

Bay Colony Group, Inc.
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**Stormwater Management Plan
“10 Commerce Boulevard”
Wrentham, MA**

**April, 2023
supplement September, 2023**



A handwritten signature in blue ink, appearing to read "William R. Buckley, Jr.", positioned below the professional seal.

Prepared for:

Edgewood Development Co., LLC
320 South Street
Plainville, MA 02762

Table of Contents:

Contents	Page
Modification.....	1
1.0 Introduction.....	previously submitted
2.0 Existing Conditions.....	previously submitted
3.0 Flood Condition Analysis and Flood Control.....	1
4.0 Stormwater Management.....	previously submitted
5.0 Climate Resiliency Design Standard	2
Figure 1- Existing Drainage Subareas (2017 Storm Water Report)	Appendix A
Figure 2- Proposed Drainage Subareas	Appendix A
Appendix A: Pre- and Post-development Analysis and Infiltration Basin Designs	A-1
Appendix B: Storm Water Worksheets	B-1
Appendix C: Operation and Maintenance Plan for Storm Water BMPs and Long Term Pollution Prevention Plan	previously submitted
Appendix D: Closed Drainage System Worksheet	D-1
Appendix E: DRAFT Stormwater Pollution Prevention Plan ...	previously submitted
Appendix F: Soils Data	previously submitted
Appendix G: Climate Resilience Desing Standards Report.....	G-1

Modification

The storm water report has been revised based on comments received from Beals & Thomas, Inc. on August 3, 2023. The changes include the removal of the 50-yr storm event and addition of the 25-yr storm event (Appendix A, Table 2 & Table 3). The closed drainage system worksheet (Appendix D) has been modified to reflect changes in the piping to limit the velocity to less than 10 ft/sec. The TSS removal worksheet has been modified to include TP removal (Appendix B and Table 4). A section has been added to address the Climate Resiliency Design Standards (Appendix G & Section 5.0). This supplement shall be read in conjunction with the original report dated April 2023.

3.0 Flood Condition Analysis and Control

Table 2: Summary of Peak Runoff (cfs) at the Study Points

Condition		2-year (cfs)	2-year (ac-ft)	10-year (cfs)	10-year (ac-ft)	25-year (cfs)	25-year (ac-ft)	100-year (cfs)	100-year (ac-ft)
Existing Conditions	South Property Line	0.0	0.00	0.0	0.00	0.0	0.02	0.3	0.11
	Rabbit Hill Brook	1.5	0.49	11.1	1.76	22.4	3.10	50.9	6.46
	Total	1.5	0.49	11.1	1.76	22.4	3.11	51.2	6.57
Developed Conditions	South Property Line	0.0	0.00	0.0	0.00	0.0	0.01	0.3	0.08
	Rabbit Hill Brook	0.0	0.01	0.4	0.19	1.8	0.46	7.4	1.28
	Total	0.0	0.01	0.4	0.19	1.8	0.48	7.7	1.36

The 2-year, 10-year, 25-year, and 100-year flood elevations in the storm water infiltration system for roof runoff is summarized in **Table 3**. The detailed flood routing calculations are attached in **Appendix A**. The infiltration rates used for the Lot 1 infiltration basin design were those outlined in the RAWLs Table in the DEP Stormwater Management Standards for Sand and were discussed in **Section 2.0 Existing Conditions**. Infiltration in the existing Lot 2 infiltration basin and the proposed Lot 1 subsurface system is substantial and will satisfy the Required Recharge Volume.

Table 3: Summary of Stormwater Basin Flood Elevations

Condition	2-inch	2-year	10-year	25-year	100-year
Lot 1 Infiltration System Elevation	212.6'	213.0'	213.3'	213.6'	214.2'
Lot 1 Infiltration System Storage Volume	0.001 ac-ft	0.005 ac-ft	0.012 ac-ft	0.019 ac-ft	0.033 ac-ft

Table 4: Summary of TSS & TP Removal

TSS Removal

Impervious Area = 0.77 acres Runoff depth to be treated = 1.77 inches (2" storm) Runoff volume to be treated = 0.1136 ac-ft				
<i>BMP</i>	<i>TSS Removal Rate</i>	<i>Starting TSS Load</i>	<i>Amount Removed</i>	<i>Remaining Load</i>
Deep Sump and Hooded CB	0.25	1.00	0.25	0.75
Cascade CS-8	0.50	0.75	0.38	0.38
Storm Water Basin (Lot 2)	0.80	0.38	0.30	0.08
TOTAL TSS REMOVED =				93 %

TP Removal

<i>BMP</i>	<i>TSS Removal Rate</i>	<i>Starting TSS Load</i>	<i>Amount Removed</i>	<i>Remaining Load</i>	
Deep Sump and Hooded CB	0.05	1.00	0.05	0.95	
Cascade CS-8	0.20	0.95	0.19	0.76	
Storm Water Basin (Lot 2)	0.68	0.76	0.52	0.24	
TOTAL TSS REMOVED =				76 %	

TP removal data for CB and wet basin from NH DEP Stormwater Manual Volume 2, Appendix B
 TP removal data for Cascade from VA DEP Approval Letter 11.27.2019

5.0 Climate Resiliency Design Standards

Potential impacts of climate change include extreme heat waves and the potential impact of more frequent and intense storm precipitation. The Project will be in compliance with the DEP Stormwater Standards and will include LID elements, to include separation of drainage paths, recharge of clean storm water, an O&M Plan to ensure storm water system is maintained, and a significant amount of green space. The storm water design will also be using the higher NRCC runoff volumes instead of the TP40 values. This will result in a system designed for higher and more frequent storms. The elevation of the building will ensure that flooding from the adjacent river will not impact the facility.

APPENDIX A – Pre- and Post-Development Analysis and Infiltration Systems Designs

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Table of Contents

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TABLE OF CONTENTS

Project Reports

- 1 Routing Diagram
- 2 Rainfall Events Listing (selected events)
- 3 Area Listing (all nodes)
- 4 Soil Listing (all nodes)
- 5 Ground Covers (all nodes)

2-Year Event

- 6 Node Listing
- 7 Subcat 3S: Watershed EA
- 9 Subcat 7S: Watershed EB
- 10 Subcat 8S: Watershed EC
- 12 Reach 4R: South Property Line
- 13 Reach 5R: Rabbit Hill Brook
- 14 Reach 6R: Isolated Depression

10-Year Event

- 15 Node Listing
- 16 Subcat 3S: Watershed EA
- 17 Subcat 7S: Watershed EB
- 18 Subcat 8S: Watershed EC
- 20 Reach 4R: South Property Line
- 21 Reach 5R: Rabbit Hill Brook
- 22 Reach 6R: Isolated Depression

25-Year Event

- 23 Node Listing
- 24 Subcat 3S: Watershed EA
- 25 Subcat 7S: Watershed EB
- 26 Subcat 8S: Watershed EC
- 28 Reach 4R: South Property Line
- 29 Reach 5R: Rabbit Hill Brook
- 30 Reach 6R: Isolated Depression

100-Year Event

- 31 Node Listing
- 32 Subcat 3S: Watershed EA
- 33 Subcat 7S: Watershed EB
- 34 Subcat 8S: Watershed EC
- 36 Reach 4R: South Property Line
- 37 Reach 5R: Rabbit Hill Brook
- 38 Reach 6R: Isolated Depression

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TABLE OF CONTENTS**Project Reports**

- 39 Routing Diagram
- 40 Rainfall Events Listing (selected events)
- 41 Area Listing (all nodes)
- 42 Soil Listing (all nodes)
- 43 Ground Covers (all nodes)
- 44 Pipe Listing (all nodes)

2-Year Event

- 45 Node Listing
- 46 Subcat 3S: Watershed BLDG-A
- 47 Subcat 5S: Watershed BLDG-B
- 48 Subcat 8S: Watershed DA
- 50 Subcat 9S: Watershed DC
- 52 Subcat 10S: Watershed DB
- 53 Subcat 11S: Watershed DD
- 55 Subcat 13S: Building & Canopy
- 56 Reach 9R: Rabbit Hill Brook
- 57 Reach 11R: South Property Line
- 58 Pond 2P: Retention Basin C3
- 60 Pond 4P: Subsurface Infiltration System A
- 63 Pond 6P: Subsurface Infiltration System B
- 66 Pond 12P: Infiltration Basin - Lot 3
- 68 Pond 14P: Infiltration System

10-Year Event

- 71 Node Listing
- 72 Subcat 3S: Watershed BLDG-A
- 73 Subcat 5S: Watershed BLDG-B
- 74 Subcat 8S: Watershed DA
- 76 Subcat 9S: Watershed DC
- 78 Subcat 10S: Watershed DB
- 79 Subcat 11S: Watershed DD
- 81 Subcat 13S: Building & Canopy
- 82 Reach 9R: Rabbit Hill Brook
- 83 Reach 11R: South Property Line
- 84 Pond 2P: Retention Basin C3
- 86 Pond 4P: Subsurface Infiltration System A
- 89 Pond 6P: Subsurface Infiltration System B
- 92 Pond 12P: Infiltration Basin - Lot 3
- 94 Pond 14P: Infiltration System

25-Year Event

- 97 Node Listing
- 98 Subcat 3S: Watershed BLDG-A
- 99 Subcat 5S: Watershed BLDG-B

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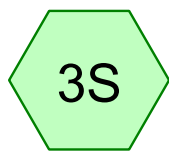
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100	Subcat 8S: Watershed DA
102	Subcat 9S: Watershed DC
104	Subcat 10S: Watershed DB
105	Subcat 11S: Watershed DD
107	Subcat 13S: Building & Canopy
108	Reach 9R: Rabbit Hill Brook
109	Reach 11R: South Property Line
110	Pond 2P: Retention Basin C3
112	Pond 4P: Subsurface Infiltration System A
115	Pond 6P: Subsurface Infiltration System B
118	Pond 12P: Infiltration Basin - Lot 3
120	Pond 14P: Infiltration System

100-Year Event

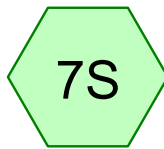
123	Node Listing
124	Subcat 3S: Watershed BLDG-A
125	Subcat 5S: Watershed BLDG-B
126	Subcat 8S: Watershed DA
128	Subcat 9S: Watershed DC
130	Subcat 10S: Watershed DB
131	Subcat 11S: Watershed DD
133	Subcat 13S: Building & Canopy
134	Reach 9R: Rabbit Hill Brook
135	Reach 11R: South Property Line
136	Pond 2P: Retention Basin C3
138	Pond 4P: Subsurface Infiltration System A
141	Pond 6P: Subsurface Infiltration System B
144	Pond 12P: Infiltration Basin - Lot 3
146	Pond 14P: Infiltration System



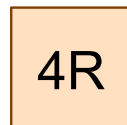
Watershed EA



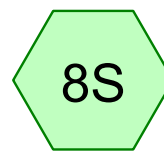
Isolated Depression



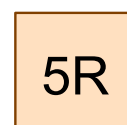
Watershed EB



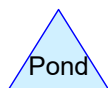
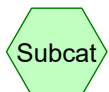
South Property Line



Watershed EC



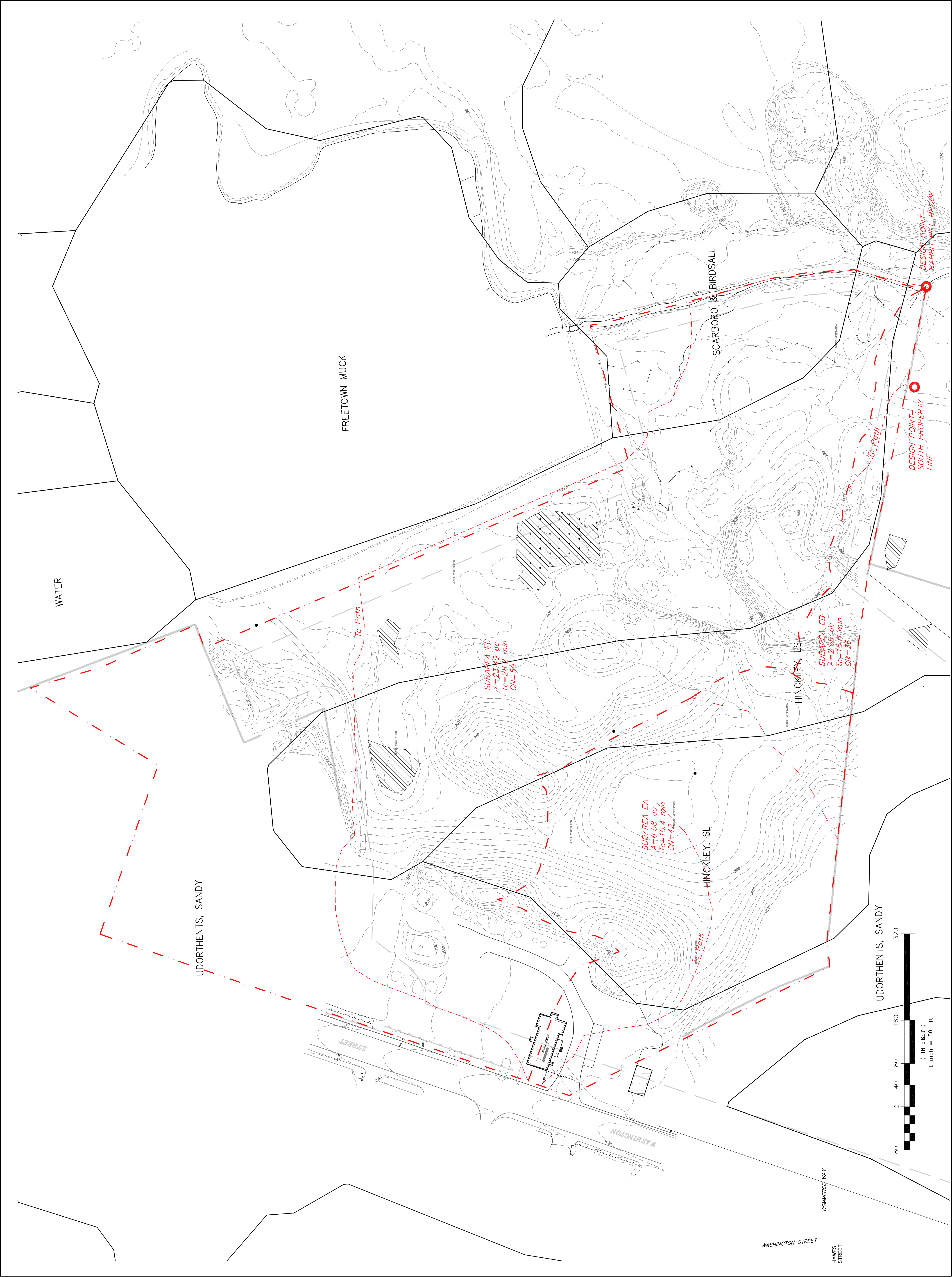
Rabbit Hill Brook



Routing Diagram for 20-0242 Existing v2

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Page 2

Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-Year	NRCC 24-hr	C	Default	24.00	1	3.22	2
2	10-Year	NRCC 24-hr	C	Default	24.00	1	4.86	2
3	25-Year	NRCC 24-hr	C	Default	24.00	1	6.15	2
4	100-Year	NRCC 24-hr	C	Default	24.00	1	8.80	2

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Page 3

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
7.720	98	Paved parking, HSG A (3S, 8S)
0.080	98	Roofs, HSG A (3S, 8S)
22.140	30	Woods, Good, HSG A (3S, 7S, 8S)
2.100	77	Woods, Good, HSG D (8S)
32.040	50	TOTAL AREA

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Page 4

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
29.940	HSG A	3S, 7S, 8S
0.000	HSG B	
0.000	HSG C	
2.100	HSG D	8S
0.000	Other	
32.040		TOTAL AREA

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Page 5

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
7.720	0.000	0.000	0.000	0.000	7.720	Paved parking	3S, 8S
0.080	0.000	0.000	0.000	0.000	0.080	Roofs	3S, 8S
22.140	0.000	0.000	2.100	0.000	24.240	Woods, Good	3S, 7S, 8S
29.940	0.000	0.000	2.100	0.000	32.040	TOTAL AREA	

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NRCC 24-hr C 2-Year Rainfall=3.22"

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Page 6

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment3S: Watershed EA

Runoff Area=6.580 ac 9.88% Impervious Runoff Depth=0.00"
Flow Length=725' Tc=10.4 min CN=37 Runoff=0.0 cfs 0.000 af

Subcatchment7S: Watershed EB

Runoff Area=2.060 ac 0.00% Impervious Runoff Depth=0.00"
Flow Length=228' Tc=15.0 min CN=30 Runoff=0.0 cfs 0.000 af

Subcatchment8S: Watershed EC

Runoff Area=23.400 ac 30.56% Impervious Runoff Depth>0.25"
Flow Length=2,467' Tc=28.2 min CN=55 Runoff=1.5 cfs 0.492 af

Reach 4R: South Property Line

Inflow=0.0 cfs 0.000 af
Outflow=0.0 cfs 0.000 af

Reach 5R: Rabbit Hill Brook

Inflow=1.5 cfs 0.492 af
Outflow=1.5 cfs 0.492 af

Reach 6R: Isolated Depression

Inflow=0.0 cfs 0.000 af
Outflow=0.0 cfs 0.000 af

Total Runoff Area = 32.040 ac Runoff Volume = 0.492 af Average Runoff Depth = 0.18"
75.66% Pervious = 24.240 ac 24.34% Impervious = 7.800 ac

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Page 7

Summary for Subcatchment 3S: Watershed EA

[45] Hint: Runoff=Zero

Runoff = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"
 Routed to Reach 6R : Isolated Depression

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 NRCC 24-hr C 2-Year Rainfall=3.22"

Area (ac)	CN	Description
0.040	98	Roofs, HSG A
0.610	98	Paved parking, HSG A
5.930	30	Woods, Good, HSG A
6.580	37	Weighted Average
5.930		90.12% Pervious Area
0.650		9.88% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	50	0.0050	0.69		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.20"
1.1	140	0.0100	2.03		Shallow Concentrated Flow, Paved Kv= 20.3 fps
8.1	535	0.0480	1.10		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
10.4	725	Total			

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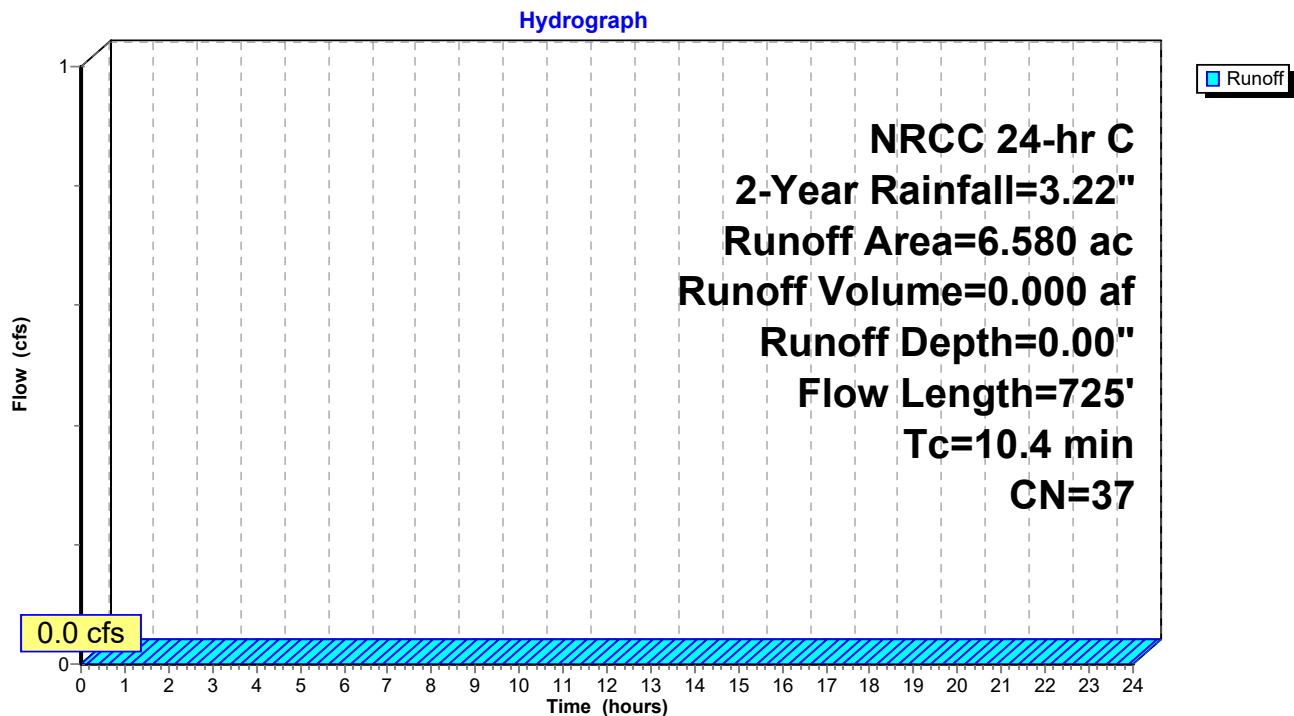
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Page 8

Subcatchment 3S: Watershed EA



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Page 9

Summary for Subcatchment 7S: Watershed EB

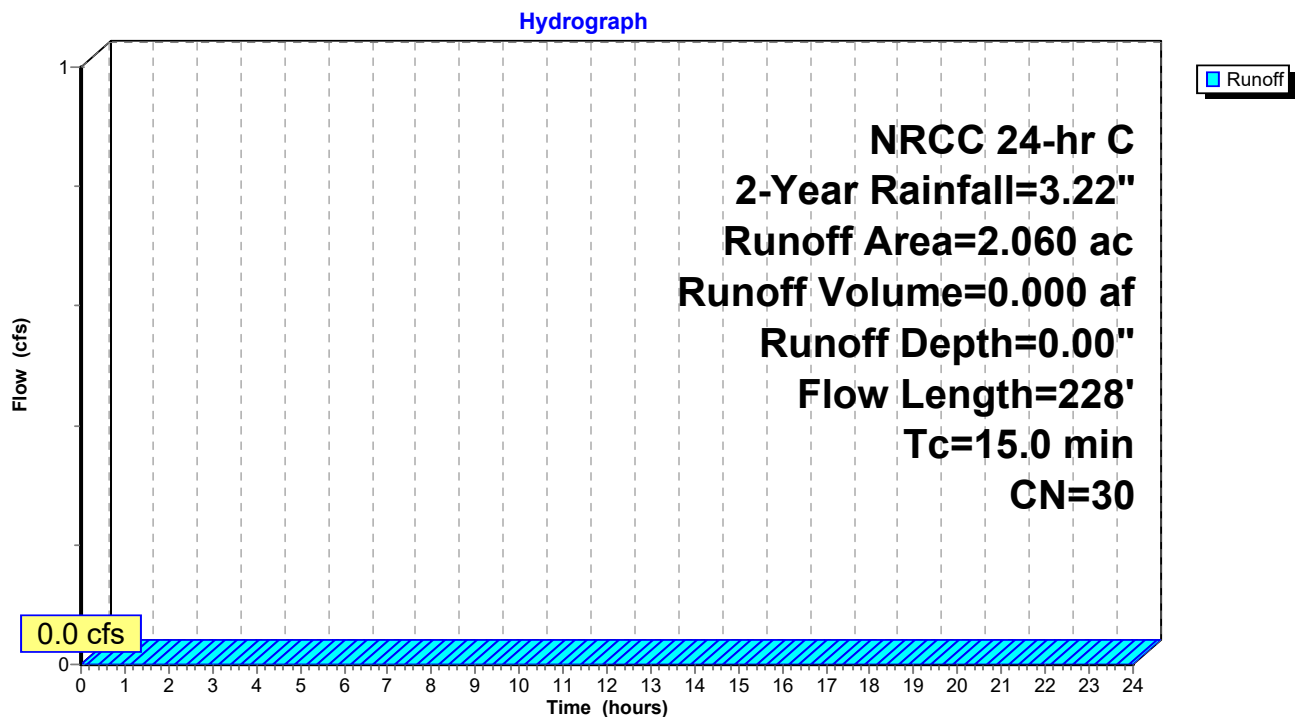
[45] Hint: Runoff=Zero

Runoff = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"
Routed to Reach 4R : South Property Line

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 2-Year Rainfall=3.22"

Area (ac)	CN	Description
2.060	30	Woods, Good, HSG A
2.060		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.3	50	0.0200	0.07		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
2.7	178	0.0500	1.12		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
15.0	228	Total			

Subcatchment 7S: Watershed EB

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Page 10

Summary for Subcatchment 8S: Watershed EC

Runoff = 1.5 cfs @ 12.67 hrs, Volume= 0.492 af, Depth> 0.25"
 Routed to Reach 5R : Rabbit Hill Brook

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 NRCC 24-hr C 2-Year Rainfall=3.22"

Area (ac)	CN	Description
0.040	98	Roofs, HSG A
7.110	98	Paved parking, HSG A
14.150	30	Woods, Good, HSG A
2.100	77	Woods, Good, HSG D
23.400	55	Weighted Average
16.250		69.44% Pervious Area
7.150		30.56% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	50	0.0050	0.69		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.20"
3.7	580	0.0170	2.65		Shallow Concentrated Flow, Paved Kv= 20.3 fps
8.1	487	0.0400	1.00		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
8.5	542	0.0050	1.06		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
5.2	350	0.0500	1.12		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
1.5	458	0.0040	5.06	91.16	Trap/Vee/Rect Channel Flow, Bot.W=5.00' D=2.00' Z= 2.0 '/' Top.W=13.00' n= 0.022 Earth, clean & straight
28.2	2,467	Total			

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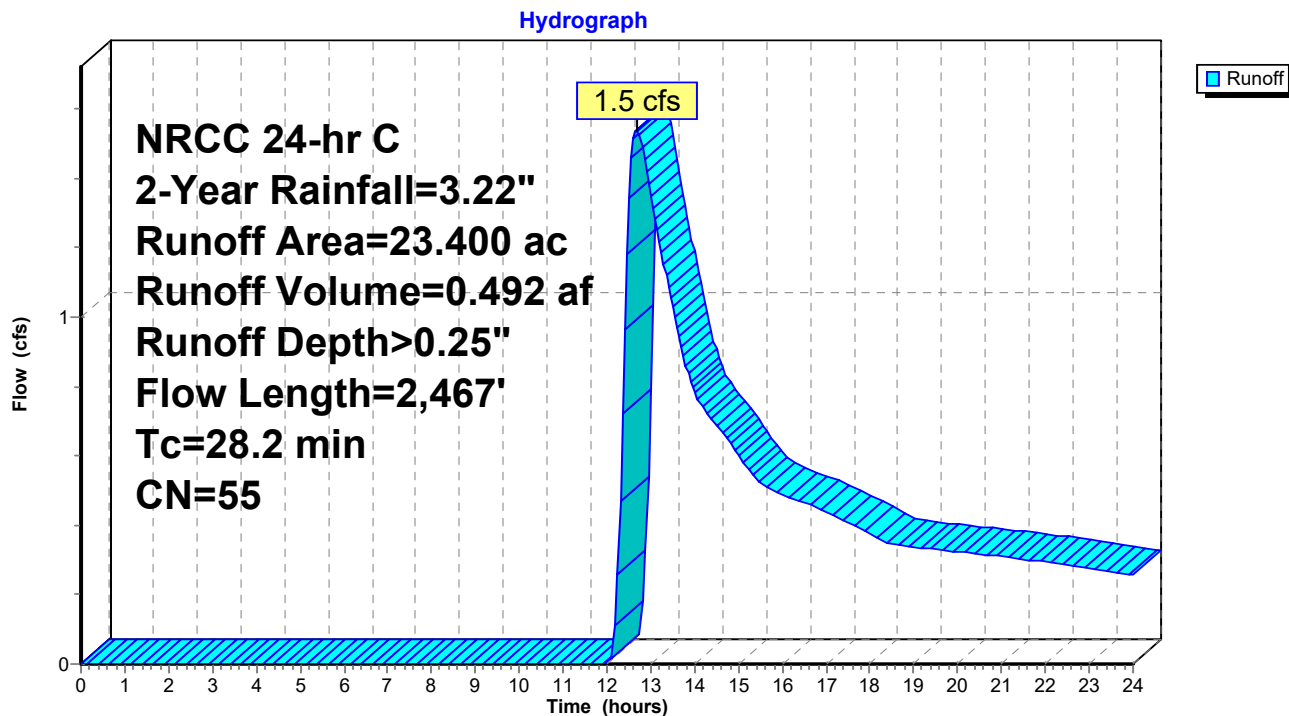
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Page 11

Subcatchment 8S: Watershed EC



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Page 12

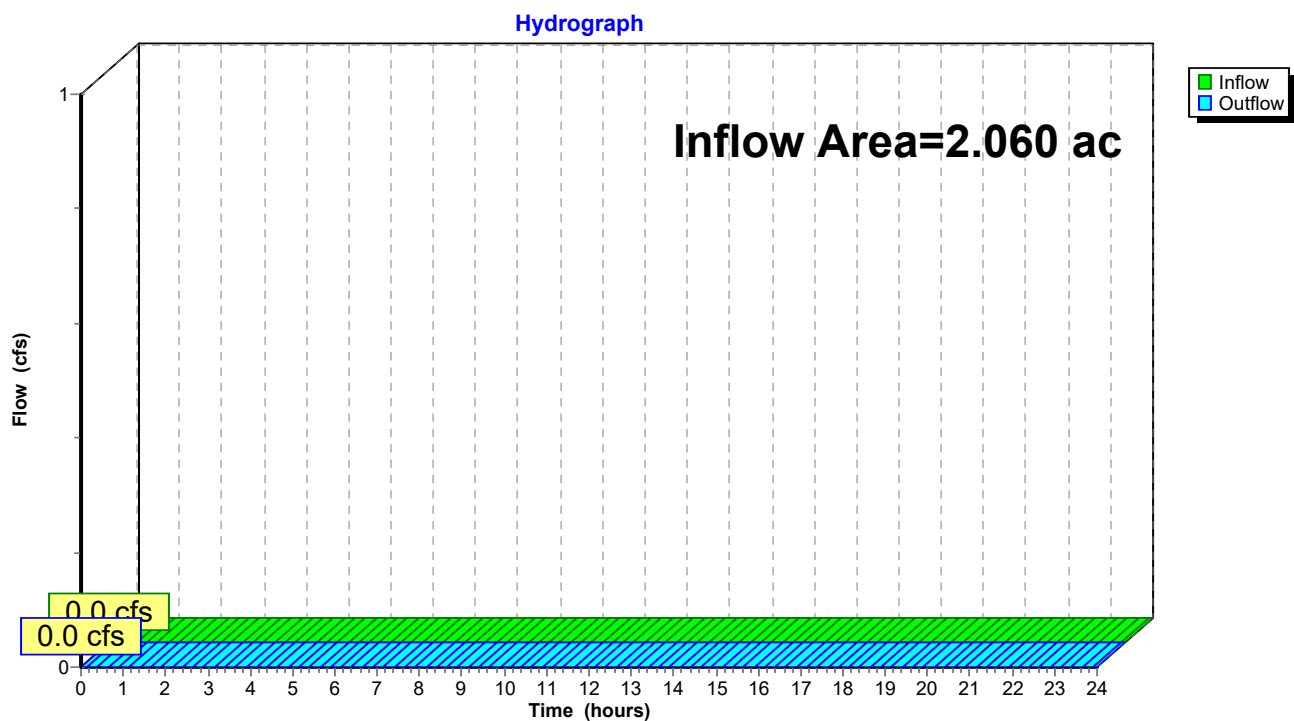
Summary for Reach 4R: South Property Line

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 2.060 ac, 0.00% Impervious, Inflow Depth = 0.00" for 2-Year event
Inflow = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af
Outflow = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach 4R: South Property Line



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Page 13

Summary for Reach 5R: Rabbit Hill Brook

[40] Hint: Not Described (Outflow=Inflow)

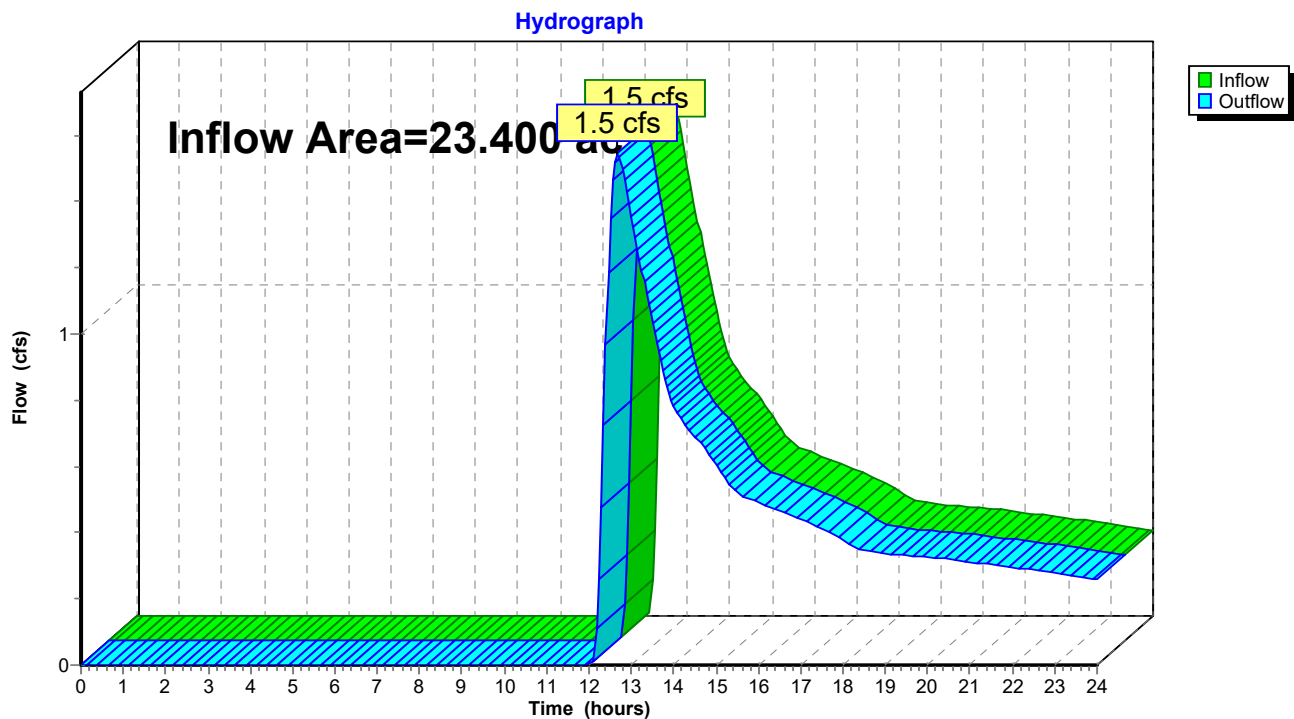
Inflow Area = 23.400 ac, 30.56% Impervious, Inflow Depth > 0.25" for 2-Year event

Inflow = 1.5 cfs @ 12.67 hrs, Volume= 0.492 af

Outflow = 1.5 cfs @ 12.67 hrs, Volume= 0.492 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach 5R: Rabbit Hill Brook



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NRCC 24-hr C 2-Year Rainfall=3.22"

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Page 14

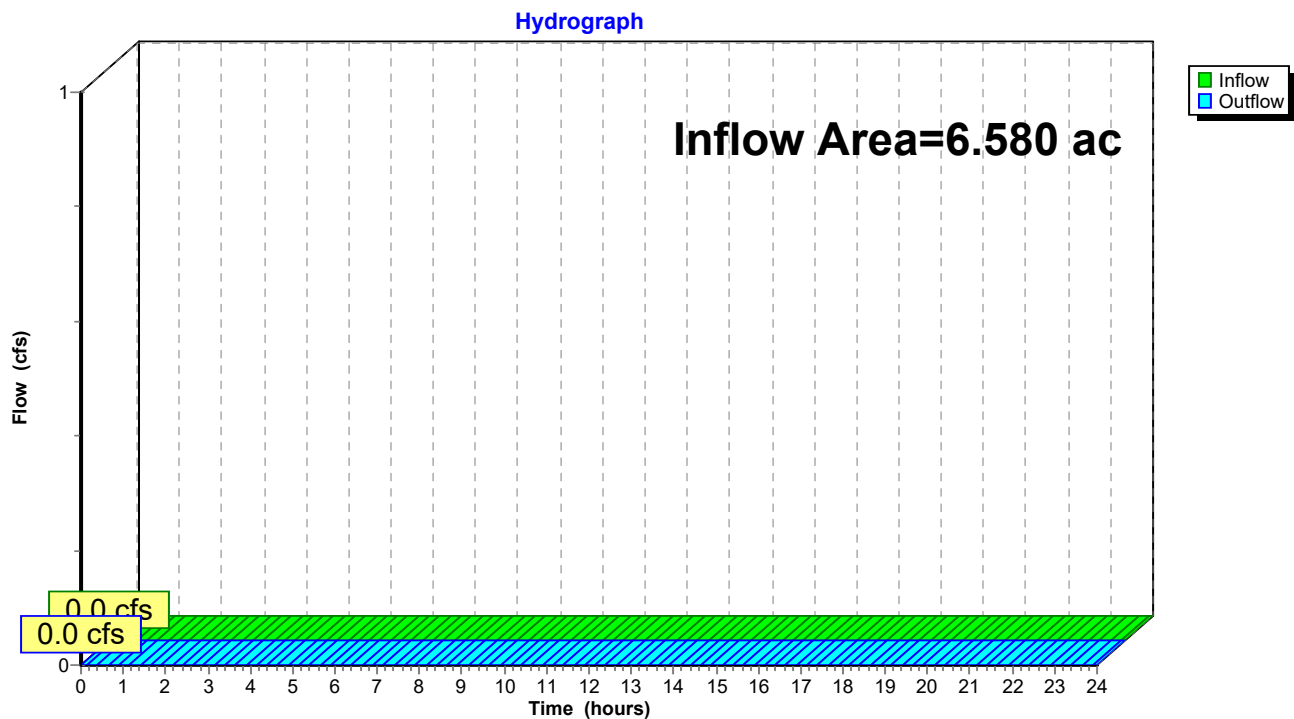
Summary for Reach 6R: Isolated Depression

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 6.580 ac, 9.88% Impervious, Inflow Depth = 0.00" for 2-Year event
Inflow = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af
Outflow = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach 6R: Isolated Depression



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NRCC 24-hr C 10-Year Rainfall=4.86"

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Page 15

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment3S: Watershed EA

Runoff Area=6.580 ac 9.88% Impervious Runoff Depth>0.11"
Flow Length=725' Tc=10.4 min CN=37 Runoff=0.1 cfs 0.062 af

Subcatchment7S: Watershed EB

Runoff Area=2.060 ac 0.00% Impervious Runoff Depth>0.00"
Flow Length=228' Tc=15.0 min CN=30 Runoff=0.0 cfs 0.000 af

Subcatchment8S: Watershed EC

Runoff Area=23.400 ac 30.56% Impervious Runoff Depth>0.90"
Flow Length=2,467' Tc=28.2 min CN=55 Runoff=11.1 cfs 1.755 af

Reach 4R: South Property Line

Inflow=0.0 cfs 0.000 af
Outflow=0.0 cfs 0.000 af

Reach 5R: Rabbit Hill Brook

Inflow=11.1 cfs 1.755 af
Outflow=11.1 cfs 1.755 af

Reach 6R: Isolated Depression

Inflow=0.1 cfs 0.062 af
Outflow=0.1 cfs 0.062 af

Total Runoff Area = 32.040 ac Runoff Volume = 1.818 af Average Runoff Depth = 0.68"
75.66% Pervious = 24.240 ac 24.34% Impervious = 7.800 ac

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Page 16

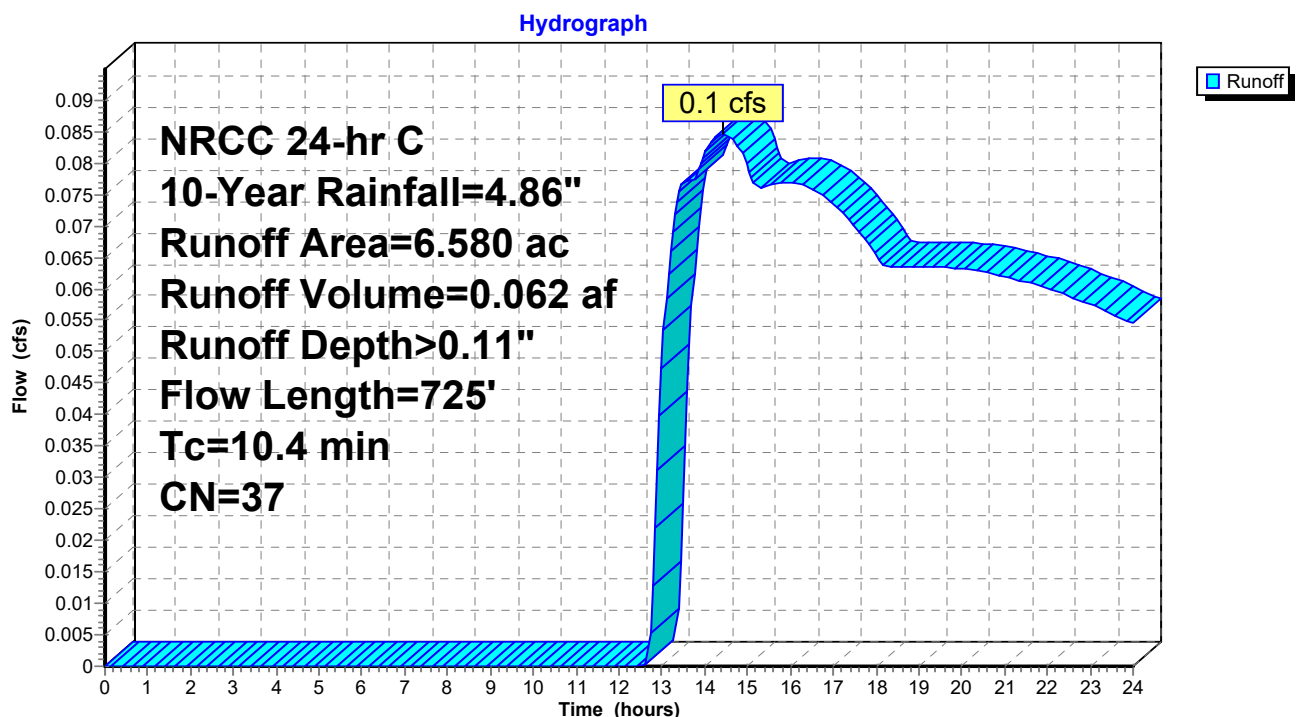
Summary for Subcatchment 3S: Watershed EA

Runoff = 0.1 cfs @ 14.44 hrs, Volume= 0.062 af, Depth> 0.11"
 Routed to Reach 6R : Isolated Depression

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 NRCC 24-hr C 10-Year Rainfall=4.86"

Area (ac)	CN	Description
0.040	98	Roofs, HSG A
0.610	98	Paved parking, HSG A
5.930	30	Woods, Good, HSG A
6.580	37	Weighted Average
5.930		90.12% Pervious Area
0.650		9.88% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	50	0.0050	0.69		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.20"
1.1	140	0.0100	2.03		Shallow Concentrated Flow, Paved Kv= 20.3 fps
8.1	535	0.0480	1.10		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
10.4	725	Total			

Subcatchment 3S: Watershed EA

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Page 17

Summary for Subcatchment 7S: Watershed EB

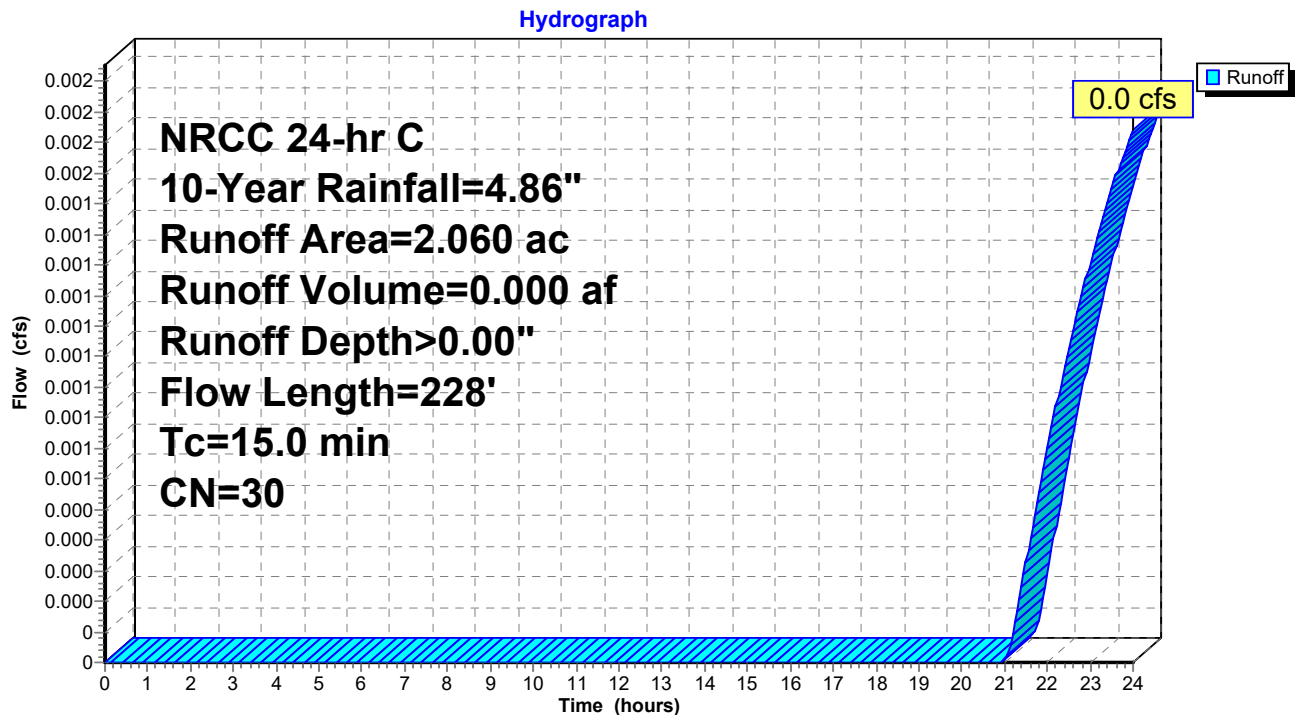
[73] Warning: Peak may fall outside time span

Runoff = 0.0 cfs @ 24.00 hrs, Volume= 0.000 af, Depth> 0.00"
 Routed to Reach 4R : South Property Line

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 NRCC 24-hr C 10-Year Rainfall=4.86"

Area (ac)	CN	Description
2.060	30	Woods, Good, HSG A
2.060		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.3	50	0.0200	0.07		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
2.7	178	0.0500	1.12		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
15.0	228	Total			

Subcatchment 7S: Watershed EB

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NRCC 24-hr C 10-Year Rainfall=4.86"

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Page 18

Summary for Subcatchment 8S: Watershed EC

Runoff = 11.1 cfs @ 12.46 hrs, Volume= 1.755 af, Depth> 0.90"
 Routed to Reach 5R : Rabbit Hill Brook

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 NRCC 24-hr C 10-Year Rainfall=4.86"

Area (ac)	CN	Description
0.040	98	Roofs, HSG A
7.110	98	Paved parking, HSG A
14.150	30	Woods, Good, HSG A
2.100	77	Woods, Good, HSG D
23.400	55	Weighted Average
16.250		69.44% Pervious Area
7.150		30.56% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	50	0.0050	0.69		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.20"
3.7	580	0.0170	2.65		Shallow Concentrated Flow, Paved Kv= 20.3 fps
8.1	487	0.0400	1.00		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
8.5	542	0.0050	1.06		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
5.2	350	0.0500	1.12		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
1.5	458	0.0040	5.06	91.16	Trap/Vee/Rect Channel Flow, Bot.W=5.00' D=2.00' Z= 2.0 '/' Top.W=13.00' n= 0.022 Earth, clean & straight
28.2	2,467	Total			

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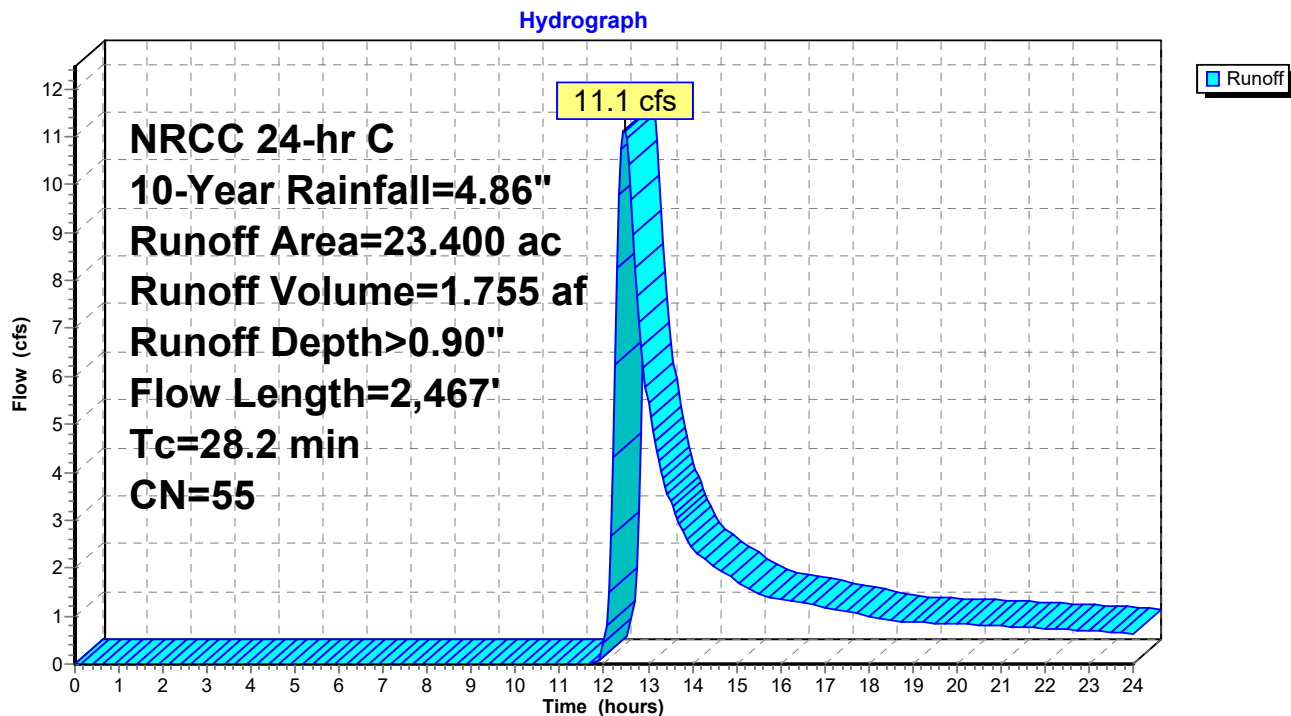
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NRCC 24-hr C 10-Year Rainfall=4.86"

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Page 19

Subcatchment 8S: Watershed EC



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NRCC 24-hr C 10-Year Rainfall=4.86"

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Page 20

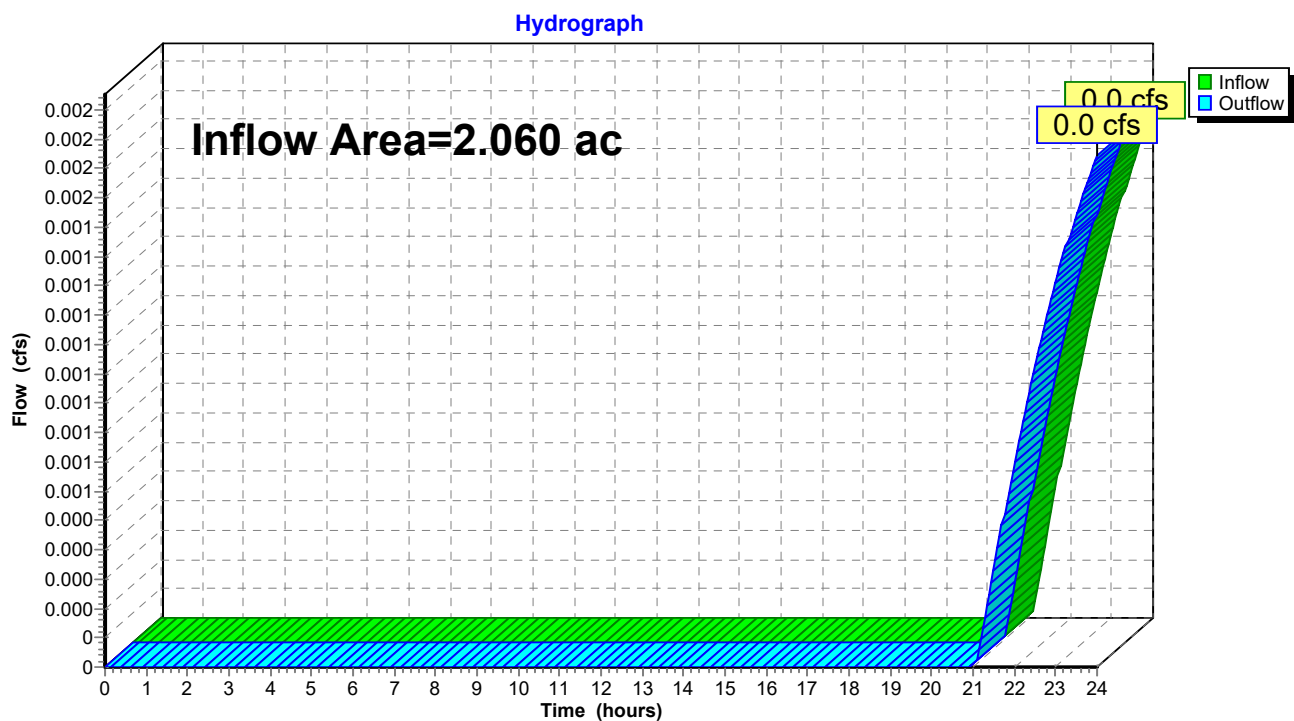
Summary for Reach 4R: South Property Line

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 2.060 ac, 0.00% Impervious, Inflow Depth > 0.00" for 10-Year event
Inflow = 0.0 cfs @ 24.00 hrs, Volume= 0.000 af
Outflow = 0.0 cfs @ 24.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach 4R: South Property Line



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Page 21

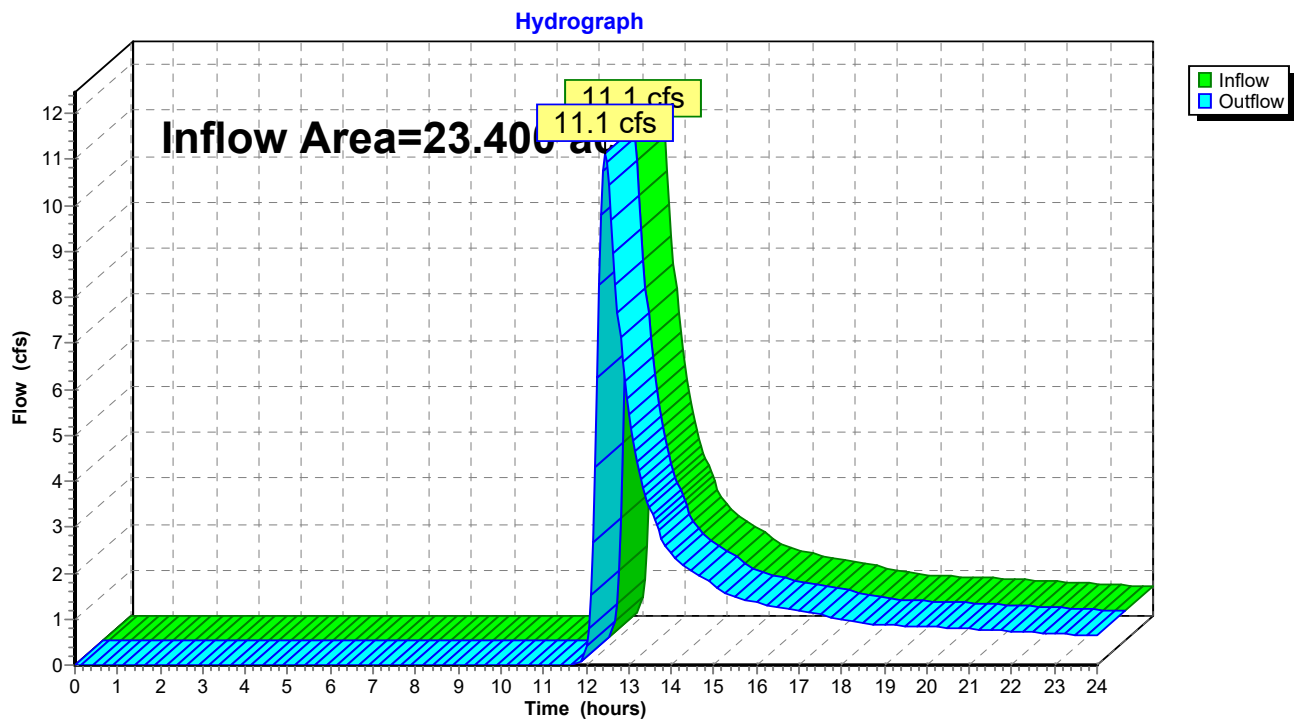
Summary for Reach 5R: Rabbit Hill Brook

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 23.400 ac, 30.56% Impervious, Inflow Depth > 0.90" for 10-Year event
Inflow = 11.1 cfs @ 12.46 hrs, Volume= 1.755 af
Outflow = 11.1 cfs @ 12.46 hrs, Volume= 1.755 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach 5R: Rabbit Hill Brook



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Page 22

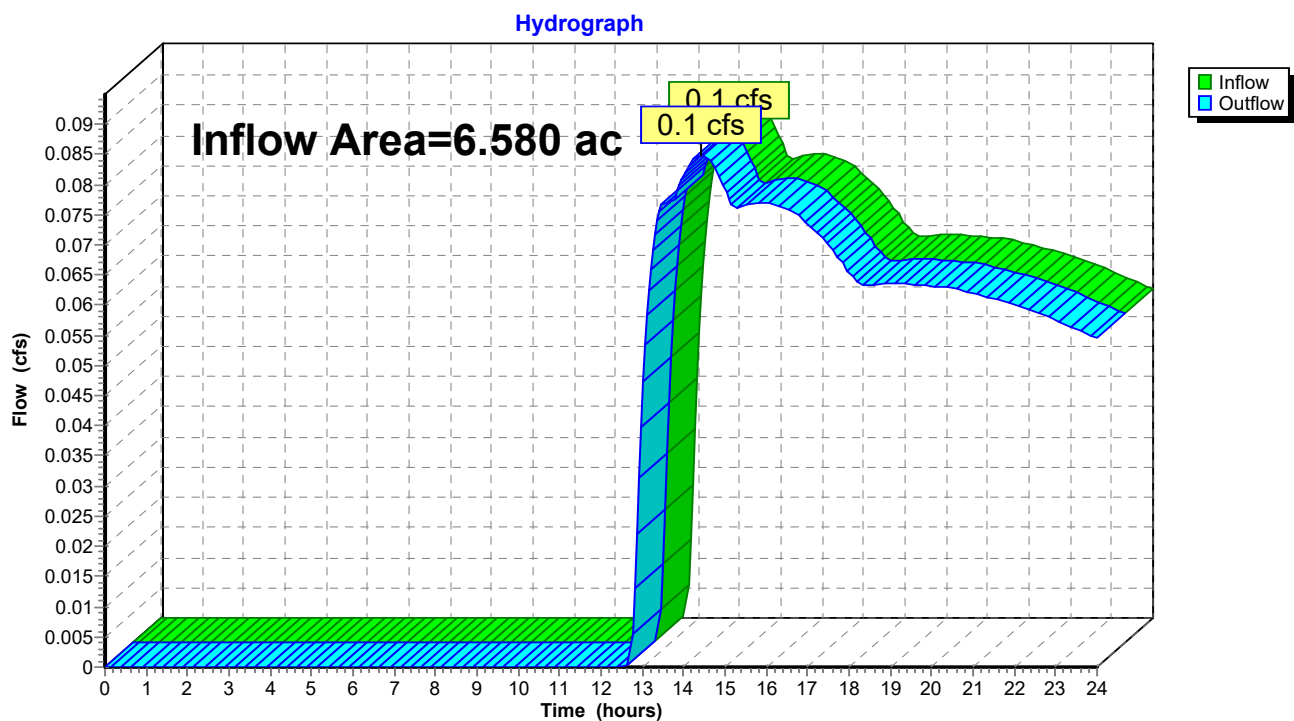
Summary for Reach 6R: Isolated Depression

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 6.580 ac, 9.88% Impervious, Inflow Depth > 0.11" for 10-Year event
Inflow = 0.1 cfs @ 14.44 hrs, Volume= 0.062 af
Outflow = 0.1 cfs @ 14.44 hrs, Volume= 0.062 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach 6R: Isolated Depression



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Page 23

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment3S: Watershed EA

Runoff Area=6.580 ac 9.88% Impervious Runoff Depth>0.38"
Flow Length=725' Tc=10.4 min CN=37 Runoff=0.6 cfs 0.208 af

Subcatchment7S: Watershed EB

Runoff Area=2.060 ac 0.00% Impervious Runoff Depth>0.09"
Flow Length=228' Tc=15.0 min CN=30 Runoff=0.0 cfs 0.015 af

Subcatchment8S: Watershed EC

Runoff Area=23.400 ac 30.56% Impervious Runoff Depth>1.59"
Flow Length=2,467' Tc=28.2 min CN=55 Runoff=22.4 cfs 3.097 af

Reach 4R: South Property Line

Inflow=0.0 cfs 0.015 af
Outflow=0.0 cfs 0.015 af

Reach 5R: Rabbit Hill Brook

Inflow=22.4 cfs 3.097 af
Outflow=22.4 cfs 3.097 af

Reach 6R: Isolated Depression

Inflow=0.6 cfs 0.208 af
Outflow=0.6 cfs 0.208 af

Total Runoff Area = 32.040 ac Runoff Volume = 3.319 af Average Runoff Depth = 1.24"
75.66% Pervious = 24.240 ac 24.34% Impervious = 7.800 ac

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Page 24

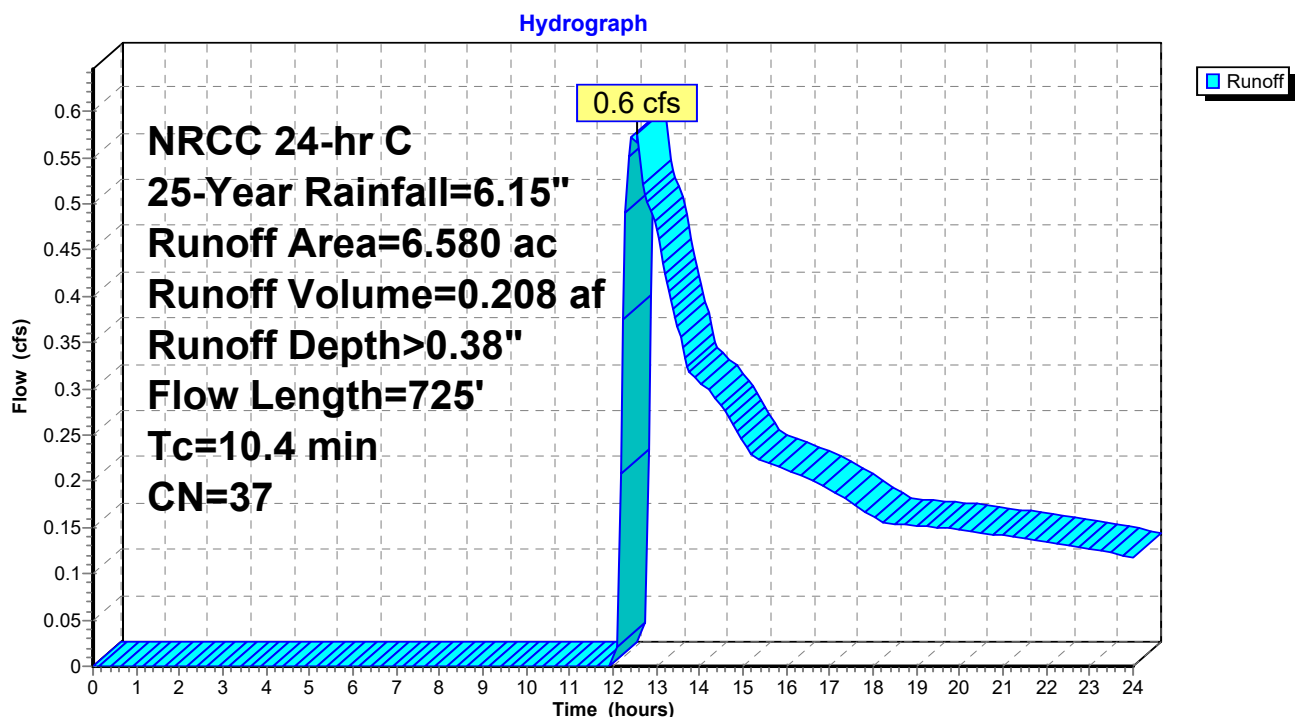
Summary for Subcatchment 3S: Watershed EA

Runoff = 0.6 cfs @ 12.55 hrs, Volume= 0.208 af, Depth> 0.38"
Routed to Reach 6R : Isolated Depression

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 25-Year Rainfall=6.15"

Area (ac)	CN	Description
0.040	98	Roofs, HSG A
0.610	98	Paved parking, HSG A
5.930	30	Woods, Good, HSG A
6.580	37	Weighted Average
5.930		90.12% Pervious Area
0.650		9.88% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	50	0.0050	0.69		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.20"
1.1	140	0.0100	2.03		Shallow Concentrated Flow, Paved Kv= 20.3 fps
8.1	535	0.0480	1.10		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
10.4	725	Total			

Subcatchment 3S: Watershed EA

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NRCC 24-hr C 25-Year Rainfall=6.15"

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Page 25

Summary for Subcatchment 7S: Watershed EB

Runoff = 0.0 cfs @ 16.88 hrs, Volume= 0.015 af, Depth> 0.09"
Routed to Reach 4R : South Property Line

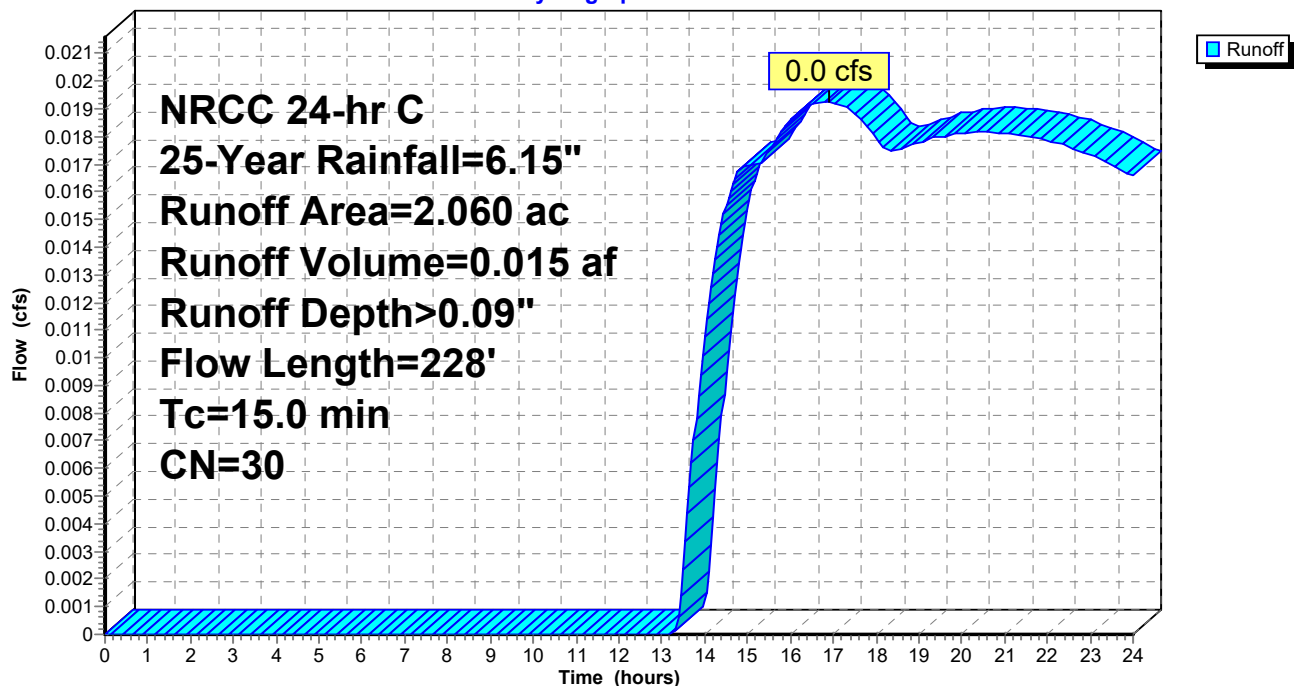
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 25-Year Rainfall=6.15"

Area (ac)	CN	Description
2.060	30	Woods, Good, HSG A
2.060		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.3	50	0.0200	0.07		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
2.7	178	0.0500	1.12		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
15.0	228	Total			

Subcatchment 7S: Watershed EB

Hydrograph



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NRCC 24-hr C 25-Year Rainfall=6.15"

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Page 26

Summary for Subcatchment 8S: Watershed EC

Runoff = 22.4 cfs @ 12.43 hrs, Volume= 3.097 af, Depth> 1.59"
 Routed to Reach 5R : Rabbit Hill Brook

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 NRCC 24-hr C 25-Year Rainfall=6.15"

Area (ac)	CN	Description
0.040	98	Roofs, HSG A
7.110	98	Paved parking, HSG A
14.150	30	Woods, Good, HSG A
2.100	77	Woods, Good, HSG D
23.400	55	Weighted Average
16.250		69.44% Pervious Area
7.150		30.56% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	50	0.0050	0.69		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.20"
3.7	580	0.0170	2.65		Shallow Concentrated Flow, Paved Kv= 20.3 fps
8.1	487	0.0400	1.00		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
8.5	542	0.0050	1.06		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
5.2	350	0.0500	1.12		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
1.5	458	0.0040	5.06	91.16	Trap/Vee/Rect Channel Flow, Bot.W=5.00' D=2.00' Z= 2.0 '/' Top.W=13.00' n= 0.022 Earth, clean & straight
28.2	2,467	Total			

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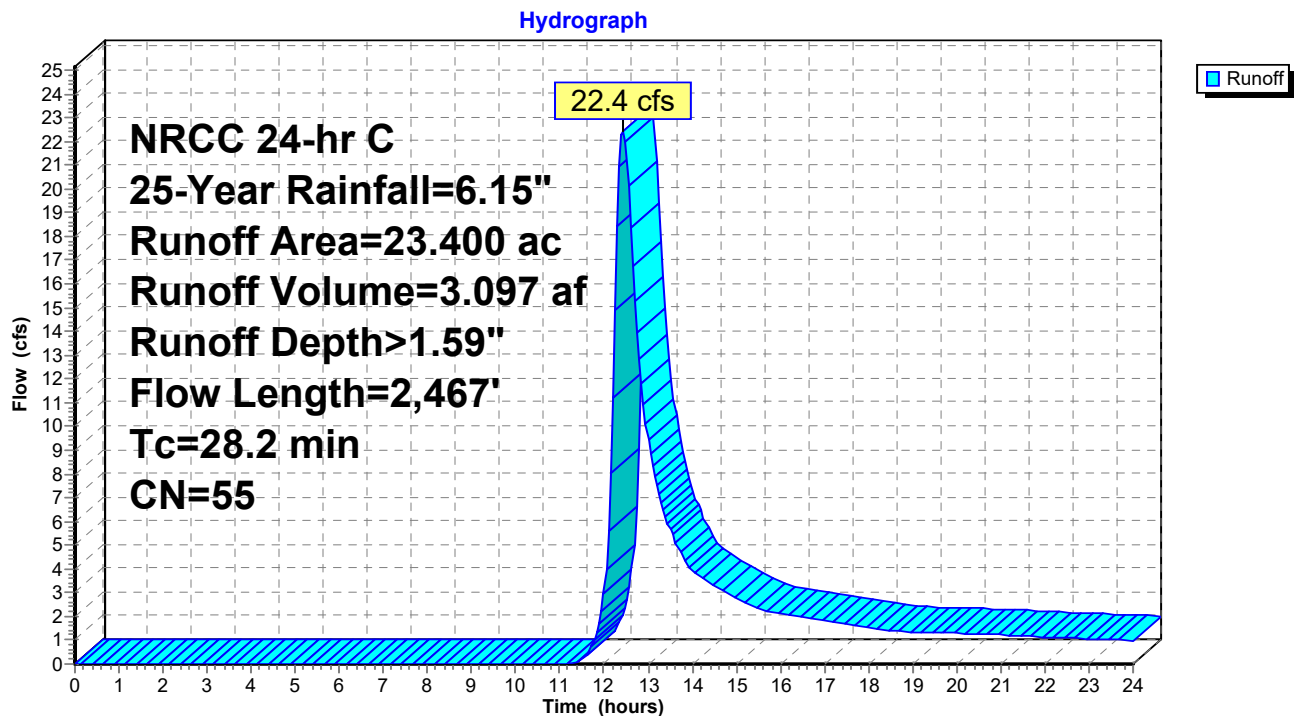
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Page 27

Subcatchment 8S: Watershed EC



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Page 28

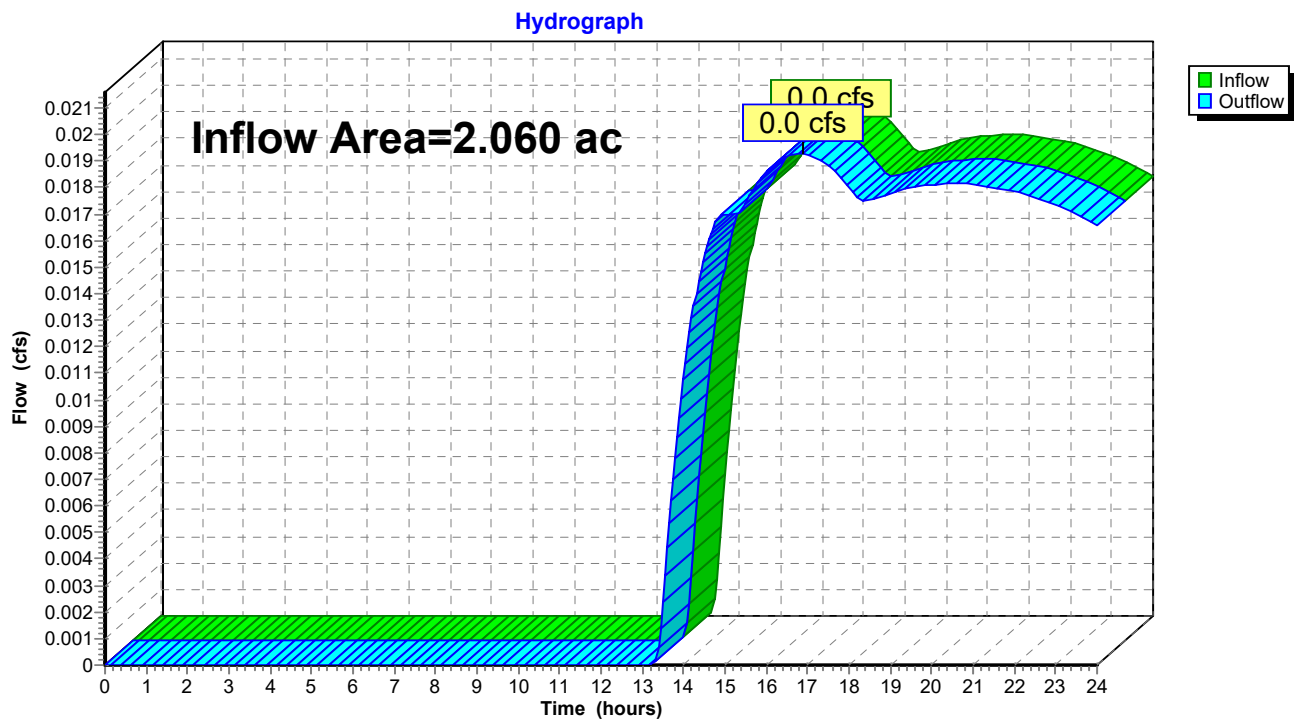
Summary for Reach 4R: South Property Line

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 2.060 ac, 0.00% Impervious, Inflow Depth > 0.09" for 25-Year event
Inflow = 0.0 cfs @ 16.88 hrs, Volume= 0.015 af
Outflow = 0.0 cfs @ 16.88 hrs, Volume= 0.015 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach 4R: South Property Line



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Page 29

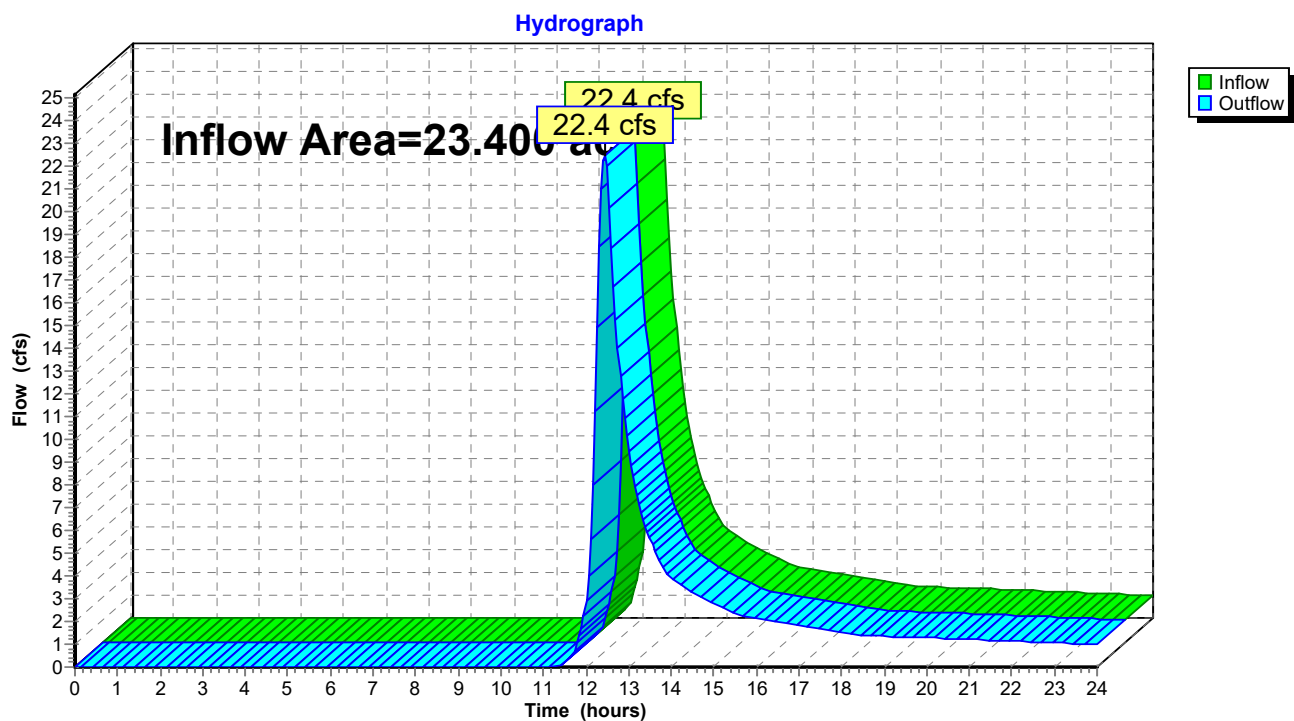
Summary for Reach 5R: Rabbit Hill Brook

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 23.400 ac, 30.56% Impervious, Inflow Depth > 1.59" for 25-Year event
Inflow = 22.4 cfs @ 12.43 hrs, Volume= 3.097 af
Outflow = 22.4 cfs @ 12.43 hrs, Volume= 3.097 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach 5R: Rabbit Hill Brook



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Page 30

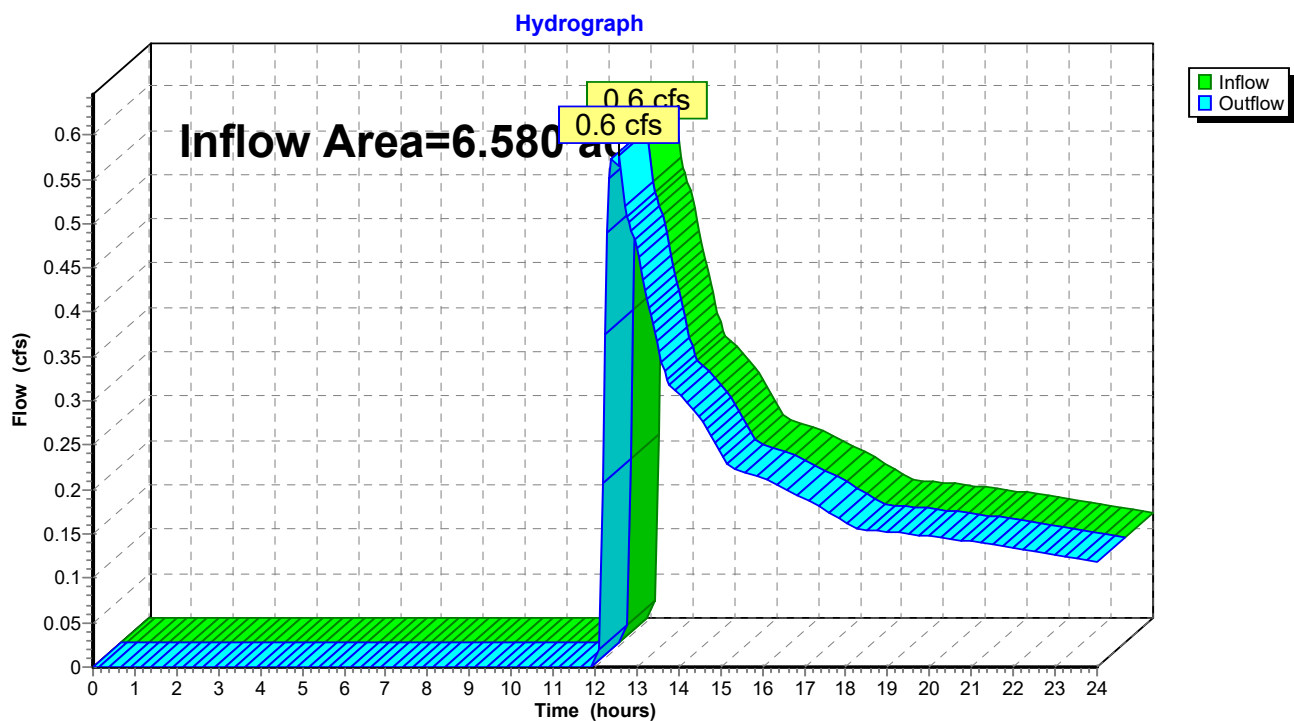
Summary for Reach 6R: Isolated Depression

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 6.580 ac, 9.88% Impervious, Inflow Depth > 0.38" for 25-Year event
Inflow = 0.6 cfs @ 12.55 hrs, Volume= 0.208 af
Outflow = 0.6 cfs @ 12.55 hrs, Volume= 0.208 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach 6R: Isolated Depression



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Page 31

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment3S: Watershed EA

Runoff Area=6.580 ac 9.88% Impervious Runoff Depth>1.29"
Flow Length=725' Tc=10.4 min CN=37 Runoff=6.3 cfs 0.709 af

Subcatchment7S: Watershed EB

Runoff Area=2.060 ac 0.00% Impervious Runoff Depth>0.62"
Flow Length=228' Tc=15.0 min CN=30 Runoff=0.3 cfs 0.106 af

Subcatchment8S: Watershed EC

Runoff Area=23.400 ac 30.56% Impervious Runoff Depth>3.31"
Flow Length=2,467' Tc=28.2 min CN=55 Runoff=50.9 cfs 6.464 af

Reach 4R: South Property Line

Inflow=0.3 cfs 0.106 af
Outflow=0.3 cfs 0.106 af

Reach 5R: Rabbit Hill Brook

Inflow=50.9 cfs 6.464 af
Outflow=50.9 cfs 6.464 af

Reach 6R: Isolated Depression

Inflow=6.3 cfs 0.709 af
Outflow=6.3 cfs 0.709 af

Total Runoff Area = 32.040 ac Runoff Volume = 7.278 af Average Runoff Depth = 2.73"
75.66% Pervious = 24.240 ac 24.34% Impervious = 7.800 ac

20-0242 Existing v2

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NRCC 24-hr C 100-Year Rainfall=8.80"

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Page 32

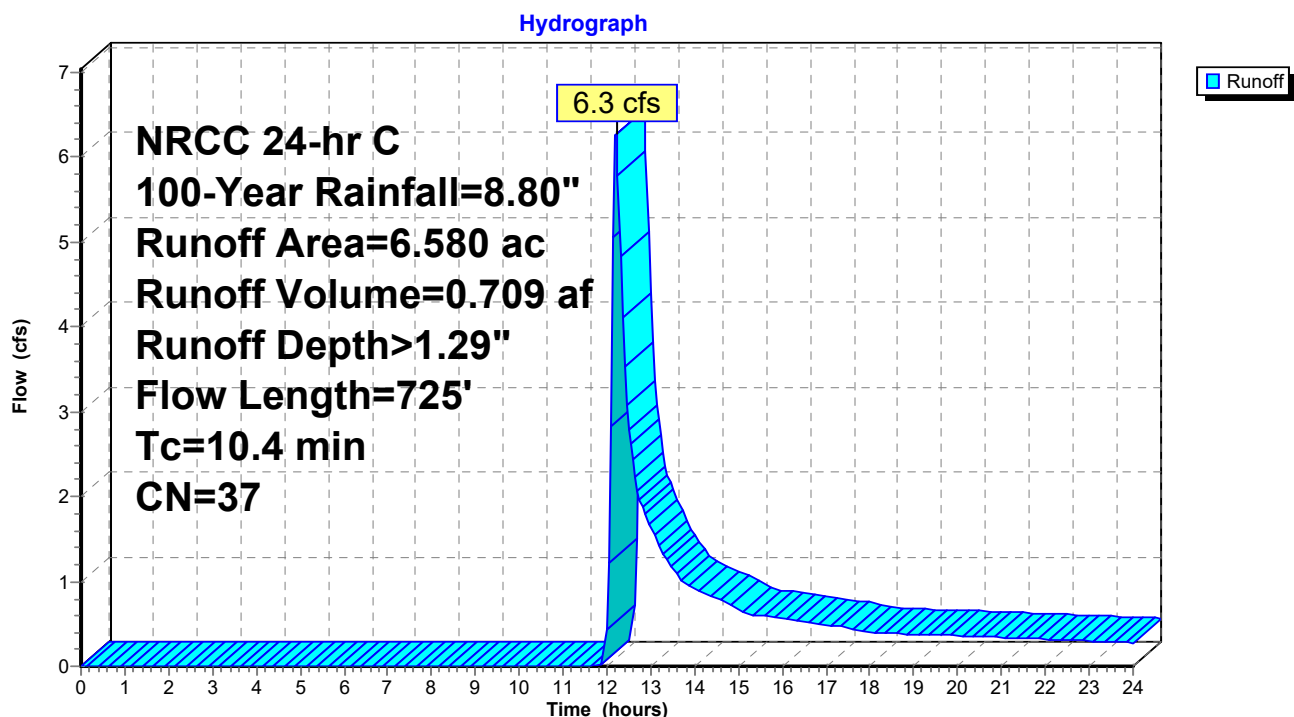
Summary for Subcatchment 3S: Watershed EA

Runoff = 6.3 cfs @ 12.21 hrs, Volume= 0.709 af, Depth> 1.29"
 Routed to Reach 6R : Isolated Depression

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 NRCC 24-hr C 100-Year Rainfall=8.80"

Area (ac)	CN	Description
0.040	98	Roofs, HSG A
0.610	98	Paved parking, HSG A
5.930	30	Woods, Good, HSG A
6.580	37	Weighted Average
5.930		90.12% Pervious Area
0.650		9.88% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	50	0.0050	0.69		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.20"
1.1	140	0.0100	2.03		Shallow Concentrated Flow, Paved Kv= 20.3 fps
8.1	535	0.0480	1.10		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
10.4	725	Total			

Subcatchment 3S: Watershed EA

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NRCC 24-hr C 100-Year Rainfall=8.80"

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Page 33

Summary for Subcatchment 7S: Watershed EB

Runoff = 0.3 cfs @ 12.46 hrs, Volume= 0.106 af, Depth> 0.62"
 Routed to Reach 4R : South Property Line

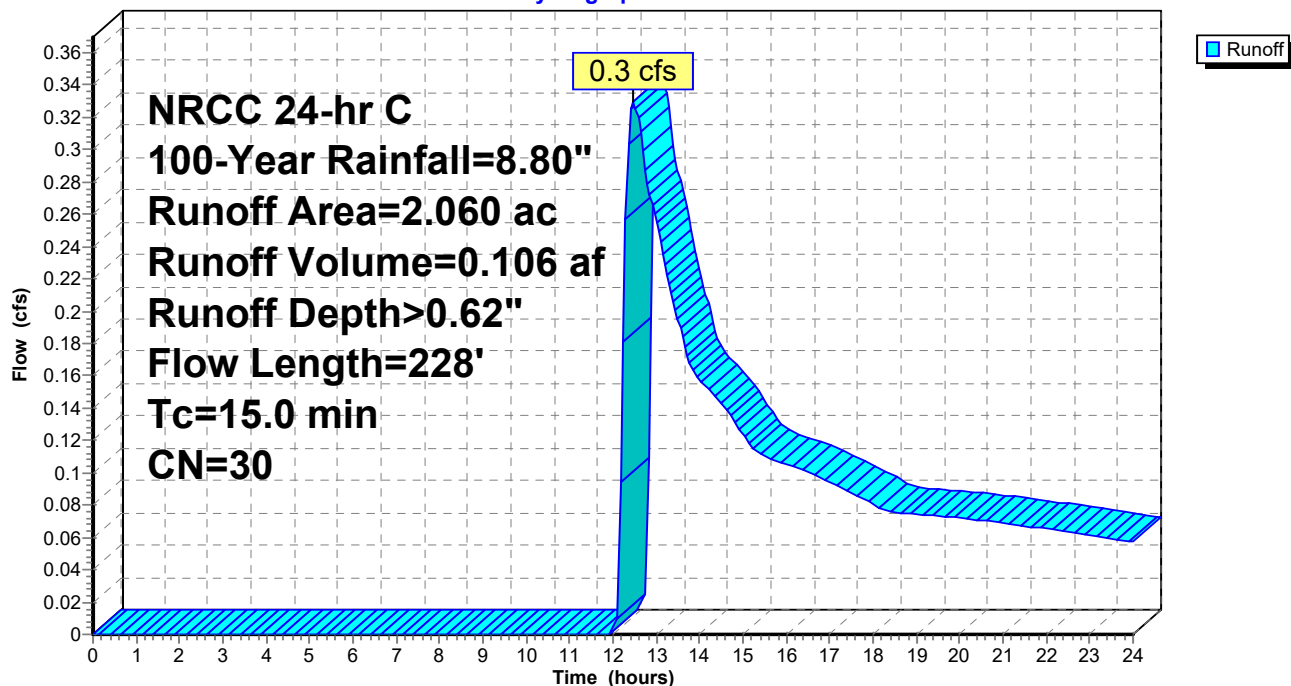
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 NRCC 24-hr C 100-Year Rainfall=8.80"

Area (ac)	CN	Description
2.060	30	Woods, Good, HSG A
2.060		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.3	50	0.0200	0.07		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
2.7	178	0.0500	1.12		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
15.0	228	Total			

Subcatchment 7S: Watershed EB

Hydrograph



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NRCC 24-hr C 100-Year Rainfall=8.80"

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Page 34

Summary for Subcatchment 8S: Watershed EC

Runoff = 50.9 cfs @ 12.41 hrs, Volume= 6.464 af, Depth> 3.31"
 Routed to Reach 5R : Rabbit Hill Brook

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 NRCC 24-hr C 100-Year Rainfall=8.80"

Area (ac)	CN	Description
0.040	98	Roofs, HSG A
7.110	98	Paved parking, HSG A
14.150	30	Woods, Good, HSG A
2.100	77	Woods, Good, HSG D
23.400	55	Weighted Average
16.250		69.44% Pervious Area
7.150		30.56% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	50	0.0050	0.69		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.20"
3.7	580	0.0170	2.65		Shallow Concentrated Flow, Paved Kv= 20.3 fps
8.1	487	0.0400	1.00		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
8.5	542	0.0050	1.06		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
5.2	350	0.0500	1.12		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
1.5	458	0.0040	5.06	91.16	Trap/Vee/Rect Channel Flow, Bot.W=5.00' D=2.00' Z= 2.0 '/' Top.W=13.00' n= 0.022 Earth, clean & straight
28.2	2,467	Total			

20-0242 Existing v2

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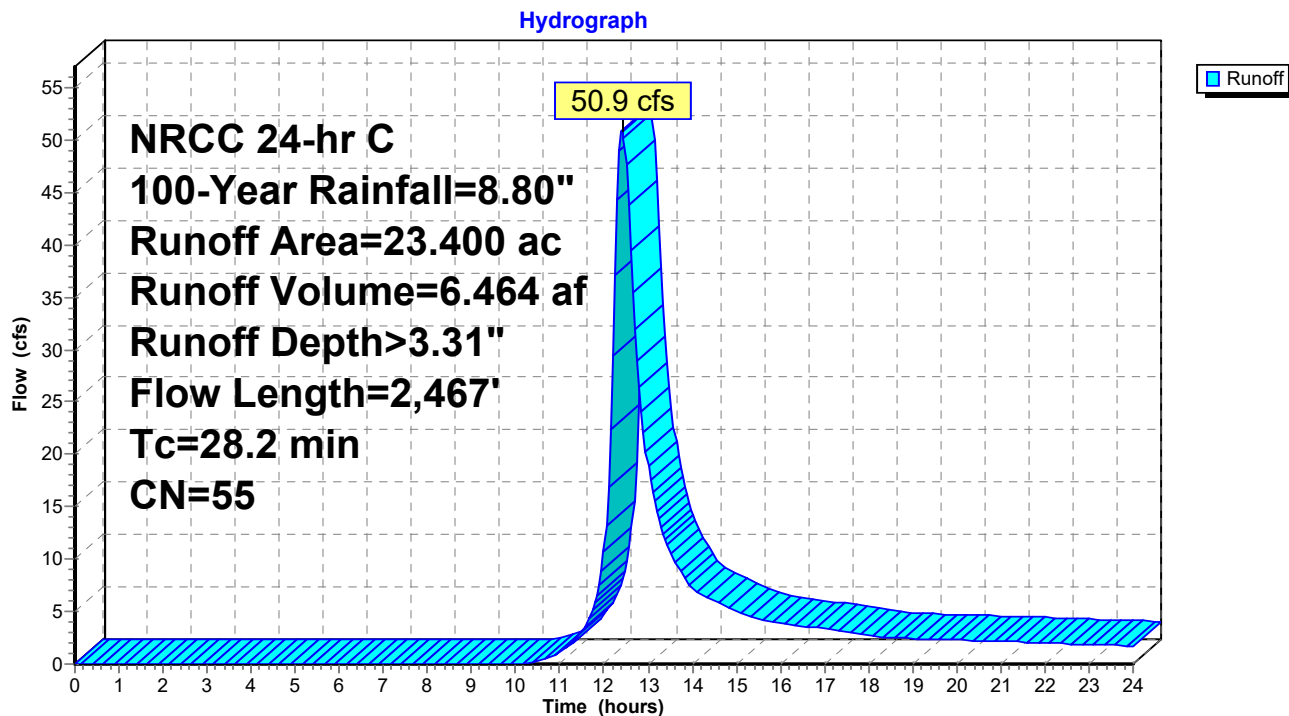
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Page 35

Subcatchment 8S: Watershed EC



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Page 36

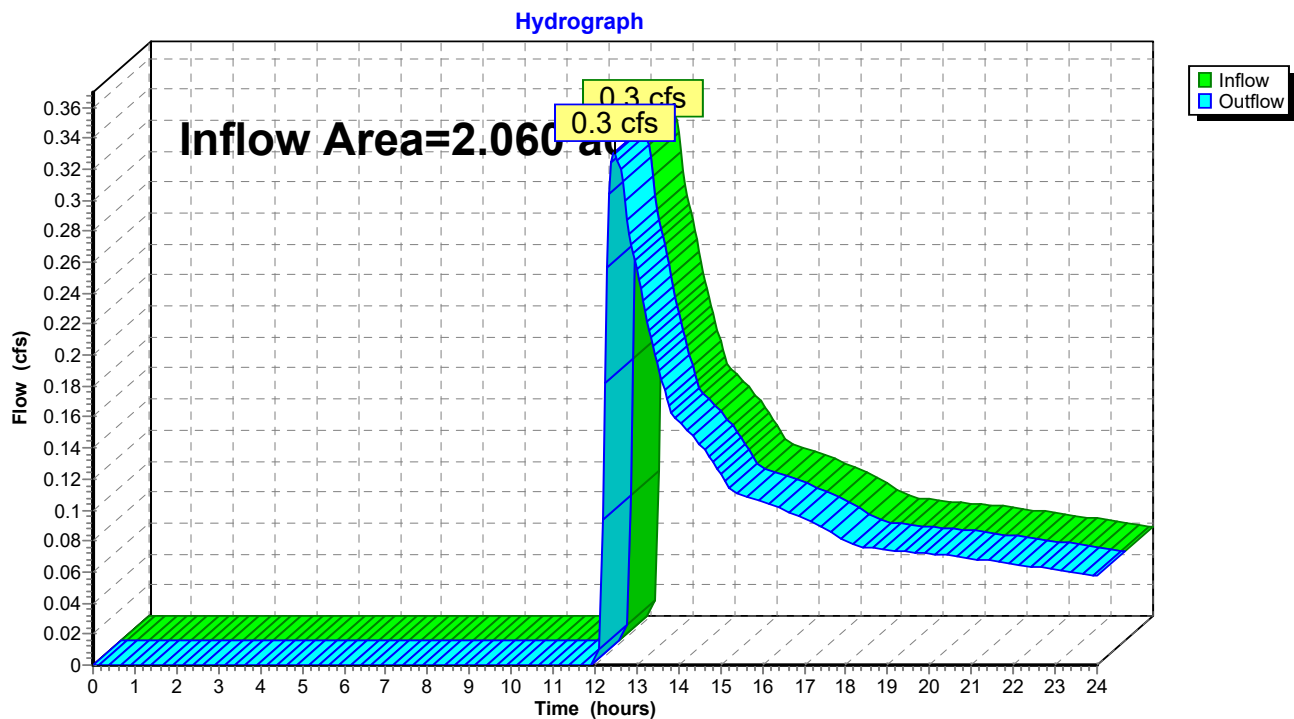
Summary for Reach 4R: South Property Line

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 2.060 ac, 0.00% Impervious, Inflow Depth > 0.62" for 100-Year event
Inflow = 0.3 cfs @ 12.46 hrs, Volume= 0.106 af
Outflow = 0.3 cfs @ 12.46 hrs, Volume= 0.106 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach 4R: South Property Line



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Page 37

Summary for Reach 5R: Rabbit Hill Brook

[40] Hint: Not Described (Outflow=Inflow)

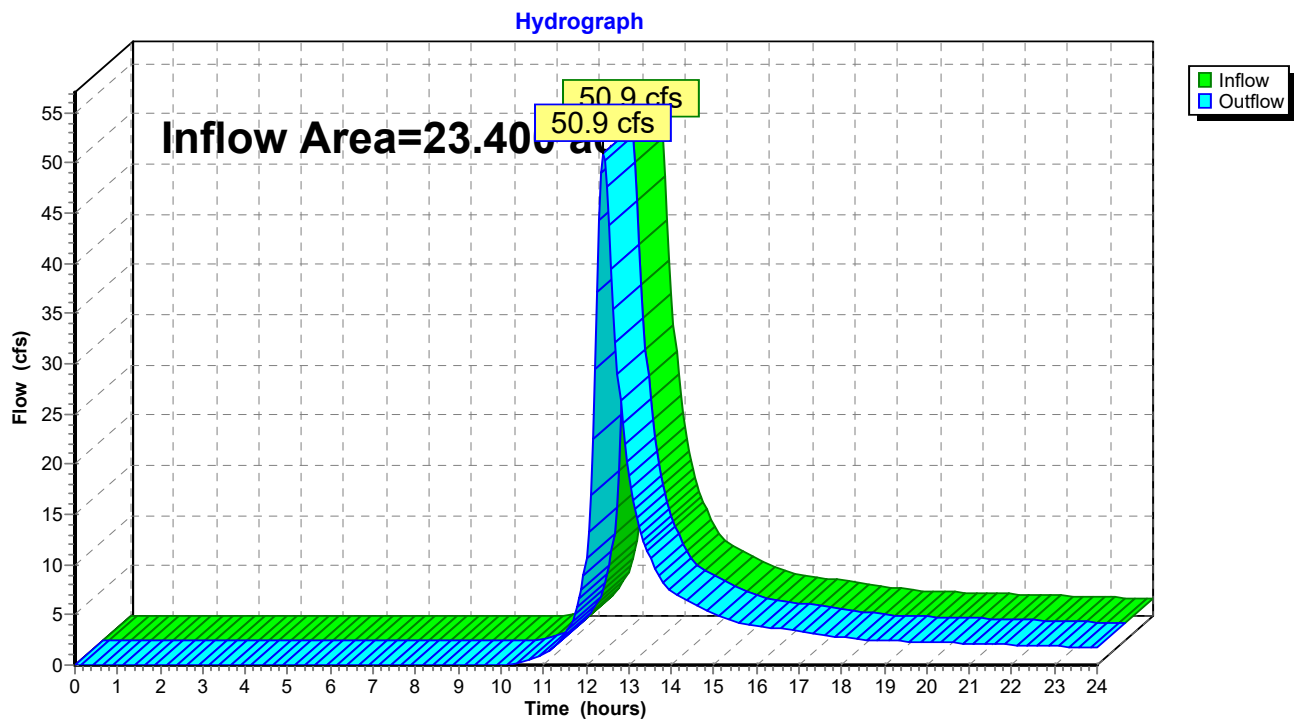
Inflow Area = 23.400 ac, 30.56% Impervious, Inflow Depth > 3.31" for 100-Year event

Inflow = 50.9 cfs @ 12.41 hrs, Volume= 6.464 af

Outflow = 50.9 cfs @ 12.41 hrs, Volume= 6.464 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach 5R: Rabbit Hill Brook



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Page 38

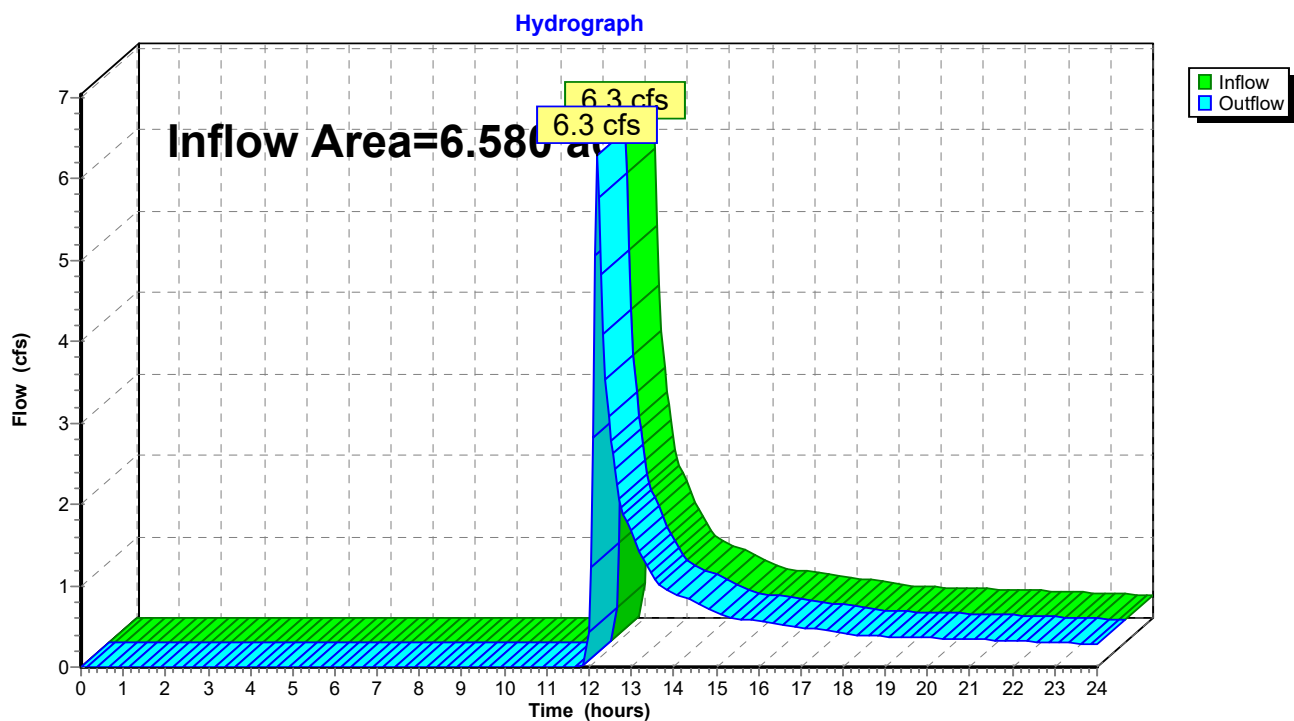
Summary for Reach 6R: Isolated Depression

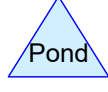
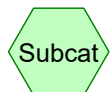
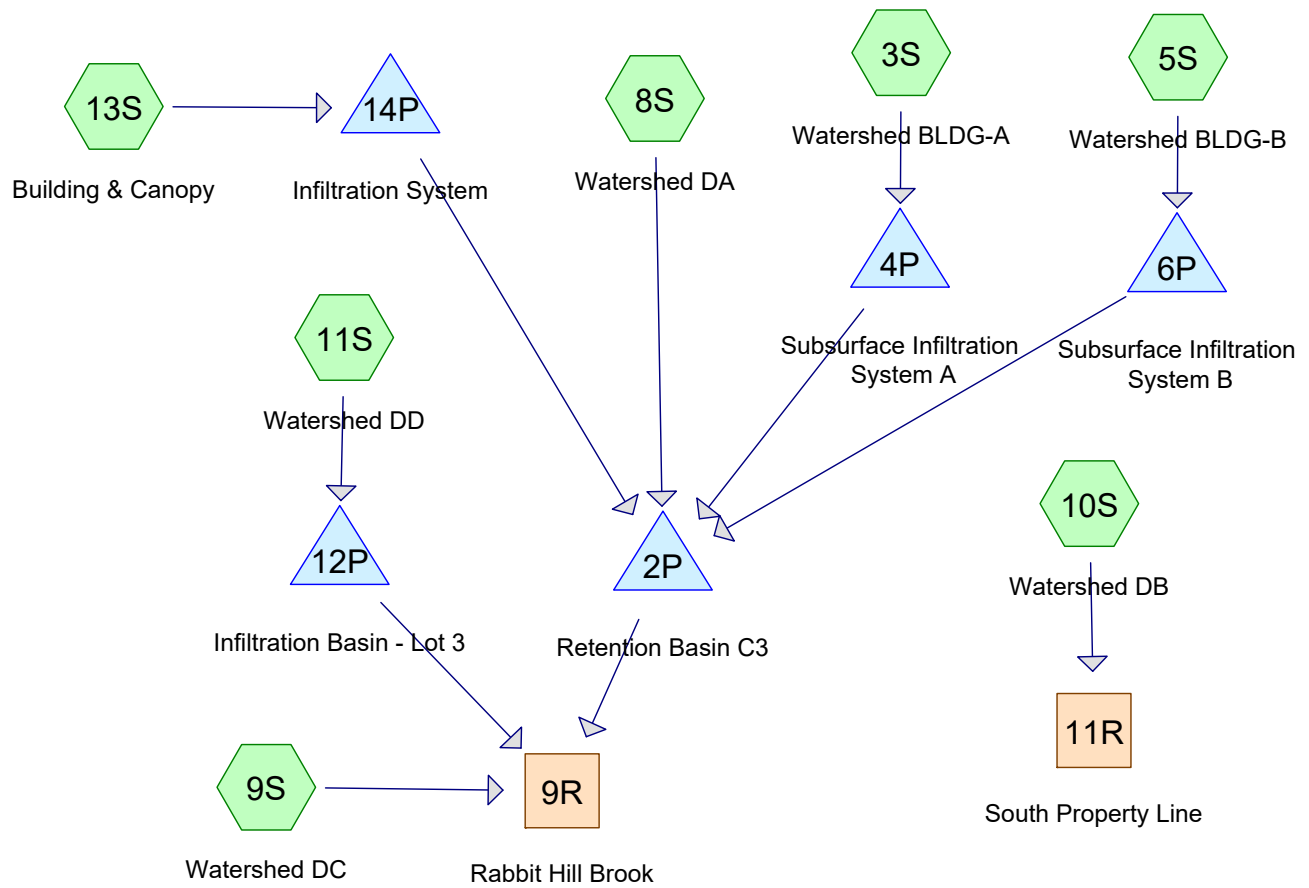
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 6.580 ac, 9.88% Impervious, Inflow Depth > 1.29" for 100-Year event
Inflow = 6.3 cfs @ 12.21 hrs, Volume= 0.709 af
Outflow = 6.3 cfs @ 12.21 hrs, Volume= 0.709 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach 6R: Isolated Depression






Routing Diagram for 21-0219 Developed v2
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10 Commerce Blvd
Wrentham,
Massachusetts

WBH, LLC
3 BELCHER STREET
PLAINVILLE, MA 02762

EDGEWOOD
DEVELOPMENT
COMPANY, LLC
3 BELCHER STREET
PLAINVILLE, MA 02762



Bay Colony Group, Inc.
Professional Civil Engineers &
Professional Land Surveyors

REFERENCES

STAMP

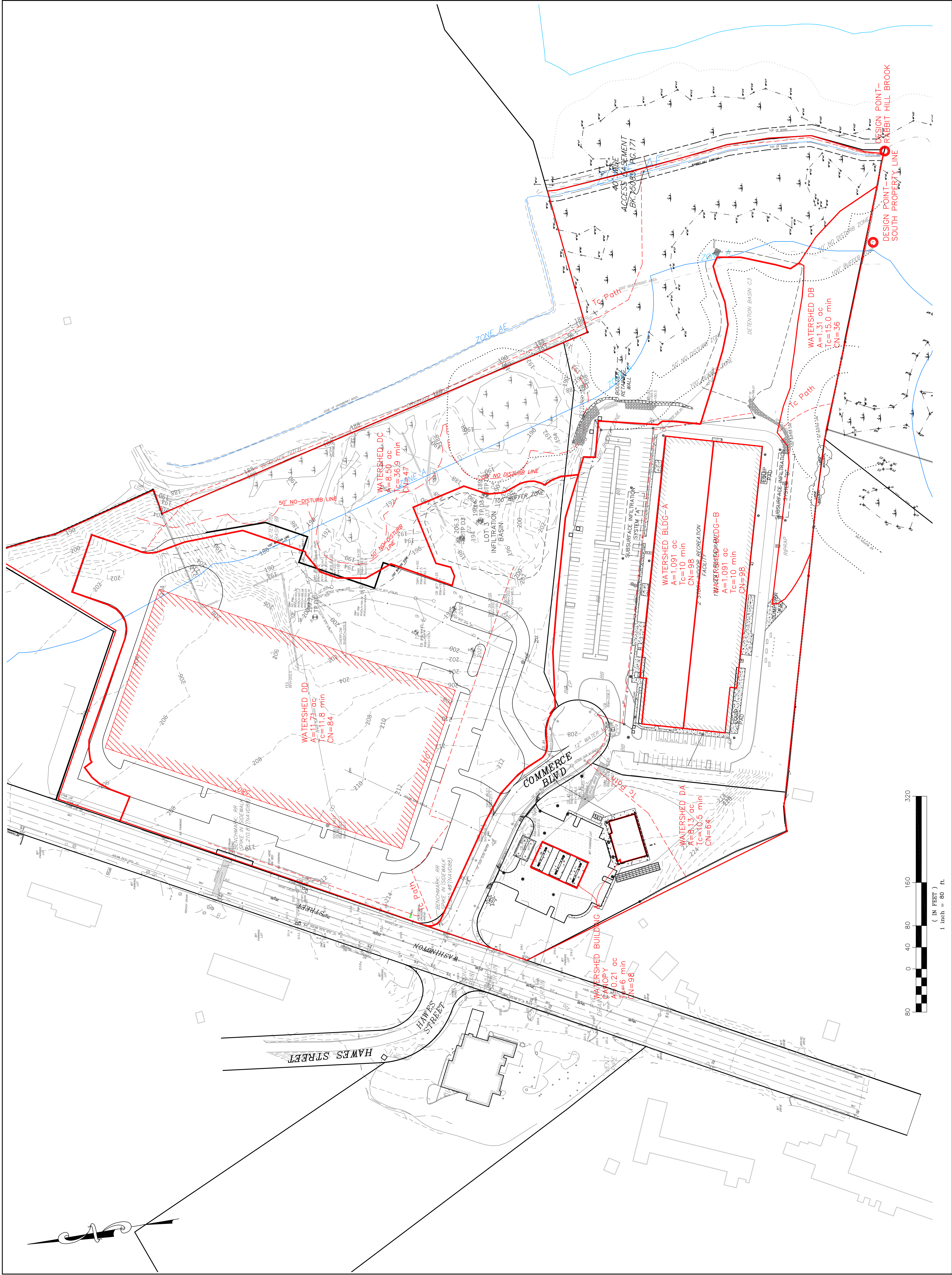
DRAWING TITLE

DEVELOPED
DRAINAGE
SUBAREAS

SCALE: 1"=80'

MARCH 13, 2023	SHEET NUMBER
----------------	--------------

21-0219F



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Page 40

Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-Year	NRCC 24-hr	C	Default	24.00	1	3.22	2
2	10-Year	NRCC 24-hr	C	Default	24.00	1	4.86	2
3	25-Year	NRCC 24-hr	C	Default	24.00	1	6.15	2
4	100-Year	NRCC 24-hr	C	Default	24.00	1	8.80	2

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Page 41

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
5.980	39	>75% Grass cover, Good, HSG A (8S, 9S, 10S, 11S)
6.640	98	Paved parking, HSG A (8S, 11S)
0.690	98	Paved roads w/curbs & sewers, HSG A (8S)
6.512	98	Unconnected roofs, HSG A (3S, 5S, 11S, 13S)
0.440	98	Water Surface, 0% imp, HSG A (8S)
0.610	98	Water Surface, HSG A (11S)
9.070	30	Woods, Good, HSG A (8S, 9S, 10S)
2.100	77	Woods, Good, HSG D (9S)
32.042	66	TOTAL AREA

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Page 42

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
29.942	HSG A	3S, 5S, 8S, 9S, 10S, 11S, 13S
0.000	HSG B	
0.000	HSG C	
2.100	HSG D	9S
0.000	Other	
32.042		TOTAL AREA

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Page 43

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
5.980	0.000	0.000	0.000	0.000	5.980	>75% Grass cover, Good	8S, 9S, 10S, 11S
6.640	0.000	0.000	0.000	0.000	6.640	Paved parking	8S, 11S
0.690	0.000	0.000	0.000	0.000	0.690	Paved roads w/curbs & sewers	8S
6.512	0.000	0.000	0.000	0.000	6.512	Unconnected roofs	3S, 5S, 11S, 13S
0.610	0.000	0.000	0.000	0.000	0.610	Water Surface	11S
0.440	0.000	0.000	0.000	0.000	0.440	Water Surface, 0% imp	8S
9.070	0.000	0.000	2.100	0.000	11.170	Woods, Good	8S, 9S, 10S
29.942	0.000	0.000	2.100	0.000	32.042	TOTAL AREA	

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Page 44

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Width (inches)	Diam/Height (inches)	Inside-Fill (inches)	Node Name
1	8S	0.00	0.00	50.0	0.0300	0.013	0.0	12.0	0.0	
2	8S	0.00	0.00	745.0	0.0150	0.013	0.0	30.0	0.0	
3	11S	0.00	0.00	640.0	0.0100	0.013	0.0	12.0	0.0	
4	4P	200.66	199.00	118.0	0.0141	0.013	0.0	12.0	0.0	
5	6P	198.60	192.00	95.0	0.0695	0.013	0.0	12.0	0.0	
6	14P	213.00	208.90	142.0	0.0289	0.013	0.0	12.0	0.0	

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Page 45

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 3S: Watershed BLDG-A Runoff Area=1.091 ac 100.00% Impervious Runoff Depth>2.98"
Tc=10.0 min CN=98 Runoff=3.0 cfs 0.271 af

Subcatchment 5S: Watershed BLDG-B Runoff Area=1.091 ac 100.00% Impervious Runoff Depth>2.98"
Tc=10.0 min CN=98 Runoff=3.0 cfs 0.271 af

Subcatchment 8S: Watershed DA Runoff Area=8.130 ac 37.52% Impervious Runoff Depth>0.49"
Flow Length=1,075' Tc=10.5 min CN=62 Runoff=3.0 cfs 0.330 af

Subcatchment 9S: Watershed DC Runoff Area=8.500 ac 0.00% Impervious Runoff Depth>0.01"
Flow Length=1,792' Tc=36.9 min CN=42 Runoff=0.0 cfs 0.010 af

Subcatchment 10S: Watershed DB Runoff Area=1.310 ac 0.00% Impervious Runoff Depth=0.00"
Flow Length=228' Tc=15.0 min CN=31 Runoff=0.0 cfs 0.000 af

Subcatchment 11S: Watershed DD Runoff Area=11.710 ac 76.94% Impervious Runoff Depth>1.69"
Flow Length=752' Tc=11.8 min CN=84 Runoff=19.9 cfs 1.653 af

Subcatchment 13S: Building & Canopy Runoff Area=0.210 ac 100.00% Impervious Runoff Depth>2.98"
Tc=10.0 min CN=98 Runoff=0.6 cfs 0.052 af

Reach 9R: Rabbit Hill Brook Inflow=0.0 cfs 0.010 af
Outflow=0.0 cfs 0.010 af

Reach 11R: South Property Line Inflow=0.0 cfs 0.000 af
Outflow=0.0 cfs 0.000 af

Pond 2P: Retention Basin C3 Peak Elev=186.49' Storage=14,373 cf Inflow=3.0 cfs 0.330 af
Discarded=0.0 cfs 0.000 af Primary=0.0 cfs 0.000 af Outflow=0.0 cfs 0.000 af

Pond 4P: Subsurface Infiltration System A Peak Elev=198.74' Storage=0.001 af Inflow=3.0 cfs 0.271 af
Discarded=3.0 cfs 0.271 af Primary=0.0 cfs 0.000 af Outflow=3.0 cfs 0.271 af

Pond 6P: Subsurface Infiltration System B Peak Elev=195.08' Storage=0.003 af Inflow=3.0 cfs 0.271 af
Discarded=3.0 cfs 0.271 af Primary=0.0 cfs 0.000 af Outflow=3.0 cfs 0.271 af

Pond 12P: Infiltration Basin - Lot 3 Peak Elev=192.41' Storage=20,353 cf Inflow=19.9 cfs 1.653 af
Discarded=4.0 cfs 1.650 af Primary=0.0 cfs 0.000 af Outflow=4.0 cfs 1.650 af

Pond 14P: Infiltration System Peak Elev=212.96' Storage=0.005 af Inflow=0.6 cfs 0.052 af
Discarded=0.3 cfs 0.052 af Primary=0.0 cfs 0.000 af Outflow=0.3 cfs 0.052 af

Total Runoff Area = 32.042 ac Runoff Volume = 2.588 af Average Runoff Depth = 0.97"
54.90% Pervious = 17.590 ac 45.10% Impervious = 14.452 ac

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Page 46

Summary for Subcatchment 3S: Watershed BLDG-A

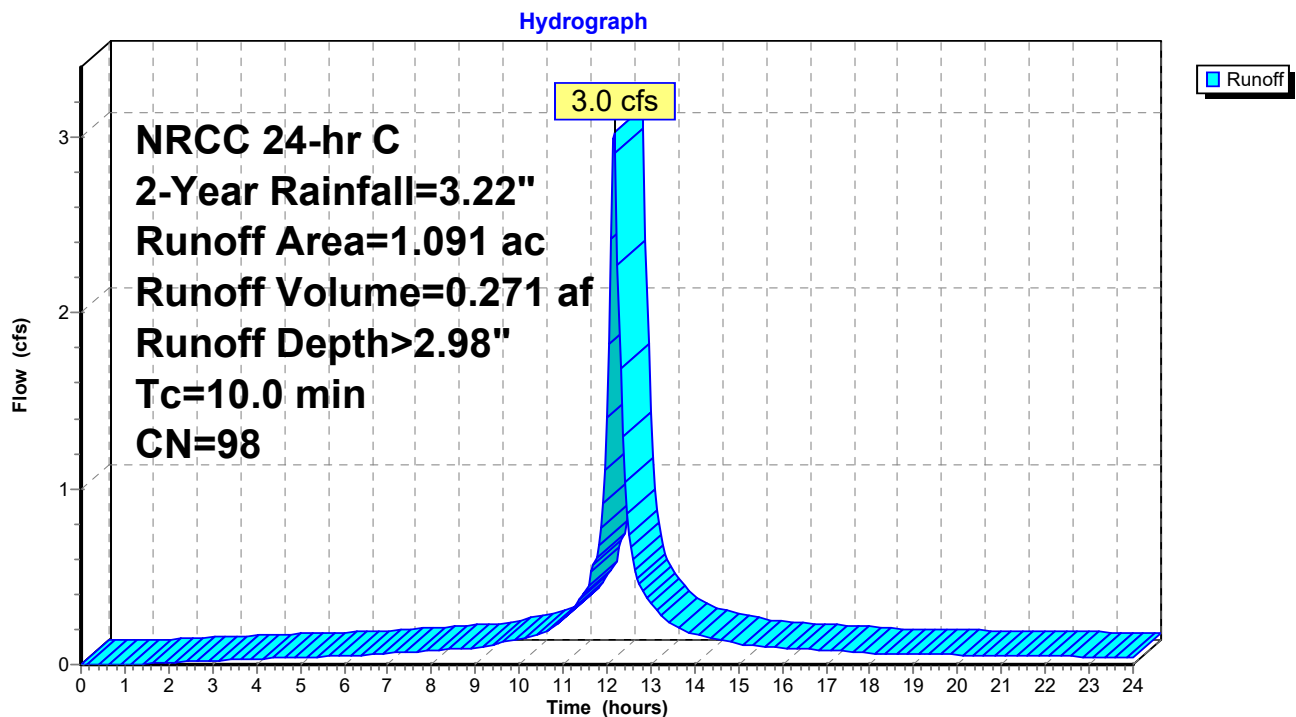
Runoff = 3.0 cfs @ 12.17 hrs, Volume= 0.271 af, Depth> 2.98"
Routed to Pond 4P : Subsurface Infiltration System A

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 2-Year Rainfall=3.22"

Area (ac)	CN	Description
1.091	98	Unconnected roofs, HSG A
1.091		100.00% Impervious Area
1.091		100.00% Unconnected

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

Subcatchment 3S: Watershed BLDG-A



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Page 47

Summary for Subcatchment 5S: Watershed BLDG-B

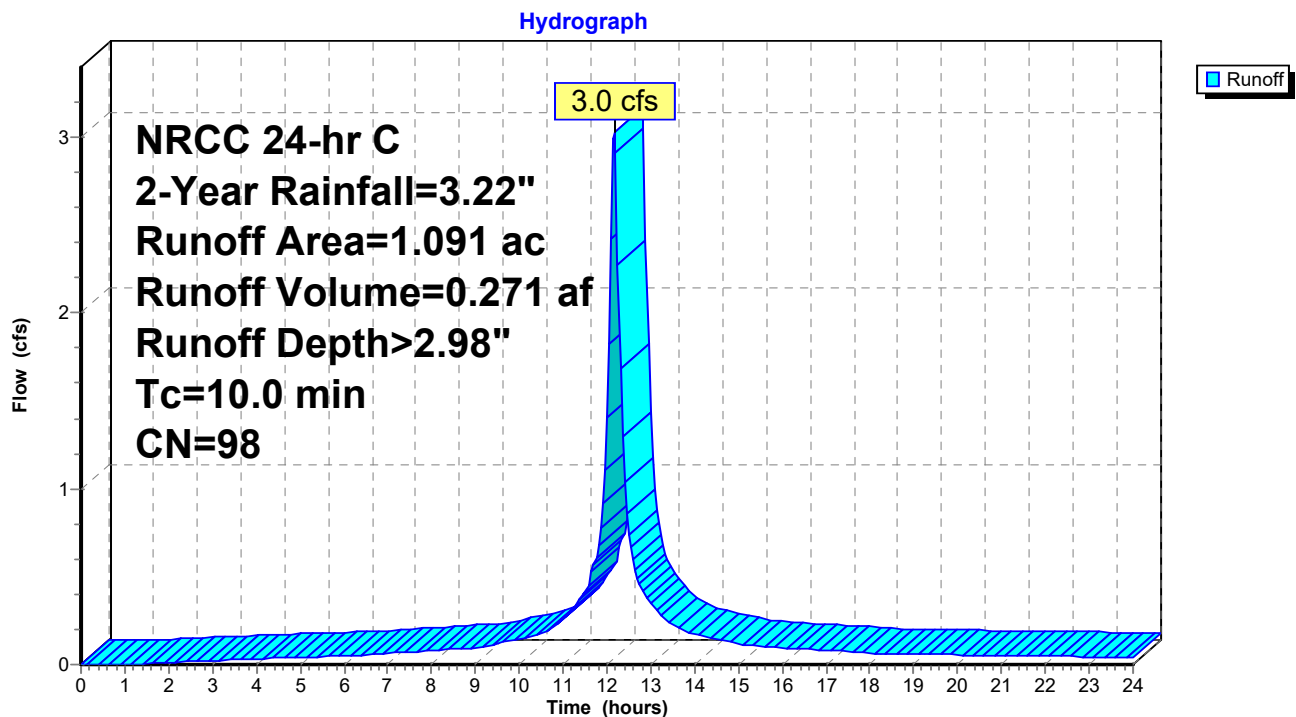
Runoff = 3.0 cfs @ 12.17 hrs, Volume= 0.271 af, Depth> 2.98"
Routed to Pond 6P : Subsurface Infiltration System B

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 2-Year Rainfall=3.22"

Area (ac)	CN	Description
1.091	98	Unconnected roofs, HSG A
1.091		100.00% Impervious Area
1.091		100.00% Unconnected

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

Subcatchment 5S: Watershed BLDG-B



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Page 48

Summary for Subcatchment 8S: Watershed DA

Runoff = 3.0 cfs @ 12.21 hrs, Volume= 0.330 af, Depth> 0.49"
 Routed to Pond 2P : Retention Basin C3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 NRCC 24-hr C 2-Year Rainfall=3.22"

Area (ac)	CN	Description
0.690	98	Paved roads w/curbs & sewers, HSG A
2.360	98	Paved parking, HSG A
1.030	39	>75% Grass cover, Good, HSG A
0.440	98	Water Surface, 0% imp, HSG A
1.890	30	Woods, Good, HSG A
1.720	39	>75% Grass cover, Good, HSG A
8.130	62	Weighted Average
5.080		62.48% Pervious Area
3.050		37.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	50	0.1000	0.13		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
2.7	230	0.0400	1.40		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.1	50	0.0300	7.86	6.17	Pipe Channel, 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
1.2	745	0.0150	10.23	50.24	Pipe Channel, 30.0" Round Area= 4.9 sf Perim= 7.9' r= 0.63' n= 0.013
10.5	1,075	Total			

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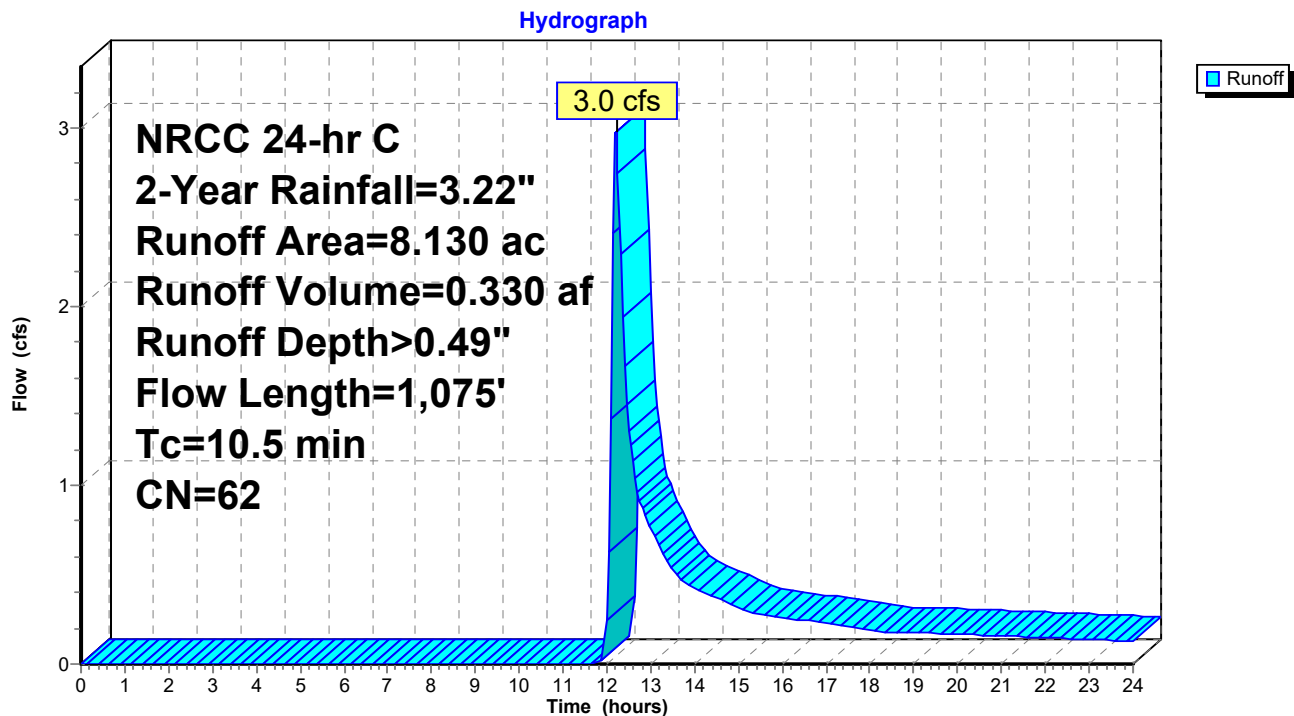
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Page 49

Subcatchment 8S: Watershed DA



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Page 50

Summary for Subcatchment 9S: Watershed DC

[73] Warning: Peak may fall outside time span

Runoff = 0.0 cfs @ 23.51 hrs, Volume= 0.010 af, Depth> 0.01"
 Routed to Reach 9R : Rabbit Hill Brook

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 NRCC 24-hr C 2-Year Rainfall=3.22"

Area (ac)	CN	Description
0.430	39	>75% Grass cover, Good, HSG A
5.970	30	Woods, Good, HSG A
2.100	77	Woods, Good, HSG D
8.500	42	Weighted Average
8.500		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	50	0.0100	0.05		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
0.6	86	0.2000	2.24		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
13.3	848	0.0050	1.06		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
5.2	350	0.0500	1.12		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
1.5	458	0.0040	5.06	91.16	Trap/Vee/Rect Channel Flow, Bot.W=5.00' D=2.00' Z= 2.0 ' Top.W=13.00' n= 0.022
36.9	1,792	Total			

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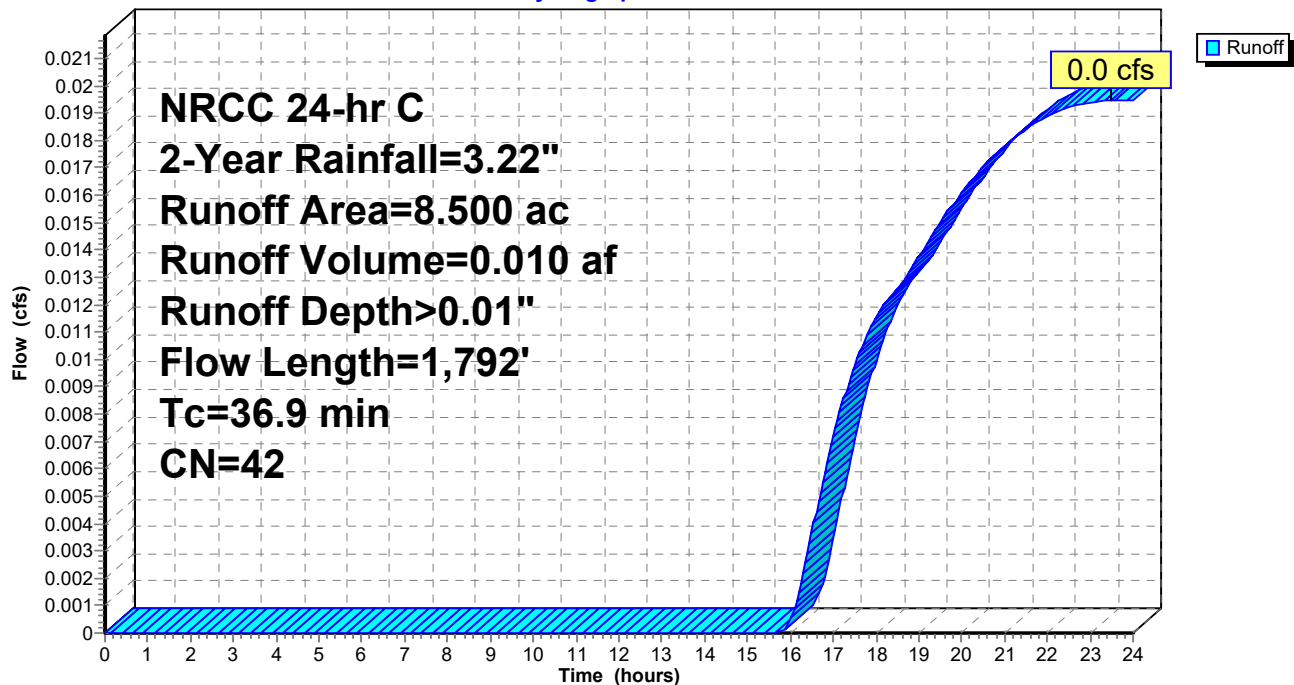
NRCC 24-hr C 2-Year Rainfall=3.22"

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Page 51

Subcatchment 9S: Watershed DC

Hydrograph



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NRCC 24-hr C 2-Year Rainfall=3.22"

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Page 52

Summary for Subcatchment 10S: Watershed DB

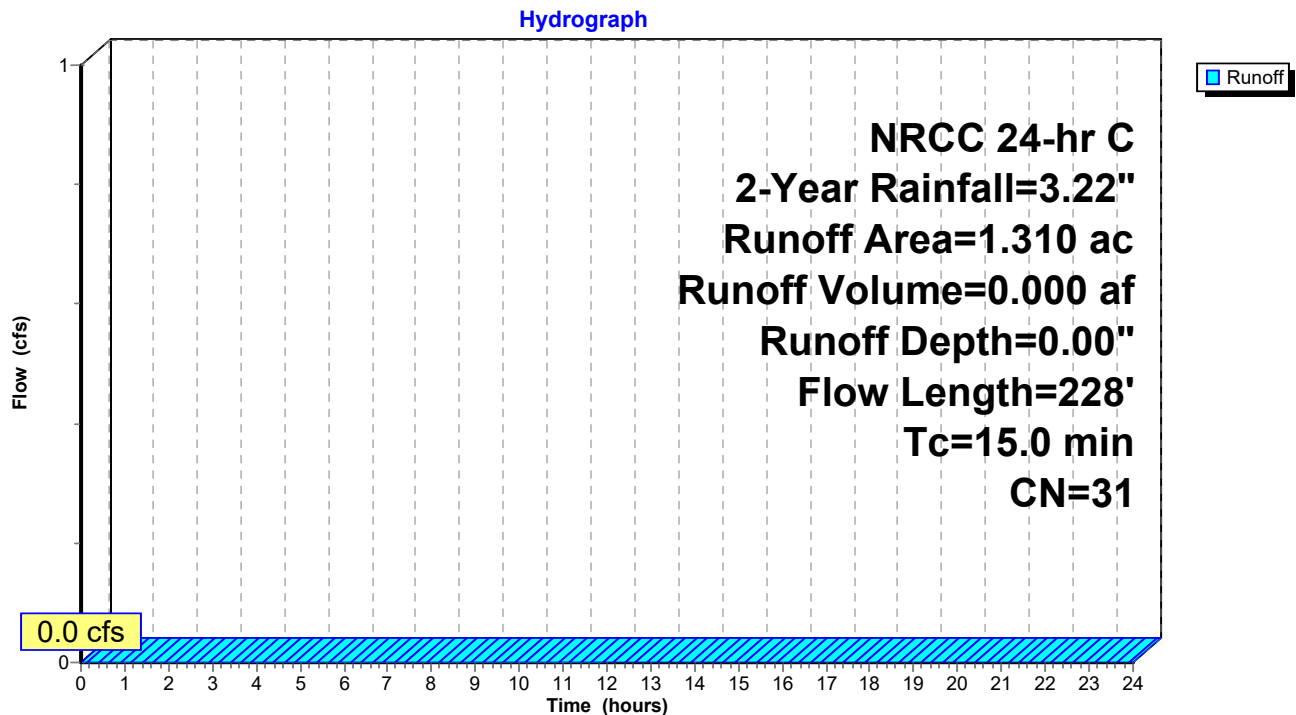
[45] Hint: Runoff=Zero

Runoff = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"
 Routed to Reach 11R : South Property Line

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 NRCC 24-hr C 2-Year Rainfall=3.22"

Area (ac)	CN	Description
1.210	30	Woods, Good, HSG A
0.100	39	>75% Grass cover, Good, HSG A
1.310	31	Weighted Average
1.310		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.3	50	0.0200	0.07		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
2.7	178	0.0500	1.12		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
15.0	228	Total			

Subcatchment 10S: Watershed DB

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NRCC 24-hr C 2-Year Rainfall=3.22"

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Page 53

Summary for Subcatchment 11S: Watershed DD

[47] Hint: Peak is 559% of capacity of segment #3

Runoff = 19.9 cfs @ 12.20 hrs, Volume= 1.653 af, Depth> 1.69"
 Routed to Pond 12P : Infiltration Basin - Lot 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 NRCC 24-hr C 2-Year Rainfall=3.22"

Area (ac)	CN	Description
2.700	39	>75% Grass cover, Good, HSG A
4.120	98	Unconnected roofs, HSG A
4.280	98	Paved parking, HSG A
0.610	98	Water Surface, HSG A
11.710	84	Weighted Average
2.700		23.06% Pervious Area
9.010		76.94% Impervious Area
4.120		45.73% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.0	50	0.0160	0.09		Sheet Flow, Grass: Dense n= 0.240 P2= 3.20"
0.4	62	0.1300	2.52		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
2.4	640	0.0100	4.54	3.56	Pipe Channel, 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
11.8	752	Total			

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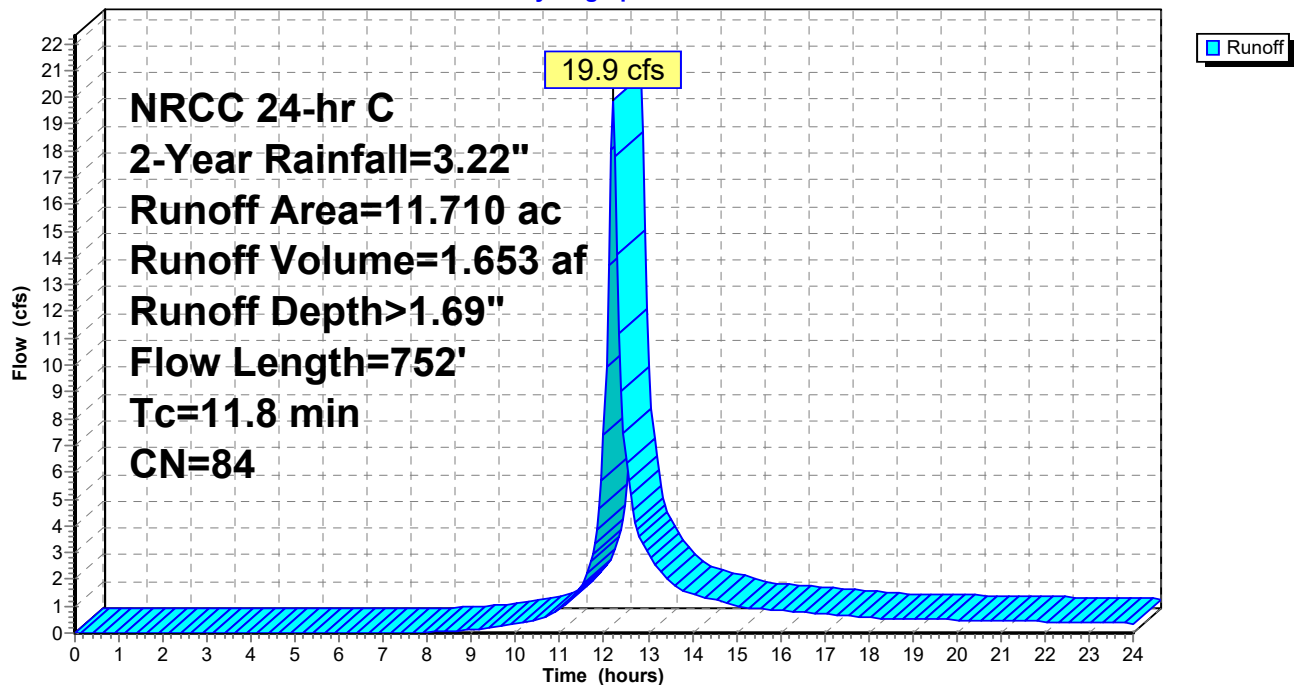
NRCC 24-hr C 2-Year Rainfall=3.22"

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Page 54

Subcatchment 11S: Watershed DD

Hydrograph



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Page 55

Summary for Subcatchment 13S: Building & Canopy

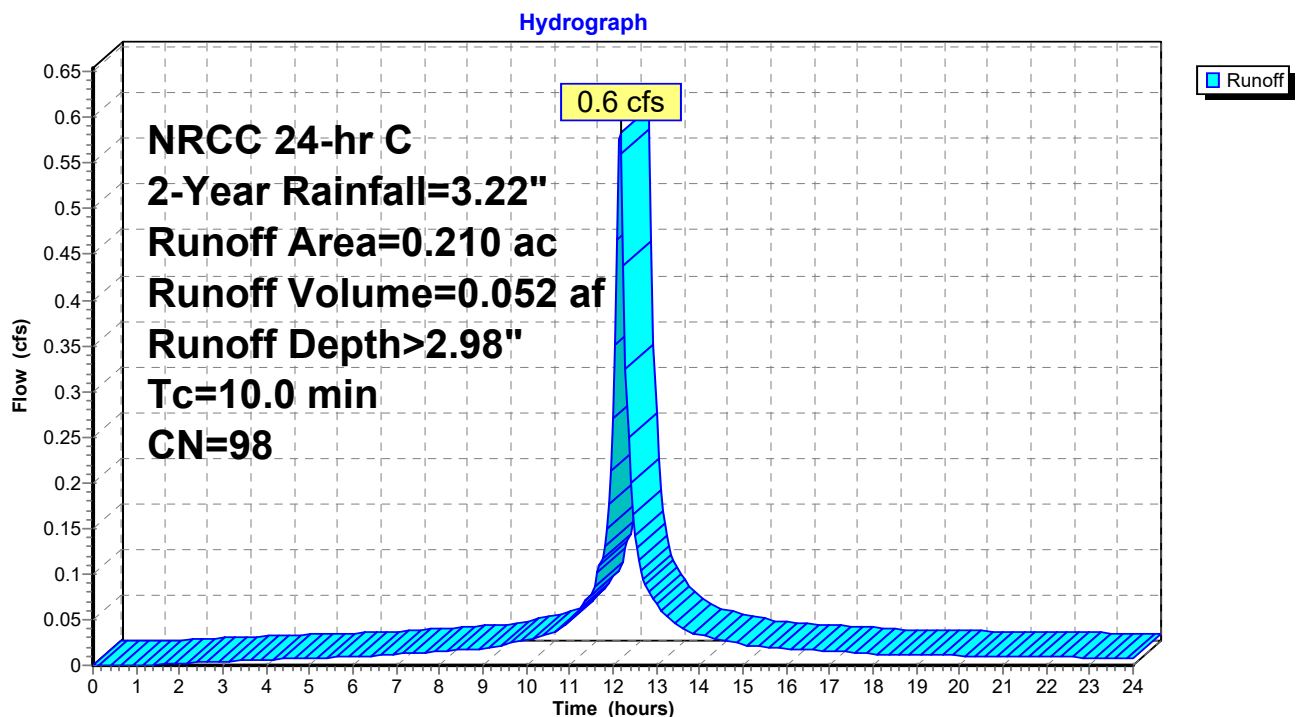
Runoff = 0.6 cfs @ 12.17 hrs, Volume= 0.052 af, Depth> 2.98"
Routed to Pond 14P : Infiltration System

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 2-Year Rainfall=3.22"

Area (ac)	CN	Description
0.210	98	Unconnected roofs, HSG A
0.210		100.00% Impervious Area
0.210		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,
6.0	0				Total, Increased to minimum Tc = 10.0 min

Subcatchment 13S: Building & Canopy



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Page 56

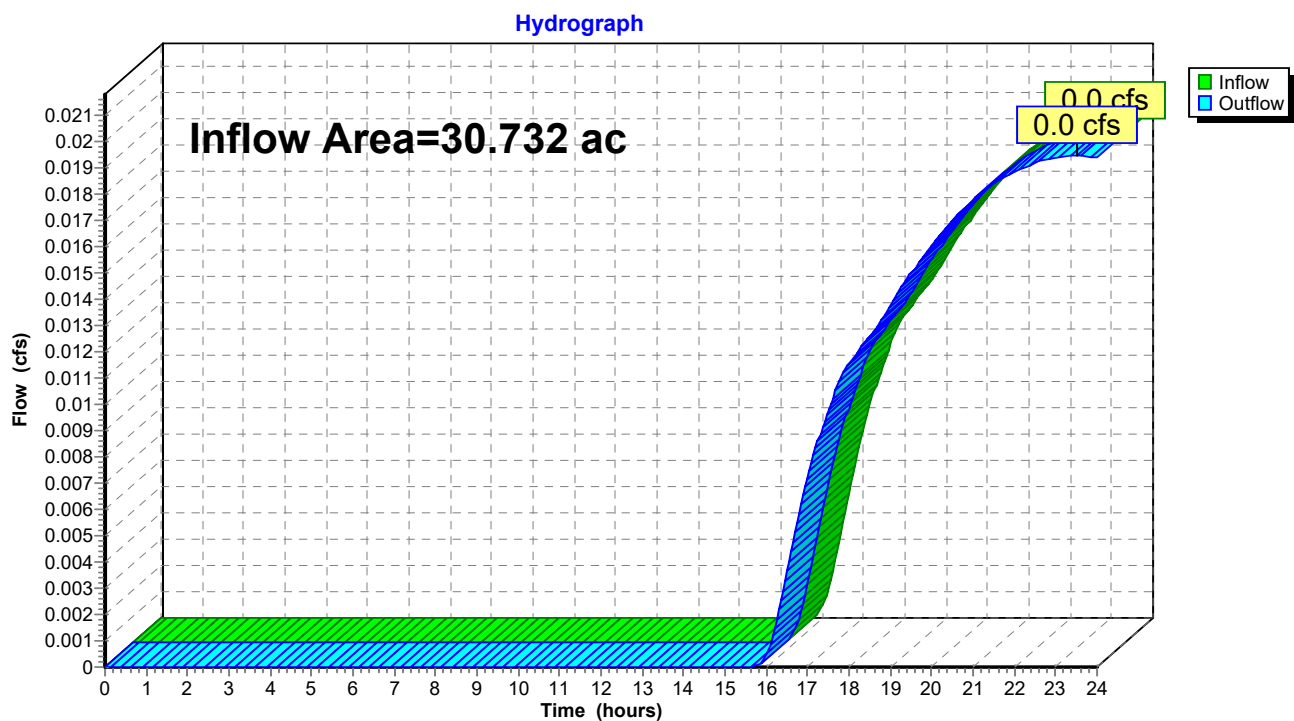
Summary for Reach 9R: Rabbit Hill Brook

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 30.732 ac, 47.03% Impervious, Inflow Depth > 0.00" for 2-Year event
Inflow = 0.0 cfs @ 23.51 hrs, Volume= 0.010 af
Outflow = 0.0 cfs @ 23.51 hrs, Volume= 0.010 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach 9R: Rabbit Hill Brook



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Page 57

Summary for Reach 11R: South Property Line

[40] Hint: Not Described (Outflow=Inflow)

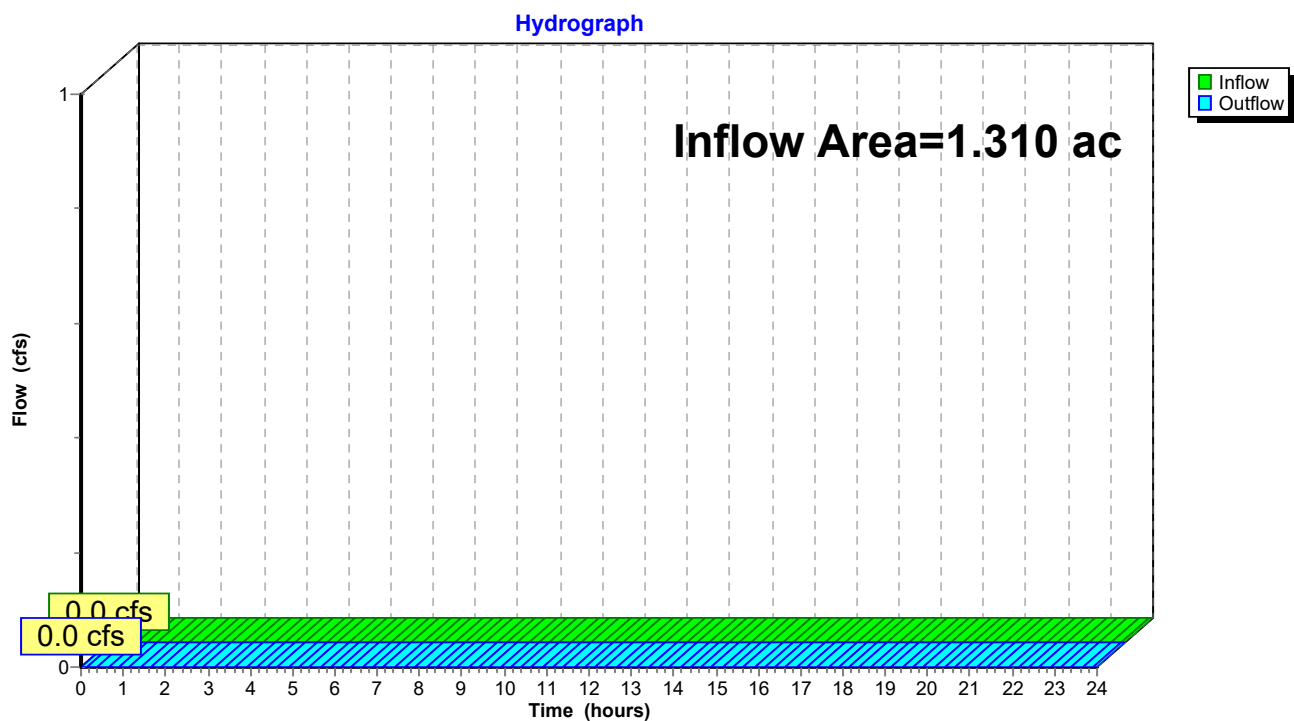
Inflow Area = 1.310 ac, 0.00% Impervious, Inflow Depth = 0.00" for 2-Year event

Inflow = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af

Outflow = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach 11R: South Property Line



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Page 58

Summary for Pond 2P: Retention Basin C3

Inflow Area = 10.522 ac, 51.72% Impervious, Inflow Depth > 0.38" for 2-Year event
 Inflow = 3.0 cfs @ 12.21 hrs, Volume= 0.330 af
 Outflow = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
 Discarded = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af
 Primary = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af
 Routed to Reach 9R : Rabbit Hill Brook

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 186.49' @ 24.00 hrs Surf.Area= 30,580 sf Storage= 14,373 cf

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

Volume	Invert	Avail.Storage	Storage Description
#1	186.01'	143,139 cf	Custom Stage Data (Irregular) Listed below (Recalc)

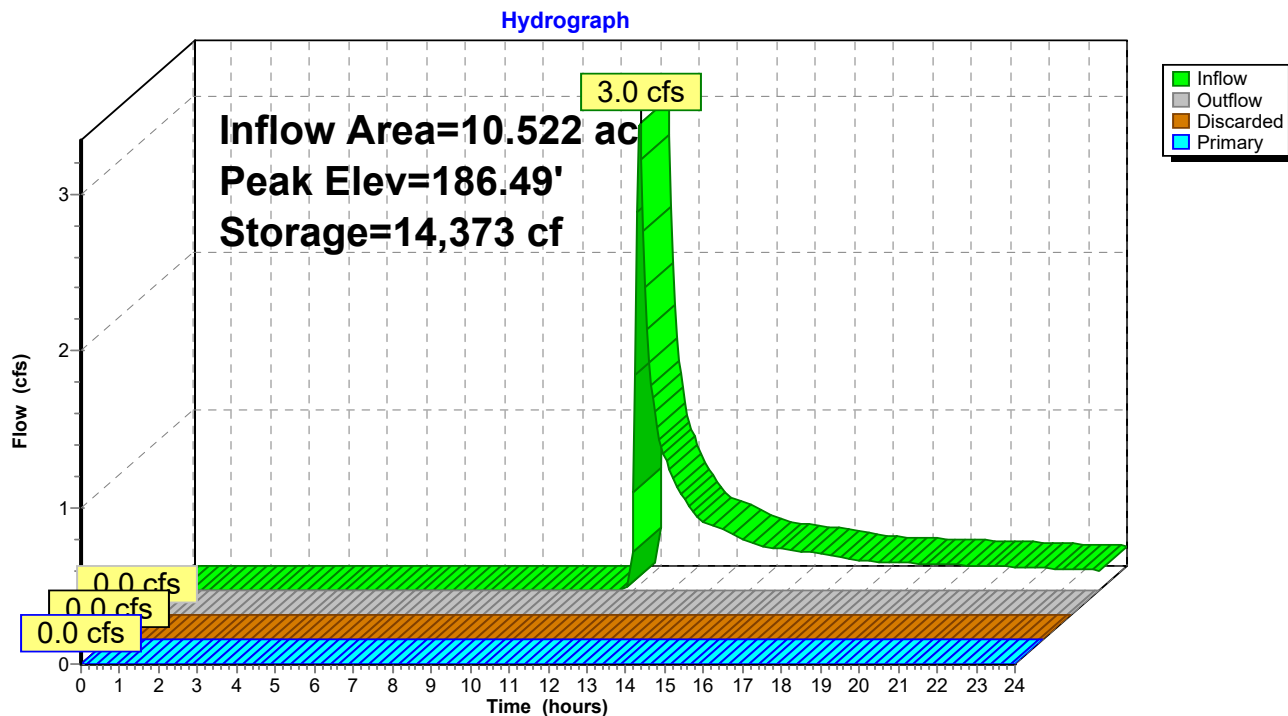
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
186.01	28,880	726.0	0	0	28,880
187.50	34,273	765.0	46,992	46,992	33,639
189.20	39,846	811.0	62,942	109,933	39,561
190.00	43,190	1,045.0	33,205	143,139	74,130

Device	Routing	Invert	Outlet Devices
#1	Primary	189.20'	10.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)
#2	Discarded	188.00'	21.038 in/hr Exfiltration over Surface area above 188.00' Conductivity to Groundwater Elevation = 186.00' Excluded Surface area = 35,869 sf

Discarded OutFlow Max=0.0 cfs @ 0.00 hrs HW=186.01' (Free Discharge)
 ↑**2=Exfiltration** (Controls 0.0 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=186.01' (Free Discharge)
 ↑**1=Sharp-Crested Rectangular Weir** (Controls 0.0 cfs)

Pond 2P: Retention Basin C3



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Page 60

Summary for Pond 4P: Subsurface Infiltration System A

Inflow Area = 1.091 ac, 100.00% Impervious, Inflow Depth > 2.98" for 2-Year event
 Inflow = 3.0 cfs @ 12.17 hrs, Volume= 0.271 af
 Outflow = 3.0 cfs @ 12.18 hrs, Volume= 0.271 af, Atten= 0%, Lag= 0.5 min
 Discarded = 3.0 cfs @ 12.18 hrs, Volume= 0.271 af
 Primary = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af
 Routed to Pond 2P : Retention Basin C3

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 198.74' @ 12.18 hrs Surf.Area= 0.081 ac Storage= 0.001 af

Plug-Flow detention time= 0.3 min calculated for 0.271 af (100% of inflow)
 Center-of-Mass det. time= 0.3 min (761.2 - 760.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	198.70'	0.068 af	30.50'W x 115.50'L x 3.54'H Field A 0.286 af Overall - 0.116 af Embedded = 0.170 af x 40.0% Voids
#2A	199.20'	0.116 af	Cultec R-330XLHD x 96 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 6 rows
#3	200.66'	0.000 af	1.50'D x 2.84'H Vertical Cone/Cylinder
		0.185 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	198.70'	42.077 in/hr Exfiltration over Wetted area Conductivity to Groundwater Elevation = 186.00'
#2	Primary	200.66'	12.0" Round Culvert L= 118.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 200.66' / 199.00' S= 0.0141 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#3	Primary	202.25'	4.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Discarded OutFlow Max=3.5 cfs @ 12.18 hrs HW=198.74' (Free Discharge)

↑1=Exfiltration (Controls 3.5 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=198.70' TW=193.50' (Fixed TW Elev= 193.50')

↑2=Culvert (Controls 0.0 cfs)

↑3=Sharp-Crested Rectangular Weir (Controls 0.0 cfs)

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Page 61

Pond 4P: Subsurface Infiltration System A - Chamber Wizard Field A

Chamber Model = Cultec R-330XLHD (Cultec Recharger® 330XLHD)

Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf

Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap

Row Length Adjustment= +1.50' x 7.45 sf x 6 rows

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

16 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 113.50' Row Length +12.0" End Stone x 2 =
115.50' Base Length

6 Rows x 52.0" Wide + 6.0" Spacing x 5 + 12.0" Side Stone x 2 = 30.50' Base Width

6.0" Stone Base + 30.5" Chamber Height + 6.0" Stone Cover = 3.54' Field Height

96 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 6 Rows = 5,074.1 cf Chamber Storage

12,476.4 cf Field - 5,074.1 cf Chambers = 7,402.3 cf Stone x 40.0% Voids = 2,960.9 cf Stone Storage

Chamber Storage + Stone Storage = 8,035.0 cf = 0.184 af

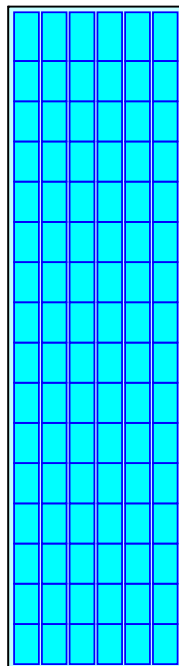
Overall Storage Efficiency = 64.4%

Overall System Size = 115.50' x 30.50' x 3.54'

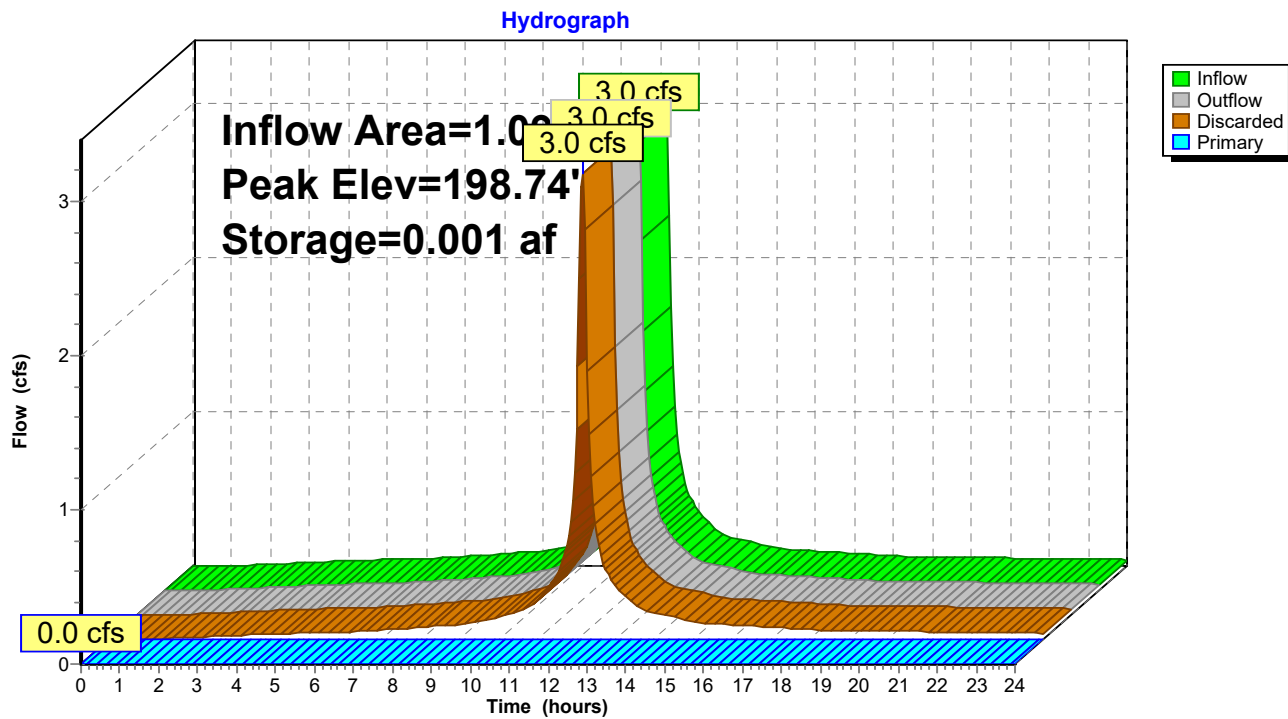
96 Chambers

462.1 cy Field

274.2 cy Stone



Pond 4P: Subsurface Infiltration System A



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Page 63

Summary for Pond 6P: Subsurface Infiltration System B

Inflow Area = 1.091 ac, 100.00% Impervious, Inflow Depth > 2.98" for 2-Year event
 Inflow = 3.0 cfs @ 12.17 hrs, Volume= 0.271 af
 Outflow = 3.0 cfs @ 12.18 hrs, Volume= 0.271 af, Atten= 1%, Lag= 0.8 min
 Discarded = 3.0 cfs @ 12.18 hrs, Volume= 0.271 af
 Primary = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af
 Routed to Pond 2P : Retention Basin C3

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 195.08' @ 12.18 hrs Surf.Area= 0.081 ac Storage= 0.003 af

Plug-Flow detention time= 0.6 min calculated for 0.271 af (100% of inflow)
 Center-of-Mass det. time= 0.5 min (761.4 - 760.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	195.00'	0.068 af	30.50'W x 115.50'L x 3.54'H Field A 0.286 af Overall - 0.116 af Embedded = 0.170 af x 40.0% Voids
#2A	195.50'	0.116 af	Cultec R-330XLHD x 96 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 6 rows
#3	197.00'	0.000 af	1.50'D x 7.00'H Vertical Cone/Cylinder
		0.185 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	195.00'	42.077 in/hr Exfiltration over Wetted area Conductivity to Groundwater Elevation = 186.00'
#2	Primary	198.60'	12.0" Round Culvert L= 95.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 198.60' / 192.00' S= 0.0695 ' / ' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Discarded OutFlow Max=3.5 cfs @ 12.18 hrs HW=195.08' (Free Discharge)
 ↑ **1=Exfiltration** (Controls 3.5 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=195.00' TW=191.00' (Fixed TW Elev= 191.00')
 ↑ **2=Culvert** (Controls 0.0 cfs)

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Page 64

Pond 6P: Subsurface Infiltration System B - Chamber Wizard Field A

Chamber Model = Cultec R-330XLHD (Cultec Recharger® 330XLHD)

Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf

Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap

Row Length Adjustment= +1.50' x 7.45 sf x 6 rows

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

16 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 113.50' Row Length +12.0" End Stone x 2 = 115.50' Base Length

6 Rows x 52.0" Wide + 6.0" Spacing x 5 + 12.0" Side Stone x 2 = 30.50' Base Width

6.0" Stone Base + 30.5" Chamber Height + 6.0" Stone Cover = 3.54' Field Height

96 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 6 Rows = 5,074.1 cf Chamber Storage

12,476.4 cf Field - 5,074.1 cf Chambers = 7,402.3 cf Stone x 40.0% Voids = 2,960.9 cf Stone Storage

Chamber Storage + Stone Storage = 8,035.0 cf = 0.184 af

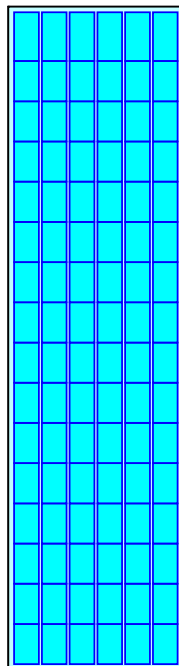
Overall Storage Efficiency = 64.4%

Overall System Size = 115.50' x 30.50' x 3.54'

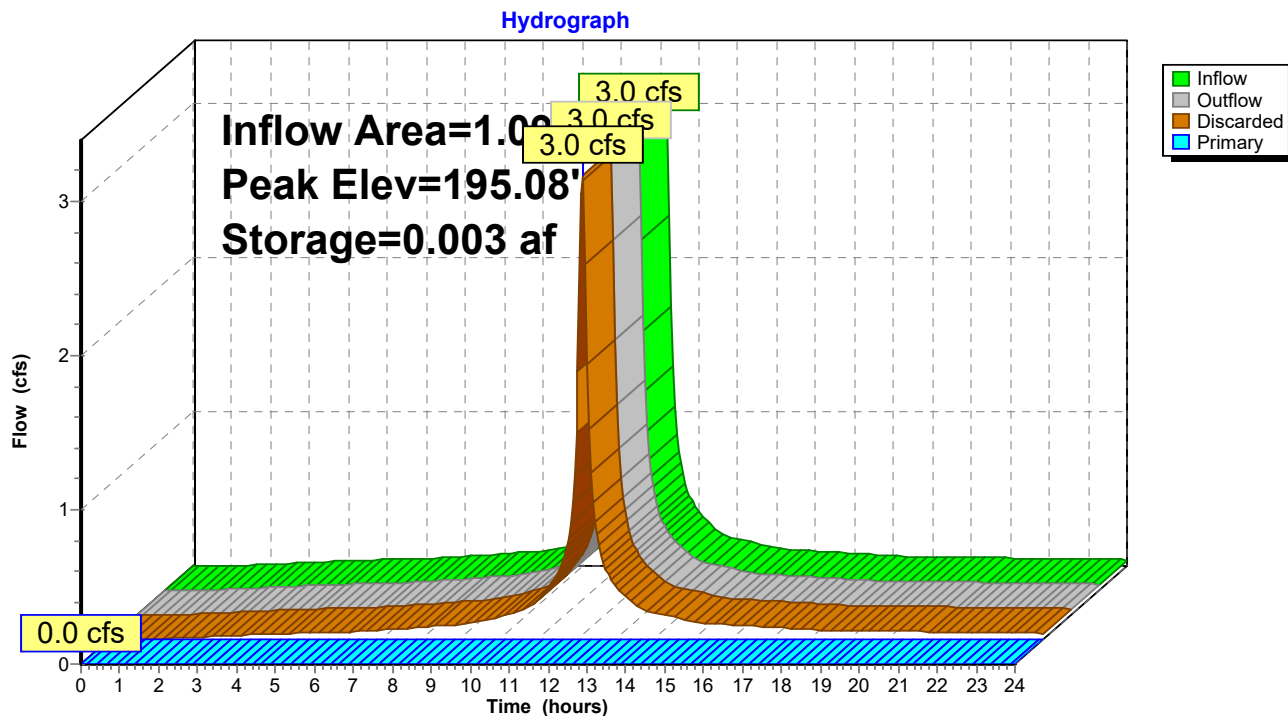
96 Chambers

462.1 cy Field

274.2 cy Stone



Pond 6P: Subsurface Infiltration System B



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Page 66

Summary for Pond 12P: Infiltration Basin - Lot 3

Inflow Area = 11.710 ac, 76.94% Impervious, Inflow Depth > 1.69" for 2-Year event
 Inflow = 19.9 cfs @ 12.20 hrs, Volume= 1.653 af
 Outflow = 4.0 cfs @ 12.72 hrs, Volume= 1.650 af, Atten= 80%, Lag= 31.3 min
 Discarded = 4.0 cfs @ 12.72 hrs, Volume= 1.650 af
 Primary = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af
 Routed to Reach 9R : Rabbit Hill Brook

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 192.41' @ 12.72 hrs Surf.Area= 15,926 sf Storage= 20,353 cf

Plug-Flow detention time= 40.3 min calculated for 1.650 af (100% of inflow)
 Center-of-Mass det. time= 39.3 min (882.1 - 842.8)

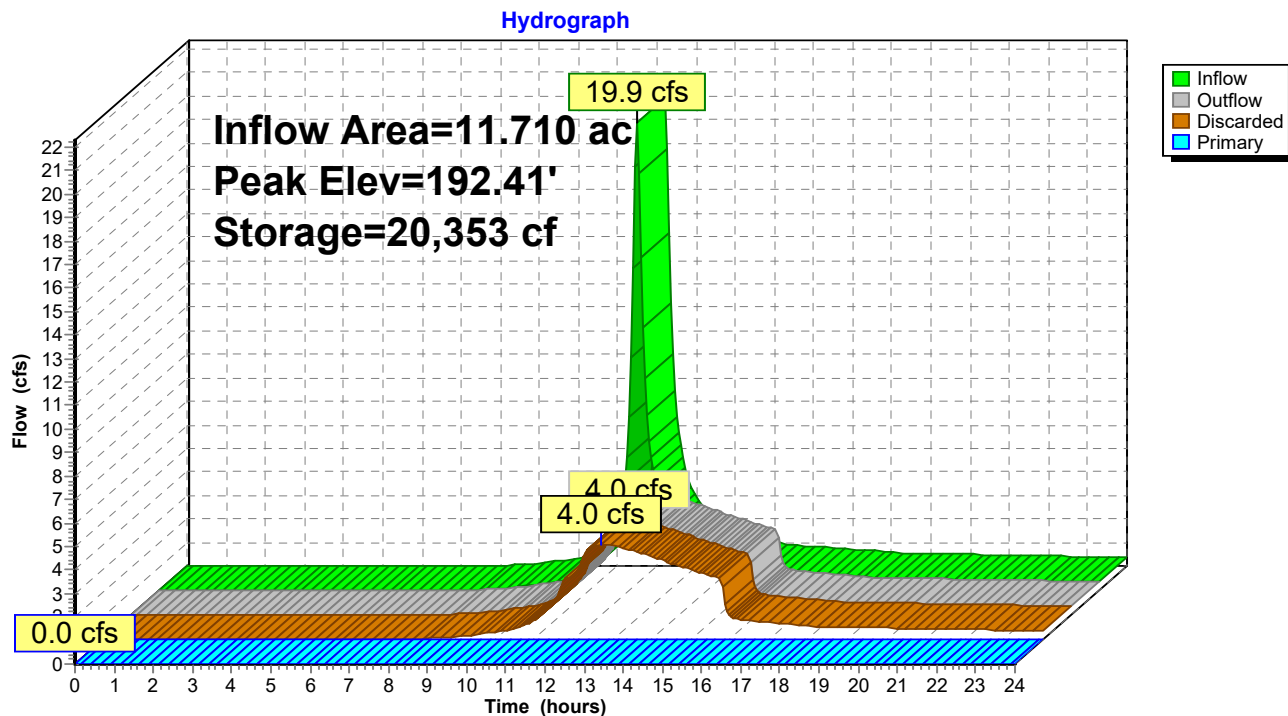
Volume	Invert	Avail.Storage	Storage Description		
#1	191.00'	145,471 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
191.00	13,068	493.0	0	0	13,068
192.00	15,090	518.0	14,067	14,067	15,142
194.00	19,436	568.0	34,434	48,501	19,597
196.00	24,184	619.0	43,534	92,035	24,559
198.00	29,335	669.0	53,436	145,471	29,843

Device	Routing	Invert	Outlet Devices
#1	Discarded	191.00'	8.270 in/hr Exfiltration over Wetted area Conductivity to Groundwater Elevation = 187.00'
#2	Primary	197.00'	10.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Discarded OutFlow Max=4.0 cfs @ 12.72 hrs HW=192.40' (Free Discharge)
 ↑**1=Exfiltration** (Controls 4.0 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=191.00' (Free Discharge)
 ↑**2=Sharp-Crested Rectangular Weir** (Controls 0.0 cfs)

Pond 12P: Infiltration Basin - Lot 3



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Page 68

Summary for Pond 14P: Infiltration System

Inflow Area = 0.210 ac, 100.00% Impervious, Inflow Depth > 2.98" for 2-Year event
 Inflow = 0.6 cfs @ 12.17 hrs, Volume= 0.052 af
 Outflow = 0.3 cfs @ 12.34 hrs, Volume= 0.052 af, Atten= 55%, Lag= 10.5 min
 Discarded = 0.3 cfs @ 12.34 hrs, Volume= 0.052 af
 Primary = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af
 Routed to Pond 2P : Retention Basin C3

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 212.96' @ 12.34 hrs Surf.Area= 0.029 ac Storage= 0.005 af

Plug-Flow detention time= 3.6 min calculated for 0.052 af (100% of inflow)
 Center-of-Mass det. time= 3.5 min (764.4 - 760.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	212.50'	0.021 af	14.75'W x 85.29'L x 2.71'H Infiltration System 0.078 af Overall - 0.026 af Embedded = 0.052 af x 40.0% Voids
#2A	213.00'	0.026 af	Cultec R-180 x 52 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
		0.047 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	212.50'	8.270 in/hr Exfiltration over Wetted area Conductivity to Groundwater Elevation = 192.90'
#2	Primary	213.00'	12.0" Round Culvert L= 142.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 213.00' / 208.90' S= 0.0289 ' /' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#3	Device 2	214.70'	18.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.3 cfs @ 12.34 hrs HW=212.96' (Free Discharge)↑ **1=Exfiltration** (Controls 0.3 cfs)**Primary OutFlow** Max=0.0 cfs @ 0.00 hrs HW=212.50' (Free Discharge)↑ **2=Culvert** (Controls 0.0 cfs)↑ **3=Orifice/Grate** (Controls 0.0 cfs)

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Page 69

Pond 14P: Infiltration System - Chamber Wizard Infiltration System

Chamber Model = Cultec R-180 (Cultec Recharger® 180HD)

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

36.0" Wide + 3.0" Spacing = 39.0" C-C Row Spacing

13 Chambers/Row x 6.33' Long +1.00' Row Adjustment = 83.29' Row Length +12.0" End Stone x 2 = 85.29' Base Length

4 Rows x 36.0" Wide + 3.0" Spacing x 3 + 12.0" Side Stone x 2 = 14.75' Base Width

6.0" Stone Base + 20.5" Chamber Height + 6.0" Stone Cover = 2.71' Field Height

52 Chambers x 21.8 cf +1.00' Row Adjustment x 3.44 sf x 4 Rows = 1,145.9 cf Chamber Storage

3,407.2 cf Field - 1,145.9 cf Chambers = 2,261.3 cf Stone x 40.0% Voids = 904.5 cf Stone Storage

Chamber Storage + Stone Storage = 2,050.4 cf = 0.047 af

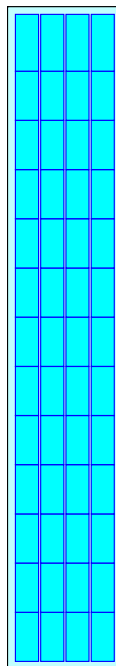
Overall Storage Efficiency = 60.2%

Overall System Size = 85.29' x 14.75' x 2.71'

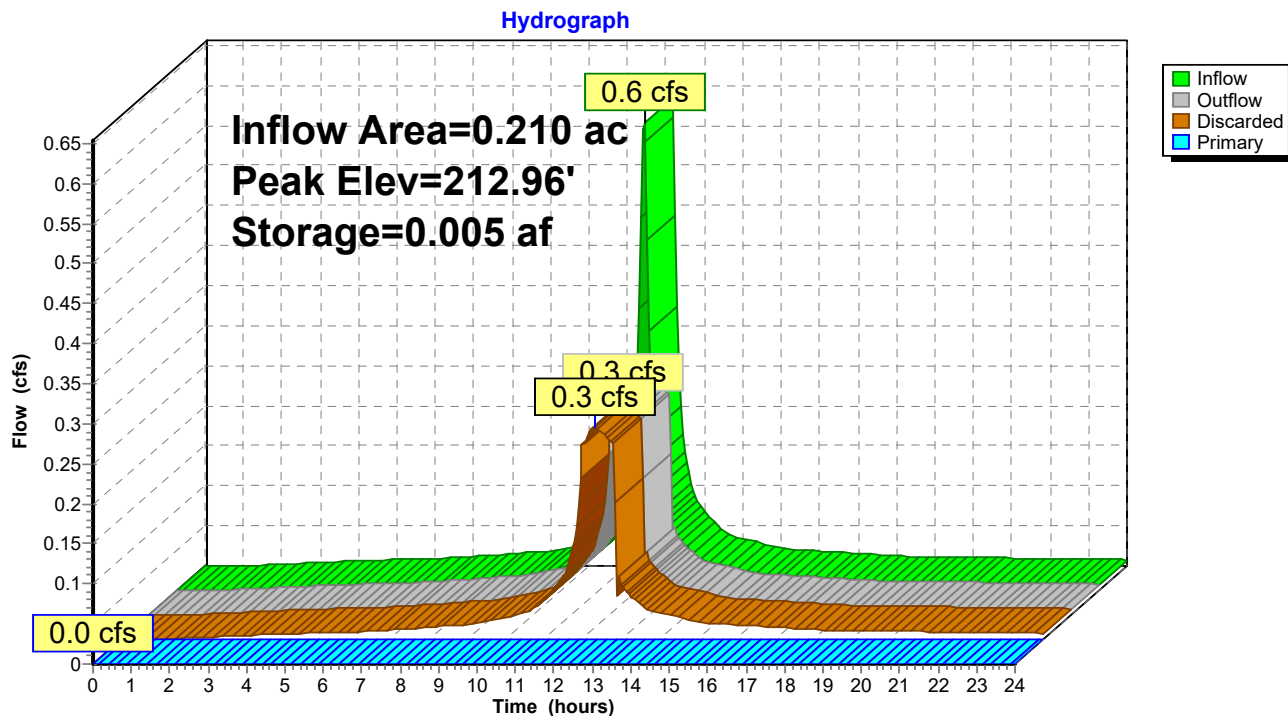
52 Chambers

126.2 cy Field

83.8 cy Stone



Pond 14P: Infiltration System



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Page 71

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 3S: Watershed BLDG-A Runoff Area=1.091 ac 100.00% Impervious Runoff Depth>4.62"
Tc=10.0 min CN=98 Runoff=4.6 cfs 0.420 af

Subcatchment 5S: Watershed BLDG-B Runoff Area=1.091 ac 100.00% Impervious Runoff Depth>4.62"
Tc=10.0 min CN=98 Runoff=4.6 cfs 0.420 af

Subcatchment 8S: Watershed DA Runoff Area=8.130 ac 37.52% Impervious Runoff Depth>1.35"
Flow Length=1,075' Tc=10.5 min CN=62 Runoff=10.7 cfs 0.913 af

Subcatchment 9S: Watershed DC Runoff Area=8.500 ac 0.00% Impervious Runoff Depth>0.27"
Flow Length=1,792' Tc=36.9 min CN=42 Runoff=0.4 cfs 0.191 af

Subcatchment 10S: Watershed DB Runoff Area=1.310 ac 0.00% Impervious Runoff Depth>0.01"
Flow Length=228' Tc=15.0 min CN=31 Runoff=0.0 cfs 0.001 af

Subcatchment 11S: Watershed DD Runoff Area=11.710 ac 76.94% Impervious Runoff Depth>3.13"
Flow Length=752' Tc=11.8 min CN=84 Runoff=36.4 cfs 3.059 af

Subcatchment 13S: Building & Canopy Runoff Area=0.210 ac 100.00% Impervious Runoff Depth>4.62"
Tc=10.0 min CN=98 Runoff=0.9 cfs 0.081 af

Reach 9R: Rabbit Hill Brook Inflow=0.4 cfs 0.191 af
Outflow=0.4 cfs 0.191 af

Reach 11R: South Property Line Inflow=0.0 cfs 0.001 af
Outflow=0.0 cfs 0.001 af

Pond 2P: Retention Basin C3 Peak Elev=187.29' Storage=39,765 cf Inflow=10.7 cfs 0.913 af
Discarded=0.0 cfs 0.000 af Primary=0.0 cfs 0.000 af Outflow=0.0 cfs 0.000 af

Pond 4P: Subsurface Infiltration System A Peak Elev=199.00' Storage=0.010 af Inflow=4.6 cfs 0.420 af
Discarded=3.6 cfs 0.420 af Primary=0.0 cfs 0.000 af Outflow=3.6 cfs 0.420 af

Pond 6P: Subsurface Infiltration System B Peak Elev=195.32' Storage=0.010 af Inflow=4.6 cfs 0.420 af
Discarded=3.6 cfs 0.420 af Primary=0.0 cfs 0.000 af Outflow=3.6 cfs 0.420 af

Pond 12P: Infiltration Basin - Lot 3 Peak Elev=193.86' Storage=45,743 cf Inflow=36.4 cfs 3.059 af
Discarded=5.8 cfs 3.054 af Primary=0.0 cfs 0.000 af Outflow=5.8 cfs 3.054 af

Pond 14P: Infiltration System Peak Elev=213.28' Storage=0.012 af Inflow=0.9 cfs 0.081 af
Discarded=0.3 cfs 0.081 af Primary=0.0 cfs 0.000 af Outflow=0.3 cfs 0.081 af

Total Runoff Area = 32.042 ac Runoff Volume = 5.084 af Average Runoff Depth = 1.90"
54.90% Pervious = 17.590 ac 45.10% Impervious = 14.452 ac

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Page 72

Summary for Subcatchment 3S: Watershed BLDG-A

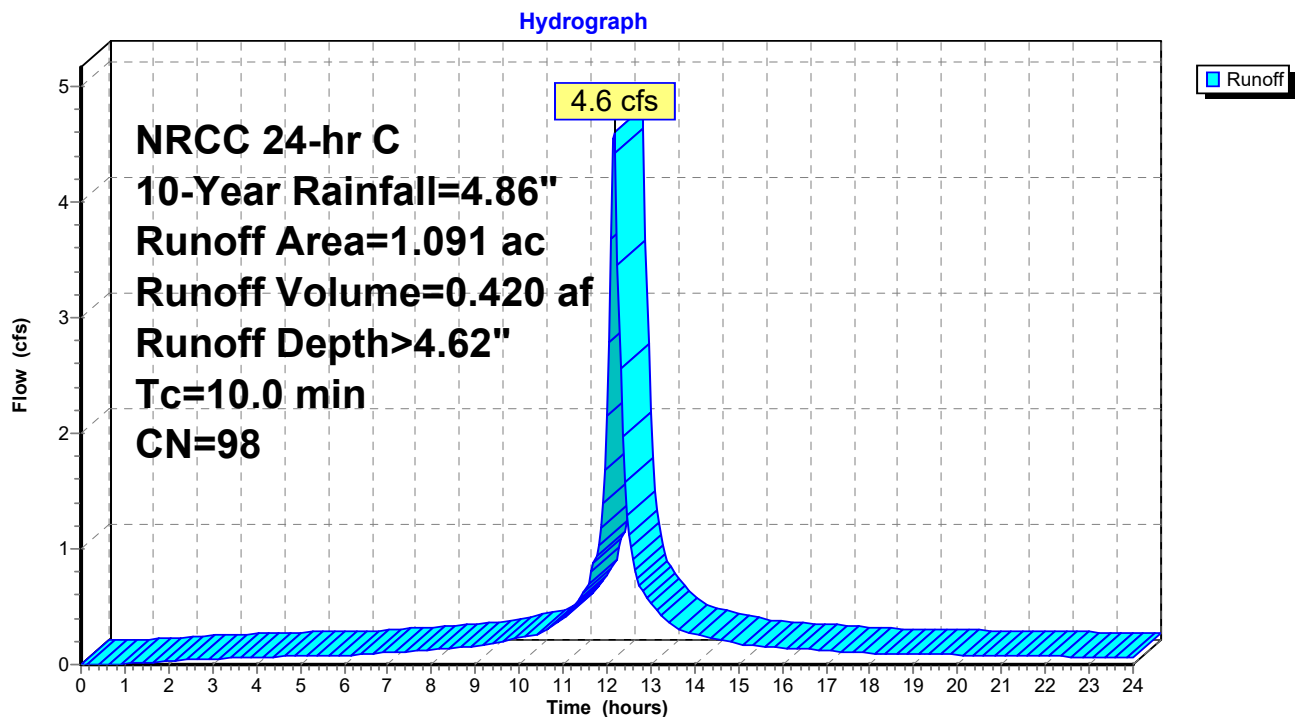
Runoff = 4.6 cfs @ 12.17 hrs, Volume= 0.420 af, Depth> 4.62"
Routed to Pond 4P : Subsurface Infiltration System A

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=4.86"

Area (ac)	CN	Description
1.091	98	Unconnected roofs, HSG A
1.091		100.00% Impervious Area
1.091		100.00% Unconnected

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

Subcatchment 3S: Watershed BLDG-A



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Page 73

Summary for Subcatchment 5S: Watershed BLDG-B

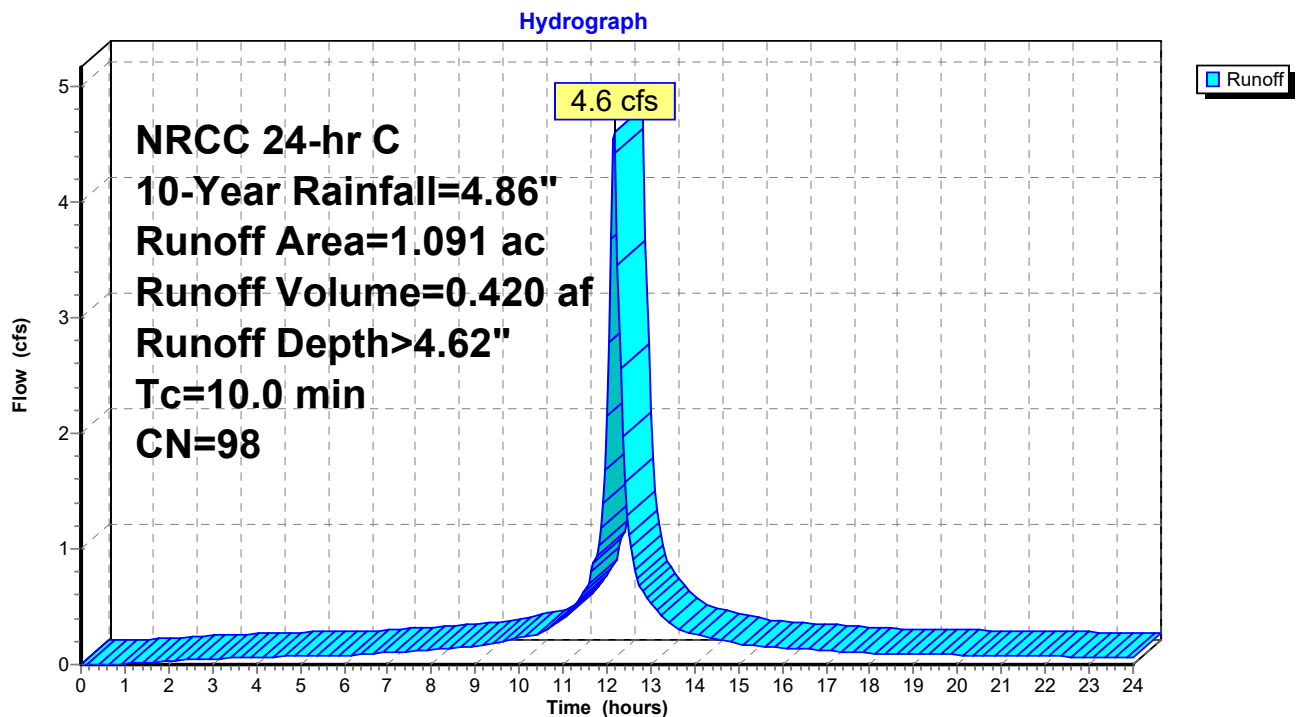
Runoff = 4.6 cfs @ 12.17 hrs, Volume= 0.420 af, Depth> 4.62"
Routed to Pond 6P : Subsurface Infiltration System B

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=4.86"

Area (ac)	CN	Description
1.091	98	Unconnected roofs, HSG A
1.091		100.00% Impervious Area
1.091		100.00% Unconnected

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

Subcatchment 5S: Watershed BLDG-B



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Page 74

Summary for Subcatchment 8S: Watershed DA

[47] Hint: Peak is 174% of capacity of segment #3

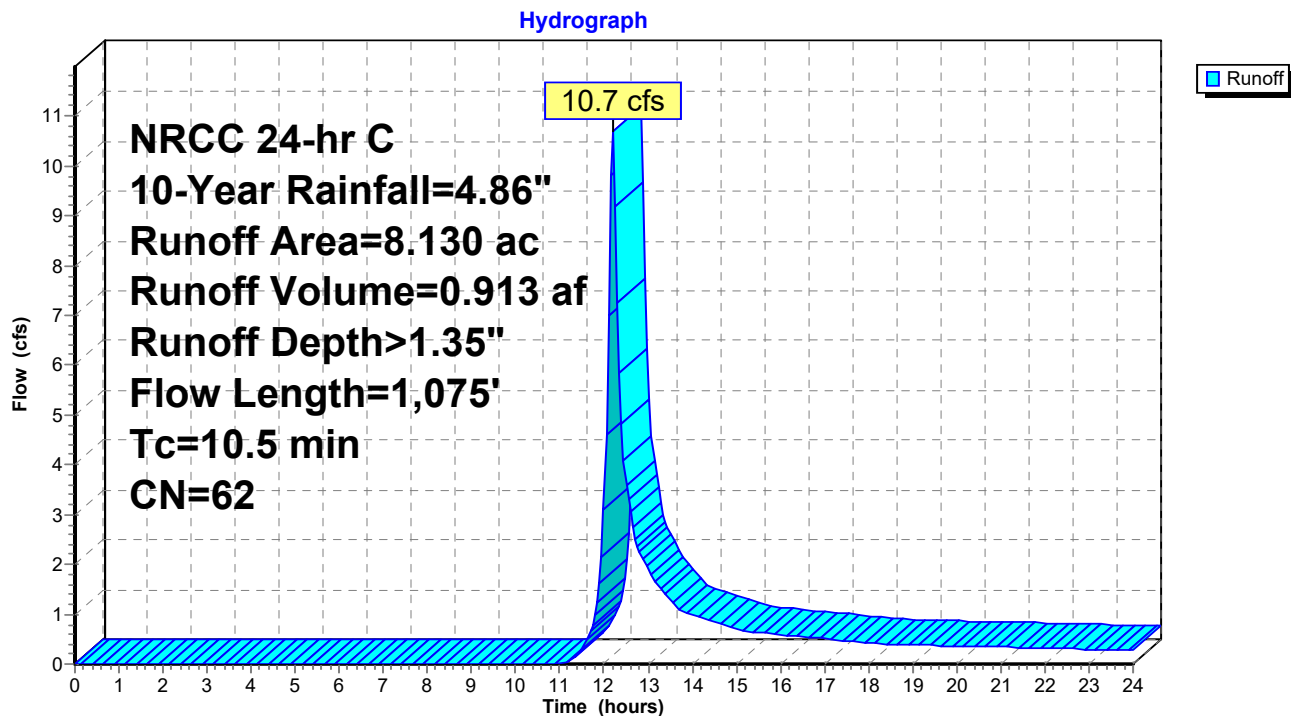
Runoff = 10.7 cfs @ 12.19 hrs, Volume= 0.913 af, Depth> 1.35"
 Routed to Pond 2P : Retention Basin C3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 NRCC 24-hr C 10-Year Rainfall=4.86"

Area (ac)	CN	Description
0.690	98	Paved roads w/curbs & sewers, HSG A
2.360	98	Paved parking, HSG A
1.030	39	>75% Grass cover, Good, HSG A
0.440	98	Water Surface, 0% imp, HSG A
1.890	30	Woods, Good, HSG A
1.720	39	>75% Grass cover, Good, HSG A
8.130	62	Weighted Average
5.080		62.48% Pervious Area
3.050		37.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	50	0.1000	0.13		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
2.7	230	0.0400	1.40		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.1	50	0.0300	7.86	6.17	Pipe Channel, 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
1.2	745	0.0150	10.23	50.24	Pipe Channel, 30.0" Round Area= 4.9 sf Perim= 7.9' r= 0.63' n= 0.013
10.5	1,075	Total			

Subcatchment 8S: Watershed DA



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Page 76

Summary for Subcatchment 9S: Watershed DC

Runoff = 0.4 cfs @ 13.16 hrs, Volume= 0.191 af, Depth> 0.27"
 Routed to Reach 9R : Rabbit Hill Brook

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 NRCC 24-hr C 10-Year Rainfall=4.86"

Area (ac)	CN	Description
0.430	39	>75% Grass cover, Good, HSG A
5.970	30	Woods, Good, HSG A
2.100	77	Woods, Good, HSG D
8.500	42	Weighted Average
8.500		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	50	0.0100	0.05		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
0.6	86	0.2000	2.24		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
13.3	848	0.0050	1.06		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
5.2	350	0.0500	1.12		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
1.5	458	0.0040	5.06	91.16	Trap/Vee/Rect Channel Flow, Bot.W=5.00' D=2.00' Z= 2.0 ' Top.W=13.00' n= 0.022
36.9	1,792	Total			

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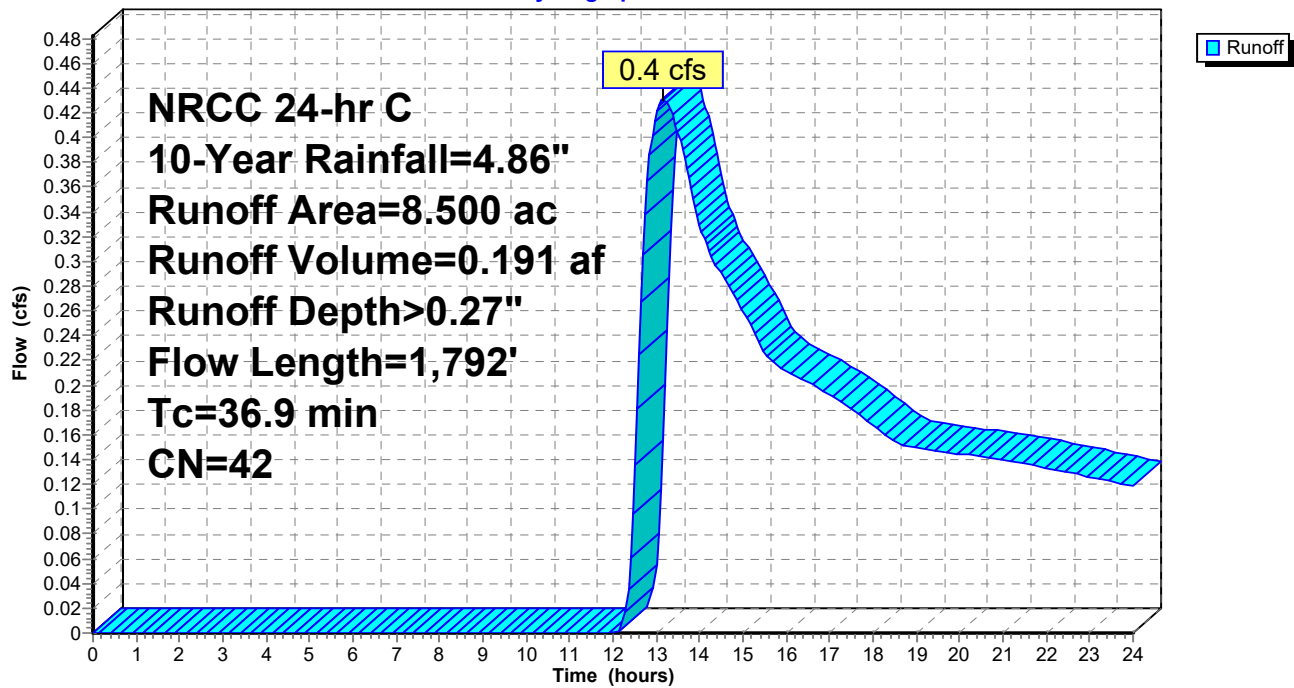
NRCC 24-hr C 10-Year Rainfall=4.86"

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Page 77

Subcatchment 9S: Watershed DC

Hydrograph



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Page 78

Summary for Subcatchment 10S: Watershed DB

[73] Warning: Peak may fall outside time span

Runoff = 0.0 cfs @ 24.00 hrs, Volume= 0.001 af, Depth> 0.01"
 Routed to Reach 11R : South Property Line

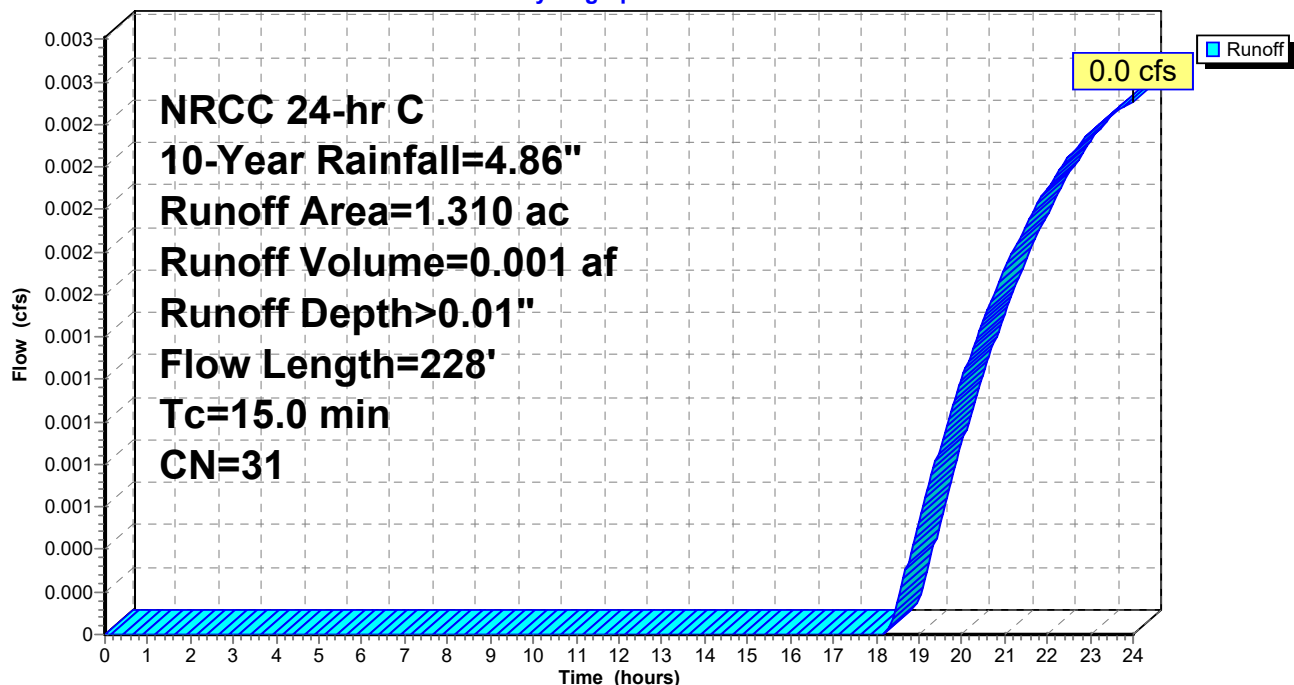
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 NRCC 24-hr C 10-Year Rainfall=4.86"

Area (ac)	CN	Description
1.210	30	Woods, Good, HSG A
0.100	39	>75% Grass cover, Good, HSG A
1.310	31	Weighted Average
1.310		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.3	50	0.0200	0.07		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
2.7	178	0.0500	1.12		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
15.0	228	Total			

Subcatchment 10S: Watershed DB

Hydrograph



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Page 79

Summary for Subcatchment 11S: Watershed DD

[47] Hint: Peak is 1022% of capacity of segment #3

Runoff = 36.4 cfs @ 12.20 hrs, Volume= 3.059 af, Depth> 3.13"
 Routed to Pond 12P : Infiltration Basin - Lot 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 NRCC 24-hr C 10-Year Rainfall=4.86"

Area (ac)	CN	Description
2.700	39	>75% Grass cover, Good, HSG A
4.120	98	Unconnected roofs, HSG A
4.280	98	Paved parking, HSG A
0.610	98	Water Surface, HSG A
11.710	84	Weighted Average
2.700		23.06% Pervious Area
9.010		76.94% Impervious Area
4.120		45.73% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.0	50	0.0160	0.09		Sheet Flow, Grass: Dense n= 0.240 P2= 3.20"
0.4	62	0.1300	2.52		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
2.4	640	0.0100	4.54	3.56	Pipe Channel, 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
11.8	752	Total			

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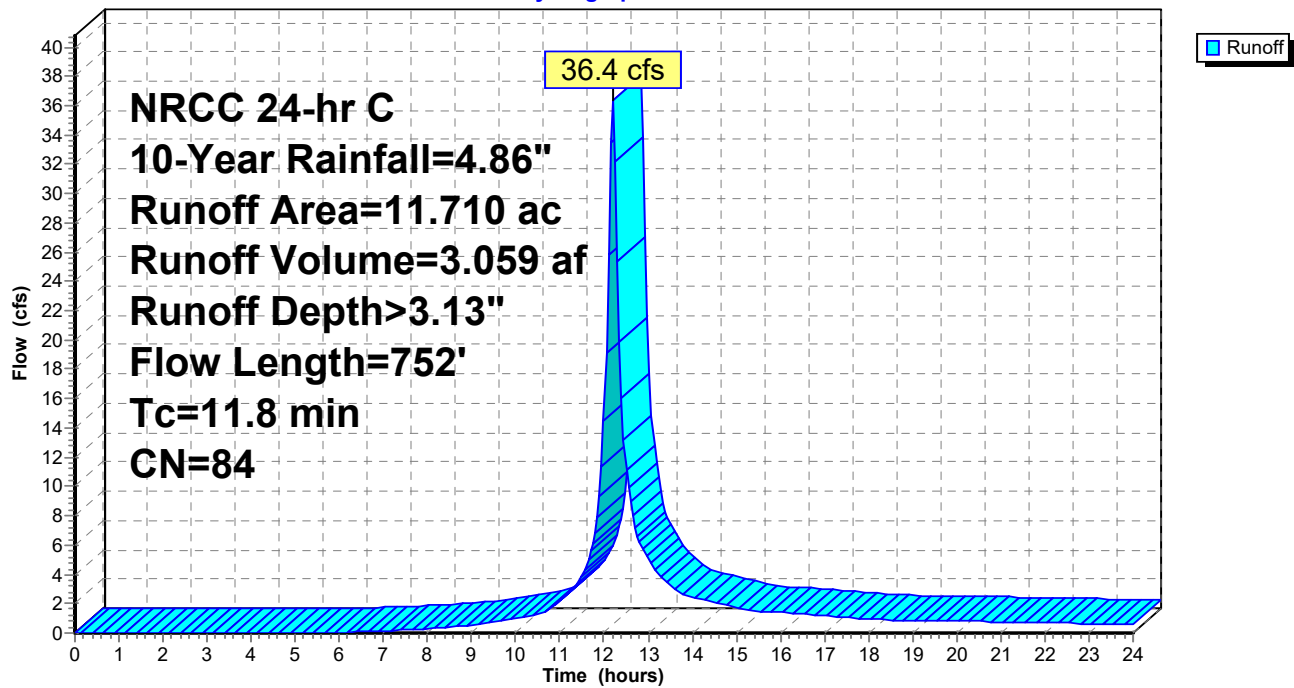
NRCC 24-hr C 10-Year Rainfall=4.86"

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Page 80

Subcatchment 11S: Watershed DD

Hydrograph



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Page 81

Summary for Subcatchment 13S: Building & Canopy

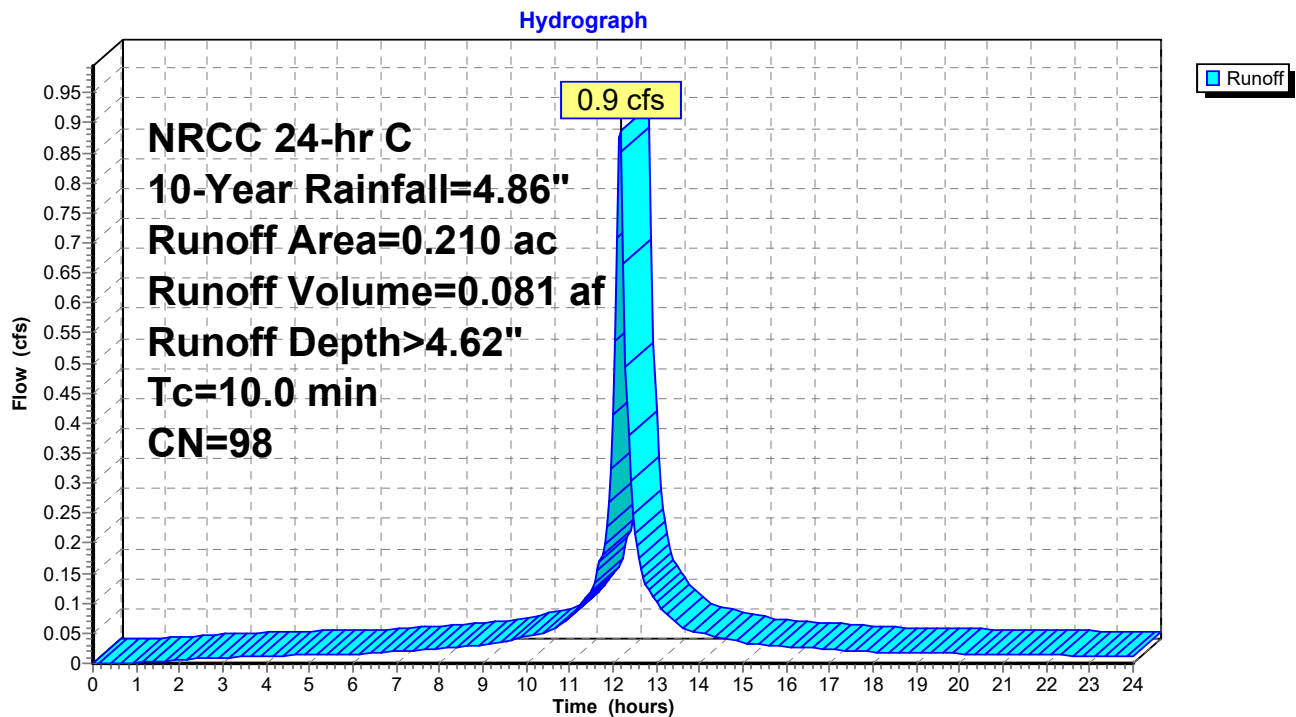
Runoff = 0.9 cfs @ 12.17 hrs, Volume= 0.081 af, Depth> 4.62"
Routed to Pond 14P : Infiltration System

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=4.86"

Area (ac)	CN	Description
0.210	98	Unconnected roofs, HSG A
0.210		100.00% Impervious Area
0.210		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,
6.0	0				Total, Increased to minimum Tc = 10.0 min

Subcatchment 13S: Building & Canopy



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Page 82

Summary for Reach 9R: Rabbit Hill Brook

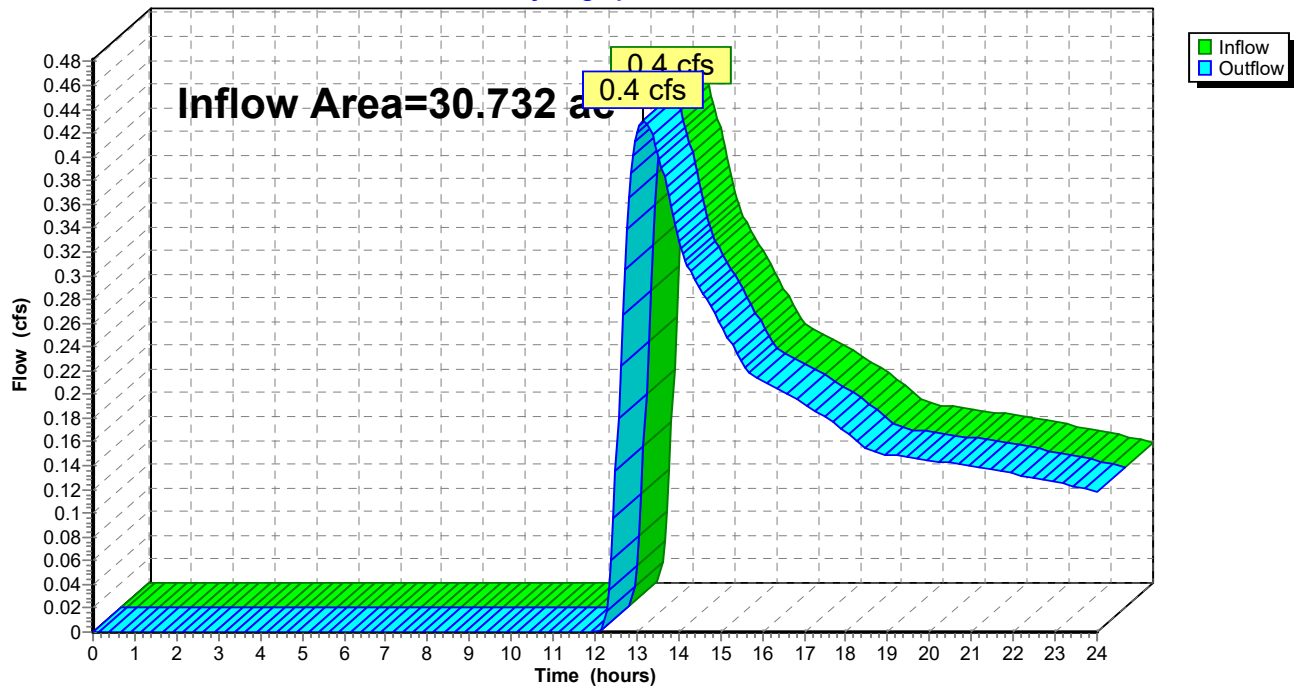
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 30.732 ac, 47.03% Impervious, Inflow Depth > 0.07" for 10-Year event
Inflow = 0.4 cfs @ 13.16 hrs, Volume= 0.191 af
Outflow = 0.4 cfs @ 13.16 hrs, Volume= 0.191 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach 9R: Rabbit Hill Brook

Hydrograph



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Page 83

Summary for Reach 11R: South Property Line

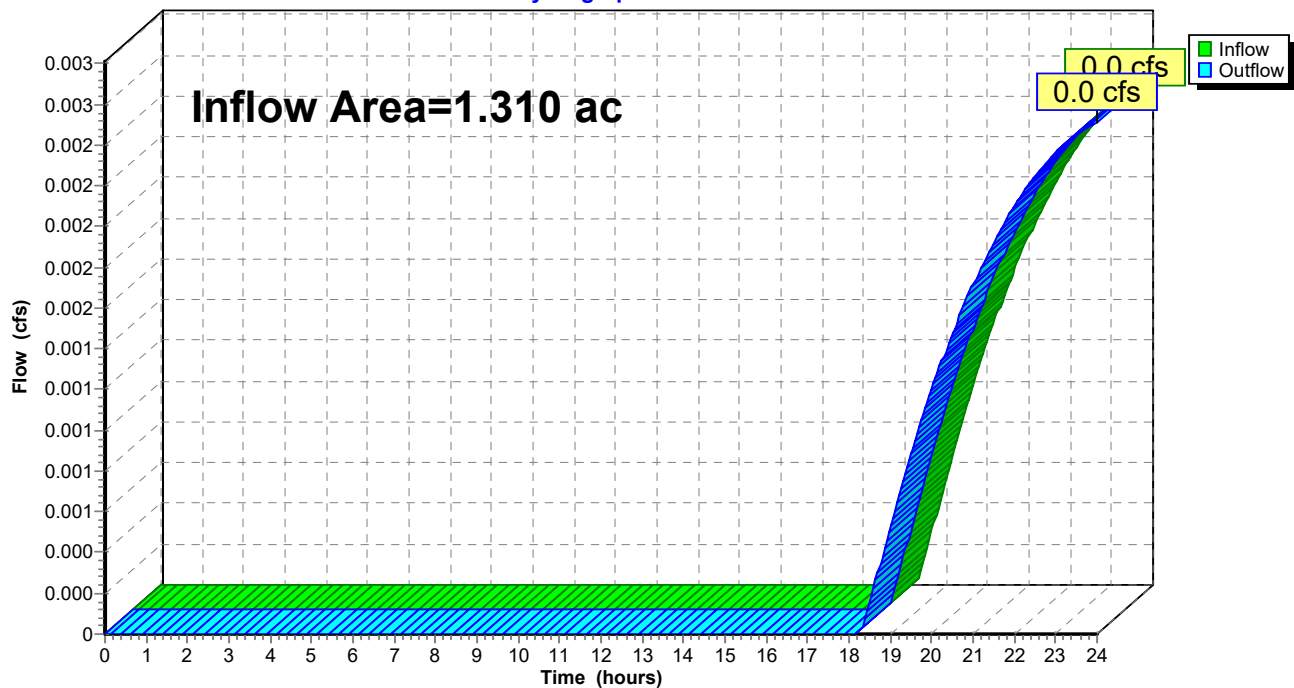
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.310 ac, 0.00% Impervious, Inflow Depth > 0.01" for 10-Year event
Inflow = 0.0 cfs @ 24.00 hrs, Volume= 0.001 af
Outflow = 0.0 cfs @ 24.00 hrs, Volume= 0.001 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach 11R: South Property Line

Hydrograph



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Page 84

Summary for Pond 2P: Retention Basin C3

Inflow Area = 10.522 ac, 51.72% Impervious, Inflow Depth > 1.04" for 10-Year event
 Inflow = 10.7 cfs @ 12.19 hrs, Volume= 0.913 af
 Outflow = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
 Discarded = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af
 Primary = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af
 Routed to Reach 9R : Rabbit Hill Brook

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 187.29' @ 24.00 hrs Surf.Area= 33,472 sf Storage= 39,765 cf

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

Volume	Invert	Avail.Storage	Storage Description
#1	186.01'	143,139 cf	Custom Stage Data (Irregular) Listed below (Recalc)

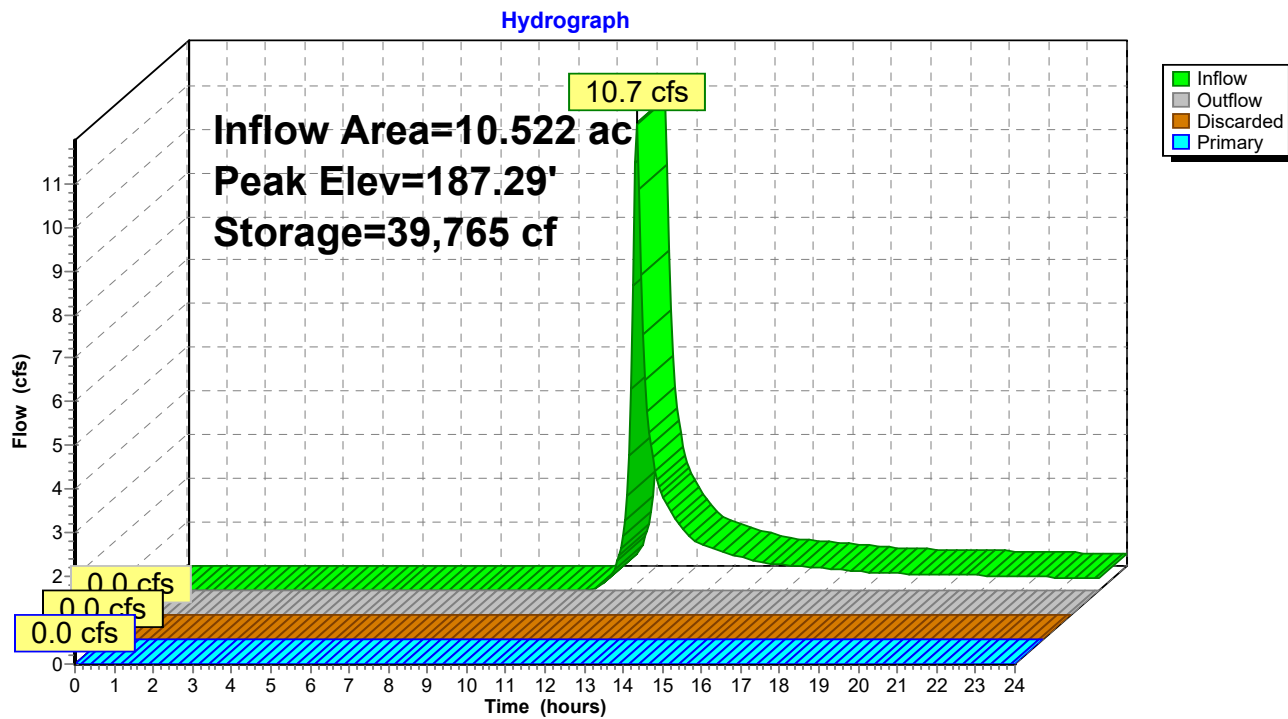
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
186.01	28,880	726.0	0	0	28,880
187.50	34,273	765.0	46,992	46,992	33,639
189.20	39,846	811.0	62,942	109,933	39,561
190.00	43,190	1,045.0	33,205	143,139	74,130

Device	Routing	Invert	Outlet Devices
#1	Primary	189.20'	10.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)
#2	Discarded	188.00'	21.038 in/hr Exfiltration over Surface area above 188.00' Conductivity to Groundwater Elevation = 186.00' Excluded Surface area = 35,869 sf

Discarded OutFlow Max=0.0 cfs @ 0.00 hrs HW=186.01' (Free Discharge)
 ↑**2=Exfiltration** (Controls 0.0 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=186.01' (Free Discharge)
 ↑**1=Sharp-Crested Rectangular Weir** (Controls 0.0 cfs)

Pond 2P: Retention Basin C3



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Page 86

Summary for Pond 4P: Subsurface Infiltration System A

[85] Warning: Oscillations may require smaller dt or Finer Routing (severity=2)

Inflow Area = 1.091 ac, 100.00% Impervious, Inflow Depth > 4.62" for 10-Year event
 Inflow = 4.6 cfs @ 12.17 hrs, Volume= 0.420 af
 Outflow = 3.6 cfs @ 12.24 hrs, Volume= 0.420 af, Atten= 22%, Lag= 4.5 min
 Discarded = 3.6 cfs @ 12.24 hrs, Volume= 0.420 af
 Primary = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af
 Routed to Pond 2P : Retention Basin C3

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 199.00' @ 12.24 hrs Surf.Area= 0.081 ac Storage= 0.010 af

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 0.5 min (753.0 - 752.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	198.70'	0.068 af	30.50'W x 115.50'L x 3.54'H Field A 0.286 af Overall - 0.116 af Embedded = 0.170 af x 40.0% Voids
#2A	199.20'	0.116 af	Cultec R-330XLHD x 96 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 6 rows
#3	200.66'	0.000 af	1.50'D x 2.84'H Vertical Cone/Cylinder
		0.185 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	198.70'	42.077 in/hr Exfiltration over Wetted area Conductivity to Groundwater Elevation = 186.00'
#2	Primary	200.66'	12.0" Round Culvert L= 118.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 200.66' / 199.00' S= 0.0141 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#3	Primary	202.25'	4.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Discarded OutFlow Max=3.6 cfs @ 12.24 hrs HW=199.00' (Free Discharge)↑ **1=Exfiltration** (Controls 3.6 cfs)**Primary OutFlow** Max=0.0 cfs @ 0.00 hrs HW=198.70' TW=193.50' (Fixed TW Elev= 193.50')↑ **2=Culvert** (Controls 0.0 cfs)↑ **3=Sharp-Crested Rectangular Weir** (Controls 0.0 cfs)

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Page 87

Pond 4P: Subsurface Infiltration System A - Chamber Wizard Field A

Chamber Model = Cultec R-330XLHD (Cultec Recharger® 330XLHD)

Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf

Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap

Row Length Adjustment= +1.50' x 7.45 sf x 6 rows

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

16 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 113.50' Row Length +12.0" End Stone x 2 =
115.50' Base Length

6 Rows x 52.0" Wide + 6.0" Spacing x 5 + 12.0" Side Stone x 2 = 30.50' Base Width

6.0" Stone Base + 30.5" Chamber Height + 6.0" Stone Cover = 3.54' Field Height

96 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 6 Rows = 5,074.1 cf Chamber Storage

12,476.4 cf Field - 5,074.1 cf Chambers = 7,402.3 cf Stone x 40.0% Voids = 2,960.9 cf Stone Storage

Chamber Storage + Stone Storage = 8,035.0 cf = 0.184 af

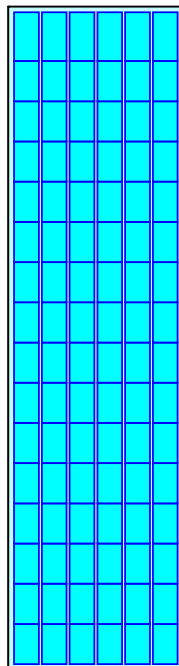
Overall Storage Efficiency = 64.4%

Overall System Size = 115.50' x 30.50' x 3.54'

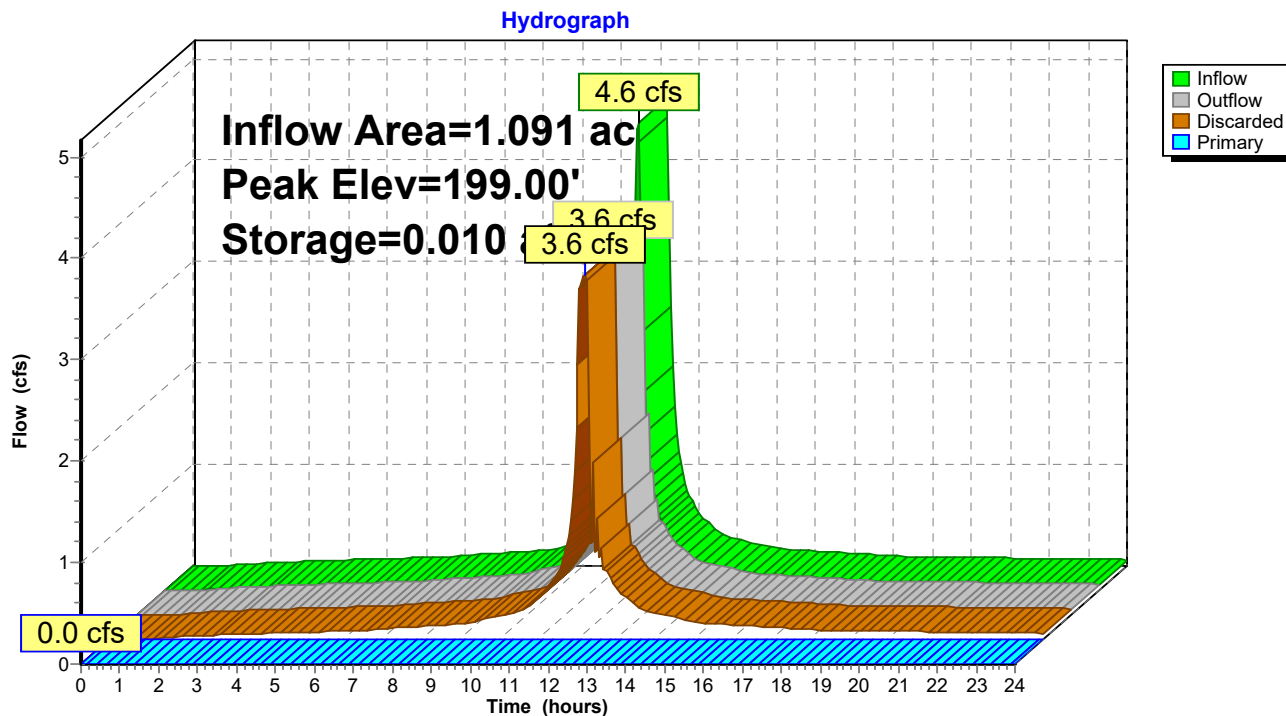
96 Chambers

462.1 cy Field

274.2 cy Stone



Pond 4P: Subsurface Infiltration System A



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Page 89

Summary for Pond 6P: Subsurface Infiltration System B

Inflow Area = 1.091 ac, 100.00% Impervious, Inflow Depth > 4.62" for 10-Year event
 Inflow = 4.6 cfs @ 12.17 hrs, Volume= 0.420 af
 Outflow = 3.6 cfs @ 12.24 hrs, Volume= 0.420 af, Atten= 21%, Lag= 4.4 min
 Discarded = 3.6 cfs @ 12.24 hrs, Volume= 0.420 af
 Primary = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af
 Routed to Pond 2P : Retention Basin C3

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 195.32' @ 12.24 hrs Surf.Area= 0.081 ac Storage= 0.010 af

Plug-Flow detention time= 0.8 min calculated for 0.420 af (100% of inflow)
 Center-of-Mass det. time= 0.7 min (753.2 - 752.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	195.00'	0.068 af	30.50'W x 115.50'L x 3.54'H Field A 0.286 af Overall - 0.116 af Embedded = 0.170 af x 40.0% Voids
#2A	195.50'	0.116 af	Cultec R-330XLHD x 96 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 6 rows
#3	197.00'	0.000 af	1.50'D x 7.00'H Vertical Cone/Cylinder
		0.185 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	195.00'	42.077 in/hr Exfiltration over Wetted area Conductivity to Groundwater Elevation = 186.00'
#2	Primary	198.60'	12.0" Round Culvert L= 95.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 198.60' / 192.00' S= 0.0695 ' /' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Discarded OutFlow Max=3.6 cfs @ 12.24 hrs HW=195.31' (Free Discharge)
 ↑ **1=Exfiltration** (Controls 3.6 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=195.00' TW=191.00' (Fixed TW Elev= 191.00')
 ↑ **2=Culvert** (Controls 0.0 cfs)

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Page 90

Pond 6P: Subsurface Infiltration System B - Chamber Wizard Field A

Chamber Model = Cultec R-330XLHD (Cultec Recharger® 330XLHD)

Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf

Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap

Row Length Adjustment= +1.50' x 7.45 sf x 6 rows

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

16 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 113.50' Row Length +12.0" End Stone x 2 =
115.50' Base Length

6 Rows x 52.0" Wide + 6.0" Spacing x 5 + 12.0" Side Stone x 2 = 30.50' Base Width

6.0" Stone Base + 30.5" Chamber Height + 6.0" Stone Cover = 3.54' Field Height

96 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 6 Rows = 5,074.1 cf Chamber Storage

12,476.4 cf Field - 5,074.1 cf Chambers = 7,402.3 cf Stone x 40.0% Voids = 2,960.9 cf Stone Storage

Chamber Storage + Stone Storage = 8,035.0 cf = 0.184 af

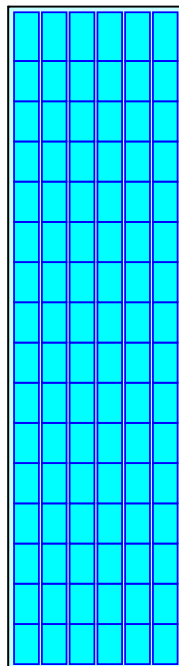
Overall Storage Efficiency = 64.4%

Overall System Size = 115.50' x 30.50' x 3.54'

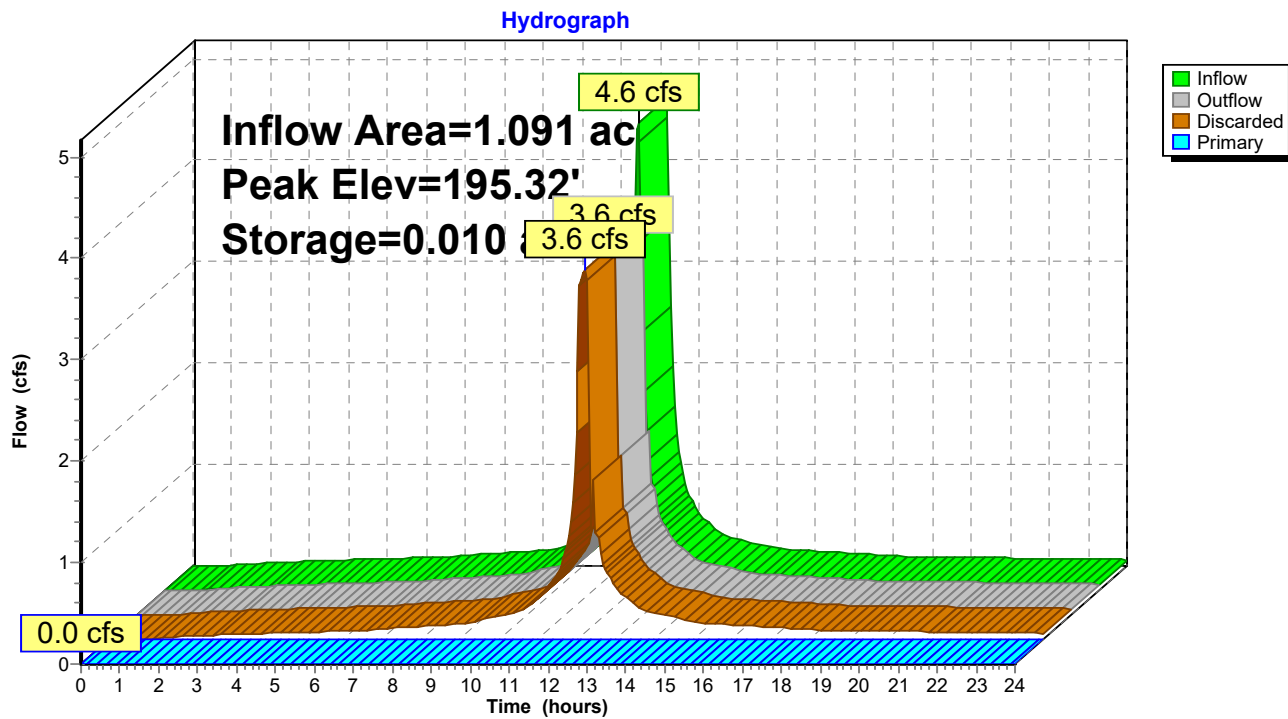
96 Chambers

462.1 cy Field

274.2 cy Stone



Pond 6P: Subsurface Infiltration System B



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Page 92

Summary for Pond 12P: Infiltration Basin - Lot 3

Inflow Area = 11.710 ac, 76.94% Impervious, Inflow Depth > 3.13" for 10-Year event
 Inflow = 36.4 cfs @ 12.20 hrs, Volume= 3.059 af
 Outflow = 5.8 cfs @ 12.87 hrs, Volume= 3.054 af, Atten= 84%, Lag= 40.2 min
 Discarded = 5.8 cfs @ 12.87 hrs, Volume= 3.054 af
 Primary = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af
 Routed to Reach 9R : Rabbit Hill Brook

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 193.86' @ 12.87 hrs Surf.Area= 19,107 sf Storage= 45,743 cf

Plug-Flow detention time= 72.6 min calculated for 3.048 af (100% of inflow)
 Center-of-Mass det. time= 71.5 min (895.0 - 823.5)

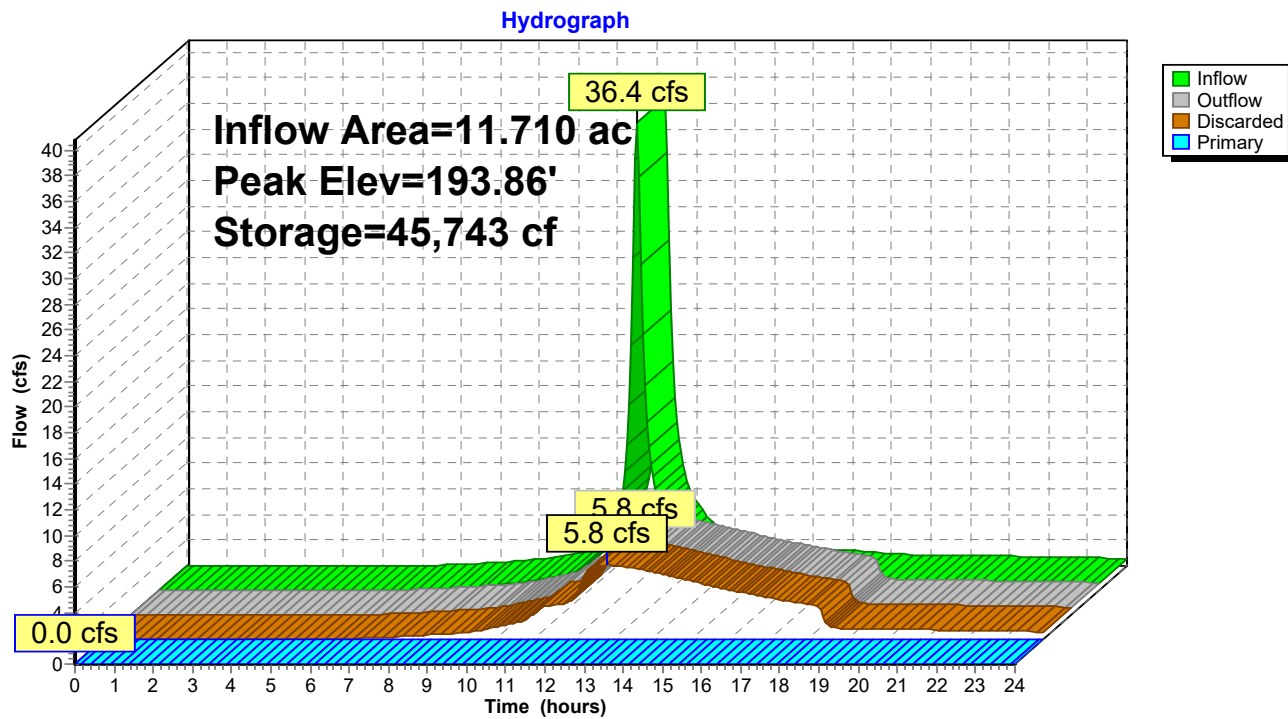
Volume	Invert	Avail.Storage	Storage Description		
#1	191.00'	145,471 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
191.00	13,068	493.0	0	0	13,068
192.00	15,090	518.0	14,067	14,067	15,142
194.00	19,436	568.0	34,434	48,501	19,597
196.00	24,184	619.0	43,534	92,035	24,559
198.00	29,335	669.0	53,436	145,471	29,843

Device	Routing	Invert	Outlet Devices
#1	Discarded	191.00'	8.270 in/hr Exfiltration over Wetted area Conductivity to Groundwater Elevation = 187.00'
#2	Primary	197.00'	10.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Discarded OutFlow Max=5.8 cfs @ 12.87 hrs HW=193.86' (Free Discharge)
 ↑**1=Exfiltration** (Controls 5.8 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=191.00' (Free Discharge)
 ↑**2=Sharp-Crested Rectangular Weir** (Controls 0.0 cfs)

Pond 12P: Infiltration Basin - Lot 3



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Page 94

Summary for Pond 14P: Infiltration System

Inflow Area = 0.210 ac, 100.00% Impervious, Inflow Depth > 4.62" for 10-Year event
 Inflow = 0.9 cfs @ 12.17 hrs, Volume= 0.081 af
 Outflow = 0.3 cfs @ 12.42 hrs, Volume= 0.081 af, Atten= 68%, Lag= 15.2 min
 Discarded = 0.3 cfs @ 12.42 hrs, Volume= 0.081 af
 Primary = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af
 Routed to Pond 2P : Retention Basin C3

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 213.28' @ 12.42 hrs Surf.Area= 0.029 ac Storage= 0.012 af

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 8.4 min (760.9 - 752.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	212.50'	0.021 af	14.75'W x 85.29'L x 2.71'H Infiltration System 0.078 af Overall - 0.026 af Embedded = 0.052 af x 40.0% Voids
#2A	213.00'	0.026 af	Cultec R-180 x 52 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
		0.047 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	212.50'	8.270 in/hr Exfiltration over Wetted area Conductivity to Groundwater Elevation = 192.90'
#2	Primary	213.00'	12.0" Round Culvert L= 142.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 213.00' / 208.90' S= 0.0289 ' /' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#3	Device 2	214.70'	18.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.3 cfs @ 12.42 hrs HW=213.27' (Free Discharge)↑ **1=Exfiltration** (Controls 0.3 cfs)**Primary OutFlow** Max=0.0 cfs @ 0.00 hrs HW=212.50' (Free Discharge)↑ **2=Culvert** (Controls 0.0 cfs)↑ **3=Orifice/Grate** (Controls 0.0 cfs)

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Page 95

Pond 14P: Infiltration System - Chamber Wizard Infiltration System

Chamber Model = Cultec R-180 (Cultec Recharger® 180HD)

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

36.0" Wide + 3.0" Spacing = 39.0" C-C Row Spacing

13 Chambers/Row x 6.33' Long +1.00' Row Adjustment = 83.29' Row Length +12.0" End Stone x 2 = 85.29' Base Length

4 Rows x 36.0" Wide + 3.0" Spacing x 3 + 12.0" Side Stone x 2 = 14.75' Base Width

6.0" Stone Base + 20.5" Chamber Height + 6.0" Stone Cover = 2.71' Field Height

52 Chambers x 21.8 cf +1.00' Row Adjustment x 3.44 sf x 4 Rows = 1,145.9 cf Chamber Storage

3,407.2 cf Field - 1,145.9 cf Chambers = 2,261.3 cf Stone x 40.0% Voids = 904.5 cf Stone Storage

Chamber Storage + Stone Storage = 2,050.4 cf = 0.047 af

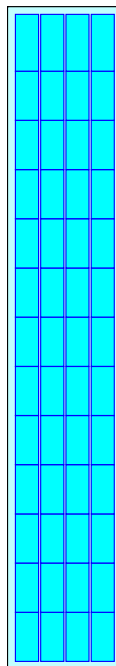
Overall Storage Efficiency = 60.2%

Overall System Size = 85.29' x 14.75' x 2.71'

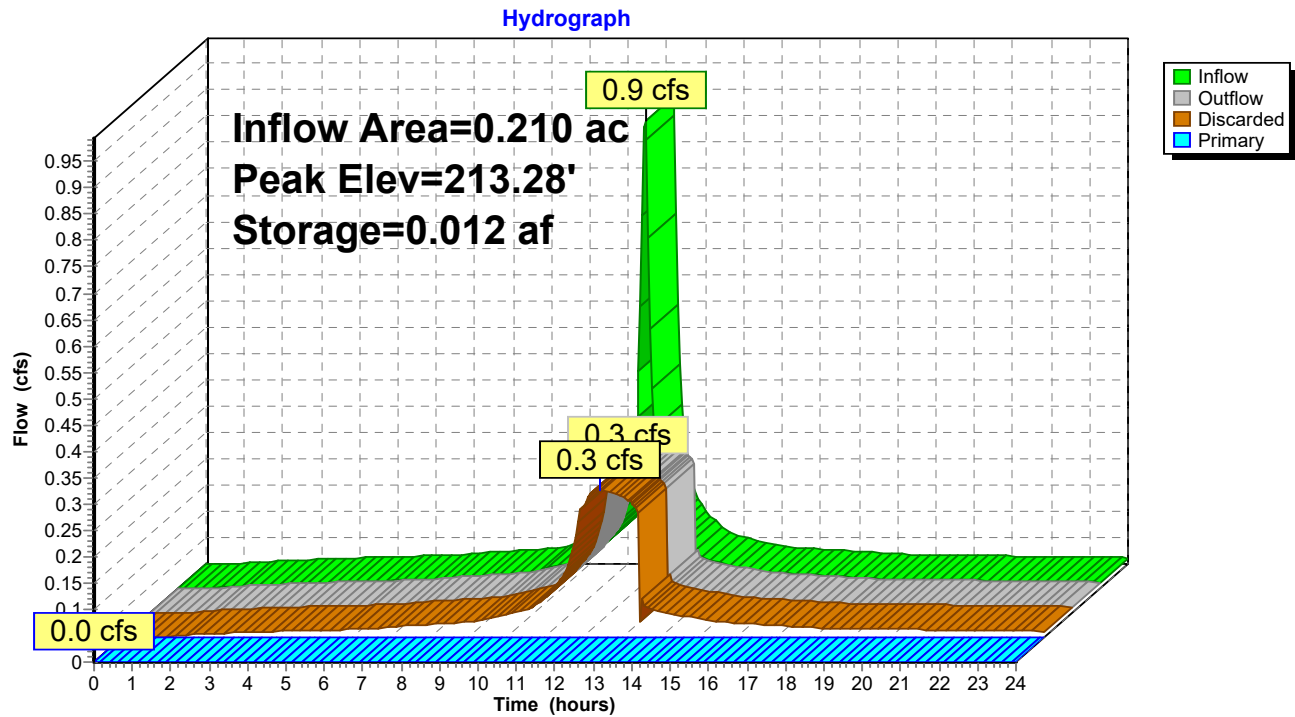
52 Chambers

126.2 cy Field

83.8 cy Stone



Pond 14P: Infiltration System



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Page 97

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 3S: Watershed BLDG-A Runoff Area=1.091 ac 100.00% Impervious Runoff Depth>5.90"
Tc=10.0 min CN=98 Runoff=5.8 cfs 0.537 af

Subcatchment 5S: Watershed BLDG-B Runoff Area=1.091 ac 100.00% Impervious Runoff Depth>5.90"
Tc=10.0 min CN=98 Runoff=5.8 cfs 0.537 af

Subcatchment 8S: Watershed DA Runoff Area=8.130 ac 37.52% Impervious Runoff Depth>2.19"
Flow Length=1,075' Tc=10.5 min CN=62 Runoff=18.1 cfs 1.482 af

Subcatchment 9S: Watershed DC Runoff Area=8.500 ac 0.00% Impervious Runoff Depth>0.65"
Flow Length=1,792' Tc=36.9 min CN=42 Runoff=1.8 cfs 0.463 af

Subcatchment 10S: Watershed DB Runoff Area=1.310 ac 0.00% Impervious Runoff Depth>0.12"
Flow Length=228' Tc=15.0 min CN=31 Runoff=0.0 cfs 0.013 af

Subcatchment 11S: Watershed DD Runoff Area=11.710 ac 76.94% Impervious Runoff Depth>4.33"
Flow Length=752' Tc=11.8 min CN=84 Runoff=49.6 cfs 4.222 af

Subcatchment 13S: Building & Canopy Runoff Area=0.210 ac 100.00% Impervious Runoff Depth>5.90"
Tc=10.0 min CN=98 Runoff=1.1 cfs 0.103 af

Reach 9R: Rabbit Hill Brook Inflow=1.8 cfs 0.463 af
Outflow=1.8 cfs 0.463 af

Reach 11R: South Property Line Inflow=0.0 cfs 0.013 af
Outflow=0.0 cfs 0.013 af

Pond 2P: Retention Basin C3 Peak Elev=188.00' Storage=64,512 cf Inflow=18.1 cfs 1.482 af
Discarded=0.0 cfs 0.000 af Primary=0.0 cfs 0.000 af Outflow=0.0 cfs 0.000 af

Pond 4P: Subsurface Infiltration System A Peak Elev=199.33' Storage=0.025 af Inflow=5.8 cfs 0.537 af
Discarded=3.8 cfs 0.537 af Primary=0.0 cfs 0.000 af Outflow=3.8 cfs 0.537 af

Pond 6P: Subsurface Infiltration System B Peak Elev=195.63' Storage=0.025 af Inflow=5.8 cfs 0.537 af
Discarded=3.9 cfs 0.537 af Primary=0.0 cfs 0.000 af Outflow=3.9 cfs 0.537 af

Pond 12P: Infiltration Basin - Lot 3 Peak Elev=194.95' Storage=68,057 cf Inflow=49.6 cfs 4.222 af
Discarded=7.3 cfs 4.216 af Primary=0.0 cfs 0.000 af Outflow=7.3 cfs 4.216 af

Pond 14P: Infiltration System Peak Elev=213.55' Storage=0.019 af Inflow=1.1 cfs 0.103 af
Discarded=0.3 cfs 0.103 af Primary=0.0 cfs 0.000 af Outflow=0.3 cfs 0.103 af

Total Runoff Area = 32.042 ac Runoff Volume = 7.357 af Average Runoff Depth = 2.76"
54.90% Pervious = 17.590 ac 45.10% Impervious = 14.452 ac

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Page 98

Summary for Subcatchment 3S: Watershed BLDG-A

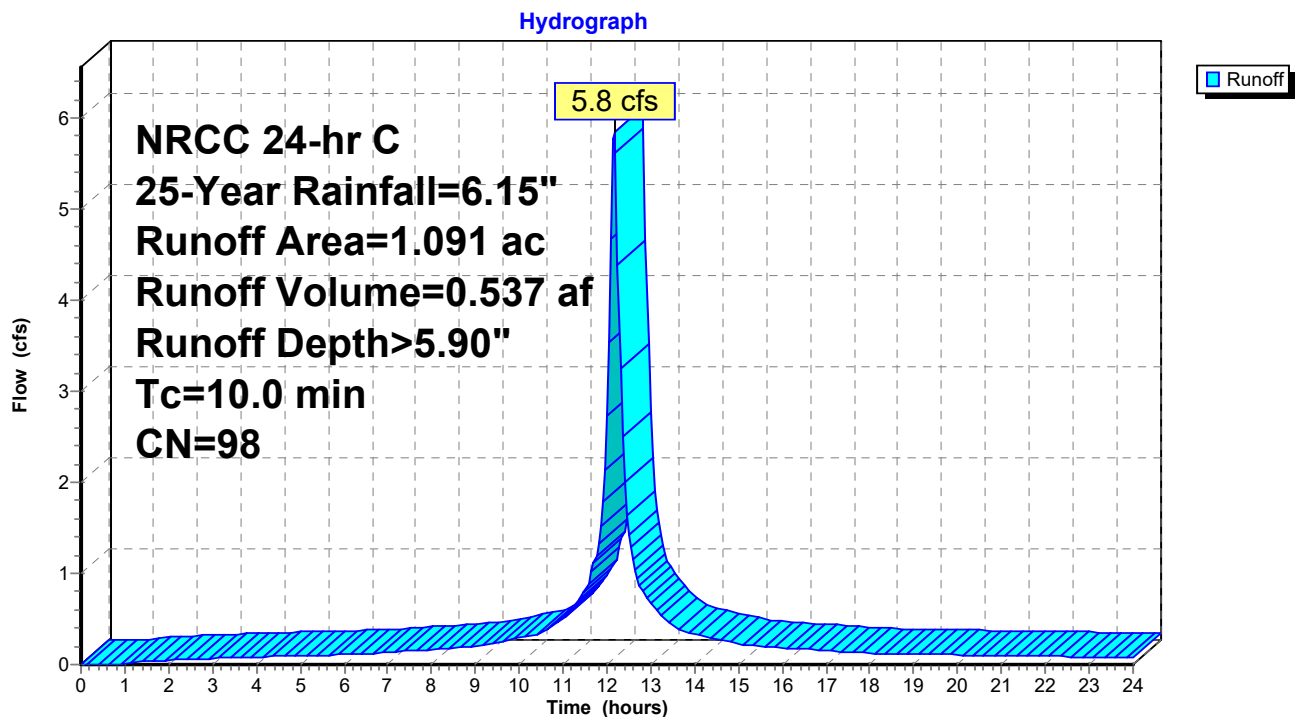
Runoff = 5.8 cfs @ 12.17 hrs, Volume= 0.537 af, Depth> 5.90"
Routed to Pond 4P : Subsurface Infiltration System A

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 25-Year Rainfall=6.15"

Area (ac)	CN	Description
1.091	98	Unconnected roofs, HSG A
1.091		100.00% Impervious Area
1.091		100.00% Unconnected

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

Subcatchment 3S: Watershed BLDG-A



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Page 99

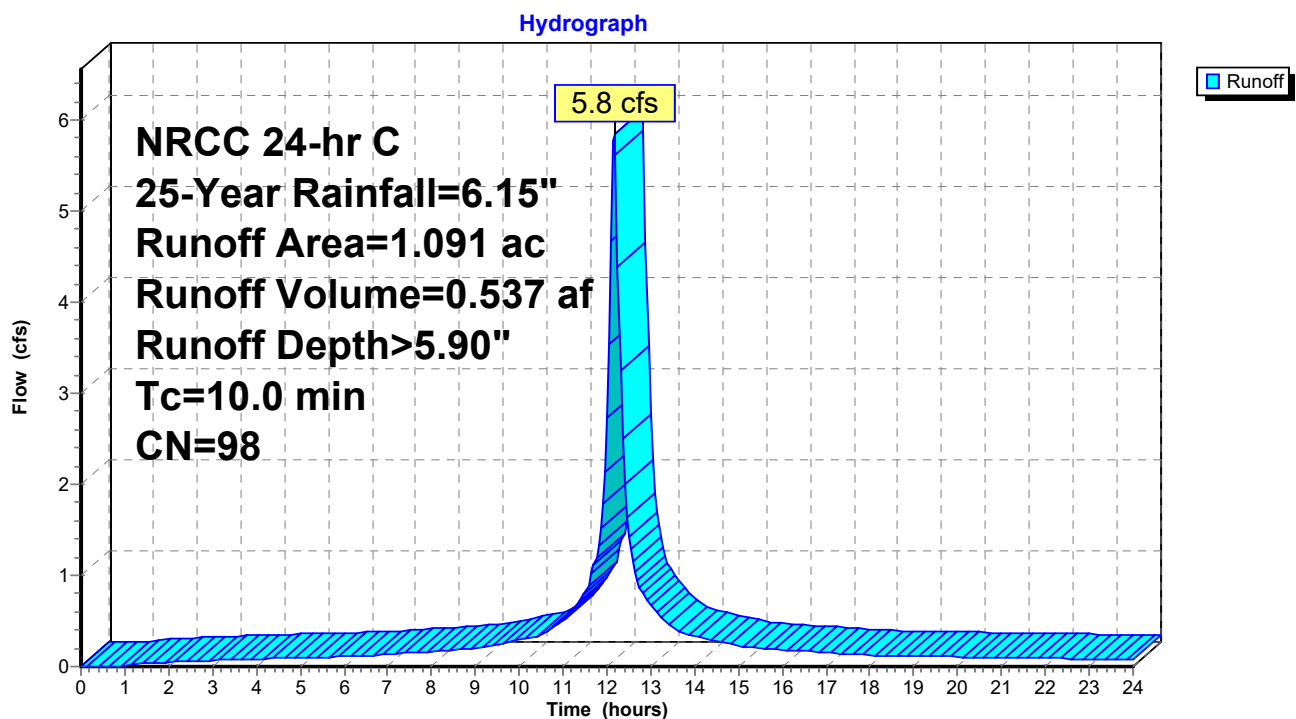
Summary for Subcatchment 5S: Watershed BLDG-B

Runoff = 5.8 cfs @ 12.17 hrs, Volume= 0.537 af, Depth> 5.90"
Routed to Pond 6P : Subsurface Infiltration System B

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 25-Year Rainfall=6.15"

Area (ac)	CN	Description
1.091	98	Unconnected roofs, HSG A
1.091		100.00% Impervious Area
1.091		100.00% Unconnected

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

Subcatchment 5S: Watershed BLDG-B

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Page 100

Summary for Subcatchment 8S: Watershed DA

[47] Hint: Peak is 294% of capacity of segment #3

Runoff = 18.1 cfs @ 12.19 hrs, Volume= 1.482 af, Depth> 2.19"
 Routed to Pond 2P : Retention Basin C3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 NRCC 24-hr C 25-Year Rainfall=6.15"

Area (ac)	CN	Description
0.690	98	Paved roads w/curbs & sewers, HSG A
2.360	98	Paved parking, HSG A
1.030	39	>75% Grass cover, Good, HSG A
0.440	98	Water Surface, 0% imp, HSG A
1.890	30	Woods, Good, HSG A
1.720	39	>75% Grass cover, Good, HSG A
8.130	62	Weighted Average
5.080		62.48% Pervious Area
3.050		37.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	50	0.1000	0.13		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
2.7	230	0.0400	1.40		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.1	50	0.0300	7.86	6.17	Pipe Channel, 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
1.2	745	0.0150	10.23	50.24	Pipe Channel, 30.0" Round Area= 4.9 sf Perim= 7.9' r= 0.63' n= 0.013
10.5	1,075	Total			

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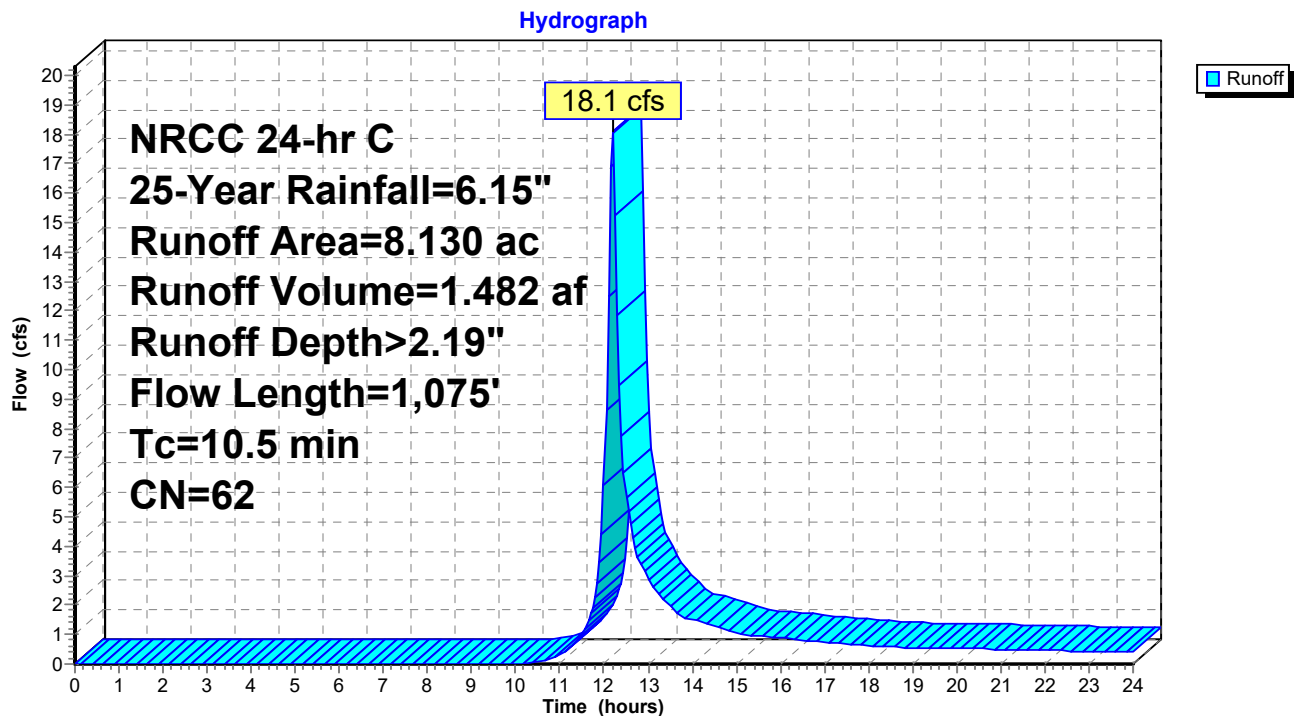
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Page 101

Subcatchment 8S: Watershed DA



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Page 102

Summary for Subcatchment 9S: Watershed DC

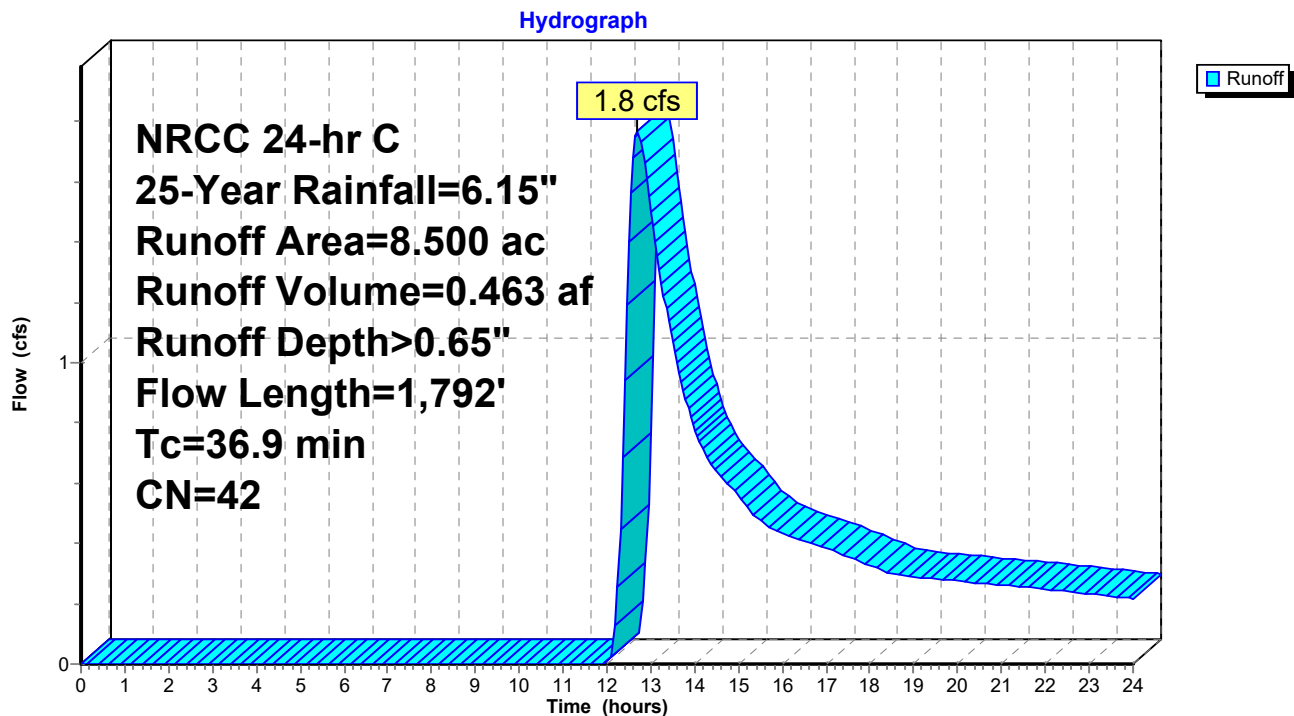
Runoff = 1.8 cfs @ 12.71 hrs, Volume= 0.463 af, Depth> 0.65"
 Routed to Reach 9R : Rabbit Hill Brook

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 NRCC 24-hr C 25-Year Rainfall=6.15"

Area (ac)	CN	Description
0.430	39	>75% Grass cover, Good, HSG A
5.970	30	Woods, Good, HSG A
2.100	77	Woods, Good, HSG D
8.500	42	Weighted Average
8.500		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	50	0.0100	0.05		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
0.6	86	0.2000	2.24		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
13.3	848	0.0050	1.06		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
5.2	350	0.0500	1.12		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
1.5	458	0.0040	5.06	91.16	Trap/Vee/Rect Channel Flow, Bot.W=5.00' D=2.00' Z= 2.0 ' Top.W=13.00' n= 0.022
36.9	1,792	Total			

Subcatchment 9S: Watershed DC



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Page 104

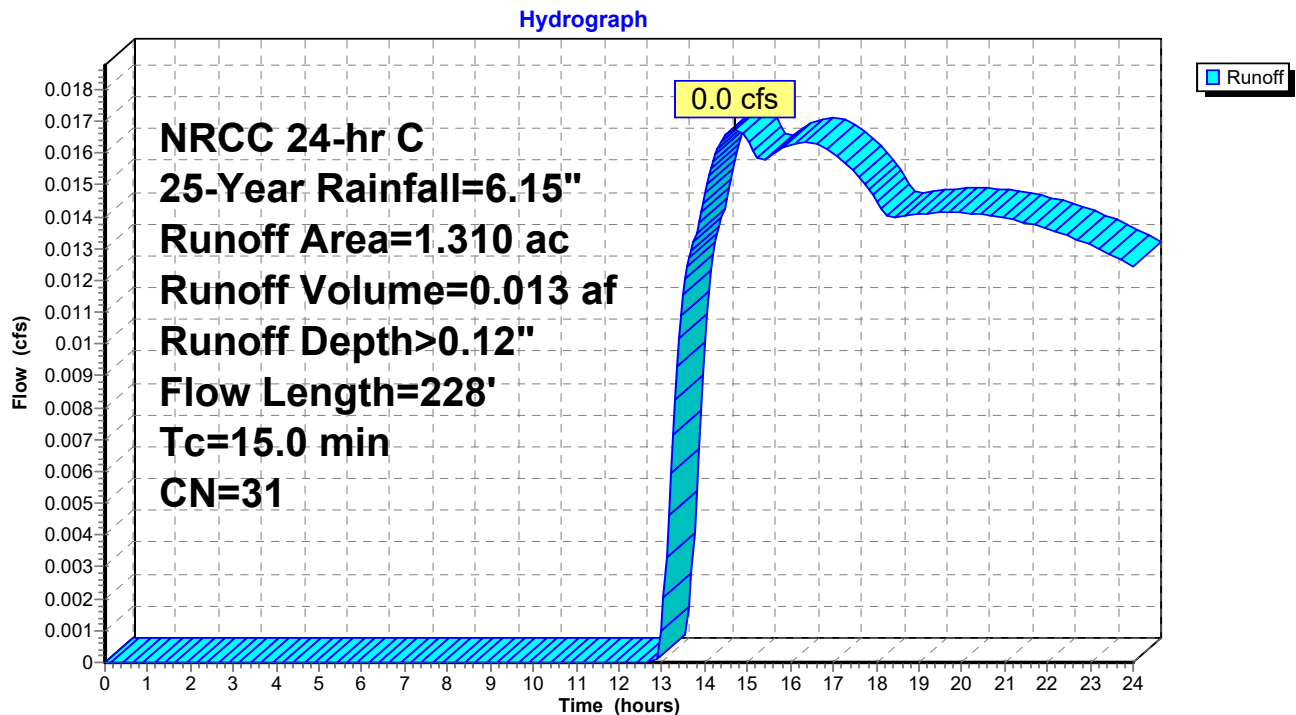
Summary for Subcatchment 10S: Watershed DB

Runoff = 0.0 cfs @ 14.70 hrs, Volume= 0.013 af, Depth> 0.12"
Routed to Reach 11R : South Property Line

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 25-Year Rainfall=6.15"

Area (ac)	CN	Description
1.210	30	Woods, Good, HSG A
0.100	39	>75% Grass cover, Good, HSG A
1.310	31	Weighted Average
1.310		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.3	50	0.0200	0.07		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
2.7	178	0.0500	1.12		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
15.0	228	Total			

Subcatchment 10S: Watershed DB

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Page 105

Summary for Subcatchment 11S: Watershed DD

[47] Hint: Peak is 1393% of capacity of segment #3

Runoff = 49.6 cfs @ 12.19 hrs, Volume= 4.222 af, Depth> 4.33"
 Routed to Pond 12P : Infiltration Basin - Lot 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 NRCC 24-hr C 25-Year Rainfall=6.15"

Area (ac)	CN	Description
2.700	39	>75% Grass cover, Good, HSG A
4.120	98	Unconnected roofs, HSG A
4.280	98	Paved parking, HSG A
0.610	98	Water Surface, HSG A
11.710	84	Weighted Average
2.700		23.06% Pervious Area
9.010		76.94% Impervious Area
4.120		45.73% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.0	50	0.0160	0.09		Sheet Flow, Grass: Dense n= 0.240 P2= 3.20"
0.4	62	0.1300	2.52		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
2.4	640	0.0100	4.54	3.56	Pipe Channel, 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
11.8	752	Total			

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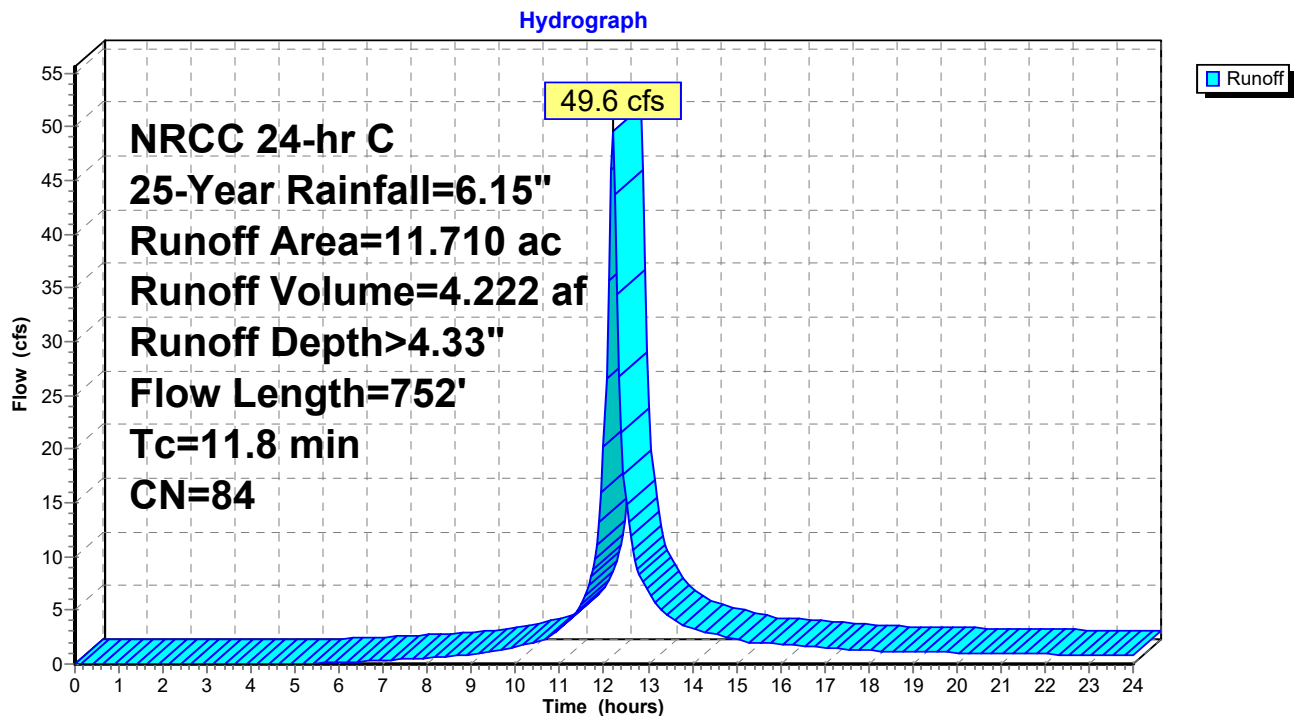
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Page 106

Subcatchment 11S: Watershed DD



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Page 107

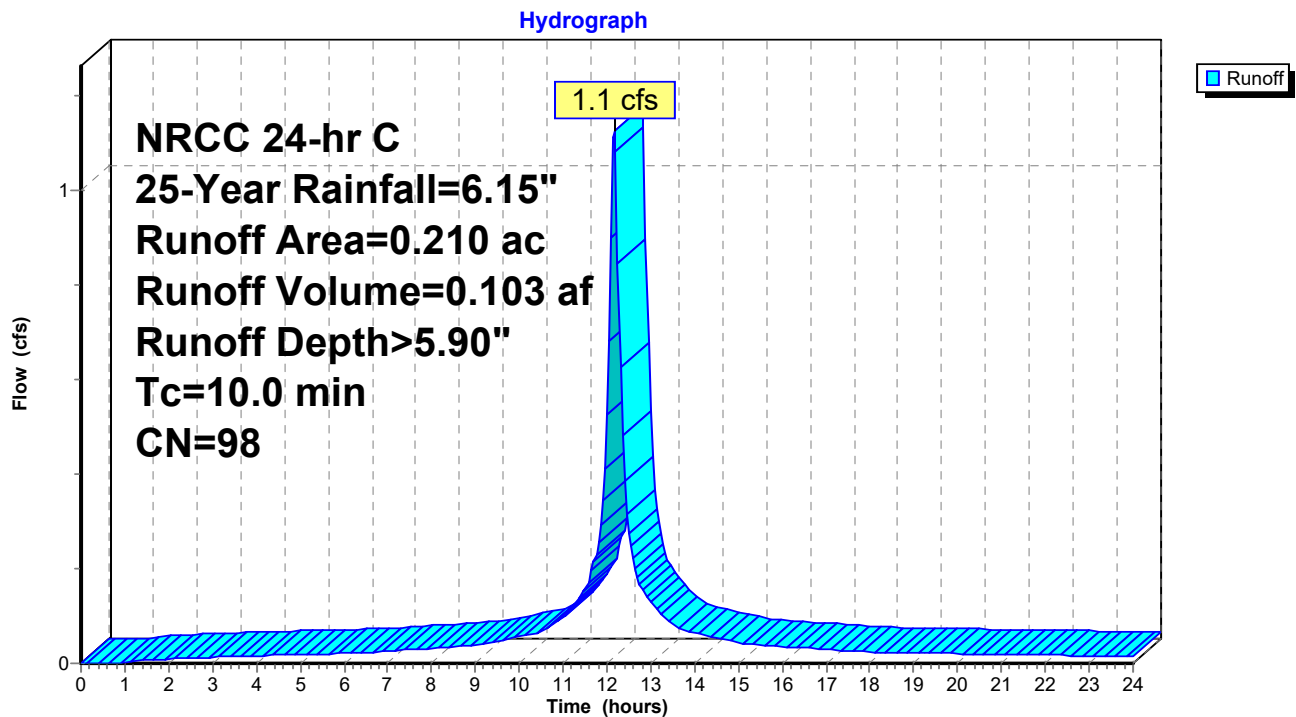
Summary for Subcatchment 13S: Building & Canopy

Runoff = 1.1 cfs @ 12.17 hrs, Volume= 0.103 af, Depth> 5.90"
Routed to Pond 14P : Infiltration System

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 25-Year Rainfall=6.15"

Area (ac)	CN	Description
0.210	98	Unconnected roofs, HSG A
0.210		100.00% Impervious Area
0.210		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,
6.0	0				Total, Increased to minimum Tc = 10.0 min

Subcatchment 13S: Building & Canopy

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Page 108

Summary for Reach 9R: Rabbit Hill Brook

[40] Hint: Not Described (Outflow=Inflow)

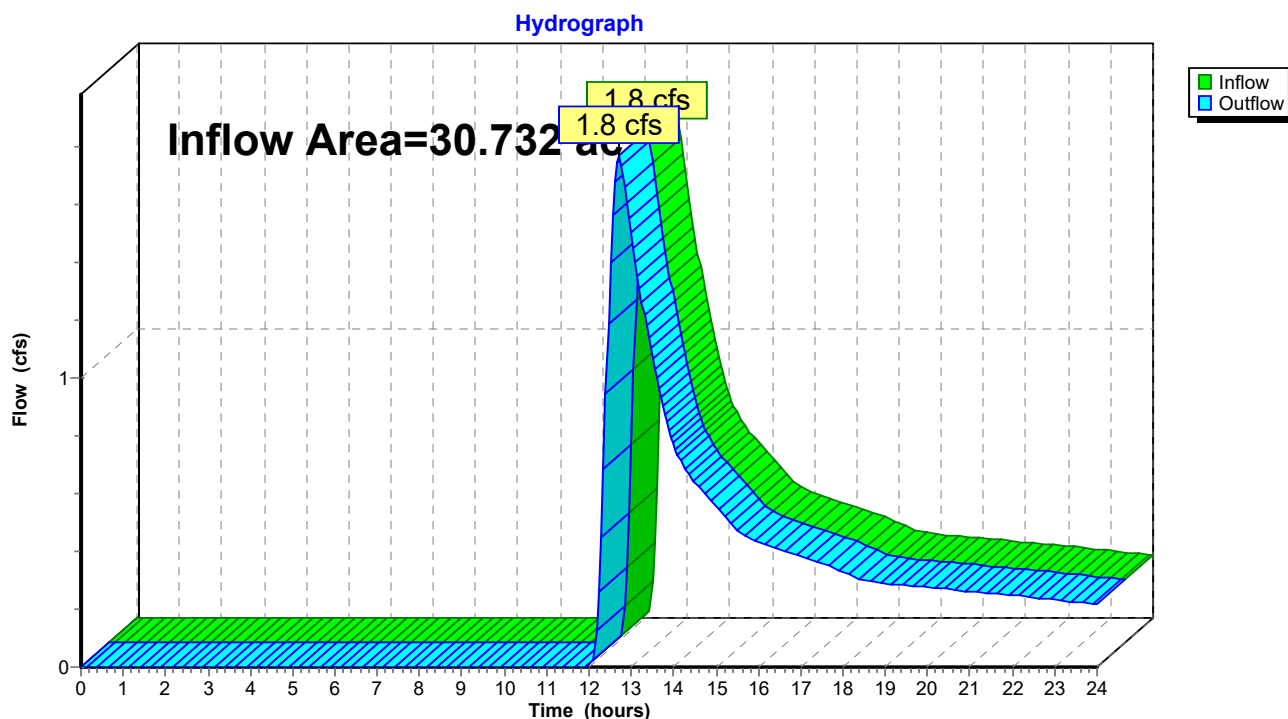
Inflow Area = 30.732 ac, 47.03% Impervious, Inflow Depth > 0.18" for 25-Year event

Inflow = 1.8 cfs @ 12.71 hrs, Volume= 0.463 af

Outflow = 1.8 cfs @ 12.71 hrs, Volume= 0.463 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach 9R: Rabbit Hill Brook



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Page 109

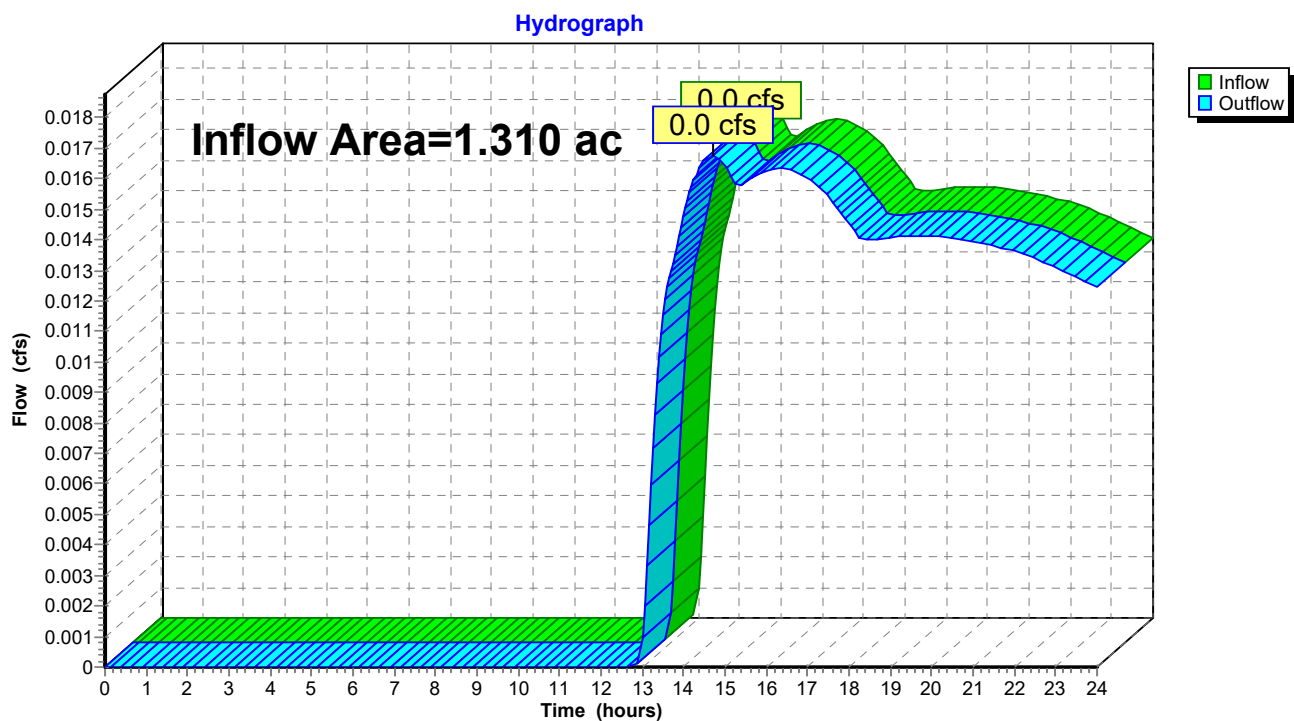
Summary for Reach 11R: South Property Line

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.310 ac, 0.00% Impervious, Inflow Depth > 0.12" for 25-Year event
Inflow = 0.0 cfs @ 14.70 hrs, Volume= 0.013 af
Outflow = 0.0 cfs @ 14.70 hrs, Volume= 0.013 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach 11R: South Property Line



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Page 110

Summary for Pond 2P: Retention Basin C3

Inflow Area = 10.522 ac, 51.72% Impervious, Inflow Depth > 1.69" for 25-Year event
 Inflow = 18.1 cfs @ 12.19 hrs, Volume= 1.482 af
 Outflow = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
 Discarded = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af
 Primary = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af
 Routed to Reach 9R : Rabbit Hill Brook

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 188.00' @ 24.00 hrs Surf.Area= 35,867 sf Storage= 64,512 cf

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

Volume	Invert	Avail.Storage	Storage Description
#1	186.01'	143,139 cf	Custom Stage Data (Irregular) Listed below (Recalc)

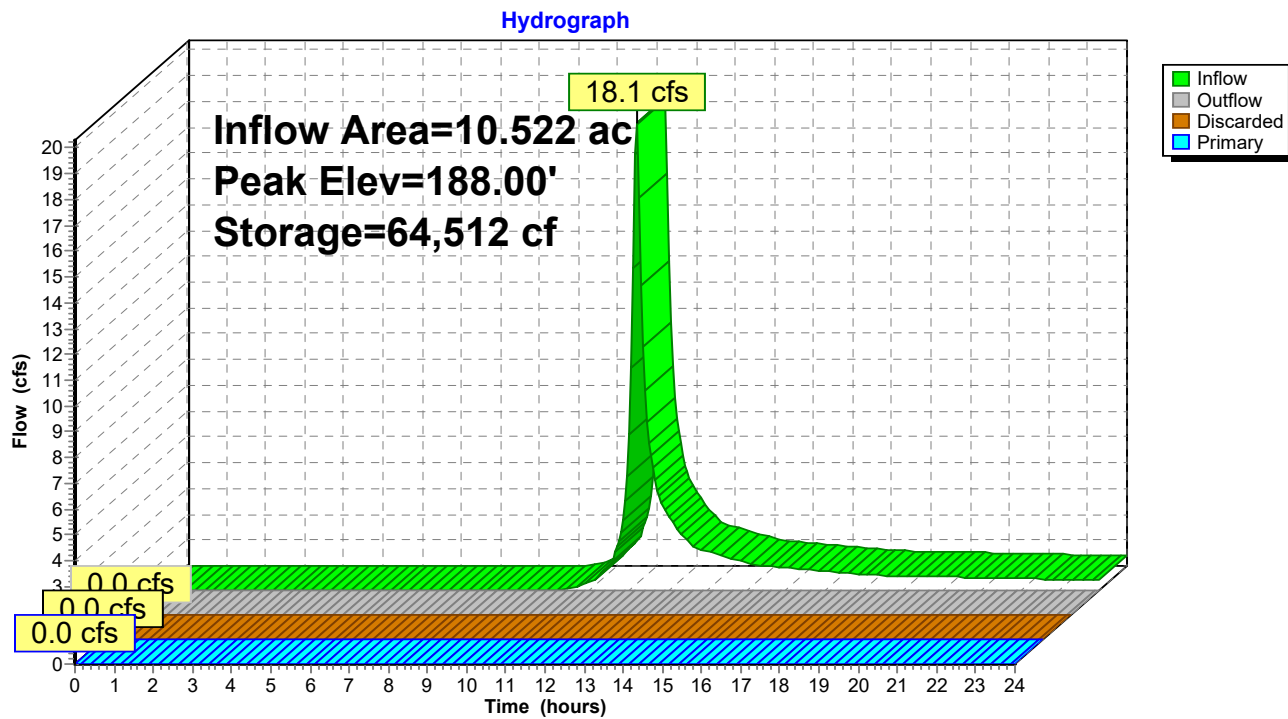
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
186.01	28,880	726.0	0	0	28,880
187.50	34,273	765.0	46,992	46,992	33,639
189.20	39,846	811.0	62,942	109,933	39,561
190.00	43,190	1,045.0	33,205	143,139	74,130

Device	Routing	Invert	Outlet Devices
#1	Primary	189.20'	10.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)
#2	Discarded	188.00'	21.038 in/hr Exfiltration over Surface area above 188.00' Conductivity to Groundwater Elevation = 186.00' Excluded Surface area = 35,869 sf

Discarded OutFlow Max=0.0 cfs @ 0.00 hrs HW=186.01' (Free Discharge)
 ↑**2=Exfiltration** (Controls 0.0 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=186.01' (Free Discharge)
 ↑**1=Sharp-Crested Rectangular Weir** (Controls 0.0 cfs)

Pond 2P: Retention Basin C3



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Page 112

Summary for Pond 4P: Subsurface Infiltration System A

[85] Warning: Oscillations may require smaller dt or Finer Routing (severity=2)

Inflow Area = 1.091 ac, 100.00% Impervious, Inflow Depth > 5.90" for 25-Year event
 Inflow = 5.8 cfs @ 12.17 hrs, Volume= 0.537 af
 Outflow = 3.8 cfs @ 12.28 hrs, Volume= 0.537 af, Atten= 35%, Lag= 6.5 min
 Discarded = 3.8 cfs @ 12.28 hrs, Volume= 0.537 af
 Primary = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af
 Routed to Pond 2P : Retention Basin C3

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 199.33' @ 12.28 hrs Surf.Area= 0.081 ac Storage= 0.025 af

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 0.9 min (749.4 - 748.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	198.70'	0.068 af	30.50'W x 115.50'L x 3.54'H Field A 0.286 af Overall - 0.116 af Embedded = 0.170 af x 40.0% Voids
#2A	199.20'	0.116 af	Cultec R-330XLHD x 96 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 6 rows
#3	200.66'	0.000 af	1.50'D x 2.84'H Vertical Cone/Cylinder
		0.185 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	198.70'	42.077 in/hr Exfiltration over Wetted area Conductivity to Groundwater Elevation = 186.00'
#2	Primary	200.66'	12.0" Round Culvert L= 118.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 200.66' / 199.00' S= 0.0141 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#3	Primary	202.25'	4.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Discarded OutFlow Max=3.8 cfs @ 12.28 hrs HW=199.32' (Free Discharge)↑ **1=Exfiltration** (Controls 3.8 cfs)**Primary OutFlow** Max=0.0 cfs @ 0.00 hrs HW=198.70' TW=193.50' (Fixed TW Elev= 193.50')↑ **2=Culvert** (Controls 0.0 cfs)↑ **3=Sharp-Crested Rectangular Weir** (Controls 0.0 cfs)

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Page 113

Pond 4P: Subsurface Infiltration System A - Chamber Wizard Field A

Chamber Model = Cultec R-330XLHD (Cultec Recharger® 330XLHD)

Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf

Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap

Row Length Adjustment= +1.50' x 7.45 sf x 6 rows

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

16 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 113.50' Row Length +12.0" End Stone x 2 = 115.50' Base Length

6 Rows x 52.0" Wide + 6.0" Spacing x 5 + 12.0" Side Stone x 2 = 30.50' Base Width

6.0" Stone Base + 30.5" Chamber Height + 6.0" Stone Cover = 3.54' Field Height

96 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 6 Rows = 5,074.1 cf Chamber Storage

12,476.4 cf Field - 5,074.1 cf Chambers = 7,402.3 cf Stone x 40.0% Voids = 2,960.9 cf Stone Storage

Chamber Storage + Stone Storage = 8,035.0 cf = 0.184 af

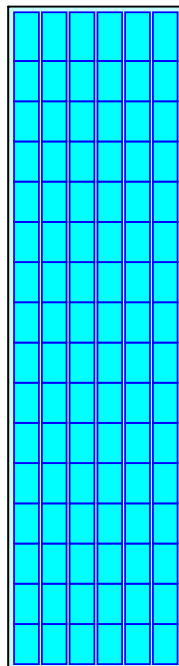
Overall Storage Efficiency = 64.4%

Overall System Size = 115.50' x 30.50' x 3.54'

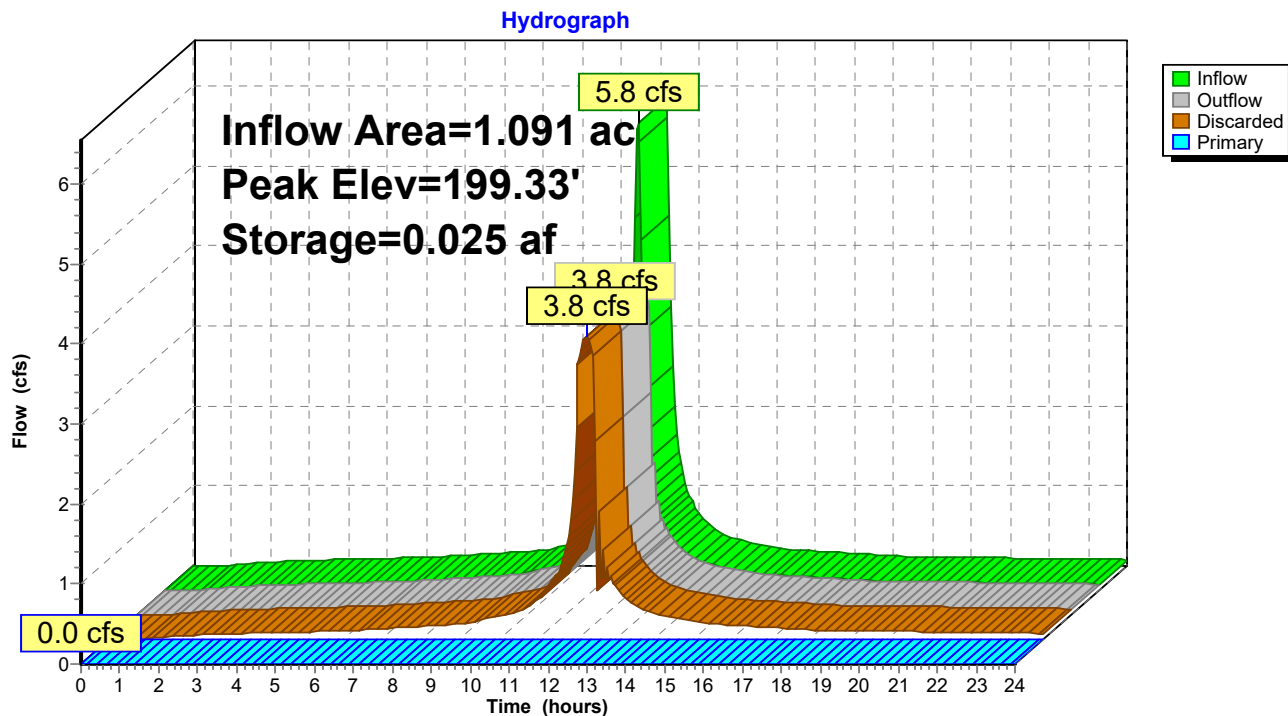
96 Chambers

462.1 cy Field

274.2 cy Stone



Pond 4P: Subsurface Infiltration System A



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Page 115

Summary for Pond 6P: Subsurface Infiltration System B

Inflow Area = 1.091 ac, 100.00% Impervious, Inflow Depth > 5.90" for 25-Year event
 Inflow = 5.8 cfs @ 12.17 hrs, Volume= 0.537 af
 Outflow = 3.9 cfs @ 12.27 hrs, Volume= 0.537 af, Atten= 34%, Lag= 6.3 min
 Discarded = 3.9 cfs @ 12.27 hrs, Volume= 0.537 af
 Primary = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af
 Routed to Pond 2P : Retention Basin C3

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 195.63' @ 12.27 hrs Surf.Area= 0.081 ac Storage= 0.025 af

Plug-Flow detention time= 1.2 min calculated for 0.535 af (100% of inflow)
 Center-of-Mass det. time= 1.1 min (749.6 - 748.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	195.00'	0.068 af	30.50'W x 115.50'L x 3.54'H Field A 0.286 af Overall - 0.116 af Embedded = 0.170 af x 40.0% Voids
#2A	195.50'	0.116 af	Cultec R-330XLHD x 96 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 6 rows
#3	197.00'	0.000 af	1.50'D x 7.00'H Vertical Cone/Cylinder
		0.185 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	195.00'	42.077 in/hr Exfiltration over Wetted area Conductivity to Groundwater Elevation = 186.00'
#2	Primary	198.60'	12.0" Round Culvert L= 95.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 198.60' / 192.00' S= 0.0695 ' /' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Discarded OutFlow Max=3.9 cfs @ 12.27 hrs HW=195.63' (Free Discharge)
 ↑ **1=Exfiltration** (Controls 3.9 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=195.00' TW=191.00' (Fixed TW Elev= 191.00')
 ↑ **2=Culvert** (Controls 0.0 cfs)

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Page 116

Pond 6P: Subsurface Infiltration System B - Chamber Wizard Field A

Chamber Model = Cultec R-330XLHD (Cultec Recharger® 330XLHD)

Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf

Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap

Row Length Adjustment= +1.50' x 7.45 sf x 6 rows

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

16 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 113.50' Row Length +12.0" End Stone x 2 = 115.50' Base Length

6 Rows x 52.0" Wide + 6.0" Spacing x 5 + 12.0" Side Stone x 2 = 30.50' Base Width

6.0" Stone Base + 30.5" Chamber Height + 6.0" Stone Cover = 3.54' Field Height

96 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 6 Rows = 5,074.1 cf Chamber Storage

12,476.4 cf Field - 5,074.1 cf Chambers = 7,402.3 cf Stone x 40.0% Voids = 2,960.9 cf Stone Storage

Chamber Storage + Stone Storage = 8,035.0 cf = 0.184 af

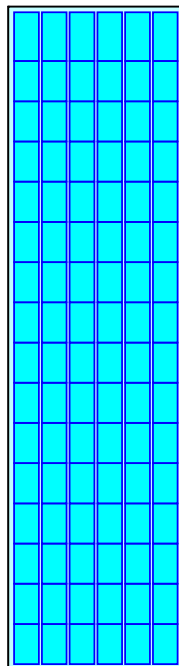
Overall Storage Efficiency = 64.4%

Overall System Size = 115.50' x 30.50' x 3.54'

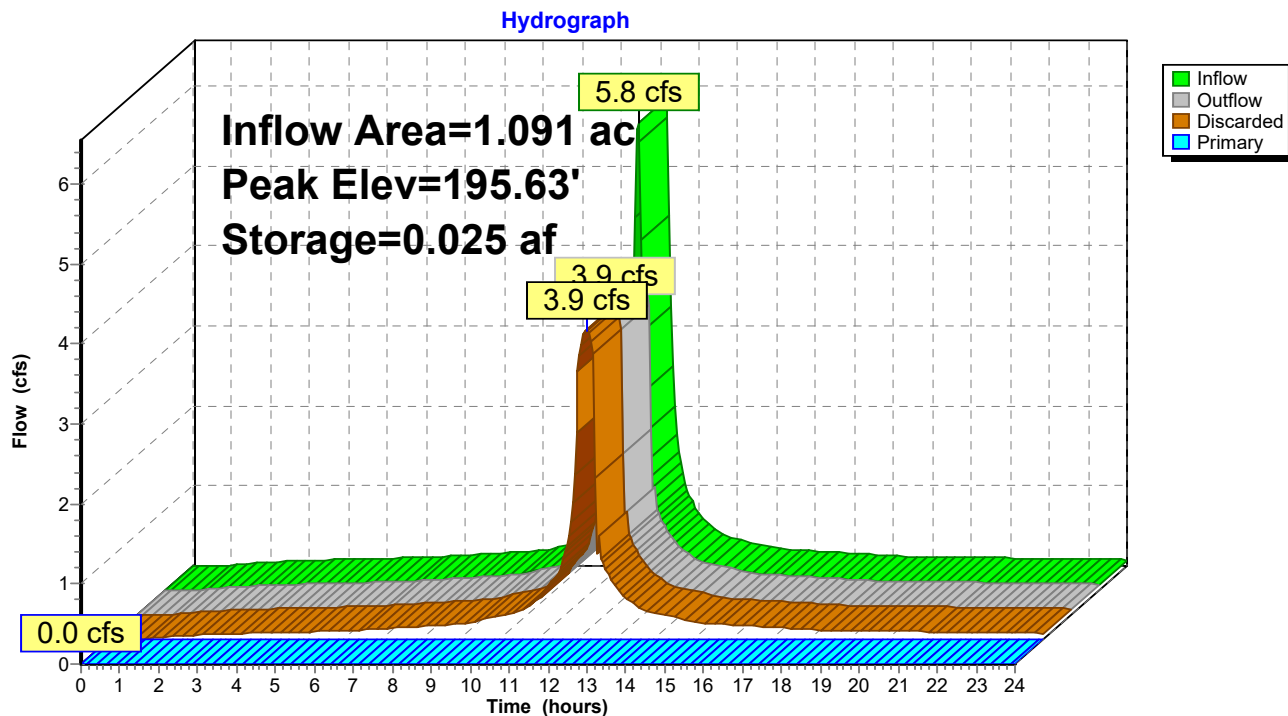
96 Chambers

462.1 cy Field

274.2 cy Stone



Pond 6P: Subsurface Infiltration System B



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Page 118

Summary for Pond 12P: Infiltration Basin - Lot 3

Inflow Area = 11.710 ac, 76.94% Impervious, Inflow Depth > 4.33" for 25-Year event
 Inflow = 49.6 cfs @ 12.19 hrs, Volume= 4.222 af
 Outflow = 7.3 cfs @ 12.93 hrs, Volume= 4.216 af, Atten= 85%, Lag= 44.0 min
 Discarded = 7.3 cfs @ 12.93 hrs, Volume= 4.216 af
 Primary = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af
 Routed to Reach 9R : Rabbit Hill Brook

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 194.95' @ 12.93 hrs Surf.Area= 21,633 sf Storage= 68,057 cf

Plug-Flow detention time= 92.5 min calculated for 4.207 af (100% of inflow)
 Center-of-Mass det. time= 91.3 min (904.8 - 813.4)

Volume	Invert	Avail.Storage	Storage Description		
#1	191.00'	145,471 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
191.00	13,068	493.0	0	0	13,068
192.00	15,090	518.0	14,067	14,067	15,142
194.00	19,436	568.0	34,434	48,501	19,597
196.00	24,184	619.0	43,534	92,035	24,559
198.00	29,335	669.0	53,436	145,471	29,843

Device	Routing	Invert	Outlet Devices
#1	Discarded	191.00'	8.270 in/hr Exfiltration over Wetted area Conductivity to Groundwater Elevation = 187.00'
#2	Primary	197.00'	10.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Discarded OutFlow Max=7.3 cfs @ 12.93 hrs HW=194.95' (Free Discharge)
 ↑1=Exfiltration (Controls 7.3 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=191.00' (Free Discharge)
 ↑2=Sharp-Crested Rectangular Weir (Controls 0.0 cfs)

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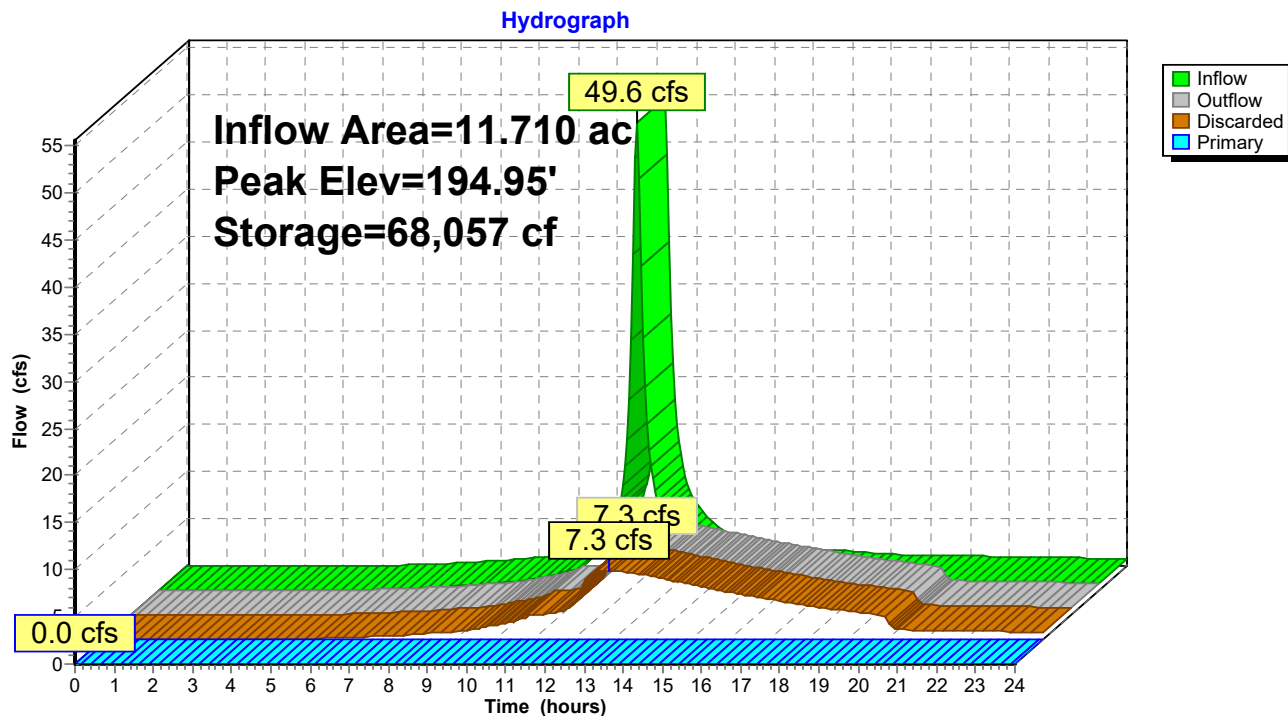
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Page 119

Pond 12P: Infiltration Basin - Lot 3



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Page 120

Summary for Pond 14P: Infiltration System

Inflow Area = 0.210 ac, 100.00% Impervious, Inflow Depth > 5.90" for 25-Year event
 Inflow = 1.1 cfs @ 12.17 hrs, Volume= 0.103 af
 Outflow = 0.3 cfs @ 12.47 hrs, Volume= 0.103 af, Atten= 74%, Lag= 18.3 min
 Discarded = 0.3 cfs @ 12.47 hrs, Volume= 0.103 af
 Primary = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af
 Routed to Pond 2P : Retention Basin C3

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 213.55' @ 12.47 hrs Surf.Area= 0.029 ac Storage= 0.019 af

Plug-Flow detention time= 13.3 min calculated for 0.103 af (100% of inflow)
 Center-of-Mass det. time= 13.2 min (761.7 - 748.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	212.50'	0.021 af	14.75'W x 85.29'L x 2.71'H Infiltration System 0.078 af Overall - 0.026 af Embedded = 0.052 af x 40.0% Voids
#2A	213.00'	0.026 af	Cultec R-180 x 52 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
		0.047 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	212.50'	8.270 in/hr Exfiltration over Wetted area Conductivity to Groundwater Elevation = 192.90'
#2	Primary	213.00'	12.0" Round Culvert L= 142.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 213.00' / 208.90' S= 0.0289 ' /' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#3	Device 2	214.70'	18.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.3 cfs @ 12.47 hrs HW=213.55' (Free Discharge)↑ **1=Exfiltration** (Controls 0.3 cfs)**Primary OutFlow** Max=0.0 cfs @ 0.00 hrs HW=212.50' (Free Discharge)↑ **2=Culvert** (Controls 0.0 cfs)↑ **3=Orifice/Grate** (Controls 0.0 cfs)

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Page 121

Pond 14P: Infiltration System - Chamber Wizard Infiltration System

Chamber Model = Cultec R-180 (Cultec Recharger® 180HD)

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

36.0" Wide + 3.0" Spacing = 39.0" C-C Row Spacing

13 Chambers/Row x 6.33' Long +1.00' Row Adjustment = 83.29' Row Length +12.0" End Stone x 2 = 85.29' Base Length

4 Rows x 36.0" Wide + 3.0" Spacing x 3 + 12.0" Side Stone x 2 = 14.75' Base Width

6.0" Stone Base + 20.5" Chamber Height + 6.0" Stone Cover = 2.71' Field Height

52 Chambers x 21.8 cf +1.00' Row Adjustment x 3.44 sf x 4 Rows = 1,145.9 cf Chamber Storage

3,407.2 cf Field - 1,145.9 cf Chambers = 2,261.3 cf Stone x 40.0% Voids = 904.5 cf Stone Storage

Chamber Storage + Stone Storage = 2,050.4 cf = 0.047 af

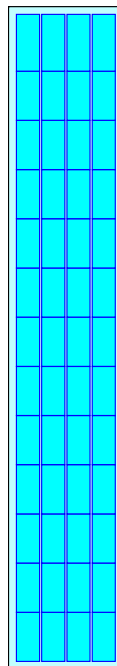
Overall Storage Efficiency = 60.2%

Overall System Size = 85.29' x 14.75' x 2.71'

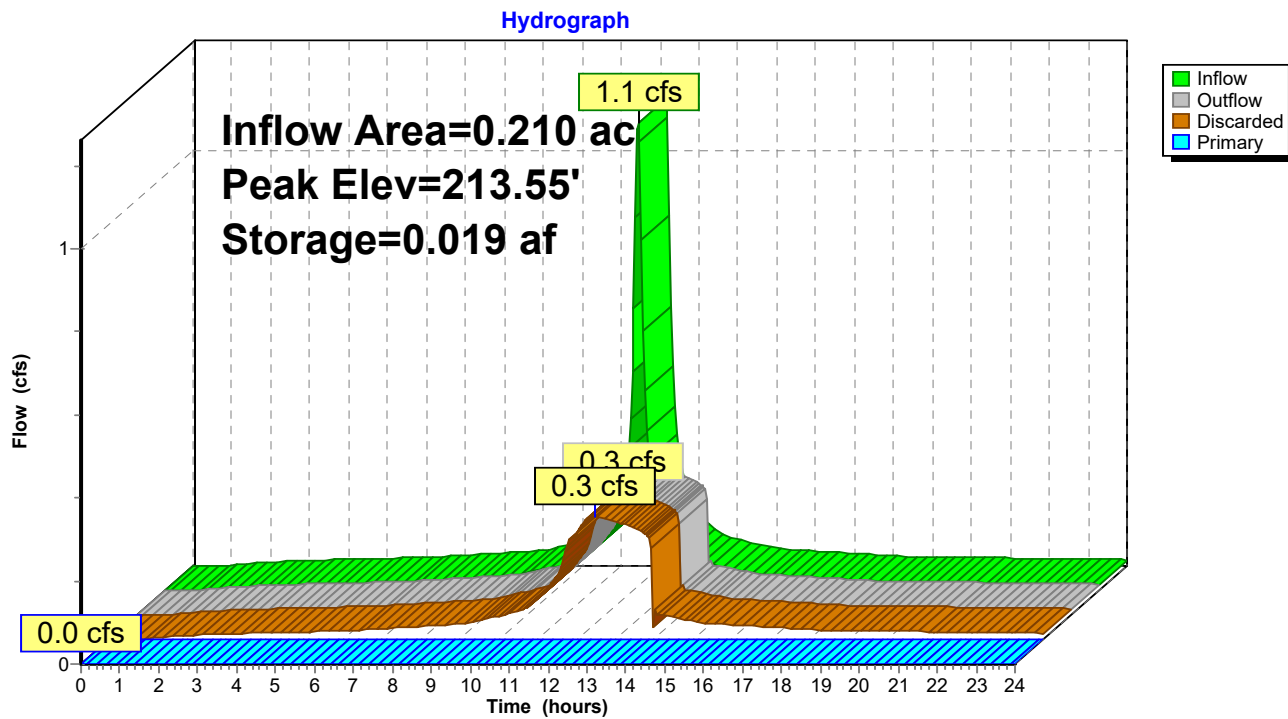
52 Chambers

126.2 cy Field

83.8 cy Stone



Pond 14P: Infiltration System



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Page 123

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 3S: Watershed BLDG-A Runoff Area=1.091 ac 100.00% Impervious Runoff Depth>8.55"
Tc=10.0 min CN=98 Runoff=8.4 cfs 0.777 af

Subcatchment 5S: Watershed BLDG-B Runoff Area=1.091 ac 100.00% Impervious Runoff Depth>8.55"
Tc=10.0 min CN=98 Runoff=8.4 cfs 0.777 af

Subcatchment 8S: Watershed DA Runoff Area=8.130 ac 37.52% Impervious Runoff Depth>4.18"
Flow Length=1,075' Tc=10.5 min CN=62 Runoff=35.4 cfs 2.829 af

Subcatchment 9S: Watershed DC Runoff Area=8.500 ac 0.00% Impervious Runoff Depth>1.81"
Flow Length=1,792' Tc=36.9 min CN=42 Runoff=7.4 cfs 1.281 af

Subcatchment 10S: Watershed DB Runoff Area=1.310 ac 0.00% Impervious Runoff Depth>0.70"
Flow Length=228' Tc=15.0 min CN=31 Runoff=0.3 cfs 0.077 af

Subcatchment 11S: Watershed DD Runoff Area=11.710 ac 76.94% Impervious Runoff Depth>6.85"
Flow Length=752' Tc=11.8 min CN=84 Runoff=76.7 cfs 6.685 af

Subcatchment 13S: Building & Canopy Runoff Area=0.210 ac 100.00% Impervious Runoff Depth>8.55"
Tc=10.0 min CN=98 Runoff=1.6 cfs 0.150 af

Reach 9R: Rabbit Hill Brook Inflow=7.4 cfs 1.281 af
Outflow=7.4 cfs 1.281 af

Reach 11R: South Property Line Inflow=0.3 cfs 0.077 af
Outflow=0.3 cfs 0.077 af

Pond 2P: Retention Basin C3 Peak Elev=188.64' Storage=88,138 cf Inflow=35.4 cfs 2.829 af
Discarded=1.2 cfs 0.917 af Primary=0.0 cfs 0.000 af Outflow=1.2 cfs 0.917 af

Pond 4P: Subsurface Infiltration System A Peak Elev=199.95' Storage=0.068 af Inflow=8.4 cfs 0.777 af
Discarded=4.1 cfs 0.777 af Primary=0.0 cfs 0.000 af Outflow=4.1 cfs 0.777 af

Pond 6P: Subsurface Infiltration System B Peak Elev=196.24' Storage=0.067 af Inflow=8.4 cfs 0.777 af
Discarded=4.3 cfs 0.777 af Primary=0.0 cfs 0.000 af Outflow=4.3 cfs 0.777 af

Pond 12P: Infiltration Basin - Lot 3 Peak Elev=196.99' Storage=117,299 cf Inflow=76.7 cfs 6.685 af
Discarded=10.3 cfs 6.676 af Primary=0.0 cfs 0.000 af Outflow=10.3 cfs 6.676 af

Pond 14P: Infiltration System Peak Elev=214.23' Storage=0.034 af Inflow=1.6 cfs 0.150 af
Discarded=0.3 cfs 0.150 af Primary=0.0 cfs 0.000 af Outflow=0.3 cfs 0.150 af

Total Runoff Area = 32.042 ac Runoff Volume = 12.576 af Average Runoff Depth = 4.71"
54.90% Pervious = 17.590 ac 45.10% Impervious = 14.452 ac

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Page 124

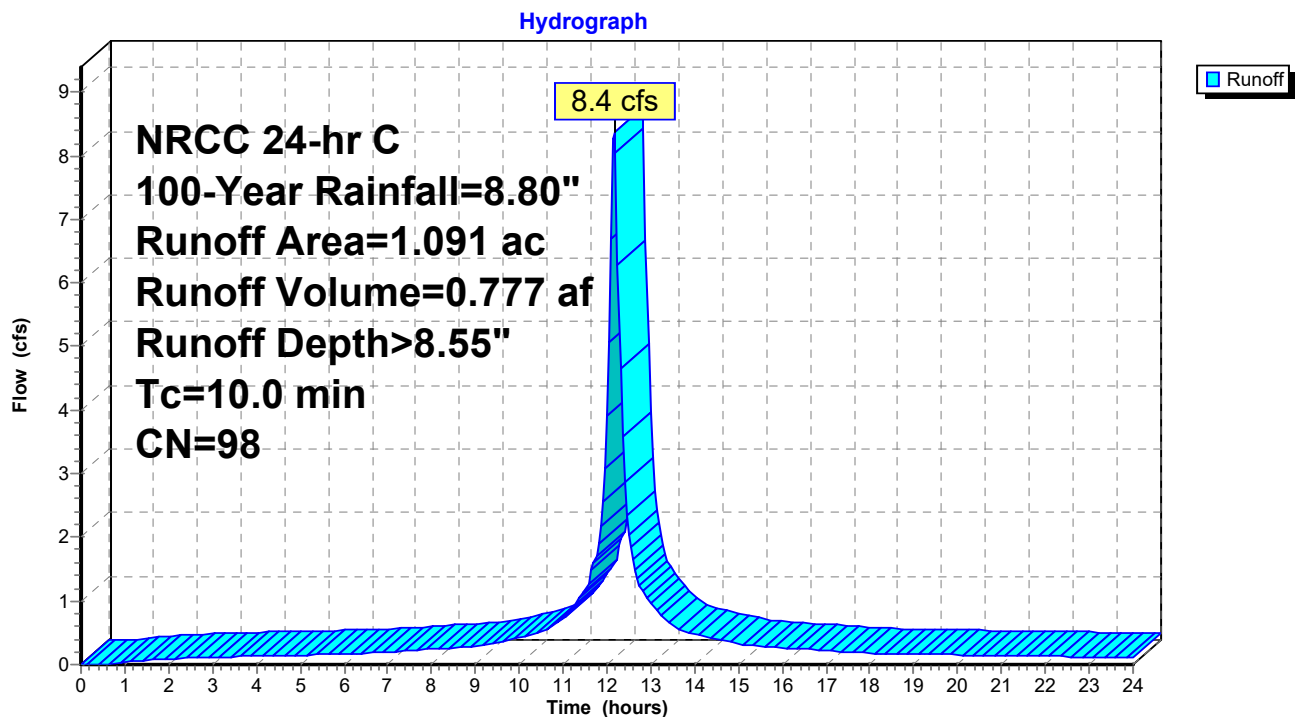
Summary for Subcatchment 3S: Watershed BLDG-A

Runoff = 8.4 cfs @ 12.17 hrs, Volume= 0.777 af, Depth> 8.55"
Routed to Pond 4P : Subsurface Infiltration System A

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=8.80"

Area (ac)	CN	Description
1.091	98	Unconnected roofs, HSG A
1.091		100.00% Impervious Area
1.091		100.00% Unconnected

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

Subcatchment 3S: Watershed BLDG-A

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Page 125

Summary for Subcatchment 5S: Watershed BLDG-B

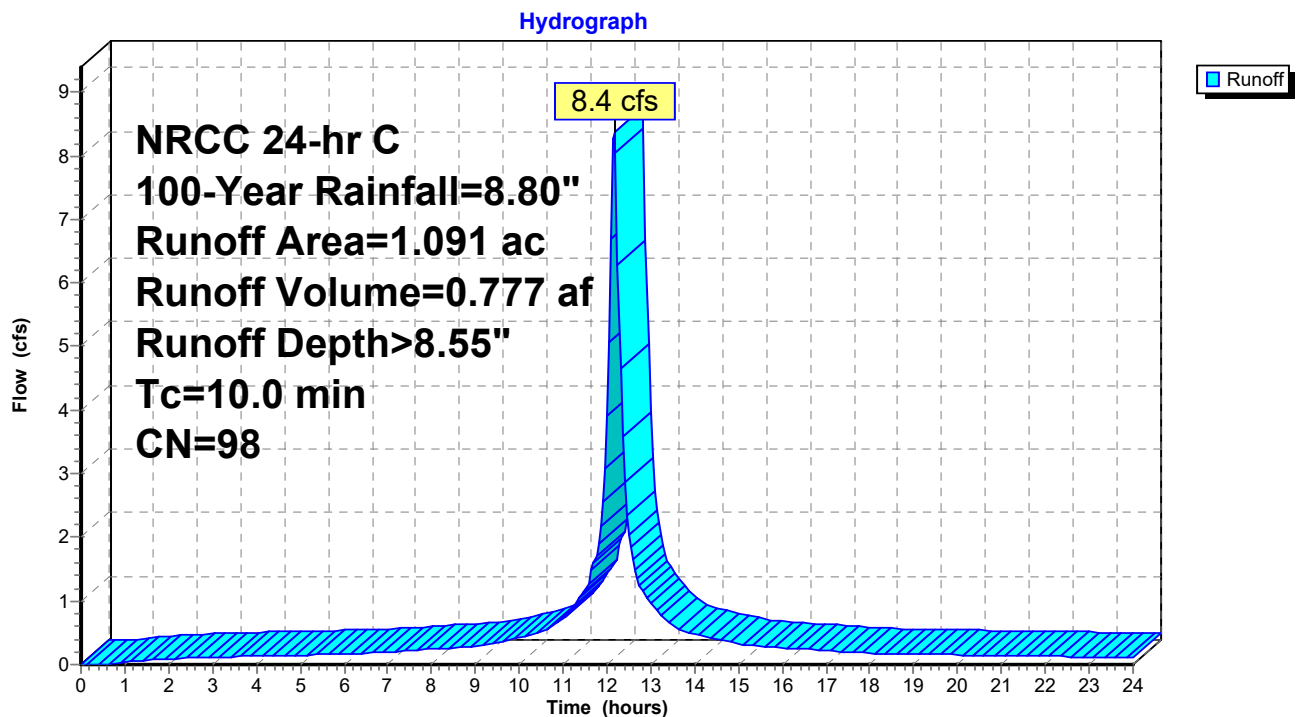
Runoff = 8.4 cfs @ 12.17 hrs, Volume= 0.777 af, Depth> 8.55"
Routed to Pond 6P : Subsurface Infiltration System B

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=8.80"

Area (ac)	CN	Description
1.091	98	Unconnected roofs, HSG A
1.091		100.00% Impervious Area
1.091		100.00% Unconnected

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

Subcatchment 5S: Watershed BLDG-B



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Page 126

Summary for Subcatchment 8S: Watershed DA

[47] Hint: Peak is 573% of capacity of segment #3

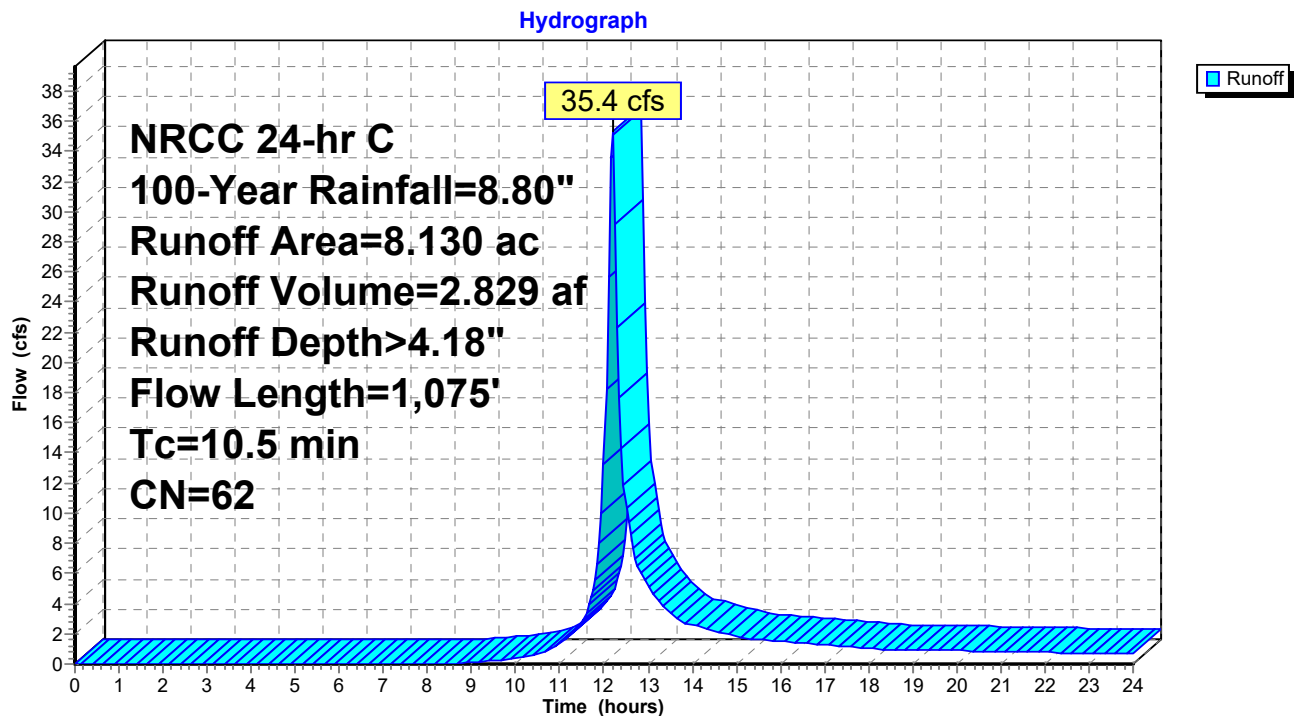
Runoff = 35.4 cfs @ 12.18 hrs, Volume= 2.829 af, Depth> 4.18"
 Routed to Pond 2P : Retention Basin C3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 NRCC 24-hr C 100-Year Rainfall=8.80"

Area (ac)	CN	Description
0.690	98	Paved roads w/curbs & sewers, HSG A
2.360	98	Paved parking, HSG A
1.030	39	>75% Grass cover, Good, HSG A
0.440	98	Water Surface, 0% imp, HSG A
1.890	30	Woods, Good, HSG A
1.720	39	>75% Grass cover, Good, HSG A
8.130	62	Weighted Average
5.080		62.48% Pervious Area
3.050		37.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	50	0.1000	0.13		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
2.7	230	0.0400	1.40		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.1	50	0.0300	7.86	6.17	Pipe Channel, 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
1.2	745	0.0150	10.23	50.24	Pipe Channel, 30.0" Round Area= 4.9 sf Perim= 7.9' r= 0.63' n= 0.013
10.5	1,075	Total			

Subcatchment 8S: Watershed DA



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Page 128

Summary for Subcatchment 9S: Watershed DC

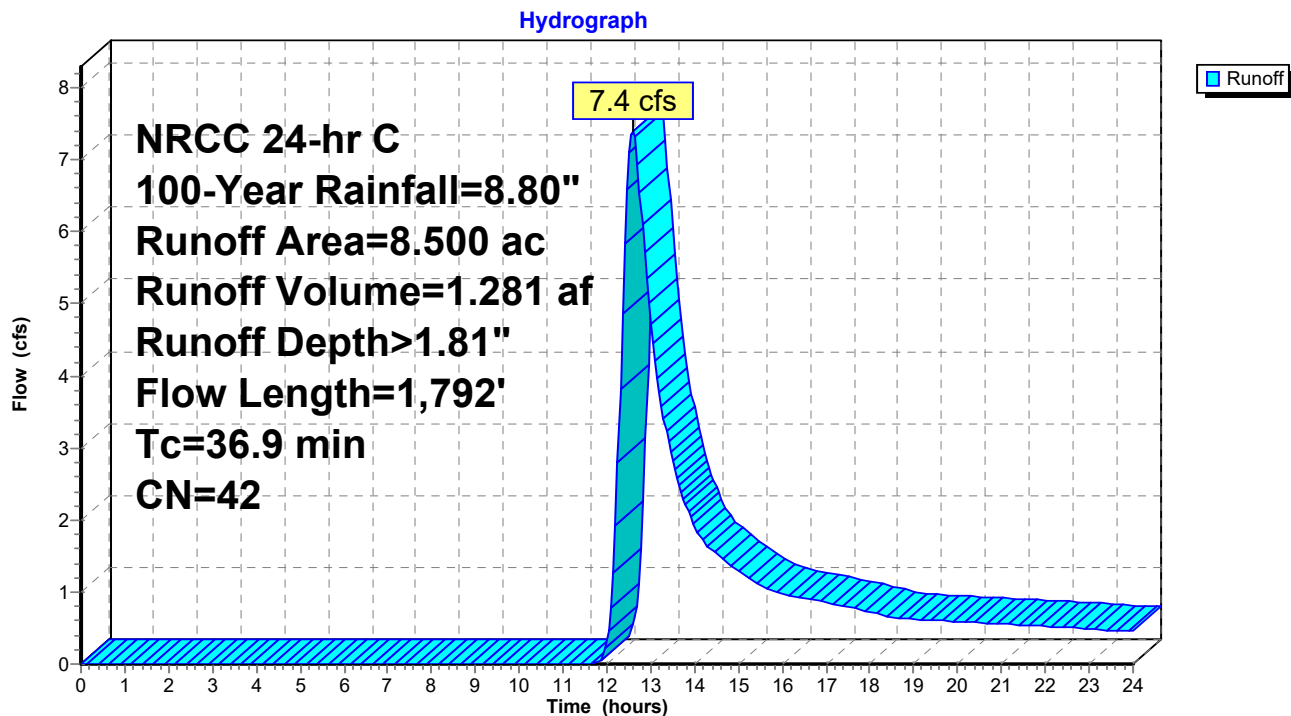
Runoff = 7.4 cfs @ 12.58 hrs, Volume= 1.281 af, Depth> 1.81"
 Routed to Reach 9R : Rabbit Hill Brook

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 NRCC 24-hr C 100-Year Rainfall=8.80"

Area (ac)	CN	Description
0.430	39	>75% Grass cover, Good, HSG A
5.970	30	Woods, Good, HSG A
2.100	77	Woods, Good, HSG D
8.500	42	Weighted Average
8.500		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	50	0.0100	0.05		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
0.6	86	0.2000	2.24		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
13.3	848	0.0050	1.06		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
5.2	350	0.0500	1.12		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
1.5	458	0.0040	5.06	91.16	Trap/Vee/Rect Channel Flow, Bot.W=5.00' D=2.00' Z= 2.0 ' Top.W=13.00' n= 0.022
36.9	1,792	Total			

Subcatchment 9S: Watershed DC



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Page 130

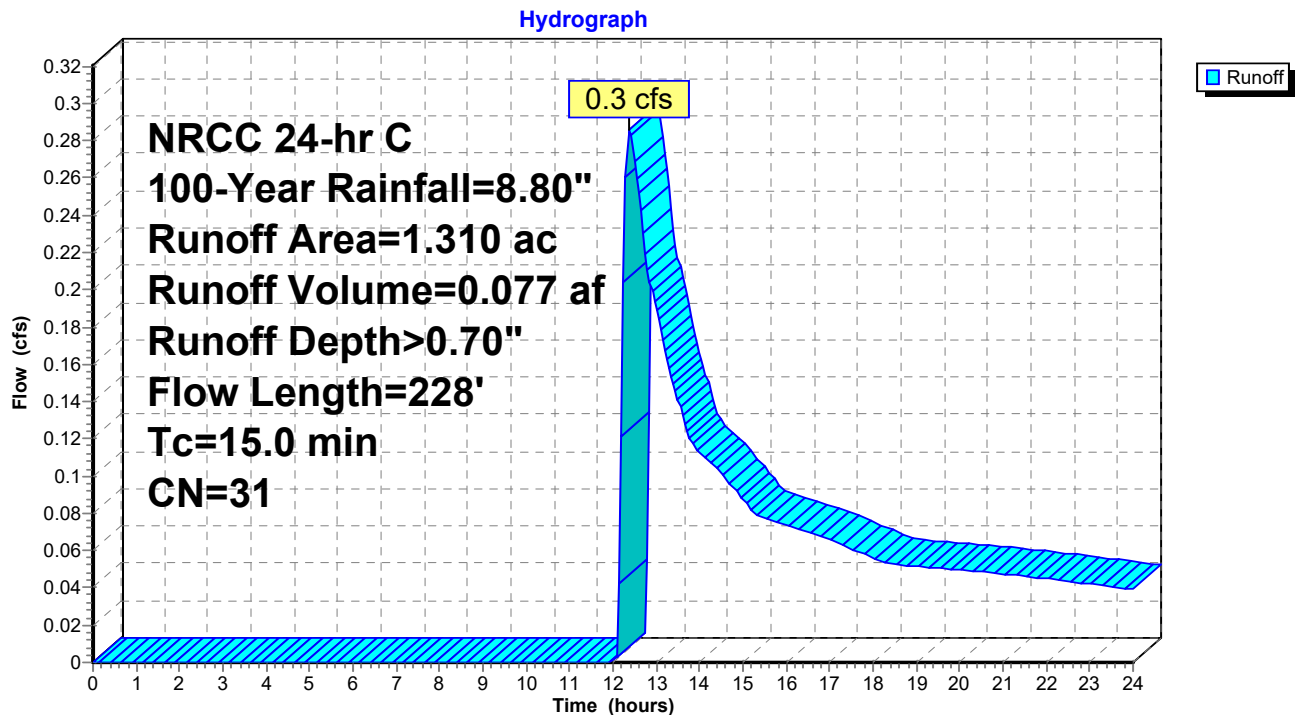
Summary for Subcatchment 10S: Watershed DB

Runoff = 0.3 cfs @ 12.39 hrs, Volume= 0.077 af, Depth> 0.70"
 Routed to Reach 11R : South Property Line

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 NRCC 24-hr C 100-Year Rainfall=8.80"

Area (ac)	CN	Description
1.210	30	Woods, Good, HSG A
0.100	39	>75% Grass cover, Good, HSG A
1.310	31	Weighted Average
1.310		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.3	50	0.0200	0.07		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
2.7	178	0.0500	1.12		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
15.0	228	Total			

Subcatchment 10S: Watershed DB

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Page 131

Summary for Subcatchment 11S: Watershed DD

[47] Hint: Peak is 2154% of capacity of segment #3

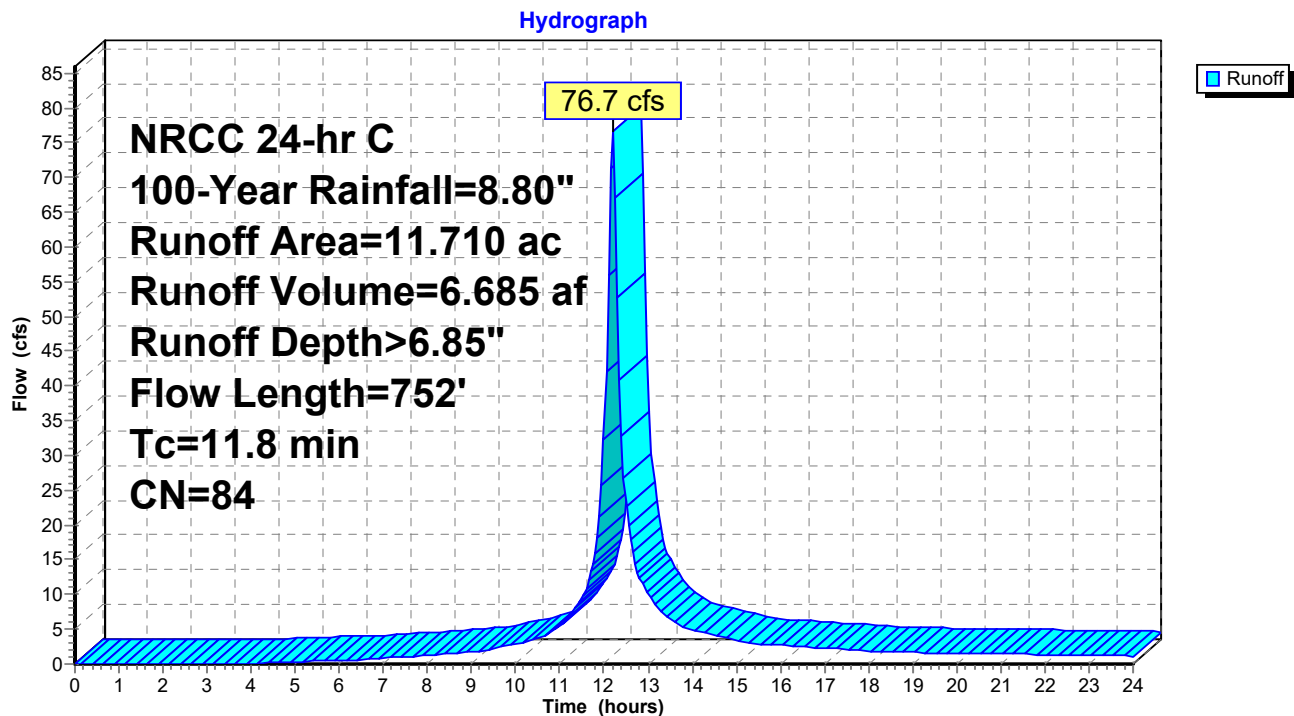
Runoff = 76.7 cfs @ 12.19 hrs, Volume= 6.685 af, Depth> 6.85"
 Routed to Pond 12P : Infiltration Basin - Lot 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 NRCC 24-hr C 100-Year Rainfall=8.80"

Area (ac)	CN	Description
2.700	39	>75% Grass cover, Good, HSG A
4.120	98	Unconnected roofs, HSG A
4.280	98	Paved parking, HSG A
0.610	98	Water Surface, HSG A
11.710	84	Weighted Average
2.700		23.06% Pervious Area
9.010		76.94% Impervious Area
4.120		45.73% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.0	50	0.0160	0.09		Sheet Flow, Grass: Dense n= 0.240 P2= 3.20"
0.4	62	0.1300	2.52		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
2.4	640	0.0100	4.54	3.56	Pipe Channel, 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
11.8	752	Total			

Subcatchment 11S: Watershed DD



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Page 133

Summary for Subcatchment 13S: Building & Canopy

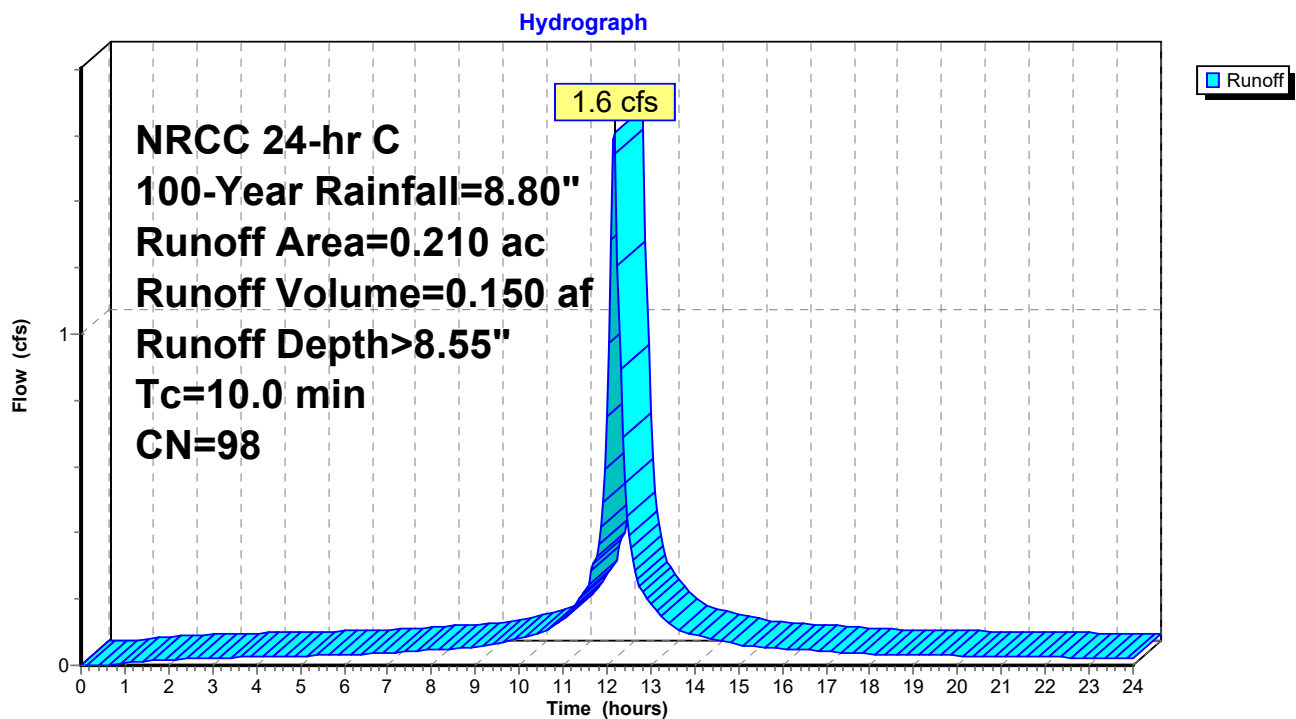
Runoff = 1.6 cfs @ 12.17 hrs, Volume= 0.150 af, Depth> 8.55"
Routed to Pond 14P : Infiltration System

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=8.80"

Area (ac)	CN	Description
0.210	98	Unconnected roofs, HSG A
0.210		100.00% Impervious Area
0.210		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,
6.0	0				Total, Increased to minimum Tc = 10.0 min

Subcatchment 13S: Building & Canopy



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Page 134

Summary for Reach 9R: Rabbit Hill Brook

[40] Hint: Not Described (Outflow=Inflow)

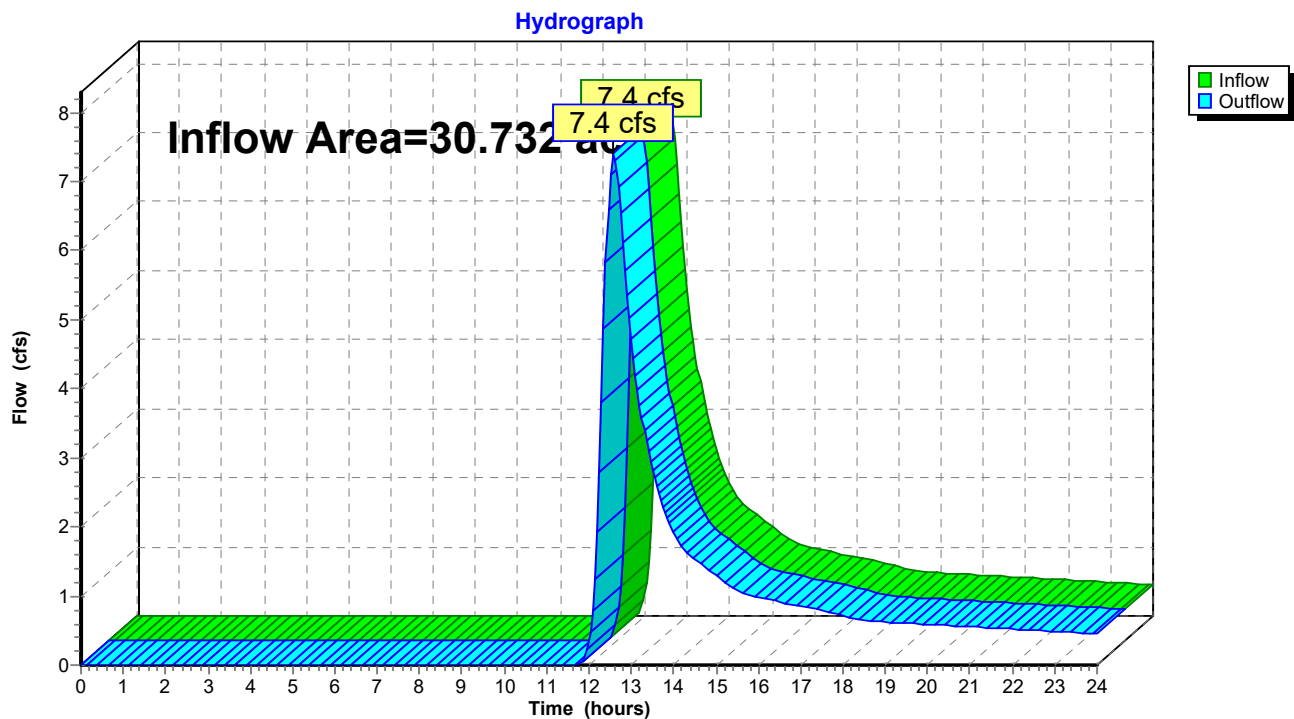
Inflow Area = 30.732 ac, 47.03% Impervious, Inflow Depth > 0.50" for 100-Year event

Inflow = 7.4 cfs @ 12.58 hrs, Volume= 1.281 af

Outflow = 7.4 cfs @ 12.58 hrs, Volume= 1.281 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach 9R: Rabbit Hill Brook



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Page 135

Summary for Reach 11R: South Property Line

[40] Hint: Not Described (Outflow=Inflow)

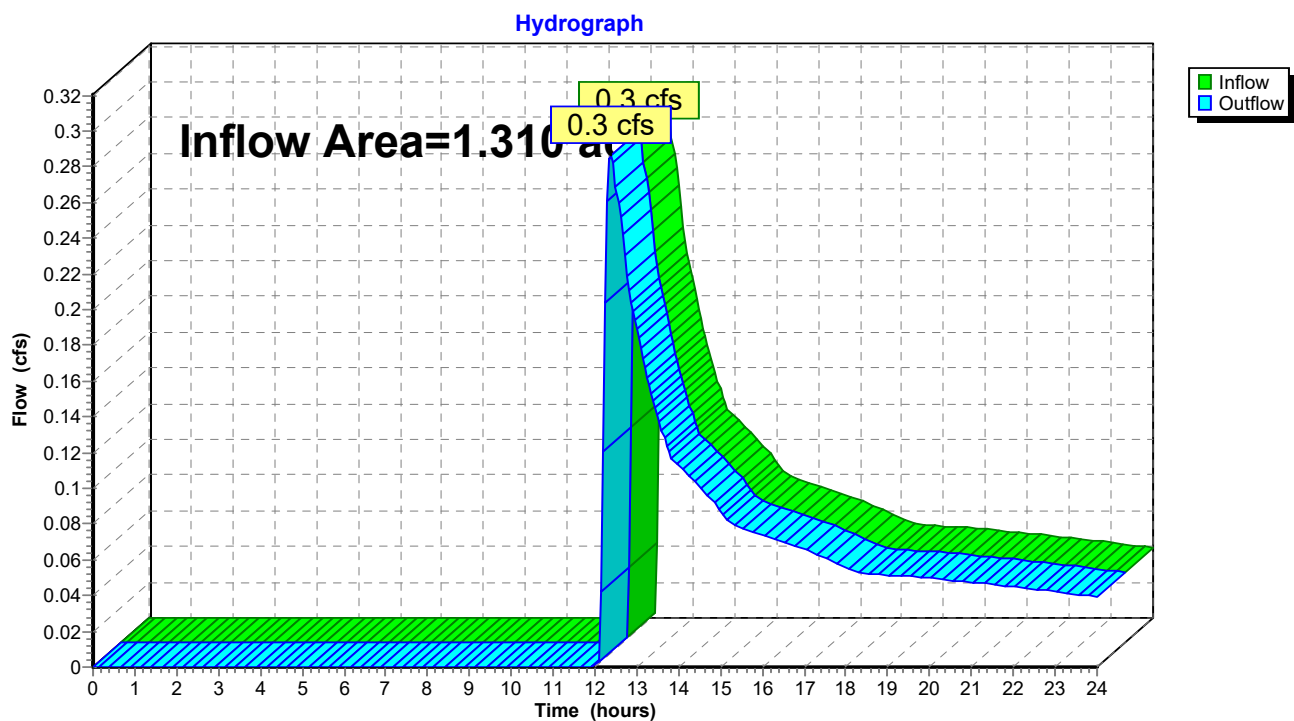
Inflow Area = 1.310 ac, 0.00% Impervious, Inflow Depth > 0.70" for 100-Year event

Inflow = 0.3 cfs @ 12.39 hrs, Volume= 0.077 af

Outflow = 0.3 cfs @ 12.39 hrs, Volume= 0.077 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach 11R: South Property Line



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Page 136

Summary for Pond 2P: Retention Basin C3

Inflow Area = 10.522 ac, 51.72% Impervious, Inflow Depth > 3.23" for 100-Year event
 Inflow = 35.4 cfs @ 12.18 hrs, Volume= 2.829 af
 Outflow = 1.2 cfs @ 17.44 hrs, Volume= 0.917 af, Atten= 97%, Lag= 315.0 min
 Discarded = 1.2 cfs @ 17.44 hrs, Volume= 0.917 af
 Primary = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af
 Routed to Reach 9R : Rabbit Hill Brook

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 188.64' @ 17.44 hrs Surf.Area= 37,963 sf Storage= 88,138 cf

Plug-Flow detention time= 411.2 min calculated for 0.915 af (32% of inflow)
 Center-of-Mass det. time= 270.4 min (1,120.7 - 850.3)

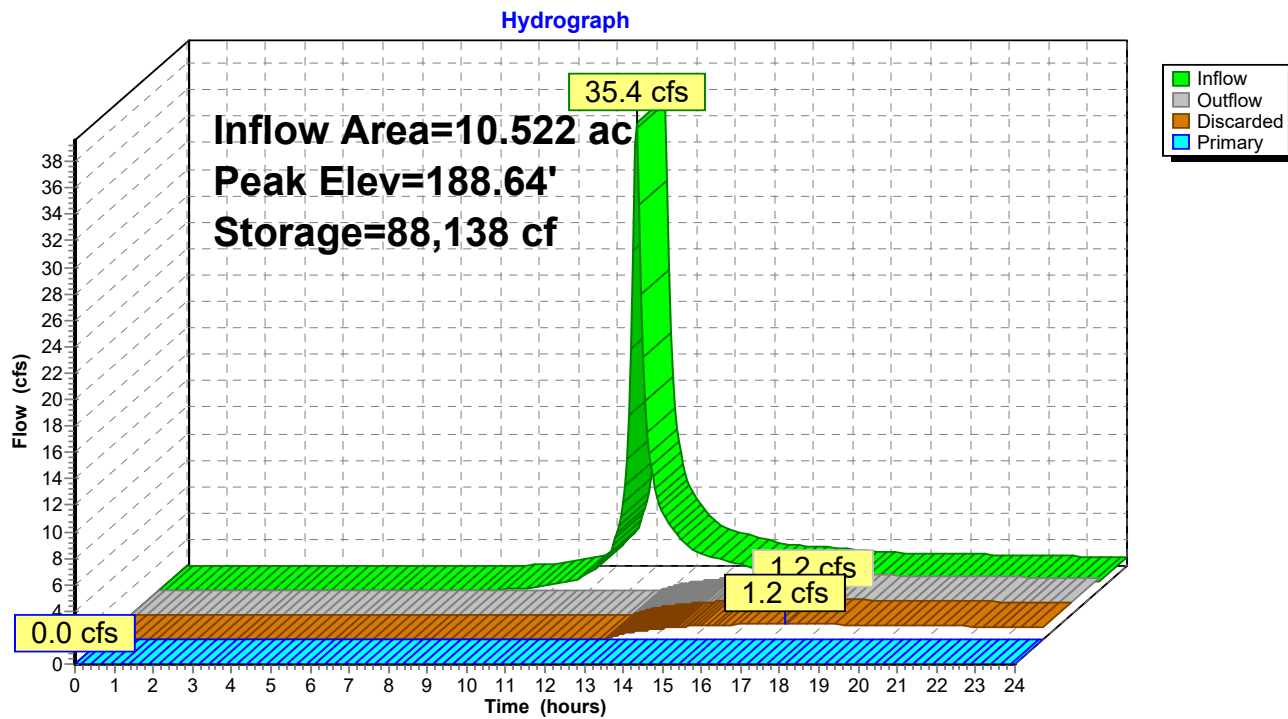
Volume	Invert	Avail.Storage	Storage Description		
#1	186.01'	143,139 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
186.01	28,880	726.0	0	0	28,880
187.50	34,273	765.0	46,992	46,992	33,639
189.20	39,846	811.0	62,942	109,933	39,561
190.00	43,190	1,045.0	33,205	143,139	74,130

Device	Routing	Invert	Outlet Devices
#1	Primary	189.20'	10.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s) 21.038 in/hr Exfiltration over Surface area above 188.00' Conductivity to Groundwater Elevation = 186.00' Excluded Surface area = 35,869 sf
#2	Discarded	188.00'	

Discarded OutFlow Max=1.2 cfs @ 17.44 hrs HW=188.64' (Free Discharge)
 ↑ **2=Exfiltration** (Controls 1.2 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=186.01' (Free Discharge)
 ↑ **1=Sharp-Crested Rectangular Weir** (Controls 0.0 cfs)

Pond 2P: Retention Basin C3



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Page 138

Summary for Pond 4P: Subsurface Infiltration System A

[85] Warning: Oscillations may require smaller dt or Finer Routing (severity=1)

Inflow Area = 1.091 ac, 100.00% Impervious, Inflow Depth > 8.55" for 100-Year event
 Inflow = 8.4 cfs @ 12.17 hrs, Volume= 0.777 af
 Outflow = 4.1 cfs @ 12.32 hrs, Volume= 0.777 af, Atten= 51%, Lag= 9.3 min
 Discarded = 4.1 cfs @ 12.32 hrs, Volume= 0.777 af
 Primary = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af
 Routed to Pond 2P : Retention Basin C3

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 199.95' @ 12.32 hrs Surf.Area= 0.081 ac Storage= 0.068 af

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 2.4 min (745.9 - 743.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	198.70'	0.068 af	30.50'W x 115.50'L x 3.54'H Field A 0.286 af Overall - 0.116 af Embedded = 0.170 af x 40.0% Voids
#2A	199.20'	0.116 af	Cultec R-330XLHD x 96 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 6 rows
#3	200.66'	0.000 af	1.50'D x 2.84'H Vertical Cone/Cylinder
		0.185 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	198.70'	42.077 in/hr Exfiltration over Wetted area Conductivity to Groundwater Elevation = 186.00'
#2	Primary	200.66'	12.0" Round Culvert L= 118.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 200.66' / 199.00' S= 0.0141 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#3	Primary	202.25'	4.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Discarded OutFlow Max=4.1 cfs @ 12.32 hrs HW=199.94' (Free Discharge)↑ **1=Exfiltration** (Controls 4.1 cfs)**Primary OutFlow** Max=0.0 cfs @ 0.00 hrs HW=198.70' TW=193.50' (Fixed TW Elev= 193.50')↑ **2=Culvert** (Controls 0.0 cfs)↑ **3=Sharp-Crested Rectangular Weir** (Controls 0.0 cfs)

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Page 139

Pond 4P: Subsurface Infiltration System A - Chamber Wizard Field A

Chamber Model = Cultec R-330XLHD (Cultec Recharger® 330XLHD)

Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf

Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap

Row Length Adjustment= +1.50' x 7.45 sf x 6 rows

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

16 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 113.50' Row Length +12.0" End Stone x 2 =
115.50' Base Length

6 Rows x 52.0" Wide + 6.0" Spacing x 5 + 12.0" Side Stone x 2 = 30.50' Base Width

6.0" Stone Base + 30.5" Chamber Height + 6.0" Stone Cover = 3.54' Field Height

96 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 6 Rows = 5,074.1 cf Chamber Storage

12,476.4 cf Field - 5,074.1 cf Chambers = 7,402.3 cf Stone x 40.0% Voids = 2,960.9 cf Stone Storage

Chamber Storage + Stone Storage = 8,035.0 cf = 0.184 af

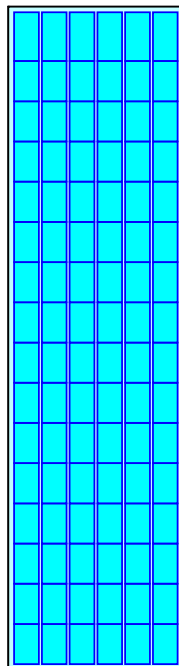
Overall Storage Efficiency = 64.4%

Overall System Size = 115.50' x 30.50' x 3.54'

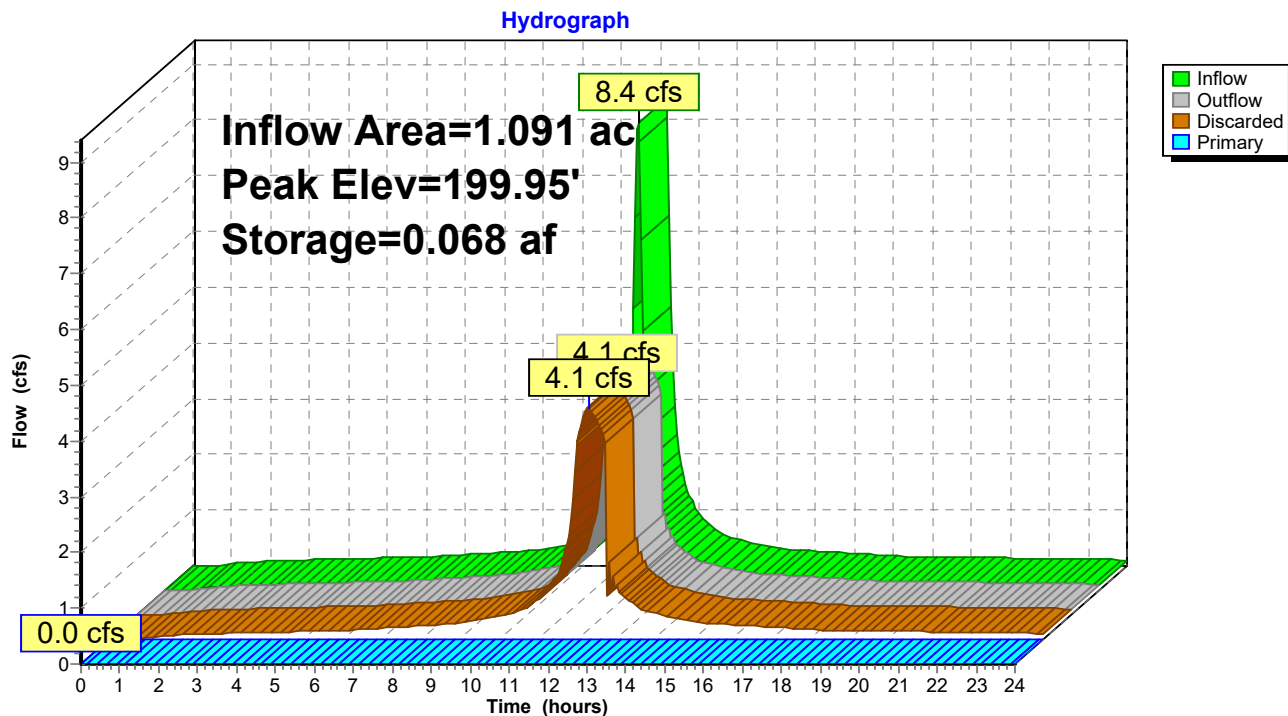
96 Chambers

462.1 cy Field

274.2 cy Stone



Pond 4P: Subsurface Infiltration System A



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Page 141

Summary for Pond 6P: Subsurface Infiltration System B

Inflow Area = 1.091 ac, 100.00% Impervious, Inflow Depth > 8.55" for 100-Year event
 Inflow = 8.4 cfs @ 12.17 hrs, Volume= 0.777 af
 Outflow = 4.3 cfs @ 12.32 hrs, Volume= 0.777 af, Atten= 49%, Lag= 9.1 min
 Discarded = 4.3 cfs @ 12.32 hrs, Volume= 0.777 af
 Primary = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af
 Routed to Pond 2P : Retention Basin C3

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 196.24' @ 12.32 hrs Surf.Area= 0.081 ac Storage= 0.067 af

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 2.5 min (746.0 - 743.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	195.00'	0.068 af	30.50'W x 115.50'L x 3.54'H Field A 0.286 af Overall - 0.116 af Embedded = 0.170 af x 40.0% Voids
#2A	195.50'	0.116 af	Cultec R-330XLHD x 96 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 6 rows
#3	197.00'	0.000 af	1.50'D x 7.00'H Vertical Cone/Cylinder
		0.185 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	195.00'	42.077 in/hr Exfiltration over Wetted area Conductivity to Groundwater Elevation = 186.00'
#2	Primary	198.60'	12.0" Round Culvert L= 95.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 198.60' / 192.00' S= 0.0695 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Discarded OutFlow Max=4.3 cfs @ 12.32 hrs HW=196.23' (Free Discharge)
 ↑**1=Exfiltration** (Controls 4.3 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=195.00' TW=191.00' (Fixed TW Elev= 191.00')
 ↑**2=Culvert** (Controls 0.0 cfs)

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Page 142

Pond 6P: Subsurface Infiltration System B - Chamber Wizard Field A

Chamber Model = Cultec R-330XLHD (Cultec Recharger® 330XLHD)

Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf

Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap

Row Length Adjustment= +1.50' x 7.45 sf x 6 rows

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

16 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 113.50' Row Length +12.0" End Stone x 2 =
115.50' Base Length

6 Rows x 52.0" Wide + 6.0" Spacing x 5 + 12.0" Side Stone x 2 = 30.50' Base Width

6.0" Stone Base + 30.5" Chamber Height + 6.0" Stone Cover = 3.54' Field Height

96 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 6 Rows = 5,074.1 cf Chamber Storage

12,476.4 cf Field - 5,074.1 cf Chambers = 7,402.3 cf Stone x 40.0% Voids = 2,960.9 cf Stone Storage

Chamber Storage + Stone Storage = 8,035.0 cf = 0.184 af

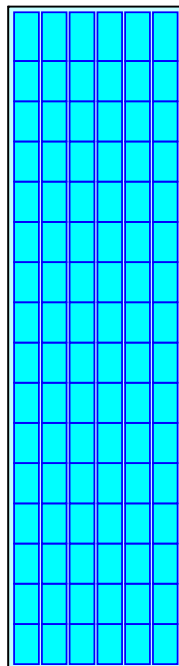
Overall Storage Efficiency = 64.4%

Overall System Size = 115.50' x 30.50' x 3.54'

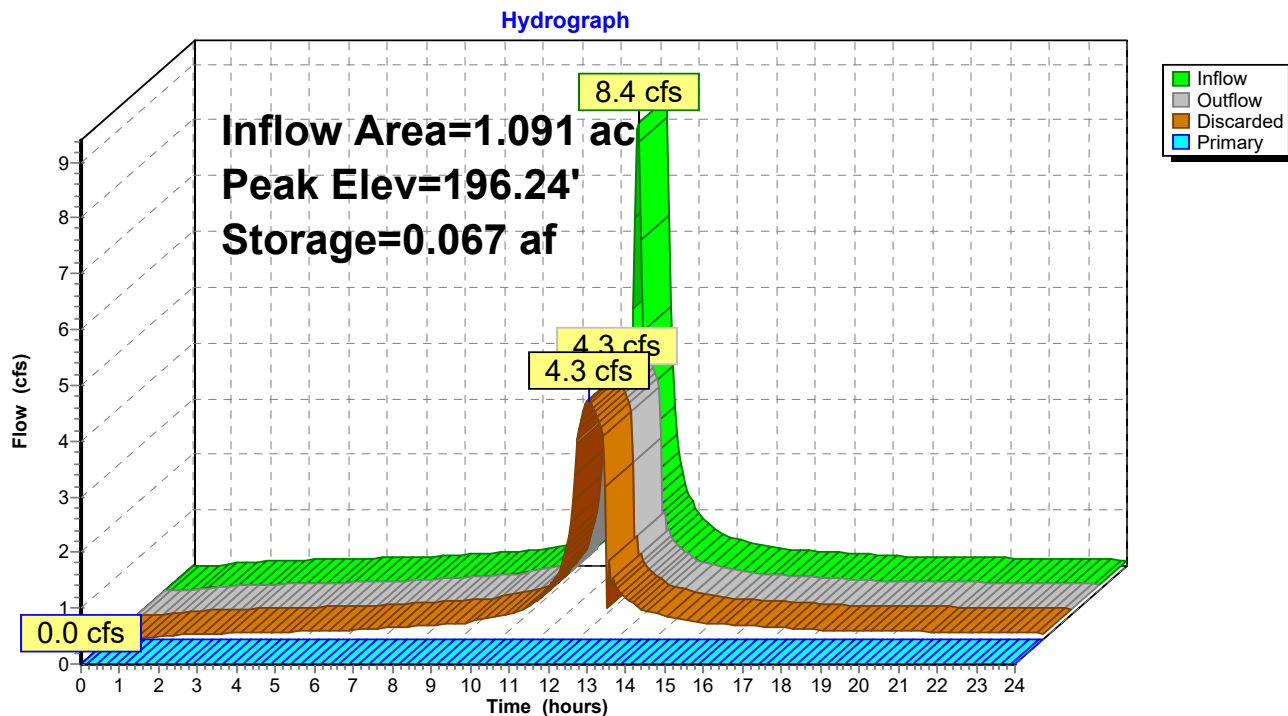
96 Chambers

462.1 cy Field

274.2 cy Stone



Pond 6P: Subsurface Infiltration System B



21-0219 Developed v2

Prepared by Bay Colony Group Inc

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10 Commerce Blvd Wrentham
NRCC 24-hr C 100-Year Rainfall=8.80"

Printed 9/7/2023

Page 144

Summary for Pond 12P: Infiltration Basin - Lot 3

Inflow Area = 11.710 ac, 76.94% Impervious, Inflow Depth > 6.85" for 100-Year event
 Inflow = 76.7 cfs @ 12.19 hrs, Volume= 6.685 af
 Outflow = 10.3 cfs @ 12.99 hrs, Volume= 6.676 af, Atten= 87%, Lag= 48.0 min
 Discarded = 10.3 cfs @ 12.99 hrs, Volume= 6.676 af
 Primary = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af
 Routed to Reach 9R : Rabbit Hill Brook

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 196.99' @ 12.99 hrs Surf.Area= 26,681 sf Storage= 117,299 cf

Plug-Flow detention time= 123.4 min calculated for 6.676 af (100% of inflow)
 Center-of-Mass det. time= 122.5 min (921.8 - 799.3)

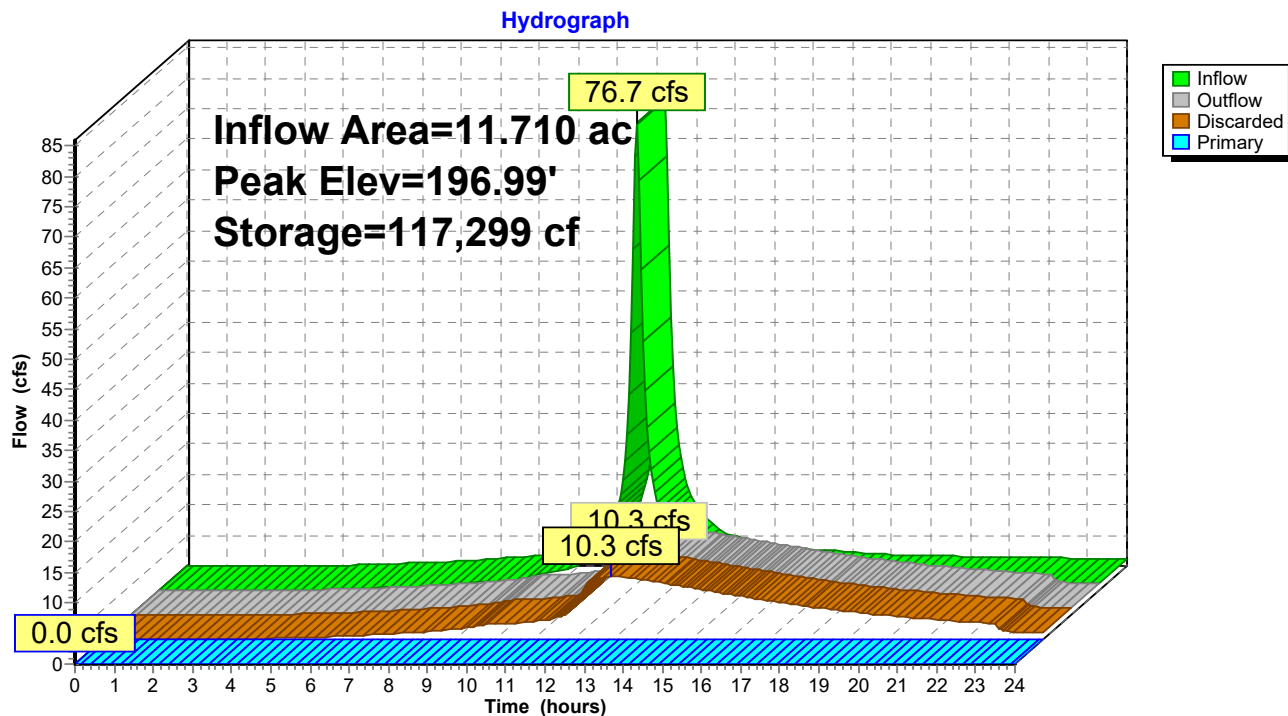
Volume	Invert	Avail.Storage	Storage Description		
#1	191.00'	145,471 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
191.00	13,068	493.0	0	0	13,068
192.00	15,090	518.0	14,067	14,067	15,142
194.00	19,436	568.0	34,434	48,501	19,597
196.00	24,184	619.0	43,534	92,035	24,559
198.00	29,335	669.0	53,436	145,471	29,843

Device	Routing	Invert	Outlet Devices
#1	Discarded	191.00'	8.270 in/hr Exfiltration over Wetted area Conductivity to Groundwater Elevation = 187.00'
#2	Primary	197.00'	10.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Discarded OutFlow Max=10.3 cfs @ 12.99 hrs HW=196.99' (Free Discharge)
 ↑1=Exfiltration (Controls 10.3 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=191.00' (Free Discharge)
 ↑2=Sharp-Crested Rectangular Weir (Controls 0.0 cfs)

Pond 12P: Infiltration Basin - Lot 3



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Printed 9/7/2023

Page 146

Summary for Pond 14P: Infiltration System

Inflow Area = 0.210 ac, 100.00% Impervious, Inflow Depth > 8.55" for 100-Year event
 Inflow = 1.6 cfs @ 12.17 hrs, Volume= 0.150 af
 Outflow = 0.3 cfs @ 12.58 hrs, Volume= 0.150 af, Atten= 79%, Lag= 24.8 min
 Discarded = 0.3 cfs @ 12.58 hrs, Volume= 0.150 af
 Primary = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af
 Routed to Pond 2P : Retention Basin C3

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 214.23' @ 12.58 hrs Surf.Area= 0.029 ac Storage= 0.034 af

Plug-Flow detention time= 24.4 min calculated for 0.150 af (100% of inflow)
 Center-of-Mass det. time= 24.3 min (767.8 - 743.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	212.50'	0.021 af	14.75'W x 85.29'L x 2.71'H Infiltration System 0.078 af Overall - 0.026 af Embedded = 0.052 af x 40.0% Voids
#2A	213.00'	0.026 af	Cultec R-180 x 52 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
0.047 af			Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	212.50'	8.270 in/hr Exfiltration over Wetted area Conductivity to Groundwater Elevation = 192.90'
#2	Primary	213.00'	12.0" Round Culvert L= 142.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 213.00' / 208.90' S= 0.0289 ' /' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#3	Device 2	214.70'	18.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.3 cfs @ 12.58 hrs HW=214.23' (Free Discharge)↑ **1=Exfiltration** (Controls 0.3 cfs)**Primary OutFlow** Max=0.0 cfs @ 0.00 hrs HW=212.50' (Free Discharge)↑ **2=Culvert** (Controls 0.0 cfs)↑ **3=Orifice/Grate** (Controls 0.0 cfs)

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NRCC 24-hr C 100-Year Rainfall=8.80"

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Page 147

Pond 14P: Infiltration System - Chamber Wizard Infiltration System

Chamber Model = Cultec R-180 (Cultec Recharger® 180HD)

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

36.0" Wide + 3.0" Spacing = 39.0" C-C Row Spacing

13 Chambers/Row x 6.33' Long +1.00' Row Adjustment = 83.29' Row Length +12.0" End Stone x 2 =
85.29' Base Length

4 Rows x 36.0" Wide + 3.0" Spacing x 3 + 12.0" Side Stone x 2 = 14.75' Base Width

6.0" Stone Base + 20.5" Chamber Height + 6.0" Stone Cover = 2.71' Field Height

52 Chambers x 21.8 cf +1.00' Row Adjustment x 3.44 sf x 4 Rows = 1,145.9 cf Chamber Storage

3,407.2 cf Field - 1,145.9 cf Chambers = 2,261.3 cf Stone x 40.0% Voids = 904.5 cf Stone Storage

Chamber Storage + Stone Storage = 2,050.4 cf = 0.047 af

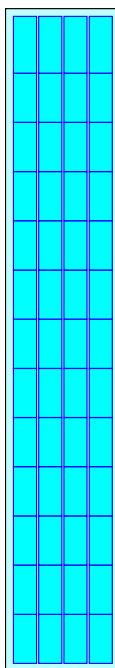
Overall Storage Efficiency = 60.2%

Overall System Size = 85.29' x 14.75' x 2.71'

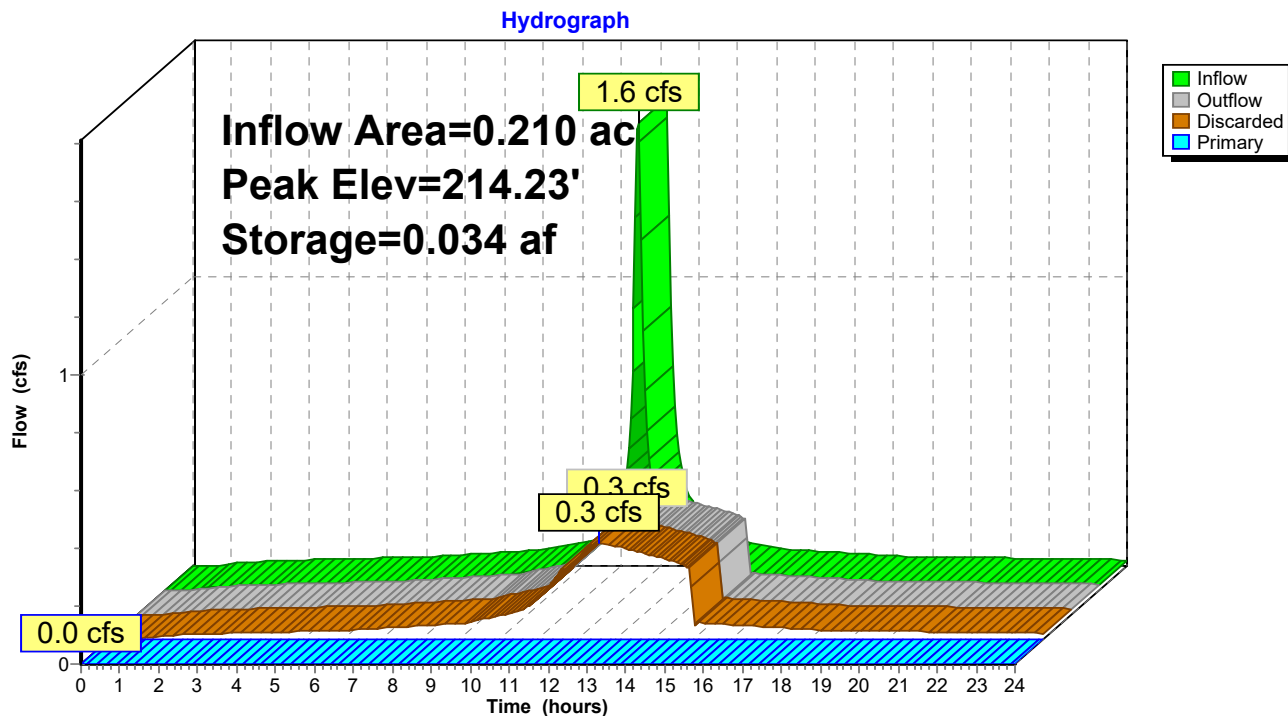
52 Chambers

126.2 cy Field

83.8 cy Stone



Pond 14P: Infiltration System



APPENDIX B – Storm Water Worksheets
TSS Removal Worksheet

TSS Removal Worksheet

PROJECT LOCATION: 10 Commerce Boulevard Wrentham
DATE: September, 2023
PROJECT NUMBER: 21-0219

TSS Removal

Impervious Area =		0.77 acres		
Runoff depth to be treated =		1.77 inches (2" storm)		
Runoff volume to be treated =		0.1136 ac-ft		
<i>BMP</i>	<i>TSS Removal Rate</i>	<i>Starting TSS Load</i>	<i>Amount Removed</i>	<i>Remaining Load</i>
Deep Sump and Hooded CB	0.25	1.00	0.25	0.75
Cascade CS-8	0.50	0.75	0.38	0.38
Storm Water Basin (Lot 2)	0.80	0.38	0.30	0.08
TOTAL TSS REMOVED =				93 %

TP Removal

<i>BMP</i>	<i>TSS Removal Rate</i>	<i>Starting TSS Load</i>	<i>Amount Removed</i>	<i>Remaining Load</i>	
Deep Sump and Hooded CB	0.05	1.00	0.05	0.95	
Cascade CS-8	0.20	0.95	0.19	0.76	
Storm Water Basin (Lot 2)	0.68	0.76	0.52	0.24	
TOTAL TSS REMOVED =				76 %	

TP removal data for CB and wet basin from NH DEP Stormwater Manual Volume 2, Appendix B
 TP removal data for Cascade from VA DEP Approval Letter 11.27.2019

APPENDIX D - Closed Drainage System Design

Closed Drainage System Analysis
10 Commerce Blvd Wrentham, MA

Upstream Node	Downstream Node	Section Size	Length (ft)	Constructed Slope (ft/ft)	Total Flow (cfs)	Capacity Free Flow (cfs)	Rational Coefficient	Average Velocity (ft/sec)	Upstream Ground Elevation (ft)	Upstream Invert Elevation (ft)	Upstream Structure Hydraulic Grade (ft)	Downstream Ground Elevation (ft)	Downstream Invert Elevation (ft)	Downstream Structure Hydraulic Grade (ft)
DMH#4	DMH#2(EXIST)	12 inch	24	0.021	3.9	5.6	N/A	7.7	210.50	204.70	205.54	210.00	204.20	204.20
DMH#3	DMH#4	12 inch	70	0.026	3.9	7.4	N/A	9.6	214.30	208.30	209.14	210.50	206.50	205.54
CB#3B	DMH#3	12 inch	34	0.006	0.3	3.0	0.7	2.5	212.50	208.50	209.39	214.30	208.30	209.37
DMH#2	DMH#3	12 inch	58	0.009	2.4	3.6	N/A	4.9	215.50	208.80	209.46	214.30	208.30	209.37
DMH#1	DMH#2	12 inch	93	0.010	2.4	3.8	N/A	5.1	214.30	209.70	210.36	215.50	208.80	209.50
CB#1B	DMH#1	12 inch	38	0.008	0.6	3.4	0.7	3.3	214.00	210.00	210.38	214.30	209.70	210.40
CB#3A	DMH#3	12 inch	23	0.020	1.3	5.4	0.7	5.6	214.60	210.60	211.08	214.30	210.15	209.37
CB#1A	DMH#1	12 inch	65	0.020	1.8	5.5	0.7	6.2	215.00	211.00	211.57	214.30	209.70	210.40
CANOPY	Infiltration System	6 inch	240	0.005	0.4	0.4	0.7	2.5	216.00	214.20	214.57	216.00	213.00	213.00
ROOF	Infiltration System	6 inch	122	0.014	0.4	0.7	0.7	3.8	216.75	214.75	215.07	216.00	213.00	213.00

Design Storm is 25-year event as shown on TP40 Boston, MA

APPENDIX G – Climate Resilience Design Standards Report

Climate Resilience Design Standards Tool Project Report

10 Commerce Boulevard Wrentham, MA

Date Created: 9/5/2023 4:40:04 PM

Created By: billbuckley@baycolonygroup.com

Date Report Generated: 9/5/2023 5:14:31 PM

Tool Version: Version 1.2

Project Contact Information: Stephen Meltzer (smeltzer@edgewood-development.com)

Project Summary

[Link to Project](#)

Estimated Capital Cost: \$1500000.00

End of Useful Life Year: 2074

Project within mapped Environmental Justice neighborhood: No

Ecosystem Service	Scores
Benefits	
Project Score	 Moderate
Exposure	
Sea Level Rise/Storm Surge	 Not Exposed
Extreme Precipitation - Urban Flooding	 Moderate Exposure
Extreme Precipitation - Riverine Flooding	 Not Exposed
Extreme Heat	 High Exposure



Asset Preliminary Climate Risk Rating

Number of Assets: 2

Summary

Asset Risk	Sea Level Rise/Storm Surge	Extreme Precipitation - Urban Flooding	Extreme Precipitation - Riverine Flooding	Extreme Heat
Convenience Store	Low Risk	Moderate Risk	Low Risk	High Risk
Intersection improvements	Low Risk	High Risk	Low Risk	High Risk

Climate Resilience Design Standards Summary

	Target Planning Horizon	Intermediate Planning Horizon	Percentile	Return Period	Tier
Sea Level Rise/Storm Surge					
Convenience Store					
Intersection improvements					
Extreme Precipitation					
Convenience Store	2070			10-yr (10%)	Tier 2
Intersection improvements	2070			50-yr (2%)	Tier 3
Extreme Heat					
Convenience Store	2070		50th		Tier 2
Intersection improvements	2070		90th		Tier 3

Scoring Rationale - Project Exposure Score

The purpose of the Exposure Score output is to provide a preliminary assessment of whether the overall project site and subsequent assets are exposed to impacts of natural hazard events and/or future impacts of climate change. For each climate parameter, the Tool will calculate one of the following exposure ratings: Not Exposed, Low Exposure, Moderate Exposure, or High Exposure. The rationale behind the exposure rating is provided below.

Sea Level Rise/Storm Surge

This project received a "Not Exposed" because of the following:

- Not located within the predicted mean high water shoreline by 2030
- No historic coastal flooding at project site
- Not located within the Massachusetts Coast Flood Risk Model (MC-FRM)

Extreme Precipitation - Urban Flooding

This project received a "Moderate Exposure" because of the following:

- Maximum annual daily rainfall exceeds 10 inches within the overall project's useful life
- No historic flooding at project site
- No increase to impervious area
- Existing impervious area of the project site is less than 10%

Extreme Precipitation - Riverine Flooding

This project received a "Not Exposed" because of the following:

- No historic riverine flooding at project site
- The project is not within a mapped FEMA floodplain [outside of the Massachusetts Coast Flood Risk Model (MC-FRM)]
- Project is more than 500ft from a waterbody
- Project is not likely susceptible to riverine erosion

Extreme Heat

This project received a "High Exposure" because of the following:

- 30+ days increase in days over 90 deg. F within project's useful life
- Not located within 100 ft of existing water body
- Existing trees are being removed as part of the proposed project
- Less than 10% of the existing project site has canopy cover
- No increase to the impervious area of the project site

Scoring Rationale - Asset Preliminary Climate Risk Rating

A Preliminary Climate Risk Rating is determined for each infrastructure and building asset by considering the overall project Exposure Score and responses to Step 4 questions provided by the user in the Tool. Natural Resource assets do not receive a risk rating. The following factors are what influenced the risk ratings for each asset.

Asset - Convenience Store

Primary asset criticality factors influencing risk ratings for this asset:

- Asset can be inaccessible/inoperable more than a week after natural hazard event without consequences
- Loss/inoperability of the asset would have impacts limited to local area and/or municipality
- Inoperability of the asset would not be expected to result in injuries
- Cost to replace is less than \$10 million
- Spills and/or releases of hazardous materials would be relatively easy to clean up

Asset - Intersection improvements

Primary asset criticality factors influencing risk ratings for this asset:

- Asset may be inaccessible/inoperable for more than a day but less than a week after natural hazard event
- Loss/inoperability of the asset would have impacts limited to the location of infrastructure only
- Infrastructure functions as an evacuation route during emergencies
- Inoperability may moderately impact other facilities, assets, or buildings, but is not expected to affect their ability to operate
- There are no hazardous materials in the asset

Project Climate Resilience Design Standards Output

Climate Resilience Design Standards and Guidance are recommended for each asset and climate parameter. The Design Standards for each climate parameter include the following: recommended planning horizon (target and/or intermediate), recommended return period (Sea Level Rise/Storm Surge and Precipitation) or percentile (Heat), and a list of applicable design criteria that are likely to be affected by climate change. Some design criteria have numerical values associated with the recommended return period and planning horizon, while others have tiered methodologies with step-by-step instructions on how to estimate design values given the other recommended design standards.

Asset: Convenience Store

Building/Facility

Sea Level Rise/Storm Surge

Low Risk

Applicable Design Criteria

Projected Tidal Datums: NOT APPLICABLE

Projected Water Surface Elevation: NOT APPLICABLE

Projected Wave Action Water Elevation: NOT APPLICABLE

Projected Wave Heights: NOT APPLICABLE

Projected Duration of Flooding: NOT APPLICABLE

Projected Design Flood Velocity: NOT APPLICABLE

Projected Scour & Erosion: NOT APPLICABLE

Extreme Precipitation

Moderate Risk

Target Planning Horizon: 2070

Return Period: 10-yr (10%)

LIMITATIONS: The recommended Standards for Total Precipitation Depth & Peak Intensity are determined by the user drawn polygon and relationships as defined in the Supporting Documents. The projected Total Precipitation Depth values provided through the Tool are based on the climate projections developed by Cornell University as part of EEA's Massachusetts Climate and Hydrologic Risk Project, GIS-based data as of 10/15/21. For additional information on the methodology of these precipitation outputs, see Supporting Documents.

While Total Precipitation Depth & Peak Intensity for 24-hour Design Storms are useful to inform planning and design, it is recommended to also consider additional longer- and shorter-duration precipitation events and intensities in accordance with best practices. Longer-duration, lower-intensity storms allow time for infiltration and reduce the load on infrastructure over the duration of the storm. Shorter-duration, higher-intensity storms often have higher runoff volumes because the water does not have enough time to infiltrate infrastructure systems (e.g., catch basins) and may overflow or back up during such storms, resulting in flooding. In the Northeast, short-duration high intensity rain events are becoming more frequent, and there is often little early warning for these events, making it difficult to plan operationally. While the Tool does not provide recommended design standards for these scenarios, users should still consider both short- and long-duration precipitation events and how they may impact the asset.

The projected values, standards, and guidance provided within this Tool may be used to inform plans and designs, but they do not provide guarantees for future conditions or resilience. The projected values are not to be considered final or appropriate for construction documents without supporting engineering analyses. The guidance provided within this Tool is intended to be general and users are encouraged to do their own due diligence

Applicable Design Criteria

Tiered Methodology: Tier 2

Projected Total Precipitation Depth & Peak Intensity for 24-hr Design Storms: APPLICABLE

Asset Name	Recommended Planning Horizon	Recommended Return Period (Design Storm)	Projected 24-hr Total Precipitation Depth (inches)	Step-by-Step Methodology for Peak Intensity
Convenience Store	2070	10-Year (10%)	7.1	Downloadable Methodology PDF

Projected Riverine Peak Discharge & Peak Flood Elevation: NOT APPLICABLE

Extreme Heat

High Risk

Target Planning Horizon: 2070
Percentile: 50th Percentile

Applicable Design Criteria

Tiered Methodology: Tier 2

Projected Annual/Summer/Winter Average Temperatures: APPLICABLE

[Methodology to Estimate Projected Values](#) : Tier 2

Projected Heat Index: APPLICABLE

[Methodology to Estimate Projected Values](#) : Tier 2

Projected Growing Degree Days: NOT APPLICABLE

Projected Days Per Year With Max Temp > 95°F, >90°F, <32°F: APPLICABLE

[Methodology to Estimate Projected Values](#) : Tier 2

Projected Number of Heat Waves Per Year & Average Heat Wave Duration: APPLICABLE

[Methodology to Estimate Projected Values](#) : Tier 2

Projected Cooling Degree Days & Heating Degree Days (base = 65°F): APPLICABLE

[Methodology to Estimate Projected Values](#) : Tier 2

Asset: Intersection improvements

Infrastructure

Sea Level Rise/Storm Surge

Low Risk

Applicable Design Criteria

Projected Tidal Datums: NOT APPLICABLE

Projected Water Surface Elevation: NOT APPLICABLE

Projected Wave Action Water Elevation: NOT APPLICABLE

Projected Wave Heights: NOT APPLICABLE

Projected Duration of Flooding: NOT APPLICABLE

Projected Design Flood Velocity: NOT APPLICABLE

Projected Scour & Erosion: NOT APPLICABLE

Extreme Precipitation

High Risk

Target Planning Horizon: 2070
Return Period: 50-yr (2%)

LIMITATIONS: The recommended Standards for Total Precipitation Depth & Peak Intensity are determined by the user drawn polygon and relationships as defined in the Supporting Documents. The projected Total Precipitation Depth values provided through the Tool are based on the climate projections developed by Cornell University as part of EEA's Massachusetts Climate and Hydrologic Risk Project, GIS-based data as of 10/15/21. For additional information on the methodology of these precipitation outputs, see Supporting Documents.

While Total Precipitation Depth & Peak Intensity for 24-hour Design Storms are useful to inform planning and design, it is recommended to also consider additional longer- and shorter-duration precipitation events and intensities in accordance with best practices. Longer-duration, lower-intensity storms allow time for infiltration and reduce the load on infrastructure over the duration of the storm. Shorter-duration, higher-intensity storms often have higher runoff volumes because the water does not have enough time to infiltrate infrastructure systems (e.g., catch basins) and may overflow or back up during such storms, resulting in flooding. In the Northeast, short-duration high intensity rain events are becoming more frequent, and there is often little early warning for these events, making it difficult to plan operationally. While the Tool does not provide recommended design standards for these scenarios, users should still consider both short- and long-duration precipitation events and how they may impact the asset.

The projected values, standards, and guidance provided within this Tool may be used to inform plans and designs, but they do not provide guarantees for future conditions or resilience. The projected values are not to be considered final or appropriate for construction documents without supporting engineering analyses. The guidance provided within this Tool is intended to be general and users are encouraged to do their own due diligence

Applicable Design Criteria

Tiered Methodology: Tier 3

Projected Total Precipitation Depth & Peak Intensity for 24-hr Design Storms: APPLICABLE

Asset Name	Recommended Planning Horizon	Recommended Return Period (Design Storm)	Projected 24-hr Total Precipitation Depth (inches)	Step-by-Step Methodology for Peak Intensity
Intersection improvements	2070	50-Year (2%)	9.8	Downloadable Methodology PDF

Projected Riverine Peak Discharge & Peak Flood Elevation: NOT APPLICABLE

Extreme Heat

High Risk

Target Planning Horizon: 2070

Percentile: 90th Percentile

Applicable Design Criteria

Tiered Methodology: Tier 3

Projected Annual/Summer/Winter Average Temperatures: APPLICABLE

[Methodology to Estimate Projected Values](#) : Tier 3

Projected Heat Index: APPLICABLE

[Methodology to Estimate Projected Values](#) : Tier 3

Projected Growing Degree Days: NOT APPLICABLE

Projected Days Per Year With Max Temp > 95°F, >90°F, <32°F: APPLICABLE

[Methodology to Estimate Projected Values](#) : Tier 3

Projected Number of Heat Waves Per Year & Average Heat Wave Duration: APPLICABLE

[Methodology to Estimate Projected Values](#) : Tier 3

Projected Cooling Degree Days & Heating Degree Days (base = 65°F): NOT APPLICABLE

Project Inputs

Core Project Information

Name:	10 Commerce Boulevard Wrentham, MA 2074
Given the expected useful life of the project, through what year do you estimate the project to last (i.e. before a major reconstruction/renovation)?	
Location of Project:	Wrentham
Estimated Capital Cost:	\$1,500,000
Who is the Submitting Entity?	Private Other Edgewood Development Comp, LLC Stephen Meltzer (smeltzer@edgewood-development.com)
Is this project being submitted as part of a state grant application?	No
Which grant program?	
What stage are you in your project lifecycle?	Permitting
Is climate resiliency a core objective of this project?	No
Is this project being submitted as part of the state capital planning process?	No
Is this project being submitted as part of a regulatory review process or permitting?	Yes
Brief Project Description:	The project will require permits from MEPA, MassDOT, Wrentham Planning Board and Wrentham Board of Health. The main goal is the construction of a 4,500 sf convenience store and fueling station. Potential impacts of climate change include extreme heat waves and the potential impact of more frequent and intense storm precipitation. The Project will be in compliance with the DEP Stormwater Standards and will include LID elements, to include: separation of drainage paths, recharge of clean storm water, use of green infrastructure (tree box filters), an O&M Plan to ensure storm water system is maintained, and maintenance of a significant amount of green space. The storm water design will also be using the higher NRCC runoff volumes instead of the TP40 values. This will result in a system designed for higher and more frequent storms. The elevation of the building will ensure that flooding from the adjacent river will not impact the facility.
Project Submission Comments:	

Project Ecosystem Service Benefits

Factors Influencing Output

- ✓ Project reduces storm damage
- ✓ Project protects public water supply
- ✓ Project promotes decarbonization
- ✓ Project recharges groundwater
- ✓ Project improves water quality
- ✓ Project protects fisheries, wildlife, and plant habitat
- ✓ Project provides oxygen production
- ✓ Project prevents pollution

Factors to Improve Output

- ✓ Incorporate nature-based solutions that may provide flood protection
- ✓ Incorporate green infrastructure to filter stormwater
- ✓ Incorporate nature-based solutions that sequester carbon carbon
- ✓ Preserve, enhance, and/or restore coastal shellfish habitats
- ✓ Incorporate vegetation that provides pollinator habitat
- ✓ Identify opportunities to remediate existing sources of pollution
- ✓ Provide opportunities for passive and/or active recreation through open space
- ✓ Mitigate atmospheric greenhouse gas concentrations and other toxic air pollutants through nature-based solutions
- ✓ Incorporate education and/or protect cultural resources as part of your project

Is the primary purpose of this project ecological restoration?

No

Project Benefits

Provides flood protection through nature-based solutions	No
Reduces storm damage	Yes
Recharges groundwater	Yes
Protects public water supply	Yes
Filters stormwater using green infrastructure	No
Improves water quality	Yes

Promotes decarbonization	Yes
Enables carbon sequestration	No
Provides oxygen production	Yes
Improves air quality	No
Prevents pollution	Yes
Remediates existing sources of pollution	No
Protects fisheries, wildlife, and plant habitat	Yes
Protects land containing shellfish	No
Provides pollinator habitat	No
Provides recreation	No
Provides cultural resources/education	No

Project Climate Exposure

Is the primary purpose of this project ecological restoration?	No
Does the project site have a history of coastal flooding?	No
Does the project site have a history of flooding during extreme precipitation events (unrelated to water/sewer damages)?	No
Does the project site have a history of riverine flooding?	No
Does the project result in a net increase in impervious area of the site?	No
Are existing trees being removed as part of the proposed project?	Yes

Project Assets

Asset: Convenience Store
Asset Type: Typically Occupied
Asset Sub-Type: Other
Construction Type: New Construction
Construction Year: 2024
Useful Life: 50

Identify the length of time the asset can be inaccessible/inoperable without significant consequences.

Building may be inaccessible/inoperable more than a week after natural hazard event without consequences

Identify the geographic area directly affected by permanent loss or significant inoperability of the building/facility.

Impacts would be limited to local area and/or municipality

Identify the population directly served that would be affected by the permanent loss of use or inoperability of the building/facility.

Less than 1,000 people

Identify if the building/facility provides services to populations that reside within Environmental Justice neighborhoods or climate vulnerable populations.

The building/facility does not provide services to populations that reside within Environmental Justice neighborhoods or climate vulnerable populations.

If the building/facility became inoperable for longer than acceptable in Question 1, how, if at all, would it be expected to impact people's health and safety?

Inoperability of the building/facility would not be expected to result in injuries

If there are hazardous materials in your building/facility, what are the extent of impacts related to spills/releases of these materials?

Spills and/or releases of hazardous materials would be relatively easy to clean up

If the building/facility became inoperable for longer than acceptable in Question 1, what are the impacts on other facilities, assets, and/or infrastructure?

Minor – Inoperability will not likely affect other facilities, assets, or buildings

If this building/facility was damaged beyond repair, how much would it approximately cost to replace?

Less than \$10 million

Is this a recreational facility which can be vacated during a natural hazard event?

No

If the building/facility became inoperable for longer than acceptable in Question 1, what are the public and/or social services impacts?

Many alternative programs and/or services are available to support the community

If the building/facility became inoperable for longer than acceptable in Question 1, what are the environmental impacts related to natural resources?

No impact on surrounding natural resources is expected

If the building/facility became inoperable for longer than acceptable in Question 1, what are the impacts to government services (i.e. the building is not able to serve or operate its intended users or function)?

Loss of building is not expected to reduce the ability to maintain government services.

If the building/facility became inoperable for longer than acceptable in Question 1, what are the impacts to loss of confidence in government (i.e. the building is not able to serve or operate its intended users or function)?

No Impact

Asset: Intersection improvements

Asset Type: Transportation

Asset Sub-Type: Other Transportation

Construction Type: Major Repair/Retrofit

Construction Year: 2024

Useful Life: 50

Identify the length of time the asset can be inaccessible/inoperable without significant consequences.

Infrastructure may be inaccessible/inoperable for more than a day, but less than a week after natural hazard without consequences.

Identify the geographic area directly affected by permanent loss or significant inoperability of the infrastructure.

Impacts limited to location of infrastructure only

Identify the population directly served that would be affected by the permanent loss or significant inoperability of the infrastructure.

Less than 5,000 people

Identify if the infrastructure provides services to populations that reside within Environmental Justice neighborhoods or climate vulnerable populations.

The infrastructure does not provide services to populations that reside within Environmental Justice neighborhoods or climate vulnerable populations.

Will the infrastructure reduce the risk of flooding?

No

If the infrastructure became inoperable for longer than acceptable in Question 1, how, if at all, would it be expected to impact people's health and safety?

Inoperability of the infrastructure would not be expected to result in injuries

If there are hazardous materials in your infrastructure, what are the extents of impacts related to spills/releases of these materials?

There are no hazardous materials in the infrastructure

If the infrastructure became inoperable for longer than acceptable in Question 1, what are the impacts on other facilities, assets, and/or infrastructure?

Moderate – Inoperability may impact other facilities, assets, or buildings, but cascading impacts do not affect the ability of other facilities, assets, or buildings to operate

If the infrastructure was damaged beyond repair, how much would it approximately cost to replace?

Less than \$10 million

Does the infrastructure function as an evacuation route during emergencies? This question only applies to roadway projects.

Yes

If the infrastructure became inoperable for longer than acceptable in Question 1, what are the environmental impacts related to natural resources?

No impact on surrounding natural resources is expected

If the infrastructure became inoperable for longer than acceptable in Question 1, what are the impacts to government services (i.e. the infrastructure is not able to serve or operate its intended users or function)?

Loss of infrastructure is not expected to reduce the ability to maintain government services

What are the impacts to loss of confidence in government resulting from loss of infrastructure functionality (i.e. the infrastructure asset is not able to serve or operate its intended users or function)?

No Impact

Report Comments

N/A