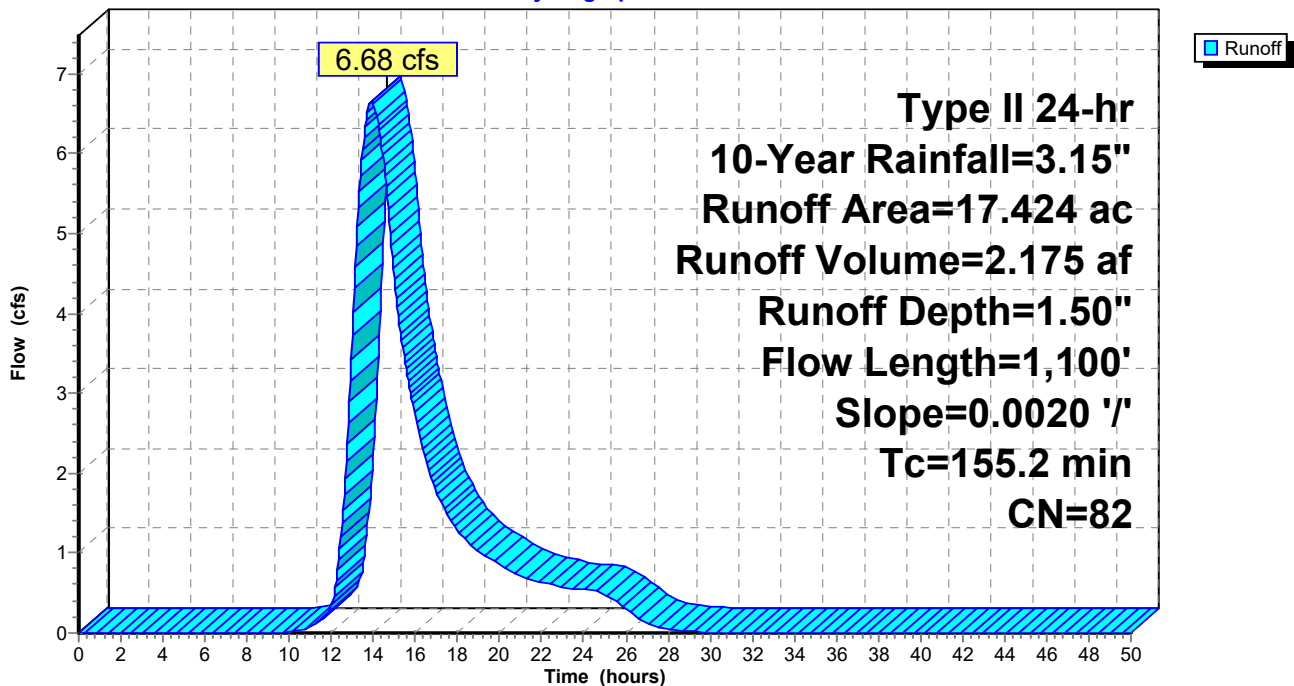
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.05 hrs
 Type II 24-hr 10-Year Rainfall=3.15"

Area (ac)	CN	Description
17.424	82	Woods/grass comb., Fair, HSG D
17.424		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
84.4	150	0.0020	0.03		Sheet Flow, Woods
70.8	950	0.0020	0.22		Shallow Concentrated Flow, Woods
					Woodland Kv= 5.0 fps
155.2	1,100	Total			

Subcatchment 1S: Existing

Hydrograph



21.011 Existing

Type II 24-hr 25-Year Rainfall=3.87"

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Time span=0.00-50.00 hrs, dt=0.05 hrs, 1001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Existing

Runoff Area=17.424 ac 0.00% Impervious Runoff Depth=2.09"
Flow Length=1,100' Slope=0.0020 '/' Tc=155.2 min CN=82 Runoff=9.45 cfs 3.038 af

Total Runoff Area = 17.424 ac Runoff Volume = 3.038 af Average Runoff Depth = 2.09"
100.00% Pervious = 17.424 ac 0.00% Impervious = 0.000 ac

21.011 Existing

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Type II 24-hr 25-Year Rainfall=3.87"

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Summary for Subcatchment 1S: Existing

Runoff = 9.45 cfs @ 13.94 hrs, Volume= 3.038 af, Depth= 2.09"
 Routed to nonexistent node 17P

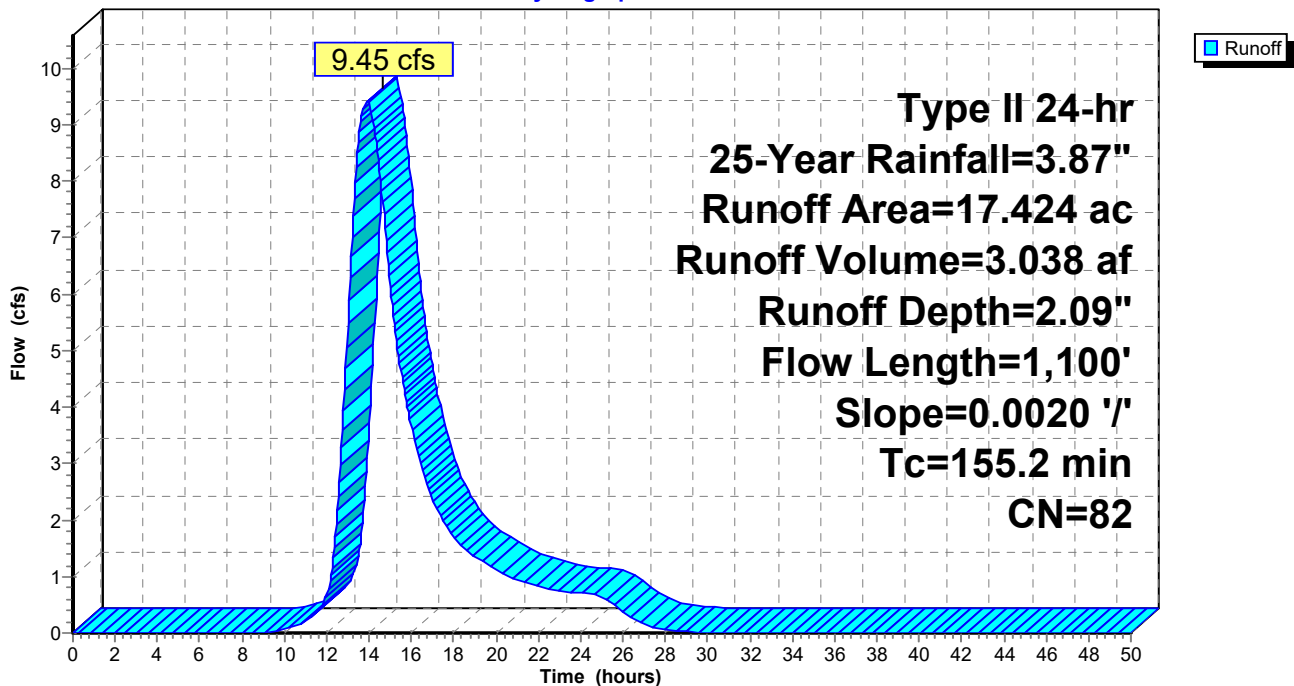
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.05 hrs
 Type II 24-hr 25-Year Rainfall=3.87"

Area (ac)	CN	Description
17.424	82	Woods/grass comb., Fair, HSG D
17.424		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
84.4	150	0.0020	0.03		Sheet Flow, Woods
70.8	950	0.0020	0.22		Woods: Light underbrush n= 0.400 P2= 2.50" Shallow Concentrated Flow, Woods
					Woodland Kv= 5.0 fps
155.2	1,100	Total			

Subcatchment 1S: Existing

Hydrograph



21.011 Existing

Type II 24-hr 50-Year Rainfall=4.52"

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Time span=0.00-50.00 hrs, dt=0.05 hrs, 1001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Existing

Runoff Area=17.424 ac 0.00% Impervious Runoff Depth=2.65"
Flow Length=1,100' Slope=0.0020 '/' Tc=155.2 min CN=82 Runoff=12.04 cfs 3.853 af

Total Runoff Area = 17.424 ac Runoff Volume = 3.853 af Average Runoff Depth = 2.65"
100.00% Pervious = 17.424 ac 0.00% Impervious = 0.000 ac

21.011 Existing

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Type II 24-hr 50-Year Rainfall=4.52"

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Summary for Subcatchment 1S: Existing

Runoff = 12.04 cfs @ 13.94 hrs, Volume= 3.853 af, Depth= 2.65"
 Routed to nonexistent node 17P

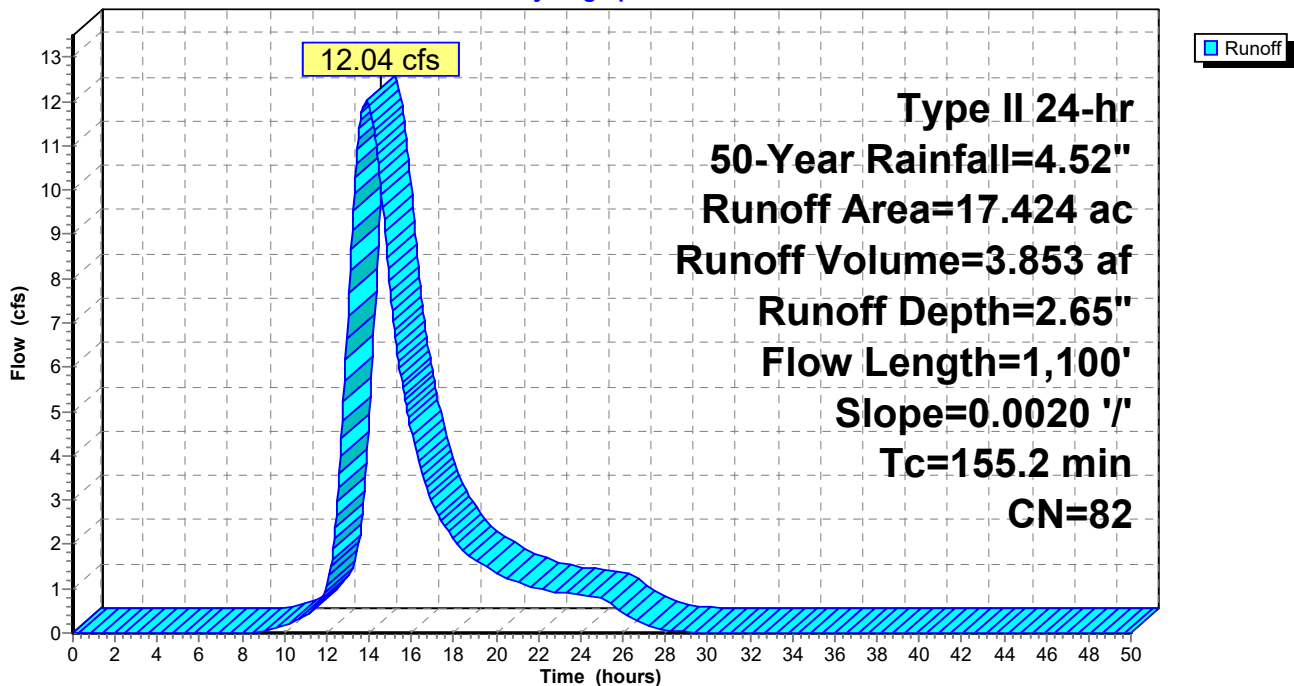
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.05 hrs
 Type II 24-hr 50-Year Rainfall=4.52"

Area (ac)	CN	Description
17.424	82	Woods/grass comb., Fair, HSG D
17.424		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
84.4	150	0.0020	0.03		Sheet Flow, Woods Woods: Light underbrush n= 0.400 P2= 2.50"
70.8	950	0.0020	0.22		Shallow Concentrated Flow, Woods Woodland Kv= 5.0 fps
155.2	1,100	Total			

Subcatchment 1S: Existing

Hydrograph



21.011 Existing

Type II 24-hr 100-Year Rainfall=5.28"

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Time span=0.00-50.00 hrs, dt=0.05 hrs, 1001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Existing

Runoff Area=17.424 ac 0.00% Impervious Runoff Depth=3.33"
Flow Length=1,100' Slope=0.0020 '/' Tc=155.2 min CN=82 Runoff=15.15 cfs 4.836 af

Total Runoff Area = 17.424 ac Runoff Volume = 4.836 af Average Runoff Depth = 3.33"
100.00% Pervious = 17.424 ac 0.00% Impervious = 0.000 ac

21.011 Existing

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Type II 24-hr 100-Year Rainfall=5.28"

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Summary for Subcatchment 1S: Existing

Runoff = 15.15 cfs @ 13.93 hrs, Volume= 4.836 af, Depth= 3.33"
 Routed to nonexistent node 17P

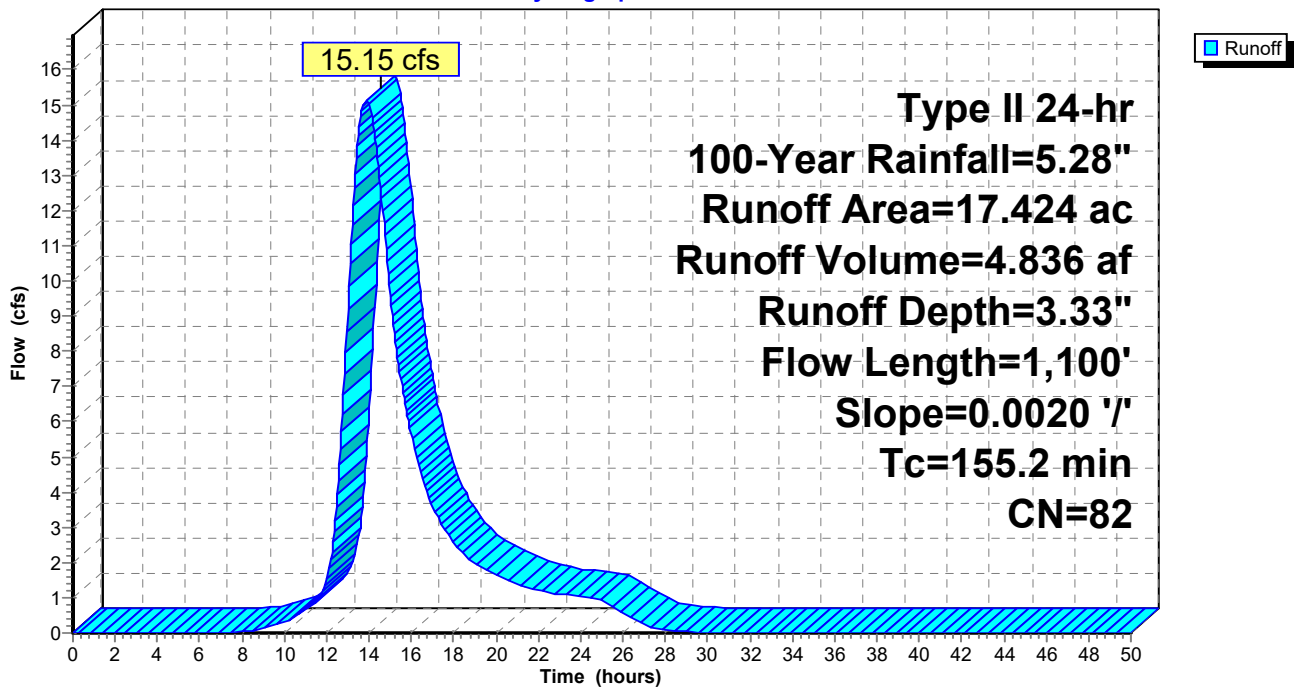
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.05 hrs
 Type II 24-hr 100-Year Rainfall=5.28"

Area (ac)	CN	Description
17.424	82	Woods/grass comb., Fair, HSG D
17.424		100.00% Pervious Area

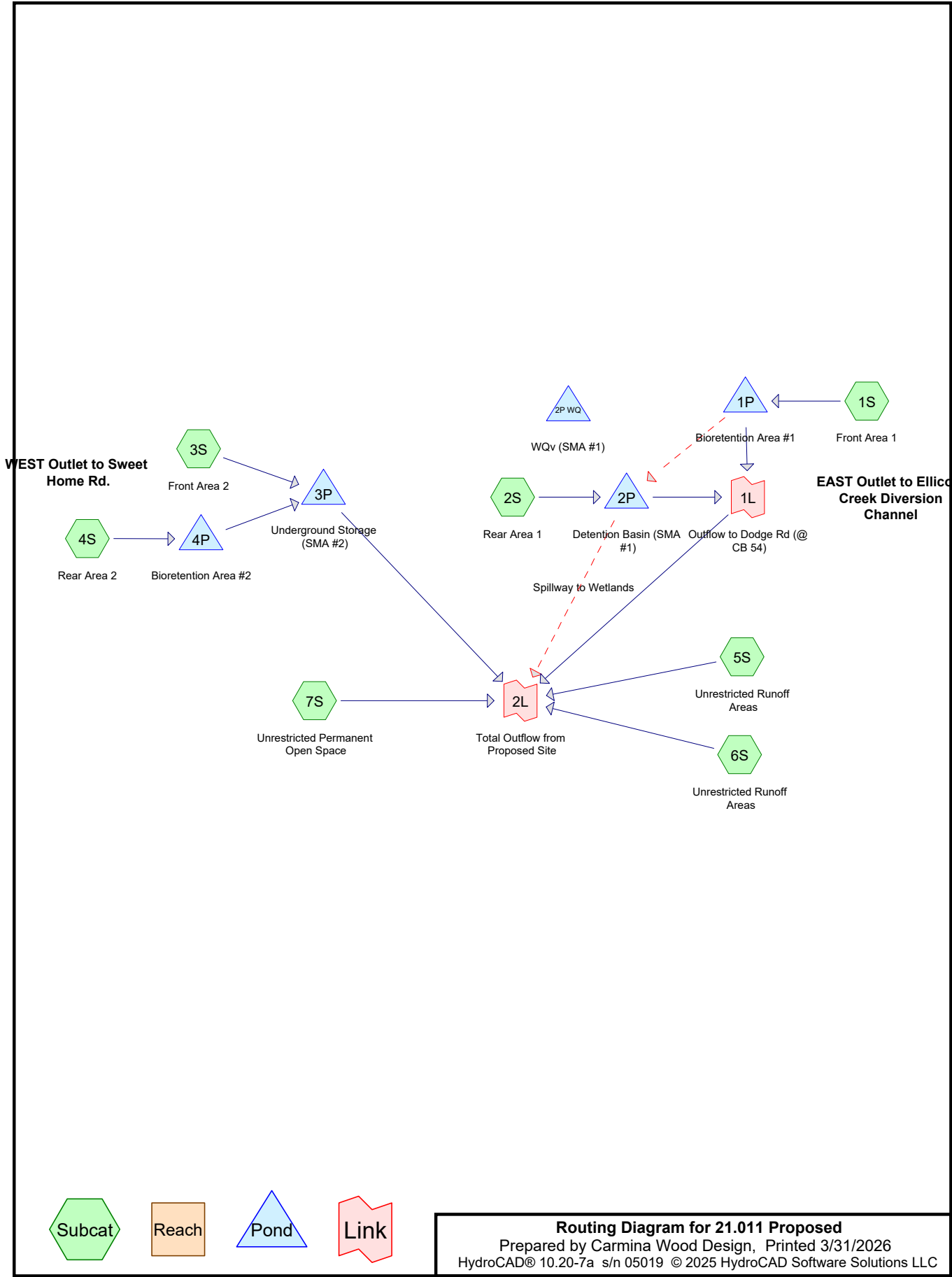
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
84.4	150	0.0020	0.03		Sheet Flow, Woods Woods: Light underbrush n= 0.400 P2= 2.50"
70.8	950	0.0020	0.22		Shallow Concentrated Flow, Woods Woodland Kv= 5.0 fps
155.2	1,100	Total			

Subcatchment 1S: Existing

Hydrograph



Proposed HydroCAD Analysis



Routing Diagram for 21.011 Proposed
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21.011 Proposed

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Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	1-Year	Type II 24-hr		Default	24.00	1	1.86	2
2	2-Year	Type II 24-hr		Default	24.00	1	2.20	2
3	5-Year	Type II 24-hr		Default	24.00	1	2.70	2
4	10-Year	Type II 24-hr		Default	24.00	1	3.15	2
5	25-Year	Type II 24-hr		Default	24.00	1	3.87	2
6	50-Year	Type II 24-hr		Default	24.00	1	4.52	2
7	100-Year	Type II 24-hr		Default	24.00	1	5.28	2

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Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
7.170	80	>75% Grass cover, Good, HSG D (1S, 2S, 3S, 4S, 5S, 6S)
9.100	98	Impervious (1S, 2S, 3S, 4S, 6S)
1.150	79	Woods, Fair, HSG D (7S)
17.420	89	TOTAL AREA

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Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
8.320	HSG D	1S, 2S, 3S, 4S, 5S, 6S, 7S
9.100	Other	1S, 2S, 3S, 4S, 6S
17.420		TOTAL AREA

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Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	7.170	0.000	7.170	>75% Grass cover, Good	1S, 2S, 3S, 4S, 5S, 6S
0.000	0.000	0.000	0.000	9.100	9.100	Impervious	1S, 2S, 3S, 4S, 6S
0.000	0.000	0.000	1.150	0.000	1.150	Woods, Fair	7S
0.000	0.000	0.000	8.320	9.100	17.420	TOTAL AREA	

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Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Width (inches)	Diam/Height (inches)	Inside-Fill (inches)	Node Name
1	1P	572.50	572.42	25.0	0.0032	0.013	0.0	8.0	0.0	
2	2P	574.00	573.79	160.0	0.0013	0.013	0.0	12.0	0.0	
3	2P	575.00	574.95	10.0	0.0050	0.010	0.0	6.0	0.0	
4	3P	569.93	569.71	72.0	0.0031	0.013	0.0	12.0	0.0	
5	4P	571.41	571.30	41.0	0.0027	0.013	0.0	8.0	0.0	

21.011 Proposed

Type II 24-hr 1-Year Rainfall=1.86"

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Time span=0.00-60.00 hrs, dt=0.01 hrs, 6001 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Front Area 1 Runoff Area=5.840 ac 59.42% Impervious Runoff Depth=1.04"
 Flow Length=652' Tc=13.3 min CN=91 Runoff=8.34 cfs 0.507 af

Subcatchment2S: Rear Area 1 Runoff Area=5.680 ac 51.06% Impervious Runoff Depth=0.91"
 Flow Length=683' Tc=14.4 min CN=89 Runoff=6.85 cfs 0.432 af

Subcatchment3S: Front Area 2 Runoff Area=1.900 ac 54.21% Impervious Runoff Depth=0.98"
 Flow Length=1,325' Slope=0.0100 '/' Tc=14.1 min CN=90 Runoff=2.47 cfs 0.154 af

Subcatchment4S: Rear Area 2 Runoff Area=2.550 ac 65.49% Impervious Runoff Depth=1.11"
 Flow Length=345' Tc=9.1 min CN=92 Runoff=4.47 cfs 0.236 af

Subcatchment5S: Unrestricted Runoff Areas Runoff Area=0.120 ac 0.00% Impervious Runoff Depth=0.48"
 Flow Length=25' Slope=0.3300 '/' Tc=5.0 min CN=80 Runoff=0.10 cfs 0.005 af

Subcatchment6S: Unrestricted Runoff Runoff Area=0.180 ac 16.67% Impervious Runoff Depth=0.60"
 Flow Length=40' Slope=0.3300 '/' Tc=5.0 min CN=83 Runoff=0.20 cfs 0.009 af

Subcatchment7S: Unrestricted Permanent Runoff Area=1.150 ac 0.00% Impervious Runoff Depth=0.44"
 Flow Length=465' Slope=0.0020 '/' Tc=107.9 min CN=79 Runoff=0.15 cfs 0.042 af

Pond 1P: Bioretention Area #1 Peak Elev=576.79' Storage=8,222 cf Inflow=8.34 cfs 0.507 af
 Primary=3.19 cfs 0.501 af Secondary=0.62 cfs 0.006 af Outflow=3.81 cfs 0.507 af

Pond 2P: Detention Basin (SMA #1) Peak Elev=575.24' Storage=14,689 cf Inflow=6.85 cfs 0.438 af
 Primary=0.11 cfs 0.278 af Secondary=0.00 cfs 0.000 af Outflow=0.11 cfs 0.278 af

Pond 2P WQ: WQv (SMA #1) Peak Elev=0.00' Storage=0 cf

Pond 3P: Underground Storage (SMA #2) Peak Elev=570.36' Storage=5,094 cf Inflow=2.53 cfs 0.391 af
 Outflow=0.45 cfs 0.347 af

Pond 4P: Bioretention Area #2 Peak Elev=575.55' Storage=5,080 cf Inflow=4.47 cfs 0.236 af
 Outflow=0.60 cfs 0.236 af

Link 1L: Outflow to Dodge Rd (@ CB 54) Inflow=3.24 cfs 0.779 af
 Primary=3.24 cfs 0.779 af

Link 2L: Total Outflow from Proposed Site Inflow=3.55 cfs 1.182 af
 Primary=3.55 cfs 1.182 af

Total Runoff Area = 17.420 ac Runoff Volume = 1.386 af Average Runoff Depth = 0.96"
47.76% Pervious = 8.320 ac 52.24% Impervious = 9.100 ac

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Summary for Subcatchment 1S: Front Area 1

Runoff = 8.34 cfs @ 12.05 hrs, Volume= 0.507 af, Depth= 1.04"
 Routed to Pond 1P : Bioretention Area #1

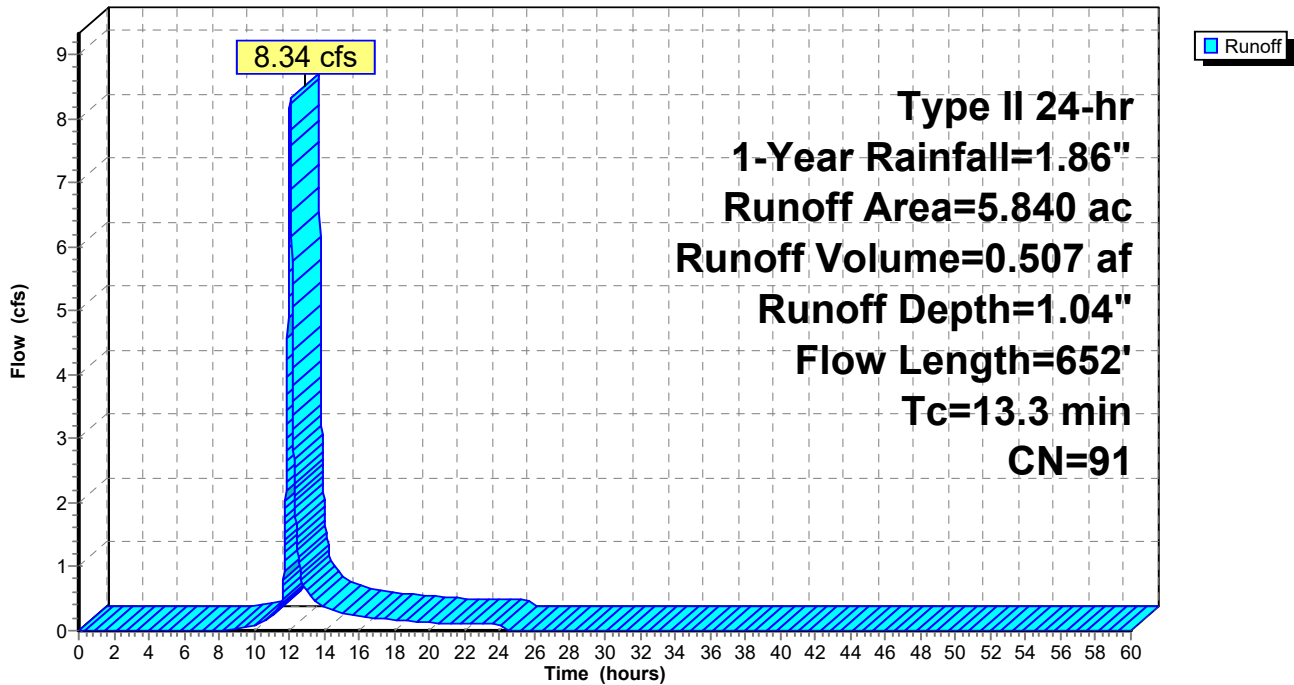
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
 Type II 24-hr 1-Year Rainfall=1.86"

Area (ac)	CN	Description
3.470	98	Impervious
2.370	80	>75% Grass cover, Good, HSG D
5.840	91	Weighted Average
2.370		40.58% Pervious Area
3.470		59.42% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.6	37	0.0100	0.06		Sheet Flow, grass Grass: Dense n= 0.240 P2= 2.50"
0.4	15	0.0120	0.68		Sheet Flow, pavement Smooth surfaces n= 0.011 P2= 2.50"
3.3	600		3.00		Direct Entry, pipe flow
13.3	652	Total			

Subcatchment 1S: Front Area 1

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Summary for Subcatchment 2S: Rear Area 1

Runoff = 6.85 cfs @ 12.07 hrs, Volume= 0.432 af, Depth= 0.91"
Routed to Pond 2P : Detention Basin (SMA #1)

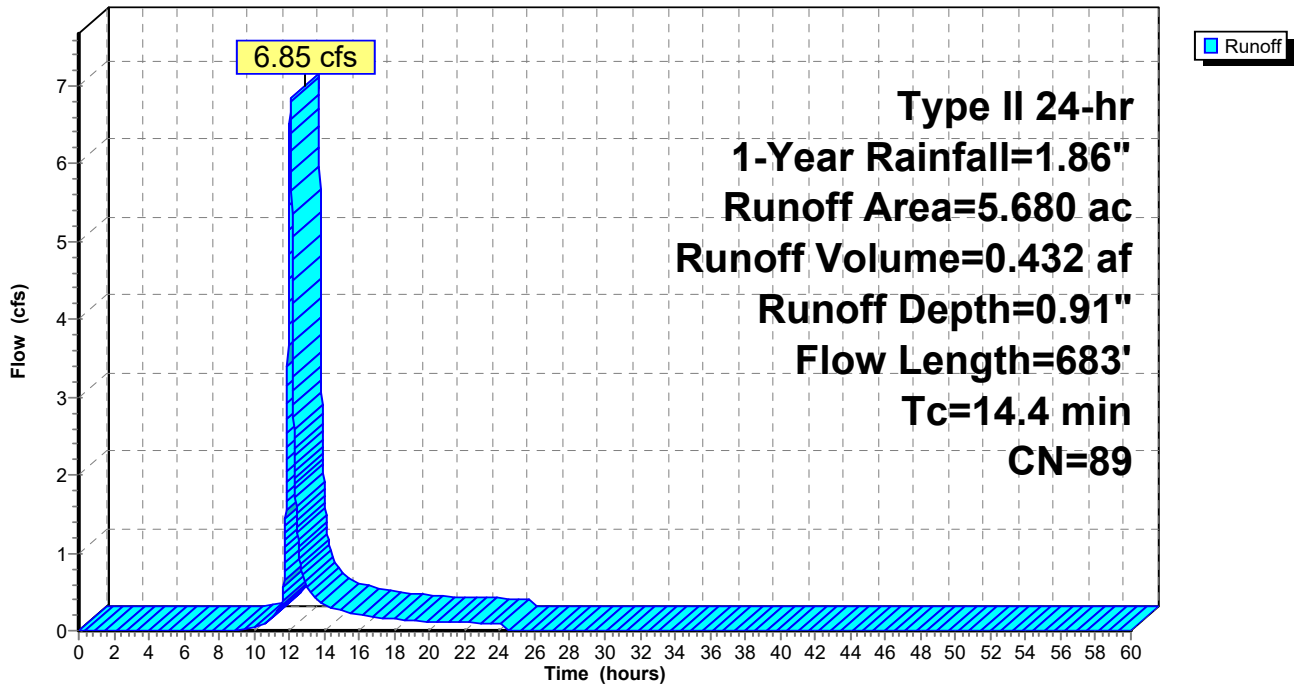
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-Year Rainfall=1.86"

Area (ac)	CN	Description
2.900	98	Impervious
2.780	80	>75% Grass cover, Good, HSG D
5.680	89	Weighted Average
2.780		48.94% Pervious Area
2.900		51.06% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.2	90	0.0200	0.15		Sheet Flow, grass Grass: Short n= 0.150 P2= 2.50"
1.3	75	0.0130	0.97		Sheet Flow, pavement Smooth surfaces n= 0.011 P2= 2.50"
2.9	518		3.00		Direct Entry, Pipe flow
14.4	683				Total

Subcatchment 2S: Rear Area 1

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Summary for Subcatchment 3S: Front Area 2

Runoff = 2.47 cfs @ 12.06 hrs, Volume= 0.154 af, Depth= 0.98"

Routed to Pond 3P : Underground Storage (SMA #2)

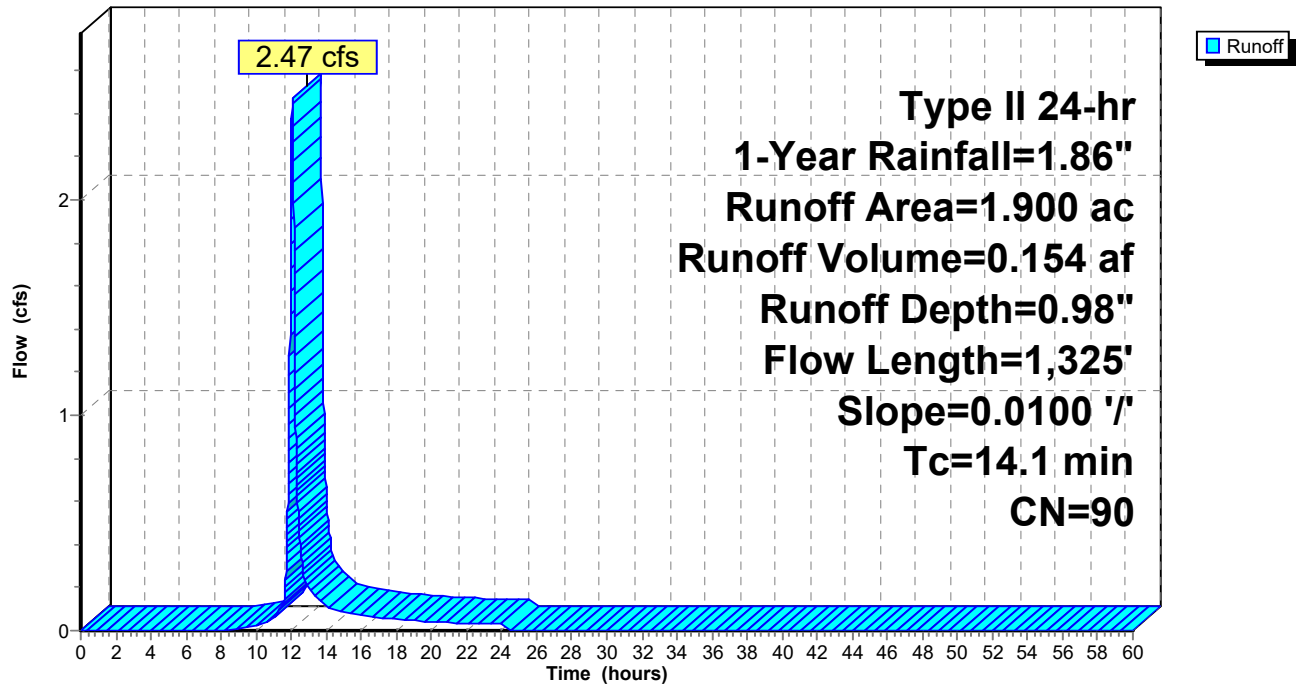
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-Year Rainfall=1.86"

Area (ac)	CN	Description
* 1.030	98	Impervious
0.870	80	>75% Grass cover, Good, HSG D
1.900	90	Weighted Average
0.870		45.79% Pervious Area
1.030		54.21% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0	40	0.0100	0.09		Sheet Flow, grass
7.1	1,285		3.00		Grass: Short n= 0.150 P2= 2.50"
14.1	1,325	Total			Direct Entry, Pipe flow

Subcatchment 3S: Front Area 2

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Summary for Subcatchment 4S: Rear Area 2

Runoff = 4.47 cfs @ 12.01 hrs, Volume= 0.236 af, Depth= 1.11"
 Routed to Pond 4P : Bioretention Area #2

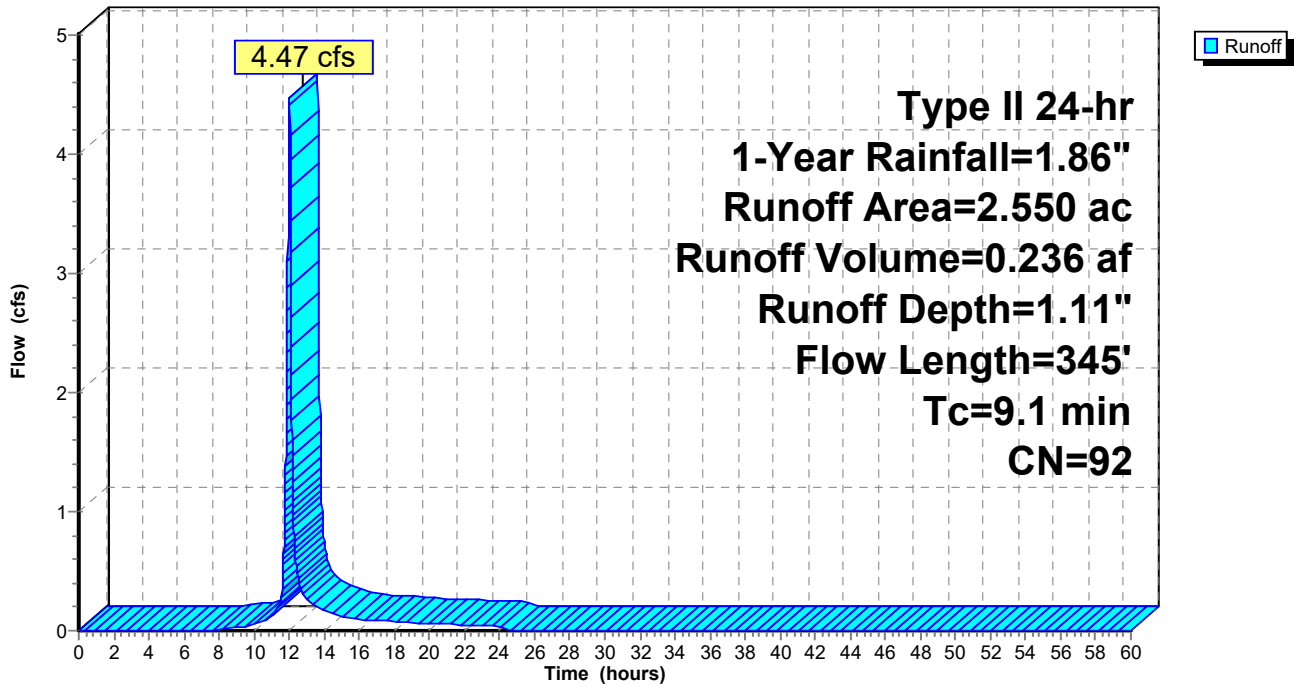
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
 Type II 24-hr 1-Year Rainfall=1.86"

Area (ac)	CN	Description
1.670	98	Impervious
0.880	80	>75% Grass cover, Good, HSG D
2.550	92	Weighted Average
0.880		34.51% Pervious Area
1.670		65.49% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.9	55	0.0200	0.13		Sheet Flow, grass Grass: Short n= 0.150 P2= 2.50"
0.8	45	0.0170	0.97		Sheet Flow, pavement Smooth surfaces n= 0.011 P2= 2.50"
1.4	245		3.00		Direct Entry, Pipe flow
9.1	345	Total			

Subcatchment 4S: Rear Area 2

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Summary for Subcatchment 5S: Unrestricted Runoff Areas

Runoff = 0.10 cfs @ 11.97 hrs, Volume= 0.005 af, Depth= 0.48"

Routed to Link 2L : Total Outflow from Proposed Site

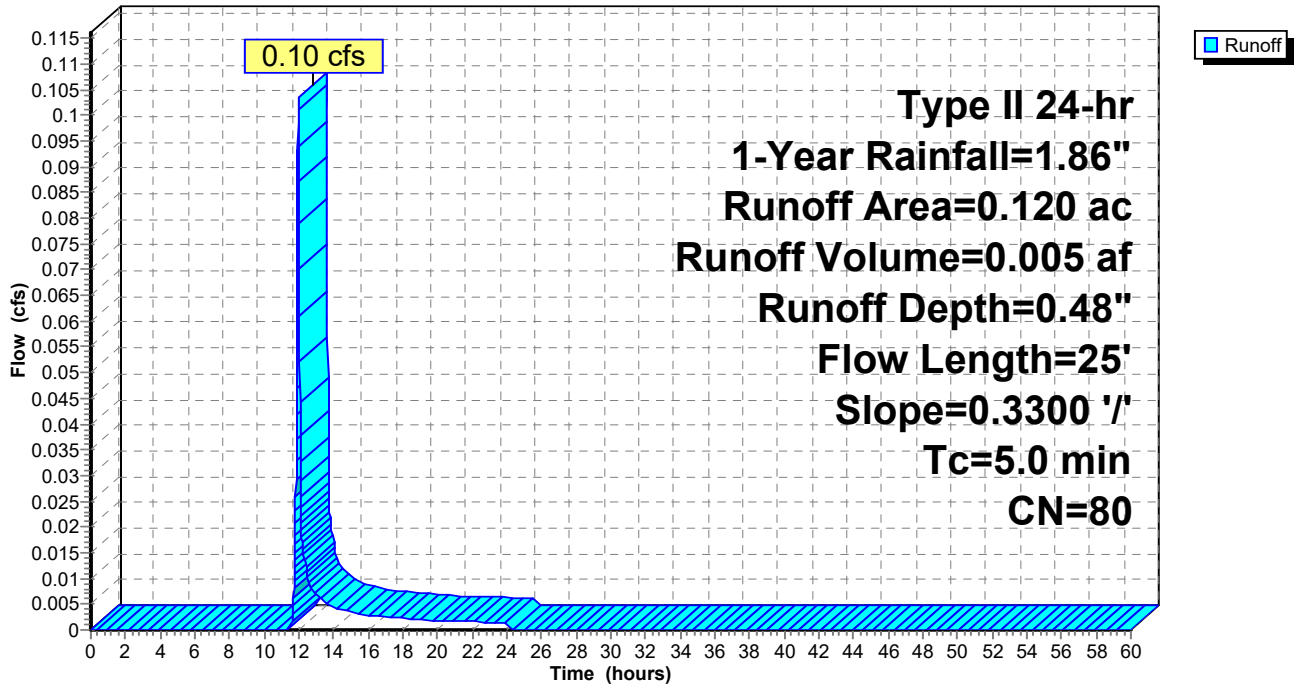
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-Year Rainfall=1.86"

Area (ac)	CN	Description
0.120	80	>75% Grass cover, Good, HSG D
0.120		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	25	0.3300	0.35		Sheet Flow, grass Grass: Short n= 0.150 P2= 2.50"
1.2	25	Total, Increased to minimum Tc = 5.0 min			

Subcatchment 5S: Unrestricted Runoff Areas

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Type II 24-hr 1-Year Rainfall=1.86"

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Summary for Subcatchment 6S: Unrestricted Runoff Areas

Runoff = 0.20 cfs @ 11.97 hrs, Volume= 0.009 af, Depth= 0.60"

Routed to Link 2L : Total Outflow from Proposed Site

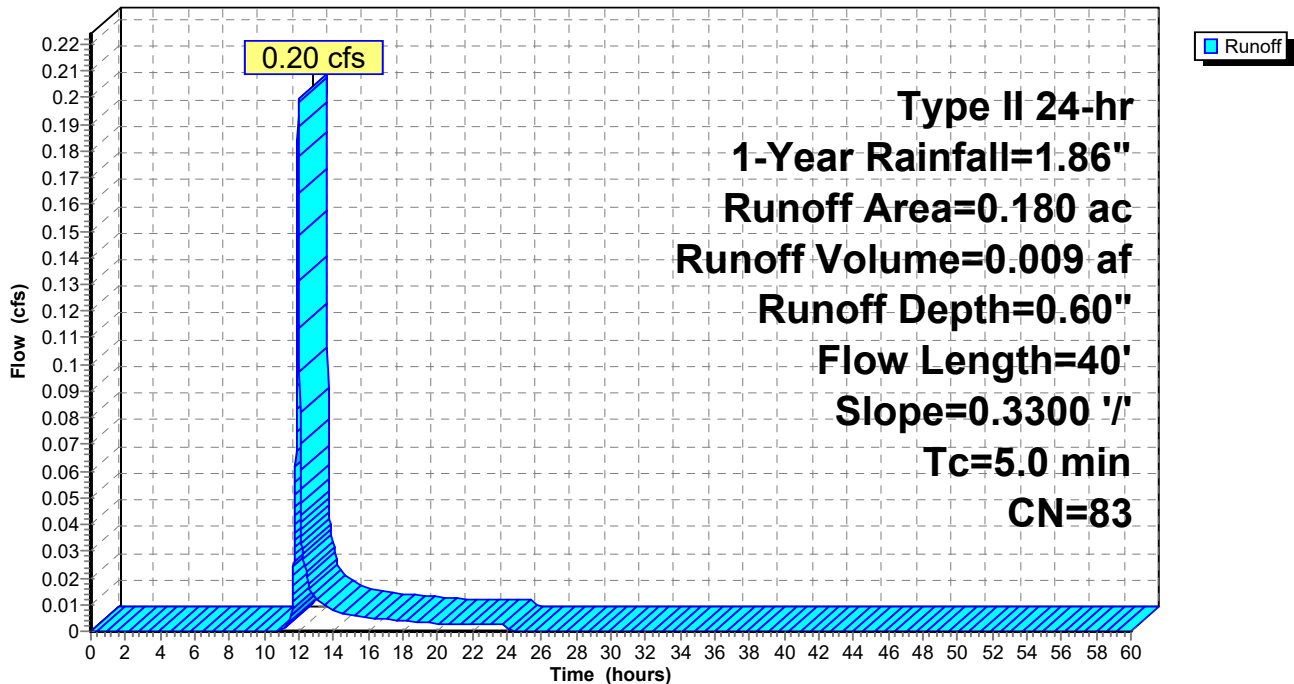
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-Year Rainfall=1.86"

Area (ac)	CN	Description
0.150	80	>75% Grass cover, Good, HSG D
* 0.030	98	Impervious
0.180	83	Weighted Average
0.150		83.33% Pervious Area
0.030		16.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.7	40	0.3300	0.38		Sheet Flow, grass Grass: Short n= 0.150 P2= 2.50"
1.7	40	Total, Increased to minimum Tc = 5.0 min			

Subcatchment 6S: Unrestricted Runoff Areas

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Summary for Subcatchment 7S: Unrestricted Permanent Open Space

Runoff = 0.15 cfs @ 13.31 hrs, Volume= 0.042 af, Depth= 0.44"

Routed to Link 2L : Total Outflow from Proposed Site

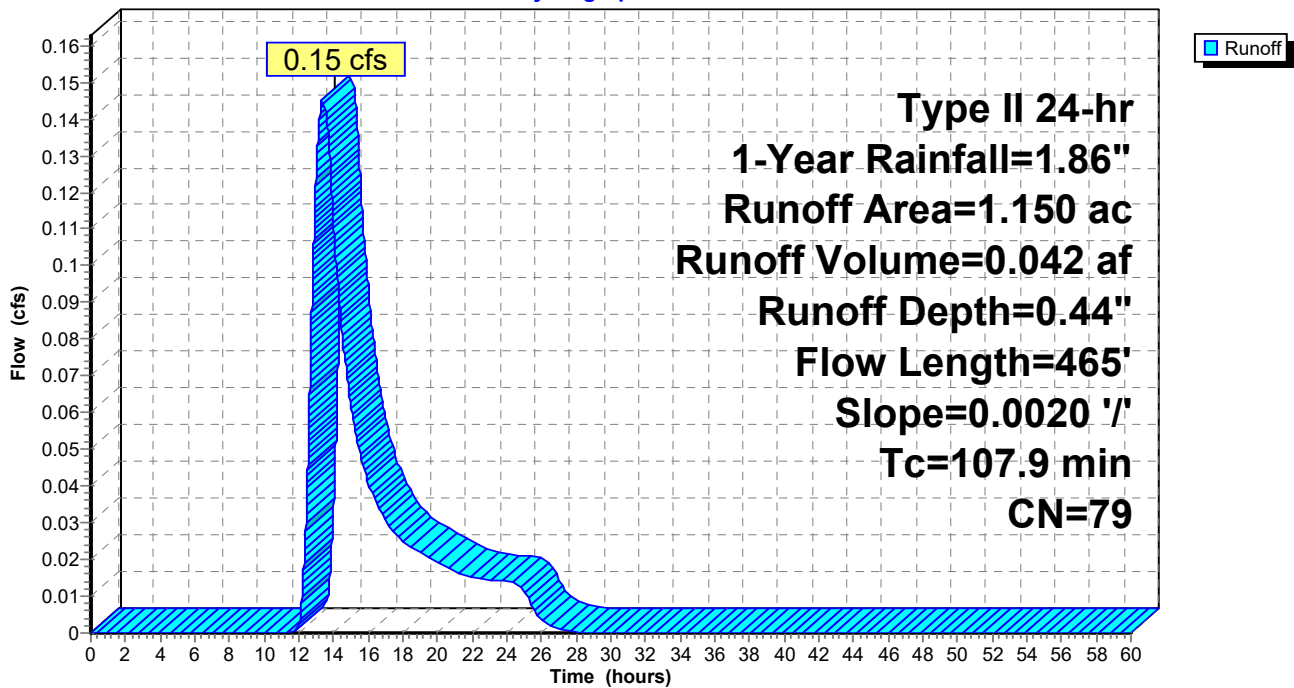
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-Year Rainfall=1.86"

Area (ac)	CN	Description
1.150	79	Woods, Fair, HSG D
1.150		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
84.4	150	0.0020	0.03		Sheet Flow, woods
23.5	315	0.0020	0.22		Shallow Concentrated Flow, woods
					Woodland Kv= 5.0 fps
107.9	465	Total			

Subcatchment 7S: Unrestricted Permanent Open Space

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Summary for Pond 1P: Bioretention Area #1

Inflow Area = 5.840 ac, 59.42% Impervious, Inflow Depth = 1.04" for 1-Year event
Inflow = 8.34 cfs @ 12.05 hrs, Volume= 0.507 af
Outflow = 3.81 cfs @ 12.21 hrs, Volume= 0.507 af, Atten= 54%, Lag= 9.6 min
Primary = 3.19 cfs @ 12.21 hrs, Volume= 0.501 af
Routed to Link 1L : Outflow to Dodge Rd (@ CB 54)
Secondary = 0.62 cfs @ 12.21 hrs, Volume= 0.006 af
Routed to Pond 2P : Detention Basin (SMA #1)

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 576.79' @ 12.21 hrs Surf.Area= 11,023 sf Storage= 8,222 cf

Plug-Flow detention time= 357.9 min calculated for 0.507 af (100% of inflow)
Center-of-Mass det. time= 357.8 min (1,186.0 - 828.1)

Volume	Invert	Avail.Storage	Storage Description
#1	576.00'	16,618 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
576.00	9,925	0	0
576.50	10,585	5,128	5,128
577.00	11,350	5,484	10,611
577.50	12,675	6,006	16,618

Device	Routing	Invert	Outlet Devices
#1	Primary	572.50'	8.0" Round 8" pipe L= 25.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 572.50' / 572.42' S= 0.0032 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#2	Device 1	576.50'	8.0" Horiz. Grate X 4.00 C= 0.600 Limited to weir flow at low heads
#3	Device 1	576.00'	0.250 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 560.00'
#4	Secondary	576.75'	30.0' long (Profile 1) Broad-Crested Rectangular Weir Head (feet) 0.49 0.98 1.48 Coef. (English) 2.92 3.37 3.59

Primary OutFlow Max=3.19 cfs @ 12.21 hrs HW=576.79' (Free Discharge)

- ↑ **1=8" pipe** (Barrel Controls 3.19 cfs @ 9.15 fps)
- ↑ **2=Grate** (Passes < 3.60 cfs potential flow)
- ↑ **3=Exfiltration** (Passes < 0.07 cfs potential flow)

Secondary OutFlow Max=0.61 cfs @ 12.21 hrs HW=576.79' (Free Discharge)

- ↑ **4=Broad-Crested Rectangular Weir** (Weir Controls 0.61 cfs @ 0.56 fps)

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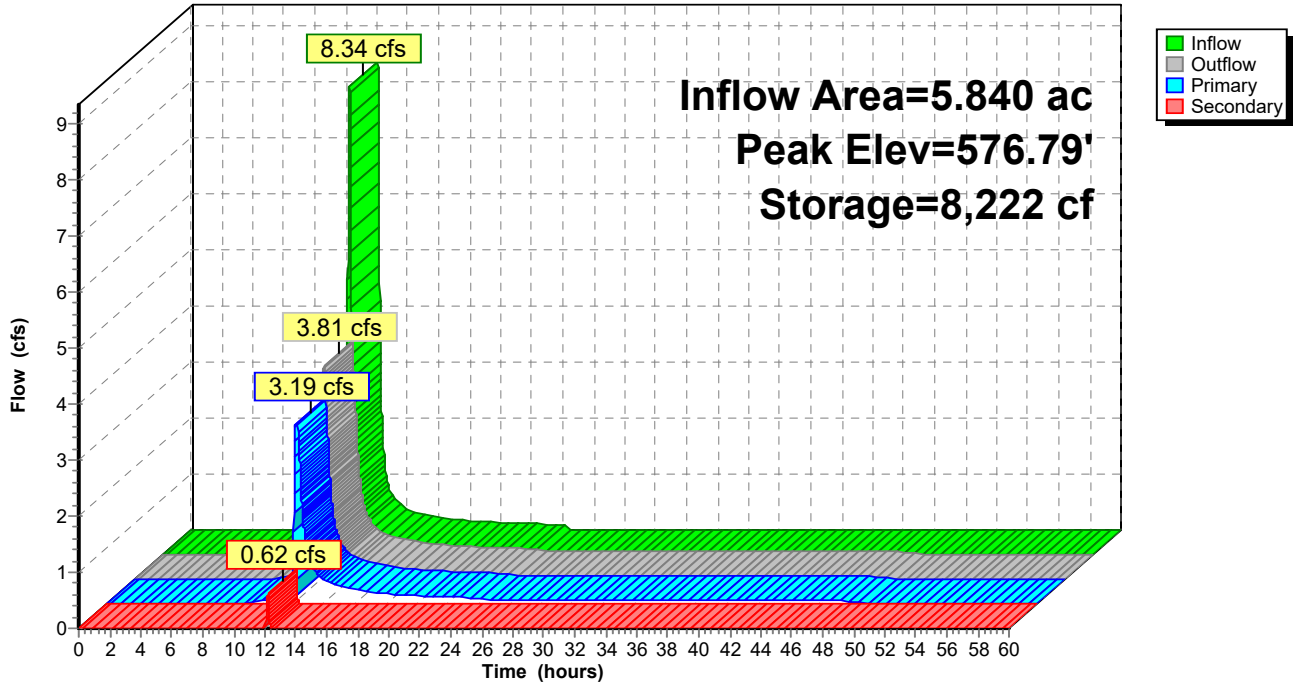
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Pond 1P: Bioretention Area #1

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Summary for Pond 2P: Detention Basin (SMA #1)

Inflow Area = 5.680 ac, 51.06% Impervious, Inflow Depth = 0.93" for 1-Year event
 Inflow = 6.85 cfs @ 12.07 hrs, Volume= 0.438 af
 Outflow = 0.11 cfs @ 20.05 hrs, Volume= 0.278 af, Atten= 98%, Lag= 479.0 min
 Primary = 0.11 cfs @ 20.05 hrs, Volume= 0.278 af
 Routed to Link 1L : Outflow to Dodge Rd (@ CB 54)
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Routed to Link 2L : Total Outflow from Proposed Site

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
 Peak Elev= 575.24' @ 20.05 hrs Surf.Area= 61,078 sf Storage= 14,689 cf

Plug-Flow detention time= 1,123.1 min calculated for 0.278 af (63% of inflow)
 Center-of-Mass det. time= 1,010.9 min (1,848.7 - 837.8)

Volume	Invert	Avail.Storage	Storage Description
#1	575.00'	118,224 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
575.00	59,213	0	0
576.00	66,849	63,031	63,031
576.80	71,134	55,193	118,224

Device	Routing	Invert	Outlet Devices
#1	Primary	574.00'	12.0" Round 12" outlet pipe L= 160.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 574.00' / 573.79' S= 0.0013 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	575.00'	6.0" Round low flow outlet pipe L= 10.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 575.00' / 574.95' S= 0.0050 '/' Cc= 0.900 n= 0.010 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#3	Device 1	576.50'	30.0" x 30.0" Horiz. Grate C= 0.600 Limited to weir flow at low heads
#4	Secondary	576.12'	20.0' long (Profile 1) Broad-Crested Rectangular Weir X 2.00 Head (feet) 0.49 0.98 1.48 Coef. (English) 2.92 3.37 3.59

Primary OutFlow Max=0.11 cfs @ 20.05 hrs HW=575.24' (Free Discharge)

- ↑ 1=12" outlet pipe (Passes 0.11 cfs of 1.87 cfs potential flow)
- ↑ 2=low flow outlet pipe (Barrel Controls 0.11 cfs @ 1.75 fps)
- ↑ 3=Grate (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=575.00' (Free Discharge)

- ↑ 4=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

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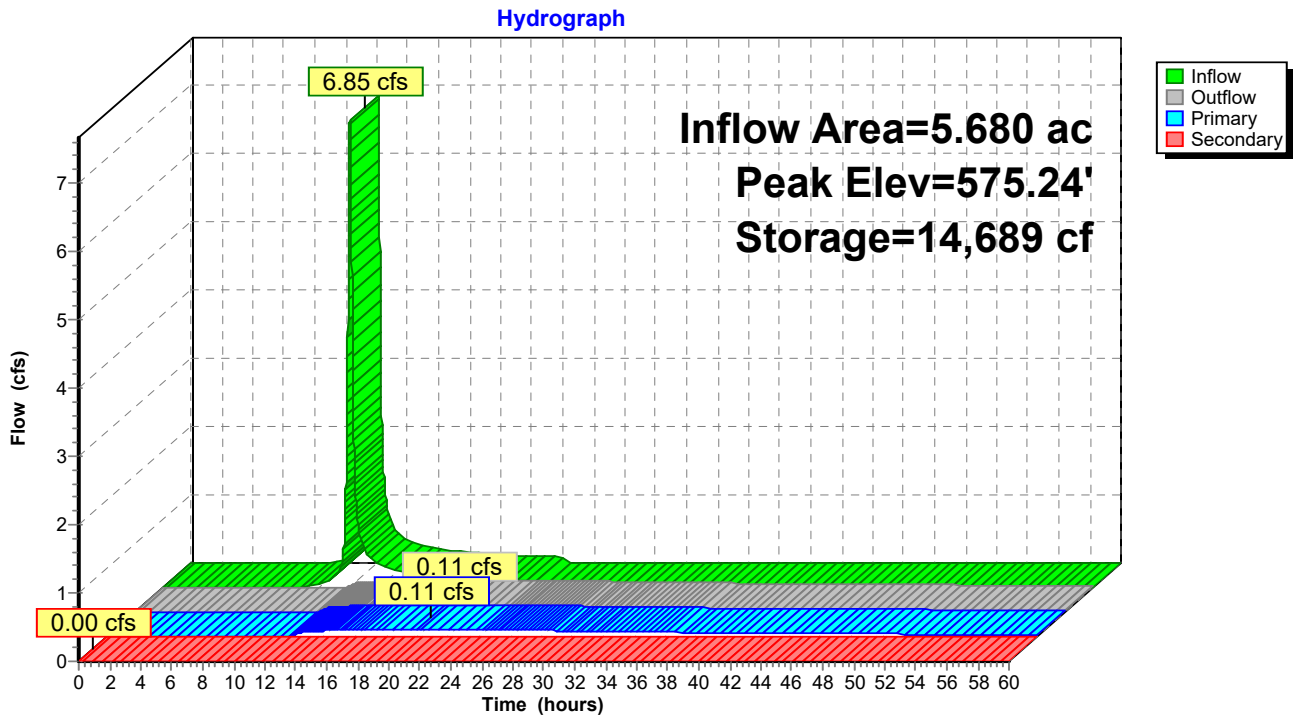
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Pond 2P: Detention Basin (SMA #1)



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Summary for Pond 2P WQ: WQv (SMA #1)

[43] Hint: Has no inflow (Outflow=Zero)

Volume	Invert	Avail.Storage	Storage Description
#1	563.00'	152,678 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
563.00	710	0	0
564.00	1,152	931	931
565.00	1,725	1,439	2,370
566.00	2,430	2,078	4,447
567.00	3,302	2,866	7,313
568.00	4,386	3,844	11,157
569.00	7,838	6,112	17,269
570.00	11,596	9,717	26,986
571.00	15,606	13,601	40,587
572.00	20,106	17,856	58,443
573.00	24,865	22,486	80,929
574.00	29,710	27,288	108,216
575.00	59,213	44,462	152,678

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Summary for Pond 3P: Underground Storage (SMA #2)

Inflow Area = 4.450 ac, 60.67% Impervious, Inflow Depth = 1.05" for 1-Year event
 Inflow = 2.53 cfs @ 12.06 hrs, Volume= 0.391 af
 Outflow = 0.45 cfs @ 13.20 hrs, Volume= 0.347 af, Atten= 82%, Lag= 68.2 min
 Primary = 0.45 cfs @ 13.20 hrs, Volume= 0.347 af
 Routed to Link 2L : Total Outflow from Proposed Site

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
 Peak Elev= 570.36' @ 13.20 hrs Surf.Area= 10,145 sf Storage= 5,094 cf

Plug-Flow detention time= 420.2 min calculated for 0.347 af (89% of inflow)
 Center-of-Mass det. time= 253.0 min (1,462.0 - 1,209.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	569.50'	8,947 cf	53.75'W x 188.74'L x 3.50'H Field A 35,506 cf Overall - 13,139 cf Embedded = 22,367 cf x 40.0% Voids
#2A	570.00'	13,139 cf	ADS_StormTech SC-740 +Cap x 286 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 286 Chambers in 11 Rows
		22,086 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	569.93'	12.0" Round Culvert L= 72.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 569.93' / 569.71' S= 0.0031 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	569.93'	4.0" Vert. Orifice X 3.00 C= 0.600 Limited to weir flow at low heads
#3	Device 1	572.00'	5.0' long Weir 2 End Contraction(s)

Primary OutFlow Max=0.45 cfs @ 13.20 hrs HW=570.36' (Free Discharge)

- ↑ **1=Culvert** (Barrel Controls 0.45 cfs @ 2.06 fps)
- ↑ **2=Orifice** (Passes 0.45 cfs of 0.65 cfs potential flow)
- ↑ **3=Weir** (Controls 0.00 cfs)

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Pond 3P: Underground Storage (SMA #2) - Chamber Wizard Field A

Chamber Model = ADS_StormTechSC-740 +Cap (ADS StormTech®SC-740 with cap length)

Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf

Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

26 Chambers/Row x 7.12' Long +0.81' Cap Length x 2 = 186.74' Row Length +12.0" End Stone x 2 = 188.74' Base Length

11 Rows x 51.0" Wide + 6.0" Spacing x 10 + 12.0" Side Stone x 2 = 53.75' Base Width

6.0" Stone Base + 30.0" Chamber Height + 6.0" Stone Cover = 3.50' Field Height

286 Chambers x 45.9 cf = 13,138.8 cf Chamber Storage

35,506.1 cf Field - 13,138.8 cf Chambers = 22,367.2 cf Stone x 40.0% Voids = 8,946.9 cf Stone Storage

Chamber Storage + Stone Storage = 22,085.7 cf = 0.507 af

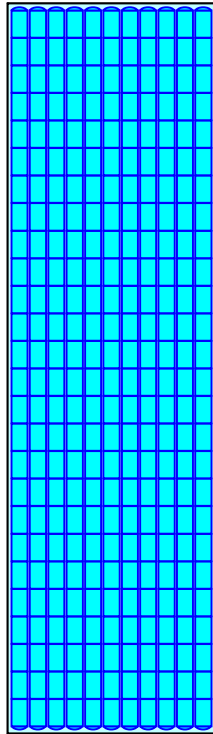
Overall Storage Efficiency = 62.2%

Overall System Size = 188.74' x 53.75' x 3.50'

286 Chambers

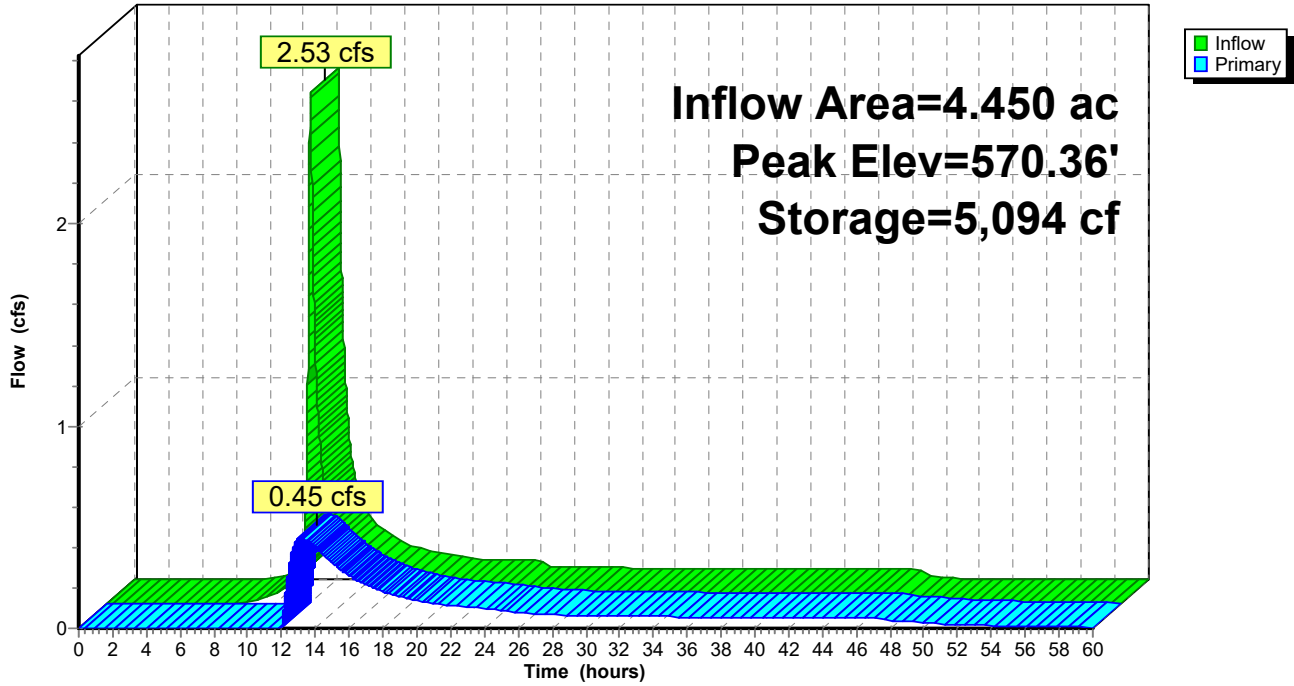
1,315.0 cy Field

828.4 cy Stone



Pond 3P: Underground Storage (SMA #2)

Hydrograph



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Type II 24-hr 1-Year Rainfall=1.86"

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Summary for Pond 4P: Bioretention Area #2

Inflow Area = 2.550 ac, 65.49% Impervious, Inflow Depth = 1.11" for 1-Year event
 Inflow = 4.47 cfs @ 12.01 hrs, Volume= 0.236 af
 Outflow = 0.60 cfs @ 12.37 hrs, Volume= 0.236 af, Atten= 87%, Lag= 21.9 min
 Primary = 0.60 cfs @ 12.37 hrs, Volume= 0.236 af
 Routed to Pond 3P : Underground Storage (SMA #2)

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
 Peak Elev= 575.55' @ 12.37 hrs Surf.Area= 9,828 sf Storage= 5,080 cf

Plug-Flow detention time= 635.2 min calculated for 0.236 af (100% of inflow)
 Center-of-Mass det. time= 635.4 min (1,454.1 - 818.7)

Volume	Invert	Avail.Storage	Storage Description
#1	575.00'	21,391 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
575.00	8,798	0	0
576.00	10,686	9,742	9,742
577.00	12,612	11,649	21,391

Device	Routing	Invert	Outlet Devices
#1	Primary	571.41'	8.0" Round Pipe L= 41.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 571.41' / 571.30' S= 0.0027 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#2	Device 1	575.50'	8.0" Horiz. Grate X 8.00 C= 0.600 Limited to weir flow at low heads
#3	Device 1	575.00'	0.250 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 560.00'
#4	Device 1	575.75'	24.0" x 24.0" Horiz. Grate (overflow) C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.59 cfs @ 12.37 hrs HW=575.55' (Free Discharge)

- ↑ **1=Pipe** (Passes 0.59 cfs of 2.75 cfs potential flow)
- ↑ **2=Grate** (Weir Controls 0.53 cfs @ 0.70 fps)
- ↑ **3=Exfiltration** (Controls 0.06 cfs)
- ↑ **4=Grate (overflow)** (Controls 0.00 cfs)

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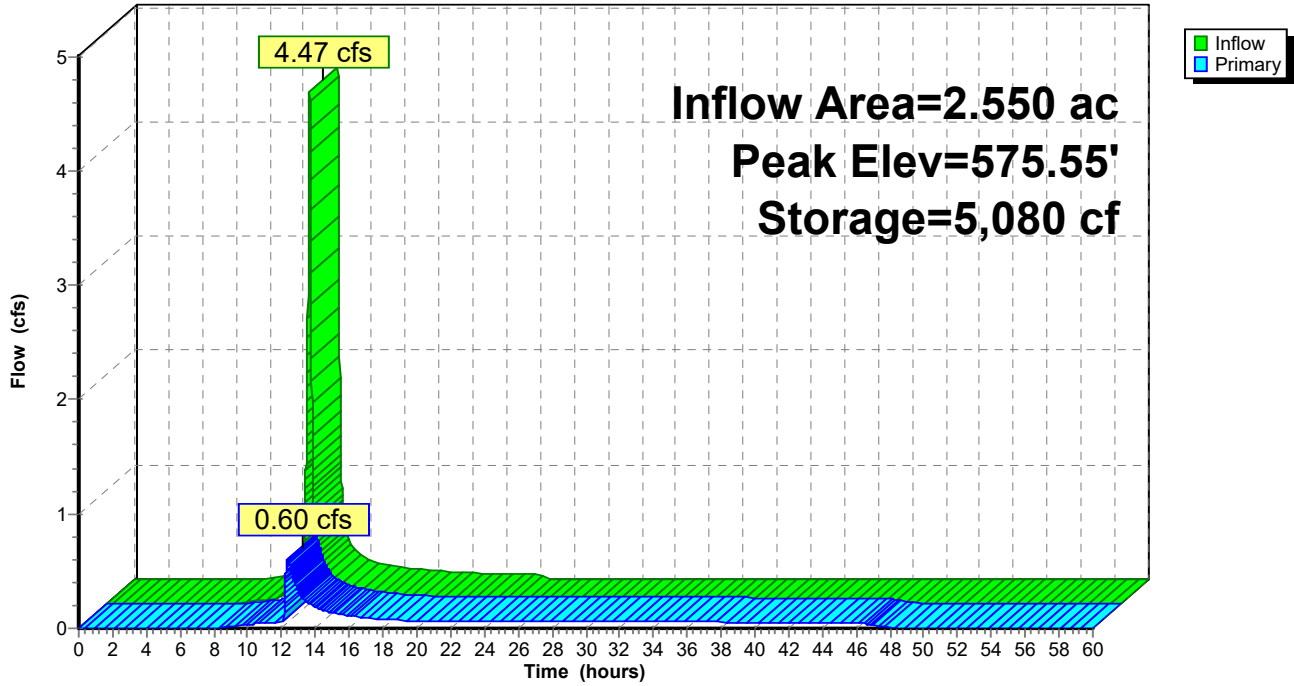
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Pond 4P: Bioretention Area #2

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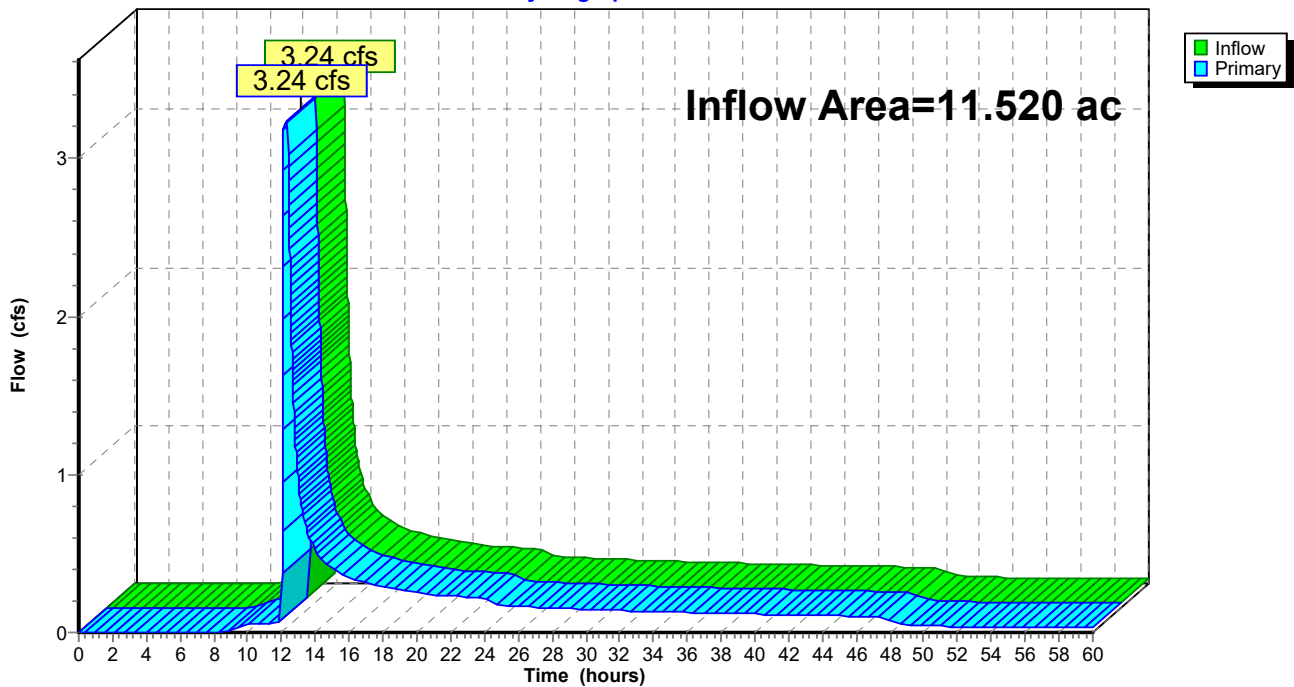
Summary for Link 1L: Outflow to Dodge Rd (@ CB 54)

Inflow Area = 11.520 ac, 55.30% Impervious, Inflow Depth > 0.81" for 1-Year event
Inflow = 3.24 cfs @ 12.26 hrs, Volume= 0.779 af
Primary = 3.24 cfs @ 12.26 hrs, Volume= 0.779 af, Atten= 0%, Lag= 0.0 min
Routed to Link 2L : Total Outflow from Proposed Site

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

Link 1L: Outflow to Dodge Rd (@ CB 54)

Hydrograph



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Type II 24-hr 1-Year Rainfall=1.86"

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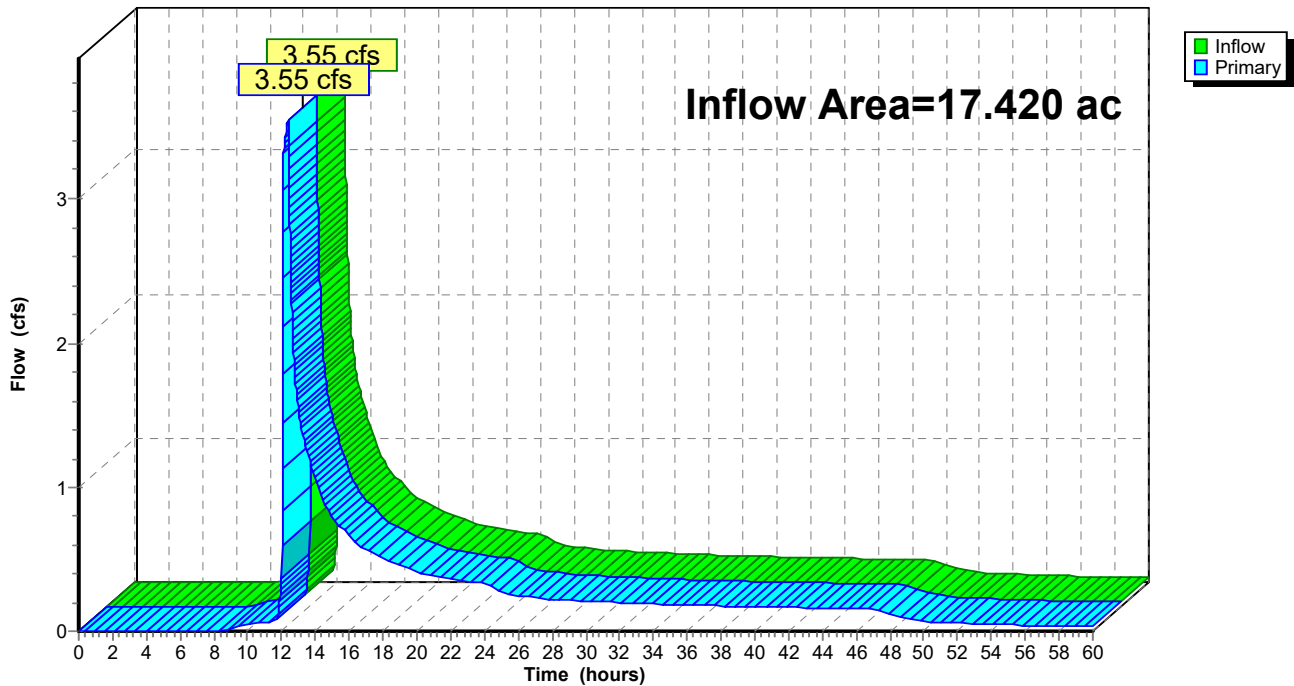
Summary for Link 2L: Total Outflow from Proposed Site

Inflow Area = 17.420 ac, 52.24% Impervious, Inflow Depth > 0.81" for 1-Year event
Inflow = 3.55 cfs @ 12.37 hrs, Volume= 1.182 af
Primary = 3.55 cfs @ 12.37 hrs, Volume= 1.182 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

Link 2L: Total Outflow from Proposed Site

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Type II 24-hr 2-Year Rainfall=2.20"

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Time span=0.00-60.00 hrs, dt=0.01 hrs, 6001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Front Area 1 Runoff Area=5.840 ac 59.42% Impervious Runoff Depth=1.34"
Flow Length=652' Tc=13.3 min CN=91 Runoff=10.67 cfs 0.652 af

Subcatchment2S: Rear Area 1 Runoff Area=5.680 ac 51.06% Impervious Runoff Depth=1.20"
Flow Length=683' Tc=14.4 min CN=89 Runoff=8.97 cfs 0.566 af

Subcatchment3S: Front Area 2 Runoff Area=1.900 ac 54.21% Impervious Runoff Depth=1.27"
Flow Length=1,325' Slope=0.0100 '/' Tc=14.1 min CN=90 Runoff=3.21 cfs 0.201 af

Subcatchment4S: Rear Area 2 Runoff Area=2.550 ac 65.49% Impervious Runoff Depth=1.42"
Flow Length=345' Tc=9.1 min CN=92 Runoff=5.65 cfs 0.301 af

Subcatchment5S: Unrestricted Runoff Areas Runoff Area=0.120 ac 0.00% Impervious Runoff Depth=0.69"
Flow Length=25' Slope=0.3300 '/' Tc=5.0 min CN=80 Runoff=0.15 cfs 0.007 af

Subcatchment6S: Unrestricted Runoff Runoff Area=0.180 ac 16.67% Impervious Runoff Depth=0.84"
Flow Length=40' Slope=0.3300 '/' Tc=5.0 min CN=83 Runoff=0.28 cfs 0.013 af

Subcatchment7S: Unrestricted Permanent Runoff Area=1.150 ac 0.00% Impervious Runoff Depth=0.64"
Flow Length=465' Slope=0.0020 '/' Tc=107.9 min CN=79 Runoff=0.23 cfs 0.062 af

Pond 1P: Bioretention Area #1 Peak Elev=576.88' Storage=9,282 cf Inflow=10.67 cfs 0.652 af
Primary=3.23 cfs 0.588 af Secondary=4.20 cfs 0.065 af Outflow=7.43 cfs 0.652 af

Pond 2P: Detention Basin (SMA #1) Peak Elev=575.34' Storage=20,420 cf Inflow=11.88 cfs 0.631 af
Primary=0.20 cfs 0.444 af Secondary=0.00 cfs 0.000 af Outflow=0.20 cfs 0.444 af

Pond 2P WQ: WQv (SMA #1) Peak Elev=0.00' Storage=0 cf

Pond 3P: Underground Storage (SMA #2) Peak Elev=570.59' Storage=7,033 cf Inflow=4.74 cfs 0.502 af
Outflow=0.89 cfs 0.458 af

Pond 4P: Bioretention Area #2 Peak Elev=575.61' Storage=5,701 cf Inflow=5.65 cfs 0.301 af
Outflow=2.02 cfs 0.301 af

Link 1L: Outflow to Dodge Rd (@ CB 54) Inflow=3.32 cfs 1.032 af
Primary=3.32 cfs 1.032 af

Link 2L: Total Outflow from Proposed Site Inflow=4.28 cfs 1.571 af
Primary=4.28 cfs 1.571 af

Total Runoff Area = 17.420 ac Runoff Volume = 1.801 af Average Runoff Depth = 1.24"
47.76% Pervious = 8.320 ac 52.24% Impervious = 9.100 ac

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Type II 24-hr 2-Year Rainfall=2.20"

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Summary for Subcatchment 1S: Front Area 1

Runoff = 10.67 cfs @ 12.05 hrs, Volume= 0.652 af, Depth= 1.34"
 Routed to Pond 1P : Bioretention Area #1

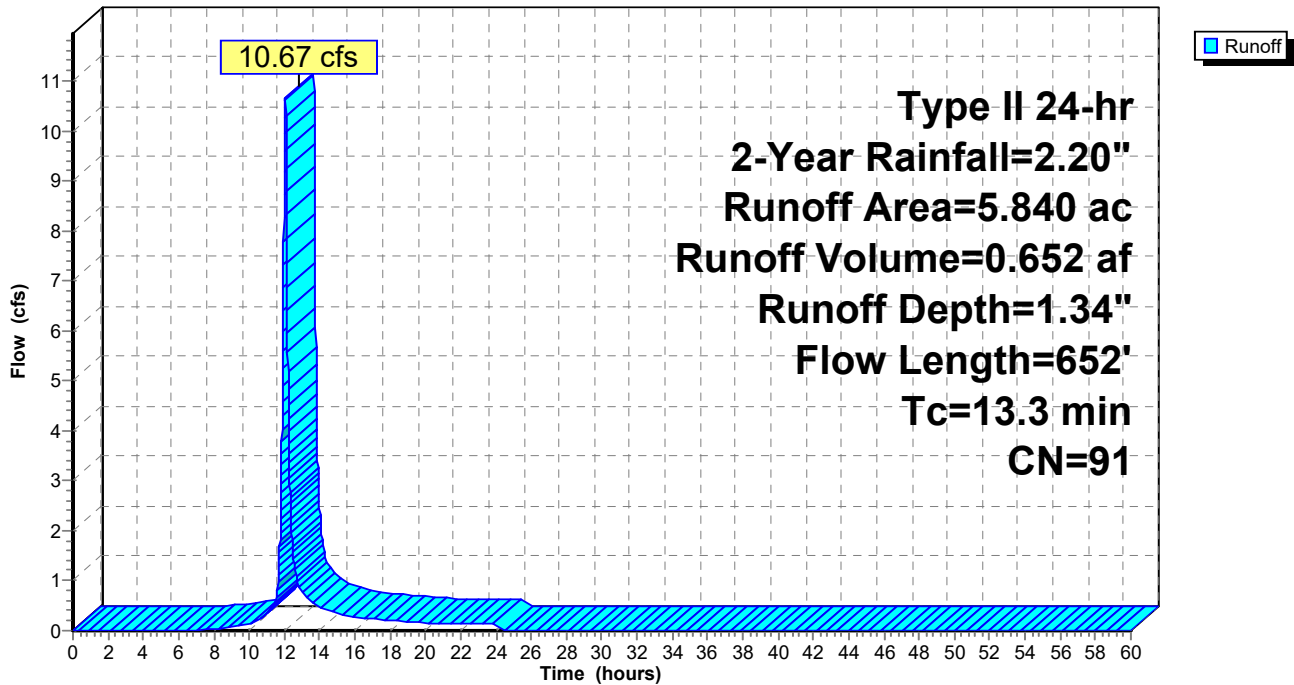
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
 Type II 24-hr 2-Year Rainfall=2.20"

Area (ac)	CN	Description
3.470	98	Impervious
2.370	80	>75% Grass cover, Good, HSG D
5.840	91	Weighted Average
2.370		40.58% Pervious Area
3.470		59.42% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.6	37	0.0100	0.06		Sheet Flow, grass Grass: Dense n= 0.240 P2= 2.50"
0.4	15	0.0120	0.68		Sheet Flow, pavement Smooth surfaces n= 0.011 P2= 2.50"
3.3	600		3.00		Direct Entry, pipe flow
13.3	652	Total			

Subcatchment 1S: Front Area 1

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Type II 24-hr 2-Year Rainfall=2.20"

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Summary for Subcatchment 2S: Rear Area 1

Runoff = 8.97 cfs @ 12.06 hrs, Volume= 0.566 af, Depth= 1.20"

Routed to Pond 2P : Detention Basin (SMA #1)

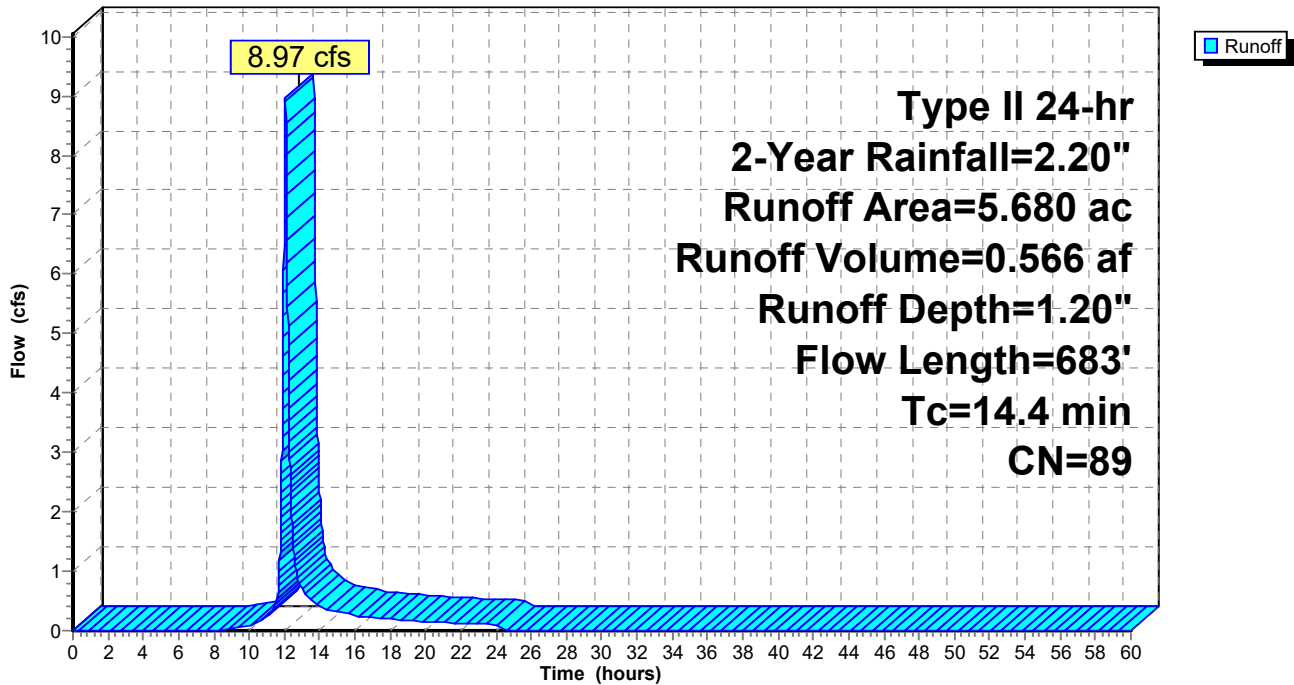
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 2-Year Rainfall=2.20"

Area (ac)	CN	Description
2.900	98	Impervious
2.780	80	>75% Grass cover, Good, HSG D
5.680	89	Weighted Average
2.780		48.94% Pervious Area
2.900		51.06% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.2	90	0.0200	0.15		Sheet Flow, grass Grass: Short n= 0.150 P2= 2.50"
1.3	75	0.0130	0.97		Sheet Flow, pavement Smooth surfaces n= 0.011 P2= 2.50"
2.9	518		3.00		Direct Entry, Pipe flow
14.4	683				Total

Subcatchment 2S: Rear Area 1

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Type II 24-hr 2-Year Rainfall=2.20"

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Summary for Subcatchment 3S: Front Area 2

Runoff = 3.21 cfs @ 12.06 hrs, Volume= 0.201 af, Depth= 1.27"

Routed to Pond 3P : Underground Storage (SMA #2)

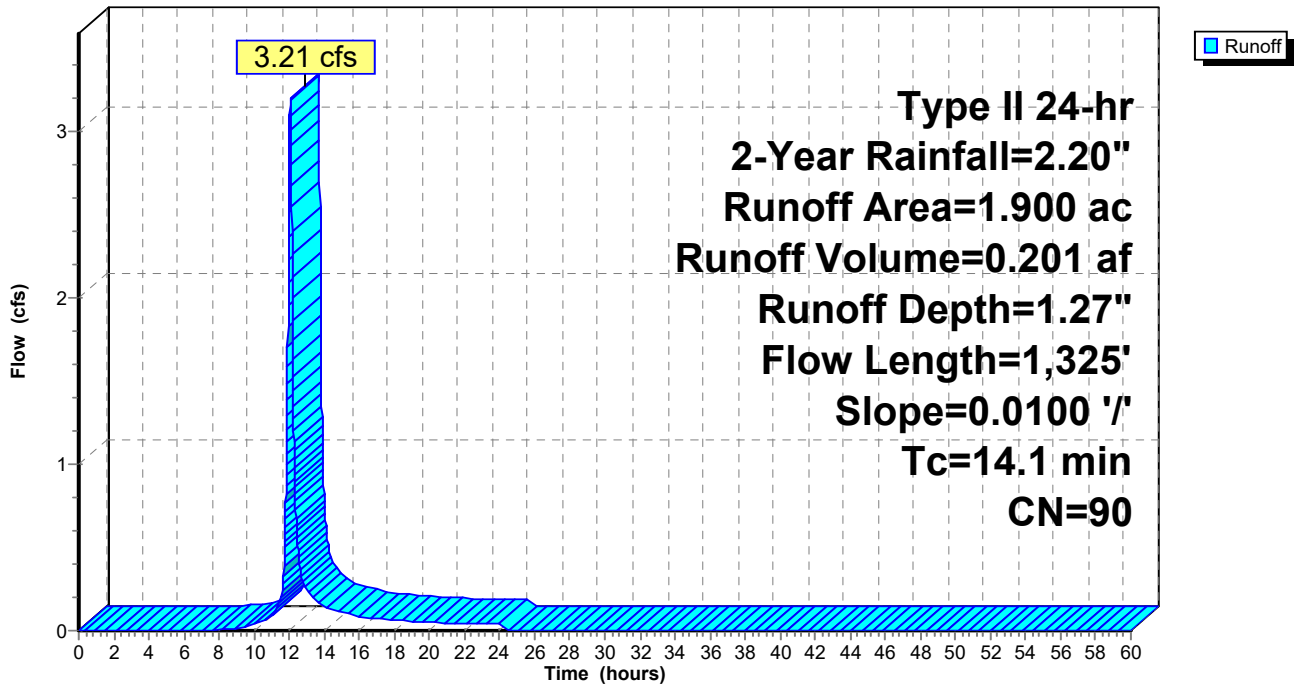
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
 Type II 24-hr 2-Year Rainfall=2.20"

Area (ac)	CN	Description
* 1.030	98	Impervious
0.870	80	>75% Grass cover, Good, HSG D
1.900	90	Weighted Average
0.870		45.79% Pervious Area
1.030		54.21% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0	40	0.0100	0.09		Sheet Flow, grass
7.1	1,285		3.00		Grass: Short n= 0.150 P2= 2.50" Direct Entry, Pipe flow
14.1	1,325				Total

Subcatchment 3S: Front Area 2

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Type II 24-hr 2-Year Rainfall=2.20"

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Summary for Subcatchment 4S: Rear Area 2

Runoff = 5.65 cfs @ 12.00 hrs, Volume= 0.301 af, Depth= 1.42"
 Routed to Pond 4P : Bioretention Area #2

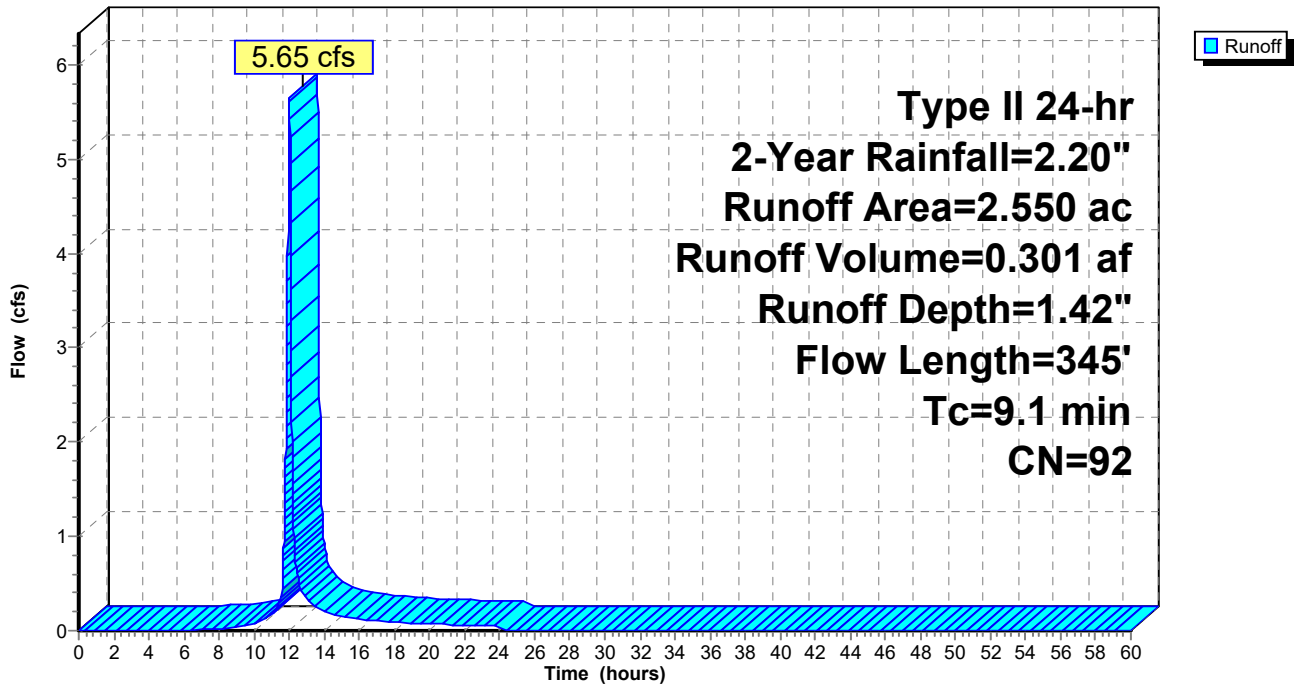
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
 Type II 24-hr 2-Year Rainfall=2.20"

Area (ac)	CN	Description
1.670	98	Impervious
0.880	80	>75% Grass cover, Good, HSG D
2.550	92	Weighted Average
0.880		34.51% Pervious Area
1.670		65.49% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.9	55	0.0200	0.13		Sheet Flow, grass Grass: Short n= 0.150 P2= 2.50"
0.8	45	0.0170	0.97		Sheet Flow, pavement Smooth surfaces n= 0.011 P2= 2.50"
1.4	245		3.00		Direct Entry, Pipe flow
9.1	345	Total			

Subcatchment 4S: Rear Area 2

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Type II 24-hr 2-Year Rainfall=2.20"

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Summary for Subcatchment 5S: Unrestricted Runoff Areas

Runoff = 0.15 cfs @ 11.97 hrs, Volume= 0.007 af, Depth= 0.69"

Routed to Link 2L : Total Outflow from Proposed Site

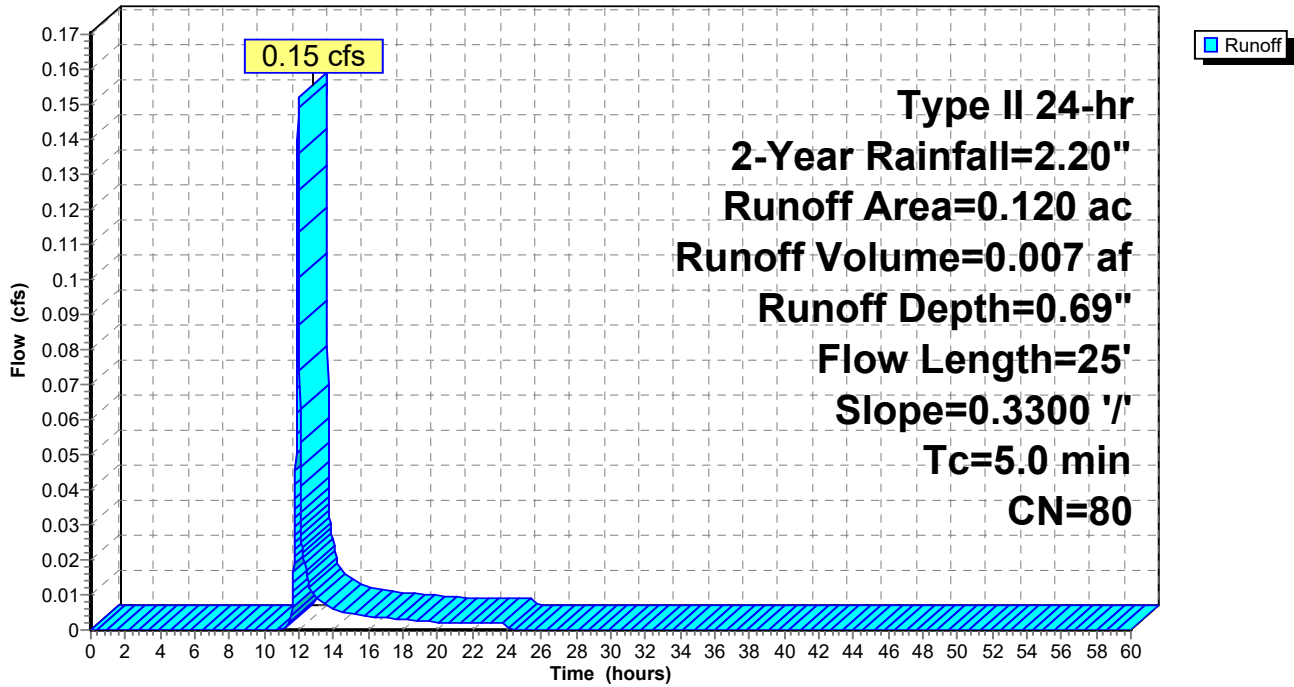
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
 Type II 24-hr 2-Year Rainfall=2.20"

Area (ac)	CN	Description
0.120	80	>75% Grass cover, Good, HSG D
0.120		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	25	0.3300	0.35		Sheet Flow, grass
					Grass: Short n= 0.150 P2= 2.50"
1.2	25	Total, Increased to minimum Tc = 5.0 min			

Subcatchment 5S: Unrestricted Runoff Areas

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Type II 24-hr 2-Year Rainfall=2.20"

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Summary for Subcatchment 6S: Unrestricted Runoff Areas

Runoff = 0.28 cfs @ 11.97 hrs, Volume= 0.013 af, Depth= 0.84"

Routed to Link 2L : Total Outflow from Proposed Site

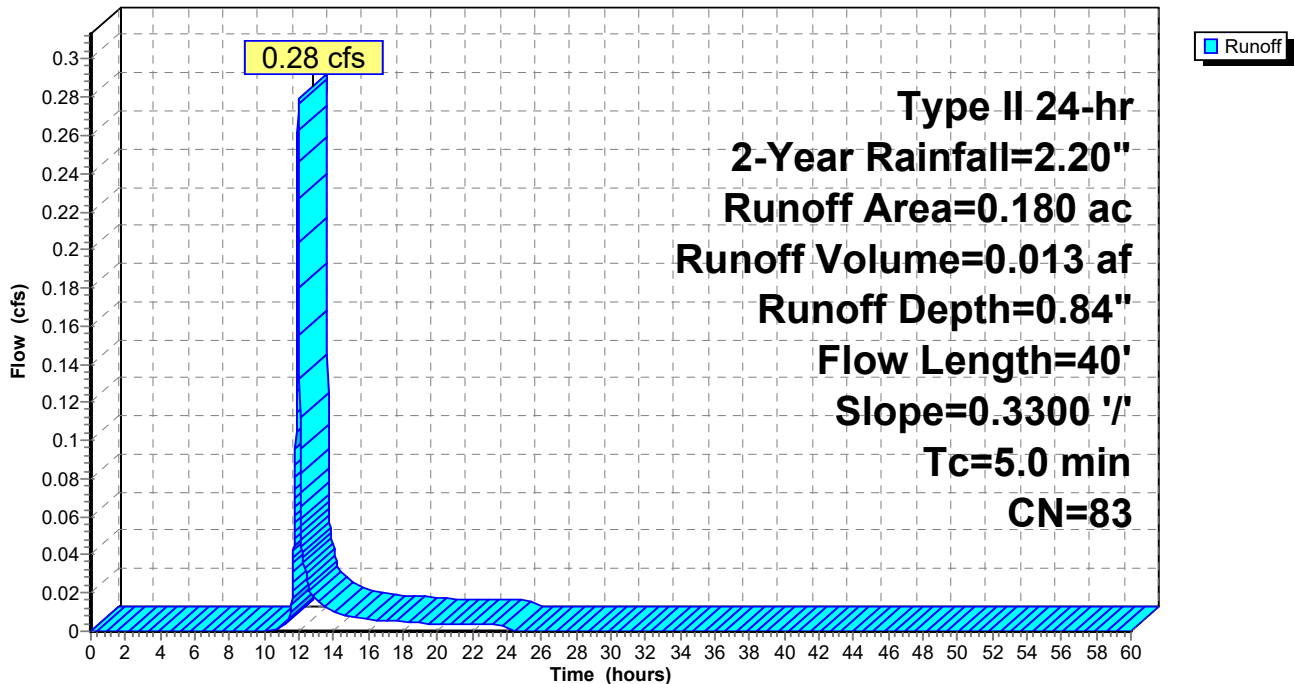
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 2-Year Rainfall=2.20"

Area (ac)	CN	Description
0.150	80	>75% Grass cover, Good, HSG D
* 0.030	98	Impervious
0.180	83	Weighted Average
0.150		83.33% Pervious Area
0.030		16.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.7	40	0.3300	0.38		Sheet Flow, grass Grass: Short n= 0.150 P2= 2.50"
1.7	40	Total, Increased to minimum Tc = 5.0 min			

Subcatchment 6S: Unrestricted Runoff Areas

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Summary for Subcatchment 7S: Unrestricted Permanent Open Space

Runoff = 0.23 cfs @ 13.31 hrs, Volume= 0.062 af, Depth= 0.64"

Routed to Link 2L : Total Outflow from Proposed Site

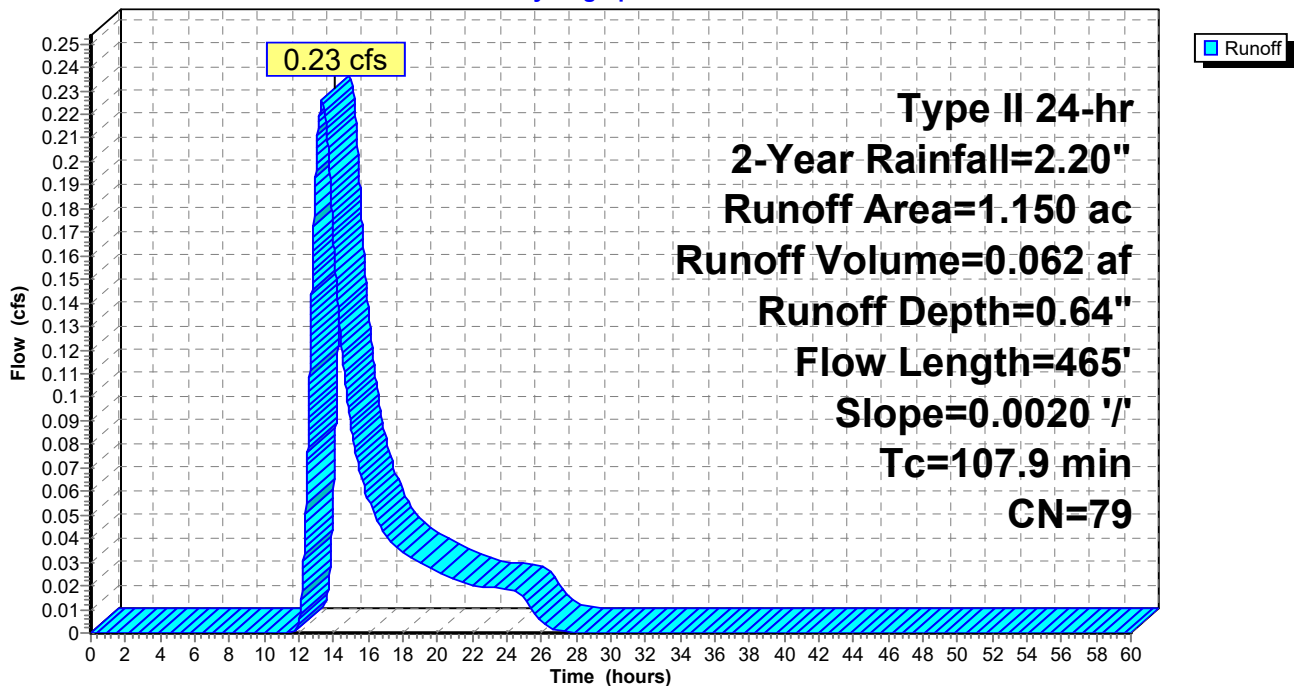
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
 Type II 24-hr 2-Year Rainfall=2.20"

Area (ac)	CN	Description
1.150	79	Woods, Fair, HSG D
1.150		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
84.4	150	0.0020	0.03		Sheet Flow, woods
23.5	315	0.0020	0.22		Shallow Concentrated Flow, woods
					Woodland Kv= 5.0 fps
107.9	465	Total			

Subcatchment 7S: Unrestricted Permanent Open Space

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Type II 24-hr 2-Year Rainfall=2.20"

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Summary for Pond 1P: Bioretention Area #1

Inflow Area = 5.840 ac, 59.42% Impervious, Inflow Depth = 1.34" for 2-Year event
Inflow = 10.67 cfs @ 12.05 hrs, Volume= 0.652 af
Outflow = 7.43 cfs @ 12.15 hrs, Volume= 0.652 af, Atten= 30%, Lag= 5.9 min
Primary = 3.23 cfs @ 12.15 hrs, Volume= 0.588 af
Routed to Link 1L : Outflow to Dodge Rd (@ CB 54)
Secondary = 4.20 cfs @ 12.15 hrs, Volume= 0.065 af
Routed to Pond 2P : Detention Basin (SMA #1)

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 576.88' @ 12.15 hrs Surf.Area= 11,169 sf Storage= 9,282 cf

Plug-Flow detention time= 284.8 min calculated for 0.652 af (100% of inflow)
Center-of-Mass det. time= 284.8 min (1,105.8 - 821.0)

Volume	Invert	Avail.Storage	Storage Description
#1	576.00'	16,618 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
576.00	9,925	0	0
576.50	10,585	5,128	5,128
577.00	11,350	5,484	10,611
577.50	12,675	6,006	16,618

Device	Routing	Invert	Outlet Devices
#1	Primary	572.50'	8.0" Round 8" pipe L= 25.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 572.50' / 572.42' S= 0.0032 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#2	Device 1	576.50'	8.0" Horiz. Grate X 4.00 C= 0.600 Limited to weir flow at low heads
#3	Device 1	576.00'	0.250 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 560.00'
#4	Secondary	576.75'	30.0' long (Profile 1) Broad-Crested Rectangular Weir Head (feet) 0.49 0.98 1.48 Coef. (English) 2.92 3.37 3.59

Primary OutFlow Max=3.23 cfs @ 12.15 hrs HW=576.88' (Free Discharge)

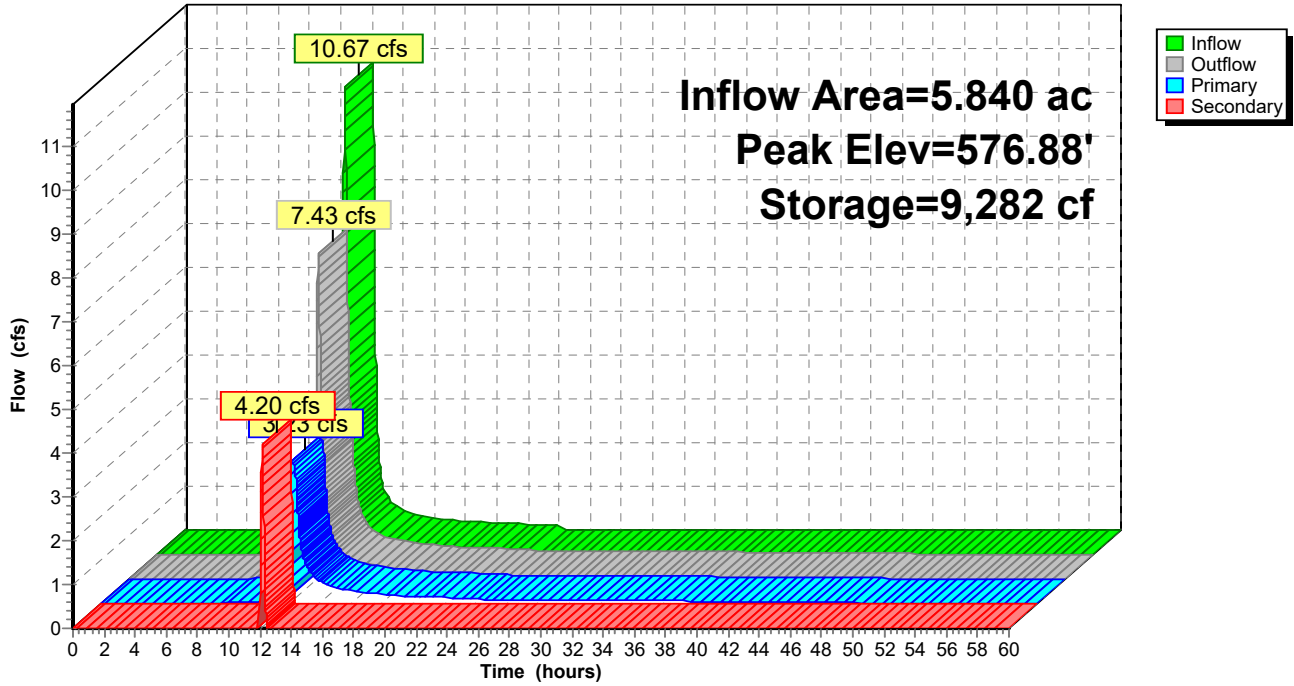
- ↑ **1=8" pipe** (Barrel Controls 3.23 cfs @ 9.26 fps)
- ↑ **2=Grate** (Passes < 4.15 cfs potential flow)
- ↑ **3=Exfiltration** (Passes < 0.07 cfs potential flow)

Secondary OutFlow Max=4.19 cfs @ 12.15 hrs HW=576.88' (Free Discharge)

- ↑ **4=Broad-Crested Rectangular Weir** (Weir Controls 4.19 cfs @ 1.06 fps)

Pond 1P: Bioretention Area #1

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Type II 24-hr 2-Year Rainfall=2.20"

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Summary for Pond 2P: Detention Basin (SMA #1)

Inflow Area = 5.680 ac, 51.06% Impervious, Inflow Depth = 1.33" for 2-Year event
 Inflow = 11.88 cfs @ 12.12 hrs, Volume= 0.631 af
 Outflow = 0.20 cfs @ 17.79 hrs, Volume= 0.444 af, Atten= 98%, Lag= 340.4 min
 Primary = 0.20 cfs @ 17.79 hrs, Volume= 0.444 af
 Routed to Link 1L : Outflow to Dodge Rd (@ CB 54)
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Routed to Link 2L : Total Outflow from Proposed Site

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
 Peak Elev= 575.34' @ 17.79 hrs Surf.Area= 61,790 sf Storage= 20,420 cf

Plug-Flow detention time= 1,041.1 min calculated for 0.444 af (70% of inflow)
 Center-of-Mass det. time= 945.6 min (1,767.0 - 821.3)

Volume	Invert	Avail.Storage	Storage Description
#1	575.00'	118,224 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
575.00	59,213	0	0
576.00	66,849	63,031	63,031
576.80	71,134	55,193	118,224

Device	Routing	Invert	Outlet Devices
#1	Primary	574.00'	12.0" Round 12" outlet pipe L= 160.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 574.00' / 573.79' S= 0.0013 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	575.00'	6.0" Round low flow outlet pipe L= 10.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 575.00' / 574.95' S= 0.0050 '/' Cc= 0.900 n= 0.010 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#3	Device 1	576.50'	30.0" x 30.0" Horiz. Grate C= 0.600 Limited to weir flow at low heads
#4	Secondary	576.12'	20.0' long (Profile 1) Broad-Crested Rectangular Weir X 2.00 Head (feet) 0.49 0.98 1.48 Coef. (English) 2.92 3.37 3.59

Primary OutFlow Max=0.20 cfs @ 17.79 hrs HW=575.34' (Free Discharge)

- ↑ 1=12" outlet pipe (Passes 0.20 cfs of 1.83 cfs potential flow)
- ↑ 2=low flow outlet pipe (Barrel Controls 0.20 cfs @ 2.00 fps)
- ↑ 3=Grate (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=575.00' (Free Discharge)

- ↑ 4=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

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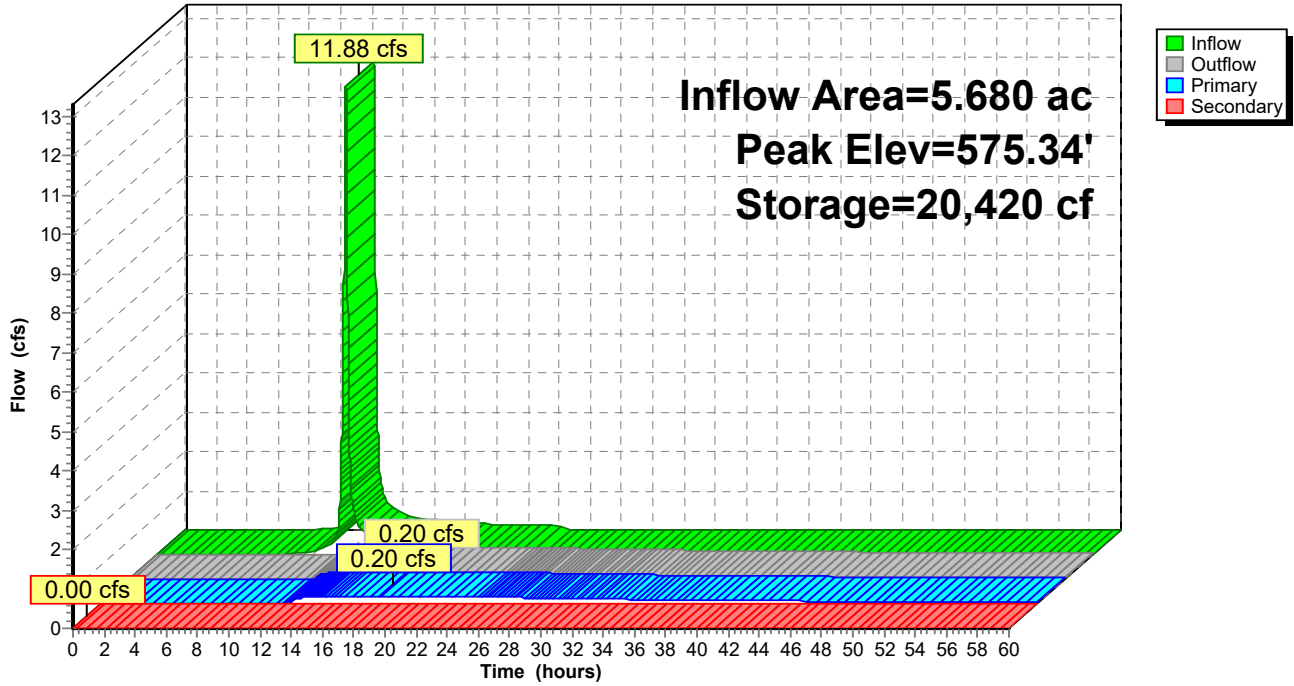
Type II 24-hr 2-Year Rainfall=2.20"

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Pond 2P: Detention Basin (SMA #1)

Hydrograph



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Summary for Pond 2P WQ: WQv (SMA #1)

[43] Hint: Has no inflow (Outflow=Zero)

Volume	Invert	Avail.Storage	Storage Description
#1	563.00'	152,678 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
563.00	710	0	0
564.00	1,152	931	931
565.00	1,725	1,439	2,370
566.00	2,430	2,078	4,447
567.00	3,302	2,866	7,313
568.00	4,386	3,844	11,157
569.00	7,838	6,112	17,269
570.00	11,596	9,717	26,986
571.00	15,606	13,601	40,587
572.00	20,106	17,856	58,443
573.00	24,865	22,486	80,929
574.00	29,710	27,288	108,216
575.00	59,213	44,462	152,678

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Summary for Pond 3P: Underground Storage (SMA #2)

Inflow Area = 4.450 ac, 60.67% Impervious, Inflow Depth = 1.35" for 2-Year event
 Inflow = 4.74 cfs @ 12.11 hrs, Volume= 0.502 af
 Outflow = 0.89 cfs @ 12.70 hrs, Volume= 0.458 af, Atten= 81%, Lag= 35.3 min
 Primary = 0.89 cfs @ 12.70 hrs, Volume= 0.458 af
 Routed to Link 2L : Total Outflow from Proposed Site

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
 Peak Elev= 570.59' @ 12.70 hrs Surf.Area= 10,145 sf Storage= 7,033 cf

Plug-Flow detention time= 344.0 min calculated for 0.458 af (91% of inflow)
 Center-of-Mass det. time= 205.9 min (1,333.2 - 1,127.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	569.50'	8,947 cf	53.75'W x 188.74'L x 3.50'H Field A 35,506 cf Overall - 13,139 cf Embedded = 22,367 cf x 40.0% Voids
#2A	570.00'	13,139 cf	ADS_StormTech SC-740 +Cap x 286 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 286 Chambers in 11 Rows
		22,086 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	569.93'	12.0" Round Culvert L= 72.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 569.93' / 569.71' S= 0.0031 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	569.93'	4.0" Vert. Orifice X 3.00 C= 0.600 Limited to weir flow at low heads
#3	Device 1	572.00'	5.0' long Weir 2 End Contraction(s)

Primary OutFlow Max=0.89 cfs @ 12.70 hrs HW=570.59' (Free Discharge)

- ↑ **1=Culvert** (Passes 0.89 cfs of 0.99 cfs potential flow)
- ↑ **2=Orifice** (Orifice Controls 0.89 cfs @ 3.38 fps)
- ↑ **3=Weir** (Controls 0.00 cfs)

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Pond 3P: Underground Storage (SMA #2) - Chamber Wizard Field A

Chamber Model = ADS_StormTechSC-740 +Cap (ADS StormTech®SC-740 with cap length)

Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf

Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

26 Chambers/Row x 7.12' Long +0.81' Cap Length x 2 = 186.74' Row Length +12.0" End Stone x 2 = 188.74' Base Length

11 Rows x 51.0" Wide + 6.0" Spacing x 10 + 12.0" Side Stone x 2 = 53.75' Base Width

6.0" Stone Base + 30.0" Chamber Height + 6.0" Stone Cover = 3.50' Field Height

286 Chambers x 45.9 cf = 13,138.8 cf Chamber Storage

35,506.1 cf Field - 13,138.8 cf Chambers = 22,367.2 cf Stone x 40.0% Voids = 8,946.9 cf Stone Storage

Chamber Storage + Stone Storage = 22,085.7 cf = 0.507 af

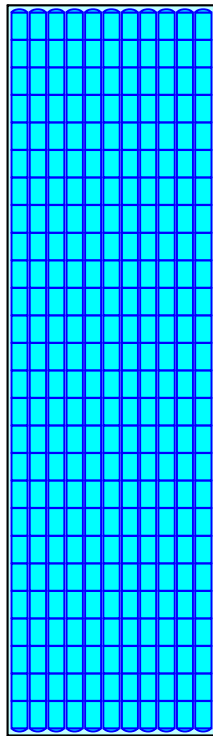
Overall Storage Efficiency = 62.2%

Overall System Size = 188.74' x 53.75' x 3.50'

286 Chambers

1,315.0 cy Field

828.4 cy Stone



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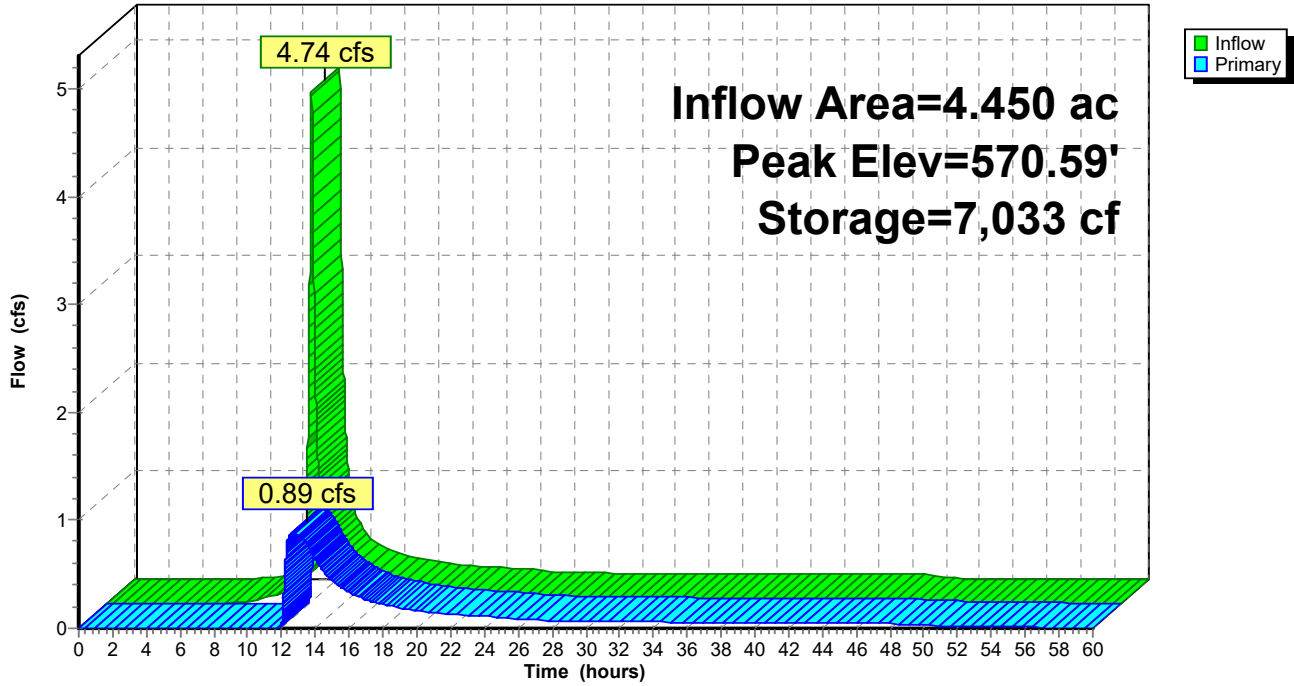
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Pond 3P: Underground Storage (SMA #2)

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Summary for Pond 4P: Bioretention Area #2

Inflow Area = 2.550 ac, 65.49% Impervious, Inflow Depth = 1.42" for 2-Year event
Inflow = 5.65 cfs @ 12.00 hrs, Volume= 0.301 af
Outflow = 2.02 cfs @ 12.15 hrs, Volume= 0.301 af, Atten= 64%, Lag= 8.7 min
Primary = 2.02 cfs @ 12.15 hrs, Volume= 0.301 af
Routed to Pond 3P : Underground Storage (SMA #2)

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 575.61' @ 12.15 hrs Surf.Area= 9,947 sf Storage= 5,701 cf

Plug-Flow detention time= 515.5 min calculated for 0.301 af (100% of inflow)
Center-of-Mass det. time= 515.5 min (1,327.3 - 811.8)

Volume	Invert	Avail.Storage	Storage Description
#1	575.00'	21,391 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
575.00	8,798	0	0
576.00	10,686	9,742	9,742
577.00	12,612	11,649	21,391

Device	Routing	Invert	Outlet Devices
#1	Primary	571.41'	8.0" Round Pipe L= 41.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 571.41' / 571.30' S= 0.0027 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#2	Device 1	575.50'	8.0" Horiz. Grate X 8.00 C= 0.600 Limited to weir flow at low heads
#3	Device 1	575.00'	0.250 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 560.00'
#4	Device 1	575.75'	24.0" x 24.0" Horiz. Grate (overflow) C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=2.01 cfs @ 12.15 hrs HW=575.61' (Free Discharge)

- ↑ **1=Pipe** (Passes 2.01 cfs of 2.78 cfs potential flow)
- ↑ **2=Grate** (Weir Controls 1.95 cfs @ 1.08 fps)
- ↑ **3=Exfiltration** (Controls 0.06 cfs)
- ↑ **4=Grate (overflow)** (Controls 0.00 cfs)

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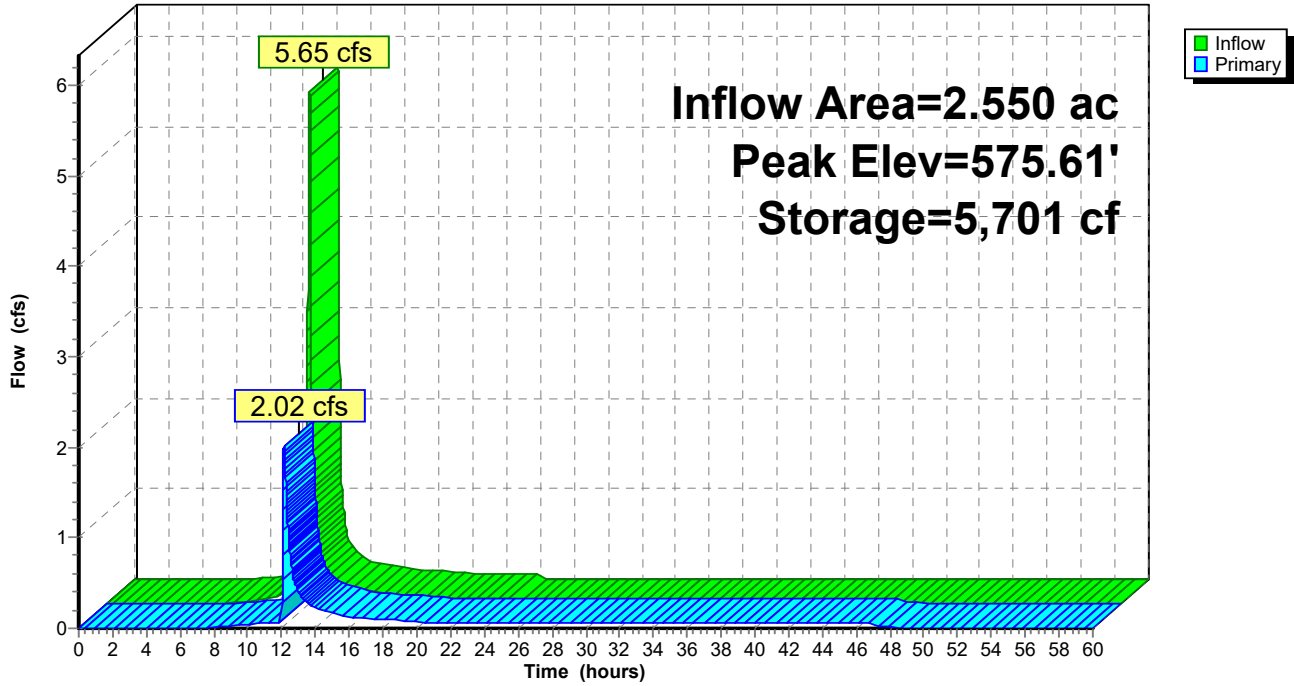
Type II 24-hr 2-Year Rainfall=2.20"

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Pond 4P: Bioretention Area #2

Hydrograph



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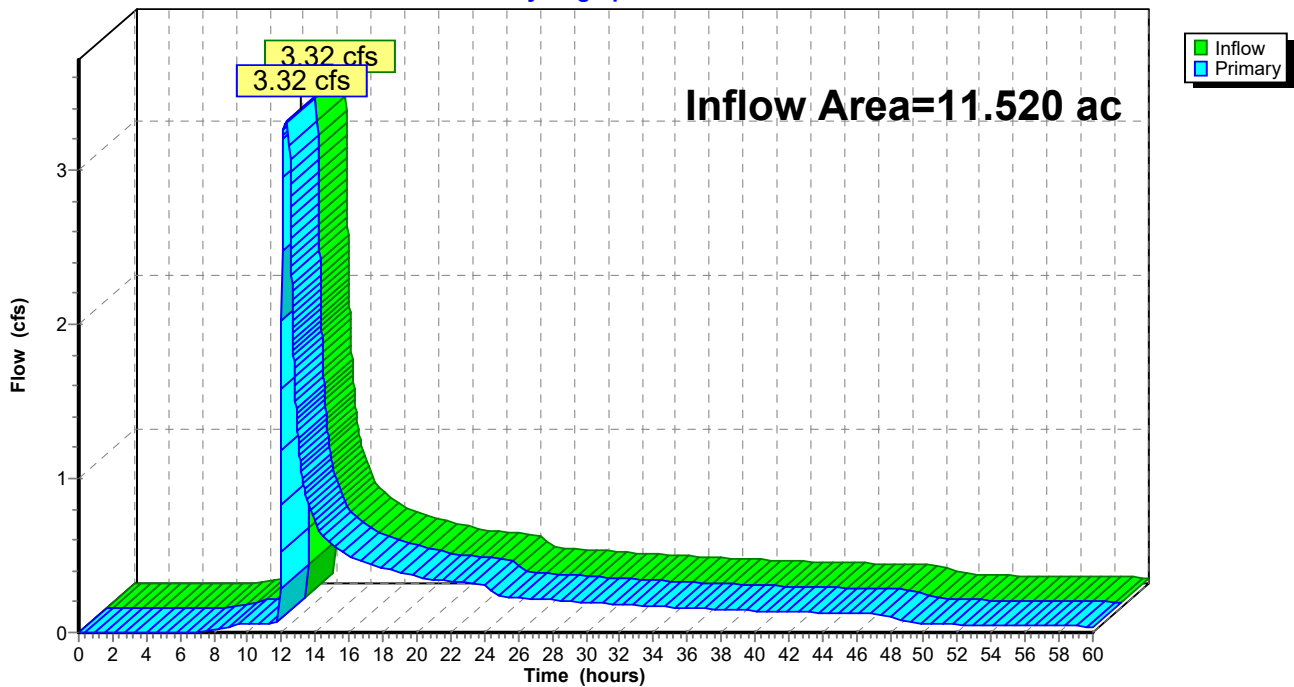
Summary for Link 1L: Outflow to Dodge Rd (@ CB 54)

Inflow Area = 11.520 ac, 55.30% Impervious, Inflow Depth > 1.07" for 2-Year event
Inflow = 3.32 cfs @ 12.28 hrs, Volume= 1.032 af
Primary = 3.32 cfs @ 12.28 hrs, Volume= 1.032 af, Atten= 0%, Lag= 0.0 min
Routed to Link 2L : Total Outflow from Proposed Site

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

Link 1L: Outflow to Dodge Rd (@ CB 54)

Hydrograph



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Type II 24-hr 2-Year Rainfall=2.20"

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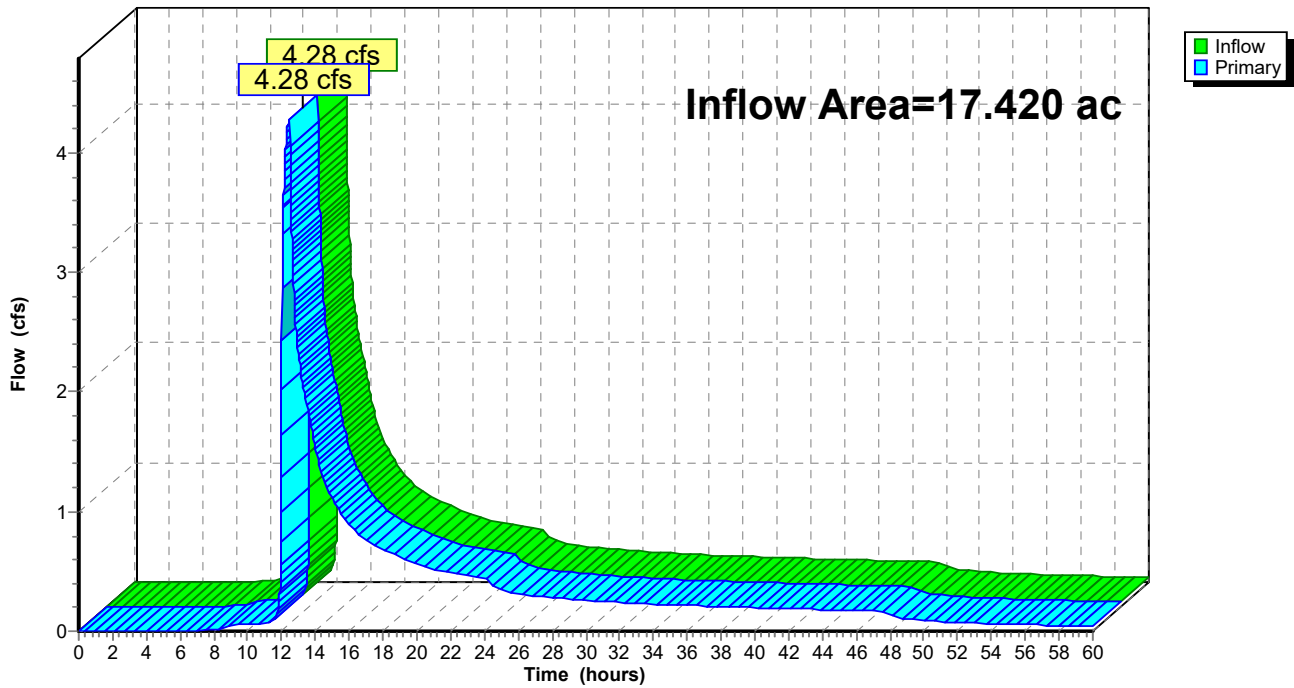
Summary for Link 2L: Total Outflow from Proposed Site

Inflow Area = 17.420 ac, 52.24% Impervious, Inflow Depth > 1.08" for 2-Year event
Inflow = 4.28 cfs @ 12.46 hrs, Volume= 1.571 af
Primary = 4.28 cfs @ 12.46 hrs, Volume= 1.571 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

Link 2L: Total Outflow from Proposed Site

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Type II 24-hr 5-Year Rainfall=2.70"

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Time span=0.00-60.00 hrs, dt=0.01 hrs, 6001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Front Area 1 Runoff Area=5.840 ac 59.42% Impervious Runoff Depth=1.79"
Flow Length=652' Tc=13.3 min CN=91 Runoff=14.16 cfs 0.873 af

Subcatchment2S: Rear Area 1 Runoff Area=5.680 ac 51.06% Impervious Runoff Depth=1.63"
Flow Length=683' Tc=14.4 min CN=89 Runoff=12.19 cfs 0.772 af

Subcatchment3S: Front Area 2 Runoff Area=1.900 ac 54.21% Impervious Runoff Depth=1.71"
Flow Length=1,325' Slope=0.0100 '/' Tc=14.1 min CN=90 Runoff=4.30 cfs 0.271 af

Subcatchment4S: Rear Area 2 Runoff Area=2.550 ac 65.49% Impervious Runoff Depth=1.88"
Flow Length=345' Tc=9.1 min CN=92 Runoff=7.40 cfs 0.399 af

Subcatchment5S: Unrestricted Runoff Areas Runoff Area=0.120 ac 0.00% Impervious Runoff Depth=1.03"
Flow Length=25' Slope=0.3300 '/' Tc=5.0 min CN=80 Runoff=0.23 cfs 0.010 af

Subcatchment6S: Unrestricted Runoff Runoff Area=0.180 ac 16.67% Impervious Runoff Depth=1.21"
Flow Length=40' Slope=0.3300 '/' Tc=5.0 min CN=83 Runoff=0.41 cfs 0.018 af

Subcatchment7S: Unrestricted Permanent Runoff Area=1.150 ac 0.00% Impervious Runoff Depth=0.97"
Flow Length=465' Slope=0.0020 '/' Tc=107.9 min CN=79 Runoff=0.36 cfs 0.093 af

Pond 1P: Bioretention Area #1 Peak Elev=576.97' Storage=10,269 cf Inflow=14.16 cfs 0.873 af
Primary=3.27 cfs 0.700 af Secondary=9.03 cfs 0.173 af Outflow=12.30 cfs 0.873 af

Pond 2P: Detention Basin (SMA #1) Peak Elev=575.49' Storage=30,230 cf Inflow=20.69 cfs 0.945 af
Primary=0.36 cfs 0.727 af Secondary=0.00 cfs 0.000 af Outflow=0.36 cfs 0.727 af

Pond 2P WQ: WQv (SMA #1) Peak Elev=0.00' Storage=0 cf

Pond 3P: Underground Storage (SMA #2) Peak Elev=571.08' Storage=10,987 cf Inflow=7.11 cfs 0.670 af
Outflow=1.25 cfs 0.626 af

Pond 4P: Bioretention Area #2 Peak Elev=575.74' Storage=7,045 cf Inflow=7.40 cfs 0.399 af
Outflow=2.83 cfs 0.399 af

Link 1L: Outflow to Dodge Rd (@ CB 54) Inflow=3.49 cfs 1.427 af
Primary=3.49 cfs 1.427 af

Link 2L: Total Outflow from Proposed Site Inflow=4.92 cfs 2.175 af
Primary=4.92 cfs 2.175 af

Total Runoff Area = 17.420 ac Runoff Volume = 2.437 af Average Runoff Depth = 1.68"
47.76% Pervious = 8.320 ac 52.24% Impervious = 9.100 ac

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Type II 24-hr 5-Year Rainfall=2.70"

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Summary for Subcatchment 1S: Front Area 1

Runoff = 14.16 cfs @ 12.05 hrs, Volume= 0.873 af, Depth= 1.79"
 Routed to Pond 1P : Bioretention Area #1

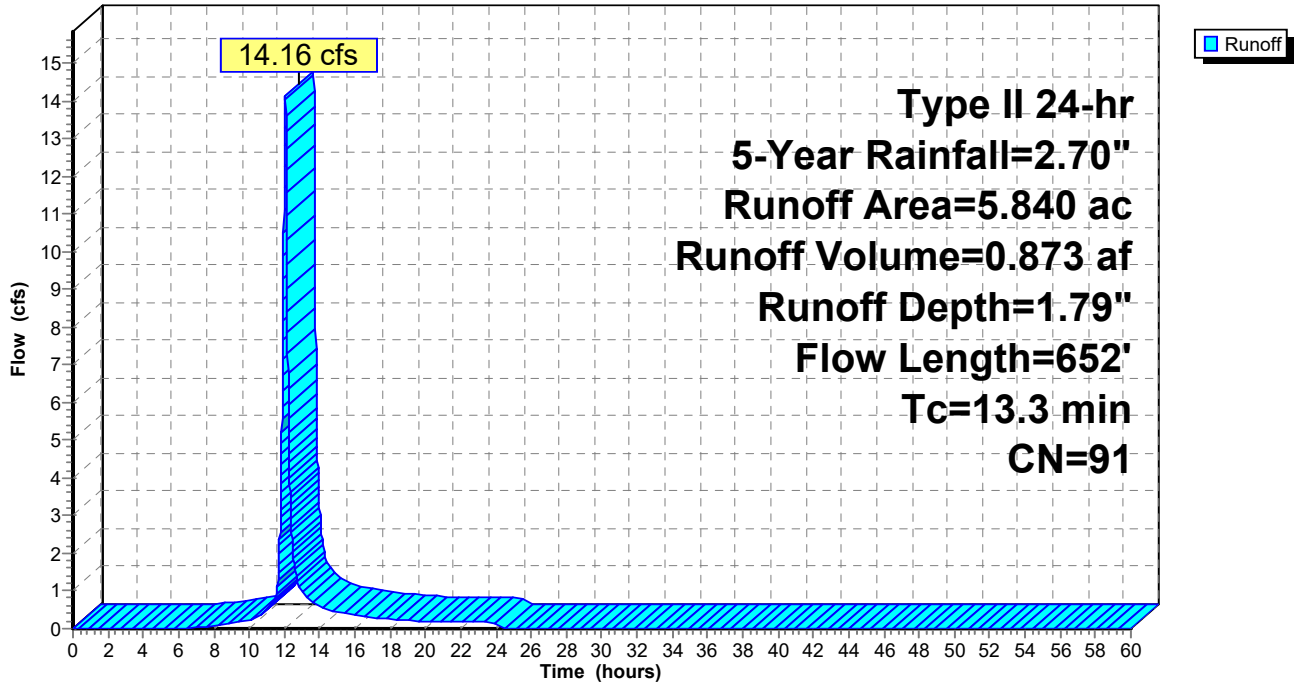
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
 Type II 24-hr 5-Year Rainfall=2.70"

Area (ac)	CN	Description
3.470	98	Impervious
2.370	80	>75% Grass cover, Good, HSG D
5.840	91	Weighted Average
2.370		40.58% Pervious Area
3.470		59.42% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.6	37	0.0100	0.06		Sheet Flow, grass Grass: Dense n= 0.240 P2= 2.50"
0.4	15	0.0120	0.68		Sheet Flow, pavement Smooth surfaces n= 0.011 P2= 2.50"
3.3	600		3.00		Direct Entry, pipe flow
13.3	652	Total			

Subcatchment 1S: Front Area 1

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Summary for Subcatchment 2S: Rear Area 1

Runoff = 12.19 cfs @ 12.06 hrs, Volume= 0.772 af, Depth= 1.63"
 Routed to Pond 2P : Detention Basin (SMA #1)

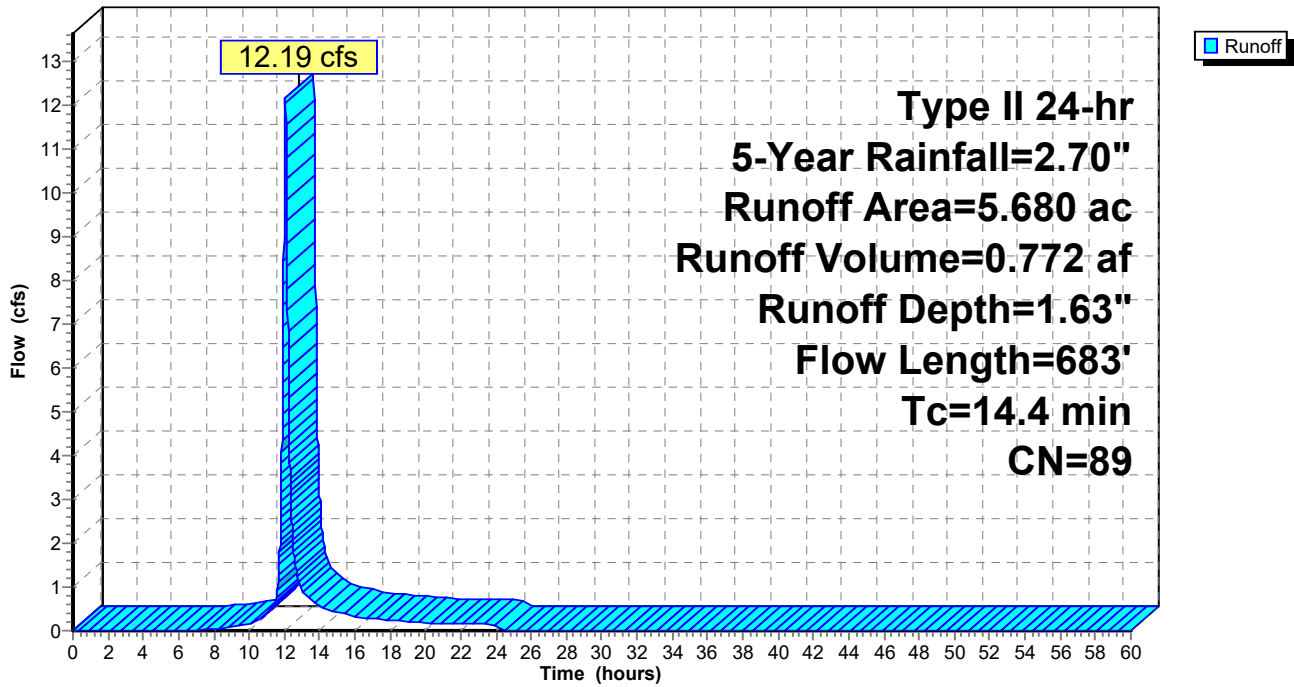
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
 Type II 24-hr 5-Year Rainfall=2.70"

Area (ac)	CN	Description
2.900	98	Impervious
2.780	80	>75% Grass cover, Good, HSG D
5.680	89	Weighted Average
2.780		48.94% Pervious Area
2.900		51.06% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.2	90	0.0200	0.15		Sheet Flow, grass Grass: Short n= 0.150 P2= 2.50"
1.3	75	0.0130	0.97		Sheet Flow, pavement Smooth surfaces n= 0.011 P2= 2.50"
2.9	518		3.00		Direct Entry, Pipe flow
14.4	683				Total

Subcatchment 2S: Rear Area 1

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Summary for Subcatchment 3S: Front Area 2

Runoff = 4.30 cfs @ 12.06 hrs, Volume= 0.271 af, Depth= 1.71"

Routed to Pond 3P : Underground Storage (SMA #2)

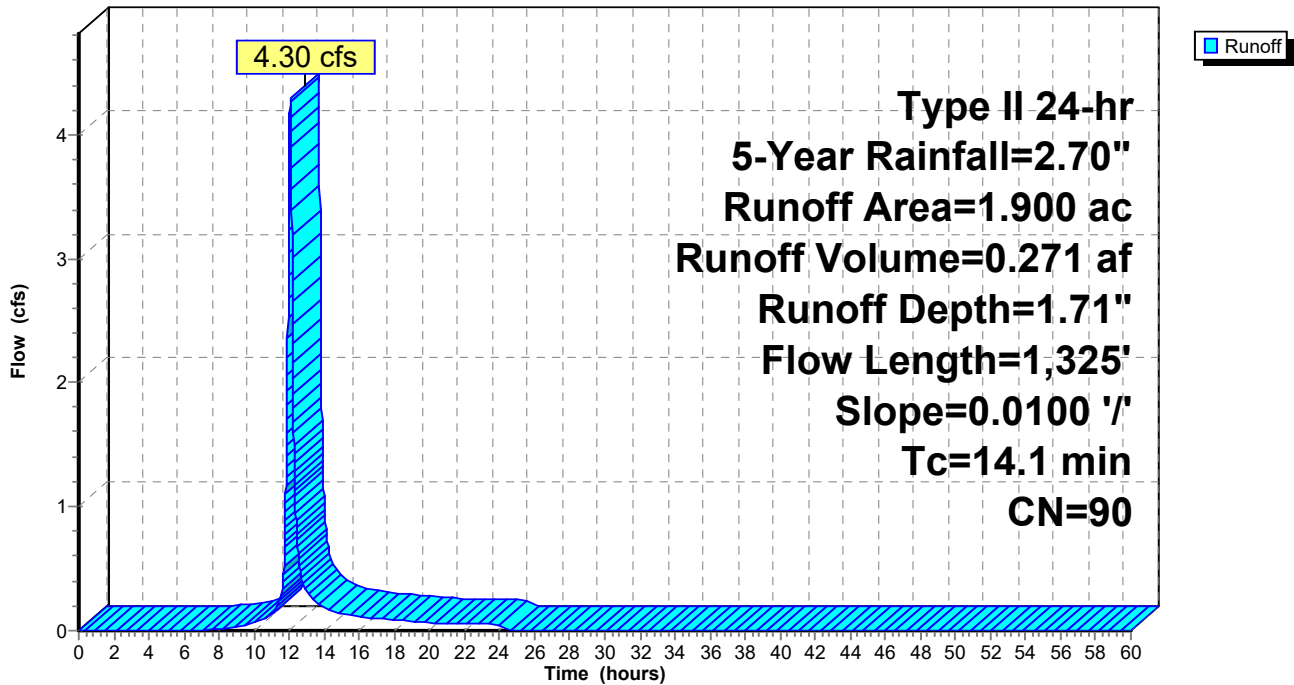
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
 Type II 24-hr 5-Year Rainfall=2.70"

Area (ac)	CN	Description
* 1.030	98	Impervious
0.870	80	>75% Grass cover, Good, HSG D
1.900	90	Weighted Average
0.870		45.79% Pervious Area
1.030		54.21% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0	40	0.0100	0.09		Sheet Flow, grass
7.1	1,285		3.00		Grass: Short n= 0.150 P2= 2.50" Direct Entry, Pipe flow
14.1	1,325	Total			

Subcatchment 3S: Front Area 2

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Summary for Subcatchment 4S: Rear Area 2

Runoff = 7.40 cfs @ 12.00 hrs, Volume= 0.399 af, Depth= 1.88"
 Routed to Pond 4P : Bioretention Area #2

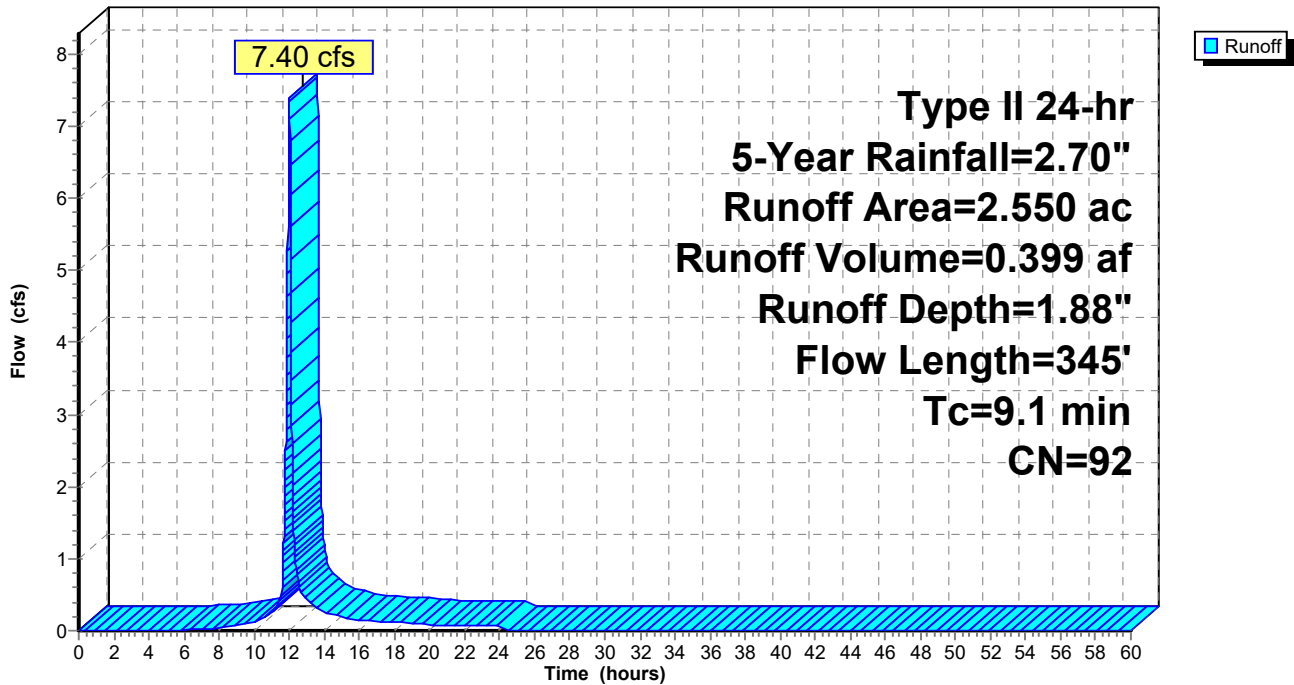
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
 Type II 24-hr 5-Year Rainfall=2.70"

Area (ac)	CN	Description
1.670	98	Impervious
0.880	80	>75% Grass cover, Good, HSG D
2.550	92	Weighted Average
0.880		34.51% Pervious Area
1.670		65.49% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.9	55	0.0200	0.13		Sheet Flow, grass Grass: Short n= 0.150 P2= 2.50"
0.8	45	0.0170	0.97		Sheet Flow, pavement Smooth surfaces n= 0.011 P2= 2.50"
1.4	245		3.00		Direct Entry, Pipe flow
9.1	345	Total			

Subcatchment 4S: Rear Area 2

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Summary for Subcatchment 5S: Unrestricted Runoff Areas

Runoff = 0.23 cfs @ 11.97 hrs, Volume= 0.010 af, Depth= 1.03"

Routed to Link 2L : Total Outflow from Proposed Site

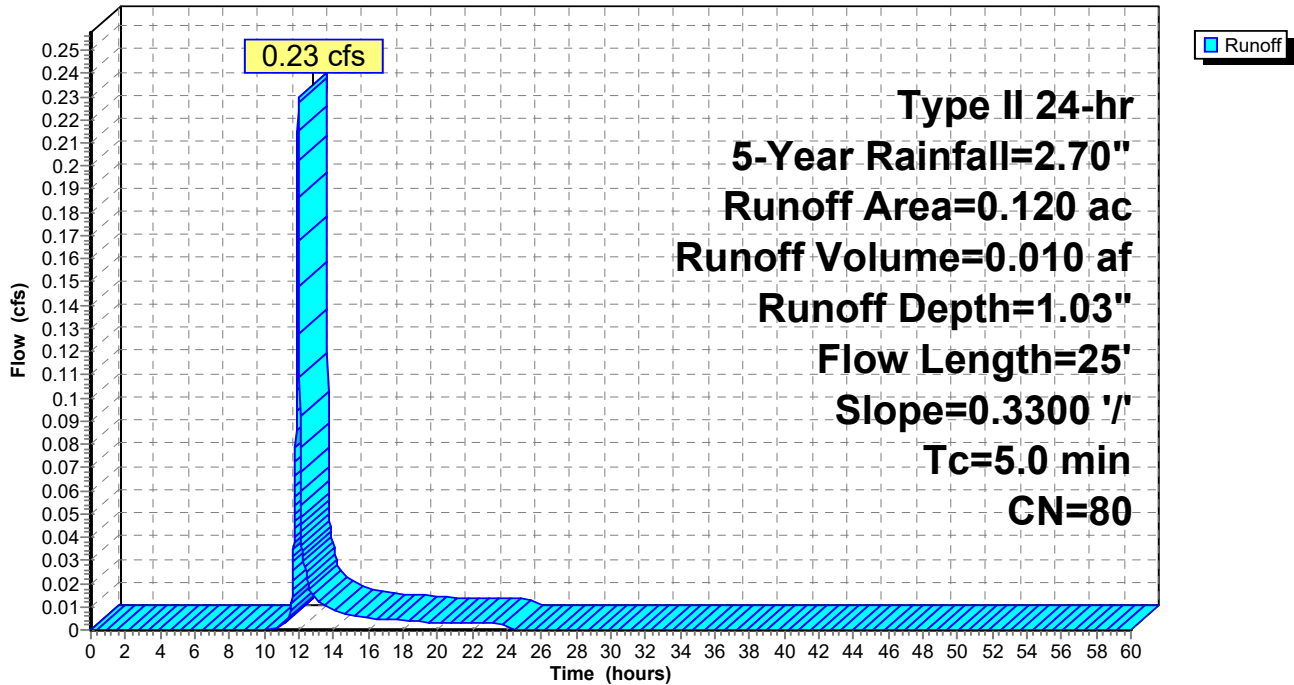
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 5-Year Rainfall=2.70"

Area (ac)	CN	Description
0.120	80	>75% Grass cover, Good, HSG D
0.120		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	25	0.3300	0.35		Sheet Flow, grass Grass: Short n= 0.150 P2= 2.50"
1.2	25	Total, Increased to minimum Tc = 5.0 min			

Subcatchment 5S: Unrestricted Runoff Areas

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Type II 24-hr 5-Year Rainfall=2.70"

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Summary for Subcatchment 6S: Unrestricted Runoff Areas

Runoff = 0.41 cfs @ 11.96 hrs, Volume= 0.018 af, Depth= 1.21"

Routed to Link 2L : Total Outflow from Proposed Site

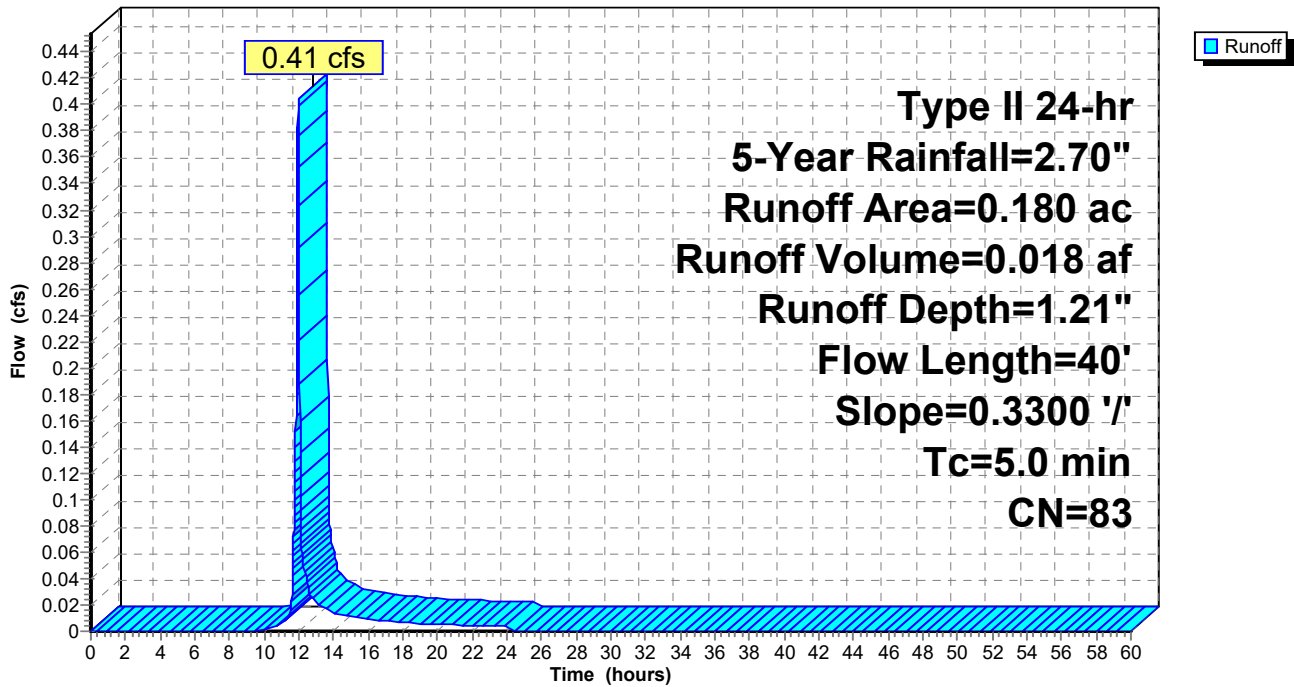
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
 Type II 24-hr 5-Year Rainfall=2.70"

Area (ac)	CN	Description
0.150	80	>75% Grass cover, Good, HSG D
* 0.030	98	Impervious
0.180	83	Weighted Average
0.150		83.33% Pervious Area
0.030		16.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.7	40	0.3300	0.38		Sheet Flow, grass Grass: Short n= 0.150 P2= 2.50"
1.7	40	Total, Increased to minimum Tc = 5.0 min			

Subcatchment 6S: Unrestricted Runoff Areas

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Type II 24-hr 5-Year Rainfall=2.70"

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Summary for Subcatchment 7S: Unrestricted Permanent Open Space

Runoff = 0.36 cfs @ 13.31 hrs, Volume= 0.093 af, Depth= 0.97"

Routed to Link 2L : Total Outflow from Proposed Site

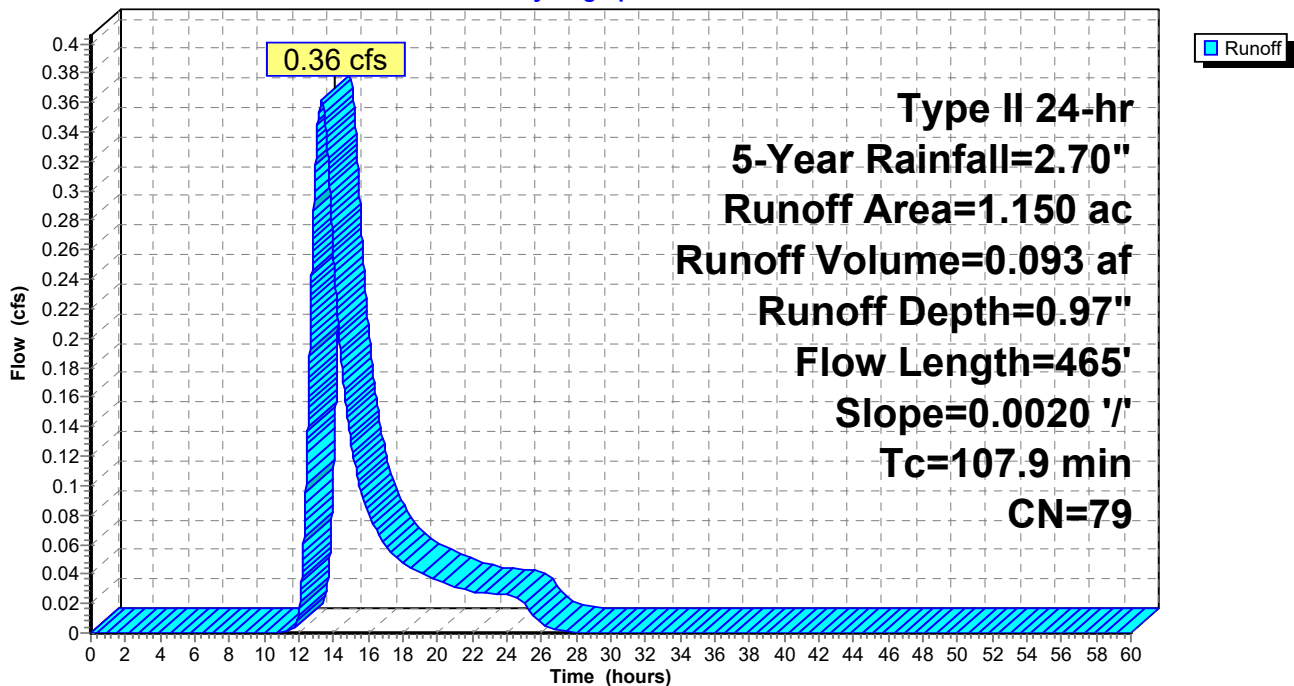
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
 Type II 24-hr 5-Year Rainfall=2.70"

Area (ac)	CN	Description
1.150	79	Woods, Fair, HSG D
1.150		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
84.4	150	0.0020	0.03		Sheet Flow, woods
23.5	315	0.0020	0.22		Shallow Concentrated Flow, woods
					Woodland Kv= 5.0 fps
107.9	465	Total			

Subcatchment 7S: Unrestricted Permanent Open Space

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Type II 24-hr 5-Year Rainfall=2.70"

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Summary for Pond 1P: Bioretention Area #1

Inflow Area = 5.840 ac, 59.42% Impervious, Inflow Depth = 1.79" for 5-Year event
Inflow = 14.16 cfs @ 12.05 hrs, Volume= 0.873 af
Outflow = 12.30 cfs @ 12.11 hrs, Volume= 0.873 af, Atten= 13%, Lag= 3.6 min
Primary = 3.27 cfs @ 12.11 hrs, Volume= 0.700 af
Routed to Link 1L : Outflow to Dodge Rd (@ CB 54)
Secondary = 9.03 cfs @ 12.11 hrs, Volume= 0.173 af
Routed to Pond 2P : Detention Basin (SMA #1)

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 576.97' @ 12.11 hrs Surf.Area= 11,304 sf Storage= 10,269 cf

Plug-Flow detention time= 219.9 min calculated for 0.873 af (100% of inflow)
Center-of-Mass det. time= 220.1 min (1,032.8 - 812.7)

Volume	Invert	Avail.Storage	Storage Description
#1	576.00'	16,618 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
576.00	9,925	0	0
576.50	10,585	5,128	5,128
577.00	11,350	5,484	10,611
577.50	12,675	6,006	16,618

Device	Routing	Invert	Outlet Devices
#1	Primary	572.50'	8.0" Round 8" pipe L= 25.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 572.50' / 572.42' S= 0.0032 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#2	Device 1	576.50'	8.0" Horiz. Grate X 4.00 C= 0.600 Limited to weir flow at low heads
#3	Device 1	576.00'	0.250 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 560.00'
#4	Secondary	576.75'	30.0' long (Profile 1) Broad-Crested Rectangular Weir Head (feet) 0.49 0.98 1.48 Coef. (English) 2.92 3.37 3.59

Primary OutFlow Max=3.27 cfs @ 12.11 hrs HW=576.97' (Free Discharge)

- ↑ **1=8" pipe** (Barrel Controls 3.27 cfs @ 9.37 fps)
- ↑ **2=Grate** (Passes < 4.61 cfs potential flow)
- ↑ **3=Exfiltration** (Passes < 0.07 cfs potential flow)

Secondary OutFlow Max=9.02 cfs @ 12.11 hrs HW=576.97' (Free Discharge)

- ↑ **4=Broad-Crested Rectangular Weir** (Weir Controls 9.02 cfs @ 1.37 fps)

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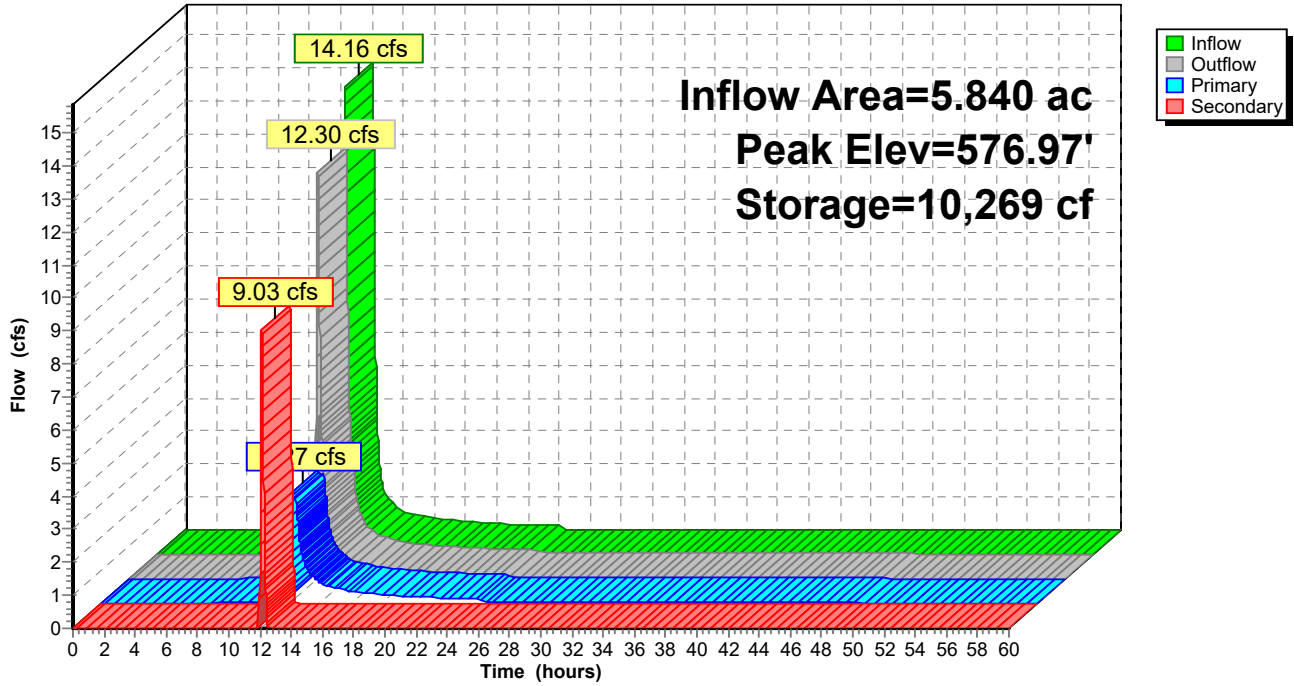
Type II 24-hr 5-Year Rainfall=2.70"

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Pond 1P: Bioretention Area #1

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Summary for Pond 2P: Detention Basin (SMA #1)

Inflow Area = 5.680 ac, 51.06% Impervious, Inflow Depth = 2.00" for 5-Year event
 Inflow = 20.69 cfs @ 12.09 hrs, Volume= 0.945 af
 Outflow = 0.36 cfs @ 15.61 hrs, Volume= 0.727 af, Atten= 98%, Lag= 211.3 min
 Primary = 0.36 cfs @ 15.61 hrs, Volume= 0.727 af
 Routed to Link 1L : Outflow to Dodge Rd (@ CB 54)
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Routed to Link 2L : Total Outflow from Proposed Site

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
 Peak Elev= 575.49' @ 15.61 hrs Surf.Area= 62,991 sf Storage= 30,230 cf

Plug-Flow detention time= 964.5 min calculated for 0.727 af (77% of inflow)
 Center-of-Mass det. time= 884.9 min (1,690.5 - 805.6)

Volume	Invert	Avail.Storage	Storage Description
#1	575.00'	118,224 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
575.00	59,213	0	0
576.00	66,849	63,031	63,031
576.80	71,134	55,193	118,224

Device	Routing	Invert	Outlet Devices
#1	Primary	574.00'	12.0" Round 12" outlet pipe L= 160.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 574.00' / 573.79' S= 0.0013 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	575.00'	6.0" Round low flow outlet pipe L= 10.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 575.00' / 574.95' S= 0.0050 '/' Cc= 0.900 n= 0.010 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#3	Device 1	576.50'	30.0" x 30.0" Horiz. Grate C= 0.600 Limited to weir flow at low heads
#4	Secondary	576.12'	20.0' long (Profile 1) Broad-Crested Rectangular Weir X 2.00 Head (feet) 0.49 0.98 1.48 Coef. (English) 2.92 3.37 3.59

Primary OutFlow Max=0.36 cfs @ 15.61 hrs HW=575.49' (Free Discharge)

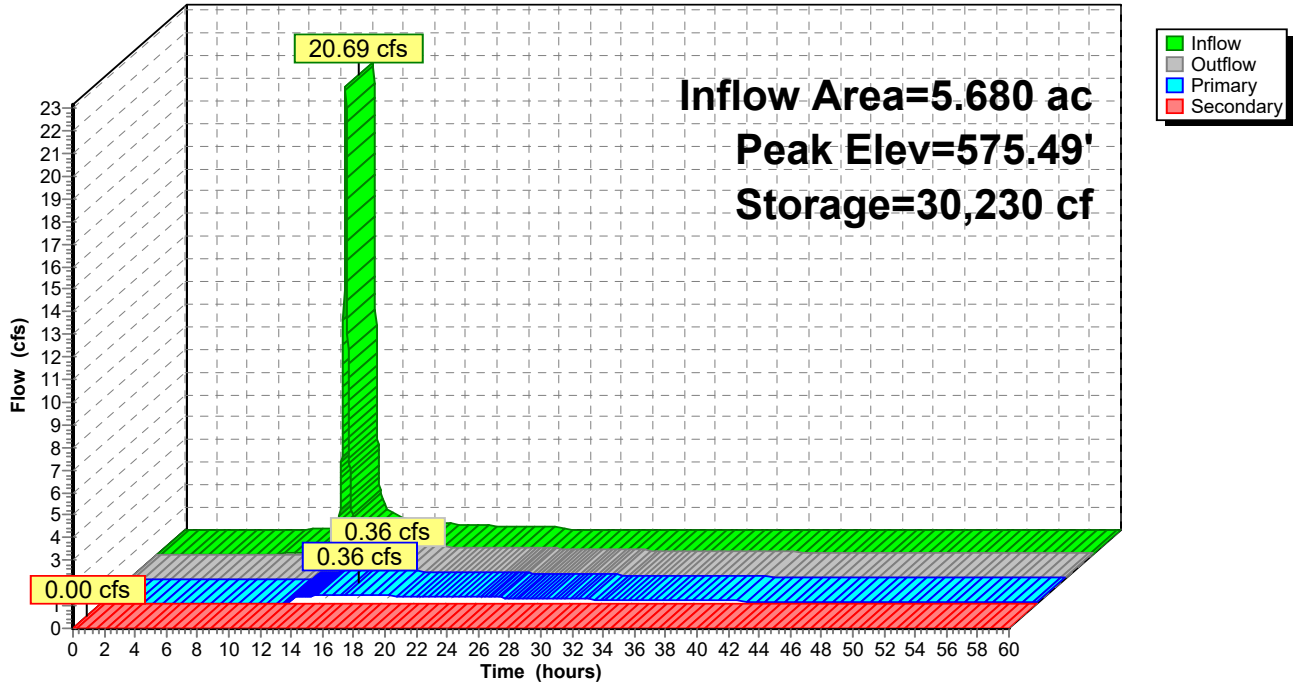
- ↑ 1=12" outlet pipe (Passes 0.36 cfs of 2.07 cfs potential flow)
- ↑ 2=low flow outlet pipe (Barrel Controls 0.36 cfs @ 2.33 fps)
- ↑ 3=Grate (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=575.00' (Free Discharge)

- ↑ 4=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond 2P: Detention Basin (SMA #1)

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Summary for Pond 2P WQ: WQv (SMA #1)

[43] Hint: Has no inflow (Outflow=Zero)

Volume	Invert	Avail.Storage	Storage Description
#1	563.00'	152,678 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
563.00	710	0	0
564.00	1,152	931	931
565.00	1,725	1,439	2,370
566.00	2,430	2,078	4,447
567.00	3,302	2,866	7,313
568.00	4,386	3,844	11,157
569.00	7,838	6,112	17,269
570.00	11,596	9,717	26,986
571.00	15,606	13,601	40,587
572.00	20,106	17,856	58,443
573.00	24,865	22,486	80,929
574.00	29,710	27,288	108,216
575.00	59,213	44,462	152,678

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Summary for Pond 3P: Underground Storage (SMA #2)

Inflow Area = 4.450 ac, 60.67% Impervious, Inflow Depth = 1.81" for 5-Year event
 Inflow = 7.11 cfs @ 12.06 hrs, Volume= 0.670 af
 Outflow = 1.25 cfs @ 12.68 hrs, Volume= 0.626 af, Atten= 82%, Lag= 37.0 min
 Primary = 1.25 cfs @ 12.68 hrs, Volume= 0.626 af
 Routed to Link 2L : Total Outflow from Proposed Site

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
 Peak Elev= 571.08' @ 12.68 hrs Surf.Area= 10,145 sf Storage= 10,987 cf

Plug-Flow detention time= 285.2 min calculated for 0.626 af (93% of inflow)
 Center-of-Mass det. time= 178.1 min (1,224.4 - 1,046.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	569.50'	8,947 cf	53.75'W x 188.74'L x 3.50'H Field A 35,506 cf Overall - 13,139 cf Embedded = 22,367 cf x 40.0% Voids
#2A	570.00'	13,139 cf	ADS_StormTech SC-740 +Cap x 286 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 286 Chambers in 11 Rows
		22,086 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	569.93'	12.0" Round Culvert L= 72.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 569.93' / 569.71' S= 0.0031 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	569.93'	4.0" Vert. Orifice X 3.00 C= 0.600 Limited to weir flow at low heads
#3	Device 1	572.00'	5.0' long Weir 2 End Contraction(s)

Primary OutFlow Max=1.25 cfs @ 12.68 hrs HW=571.08' (Free Discharge)

- ↑ **1=Culvert** (Passes 1.25 cfs of 2.28 cfs potential flow)
- ↑ **2=Orifice** (Orifice Controls 1.25 cfs @ 4.77 fps)
- ↑ **3=Weir** (Controls 0.00 cfs)

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Pond 3P: Underground Storage (SMA #2) - Chamber Wizard Field A

Chamber Model = ADS_StormTechSC-740 +Cap (ADS StormTech®SC-740 with cap length)

Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf

Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

26 Chambers/Row x 7.12' Long +0.81' Cap Length x 2 = 186.74' Row Length +12.0" End Stone x 2 = 188.74' Base Length

11 Rows x 51.0" Wide + 6.0" Spacing x 10 + 12.0" Side Stone x 2 = 53.75' Base Width

6.0" Stone Base + 30.0" Chamber Height + 6.0" Stone Cover = 3.50' Field Height

286 Chambers x 45.9 cf = 13,138.8 cf Chamber Storage

35,506.1 cf Field - 13,138.8 cf Chambers = 22,367.2 cf Stone x 40.0% Voids = 8,946.9 cf Stone Storage

Chamber Storage + Stone Storage = 22,085.7 cf = 0.507 af

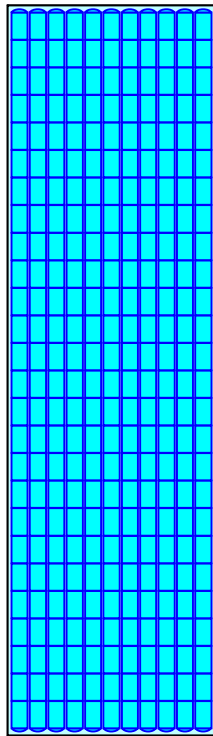
Overall Storage Efficiency = 62.2%

Overall System Size = 188.74' x 53.75' x 3.50'

286 Chambers

1,315.0 cy Field

828.4 cy Stone



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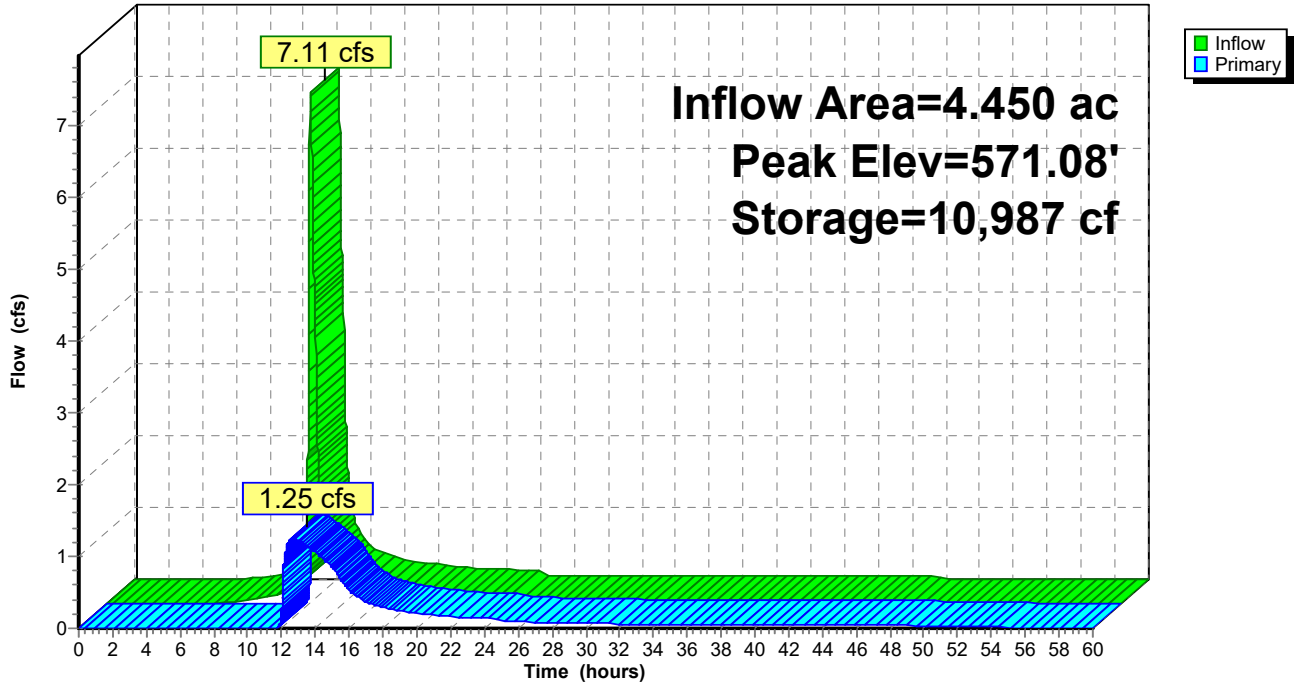
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Pond 3P: Underground Storage (SMA #2)

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Summary for Pond 4P: Bioretention Area #2

Inflow Area = 2.550 ac, 65.49% Impervious, Inflow Depth = 1.88" for 5-Year event
 Inflow = 7.40 cfs @ 12.00 hrs, Volume= 0.399 af
 Outflow = 2.83 cfs @ 12.14 hrs, Volume= 0.399 af, Atten= 62%, Lag= 8.3 min
 Primary = 2.83 cfs @ 12.14 hrs, Volume= 0.399 af
 Routed to Pond 3P : Underground Storage (SMA #2)

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
 Peak Elev= 575.74' @ 12.14 hrs Surf.Area= 10,198 sf Storage= 7,045 cf

Plug-Flow detention time= 397.3 min calculated for 0.399 af (100% of inflow)
 Center-of-Mass det. time= 397.3 min (1,201.1 - 803.8)

Volume	Invert	Avail.Storage	Storage Description
#1	575.00'	21,391 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
575.00	8,798	0	0
576.00	10,686	9,742	9,742
577.00	12,612	11,649	21,391

Device	Routing	Invert	Outlet Devices
#1	Primary	571.41'	8.0" Round Pipe L= 41.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 571.41' / 571.30' S= 0.0027 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#2	Device 1	575.50'	8.0" Horiz. Grate X 8.00 C= 0.600 Limited to weir flow at low heads
#3	Device 1	575.00'	0.250 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 560.00'
#4	Device 1	575.75'	24.0" x 24.0" Horiz. Grate (overflow) C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=2.83 cfs @ 12.14 hrs HW=575.74' (Free Discharge)

- ↑ **1=Pipe** (Barrel Controls 2.83 cfs @ 8.09 fps)
- ↑ **2=Grate** (Passes < 6.51 cfs potential flow)
- ↑ **3=Exfiltration** (Passes < 0.06 cfs potential flow)
- ↑ **4=Grate (overflow)** (Controls 0.00 cfs)

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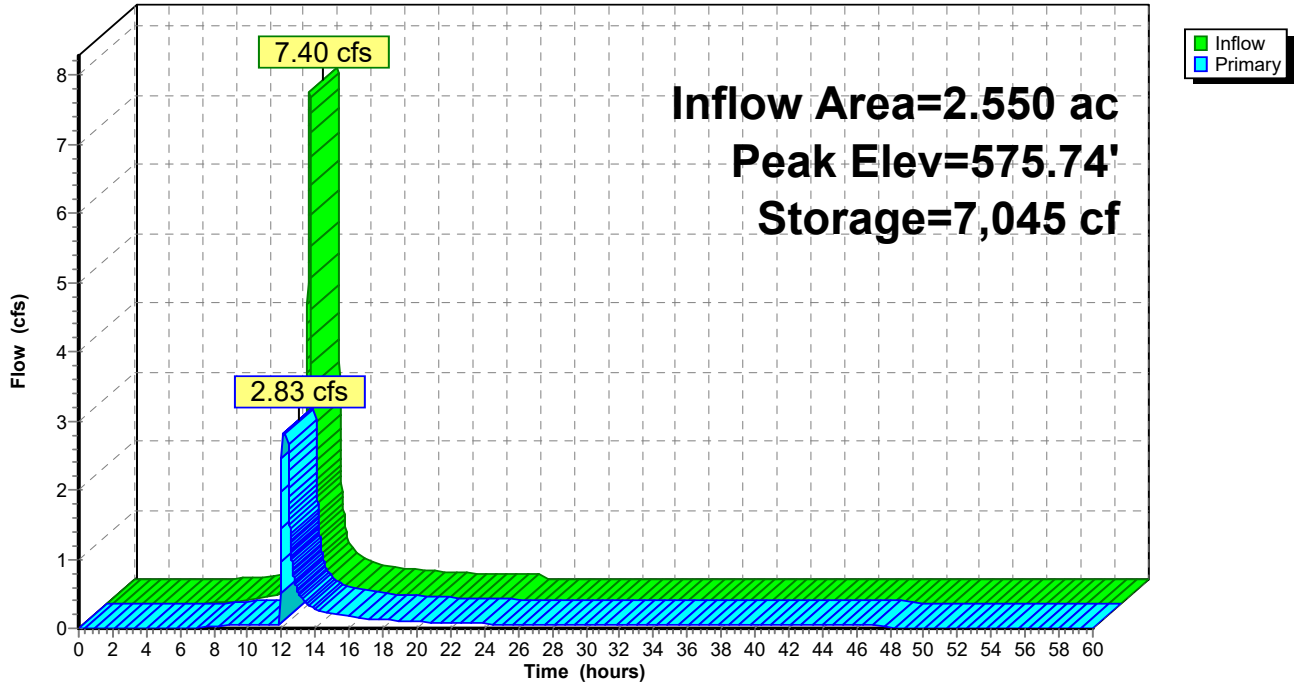
Type II 24-hr 5-Year Rainfall=2.70"

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Pond 4P: Bioretention Area #2

Hydrograph



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Type II 24-hr 5-Year Rainfall=2.70"

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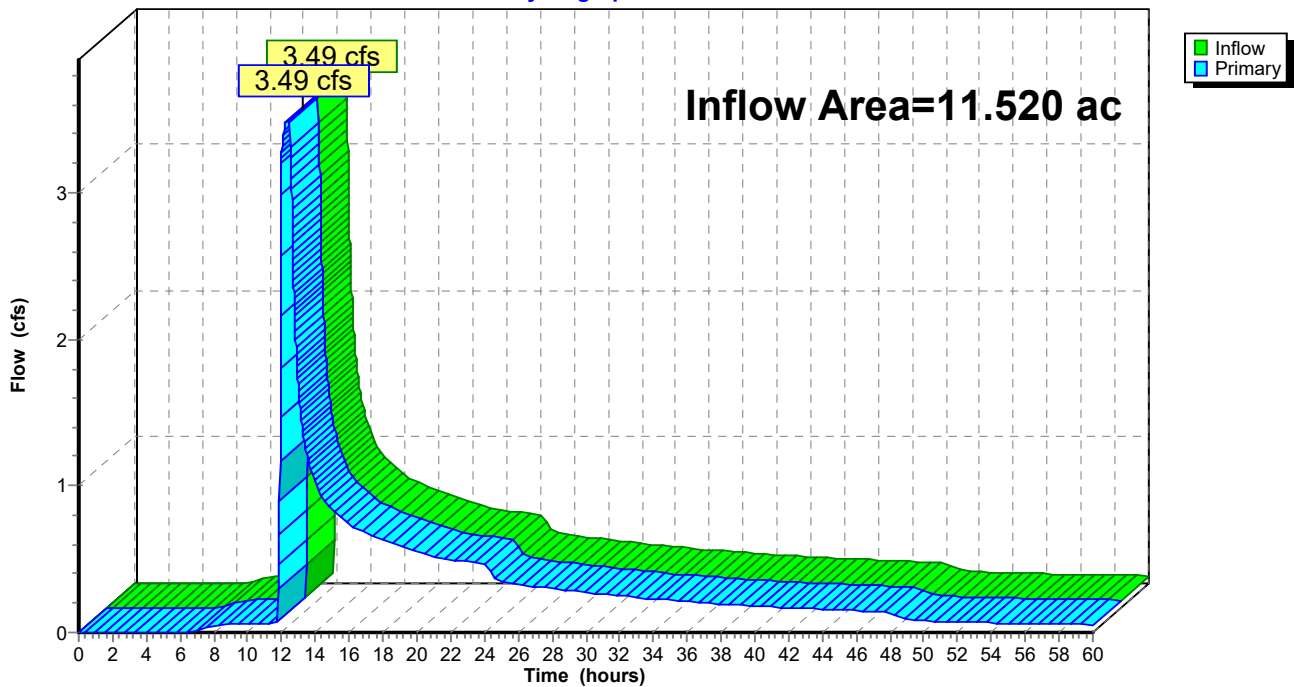
Summary for Link 1L: Outflow to Dodge Rd (@ CB 54)

Inflow Area = 11.520 ac, 55.30% Impervious, Inflow Depth > 1.49" for 5-Year event
Inflow = 3.49 cfs @ 12.39 hrs, Volume= 1.427 af
Primary = 3.49 cfs @ 12.39 hrs, Volume= 1.427 af, Atten= 0%, Lag= 0.0 min
Routed to Link 2L : Total Outflow from Proposed Site

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

Link 1L: Outflow to Dodge Rd (@ CB 54)

Hydrograph



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Type II 24-hr 5-Year Rainfall=2.70"

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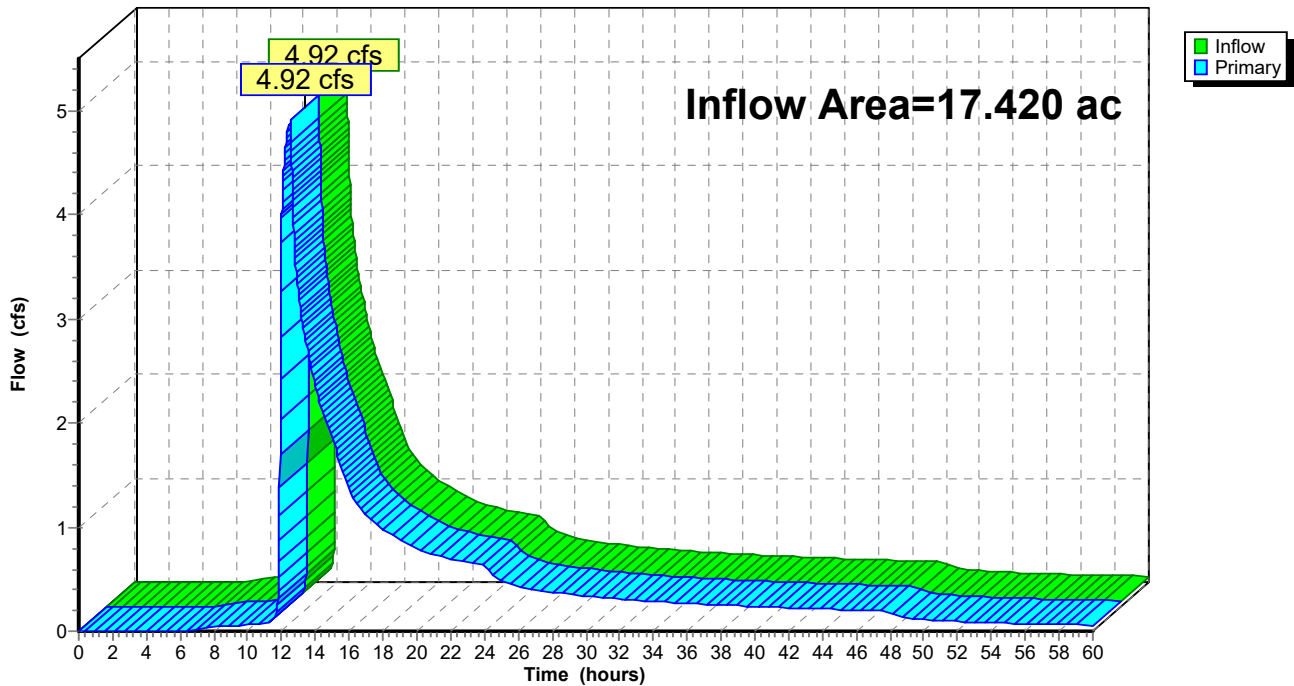
Summary for Link 2L: Total Outflow from Proposed Site

Inflow Area = 17.420 ac, 52.24% Impervious, Inflow Depth > 1.50" for 5-Year event
Inflow = 4.92 cfs @ 12.53 hrs, Volume= 2.175 af
Primary = 4.92 cfs @ 12.53 hrs, Volume= 2.175 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

Link 2L: Total Outflow from Proposed Site

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Type II 24-hr 10-Year Rainfall=3.15"

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Time span=0.00-60.00 hrs, dt=0.01 hrs, 6001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Front Area 1 Runoff Area=5.840 ac 59.42% Impervious Runoff Depth=2.21"
Flow Length=652' Tc=13.3 min CN=91 Runoff=17.31 cfs 1.076 af

Subcatchment2S: Rear Area 1 Runoff Area=5.680 ac 51.06% Impervious Runoff Depth=2.04"
Flow Length=683' Tc=14.4 min CN=89 Runoff=15.13 cfs 0.964 af

Subcatchment3S: Front Area 2 Runoff Area=1.900 ac 54.21% Impervious Runoff Depth=2.12"
Flow Length=1,325' Slope=0.0100 '/' Tc=14.1 min CN=90 Runoff=5.30 cfs 0.336 af

Subcatchment4S: Rear Area 2 Runoff Area=2.550 ac 65.49% Impervious Runoff Depth=2.30"
Flow Length=345' Tc=9.1 min CN=92 Runoff=8.97 cfs 0.489 af

Subcatchment5S: Unrestricted Runoff Areas Runoff Area=0.120 ac 0.00% Impervious Runoff Depth=1.36"
Flow Length=25' Slope=0.3300 '/' Tc=5.0 min CN=80 Runoff=0.30 cfs 0.014 af

Subcatchment6S: Unrestricted Runoff Runoff Area=0.180 ac 16.67% Impervious Runoff Depth=1.57"
Flow Length=40' Slope=0.3300 '/' Tc=5.0 min CN=83 Runoff=0.52 cfs 0.024 af

Subcatchment7S: Unrestricted Permanent Runoff Area=1.150 ac 0.00% Impervious Runoff Depth=1.30"
Flow Length=465' Slope=0.0020 '/' Tc=107.9 min CN=79 Runoff=0.50 cfs 0.125 af

Pond 1P: Bioretention Area #1 Peak Elev=577.02' Storage=10,893 cf Inflow=17.31 cfs 1.076 af
Primary=3.29 cfs 0.798 af Secondary=12.62 cfs 0.278 af Outflow=15.92 cfs 1.076 af

Pond 2P: Detention Basin (SMA #1) Peak Elev=575.65' Storage=40,053 cf Inflow=27.47 cfs 1.242 af
Primary=0.50 cfs 0.997 af Secondary=0.00 cfs 0.000 af Outflow=0.50 cfs 0.997 af

Pond 2P WQ: WQv (SMA #1) Peak Elev=0.00' Storage=0 cf

Pond 3P: Underground Storage (SMA #2) Peak Elev=571.58' Storage=14,720 cf Inflow=8.16 cfs 0.825 af
Outflow=1.53 cfs 0.781 af

Pond 4P: Bioretention Area #2 Peak Elev=575.90' Storage=8,718 cf Inflow=8.97 cfs 0.489 af
Outflow=2.89 cfs 0.489 af

Link 1L: Outflow to Dodge Rd (@ CB 54) Inflow=3.65 cfs 1.795 af
Primary=3.65 cfs 1.795 af

Link 2L: Total Outflow from Proposed Site Inflow=5.44 cfs 2.738 af
Primary=5.44 cfs 2.738 af

Total Runoff Area = 17.420 ac Runoff Volume = 3.027 af Average Runoff Depth = 2.09"
47.76% Pervious = 8.320 ac 52.24% Impervious = 9.100 ac

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Type II 24-hr 10-Year Rainfall=3.15"

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Summary for Subcatchment 1S: Front Area 1

Runoff = 17.31 cfs @ 12.05 hrs, Volume= 1.076 af, Depth= 2.21"
 Routed to Pond 1P : Bioretention Area #1

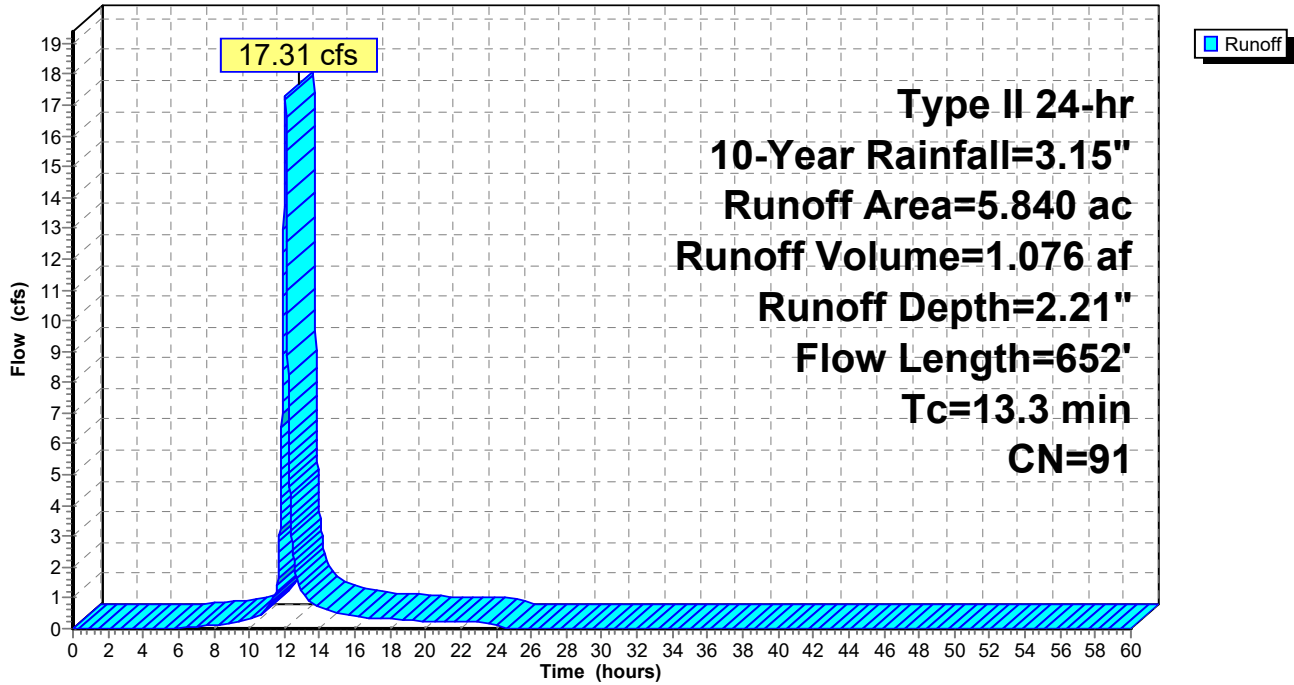
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
 Type II 24-hr 10-Year Rainfall=3.15"

Area (ac)	CN	Description
3.470	98	Impervious
2.370	80	>75% Grass cover, Good, HSG D
5.840	91	Weighted Average
2.370		40.58% Pervious Area
3.470		59.42% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.6	37	0.0100	0.06		Sheet Flow, grass Grass: Dense n= 0.240 P2= 2.50"
0.4	15	0.0120	0.68		Sheet Flow, pavement Smooth surfaces n= 0.011 P2= 2.50"
3.3	600		3.00		Direct Entry, pipe flow
13.3	652	Total			

Subcatchment 1S: Front Area 1

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Type II 24-hr 10-Year Rainfall=3.15"

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Summary for Subcatchment 2S: Rear Area 1

Runoff = 15.13 cfs @ 12.06 hrs, Volume= 0.964 af, Depth= 2.04"
 Routed to Pond 2P : Detention Basin (SMA #1)

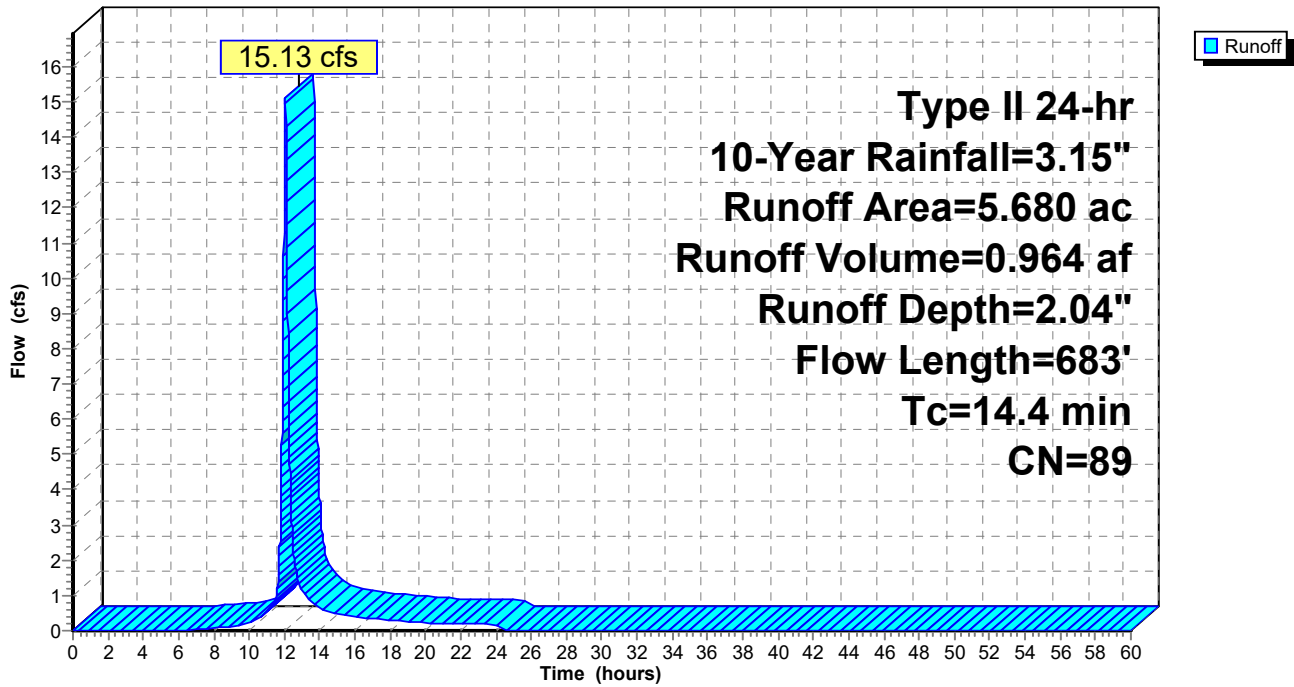
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
 Type II 24-hr 10-Year Rainfall=3.15"

Area (ac)	CN	Description
2.900	98	Impervious
2.780	80	>75% Grass cover, Good, HSG D
5.680	89	Weighted Average
2.780		48.94% Pervious Area
2.900		51.06% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.2	90	0.0200	0.15		Sheet Flow, grass Grass: Short n= 0.150 P2= 2.50"
1.3	75	0.0130	0.97		Sheet Flow, pavement Smooth surfaces n= 0.011 P2= 2.50"
2.9	518		3.00		Direct Entry, Pipe flow
14.4	683	Total			

Subcatchment 2S: Rear Area 1

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Type II 24-hr 10-Year Rainfall=3.15"

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Summary for Subcatchment 3S: Front Area 2

Runoff = 5.30 cfs @ 12.06 hrs, Volume= 0.336 af, Depth= 2.12"

Routed to Pond 3P : Underground Storage (SMA #2)

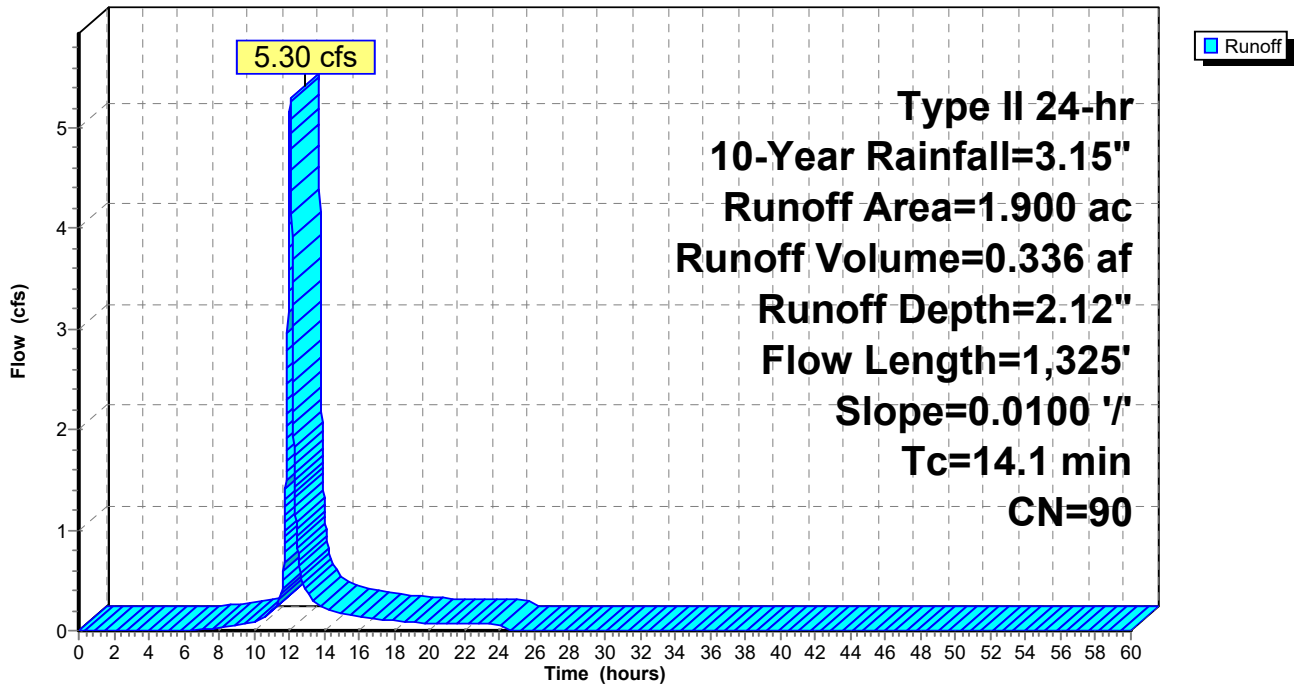
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
 Type II 24-hr 10-Year Rainfall=3.15"

Area (ac)	CN	Description
* 1.030	98	Impervious
0.870	80	>75% Grass cover, Good, HSG D
1.900	90	Weighted Average
0.870		45.79% Pervious Area
1.030		54.21% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0	40	0.0100	0.09		Sheet Flow, grass
7.1	1,285		3.00		Grass: Short n= 0.150 P2= 2.50" Direct Entry, Pipe flow
14.1	1,325				Total

Subcatchment 3S: Front Area 2

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Type II 24-hr 10-Year Rainfall=3.15"

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Summary for Subcatchment 4S: Rear Area 2

Runoff = 8.97 cfs @ 12.00 hrs, Volume= 0.489 af, Depth= 2.30"
 Routed to Pond 4P : Bioretention Area #2

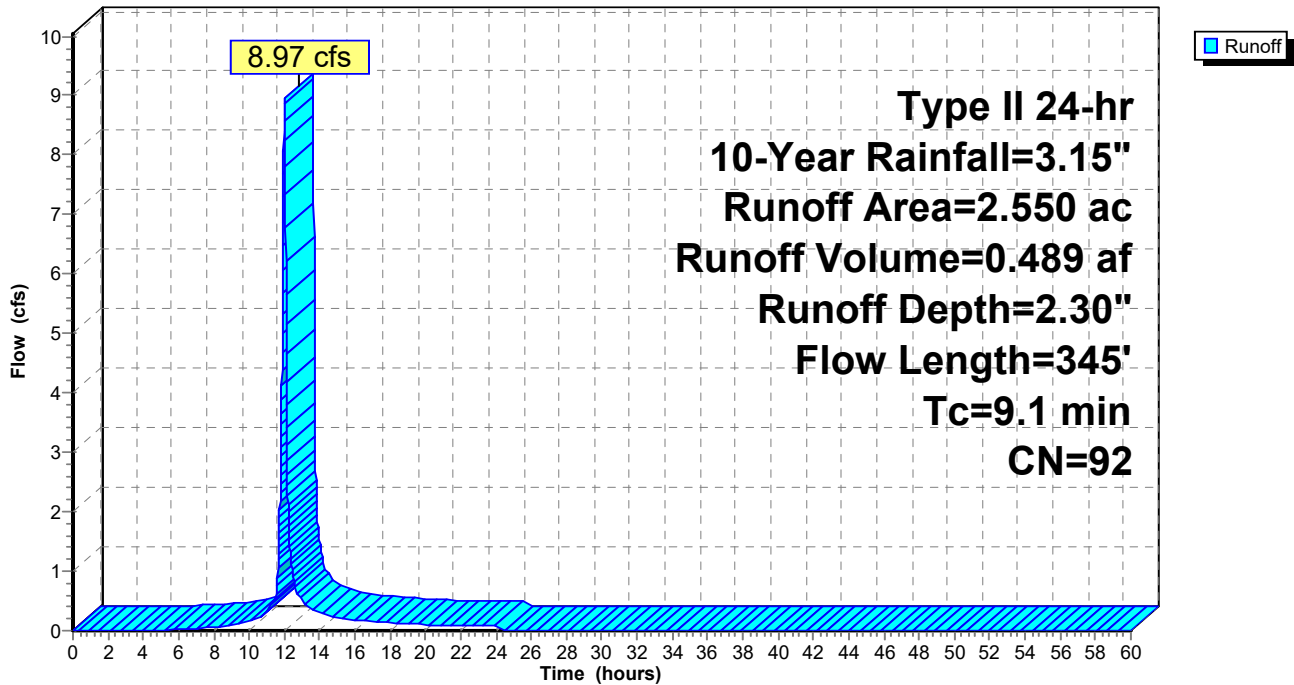
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
 Type II 24-hr 10-Year Rainfall=3.15"

Area (ac)	CN	Description
1.670	98	Impervious
0.880	80	>75% Grass cover, Good, HSG D
2.550	92	Weighted Average
0.880		34.51% Pervious Area
1.670		65.49% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.9	55	0.0200	0.13		Sheet Flow, grass Grass: Short n= 0.150 P2= 2.50"
0.8	45	0.0170	0.97		Sheet Flow, pavement Smooth surfaces n= 0.011 P2= 2.50"
1.4	245		3.00		Direct Entry, Pipe flow
9.1	345	Total			

Subcatchment 4S: Rear Area 2

Hydrograph



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Type II 24-hr 10-Year Rainfall=3.15"

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Summary for Subcatchment 5S: Unrestricted Runoff Areas

Runoff = 0.30 cfs @ 11.96 hrs, Volume= 0.014 af, Depth= 1.36"

Routed to Link 2L : Total Outflow from Proposed Site

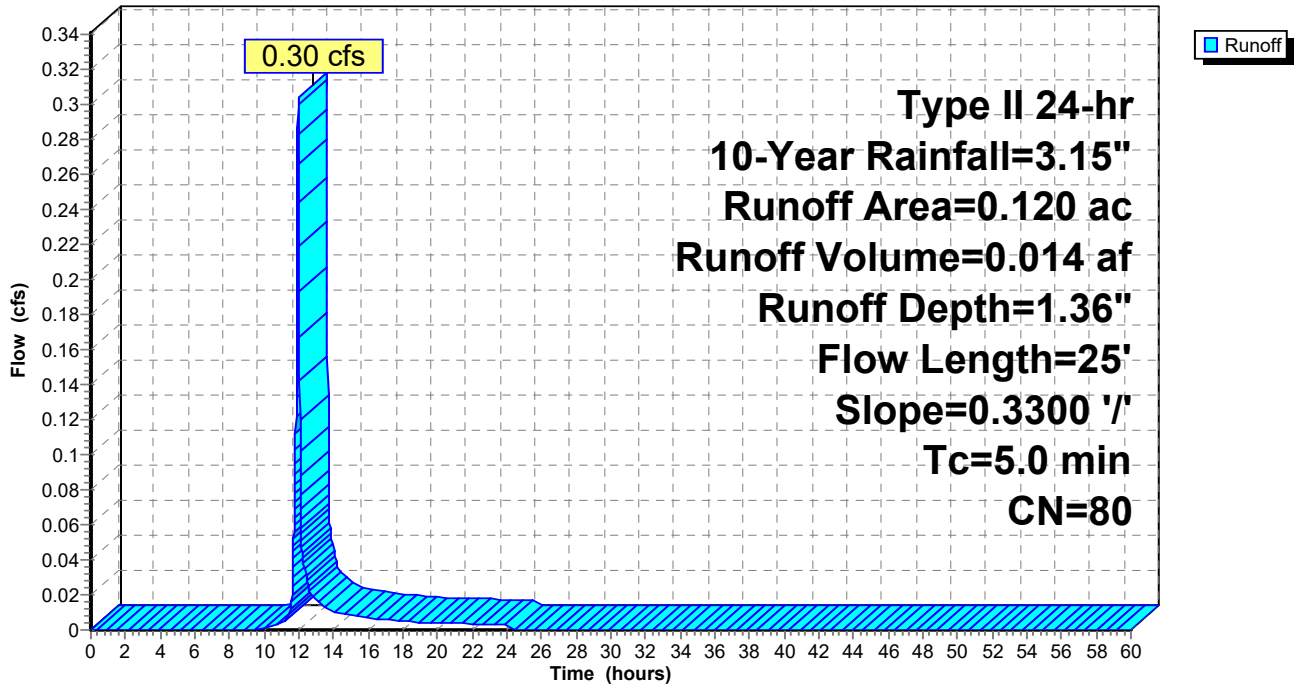
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-Year Rainfall=3.15"

Area (ac)	CN	Description
0.120	80	>75% Grass cover, Good, HSG D
0.120		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	25	0.3300	0.35		Sheet Flow, grass Grass: Short n= 0.150 P2= 2.50"
1.2	25	Total, Increased to minimum Tc = 5.0 min			

Subcatchment 5S: Unrestricted Runoff Areas

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Type II 24-hr 10-Year Rainfall=3.15"

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Summary for Subcatchment 6S: Unrestricted Runoff Areas

Runoff = 0.52 cfs @ 11.96 hrs, Volume= 0.024 af, Depth= 1.57"

Routed to Link 2L : Total Outflow from Proposed Site

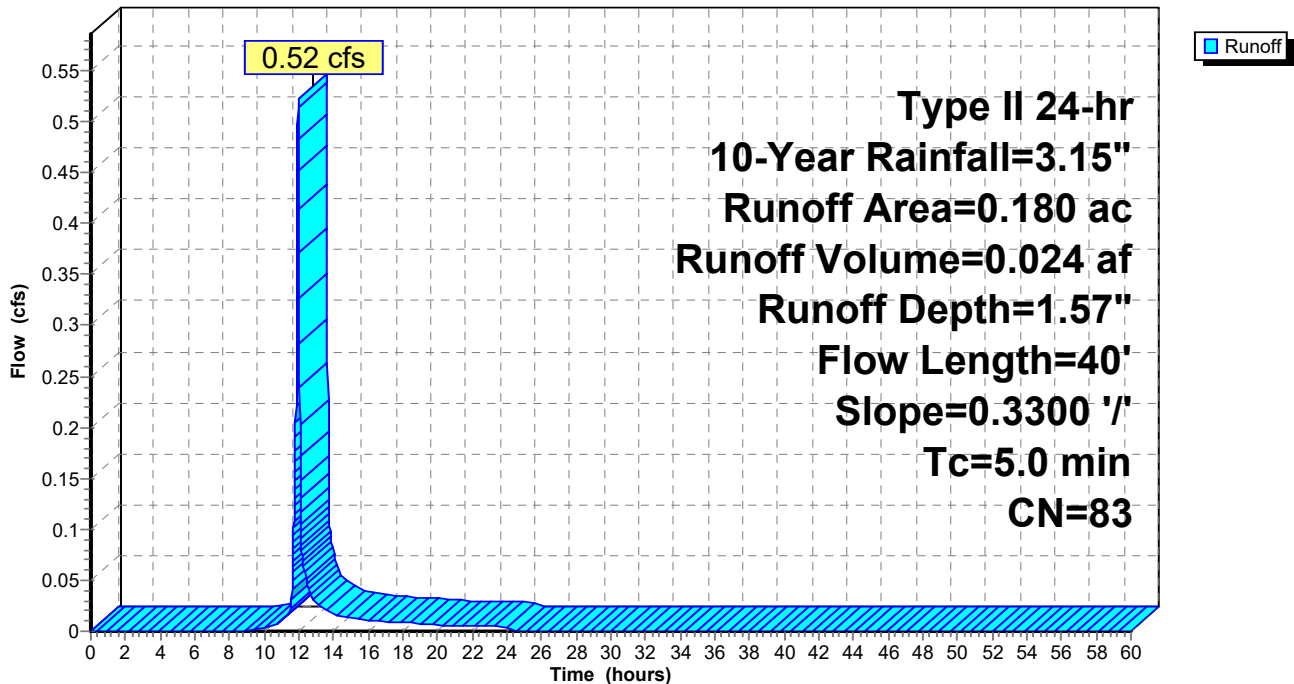
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
 Type II 24-hr 10-Year Rainfall=3.15"

Area (ac)	CN	Description
0.150	80	>75% Grass cover, Good, HSG D
* 0.030	98	Impervious
0.180	83	Weighted Average
0.150		83.33% Pervious Area
0.030		16.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.7	40	0.3300	0.38		Sheet Flow, grass Grass: Short n= 0.150 P2= 2.50"
1.7	40	Total, Increased to minimum Tc = 5.0 min			

Subcatchment 6S: Unrestricted Runoff Areas

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Type II 24-hr 10-Year Rainfall=3.15"

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Summary for Subcatchment 7S: Unrestricted Permanent Open Space

Runoff = 0.50 cfs @ 13.31 hrs, Volume= 0.125 af, Depth= 1.30"

Routed to Link 2L : Total Outflow from Proposed Site

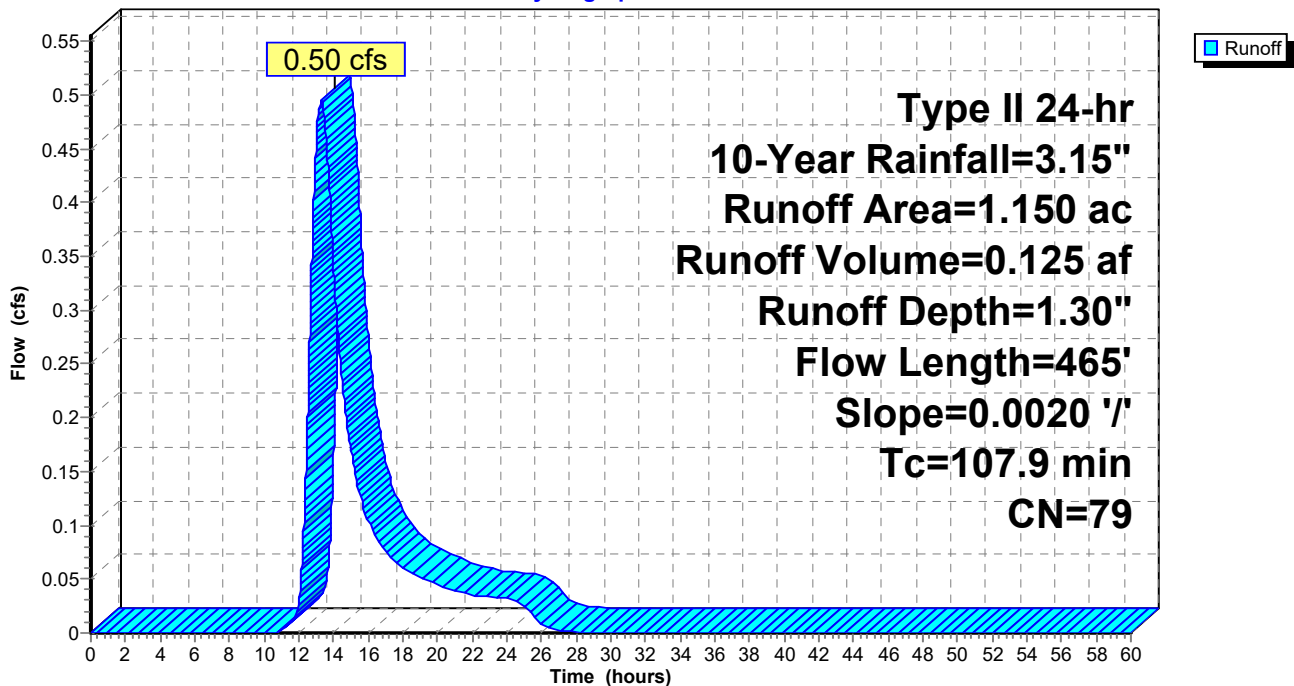
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
 Type II 24-hr 10-Year Rainfall=3.15"

Area (ac)	CN	Description
1.150	79	Woods, Fair, HSG D
1.150		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
84.4	150	0.0020	0.03		Sheet Flow, woods Woods: Light underbrush n= 0.400 P2= 2.50"
23.5	315	0.0020	0.22		Shallow Concentrated Flow, woods Woodland Kv= 5.0 fps
107.9	465	Total			

Subcatchment 7S: Unrestricted Permanent Open Space

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Type II 24-hr 10-Year Rainfall=3.15"

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Summary for Pond 1P: Bioretention Area #1

Inflow Area = 5.840 ac, 59.42% Impervious, Inflow Depth = 2.21" for 10-Year event
Inflow = 17.31 cfs @ 12.05 hrs, Volume= 1.076 af
Outflow = 15.92 cfs @ 12.09 hrs, Volume= 1.076 af, Atten= 8%, Lag= 2.8 min
Primary = 3.29 cfs @ 12.09 hrs, Volume= 0.798 af
Routed to Link 1L : Outflow to Dodge Rd (@ CB 54)
Secondary = 12.62 cfs @ 12.09 hrs, Volume= 0.278 af
Routed to Pond 2P : Detention Basin (SMA #1)

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 577.02' @ 12.09 hrs Surf.Area= 11,416 sf Storage= 10,893 cf

Plug-Flow detention time= 183.7 min calculated for 1.076 af (100% of inflow)
Center-of-Mass det. time= 183.9 min (990.6 - 806.7)

Volume	Invert	Avail.Storage	Storage Description
#1	576.00'	16,618 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
576.00	9,925	0	0
576.50	10,585	5,128	5,128
577.00	11,350	5,484	10,611
577.50	12,675	6,006	16,618

Device	Routing	Invert	Outlet Devices
#1	Primary	572.50'	8.0" Round 8" pipe L= 25.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 572.50' / 572.42' S= 0.0032 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#2	Device 1	576.50'	8.0" Horiz. Grate X 4.00 C= 0.600 Limited to weir flow at low heads
#3	Device 1	576.00'	0.250 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 560.00'
#4	Secondary	576.75'	30.0' long (Profile 1) Broad-Crested Rectangular Weir Head (feet) 0.49 0.98 1.48 Coef. (English) 2.92 3.37 3.59

Primary OutFlow Max=3.29 cfs @ 12.09 hrs HW=577.02' (Free Discharge)

- ↑ **1=8" pipe** (Barrel Controls 3.29 cfs @ 9.44 fps)
- ↑ **2=Grate** (Passes < 4.87 cfs potential flow)
- ↑ **3=Exfiltration** (Passes < 0.07 cfs potential flow)

Secondary OutFlow Max=12.60 cfs @ 12.09 hrs HW=577.02' (Free Discharge)

- ↑ **4=Broad-Crested Rectangular Weir** (Weir Controls 12.60 cfs @ 1.53 fps)

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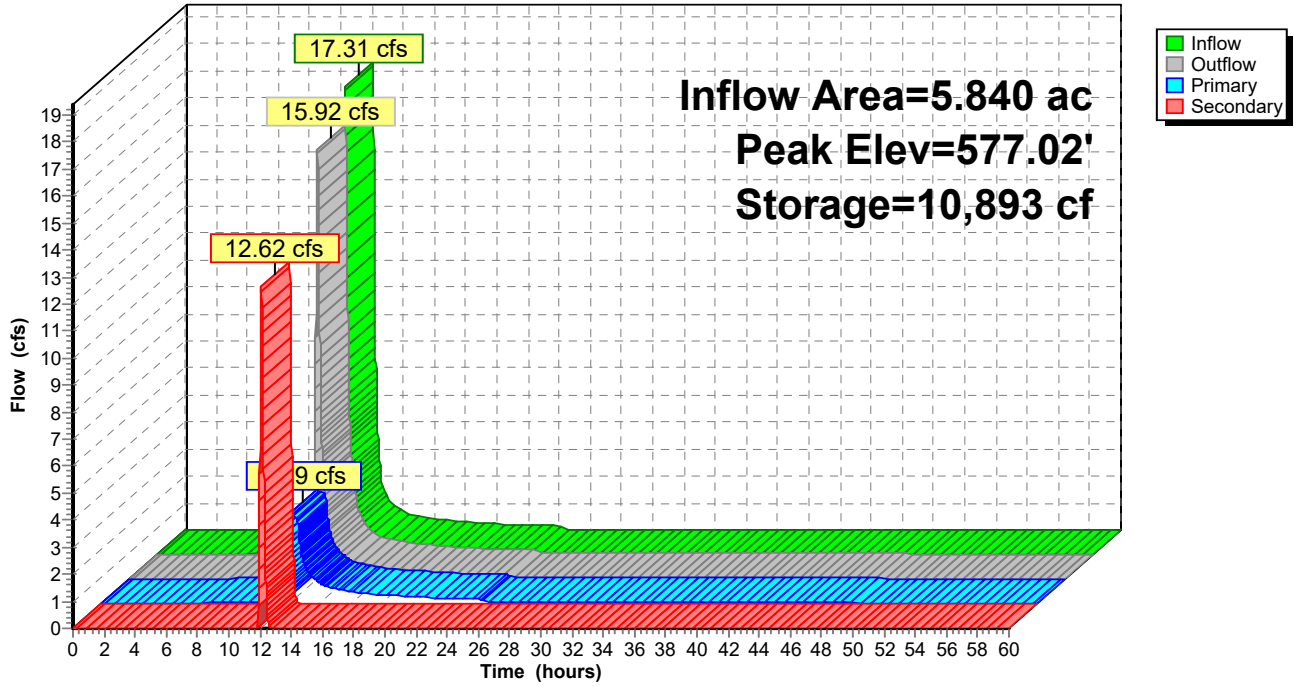
Type II 24-hr 10-Year Rainfall=3.15"

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Pond 1P: Bioretention Area #1

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Summary for Pond 2P: Detention Basin (SMA #1)

Inflow Area = 5.680 ac, 51.06% Impervious, Inflow Depth = 2.62" for 10-Year event
 Inflow = 27.47 cfs @ 12.08 hrs, Volume= 1.242 af
 Outflow = 0.50 cfs @ 15.07 hrs, Volume= 0.997 af, Atten= 98%, Lag= 179.7 min
 Primary = 0.50 cfs @ 15.07 hrs, Volume= 0.997 af
 Routed to Link 1L : Outflow to Dodge Rd (@ CB 54)
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Routed to Link 2L : Total Outflow from Proposed Site

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
 Peak Elev= 575.65' @ 15.07 hrs Surf.Area= 64,171 sf Storage= 40,053 cf

Plug-Flow detention time= 944.6 min calculated for 0.997 af (80% of inflow)
 Center-of-Mass det. time= 873.0 min (1,669.7 - 796.7)

Volume	Invert	Avail.Storage	Storage Description
#1	575.00'	118,224 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
575.00	59,213	0	0
576.00	66,849	63,031	63,031
576.80	71,134	55,193	118,224

Device	Routing	Invert	Outlet Devices
#1	Primary	574.00'	12.0" Round 12" outlet pipe L= 160.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 574.00' / 573.79' S= 0.0013 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	575.00'	6.0" Round low flow outlet pipe L= 10.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 575.00' / 574.95' S= 0.0050 '/' Cc= 0.900 n= 0.010 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#3	Device 1	576.50'	30.0" x 30.0" Horiz. Grate C= 0.600 Limited to weir flow at low heads
#4	Secondary	576.12'	20.0' long (Profile 1) Broad-Crested Rectangular Weir X 2.00 Head (feet) 0.49 0.98 1.48 Coef. (English) 2.92 3.37 3.59

Primary OutFlow Max=0.50 cfs @ 15.07 hrs HW=575.65' (Free Discharge)

- ↑ 1=12" outlet pipe (Passes 0.50 cfs of 2.29 cfs potential flow)
- ↑ 2=low flow outlet pipe (Barrel Controls 0.50 cfs @ 2.55 fps)
- ↑ 3=Grate (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=575.00' (Free Discharge)

- ↑ 4=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

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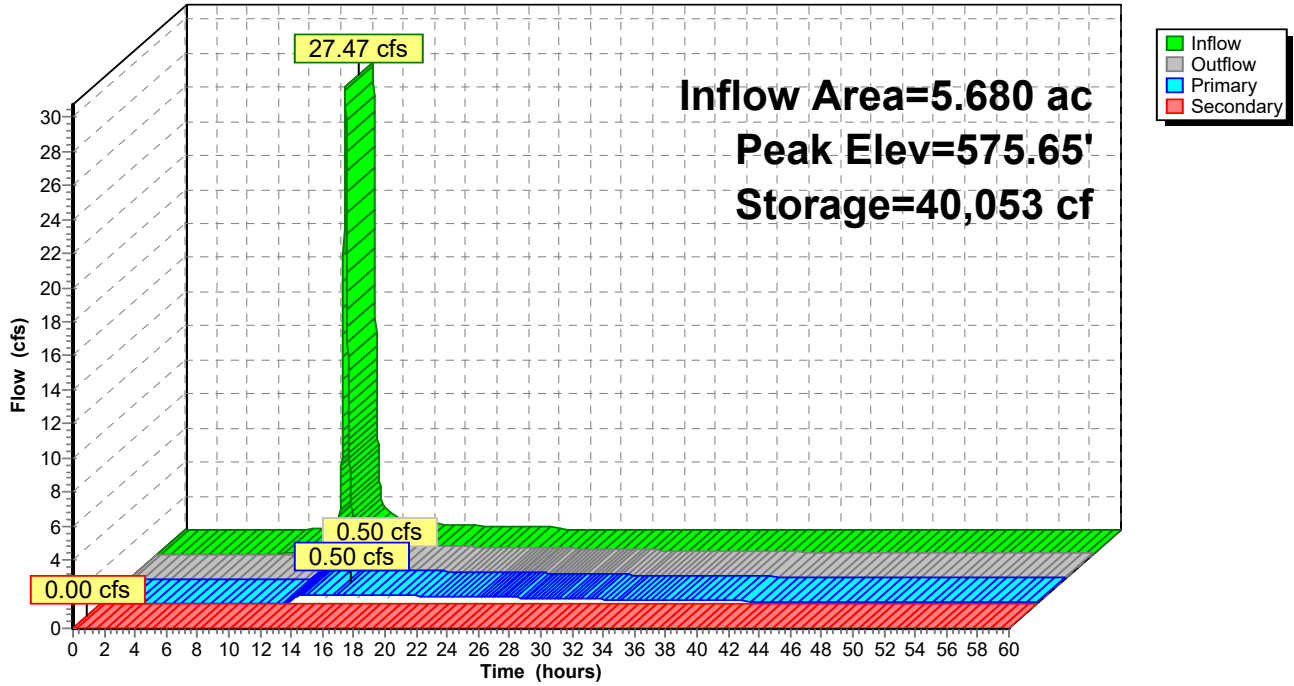
Type II 24-hr 10-Year Rainfall=3.15"

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Pond 2P: Detention Basin (SMA #1)

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Summary for Pond 2P WQ: WQv (SMA #1)

[43] Hint: Has no inflow (Outflow=Zero)

Volume	Invert	Avail.Storage	Storage Description
#1	563.00'	152,678 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
563.00	710	0	0
564.00	1,152	931	931
565.00	1,725	1,439	2,370
566.00	2,430	2,078	4,447
567.00	3,302	2,866	7,313
568.00	4,386	3,844	11,157
569.00	7,838	6,112	17,269
570.00	11,596	9,717	26,986
571.00	15,606	13,601	40,587
572.00	20,106	17,856	58,443
573.00	24,865	22,486	80,929
574.00	29,710	27,288	108,216
575.00	59,213	44,462	152,678

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Summary for Pond 3P: Underground Storage (SMA #2)

[79] Warning: Submerged Pond 4P Primary device # 1 INLET by 0.17'

Inflow Area = 4.450 ac, 60.67% Impervious, Inflow Depth = 2.23" for 10-Year event
 Inflow = 8.16 cfs @ 12.06 hrs, Volume= 0.825 af
 Outflow = 1.53 cfs @ 12.80 hrs, Volume= 0.781 af, Atten= 81%, Lag= 44.8 min
 Primary = 1.53 cfs @ 12.80 hrs, Volume= 0.781 af
 Routed to Link 2L : Total Outflow from Proposed Site

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
 Peak Elev= 571.58' @ 12.80 hrs Surf.Area= 10,145 sf Storage= 14,720 cf

Plug-Flow detention time= 258.3 min calculated for 0.781 af (95% of inflow)
 Center-of-Mass det. time= 169.7 min (1,170.5 - 1,000.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	569.50'	8,947 cf	53.75"W x 188.74"L x 3.50'H Field A 35,506 cf Overall - 13,139 cf Embedded = 22,367 cf x 40.0% Voids
#2A	570.00'	13,139 cf	ADS_StormTech SC-740 +Cap x 286 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 286 Chambers in 11 Rows
		22,086 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	569.93'	12.0" Round Culvert L= 72.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 569.93' / 569.71' S= 0.0031 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	569.93'	4.0" Vert. Orifice X 3.00 C= 0.600 Limited to weir flow at low heads
#3	Device 1	572.00'	5.0' long Weir 2 End Contraction(s)

Primary OutFlow Max=1.53 cfs @ 12.80 hrs HW=571.58' (Free Discharge)

- ↑ **1=Culvert** (Passes 1.53 cfs of 3.03 cfs potential flow)
- ↑ **2=Orifice** (Orifice Controls 1.53 cfs @ 5.86 fps)
- ↑ **3=Weir** (Controls 0.00 cfs)

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Pond 3P: Underground Storage (SMA #2) - Chamber Wizard Field A

Chamber Model = ADS_StormTechSC-740 +Cap (ADS StormTech®SC-740 with cap length)

Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf

Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

26 Chambers/Row x 7.12' Long +0.81' Cap Length x 2 = 186.74' Row Length +12.0" End Stone x 2 = 188.74' Base Length

11 Rows x 51.0" Wide + 6.0" Spacing x 10 + 12.0" Side Stone x 2 = 53.75' Base Width

6.0" Stone Base + 30.0" Chamber Height + 6.0" Stone Cover = 3.50' Field Height

286 Chambers x 45.9 cf = 13,138.8 cf Chamber Storage

35,506.1 cf Field - 13,138.8 cf Chambers = 22,367.2 cf Stone x 40.0% Voids = 8,946.9 cf Stone Storage

Chamber Storage + Stone Storage = 22,085.7 cf = 0.507 af

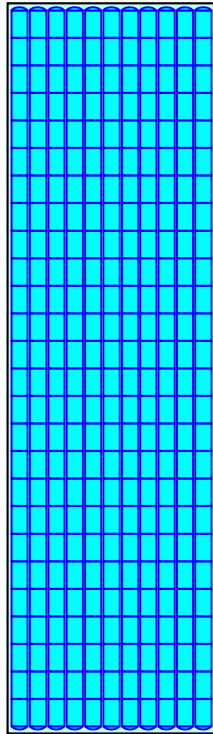
Overall Storage Efficiency = 62.2%

Overall System Size = 188.74' x 53.75' x 3.50'

286 Chambers

1,315.0 cy Field

828.4 cy Stone



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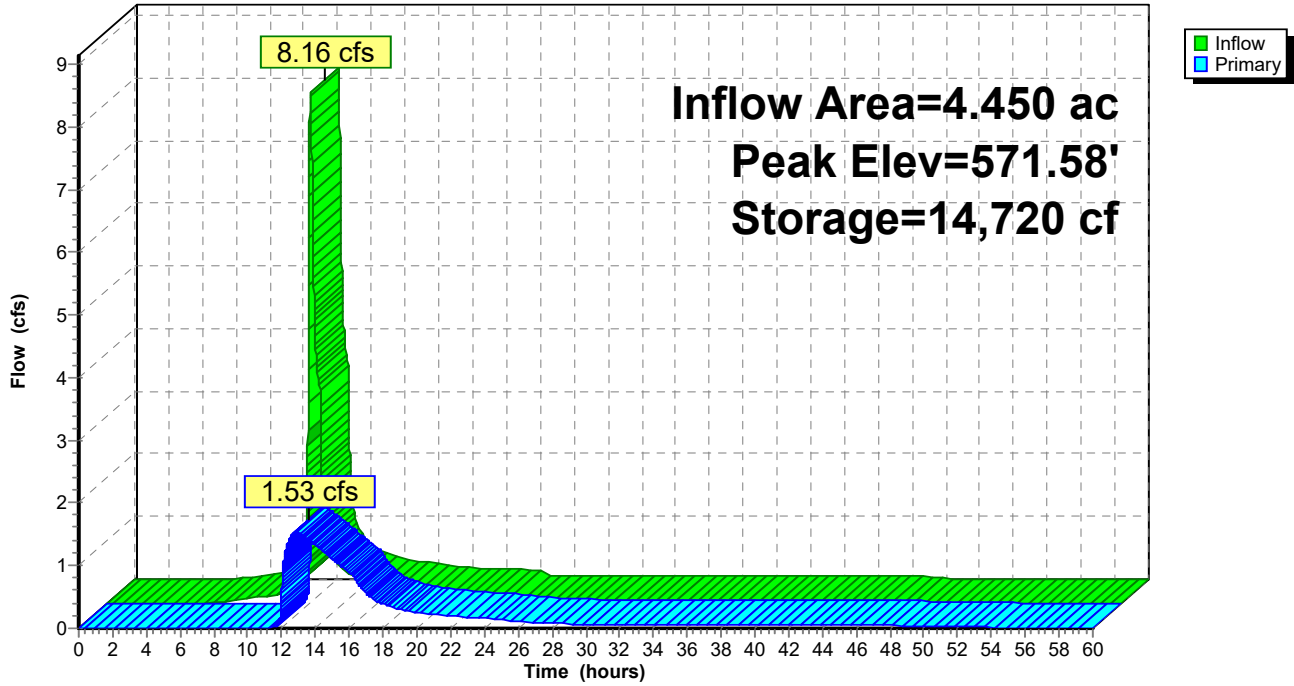
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Pond 3P: Underground Storage (SMA #2)

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Summary for Pond 4P: Bioretention Area #2

Inflow Area = 2.550 ac, 65.49% Impervious, Inflow Depth = 2.30" for 10-Year event
Inflow = 8.97 cfs @ 12.00 hrs, Volume= 0.489 af
Outflow = 2.89 cfs @ 12.16 hrs, Volume= 0.489 af, Atten= 68%, Lag= 9.4 min
Primary = 2.89 cfs @ 12.16 hrs, Volume= 0.489 af
Routed to Pond 3P : Underground Storage (SMA #2)

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 575.90' @ 12.16 hrs Surf.Area= 10,504 sf Storage= 8,718 cf

Plug-Flow detention time= 332.5 min calculated for 0.489 af (100% of inflow)
Center-of-Mass det. time= 332.4 min (1,130.5 - 798.1)

Volume	Invert	Avail.Storage	Storage Description
#1	575.00'	21,391 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
575.00	8,798	0	0
576.00	10,686	9,742	9,742
577.00	12,612	11,649	21,391

Device	Routing	Invert	Outlet Devices
#1	Primary	571.41'	8.0" Round Pipe L= 41.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 571.41' / 571.30' S= 0.0027 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#2	Device 1	575.50'	8.0" Horiz. Grate X 8.00 C= 0.600 Limited to weir flow at low heads
#3	Device 1	575.00'	0.250 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 560.00'
#4	Device 1	575.75'	24.0" x 24.0" Horiz. Grate (overflow) C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=2.89 cfs @ 12.16 hrs HW=575.90' (Free Discharge)

- 1=Pipe (Barrel Controls 2.89 cfs @ 8.27 fps)
- 2=Grate (Passes < 8.54 cfs potential flow)
- 3=Exfiltration (Passes < 0.06 cfs potential flow)
- 4=Grate (overflow) (Passes < 1.57 cfs potential flow)

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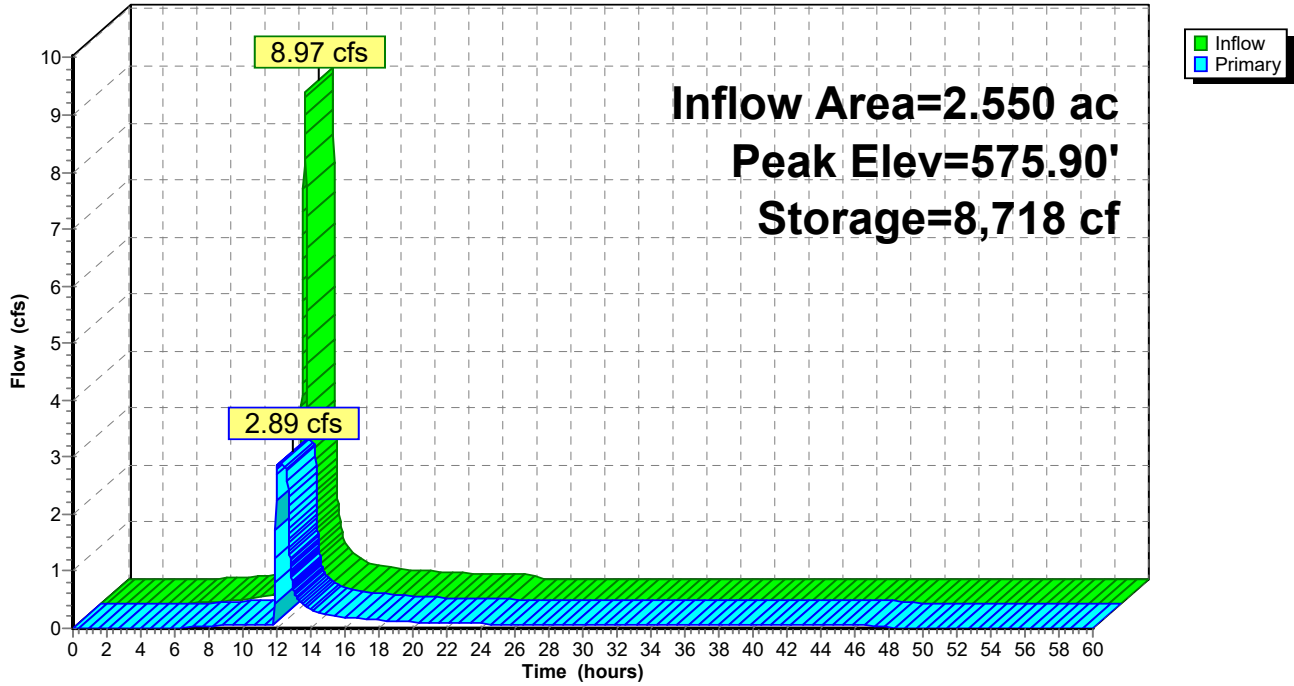
Type II 24-hr 10-Year Rainfall=3.15"

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Pond 4P: Bioretention Area #2

Hydrograph



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Type II 24-hr 10-Year Rainfall=3.15"

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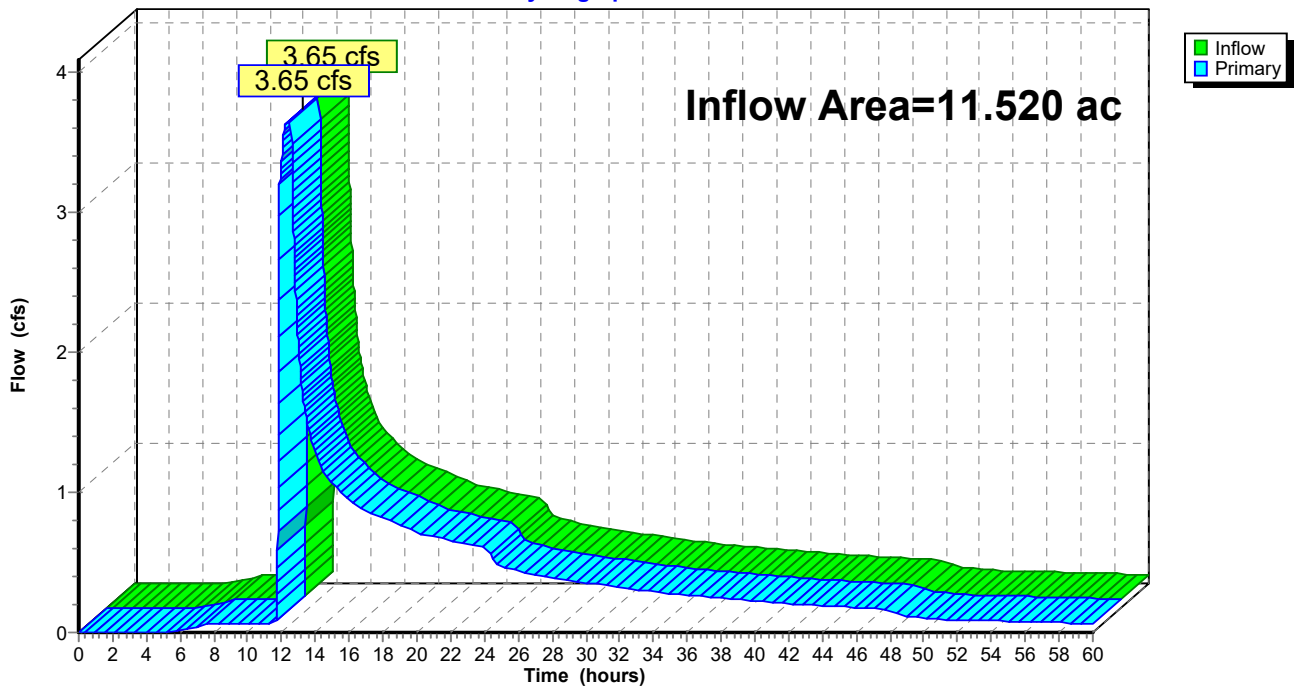
Summary for Link 1L: Outflow to Dodge Rd (@ CB 54)

Inflow Area = 11.520 ac, 55.30% Impervious, Inflow Depth > 1.87" for 10-Year event
Inflow = 3.65 cfs @ 12.40 hrs, Volume= 1.795 af
Primary = 3.65 cfs @ 12.40 hrs, Volume= 1.795 af, Atten= 0%, Lag= 0.0 min
Routed to Link 2L : Total Outflow from Proposed Site

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

Link 1L: Outflow to Dodge Rd (@ CB 54)

Hydrograph



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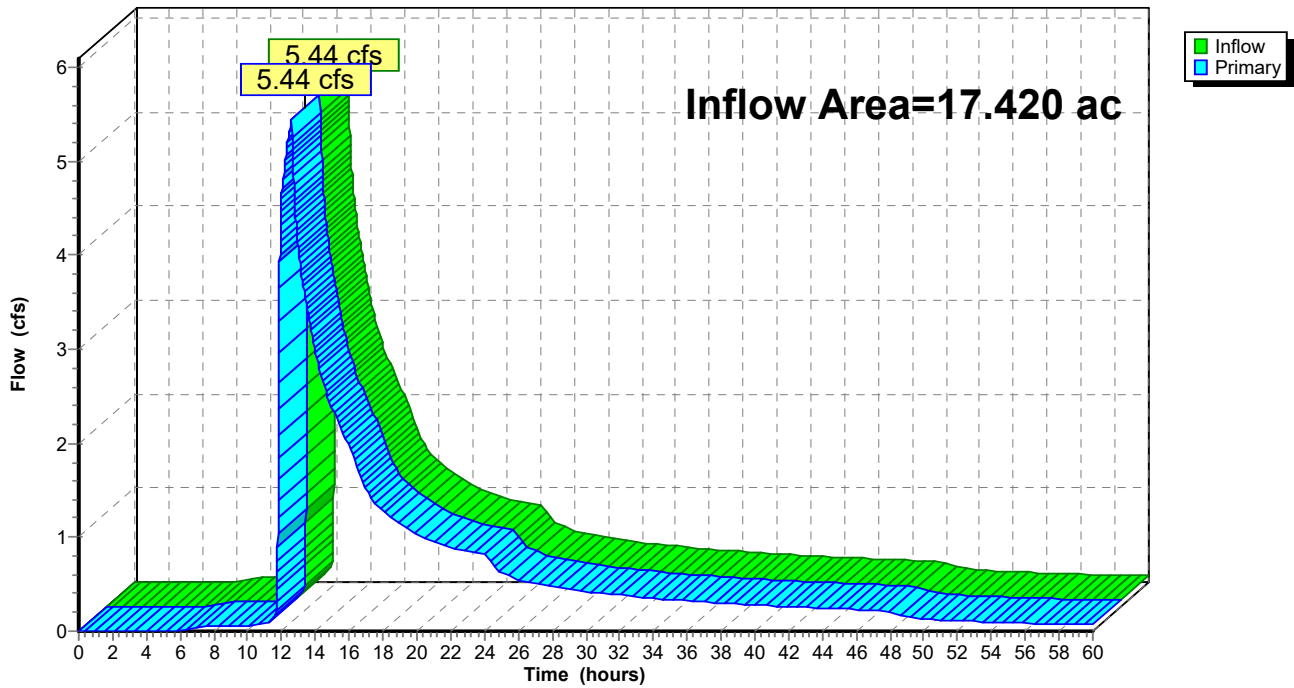
Summary for Link 2L: Total Outflow from Proposed Site

Inflow Area = 17.420 ac, 52.24% Impervious, Inflow Depth > 1.89" for 10-Year event
Inflow = 5.44 cfs @ 12.60 hrs, Volume= 2.738 af
Primary = 5.44 cfs @ 12.60 hrs, Volume= 2.738 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

Link 2L: Total Outflow from Proposed Site

Hydrograph



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Type II 24-hr 25-Year Rainfall=3.87"

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Time span=0.00-60.00 hrs, dt=0.01 hrs, 6001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Front Area 1

Runoff Area=5.840 ac 59.42% Impervious Runoff Depth=2.89"
Flow Length=652' Tc=13.3 min CN=91 Runoff=22.36 cfs 1.408 af

Subcatchment2S: Rear Area 1

Runoff Area=5.680 ac 51.06% Impervious Runoff Depth=2.70"
Flow Length=683' Tc=14.4 min CN=89 Runoff=19.87 cfs 1.279 af

Subcatchment3S: Front Area 2

Runoff Area=1.900 ac 54.21% Impervious Runoff Depth=2.80"
Flow Length=1,325' Slope=0.0100 '/' Tc=14.1 min CN=90 Runoff=6.91 cfs 0.443 af

Subcatchment4S: Rear Area 2

Runoff Area=2.550 ac 65.49% Impervious Runoff Depth=2.99"
Flow Length=345' Tc=9.1 min CN=92 Runoff=11.47 cfs 0.636 af

Subcatchment5S: Unrestricted Runoff Areas Runoff Area=0.120 ac 0.00% Impervious Runoff Depth=1.93"
Flow Length=25' Slope=0.3300 '/' Tc=5.0 min CN=80 Runoff=0.43 cfs 0.019 af

Subcatchment6S: Unrestricted Runoff Runoff Area=0.180 ac 16.67% Impervious Runoff Depth=2.17"
Flow Length=40' Slope=0.3300 '/' Tc=5.0 min CN=83 Runoff=0.72 cfs 0.033 af

Subcatchment7S: Unrestricted Permanent Runoff Area=1.150 ac 0.00% Impervious Runoff Depth=1.86"
Flow Length=465' Slope=0.0020 '/' Tc=107.9 min CN=79 Runoff=0.72 cfs 0.178 af

Pond 1P: Bioretention Area #1

Peak Elev=577.09' Storage=11,696 cf Inflow=22.36 cfs 1.408 af
Primary=3.32 cfs 0.965 af Secondary=17.72 cfs 0.443 af Outflow=21.04 cfs 1.408 af

Pond 2P: Detention Basin (SMA #1)

Peak Elev=575.90' Storage=56,601 cf Inflow=37.34 cfs 1.722 af
Primary=0.67 cfs 1.431 af Secondary=0.00 cfs 0.000 af Outflow=0.67 cfs 1.431 af

Pond 2P WQ: WQv (SMA #1)

Peak Elev=0.00' Storage=0 cf

Pond 3P: Underground Storage (SMA #2)

Peak Elev=572.20' Storage=18,670 cf Inflow=9.85 cfs 1.079 af
Outflow=3.24 cfs 1.034 af

Pond 4P: Bioretention Area #2

Peak Elev=576.17' Storage=11,587 cf Inflow=11.47 cfs 0.636 af
Outflow=2.98 cfs 0.636 af

Link 1L: Outflow to Dodge Rd (@ CB 54)

Inflow=3.84 cfs 2.396 af
Primary=3.84 cfs 2.396 af

Link 2L: Total Outflow from Proposed Site

Inflow=6.64 cfs 3.660 af
Primary=6.64 cfs 3.660 af

Total Runoff Area = 17.420 ac Runoff Volume = 3.995 af Average Runoff Depth = 2.75"
47.76% Pervious = 8.320 ac 52.24% Impervious = 9.100 ac

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Type II 24-hr 25-Year Rainfall=3.87"

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Summary for Subcatchment 1S: Front Area 1

Runoff = 22.36 cfs @ 12.05 hrs, Volume= 1.408 af, Depth= 2.89"
 Routed to Pond 1P : Bioretention Area #1

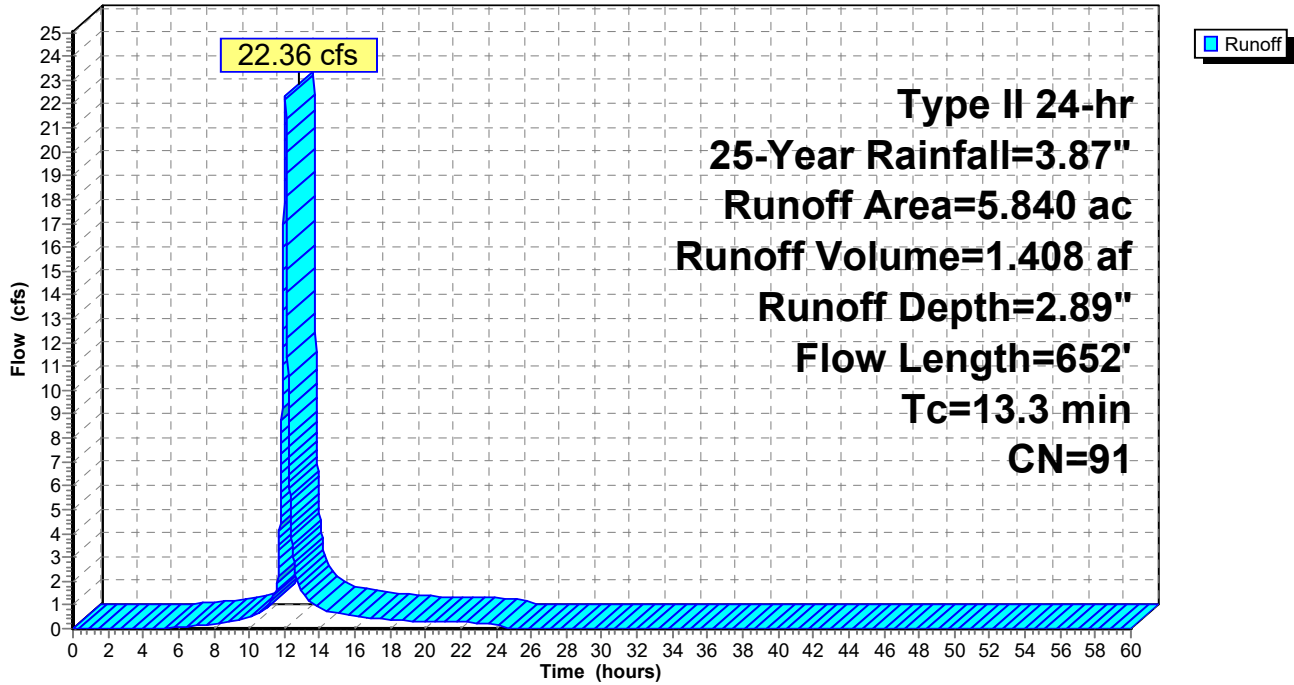
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
 Type II 24-hr 25-Year Rainfall=3.87"

Area (ac)	CN	Description
3.470	98	Impervious
2.370	80	>75% Grass cover, Good, HSG D
5.840	91	Weighted Average
2.370		40.58% Pervious Area
3.470		59.42% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.6	37	0.0100	0.06		Sheet Flow, grass Grass: Dense n= 0.240 P2= 2.50"
0.4	15	0.0120	0.68		Sheet Flow, pavement Smooth surfaces n= 0.011 P2= 2.50"
3.3	600		3.00		Direct Entry, pipe flow
13.3	652	Total			

Subcatchment 1S: Front Area 1

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Summary for Subcatchment 2S: Rear Area 1

Runoff = 19.87 cfs @ 12.06 hrs, Volume= 1.279 af, Depth= 2.70"
 Routed to Pond 2P : Detention Basin (SMA #1)

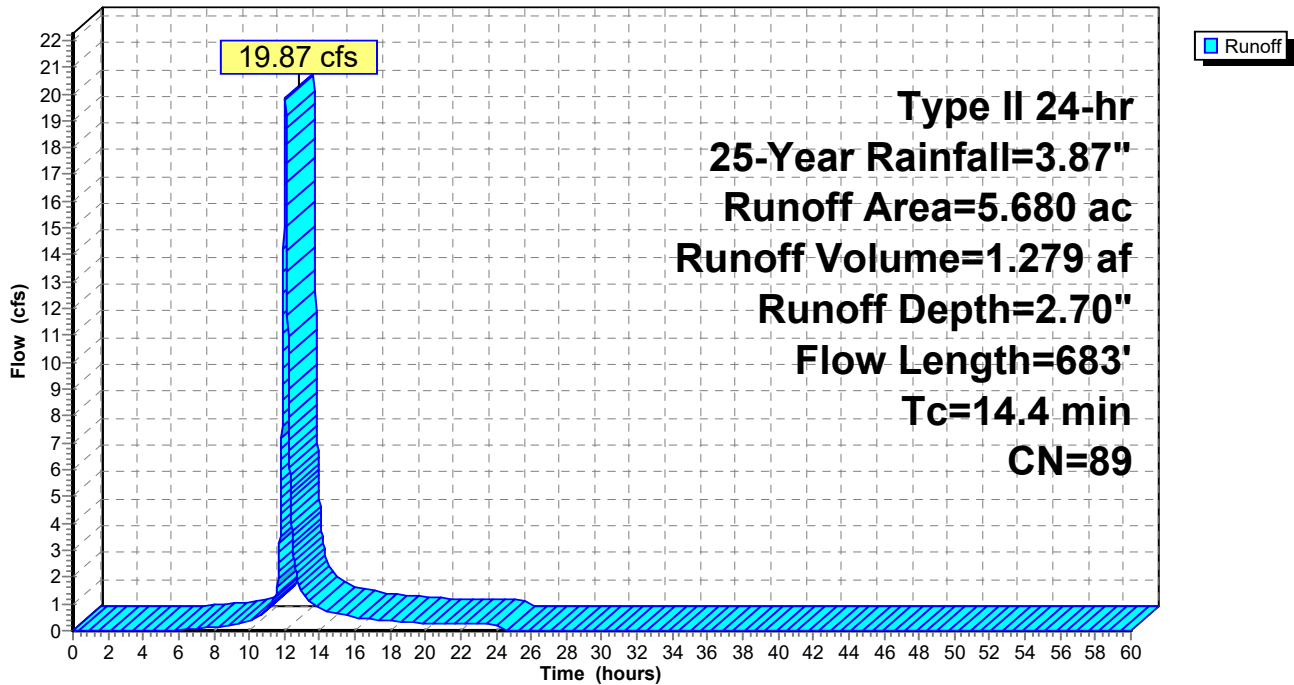
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
 Type II 24-hr 25-Year Rainfall=3.87"

Area (ac)	CN	Description
2.900	98	Impervious
2.780	80	>75% Grass cover, Good, HSG D
5.680	89	Weighted Average
2.780		48.94% Pervious Area
2.900		51.06% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.2	90	0.0200	0.15		Sheet Flow, grass Grass: Short n= 0.150 P2= 2.50"
1.3	75	0.0130	0.97		Sheet Flow, pavement Smooth surfaces n= 0.011 P2= 2.50"
2.9	518		3.00		Direct Entry, Pipe flow
14.4	683	Total			

Subcatchment 2S: Rear Area 1

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Summary for Subcatchment 3S: Front Area 2

Runoff = 6.91 cfs @ 12.05 hrs, Volume= 0.443 af, Depth= 2.80"

Routed to Pond 3P : Underground Storage (SMA #2)

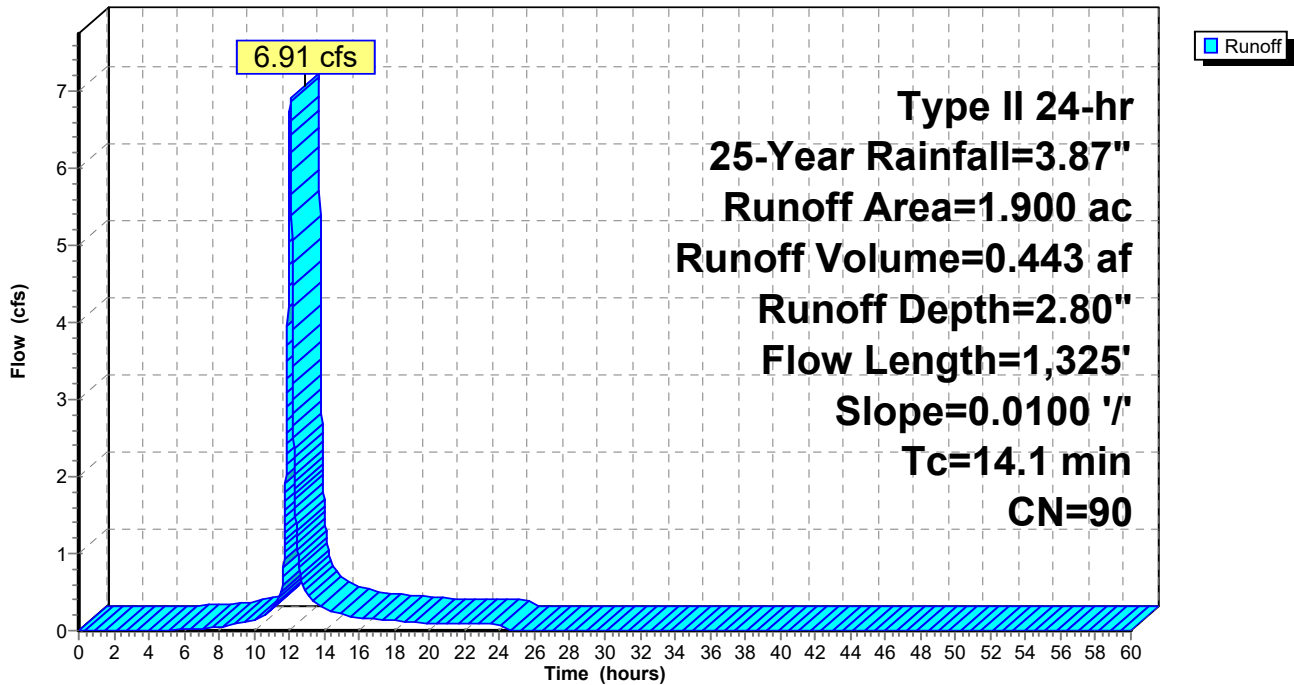
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 25-Year Rainfall=3.87"

Area (ac)	CN	Description
* 1.030	98	Impervious
0.870	80	>75% Grass cover, Good, HSG D
1.900	90	Weighted Average
0.870		45.79% Pervious Area
1.030		54.21% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0	40	0.0100	0.09		Sheet Flow, grass
7.1	1,285		3.00		Grass: Short n= 0.150 P2= 2.50" Direct Entry, Pipe flow
14.1	1,325	Total			

Subcatchment 3S: Front Area 2

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Summary for Subcatchment 4S: Rear Area 2

Runoff = 11.47 cfs @ 12.00 hrs, Volume= 0.636 af, Depth= 2.99"
 Routed to Pond 4P : Bioretention Area #2

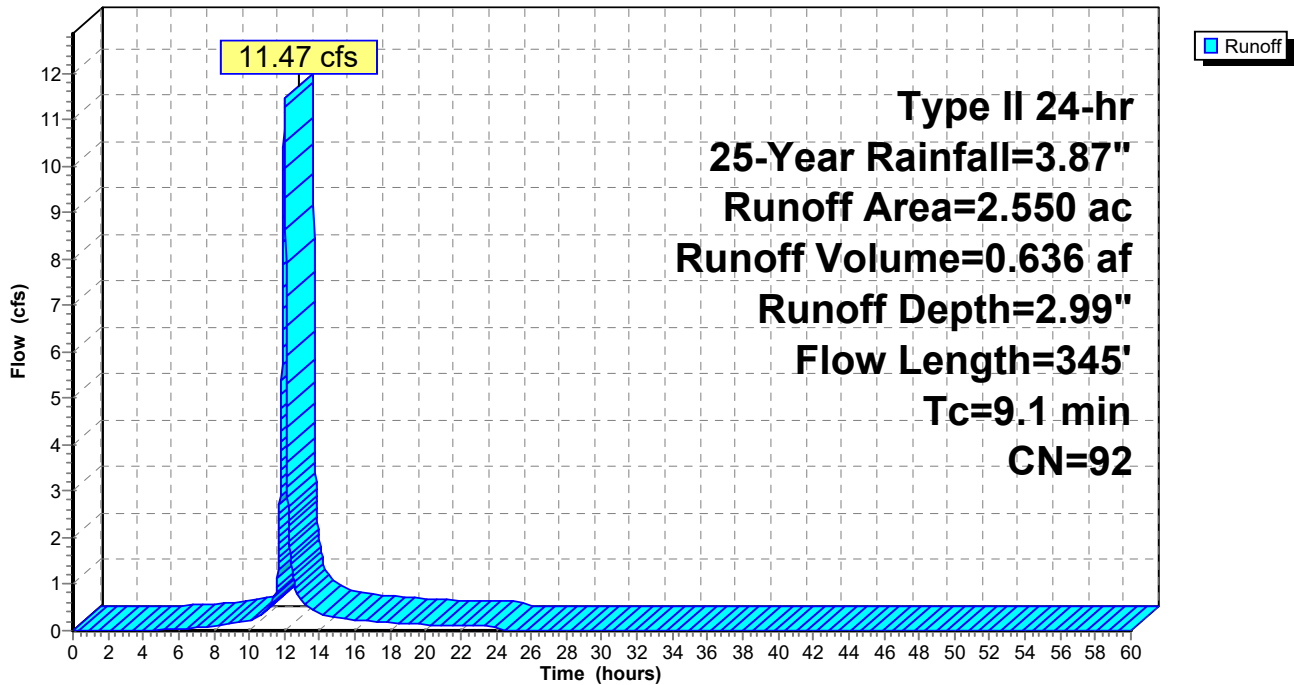
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
 Type II 24-hr 25-Year Rainfall=3.87"

Area (ac)	CN	Description
1.670	98	Impervious
0.880	80	>75% Grass cover, Good, HSG D
2.550	92	Weighted Average
0.880		34.51% Pervious Area
1.670		65.49% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.9	55	0.0200	0.13		Sheet Flow, grass Grass: Short n= 0.150 P2= 2.50"
0.8	45	0.0170	0.97		Sheet Flow, pavement Smooth surfaces n= 0.011 P2= 2.50"
1.4	245		3.00		Direct Entry, Pipe flow
9.1	345	Total			

Subcatchment 4S: Rear Area 2

Hydrograph



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Summary for Subcatchment 5S: Unrestricted Runoff Areas

Runoff = 0.43 cfs @ 11.96 hrs, Volume= 0.019 af, Depth= 1.93"

Routed to Link 2L : Total Outflow from Proposed Site

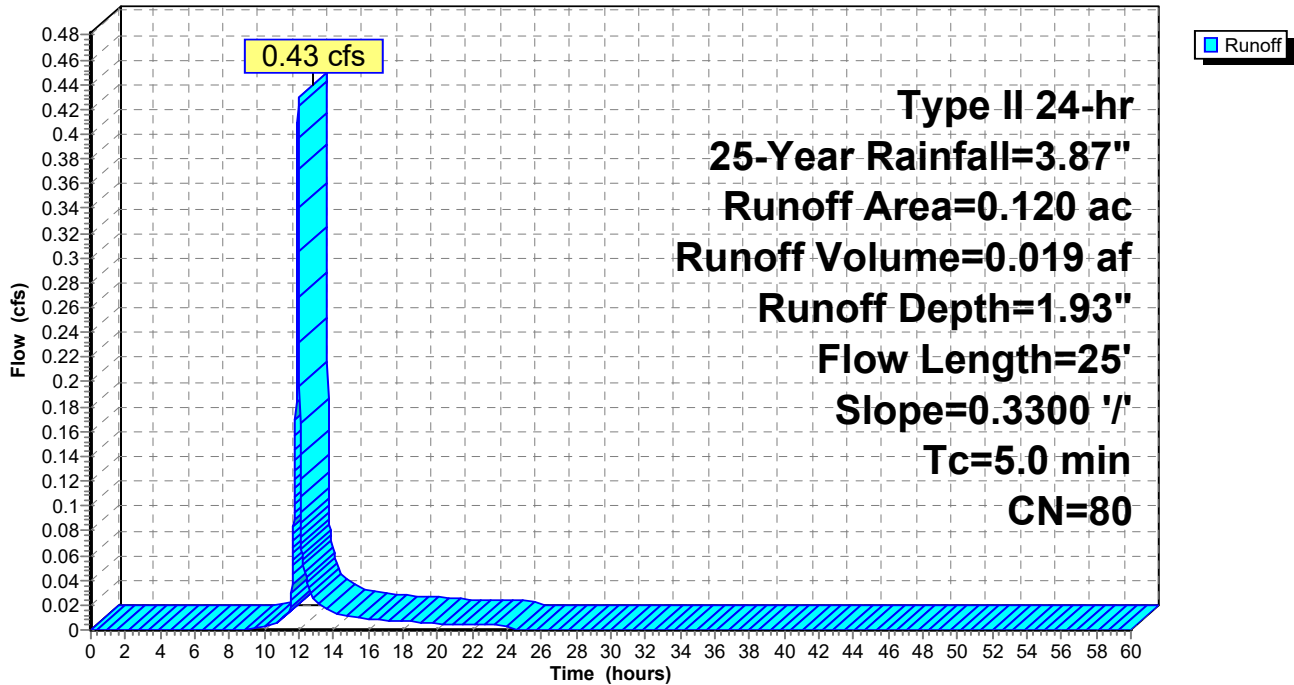
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 25-Year Rainfall=3.87"

Area (ac)	CN	Description
0.120	80	>75% Grass cover, Good, HSG D
0.120		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	25	0.3300	0.35		Sheet Flow, grass Grass: Short n= 0.150 P2= 2.50"
1.2	25	Total, Increased to minimum Tc = 5.0 min			

Subcatchment 5S: Unrestricted Runoff Areas

Hydrograph



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Type II 24-hr 25-Year Rainfall=3.87"

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Summary for Subcatchment 6S: Unrestricted Runoff Areas

Runoff = 0.72 cfs @ 11.96 hrs, Volume= 0.033 af, Depth= 2.17"

Routed to Link 2L : Total Outflow from Proposed Site

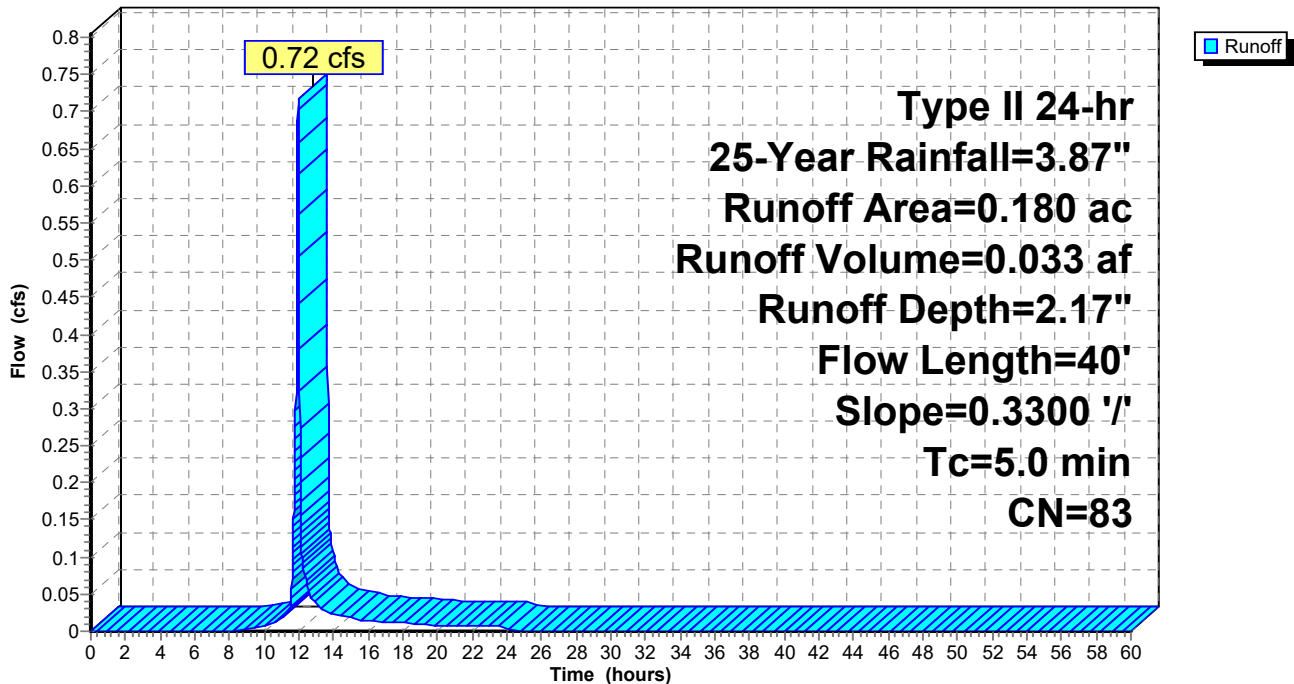
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 25-Year Rainfall=3.87"

Area (ac)	CN	Description
0.150	80	>75% Grass cover, Good, HSG D
* 0.030	98	Impervious
0.180	83	Weighted Average
0.150		83.33% Pervious Area
0.030		16.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.7	40	0.3300	0.38		Sheet Flow, grass Grass: Short n= 0.150 P2= 2.50"
1.7	40	Total, Increased to minimum Tc = 5.0 min			

Subcatchment 6S: Unrestricted Runoff Areas

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Type II 24-hr 25-Year Rainfall=3.87"

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Summary for Subcatchment 7S: Unrestricted Permanent Open Space

Runoff = 0.72 cfs @ 13.30 hrs, Volume= 0.178 af, Depth= 1.86"

Routed to Link 2L : Total Outflow from Proposed Site

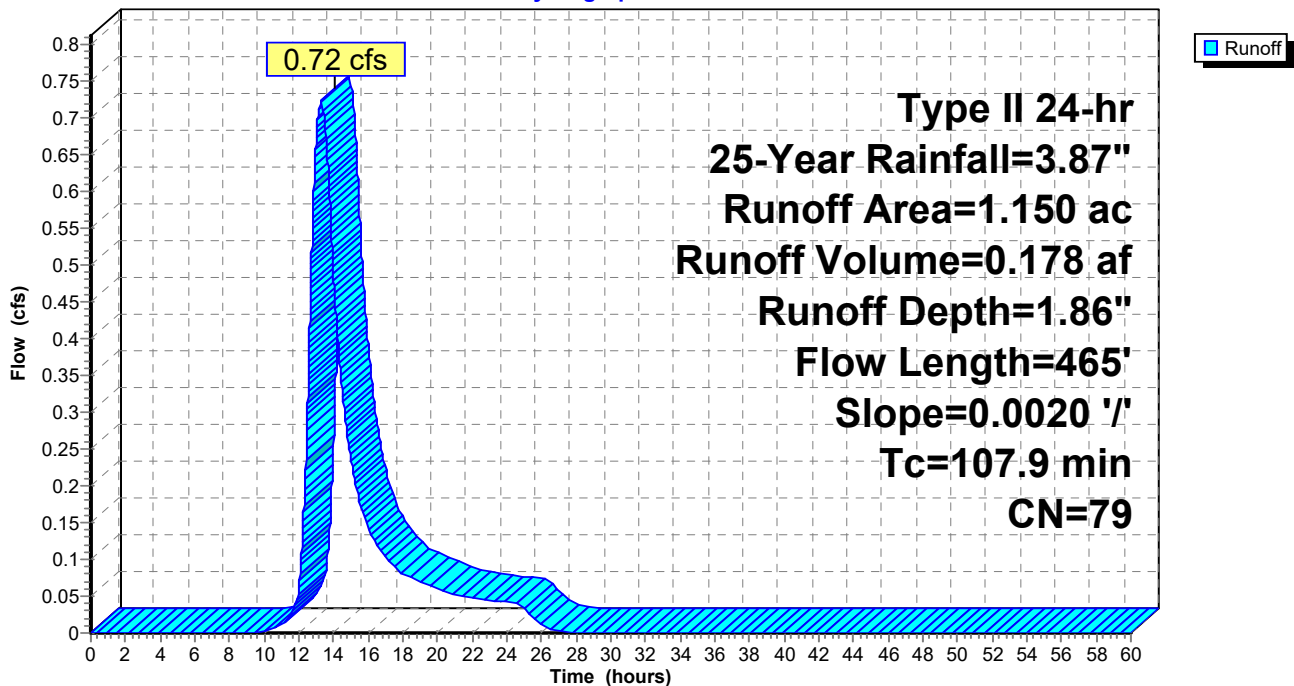
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
 Type II 24-hr 25-Year Rainfall=3.87"

Area (ac)	CN	Description
1.150	79	Woods, Fair, HSG D
1.150		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
84.4	150	0.0020	0.03		Sheet Flow, woods Woods: Light underbrush n= 0.400 P2= 2.50"
23.5	315	0.0020	0.22		Shallow Concentrated Flow, woods Woodland Kv= 5.0 fps
107.9	465	Total			

Subcatchment 7S: Unrestricted Permanent Open Space

Hydrograph



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Type II 24-hr 25-Year Rainfall=3.87"

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Summary for Pond 1P: Bioretention Area #1

Inflow Area = 5.840 ac, 59.42% Impervious, Inflow Depth = 2.89" for 25-Year event
 Inflow = 22.36 cfs @ 12.05 hrs, Volume= 1.408 af
 Outflow = 21.04 cfs @ 12.09 hrs, Volume= 1.408 af, Atten= 6%, Lag= 2.4 min
 Primary = 3.32 cfs @ 12.09 hrs, Volume= 0.965 af
 Routed to Link 1L : Outflow to Dodge Rd (@ CB 54)
 Secondary = 17.72 cfs @ 12.09 hrs, Volume= 0.443 af
 Routed to Pond 2P : Detention Basin (SMA #1)

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
 Peak Elev= 577.09' @ 12.09 hrs Surf.Area= 11,601 sf Storage= 11,696 cf

Plug-Flow detention time= 147.3 min calculated for 1.408 af (100% of inflow)
 Center-of-Mass det. time= 147.5 min (946.7 - 799.2)

Volume	Invert	Avail.Storage	Storage Description
#1	576.00'	16,618 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
576.00	9,925	0	0
576.50	10,585	5,128	5,128
577.00	11,350	5,484	10,611
577.50	12,675	6,006	16,618

Device	Routing	Invert	Outlet Devices
#1	Primary	572.50'	8.0" Round 8" pipe L= 25.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 572.50' / 572.42' S= 0.0032 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#2	Device 1	576.50'	8.0" Horiz. Grate X 4.00 C= 0.600 Limited to weir flow at low heads
#3	Device 1	576.00'	0.250 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 560.00'
#4	Secondary	576.75'	30.0' long (Profile 1) Broad-Crested Rectangular Weir Head (feet) 0.49 0.98 1.48 Coef. (English) 2.92 3.37 3.59

Primary OutFlow Max=3.32 cfs @ 12.09 hrs HW=577.09' (Free Discharge)

- ↑ **1=8" pipe** (Barrel Controls 3.32 cfs @ 9.52 fps)
- ↑ **2=Grate** (Passes < 5.18 cfs potential flow)
- ↑ **3=Exfiltration** (Passes < 0.07 cfs potential flow)

Secondary OutFlow Max=17.70 cfs @ 12.09 hrs HW=577.09' (Free Discharge)

- ↑ **4=Broad-Crested Rectangular Weir** (Weir Controls 17.70 cfs @ 1.71 fps)

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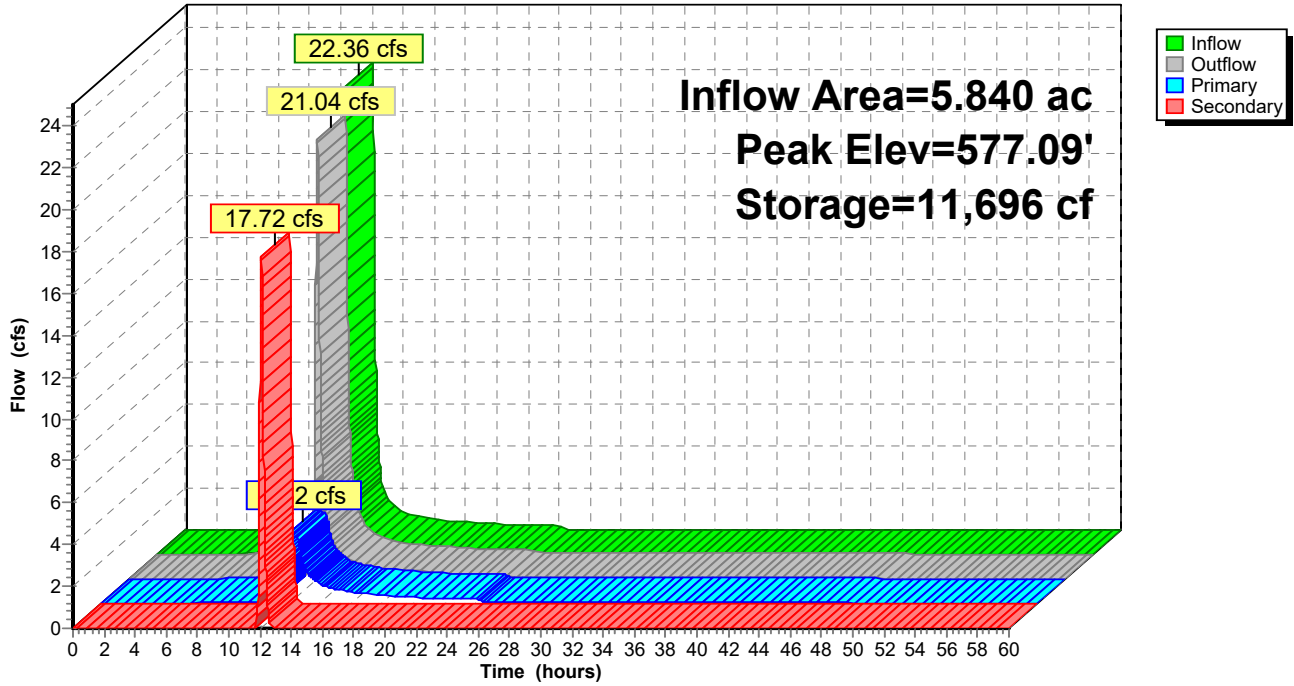
Type II 24-hr 25-Year Rainfall=3.87"

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Pond 1P: Bioretention Area #1

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Summary for Pond 2P: Detention Basin (SMA #1)

Inflow Area = 5.680 ac, 51.06% Impervious, Inflow Depth = 3.64" for 25-Year event
 Inflow = 37.34 cfs @ 12.07 hrs, Volume= 1.722 af
 Outflow = 0.67 cfs @ 14.76 hrs, Volume= 1.431 af, Atten= 98%, Lag= 161.0 min
 Primary = 0.67 cfs @ 14.76 hrs, Volume= 1.431 af
 Routed to Link 1L : Outflow to Dodge Rd (@ CB 54)
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Routed to Link 2L : Total Outflow from Proposed Site

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
 Peak Elev= 575.90' @ 14.76 hrs Surf.Area= 66,110 sf Storage= 56,601 cf

Plug-Flow detention time= 965.1 min calculated for 1.431 af (83% of inflow)
 Center-of-Mass det. time= 901.0 min (1,688.5 - 787.5)

Volume	Invert	Avail.Storage	Storage Description
#1	575.00'	118,224 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
575.00	59,213	0	0
576.00	66,849	63,031	63,031
576.80	71,134	55,193	118,224

Device	Routing	Invert	Outlet Devices
#1	Primary	574.00'	12.0" Round 12" outlet pipe L= 160.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 574.00' / 573.79' S= 0.0013 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	575.00'	6.0" Round low flow outlet pipe L= 10.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 575.00' / 574.95' S= 0.0050 '/' Cc= 0.900 n= 0.010 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#3	Device 1	576.50'	30.0" x 30.0" Horiz. Grate C= 0.600 Limited to weir flow at low heads
#4	Secondary	576.12'	20.0' long (Profile 1) Broad-Crested Rectangular Weir X 2.00 Head (feet) 0.49 0.98 1.48 Coef. (English) 2.92 3.37 3.59

Primary OutFlow Max=0.67 cfs @ 14.76 hrs HW=575.90' (Free Discharge)

- ↑ 1=12" outlet pipe (Passes 0.67 cfs of 2.60 cfs potential flow)
- ↑ 2=low flow outlet pipe (Inlet Controls 0.67 cfs @ 3.43 fps)
- ↑ 3=Grate (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=575.00' (Free Discharge)

- ↑ 4=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

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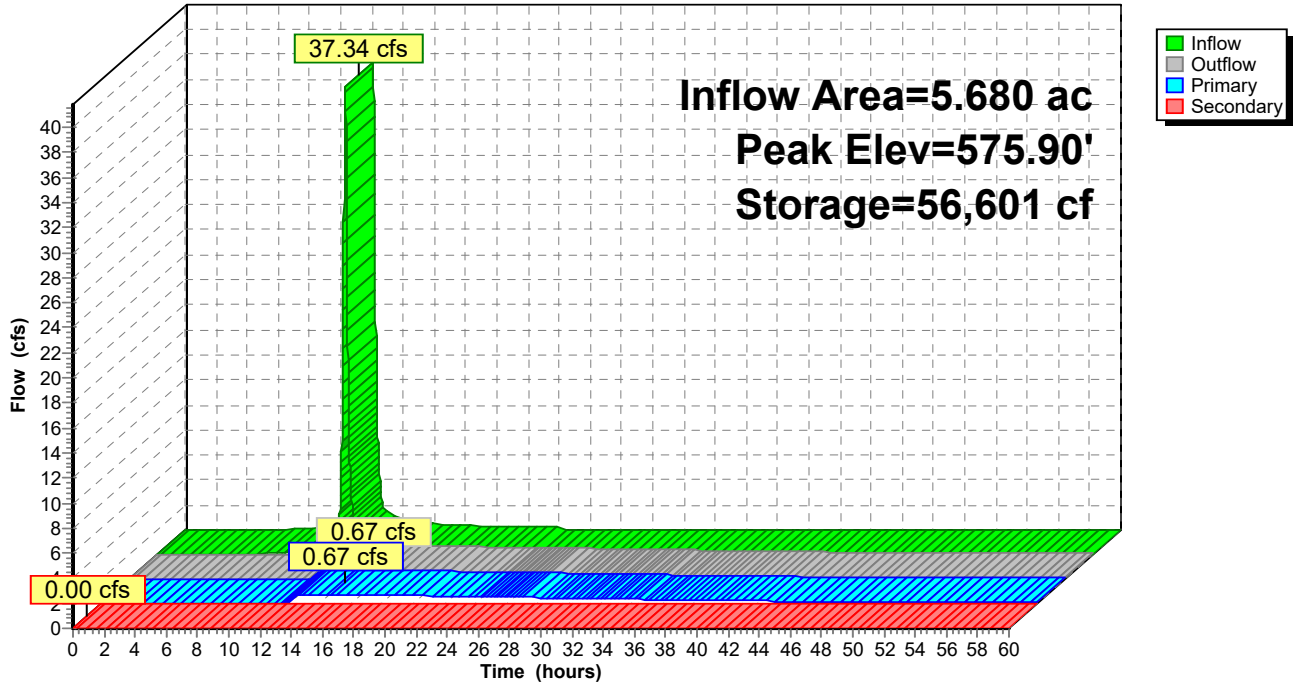
Type II 24-hr 25-Year Rainfall=3.87"

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Pond 2P: Detention Basin (SMA #1)

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Summary for Pond 2P WQ: WQv (SMA #1)

[43] Hint: Has no inflow (Outflow=Zero)

Volume	Invert	Avail.Storage	Storage Description
#1	563.00'	152,678 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
563.00	710	0	0
564.00	1,152	931	931
565.00	1,725	1,439	2,370
566.00	2,430	2,078	4,447
567.00	3,302	2,866	7,313
568.00	4,386	3,844	11,157
569.00	7,838	6,112	17,269
570.00	11,596	9,717	26,986
571.00	15,606	13,601	40,587
572.00	20,106	17,856	58,443
573.00	24,865	22,486	80,929
574.00	29,710	27,288	108,216
575.00	59,213	44,462	152,678

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Summary for Pond 3P: Underground Storage (SMA #2)

[79] Warning: Submerged Pond 4P Primary device # 1 INLET by 0.79'

Inflow Area = 4.450 ac, 60.67% Impervious, Inflow Depth = 2.91" for 25-Year event
 Inflow = 9.85 cfs @ 12.06 hrs, Volume= 1.079 af
 Outflow = 3.24 cfs @ 13.05 hrs, Volume= 1.034 af, Atten= 67%, Lag= 59.5 min
 Primary = 3.24 cfs @ 13.05 hrs, Volume= 1.034 af
 Routed to Link 2L : Total Outflow from Proposed Site

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
 Peak Elev= 572.20' @ 13.05 hrs Surf.Area= 10,145 sf Storage= 18,670 cf

Plug-Flow detention time= 226.6 min calculated for 1.034 af (96% of inflow)
 Center-of-Mass det. time= 157.5 min (1,112.6 - 955.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	569.50'	8,947 cf	53.75'W x 188.74'L x 3.50'H Field A 35,506 cf Overall - 13,139 cf Embedded = 22,367 cf x 40.0% Voids
#2A	570.00'	13,139 cf	ADS_StormTech SC-740 +Cap x 286 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 286 Chambers in 11 Rows
		22,086 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	569.93'	12.0" Round Culvert L= 72.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 569.93' / 569.71' S= 0.0031 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	569.93'	4.0" Vert. Orifice X 3.00 C= 0.600 Limited to weir flow at low heads
#3	Device 1	572.00'	5.0' long Weir 2 End Contraction(s)

Primary OutFlow Max=3.24 cfs @ 13.05 hrs HW=572.20' (Free Discharge)

- ↑ **1=Culvert** (Passes 3.24 cfs of 3.96 cfs potential flow)
- ↑ **2=Orifice** (Orifice Controls 1.83 cfs @ 6.98 fps)
- ↑ **3=Weir** (Weir Controls 1.41 cfs @ 1.45 fps)

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Pond 3P: Underground Storage (SMA #2) - Chamber Wizard Field A

Chamber Model = ADS_StormTechSC-740 +Cap (ADS StormTech®SC-740 with cap length)

Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf

Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

26 Chambers/Row x 7.12' Long +0.81' Cap Length x 2 = 186.74' Row Length +12.0" End Stone x 2 = 188.74' Base Length

11 Rows x 51.0" Wide + 6.0" Spacing x 10 + 12.0" Side Stone x 2 = 53.75' Base Width

6.0" Stone Base + 30.0" Chamber Height + 6.0" Stone Cover = 3.50' Field Height

286 Chambers x 45.9 cf = 13,138.8 cf Chamber Storage

35,506.1 cf Field - 13,138.8 cf Chambers = 22,367.2 cf Stone x 40.0% Voids = 8,946.9 cf Stone Storage

Chamber Storage + Stone Storage = 22,085.7 cf = 0.507 af

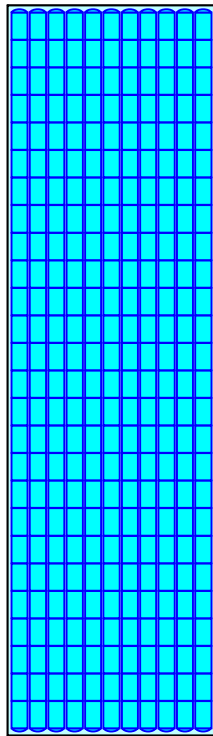
Overall Storage Efficiency = 62.2%

Overall System Size = 188.74' x 53.75' x 3.50'

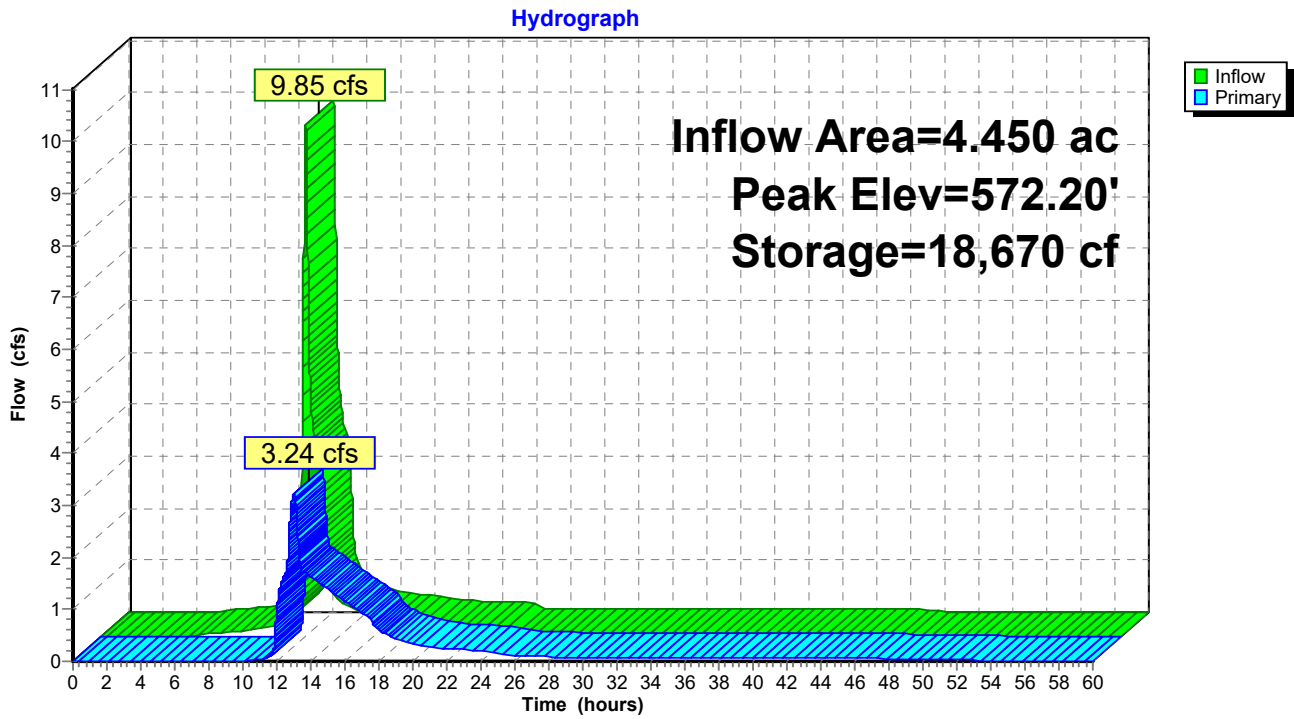
286 Chambers

1,315.0 cy Field

828.4 cy Stone



Pond 3P: Underground Storage (SMA #2)



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Summary for Pond 4P: Bioretention Area #2

Inflow Area = 2.550 ac, 65.49% Impervious, Inflow Depth = 2.99" for 25-Year event
 Inflow = 11.47 cfs @ 12.00 hrs, Volume= 0.636 af
 Outflow = 2.98 cfs @ 12.18 hrs, Volume= 0.636 af, Atten= 74%, Lag= 11.0 min
 Primary = 2.98 cfs @ 12.18 hrs, Volume= 0.636 af
 Routed to Pond 3P : Underground Storage (SMA #2)

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
 Peak Elev= 576.17' @ 12.18 hrs Surf.Area= 11,013 sf Storage= 11,587 cf

Plug-Flow detention time= 269.4 min calculated for 0.636 af (100% of inflow)
 Center-of-Mass det. time= 269.3 min (1,060.1 - 790.7)

Volume	Invert	Avail.Storage	Storage Description
#1	575.00'	21,391 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
575.00	8,798	0	0
576.00	10,686	9,742	9,742
577.00	12,612	11,649	21,391

Device	Routing	Invert	Outlet Devices
#1	Primary	571.41'	8.0" Round Pipe L= 41.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 571.41' / 571.30' S= 0.0027 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#2	Device 1	575.50'	8.0" Horiz. Grate X 8.00 C= 0.600 Limited to weir flow at low heads
#3	Device 1	575.00'	0.250 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 560.00'
#4	Device 1	575.75'	24.0" x 24.0" Horiz. Grate (overflow) C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=2.98 cfs @ 12.18 hrs HW=576.17' (Free Discharge)

- ↑ **1=Pipe** (Barrel Controls 2.98 cfs @ 8.54 fps)
- ↑ **2=Grate** (Passes < 11.01 cfs potential flow)
- ↑ **3=Exfiltration** (Passes < 0.07 cfs potential flow)
- ↑ **4=Grate (overflow)** (Passes < 7.12 cfs potential flow)

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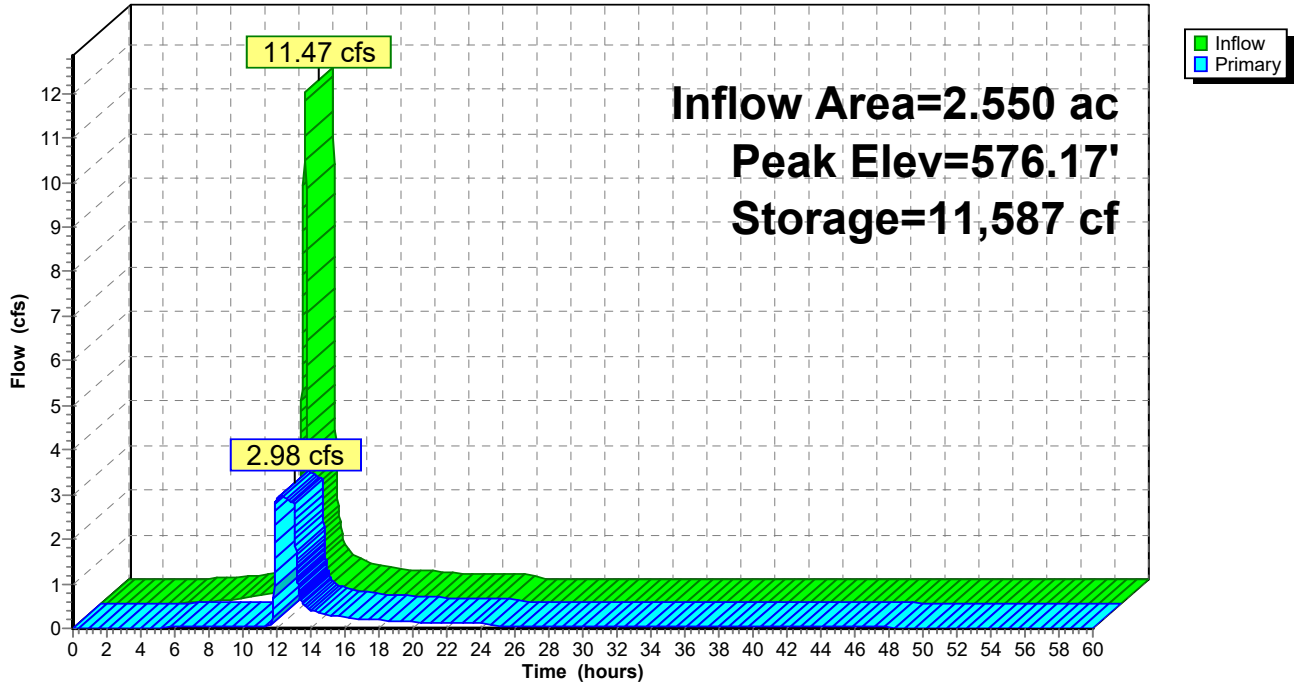
Type II 24-hr 25-Year Rainfall=3.87"

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Pond 4P: Bioretention Area #2

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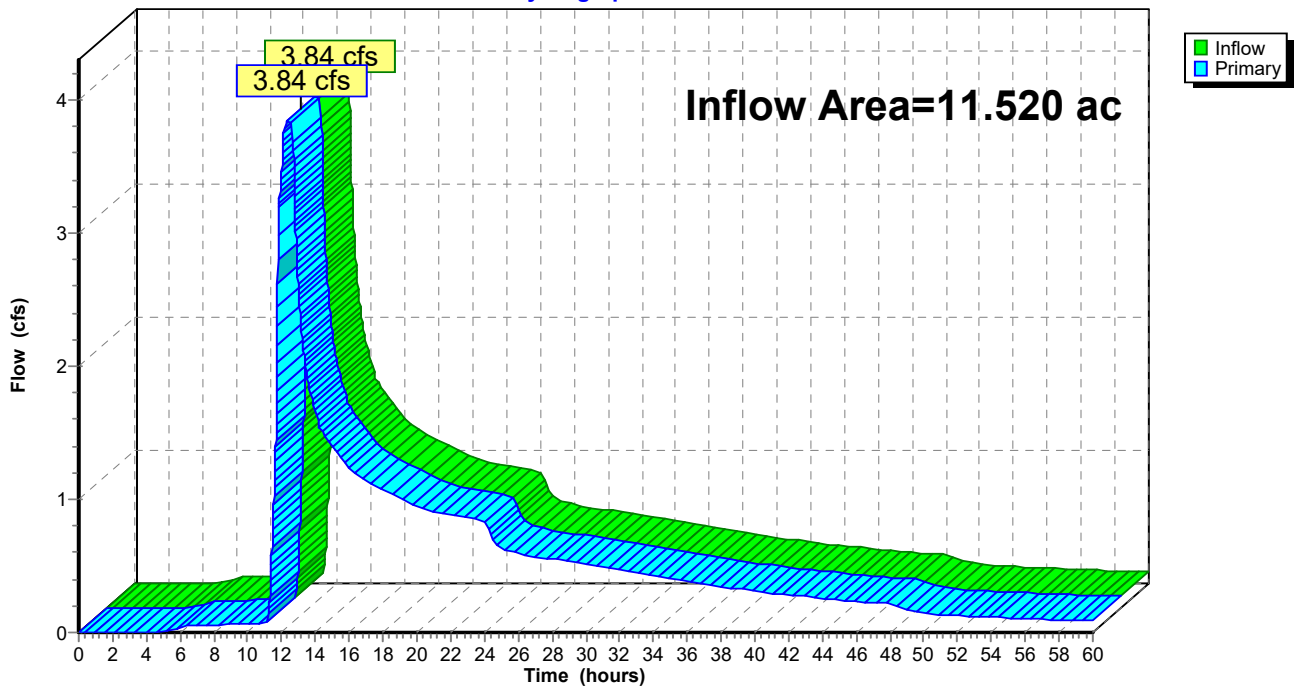
Summary for Link 1L: Outflow to Dodge Rd (@ CB 54)

Inflow Area = 11.520 ac, 55.30% Impervious, Inflow Depth > 2.50" for 25-Year event
Inflow = 3.84 cfs @ 12.31 hrs, Volume= 2.396 af
Primary = 3.84 cfs @ 12.31 hrs, Volume= 2.396 af, Atten= 0%, Lag= 0.0 min
Routed to Link 2L : Total Outflow from Proposed Site

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

Link 1L: Outflow to Dodge Rd (@ CB 54)

Hydrograph



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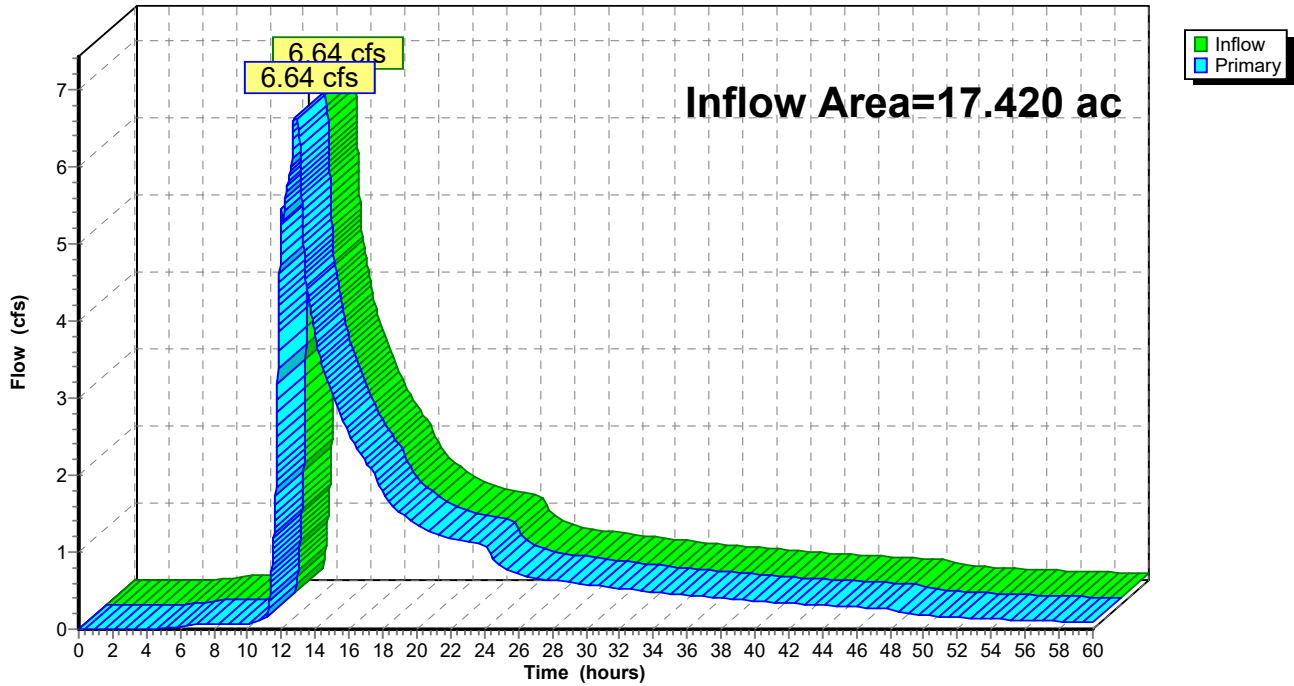
Summary for Link 2L: Total Outflow from Proposed Site

Inflow Area = 17.420 ac, 52.24% Impervious, Inflow Depth > 2.52" for 25-Year event
Inflow = 6.64 cfs @ 12.83 hrs, Volume= 3.660 af
Primary = 6.64 cfs @ 12.83 hrs, Volume= 3.660 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

Link 2L: Total Outflow from Proposed Site

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Type II 24-hr 50-Year Rainfall=4.52"

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Time span=0.00-60.00 hrs, dt=0.01 hrs, 6001 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Front Area 1 Runoff Area=5.840 ac 59.42% Impervious Runoff Depth=3.52"
 Flow Length=652' Tc=13.3 min CN=91 Runoff=26.91 cfs 1.712 af

Subcatchment2S: Rear Area 1 Runoff Area=5.680 ac 51.06% Impervious Runoff Depth=3.31"
 Flow Length=683' Tc=14.4 min CN=89 Runoff=24.16 cfs 1.569 af

Subcatchment3S: Front Area 2 Runoff Area=1.900 ac 54.21% Impervious Runoff Depth=3.41"
 Flow Length=1,325' Slope=0.0100 '/' Tc=14.1 min CN=90 Runoff=8.36 cfs 0.541 af

Subcatchment4S: Rear Area 2 Runoff Area=2.550 ac 65.49% Impervious Runoff Depth=3.62"
 Flow Length=345' Tc=9.1 min CN=92 Runoff=13.73 cfs 0.770 af

Subcatchment5S: Unrestricted Runoff Areas Runoff Area=0.120 ac 0.00% Impervious Runoff Depth=2.48"
 Flow Length=25' Slope=0.3300 '/' Tc=5.0 min CN=80 Runoff=0.55 cfs 0.025 af

Subcatchment6S: Unrestricted Runoff Runoff Area=0.180 ac 16.67% Impervious Runoff Depth=2.74"
 Flow Length=40' Slope=0.3300 '/' Tc=5.0 min CN=83 Runoff=0.90 cfs 0.041 af

Subcatchment7S: Unrestricted Permanent Runoff Area=1.150 ac 0.00% Impervious Runoff Depth=2.39"
 Flow Length=465' Slope=0.0020 '/' Tc=107.9 min CN=79 Runoff=0.94 cfs 0.229 af

Pond 1P: Bioretention Area #1 Peak Elev=577.15' Storage=12,346 cf Inflow=26.91 cfs 1.712 af
 Primary=3.35 cfs 1.122 af Secondary=22.18 cfs 0.590 af Outflow=25.53 cfs 1.712 af

Pond 2P: Detention Basin (SMA #1) Peak Elev=576.13' Storage=71,738 cf Inflow=46.09 cfs 2.158 af
 Primary=0.78 cfs 1.802 af Secondary=0.13 cfs 0.017 af Outflow=0.91 cfs 1.819 af

Pond 2P WQ: WQv (SMA #1) Peak Elev=0.00' Storage=0 cf

Pond 3P: Underground Storage (SMA #2) Peak Elev=572.26' Storage=19,007 cf Inflow=11.37 cfs 1.310 af
 Outflow=4.02 cfs 1.266 af

Pond 4P: Bioretention Area #2 Peak Elev=576.40' Storage=14,208 cf Inflow=13.73 cfs 0.770 af
 Outflow=3.06 cfs 0.770 af

Link 1L: Outflow to Dodge Rd (@ CB 54) Inflow=3.96 cfs 2.924 af
 Primary=3.96 cfs 2.924 af

Link 2L: Total Outflow from Proposed Site Inflow=8.59 cfs 4.503 af
 Primary=8.59 cfs 4.503 af

Total Runoff Area = 17.420 ac Runoff Volume = 4.886 af Average Runoff Depth = 3.37"
47.76% Pervious = 8.320 ac 52.24% Impervious = 9.100 ac

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Type II 24-hr 50-Year Rainfall=4.52"

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Summary for Subcatchment 1S: Front Area 1

Runoff = 26.91 cfs @ 12.05 hrs, Volume= 1.712 af, Depth= 3.52"
 Routed to Pond 1P : Bioretention Area #1

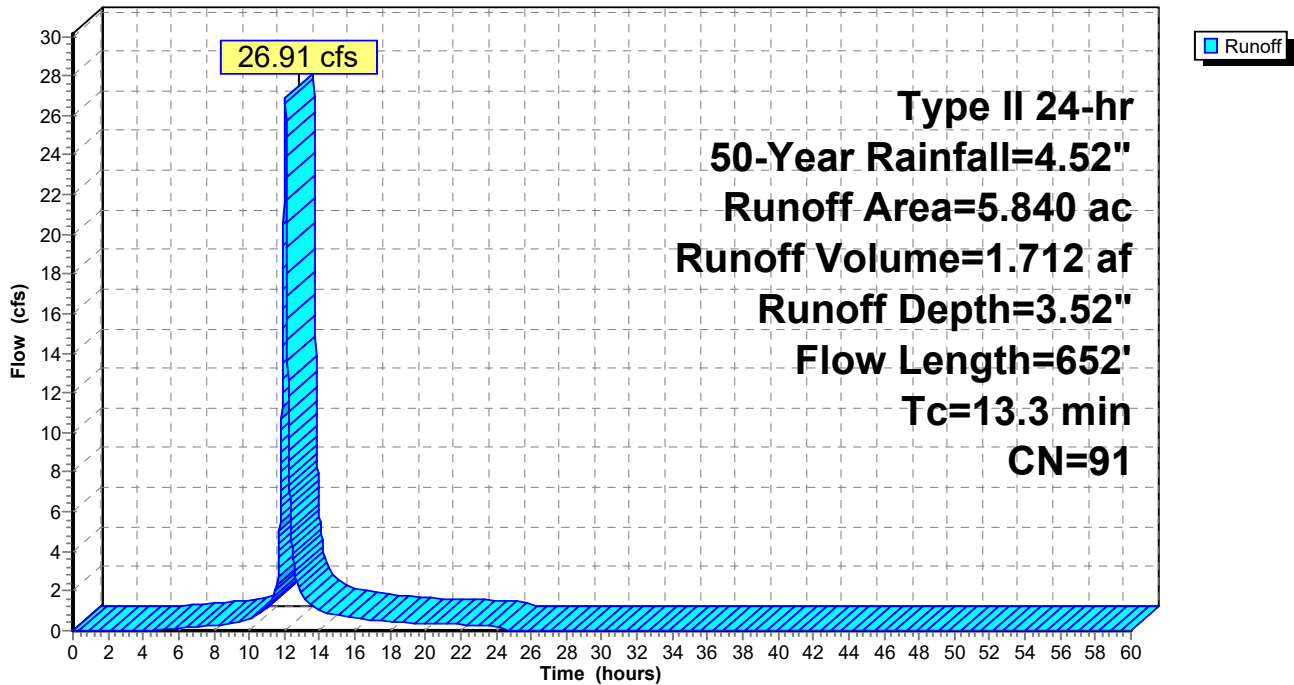
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
 Type II 24-hr 50-Year Rainfall=4.52"

Area (ac)	CN	Description
3.470	98	Impervious
2.370	80	>75% Grass cover, Good, HSG D
5.840	91	Weighted Average
2.370		40.58% Pervious Area
3.470		59.42% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.6	37	0.0100	0.06		Sheet Flow, grass Grass: Dense n= 0.240 P2= 2.50"
0.4	15	0.0120	0.68		Sheet Flow, pavement Smooth surfaces n= 0.011 P2= 2.50"
3.3	600		3.00		Direct Entry, pipe flow
13.3	652	Total			

Subcatchment 1S: Front Area 1

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Summary for Subcatchment 2S: Rear Area 1

Runoff = 24.16 cfs @ 12.06 hrs, Volume= 1.569 af, Depth= 3.31"
 Routed to Pond 2P : Detention Basin (SMA #1)

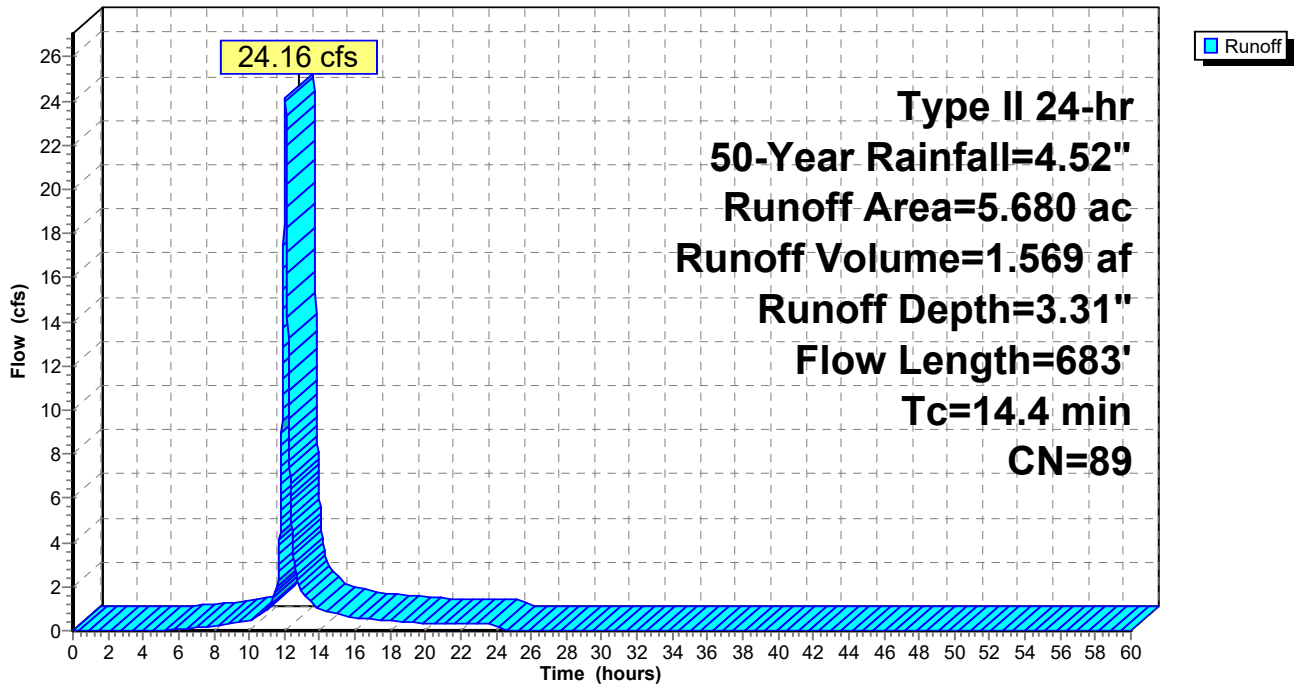
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
 Type II 24-hr 50-Year Rainfall=4.52"

Area (ac)	CN	Description
2.900	98	Impervious
2.780	80	>75% Grass cover, Good, HSG D
5.680	89	Weighted Average
2.780		48.94% Pervious Area
2.900		51.06% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.2	90	0.0200	0.15		Sheet Flow, grass Grass: Short n= 0.150 P2= 2.50"
1.3	75	0.0130	0.97		Sheet Flow, pavement Smooth surfaces n= 0.011 P2= 2.50"
2.9	518		3.00		Direct Entry, Pipe flow
14.4	683				Total

Subcatchment 2S: Rear Area 1

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Type II 24-hr 50-Year Rainfall=4.52"

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Summary for Subcatchment 3S: Front Area 2

Runoff = 8.36 cfs @ 12.05 hrs, Volume= 0.541 af, Depth= 3.41"

Routed to Pond 3P : Underground Storage (SMA #2)

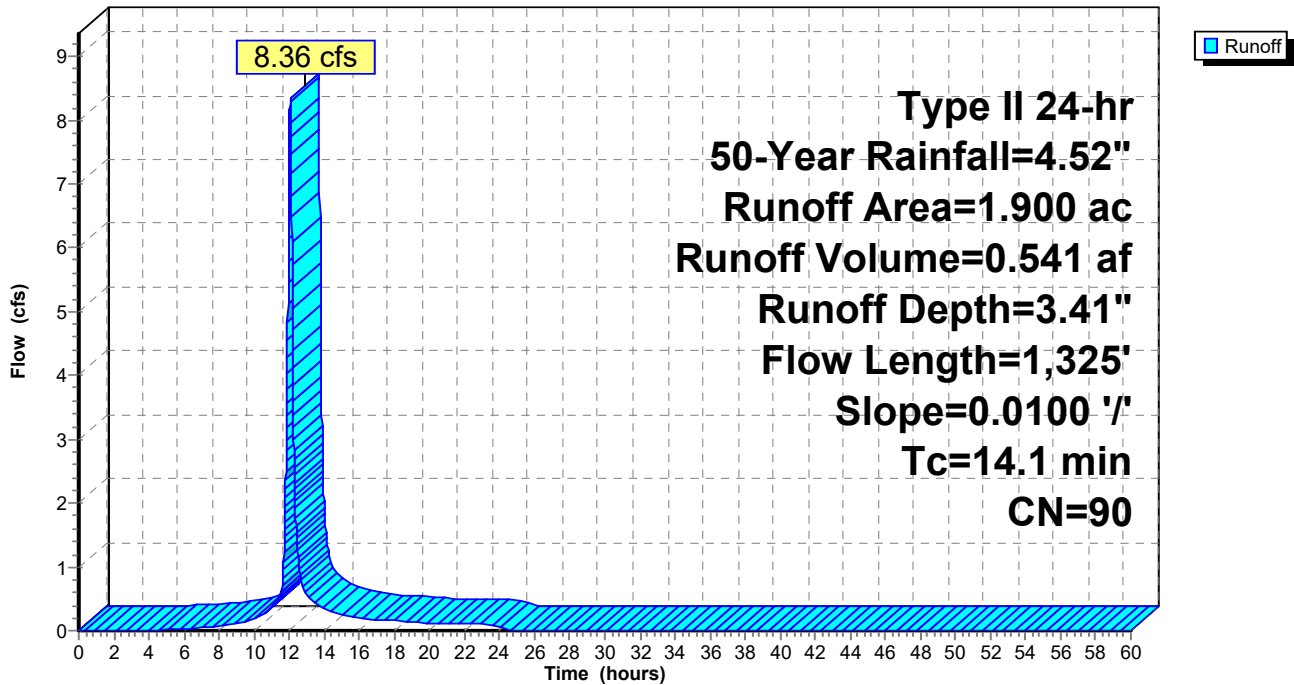
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
 Type II 24-hr 50-Year Rainfall=4.52"

Area (ac)	CN	Description
* 1.030	98	Impervious
0.870	80	>75% Grass cover, Good, HSG D
1.900	90	Weighted Average
0.870		45.79% Pervious Area
1.030		54.21% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0	40	0.0100	0.09		Sheet Flow, grass
7.1	1,285		3.00		Grass: Short n= 0.150 P2= 2.50" Direct Entry, Pipe flow
14.1	1,325	Total			

Subcatchment 3S: Front Area 2

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Summary for Subcatchment 4S: Rear Area 2

Runoff = 13.73 cfs @ 12.00 hrs, Volume= 0.770 af, Depth= 3.62"
 Routed to Pond 4P : Bioretention Area #2

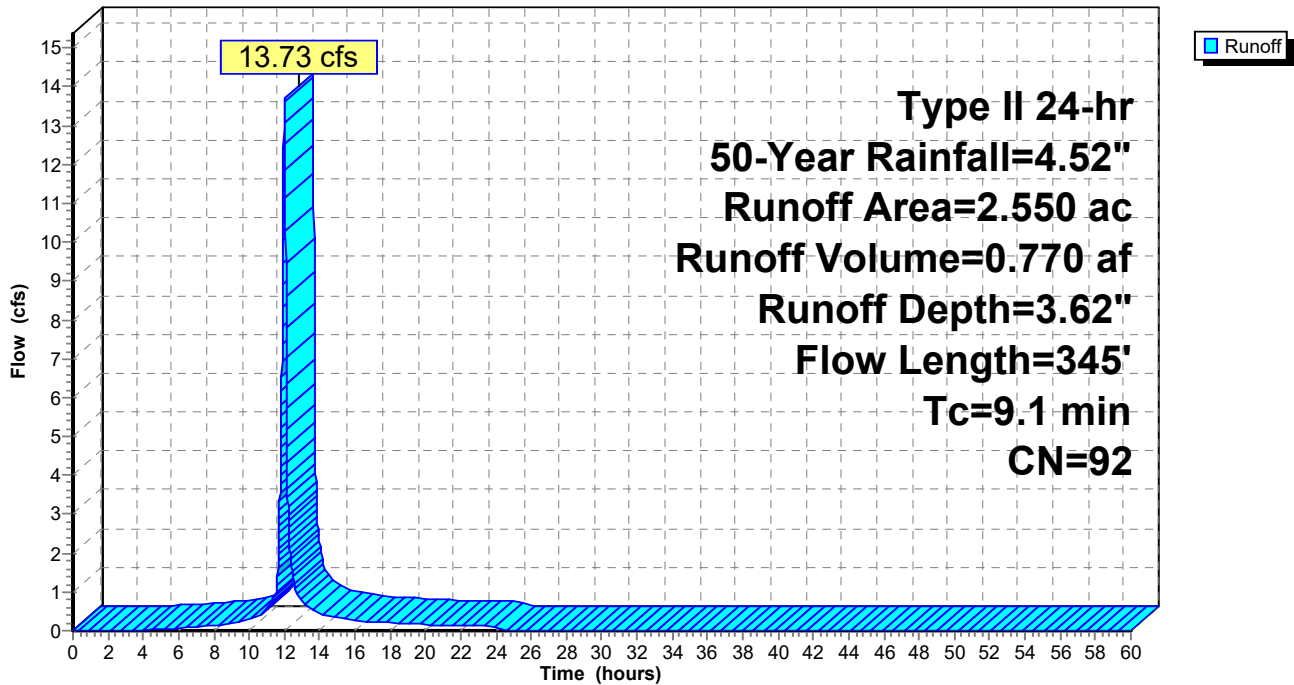
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
 Type II 24-hr 50-Year Rainfall=4.52"

Area (ac)	CN	Description
1.670	98	Impervious
0.880	80	>75% Grass cover, Good, HSG D
2.550	92	Weighted Average
0.880		34.51% Pervious Area
1.670		65.49% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.9	55	0.0200	0.13		Sheet Flow, grass Grass: Short n= 0.150 P2= 2.50"
0.8	45	0.0170	0.97		Sheet Flow, pavement Smooth surfaces n= 0.011 P2= 2.50"
1.4	245		3.00		Direct Entry, Pipe flow
9.1	345				Total

Subcatchment 4S: Rear Area 2

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Summary for Subcatchment 5S: Unrestricted Runoff Areas

Runoff = 0.55 cfs @ 11.96 hrs, Volume= 0.025 af, Depth= 2.48"

Routed to Link 2L : Total Outflow from Proposed Site

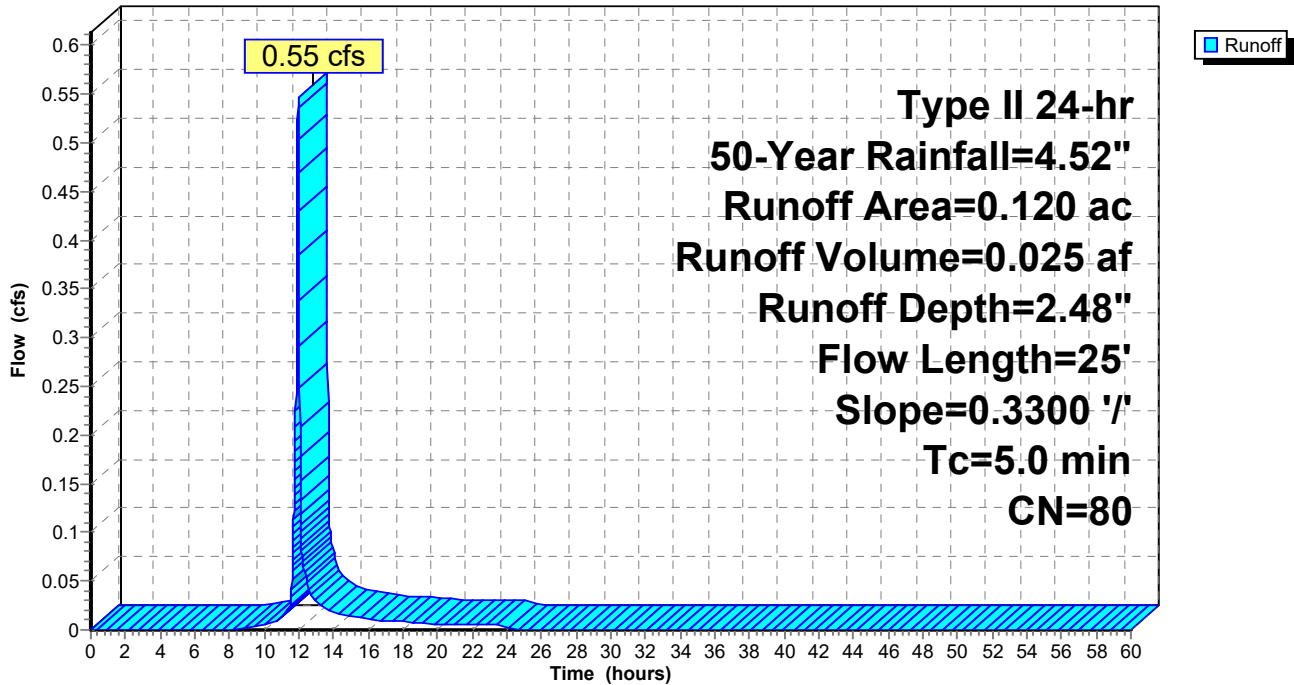
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 50-Year Rainfall=4.52"

Area (ac)	CN	Description
0.120	80	>75% Grass cover, Good, HSG D
0.120		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	25	0.3300	0.35		Sheet Flow, grass Grass: Short n= 0.150 P2= 2.50"
1.2	25	Total, Increased to minimum Tc = 5.0 min			

Subcatchment 5S: Unrestricted Runoff Areas

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Type II 24-hr 50-Year Rainfall=4.52"

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Summary for Subcatchment 6S: Unrestricted Runoff Areas

Runoff = 0.90 cfs @ 11.96 hrs, Volume= 0.041 af, Depth= 2.74"

Routed to Link 2L : Total Outflow from Proposed Site

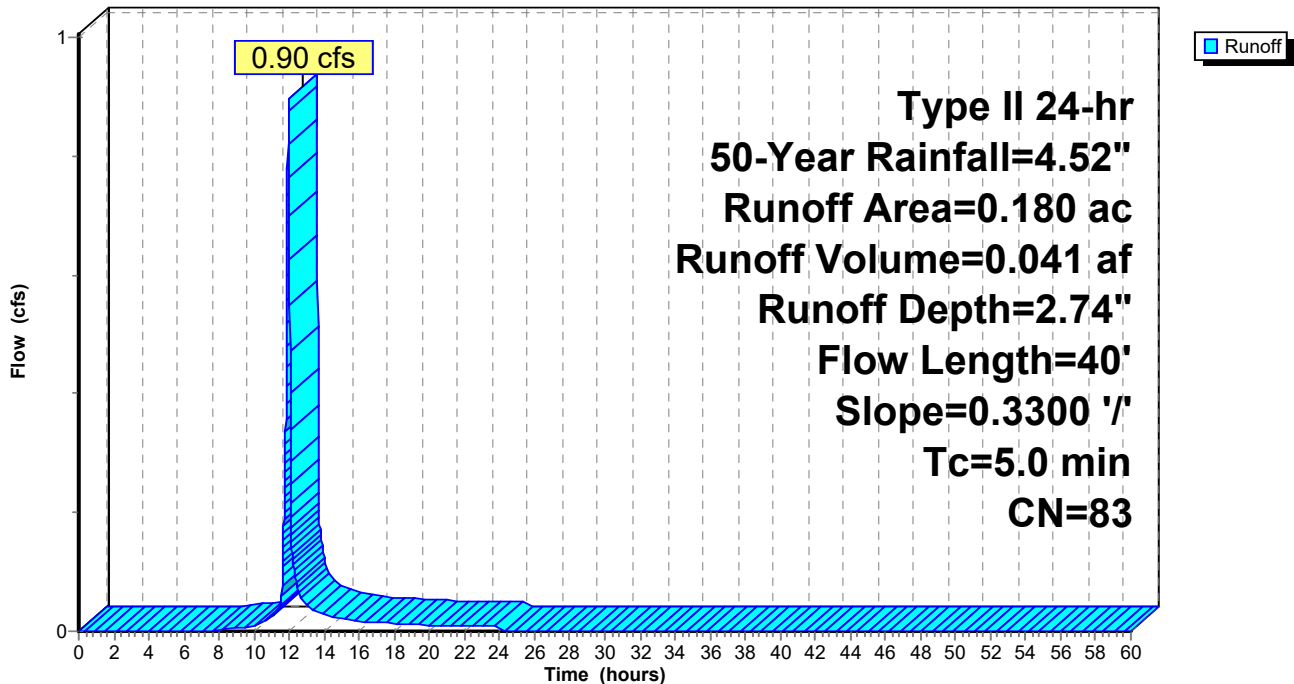
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
 Type II 24-hr 50-Year Rainfall=4.52"

Area (ac)	CN	Description
0.150	80	>75% Grass cover, Good, HSG D
* 0.030	98	Impervious
0.180	83	Weighted Average
0.150		83.33% Pervious Area
0.030		16.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.7	40	0.3300	0.38		Sheet Flow, grass
					Grass: Short n= 0.150 P2= 2.50"
1.7	40	Total, Increased to minimum Tc = 5.0 min			

Subcatchment 6S: Unrestricted Runoff Areas

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Type II 24-hr 50-Year Rainfall=4.52"

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Summary for Subcatchment 7S: Unrestricted Permanent Open Space

Runoff = 0.94 cfs @ 13.30 hrs, Volume= 0.229 af, Depth= 2.39"

Routed to Link 2L : Total Outflow from Proposed Site

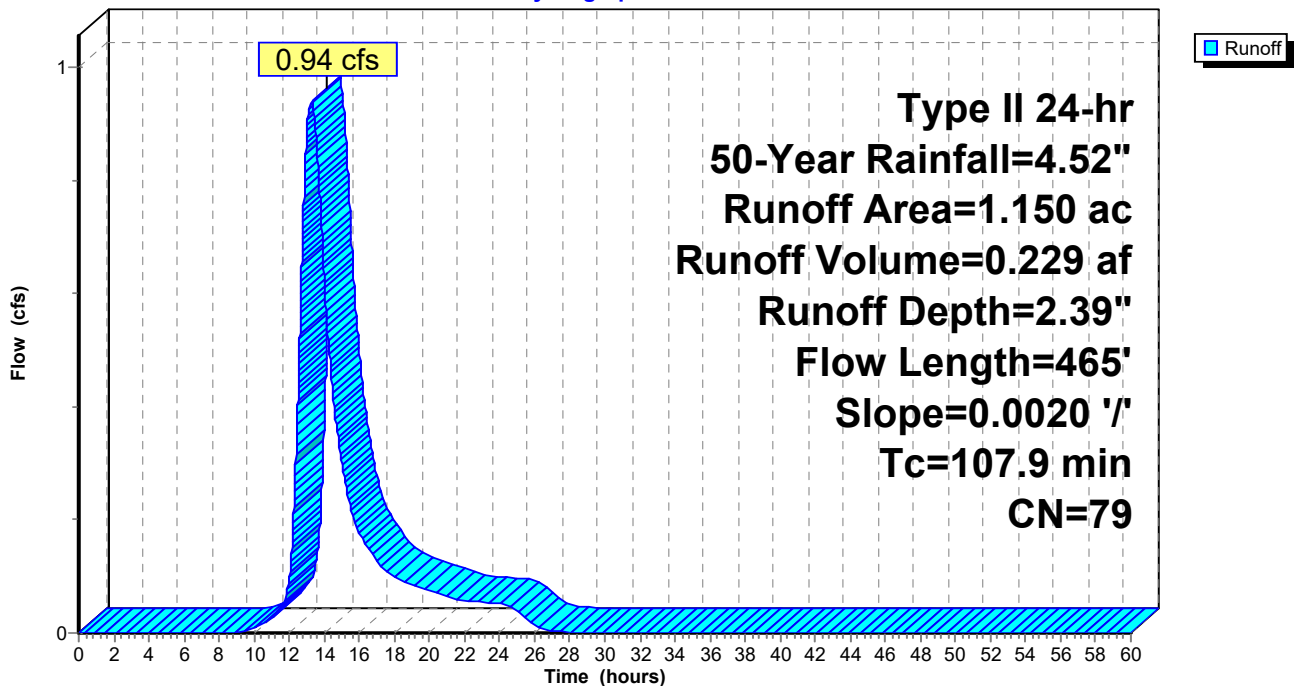
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
 Type II 24-hr 50-Year Rainfall=4.52"

Area (ac)	CN	Description
1.150	79	Woods, Fair, HSG D
1.150		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
84.4	150	0.0020	0.03		Sheet Flow, woods
23.5	315	0.0020	0.22		Shallow Concentrated Flow, woods
					Woodland Kv= 5.0 fps
107.9	465	Total			

Subcatchment 7S: Unrestricted Permanent Open Space

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Summary for Pond 1P: Bioretention Area #1

Inflow Area = 5.840 ac, 59.42% Impervious, Inflow Depth = 3.52" for 50-Year event
Inflow = 26.91 cfs @ 12.05 hrs, Volume= 1.712 af
Outflow = 25.53 cfs @ 12.08 hrs, Volume= 1.712 af, Atten= 5%, Lag= 2.2 min
Primary = 3.35 cfs @ 12.08 hrs, Volume= 1.122 af
Routed to Link 1L : Outflow to Dodge Rd (@ CB 54)
Secondary = 22.18 cfs @ 12.08 hrs, Volume= 0.590 af
Routed to Pond 2P : Detention Basin (SMA #1)

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 577.15' @ 12.08 hrs Surf.Area= 11,748 sf Storage= 12,346 cf

Plug-Flow detention time= 126.4 min calculated for 1.712 af (100% of inflow)
Center-of-Mass det. time= 126.3 min (920.1 - 793.7)

Volume	Invert	Avail.Storage	Storage Description
#1	576.00'	16,618 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
576.00	9,925	0	0
576.50	10,585	5,128	5,128
577.00	11,350	5,484	10,611
577.50	12,675	6,006	16,618

Device	Routing	Invert	Outlet Devices
#1	Primary	572.50'	8.0" Round 8" pipe L= 25.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 572.50' / 572.42' S= 0.0032 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#2	Device 1	576.50'	8.0" Horiz. Grate X 4.00 C= 0.600 Limited to weir flow at low heads
#3	Device 1	576.00'	0.250 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 560.00'
#4	Secondary	576.75'	30.0' long (Profile 1) Broad-Crested Rectangular Weir Head (feet) 0.49 0.98 1.48 Coef. (English) 2.92 3.37 3.59

Primary OutFlow Max=3.35 cfs @ 12.08 hrs HW=577.15' (Free Discharge)

- ↑ **1=8" pipe** (Barrel Controls 3.35 cfs @ 9.59 fps)
- ↑ **2=Grate** (Passes < 5.42 cfs potential flow)
- ↑ **3=Exfiltration** (Passes < 0.07 cfs potential flow)

Secondary OutFlow Max=22.16 cfs @ 12.08 hrs HW=577.15' (Free Discharge)

- ↑ **4=Broad-Crested Rectangular Weir** (Weir Controls 22.16 cfs @ 1.85 fps)

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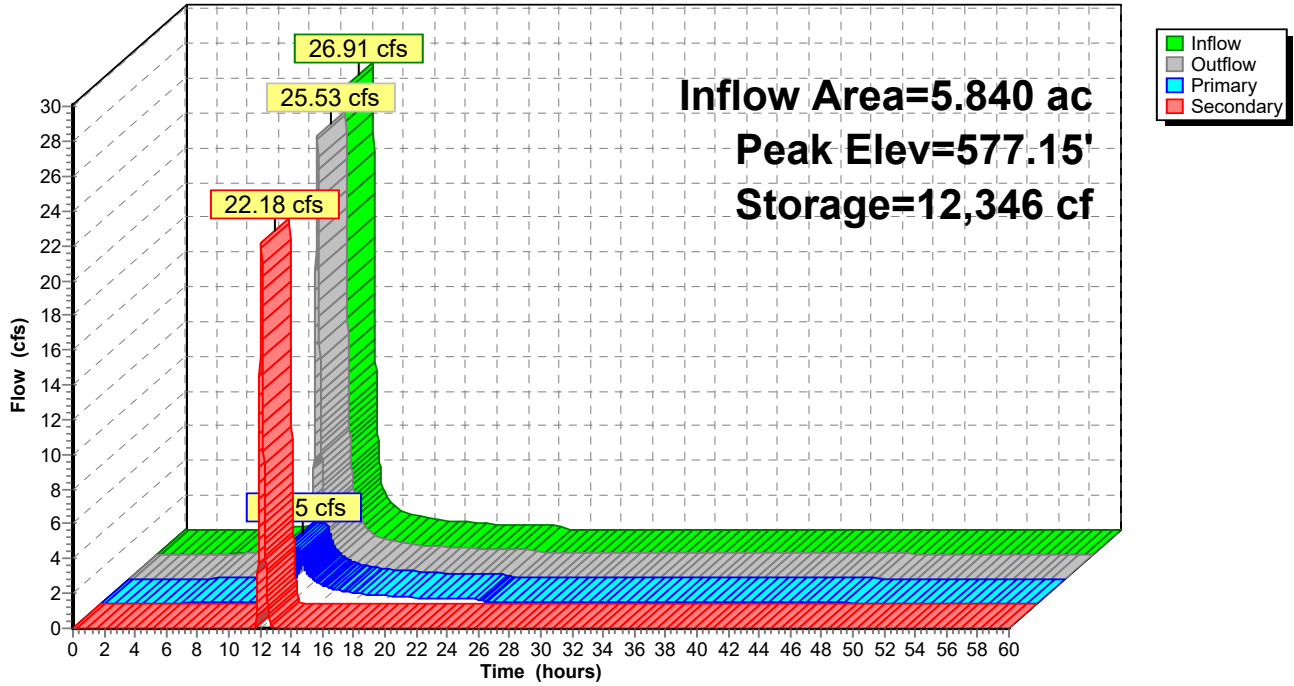
Type II 24-hr 50-Year Rainfall=4.52"

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Pond 1P: Bioretention Area #1

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Summary for Pond 2P: Detention Basin (SMA #1)

Inflow Area = 5.680 ac, 51.06% Impervious, Inflow Depth = 4.56" for 50-Year event
 Inflow = 46.09 cfs @ 12.07 hrs, Volume= 2.158 af
 Outflow = 0.91 cfs @ 14.19 hrs, Volume= 1.819 af, Atten= 98%, Lag= 127.1 min
 Primary = 0.78 cfs @ 14.19 hrs, Volume= 1.802 af
 Routed to Link 1L : Outflow to Dodge Rd (@ CB 54)
 Secondary = 0.13 cfs @ 14.19 hrs, Volume= 0.017 af
 Routed to Link 2L : Total Outflow from Proposed Site

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
 Peak Elev= 576.13' @ 14.19 hrs Surf.Area= 67,543 sf Storage= 71,738 cf

Plug-Flow detention time= 1,002.8 min calculated for 1.819 af (84% of inflow)
 Center-of-Mass det. time= 942.5 min (1,724.5 - 782.0)

Volume	Invert	Avail.Storage	Storage Description
#1	575.00'	118,224 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
575.00	59,213	0	0
576.00	66,849	63,031	63,031
576.80	71,134	55,193	118,224

Device	Routing	Invert	Outlet Devices
#1	Primary	574.00'	12.0" Round 12" outlet pipe L= 160.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 574.00' / 573.79' S= 0.0013 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	575.00'	6.0" Round low flow outlet pipe L= 10.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 575.00' / 574.95' S= 0.0050 '/' Cc= 0.900 n= 0.010 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#3	Device 1	576.50'	30.0" x 30.0" Horiz. Grate C= 0.600 Limited to weir flow at low heads
#4	Secondary	576.12'	20.0' long (Profile 1) Broad-Crested Rectangular Weir X 2.00 Head (feet) 0.49 0.98 1.48 Coef. (English) 2.92 3.37 3.59

Primary OutFlow Max=0.78 cfs @ 14.19 hrs HW=576.13' (Free Discharge)

- ↑ 1=12" outlet pipe (Passes 0.78 cfs of 2.86 cfs potential flow)
- ↑ 2=low flow outlet pipe (Inlet Controls 0.78 cfs @ 3.98 fps)
- ↑ 3=Grate (Controls 0.00 cfs)

Secondary OutFlow Max=0.11 cfs @ 14.19 hrs HW=576.13' (Free Discharge)

- ↑ 4=Broad-Crested Rectangular Weir (Weir Controls 0.11 cfs @ 0.29 fps)

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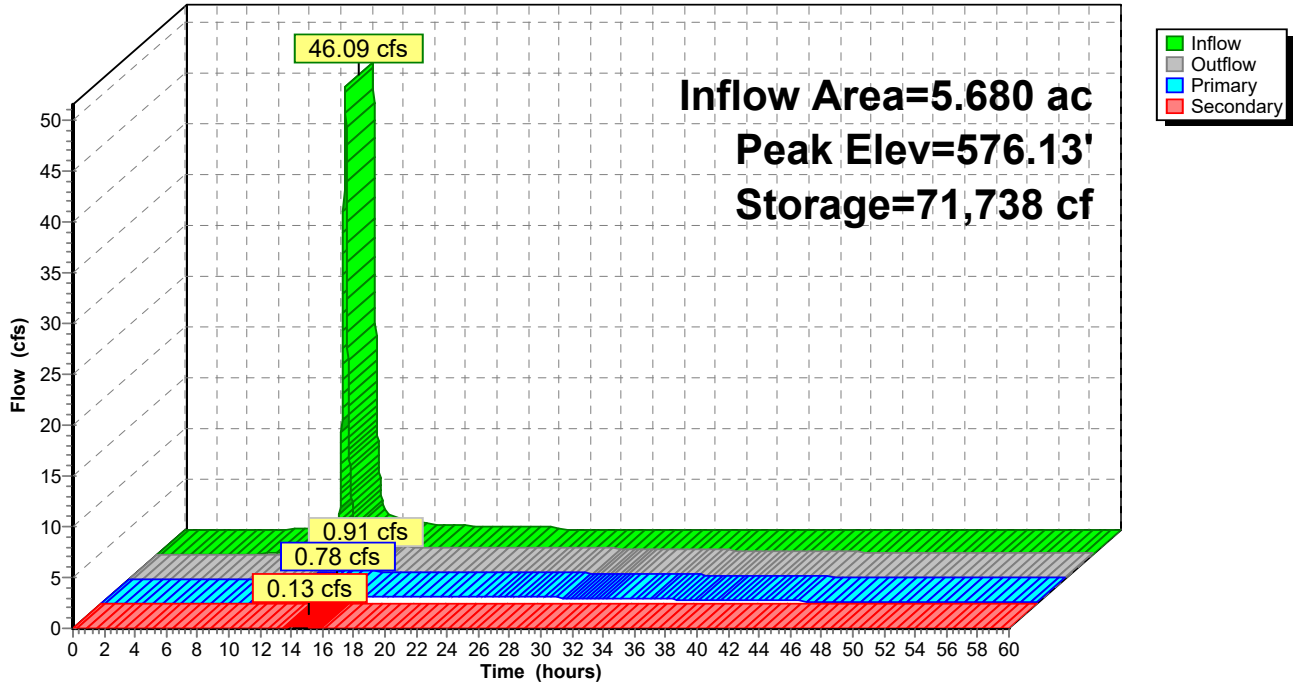
Type II 24-hr 50-Year Rainfall=4.52"

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Pond 2P: Detention Basin (SMA #1)

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Summary for Pond 2P WQ: WQv (SMA #1)

[43] Hint: Has no inflow (Outflow=Zero)

Volume	Invert	Avail.Storage	Storage Description
#1	563.00'	152,678 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
563.00	710	0	0
564.00	1,152	931	931
565.00	1,725	1,439	2,370
566.00	2,430	2,078	4,447
567.00	3,302	2,866	7,313
568.00	4,386	3,844	11,157
569.00	7,838	6,112	17,269
570.00	11,596	9,717	26,986
571.00	15,606	13,601	40,587
572.00	20,106	17,856	58,443
573.00	24,865	22,486	80,929
574.00	29,710	27,288	108,216
575.00	59,213	44,462	152,678

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Type II 24-hr 50-Year Rainfall=4.52"

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Summary for Pond 3P: Underground Storage (SMA #2)

[79] Warning: Submerged Pond 4P Primary device # 1 INLET by 0.85'

Inflow Area = 4.450 ac, 60.67% Impervious, Inflow Depth = 3.53" for 50-Year event
 Inflow = 11.37 cfs @ 12.05 hrs, Volume= 1.310 af
 Outflow = 4.02 cfs @ 12.58 hrs, Volume= 1.266 af, Atten= 65%, Lag= 31.4 min
 Primary = 4.02 cfs @ 12.58 hrs, Volume= 1.266 af
 Routed to Link 2L : Total Outflow from Proposed Site

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
 Peak Elev= 572.26' @ 12.58 hrs Surf.Area= 10,145 sf Storage= 19,007 cf

Plug-Flow detention time= 198.8 min calculated for 1.266 af (97% of inflow)
 Center-of-Mass det. time= 141.3 min (1,070.3 - 929.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	569.50'	8,947 cf	53.75"W x 188.74"L x 3.50'H Field A 35,506 cf Overall - 13,139 cf Embedded = 22,367 cf x 40.0% Voids
#2A	570.00'	13,139 cf	ADS_StormTech SC-740 +Cap x 286 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 286 Chambers in 11 Rows
		22,086 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	569.93'	12.0" Round Culvert L= 72.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 569.93' / 569.71' S= 0.0031 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	569.93'	4.0" Vert. Orifice X 3.00 C= 0.600 Limited to weir flow at low heads
#3	Device 1	572.00'	5.0' long Weir 2 End Contraction(s)

Primary OutFlow Max=4.03 cfs @ 12.58 hrs HW=572.26' (Free Discharge)

- ↑ **1=Culvert** (Passes 4.03 cfs of 4.05 cfs potential flow)
- ↑ **2=Orifice** (Orifice Controls 1.85 cfs @ 7.09 fps)
- ↑ **3=Weir** (Weir Controls 2.17 cfs @ 1.67 fps)

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Type II 24-hr 50-Year Rainfall=4.52"

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Pond 3P: Underground Storage (SMA #2) - Chamber Wizard Field A

Chamber Model = ADS_StormTechSC-740 +Cap (ADS StormTech®SC-740 with cap length)

Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf

Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

26 Chambers/Row x 7.12' Long +0.81' Cap Length x 2 = 186.74' Row Length +12.0" End Stone x 2 = 188.74' Base Length

11 Rows x 51.0" Wide + 6.0" Spacing x 10 + 12.0" Side Stone x 2 = 53.75' Base Width

6.0" Stone Base + 30.0" Chamber Height + 6.0" Stone Cover = 3.50' Field Height

286 Chambers x 45.9 cf = 13,138.8 cf Chamber Storage

35,506.1 cf Field - 13,138.8 cf Chambers = 22,367.2 cf Stone x 40.0% Voids = 8,946.9 cf Stone Storage

Chamber Storage + Stone Storage = 22,085.7 cf = 0.507 af

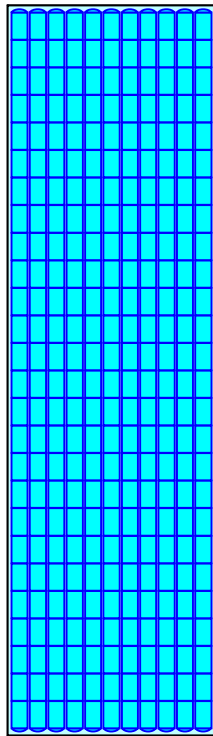
Overall Storage Efficiency = 62.2%

Overall System Size = 188.74' x 53.75' x 3.50'

286 Chambers

1,315.0 cy Field

828.4 cy Stone



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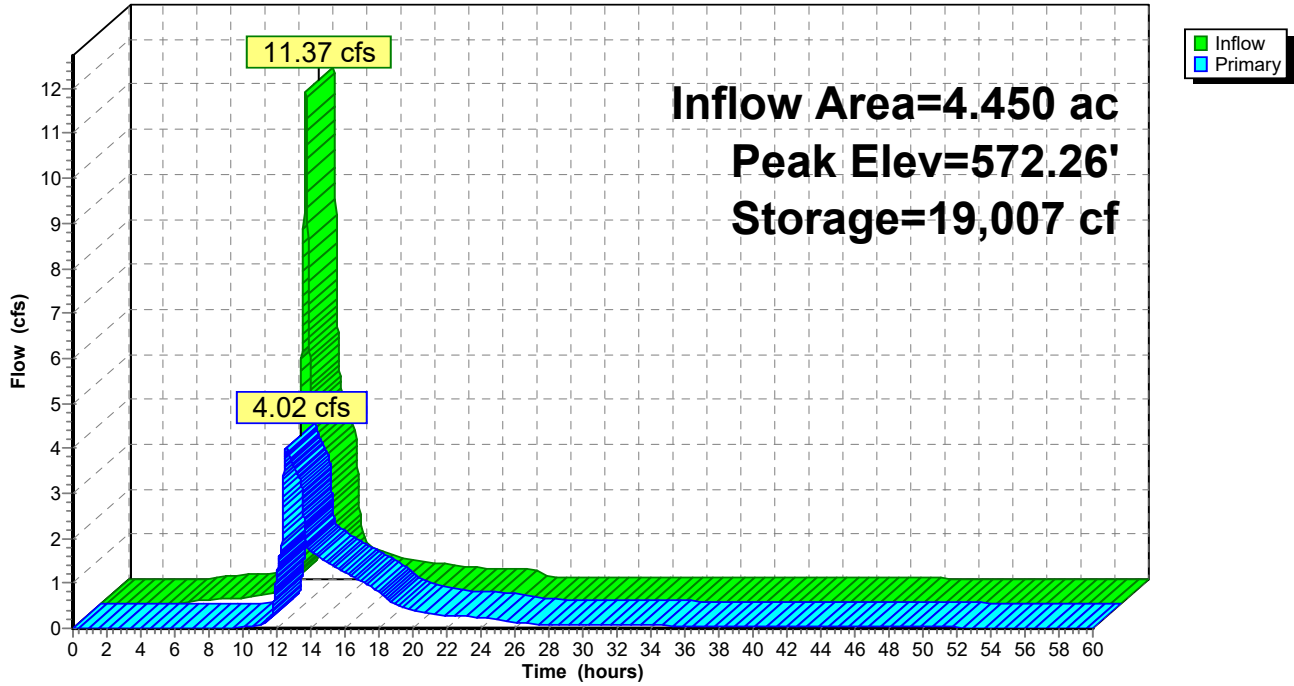
Type II 24-hr 50-Year Rainfall=4.52"

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Pond 3P: Underground Storage (SMA #2)

Hydrograph



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Type II 24-hr 50-Year Rainfall=4.52"

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Summary for Pond 4P: Bioretention Area #2

Inflow Area = 2.550 ac, 65.49% Impervious, Inflow Depth = 3.62" for 50-Year event
 Inflow = 13.73 cfs @ 12.00 hrs, Volume= 0.770 af
 Outflow = 3.06 cfs @ 12.21 hrs, Volume= 0.770 af, Atten= 78%, Lag= 12.3 min
 Primary = 3.06 cfs @ 12.21 hrs, Volume= 0.770 af
 Routed to Pond 3P : Underground Storage (SMA #2)

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
 Peak Elev= 576.40' @ 12.21 hrs Surf.Area= 11,463 sf Storage= 14,208 cf

Plug-Flow detention time= 235.3 min calculated for 0.770 af (100% of inflow)
 Center-of-Mass det. time= 235.3 min (1,020.8 - 785.5)

Volume	Invert	Avail.Storage	Storage Description
#1	575.00'	21,391 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
575.00	8,798	0	0
576.00	10,686	9,742	9,742
577.00	12,612	11,649	21,391

Device	Routing	Invert	Outlet Devices
#1	Primary	571.41'	8.0" Round Pipe L= 41.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 571.41' / 571.30' S= 0.0027 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#2	Device 1	575.50'	8.0" Horiz. Grate X 8.00 C= 0.600 Limited to weir flow at low heads
#3	Device 1	575.00'	0.250 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 560.00'
#4	Device 1	575.75'	24.0" x 24.0" Horiz. Grate (overflow) C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=3.06 cfs @ 12.21 hrs HW=576.40' (Free Discharge)

- ↑ **1=Pipe** (Barrel Controls 3.06 cfs @ 8.78 fps)
- ↑ **2=Grate** (Passes < 12.78 cfs potential flow)
- ↑ **3=Exfiltration** (Passes < 0.07 cfs potential flow)
- ↑ **4=Grate (overflow)** (Passes < 13.81 cfs potential flow)

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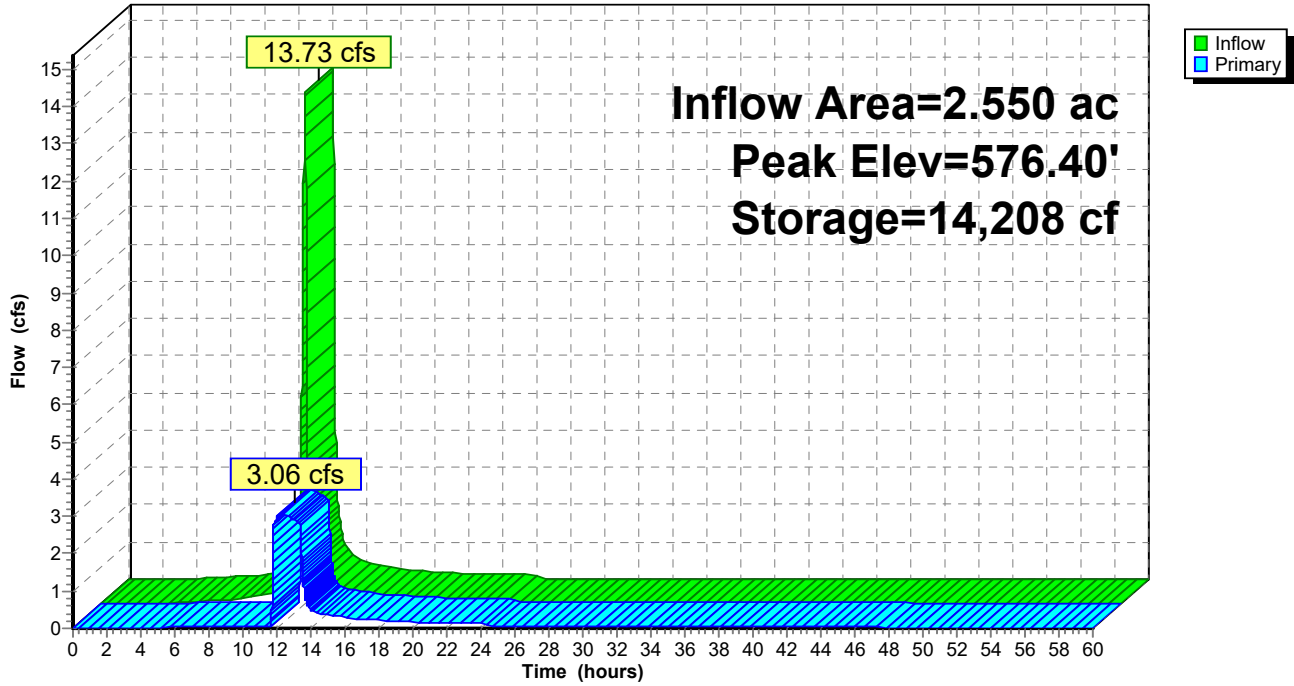
Type II 24-hr 50-Year Rainfall=4.52"

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Pond 4P: Bioretention Area #2

Hydrograph



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Type II 24-hr 50-Year Rainfall=4.52"

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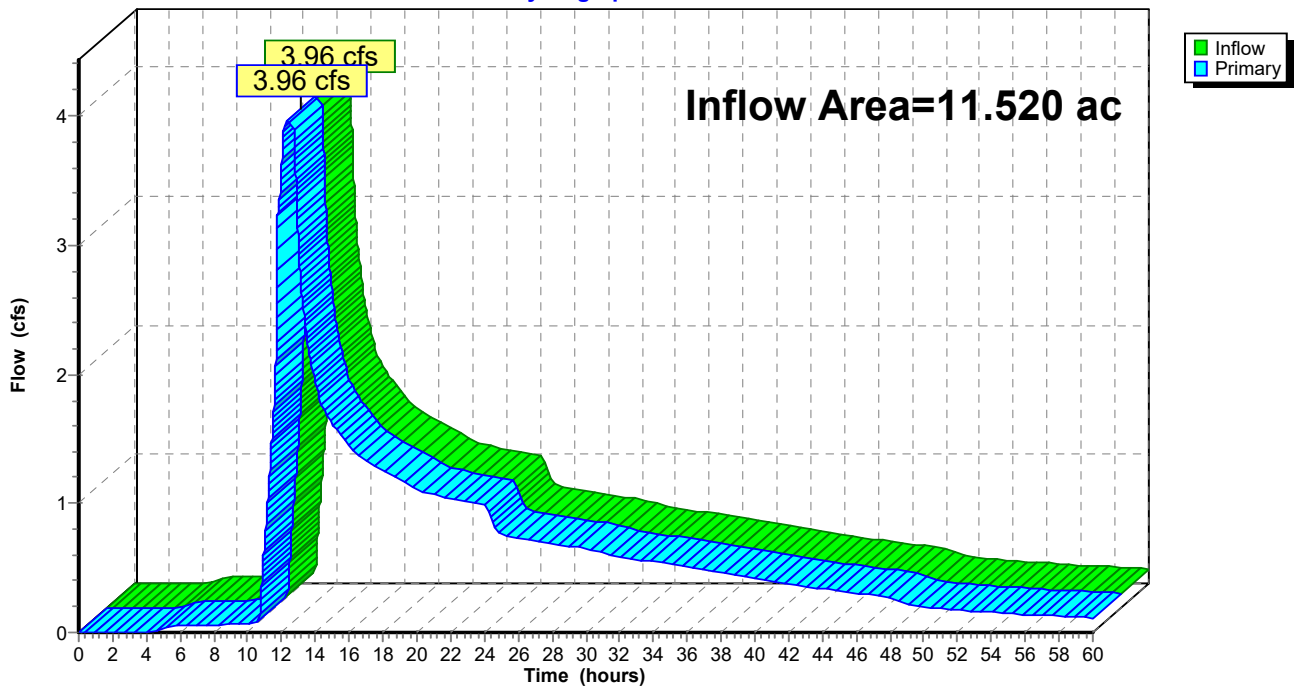
Summary for Link 1L: Outflow to Dodge Rd (@ CB 54)

Inflow Area = 11.520 ac, 55.30% Impervious, Inflow Depth > 3.05" for 50-Year event
Inflow = 3.96 cfs @ 12.27 hrs, Volume= 2.924 af
Primary = 3.96 cfs @ 12.27 hrs, Volume= 2.924 af, Atten= 0%, Lag= 0.0 min
Routed to Link 2L : Total Outflow from Proposed Site

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

Link 1L: Outflow to Dodge Rd (@ CB 54)

Hydrograph



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Type II 24-hr 50-Year Rainfall=4.52"

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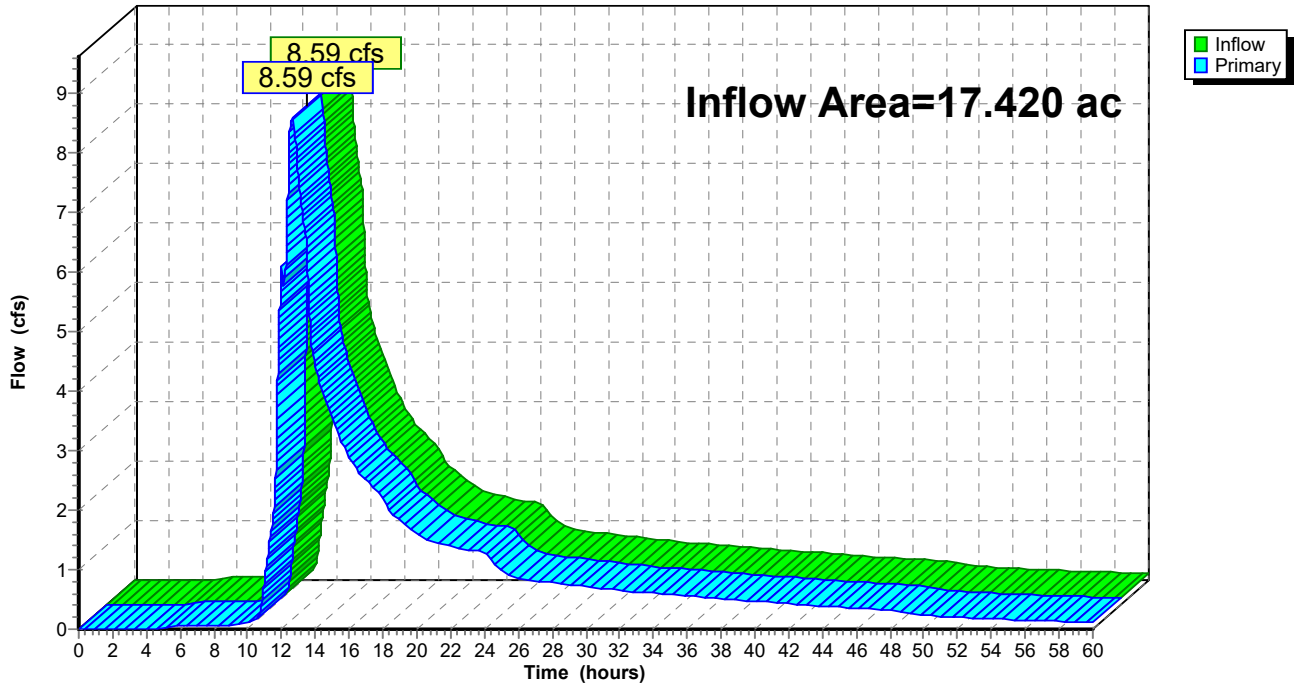
Summary for Link 2L: Total Outflow from Proposed Site

Inflow Area = 17.420 ac, 52.24% Impervious, Inflow Depth > 3.10" for 50-Year event
Inflow = 8.59 cfs @ 12.64 hrs, Volume= 4.503 af
Primary = 8.59 cfs @ 12.64 hrs, Volume= 4.503 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

Link 2L: Total Outflow from Proposed Site

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Type II 24-hr 100-Year Rainfall=5.28"

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Time span=0.00-60.00 hrs, dt=0.01 hrs, 6001 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Front Area 1 Runoff Area=5.840 ac 59.42% Impervious Runoff Depth=4.25"
 Flow Length=652' Tc=13.3 min CN=91 Runoff=32.21 cfs 2.070 af

Subcatchment2S: Rear Area 1 Runoff Area=5.680 ac 51.06% Impervious Runoff Depth=4.04"
 Flow Length=683' Tc=14.4 min CN=89 Runoff=29.17 cfs 1.913 af

Subcatchment3S: Front Area 2 Runoff Area=1.900 ac 54.21% Impervious Runoff Depth=4.15"
 Flow Length=1,325' Slope=0.0100 '/' Tc=14.1 min CN=90 Runoff=10.05 cfs 0.657 af

Subcatchment4S: Rear Area 2 Runoff Area=2.550 ac 65.49% Impervious Runoff Depth=4.36"
 Flow Length=345' Tc=9.1 min CN=92 Runoff=16.34 cfs 0.927 af

Subcatchment5S: Unrestricted Runoff Areas Runoff Area=0.120 ac 0.00% Impervious Runoff Depth=3.14"
 Flow Length=25' Slope=0.3300 '/' Tc=5.0 min CN=80 Runoff=0.69 cfs 0.031 af

Subcatchment6S: Unrestricted Runoff Runoff Area=0.180 ac 16.67% Impervious Runoff Depth=3.43"
 Flow Length=40' Slope=0.3300 '/' Tc=5.0 min CN=83 Runoff=1.11 cfs 0.051 af

Subcatchment7S: Unrestricted Permanent Runoff Area=1.150 ac 0.00% Impervious Runoff Depth=3.04"
 Flow Length=465' Slope=0.0020 '/' Tc=107.9 min CN=79 Runoff=1.21 cfs 0.292 af

Pond 1P: Bioretention Area #1 Peak Elev=577.21' Storage=13,056 cf Inflow=32.21 cfs 2.070 af
 Primary=3.37 cfs 1.306 af Secondary=27.35 cfs 0.764 af Outflow=30.72 cfs 2.070 af

Pond 2P: Detention Basin (SMA #1) Peak Elev=576.25' Storage=80,014 cf Inflow=56.26 cfs 2.677 af
 Primary=0.83 cfs 1.866 af Secondary=5.58 cfs 0.463 af Outflow=6.41 cfs 2.330 af

Pond 2P WQ: WQv (SMA #1) Peak Elev=0.00' Storage=0 cf

Pond 3P: Underground Storage (SMA #2) Peak Elev=572.67' Storage=20,753 cf Inflow=13.12 cfs 1.584 af
 Outflow=4.55 cfs 1.539 af

Pond 4P: Bioretention Area #2 Peak Elev=576.65' Storage=17,089 cf Inflow=16.34 cfs 0.927 af
 Outflow=3.15 cfs 0.927 af

Link 1L: Outflow to Dodge Rd (@ CB 54) Inflow=4.08 cfs 3.172 af
 Primary=4.08 cfs 3.172 af

Link 2L: Total Outflow from Proposed Site Inflow=14.88 cfs 5.550 af
 Primary=14.88 cfs 5.550 af

Total Runoff Area = 17.420 ac Runoff Volume = 5.941 af Average Runoff Depth = 4.09"
47.76% Pervious = 8.320 ac 52.24% Impervious = 9.100 ac

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Type II 24-hr 100-Year Rainfall=5.28"

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Summary for Subcatchment 1S: Front Area 1

Runoff = 32.21 cfs @ 12.04 hrs, Volume= 2.070 af, Depth= 4.25"
 Routed to Pond 1P : Bioretention Area #1

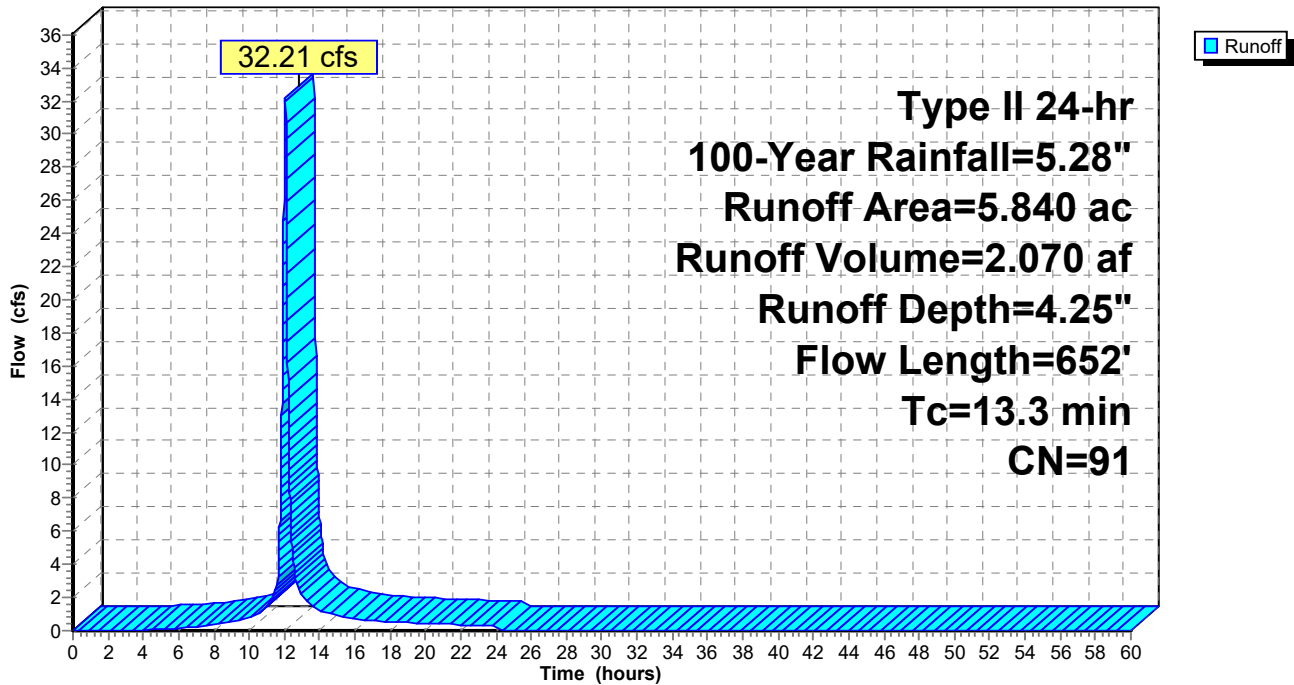
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
 Type II 24-hr 100-Year Rainfall=5.28"

Area (ac)	CN	Description
3.470	98	Impervious
2.370	80	>75% Grass cover, Good, HSG D
5.840	91	Weighted Average
2.370		40.58% Pervious Area
3.470		59.42% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.6	37	0.0100	0.06		Sheet Flow, grass Grass: Dense n= 0.240 P2= 2.50"
0.4	15	0.0120	0.68		Sheet Flow, pavement Smooth surfaces n= 0.011 P2= 2.50"
3.3	600		3.00		Direct Entry, pipe flow
13.3	652	Total			

Subcatchment 1S: Front Area 1

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Summary for Subcatchment 2S: Rear Area 1

Runoff = 29.17 cfs @ 12.06 hrs, Volume= 1.913 af, Depth= 4.04"
 Routed to Pond 2P : Detention Basin (SMA #1)

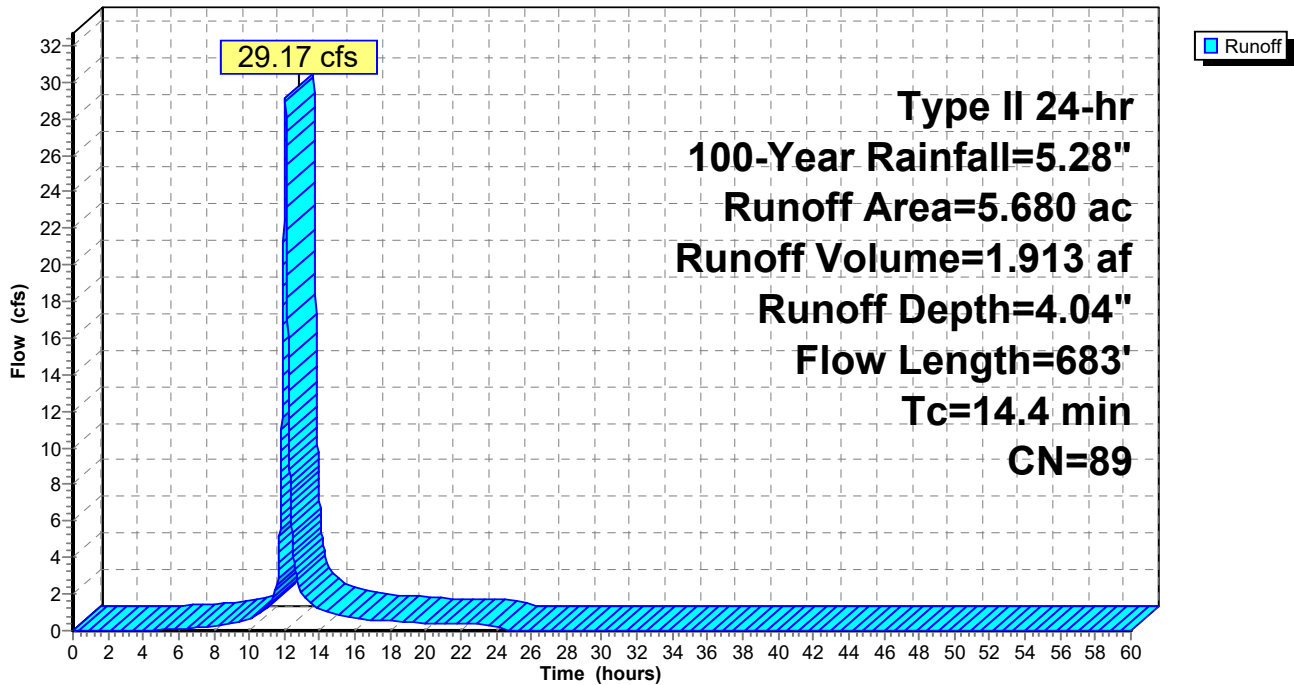
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
 Type II 24-hr 100-Year Rainfall=5.28"

Area (ac)	CN	Description
2.900	98	Impervious
2.780	80	>75% Grass cover, Good, HSG D
5.680	89	Weighted Average
2.780		48.94% Pervious Area
2.900		51.06% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.2	90	0.0200	0.15		Sheet Flow, grass Grass: Short n= 0.150 P2= 2.50"
1.3	75	0.0130	0.97		Sheet Flow, pavement Smooth surfaces n= 0.011 P2= 2.50"
2.9	518		3.00		Direct Entry, Pipe flow
14.4	683	Total			

Subcatchment 2S: Rear Area 1

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Type II 24-hr 100-Year Rainfall=5.28"

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Summary for Subcatchment 3S: Front Area 2

Runoff = 10.05 cfs @ 12.05 hrs, Volume= 0.657 af, Depth= 4.15"

Routed to Pond 3P : Underground Storage (SMA #2)

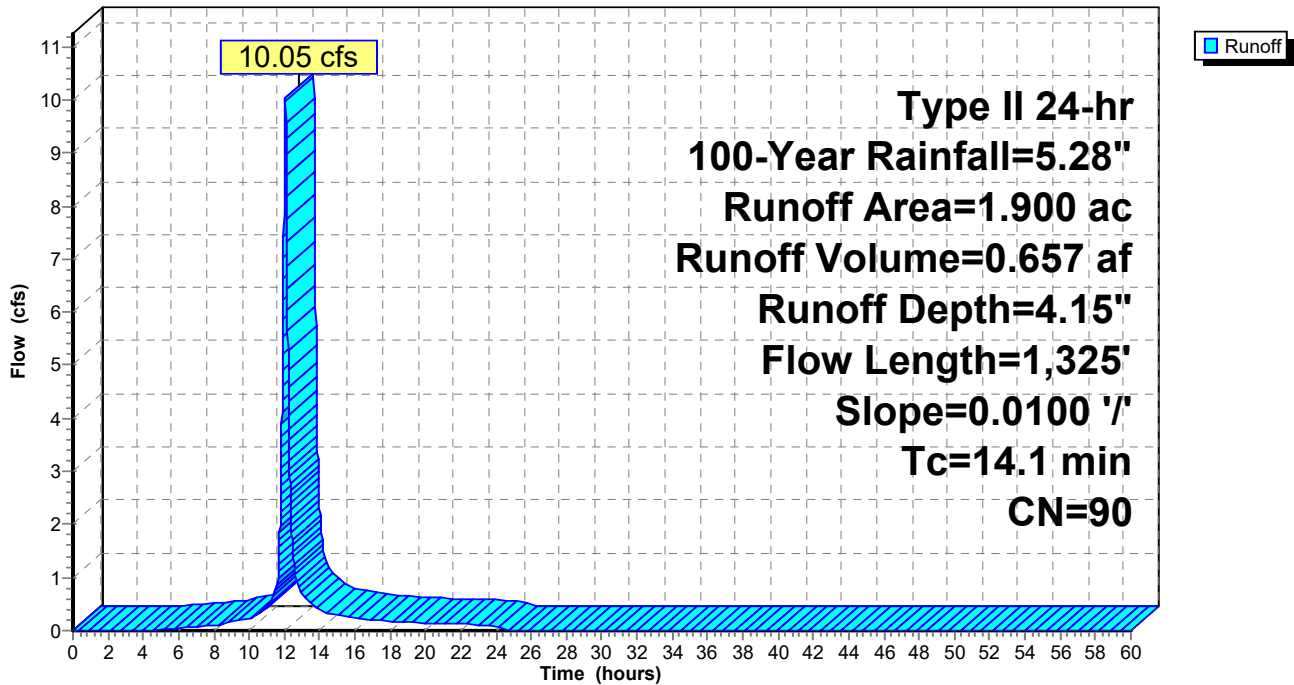
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
 Type II 24-hr 100-Year Rainfall=5.28"

Area (ac)	CN	Description
* 1.030	98	Impervious
0.870	80	>75% Grass cover, Good, HSG D
1.900	90	Weighted Average
0.870		45.79% Pervious Area
1.030		54.21% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0	40	0.0100	0.09		Sheet Flow, grass
7.1	1,285		3.00		Grass: Short n= 0.150 P2= 2.50" Direct Entry, Pipe flow
14.1	1,325				Total

Subcatchment 3S: Front Area 2

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Type II 24-hr 100-Year Rainfall=5.28"

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Summary for Subcatchment 4S: Rear Area 2

Runoff = 16.34 cfs @ 12.00 hrs, Volume= 0.927 af, Depth= 4.36"
 Routed to Pond 4P : Bioretention Area #2

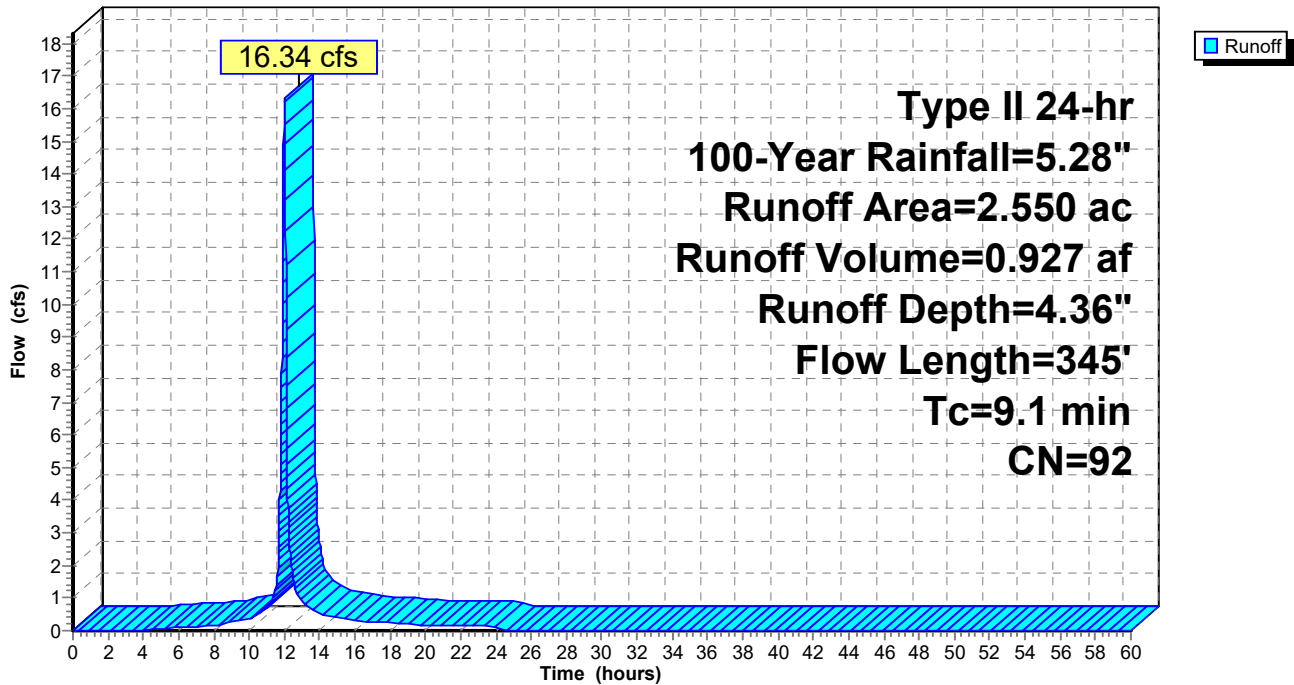
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
 Type II 24-hr 100-Year Rainfall=5.28"

Area (ac)	CN	Description
1.670	98	Impervious
0.880	80	>75% Grass cover, Good, HSG D
2.550	92	Weighted Average
0.880		34.51% Pervious Area
1.670		65.49% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.9	55	0.0200	0.13		Sheet Flow, grass Grass: Short n= 0.150 P2= 2.50"
0.8	45	0.0170	0.97		Sheet Flow, pavement Smooth surfaces n= 0.011 P2= 2.50"
1.4	245		3.00		Direct Entry, Pipe flow
9.1	345	Total			

Subcatchment 4S: Rear Area 2

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Summary for Subcatchment 5S: Unrestricted Runoff Areas

Runoff = 0.69 cfs @ 11.96 hrs, Volume= 0.031 af, Depth= 3.14"

Routed to Link 2L : Total Outflow from Proposed Site

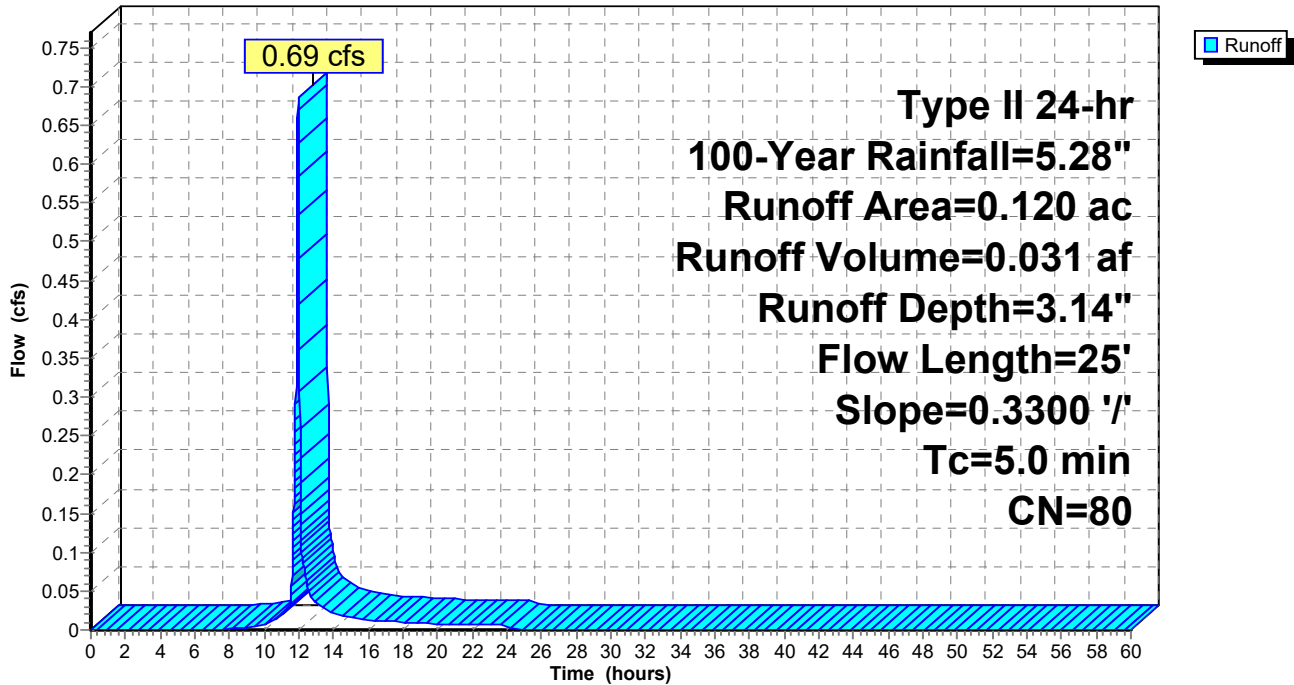
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-Year Rainfall=5.28"

Area (ac)	CN	Description
0.120	80	>75% Grass cover, Good, HSG D
0.120		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	25	0.3300	0.35		Sheet Flow, grass Grass: Short n= 0.150 P2= 2.50"
1.2	25	Total, Increased to minimum Tc = 5.0 min			

Subcatchment 5S: Unrestricted Runoff Areas

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Type II 24-hr 100-Year Rainfall=5.28"

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Summary for Subcatchment 6S: Unrestricted Runoff Areas

Runoff = 1.11 cfs @ 11.96 hrs, Volume= 0.051 af, Depth= 3.43"

Routed to Link 2L : Total Outflow from Proposed Site

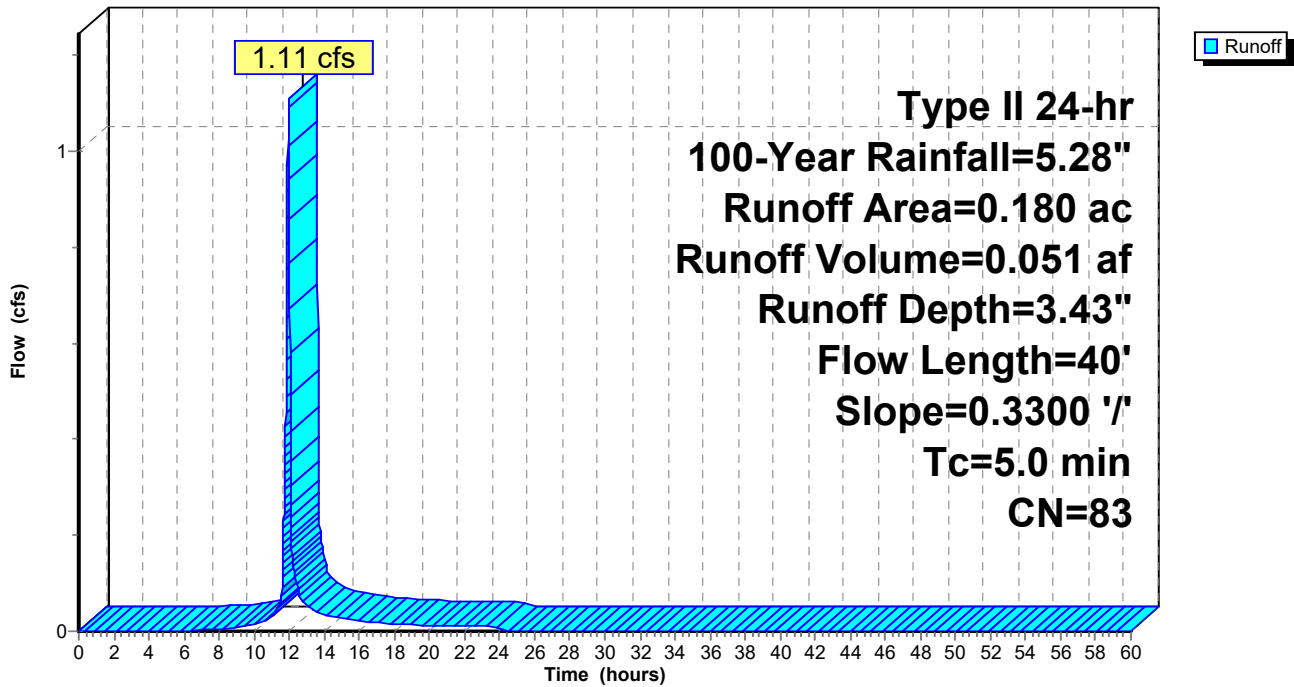
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
 Type II 24-hr 100-Year Rainfall=5.28"

Area (ac)	CN	Description
0.150	80	>75% Grass cover, Good, HSG D
* 0.030	98	Impervious
0.180	83	Weighted Average
0.150		83.33% Pervious Area
0.030		16.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.7	40	0.3300	0.38		Sheet Flow, grass Grass: Short n= 0.150 P2= 2.50"
1.7	40	Total, Increased to minimum Tc = 5.0 min			

Subcatchment 6S: Unrestricted Runoff Areas

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Type II 24-hr 100-Year Rainfall=5.28"

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Summary for Subcatchment 7S: Unrestricted Permanent Open Space

Runoff = 1.21 cfs @ 13.30 hrs, Volume= 0.292 af, Depth= 3.04"

Routed to Link 2L : Total Outflow from Proposed Site

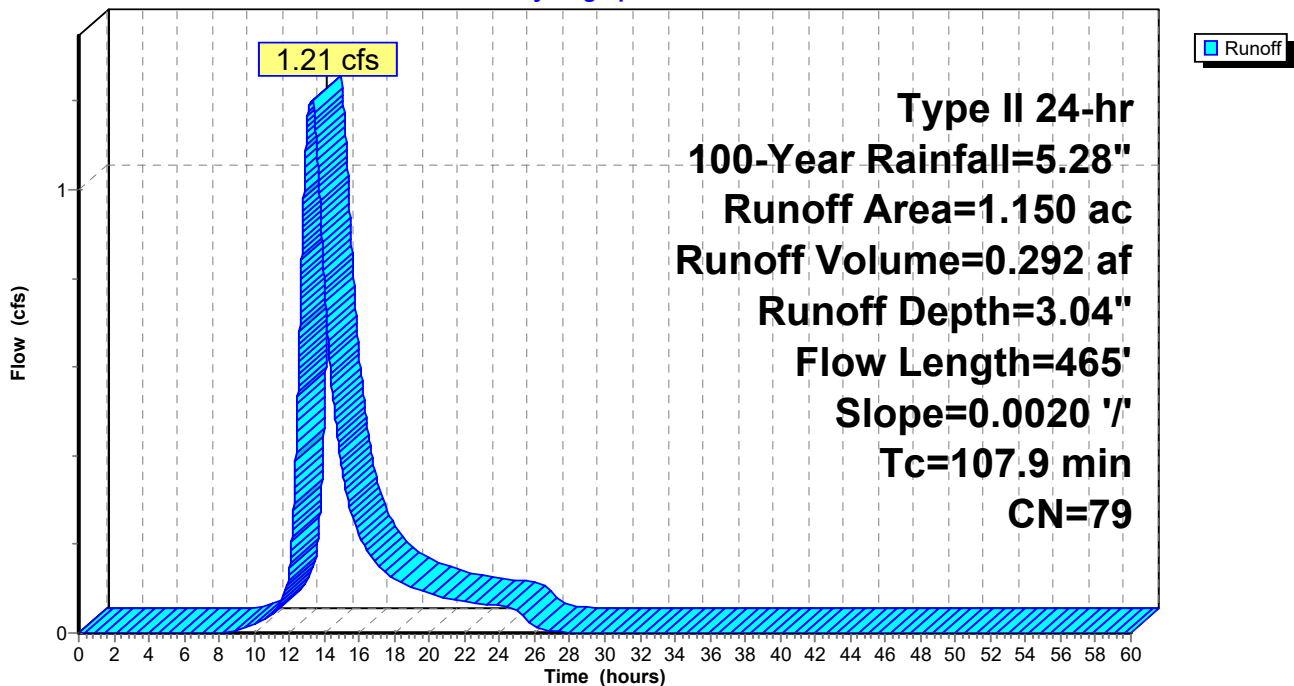
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
 Type II 24-hr 100-Year Rainfall=5.28"

Area (ac)	CN	Description
1.150	79	Woods, Fair, HSG D
1.150		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
84.4	150	0.0020	0.03		Sheet Flow, woods
23.5	315	0.0020	0.22		Shallow Concentrated Flow, woods
					Woodland Kv= 5.0 fps
107.9	465	Total			

Subcatchment 7S: Unrestricted Permanent Open Space

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Type II 24-hr 100-Year Rainfall=5.28"

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Summary for Pond 1P: Bioretention Area #1

Inflow Area = 5.840 ac, 59.42% Impervious, Inflow Depth = 4.25" for 100-Year event
 Inflow = 32.21 cfs @ 12.04 hrs, Volume= 2.070 af
 Outflow = 30.72 cfs @ 12.08 hrs, Volume= 2.070 af, Atten= 5%, Lag= 2.1 min
 Primary = 3.37 cfs @ 12.08 hrs, Volume= 1.306 af
 Routed to Link 1L : Outflow to Dodge Rd (@ CB 54)
 Secondary = 27.35 cfs @ 12.08 hrs, Volume= 0.764 af
 Routed to Pond 2P : Detention Basin (SMA #1)

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
 Peak Elev= 577.21' @ 12.08 hrs Surf.Area= 11,907 sf Storage= 13,056 cf

Plug-Flow detention time= 108.7 min calculated for 2.070 af (100% of inflow)
 Center-of-Mass det. time= 108.9 min (897.5 - 788.5)

Volume	Invert	Avail.Storage	Storage Description
#1	576.00'	16,618 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
576.00	9,925	0	0
576.50	10,585	5,128	5,128
577.00	11,350	5,484	10,611
577.50	12,675	6,006	16,618

Device	Routing	Invert	Outlet Devices
#1	Primary	572.50'	8.0" Round 8" pipe L= 25.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 572.50' / 572.42' S= 0.0032 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#2	Device 1	576.50'	8.0" Horiz. Grate X 4.00 C= 0.600 Limited to weir flow at low heads
#3	Device 1	576.00'	0.250 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 560.00'
#4	Secondary	576.75'	30.0' long (Profile 1) Broad-Crested Rectangular Weir Head (feet) 0.49 0.98 1.48 Coef. (English) 2.92 3.37 3.59

Primary OutFlow Max=3.37 cfs @ 12.08 hrs HW=577.21' (Free Discharge)

- ↑ **1=8" pipe** (Barrel Controls 3.37 cfs @ 9.66 fps)
- ↑ **2=Grate** (Passes < 5.67 cfs potential flow)
- ↑ **3=Exfiltration** (Passes < 0.07 cfs potential flow)

Secondary OutFlow Max=27.35 cfs @ 12.08 hrs HW=577.21' (Free Discharge)

- ↑ **4=Broad-Crested Rectangular Weir** (Weir Controls 27.35 cfs @ 1.98 fps)

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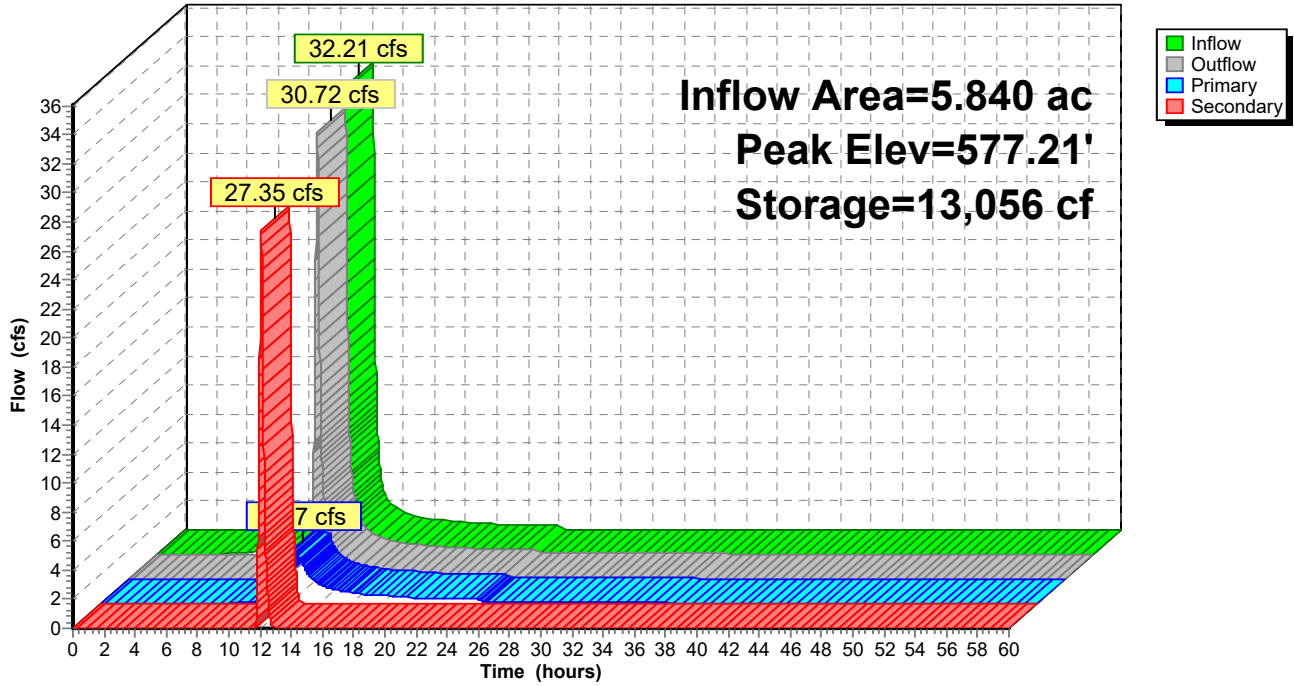
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Pond 1P: Bioretention Area #1

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Summary for Pond 2P: Detention Basin (SMA #1)

Inflow Area = 5.680 ac, 51.06% Impervious, Inflow Depth = 5.66" for 100-Year event
 Inflow = 56.26 cfs @ 12.07 hrs, Volume= 2.677 af
 Outflow = 6.41 cfs @ 12.51 hrs, Volume= 2.330 af, Atten= 89%, Lag= 26.2 min
 Primary = 0.83 cfs @ 12.51 hrs, Volume= 1.866 af
 Routed to Link 1L : Outflow to Dodge Rd (@ CB 54)
 Secondary = 5.58 cfs @ 12.51 hrs, Volume= 0.463 af
 Routed to Link 2L : Total Outflow from Proposed Site

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
 Peak Elev= 576.25' @ 12.51 hrs Surf.Area= 68,196 sf Storage= 80,014 cf

Plug-Flow detention time= 825.1 min calculated for 2.329 af (87% of inflow)
 Center-of-Mass det. time= 771.3 min (1,548.3 - 777.1)

Volume	Invert	Avail.Storage	Storage Description
#1	575.00'	118,224 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
575.00	59,213	0	0
576.00	66,849	63,031	63,031
576.80	71,134	55,193	118,224

Device	Routing	Invert	Outlet Devices
#1	Primary	574.00'	12.0" Round 12" outlet pipe L= 160.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 574.00' / 573.79' S= 0.0013 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	575.00'	6.0" Round low flow outlet pipe L= 10.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 575.00' / 574.95' S= 0.0050 '/' Cc= 0.900 n= 0.010 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#3	Device 1	576.50'	30.0" x 30.0" Horiz. Grate C= 0.600 Limited to weir flow at low heads
#4	Secondary	576.12'	20.0' long (Profile 1) Broad-Crested Rectangular Weir X 2.00 Head (feet) 0.49 0.98 1.48 Coef. (English) 2.92 3.37 3.59

Primary OutFlow Max=0.83 cfs @ 12.51 hrs HW=576.25' (Free Discharge)

- ↑ 1=12" outlet pipe (Passes 0.83 cfs of 2.98 cfs potential flow)
- ↑ 2=low flow outlet pipe (Inlet Controls 0.83 cfs @ 4.25 fps)
- ↑ 3=Grate (Controls 0.00 cfs)

Secondary OutFlow Max=5.57 cfs @ 12.51 hrs HW=576.25' (Free Discharge)

- ↑ 4=Broad-Crested Rectangular Weir (Weir Controls 5.57 cfs @ 1.06 fps)

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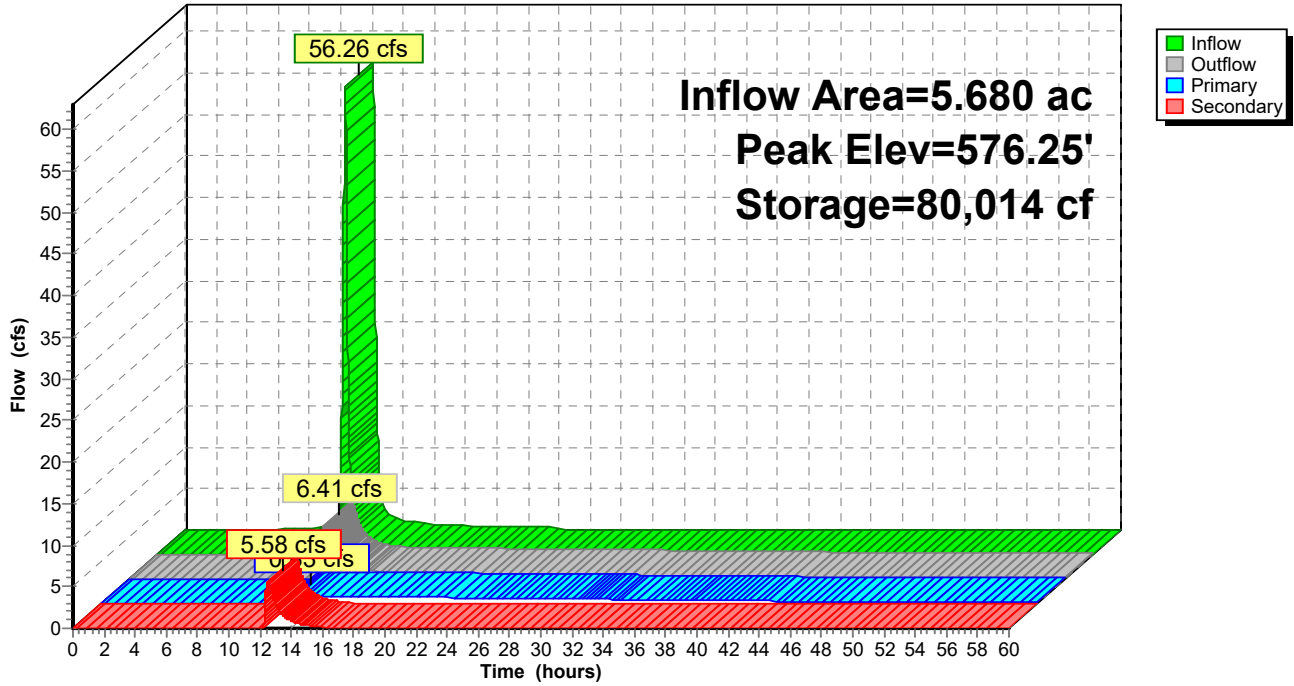
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Pond 2P: Detention Basin (SMA #1)

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Summary for Pond 2P WQ: WQv (SMA #1)

[43] Hint: Has no inflow (Outflow=Zero)

Volume	Invert	Avail.Storage	Storage Description
#1	563.00'	152,678 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
563.00	710	0	0
564.00	1,152	931	931
565.00	1,725	1,439	2,370
566.00	2,430	2,078	4,447
567.00	3,302	2,866	7,313
568.00	4,386	3,844	11,157
569.00	7,838	6,112	17,269
570.00	11,596	9,717	26,986
571.00	15,606	13,601	40,587
572.00	20,106	17,856	58,443
573.00	24,865	22,486	80,929
574.00	29,710	27,288	108,216
575.00	59,213	44,462	152,678

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Summary for Pond 3P: Underground Storage (SMA #2)

[79] Warning: Submerged Pond 4P Primary device # 1 INLET by 1.26'

Inflow Area = 4.450 ac, 60.67% Impervious, Inflow Depth = 4.27" for 100-Year event
 Inflow = 13.12 cfs @ 12.05 hrs, Volume= 1.584 af
 Outflow = 4.55 cfs @ 12.50 hrs, Volume= 1.539 af, Atten= 65%, Lag= 27.0 min
 Primary = 4.55 cfs @ 12.50 hrs, Volume= 1.539 af
 Routed to Link 2L : Total Outflow from Proposed Site

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
 Peak Elev= 572.67' @ 12.50 hrs Surf.Area= 10,145 sf Storage= 20,753 cf

Plug-Flow detention time= 176.4 min calculated for 1.539 af (97% of inflow)
 Center-of-Mass det. time= 128.4 min (1,036.7 - 908.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	569.50'	8,947 cf	53.75"W x 188.74"L x 3.50'H Field A 35,506 cf Overall - 13,139 cf Embedded = 22,367 cf x 40.0% Voids
#2A	570.00'	13,139 cf	ADS_StormTech SC-740 +Cap x 286 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 286 Chambers in 11 Rows
		22,086 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	569.93'	12.0" Round Culvert L= 72.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 569.93' / 569.71' S= 0.0031 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	569.93'	4.0" Vert. Orifice X 3.00 C= 0.600 Limited to weir flow at low heads
#3	Device 1	572.00'	5.0' long Weir 2 End Contraction(s)

Primary OutFlow Max=4.55 cfs @ 12.50 hrs HW=572.67' (Free Discharge)

- ↑ **1=Culvert** (Barrel Controls 4.55 cfs @ 5.80 fps)
- ↑ **2=Orifice** (Passes < 2.02 cfs potential flow)
- ↑ **3=Weir** (Passes < 8.76 cfs potential flow)

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Pond 3P: Underground Storage (SMA #2) - Chamber Wizard Field A

Chamber Model = ADS_StormTechSC-740 +Cap (ADS StormTech®SC-740 with cap length)

Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf

Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

26 Chambers/Row x 7.12' Long +0.81' Cap Length x 2 = 186.74' Row Length +12.0" End Stone x 2 = 188.74' Base Length

11 Rows x 51.0" Wide + 6.0" Spacing x 10 + 12.0" Side Stone x 2 = 53.75' Base Width

6.0" Stone Base + 30.0" Chamber Height + 6.0" Stone Cover = 3.50' Field Height

286 Chambers x 45.9 cf = 13,138.8 cf Chamber Storage

35,506.1 cf Field - 13,138.8 cf Chambers = 22,367.2 cf Stone x 40.0% Voids = 8,946.9 cf Stone Storage

Chamber Storage + Stone Storage = 22,085.7 cf = 0.507 af

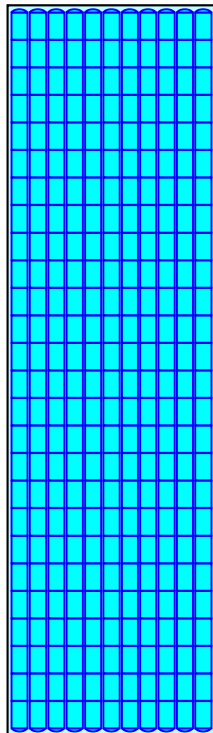
Overall Storage Efficiency = 62.2%

Overall System Size = 188.74' x 53.75' x 3.50'

286 Chambers

1,315.0 cy Field

828.4 cy Stone



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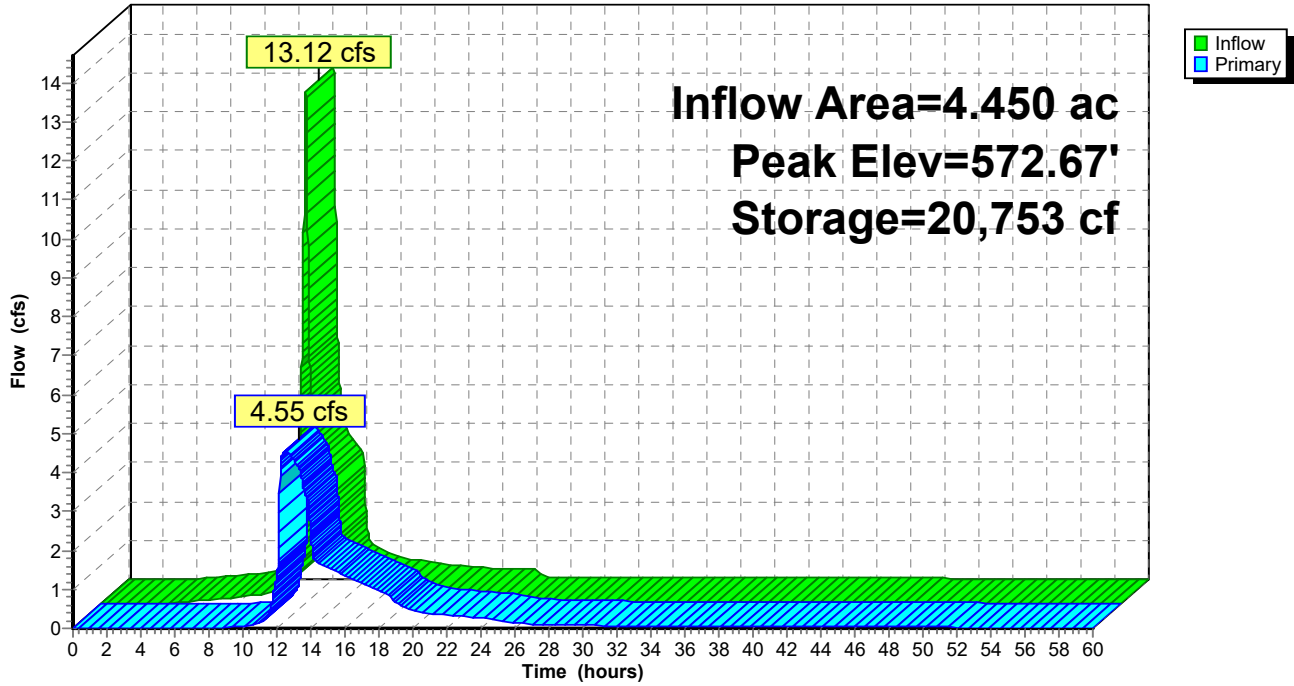
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Pond 3P: Underground Storage (SMA #2)

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Summary for Pond 4P: Bioretention Area #2

Inflow Area = 2.550 ac, 65.49% Impervious, Inflow Depth = 4.36" for 100-Year event
 Inflow = 16.34 cfs @ 12.00 hrs, Volume= 0.927 af
 Outflow = 3.15 cfs @ 12.23 hrs, Volume= 0.927 af, Atten= 81%, Lag= 13.8 min
 Primary = 3.15 cfs @ 12.23 hrs, Volume= 0.927 af
 Routed to Pond 3P : Underground Storage (SMA #2)

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
 Peak Elev= 576.65' @ 12.23 hrs Surf.Area= 11,937 sf Storage= 17,089 cf

Plug-Flow detention time= 209.1 min calculated for 0.927 af (100% of inflow)
 Center-of-Mass det. time= 209.4 min (989.9 - 780.5)

Volume	Invert	Avail.Storage	Storage Description
#1	575.00'	21,391 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
575.00	8,798	0	0
576.00	10,686	9,742	9,742
577.00	12,612	11,649	21,391

Device	Routing	Invert	Outlet Devices
#1	Primary	571.41'	8.0" Round Pipe L= 41.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 571.41' / 571.30' S= 0.0027 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#2	Device 1	575.50'	8.0" Horiz. Grate X 8.00 C= 0.600 Limited to weir flow at low heads
#3	Device 1	575.00'	0.250 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 560.00'
#4	Device 1	575.75'	24.0" x 24.0" Horiz. Grate (overflow) C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=3.15 cfs @ 12.23 hrs HW=576.65' (Free Discharge)

- ↑ **1=Pipe** (Barrel Controls 3.15 cfs @ 9.02 fps)
- ↑ **2=Grate** (Passes < 14.42 cfs potential flow)
- ↑ **3=Exfiltration** (Passes < 0.08 cfs potential flow)
- ↑ **4=Grate (overflow)** (Passes < 18.27 cfs potential flow)

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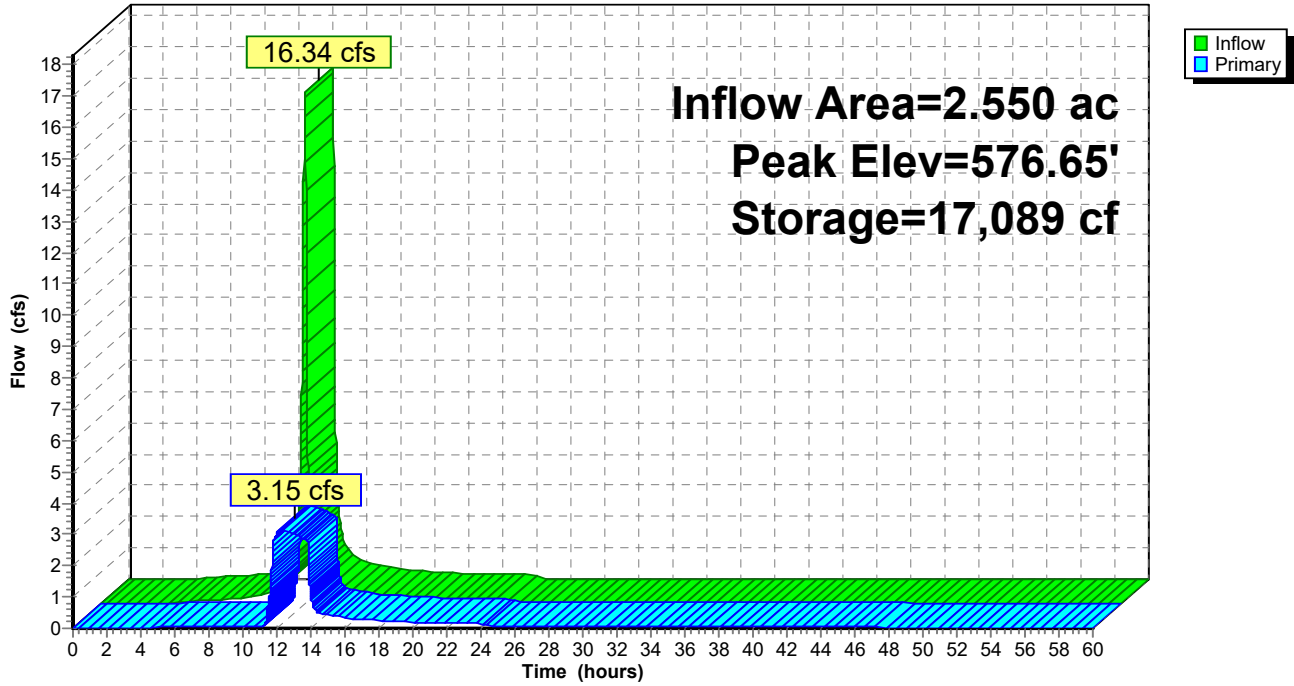
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Pond 4P: Bioretention Area #2

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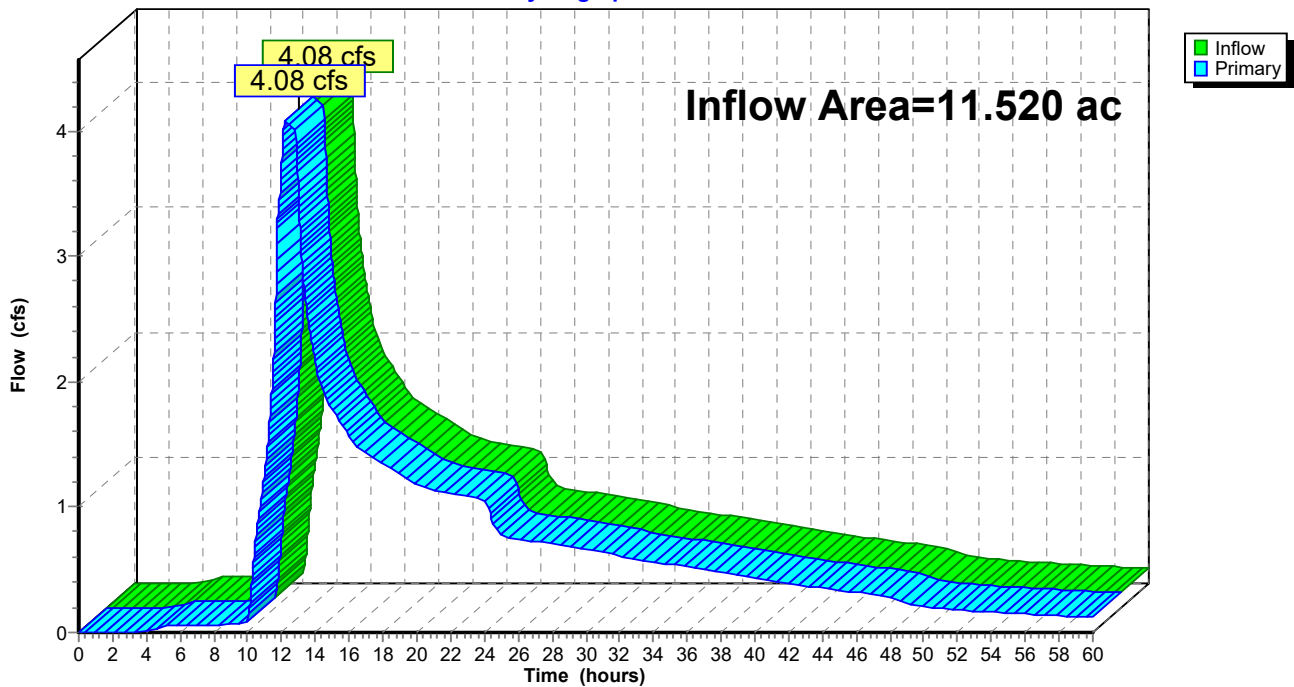
Summary for Link 1L: Outflow to Dodge Rd (@ CB 54)

Inflow Area = 11.520 ac, 55.30% Impervious, Inflow Depth > 3.30" for 100-Year event
Inflow = 4.08 cfs @ 12.24 hrs, Volume= 3.172 af
Primary = 4.08 cfs @ 12.24 hrs, Volume= 3.172 af, Atten= 0%, Lag= 0.0 min
Routed to Link 2L : Total Outflow from Proposed Site

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

Link 1L: Outflow to Dodge Rd (@ CB 54)

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Summary for Link 2L: Total Outflow from Proposed Site

Inflow Area = 17.420 ac, 52.24% Impervious, Inflow Depth > 3.82" for 100-Year event
Inflow = 14.88 cfs @ 12.52 hrs, Volume= 5.550 af
Primary = 14.88 cfs @ 12.52 hrs, Volume= 5.550 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

Link 2L: Total Outflow from Proposed Site

Hydrograph

