



Drainage Report
South Avenue Redevelopment
Plainfield , NJ
Block 623, Lots 1& 2

July 26, 2022
November 11, 2022

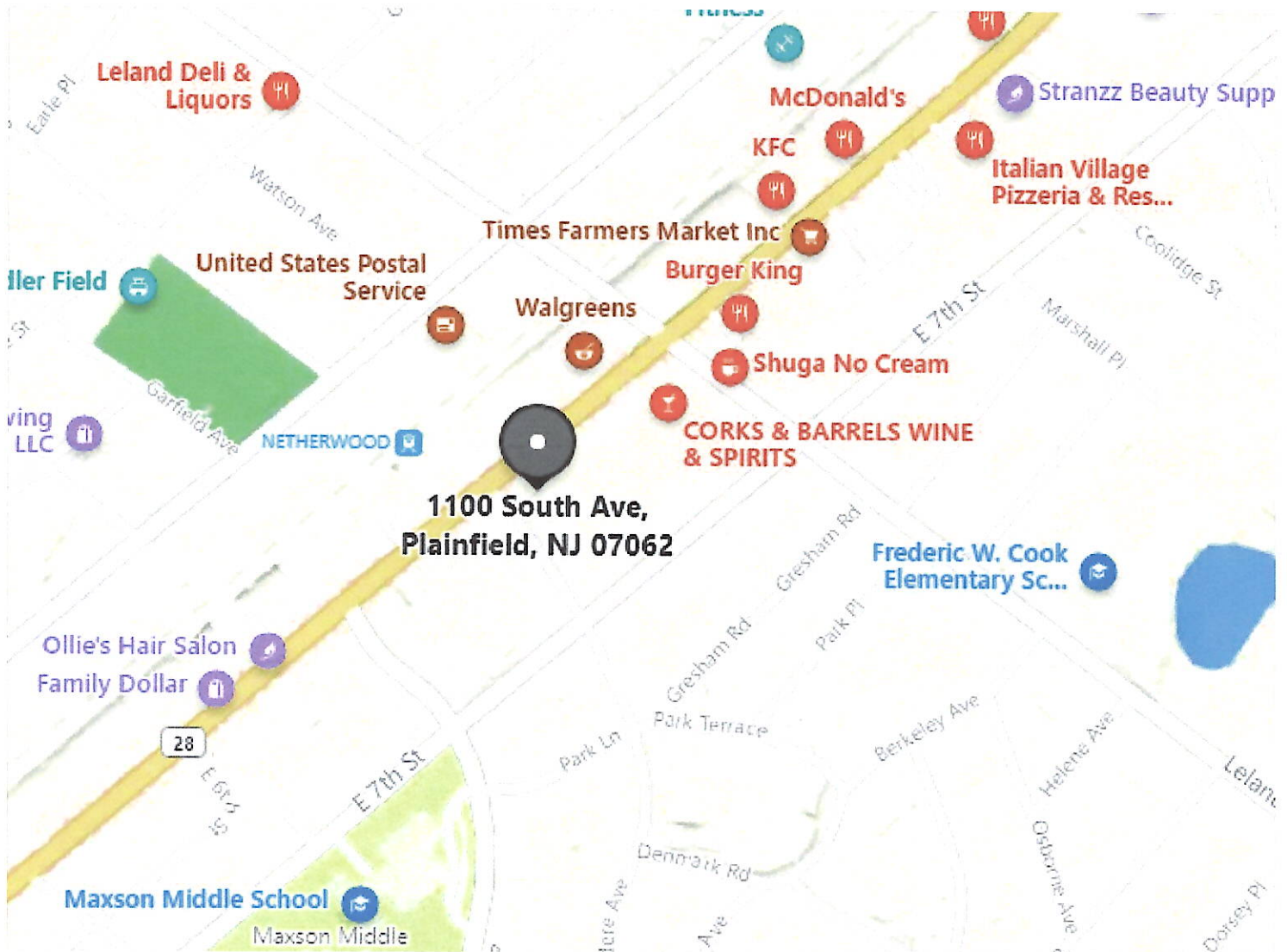
A handwritten signature in blue ink, appearing to read "Paul W. Anderson", is written over a horizontal line.

Paul W. Anderson PE PP CME
NJ PE Lic. No. 33410

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Hydrocad calculations



Introduction

The applicant is proposing to redevelop the property at 1100-1114 South Avenue in Plainfield NJ with a multi-story residential building over commercial space. Because of the amount of disturbance required for the project, it is classified as a major project and the state stormwater statute's reduced discharge rates groundwater recharge and water quality will apply. The proposed design will capture roof runoff and discharge it to a stormwater detention pipe under the floor of the underbuilding garage. Stormwater that falls onto the parking lot outside the building line will run over porous pavement and inlets that feed the porous pavement system. The porous pavement will overflow to the detention system.

The calculations utilize Hydrocad, version 9.10, NJDEP approved intensity curves, and the SCS TR-20 methodology to calculate the pre-and post-development runoff volumes. The porous pavement system provide the water quality element with green technology, The infiltration/ detention system meets the groundwater recharge and discharge rate requirements.

Methodology

The drainage for the property is calculated for the existing and proposed conditions. Discharge rates for the existing conditions under the 2, 10 and 100-year storm events are calculated with The Hydrocad drainage program and the SCS TR-20 method. Hydrographs for the proposed conditions for areas detained and un-detained are developed. Allowable discharge rates for the detention system are calculated and the proposed hydrograph is routed through a proposed detention systems until the desired discharge rate is achieved for each storm.

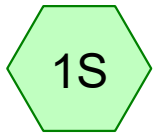
The porous pavement system does provide some discharge rate attenuation however it is not modeled in our analysis.

Summary

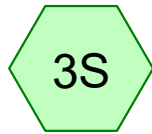
The result of the stormwater design for the project is shown in the table below and detailed hydrographs and routings are included in back of this report.

Storm	Existing (cfs)	Un-detained	Permitted Discharge From detention	Detention Discharge	Total Discharge
2	2.21 cfs	.03 cfs	1.08 cfs	.87 cfs	.90 cfs
10	3.73 cfs	.11 cfs	2.50cfs	2.32cfs	2.43 cfs
100	6.24cfs	.20 cfs	4.79cfs	4.28 cfs	4.48 cfs

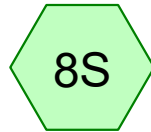
The routing of the runoff to thru the detention pipe reduces the discharge rate in accordance with Plainfield's and state standards so no detrimental impact to the capacity of the city storm sewer system is anticipated.



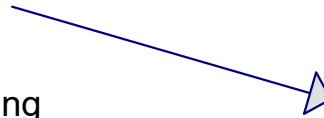
existing conditions



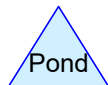
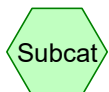
proposed overland



roof & parking



recharge basin



Routing Diagram for 1110 South Ave Drainage

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Type III 24-hr 2-Year Rainfall=3.31"

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Time span=0.00-36.00 hrs, dt=0.06 hrs, 601 points
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv.
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: existing conditions Runoff Area=38,698 sf 65.00% Impervious Runoff Depth=2.68"
Flow Length=105' Slope=0.0380 '/' Tc=10.0 min CN=86/98 Runoff=2.21 cfs 0.198 af

Subcatchment 3S: proposed overland Runoff Area=1,316 sf 0.00% Impervious Runoff Depth=1.11"
Tc=10.0 min CN=74/0 Runoff=0.03 cfs 0.003 af

Subcatchment 8S: roof & parking Runoff Area=37,382 sf 100.00% Impervious Runoff Depth=3.08"
Tc=10.0 min CN=0/98 Runoff=2.39 cfs 0.220 af

Pond 9P: recharge basin Peak Elev=119.96' Storage=2,524 cf Inflow=2.39 cfs 0.220 af
Discarded=0.16 cfs 0.111 af Primary=0.87 cfs 0.109 af Outflow=1.02 cfs 0.220 af

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Summary for Subcatchment 1S: existing conditions

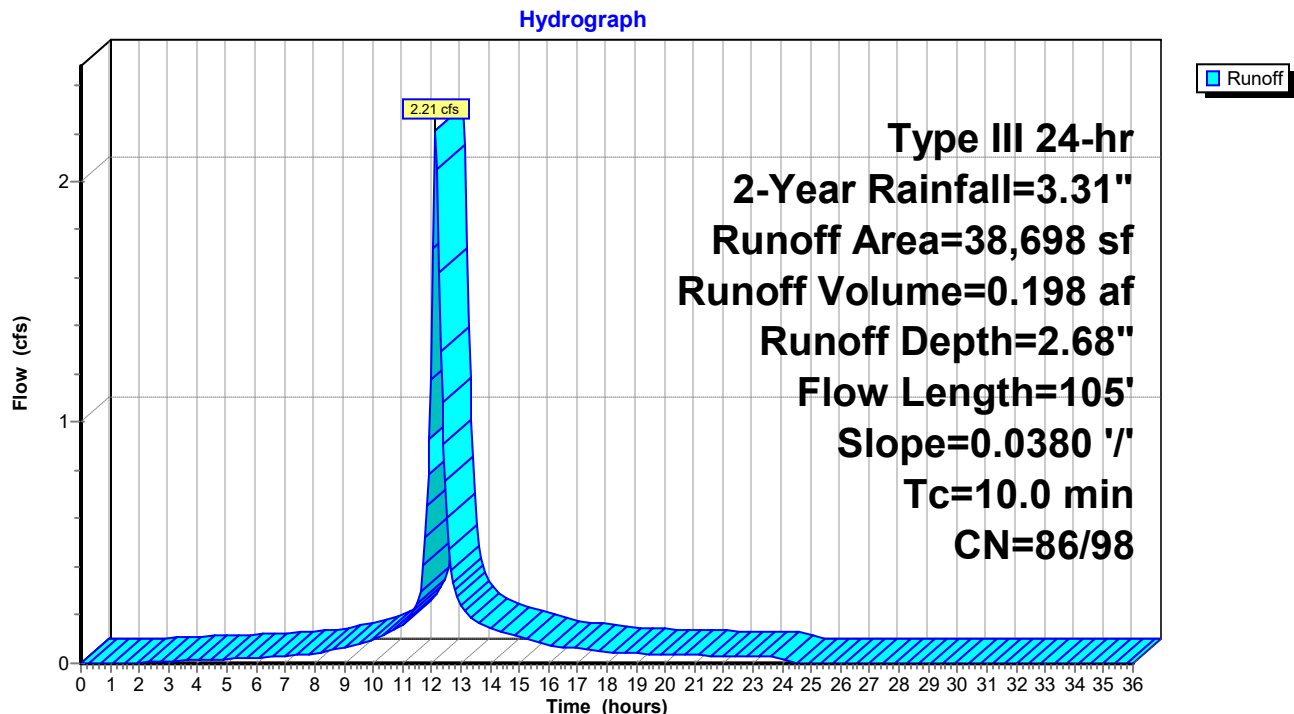
Runoff = 2.21 cfs @ 12.14 hrs, Volume= 0.198 af, Depth= 2.68"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.06 hrs
Type III 24-hr 2-Year Rainfall=3.31"

Area (sf)	CN	Description
25,154	98	Paved parking, HSG C
13,544	86	<50% Grass cover, Poor, HSG C
38,698	94	Weighted Average
13,544	86	35.00% Pervious Area
25,154	98	65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	105	0.0380	0.21		Sheet Flow, grass
					Grass: Short n= 0.150 P2= 2.80"
8.4	105	Total, Increased to minimum Tc = 10.0 min			

Subcatchment 1S: existing conditions



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Hydrograph for Subcatchment 1S: existing conditions

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	0.00
1.20	0.04	0.00	0.00	0.00
2.40	0.08	0.00	0.01	0.01
3.60	0.13	0.00	0.02	0.01
4.80	0.18	0.00	0.06	0.02
6.00	0.24	0.00	0.10	0.02
7.20	0.31	0.00	0.16	0.03
8.40	0.41	0.00	0.24	0.05
9.60	0.56	0.03	0.38	0.09
10.80	0.78	0.10	0.58	0.14
12.00	1.65	0.60	1.43	1.18
13.20	2.53	1.27	2.30	0.20
14.40	2.75	1.45	2.52	0.13
15.60	2.90	1.57	2.66	0.09
16.80	3.00	1.66	2.76	0.06
18.00	3.07	1.72	2.84	0.05
19.20	3.13	1.78	2.90	0.04
20.40	3.18	1.82	2.95	0.04
21.60	3.23	1.86	3.00	0.03
22.80	3.27	1.90	3.04	0.03
24.00	3.31	1.93	3.08	0.02
25.20	3.31	1.93	3.08	0.00
26.40	3.31	1.93	3.08	0.00
27.60	3.31	1.93	3.08	0.00
28.80	3.31	1.93	3.08	0.00
30.00	3.31	1.93	3.08	0.00
31.20	3.31	1.93	3.08	0.00
32.40	3.31	1.93	3.08	0.00
33.60	3.31	1.93	3.08	0.00
34.80	3.31	1.93	3.08	0.00
36.00	3.31	1.93	3.08	0.00

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Summary for Subcatchment 3S: proposed overland

Runoff = 0.03 cfs @ 12.15 hrs, Volume= 0.003 af, Depth= 1.11"

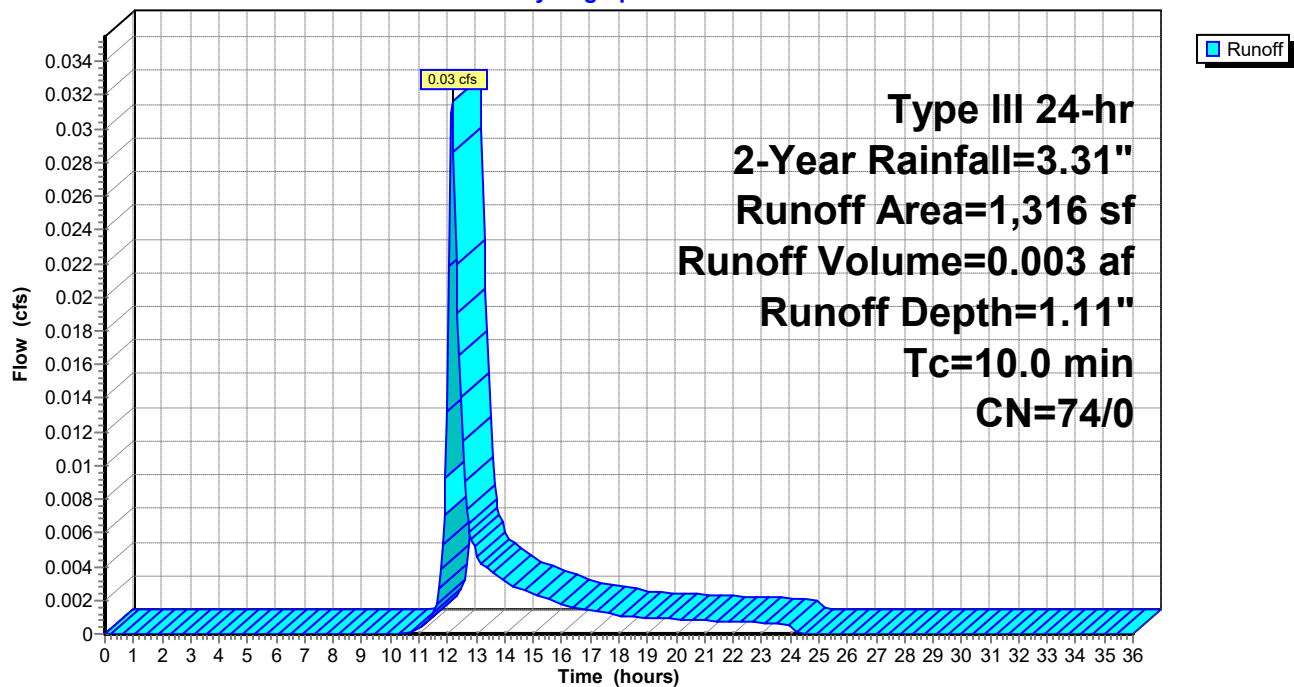
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.06 hrs
Type III 24-hr 2-Year Rainfall=3.31"

Area (sf)	CN	Description
1,316	74	>75% Grass cover, Good, HSG C
1,316	74	100.00% Pervious Area

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

Subcatchment 3S: proposed overland

Hydrograph



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Hydrograph for Subcatchment 3S: proposed overland

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	0.00
1.20	0.04	0.00	0.00	0.00
2.40	0.08	0.00	0.00	0.00
3.60	0.13	0.00	0.00	0.00
4.80	0.18	0.00	0.00	0.00
6.00	0.24	0.00	0.00	0.00
7.20	0.31	0.00	0.00	0.00
8.40	0.41	0.00	0.00	0.00
9.60	0.56	0.00	0.00	0.00
10.80	0.78	0.00	0.00	0.00
12.00	1.65	0.20	0.00	0.01
13.20	2.53	0.62	0.00	0.00
14.40	2.75	0.75	0.00	0.00
15.60	2.90	0.84	0.00	0.00
16.80	3.00	0.91	0.00	0.00
18.00	3.07	0.95	0.00	0.00
19.20	3.13	0.99	0.00	0.00
20.40	3.18	1.03	0.00	0.00
21.60	3.23	1.06	0.00	0.00
22.80	3.27	1.09	0.00	0.00
24.00	3.31	1.11	0.00	0.00
25.20	3.31	1.11	0.00	0.00
26.40	3.31	1.11	0.00	0.00
27.60	3.31	1.11	0.00	0.00
28.80	3.31	1.11	0.00	0.00
30.00	3.31	1.11	0.00	0.00
31.20	3.31	1.11	0.00	0.00
32.40	3.31	1.11	0.00	0.00
33.60	3.31	1.11	0.00	0.00
34.80	3.31	1.11	0.00	0.00
36.00	3.31	1.11	0.00	0.00

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Summary for Subcatchment 8S: roof & parking

Runoff = 2.39 cfs @ 12.13 hrs, Volume= 0.220 af, Depth= 3.08"

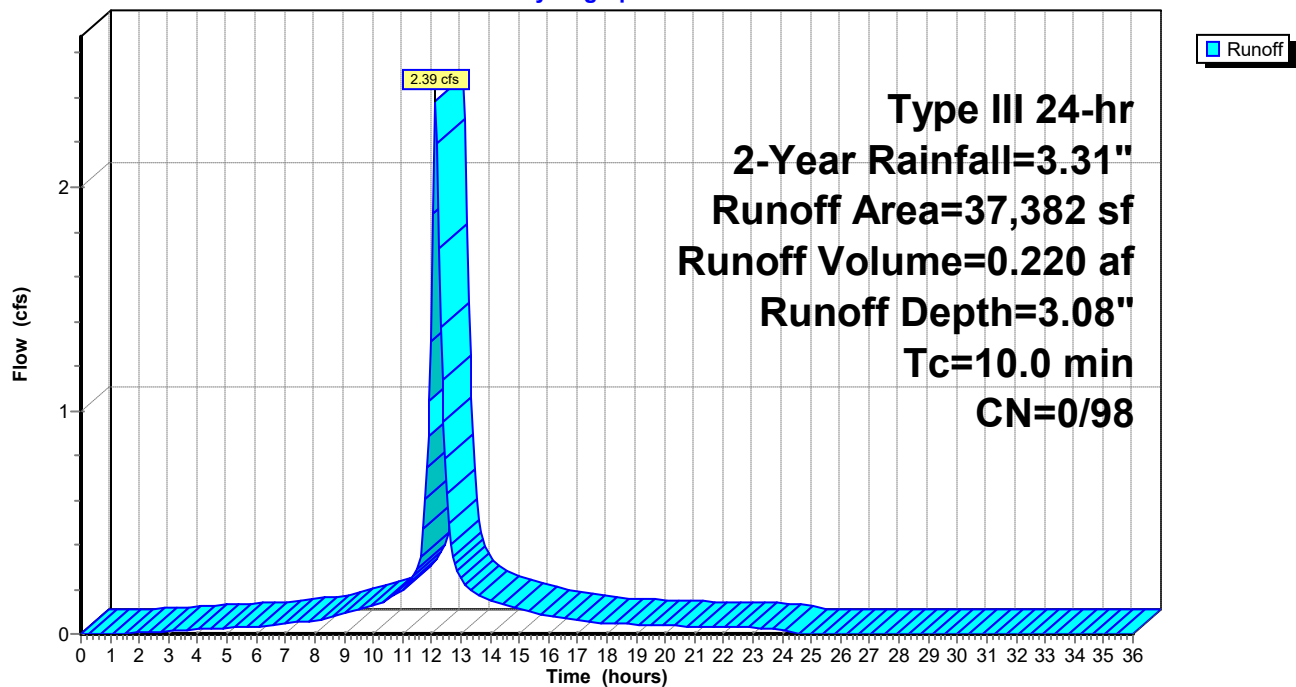
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.06 hrs
Type III 24-hr 2-Year Rainfall=3.31"

Area (sf)	CN	Description
37,382	98	Roofs, HSG C
37,382	98	100.00% Impervious Area

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

Subcatchment 8S: roof & parking

Hydrograph



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Hydrograph for Subcatchment 8S: roof & parking

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	0.00
1.20	0.04	0.00	0.00	0.00
2.40	0.08	0.00	0.01	0.01
3.60	0.13	0.00	0.02	0.02
4.80	0.18	0.00	0.06	0.03
6.00	0.24	0.00	0.10	0.03
7.20	0.31	0.00	0.16	0.05
8.40	0.41	0.00	0.24	0.07
9.60	0.56	0.00	0.38	0.11
10.80	0.78	0.00	0.58	0.18
12.00	1.65	0.00	1.43	1.31
13.20	2.53	0.00	2.30	0.21
14.40	2.75	0.00	2.52	0.13
15.60	2.90	0.00	2.66	0.09
16.80	3.00	0.00	2.76	0.06
18.00	3.07	0.00	2.84	0.05
19.20	3.13	0.00	2.90	0.04
20.40	3.18	0.00	2.95	0.04
21.60	3.23	0.00	3.00	0.03
22.80	3.27	0.00	3.04	0.03
24.00	3.31	0.00	3.08	0.02
25.20	3.31	0.00	3.08	0.00
26.40	3.31	0.00	3.08	0.00
27.60	3.31	0.00	3.08	0.00
28.80	3.31	0.00	3.08	0.00
30.00	3.31	0.00	3.08	0.00
31.20	3.31	0.00	3.08	0.00
32.40	3.31	0.00	3.08	0.00
33.60	3.31	0.00	3.08	0.00
34.80	3.31	0.00	3.08	0.00
36.00	3.31	0.00	3.08	0.00

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Summary for Pond 9P: recharge basin

Inflow Area = 0.858 ac, 100.00% Impervious, Inflow Depth = 3.08" for 2-Year event
Inflow = 2.39 cfs @ 12.13 hrs, Volume= 0.220 af
Outflow = 1.02 cfs @ 12.40 hrs, Volume= 0.220 af, Atten= 57%, Lag= 15.8 min
Discarded = 0.16 cfs @ 12.40 hrs, Volume= 0.111 af
Primary = 0.87 cfs @ 12.40 hrs, Volume= 0.109 af

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.06 hrs
Peak Elev= 119.96' @ 12.40 hrs Surf.Area= 1,700 sf Storage= 2,524 cf

Plug-Flow detention time= 61.1 min calculated for 0.220 af (100% of inflow)
Center-of-Mass det. time= 61.1 min (820.5 - 759.4)

Volume	Invert	Avail.Storage	Storage Description
#1	117.00'	2,659 cf	Custom Stage Data (Prismatic) Listed below (Recalc) 9,350 cf Overall - 2,704 cf Embedded = 6,646 cf x 40.0% Voids
#2	118.00'	2,136 cf	48.0" Round Pipe Storage Inside #1 L= 170.0' 2,704 cf Overall - 3.0" Wall Thickness = 2,136 cf
		4,795 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
117.00	1,700	0	0
122.50	1,700	9,350	9,350

Device	Routing	Invert	Outlet Devices
#1	Discarded	117.00'	1.000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 116.00'
#2	Primary	118.00'	5.0" Vert. Orifice/Grate C= 0.600
#3	Primary	120.00'	10.0" Vert. Orifice/Grate C= 0.600

Discarded OutFlow Max=0.16 cfs @ 12.40 hrs HW=119.95' (Free Discharge)
↑ **1=Exfiltration** (Controls 0.16 cfs)

Primary OutFlow Max=0.87 cfs @ 12.40 hrs HW=119.95' (Free Discharge)
↑ **2=Orifice/Grate** (Orifice Controls 0.87 cfs @ 6.36 fps)
↑ **3=Orifice/Grate** (Controls 0.00 cfs)

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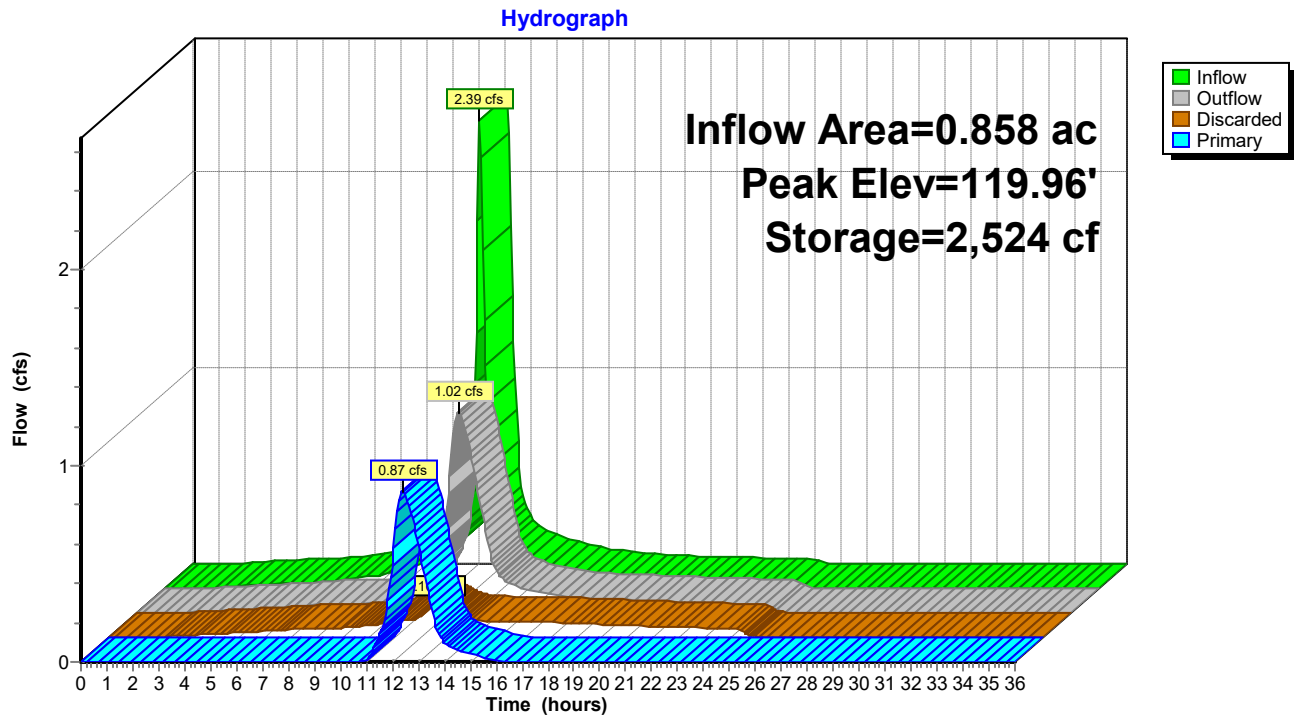
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Pond 9P: recharge basin



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Hydrograph for Pond 9P: recharge basin

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
0.00	0.00	0	117.00	0.00	0.00	0.00
1.20	0.00	0	117.00	0.00	0.00	0.00
2.40	0.01	5	117.01	0.01	0.01	0.00
3.60	0.02	13	117.02	0.01	0.01	0.00
4.80	0.03	21	117.03	0.02	0.02	0.00
6.00	0.03	28	117.04	0.03	0.03	0.00
7.20	0.05	43	117.06	0.04	0.04	0.00
8.40	0.07	109	117.16	0.05	0.05	0.00
9.60	0.11	288	117.42	0.06	0.06	0.00
10.80	0.18	608	117.91	0.08	0.08	0.00
12.00	1.31	1,315	118.78	0.60	0.11	0.50
13.20	0.21	1,270	118.73	0.58	0.11	0.47
14.40	0.13	765	118.16	0.15	0.08	0.06
15.60	0.09	715	118.09	0.10	0.08	0.02
16.80	0.06	657	118.00	0.08	0.08	0.00
18.00	0.05	572	117.85	0.07	0.07	0.00
19.20	0.04	462	117.68	0.07	0.07	0.00
20.40	0.04	357	117.52	0.06	0.06	0.00
21.60	0.03	259	117.38	0.05	0.05	0.00
22.80	0.03	167	117.25	0.05	0.05	0.00
24.00	0.02	82	117.12	0.04	0.04	0.00
25.20	0.00	1	117.00	0.00	0.00	0.00
26.40	0.00	0	117.00	0.00	0.00	0.00
27.60	0.00	0	117.00	0.00	0.00	0.00
28.80	0.00	0	117.00	0.00	0.00	0.00
30.00	0.00	0	117.00	0.00	0.00	0.00
31.20	0.00	0	117.00	0.00	0.00	0.00
32.40	0.00	0	117.00	0.00	0.00	0.00
33.60	0.00	0	117.00	0.00	0.00	0.00
34.80	0.00	0	117.00	0.00	0.00	0.00
36.00	0.00	0	117.00	0.00	0.00	0.00

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Stage-Discharge for Pond 9P: recharge basin

Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)	Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)
117.00	0.00	0.00	0.00	122.10	4.94	0.24	4.70
117.10	0.04	0.04	0.00	122.20	5.06	0.24	4.82
117.20	0.05	0.05	0.00	122.30	5.18	0.25	4.93
117.30	0.05	0.05	0.00	122.40	5.29	0.25	5.04
117.40	0.06	0.06	0.00	122.50	5.41	0.26	5.15
117.50	0.06	0.06	0.00				
117.60	0.06	0.06	0.00				
117.70	0.07	0.07	0.00				
117.80	0.07	0.07	0.00				
117.90	0.07	0.07	0.00				
118.00	0.08	0.08	0.00				
118.10	0.11	0.08	0.03				
118.20	0.19	0.09	0.10				
118.30	0.29	0.09	0.20				
118.40	0.38	0.09	0.29				
118.50	0.45	0.10	0.35				
118.60	0.51	0.10	0.41				
118.70	0.57	0.11	0.46				
118.80	0.62	0.11	0.51				
118.90	0.66	0.11	0.55				
119.00	0.70	0.12	0.58				
119.10	0.74	0.12	0.62				
119.20	0.78	0.13	0.65				
119.30	0.82	0.13	0.69				
119.40	0.85	0.13	0.72				
119.50	0.88	0.14	0.75				
119.60	0.92	0.14	0.77				
119.70	0.95	0.15	0.80				
119.80	0.98	0.15	0.83				
119.90	1.01	0.15	0.85				
120.00	1.04	0.16	0.88				
120.10	1.10	0.16	0.94				
120.20	1.25	0.17	1.08				
120.30	1.45	0.17	1.28				
120.40	1.70	0.17	1.53				
120.50	1.99	0.18	1.82				
120.60	2.31	0.18	2.12				
120.70	2.61	0.18	2.43				
120.80	2.88	0.19	2.70				
120.90	3.10	0.19	2.90				
121.00	3.30	0.20	3.10				
121.10	3.49	0.20	3.29				
121.20	3.66	0.20	3.46				
121.30	3.83	0.21	3.62				
121.40	3.99	0.21	3.78				
121.50	4.14	0.22	3.92				
121.60	4.29	0.22	4.07				
121.70	4.43	0.22	4.20				
121.80	4.56	0.23	4.33				
121.90	4.69	0.23	4.46				
122.00	4.82	0.24	4.58				

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Type III 24-hr 10-Year Rainfall=5.02", AMC=3

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Time span=0.00-36.00 hrs, dt=0.06 hrs, 601 points

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv.

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: existing conditions Runoff Area=38,698 sf 65.00% Impervious Runoff Depth=4.70"
Flow Length=105' Slope=0.0380 '/' Tc=10.0 min AMC Adjusted CN=94/99 Runoff=3.73 cfs 0.348 af

Subcatchment 3S: proposed overland Runoff Area=1,316 sf 0.00% Impervious Runoff Depth=3.69"
Tc=10.0 min AMC Adjusted CN=88/0 Runoff=0.11 cfs 0.009 af

Subcatchment 8S: roof & parking Runoff Area=37,382 sf 100.00% Impervious Runoff Depth=4.90"
Tc=10.0 min AMC Adjusted CN=0/99 Runoff=3.67 cfs 0.350 af

Pond 9P: recharge basin Peak Elev=120.66' Storage=3,261 cf Inflow=3.67 cfs 0.350 af
Discarded=0.18 cfs 0.144 af Primary=2.32 cfs 0.207 af Outflow=2.50 cfs 0.350 af

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Type III 24-hr 10-Year Rainfall=5.02", AMC=3

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Summary for Subcatchment 1S: existing conditions

Runoff = 3.73 cfs @ 12.13 hrs, Volume= 0.348 af, Depth= 4.70"

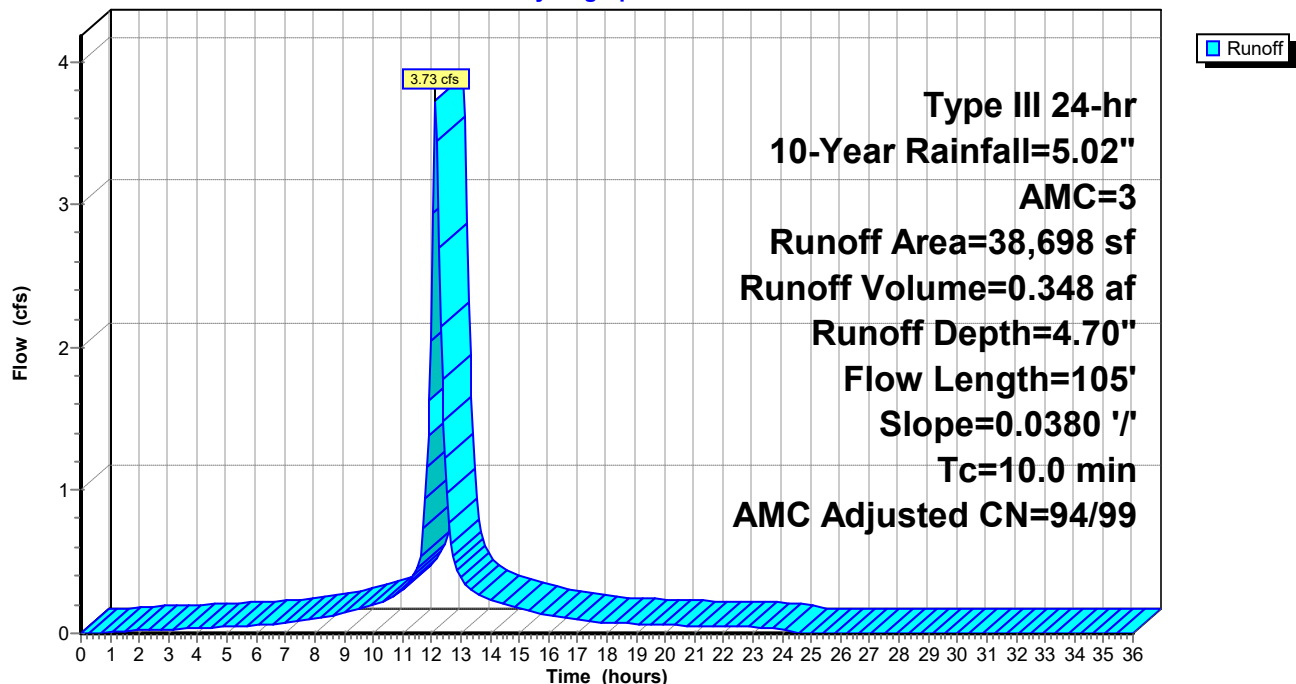
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.06 hrs
Type III 24-hr 10-Year Rainfall=5.02", AMC=3

Area (sf)	CN	Adj	Description
25,154	98		Paved parking, HSG C
13,544	86		<50% Grass cover, Poor, HSG C
38,698	94	98	Weighted Average, AMC Adjusted
13,544	86	94	35.00% Pervious Area, AMC Adjusted
25,154	98	99	65.00% Impervious Area, AMC Adjusted

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	105	0.0380	0.21		Sheet Flow, grass
					Grass: Short n= 0.150 P2= 2.80"
8.4	105	Total, Increased to minimum Tc = 10.0 min			

Subcatchment 1S: existing conditions

Hydrograph



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Hydrograph for Subcatchment 1S: existing conditions

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	0.00
1.20	0.06	0.00	0.01	0.01
2.40	0.12	0.00	0.05	0.02
3.60	0.19	0.01	0.11	0.03
4.80	0.27	0.03	0.18	0.04
6.00	0.36	0.06	0.26	0.05
7.20	0.48	0.12	0.37	0.08
8.40	0.63	0.22	0.52	0.11
9.60	0.86	0.39	0.74	0.17
10.80	1.18	0.66	1.07	0.27
12.00	2.51	1.88	2.39	2.05
13.20	3.84	3.16	3.72	0.33
14.40	4.16	3.49	4.05	0.21
15.60	4.39	3.71	4.27	0.14
16.80	4.54	3.86	4.43	0.10
18.00	4.66	3.97	4.54	0.07
19.20	4.75	4.06	4.63	0.06
20.40	4.83	4.14	4.71	0.06
21.60	4.90	4.21	4.78	0.05
22.80	4.96	4.27	4.85	0.04
24.00	5.02	4.33	4.90	0.04
25.20	5.02	4.33	4.90	0.00
26.40	5.02	4.33	4.90	0.00
27.60	5.02	4.33	4.90	0.00
28.80	5.02	4.33	4.90	0.00
30.00	5.02	4.33	4.90	0.00
31.20	5.02	4.33	4.90	0.00
32.40	5.02	4.33	4.90	0.00
33.60	5.02	4.33	4.90	0.00
34.80	5.02	4.33	4.90	0.00
36.00	5.02	4.33	4.90	0.00

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Type III 24-hr 10-Year Rainfall=5.02", AMC=3

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Summary for Subcatchment 3S: proposed overland

Runoff = 0.11 cfs @ 12.14 hrs, Volume= 0.009 af, Depth= 3.69"

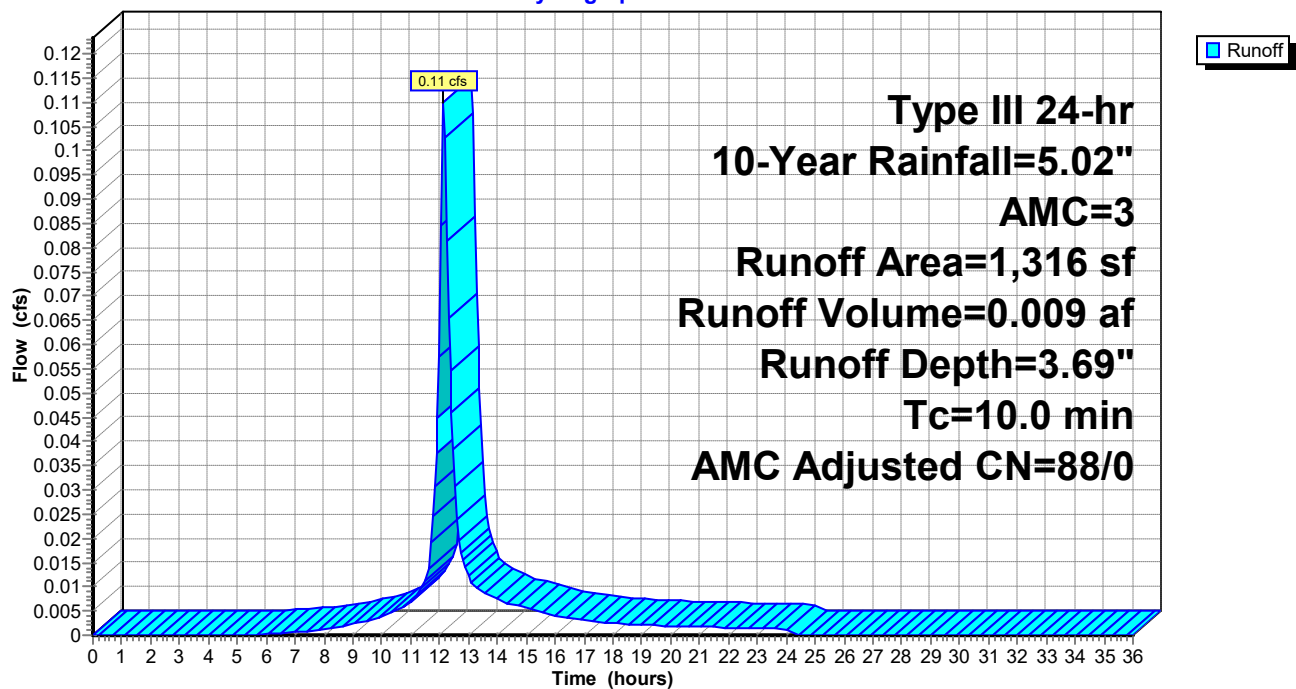
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.06 hrs
Type III 24-hr 10-Year Rainfall=5.02", AMC=3

Area (sf)	CN	Adj	Description
1,316	74		>75% Grass cover, Good, HSG C
1,316	74	88	Weighted Average, AMC Adjusted
1,316	74	88	100.00% Pervious Area, AMC Adjusted

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

Subcatchment 3S: proposed overland

Hydrograph



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Hydrograph for Subcatchment 3S: proposed overland

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	0.00
1.20	0.06	0.00	0.00	0.00
2.40	0.12	0.00	0.00	0.00
3.60	0.19	0.00	0.00	0.00
4.80	0.27	0.00	0.00	0.00
6.00	0.36	0.01	0.00	0.00
7.20	0.48	0.03	0.00	0.00
8.40	0.63	0.07	0.00	0.00
9.60	0.86	0.17	0.00	0.00
10.80	1.18	0.37	0.00	0.01
12.00	2.51	1.39	0.00	0.06
13.20	3.84	2.58	0.00	0.01
14.40	4.16	2.88	0.00	0.01
15.60	4.39	3.09	0.00	0.00
16.80	4.54	3.24	0.00	0.00
18.00	4.66	3.35	0.00	0.00
19.20	4.75	3.43	0.00	0.00
20.40	4.83	3.51	0.00	0.00
21.60	4.90	3.58	0.00	0.00
22.80	4.96	3.64	0.00	0.00
24.00	5.02	3.69	0.00	0.00
25.20	5.02	3.69	0.00	0.00
26.40	5.02	3.69	0.00	0.00
27.60	5.02	3.69	0.00	0.00
28.80	5.02	3.69	0.00	0.00
30.00	5.02	3.69	0.00	0.00
31.20	5.02	3.69	0.00	0.00
32.40	5.02	3.69	0.00	0.00
33.60	5.02	3.69	0.00	0.00
34.80	5.02	3.69	0.00	0.00
36.00	5.02	3.69	0.00	0.00

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Type III 24-hr 10-Year Rainfall=5.02", AMC=3

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Summary for Subcatchment 8S: roof & parking

Runoff = 3.67 cfs @ 12.13 hrs, Volume= 0.350 af, Depth= 4.90"

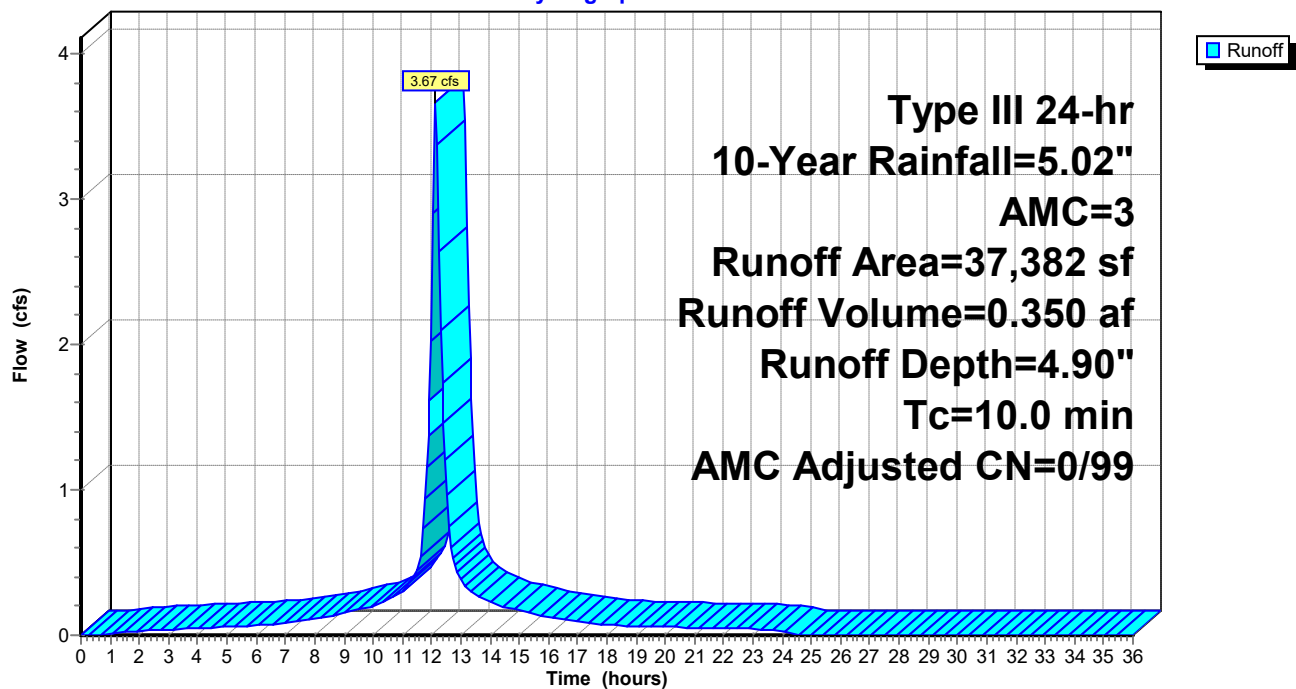
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.06 hrs
Type III 24-hr 10-Year Rainfall=5.02", AMC=3

Area (sf)	CN	Adj	Description
37,382	98		Roofs, HSG C
37,382	98	99	Weighted Average, AMC Adjusted
37,382	98	99	100.00% Impervious Area, AMC Adjusted

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

Subcatchment 8S: roof & parking

Hydrograph



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Hydrograph for Subcatchment 8S: roof & parking

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	0.00
1.20	0.06	0.00	0.01	0.02
2.40	0.12	0.00	0.05	0.03
3.60	0.19	0.00	0.11	0.04
4.80	0.27	0.00	0.18	0.06
6.00	0.36	0.00	0.26	0.06
7.20	0.48	0.00	0.37	0.09
8.40	0.63	0.00	0.52	0.12
9.60	0.86	0.00	0.74	0.18
10.80	1.18	0.00	1.07	0.28
12.00	2.51	0.00	2.39	2.02
13.20	3.84	0.00	3.72	0.32
14.40	4.16	0.00	4.05	0.20
15.60	4.39	0.00	4.27	0.14
16.80	4.54	0.00	4.43	0.10
18.00	4.66	0.00	4.54	0.07
19.20	4.75	0.00	4.63	0.06
20.40	4.83	0.00	4.71	0.06
21.60	4.90	0.00	4.78	0.05
22.80	4.96	0.00	4.85	0.04
24.00	5.02	0.00	4.90	0.04
25.20	5.02	0.00	4.90	0.00
26.40	5.02	0.00	4.90	0.00
27.60	5.02	0.00	4.90	0.00
28.80	5.02	0.00	4.90	0.00
30.00	5.02	0.00	4.90	0.00
31.20	5.02	0.00	4.90	0.00
32.40	5.02	0.00	4.90	0.00
33.60	5.02	0.00	4.90	0.00
34.80	5.02	0.00	4.90	0.00
36.00	5.02	0.00	4.90	0.00

1110 South Ave DrainageSouth Ave Redevelopment
Type III 24-hr 10-Year Rainfall=5.02", AMC=3

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Summary for Pond 9P: recharge basin

Inflow Area = 0.858 ac, 100.00% Impervious, Inflow Depth = 4.90" for 10-Year event
 Inflow = 3.67 cfs @ 12.13 hrs, Volume= 0.350 af
 Outflow = 2.50 cfs @ 12.27 hrs, Volume= 0.350 af, Atten= 32%, Lag= 7.9 min
 Discarded = 0.18 cfs @ 12.27 hrs, Volume= 0.144 af
 Primary = 2.32 cfs @ 12.27 hrs, Volume= 0.207 af

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.06 hrs
 Peak Elev= 120.66' @ 12.27 hrs Surf.Area= 1,700 sf Storage= 3,261 cf

Plug-Flow detention time= 55.9 min calculated for 0.350 af (100% of inflow)
 Center-of-Mass det. time= 56.0 min (798.2 - 742.2)

Volume	Invert	Avail.Storage	Storage Description
#1	117.00'	2,659 cf	Custom Stage Data (Prismatic) Listed below (Recalc) 9,350 cf Overall - 2,704 cf Embedded = 6,646 cf x 40.0% Voids
#2	118.00'	2,136 cf	48.0" Round Pipe Storage Inside #1 L= 170.0' 2,704 cf Overall - 3.0" Wall Thickness = 2,136 cf
		4,795 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
117.00	1,700	0	0
122.50	1,700	9,350	9,350

Device	Routing	Invert	Outlet Devices
#1	Discarded	117.00'	1.000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 116.00'
#2	Primary	118.00'	5.0" Vert. Orifice/Grate C= 0.600
#3	Primary	120.00'	10.0" Vert. Orifice/Grate C= 0.600

Discarded OutFlow Max=0.18 cfs @ 12.27 hrs HW=120.64' (Free Discharge)
 ↑ **1=Exfiltration** (Controls 0.18 cfs)

Primary OutFlow Max=2.25 cfs @ 12.27 hrs HW=120.64' (Free Discharge)
 ↑ **2=Orifice/Grate** (Orifice Controls 1.02 cfs @ 7.51 fps)
 ↑ **3=Orifice/Grate** (Orifice Controls 1.23 cfs @ 2.72 fps)

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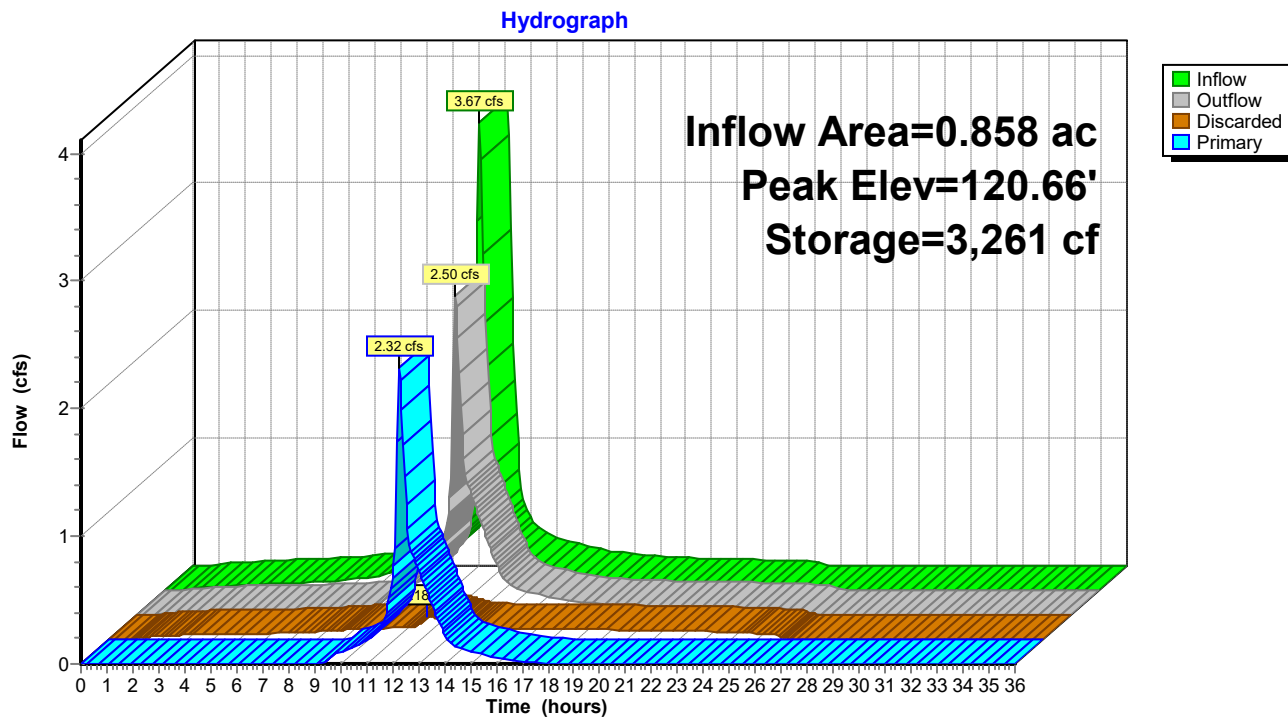
South Ave Redevelopment

Type III 24-hr 10-Year Rainfall=5.02", AMC=3

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Pond 9P: recharge basin



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Hydrograph for Pond 9P: recharge basin

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
0.00	0.00	0	117.00	0.00	0.00	0.00
1.20	0.02	12	117.02	0.01	0.01	0.00
2.40	0.03	27	117.04	0.03	0.03	0.00
3.60	0.04	39	117.06	0.04	0.04	0.00
4.80	0.06	73	117.11	0.04	0.04	0.00
6.00	0.06	136	117.20	0.05	0.05	0.00
7.20	0.09	248	117.36	0.05	0.05	0.00
8.40	0.12	439	117.65	0.06	0.06	0.00
9.60	0.18	750	118.14	0.13	0.08	0.05
10.80	0.28	857	118.27	0.26	0.09	0.17
12.00	2.02	1,793	119.26	0.80	0.13	0.67
13.20	0.32	1,689	119.16	0.76	0.12	0.64
14.40	0.20	836	118.24	0.23	0.09	0.14
15.60	0.14	770	118.16	0.15	0.09	0.07
16.80	0.10	720	118.09	0.11	0.08	0.03
18.00	0.07	678	118.03	0.08	0.08	0.00
19.20	0.06	624	117.94	0.08	0.08	0.00
20.40	0.06	558	117.83	0.07	0.07	0.00
21.60	0.05	483	117.71	0.07	0.07	0.00
22.80	0.04	403	117.59	0.06	0.06	0.00
24.00	0.04	318	117.47	0.06	0.06	0.00
25.20	0.00	114	117.17	0.05	0.05	0.00
26.40	0.00	2	117.00	0.00	0.00	0.00
27.60	0.00	0	117.00	0.00	0.00	0.00
28.80	0.00	0	117.00	0.00	0.00	0.00
30.00	0.00	0	117.00	0.00	0.00	0.00
31.20	0.00	0	117.00	0.00	0.00	0.00
32.40	0.00	0	117.00	0.00	0.00	0.00
33.60	0.00	0	117.00	0.00	0.00	0.00
34.80	0.00	0	117.00	0.00	0.00	0.00
36.00	0.00	0	117.00	0.00	0.00	0.00

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Stage-Discharge for Pond 9P: recharge basin

Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)	Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)
117.00	0.00	0.00	0.00	122.10	4.94	0.24	4.70
117.10	0.04	0.04	0.00	122.20	5.06	0.24	4.82
117.20	0.05	0.05	0.00	122.30	5.18	0.25	4.93
117.30	0.05	0.05	0.00	122.40	5.29	0.25	5.04
117.40	0.06	0.06	0.00	122.50	5.41	0.26	5.15
117.50	0.06	0.06	0.00				
117.60	0.06	0.06	0.00				
117.70	0.07	0.07	0.00				
117.80	0.07	0.07	0.00				
117.90	0.07	0.07	0.00				
118.00	0.08	0.08	0.00				
118.10	0.11	0.08	0.03				
118.20	0.19	0.09	0.10				
118.30	0.29	0.09	0.20				
118.40	0.38	0.09	0.29				
118.50	0.45	0.10	0.35				
118.60	0.51	0.10	0.41				
118.70	0.57	0.11	0.46				
118.80	0.62	0.11	0.51				
118.90	0.66	0.11	0.55				
119.00	0.70	0.12	0.58				
119.10	0.74	0.12	0.62				
119.20	0.78	0.13	0.65				
119.30	0.82	0.13	0.69				
119.40	0.85	0.13	0.72				
119.50	0.88	0.14	0.75				
119.60	0.92	0.14	0.77				
119.70	0.95	0.15	0.80				
119.80	0.98	0.15	0.83				
119.90	1.01	0.15	0.85				
120.00	1.04	0.16	0.88				
120.10	1.10	0.16	0.94				
120.20	1.25	0.17	1.08				
120.30	1.45	0.17	1.28				
120.40	1.70	0.17	1.53				
120.50	1.99	0.18	1.82				
120.60	2.31	0.18	2.12				
120.70	2.61	0.18	2.43				
120.80	2.88	0.19	2.70				
120.90	3.10	0.19	2.90				
121.00	3.30	0.20	3.10				
121.10	3.49	0.20	3.29				
121.20	3.66	0.20	3.46				
121.30	3.83	0.21	3.62				
121.40	3.99	0.21	3.78				
121.50	4.14	0.22	3.92				
121.60	4.29	0.22	4.07				
121.70	4.43	0.22	4.20				
121.80	4.56	0.23	4.33				
121.90	4.69	0.23	4.46				
122.00	4.82	0.24	4.58				

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Type III 24-hr 100-Year Rainfall=8.31", AMC=3

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Time span=0.00-36.00 hrs, dt=0.06 hrs, 601 points

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv.

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: existing conditions Runoff Area=38,698 sf 65.00% Impervious Runoff Depth=7.98"
Flow Length=105' Slope=0.0380 '/' Tc=10.0 min AMC Adjusted CN=94/99 Runoff=6.24 cfs 0.591 af

Subcatchment 3S: proposed overland Runoff Area=1,316 sf 0.00% Impervious Runoff Depth=6.87"
Tc=10.0 min AMC Adjusted CN=88/0 Runoff=0.20 cfs 0.017 af

Subcatchment 8S: roof & parking Runoff Area=37,382 sf 100.00% Impervious Runoff Depth=8.19"
Tc=10.0 min AMC Adjusted CN=0/99 Runoff=6.07 cfs 0.586 af

Pond 9P: recharge basin Peak Elev=121.76' Storage=4,302 cf Inflow=6.07 cfs 0.586 af
Discarded=0.23 cfs 0.177 af Primary=4.28 cfs 0.408 af Outflow=4.51 cfs 0.586 af

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Type III 24-hr 100-Year Rainfall=8.31", AMC=3

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Summary for Subcatchment 1S: existing conditions

Runoff = 6.24 cfs @ 12.13 hrs, Volume= 0.591 af, Depth= 7.98"

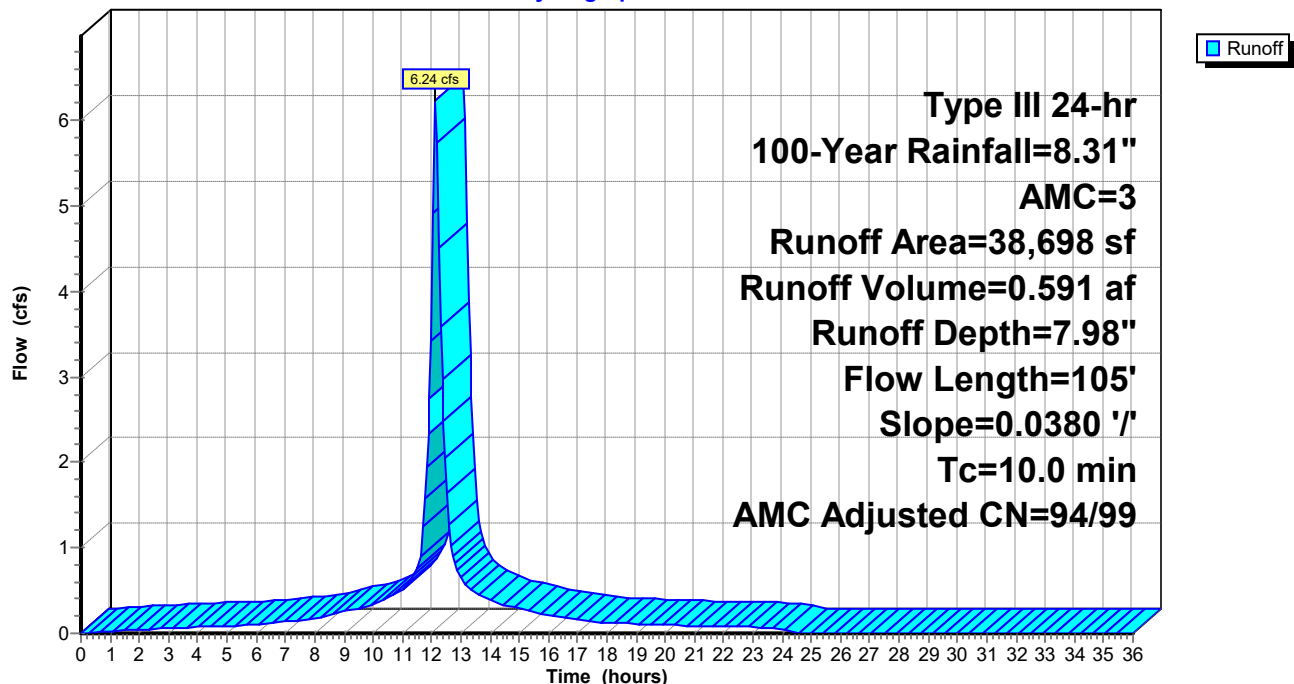
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.06 hrs
Type III 24-hr 100-Year Rainfall=8.31", AMC=3

Area (sf)	CN	Adj	Description
25,154	98		Paved parking, HSG C
13,544	86		<50% Grass cover, Poor, HSG C
38,698	94	98	Weighted Average, AMC Adjusted
13,544	86	94	35.00% Pervious Area, AMC Adjusted
25,154	98	99	65.00% Impervious Area, AMC Adjusted

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	105	0.0380	0.21		Sheet Flow, grass
					Grass: Short n= 0.150 P2= 2.80"
8.4	105	Total, Increased to minimum Tc = 10.0 min			

Subcatchment 1S: existing conditions

Hydrograph



1110 South Ave Drainage

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Type III 24-hr 100-Year Rainfall=8.31", AMC=3

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Hydrograph for Subcatchment 1S: existing conditions

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	0.00
1.20	0.10	0.00	0.04	0.03
2.40	0.20	0.01	0.12	0.05
3.60	0.32	0.04	0.22	0.07
4.80	0.45	0.11	0.35	0.08
6.00	0.60	0.20	0.49	0.10
7.20	0.79	0.34	0.68	0.14
8.40	1.04	0.54	0.93	0.20
9.60	1.42	0.86	1.30	0.30
10.80	1.96	1.36	1.84	0.47
12.00	4.15	3.48	4.04	3.43
13.20	6.35	5.64	6.23	0.54
14.40	6.89	6.18	6.77	0.34
15.60	7.27	6.56	7.15	0.24
16.80	7.52	6.81	7.40	0.17
18.00	7.71	7.00	7.59	0.12
19.20	7.86	7.14	7.74	0.11
20.40	8.00	7.28	7.88	0.09
21.60	8.11	7.39	7.99	0.08
22.80	8.22	7.50	8.10	0.07
24.00	8.31	7.59	8.19	0.06
25.20	8.31	7.59	8.19	0.00
26.40	8.31	7.59	8.19	0.00
27.60	8.31	7.59	8.19	0.00
28.80	8.31	7.59	8.19	0.00
30.00	8.31	7.59	8.19	0.00
31.20	8.31	7.59	8.19	0.00
32.40	8.31	7.59	8.19	0.00
33.60	8.31	7.59	8.19	0.00
34.80	8.31	7.59	8.19	0.00
36.00	8.31	7.59	8.19	0.00

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Summary for Subcatchment 3S: proposed overland

Runoff = 0.20 cfs @ 12.14 hrs, Volume= 0.017 af, Depth= 6.87"

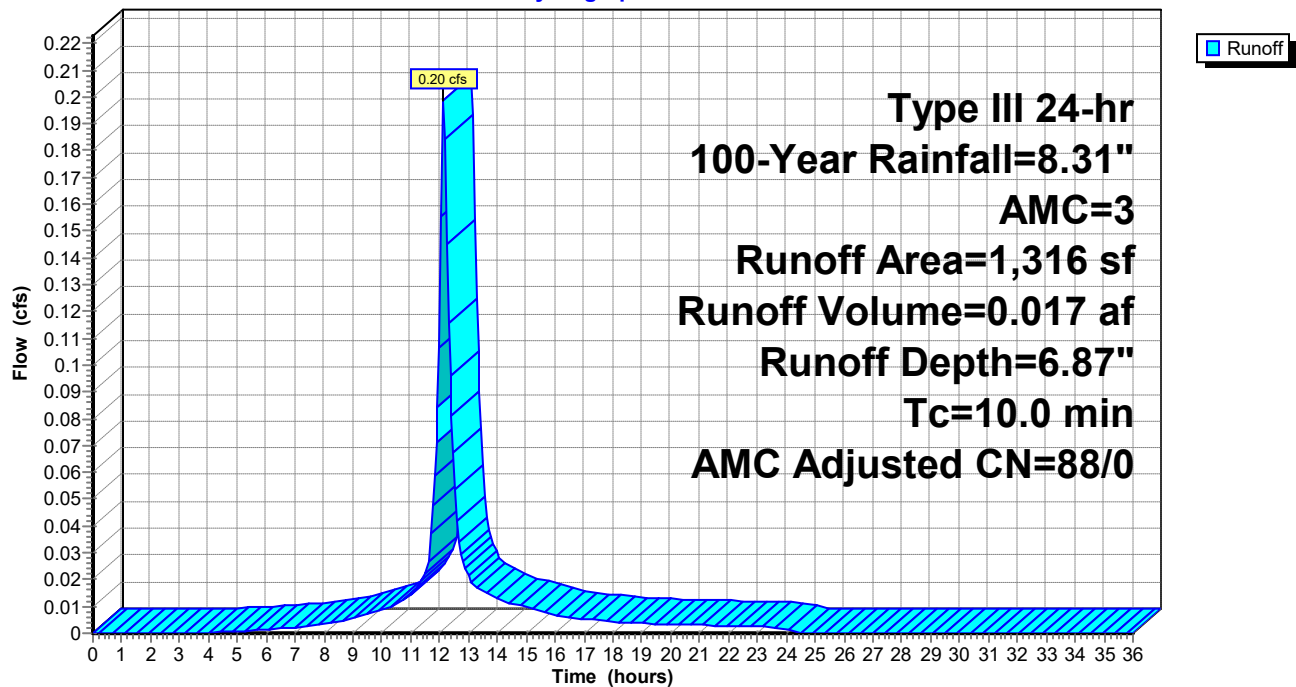
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.06 hrs
Type III 24-hr 100-Year Rainfall=8.31", AMC=3

Area (sf)	CN	Adj	Description
1,316	74		>75% Grass cover, Good, HSG C
1,316	74	88	Weighted Average, AMC Adjusted
1,316	74	88	100.00% Pervious Area, AMC Adjusted

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

Subcatchment 3S: proposed overland

Hydrograph



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Hydrograph for Subcatchment 3S: proposed overland

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	0.00
1.20	0.10	0.00	0.00	0.00
2.40	0.20	0.00	0.00	0.00
3.60	0.32	0.00	0.00	0.00
4.80	0.45	0.02	0.00	0.00
6.00	0.60	0.06	0.00	0.00
7.20	0.79	0.14	0.00	0.00
8.40	1.04	0.28	0.00	0.00
9.60	1.42	0.52	0.00	0.01
10.80	1.96	0.93	0.00	0.01
12.00	4.15	2.87	0.00	0.11
13.20	6.35	4.96	0.00	0.02
14.40	6.89	5.49	0.00	0.01
15.60	7.27	5.85	0.00	0.01
16.80	7.52	6.10	0.00	0.01
18.00	7.71	6.29	0.00	0.00
19.20	7.86	6.43	0.00	0.00
20.40	8.00	6.56	0.00	0.00
21.60	8.11	6.68	0.00	0.00
22.80	8.22	6.78	0.00	0.00
24.00	8.31	6.87	0.00	0.00
25.20	8.31	6.87	0.00	0.00
26.40	8.31	6.87	0.00	0.00
27.60	8.31	6.87	0.00	0.00
28.80	8.31	6.87	0.00	0.00
30.00	8.31	6.87	0.00	0.00
31.20	8.31	6.87	0.00	0.00
32.40	8.31	6.87	0.00	0.00
33.60	8.31	6.87	0.00	0.00
34.80	8.31	6.87	0.00	0.00
36.00	8.31	6.87	0.00	0.00

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Summary for Subcatchment 8S: roof & parking

Runoff = 6.07 cfs @ 12.13 hrs, Volume= 0.586 af, Depth= 8.19"

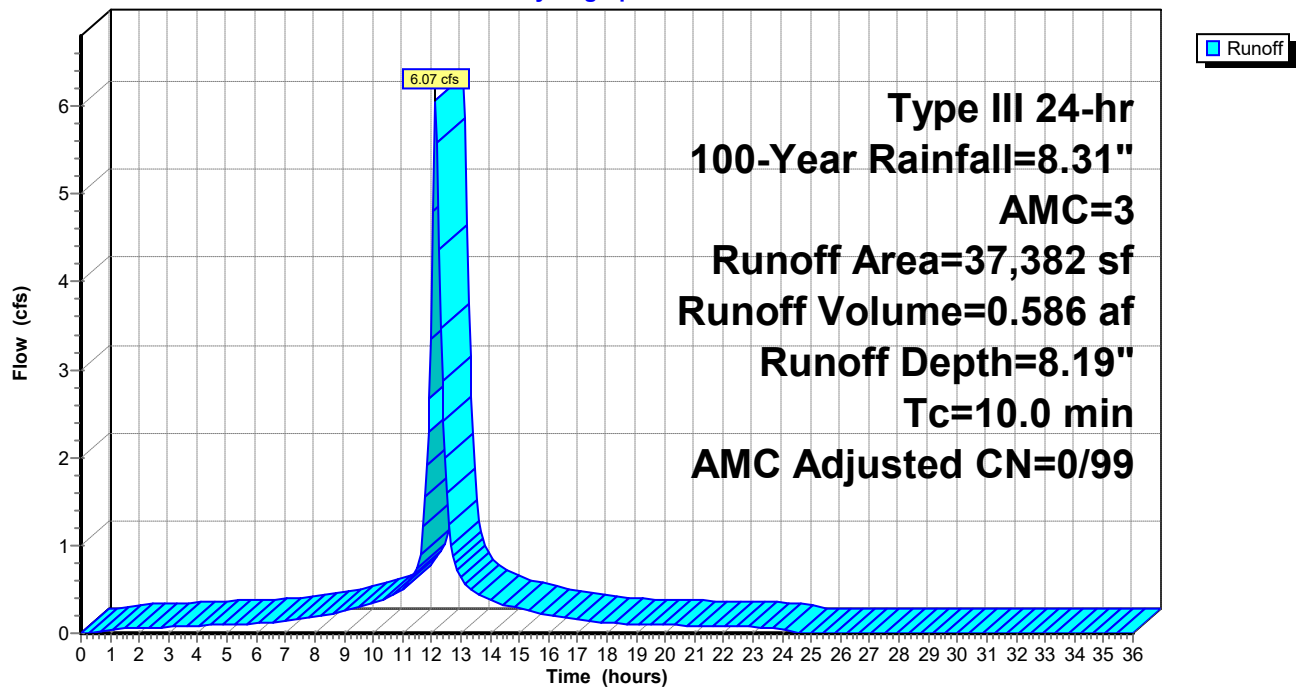
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.06 hrs
Type III 24-hr 100-Year Rainfall=8.31", AMC=3

Area (sf)	CN	Adj	Description
37,382	98		Roofs, HSG C
37,382	98	99	Weighted Average, AMC Adjusted
37,382	98	99	100.00% Impervious Area, AMC Adjusted

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

Subcatchment 8S: roof & parking

Hydrograph



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Type III 24-hr 100-Year Rainfall=8.31", AMC=3

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Hydrograph for Subcatchment 8S: roof & parking

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	0.00
1.20	0.10	0.00	0.04	0.05
2.40	0.20	0.00	0.12	0.06
3.60	0.32	0.00	0.22	0.08
4.80	0.45	0.00	0.35	0.10
6.00	0.60	0.00	0.49	0.11
7.20	0.79	0.00	0.68	0.15
8.40	1.04	0.00	0.93	0.21
9.60	1.42	0.00	1.30	0.30
10.80	1.96	0.00	1.84	0.46
12.00	4.15	0.00	4.04	3.35
13.20	6.35	0.00	6.23	0.52
14.40	6.89	0.00	6.77	0.33
15.60	7.27	0.00	7.15	0.23
16.80	7.52	0.00	7.40	0.16
18.00	7.71	0.00	7.59	0.12
19.20	7.86	0.00	7.74	0.10
20.40	8.00	0.00	7.88	0.09
21.60	8.11	0.00	7.99	0.08
22.80	8.22	0.00	8.10	0.07
24.00	8.31	0.00	8.19	0.06
25.20	8.31	0.00	8.19	0.00
26.40	8.31	0.00	8.19	0.00
27.60	8.31	0.00	8.19	0.00
28.80	8.31	0.00	8.19	0.00
30.00	8.31	0.00	8.19	0.00
31.20	8.31	0.00	8.19	0.00
32.40	8.31	0.00	8.19	0.00
33.60	8.31	0.00	8.19	0.00
34.80	8.31	0.00	8.19	0.00
36.00	8.31	0.00	8.19	0.00

1110 South Ave DrainageSouth Ave Redevelopment
Type III 24-hr 100-Year Rainfall=8.31", AMC=3

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Summary for Pond 9P: recharge basin

Inflow Area = 0.858 ac, 100.00% Impervious, Inflow Depth = 8.19" for 100-Year event
 Inflow = 6.07 cfs @ 12.13 hrs, Volume= 0.586 af
 Outflow = 4.51 cfs @ 12.24 hrs, Volume= 0.586 af, Atten= 26%, Lag= 6.5 min
 Discarded = 0.23 cfs @ 12.24 hrs, Volume= 0.177 af
 Primary = 4.28 cfs @ 12.24 hrs, Volume= 0.408 af

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.06 hrs
 Peak Elev= 121.76' @ 12.24 hrs Surf.Area= 1,700 sf Storage= 4,302 cf

Plug-Flow detention time= 47.2 min calculated for 0.585 af (100% of inflow)
 Center-of-Mass det. time= 47.5 min (785.2 - 737.7)

Volume	Invert	Avail.Storage	Storage Description
#1	117.00'	2,659 cf	Custom Stage Data (Prismatic) Listed below (Recalc) 9,350 cf Overall - 2,704 cf Embedded = 6,646 cf x 40.0% Voids
#2	118.00'	2,136 cf	48.0" Round Pipe Storage Inside #1 L= 170.0' 2,704 cf Overall - 3.0" Wall Thickness = 2,136 cf
		4,795 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
117.00	1,700	0	0
122.50	1,700	9,350	9,350

Device	Routing	Invert	Outlet Devices
#1	Discarded	117.00'	1.000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 116.00'
#2	Primary	118.00'	5.0" Vert. Orifice/Grate C= 0.600
#3	Primary	120.00'	10.0" Vert. Orifice/Grate C= 0.600

Discarded OutFlow Max=0.23 cfs @ 12.24 hrs HW=121.75' (Free Discharge)
 ↑ **1=Exfiltration** (Controls 0.23 cfs)

Primary OutFlow Max=4.27 cfs @ 12.24 hrs HW=121.75' (Free Discharge)
 ↑ **2=Orifice/Grate** (Orifice Controls 1.24 cfs @ 9.07 fps)
 ↑ **3=Orifice/Grate** (Orifice Controls 3.04 cfs @ 5.57 fps)

1110 South Ave Drainage

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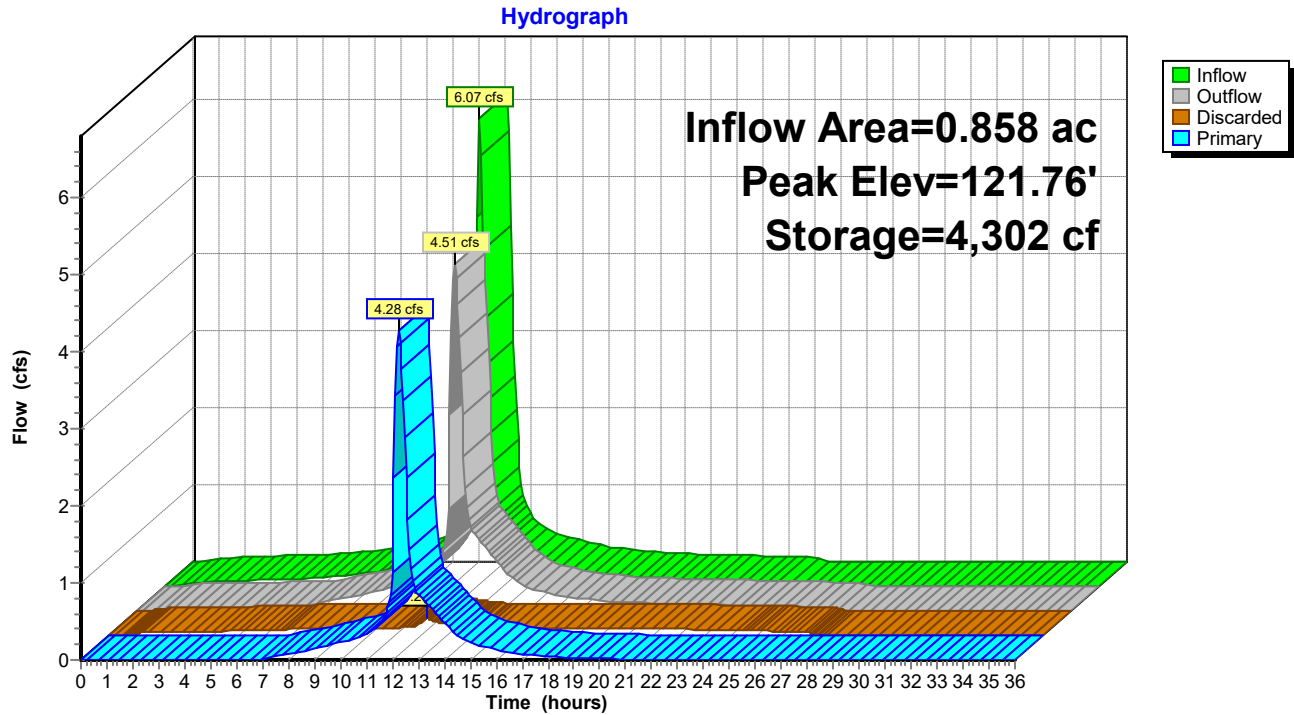
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Pond 9P: recharge basin



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Hydrograph for Pond 9P: recharge basin

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
0.00	0.00	0	117.00	0.00	0.00	0.00
1.20	0.05	33	117.05	0.04	0.04	0.00
2.40	0.06	90	117.13	0.04	0.04	0.00
3.60	0.08	200	117.29	0.05	0.05	0.00
4.80	0.10	347	117.51	0.06	0.06	0.00
6.00	0.11	517	117.76	0.07	0.07	0.00
7.20	0.15	727	118.11	0.11	0.08	0.03
8.40	0.21	803	118.20	0.19	0.09	0.10
9.60	0.30	882	118.30	0.29	0.09	0.20
10.80	0.46	1,004	118.44	0.41	0.10	0.32
12.00	3.35	2,814	120.23	1.31	0.17	1.14
13.20	0.52	2,168	119.62	0.92	0.14	0.78
14.40	0.33	1,050	118.49	0.45	0.10	0.35
15.60	0.23	854	118.27	0.25	0.09	0.16
16.80	0.16	789	118.19	0.17	0.09	0.09
18.00	0.12	747	118.13	0.13	0.08	0.05
19.20	0.10	720	118.10	0.11	0.08	0.03
20.40	0.09	701	118.07	0.10	0.08	0.01
21.60	0.08	683	118.04	0.09	0.08	0.01
22.80	0.07	658	118.00	0.08	0.08	0.00
24.00	0.06	614	117.92	0.08	0.08	0.00
25.20	0.00	355	117.52	0.06	0.06	0.00
26.40	0.00	126	117.18	0.05	0.05	0.00
27.60	0.00	3	117.00	0.00	0.00	0.00
28.80	0.00	0	117.00	0.00	0.00	0.00
30.00	0.00	0	117.00	0.00	0.00	0.00
31.20	0.00	0	117.00	0.00	0.00	0.00
32.40	0.00	0	117.00	0.00	0.00	0.00
33.60	0.00	0	117.00	0.00	0.00	0.00
34.80	0.00	0	117.00	0.00	0.00	0.00
36.00	0.00	0	117.00	0.00	0.00	0.00

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Stage-Discharge for Pond 9P: recharge basin

Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)	Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)
117.00	0.00	0.00	0.00	122.10	4.94	0.24	4.70
117.10	0.04	0.04	0.00	122.20	5.06	0.24	4.82
117.20	0.05	0.05	0.00	122.30	5.18	0.25	4.93
117.30	0.05	0.05	0.00	122.40	5.29	0.25	5.04
117.40	0.06	0.06	0.00	122.50	5.41	0.26	5.15
117.50	0.06	0.06	0.00				
117.60	0.06	0.06	0.00				
117.70	0.07	0.07	0.00				
117.80	0.07	0.07	0.00				
117.90	0.07	0.07	0.00				
118.00	0.08	0.08	0.00				
118.10	0.11	0.08	0.03				
118.20	0.19	0.09	0.10				
118.30	0.29	0.09	0.20				
118.40	0.38	0.09	0.29				
118.50	0.45	0.10	0.35				
118.60	0.51	0.10	0.41				
118.70	0.57	0.11	0.46				
118.80	0.62	0.11	0.51				
118.90	0.66	0.11	0.55				
119.00	0.70	0.12	0.58				
119.10	0.74	0.12	0.62				
119.20	0.78	0.13	0.65				
119.30	0.82	0.13	0.69				
119.40	0.85	0.13	0.72				
119.50	0.88	0.14	0.75				
119.60	0.92	0.14	0.77				
119.70	0.95	0.15	0.80				
119.80	0.98	0.15	0.83				
119.90	1.01	0.15	0.85				
120.00	1.04	0.16	0.88				
120.10	1.10	0.16	0.94				
120.20	1.25	0.17	1.08				
120.30	1.45	0.17	1.28				
120.40	1.70	0.17	1.53				
120.50	1.99	0.18	1.82				
120.60	2.31	0.18	2.12				
120.70	2.61	0.18	2.43				
120.80	2.88	0.19	2.70				
120.90	3.10	0.19	2.90				
121.00	3.30	0.20	3.10				
121.10	3.49	0.20	3.29				
121.20	3.66	0.20	3.46				
121.30	3.83	0.21	3.62				
121.40	3.99	0.21	3.78				
121.50	4.14	0.22	3.92				
121.60	4.29	0.22	4.07				
121.70	4.43	0.22	4.20				
121.80	4.56	0.23	4.33				
121.90	4.69	0.23	4.46				
122.00	4.82	0.24	4.58				

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Time span=0.00-36.00 hrs, dt=0.06 hrs, 601 points

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv.

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: existing conditions Runoff Area=38,698 sf 65.00% Impervious Runoff Depth=7.98"
Flow Length=105' Slope=0.0380 '/' Tc=10.0 min AMC Adjusted CN=94/99 Runoff=6.24 cfs 0.591 af

Subcatchment 3S: proposed overland Runoff Area=1,316 sf 0.00% Impervious Runoff Depth=6.87"
Tc=10.0 min AMC Adjusted CN=88/0 Runoff=0.20 cfs 0.017 af

Subcatchment 8S: roof & parking Runoff Area=37,382 sf 100.00% Impervious Runoff Depth=8.19"
Tc=10.0 min AMC Adjusted CN=0/99 Runoff=6.07 cfs 0.586 af

Pond 9P: recharge basin Peak Elev=121.76' Storage=4,302 cf Inflow=6.07 cfs 0.586 af
Discarded=0.23 cfs 0.177 af Primary=4.28 cfs 0.408 af Outflow=4.51 cfs 0.586 af

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Summary for Subcatchment 1S: existing conditions

Runoff = 6.24 cfs @ 12.13 hrs, Volume= 0.591 af, Depth= 7.98"

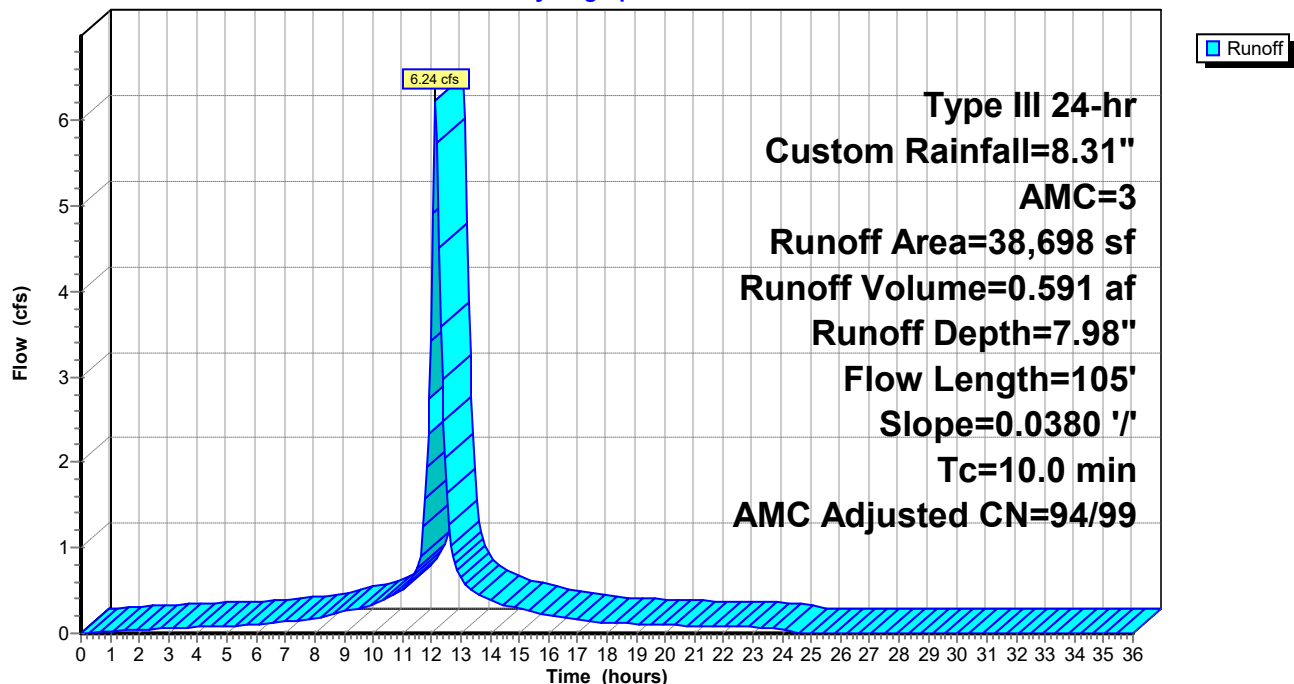
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.06 hrs
Type III 24-hr Custom Rainfall=8.31", AMC=3

Area (sf)	CN	Adj	Description
25,154	98		Paved parking, HSG C
13,544	86		<50% Grass cover, Poor, HSG C
38,698	94	98	Weighted Average, AMC Adjusted
13,544	86	94	35.00% Pervious Area, AMC Adjusted
25,154	98	99	65.00% Impervious Area, AMC Adjusted

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	105	0.0380	0.21		Sheet Flow, grass
					Grass: Short n= 0.150 P2= 2.80"
8.4	105	Total, Increased to minimum Tc = 10.0 min			

Subcatchment 1S: existing conditions

Hydrograph



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Hydrograph for Subcatchment 1S: existing conditions

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	0.00
1.20	0.10	0.00	0.04	0.03
2.40	0.20	0.01	0.12	0.05
3.60	0.32	0.04	0.22	0.07
4.80	0.45	0.11	0.35	0.08
6.00	0.60	0.20	0.49	0.10
7.20	0.79	0.34	0.68	0.14
8.40	1.04	0.54	0.93	0.20
9.60	1.42	0.86	1.30	0.30
10.80	1.96	1.36	1.84	0.47
12.00	4.15	3.48	4.04	3.43
13.20	6.35	5.64	6.23	0.54
14.40	6.89	6.18	6.77	0.34
15.60	7.27	6.56	7.15	0.24
16.80	7.52	6.81	7.40	0.17
18.00	7.71	7.00	7.59	0.12
19.20	7.86	7.14	7.74	0.11
20.40	8.00	7.28	7.88	0.09
21.60	8.11	7.39	7.99	0.08
22.80	8.22	7.50	8.10	0.07
24.00	8.31	7.59	8.19	0.06
25.20	8.31	7.59	8.19	0.00
26.40	8.31	7.59	8.19	0.00
27.60	8.31	7.59	8.19	0.00
28.80	8.31	7.59	8.19	0.00
30.00	8.31	7.59	8.19	0.00
31.20	8.31	7.59	8.19	0.00
32.40	8.31	7.59	8.19	0.00
33.60	8.31	7.59	8.19	0.00
34.80	8.31	7.59	8.19	0.00
36.00	8.31	7.59	8.19	0.00

1110 South Ave Drainage

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Type III 24-hr Custom Rainfall=8.31", AMC=3

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Summary for Subcatchment 3S: proposed overland

Runoff = 0.20 cfs @ 12.14 hrs, Volume= 0.017 af, Depth= 6.87"

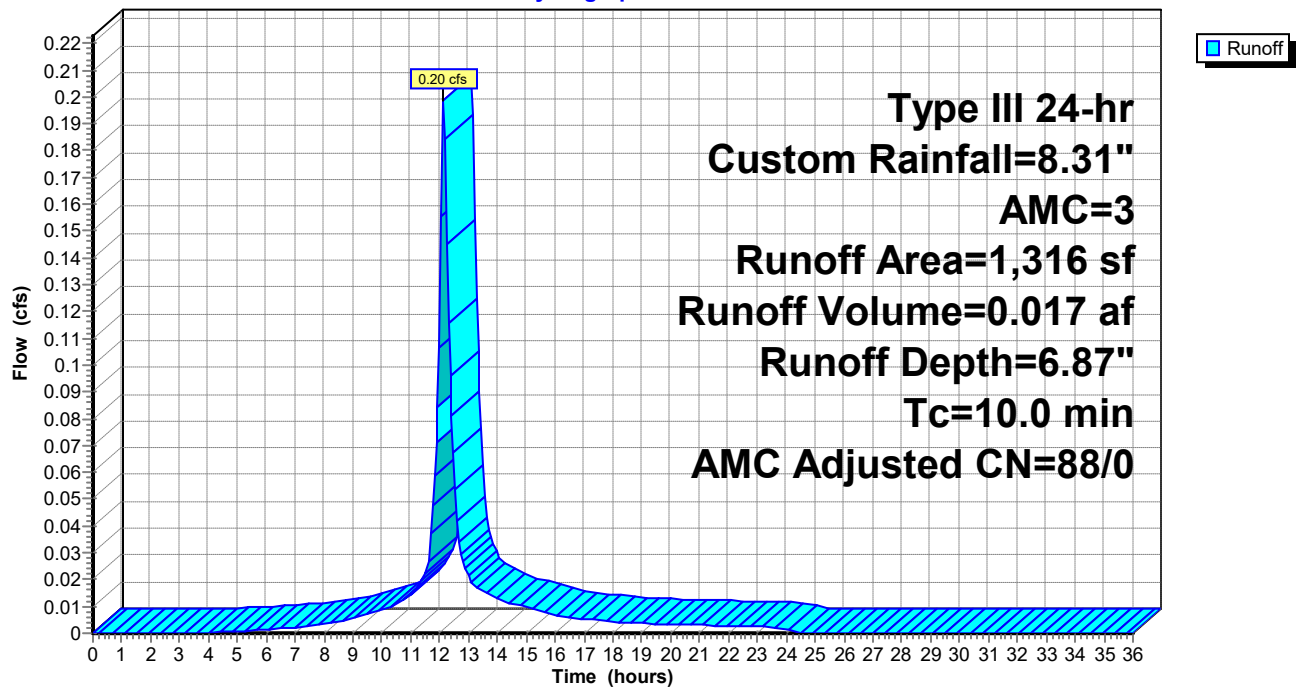
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.06 hrs
Type III 24-hr Custom Rainfall=8.31", AMC=3

Area (sf)	CN	Adj	Description
1,316	74		>75% Grass cover, Good, HSG C
1,316	74	88	Weighted Average, AMC Adjusted
1,316	74	88	100.00% Pervious Area, AMC Adjusted

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

Subcatchment 3S: proposed overland

Hydrograph



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Hydrograph for Subcatchment 3S: proposed overland

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	0.00
1.20	0.10	0.00	0.00	0.00
2.40	0.20	0.00	0.00	0.00
3.60	0.32	0.00	0.00	0.00
4.80	0.45	0.02	0.00	0.00
6.00	0.60	0.06	0.00	0.00
7.20	0.79	0.14	0.00	0.00
8.40	1.04	0.28	0.00	0.00
9.60	1.42	0.52	0.00	0.01
10.80	1.96	0.93	0.00	0.01
12.00	4.15	2.87	0.00	0.11
13.20	6.35	4.96	0.00	0.02
14.40	6.89	5.49	0.00	0.01
15.60	7.27	5.85	0.00	0.01
16.80	7.52	6.10	0.00	0.01
18.00	7.71	6.29	0.00	0.00
19.20	7.86	6.43	0.00	0.00
20.40	8.00	6.56	0.00	0.00
21.60	8.11	6.68	0.00	0.00
22.80	8.22	6.78	0.00	0.00
24.00	8.31	6.87	0.00	0.00
25.20	8.31	6.87	0.00	0.00
26.40	8.31	6.87	0.00	0.00
27.60	8.31	6.87	0.00	0.00
28.80	8.31	6.87	0.00	0.00
30.00	8.31	6.87	0.00	0.00
31.20	8.31	6.87	0.00	0.00
32.40	8.31	6.87	0.00	0.00
33.60	8.31	6.87	0.00	0.00
34.80	8.31	6.87	0.00	0.00
36.00	8.31	6.87	0.00	0.00

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Summary for Subcatchment 8S: roof & parking

Runoff = 6.07 cfs @ 12.13 hrs, Volume= 0.586 af, Depth= 8.19"

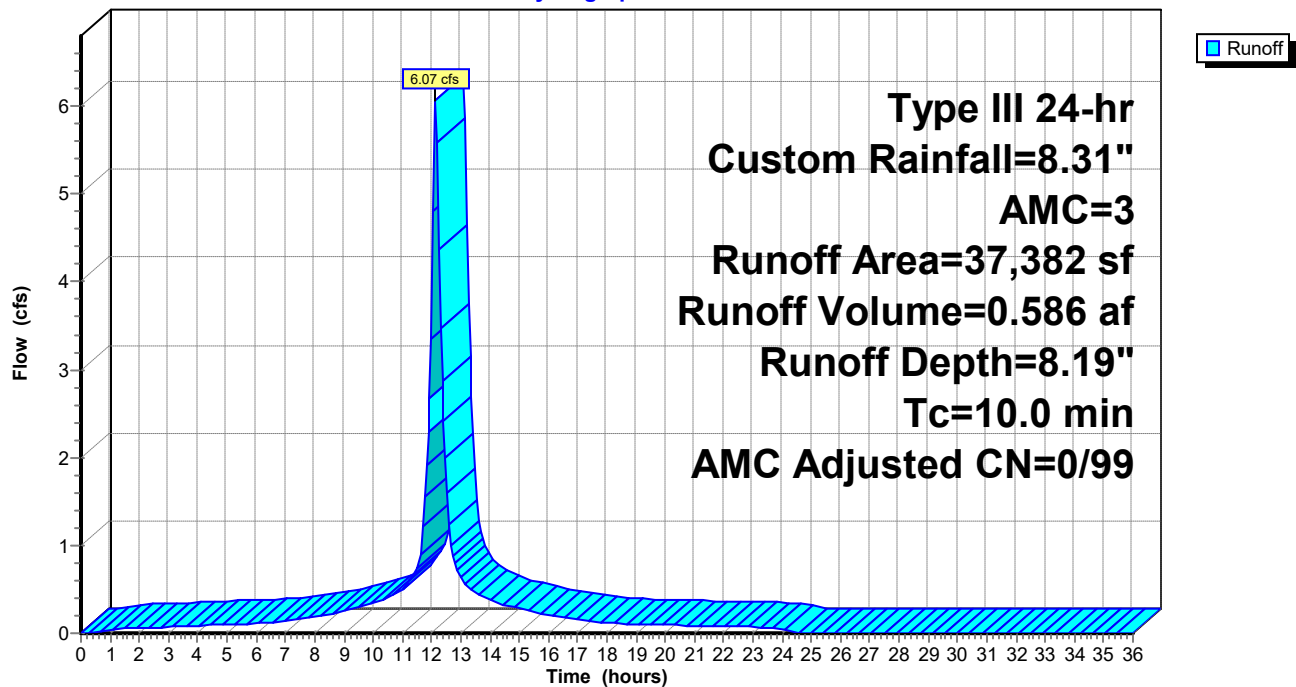
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.06 hrs
Type III 24-hr Custom Rainfall=8.31", AMC=3

Area (sf)	CN	Adj	Description
37,382	98		Roofs, HSG C
37,382	98	99	Weighted Average, AMC Adjusted
37,382	98	99	100.00% Impervious Area, AMC Adjusted

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

Subcatchment 8S: roof & parking

Hydrograph



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Hydrograph for Subcatchment 8S: roof & parking

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	0.00
1.20	0.10	0.00	0.04	0.05
2.40	0.20	0.00	0.12	0.06
3.60	0.32	0.00	0.22	0.08
4.80	0.45	0.00	0.35	0.10
6.00	0.60	0.00	0.49	0.11
7.20	0.79	0.00	0.68	0.15
8.40	1.04	0.00	0.93	0.21
9.60	1.42	0.00	1.30	0.30
10.80	1.96	0.00	1.84	0.46
12.00	4.15	0.00	4.04	3.35
13.20	6.35	0.00	6.23	0.52
14.40	6.89	0.00	6.77	0.33
15.60	7.27	0.00	7.15	0.23
16.80	7.52	0.00	7.40	0.16
18.00	7.71	0.00	7.59	0.12
19.20	7.86	0.00	7.74	0.10
20.40	8.00	0.00	7.88	0.09
21.60	8.11	0.00	7.99	0.08
22.80	8.22	0.00	8.10	0.07
24.00	8.31	0.00	8.19	0.06
25.20	8.31	0.00	8.19	0.00
26.40	8.31	0.00	8.19	0.00
27.60	8.31	0.00	8.19	0.00
28.80	8.31	0.00	8.19	0.00
30.00	8.31	0.00	8.19	0.00
31.20	8.31	0.00	8.19	0.00
32.40	8.31	0.00	8.19	0.00
33.60	8.31	0.00	8.19	0.00
34.80	8.31	0.00	8.19	0.00
36.00	8.31	0.00	8.19	0.00

1110 South Ave DrainageSouth Ave Redevelopment
Type III 24-hr Custom Rainfall=8.31", AMC=3

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Summary for Pond 9P: recharge basin

Inflow Area = 0.858 ac, 100.00% Impervious, Inflow Depth = 8.19" for Custom event
 Inflow = 6.07 cfs @ 12.13 hrs, Volume= 0.586 af
 Outflow = 4.51 cfs @ 12.24 hrs, Volume= 0.586 af, Atten= 26%, Lag= 6.5 min
 Discarded = 0.23 cfs @ 12.24 hrs, Volume= 0.177 af
 Primary = 4.28 cfs @ 12.24 hrs, Volume= 0.408 af

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.06 hrs
 Peak Elev= 121.76' @ 12.24 hrs Surf.Area= 1,700 sf Storage= 4,302 cf

Plug-Flow detention time= 47.2 min calculated for 0.585 af (100% of inflow)
 Center-of-Mass det. time= 47.5 min (785.2 - 737.7)

Volume	Invert	Avail.Storage	Storage Description
#1	117.00'	2,659 cf	Custom Stage Data (Prismatic) Listed below (Recalc) 9,350 cf Overall - 2,704 cf Embedded = 6,646 cf x 40.0% Voids
#2	118.00'	2,136 cf	48.0" Round Pipe Storage Inside #1 L= 170.0' 2,704 cf Overall - 3.0" Wall Thickness = 2,136 cf
		4,795 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
117.00	1,700	0	0
122.50	1,700	9,350	9,350

Device	Routing	Invert	Outlet Devices
#1	Discarded	117.00'	1.000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 116.00'
#2	Primary	118.00'	5.0" Vert. Orifice/Grate C= 0.600
#3	Primary	120.00'	10.0" Vert. Orifice/Grate C= 0.600

Discarded OutFlow Max=0.23 cfs @ 12.24 hrs HW=121.75' (Free Discharge)
 ↑ **1=Exfiltration** (Controls 0.23 cfs)

Primary OutFlow Max=4.27 cfs @ 12.24 hrs HW=121.75' (Free Discharge)
 ↑ **2=Orifice/Grate** (Orifice Controls 1.24 cfs @ 9.07 fps)
 ↑ **3=Orifice/Grate** (Orifice Controls 3.04 cfs @ 5.57 fps)

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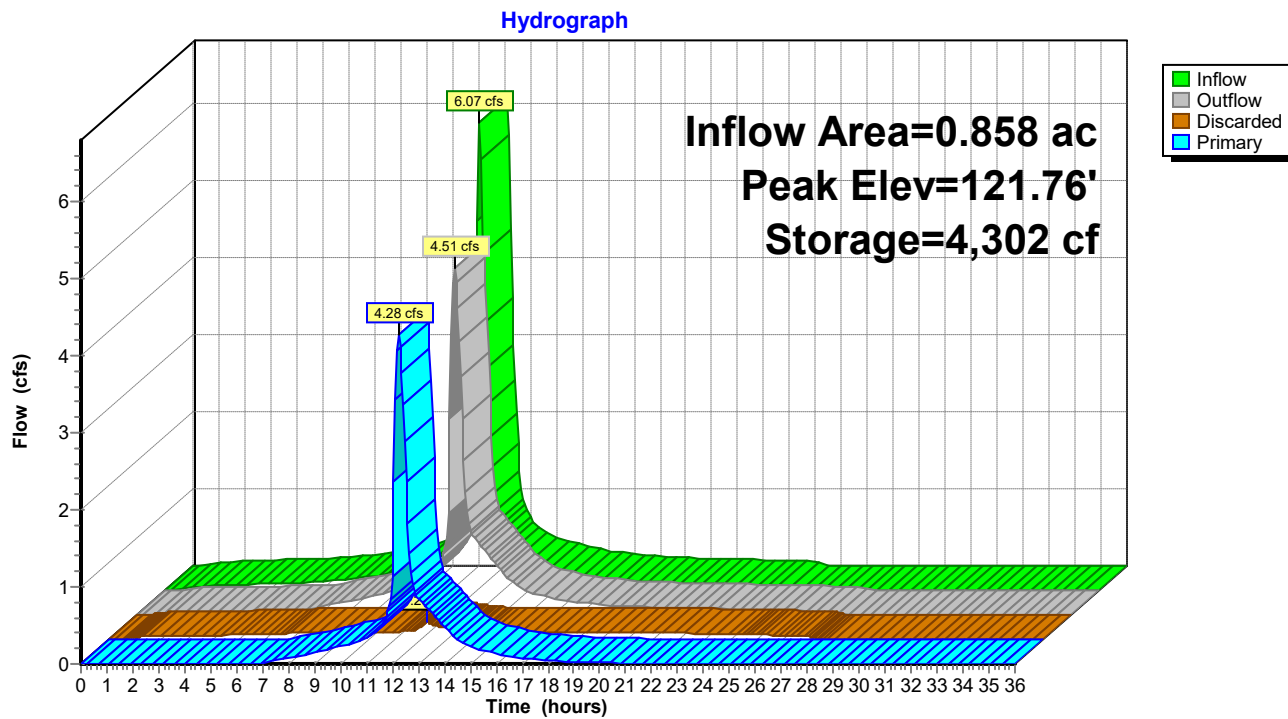
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Type III 24-hr Custom Rainfall=8.31", AMC=3

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Pond 9P: recharge basin



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Hydrograph for Pond 9P: recharge basin

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
0.00	0.00	0	117.00	0.00	0.00	0.00
1.20	0.05	33	117.05	0.04	0.04	0.00
2.40	0.06	90	117.13	0.04	0.04	0.00
3.60	0.08	200	117.29	0.05	0.05	0.00
4.80	0.10	347	117.51	0.06	0.06	0.00
6.00	0.11	517	117.76	0.07	0.07	0.00
7.20	0.15	727	118.11	0.11	0.08	0.03
8.40	0.21	803	118.20	0.19	0.09	0.10
9.60	0.30	882	118.30	0.29	0.09	0.20
10.80	0.46	1,004	118.44	0.41	0.10	0.32
12.00	3.35	2,814	120.23	1.31	0.17	1.14
13.20	0.52	2,168	119.62	0.92	0.14	0.78
14.40	0.33	1,050	118.49	0.45	0.10	0.35
15.60	0.23	854	118.27	0.25	0.09	0.16
16.80	0.16	789	118.19	0.17	0.09	0.09
18.00	0.12	747	118.13	0.13	0.08	0.05
19.20	0.10	720	118.10	0.11	0.08	0.03
20.40	0.09	701	118.07	0.10	0.08	0.01
21.60	0.08	683	118.04	0.09	0.08	0.01
22.80	0.07	658	118.00	0.08	0.08	0.00
24.00	0.06	614	117.92	0.08	0.08	0.00
25.20	0.00	355	117.52	0.06	0.06	0.00
26.40	0.00	126	117.18	0.05	0.05	0.00
27.60	0.00	3	117.00	0.00	0.00	0.00
28.80	0.00	0	117.00	0.00	0.00	0.00
30.00	0.00	0	117.00	0.00	0.00	0.00
31.20	0.00	0	117.00	0.00	0.00	0.00
32.40	0.00	0	117.00	0.00	0.00	0.00
33.60	0.00	0	117.00	0.00	0.00	0.00
34.80	0.00	0	117.00	0.00	0.00	0.00
36.00	0.00	0	117.00	0.00	0.00	0.00

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Stage-Discharge for Pond 9P: recharge basin

Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)	Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)
117.00	0.00	0.00	0.00	122.10	4.94	0.24	4.70
117.10	0.04	0.04	0.00	122.20	5.06	0.24	4.82
117.20	0.05	0.05	0.00	122.30	5.18	0.25	4.93
117.30	0.05	0.05	0.00	122.40	5.29	0.25	5.04
117.40	0.06	0.06	0.00	122.50	5.41	0.26	5.15
117.50	0.06	0.06	0.00				
117.60	0.06	0.06	0.00				
117.70	0.07	0.07	0.00				
117.80	0.07	0.07	0.00				
117.90	0.07	0.07	0.00				
118.00	0.08	0.08	0.00				
118.10	0.11	0.08	0.03				
118.20	0.19	0.09	0.10				
118.30	0.29	0.09	0.20				
118.40	0.38	0.09	0.29				
118.50	0.45	0.10	0.35				
118.60	0.51	0.10	0.41				
118.70	0.57	0.11	0.46				
118.80	0.62	0.11	0.51				
118.90	0.66	0.11	0.55				
119.00	0.70	0.12	0.58				
119.10	0.74	0.12	0.62				
119.20	0.78	0.13	0.65				
119.30	0.82	0.13	0.69				
119.40	0.85	0.13	0.72				
119.50	0.88	0.14	0.75				
119.60	0.92	0.14	0.77				
119.70	0.95	0.15	0.80				
119.80	0.98	0.15	0.83				
119.90	1.01	0.15	0.85				
120.00	1.04	0.16	0.88				
120.10	1.10	0.16	0.94				
120.20	1.25	0.17	1.08				
120.30	1.45	0.17	1.28				
120.40	1.70	0.17	1.53				
120.50	1.99	0.18	1.82				
120.60	2.31	0.18	2.12				
120.70	2.61	0.18	2.43				
120.80	2.88	0.19	2.70				
120.90	3.10	0.19	2.90				
121.00	3.30	0.20	3.10				
121.10	3.49	0.20	3.29				
121.20	3.66	0.20	3.46				
121.30	3.83	0.21	3.62				
121.40	3.99	0.21	3.78				
121.50	4.14	0.22	3.92				
121.60	4.29	0.22	4.07				
121.70	4.43	0.22	4.20				
121.80	4.56	0.23	4.33				
121.90	4.69	0.23	4.46				
122.00	4.82	0.24	4.58				