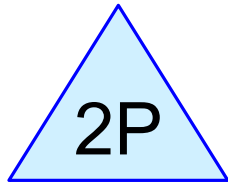


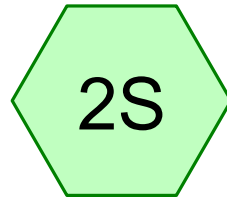
1S



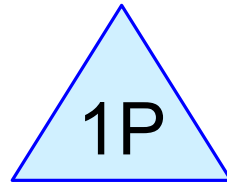
Infiltration Trench



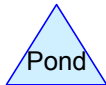
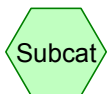
PROPERTY LINE



2S



Subsurface infiltration chambers



Routing Diagram for 217-177 Post Development Final (R1)

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## 217-177 Post Development Final (R1)

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### Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.190	39	>75% Grass cover, Good, HSG A (1S, 2S)
0.204	39	>75% Grass cover, Good, HSG A (Offsite) (1S)
0.004	98	Concrete stairs, HSG A (1S)
0.031	98	Concrete walk, HSG A (2S)
0.063	96	Gravel surface, HSG A (1S)
0.116	96	Gravel surface, HSG A (Offsite) (1S)
0.148	98	Paved parking, HSG A (2S)
0.051	64	Permeable pavers, HSG A (2S)
0.056	39	Planters, HSG A (2S)
0.326	98	Roofs, HSG A (2S)
0.040	98	Roofs, HSG A (Offsite) (1S)
0.006	98	Wall, HSG A (2S)
1.404	30	Woods, Good, HSG A (Offsite) (1S)
<b>2.640</b>	<b>51</b>	<b>TOTAL AREA</b>

## 217-177 Post Development Final (R1)

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### Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
2.640	HSG A	1S, 2S
0.000	HSG B	
0.000	HSG C	
0.000	HSG D	
0.000	Other	
<b>2.640</b>		<b>TOTAL AREA</b>

## 217-177 Post Development Final (R1)

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### Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.394	0.000	0.000	0.000	0.000	0.394	>75% Grass cover, Good	1S, 2S
0.004	0.000	0.000	0.000	0.000	0.004	Concrete stairs	1S
0.031	0.000	0.000	0.000	0.000	0.031	Concrete walk	2S
0.180	0.000	0.000	0.000	0.000	0.180	Gravel surface	1S
0.148	0.000	0.000	0.000	0.000	0.148	Paved parking	2S
0.051	0.000	0.000	0.000	0.000	0.051	Permeable pavers	2S
0.056	0.000	0.000	0.000	0.000	0.056	Planters	2S
0.366	0.000	0.000	0.000	0.000	0.366	Roofs	1S, 2S
0.006	0.000	0.000	0.000	0.000	0.006	Wall	2S
1.404	0.000	0.000	0.000	0.000	1.404	Woods, Good	1S
<b>2.640</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>2.640</b>	<b>TOTAL AREA</b>	

## 217-177 Post Development Final (R1)

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### Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	1S	0.00	0.00	297.0	0.0050	0.012	12.0	0.0	0.0

**217-177 Post Development Final (R1)**

Type III 24-hr 2-Year Rainfall=3.20"

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Time span=5.00-48.00 hrs, dt=0.05 hrs, 861 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment1S: 1S**

Runoff Area=80,164 sf 2.40% Impervious Runoff Depth=0.00"  
Flow Length=650' Tc=17.3 min CN=39 Runoff=0.00 cfs 0.000 af

**Subcatchment2S: 2S**

Runoff Area=34,831 sf 63.83% Impervious Runoff Depth=1.27"  
Tc=6.0 min CN=78 Runoff=1.15 cfs 0.085 af

**Reach DP-1: PROPERTYLINE**

Inflow=0.00 cfs 0.000 af  
Outflow=0.00 cfs 0.000 af

**Pond 1P: Subsurface infiltration chambers**

Peak Elev=153.50' Storage=581 cf Inflow=1.15 cfs 0.085 af  
Outflow=0.39 cfs 0.085 af

**Pond 2P: Infiltration Trench**

Peak Elev=142.00' Storage=0 cf Inflow=0.00 cfs 0.000 af  
Discarded=0.00 cfs 0.000 af Primary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.000 af

**Total Runoff Area = 2.640 ac Runoff Volume = 0.085 af Average Runoff Depth = 0.39"**  
**78.99% Pervious = 2.085 ac 21.01% Impervious = 0.555 ac**

**Summary for Subcatchment 1S: 1S**

Runoff = 0.00 cfs @ 24.04 hrs, Volume= 0.000 af, Depth= 0.00"

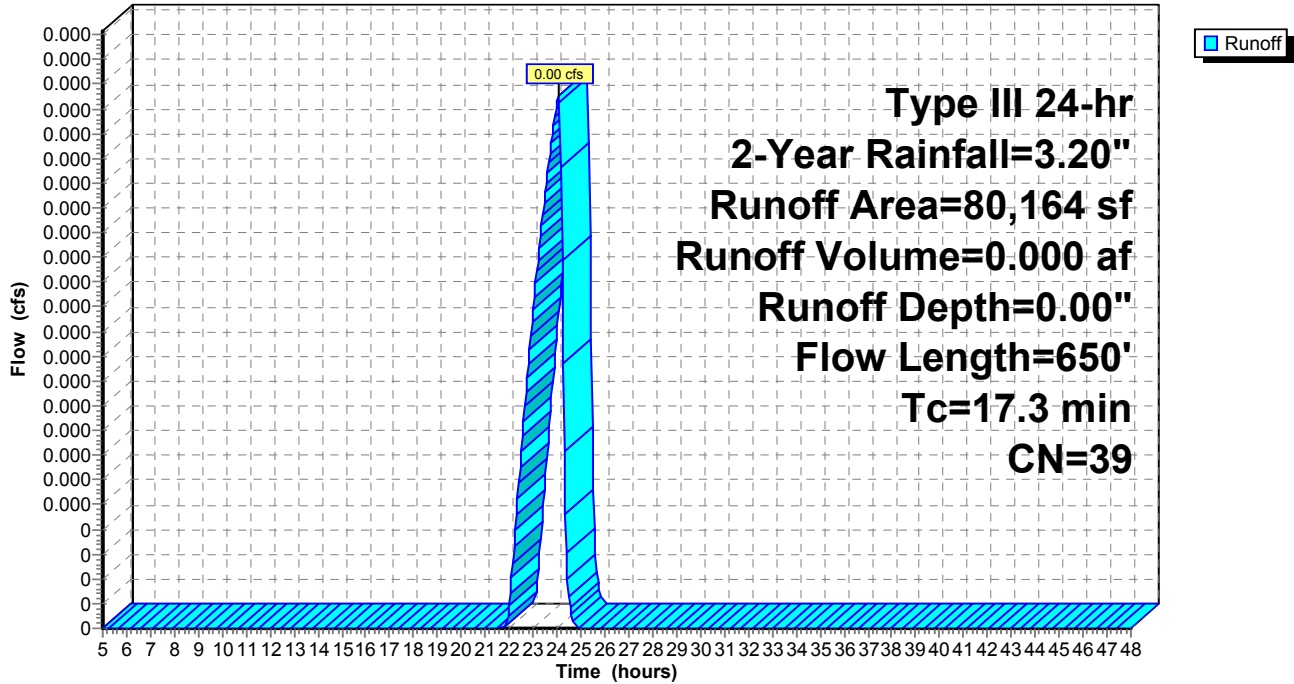
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs  
Type III 24-hr 2-Year Rainfall=3.20"

Area (sf)	CN	Description
* 61,141	30	Woods, Good, HSG A (Offsite)
* 5,064	96	Gravel surface, HSG A (Offsite)
* 8,886	39	>75% Grass cover, Good, HSG A (Offsite)
* 1,742	98	Roofs, HSG A (Offsite)
1,332	96	Gravel surface, HSG A
* 184	98	Concrete stairs, HSG A
* 1,432	96	Gravel surface, HSG A
383	39	>75% Grass cover, Good, HSG A
80,164	39	Weighted Average
78,238		97.60% Pervious Area
1,926		2.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.8	50	0.0150	0.06		<b>Sheet Flow, SHEET FLOW</b> Woods: Light underbrush n= 0.400 P2= 3.20"
2.1	303	0.0230	2.44		<b>Shallow Concentrated Flow, SHALLOW CONC. FLOW</b> Unpaved Kv= 16.1 fps
1.4	297	0.0050	3.47	2.73	<b>Pipe Channel,</b> 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012
17.3	650	Total			

### Subcatchment 1S: 1S

Hydrograph





**Summary for Subcatchment 2S: 2S**

Runoff = 1.15 cfs @ 12.10 hrs, Volume= 0.085 af, Depth= 1.27"

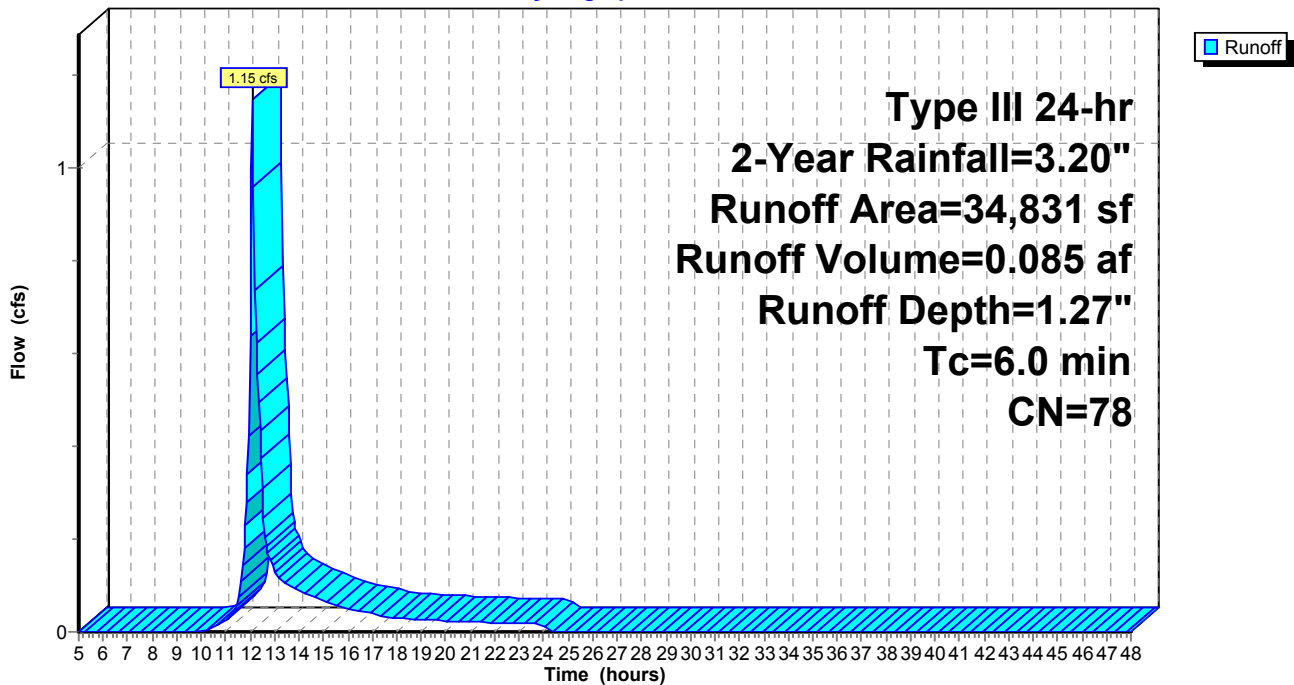
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs  
Type III 24-hr 2-Year Rainfall=3.20"

Area (sf)	CN	Description
7,900	39	>75% Grass cover, Good, HSG A
6,431	98	Paved parking, HSG A
14,221	98	Roofs, HSG A
* 252	98	Wall, HSG A
* 1,329	98	Concrete walk, HSG A
* 2,243	64	Permeable pavers, HSG A
* 2,455	39	Planters, HSG A
34,831	78	Weighted Average
12,598		36.17% Pervious Area
22,233		63.83% Impervious Area

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

**Subcatchment 2S: 2S**

Hydrograph



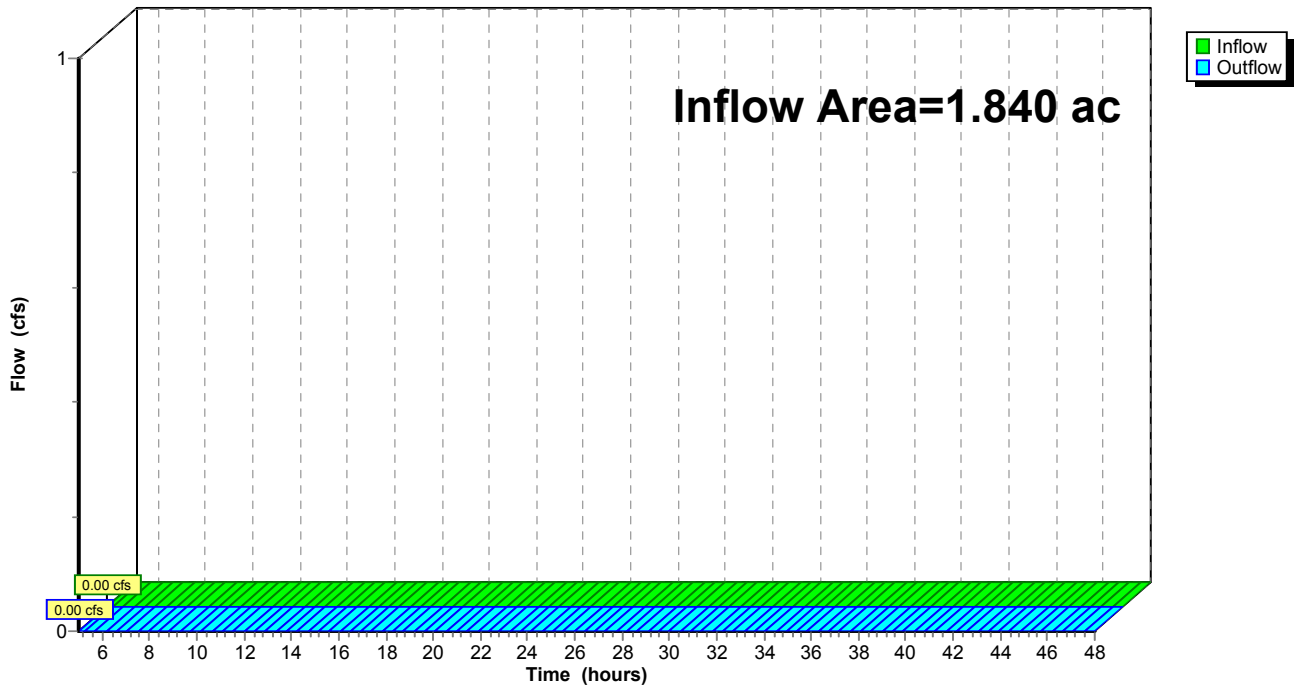
### Summary for Reach DP-1: PROPERTY LINE

Inflow Area = 1.840 ac, 2.40% Impervious, Inflow Depth = 0.00" for 2-Year event  
Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af  
Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs

### Reach DP-1: PROPERTY LINE

Hydrograph



**Summary for Pond 1P: Subsurface infiltration chambers**

Inflow Area = 0.800 ac, 63.83% Impervious, Inflow Depth = 1.27" for 2-Year event  
 Inflow = 1.15 cfs @ 12.10 hrs, Volume= 0.085 af  
 Outflow = 0.39 cfs @ 12.00 hrs, Volume= 0.085 af, Atten= 66%, Lag= 0.0 min  
 Discarded = 0.39 cfs @ 12.00 hrs, Volume= 0.085 af

Routing by Stor-Ind method, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs  
 Peak Elev= 153.50' @ 12.43 hrs Surf.Area= 2,048 sf Storage= 581 cf

Plug-Flow detention time= 7.7 min calculated for 0.085 af (100% of inflow)  
 Center-of-Mass det. time= 7.7 min ( 856.9 - 849.2 )

Volume	Invert	Avail.Storage	Storage Description
#1A	152.90'	1,734 cf	<b>45.00'W x 45.50'L x 3.54'H Field A</b> 7,252 cf Overall - 2,917 cf Embedded = 4,334 cf x 40.0% Voids
#2A	153.40'	2,917 cf	<b>Cultec R-330XLHD x 54 Inside #1</b> 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 9 rows
		4,651 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	152.90'	<b>8.270 in/hr Exfiltration over Surface area</b>

**Discarded OutFlow** Max=0.39 cfs @ 12.00 hrs HW=152.97' (Free Discharge)  
 ↑1=Exfiltration (Exfiltration Controls 0.39 cfs)

**Pond 1P: Subsurface infiltration chambers - 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 9 rows

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

6 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 43.50' Row Length +12.0" End Stone x 2 = 45.50' Base Length

9 Rows x 52.0" Wide + 6.0" Spacing x 8 + 12.0" Side Stone x 2 = 45.00' Base Width

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

54 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 9 Rows = 2,917.1 cf Chamber Storage

7,251.6 cf Field - 2,917.1 cf Chambers = 4,334.5 cf Stone x 40.0% Voids = 1,733.8 cf Stone Storage

Chamber Storage + Stone Storage = 4,650.9 cf = 0.107 af

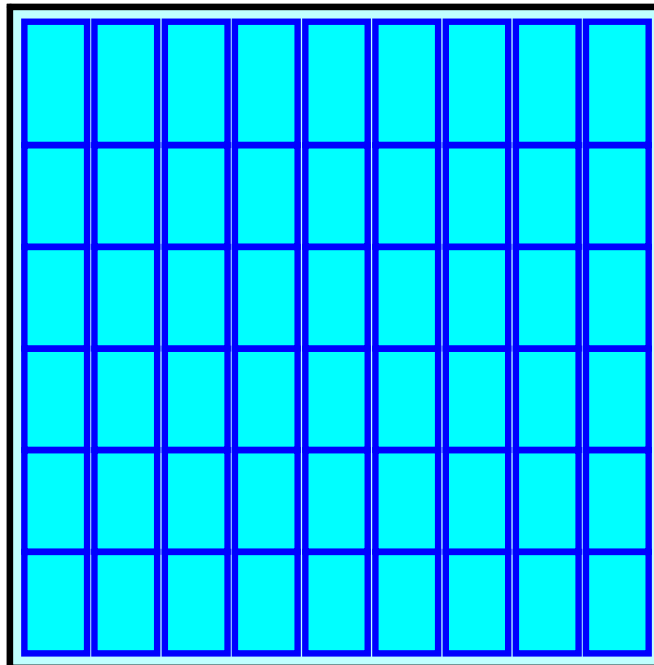
Overall Storage Efficiency = 64.1%

Overall System Size = 45.50' x 45.00' x 3.54'

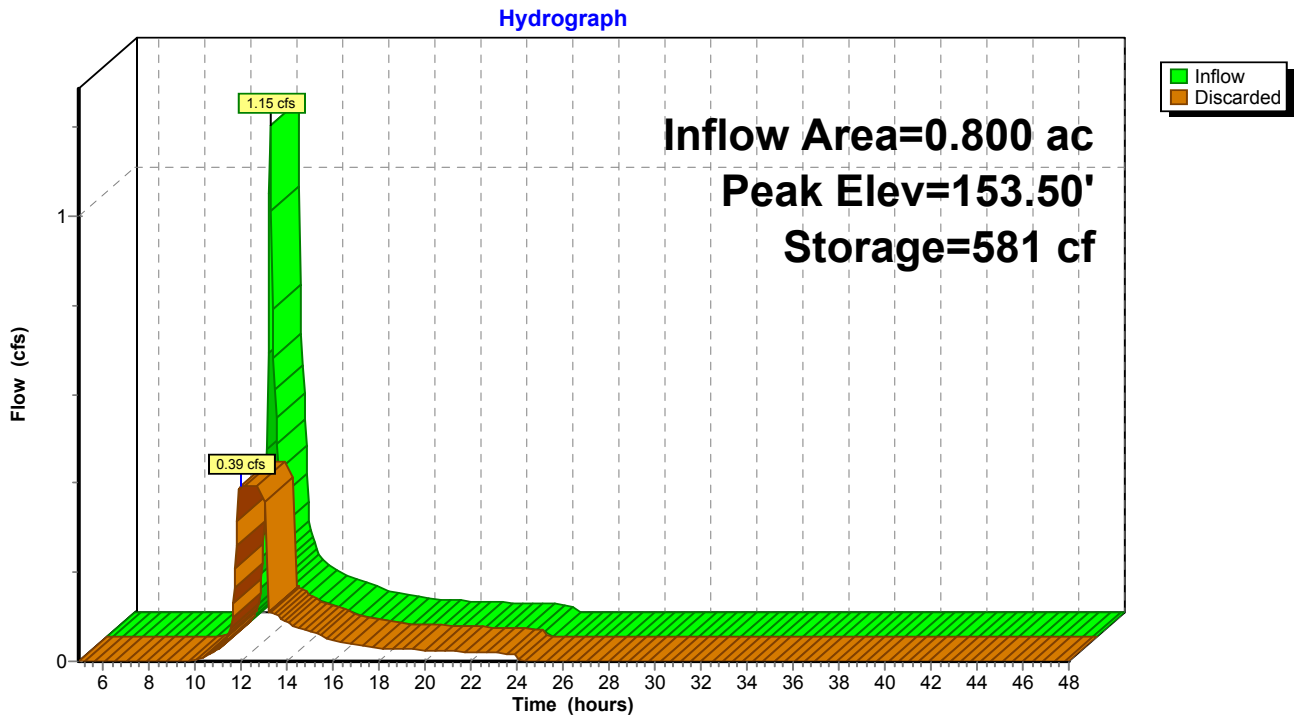
54 Chambers

268.6 cy Field

160.5 cy Stone



### Pond 1P: Subsurface infiltration chambers



**Summary for Pond 2P: Infiltration Trench**

Inflow Area = 1.840 ac, 2.40% Impervious, Inflow Depth = 0.00" for 2-Year event  
 Inflow = 0.00 cfs @ 24.04 hrs, Volume= 0.000 af  
 Outflow = 0.00 cfs @ 24.08 hrs, Volume= 0.000 af, Atten= 2%, Lag= 2.5 min  
 Discarded = 0.00 cfs @ 24.08 hrs, Volume= 0.000 af  
 Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs / 4  
 Peak Elev= 142.00' @ 24.08 hrs Surf.Area= 128 sf Storage= 0 cf

Plug-Flow detention time= 4.7 min calculated for 0.000 af (100% of inflow)  
 Center-of-Mass det. time= 4.7 min ( 1,411.7 - 1,407.1 )

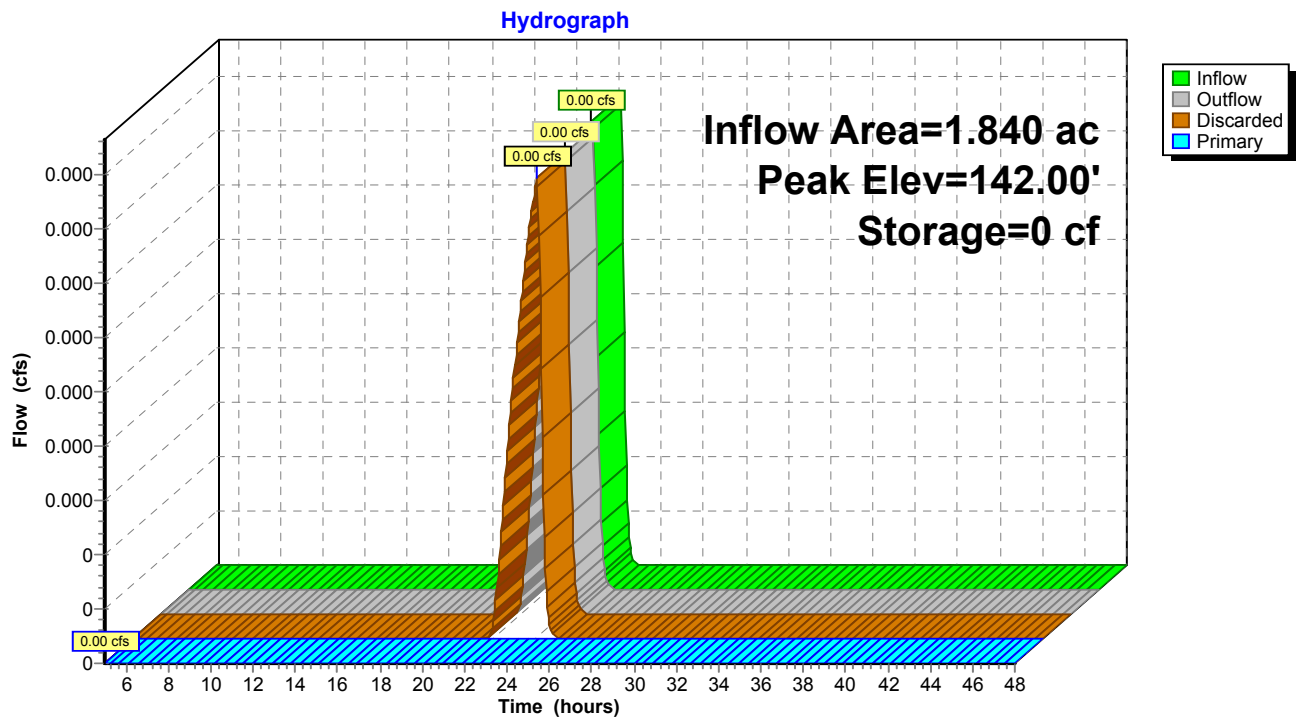
Volume	Invert	Avail.Storage	Storage Description
#1	142.00'	205 cf	<b>4.00'W x 32.00'L x 4.00'H Prismatoid</b> 512 cf Overall x 40.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Discarded	142.00'	<b>2.410 in/hr Exfiltration over Wetted area</b> Phase-In= 0.01'
#2	Primary	145.40'	<b>2.0' long x 1.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

**Discarded OutFlow** Max=0.00 cfs @ 24.08 hrs HW=142.00' (Free Discharge)  
 ↑1=Exfiltration (Exfiltration Controls 0.00 cfs)

**Primary OutFlow** Max=0.00 cfs @ 5.00 hrs HW=142.00' (Free Discharge)  
 ↑2=Broad-Crested Rectangular Weir ( Controls 0.00 cfs)

### Pond 2P: Infiltration Trench



**217-177 Post Development Final (R1)**

*Type III 24-hr 10-Year Rainfall=4.70"*

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Time span=5.00-48.00 hrs, dt=0.05 hrs, 861 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment1S: 1S**

Runoff Area=80,164 sf 2.40% Impervious Runoff Depth=0.14"  
Flow Length=650' Tc=17.3 min CN=39 Runoff=0.04 cfs 0.022 af

**Subcatchment2S: 2S**

Runoff Area=34,831 sf 63.83% Impervious Runoff Depth=2.46"  
Tc=6.0 min CN=78 Runoff=2.26 cfs 0.164 af

**Reach DP-1: PROPERTYLINE**

Inflow=0.01 cfs 0.001 af  
Outflow=0.01 cfs 0.001 af

**Pond 1P: Subsurface infiltration chambers**

Peak Elev=154.33' Storage=2,007 cf Inflow=2.26 cfs 0.164 af  
Outflow=0.39 cfs 0.164 af

**Pond 2P: Infiltration Trench**

Peak Elev=145.41' Storage=175 cf Inflow=0.04 cfs 0.022 af  
Discarded=0.02 cfs 0.021 af Primary=0.01 cfs 0.001 af Outflow=0.03 cfs 0.022 af

**Total Runoff Area = 2.640 ac Runoff Volume = 0.186 af Average Runoff Depth = 0.84"**  
**78.99% Pervious = 2.085 ac 21.01% Impervious = 0.555 ac**



**217-177 Post Development Final (R1)**

Type III 24-hr 10-Year Rainfall=4.70"

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**Summary for Subcatchment 1S: 1S**

Runoff = 0.04 cfs @ 13.94 hrs, Volume= 0.022 af, Depth= 0.14"

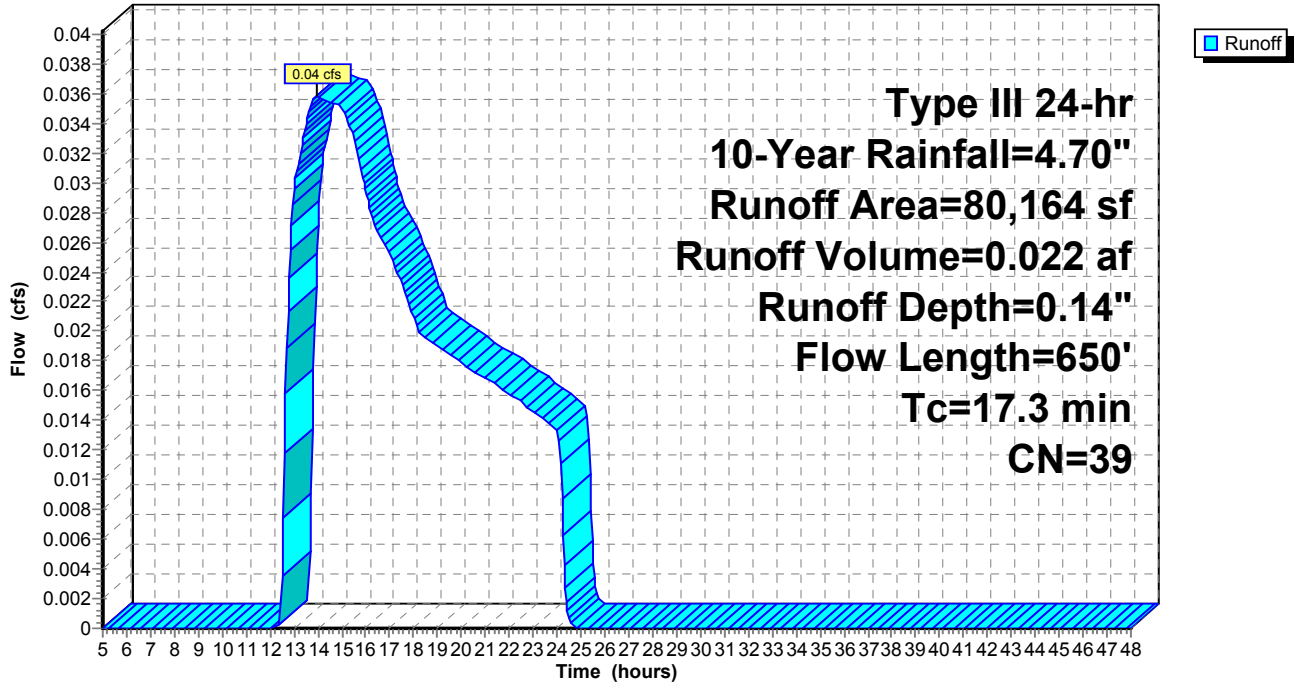
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs  
Type III 24-hr 10-Year Rainfall=4.70"

Area (sf)	CN	Description
* 61,141	30	Woods, Good, HSG A (Offsite)
* 5,064	96	Gravel surface, HSG A (Offsite)
* 8,886	39	>75% Grass cover, Good, HSG A (Offsite)
* 1,742	98	Roofs, HSG A (Offsite)
1,332	96	Gravel surface, HSG A
* 184	98	Concrete stairs, HSG A
* 1,432	96	Gravel surface, HSG A
383	39	>75% Grass cover, Good, HSG A
80,164	39	Weighted Average
78,238		97.60% Pervious Area
1,926		2.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.8	50	0.0150	0.06		<b>Sheet Flow, SHEET FLOW</b> Woods: Light underbrush n= 0.400 P2= 3.20"
2.1	303	0.0230	2.44		<b>Shallow Concentrated Flow, SHALLOW CONC. FLOW</b> Unpaved Kv= 16.1 fps
1.4	297	0.0050	3.47	2.73	<b>Pipe Channel,</b> 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012
17.3	650	Total			

### Subcatchment 1S: 1S

Hydrograph



**Summary for Subcatchment 2S: 2S**

Runoff = 2.26 cfs @ 12.09 hrs, Volume= 0.164 af, Depth= 2.46"

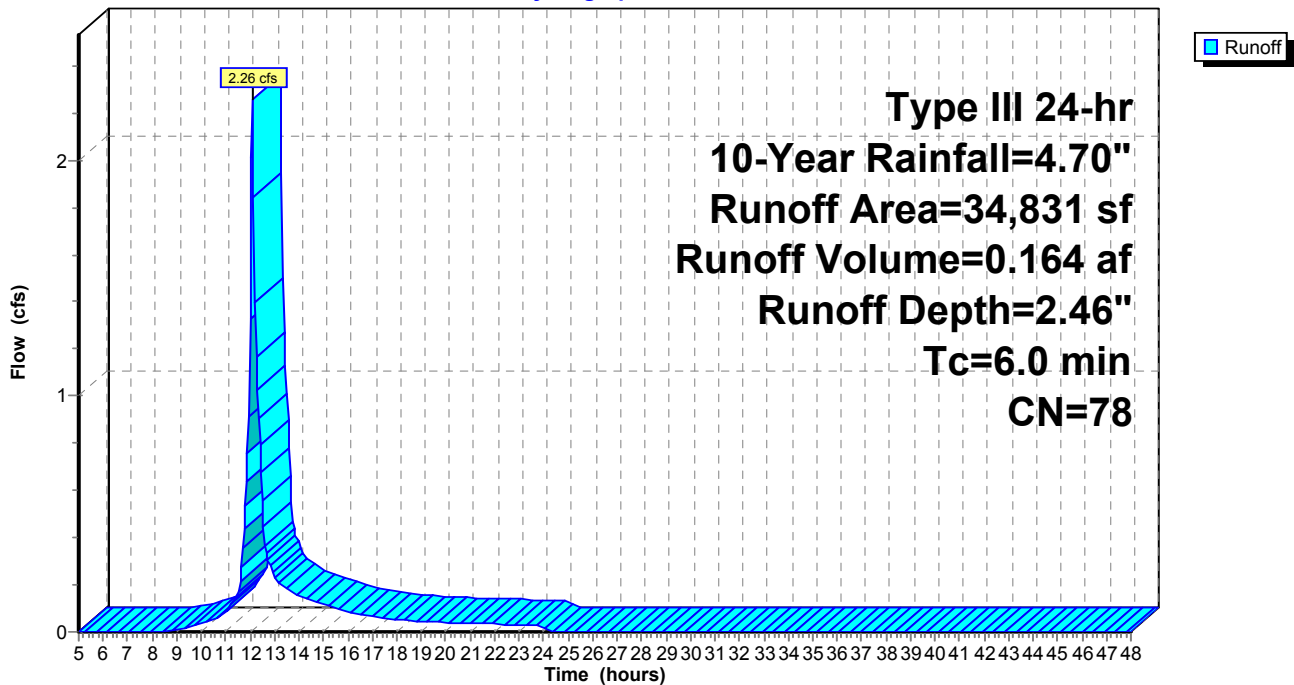
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs  
 Type III 24-hr 10-Year Rainfall=4.70"

Area (sf)	CN	Description
7,900	39	>75% Grass cover, Good, HSG A
6,431	98	Paved parking, HSG A
14,221	98	Roofs, HSG A
* 252	98	Wall, HSG A
* 1,329	98	Concrete walk, HSG A
* 2,243	64	Permeable pavers, HSG A
* 2,455	39	Planters, HSG A
34,831	78	Weighted Average
12,598		36.17% Pervious Area
22,233		63.83% Impervious Area

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

**Subcatchment 2S: 2S**

Hydrograph



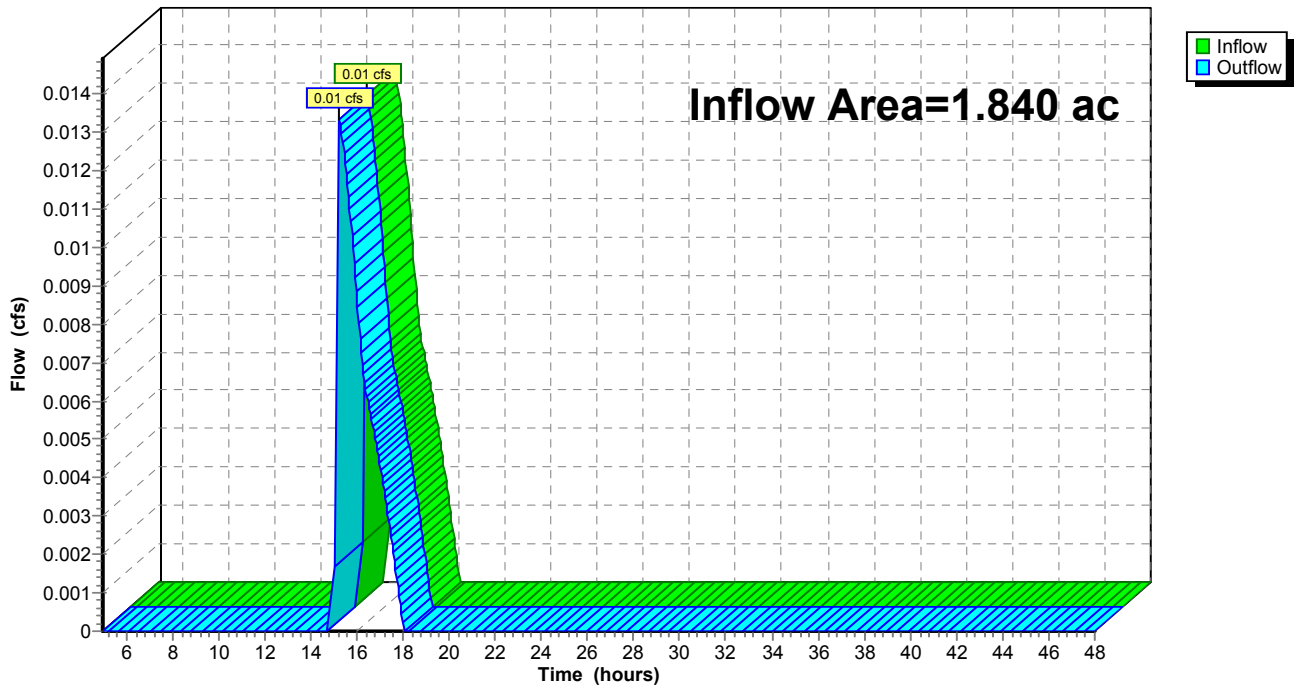
### Summary for Reach DP-1: PROPERTY LINE

Inflow Area = 1.840 ac, 2.40% Impervious, Inflow Depth = 0.01" for 10-Year event  
Inflow = 0.01 cfs @ 15.25 hrs, Volume= 0.001 af  
Outflow = 0.01 cfs @ 15.25 hrs, Volume= 0.001 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs

### Reach DP-1: PROPERTY LINE

Hydrograph



**Summary for Pond 1P: Subsurface infiltration chambers**

Inflow Area = 0.800 ac, 63.83% Impervious, Inflow Depth = 2.46" for 10-Year event  
 Inflow = 2.26 cfs @ 12.09 hrs, Volume= 0.164 af  
 Outflow = 0.39 cfs @ 11.75 hrs, Volume= 0.164 af, Atten= 83%, Lag= 0.0 min  
 Discarded = 0.39 cfs @ 11.75 hrs, Volume= 0.164 af

Routing by Stor-Ind method, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs  
 Peak Elev= 154.33' @ 12.59 hrs Surf.Area= 2,048 sf Storage= 2,007 cf

Plug-Flow detention time= 33.2 min calculated for 0.164 af (100% of inflow)  
 Center-of-Mass det. time= 33.2 min ( 863.1 - 829.9 )

Volume	Invert	Avail.Storage	Storage Description
#1A	152.90'	1,734 cf	<b>45.00'W x 45.50'L x 3.54'H Field A</b> 7,252 cf Overall - 2,917 cf Embedded = 4,334 cf x 40.0% Voids
#2A	153.40'	2,917 cf	<b>Cultec R-330XLHD x 54 Inside #1</b> 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 9 rows
		4,651 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	152.90'	<b>8.270 in/hr Exfiltration over Surface area</b>

**Discarded OutFlow** Max=0.39 cfs @ 11.75 hrs HW=152.94' (Free Discharge)  
 ↑1=Exfiltration (Exfiltration Controls 0.39 cfs)

**Pond 1P: Subsurface infiltration chambers - 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 9 rows

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

6 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 43.50' Row Length +12.0" End Stone x 2 = 45.50' Base Length

9 Rows x 52.0" Wide + 6.0" Spacing x 8 + 12.0" Side Stone x 2 = 45.00' Base Width

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

54 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 9 Rows = 2,917.1 cf Chamber Storage

7,251.6 cf Field - 2,917.1 cf Chambers = 4,334.5 cf Stone x 40.0% Voids = 1,733.8 cf Stone Storage

Chamber Storage + Stone Storage = 4,650.9 cf = 0.107 af

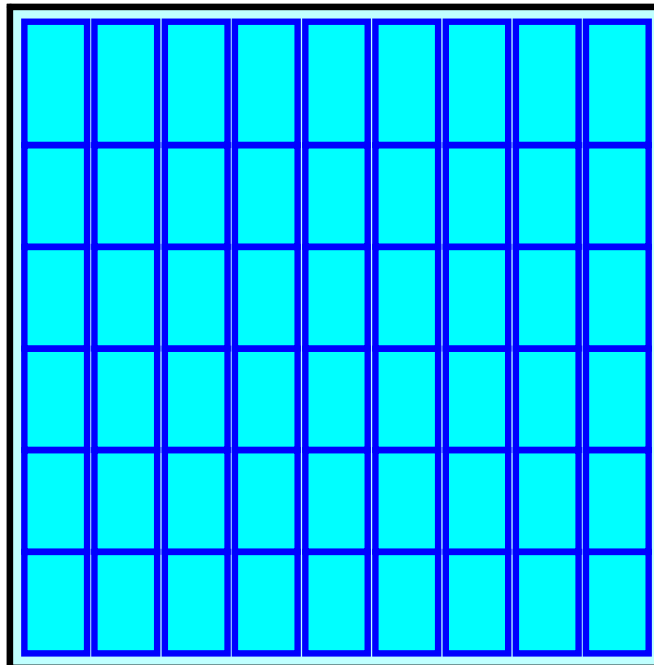
Overall Storage Efficiency = 64.1%

Overall System Size = 45.50' x 45.00' x 3.54'

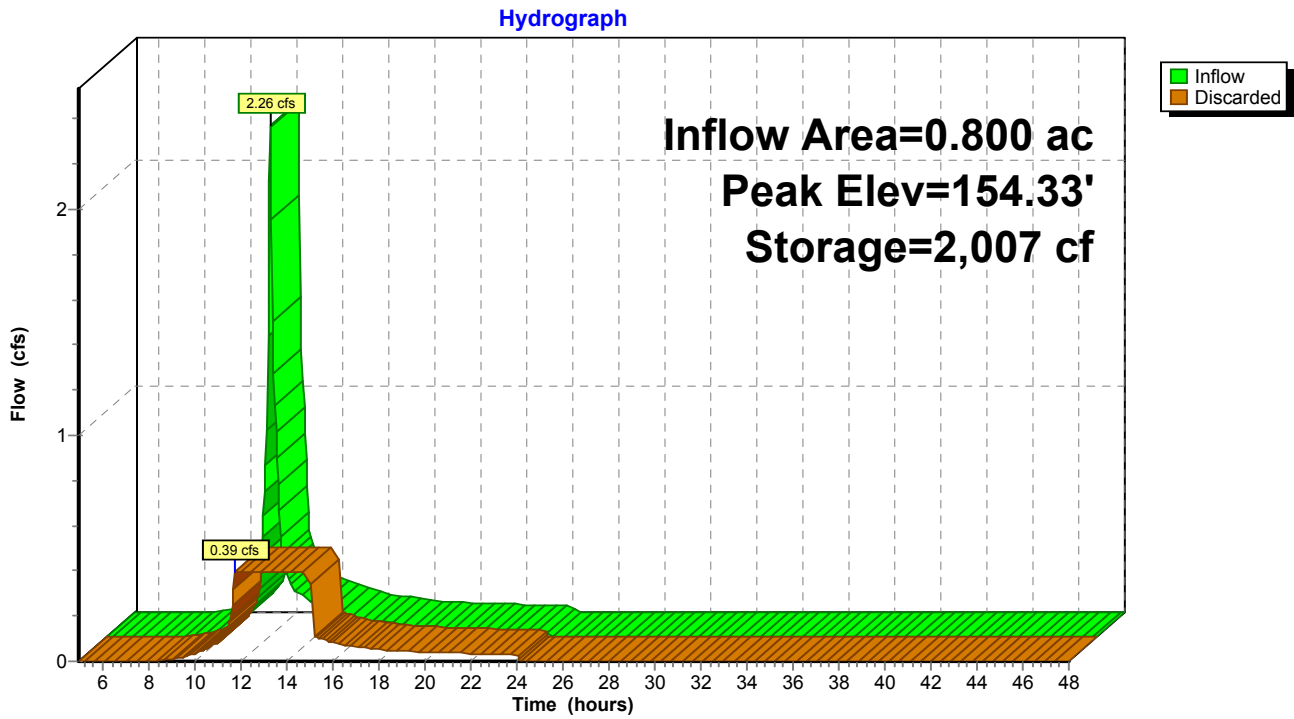
54 Chambers

268.6 cy Field

160.5 cy Stone



### Pond 1P: Subsurface infiltration chambers



**Summary for Pond 2P: Infiltration Trench**

Inflow Area = 1.840 ac, 2.40% Impervious, Inflow Depth = 0.14" for 10-Year event  
 Inflow = 0.04 cfs @ 13.94 hrs, Volume= 0.022 af  
 Outflow = 0.03 cfs @ 15.25 hrs, Volume= 0.022 af, Atten= 5%, Lag= 78.4 min  
 Discarded = 0.02 cfs @ 15.25 hrs, Volume= 0.021 af  
 Primary = 0.01 cfs @ 15.25 hrs, Volume= 0.001 af

Routing by Stor-Ind method, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs / 4  
 Peak Elev= 145.41' @ 15.25 hrs Surf.Area= 128 sf Storage= 175 cf

Plug-Flow detention time= 114.2 min calculated for 0.022 af (100% of inflow)  
 Center-of-Mass det. time= 114.4 min ( 1,159.1 - 1,044.7 )

Volume	Invert	Avail.Storage	Storage Description
#1	142.00'	205 cf	<b>4.00'W x 32.00'L x 4.00'H Prismaoid</b> 512 cf Overall x 40.0% Voids

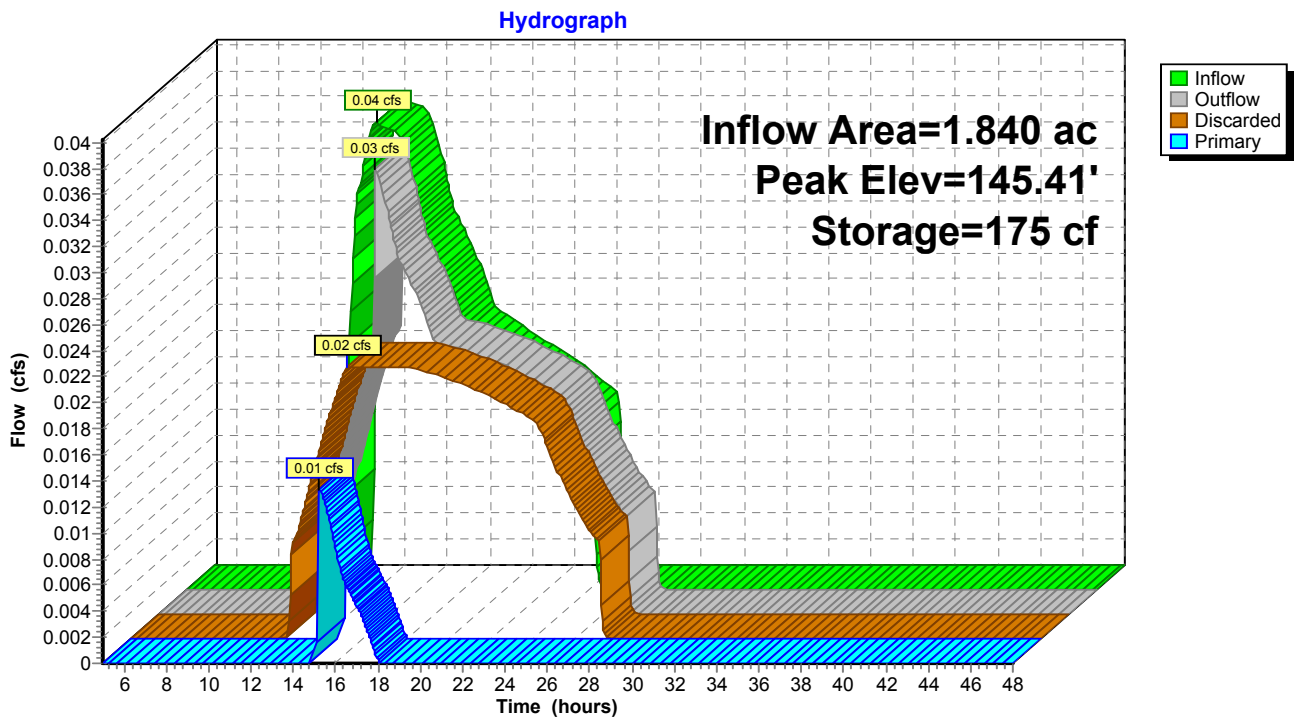
Device	Routing	Invert	Outlet Devices
#1	Discarded	142.00'	<b>2.410 in/hr Exfiltration over Wetted area</b> Phase-In= 0.01'
#2	Primary	145.40'	<b>2.0' long x 1.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

**Discarded OutFlow** Max=0.02 cfs @ 15.25 hrs HW=145.41' (Free Discharge)  
 ↑1=Exfiltration (Exfiltration Controls 0.02 cfs)

**Primary OutFlow** Max=0.01 cfs @ 15.25 hrs HW=145.41' (Free Discharge)  
 ↑2=Broad-Crested Rectangular Weir (Weir Controls 0.01 cfs @ 0.30 fps)



### Pond 2P: Infiltration Trench



**217-177 Post Development Final (R1)***Type III 24-hr 25-Year Rainfall=5.50"*

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Time span=5.00-48.00 hrs, dt=0.05 hrs, 861 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment1S: 1S**

Runoff Area=80,164 sf 2.40% Impervious Runoff Depth=0.31"  
Flow Length=650' Tc=17.3 min CN=39 Runoff=0.15 cfs 0.048 af

**Subcatchment2S: 2S**

Runoff Area=34,831 sf 63.83% Impervious Runoff Depth=3.14"  
Tc=6.0 min CN=78 Runoff=2.89 cfs 0.209 af

**Reach DP-1: PROPERTYLINE**

Inflow=0.10 cfs 0.024 af  
Outflow=0.10 cfs 0.024 af

**Pond 1P: Subsurface infiltration chambers**

Peak Elev=154.90' Storage=2,925 cf Inflow=2.89 cfs 0.209 af  
Outflow=0.39 cfs 0.209 af

**Pond 2P: Infiltration Trench**

Peak Elev=145.47' Storage=178 cf Inflow=0.15 cfs 0.048 af  
Discarded=0.02 cfs 0.024 af Primary=0.10 cfs 0.024 af Outflow=0.12 cfs 0.048 af

**Total Runoff Area = 2.640 ac Runoff Volume = 0.257 af Average Runoff Depth = 1.17"**  
**78.99% Pervious = 2.085 ac 21.01% Impervious = 0.555 ac**

**217-177 Post Development Final (R1)**

Type III 24-hr 25-Year Rainfall=5.50"

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**Summary for Subcatchment 1S: 1S**

Runoff = 0.15 cfs @ 12.57 hrs, Volume= 0.048 af, Depth= 0.31"

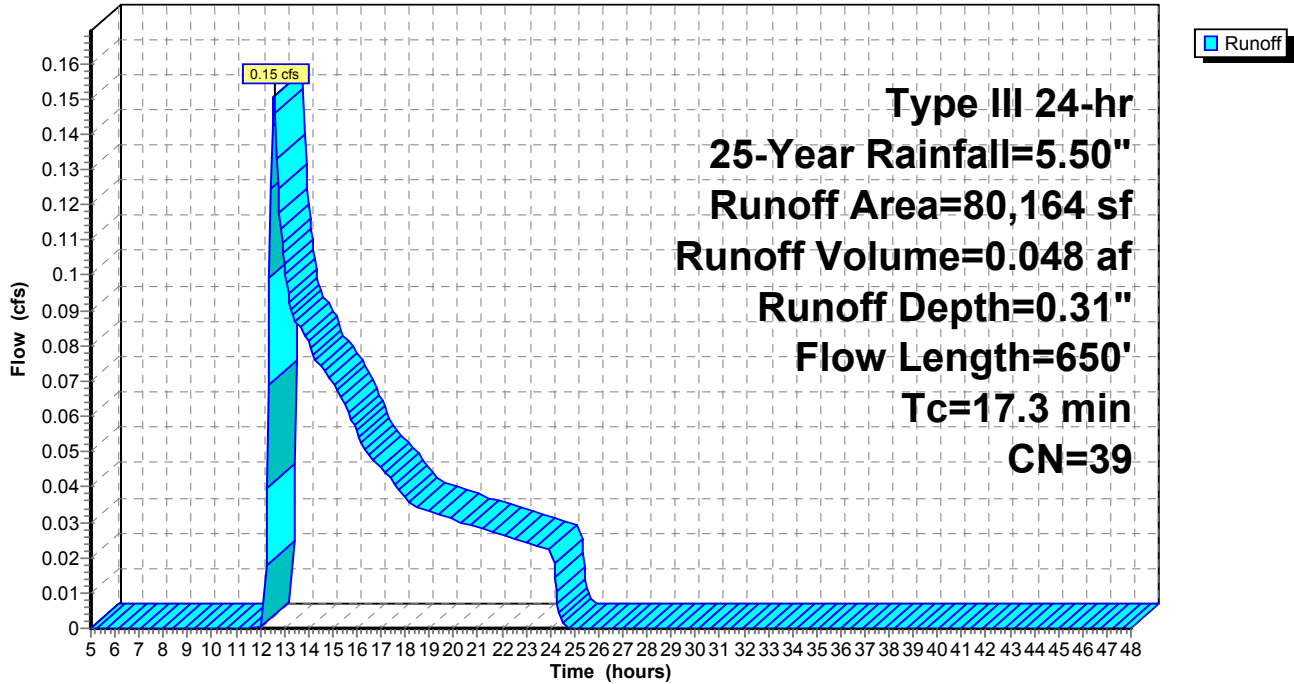
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25-Year Rainfall=5.50"

Area (sf)	CN	Description
* 61,141	30	Woods, Good, HSG A (Offsite)
* 5,064	96	Gravel surface, HSG A (Offsite)
* 8,886	39	>75% Grass cover, Good, HSG A (Offsite)
* 1,742	98	Roofs, HSG A (Offsite)
1,332	96	Gravel surface, HSG A
* 184	98	Concrete stairs, HSG A
* 1,432	96	Gravel surface, HSG A
383	39	>75% Grass cover, Good, HSG A
80,164	39	Weighted Average
78,238		97.60% Pervious Area
1,926		2.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.8	50	0.0150	0.06		<b>Sheet Flow, SHEET FLOW</b> Woods: Light underbrush n= 0.400 P2= 3.20"
2.1	303	0.0230	2.44		<b>Shallow Concentrated Flow, SHALLOW CONC. FLOW</b> Unpaved Kv= 16.1 fps
1.4	297	0.0050	3.47	2.73	<b>Pipe Channel,</b> 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012
17.3	650	Total			

### Subcatchment 1S: 1S

Hydrograph



**Summary for Subcatchment 2S: 2S**

Runoff = 2.89 cfs @ 12.09 hrs, Volume= 0.209 af, Depth= 3.14"

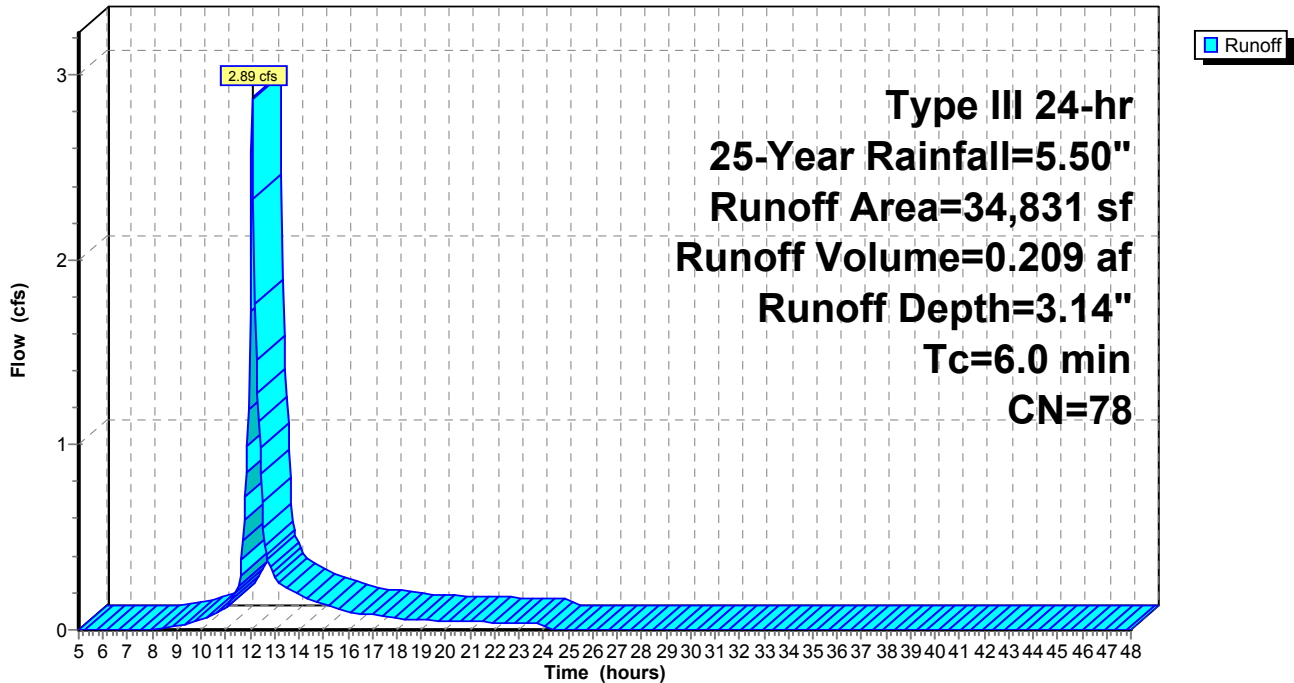
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs  
 Type III 24-hr 25-Year Rainfall=5.50"

Area (sf)	CN	Description
7,900	39	>75% Grass cover, Good, HSG A
6,431	98	Paved parking, HSG A
14,221	98	Roofs, HSG A
* 252	98	Wall, HSG A
* 1,329	98	Concrete walk, HSG A
* 2,243	64	Permeable pavers, HSG A
* 2,455	39	Planters, HSG A
34,831	78	Weighted Average
12,598		36.17% Pervious Area
22,233		63.83% Impervious Area

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

**Subcatchment 2S: 2S**

Hydrograph



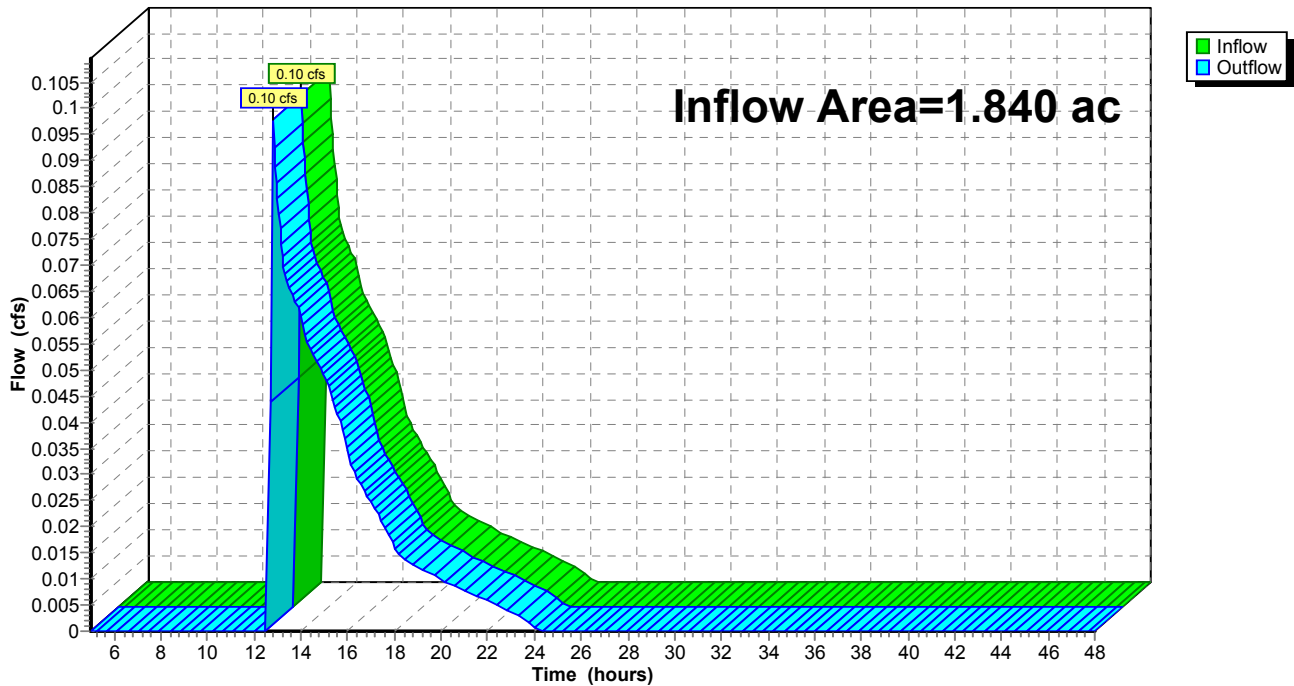
### Summary for Reach DP-1: PROPERTY LINE

Inflow Area = 1.840 ac, 2.40% Impervious, Inflow Depth = 0.15" for 25-Year event  
Inflow = 0.10 cfs @ 12.81 hrs, Volume= 0.024 af  
Outflow = 0.10 cfs @ 12.81 hrs, Volume= 0.024 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs

### Reach DP-1: PROPERTY LINE

Hydrograph



**Summary for Pond 1P: Subsurface infiltration chambers**

Inflow Area = 0.800 ac, 63.83% Impervious, Inflow Depth = 3.14" for 25-Year event  
 Inflow = 2.89 cfs @ 12.09 hrs, Volume= 0.209 af  
 Outflow = 0.39 cfs @ 11.70 hrs, Volume= 0.209 af, Atten= 86%, Lag= 0.0 min  
 Discarded = 0.39 cfs @ 11.70 hrs, Volume= 0.209 af

Routing by Stor-Ind method, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs  
 Peak Elev= 154.90' @ 12.69 hrs Surf.Area= 2,048 sf Storage= 2,925 cf

Plug-Flow detention time= 53.8 min calculated for 0.209 af (100% of inflow)  
 Center-of-Mass det. time= 53.7 min ( 876.6 - 822.9 )

Volume	Invert	Avail.Storage	Storage Description
#1A	152.90'	1,734 cf	<b>45.00'W x 45.50'L x 3.54'H Field A</b> 7,252 cf Overall - 2,917 cf Embedded = 4,334 cf x 40.0% Voids
#2A	153.40'	2,917 cf	<b>Cultec R-330XLHD x 54 Inside #1</b> 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 9 rows
		4,651 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	152.90'	<b>8.270 in/hr Exfiltration over Surface area</b>

**Discarded OutFlow** Max=0.39 cfs @ 11.70 hrs HW=152.94' (Free Discharge)  
 ↑1=Exfiltration (Exfiltration Controls 0.39 cfs)

**Pond 1P: Subsurface infiltration chambers - 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 9 rows

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

6 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 43.50' Row Length +12.0" End Stone x 2 = 45.50' Base Length

9 Rows x 52.0" Wide + 6.0" Spacing x 8 + 12.0" Side Stone x 2 = 45.00' Base Width

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

54 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 9 Rows = 2,917.1 cf Chamber Storage

7,251.6 cf Field - 2,917.1 cf Chambers = 4,334.5 cf Stone x 40.0% Voids = 1,733.8 cf Stone Storage

Chamber Storage + Stone Storage = 4,650.9 cf = 0.107 af

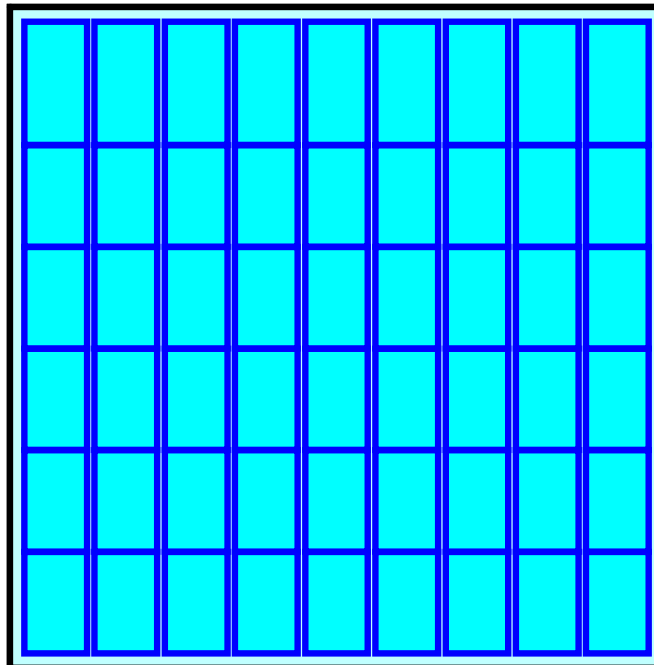
Overall Storage Efficiency = 64.1%

Overall System Size = 45.50' x 45.00' x 3.54'

54 Chambers

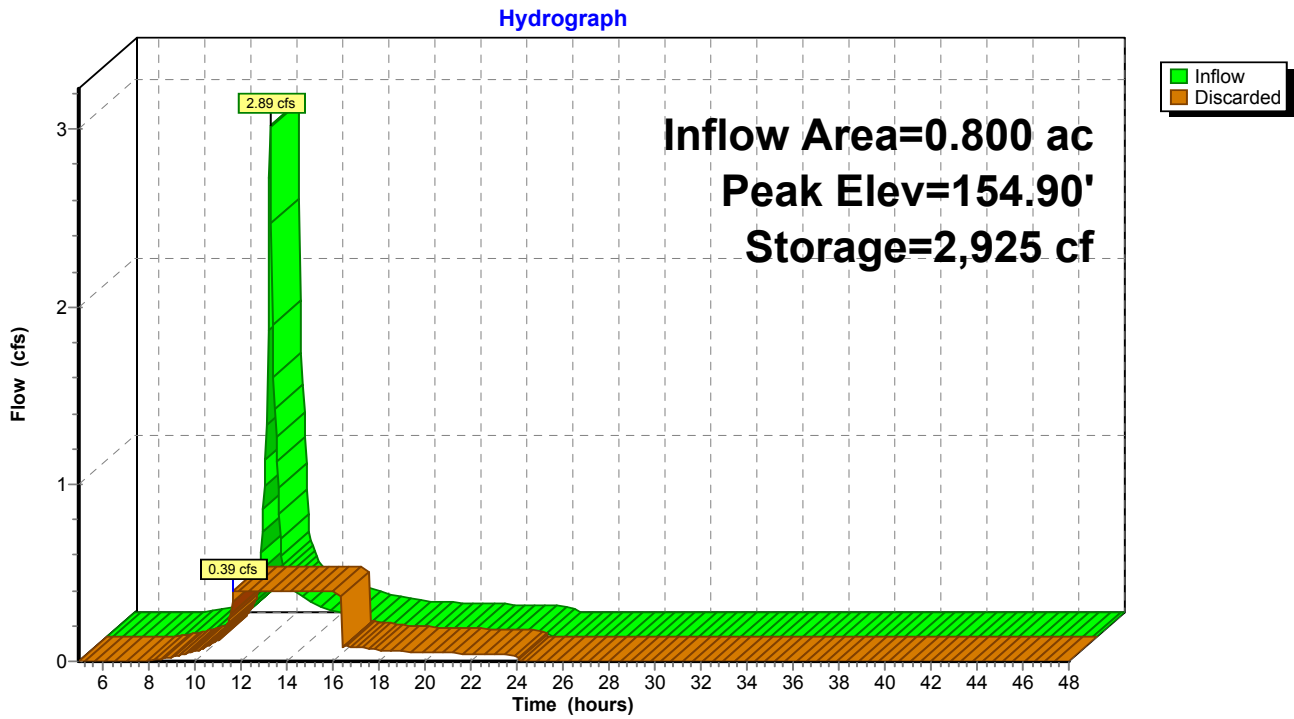
268.6 cy Field

160.5 cy Stone





### Pond 1P: Subsurface infiltration chambers



**Summary for Pond 2P: Infiltration Trench**

Inflow Area = 1.840 ac, 2.40% Impervious, Inflow Depth = 0.31" for 25-Year event  
 Inflow = 0.15 cfs @ 12.57 hrs, Volume= 0.048 af  
 Outflow = 0.12 cfs @ 12.81 hrs, Volume= 0.048 af, Atten= 21%, Lag= 14.3 min  
 Discarded = 0.02 cfs @ 12.80 hrs, Volume= 0.024 af  
 Primary = 0.10 cfs @ 12.81 hrs, Volume= 0.024 af

Routing by Stor-Ind method, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs / 4  
 Peak Elev= 145.47' @ 12.80 hrs Surf.Area= 128 sf Storage= 178 cf

Plug-Flow detention time= 65.1 min calculated for 0.048 af (100% of inflow)  
 Center-of-Mass det. time= 66.4 min ( 1,057.7 - 991.3 )

Volume	Invert	Avail.Storage	Storage Description
#1	142.00'	205 cf	<b>4.00'W x 32.00'L x 4.00'H Prismaoid</b> 512 cf Overall x 40.0% Voids

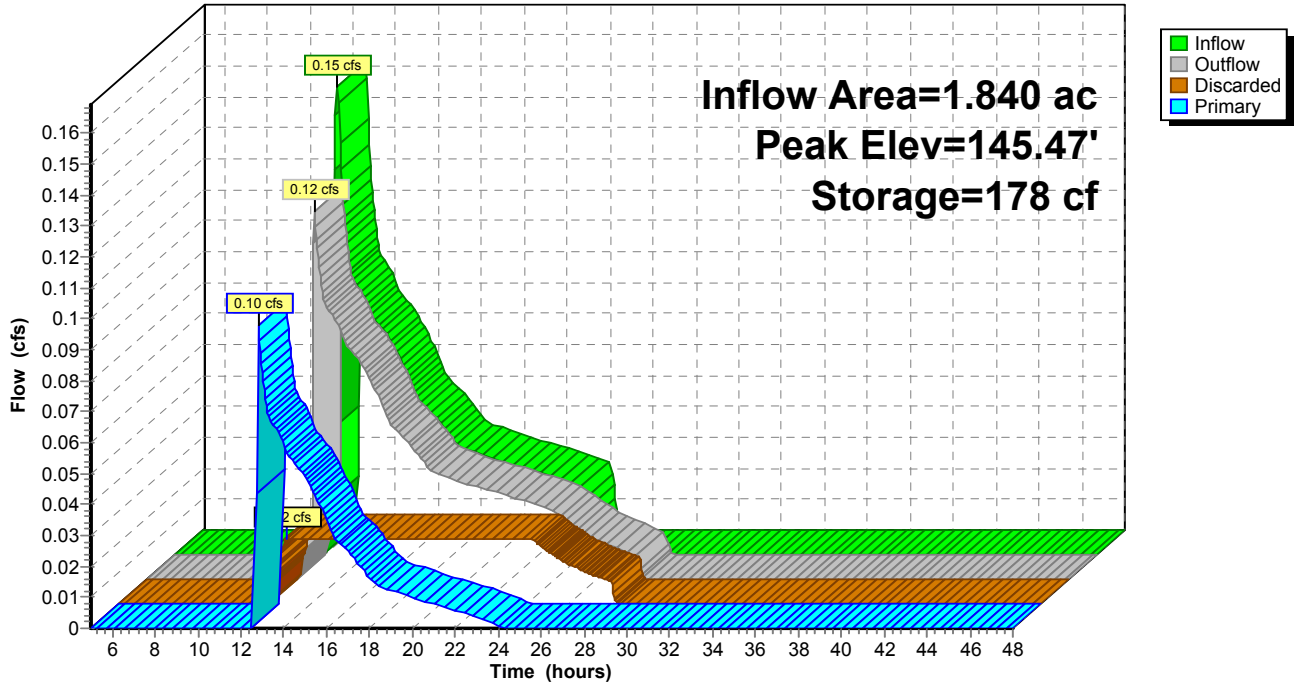
Device	Routing	Invert	Outlet Devices
#1	Discarded	142.00'	<b>2.410 in/hr Exfiltration over Wetted area</b> Phase-In= 0.01'
#2	Primary	145.40'	<b>2.0' long x 1.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

**Discarded OutFlow** Max=0.02 cfs @ 12.80 hrs HW=145.47' (Free Discharge)  
 ↑1=Exfiltration (Exfiltration Controls 0.02 cfs)

**Primary OutFlow** Max=0.09 cfs @ 12.81 hrs HW=145.47' (Free Discharge)  
 ↑2=Broad-Crested Rectangular Weir (Weir Controls 0.09 cfs @ 0.70 fps)

### Pond 2P: Infiltration Trench

Hydrograph



**217-177 Post Development Final (R1)**

Type III 24-hr 100-Year Rainfall=6.70"

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Time span=5.00-48.00 hrs, dt=0.05 hrs, 861 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment1S: 1S**

Runoff Area=80,164 sf 2.40% Impervious Runoff Depth=0.66"  
Flow Length=650' Tc=17.3 min CN=39 Runoff=0.53 cfs 0.102 af

**Subcatchment2S: 2S**

Runoff Area=34,831 sf 63.83% Impervious Runoff Depth=4.20"  
Tc=6.0 min CN=78 Runoff=3.84 cfs 0.280 af

**Reach DP-1: PROPERTYLINE**

Inflow=0.50 cfs 0.076 af  
Outflow=0.50 cfs 0.076 af

**Pond 1P: Subsurface infiltration chambers**

Peak Elev=156.20' Storage=4,450 cf Inflow=3.84 cfs 0.280 af  
Outflow=0.39 cfs 0.280 af

**Pond 2P: Infiltration Trench**

Peak Elev=145.61' Storage=185 cf Inflow=0.53 cfs 0.102 af  
Discarded=0.02 cfs 0.025 af Primary=0.50 cfs 0.076 af Outflow=0.52 cfs 0.102 af

**Total Runoff Area = 2.640 ac Runoff Volume = 0.382 af Average Runoff Depth = 1.74"**  
**78.99% Pervious = 2.085 ac 21.01% Impervious = 0.555 ac**

**Summary for Subcatchment 1S: 1S**

Runoff = 0.53 cfs @ 12.45 hrs, Volume= 0.102 af, Depth= 0.66"

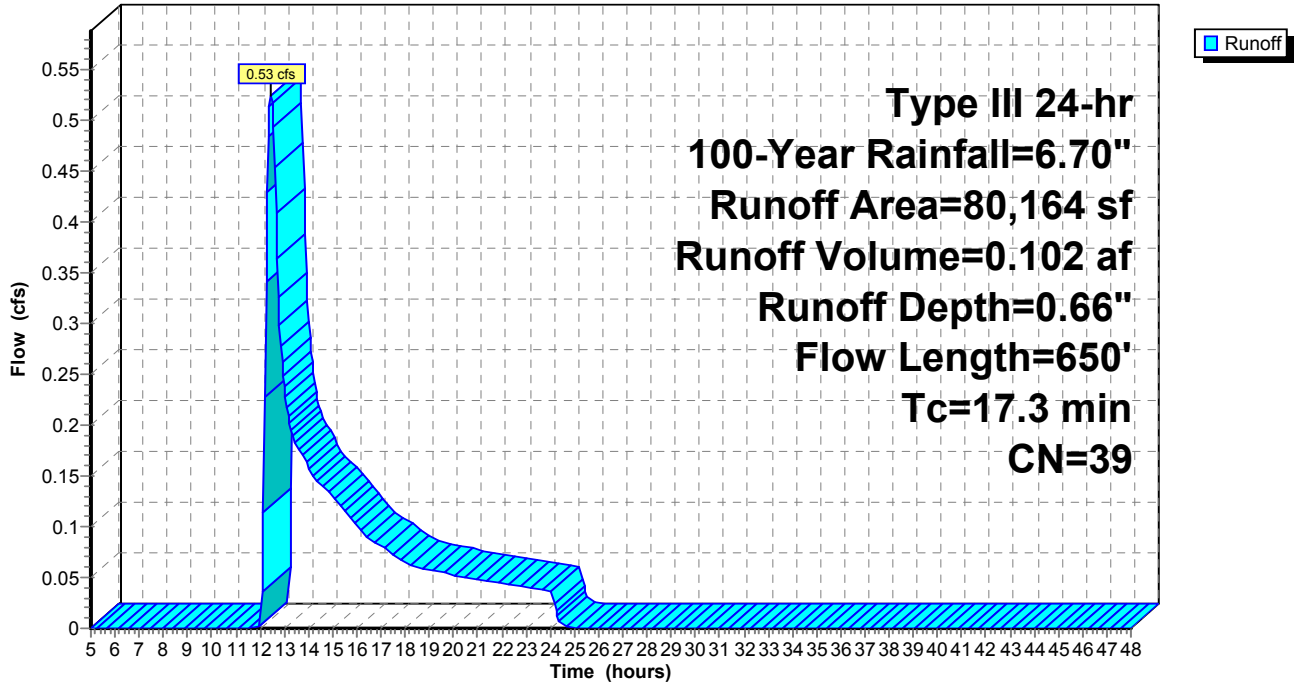
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs  
Type III 24-hr 100-Year Rainfall=6.70"

Area (sf)	CN	Description
* 61,141	30	Woods, Good, HSG A (Offsite)
* 5,064	96	Gravel surface, HSG A (Offsite)
* 8,886	39	>75% Grass cover, Good, HSG A (Offsite)
* 1,742	98	Roofs, HSG A (Offsite)
1,332	96	Gravel surface, HSG A
* 184	98	Concrete stairs, HSG A
* 1,432	96	Gravel surface, HSG A
383	39	>75% Grass cover, Good, HSG A
80,164	39	Weighted Average
78,238		97.60% Pervious Area
1,926		2.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.8	50	0.0150	0.06		<b>Sheet Flow, SHEET FLOW</b> Woods: Light underbrush n= 0.400 P2= 3.20"
2.1	303	0.0230	2.44		<b>Shallow Concentrated Flow, SHALLOW CONC. FLOW</b> Unpaved Kv= 16.1 fps
1.4	297	0.0050	3.47	2.73	<b>Pipe Channel,</b> 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012
17.3	650	Total			

### Subcatchment 1S: 1S

Hydrograph



**Summary for Subcatchment 2S: 2S**

Runoff = 3.84 cfs @ 12.09 hrs, Volume= 0.280 af, Depth= 4.20"

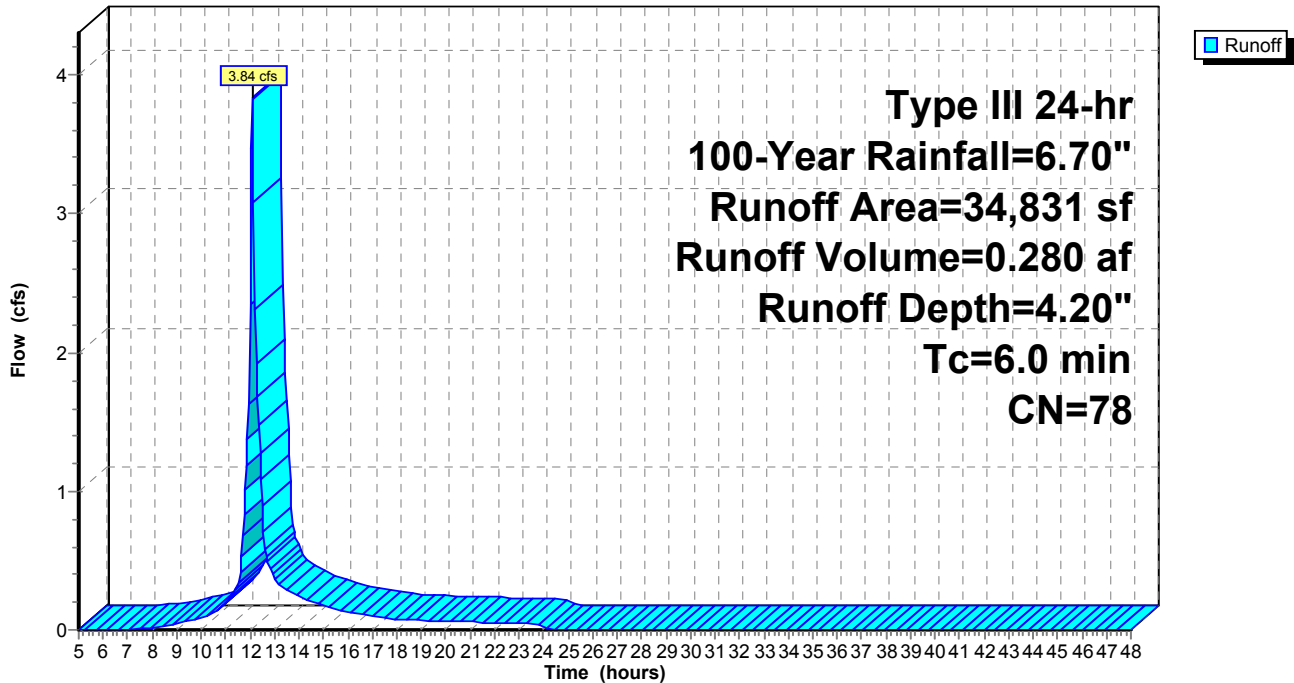
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs  
 Type III 24-hr 100-Year Rainfall=6.70"

Area (sf)	CN	Description
7,900	39	>75% Grass cover, Good, HSG A
6,431	98	Paved parking, HSG A
14,221	98	Roofs, HSG A
* 252	98	Wall, HSG A
* 1,329	98	Concrete walk, HSG A
* 2,243	64	Permeable pavers, HSG A
* 2,455	39	Planters, HSG A
34,831	78	Weighted Average
12,598		36.17% Pervious Area
22,233		63.83% Impervious Area

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

**Subcatchment 2S: 2S**

Hydrograph



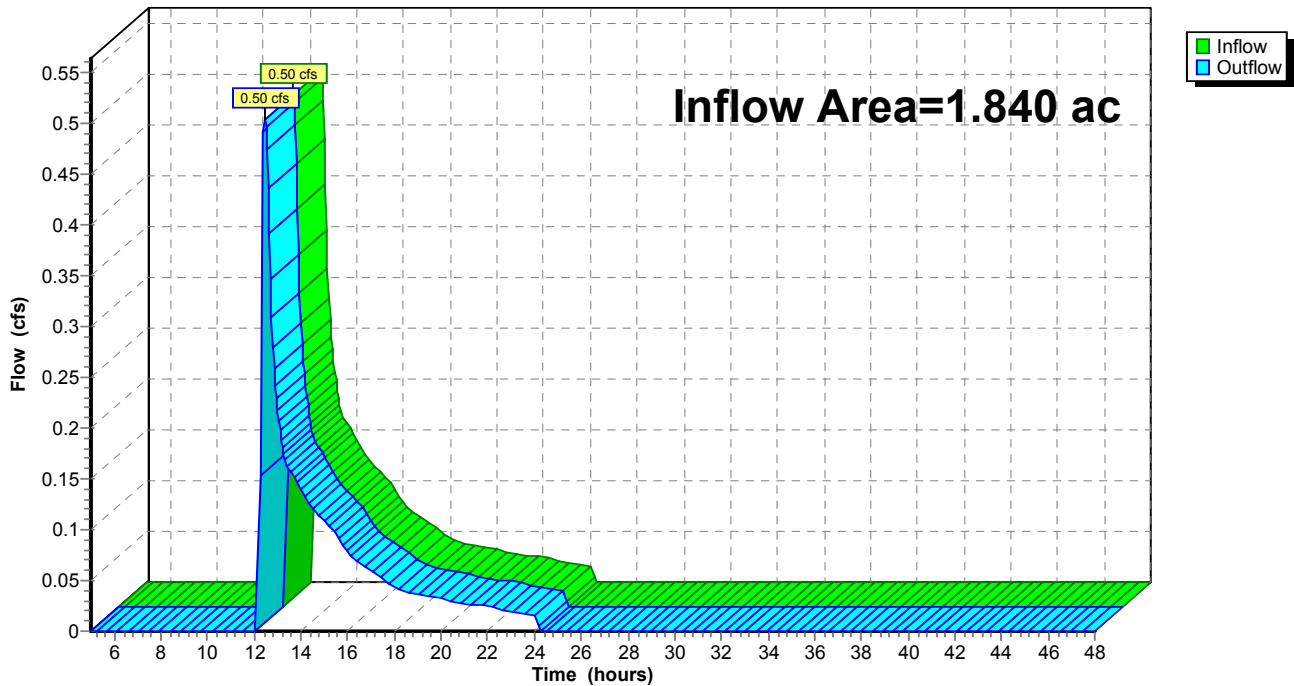
### Summary for Reach DP-1: PROPERTY LINE

Inflow Area = 1.840 ac, 2.40% Impervious, Inflow Depth = 0.50" for 100-Year event  
Inflow = 0.50 cfs @ 12.46 hrs, Volume= 0.076 af  
Outflow = 0.50 cfs @ 12.46 hrs, Volume= 0.076 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs

### Reach DP-1: PROPERTY LINE

Hydrograph





**Summary for Pond 1P: Subsurface infiltration chambers**

Inflow Area = 0.800 ac, 63.83% Impervious, Inflow Depth = 4.20" for 100-Year event  
 Inflow = 3.84 cfs @ 12.09 hrs, Volume= 0.280 af  
 Outflow = 0.39 cfs @ 11.65 hrs, Volume= 0.280 af, Atten= 90%, Lag= 0.0 min  
 Discarded = 0.39 cfs @ 11.65 hrs, Volume= 0.280 af

Routing by Stor-Ind method, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs  
 Peak Elev= 156.20' @ 12.95 hrs Surf.Area= 2,048 sf Storage= 4,450 cf

Plug-Flow detention time= 90.0 min calculated for 0.280 af (100% of inflow)  
 Center-of-Mass det. time= 89.9 min ( 904.5 - 814.6 )

Volume	Invert	Avail.Storage	Storage Description
#1A	152.90'	1,734 cf	<b>45.00'W x 45.50'L x 3.54'H Field A</b> 7,252 cf Overall - 2,917 cf Embedded = 4,334 cf x 40.0% Voids
#2A	153.40'	2,917 cf	<b>Cultec R-330XLHD x 54 Inside #1</b> 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 9 rows
		4,651 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	152.90'	<b>8.270 in/hr Exfiltration over Surface area</b>

**Discarded OutFlow** Max=0.39 cfs @ 11.65 hrs HW=152.95' (Free Discharge)  
 ↑1=Exfiltration (Exfiltration Controls 0.39 cfs)

**Pond 1P: Subsurface infiltration chambers - 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 9 rows

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

6 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 43.50' Row Length +12.0" End Stone x 2 = 45.50' Base Length

9 Rows x 52.0" Wide + 6.0" Spacing x 8 + 12.0" Side Stone x 2 = 45.00' Base Width

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

54 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 9 Rows = 2,917.1 cf Chamber Storage

7,251.6 cf Field - 2,917.1 cf Chambers = 4,334.5 cf Stone x 40.0% Voids = 1,733.8 cf Stone Storage

Chamber Storage + Stone Storage = 4,650.9 cf = 0.107 af

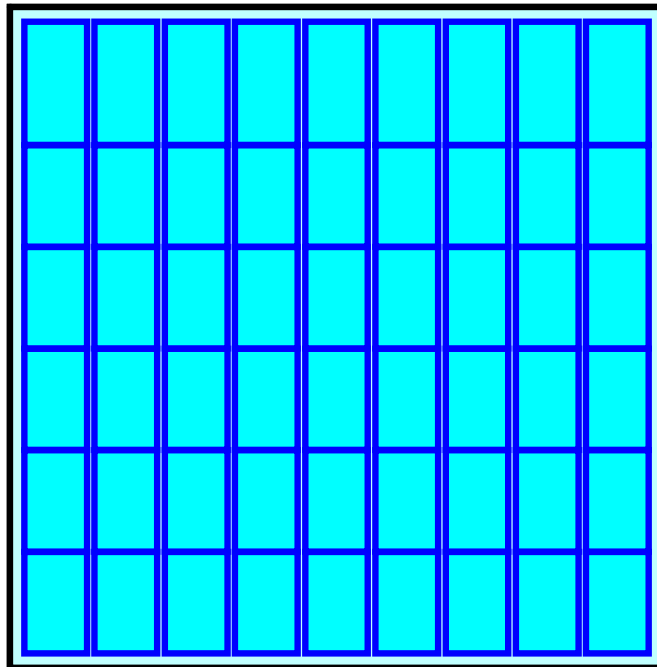
Overall Storage Efficiency = 64.1%

Overall System Size = 45.50' x 45.00' x 3.54'

54 Chambers

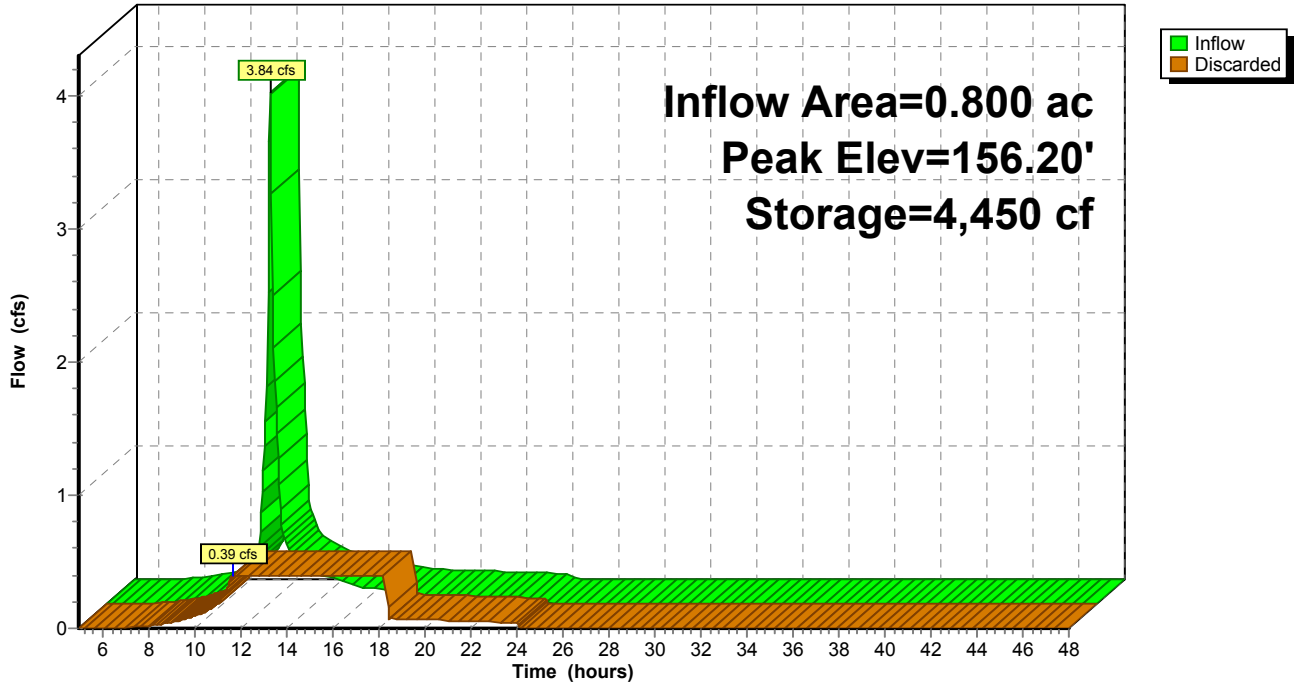
268.6 cy Field

160.5 cy Stone



### Pond 1P: Subsurface infiltration chambers

Hydrograph



**Summary for Pond 2P: Infiltration Trench**

Inflow Area = 1.840 ac, 2.40% Impervious, Inflow Depth = 0.66" for 100-Year event  
 Inflow = 0.53 cfs @ 12.45 hrs, Volume= 0.102 af  
 Outflow = 0.52 cfs @ 12.46 hrs, Volume= 0.102 af, Atten= 0%, Lag= 0.2 min  
 Discarded = 0.02 cfs @ 12.46 hrs, Volume= 0.025 af  
 Primary = 0.50 cfs @ 12.46 hrs, Volume= 0.076 af

Routing by Stor-Ind method, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs / 4  
 Peak Elev= 145.61' @ 12.46 hrs Surf.Area= 128 sf Storage= 185 cf

Plug-Flow detention time= 34.7 min calculated for 0.101 af (100% of inflow)  
 Center-of-Mass det. time= 33.4 min ( 981.9 - 948.5 )

Volume	Invert	Avail.Storage	Storage Description
#1	142.00'	205 cf	<b>4.00'W x 32.00'L x 4.00'H Prismaoid</b> 512 cf Overall x 40.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Discarded	142.00'	<b>2.410 in/hr Exfiltration over Wetted area</b> Phase-In= 0.01'
#2	Primary	145.40'	<b>2.0' long x 1.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

**Discarded OutFlow** Max=0.02 cfs @ 12.46 hrs HW=145.61' (Free Discharge)  
 ↑1=Exfiltration (Exfiltration Controls 0.02 cfs)

**Primary OutFlow** Max=0.50 cfs @ 12.46 hrs HW=145.61' (Free Discharge)  
 ↑2=Broad-Crested Rectangular Weir (Weir Controls 0.50 cfs @ 1.22 fps)

### Pond 2P: Infiltration Trench

Hydrograph

