EDEN ESTATES

Bancroft Road
Andover, Massachusetts

PROJECT REPORT

on
Drainage & Sedimentation Control
&
Project Stormwater Report

Prepared For:

EDEN LANE, LLC
42 School Street
Andover, MA 01810

UPDATED DRAINAGE CALCULATIONS

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Date: May 26, 2024
Revised: August 28, 2024

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Pre-Development vs. Post-Development Drainage Summary Tables

Point #1

Design Storm	Peak Flow Rate			Runoff Volume		
	Pre-Dev. (cfs)	Post-Dev. (cfs)	Δ (cfs)	Pre-Dev. (ac.-ft.)	Post-Dev. (ac.-ft.)	Δ (ac.-ft.)
2	1.8	0.4	(1.4)	0.171	0.061	(0.110)
10	4.4	1.0	(3.4)	0.389	0.250	(0.139)
25	6.1	2.1	(4.0)	0.541	0.425	(0.116)
100	8.9	6.4	(2.5)	0.789	0.720	(0.069)

Point #2

Design Storm	Peak Flow Rate			Runoff Volume		
	Pre-Dev. (cfs)	Post-Dev. (cfs)	Δ (cfs)	Pre-Dev. (ac.-ft.)	Post-Dev. (ac.-ft.)	Δ (ac.-ft.)
2	1.8	1.8	0.0	0.221	0.212	(0.009)
10	4.6	4.5	(0.1)	0.523	0.486	(0.037)
25	6.5	6.1	(0.4)	0.735	0.671	(0.064)
100	9.7	8.6	(1.1)	1.084	0.971	(0.113)

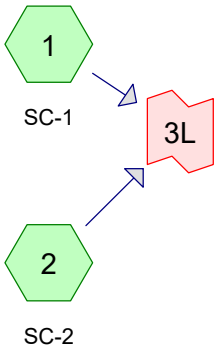
These Storm Drainage calculations were prepared in accordance with the applicable Town of Andover Regulations and the Massachusetts DEP Stormwater Handbook. Drainage structures and pipes were designed according to generally accepted engineering principles and in accordance with the stated regulations.

ii. Runoff and Mitigation Design Calculations

25-Year Design Storm Event – Detail

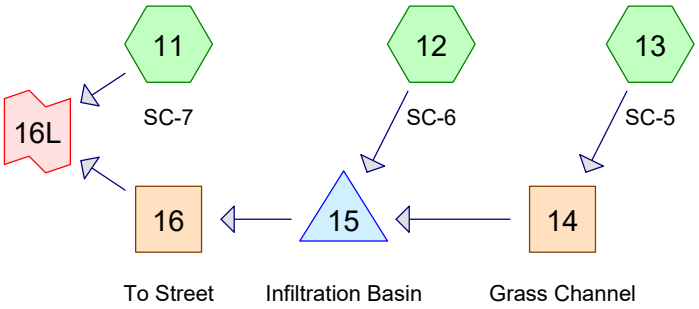
See Following Pages

Pre-Development

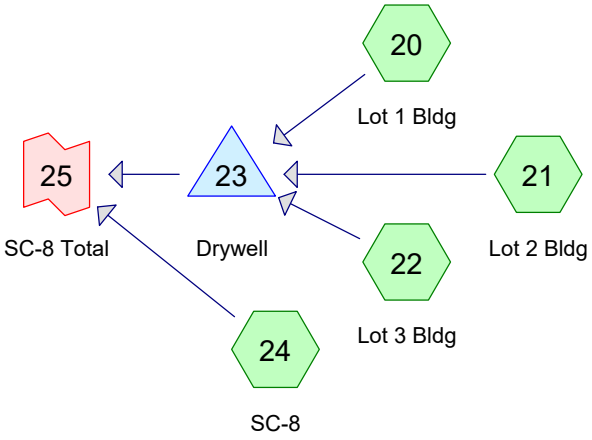


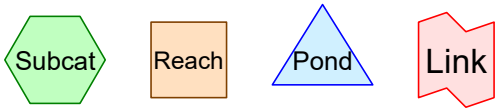
POINT #1

Post-Development



POINT #2





Routing Diagram for 42215 Rev 2024-08-28
Prepared by DK Engineering LLC, Printed 8/29/2024

Summary for Subcatchment 1: SC-1

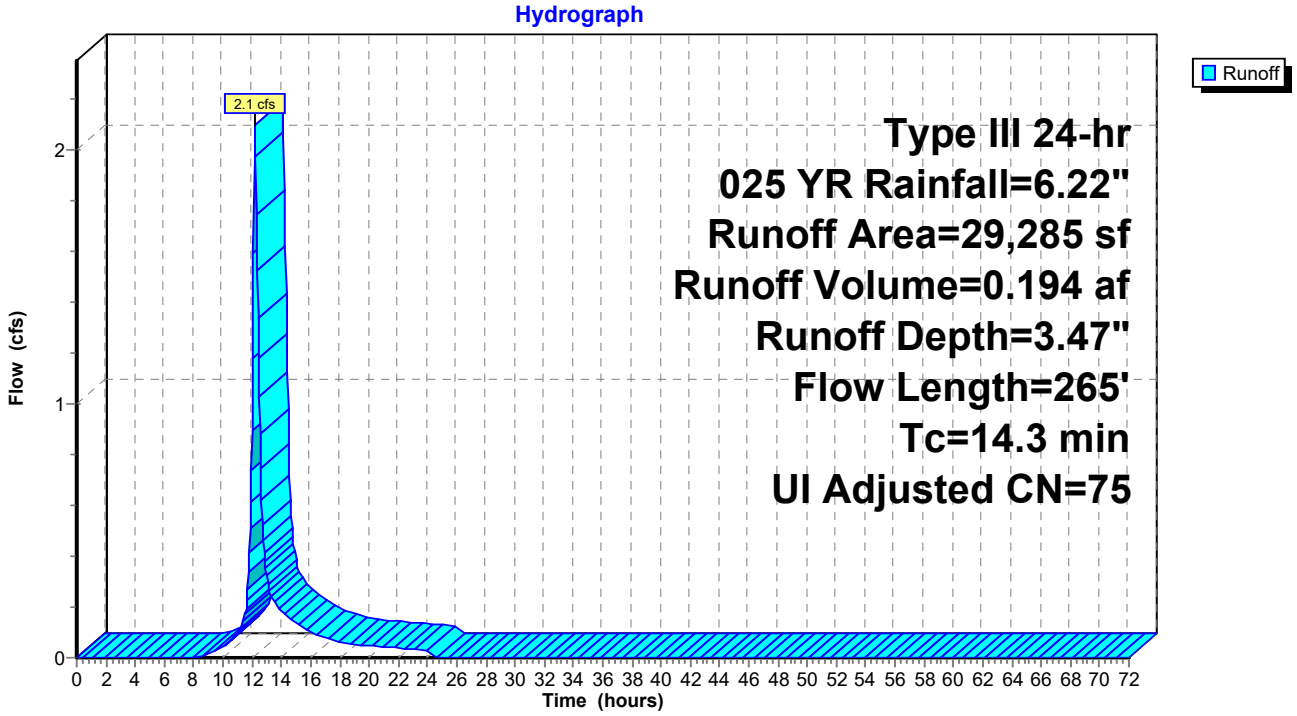
Runoff = 2.1 cfs @ 12.20 hrs, Volume= 0.194 af, Depth= 3.47"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 025 YR Rainfall=6.22"

Area (sf)	CN	Adj	Description
4,056	98		Unconnected pavement, HSG C
1,796	98		Unconnected roofs, HSG C
9,879	70		Woods, Good, HSG C
13,554	74		>75% Grass cover, Good, HSG C
29,285	77	75	Weighted Average, UI Adjusted
23,433			80.02% Pervious Area
5,852			19.98% Impervious Area
5,852			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.5	50	0.0200	0.07		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
0.5	92	0.0220	3.01		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.3	123	0.0100	1.61		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
14.3	265	Total			

Subcatchment 1: SC-1



Summary for Subcatchment 2: SC-2

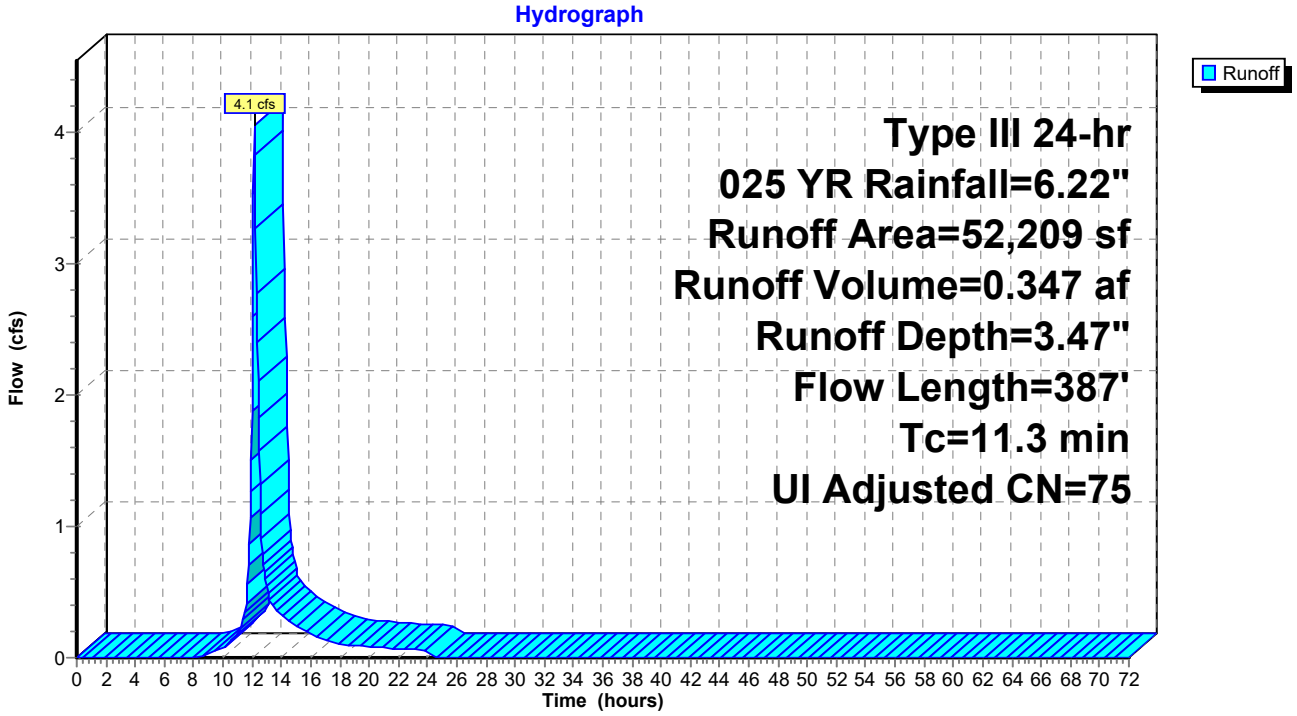
Runoff = 4.1 cfs @ 12.16 hrs, Volume= 0.347 af, Depth= 3.47"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 025 YR Rainfall=6.22"

Area (sf)	CN	Adj	Description
2,642	98		Unconnected pavement, HSG C
3,334	98		Unconnected roofs, HSG C
36,346	74		>75% Grass cover, Good, HSG C
9,887	70		Woods, Good, HSG C
52,209	76	75	Weighted Average, UI Adjusted
46,233			88.55% Pervious Area
5,976			11.45% Impervious Area
5,976			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.1	50	0.0430	0.14		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.10"
1.7	163	0.0520	1.60		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.0	62	0.0230	1.06		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
2.5	112	0.0230	0.76		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
11.3	387	Total			

Subcatchment 2: SC-2

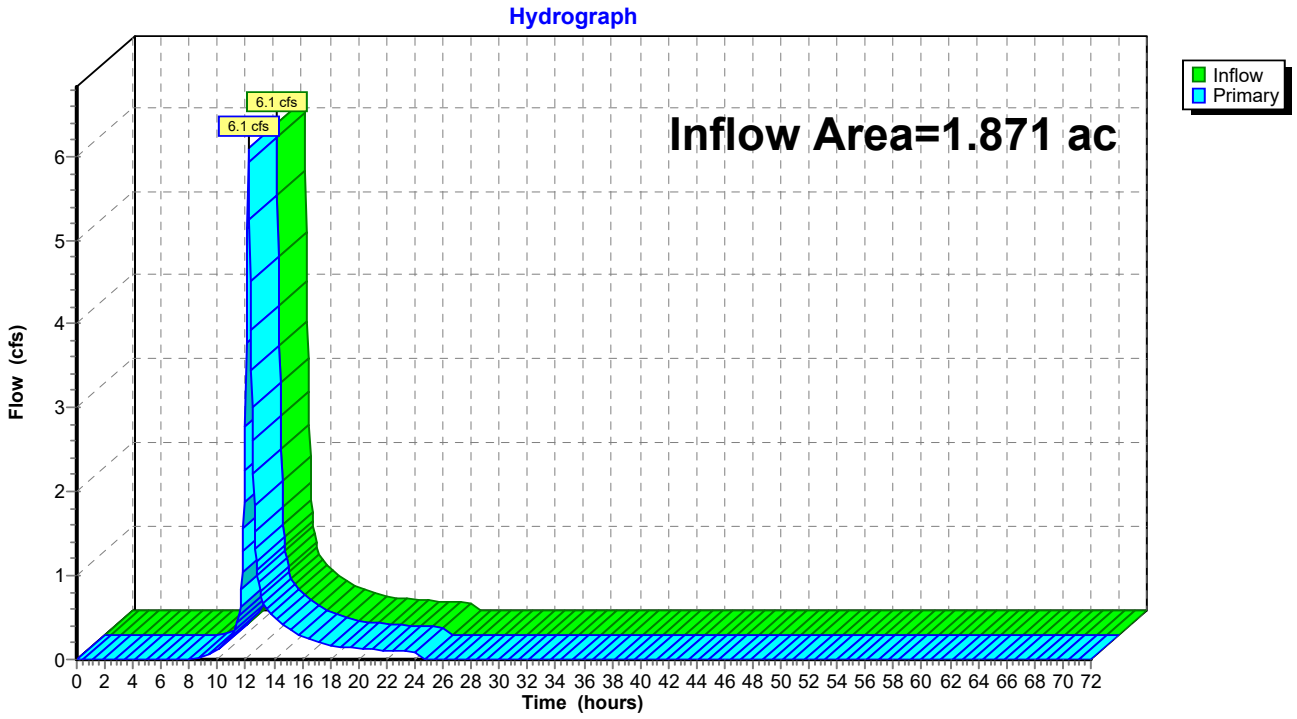


Summary for Link 3L:

Inflow Area = 1.871 ac, 14.51% Impervious, Inflow Depth = 3.47" for 025 YR event
Inflow = 6.1 cfs @ 12.17 hrs, Volume= 0.541 af
Primary = 6.1 cfs @ 12.17 hrs, Volume= 0.541 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 3L:



Summary for Subcatchment 4: SC-3

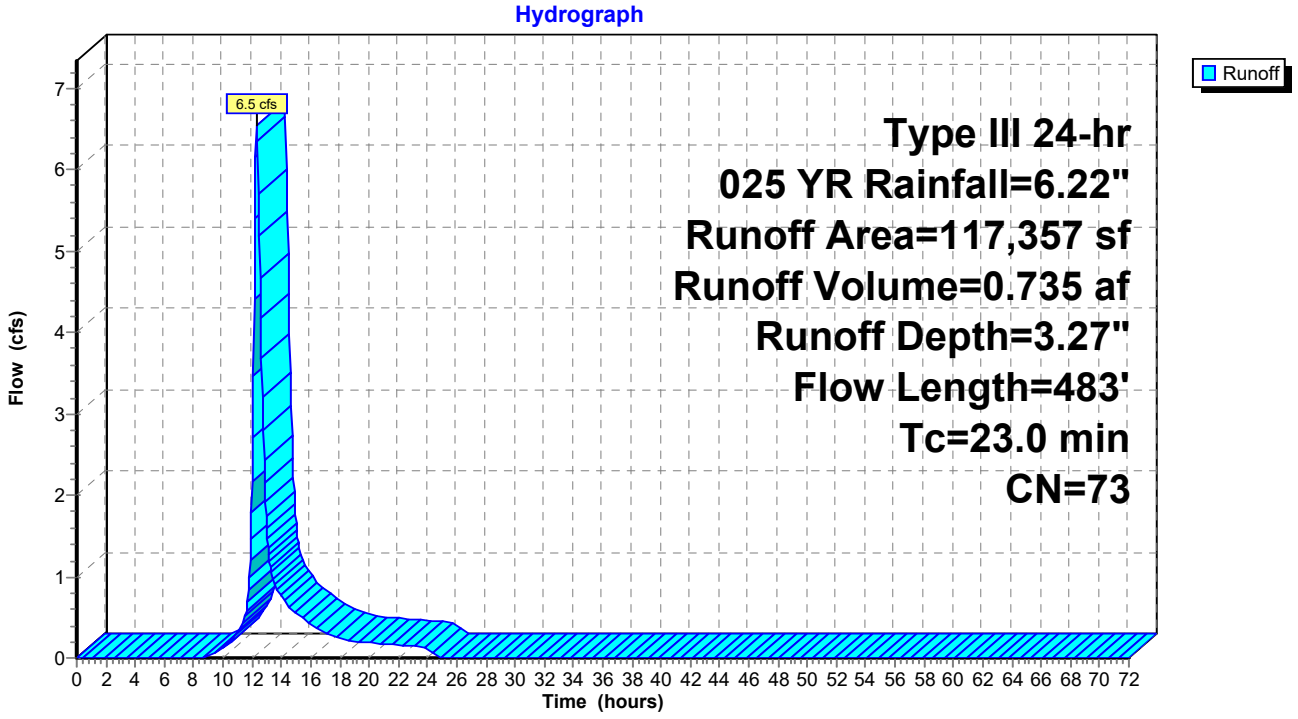
Runoff = 6.5 cfs @ 12.32 hrs, Volume= 0.735 af, Depth= 3.27"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 025 YR Rainfall=6.22"

Area (sf)	CN	Description
952	98	Unconnected roofs, HSG C
85,299	74	>75% Grass cover, Good, HSG C
31,106	70	Woods, Good, HSG C
117,357	73	Weighted Average
116,405		99.19% Pervious Area
952		0.81% Impervious Area
952		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.5	50	0.0100	0.05		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
6.5	433	0.0500	1.12		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
23.0	483	Total			

Subcatchment 4: SC-3



Summary for Subcatchment 11: SC-7

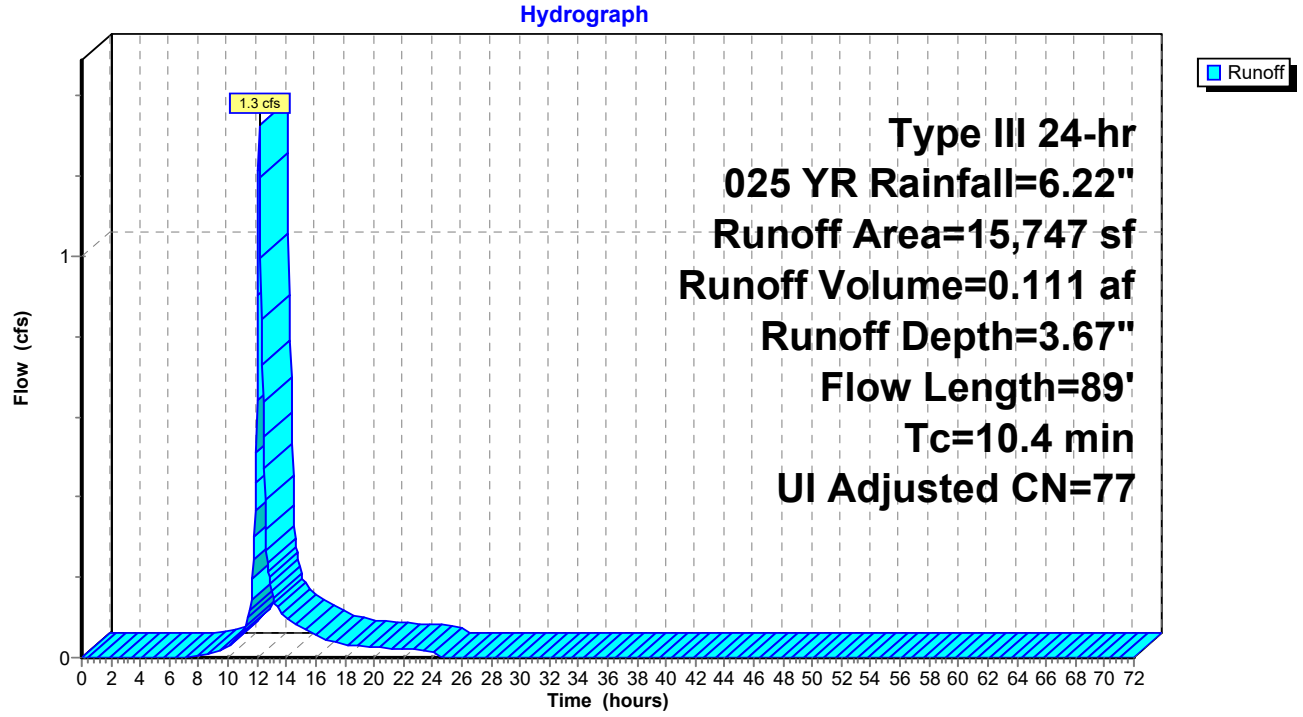
Runoff = 1.3 cfs @ 12.15 hrs, Volume= 0.111 af, Depth= 3.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 025 YR Rainfall=6.22"

Area (sf)	CN	Adj	Description
3,395	98		Unconnected pavement, HSG C
1,065	98		Unconnected roofs, HSG C
10,044	74		>75% Grass cover, Good, HSG C
1,243	70		Woods, Good, HSG C
15,747	80	77	Weighted Average, UI Adjusted
11,287			71.68% Pervious Area
4,460			28.32% Impervious Area
4,460			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.1	38	0.0200	0.06		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
0.3	51	0.0300	2.79		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
10.4	89	Total			

Subcatchment 11: SC-7



Summary for Subcatchment 12: SC-6

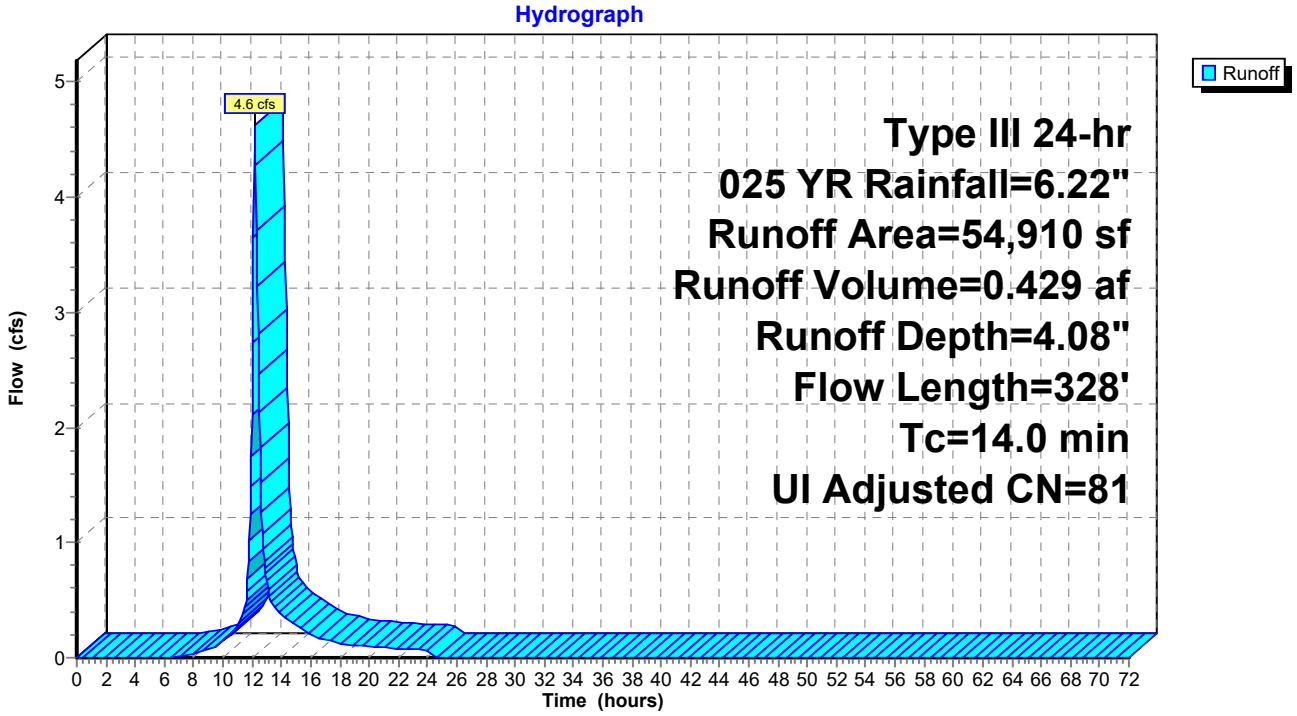
Runoff = 4.6 cfs @ 12.19 hrs, Volume= 0.429 af, Depth= 4.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 025 YR Rainfall=6.22"

Area (sf)	CN	Adj	Description
1,944	98		Unconnected pavement, HSG C
3,334	98		Unconnected roofs, HSG C
23,048	74		>75% Grass cover, Good, HSG C
26,584	86		<50% Grass cover, Poor, HSG C
54,910	82	81	Weighted Average, UI Adjusted
49,632			90.39% Pervious Area
5,278			9.61% Impervious Area
5,278			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.0	50	0.0100	0.08		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.10"
0.9	98	0.0700	1.85		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
2.1	180	0.0050	1.40	4.2	**Channel Flow,** Area= 3.0 sf Perim= 5.5' r= 0.55' n= 0.050 Earth, cobble bottom, clean sides
14.0	328	Total			

Subcatchment 12: SC-6



Summary for Subcatchment 13: SC-5

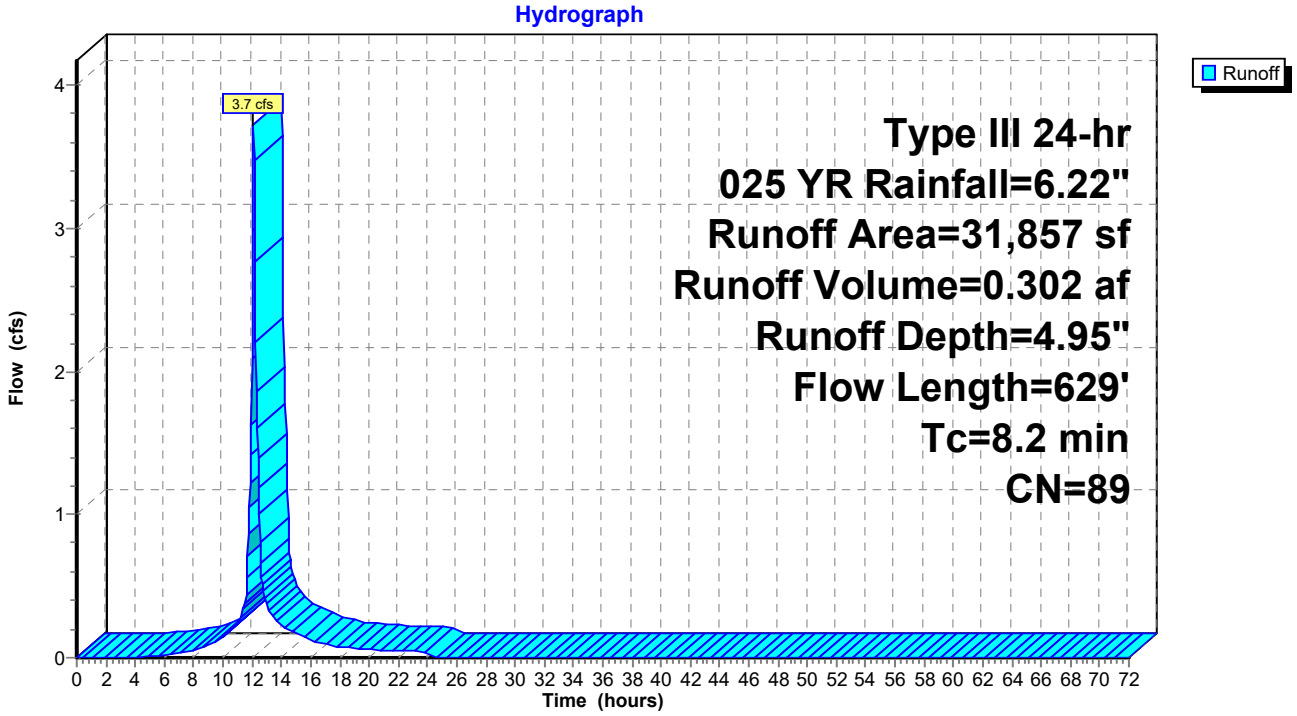
Runoff = 3.7 cfs @ 12.11 hrs, Volume= 0.302 af, Depth= 4.95"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 025 YR Rainfall=6.22"

Area (sf)	CN	Description
11,986	98	Paved parking, HSG C
1,048	98	Unconnected pavement, HSG C
15,126	86	<50% Grass cover, Poor, HSG C
3,697	70	Woods, Good, HSG C
31,857	89	Weighted Average
18,823		59.09% Pervious Area
13,034		40.91% Impervious Area
1,048		8.04% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	50	0.0550	0.15		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.10"
1.9	300	0.0160	2.57		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.0	14	0.0100	5.90	4.6	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.010
0.2	55	0.0100	5.90	4.6	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.010
0.5	210	0.0120	6.46	5.1	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.010
8.2	629	Total			

Subcatchment 13: SC-5



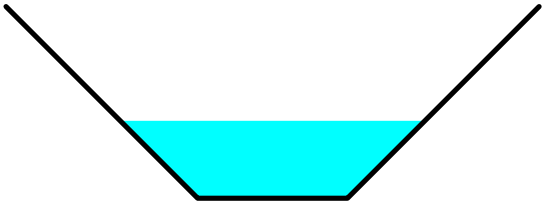
Summary for Reach 14: Grass Channel

Inflow Area = 0.731 ac, 40.91% Impervious, Inflow Depth = 4.95" for 025 YR event
Inflow = 3.7 cfs @ 12.11 hrs, Volume= 0.302 af
Outflow = 3.5 cfs @ 12.17 hrs, Volume= 0.302 af, Atten= 6%, Lag= 3.6 min

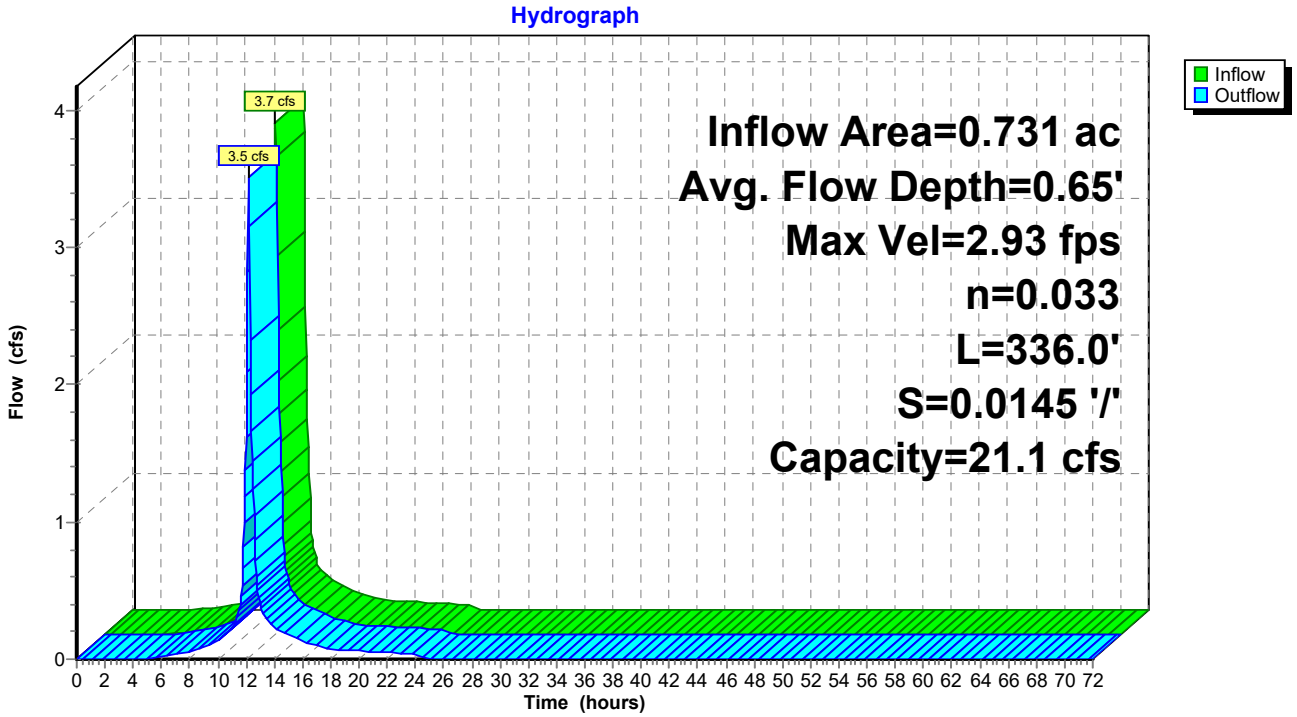
Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.93 fps, Min. Travel Time= 1.9 min
Avg. Velocity = 0.89 fps, Avg. Travel Time= 6.3 min

Peak Storage= 412 cf @ 12.14 hrs
Average Depth at Peak Storage= 0.65'
Bank-Full Depth= 1.60' Flow Area= 4.6 sf, Capacity= 21.1 cfs

1.25' x 1.60' deep channel, n= 0.033 Earth, grassed & winding
Side Slope Z-value= 1.0 '/' Top Width= 4.45'
Length= 336.0' Slope= 0.0145 '/'
Inlet Invert= 302.00', Outlet Invert= 297.13'



Reach 14: Grass Channel



Summary for Pond 15: Infiltration Basin

Inflow Area = 1.992 ac, 21.10% Impervious, Inflow Depth = 4.40" for 025 YR event
Inflow = 8.1 cfs @ 12.18 hrs, Volume= 0.731 af
Outflow = 2.1 cfs @ 12.65 hrs, Volume= 0.731 af, Atten= 75%, Lag= 27.7 min
Discarded = 0.2 cfs @ 12.65 hrs, Volume= 0.416 af
Primary = 1.8 cfs @ 12.65 hrs, Volume= 0.315 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 288.68' @ 12.65 hrs Surf.Area= 9,822 sf Storage= 14,577 cf

Plug-Flow detention time= 304.2 min calculated for 0.731 af (100% of inflow)
Center-of-Mass det. time= 304.1 min (1,112.3 - 808.2)

Volume	Invert	Avail.Storage	Storage Description
#1	287.00'	41,433 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

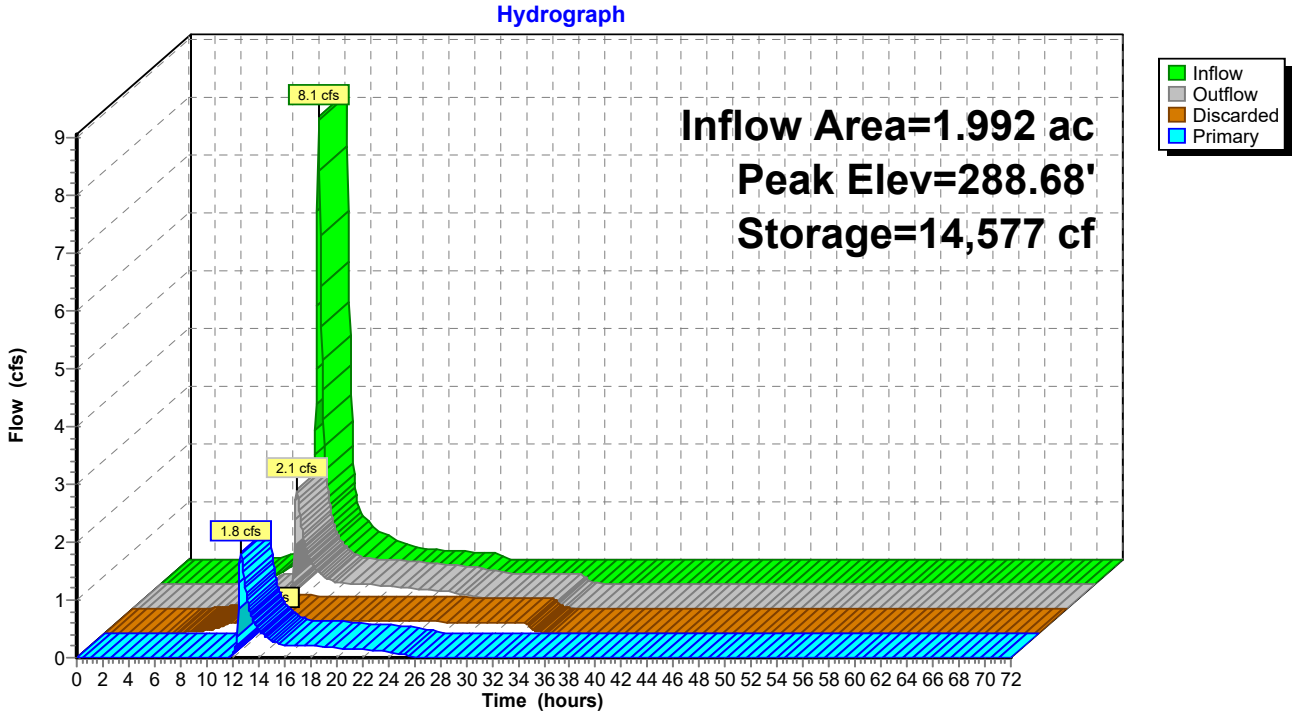
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
287.00	7,665	0	0
288.00	8,800	8,233	8,233
290.00	11,800	20,600	28,833
291.00	13,400	12,600	41,433

Device	Routing	Invert	Outlet Devices
#1	Discarded	287.00'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	287.50'	**3.0" Vert. Orifice/Grate** C= 0.600
#3	Primary	288.50'	**24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.2 cfs @ 12.65 hrs HW=288.68' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.2 cfs)

Primary OutFlow Max=1.8 cfs @ 12.65 hrs HW=288.68' (Free Discharge)
├**2=Orifice/Grate** (Orifice Controls 0.2 cfs @ 4.95 fps)
└**3=Orifice/Grate** (Weir Controls 1.6 cfs @ 1.39 fps)

Pond 15: Infiltration Basin



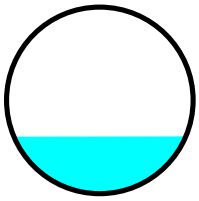
Summary for Reach 16: To Street

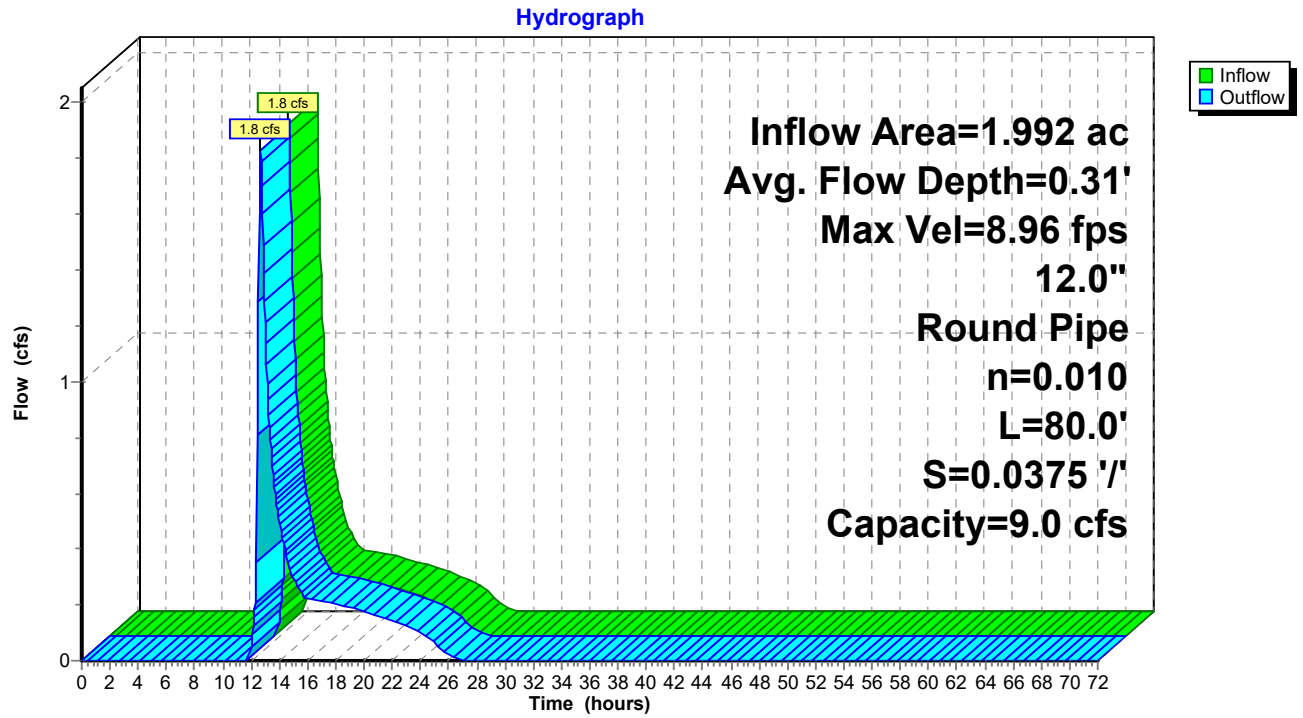
Inflow Area = 1.992 ac, 21.10% Impervious, Inflow Depth = 1.90" for 025 YR event
Inflow = 1.8 cfs @ 12.65 hrs, Volume= 0.315 af
Outflow = 1.8 cfs @ 12.65 hrs, Volume= 0.315 af, Atten= 0%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Max. Velocity= 8.96 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 4.48 fps, Avg. Travel Time= 0.3 min

Peak Storage= 16 cf @ 12.65 hrs
Average Depth at Peak Storage= 0.31'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 9.0 cfs

12.0" Round Pipe
n= 0.010
Length= 80.0' Slope= 0.0375 '/'
Inlet Invert= 285.00', Outlet Invert= 282.00'



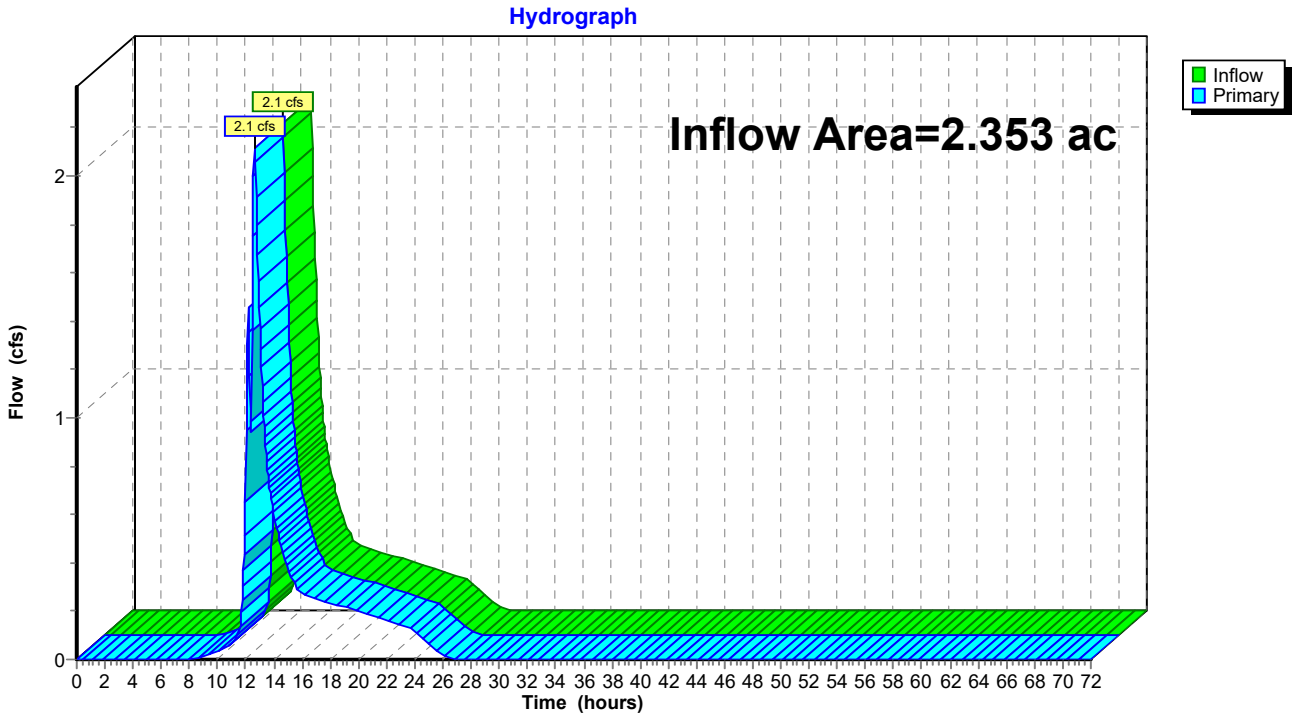


Summary for Link 16L:

Inflow Area = 2.353 ac, 22.21% Impervious, Inflow Depth = 2.17" for 025 YR event
Inflow = 2.1 cfs @ 12.62 hrs, Volume= 0.425 af
Primary = 2.1 cfs @ 12.62 hrs, Volume= 0.425 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 16L:



Summary for Subcatchment 20: Lot 1 Bldg

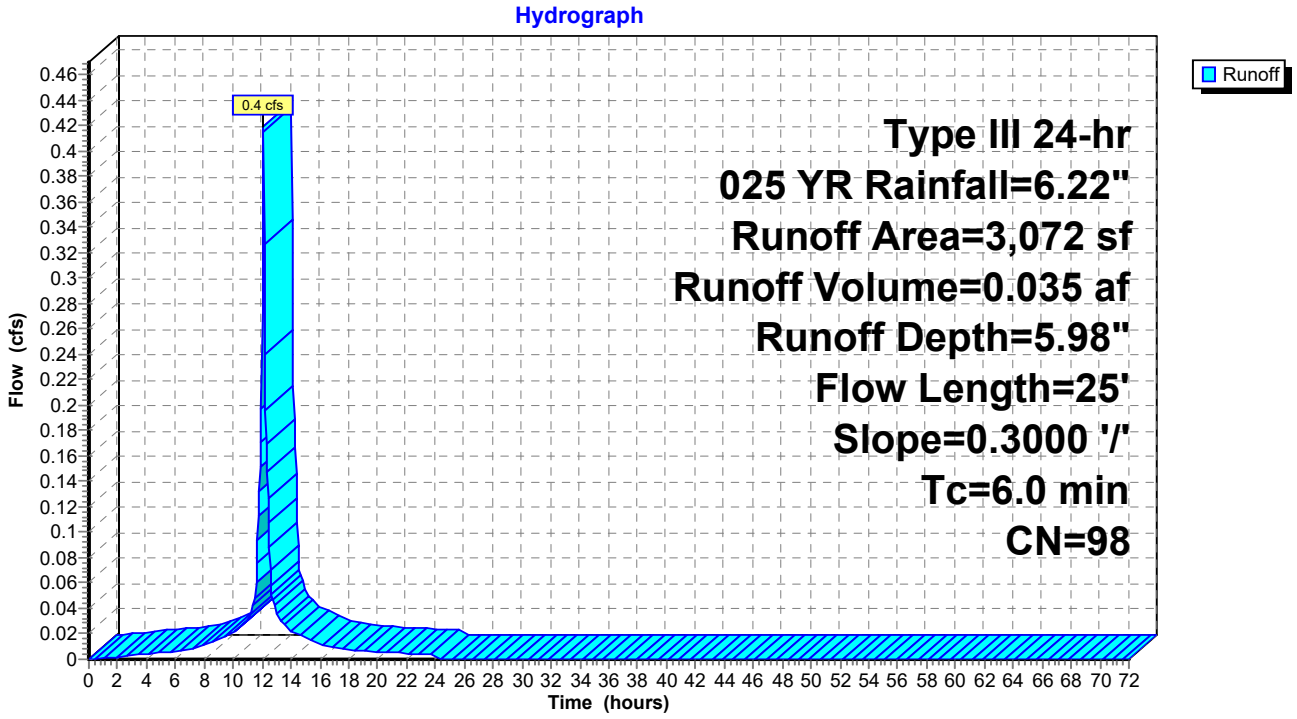
Runoff = 0.4 cfs @ 12.09 hrs, Volume= 0.035 af, Depth= 5.98"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 025 YR Rainfall=6.22"

Area (sf)	CN	Description
3,072	98	Unconnected roofs, HSG C
3,072		100.00% Impervious Area
3,072		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.1	25	0.3000	3.03		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.10"
0.1	25	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 20: Lot 1 Bldg



Summary for Subcatchment 21: Lot 2 Bldg

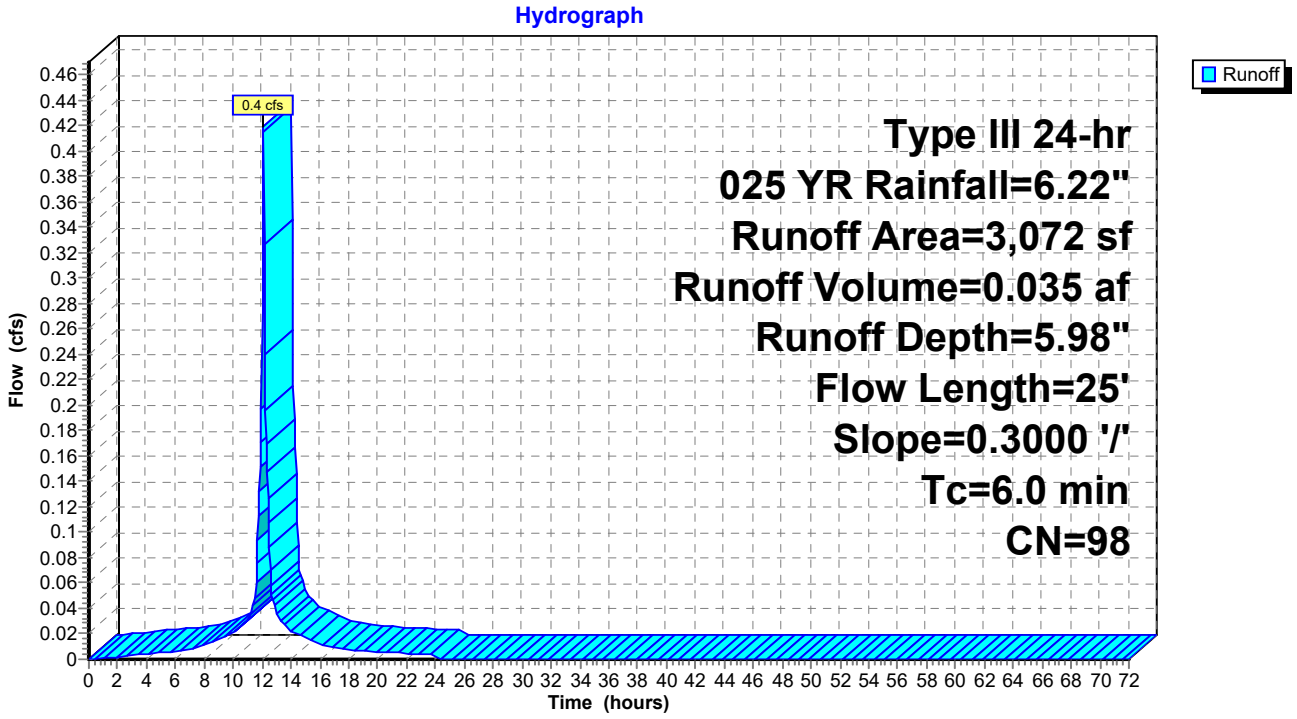
Runoff = 0.4 cfs @ 12.09 hrs, Volume= 0.035 af, Depth= 5.98"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 025 YR Rainfall=6.22"

Area (sf)	CN	Description
3,072	98	Unconnected roofs, HSG C
3,072		100.00% Impervious Area
3,072		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.1	25	0.3000	3.03		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.10"
0.1	25	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 21: Lot 2 Bldg



Summary for Subcatchment 22: Lot 3 Bldg

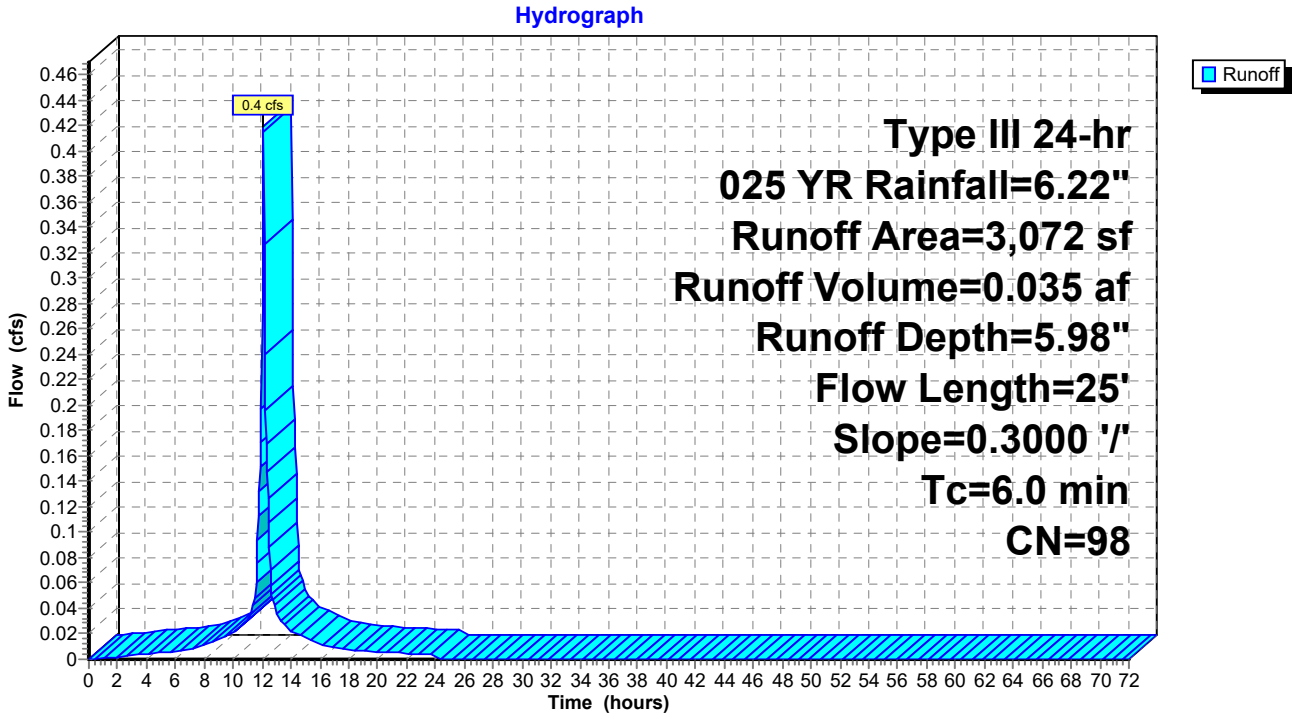
Runoff = 0.4 cfs @ 12.09 hrs, Volume= 0.035 af, Depth= 5.98"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 025 YR Rainfall=6.22"

Area (sf)	CN	Description
3,072	98	Unconnected roofs, HSG C
3,072		100.00% Impervious Area
3,072		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.1	25	0.3000	3.03		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.10"
0.1	25	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 22: Lot 3 Bldg



Summary for Pond 23: Drywell

Inflow Area = 0.212 ac,100.00% Impervious, Inflow Depth = 5.98" for 025 YR event
Inflow = 1.3 cfs @ 12.09 hrs, Volume= 0.105 af
Outflow = 1.3 cfs @ 12.11 hrs, Volume= 0.105 af, Atten= 0%, Lag= 1.3 min
Discarded = 0.0 cfs @ 7.10 hrs, Volume= 0.063 af
Primary = 1.3 cfs @ 12.11 hrs, Volume= 0.042 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 3.23' @ 12.11 hrs Surf.Area= 990 sf Storage= 1,313 cf

Plug-Flow detention time= 292.1 min calculated for 0.105 af (100% of inflow)
Center-of-Mass det. time= 292.5 min (1,037.1 - 744.6)

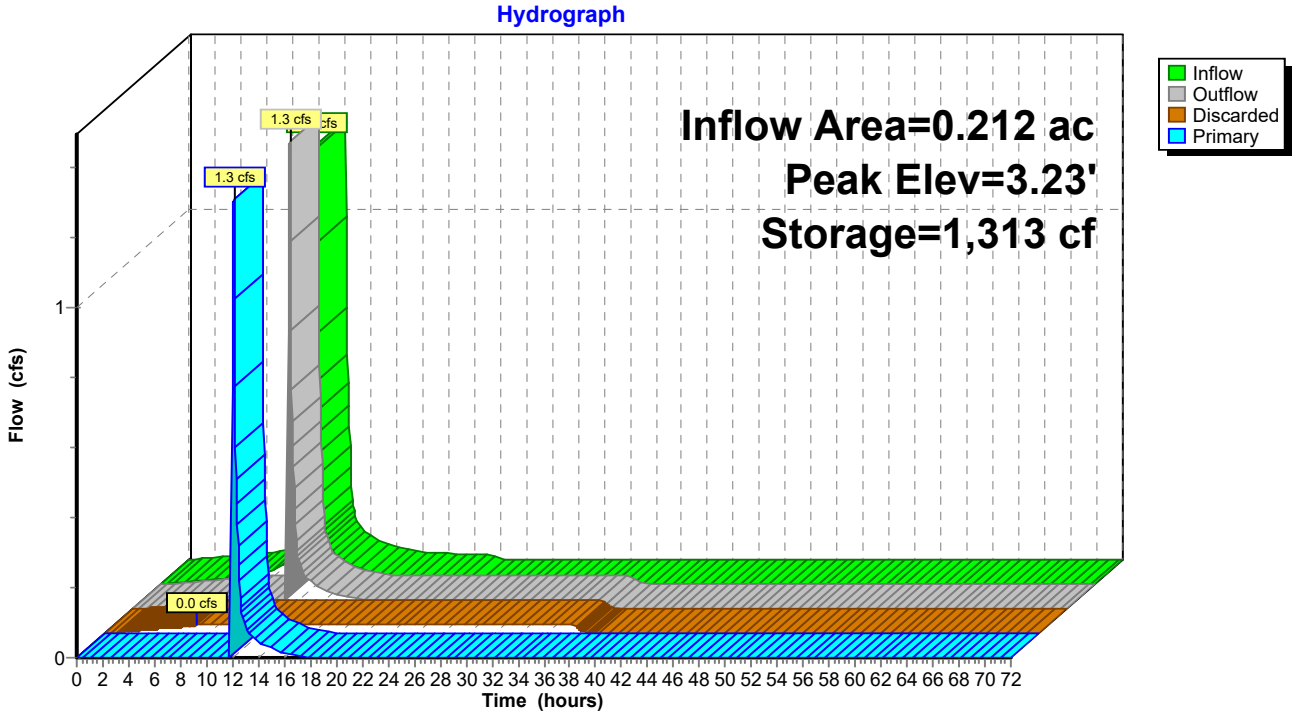
Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	454 cf	**15.00'W x 22.00'L x 3.50'H Prismatoid** 1,155 cf Overall - 19 cf Embedded = 1,136 cf x 40.0% Voids
#2	0.50'	19 cf	**12.0" Round Pipe Storage** x 2 Inside #1 L= 12.0' S= 0.0050 '/'
		473 cf	x 3.00 = 1,420 cf Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	3.00'	**5.0' long x 5.0' breadth Broad-Crested Rectangular Weir** 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 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Discarded OutFlow Max=0.0 cfs @ 7.10 hrs HW=0.07' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.0 cfs)

Primary OutFlow Max=1.2 cfs @ 12.11 hrs HW=3.22' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 1.2 cfs @ 1.12 fps)

Pond 23: Drywell



Summary for Subcatchment 24: SC-8

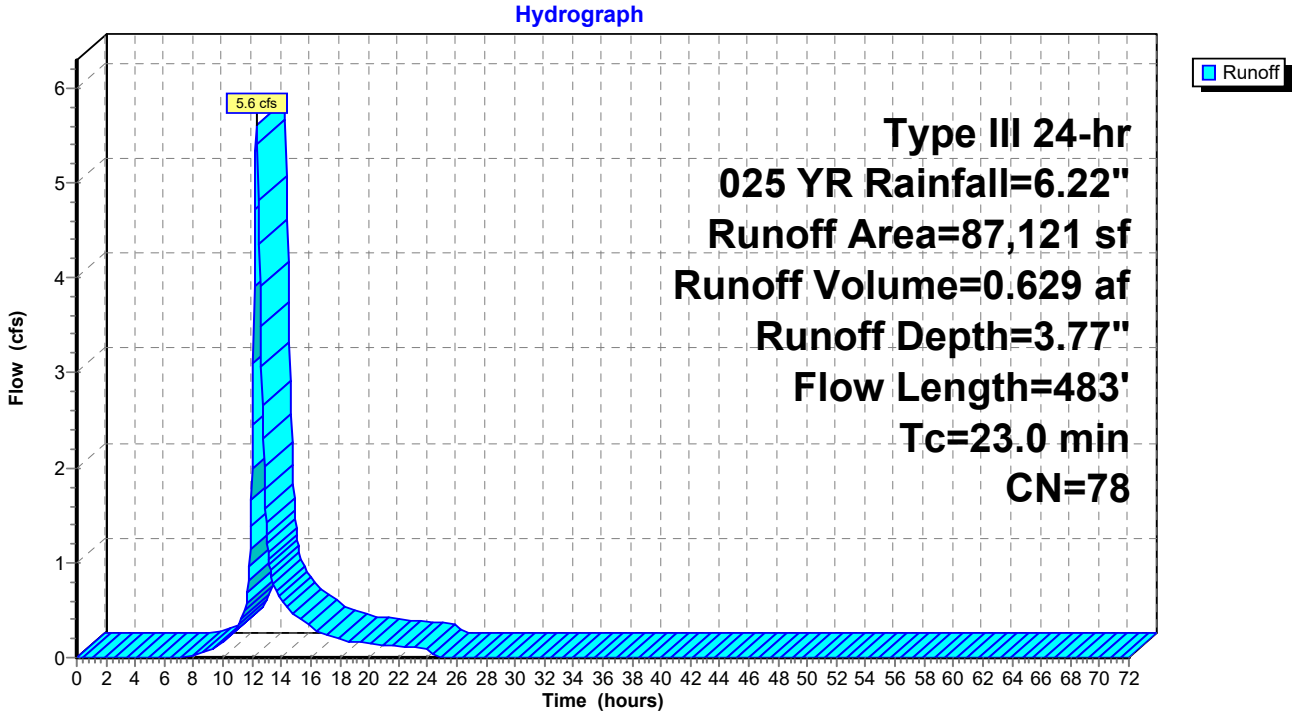
Runoff = 5.6 cfs @ 12.32 hrs, Volume= 0.629 af, Depth= 3.77"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 025 YR Rainfall=6.22"

Area (sf)	CN	Description
2,640	98	Unconnected pavement, HSG C
33,125	86	<50% Grass cover, Poor, HSG C
33,911	74	>75% Grass cover, Good, HSG C
17,445	70	Woods, Good, HSG C
87,121	78	Weighted Average
84,481		96.97% Pervious Area
2,640		3.03% Impervious Area
2,640		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.5	50	0.0100	0.05		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
6.5	433	0.0490	1.11		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
23.0	483	Total			

Subcatchment 24: SC-8

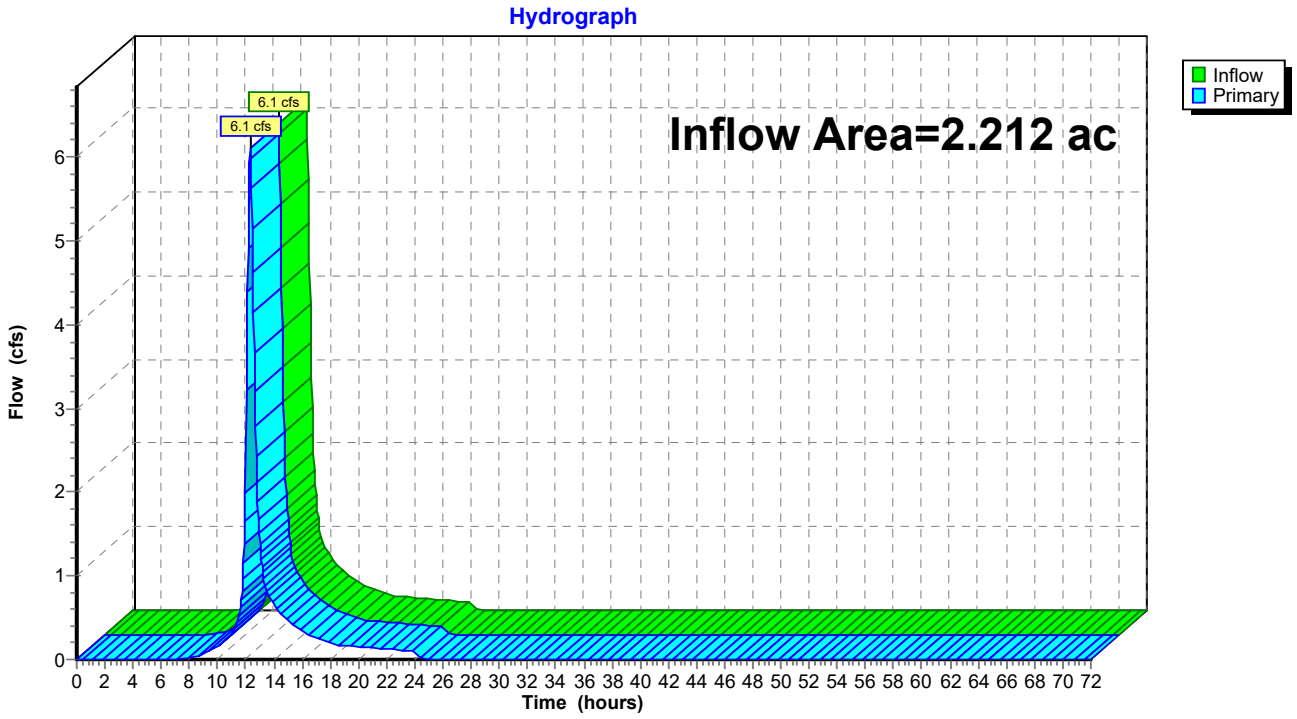


Summary for Link 25: SC-8 Total

Inflow Area = 2.212 ac, 12.31% Impervious, Inflow Depth = 3.64" for 025 YR event
Inflow = 6.1 cfs @ 12.30 hrs, Volume= 0.671 af
Primary = 6.1 cfs @ 12.30 hrs, Volume= 0.671 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 25: SC-8 Total



iii. Runoff and Mitigation Design Summary Calculations

2, 10, 25 & 100-Year Design Storm Events Summary Calculations

See Following Pages

Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1: SC-1 Runoff Area=29,285 sf 19.98% Impervious Runoff Depth=1.09"
Flow Length=265' Tc=14.3 min UI Adjusted CN=75 Runoff=0.6 cfs 0.061 af

Subcatchment2: SC-2 Runoff Area=52,209 sf 11.45% Impervious Runoff Depth=1.09"
Flow Length=387' Tc=11.3 min UI Adjusted CN=75 Runoff=1.2 cfs 0.109 af

Link 3L: Inflow=1.8 cfs 0.171 af
Primary=1.8 cfs 0.171 af

Subcatchment4: SC-3 Runoff Area=117,357 sf 0.81% Impervious Runoff Depth=0.98"
Flow Length=483' Tc=23.0 min CN=73 Runoff=1.8 cfs 0.221 af

Subcatchment11: SC-7 Runoff Area=15,747 sf 28.32% Impervious Runoff Depth=1.21"
Flow Length=89' Tc=10.4 min UI Adjusted CN=77 Runoff=0.4 cfs 0.037 af

Subcatchment12: SC-6 Runoff Area=54,910 sf 9.61% Impervious Runoff Depth=1.47"
Flow Length=328' Tc=14.0 min UI Adjusted CN=81 Runoff=1.7 cfs 0.154 af

Subcatchment13: SC-5 Runoff Area=31,857 sf 40.91% Impervious Runoff Depth=2.08"
Flow Length=629' Tc=8.2 min CN=89 Runoff=1.6 cfs 0.127 af

Reach 14: Grass Channel Avg. Flow Depth=0.40' Max Vel=2.32 fps Inflow=1.6 cfs 0.127 af
n=0.033 L=336.0' S=0.0145 '/' Capacity=21.1 cfs Outflow=1.5 cfs 0.127 af

Pond 15: Infiltration Basin Peak Elev=287.72' Storage=5,838 cf Inflow=3.2 cfs 0.281 af
Discarded=0.2 cfs 0.257 af Primary=0.1 cfs 0.024 af Outflow=0.3 cfs 0.281 af

Reach 16: To Street Avg. Flow Depth=0.06' Max Vel=3.47 fps Inflow=0.1 cfs 0.024 af
12.0" Round Pipe n=0.010 L=80.0' S=0.0375 '/' Capacity=9.0 cfs Outflow=0.1 cfs 0.024 af

Link 16L: Inflow=0.4 cfs 0.061 af
Primary=0.4 cfs 0.061 af

Subcatchment20: Lot 1 Bldg Runoff Area=3,072 sf 100.00% Impervious Runoff Depth=2.97"
Flow Length=25' Slope=0.3000 '/' Tc=6.0 min CN=98 Runoff=0.2 cfs 0.017 af

Subcatchment21: Lot 2 Bldg Runoff Area=3,072 sf 100.00% Impervious Runoff Depth=2.97"
Flow Length=25' Slope=0.3000 '/' Tc=6.0 min CN=98 Runoff=0.2 cfs 0.017 af

Subcatchment22: Lot 3 Bldg Runoff Area=3,072 sf 100.00% Impervious Runoff Depth=2.97"
Flow Length=25' Slope=0.3000 '/' Tc=6.0 min CN=98 Runoff=0.2 cfs 0.017 af

Pond 23: Drywell Peak Elev=3.00' Storage=1,222 cf Inflow=0.6 cfs 0.052 af
Discarded=0.0 cfs 0.052 af Primary=0.0 cfs 0.000 af Outflow=0.0 cfs 0.052 af

Subcatchment24: SC-8 Runoff Area=87,121 sf 3.03% Impervious Runoff Depth=1.27"
Flow Length=483' Tc=23.0 min CN=78 Runoff=1.8 cfs 0.212 af

Link 25: SC-8 Total

Inflow=1.8 cfs 0.212 af
Primary=1.8 cfs 0.212 af

Total Runoff Area = 9.130 ac Runoff Volume = 0.973 af Average Runoff Depth = 1.28"
88.08% Pervious = 8.042 ac 11.92% Impervious = 1.088 ac

Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1: SC-1 Runoff Area=29,285 sf 19.98% Impervious Runoff Depth=2.50"
Flow Length=265' Tc=14.3 min UI Adjusted CN=75 Runoff=1.5 cfs 0.140 af

Subcatchment2: SC-2 Runoff Area=52,209 sf 11.45% Impervious Runoff Depth=2.50"
Flow Length=387' Tc=11.3 min UI Adjusted CN=75 Runoff=2.9 cfs 0.250 af

Link 3L: Inflow=4.4 cfs 0.389 af
Primary=4.4 cfs 0.389 af

Subcatchment4: SC-3 Runoff Area=117,357 sf 0.81% Impervious Runoff Depth=2.33"
Flow Length=483' Tc=23.0 min CN=73 Runoff=4.6 cfs 0.523 af

Subcatchment11: SC-7 Runoff Area=15,747 sf 28.32% Impervious Runoff Depth=2.67"
Flow Length=89' Tc=10.4 min UI Adjusted CN=77 Runoff=1.0 cfs 0.081 af

Subcatchment12: SC-6 Runoff Area=54,910 sf 9.61% Impervious Runoff Depth=3.04"
Flow Length=328' Tc=14.0 min UI Adjusted CN=81 Runoff=3.5 cfs 0.319 af

Subcatchment13: SC-5 Runoff Area=31,857 sf 40.91% Impervious Runoff Depth=3.83"
Flow Length=629' Tc=8.2 min CN=89 Runoff=2.9 cfs 0.233 af

Reach 14: Grass Channel Avg. Flow Depth=0.57' Max Vel=2.74 fps Inflow=2.9 cfs 0.233 af
n=0.033 L=336.0' S=0.0145 '/' Capacity=21.1 cfs Outflow=2.7 cfs 0.233 af

Pond 15: Infiltration Basin Peak Elev=288.48' Storage=12,652 cf Inflow=6.2 cfs 0.553 af
Discarded=0.2 cfs 0.383 af Primary=0.2 cfs 0.169 af Outflow=0.4 cfs 0.553 af

Reach 16: To Street Avg. Flow Depth=0.11' Max Vel=4.80 fps Inflow=0.2 cfs 0.169 af
12.0" Round Pipe n=0.010 L=80.0' S=0.0375 '/' Capacity=9.0 cfs Outflow=0.2 cfs 0.169 af

Link 16L: Inflow=1.0 cfs 0.250 af
Primary=1.0 cfs 0.250 af

Subcatchment20: Lot 1 Bldg Runoff Area=3,072 sf 100.00% Impervious Runoff Depth=4.82"
Flow Length=25' Slope=0.3000 '/' Tc=6.0 min CN=98 Runoff=0.3 cfs 0.028 af

Subcatchment21: Lot 2 Bldg Runoff Area=3,072 sf 100.00% Impervious Runoff Depth=4.82"
Flow Length=25' Slope=0.3000 '/' Tc=6.0 min CN=98 Runoff=0.3 cfs 0.028 af

Subcatchment22: Lot 3 Bldg Runoff Area=3,072 sf 100.00% Impervious Runoff Depth=4.82"
Flow Length=25' Slope=0.3000 '/' Tc=6.0 min CN=98 Runoff=0.3 cfs 0.028 af

Pond 23: Drywell Peak Elev=3.18' Storage=1,294 cf Inflow=1.0 cfs 0.085 af
Discarded=0.0 cfs 0.060 af Primary=0.8 cfs 0.025 af Outflow=0.8 cfs 0.085 af

Subcatchment24: SC-8 Runoff Area=87,121 sf 3.03% Impervious Runoff Depth=2.76"
Flow Length=483' Tc=23.0 min CN=78 Runoff=4.1 cfs 0.460 af

Link 25: SC-8 Total

Inflow=4.5 cfs 0.486 af
Primary=4.5 cfs 0.486 af

Total Runoff Area = 9.130 ac Runoff Volume = 2.091 af Average Runoff Depth = 2.75"
88.08% Pervious = 8.042 ac 11.92% Impervious = 1.088 ac

Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1: SC-1 Runoff Area=29,285 sf 19.98% Impervious Runoff Depth=3.47"
Flow Length=265' Tc=14.3 min UI Adjusted CN=75 Runoff=2.1 cfs 0.194 af

Subcatchment2: SC-2 Runoff Area=52,209 sf 11.45% Impervious Runoff Depth=3.47"
Flow Length=387' Tc=11.3 min UI Adjusted CN=75 Runoff=4.1 cfs 0.347 af

Link 3L: Inflow=6.1 cfs 0.541 af
Primary=6.1 cfs 0.541 af

Subcatchment4: SC-3 Runoff Area=117,357 sf 0.81% Impervious Runoff Depth=3.27"
Flow Length=483' Tc=23.0 min CN=73 Runoff=6.5 cfs 0.735 af

Subcatchment11: SC-7 Runoff Area=15,747 sf 28.32% Impervious Runoff Depth=3.67"
Flow Length=89' Tc=10.4 min UI Adjusted CN=77 Runoff=1.3 cfs 0.111 af

Subcatchment12: SC-6 Runoff Area=54,910 sf 9.61% Impervious Runoff Depth=4.08"
Flow Length=328' Tc=14.0 min UI Adjusted CN=81 Runoff=4.6 cfs 0.429 af

Subcatchment13: SC-5 Runoff Area=31,857 sf 40.91% Impervious Runoff Depth=4.95"
Flow Length=629' Tc=8.2 min CN=89 Runoff=3.7 cfs 0.302 af

Reach 14: Grass Channel Avg. Flow Depth=0.65' Max Vel=2.93 fps Inflow=3.7 cfs 0.302 af
n=0.033 L=336.0' S=0.0145 '/' Capacity=21.1 cfs Outflow=3.5 cfs 0.302 af

Pond 15: Infiltration Basin Peak Elev=288.68' Storage=14,577 cf Inflow=8.1 cfs 0.731 af
Discarded=0.2 cfs 0.416 af Primary=1.8 cfs 0.315 af Outflow=2.1 cfs 0.731 af

Reach 16: To Street Avg. Flow Depth=0.31' Max Vel=8.96 fps Inflow=1.8 cfs 0.315 af
12.0" Round Pipe n=0.010 L=80.0' S=0.0375 '/' Capacity=9.0 cfs Outflow=1.8 cfs 0.315 af

Link 16L: Inflow=2.1 cfs 0.425 af
Primary=2.1 cfs 0.425 af

Subcatchment20: Lot 1 Bldg Runoff Area=3,072 sf 100.00% Impervious Runoff Depth=5.98"
Flow Length=25' Slope=0.3000 '/' Tc=6.0 min CN=98 Runoff=0.4 cfs 0.035 af

Subcatchment21: Lot 2 Bldg Runoff Area=3,072 sf 100.00% Impervious Runoff Depth=5.98"
Flow Length=25' Slope=0.3000 '/' Tc=6.0 min CN=98 Runoff=0.4 cfs 0.035 af

Subcatchment22: Lot 3 Bldg Runoff Area=3,072 sf 100.00% Impervious Runoff Depth=5.98"
Flow Length=25' Slope=0.3000 '/' Tc=6.0 min CN=98 Runoff=0.4 cfs 0.035 af

Pond 23: Drywell Peak Elev=3.23' Storage=1,313 cf Inflow=1.3 cfs 0.105 af
Discarded=0.0 cfs 0.063 af Primary=1.3 cfs 0.042 af Outflow=1.3 cfs 0.105 af

Subcatchment24: SC-8 Runoff Area=87,121 sf 3.03% Impervious Runoff Depth=3.77"
Flow Length=483' Tc=23.0 min CN=78 Runoff=5.6 cfs 0.629 af

Link 25: SC-8 Total

Inflow=6.1 cfs 0.671 af
Primary=6.1 cfs 0.671 af

Total Runoff Area = 9.130 ac Runoff Volume = 2.851 af Average Runoff Depth = 3.75"
88.08% Pervious = 8.042 ac 11.92% Impervious = 1.088 ac

Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1: SC-1 Runoff Area=29,285 sf 19.98% Impervious Runoff Depth=5.06"
Flow Length=265' Tc=14.3 min UI Adjusted CN=75 Runoff=3.0 cfs 0.283 af

Subcatchment2: SC-2 Runoff Area=52,209 sf 11.45% Impervious Runoff Depth=5.06"
Flow Length=387' Tc=11.3 min UI Adjusted CN=75 Runoff=5.9 cfs 0.505 af

Link 3L: Inflow=8.9 cfs 0.789 af
Primary=8.9 cfs 0.789 af

Subcatchment4: SC-3 Runoff Area=117,357 sf 0.81% Impervious Runoff Depth=4.83"
Flow Length=483' Tc=23.0 min CN=73 Runoff=9.7 cfs 1.084 af

Subcatchment11: SC-7 Runoff Area=15,747 sf 28.32% Impervious Runoff Depth=5.29"
Flow Length=89' Tc=10.4 min UI Adjusted CN=77 Runoff=1.9 cfs 0.159 af

Subcatchment12: SC-6 Runoff Area=54,910 sf 9.61% Impervious Runoff Depth=5.76"
Flow Length=328' Tc=14.0 min UI Adjusted CN=81 Runoff=6.5 cfs 0.605 af

Subcatchment13: SC-5 Runoff Area=31,857 sf 40.91% Impervious Runoff Depth=6.71"
Flow Length=629' Tc=8.2 min CN=89 Runoff=5.0 cfs 0.409 af

Reach 14: Grass Channel Avg. Flow Depth=0.76' Max Vel=3.17 fps Inflow=5.0 cfs 0.409 af
n=0.033 L=336.0' S=0.0145 '/' Capacity=21.1 cfs Outflow=4.7 cfs 0.409 af

Pond 15: Infiltration Basin Peak Elev=288.90' Storage=16,793 cf Inflow=11.1 cfs 1.014 af
Discarded=0.2 cfs 0.453 af Primary=5.5 cfs 0.561 af Outflow=5.8 cfs 1.014 af

Reach 16: To Street Avg. Flow Depth=0.57' Max Vel=12.01 fps Inflow=5.5 cfs 0.561 af
12.0" Round Pipe n=0.010 L=80.0' S=0.0375 '/' Capacity=9.0 cfs Outflow=5.5 cfs 0.561 af

Link 16L: Inflow=6.4 cfs 0.720 af
Primary=6.4 cfs 0.720 af

Subcatchment20: Lot 1 Bldg Runoff Area=3,072 sf 100.00% Impervious Runoff Depth=7.78"
Flow Length=25' Slope=0.3000 '/' Tc=6.0 min CN=98 Runoff=0.5 cfs 0.046 af

Subcatchment21: Lot 2 Bldg Runoff Area=3,072 sf 100.00% Impervious Runoff Depth=7.78"
Flow Length=25' Slope=0.3000 '/' Tc=6.0 min CN=98 Runoff=0.5 cfs 0.046 af

Subcatchment22: Lot 3 Bldg Runoff Area=3,072 sf 100.00% Impervious Runoff Depth=7.78"
Flow Length=25' Slope=0.3000 '/' Tc=6.0 min CN=98 Runoff=0.5 cfs 0.046 af

Pond 23: Drywell Peak Elev=3.26' Storage=1,325 cf Inflow=1.6 cfs 0.137 af
Discarded=0.0 cfs 0.067 af Primary=1.6 cfs 0.070 af Outflow=1.6 cfs 0.137 af

Subcatchment24: SC-8 Runoff Area=87,121 sf 3.03% Impervious Runoff Depth=5.41"
Flow Length=483' Tc=23.0 min CN=78 Runoff=8.0 cfs 0.902 af

Link 25: SC-8 Total

Inflow=8.6 cfs 0.971 af
Primary=8.6 cfs 0.971 af

Total Runoff Area = 9.130 ac Runoff Volume = 4.085 af Average Runoff Depth = 5.37"
88.08% Pervious = 8.042 ac 11.92% Impervious = 1.088 ac