

# Addendum#2

## Stormwater Management Report

**Proposed 4 Story Apartment Building**  
501 Pond Street  
Ashland, MA

Prepared By: Bruce Saluk & Associates, Inc.  
Civil Engineering & Land Surveying  
576 Boston Post Road East  
Marlborough, MA 01752  
Tel# 508-485-1662

Developer: Trask Inc  
337 Turnpike Rd, Suite 201  
Southborough, MA 01772  
Tel# 508-485-0077



September 2022

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## **SECTION 1A: Addendum#2 Narrative & Summary**

The plans have been revised to address Town and peer review comments. Plan changes are as follows:

The runoff calculations now include the NOAA Atlas 14 rainfall depths. The drainage system was modified to meet the no net increase in volume of runoff for the 2, 10, 25 & 100 year storm flows. The rainfalls used for the above storms were 3.36, 5.25, 6.43 and 8.26 inches, respectively. The rainfall distribution used for each of the storms was the NOAA type D 24-hour distribution, which is similar to the NRCS legacy SCS type III, 24-hour rainfall distribution.

The Contech Stormwater treatment units were capped at 50% TSS removal capacity. Note that although the attached calculations by the Contech's engineer is showing a higher TSS removal value, our calculations in this addendum are showing 50 % TSS removal for each of the 11 treatment units.

The rain garden was relocated and increased in size. The new location at the front of the site will allow a 30" filter depth for removal of TP and TN.

The east driveway connection between the proposed development and the abutting south property has been redesigned to flatten the slope from 9% to 7%. This was achieved by tapering the driveway grade into the south property. The grading modification and both walkway connections to the south abutting property are subject to approval by the property owner. The walkways are also subject to approval by the Architectural Barriers Board.

Plan modifications resulted in drainage changes, so the drainage area plans DA#2 & DA#3 in the back of the addendum have been updated. Also updated are the drainage calculations included in Appendices 'A', 'E' and 'F'.

Other miscellaneous modifications to the plans are listed in the response to the peer review comments.

Table 4-1 below has been revised per the plan changes noted above. This table summarizes compliance with DEP Standard #2 for Post Development Peak Discharge Rates and provides a comparison for existing & proposed conditions.

TABLE 4-1: EXISTING vs PROPOSED PEAK FLOW (CFS) REDUCTION				
DESIGN POINT & RUNOFF CONDITION	2 YR	10YR	25YR	100YR
TOTAL SITE RUNOFF				
-EXISTING CONDITIONS	2.28	7.70	11.70	18.44
- PROPOSED CONDITIONS	1.37	5.19	7.54	14.65
% REDUCTION (TOTAL)	40%	33%	36%	21%

Table 4-2 below has been revised per the plan changes noted above. This table summarizes compliance with the Ashland Town requirement of no increase in runoff volume, This table provides provides a comparison for existing & proposed conditions for Acre Feet(AF) of runoff volume.

TABLE 4-2 : EXISTING vs PROPOSED RUNOFF VOLUME (AF) REDUCTION				
DESIGN POINT & RUNOFF CONDITION	2 YR	10YR	25YR	100YR
TOTAL SITE RUNOFF				
-EXISTING CONDITIONS	0.218	0.602	0.888	1.376
- PROPOSED CONDITIONS	0.098	0.596	0.852	1.277
% REDUCTION (TOTAL)	55%	1%	4%	7%

The runoff volumes given in Tables 4-1 and 4-2 were taken from the attached HYDROCAD calculations in Appendix "F" .

**APPENDIX A**  
**DEP Stormwater Management Standards**

## **Documentation & Calculations for DEP Stormwater Management Policy Standards**

This project will meet the Stormwater Management Standards. The proposed Best Management Practices (BMP's) will reduce and improve the water quality leaving the site. The following stormwater management standards pertain to the Massachusetts DEP Stormwater Policy.

### **Standard #1-Untreated Stormwater**

This project was designed to not discharge untreated contaminated stormwater into, or cause erosion to wetlands or waters of the Commonwealth. The stormwater discharge treatment from the proposed project will exceed 80% TSS removal from runoff leaving the site. Refer to Standard #4 below where TSS removal calculations are provided. A small portion of the site is situated below the Water Quality system, but the overall TSS removal will exceed 80% for the site. The small area meets the criteria for De Minimus site discharge in Vol. 3, Chap. 1, page 34 of the Mass Stormwater Handbook.

### **Standard #2-Post Development Peak Discharge Rates**

All performance requirements for this standard have been met. Refer to summary and conclusions in Section 1A of this Addendum where runoff flow summaries for both predevelopment and proposed conditions are given.

### **Standard #3-Recharge to Groundwater**

Full performance requirements for this standard have been met. Calculations for runoff are based on hydrologic soil groups (HSG) "B" for the site runoff. The target depth factor calculating the required recharge volume in the Stormwater Management Policy (SMP) is as follows:

<u>NRCS Soil Group</u>	<u>Target depth factor (F)</u>
A	0.6-inch
B	0.35-inch
C	0.25-inch
D	0.1-inch

*The proposed impervious area for the proposed development = 2.93 Ac.*

*The required ground water recharge for full build out is:*

*Rv= F (impervious area)  
RV=required recharge volume  
F=target depth factor  
The factor for HSG "B" is 0.35-inch @ 2.93 Ac.*

SITE RUNOFF Rv

$Rv(DEP) = (0.35\text{-inch}) \times (1\text{FT}/12\text{inches}) (2.93 \text{ Ac}) (43,560 \text{ SF}/\text{Ac.}) = 3723 \text{ CF}$

The above Rv and WQF values will be met by the proposed chambers systems as follows:

PROPOSED RECHARGE VOLUME

The "Simple Dynamic Method" was used to determine the available storage volume:

Proposed system capacity calculation using the Simple Dynamic Method:

- Roof Infiltration Simple Dynamic Method.

The proposed method for recharge will be nine(9) chamber systems using Cultec chambers embedded in stone. The material dimensions and quantities are summarized below, as well included on the detail sheet.

<b>CHAMBER SYSTEM SCHEDULE</b>						
Chamber System(CS)	Chamber Type	Quantity	No.of Rows	Stone Dimensions (FT)	Storage Below Pipe Invert(CF)	2 hr Recharge* (CF)
CS#1	R180HD	30	3	12'W x 68'L x 3.0'H	163	54
CS#2	R180HD	60	4	16'W x 99'L x 3.0'H	317	306
CS#3	R180HD	45	3	12'W x 99'L x 2.8'H	238	-----
CS#4	R150XLHD	56	7	25'W x 85'L x 3.0'H	425	364
CS#5	R150XLHD	156	12	40.5'W x 136'L x 3.0'H	1102	1990
CS#6A & CS#6B	R180HD	94	9	32'W x 41'L x 3.0'H 32'W x 36'L x 3.0'H	262	296
CS#7	R180HD	93	3	12'W x 200'L x 3.0'H	480	363
CS#8	C100HD	39	3	12'W x 110'L x 3.0'H	264	352
Totals :					3251 CF	3722 CF*

S

\* The HYDROCAD calculations for the Simple Dynamic Method on the following pages include the recharge (Rounded down to 3722 CF) and storage capacities for the nine(9) chamber systems. The summary for these calculations is:

- Volume recharged over 2 HR period for 9 chamber systems.....= 3722 CF
  - Volume of storage below pipe inverts in 9 chamber systems.....= 3251 CF
- Total Recharge Volume provided.....= 6973 CF

**TOTAL Recharge capacity provided =6973 CF > Rv(3723 CF required)**

Check for BMP draw down time:

$$\text{Roof DW draw down time} = 3.0 \text{ FT} / 0.689 \text{ FT/hr} \dots\dots\dots = 4.4 \text{ hr.} < 72\text{hr}$$

**Standard #4 (Water Quality)**

TSS removal will be met by using deep sump yard basins and 11 Water Quality proprietary treatment units by Contech. A long-term pollution prevention & Operation and Maintenance plan is included in Appendix "B" of this report.

$$V_{wq} = D_{wq} \times A_{wq}$$

$V_{wq}$  = water quality volume (CF)  
 $D_{wq}$  = water quality depth (inches)  
 $A_{wq}$  = On site Impervious area proposed ( Ac.)

The required water quality volume is 1-INCH.  
The design meets Standard #4 criteria for a 1-inch WQV.

Removal of TSS meets DEP Requirements. See proprietary TSS removal and calculation sheets for TSS removal and Excel spreadsheet included in the next pages.

TSS will be removed by the following means:

- Eleven (11) Water Quality proprietary treatment units by Contech
- Nine(9) chamber systems

The TSS treatment system is designed to remove greater than 80% of the TSS from the catchment area.

The TSS efficiency values in the TSS calculations were taken from DEP SWMP, Volume 1, Chapter 1, Table 'TSS' (Revised 2008) and the TSS removal for the proprietary units were provided by Contech. Note although Contech shows TSS removal above 90% a value of 50% was used for the Contech treatment units in the TSS calculations.

Refer to the following TSS removal calculations showing how TSS is removed from the stormwater

**BSA**

**Bruce Saluk & Associates, Inc.**

Civil Engineering & Land Surveying  
576 Boston Post Road East  
Marlborough, MA 01752  
(508) 485-1662

**WQI's**

**#1  
imperv. Area  
0.45 AC.**

	<b>A</b> BMP	<b>B</b> TSS Removal Rate (%)	<b>C</b> Starting TSS Load*	<b>D</b> Amount Removed (BxC)	<b>E</b> Remaining Load (C-D)
	WQI's	50	1.00	0.50	0.50
	DW	80	0.50	0.40	0.10
		0	0.10	0.00	0.10
	<b>Total TSS Removal =</b>				<b>90%</b>

**Notes:**

1) Starting TSS Load for first BMP= 1.00. TSS load for subsequent BMP's is equal to the Remaining Load (E) from the previous BMP.

**TSS Removal Calculation Worksheet**

Name: Proposed 4 Story Mixed Use

1 of 5

Proj. No.: 2874

Date:9/11/22

Computed by: BMS

Location: 501 Pond ST

Ashland, MA

**BSA**

**Bruce Saluk & Associates, Inc.**

Civil Engineering & Land Surveying  
576 Boston Post Road East  
Marlborough, MA 01752  
(508) 485-1662

**WQI's**

YD's, CB's  
& TU's  
imperv. Area  
1.22Ac.

**TSS Removal Calculation Worksheet**

Name: Proposed 4 story Mixed Use

2 of 5

Proj. No.: 2874

Date: 9/11/22

Computed by: BMS

Location: 501 Pond ST  
Ashland, MA

	A	B	C	D	E
	BMP	TSS Removal Rate (%)	Starting TSS Load*	Amount Removed (BxC)	Remaining Load (C-D)
CB's	CB's	25	1.00	0.25	0.75
TU	TU	50	0.75	0.38	0.38
DW	DW	80	0.38	0.30	0.08
<b>Total TSS Removal =</b>				<b>93%</b>	

**Notes:**

1) Starting TSS Load for first BMP= 1.00. TSS load for subsequent BMP's is equal to the Remaining Load (E) from the previous BMP.

**BSA**

**Bruce Saluk & Associates, Inc.**

Civil Engineering & Land Surveying  
576 Boston Post Road East  
Marlborough, MA 01752  
(508) 485-1662

**TD's &  
TU's**

imperv. Area  
0.27 Ac.

**TSS Removal Calculation Worksheet**

Name: Proposed 4 story Mixed Use

3 of 5

Proj. No.: 2874

Date: 9/11/22 3 of 7

Computed by: BMS

Location: 501 Pond ST  
Ashland, MA

	A BMP	B TSS Removal Rate (%)	C Starting TSS Load*	D Amount Removed (BxC)	E Remaining Load (C-D)
	TU	50	1.00	0.50	0.50
		0	0.50	0.00	0.50
		0	0.50	0.00	0.50
<b>Total TSS Removal =</b>					<b>50%</b>

**Notes:**

1) Starting TSS Load for first BMP= 1.00. TSS load for subsequent BMP's is equal to the Remaining Load (E) from the previous BMP.

**BSA**

**Bruce Saluk & Associates, Inc.**

Civil Engineering & Land Surveying  
576 Boston Post Road East  
Marlborough, MA 01752  
(508) 485-1662

**TSS Removal Calculation Worksheet**

Name: Proposed 4 Mixed Use

4 OF 5

Proj. No.: 2874

Date: 9/11/22

Computed by: BMS

Location: 501 Pond ST

Ashland, MA

**Roof Area**

imperv. Area

0.91 Ac.

A BMP	B TSS Removal Rate (%)	C Starting TSS Load*	D Amount Removed (BxC)	E Remaining Load (C-D)
ROOF RECHARGE	80	1.00	0.80	0.20
<b>Total TSS Removal =</b>				<b>80%</b>

**Notes:**

\*) Starting TSS Load for first BMP= 1.00. TSS load for subsequent BMP's is equal to the Remaining Load (E) from the previous BMP.

**BSA**

**Bruce Saluk & Associates, Inc.**  
Civil Engineering & Land Surveying  
576 Boston Post Road East  
Marlborough, MA 01752  
(508) 485-1662

**TSS Removal Calculation Worksheet**

5 OF 5

Name: Proposed 4 Story Mixed Use Proj. No.: 2874

Date: 9/11/22

Computed by: BMS

Location: 501 Pond ST  
Ashland, MA

**TSS SUMMARY SHEET**

Total impervious site area=2.93Ac.

Site TSS Removal : 
$$\frac{[(90 \times 0.45 \text{Ac}) + (93 \times 1.22 \text{Ac}) + (50 \times 0.27 \text{Ac}) + (80 \times 0.91 \text{Ac}) + (0 \times 0.08 \text{Ac})]}{100} \times 100 = 82.0\%$$
  
2.93 Ac

**Project:** Pond Street  
**Location:** Ashland, MA  
**Prepared For:** Bruce Saluk & Associates



**Purpose:** To calculate the water quality flow rate (WQF) over a given site area. In this situation the WQF is derived from the first 1" of runoff from the contributing impervious surface.

**Reference:** Massachusetts Dept. of Environmental Protection Wetlands Program / United States Department of Agriculture Natural Resources Conservation Service TR-55 Manual

**Procedure:** Determine unit peak discharge using Figure 1 or 2. Figure 2 is in tabular form so is preferred. Using the  $t_c$ , read the unit peak discharge ( $q_u$ ) from Figure 1 or Table in Figure 2.  $q_u$  is expressed in the following units: cfs/mi<sup>2</sup>/watershed inches (csm/in).

Compute Q Rate using the following equation:

$$Q = (q_u) (A) (WQV)$$

where:

Q = flow rate associated with first 1" of runoff

$q_u$  = the unit peak discharge, in csm/in.

A = impervious surface drainage area (in square miles)

WQV = water quality volume in watershed inches (1" in this case)

Structure Name	Impv. (acres)	A (miles <sup>2</sup> )	$t_c$ (min)	$t_c$ (hr)	WQV (in)	$q_u$ (csm/in.)	Q (cfs)
WQI #1	0.13	0.0002031	6.0	0.100	1.00	774.00	0.16
WQI #2	0.09	0.0001406	6.0	0.100	1.00	774.00	0.11
WQI #3	0.11	0.0001719	6.0	0.100	1.00	774.00	0.13
WQI #4	0.12	0.0001875	6.0	0.100	1.00	774.00	0.15
TU #1	0.13	0.0002031	6.0	0.100	1.00	774.00	0.16
TU #2	0.12	0.0001875	6.0	0.100	1.00	774.00	0.15
TU #3	0.15	0.0002344	6.0	0.100	1.00	774.00	0.18
TU #4	0.25	0.0003906	6.0	0.100	1.00	774.00	0.30
TU #5	0.25	0.0003906	6.0	0.100	1.00	774.00	0.30
TU #6	0.31	0.0004844	6.0	0.100	1.00	774.00	0.37
TU #7	0.28	0.0004375	6.0	0.100	1.00	774.00	0.34

## Brief Stormceptor Sizing Report - TU #1

Project Information & Location			
<b>Project Name</b>	Pond Street	<b>Project Number</b>	694516
<b>City</b>	Ashland	<b>State/ Province</b>	Massachusetts
<b>Country</b>	United States of America	<b>Date</b>	11/15/2021
Designer Information		EOR Information (optional)	
<b>Name</b>	Josh Stackhouse	<b>Name</b>	
<b>Company</b>	Contech Engineered Solutions	<b>Company</b>	
<b>Phone #</b>	207-219-9110	<b>Phone #</b>	
<b>Email</b>	joshua.stackhouse@conteches.com	<b>Email</b>	

### Stormwater Treatment Recommendation

The recommended Stormceptor Model(s) which achieve or exceed the user defined water quality objective for each site within the project are listed in the below Sizing Summary table.

<b>Site Name</b>	TU #1
<b>Target TSS Removal (%)</b>	80
<b>TSS Removal (%) Provided</b>	95
<b>Recommended Stormceptor Model</b>	STC 450i

The recommended Stormceptor Model achieves the water quality objectives based on the selected inputs, historical rainfall records and selected particle size distribution.

Stormceptor Sizing Summary	
Stormceptor Model	% TSS Removal Provided
STC 450i	95
STC 900	97
STC 1200	98
STC 1800	98
STC 2400	98
STC 3600	99
STC 4800	99
STC 6000	99
STC 7200	99
STC 11000	100
STC 13000	100
STC 16000	100

Sizing Details			
<b>Drainage Area</b>		<b>Water Quality Objective</b>	
Total Area (acres)	0.13	TSS Removal (%)	80.0
Imperviousness %	100.0	Runoff Volume Capture (%)	
<b>Rainfall</b>		Oil Spill Capture Volume (Gal)	
Station Name	BOSTON WSFO AP	Peak Conveyed Flow Rate (CFS)	
State/Province	Massachusetts	Water Quality Flow Rate (CFS)	
Station ID #	0770	<b>Up Stream Storage</b>	
Years of Records	58	Storage (ac-ft)	Discharge (cfs)
Latitude	42°21'38"N	0.000	0.000
Longitude	71°0'38"W	<b>Up Stream Flow Diversion</b>	
		Max. Flow to Stormceptor (cfs)	

Particle Size Distribution (PSD) The selected PSD defines TSS removal		
OK-110		
Particle Diameter (microns)	Distribution %	Specific Gravity
1.0	0.0	2.65
53.0	3.0	2.65
75.0	15.0	2.65
88.0	25.0	2.65
106.0	41.0	2.65
125.0	15.0	2.65
150.0	1.0	2.65
212.0	0.0	2.65

Notes
<ul style="list-style-type: none"> <li>Stormceptor performance estimates are based on simulations using PCSWMM for Stormceptor, which uses the EPA Rainfall and Runoff modules.</li> <li>Design estimates listed are only representative of specific project requirements based on total suspended solids (TSS) removal defined by the selected PSD, and based on stable site conditions only, after construction is completed.</li> <li>For submerged applications or sites specific to spill control, please contact your local Stormceptor representative for further design assistance.</li> </ul>

For Stormceptor Specifications and Drawings Please Visit:  
<https://www.conteches.com/technical-guides/search?filter=1WBC005EYX>

## Brief Stormceptor Sizing Report - TU #2

Project Information & Location			
<b>Project Name</b>	Pond Street	<b>Project Number</b>	694516
<b>City</b>	Ashland	<b>State/ Province</b>	Massachusetts
<b>Country</b>	United States of America	<b>Date</b>	11/15/2021
Designer Information		EOR Information (optional)	
<b>Name</b>	Josh Stackhouse	<b>Name</b>	
<b>Company</b>	Contech Engineered Solutions	<b>Company</b>	
<b>Phone #</b>	207-219-9110	<b>Phone #</b>	
<b>Email</b>	joshua.stackhouse@conteches.com	<b>Email</b>	

### Stormwater Treatment Recommendation

The recommended Stormceptor Model(s) which achieve or exceed the user defined water quality objective for each site within the project are listed in the below Sizing Summary table.

<b>Site Name</b>	TU #2
<b>Target TSS Removal (%)</b>	80
<b>TSS Removal (%) Provided</b>	95
<b>Recommended Stormceptor Model</b>	STC 450i

The recommended Stormceptor Model achieves the water quality objectives based on the selected inputs, historical rainfall records and selected particle size distribution.

Stormceptor Sizing Summary	
Stormceptor Model	% TSS Removal Provided
STC 450i	95
STC 900	98
STC 1200	98
STC 1800	98
STC 2400	99
STC 3600	99
STC 4800	99
STC 6000	99
STC 7200	99
STC 11000	100
STC 13000	100
STC 16000	100

Sizing Details			
<b>Drainage Area</b>		<b>Water Quality Objective</b>	
Total Area (acres)	0.12	TSS Removal (%)	80.0
Imperviousness %	100.0	Runoff Volume Capture (%)	
<b>Rainfall</b>		Oil Spill Capture Volume (Gal)	
Station Name	BOSTON WSFO AP	Peak Conveyed Flow Rate (CFS)	
State/Province	Massachusetts	Water Quality Flow Rate (CFS)	
Station ID #	0770	<b>Up Stream Storage</b>	
Years of Records	58	Storage (ac-ft)	Discharge (cfs)
Latitude	42°21'38"N	0.000	0.000
Longitude	71°0'38"W	<b>Up Stream Flow Diversion</b>	
		Max. Flow to Stormceptor (cfs)	

Particle Size Distribution (PSD) The selected PSD defines TSS removal		
OK-110		
Particle Diameter (microns)	Distribution %	Specific Gravity
1.0	0.0	2.65
53.0	3.0	2.65
75.0	15.0	2.65
88.0	25.0	2.65
106.0	41.0	2.65
125.0	15.0	2.65
150.0	1.0	2.65
212.0	0.0	2.65

Notes
<ul style="list-style-type: none"> <li>Stormceptor performance estimates are based on simulations using PCSWMM for Stormceptor, which uses the EPA Rainfall and Runoff modules.</li> <li>Design estimates listed are only representative of specific project requirements based on total suspended solids (TSS) removal defined by the selected PSD, and based on stable site conditions only, after construction is completed.</li> <li>For submerged applications or sites specific to spill control, please contact your local Stormceptor representative for further design assistance.</li> </ul>

For Stormceptor Specifications and Drawings Please Visit:  
<https://www.conteches.com/technical-guides/search?filter=1WBC005EYX>

## Brief Stormceptor Sizing Report - TU #3

Project Information & Location			
<b>Project Name</b>	Pond Street	<b>Project Number</b>	694516
<b>City</b>	Ashland	<b>State/ Province</b>	Massachusetts
<b>Country</b>	United States of America	<b>Date</b>	11/15/2021
Designer Information		EOR Information (optional)	
<b>Name</b>	Josh Stackhouse	<b>Name</b>	
<b>Company</b>	Contech Engineered Solutions	<b>Company</b>	
<b>Phone #</b>	207-219-9110	<b>Phone #</b>	
<b>Email</b>	joshua.stackhouse@conteches.com	<b>Email</b>	

### Stormwater Treatment Recommendation

The recommended Stormceptor Model(s) which achieve or exceed the user defined water quality objective for each site within the project are listed in the below Sizing Summary table.

<b>Site Name</b>	TU #3
<b>Target TSS Removal (%)</b>	80
<b>TSS Removal (%) Provided</b>	95
<b>Recommended Stormceptor Model</b>	STC 450i

The recommended Stormceptor Model achieves the water quality objectives based on the selected inputs, historical rainfall records and selected particle size distribution.

Stormceptor Sizing Summary	
Stormceptor Model	% TSS Removal Provided
STC 450i	95
STC 900	97
STC 1200	97
STC 1800	98
STC 2400	98
STC 3600	99
STC 4800	99
STC 6000	99
STC 7200	99
STC 11000	100
STC 13000	100
STC 16000	100

Sizing Details			
<b>Drainage Area</b>		<b>Water Quality Objective</b>	
Total Area (acres)	0.15	TSS Removal (%)	80.0
Imperviousness %	100.0	Runoff Volume Capture (%)	
<b>Rainfall</b>		Oil Spill Capture Volume (Gal)	
Station Name	BOSTON WSFO AP	Peak Conveyed Flow Rate (CFS)	
State/Province	Massachusetts	Water Quality Flow Rate (CFS)	
Station ID #	0770	<b>Up Stream Storage</b>	
Years of Records	58	Storage (ac-ft)	Discharge (cfs)
Latitude	42°21'38"N	0.000	0.000
Longitude	71°0'38"W	<b>Up Stream Flow Diversion</b>	
		Max. Flow to Stormceptor (cfs)	

Particle Size Distribution (PSD) The selected PSD defines TSS removal		
OK-110		
Particle Diameter (microns)	Distribution %	Specific Gravity
1.0	0.0	2.65
53.0	3.0	2.65
75.0	15.0	2.65
88.0	25.0	2.65
106.0	41.0	2.65
125.0	15.0	2.65
150.0	1.0	2.65
212.0	0.0	2.65

Notes
<ul style="list-style-type: none"> <li>Stormceptor performance estimates are based on simulations using PCSWMM for Stormceptor, which uses the EPA Rainfall and Runoff modules.</li> <li>Design estimates listed are only representative of specific project requirements based on total suspended solids (TSS) removal defined by the selected PSD, and based on stable site conditions only, after construction is completed.</li> <li>For submerged applications or sites specific to spill control, please contact your local Stormceptor representative for further design assistance.</li> </ul>

For Stormceptor Specifications and Drawings Please Visit:  
<https://www.conteches.com/technical-guides/search?filter=1WBC005EYX>

## Brief Stormceptor Sizing Report - TU #4

Project Information & Location			
Project Name	Pond Street	Project Number	694516
City	Ashland	State/ Province	Massachusetts
Country	United States of America	Date	11/15/2021
Designer Information		EOR Information (optional)	
Name	Josh Stackhouse	Name	
Company	Contech Engineered Solutions	Company	
Phone #	207-219-9110	Phone #	
Email	joshua.stackhouse@conteches.com	Email	

### Stormwater Treatment Recommendation

The recommended Stormceptor Model(s) which achieve or exceed the user defined water quality objective for each site within the project are listed in the below Sizing Summary table.

Site Name	TU #4
Target TSS Removal (%)	80
TSS Removal (%) Provided	92
Recommended Stormceptor Model	STC 450i

The recommended Stormceptor Model achieves the water quality objectives based on the selected inputs, historical rainfall records and selected particle size distribution.

Stormceptor Sizing Summary	
Stormceptor Model	% TSS Removal Provided
STC 450i	92
STC 900	96
STC 1200	96
STC 1800	96
STC 2400	97
STC 3600	98
STC 4800	98
STC 6000	99
STC 7200	99
STC 11000	99
STC 13000	99
STC 16000	99

Sizing Details			
<b>Drainage Area</b>		<b>Water Quality Objective</b>	
Total Area (acres)	0.25	TSS Removal (%)	80.0
Imperviousness %	100.0	Runoff Volume Capture (%)	
<b>Rainfall</b>		Oil Spill Capture Volume (Gal)	
Station Name	BOSTON WSFO AP	Peak Conveyed Flow Rate (CFS)	
State/Province	Massachusetts	Water Quality Flow Rate (CFS)	
Station ID #	0770	<b>Up Stream Storage</b>	
Years of Records	58	Storage (ac-ft)	Discharge (cfs)
Latitude	42°21'38"N	0.000	0.000
Longitude	71°0'38"W	<b>Up Stream Flow Diversion</b>	
		Max. Flow to Stormceptor (cfs)	

Particle Size Distribution (PSD) The selected PSD defines TSS removal		
OK-110		
Particle Diameter (microns)	Distribution %	Specific Gravity
1.0	0.0	2.65
53.0	3.0	2.65
75.0	15.0	2.65
88.0	25.0	2.65
106.0	41.0	2.65
125.0	15.0	2.65
150.0	1.0	2.65
212.0	0.0	2.65

Notes
<ul style="list-style-type: none"> <li>Stormceptor performance estimates are based on simulations using PCSWMM for Stormceptor, which uses the EPA Rainfall and Runoff modules.</li> <li>Design estimates listed are only representative of specific project requirements based on total suspended solids (TSS) removal defined by the selected PSD, and based on stable site conditions only, after construction is completed.</li> <li>For submerged applications or sites specific to spill control, please contact your local Stormceptor representative for further design assistance.</li> </ul>

For Stormceptor Specifications and Drawings Please Visit:  
<https://www.conteches.com/technical-guides/search?filter=1WBC005EYX>

## Brief Stormceptor Sizing Report - TU #5

Project Information & Location			
<b>Project Name</b>	Pond Street	<b>Project Number</b>	694516
<b>City</b>	Ashland	<b>State/ Province</b>	Massachusetts
<b>Country</b>	United States of America	<b>Date</b>	11/15/2021
Designer Information		EOR Information (optional)	
<b>Name</b>	Josh Stackhouse	<b>Name</b>	
<b>Company</b>	Contech Engineered Solutions	<b>Company</b>	
<b>Phone #</b>	207-219-9110	<b>Phone #</b>	
<b>Email</b>	joshua.stackhouse@conteches.com	<b>Email</b>	

### Stormwater Treatment Recommendation

The recommended Stormceptor Model(s) which achieve or exceed the user defined water quality objective for each site within the project are listed in the below Sizing Summary table.

<b>Site Name</b>	TU #5
<b>Target TSS Removal (%)</b>	80
<b>TSS Removal (%) Provided</b>	92
<b>Recommended Stormceptor Model</b>	STC 450i

The recommended Stormceptor Model achieves the water quality objectives based on the selected inputs, historical rainfall records and selected particle size distribution.

Stormceptor Sizing Summary	
Stormceptor Model	% TSS Removal Provided
STC 450i	92
STC 900	96
STC 1200	96
STC 1800	96
STC 2400	97
STC 3600	98
STC 4800	98
STC 6000	99
STC 7200	99
STC 11000	99
STC 13000	99
STC 16000	99

Sizing Details			
<b>Drainage Area</b>		<b>Water Quality Objective</b>	
Total Area (acres)	0.25	TSS Removal (%)	80.0
Imperviousness %	100.0	Runoff Volume Capture (%)	
<b>Rainfall</b>		Oil Spill Capture Volume (Gal)	
Station Name	BOSTON WSFO AP	Peak Conveyed Flow Rate (CFS)	
State/Province	Massachusetts	Water Quality Flow Rate (CFS)	
Station ID #	0770	<b>Up Stream Storage</b>	
Years of Records	58	Storage (ac-ft)	Discharge (cfs)
Latitude	42°21'38"N	0.000	0.000
Longitude	71°0'38"W	<b>Up Stream Flow Diversion</b>	
		Max. Flow to Stormceptor (cfs)	

Particle Size Distribution (PSD) The selected PSD defines TSS removal		
OK-110		
Particle Diameter (microns)	Distribution %	Specific Gravity
1.0	0.0	2.65
53.0	3.0	2.65
75.0	15.0	2.65
88.0	25.0	2.65
106.0	41.0	2.65
125.0	15.0	2.65
150.0	1.0	2.65
212.0	0.0	2.65

Notes
<ul style="list-style-type: none"> <li>Stormceptor performance estimates are based on simulations using PCSWMM for Stormceptor, which uses the EPA Rainfall and Runoff modules.</li> <li>Design estimates listed are only representative of specific project requirements based on total suspended solids (TSS) removal defined by the selected PSD, and based on stable site conditions only, after construction is completed.</li> <li>For submerged applications or sites specific to spill control, please contact your local Stormceptor representative for further design assistance.</li> </ul>

For Stormceptor Specifications and Drawings Please Visit:  
<https://www.conteches.com/technical-guides/search?filter=1WBC005EYX>

## Brief Stormceptor Sizing Report - TU #6

Project Information & Location			
<b>Project Name</b>	Pond Street	<b>Project Number</b>	694516
<b>City</b>	Ashland	<b>State/ Province</b>	Massachusetts
<b>Country</b>	United States of America	<b>Date</b>	11/15/2021
Designer Information		EOR Information (optional)	
<b>Name</b>	Josh Stackhouse	<b>Name</b>	
<b>Company</b>	Contech Engineered Solutions	<b>Company</b>	
<b>Phone #</b>	207-219-9110	<b>Phone #</b>	
<b>Email</b>	joshua.stackhouse@conteches.com	<b>Email</b>	

### Stormwater Treatment Recommendation

The recommended Stormceptor Model(s) which achieve or exceed the user defined water quality objective for each site within the project are listed in the below Sizing Summary table.

<b>Site Name</b>	TU #6
<b>Target TSS Removal (%)</b>	80
<b>TSS Removal (%) Provided</b>	91
<b>Recommended Stormceptor Model</b>	STC 450i

The recommended Stormceptor Model achieves the water quality objectives based on the selected inputs, historical rainfall records and selected particle size distribution.

Stormceptor Sizing Summary	
Stormceptor Model	% TSS Removal Provided
STC 450i	91
STC 900	95
STC 1200	95
STC 1800	96
STC 2400	97
STC 3600	97
STC 4800	98
STC 6000	98
STC 7200	99
STC 11000	99
STC 13000	99
STC 16000	99

Sizing Details			
<b>Drainage Area</b>		<b>Water Quality Objective</b>	
Total Area (acres)	0.31	TSS Removal (%)	80.0
Imperviousness %	100.0	Runoff Volume Capture (%)	
<b>Rainfall</b>		Oil Spill Capture Volume (Gal)	
Station Name	BOSTON WSFO AP	Peak Conveyed Flow Rate (CFS)	
State/Province	Massachusetts	Water Quality Flow Rate (CFS)	
Station ID #	0770	<b>Up Stream Storage</b>	
Years of Records	58	Storage (ac-ft)	Discharge (cfs)
Latitude	42°21'38"N	0.000	0.000
Longitude	71°0'38"W	<b>Up Stream Flow Diversion</b>	
		Max. Flow to Stormceptor (cfs)	

Particle Size Distribution (PSD) The selected PSD defines TSS removal		
OK-110		
Particle Diameter (microns)	Distribution %	Specific Gravity
1.0	0.0	2.65
53.0	3.0	2.65
75.0	15.0	2.65
88.0	25.0	2.65
106.0	41.0	2.65
125.0	15.0	2.65
150.0	1.0	2.65
212.0	0.0	2.65

Notes
<ul style="list-style-type: none"> <li>Stormceptor performance estimates are based on simulations using PCSWMM for Stormceptor, which uses the EPA Rainfall and Runoff modules.</li> <li>Design estimates listed are only representative of specific project requirements based on total suspended solids (TSS) removal defined by the selected PSD, and based on stable site conditions only, after construction is completed.</li> <li>For submerged applications or sites specific to spill control, please contact your local Stormceptor representative for further design assistance.</li> </ul>

For Stormceptor Specifications and Drawings Please Visit:  
<https://www.conteches.com/technical-guides/search?filter=1WBC005EYX>

## Brief Stormceptor Sizing Report - TU #7

Project Information & Location			
<b>Project Name</b>	Pond Street	<b>Project Number</b>	694516
<b>City</b>	Ashland	<b>State/ Province</b>	Massachusetts
<b>Country</b>	United States of America	<b>Date</b>	11/15/2021
Designer Information		EOR Information (optional)	
<b>Name</b>	Josh Stackhouse	<b>Name</b>	
<b>Company</b>	Contech Engineered Solutions	<b>Company</b>	
<b>Phone #</b>	207-219-9110	<b>Phone #</b>	
<b>Email</b>	joshua.stackhouse@conteches.com	<b>Email</b>	

### Stormwater Treatment Recommendation

The recommended Stormceptor Model(s) which achieve or exceed the user defined water quality objective for each site within the project are listed in the below Sizing Summary table.

<b>Site Name</b>	TU #7
<b>Target TSS Removal (%)</b>	80
<b>TSS Removal (%) Provided</b>	92
<b>Recommended Stormceptor Model</b>	STC 450i

The recommended Stormceptor Model achieves the water quality objectives based on the selected inputs, historical rainfall records and selected particle size distribution.

Stormceptor Sizing Summary	
Stormceptor Model	% TSS Removal Provided
STC 450i	92
STC 900	96
STC 1200	96
STC 1800	96
STC 2400	97
STC 3600	98
STC 4800	98
STC 6000	98
STC 7200	99
STC 11000	99
STC 13000	99
STC 16000	99

Sizing Details			
<b>Drainage Area</b>		<b>Water Quality Objective</b>	
Total Area (acres)	0.28	TSS Removal (%)	80.0
Imperviousness %	100.0	Runoff Volume Capture (%)	
<b>Rainfall</b>		Oil Spill Capture Volume (Gal)	
Station Name	BOSTON WSFO AP	Peak Conveyed Flow Rate (CFS)	
State/Province	Massachusetts	Water Quality Flow Rate (CFS)	
Station ID #	0770	<b>Up Stream Storage</b>	
Years of Records	58	Storage (ac-ft)	Discharge (cfs)
Latitude	42°21'38"N	0.000	0.000
Longitude	71°0'38"W	<b>Up Stream Flow Diversion</b>	
		Max. Flow to Stormceptor (cfs)	

Particle Size Distribution (PSD) The selected PSD defines TSS removal		
OK-110		
Particle Diameter (microns)	Distribution %	Specific Gravity
1.0	0.0	2.65
53.0	3.0	2.65
75.0	15.0	2.65
88.0	25.0	2.65
106.0	41.0	2.65
125.0	15.0	2.65
150.0	1.0	2.65
212.0	0.0	2.65

Notes
<ul style="list-style-type: none"> <li>Stormceptor performance estimates are based on simulations using PCSWMM for Stormceptor, which uses the EPA Rainfall and Runoff modules.</li> <li>Design estimates listed are only representative of specific project requirements based on total suspended solids (TSS) removal defined by the selected PSD, and based on stable site conditions only, after construction is completed.</li> <li>For submerged applications or sites specific to spill control, please contact your local Stormceptor representative for further design assistance.</li> </ul>

For Stormceptor Specifications and Drawings Please Visit:  
<https://www.conteches.com/technical-guides/search?filter=1WBC005EYX>

## Brief Stormceptor Sizing Report - WQI #1

Project Information & Location			
<b>Project Name</b>	Pond Street	<b>Project Number</b>	694516
<b>City</b>	Ashland	<b>State/ Province</b>	Massachusetts
<b>Country</b>	United States of America	<b>Date</b>	11/15/2021
Designer Information		EOR Information (optional)	
<b>Name</b>	Josh Stackhouse	<b>Name</b>	
<b>Company</b>	Contech Engineered Solutions	<b>Company</b>	
<b>Phone #</b>	207-219-9110	<b>Phone #</b>	
<b>Email</b>	joshua.stackhouse@conteches.com	<b>Email</b>	

### Stormwater Treatment Recommendation

The recommended Stormceptor Model(s) which achieve or exceed the user defined water quality objective for each site within the project are listed in the below Sizing Summary table.

<b>Site Name</b>	WQI #1
<b>Target TSS Removal (%)</b>	80
<b>TSS Removal (%) Provided</b>	95
<b>Recommended Stormceptor Model</b>	STC 450i

The recommended Stormceptor Model achieves the water quality objectives based on the selected inputs, historical rainfall records and selected particle size distribution.

Stormceptor Sizing Summary	
Stormceptor Model	% TSS Removal Provided
STC 450i	95
STC 900	97
STC 1200	98
STC 1800	98
STC 2400	98
STC 3600	99
STC 4800	99
STC 6000	99
STC 7200	99
STC 11000	100
STC 13000	100
STC 16000	100

Sizing Details			
<b>Drainage Area</b>		<b>Water Quality Objective</b>	
Total Area (acres)	0.13	TSS Removal (%)	80.0
Imperviousness %	100.0	Runoff Volume Capture (%)	
<b>Rainfall</b>		Oil Spill Capture Volume (Gal)	
Station Name	BOSTON WSFO AP	Peak Conveyed Flow Rate (CFS)	
State/Province	Massachusetts	Water Quality Flow Rate (CFS)	
Station ID #	0770	<b>Up Stream Storage</b>	
Years of Records	58	Storage (ac-ft)	Discharge (cfs)
Latitude	42°21'38"N	0.000	0.000
Longitude	71°0'38"W	<b>Up Stream Flow Diversion</b>	
		Max. Flow to Stormceptor (cfs)	

Particle Size Distribution (PSD) The selected PSD defines TSS removal		
OK-110		
Particle Diameter (microns)	Distribution %	Specific Gravity
1.0	0.0	2.65
53.0	3.0	2.65
75.0	15.0	2.65
88.0	25.0	2.65
106.0	41.0	2.65
125.0	15.0	2.65
150.0	1.0	2.65
212.0	0.0	2.65

Notes
<ul style="list-style-type: none"> <li>Stormceptor performance estimates are based on simulations using PCSWMM for Stormceptor, which uses the EPA Rainfall and Runoff modules.</li> <li>Design estimates listed are only representative of specific project requirements based on total suspended solids (TSS) removal defined by the selected PSD, and based on stable site conditions only, after construction is completed.</li> <li>For submerged applications or sites specific to spill control, please contact your local Stormceptor representative for further design assistance.</li> </ul>

For Stormceptor Specifications and Drawings Please Visit:  
<https://www.conteches.com/technical-guides/search?filter=1WBC005EYX>

## Brief Stormceptor Sizing Report - WQI #2

Project Information & Location			
<b>Project Name</b>	Pond Street	<b>Project Number</b>	694516
<b>City</b>	Ashland	<b>State/ Province</b>	Massachusetts
<b>Country</b>	United States of America	<b>Date</b>	11/15/2021
Designer Information		EOR Information (optional)	
<b>Name</b>	Josh Stackhouse	<b>Name</b>	
<b>Company</b>	Contech Engineered Solutions	<b>Company</b>	
<b>Phone #</b>	207-219-9110	<b>Phone #</b>	
<b>Email</b>	joshua.stackhouse@conteches.com	<b>Email</b>	

### Stormwater Treatment Recommendation

The recommended Stormceptor Model(s) which achieve or exceed the user defined water quality objective for each site within the project are listed in the below Sizing Summary table.

<b>Site Name</b>	WQI #2
<b>Target TSS Removal (%)</b>	80
<b>TSS Removal (%) Provided</b>	96
<b>Recommended Stormceptor Model</b>	STC 450i

The recommended Stormceptor Model achieves the water quality objectives based on the selected inputs, historical rainfall records and selected particle size distribution.

Stormceptor Sizing Summary	
Stormceptor Model	% TSS Removal Provided
STC 450i	96
STC 900	98
STC 1200	98
STC 1800	98
STC 2400	99
STC 3600	99
STC 4800	99
STC 6000	99
STC 7200	100
STC 11000	100
STC 13000	100
STC 16000	100

Sizing Details			
<b>Drainage Area</b>		<b>Water Quality Objective</b>	
Total Area (acres)	0.09	TSS Removal (%)	80.0
Imperviousness %	100.0	Runoff Volume Capture (%)	
<b>Rainfall</b>		Oil Spill Capture Volume (Gal)	
Station Name	BOSTON WSFO AP	Peak Conveyed Flow Rate (CFS)	
State/Province	Massachusetts	Water Quality Flow Rate (CFS)	
Station ID #	0770	<b>Up Stream Storage</b>	
Years of Records	58	Storage (ac-ft)	Discharge (cfs)
Latitude	42°21'38"N	0.000	0.000
Longitude	71°0'38"W	<b>Up Stream Flow Diversion</b>	
		Max. Flow to Stormceptor (cfs)	

Particle Size Distribution (PSD) The selected PSD defines TSS removal		
OK-110		
Particle Diameter (microns)	Distribution %	Specific Gravity
1.0	0.0	2.65
53.0	3.0	2.65
75.0	15.0	2.65
88.0	25.0	2.65
106.0	41.0	2.65
125.0	15.0	2.65
150.0	1.0	2.65
212.0	0.0	2.65

Notes
<ul style="list-style-type: none"> <li>Stormceptor performance estimates are based on simulations using PCSWMM for Stormceptor, which uses the EPA Rainfall and Runoff modules.</li> <li>Design estimates listed are only representative of specific project requirements based on total suspended solids (TSS) removal defined by the selected PSD, and based on stable site conditions only, after construction is completed.</li> <li>For submerged applications or sites specific to spill control, please contact your local Stormceptor representative for further design assistance.</li> </ul>

For Stormceptor Specifications and Drawings Please Visit:  
<https://www.conteches.com/technical-guides/search?filter=1WBC005EYX>

## Brief Stormceptor Sizing Report - WQI #3

Project Information & Location			
<b>Project Name</b>	Pond Street	<b>Project Number</b>	694516
<b>City</b>	Ashland	<b>State/ Province</b>	Massachusetts
<b>Country</b>	United States of America	<b>Date</b>	11/15/2021
Designer Information		EOR Information (optional)	
<b>Name</b>	Josh Stackhouse	<b>Name</b>	
<b>Company</b>	Contech Engineered Solutions	<b>Company</b>	
<b>Phone #</b>	207-219-9110	<b>Phone #</b>	
<b>Email</b>	joshua.stackhouse@conteches.com	<b>Email</b>	

### Stormwater Treatment Recommendation

The recommended Stormceptor Model(s) which achieve or exceed the user defined water quality objective for each site within the project are listed in the below Sizing Summary table.

<b>Site Name</b>	WQI #3
<b>Target TSS Removal (%)</b>	80
<b>TSS Removal (%) Provided</b>	96
<b>Recommended Stormceptor Model</b>	STC 450i

The recommended Stormceptor Model achieves the water quality objectives based on the selected inputs, historical rainfall records and selected particle size distribution.

Stormceptor Sizing Summary	
Stormceptor Model	% TSS Removal Provided
STC 450i	96
STC 900	98
STC 1200	98
STC 1800	98
STC 2400	99
STC 3600	99
STC 4800	99
STC 6000	99
STC 7200	99
STC 11000	100
STC 13000	100
STC 16000	100

Sizing Details			
<b>Drainage Area</b>		<b>Water Quality Objective</b>	
Total Area (acres)	0.11	TSS Removal (%)	80.0
Imperviousness %	100.0	Runoff Volume Capture (%)	
<b>Rainfall</b>		Oil Spill Capture Volume (Gal)	
Station Name	BOSTON WSFO AP	Peak Conveyed Flow Rate (CFS)	
State/Province	Massachusetts	Water Quality Flow Rate (CFS)	
Station ID #	0770	<b>Up Stream Storage</b>	
Years of Records	58	Storage (ac-ft)	Discharge (cfs)
Latitude	42°21'38"N	0.000	0.000
Longitude	71°0'38"W	<b>Up Stream Flow Diversion</b>	
		Max. Flow to Stormceptor (cfs)	

Particle Size Distribution (PSD) The selected PSD defines TSS removal		
OK-110		
Particle Diameter (microns)	Distribution %	Specific Gravity
1.0	0.0	2.65
53.0	3.0	2.65
75.0	15.0	2.65
88.0	25.0	2.65
106.0	41.0	2.65
125.0	15.0	2.65
150.0	1.0	2.65
212.0	0.0	2.65

Notes
<ul style="list-style-type: none"> <li>Stormceptor performance estimates are based on simulations using PCSWMM for Stormceptor, which uses the EPA Rainfall and Runoff modules.</li> <li>Design estimates listed are only representative of specific project requirements based on total suspended solids (TSS) removal defined by the selected PSD, and based on stable site conditions only, after construction is completed.</li> <li>For submerged applications or sites specific to spill control, please contact your local Stormceptor representative for further design assistance.</li> </ul>

For Stormceptor Specifications and Drawings Please Visit:  
<https://www.conteches.com/technical-guides/search?filter=1WBC005EYX>

## Brief Stormceptor Sizing Report - WQI #4

Project Information & Location			
<b>Project Name</b>	Pond Street	<b>Project Number</b>	694516
<b>City</b>	Ashland	<b>State/ Province</b>	Massachusetts
<b>Country</b>	United States of America	<b>Date</b>	11/15/2021
Designer Information		EOR Information (optional)	
<b>Name</b>	Josh Stackhouse	<b>Name</b>	
<b>Company</b>	Contech Engineered Solutions	<b>Company</b>	
<b>Phone #</b>	207-219-9110	<b>Phone #</b>	
<b>Email</b>	joshua.stackhouse@conteches.com	<b>Email</b>	

### Stormwater Treatment Recommendation

The recommended Stormceptor Model(s) which achieve or exceed the user defined water quality objective for each site within the project are listed in the below Sizing Summary table.

<b>Site Name</b>	WQI #4
<b>Target TSS Removal (%)</b>	80
<b>TSS Removal (%) Provided</b>	95
<b>Recommended Stormceptor Model</b>	STC 450i

The recommended Stormceptor Model achieves the water quality objectives based on the selected inputs, historical rainfall records and selected particle size distribution.

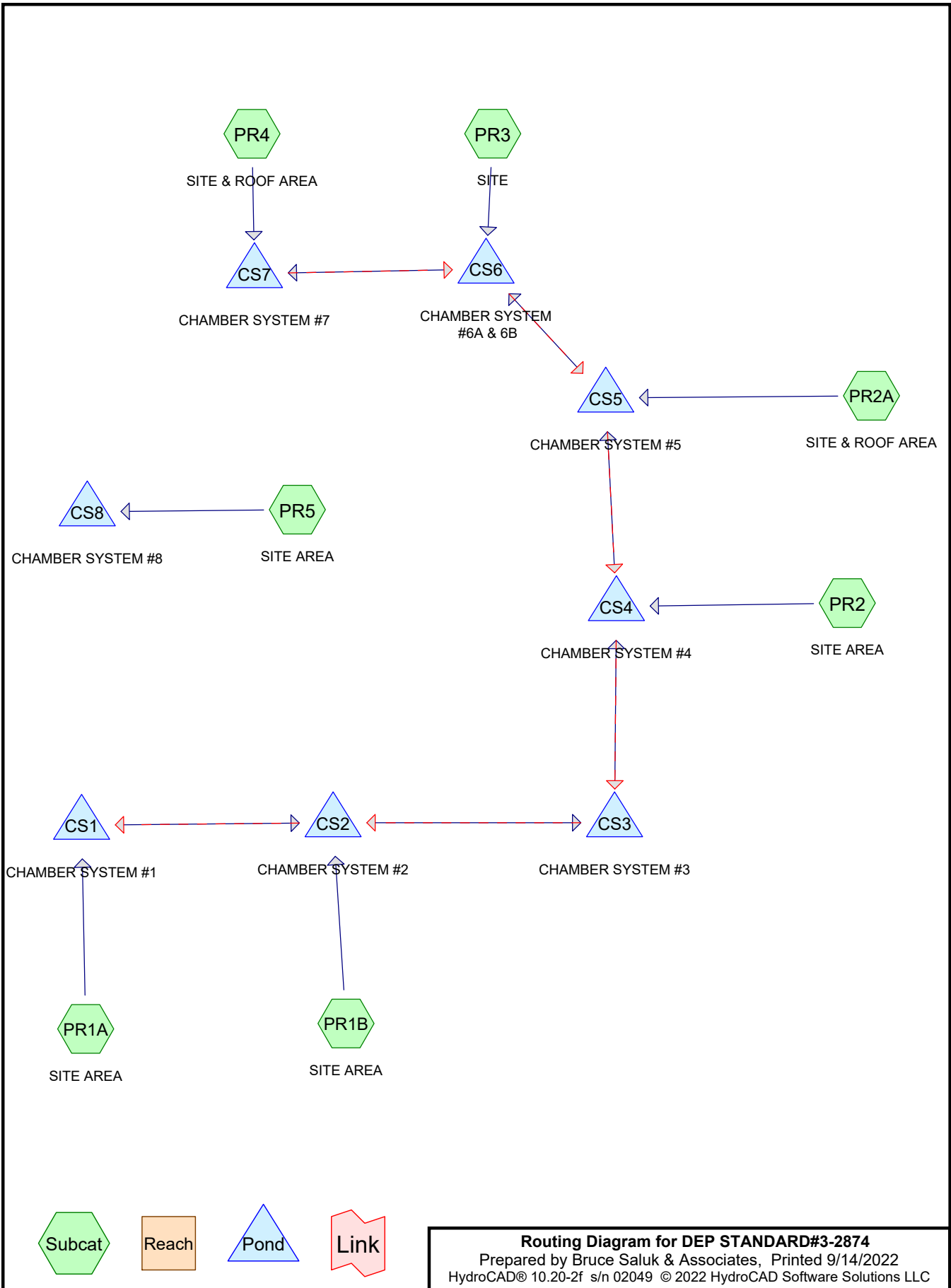
Stormceptor Sizing Summary	
Stormceptor Model	% TSS Removal Provided
STC 450i	95
STC 900	98
STC 1200	98
STC 1800	98
STC 2400	99
STC 3600	99
STC 4800	99
STC 6000	99
STC 7200	99
STC 11000	100
STC 13000	100
STC 16000	100

Sizing Details			
<b>Drainage Area</b>		<b>Water Quality Objective</b>	
Total Area (acres)	0.12	TSS Removal (%)	80.0
Imperviousness %	100.0	Runoff Volume Capture (%)	
<b>Rainfall</b>		Oil Spill Capture Volume (Gal)	
Station Name	BOSTON WSFO AP	Peak Conveyed Flow Rate (CFS)	
State/Province	Massachusetts	Water Quality Flow Rate (CFS)	
Station ID #	0770	<b>Up Stream Storage</b>	
Years of Records	58	Storage (ac-ft)	Discharge (cfs)
Latitude	42°21'38"N	0.000	0.000
Longitude	71°0'38"W	<b>Up Stream Flow Diversion</b>	
		Max. Flow to Stormceptor (cfs)	

Particle Size Distribution (PSD) The selected PSD defines TSS removal		
OK-110		
Particle Diameter (microns)	Distribution %	Specific Gravity
1.0	0.0	2.65
53.0	3.0	2.65
75.0	15.0	2.65
88.0	25.0	2.65
106.0	41.0	2.65
125.0	15.0	2.65
150.0	1.0	2.65
212.0	0.0	2.65

Notes
<ul style="list-style-type: none"> <li>Stormceptor performance estimates are based on simulations using PCSWMM for Stormceptor, which uses the EPA Rainfall and Runoff modules.</li> <li>Design estimates listed are only representative of specific project requirements based on total suspended solids (TSS) removal defined by the selected PSD, and based on stable site conditions only, after construction is completed.</li> <li>For submerged applications or sites specific to spill control, please contact your local Stormceptor representative for further design assistance.</li> </ul>

For Stormceptor Specifications and Drawings Please Visit:  
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**Routing Diagram for DEP STANDARD#3-2874**  
 Prepared by Bruce Saluk & Associates, Printed 9/14/2022  
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# DEP STANDARD#3-2874

Prepared by Bruce Saluk & Associates

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501 Pond Street, Ashland, MA

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**Rainfall Events Listing (selected events)**

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	STD #3	Type III 24-hr		Default	24.00	1	1.35	2

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Type III 24-hr STD #3 Rainfall=1.35"

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**Summary for Subcatchment PR1A: SITE AREA**

Runoff = 0.03 cfs @ 12.10 hrs, Volume= 54 cf, Depth> 0.10"  
Routed to Pond CS1 : CHAMBER SYSTEM #1

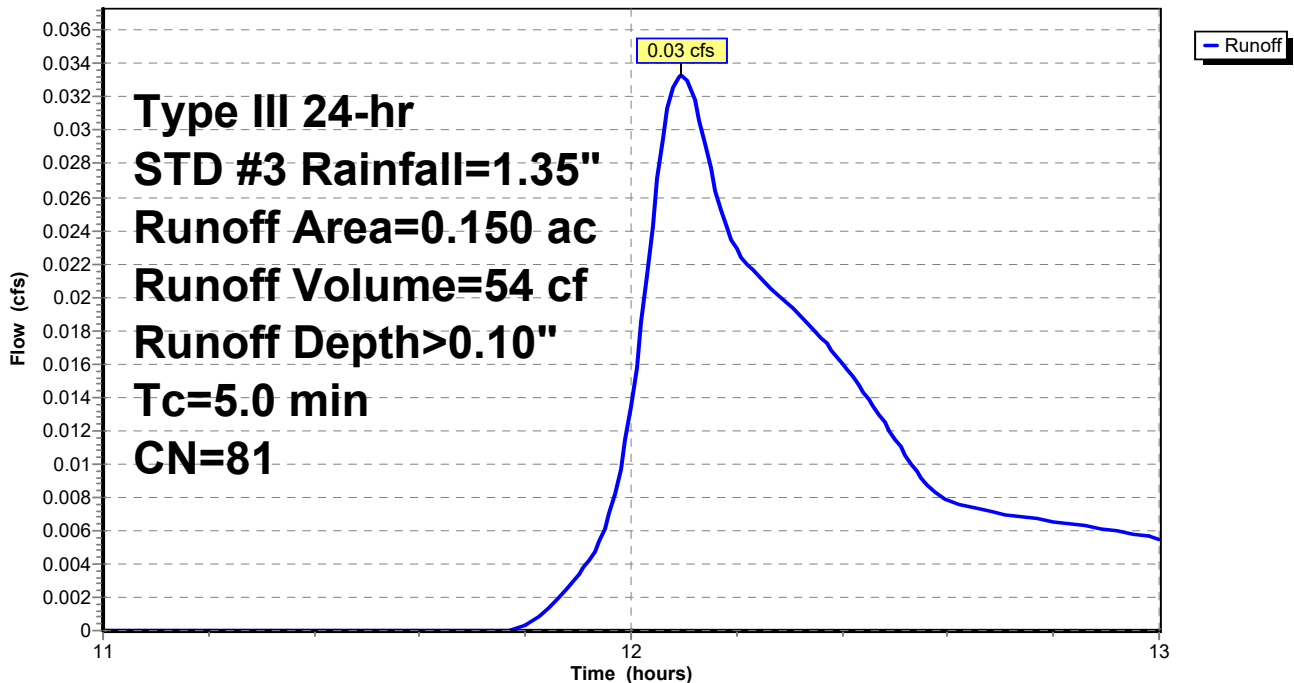
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 11.00-13.00 hrs, dt= 0.01 hrs  
Type III 24-hr STD #3 Rainfall=1.35"

Area (ac)	CN	Description
* 0.080	98	Impervious Area
0.070	61	>75% Grass cover, Good, HSG B
0.150	81	Weighted Average
0.070		46.67% Pervious Area
0.080		53.33% Impervious Area

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

**Subcatchment PR1A: SITE AREA**

Hydrograph



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**Summary for Subcatchment PR1B: SITE AREA**

Runoff = 0.19 cfs @ 12.08 hrs, Volume= 307 cf, Depth> 0.18"  
Routed to Pond CS2 : CHAMBER SYSTEM #2

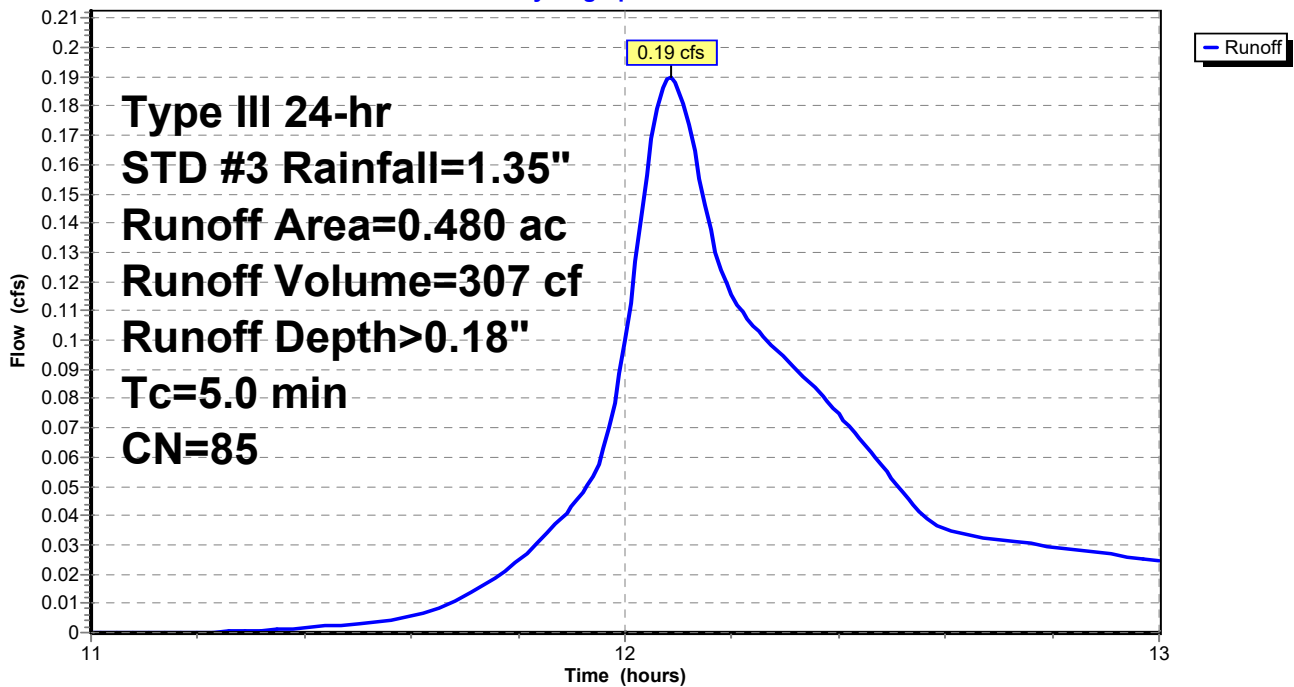
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 11.00-13.00 hrs, dt= 0.01 hrs  
Type III 24-hr STD #3 Rainfall=1.35"

Area (ac)	CN	Description
* 0.310	98	Impervious Area
0.170	61	>75% Grass cover, Good, HSG B
0.480	85	Weighted Average
0.170		35.42% Pervious Area
0.310		64.58% Impervious Area

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

**Subcatchment PR1B: SITE AREA**

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**Summary for Subcatchment PR2: SITE AREA**

Runoff = 0.22 cfs @ 12.08 hrs, Volume= 365 cf, Depth> 0.31"  
Routed to Pond CS4 : CHAMBER SYSTEM #4

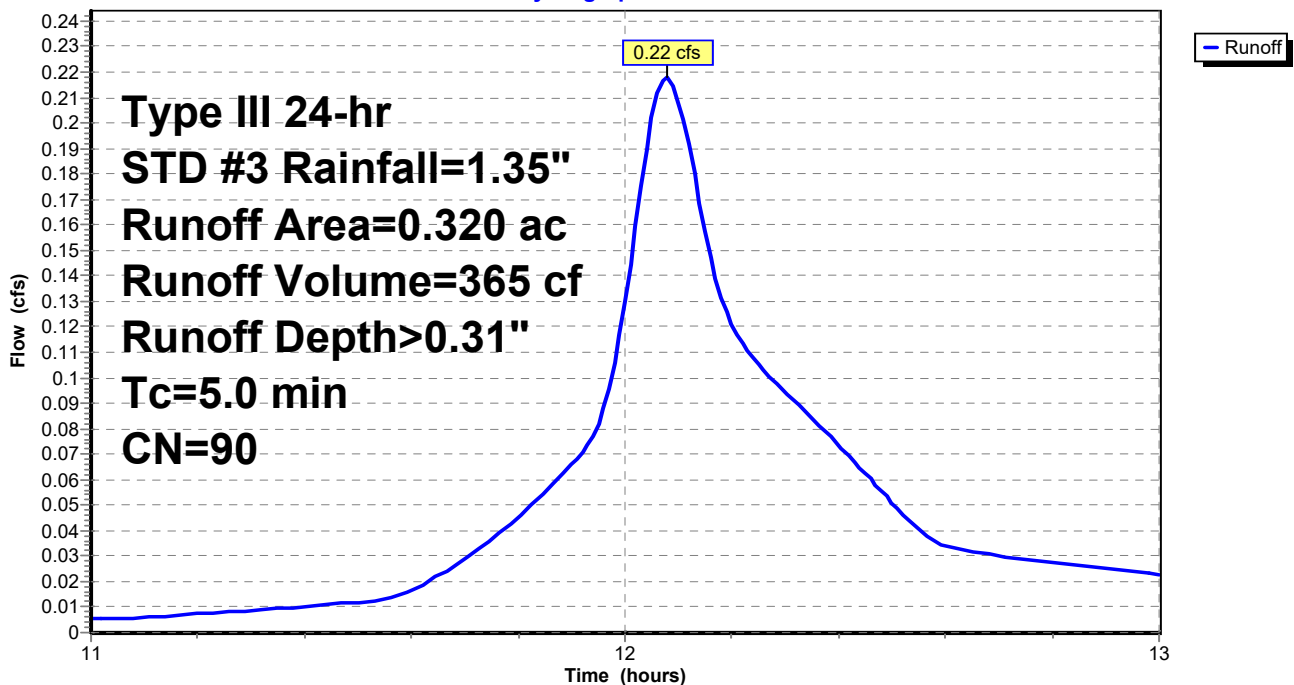
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 11.00-13.00 hrs, dt= 0.01 hrs  
Type III 24-hr STD #3 Rainfall=1.35"

Area (ac)	CN	Description
* 0.250	98	Impervious Area
0.070	61	>75% Grass cover, Good, HSG B
0.320	90	Weighted Average
0.070		21.88% Pervious Area
0.250		78.13% Impervious Area

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

**Subcatchment PR2: SITE AREA**

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**Summary for Subcatchment PR2A: SITE & ROOF AREA**

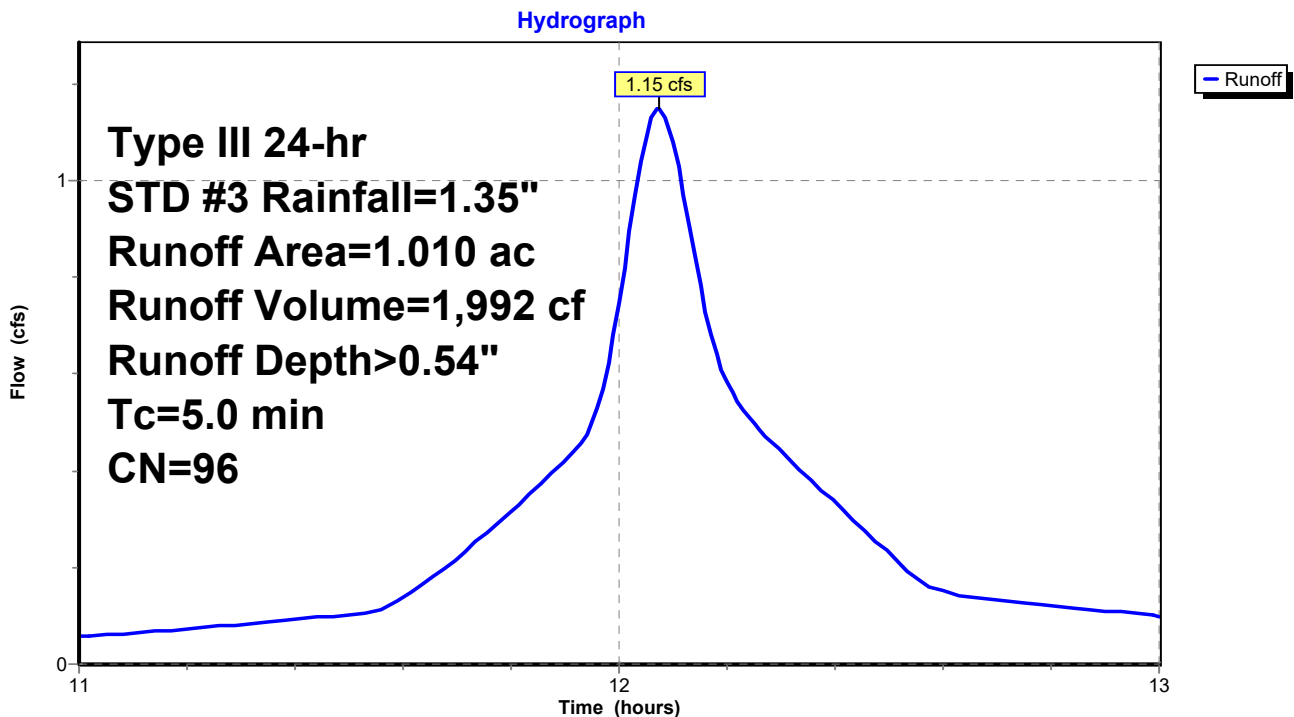
Runoff = 1.15 cfs @ 12.07 hrs, Volume= 1,992 cf, Depth> 0.54"  
Routed to Pond CS5 : CHAMBER SYSTEM #5

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 11.00-13.00 hrs, dt= 0.01 hrs  
Type III 24-hr STD #3 Rainfall=1.35"

Area (ac)	CN	Description
* 0.250	98	Impervious Area
0.050	61	>75% Grass cover, Good, HSG B
* 0.710	98	Roof
1.010	96	Weighted Average
0.050		4.95% Pervious Area
0.960		95.05% Impervious Area

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

**Subcatchment PR2A: SITE & ROOF AREA**



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**Summary for Subcatchment PR3: SITE**

Runoff = 0.18 cfs @ 12.09 hrs, Volume= 296 cf, Depth> 0.15"  
Routed to Pond CS6 : CHAMBER SYSTEM #6A & 6B

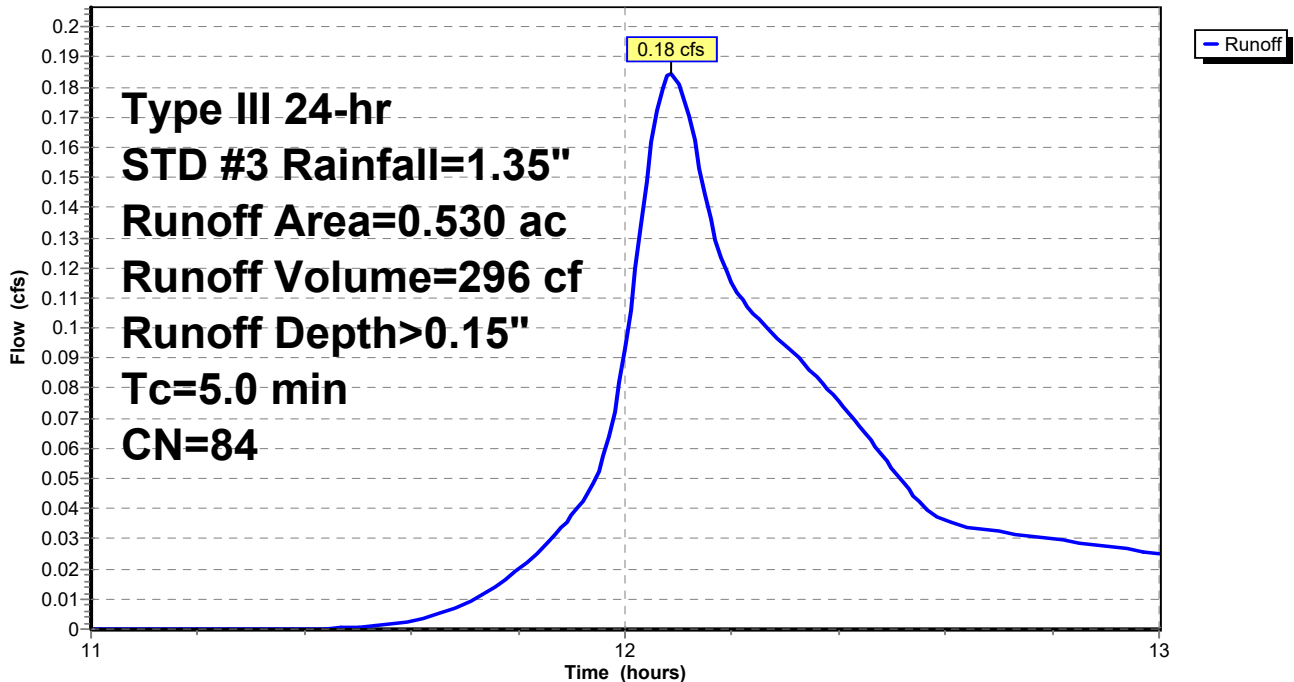
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 11.00-13.00 hrs, dt= 0.01 hrs  
Type III 24-hr STD #3 Rainfall=1.35"

Area (ac)	CN	Description
* 0.130	98	Impervious Area
0.200	61	>75% Grass cover, Good, HSG B
* 0.200	98	Roof Area
0.530	84	Weighted Average
0.200		37.74% Pervious Area
0.330		62.26% Impervious Area

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

**Subcatchment PR3: SITE**

Hydrograph



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**Summary for Subcatchment PR4: SITE & ROOF AREA**

Runoff = 0.23 cfs @ 12.09 hrs, Volume= 363 cf, Depth> 0.15"  
Routed to Pond CS7 : CHAMBER SYSTEM #7

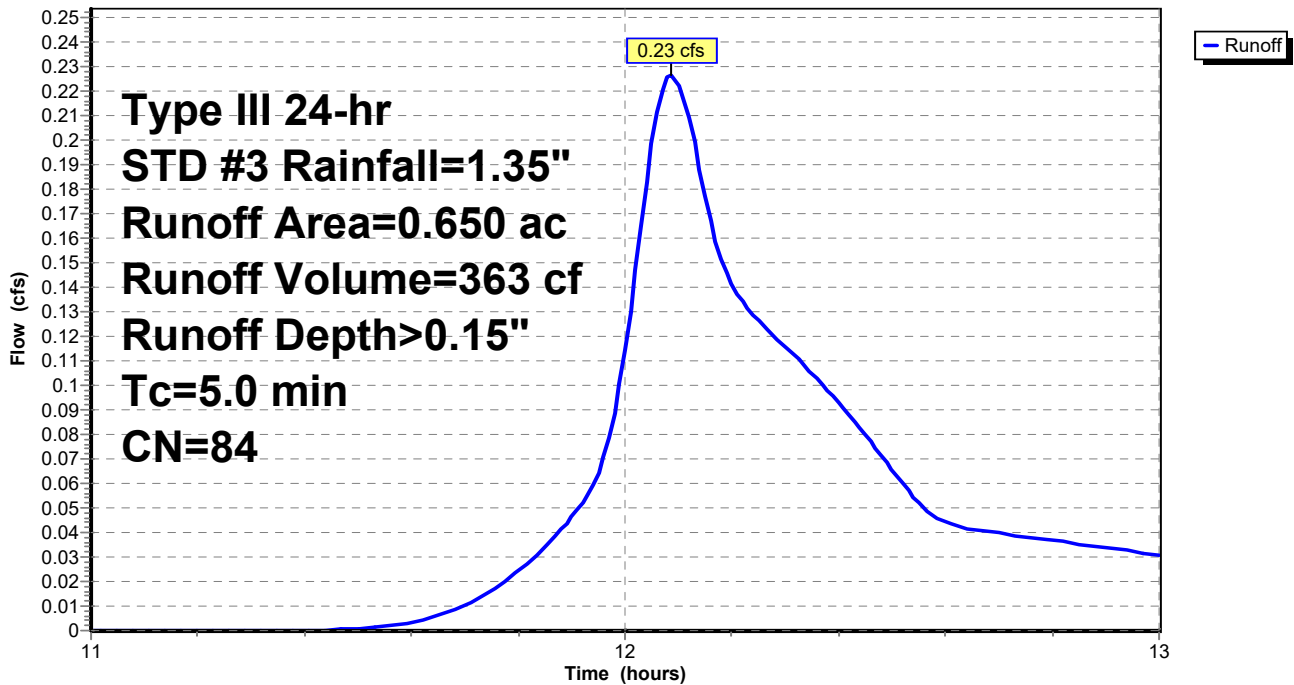
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 11.00-13.00 hrs, dt= 0.01 hrs  
Type III 24-hr STD #3 Rainfall=1.35"

Area (ac)	CN	Description
* 0.410	98	Impervious Area
0.240	61	>75% Grass cover, Good, HSG B
0.650	84	Weighted Average
0.240		36.92% Pervious Area
0.410		63.08% Impervious Area

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

**Subcatchment PR4: SITE & ROOF AREA**

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**Summary for Subcatchment PR5: SITE AREA**

Runoff = 0.21 cfs @ 12.08 hrs, Volume= 353 cf, Depth> 0.35"  
Routed to Pond CS8 : CHAMBER SYSTEM #8

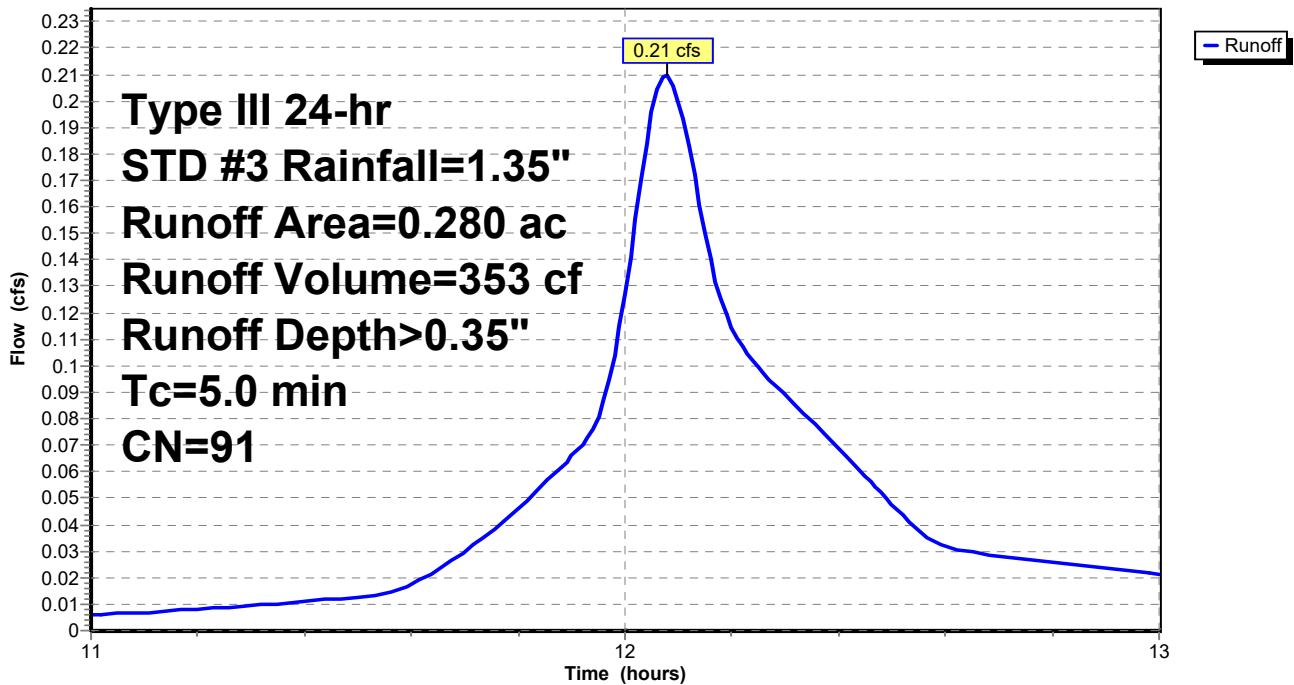
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 11.00-13.00 hrs, dt= 0.01 hrs  
Type III 24-hr STD #3 Rainfall=1.35"

Area (ac)	CN	Description
* 0.230	98	Impervious Area
0.050	61	>75% Grass cover, Good, HSG B
0.280	91	Weighted Average
0.050		17.86% Pervious Area
0.230		82.14% Impervious Area

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

**Subcatchment PR5: SITE AREA**

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**Summary for Pond CS1: CHAMBER SYSTEM #1**

Inflow = 0.03 cfs @ 12.10 hrs, Volume= 54 cf  
 Outflow = 0.03 cfs @ 12.10 hrs, Volume= 54 cf, Atten= 0%, Lag= 0.3 min  
 Discarded = 0.03 cfs @ 12.10 hrs, Volume= 54 cf  
 Primary = 0.00 cfs @ 11.00 hrs, Volume= 0 cf  
 Routed to Pond CS2 : CHAMBER SYSTEM #2

Routing by Sim-Route method w/Net Flows, Time Span= 11.00-13.00 hrs, dt= 0.01 hrs  
 Peak Elev= 254.60' @ 12.10 hrs Surf.Area= 816 sf Storage= 1 cf

Plug-Flow detention time= 0.3 min calculated for 54 cf (100% of inflow)  
 Center-of-Mass det. time= 0.4 min ( 739.7 - 739.3 )

Volume	Invert	Avail.Storage	Storage Description
#1	254.60'	648 cf	<b>12.00'W x 68.00'L x 2.80'H Prismatic</b> 2,285 cf Overall - 665 cf Embedded = 1,619 cf x 40.0% Voids
#2	255.10'	663 cf	<b>Cultec R-180 x 30 Inside #1</b> Effective Size= 33.6"W x 20.0"H => 3.44 sf x 6.33'L = 21.8 cf Overall Size= 36.0"W x 20.5"H x 7.33'L with 1.00' Overlap Row Length Adjustment= +1.00' x 3.44 sf x 3 rows
#3	255.10'	2 cf	<b>Cultec HVLV FC-24 x 4 Inside #1</b> Effective Size= 15.3"W x 12.0"H => 0.91 sf x 0.50'L = 0.5 cf Overall Size= 16.0"W x 12.0"H x 2.02'L with 1.52' Overlap 4 Chambers in 3 Rows
#4	255.10'	57 cf	<b>12.0" Round Pipe Storage x 3 -Impervious</b> L= 24.0' S= 0.0200 '/'
#5	255.10'	14 cf	<b>10.0" Round Pipe Storage-Impervious</b> L= 25.0' S= 0.0200 '/'
#6	255.50'	63 cf	<b>4.00'D x 5.00'H Vertical Cone/Cylinder-Impervious</b>
		1,446 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	254.60'	<b>8.270 in/hr Exfiltration over Horizontal area</b> Phase-In= 0.01'
#2	Primary	255.10'	<b>12.0" Vert. Orifice/Grate X 2.00</b> C= 0.600 Limited to weir flow at low heads
#3	Primary	258.60'	<b>2.0" x 2.0" Horiz. Orifice/Grate X 6.00 columns</b> X 6 rows C= 0.600 in 24.0" x 24.0" Grate (25% open area) Limited to weir flow at low heads

**Discarded OutFlow** Max=0.03 cfs @ 12.10 hrs HW=254.60' (Free Discharge)

↑1=Exfiltration (Exfiltration Controls 0.03 cfs)

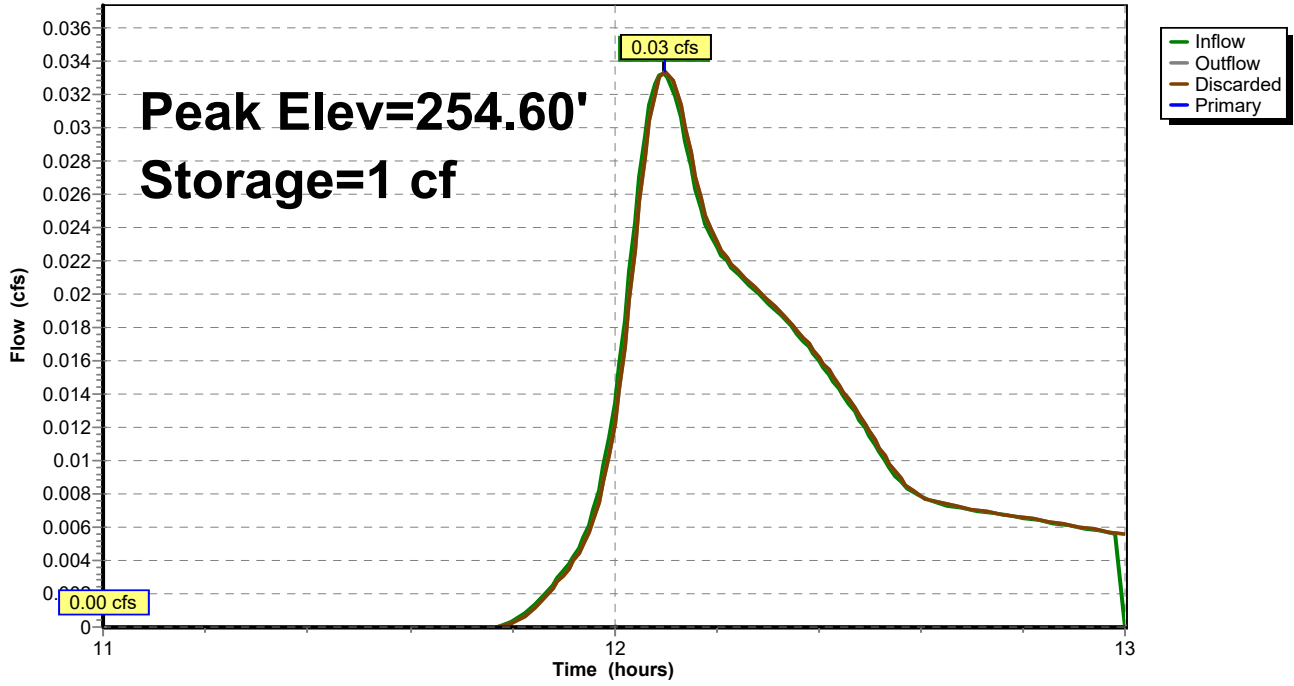
**Primary OutFlow** Max=0.00 cfs @ 11.00 hrs HW=254.60' TW=254.60' (Dynamic Tailwater)

↑2=Orifice/Grate ( Controls 0.00 cfs)

↑3=Orifice/Grate ( Controls 0.00 cfs)

Pond CS1: CHAMBER SYSTEM #1

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**Summary for Pond CS2: CHAMBER SYSTEM #2**

Inflow = 0.19 cfs @ 12.08 hrs, Volume= 306 cf  
 Outflow = 0.19 cfs @ 12.09 hrs, Volume= 306 cf, Atten= 0%, Lag= 0.3 min  
 Discarded = 0.19 cfs @ 12.09 hrs, Volume= 306 cf  
 Primary = 0.00 cfs @ 11.00 hrs, Volume= 0 cf  
 Routed to Pond CS3 : CHAMBER SYSTEM #3  
 Secondary = 0.00 cfs @ 11.00 hrs, Volume= 0 cf  
 Routed to Pond CS1 : CHAMBER SYSTEM #1

Routing by Sim-Route method w/Net Flows, Time Span= 11.00-13.00 hrs, dt= 0.01 hrs  
 Peak Elev= 254.61' @ 12.09 hrs Surf.Area= 1,584 sf Storage= 4 cf

Plug-Flow detention time= 0.3 min calculated for 304 cf (100% of inflow)  
 Center-of-Mass det. time= 0.4 min ( 735.2 - 734.8 )

Volume	Invert	Avail.Storage	Storage Description
#1	254.60'	1,371 cf	<b>16.00'W x 99.00'L x 3.00'H Prismaoid</b> 4,752 cf Overall - 1,324 cf Embedded = 3,428 cf x 40.0% Voids
#2	255.10'	1,320 cf	<b>Cultec R-180 x 60 Inside #1</b> Effective Size= 33.6"W x 20.0"H => 3.44 sf x 6.33'L = 21.8 cf Overall Size= 36.0"W x 20.5"H x 7.33'L with 1.00' Overlap Row Length Adjustment= +1.00' x 3.44 sf x 4 rows
#3	255.10'	4 cf	<b>Cultec HVLV FC-24 x 9 Inside #1</b> Effective Size= 15.3"W x 12.0"H => 0.91 sf x 0.50'L = 0.5 cf Overall Size= 16.0"W x 12.0"H x 2.02'L with 1.52' Overlap 9 Chambers in 4 Rows
#4	255.10'	26 cf	<b>12.0" Round Pipe Storage-Impervious</b> L= 33.0'
#5	255.82'	113 cf	<b>4.00'D x 3.00'H Vertical Cone/Cylinder x 3 -Impervious</b>
#6	255.10'	4 cf	<b>10.0" Round Pipe Storage-Impervious</b> L= 7.0' S= 0.0143 '/'
#7	255.45'	23 cf	<b>10.0" Round Pipe Storage-Impervious</b> L= 42.0' S= 0.0100 '/'
#8	255.45'	38 cf	<b>10.0" Round Pipe Storage</b> L= 70.0' S= 0.0100 '/'
		2,899 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	255.10'	<b>12.0" Vert. Orifice/Grate X 3.00</b> C= 0.600 Limited to weir flow at low heads
#2	Discarded	254.60'	<b>8.270 in/hr Exfiltration over Horizontal area</b> Phase-In= 0.01'
#3	Secondary	255.10'	<b>12.0" Vert. Orifice/Grate X 3.00</b> C= 0.600 Limited to weir flow at low heads

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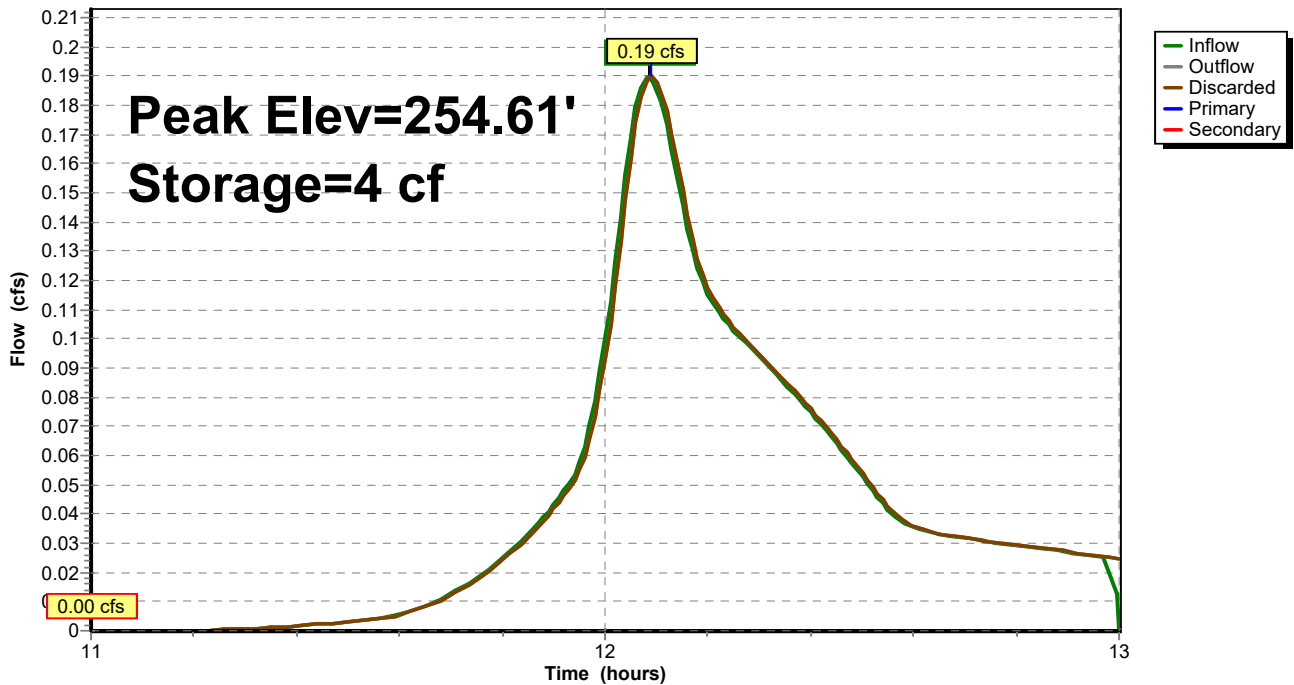
**Discarded OutFlow** Max=0.19 cfs @ 12.09 hrs HW=254.61' (Free Discharge)  
↳ **2=Exfiltration** (Exfiltration Controls 0.19 cfs)

**Primary OutFlow** Max=0.00 cfs @ 11.00 hrs HW=254.60' TW=254.60' (Dynamic Tailwater)  
↳ **1=Orifice/Grate** ( Controls 0.00 cfs)

**Secondary OutFlow** Max=0.00 cfs @ 11.00 hrs HW=254.60' TW=254.60' (Dynamic Tailwater)  
↳ **3=Orifice/Grate** ( Controls 0.00 cfs)

**Pond CS2: CHAMBER SYSTEM #2**

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**Summary for Pond CS3: CHAMBER SYSTEM #3**

Inflow = 0.00 cfs @ 11.00 hrs, Volume= 0 cf  
 Outflow = 0.00 cfs @ 11.00 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min  
 Discarded = 0.00 cfs @ 11.00 hrs, Volume= 0 cf  
 Primary = 0.00 cfs @ 11.00 hrs, Volume= 0 cf  
     Routed to Pond CS4 : CHAMBER SYSTEM #4  
 Secondary = 0.00 cfs @ 11.00 hrs, Volume= 0 cf  
     Routed to Pond CS2 : CHAMBER SYSTEM #2

Routing by Sim-Route method w/Net Flows, Time Span= 11.00-13.00 hrs, dt= 0.01 hrs  
 Peak Elev= 254.60' @ 11.00 hrs Surf.Area= 1,188 sf Storage= 0 cf

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

Volume	Invert	Avail.Storage	Storage Description
#1	254.60'	1,028 cf	<b>12.00'W x 99.00'L x 3.00'H Prismatic</b> 3,564 cf Overall - 993 cf Embedded = 2,571 cf x 40.0% Voids
#2	255.10'	990 cf	<b>Cultec R-180</b> x 45 Inside #1 Effective Size= 33.6"W x 20.0"H => 3.44 sf x 6.33'L = 21.8 cf Overall Size= 36.0"W x 20.5"H x 7.33'L with 1.00' Overlap Row Length Adjustment= +1.00' x 3.44 sf x 3 rows
#3	255.10'	3 cf	<b>Cultec HVLV FC-24</b> x 6 Inside #1 Effective Size= 15.3"W x 12.0"H => 0.91 sf x 0.50'L = 0.5 cf Overall Size= 16.0"W x 12.0"H x 2.02'L with 1.52' Overlap 6 Chambers in 3 Rows
#4	255.10'	28 cf	<b>12.0" Round Pipe Storage</b> x 3 -Impervious L= 12.0'
		2,050 cf	Total Available Storage

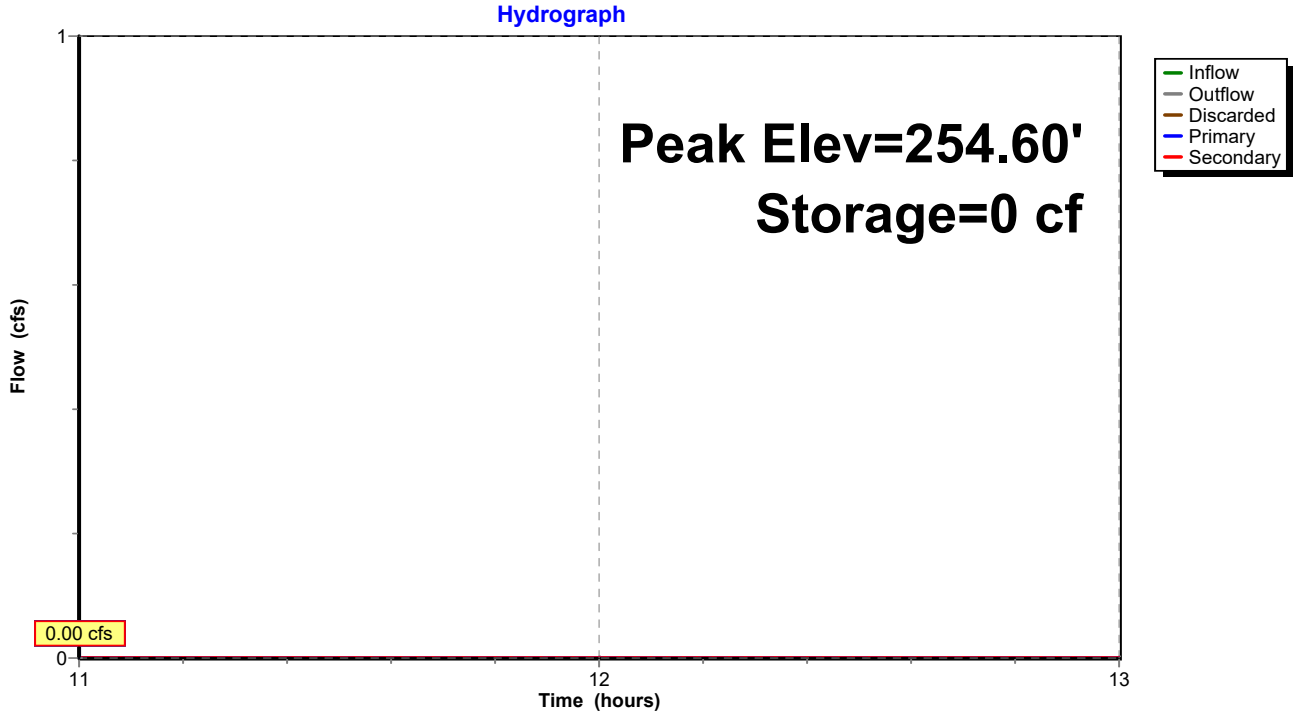
Device	Routing	Invert	Outlet Devices
#1	Primary	255.10'	<b>12.0" Vert. Orifice/Grate X 3.00</b> C= 0.600 Limited to weir flow at low heads
#2	Discarded	254.60'	<b>8.270 in/hr Exfiltration X 0.00 over Horizontal area</b> Phase-In= 0.01'
#3	Secondary	255.10'	<b>12.0" Vert. Orifice/Grate X 3.00</b> C= 0.600 Limited to weir flow at low heads

**Discarded OutFlow** Max=0.00 cfs @ 11.00 hrs HW=254.60' (Free Discharge)  
 ↑**2=Exfiltration** ( Controls 0.00 cfs)

**Primary OutFlow** Max=0.00 cfs @ 11.00 hrs HW=254.60' TW=254.60' (Dynamic Tailwater)  
 ↑**1=Orifice/Grate** ( Controls 0.00 cfs)

**Secondary OutFlow** Max=0.00 cfs @ 11.00 hrs HW=254.60' TW=254.60' (Dynamic Tailwater)  
 ↑**3=Orifice/Grate** ( Controls 0.00 cfs)

**Pond CS3: CHAMBER SYSTEM #3**



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**Summary for Pond CS4: CHAMBER SYSTEM #4**

Inflow = 0.22 cfs @ 12.08 hrs, Volume= 364 cf  
 Outflow = 0.22 cfs @ 12.08 hrs, Volume= 364 cf, Atten= 0%, Lag= 0.3 min  
 Discarded = 0.22 cfs @ 12.08 hrs, Volume= 364 cf  
 Primary = 0.00 cfs @ 11.00 hrs, Volume= 0 cf  
     Routed to Pond CS5 : CHAMBER SYSTEM #5  
 Secondary = 0.00 cfs @ 11.00 hrs, Volume= 0 cf  
     Routed to Pond CS3 : CHAMBER SYSTEM #3

Routing by Sim-Route method w/Net Flows, Time Span= 11.00-13.00 hrs, dt= 0.01 hrs  
 Peak Elev= 254.61' @ 12.08 hrs Surf.Area= 2,125 sf Storage= 5 cf

Plug-Flow detention time= 0.3 min calculated for 363 cf (100% of inflow)  
 Center-of-Mass det. time= 0.4 min ( 730.0 - 729.6 )

Volume	Invert	Avail.Storage	Storage Description
#1	254.60'	1,933 cf	<b>25.00'W x 85.00'L x 3.00'H Prismatic</b> 6,375 cf Overall - 1,543 cf Embedded = 4,832 cf x 40.0% Voids
#2	255.10'	1,534 cf	<b>Cultec R-150XLHD x 56 Inside #1</b> Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap Row Length Adjustment= +0.75' x 2.65 sf x 7 rows
#3	255.10'	8 cf	<b>Cultec R-150XLHD-FC-24 x 18 Inside #1</b> Effective Size= 15.3"W x 12.0"H => 0.91 sf x 0.50'L = 0.5 cf Overall Size= 16.0"W x 12.0"H x 2.02'L with 1.52' Overlap 18 Chambers in 7 Rows
#4	255.10'	122 cf	<b>12.0" Round Pipe Storage-Impervious</b> L= 155.0'
#5	255.20'	151 cf	<b>4.00'D x 3.00'H Vertical Cone/Cylinder x 4 -Impervious</b>
#6	255.85'	75 cf	<b>4.00'D x 3.00'H Vertical Cone/Cylinder x 2 -Impervious</b>
#7	255.10'	3 cf	<b>10.0" Round Pipe Storage</b> L= 5.0' S= 0.0200 '/'
#8	255.45'	44 cf	<b>10.0" Round Pipe Storage x 2</b> L= 40.0' S= 0.0100 '/'
		3,870 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	255.10'	<b>12.0" Vert. Orifice/Grate X 4.00</b> C= 0.600 Limited to weir flow at low heads
#2	Discarded	254.60'	<b>8.270 in/hr Exfiltration over Horizontal area</b> Phase-In= 0.01'
#3	Secondary	255.10'	<b>12.0" Vert. Orifice/Grate X 3.00</b> C= 0.600 Limited to weir flow at low heads

**DEP STANDARD#3-2874**

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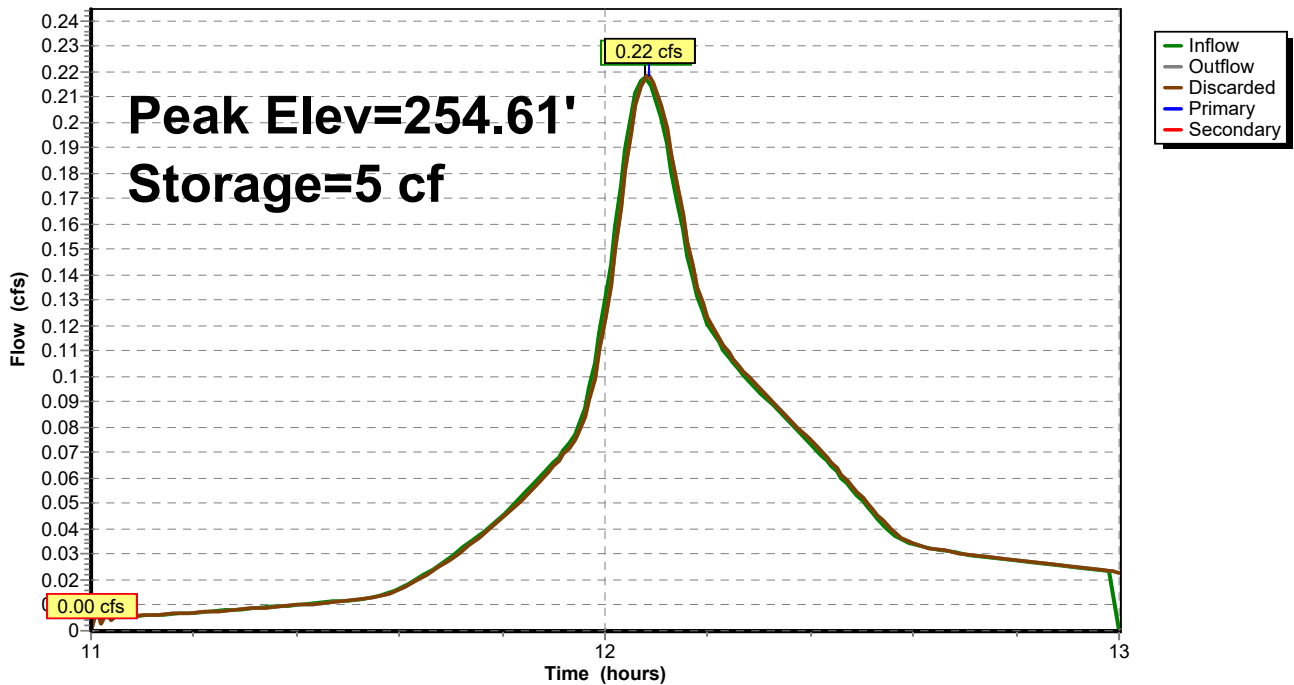
**Discarded OutFlow** Max=0.22 cfs @ 12.08 hrs HW=254.61' (Free Discharge)  
↳ **2=Exfiltration** (Exfiltration Controls 0.22 cfs)

**Primary OutFlow** Max=0.00 cfs @ 11.00 hrs HW=254.60' TW=254.60' (Dynamic Tailwater)  
↳ **1=Orifice/Grate** ( Controls 0.00 cfs)

**Secondary OutFlow** Max=0.00 cfs @ 11.00 hrs HW=254.60' TW=254.60' (Dynamic Tailwater)  
↳ **3=Orifice/Grate** ( Controls 0.00 cfs)

**Pond CS4: CHAMBER SYSTEM #4**

Hydrograph



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**Summary for Pond CS5: CHAMBER SYSTEM #5**

Inflow = 1.15 cfs @ 12.07 hrs, Volume= 1,988 cf  
 Outflow = 1.05 cfs @ 12.05 hrs, Volume= 1,990 cf, Atten= 8%, Lag= 0.0 min  
 Discarded = 1.05 cfs @ 12.05 hrs, Volume= 1,990 cf  
 Primary = 0.00 cfs @ 11.00 hrs, Volume= 0 cf  
 Routed to Pond CS6 : CHAMBER SYSTEM #6A & 6B  
 Secondary = 0.00 cfs @ 11.00 hrs, Volume= 0 cf  
 Routed to Pond CS4 : CHAMBER SYSTEM #4

Routing by Sim-Route method w/Net Flows, Time Span= 11.00-13.00 hrs, dt= 0.01 hrs  
 Peak Elev= 254.62' @ 12.11 hrs Surf.Area= 5,508 sf Storage= 37 cf

Plug-Flow detention time= 0.4 min calculated for 1,980 cf (100% of inflow)  
 Center-of-Mass det. time= 0.4 min ( 725.8 - 725.3 )

Volume	Invert	Avail.Storage	Storage Description
#1	254.60'	4,896 cf	<b>40.50'W x 136.00'L x 3.00'H Prismaoid</b> 16,524 cf Overall - 4,285 cf Embedded = 12,239 cf x 40.0% Voids
#2	255.10'	4,260 cf	<b>Cultec R-150XLHD x 156 Inside #1</b> Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap Row Length Adjustment= +0.75' x 2.65 sf x 12 rows
#3	255.10'	25 cf	<b>Cultec R-150XLHD-FC-24 x 55 Inside #1</b> Effective Size= 15.3"W x 12.0"H => 0.91 sf x 0.50'L = 0.5 cf Overall Size= 16.0"W x 12.0"H x 2.02'L with 1.52' Overlap 55 Chambers in 12 Rows
#4	255.10'	35 cf	<b>12.0" Round Pipe Storage 1 x 4 -Impervious</b> L= 11.0'
#5	255.10'	40 cf	<b>12.0" Round Pipe Storage 2 x 3 -Impervious</b> L= 17.0' S= 0.0200 '/'
#6	255.10'	12 cf	<b>12.0" Round Pipe Storage 3-Impervious</b> L= 15.0' S= 0.0200 '/'
#7	255.10'	2 cf	<b>10.0" Round Pipe Storage 4-Impervious</b> L= 3.0' S= 0.0100 '/'
#8	255.38'	26 cf	<b>10.0" Round Pipe Storage 5-Impervious</b> L= 47.0' S= 0.0100 '/'
#9	255.38'	15 cf	<b>10.0" Round Pipe Storage 6-Impervious</b> L= 27.0' S= 0.0100 '/'
#10	255.65'	38 cf	<b>4.00'D x 3.00'H Vertical Cone/Cylinder-Impervious</b>
#11	255.85'	38 cf	<b>4.00'D x 3.00'H Vertical Cone/Cylinder-Impervious</b>
		9,384 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	255.10'	<b>12.0" Vert. Orifice/Grate X 3.00</b> C= 0.600 Limited to weir flow at low heads
#2	Discarded	254.60'	<b>8.270 in/hr Exfiltration over Horizontal area</b> Phase-In= 0.01'
#3	Secondary	255.10'	<b>12.0" Vert. Orifice/Grate X 4.00</b> C= 0.600 Limited to weir flow at low heads

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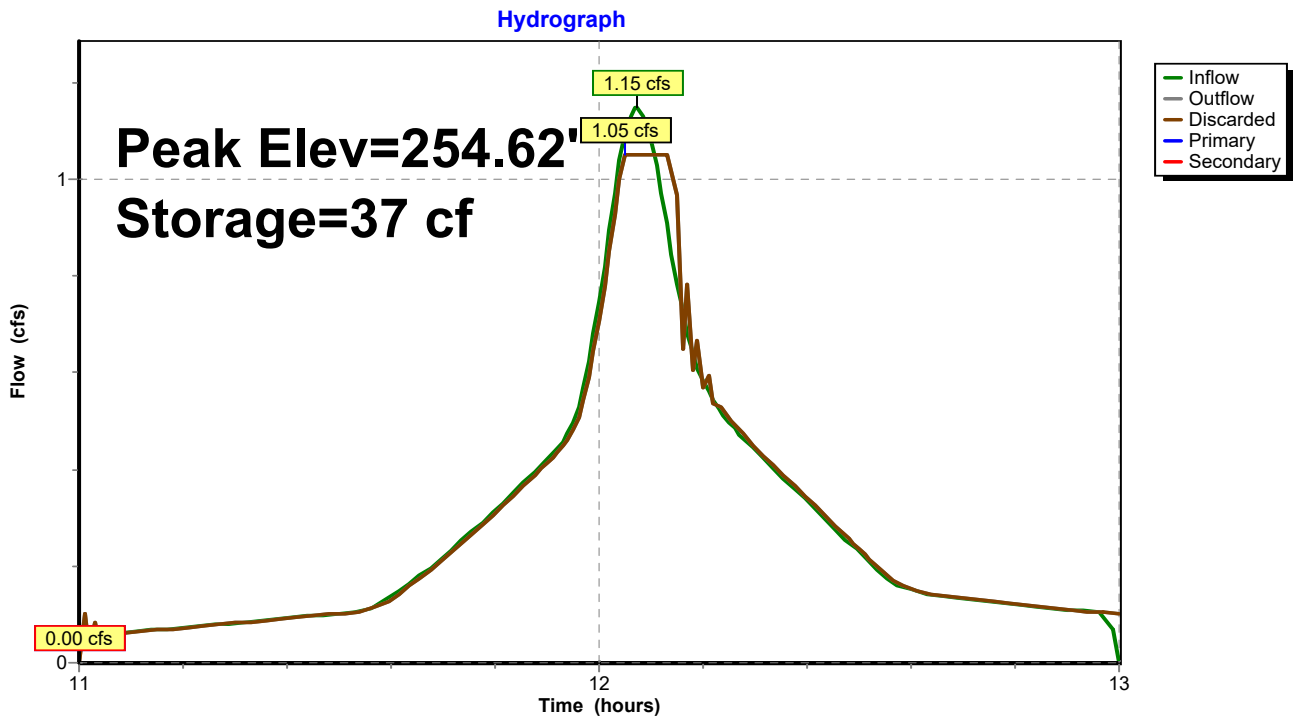
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**Discarded OutFlow** Max=1.05 cfs @ 12.05 hrs HW=254.61' (Free Discharge)  
↳ **2=Exfiltration** (Exfiltration Controls 1.05 cfs)

**Primary OutFlow** Max=0.00 cfs @ 11.00 hrs HW=254.60' TW=254.60' (Dynamic Tailwater)  
↳ **1=Orifice/Grate** ( Controls 0.00 cfs)

**Secondary OutFlow** Max=0.00 cfs @ 11.00 hrs HW=254.60' TW=254.60' (Dynamic Tailwater)  
↳ **3=Orifice/Grate** ( Controls 0.00 cfs)

**Pond CS5: CHAMBER SYSTEM #5**



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**Summary for Pond CS6: CHAMBER SYSTEM #6A & 6B**

Inflow = 0.18 cfs @ 12.09 hrs, Volume= 295 cf  
 Outflow = 0.18 cfs @ 12.09 hrs, Volume= 296 cf, Atten= 0%, Lag= 0.3 min  
 Discarded = 0.18 cfs @ 12.09 hrs, Volume= 296 cf  
 Primary = 0.00 cfs @ 11.00 hrs, Volume= 0 cf  
     Routed to Pond CS7 : CHAMBER SYSTEM #7  
 Secondary = 0.00 cfs @ 11.00 hrs, Volume= 0 cf  
     Routed to Pond CS5 : CHAMBER SYSTEM #5

Routing by Sim-Route method w/Net Flows, Time Span= 11.00-13.00 hrs, dt= 0.01 hrs  
 Peak Elev= 254.60' @ 12.09 hrs Surf.Area= 2,464 sf Storage= 4 cf

Plug-Flow detention time= 0.3 min calculated for 294 cf (100% of inflow)  
 Center-of-Mass det. time= 0.4 min ( 736.4 - 736.0 )

Volume	Invert	Avail.Storage	Storage Description
#1	254.60'	1,089 cf	<b>32.00'W x 41.00'L x 3.00'H Prismaoid 6A</b> 3,936 cf Overall - 1,214 cf Embedded = 2,722 cf x 40.0% Voids
#2	255.10'	1,207 cf	<b>Cultec R-180 (SECTION 6A) x 54 Inside #1</b> Effective Size= 33.6"W x 20.0"H => 3.44 sf x 6.33'L = 21.8 cf Overall Size= 36.0"W x 20.5"H x 7.33'L with 1.00' Overlap Row Length Adjustment= +1.00' x 3.44 sf x 9 rows
#3	255.10'	7 cf	<b>Cultec HVLV FC-24 (SECTION 6A) x 16 Inside #1</b> Effective Size= 15.3"W x 12.0"H => 0.91 sf x 0.50'L = 0.5 cf Overall Size= 16.0"W x 12.0"H x 2.02'L with 1.52' Overlap 16 Chambers in 9 Rows
#4	254.60'	975 cf	<b>32.00'W x 36.00'L x 3.00'H Prismaoid (SECTION 6B)</b> 3,456 cf Overall - 1,018 cf Embedded = 2,438 cf x 40.0% Voids
#5	255.10'	1,011 cf	<b>Cultec R-180 (SECTION 6B) x 45 Inside #4</b> Effective Size= 33.6"W x 20.0"H => 3.44 sf x 6.33'L = 21.8 cf Overall Size= 36.0"W x 20.5"H x 7.33'L with 1.00' Overlap Row Length Adjustment= +1.00' x 3.44 sf x 9 rows
#6	255.10'	7 cf	<b>Cultec HVLV FC-24 (SECTION 6B) x 16 Inside #4</b> Effective Size= 15.3"W x 12.0"H => 0.91 sf x 0.50'L = 0.5 cf Overall Size= 16.0"W x 12.0"H x 2.02'L with 1.52' Overlap 16 Chambers in 9 Rows
#7	255.10'	54 cf	<b>12.0" Round Pipe Storage 1 x 3 -Impervious</b> L= 23.0'
#8	254.77'	198 cf	<b>18.0" Round Pipe Storage 2-Impervious</b> L= 112.0'
#9	255.10'	14 cf	<b>12.0" Round Pipe Storage 3 x 6 -Impervious</b> L= 3.0'
#10	255.10'	20 cf	<b>12.0" Round Pipe Storage 4-Impervious</b> L= 26.0' S= 0.0200 '/'
#11	255.10'	51 cf	<b>Custom Stage Data (Prismatic) Listed below (Recalc) -Impervious</b>
		4,634 cf	Total Available Storage

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Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
255.10	17	0	0
258.10	17	51	51

Device	Routing	Invert	Outlet Devices
#1	Primary	253.80'	<b>12.0" Vert. Orifice/Grate X 3.00</b> C= 0.600 Limited to weir flow at low heads
#2	Device 1	253.55'	<b>18.0" Round Culvert</b> L= 15.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 253.55' / 253.55' S= 0.0000 ' / ' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#3	Device 2	255.50'	<b>3.4' long Sharp-Crested Rectangular Weir</b> 1 End Contraction(s) 2.5' Crest Height
#4	Device 2	255.10'	<b>0.8' long Sharp-Crested Rectangular Weir</b> 2 End Contraction(s) 2.0' Crest Height
#5	Primary	254.77'	<b>18.0" Round Culvert</b> L= 71.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 254.77' / 254.77' S= 0.0000 ' / ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#6	Device 5	255.10'	<b>12.0" Vert. Orifice/Grate X 6.00</b> C= 0.600 Limited to weir flow at low heads
#7	Discarded	254.60'	<b>8.270 in/hr Exfiltration over Horizontal area</b> Phase-In= 0.01'
#8	Secondary	255.10'	<b>12.0" Vert. Orifice/Grate X 3.00</b> C= 0.600 Limited to weir flow at low heads

**Discarded OutFlow** Max=0.18 cfs @ 12.09 hrs HW=254.60' (Free Discharge)

↑7=Exfiltration (Exfiltration Controls 0.18 cfs)

**Primary OutFlow** Max=0.00 cfs @ 11.00 hrs HW=254.60' TW=253.30' (Dynamic Tailwater)

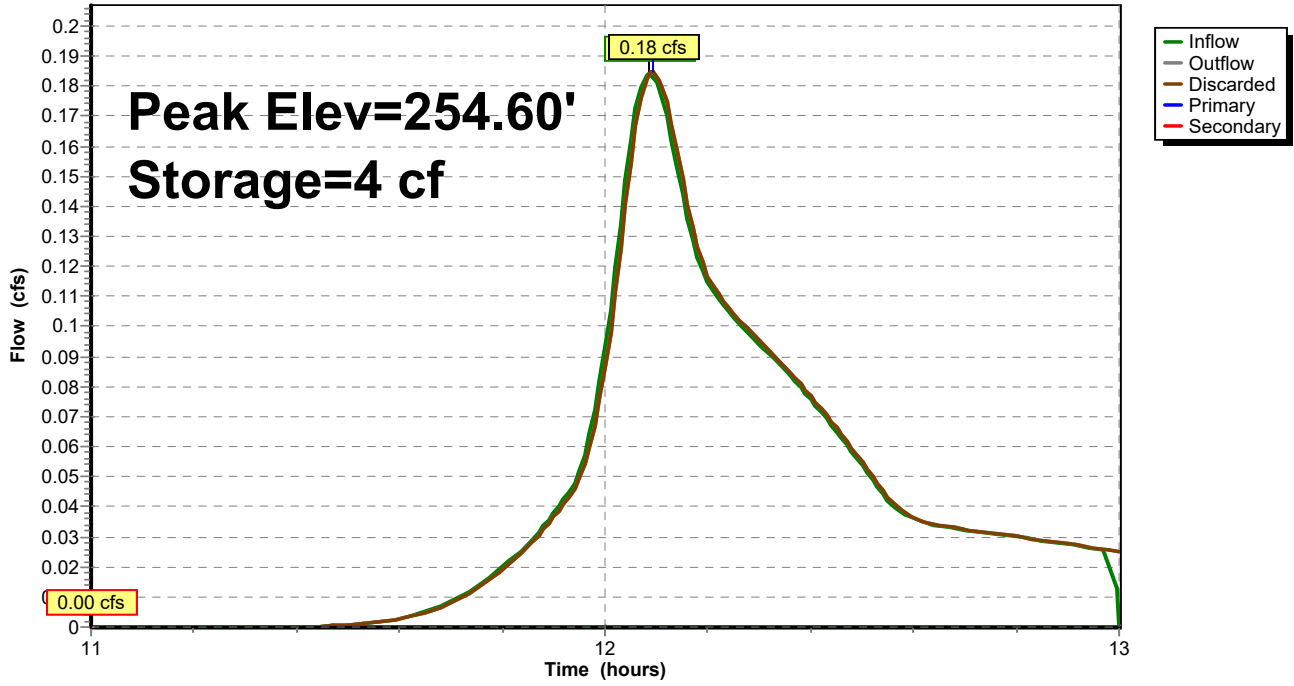
↑1=Orifice/Grate (Passes 0.00 cfs of 6.15 cfs potential flow)  
 ↑2=Culvert (Passes 0.00 cfs of 2.91 cfs potential flow)  
 ↑3=Sharp-Crested Rectangular Weir ( Controls 0.00 cfs)  
 ↑4=Sharp-Crested Rectangular Weir ( Controls 0.00 cfs)  
 ↑5=Culvert ( Controls 0.00 cfs)  
 ↑6=Orifice/Grate ( Controls 0.00 cfs)

**Secondary OutFlow** Max=0.00 cfs @ 11.00 hrs HW=254.60' TW=254.60' (Dynamic Tailwater)

↑8=Orifice/Grate ( Controls 0.00 cfs)

**Pond CS6: CHAMBER SYSTEM #6A & 6B**

Hydrograph



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**Summary for Pond CS7: CHAMBER SYSTEM #7**

Inflow = 0.23 cfs @ 12.09 hrs, Volume= 362 cf  
 Outflow = 0.23 cfs @ 12.09 hrs, Volume= 363 cf, Atten= 0%, Lag= 0.3 min  
 Discarded = 0.23 cfs @ 12.09 hrs, Volume= 363 cf  
 Primary = 0.00 cfs @ 11.00 hrs, Volume= 0 cf  
 Routed to nonexistent node TW  
 Secondary = 0.00 cfs @ 11.00 hrs, Volume= 0 cf  
 Routed to Pond CS6 : CHAMBER SYSTEM #6A & 6B

Routing by Sim-Route method w/Net Flows, Time Span= 11.00-13.00 hrs, dt= 0.01 hrs  
 Peak Elev= 253.30' @ 12.09 hrs Surf.Area= 2,400 sf Storage= 5 cf

Plug-Flow detention time= 0.3 min calculated for 361 cf (100% of inflow)  
 Center-of-Mass det. time= 0.4 min ( 736.4 - 736.0 )

Volume	Invert	Avail.Storage	Storage Description
#1	253.30'	2,012 cf	<b>12.00'W x 200.00'L x 3.00'H Prismaoid</b> 7,200 cf Overall - 2,169 cf Embedded = 5,031 cf x 40.0% Voids
#2	253.80'	2,166 cf	<b>Cultec R-180</b> x 99 Inside #1 Effective Size= 33.6"W x 20.0"H => 3.44 sf x 6.33'L = 21.8 cf Overall Size= 36.0"W x 20.5"H x 7.33'L with 1.00' Overlap Row Length Adjustment= +1.00' x 3.44 sf x 3 rows
#3	253.80'	4 cf	<b>Cultec HVLV FC-24</b> x 8 Inside #1 Effective Size= 15.3"W x 12.0"H => 0.91 sf x 0.50'L = 0.5 cf Overall Size= 16.0"W x 12.0"H x 2.02'L with 1.52' Overlap 8 Chambers in 3 Rows
#4	253.80'	24 cf	<b>12.0" Round Pipe Storage-Impervious</b> L= 30.0' S= 0.0200 '/'
#5	253.80'	75 cf	<b>4.00'D x 3.00'H Vertical Cone/Cylinder</b> x 2 -Impervious
#6	253.80'	74 cf	<b>10.0" Round Pipe Storage-Impervious</b> L= 135.0' S= 0.0200 '/'
		4,354 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	253.25'	<b>18.0" Round RCP_Round 18"</b> L= 47.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 253.25' / 249.30' S= 0.0840 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf
#2	Device 1	253.80'	<b>12.0" Vert. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	255.60'	<b>4.2' long x 1.50' rise Sharp-Crested Rectangular Weir</b> 2 End Contraction(s) 2.2' Crest Height
#4	Device 2	253.55'	<b>18.0" Vert. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#5	Device 4	253.80'	<b>12.0" Vert. Orifice/Grate X 3.00</b> C= 0.600 Limited to weir flow at low heads
#6	Discarded	253.30'	<b>8.270 in/hr Exfiltration over Horizontal area</b> Phase-In= 0.01'
#7	Secondary	253.80'	<b>12.0" Vert. Orifice/Grate X 3.00</b> C= 0.600 Limited to weir flow at low heads

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**Discarded OutFlow** Max=0.23 cfs @ 12.09 hrs HW=253.30' (Free Discharge)  
↳ **6=Exfiltration** (Exfiltration Controls 0.23 cfs)

**Primary OutFlow** Max=0.00 cfs @ 11.00 hrs HW=253.30' (Free Discharge)

↳ **1=RCP\_Round 18"** (Passes 0.00 cfs of 0.01 cfs potential flow)

↳ **2=Orifice/Grate** ( Controls 0.00 cfs)

↳ **4=Orifice/Grate** ( Controls 0.00 cfs)

↳ **5=Orifice/Grate** ( Controls 0.00 cfs)

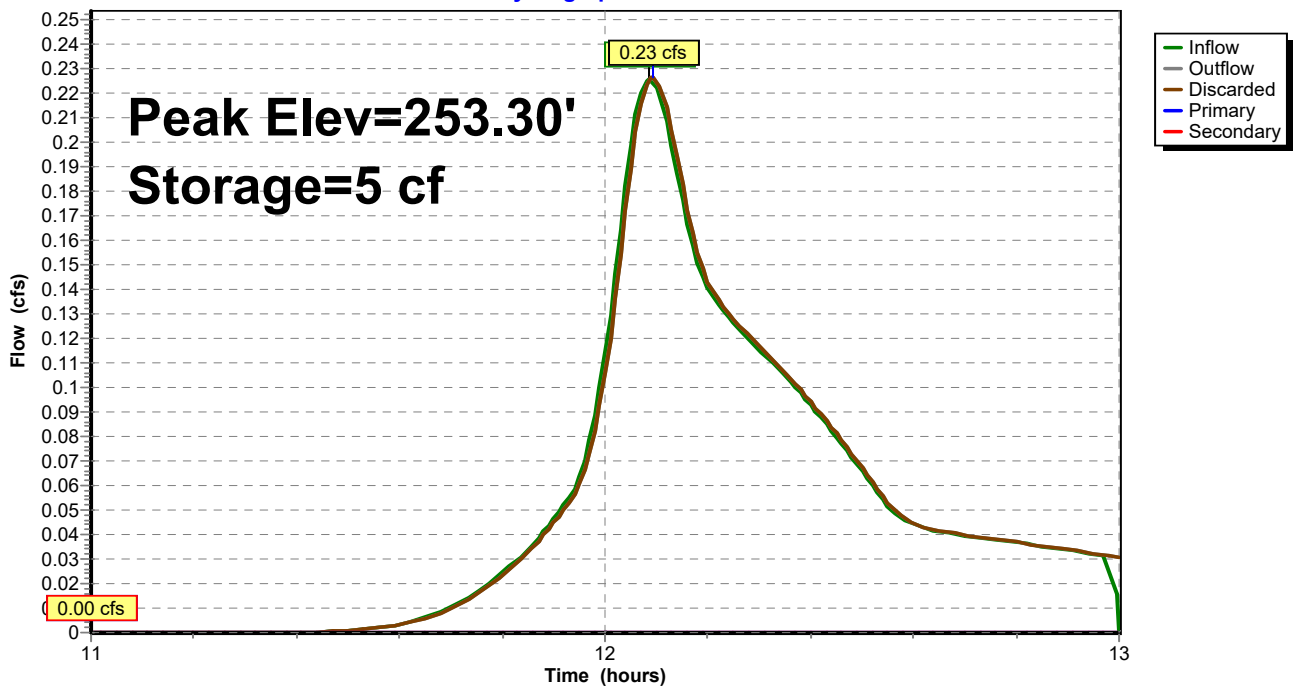
↳ **3=Sharp-Crested Rectangular Weir** ( Controls 0.00 cfs)

**Secondary OutFlow** Max=0.00 cfs @ 11.00 hrs HW=253.30' TW=254.60' (Dynamic Tailwater)

↳ **7=Orifice/Grate** ( Controls 0.00 cfs)

**Pond CS7: CHAMBER SYSTEM #7**

Hydrograph



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**Summary for Pond CS8: CHAMBER SYSTEM #8**

Inflow Area = 12,197 sf, 82.14% Impervious, Inflow Depth > 0.35" for STD #3 event  
 Inflow = 0.21 cfs @ 12.08 hrs, Volume= 352 cf  
 Outflow = 0.21 cfs @ 12.08 hrs, Volume= 352 cf, Atten= 0%, Lag= 0.3 min  
 Discarded = 0.21 cfs @ 12.08 hrs, Volume= 352 cf  
 Primary = 0.00 cfs @ 11.00 hrs, Volume= 0 cf  
 Routed to nonexistent node TW

Routing by Sim-Route method w/Net Flows, Time Span= 11.00-13.00 hrs, dt= 0.01 hrs  
 Peak Elev= 254.11' @ 12.08 hrs Surf.Area= 1,320 sf Storage= 4 cf

Plug-Flow detention time= 0.3 min calculated for 351 cf (100% of inflow)  
 Center-of-Mass det. time= 0.4 min ( 729.2 - 728.8 )

Volume	Invert	Avail.Storage	Storage Description
#1	254.10'	890 cf	<b>12.00'W x 110.00'L x 2.10'H Prisma</b> 2,772 cf Overall - 548 cf Embedded = 2,224 cf x 40.0% Voids
#2	254.60'	547 cf	<b>Cultec C-100HD</b> x 39 Inside #1 Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap Row Length Adjustment= +0.50' x 1.86 sf x 3 rows
#3	254.60'	0 cf	<b>Cultec C-100-SFCx2</b> x 4 Inside #1 Effective Size= 10.1"W x 7.6"H => 0.29 sf x 0.33'L = 0.1 cf Overall Size= 12.0"W x 7.6"H x 1.64'L with 1.31' Overlap 4 Chambers in 3 Rows
#4	254.60'	28 cf	<b>8.0" Round Pipe Storage</b> -Impervious L= 80.0' S= 0.0100 '/'
#5	254.60'	75 cf	<b>4.00'D x 3.00'H Vertical Cone/Cylinder</b> x 2 -Impervious
		1,541 cf	Total Available Storage

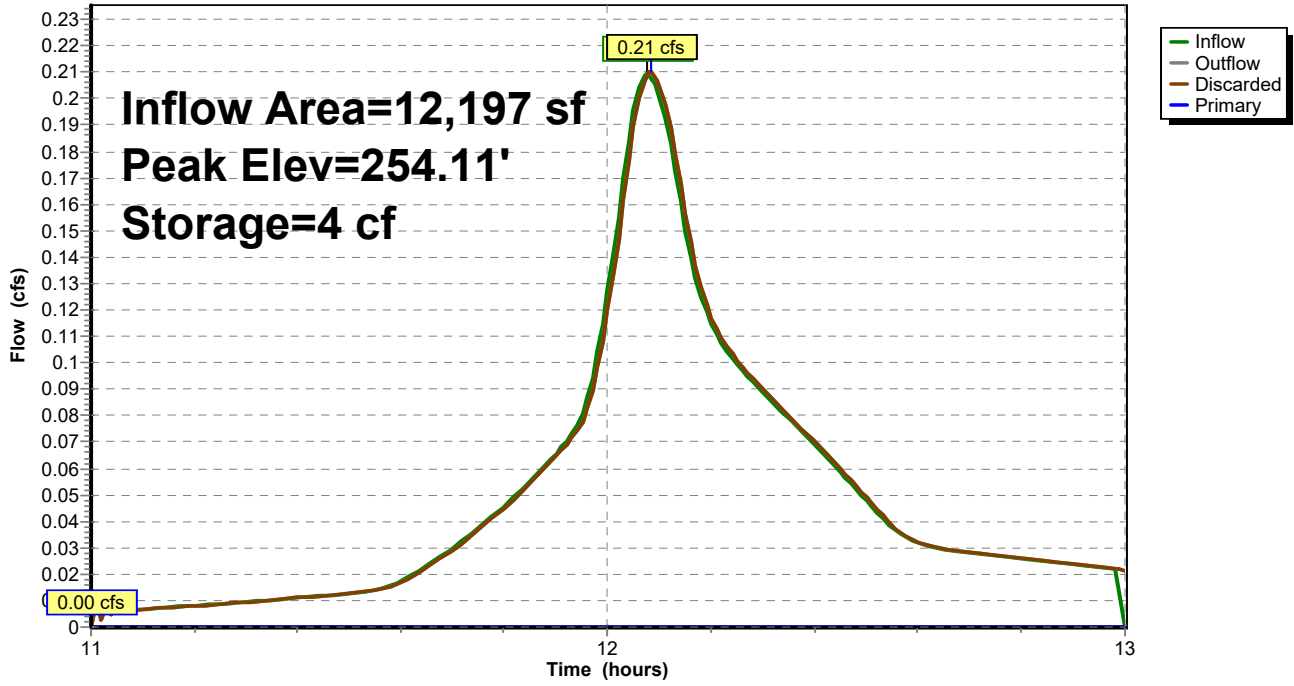
Device	Routing	Invert	Outlet Devices
#1	Primary	254.50'	<b>8.0" Vert. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#2	Discarded	254.10'	<b>8.270 in/hr Exfiltration over Horizontal area</b> Phase-In= 0.01'

**Discarded OutFlow** Max=0.21 cfs @ 12.08 hrs HW=254.11' (Free Discharge)  
 ↑**2=Exfiltration** (Exfiltration Controls 0.21 cfs)

**Primary OutFlow** Max=0.00 cfs @ 11.00 hrs HW=254.10' (Free Discharge)  
 ↑**1=Orifice/Grate** ( Controls 0.00 cfs)

Pond CS8: CHAMBER SYSTEM #8

Hydrograph



**Standard #5 Land Uses with Higher Potential Pollutant Loads (LUHPPLs)**

This project land use is not subject to higher pollution control requirements

**Standard #6 (Protection of Critical Areas)**

The project is not located near a Critical area.

**Standard #7 (Redevelopment)**

This site is not a redevelopment project.

**Standard #8 (Erosion /Sediment Control)**

This standard has been fully met. Refer to the “Construction Period Operation and Maintenance Plan” included in Appendix ‘C’ in the Storm water Report

**Standard #9 (Operation & Maintenance Plan)**

This standard has been fully met. Refer to the Long-Term Pollution Prevention & Operation and Maintenance Plan in Appendix “B”

**Standard #10 (Illicit Discharge Compliance Statement)**

This standard has been fully met. The applicant will submit an illicit discharge compliance statement prior to the discharge of any stormwater to post-development BMP’s.

**APPENDIX B:**

**Long Term Pollution Prevention, Operation and Maintenance Plan**

# **LONG TERM POLLUTION PREVENTION, OPERATION AND MAINTENANCE PLAN**

STANDARDS 4-6 & 9

For

**4-Story Mixed Use Building**

**- Pond St & Converse Way, Ashland MA-**

*Revised 9/13/22*

The following items are intended as a guideline for continued maintenance of the storm drain system after construction. There may be other measures that should be applied to certain drainage appurtenances not mentioned herein. Therefore, the current owner, followed by the future owners of the Stormwater system should be updating this plan on an as needed basis.

## **Responsible Party for the Operation, Maintenance & Financing repairs**

Initially, and until the Project site is turned over to another ownership, the responsible party will be:

The responsible party is the property owner.

Trask Inc.  
337 Turnpike RD, Suite 201  
Southborough, MA  
Contact: Ben Stevens Tel: 508-485-0077

## **Inspection and Maintenance Requirements**

The responsible party shall retain and pay for inspectional services by a designated person that is qualified and approved to perform such inspectional services. Training for individual(s) involved with implementing the Long-term Pollution Prevention Plan shall be provided by the responsible party. Said party shall also pay the maintenance and repair cost. After each inspection, the inspector shall complete the inspection report forms. These reports shall be kept for future review by Federal, State or Local authorities. The frequency of the inspections shall be as updated to the amended DEP Stormwater Management Regulations, and, in the case of the subsurface Water Quality Structures, according to the O & M schedules recommended by those Manufacturers.

The estimated annual operation & Maintenance Budget for the Stormwater system is \$2000. The entity providing maintenance services shall follow confined space entry procedures in accordance with OSHA requirements.

The inspection and maintenance outlined below shall be followed and submitted by the inspector to the owner and the designated Municipal Department.

**Erosion**

Significant erosion along slopes shall be protected with engineered soil reinforcement, jute mesh, ground cover and/or erosion control, as approved.

**Water Quality Structures**

There are eleven(11) TSS removal structures proposed and designated on the drainage plans. These Water quality structures are Stormceptor STC 450i units manufactured by Contech shall be inspected twice per year(spring & fall). The inlet grates shall be inspected and cleaned four(4) times per year. Following the first year, inspection sequence shall be performed as recommended by the inspector, but not less than once per year. The inlet grates shall be inspected and cleaned four(4) times/yr.. Removal of sediment shall be required when the sediment reaches an 8-inch depth in the sump. Measurements shall be taken at each inspection and recorded in the Inspection & Maintenance log. Removal of the sediment from the sump area and disposal shall be in accordance with local, State and Federal regulations. Sediment removal shall be performed by a certified CDS unit maintenance provider using a Vac Truck, or equal. The procedures and Inspection & maintenance shall follow the manual entitled "STORMCEPTOR STC 450 i Inspection & Maintenance Guide", by Contech at [www.conteches.com](http://www.conteches.com)

**Site Drain – Subsurface Chamber Systems**

Inspection and maintenance of the chamber systems shall be in accordance with the proprietary guidelines, as follows:

Inspection and maintenance of the chamber system shall be in accordance with the proprietary guidelines entitled "Contacto & Recharger Stormwater Chamber- operation and maintenance guidelines." [www.cultec.com](http://www.cultec.com) Access to the subsurface chambers shall be from the inspection ports provided. If inspection shows that any of the chamber systems are not fully draining within 72 hours following a storm event, the responsible party shall retain a qualified engineer to assess the reason for infiltration failure and to recommend corrective action for restoring the infiltration rate. The responsible party shall implement corrective action based on this evaluation.

Bi-annual inspection of the chamber system shall be from the inspection port provided.

**Outlet Control Structures**

There is one(1) outlet control structure for Chamber system shown on the drainage plans. This structure should be inspected once per year and cleaned of debris at the outlet orifice.

**Yard DrainS & Catch Basins**

In accordance with DEP Stormwater Manual, yard drains & Catch Basins shall be Inspected 4 times per year and cleaned of debris when the depth of sediment reaches 2FT(50 % of the sump depth). Disposal shall comply with local, State and Federal regulations.

### **Snow removal, Deicing Treatment & Storage Operations**

Snow disposal, if required, shall be in accordance with Mass DEP Guideline No. BRPG01-01 requirements. Salt application shall be minimal and shall only be used where necessary. The use of sodium Chloride (NaCl) is prohibited. Storage of Roadway deicing salt shall be offsite. Snow quantities in excess of the onsite storage capacity shall be removed from the site by the snow removal contractor.

### **Good House Keeping Practices & Illicit Discharge Prevention**

Inspections of the entire site and shall identify and report to the owner any erosion, pollution, and accumulation of any unsuitable material on the site. The inspector shall note and report any sign of an illicit discharge on the property. The owner shall assign qualified workers to fulfill recommendations by the inspector for cleanup and illicit discharge elimination.

All hazardous waste materials discovered will be disposed of in the manner specified by local and state regulation. The owner will be responsible for seeing that these procedures are followed.

### **Pavement Sweeping**

Pavement shall be swept every spring and late fall at the frequency required to remove sand and other debris.

### **Accidental Spill Containment**

The drainage system provides sufficient capacity to isolate and contain a large spill within the stormwater system for an accidental spill. The company providing the cleanup services for the spill shall follow public safety practices and cordon off the spill containment work zone for the protection of the public. Regardless of the size, spills of toxic or hazardous material will be reported to the appropriate State or local government agency. The inspector shall report all inspections and make recommendations to the owner for actions and maintenance deemed necessary by the inspector.

The above recommendations are applicable to project completion with 100% established vegetative cover and are not intended for construction progress measures.

### **Storage of Materials and Waste**

Long term storage of waste or trash that is harmful to the groundwater and wetland resources is prohibited. Such waste shall be immediately removed from the property by a licensed contractor. Weekly garbage removal shall be by a commercial trash removal company.

### **Vehicle Washing Control**

Vehicle washing on this property is prohibited. Vehicle washing shall be at commercial car washing facility that already has environmental controls in place.

### **Fertilizers, Herbicides, Pesticides and Fungicides**

It is recommended that the common application of fertilizers, herbicides, pesticides and fungicides be restricted, and only used on a limited basis in the approved application zone as follows: Chemical additives applied to the ground cover and plants within 20 FT of the Wetlands are prohibited. Application for such chemicals shall only be used on a limited basis beyond said Wetland setback zone.

Use of chemicals in these areas shall be applied in a manner that prevents the chemical from being washed down gradient of the application zone, e.g., fertilizer shall be worked into the soil to prevent washout. Storage of these chemicals shall be in the product containers in a safe dry enclosure, such as a locked shed, or offsite landscape company's storage facility.

### **Dog Park Maintenance**

Weekly maintenance shall include trash and dog poop removal. Weekly restocking of poop bags and inspection of entire dog park for miscellaneous cleanup.

### **Rain Garden Maintenance**

The Garden is not designed to recharge collected water into the ground. Its function is to filter water back into the drain system where it is once again treated before being recharged into the ground at one of the subsurface chamber systems. Therefore, it is important that the rain garden is properly maintained to allow filtration as designed.

Below is a maintenance schedule to be followed.

<b>RAIN GARDEN MAINTENANCE SCHEDULE</b>		
<b>Activity</b>	<b>Time of Year</b>	<b>Frequency</b>
Inspect & remove trash	Year round	Monthly
Mulch	Spring	Annually
Remove dead vegetation	Fall or Spring	Annually
Replace dead vegetation	Spring	Annually
Prune	Spring or Fall	Annually
Replace entire media & all vegetation	Late Spring / Early Summer	As Needed*
<i>*Paying careful attention to pretreatment and operation &amp; maintenance can extend the life of the soil media.</i>		

**INSPECTION REPORT No.**  
**For**  
**4-Story Mixed Use Building**  
**-501 Pond ST, Ashland MA-**

**INSPECTION DATE:**

**INSPECTOR:**

INSPECTION DATE:

INSPECTOR:

**1) WATER QUALITY STRUCTURES ( Contech Stormceptor STC 450i )**

The inspector shall refer to the narrative on previous pages.

COMMENTS & RECOMMENDATIONS:

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MEASUREMENTS:

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SIGNS OF ILLICIT DISCHARGES: YES NO

CLEANING REQUIRED: YES NO

DEPTH OF SEDIMENT \_\_\_\_\_

DATE CLEANED: \_\_\_\_\_

PERFORMED BY: \_\_\_\_\_

**2) EROSION**

The inspector shall refer to the narrative on previous pages.

COMMENTS & RECOMMENDATIONS:

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MEASUREMENTS:

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SIGNS OF EROSION:            YES        NO

MAINTENANCE REQUIRED:    YES        NO

DATE MAINTAINED: \_\_\_\_\_

PERFORMED BY:            \_\_\_\_\_

**3) SUBSURFACE RECHARGE CHAMBERS**

Refer to narrative on page the previous pages.

Inspection frequency: twice per year

REFER TO THE GUIDELINES REFERENCE ON PAGE 2 FOR INSPECTION & MAINTENANCE.

COMMENTS & RECOMMENDATIONS:

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MEASUREMENTS: \_\_\_\_\_

INSPECTION PORTS ARE ACCESSIBLE:	YES	NO
CLEANING REQUIRED:	YES	NO
WATER IN THE CHAMBER IS PRESENT	YES	NO
DID THE CHAMBERS FULLY DRAIN?		
WITHIN 72 HRS SINCE THE LAST STORM	YES	NO

MAINTENANCE REQUIRED: \_\_\_\_\_

PERFORMED BY: \_\_\_\_\_

**INSPECTION DATE:**

**INSPECTOR:**

**4) YARD DRAINS & CATCH BASINS**

The inspector shall refer to the narrative on the previous pages.

COMMENTS & RECOMMENDATIONS:

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MEASUREMENTS: \_\_\_\_\_

SIGNS OF ILLICIT DISCHARGES: YES NO  
CLEANING REQUIRED: YES NO  
DEPTH OF SEDIMENT: \_\_\_\_\_  
DATE CLEANED: \_\_\_\_\_  
PERFORMED BY: \_\_\_\_\_

**5) GOOD HOUSE KEEPING & PREVENTION OF ILLICIT DISCHARGES:**

The inspector shall refer to the narrative on previous pages.

COMMENTS & RECOMMENDATIONS:

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MEASUREMENTS: \_\_\_\_\_

SIGNS OF ILLICIT DISCHARGE: YES NO  
CLEANING REQUIRED: YES NO  
DATE MAINTAINED: \_\_\_\_\_  
PERFORMED BY: \_\_\_\_\_

**6) PAVEMENT SWEEPING:**

The inspector shall refer to the narrative on previous pages.

COMMENTS & RECOMMENDATIONS:

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MEASUREMENTS: \_\_\_\_\_

SWEEPING REQUIRED: YES                      NO

DATE SWEEPED: \_\_\_\_\_

PERFORMED BY: \_\_\_\_\_

**7) DOG PARK MAINTENANCE**

Refer to narrative on the previous pages.

Inspection frequency: weekly

REFER TO THE GUIDELINES REFERENCE ON PREVIOUS PAGE FOR INSPECTION & MAINTENANCE.

COMMENTS & RECOMMENDATIONS:

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MEASUREMENTS: \_\_\_\_\_

RE-STOCK BAGS:                              YES                      NO

DOG PARK INSPECTED :                      YES                      NO

ADDITIONAL CLEANUP REQUIRED              YES                      NO

MAINTENANCE REQUIRED: \_\_\_\_\_

PERFORMED BY: \_\_\_\_\_

**8) RAIN GARDEN MAINTENANCE**

Refer to narrative on the previous pages.

Inspection frequency: Monthly and annually ( Refer to the schedule in the Rain Garden narrative on the previous pages).

REFER TO THE GUIDELINES REFERENCE ON PREVIOUS PAGE FOR INSPECTION & MAINTENANCE.

COMMENTS & RECOMMENDATIONS:

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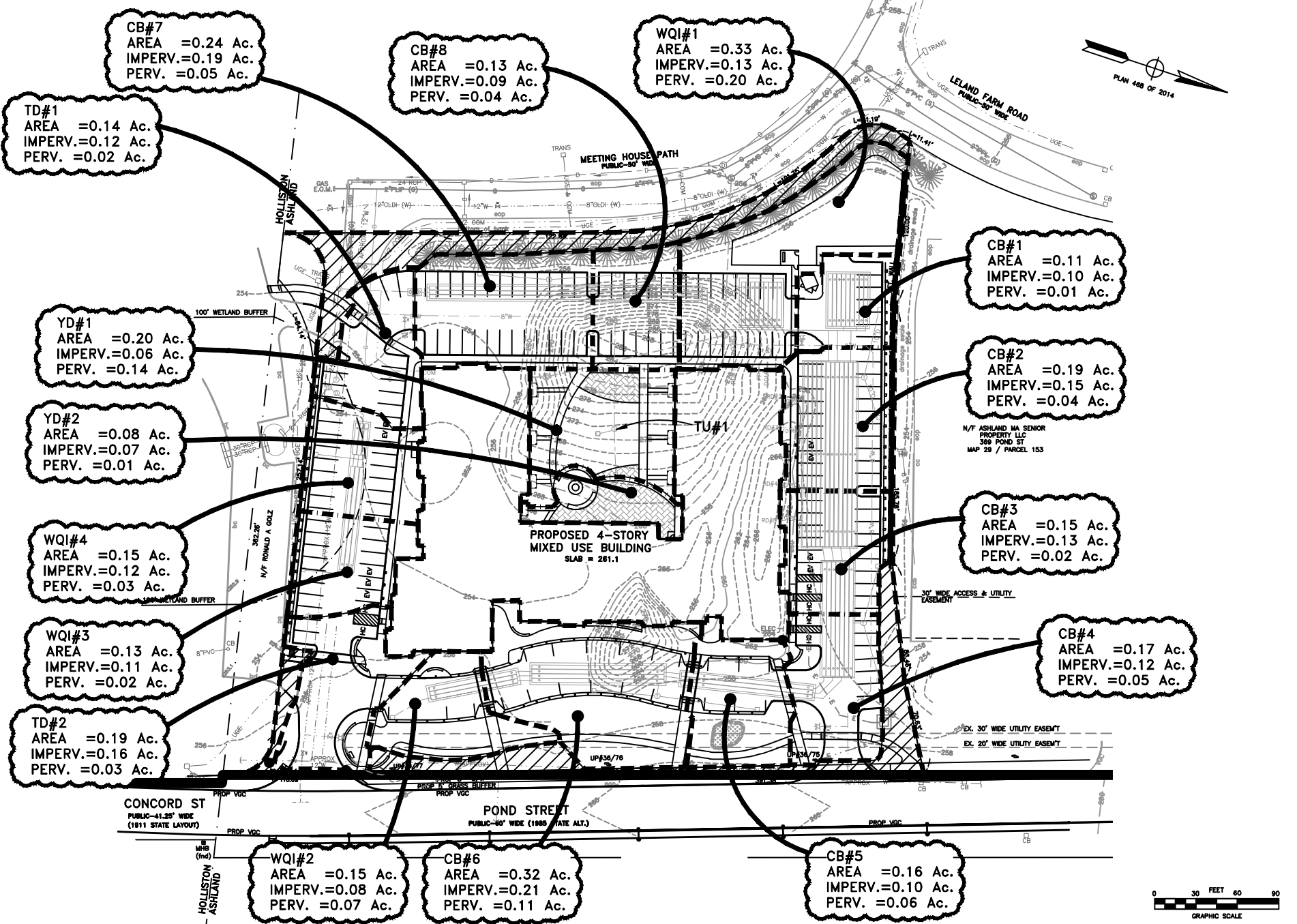
MEASUREMENTS: \_\_\_\_\_

TRASH NEEDS TO BE REMOVED:	YES	NO
DEAD VEGETATION REMOVAL REQUIRED :	YES	NO
VEGEATATION REPLACEMENT REQUIRED:	YES	NO
PRUNING REQUIRED:	YES	NO
MULCH REQUIRED:	YES	NO
MEDIA REPLACEMENT REQUIRED:	YES	NO
ADDITIONAL CLEANUP REQUIRED:	YES	NO

MAINTENANCE REQUIRED: \_\_\_\_\_

PERFORMED BY: \_\_\_\_\_

**APPENDIX E:**  
**Drainage Collection System Calculations**



CB#7  
 AREA =0.24 Ac.  
 IMPERV.=0.19 Ac.  
 PERV. =0.05 Ac.

CB#8  
 AREA =0.13 Ac.  
 IMPERV.=0.09 Ac.  
 PERV. =0.04 Ac.

WQI#1  
 AREA =0.33 Ac.  
 IMPERV.=0.13 Ac.  
 PERV. =0.20 Ac.

TD#1  
 AREA =0.14 Ac.  
 IMPERV.=0.12 Ac.  
 PERV. =0.02 Ac.

YD#1  
 AREA =0.20 Ac.  
 IMPERV.=0.06 Ac.  
 PERV. =0.14 Ac.

YD#2  
 AREA =0.08 Ac.  
 IMPERV.=0.07 Ac.  
 PERV. =0.01 Ac.

WQI#4  
 AREA =0.15 Ac.  
 IMPERV.=0.12 Ac.  
 PERV. =0.03 Ac.

WQI#3  
 AREA =0.13 Ac.  
 IMPERV.=0.11 Ac.  
 PERV. =0.02 Ac.

TD#2  
 AREA =0.19 Ac.  
 IMPERV.=0.16 Ac.  
 PERV. =0.03 Ac.

WQI#2  
 AREA =0.15 Ac.  
 IMPERV.=0.08 Ac.  
 PERV. =0.07 Ac.

CB#6  
 AREA =0.32 Ac.  
 IMPERV.=0.21 Ac.  
 PERV. =0.11 Ac.

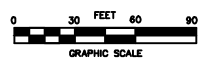
CB#5  
 AREA =0.16 Ac.  
 IMPERV.=0.10 Ac.  
 PERV. =0.06 Ac.

CB#1  
 AREA =0.11 Ac.  
 IMPERV.=0.10 Ac.  
 PERV. =0.01 Ac.

CB#2  
 AREA =0.19 Ac.  
 IMPERV.=0.15 Ac.  
 PERV. =0.04 Ac.

CB#3  
 AREA =0.15 Ac.  
 IMPERV.=0.13 Ac.  
 PERV. =0.02 Ac.

CB#4  
 AREA =0.17 Ac.  
 IMPERV.=0.12 Ac.  
 PERV. =0.05 Ac.



NO.	DATE	BY	DESCRIPTION
1	11/08/14	TRASK	PREPARED
2	09/27/14	TRASK	REVISION
3	09/27/14	TRASK	REVISION
4	11/08/14	TRASK	REVISION
5	11/08/14	TRASK	REVISION

PREPARED BY:  
 BRUCE SALUK & ASSOC., INC.  
 CIVIL ENGINEERING & LAND SURVEYING  
 100 STATE STREET, SUITE 201  
 SOUTHBOROUGH, MA 01772  
 TEL: 508-881-1822  
 FAX: 508-881-1825

PROPOSED DRAINAGE SUBAREAS  
 POND STREET  
 ASHLAND ,MA

DEVELOPER:  
 TRASK INC  
 337 TURNPIKE ROAD, SUITE 201  
 SOUTHBOROUGH, MA 01772

DATE: NOVEMBER 8, 2011

DA3

**Bruce Saluk & Associates, Inc.**

Civil Engineering & Land Surveying  
 576 Boston Post Road East  
 Marlborough, Massachusetts 01752  
 ph (508) 485-1662  
 fax (508) 481-9929  
 email Bruce@salukassoc.com

**Storm Drainage Computations**

Name: 4-Story Mixed Use Building  
 Ashland, MA

Proj. No.: 2874  
 Date: 9/9/2022  
 Computed by: BMS

Design Parameters:  
 25 Year Storm\*

RUNOFF										DESIGN									
LOCATION		AREA (AC.)	C	C x A	SUM or C x A	FLOW TIME (MIN)		i	Q cfs	PIPE ASBUILT			CAPACITY		PROFILE				
FROM	TO					PIPE	CONC TIME			PIPE TYPE	PIPE SIZE	SLOPE (ft/ft)	Q full cfs	V full ft/s	LENGTH	FALL	RIM UPPER	INV UPPER	INV LOWER
CB#7	TU#7	0.24	0.75	0.18	0.18	0.16	5.00	6	1.1	HDPE	10	0.010	2.6	4.7	47	0.47	257.80	254.55	254.08
CB#8	TU#7	0.13	0.68	0.09	0.09	0.16	5.00	6	0.5	HDPE	10	0.0100	2.6	4.7	47	0.47	257.60	254.55	254.08
TU#7	CS#7	0.37	NA	0.27	0.27	0.01	5.00	6	1.6	HDPE	10	0.0100	2.6	4.7	3	0.03	258.52	253.83	253.80
WQI#1	CS#6	0.33	0.48	0.16	0.16	0.16	5.00	6	0.9	HDPE	10	0.0111	2.7	5.0	9	0.10	257.80	255.20	255.10
CB#1	TU#4	0.11	0.84	0.09	0.09	0.16	5.00	6	0.6	HDPE	10	0.0100	2.6	4.7	47	0.47	258.70	255.85	255.38
CB#2	TU#4	0.19	0.75	0.14	0.14	0.09	5.00	6	0.9	HDPE	10	0.0100	2.6	4.7	27	0.27	258.50	255.65	255.38
TU#4	CS#5	0.30	NA	0.24	0.24	0.01	5.00	6	1.4	HDPE	10	0.0100	2.6	4.7	3	0.03	258.90	255.13	255.10
CB#3	TU#5	0.15	0.81	0.12	0.12	0.14	5.00	6	0.7	HDPE	10	0.0100	2.6	4.7	40	0.40	258.50	255.85	255.45
CB#4	TU#5	0.17	0.69	0.12	0.12	0.14	5.00	6	0.7	HDPE	10	0.0100	2.6	4.7	40	0.40	258.50	255.85	255.45
TU#5	CS#4	0.32	0.66	0.21	0.21	0.01	5.00	6	1.3	HDPE	10	0.0200	3.7	6.7	5	0.10	259.39	255.20	255.10
CB#5	TU#6	0.16	0.64	0.10	0.10	0.25	5.00	6	0.6	HDPE	10	0.010	2.6	4.7	70	0.70	259.40	256.15	255.45
CB#6	TU#6	0.32	0.66	0.21	0.21	0.15	5.00	6	1.3	HDPE	10	0.0100	2.6	4.7	42	0.42	259.50	255.87	255.45
TU#6	CS#2	0.48	NA	0.31	0.31	0.02	5.00	6	1.9	HDPE	10	0.0143	3.1	5.7	7	0.10	260.20	255.20	255.10

**Bruce Saluk & Associates, Inc.**

Civil Engineering & Land Surveying  
 576 Boston Post Road East  
 Marlborough, Massachusetts 01752  
 ph (508) 485-1662  
 fax (508) 481-9929  
 email Bruce@salukassoc.com

**Storm Drainage Computations**

Name: 4-Story Mixed Use Building  
 Ashland, MA

Proj. No.: 2874  
 Date: 9/9/2022  
 Computed by: BMS

Design Parameters:  
 25 Year Storm\*

RUNOFF										DESIGN									
LOCATION		AREA (AC.)	C	C x A	SUM or C x A	FLOW TIME (MIN)		i	Q cfs	PIPE ASBUILT			CAPACITY		PROFILE				
FROM	TO					PIPE	CONC TIME			PIPE TYPE	PIPE SIZE	SLOPE (ft/ft)	Q full cfs	V full ft/s	LENGTH	FALL	RIM UPPER	INV UPPER	INV LOWER
WQI#2	CS#1	0.15	0.62	0.09	0.09	0.09	5.00	6	0.6	HDPE	10	0.011	2.7	4.9	28	0.30	258.60	255.40	255.10
WQI#3	CS#8	0.13	0.79	0.10	0.10	0.13	5.00	6	0.6	HDPE	8	0.010	1.4	4.1	32	0.32	257.50	254.92	254.60
WQI#4	CS#8	0.15	0.76	0.11	0.11	0.13	5.00	6	0.7	HDPE	8	0.010	1.4	4.1	32	0.32	257.50	254.92	254.60
YD#2	TU#1	0.08	0.81	0.07	0.07	0.14	5.00	6	0.4	HDPE	10	0.010	2.6	4.7	41	0.41	258.80	255.37	254.96
YD#1	TU#1	0.20	0.60	0.12	0.12	0.02	5.00	6	0.7	HDPE	10	0.020	3.7	6.7	9	0.18	258.60	255.14	254.96
TU#1	CS#7	0.28	-----	0.19	0.19	0.32	5.00	6	1.1	HDPE	10	0.010	2.6	4.7	92	0.92	259.00	254.72	253.80
RC#1	CS#7	0.20	0.90	0.18	0.18	0.06	5.00	6	1.1	HDPE	10	0.020	3.7	6.7	26	0.52	NA	255.62	255.10
RC#2	CS#7	0.18	0.90	0.16	0.16	0.04	5.00	6	1.0	HDPE	10	0.020	3.7	6.7	15	0.30	NA	255.40	255.10
RC#3	CS#7	0.18	0.90	0.16	0.16	0.04	5.00	6	1.0	HDPE	10	0.020	3.7	6.7	17	0.34	NA	255.44	255.10
RC#4	CS#5	0.18	0.90	0.16	0.16	0.04	5.00	6	1.0	HDPE	10	0.020	3.7	6.7	17	0.34	NA	255.44	255.10
RC#5	CS#5	0.17	0.90	0.15	0.15	0.04	5.00	6	0.9	HDPE	10	0.020	3.7	6.7	17	0.34	NA	255.44	255.10
TD#1	TU#2	0.14	0.80	0.11	0.11	0.04	5.00	6	0.7	HDPE	8	0.0500	3.2	9.1	20	1.00	255.63	254.63	253.63
TU#2	EXDMH2	0.14	0.80	0.11	0.11	0.08	5.00	6	0.7	HDPE	8	0.0244	2.2	6.4	32	0.78	256.00	255.00	254.22
TD#2	TU#3	0.19	0.75	0.14	0.14	0.08	5.00	6	0.9	HDPE	8	0.0244	2.2	6.4	32	0.78	256.00	255.00	254.22

**Bruce Saluk & Associates, Inc.**

Civil Engineering & Land Surveying  
 576 Boston Post Road East  
 Marlborough, Massachusetts 01752  
 ph (508) 485-1662  
 fax (508) 481-9929  
 email Bruce@salukassoc.com

**Storm Drainage Computations**

Name: 4-Story Mixed Use Building Proj. No.: 2874  
 Ashland, MA Date: 9/9/2022  
 Location: Pond ST & Converse Way Computed by: BMS

Design Parameters:  
**25 Year Storm\***

RUNOFF										DESIGN									
LOCATION		AREA (AC.)	C	C x A	SUM or C x A	FLOW TIME (MIN)		i	Q cfs	PIPE ASBUILT			CAPACITY		PROFILE				
FROM	TO					PIPE	CONC TIME			PIPE TYPE	PIPE SIZE	SLOPE (ft/ft)	Q full cfs	V full ft/s	LENGTH	FALL	RIM UPPER	INV UPPER	INV LOWER
TU#3	DMH#3	0.19	0.75	0.14	0.14	0.46	5.00	6	0.9	HDPE	8	0.0200	2.0	5.8	159	3.18	258.10	253.97	250.79
DMH#3	DMH#2	NA	NA	NA	NA	NA	NA	NA	2.0	HDPE	12	0.1000	13.3	17.0	3	0.30	257.60	249.90	249.60
* Intensity (i) - Duration - Frequency Curve for Boston, MA																			

**Bruce Saluk & Associates, Inc.**

Civil Engineering and Land Surveying  
 576 Boston Post Road East  
 Marlborough, MA 01752  
 (508) 485-1662  
 fax (508) 481-9929

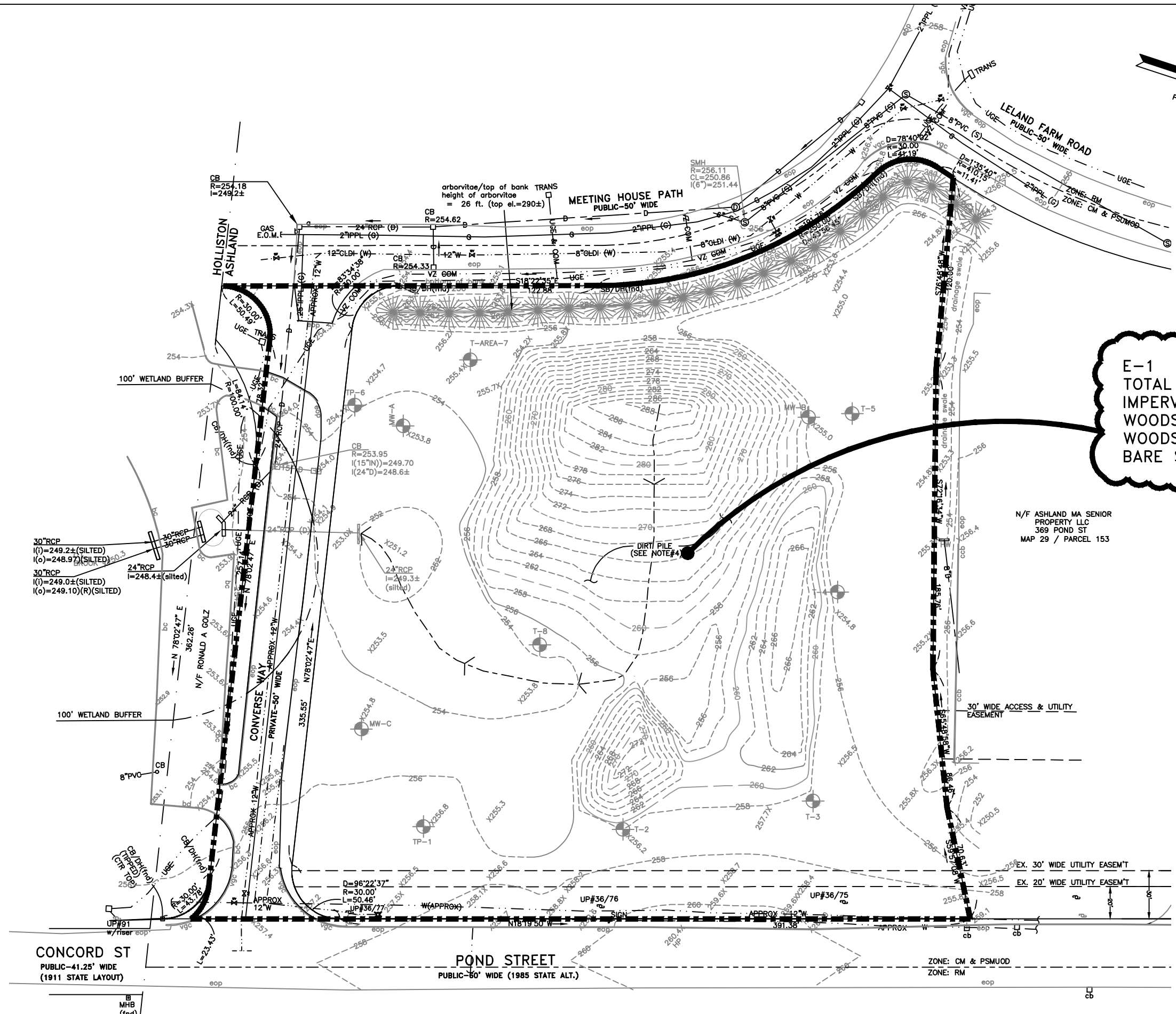
Subject: 4 Story Apartment Building  
 Job No. 2874  
 Computed By: BMS  
 Checked By: \_\_\_\_\_  
 Date: 9/8/2022

**Table #1****Drainage Subareas  
& Runoff Coefficients**

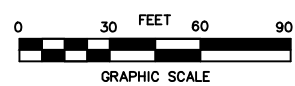
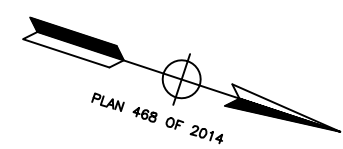
SUBAREA (system component)	Pervious Area, As (C=0.20)	Impervious Area, Ap (C=0.90)	(Asx0.20)+ (ApX0.90)	Total Tributary Area (acres)	WEIGHTED "C"
CB#7	0.05	0.19	0.18	0.24	0.75
CB#8	0.04	0.09	0.09	0.13	0.68
WQI#1	0.20	0.13	0.16	0.33	0.48
CB#1	0.01	0.10	0.09	0.11	0.84
CB#2	0.04	0.15	0.14	0.19	0.75
CB#3	0.02	0.13	0.12	0.15	0.81
CB#4	0.05	0.12	0.12	0.17	0.69
CB#5	0.06	0.10	0.10	0.16	0.64
CB#6	0.11	0.21	0.21	0.32	0.66
WQI#2	0.06	0.09	0.09	0.15	0.62
WQI#3	0.02	0.11	0.10	0.13	0.79
WQI#4	0.03	0.12	0.11	0.15	0.76
YD#1	0.14	0.06	0.12	0.20	0.60
YD#2	0.01	0.07	0.065	0.08	0.81
TD#1	0.02	0.12	0.112	0.14	0.80
TD#2	0.04	0.15	0.143	0.19	0.75



**APPENDIX F:  
HydroCAD Runoff Rates & Volumes  
-Existing & Proposed Conditions-**



E-1  
 TOTAL AREA=4.14 Ac.  
 IMPERVIOUS=0.25 Ac.  
 WOODS,GOOD=0.70 Ac.  
 WOODS, FAIR=2.74 Ac.  
 BARE SOIL=0.45 Ac.



NO.	DATE	REVISION	BY

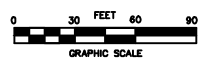
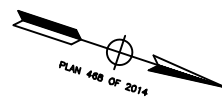
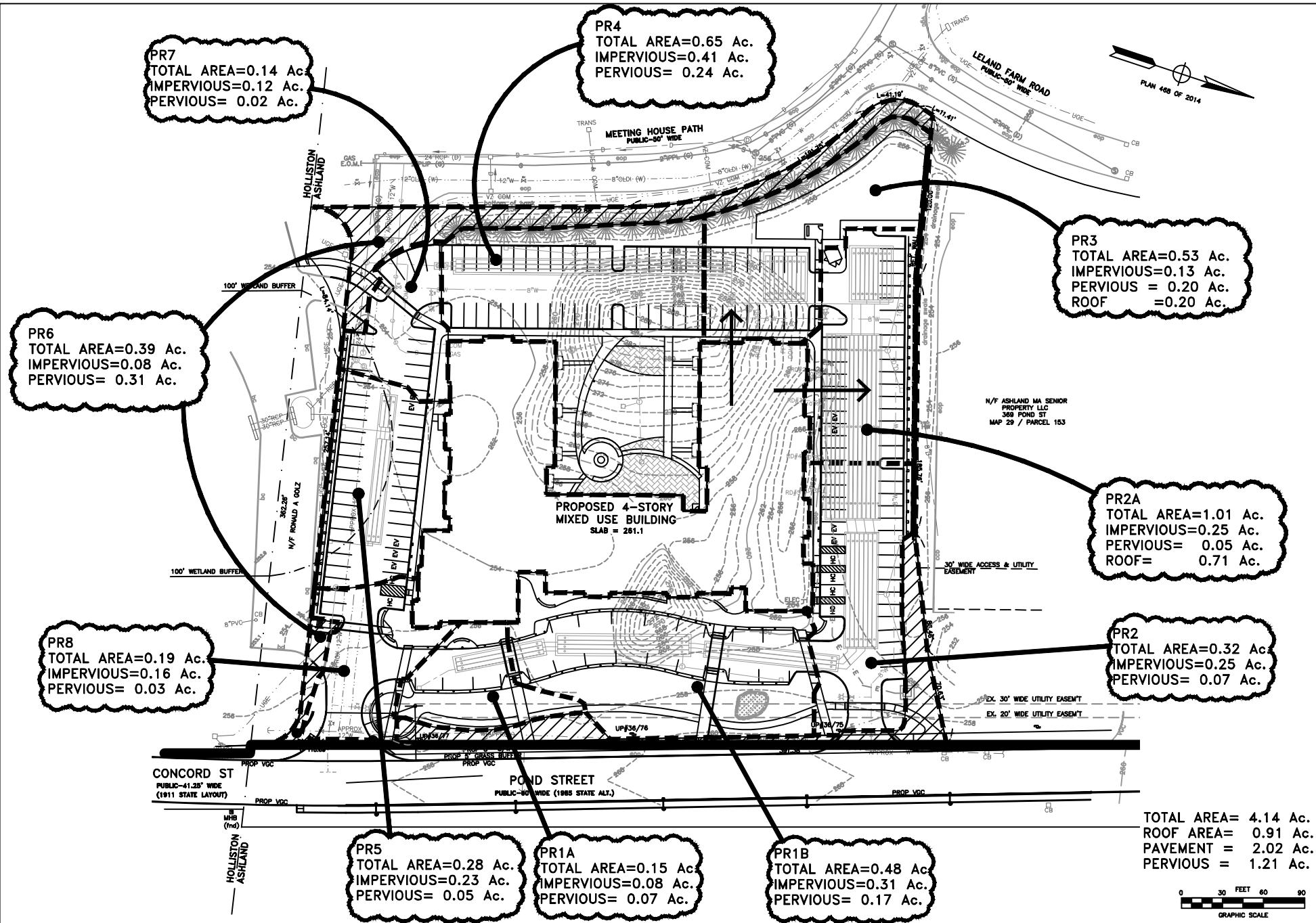
PREPARED BY:  
 BRUCE SALUK & ASSOC., INC.  
 CIVIL ENGINEERING & LAND SURVEYING  
 576 BOSTON POST ROAD EAST  
 MARLBOROUGH, MA 01752  
 TEL: 508-481-1862  
 FAX: 508-481-9825

EXISTING DRAINAGE AREA  
 POND STREET  
 ASHLAND, MA

DEVELOPER:  
 TRASK INC  
 337 TURNPIKE ROAD, SUITE 201  
 SOUTHBOROUGH, MA 01772

DATE: NOVEMBER 6, 2021

DA1  
 2874C1.dwg



NO.	DATE	DESCRIPTION
1	6/15/21	REVISION
2	7/26/21	REVISION
3	7/26/21	REVISION
4	8/16/21	REVISION
5	8/16/21	REVISION
6	8/16/21	REVISION
7	8/16/21	REVISION
8	8/16/21	REVISION
9	8/16/21	REVISION
10	8/16/21	REVISION

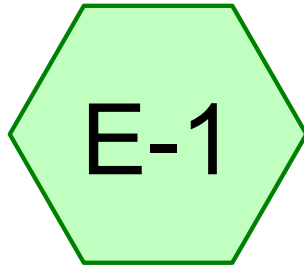
PREPARED BY:  
BRUCE SALUK & ASSOC., INC.  
CIVIL ENGINEERING & LAND SURVEYING  
100 SOUTH MAIN STREET, SUITE 201  
SOUTHBOROUGH, MA 01772  
PHONE: 508-885-1822  
FAX: 508-885-1825

DRAINAGE SUBAREAS  
POND STREET  
ASHLAND .MA

DEVELOPER:  
TRASK INC  
337 TURNPIKE ROAD, SUITE 201  
SOUTHBOROUGH, MA 01772

DATE: NOVEMBER 8, 2021  
2874C1.dwg

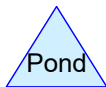
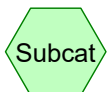
DA2



PARCEL



TOTAL FLOW



**Proposed Conditions-2874**

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**Existing Conditions-2874**

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**Rainfall Events Listing (selected events)**

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2 YR-NOAA ATLAS 14	Type III 24-hr		Default	24.00	1	3.35	2
2	10 YR-NOAA ATLAS 14	Type III 24-hr		Default	24.00	1	5.25	2
3	25 YR-NOAA ATLAS 14	Type III 24-hr		Default	24.00	1	6.43	2
4	100 YR-NOAA ATLAS 14	Type III 24-hr		Default	24.00	1	8.26	2

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Type III 24-hr 2 YR-NOAA ATLAS 14 Rainfall=3.35"

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**Summary for Subcatchment E-1: PARCEL**

Runoff = 2.28 cfs @ 12.13 hrs, Volume= 0.218 af, Depth= 0.63"  
 Routed to Reach SUM : TOTAL FLOW

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 2 YR-NOAA ATLAS 14 Rainfall=3.35"

Area (ac)	CN	Description
0.700	55	Woods, Good, HSG B
2.740	60	Woods, Fair, HSG B
* 0.250	98	Paved, HSG B
0.450	86	Newly graded area, HSG B
4.140	64	Weighted Average
3.890		93.96% Pervious Area
0.250		6.04% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.3	50	0.2400	0.36		<b>Sheet Flow, Sheet Flow</b> Cultivated: Residue>20% n= 0.170 P2= 3.20"
1.3	151	0.1460	1.91		<b>Shallow Concentrated Flow, SCF</b> Woodland Kv= 5.0 fps
3.7	179	0.0260	0.81		<b>Shallow Concentrated Flow, SCF</b> Woodland Kv= 5.0 fps
7.3	380	Total			

**Summary for Reach SUM: TOTAL FLOW**

Inflow Area = 4.140 ac, 6.04% Impervious, Inflow Depth = 0.63" for 2 YR-NOAA ATLAS 14 event  
 Inflow = 2.28 cfs @ 12.13 hrs, Volume= 0.218 af  
 Outflow = 2.28 cfs @ 12.13 hrs, Volume= 0.218 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 4

**Existing Conditions-2874**

Type III 24-hr 10 YR-NOAA ATLAS 14 Rainfall=5.25"

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**Summary for Subcatchment E-1: PARCEL**

Runoff = 7.70 cfs @ 12.11 hrs, Volume= 0.602 af, Depth= 1.75"  
 Routed to Reach SUM : TOTAL FLOW

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 10 YR-NOAA ATLAS 14 Rainfall=5.25"

Area (ac)	CN	Description
0.700	55	Woods, Good, HSG B
2.740	60	Woods, Fair, HSG B
* 0.250	98	Paved, HSG B
0.450	86	Newly graded area, HSG B
4.140	64	Weighted Average
3.890		93.96% Pervious Area
0.250		6.04% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.3	50	0.2400	0.36		<b>Sheet Flow, Sheet Flow</b> Cultivated: Residue>20% n= 0.170 P2= 3.20"
1.3	151	0.1460	1.91		<b>Shallow Concentrated Flow, SCF</b> Woodland Kv= 5.0 fps
3.7	179	0.0260	0.81		<b>Shallow Concentrated Flow, SCF</b> Woodland Kv= 5.0 fps
7.3	380	Total			

**Summary for Reach SUM: TOTAL FLOW**

Inflow Area = 4.140 ac, 6.04% Impervious, Inflow Depth = 1.75" for 10 YR-NOAA ATLAS 14 event  
 Inflow = 7.70 cfs @ 12.11 hrs, Volume= 0.602 af  
 Outflow = 7.70 cfs @ 12.11 hrs, Volume= 0.602 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 4

**Existing Conditions-2874**

Type III 24-hr 25 YR-NOAA ATLAS 14 Rainfall=6.43"

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**Summary for Subcatchment E-1: PARCEL**

Runoff = 11.70 cfs @ 12.11 hrs, Volume= 0.888 af, Depth= 2.57"  
 Routed to Reach SUM : TOTAL FLOW

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 25 YR-NOAA ATLAS 14 Rainfall=6.43"

Area (ac)	CN	Description
0.700	55	Woods, Good, HSG B
2.740	60	Woods, Fair, HSG B
* 0.250	98	Paved, HSG B
0.450	86	Newly graded area, HSG B
4.140	64	Weighted Average
3.890		93.96% Pervious Area
0.250		6.04% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.3	50	0.2400	0.36		<b>Sheet Flow, Sheet Flow</b> Cultivated: Residue>20% n= 0.170 P2= 3.20"
1.3	151	0.1460	1.91		<b>Shallow Concentrated Flow, SCF</b> Woodland Kv= 5.0 fps
3.7	179	0.0260	0.81		<b>Shallow Concentrated Flow, SCF</b> Woodland Kv= 5.0 fps
7.3	380	Total			

**Summary for Reach SUM: TOTAL FLOW**

Inflow Area = 4.140 ac, 6.04% Impervious, Inflow Depth = 2.57" for 25 YR-NOAA ATLAS 14 event  
 Inflow = 11.70 cfs @ 12.11 hrs, Volume= 0.888 af  
 Outflow = 11.70 cfs @ 12.11 hrs, Volume= 0.888 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 4

**Existing Conditions-2874**

Type III 24-hr 100 YR-NOAA ATLAS 14 Rainfall=8.26"

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**Summary for Subcatchment E-1: PARCEL**

Runoff = 18.44 cfs @ 12.11 hrs, Volume= 1.376 af, Depth= 3.99"  
 Routed to Reach SUM : TOTAL FLOW

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 100 YR-NOAA ATLAS 14 Rainfall=8.26"

Area (ac)	CN	Description
0.700	55	Woods, Good, HSG B
2.740	60	Woods, Fair, HSG B
* 0.250	98	Paved, HSG B
0.450	86	Newly graded area, HSG B
4.140	64	Weighted Average
3.890		93.96% Pervious Area
0.250		6.04% Impervious Area

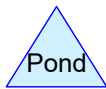
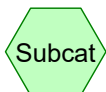
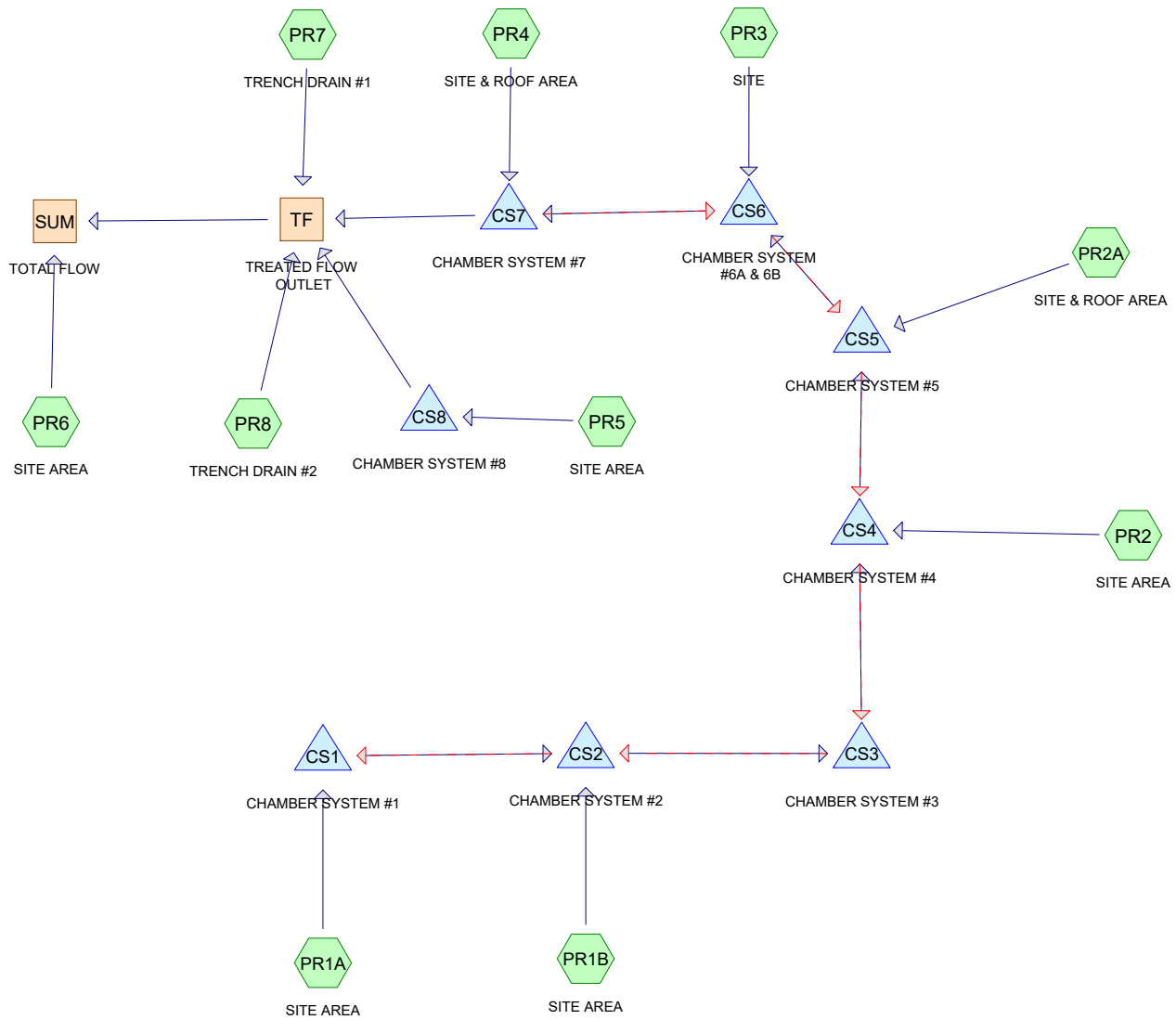
  

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.3	50	0.2400	0.36		<b>Sheet Flow, Sheet Flow</b> Cultivated: Residue>20% n= 0.170 P2= 3.20"
1.3	151	0.1460	1.91		<b>Shallow Concentrated Flow, SCF</b> Woodland Kv= 5.0 fps
3.7	179	0.0260	0.81		<b>Shallow Concentrated Flow, SCF</b> Woodland Kv= 5.0 fps
7.3	380	Total			

**Summary for Reach SUM: TOTAL FLOW**

Inflow Area = 4.140 ac, 6.04% Impervious, Inflow Depth = 3.99" for 100 YR-NOAA ATLAS 14 event  
 Inflow = 18.44 cfs @ 12.11 hrs, Volume= 1.376 af  
 Outflow = 18.44 cfs @ 12.11 hrs, Volume= 1.376 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 4



**Routing Diagram for Proposed Conditions-2874**  
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**Proposed Conditions-2874**

NOAA 24-hr D 2YR-NOAA ATLAS 14 Rainfall=3.36"

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**Summary for Subcatchment PR1A: SITE AREA**

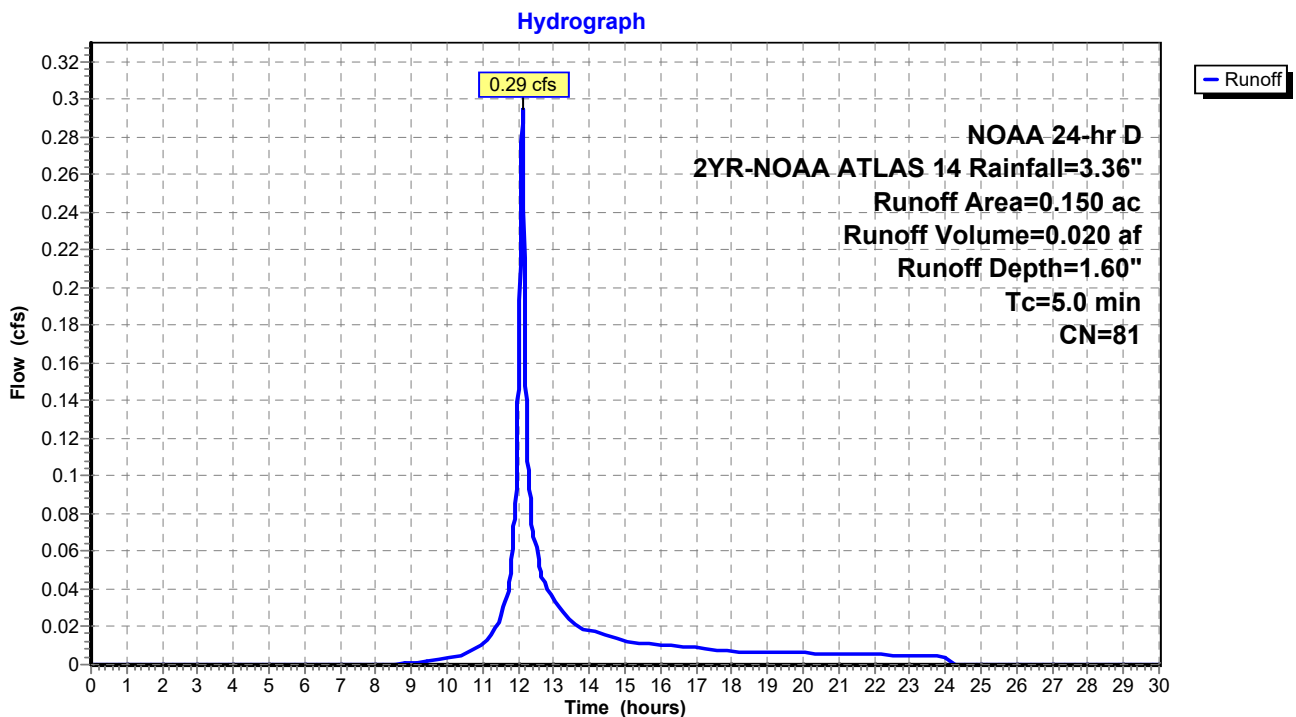
Runoff = 0.29 cfs @ 12.13 hrs, Volume= 0.020 af, Depth= 1.60"  
 Routed to Pond CS1 : CHAMBER SYSTEM #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 NOAA 24-hr D 2YR-NOAA ATLAS 14 Rainfall=3.36"

Area (ac)	CN	Description
* 0.080	98	Impervious Area
0.070	61	>75% Grass cover, Good, HSG B
0.150	81	Weighted Average
0.070		46.67% Pervious Area
0.080		53.33% Impervious Area

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

**Subcatchment PR1A: SITE AREA**



**Proposed Conditions-2874**

NOAA 24-hr D 2YR-NOAA ATLAS 14 Rainfall=3.36"

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**Summary for Subcatchment PR1B: SITE AREA**

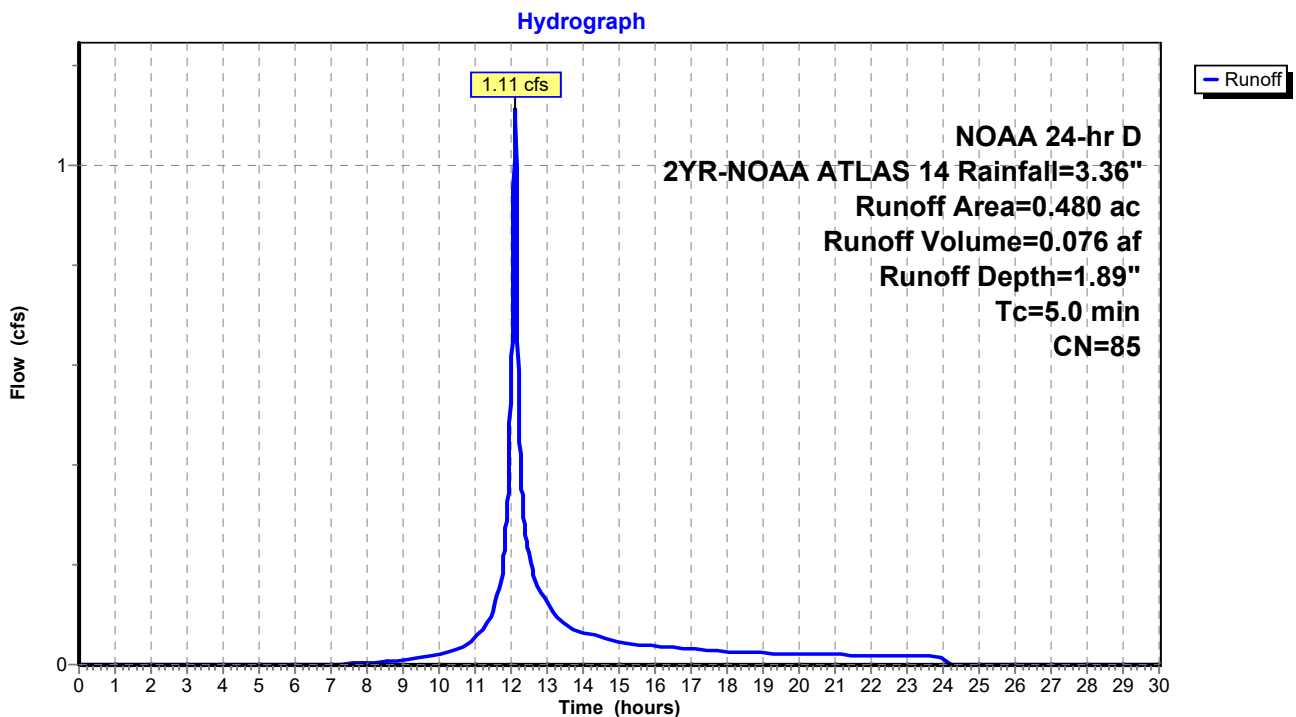
Runoff = 1.11 cfs @ 12.12 hrs, Volume= 0.076 af, Depth= 1.89"  
 Routed to Pond CS2 : CHAMBER SYSTEM #2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 NOAA 24-hr D 2YR-NOAA ATLAS 14 Rainfall=3.36"

Area (ac)	CN	Description
* 0.310	98	Impervious Area
0.170	61	>75% Grass cover, Good, HSG B
0.480	85	Weighted Average
0.170		35.42% Pervious Area
0.310		64.58% Impervious Area

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

**Subcatchment PR1B: SITE AREA**



**Proposed Conditions-2874**

NOAA 24-hr D 2YR-NOAA ATLAS 14 Rainfall=3.36"

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**Summary for Subcatchment PR2: SITE AREA**

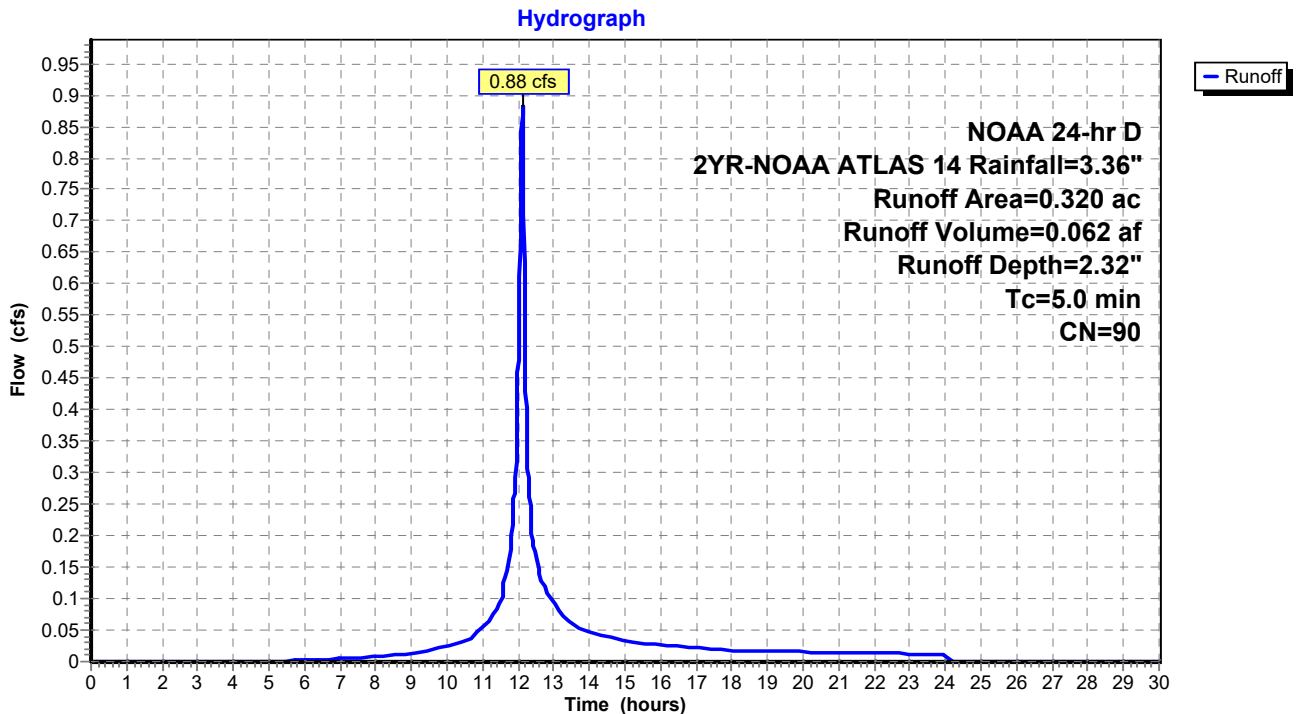
Runoff = 0.88 cfs @ 12.12 hrs, Volume= 0.062 af, Depth= 2.32"  
 Routed to Pond CS4 : CHAMBER SYSTEM #4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 NOAA 24-hr D 2YR-NOAA ATLAS 14 Rainfall=3.36"

Area (ac)	CN	Description
* 0.250	98	Impervious Area
0.070	61	>75% Grass cover, Good, HSG B
0.320	90	Weighted Average
0.070		21.87% Pervious Area
0.250		78.13% Impervious Area

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

**Subcatchment PR2: SITE AREA**



**Proposed Conditions-2874**

NOAA 24-hr D 2YR-NOAA ATLAS 14 Rainfall=3.36"

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**Summary for Subcatchment PR2A: SITE & ROOF AREA**

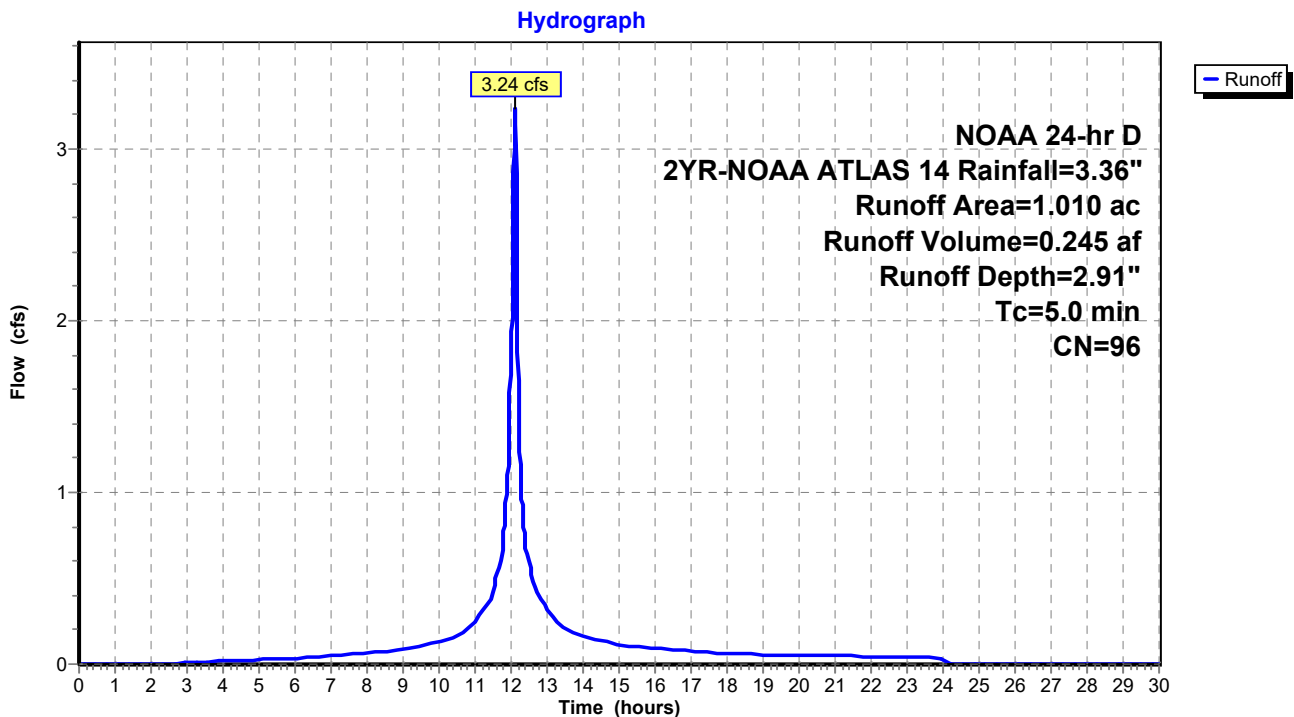
Runoff = 3.24 cfs @ 12.12 hrs, Volume= 0.245 af, Depth= 2.91"  
 Routed to Pond CS5 : CHAMBER SYSTEM #5

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 NOAA 24-hr D 2YR-NOAA ATLAS 14 Rainfall=3.36"

Area (ac)	CN	Description
* 0.250	98	Impervious Area
0.050	61	>75% Grass cover, Good, HSG B
* 0.710	98	Roof
1.010	96	Weighted Average
0.050		4.95% Pervious Area
0.960		95.05% Impervious Area

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

**Subcatchment PR2A: SITE & ROOF AREA**



**Proposed Conditions-2874**

NOAA 24-hr D 2YR-NOAA ATLAS 14 Rainfall=3.36"

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**Summary for Subcatchment PR3: SITE**

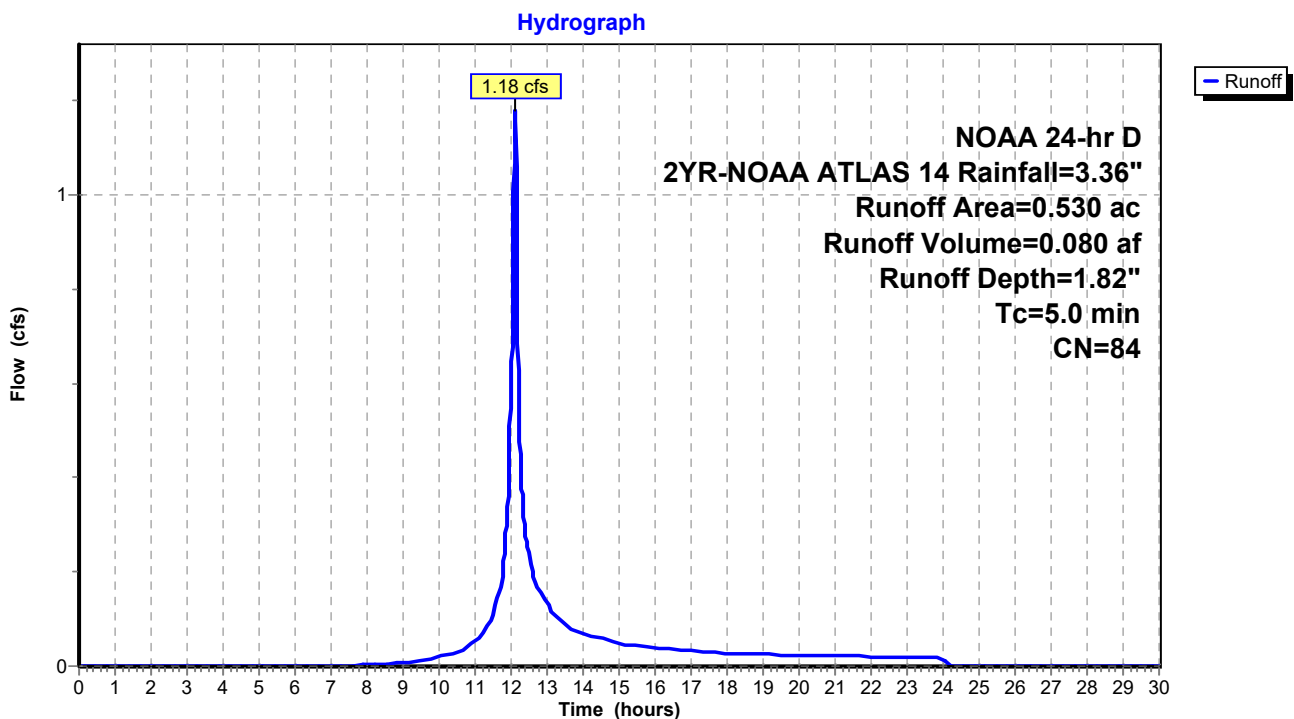
Runoff = 1.18 cfs @ 12.12 hrs, Volume= 0.080 af, Depth= 1.82"  
 Routed to Pond CS6 : CHAMBER SYSTEM #6A & 6B

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 NOAA 24-hr D 2YR-NOAA ATLAS 14 Rainfall=3.36"

Area (ac)	CN	Description
* 0.130	98	Impervious Area
0.200	61	>75% Grass cover, Good, HSG B
* 0.200	98	Roof
0.530	84	Weighted Average
0.200		37.74% Pervious Area
0.330		62.26% Impervious Area

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

**Subcatchment PR3: SITE**



**Proposed Conditions-2874**

NOAA 24-hr D 2YR-NOAA ATLAS 14 Rainfall=3.36"

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**Summary for Subcatchment PR4: SITE & ROOF AREA**

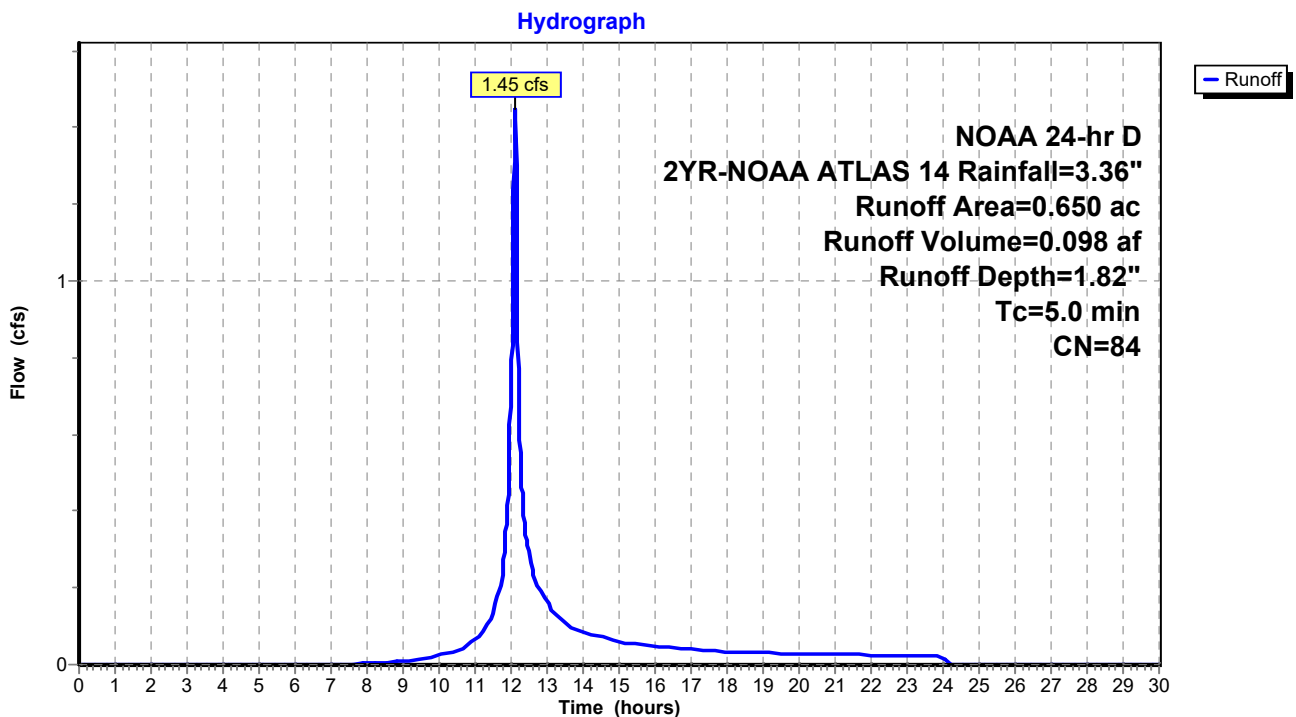
Runoff = 1.45 cfs @ 12.12 hrs, Volume= 0.098 af, Depth= 1.82"  
 Routed to Pond CS7 : CHAMBER SYSTEM #7

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 NOAA 24-hr D 2YR-NOAA ATLAS 14 Rainfall=3.36"

Area (ac)	CN	Description
* 0.410	98	Impervious Area
0.240	61	>75% Grass cover, Good, HSG B
0.650	84	Weighted Average
0.240		36.92% Pervious Area
0.410		63.08% Impervious Area

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

**Subcatchment PR4: SITE & ROOF AREA**



**Proposed Conditions-2874**

NOAA 24-hr D 2YR-NOAA ATLAS 14 Rainfall=3.36"

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**Summary for Subcatchment PR5: SITE AREA**

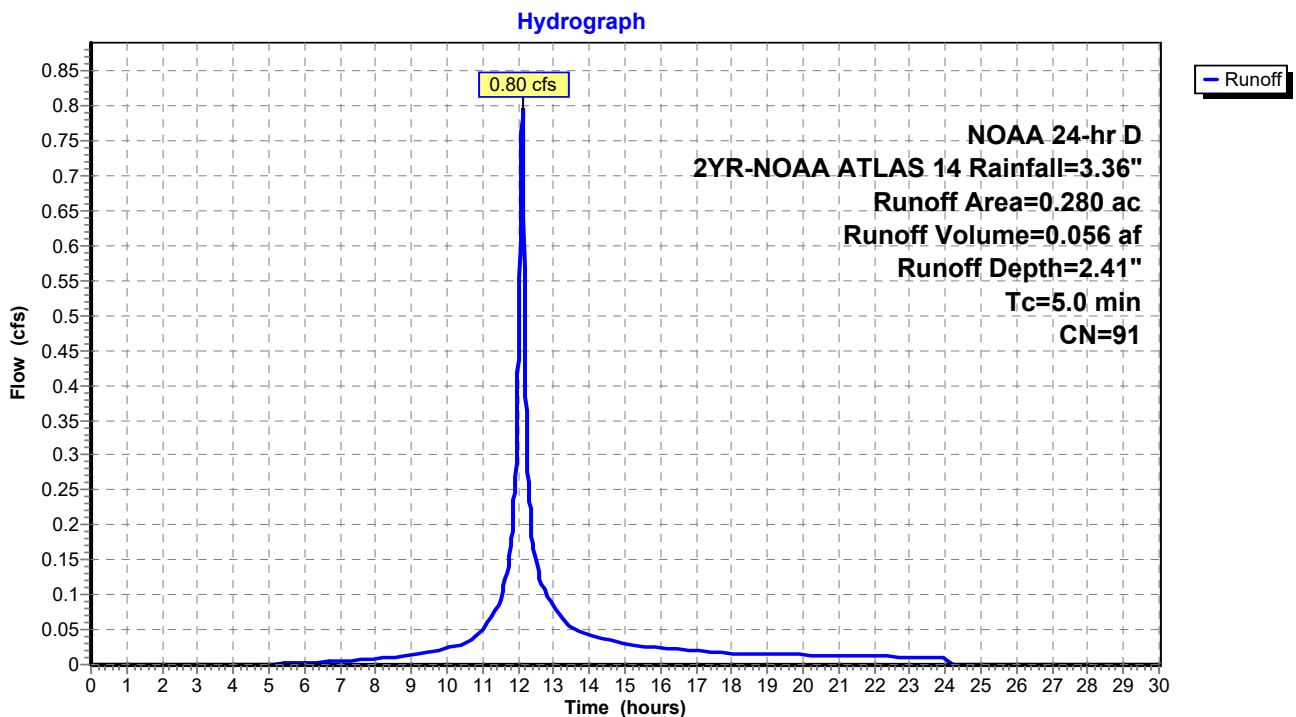
Runoff = 0.80 cfs @ 12.12 hrs, Volume= 0.056 af, Depth= 2.41"  
 Routed to Pond CS8 : CHAMBER SYSTEM #8

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 NOAA 24-hr D 2YR-NOAA ATLAS 14 Rainfall=3.36"

Area (ac)	CN	Description
* 0.230	98	Impervious Area
0.050	61	>75% Grass cover, Good, HSG B
0.280	91	Weighted Average
0.050		17.86% Pervious Area
0.230		82.14% Impervious Area

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

**Subcatchment PR5: SITE AREA**



**Proposed Conditions-2874**

NOAA 24-hr D 2YR-NOAA ATLAS 14 Rainfall=3.36"

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**Summary for Subcatchment PR6: SITE AREA**

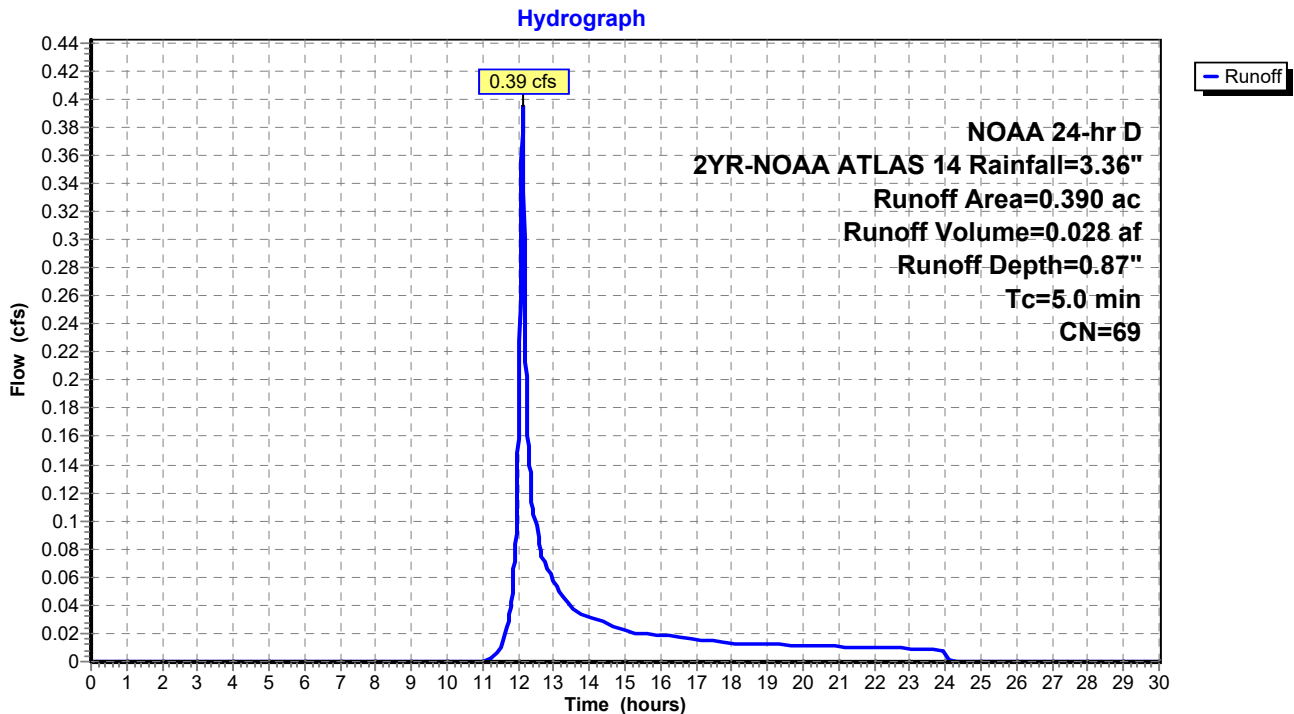
Runoff = 0.39 cfs @ 12.13 hrs, Volume= 0.028 af, Depth= 0.87"  
 Routed to Reach SUM : TOTAL FLOW

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 NOAA 24-hr D 2YR-NOAA ATLAS 14 Rainfall=3.36"

Area (ac)	CN	Description
* 0.080	98	Impervious Area
0.310	61	>75% Grass cover, Good, HSG B
0.390	69	Weighted Average
0.310		79.49% Pervious Area
0.080		20.51% Impervious Area

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

**Subcatchment PR6: SITE AREA**



**Proposed Conditions-2874**

NOAA 24-hr D 2YR-NOAA ATLAS 14 Rainfall=3.36"

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**Summary for Subcatchment PR7: TRENCH DRAIN #1**

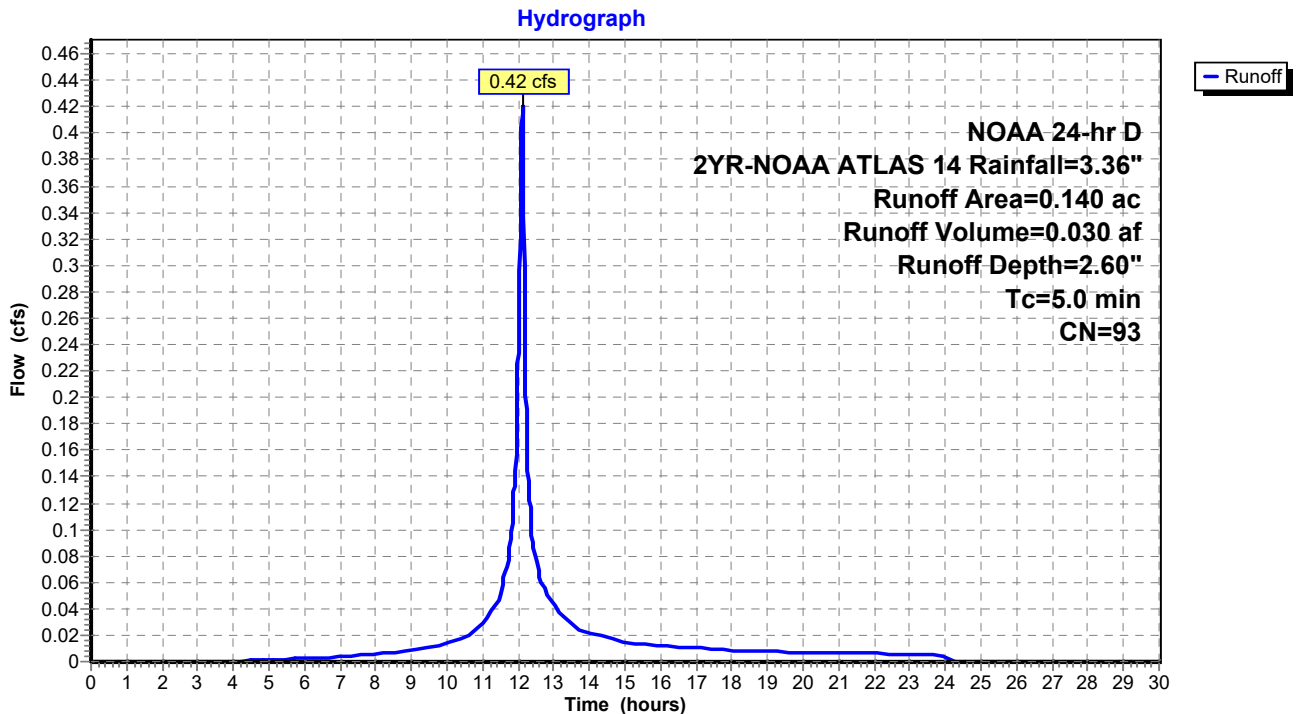
Runoff = 0.42 cfs @ 12.12 hrs, Volume= 0.030 af, Depth= 2.60"  
 Routed to Reach TF : TREATED FLOW OUTLET

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 NOAA 24-hr D 2YR-NOAA ATLAS 14 Rainfall=3.36"

Area (ac)	CN	Description
* 0.120	98	Impervious Area
0.020	61	>75% Grass cover, Good, HSG B
0.140	93	Weighted Average
0.020		14.29% Pervious Area
0.120		85.71% Impervious Area

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

**Subcatchment PR7: TRENCH DRAIN #1**



**Proposed Conditions-2874**

NOAA 24-hr D 2YR-NOAA ATLAS 14 Rainfall=3.36"

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**Summary for Subcatchment PR8: TRENCH DRAIN #2**

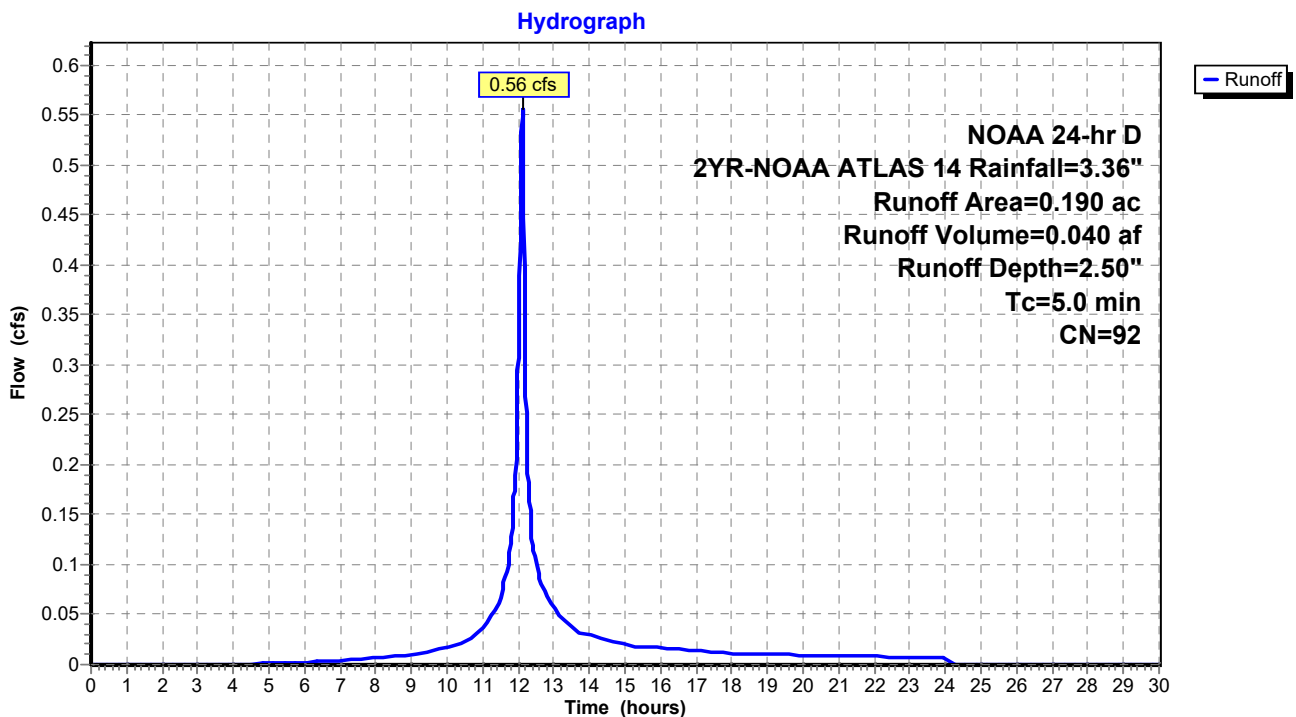
Runoff = 0.56 cfs @ 12.12 hrs, Volume= 0.040 af, Depth= 2.50"  
 Routed to Reach TF : TREATED FLOW OUTLET

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 NOAA 24-hr D 2YR-NOAA ATLAS 14 Rainfall=3.36"

Area (ac)	CN	Description
* 0.160	98	Impervious Area
0.030	61	>75% Grass cover, Good, HSG B
0.190	92	Weighted Average
0.030		15.79% Pervious Area
0.160		84.21% Impervious Area

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

**Subcatchment PR8: TRENCH DRAIN #2**



**Proposed Conditions-2874**

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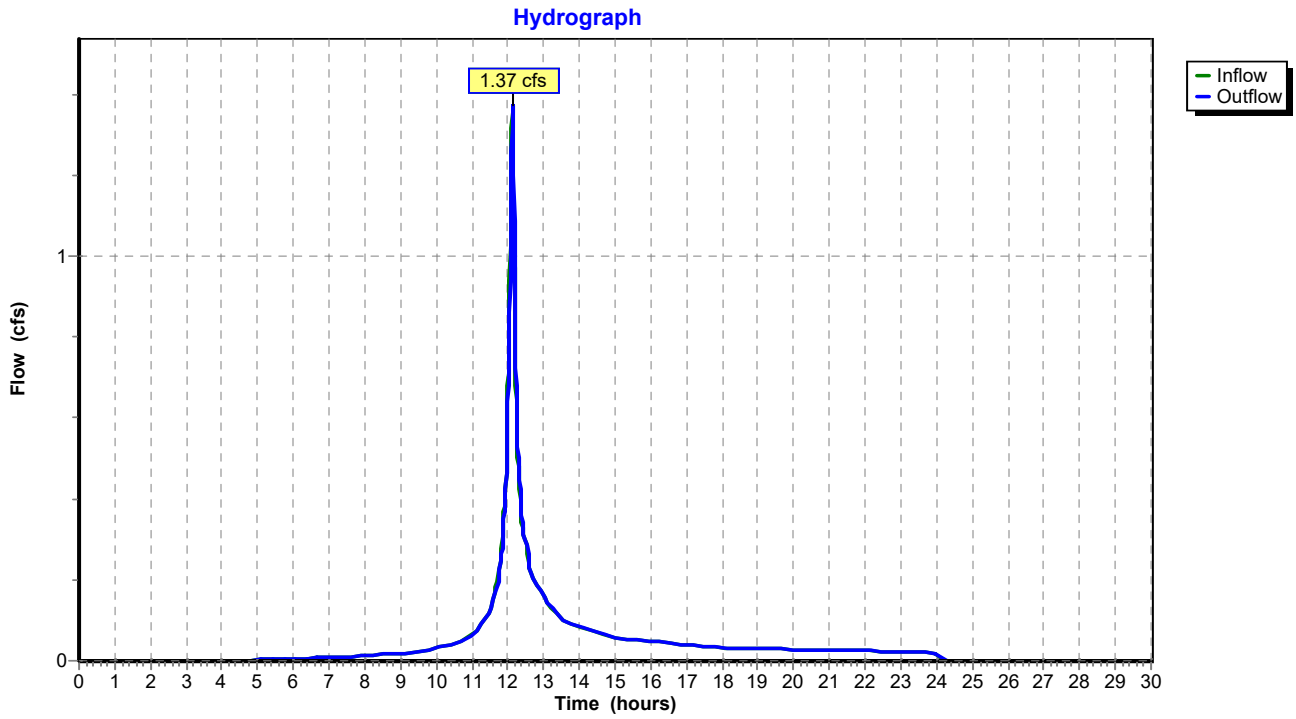
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**Summary for Reach SUM: TOTAL FLOW**

Inflow = 1.37 cfs @ 12.13 hrs, Volume= 0.098 af  
Outflow = 1.37 cfs @ 12.14 hrs, Volume= 0.098 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

**Reach SUM: TOTAL FLOW**



**Proposed Conditions-2874**

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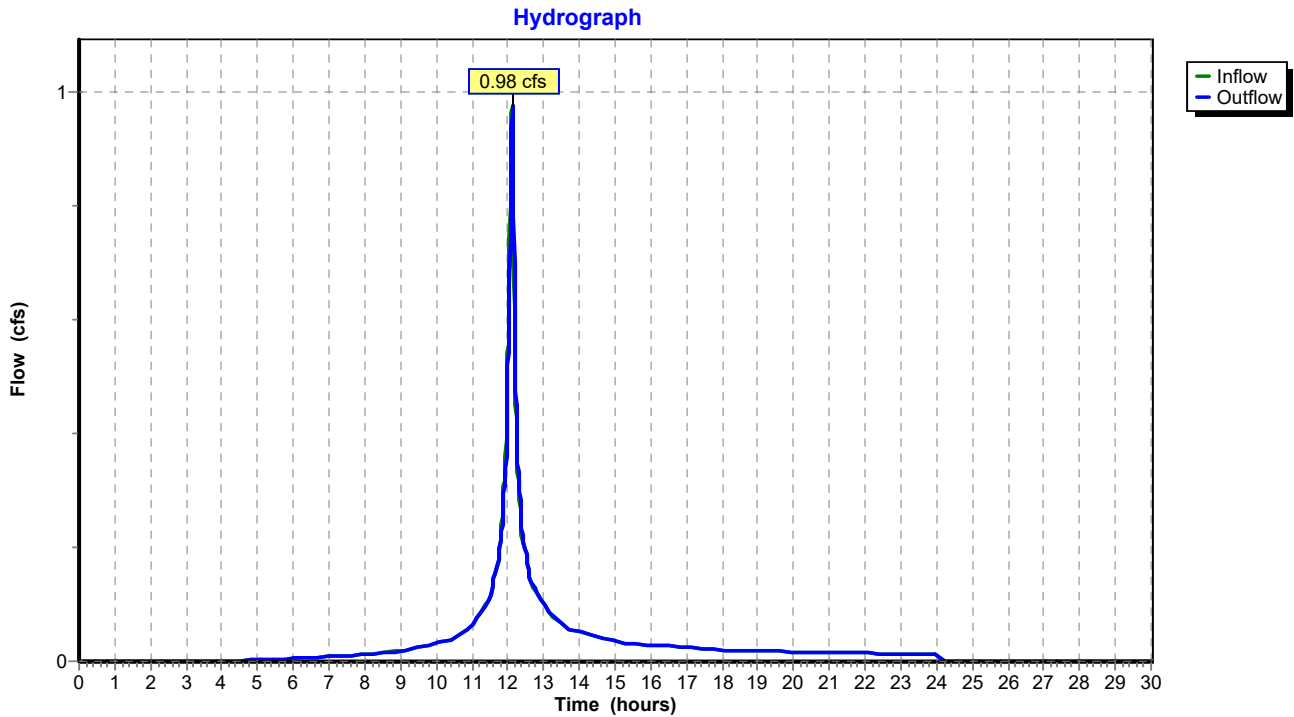
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**Summary for Reach TF: TREATED FLOW OUTLET**

Inflow = 0.98 cfs @ 12.12 hrs, Volume= 0.070 af  
Outflow = 0.98 cfs @ 12.13 hrs, Volume= 0.070 af, Atten= 0%, Lag= 0.6 min  
Routed to Reach SUM : TOTAL FLOW

Routing by Sim-Route method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

**Reach TF: TREATED FLOW OUTLET**



**Proposed Conditions-2874**

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**Summary for Pond CS1: CHAMBER SYSTEM #1**

Inflow = 0.29 cfs @ 12.13 hrs, Volume= 0.022 af  
 Outflow = 0.16 cfs @ 12.03 hrs, Volume= 0.022 af, Atten= 47%, Lag= 0.0 min  
 Discarded = 0.16 cfs @ 12.03 hrs, Volume= 0.022 af  
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af  
 Routed to Pond CS2 : CHAMBER SYSTEM #2

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 Peak Elev= 254.86' @ 12.32 hrs Surf.Area= 816 sf Storage= 85 cf

Plug-Flow detention time= 2.2 min calculated for 0.022 af (100% of inflow)  
 Center-of-Mass det. time= 2.2 min ( 841.0 - 838.8 )

Volume	Invert	Avail.Storage	Storage Description
#1	254.60'	713 cf	<b>12.00'W x 68.00'L x 3.00'H Prismatic</b> 2,448 cf Overall - 665 cf Embedded = 1,783 cf x 40.0% Voids
#2	255.10'	663 cf	<b>Cultec R-180 x 30 Inside #1</b> Effective Size= 33.6"W x 20.0"H => 3.44 sf x 6.33'L = 21.8 cf Overall Size= 36.0"W x 20.5"H x 7.33'L with 1.00' Overlap Row Length Adjustment= +1.00' x 3.44 sf x 3 rows
#3	255.10'	2 cf	<b>Cultec HVLV FC-24 x 4 Inside #1</b> Effective Size= 15.3"W x 12.0"H => 0.91 sf x 0.50'L = 0.5 cf Overall Size= 16.0"W x 12.0"H x 2.02'L with 1.52' Overlap 4 Chambers in 3 Rows
#4	255.10'	16 cf	<b>10.0" Round Pipe Storage-Impervious</b> L= 29.0' S= 0.0200 '/'
#5	255.50'	63 cf	<b>4.00'D x 5.00'H Vertical Cone/Cylinder-Impervious</b>
		1,457 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	254.60'	<b>8.270 in/hr Exfiltration over Horizontal area</b> Phase-In= 0.01'
#2	Primary	255.10'	<b>12.0" Vert. Orifice/Grate X 3.00</b> C= 0.600 Limited to weir flow at low heads
#3	Primary	258.60'	<b>2.0" x 2.0" Horiz. Orifice/Grate X 6.00 columns</b> X 6 rows C= 0.600 in 24.0" x 24.0" Grate (25% open area) Limited to weir flow at low heads

**Discarded OutFlow** Max=0.16 cfs @ 12.03 hrs HW=254.61' (Free Discharge)

↑1=Exfiltration (Exfiltration Controls 0.16 cfs)

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=254.60' TW=254.60' (Dynamic Tailwater)

↑2=Orifice/Grate ( Controls 0.00 cfs)

↑3=Orifice/Grate ( Controls 0.00 cfs)

**Proposed Conditions-2874**

NOAA 24-hr D 2YR-NOAA ATLAS 14 Rainfall=3.36"

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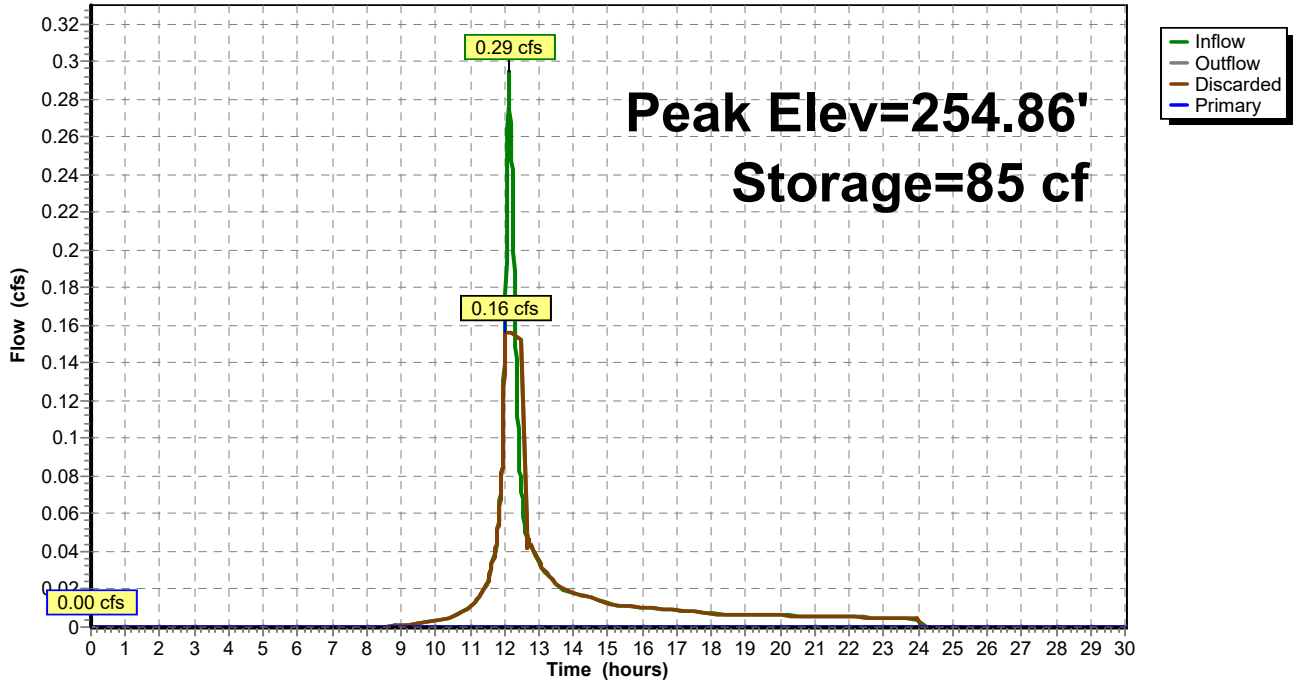
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**Pond CS1: CHAMBER SYSTEM #1**

Hydrograph



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**Summary for Pond CS2: CHAMBER SYSTEM #2**

Inflow = 1.11 cfs @ 12.12 hrs, Volume= 0.076 af  
 Outflow = 0.51 cfs @ 12.23 hrs, Volume= 0.076 af, Atten= 54%, Lag= 6.4 min  
 Discarded = 0.30 cfs @ 11.89 hrs, Volume= 0.073 af  
 Primary = 0.10 cfs @ 12.23 hrs, Volume= 0.002 af  
     Routed to Pond CS3 : CHAMBER SYSTEM #3  
 Secondary = 0.10 cfs @ 12.23 hrs, Volume= 0.002 af  
     Routed to Pond CS1 : CHAMBER SYSTEM #1

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 Peak Elev= 255.19' @ 12.23 hrs Surf.Area= 1,584 sf Storage= 430 cf

Plug-Flow detention time= 5.4 min calculated for 0.076 af (100% of inflow)  
 Center-of-Mass det. time= 5.4 min ( 837.6 - 832.3 )

Volume	Invert	Avail.Storage	Storage Description
#1	254.60'	1,371 cf	<b>16.00'W x 99.00'L x 3.00'H Prismatic</b> 4,752 cf Overall - 1,324 cf Embedded = 3,428 cf x 40.0% Voids
#2	255.10'	1,320 cf	<b>Cultec R-180</b> x 60 Inside #1 Effective Size= 33.6"W x 20.0"H => 3.44 sf x 6.33'L = 21.8 cf Overall Size= 36.0"W x 20.5"H x 7.33'L with 1.00' Overlap Row Length Adjustment= +1.00' x 3.44 sf x 4 rows
#3	255.10'	4 cf	<b>Cultec HVLV FC-24</b> x 9 Inside #1 Effective Size= 15.3"W x 12.0"H => 0.91 sf x 0.50'L = 0.5 cf Overall Size= 16.0"W x 12.0"H x 2.02'L with 1.52' Overlap 9 Chambers in 4 Rows
#4	255.10'	26 cf	<b>12.0" Round Pipe Storage</b> -Impervious L= 33.0'
#5	255.82'	113 cf	<b>4.00'D x 3.00'H Vertical Cone/Cylinder</b> x 3 -Impervious
#6	255.10'	4 cf	<b>10.0" Round Pipe Storage</b> -Impervious L= 7.0' S= 0.0143 '/'
#7	255.45'	23 cf	<b>10.0" Round Pipe Storage</b> -Impervious L= 42.0' S= 0.0100 '/'
#8	255.45'	38 cf	<b>10.0" Round Pipe Storage</b> L= 70.0' S= 0.0100 '/'
		2,899 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	255.10'	<b>12.0" Vert. Orifice/Grate X 3.00</b> C= 0.600 Limited to weir flow at low heads
#2	Discarded	254.60'	<b>8.270 in/hr Exfiltration over Horizontal area</b> Phase-In= 0.01'
#3	Secondary	255.10'	<b>12.0" Vert. Orifice/Grate X 3.00</b> C= 0.600 Limited to weir flow at low heads

**Proposed Conditions-2874**

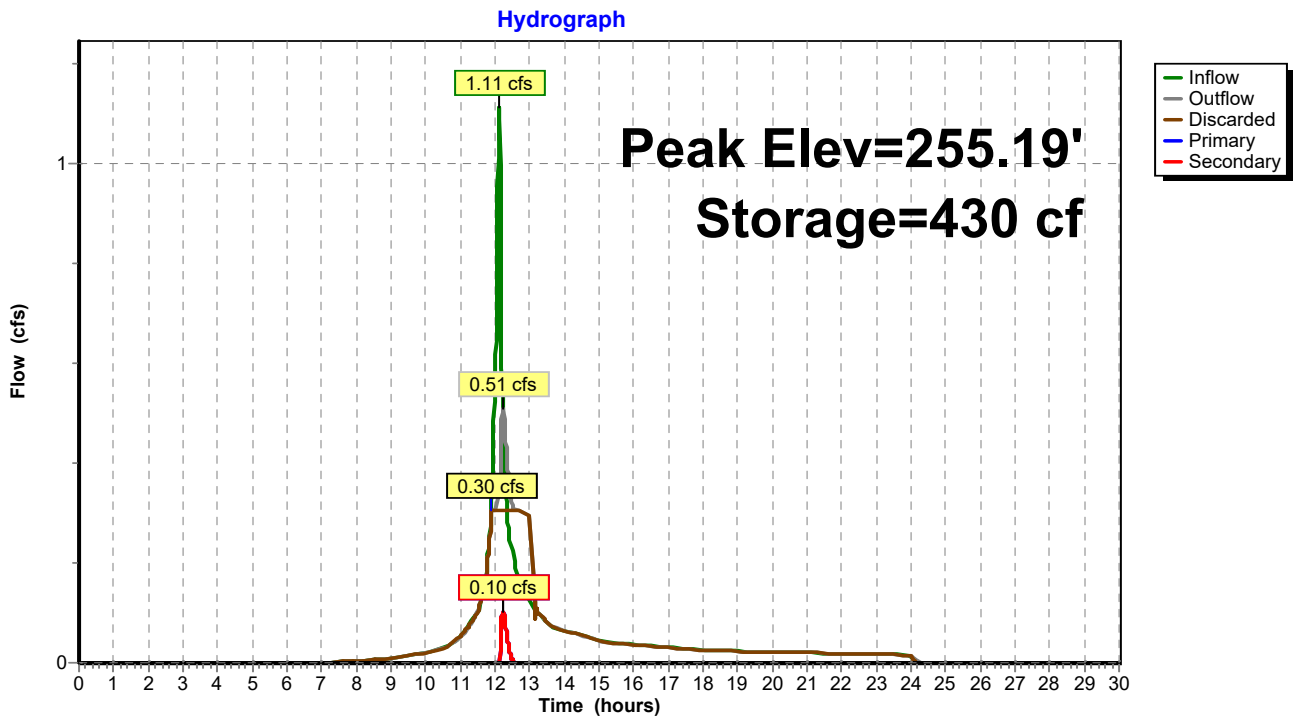
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**Discarded OutFlow** Max=0.30 cfs @ 11.89 hrs HW=254.61' (Free Discharge)  
↳ **2=Exfiltration** (Exfiltration Controls 0.30 cfs)

**Primary OutFlow** Max=0.10 cfs @ 12.23 hrs HW=255.19' TW=254.60' (Dynamic Tailwater)  
↳ **1=Orifice/Grate** (Orifice Controls 0.10 cfs @ 1.01 fps)

**Secondary OutFlow** Max=0.10 cfs @ 12.23 hrs HW=255.19' TW=254.82' (Dynamic Tailwater)  
↳ **3=Orifice/Grate** (Orifice Controls 0.10 cfs @ 1.01 fps)

**Pond CS2: CHAMBER SYSTEM #2**



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**Summary for Pond CS3: CHAMBER SYSTEM #3**

Inflow = 0.10 cfs @ 12.23 hrs, Volume= 0.002 af  
 Outflow = 0.10 cfs @ 12.24 hrs, Volume= 0.002 af, Atten= 0%, Lag= 0.3 min  
 Discarded = 0.10 cfs @ 12.24 hrs, Volume= 0.002 af  
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af  
     Routed to Pond CS4 : CHAMBER SYSTEM #4  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af  
     Routed to Pond CS2 : CHAMBER SYSTEM #2

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 Peak Elev= 254.60' @ 12.24 hrs Surf.Area= 1,188 sf Storage= 2 cf

Plug-Flow detention time= 0.3 min calculated for 0.002 af (100% of inflow)  
 Center-of-Mass det. time= 0.3 min ( 737.2 - 736.9 )

Volume	Invert	Avail.Storage	Storage Description
#1	254.60'	1,028 cf	<b>12.00'W x 99.00'L x 3.00'H Prismatic</b> 3,564 cf Overall - 993 cf Embedded = 2,571 cf x 40.0% Voids
#2	255.10'	990 cf	<b>Cultec R-180</b> x 45 Inside #1 Effective Size= 33.6"W x 20.0"H => 3.44 sf x 6.33'L = 21.8 cf Overall Size= 36.0"W x 20.5"H x 7.33'L with 1.00' Overlap Row Length Adjustment= +1.00' x 3.44 sf x 3 rows
#3	255.10'	3 cf	<b>Cultec HVLV FC-24</b> x 6 Inside #1 Effective Size= 15.3"W x 12.0"H => 0.91 sf x 0.50'L = 0.5 cf Overall Size= 16.0"W x 12.0"H x 2.02'L with 1.52' Overlap 6 Chambers in 3 Rows
#4	255.10'	28 cf	<b>12.0" Round Pipe Storage</b> x 3 -Impervious L= 12.0'
		2,050 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	255.10'	<b>12.0" Vert. Orifice/Grate X 3.00</b> C= 0.600 Limited to weir flow at low heads
#2	Discarded	254.60'	<b>8.270 in/hr Exfiltration over Horizontal area</b> Phase-In= 0.01'
#3	Secondary	255.10'	<b>12.0" Vert. Orifice/Grate X 3.00</b> C= 0.600 Limited to weir flow at low heads

**Discarded OutFlow** Max=0.10 cfs @ 12.24 hrs HW=254.60' (Free Discharge)  
 ↑**2=Exfiltration** (Exfiltration Controls 0.10 cfs)

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=254.60' TW=254.60' (Dynamic Tailwater)  
 ↑**1=Orifice/Grate** ( Controls 0.00 cfs)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=254.60' TW=254.60' (Dynamic Tailwater)  
 ↑**3=Orifice/Grate** ( Controls 0.00 cfs)

**Proposed Conditions-2874**

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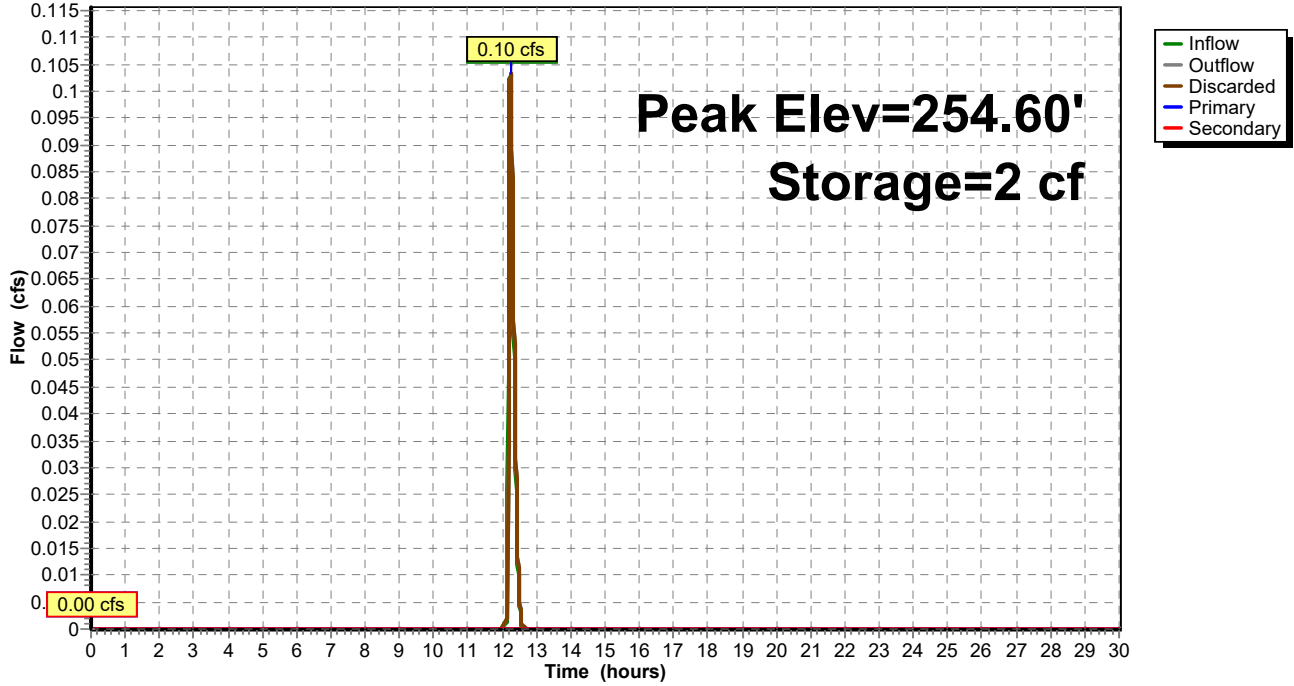
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**Pond CS3: CHAMBER SYSTEM #3**

Hydrograph



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**Summary for Pond CS4: CHAMBER SYSTEM #4**

Inflow = 0.88 cfs @ 12.12 hrs, Volume= 0.062 af  
 Outflow = 0.41 cfs @ 11.98 hrs, Volume= 0.062 af, Atten= 54%, Lag= 0.0 min  
 Discarded = 0.41 cfs @ 11.98 hrs, Volume= 0.062 af  
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af  
     Routed to Pond CS5 : CHAMBER SYSTEM #5  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af  
     Routed to Pond CS3 : CHAMBER SYSTEM #3

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 Peak Elev= 254.85' @ 12.23 hrs Surf.Area= 2,125 sf Storage= 215 cf

Plug-Flow detention time= 1.8 min calculated for 0.062 af (100% of inflow)  
 Center-of-Mass det. time= 1.8 min ( 812.7 - 810.9 )

Volume	Invert	Avail.Storage	Storage Description
#1	254.60'	1,933 cf	<b>25.00'W x 85.00'L x 3.00'H Prismatic</b> 6,375 cf Overall - 1,543 cf Embedded = 4,832 cf x 40.0% Voids
#2	255.10'	1,534 cf	<b>Cultec R-150XLHD x 56 Inside #1</b> Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap Row Length Adjustment= +0.75' x 2.65 sf x 7 rows
#3	255.10'	8 cf	<b>Cultec R-150XLHD-FC-24 x 18 Inside #1</b> Effective Size= 15.3"W x 12.0"H => 0.91 sf x 0.50'L = 0.5 cf Overall Size= 16.0"W x 12.0"H x 2.02'L with 1.52' Overlap 18 Chambers in 7 Rows
#4	255.10'	122 cf	<b>12.0" Round Pipe Storage-Impervious</b> L= 155.0'
#5	255.20'	151 cf	<b>4.00'D x 3.00'H Vertical Cone/Cylinder x 4 -Impervious</b>
#6	255.85'	75 cf	<b>4.00'D x 3.00'H Vertical Cone/Cylinder x 2 -Impervious</b>
#7	255.10'	3 cf	<b>10.0" Round Pipe Storage</b> L= 5.0' S= 0.0200 '/'
#8	255.45'	44 cf	<b>10.0" Round Pipe Storage x 2</b> L= 40.0' S= 0.0100 '/'
		3,870 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	255.10'	<b>12.0" Vert. Orifice/Grate X 4.00</b> C= 0.600 Limited to weir flow at low heads
#2	Discarded	254.60'	<b>8.270 in/hr Exfiltration over Horizontal area</b> Phase-In= 0.01'
#3	Secondary	255.10'	<b>12.0" Vert. Orifice/Grate X 3.00</b> C= 0.600 Limited to weir flow at low heads

**Proposed Conditions-2874**

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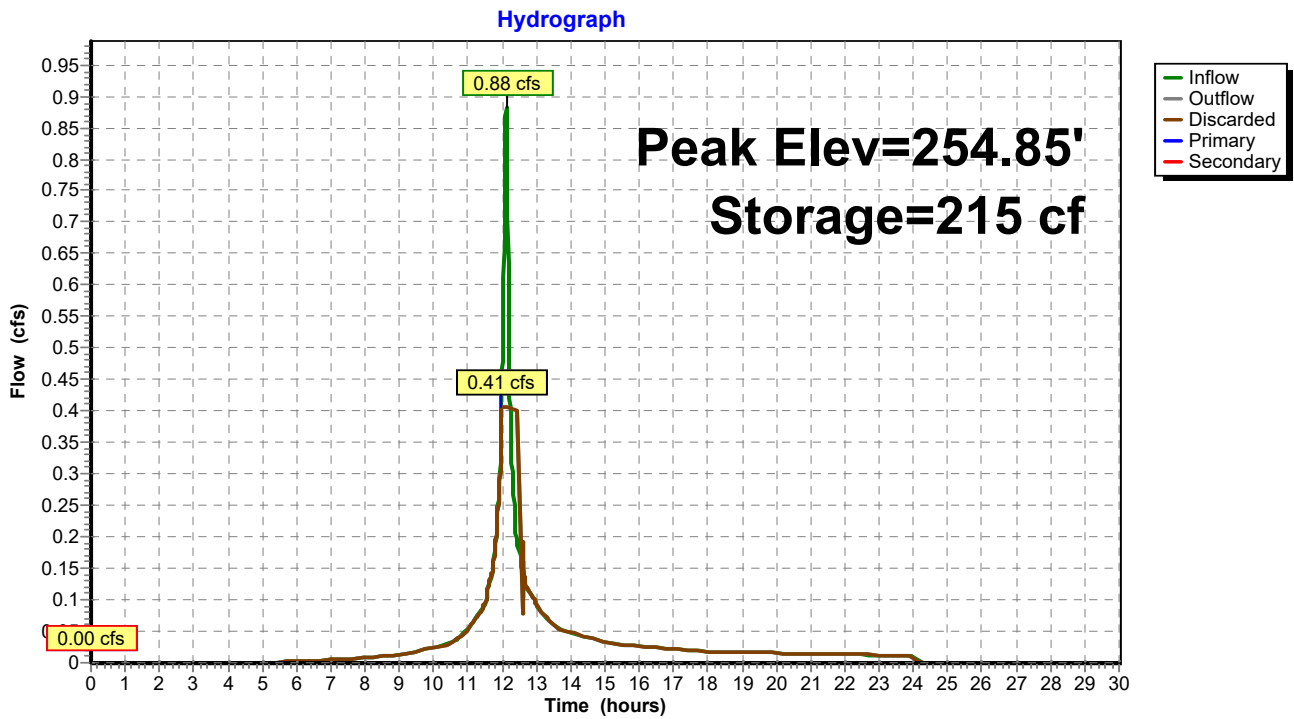
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**Discarded OutFlow** Max=0.41 cfs @ 11.98 hrs HW=254.61' (Free Discharge)  
↳ **2=Exfiltration** (Exfiltration Controls 0.41 cfs)

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=254.60' TW=254.60' (Dynamic Tailwater)  
↳ **1=Orifice/Grate** ( Controls 0.00 cfs)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=254.60' TW=254.60' (Dynamic Tailwater)  
↳ **3=Orifice/Grate** ( Controls 0.00 cfs)

**Pond CS4: CHAMBER SYSTEM #4**



**Proposed Conditions-2874**

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**Summary for Pond CS5: CHAMBER SYSTEM #5**

Inflow = 3.24 cfs @ 12.12 hrs, Volume= 0.245 af  
 Outflow = 1.10 cfs @ 12.27 hrs, Volume= 0.245 af, Atten= 66%, Lag= 9.2 min  
 Discarded = 1.05 cfs @ 11.90 hrs, Volume= 0.244 af  
 Primary = 0.02 cfs @ 12.27 hrs, Volume= 0.000 af  
     Routed to Pond CS6 : CHAMBER SYSTEM #6A & 6B  
 Secondary = 0.03 cfs @ 12.27 hrs, Volume= 0.000 af  
     Routed to Pond CS4 : CHAMBER SYSTEM #4

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 Peak Elev= 255.14' @ 12.27 hrs Surf.Area= 5,508 sf Storage= 1,275 cf

Plug-Flow detention time= 4.4 min calculated for 0.245 af (100% of inflow)  
 Center-of-Mass det. time= 4.4 min ( 779.7 - 775.3 )

Volume	Invert	Avail.Storage	Storage Description
#1	254.60'	4,896 cf	<b>40.50'W x 136.00'L x 3.00'H Prismaoid</b> 16,524 cf Overall - 4,285 cf Embedded = 12,239 cf x 40.0% Voids
#2	255.10'	4,260 cf	<b>Cultec R-150XLHD x 156 Inside #1</b> Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap Row Length Adjustment= +0.75' x 2.65 sf x 12 rows
#3	255.10'	25 cf	<b>Cultec R-150XLHD-FC-24 x 55 Inside #1</b> Effective Size= 15.3"W x 12.0"H => 0.91 sf x 0.50'L = 0.5 cf Overall Size= 16.0"W x 12.0"H x 2.02'L with 1.52' Overlap 55 Chambers in 12 Rows
#4	255.10'	35 cf	<b>12.0" Round Pipe Storage 1 x 4 -Impervious</b> L= 11.0'
#5	255.10'	40 cf	<b>12.0" Round Pipe Storage 2 x 3 -Impervious</b> L= 17.0' S= 0.0200 '/'
#6	255.10'	12 cf	<b>12.0" Round Pipe Storage 3-Impervious</b> L= 15.0' S= 0.0200 '/'
#7	255.10'	2 cf	<b>10.0" Round Pipe Storage 4-Impervious</b> L= 3.0' S= 0.0100 '/'
#8	255.38'	26 cf	<b>10.0" Round Pipe Storage 5-Impervious</b> L= 47.0' S= 0.0100 '/'
#9	255.38'	15 cf	<b>10.0" Round Pipe Storage 6-Impervious</b> L= 27.0' S= 0.0100 '/'
#10	255.65'	38 cf	<b>4.00'D x 3.00'H Vertical Cone/Cylinder-Impervious</b>
#11	255.85'	38 cf	<b>4.00'D x 3.00'H Vertical Cone/Cylinder-Impervious</b>
		9,384 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	255.10'	<b>12.0" Vert. Orifice/Grate X 3.00</b> C= 0.600 Limited to weir flow at low heads
#2	Discarded	254.60'	<b>8.270 in/hr Exfiltration over Horizontal area</b> Phase-In= 0.01'
#3	Secondary	255.10'	<b>12.0" Vert. Orifice/Grate X 4.00</b> C= 0.600 Limited to weir flow at low heads

**Proposed Conditions-2874**

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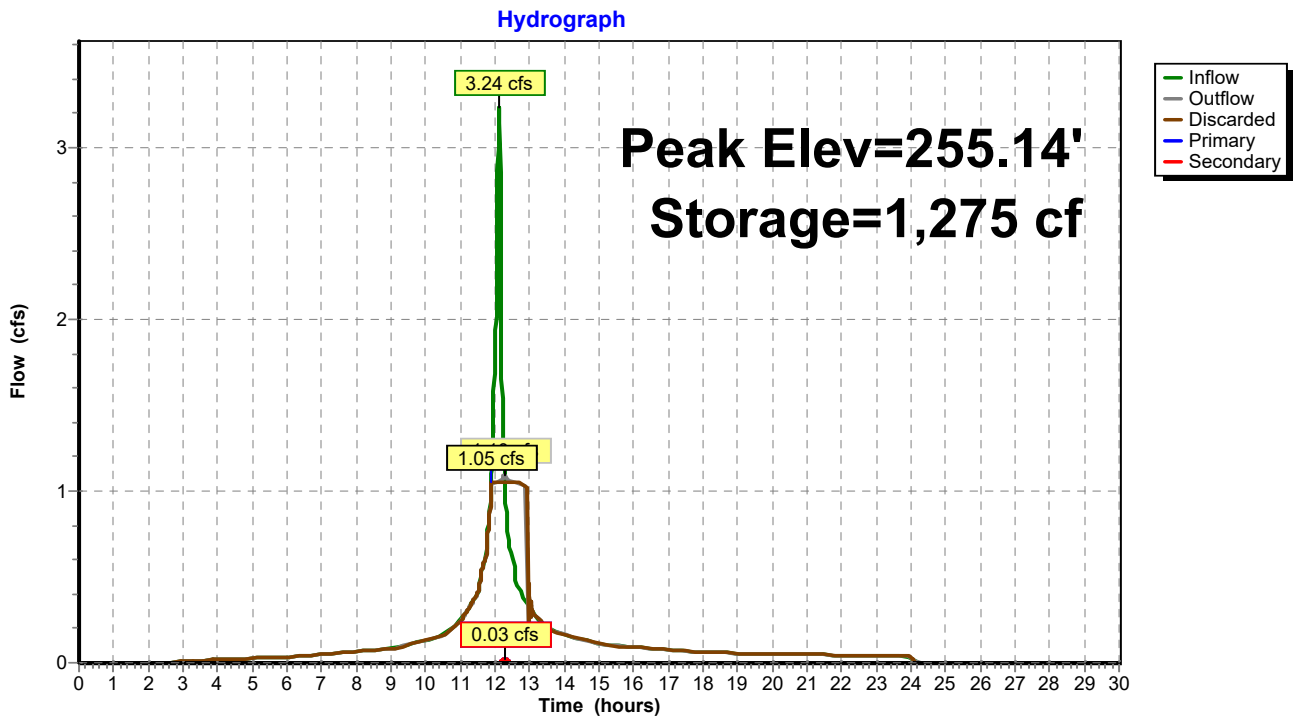
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**Discarded OutFlow** Max=1.05 cfs @ 11.90 hrs HW=254.61' (Free Discharge)  
↳ **2=Exfiltration** (Exfiltration Controls 1.05 cfs)

**Primary OutFlow** Max=0.02 cfs @ 12.27 hrs HW=255.14' TW=254.94' (Dynamic Tailwater)  
↳ **1=Orifice/Grate** (Orifice Controls 0.02 cfs @ 0.66 fps)

**Secondary OutFlow** Max=0.03 cfs @ 12.27 hrs HW=255.14' TW=254.85' (Dynamic Tailwater)  
↳ **3=Orifice/Grate** (Orifice Controls 0.03 cfs @ 0.66 fps)

**Pond CS5: CHAMBER SYSTEM #5**



**Proposed Conditions-2874**

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**Summary for Pond CS6: CHAMBER SYSTEM #6A & 6B**

Inflow = 1.18 cfs @ 12.12 hrs, Volume= 0.080 af  
 Outflow = 0.47 cfs @ 11.97 hrs, Volume= 0.080 af, Atten= 60%, Lag= 0.0 min  
 Discarded = 0.47 cfs @ 11.97 hrs, Volume= 0.080 af  
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af  
     Routed to Pond CS7 : CHAMBER SYSTEM #7  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af  
     Routed to Pond CS5 : CHAMBER SYSTEM #5

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 Peak Elev= 254.94' @ 12.26 hrs Surf.Area= 2,464 sf Storage= 347 cf

Plug-Flow detention time= 2.8 min calculated for 0.080 af (100% of inflow)  
 Center-of-Mass det. time= 2.8 min ( 838.5 - 835.7 )

Volume	Invert	Avail.Storage	Storage Description
#1	254.60'	1,089 cf	<b>32.00'W x 41.00'L x 3.00'H Prismatic 6A</b> 3,936 cf Overall - 1,214 cf Embedded = 2,722 cf x 40.0% Voids
#2	255.10'	1,207 cf	<b>Cultec R-180 (SECTION 6A) x 54 Inside #1</b> Effective Size= 33.6"W x 20.0"H => 3.44 sf x 6.33'L = 21.8 cf Overall Size= 36.0"W x 20.5"H x 7.33'L with 1.00' Overlap Row Length Adjustment= +1.00' x 3.44 sf x 9 rows
#3	255.10'	7 cf	<b>Cultec HVLV FC-24 (SECTION 6A) x 16 Inside #1</b> Effective Size= 15.3"W x 12.0"H => 0.91 sf x 0.50'L = 0.5 cf Overall Size= 16.0"W x 12.0"H x 2.02'L with 1.52' Overlap 16 Chambers in 9 Rows
#4	254.60'	975 cf	<b>32.00'W x 36.00'L x 3.00'H Prismatic (SECTION 6B)</b> 3,456 cf Overall - 1,018 cf Embedded = 2,438 cf x 40.0% Voids
#5	255.10'	1,011 cf	<b>Cultec R-180 (SECTION 6B) x 45 Inside #4</b> Effective Size= 33.6"W x 20.0"H => 3.44 sf x 6.33'L = 21.8 cf Overall Size= 36.0"W x 20.5"H x 7.33'L with 1.00' Overlap Row Length Adjustment= +1.00' x 3.44 sf x 9 rows
#6	255.10'	7 cf	<b>Cultec HVLV FC-24 (SECTION 6B) x 16 Inside #4</b> Effective Size= 15.3"W x 12.0"H => 0.91 sf x 0.50'L = 0.5 cf Overall Size= 16.0"W x 12.0"H x 2.02'L with 1.52' Overlap 16 Chambers in 9 Rows
#7	255.10'	54 cf	<b>12.0" Round Pipe Storage 1 x 3 -Impervious</b> L= 23.0'
#8	254.77'	198 cf	<b>18.0" Round Pipe Storage 2-Impervious</b> L= 112.0'
#9	255.10'	14 cf	<b>12.0" Round Pipe Storage 3 x 6 -Impervious</b> L= 3.0'
#10	255.10'	20 cf	<b>12.0" Round Pipe Storage 4-Impervious</b> L= 26.0' S= 0.0200 '/'
#11	255.10'	51 cf	<b>Custom Stage Data (Prismatic) Listed below (Recalc) -Impervious</b>
		4,634 cf	Total Available Storage

**Proposed Conditions-2874**

NOAA 24-hr D 2YR-NOAA ATLAS 14 Rainfall=3.36"

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Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
255.10	17	0	0
258.10	17	51	51

Device	Routing	Invert	Outlet Devices
#1	Primary	253.80'	<b>12.0" Vert. Orifice/Grate X 3.00</b> C= 0.600 Limited to weir flow at low heads
#2	Device 1	253.55'	<b>18.0" Round Culvert</b> L= 15.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 253.55' / 253.55' S= 0.0000 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#3	Device 2	255.50'	<b>3.4' long Sharp-Crested Rectangular Weir</b> 1 End Contraction(s) 2.5' Crest Height
#4	Device 2	255.10'	<b>0.8' long Sharp-Crested Rectangular Weir</b> 2 End Contraction(s) 2.0' Crest Height
#5	Primary	254.77'	<b>18.0" Round Culvert</b> L= 71.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 254.77' / 254.77' S= 0.0000 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#6	Device 5	255.10'	<b>12.0" Vert. Orifice/Grate X 6.00</b> C= 0.600 Limited to weir flow at low heads
#7	Discarded	254.60'	<b>8.270 in/hr Exfiltration over Horizontal area</b> Phase-In= 0.01'
#8	Secondary	255.10'	<b>12.0" Vert. Orifice/Grate X 3.00</b> C= 0.600 Limited to weir flow at low heads

**Discarded OutFlow** Max=0.47 cfs @ 11.97 hrs HW=254.61' (Free Discharge)

↑7=Exfiltration (Exfiltration Controls 0.47 cfs)

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=254.60' TW=253.30' (Dynamic Tailwater)

↑1=Orifice/Grate (Passes 0.00 cfs of 6.15 cfs potential flow)  
 ↑2=Culvert (Passes 0.00 cfs of 2.91 cfs potential flow)  
 ↑3=Sharp-Crested Rectangular Weir ( Controls 0.00 cfs)  
 ↑4=Sharp-Crested Rectangular Weir ( Controls 0.00 cfs)  
 ↑5=Culvert ( Controls 0.00 cfs)  
 ↑6=Orifice/Grate ( Controls 0.00 cfs)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=254.60' TW=254.60' (Dynamic Tailwater)

↑8=Orifice/Grate ( Controls 0.00 cfs)

**Proposed Conditions-2874**

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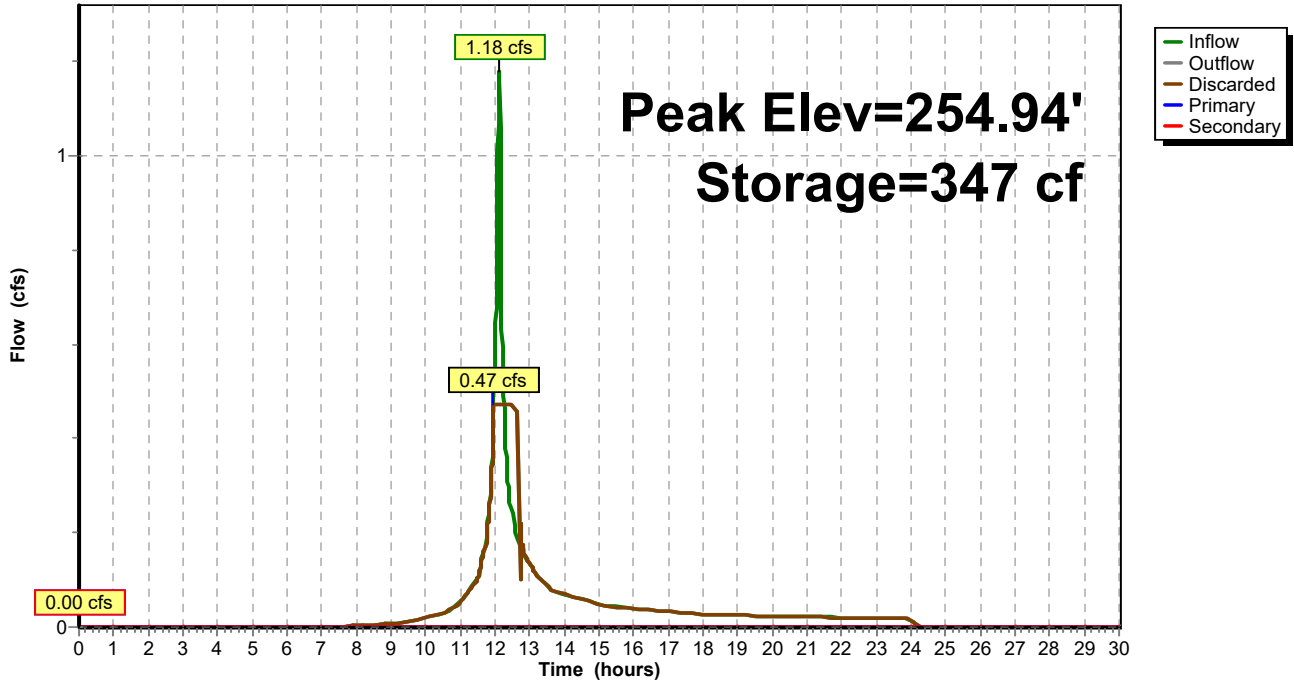
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**Pond CS6: CHAMBER SYSTEM #6A & 6B**

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**Summary for Pond CS7: CHAMBER SYSTEM #7**

Inflow = 1.45 cfs @ 12.12 hrs, Volume= 0.098 af  
 Outflow = 0.46 cfs @ 12.30 hrs, Volume= 0.098 af, Atten= 68%, Lag= 10.7 min  
 Discarded = 0.46 cfs @ 11.95 hrs, Volume= 0.098 af  
 Primary = 0.00 cfs @ 12.30 hrs, Volume= 0.000 af  
 Routed to Reach TF : TREATED FLOW OUTLET  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af  
 Routed to Pond CS6 : CHAMBER SYSTEM #6A & 6B

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 Peak Elev= 253.83' @ 12.30 hrs Surf.Area= 2,400 sf Storage= 557 cf

Plug-Flow detention time= 5.2 min calculated for 0.098 af (100% of inflow)  
 Center-of-Mass det. time= 5.2 min ( 841.2 - 836.0 )

Volume	Invert	Avail.Storage	Storage Description
#1	253.30'	2,064 cf	<b>12.00'W x 200.00'L x 3.00'H Prismatic</b> 7,200 cf Overall - 2,039 cf Embedded = 5,161 cf x 40.0% Voids
#2	253.80'	2,035 cf	<b>Cultec R-180</b> x 93 Inside #1 Effective Size= 33.6"W x 20.0"H => 3.44 sf x 6.33'L = 21.8 cf Overall Size= 36.0"W x 20.5"H x 7.33'L with 1.00' Overlap Row Length Adjustment= +1.00' x 3.44 sf x 3 rows
#3	253.80'	4 cf	<b>Cultec HVLV FC-24</b> x 8 Inside #1 Effective Size= 15.3"W x 12.0"H => 0.91 sf x 0.50'L = 0.5 cf Overall Size= 16.0"W x 12.0"H x 2.02'L with 1.52' Overlap 8 Chambers in 3 Rows
#4	253.80'	26 cf	<b>12.0" Round Pipe Storage 1-Impervious</b> L= 33.0'
#5	253.55'	41 cf	<b>18.0" Round Pipe Storage 2-Impervious</b> L= 23.0'
#6	253.30'	51 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc) -Impervious
		4,221 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
253.30	17	0	0
256.30	17	51	51

Device	Routing	Invert	Outlet Devices
#1	Primary	253.25'	<b>18.0" Round RCP_Round 18"</b> L= 47.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 253.25' / 249.30' S= 0.0840 ' / Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf
#2	Device 1	253.80'	<b>12.0" Vert. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	255.40'	<b>4.2' long x 1.50' rise Sharp-Crested Rectangular Weir</b> 2 End Contraction(s) 2.2' Crest Height
#4	Device 2	253.55'	<b>18.0" Vert. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#5	Device 4	253.80'	<b>12.0" Vert. Orifice/Grate X 3.00</b> C= 0.600

**Proposed Conditions-2874**

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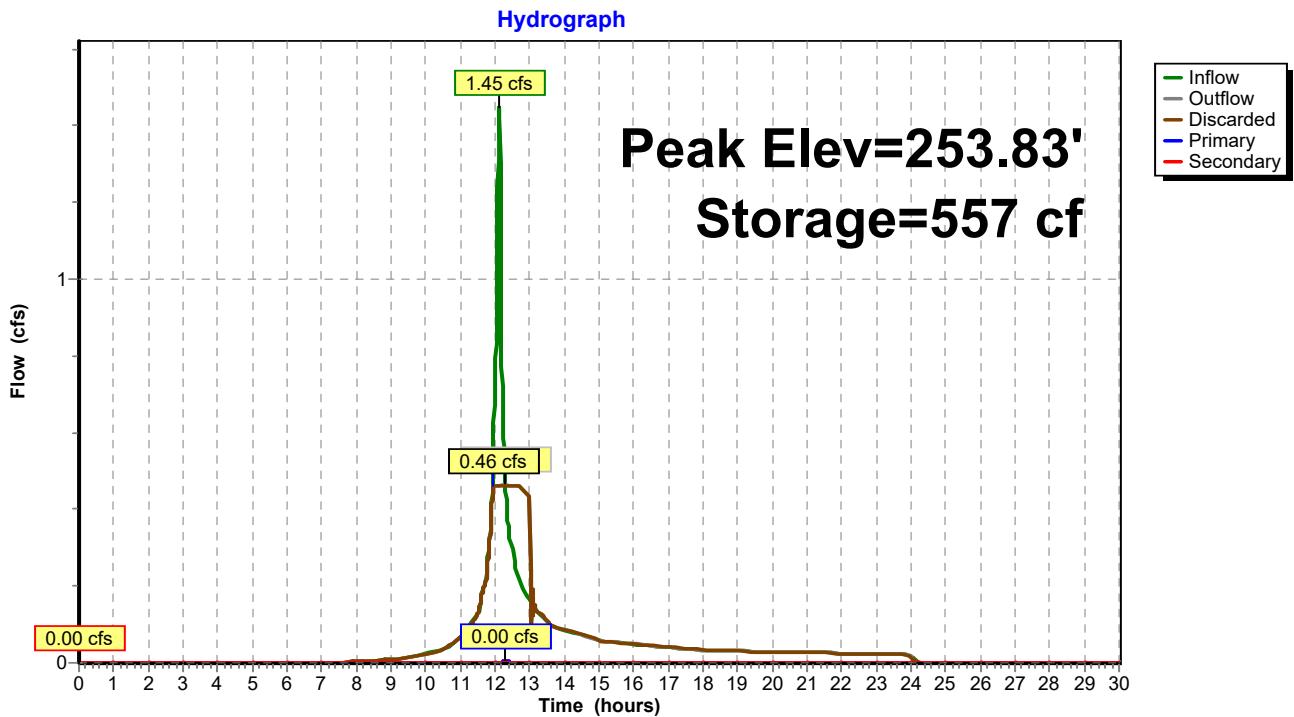
			Limited to weir flow at low heads	
#6	Discarded	253.30'	<b>8.270 in/hr Exfiltration over Horizontal area</b>	Phase-In= 0.01'
#7	Secondary	253.80'	<b>12.0" Vert. Orifice/Grate X 3.00</b>	C= 0.600
			Limited to weir flow at low heads	

**Discarded OutFlow** Max=0.46 cfs @ 11.95 hrs HW=253.31' (Free Discharge)  
 ↳ **6=Exfiltration** (Exfiltration Controls 0.46 cfs)

**Primary OutFlow** Max=0.00 cfs @ 12.30 hrs HW=253.83' TW=0.00' (Dynamic Tailwater)  
 ↳ **1=RCP\_Round 18"** (Passes 0.00 cfs of 1.65 cfs potential flow)  
 ↳ **2=Orifice/Grate** (Orifice Controls 0.00 cfs @ 0.61 fps)  
 ↳ **4=Orifice/Grate** (Passes 0.00 cfs of 0.20 cfs potential flow)  
 ↳ **5=Orifice/Grate** (Passes 0.00 cfs of 0.01 cfs potential flow)  
 ↳ **3=Sharp-Crested Rectangular Weir** ( Controls 0.00 cfs)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=253.30' TW=254.60' (Dynamic Tailwater)  
 ↳ **7=Orifice/Grate** ( Controls 0.00 cfs)

**Pond CS7: CHAMBER SYSTEM #7**



**Proposed Conditions-2874**

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**Summary for Pond CS8: CHAMBER SYSTEM #8**

Inflow Area = 0.280 ac, 82.14% Impervious, Inflow Depth = 2.41" for 2YR-NOAA ATLAS 14 event  
 Inflow = 0.80 cfs @ 12.12 hrs, Volume= 0.056 af  
 Outflow = 0.26 cfs @ 12.28 hrs, Volume= 0.056 af, Atten= 67%, Lag= 9.8 min  
 Discarded = 0.25 cfs @ 11.91 hrs, Volume= 0.056 af  
 Primary = 0.01 cfs @ 12.28 hrs, Volume= 0.000 af  
 Routed to Reach TF : TREATED FLOW OUTLET

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 Peak Elev= 254.65' @ 12.28 hrs Surf.Area= 1,320 sf Storage= 314 cf

Plug-Flow detention time= 4.9 min calculated for 0.056 af (100% of inflow)  
 Center-of-Mass det. time= 4.9 min ( 811.3 - 806.4 )

Volume	Invert	Avail.Storage	Storage Description
#1	254.10'	886 cf	<b>12.00'W x 110.00'L x 2.10'H Prismaoid</b> 2,772 cf Overall - 558 cf Embedded = 2,214 cf x 40.0% Voids
#2	254.60'	547 cf	<b>Cultec C-100HD</b> x 39 Inside #1 Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap Row Length Adjustment= +0.50' x 1.86 sf x 3 rows
#3	254.60'	0 cf	<b>Cultec C-100-SFCx2</b> x 4 Inside #1 Effective Size= 10.1"W x 7.6"H => 0.29 sf x 0.33'L = 0.1 cf Overall Size= 12.0"W x 7.6"H x 1.64'L with 1.31' Overlap 4 Chambers in 3 Rows
#4	254.60'	23 cf	<b>8.0" Round Pipe Storage 1</b> -Impervious L= 65.0' S= 0.0100 '/'
#5	254.60'	10 cf	<b>8.0" Round Pipe Storage 2</b> Inside #1 L= 30.0'
#6	254.92'	75 cf	<b>4.00'D x 3.00'H Vertical Cone/Cylinder</b> x 2 -Impervious
		1,542 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	254.60'	<b>8.0" Vert. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#2	Discarded	254.10'	<b>8.270 in/hr Exfiltration over Horizontal area</b> Phase-In= 0.01'

**Discarded OutFlow** Max=0.25 cfs @ 11.91 hrs HW=254.11' (Free Discharge)  
 ↑**2=Exfiltration** (Exfiltration Controls 0.25 cfs)

**Primary OutFlow** Max=0.01 cfs @ 12.28 hrs HW=254.65' TW=0.00' (Dynamic Tailwater)  
 ↑**1=Orifice/Grate** (Orifice Controls 0.01 cfs @ 0.76 fps)

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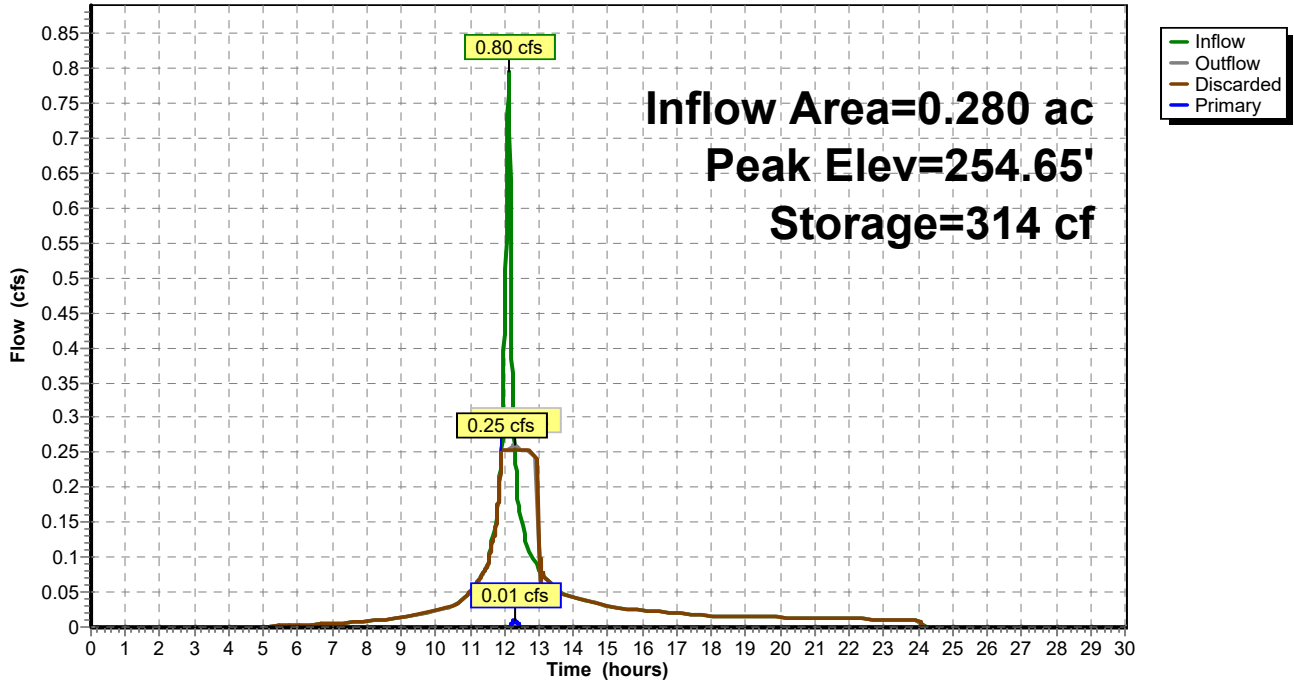
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**Pond CS8: CHAMBER SYSTEM #8**

Hydrograph



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**25YR NOAA ATLAS 14 Event**

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**100YR-NOAA ATLAS 14 Event**

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**Proposed Conditions-2874**

NOAA 24-hr D 10YR-NOAA ATLAS 14 Rainfall=5.25"

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**Summary for Subcatchment PR1A: SITE AREA**

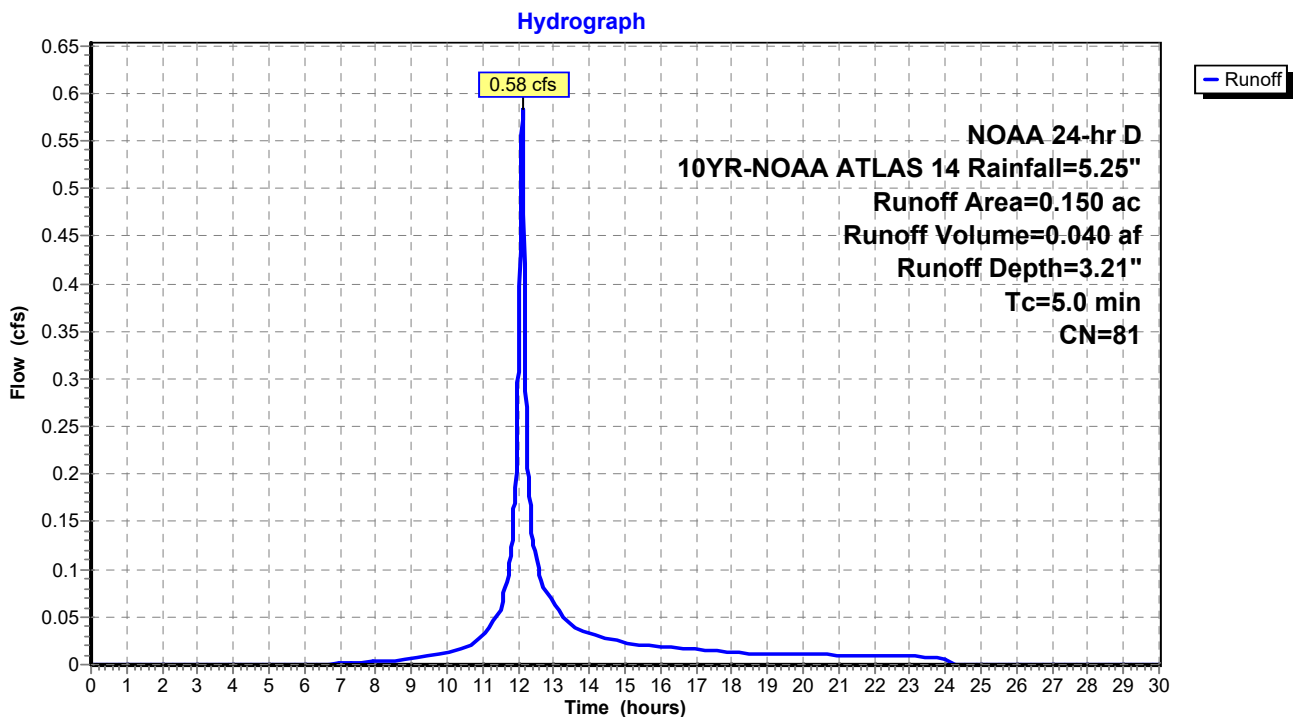
Runoff = 0.58 cfs @ 12.12 hrs, Volume= 0.040 af, Depth= 3.21"  
 Routed to Pond CS1 : CHAMBER SYSTEM #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 NOAA 24-hr D 10YR-NOAA ATLAS 14 Rainfall=5.25"

Area (ac)	CN	Description
* 0.080	98	Impervious Area
0.070	61	>75% Grass cover, Good, HSG B
0.150	81	Weighted Average
0.070		46.67% Pervious Area
0.080		53.33% Impervious Area

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

**Subcatchment PR1A: SITE AREA**



**Proposed Conditions-2874**

NOAA 24-hr D 10YR-NOAA ATLAS 14 Rainfall=5.25"

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**Summary for Subcatchment PR1B: SITE AREA**

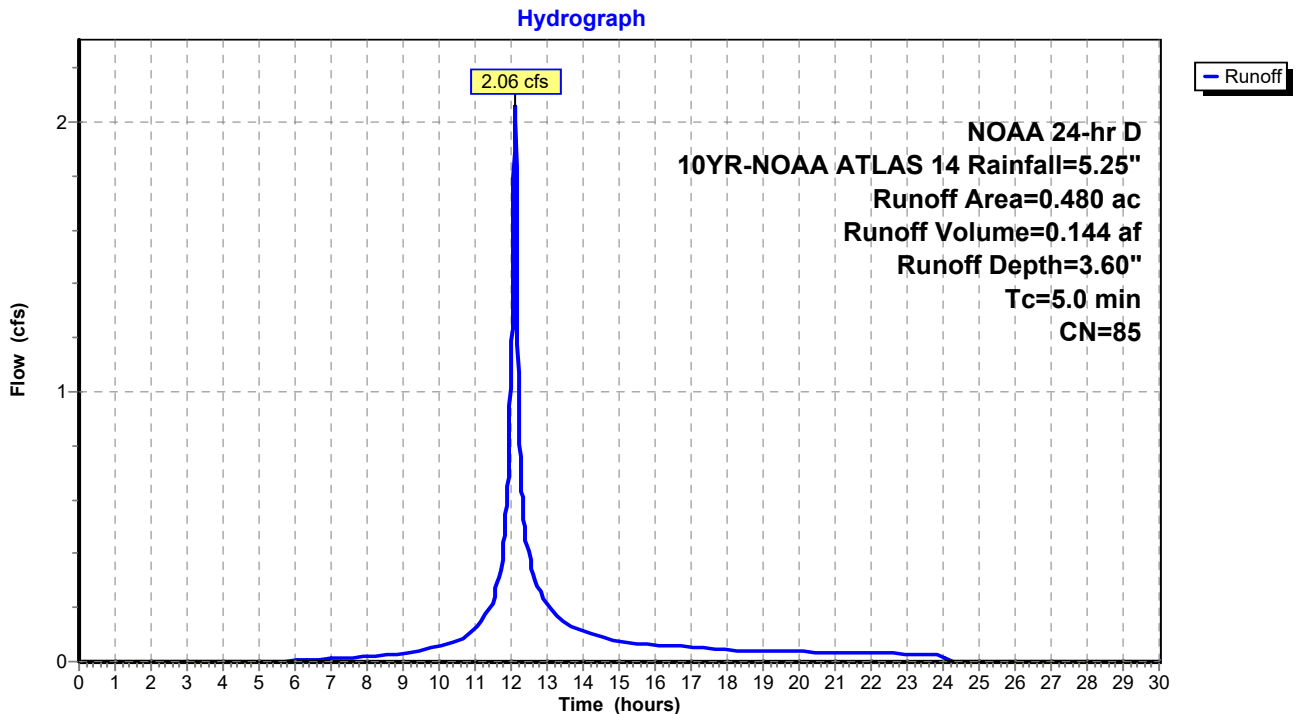
Runoff = 2.06 cfs @ 12.12 hrs, Volume= 0.144 af, Depth= 3.60"  
 Routed to Pond CS2 : CHAMBER SYSTEM #2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 NOAA 24-hr D 10YR-NOAA ATLAS 14 Rainfall=5.25"

Area (ac)	CN	Description
* 0.310	98	Impervious Area
0.170	61	>75% Grass cover, Good, HSG B
0.480	85	Weighted Average
0.170		35.42% Pervious Area
0.310		64.58% Impervious Area

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

**Subcatchment PR1B: SITE AREA**



**Proposed Conditions-2874**

NOAA 24-hr D 10YR-NOAA ATLAS 14 Rainfall=5.25"

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**Summary for Subcatchment PR2: SITE AREA**

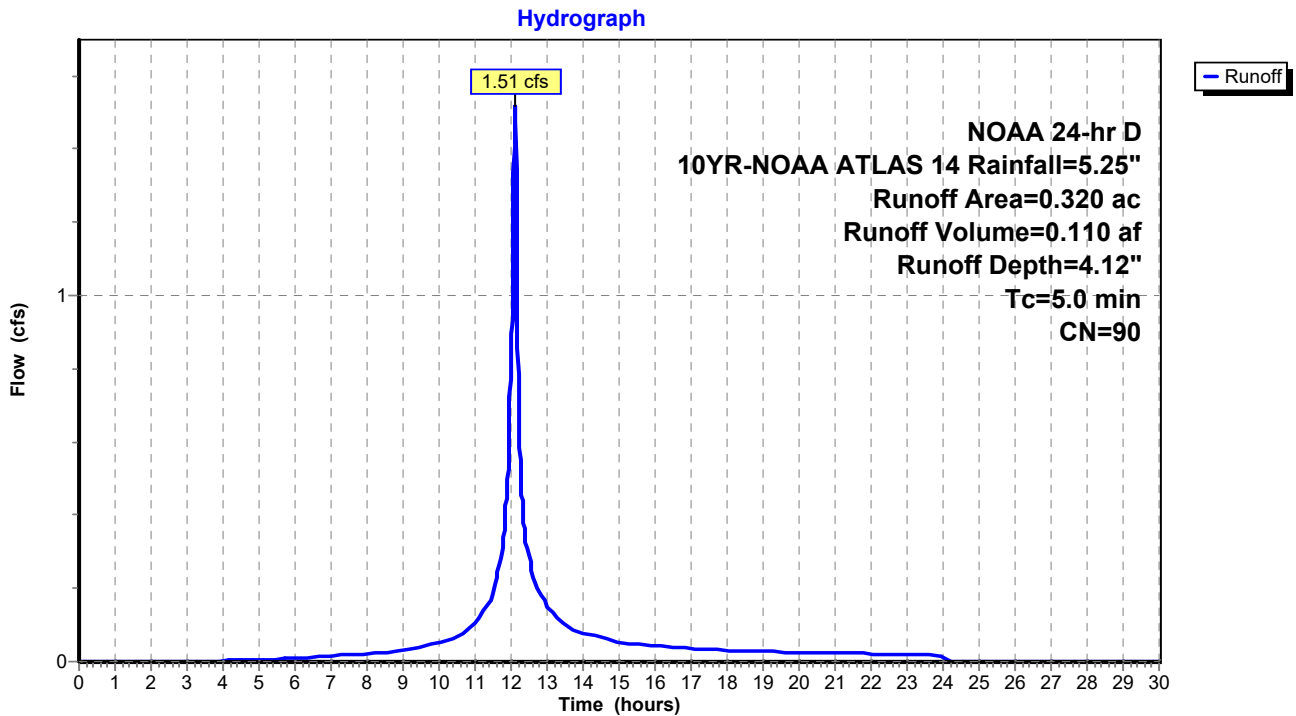
Runoff = 1.51 cfs @ 12.12 hrs, Volume= 0.110 af, Depth= 4.12"  
 Routed to Pond CS4 : CHAMBER SYSTEM #4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 NOAA 24-hr D 10YR-NOAA ATLAS 14 Rainfall=5.25"

Area (ac)	CN	Description
* 0.250	98	Impervious Area
0.070	61	>75% Grass cover, Good, HSG B
0.320	90	Weighted Average
0.070		21.87% Pervious Area
0.250		78.13% Impervious Area

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

**Subcatchment PR2: SITE AREA**



**Proposed Conditions-2874**

NOAA 24-hr D 10YR-NOAA ATLAS 14 Rainfall=5.25"

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**Summary for Subcatchment PR2A: SITE & ROOF AREA**

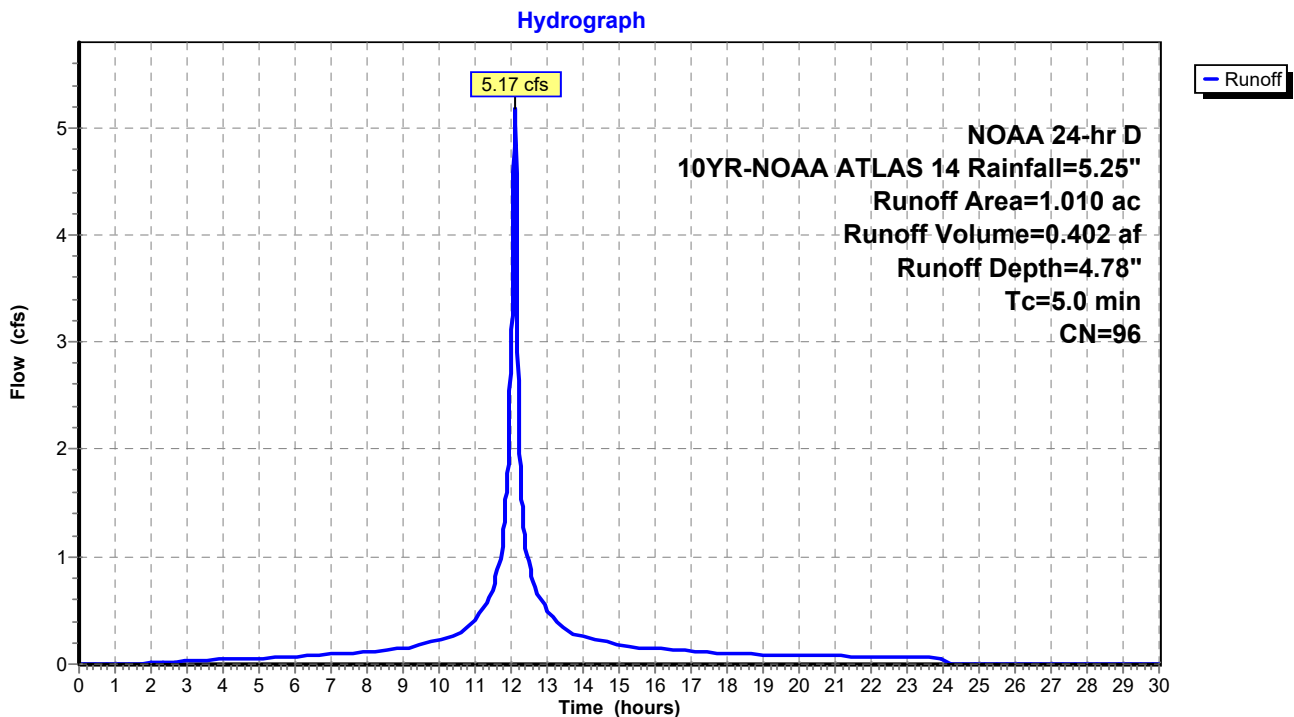
Runoff = 5.17 cfs @ 12.12 hrs, Volume= 0.402 af, Depth= 4.78"  
 Routed to Pond CS5 : CHAMBER SYSTEM #5

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 NOAA 24-hr D 10YR-NOAA ATLAS 14 Rainfall=5.25"

Area (ac)	CN	Description
* 0.250	98	Impervious Area
0.050	61	>75% Grass cover, Good, HSG B
* 0.710	98	Roof
1.010	96	Weighted Average
0.050		4.95% Pervious Area
0.960		95.05% Impervious Area

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

**Subcatchment PR2A: SITE & ROOF AREA**



**Proposed Conditions-2874**

NOAA 24-hr D 10YR-NOAA ATLAS 14 Rainfall=5.25"

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**Summary for Subcatchment PR3: SITE**

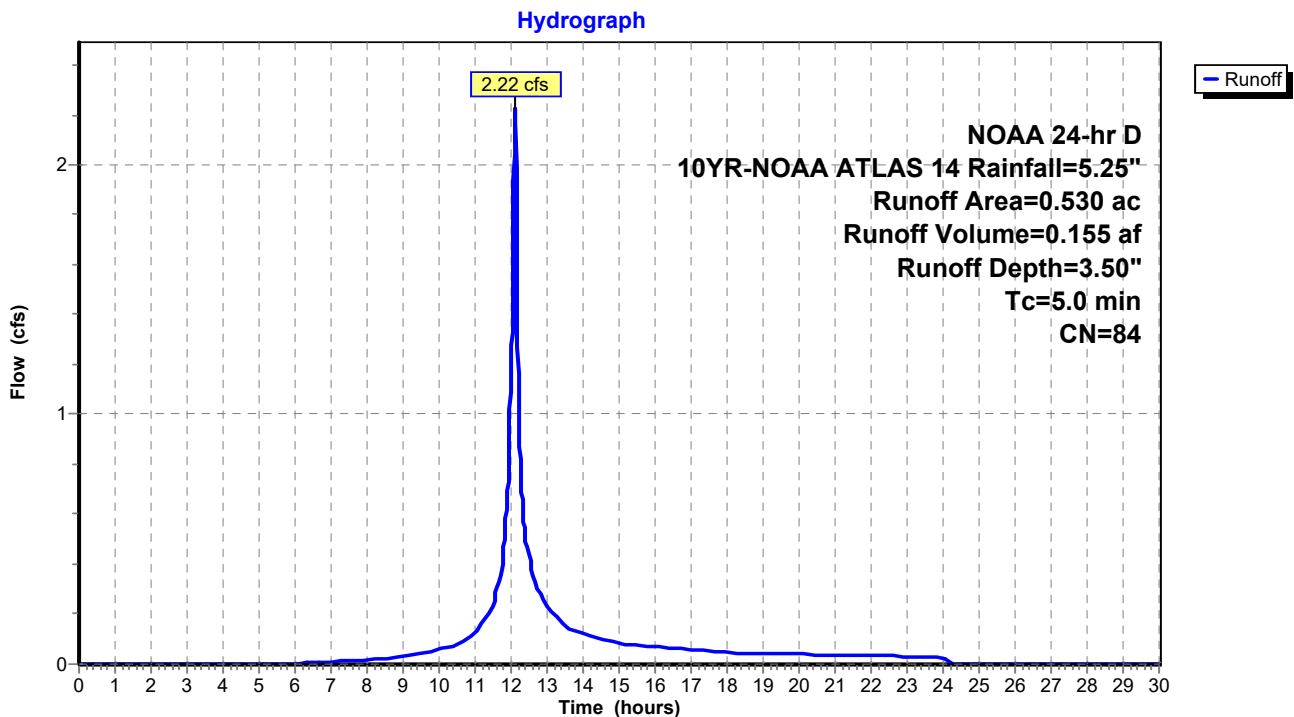
Runoff = 2.22 cfs @ 12.12 hrs, Volume= 0.155 af, Depth= 3.50"  
 Routed to Pond CS6 : CHAMBER SYSTEM #6A & 6B

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 NOAA 24-hr D 10YR-NOAA ATLAS 14 Rainfall=5.25"

Area (ac)	CN	Description
* 0.130	98	Impervious Area
0.200	61	>75% Grass cover, Good, HSG B
* 0.200	98	Roof
0.530	84	Weighted Average
0.200		37.74% Pervious Area
0.330		62.26% Impervious Area

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

**Subcatchment PR3: SITE**



**Proposed Conditions-2874**

NOAA 24-hr D 10YR-NOAA ATLAS 14 Rainfall=5.25"

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**Summary for Subcatchment PR4: SITE & ROOF AREA**

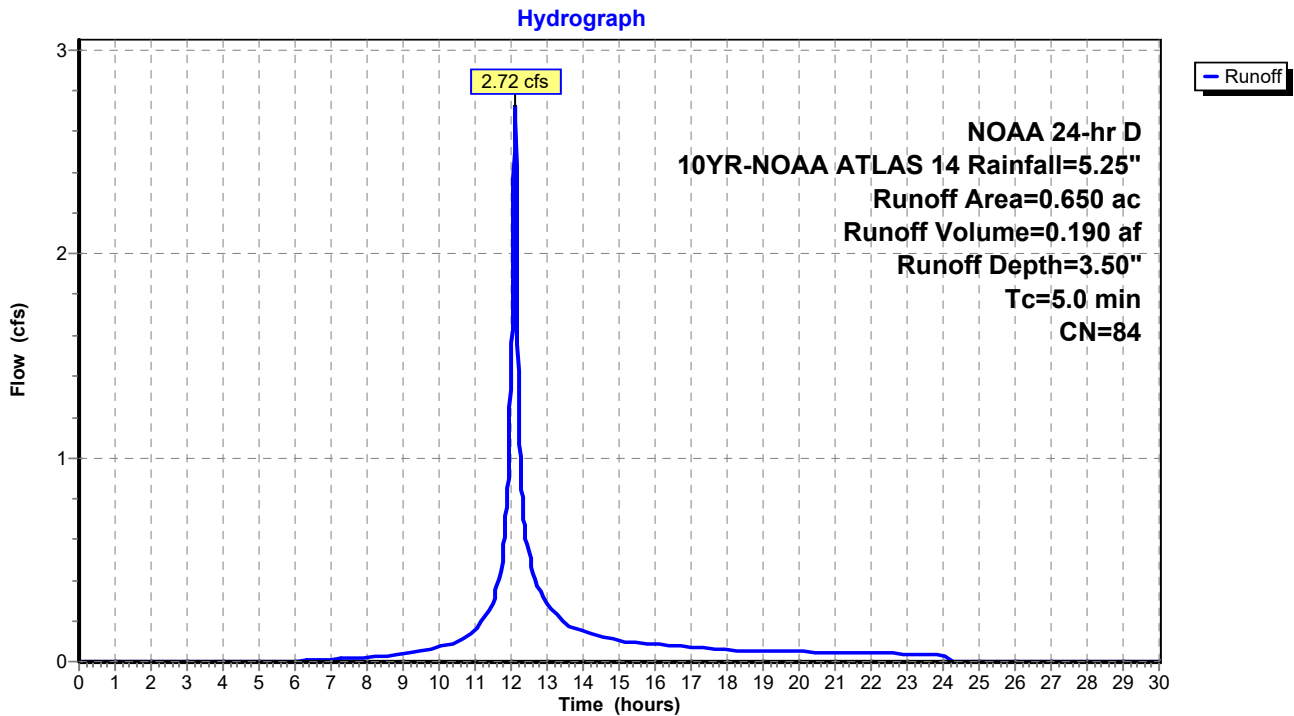
Runoff = 2.72 cfs @ 12.12 hrs, Volume= 0.190 af, Depth= 3.50"  
 Routed to Pond CS7 : CHAMBER SYSTEM #7

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 NOAA 24-hr D 10YR-NOAA ATLAS 14 Rainfall=5.25"

Area (ac)	CN	Description
* 0.410	98	Impervious Area
0.240	61	>75% Grass cover, Good, HSG B
0.650	84	Weighted Average
0.240		36.92% Pervious Area
0.410		63.08% Impervious Area

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

**Subcatchment PR4: SITE & ROOF AREA**



**Proposed Conditions-2874**

NOAA 24-hr D 10YR-NOAA ATLAS 14 Rainfall=5.25"

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**Summary for Subcatchment PR5: SITE AREA**

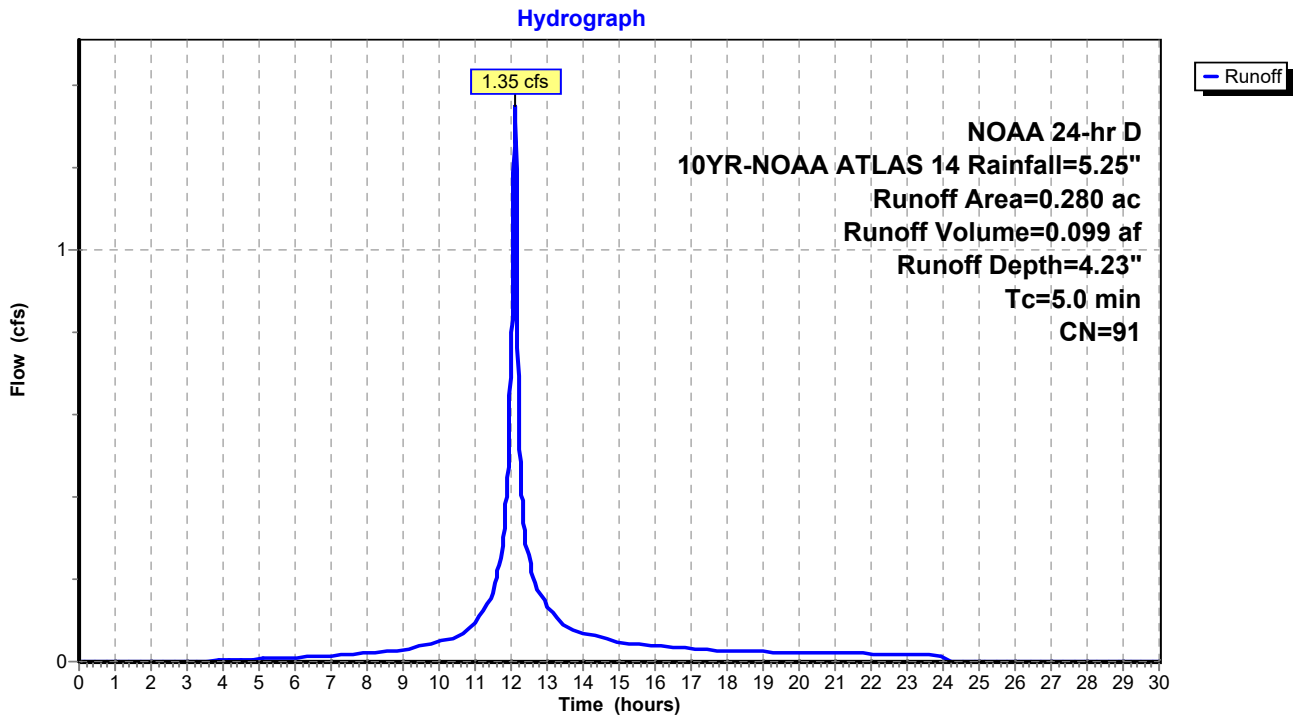
Runoff = 1.35 cfs @ 12.12 hrs, Volume= 0.099 af, Depth= 4.23"  
 Routed to Pond CS8 : CHAMBER SYSTEM #8

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 NOAA 24-hr D 10YR-NOAA ATLAS 14 Rainfall=5.25"

Area (ac)	CN	Description
* 0.230	98	Impervious Area
0.050	61	>75% Grass cover, Good, HSG B
0.280	91	Weighted Average
0.050		17.86% Pervious Area
0.230		82.14% Impervious Area

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

**Subcatchment PR5: SITE AREA**



**Proposed Conditions-2874**

NOAA 24-hr D 10YR-NOAA ATLAS 14 Rainfall=5.25"

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**Summary for Subcatchment PR6: SITE AREA**

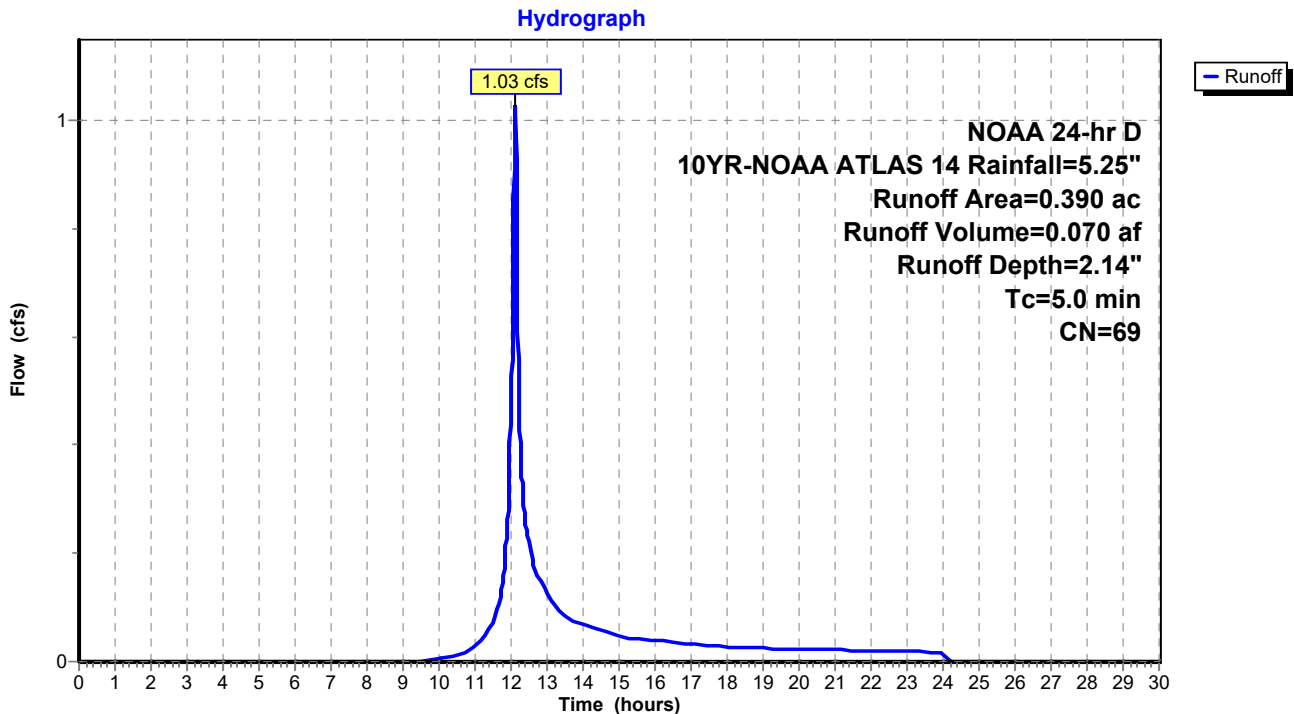
Runoff = 1.03 cfs @ 12.13 hrs, Volume= 0.070 af, Depth= 2.14"  
 Routed to Reach SUM : TOTAL FLOW

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 NOAA 24-hr D 10YR-NOAA ATLAS 14 Rainfall=5.25"

Area (ac)	CN	Description
* 0.080	98	Impervious Area
0.310	61	>75% Grass cover, Good, HSG B
0.390	69	Weighted Average
0.310		79.49% Pervious Area
0.080		20.51% Impervious Area

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

**Subcatchment PR6: SITE AREA**



**Proposed Conditions-2874**

NOAA 24-hr D 10YR-NOAA ATLAS 14 Rainfall=5.25"

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**Summary for Subcatchment PR7: TRENCH DRAIN #1**

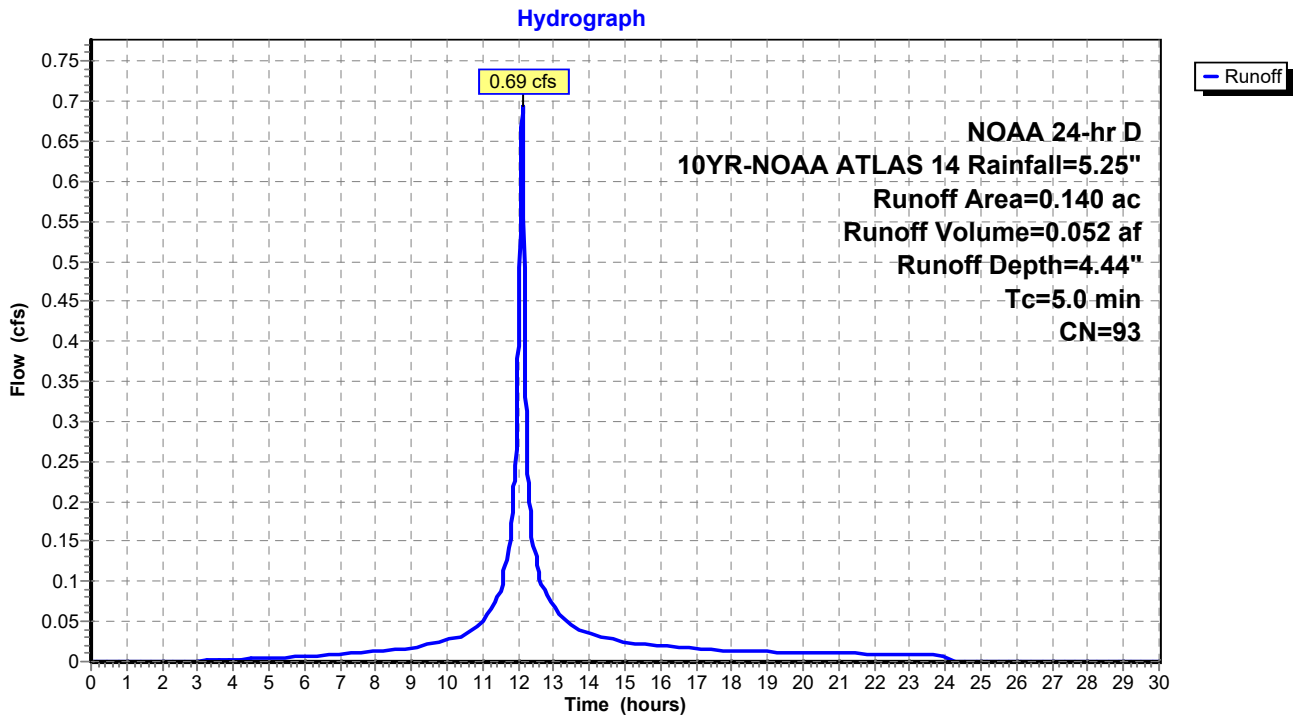
Runoff = 0.69 cfs @ 12.12 hrs, Volume= 0.052 af, Depth= 4.44"  
 Routed to Reach TF : TREATED FLOW OUTLET

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 NOAA 24-hr D 10YR-NOAA ATLAS 14 Rainfall=5.25"

Area (ac)	CN	Description
* 0.120	98	Impervious Area
0.020	61	>75% Grass cover, Good, HSG B
0.140	93	Weighted Average
0.020		14.29% Pervious Area
0.120		85.71% Impervious Area

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

**Subcatchment PR7: TRENCH DRAIN #1**



**Proposed Conditions-2874**

NOAA 24-hr D 10YR-NOAA ATLAS 14 Rainfall=5.25"

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**Summary for Subcatchment PR8: TRENCH DRAIN #2**

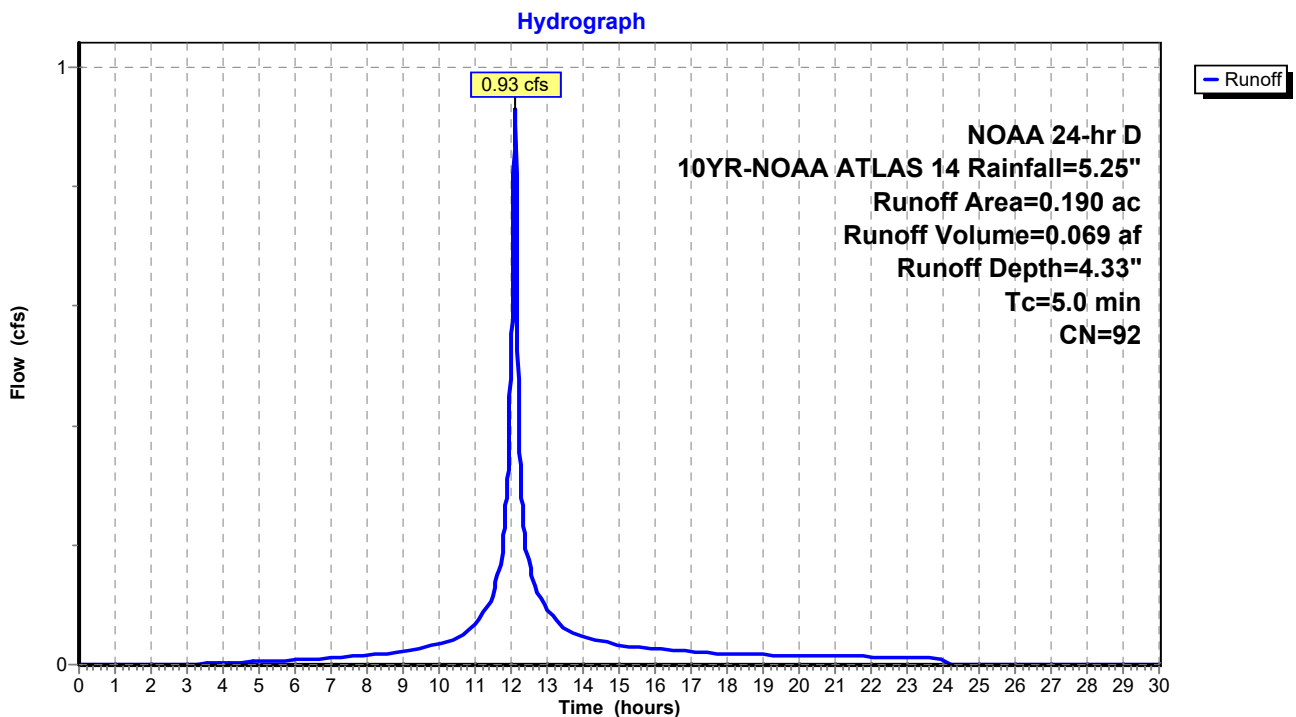
Runoff = 0.93 cfs @ 12.12 hrs, Volume= 0.069 af, Depth= 4.33"  
 Routed to Reach TF : TREATED FLOW OUTLET

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 NOAA 24-hr D 10YR-NOAA ATLAS 14 Rainfall=5.25"

Area (ac)	CN	Description
* 0.160	98	Impervious Area
0.030	61	>75% Grass cover, Good, HSG B
0.190	92	Weighted Average
0.030		15.79% Pervious Area
0.160		84.21% Impervious Area

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

**Subcatchment PR8: TRENCH DRAIN #2**



**Proposed Conditions-2874**

NOAA 24-hr D 10YR-NOAA ATLAS 14 Rainfall=5.25"

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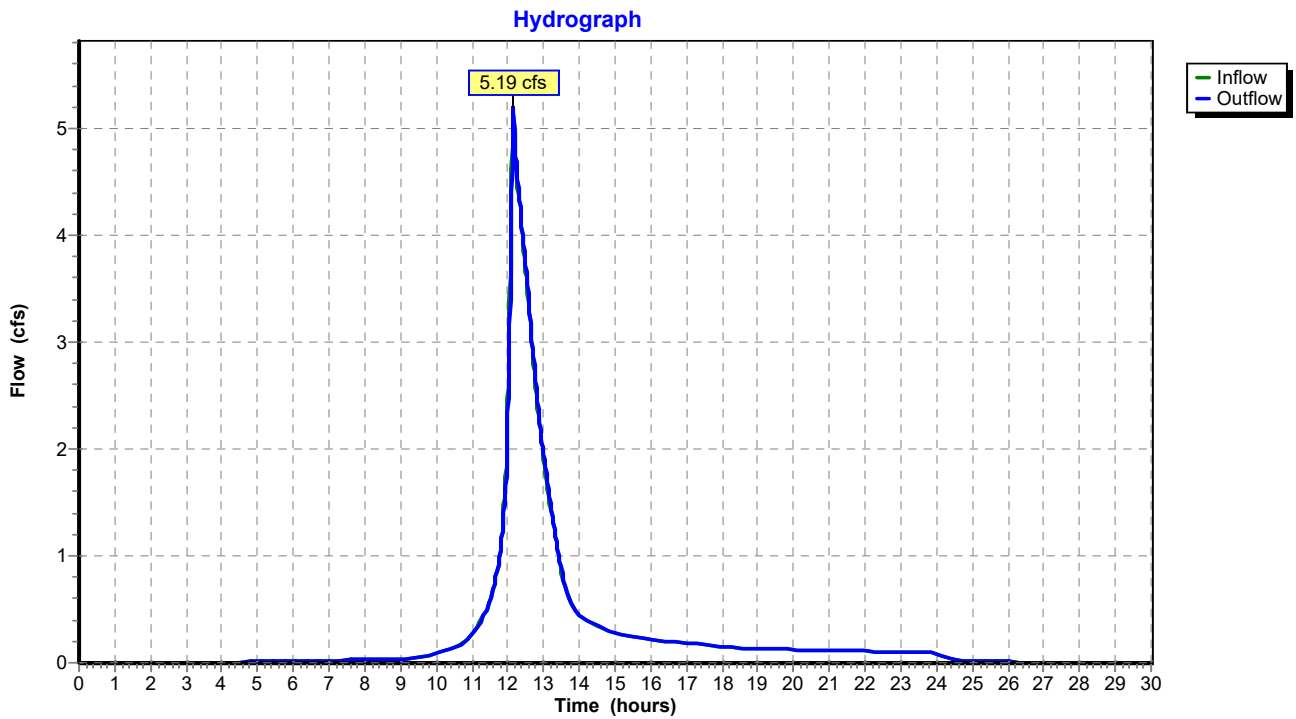
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**Summary for Reach SUM: TOTAL FLOW**

Inflow = 5.19 cfs @ 12.15 hrs, Volume= 0.596 af  
Outflow = 5.19 cfs @ 12.16 hrs, Volume= 0.596 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

**Reach SUM: TOTAL FLOW**



**Proposed Conditions-2874**

NOAA 24-hr D 10YR-NOAA ATLAS 14 Rainfall=5.25"

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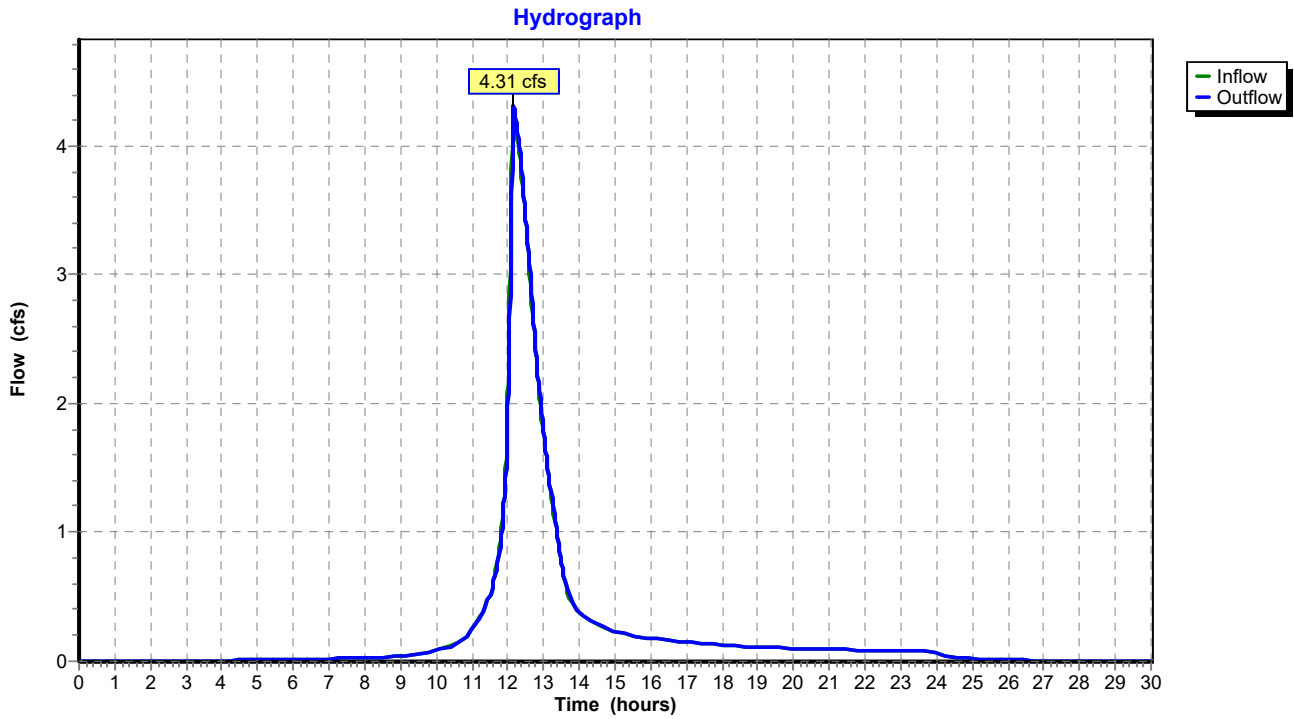
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**Summary for Reach TF: TREATED FLOW OUTLET**

Inflow = 4.31 cfs @ 12.16 hrs, Volume= 0.526 af  
Outflow = 4.31 cfs @ 12.17 hrs, Volume= 0.526 af, Atten= 0%, Lag= 0.6 min  
Routed to Reach SUM : TOTAL FLOW

Routing by Sim-Route method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

**Reach TF: TREATED FLOW OUTLET**



**Proposed Conditions-2874**

NOAA 24-hr D 10YR-NOAA ATLAS 14 Rainfall=5.25"

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**Summary for Pond CS1: CHAMBER SYSTEM #1**

Inflow = 5.13 cfs @ 12.30 hrs, Volume= 0.131 af  
 Outflow = 5.74 cfs @ 12.28 hrs, Volume= 0.127 af, Atten= 0%, Lag= 0.0 min  
 Discarded = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af  
 Primary = 5.74 cfs @ 12.28 hrs, Volume= 0.127 af  
 Routed to Pond CS2 : CHAMBER SYSTEM #2

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 Peak Elev= 255.96' @ 12.28 hrs Surf.Area= 816 sf Storage= 719 cf

Plug-Flow detention time= 33.2 min calculated for 0.132 af (97% of inflow)  
 Center-of-Mass det. time= 18.0 min ( 791.2 - 772.4 )

Volume	Invert	Avail.Storage	Storage Description
#1	254.60'	713 cf	<b>12.00'W x 68.00'L x 3.00'H Prismatic</b> 2,448 cf Overall - 665 cf Embedded = 1,783 cf x 40.0% Voids
#2	255.10'	663 cf	<b>Cultec R-180 x 30 Inside #1</b> Effective Size= 33.6"W x 20.0"H => 3.44 sf x 6.33'L = 21.8 cf Overall Size= 36.0"W x 20.5"H x 7.33'L with 1.00' Overlap Row Length Adjustment= +1.00' x 3.44 sf x 3 rows
#3	255.10'	2 cf	<b>Cultec HVLV FC-24 x 4 Inside #1</b> Effective Size= 15.3"W x 12.0"H => 0.91 sf x 0.50'L = 0.5 cf Overall Size= 16.0"W x 12.0"H x 2.02'L with 1.52' Overlap 4 Chambers in 3 Rows
#4	255.10'	16 cf	<b>10.0" Round Pipe Storage-Impervious</b> L= 29.0' S= 0.0200 '/'
#5	255.50'	63 cf	<b>4.00'D x 5.00'H Vertical Cone/Cylinder-Impervious</b>
		1,457 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	254.60'	<b>8.270 in/hr Exfiltration X 0.00 over Horizontal area</b> Phase-In= 0.01'
#2	Primary	255.10'	<b>12.0" Vert. Orifice/Grate X 3.00</b> C= 0.600 Limited to weir flow at low heads
#3	Primary	258.60'	<b>2.0" x 2.0" Horiz. Orifice/Grate X 6.00 columns</b> X 6 rows C= 0.600 in 24.0" x 24.0" Grate (25% open area) Limited to weir flow at low heads

**Discarded OutFlow** Max=0.00 cfs @ 0.00 hrs HW=254.60' (Free Discharge)  
 ↑1=Exfiltration ( Controls 0.00 cfs)

**Primary OutFlow** Max=5.66 cfs @ 12.28 hrs HW=255.92' TW=255.60' (Dynamic Tailwater)  
 ↑2=Orifice/Grate (Orifice Controls 5.66 cfs @ 2.74 fps)  
 ↑3=Orifice/Grate ( Controls 0.00 cfs)

**Proposed Conditions-2874**

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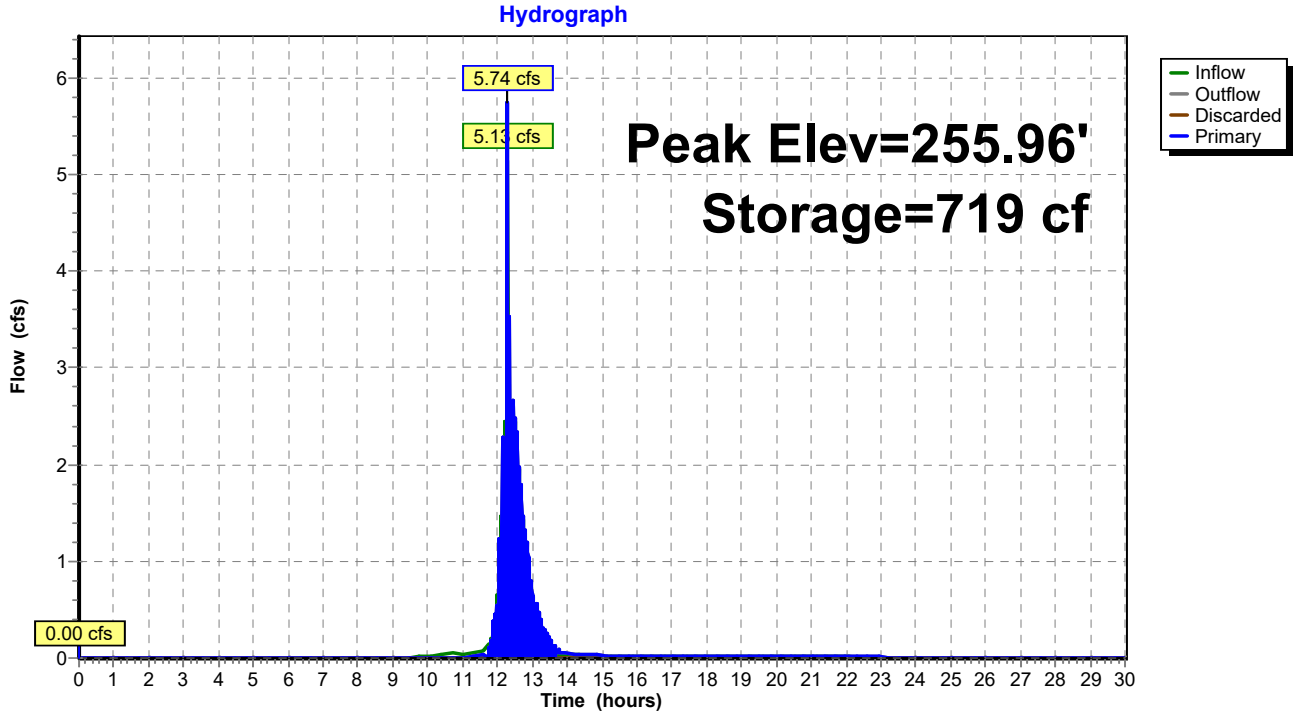
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**Pond CS1: CHAMBER SYSTEM #1**



**Proposed Conditions-2874**

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**Summary for Pond CS2: CHAMBER SYSTEM #2**

Inflow = 10.69 cfs @ 12.28 hrs, Volume= 0.322 af  
 Outflow = 10.86 cfs @ 12.30 hrs, Volume= 0.314 af, Atten= 0%, Lag= 1.2 min  
 Discarded = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af  
 Primary = 5.95 cfs @ 12.30 hrs, Volume= 0.224 af  
     Routed to Pond CS3 : CHAMBER SYSTEM #3  
 Secondary = 4.95 cfs @ 12.30 hrs, Volume= 0.091 af  
     Routed to Pond CS1 : CHAMBER SYSTEM #1

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 Peak Elev= 255.92' @ 12.26 hrs Surf.Area= 1,615 sf Storage= 1,363 cf

Plug-Flow detention time= 32.2 min calculated for 0.314 af (98% of inflow)  
 Center-of-Mass det. time= 17.4 min ( 811.3 - 793.9 )

Volume	Invert	Avail.Storage	Storage Description
#1	254.60'	1,371 cf	<b>16.00'W x 99.00'L x 3.00'H Prismatic</b> 4,752 cf Overall - 1,324 cf Embedded = 3,428 cf x 40.0% Voids
#2	255.10'	1,320 cf	<b>Cultec R-180 x 60 Inside #1</b> Effective Size= 33.6"W x 20.0"H => 3.44 sf x 6.33'L = 21.8 cf Overall Size= 36.0"W x 20.5"H x 7.33'L with 1.00' Overlap Row Length Adjustment= +1.00' x 3.44 sf x 4 rows
#3	255.10'	4 cf	<b>Cultec HVLV FC-24 x 9 Inside #1</b> Effective Size= 15.3"W x 12.0"H => 0.91 sf x 0.50'L = 0.5 cf Overall Size= 16.0"W x 12.0"H x 2.02'L with 1.52' Overlap 9 Chambers in 4 Rows
#4	255.10'	26 cf	<b>12.0" Round Pipe Storage-Impervious</b> L= 33.0'
#5	255.82'	113 cf	<b>4.00'D x 3.00'H Vertical Cone/Cylinder x 3 -Impervious</b>
#6	255.10'	4 cf	<b>10.0" Round Pipe Storage-Impervious</b> L= 7.0' S= 0.0143 '/'
#7	255.45'	23 cf	<b>10.0" Round Pipe Storage-Impervious</b> L= 42.0' S= 0.0100 '/'
#8	255.45'	38 cf	<b>10.0" Round Pipe Storage</b> L= 70.0' S= 0.0100 '/'
		2,899 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	255.10'	<b>12.0" Vert. Orifice/Grate X 3.00</b> C= 0.600 Limited to weir flow at low heads
#2	Discarded	254.60'	<b>8.270 in/hr Exfiltration X 0.00 over Horizontal area</b> Phase-In= 0.01'
#3	Secondary	255.10'	<b>12.0" Vert. Orifice/Grate X 3.00</b> C= 0.600 Limited to weir flow at low heads

**Proposed Conditions-2874**

NOAA 24-hr D 10YR-NOAA ATLAS 14 Rainfall=5.25"

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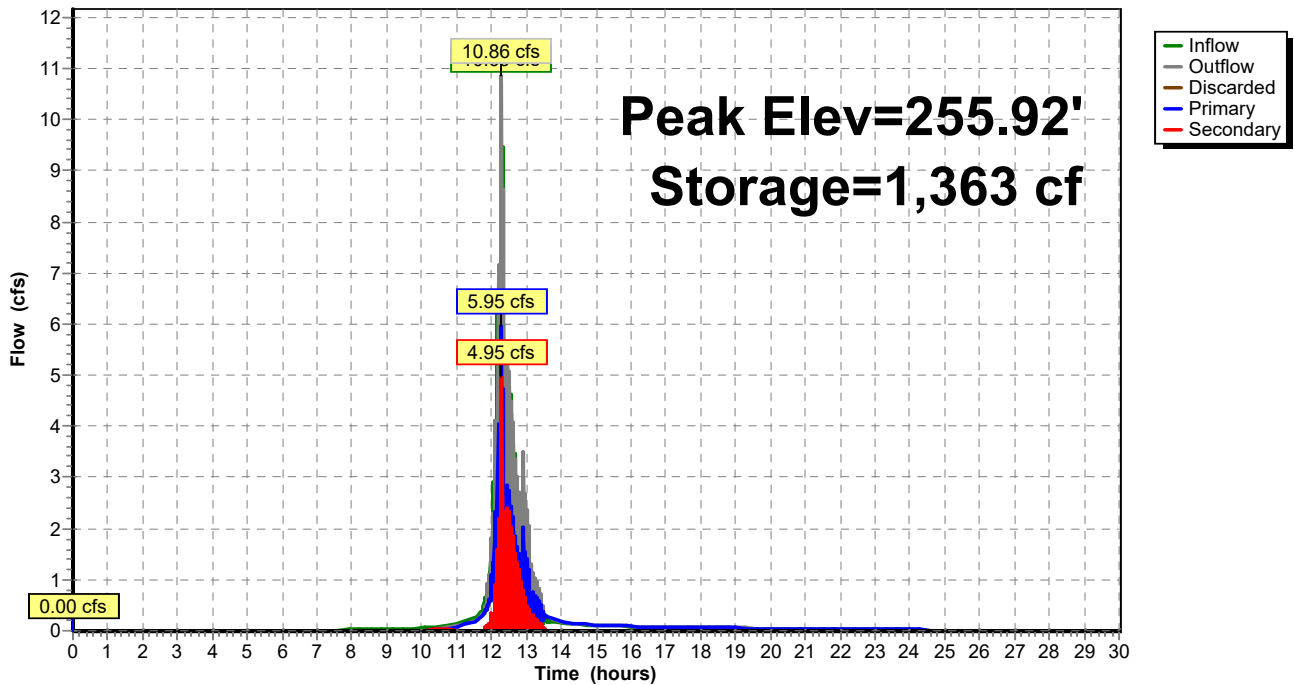
**Discarded OutFlow** Max=0.00 cfs @ 0.00 hrs HW=254.60' (Free Discharge)  
 ↳ **2=Exfiltration** ( Controls 0.00 cfs)

**Primary OutFlow** Max=5.51 cfs @ 12.30 hrs HW=255.89' TW=255.57' (Dynamic Tailwater)  
 ↳ **1=Orifice/Grate** (Orifice Controls 5.51 cfs @ 2.75 fps)

**Secondary OutFlow** Max=5.09 cfs @ 12.30 hrs HW=255.87' TW=255.58' (Dynamic Tailwater)  
 ↳ **3=Orifice/Grate** (Orifice Controls 5.09 cfs @ 2.60 fps)

**Pond CS2: CHAMBER SYSTEM #2**

Hydrograph



**Proposed Conditions-2874**

NOAA 24-hr D 10YR-NOAA ATLAS 14 Rainfall=5.25"

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**Summary for Pond CS3: CHAMBER SYSTEM #3**

Inflow = 9.46 cfs @ 12.30 hrs, Volume= 0.261 af  
 Outflow = 9.82 cfs @ 12.35 hrs, Volume= 0.255 af, Atten= 0%, Lag= 3.0 min  
 Discarded = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af  
 Primary = 5.60 cfs @ 12.35 hrs, Volume= 0.204 af  
     Routed to Pond CS4 : CHAMBER SYSTEM #4  
 Secondary = 4.29 cfs @ 12.28 hrs, Volume= 0.051 af  
     Routed to Pond CS2 : CHAMBER SYSTEM #2

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 Peak Elev= 255.98' @ 12.35 hrs Surf.Area= 1,188 sf Storage= 1,073 cf

Plug-Flow detention time= 27.2 min calculated for 0.257 af (98% of inflow)  
 Center-of-Mass det. time= 12.6 min ( 835.7 - 823.0 )

Volume	Invert	Avail.Storage	Storage Description
#1	254.60'	1,028 cf	<b>12.00'W x 99.00'L x 3.00'H Prismatic</b> 3,564 cf Overall - 993 cf Embedded = 2,571 cf x 40.0% Voids
#2	255.10'	990 cf	<b>Cultec R-180</b> x 45 Inside #1 Effective Size= 33.6"W x 20.0"H => 3.44 sf x 6.33'L = 21.8 cf Overall Size= 36.0"W x 20.5"H x 7.33'L with 1.00' Overlap Row Length Adjustment= +1.00' x 3.44 sf x 3 rows
#3	255.10'	3 cf	<b>Cultec HVLV FC-24</b> x 6 Inside #1 Effective Size= 15.3"W x 12.0"H => 0.91 sf x 0.50'L = 0.5 cf Overall Size= 16.0"W x 12.0"H x 2.02'L with 1.52' Overlap 6 Chambers in 3 Rows
#4	255.10'	28 cf	<b>12.0" Round Pipe Storage</b> x 3 -Impervious L= 12.0'
		2,050 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	255.10'	<b>12.0" Vert. Orifice/Grate X 3.00</b> C= 0.600 Limited to weir flow at low heads
#2	Discarded	254.60'	<b>8.270 in/hr Exfiltration X 0.00 over Horizontal area</b> Phase-In= 0.01'
#3	Secondary	255.10'	<b>12.0" Vert. Orifice/Grate X 3.00</b> C= 0.600 Limited to weir flow at low heads

**Discarded OutFlow** Max=0.00 cfs @ 0.00 hrs HW=254.60' (Free Discharge)  
 ↑**2=Exfiltration** ( Controls 0.00 cfs)

**Primary OutFlow** Max=6.46 cfs @ 12.35 hrs HW=255.98' TW=255.60' (Dynamic Tailwater)  
 ↑**1=Orifice/Grate** (Orifice Controls 6.46 cfs @ 2.94 fps)

**Secondary OutFlow** Max=4.82 cfs @ 12.28 hrs HW=255.85' TW=255.57' (Dynamic Tailwater)  
 ↑**3=Orifice/Grate** (Orifice Controls 4.82 cfs @ 2.54 fps)

**Proposed Conditions-2874**

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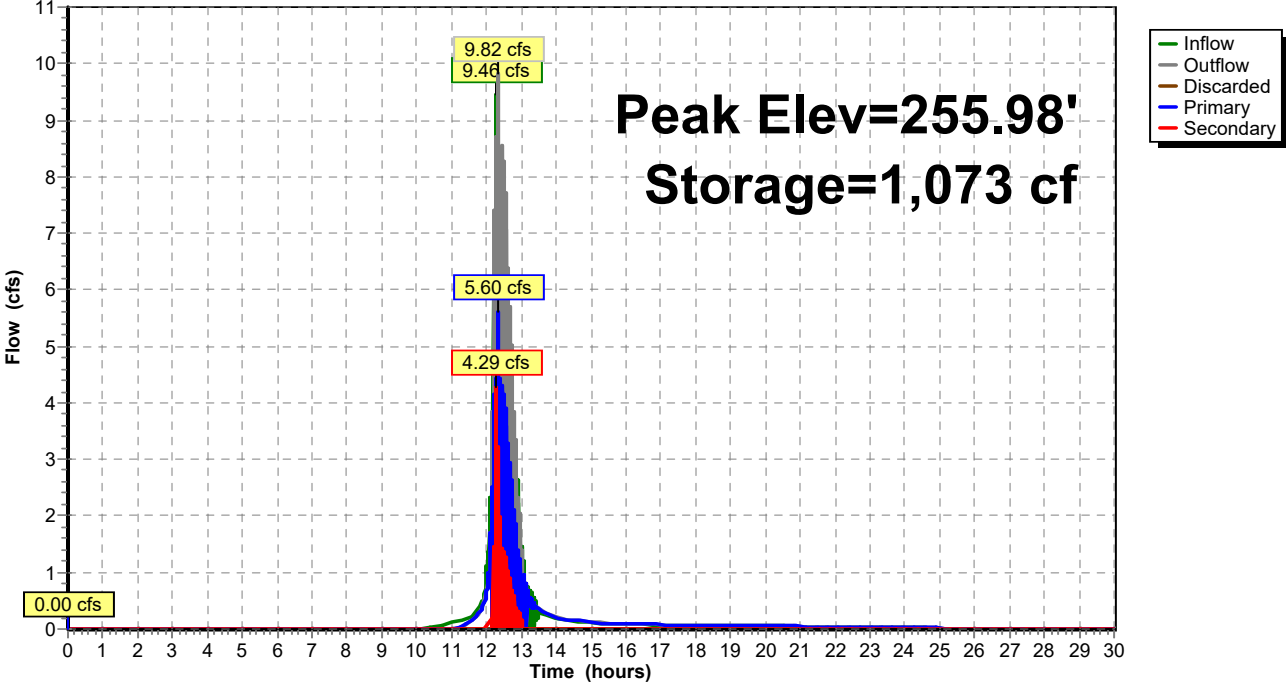
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**Pond CS3: CHAMBER SYSTEM #3**

Hydrograph



**Proposed Conditions-2874**

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**Summary for Pond CS4: CHAMBER SYSTEM #4**

Inflow = 6.93 cfs @ 12.28 hrs, Volume= 0.320 af  
 Outflow = 6.91 cfs @ 12.30 hrs, Volume= 0.310 af, Atten= 0%, Lag= 1.1 min  
 Discarded = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af  
 Primary = 4.61 cfs @ 12.29 hrs, Volume= 0.272 af  
     Routed to Pond CS5 : CHAMBER SYSTEM #5  
 Secondary = 3.51 cfs @ 12.30 hrs, Volume= 0.038 af  
     Routed to Pond CS3 : CHAMBER SYSTEM #3

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 Peak Elev= 255.81' @ 12.29 hrs Surf.Area= 2,174 sf Storage= 1,735 cf

Plug-Flow detention time= 41.3 min calculated for 0.323 af (97% of inflow)  
 Center-of-Mass det. time= 21.8 min ( 856.1 - 833.3 )

Volume	Invert	Avail.Storage	Storage Description
#1	254.60'	1,933 cf	<b>25.00'W x 85.00'L x 3.00'H Prismatic</b> 6,375 cf Overall - 1,543 cf Embedded = 4,832 cf x 40.0% Voids
#2	255.10'	1,534 cf	<b>Cultec R-150XLHD x 56 Inside #1</b> Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap Row Length Adjustment= +0.75' x 2.65 sf x 7 rows
#3	255.10'	8 cf	<b>Cultec R-150XLHD-FC-24 x 18 Inside #1</b> Effective Size= 15.3"W x 12.0"H => 0.91 sf x 0.50'L = 0.5 cf Overall Size= 16.0"W x 12.0"H x 2.02'L with 1.52' Overlap 18 Chambers in 7 Rows
#4	255.10'	122 cf	<b>12.0" Round Pipe Storage-Impervious</b> L= 155.0'
#5	255.20'	151 cf	<b>4.00'D x 3.00'H Vertical Cone/Cylinder x 4 -Impervious</b>
#6	255.85'	75 cf	<b>4.00'D x 3.00'H Vertical Cone/Cylinder x 2 -Impervious</b>
#7	255.10'	3 cf	<b>10.0" Round Pipe Storage</b> L= 5.0' S= 0.0200 '/'
#8	255.45'	44 cf	<b>10.0" Round Pipe Storage x 2</b> L= 40.0' S= 0.0100 '/'
		3,870 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	255.10'	<b>12.0" Vert. Orifice/Grate X 4.00</b> C= 0.600 Limited to weir flow at low heads
#2	Discarded	254.60'	<b>8.270 in/hr Exfiltration X 0.00 over Horizontal area</b> Phase-In= 0.01'
#3	Secondary	255.10'	<b>12.0" Vert. Orifice/Grate X 3.00</b> C= 0.600 Limited to weir flow at low heads

**Proposed Conditions-2874**

NOAA 24-hr D 10YR-NOAA ATLAS 14 Rainfall=5.25"

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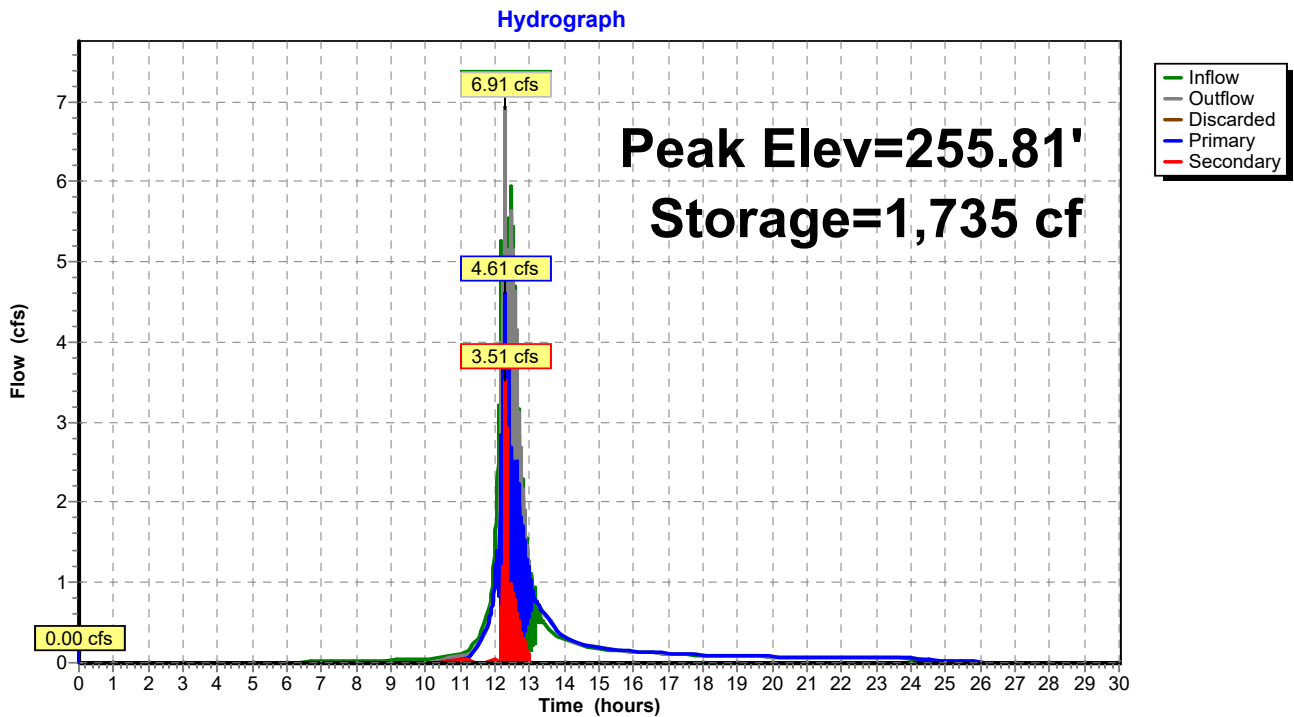
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**Discarded OutFlow** Max=0.00 cfs @ 0.00 hrs HW=254.60' (Free Discharge)  
 ↳ **2=Exfiltration** ( Controls 0.00 cfs)

**Primary OutFlow** Max=4.23 cfs @ 12.29 hrs HW=255.79' TW=255.65' (Dynamic Tailwater)  
 ↳ **1=Orifice/Grate** (Orifice Controls 4.23 cfs @ 1.83 fps)

**Secondary OutFlow** Max=2.48 cfs @ 12.30 hrs HW=255.72' TW=255.61' (Dynamic Tailwater)  
 ↳ **3=Orifice/Grate** (Orifice Controls 2.48 cfs @ 1.61 fps)

**Pond CS4: CHAMBER SYSTEM #4**



**Proposed Conditions-2874**

NOAA 24-hr D 10YR-NOAA ATLAS 14 Rainfall=5.25"

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**Summary for Pond CS5: CHAMBER SYSTEM #5**

Inflow = 6.55 cfs @ 12.11 hrs, Volume= 0.674 af  
 Outflow = 5.06 cfs @ 12.28 hrs, Volume= 0.674 af, Atten= 23%, Lag= 9.9 min  
 Discarded = 1.05 cfs @ 11.58 hrs, Volume= 0.527 af  
 Primary = 2.36 cfs @ 12.16 hrs, Volume= 0.142 af  
     Routed to Pond CS6 : CHAMBER SYSTEM #6A & 6B  
 Secondary = 1.93 cfs @ 12.28 hrs, Volume= 0.006 af  
     Routed to Pond CS4 : CHAMBER SYSTEM #4

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 Peak Elev= 255.68' @ 12.27 hrs Surf.Area= 5,508 sf Storage= 3,728 cf

Plug-Flow detention time= 10.5 min calculated for 0.684 af (100% of inflow)  
 Center-of-Mass det. time= 10.5 min ( 817.4 - 806.7 )

Volume	Invert	Avail.Storage	Storage Description
#1	254.60'	4,896 cf	<b>40.50'W x 136.00'L x 3.00'H Prismaoid</b> 16,524 cf Overall - 4,285 cf Embedded = 12,239 cf x 40.0% Voids
#2	255.10'	4,260 cf	<b>Cultec R-150XLHD x 156 Inside #1</b> Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap Row Length Adjustment= +0.75' x 2.65 sf x 12 rows
#3	255.10'	25 cf	<b>Cultec R-150XLHD-FC-24 x 55 Inside #1</b> Effective Size= 15.3"W x 12.0"H => 0.91 sf x 0.50'L = 0.5 cf Overall Size= 16.0"W x 12.0"H x 2.02'L with 1.52' Overlap 55 Chambers in 12 Rows
#4	255.10'	35 cf	<b>12.0" Round Pipe Storage 1 x 4 -Impervious</b> L= 11.0'
#5	255.10'	40 cf	<b>12.0" Round Pipe Storage 2 x 3 -Impervious</b> L= 17.0' S= 0.0200 '/'
#6	255.10'	12 cf	<b>12.0" Round Pipe Storage 3-Impervious</b> L= 15.0' S= 0.0200 '/'
#7	255.10'	2 cf	<b>10.0" Round Pipe Storage 4-Impervious</b> L= 3.0' S= 0.0100 '/'
#8	255.38'	26 cf	<b>10.0" Round Pipe Storage 5-Impervious</b> L= 47.0' S= 0.0100 '/'
#9	255.38'	15 cf	<b>10.0" Round Pipe Storage 6-Impervious</b> L= 27.0' S= 0.0100 '/'
#10	255.65'	38 cf	<b>4.00'D x 3.00'H Vertical Cone/Cylinder-Impervious</b>
#11	255.85'	38 cf	<b>4.00'D x 3.00'H Vertical Cone/Cylinder-Impervious</b>
		9,384 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	255.10'	<b>12.0" Vert. Orifice/Grate X 3.00</b> C= 0.600 Limited to weir flow at low heads
#2	Discarded	254.60'	<b>8.270 in/hr Exfiltration over Horizontal area</b> Phase-In= 0.01'
#3	Secondary	255.10'	<b>12.0" Vert. Orifice/Grate X 4.00</b> C= 0.600 Limited to weir flow at low heads

**Proposed Conditions-2874**

NOAA 24-hr D 10YR-NOAA ATLAS 14 Rainfall=5.25"

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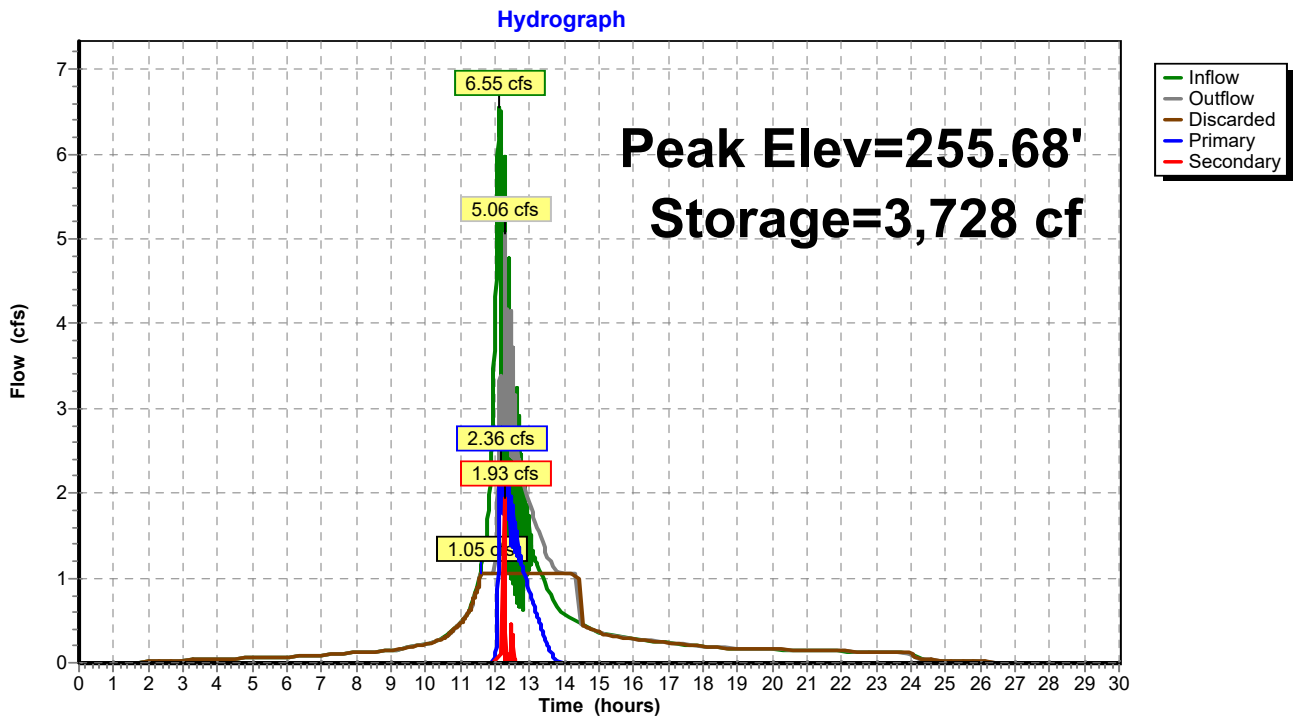
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**Discarded OutFlow** Max=1.05 cfs @ 11.58 hrs HW=254.61' (Free Discharge)  
↳ **2=Exfiltration** (Exfiltration Controls 1.05 cfs)

**Primary OutFlow** Max=2.07 cfs @ 12.16 hrs HW=255.58' TW=255.44' (Dynamic Tailwater)  
↳ **1=Orifice/Grate** (Orifice Controls 2.07 cfs @ 1.84 fps)

**Secondary OutFlow** Max=0.00 cfs @ 12.32 hrs HW=255.66' TW=255.69' (Dynamic Tailwater)  
↳ **3=Orifice/Grate** ( Controls 0.00 cfs)

**Pond CS5: CHAMBER SYSTEM #5**



**Proposed Conditions-2874**

NOAA 24-hr D 10YR-NOAA ATLAS 14 Rainfall=5.25"

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**Summary for Pond CS6: CHAMBER SYSTEM #6A & 6B**

Inflow = 4.40 cfs @ 12.14 hrs, Volume= 0.296 af  
 Outflow = 2.83 cfs @ 12.28 hrs, Volume= 0.296 af, Atten= 36%, Lag= 8.6 min  
 Discarded = 0.47 cfs @ 11.81 hrs, Volume= 0.160 af  
 Primary = 2.35 cfs @ 12.28 hrs, Volume= 0.136 af  
     Routed to Pond CS7 : CHAMBER SYSTEM #7  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af  
     Routed to Pond CS5 : CHAMBER SYSTEM #5

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 Peak Elev= 255.57' @ 12.28 hrs Surf.Area= 2,464 sf Storage= 1,605 cf

Plug-Flow detention time= 8.8 min calculated for 0.296 af (100% of inflow)  
 Center-of-Mass det. time= 8.8 min ( 795.7 - 786.9 )

Volume	Invert	Avail.Storage	Storage Description
#1	254.60'	1,089 cf	<b>32.00'W x 41.00'L x 3.00'H Prismatic 6A</b> 3,936 cf Overall - 1,214 cf Embedded = 2,722 cf x 40.0% Voids
#2	255.10'	1,207 cf	<b>Cultec R-180 (SECTION 6A) x 54 Inside #1</b> Effective Size= 33.6"W x 20.0"H => 3.44 sf x 6.33'L = 21.8 cf Overall Size= 36.0"W x 20.5"H x 7.33'L with 1.00' Overlap Row Length Adjustment= +1.00' x 3.44 sf x 9 rows
#3	255.10'	7 cf	<b>Cultec HVLV FC-24 (SECTION 6A) x 16 Inside #1</b> Effective Size= 15.3"W x 12.0"H => 0.91 sf x 0.50'L = 0.5 cf Overall Size= 16.0"W x 12.0"H x 2.02'L with 1.52' Overlap 16 Chambers in 9 Rows
#4	254.60'	975 cf	<b>32.00'W x 36.00'L x 3.00'H Prismatic (SECTION 6B)</b> 3,456 cf Overall - 1,018 cf Embedded = 2,438 cf x 40.0% Voids
#5	255.10'	1,011 cf	<b>Cultec R-180 (SECTION 6B) x 45 Inside #4</b> Effective Size= 33.6"W x 20.0"H => 3.44 sf x 6.33'L = 21.8 cf Overall Size= 36.0"W x 20.5"H x 7.33'L with 1.00' Overlap Row Length Adjustment= +1.00' x 3.44 sf x 9 rows
#6	255.10'	7 cf	<b>Cultec HVLV FC-24 (SECTION 6B) x 16 Inside #4</b> Effective Size= 15.3"W x 12.0"H => 0.91 sf x 0.50'L = 0.5 cf Overall Size= 16.0"W x 12.0"H x 2.02'L with 1.52' Overlap 16 Chambers in 9 Rows
#7	255.10'	54 cf	<b>12.0" Round Pipe Storage 1 x 3 -Impervious</b> L= 23.0'
#8	254.77'	198 cf	<b>18.0" Round Pipe Storage 2-Impervious</b> L= 112.0'
#9	255.10'	14 cf	<b>12.0" Round Pipe Storage 3 x 6 -Impervious</b> L= 3.0'
#10	255.10'	20 cf	<b>12.0" Round Pipe Storage 4-Impervious</b> L= 26.0' S= 0.0200 '/'
#11	255.10'	51 cf	<b>Custom Stage Data (Prismatic) Listed below (Recalc) -Impervious</b>
		4,634 cf	Total Available Storage

**Proposed Conditions-2874**

NOAA 24-hr D 10YR-NOAA ATLAS 14 Rainfall=5.25"

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Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
255.10	17	0	0
258.10	17	51	51

Device	Routing	Invert	Outlet Devices
#1	Primary	253.80'	<b>12.0" Vert. Orifice/Grate X 3.00</b> C= 0.600 Limited to weir flow at low heads
#2	Device 1	253.55'	<b>18.0" Round Culvert</b> L= 15.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 253.55' / 253.55' S= 0.0000 ' / ' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#3	Device 2	255.50'	<b>3.4' long Sharp-Crested Rectangular Weir</b> 1 End Contraction(s) 2.5' Crest Height
#4	Device 2	255.10'	<b>0.8' long Sharp-Crested Rectangular Weir</b> 2 End Contraction(s) 2.0' Crest Height
#5	Primary	254.77'	<b>18.0" Round Culvert</b> L= 71.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 254.77' / 254.77' S= 0.0000 ' / ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#6	Device 5	255.10'	<b>12.0" Vert. Orifice/Grate X 6.00</b> C= 0.600 Limited to weir flow at low heads
#7	Discarded	254.60'	<b>8.270 in/hr Exfiltration over Horizontal area</b> Phase-In= 0.01'
#8	Secondary	255.10'	<b>12.0" Vert. Orifice/Grate X 3.00</b> C= 0.600 Limited to weir flow at low heads

**Discarded OutFlow** Max=0.47 cfs @ 11.81 hrs HW=254.61' (Free Discharge)

↑7=Exfiltration (Exfiltration Controls 0.47 cfs)

**Primary OutFlow** Max=2.35 cfs @ 12.28 hrs HW=255.57' TW=254.84' (Dynamic Tailwater)

↑1=Orifice/Grate (Passes 0.99 cfs of 9.69 cfs potential flow)

↑2=Culvert (Passes 0.99 cfs of 7.26 cfs potential flow)

↑3=Sharp-Crested Rectangular Weir (Weir Controls 0.22 cfs @ 0.89 fps)

↑4=Sharp-Crested Rectangular Weir (Weir Controls 0.77 cfs @ 2.31 fps)

↑5=Culvert (Barrel Controls 1.36 cfs @ 2.05 fps)

↑6=Orifice/Grate (Passes 1.36 cfs of 5.14 cfs potential flow)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=254.60' TW=254.60' (Dynamic Tailwater)

↑8=Orifice/Grate ( Controls 0.00 cfs)

**Proposed Conditions-2874**

NOAA 24-hr D 10YR-NOAA ATLAS 14 Rainfall=5.25"

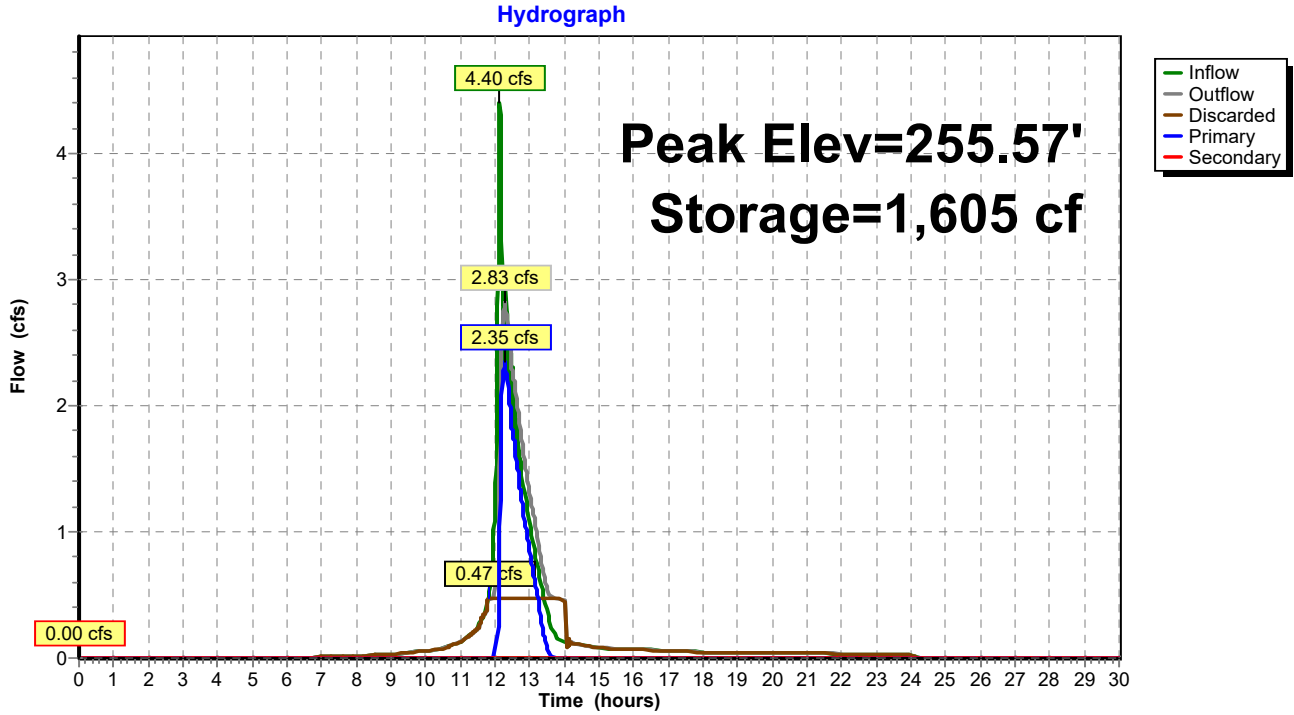
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**Pond CS6: CHAMBER SYSTEM #6A & 6B**



**Proposed Conditions-2874**

NOAA 24-hr D 10YR-NOAA ATLAS 14 Rainfall=5.25"

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**Summary for Pond CS7: CHAMBER SYSTEM #7**

Inflow = 3.68 cfs @ 12.15 hrs, Volume= 0.326 af  
 Outflow = 2.89 cfs @ 12.37 hrs, Volume= 0.313 af, Atten= 22%, Lag= 13.2 min  
 Discarded = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af  
 Primary = 2.89 cfs @ 12.37 hrs, Volume= 0.313 af  
 Routed to Reach TF : TREATED FLOW OUTLET  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af  
 Routed to Pond CS6 : CHAMBER SYSTEM #6A & 6B

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 Peak Elev= 254.88' @ 12.37 hrs Surf.Area= 2,400 sf Storage= 2,567 cf

Plug-Flow detention time= 52.7 min calculated for 0.313 af (96% of inflow)  
 Center-of-Mass det. time= 32.0 min ( 822.3 - 790.3 )

Volume	Invert	Avail.Storage	Storage Description
#1	253.30'	2,064 cf	<b>12.00'W x 200.00'L x 3.00'H Prismatic</b> 7,200 cf Overall - 2,039 cf Embedded = 5,161 cf x 40.0% Voids
#2	253.80'	2,035 cf	<b>Cultec R-180</b> x 93 Inside #1 Effective Size= 33.6"W x 20.0"H => 3.44 sf x 6.33'L = 21.8 cf Overall Size= 36.0"W x 20.5"H x 7.33'L with 1.00' Overlap Row Length Adjustment= +1.00' x 3.44 sf x 3 rows
#3	253.80'	4 cf	<b>Cultec HVLV FC-24</b> x 8 Inside #1 Effective Size= 15.3"W x 12.0"H => 0.91 sf x 0.50'L = 0.5 cf Overall Size= 16.0"W x 12.0"H x 2.02'L with 1.52' Overlap 8 Chambers in 3 Rows
#4	253.80'	26 cf	<b>12.0" Round Pipe Storage 1-Impervious</b> L= 33.0'
#5	253.55'	41 cf	<b>18.0" Round Pipe Storage 2-Impervious</b> L= 23.0'
#6	253.30'	51 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc) -Impervious
		4,221 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
253.30	17	0	0
256.30	17	51	51

Device	Routing	Invert	Outlet Devices
#1	Primary	253.25'	<b>18.0" Round RCP_Round 18"</b> L= 47.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 253.25' / 249.30' S= 0.0840 ' /' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf
#2	Device 1	253.80'	<b>12.0" Vert. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	255.40'	<b>4.2' long x 1.50' rise Sharp-Crested Rectangular Weir</b> 2 End Contraction(s) 2.2' Crest Height
#4	Device 2	253.55'	<b>18.0" Vert. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#5	Device 4	253.80'	<b>12.0" Vert. Orifice/Grate X 3.00</b> C= 0.600

**Proposed Conditions-2874**

NOAA 24-hr D 10YR-NOAA ATLAS 14 Rainfall=5.25"

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#6	Discarded	253.30'	Limited to weir flow at low heads <b>8.270 in/hr Exfiltration X 0.00 over Horizontal area</b> Phase-In= 0.01'
#7	Secondary	253.80'	<b>12.0" Vert. Orifice/Grate X 3.00</b> C= 0.600 Limited to weir flow at low heads

**Discarded OutFlow** Max=0.00 cfs @ 0.00 hrs HW=253.30' (Free Discharge)

↳ **6=Exfiltration** ( Controls 0.00 cfs)

**Primary OutFlow** Max=2.89 cfs @ 12.37 hrs HW=254.88' TW=0.00' (Dynamic Tailwater)

↳ **1=RCP\_Round 18"** (Passes 2.89 cfs of 7.99 cfs potential flow)

↳ **2=Orifice/Grate** (Orifice Controls 2.89 cfs @ 3.67 fps)

↳ **4=Orifice/Grate** (Passes 2.89 cfs of 6.52 cfs potential flow)

↳ **5=Orifice/Grate** (Passes 2.89 cfs of 8.66 cfs potential flow)

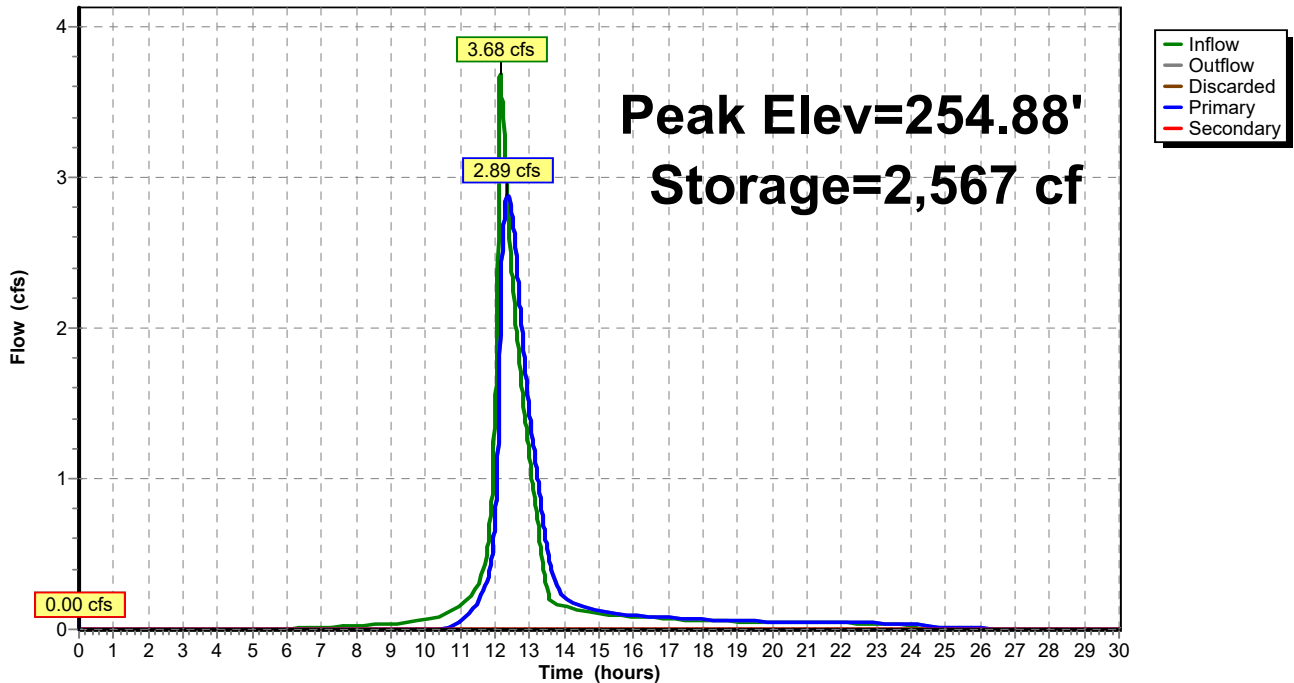
↳ **3=Sharp-Crested Rectangular Weir** ( Controls 0.00 cfs)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=253.30' TW=254.60' (Dynamic Tailwater)

↳ **7=Orifice/Grate** ( Controls 0.00 cfs)

**Pond CS7: CHAMBER SYSTEM #7**

Hydrograph



**Proposed Conditions-2874**

NOAA 24-hr D 10YR-NOAA ATLAS 14 Rainfall=5.25"

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**Summary for Pond CS8: CHAMBER SYSTEM #8**

Inflow Area = 0.280 ac, 82.14% Impervious, Inflow Depth = 4.23" for 10YR-NOAA ATLAS 14 event  
 Inflow = 1.35 cfs @ 12.12 hrs, Volume= 0.099 af  
 Outflow = 0.94 cfs @ 12.18 hrs, Volume= 0.092 af, Atten= 30%, Lag= 3.3 min  
 Discarded = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af  
 Primary = 0.94 cfs @ 12.18 hrs, Volume= 0.092 af  
 Routed to Reach TF : TREATED FLOW OUTLET

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 Peak Elev= 255.24' @ 12.18 hrs Surf.Area= 1,320 sf Storage= 893 cf

Plug-Flow detention time= 85.6 min calculated for 0.092 af (94% of inflow)  
 Center-of-Mass det. time= 49.7 min ( 839.0 - 789.2 )

Volume	Invert	Avail.Storage	Storage Description
#1	254.10'	886 cf	<b>12.00'W x 110.00'L x 2.10'H Prismaoid</b> 2,772 cf Overall - 558 cf Embedded = 2,214 cf x 40.0% Voids
#2	254.60'	547 cf	<b>Cultec C-100HD</b> x 39 Inside #1 Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap Row Length Adjustment= +0.50' x 1.86 sf x 3 rows
#3	254.60'	0 cf	<b>Cultec C-100-SFCx2</b> x 4 Inside #1 Effective Size= 10.1"W x 7.6"H => 0.29 sf x 0.33'L = 0.1 cf Overall Size= 12.0"W x 7.6"H x 1.64'L with 1.31' Overlap 4 Chambers in 3 Rows
#4	254.60'	23 cf	<b>8.0" Round Pipe Storage 1</b> -Impervious L= 65.0' S= 0.0100 '/'
#5	254.60'	10 cf	<b>8.0" Round Pipe Storage 2</b> Inside #1 L= 30.0'
#6	254.92'	75 cf	<b>4.00'D x 3.00'H Vertical Cone/Cylinder</b> x 2 -Impervious
		1,542 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	254.60'	<b>8.0" Vert. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#2	Discarded	254.10'	<b>8.270 in/hr Exfiltration X 0.00 over Horizontal area</b> Phase-In= 0.01'

**Discarded OutFlow** Max=0.00 cfs @ 0.00 hrs HW=254.10' (Free Discharge)  
 ↑**2=Exfiltration** ( Controls 0.00 cfs)

**Primary OutFlow** Max=0.94 cfs @ 12.18 hrs HW=255.24' TW=0.00' (Dynamic Tailwater)  
 ↑**1=Orifice/Grate** (Orifice Controls 0.94 cfs @ 2.73 fps)

**Proposed Conditions-2874**

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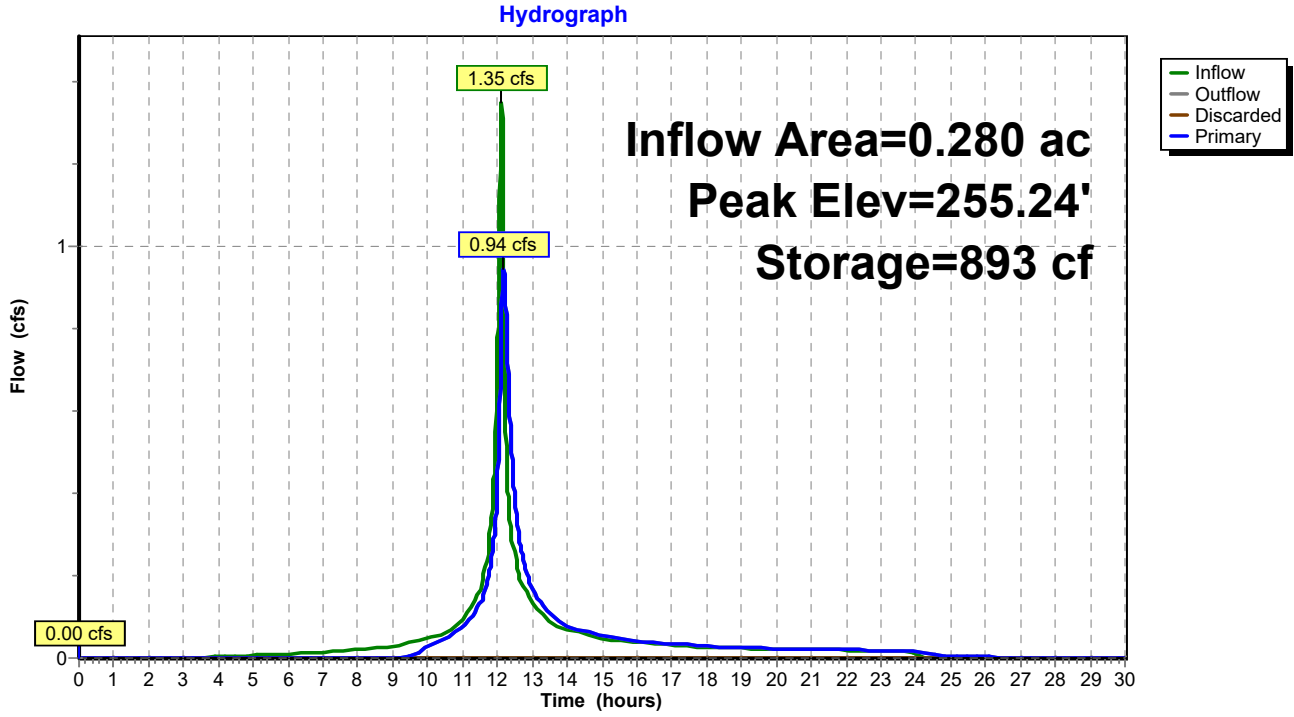
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**Pond CS8: CHAMBER SYSTEM #8**



**Proposed Conditions-2874**

NOAA 24-hr D 25YR NOAA ATLAS 14 Rainfall=6.43"

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**Summary for Subcatchment PR1A: SITE AREA**

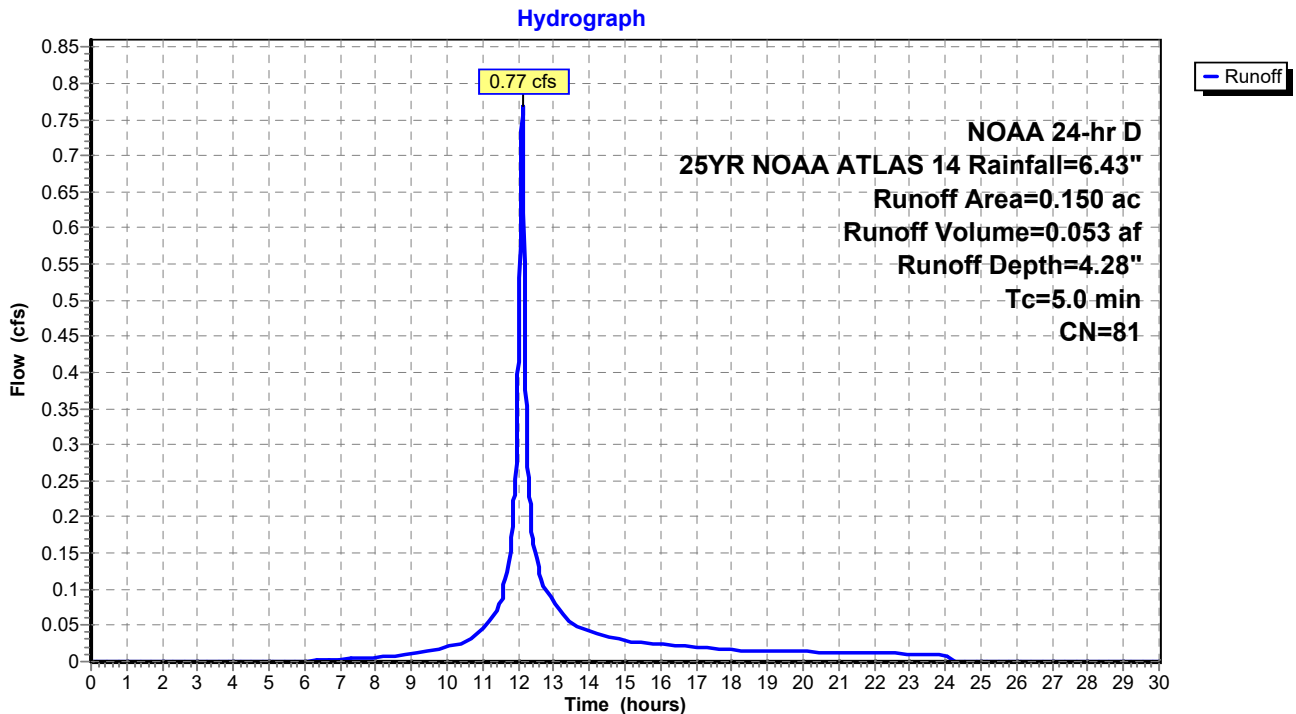
Runoff = 0.77 cfs @ 12.12 hrs, Volume= 0.053 af, Depth= 4.28"  
 Routed to Pond CS1 : CHAMBER SYSTEM #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 NOAA 24-hr D 25YR NOAA ATLAS 14 Rainfall=6.43"

Area (ac)	CN	Description
* 0.080	98	Impervious Area
0.070	61	>75% Grass cover, Good, HSG B
0.150	81	Weighted Average
0.070		46.67% Pervious Area
0.080		53.33% Impervious Area

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

**Subcatchment PR1A: SITE AREA**



**Proposed Conditions-2874**

NOAA 24-hr D 25YR NOAA ATLAS 14 Rainfall=6.43"

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**Summary for Subcatchment PR1B: SITE AREA**

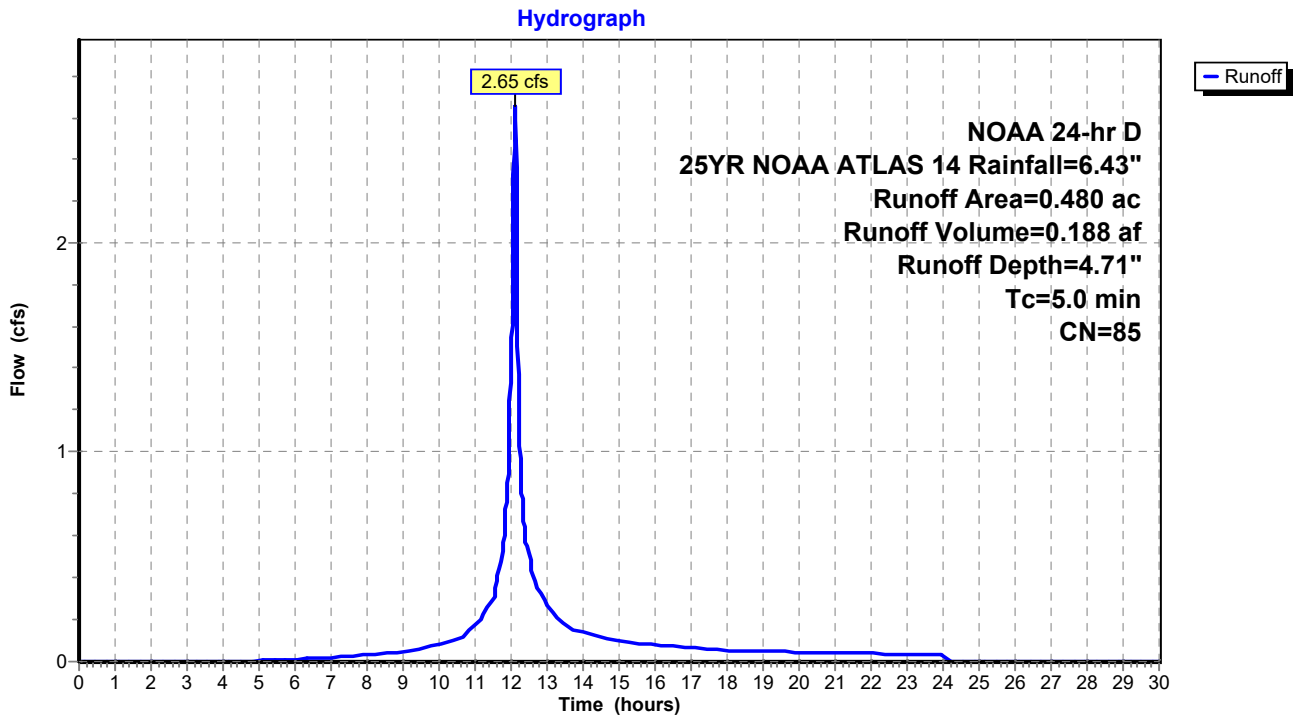
Runoff = 2.65 cfs @ 12.12 hrs, Volume= 0.188 af, Depth= 4.71"  
 Routed to Pond CS2 : CHAMBER SYSTEM #2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 NOAA 24-hr D 25YR NOAA ATLAS 14 Rainfall=6.43"

Area (ac)	CN	Description
* 0.310	98	Impervious Area
0.170	61	>75% Grass cover, Good, HSG B
0.480	85	Weighted Average
0.170		35.42% Pervious Area
0.310		64.58% Impervious Area

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

**Subcatchment PR1B: SITE AREA**



**Proposed Conditions-2874**

NOAA 24-hr D 25YR NOAA ATLAS 14 Rainfall=6.43"

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**Summary for Subcatchment PR2: SITE AREA**

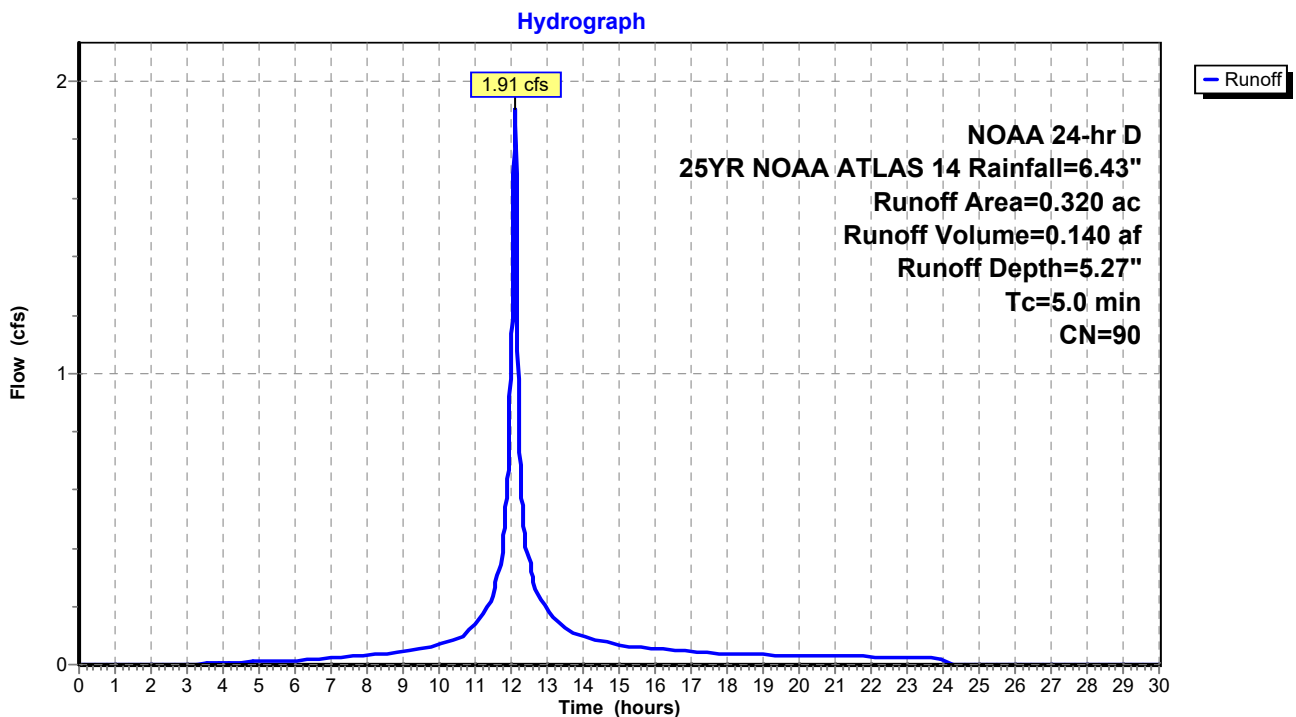
Runoff = 1.91 cfs @ 12.12 hrs, Volume= 0.140 af, Depth= 5.27"  
 Routed to Pond CS4 : CHAMBER SYSTEM #4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 NOAA 24-hr D 25YR NOAA ATLAS 14 Rainfall=6.43"

Area (ac)	CN	Description
* 0.250	98	Impervious Area
0.070	61	>75% Grass cover, Good, HSG B
0.320	90	Weighted Average
0.070		21.87% Pervious Area
0.250		78.13% Impervious Area

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

**Subcatchment PR2: SITE AREA**



**Proposed Conditions-2874**

NOAA 24-hr D 25YR NOAA ATLAS 14 Rainfall=6.43"

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**Summary for Subcatchment PR2A: SITE & ROOF AREA**

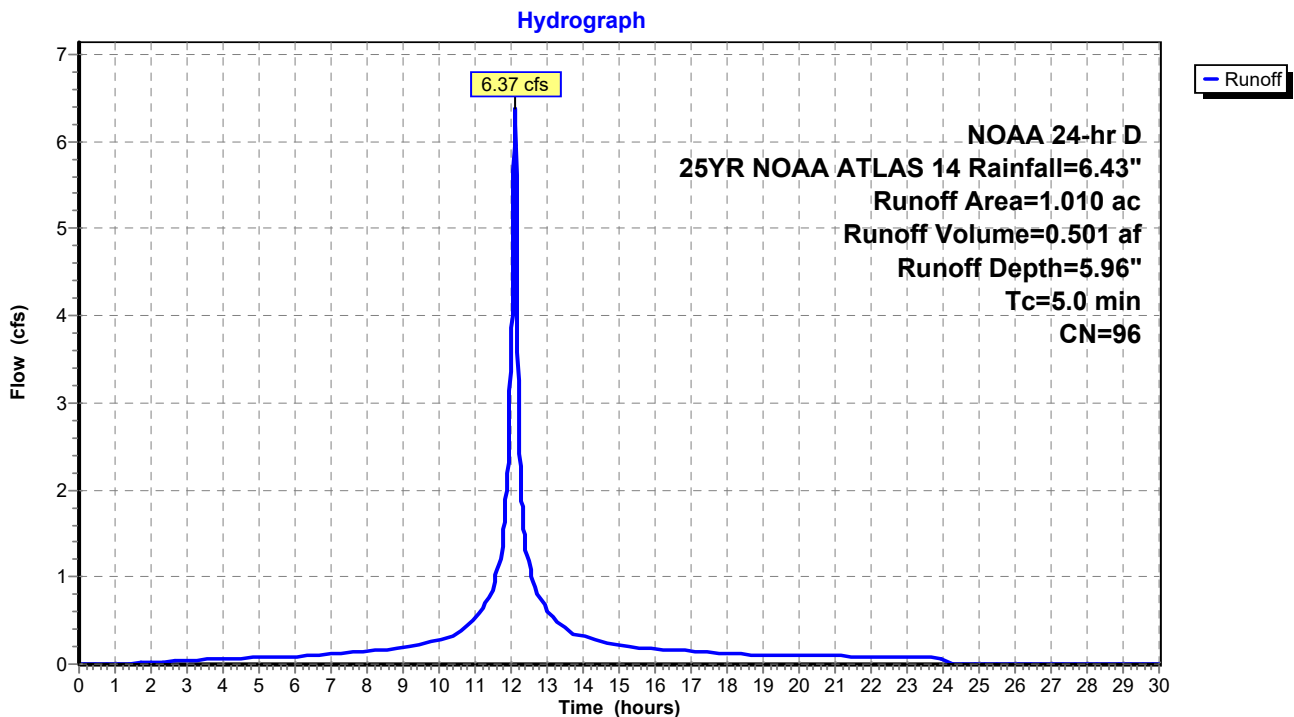
Runoff = 6.37 cfs @ 12.12 hrs, Volume= 0.501 af, Depth= 5.96"  
 Routed to Pond CS5 : CHAMBER SYSTEM #5

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 NOAA 24-hr D 25YR NOAA ATLAS 14 Rainfall=6.43"

Area (ac)	CN	Description
* 0.250	98	Impervious Area
0.050	61	>75% Grass cover, Good, HSG B
* 0.710	98	Roof
1.010	96	Weighted Average
0.050		4.95% Pervious Area
0.960		95.05% Impervious Area

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

**Subcatchment PR2A: SITE & ROOF AREA**



**Proposed Conditions-2874**

NOAA 24-hr D 25YR NOAA ATLAS 14 Rainfall=6.43"

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**Summary for Subcatchment PR3: SITE**

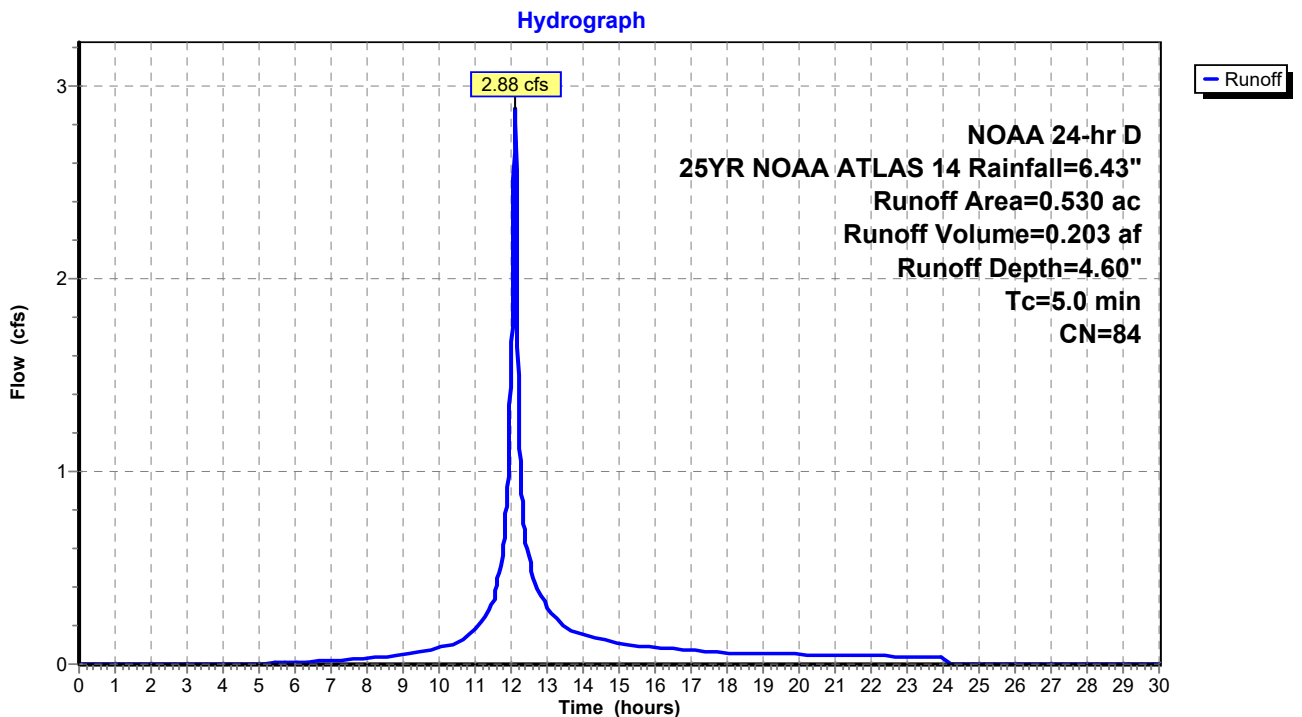
Runoff = 2.88 cfs @ 12.12 hrs, Volume= 0.203 af, Depth= 4.60"  
 Routed to Pond CS6 : CHAMBER SYSTEM #6A & 6B

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 NOAA 24-hr D 25YR NOAA ATLAS 14 Rainfall=6.43"

Area (ac)	CN	Description
* 0.130	98	Impervious Area
0.200	61	>75% Grass cover, Good, HSG B
* 0.200	98	Roof
0.530	84	Weighted Average
0.200		37.74% Pervious Area
0.330		62.26% Impervious Area

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

**Subcatchment PR3: SITE**



**Proposed Conditions-2874**

NOAA 24-hr D 25YR NOAA ATLAS 14 Rainfall=6.43"

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**Summary for Subcatchment PR4: SITE & ROOF AREA**

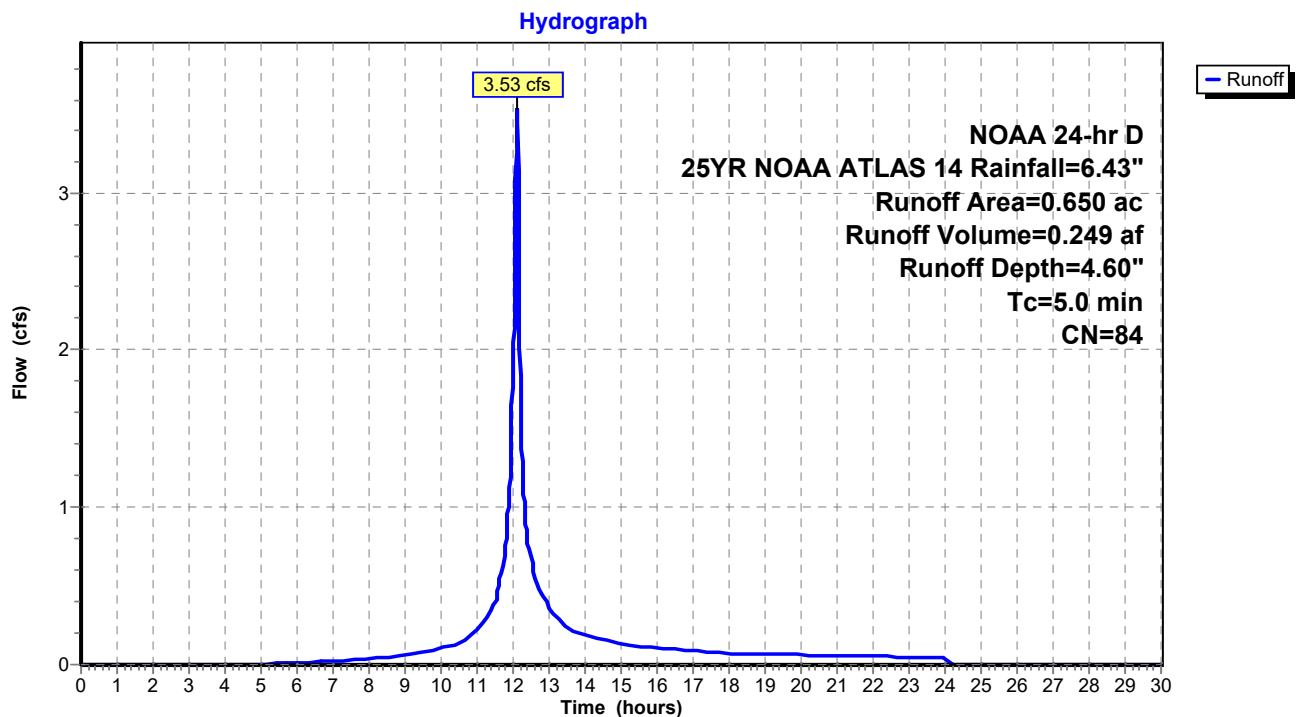
Runoff = 3.53 cfs @ 12.12 hrs, Volume= 0.249 af, Depth= 4.60"  
 Routed to Pond CS7 : CHAMBER SYSTEM #7

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 NOAA 24-hr D 25YR NOAA ATLAS 14 Rainfall=6.43"

Area (ac)	CN	Description
* 0.410	98	Impervious Area
0.240	61	>75% Grass cover, Good, HSG B
0.650	84	Weighted Average
0.240		36.92% Pervious Area
0.410		63.08% Impervious Area

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

**Subcatchment PR4: SITE & ROOF AREA**



**Proposed Conditions-2874**

NOAA 24-hr D 25YR NOAA ATLAS 14 Rainfall=6.43"

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**Summary for Subcatchment PR5: SITE AREA**

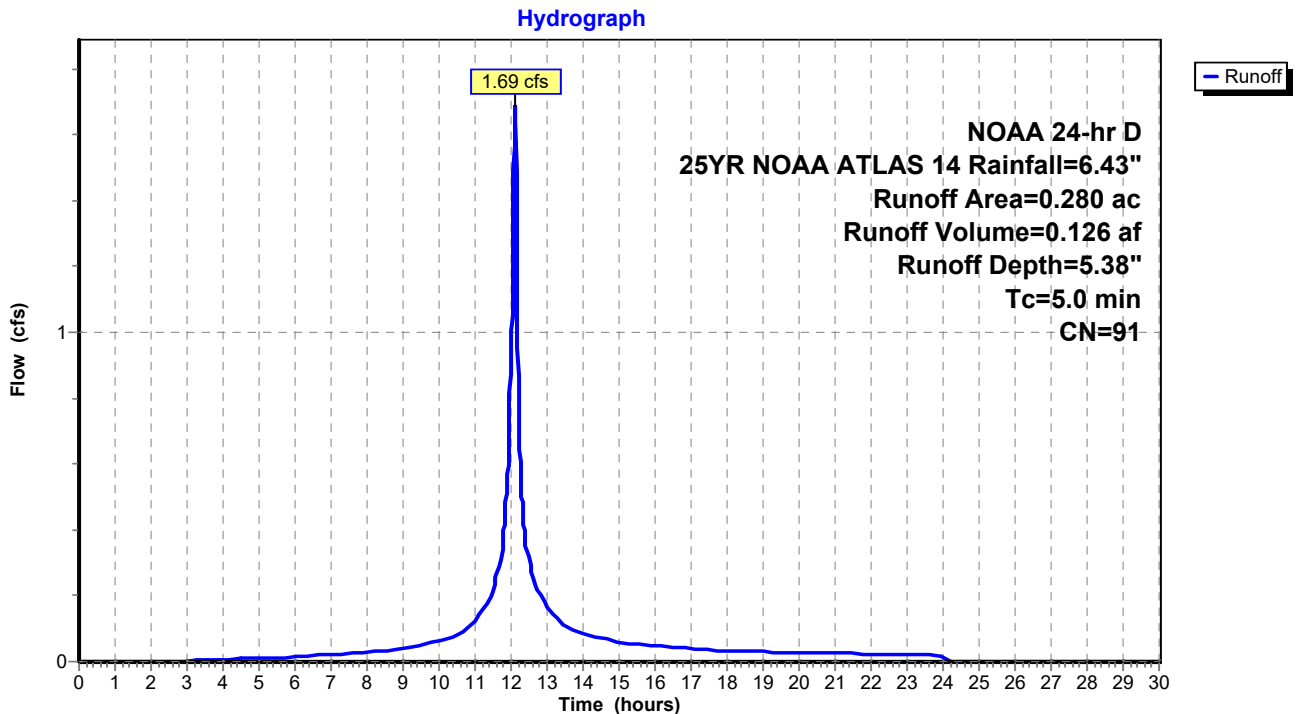
Runoff = 1.69 cfs @ 12.12 hrs, Volume= 0.126 af, Depth= 5.38"  
 Routed to Pond CS8 : CHAMBER SYSTEM #8

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 NOAA 24-hr D 25YR NOAA ATLAS 14 Rainfall=6.43"

Area (ac)	CN	Description
* 0.230	98	Impervious Area
0.050	61	>75% Grass cover, Good, HSG B
0.280	91	Weighted Average
0.050		17.86% Pervious Area
0.230		82.14% Impervious Area

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

**Subcatchment PR5: SITE AREA**



**Proposed Conditions-2874**

NOAA 24-hr D 25YR NOAA ATLAS 14 Rainfall=6.43"

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**Summary for Subcatchment PR6: SITE AREA**

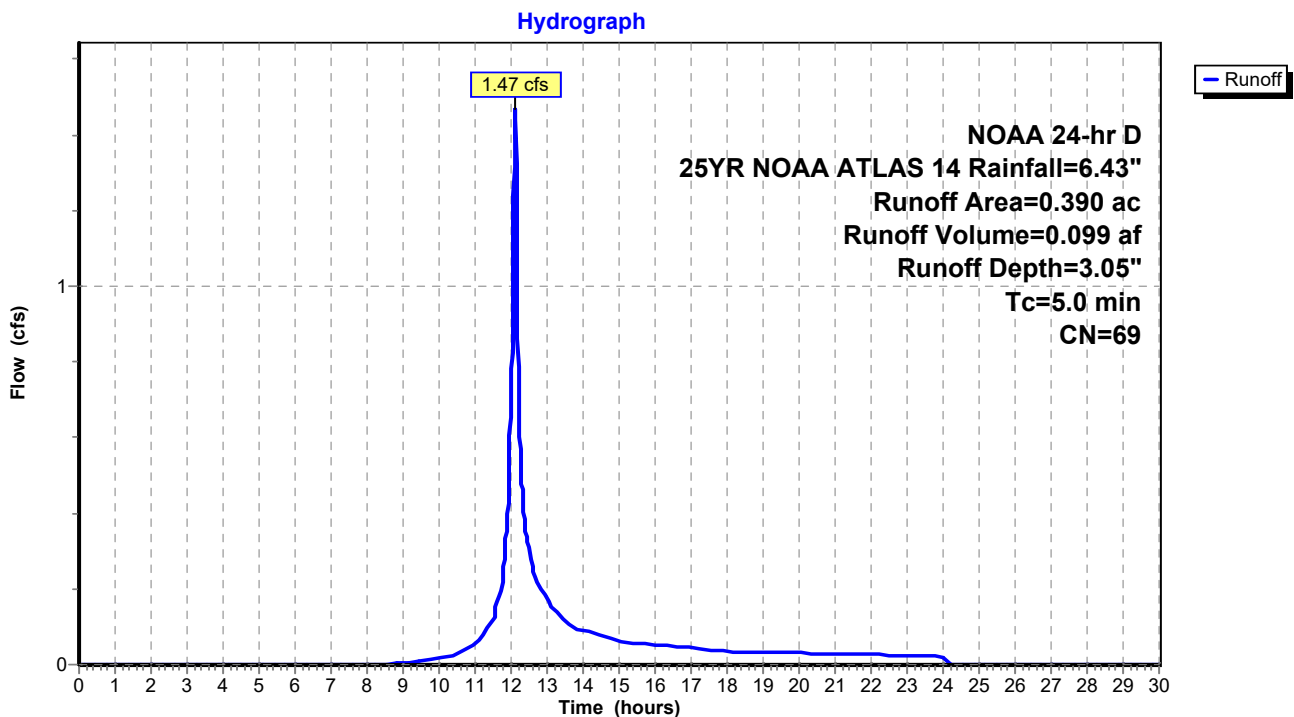
Runoff = 1.47 cfs @ 12.13 hrs, Volume= 0.099 af, Depth= 3.05"  
 Routed to Reach SUM : TOTAL FLOW

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 NOAA 24-hr D 25YR NOAA ATLAS 14 Rainfall=6.43"

Area (ac)	CN	Description
* 0.080	98	Impervious Area
0.310	61	>75% Grass cover, Good, HSG B
0.390	69	Weighted Average
0.310		79.49% Pervious Area
0.080		20.51% Impervious Area

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

**Subcatchment PR6: SITE AREA**



**Proposed Conditions-2874**

NOAA 24-hr D 25YR NOAA ATLAS 14 Rainfall=6.43"

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**Summary for Subcatchment PR7: TRENCH DRAIN #1**

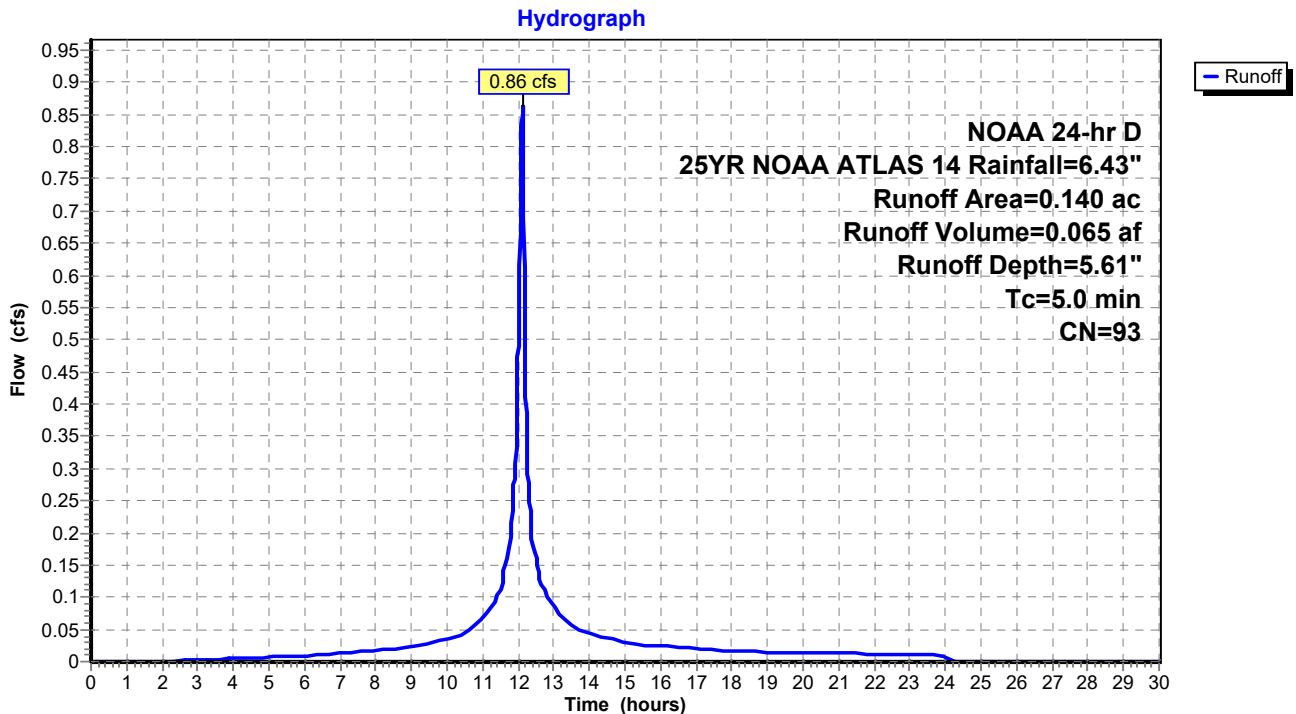
Runoff = 0.86 cfs @ 12.12 hrs, Volume= 0.065 af, Depth= 5.61"  
 Routed to Reach TF : TREATED FLOW OUTLET

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 NOAA 24-hr D 25YR NOAA ATLAS 14 Rainfall=6.43"

Area (ac)	CN	Description
* 0.120	98	Impervious Area
0.020	61	>75% Grass cover, Good, HSG B
0.140	93	Weighted Average
0.020		14.29% Pervious Area
0.120		85.71% Impervious Area

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

**Subcatchment PR7: TRENCH DRAIN #1**



**Proposed Conditions-2874**

NOAA 24-hr D 25YR NOAA ATLAS 14 Rainfall=6.43"

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**Summary for Subcatchment PR8: TRENCH DRAIN #2**

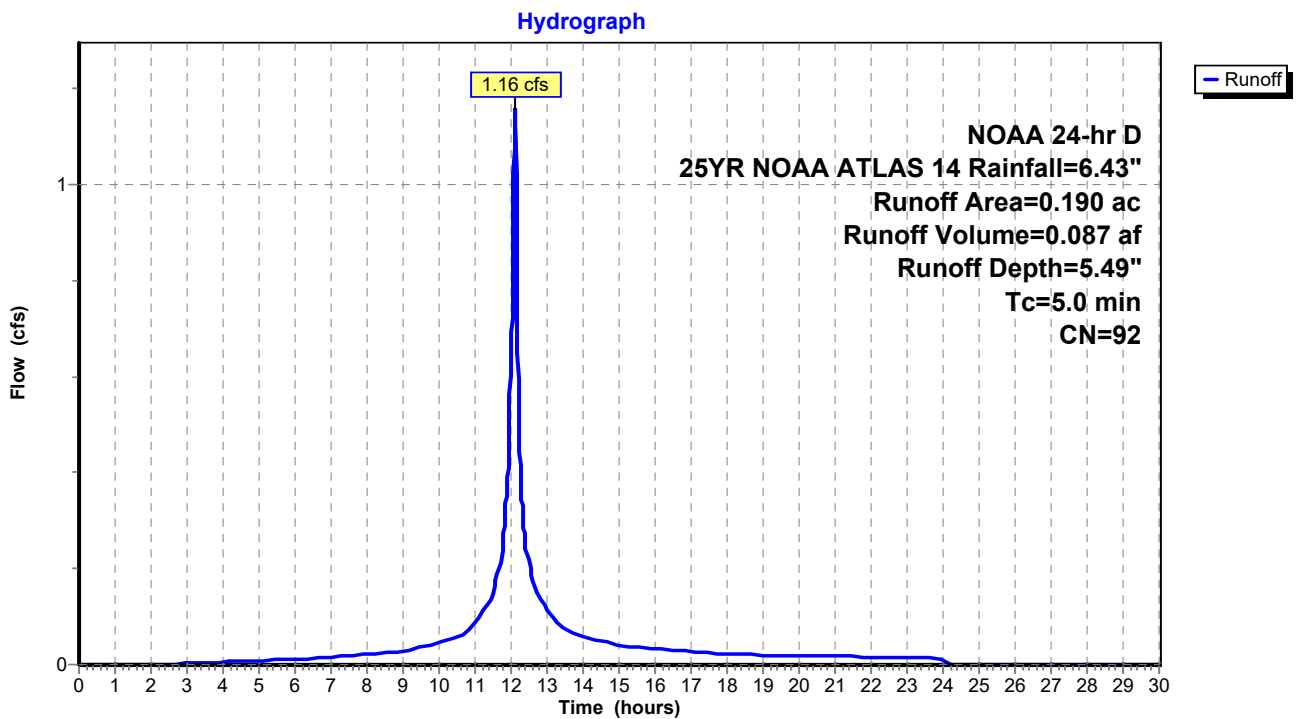
Runoff = 1.16 cfs @ 12.12 hrs, Volume= 0.087 af, Depth= 5.49"  
 Routed to Reach TF : TREATED FLOW OUTLET

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 NOAA 24-hr D 25YR NOAA ATLAS 14 Rainfall=6.43"

Area (ac)	CN	Description
* 0.160	98	Impervious Area
0.030	61	>75% Grass cover, Good, HSG B
0.190	92	Weighted Average
0.030		15.79% Pervious Area
0.160		84.21% Impervious Area

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

**Subcatchment PR8: TRENCH DRAIN #2**



**Proposed Conditions-2874**

NOAA 24-hr D 25YR NOAA ATLAS 14 Rainfall=6.43"

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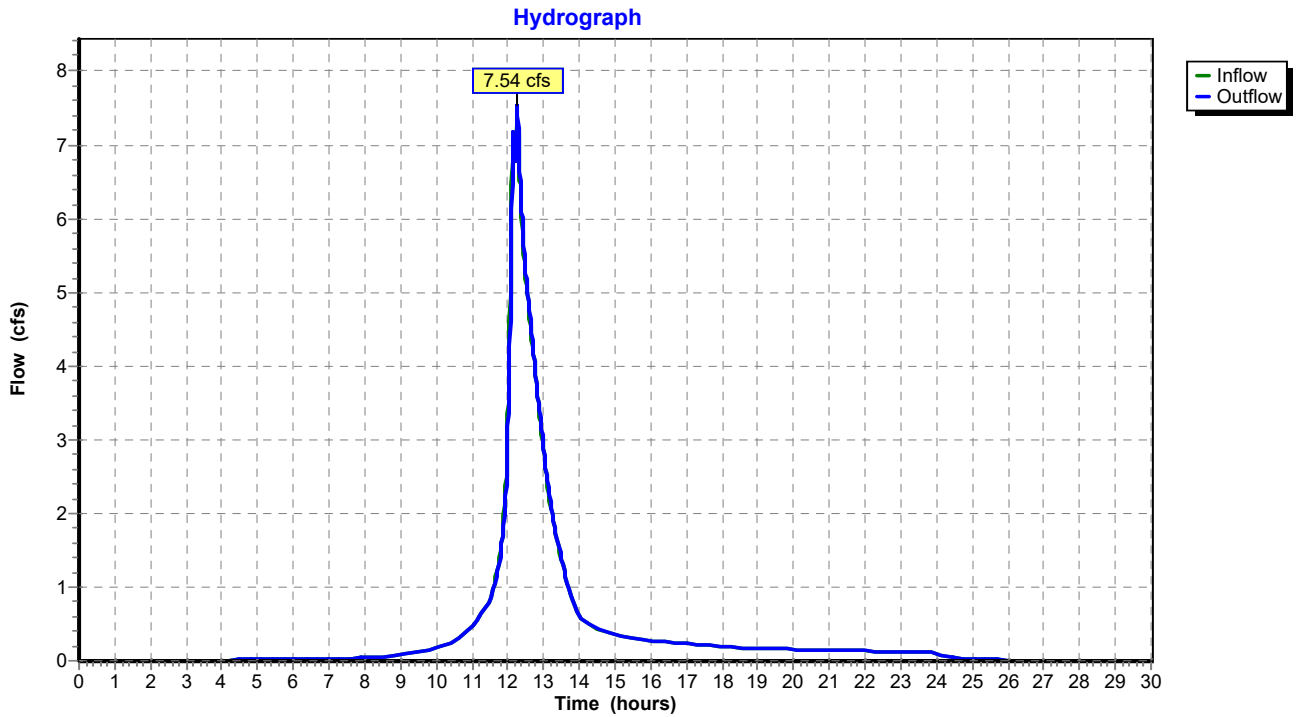
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**Summary for Reach SUM: TOTAL FLOW**

Inflow = 7.54 cfs @ 12.25 hrs, Volume= 0.852 af  
Outflow = 7.54 cfs @ 12.26 hrs, Volume= 0.852 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

**Reach SUM: TOTAL FLOW**



**Proposed Conditions-2874**

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NOAA 24-hr D 25YR NOAA ATLAS 14 Rainfall=6.43"

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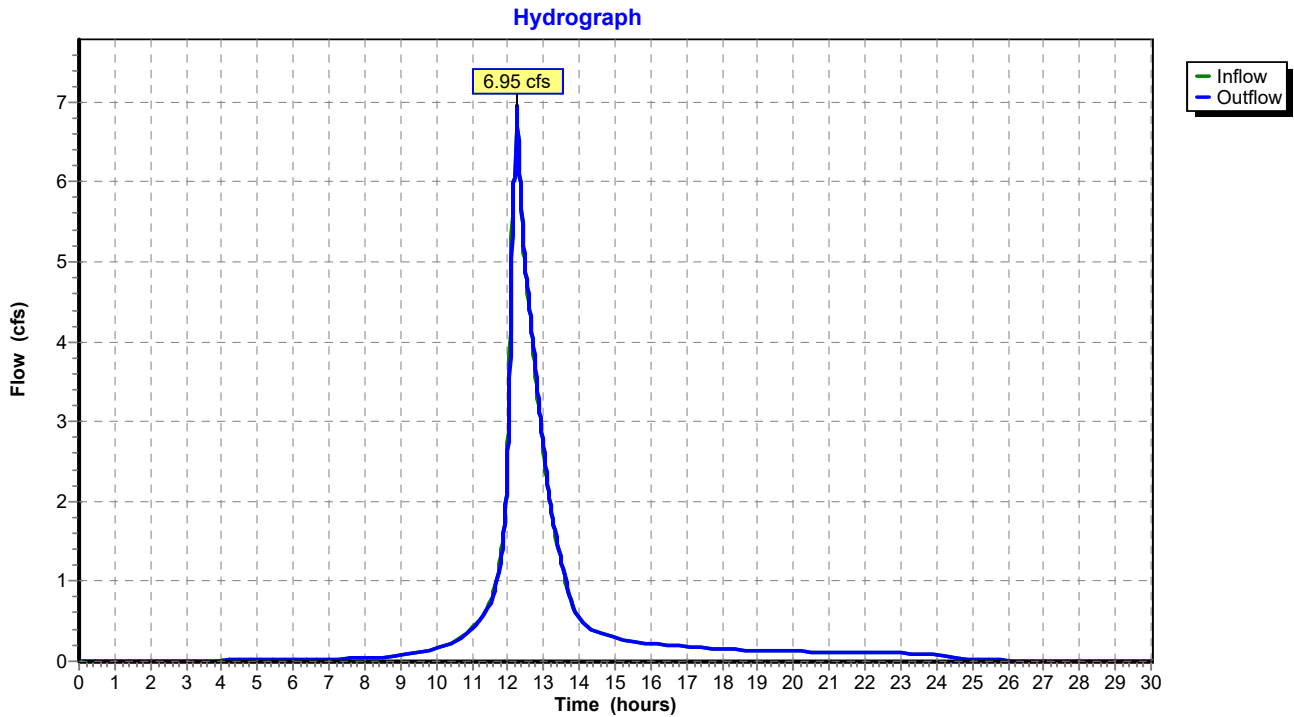
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**Summary for Reach TF: TREATED FLOW OUTLET**

Inflow = 6.95 cfs @ 12.24 hrs, Volume= 0.753 af  
Outflow = 6.95 cfs @ 12.25 hrs, Volume= 0.753 af, Atten= 0%, Lag= 0.6 min  
Routed to Reach SUM : TOTAL FLOW

Routing by Sim-Route method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

**Reach TF: TREATED FLOW OUTLET**



**Proposed Conditions-2874**

NOAA 24-hr D 25YR NOAA ATLAS 14 Rainfall=6.43"

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**Summary for Pond CS1: CHAMBER SYSTEM #1**

Inflow = 7.76 cfs @ 12.31 hrs, Volume= 0.228 af  
 Outflow = 8.28 cfs @ 12.33 hrs, Volume= 0.224 af, Atten= 0%, Lag= 1.2 min  
 Discarded = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af  
 Primary = 8.28 cfs @ 12.33 hrs, Volume= 0.224 af  
 Routed to Pond CS2 : CHAMBER SYSTEM #2

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 Peak Elev= 256.38' @ 12.33 hrs Surf.Area= 816 sf Storage= 963 cf

Plug-Flow detention time= 22.4 min calculated for 0.230 af (98% of inflow)  
 Center-of-Mass det. time= 13.0 min ( 779.5 - 766.1 )

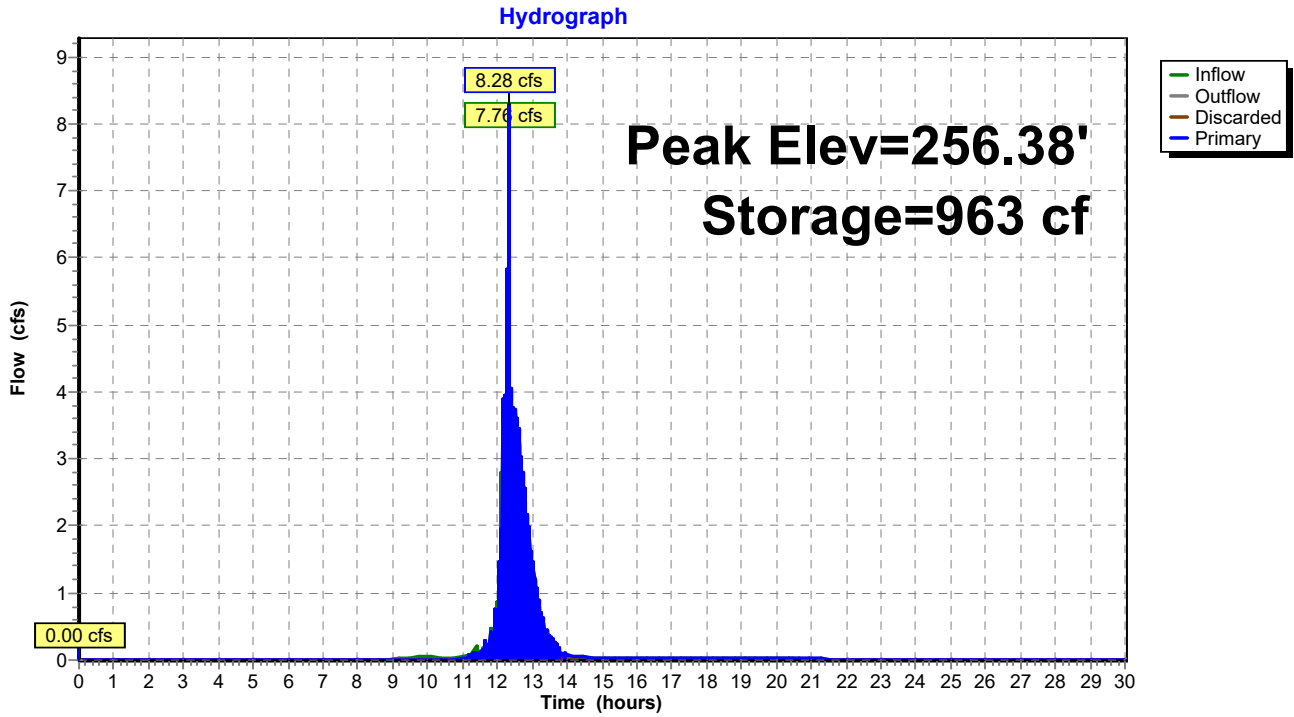
Volume	Invert	Avail.Storage	Storage Description
#1	254.60'	713 cf	<b>12.00'W x 68.00'L x 3.00'H Prismatic</b> 2,448 cf Overall - 665 cf Embedded = 1,783 cf x 40.0% Voids
#2	255.10'	663 cf	<b>Cultec R-180 x 30 Inside #1</b> Effective Size= 33.6"W x 20.0"H => 3.44 sf x 6.33'L = 21.8 cf Overall Size= 36.0"W x 20.5"H x 7.33'L with 1.00' Overlap Row Length Adjustment= +1.00' x 3.44 sf x 3 rows
#3	255.10'	2 cf	<b>Cultec HVLV FC-24 x 4 Inside #1</b> Effective Size= 15.3"W x 12.0"H => 0.91 sf x 0.50'L = 0.5 cf Overall Size= 16.0"W x 12.0"H x 2.02'L with 1.52' Overlap 4 Chambers in 3 Rows
#4	255.10'	16 cf	<b>10.0" Round Pipe Storage-Impervious</b> L= 29.0' S= 0.0200 '/'
#5	255.50'	63 cf	<b>4.00'D x 5.00'H Vertical Cone/Cylinder-Impervious</b>
		1,457 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	254.60'	<b>8.270 in/hr Exfiltration X 0.00 over Horizontal area</b> Phase-In= 0.01'
#2	Primary	255.10'	<b>12.0" Vert. Orifice/Grate X 3.00</b> C= 0.600 Limited to weir flow at low heads
#3	Primary	258.60'	<b>2.0" x 2.0" Horiz. Orifice/Grate X 6.00 columns</b> X 6 rows C= 0.600 in 24.0" x 24.0" Grate (25% open area) Limited to weir flow at low heads

**Discarded OutFlow** Max=0.00 cfs @ 0.00 hrs HW=254.60' (Free Discharge)  
 ↑1=Exfiltration ( Controls 0.00 cfs)

**Primary OutFlow** Max=8.25 cfs @ 12.33 hrs HW=256.27' TW=255.74' (Dynamic Tailwater)  
 ↑2=Orifice/Grate (Orifice Controls 8.25 cfs @ 3.50 fps)  
 ↑3=Orifice/Grate ( Controls 0.00 cfs)

Pond CS1: CHAMBER SYSTEM #1



**Proposed Conditions-2874**

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**Summary for Pond CS2: CHAMBER SYSTEM #2**

Inflow = 16.21 cfs @ 12.29 hrs, Volume= 0.525 af  
 Outflow = 16.70 cfs @ 12.31 hrs, Volume= 0.517 af, Atten= 0%, Lag= 1.2 min  
 Discarded = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af  
 Primary = 9.18 cfs @ 12.31 hrs, Volume= 0.342 af  
     Routed to Pond CS3 : CHAMBER SYSTEM #3  
 Secondary = 7.53 cfs @ 12.31 hrs, Volume= 0.175 af  
     Routed to Pond CS1 : CHAMBER SYSTEM #1

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 Peak Elev= 256.34' @ 12.31 hrs Surf.Area= 1,629 sf Storage= 1,883 cf

Plug-Flow detention time= 22.2 min calculated for 0.517 af (99% of inflow)  
 Center-of-Mass det. time= 12.9 min ( 795.1 - 782.2 )

Volume	Invert	Avail.Storage	Storage Description
#1	254.60'	1,371 cf	<b>16.00'W x 99.00'L x 3.00'H Prismatic</b> 4,752 cf Overall - 1,324 cf Embedded = 3,428 cf x 40.0% Voids
#2	255.10'	1,320 cf	<b>Cultec R-180 x 60 Inside #1</b> Effective Size= 33.6"W x 20.0"H => 3.44 sf x 6.33'L = 21.8 cf Overall Size= 36.0"W x 20.5"H x 7.33'L with 1.00' Overlap Row Length Adjustment= +1.00' x 3.44 sf x 4 rows
#3	255.10'	4 cf	<b>Cultec HVLV FC-24 x 9 Inside #1</b> Effective Size= 15.3"W x 12.0"H => 0.91 sf x 0.50'L = 0.5 cf Overall Size= 16.0"W x 12.0"H x 2.02'L with 1.52' Overlap 9 Chambers in 4 Rows
#4	255.10'	26 cf	<b>12.0" Round Pipe Storage-Impervious</b> L= 33.0'
#5	255.82'	113 cf	<b>4.00'D x 3.00'H Vertical Cone/Cylinder x 3 -Impervious</b>
#6	255.10'	4 cf	<b>10.0" Round Pipe Storage-Impervious</b> L= 7.0' S= 0.0143 '/'
#7	255.45'	23 cf	<b>10.0" Round Pipe Storage-Impervious</b> L= 42.0' S= 0.0100 '/'
#8	255.45'	38 cf	<b>10.0" Round Pipe Storage</b> L= 70.0' S= 0.0100 '/'
		2,899 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	255.10'	<b>12.0" Vert. Orifice/Grate X 3.00</b> C= 0.600 Limited to weir flow at low heads
#2	Discarded	254.60'	<b>8.270 in/hr Exfiltration X 0.00 over Horizontal area</b> Phase-In= 0.01'
#3	Secondary	255.10'	<b>12.0" Vert. Orifice/Grate X 3.00</b> C= 0.600 Limited to weir flow at low heads

**Proposed Conditions-2874**

NOAA 24-hr D 25YR NOAA ATLAS 14 Rainfall=6.43"

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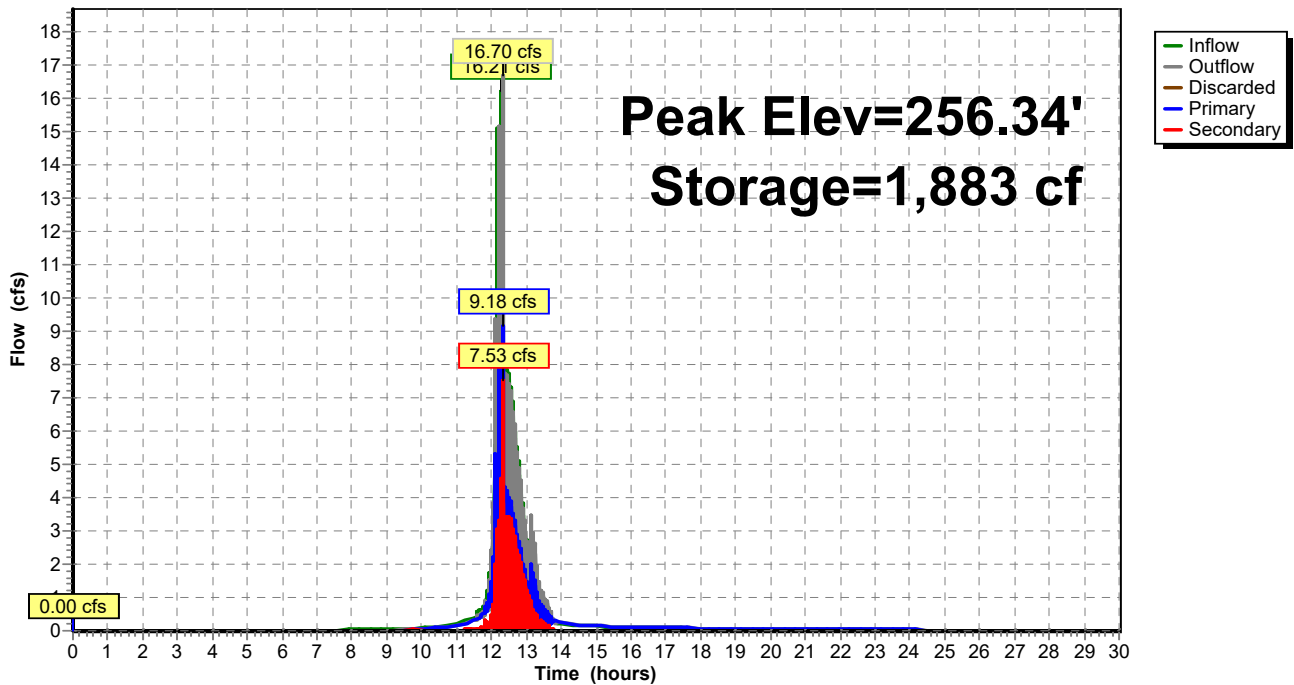
**Discarded OutFlow** Max=0.00 cfs @ 0.00 hrs HW=254.60' (Free Discharge)  
 ↳ **2=Exfiltration** ( Controls 0.00 cfs)

**Primary OutFlow** Max=8.09 cfs @ 12.31 hrs HW=256.25' TW=255.74' (Dynamic Tailwater)  
 ↳ **1=Orifice/Grate** (Orifice Controls 8.09 cfs @ 3.44 fps)

**Secondary OutFlow** Max=7.86 cfs @ 12.31 hrs HW=256.23' TW=255.75' (Dynamic Tailwater)  
 ↳ **3=Orifice/Grate** (Orifice Controls 7.86 cfs @ 3.33 fps)

**Pond CS2: CHAMBER SYSTEM #2**

Hydrograph



**Proposed Conditions-2874**

NOAA 24-hr D 25YR NOAA ATLAS 14 Rainfall=6.43"

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**Summary for Pond CS3: CHAMBER SYSTEM #3**

Inflow = 14.42 cfs @ 12.35 hrs, Volume= 0.427 af  
 Outflow = 16.86 cfs @ 12.25 hrs, Volume= 0.421 af, Atten= 0%, Lag= 0.0 min  
 Discarded = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af  
 Primary = 9.28 cfs @ 12.25 hrs, Volume= 0.309 af  
     Routed to Pond CS4 : CHAMBER SYSTEM #4  
 Secondary = 7.61 cfs @ 12.29 hrs, Volume= 0.112 af  
     Routed to Pond CS2 : CHAMBER SYSTEM #2

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 Peak Elev= 256.54' @ 12.25 hrs Surf.Area= 1,188 sf Storage= 1,515 cf

Plug-Flow detention time= 18.5 min calculated for 0.424 af (99% of inflow)  
 Center-of-Mass det. time= 9.4 min ( 812.9 - 803.4 )

Volume	Invert	Avail.Storage	Storage Description
#1	254.60'	1,028 cf	<b>12.00'W x 99.00'L x 3.00'H Prismatic</b> 3,564 cf Overall - 993 cf Embedded = 2,571 cf x 40.0% Voids
#2	255.10'	990 cf	<b>Cultec R-180</b> x 45 Inside #1 Effective Size= 33.6"W x 20.0"H => 3.44 sf x 6.33'L = 21.8 cf Overall Size= 36.0"W x 20.5"H x 7.33'L with 1.00' Overlap Row Length Adjustment= +1.00' x 3.44 sf x 3 rows
#3	255.10'	3 cf	<b>Cultec HVLV FC-24</b> x 6 Inside #1 Effective Size= 15.3"W x 12.0"H => 0.91 sf x 0.50'L = 0.5 cf Overall Size= 16.0"W x 12.0"H x 2.02'L with 1.52' Overlap 6 Chambers in 3 Rows
#4	255.10'	28 cf	<b>12.0" Round Pipe Storage</b> x 3 -Impervious L= 12.0'
		2,050 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	255.10'	<b>12.0" Vert. Orifice/Grate X 3.00</b> C= 0.600 Limited to weir flow at low heads
#2	Discarded	254.60'	<b>8.270 in/hr Exfiltration X 0.00 over Horizontal area</b> Phase-In= 0.01'
#3	Secondary	255.10'	<b>12.0" Vert. Orifice/Grate X 3.00</b> C= 0.600 Limited to weir flow at low heads

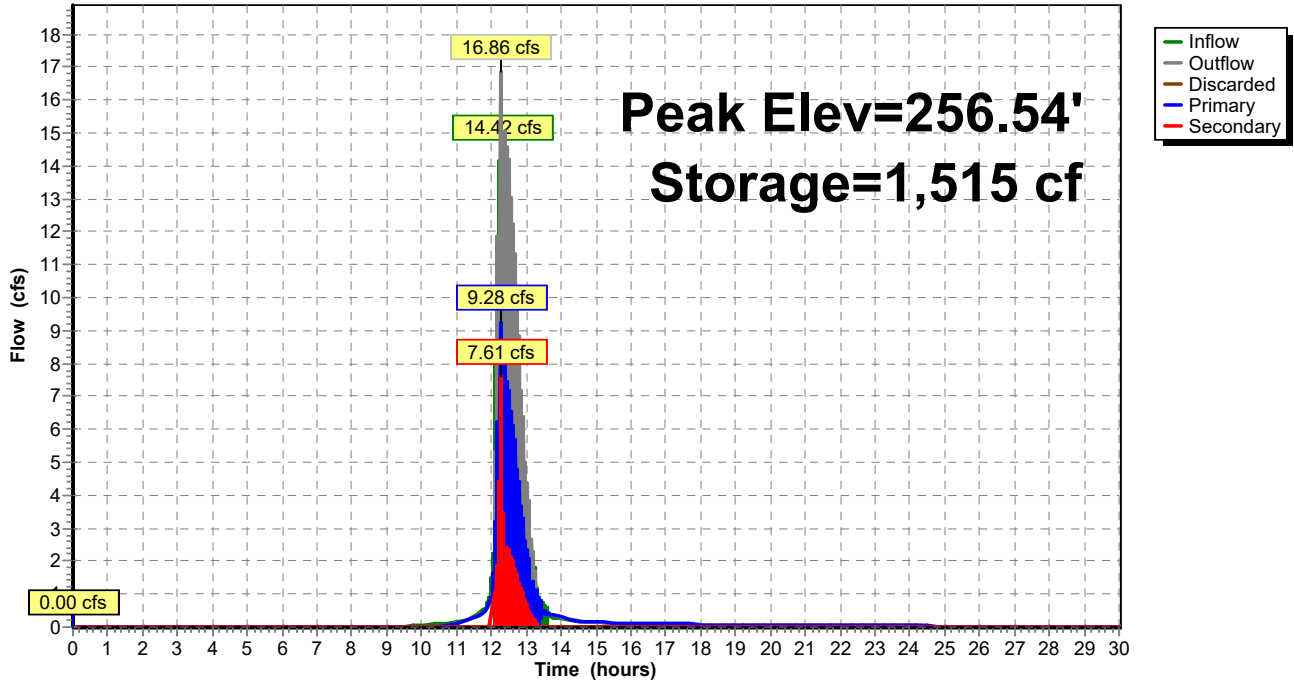
**Discarded OutFlow** Max=0.00 cfs @ 0.00 hrs HW=254.60' (Free Discharge)  
 ↑**2=Exfiltration** ( Controls 0.00 cfs)

**Primary OutFlow** Max=9.75 cfs @ 12.25 hrs HW=256.48' TW=255.74' (Dynamic Tailwater)  
 ↑**1=Orifice/Grate** (Orifice Controls 9.75 cfs @ 4.14 fps)

**Secondary OutFlow** Max=9.14 cfs @ 12.29 hrs HW=256.33' TW=255.69' (Dynamic Tailwater)  
 ↑**3=Orifice/Grate** (Orifice Controls 9.14 cfs @ 3.88 fps)

### Pond CS3: CHAMBER SYSTEM #3

Hydrograph



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**Summary for Pond CS4: CHAMBER SYSTEM #4**

Inflow = 12.36 cfs @ 12.33 hrs, Volume= 0.486 af  
 Outflow = 10.99 cfs @ 12.27 hrs, Volume= 0.476 af, Atten= 11%, Lag= 0.0 min  
 Discarded = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af  
 Primary = 7.70 cfs @ 12.34 hrs, Volume= 0.392 af  
     Routed to Pond CS5 : CHAMBER SYSTEM #5  
 Secondary = 5.64 cfs @ 12.20 hrs, Volume= 0.084 af  
     Routed to Pond CS3 : CHAMBER SYSTEM #3

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 Peak Elev= 256.09' @ 12.34 hrs Surf.Area= 2,189 sf Storage= 2,213 cf

Plug-Flow detention time= 29.6 min calculated for 0.510 af (98% of inflow)  
 Center-of-Mass det. time= 16.5 min ( 832.1 - 814.2 )

Volume	Invert	Avail.Storage	Storage Description
#1	254.60'	1,933 cf	<b>25.00'W x 85.00'L x 3.00'H Prismatic</b> 6,375 cf Overall - 1,543 cf Embedded = 4,832 cf x 40.0% Voids
#2	255.10'	1,534 cf	<b>Cultec R-150XLHD x 56 Inside #1</b> Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap Row Length Adjustment= +0.75' x 2.65 sf x 7 rows
#3	255.10'	8 cf	<b>Cultec R-150XLHD-FC-24 x 18 Inside #1</b> Effective Size= 15.3"W x 12.0"H => 0.91 sf x 0.50'L = 0.5 cf Overall Size= 16.0"W x 12.0"H x 2.02'L with 1.52' Overlap 18 Chambers in 7 Rows
#4	255.10'	122 cf	<b>12.0" Round Pipe Storage-Impervious</b> L= 155.0'
#5	255.20'	151 cf	<b>4.00'D x 3.00'H Vertical Cone/Cylinder x 4 -Impervious</b>
#6	255.85'	75 cf	<b>4.00'D x 3.00'H Vertical Cone/Cylinder x 2 -Impervious</b>
#7	255.10'	3 cf	<b>10.0" Round Pipe Storage</b> L= 5.0' S= 0.0200 '/'
#8	255.45'	44 cf	<b>10.0" Round Pipe Storage x 2</b> L= 40.0' S= 0.0100 '/'
		3,870 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	255.10'	<b>12.0" Vert. Orifice/Grate X 4.00</b> C= 0.600 Limited to weir flow at low heads
#2	Discarded	254.60'	<b>8.270 in/hr Exfiltration X 0.00 over Horizontal area</b> Phase-In= 0.01'
#3	Secondary	255.10'	<b>12.0" Vert. Orifice/Grate X 3.00</b> C= 0.600 Limited to weir flow at low heads

**Proposed Conditions-2874**

NOAA 24-hr D 25YR NOAA ATLAS 14 Rainfall=6.43"

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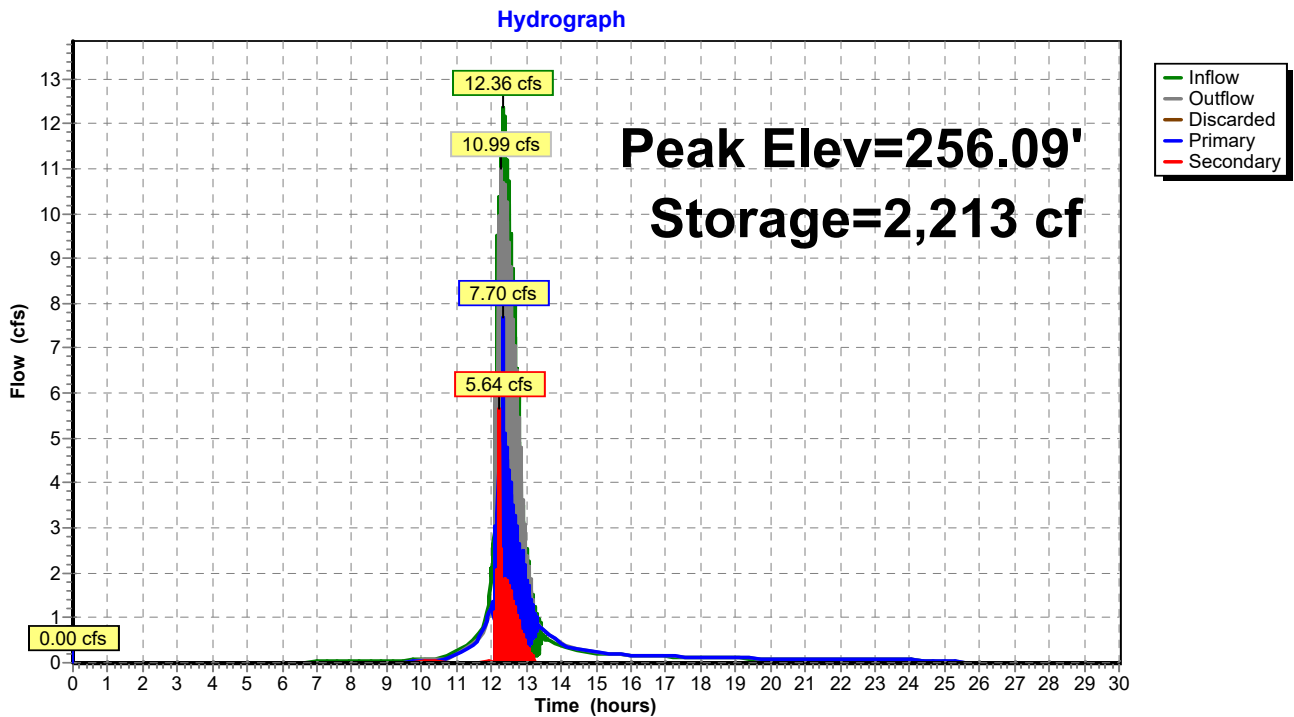
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**Discarded OutFlow** Max=0.00 cfs @ 0.00 hrs HW=254.60' (Free Discharge)  
↳ **2=Exfiltration** ( Controls 0.00 cfs)

**Primary OutFlow** Max=7.21 cfs @ 12.34 hrs HW=256.04' TW=255.81' (Dynamic Tailwater)  
↳ **1=Orifice/Grate** (Orifice Controls 7.21 cfs @ 2.35 fps)

**Secondary OutFlow** Max=3.87 cfs @ 12.20 hrs HW=255.90' TW=255.74' (Dynamic Tailwater)  
↳ **3=Orifice/Grate** (Orifice Controls 3.87 cfs @ 1.91 fps)

**Pond CS4: CHAMBER SYSTEM #4**



**Proposed Conditions-2874**

NOAA 24-hr D 25YR NOAA ATLAS 14 Rainfall=6.43"

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**Summary for Pond CS5: CHAMBER SYSTEM #5**

Inflow = 10.34 cfs @ 12.19 hrs, Volume= 0.893 af  
 Outflow = 9.20 cfs @ 12.22 hrs, Volume= 0.893 af, Atten= 11%, Lag= 1.6 min  
 Discarded = 1.05 cfs @ 11.33 hrs, Volume= 0.622 af  
 Primary = 3.94 cfs @ 12.21 hrs, Volume= 0.233 af  
     Routed to Pond CS6 : CHAMBER SYSTEM #6A & 6B  
 Secondary = 4.55 cfs @ 12.22 hrs, Volume= 0.037 af  
     Routed to Pond CS4 : CHAMBER SYSTEM #4

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 Peak Elev= 255.88' @ 12.21 hrs Surf.Area= 5,508 sf Storage= 4,626 cf

Plug-Flow detention time= 10.6 min calculated for 0.904 af (100% of inflow)  
 Center-of-Mass det. time= 10.6 min ( 809.2 - 798.5 )

Volume	Invert	Avail.Storage	Storage Description
#1	254.60'	4,896 cf	<b>40.50'W x 136.00'L x 3.00'H Prismaoid</b> 16,524 cf Overall - 4,285 cf Embedded = 12,239 cf x 40.0% Voids
#2	255.10'	4,260 cf	<b>Cultec R-150XLHD x 156 Inside #1</b> Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap Row Length Adjustment= +0.75' x 2.65 sf x 12 rows
#3	255.10'	25 cf	<b>Cultec R-150XLHD-FC-24 x 55 Inside #1</b> Effective Size= 15.3"W x 12.0"H => 0.91 sf x 0.50'L = 0.5 cf Overall Size= 16.0"W x 12.0"H x 2.02'L with 1.52' Overlap 55 Chambers in 12 Rows
#4	255.10'	35 cf	<b>12.0" Round Pipe Storage 1 x 4 -Impervious</b> L= 11.0'
#5	255.10'	40 cf	<b>12.0" Round Pipe Storage 2 x 3 -Impervious</b> L= 17.0' S= 0.0200 '/'
#6	255.10'	12 cf	<b>12.0" Round Pipe Storage 3-Impervious</b> L= 15.0' S= 0.0200 '/'
#7	255.10'	2 cf	<b>10.0" Round Pipe Storage 4-Impervious</b> L= 3.0' S= 0.0100 '/'
#8	255.38'	26 cf	<b>10.0" Round Pipe Storage 5-Impervious</b> L= 47.0' S= 0.0100 '/'
#9	255.38'	15 cf	<b>10.0" Round Pipe Storage 6-Impervious</b> L= 27.0' S= 0.0100 '/'
#10	255.65'	38 cf	<b>4.00'D x 3.00'H Vertical Cone/Cylinder-Impervious</b>
#11	255.85'	38 cf	<b>4.00'D x 3.00'H Vertical Cone/Cylinder-Impervious</b>
		9,384 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	255.10'	<b>12.0" Vert. Orifice/Grate X 3.00</b> C= 0.600 Limited to weir flow at low heads
#2	Discarded	254.60'	<b>8.270 in/hr Exfiltration over Horizontal area</b> Phase-In= 0.01'
#3	Secondary	255.10'	<b>12.0" Vert. Orifice/Grate X 4.00</b> C= 0.600 Limited to weir flow at low heads

**Proposed Conditions-2874**

NOAA 24-hr D 25YR NOAA ATLAS 14 Rainfall=6.43"

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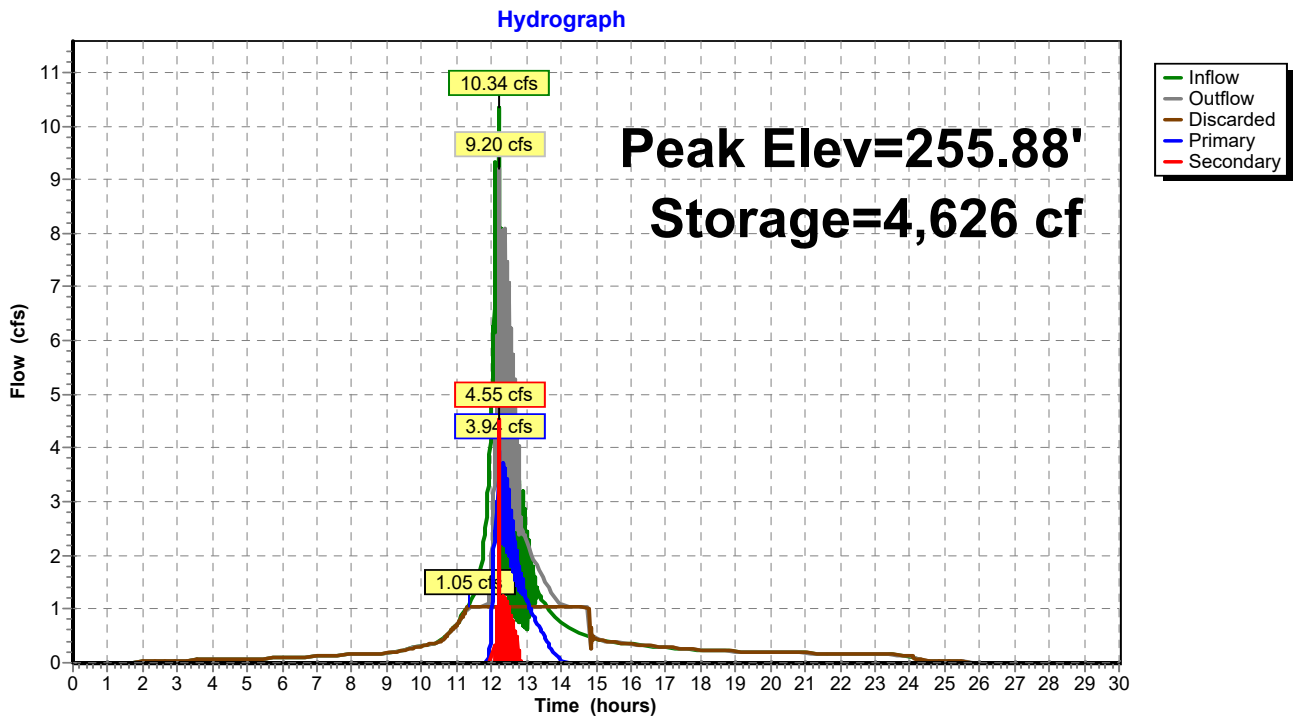
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**Discarded OutFlow** Max=1.05 cfs @ 11.33 hrs HW=254.61' (Free Discharge)  
↳ **2=Exfiltration** (Exfiltration Controls 1.05 cfs)

**Primary OutFlow** Max=3.81 cfs @ 12.21 hrs HW=255.88' TW=255.72' (Dynamic Tailwater)  
↳ **1=Orifice/Grate** (Orifice Controls 3.81 cfs @ 1.93 fps)

**Secondary OutFlow** Max=0.00 cfs @ 12.22 hrs HW=255.87' TW=255.87' (Dynamic Tailwater)  
↳ **3=Orifice/Grate** ( Controls 0.00 cfs)

**Pond CS5: CHAMBER SYSTEM #5**



**Proposed Conditions-2874**

NOAA 24-hr D 25YR NOAA ATLAS 14 Rainfall=6.43"

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**Summary for Pond CS6: CHAMBER SYSTEM #6A & 6B**

Inflow = 5.55 cfs @ 12.14 hrs, Volume= 0.437 af  
 Outflow = 4.67 cfs @ 12.22 hrs, Volume= 0.437 af, Atten= 16%, Lag= 5.1 min  
 Discarded = 0.47 cfs @ 11.70 hrs, Volume= 0.192 af  
 Primary = 4.20 cfs @ 12.22 hrs, Volume= 0.245 af  
     Routed to Pond CS7 : CHAMBER SYSTEM #7  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af  
     Routed to Pond CS5 : CHAMBER SYSTEM #5

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 Peak Elev= 255.74' @ 12.27 hrs Surf.Area= 2,464 sf Storage= 1,979 cf

Plug-Flow detention time= 8.1 min calculated for 0.436 af (100% of inflow)  
 Center-of-Mass det. time= 8.1 min ( 788.0 - 780.0 )

Volume	Invert	Avail.Storage	Storage Description
#1	254.60'	1,089 cf	<b>32.00'W x 41.00'L x 3.00'H Prismatic 6A</b> 3,936 cf Overall - 1,214 cf Embedded = 2,722 cf x 40.0% Voids
#2	255.10'	1,207 cf	<b>Cultec R-180 (SECTION 6A) x 54 Inside #1</b> Effective Size= 33.6"W x 20.0"H => 3.44 sf x 6.33'L = 21.8 cf Overall Size= 36.0"W x 20.5"H x 7.33'L with 1.00' Overlap Row Length Adjustment= +1.00' x 3.44 sf x 9 rows
#3	255.10'	7 cf	<b>Cultec HVLV FC-24 (SECTION 6A) x 16 Inside #1</b> Effective Size= 15.3"W x 12.0"H => 0.91 sf x 0.50'L = 0.5 cf Overall Size= 16.0"W x 12.0"H x 2.02'L with 1.52' Overlap 16 Chambers in 9 Rows
#4	254.60'	975 cf	<b>32.00'W x 36.00'L x 3.00'H Prismatic (SECTION 6B)</b> 3,456 cf Overall - 1,018 cf Embedded = 2,438 cf x 40.0% Voids
#5	255.10'	1,011 cf	<b>Cultec R-180 (SECTION 6B) x 45 Inside #4</b> Effective Size= 33.6"W x 20.0"H => 3.44 sf x 6.33'L = 21.8 cf Overall Size= 36.0"W x 20.5"H x 7.33'L with 1.00' Overlap Row Length Adjustment= +1.00' x 3.44 sf x 9 rows
#6	255.10'	7 cf	<b>Cultec HVLV FC-24 (SECTION 6B) x 16 Inside #4</b> Effective Size= 15.3"W x 12.0"H => 0.91 sf x 0.50'L = 0.5 cf Overall Size= 16.0"W x 12.0"H x 2.02'L with 1.52' Overlap 16 Chambers in 9 Rows
#7	255.10'	54 cf	<b>12.0" Round Pipe Storage 1 x 3 -Impervious</b> L= 23.0'
#8	254.77'	198 cf	<b>18.0" Round Pipe Storage 2-Impervious</b> L= 112.0'
#9	255.10'	14 cf	<b>12.0" Round Pipe Storage 3 x 6 -Impervious</b> L= 3.0'
#10	255.10'	20 cf	<b>12.0" Round Pipe Storage 4-Impervious</b> L= 26.0' S= 0.0200 'f
#11	255.10'	51 cf	<b>Custom Stage Data (Prismatic) Listed below (Recalc) -Impervious</b>
		4,634 cf	Total Available Storage

**Proposed Conditions-2874**

NOAA 24-hr D 25YR NOAA ATLAS 14 Rainfall=6.43"

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Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
255.10	17	0	0
258.10	17	51	51

Device	Routing	Invert	Outlet Devices
#1	Primary	253.80'	<b>12.0" Vert. Orifice/Grate X 3.00</b> C= 0.600 Limited to weir flow at low heads
#2	Device 1	253.55'	<b>18.0" Round Culvert</b> L= 15.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 253.55' / 253.55' S= 0.0000 ' / ' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#3	Device 2	255.50'	<b>3.4' long Sharp-Crested Rectangular Weir</b> 1 End Contraction(s) 2.5' Crest Height
#4	Device 2	255.10'	<b>0.8' long Sharp-Crested Rectangular Weir</b> 2 End Contraction(s) 2.0' Crest Height
#5	Primary	254.77'	<b>18.0" Round Culvert</b> L= 71.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 254.77' / 254.77' S= 0.0000 ' / ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#6	Device 5	255.10'	<b>12.0" Vert. Orifice/Grate X 6.00</b> C= 0.600 Limited to weir flow at low heads
#7	Discarded	254.60'	<b>8.270 in/hr Exfiltration over Horizontal area</b> Phase-In= 0.01'
#8	Secondary	255.10'	<b>12.0" Vert. Orifice/Grate X 3.00</b> C= 0.600 Limited to weir flow at low heads

**Discarded OutFlow** Max=0.47 cfs @ 11.70 hrs HW=254.61' (Free Discharge)

↑7=Exfiltration (Exfiltration Controls 0.47 cfs)

**Primary OutFlow** Max=4.12 cfs @ 12.22 hrs HW=255.73' TW=255.49' (Dynamic Tailwater)

↑1=Orifice/Grate (Passes 2.16 cfs of 5.64 cfs potential flow)

↑2=Culvert (Passes 2.16 cfs of 4.23 cfs potential flow)

↑3=Sharp-Crested Rectangular Weir (Weir Controls 1.26 cfs @ 1.60 fps)

↑4=Sharp-Crested Rectangular Weir (Weir Controls 0.90 cfs @ 2.11 fps)

↑5=Culvert (Barrel Controls 1.97 cfs @ 2.34 fps)

↑6=Orifice/Grate (Passes 1.97 cfs of 7.53 cfs potential flow)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=254.60' TW=254.60' (Dynamic Tailwater)

↑8=Orifice/Grate ( Controls 0.00 cfs)

**Proposed Conditions-2874**

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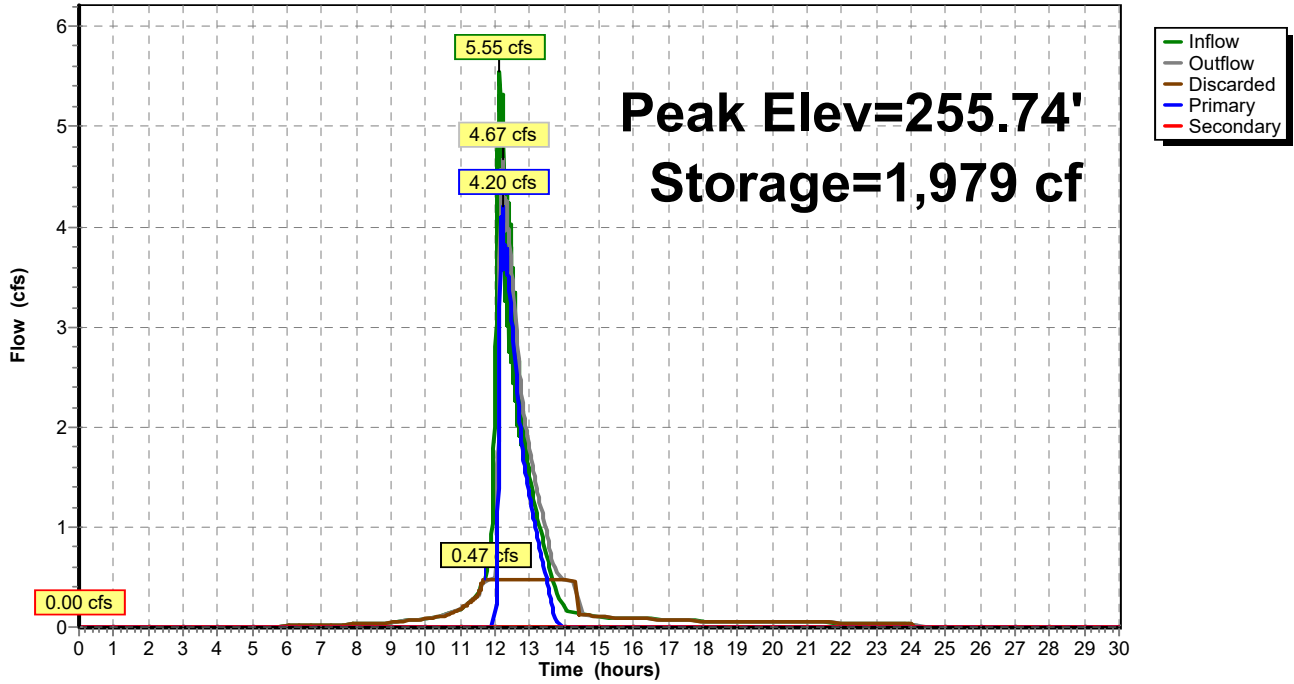
NOAA 24-hr D 25YR NOAA ATLAS 14 Rainfall=6.43"

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**Pond CS6: CHAMBER SYSTEM #6A & 6B**

Hydrograph



**Proposed Conditions-2874**

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**Summary for Pond CS7: CHAMBER SYSTEM #7**

Inflow = 6.74 cfs @ 12.15 hrs, Volume= 0.494 af  
 Outflow = 5.10 cfs @ 12.25 hrs, Volume= 0.482 af, Atten= 24%, Lag= 5.8 min  
 Discarded = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af  
 Primary = 5.10 cfs @ 12.25 hrs, Volume= 0.482 af  
 Routed to Reach TF : TREATED FLOW OUTLET  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af  
 Routed to Pond CS6 : CHAMBER SYSTEM #6A & 6B

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 Peak Elev= 255.56' @ 12.25 hrs Surf.Area= 2,400 sf Storage= 3,496 cf

Plug-Flow detention time= 40.8 min calculated for 0.481 af (98% of inflow)  
 Center-of-Mass det. time= 26.7 min ( 808.2 - 781.5 )

Volume	Invert	Avail.Storage	Storage Description
#1	253.30'	2,064 cf	<b>12.00'W x 200.00'L x 3.00'H Prismatic</b> 7,200 cf Overall - 2,039 cf Embedded = 5,161 cf x 40.0% Voids
#2	253.80'	2,035 cf	<b>Cultec R-180</b> x 93 Inside #1 Effective Size= 33.6"W x 20.0"H => 3.44 sf x 6.33'L = 21.8 cf Overall Size= 36.0"W x 20.5"H x 7.33'L with 1.00' Overlap Row Length Adjustment= +1.00' x 3.44 sf x 3 rows
#3	253.80'	4 cf	<b>Cultec HVLV FC-24</b> x 8 Inside #1 Effective Size= 15.3"W x 12.0"H => 0.91 sf x 0.50'L = 0.5 cf Overall Size= 16.0"W x 12.0"H x 2.02'L with 1.52' Overlap 8 Chambers in 3 Rows
#4	253.80'	26 cf	<b>12.0" Round Pipe Storage 1-Impervious</b> L= 33.0'
#5	253.55'	41 cf	<b>18.0" Round Pipe Storage 2-Impervious</b> L= 23.0'
#6	253.30'	51 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc) -Impervious
		4,221 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
253.30	17	0	0
256.30	17	51	51

Device	Routing	Invert	Outlet Devices
#1	Primary	253.25'	<b>18.0" Round RCP_Round 18"</b> L= 47.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 253.25' / 249.30' S= 0.0840 ' / Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf
#2	Device 1	253.80'	<b>12.0" Vert. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	255.40'	<b>4.2' long x 1.50' rise Sharp-Crested Rectangular Weir</b> 2 End Contraction(s) 2.2' Crest Height
#4	Device 2	253.55'	<b>18.0" Vert. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#5	Device 4	253.80'	<b>12.0" Vert. Orifice/Grate X 3.00</b> C= 0.600

**Proposed Conditions-2874**

NOAA 24-hr D 25YR NOAA ATLAS 14 Rainfall=6.43"

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#6	Discarded	253.30'	Limited to weir flow at low heads <b>8.270 in/hr Exfiltration X 0.00 over Horizontal area</b> Phase-In= 0.01'
#7	Secondary	253.80'	<b>12.0" Vert. Orifice/Grate X 3.00</b> C= 0.600 Limited to weir flow at low heads

**Discarded OutFlow** Max=0.00 cfs @ 0.00 hrs HW=253.30' (Free Discharge)

↳ **6=Exfiltration** ( Controls 0.00 cfs)

**Primary OutFlow** Max=5.10 cfs @ 12.25 hrs HW=255.56' TW=0.00' (Dynamic Tailwater)

↳ **1=RCP\_Round 18"** (Passes 5.10 cfs of 10.62 cfs potential flow)

↳ **2=Orifice/Grate** (Orifice Controls 4.24 cfs @ 5.40 fps)

↳ **4=Orifice/Grate** (Passes 4.24 cfs of 9.54 cfs potential flow)

↳ **5=Orifice/Grate** (Passes 4.24 cfs of 12.72 cfs potential flow)

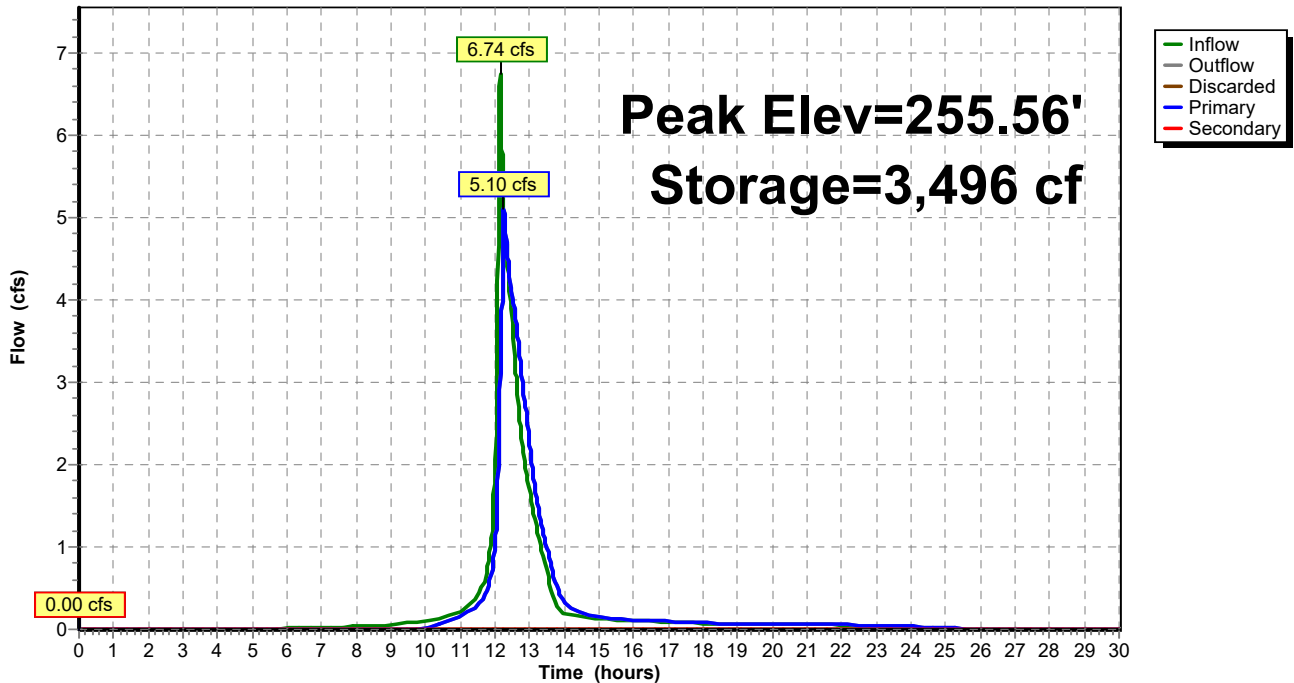
↳ **3=Sharp-Crested Rectangular Weir** (Weir Controls 0.86 cfs @ 1.31 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=253.30' TW=254.60' (Dynamic Tailwater)

↳ **7=Orifice/Grate** ( Controls 0.00 cfs)

**Pond CS7: CHAMBER SYSTEM #7**

Hydrograph



**Proposed Conditions-2874**

NOAA 24-hr D 25YR NOAA ATLAS 14 Rainfall=6.43"

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**Summary for Pond CS8: CHAMBER SYSTEM #8**

Inflow Area = 0.280 ac, 82.14% Impervious, Inflow Depth = 5.38" for 25YR NOAA ATLAS 14 event  
 Inflow = 1.69 cfs @ 12.12 hrs, Volume= 0.126 af  
 Outflow = 1.14 cfs @ 12.18 hrs, Volume= 0.119 af, Atten= 32%, Lag= 3.5 min  
 Discarded = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af  
 Primary = 1.14 cfs @ 12.18 hrs, Volume= 0.119 af  
 Routed to Reach TF : TREATED FLOW OUTLET

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 Peak Elev= 255.40' @ 12.18 hrs Surf.Area= 1,320 sf Storage= 1,024 cf

Plug-Flow detention time= 74.5 min calculated for 0.119 af (95% of inflow)  
 Center-of-Mass det. time= 45.1 min ( 827.3 - 782.2 )

Volume	Invert	Avail.Storage	Storage Description
#1	254.10'	886 cf	<b>12.00'W x 110.00'L x 2.10'H Prismaoid</b> 2,772 cf Overall - 558 cf Embedded = 2,214 cf x 40.0% Voids
#2	254.60'	547 cf	<b>Cultec C-100HD</b> x 39 Inside #1 Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap Row Length Adjustment= +0.50' x 1.86 sf x 3 rows
#3	254.60'	0 cf	<b>Cultec C-100-SFCx2</b> x 4 Inside #1 Effective Size= 10.1"W x 7.6"H => 0.29 sf x 0.33'L = 0.1 cf Overall Size= 12.0"W x 7.6"H x 1.64'L with 1.31' Overlap 4 Chambers in 3 Rows
#4	254.60'	23 cf	<b>8.0" Round Pipe Storage 1</b> -Impervious L= 65.0' S= 0.0100 '/'
#5	254.60'	10 cf	<b>8.0" Round Pipe Storage 2</b> Inside #1 L= 30.0'
#6	254.92'	75 cf	<b>4.00'D x 3.00'H Vertical Cone/Cylinder</b> x 2 -Impervious
		1,542 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	254.60'	<b>8.0" Vert. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#2	Discarded	254.10'	<b>8.270 in/hr Exfiltration X 0.00 over Horizontal area</b> Phase-In= 0.01'

**Discarded OutFlow** Max=0.00 cfs @ 0.00 hrs HW=254.10' (Free Discharge)  
 ↑2=Exfiltration ( Controls 0.00 cfs)

**Primary OutFlow** Max=1.14 cfs @ 12.18 hrs HW=255.40' TW=0.00' (Dynamic Tailwater)  
 ↑1=Orifice/Grate (Orifice Controls 1.14 cfs @ 3.27 fps)

**Proposed Conditions-2874**

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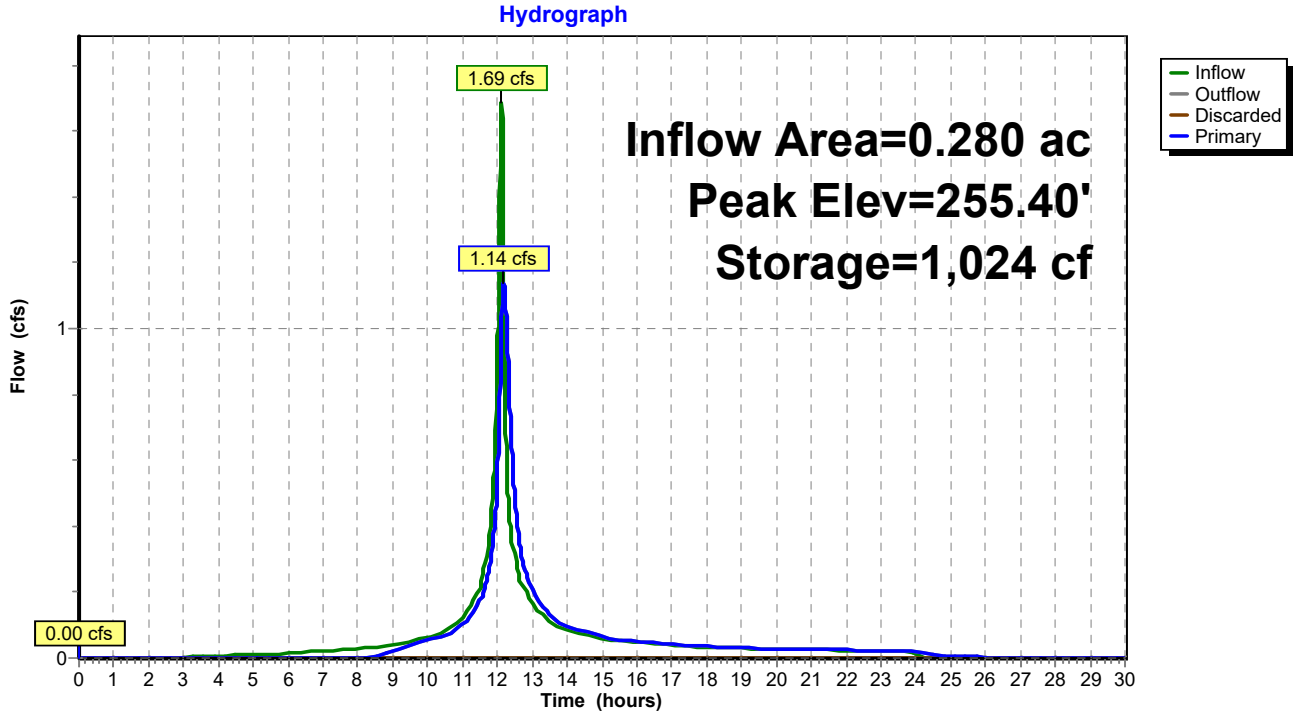
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**Pond CS8: CHAMBER SYSTEM #8**



**Proposed Conditions-2874**

NOAA 24-hr D 100YR-NOAA ATLAS 14 Rainfall=8.26"

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**Summary for Subcatchment PR1A: SITE AREA**

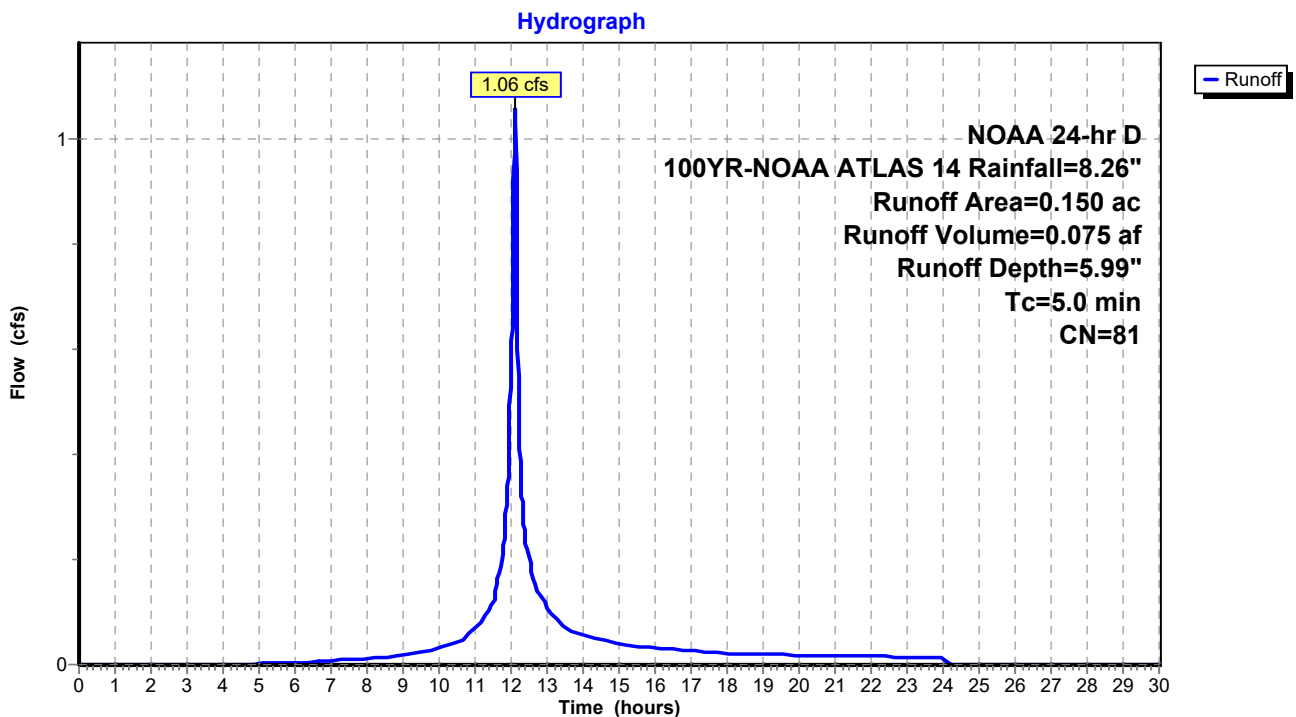
Runoff = 1.06 cfs @ 12.12 hrs, Volume= 0.075 af, Depth= 5.99"  
 Routed to Pond CS1 : CHAMBER SYSTEM #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 NOAA 24-hr D 100YR-NOAA ATLAS 14 Rainfall=8.26"

Area (ac)	CN	Description
* 0.080	98	Impervious Area
0.070	61	>75% Grass cover, Good, HSG B
0.150	81	Weighted Average
0.070		46.67% Pervious Area
0.080		53.33% Impervious Area

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

**Subcatchment PR1A: SITE AREA**



**Proposed Conditions-2874**

NOAA 24-hr D 100YR-NOAA ATLAS 14 Rainfall=8.26"

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**Summary for Subcatchment PR1B: SITE AREA**

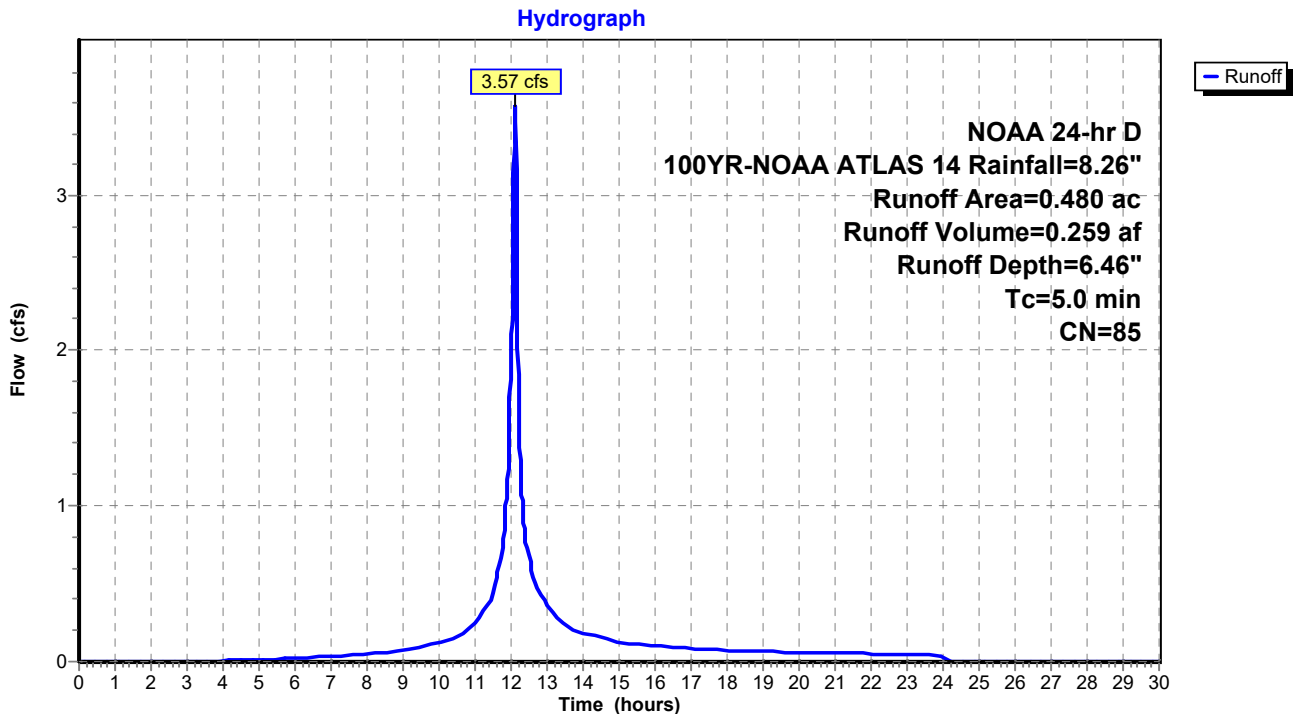
Runoff = 3.57 cfs @ 12.12 hrs, Volume= 0.259 af, Depth= 6.46"  
 Routed to Pond CS2 : CHAMBER SYSTEM #2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 NOAA 24-hr D 100YR-NOAA ATLAS 14 Rainfall=8.26"

Area (ac)	CN	Description
* 0.310	98	Impervious Area
0.170	61	>75% Grass cover, Good, HSG B
0.480	85	Weighted Average
0.170		35.42% Pervious Area
0.310		64.58% Impervious Area

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

**Subcatchment PR1B: SITE AREA**



**Proposed Conditions-2874**

NOAA 24-hr D 100YR-NOAA ATLAS 14 Rainfall=8.26"

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**Summary for Subcatchment PR2: SITE AREA**

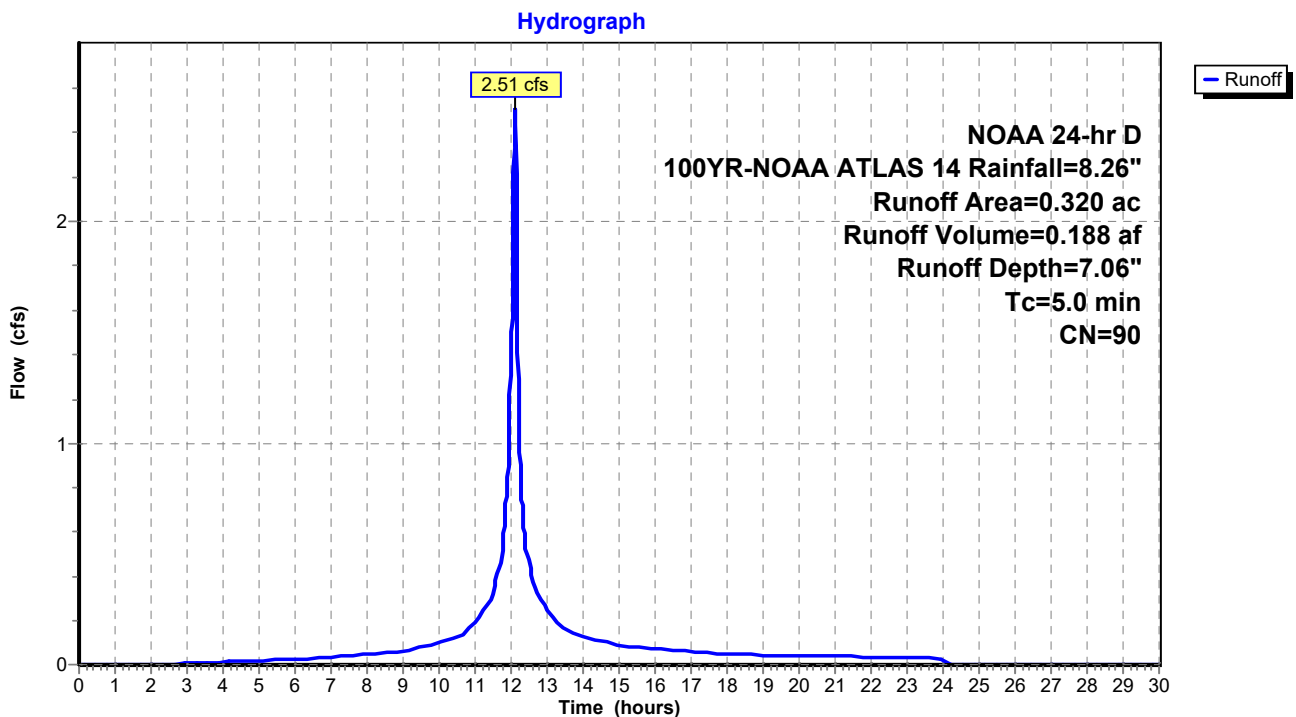
Runoff = 2.51 cfs @ 12.12 hrs, Volume= 0.188 af, Depth= 7.06"  
 Routed to Pond CS4 : CHAMBER SYSTEM #4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 NOAA 24-hr D 100YR-NOAA ATLAS 14 Rainfall=8.26"

Area (ac)	CN	Description
* 0.250	98	Impervious Area
0.070	61	>75% Grass cover, Good, HSG B
0.320	90	Weighted Average
0.070		21.87% Pervious Area
0.250		78.13% Impervious Area

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

**Subcatchment PR2: SITE AREA**



**Proposed Conditions-2874**

NOAA 24-hr D 100YR-NOAA ATLAS 14 Rainfall=8.26"

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**Summary for Subcatchment PR2A: SITE & ROOF AREA**

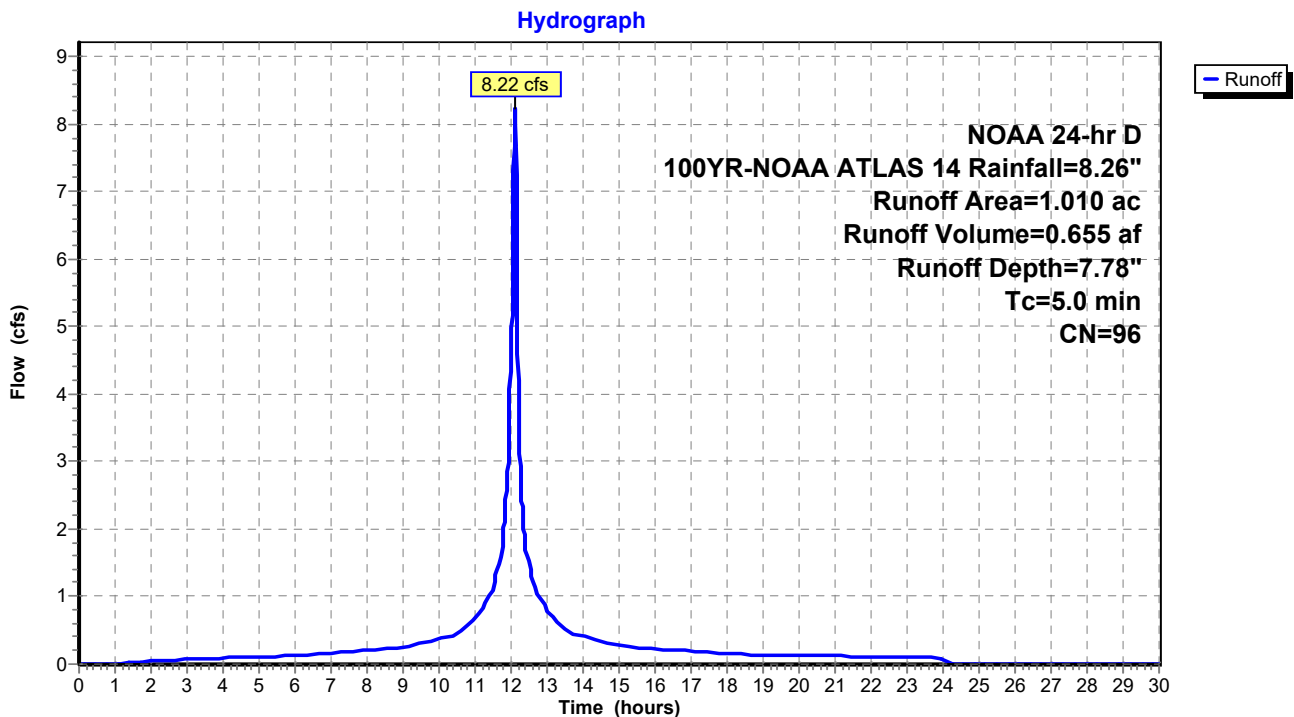
Runoff = 8.22 cfs @ 12.12 hrs, Volume= 0.655 af, Depth= 7.78"  
 Routed to Pond CS5 : CHAMBER SYSTEM #5

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 NOAA 24-hr D 100YR-NOAA ATLAS 14 Rainfall=8.26"

Area (ac)	CN	Description
* 0.250	98	Impervious Area
0.050	61	>75% Grass cover, Good, HSG B
* 0.710	98	Roof
1.010	96	Weighted Average
0.050		4.95% Pervious Area
0.960		95.05% Impervious Area

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

**Subcatchment PR2A: SITE & ROOF AREA**



**Proposed Conditions-2874**

NOAA 24-hr D 100YR-NOAA ATLAS 14 Rainfall=8.26"

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**Summary for Subcatchment PR3: SITE**

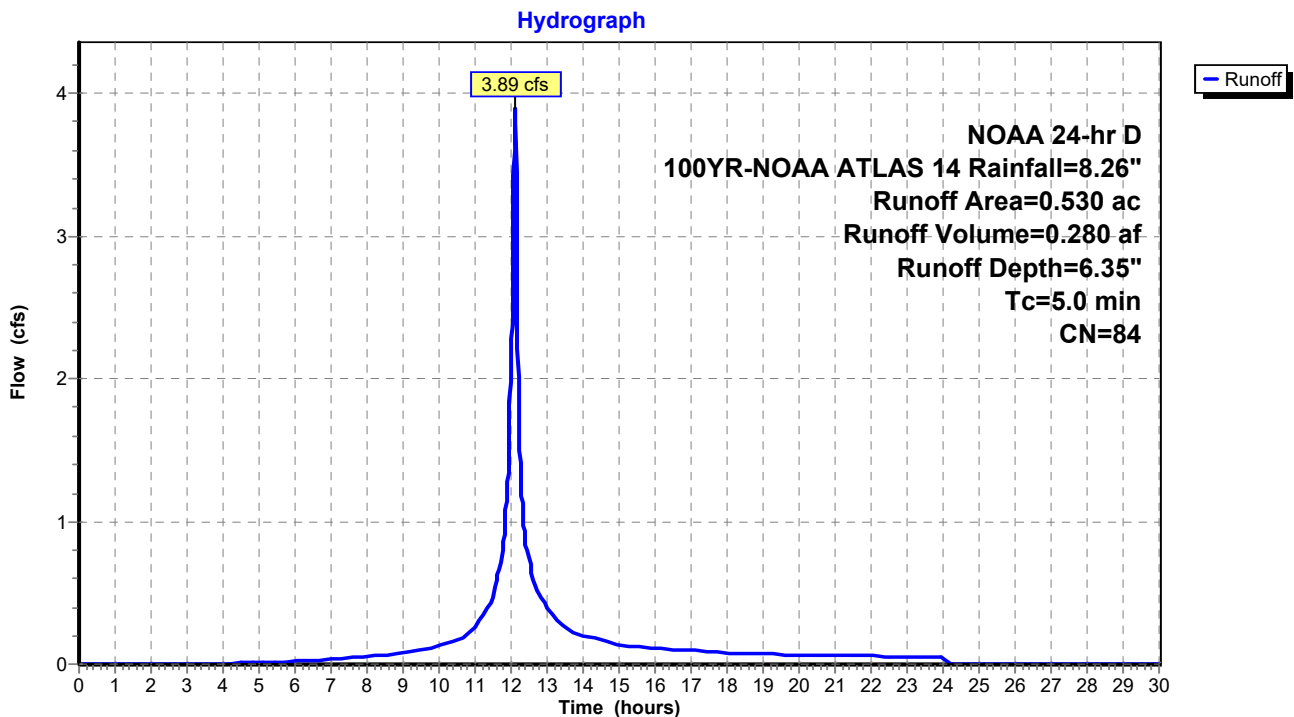
Runoff = 3.89 cfs @ 12.12 hrs, Volume= 0.280 af, Depth= 6.35"  
 Routed to Pond CS6 : CHAMBER SYSTEM #6A & 6B

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 NOAA 24-hr D 100YR-NOAA ATLAS 14 Rainfall=8.26"

Area (ac)	CN	Description
* 0.130	98	Impervious Area
0.200	61	>75% Grass cover, Good, HSG B
* 0.200	98	Roof
0.530	84	Weighted Average
0.200		37.74% Pervious Area
0.330		62.26% Impervious Area

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

**Subcatchment PR3: SITE**



**Proposed Conditions-2874**

NOAA 24-hr D 100YR-NOAA ATLAS 14 Rainfall=8.26"

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**Summary for Subcatchment PR4: SITE & ROOF AREA**

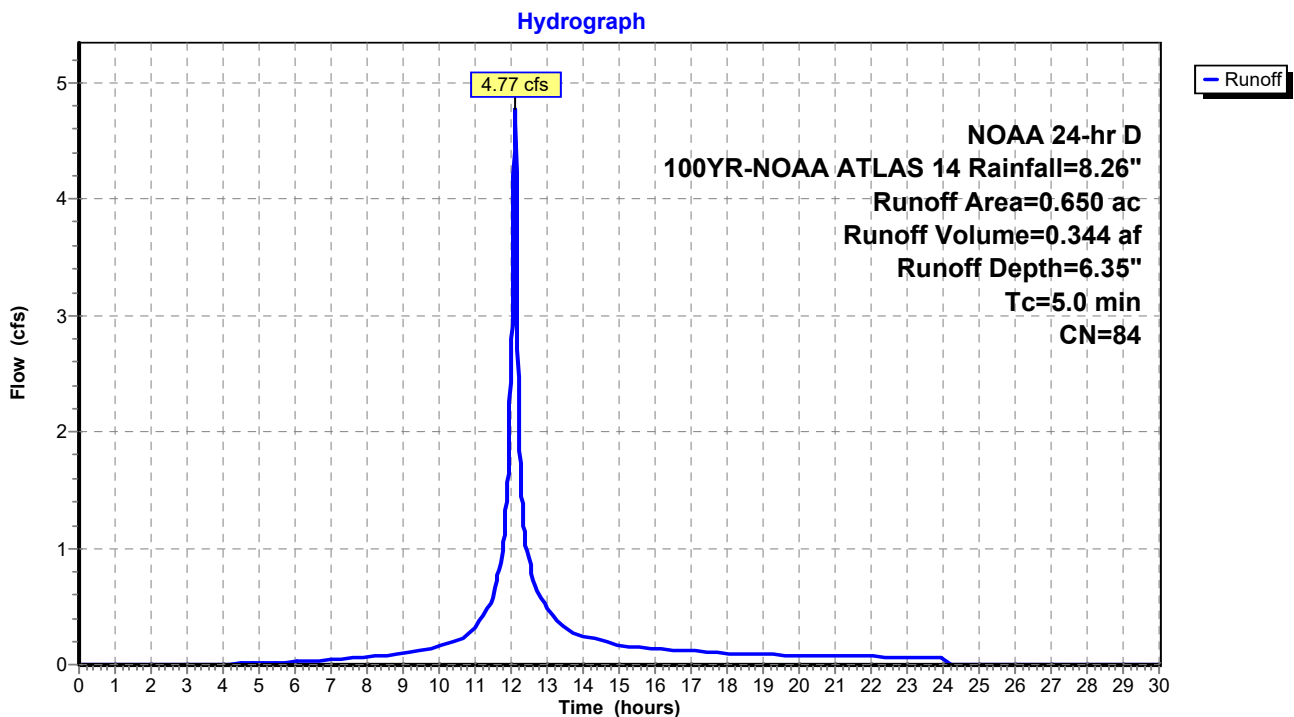
Runoff = 4.77 cfs @ 12.12 hrs, Volume= 0.344 af, Depth= 6.35"  
 Routed to Pond CS7 : CHAMBER SYSTEM #7

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 NOAA 24-hr D 100YR-NOAA ATLAS 14 Rainfall=8.26"

Area (ac)	CN	Description
* 0.410	98	Impervious Area
0.240	61	>75% Grass cover, Good, HSG B
0.650	84	Weighted Average
0.240		36.92% Pervious Area
0.410		63.08% Impervious Area

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

**Subcatchment PR4: SITE & ROOF AREA**



**Proposed Conditions-2874**

NOAA 24-hr D 100YR-NOAA ATLAS 14 Rainfall=8.26"

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**Summary for Subcatchment PR5: SITE AREA**

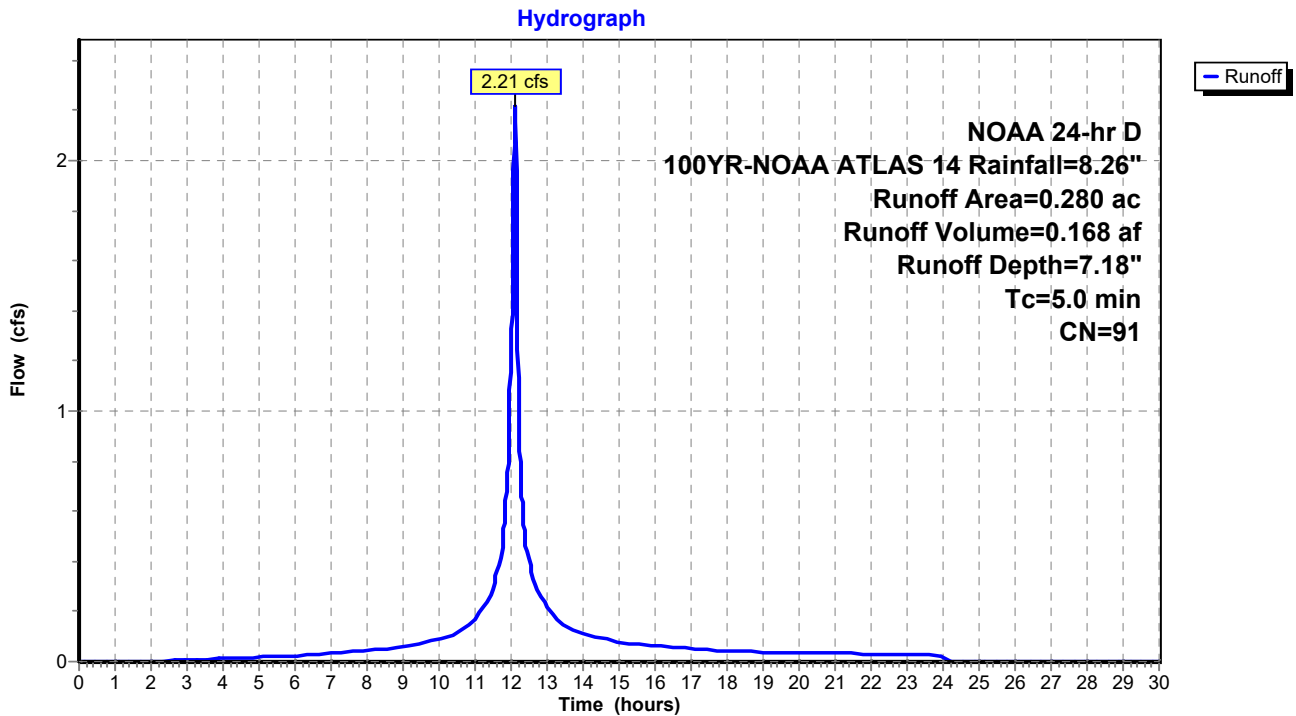
Runoff = 2.21 cfs @ 12.12 hrs, Volume= 0.168 af, Depth= 7.18"  
 Routed to Pond CS8 : CHAMBER SYSTEM #8

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 NOAA 24-hr D 100YR-NOAA ATLAS 14 Rainfall=8.26"

Area (ac)	CN	Description
* 0.230	98	Impervious Area
0.050	61	>75% Grass cover, Good, HSG B
0.280	91	Weighted Average
0.050		17.86% Pervious Area
0.230		82.14% Impervious Area

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

**Subcatchment PR5: SITE AREA**



**Proposed Conditions-2874**

NOAA 24-hr D 100YR-NOAA ATLAS 14 Rainfall=8.26"

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**Summary for Subcatchment PR6: SITE AREA**

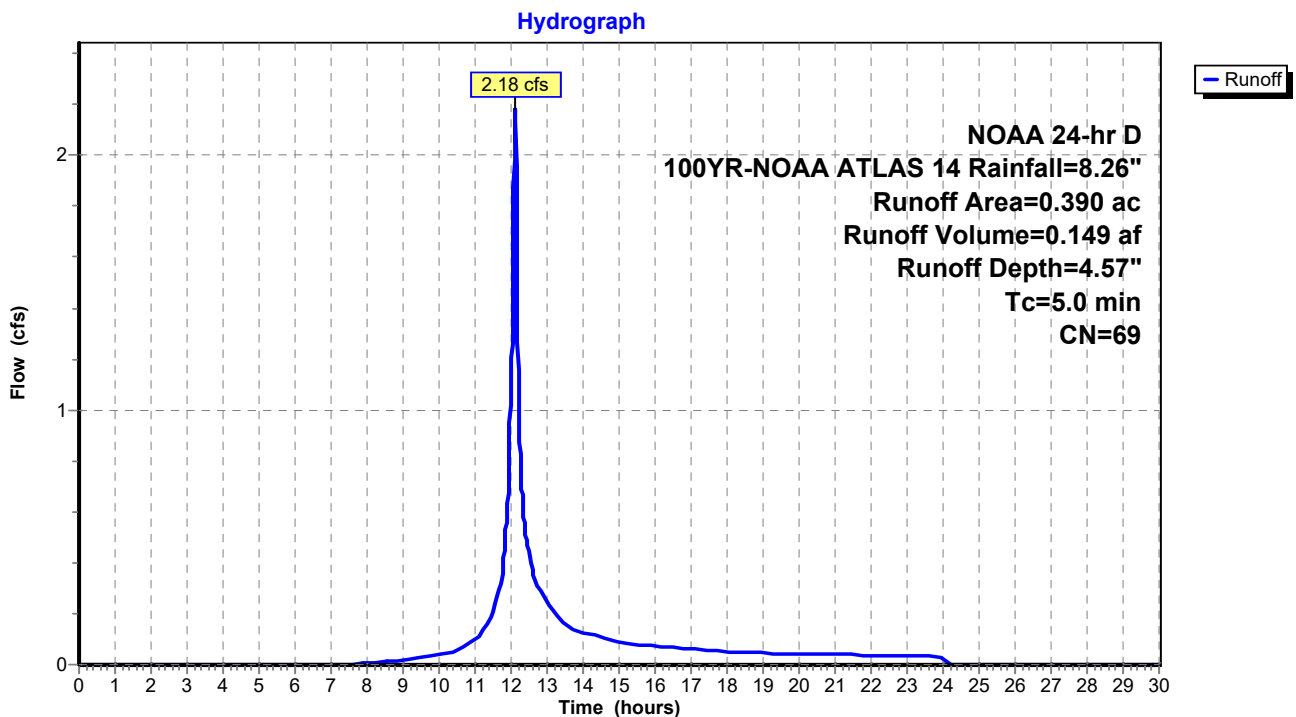
Runoff = 2.18 cfs @ 12.12 hrs, Volume= 0.149 af, Depth= 4.57"  
 Routed to Reach SUM : TOTAL FLOW

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 NOAA 24-hr D 100YR-NOAA ATLAS 14 Rainfall=8.26"

Area (ac)	CN	Description
* 0.080	98	Impervious Area
0.310	61	>75% Grass cover, Good, HSG B
0.390	69	Weighted Average
0.310		79.49% Pervious Area
0.080		20.51% Impervious Area

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

**Subcatchment PR6: SITE AREA**



**Proposed Conditions-2874**

NOAA 24-hr D 100YR-NOAA ATLAS 14 Rainfall=8.26"

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**Summary for Subcatchment PR7: TRENCH DRAIN #1**

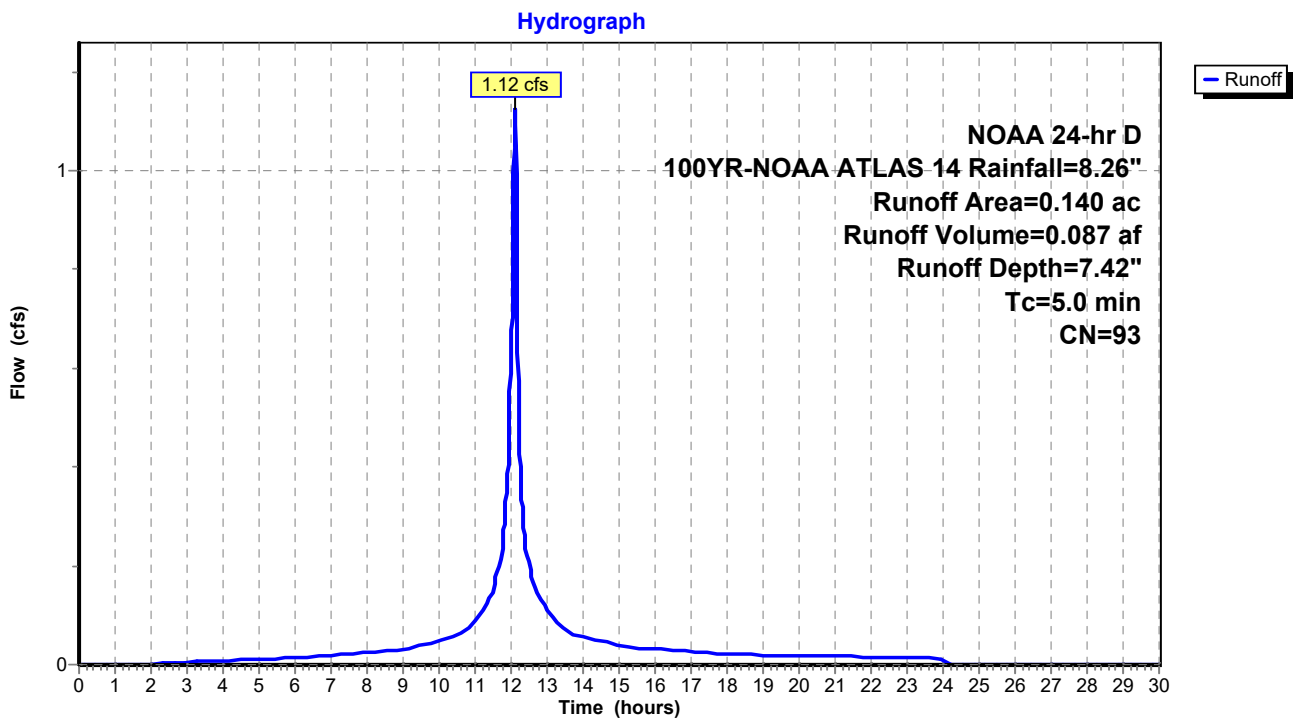
Runoff = 1.12 cfs @ 12.12 hrs, Volume= 0.087 af, Depth= 7.42"  
 Routed to Reach TF : TREATED FLOW OUTLET

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 NOAA 24-hr D 100YR-NOAA ATLAS 14 Rainfall=8.26"

Area (ac)	CN	Description
* 0.120	98	Impervious Area
0.020	61	>75% Grass cover, Good, HSG B
0.140	93	Weighted Average
0.020		14.29% Pervious Area
0.120		85.71% Impervious Area

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

**Subcatchment PR7: TRENCH DRAIN #1**



**Proposed Conditions-2874**

NOAA 24-hr D 100YR-NOAA ATLAS 14 Rainfall=8.26"

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**Summary for Subcatchment PR8: TRENCH DRAIN #2**

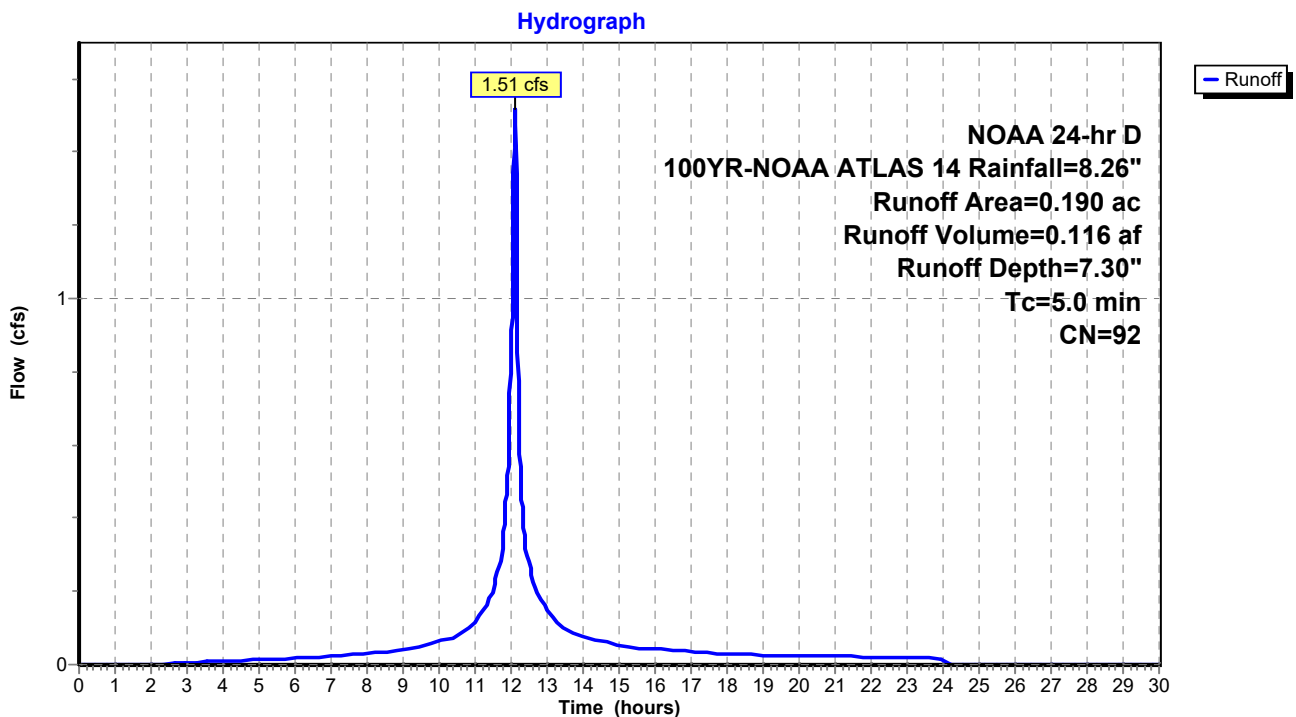
Runoff = 1.51 cfs @ 12.12 hrs, Volume= 0.116 af, Depth= 7.30"  
 Routed to Reach TF : TREATED FLOW OUTLET

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 NOAA 24-hr D 100YR-NOAA ATLAS 14 Rainfall=8.26"

Area (ac)	CN	Description
* 0.160	98	Impervious Area
0.030	61	>75% Grass cover, Good, HSG B
0.190	92	Weighted Average
0.030		15.79% Pervious Area
0.160		84.21% Impervious Area

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

**Subcatchment PR8: TRENCH DRAIN #2**



**Proposed Conditions-2874**

NOAA 24-hr D 100YR-NOAA ATLAS 14 Rainfall=8.26"

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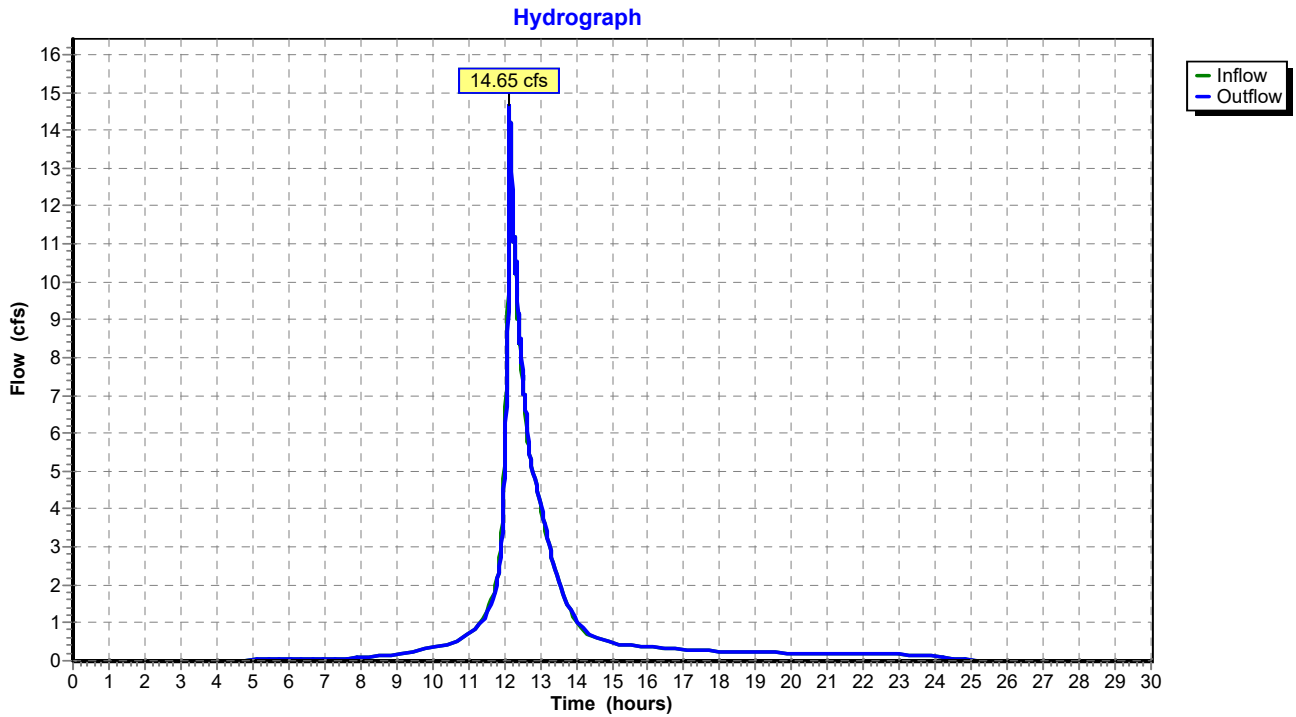
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**Summary for Reach SUM: TOTAL FLOW**

Inflow = 14.65 cfs @ 12.14 hrs, Volume= 1.277 af  
Outflow = 14.65 cfs @ 12.15 hrs, Volume= 1.277 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

**Reach SUM: TOTAL FLOW**



**Proposed Conditions-2874**

NOAA 24-hr D 100YR-NOAA ATLAS 14 Rainfall=8.26"

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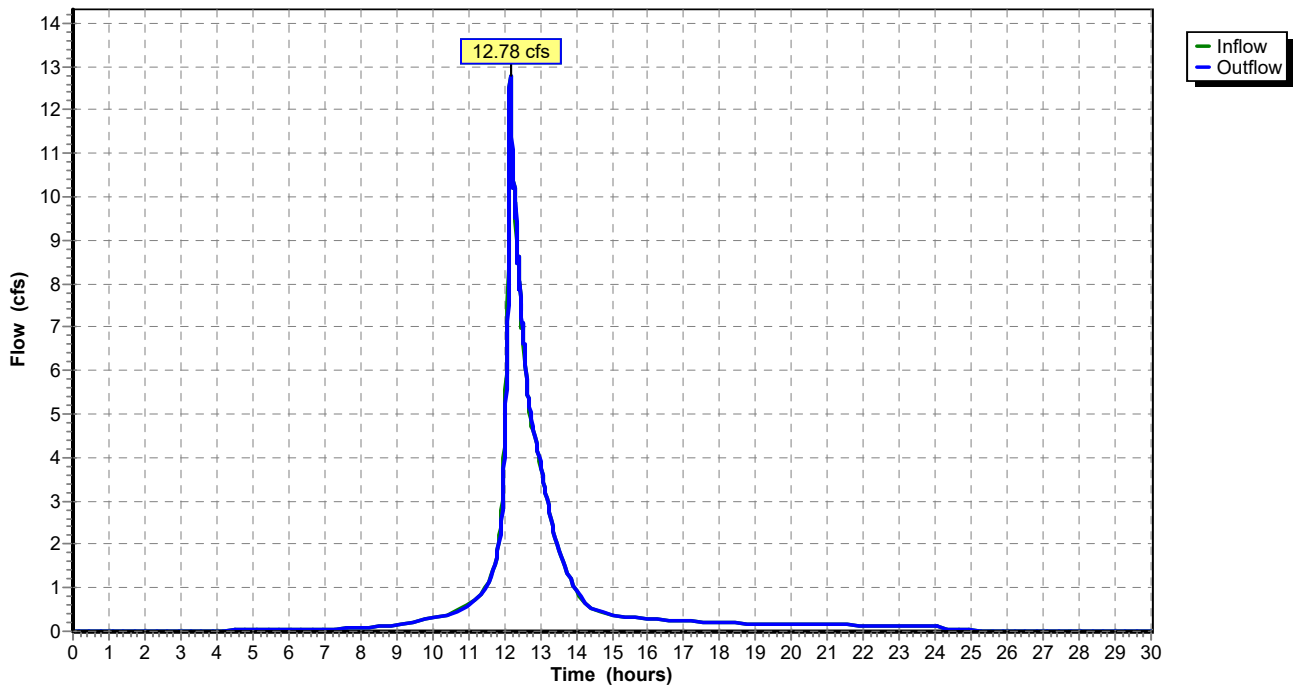
**Summary for Reach TF: TREATED FLOW OUTLET**

Inflow = 12.78 cfs @ 12.16 hrs, Volume= 1.128 af  
Outflow = 12.78 cfs @ 12.17 hrs, Volume= 1.128 af, Atten= 0%, Lag= 0.6 min  
Routed to Reach SUM : TOTAL FLOW

Routing by Sim-Route method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

**Reach TF: TREATED FLOW OUTLET**

Hydrograph



**Proposed Conditions-2874**

NOAA 24-hr D 100YR-NOAA ATLAS 14 Rainfall=8.26"

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**Summary for Pond CS1: CHAMBER SYSTEM #1**

Inflow = 11.53 cfs @ 12.23 hrs, Volume= 0.395 af  
 Outflow = 12.26 cfs @ 12.25 hrs, Volume= 0.391 af, Atten= 0%, Lag= 1.2 min  
 Discarded = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af  
 Primary = 12.26 cfs @ 12.25 hrs, Volume= 0.391 af  
 Routed to Pond CS2 : CHAMBER SYSTEM #2

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 Peak Elev= 257.35' @ 12.25 hrs Surf.Area= 816 sf Storage= 1,335 cf

Plug-Flow detention time= 15.7 min calculated for 0.398 af (99% of inflow)  
 Center-of-Mass det. time= 9.9 min ( 772.9 - 762.7 )

Volume	Invert	Avail.Storage	Storage Description
#1	254.60'	713 cf	<b>12.00'W x 68.00'L x 3.00'H Prismatic</b> 2,448 cf Overall - 665 cf Embedded = 1,783 cf x 40.0% Voids
#2	255.10'	663 cf	<b>Cultec R-180 x 30 Inside #1</b> Effective Size= 33.6"W x 20.0"H => 3.44 sf x 6.33'L = 21.8 cf Overall Size= 36.0"W x 20.5"H x 7.33'L with 1.00' Overlap Row Length Adjustment= +1.00' x 3.44 sf x 3 rows
#3	255.10'	2 cf	<b>Cultec HVLV FC-24 x 4 Inside #1</b> Effective Size= 15.3"W x 12.0"H => 0.91 sf x 0.50'L = 0.5 cf Overall Size= 16.0"W x 12.0"H x 2.02'L with 1.52' Overlap 4 Chambers in 3 Rows
#4	255.10'	16 cf	<b>10.0" Round Pipe Storage-Impervious</b> L= 29.0' S= 0.0200 '/'
#5	255.50'	63 cf	<b>4.00'D x 5.00'H Vertical Cone/Cylinder-Impervious</b>
		1,457 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	254.60'	<b>8.270 in/hr Exfiltration X 0.00 over Horizontal area</b> Phase-In= 0.01'
#2	Primary	255.10'	<b>12.0" Vert. Orifice/Grate X 3.00</b> C= 0.600 Limited to weir flow at low heads
#3	Primary	258.60'	<b>2.0" x 2.0" Horiz. Orifice/Grate X 6.00 columns</b> X 6 rows C= 0.600 in 24.0" x 24.0" Grate (25% open area) Limited to weir flow at low heads

**Discarded OutFlow** Max=0.00 cfs @ 0.00 hrs HW=254.60' (Free Discharge)  
 ↑1=Exfiltration ( Controls 0.00 cfs)

**Primary OutFlow** Max=11.63 cfs @ 12.25 hrs HW=257.11' TW=256.06' (Dynamic Tailwater)  
 ↑2=Orifice/Grate (Orifice Controls 11.63 cfs @ 4.94 fps)  
 ↑3=Orifice/Grate ( Controls 0.00 cfs)

**Proposed Conditions-2874**

NOAA 24-hr D 100YR-NOAA ATLAS 14 Rainfall=8.26"

Prepared by Bruce Saluk & Associates

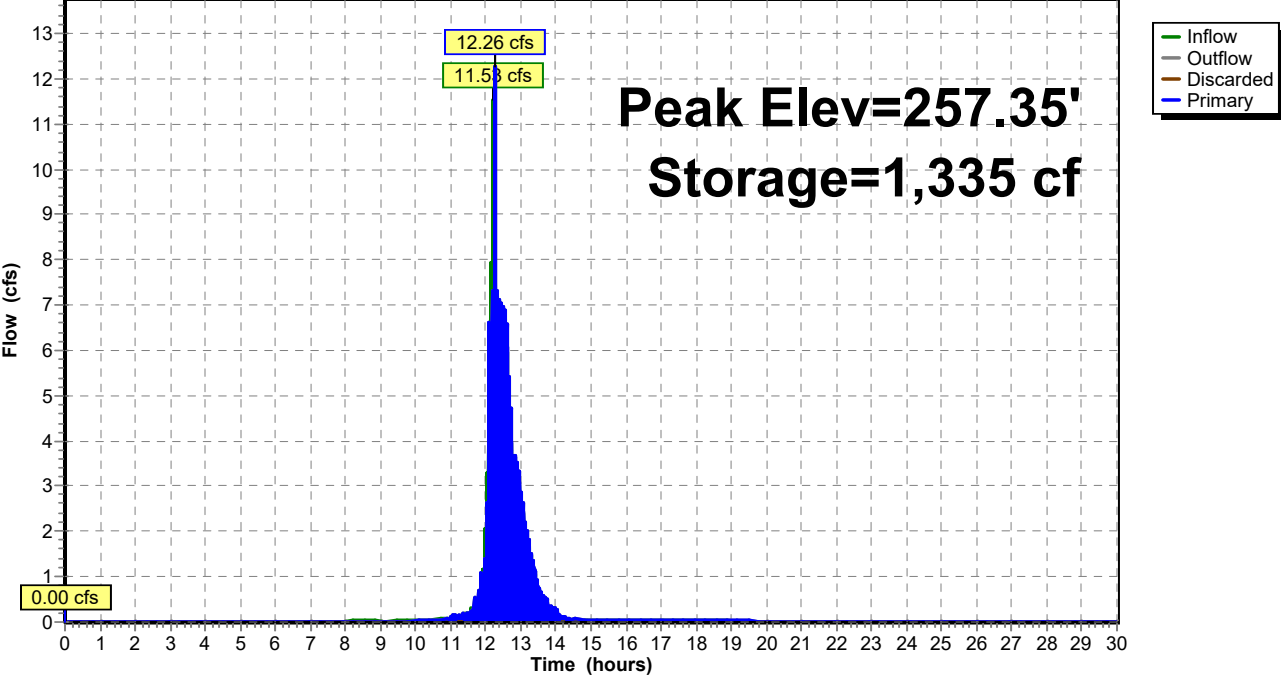
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**Pond CS1: CHAMBER SYSTEM #1**

Hydrograph



**Proposed Conditions-2874**

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**Summary for Pond CS2: CHAMBER SYSTEM #2**

Inflow = 24.65 cfs @ 12.25 hrs, Volume= 0.863 af  
 Outflow = 24.26 cfs @ 12.27 hrs, Volume= 0.856 af, Atten= 2%, Lag= 1.3 min  
 Discarded = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af  
 Primary = 13.15 cfs @ 12.27 hrs, Volume= 0.536 af  
     Routed to Pond CS3 : CHAMBER SYSTEM #3  
 Secondary = 11.12 cfs @ 12.27 hrs, Volume= 0.320 af  
     Routed to Pond CS1 : CHAMBER SYSTEM #1

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 Peak Elev= 257.21' @ 12.27 hrs Surf.Area= 1,584 sf Storage= 2,592 cf

Plug-Flow detention time= 15.7 min calculated for 0.855 af (99% of inflow)  
 Center-of-Mass det. time= 10.0 min ( 784.4 - 774.5 )

Volume	Invert	Avail.Storage	Storage Description
#1	254.60'	1,371 cf	<b>16.00'W x 99.00'L x 3.00'H Prismatoid</b> 4,752 cf Overall - 1,324 cf Embedded = 3,428 cf x 40.0% Voids
#2	255.10'	1,320 cf	<b>Cultec R-180 x 60 Inside #1</b> Effective Size= 33.6"W x 20.0"H => 3.44 sf x 6.33'L = 21.8 cf Overall Size= 36.0"W x 20.5"H x 7.33'L with 1.00' Overlap Row Length Adjustment= +1.00' x 3.44 sf x 4 rows
#3	255.10'	4 cf	<b>Cultec HVLV FC-24 x 9 Inside #1</b> Effective Size= 15.3"W x 12.0"H => 0.91 sf x 0.50'L = 0.5 cf Overall Size= 16.0"W x 12.0"H x 2.02'L with 1.52' Overlap 9 Chambers in 4 Rows
#4	255.10'	26 cf	<b>12.0" Round Pipe Storage-Impervious</b> L= 33.0'
#5	255.82'	113 cf	<b>4.00'D x 3.00'H Vertical Cone/Cylinder x 3 -Impervious</b>
#6	255.10'	4 cf	<b>10.0" Round Pipe Storage-Impervious</b> L= 7.0' S= 0.0143 '/'
#7	255.45'	23 cf	<b>10.0" Round Pipe Storage-Impervious</b> L= 42.0' S= 0.0100 '/'
#8	255.45'	38 cf	<b>10.0" Round Pipe Storage</b> L= 70.0' S= 0.0100 '/'
		2,899 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	255.10'	<b>12.0" Vert. Orifice/Grate X 3.00</b> C= 0.600 Limited to weir flow at low heads
#2	Discarded	254.60'	<b>8.270 in/hr Exfiltration X 0.00 over Horizontal area</b> Phase-In= 0.01'
#3	Secondary	255.10'	<b>12.0" Vert. Orifice/Grate X 3.00</b> C= 0.600 Limited to weir flow at low heads

**Proposed Conditions-2874**

NOAA 24-hr D 100YR-NOAA ATLAS 14 Rainfall=8.26"

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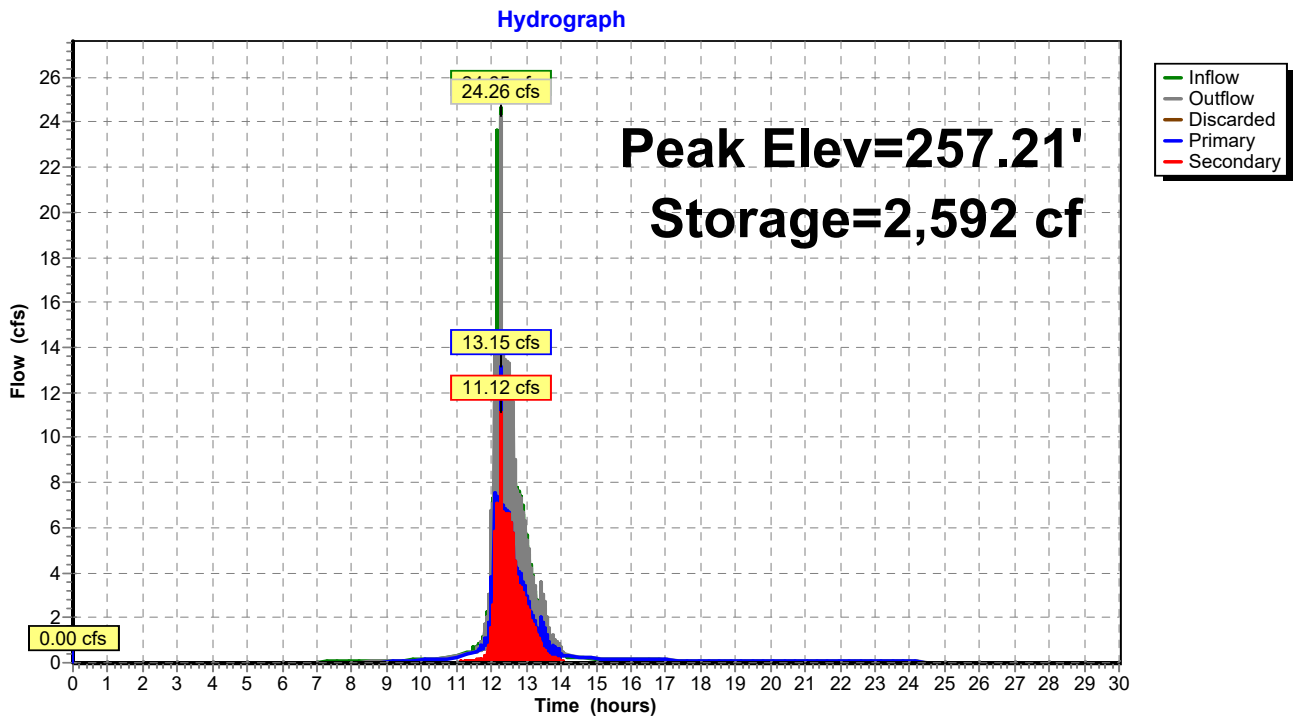
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**Discarded OutFlow** Max=0.00 cfs @ 0.00 hrs HW=254.60' (Free Discharge)  
↳ **2=Exfiltration** ( Controls 0.00 cfs)

**Primary OutFlow** Max=11.18 cfs @ 12.27 hrs HW=257.01' TW=256.04' (Dynamic Tailwater)  
↳ **1=Orifice/Grate** (Orifice Controls 11.18 cfs @ 4.75 fps)

**Secondary OutFlow** Max=10.89 cfs @ 12.27 hrs HW=256.98' TW=256.05' (Dynamic Tailwater)  
↳ **3=Orifice/Grate** (Orifice Controls 10.89 cfs @ 4.62 fps)

**Pond CS2: CHAMBER SYSTEM #2**



**Proposed Conditions-2874**

NOAA 24-hr D 100YR-NOAA ATLAS 14 Rainfall=8.26"

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**Summary for Pond CS3: CHAMBER SYSTEM #3**

Inflow = 21.10 cfs @ 12.23 hrs, Volume= 0.678 af  
 Outflow = 23.43 cfs @ 12.25 hrs, Volume= 0.672 af, Atten= 0%, Lag= 1.1 min  
 Discarded = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af  
 Primary = 12.33 cfs @ 12.25 hrs, Volume= 0.458 af  
     Routed to Pond CS4 : CHAMBER SYSTEM #4  
 Secondary = 11.16 cfs @ 12.25 hrs, Volume= 0.214 af  
     Routed to Pond CS2 : CHAMBER SYSTEM #2

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 Peak Elev= 257.28' @ 12.25 hrs Surf.Area= 1,188 sf Storage= 1,898 cf

Plug-Flow detention time= 13.8 min calculated for 0.674 af (99% of inflow)  
 Center-of-Mass det. time= 7.8 min ( 799.9 - 792.1 )

Volume	Invert	Avail.Storage	Storage Description
#1	254.60'	1,028 cf	<b>12.00'W x 99.00'L x 3.00'H Prismatic</b> 3,564 cf Overall - 993 cf Embedded = 2,571 cf x 40.0% Voids
#2	255.10'	990 cf	<b>Cultec R-180</b> x 45 Inside #1 Effective Size= 33.6"W x 20.0"H => 3.44 sf x 6.33'L = 21.8 cf Overall Size= 36.0"W x 20.5"H x 7.33'L with 1.00' Overlap Row Length Adjustment= +1.00' x 3.44 sf x 3 rows
#3	255.10'	3 cf	<b>Cultec HVLV FC-24</b> x 6 Inside #1 Effective Size= 15.3"W x 12.0"H => 0.91 sf x 0.50'L = 0.5 cf Overall Size= 16.0"W x 12.0"H x 2.02'L with 1.52' Overlap 6 Chambers in 3 Rows
#4	255.10'	28 cf	<b>12.0" Round Pipe Storage</b> x 3 -Impervious L= 12.0'
		2,050 cf	Total Available Storage

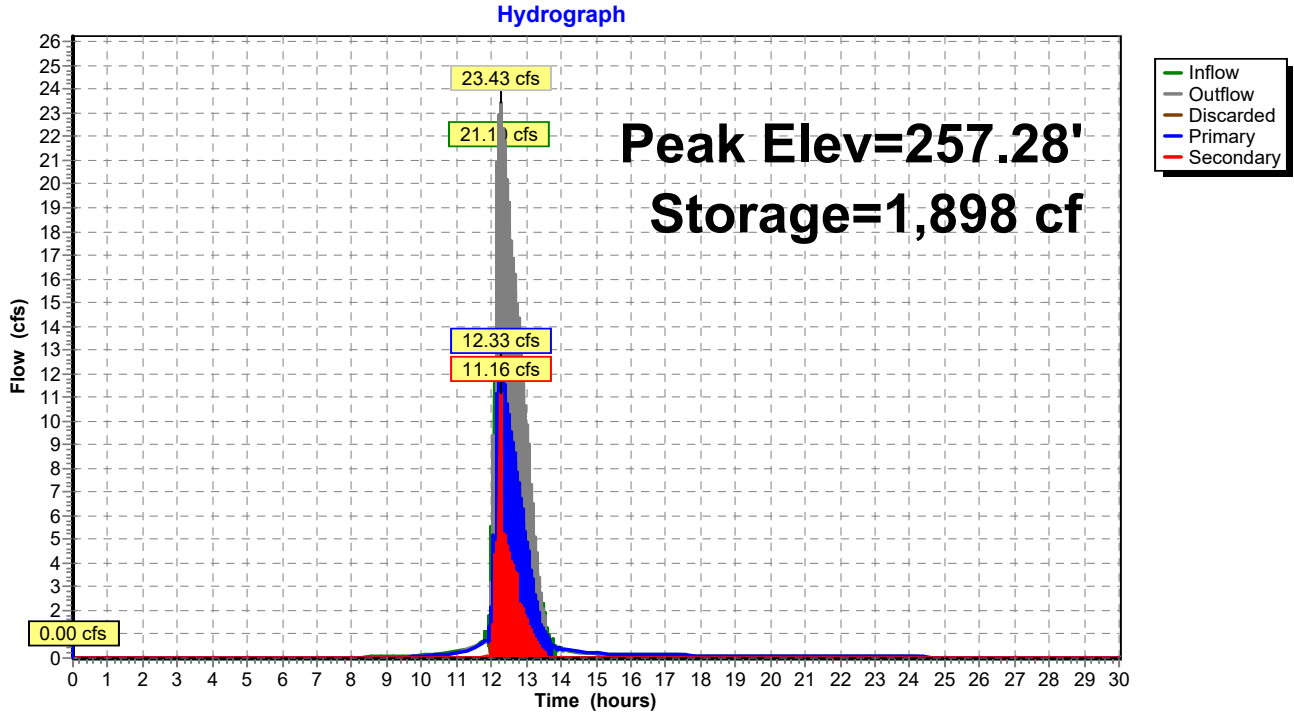
Device	Routing	Invert	Outlet Devices
#1	Primary	255.10'	<b>12.0" Vert. Orifice/Grate X 3.00</b> C= 0.600 Limited to weir flow at low heads
#2	Discarded	254.60'	<b>8.270 in/hr Exfiltration X 0.00 over Horizontal area</b> Phase-In= 0.01'
#3	Secondary	255.10'	<b>12.0" Vert. Orifice/Grate X 3.00</b> C= 0.600 Limited to weir flow at low heads

**Discarded OutFlow** Max=0.00 cfs @ 0.00 hrs HW=254.60' (Free Discharge)  
 ↑**2=Exfiltration** ( Controls 0.00 cfs)

**Primary OutFlow** Max=11.77 cfs @ 12.25 hrs HW=257.19' TW=256.12' (Dynamic Tailwater)  
 ↑**1=Orifice/Grate** (Orifice Controls 11.77 cfs @ 5.00 fps)

**Secondary OutFlow** Max=12.58 cfs @ 12.25 hrs HW=257.15' TW=255.92' (Dynamic Tailwater)  
 ↑**3=Orifice/Grate** (Orifice Controls 12.58 cfs @ 5.34 fps)

### Pond CS3: CHAMBER SYSTEM #3



**Proposed Conditions-2874**

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**Summary for Pond CS4: CHAMBER SYSTEM #4**

Inflow = 19.87 cfs @ 12.21 hrs, Volume= 0.733 af  
 Outflow = 16.78 cfs @ 12.23 hrs, Volume= 0.722 af, Atten= 16%, Lag= 1.1 min  
 Discarded = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af  
 Primary = 11.03 cfs @ 12.26 hrs, Volume= 0.580 af  
     Routed to Pond CS5 : CHAMBER SYSTEM #5  
 Secondary = 8.12 cfs @ 12.23 hrs, Volume= 0.142 af  
     Routed to Pond CS3 : CHAMBER SYSTEM #3

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 Peak Elev= 256.70' @ 12.26 hrs Surf.Area= 2,125 sf Storage= 2,977 cf

Plug-Flow detention time= 22.1 min calculated for 0.793 af (99% of inflow)  
 Center-of-Mass det. time= 13.4 min ( 816.3 - 801.6 )

Volume	Invert	Avail.Storage	Storage Description
#1	254.60'	1,933 cf	<b>25.00'W x 85.00'L x 3.00'H Prismatic</b> 6,375 cf Overall - 1,543 cf Embedded = 4,832 cf x 40.0% Voids
#2	255.10'	1,534 cf	<b>Cultec R-150XLHD x 56 Inside #1</b> Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap Row Length Adjustment= +0.75' x 2.65 sf x 7 rows
#3	255.10'	8 cf	<b>Cultec R-150XLHD-FC-24 x 18 Inside #1</b> Effective Size= 15.3"W x 12.0"H => 0.91 sf x 0.50'L = 0.5 cf Overall Size= 16.0"W x 12.0"H x 2.02'L with 1.52' Overlap 18 Chambers in 7 Rows
#4	255.10'	122 cf	<b>12.0" Round Pipe Storage-Impervious</b> L= 155.0'
#5	255.20'	151 cf	<b>4.00'D x 3.00'H Vertical Cone/Cylinder x 4 -Impervious</b>
#6	255.85'	75 cf	<b>4.00'D x 3.00'H Vertical Cone/Cylinder x 2 -Impervious</b>
#7	255.10'	3 cf	<b>10.0" Round Pipe Storage</b> L= 5.0' S= 0.0200 '/'
#8	255.45'	44 cf	<b>10.0" Round Pipe Storage x 2</b> L= 40.0' S= 0.0100 '/'
		3,870 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	255.10'	<b>12.0" Vert. Orifice/Grate X 4.00</b> C= 0.600 Limited to weir flow at low heads
#2	Discarded	254.60'	<b>8.270 in/hr Exfiltration X 0.00 over Horizontal area</b> Phase-In= 0.01'
#3	Secondary	255.10'	<b>12.0" Vert. Orifice/Grate X 3.00</b> C= 0.600 Limited to weir flow at low heads

**Proposed Conditions-2874**

NOAA 24-hr D 100YR-NOAA ATLAS 14 Rainfall=8.26"

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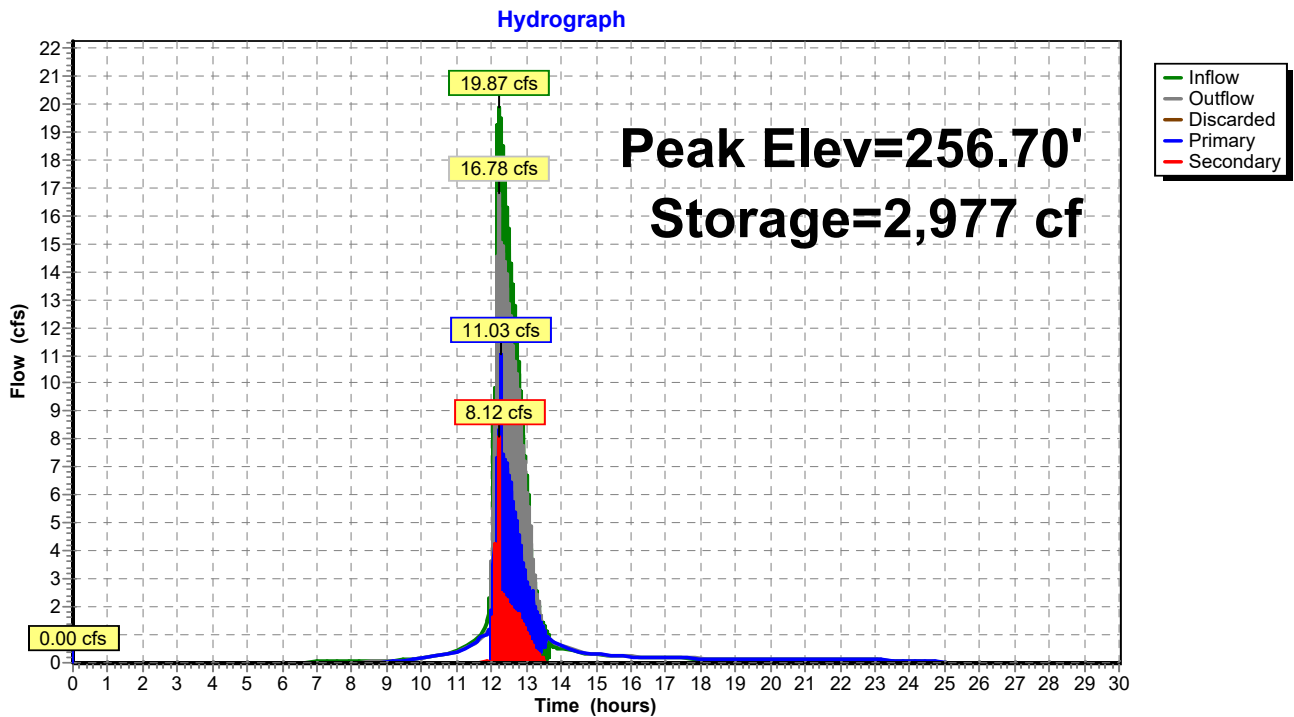
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**Discarded OutFlow** Max=0.00 cfs @ 0.00 hrs HW=254.60' (Free Discharge)  
 ↳ **2=Exfiltration** ( Controls 0.00 cfs)

**Primary OutFlow** Max=10.25 cfs @ 12.26 hrs HW=256.60' TW=256.14' (Dynamic Tailwater)  
 ↳ **1=Orifice/Grate** (Orifice Controls 10.25 cfs @ 3.26 fps)

**Secondary OutFlow** Max=5.92 cfs @ 12.23 hrs HW=256.34' TW=256.07' (Dynamic Tailwater)  
 ↳ **3=Orifice/Grate** (Orifice Controls 5.92 cfs @ 2.51 fps)

**Pond CS4: CHAMBER SYSTEM #4**



**Proposed Conditions-2874**

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**Summary for Pond CS5: CHAMBER SYSTEM #5**

Inflow = 14.59 cfs @ 12.15 hrs, Volume= 1.235 af  
 Outflow = 12.84 cfs @ 12.29 hrs, Volume= 1.235 af, Atten= 12%, Lag= 8.4 min  
 Discarded = 1.05 cfs @ 11.01 hrs, Volume= 0.758 af  
 Primary = 5.91 cfs @ 12.28 hrs, Volume= 0.390 af  
     Routed to Pond CS6 : CHAMBER SYSTEM #6A & 6B  
 Secondary = 6.56 cfs @ 12.21 hrs, Volume= 0.086 af  
     Routed to Pond CS4 : CHAMBER SYSTEM #4

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 Peak Elev= 256.25' @ 12.24 hrs Surf.Area= 5,508 sf Storage= 6,080 cf

Plug-Flow detention time= 10.6 min calculated for 1.252 af (100% of inflow)  
 Center-of-Mass det. time= 10.6 min ( 800.8 - 790.0 )

Volume	Invert	Avail.Storage	Storage Description
#1	254.60'	4,896 cf	<b>40.50'W x 136.00'L x 3.00'H Prismaoid</b> 16,524 cf Overall - 4,285 cf Embedded = 12,239 cf x 40.0% Voids
#2	255.10'	4,260 cf	<b>Cultec R-150XLHD x 156 Inside #1</b> Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap Row Length Adjustment= +0.75' x 2.65 sf x 12 rows
#3	255.10'	25 cf	<b>Cultec R-150XLHD-FC-24 x 55 Inside #1</b> Effective Size= 15.3"W x 12.0"H => 0.91 sf x 0.50'L = 0.5 cf Overall Size= 16.0"W x 12.0"H x 2.02'L with 1.52' Overlap 55 Chambers in 12 Rows
#4	255.10'	35 cf	<b>12.0" Round Pipe Storage 1 x 4 -Impervious</b> L= 11.0'
#5	255.10'	40 cf	<b>12.0" Round Pipe Storage 2 x 3 -Impervious</b> L= 17.0' S= 0.0200 '/'
#6	255.10'	12 cf	<b>12.0" Round Pipe Storage 3-Impervious</b> L= 15.0' S= 0.0200 '/'
#7	255.10'	2 cf	<b>10.0" Round Pipe Storage 4-Impervious</b> L= 3.0' S= 0.0100 '/'
#8	255.38'	26 cf	<b>10.0" Round Pipe Storage 5-Impervious</b> L= 47.0' S= 0.0100 '/'
#9	255.38'	15 cf	<b>10.0" Round Pipe Storage 6-Impervious</b> L= 27.0' S= 0.0100 '/'
#10	255.65'	38 cf	<b>4.00'D x 3.00'H Vertical Cone/Cylinder-Impervious</b>
#11	255.85'	38 cf	<b>4.00'D x 3.00'H Vertical Cone/Cylinder-Impervious</b>
		9,384 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	255.10'	<b>12.0" Vert. Orifice/Grate X 3.00</b> C= 0.600 Limited to weir flow at low heads
#2	Discarded	254.60'	<b>8.270 in/hr Exfiltration over Horizontal area</b> Phase-In= 0.01'
#3	Secondary	255.10'	<b>12.0" Vert. Orifice/Grate X 4.00</b> C= 0.600 Limited to weir flow at low heads

**Proposed Conditions-2874**

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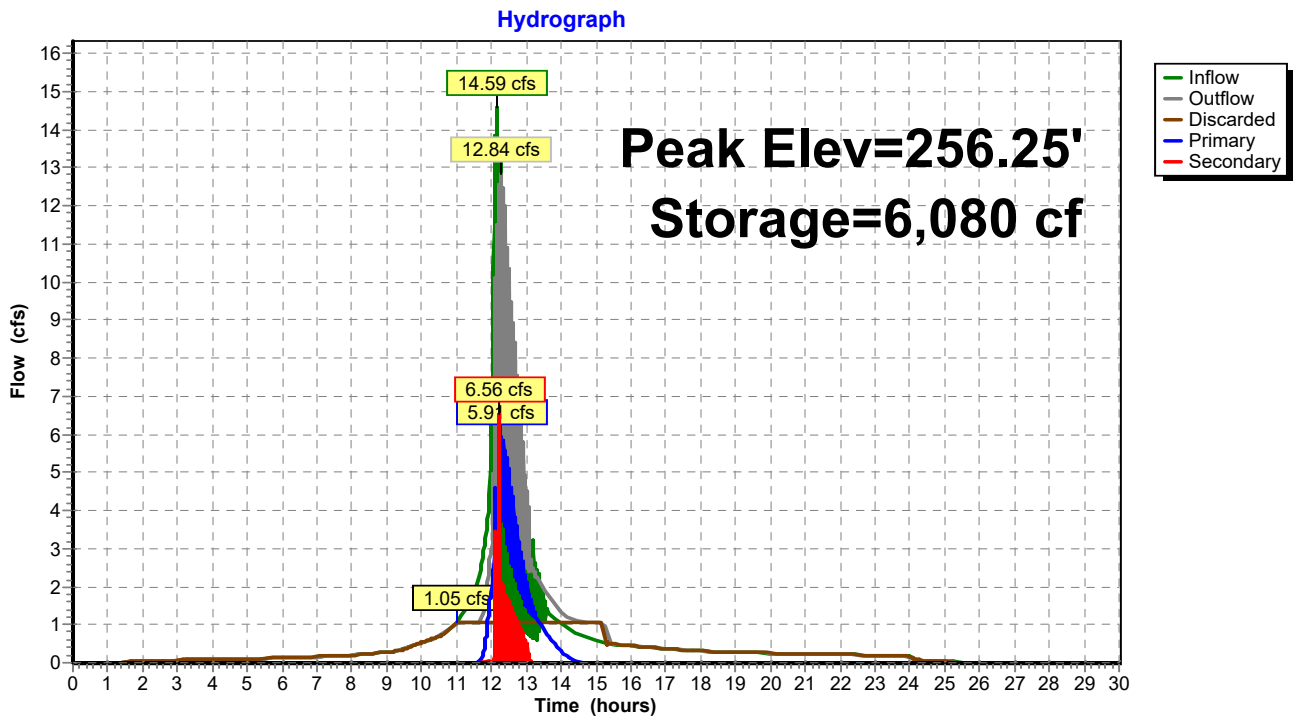
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**Discarded OutFlow** Max=1.05 cfs @ 11.01 hrs HW=254.61' (Free Discharge)  
 ↳ **2=Exfiltration** (Exfiltration Controls 1.05 cfs)

**Primary OutFlow** Max=5.79 cfs @ 12.28 hrs HW=256.24' TW=255.98' (Dynamic Tailwater)  
 ↳ **1=Orifice/Grate** (Orifice Controls 5.79 cfs @ 2.46 fps)

**Secondary OutFlow** Max=2.87 cfs @ 12.21 hrs HW=256.19' TW=256.15' (Dynamic Tailwater)  
 ↳ **3=Orifice/Grate** (Orifice Controls 2.87 cfs @ 0.91 fps)

**Pond CS5: CHAMBER SYSTEM #5**



**Proposed Conditions-2874**

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**Summary for Pond CS6: CHAMBER SYSTEM #6A & 6B**

Inflow = 8.46 cfs @ 12.13 hrs, Volume= 0.671 af  
 Outflow = 7.29 cfs @ 12.30 hrs, Volume= 0.671 af, Atten= 14%, Lag= 10.1 min  
 Discarded = 0.47 cfs @ 11.54 hrs, Volume= 0.237 af  
 Primary = 6.81 cfs @ 12.30 hrs, Volume= 0.433 af  
     Routed to Pond CS7 : CHAMBER SYSTEM #7  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af  
     Routed to Pond CS5 : CHAMBER SYSTEM #5

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 Peak Elev= 256.03' @ 12.18 hrs Surf.Area= 2,464 sf Storage= 2,605 cf

Plug-Flow detention time= 7.4 min calculated for 0.671 af (100% of inflow)  
 Center-of-Mass det. time= 7.4 min ( 781.6 - 774.2 )

Volume	Invert	Avail.Storage	Storage Description
#1	254.60'	1,089 cf	<b>32.00'W x 41.00'L x 3.00'H Prismatic 6A</b> 3,936 cf Overall - 1,214 cf Embedded = 2,722 cf x 40.0% Voids
#2	255.10'	1,207 cf	<b>Cultec R-180 (SECTION 6A) x 54 Inside #1</b> Effective Size= 33.6"W x 20.0"H => 3.44 sf x 6.33'L = 21.8 cf Overall Size= 36.0"W x 20.5"H x 7.33'L with 1.00' Overlap Row Length Adjustment= +1.00' x 3.44 sf x 9 rows
#3	255.10'	7 cf	<b>Cultec HVLV FC-24 (SECTION 6A) x 16 Inside #1</b> Effective Size= 15.3"W x 12.0"H => 0.91 sf x 0.50'L = 0.5 cf Overall Size= 16.0"W x 12.0"H x 2.02'L with 1.52' Overlap 16 Chambers in 9 Rows
#4	254.60'	975 cf	<b>32.00'W x 36.00'L x 3.00'H Prismatic (SECTION 6B)</b> 3,456 cf Overall - 1,018 cf Embedded = 2,438 cf x 40.0% Voids
#5	255.10'	1,011 cf	<b>Cultec R-180 (SECTION 6B) x 45 Inside #4</b> Effective Size= 33.6"W x 20.0"H => 3.44 sf x 6.33'L = 21.8 cf Overall Size= 36.0"W x 20.5"H x 7.33'L with 1.00' Overlap Row Length Adjustment= +1.00' x 3.44 sf x 9 rows
#6	255.10'	7 cf	<b>Cultec HVLV FC-24 (SECTION 6B) x 16 Inside #4</b> Effective Size= 15.3"W x 12.0"H => 0.91 sf x 0.50'L = 0.5 cf Overall Size= 16.0"W x 12.0"H x 2.02'L with 1.52' Overlap 16 Chambers in 9 Rows
#7	255.10'	54 cf	<b>12.0" Round Pipe Storage 1 x 3 -Impervious</b> L= 23.0'
#8	254.77'	198 cf	<b>18.0" Round Pipe Storage 2-Impervious</b> L= 112.0'
#9	255.10'	14 cf	<b>12.0" Round Pipe Storage 3 x 6 -Impervious</b> L= 3.0'
#10	255.10'	20 cf	<b>12.0" Round Pipe Storage 4-Impervious</b> L= 26.0' S= 0.0200 '/'
#11	255.10'	51 cf	<b>Custom Stage Data (Prismatic) Listed below (Recalc) -Impervious</b>
		4,634 cf	Total Available Storage

**Proposed Conditions-2874**

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Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
255.10	17	0	0
258.10	17	51	51

Device	Routing	Invert	Outlet Devices
#1	Primary	253.80'	<b>12.0" Vert. Orifice/Grate X 3.00</b> C= 0.600 Limited to weir flow at low heads
#2	Device 1	253.55'	<b>18.0" Round Culvert</b> L= 15.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 253.55' / 253.55' S= 0.0000 ' / ' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#3	Device 2	255.50'	<b>3.4' long Sharp-Crested Rectangular Weir</b> 1 End Contraction(s) 2.5' Crest Height
#4	Device 2	255.10'	<b>0.8' long Sharp-Crested Rectangular Weir</b> 2 End Contraction(s) 2.0' Crest Height
#5	Primary	254.77'	<b>18.0" Round Culvert</b> L= 71.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 254.77' / 254.77' S= 0.0000 ' / ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#6	Device 5	255.10'	<b>12.0" Vert. Orifice/Grate X 6.00</b> C= 0.600 Limited to weir flow at low heads
#7	Discarded	254.60'	<b>8.270 in/hr Exfiltration over Horizontal area</b> Phase-In= 0.01'
#8	Secondary	255.10'	<b>12.0" Vert. Orifice/Grate X 3.00</b> C= 0.600 Limited to weir flow at low heads

**Discarded OutFlow** Max=0.47 cfs @ 11.54 hrs HW=254.61' (Free Discharge)

↑7=Exfiltration (Exfiltration Controls 0.47 cfs)

**Primary OutFlow** Max=6.61 cfs @ 12.30 hrs HW=255.99' TW=255.77' (Dynamic Tailwater)

↑1=Orifice/Grate (Passes 3.99 cfs of 5.32 cfs potential flow)

↑2=Culvert (Inlet Controls 3.99 cfs @ 2.26 fps)

↑3=Sharp-Crested Rectangular Weir (Passes < 3.13 cfs potential flow)

↑4=Sharp-Crested Rectangular Weir (Passes < 1.20 cfs potential flow)

↑5=Culvert (Outlet Controls 2.62 cfs @ 2.32 fps)

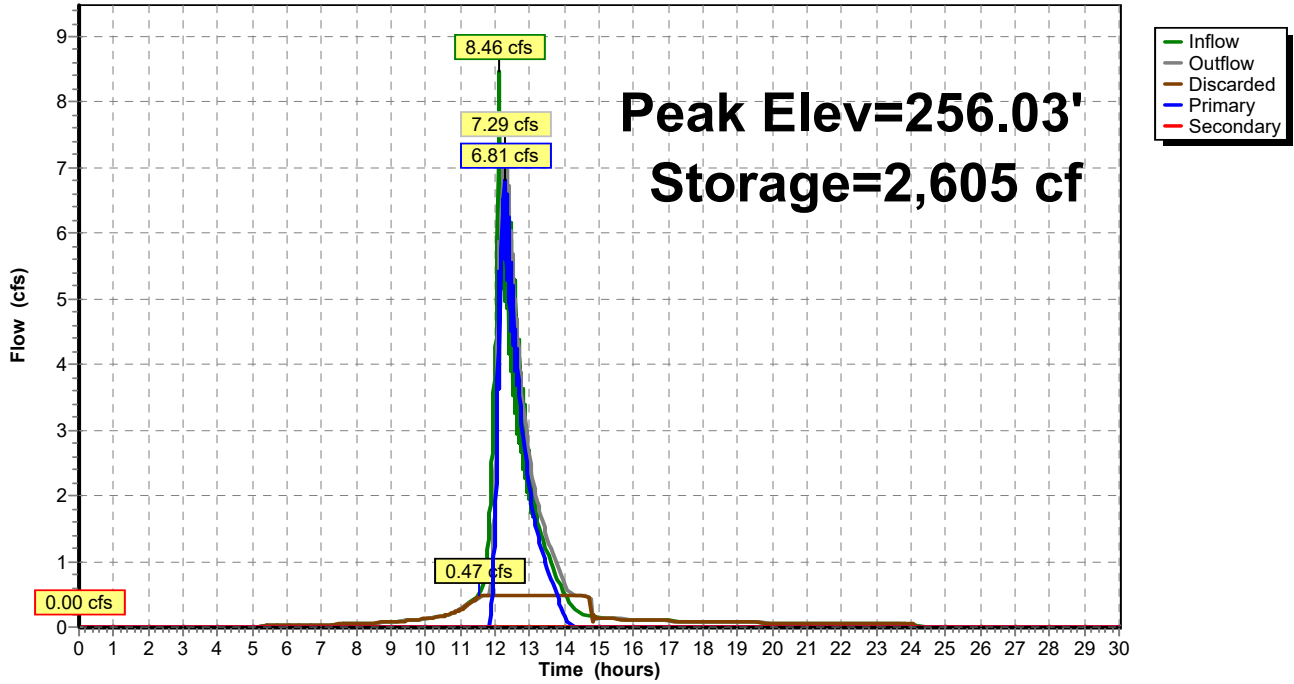
↑6=Orifice/Grate (Passes 2.62 cfs of 9.98 cfs potential flow)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=254.60' TW=254.60' (Dynamic Tailwater)

↑8=Orifice/Grate ( Controls 0.00 cfs)

**Pond CS6: CHAMBER SYSTEM #6A & 6B**

Hydrograph



**Proposed Conditions-2874**

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**Summary for Pond CS7: CHAMBER SYSTEM #7**

Inflow = 10.34 cfs @ 12.12 hrs, Volume= 0.777 af  
 Outflow = 9.26 cfs @ 12.17 hrs, Volume= 0.765 af, Atten= 10%, Lag= 3.0 min  
 Discarded = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af  
 Primary = 9.26 cfs @ 12.17 hrs, Volume= 0.765 af  
 Routed to Reach TF : TREATED FLOW OUTLET  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af  
 Routed to Pond CS6 : CHAMBER SYSTEM #6A & 6B

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 Peak Elev= 255.88' @ 12.17 hrs Surf.Area= 2,400 sf Storage= 3,806 cf

Plug-Flow detention time= 30.6 min calculated for 0.765 af (98% of inflow)  
 Center-of-Mass det. time= 21.3 min ( 795.7 - 774.4 )

Volume	Invert	Avail.Storage	Storage Description
#1	253.30'	2,064 cf	<b>12.00'W x 200.00'L x 3.00'H Prismatic</b> 7,200 cf Overall - 2,039 cf Embedded = 5,161 cf x 40.0% Voids
#2	253.80'	2,035 cf	<b>Cultec R-180</b> x 93 Inside #1 Effective Size= 33.6"W x 20.0"H => 3.44 sf x 6.33'L = 21.8 cf Overall Size= 36.0"W x 20.5"H x 7.33'L with 1.00' Overlap Row Length Adjustment= +1.00' x 3.44 sf x 3 rows
#3	253.80'	4 cf	<b>Cultec HVLV FC-24</b> x 8 Inside #1 Effective Size= 15.3"W x 12.0"H => 0.91 sf x 0.50'L = 0.5 cf Overall Size= 16.0"W x 12.0"H x 2.02'L with 1.52' Overlap 8 Chambers in 3 Rows
#4	253.80'	26 cf	<b>12.0" Round Pipe Storage 1-Impervious</b> L= 33.0'
#5	253.55'	41 cf	<b>18.0" Round Pipe Storage 2-Impervious</b> L= 23.0'
#6	253.30'	51 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc) -Impervious
		4,221 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
253.30	17	0	0
256.30	17	51	51

Device	Routing	Invert	Outlet Devices
#1	Primary	253.25'	<b>18.0" Round RCP_Round 18"</b> L= 47.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 253.25' / 249.30' S= 0.0840 ' / Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf
#2	Device 1	253.80'	<b>12.0" Vert. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	255.40'	<b>4.2' long x 1.50' rise Sharp-Crested Rectangular Weir</b> 2 End Contraction(s) 2.2' Crest Height
#4	Device 2	253.55'	<b>18.0" Vert. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#5	Device 4	253.80'	<b>12.0" Vert. Orifice/Grate X 3.00</b> C= 0.600

**Proposed Conditions-2874**

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#6	Discarded	253.30'	Limited to weir flow at low heads <b>8.270 in/hr Exfiltration X 0.00 over Horizontal area</b> Phase-In= 0.01'
#7	Secondary	253.80'	<b>12.0" Vert. Orifice/Grate X 3.00</b> C= 0.600 Limited to weir flow at low heads

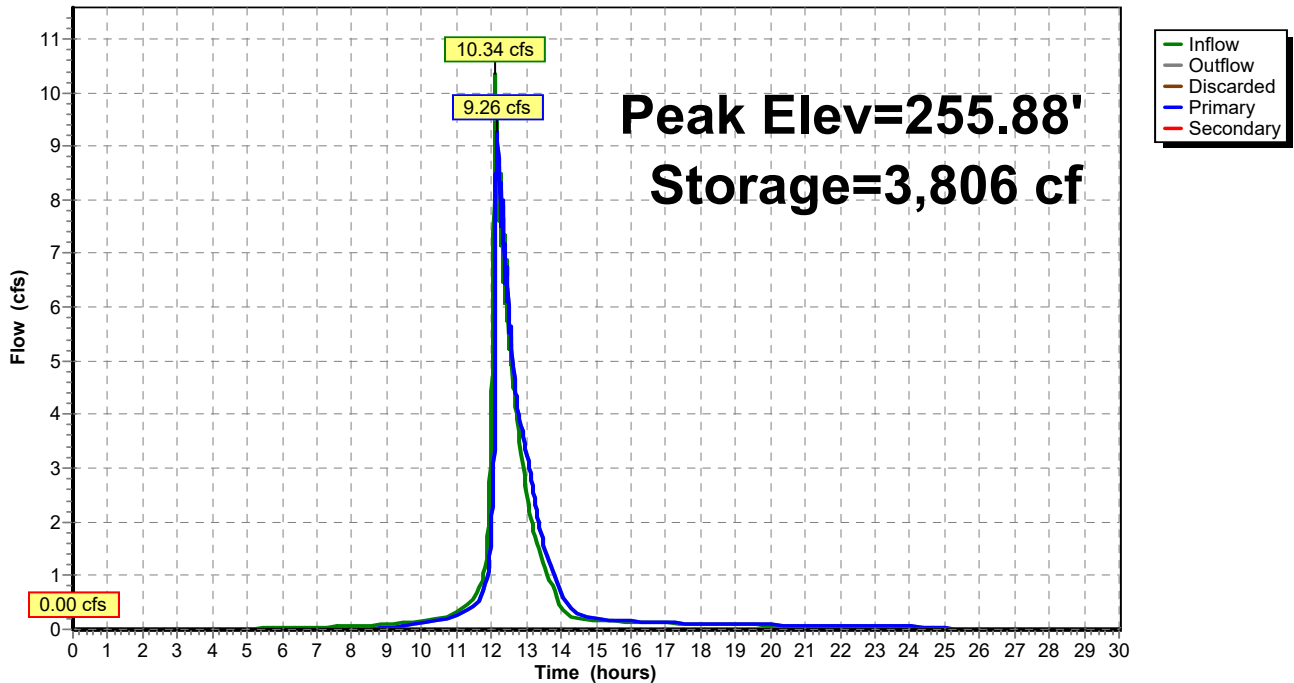
**Discarded OutFlow** Max=0.00 cfs @ 0.00 hrs HW=253.30' (Free Discharge)  
 ↳ **6=Exfiltration** ( Controls 0.00 cfs)

**Primary OutFlow** Max=9.22 cfs @ 12.17 hrs HW=255.87' TW=0.00' (Dynamic Tailwater)  
 ↳ **1=RCP\_Round 18"** (Passes 9.22 cfs of 11.64 cfs potential flow)  
 ↳ **2=Orifice/Grate** (Orifice Controls 4.74 cfs @ 6.04 fps)  
 ↳ **4=Orifice/Grate** (Passes 4.74 cfs of 10.67 cfs potential flow)  
 ↳ **5=Orifice/Grate** (Passes 4.74 cfs of 14.23 cfs potential flow)  
 ↳ **3=Sharp-Crested Rectangular Weir** (Weir Controls 4.48 cfs @ 2.31 fps)

**Secondary OutFlow** Max=0.00 cfs @ 12.13 hrs HW=255.82' TW=255.85' (Dynamic Tailwater)  
 ↳ **7=Orifice/Grate** ( Controls 0.00 cfs)

**Pond CS7: CHAMBER SYSTEM #7**

Hydrograph



**Proposed Conditions-2874**

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**Summary for Pond CS8: CHAMBER SYSTEM #8**

Inflow Area = 0.280 ac, 82.14% Impervious, Inflow Depth = 7.18" for 100YR-NOAA ATLAS 14 event  
 Inflow = 2.21 cfs @ 12.12 hrs, Volume= 0.168 af  
 Outflow = 1.49 cfs @ 12.18 hrs, Volume= 0.161 af, Atten= 33%, Lag= 3.6 min  
 Discarded = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af  
 Primary = 1.49 cfs @ 12.18 hrs, Volume= 0.161 af  
 Routed to Reach TF : TREATED FLOW OUTLET

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 Peak Elev= 255.72' @ 12.18 hrs Surf.Area= 1,320 sf Storage= 1,230 cf

Plug-Flow detention time= 62.6 min calculated for 0.161 af (96% of inflow)  
 Center-of-Mass det. time= 39.8 min ( 814.0 - 774.2 )

Volume	Invert	Avail.Storage	Storage Description
#1	254.10'	886 cf	<b>12.00'W x 110.00'L x 2.10'H Prismaoid</b> 2,772 cf Overall - 558 cf Embedded = 2,214 cf x 40.0% Voids
#2	254.60'	547 cf	<b>Cultec C-100HD</b> x 39 Inside #1 Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap Row Length Adjustment= +0.50' x 1.86 sf x 3 rows
#3	254.60'	0 cf	<b>Cultec C-100-SFCx2</b> x 4 Inside #1 Effective Size= 10.1"W x 7.6"H => 0.29 sf x 0.33'L = 0.1 cf Overall Size= 12.0"W x 7.6"H x 1.64'L with 1.31' Overlap 4 Chambers in 3 Rows
#4	254.60'	23 cf	<b>8.0" Round Pipe Storage 1</b> -Impervious L= 65.0' S= 0.0100 '/'
#5	254.60'	10 cf	<b>8.0" Round Pipe Storage 2</b> Inside #1 L= 30.0'
#6	254.92'	75 cf	<b>4.00'D x 3.00'H Vertical Cone/Cylinder</b> x 2 -Impervious
		1,542 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	254.60'	<b>8.0" Vert. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#2	Discarded	254.10'	<b>8.270 in/hr Exfiltration X 0.00 over Horizontal area</b> Phase-In= 0.01'

**Discarded OutFlow** Max=0.00 cfs @ 0.00 hrs HW=254.10' (Free Discharge)  
 ↑**2=Exfiltration** ( Controls 0.00 cfs)

**Primary OutFlow** Max=1.49 cfs @ 12.18 hrs HW=255.72' TW=0.00' (Dynamic Tailwater)  
 ↑**1=Orifice/Grate** (Orifice Controls 1.49 cfs @ 4.26 fps)

**Proposed Conditions-2874**

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**Pond CS8: CHAMBER SYSTEM #8**

