

Technical Memorandum – Stormwater Management Report

October 8, 2021

From: Patrick P. Doherty, PE, LEED AP

RE: Planning Board & Conservation Commission Applications
Hotel Redevelopment Plan
21 New Boston Road, Sturbridge, MA

This Stormwater Management Report (the Report) has been prepared to demonstrate compliance with the Commonwealth of Massachusetts Department of Environmental Protection (DEP) and Town of Sturbridge regulations for drainage design associated with Special Permit and Site Plan review. The Project's stormwater management design utilized the Massachusetts Department of Environmental Protection (MassDEP) Stormwater Management Handbook as a guide.

Project Description

The Applicant, Om Shri Ambika, LLC, is proposing to modify the site plan for a portion of the Hotel Redevelopment Plan located at 21 New Boston Road in Sturbridge Massachusetts. The project was approved in 2018 and areas of the site south of the gas pipeline easement have been constructed. A pad area north of the easement was proposed to be used as a 3,775 square foot bank with drive-thru. A parking area with capacity of 42 vehicles was proposed to support the Bank use. The applicant wishes to modify the plan by replacing the proposed Bank use with a 4,804 square foot full-service restaurant with outdoor patio. A parking area with capacity of 65 vehicles is proposed to support the Restaurant use. The location of the building, the project limit of work and features of the stormwater management system (including location of catch basins, discharge points and proposed BMP's) remain the same as the previously approved site plan. The modified plan will increase impervious coverage of the site by 4,251 square feet. Which includes a 2,327 square feet increase in impervious coverage of roof and patio areas and 1,924 square feet increase in paved parking area. To mitigate this increased impervious coverage the proposed underground changer infiltration system volume will be increase by adding one row of chambers to the design.

Stormwater management system.

Stormwater management for the project was designed so that areas north and south of the existing gas pipeline are independent systems with separate discharge points. Areas south of the site remain unchanged from the original design and have been constructed in accordance with the approved plans.

The stormwater management report prepared for the project analyzed peak flowrate of runoff from the site. Under existing and proposed conditions runoff flows in a east-west direction and ultimately flows off site to Cedar Pond. Runoff from developed areas north of the pipeline is captured by deep sump catch basins and/or the roof drainage system. The runoff from parking areas flows through a Stormceptor water quality unit. The roof and parking area runoff then flows through an underground chamber infiltration

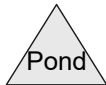
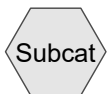
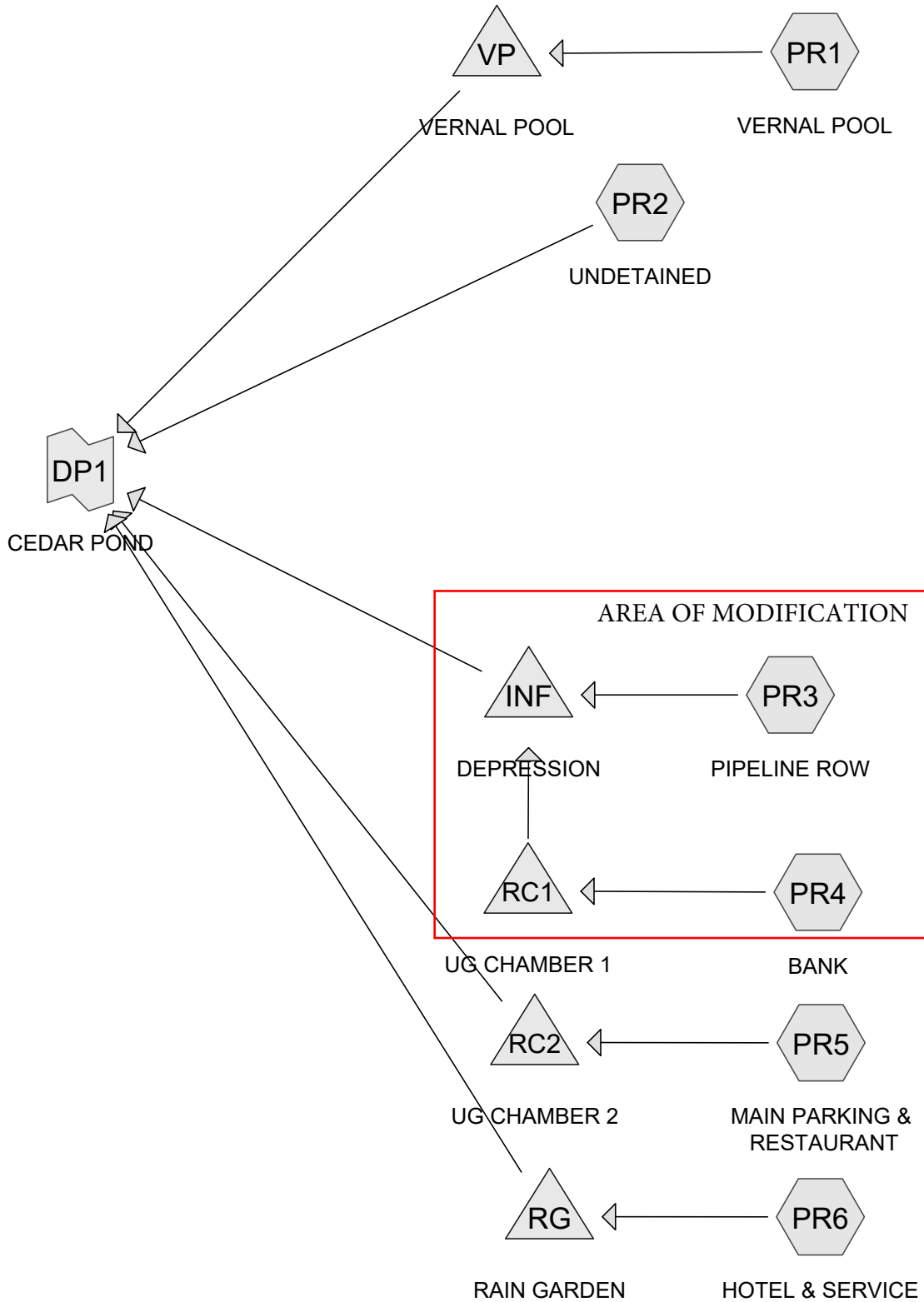
system. The infiltration system, during infrequent design storms, overflows and is discharged to a depression in the landscape south of the vernal pool. This depression would overflow towards Cedar Pond.

To determine impacts associated with modification of the north area of the site, MidPoint updated the hydrologic model of the site. The model was changed to reflect the increased impervious coverage of the Restaurant plan as well as the addition of one row of chambers to the underground infiltration area in the parking area of the Restaurant.

The model results indicate that during all design storms runoff from the developed area north of the site will remain on-site and will be infiltrated within the underground infiltration system or the depression located south of the vernal pool. During a 100-year design storm event the elevation of pooling water within the depression will increase by an insignificant amount less than 0.1 feet.

Attached please find hydrologic model results for the original and modified analysis of areas north of the gas pipeline.

Please contact me should you have any questions or require additional information.



Summary for Subcatchment PR3: PIPELINE ROW

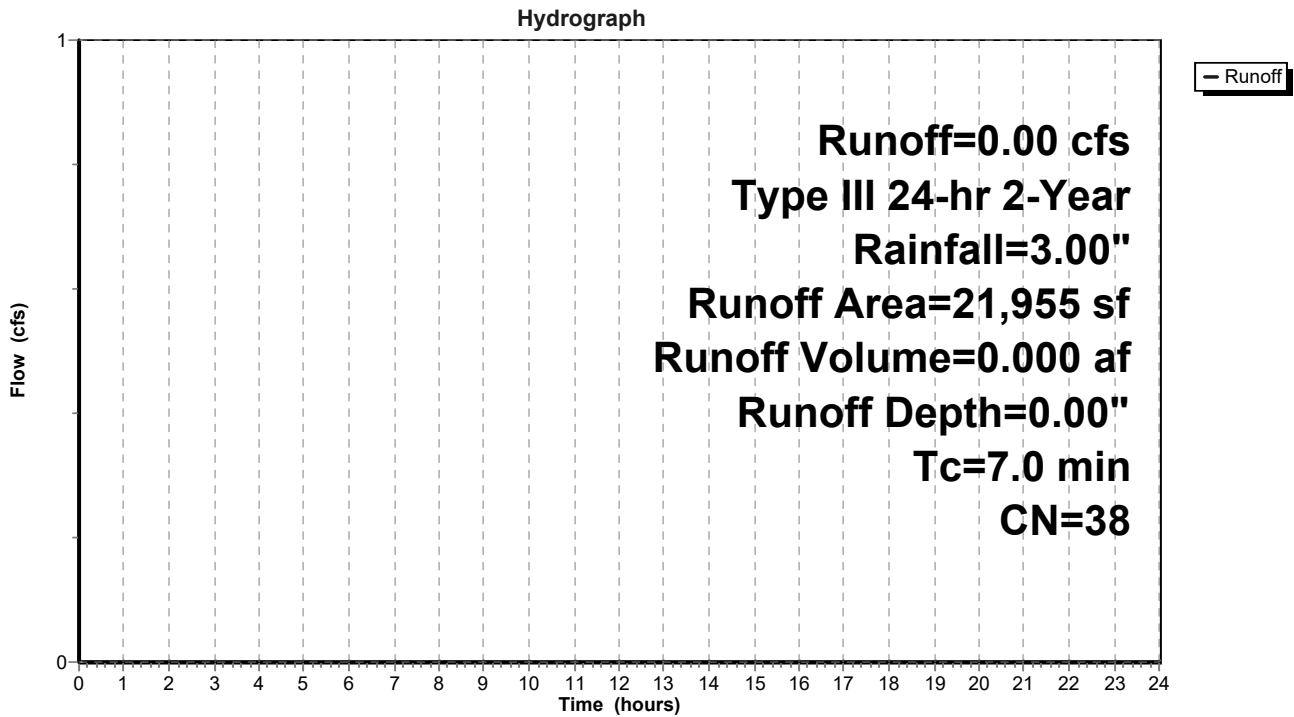
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Type III 24-hr 2-Year Rainfall=3.00"

Area (sf)	CN	Description
20,286	36	Woods, Fair, HSG A
1,669	61	>75% Grass cover, Good, HSG B
21,955	38	Weighted Average
21,955		100.00% Pervious Area

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

Subcatchment PR3: PIPELINE ROW



Summary for Subcatchment PR4: BANK

Runoff = 0.84 cfs @ 12.09 hrs, Volume= 0.064 af, Depth> 0.76"

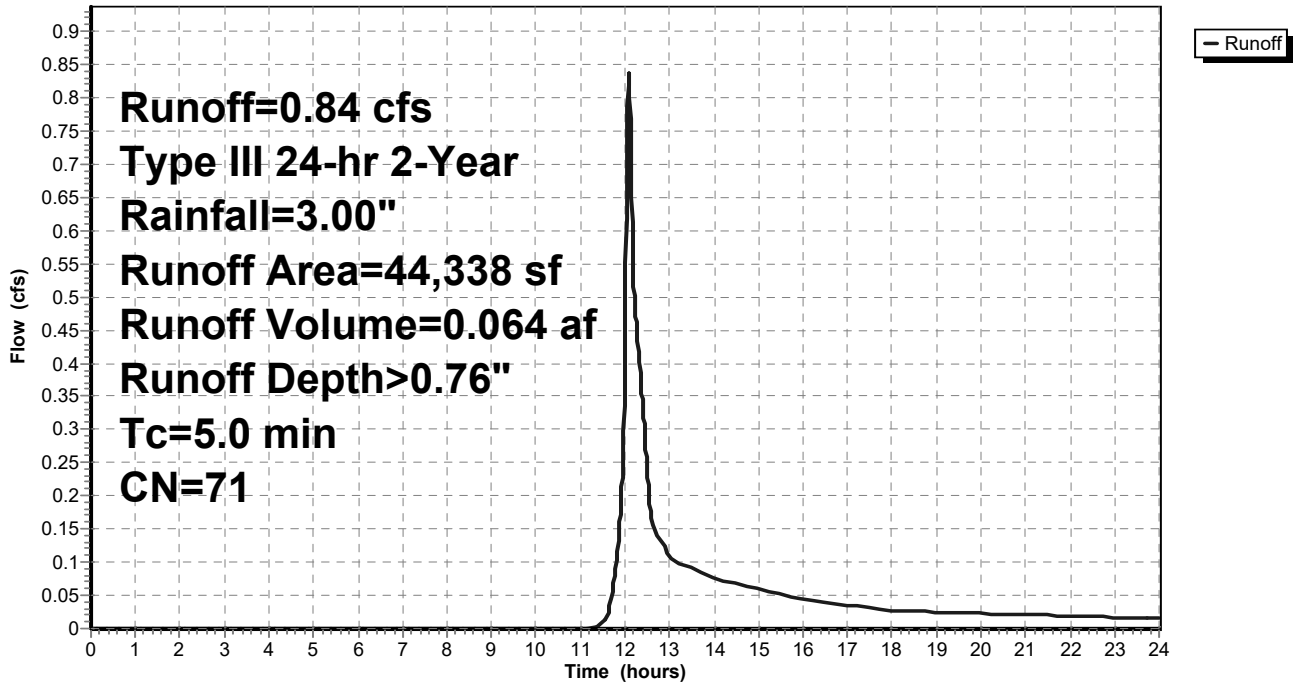
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Type III 24-hr 2-Year Rainfall=3.00"

	Area (sf)	CN	Description
*	23,810	98	Paved parking
	20,528	39	>75% Grass cover, Good, HSG A
	44,338	71	Weighted Average
	20,528		46.30% Pervious Area
	23,810		53.70% Impervious Area

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

Subcatchment PR4: BANK

Hydrograph



Summary for Pond INF: DEPRESSION

Inflow Area = 1.522 ac, 35.92% Impervious, Inflow Depth = 0.00" for 2-Year event
 Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
 Discarded = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 583.00' @ 0.00 hrs Surf.Area= 690 sf Storage= 0 cf

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

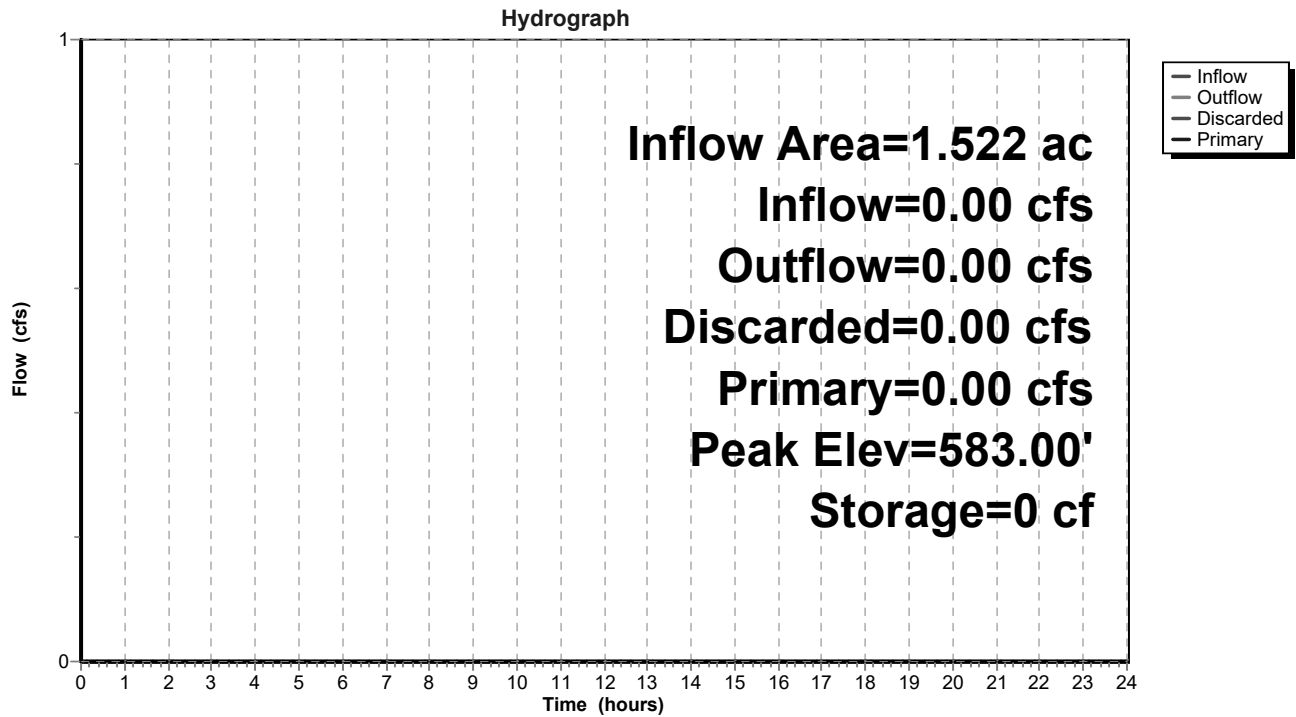
Volume	Invert	Avail.Storage	Storage Description
#1	583.00'	24,183 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
583.00	690	0	0
584.00	3,464	2,077	2,077
585.00	5,103	4,284	6,361
586.00	6,710	5,907	12,267
587.00	8,251	7,481	19,748
587.50	9,492	4,436	24,183

Device	Routing	Invert	Outlet Devices
#1	Discarded	583.00'	2.410 in/hr Exfiltration over Surface area
#2	Primary	587.00'	12.0' long x 1.0' 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 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Discarded OutFlow Max=0.00 cfs @ 0.00 hrs HW=583.00' (Free Discharge)
 ↑1=Exfiltration (Passes 0.00 cfs of 0.04 cfs potential flow)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=583.00' (Free Discharge)
 ↑2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond INF: DEPRESSION



Summary for Pond RC1: UG CHAMBER 1

Inflow Area = 1.018 ac, 53.70% Impervious, Inflow Depth > 0.76" for 2-Year event
 Inflow = 0.84 cfs @ 12.09 hrs, Volume= 0.064 af
 Outflow = 0.05 cfs @ 11.79 hrs, Volume= 0.050 af, Atten= 94%, Lag= 0.0 min
 Discarded = 0.05 cfs @ 11.79 hrs, Volume= 0.050 af
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 594.78' @ 15.66 hrs Surf.Area= 0.020 ac Storage= 0.031 af

Plug-Flow detention time= 283.0 min calculated for 0.050 af (78% of inflow)
 Center-of-Mass det. time= 195.0 min (1,070.2 - 875.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	592.50'	0.025 af	21.75'W x 40.62'L x 5.00'H Field A 0.101 af Overall - 0.038 af Embedded = 0.063 af x 40.0% Voids
#2A	593.25'	0.038 af	StormTech MC-3500 x 15 Inside #1 Effective Size= 69.0"W x 45.0"H => 15.35 sf x 7.17'L = 110.1 cf Overall Size= 75.0"W x 45.0"H x 7.50'L with 0.33' Overlap
		0.063 af	Total Available Storage

Storage Group A created with Chamber Wizard

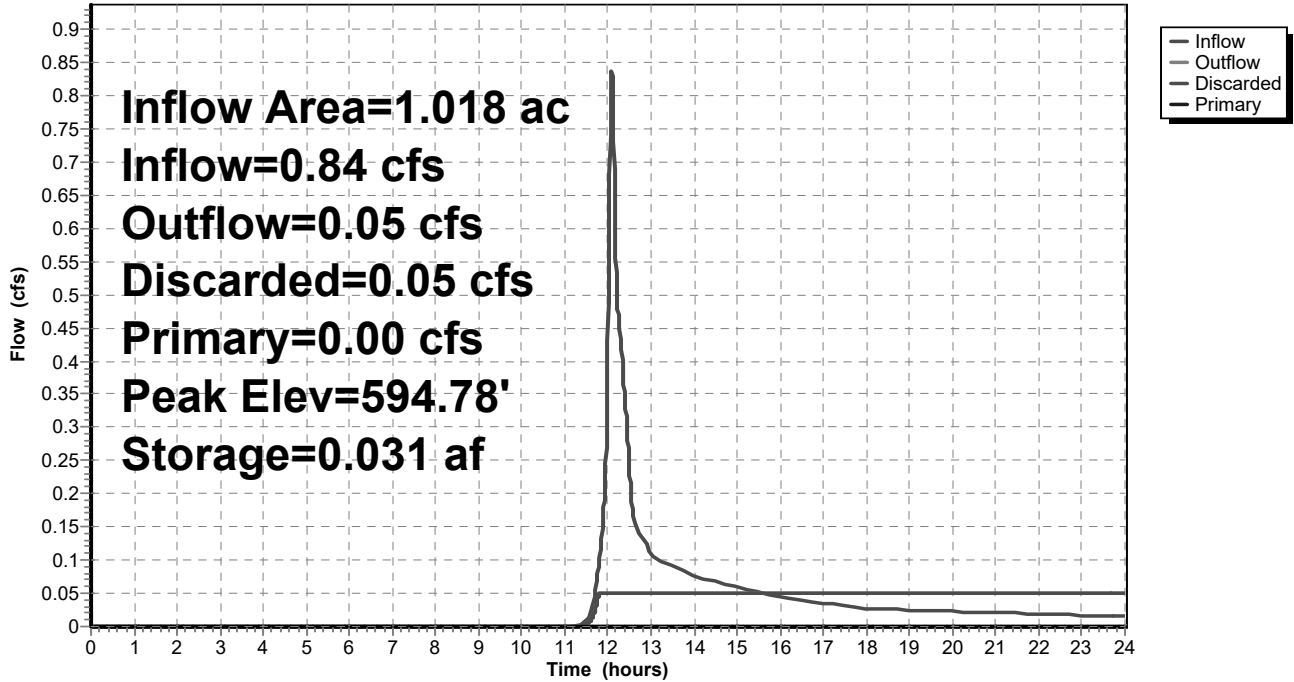
Device	Routing	Invert	Outlet Devices
#1	Primary	596.50'	4.0' long x 1.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32
#2	Discarded	592.50'	2.410 in/hr Exfiltration over Surface area

Discarded OutFlow Max=0.05 cfs @ 11.79 hrs HW=592.55' (Free Discharge)
 ↳2=Exfiltration (Exfiltration Controls 0.05 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=592.50' (Free Discharge)
 ↳1=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond RC1: UG CHAMBER 1

Hydrograph



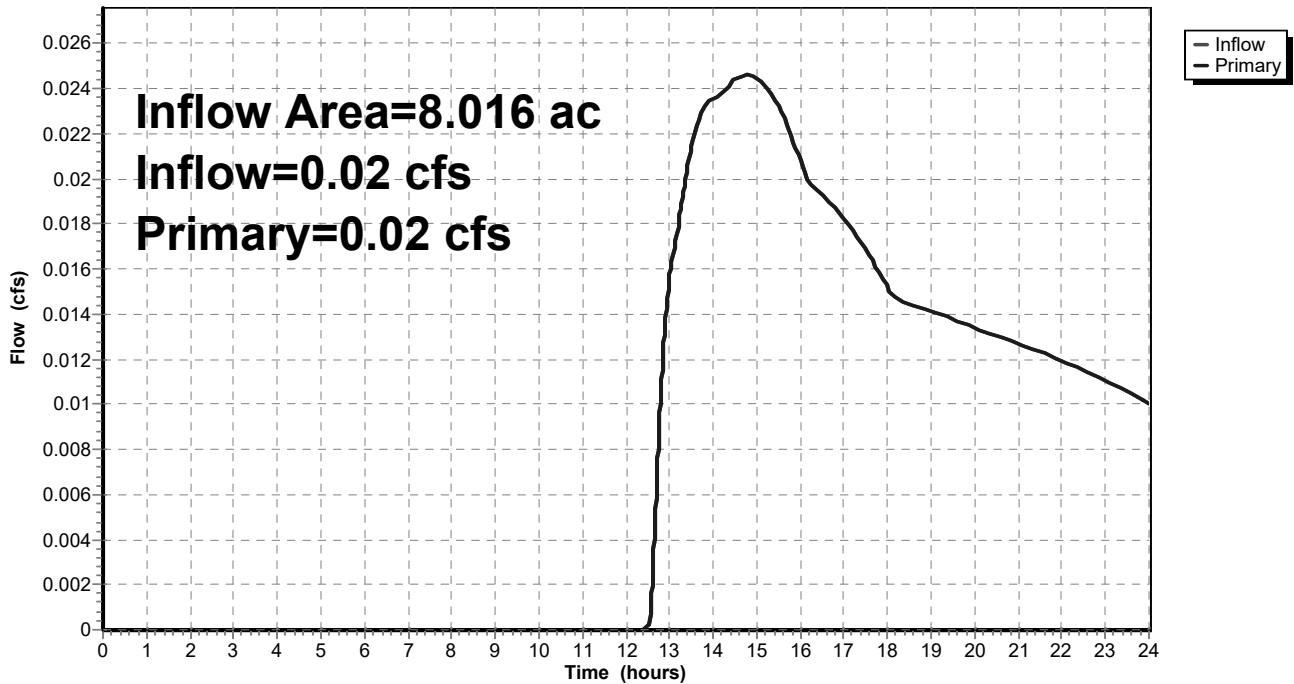
Summary for Link DP1: CEDAR POND

Inflow Area = 8.016 ac, 37.70% Impervious, Inflow Depth > 0.02" for 2-Year event
Inflow = 0.02 cfs @ 14.76 hrs, Volume= 0.015 af
Primary = 0.02 cfs @ 14.76 hrs, Volume= 0.015 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Link DP1: CEDAR POND

Hydrograph



Summary for Subcatchment PR3: PIPELINE ROW

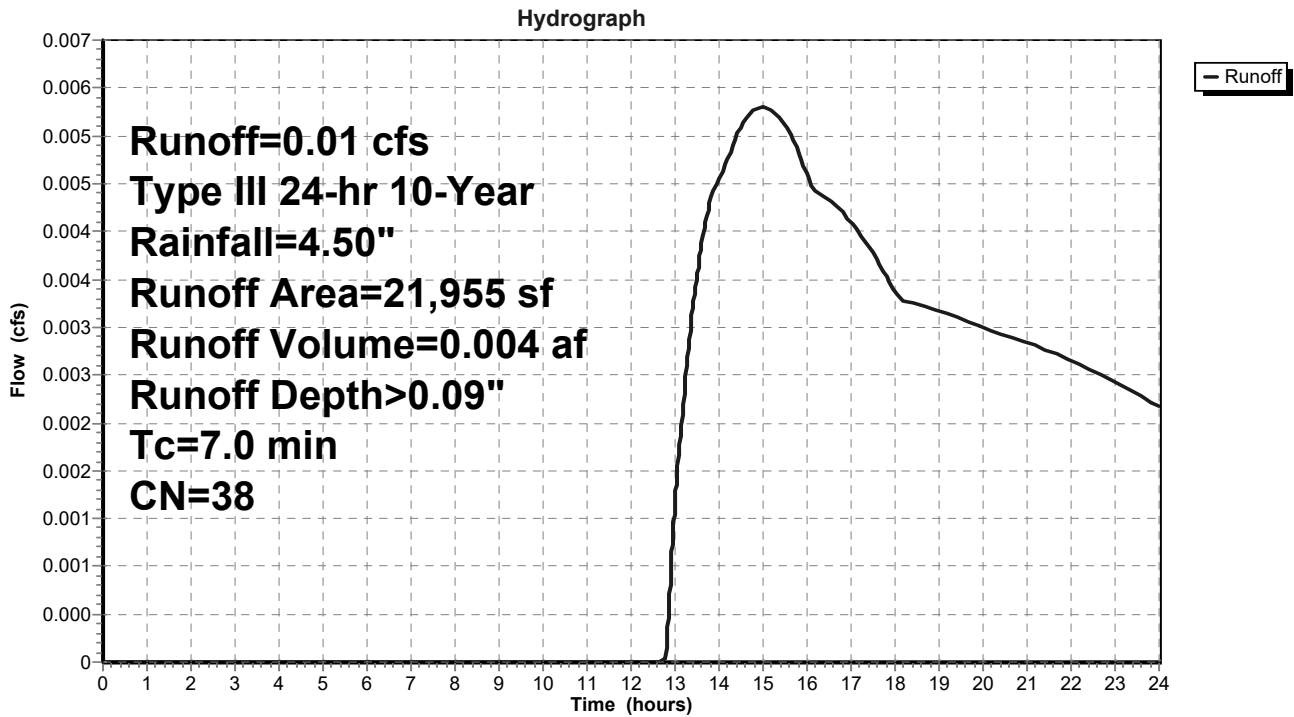
Runoff = 0.01 cfs @ 14.99 hrs, Volume= 0.004 af, Depth> 0.09"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
20,286	36	Woods, Fair, HSG A
1,669	61	>75% Grass cover, Good, HSG B
21,955	38	Weighted Average
21,955		100.00% Pervious Area

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

Subcatchment PR3: PIPELINE ROW



Summary for Subcatchment PR4: BANK

Runoff = 2.11 cfs @ 12.08 hrs, Volume= 0.148 af, Depth> 1.74"

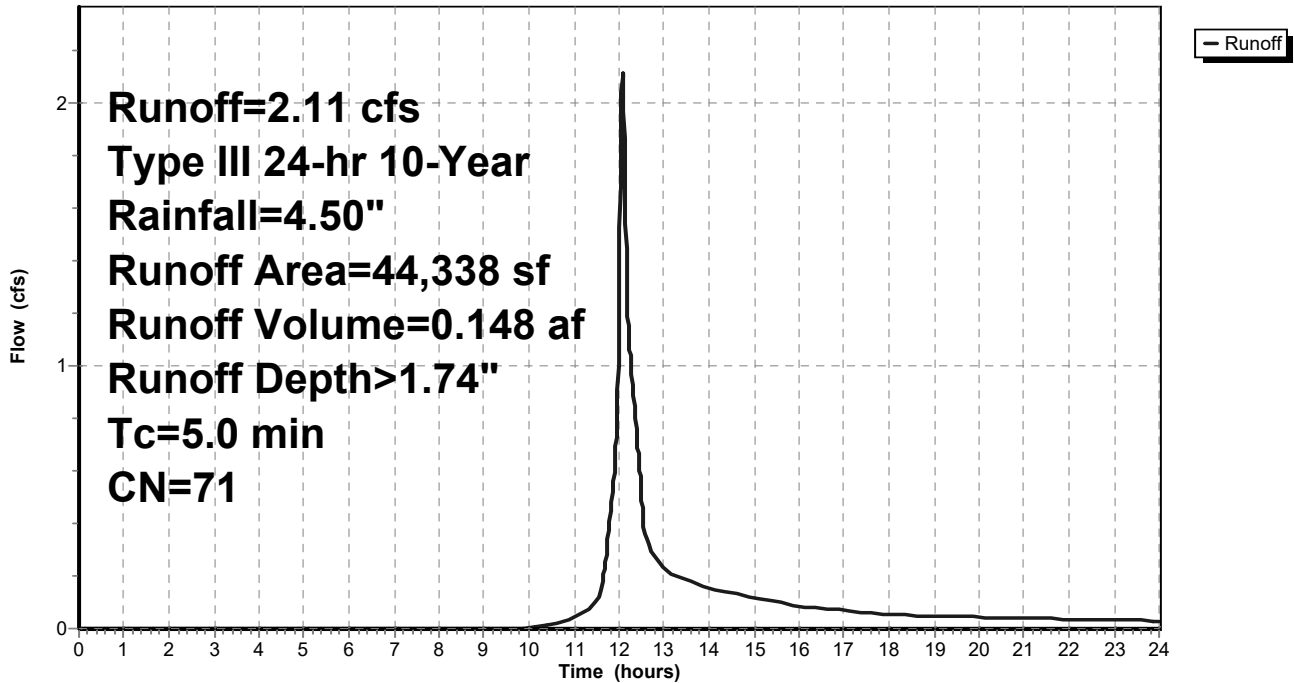
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Type III 24-hr 10-Year Rainfall=4.50"

	Area (sf)	CN	Description
*	23,810	98	Paved parking
	20,528	39	>75% Grass cover, Good, HSG A
	44,338	71	Weighted Average
	20,528		46.30% Pervious Area
	23,810		53.70% Impervious Area

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

Subcatchment PR4: BANK

Hydrograph



Summary for Pond INF: DEPRESSION

Inflow Area = 1.522 ac, 35.92% Impervious, Inflow Depth > 0.38" for 10-Year event
 Inflow = 0.64 cfs @ 12.42 hrs, Volume= 0.048 af
 Outflow = 0.11 cfs @ 13.96 hrs, Volume= 0.048 af, Atten= 82%, Lag= 92.2 min
 Discarded = 0.11 cfs @ 13.96 hrs, Volume= 0.048 af
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 583.49' @ 13.96 hrs Surf.Area= 2,057 sf Storage= 677 cf

Plug-Flow detention time= 75.6 min calculated for 0.048 af (100% of inflow)
 Center-of-Mass det. time= 75.0 min (918.5 - 843.5)

Volume	Invert	Avail.Storage	Storage Description
#1	583.00'	24,183 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
583.00	690	0	0
584.00	3,464	2,077	2,077
585.00	5,103	4,284	6,361
586.00	6,710	5,907	12,267
587.00	8,251	7,481	19,748
587.50	9,492	4,436	24,183

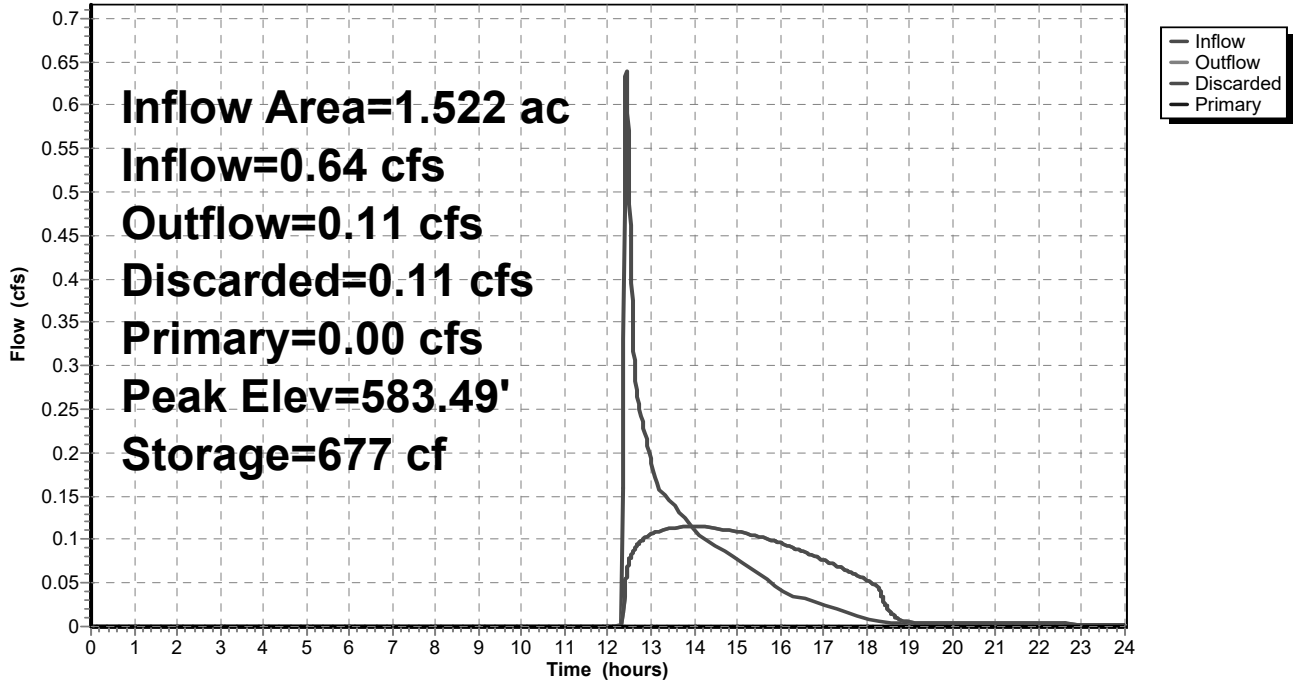
Device	Routing	Invert	Outlet Devices
#1	Discarded	583.00'	2.410 in/hr Exfiltration over Surface area
#2	Primary	587.00'	12.0' long x 1.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Discarded OutFlow Max=0.11 cfs @ 13.96 hrs HW=583.49' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.11 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=583.00' (Free Discharge)
 ↑2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond INF: DEPRESSION

Hydrograph



Summary for Pond RC1: UG CHAMBER 1

Inflow Area = 1.018 ac, 53.70% Impervious, Inflow Depth > 1.74" for 10-Year event
 Inflow = 2.11 cfs @ 12.08 hrs, Volume= 0.148 af
 Outflow = 0.69 cfs @ 12.42 hrs, Volume= 0.098 af, Atten= 67%, Lag= 20.5 min
 Discarded = 0.05 cfs @ 11.20 hrs, Volume= 0.054 af
 Primary = 0.64 cfs @ 12.42 hrs, Volume= 0.044 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 596.65' @ 12.42 hrs Surf.Area= 0.020 ac Storage= 0.056 af

Plug-Flow detention time= 201.9 min calculated for 0.098 af (66% of inflow)
 Center-of-Mass det. time= 94.8 min (944.0 - 849.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	592.50'	0.025 af	21.75'W x 40.62'L x 5.00'H Field A 0.101 af Overall - 0.038 af Embedded = 0.063 af x 40.0% Voids
#2A	593.25'	0.038 af	StormTech MC-3500 x 15 Inside #1 Effective Size= 69.0"W x 45.0"H => 15.35 sf x 7.17'L = 110.1 cf Overall Size= 75.0"W x 45.0"H x 7.50'L with 0.33' Overlap
		0.063 af	Total Available Storage

Storage Group A created with Chamber Wizard

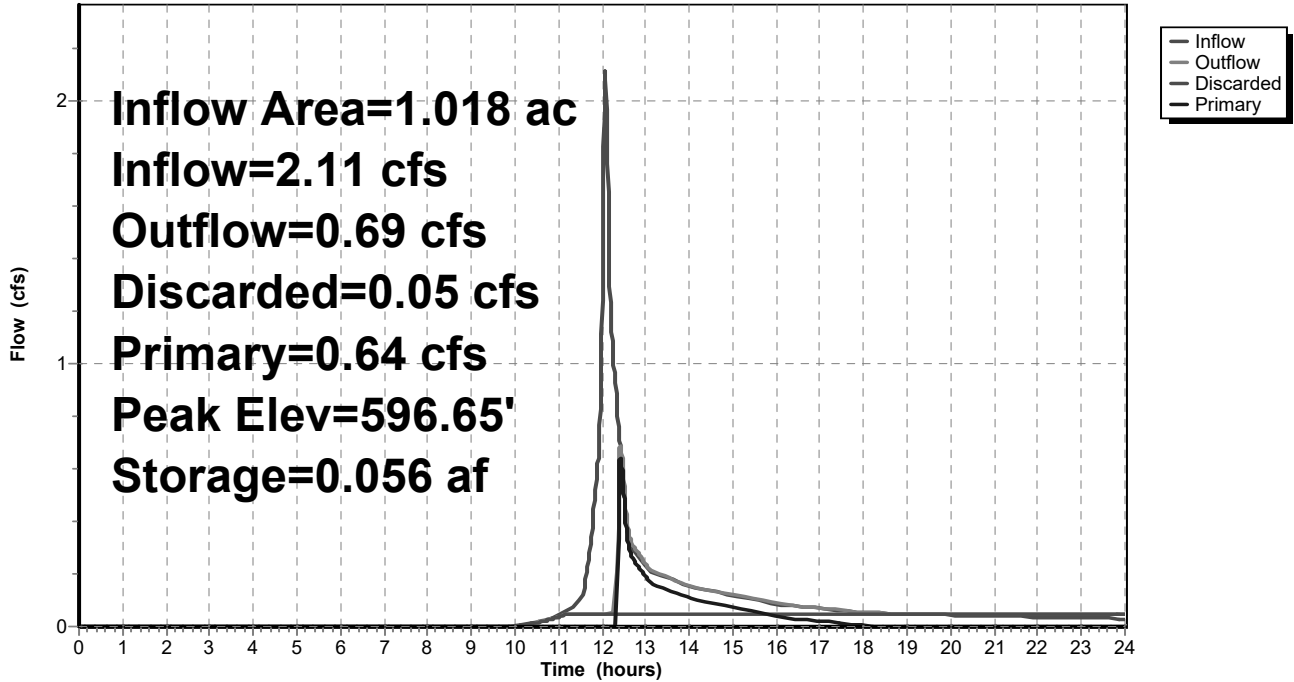
Device	Routing	Invert	Outlet Devices
#1	Primary	596.50'	4.0' long x 1.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32
#2	Discarded	592.50'	2.410 in/hr Exfiltration over Surface area

Discarded OutFlow Max=0.05 cfs @ 11.20 hrs HW=592.55' (Free Discharge)
 ↳**2=Exfiltration** (Exfiltration Controls 0.05 cfs)

Primary OutFlow Max=0.64 cfs @ 12.42 hrs HW=596.65' (Free Discharge)
 ↳**1=Broad-Crested Rectangular Weir** (Weir Controls 0.64 cfs @ 1.05 fps)

Pond RC1: UG CHAMBER 1

Hydrograph



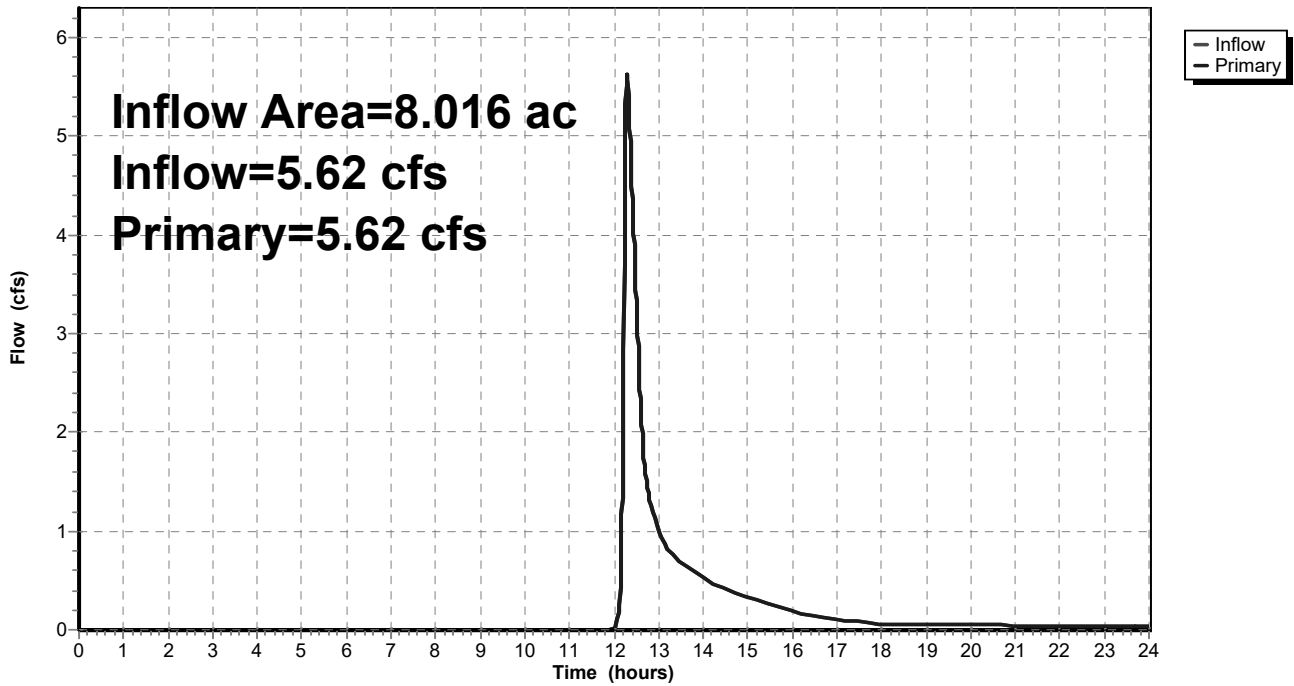
Summary for Link DP1: CEDAR POND

Inflow Area = 8.016 ac, 37.70% Impervious, Inflow Depth > 0.51" for 10-Year event
Inflow = 5.62 cfs @ 12.29 hrs, Volume= 0.341 af
Primary = 5.62 cfs @ 12.29 hrs, Volume= 0.341 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Link DP1: CEDAR POND

Hydrograph



Summary for Subcatchment PR3: PIPELINE ROW

Runoff = 0.02 cfs @ 12.48 hrs, Volume= 0.009 af, Depth> 0.23"

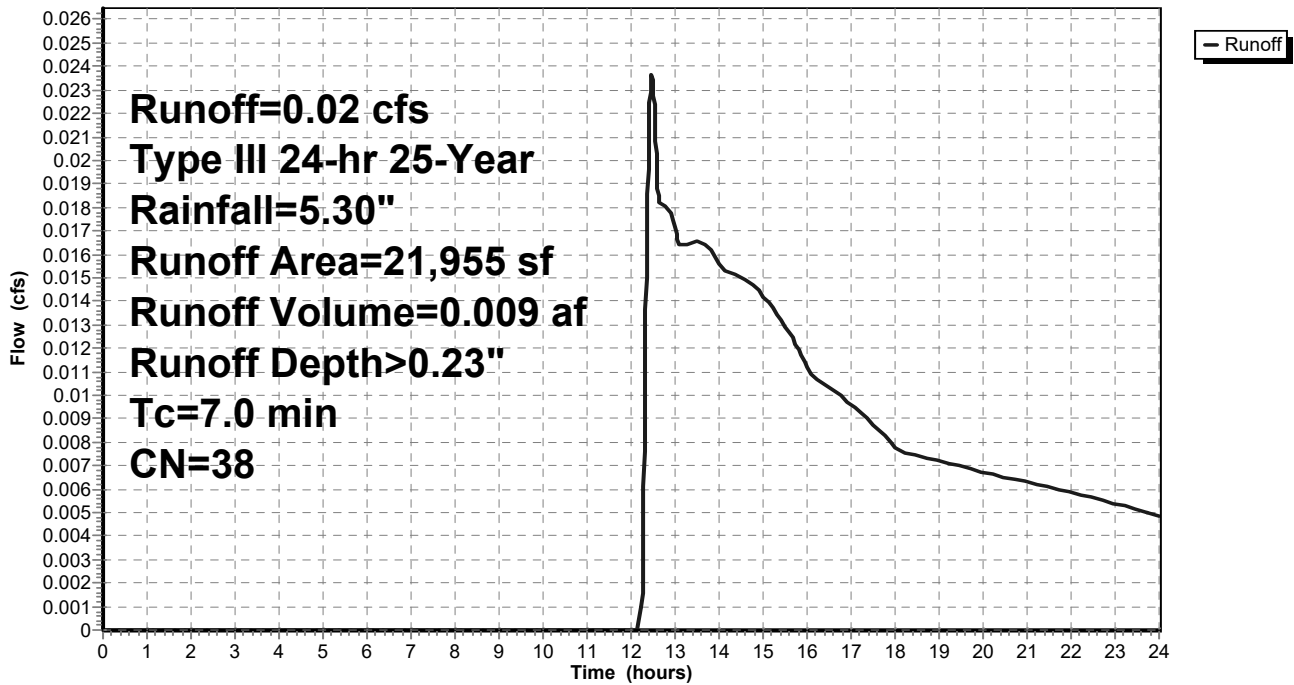
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Type III 24-hr 25-Year Rainfall=5.30"

Area (sf)	CN	Description
20,286	36	Woods, Fair, HSG A
1,669	61	>75% Grass cover, Good, HSG B
21,955	38	Weighted Average
21,955		100.00% Pervious Area

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

Subcatchment PR3: PIPELINE ROW

Hydrograph



Summary for Subcatchment PR4: BANK

Runoff = 2.88 cfs @ 12.08 hrs, Volume= 0.199 af, Depth> 2.34"

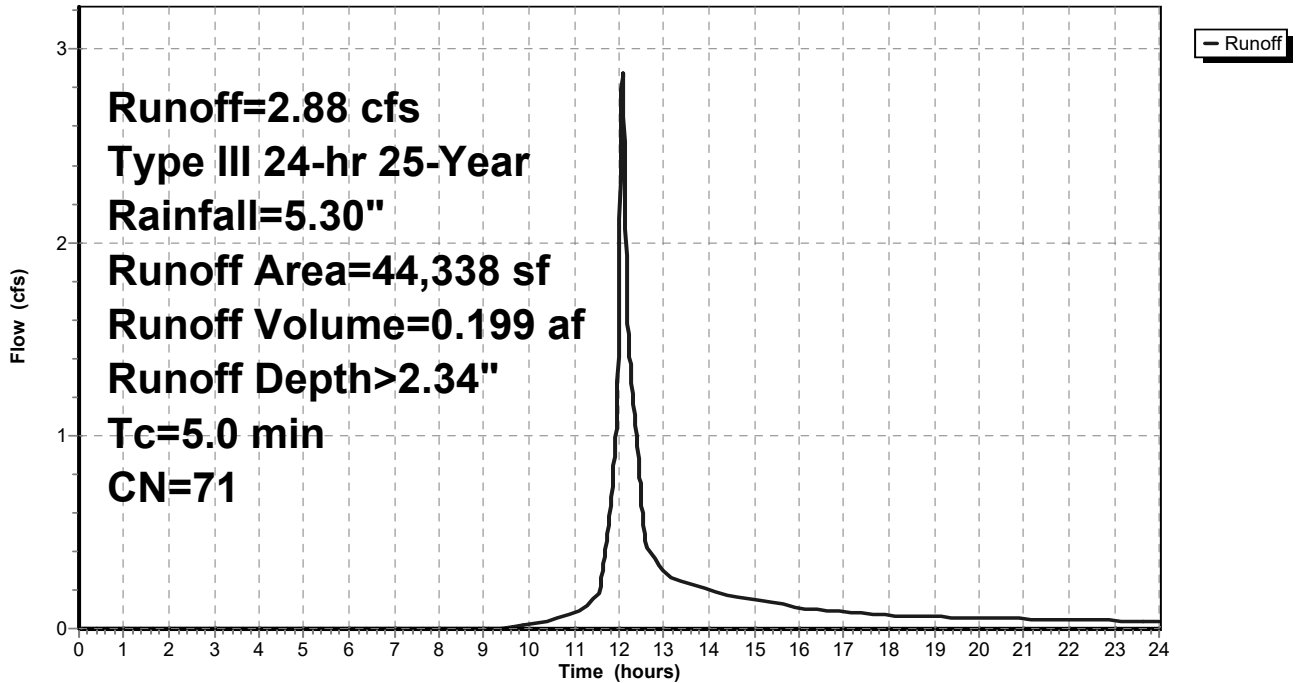
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Type III 24-hr 25-Year Rainfall=5.30"

	Area (sf)	CN	Description
*	23,810	98	Paved parking
	20,528	39	>75% Grass cover, Good, HSG A
	44,338	71	Weighted Average
	20,528		46.30% Pervious Area
	23,810		53.70% Impervious Area

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

Subcatchment PR4: BANK

Hydrograph



Summary for Pond INF: DEPRESSION

Inflow Area = 1.522 ac, 35.92% Impervious, Inflow Depth > 0.78" for 25-Year event
 Inflow = 1.63 cfs @ 12.19 hrs, Volume= 0.099 af
 Outflow = 0.18 cfs @ 13.82 hrs, Volume= 0.099 af, Atten= 89%, Lag= 98.0 min
 Discarded = 0.18 cfs @ 13.82 hrs, Volume= 0.099 af
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 583.92' @ 13.82 hrs Surf.Area= 3,235 sf Storage= 1,801 cf

Plug-Flow detention time= 128.5 min calculated for 0.099 af (100% of inflow)
 Center-of-Mass det. time= 128.0 min (959.0 - 831.1)

Volume	Invert	Avail.Storage	Storage Description
#1	583.00'	24,183 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
583.00	690	0	0
584.00	3,464	2,077	2,077
585.00	5,103	4,284	6,361
586.00	6,710	5,907	12,267
587.00	8,251	7,481	19,748
587.50	9,492	4,436	24,183

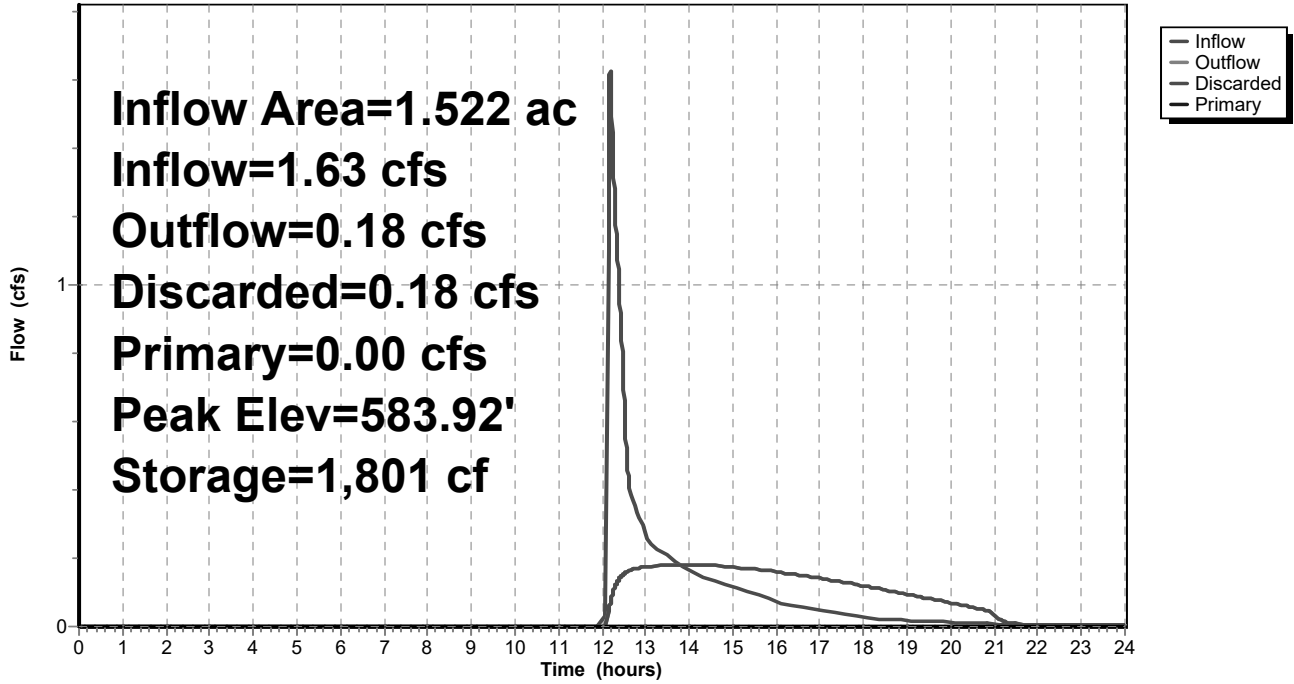
Device	Routing	Invert	Outlet Devices
#1	Discarded	583.00'	2.410 in/hr Exfiltration over Surface area
#2	Primary	587.00'	12.0' long x 1.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Discarded OutFlow Max=0.18 cfs @ 13.82 hrs HW=583.92' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.18 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=583.00' (Free Discharge)
 ↑2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond INF: DEPRESSION

Hydrograph



Summary for Pond RC1: UG CHAMBER 1

Inflow Area = 1.018 ac, 53.70% Impervious, Inflow Depth > 2.34" for 25-Year event
 Inflow = 2.88 cfs @ 12.08 hrs, Volume= 0.199 af
 Outflow = 1.68 cfs @ 12.19 hrs, Volume= 0.146 af, Atten= 42%, Lag= 6.6 min
 Discarded = 0.05 cfs @ 10.70 hrs, Volume= 0.056 af
 Primary = 1.63 cfs @ 12.19 hrs, Volume= 0.089 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 596.78' @ 12.19 hrs Surf.Area= 0.020 ac Storage= 0.057 af

Plug-Flow detention time= 147.5 min calculated for 0.146 af (73% of inflow)
 Center-of-Mass det. time= 54.2 min (894.7 - 840.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	592.50'	0.025 af	21.75'W x 40.62'L x 5.00'H Field A 0.101 af Overall - 0.038 af Embedded = 0.063 af x 40.0% Voids
#2A	593.25'	0.038 af	StormTech MC-3500 x 15 Inside #1 Effective Size= 69.0"W x 45.0"H => 15.35 sf x 7.17'L = 110.1 cf Overall Size= 75.0"W x 45.0"H x 7.50'L with 0.33' Overlap
		0.063 af	Total Available Storage

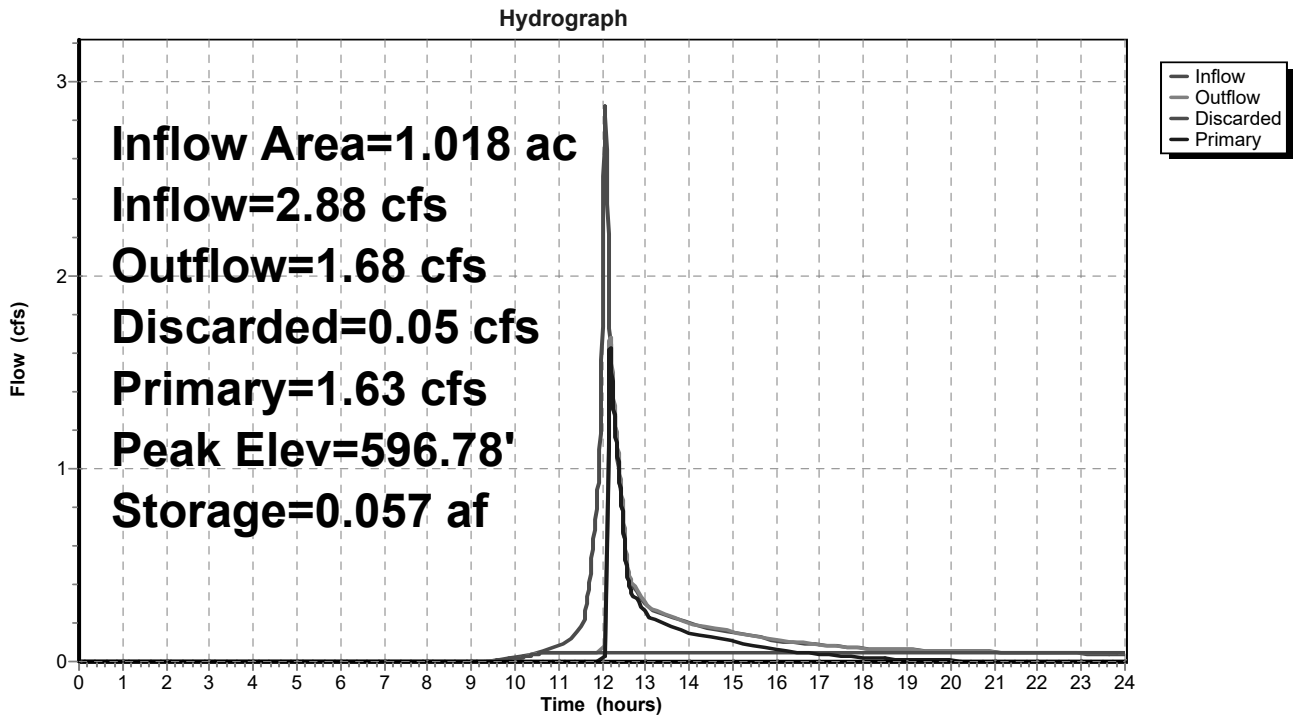
Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	596.50'	4.0' long x 1.0' 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 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32
#2	Discarded	592.50'	2.410 in/hr Exfiltration over Surface area

Discarded OutFlow Max=0.05 cfs @ 10.70 hrs HW=592.55' (Free Discharge)
 ↳2=Exfiltration (Exfiltration Controls 0.05 cfs)

Primary OutFlow Max=1.62 cfs @ 12.19 hrs HW=596.78' (Free Discharge)
 ↳1=Broad-Crested Rectangular Weir (Weir Controls 1.62 cfs @ 1.43 fps)

Pond RC1: UG CHAMBER 1



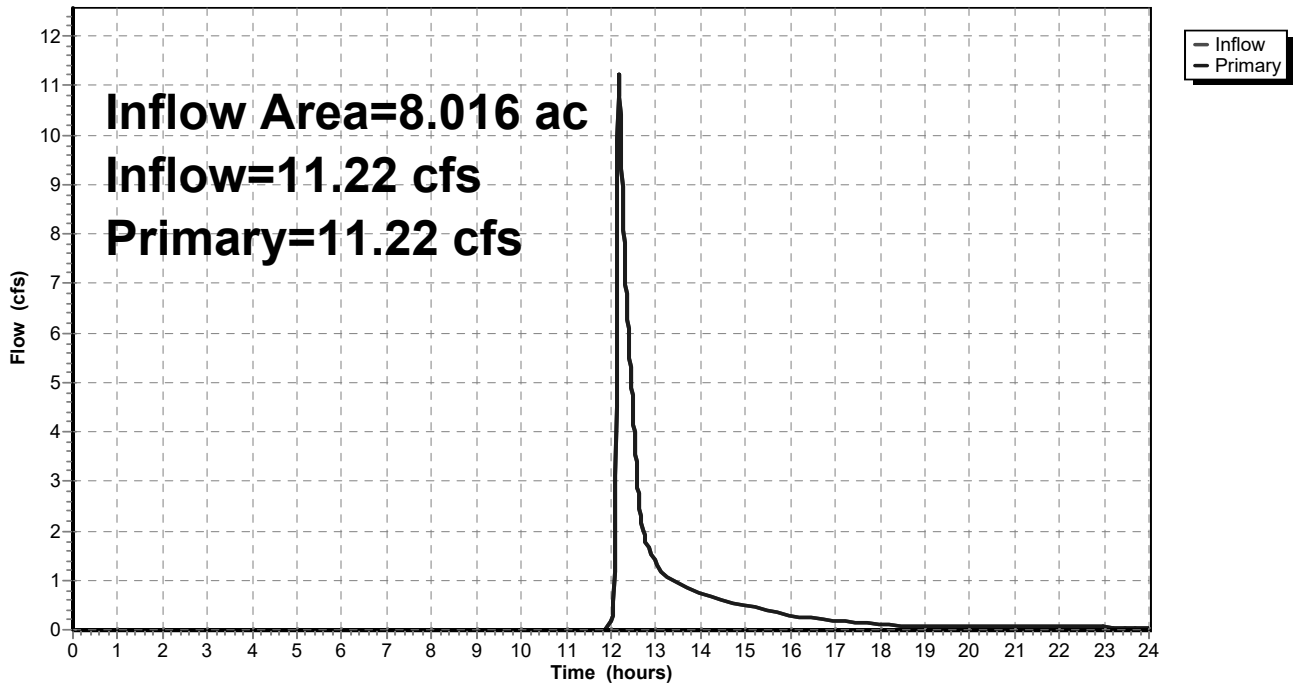
Summary for Link DP1: CEDAR POND

Inflow Area = 8.016 ac, 37.70% Impervious, Inflow Depth > 0.84" for 25-Year event
Inflow = 11.22 cfs @ 12.18 hrs, Volume= 0.562 af
Primary = 11.22 cfs @ 12.18 hrs, Volume= 0.562 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Link DP1: CEDAR POND

Hydrograph



Summary for Subcatchment PR3: PIPELINE ROW

Runoff = 0.11 cfs @ 12.34 hrs, Volume= 0.022 af, Depth> 0.53"

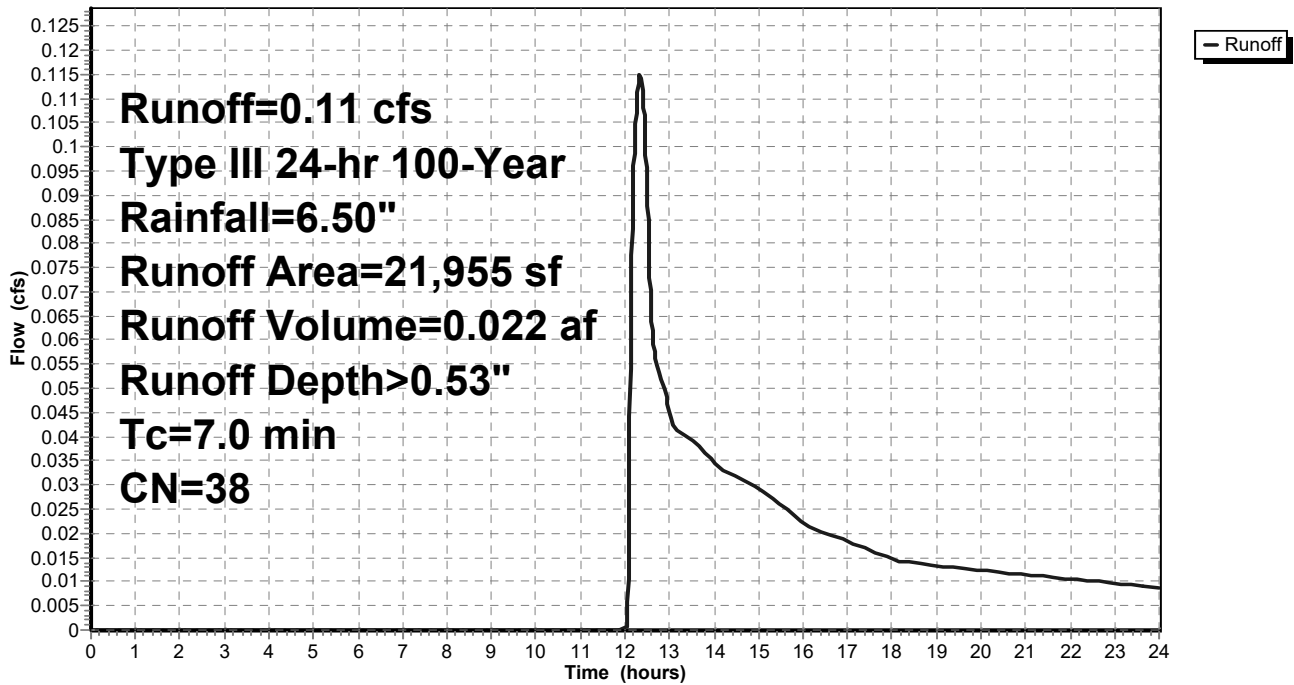
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Type III 24-hr 100-Year Rainfall=6.50"

Area (sf)	CN	Description
20,286	36	Woods, Fair, HSG A
1,669	61	>75% Grass cover, Good, HSG B
21,955	38	Weighted Average
21,955		100.00% Pervious Area

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

Subcatchment PR3: PIPELINE ROW

Hydrograph



Summary for Subcatchment PR4: BANK

Runoff = 4.09 cfs @ 12.08 hrs, Volume= 0.280 af, Depth> 3.30"

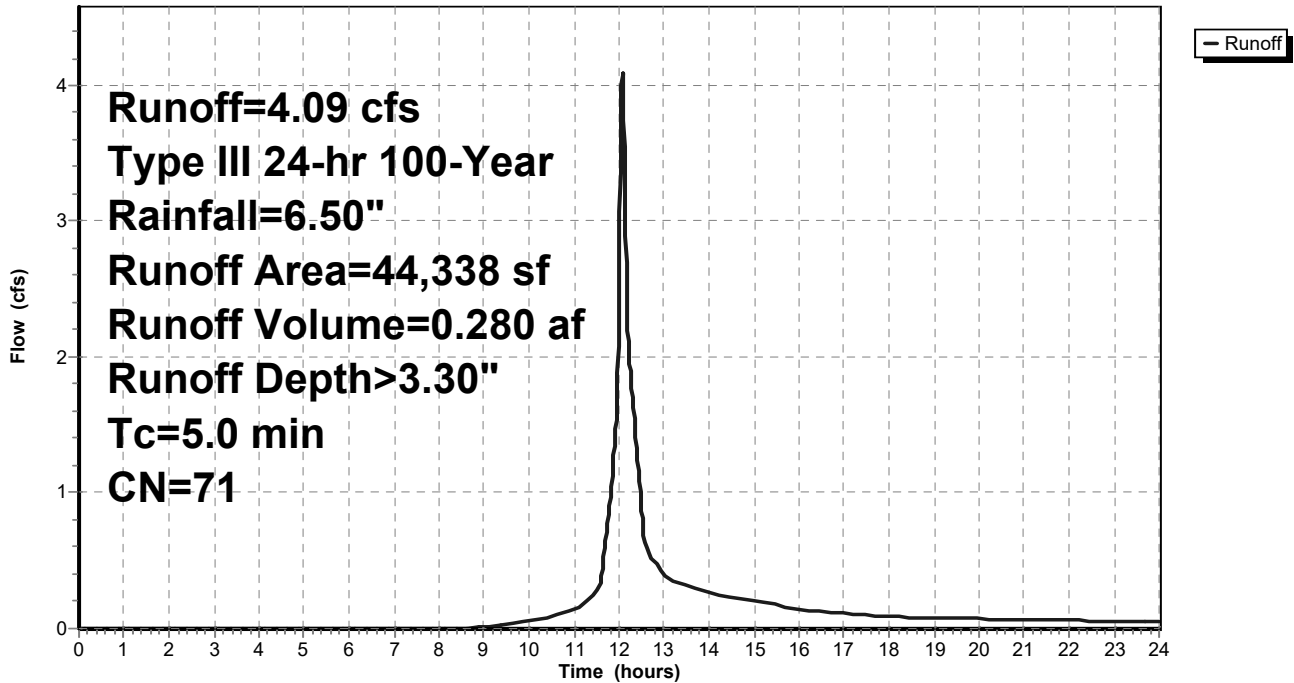
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Type III 24-hr 100-Year Rainfall=6.50"

	Area (sf)	CN	Description
*	23,810	98	Paved parking
	20,528	39	>75% Grass cover, Good, HSG A
	44,338	71	Weighted Average
	20,528		46.30% Pervious Area
	23,810		53.70% Impervious Area

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

Subcatchment PR4: BANK

Hydrograph



Summary for Pond INF: DEPRESSION

Inflow Area = 1.522 ac, 35.92% Impervious, Inflow Depth > 1.49" for 100-Year event
 Inflow = 4.01 cfs @ 12.09 hrs, Volume= 0.189 af
 Outflow = 0.24 cfs @ 14.08 hrs, Volume= 0.184 af, Atten= 94%, Lag= 119.1 min
 Discarded = 0.24 cfs @ 14.08 hrs, Volume= 0.184 af
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 584.52' @ 14.08 hrs Surf.Area= 4,321 sf Storage= 4,113 cf

Plug-Flow detention time= 213.0 min calculated for 0.184 af (98% of inflow)
 Center-of-Mass det. time= 201.1 min (1,030.6 - 829.6)

Volume	Invert	Avail.Storage	Storage Description
#1	583.00'	24,183 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
583.00	690	0	0
584.00	3,464	2,077	2,077
585.00	5,103	4,284	6,361
586.00	6,710	5,907	12,267
587.00	8,251	7,481	19,748
587.50	9,492	4,436	24,183

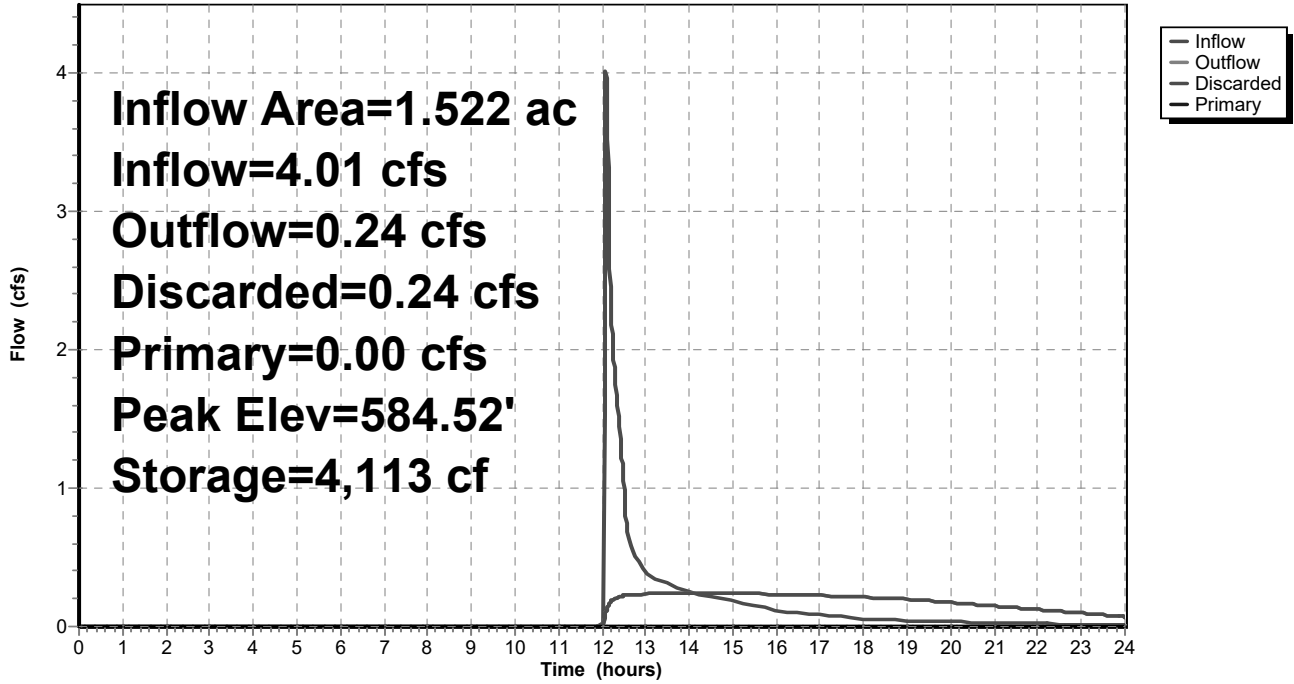
Device	Routing	Invert	Outlet Devices
#1	Discarded	583.00'	2.410 in/hr Exfiltration over Surface area
#2	Primary	587.00'	12.0' long x 1.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Discarded OutFlow Max=0.24 cfs @ 14.08 hrs HW=584.52' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.24 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=583.00' (Free Discharge)
 ↑2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond INF: DEPRESSION

Hydrograph



Summary for Pond RC1: UG CHAMBER 1

Inflow Area = 1.018 ac, 53.70% Impervious, Inflow Depth > 3.30" for 100-Year event
 Inflow = 4.09 cfs @ 12.08 hrs, Volume= 0.280 af
 Outflow = 4.04 cfs @ 12.09 hrs, Volume= 0.226 af, Atten= 1%, Lag= 0.8 min
 Discarded = 0.05 cfs @ 10.02 hrs, Volume= 0.059 af
 Primary = 3.99 cfs @ 12.09 hrs, Volume= 0.166 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 597.01' @ 12.09 hrs Surf.Area= 0.020 ac Storage= 0.059 af

Plug-Flow detention time= 109.0 min calculated for 0.226 af (81% of inflow)
 Center-of-Mass det. time= 32.4 min (862.9 - 830.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	592.50'	0.025 af	21.75'W x 40.62'L x 5.00'H Field A 0.101 af Overall - 0.038 af Embedded = 0.063 af x 40.0% Voids
#2A	593.25'	0.038 af	StormTech MC-3500 x 15 Inside #1 Effective Size= 69.0"W x 45.0"H => 15.35 sf x 7.17'L = 110.1 cf Overall Size= 75.0"W x 45.0"H x 7.50'L with 0.33' Overlap
		0.063 af	Total Available Storage

Storage Group A created with Chamber Wizard

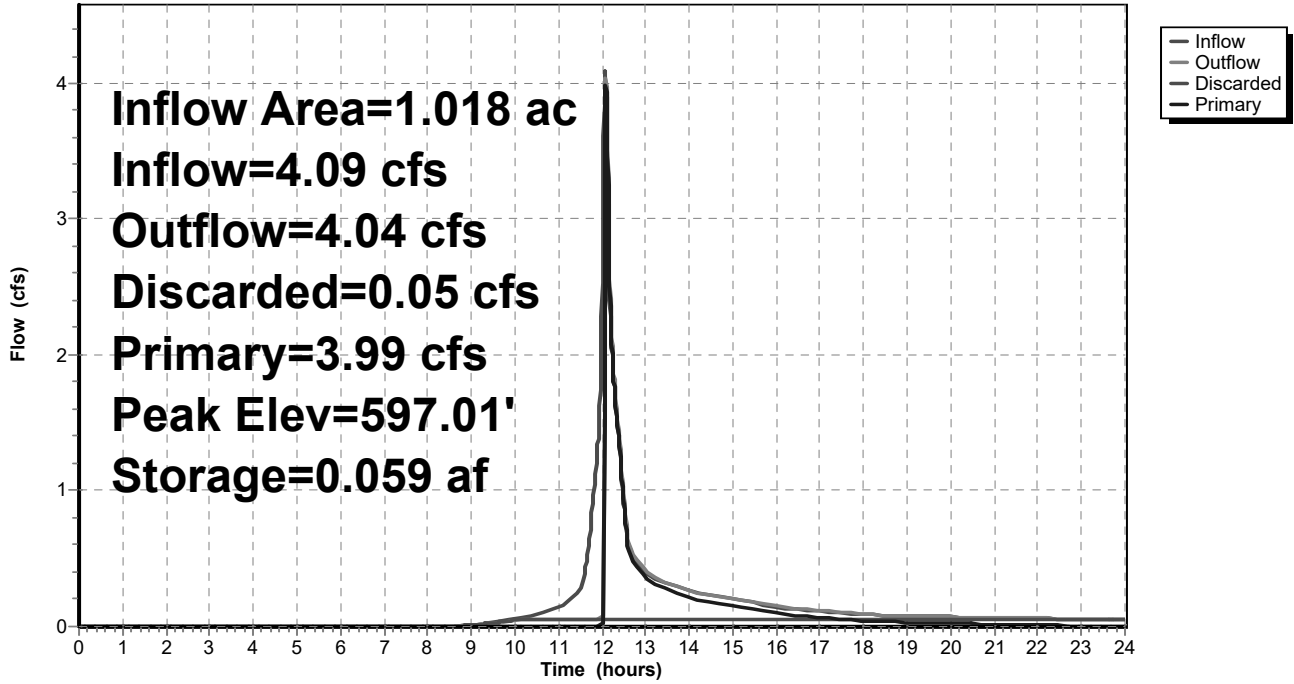
Device	Routing	Invert	Outlet Devices
#1	Primary	596.50'	4.0' long x 1.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32
#2	Discarded	592.50'	2.410 in/hr Exfiltration over Surface area

Discarded OutFlow Max=0.05 cfs @ 10.02 hrs HW=592.55' (Free Discharge)
 ↳ **2=Exfiltration** (Exfiltration Controls 0.05 cfs)

Primary OutFlow Max=3.98 cfs @ 12.09 hrs HW=597.01' (Free Discharge)
 ↳ **1=Broad-Crested Rectangular Weir** (Weir Controls 3.98 cfs @ 1.95 fps)

Pond RC1: UG CHAMBER 1

Hydrograph



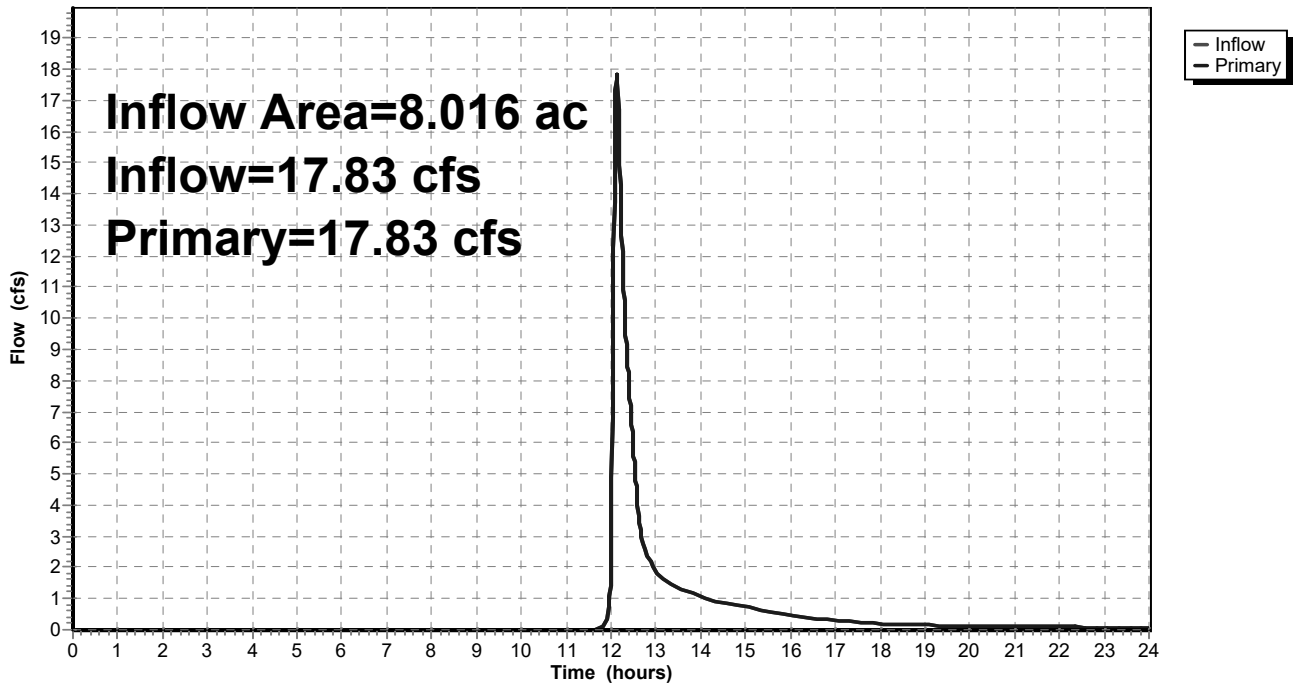
Summary for Link DP1: CEDAR POND

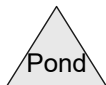
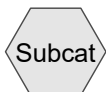
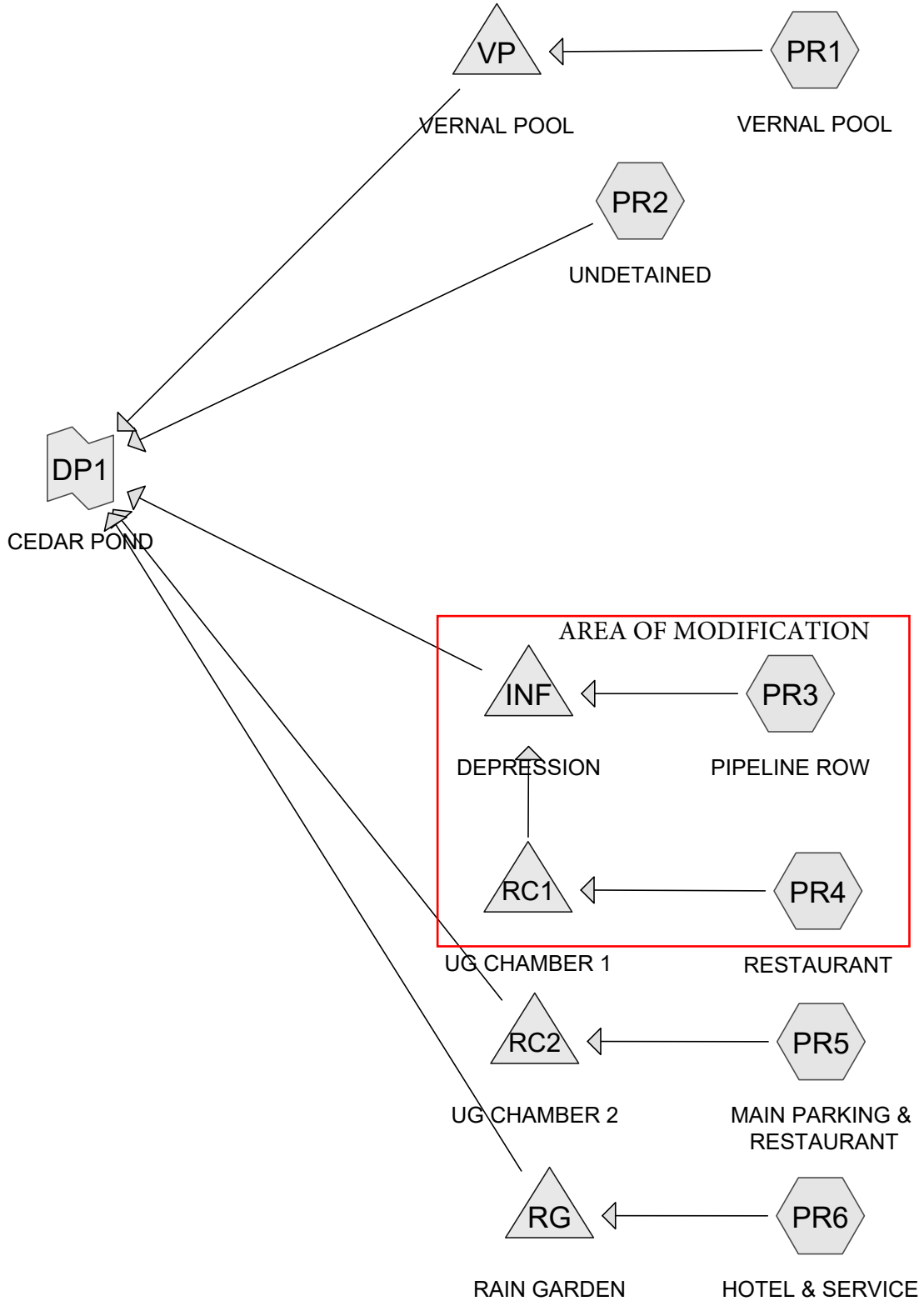
Inflow Area = 8.016 ac, 37.70% Impervious, Inflow Depth > 1.39" for 100-Year event
Inflow = 17.83 cfs @ 12.13 hrs, Volume= 0.927 af
Primary = 17.83 cfs @ 12.13 hrs, Volume= 0.927 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Link DP1: CEDAR POND

Hydrograph





Summary for Subcatchment PR3: PIPELINE ROW

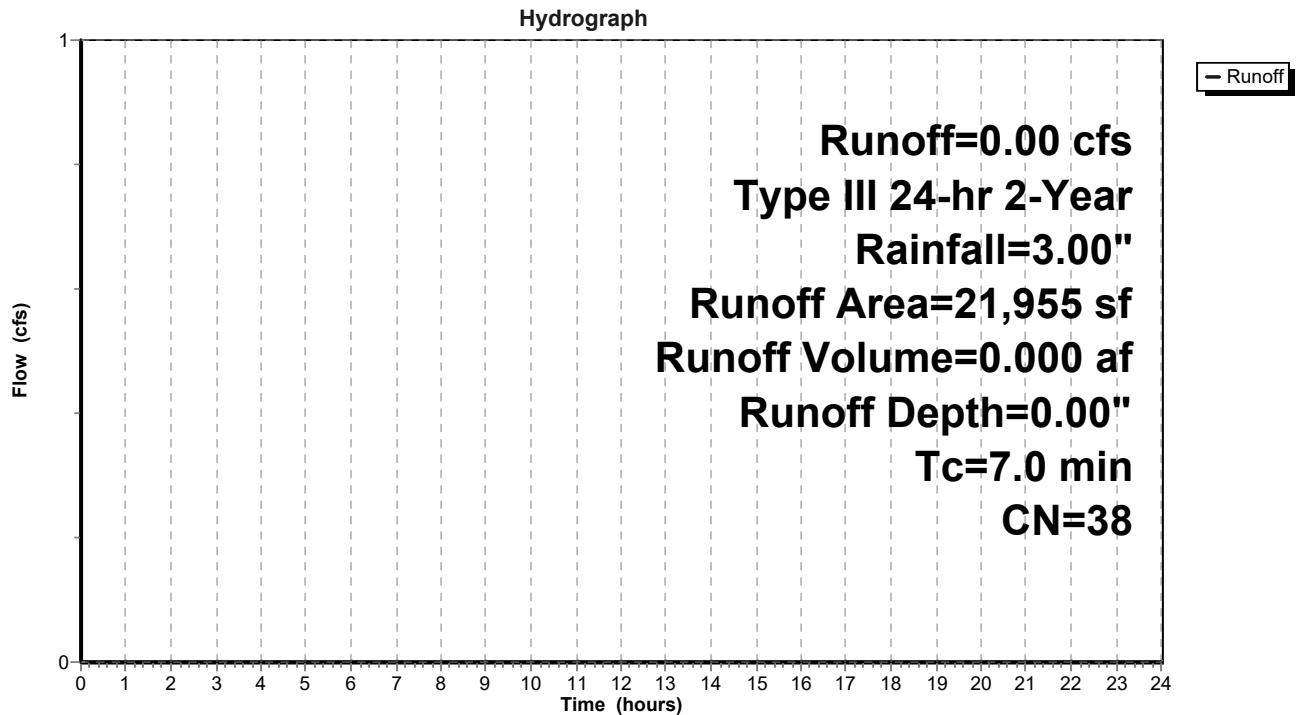
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Type III 24-hr 2-Year Rainfall=3.00"

Area (sf)	CN	Description
20,286	36	Woods, Fair, HSG A
1,669	61	>75% Grass cover, Good, HSG B
21,955	38	Weighted Average
21,955		100.00% Pervious Area

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

Subcatchment PR3: PIPELINE ROW



Summary for Subcatchment PR4: RESTAURANT

Runoff = 1.20 cfs @ 12.08 hrs, Volume= 0.086 af, Depth> 1.01"

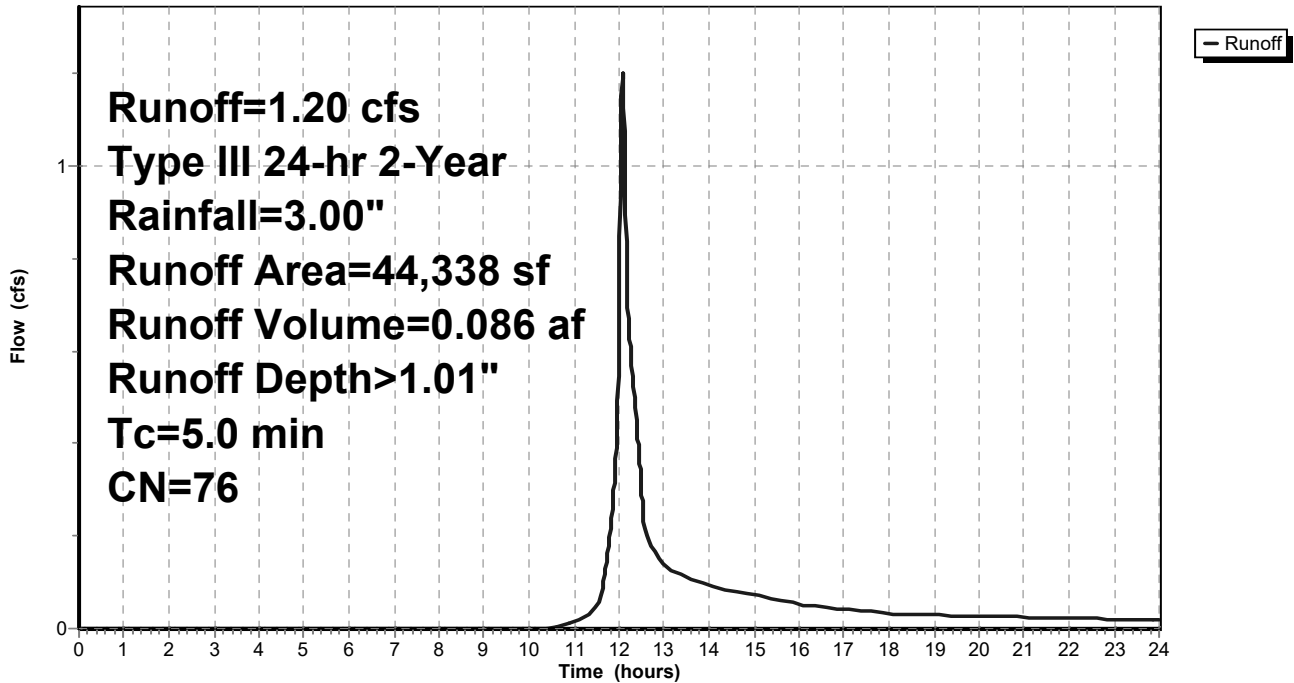
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Type III 24-hr 2-Year Rainfall=3.00"

	Area (sf)	CN	Description
*	28,061	98	Paved parking
	16,277	39	>75% Grass cover, Good, HSG A
	44,338	76	Weighted Average
	16,277		36.71% Pervious Area
	28,061		63.29% Impervious Area

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

Subcatchment PR4: RESTAURANT

Hydrograph



Summary for Pond INF: DEPRESSION

Inflow Area = 1.522 ac, 42.33% Impervious, Inflow Depth = 0.00" for 2-Year event
 Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
 Discarded = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 583.00' @ 0.00 hrs Surf.Area= 690 sf Storage= 0 cf

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

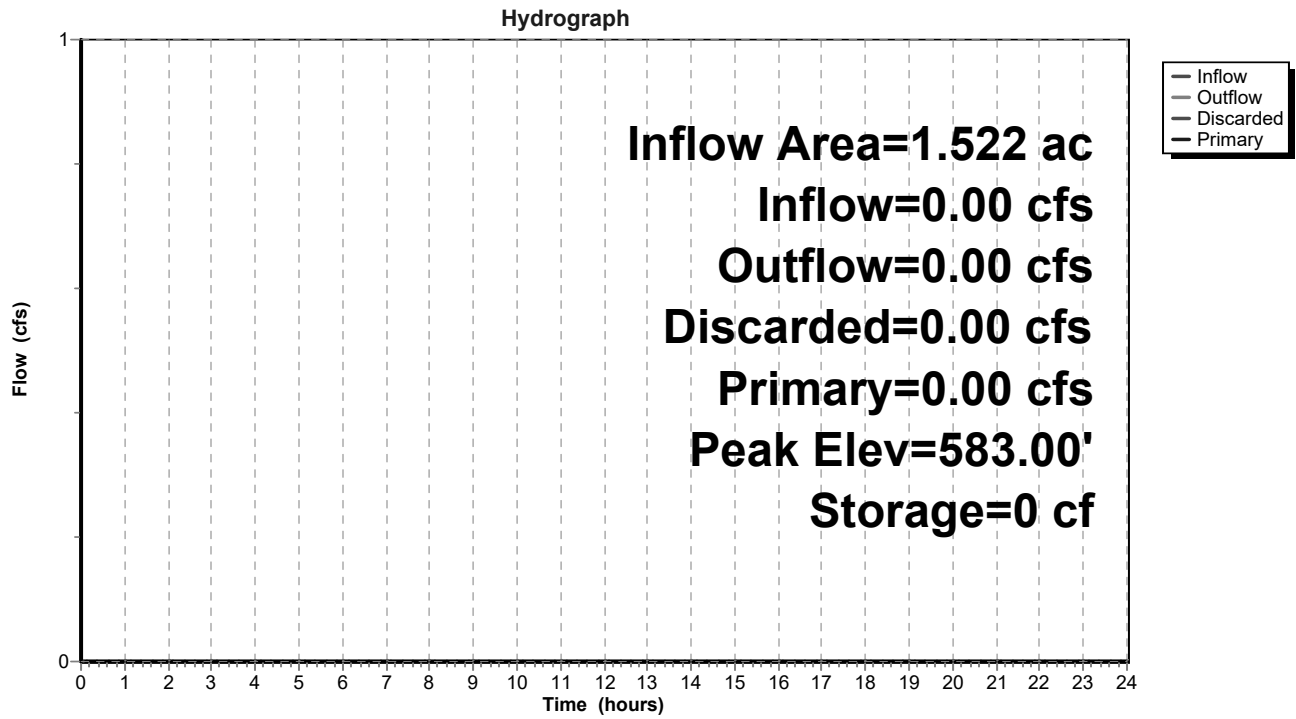
Volume	Invert	Avail.Storage	Storage Description
#1	583.00'	24,183 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
583.00	690	0	0
584.00	3,464	2,077	2,077
585.00	5,103	4,284	6,361
586.00	6,710	5,907	12,267
587.00	8,251	7,481	19,748
587.50	9,492	4,436	24,183

Device	Routing	Invert	Outlet Devices
#1	Discarded	583.00'	2.410 in/hr Exfiltration over Surface area
#2	Primary	587.00'	12.0' long x 1.0' 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
			Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Discarded OutFlow Max=0.00 cfs @ 0.00 hrs HW=583.00' (Free Discharge)
 ↑1=Exfiltration (Passes 0.00 cfs of 0.04 cfs potential flow)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=583.00' (Free Discharge)
 ↑2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond INF: DEPRESSION



Summary for Pond RC1: UG CHAMBER 1

Inflow Area = 1.018 ac, 63.29% Impervious, Inflow Depth > 1.01" for 2-Year event
 Inflow = 1.20 cfs @ 12.08 hrs, Volume= 0.086 af
 Outflow = 0.06 cfs @ 11.66 hrs, Volume= 0.068 af, Atten= 95%, Lag= 0.0 min
 Discarded = 0.06 cfs @ 11.66 hrs, Volume= 0.068 af
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 594.86' @ 15.40 hrs Surf.Area= 0.027 ac Storage= 0.042 af

Plug-Flow detention time= 286.8 min calculated for 0.068 af (79% of inflow)
 Center-of-Mass det. time= 202.3 min (1,060.1 - 857.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	592.50'	0.033 af	28.50'W x 40.62'L x 5.00'H Field A 0.133 af Overall - 0.051 af Embedded = 0.082 af x 40.0% Voids
#2A	593.25'	0.051 af	StormTech MC-3500 x 20 Inside #1 Effective Size= 69.0"W x 45.0"H => 15.35 sf x 7.17'L = 110.1 cf Overall Size= 75.0"W x 45.0"H x 7.50'L with 0.33' Overlap
		0.083 af	Total Available Storage

Storage Group A created with Chamber Wizard

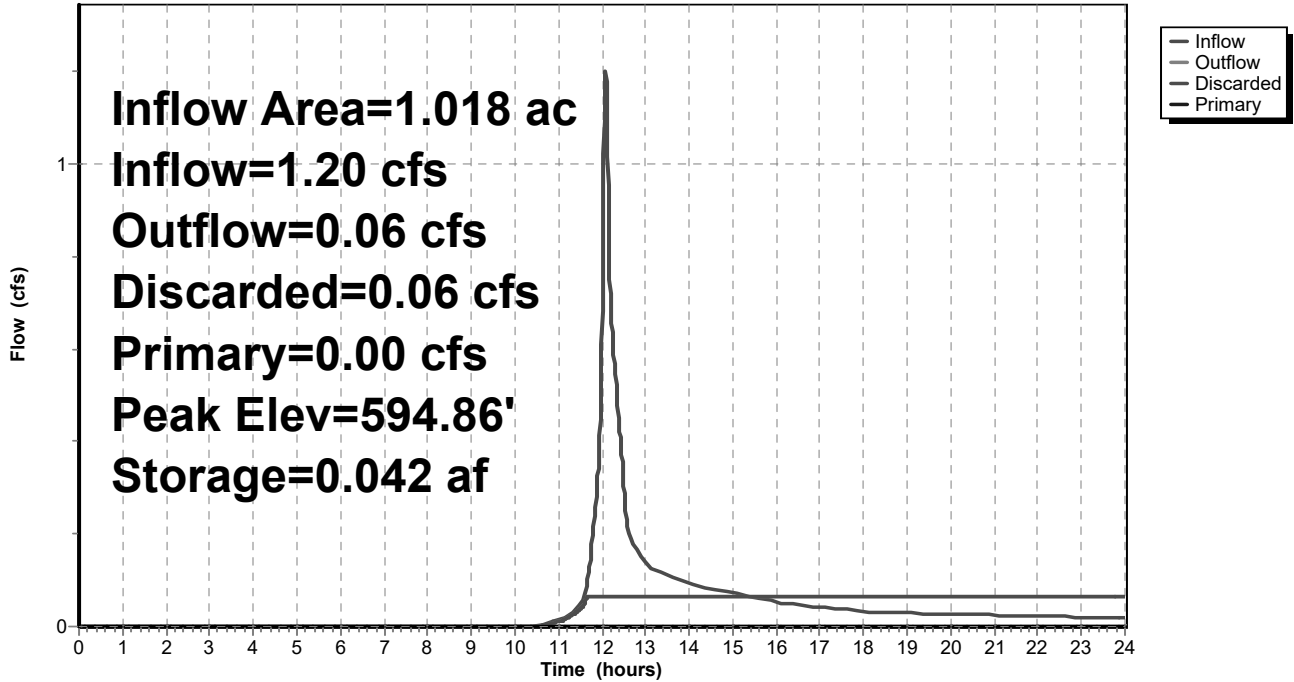
Device	Routing	Invert	Outlet Devices
#1	Primary	596.50'	4.0' long x 1.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32
#2	Discarded	592.50'	2.410 in/hr Exfiltration over Surface area

Discarded OutFlow Max=0.06 cfs @ 11.66 hrs HW=592.55' (Free Discharge)
 ↳**2=Exfiltration** (Exfiltration Controls 0.06 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=592.50' (Free Discharge)
 ↳**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond RC1: UG CHAMBER 1

Hydrograph



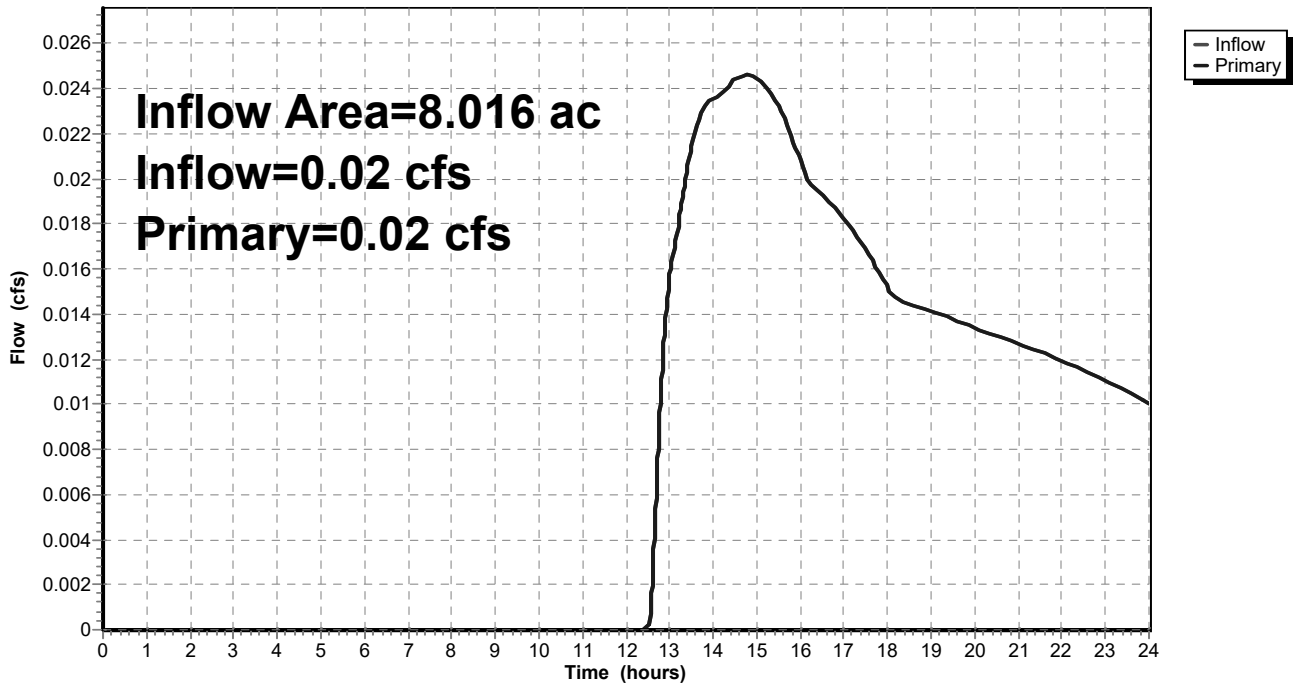
Summary for Link DP1: CEDAR POND

Inflow Area = 8.016 ac, 38.92% Impervious, Inflow Depth > 0.02" for 2-Year event
Inflow = 0.02 cfs @ 14.76 hrs, Volume= 0.015 af
Primary = 0.02 cfs @ 14.76 hrs, Volume= 0.015 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Link DP1: CEDAR POND

Hydrograph



Summary for Subcatchment PR3: PIPELINE ROW

Runoff = 0.01 cfs @ 14.99 hrs, Volume= 0.004 af, Depth> 0.09"

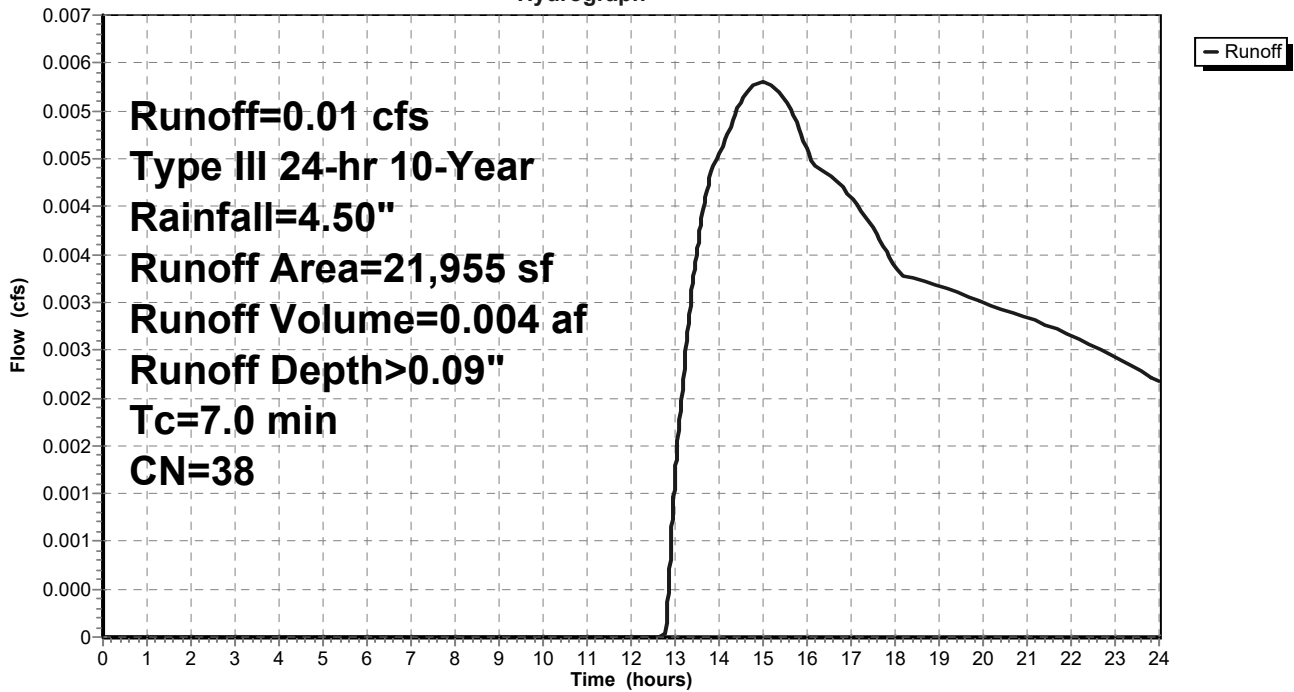
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
20,286	36	Woods, Fair, HSG A
1,669	61	>75% Grass cover, Good, HSG B
21,955	38	Weighted Average
21,955		100.00% Pervious Area

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

Subcatchment PR3: PIPELINE ROW

Hydrograph



Summary for Subcatchment PR4: RESTAURANT

Runoff = 2.62 cfs @ 12.08 hrs, Volume= 0.180 af, Depth> 2.13"

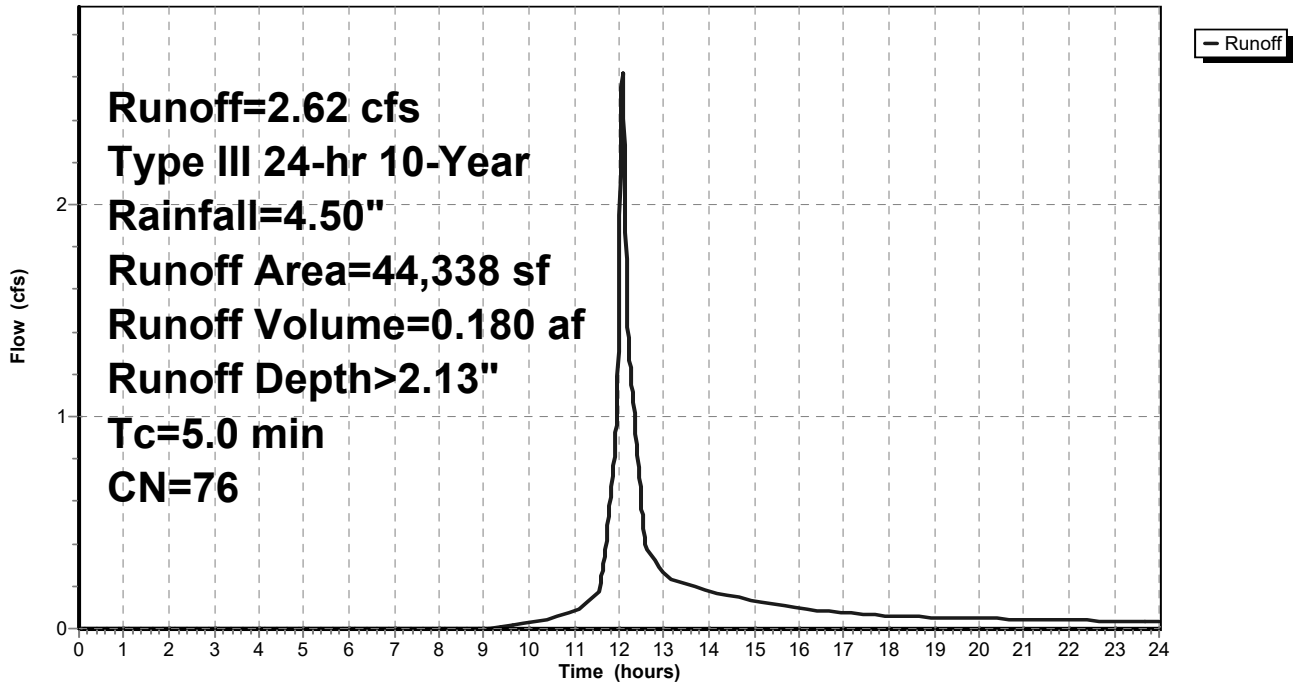
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Type III 24-hr 10-Year Rainfall=4.50"

	Area (sf)	CN	Description
*	28,061	98	Paved parking
	16,277	39	>75% Grass cover, Good, HSG A
	44,338	76	Weighted Average
	16,277		36.71% Pervious Area
	28,061		63.29% Impervious Area

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

Subcatchment PR4: RESTAURANT

Hydrograph



Summary for Pond INF: DEPRESSION

Inflow Area = 1.522 ac, 42.33% Impervious, Inflow Depth > 0.38" for 10-Year event
 Inflow = 0.66 cfs @ 12.45 hrs, Volume= 0.049 af
 Outflow = 0.12 cfs @ 13.99 hrs, Volume= 0.049 af, Atten= 82%, Lag= 92.1 min
 Discarded = 0.12 cfs @ 13.99 hrs, Volume= 0.049 af
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 583.52' @ 13.99 hrs Surf.Area= 2,145 sf Storage= 743 cf

Plug-Flow detention time= 79.9 min calculated for 0.049 af (100% of inflow)
 Center-of-Mass det. time= 79.3 min (916.3 - 837.0)

Volume	Invert	Avail.Storage	Storage Description
#1	583.00'	24,183 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
583.00	690	0	0
584.00	3,464	2,077	2,077
585.00	5,103	4,284	6,361
586.00	6,710	5,907	12,267
587.00	8,251	7,481	19,748
587.50	9,492	4,436	24,183

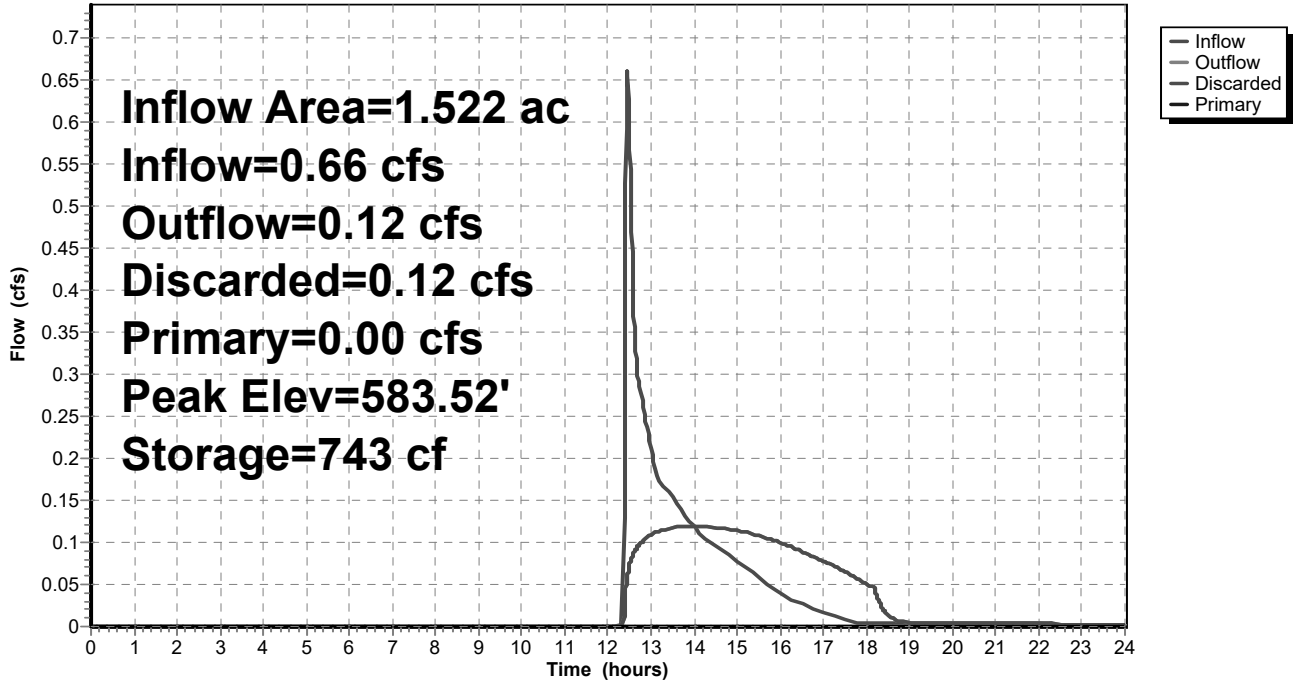
Device	Routing	Invert	Outlet Devices
#1	Discarded	583.00'	2.410 in/hr Exfiltration over Surface area
#2	Primary	587.00'	12.0' long x 1.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Discarded OutFlow Max=0.12 cfs @ 13.99 hrs HW=583.52' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.12 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=583.00' (Free Discharge)
 ↑2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond INF: DEPRESSION

Hydrograph



Summary for Pond RC1: UG CHAMBER 1

Inflow Area = 1.018 ac, 63.29% Impervious, Inflow Depth > 2.13" for 10-Year event
 Inflow = 2.62 cfs @ 12.08 hrs, Volume= 0.180 af
 Outflow = 0.73 cfs @ 12.45 hrs, Volume= 0.119 af, Atten= 72%, Lag= 22.4 min
 Discarded = 0.06 cfs @ 10.88 hrs, Volume= 0.074 af
 Primary = 0.66 cfs @ 12.45 hrs, Volume= 0.045 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 596.66' @ 12.45 hrs Surf.Area= 0.027 ac Storage= 0.074 af

Plug-Flow detention time= 214.8 min calculated for 0.119 af (66% of inflow)
 Center-of-Mass det. time= 110.4 min (946.2 - 835.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	592.50'	0.033 af	28.50'W x 40.62'L x 5.00'H Field A 0.133 af Overall - 0.051 af Embedded = 0.082 af x 40.0% Voids
#2A	593.25'	0.051 af	StormTech MC-3500 x 20 Inside #1 Effective Size= 69.0"W x 45.0"H => 15.35 sf x 7.17'L = 110.1 cf Overall Size= 75.0"W x 45.0"H x 7.50'L with 0.33' Overlap
		0.083 af	Total Available Storage

Storage Group A created with Chamber Wizard

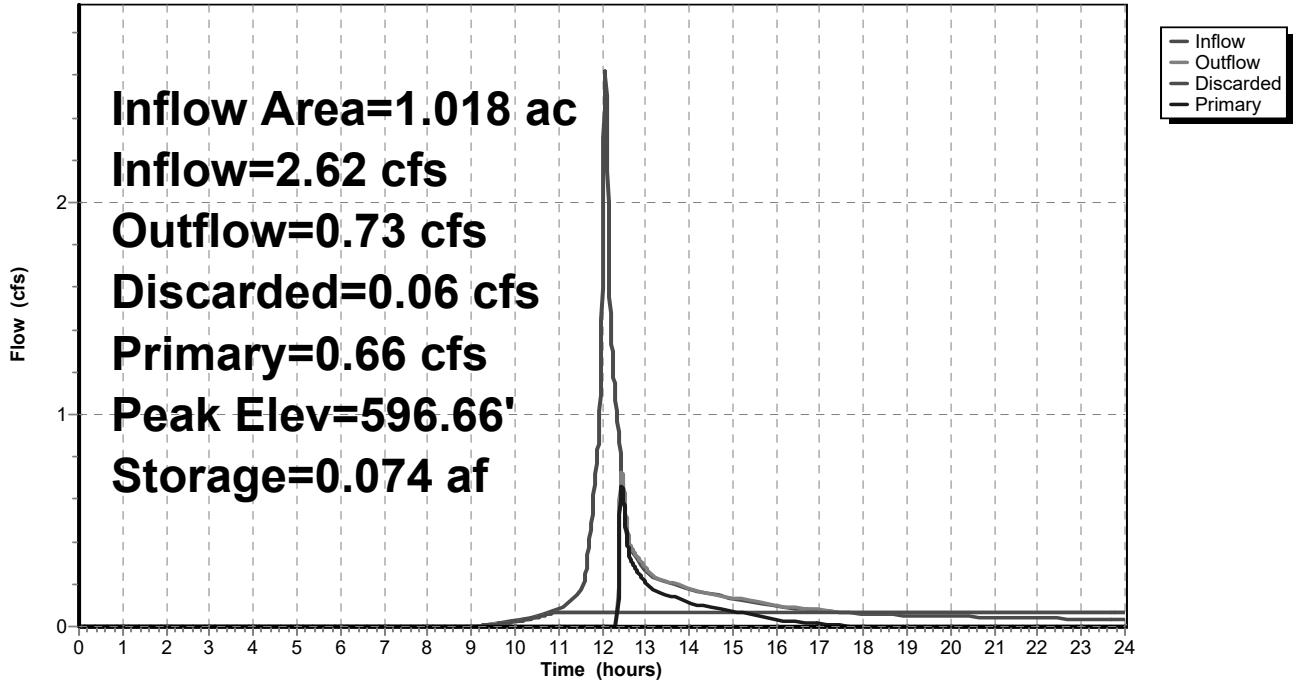
Device	Routing	Invert	Outlet Devices
#1	Primary	596.50'	4.0' long x 1.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32
#2	Discarded	592.50'	2.410 in/hr Exfiltration over Surface area

Discarded OutFlow Max=0.06 cfs @ 10.88 hrs HW=592.55' (Free Discharge)
 ↳**2=Exfiltration** (Exfiltration Controls 0.06 cfs)

Primary OutFlow Max=0.66 cfs @ 12.45 hrs HW=596.66' (Free Discharge)
 ↳**1=Broad-Crested Rectangular Weir** (Weir Controls 0.66 cfs @ 1.06 fps)

Pond RC1: UG CHAMBER 1

Hydrograph



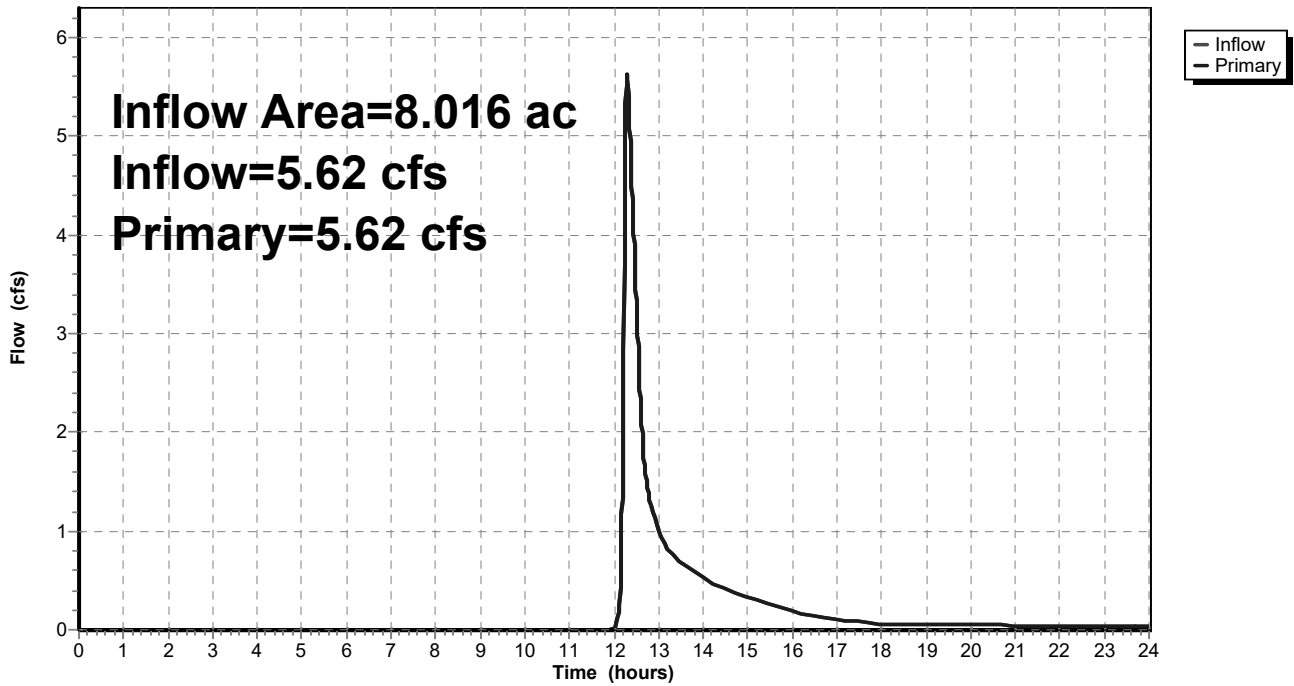
Summary for Link DP1: CEDAR POND

Inflow Area = 8.016 ac, 38.92% Impervious, Inflow Depth > 0.51" for 10-Year event
Inflow = 5.62 cfs @ 12.29 hrs, Volume= 0.341 af
Primary = 5.62 cfs @ 12.29 hrs, Volume= 0.341 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Link DP1: CEDAR POND

Hydrograph



Summary for Subcatchment PR3: PIPELINE ROW

Runoff = 0.02 cfs @ 12.48 hrs, Volume= 0.009 af, Depth> 0.23"

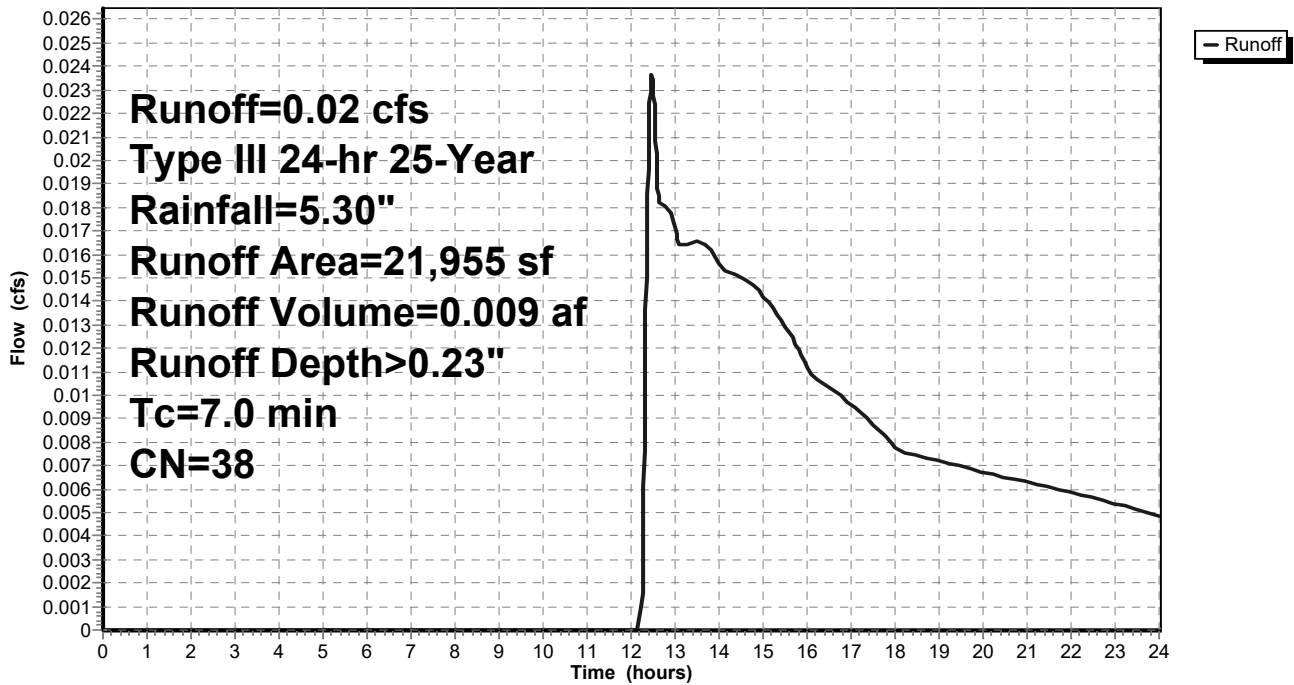
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Type III 24-hr 25-Year Rainfall=5.30"

Area (sf)	CN	Description
20,286	36	Woods, Fair, HSG A
1,669	61	>75% Grass cover, Good, HSG B
21,955	38	Weighted Average
21,955		100.00% Pervious Area

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

Subcatchment PR3: PIPELINE ROW

Hydrograph



Summary for Subcatchment PR4: RESTAURANT

Runoff = 3.44 cfs @ 12.08 hrs, Volume= 0.236 af, Depth> 2.78"

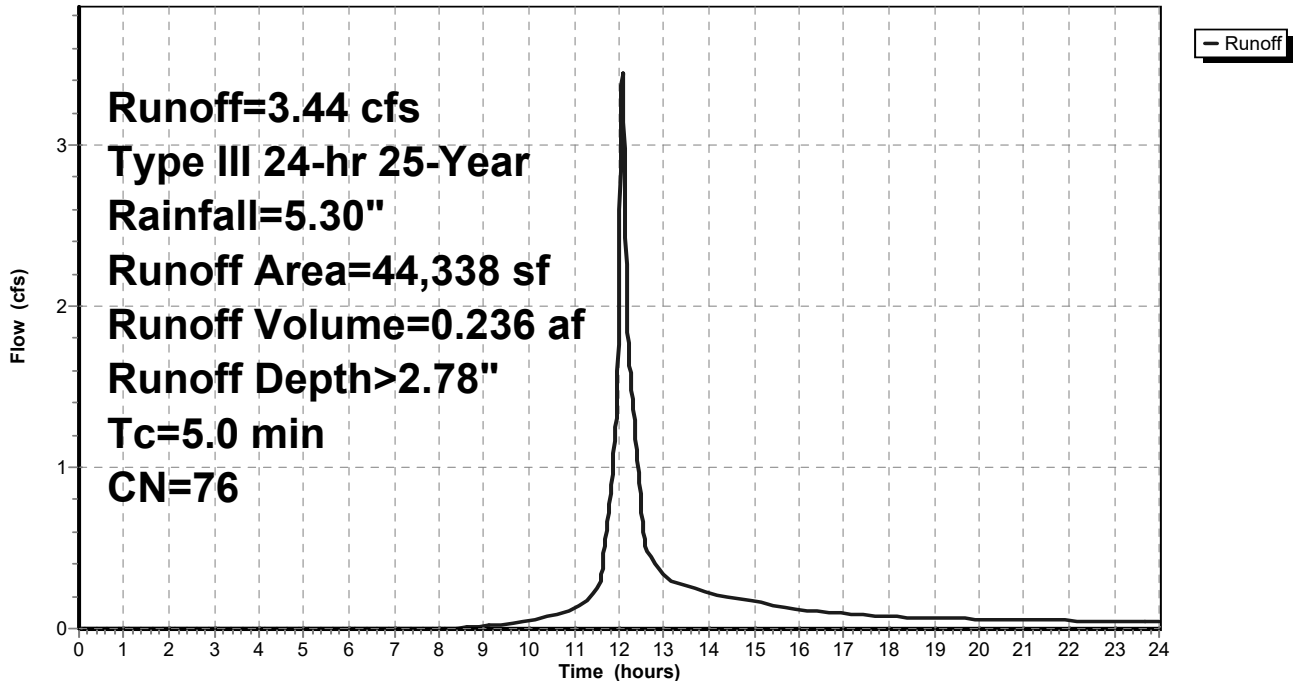
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Type III 24-hr 25-Year Rainfall=5.30"

	Area (sf)	CN	Description
*	28,061	98	Paved parking
	16,277	39	>75% Grass cover, Good, HSG A
	44,338	76	Weighted Average
	16,277		36.71% Pervious Area
	28,061		63.29% Impervious Area

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

Subcatchment PR4: RESTAURANT

Hydrograph



Summary for Pond INF: DEPRESSION

Inflow Area = 1.522 ac, 42.33% Impervious, Inflow Depth > 0.80" for 25-Year event
 Inflow = 1.73 cfs @ 12.21 hrs, Volume= 0.102 af
 Outflow = 0.19 cfs @ 13.83 hrs, Volume= 0.102 af, Atten= 89%, Lag= 97.0 min
 Discarded = 0.19 cfs @ 13.83 hrs, Volume= 0.102 af
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 583.98' @ 13.83 hrs Surf.Area= 3,397 sf Storage= 1,995 cf

Plug-Flow detention time= 136.0 min calculated for 0.102 af (100% of inflow)
 Center-of-Mass det. time= 135.4 min (955.5 - 820.1)

Volume	Invert	Avail.Storage	Storage Description
#1	583.00'	24,183 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
583.00	690	0	0
584.00	3,464	2,077	2,077
585.00	5,103	4,284	6,361
586.00	6,710	5,907	12,267
587.00	8,251	7,481	19,748
587.50	9,492	4,436	24,183

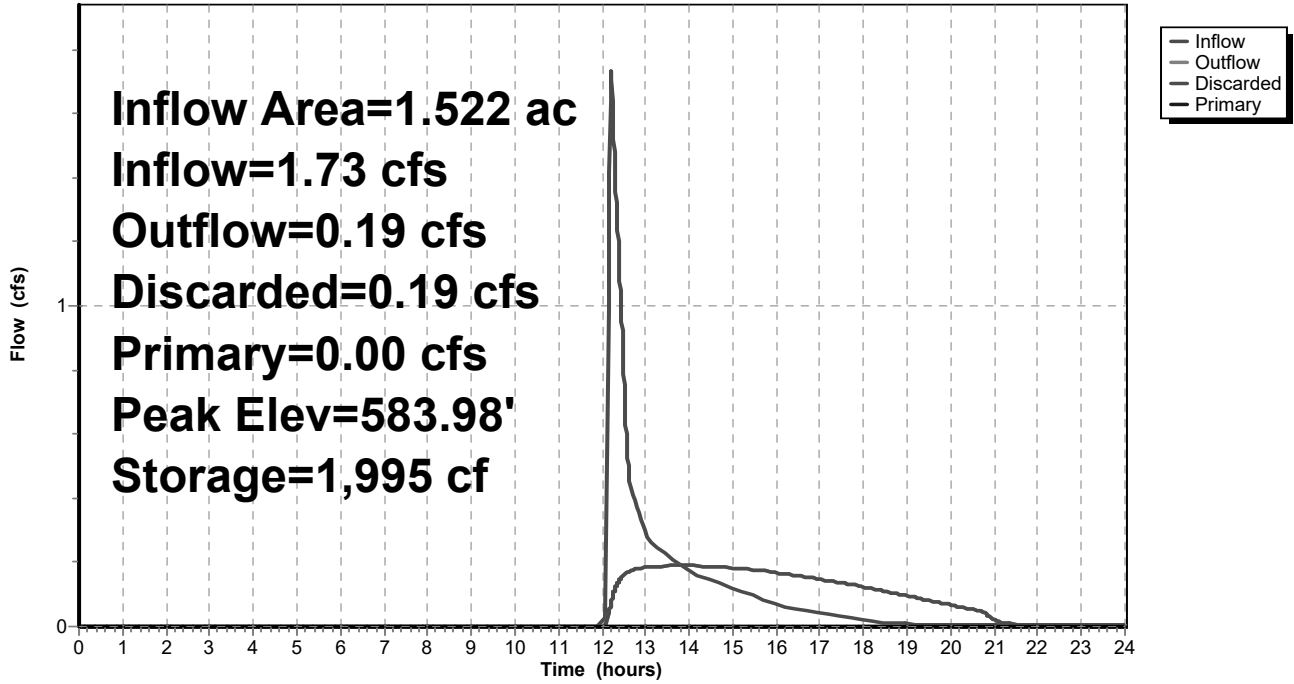
Device	Routing	Invert	Outlet Devices
#1	Discarded	583.00'	2.410 in/hr Exfiltration over Surface area
#2	Primary	587.00'	12.0' long x 1.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Discarded OutFlow Max=0.19 cfs @ 13.83 hrs HW=583.98' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.19 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=583.00' (Free Discharge)
 ↑2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond INF: DEPRESSION

Hydrograph



Summary for Pond RC1: UG CHAMBER 1

Inflow Area = 1.018 ac, 63.29% Impervious, Inflow Depth > 2.78" for 25-Year event
 Inflow = 3.44 cfs @ 12.08 hrs, Volume= 0.236 af
 Outflow = 1.79 cfs @ 12.21 hrs, Volume= 0.169 af, Atten= 48%, Lag= 8.0 min
 Discarded = 0.06 cfs @ 10.37 hrs, Volume= 0.077 af
 Primary = 1.73 cfs @ 12.21 hrs, Volume= 0.092 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 596.79' @ 12.21 hrs Surf.Area= 0.027 ac Storage= 0.076 af

Plug-Flow detention time= 160.3 min calculated for 0.169 af (72% of inflow)
 Center-of-Mass det. time= 66.6 min (894.7 - 828.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	592.50'	0.033 af	28.50'W x 40.62'L x 5.00'H Field A 0.133 af Overall - 0.051 af Embedded = 0.082 af x 40.0% Voids
#2A	593.25'	0.051 af	StormTech MC-3500 x 20 Inside #1 Effective Size= 69.0"W x 45.0"H => 15.35 sf x 7.17'L = 110.1 cf Overall Size= 75.0"W x 45.0"H x 7.50'L with 0.33' Overlap
		0.083 af	Total Available Storage

Storage Group A created with Chamber Wizard

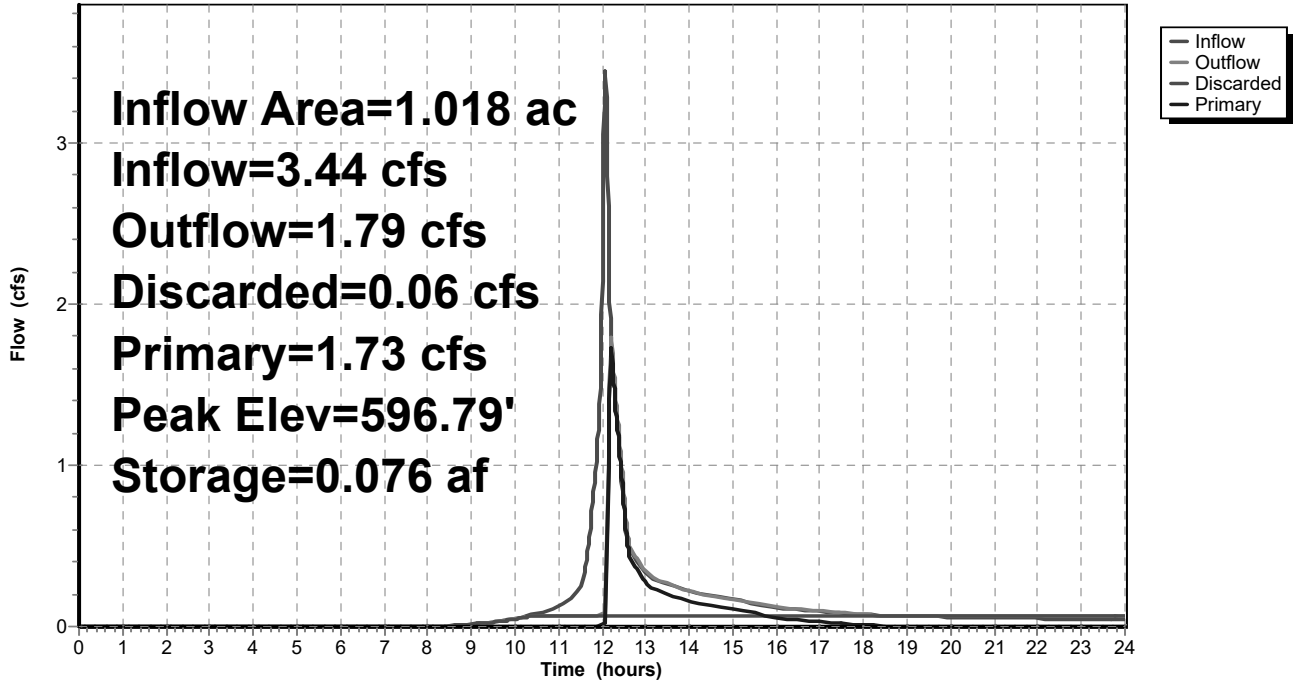
Device	Routing	Invert	Outlet Devices
#1	Primary	596.50'	4.0' long x 1.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32
#2	Discarded	592.50'	2.410 in/hr Exfiltration over Surface area

Discarded OutFlow Max=0.06 cfs @ 10.37 hrs HW=592.55' (Free Discharge)
 ↳**2=Exfiltration** (Exfiltration Controls 0.06 cfs)

Primary OutFlow Max=1.72 cfs @ 12.21 hrs HW=596.79' (Free Discharge)
 ↳**1=Broad-Crested Rectangular Weir** (Weir Controls 1.72 cfs @ 1.47 fps)

Pond RC1: UG CHAMBER 1

Hydrograph



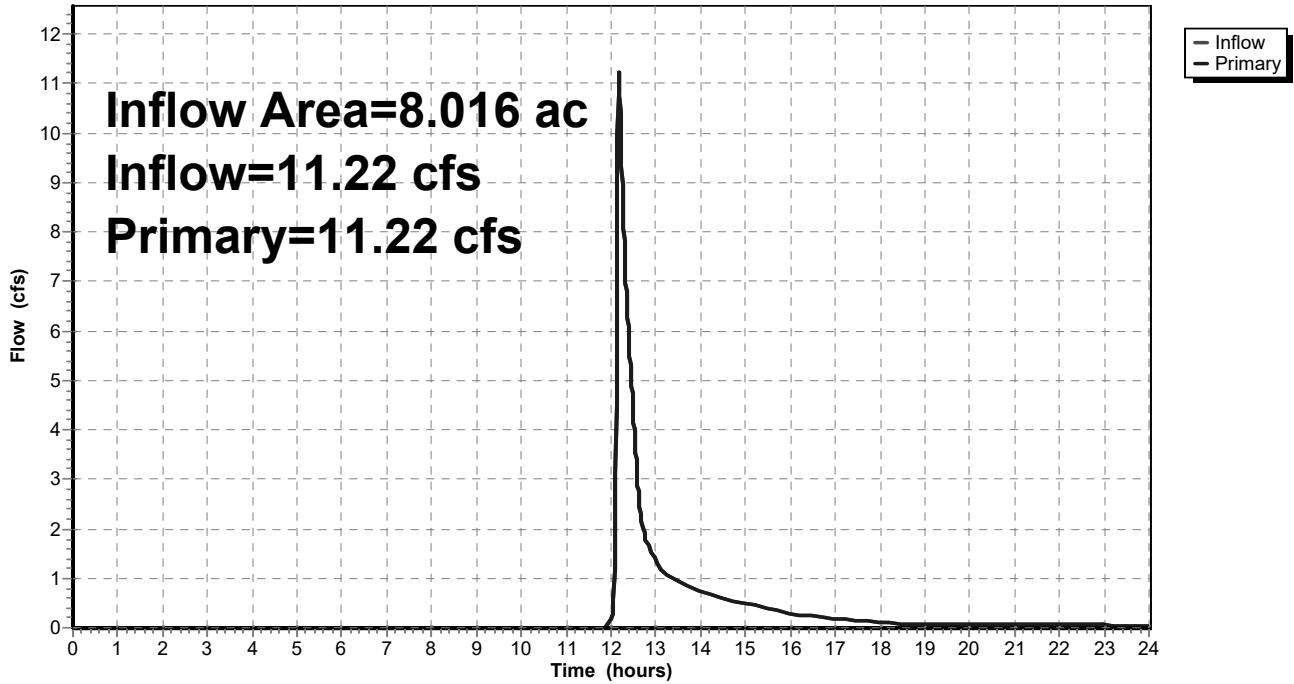
Summary for Link DP1: CEDAR POND

Inflow Area = 8.016 ac, 38.92% Impervious, Inflow Depth > 0.84" for 25-Year event
Inflow = 11.22 cfs @ 12.18 hrs, Volume= 0.562 af
Primary = 11.22 cfs @ 12.18 hrs, Volume= 0.562 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Link DP1: CEDAR POND

Hydrograph



Summary for Subcatchment PR3: PIPELINE ROW

Runoff = 0.11 cfs @ 12.34 hrs, Volume= 0.022 af, Depth> 0.53"

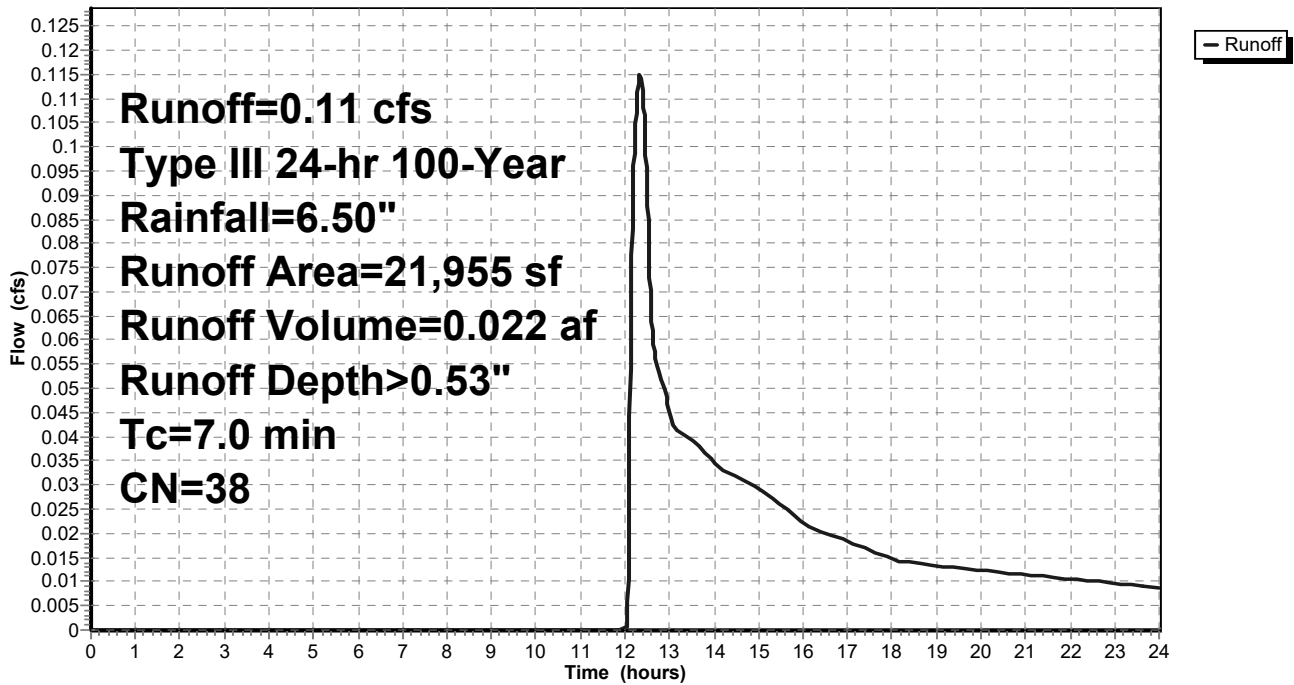
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Type III 24-hr 100-Year Rainfall=6.50"

Area (sf)	CN	Description
20,286	36	Woods, Fair, HSG A
1,669	61	>75% Grass cover, Good, HSG B
21,955	38	Weighted Average
21,955		100.00% Pervious Area

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

Subcatchment PR3: PIPELINE ROW

Hydrograph



Summary for Subcatchment PR4: RESTAURANT

Runoff = 4.72 cfs @ 12.07 hrs, Volume= 0.323 af, Depth> 3.81"

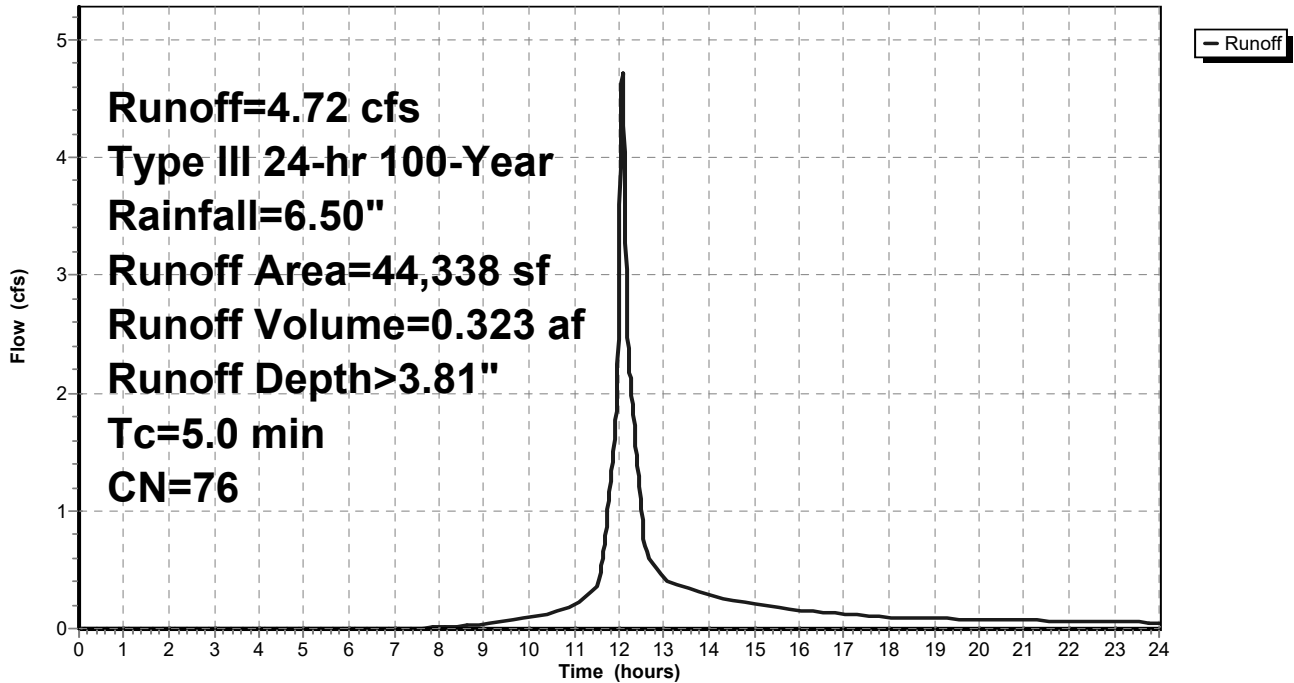
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Type III 24-hr 100-Year Rainfall=6.50"

	Area (sf)	CN	Description
*	28,061	98	Paved parking
	16,277	39	>75% Grass cover, Good, HSG A
	44,338	76	Weighted Average
	16,277		36.71% Pervious Area
	28,061		63.29% Impervious Area

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

Subcatchment PR4: RESTAURANT

Hydrograph



Summary for Pond INF: DEPRESSION

Inflow Area = 1.522 ac, 42.33% Impervious, Inflow Depth > 1.53" for 100-Year event
 Inflow = 4.51 cfs @ 12.10 hrs, Volume= 0.194 af
 Outflow = 0.25 cfs @ 14.07 hrs, Volume= 0.190 af, Atten= 94%, Lag= 118.3 min
 Discarded = 0.25 cfs @ 14.07 hrs, Volume= 0.190 af
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 584.61' @ 14.07 hrs Surf.Area= 4,469 sf Storage= 4,509 cf

Plug-Flow detention time= 224.9 min calculated for 0.190 af (98% of inflow)
 Center-of-Mass det. time= 214.0 min (1,029.8 - 815.8)

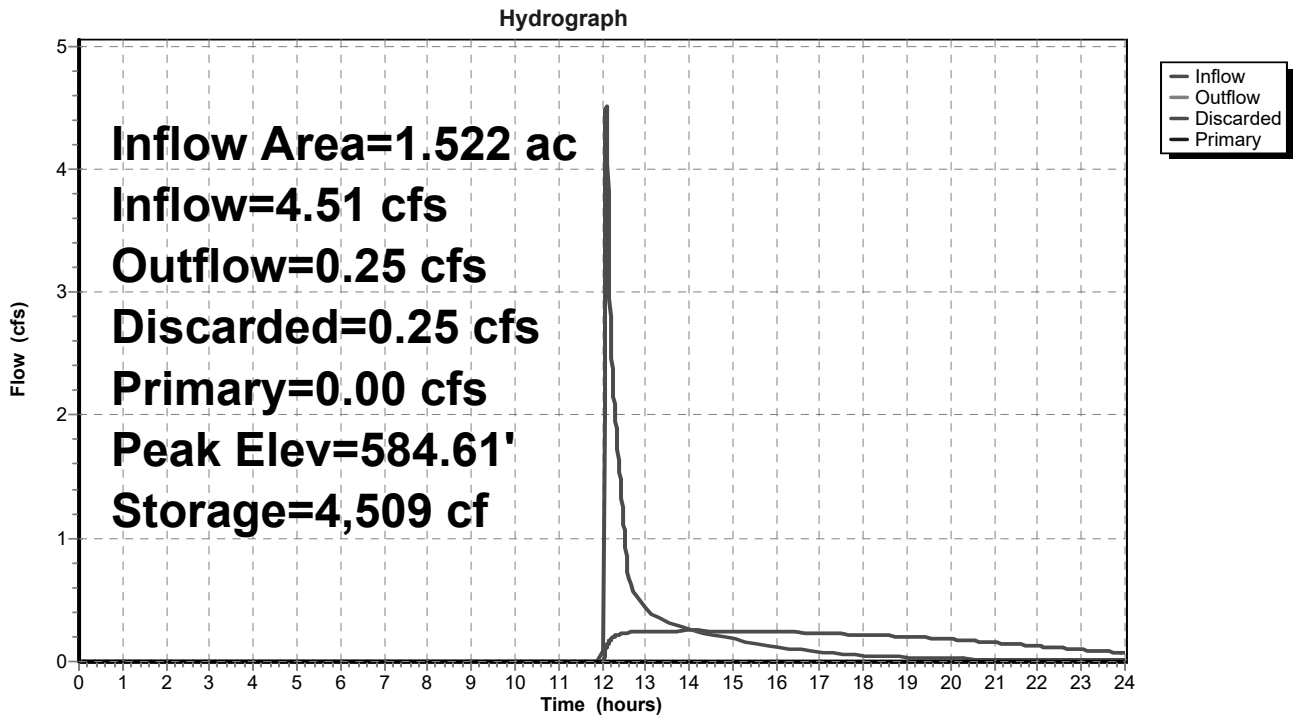
Volume	Invert	Avail.Storage	Storage Description
#1	583.00'	24,183 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
583.00	690	0	0
584.00	3,464	2,077	2,077
585.00	5,103	4,284	6,361
586.00	6,710	5,907	12,267
587.00	8,251	7,481	19,748
587.50	9,492	4,436	24,183

Device	Routing	Invert	Outlet Devices
#1	Discarded	583.00'	2.410 in/hr Exfiltration over Surface area
#2	Primary	587.00'	12.0' long x 1.0' 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 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Discarded OutFlow Max=0.25 cfs @ 14.07 hrs HW=584.61' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.25 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=583.00' (Free Discharge)
 ↑2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond INF: DEPRESSION



Summary for Pond RC1: UG CHAMBER 1

Inflow Area = 1.018 ac, 63.29% Impervious, Inflow Depth > 3.81" for 100-Year event
 Inflow = 4.72 cfs @ 12.07 hrs, Volume= 0.323 af
 Outflow = 4.54 cfs @ 12.10 hrs, Volume= 0.253 af, Atten= 4%, Lag= 1.3 min
 Discarded = 0.06 cfs @ 9.63 hrs, Volume= 0.081 af
 Primary = 4.48 cfs @ 12.10 hrs, Volume= 0.172 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 597.05' @ 12.10 hrs Surf.Area= 0.027 ac Storage= 0.079 af

Plug-Flow detention time= 119.4 min calculated for 0.253 af (78% of inflow)
 Center-of-Mass det. time= 38.6 min (857.6 - 819.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	592.50'	0.033 af	28.50'W x 40.62'L x 5.00'H Field A 0.133 af Overall - 0.051 af Embedded = 0.082 af x 40.0% Voids
#2A	593.25'	0.051 af	StormTech MC-3500 x 20 Inside #1 Effective Size= 69.0"W x 45.0"H => 15.35 sf x 7.17'L = 110.1 cf Overall Size= 75.0"W x 45.0"H x 7.50'L with 0.33' Overlap
		0.083 af	Total Available Storage

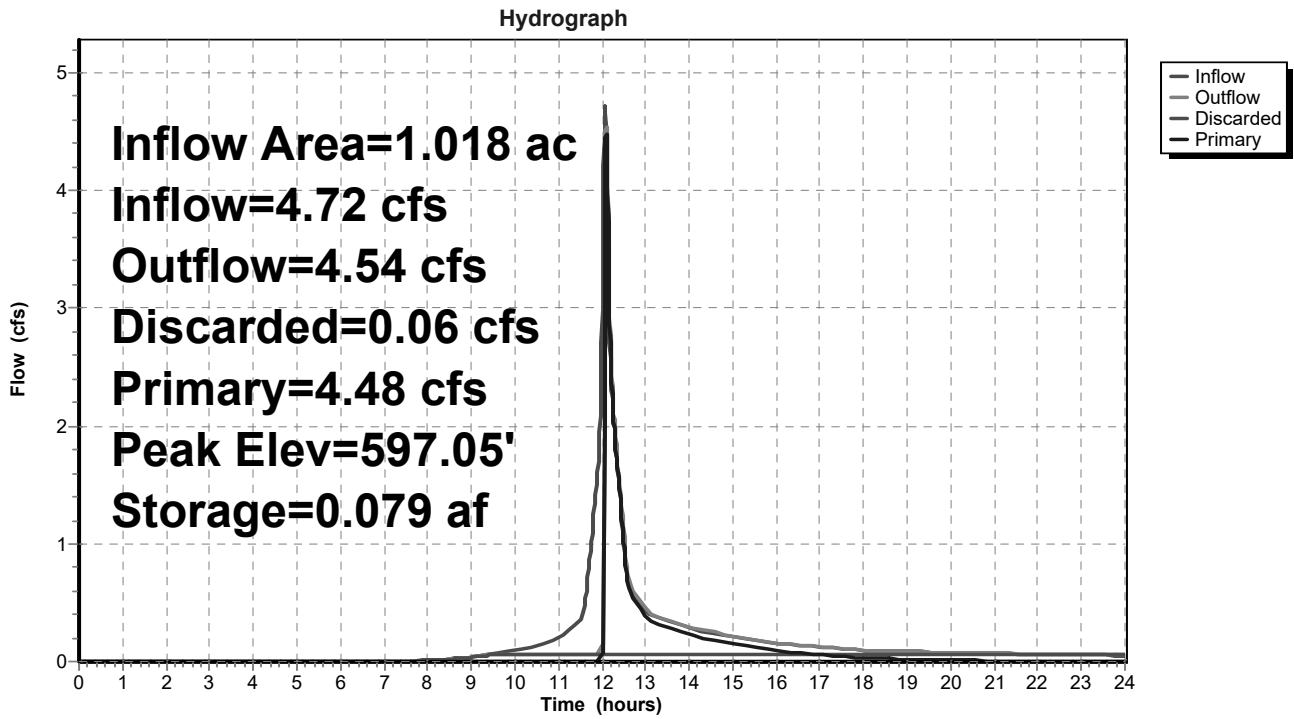
Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	596.50'	4.0' long x 1.0' 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 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32
#2	Discarded	592.50'	2.410 in/hr Exfiltration over Surface area

Discarded OutFlow Max=0.06 cfs @ 9.63 hrs HW=592.55' (Free Discharge)
 ↳**2=Exfiltration** (Exfiltration Controls 0.06 cfs)

Primary OutFlow Max=4.46 cfs @ 12.10 hrs HW=597.05' (Free Discharge)
 ↳**1=Broad-Crested Rectangular Weir** (Weir Controls 4.46 cfs @ 2.03 fps)

Pond RC1: UG CHAMBER 1



Summary for Link DP1: CEDAR POND

Inflow Area = 8.016 ac, 38.92% Impervious, Inflow Depth > 1.39" for 100-Year event
Inflow = 17.83 cfs @ 12.13 hrs, Volume= 0.927 af
Primary = 17.83 cfs @ 12.13 hrs, Volume= 0.927 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Link DP1: CEDAR POND

Hydrograph

