

October 21, 2025

Town of Reading
Conservation Commission
16 Lowell Street
Reading, MA 01867

**Re: Modified House Footprint, 0 Annette Lane, Reading, MA (Map 38, Lot 139)
Stormwater Memorandum**

Dear Commissioners:

Civil Design Group, LLC has been retained by Dale and Jessica Harvey to evaluate the previously approved drainage narrative entitled, ‘Drainage Narrative, Definitive Subdivision’, prepared by Somerville Engineering, dated August 11, 2023. Specifically, it was requested that our office review the watersheds contributing to Leaching Field 1 (D-1) and to determine whether any modifications to D-1 are required due to the increase in the proposed house footprint.

The previously approved watersheds contributing to D-1 include the house footprint (1,680 square feet) (Watershed R-1) and yard areas (Watershed P-1B) proximate to the house that are conveyed to D-1 via the stone trench. The modification will substantially maintain the yard areas and its contributing watershed factors; however, the house footprint is proposed to increase to 3,009± square feet. Our office re-created the D-1 leaching field in HydroCAD and modelled the same P-1B watershed and the revised R-1 watershed. The results yielded an increase of the 4’x4’ concrete structures from 6 units to 12 units in order to maintain the same peak flow rates. Below is a comparison between the previously approved and the proposed non-discarded rates for the D-1 node.

TABLE 1: NON-DISCARDED PEAK FLOW RATE COMPARISON

POINT OF ANALYSIS	2-YEAR STORM EVENT (3.22"/24-HR)		10-YEAR STORM EVENT (4.89"/24-HR)		25-YEAR STORM EVENT (6.22"/24-HR)		100-YEAR STORM EVENT (8.94"/24-HR)	
	PRE-APP (CFS)	PROP (CFS)	PRE-APP (CFS)	PROP (CFS)	PRE-APP (CFS)	PROP (CFS)	PRE-APP (CFS)	PROP (CFS)
D-1	<i>0.00</i>	0.00	<i>0.00</i>	0.00	<i>0.00</i>	0.00	<i>0.00</i>	0.00

Enclosed, please find the HydroCad outputs from the previously approved and the proposed D-1 leaching field node.

Sincerely,

CIVIL DESIGN GROUP, LLC



Philip R. Henry, P.E.
Principal

cc. Mr. Dale Harvey



PREVIOUSLY APPROVED

220304-01 - Proposed HCAD

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0 Annette Lane
 Multi-Event Tables
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Events for Pond D-1: Leaching Field

Event	Inflow (cfs)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)	Volume (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
2-YR	0.14	0.01	0.01	0.00	0	92.50	194
10-YR	0.21	0.02	0.02	0.00	0	95.61	319
25-YR	0.27	0.02	0.02	0.00	0	97.67	527
100-YR	0.59	0.03	0.03	0.00	0	99.34	1,018

220304-01 - Proposed HCAD

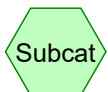
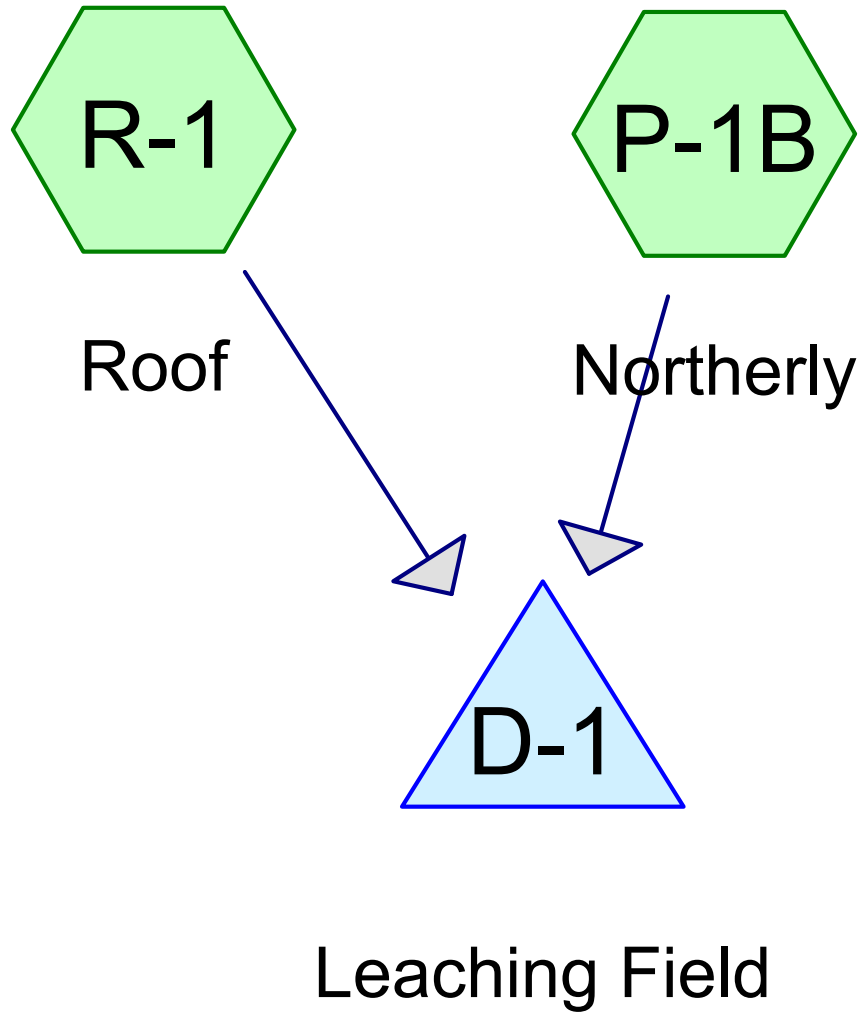
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0 Annette Lane
 Multi-Event Tables
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Events for Pond D-2: Leaching Field

Event	Inflow (cfs)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)	Volume (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
2-YR	0.17	0.02	0.02	0.00	0	96.45	203
10-YR	0.26	0.02	0.02	0.00	0	96.97	367
25-YR	0.33	0.02	0.02	0.00	0	97.46	520
100-YR	0.47	0.02	0.02	0.00	0	100.87	882

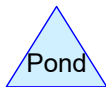
PROPOSED



Subcat



Reach



Pond



Link

Routing Diagram for 0 Annette Lane

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Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.129	39	>75% Grass cover, Good, HSG A (P-1B)
0.069	98	Unconnected roofs, HSG A (R-1)
0.042	30	Woods, Good, HSG A (P-1B)
0.240	54	TOTAL AREA

0 Annette Lane

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Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.240	HSG A	P-1B, R-1
0.000	HSG B	
0.000	HSG C	
0.000	HSG D	
0.000	Other	
0.240		TOTAL AREA

0 Annette Lane

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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
0.129	0.000	0.000	0.000	0.000	0.129	>75% Grass cover, Good	P-1B
0.069	0.000	0.000	0.000	0.000	0.069	Unconnected roofs	R-1
0.042	0.000	0.000	0.000	0.000	0.042	Woods, Good	P-1B
0.240	0.000	0.000	0.000	0.000	0.240	TOTAL AREA	

0 Annette Lane

Type III 24-hr 2-YR Rainfall=3.22"

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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

Subcatchment P-1B: Northerly

Runoff Area=7,457 sf 0.00% Impervious Runoff Depth=0.00"
Tc=6.0 min CN=37 Runoff=0.00 cfs 0.000 af

Subcatchment R-1: Roof

Runoff Area=3,009 sf 100.00% Impervious Runoff Depth=2.99"
Tc=6.0 min CN=98 Runoff=0.21 cfs 0.017 af

Pond D-1: Leaching Field

Peak Elev=95.14' Storage=379 cf Inflow=0.21 cfs 0.017 af
Discarded=0.02 cfs 0.017 af Primary=0.00 cfs 0.000 af Outflow=0.02 cfs 0.017 af

Total Runoff Area = 0.240 ac Runoff Volume = 0.017 af Average Runoff Depth = 0.86"
71.25% Pervious = 0.171 ac 28.75% Impervious = 0.069 ac

Summary for Subcatchment P-1B: Northerly

[45] Hint: Runoff=Zero

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

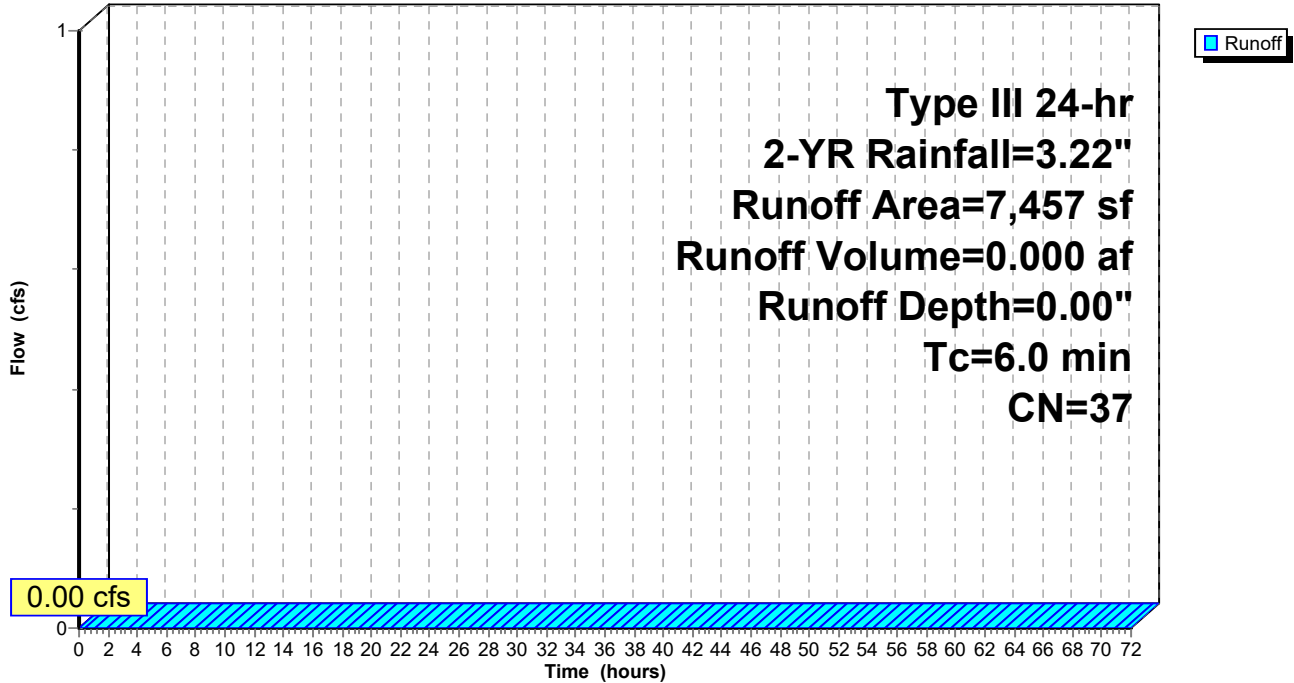
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 Type III 24-hr 2-YR Rainfall=3.22"

Area (sf)	CN	Description
1,842	30	Woods, Good, HSG A
5,615	39	>75% Grass cover, Good, HSG A
7,457	37	Weighted Average
7,457		100.00% Pervious Area

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

Subcatchment P-1B: Northerly

Hydrograph



Summary for Subcatchment R-1: Roof

Runoff = 0.21 cfs @ 12.09 hrs, Volume= 0.017 af, Depth= 2.99"

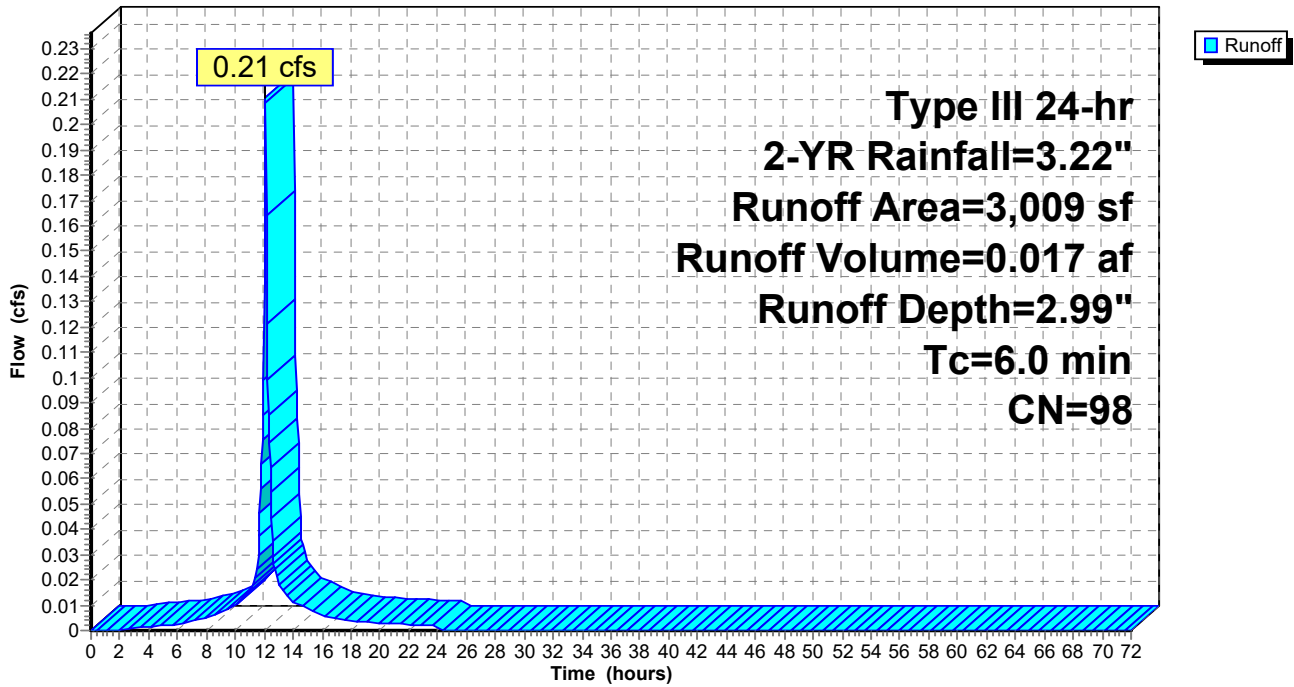
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-YR Rainfall=3.22"

Area (sf)	CN	Description
3,009	98	Unconnected roofs, HSG A
3,009		100.00% Impervious Area
3,009		100.00% Unconnected

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

Subcatchment R-1: Roof

Hydrograph



Summary for Pond D-1: Leaching Field

[42] Hint: Gap in defined storage above volume #4 at 92.50'

[92] Warning: Device #3 is above defined storage

Inflow Area = 0.240 ac, 28.75% Impervious, Inflow Depth = 0.86" for 2-YR event
 Inflow = 0.21 cfs @ 12.09 hrs, Volume= 0.017 af
 Outflow = 0.02 cfs @ 12.05 hrs, Volume= 0.017 af, Atten= 91%, Lag= 0.0 min
 Discarded = 0.02 cfs @ 12.05 hrs, Volume= 0.017 af
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 Peak Elev= 95.14' @ 12.92 hrs Surf.Area= 841 sf Storage= 379 cf

Plug-Flow detention time= 253.7 min calculated for 0.017 af (100% of inflow)
 Center-of-Mass det. time= 254.3 min (1,010.5 - 756.3)

Volume	Invert	Avail.Storage	Storage Description
#1	94.20'	349 cf	31.00'W x 11.00'L x 4.75'H Field A 1,620 cf Overall - 748 cf Embedded = 872 cf x 40.0% Voids
#2	94.70'	557 cf	Shea Leaching Chamber 4x4x4 x 12 Inside #1 Inside= 42.2"W x 45.0"H => 13.25 sf x 3.50'L = 46.4 cf Outside= 54.0"W x 51.0"H => 15.58 sf x 4.00'L = 62.3 cf
#3	98.95'	3 cf	2.00'D x 1.00'H Frame & Grate
#4	91.50'	218 cf	Custom Stage Data (Prismatic) Listed below
#5	98.00'	590 cf	2.00'W x 370.00'L x 2.00'H Stone Trench 1,480 cf Overall - 4 cf Embedded = 1,476 cf x 40.0% Voids
#6	98.50'	4 cf	6.0" Round Pipe Storage Inside #5 L= 20.0'
		1,720 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
91.50	0	0	0
92.00	185	46	46
92.50	500	171	218

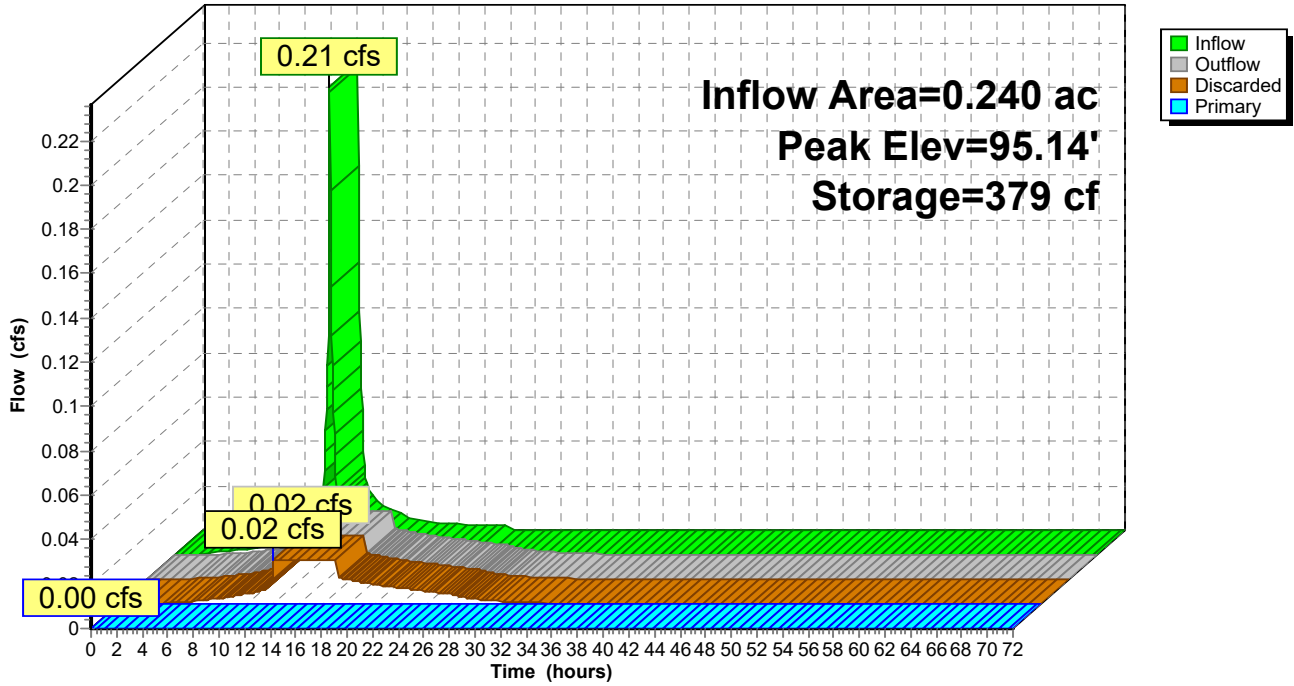
Device	Routing	Invert	Outlet Devices
#1	Discarded	91.50'	1.020 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Primary	99.94'	20.0' long x 0.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#3	Primary	100.00'	24.0" x 24.0" Horiz. Automatic Storage Overflow C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.02 cfs @ 12.05 hrs HW=94.24' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=91.50' (Free Discharge)
 ↑2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)
 ↑3=Automatic Storage Overflow (Controls 0.00 cfs)

Pond D-1: Leaching Field

Hydrograph



0 Annette Lane

Type III 24-hr 10-YR Rainfall=4.89"

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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

Subcatchment P-1B: Northerly

Runoff Area=7,457 sf 0.00% Impervious Runoff Depth=0.12"
Tc=6.0 min CN=37 Runoff=0.00 cfs 0.002 af

Subcatchment R-1: Roof

Runoff Area=3,009 sf 100.00% Impervious Runoff Depth=4.65"
Tc=6.0 min CN=98 Runoff=0.32 cfs 0.027 af

Pond D-1: Leaching Field

Peak Elev=96.38' Storage=647 cf Inflow=0.32 cfs 0.028 af
Discarded=0.02 cfs 0.028 af Primary=0.00 cfs 0.000 af Outflow=0.02 cfs 0.028 af

Total Runoff Area = 0.240 ac Runoff Volume = 0.028 af Average Runoff Depth = 1.42"
71.25% Pervious = 0.171 ac 28.75% Impervious = 0.069 ac

Summary for Subcatchment P-1B: Northerly

Runoff = 0.00 cfs @ 14.72 hrs, Volume= 0.002 af, Depth= 0.12"

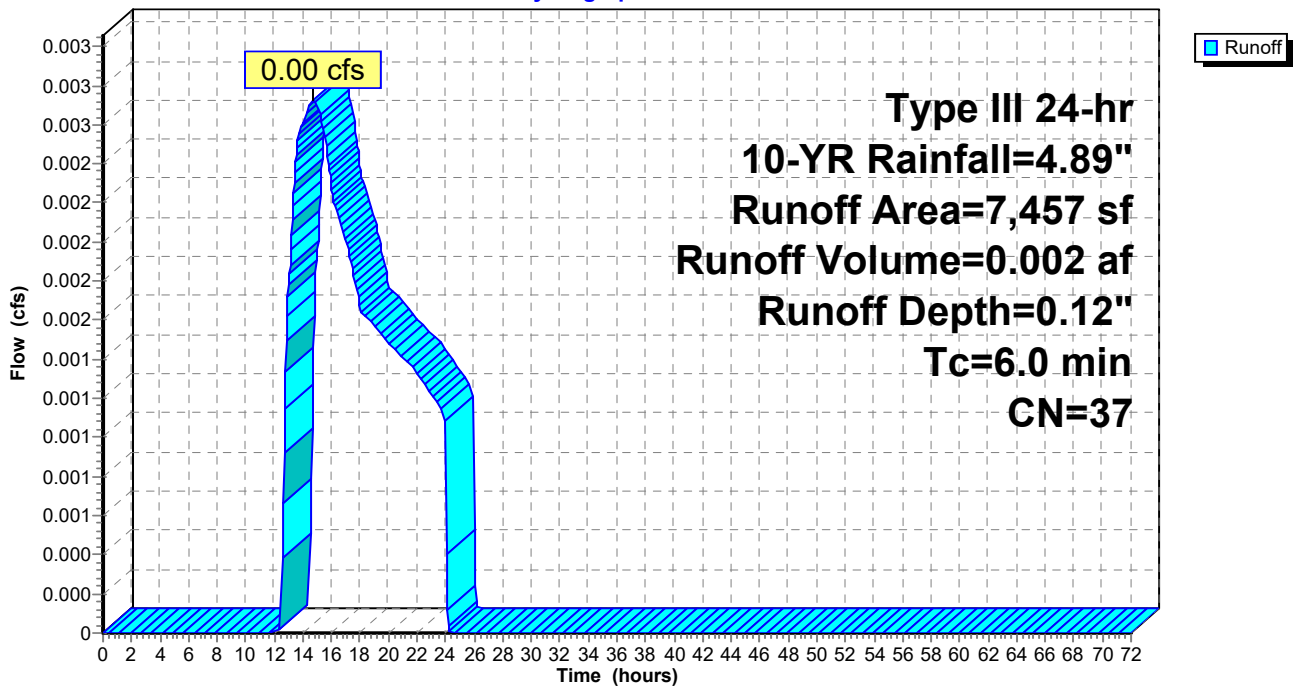
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-YR Rainfall=4.89"

Area (sf)	CN	Description
1,842	30	Woods, Good, HSG A
5,615	39	>75% Grass cover, Good, HSG A
7,457	37	Weighted Average
7,457		100.00% Pervious Area

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

Subcatchment P-1B: Northerly

Hydrograph



Summary for Subcatchment R-1: Roof

Runoff = 0.32 cfs @ 12.09 hrs, Volume= 0.027 af, Depth= 4.65"

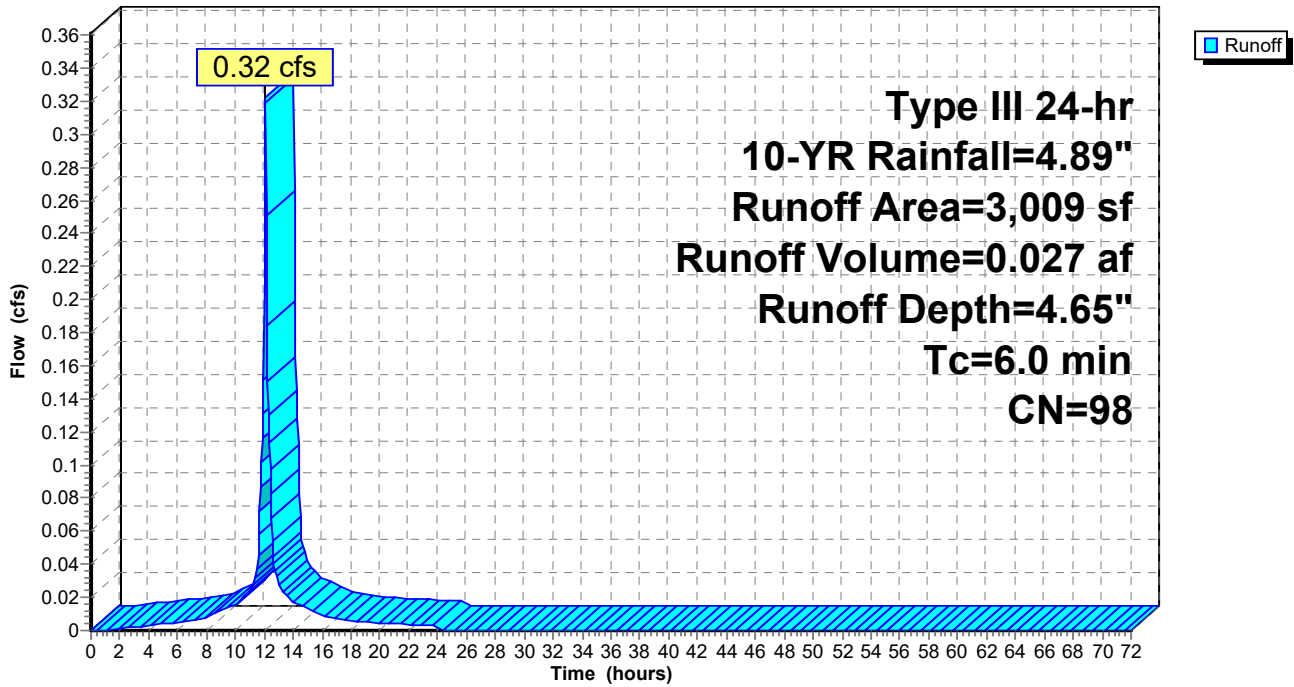
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-YR Rainfall=4.89"

Area (sf)	CN	Description
3,009	98	Unconnected roofs, HSG A
3,009		100.00% Impervious Area
3,009		100.00% Unconnected

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

Subcatchment R-1: Roof

Hydrograph



Summary for Pond D-1: Leaching Field

[42] Hint: Gap in defined storage above volume #4 at 92.50'

[92] Warning: Device #3 is above defined storage

Inflow Area = 0.240 ac, 28.75% Impervious, Inflow Depth = 1.42" for 10-YR event
 Inflow = 0.32 cfs @ 12.09 hrs, Volume= 0.028 af
 Outflow = 0.02 cfs @ 11.80 hrs, Volume= 0.028 af, Atten= 94%, Lag= 0.0 min
 Discarded = 0.02 cfs @ 11.80 hrs, Volume= 0.028 af
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 Peak Elev= 96.38' @ 14.02 hrs Surf.Area= 841 sf Storage= 647 cf

Plug-Flow detention time= 362.2 min calculated for 0.028 af (100% of inflow)
 Center-of-Mass det. time= 361.7 min (1,128.3 - 766.7)

Volume	Invert	Avail.Storage	Storage Description
#1	94.20'	349 cf	31.00'W x 11.00'L x 4.75'H Field A 1,620 cf Overall - 748 cf Embedded = 872 cf x 40.0% Voids
#2	94.70'	557 cf	Shea Leaching Chamber 4x4x4 x 12 Inside #1 Inside= 42.2"W x 45.0"H => 13.25 sf x 3.50'L = 46.4 cf Outside= 54.0"W x 51.0"H => 15.58 sf x 4.00'L = 62.3 cf
#3	98.95'	3 cf	2.00'D x 1.00'H Frame & Grate
#4	91.50'	218 cf	Custom Stage Data (Prismatic) Listed below
#5	98.00'	590 cf	2.00'W x 370.00'L x 2.00'H Stone Trench 1,480 cf Overall - 4 cf Embedded = 1,476 cf x 40.0% Voids
#6	98.50'	4 cf	6.0" Round Pipe Storage Inside #5 L= 20.0'
		1,720 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
91.50	0	0	0
92.00	185	46	46
92.50	500	171	218

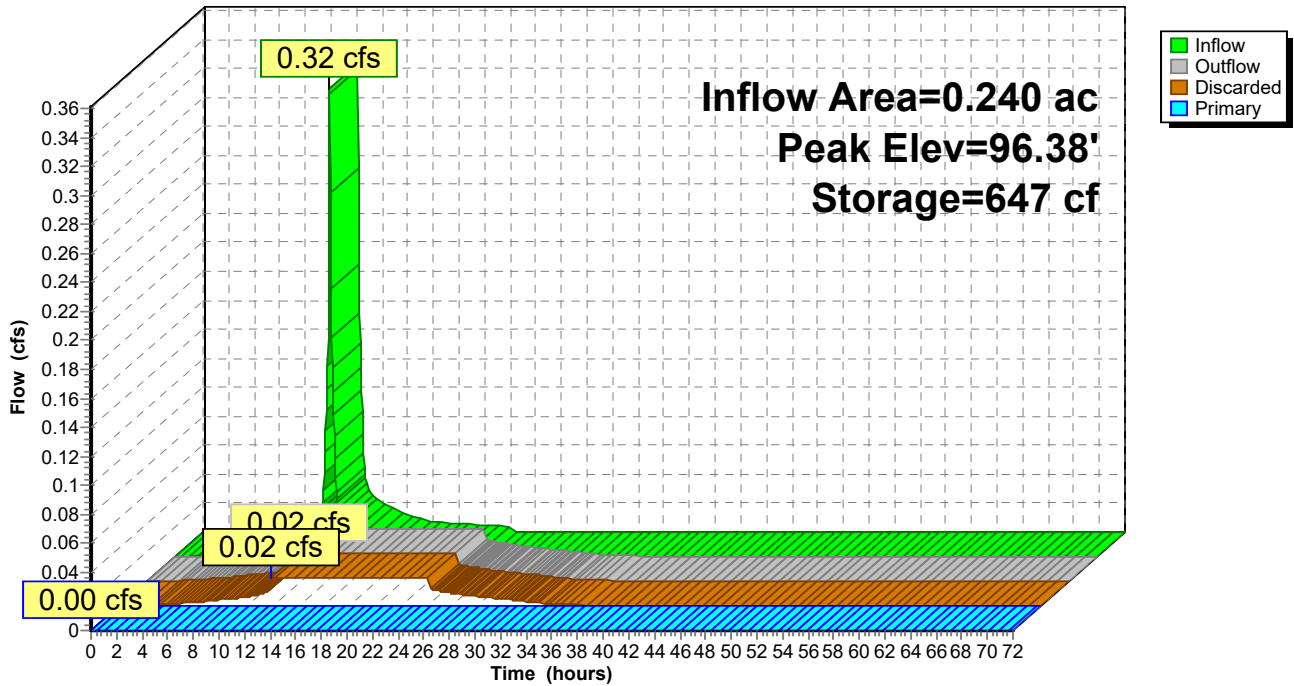
Device	Routing	Invert	Outlet Devices
#1	Discarded	91.50'	1.020 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Primary	99.94'	20.0' long x 0.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#3	Primary	100.00'	24.0" x 24.0" Horiz. Automatic Storage Overflow C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.02 cfs @ 11.80 hrs HW=94.28' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=91.50' (Free Discharge)
 ↑2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)
 ↑3=Automatic Storage Overflow (Controls 0.00 cfs)

Pond D-1: Leaching Field

Hydrograph



0 Annette Lane

Type III 24-hr 25-YR Rainfall=6.22"

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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

Subcatchment P-1B: Northerly

Runoff Area=7,457 sf 0.00% Impervious Runoff Depth=0.40"
Tc=6.0 min CN=37 Runoff=0.02 cfs 0.006 af

Subcatchment R-1: Roof

Runoff Area=3,009 sf 100.00% Impervious Runoff Depth=5.98"
Tc=6.0 min CN=98 Runoff=0.41 cfs 0.034 af

Pond D-1: Leaching Field

Peak Elev=97.93' Storage=977 cf Inflow=0.41 cfs 0.040 af
Discarded=0.02 cfs 0.040 af Primary=0.00 cfs 0.000 af Outflow=0.02 cfs 0.040 af

Total Runoff Area = 0.240 ac Runoff Volume = 0.040 af Average Runoff Depth = 2.00"
71.25% Pervious = 0.171 ac 28.75% Impervious = 0.069 ac

Summary for Subcatchment P-1B: Northerly

Runoff = 0.02 cfs @ 12.37 hrs, Volume= 0.006 af, Depth= 0.40"

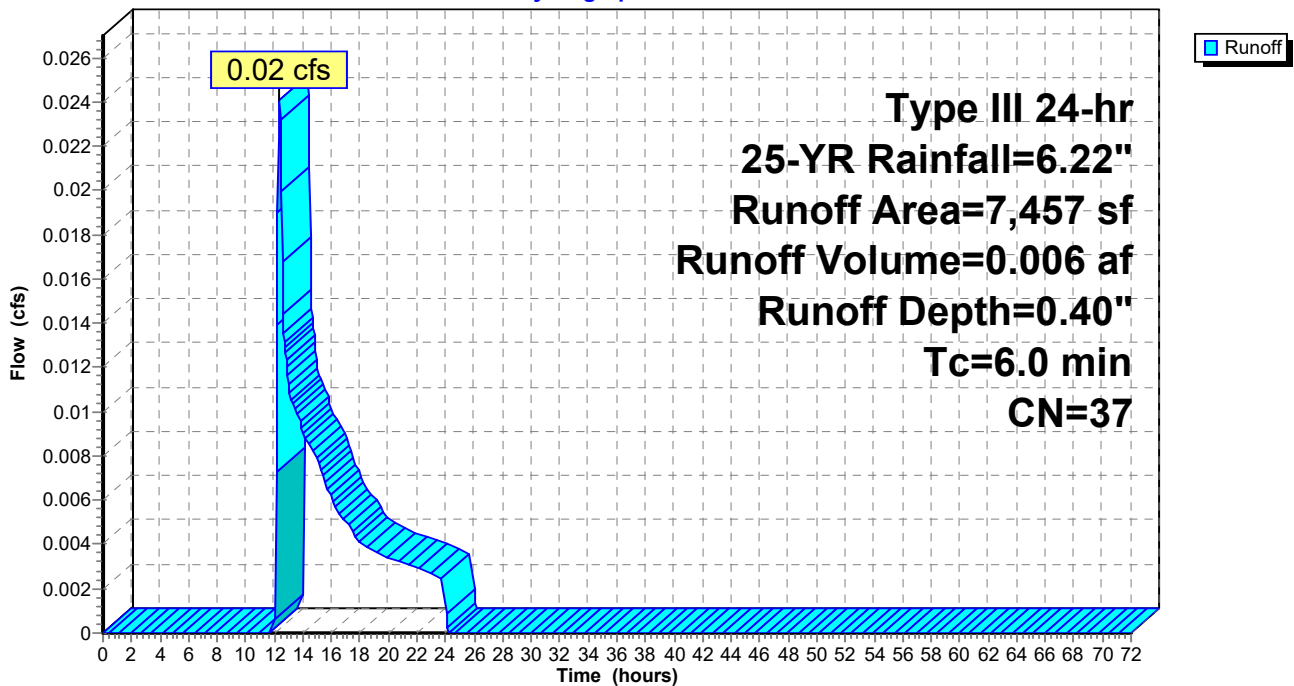
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 Type III 24-hr 25-YR Rainfall=6.22"

Area (sf)	CN	Description
1,842	30	Woods, Good, HSG A
5,615	39	>75% Grass cover, Good, HSG A
7,457	37	Weighted Average
7,457		100.00% Pervious Area

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

Subcatchment P-1B: Northerly

Hydrograph



Summary for Subcatchment R-1: Roof

Runoff = 0.41 cfs @ 12.09 hrs, Volume= 0.034 af, Depth= 5.98"

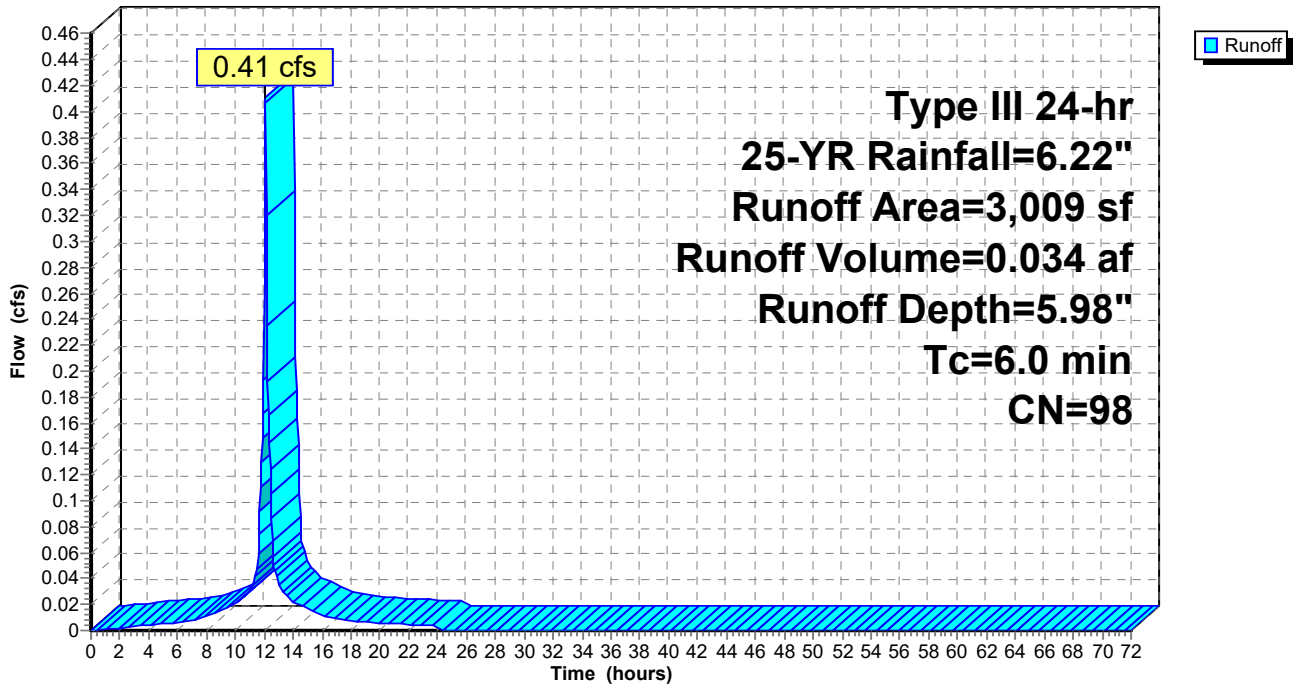
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 Type III 24-hr 25-YR Rainfall=6.22"

Area (sf)	CN	Description
3,009	98	Unconnected roofs, HSG A
3,009		100.00% Impervious Area
3,009		100.00% Unconnected

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

Subcatchment R-1: Roof

Hydrograph



Summary for Pond D-1: Leaching Field

[42] Hint: Gap in defined storage above volume #4 at 92.50'

[92] Warning: Device #3 is above defined storage

Inflow Area = 0.240 ac, 28.75% Impervious, Inflow Depth = 2.00" for 25-YR event
 Inflow = 0.41 cfs @ 12.09 hrs, Volume= 0.040 af
 Outflow = 0.02 cfs @ 11.40 hrs, Volume= 0.040 af, Atten= 95%, Lag= 0.0 min
 Discarded = 0.02 cfs @ 11.40 hrs, Volume= 0.040 af
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 Peak Elev= 97.93' @ 15.70 hrs Surf.Area= 841 sf Storage= 977 cf

Plug-Flow detention time= 518.4 min calculated for 0.040 af (100% of inflow)
 Center-of-Mass det. time= 519.2 min (1,295.9 - 776.7)

Volume	Invert	Avail.Storage	Storage Description
#1	94.20'	349 cf	31.00'W x 11.00'L x 4.75'H Field A 1,620 cf Overall - 748 cf Embedded = 872 cf x 40.0% Voids
#2	94.70'	557 cf	Shea Leaching Chamber 4x4x4 x 12 Inside #1 Inside= 42.2"W x 45.0"H => 13.25 sf x 3.50'L = 46.4 cf Outside= 54.0"W x 51.0"H => 15.58 sf x 4.00'L = 62.3 cf
#3	98.95'	3 cf	2.00'D x 1.00'H Frame & Grate
#4	91.50'	218 cf	Custom Stage Data (Prismatic) Listed below
#5	98.00'	590 cf	2.00'W x 370.00'L x 2.00'H Stone Trench 1,480 cf Overall - 4 cf Embedded = 1,476 cf x 40.0% Voids
#6	98.50'	4 cf	6.0" Round Pipe Storage Inside #5 L= 20.0'
		1,720 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
91.50	0	0	0
92.00	185	46	46
92.50	500	171	218

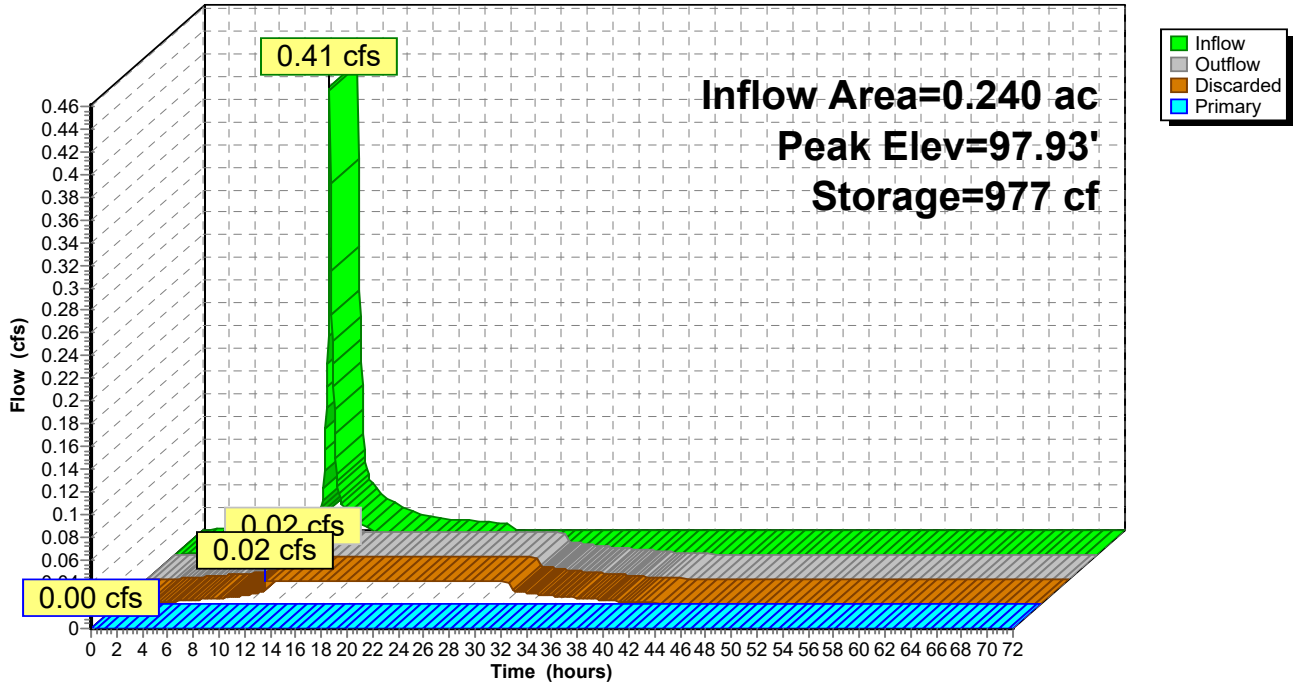
Device	Routing	Invert	Outlet Devices
#1	Discarded	91.50'	1.020 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Primary	99.94'	20.0' long x 0.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#3	Primary	100.00'	24.0" x 24.0" Horiz. Automatic Storage Overflow C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.02 cfs @ 11.40 hrs HW=94.22' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=91.50' (Free Discharge)
 ↑2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)
 ↑3=Automatic Storage Overflow (Controls 0.00 cfs)

Pond D-1: Leaching Field

Hydrograph



0 Annette Lane

Type III 24-hr 100-YR Rainfall=8.94"

Prepared by {enter your company name here}

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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

Subcatchment P-1B: Northerly

Runoff Area=7,457 sf 0.00% Impervious Runoff Depth=1.36"
Tc=6.0 min CN=37 Runoff=0.18 cfs 0.019 af

Subcatchment R-1: Roof

Runoff Area=3,009 sf 100.00% Impervious Runoff Depth=8.70"
Tc=6.0 min CN=98 Runoff=0.59 cfs 0.050 af

Pond D-1: Leaching Field

Peak Elev=99.89' Storage=1,689 cf Inflow=0.76 cfs 0.069 af
Discarded=0.04 cfs 0.069 af Primary=0.00 cfs 0.000 af Outflow=0.04 cfs 0.069 af

Total Runoff Area = 0.240 ac Runoff Volume = 0.069 af Average Runoff Depth = 3.47"
71.25% Pervious = 0.171 ac 28.75% Impervious = 0.069 ac

Summary for Subcatchment P-1B: Northerly

Runoff = 0.18 cfs @ 12.12 hrs, Volume= 0.019 af, Depth= 1.36"

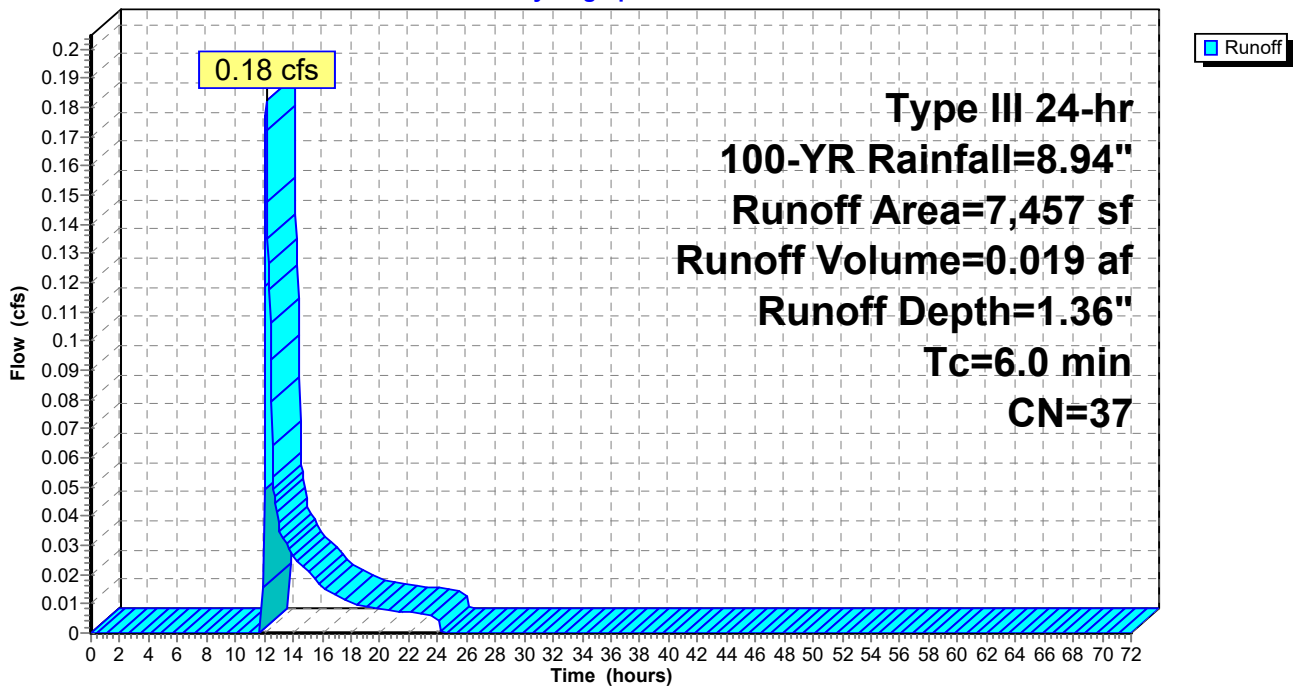
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 Type III 24-hr 100-YR Rainfall=8.94"

Area (sf)	CN	Description
1,842	30	Woods, Good, HSG A
5,615	39	>75% Grass cover, Good, HSG A
7,457	37	Weighted Average
7,457		100.00% Pervious Area

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

Subcatchment P-1B: Northerly

Hydrograph



Summary for Subcatchment R-1: Roof

Runoff = 0.59 cfs @ 12.09 hrs, Volume= 0.050 af, Depth= 8.70"

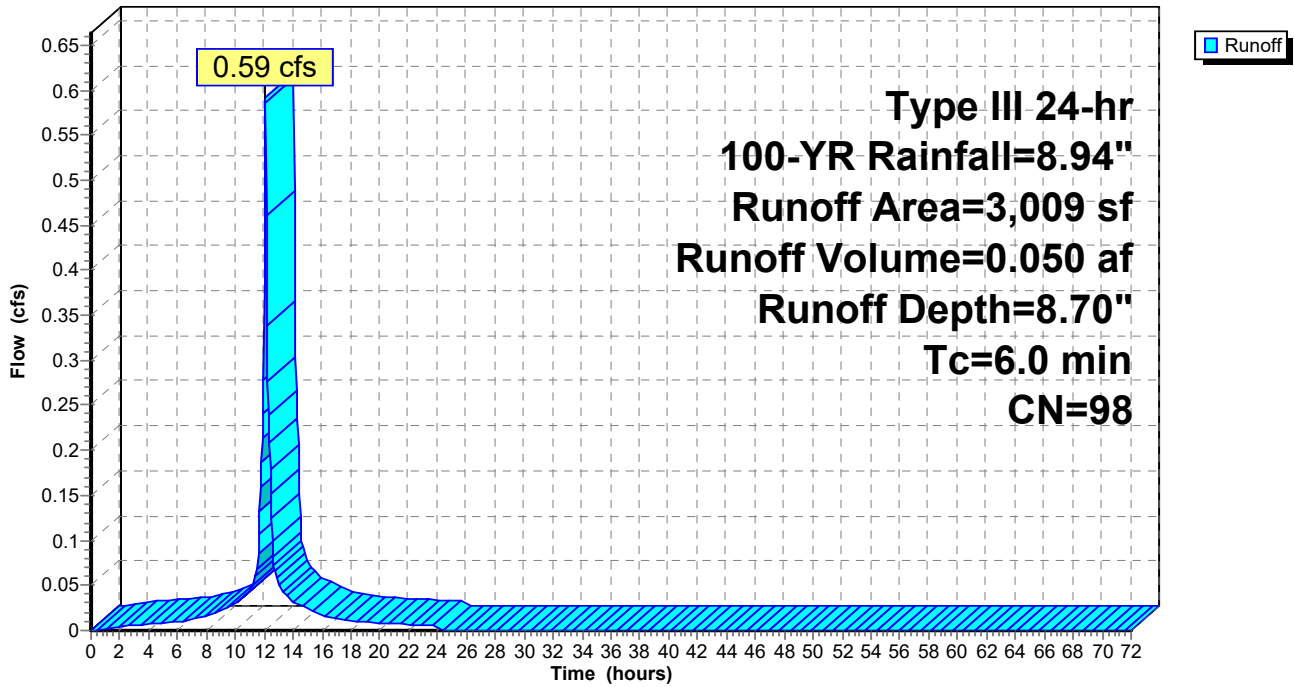
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 Type III 24-hr 100-YR Rainfall=8.94"

Area (sf)	CN	Description
3,009	98	Unconnected roofs, HSG A
3,009		100.00% Impervious Area
3,009		100.00% Unconnected

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

Subcatchment R-1: Roof

Hydrograph



Summary for Pond D-1: Leaching Field

[42] Hint: Gap in defined storage above volume #4 at 92.50'

[92] Warning: Device #3 is above defined storage

Inflow Area = 0.240 ac, 28.75% Impervious, Inflow Depth = 3.47" for 100-YR event
 Inflow = 0.76 cfs @ 12.10 hrs, Volume= 0.069 af
 Outflow = 0.04 cfs @ 12.60 hrs, Volume= 0.069 af, Atten= 95%, Lag= 30.2 min
 Discarded = 0.04 cfs @ 12.60 hrs, Volume= 0.069 af
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 Peak Elev= 99.89' @ 15.62 hrs Surf.Area= 1,584 sf Storage= 1,689 cf

Plug-Flow detention time= 544.4 min calculated for 0.069 af (100% of inflow)
 Center-of-Mass det. time= 545.2 min (1,332.2 - 787.0)

Volume	Invert	Avail.Storage	Storage Description
#1	94.20'	349 cf	31.00'W x 11.00'L x 4.75'H Field A 1,620 cf Overall - 748 cf Embedded = 872 cf x 40.0% Voids
#2	94.70'	557 cf	Shea Leaching Chamber 4x4x4 x 12 Inside #1 Inside= 42.2"W x 45.0"H => 13.25 sf x 3.50'L = 46.4 cf Outside= 54.0"W x 51.0"H => 15.58 sf x 4.00'L = 62.3 cf
#3	98.95'	3 cf	2.00'D x 1.00'H Frame & Grate
#4	91.50'	218 cf	Custom Stage Data (Prismatic) Listed below
#5	98.00'	590 cf	2.00'W x 370.00'L x 2.00'H Stone Trench 1,480 cf Overall - 4 cf Embedded = 1,476 cf x 40.0% Voids
#6	98.50'	4 cf	6.0" Round Pipe Storage Inside #5 L= 20.0'
		1,720 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
91.50	0	0	0
92.00	185	46	46
92.50	500	171	218

Device	Routing	Invert	Outlet Devices
#1	Discarded	91.50'	1.020 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Primary	99.94'	20.0' long x 0.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#3	Primary	100.00'	24.0" x 24.0" Horiz. Automatic Storage Overflow C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.04 cfs @ 12.60 hrs HW=98.97' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.04 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=91.50' (Free Discharge)
 ↑2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)
 ↑3=Automatic Storage Overflow (Controls 0.00 cfs)

Pond D-1: Leaching Field

Hydrograph

