

PRELIMINARY STORMWATER MANAGEMENT FACILITIES REPORT FOR



Site Address:

250 NW McNary Court
Lee's Summit, MO 64086

Developer:

TM Crowley

501 Pennsylvania Parkway Suite 160
Indianapolis, IN 46280

Prepared By:



Dated: August 10, 2020

STORMWATER FACILITIES MANAGEMENT REPORT

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Introduction

The proposed improvements that are depicted on the Preliminary Development Plan provides the design for the proposed development for Petsuites located at 250 NW McNary court. The development will increase the impervious area of the site therefore changing the characteristics of the stormwater runoff. The information supplied in this report will provide evidence that the Post Developed Stormwater Runoff has been mitigated appropriately with the Best Management Practices proposed for this development.

Project Narrative

TM Crowley is developing the subject property for Petsuites of America. . The property size is ±2.11 acres and is located at the west end of the cul-de-sac on McNary Court. The proposed building will consist of a veterinary clinic and PetSuites for a total of 14,100 sq. ft.

Methodology

The methodology used for the project is Hydro CAD 10.10-3a for determination of SCS hydrographs. The hydraulics for the project were determined using Autodesk Civil 3D 2020 Storm Sewer Analysis. To determine the Storm Intensity and Frequency the overall project pre-development condition and post development condition was determined by the SCS method using NOAA's precipitation intensity data from their website.

Existing Condition Analysis

The site is an open field with a wooded area to the west. It is surrounded by commercial properties except the west which is railroad right of way. The existing runoff drains to the west.

Site Area Calculations

Property Size	2.11 Acres
<u>Pre-Development Condition</u>	
2.11 Acres of Grass	CN=74
<u>Post-Development Condition</u>	
0.69 Acres of Impervious Area (Buildings and Pavement)	CN=98
1.42 Acres of Pervious Area	CN=74
"C" Value Weighted Average	CN=82

Worksheet 1 – Required Level of Service – Undeveloped Site

WORKSHEET 1 REQUIRED LEVEL OF SERVICE-UNDEVELOPED SITE

Project: PetSuites
Location: Lee's Summit, MO

By: M. Fogarty
Date: 8/12/2020

1. Runoff Curve Number

A. Predevelopment CN

Cover Description	Soil HSG	CN from Table 1	Area (ac.)	Product of CN x Area
Grass	C	80	2.11	168.8
				0
				0
Totals:			2.11	168.80

Area-Weighted CN = total product/total area =

80

(Round to integer)

B. Postdevelopment CN

Cover Description	Soil HSG	CN from Table 1	Area (ac.)	Product of CN x Area
Building	C	98	0.32	31.36
Pavement	C	98	0.4	39.2
Green Space	C	80	1.39	111.2
Totals:			2.11	181.76

Area-Weighted CN = total product/total area =

86

(Round to integer)

C. Level of Service (LS) Calculation

		Change in CN	LS
		17+	8
Predevelopment CN:	80	7 to 16	7
		4 to 6	6
Postdevelopment CN:	86	1 to 3	5
		0	4
Difference:	6	-7 to -1	3
		-8 to -17	2
LS Required:	6	-18 to -21	1
		-22 -	0

Worksheet 2 – Develop Mitigation Package(s) That Meets the Required Level of Service

WORKSHEET 2: DEVELOP MITIGATION PACKAGE(S) THAT MEETS THE REQUIRED LS

Project: PetSuites
Location: Lee's Summit, MO

By: M. Fogarty
Date: 8/6/2020

1. Required LS (New Development, Wksht 1) or Total VR (Redevelopment, Worksheet 1)

6

Note: Various BMP's may alter CN of proposed development, and LS, recalculate both if applicable.

2. Proposed BMP Option Package No. 1

Cover/BMP Description	Treatment Area (ac)	VR from Table 4.4 or 4.6 ¹	Product of VR X Area
Vegetative Basin	1.32	6	7.92
			0.00
Total ² :	1.32	Total:	7.92
		*Weighted VR:	6.00

¹ VR calculated for final BMP only in treatment train.

² Total treatment area cannot exceed 100 percent of the actual site area.

* Blank in Redevelopment

Meets Required LS
(Yes/No)

Yes

(If no, or additional options are being tested preceed below)

Differential Runoff Table

	<u>Existing Conditions</u>	<u>Post Developed Condition (No Detention) (c.f.s.)</u>	<u>Allowable release rate (c.f.s.)</u>	<u>Post Developed Routed through Detention (c.f.s.)</u>	<u>Bypass Areas (c.f.s.)</u>	<u>Post Developed Condition Final Routing (c.f.s.)</u>	<u>Differential Runoff Post Developed to Existing</u>	<u>Increase or Reduction for Runoff from Existing to Proposed Condition</u>
1 Year WQv	0.14	0.96	N/A	0.08	0.13	0.21	0.07	Minor Increase
2 Year	3.90	6.76	1.06	0.75	1.53	2.28	-1.62	Reduction
10 Year	8.33	12.44	4.22	2.64	3.03	5.67	-2.66	Reduction
100 Year	14.76	20.17	6.33	5.37	5.13	10.50	-4.26	Reduction

Proposed Development Analysis

The proposed project will change the existing stormwater runoff by the increase of impervious area. The bypass areas have been mitigated to the maximum extent practical and the detention has accommodated for such areas. There is an overall reduction in the total runoff based on the proposed conditions as referenced in the Differential Runoff Table. The table was derived per the event tables from HydroCAD.

The proposed project will increase the impervious surface however it will reduce the runoff for the overall disturbed area per APWA 5600. This project proposes that areas that will route through the detention will meet the allowable release rate. The bypass areas consist of existing woodlands that will remain in place therefore to meet the requirements we would have to remove the existing vegetation in place.

Due to the orifice size for the WQv event designed at 1.5" the full water volume design can not be obtained unless the orifice size is reduced to 0.67". Most municipalities in the Midwest with extended detention or channel protection requirements do not allow an orifice size less than 1.5". While we have a larger orifice size than the calculations state for the 40 hour extended detention, we meet the release rate within 0.07 cfs.

Conclusions and Recommendations

Impacts to downstream sewers and streams have been mitigated to the maximum extent practical. This project provides filters via catch basin inserts and a vegetated basin for water quality which meets the KC APWA MARC Manual. This project will meet the requirements that were being set forth by the governing jurisdiction.

40 Hour Extended Detention/Channel Protection Calculations

Project: PetSuites - Lee's Summit, MO

PCE Project # 2008920

COMPUTATIONS FOR CP_v PROPOSED:

Site Acreage	Impervious Area	Percent Impervious
2.11 Ac.	0.69 Ac.	32.7 %

Impervious Areas

Pavement Area	0.36 Ac.
Roof Area	= 0.33 Ac.
Total Impervious Area	= 0.69 Ac.

Pervious Areas

Grassed Areas	= 1.42 Ac.	Soil Type	= C
Total Pervious Area	= 1.42 Ac.		

The following computational procedure follows the methodology detailed in Appendix D.11 of the Maryland Stormwater Design Manual.

1. Compute the time of concentration (tc) and the one year post-development runoff depth (Q_a) in inches.

From TR-55 T_c = 0.10 hours

2. Determine the curve number (See Hydrograph Report)

CN= 82

3. Determine the initial abstraction (I_a):

$$\begin{aligned} S &= \text{potential maximum retention after runoff begins (in)} \\ S &= (1000 \div 82.0) - 10 \\ S &= 2.20 \\ I_a &= \text{Initial abstraction} \\ I_a &= 0.2 * S & (200/CN) - 2 \\ I_a &= 0.2 * 2.20 & (200 / 82.0) - 2 \\ I_a &= 0.44 & 0.44 \end{aligned}$$

- 4 Calculate I_a/P: For this method, the value of I_a/P must be in the range of:

0.1 ≤ I_a/P ≤ 0.5. If I_a/P is less than 0.1 then set I_a/P to 0.1

If I_a/P is > 0.5, then set I_a/P to 0.5

P = Channel Protection Storm Event Depth = 1.37 "

I_a/P = 0.44 / 1.37 = 0.320 Therefore use 0.10

5. Determine Q_a (Runoff depth in watershed inches)

$$\begin{aligned} Q_a &= \frac{(P - I_a)^2}{(P - I_a) + S} \\ Q_a &= \frac{(1.37 - 0.44)^2}{(1.37 - 0.44) + 2.20} \\ Q_a &= 0.28 \text{ cfs} \end{aligned}$$

6. With T_c and I_a/P known, find the unit peak factor (q_u) using Figure D.11.1 (attached).

$$\begin{aligned} T_c &= 0.1 \\ I_a/P &= 0.10 \\ q_u &= 990 \end{aligned}$$

7. Compute the one year post-development peak discharge q_i .

$$\begin{aligned} A &= 2.11 \text{ Ac.} & A &= 0.00329688 \text{ sq. miles} \\ q_i &= (q_u) (A) (Q_a) \\ q_i &= (990) (0.003296875) (0.28) \\ q_i &= 0.90 \text{ cfs} \end{aligned}$$

8. Find q_o/q_i from MARYLAND Stormwater Design Manual Appendix D-11, Figure (Ratio of outflow to inflow)

$$\begin{aligned} q_u &= 990 \text{ csm/in} \\ T &= 24 \text{ hours} \\ \text{Peak outflow discharge/peak inflow discharge } q_o/q_i &= 0.02 \end{aligned}$$

9. Compute the peak outflow discharge

$$\begin{aligned} q_o &= q_o/q_i \times q_i \\ q_o &= (0.02) \times 0.90 \\ q_o &= 0.02 \text{ cfs} \end{aligned}$$

10. Compute V_s/V_r ; for type II rainfall distribution (Ratio of storage to runoff volume)

$$\begin{aligned} V_s/V_r &= 0.683 - 1.43 (q_o/q_i) + 1.64 (q_o/q_i)^2 - 0.804 (q_o/q_i)^3 \\ V_s/V_r &= 0.683 - 1.43 (0.02) + 1.64 (0.02)^2 - 0.804 (0.02)^3 \\ V_s/V_r &= 0.655 \end{aligned}$$

11. Compute the extended detention storage volume

$$\begin{aligned} V_s &= V_s/V_r (Q_a) (1/12) (Ac) = \text{ac-ft} \\ V_s &= 0.655 (0.28) (1/12) (2.11) = \text{ac-ft} \\ V_s &= 0.03193 \text{ ac-ft} \\ &= 1,391 \text{ cf Required} \end{aligned}$$

12. Define the CP_v Release Rate:

$$\text{Known } Q_l = 0.90 \text{ cfs}$$

$$q_o = (q_o/q_i) \quad q_i$$

$$q_o = (0.02 / 0.90) \cdot 0.90$$

$$q_o = 0.018 \text{ cfs}$$

13. Compute the Channel Protection orifice size:

$$A_o = Q / [(C * (2 \cdot g h_o^{0.5}))]$$
$$= 0.018 [4.81 * (2.50^{0.5})]$$

$$A_o = 0.0024 \text{ sf}$$

$$C = 0.60$$

$$h_o = 2.50 \text{ ft}$$

$$\pi = 3.14$$

$$D_o = [(4 * A_o / \pi)]^{0.5}$$

$$D_o = 0.0551 \text{ ft} = 0.661 \text{ in} > 1.5 \text{ in}$$

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2020-08-01 BASIN DESIGN

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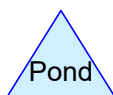
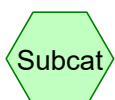
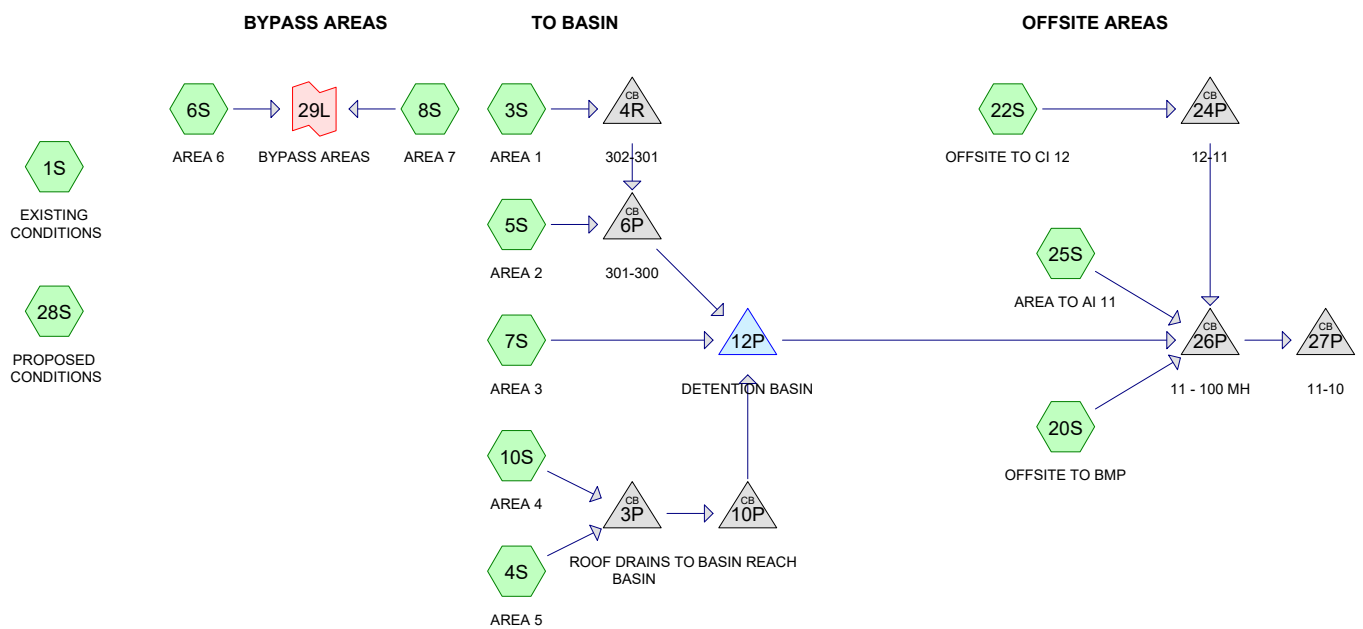
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10-Year Event

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Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
4.490	74	>75% Grass cover, Good, HSG C (1S, 3S, 4S, 5S, 6S, 7S, 8S, 25S, 28S)
0.030	74	>75% Grass cover, Good, HSG C OFFSITE TO ONSITE (5S)
1.140	98	Paved parking, HSG C (4S, 5S, 6S, 7S, 8S, 28S)
0.150	98	Paved parking, HSG D (3S)
0.330	98	Roofs, HSG C (10S)
3.340	94	Urban commercial, 85% imp, HSG C (20S, 22S)
9.480	85	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	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	3P	994.54	994.11	21.7	0.0198	0.012	6.0	0.0	0.0
2	4R	994.94	994.11	165.3	0.0050	0.012	15.0	0.0	0.0
3	6P	994.01	993.00	201.5	0.0050	0.012	12.0	0.0	0.0
4	10P	994.25	993.00	31.2	0.0401	0.012	6.0	0.0	0.0
5	12P	988.04	987.00	50.1	0.0208	0.012	18.0	0.0	0.0
6	24P	994.87	989.91	181.2	0.0274	0.013	18.0	0.0	0.0
7	26P	988.71	985.04	123.4	0.0297	0.012	18.0	0.0	0.0
8	27P	985.04	982.83	76.1	0.0290	0.012	18.0	0.0	0.0

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Type II 24-hr 1-Year WQv Rainfall=1.37"

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Time span=1.00-48.00 hrs, dt=0.05 hrs, 941 points x 2
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: EXISTING CONDITIONS

Runoff Area=2.110 ac 0.00% Impervious Runoff Depth=0.11"
 Tc=10.0 min CN=74 Runoff=0.14 cfs 0.019 af

Subcatchment 3S: AREA 1

Runoff Area=0.210 ac 71.43% Impervious Runoff Depth=0.64"
 Tc=5.0 min CN=91 Runoff=0.24 cfs 0.011 af

Subcatchment 4S: AREA 5

Runoff Area=0.100 ac 50.00% Impervious Runoff Depth=0.41"
 Tc=5.0 min CN=86 Runoff=0.07 cfs 0.003 af

Subcatchment 5S: AREA 2

Runoff Area=0.240 ac 66.67% Impervious Runoff Depth=0.58"
 Tc=5.0 min CN=90 Runoff=0.25 cfs 0.012 af

Subcatchment 6S: AREA 6

Runoff Area=0.510 ac 11.76% Impervious Runoff Depth=0.16"
 Tc=5.0 min CN=77 Runoff=0.11 cfs 0.007 af

Subcatchment 7S: AREA 3

Runoff Area=0.440 ac 36.36% Impervious Runoff Depth=0.31"
 Tc=5.0 min CN=83 Runoff=0.23 cfs 0.011 af

Subcatchment 8S: AREA 7

Runoff Area=0.070 ac 28.57% Impervious Runoff Depth=0.25"
 Tc=5.0 min CN=81 Runoff=0.03 cfs 0.001 af

Subcatchment 10S: AREA 4

Runoff Area=0.330 ac 100.00% Impervious Runoff Depth=1.15"
 Tc=5.0 min CN=98 Runoff=0.62 cfs 0.032 af

Subcatchment 20S: OFFSITE TO BMP

Runoff Area=1.170 ac 85.00% Impervious Runoff Depth=0.82"
 Tc=30.0 min CN=94 Runoff=0.83 cfs 0.080 af

Subcatchment 22S: OFFSITE TO CI 12

Runoff Area=2.170 ac 85.00% Impervious Runoff Depth=0.82"
 Tc=20.0 min CN=94 Runoff=1.97 cfs 0.148 af

Subcatchment 25S: AREA TO AI 11

Runoff Area=0.020 ac 0.00% Impervious Runoff Depth=0.11"
 Tc=5.0 min CN=74 Runoff=0.00 cfs 0.000 af

Subcatchment 28S: PROPOSED CONDITIONS

Runoff Area=2.110 ac 32.70% Impervious Runoff Depth=0.28"
 Tc=5.0 min CN=82 Runoff=0.96 cfs 0.049 af

Pond 3P: ROOF DRAINS TO BASIN

Peak Elev=995.28' Inflow=0.69 cfs 0.035 af
 6.0" Round Culvert n=0.012 L=21.7' S=0.0198 '/' Outflow=0.69 cfs 0.035 af

Pond 4R: 302-301

Peak Elev=995.20' Inflow=0.24 cfs 0.011 af
 15.0" Round Culvert n=0.012 L=165.3' S=0.0050 '/' Outflow=0.24 cfs 0.011 af

Pond 6P: 301-300

Peak Elev=994.45' Inflow=0.49 cfs 0.023 af
 12.0" Round Culvert n=0.012 L=201.5' S=0.0050 '/' Outflow=0.49 cfs 0.023 af

Pond 10P: BASIN REACH

Peak Elev=994.79' Inflow=0.69 cfs 0.035 af
 6.0" Round Culvert n=0.012 L=31.2' S=0.0401 '/' Outflow=0.69 cfs 0.035 af

Pond 12P: DETENTION BASIN

Peak Elev=994.14' Storage=1,296 cf Inflow=1.40 cfs 0.069 af
 Outflow=0.08 cfs 0.069 af

Pond 24P: 12-11

Peak Elev=995.51' Inflow=1.97 cfs 0.148 af
 18.0" Round Culvert n=0.013 L=181.2' S=0.0274 '/' Outflow=1.97 cfs 0.148 af

Pond 26P: 11 - 100 MH

Peak Elev=989.40' Inflow=2.77 cfs 0.298 af
 18.0" Round Culvert n=0.012 L=123.4' S=0.0297 '/' Outflow=2.77 cfs 0.298 af

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Type II 24-hr 1-Year WQv Rainfall=1.37"

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Pond 27P: 11-10

Peak Elev=985.73' Inflow=2.77 cfs 0.298 af
18.0" Round Culvert n=0.012 L=76.1' S=0.0290 '/' Outflow=2.77 cfs 0.298 af

Link 29L: BYPASS AREAS

Inflow=0.13 cfs 0.008 af
Primary=0.13 cfs 0.008 af

Total Runoff Area = 9.480 ac Runoff Volume = 0.373 af Average Runoff Depth = 0.47"
52.96% Pervious = 5.021 ac 47.04% Impervious = 4.459 ac

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Type II 24-hr 1-Year WQv Rainfall=1.37"

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Summary for Subcatchment 1S: EXISTING CONDITIONS

Runoff = 0.14 cfs @ 12.07 hrs, Volume= 0.019 af, Depth= 0.11"

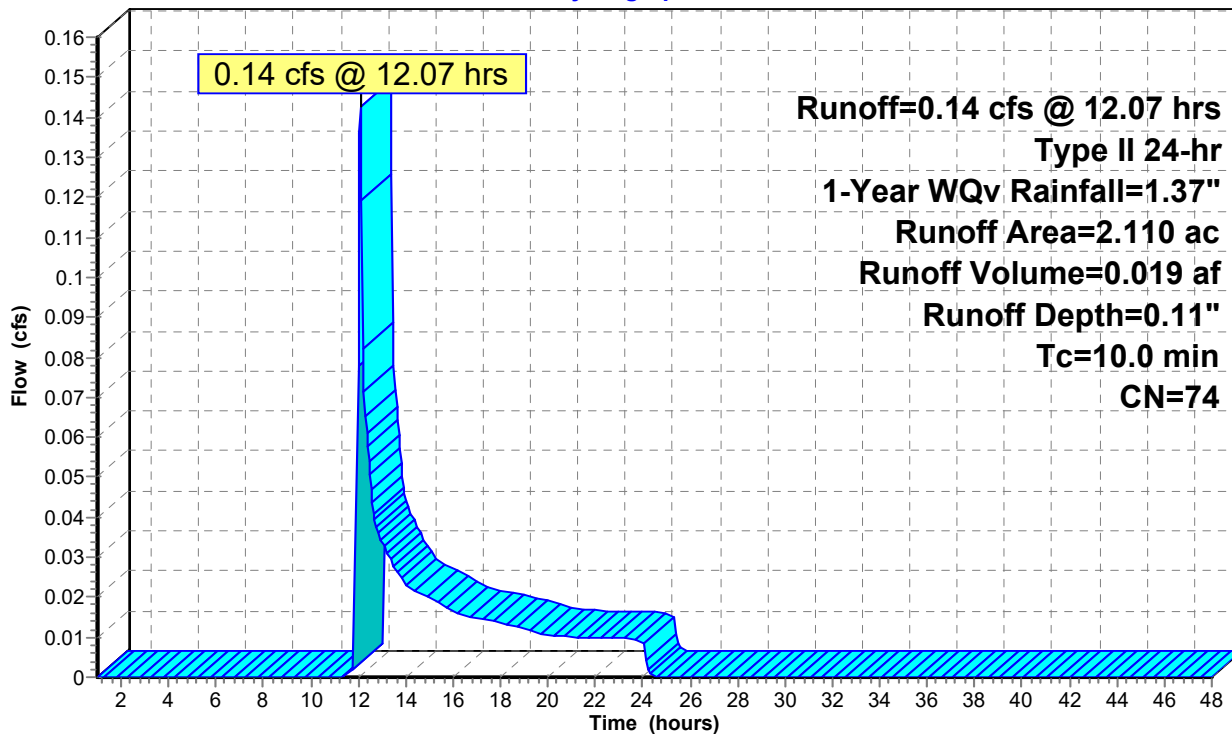
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 1-Year WQv Rainfall=1.37"

Area (ac)	CN	Description
2.110	74	>75% Grass cover, Good, HSG C
2.110		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry, Assumed TC of 10 Minutes used for Pre-Developed Condition

Subcatchment 1S: EXISTING CONDITIONS

Hydrograph



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Type II 24-hr 1-Year WQv Rainfall=1.37"

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Summary for Subcatchment 3S: AREA 1[49] Hint: $T_c < 2dt$ may require smaller dt

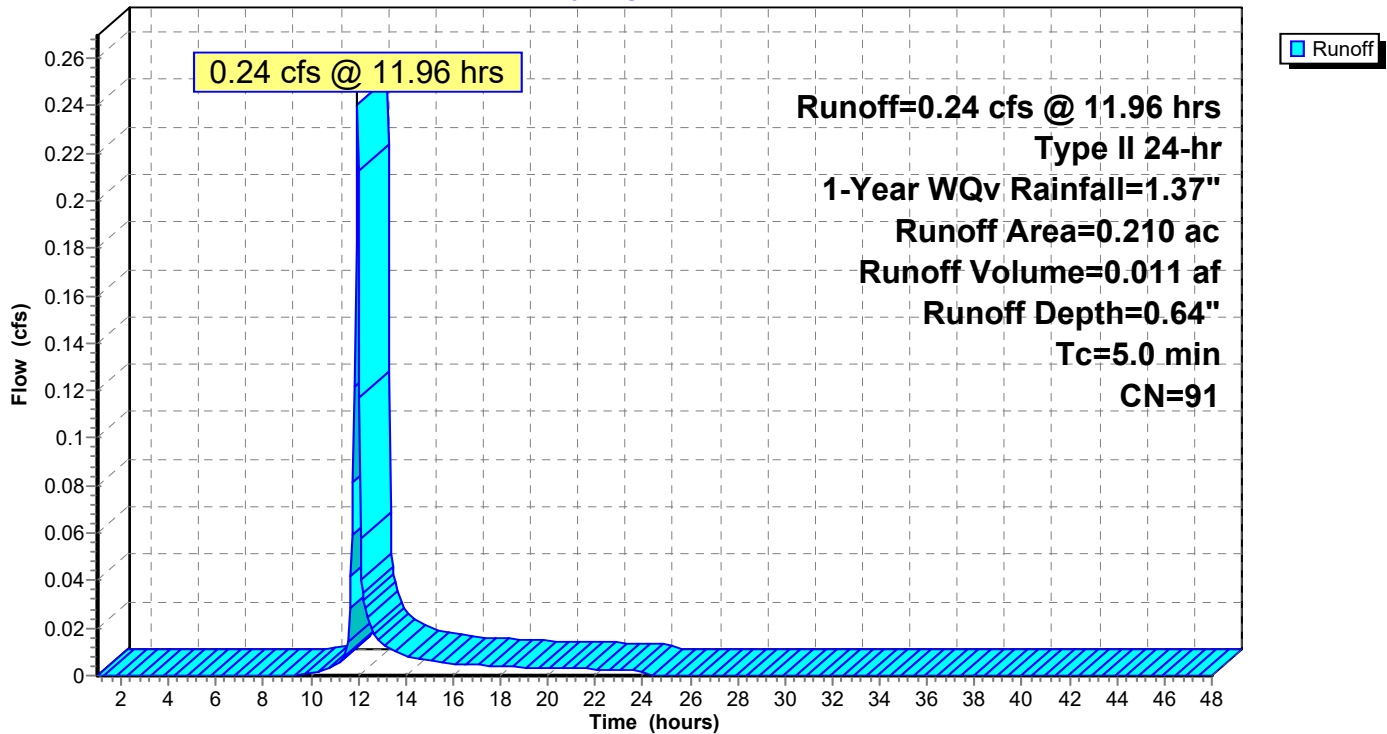
Runoff = 0.24 cfs @ 11.96 hrs, Volume= 0.011 af, Depth= 0.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, $dt=0.05$ hrs

Type II 24-hr 1-Year WQv Rainfall=1.37"

Area (ac)	CN	Description
0.150	98	Paved parking, HSG D
0.060	74	>75% Grass cover, Good, HSG C
0.210	91	Weighted Average
0.060		28.57% Pervious Area
0.150		71.43% Impervious Area

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

Subcatchment 3S: AREA 1**Hydrograph**

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Type II 24-hr 1-Year WQv Rainfall=1.37"

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Summary for Subcatchment 4S: AREA 5

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.07 cfs @ 11.97 hrs, Volume= 0.003 af, Depth= 0.41"

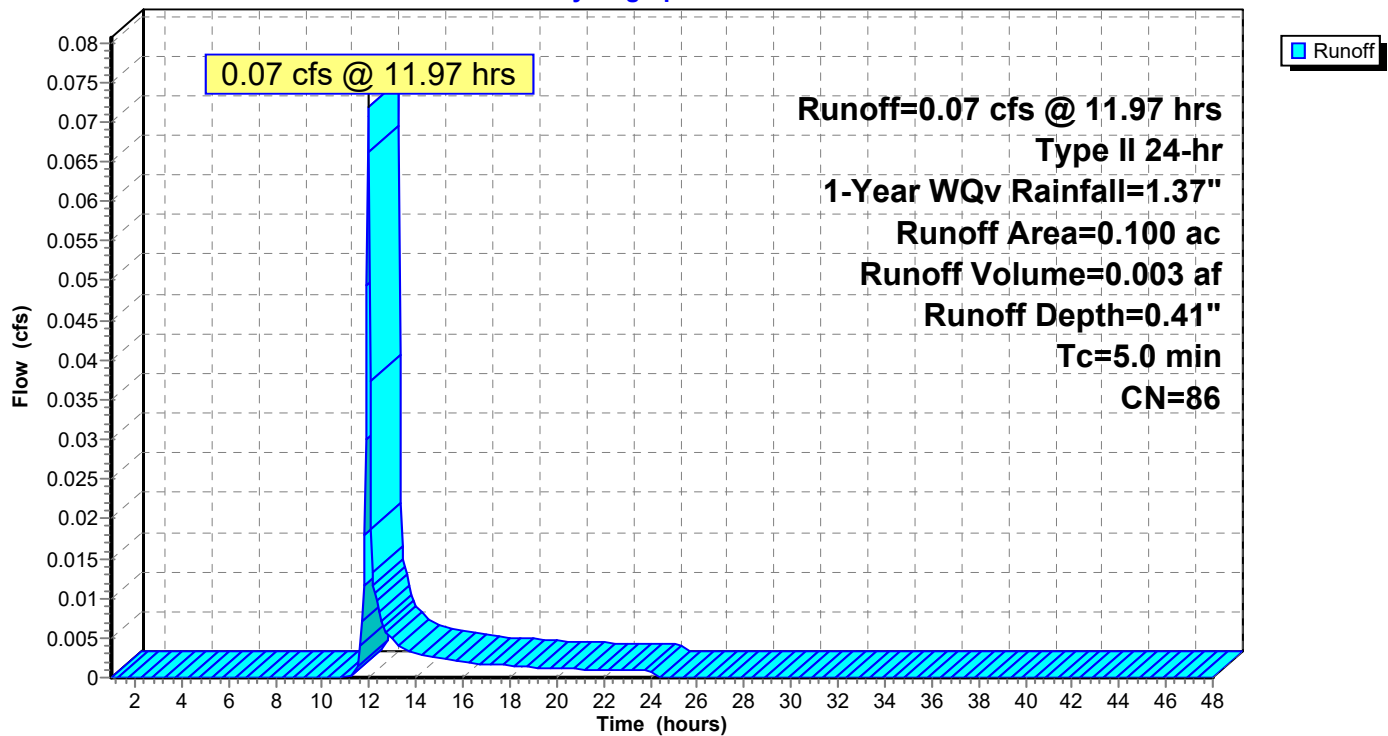
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, $dt=0.05$ hrs
Type II 24-hr 1-Year WQv Rainfall=1.37"

Area (ac)	CN	Description
0.050	98	Paved parking, HSG C
0.050	74	>75% Grass cover, Good, HSG C
0.100	86	Weighted Average
0.050		50.00% Pervious Area
0.050		50.00% Impervious Area

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

Subcatchment 4S: AREA 5

Hydrograph



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Type II 24-hr 1-Year WQv Rainfall=1.37"

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Summary for Subcatchment 5S: AREA 2

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.25 cfs @ 11.96 hrs, Volume= 0.012 af, Depth= 0.58"

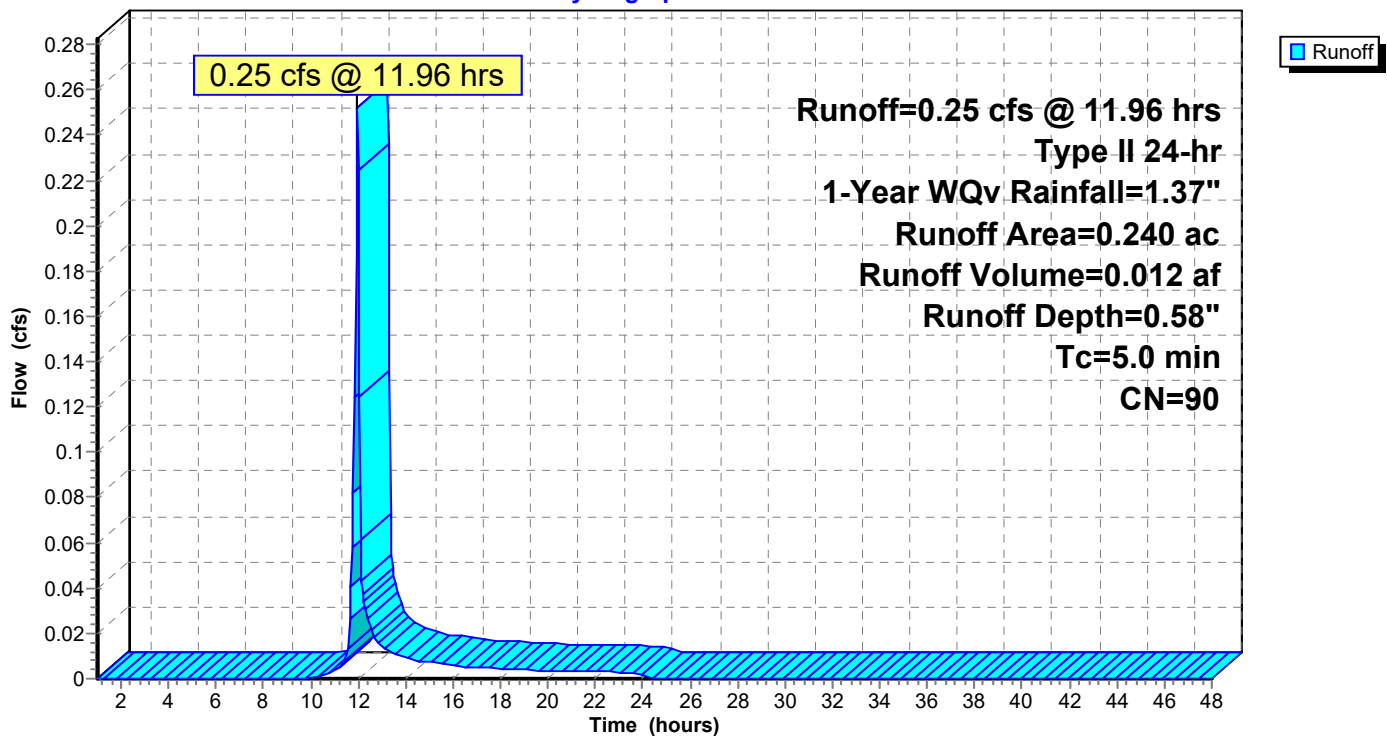
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, $dt=0.05$ hrs
Type II 24-hr 1-Year WQv Rainfall=1.37"

Area (ac)	CN	Description
0.160	98	Paved parking, HSG C
0.050	74	>75% Grass cover, Good, HSG C
* 0.030	74	>75% Grass cover, Good, HSG C OFFSITE TO ONSITE
0.240	90	Weighted Average
0.080		33.33% Pervious Area
0.160		66.67% Impervious Area

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

Subcatchment 5S: AREA 2

Hydrograph



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Type II 24-hr 1-Year WQv Rainfall=1.37"

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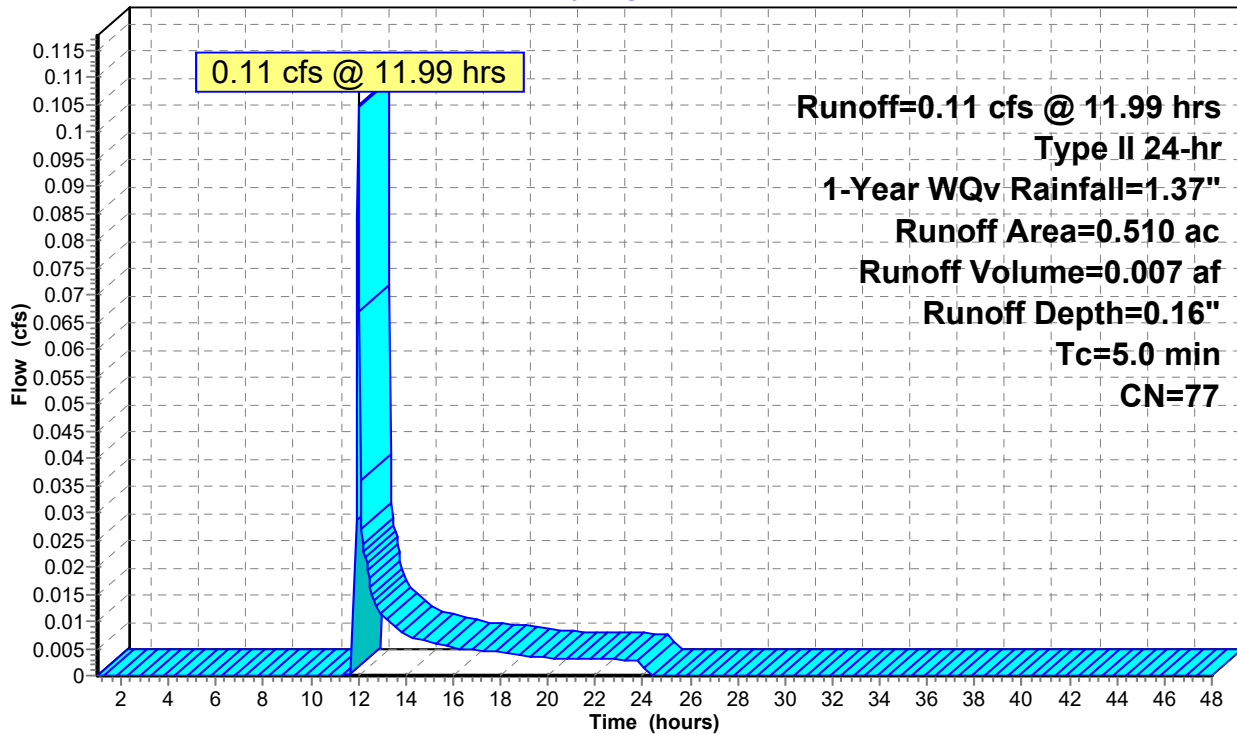
Summary for Subcatchment 6S: AREA 6[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.11 cfs @ 11.99 hrs, Volume= 0.007 af, Depth= 0.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, $dt=0.05$ hrs
Type II 24-hr 1-Year WQv Rainfall=1.37"

Area (ac)	CN	Description
0.060	98	Paved parking, HSG C
0.450	74	>75% Grass cover, Good, HSG C
0.510	77	Weighted Average
0.450		88.24% Pervious Area
0.060		11.76% Impervious Area

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

Subcatchment 6S: AREA 6**Hydrograph**

Runoff

Summary for Subcatchment 7S: AREA 3

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.23 cfs @ 11.97 hrs, Volume= 0.011 af, Depth= 0.31"

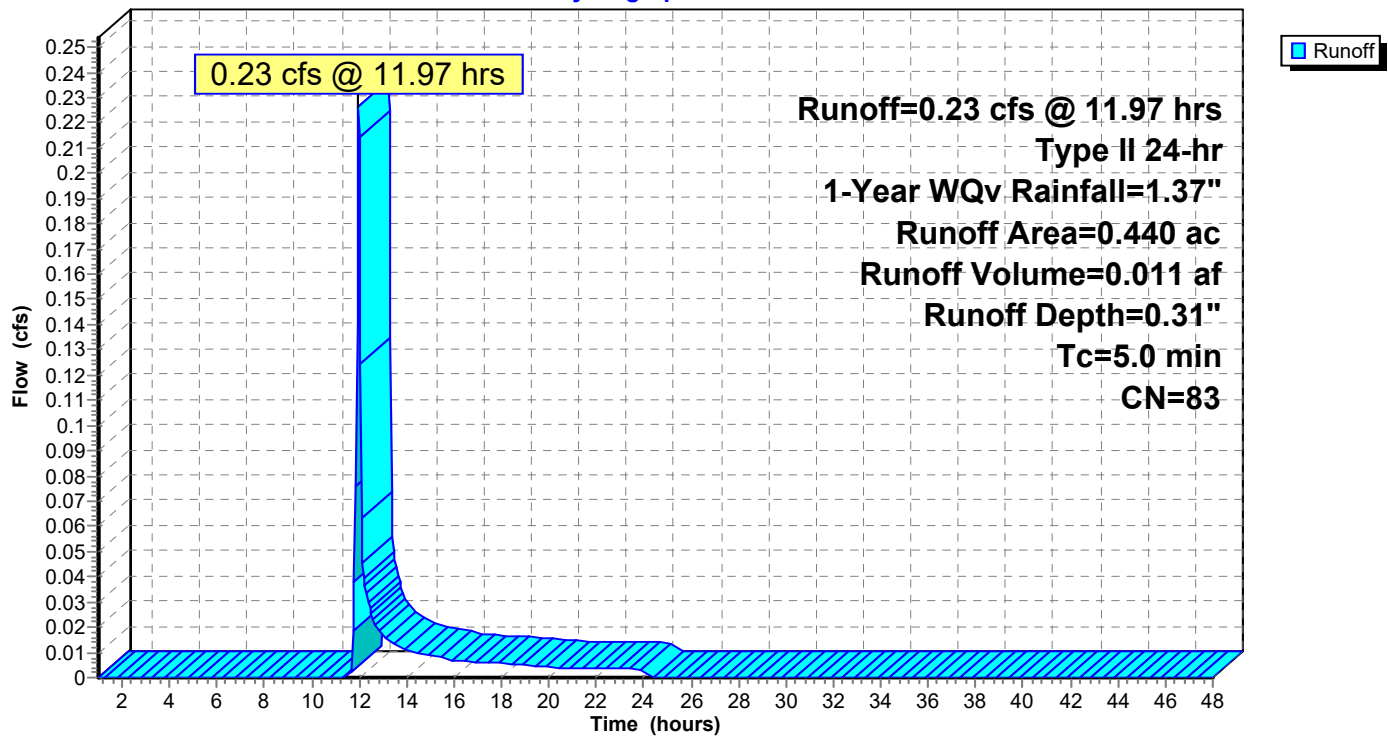
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, $dt=0.05$ hrs
Type II 24-hr 1-Year WQv Rainfall=1.37"

Area (ac)	CN	Description
0.160	98	Paved parking, HSG C
0.280	74	>75% Grass cover, Good, HSG C
0.440	83	Weighted Average
0.280		63.64% Pervious Area
0.160		36.36% Impervious Area

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

Subcatchment 7S: AREA 3

Hydrograph



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Type II 24-hr 1-Year WQv Rainfall=1.37"

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Summary for Subcatchment 8S: AREA 7

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.03 cfs @ 11.98 hrs, Volume= 0.001 af, Depth= 0.25"

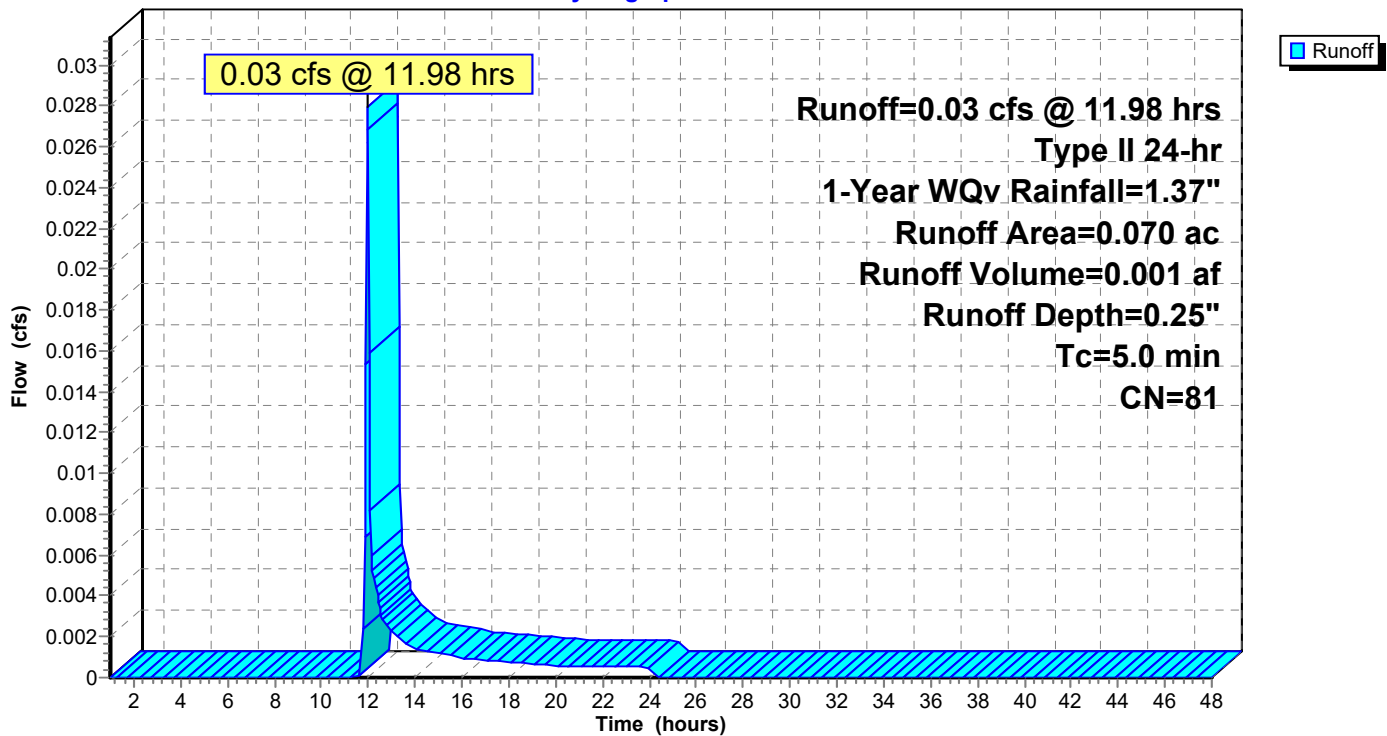
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, $dt=0.05$ hrs
Type II 24-hr 1-Year WQv Rainfall=1.37"

Area (ac)	CN	Description
0.020	98	Paved parking, HSG C
0.050	74	>75% Grass cover, Good, HSG C
0.070	81	Weighted Average
0.050		71.43% Pervious Area
0.020		28.57% Impervious Area

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

Subcatchment 8S: AREA 7

Hydrograph



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Type II 24-hr 1-Year WQv Rainfall=1.37"

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Summary for Subcatchment 10S: AREA 4

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.62 cfs @ 11.95 hrs, Volume= 0.032 af, Depth= 1.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, $dt=0.05$ hrs

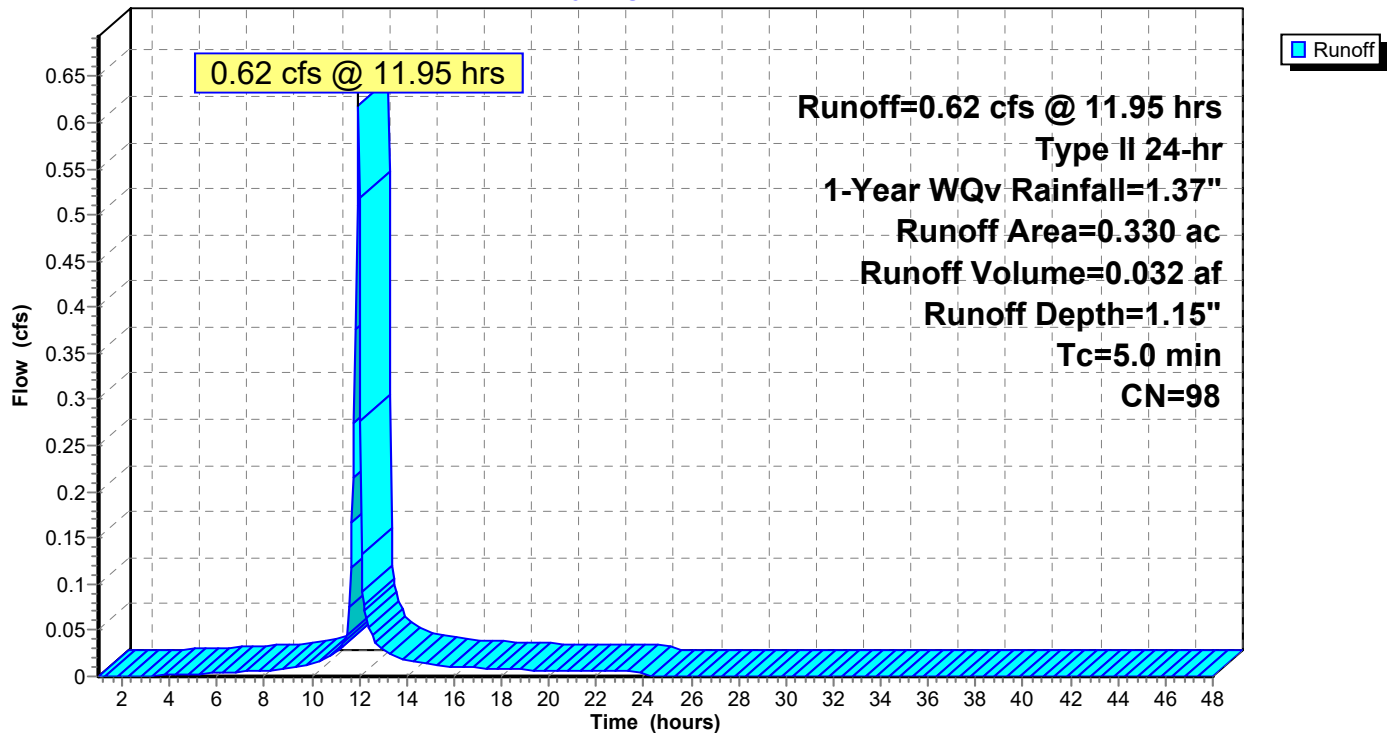
Type II 24-hr 1-Year WQv Rainfall=1.37"

Area (ac)	CN	Description
0.330	98	Roofs, HSG C
0.330		100.00% Impervious Area

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

Subcatchment 10S: AREA 4

Hydrograph



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Type II 24-hr 1-Year WQv Rainfall=1.37"

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Summary for Subcatchment 20S: OFFSITE TO BMP

Runoff = 0.83 cfs @ 12.24 hrs, Volume= 0.080 af, Depth= 0.82"

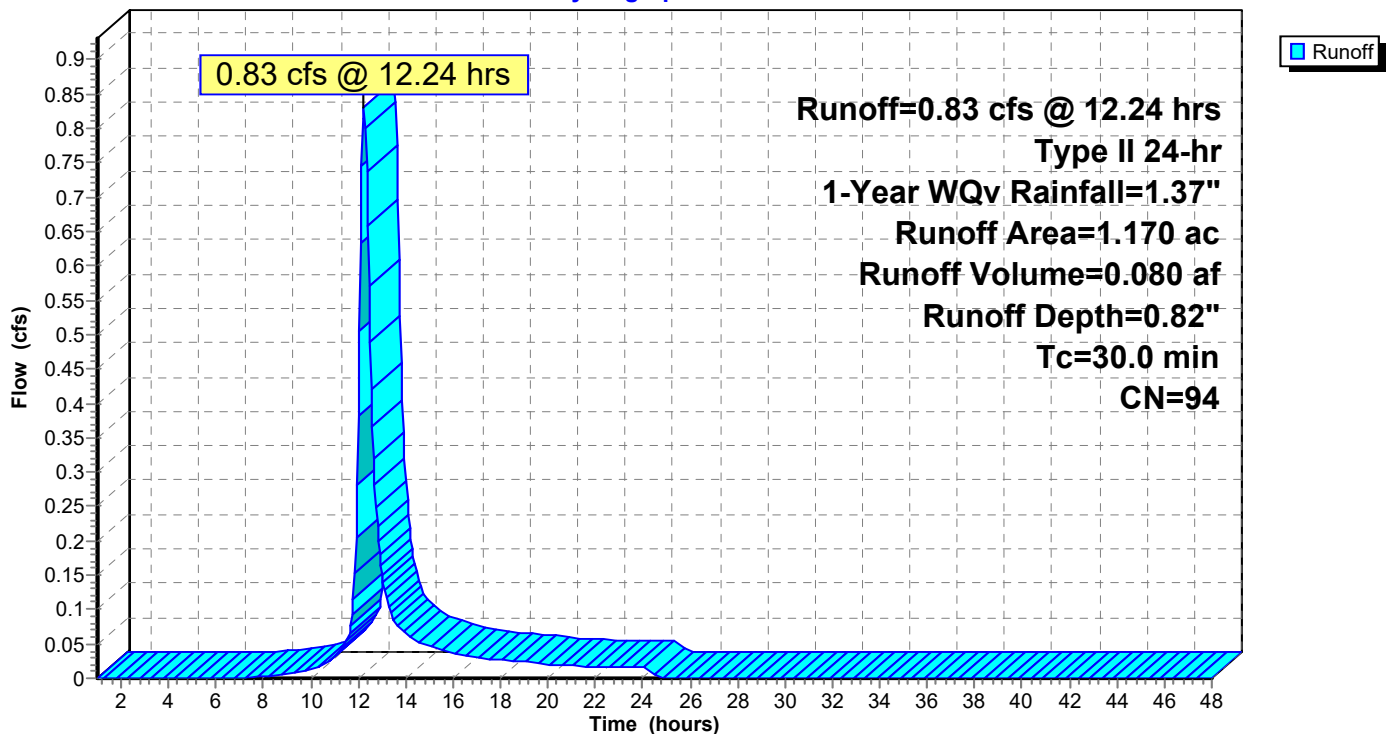
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 1-Year WQv Rainfall=1.37"

Area (ac)	CN	Description
1.170	94	Urban commercial, 85% imp, HSG C
0.175		15.00% Pervious Area
0.994		85.00% Impervious Area

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

Subcatchment 20S: OFFSITE TO BMP

Hydrograph



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Type II 24-hr 1-Year WQv Rainfall=1.37"

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Summary for Subcatchment 22S: OFFSITE TO CI 12

Runoff = 1.97 cfs @ 12.13 hrs, Volume= 0.148 af, Depth= 0.82"

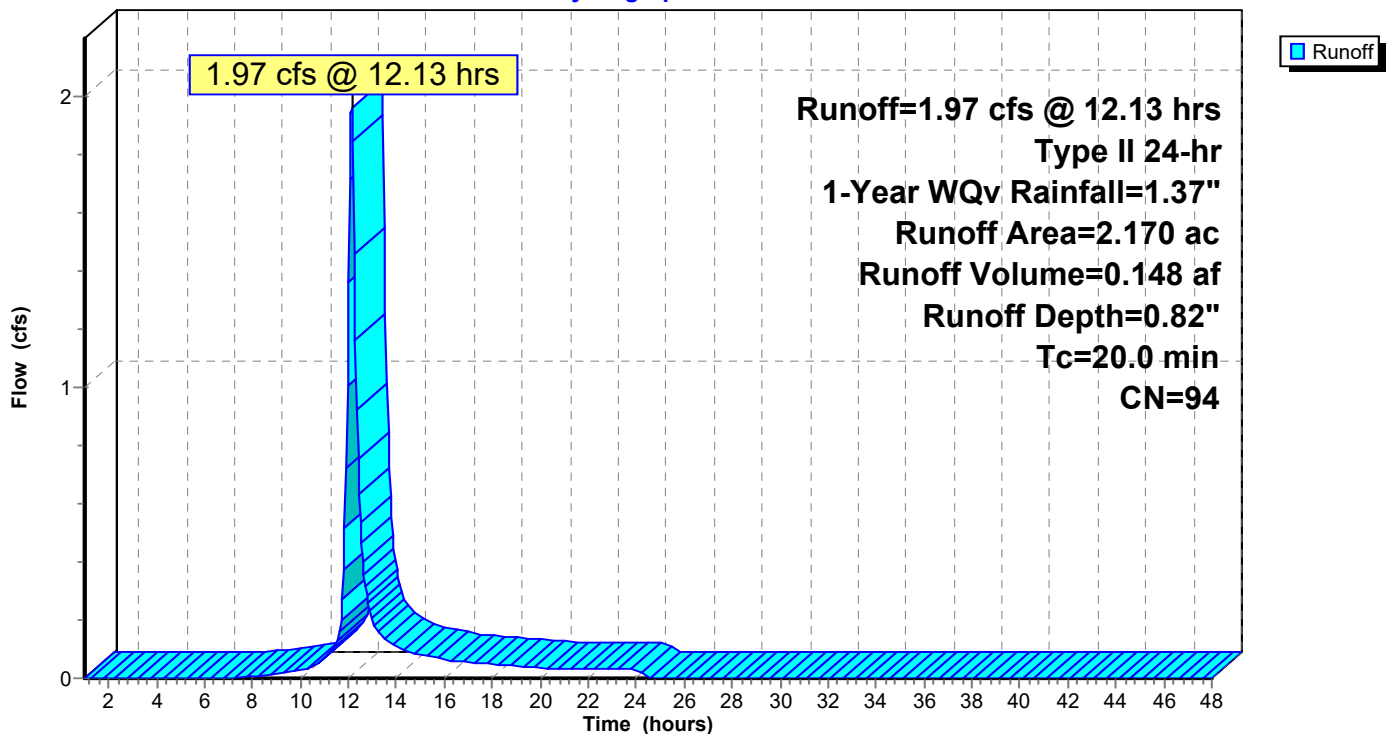
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 1-Year WQv Rainfall=1.37"

Area (ac)	CN	Description
2.170	94	Urban commercial, 85% imp, HSG C
0.325		15.00% Pervious Area
1.844		85.00% Impervious Area

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

Subcatchment 22S: OFFSITE TO CI 12

Hydrograph



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Type II 24-hr 1-Year WQv Rainfall=1.37"

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Summary for Subcatchment 25S: AREA TO AI 11

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.00 cfs @ 12.01 hrs, Volume= 0.000 af, Depth= 0.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, $dt=0.05$ hrs

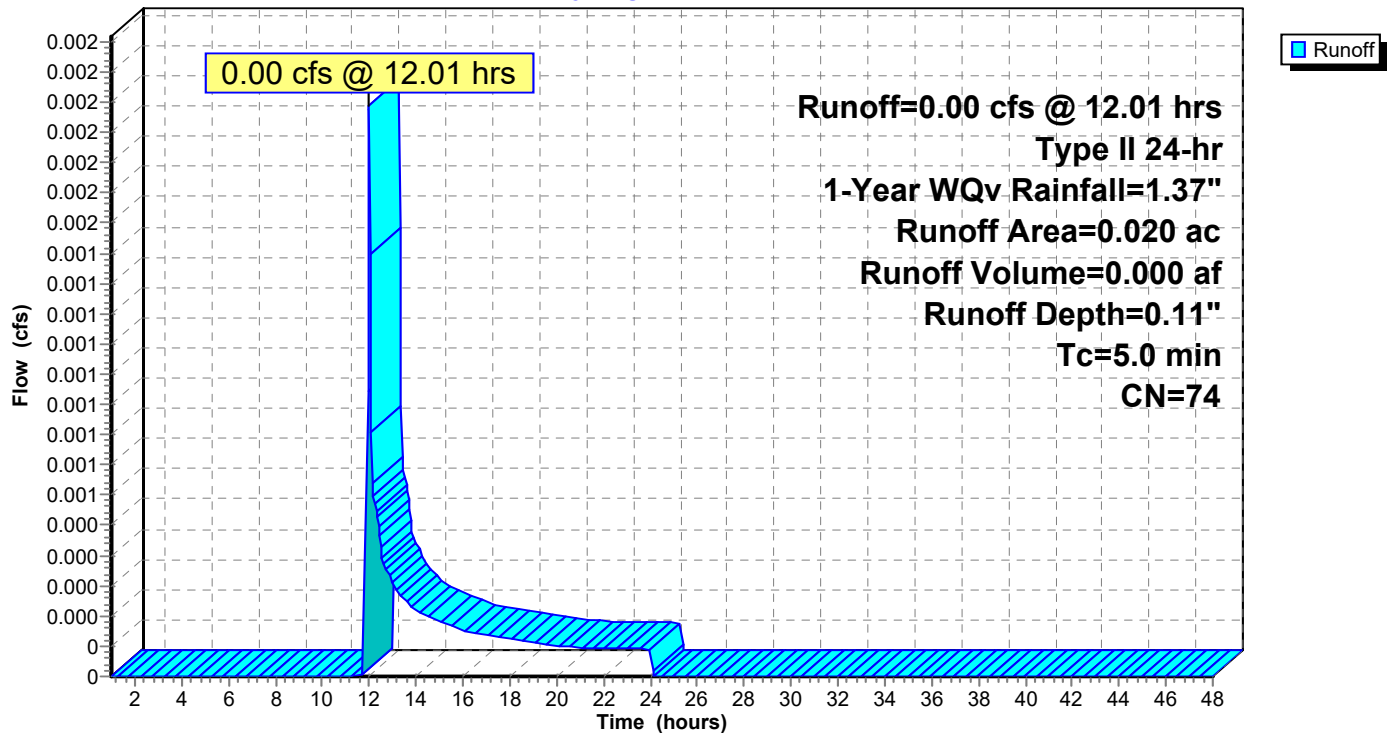
Type II 24-hr 1-Year WQv Rainfall=1.37"

Area (ac)	CN	Description
0.020	74	>75% Grass cover, Good, HSG C
0.020		100.00% Pervious Area

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

Subcatchment 25S: AREA TO AI 11

Hydrograph



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Type II 24-hr 1-Year WQv Rainfall=1.37"

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Summary for Subcatchment 28S: PROPOSED CONDITIONS

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.96 cfs @ 11.98 hrs, Volume= 0.049 af, Depth= 0.28"

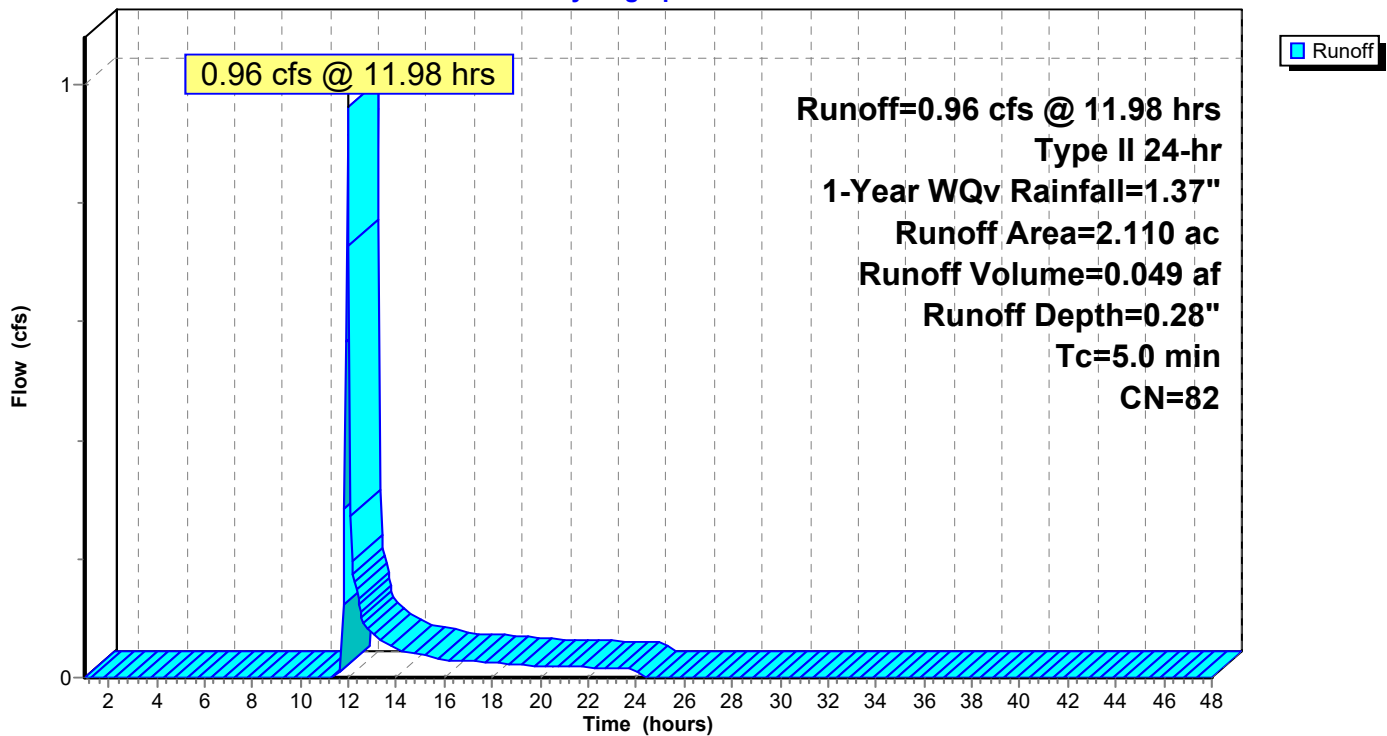
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, $dt=0.05$ hrs
Type II 24-hr 1-Year WQv Rainfall=1.37"

Area (ac)	CN	Description
0.690	98	Paved parking, HSG C
1.420	74	>75% Grass cover, Good, HSG C
2.110	82	Weighted Average
1.420		67.30% Pervious Area
0.690		32.70% Impervious Area

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

Subcatchment 28S: PROPOSED CONDITIONS

Hydrograph



Summary for Pond 3P: ROOF DRAINS TO BASIN

Inflow Area = 0.430 ac, 88.37% Impervious, Inflow Depth = 0.98" for 1-Year WQv event
 Inflow = 0.69 cfs @ 11.95 hrs, Volume= 0.035 af
 Outflow = 0.69 cfs @ 11.95 hrs, Volume= 0.035 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.69 cfs @ 11.95 hrs, Volume= 0.035 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs / 2

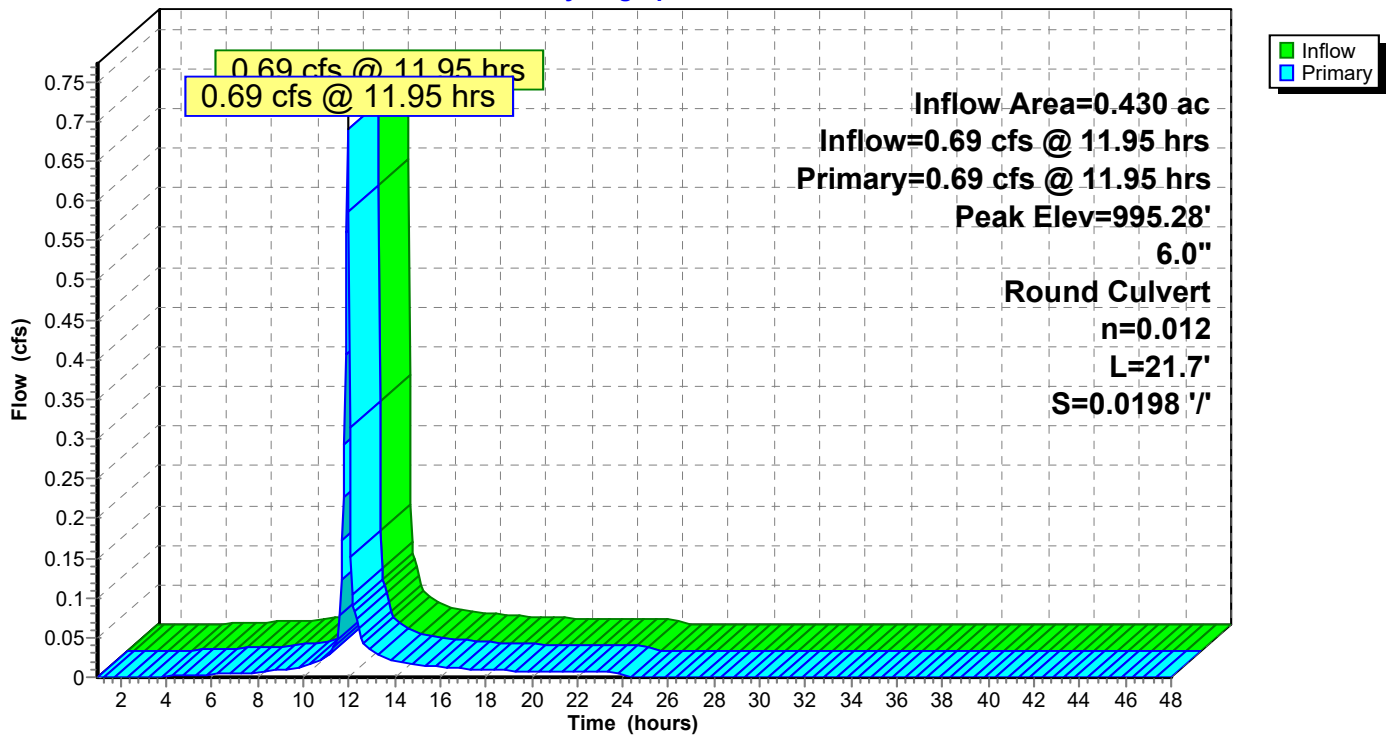
Peak Elev= 995.28' @ 11.95 hrs

Flood Elev= 1,000.93'

Device	Routing	Invert	Outlet Devices
#1	Primary	994.54'	6.0" Round Culvert L= 21.7' RCP, rounded edge headwall, Ke= 0.100 Inlet / Outlet Invert= 994.54' / 994.11' S= 0.0198 '/ Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.20 sf

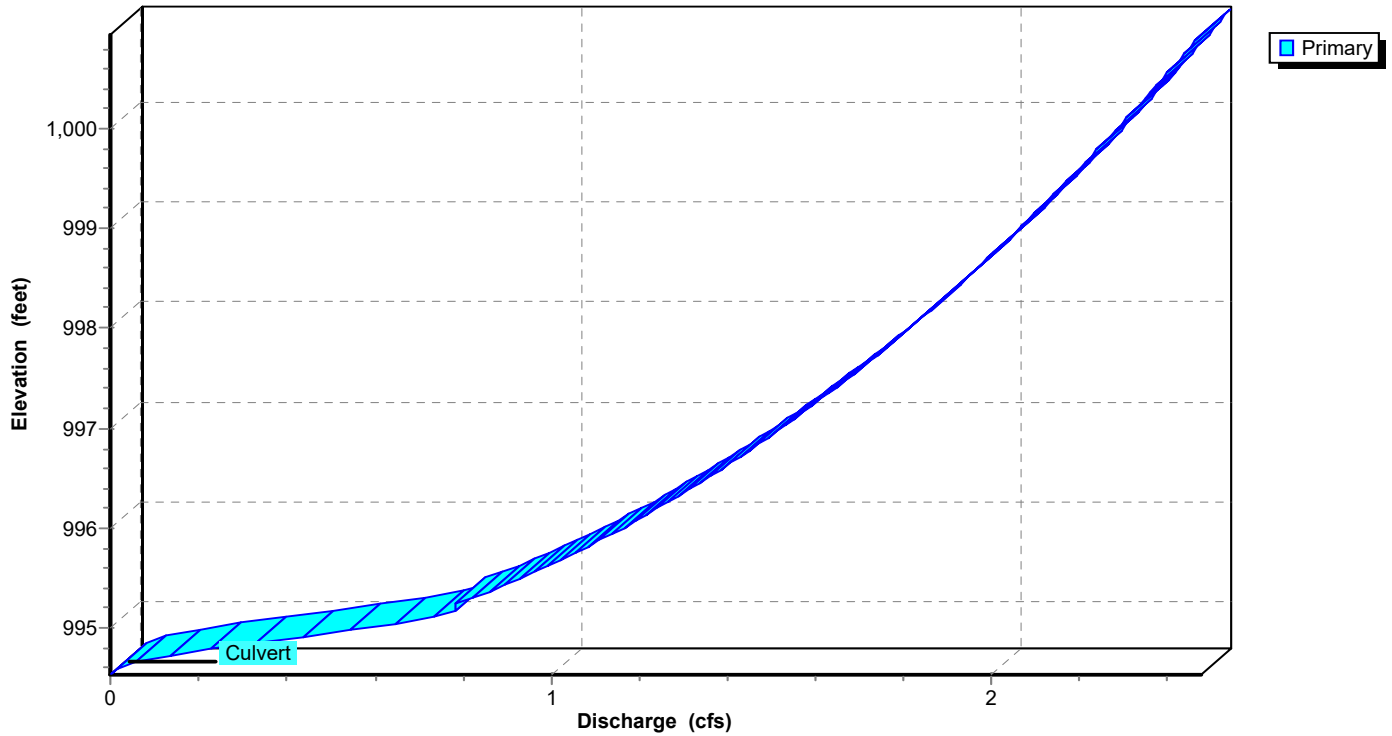
Primary OutFlow Max=0.69 cfs @ 11.95 hrs HW=995.27' TW=994.78' (Dynamic Tailwater)

1=Culvert (Outlet Controls 0.69 cfs @ 3.49 fps)

Pond 3P: ROOF DRAINS TO BASIN**Hydrograph**

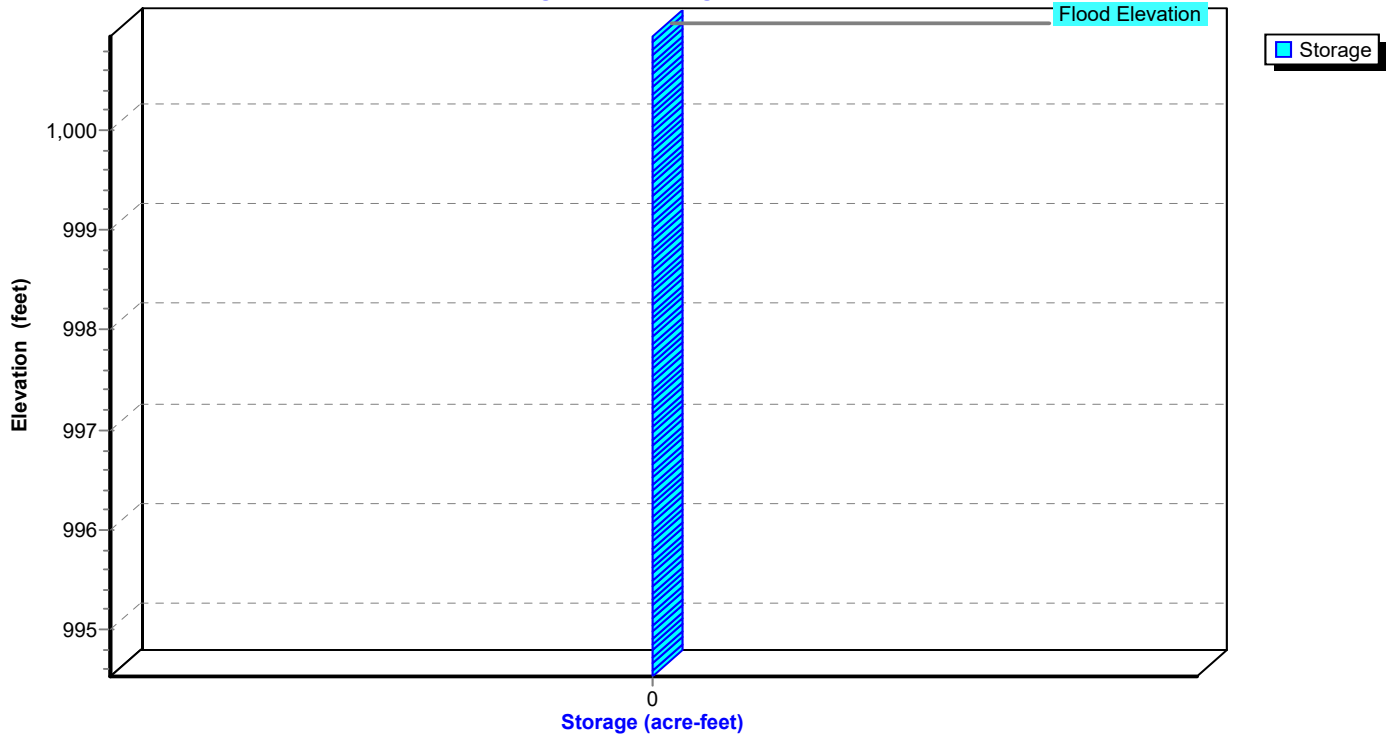
Pond 3P: ROOF DRAINS TO BASIN

Stage-Discharge



Pond 3P: ROOF DRAINS TO BASIN

Stage-Area-Storage



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Type II 24-hr 1-Year WQv Rainfall=1.37"

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Summary for Pond 4R: 302-301

[58] Hint: Peaked 0.26' above defined flood level

Inflow Area = 0.210 ac, 71.43% Impervious, Inflow Depth = 0.64" for 1-Year WQv event
Inflow = 0.24 cfs @ 11.96 hrs, Volume= 0.011 af
Outflow = 0.24 cfs @ 11.96 hrs, Volume= 0.011 af, Atten= 0%, Lag= 0.0 min
Primary = 0.24 cfs @ 11.96 hrs, Volume= 0.011 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs / 2

Peak Elev= 995.20' @ 11.96 hrs

Flood Elev= 994.94'

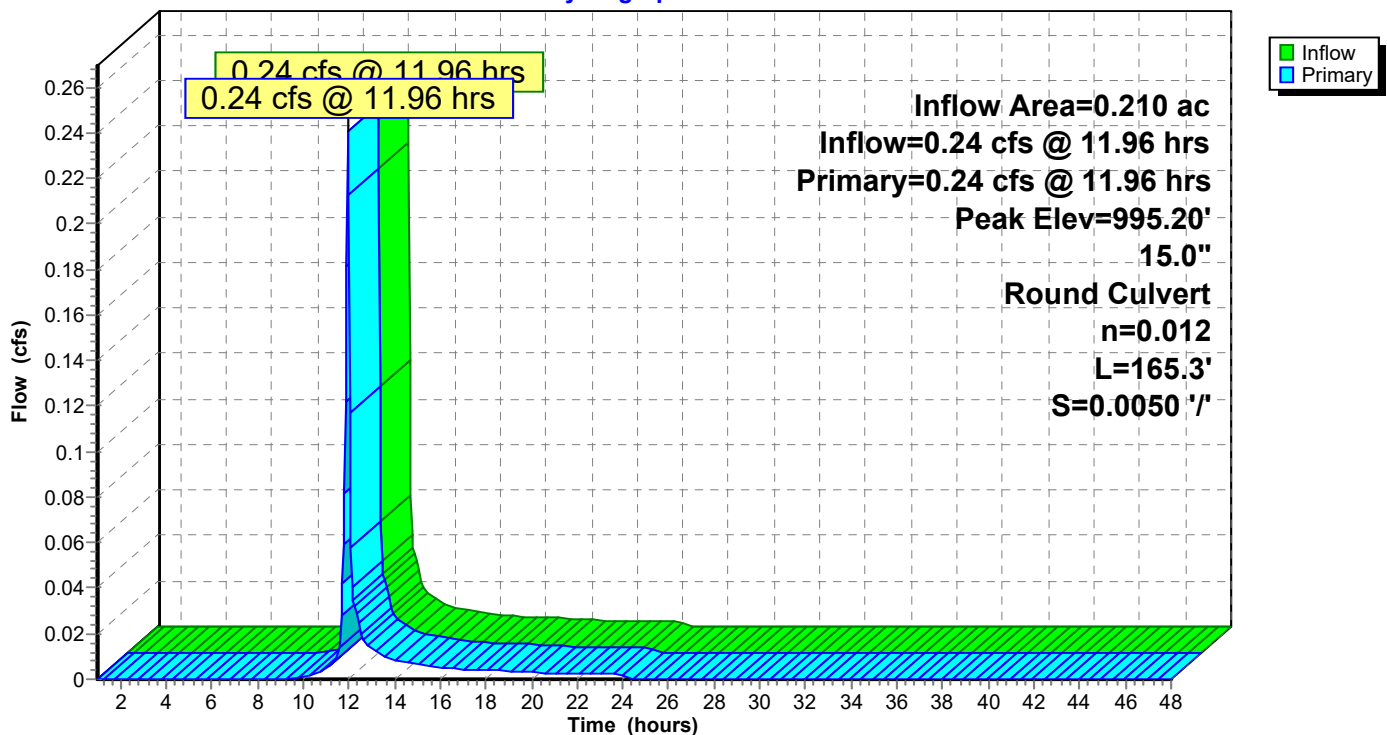
Device	Routing	Invert	Outlet Devices
#1	Primary	994.94'	15.0" Round Culvert L= 165.3' RCP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 994.94' / 994.11' S= 0.0050 '/ Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=0.23 cfs @ 11.96 hrs HW=995.20' TW=994.44' (Dynamic Tailwater)

↑ **1=Culvert** (Outlet Controls 0.23 cfs @ 1.90 fps)

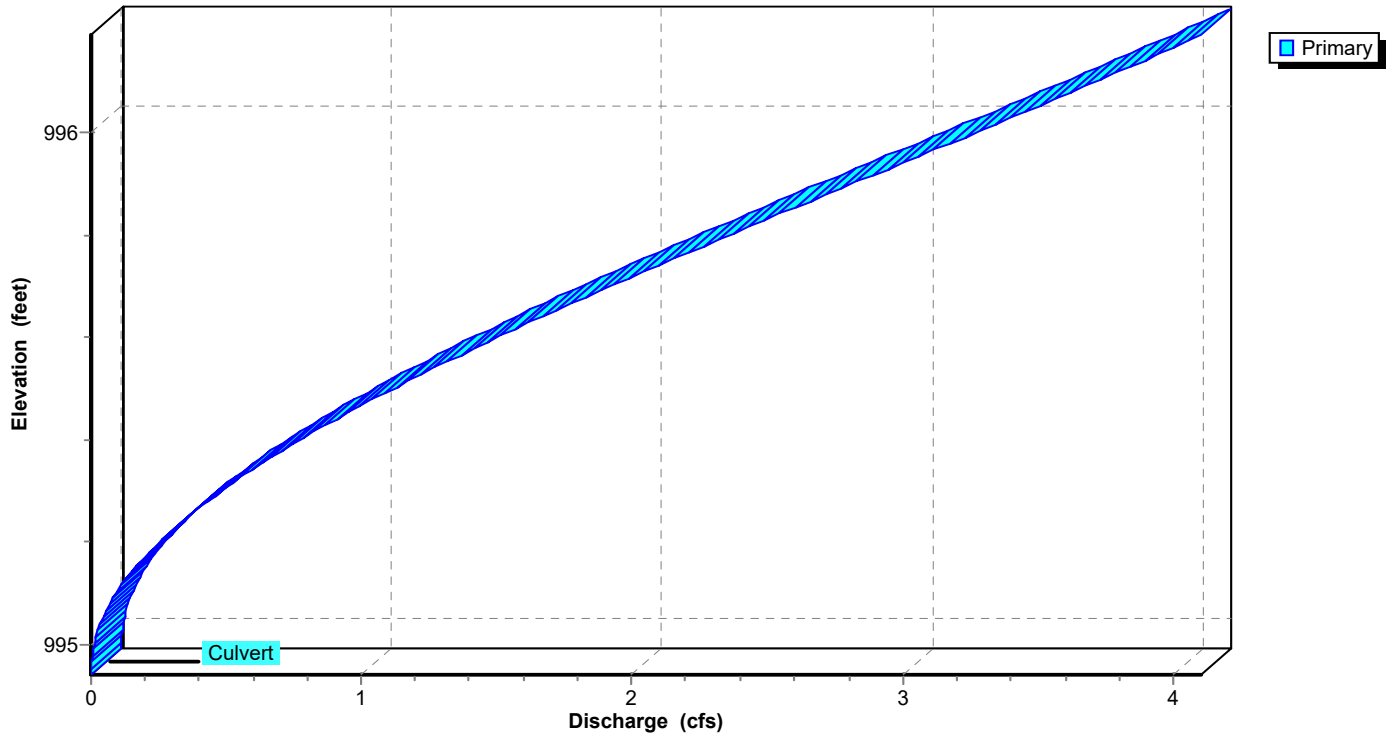
Pond 4R: 302-301

Hydrograph



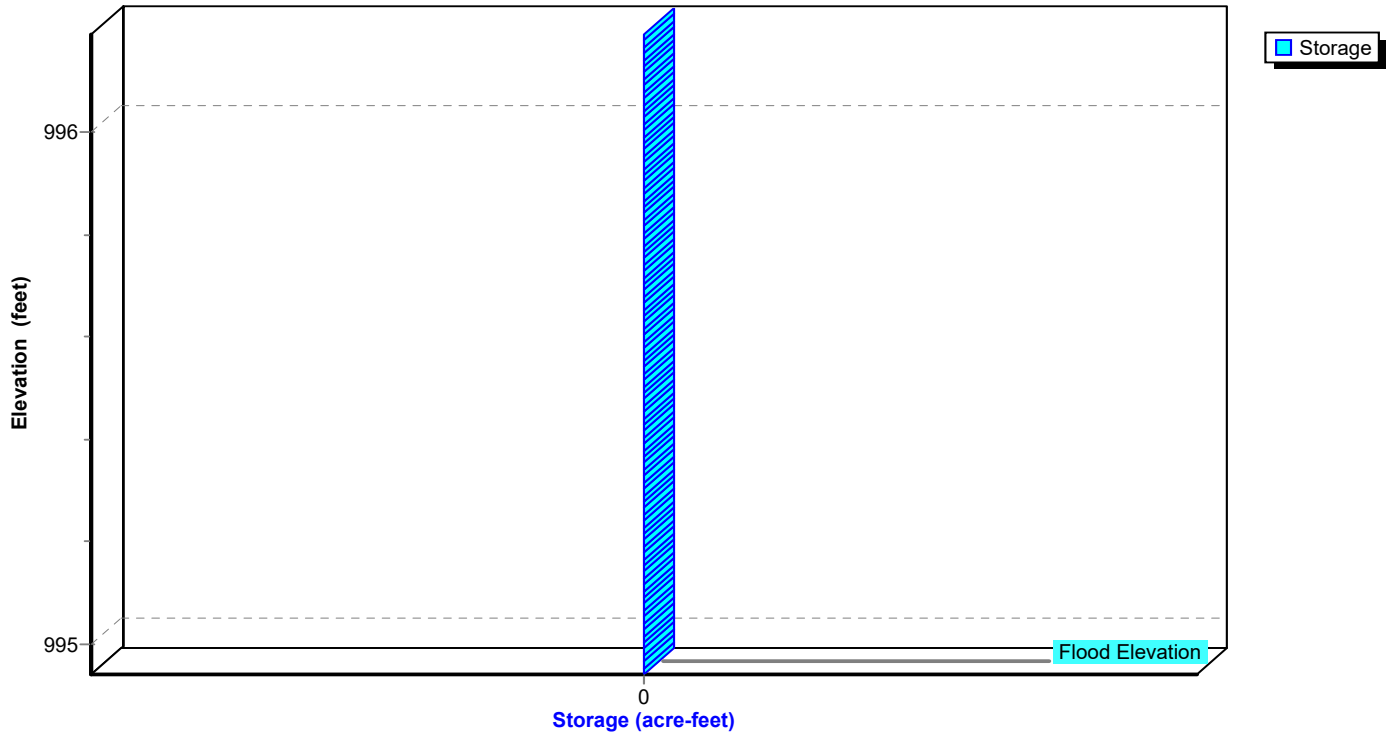
Pond 4R: 302-301

Stage-Discharge



Pond 4R: 302-301

Stage-Area-Storage



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Type II 24-hr 1-Year WQv Rainfall=1.37"

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Summary for Pond 6P: 301-300

Inflow Area = 0.450 ac, 68.89% Impervious, Inflow Depth = 0.61" for 1-Year WQv event
Inflow = 0.49 cfs @ 11.96 hrs, Volume= 0.023 af
Outflow = 0.49 cfs @ 11.96 hrs, Volume= 0.023 af, Atten= 0%, Lag= 0.0 min
Primary = 0.49 cfs @ 11.96 hrs, Volume= 0.023 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs / 2

Peak Elev= 994.45' @ 11.98 hrs

Flood Elev= 998.82'

Device	Routing	Invert	Outlet Devices
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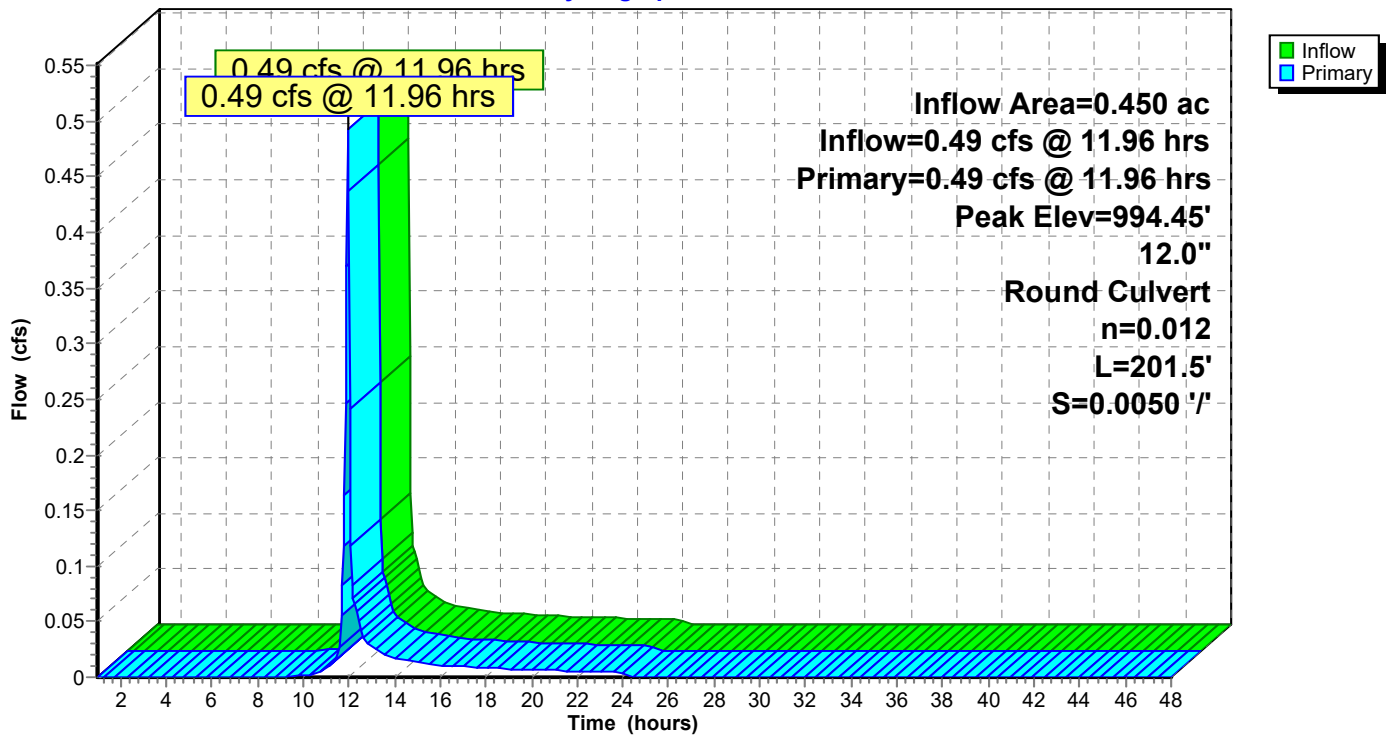
#1	Primary	994.01'	12.0" Round 202-201 L= 201.5' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 994.01' / 993.00' S= 0.0050 '/ Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf
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Primary OutFlow Max=0.48 cfs @ 11.96 hrs HW=994.44' TW=993.68' (Dynamic Tailwater)

↑**1=202-201** (Outlet Controls 0.48 cfs @ 2.22 fps)

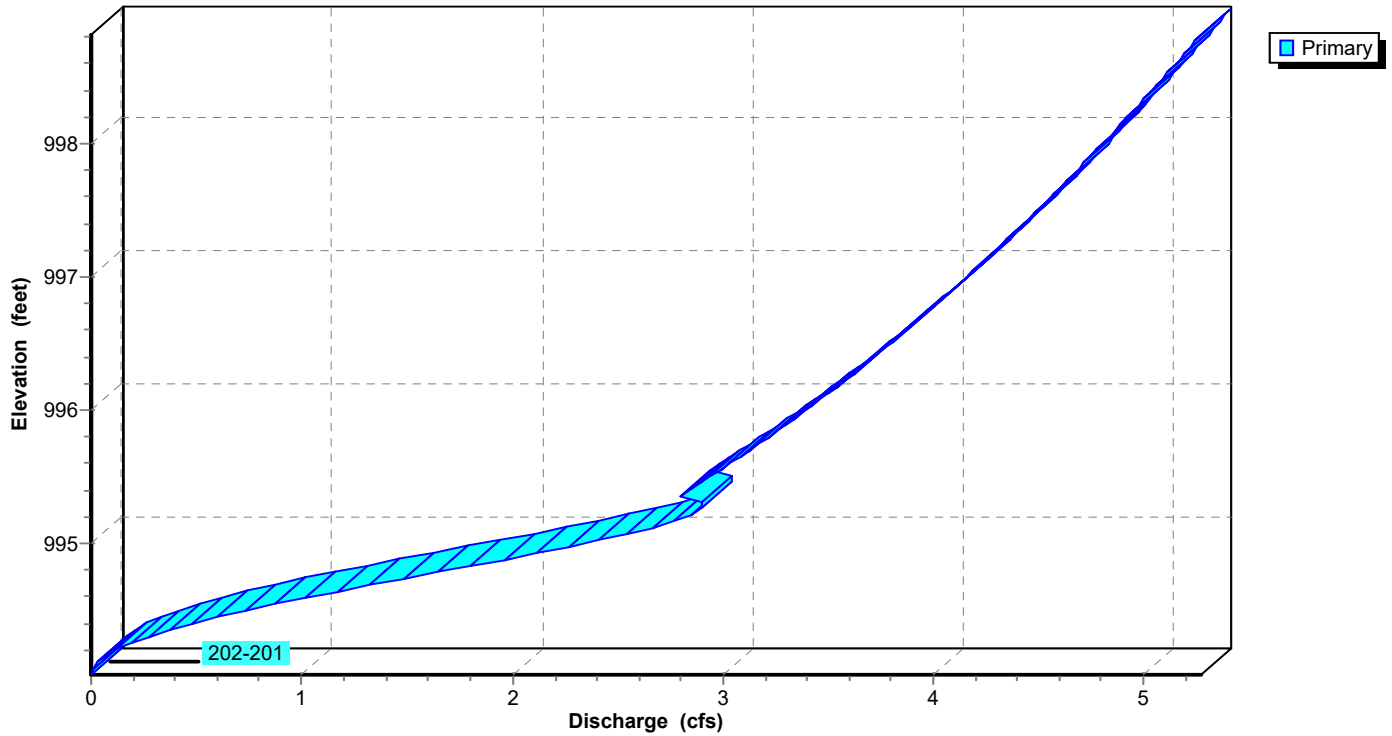
Pond 6P: 301-300

Hydrograph



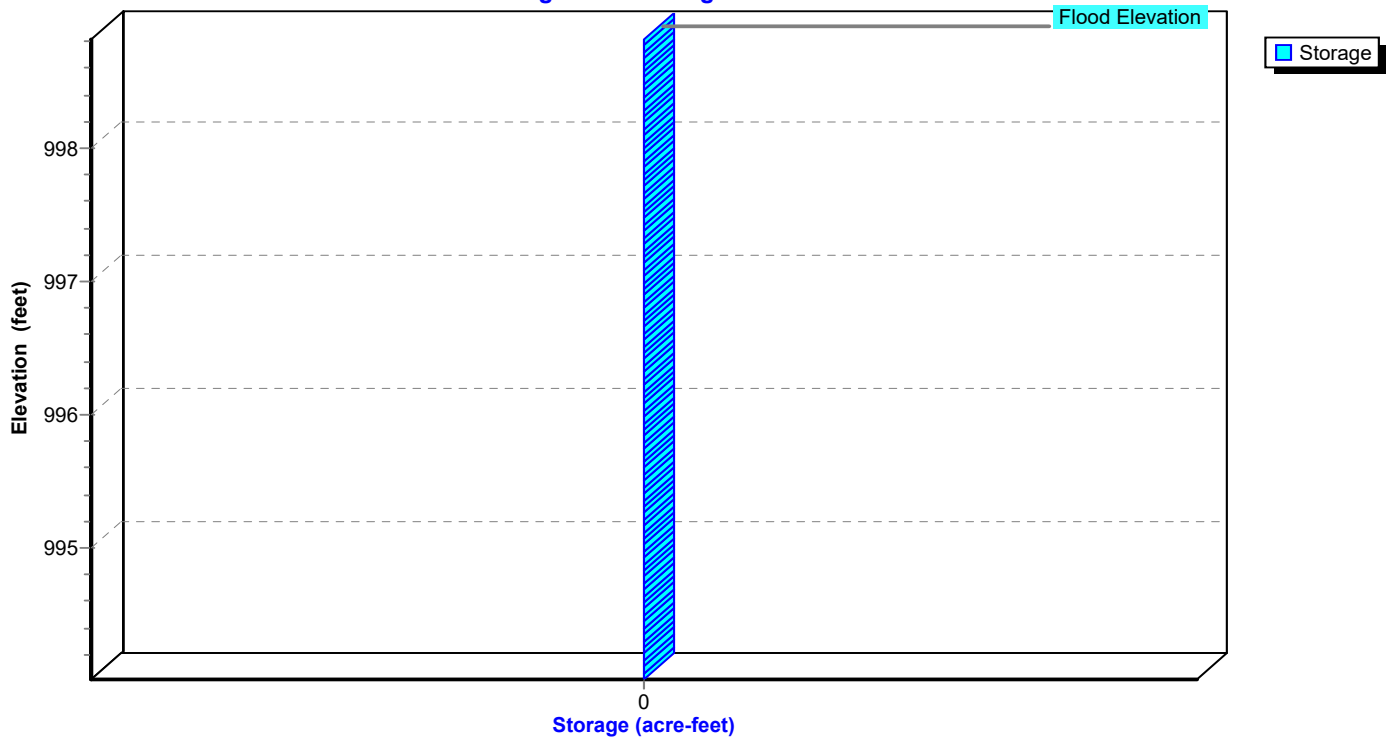
Pond 6P: 301-300

Stage-Discharge



Pond 6P: 301-300

Stage-Area-Storage



Summary for Pond 10P: BASIN REACH

Inflow Area = 0.430 ac, 88.37% Impervious, Inflow Depth = 0.98" for 1-Year WQv event
 Inflow = 0.69 cfs @ 11.95 hrs, Volume= 0.035 af
 Outflow = 0.69 cfs @ 11.95 hrs, Volume= 0.035 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.69 cfs @ 11.95 hrs, Volume= 0.035 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs / 2

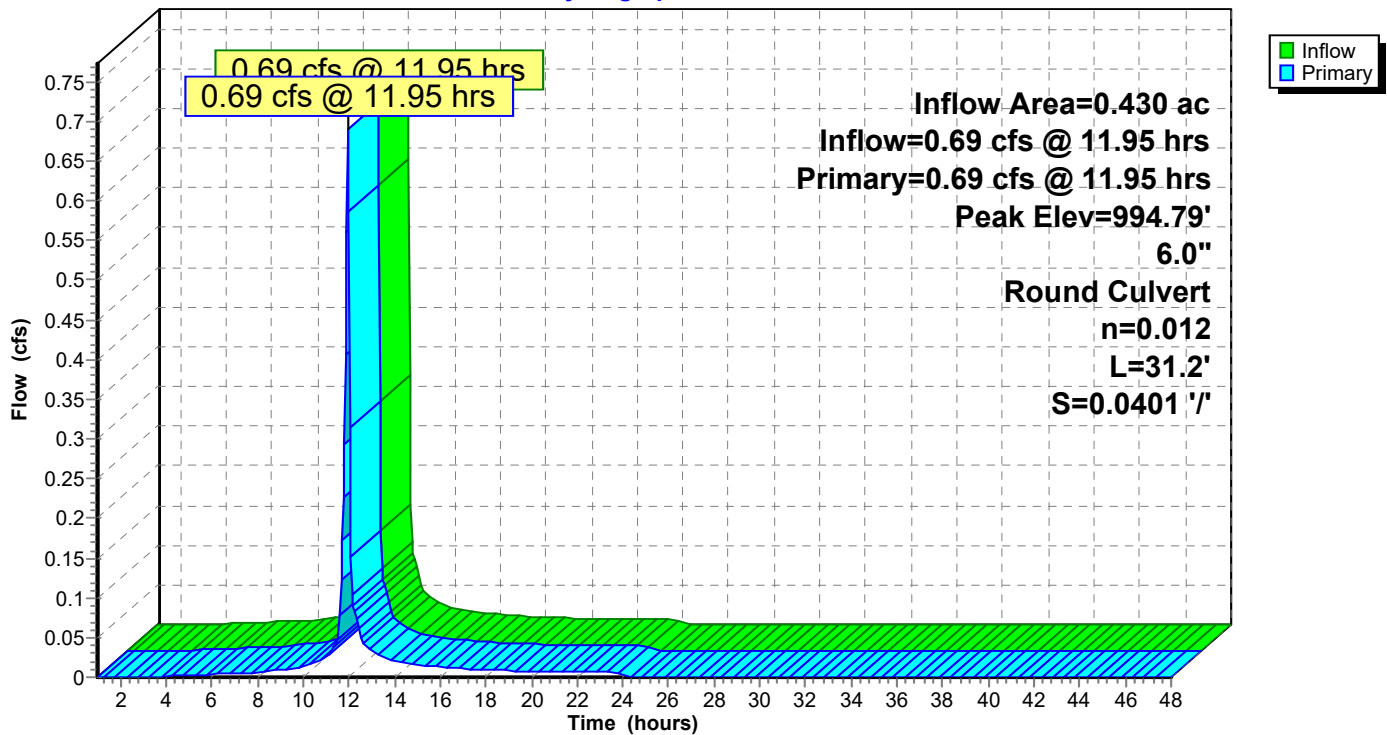
Peak Elev= 994.79' @ 11.95 hrs

Flood Elev= 1,000.67'

Device	Routing	Invert	Outlet Devices
#1	Primary	994.25'	6.0" Round Culvert L= 31.2' RCP, rounded edge headwall, Ke= 0.100 Inlet / Outlet Invert= 994.25' / 993.00' S= 0.0401 '/ L= 31.2' n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.20 sf

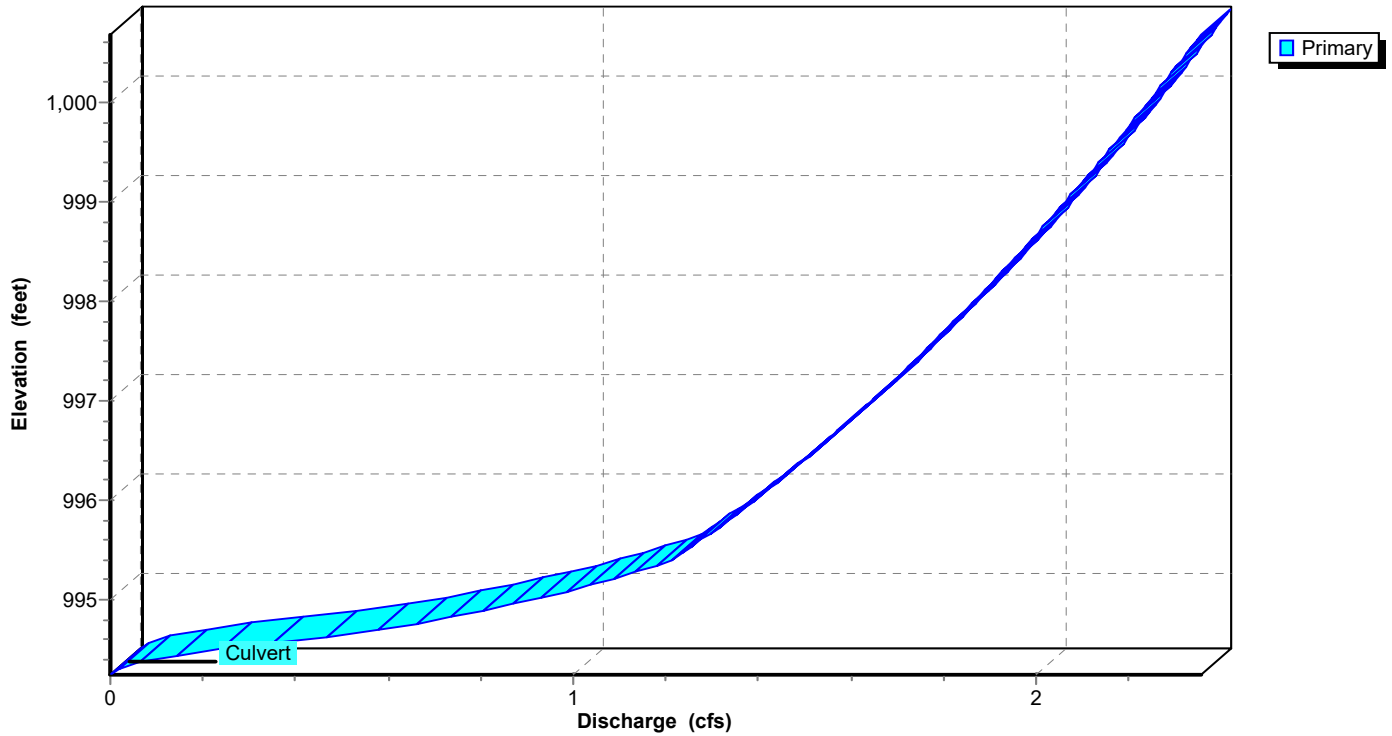
Primary OutFlow Max=0.68 cfs @ 11.95 hrs HW=994.78' TW=993.65' (Dynamic Tailwater)

↑**1=Culvert** (Inlet Controls 0.68 cfs @ 3.48 fps)

Pond 10P: BASIN REACH**Hydrograph**

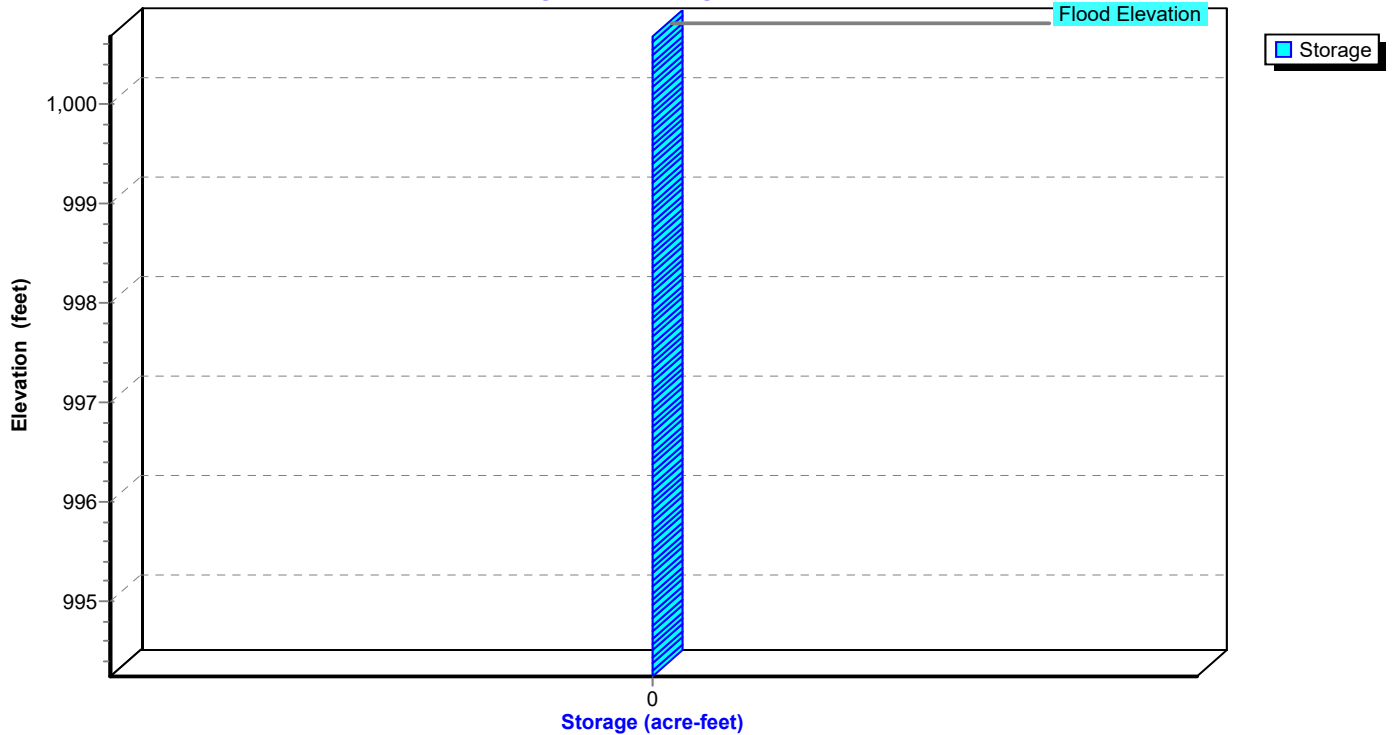
Pond 10P: BASIN REACH

Stage-Discharge



Pond 10P: BASIN REACH

Stage-Area-Storage



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Type II 24-hr 1-Year WQv Rainfall=1.37"

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Summary for Pond 12P: DETENTION BASIN

Inflow Area = 1.320 ac, 64.39% Impervious, Inflow Depth = 0.63" for 1-Year WQv event
 Inflow = 1.40 cfs @ 11.96 hrs, Volume= 0.069 af
 Outflow = 0.08 cfs @ 12.91 hrs, Volume= 0.069 af, Atten= 94%, Lag= 57.2 min
 Primary = 0.08 cfs @ 12.91 hrs, Volume= 0.069 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs / 2

Peak Elev= 994.14' @ 12.91 hrs Surf.Area= 1,471 sf Storage= 1,296 cf

Flood Elev= 999.00' Surf.Area= 6,484 sf Storage= 19,812 cf

Plug-Flow detention time= 148.4 min calculated for 0.069 af (100% of inflow)

Center-of-Mass det. time= 147.6 min (964.1 - 816.5)

Volume	Invert	Avail.Storage	Storage Description		
#1	992.10'	19,812 cf	Custom Stage Data (Pyramidal) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)	
992.10	4	0	0	4	
993.00	539	177	177	541	
994.00	1,359	918	1,095	1,370	
995.00	2,235	1,779	2,874	2,262	
996.00	3,166	2,687	5,561	3,215	
997.00	4,169	3,656	9,217	4,247	
998.00	5,290	4,718	13,935	5,401	
999.00	6,484	5,877	19,812	6,634	

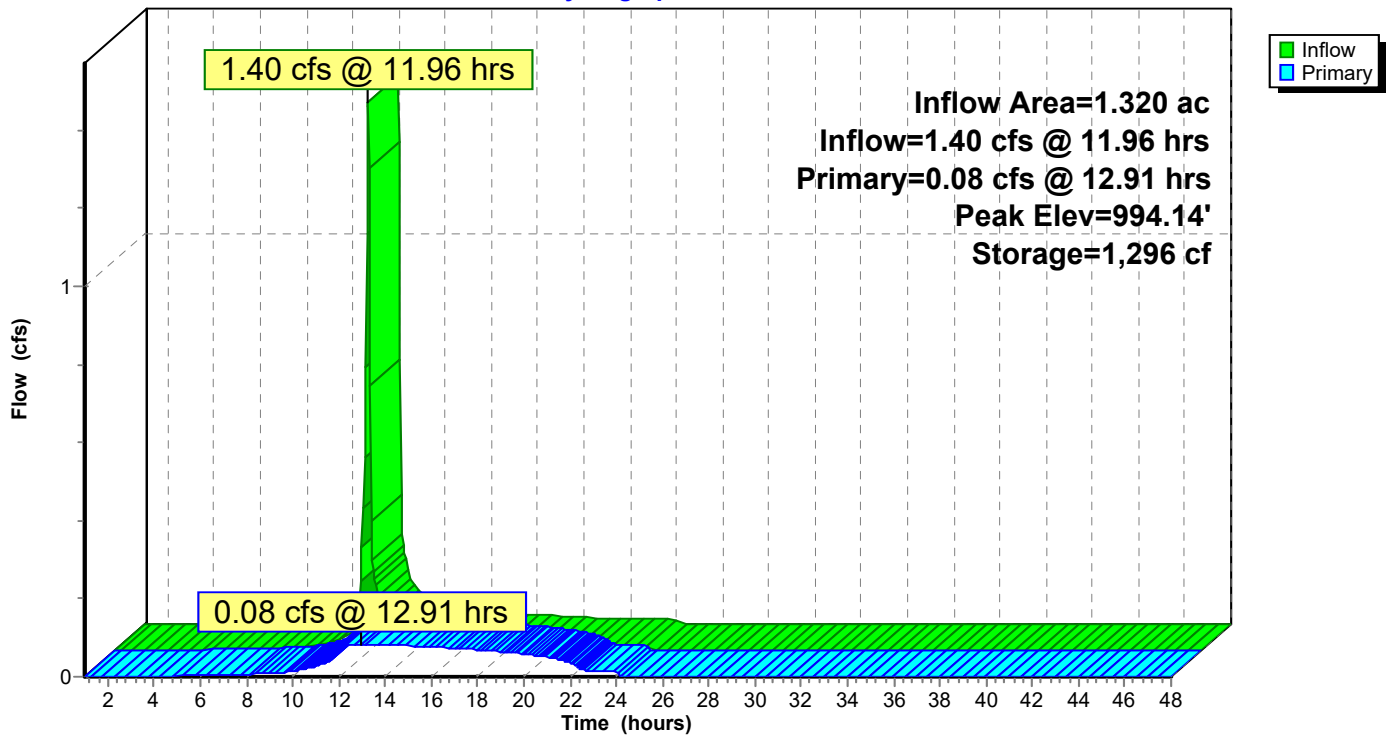
Device	Routing	Invert	Outlet Devices
#1	Primary	988.04'	18.0" Round Culvert L= 50.1' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 988.04' / 987.00' S= 0.0208 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf
#2	Device 1	992.10'	1.5" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	994.25'	4.0" W x 4.0" H Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#4	Device 1	996.00'	12.0" W x 6.0" H Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#5	Device 1	997.50'	4.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Primary OutFlow Max=0.08 cfs @ 12.91 hrs HW=994.14' TW=988.98' (Dynamic Tailwater)

- 1=Culvert (Passes 0.08 cfs of 22.89 cfs potential flow)
- 2=Orifice/Grate (Orifice Controls 0.08 cfs @ 6.78 fps)
- 3=Orifice/Grate (Controls 0.00 cfs)
- 4=Orifice/Grate (Controls 0.00 cfs)
- 5=Sharp-Crested Rectangular Weir (Controls 0.00 cfs)

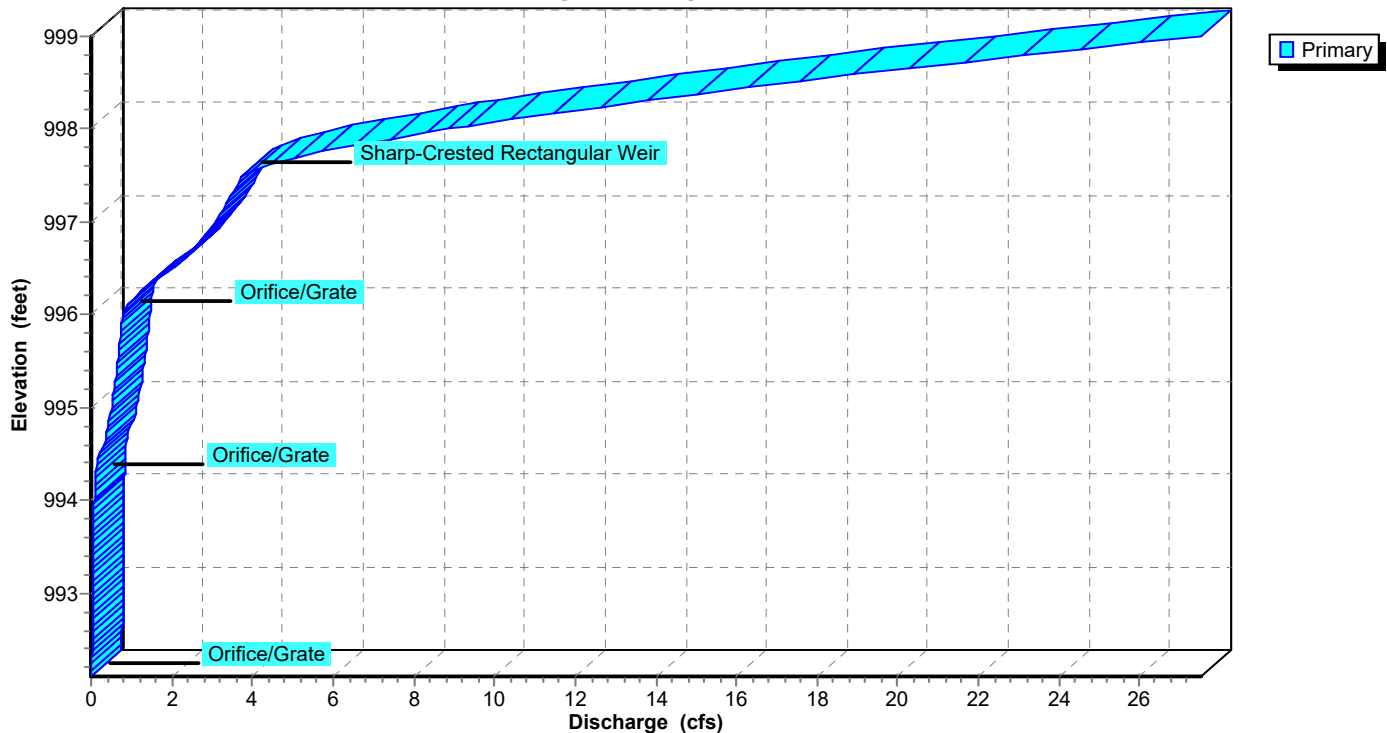
Pond 12P: DETENTION BASIN

Hydrograph



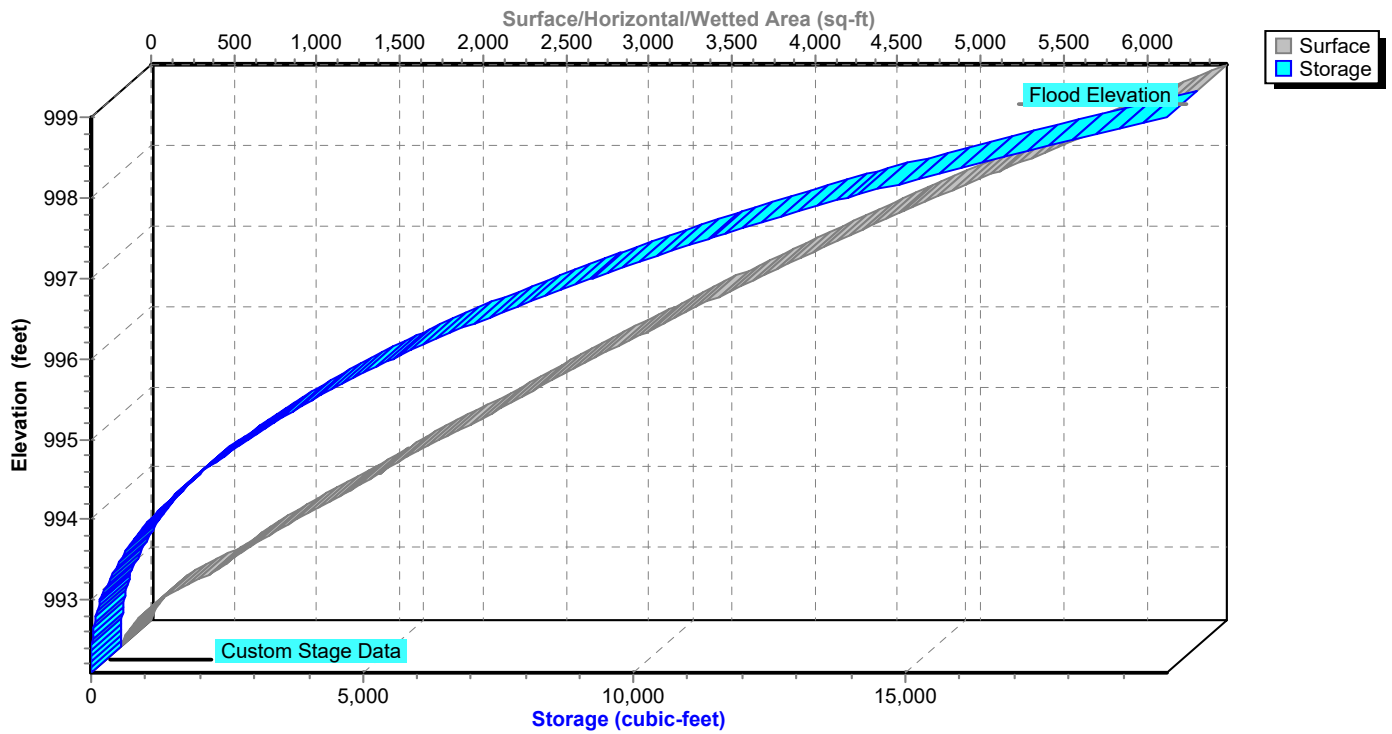
Pond 12P: DETENTION BASIN

Stage-Discharge



Pond 12P: DETENTION BASIN

Stage-Area-Storage



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Type II 24-hr 1-Year WQv Rainfall=1.37"

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Summary for Pond 24P: 12-11

[58] Hint: Peaked 2.21' above defined flood level

Inflow Area = 2.170 ac, 85.00% Impervious, Inflow Depth = 0.82" for 1-Year WQv event
Inflow = 1.97 cfs @ 12.13 hrs, Volume= 0.148 af
Outflow = 1.97 cfs @ 12.13 hrs, Volume= 0.148 af, Atten= 0%, Lag= 0.0 min
Primary = 1.97 cfs @ 12.13 hrs, Volume= 0.148 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs / 2

Peak Elev= 995.51' @ 12.13 hrs

Flood Elev= 993.30'

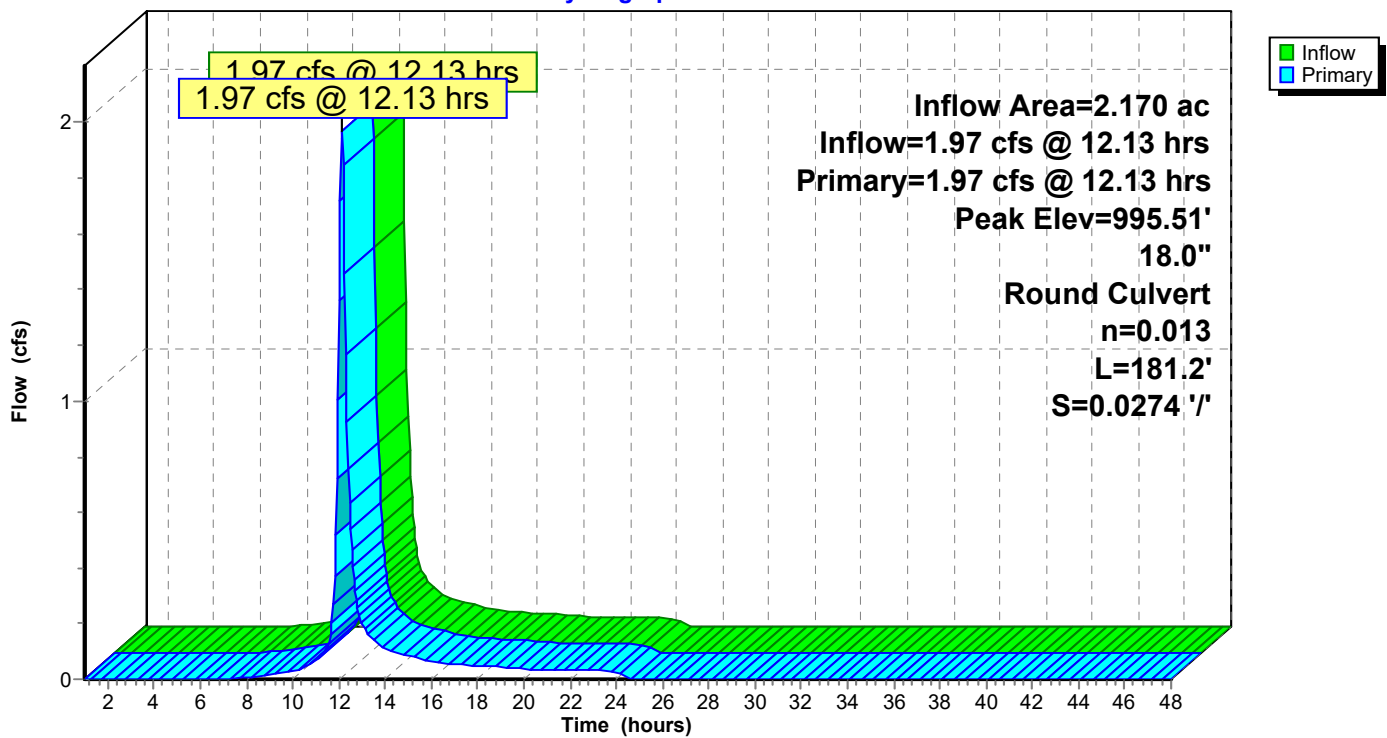
Device	Routing	Invert	Outlet Devices
#1	Primary	994.87'	18.0" Round Culvert L= 181.2' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 994.87' / 989.91' S= 0.0274 ' / ' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.77 sf

Primary OutFlow Max=1.94 cfs @ 12.13 hrs HW=995.51' TW=989.39' (Dynamic Tailwater)

↑ **1=Culvert** (Inlet Controls 1.94 cfs @ 2.72 fps)

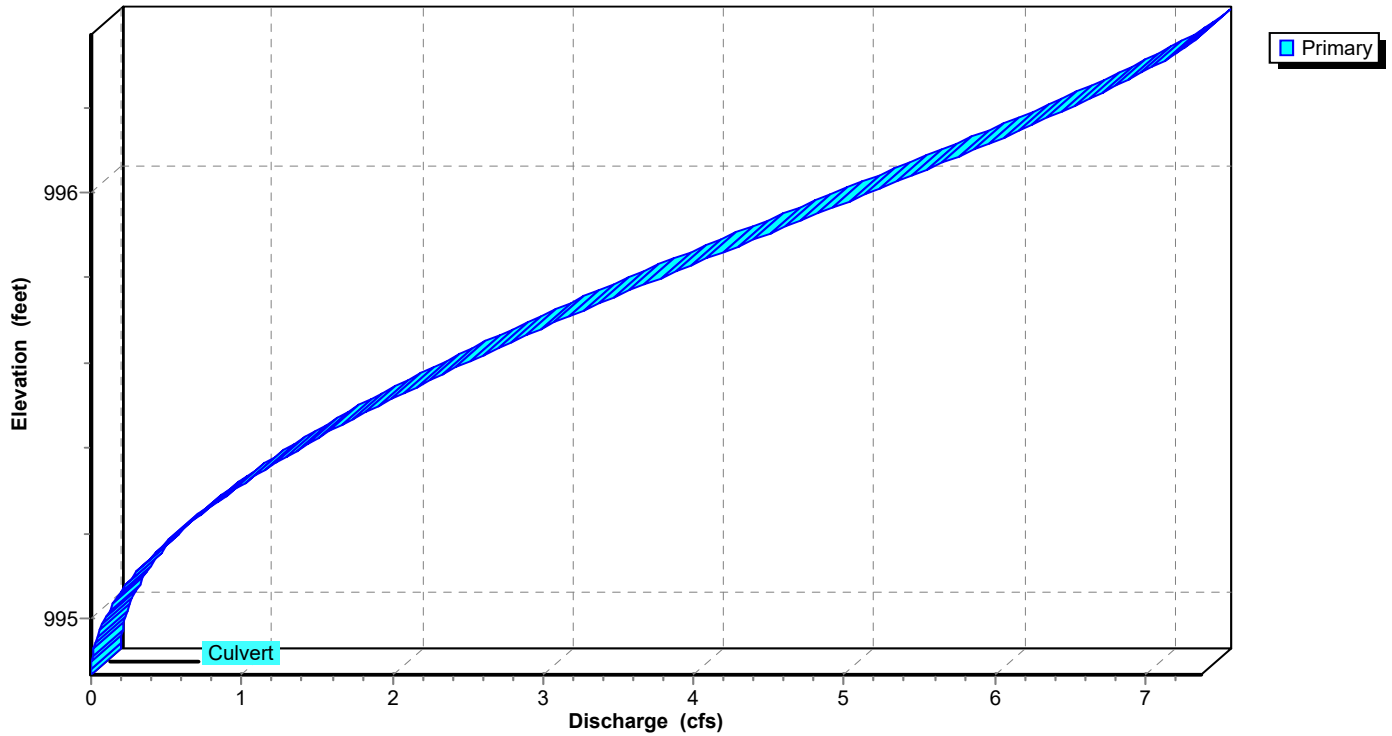
Pond 24P: 12-11

Hydrograph



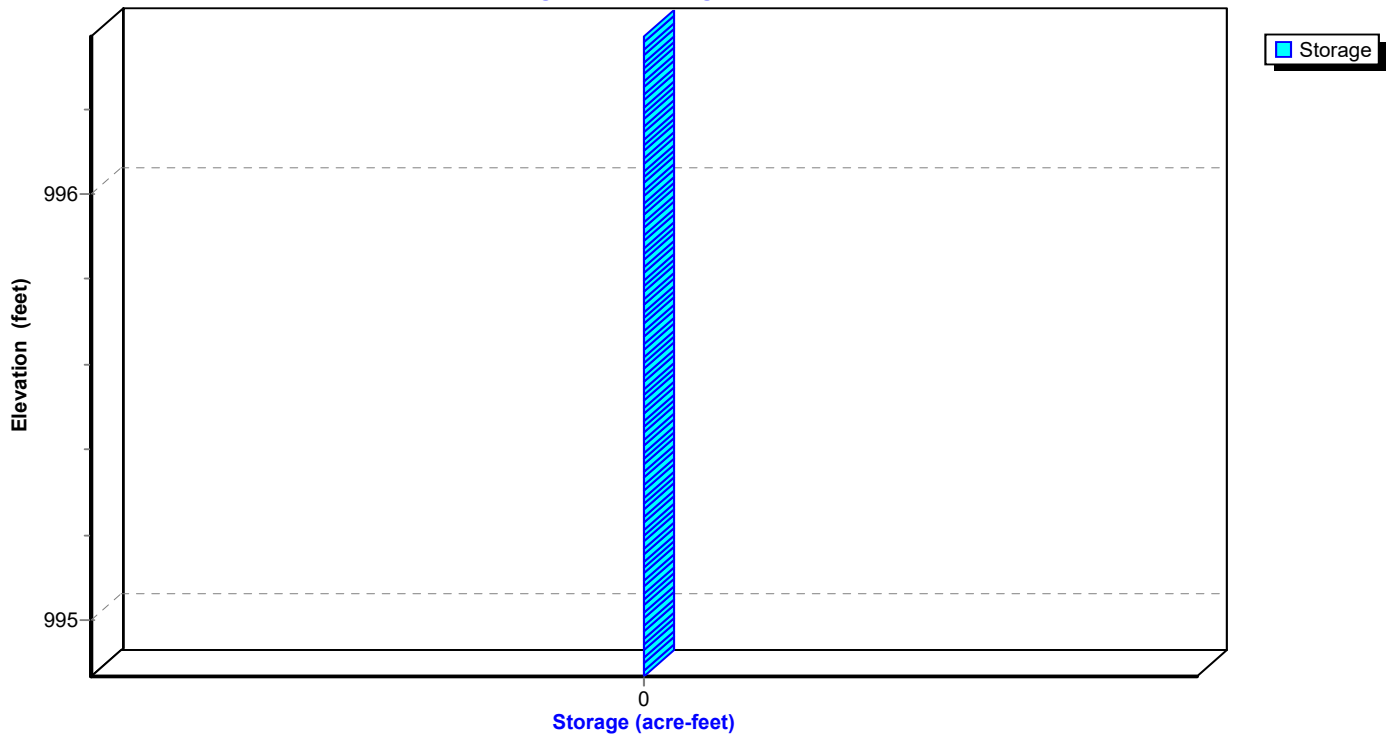
Pond 24P: 12-11

Stage-Discharge



Pond 24P: 12-11

Stage-Area-Storage



Summary for Pond 26P: 11 - 100 MH

Inflow Area = 4.680 ac, 78.82% Impervious, Inflow Depth = 0.76" for 1-Year WQv event
 Inflow = 2.77 cfs @ 12.15 hrs, Volume= 0.298 af
 Outflow = 2.77 cfs @ 12.15 hrs, Volume= 0.298 af, Atten= 0%, Lag= 0.0 min
 Primary = 2.77 cfs @ 12.15 hrs, Volume= 0.298 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs / 2

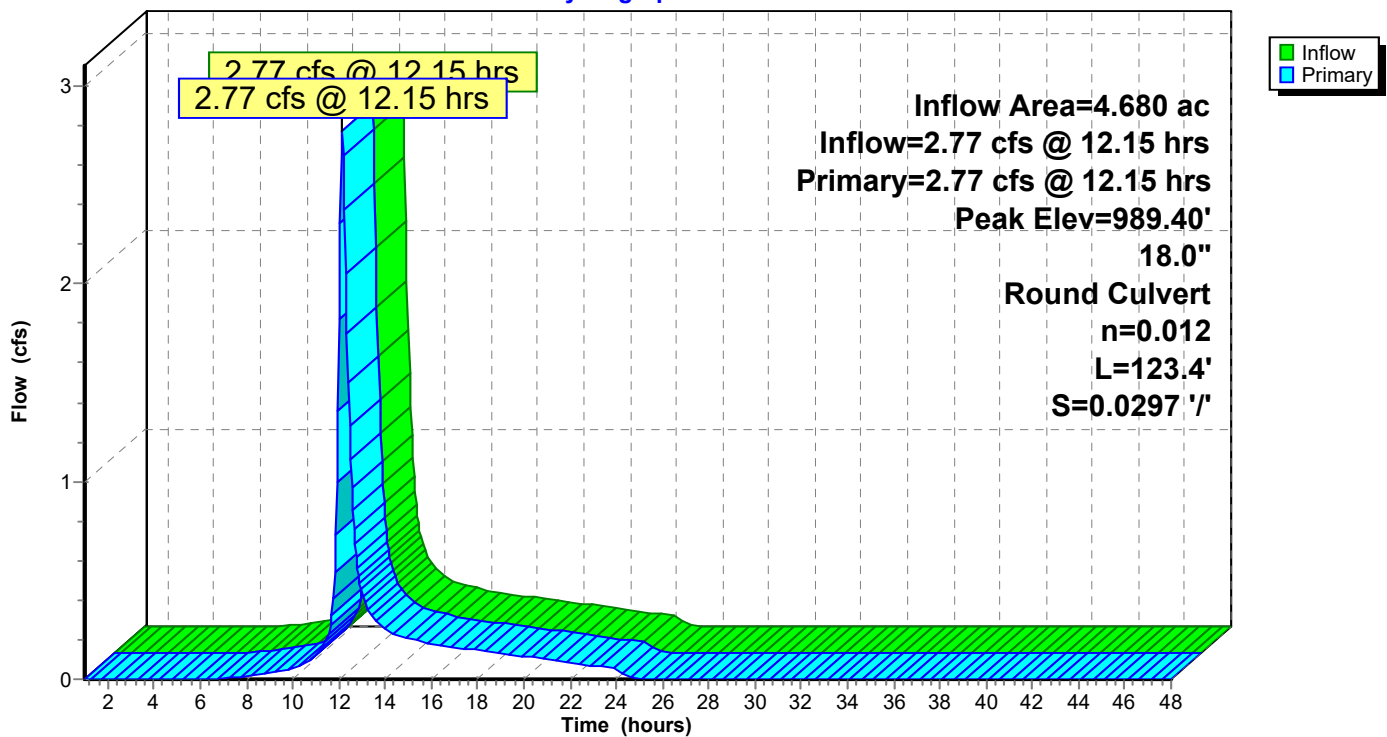
Peak Elev= 989.40' @ 12.15 hrs

Flood Elev= 995.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	988.71'	18.0" Round Culvert L= 123.4' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 988.71' / 985.04' S= 0.0297 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf

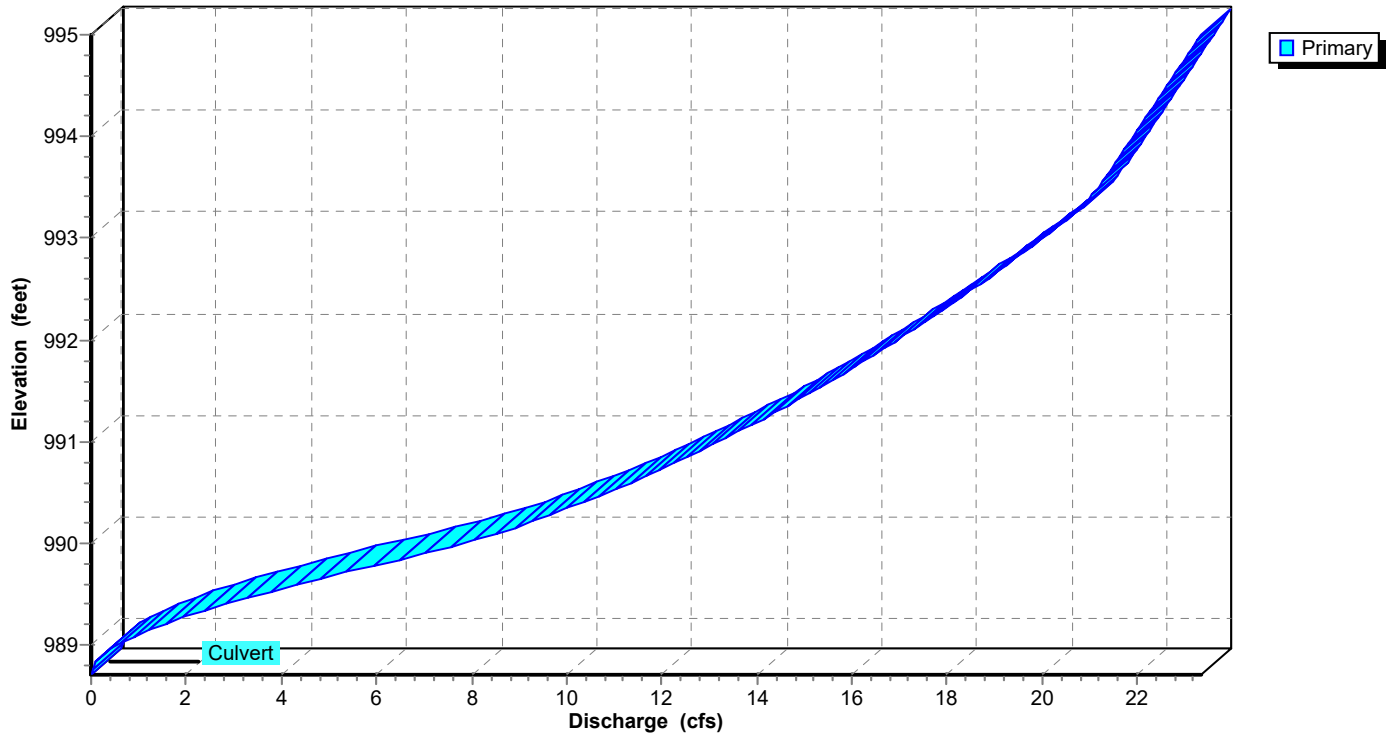
Primary OutFlow Max=2.77 cfs @ 12.15 hrs HW=989.39' TW=985.72' (Dynamic Tailwater)

↑**1=Culvert** (Inlet Controls 2.77 cfs @ 3.52 fps)

Pond 26P: 11 - 100 MH**Hydrograph**

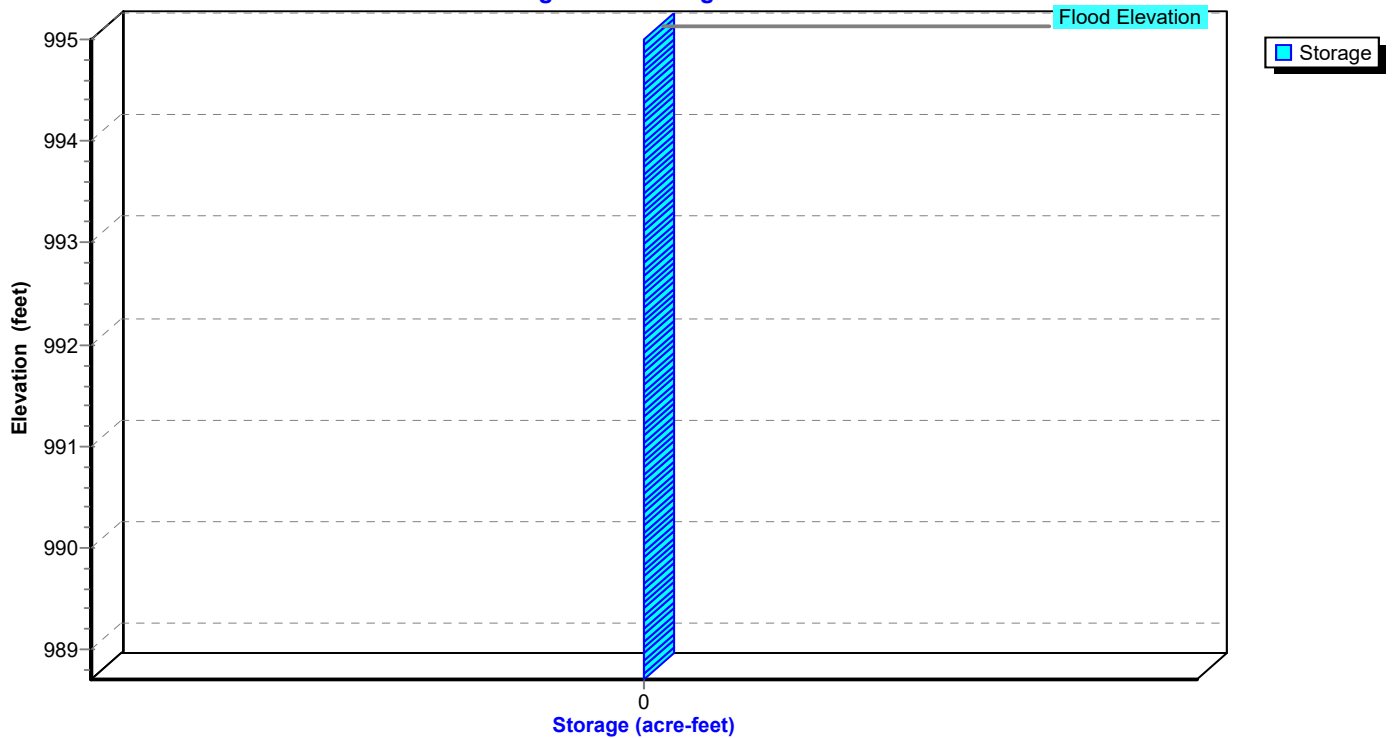
Pond 26P: 11 - 100 MH

Stage-Discharge



Pond 26P: 11 - 100 MH

Stage-Area-Storage



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Type II 24-hr 1-Year WQv Rainfall=1.37"

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Summary for Pond 27P: 11-10

Inflow Area = 4.680 ac, 78.82% Impervious, Inflow Depth = 0.76" for 1-Year WQv event
Inflow = 2.77 cfs @ 12.15 hrs, Volume= 0.298 af
Outflow = 2.77 cfs @ 12.15 hrs, Volume= 0.298 af, Atten= 0%, Lag= 0.0 min
Primary = 2.77 cfs @ 12.15 hrs, Volume= 0.298 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs / 2

Peak Elev= 985.73' @ 12.15 hrs

Flood Elev= 995.00'

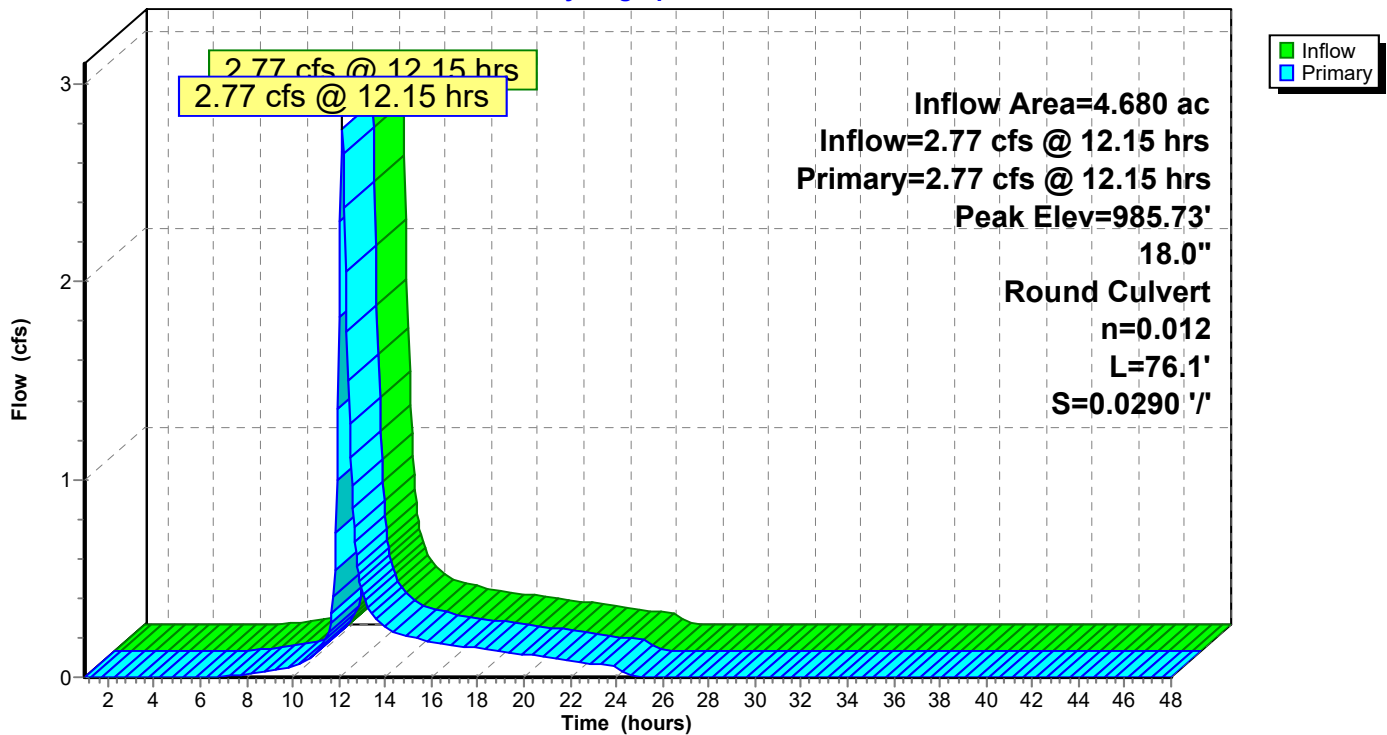
Device	Routing	Invert	Outlet Devices
#1	Primary	985.04'	18.0" Round Culvert L= 76.1' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 985.04' / 982.83' S= 0.0290 '/ Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=2.77 cfs @ 12.15 hrs HW=985.72' (Free Discharge)

↑**1=Culvert** (Inlet Controls 2.77 cfs @ 3.52 fps)

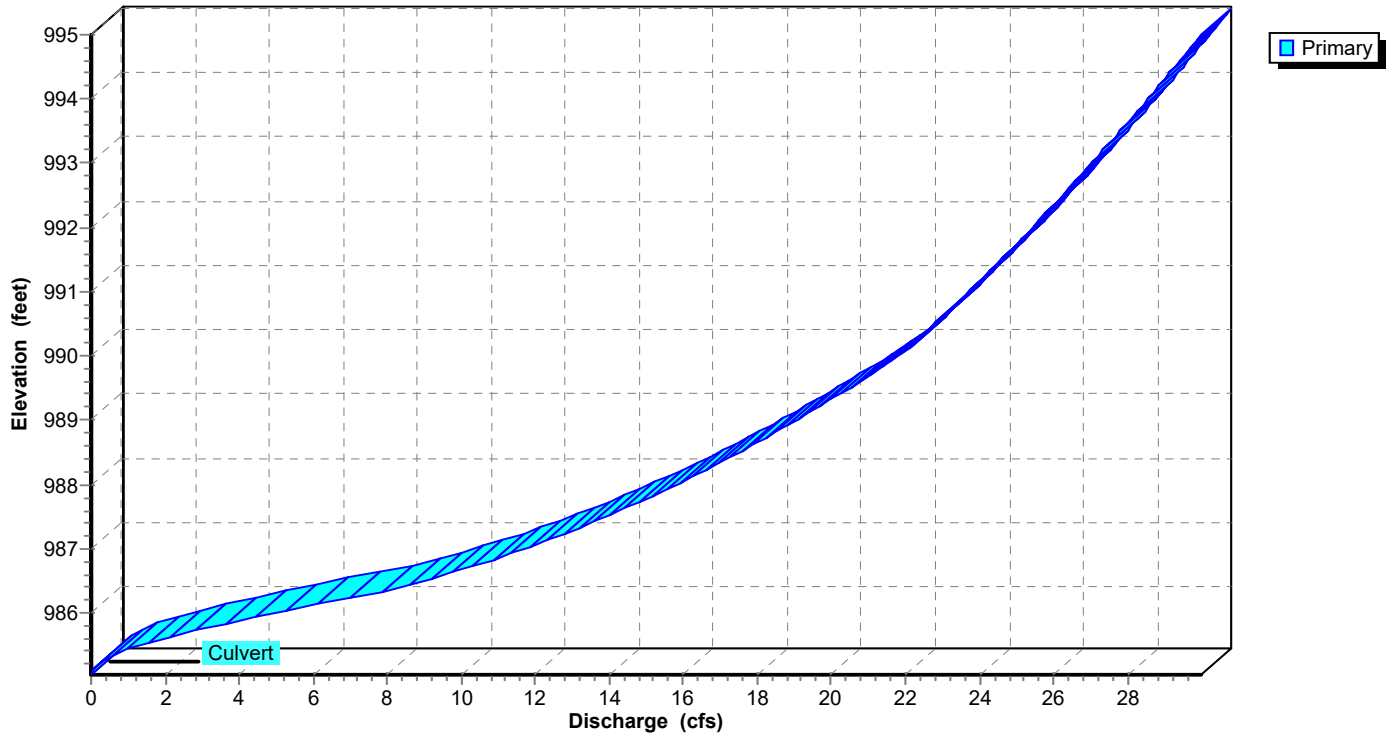
Pond 27P: 11-10

Hydrograph



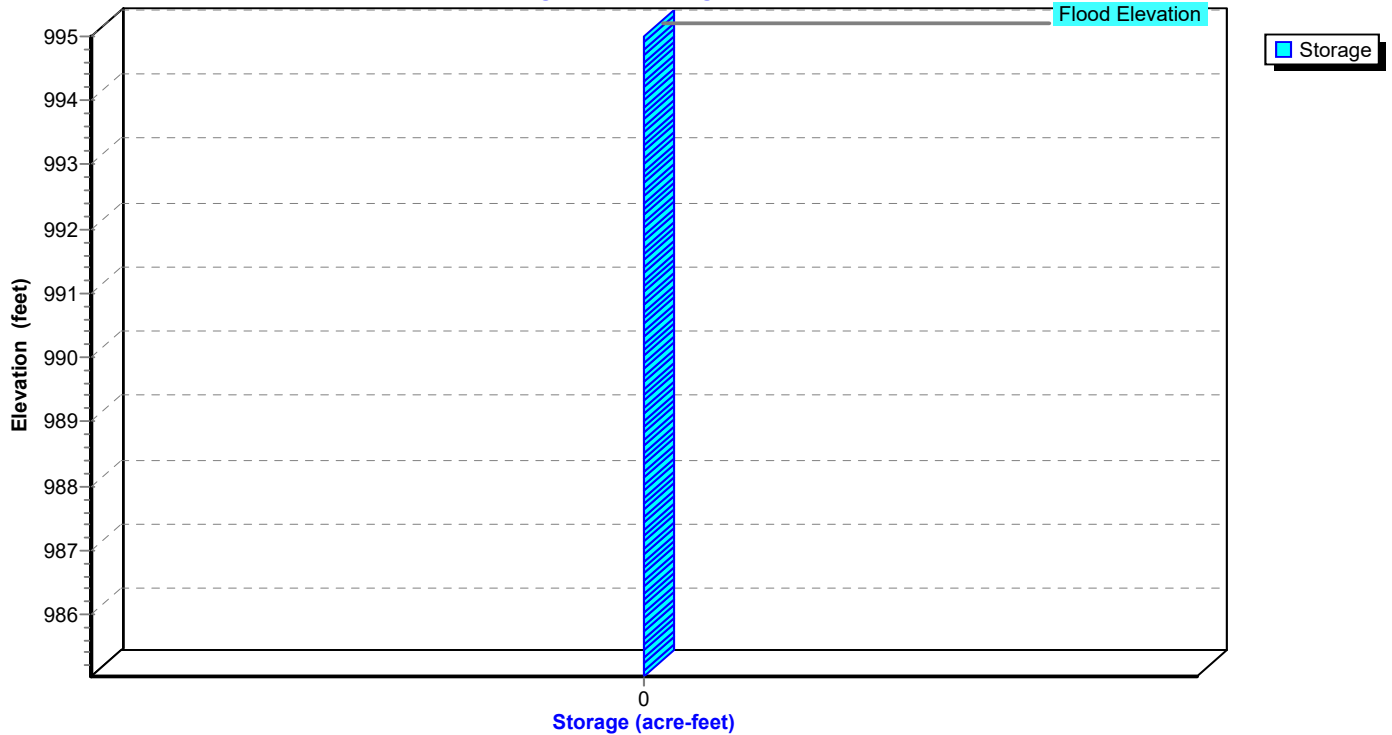
Pond 27P: 11-10

Stage-Discharge



Pond 27P: 11-10

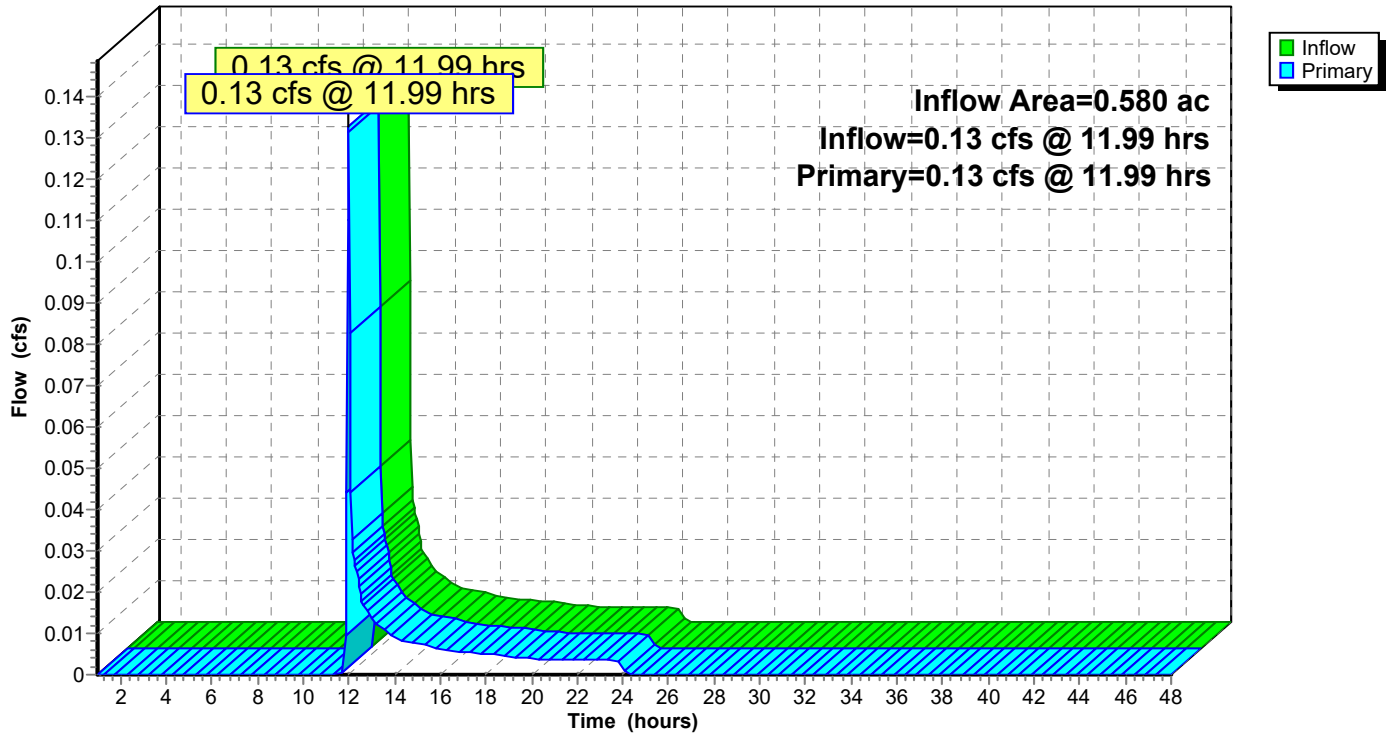
Stage-Area-Storage



Summary for Link 29L: BYPASS AREAS

Inflow Area = 0.580 ac, 13.79% Impervious, Inflow Depth = 0.17" for 1-Year WQv event
Inflow = 0.13 cfs @ 11.99 hrs, Volume= 0.008 af
Primary = 0.13 cfs @ 11.99 hrs, Volume= 0.008 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs

Link 29L: BYPASS AREAS**Hydrograph**

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Type II 24-hr 2-Year Rainfall=3.50"

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Time span=1.00-48.00 hrs, dt=0.05 hrs, 941 points x 2
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: EXISTING CONDITIONS

Runoff Area=2.110 ac 0.00% Impervious Runoff Depth=1.24"
 Tc=10.0 min CN=74 Runoff=3.90 cfs 0.218 af

Subcatchment 3S: AREA 1

Runoff Area=0.210 ac 71.43% Impervious Runoff Depth=2.54"
 Tc=5.0 min CN=91 Runoff=0.91 cfs 0.044 af

Subcatchment 4S: AREA 5

Runoff Area=0.100 ac 50.00% Impervious Runoff Depth=2.10"
 Tc=5.0 min CN=86 Runoff=0.37 cfs 0.017 af

Subcatchment 5S: AREA 2

Runoff Area=0.240 ac 66.67% Impervious Runoff Depth=2.45"
 Tc=5.0 min CN=90 Runoff=1.02 cfs 0.049 af

Subcatchment 6S: AREA 6

Runoff Area=0.510 ac 11.76% Impervious Runoff Depth=1.43"
 Tc=5.0 min CN=77 Runoff=1.31 cfs 0.061 af

Subcatchment 7S: AREA 3

Runoff Area=0.440 ac 36.36% Impervious Runoff Depth=1.86"
 Tc=5.0 min CN=83 Runoff=1.47 cfs 0.068 af

Subcatchment 8S: AREA 7

Runoff Area=0.070 ac 28.57% Impervious Runoff Depth=1.71"
 Tc=5.0 min CN=81 Runoff=0.22 cfs 0.010 af

Subcatchment 10S: AREA 4

Runoff Area=0.330 ac 100.00% Impervious Runoff Depth=3.27"
 Tc=5.0 min CN=98 Runoff=1.65 cfs 0.090 af

Subcatchment 20S: OFFSITE TO BMP

Runoff Area=1.170 ac 85.00% Impervious Runoff Depth=2.84"
 Tc=30.0 min CN=94 Runoff=2.78 cfs 0.276 af

Subcatchment 22S: OFFSITE TO CI 12

Runoff Area=2.170 ac 85.00% Impervious Runoff Depth=2.84"
 Tc=20.0 min CN=94 Runoff=6.52 cfs 0.513 af

Subcatchment 25S: AREA TO AI 11

Runoff Area=0.020 ac 0.00% Impervious Runoff Depth=1.24"
 Tc=5.0 min CN=74 Runoff=0.04 cfs 0.002 af

Subcatchment 28S: PROPOSED CONDITIONS

Runoff Area=2.110 ac 32.70% Impervious Runoff Depth=1.78"
 Tc=5.0 min CN=82 Runoff=6.76 cfs 0.313 af

Pond 3P: ROOF DRAINS TO BASIN

Peak Elev=1,004.48' Inflow=2.02 cfs 0.107 af
 6.0" Round Culvert n=0.012 L=21.7' S=0.0198 '/' Outflow=2.02 cfs 0.107 af

Pond 4R: 302-301

Peak Elev=995.86' Inflow=0.91 cfs 0.044 af
 15.0" Round Culvert n=0.012 L=165.3' S=0.0050 '/' Outflow=0.91 cfs 0.044 af

Pond 6P: 301-300

Peak Elev=996.05' Inflow=1.93 cfs 0.093 af
 12.0" Round Culvert n=0.012 L=201.5' S=0.0050 '/' Outflow=1.93 cfs 0.093 af

Pond 10P: BASIN REACH

Peak Elev=1,000.59' Inflow=2.02 cfs 0.107 af
 6.0" Round Culvert n=0.012 L=31.2' S=0.0401 '/' Outflow=2.02 cfs 0.107 af

Pond 12P: DETENTION BASIN

Peak Elev=995.85' Storage=5,093 cf Inflow=5.42 cfs 0.269 af
 Outflow=0.75 cfs 0.269 af

Pond 24P: 12-11

Peak Elev=996.20' Inflow=6.52 cfs 0.513 af
 18.0" Round Culvert n=0.013 L=181.2' S=0.0274 '/' Outflow=6.52 cfs 0.513 af

Pond 26P: 11 - 100 MH

Peak Elev=990.29' Inflow=9.70 cfs 1.060 af
 18.0" Round Culvert n=0.012 L=123.4' S=0.0297 '/' Outflow=9.70 cfs 1.060 af

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Pond 27P: 11-10

Peak Elev=986.62' Inflow=9.70 cfs 1.060 af
18.0" Round Culvert n=0.012 L=76.1' S=0.0290 '/' Outflow=9.70 cfs 1.060 af

Link 29L: BYPASS AREAS

Inflow=1.53 cfs 0.071 af
Primary=1.53 cfs 0.071 af

Total Runoff Area = 9.480 ac Runoff Volume = 1.662 af Average Runoff Depth = 2.10"
52.96% Pervious = 5.021 ac 47.04% Impervious = 4.459 ac

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Summary for Subcatchment 1S: EXISTING CONDITIONS

Runoff = 3.90 cfs @ 12.02 hrs, Volume= 0.218 af, Depth= 1.24"

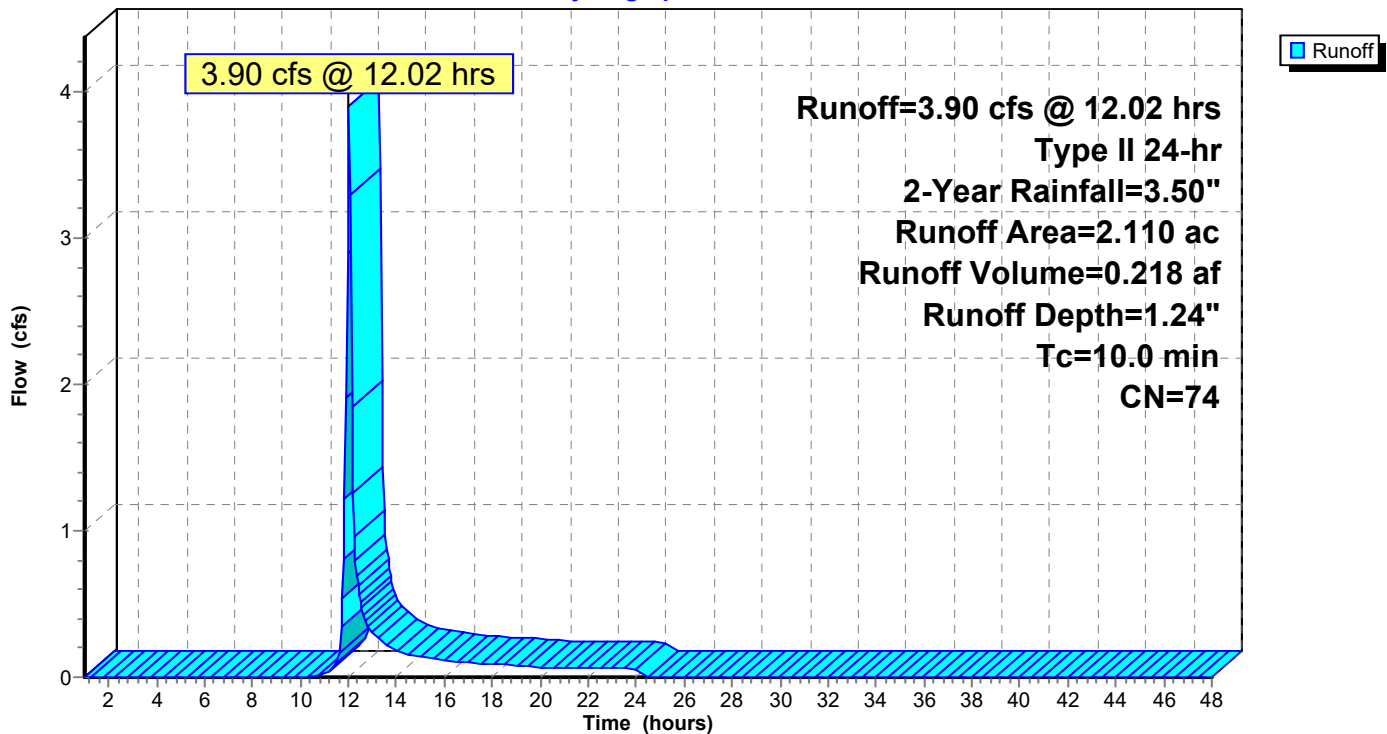
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-Year Rainfall=3.50"

Area (ac)	CN	Description
2.110	74	>75% Grass cover, Good, HSG C
2.110		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry, Assumed TC of 10 Minutes used for Pre-Developed Condition

Subcatchment 1S: EXISTING CONDITIONS

Hydrograph



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Type II 24-hr 2-Year Rainfall=3.50"

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Summary for Subcatchment 3S: AREA 1

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.91 cfs @ 11.95 hrs, Volume= 0.044 af, Depth= 2.54"

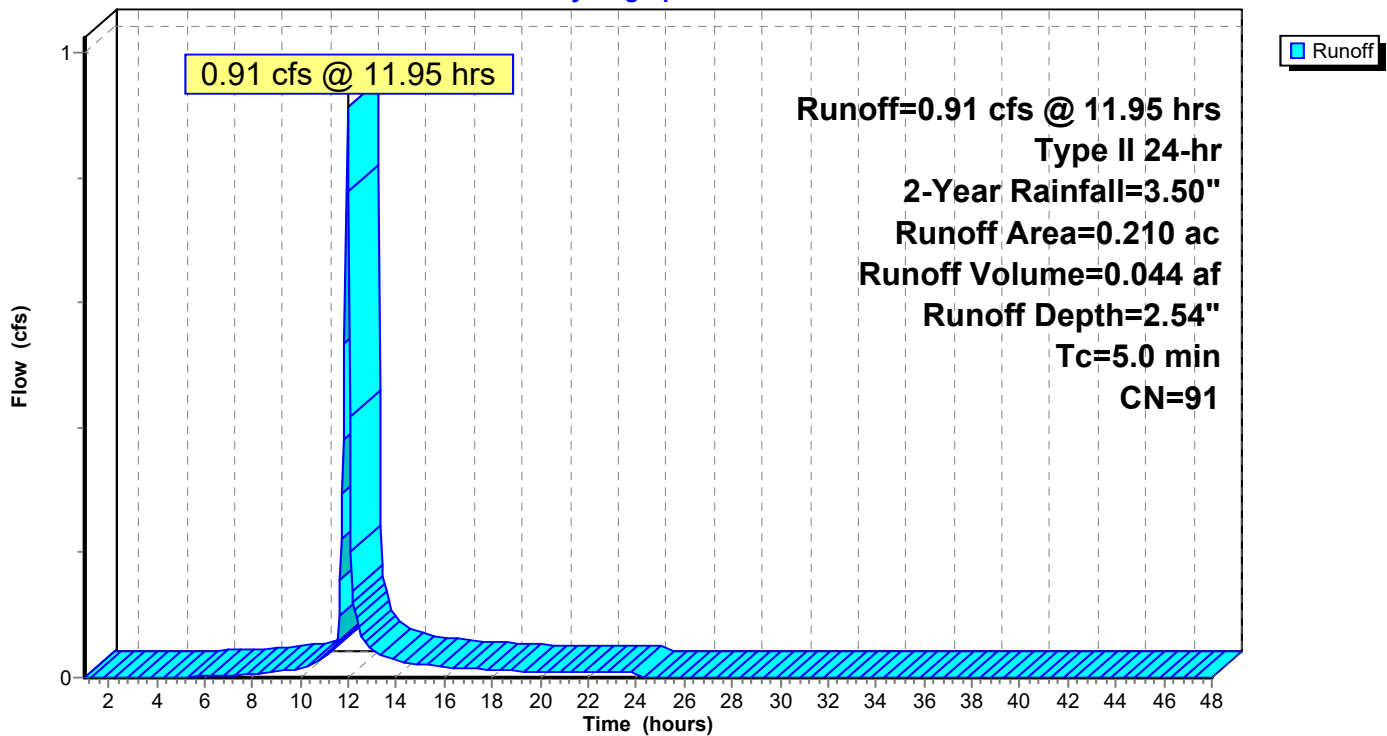
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, $dt=0.05$ hrs
Type II 24-hr 2-Year Rainfall=3.50"

Area (ac)	CN	Description
0.150	98	Paved parking, HSG D
0.060	74	>75% Grass cover, Good, HSG C
0.210	91	Weighted Average
0.060		28.57% Pervious Area
0.150		71.43% Impervious Area

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

Subcatchment 3S: AREA 1

Hydrograph



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Type II 24-hr 2-Year Rainfall=3.50"

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Summary for Subcatchment 4S: AREA 5

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.37 cfs @ 11.96 hrs, Volume= 0.017 af, Depth= 2.10"

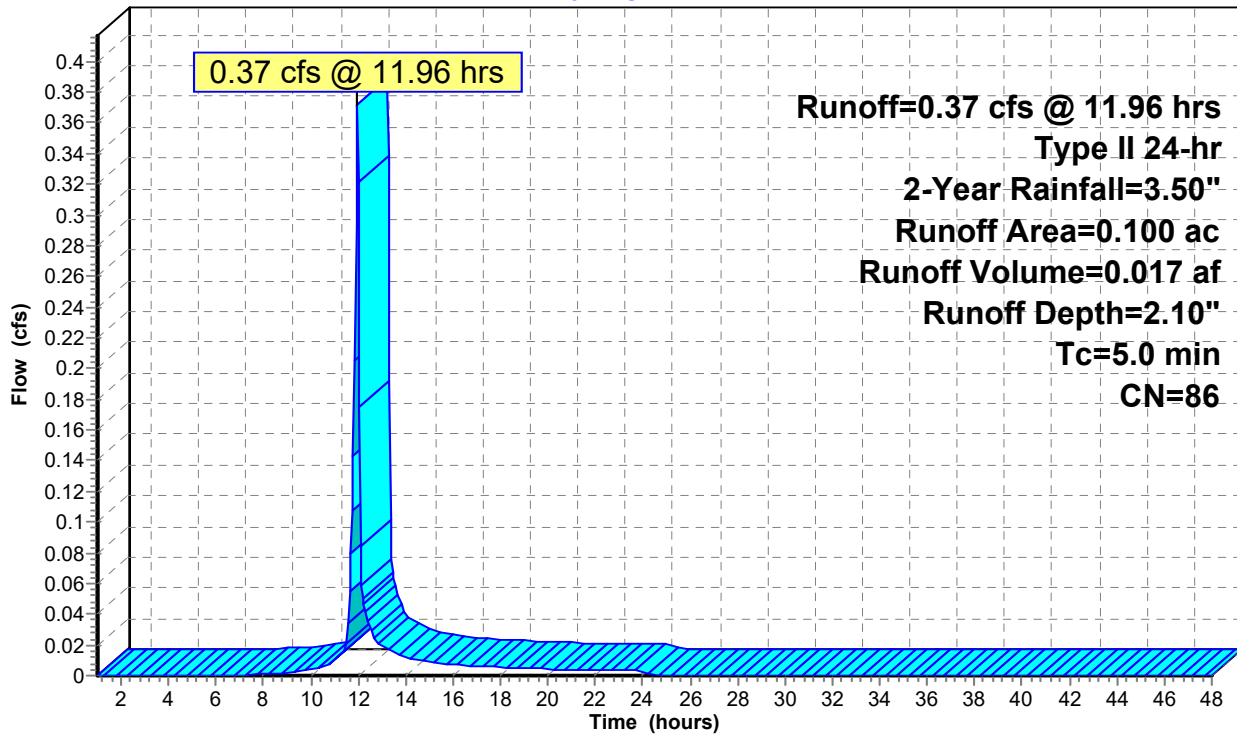
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, $dt=0.05$ hrs
Type II 24-hr 2-Year Rainfall=3.50"

Area (ac)	CN	Description
0.050	98	Paved parking, HSG C
0.050	74	>75% Grass cover, Good, HSG C
0.100	86	Weighted Average
0.050		50.00% Pervious Area
0.050		50.00% Impervious Area

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

Subcatchment 4S: AREA 5

Hydrograph



Summary for Subcatchment 5S: AREA 2

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 1.02 cfs @ 11.95 hrs, Volume= 0.049 af, Depth= 2.45"

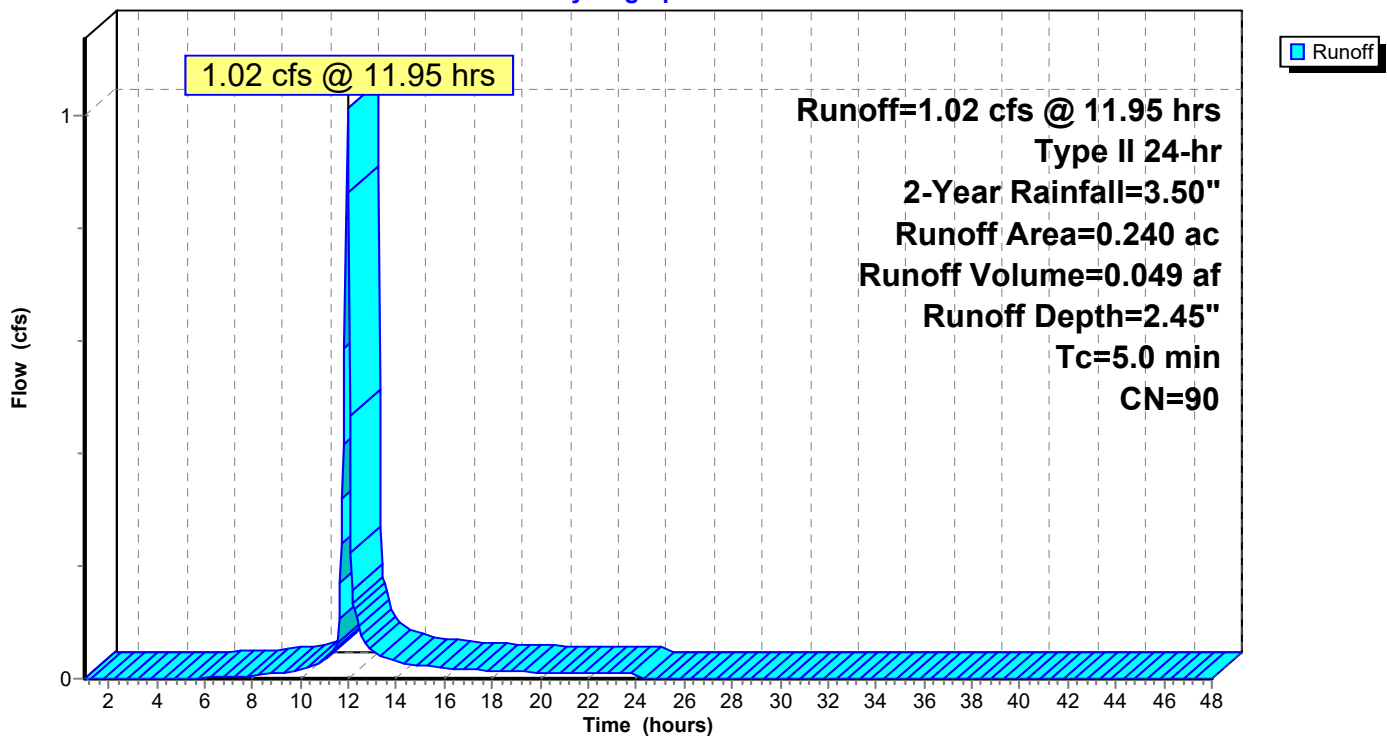
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, $dt=0.05$ hrs
Type II 24-hr 2-Year Rainfall=3.50"

Area (ac)	CN	Description
0.160	98	Paved parking, HSG C
0.050	74	>75% Grass cover, Good, HSG C
* 0.030	74	>75% Grass cover, Good, HSG C OFFSITE TO ONSITE
0.240	90	Weighted Average
0.080		33.33% Pervious Area
0.160		66.67% Impervious Area

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

Subcatchment 5S: AREA 2

Hydrograph



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Type II 24-hr 2-Year Rainfall=3.50"

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Summary for Subcatchment 6S: AREA 6

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 1.31 cfs @ 11.96 hrs, Volume= 0.061 af, Depth= 1.43"

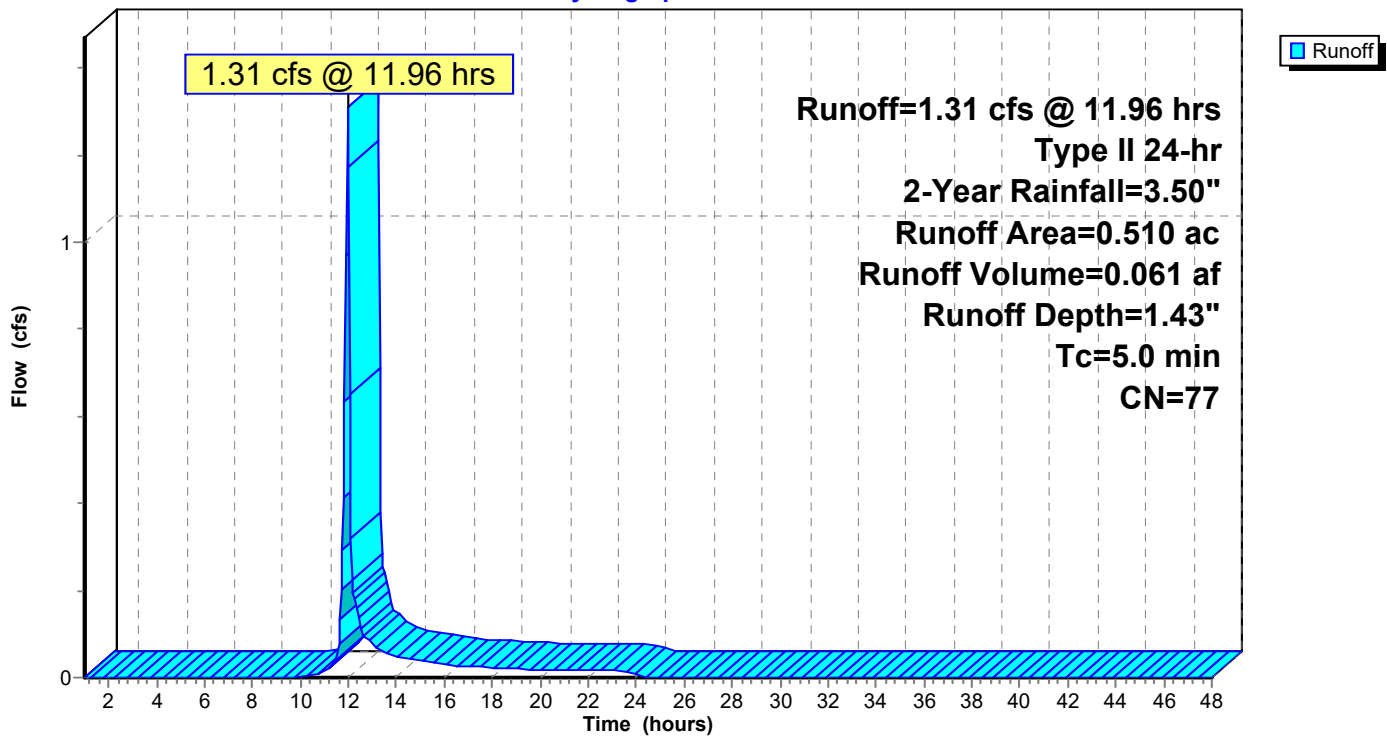
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, $dt=0.05$ hrs
Type II 24-hr 2-Year Rainfall=3.50"

Area (ac)	CN	Description
0.060	98	Paved parking, HSG C
0.450	74	>75% Grass cover, Good, HSG C
0.510	77	Weighted Average
0.450		88.24% Pervious Area
0.060		11.76% Impervious Area

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

Subcatchment 6S: AREA 6

Hydrograph



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Type II 24-hr 2-Year Rainfall=3.50"

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Summary for Subcatchment 7S: AREA 3

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 1.47 cfs @ 11.96 hrs, Volume= 0.068 af, Depth= 1.86"

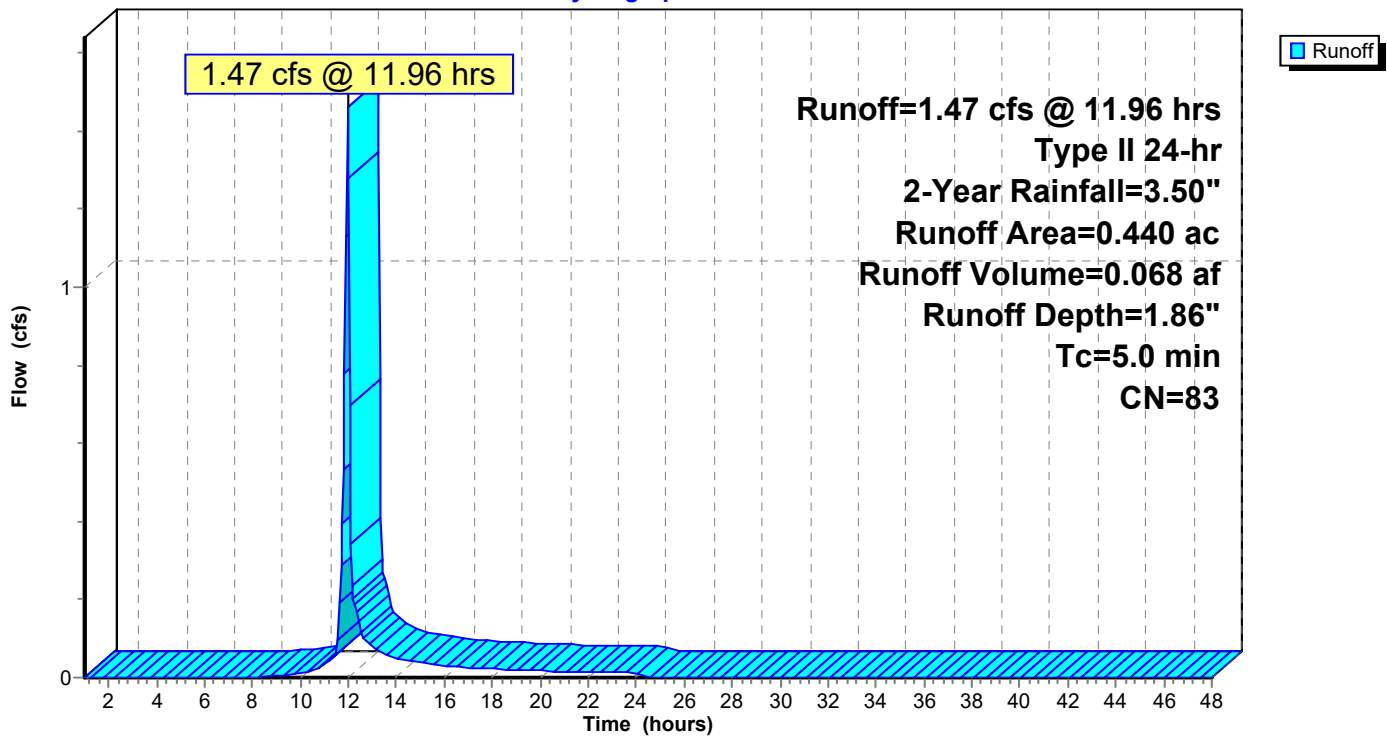
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, $dt=0.05$ hrs
Type II 24-hr 2-Year Rainfall=3.50"

Area (ac)	CN	Description
0.160	98	Paved parking, HSG C
0.280	74	>75% Grass cover, Good, HSG C
0.440	83	Weighted Average
0.280		63.64% Pervious Area
0.160		36.36% Impervious Area

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

Subcatchment 7S: AREA 3

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Type II 24-hr 2-Year Rainfall=3.50"

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Summary for Subcatchment 8S: AREA 7

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.22 cfs @ 11.96 hrs, Volume= 0.010 af, Depth= 1.71"

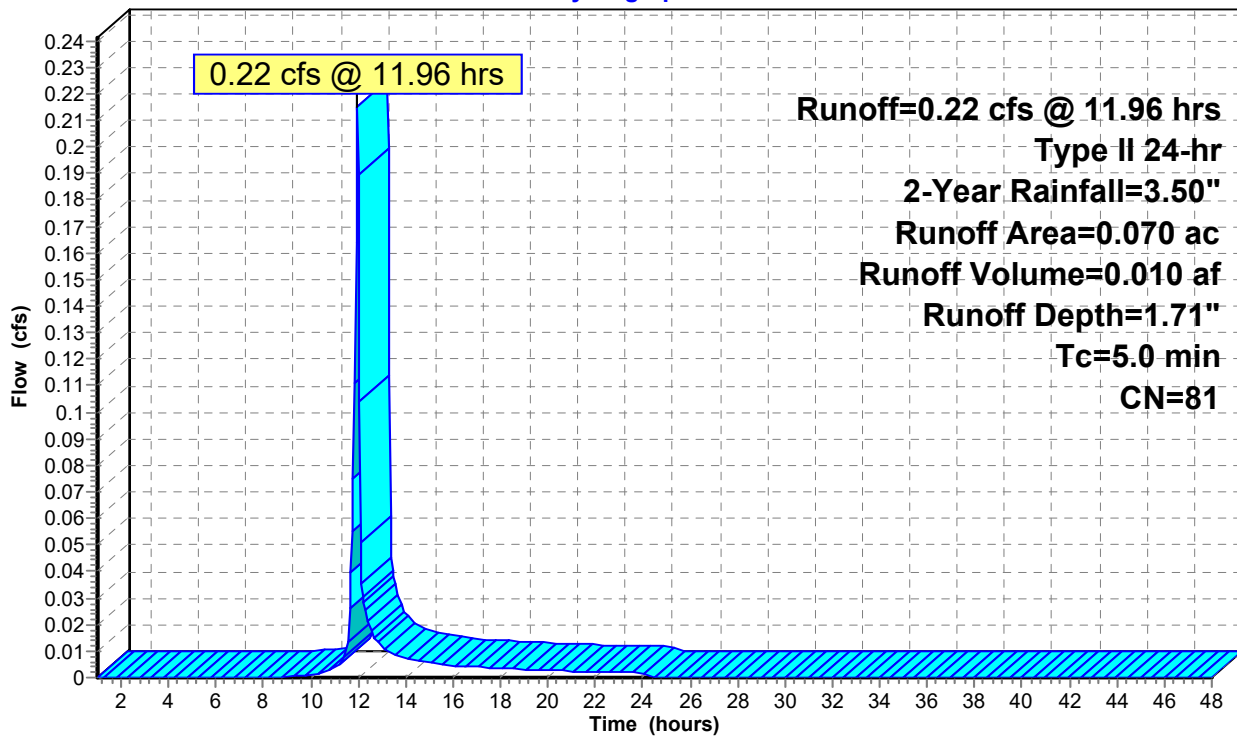
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, $dt=0.05$ hrs
Type II 24-hr 2-Year Rainfall=3.50"

Area (ac)	CN	Description
0.020	98	Paved parking, HSG C
0.050	74	>75% Grass cover, Good, HSG C
0.070	81	Weighted Average
0.050		71.43% Pervious Area
0.020		28.57% Impervious Area

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

Subcatchment 8S: AREA 7

Hydrograph



Runoff

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Type II 24-hr 2-Year Rainfall=3.50"

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Summary for Subcatchment 10S: AREA 4

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 1.65 cfs @ 11.95 hrs, Volume= 0.090 af, Depth= 3.27"

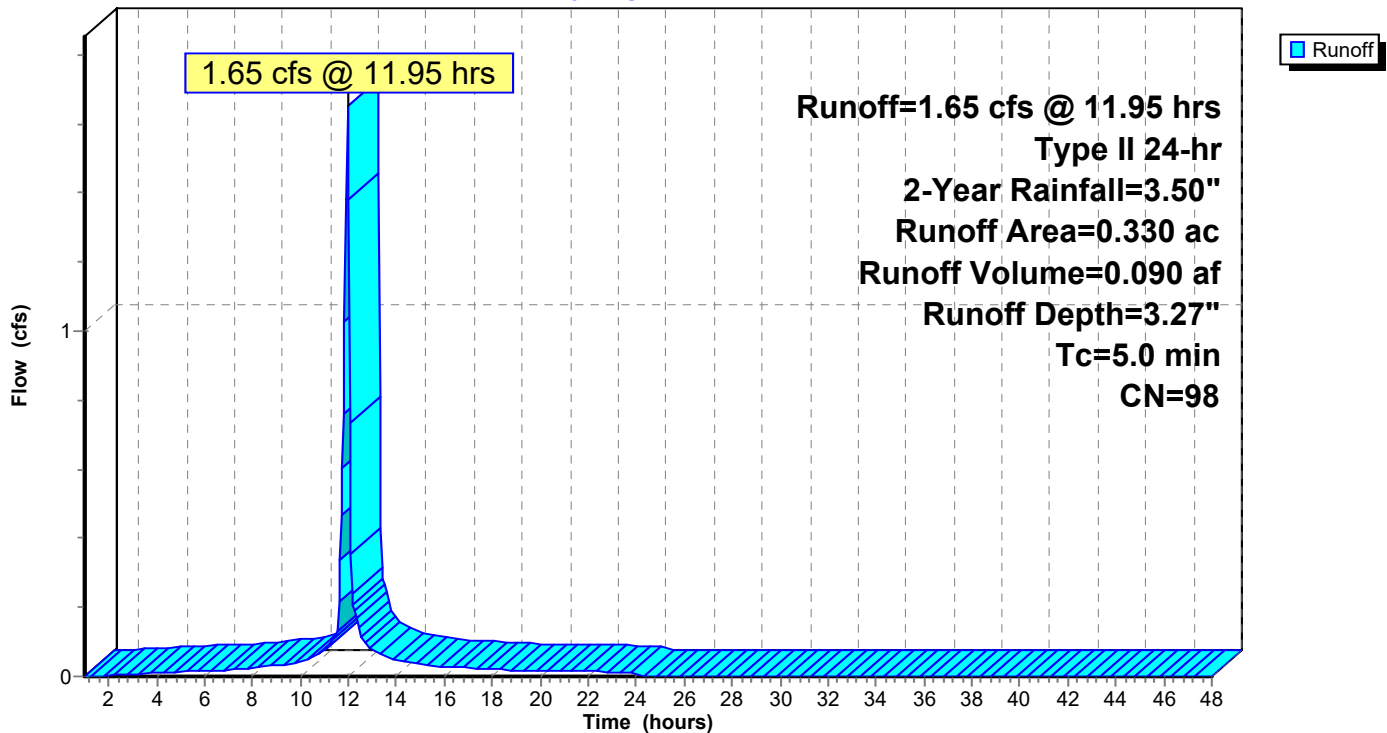
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, $dt=0.05$ hrs
Type II 24-hr 2-Year Rainfall=3.50"

Area (ac)	CN	Description
0.330	98	Roofs, HSG C
0.330		100.00% Impervious Area

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

Subcatchment 10S: AREA 4

Hydrograph



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Type II 24-hr 2-Year Rainfall=3.50"

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Summary for Subcatchment 20S: OFFSITE TO BMP

Runoff = 2.78 cfs @ 12.23 hrs, Volume= 0.276 af, Depth= 2.84"

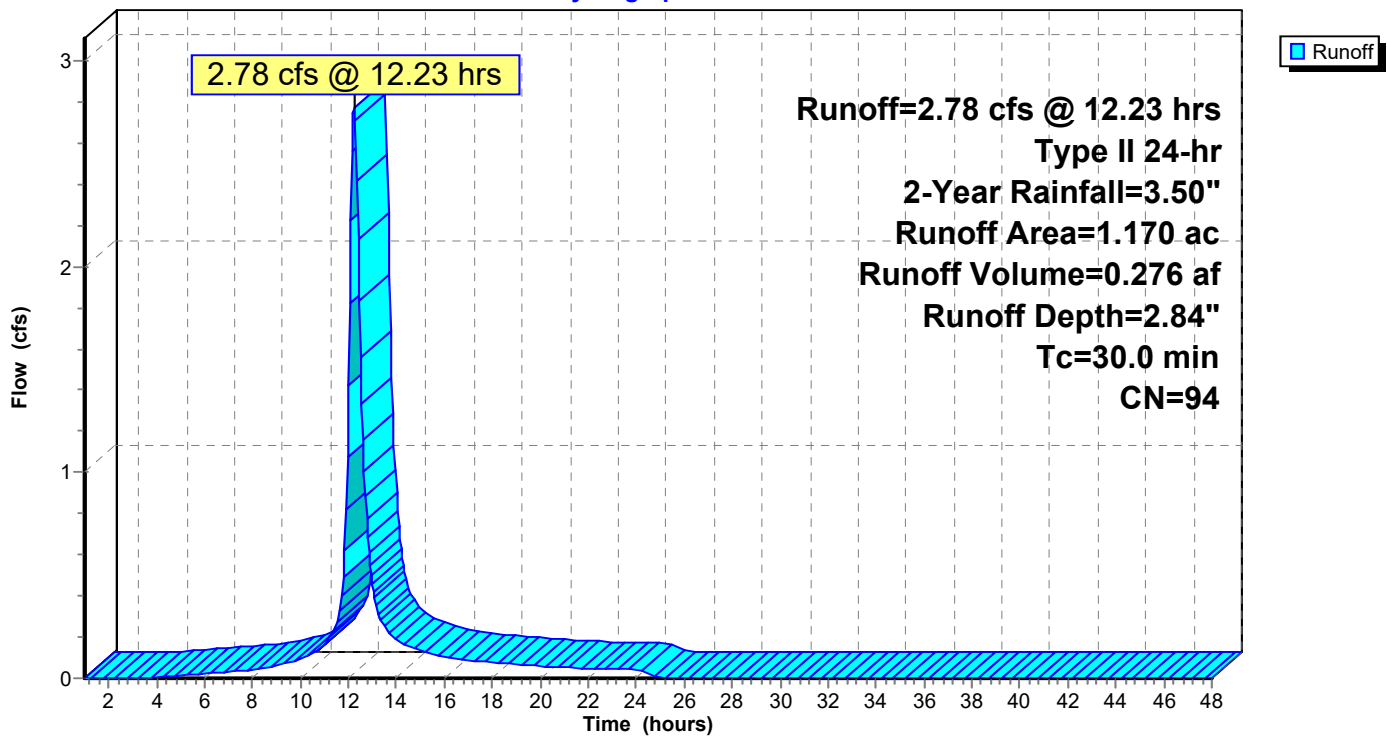
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-Year Rainfall=3.50"

Area (ac)	CN	Description
1.170	94	Urban commercial, 85% imp, HSG C
0.175		15.00% Pervious Area
0.994		85.00% Impervious Area

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

Subcatchment 20S: OFFSITE TO BMP

Hydrograph



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Type II 24-hr 2-Year Rainfall=3.50"

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Summary for Subcatchment 22S: OFFSITE TO CI 12

Runoff = 6.52 cfs @ 12.12 hrs, Volume= 0.513 af, Depth= 2.84"

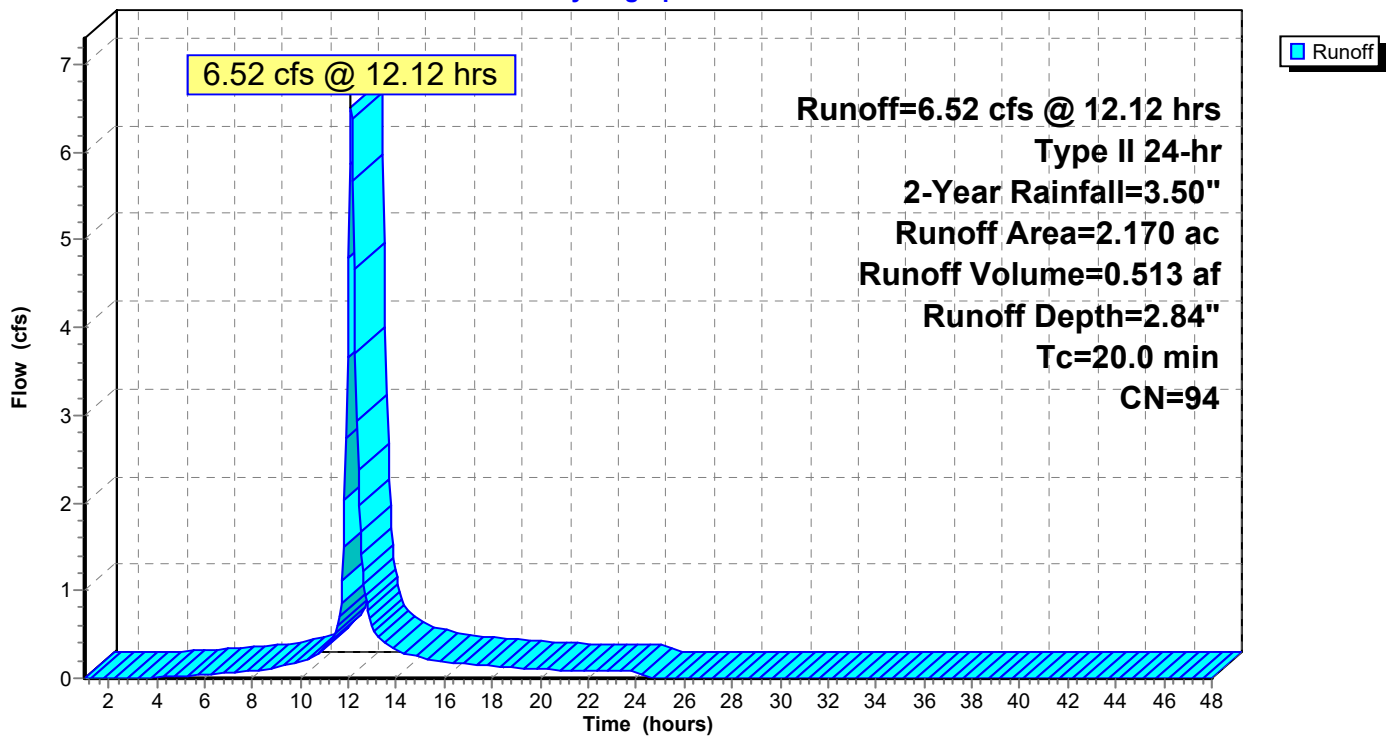
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-Year Rainfall=3.50"

Area (ac)	CN	Description
2.170	94	Urban commercial, 85% imp, HSG C
0.325		15.00% Pervious Area
1.844		85.00% Impervious Area

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

Subcatchment 22S: OFFSITE TO CI 12

Hydrograph



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Type II 24-hr 2-Year Rainfall=3.50"

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Summary for Subcatchment 25S: AREA TO AI 11

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.04 cfs @ 11.96 hrs, Volume= 0.002 af, Depth= 1.24"

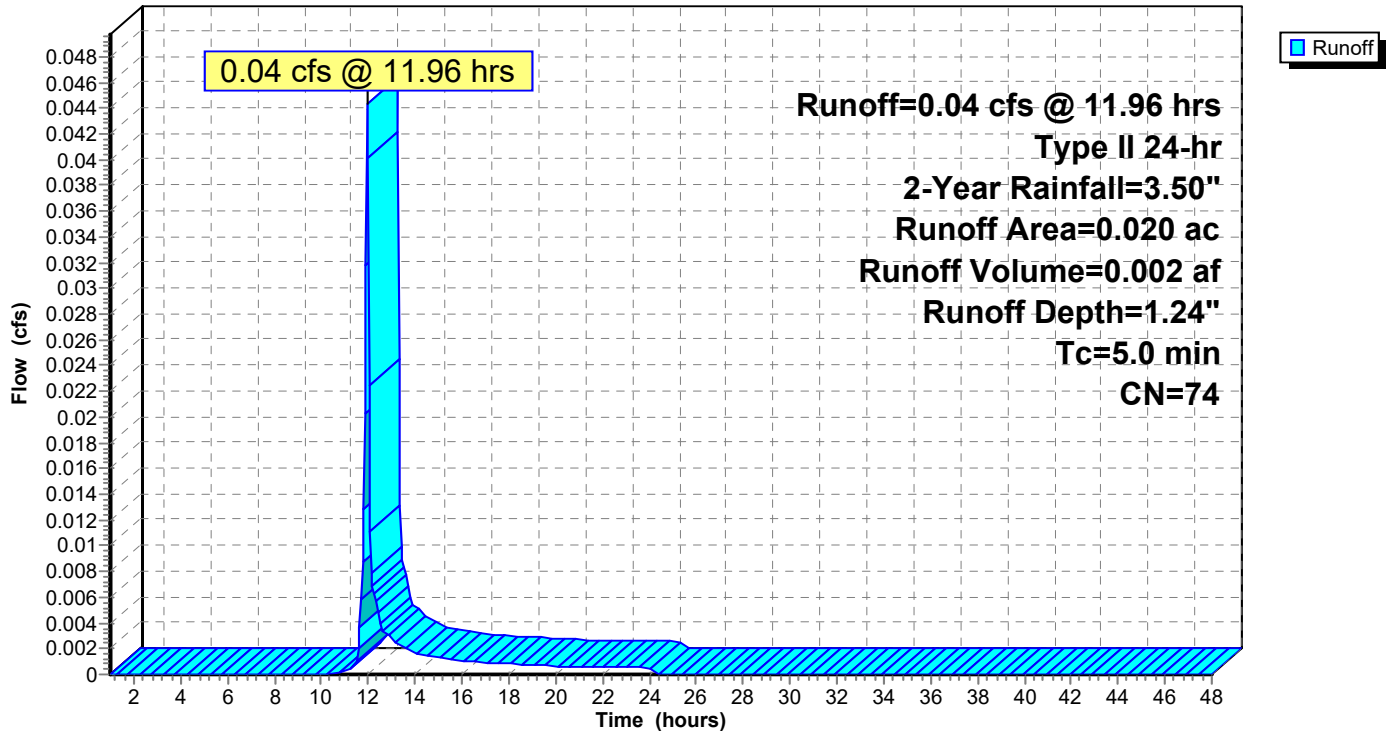
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, $dt=0.05$ hrs
Type II 24-hr 2-Year Rainfall=3.50"

Area (ac)	CN	Description
0.020	74	>75% Grass cover, Good, HSG C
0.020		100.00% Pervious Area

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

Subcatchment 25S: AREA TO AI 11

Hydrograph



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Type II 24-hr 2-Year Rainfall=3.50"

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Summary for Subcatchment 28S: PROPOSED CONDITIONS

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 6.76 cfs @ 11.96 hrs, Volume= 0.313 af, Depth= 1.78"

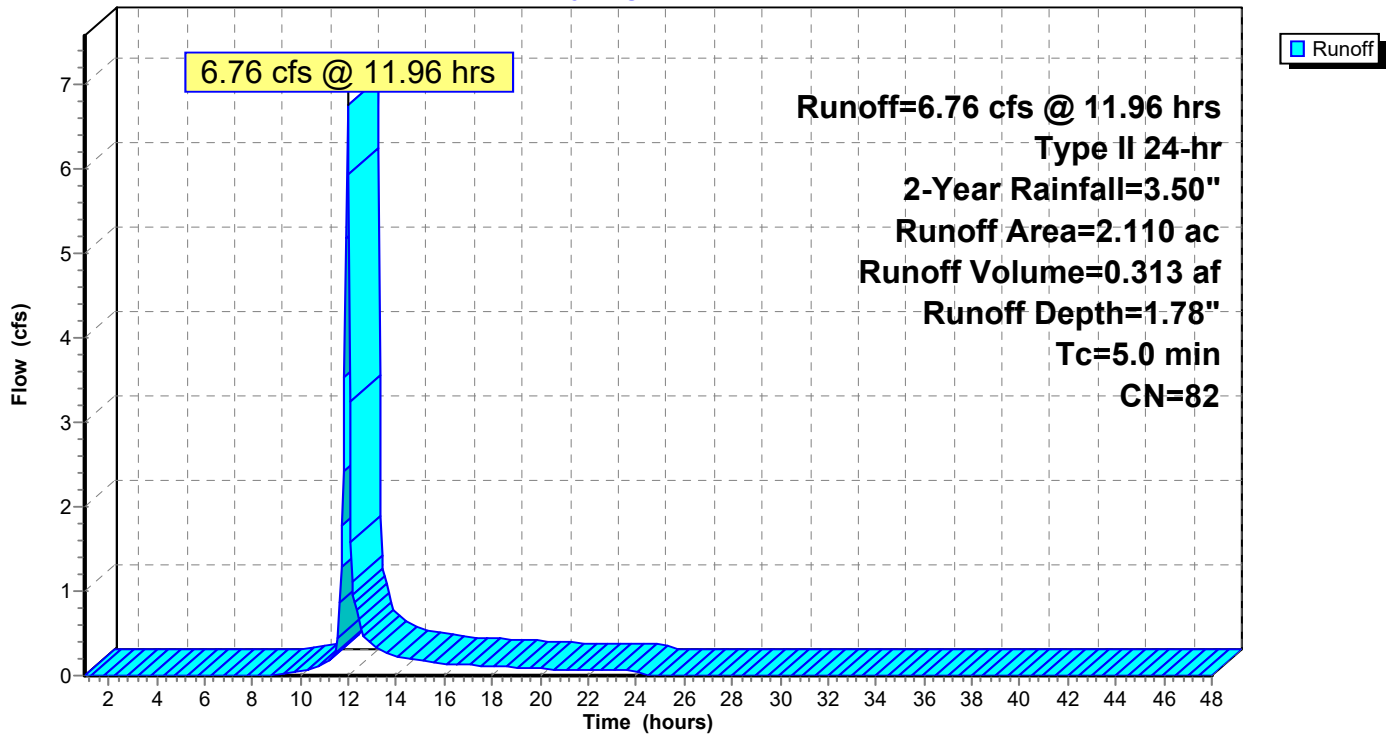
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, $dt=0.05$ hrs
Type II 24-hr 2-Year Rainfall=3.50"

Area (ac)	CN	Description
0.690	98	Paved parking, HSG C
1.420	74	>75% Grass cover, Good, HSG C
2.110	82	Weighted Average
1.420		67.30% Pervious Area
0.690		32.70% Impervious Area

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

Subcatchment 28S: PROPOSED CONDITIONS

Hydrograph



Summary for Pond 3P: ROOF DRAINS TO BASIN

[58] Hint: Peaked 3.55' above defined flood level

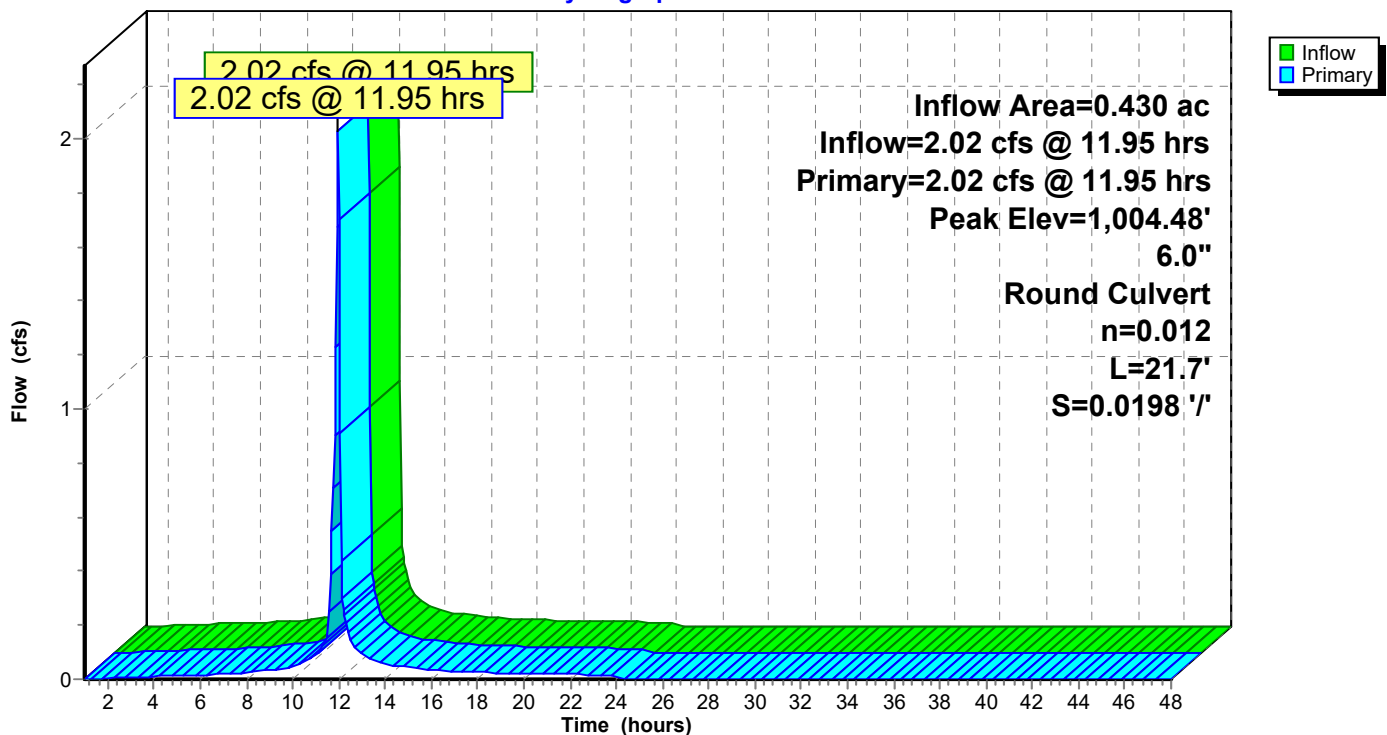
Inflow Area = 0.430 ac, 88.37% Impervious, Inflow Depth = 2.99" for 2-Year event
 Inflow = 2.02 cfs @ 11.95 hrs, Volume= 0.107 af
 Outflow = 2.02 cfs @ 11.95 hrs, Volume= 0.107 af, Atten= 0%, Lag= 0.0 min
 Primary = 2.02 cfs @ 11.95 hrs, Volume= 0.107 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs / 2

Peak Elev= 1,004.48' @ 11.95 hrs

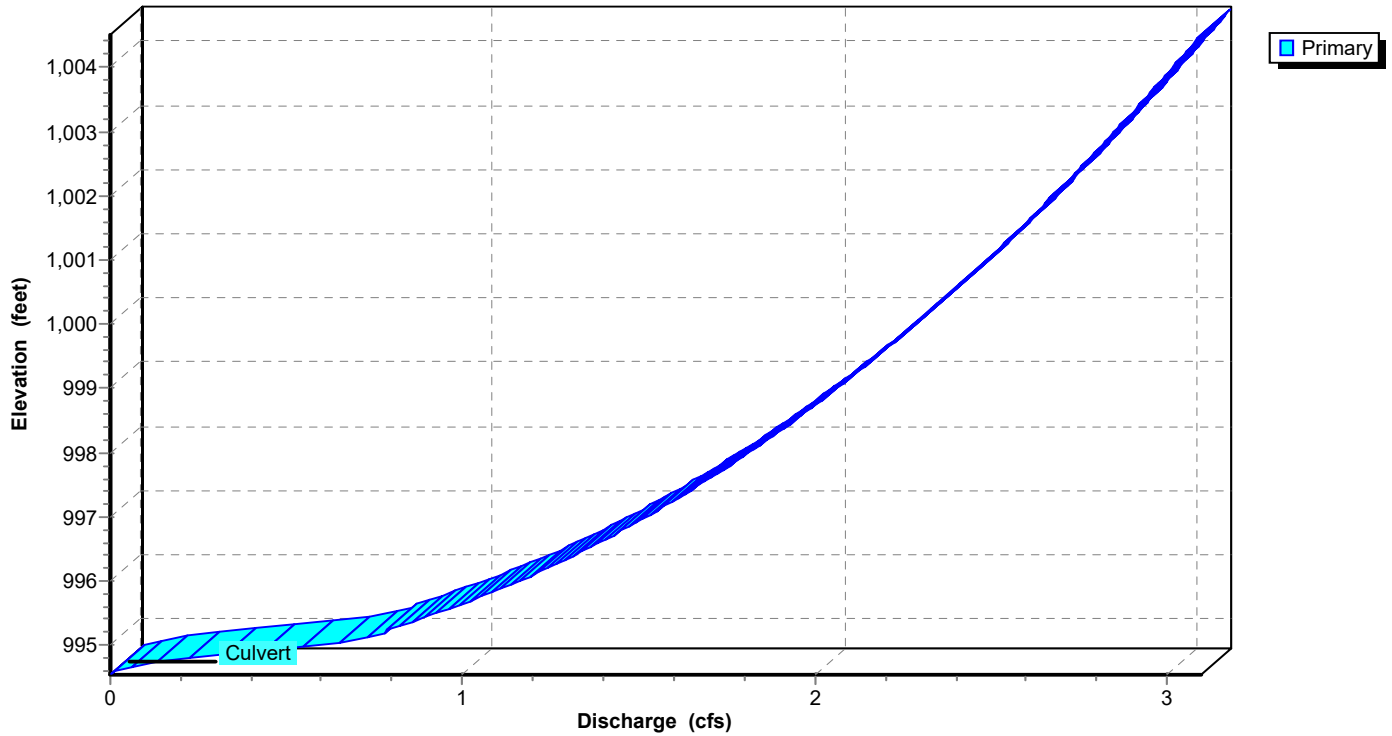
Flood Elev= 1,000.93'

Device	Routing	Invert	Outlet Devices
#1	Primary	994.54'	6.0" Round Culvert L= 21.7' RCP, rounded edge headwall, Ke= 0.100 Inlet / Outlet Invert= 994.54' / 994.11' S= 0.0198 '/ Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.20 sf

Primary OutFlow Max=1.94 cfs @ 11.95 hrs HW=1,004.41' TW=1,000.54' (Dynamic Tailwater)↑ **1=Culvert** (Outlet Controls 1.94 cfs @ 9.86 fps)**Pond 3P: ROOF DRAINS TO BASIN****Hydrograph**

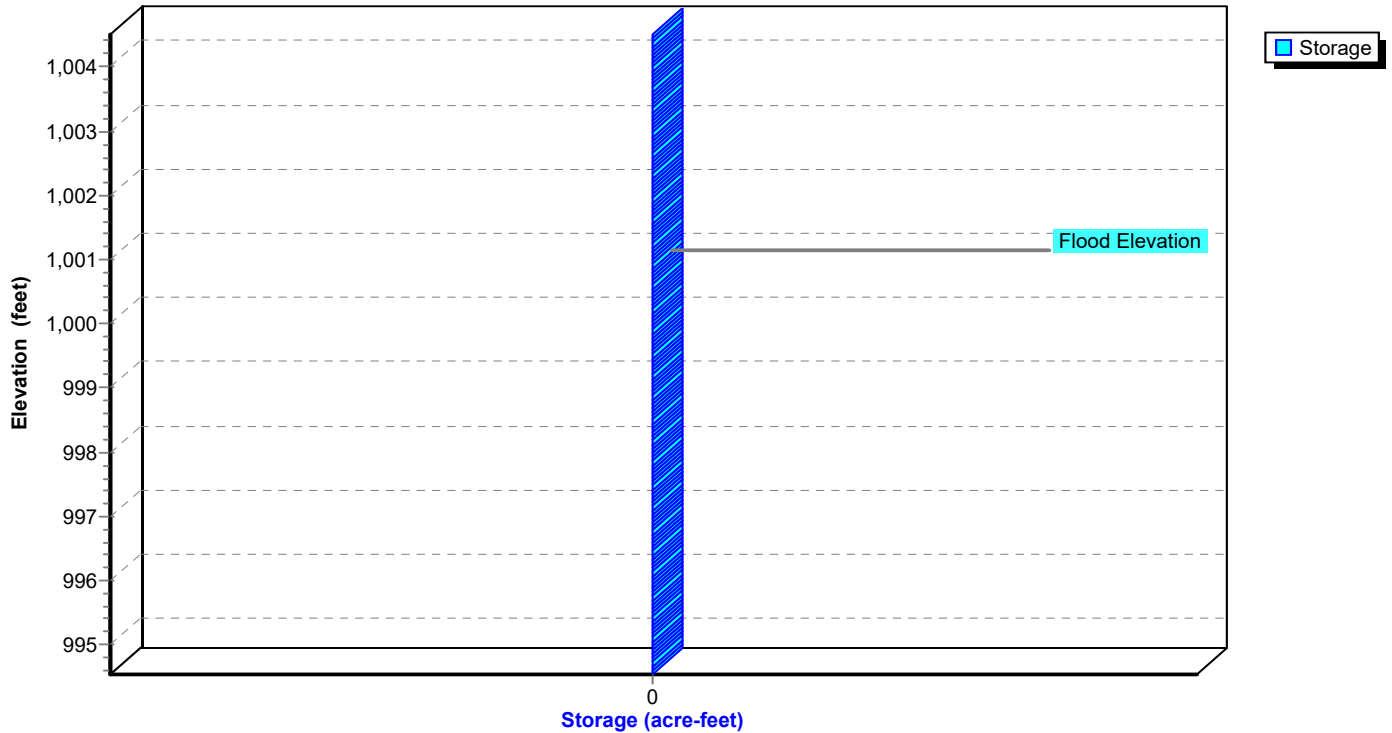
Pond 3P: ROOF DRAINS TO BASIN

Stage-Discharge



Pond 3P: ROOF DRAINS TO BASIN

Stage-Area-Storage



Summary for Pond 4R: 302-301

[58] Hint: Peaked 0.92' above defined flood level

Inflow Area = 0.210 ac, 71.43% Impervious, Inflow Depth = 2.54" for 2-Year event
 Inflow = 0.91 cfs @ 11.95 hrs, Volume= 0.044 af
 Outflow = 0.91 cfs @ 11.95 hrs, Volume= 0.044 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.91 cfs @ 11.95 hrs, Volume= 0.044 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs / 2

Peak Elev= 995.86' @ 12.22 hrs

Flood Elev= 994.94'

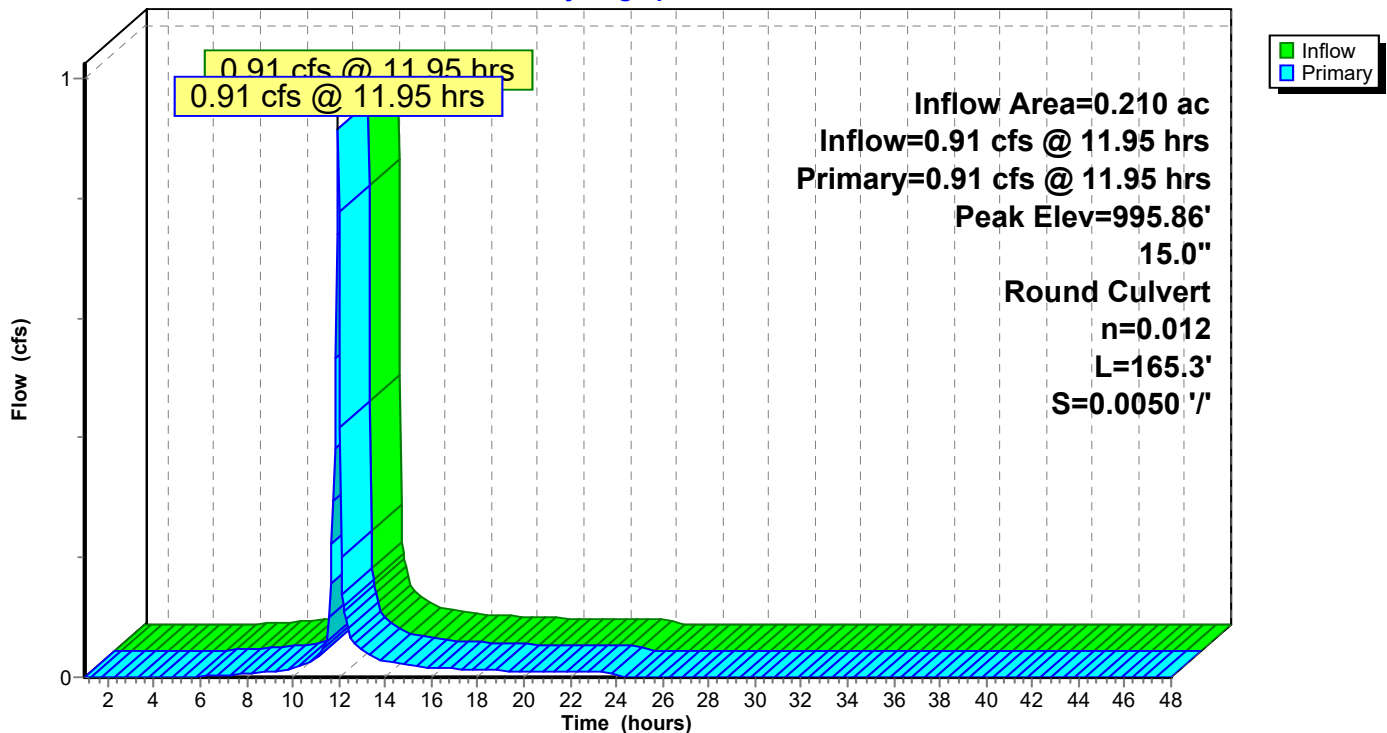
Device	Routing	Invert	Outlet Devices
#1	Primary	994.94'	15.0" Round Culvert L= 165.3' RCP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 994.94' / 994.11' S= 0.0050 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=0.00 cfs @ 11.95 hrs HW=995.77' TW=995.94' (Dynamic Tailwater)

↑ **1=Culvert** (Controls 0.00 cfs)

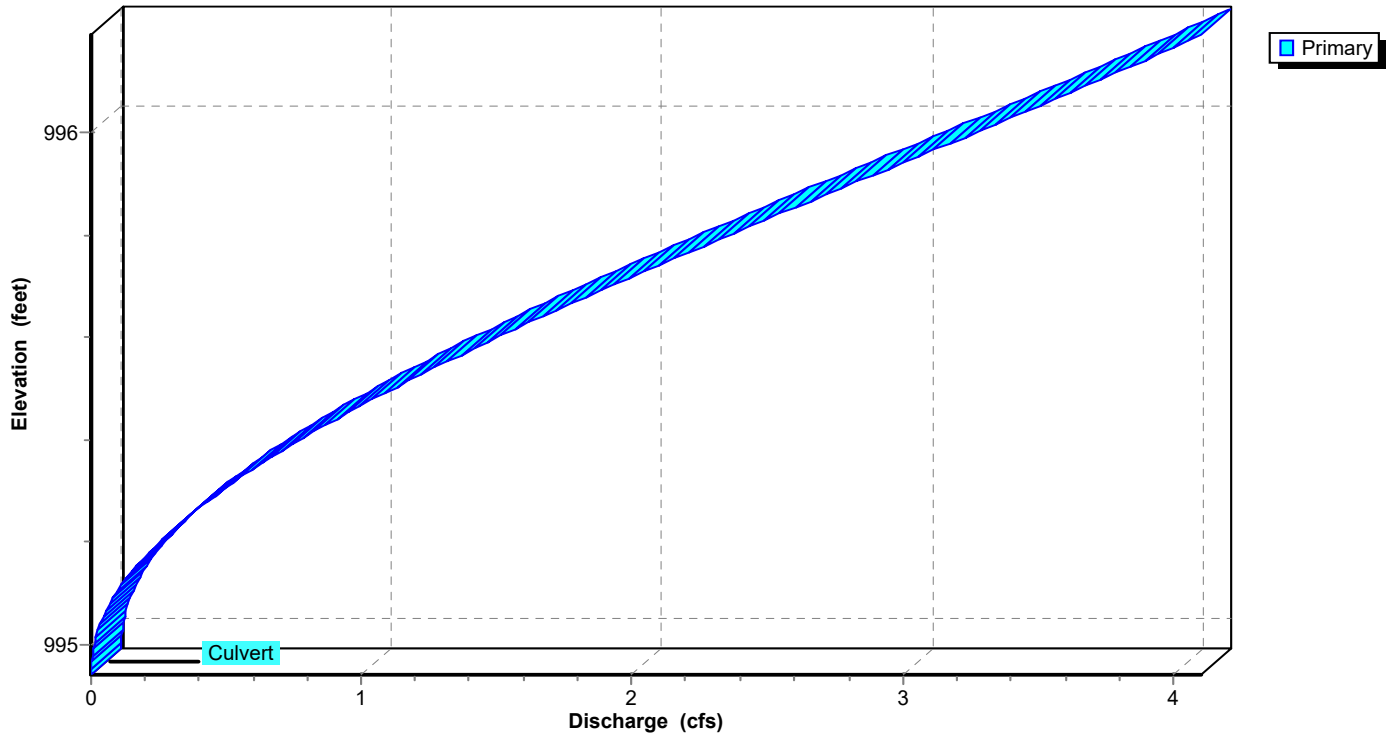
Pond 4R: 302-301

Hydrograph



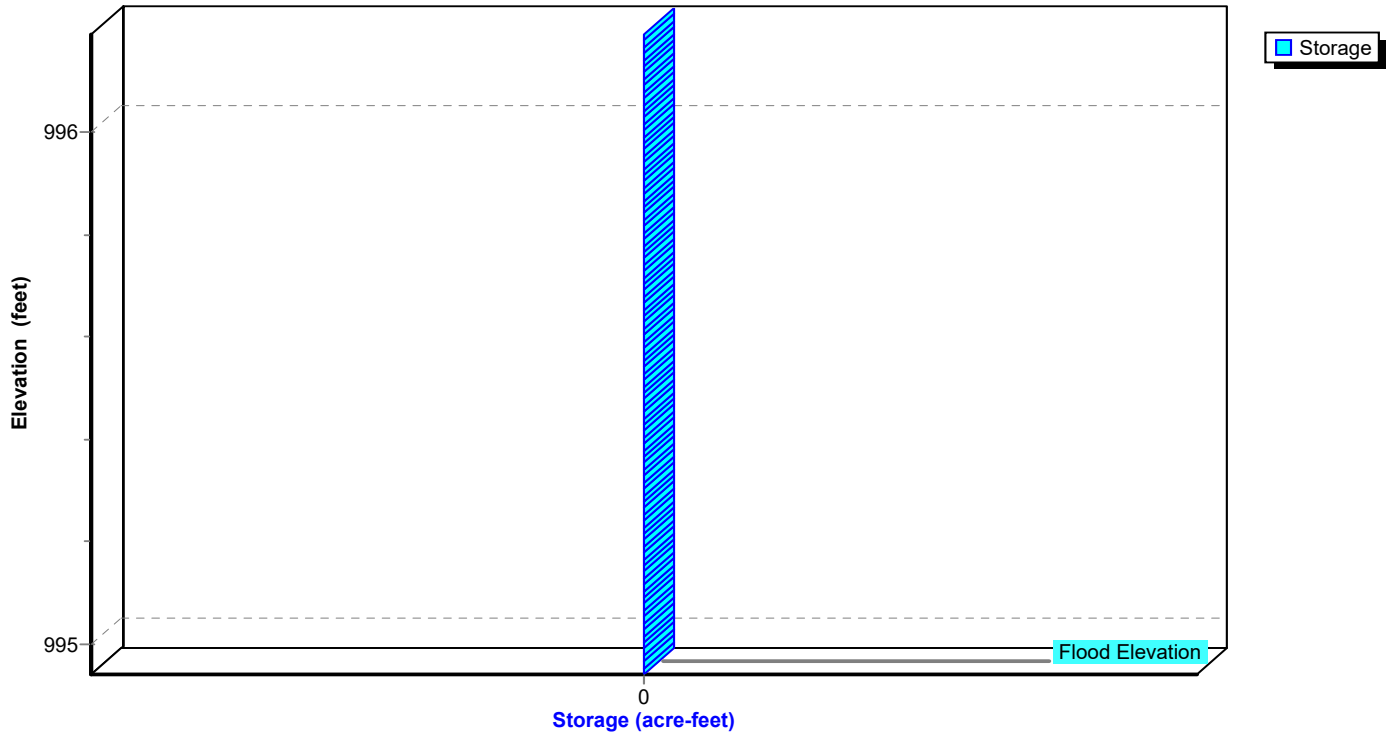
Pond 4R: 302-301

Stage-Discharge



Pond 4R: 302-301

Stage-Area-Storage



Summary for Pond 6P: 301-300

[80] Warning: Exceeded Pond 4R by 0.20' @ 12.00 hrs (1.51 cfs 0.019 af)

Inflow Area = 0.450 ac, 68.89% Impervious, Inflow Depth = 2.49" for 2-Year event
 Inflow = 1.93 cfs @ 11.95 hrs, Volume= 0.093 af
 Outflow = 1.93 cfs @ 11.95 hrs, Volume= 0.093 af, Atten= 0%, Lag= 0.0 min
 Primary = 1.93 cfs @ 11.95 hrs, Volume= 0.093 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs / 2

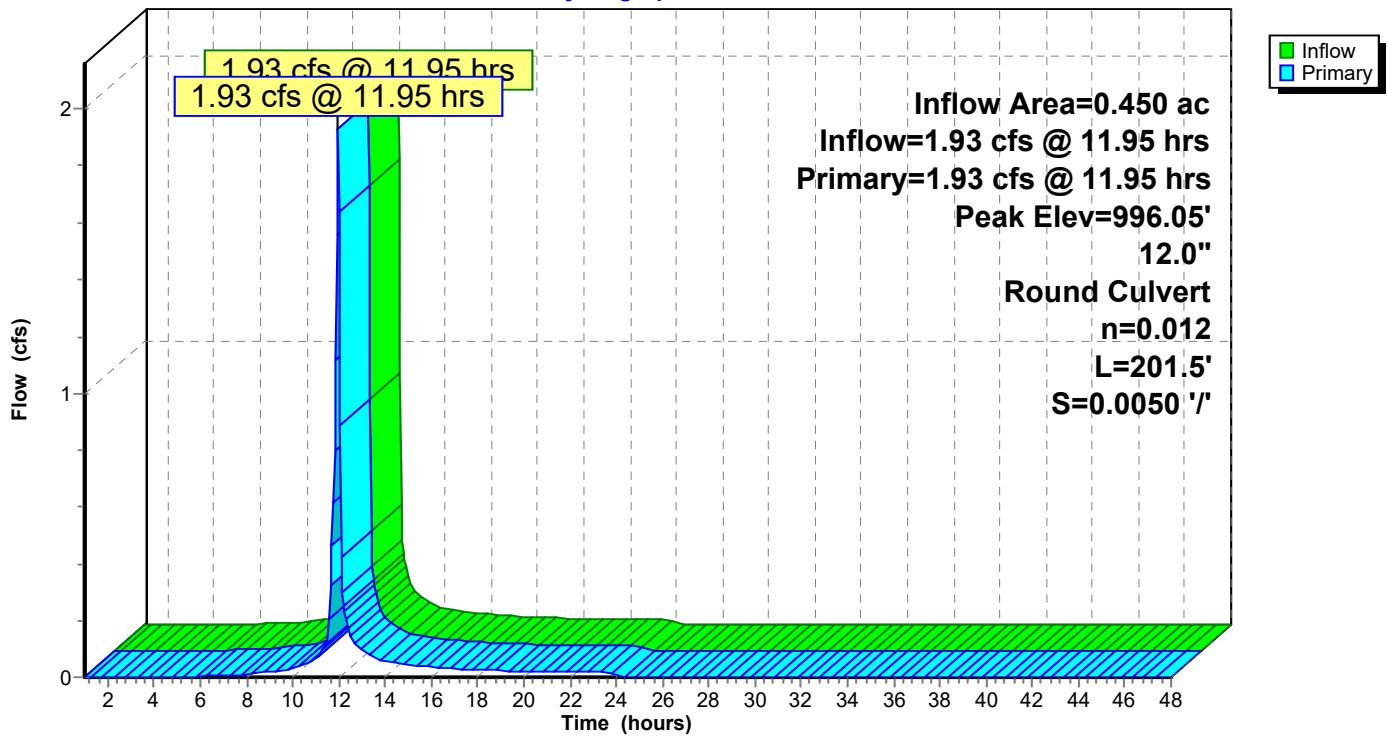
Peak Elev= 996.05' @ 12.00 hrs

Flood Elev= 998.82'

Device	Routing	Invert	Outlet Devices
#1	Primary	994.01'	12.0" Round 202-201 L= 201.5' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 994.01' / 993.00' S= 0.0050 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

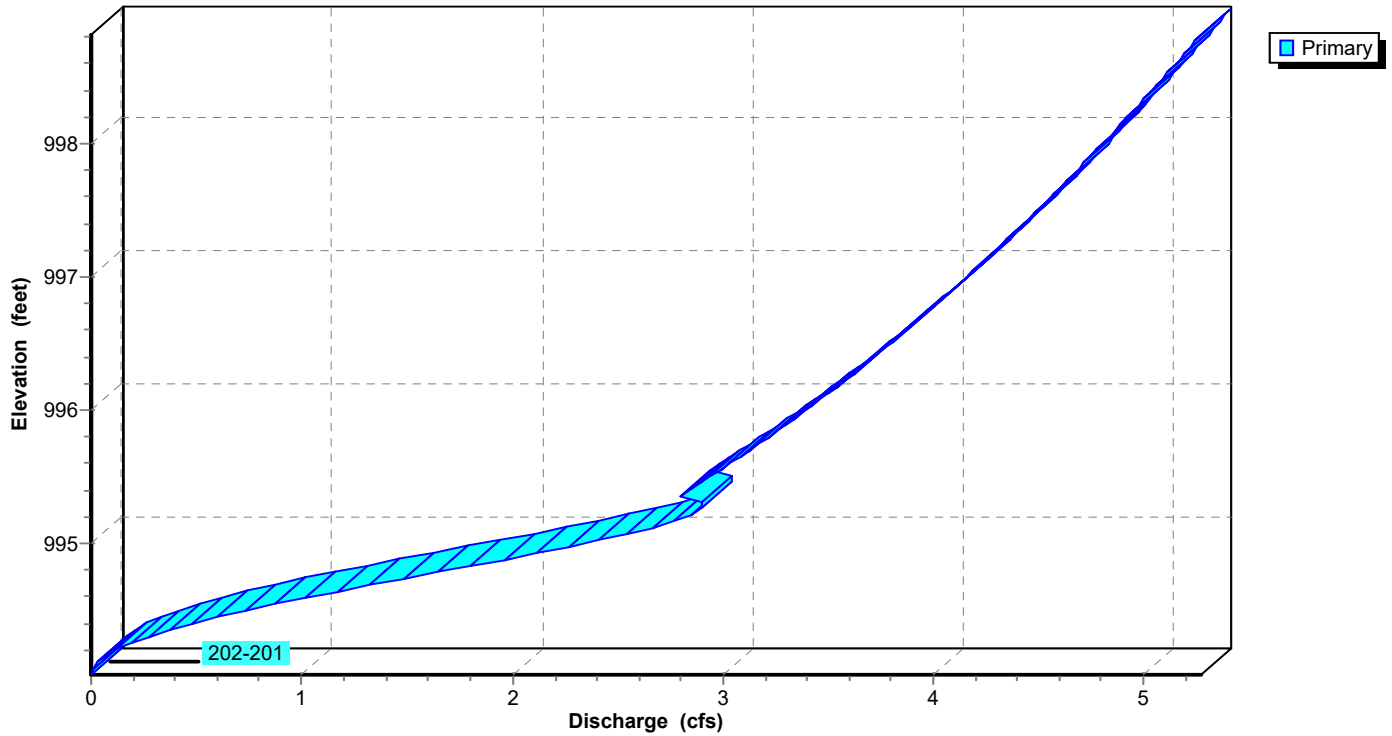
Primary OutFlow Max=1.91 cfs @ 11.95 hrs HW=995.94' TW=995.30' (Dynamic Tailwater)

↑ **1=202-201** (Outlet Controls 1.91 cfs @ 2.43 fps)

Pond 6P: 301-300**Hydrograph**

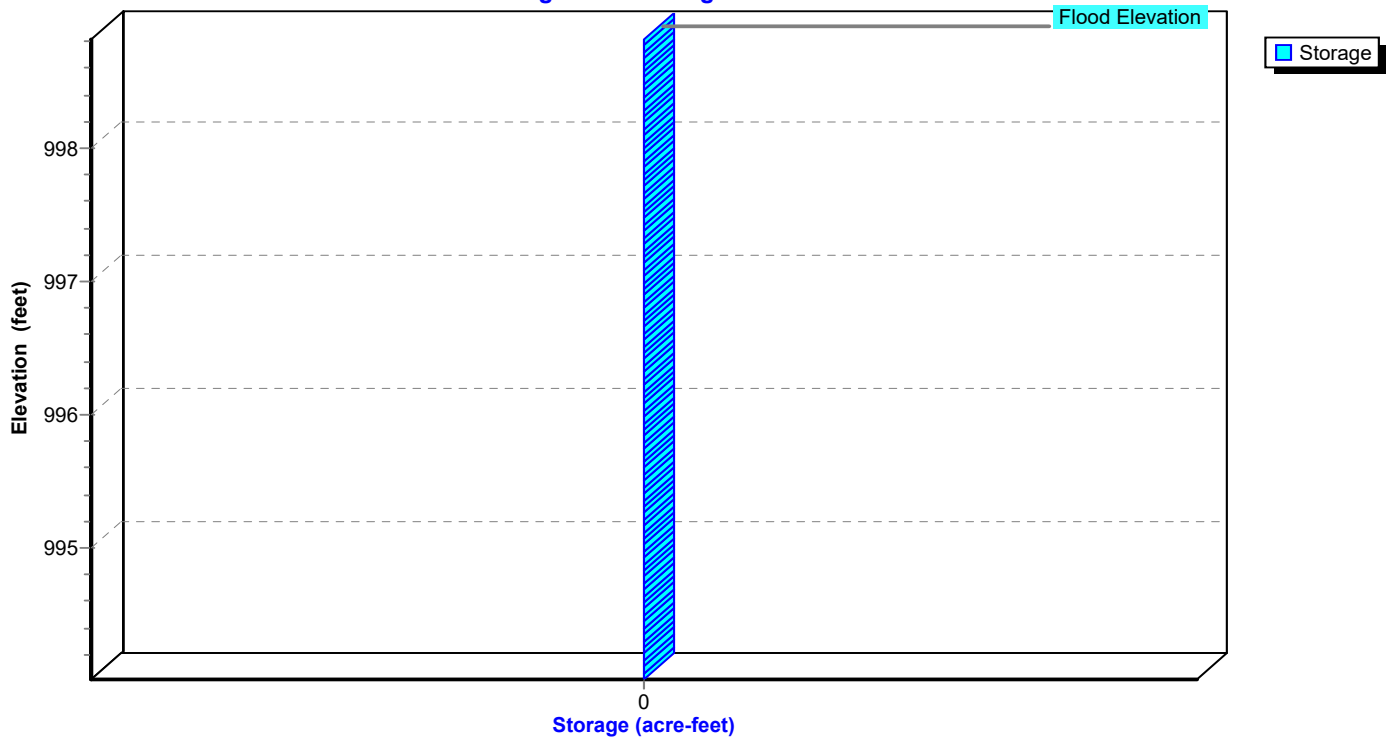
Pond 6P: 301-300

Stage-Discharge



Pond 6P: 301-300

Stage-Area-Storage



Summary for Pond 10P: BASIN REACH

Inflow Area = 0.430 ac, 88.37% Impervious, Inflow Depth = 2.99" for 2-Year event
 Inflow = 2.02 cfs @ 11.95 hrs, Volume= 0.107 af
 Outflow = 2.02 cfs @ 11.95 hrs, Volume= 0.107 af, Atten= 0%, Lag= 0.0 min
 Primary = 2.02 cfs @ 11.95 hrs, Volume= 0.107 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs / 2

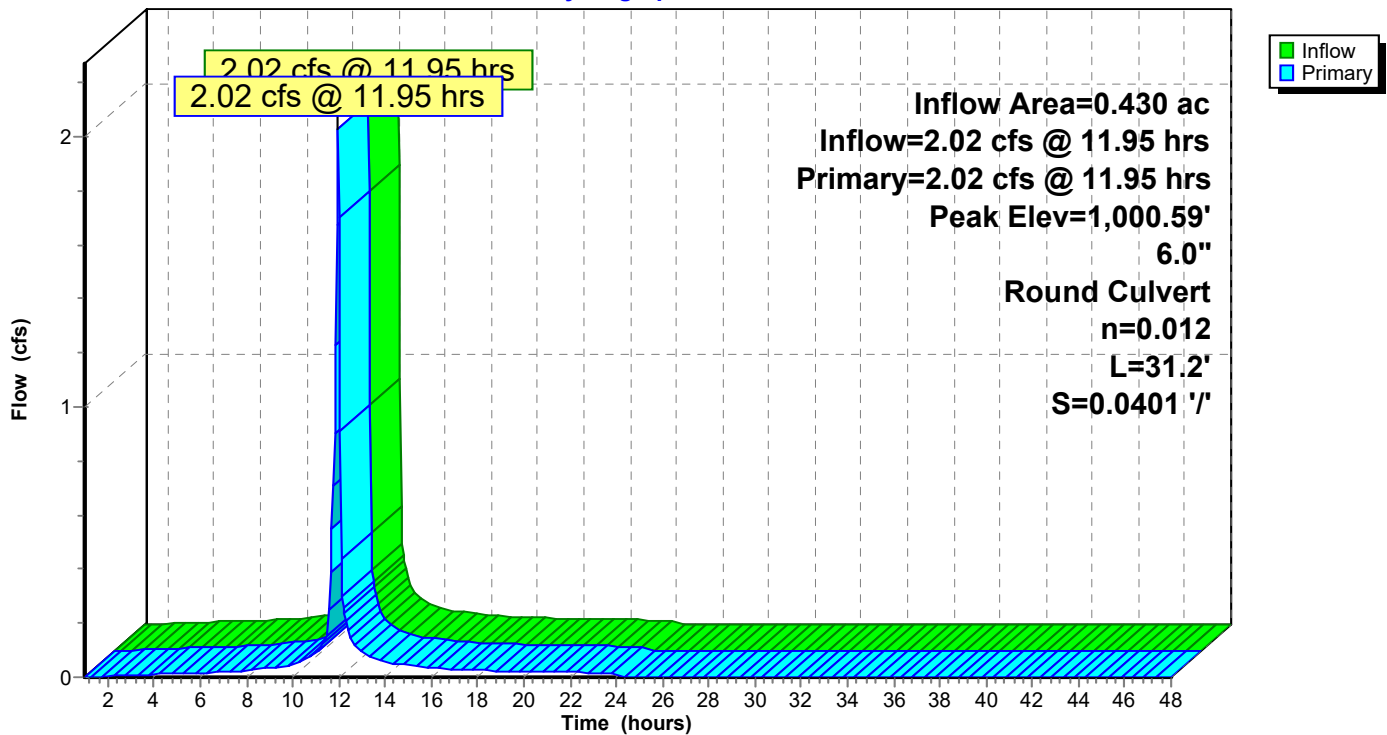
Peak Elev= 1,000.59' @ 11.96 hrs

Flood Elev= 1,000.67'

Device	Routing	Invert	Outlet Devices
#1	Primary	994.25'	6.0" Round Culvert L= 31.2' RCP, rounded edge headwall, Ke= 0.100 Inlet / Outlet Invert= 994.25' / 993.00' S= 0.0401 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.20 sf

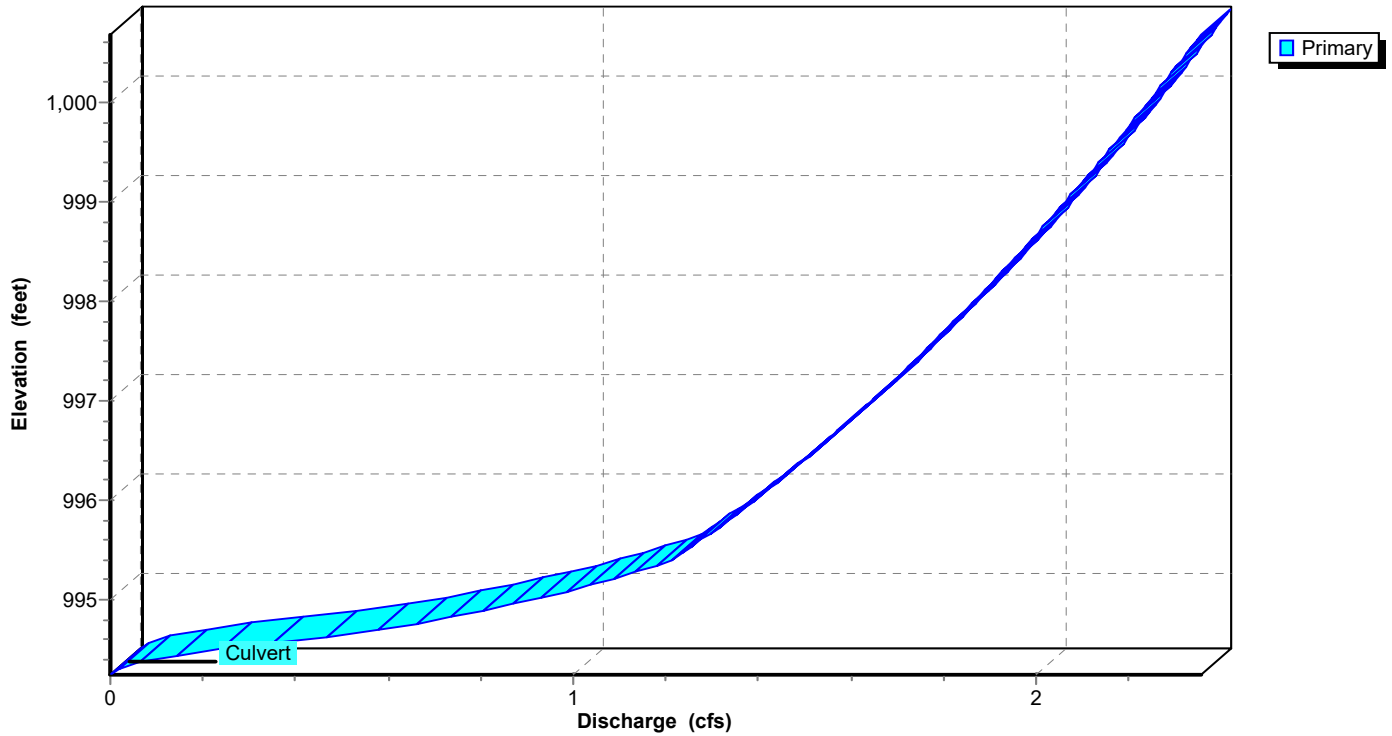
Primary OutFlow Max=2.02 cfs @ 11.95 hrs HW=1,000.54' TW=995.29' (Dynamic Tailwater)

↑**1=Culvert** (Outlet Controls 2.02 cfs @ 10.28 fps)

Pond 10P: BASIN REACH**Hydrograph**

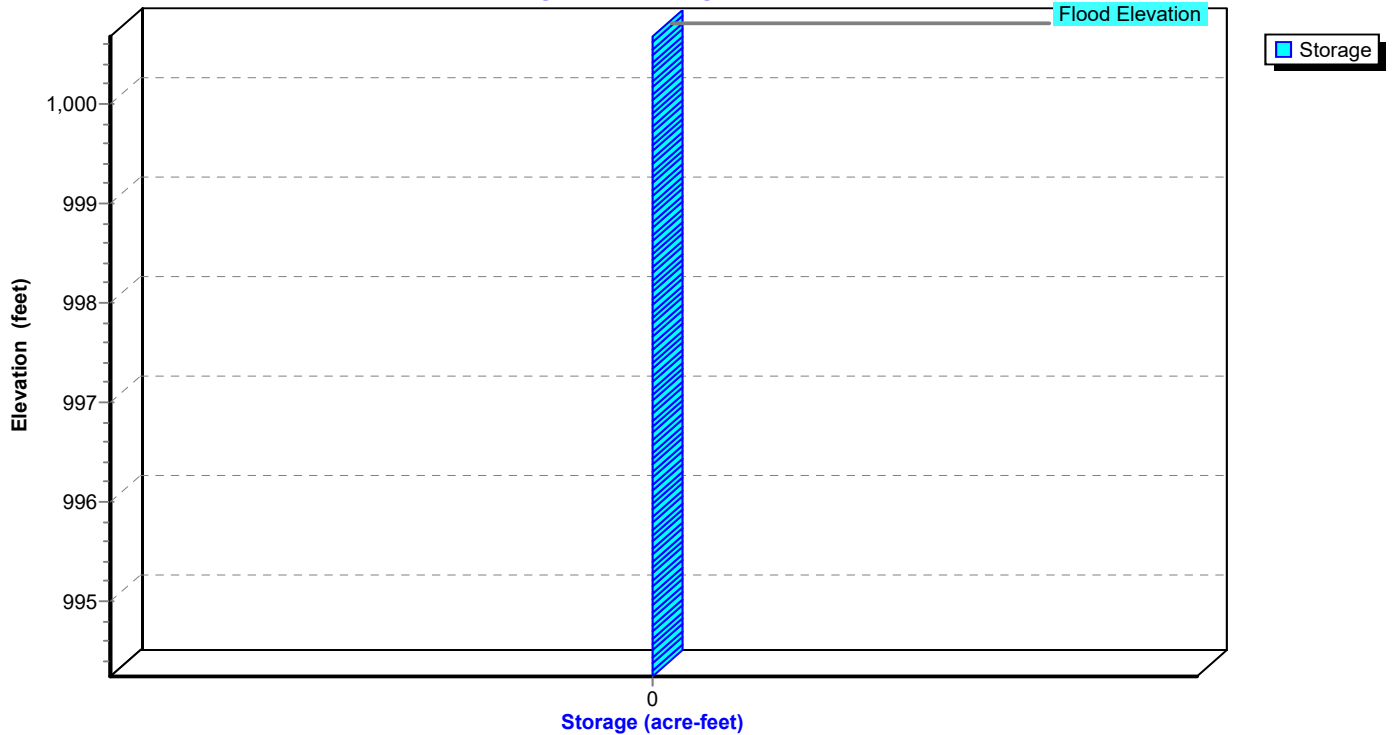
Pond 10P: BASIN REACH

Stage-Discharge



Pond 10P: BASIN REACH

Stage-Area-Storage



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Type II 24-hr 2-Year Rainfall=3.50"

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Summary for Pond 12P: DETENTION BASIN

Inflow Area = 1.320 ac, 64.39% Impervious, Inflow Depth = 2.44" for 2-Year event
 Inflow = 5.42 cfs @ 11.95 hrs, Volume= 0.269 af
 Outflow = 0.75 cfs @ 12.19 hrs, Volume= 0.269 af, Atten= 86%, Lag= 13.9 min
 Primary = 0.75 cfs @ 12.19 hrs, Volume= 0.269 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs / 2

Peak Elev= 995.85' @ 12.19 hrs Surf.Area= 3,015 sf Storage= 5,093 cf

Flood Elev= 999.00' Surf.Area= 6,484 sf Storage= 19,812 cf

Plug-Flow detention time= 135.0 min calculated for 0.269 af (100% of inflow)

Center-of-Mass det. time= 135.1 min (924.6 - 789.5)

Volume	Invert	Avail.Storage	Storage Description
#1	992.10'	19,812 cf	Custom Stage Data (Pyramidal) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
992.10	4	0	0	4
993.00	539	177	177	541
994.00	1,359	918	1,095	1,370
995.00	2,235	1,779	2,874	2,262
996.00	3,166	2,687	5,561	3,215
997.00	4,169	3,656	9,217	4,247
998.00	5,290	4,718	13,935	5,401
999.00	6,484	5,877	19,812	6,634

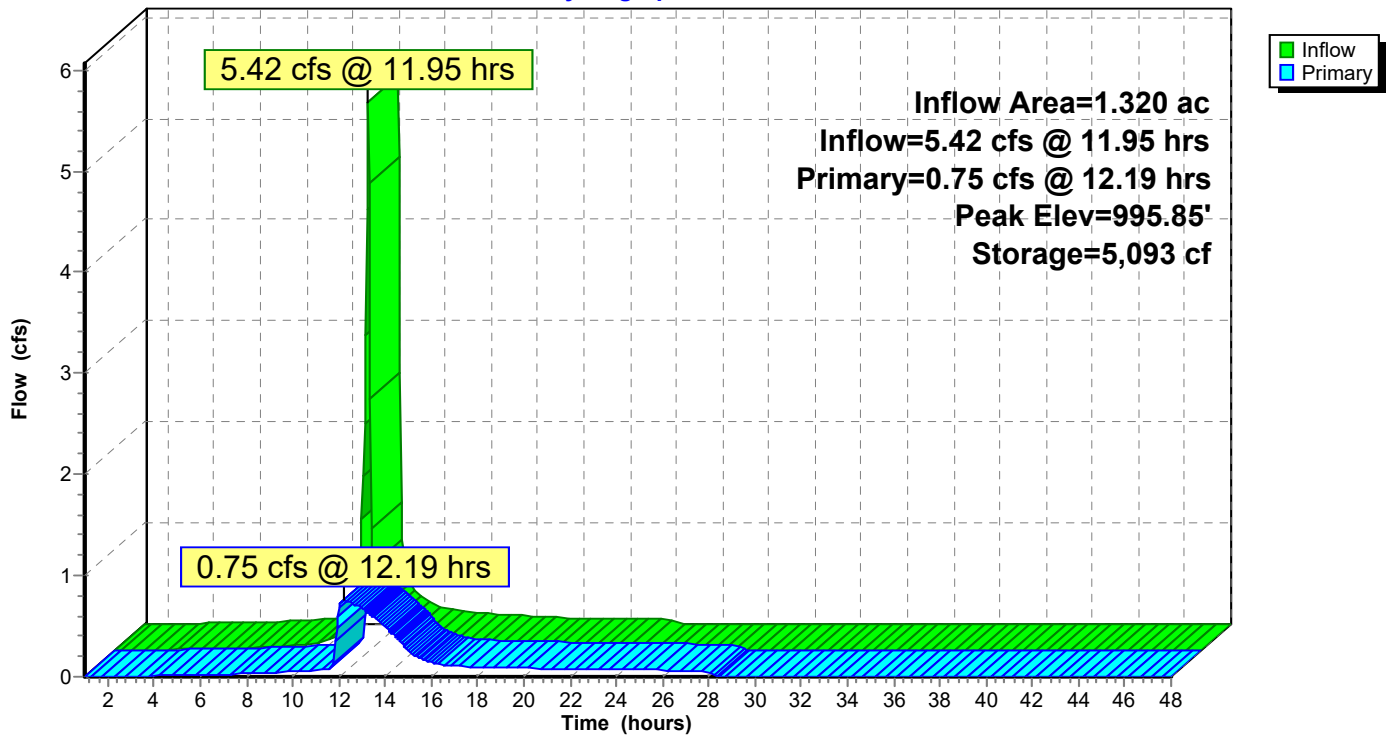
Device	Routing	Invert	Outlet Devices
#1	Primary	988.04'	18.0" Round Culvert L= 50.1' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 988.04' / 987.00' S= 0.0208 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf
#2	Device 1	992.10'	1.5" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	994.25'	4.0" W x 4.0" H Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#4	Device 1	996.00'	12.0" W x 6.0" H Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#5	Device 1	997.50'	4.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Primary OutFlow Max=0.75 cfs @ 12.19 hrs HW=995.85' TW=990.23' (Dynamic Tailwater)

1=Culvert (Passes 0.75 cfs of 23.89 cfs potential flow)
 2=Orifice/Grate (Orifice Controls 0.11 cfs @ 9.24 fps)
 3=Orifice/Grate (Orifice Controls 0.64 cfs @ 5.76 fps)
 4=Orifice/Grate (Controls 0.00 cfs)
 5=Sharp-Crested Rectangular Weir (Controls 0.00 cfs)

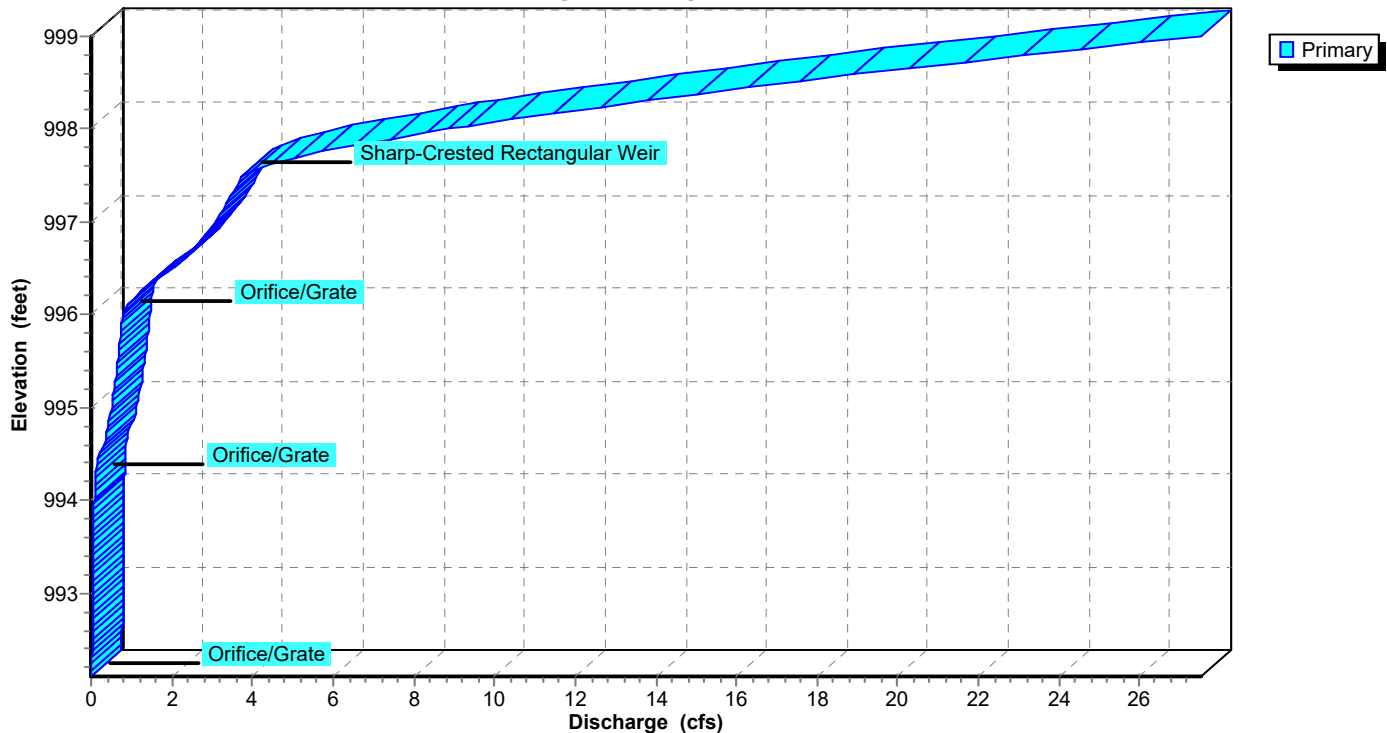
Pond 12P: DETENTION BASIN

Hydrograph



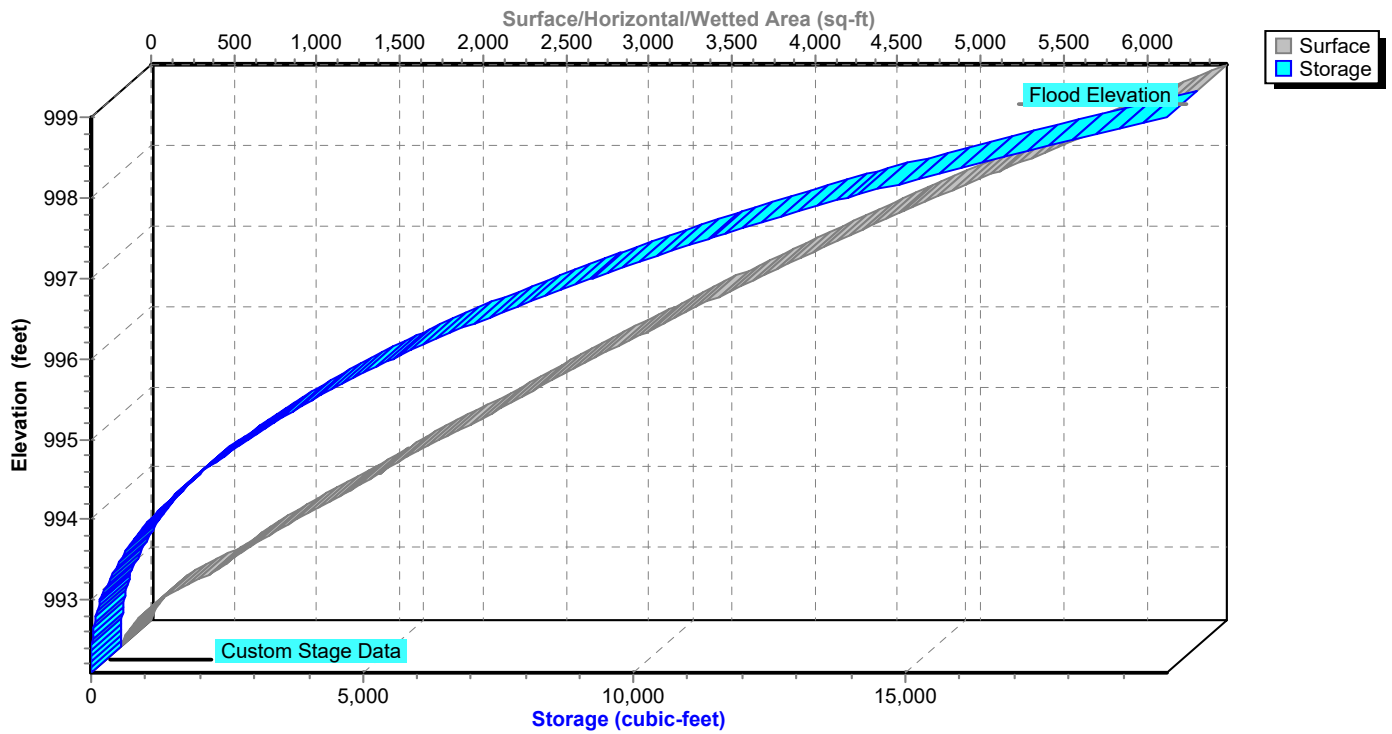
Pond 12P: DETENTION BASIN

Stage-Discharge



Pond 12P: DETENTION BASIN

Stage-Area-Storage



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Type II 24-hr 2-Year Rainfall=3.50"

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Summary for Pond 24P: 12-11

[58] Hint: Peaked 2.90' above defined flood level

Inflow Area = 2.170 ac, 85.00% Impervious, Inflow Depth = 2.84" for 2-Year event
Inflow = 6.52 cfs @ 12.12 hrs, Volume= 0.513 af
Outflow = 6.52 cfs @ 12.12 hrs, Volume= 0.513 af, Atten= 0%, Lag= 0.0 min
Primary = 6.52 cfs @ 12.12 hrs, Volume= 0.513 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs / 2

Peak Elev= 996.20' @ 12.12 hrs

Flood Elev= 993.30'

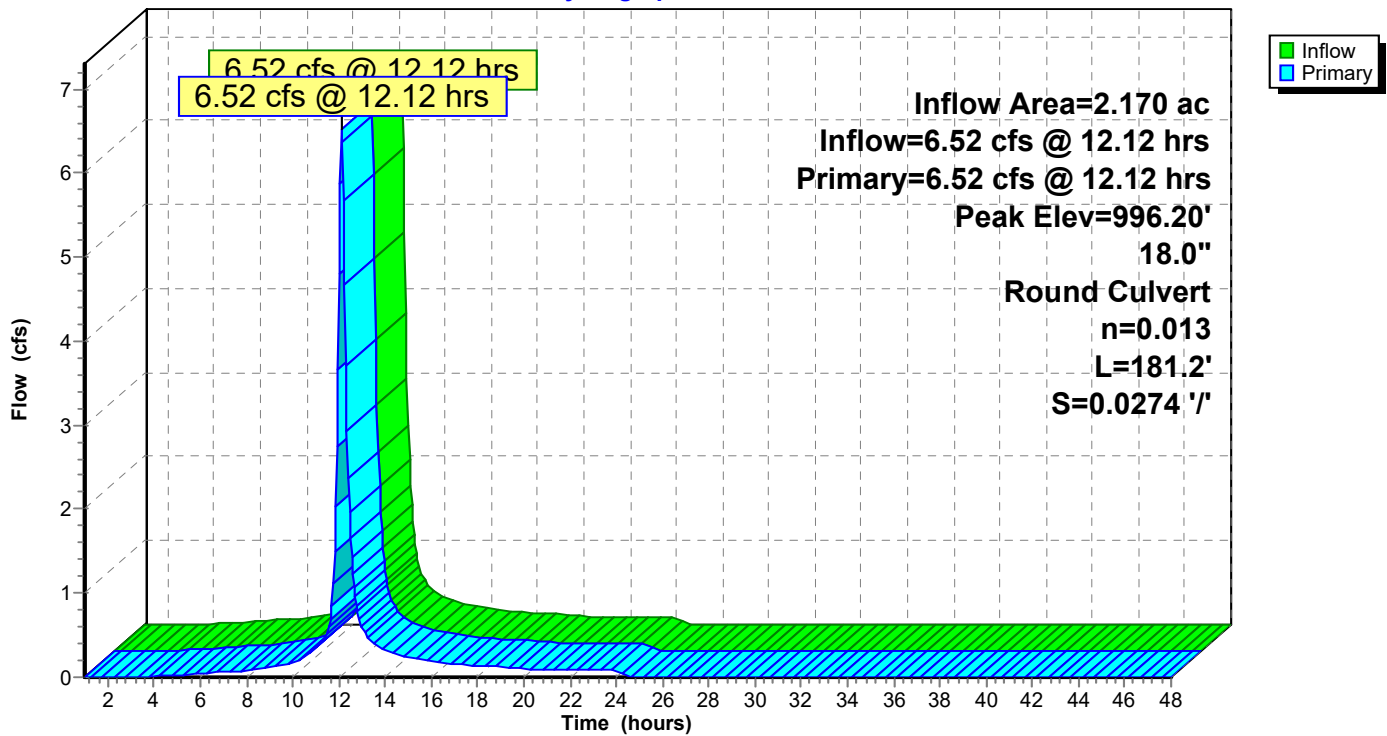
Device	Routing	Invert	Outlet Devices
#1	Primary	994.87'	18.0" Round Culvert L= 181.2' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 994.87' / 989.91' S= 0.0274 '/ Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.77 sf

Primary OutFlow Max=6.44 cfs @ 12.12 hrs HW=996.19' TW=990.26' (Dynamic Tailwater)

↑ **1=Culvert** (Inlet Controls 6.44 cfs @ 3.91 fps)

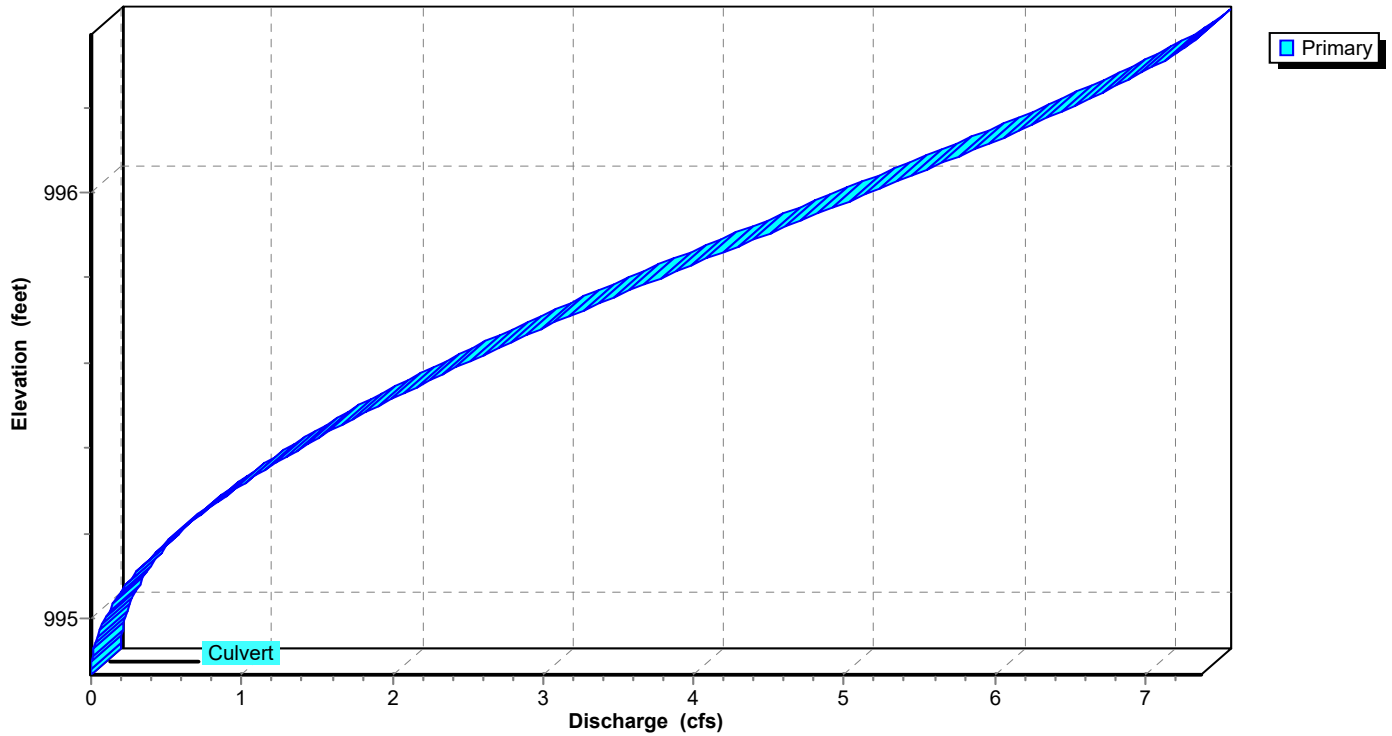
Pond 24P: 12-11

Hydrograph



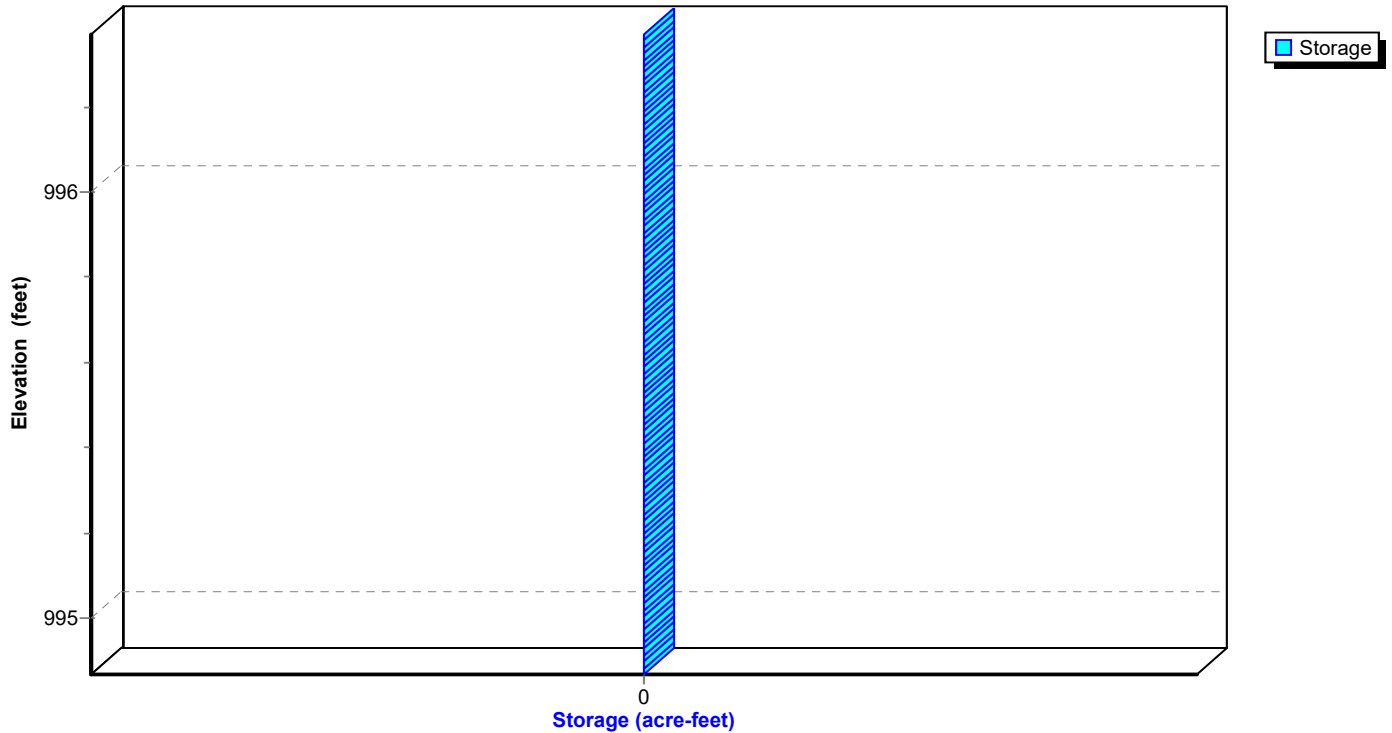
Pond 24P: 12-11

Stage-Discharge



Pond 24P: 12-11

Stage-Area-Storage



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Type II 24-hr 2-Year Rainfall=3.50"

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Summary for Pond 26P: 11 - 100 MH

Inflow Area = 4.680 ac, 78.82% Impervious, Inflow Depth = 2.72" for 2-Year event
Inflow = 9.70 cfs @ 12.14 hrs, Volume= 1.060 af
Outflow = 9.70 cfs @ 12.14 hrs, Volume= 1.060 af, Atten= 0%, Lag= 0.0 min
Primary = 9.70 cfs @ 12.14 hrs, Volume= 1.060 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs / 2

Peak Elev= 990.29' @ 12.14 hrs

Flood Elev= 995.00'

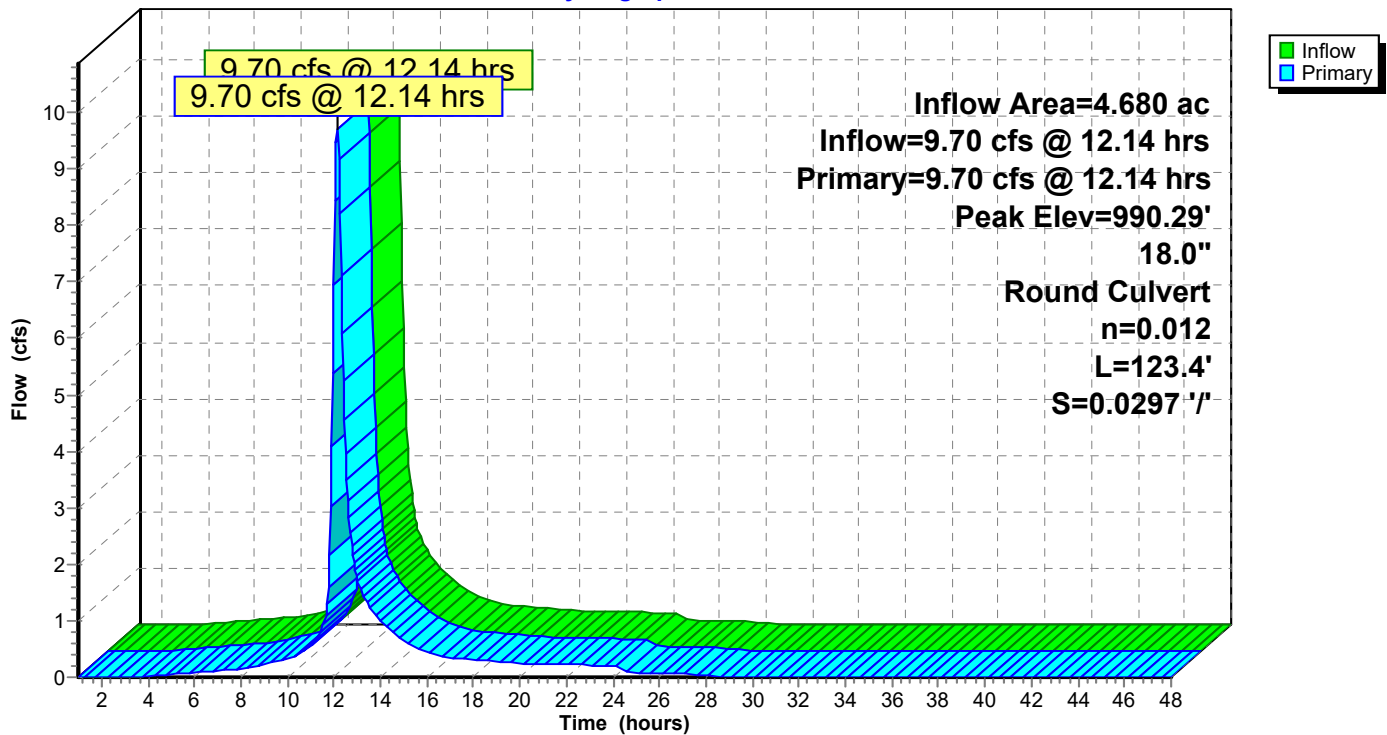
Device	Routing	Invert	Outlet Devices
#1	Primary	988.71'	18.0" Round Culvert L= 123.4' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 988.71' / 985.04' S= 0.0297 '/ Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=9.65 cfs @ 12.14 hrs HW=990.28' TW=986.61' (Dynamic Tailwater)

↑**1=Culvert** (Inlet Controls 9.65 cfs @ 5.46 fps)

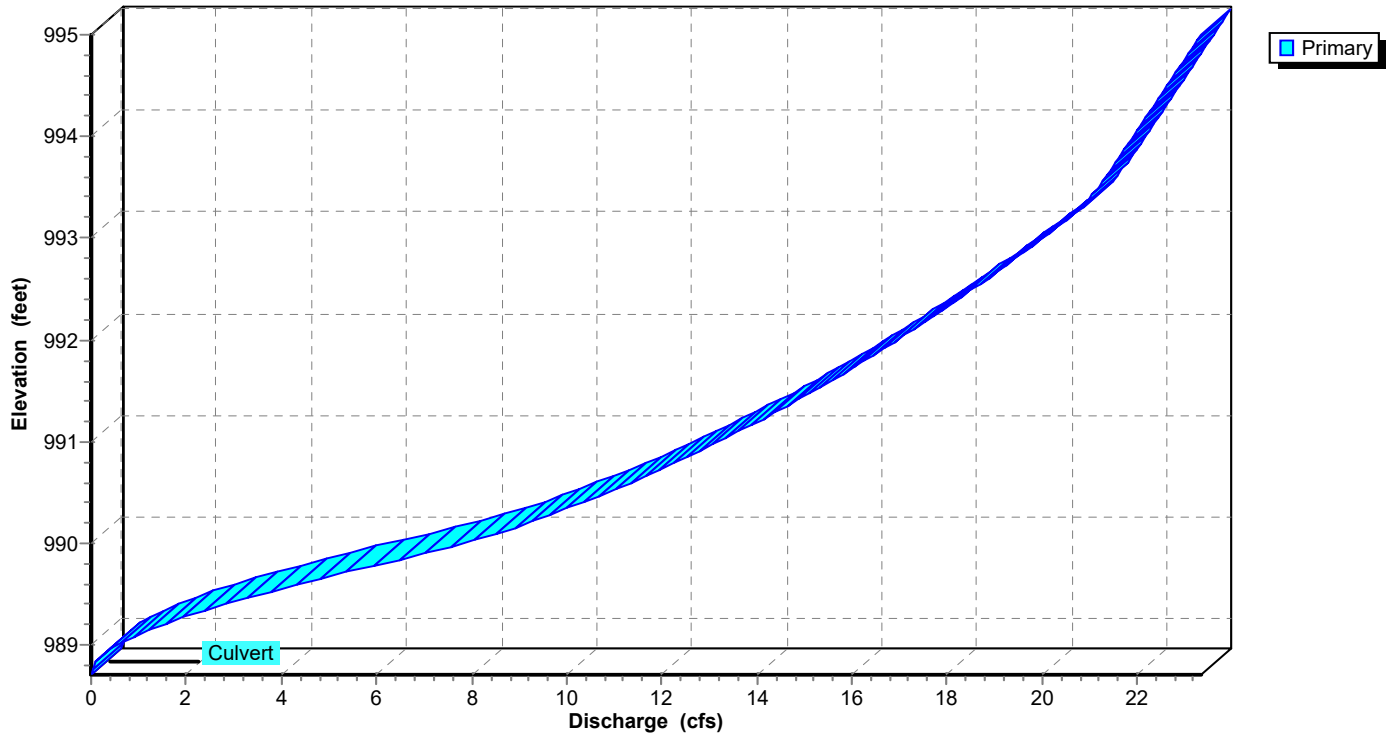
Pond 26P: 11 - 100 MH

Hydrograph



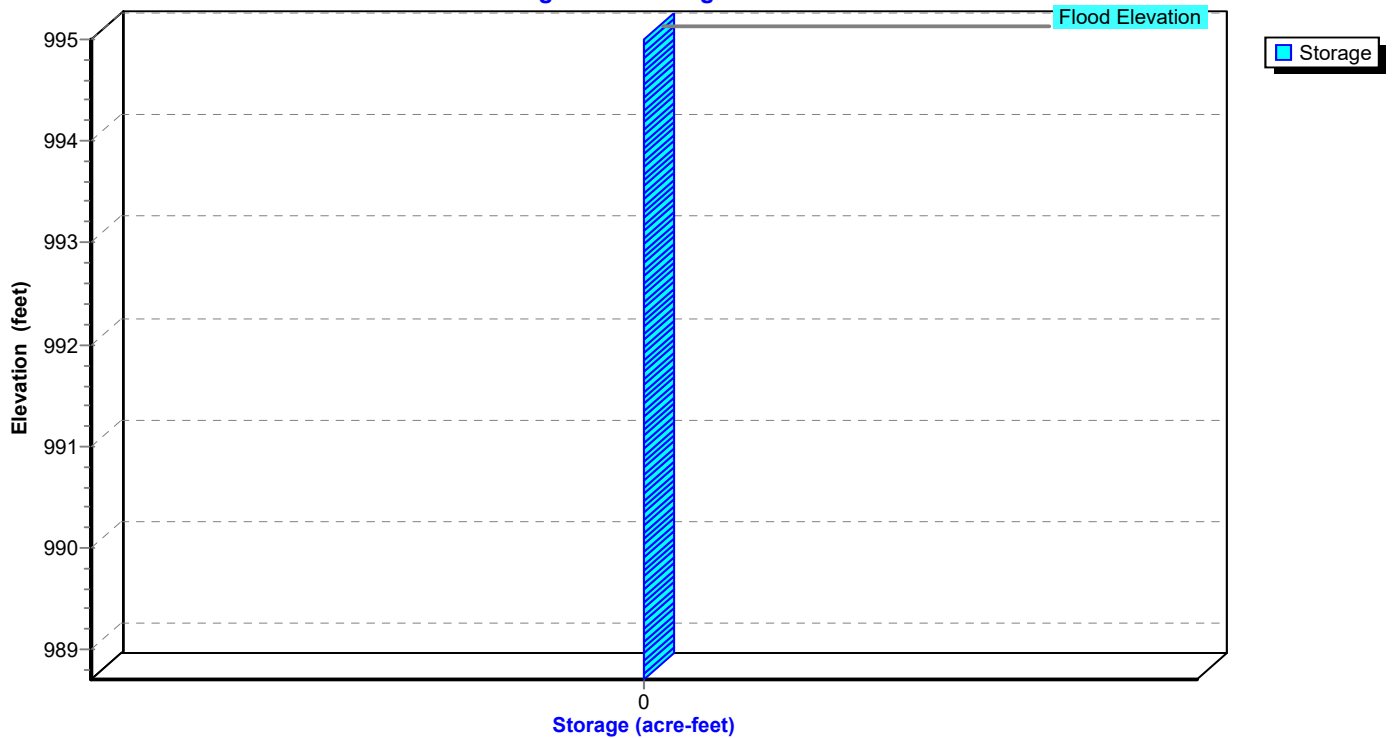
Pond 26P: 11 - 100 MH

Stage-Discharge



Pond 26P: 11 - 100 MH

Stage-Area-Storage



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Type II 24-hr 2-Year Rainfall=3.50"

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Summary for Pond 27P: 11-10

Inflow Area = 4.680 ac, 78.82% Impervious, Inflow Depth = 2.72" for 2-Year event
Inflow = 9.70 cfs @ 12.14 hrs, Volume= 1.060 af
Outflow = 9.70 cfs @ 12.14 hrs, Volume= 1.060 af, Atten= 0%, Lag= 0.0 min
Primary = 9.70 cfs @ 12.14 hrs, Volume= 1.060 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs / 2

Peak Elev= 986.62' @ 12.14 hrs

Flood Elev= 995.00'

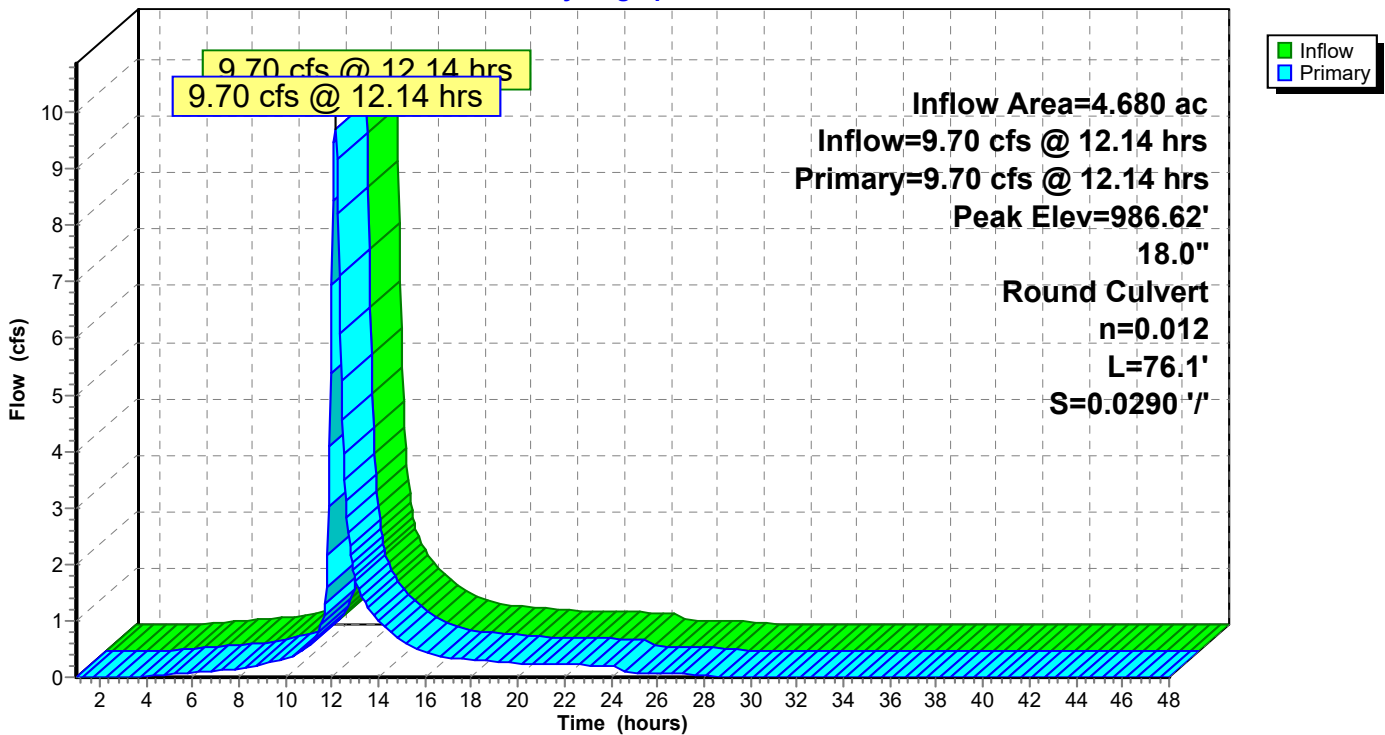
Device	Routing	Invert	Outlet Devices
#1	Primary	985.04'	18.0" Round Culvert L= 76.1' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 985.04' / 982.83' S= 0.0290 '/ Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=9.65 cfs @ 12.14 hrs HW=986.61' (Free Discharge)

↑**1=Culvert** (Inlet Controls 9.65 cfs @ 5.46 fps)

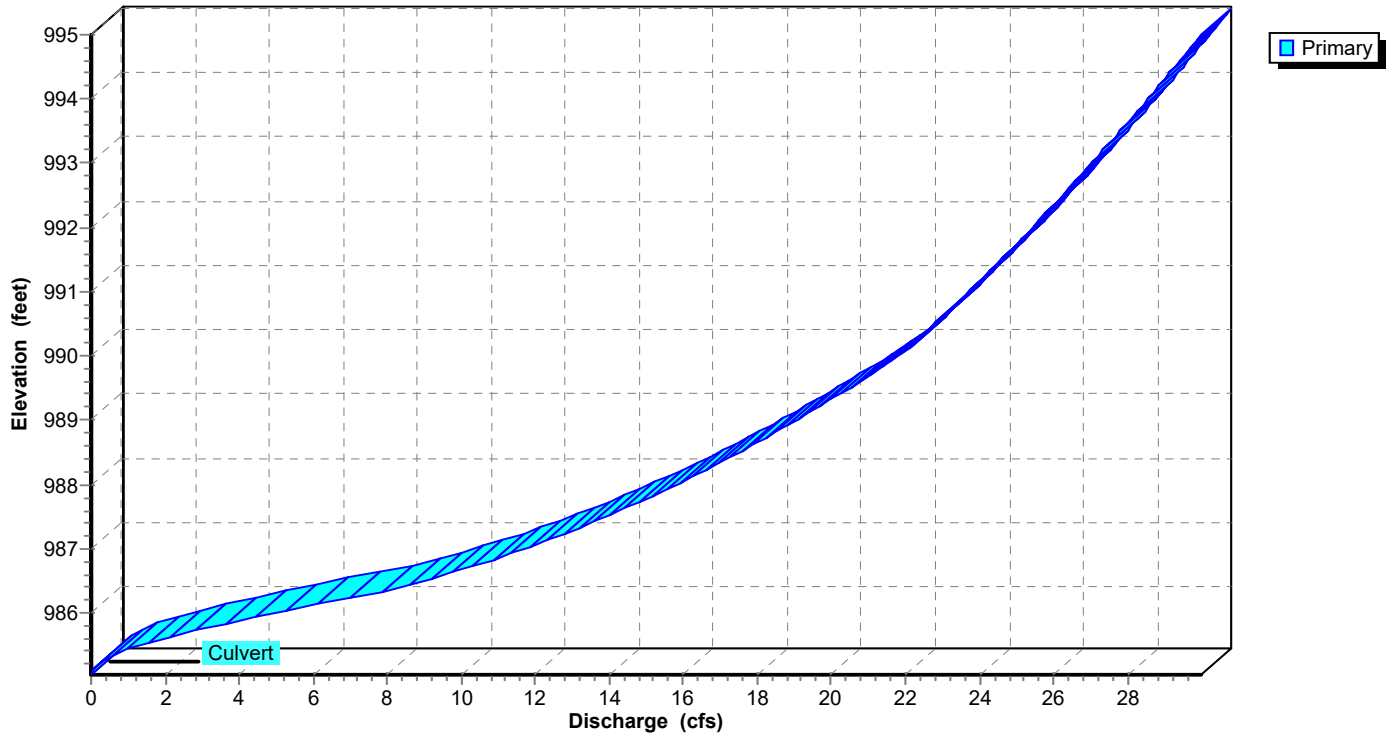
Pond 27P: 11-10

Hydrograph



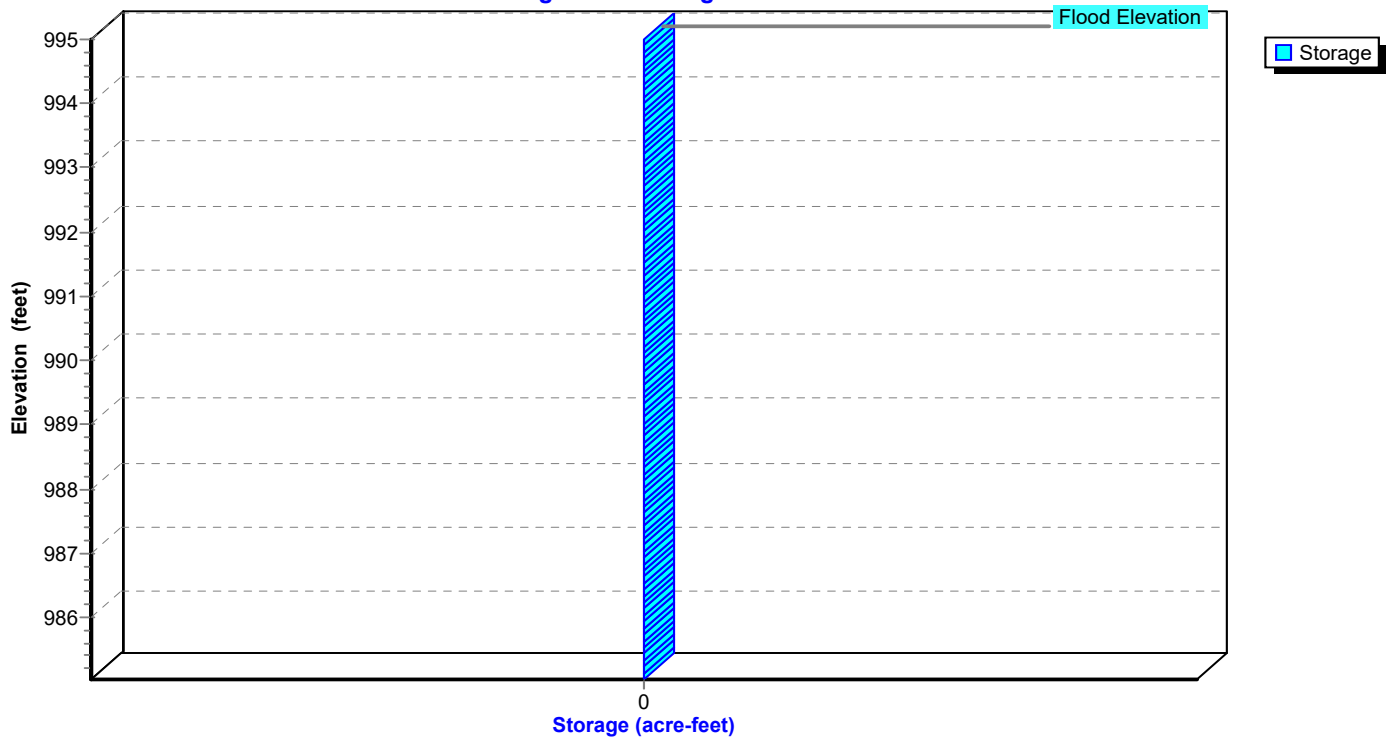
Pond 27P: 11-10

Stage-Discharge



Pond 27P: 11-10

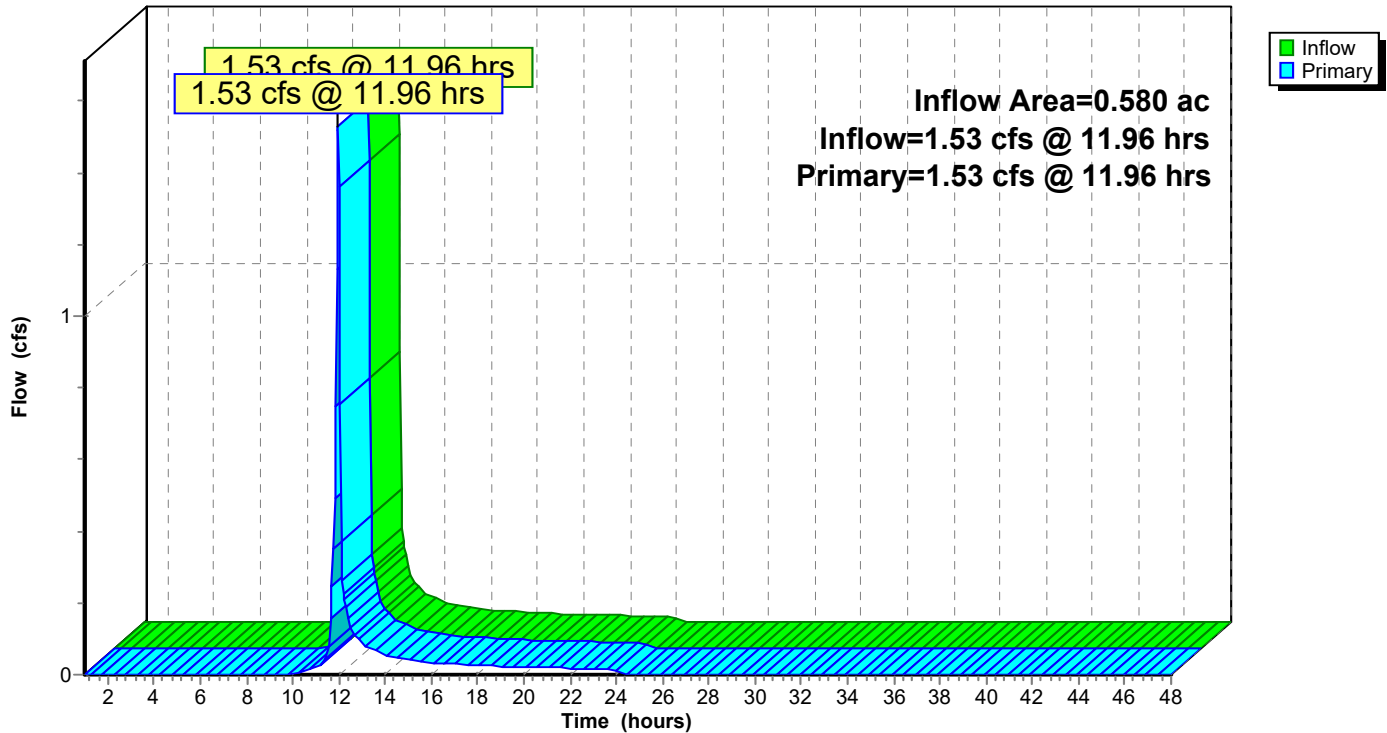
Stage-Area-Storage



Summary for Link 29L: BYPASS AREAS

Inflow Area = 0.580 ac, 13.79% Impervious, Inflow Depth = 1.46" for 2-Year event
Inflow = 1.53 cfs @ 11.96 hrs, Volume= 0.071 af
Primary = 1.53 cfs @ 11.96 hrs, Volume= 0.071 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs

Link 29L: BYPASS AREAS**Hydrograph**

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Type II 24-hr 10-Year Rainfall=5.30"

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Time span=1.00-48.00 hrs, dt=0.05 hrs, 941 points x 2
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: EXISTING CONDITIONS

Runoff Area=2.110 ac 0.00% Impervious Runoff Depth=2.61"
 Tc=10.0 min CN=74 Runoff=8.33 cfs 0.458 af

Subcatchment 3S: AREA 1

Runoff Area=0.210 ac 71.43% Impervious Runoff Depth=4.27"
 Tc=5.0 min CN=91 Runoff=1.49 cfs 0.075 af

Subcatchment 4S: AREA 5

Runoff Area=0.100 ac 50.00% Impervious Runoff Depth=3.75"
 Tc=5.0 min CN=86 Runoff=0.65 cfs 0.031 af

Subcatchment 5S: AREA 2

Runoff Area=0.240 ac 66.67% Impervious Runoff Depth=4.17"
 Tc=5.0 min CN=90 Runoff=1.67 cfs 0.083 af

Subcatchment 6S: AREA 6

Runoff Area=0.510 ac 11.76% Impervious Runoff Depth=2.88"
 Tc=5.0 min CN=77 Runoff=2.63 cfs 0.122 af

Subcatchment 7S: AREA 3

Runoff Area=0.440 ac 36.36% Impervious Runoff Depth=3.45"
 Tc=5.0 min CN=83 Runoff=2.66 cfs 0.126 af

Subcatchment 8S: AREA 7

Runoff Area=0.070 ac 28.57% Impervious Runoff Depth=3.25"
 Tc=5.0 min CN=81 Runoff=0.40 cfs 0.019 af

Subcatchment 10S: AREA 4

Runoff Area=0.330 ac 100.00% Impervious Runoff Depth>5.06"
 Tc=5.0 min CN=98 Runoff=2.52 cfs 0.139 af

Subcatchment 20S: OFFSITE TO BMP

Runoff Area=1.170 ac 85.00% Impervious Runoff Depth=4.60"
 Tc=30.0 min CN=94 Runoff=4.40 cfs 0.449 af

Subcatchment 22S: OFFSITE TO CI 12

Runoff Area=2.170 ac 85.00% Impervious Runoff Depth=4.60"
 Tc=20.0 min CN=94 Runoff=10.31 cfs 0.833 af

Subcatchment 25S: AREA TO AI 11

Runoff Area=0.020 ac 0.00% Impervious Runoff Depth=2.61"
 Tc=5.0 min CN=74 Runoff=0.09 cfs 0.004 af

Subcatchment 28S: PROPOSED CONDITIONS

Runoff Area=2.110 ac 32.70% Impervious Runoff Depth=3.35"
 Tc=5.0 min CN=82 Runoff=12.44 cfs 0.589 af

Pond 3P: ROOF DRAINS TO BASIN

Peak Elev=1,019.09' Inflow=3.16 cfs 0.170 af
 6.0" Round Culvert n=0.012 L=21.7' S=0.0198 '/' Outflow=3.16 cfs 0.170 af

Pond 4R: 302-301

Peak Elev=997.77' Inflow=1.49 cfs 0.075 af
 15.0" Round Culvert n=0.012 L=165.3' S=0.0050 '/' Outflow=1.49 cfs 0.075 af

Pond 6P: 301-300

Peak Elev=998.05' Inflow=3.16 cfs 0.158 af
 12.0" Round Culvert n=0.012 L=201.5' S=0.0050 '/' Outflow=3.16 cfs 0.158 af

Pond 10P: BASIN REACH

Peak Elev=1,009.17' Inflow=3.16 cfs 0.170 af
 6.0" Round Culvert n=0.012 L=31.2' S=0.0401 '/' Outflow=3.16 cfs 0.170 af

Pond 12P: DETENTION BASIN

Peak Elev=996.76' Storage=8,239 cf Inflow=8.98 cfs 0.455 af
 Outflow=2.64 cfs 0.455 af

Pond 24P: 12-11

Peak Elev=997.09' Inflow=10.31 cfs 0.833 af
 18.0" Round Culvert n=0.013 L=181.2' S=0.0274 '/' Outflow=10.31 cfs 0.833 af

Pond 26P: 11 - 100 MH

Peak Elev=992.63' Inflow=16.76 cfs 1.741 af
 18.0" Round Culvert n=0.012 L=123.4' S=0.0297 '/' Outflow=16.76 cfs 1.741 af

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Type II 24-hr 10-Year Rainfall=5.30"

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Pond 27P: 11-10

Peak Elev=988.27' Inflow=16.76 cfs 1.741 af
18.0" Round Culvert n=0.012 L=76.1' S=0.0290 '/' Outflow=16.76 cfs 1.741 af

Link 29L: BYPASS AREAS

Inflow=3.03 cfs 0.141 af
Primary=3.03 cfs 0.141 af

Total Runoff Area = 9.480 ac Runoff Volume = 2.929 af Average Runoff Depth = 3.71"
52.96% Pervious = 5.021 ac 47.04% Impervious = 4.459 ac

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Type II 24-hr 10-Year Rainfall=5.30"

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Summary for Subcatchment 1S: EXISTING CONDITIONS

Runoff = 8.33 cfs @ 12.02 hrs, Volume= 0.458 af, Depth= 2.61"

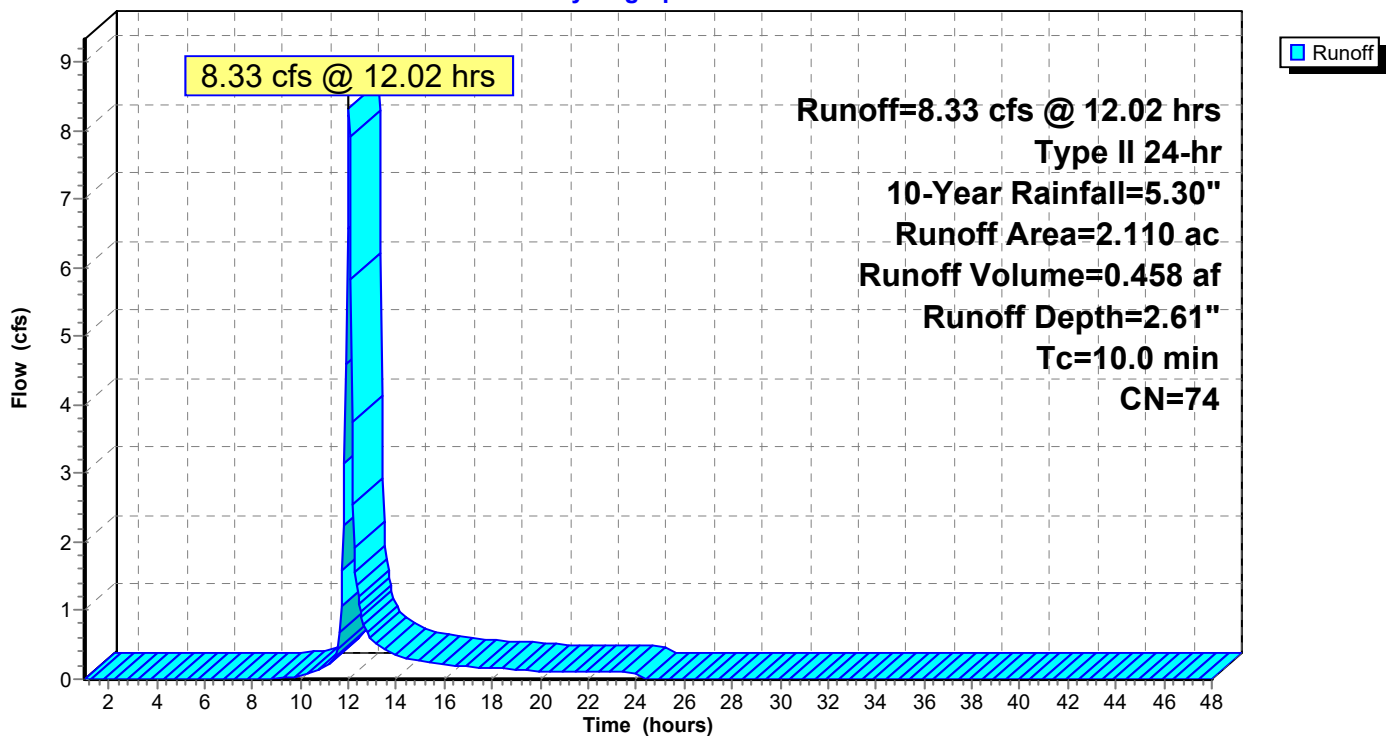
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-Year Rainfall=5.30"

Area (ac)	CN	Description
2.110	74	>75% Grass cover, Good, HSG C
2.110		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry, Assumed TC of 10 Minutes used for Pre-Developed Condition

Subcatchment 1S: EXISTING CONDITIONS

Hydrograph



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Type II 24-hr 10-Year Rainfall=5.30"

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Summary for Subcatchment 3S: AREA 1

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 1.49 cfs @ 11.95 hrs, Volume= 0.075 af, Depth= 4.27"

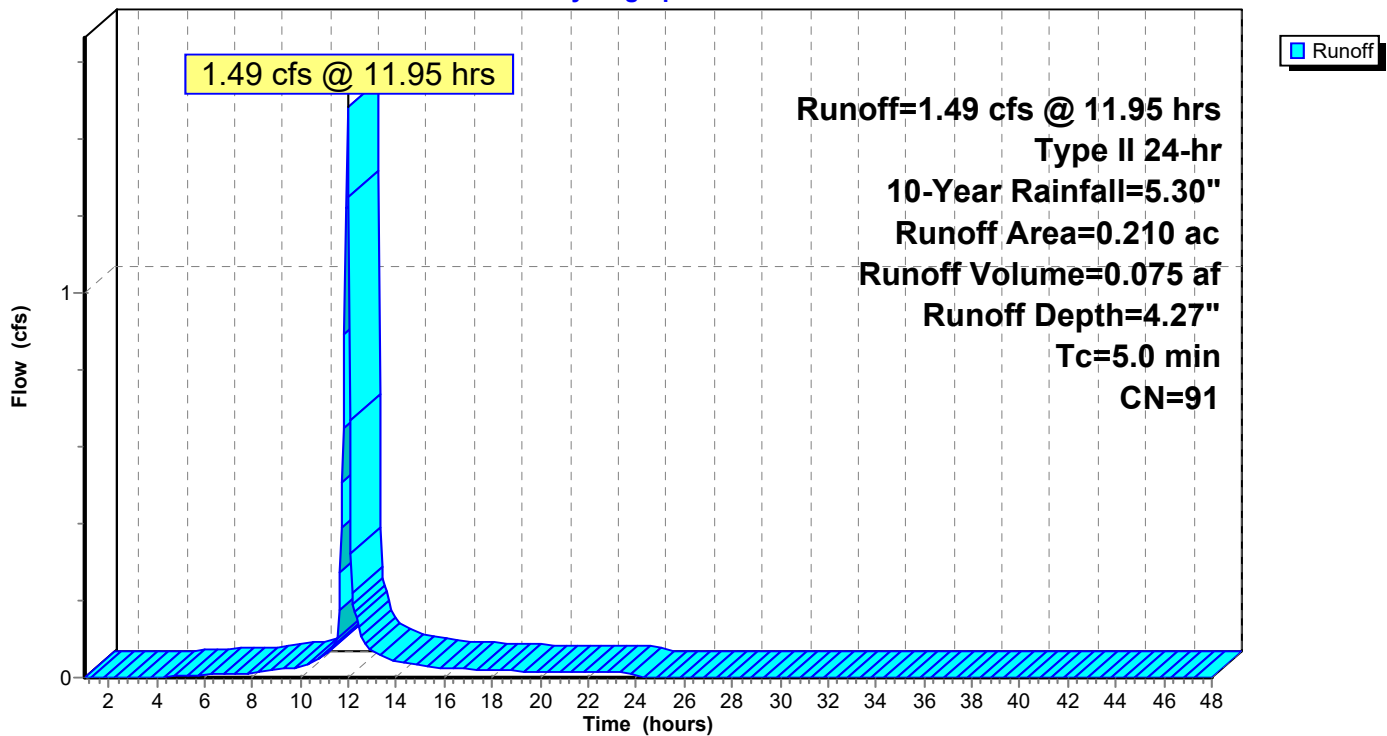
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, $dt=0.05$ hrs
Type II 24-hr 10-Year Rainfall=5.30"

Area (ac)	CN	Description
0.150	98	Paved parking, HSG D
0.060	74	>75% Grass cover, Good, HSG C
0.210	91	Weighted Average
0.060		28.57% Pervious Area
0.150		71.43% Impervious Area

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

Subcatchment 3S: AREA 1

Hydrograph



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Type II 24-hr 10-Year Rainfall=5.30"

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Summary for Subcatchment 4S: AREA 5[49] Hint: $T_c < 2dt$ may require smaller dt

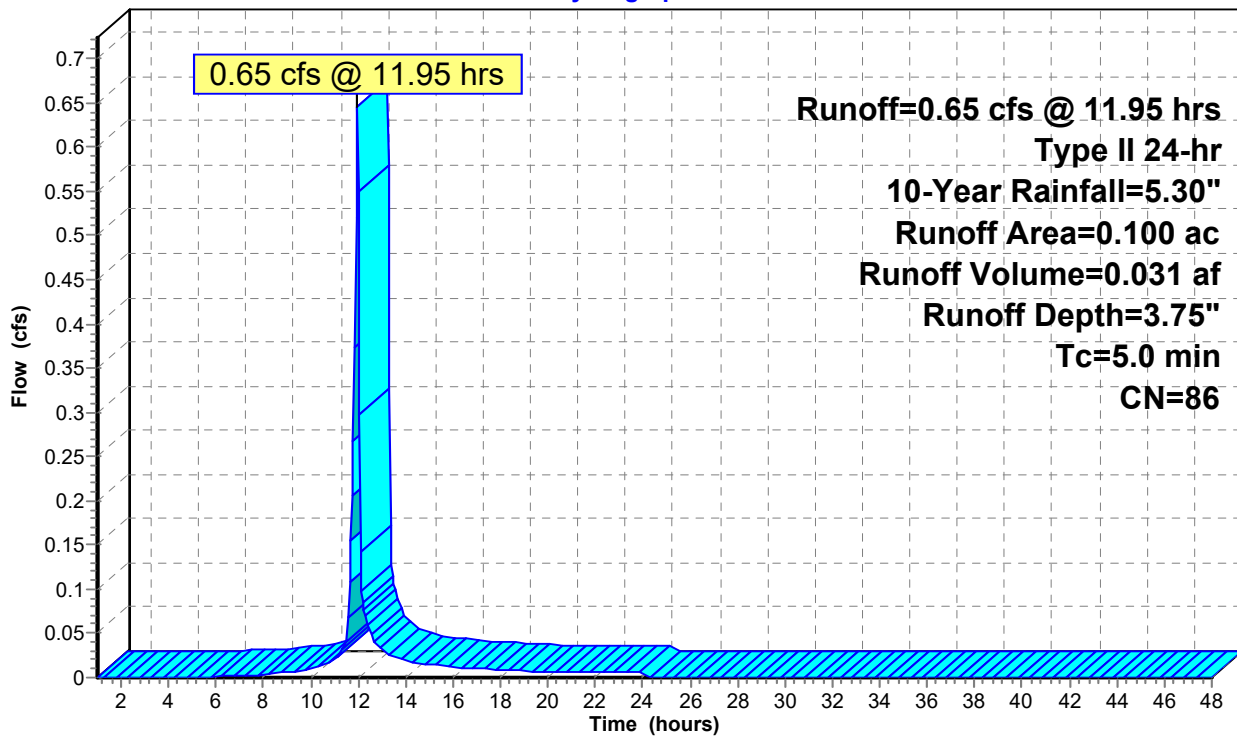
Runoff = 0.65 cfs @ 11.95 hrs, Volume= 0.031 af, Depth= 3.75"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, $dt=0.05$ hrs

Type II 24-hr 10-Year Rainfall=5.30"

Area (ac)	CN	Description
0.050	98	Paved parking, HSG C
0.050	74	>75% Grass cover, Good, HSG C
0.100	86	Weighted Average
0.050		50.00% Pervious Area
0.050		50.00% Impervious Area

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

Subcatchment 4S: AREA 5**Hydrograph**

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Type II 24-hr 10-Year Rainfall=5.30"

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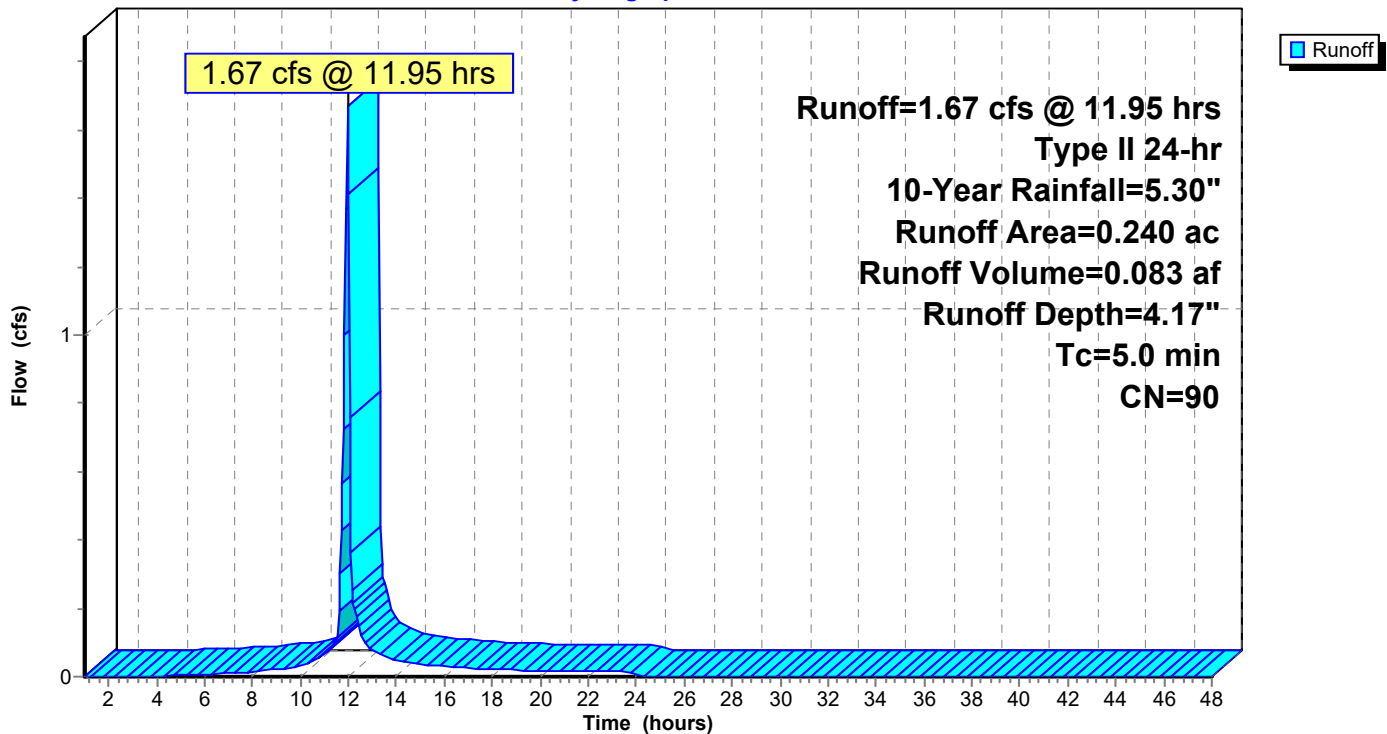
Summary for Subcatchment 5S: AREA 2[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 1.67 cfs @ 11.95 hrs, Volume= 0.083 af, Depth= 4.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, $dt=0.05$ hrs
Type II 24-hr 10-Year Rainfall=5.30"

Area (ac)	CN	Description
0.160	98	Paved parking, HSG C
0.050	74	>75% Grass cover, Good, HSG C
* 0.030	74	>75% Grass cover, Good, HSG C OFFSITE TO ONSITE
0.240	90	Weighted Average
0.080		33.33% Pervious Area
0.160		66.67% Impervious Area

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

Subcatchment 5S: AREA 2**Hydrograph**

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Type II 24-hr 10-Year Rainfall=5.30"

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Summary for Subcatchment 6S: AREA 6

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 2.63 cfs @ 11.96 hrs, Volume= 0.122 af, Depth= 2.88"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, $dt=0.05$ hrs

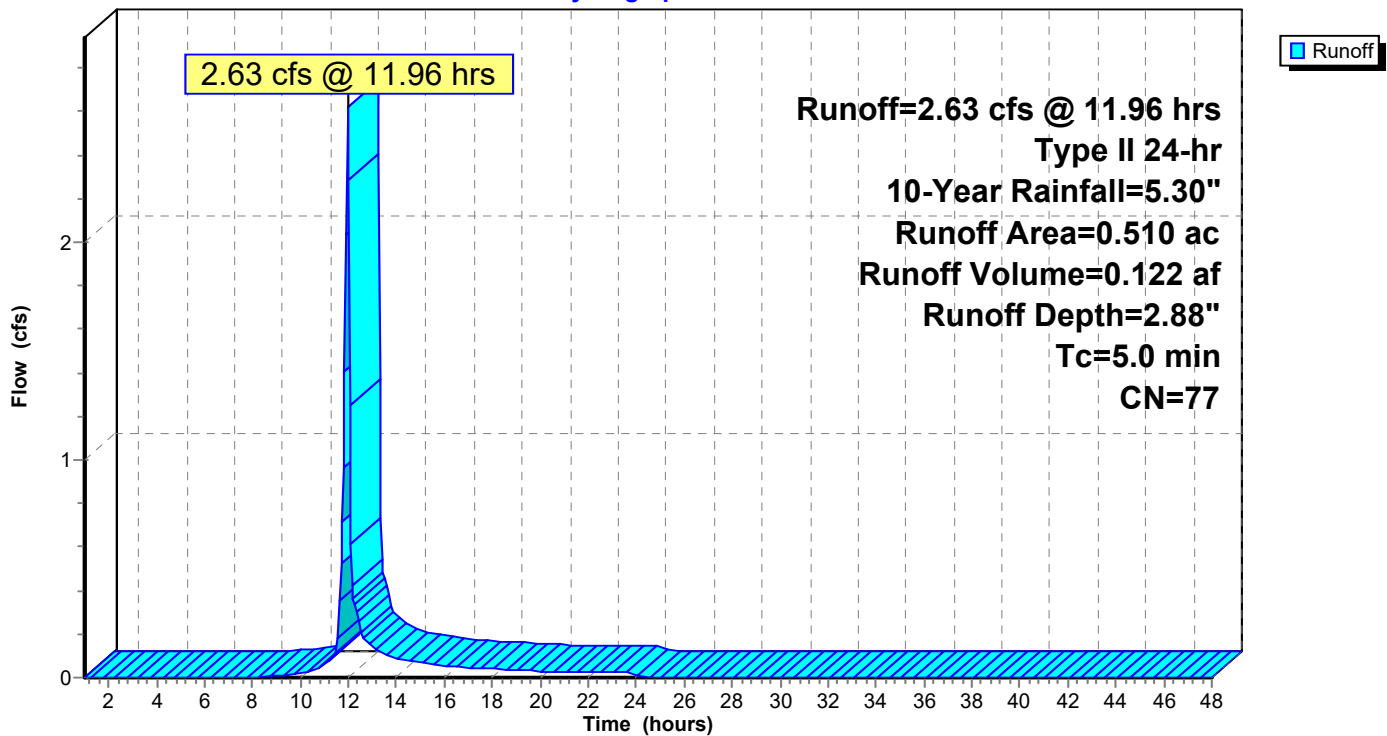
Type II 24-hr 10-Year Rainfall=5.30"

Area (ac)	CN	Description
0.060	98	Paved parking, HSG C
0.450	74	>75% Grass cover, Good, HSG C
0.510	77	Weighted Average
0.450		88.24% Pervious Area
0.060		11.76% Impervious Area

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

Subcatchment 6S: AREA 6

Hydrograph



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Type II 24-hr 10-Year Rainfall=5.30"

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Summary for Subcatchment 7S: AREA 3

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 2.66 cfs @ 11.95 hrs, Volume= 0.126 af, Depth= 3.45"

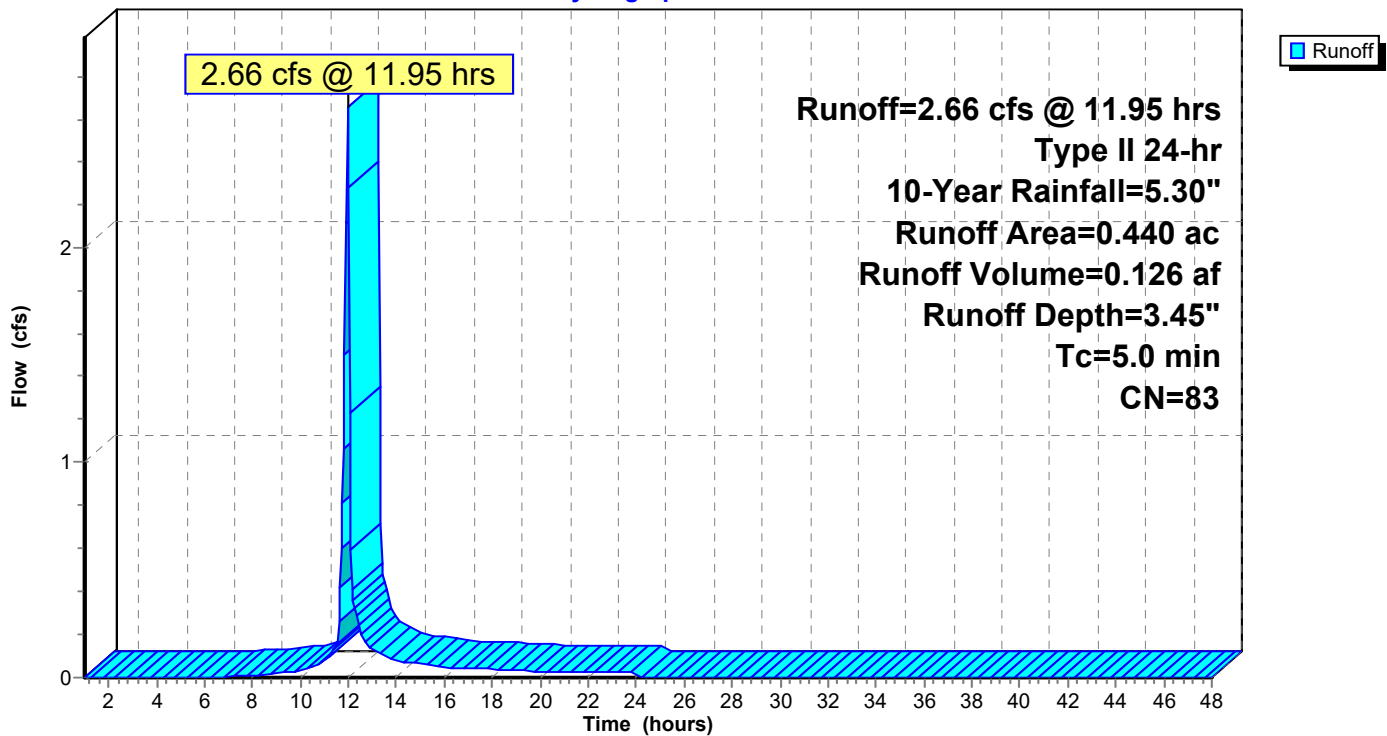
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, $dt=0.05$ hrs
Type II 24-hr 10-Year Rainfall=5.30"

Area (ac)	CN	Description
0.160	98	Paved parking, HSG C
0.280	74	>75% Grass cover, Good, HSG C
0.440	83	Weighted Average
0.280		63.64% Pervious Area
0.160		36.36% Impervious Area

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

Subcatchment 7S: AREA 3

Hydrograph



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Type II 24-hr 10-Year Rainfall=5.30"

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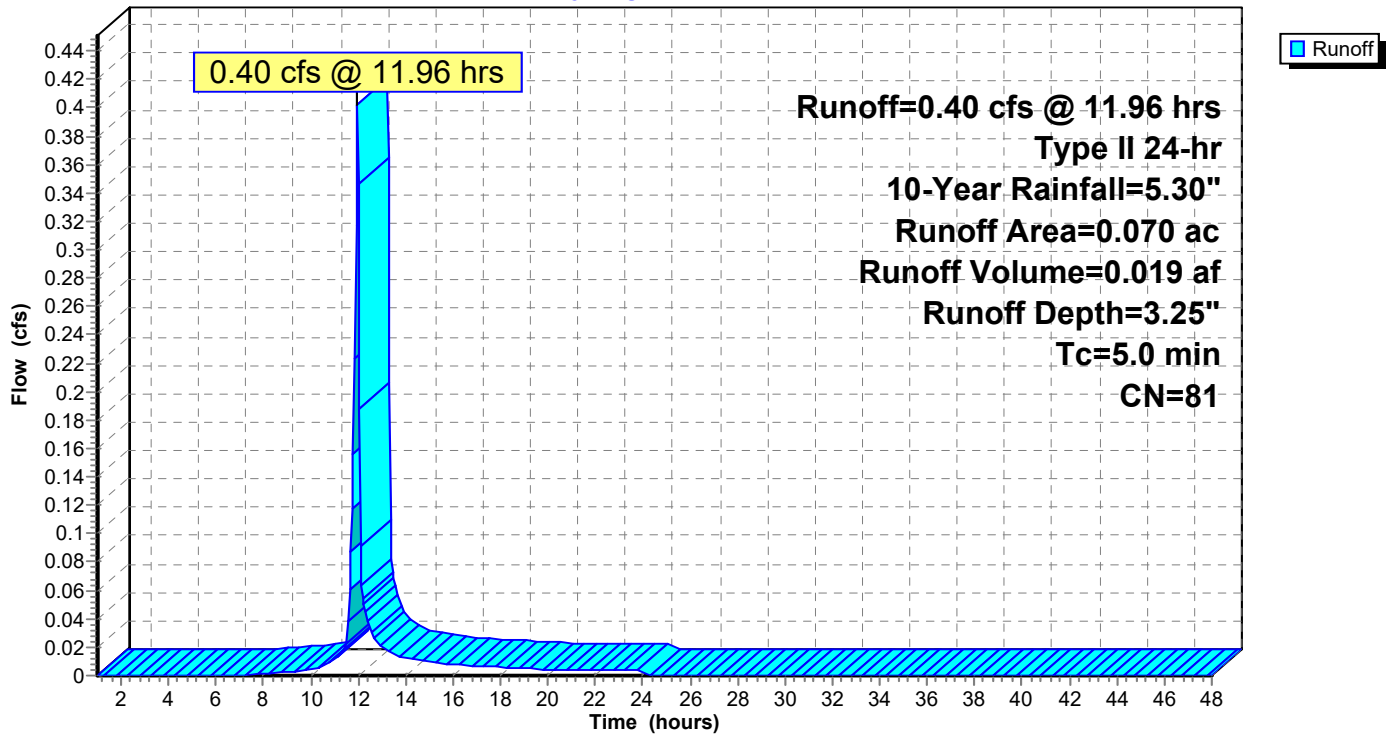
Summary for Subcatchment 8S: AREA 7[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.40 cfs @ 11.96 hrs, Volume= 0.019 af, Depth= 3.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, $dt=0.05$ hrs
Type II 24-hr 10-Year Rainfall=5.30"

Area (ac)	CN	Description
0.020	98	Paved parking, HSG C
0.050	74	>75% Grass cover, Good, HSG C
0.070	81	Weighted Average
0.050		71.43% Pervious Area
0.020		28.57% Impervious Area

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

Subcatchment 8S: AREA 7**Hydrograph**

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Type II 24-hr 10-Year Rainfall=5.30"

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Summary for Subcatchment 10S: AREA 4

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 2.52 cfs @ 11.95 hrs, Volume= 0.139 af, Depth> 5.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, $dt=0.05$ hrs

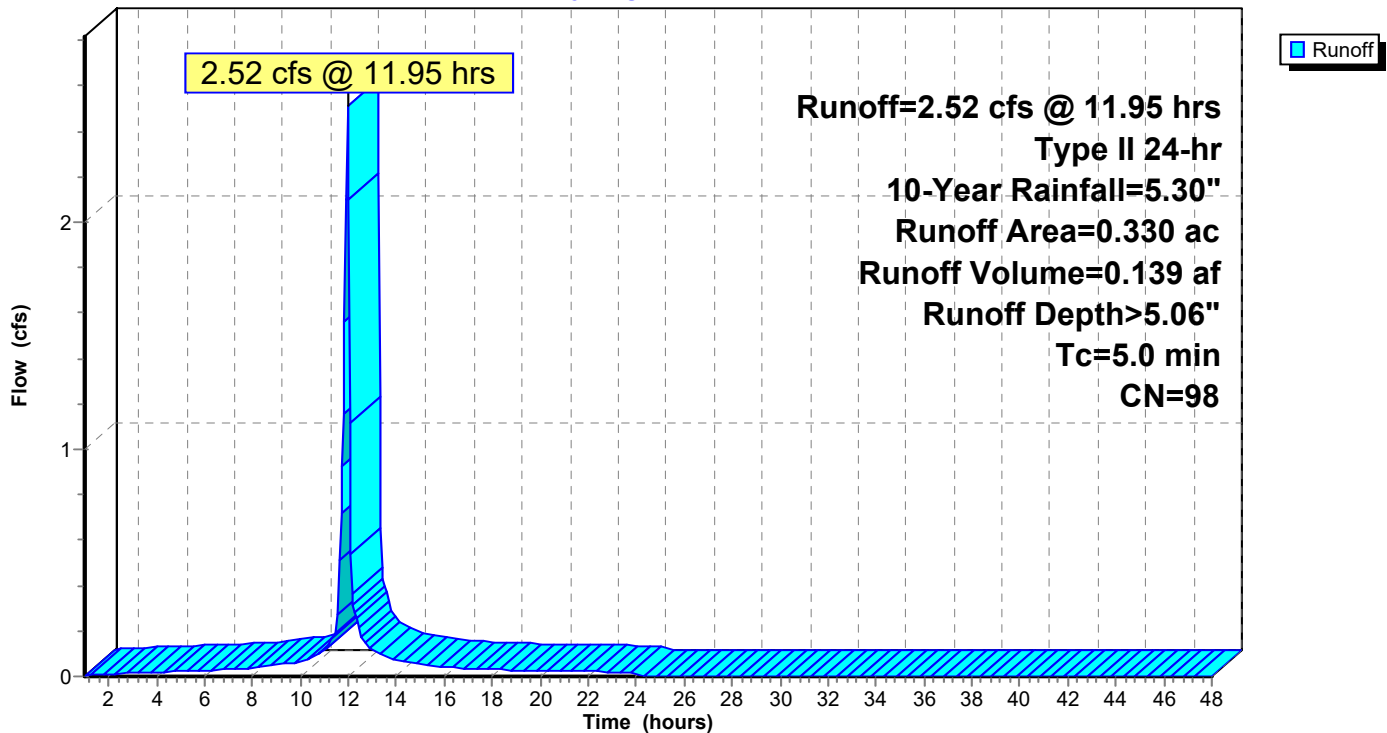
Type II 24-hr 10-Year Rainfall=5.30"

Area (ac)	CN	Description
0.330	98	Roofs, HSG C
0.330		100.00% Impervious Area

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

Subcatchment 10S: AREA 4

Hydrograph



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Type II 24-hr 10-Year Rainfall=5.30"

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Summary for Subcatchment 20S: OFFSITE TO BMP

Runoff = 4.40 cfs @ 12.23 hrs, Volume= 0.449 af, Depth= 4.60"

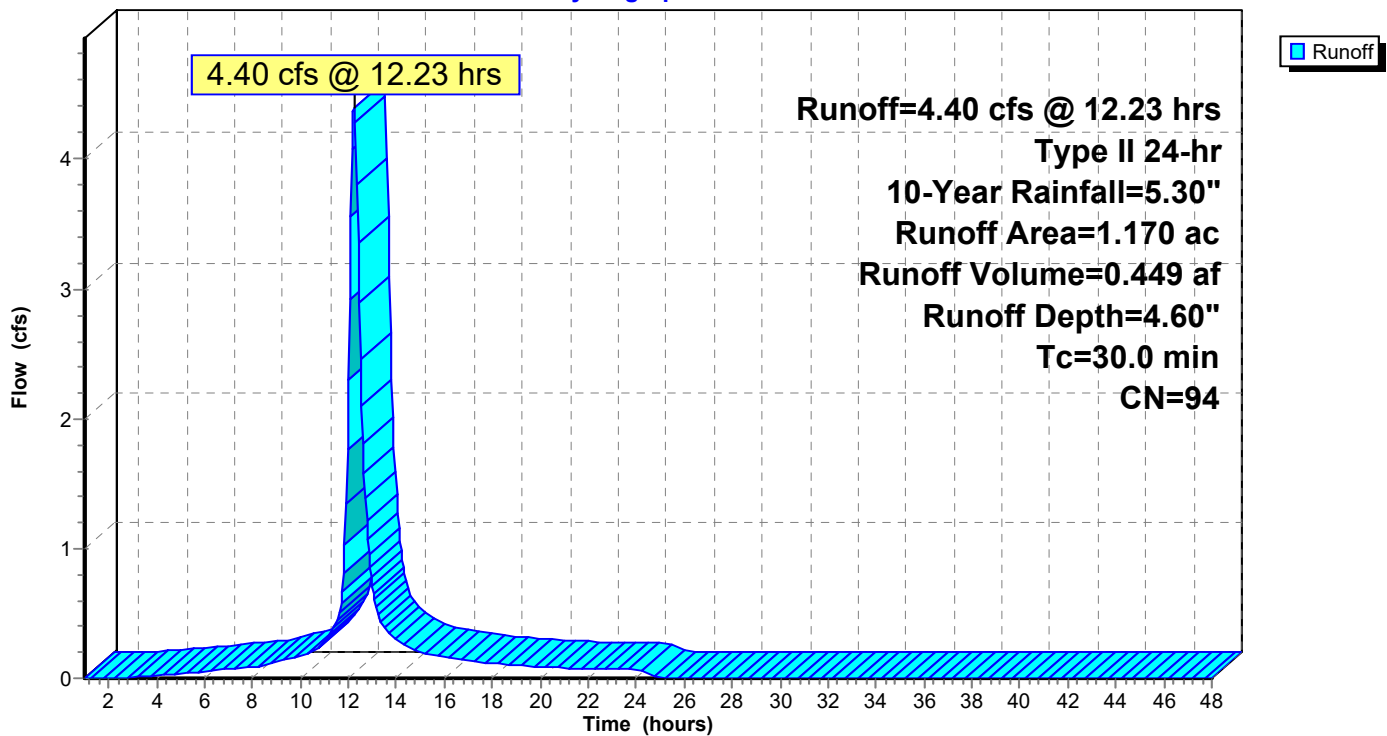
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-Year Rainfall=5.30"

Area (ac)	CN	Description
1.170	94	Urban commercial, 85% imp, HSG C
0.175		15.00% Pervious Area
0.994		85.00% Impervious Area

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

Subcatchment 20S: OFFSITE TO BMP

Hydrograph



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Type II 24-hr 10-Year Rainfall=5.30"

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Summary for Subcatchment 22S: OFFSITE TO CI 12

Runoff = 10.31 cfs @ 12.12 hrs, Volume= 0.833 af, Depth= 4.60"

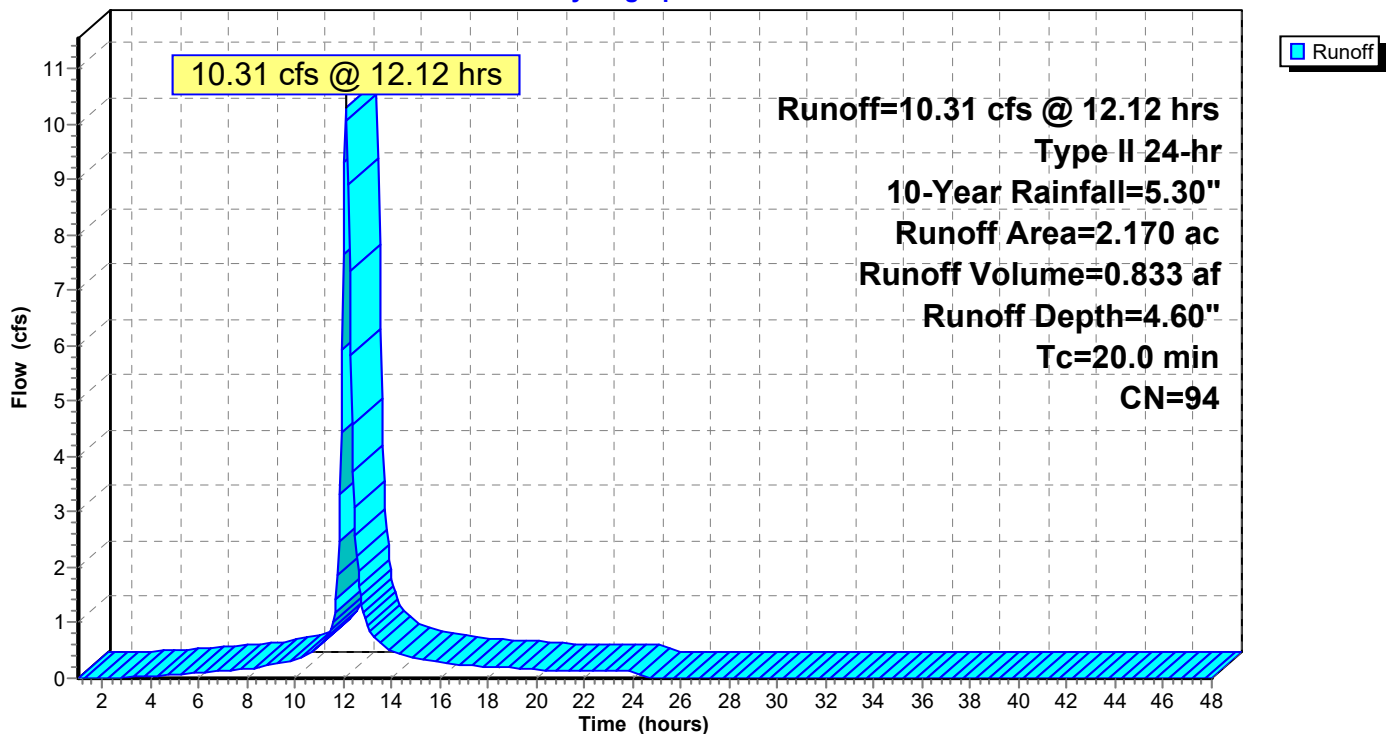
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-Year Rainfall=5.30"

Area (ac)	CN	Description
2.170	94	Urban commercial, 85% imp, HSG C
0.325		15.00% Pervious Area
1.844		85.00% Impervious Area

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

Subcatchment 22S: OFFSITE TO CI 12

Hydrograph



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Type II 24-hr 10-Year Rainfall=5.30"

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Summary for Subcatchment 25S: AREA TO AI 11

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.09 cfs @ 11.96 hrs, Volume= 0.004 af, Depth= 2.61"

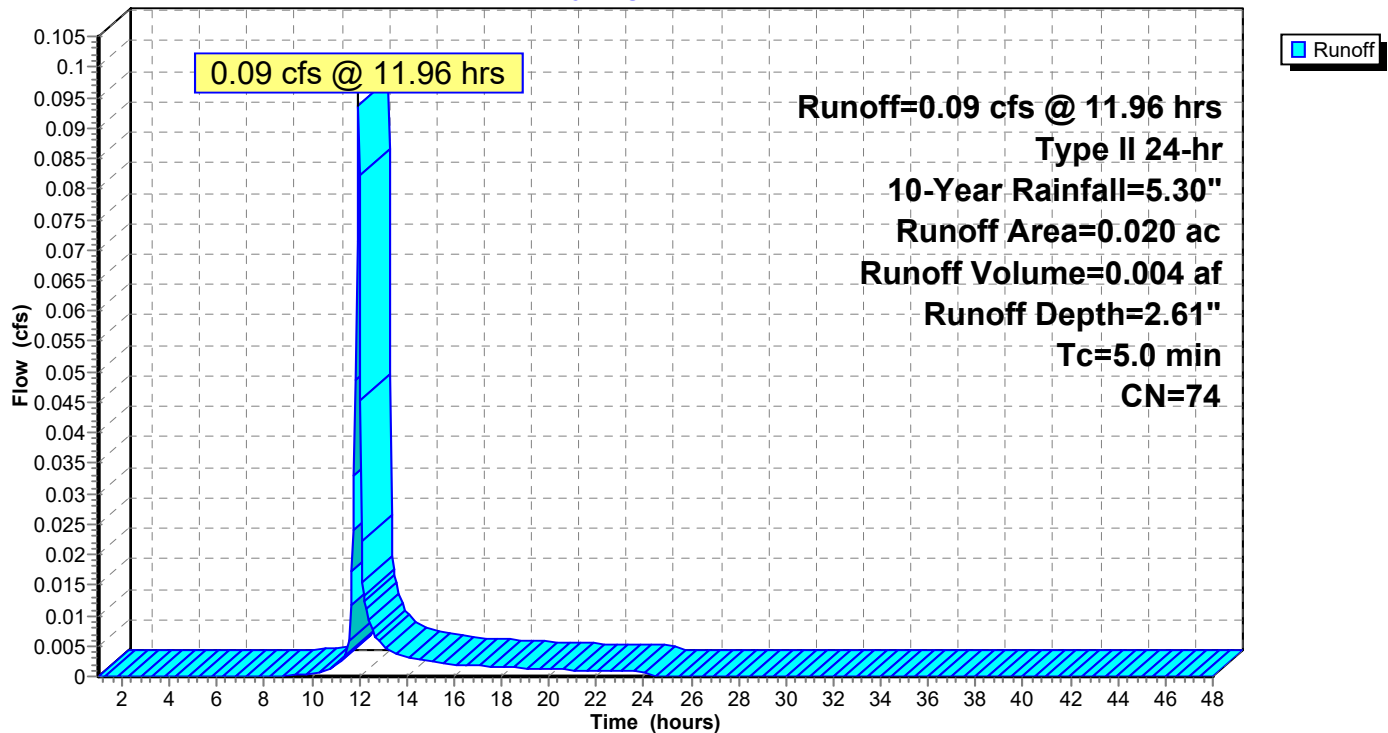
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, $dt=0.05$ hrs
Type II 24-hr 10-Year Rainfall=5.30"

Area (ac)	CN	Description
0.020	74	>75% Grass cover, Good, HSG C
0.020		100.00% Pervious Area

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

Subcatchment 25S: AREA TO AI 11

Hydrograph



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Type II 24-hr 10-Year Rainfall=5.30"

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Summary for Subcatchment 28S: PROPOSED CONDITIONS

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 12.44 cfs @ 11.95 hrs, Volume= 0.589 af, Depth= 3.35"

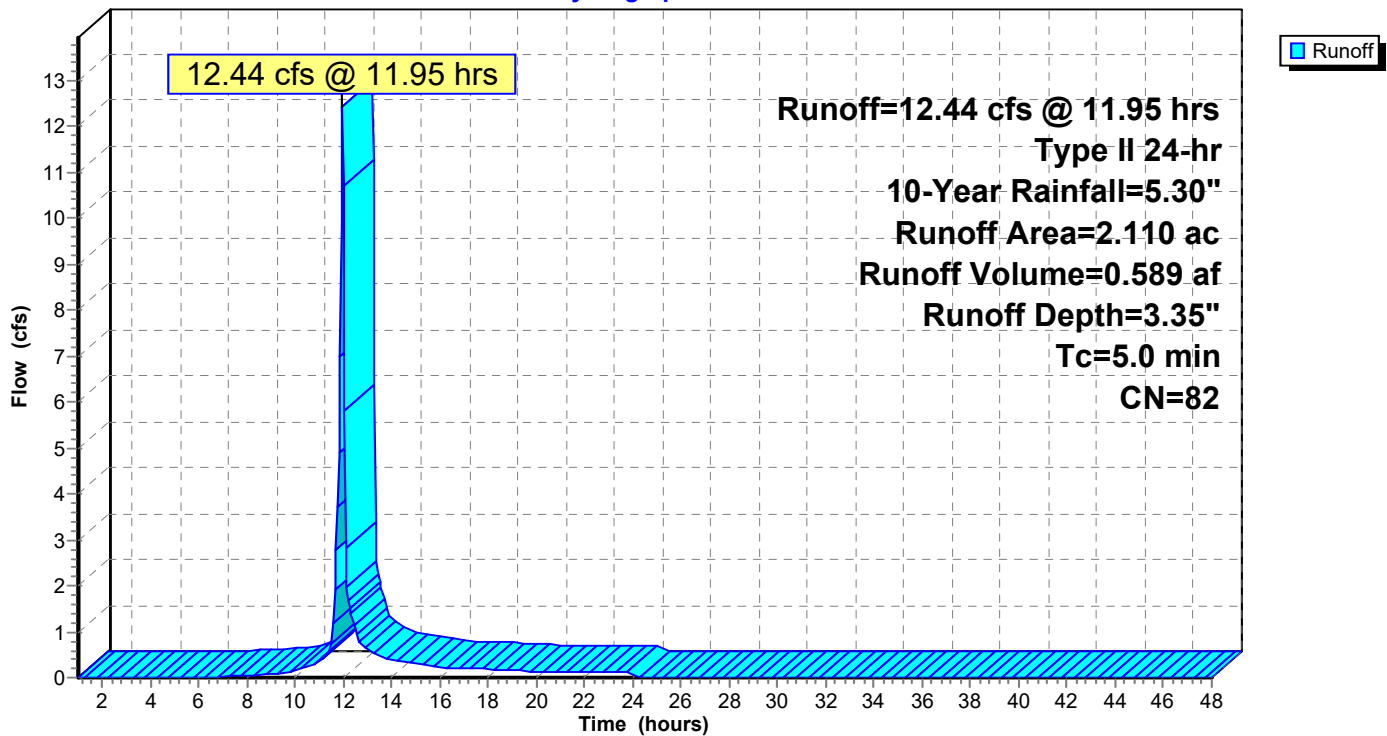
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, $dt=0.05$ hrs
Type II 24-hr 10-Year Rainfall=5.30"

Area (ac)	CN	Description
0.690	98	Paved parking, HSG C
1.420	74	>75% Grass cover, Good, HSG C
2.110	82	Weighted Average
1.420		67.30% Pervious Area
0.690		32.70% Impervious Area

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

Subcatchment 28S: PROPOSED CONDITIONS

Hydrograph



Summary for Pond 3P: ROOF DRAINS TO BASIN

[58] Hint: Peaked 18.16' above defined flood level

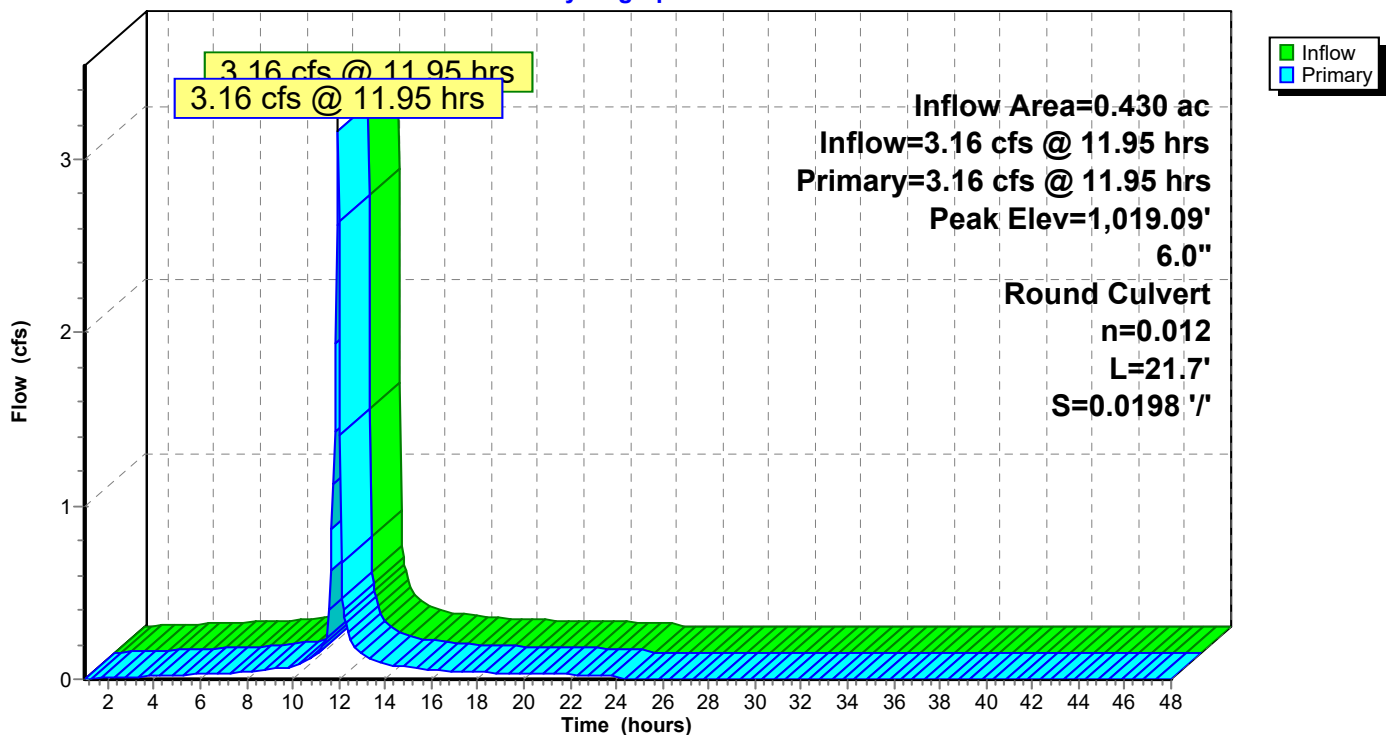
Inflow Area = 0.430 ac, 88.37% Impervious, Inflow Depth > 4.76" for 10-Year event
 Inflow = 3.16 cfs @ 11.95 hrs, Volume= 0.170 af
 Outflow = 3.16 cfs @ 11.95 hrs, Volume= 0.170 af, Atten= 0%, Lag= 0.0 min
 Primary = 3.16 cfs @ 11.95 hrs, Volume= 0.170 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs / 2

Peak Elev= 1,019.09' @ 11.95 hrs

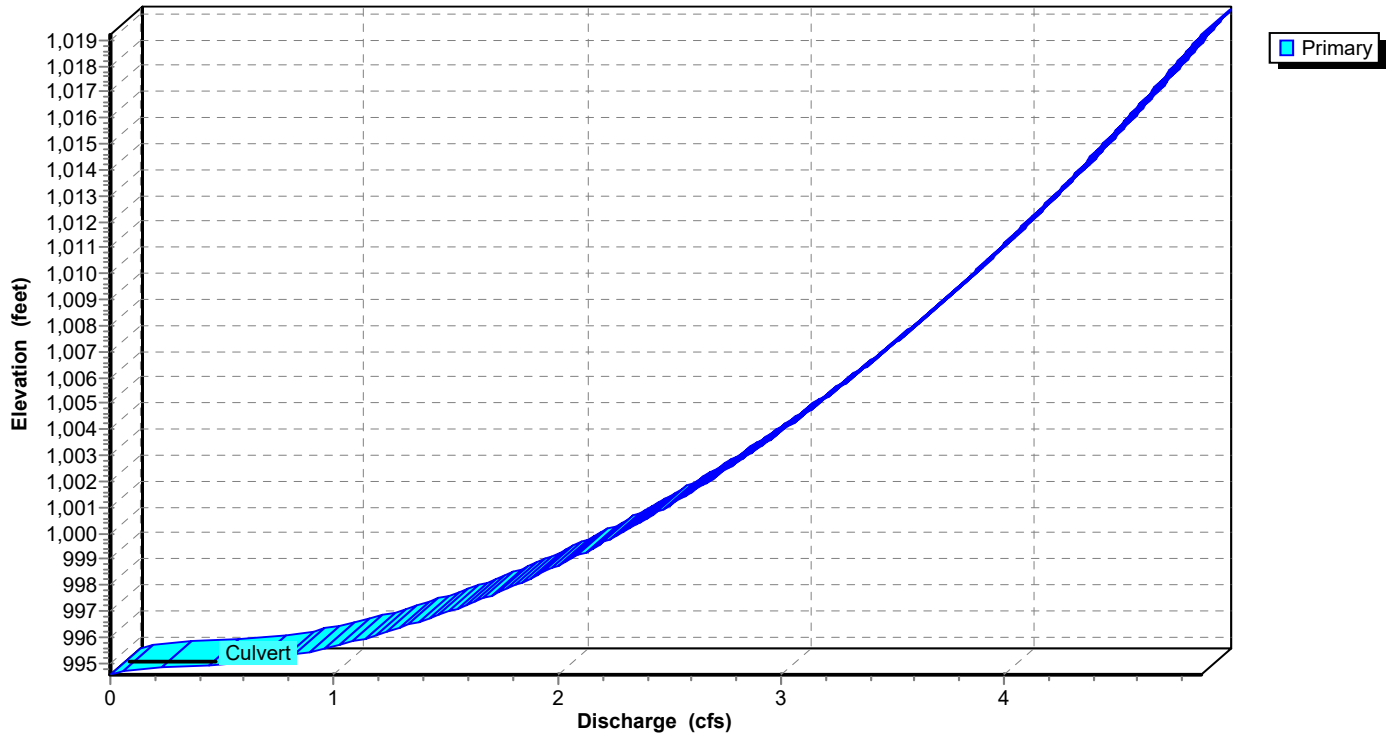
Flood Elev= 1,000.93'

Device	Routing	Invert	Outlet Devices
#1	Primary	994.54'	6.0" Round Culvert L= 21.7' RCP, rounded edge headwall, Ke= 0.100 Inlet / Outlet Invert= 994.54' / 994.11' S= 0.0198 '/ Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.20 sf

Primary OutFlow Max=3.10 cfs @ 11.95 hrs HW=1,019.00' TW=1,009.11' (Dynamic Tailwater)↑ **1=Culvert** (Outlet Controls 3.10 cfs @ 15.76 fps)**Pond 3P: ROOF DRAINS TO BASIN****Hydrograph**

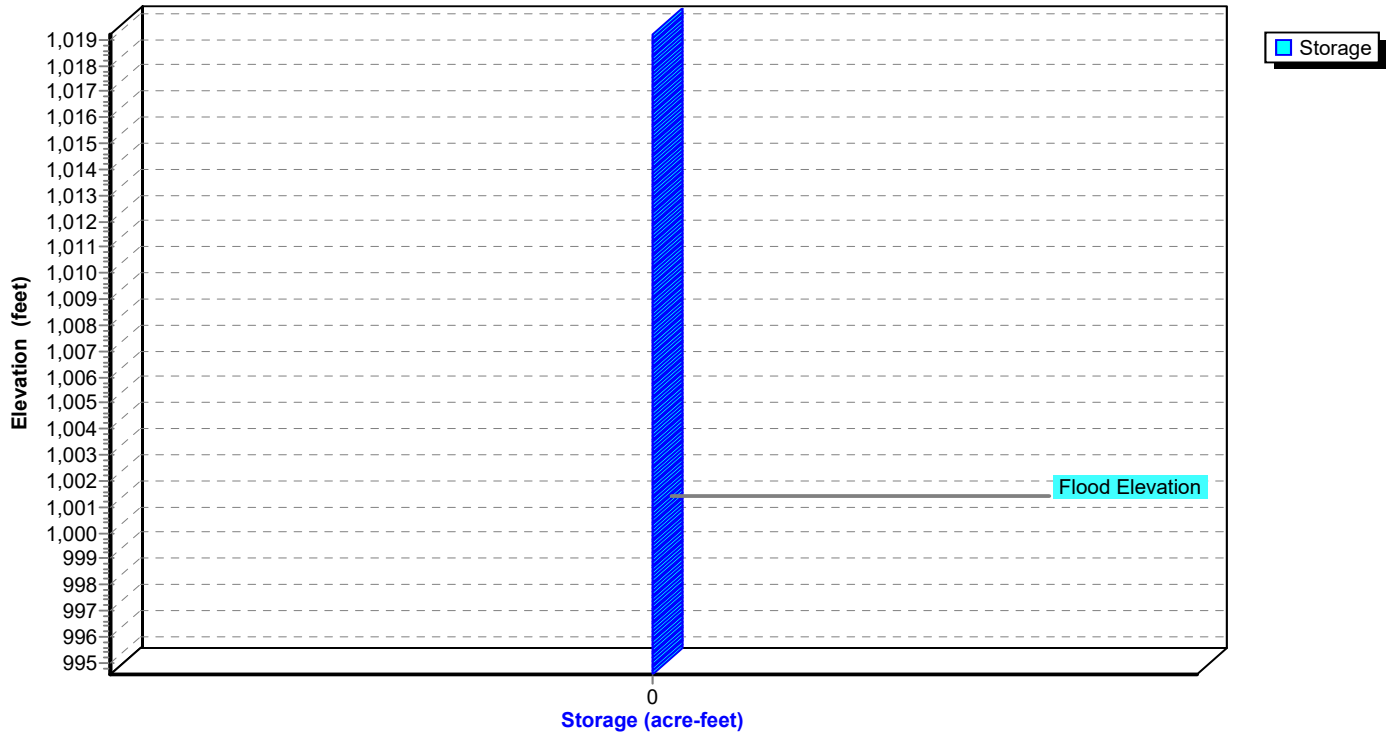
Pond 3P: ROOF DRAINS TO BASIN

Stage-Discharge



Pond 3P: ROOF DRAINS TO BASIN

Stage-Area-Storage



Summary for Pond 4R: 302-301

[58] Hint: Peaked 2.83' above defined flood level

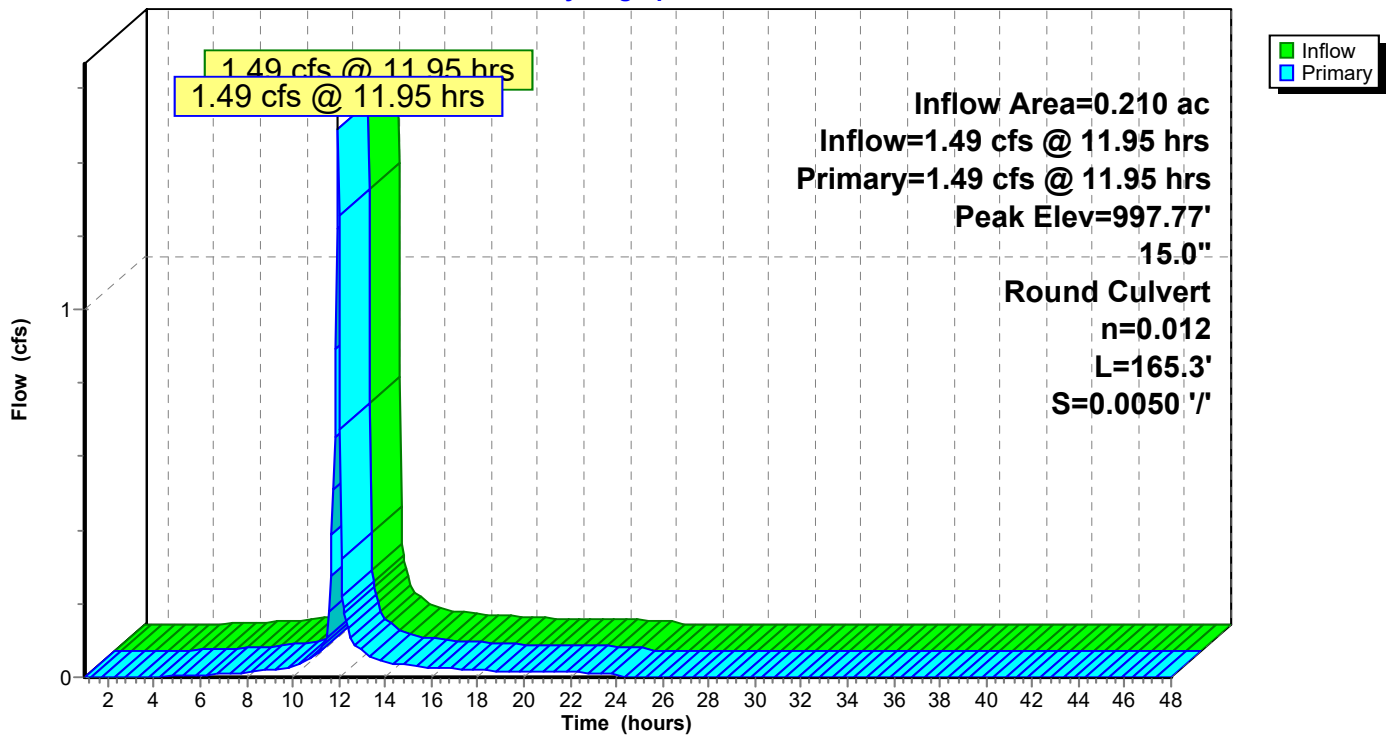
Inflow Area = 0.210 ac, 71.43% Impervious, Inflow Depth = 4.27" for 10-Year event
 Inflow = 1.49 cfs @ 11.95 hrs, Volume= 0.075 af
 Outflow = 1.49 cfs @ 11.95 hrs, Volume= 0.075 af, Atten= 0%, Lag= 0.0 min
 Primary = 1.49 cfs @ 11.95 hrs, Volume= 0.075 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs / 2

Peak Elev= 997.77' @ 11.97 hrs

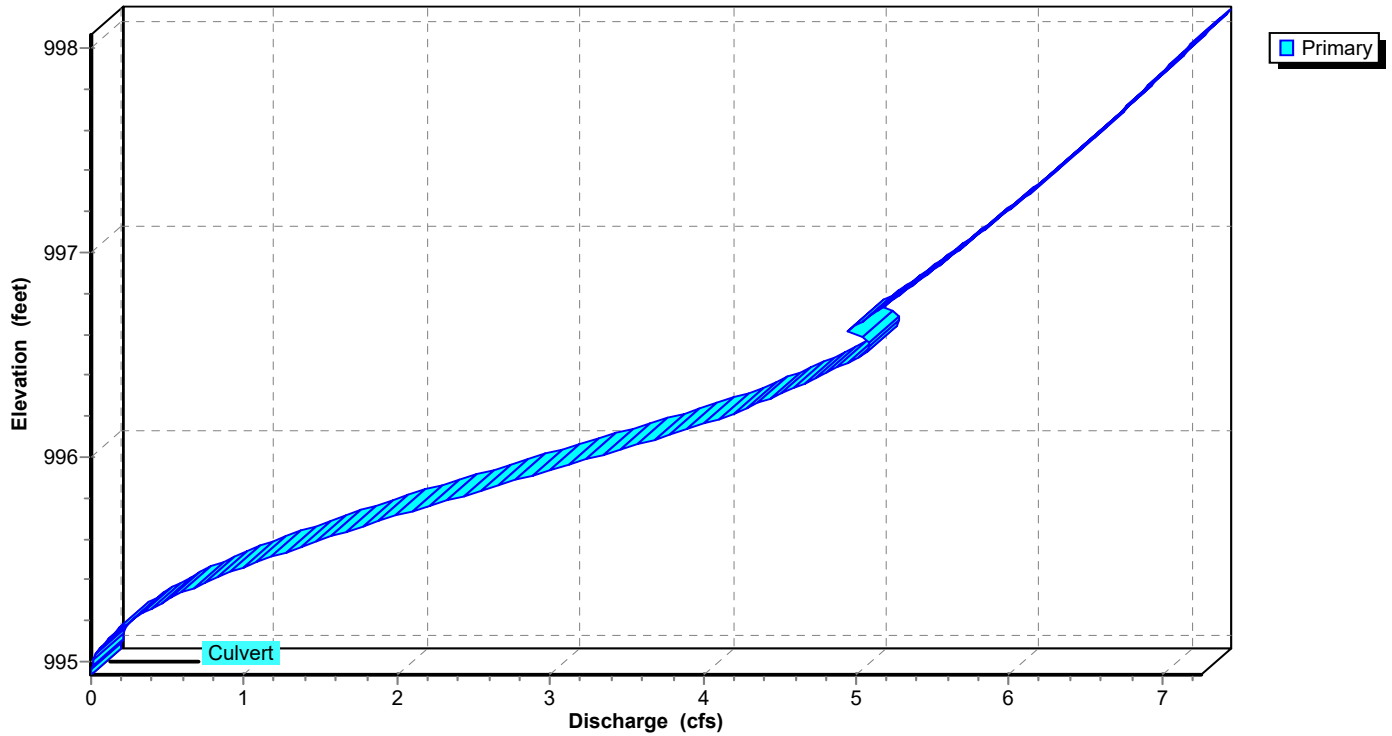
Flood Elev= 994.94'

Device	Routing	Invert	Outlet Devices
#1	Primary	994.94'	15.0" Round Culvert L= 165.3' RCP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 994.94' / 994.11' S= 0.0050 '/ Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=0.00 cfs @ 11.95 hrs HW=997.69' TW=997.97' (Dynamic Tailwater)↑**1=Culvert** (Controls 0.00 cfs)**Pond 4R: 302-301****Hydrograph**

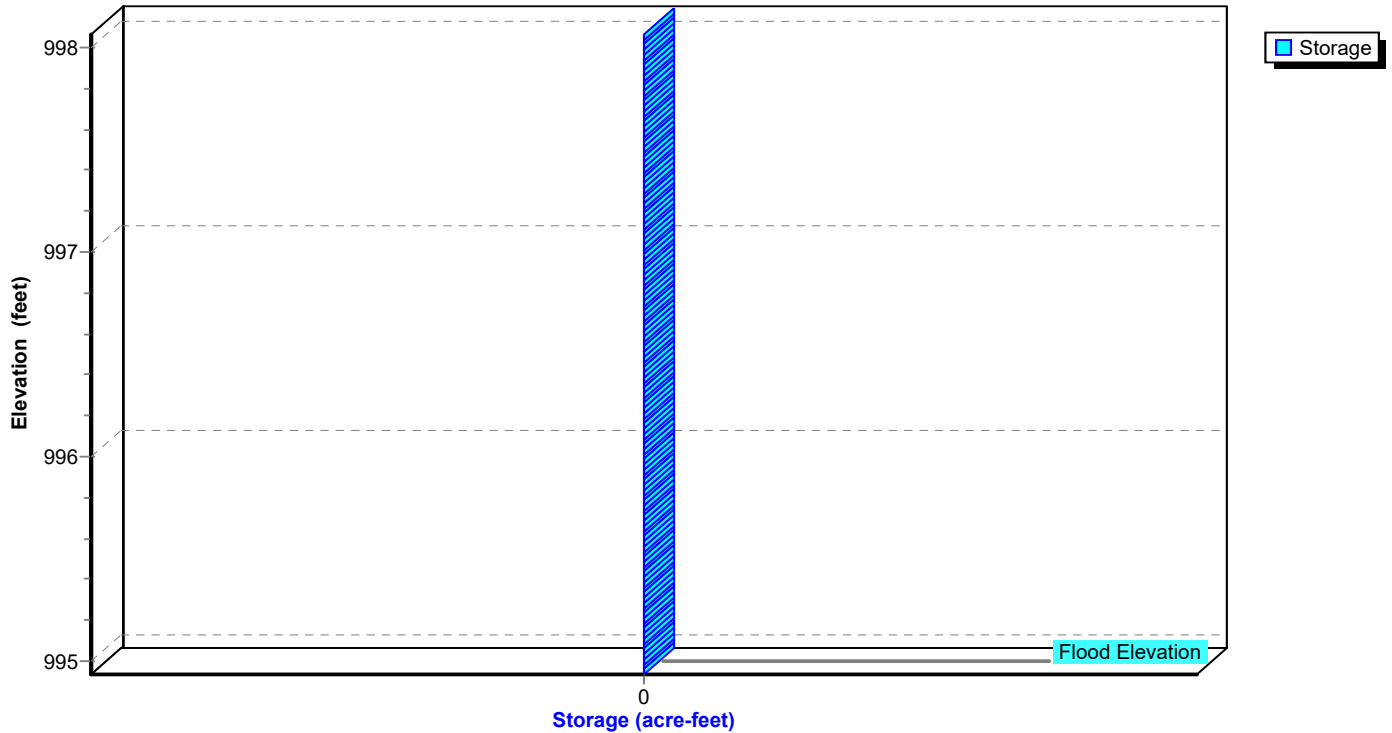
Pond 4R: 302-301

Stage-Discharge



Pond 4R: 302-301

Stage-Area-Storage



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Type II 24-hr 10-Year Rainfall=5.30"

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Summary for Pond 6P: 301-300

[80] Warning: Exceeded Pond 4R by 0.29' @ 11.95 hrs (2.37 cfs 0.044 af)

Inflow Area = 0.450 ac, 68.89% Impervious, Inflow Depth = 4.22" for 10-Year event
Inflow = 3.16 cfs @ 11.95 hrs, Volume= 0.158 af
Outflow = 3.16 cfs @ 11.95 hrs, Volume= 0.158 af, Atten= 0%, Lag= 0.0 min
Primary = 3.16 cfs @ 11.95 hrs, Volume= 0.158 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs / 2

Peak Elev= 998.05' @ 11.97 hrs

Flood Elev= 998.82'

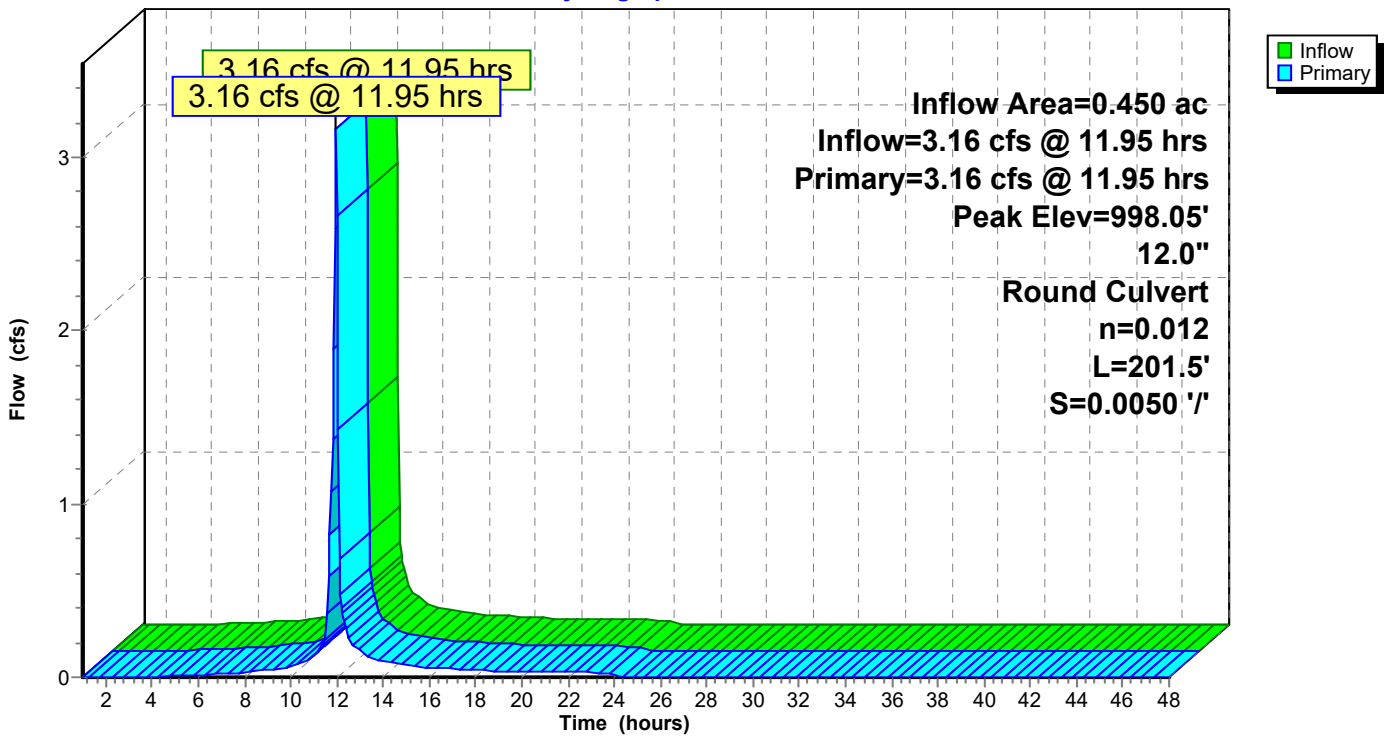
Device	Routing	Invert	Outlet Devices
#1	Primary	994.01'	12.0" Round 202-201 L= 201.5' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 994.01' / 993.00' S= 0.0050 '/ Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=3.14 cfs @ 11.95 hrs HW=997.97' TW=996.26' (Dynamic Tailwater)

↑1=202-201 (Outlet Controls 3.14 cfs @ 4.00 fps)

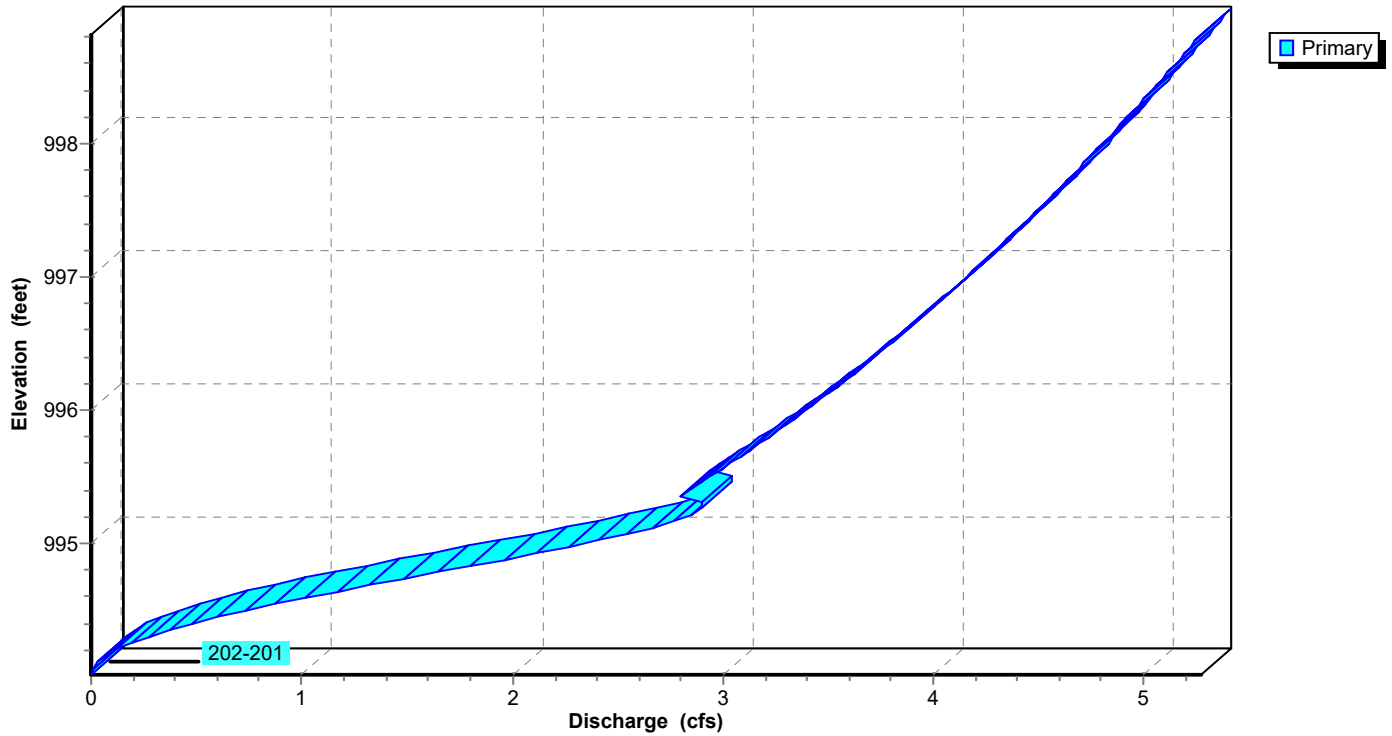
Pond 6P: 301-300

Hydrograph



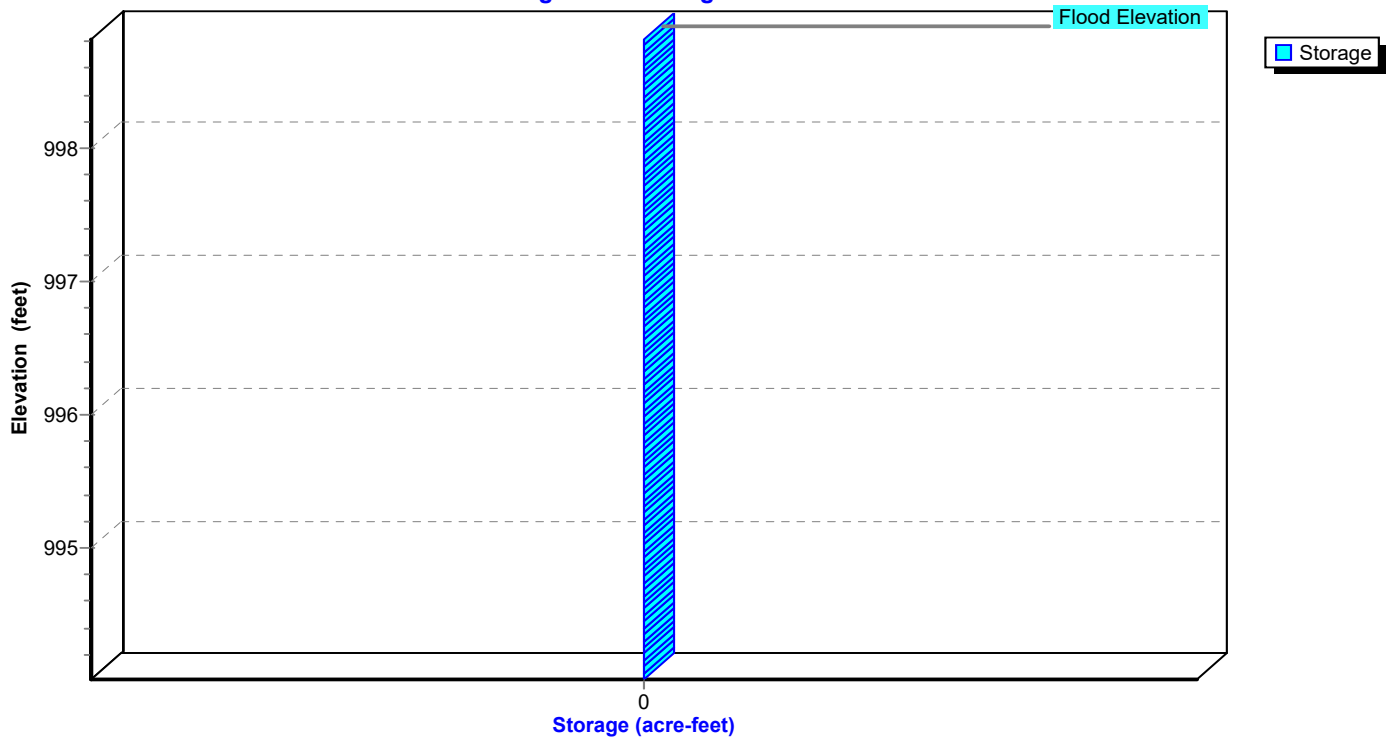
Pond 6P: 301-300

Stage-Discharge



Pond 6P: 301-300

Stage-Area-Storage



Summary for Pond 10P: BASIN REACH

[58] Hint: Peaked 8.50' above defined flood level

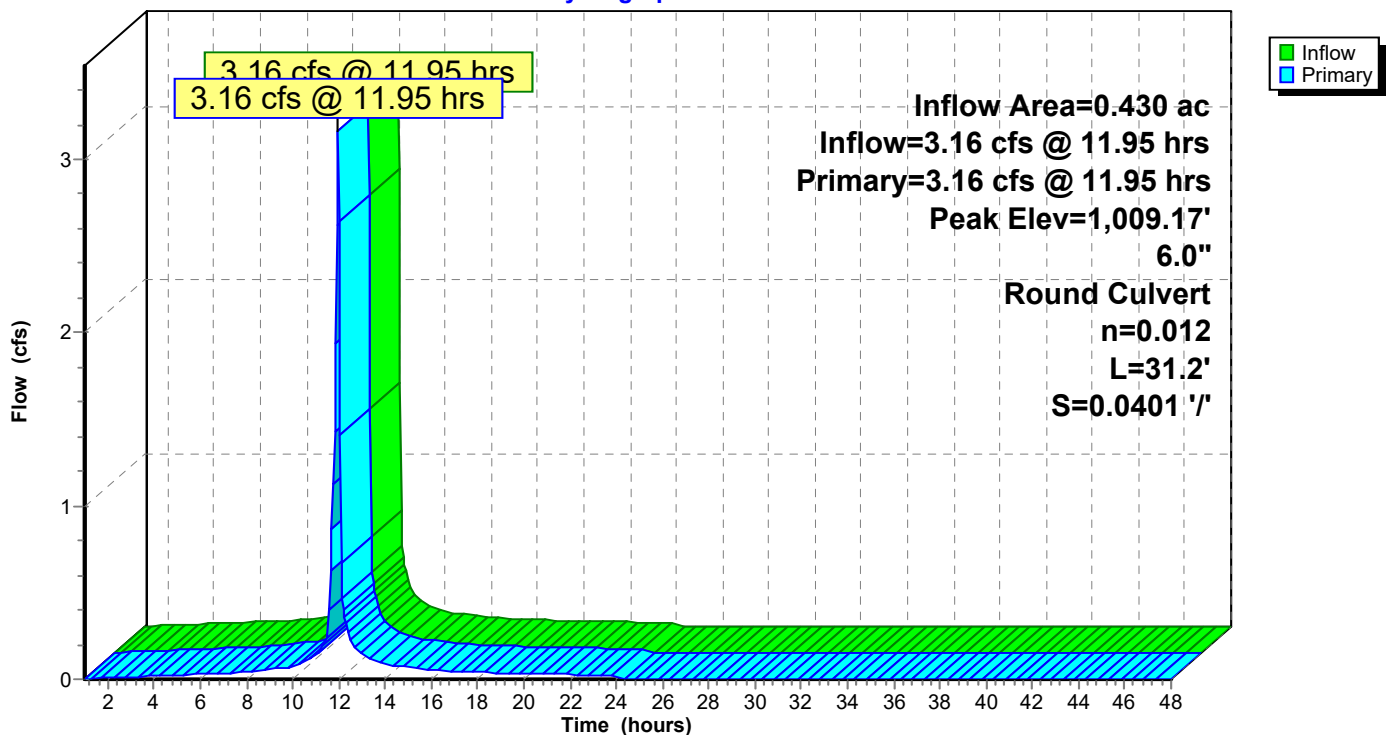
Inflow Area = 0.430 ac, 88.37% Impervious, Inflow Depth > 4.76" for 10-Year event
 Inflow = 3.16 cfs @ 11.95 hrs, Volume= 0.170 af
 Outflow = 3.16 cfs @ 11.95 hrs, Volume= 0.170 af, Atten= 0%, Lag= 0.0 min
 Primary = 3.16 cfs @ 11.95 hrs, Volume= 0.170 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs / 2

Peak Elev= 1,009.17' @ 11.95 hrs

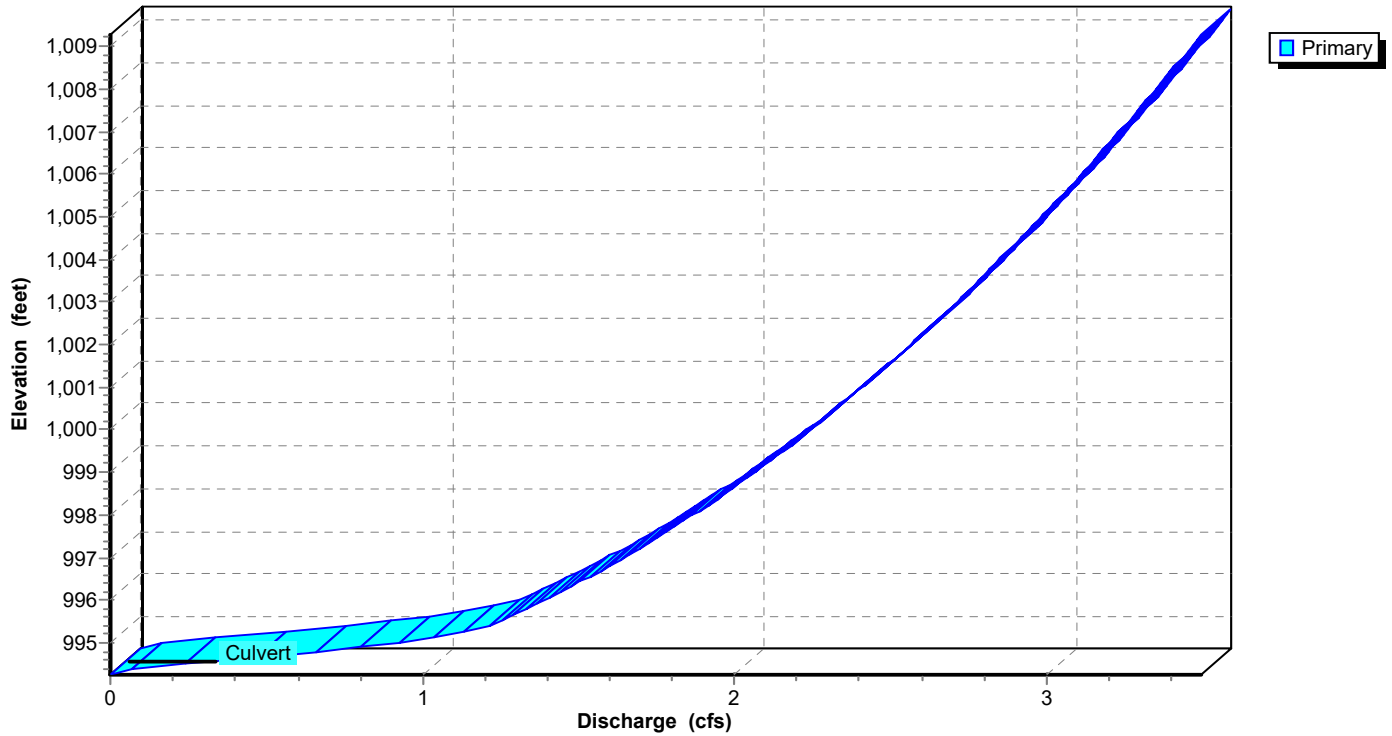
Flood Elev= 1,000.67'

Device	Routing	Invert	Outlet Devices
#1	Primary	994.25'	6.0" Round Culvert L= 31.2' RCP, rounded edge headwall, Ke= 0.100 Inlet / Outlet Invert= 994.25' / 993.00' S= 0.0401 '/ Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.20 sf

Primary OutFlow Max=3.16 cfs @ 11.95 hrs HW=1,009.11' TW=996.25' (Dynamic Tailwater)↑ **1=Culvert** (Outlet Controls 3.16 cfs @ 16.08 fps)**Pond 10P: BASIN REACH****Hydrograph**

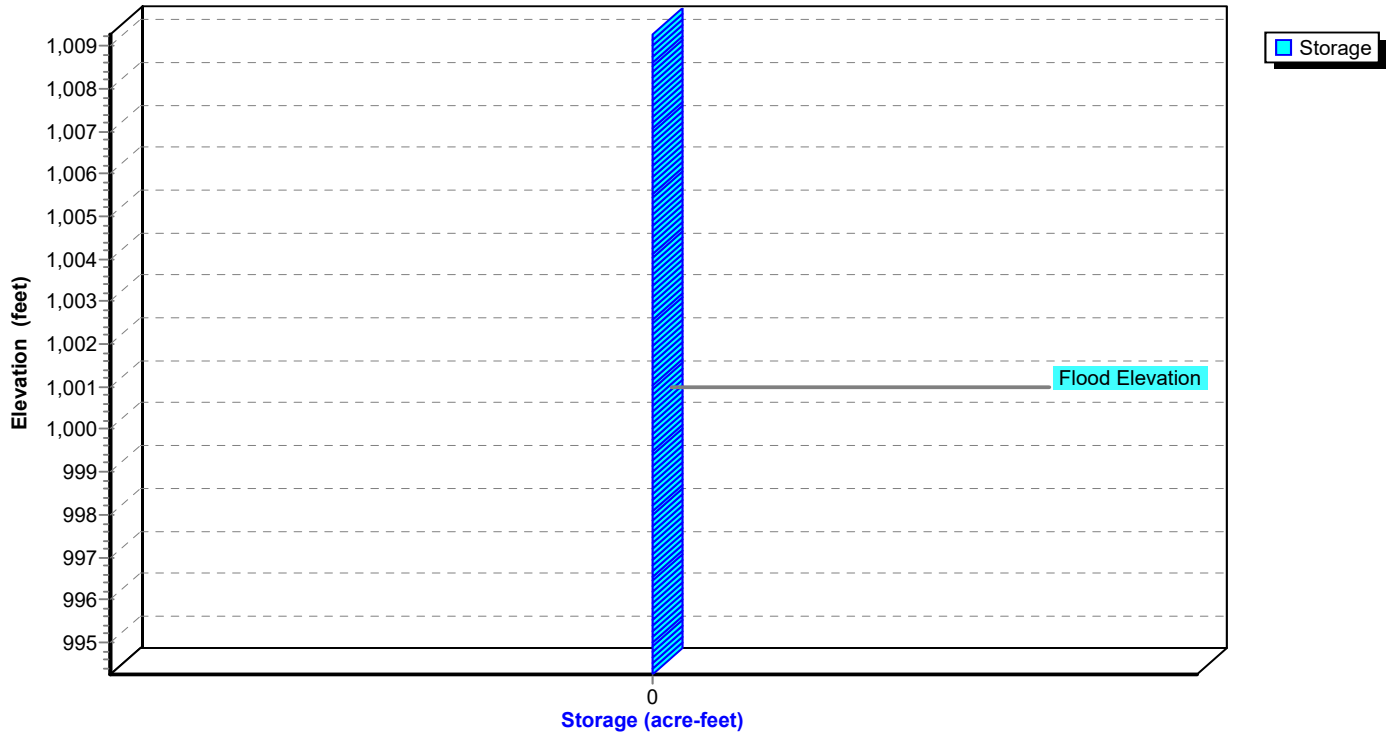
Pond 10P: BASIN REACH

Stage-Discharge



Pond 10P: BASIN REACH

Stage-Area-Storage



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Summary for Pond 12P: DETENTION BASIN

[80] Warning: Exceeded Pond 6P by 0.16' @ 24.35 hrs (0.03 cfs 0.001 af)

Inflow Area = 1.320 ac, 64.39% Impervious, Inflow Depth > 4.14" for 10-Year event
 Inflow = 8.98 cfs @ 11.95 hrs, Volume= 0.455 af
 Outflow = 2.64 cfs @ 12.09 hrs, Volume= 0.455 af, Atten= 71%, Lag= 8.2 min
 Primary = 2.64 cfs @ 12.09 hrs, Volume= 0.455 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs / 2
 Peak Elev= 996.76' @ 12.09 hrs Surf.Area= 3,914 sf Storage= 8,239 cf
 Flood Elev= 999.00' Surf.Area= 6,484 sf Storage= 19,812 cf

Plug-Flow detention time= 116.8 min calculated for 0.455 af (100% of inflow)
 Center-of-Mass det. time= 116.2 min (894.3 - 778.1)

Volume	Invert	Avail.Storage	Storage Description	
#1	992.10'	19,812 cf	Custom Stage Data (Pyramidal) Listed below (Recalc)	
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
992.10	4	0	0	4
993.00	539	177	177	541
994.00	1,359	918	1,095	1,370
995.00	2,235	1,779	2,874	2,262
996.00	3,166	2,687	5,561	3,215
997.00	4,169	3,656	9,217	4,247
998.00	5,290	4,718	13,935	5,401
999.00	6,484	5,877	19,812	6,634

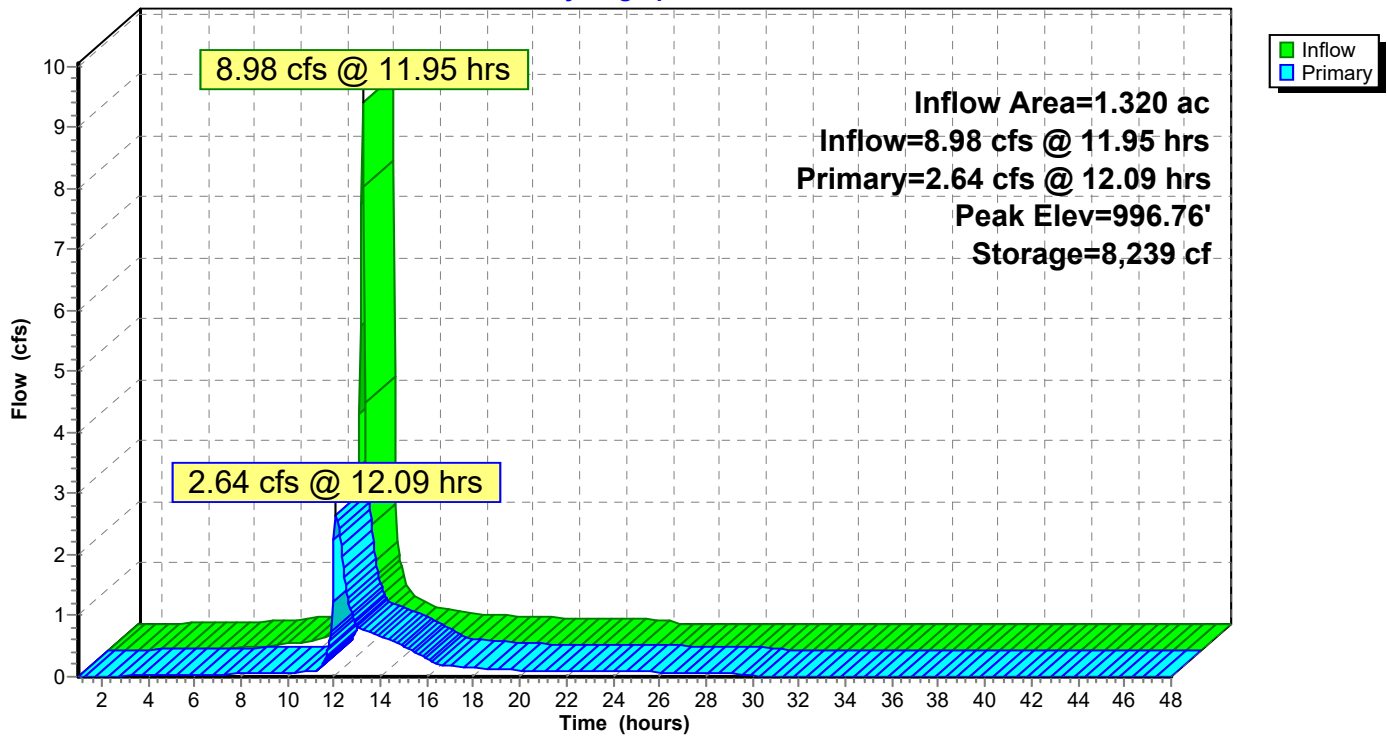
Device	Routing	Invert	Outlet Devices
#1	Primary	988.04'	18.0" Round Culvert L= 50.1' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 988.04' / 987.00' S= 0.0208 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf
#2	Device 1	992.10'	1.5" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	994.25'	4.0" W x 4.0" H Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#4	Device 1	996.00'	12.0" W x 6.0" H Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#5	Device 1	997.50'	4.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Primary OutFlow Max=2.63 cfs @ 12.09 hrs HW=996.75' TW=992.19' (Dynamic Tailwater)

- 1=Culvert (Passes 2.63 cfs of 21.53 cfs potential flow)
- 2=Orifice/Grate (Orifice Controls 0.13 cfs @ 10.29 fps)
- 3=Orifice/Grate (Orifice Controls 0.82 cfs @ 7.36 fps)
- 4=Orifice/Grate (Orifice Controls 1.69 cfs @ 3.38 fps)
- 5=Sharp-Crested Rectangular Weir (Controls 0.00 cfs)

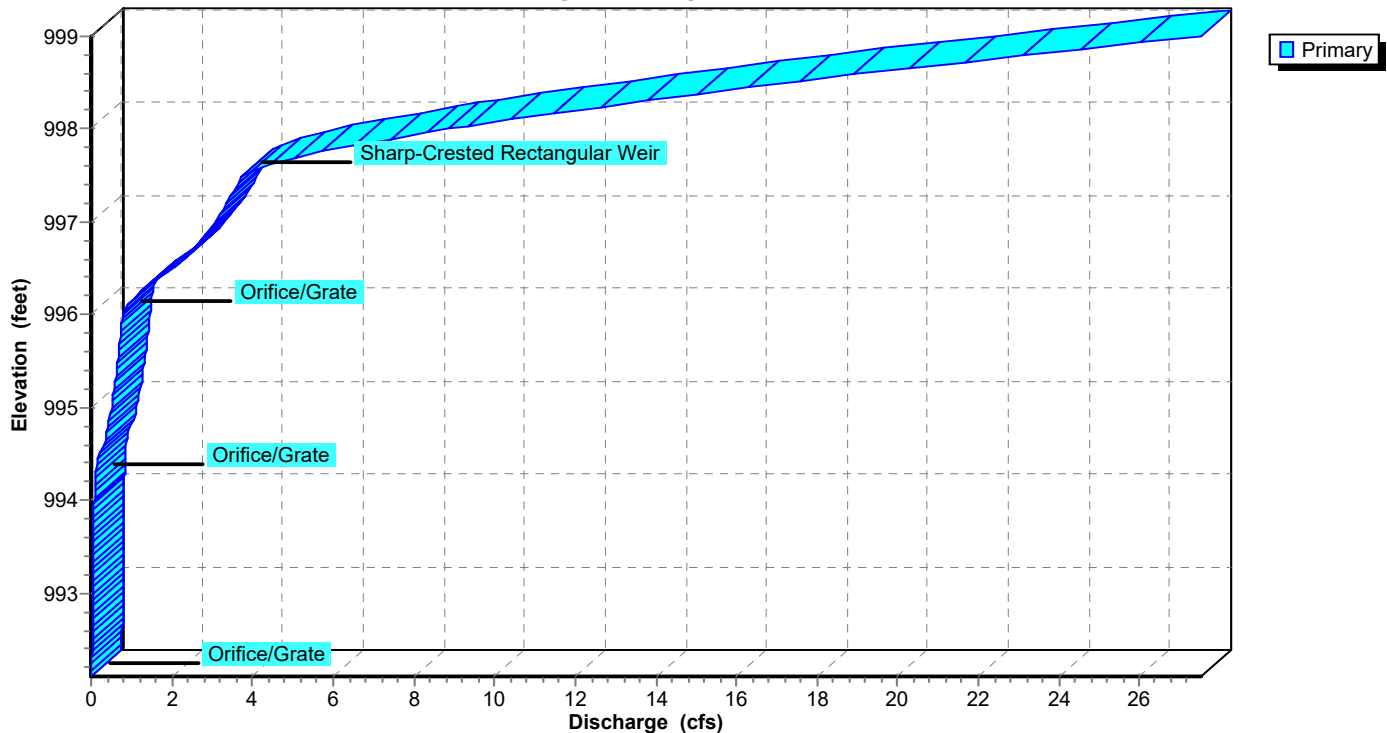
Pond 12P: DETENTION BASIN

Hydrograph



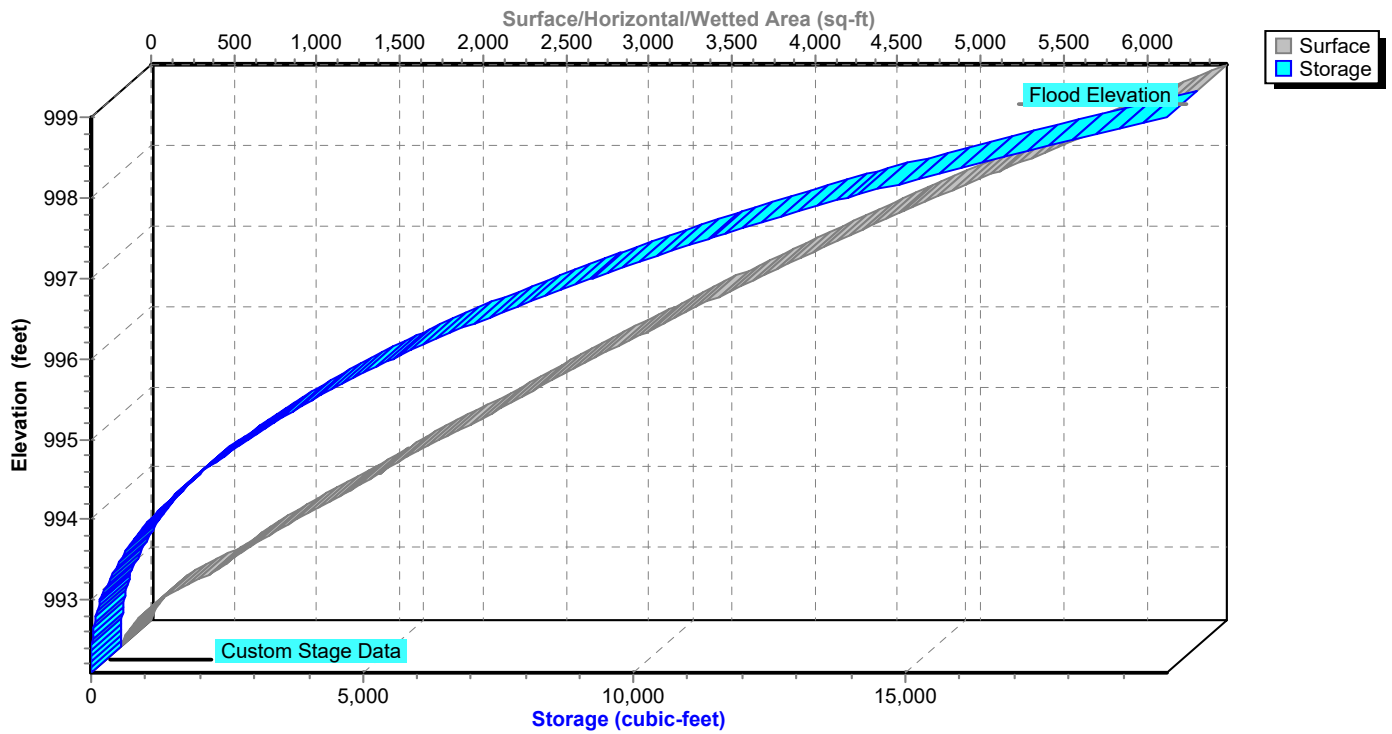
Pond 12P: DETENTION BASIN

Stage-Discharge



Pond 12P: DETENTION BASIN

Stage-Area-Storage



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Summary for Pond 24P: 12-11

[58] Hint: Peaked 3.79' above defined flood level

Inflow Area = 2.170 ac, 85.00% Impervious, Inflow Depth = 4.60" for 10-Year event
Inflow = 10.31 cfs @ 12.12 hrs, Volume= 0.833 af
Outflow = 10.31 cfs @ 12.12 hrs, Volume= 0.833 af, Atten= 0%, Lag= 0.0 min
Primary = 10.31 cfs @ 12.12 hrs, Volume= 0.833 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs / 2

Peak Elev= 997.09' @ 12.12 hrs

Flood Elev= 993.30'

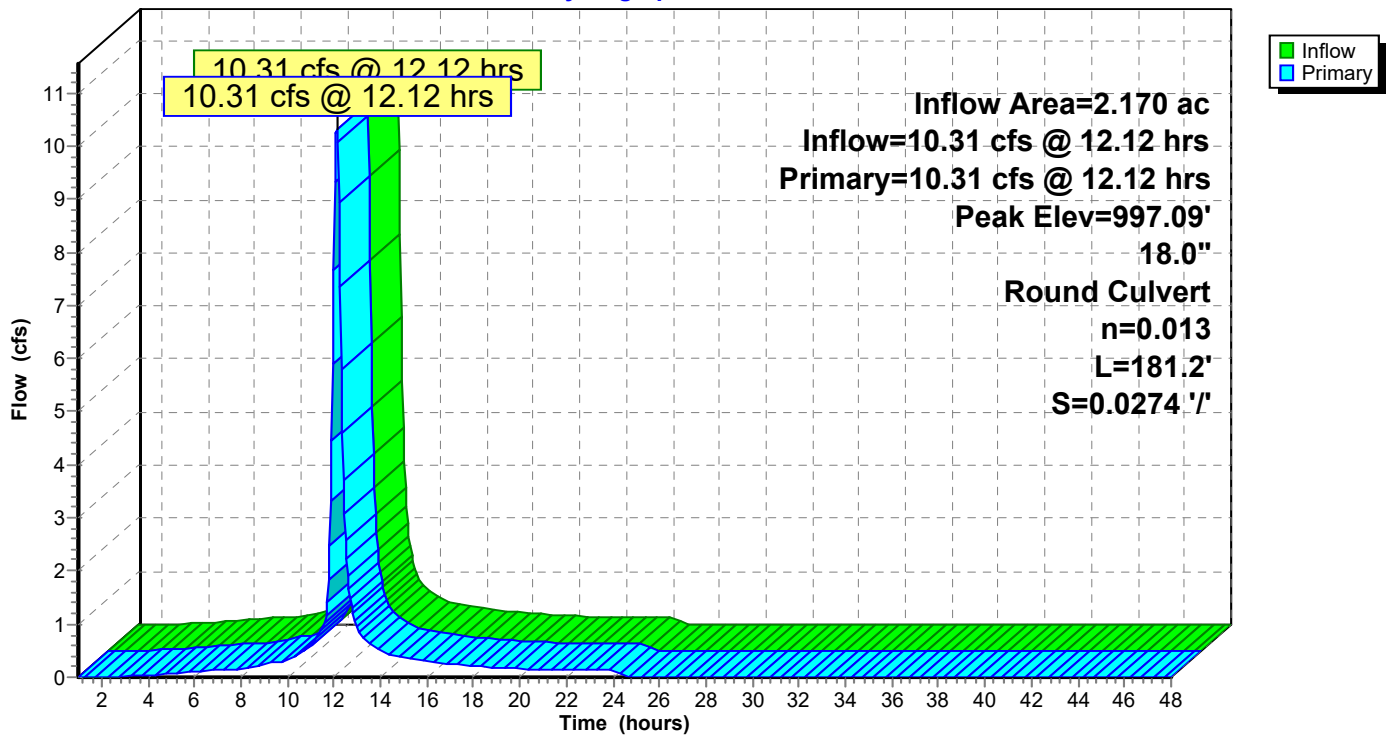
Device	Routing	Invert	Outlet Devices
#1	Primary	994.87'	18.0" Round Culvert L= 181.2' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 994.87' / 989.91' S= 0.0274 '/ Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.77 sf

Primary OutFlow Max=10.19 cfs @ 12.12 hrs HW=997.05' TW=992.46' (Dynamic Tailwater)

↑ **1=Culvert** (Inlet Controls 10.19 cfs @ 5.77 fps)

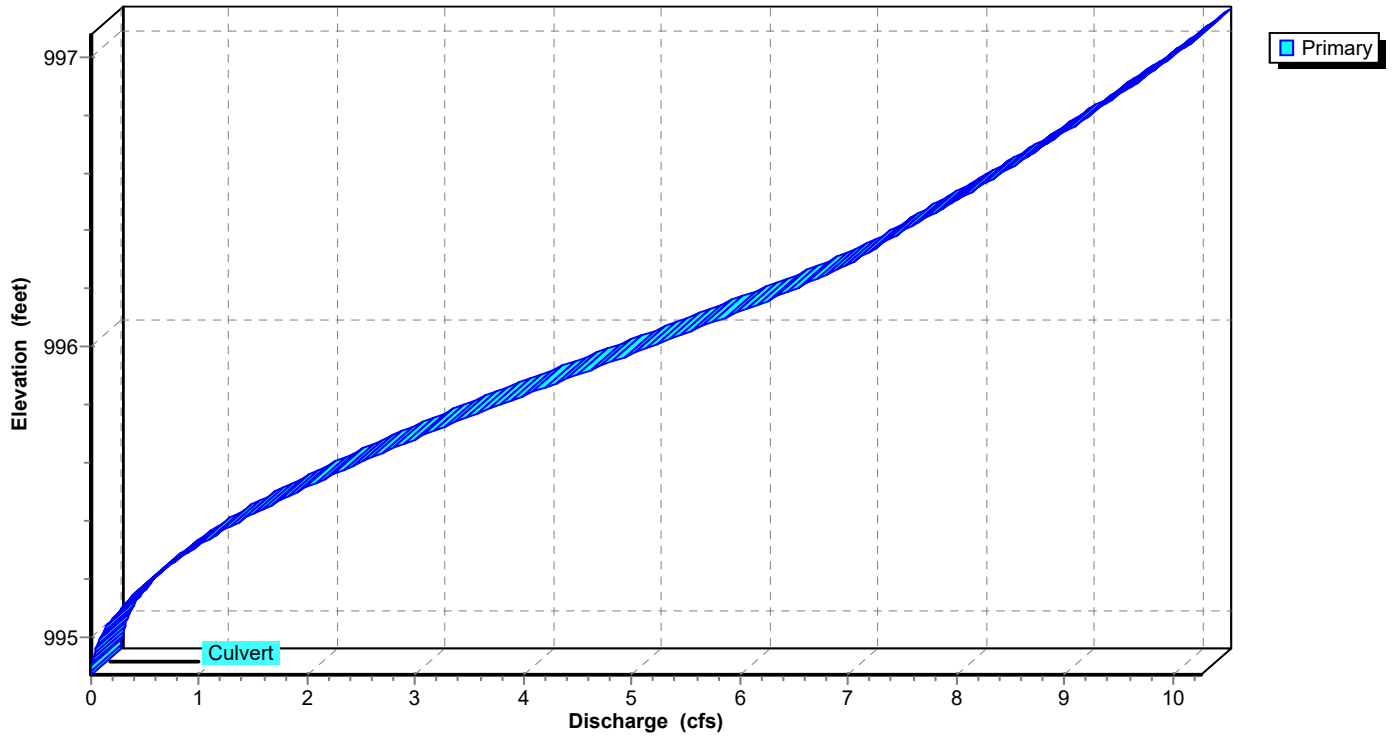
Pond 24P: 12-11

Hydrograph



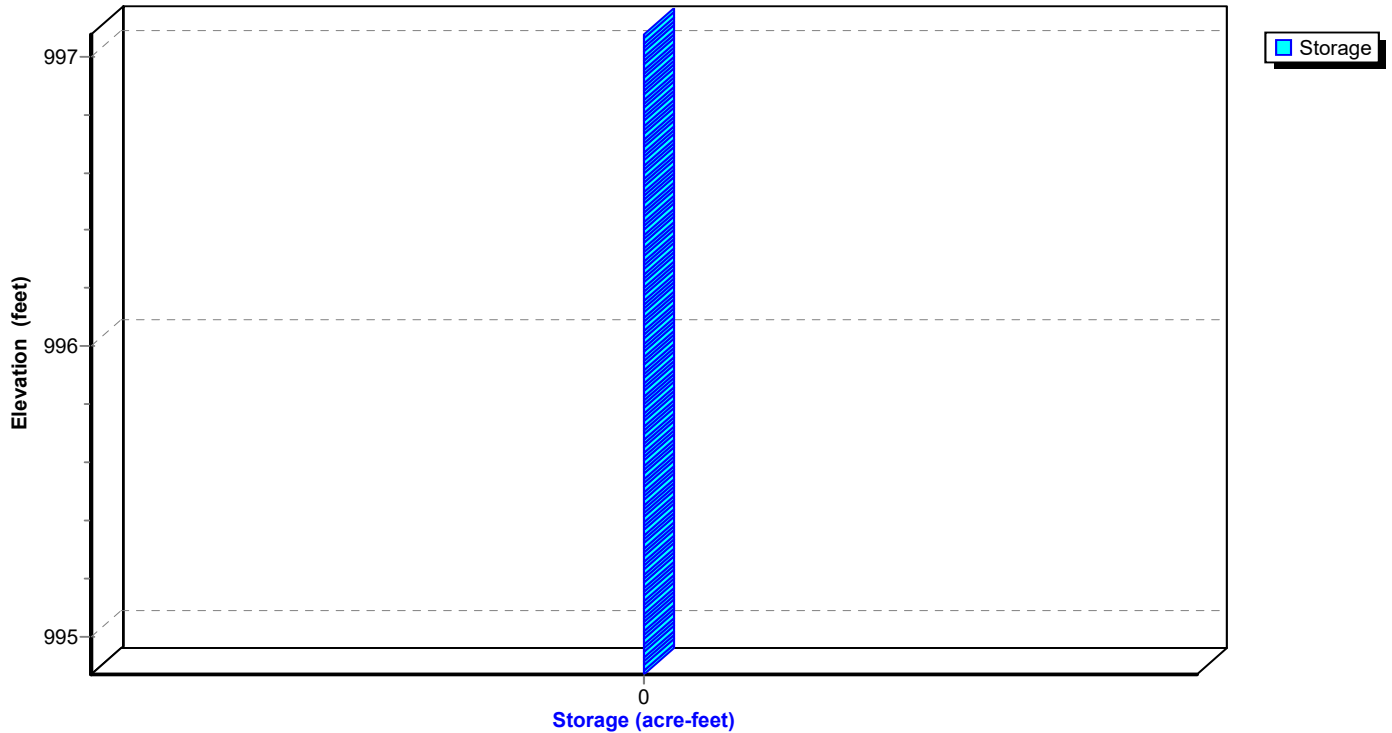
Pond 24P: 12-11

Stage-Discharge



Pond 24P: 12-11

Stage-Area-Storage



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Summary for Pond 26P: 11 - 100 MH

Inflow Area = 4.680 ac, 78.82% Impervious, Inflow Depth > 4.46" for 10-Year event
Inflow = 16.76 cfs @ 12.13 hrs, Volume= 1.741 af
Outflow = 16.76 cfs @ 12.13 hrs, Volume= 1.741 af, Atten= 0%, Lag= 0.0 min
Primary = 16.76 cfs @ 12.13 hrs, Volume= 1.741 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs / 2

Peak Elev= 992.63' @ 12.13 hrs

Flood Elev= 995.00'

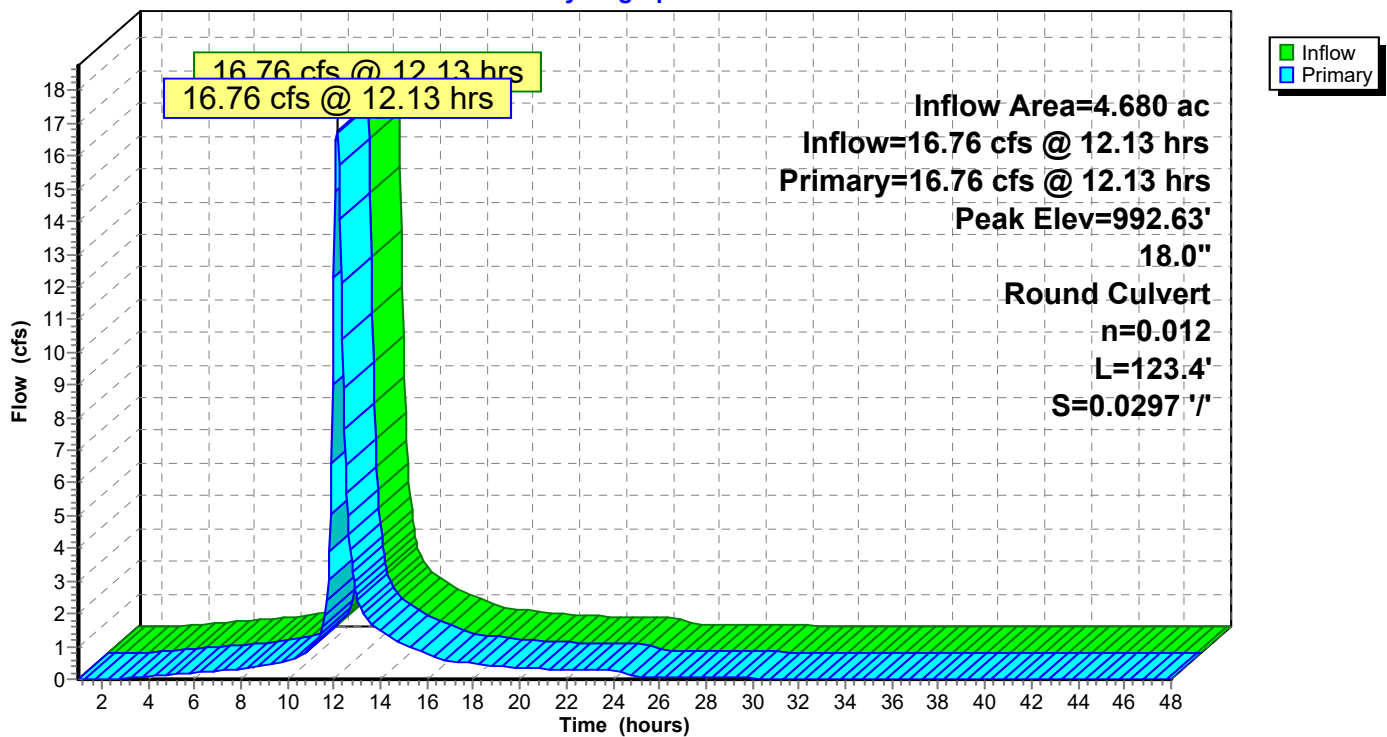
Device	Routing	Invert	Outlet Devices
#1	Primary	988.71'	18.0" Round Culvert L= 123.4' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 988.71' / 985.04' S= 0.0297 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=16.63 cfs @ 12.13 hrs HW=992.53' TW=988.24' (Dynamic Tailwater)

↑**1=Culvert** (Outlet Controls 16.63 cfs @ 9.41 fps)

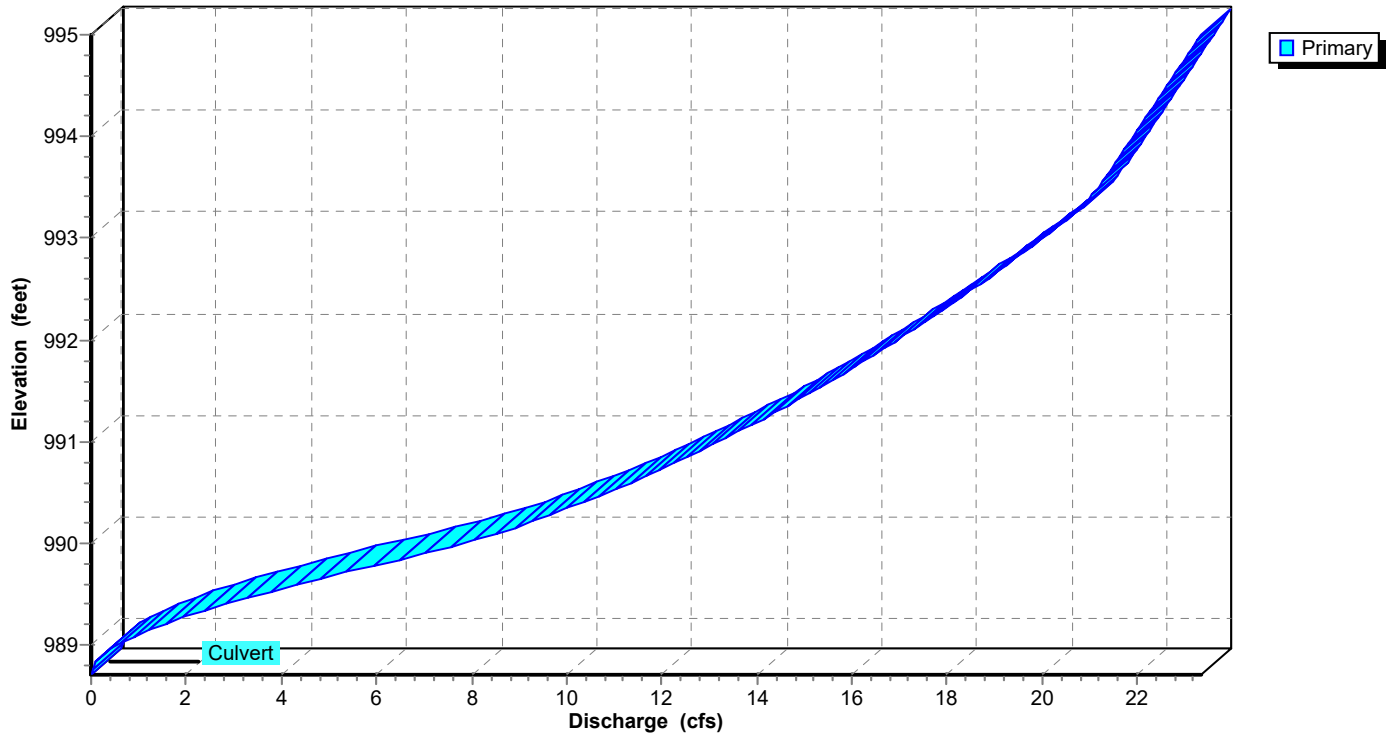
Pond 26P: 11 - 100 MH

Hydrograph



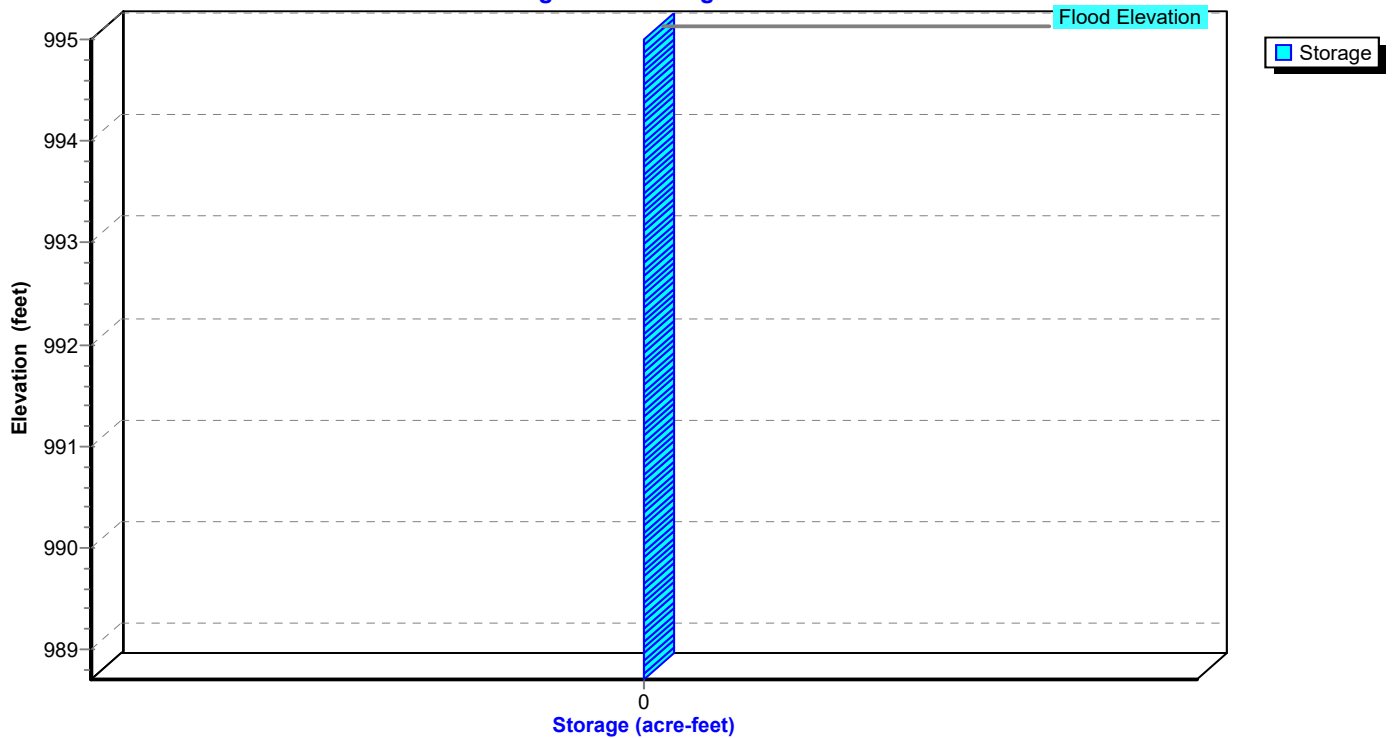
Pond 26P: 11 - 100 MH

Stage-Discharge



Pond 26P: 11 - 100 MH

Stage-Area-Storage



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Summary for Pond 27P: 11-10

Inflow Area = 4.680 ac, 78.82% Impervious, Inflow Depth > 4.46" for 10-Year event
Inflow = 16.76 cfs @ 12.13 hrs, Volume= 1.741 af
Outflow = 16.76 cfs @ 12.13 hrs, Volume= 1.741 af, Atten= 0%, Lag= 0.0 min
Primary = 16.76 cfs @ 12.13 hrs, Volume= 1.741 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs / 2

Peak Elev= 988.27' @ 12.13 hrs

Flood Elev= 995.00'

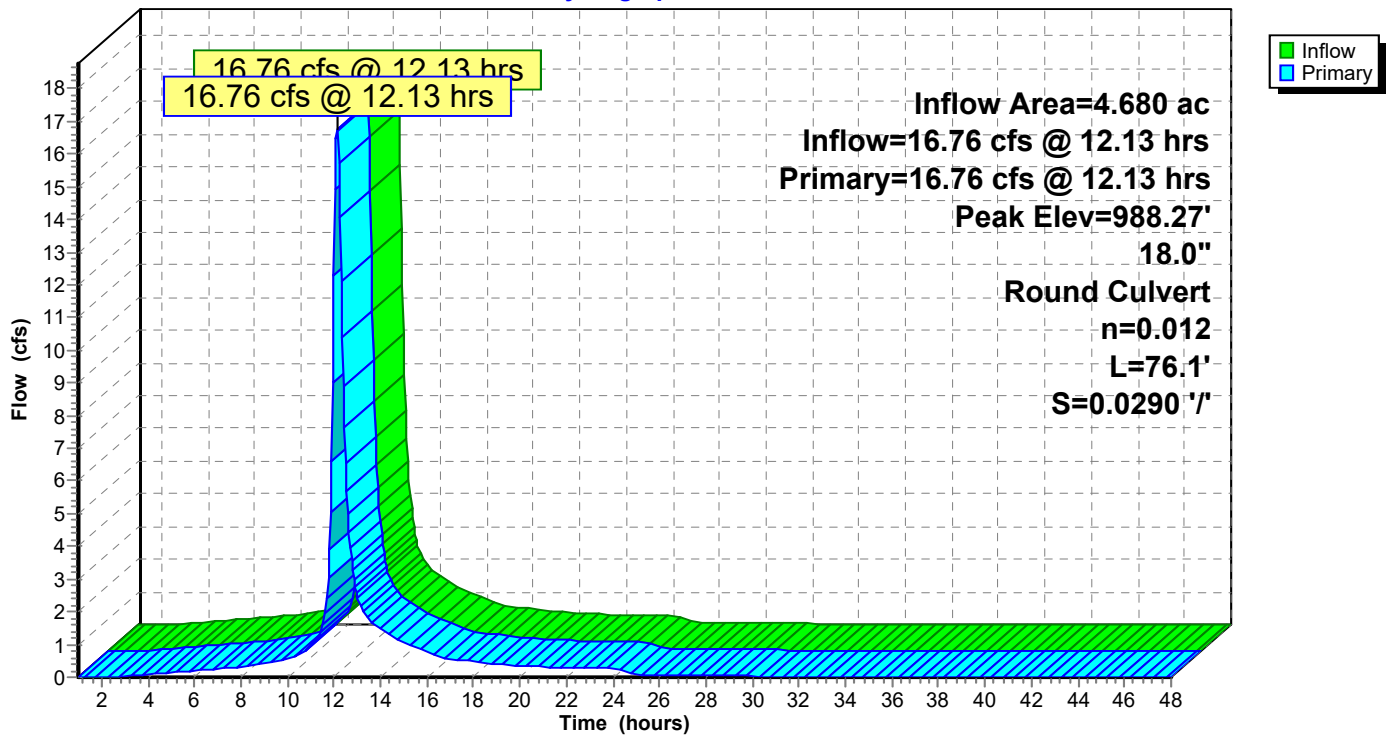
Device	Routing	Invert	Outlet Devices
#1	Primary	985.04'	18.0" Round Culvert L= 76.1' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 985.04' / 982.83' S= 0.0290 '/ Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=16.63 cfs @ 12.13 hrs HW=988.24' (Free Discharge)

↑**1=Culvert** (Inlet Controls 16.63 cfs @ 9.41 fps)

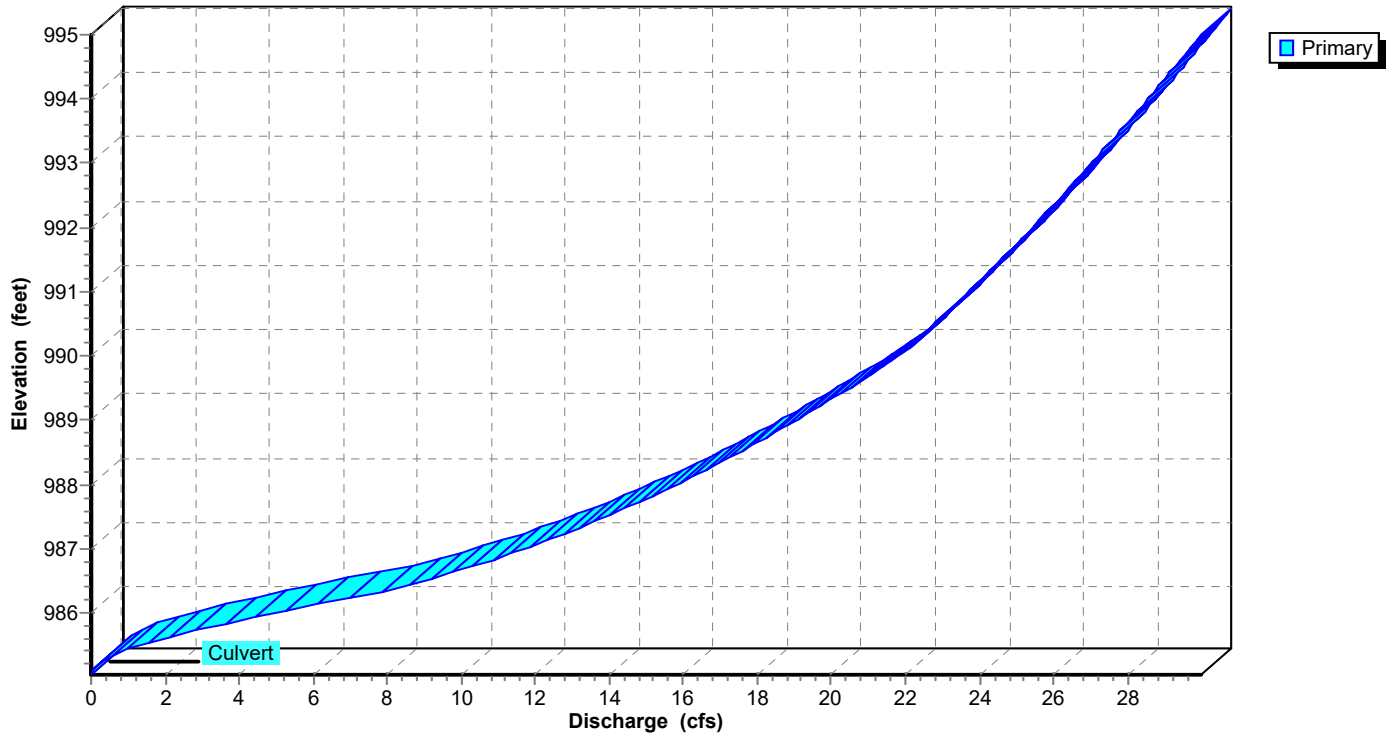
Pond 27P: 11-10

Hydrograph



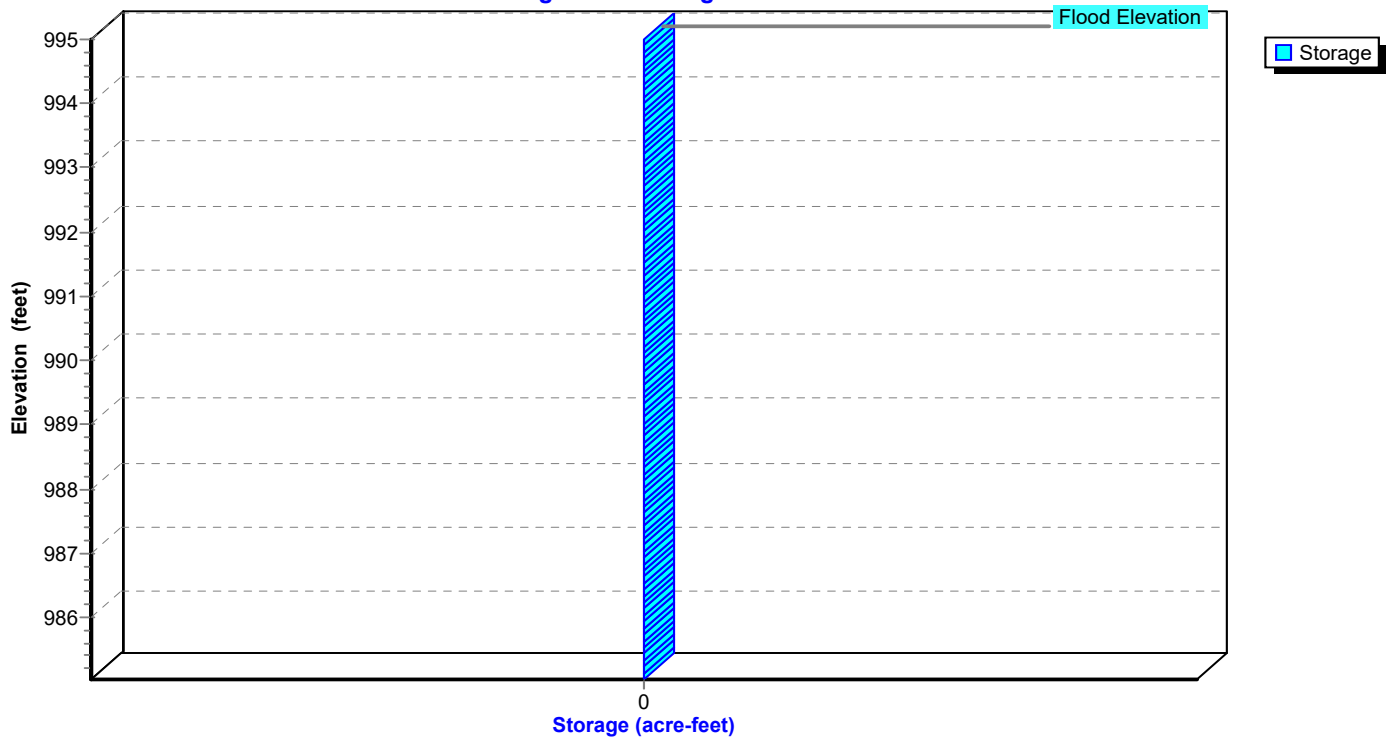
Pond 27P: 11-10

Stage-Discharge



Pond 27P: 11-10

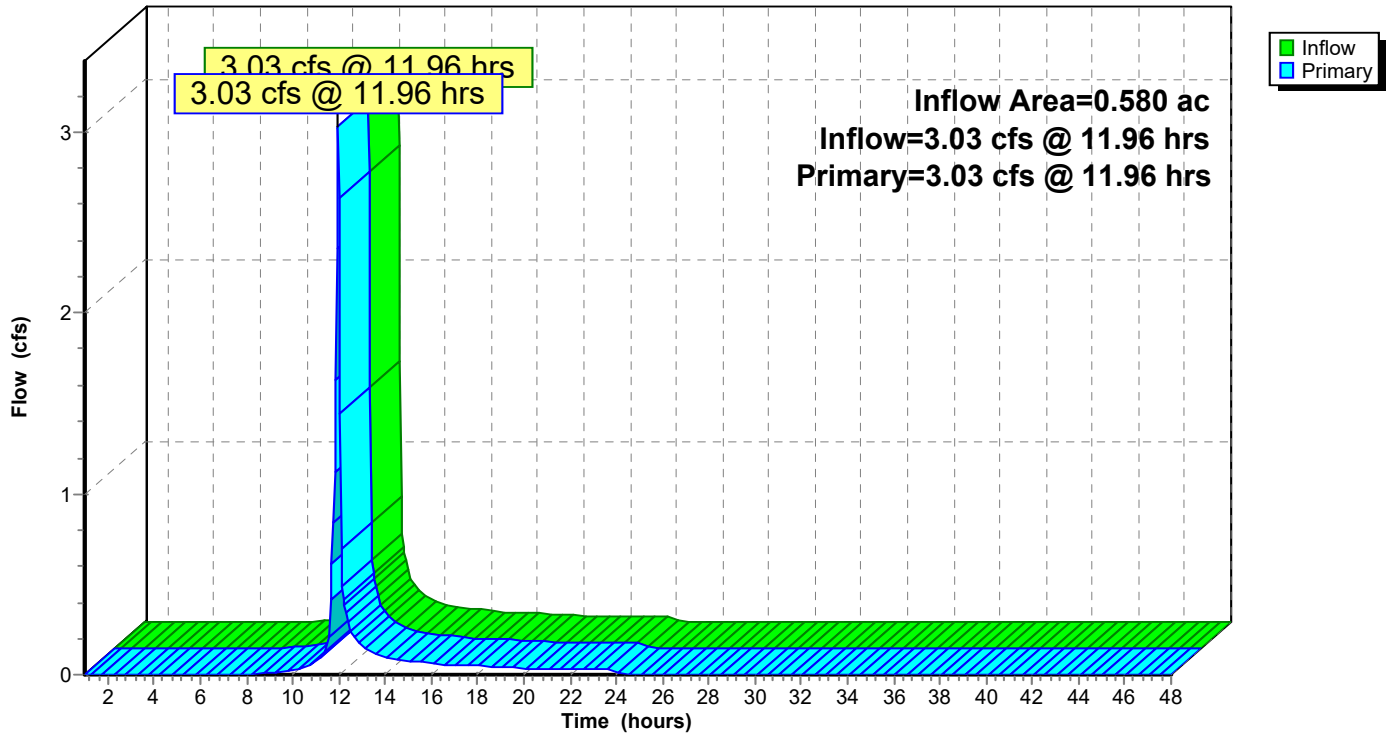
Stage-Area-Storage



Summary for Link 29L: BYPASS AREAS

Inflow Area = 0.580 ac, 13.79% Impervious, Inflow Depth = 2.92" for 10-Year event
Inflow = 3.03 cfs @ 11.96 hrs, Volume= 0.141 af
Primary = 3.03 cfs @ 11.96 hrs, Volume= 0.141 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs

Link 29L: BYPASS AREAS**Hydrograph**

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Time span=1.00-48.00 hrs, dt=0.05 hrs, 941 points x 2
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: EXISTING CONDITIONS

Runoff Area=2.110 ac 0.00% Impervious Runoff Depth=4.66"
 Tc=10.0 min CN=74 Runoff=14.76 cfs 0.819 af

Subcatchment 3S: AREA 1

Runoff Area=0.210 ac 71.43% Impervious Runoff Depth=6.63"
 Tc=5.0 min CN=91 Runoff=2.24 cfs 0.116 af

Subcatchment 4S: AREA 5

Runoff Area=0.100 ac 50.00% Impervious Runoff Depth=6.04"
 Tc=5.0 min CN=86 Runoff=1.01 cfs 0.050 af

Subcatchment 5S: AREA 2

Runoff Area=0.240 ac 66.67% Impervious Runoff Depth=6.51"
 Tc=5.0 min CN=90 Runoff=2.54 cfs 0.130 af

Subcatchment 6S: AREA 6

Runoff Area=0.510 ac 11.76% Impervious Runoff Depth=5.00"
 Tc=5.0 min CN=77 Runoff=4.47 cfs 0.212 af

Subcatchment 7S: AREA 3

Runoff Area=0.440 ac 36.36% Impervious Runoff Depth=5.69"
 Tc=5.0 min CN=83 Runoff=4.27 cfs 0.209 af

Subcatchment 8S: AREA 7

Runoff Area=0.070 ac 28.57% Impervious Runoff Depth=5.46"
 Tc=5.0 min CN=81 Runoff=0.66 cfs 0.032 af

Subcatchment 10S: AREA 4

Runoff Area=0.330 ac 100.00% Impervious Runoff Depth>7.46"
 Tc=5.0 min CN=98 Runoff=3.67 cfs 0.205 af

Subcatchment 20S: OFFSITE TO BMP

Runoff Area=1.170 ac 85.00% Impervious Runoff Depth=6.98"
 Tc=30.0 min CN=94 Runoff=6.54 cfs 0.681 af

Subcatchment 22S: OFFSITE TO CI 12

Runoff Area=2.170 ac 85.00% Impervious Runoff Depth=6.98"
 Tc=20.0 min CN=94 Runoff=15.31 cfs 1.263 af

Subcatchment 25S: AREA TO AI 11

Runoff Area=0.020 ac 0.00% Impervious Runoff Depth=4.66"
 Tc=5.0 min CN=74 Runoff=0.17 cfs 0.008 af

Subcatchment 28S: PROPOSED CONDITIONS

Runoff Area=2.110 ac 32.70% Impervious Runoff Depth=5.58"
 Tc=5.0 min CN=82 Runoff=20.17 cfs 0.980 af

Pond 3P: ROOF DRAINS TO BASIN

Peak Elev=1,047.46' Inflow=4.68 cfs 0.255 af
 6.0" Round Culvert n=0.012 L=21.7' S=0.0198 '/' Outflow=4.68 cfs 0.255 af

Pond 4R: 302-301

Peak Elev=1,000.90' Inflow=2.24 cfs 0.116 af
 15.0" Round Culvert n=0.012 L=165.3' S=0.0050 '/' Outflow=2.24 cfs 0.116 af

Pond 6P: 301-300

Peak Elev=1,001.08' Inflow=4.78 cfs 0.246 af
 12.0" Round Culvert n=0.012 L=201.5' S=0.0050 '/' Outflow=4.78 cfs 0.246 af

Pond 10P: BASIN REACH

Peak Elev=1,025.31' Inflow=4.68 cfs 0.255 af
 6.0" Round Culvert n=0.012 L=31.2' S=0.0401 '/' Outflow=4.68 cfs 0.255 af

Pond 12P: DETENTION BASIN

Peak Elev=997.79' Storage=12,847 cf Inflow=13.73 cfs 0.710 af
 Outflow=5.71 cfs 0.710 af

Pond 24P: 12-11

Peak Elev=1,003.48' Inflow=15.31 cfs 1.263 af
 18.0" Round Culvert n=0.013 L=181.2' S=0.0274 '/' Outflow=15.31 cfs 1.263 af

Pond 26P: 11 - 100 MH

Peak Elev=1,000.34' Inflow=24.21 cfs 2.680 af
 18.0" Round Culvert n=0.012 L=123.4' S=0.0297 '/' Outflow=24.21 cfs 2.680 af

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Type II 24-hr 100-Year Rainfall=7.70"

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Pond 27P: 11-10

Peak Elev=991.28' Inflow=24.21 cfs 2.680 af
18.0" Round Culvert n=0.012 L=76.1' S=0.0290 '/' Outflow=24.21 cfs 2.680 af

Link 29L: BYPASS AREAS

Inflow=5.13 cfs 0.244 af
Primary=5.13 cfs 0.244 af

Total Runoff Area = 9.480 ac Runoff Volume = 4.706 af Average Runoff Depth = 5.96"
52.96% Pervious = 5.021 ac 47.04% Impervious = 4.459 ac

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Summary for Subcatchment 1S: EXISTING CONDITIONS

Runoff = 14.76 cfs @ 12.01 hrs, Volume= 0.819 af, Depth= 4.66"

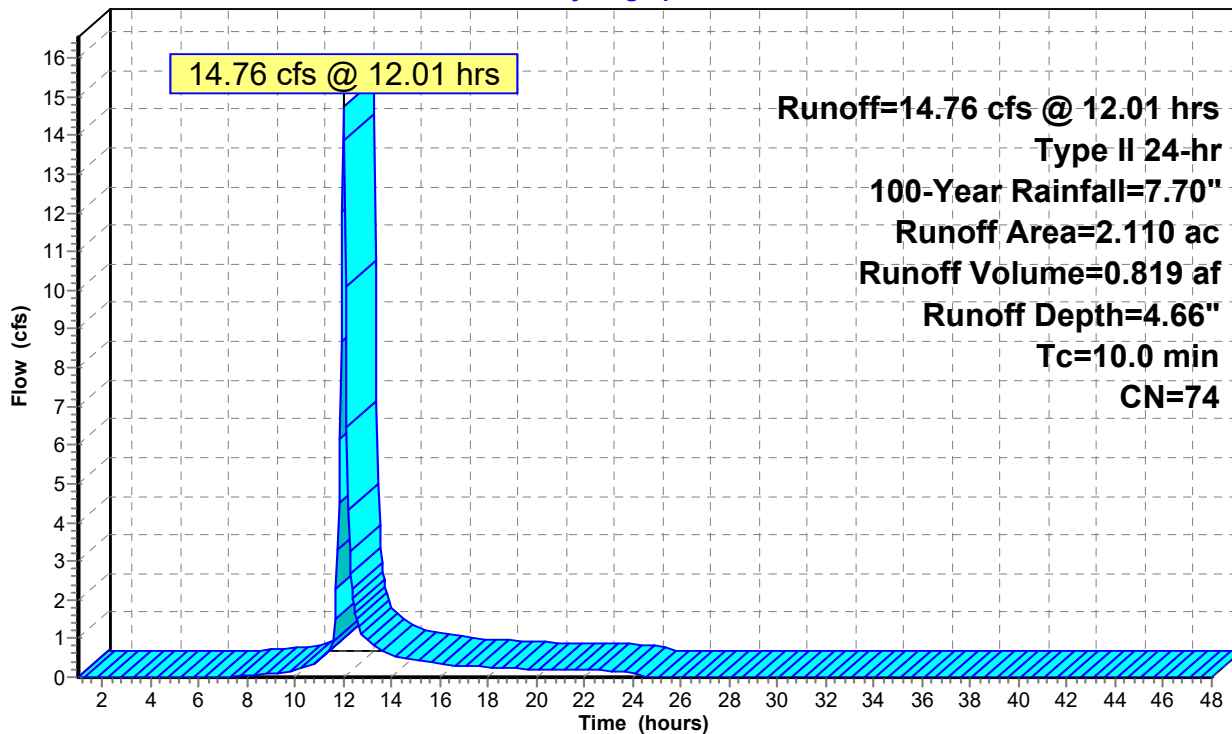
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-Year Rainfall=7.70"

Area (ac)	CN	Description
2.110	74	>75% Grass cover, Good, HSG C
2.110		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry, Assumed TC of 10 Minutes used for Pre-Developed Condition

Subcatchment 1S: EXISTING CONDITIONS

Hydrograph



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Summary for Subcatchment 3S: AREA 1[49] Hint: $T_c < 2dt$ may require smaller dt

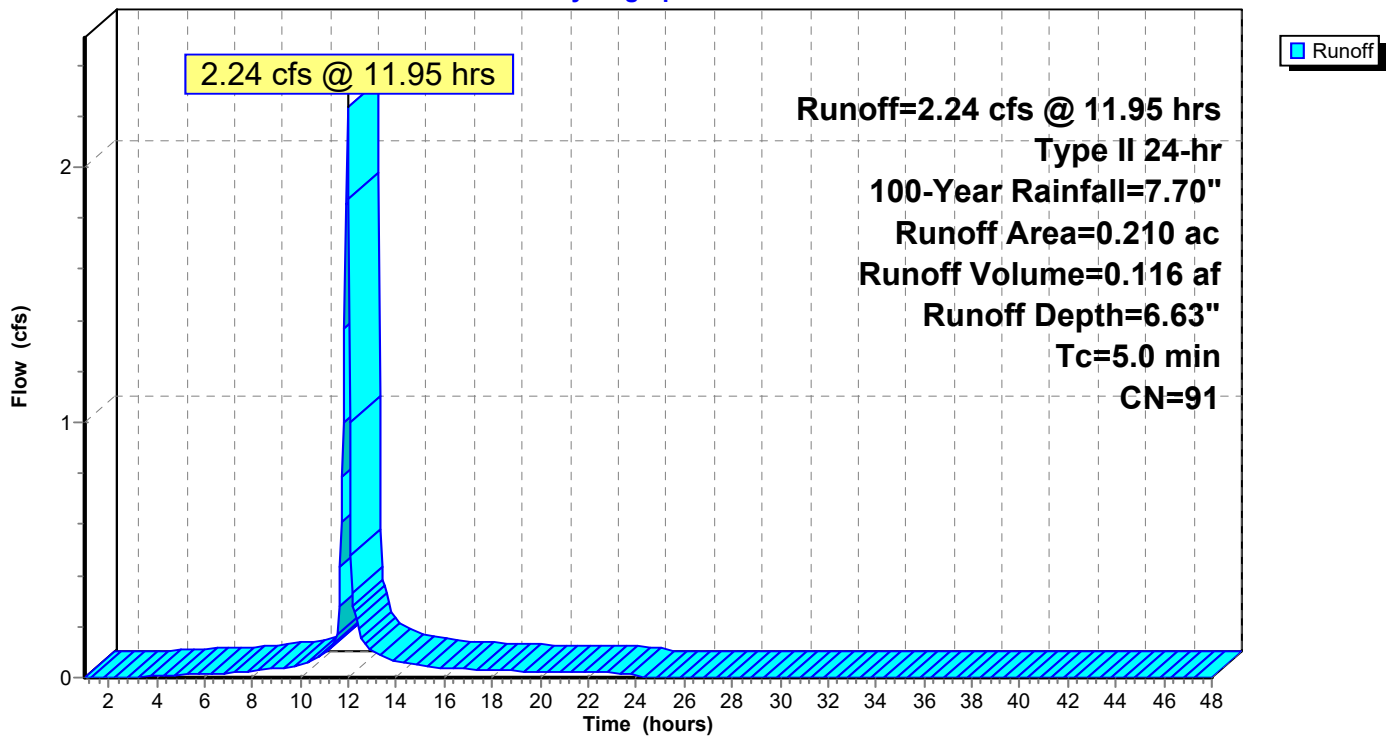
Runoff = 2.24 cfs @ 11.95 hrs, Volume= 0.116 af, Depth= 6.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, $dt=0.05$ hrs

Type II 24-hr 100-Year Rainfall=7.70"

Area (ac)	CN	Description
0.150	98	Paved parking, HSG D
0.060	74	>75% Grass cover, Good, HSG C
0.210	91	Weighted Average
0.060		28.57% Pervious Area
0.150		71.43% Impervious Area

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

Subcatchment 3S: AREA 1**Hydrograph**

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Type II 24-hr 100-Year Rainfall=7.70"

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Summary for Subcatchment 4S: AREA 5[49] Hint: $T_c < 2dt$ may require smaller dt

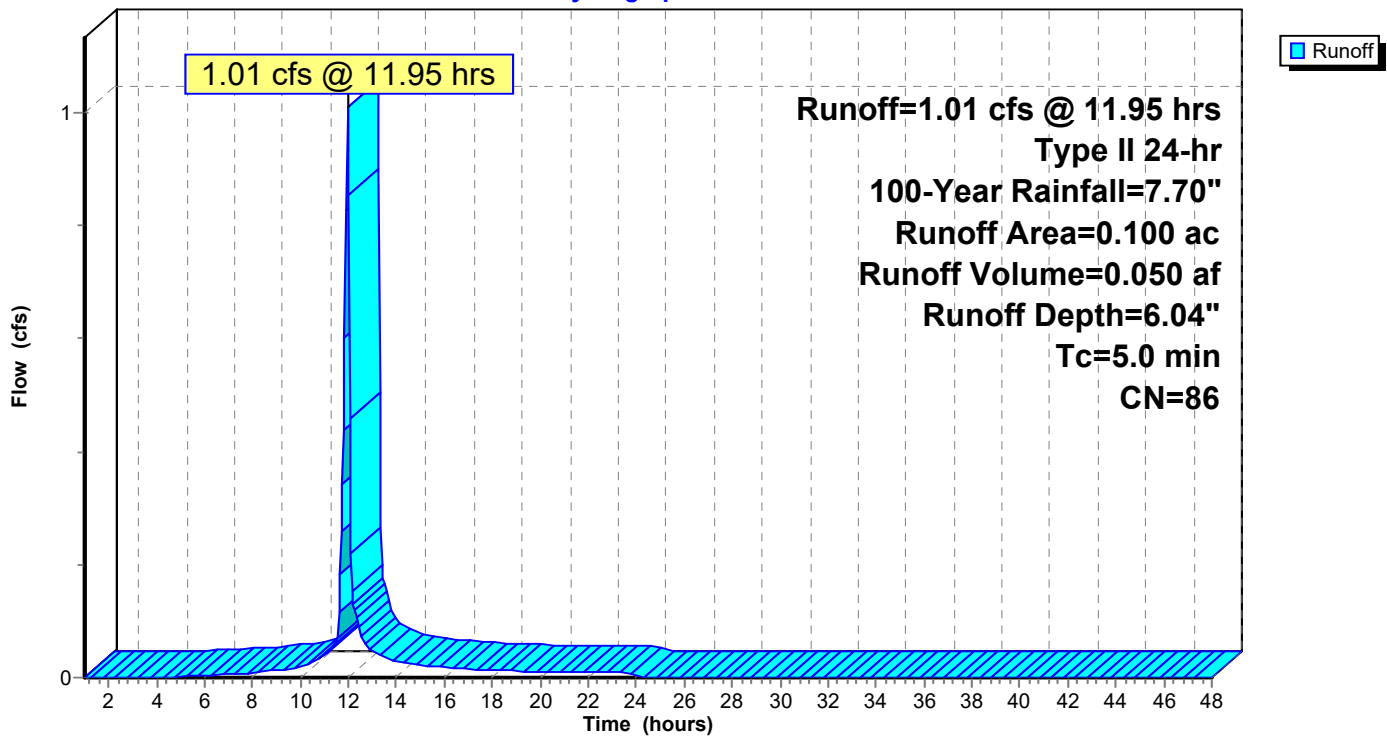
Runoff = 1.01 cfs @ 11.95 hrs, Volume= 0.050 af, Depth= 6.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, $dt=0.05$ hrs

Type II 24-hr 100-Year Rainfall=7.70"

Area (ac)	CN	Description
0.050	98	Paved parking, HSG C
0.050	74	>75% Grass cover, Good, HSG C
0.100	86	Weighted Average
0.050		50.00% Pervious Area
0.050		50.00% Impervious Area

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

Subcatchment 4S: AREA 5**Hydrograph**

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Type II 24-hr 100-Year Rainfall=7.70"

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Summary for Subcatchment 5S: AREA 2[49] Hint: $T_c < 2dt$ may require smaller dt

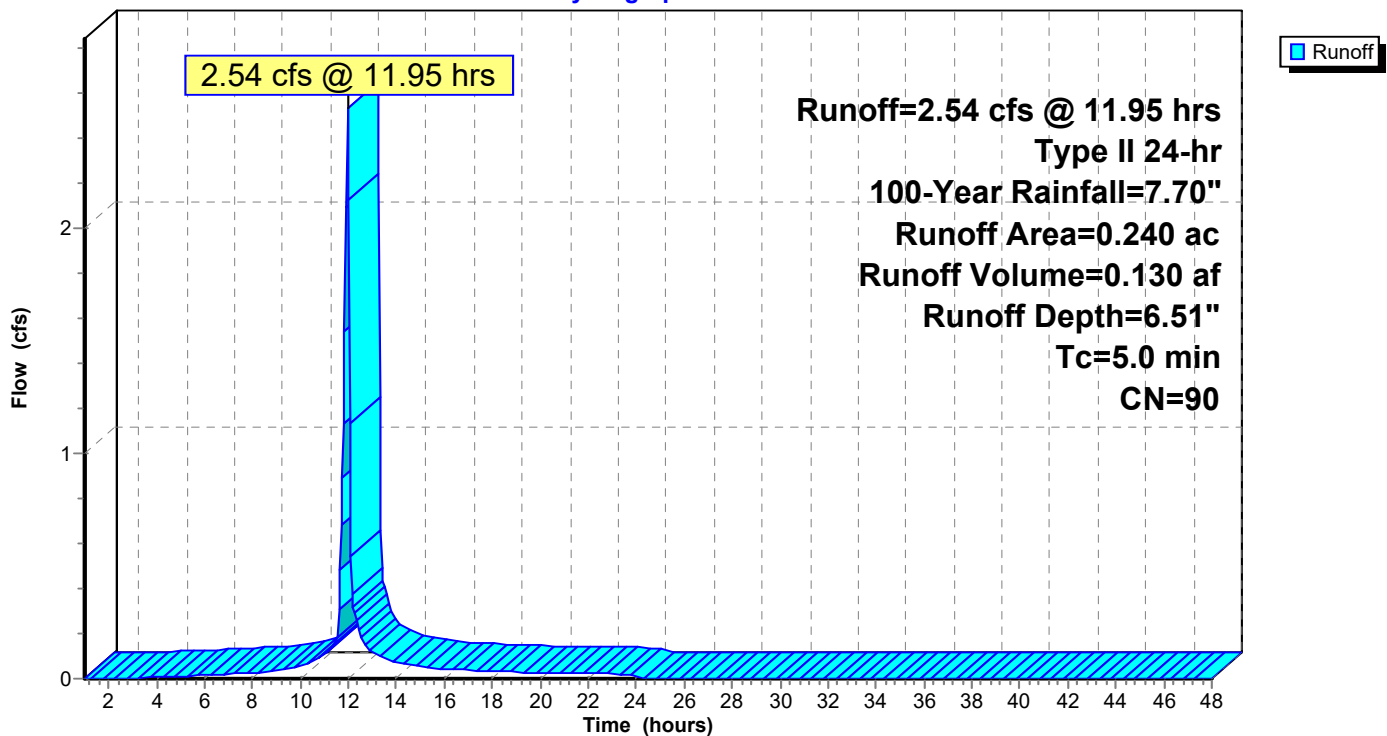
Runoff = 2.54 cfs @ 11.95 hrs, Volume= 0.130 af, Depth= 6.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, $dt=0.05$ hrs

Type II 24-hr 100-Year Rainfall=7.70"

Area (ac)	CN	Description
0.160	98	Paved parking, HSG C
0.050	74	>75% Grass cover, Good, HSG C
* 0.030	74	>75% Grass cover, Good, HSG C OFFSITE TO ONSITE
0.240	90	Weighted Average
0.080		33.33% Pervious Area
0.160		66.67% Impervious Area

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

Subcatchment 5S: AREA 2**Hydrograph**

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Type II 24-hr 100-Year Rainfall=7.70"

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Summary for Subcatchment 6S: AREA 6

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 4.47 cfs @ 11.95 hrs, Volume= 0.212 af, Depth= 5.00"

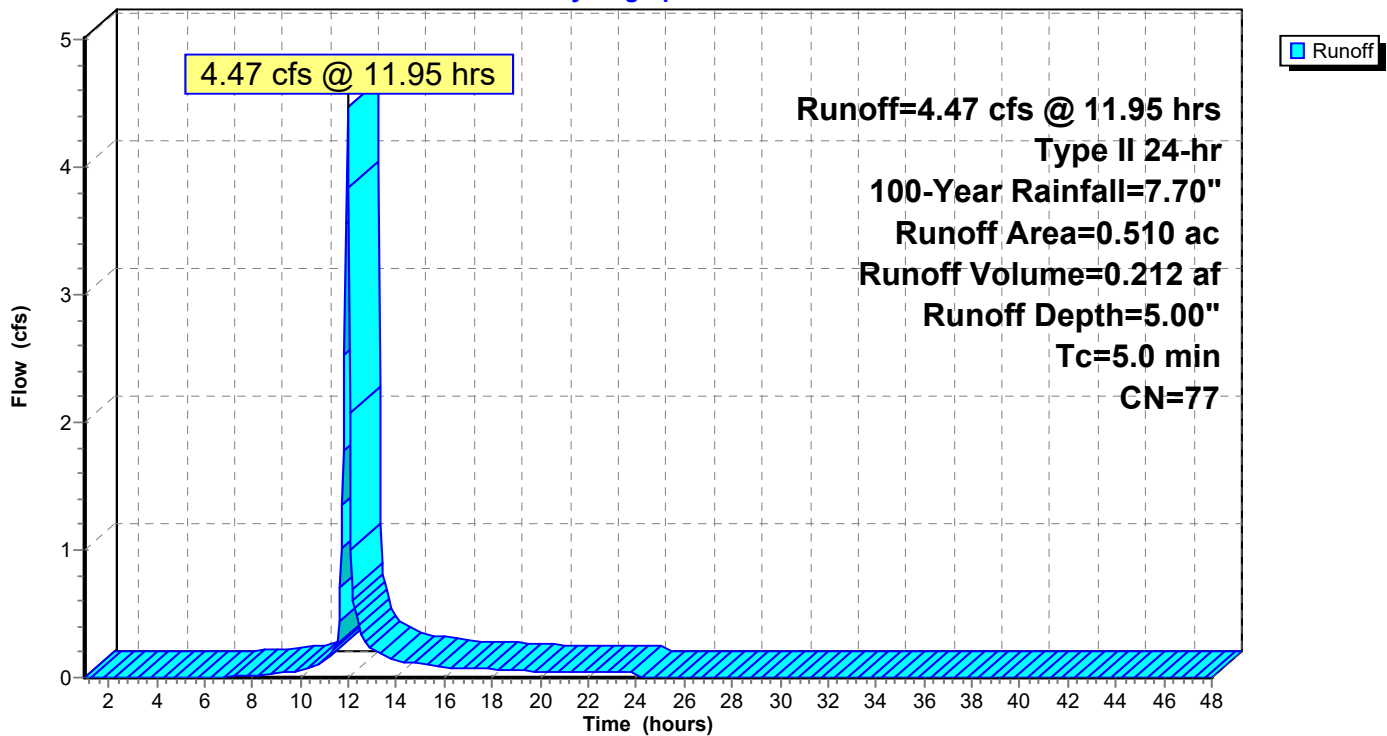
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, $dt=0.05$ hrs
Type II 24-hr 100-Year Rainfall=7.70"

Area (ac)	CN	Description
0.060	98	Paved parking, HSG C
0.450	74	>75% Grass cover, Good, HSG C
0.510	77	Weighted Average
0.450		88.24% Pervious Area
0.060		11.76% Impervious Area

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

Subcatchment 6S: AREA 6

Hydrograph



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Summary for Subcatchment 7S: AREA 3

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 4.27 cfs @ 11.95 hrs, Volume= 0.209 af, Depth= 5.69"

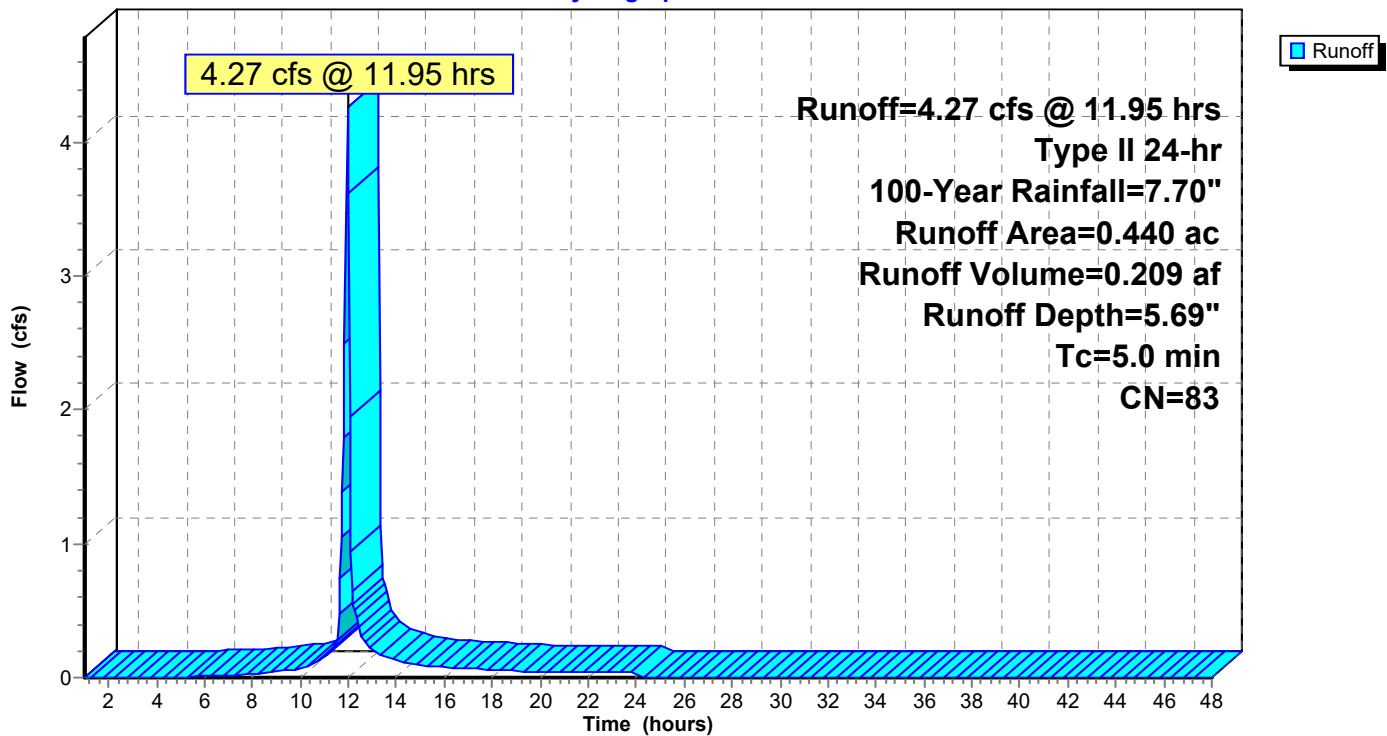
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, $dt=0.05$ hrs
Type II 24-hr 100-Year Rainfall=7.70"

Area (ac)	CN	Description
0.160	98	Paved parking, HSG C
0.280	74	>75% Grass cover, Good, HSG C
0.440	83	Weighted Average
0.280		63.64% Pervious Area
0.160		36.36% Impervious Area

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

Subcatchment 7S: AREA 3

Hydrograph



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Type II 24-hr 100-Year Rainfall=7.70"

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Summary for Subcatchment 8S: AREA 7

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.66 cfs @ 11.95 hrs, Volume= 0.032 af, Depth= 5.46"

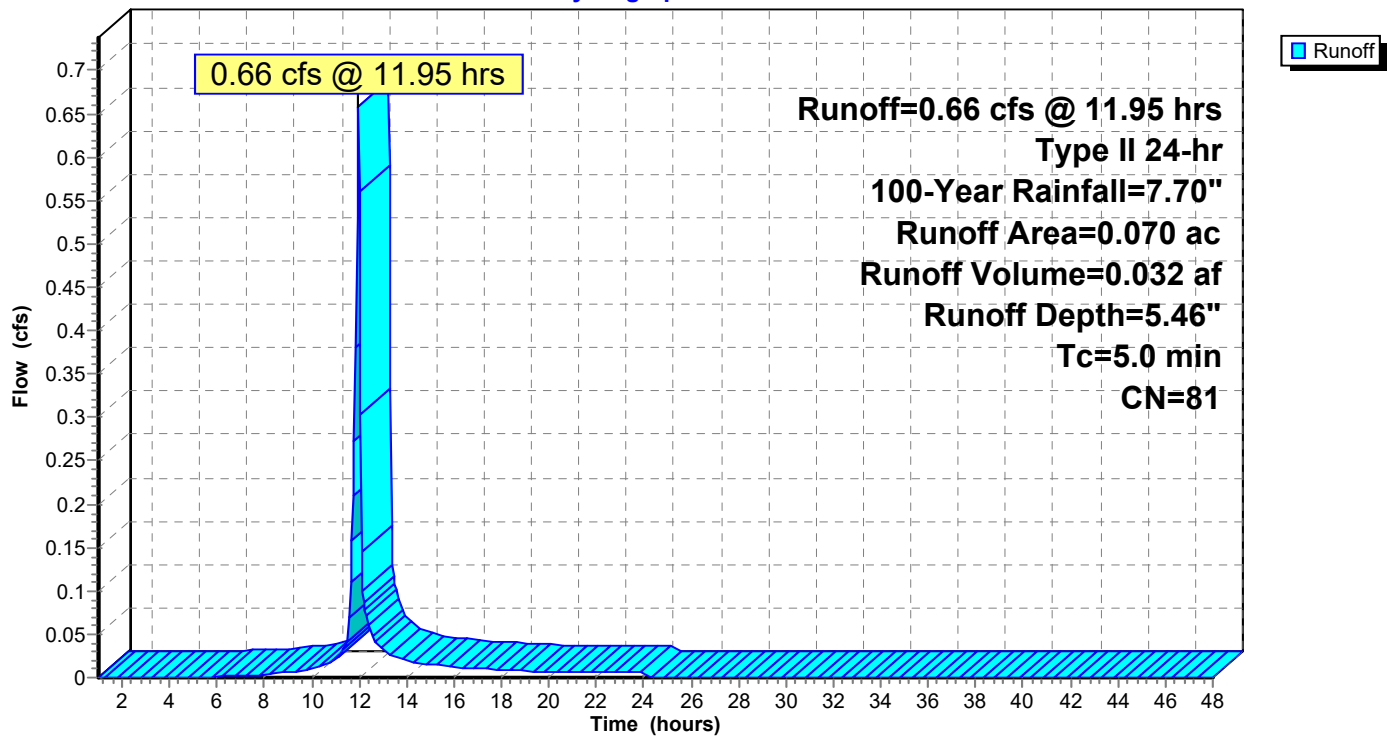
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, $dt=0.05$ hrs
Type II 24-hr 100-Year Rainfall=7.70"

Area (ac)	CN	Description
0.020	98	Paved parking, HSG C
0.050	74	>75% Grass cover, Good, HSG C
0.070	81	Weighted Average
0.050		71.43% Pervious Area
0.020		28.57% Impervious Area

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

Subcatchment 8S: AREA 7

Hydrograph



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Type II 24-hr 100-Year Rainfall=7.70"

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Summary for Subcatchment 10S: AREA 4

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 3.67 cfs @ 11.95 hrs, Volume= 0.205 af, Depth> 7.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, $dt=0.05$ hrs

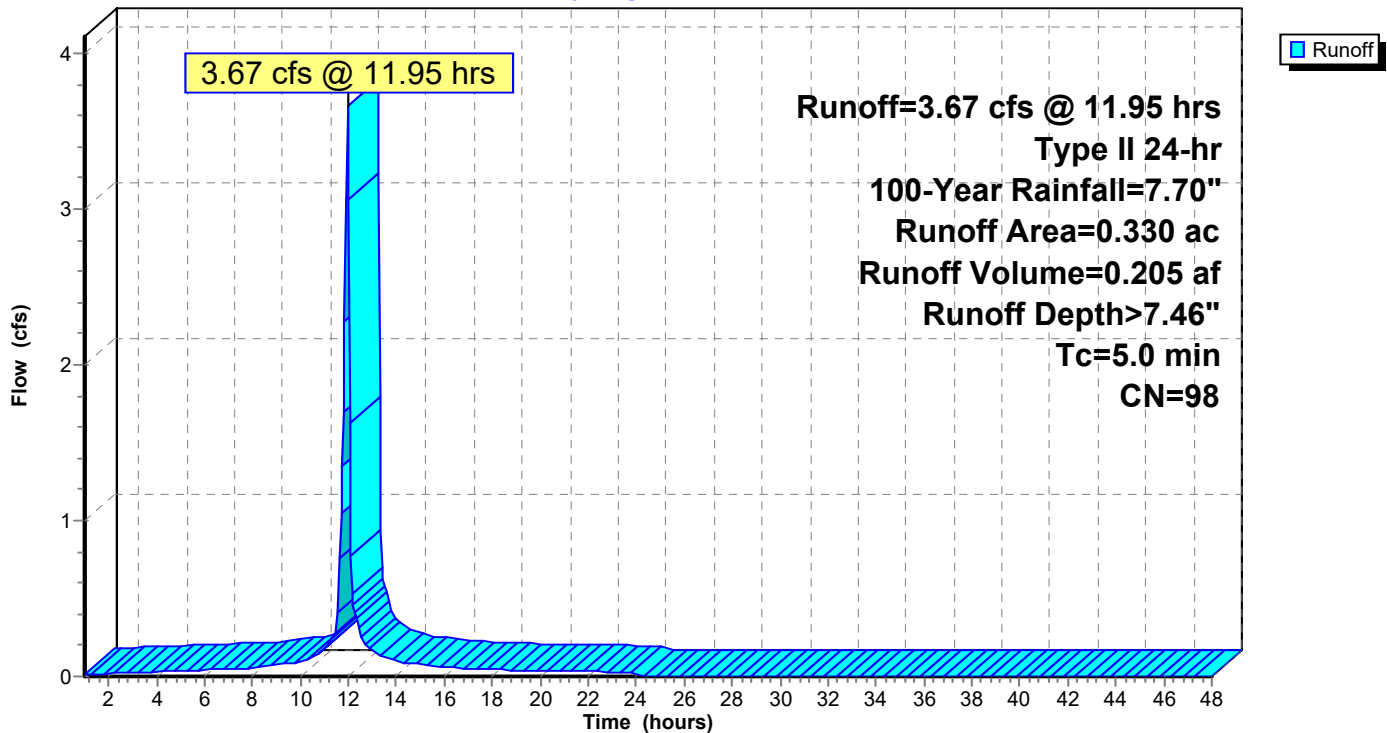
Type II 24-hr 100-Year Rainfall=7.70"

Area (ac)	CN	Description
0.330	98	Roofs, HSG C
0.330		100.00% Impervious Area

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

Subcatchment 10S: AREA 4

Hydrograph



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Type II 24-hr 100-Year Rainfall=7.70"

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Summary for Subcatchment 20S: OFFSITE TO BMP

Runoff = 6.54 cfs @ 12.23 hrs, Volume= 0.681 af, Depth= 6.98"

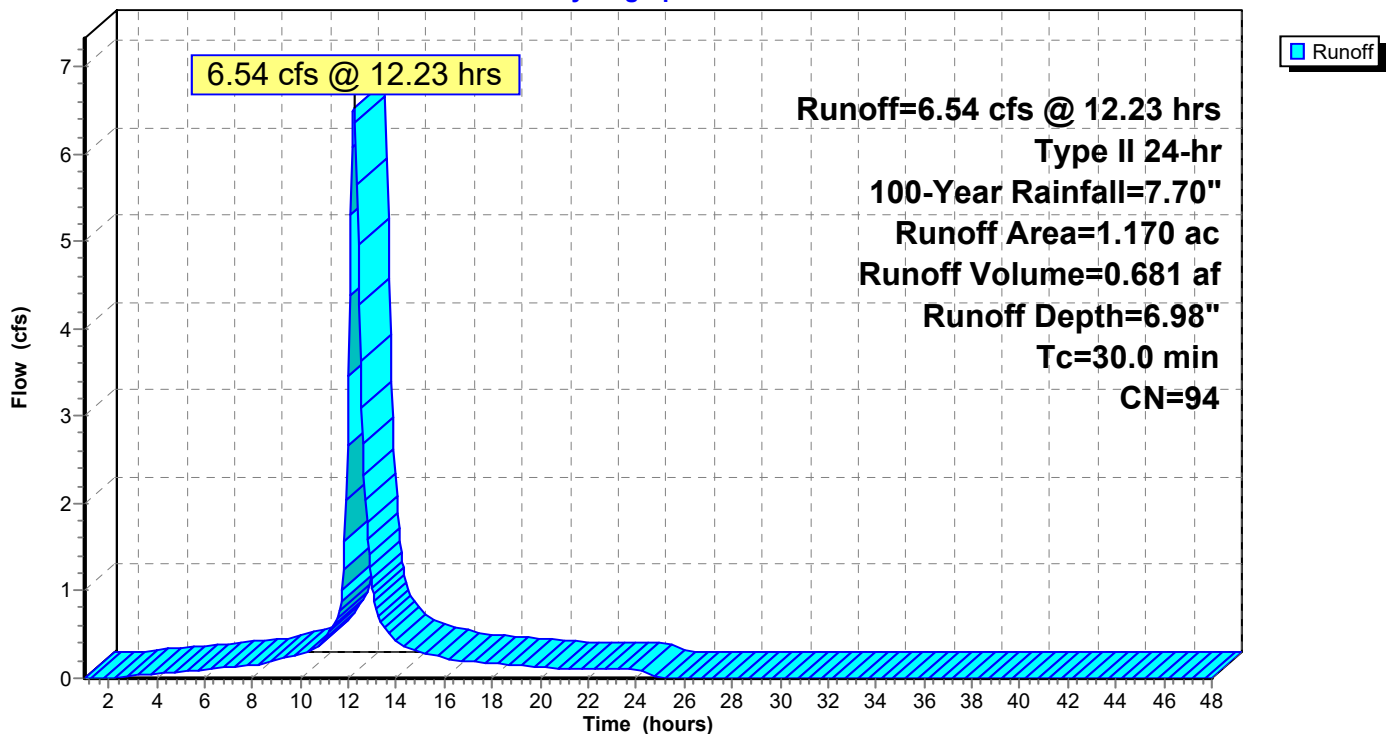
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-Year Rainfall=7.70"

Area (ac)	CN	Description
1.170	94	Urban commercial, 85% imp, HSG C
0.175		15.00% Pervious Area
0.994		85.00% Impervious Area

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

Subcatchment 20S: OFFSITE TO BMP

Hydrograph



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Type II 24-hr 100-Year Rainfall=7.70"

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Summary for Subcatchment 22S: OFFSITE TO CI 12

Runoff = 15.31 cfs @ 12.12 hrs, Volume= 1.263 af, Depth= 6.98"

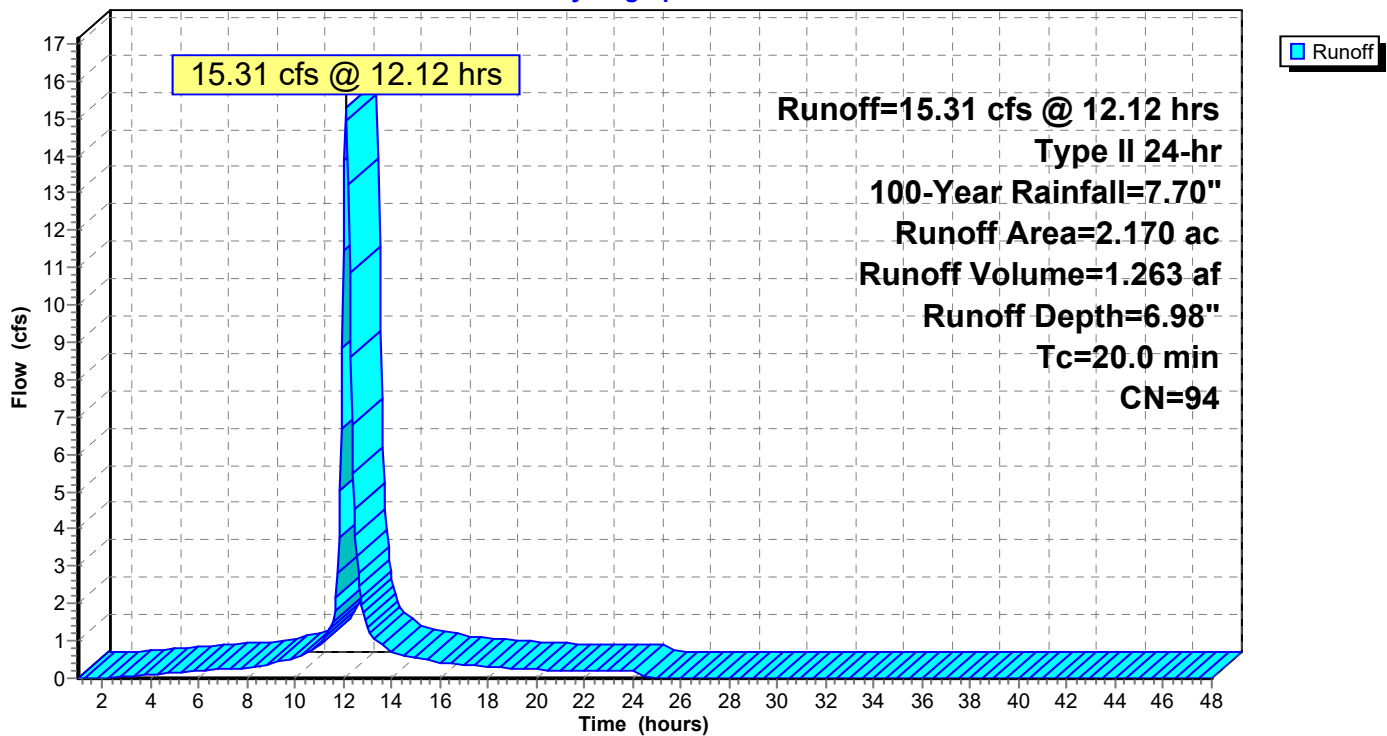
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-Year Rainfall=7.70"

Area (ac)	CN	Description
2.170	94	Urban commercial, 85% imp, HSG C
0.325		15.00% Pervious Area
1.844		85.00% Impervious Area

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

Subcatchment 22S: OFFSITE TO CI 12

Hydrograph



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Type II 24-hr 100-Year Rainfall=7.70"

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Summary for Subcatchment 25S: AREA TO AI 11

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.17 cfs @ 11.96 hrs, Volume= 0.008 af, Depth= 4.66"

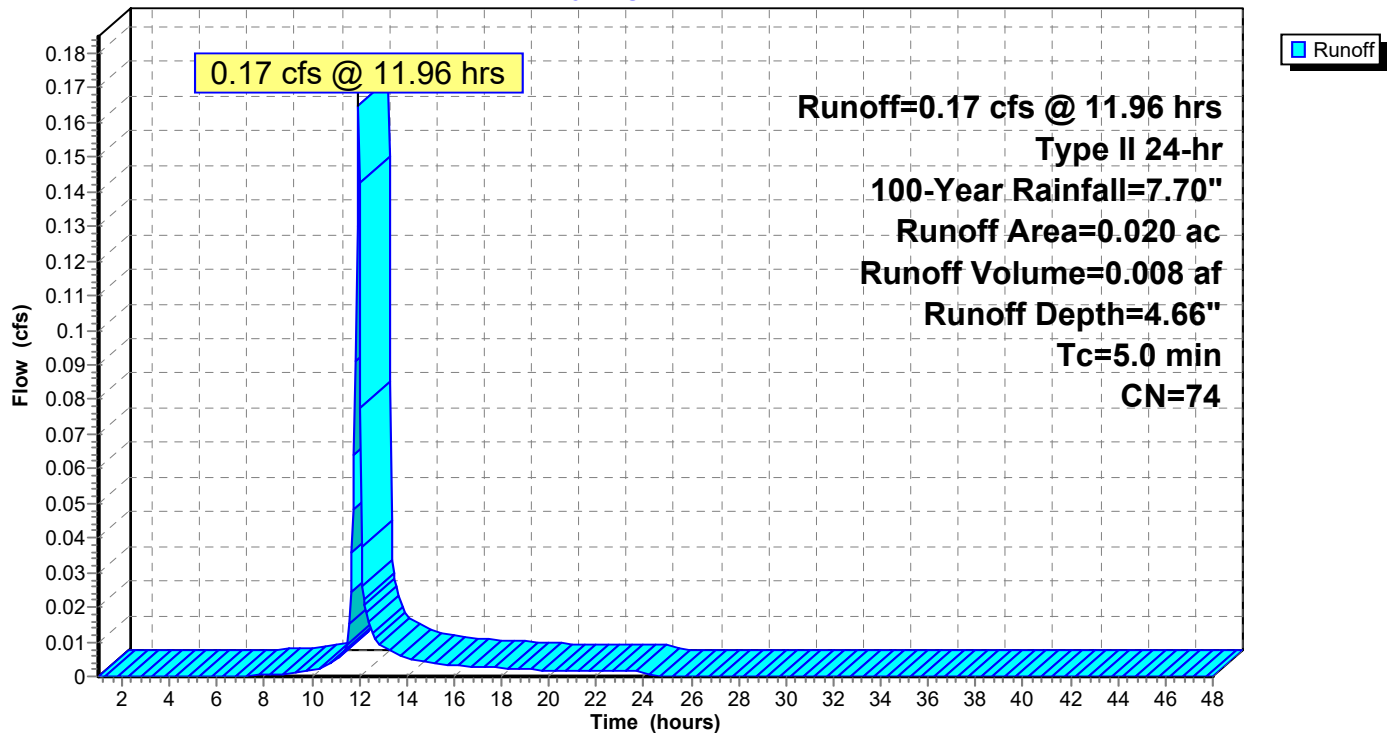
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, $dt=0.05$ hrs
Type II 24-hr 100-Year Rainfall=7.70"

Area (ac)	CN	Description
0.020	74	>75% Grass cover, Good, HSG C
0.020		100.00% Pervious Area

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

Subcatchment 25S: AREA TO AI 11

Hydrograph



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Type II 24-hr 100-Year Rainfall=7.70"

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Summary for Subcatchment 28S: PROPOSED CONDITIONS

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 20.17 cfs @ 11.95 hrs, Volume= 0.980 af, Depth= 5.58"

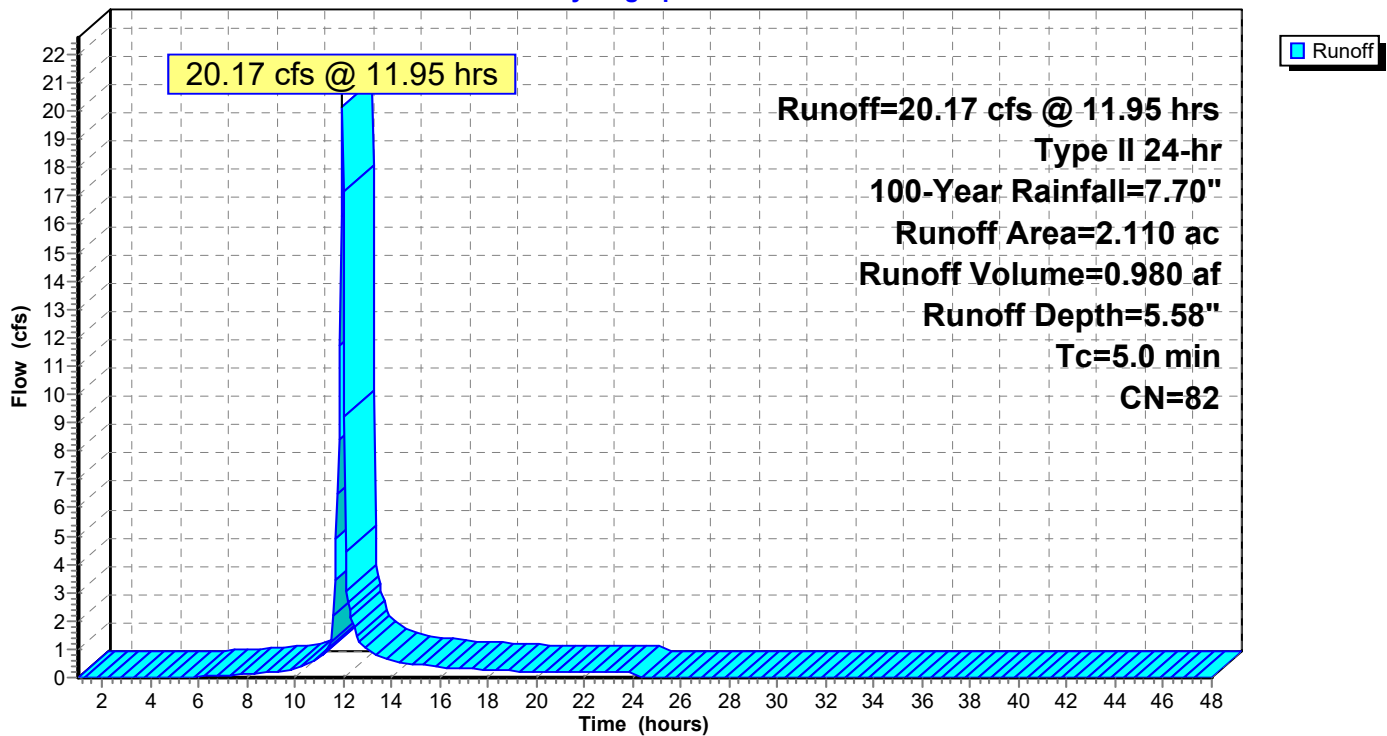
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, $dt=0.05$ hrs
Type II 24-hr 100-Year Rainfall=7.70"

Area (ac)	CN	Description
0.690	98	Paved parking, HSG C
1.420	74	>75% Grass cover, Good, HSG C
2.110	82	Weighted Average
1.420		67.30% Pervious Area
0.690		32.70% Impervious Area

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

Subcatchment 28S: PROPOSED CONDITIONS

Hydrograph



Summary for Pond 3P: ROOF DRAINS TO BASIN

[82] Warning: Early inflow requires earlier time span

[58] Hint: Peaked 46.53' above defined flood level

Inflow Area = 0.430 ac, 88.37% Impervious, Inflow Depth > 7.13" for 100-Year event
 Inflow = 4.68 cfs @ 11.95 hrs, Volume= 0.255 af
 Outflow = 4.68 cfs @ 11.95 hrs, Volume= 0.255 af, Atten= 0%, Lag= 0.0 min
 Primary = 4.68 cfs @ 11.95 hrs, Volume= 0.255 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs / 2

Peak Elev= 1,047.46' @ 11.95 hrs

Flood Elev= 1,000.93'

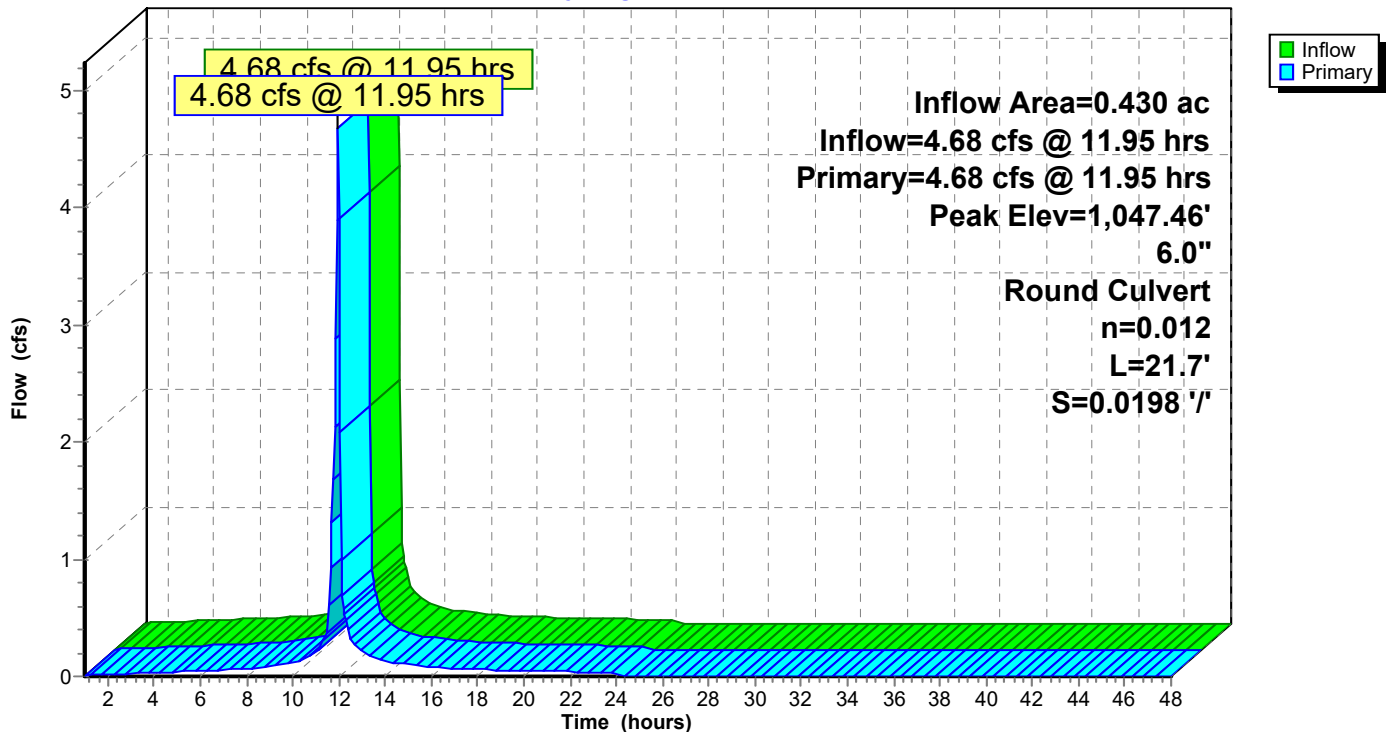
Device	Routing	Invert	Outlet Devices
#1	Primary	994.54'	6.0" Round Culvert L= 21.7' RCP, rounded edge headwall, Ke= 0.100 Inlet / Outlet Invert= 994.54' / 994.11' S= 0.0198 '/ Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.20 sf

Primary OutFlow Max=4.63 cfs @ 11.95 hrs HW=1,047.36' TW=1,025.25' (Dynamic Tailwater)

↑1=Culvert (Outlet Controls 4.63 cfs @ 23.57 fps)

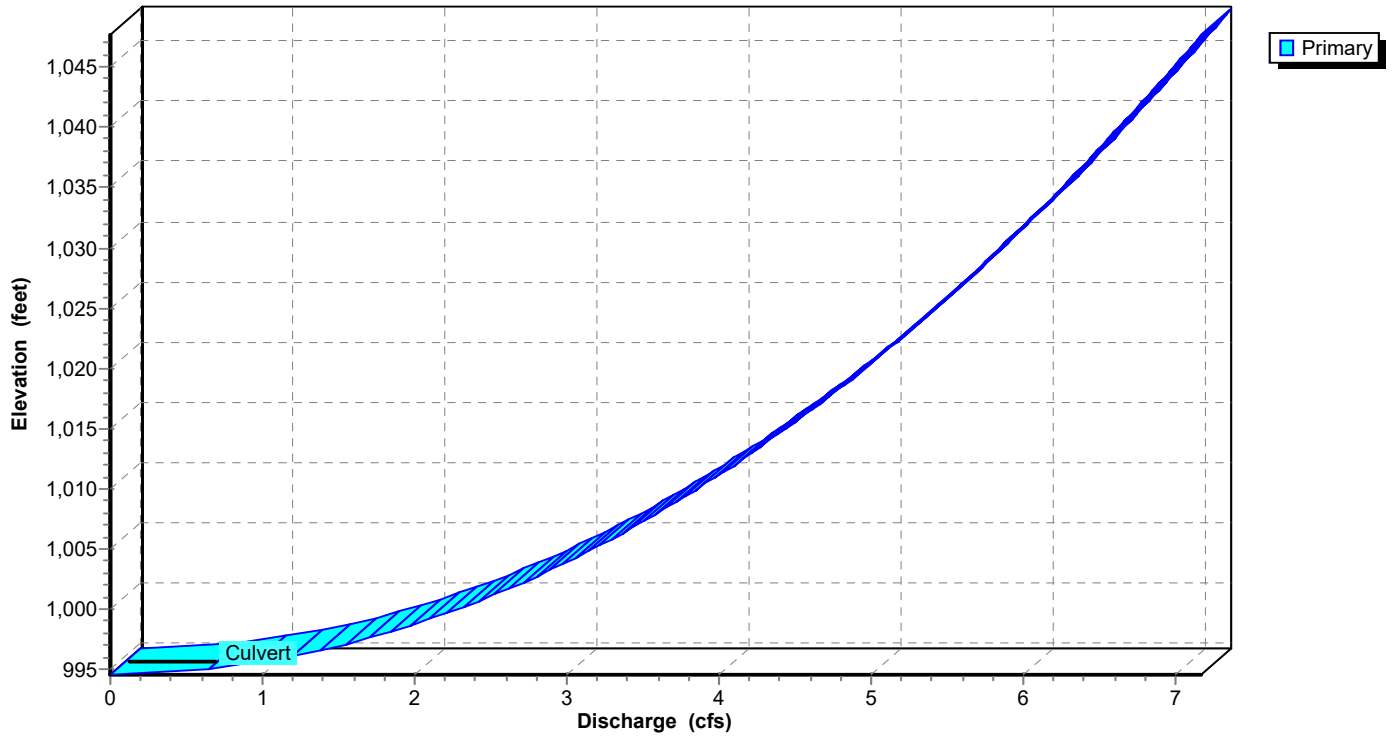
Pond 3P: ROOF DRAINS TO BASIN

Hydrograph



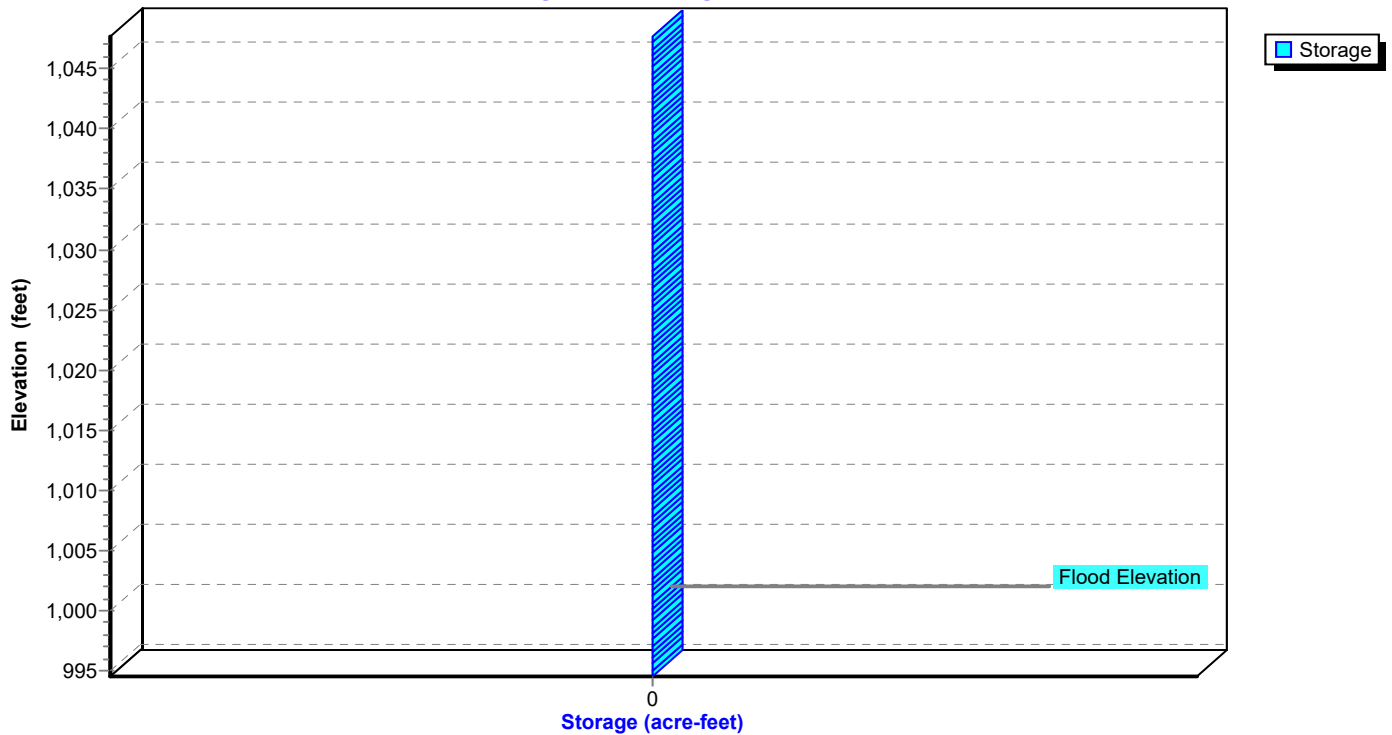
Pond 3P: ROOF DRAINS TO BASIN

Stage-Discharge



Pond 3P: ROOF DRAINS TO BASIN

Stage-Area-Storage



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Type II 24-hr 100-Year Rainfall=7.70"

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Summary for Pond 4R: 302-301

[58] Hint: Peaked 5.96' above defined flood level

Inflow Area = 0.210 ac, 71.43% Impervious, Inflow Depth = 6.63" for 100-Year event
Inflow = 2.24 cfs @ 11.95 hrs, Volume= 0.116 af
Outflow = 2.24 cfs @ 11.95 hrs, Volume= 0.116 af, Atten= 0%, Lag= 0.0 min
Primary = 2.24 cfs @ 11.95 hrs, Volume= 0.116 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs / 2

Peak Elev= 1,000.90' @ 11.96 hrs

Flood Elev= 994.94'

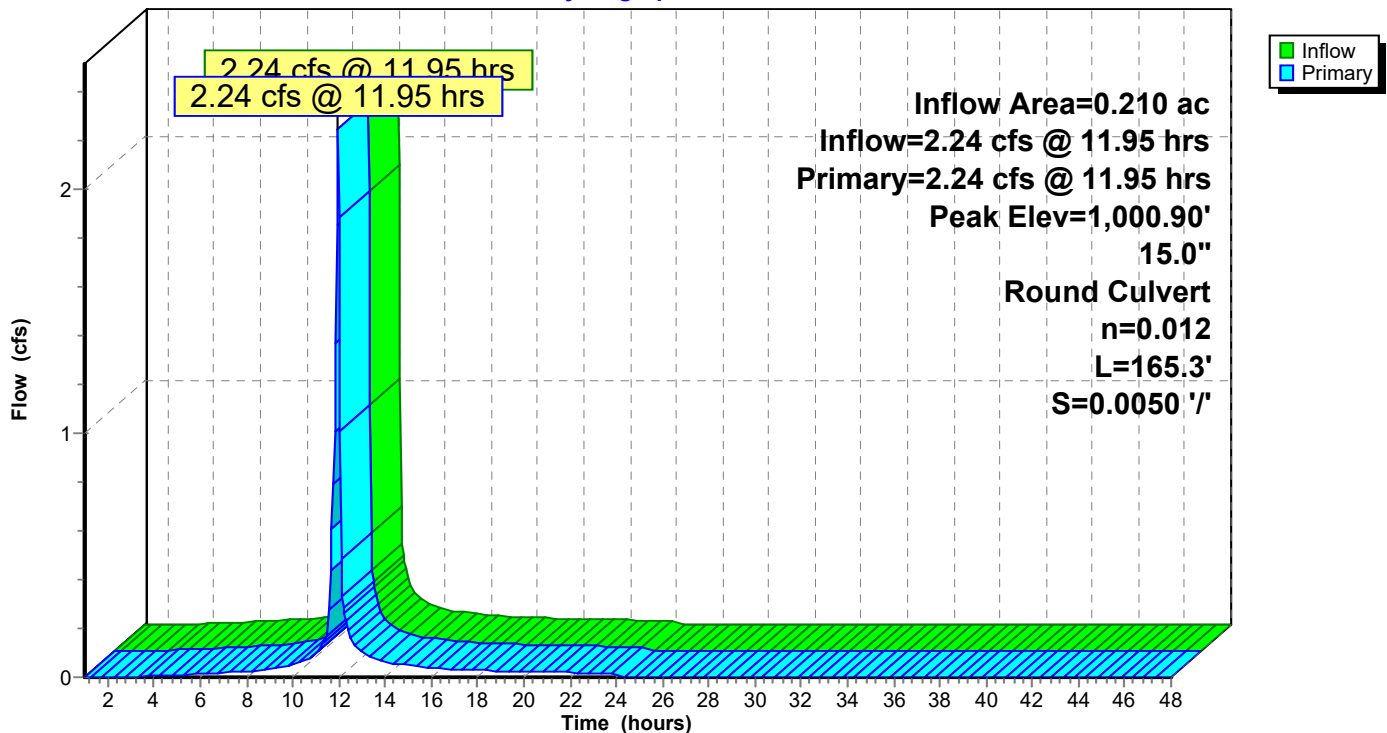
Device	Routing	Invert	Outlet Devices
#1	Primary	994.94'	15.0" Round Culvert L= 165.3' RCP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 994.94' / 994.11' S= 0.0050 '/ Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=0.00 cfs @ 11.95 hrs HW=1,000.85' TW=1,001.03' (Dynamic Tailwater)

↑ **1=Culvert** (Controls 0.00 cfs)

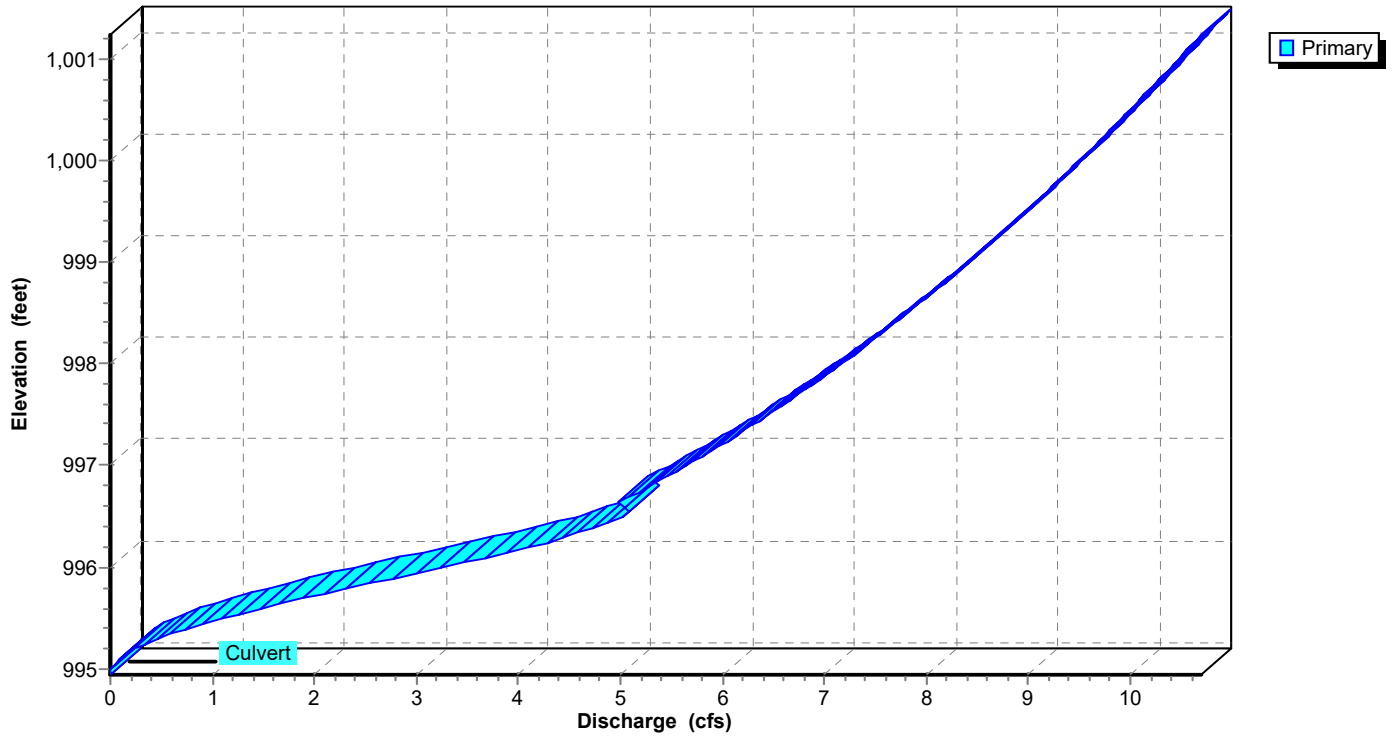
Pond 4R: 302-301

Hydrograph



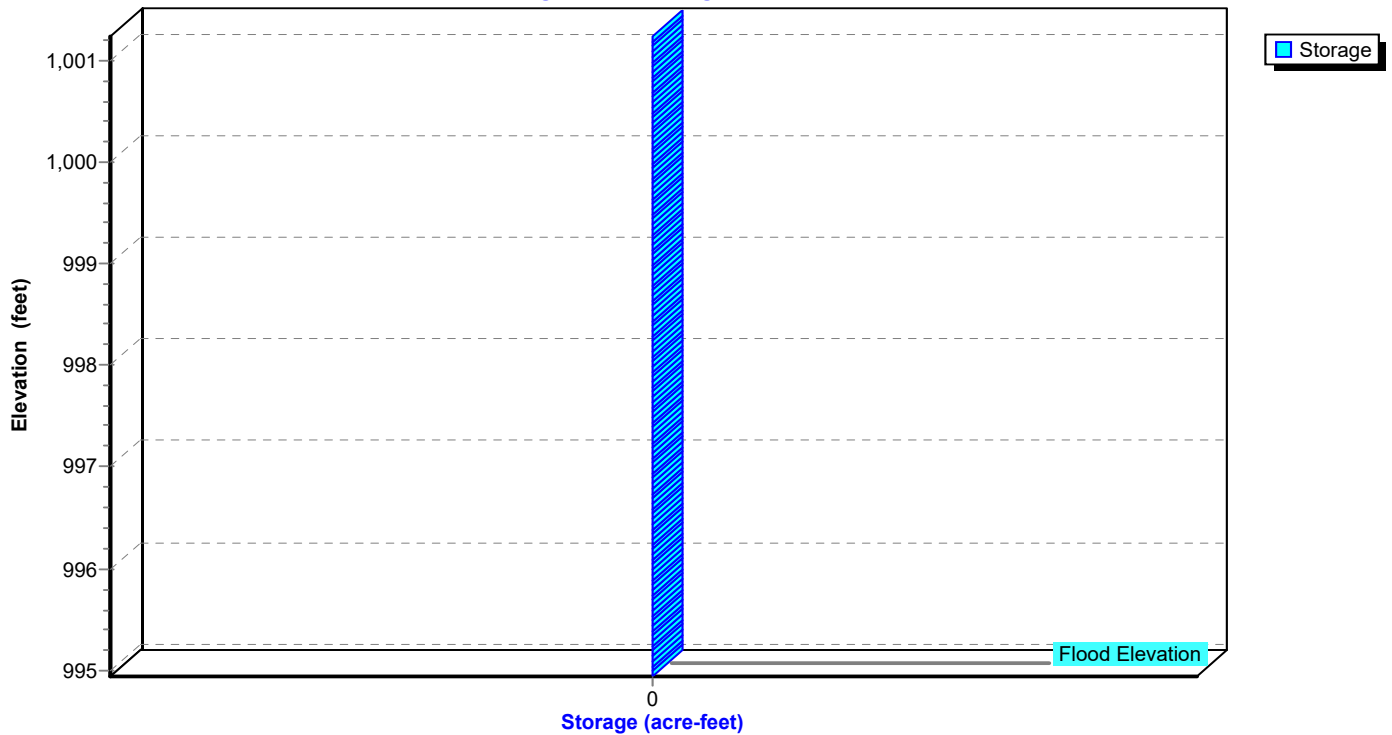
Pond 4R: 302-301

Stage-Discharge



Pond 4R: 302-301

Stage-Area-Storage



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Type II 24-hr 100-Year Rainfall=7.70"

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Summary for Pond 6P: 301-300

[58] Hint: Peaked 2.26' above defined flood level

[80] Warning: Exceeded Pond 4R by 0.25' @ 11.85 hrs (2.20 cfs 0.068 af)

Inflow Area = 0.450 ac, 68.89% Impervious, Inflow Depth = 6.57" for 100-Year event
Inflow = 4.78 cfs @ 11.95 hrs, Volume= 0.246 af
Outflow = 4.78 cfs @ 11.95 hrs, Volume= 0.246 af, Atten= 0%, Lag= 0.0 min
Primary = 4.78 cfs @ 11.95 hrs, Volume= 0.246 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs / 2

Peak Elev= 1,001.08' @ 11.96 hrs

Flood Elev= 998.82'

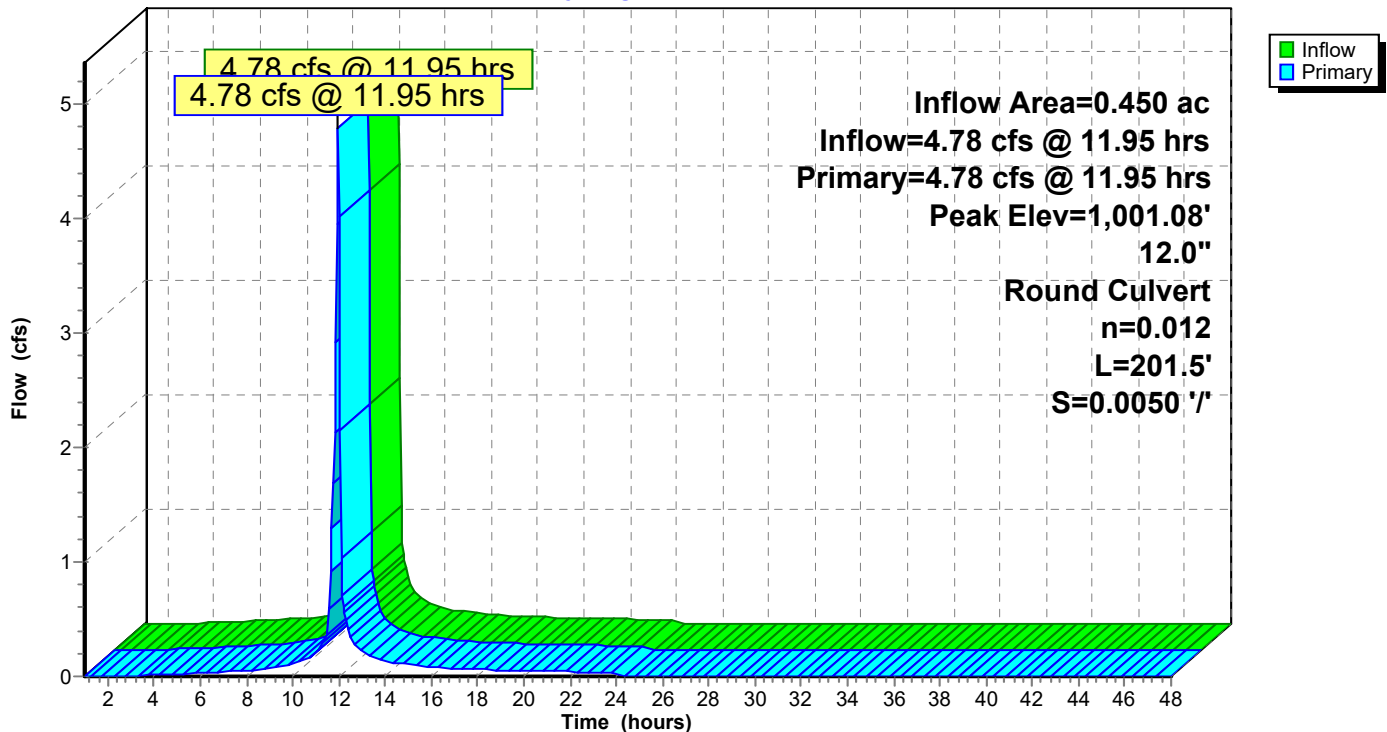
Device	Routing	Invert	Outlet Devices
#1	Primary	994.01'	12.0" Round 202-201 L= 201.5' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 994.01' / 993.00' S= 0.0050 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=4.77 cfs @ 11.95 hrs HW=1,001.02' TW=997.08' (Dynamic Tailwater)

↑**1=202-201** (Outlet Controls 4.77 cfs @ 6.07 fps)

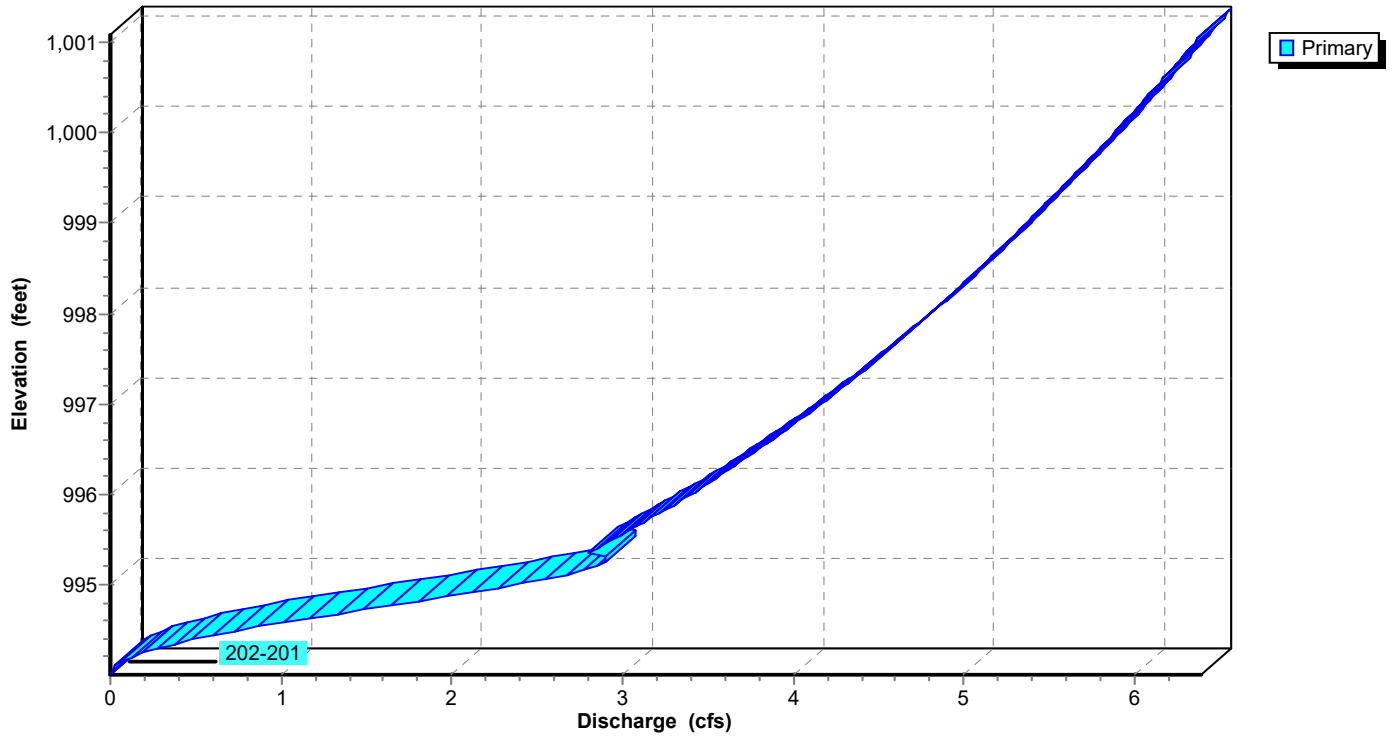
Pond 6P: 301-300

Hydrograph



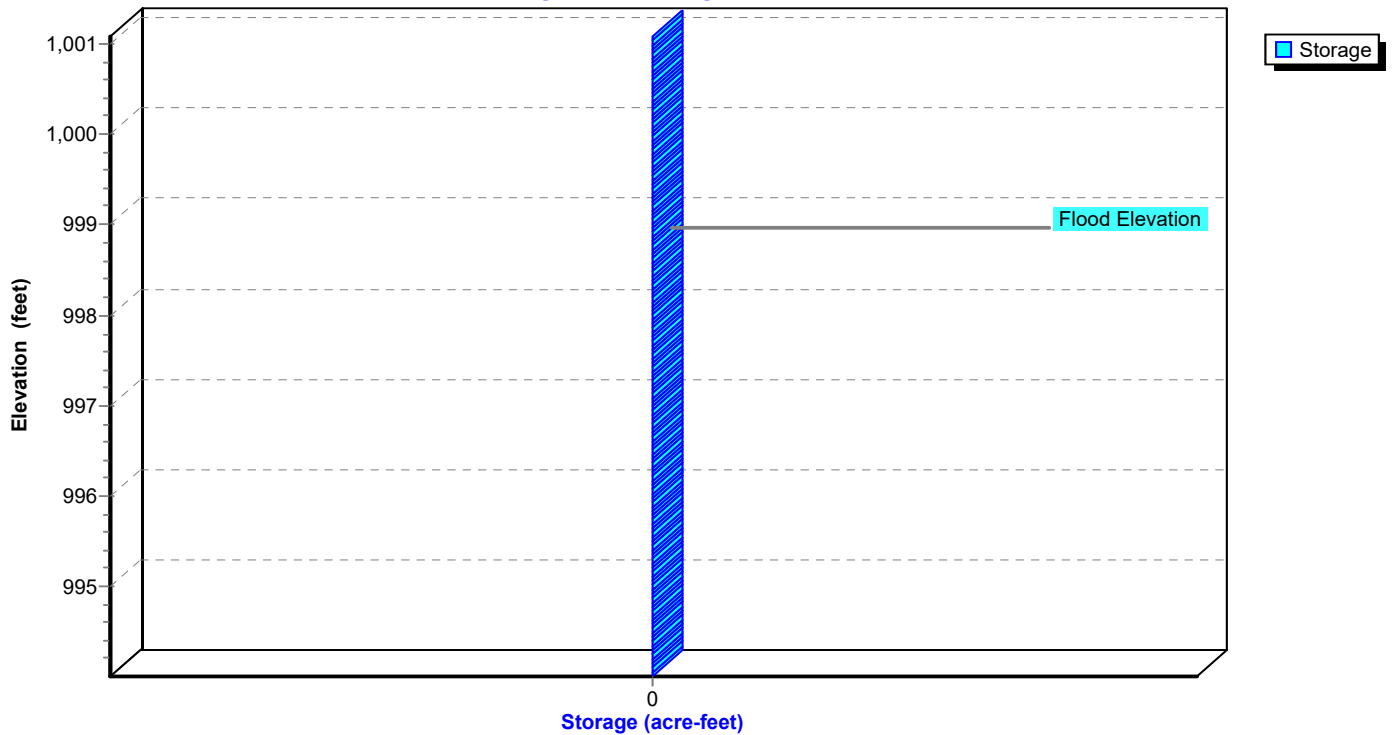
Pond 6P: 301-300

Stage-Discharge



Pond 6P: 301-300

Stage-Area-Storage



Summary for Pond 10P: BASIN REACH

[82] Warning: Early inflow requires earlier time span

[58] Hint: Peaked 24.64' above defined flood level

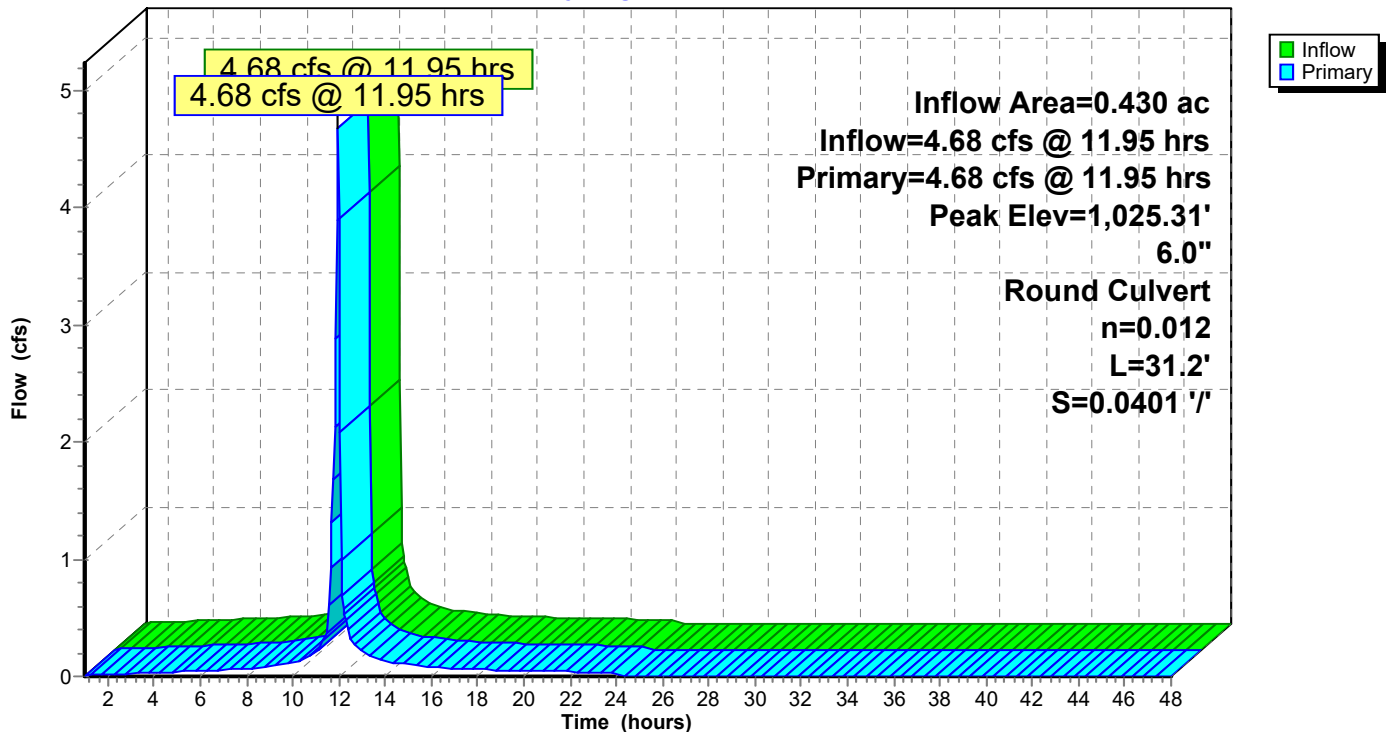
Inflow Area = 0.430 ac, 88.37% Impervious, Inflow Depth > 7.13" for 100-Year event
 Inflow = 4.68 cfs @ 11.95 hrs, Volume= 0.255 af
 Outflow = 4.68 cfs @ 11.95 hrs, Volume= 0.255 af, Atten= 0%, Lag= 0.0 min
 Primary = 4.68 cfs @ 11.95 hrs, Volume= 0.255 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs / 2

Peak Elev= 1,025.31' @ 11.95 hrs

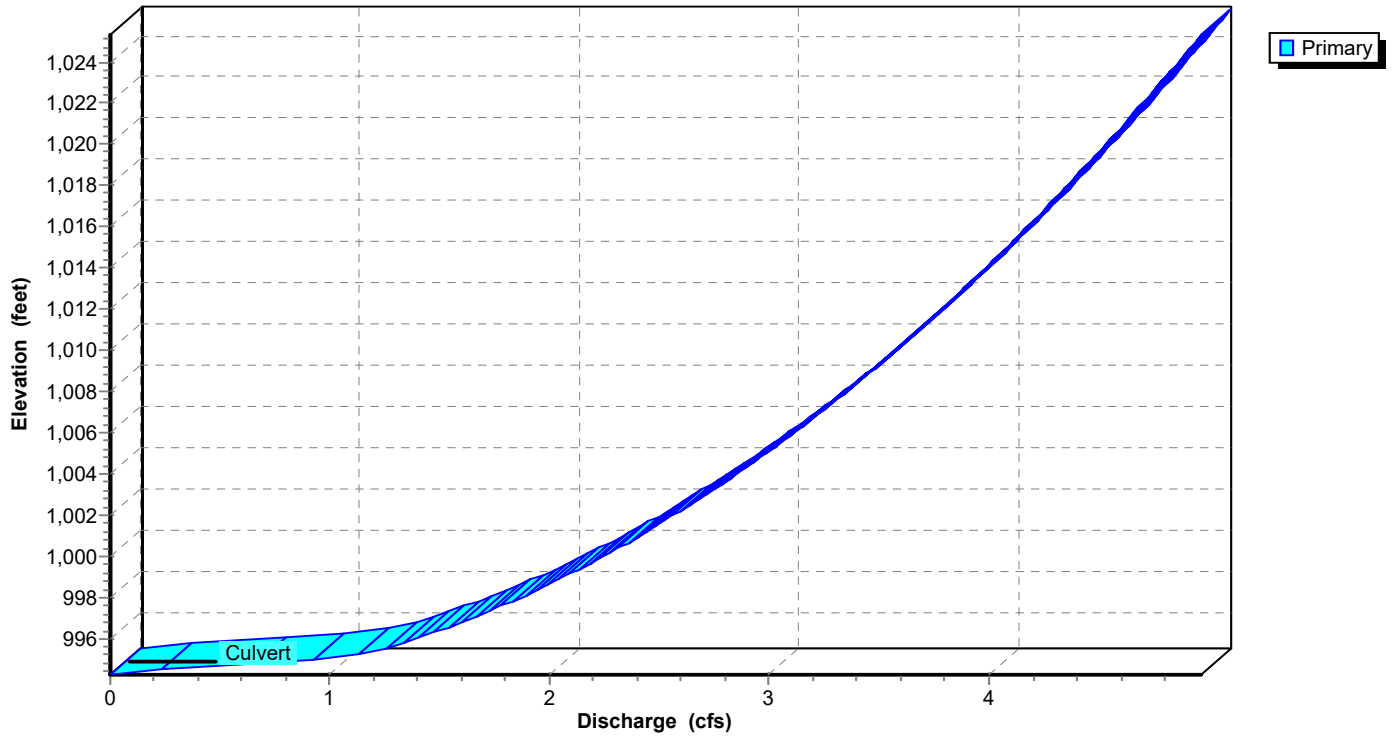
Flood Elev= 1,000.67'

Device	Routing	Invert	Outlet Devices
#1	Primary	994.25'	6.0" Round Culvert L= 31.2' RCP, rounded edge headwall, Ke= 0.100 Inlet / Outlet Invert= 994.25' / 993.00' S= 0.0401 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.20 sf

Primary OutFlow Max=4.67 cfs @ 11.95 hrs HW=1,025.25' TW=997.08' (Dynamic Tailwater)↑**1=Culvert** (Outlet Controls 4.67 cfs @ 23.80 fps)**Pond 10P: BASIN REACH****Hydrograph**

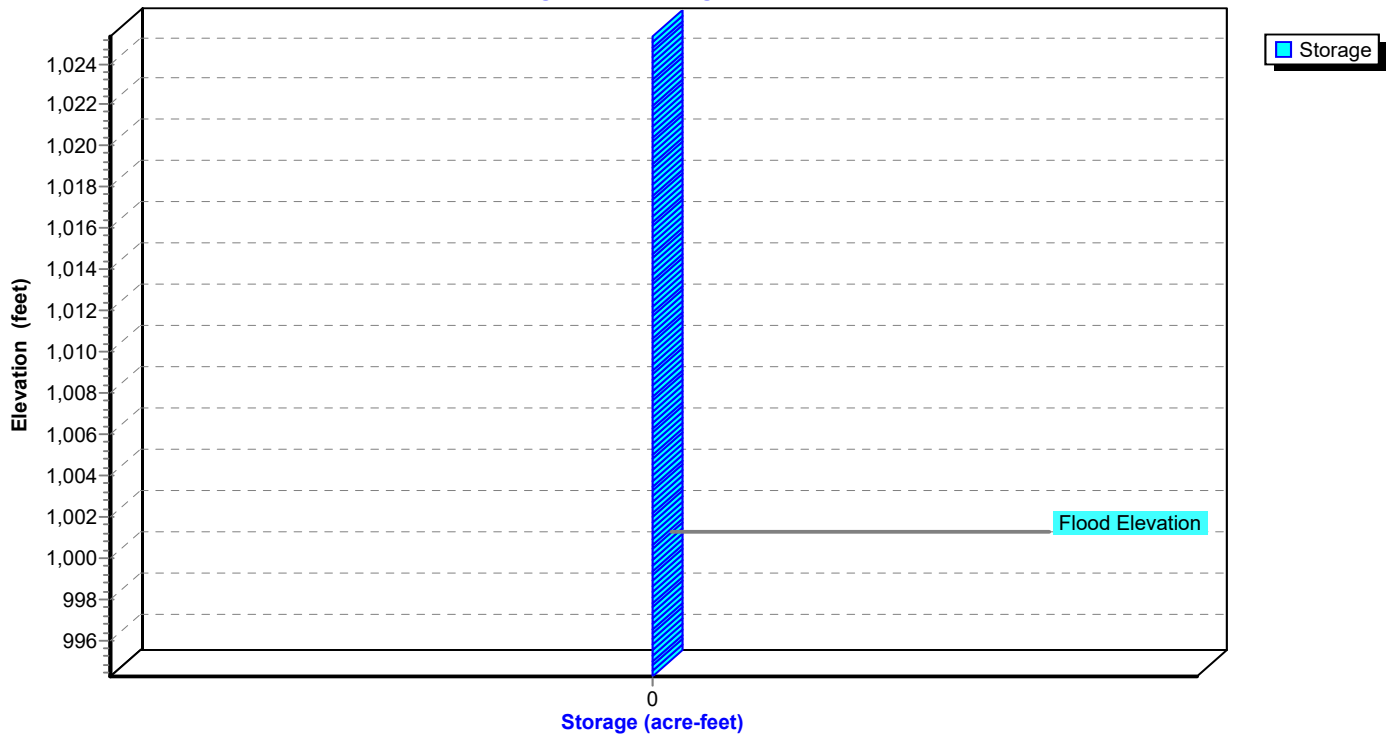
Pond 10P: BASIN REACH

Stage-Discharge



Pond 10P: BASIN REACH

Stage-Area-Storage



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Summary for Pond 12P: DETENTION BASIN

[80] Warning: Exceeded Pond 6P by 0.28' @ 24.30 hrs (0.13 cfs 0.004 af)

[80] Warning: Exceeded Pond 10P by 0.04' @ 24.25 hrs (0.00 cfs 0.000 af)

Inflow Area = 1.320 ac, 64.39% Impervious, Inflow Depth > 6.46" for 100-Year event
 Inflow = 13.73 cfs @ 11.95 hrs, Volume= 0.710 af
 Outflow = 5.71 cfs @ 12.27 hrs, Volume= 0.710 af, Atten= 58%, Lag= 18.9 min
 Primary = 5.37 cfs @ 12.25 hrs, Volume= 0.729 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs / 2

Peak Elev= 997.79' @ 12.21 hrs Surf.Area= 5,043 sf Storage= 12,847 cf

Flood Elev= 999.00' Surf.Area= 6,484 sf Storage= 19,812 cf

Plug-Flow detention time= 99.0 min calculated for 0.710 af (100% of inflow)

Center-of-Mass det. time= 99.3 min (867.9 - 768.6)

Volume	Invert	Avail.Storage	Storage Description
#1	992.10'	19,812 cf	Custom Stage Data (Pyramidal) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
992.10	4	0	0	4
993.00	539	177	177	541
994.00	1,359	918	1,095	1,370
995.00	2,235	1,779	2,874	2,262
996.00	3,166	2,687	5,561	3,215
997.00	4,169	3,656	9,217	4,247
998.00	5,290	4,718	13,935	5,401
999.00	6,484	5,877	19,812	6,634

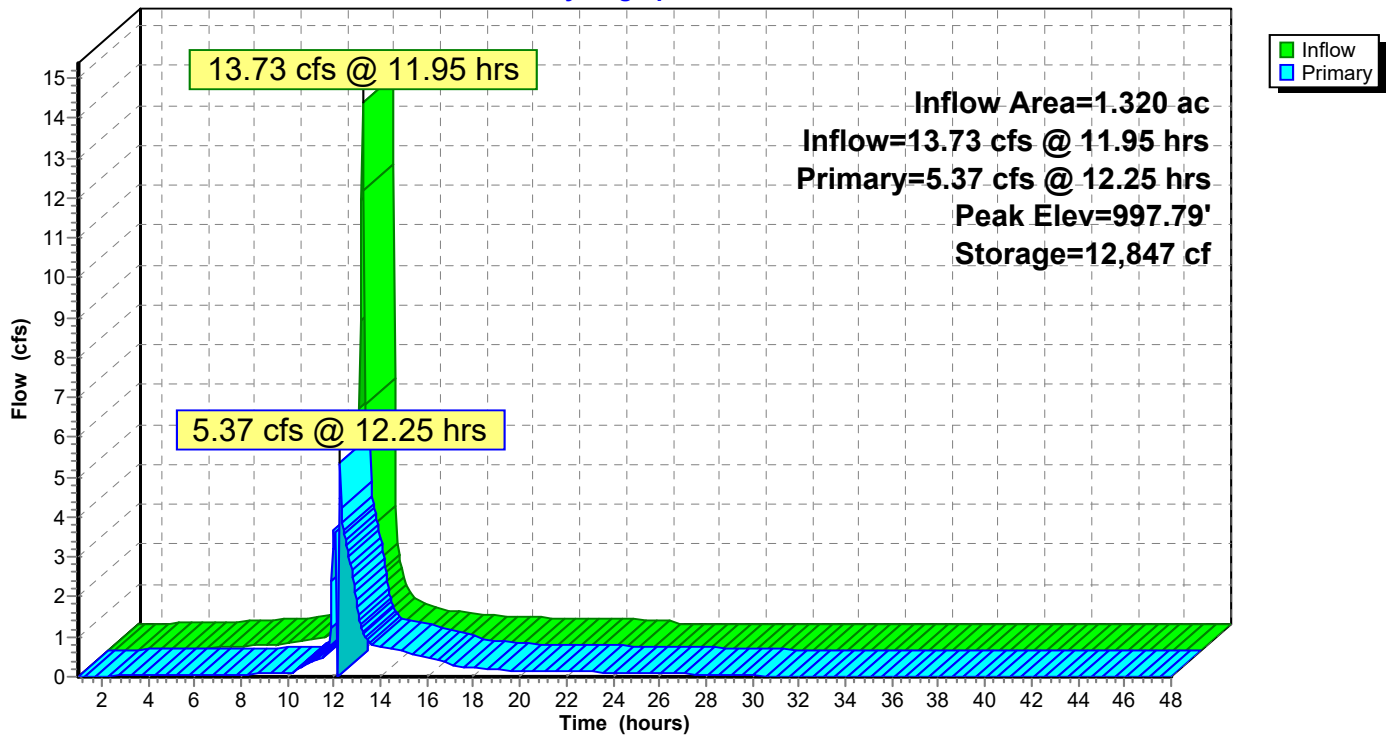
Device	Routing	Invert	Outlet Devices
#1	Primary	988.04'	18.0" Round Culvert L= 50.1' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 988.04' / 987.00' S= 0.0208 ' / ' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf
#2	Device 1	992.10'	1.5" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	994.25'	4.0" W x 4.0" H Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#4	Device 1	996.00'	12.0" W x 6.0" H Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#5	Device 1	997.50'	4.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Primary OutFlow Max=4.69 cfs @ 12.25 hrs HW=997.75' TW=996.73' (Dynamic Tailwater)

- 1=Culvert (Passes 4.69 cfs of 10.21 cfs potential flow)
- 2=Orifice/Grate (Orifice Controls 0.06 cfs @ 4.88 fps)
- 3=Orifice/Grate (Orifice Controls 0.54 cfs @ 4.88 fps)
- 4=Orifice/Grate (Orifice Controls 2.44 cfs @ 4.88 fps)
- 5=Sharp-Crested Rectangular Weir (Weir Controls 1.65 cfs @ 1.65 fps)

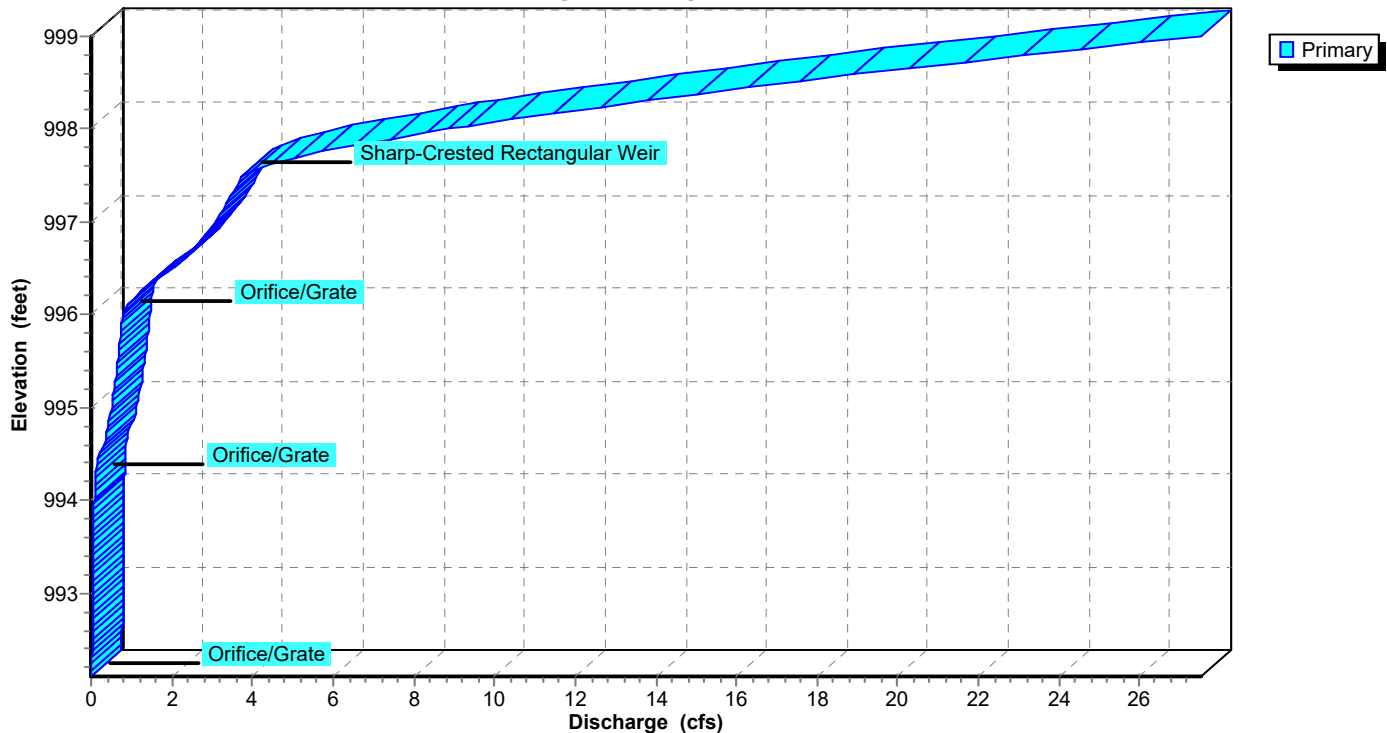
Pond 12P: DETENTION BASIN

Hydrograph



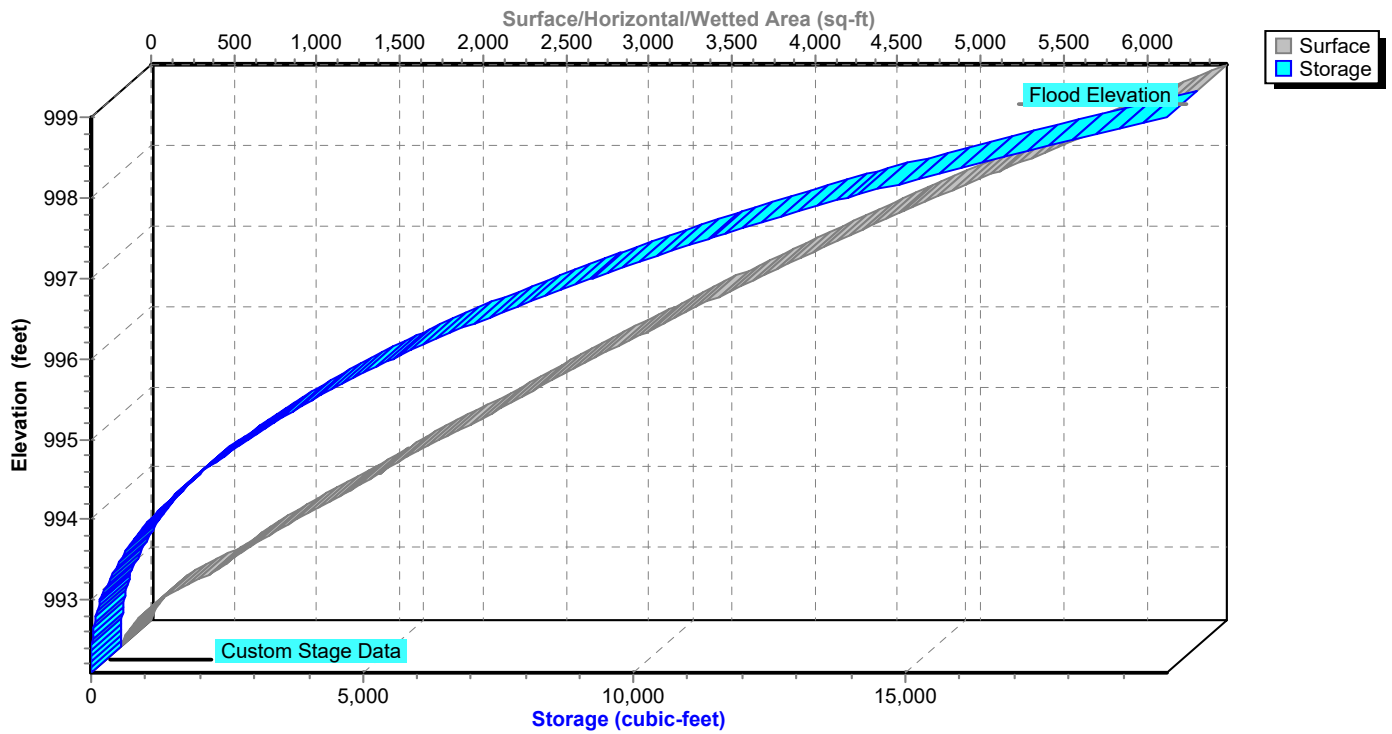
Pond 12P: DETENTION BASIN

Stage-Discharge



Pond 12P: DETENTION BASIN

Stage-Area-Storage



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Summary for Pond 24P: 12-11

[58] Hint: Peaked 10.18' above defined flood level

Inflow Area = 2.170 ac, 85.00% Impervious, Inflow Depth = 6.98" for 100-Year event
Inflow = 15.31 cfs @ 12.12 hrs, Volume= 1.263 af
Outflow = 15.31 cfs @ 12.12 hrs, Volume= 1.263 af, Atten= 0%, Lag= 0.0 min
Primary = 15.31 cfs @ 12.12 hrs, Volume= 1.263 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs / 2

Peak Elev= 1,003.48' @ 12.16 hrs

Flood Elev= 993.30'

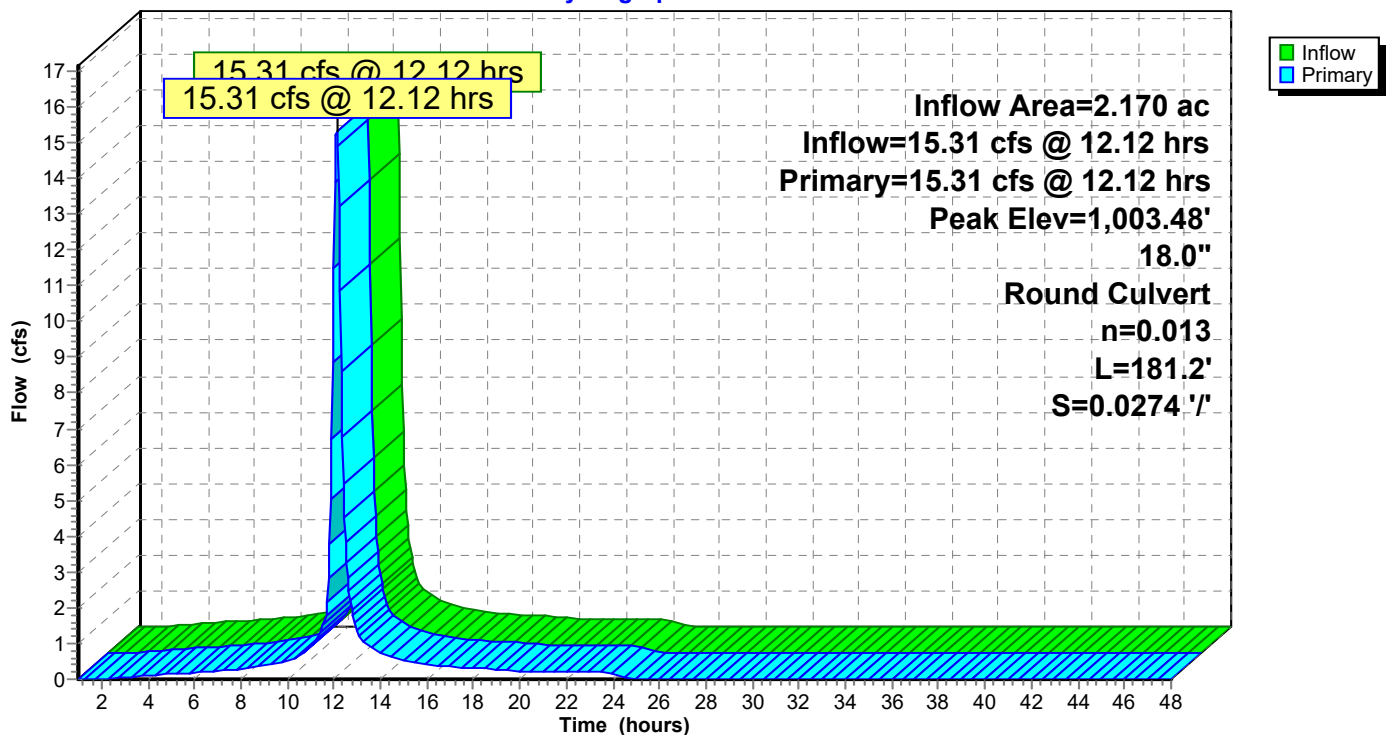
Device	Routing	Invert	Outlet Devices
#1	Primary	994.87'	18.0" Round Culvert L= 181.2' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 994.87' / 989.91' S= 0.0274 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.77 sf

Primary OutFlow Max=13.91 cfs @ 12.12 hrs HW=1,002.83' TW=998.20' (Dynamic Tailwater)

↑ **1=Culvert** (Outlet Controls 13.91 cfs @ 7.87 fps)

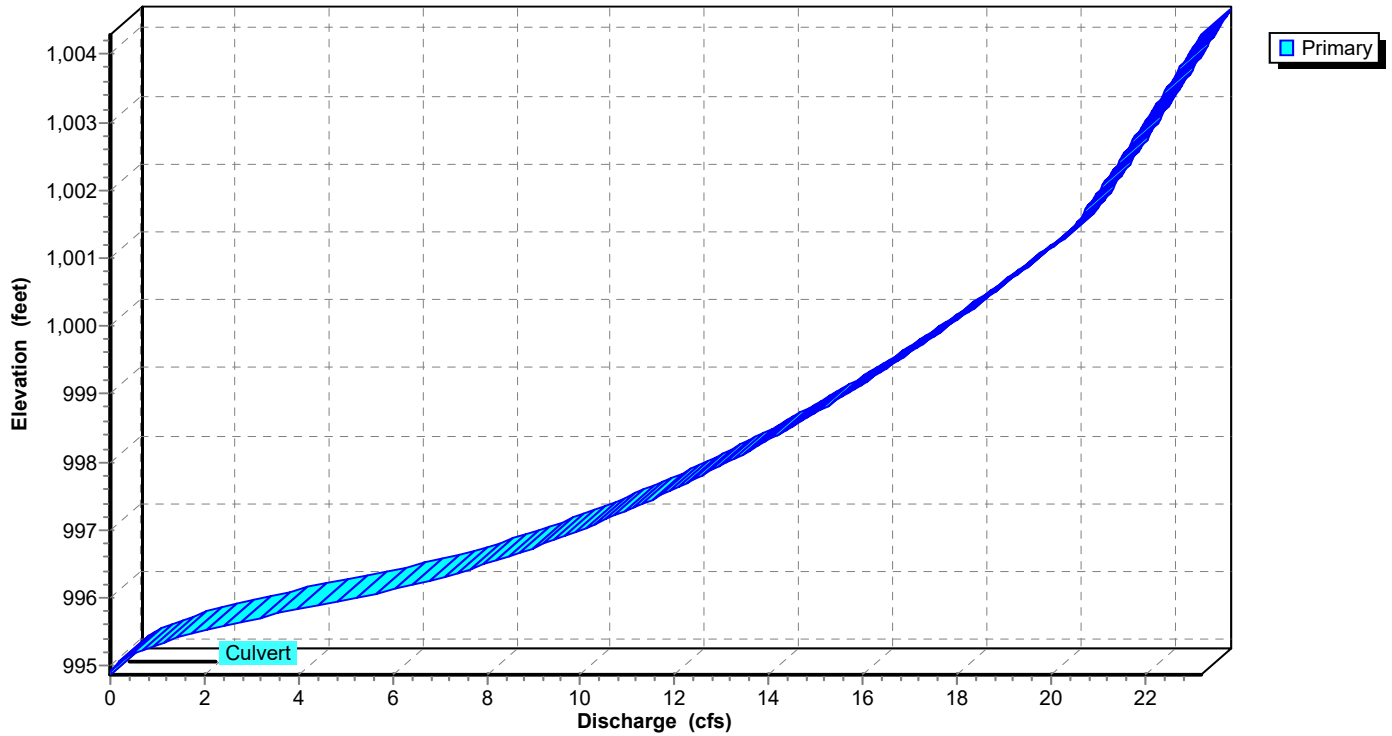
Pond 24P: 12-11

Hydrograph



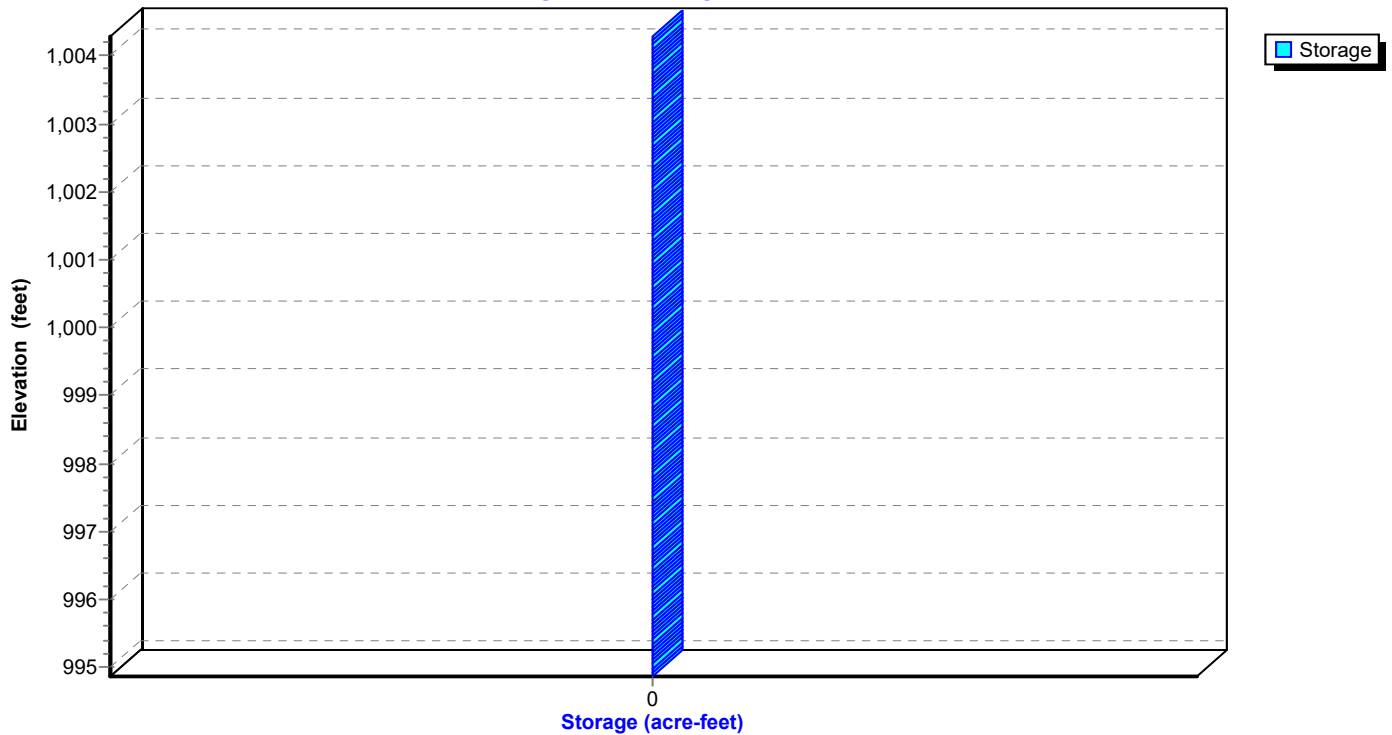
Pond 24P: 12-11

Stage-Discharge



Pond 24P: 12-11

Stage-Area-Storage



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Type II 24-hr 100-Year Rainfall=7.70"

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Summary for Pond 26P: 11 - 100 MH

[58] Hint: Peaked 5.34' above defined flood level

[80] Warning: Exceeded Pond 12P by 2.55' @ 12.20 hrs (16.08 cfs 0.121 af)

Inflow Area = 4.680 ac, 78.82% Impervious, Inflow Depth > 6.87" for 100-Year event
Inflow = 24.21 cfs @ 12.10 hrs, Volume= 2.680 af
Outflow = 24.21 cfs @ 12.10 hrs, Volume= 2.680 af, Atten= 0%, Lag= 0.0 min
Primary = 24.21 cfs @ 12.10 hrs, Volume= 2.680 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs / 2

Peak Elev= 1,000.34' @ 12.20 hrs

Flood Elev= 995.00'

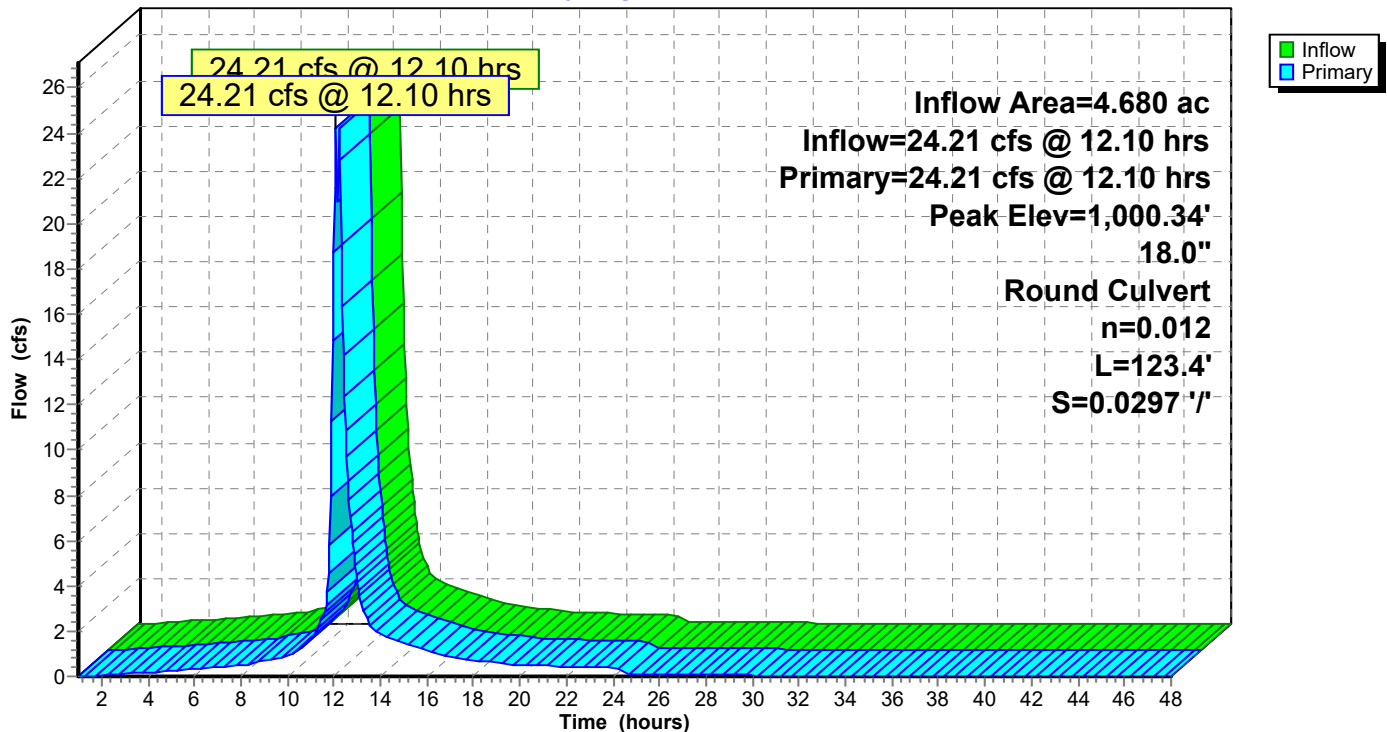
Device	Routing	Invert	Outlet Devices
#1	Primary	988.71'	18.0" Round Culvert L= 123.4' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 988.71' / 985.04' S= 0.0297 '/ Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=22.20 cfs @ 12.10 hrs HW=998.93' TW=991.28' (Dynamic Tailwater)

↑**1=Culvert** (Outlet Controls 22.20 cfs @ 12.56 fps)

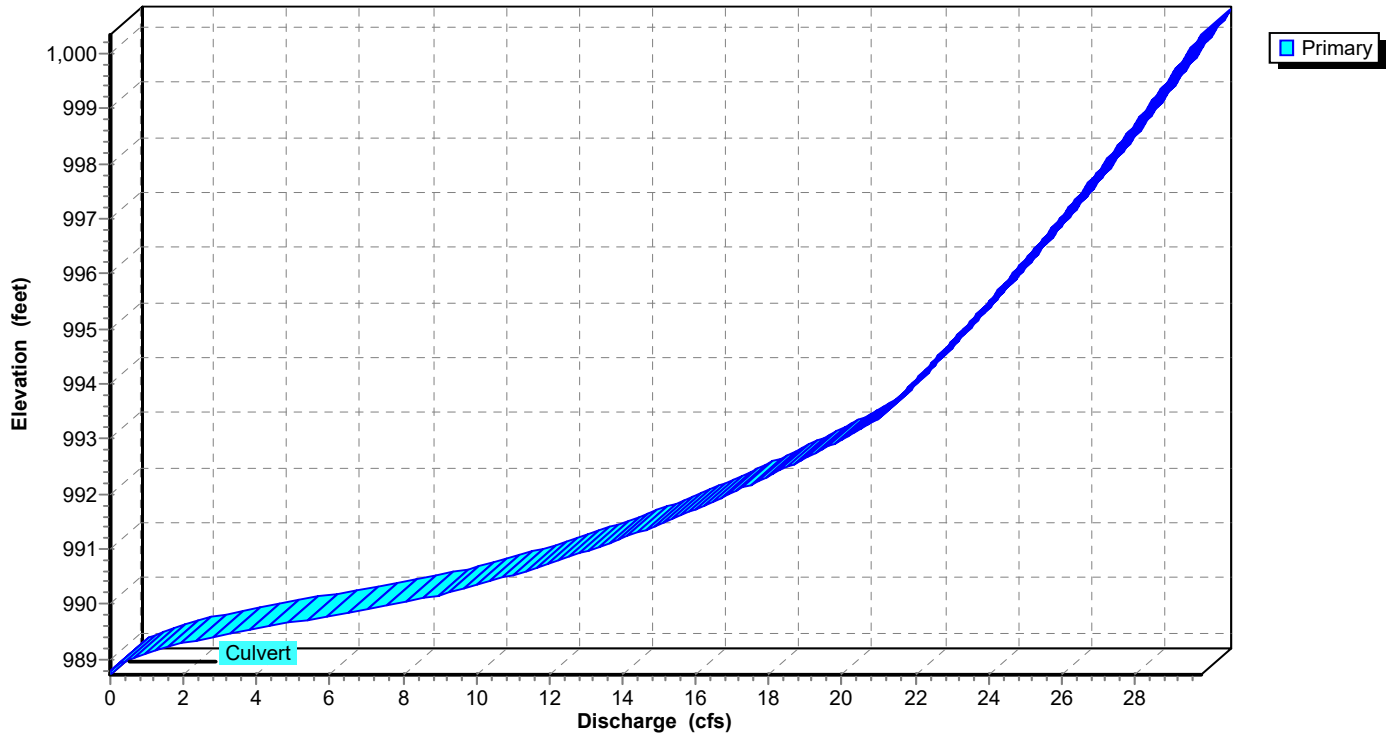
Pond 26P: 11 - 100 MH

Hydrograph



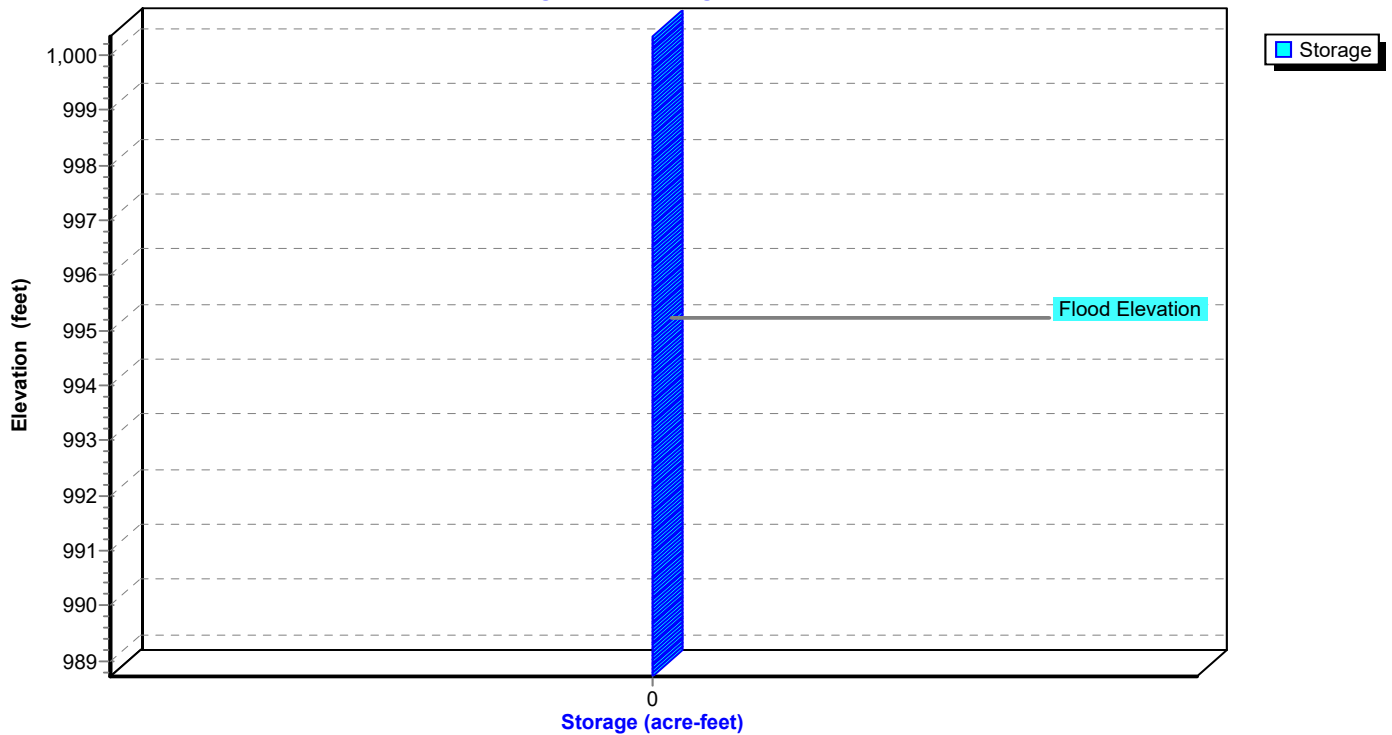
Pond 26P: 11 - 100 MH

Stage-Discharge



Pond 26P: 11 - 100 MH

Stage-Area-Storage



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Summary for Pond 27P: 11-10

Inflow Area = 4.680 ac, 78.82% Impervious, Inflow Depth > 6.87" for 100-Year event
Inflow = 24.21 cfs @ 12.10 hrs, Volume= 2.680 af
Outflow = 24.21 cfs @ 12.10 hrs, Volume= 2.680 af, Atten= 0%, Lag= 0.0 min
Primary = 24.21 cfs @ 12.10 hrs, Volume= 2.680 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs / 2

Peak Elev= 991.28' @ 12.10 hrs

Flood Elev= 995.00'

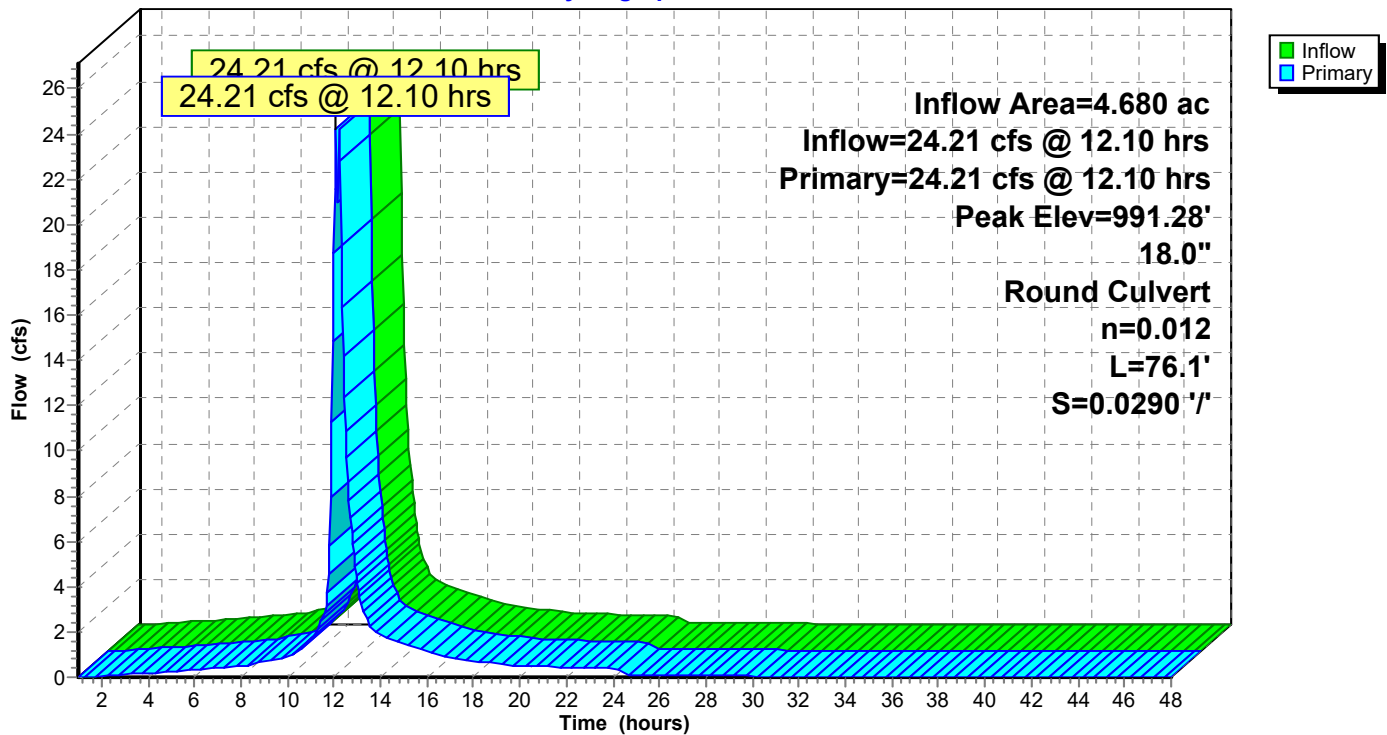
Device	Routing	Invert	Outlet Devices
#1	Primary	985.04'	18.0" Round Culvert L= 76.1' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 985.04' / 982.83' S= 0.0290 '/ Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=24.21 cfs @ 12.10 hrs HW=991.28' (Free Discharge)

↑**1=Culvert** (Barrel Controls 24.21 cfs @ 13.70 fps)

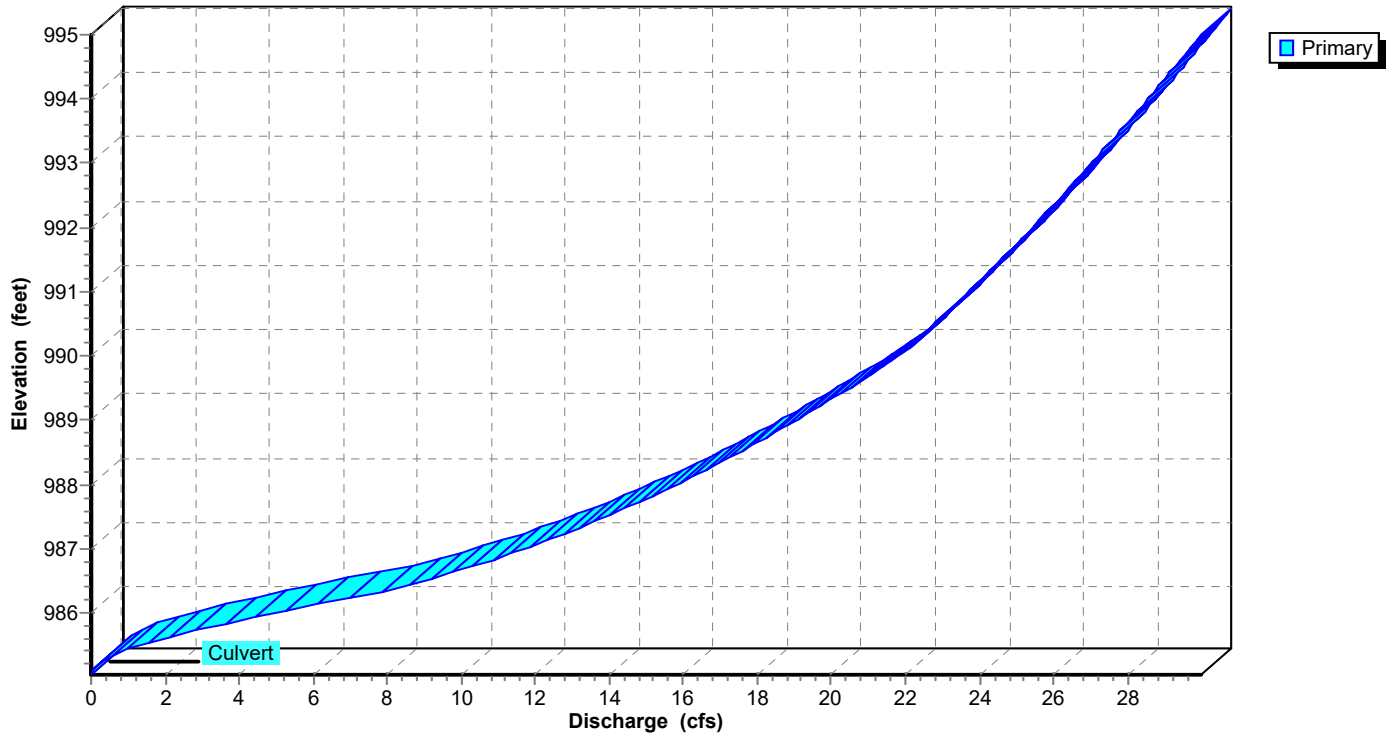
Pond 27P: 11-10

Hydrograph



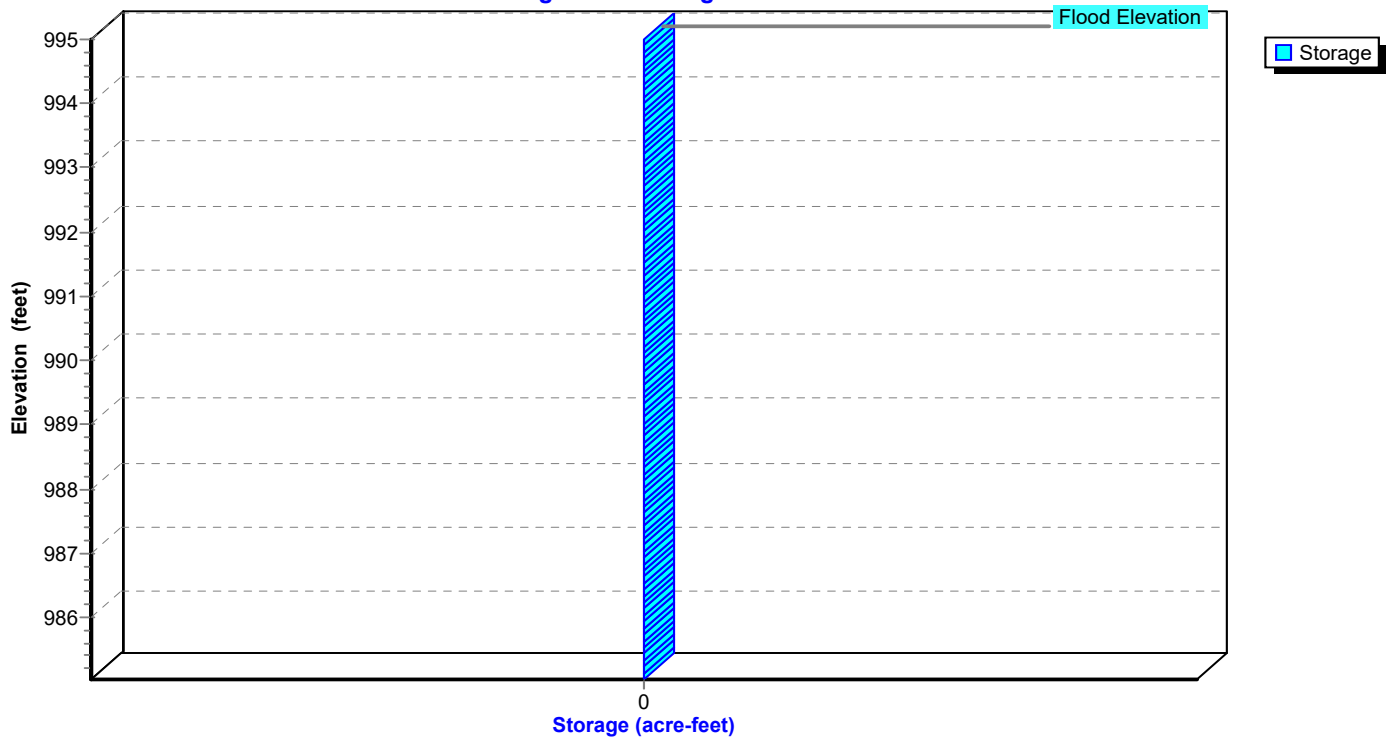
Pond 27P: 11-10

Stage-Discharge



Pond 27P: 11-10

Stage-Area-Storage



Summary for Link 29L: BYPASS AREAS

Inflow Area = 0.580 ac, 13.79% Impervious, Inflow Depth = 5.06" for 100-Year event
Inflow = 5.13 cfs @ 11.95 hrs, Volume= 0.244 af
Primary = 5.13 cfs @ 11.95 hrs, Volume= 0.244 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs

Link 29L: BYPASS AREAS**Hydrograph**