



*Civil
Site Planning
Environmental
Engineering*

133 Court Street
Portsmouth, NH
03801-4413

Drainage Assessment

**“The Ridge at Riverwoods” – Administration Wing
Tax Map 80, Lot 18
6 White Oak Drive, Exeter, NH
Altus Project #5056
Revised per Town Review, April 3, 2020**

RiverWoods at Exeter is proposing to construct a 3,378 sf building addition and associated improvements on its previously developed 47.14-acre campus located off of Kingston Road (NH 111). Originally permitted in 2003, the existing “Ridge” Continuing Care Retirement Community encompasses over 100 elderly housing dwelling units, a supportive care unit and various maintenance functions spread over several buildings together with associated utility structures, accessways and parking areas. The remainder of the site is comprised of wooded upland and some sections of freshwater wetland, none of which will be impacted by the project. Within the vicinity of the proposed building addition, stormwater runoff is currently directed to a closed drainage system comprised of catch basins and drain manholes tributary to an existing treatment swale designed for the sites original NHDES Alteration of Terrain Permit.

Together with the building additions, the project entails of the demolition of an existing storage building, reconfiguration of existing sidewalks and paved areas and the construction of an outdoor patio area, which taken together result in a net 2,370 sf increase in impervious surface. In order to mitigate this, the existing drainage system will be retrofitted to include several new area drains and a small underground detention facility that reduces the peak rate of runoff from the existing conditions which in turn maintains the effectiveness of the existing treatment swale. The project contemplates a total of only 9,900 sf of land disturbance all of which will be within previously developed areas of the site.

For the purposes of this analysis, only stormwater facilities in the immediate vicinity of the project needed to be evaluated. Currently, the affected area ultimately drains to a catch basin located in a parking area. Identified as Point of Analysis (POA) #100, this structure collects runoff from 1.22 acres of area as shown on the attached Pre- and Post-Development Drainage Area Plans.

The drainage study was completed using the USDA SCS TR-20 Method within the HydroCAD Stormwater Modeling System. Reservoir routing was performed with the Dynamic Storage Indication method with automated calculation of tailwater conditions. A Type III 24-hour rainfall distribution was utilized in analyzing the data for the 2, 10, 25 and 50 year - 24-hour storm events using rainfall data provided by the Northeast Regional Climate Center (NRCC). All rainfall amount have been increased by 15%. Based on site conditions observed during construction of the campus, in situ soils were modeled as Hydrologic Soil Group (HSG) C.

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Drainage Analysis

A complete summary of the drainage model is included later in this report. The following table compares pre- and post-development peak rates of runoff for all analyzed storm events:

Stormwater Modeling Summary Peak Rate (Q) in Cubic Feet per Second (cfs) for Type III 24-Hour Storm Events

Storm Event: Rainfall:	2-Year Storm (3.67 inches)	10-Year Storm (5.62 inches)	25-Year Storm (7.14 inches)	50-Year Storm (8.58 inches)
<u>POA#100</u> Existing Catch Basin				
Pre	1.57	2.68	3.55	4.37
Post	1.55	2.50	3.25	4.32
Net Change	-0.02	-0.18	-0.30	-0.05

As the above table demonstrates, the proposed peak rates of runoff will be decreased from the existing conditions of the site at the analysis point for all analyzed storm events.

ATTACHMENTS

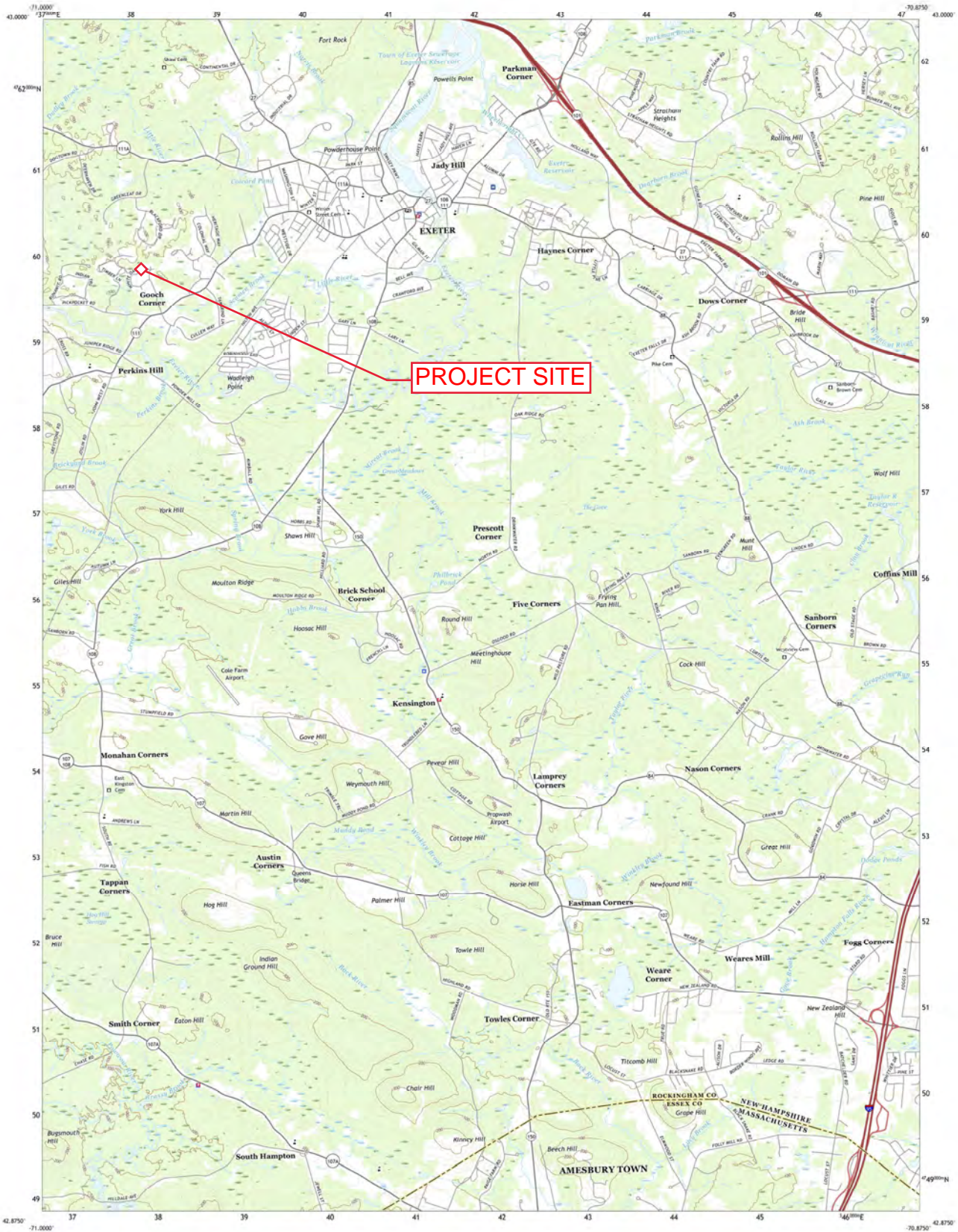
1. Maps and Figures
2. NRCC Extreme Precipitation Table
3. Pre-Development Drainage Analysis
4. Post-Development Drainage Analysis
5. Groundwater Recharge Calculations
6. Stormwater Operations & Maintenance
7. Plans
 - a. Pre- Development Drainage Area Plan
 - b. Post- Development Drainage Area Plan

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Section 1

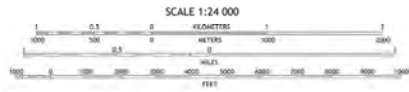
Maps and Figures

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Produced by the United States Geological Survey
North American Datum of 1983 (NAD83)
World Geodetic System of 1984 (WGS84) Projection and
1:24,000 scale and contour interval. Contour interval: 20 feet.
This map is not a legal document. Boundaries may be
generated for this map under private land use government
regulations may not be shown. Obtain permission before
reproducing any part of this map.

Imagery: Aerial July 2018 | October 2016
Base: U.S. Census Bureau, 2011
Hydrography: National Hydrography Dataset, 2004
Contour: National Elevation Dataset, 2011
Boundaries: Multiple sources, see metadata for 2011
Metadata: FWS National Wetlands Inventory, 2012



SCALE 1:24 000
CONTOUR INTERVAL: 20 FEET
NORTH AMERICAN DATUM, DATUM OF 1983
This map was produced in compliance with the
National Geographic Program US Topo Product Standard, 2015.
A metadata file associated with this product is available at www.usgs.gov.



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Section 2

NRCC Extreme Precipitation Table

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Extreme Precipitation Tables

Northeast Regional Climate Center

Data represents point estimates calculated from partial duration series. All precipitation amounts are displayed in inches.

Smoothing	Yes
State	New Hampshire
Location	
Longitude	70.986 degrees West
Latitude	42.973 degrees North
Elevation	0 feet
Date/Time	Wed, 26 Feb 2020 17:29:17 -0500

All rainfall amounts increased by 15%

Extreme Precipitation Estimates

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.26	0.40	0.50	0.66	0.82	1.04	1yr	0.71	0.99	1.22	1.57	2.04	2.67	2.87	1yr	2.36	2.76	3.17	3.88	4.50	1yr
2yr	0.32	0.50	0.62	0.82	1.03	1.30	2yr	0.89	1.18	1.52	1.94	2.48	3.19	3.54	2yr	2.83	3.40	3.92	4.64	5.29	2yr
5yr	0.38	0.59	0.73	0.98	1.26	1.62	5yr	1.09	1.47	1.90	2.44	3.14	4.06	4.55	5yr	3.60	4.38	5.01	5.94	6.71	5yr
10yr	0.42	0.66	0.83	1.13	1.47	1.91	10yr	1.27	1.74	2.25	2.92	3.77	4.88	5.51	10yr	4.32	5.30	6.03	7.16	8.03	10yr
25yr	0.49	0.78	0.99	1.36	1.81	2.38	25yr	1.56	2.16	2.82	3.68	4.79	6.21	7.10	25yr	5.49	6.83	7.72	9.17	10.19	25yr
50yr	0.55	0.88	1.13	1.57	2.12	2.82	50yr	1.83	2.55	3.36	4.40	5.74	7.46	8.61	50yr	6.60	8.28	9.30	11.06	12.22	50yr
100yr	0.61	0.99	1.28	1.82	2.48	3.34	100yr	2.14	3.02	4.00	5.26	6.88	8.96	10.43	100yr	7.93	10.03	11.21	13.36	14.65	100yr
200yr	0.70	1.14	1.48	2.11	2.92	3.95	200yr	2.52	3.57	4.75	6.28	8.24	10.77	12.65	200yr	9.53	12.16	13.52	16.14	17.57	200yr
500yr	0.82	1.36	1.77	2.57	3.61	4.94	500yr	3.12	4.47	5.97	7.95	10.48	13.74	16.32	500yr	12.16	15.69	17.33	20.74	22.38	500yr

Lower Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.24	0.37	0.45	0.61	0.75	0.89	1yr	0.64	0.87	0.97	1.25	1.53	2.29	2.53	1yr	2.03	2.43	2.88	3.50	4.03	1yr
2yr	0.32	0.49	0.60	0.82	1.01	1.19	2yr	0.87	1.16	1.37	1.81	2.32	3.10	3.44	2yr	2.75	3.31	3.81	4.50	5.12	2yr
5yr	0.36	0.55	0.68	0.94	1.19	1.42	5yr	1.03	1.39	1.62	2.11	2.72	3.75	4.17	5yr	3.32	4.01	4.59	5.58	6.19	5yr
10yr	0.40	0.61	0.75	1.05	1.36	1.63	10yr	1.18	1.59	1.82	2.39	3.06	4.29	4.80	10yr	3.80	4.62	5.29	6.53	7.08	10yr
25yr	0.46	0.70	0.87	1.24	1.63	1.95	25yr	1.40	1.91	2.12	2.78	3.57	4.96	5.78	25yr	4.39	5.56	6.36	8.03	8.90	25yr
50yr	0.51	0.77	0.96	1.38	1.86	2.25	50yr	1.61	2.20	2.37	3.11	4.00	5.61	6.63	50yr	4.97	6.38	7.30	9.40	10.31	50yr
100yr	0.57	0.86	1.08	1.56	2.14	2.58	100yr	1.85	2.53	2.65	3.48	4.48	6.33	7.59	100yr	5.61	7.30	8.39	11.00	11.93	100yr
200yr	0.64	0.96	1.22	1.77	2.46	2.97	200yr	2.12	2.90	2.96	3.89	5.01	7.11	9.80	200yr	6.29	9.42	9.64	12.89	13.83	200yr
500yr	0.75	1.12	1.44	2.09	2.98	3.58	500yr	2.57	3.50	3.43	4.50	5.84	8.23	12.06	500yr	7.28	11.59	11.58	15.91	16.78	500yr

Upper Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.28	0.44	0.54	0.72	0.89	1.08	1yr	0.77	1.06	1.26	1.70	2.15	2.93	3.17	1yr	2.59	3.05	3.53	4.20	4.92	1yr
2yr	0.33	0.51	0.63	0.86	1.05	1.26	2yr	0.91	1.23	1.48	1.94	2.48	3.35	3.67	2yr	2.96	3.53	4.07	4.84	5.57	2yr
5yr	0.40	0.62	0.77	1.06	1.35	1.62	5yr	1.16	1.58	1.87	2.47	3.15	4.40	4.98	5yr	3.89	4.79	5.46	6.31	7.27	5yr
10yr	0.48	0.74	0.91	1.27	1.64	1.97	10yr	1.42	1.93	2.26	3.00	3.78	5.49	6.29	10yr	4.86	6.05	6.87	7.81	9.03	10yr
25yr	0.59	0.90	1.13	1.61	2.11	2.56	25yr	1.82	2.50	2.93	3.89	4.83	7.49	8.60	25yr	6.63	8.27	9.28	10.38	11.42	25yr
50yr	0.70	1.06	1.32	1.90	2.56	3.12	50yr	2.21	3.05	3.56	4.72	5.84	9.39	10.93	50yr	8.31	10.51	11.68	12.88	14.03	50yr
100yr	0.83	1.25	1.56	2.26	3.10	3.79	100yr	2.67	3.70	4.34	5.76	7.06	11.79	13.87	100yr	10.44	13.34	14.69	15.99	17.26	100yr
200yr	0.97	1.46	1.86	2.69	3.75	4.62	200yr	3.23	4.52	5.30	7.02	8.52	14.85	15.76	200yr	13.14	15.15	18.51	19.85	21.25	200yr
500yr	1.22	1.81	2.33	3.38	4.81	5.99	500yr	4.15	5.86	6.89	9.14	10.96	20.16	21.15	500yr	17.84	20.34	25.08	26.44	28.02	500yr



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Section 3

Drainage Calculations

Pre-Development

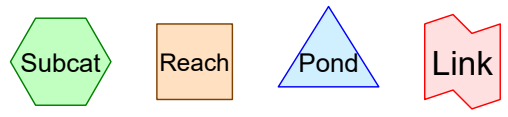
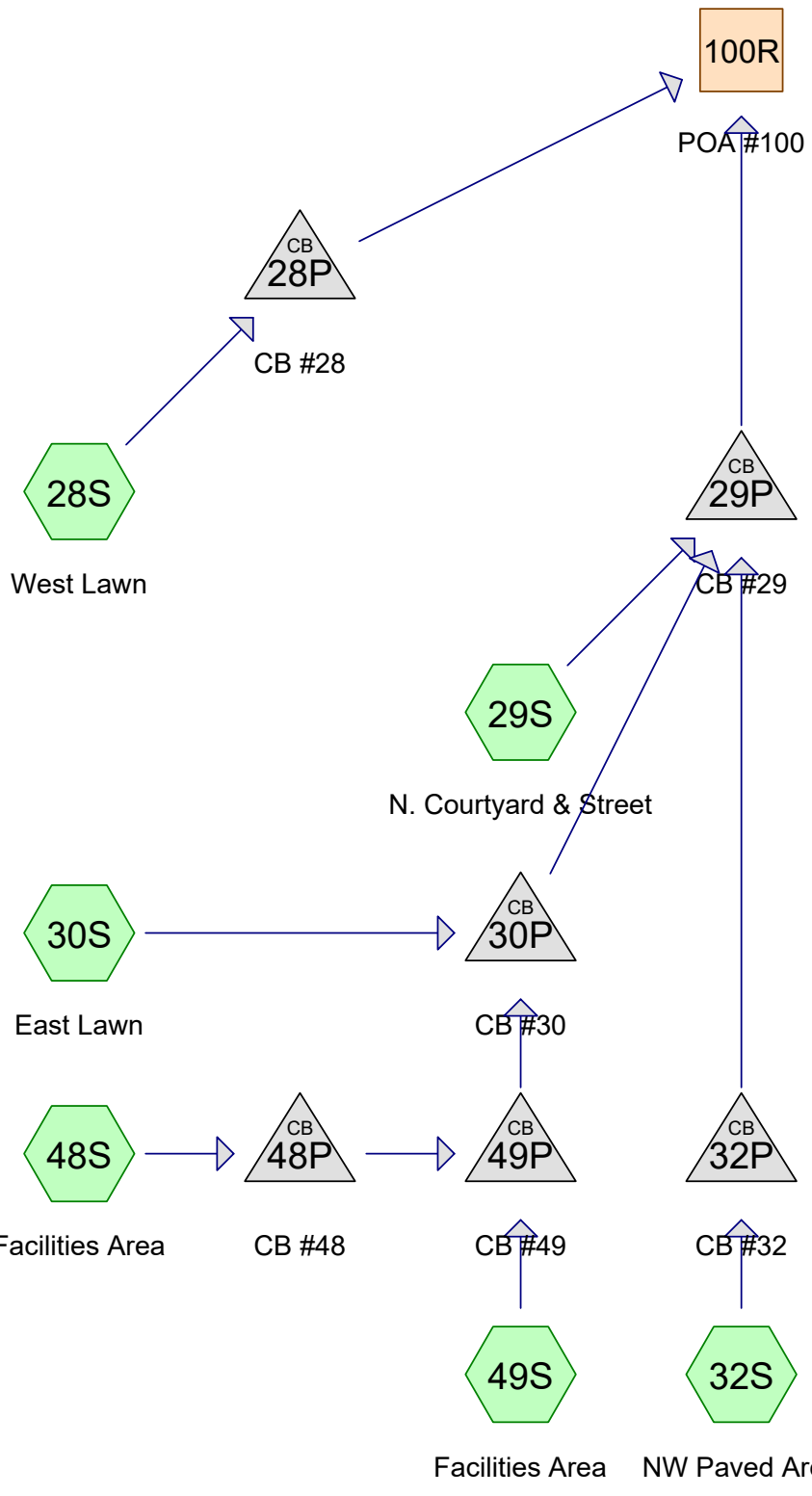
2-Year, 24-Hour Summary

10-Year, 24-Hour Complete

25-Year, 24-Hour Summary

50-Year, 24-Hour Summary

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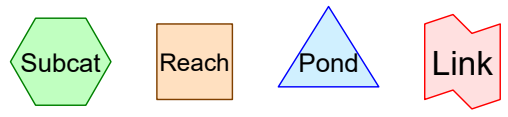
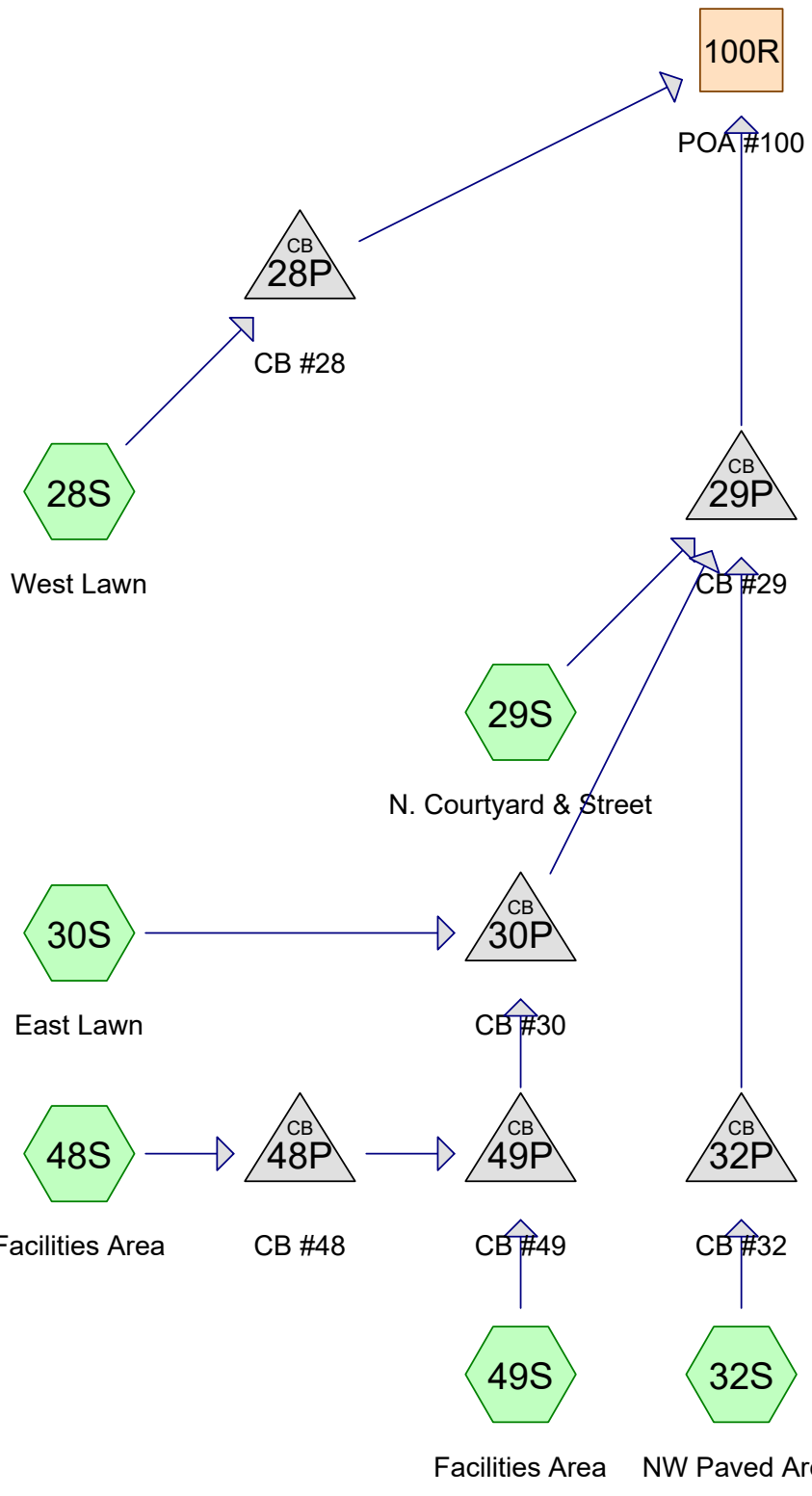


Routing Diagram for 5056-PRE-rev040120
 Prepared by Altus Engineering, Inc., Printed 4/1/2020
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Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 28S: West Lawn	Runoff Area=9,719 sf 33.08% Impervious Runoff Depth>1.92" Tc=6.0 min CN=82 Runoff=0.50 cfs 0.036 af
Subcatchment 29S: N. Courtyard & Street	Runoff Area=4,826 sf 84.44% Impervious Runoff Depth>3.00" Tc=6.0 min CN=94 Runoff=0.37 cfs 0.028 af
Subcatchment 30S: East Lawn	Runoff Area=4,902 sf 46.59% Impervious Runoff Depth>2.16" Tc=6.0 min CN=85 Runoff=0.29 cfs 0.020 af
Subcatchment 32S: NW Paved Area	Runoff Area=1,437 sf 100.00% Impervious Runoff Depth>3.43" Tc=6.0 min CN=98 Runoff=0.12 cfs 0.009 af
Subcatchment 48S: Facilities Area	Runoff Area=1,243 sf 100.00% Impervious Runoff Depth>3.43" Tc=6.0 min CN=98 Runoff=0.10 cfs 0.008 af
Subcatchment 49S: Facilities Area	Runoff Area=2,283 sf 100.00% Impervious Runoff Depth>3.43" Tc=6.0 min CN=98 Runoff=0.19 cfs 0.015 af
Reach 100R: POA #100	Inflow=1.57 cfs 0.116 af Outflow=1.57 cfs 0.116 af
Pond 28P: CB #28	Peak Elev=92.30' Inflow=0.50 cfs 0.036 af 12.0" Round Culvert n=0.012 L=60.0' S=0.0183 '/' Outflow=0.50 cfs 0.036 af
Pond 29P: CB #29	Peak Elev=91.05' Inflow=1.06 cfs 0.081 af 18.0" Round Culvert n=0.012 L=41.0' S=0.0049 '/' Outflow=1.06 cfs 0.081 af
Pond 30P: CB #30	Peak Elev=91.79' Inflow=0.57 cfs 0.043 af 12.0" Round Culvert n=0.012 L=79.0' S=0.0073 '/' Outflow=0.57 cfs 0.043 af
Pond 32P: CB #32	Peak Elev=91.40' Inflow=0.12 cfs 0.009 af 15.0" Round Culvert n=0.012 L=85.0' S=0.0053 '/' Outflow=0.12 cfs 0.009 af
Pond 48P: CB #48	Peak Elev=94.08' Inflow=0.10 cfs 0.008 af 8.0" Round Culvert n=0.012 L=64.0' S=0.0362 '/' Outflow=0.10 cfs 0.008 af
Pond 49P: CB #49	Peak Elev=92.10' Inflow=0.29 cfs 0.023 af 12.0" Round Culvert n=0.012 L=40.0' S=0.0085 '/' Outflow=0.29 cfs 0.023 af

Total Runoff Area = 0.560 ac Runoff Volume = 0.116 af Average Runoff Depth = 2.49"
40.45% Pervious = 0.227 ac 59.55% Impervious = 0.334 ac



Routing Diagram for 5056-PRE-rev040120
 Prepared by Altus Engineering, Inc., Printed 4/1/2020
 HydroCAD® 10.00-25 s/n 01222 © 2019 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.227	74	>75% Grass cover, Good, HSG C (28S, 29S, 30S)
0.334	98	Impervious (28S, 29S, 30S, 32S, 48S, 49S)
0.560	88	TOTAL AREA

Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 28S: West Lawn	Runoff Area=9,719 sf 33.08% Impervious Runoff Depth>3.64" Tc=6.0 min CN=82 Runoff=0.95 cfs 0.068 af
Subcatchment 29S: N. Courtyard & Street	Runoff Area=4,826 sf 84.44% Impervious Runoff Depth>4.92" Tc=6.0 min CN=94 Runoff=0.59 cfs 0.045 af
Subcatchment 30S: East Lawn	Runoff Area=4,902 sf 46.59% Impervious Runoff Depth>3.94" Tc=6.0 min CN=85 Runoff=0.51 cfs 0.037 af
Subcatchment 32S: NW Paved Area	Runoff Area=1,437 sf 100.00% Impervious Runoff Depth>5.38" Tc=6.0 min CN=98 Runoff=0.18 cfs 0.015 af
Subcatchment 48S: Facilities Area	Runoff Area=1,243 sf 100.00% Impervious Runoff Depth>5.38" Tc=6.0 min CN=98 Runoff=0.16 cfs 0.013 af
Subcatchment 49S: Facilities Area	Runoff Area=2,283 sf 100.00% Impervious Runoff Depth>5.38" Tc=6.0 min CN=98 Runoff=0.29 cfs 0.023 af
Reach 100R: POA #100	Inflow=2.68 cfs 0.201 af Outflow=2.68 cfs 0.201 af
Pond 28P: CB #28	Peak Elev=92.47' Inflow=0.95 cfs 0.068 af 12.0" Round Culvert n=0.012 L=60.0' S=0.0183 '/' Outflow=0.95 cfs 0.068 af
Pond 29P: CB #29	Peak Elev=91.23' Inflow=1.73 cfs 0.133 af 18.0" Round Culvert n=0.012 L=41.0' S=0.0049 '/' Outflow=1.73 cfs 0.133 af
Pond 30P: CB #30	Peak Elev=91.94' Inflow=0.96 cfs 0.073 af 12.0" Round Culvert n=0.012 L=79.0' S=0.0073 '/' Outflow=0.96 cfs 0.073 af
Pond 32P: CB #32	Peak Elev=91.47' Inflow=0.18 cfs 0.015 af 15.0" Round Culvert n=0.012 L=85.0' S=0.0053 '/' Outflow=0.18 cfs 0.015 af
Pond 48P: CB #48	Peak Elev=94.13' Inflow=0.16 cfs 0.013 af 8.0" Round Culvert n=0.012 L=64.0' S=0.0362 '/' Outflow=0.16 cfs 0.013 af
Pond 49P: CB #49	Peak Elev=92.21' Inflow=0.45 cfs 0.036 af 12.0" Round Culvert n=0.012 L=40.0' S=0.0085 '/' Outflow=0.45 cfs 0.036 af

Total Runoff Area = 0.560 ac Runoff Volume = 0.201 af Average Runoff Depth = 4.30"
40.45% Pervious = 0.227 ac 59.55% Impervious = 0.334 ac

Summary for Subcatchment 28S: West Lawn

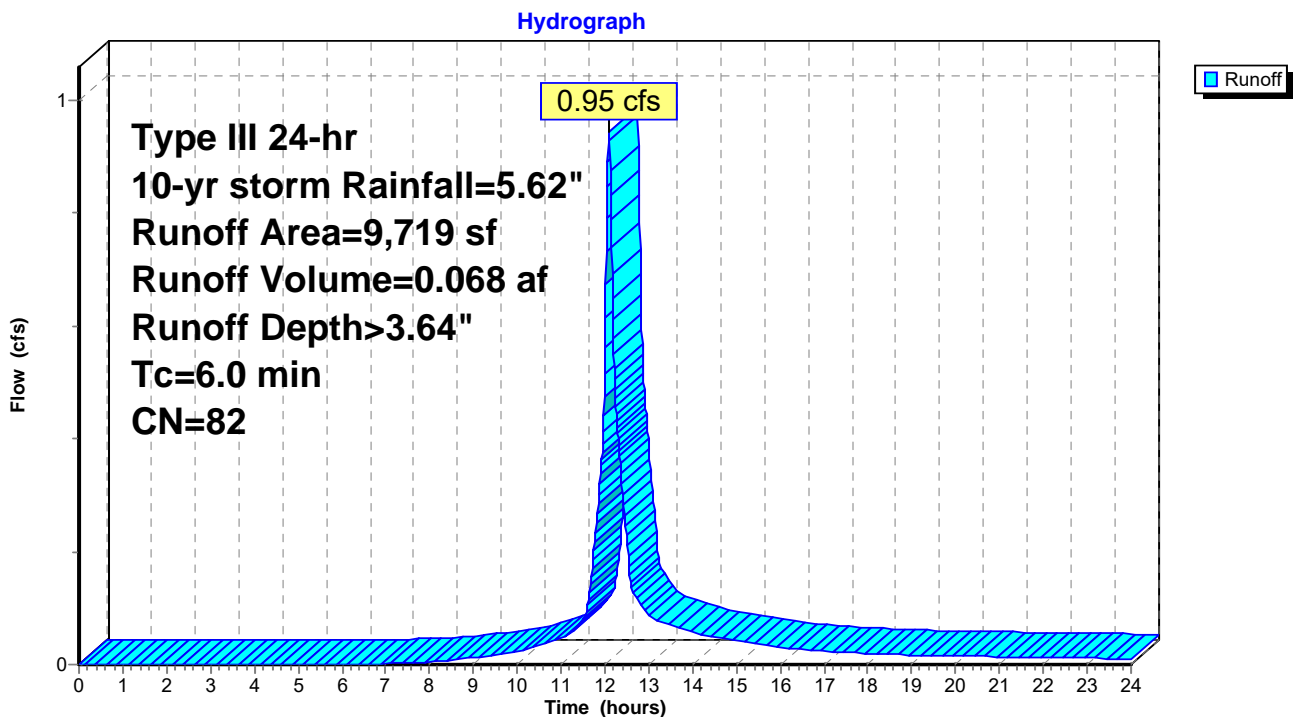
Runoff = 0.95 cfs @ 12.09 hrs, Volume= 0.068 af, Depth> 3.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Type III 24-hr 10-yr storm Rainfall=5.62"

	Area (sf)	CN	Description
*	3,215	98	Impervious
	6,504	74	>75% Grass cover, Good, HSG C
	9,719	82	Weighted Average
	6,504		66.92% Pervious Area
	3,215		33.08% Impervious Area

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

Subcatchment 28S: West Lawn



Summary for Subcatchment 29S: N. Courtyard & Street

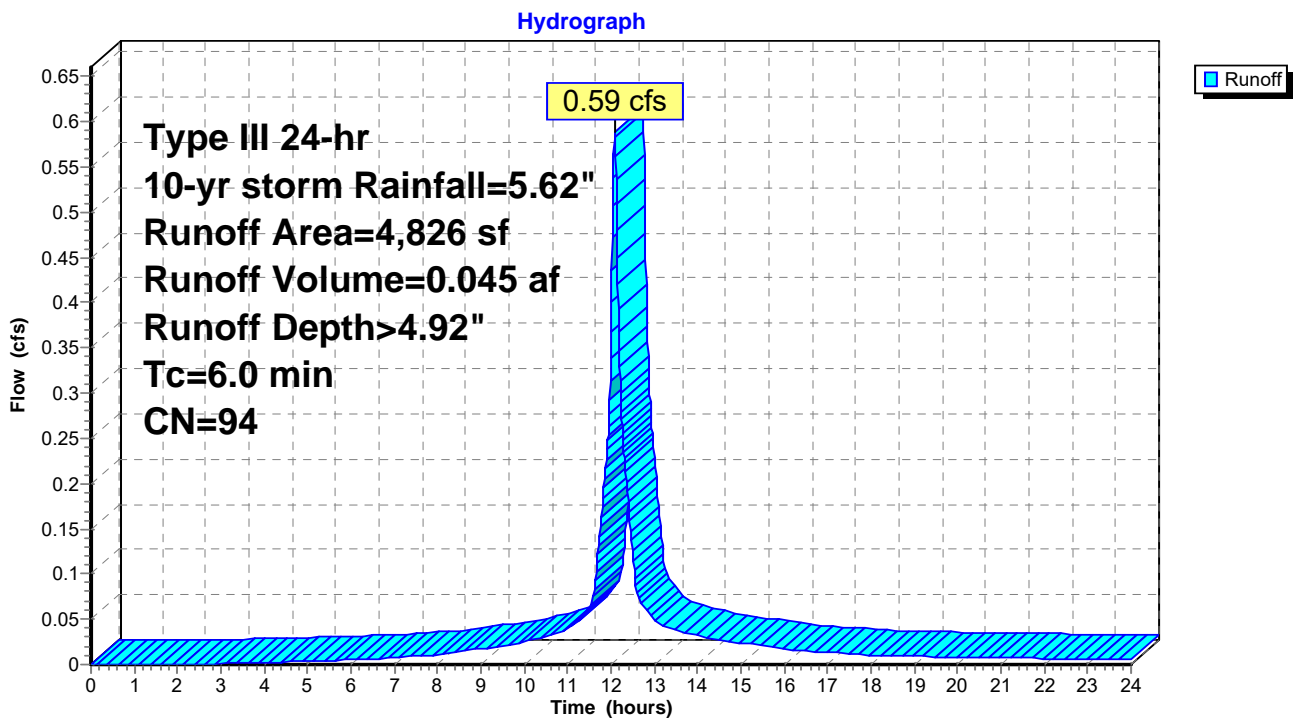
Runoff = 0.59 cfs @ 12.08 hrs, Volume= 0.045 af, Depth> 4.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Type III 24-hr 10-yr storm Rainfall=5.62"

Area (sf)	CN	Description
* 4,075	98	Impervious
751	74	>75% Grass cover, Good, HSG C
4,826	94	Weighted Average
751		15.56% Pervious Area
4,075		84.44% Impervious Area

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

Subcatchment 29S: N. Courtyard & Street



Summary for Subcatchment 30S: East Lawn

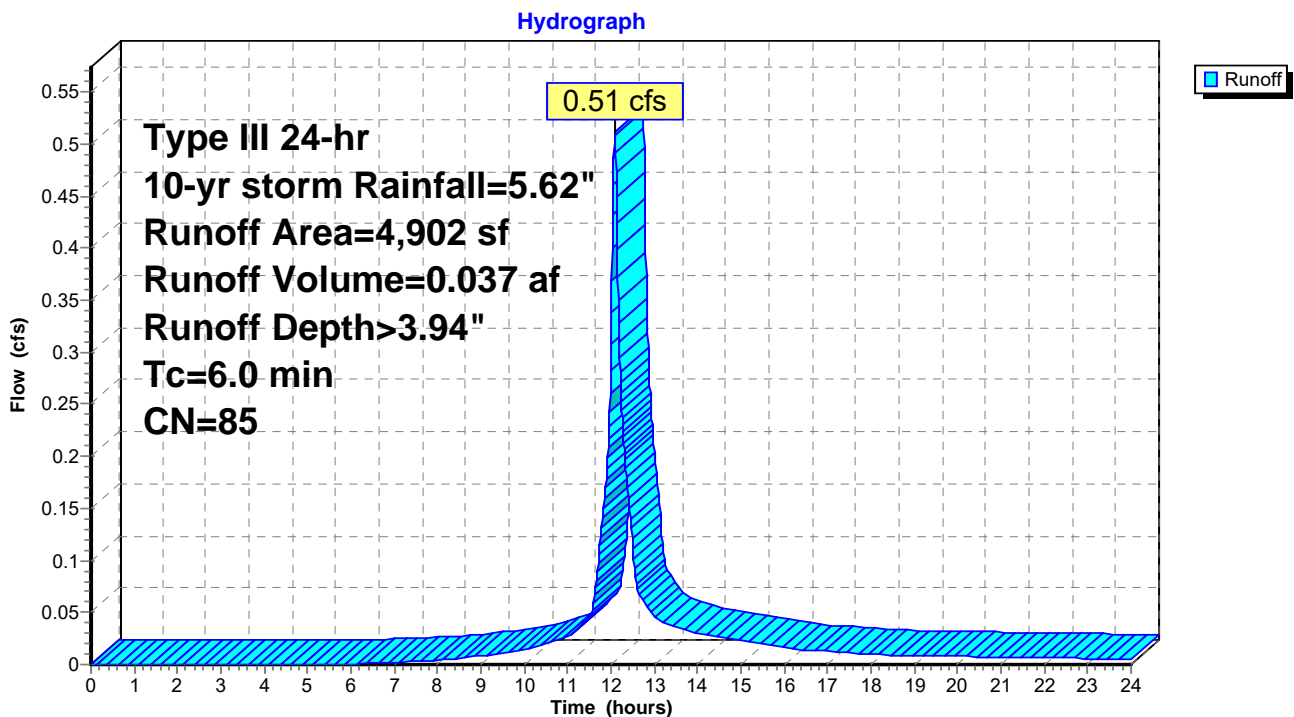
Runoff = 0.51 cfs @ 12.09 hrs, Volume= 0.037 af, Depth> 3.94"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Type III 24-hr 10-yr storm Rainfall=5.62"

	Area (sf)	CN	Description
*	2,284	98	Impervious
	2,618	74	>75% Grass cover, Good, HSG C
	4,902	85	Weighted Average
	2,618		53.41% Pervious Area
	2,284		46.59% Impervious Area

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

Subcatchment 30S: East Lawn



Summary for Subcatchment 32S: NW Paved Area

Runoff = 0.18 cfs @ 12.08 hrs, Volume= 0.015 af, Depth> 5.38"

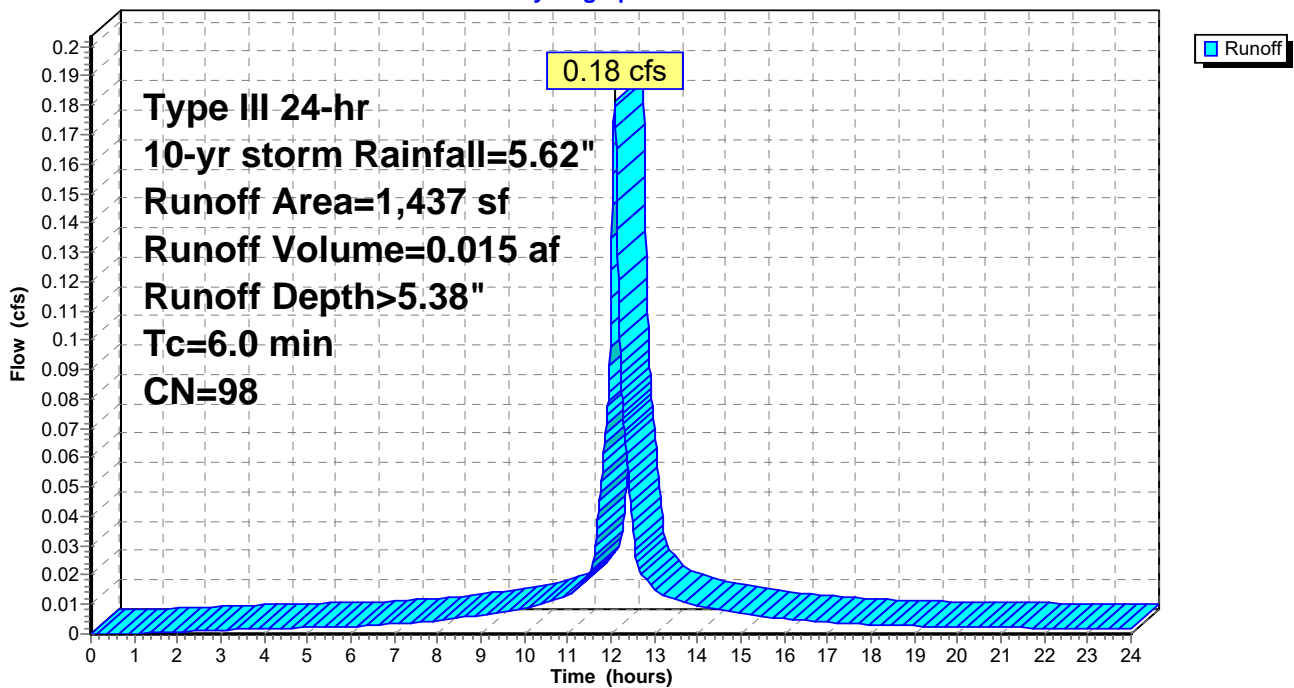
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Type III 24-hr 10-yr storm Rainfall=5.62"

Area (sf)	CN	Description
* 1,437	98	Impervious
1,437		100.00% Impervious Area

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

Subcatchment 32S: NW Paved Area

Hydrograph



Summary for Subcatchment 48S: Facilities Area

Runoff = 0.16 cfs @ 12.08 hrs, Volume= 0.013 af, Depth> 5.38"

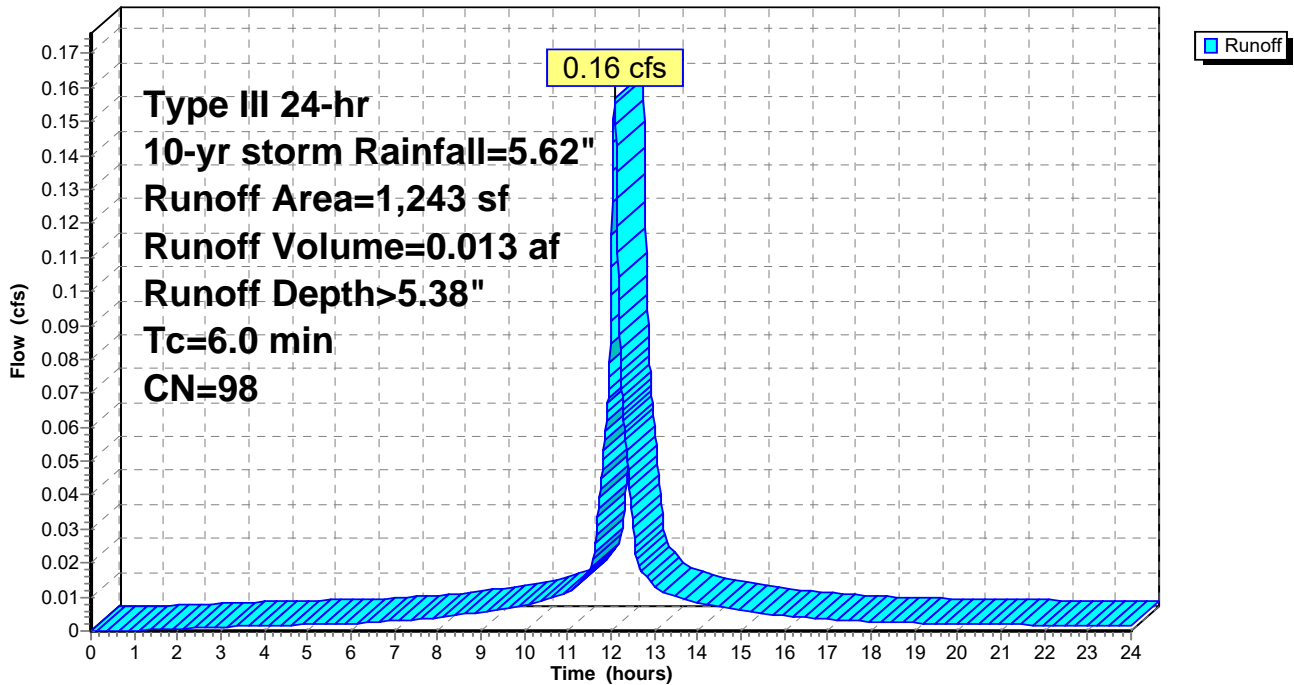
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Type III 24-hr 10-yr storm Rainfall=5.62"

Area (sf)	CN	Description
* 1,243	98	Impervious
1,243		100.00% Impervious Area

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

Subcatchment 48S: Facilities Area

Hydrograph



Summary for Subcatchment 49S: Facilities Area

Runoff = 0.29 cfs @ 12.08 hrs, Volume= 0.023 af, Depth> 5.38"

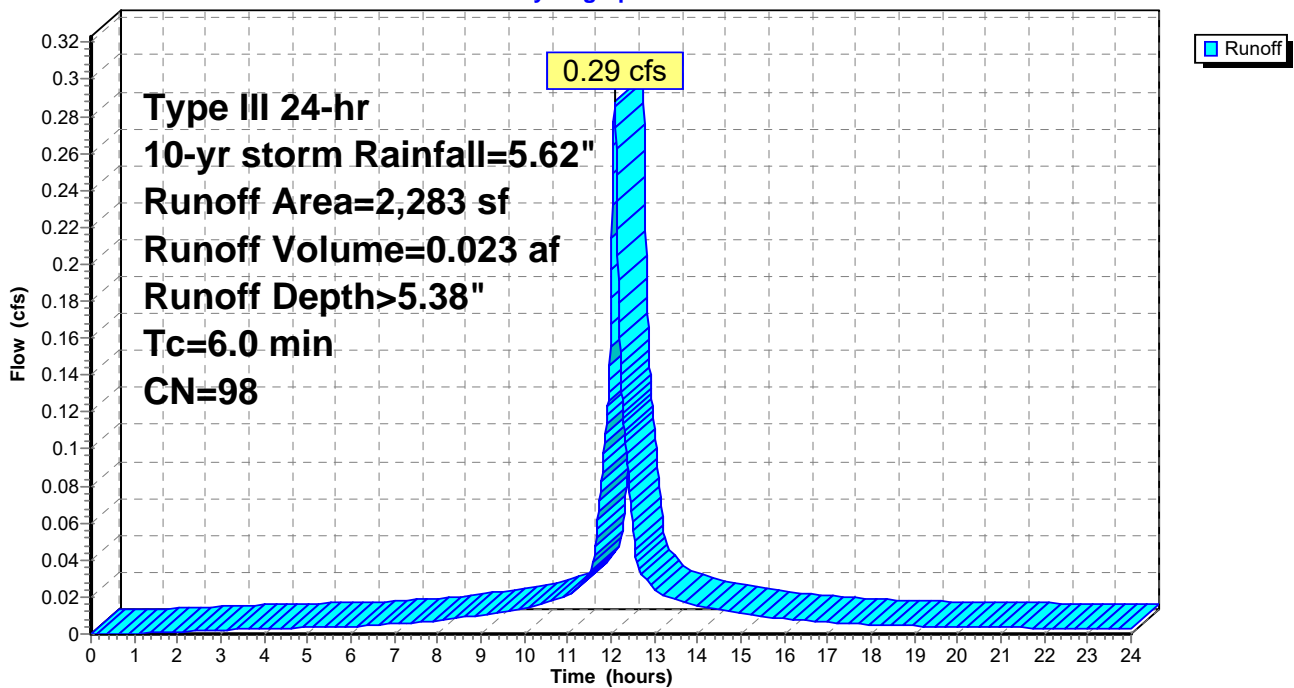
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Type III 24-hr 10-yr storm Rainfall=5.62"

Area (sf)	CN	Description
* 2,283	98	Impervious
2,283		100.00% Impervious Area

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

Subcatchment 49S: Facilities Area

Hydrograph

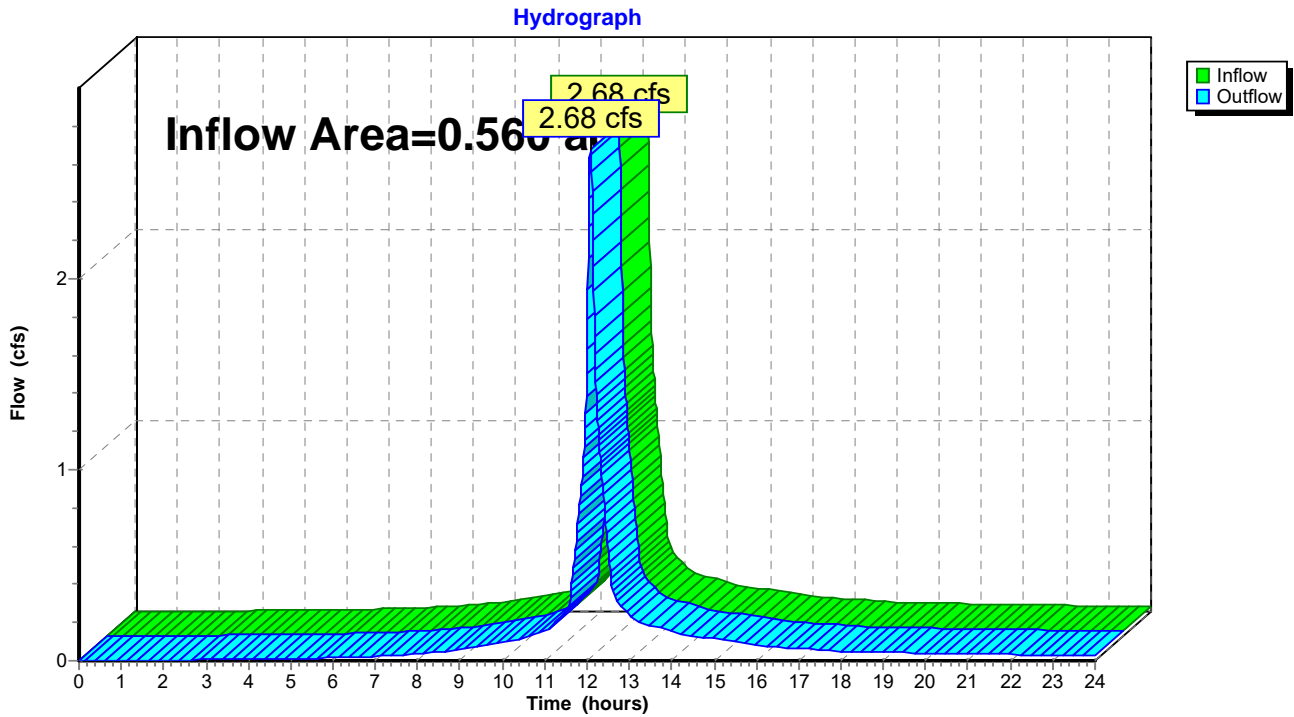


Summary for Reach 100R: POA #100

Inflow Area = 0.560 ac, 59.55% Impervious, Inflow Depth > 4.30" for 10-yr storm event
Inflow = 2.68 cfs @ 12.09 hrs, Volume= 0.201 af
Outflow = 2.68 cfs @ 12.09 hrs, Volume= 0.201 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach 100R: POA #100



Summary for Pond 28P: CB #28

Inflow Area = 0.223 ac, 33.08% Impervious, Inflow Depth > 3.64" for 10-yr storm event
 Inflow = 0.95 cfs @ 12.09 hrs, Volume= 0.068 af
 Outflow = 0.95 cfs @ 12.09 hrs, Volume= 0.068 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.95 cfs @ 12.09 hrs, Volume= 0.068 af

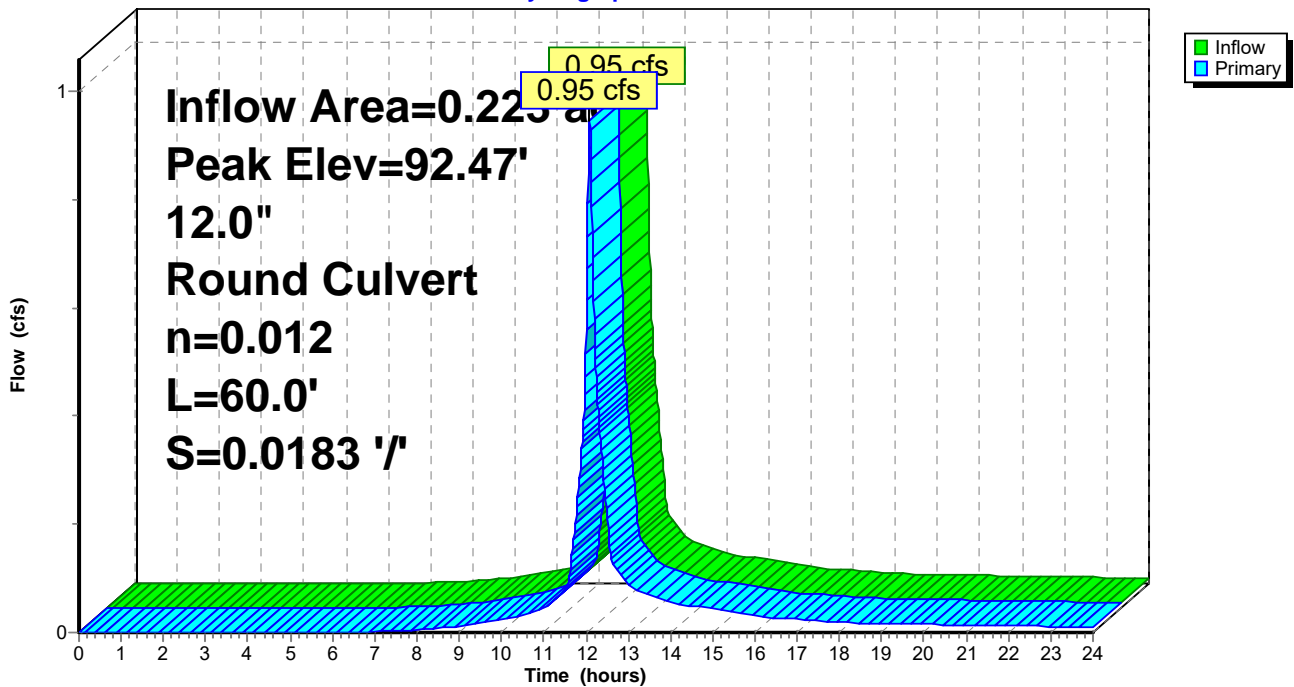
Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 92.47' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	91.90'	12.0" Round Culvert L= 60.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 91.90' / 90.80' S= 0.0183 '/ Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.94 cfs @ 12.09 hrs HW=92.47' TW=0.00' (Dynamic Tailwater)
 ←1=Culvert (Inlet Controls 0.94 cfs @ 2.03 fps)

Pond 28P: CB #28

Hydrograph



Summary for Pond 29P: CB #29

Inflow Area = 0.337 ac, 77.07% Impervious, Inflow Depth > 4.75" for 10-yr storm event
 Inflow = 1.73 cfs @ 12.08 hrs, Volume= 0.133 af
 Outflow = 1.73 cfs @ 12.08 hrs, Volume= 0.133 af, Atten= 0%, Lag= 0.0 min
 Primary = 1.73 cfs @ 12.08 hrs, Volume= 0.133 af

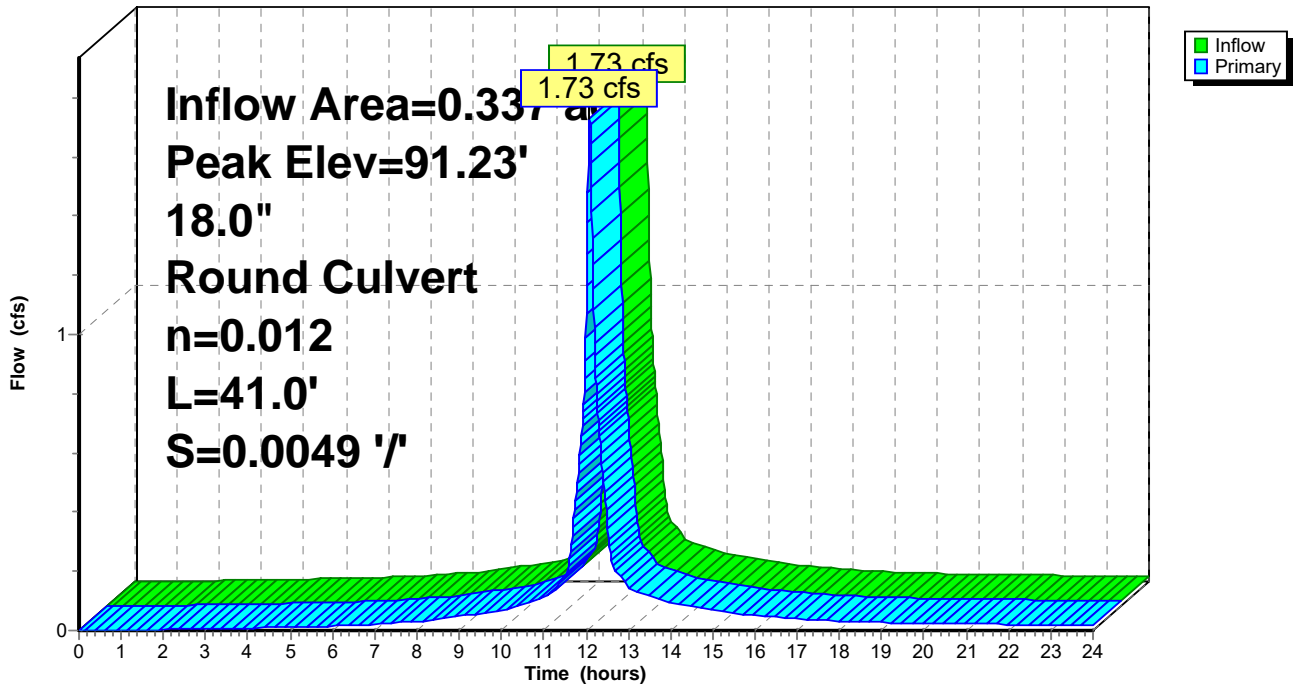
Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 91.23' @ 12.08 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	90.50'	18.0" Round Culvert L= 41.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 90.50' / 90.30' S= 0.0049 '/ Cc= 0.900 n= 0.012, Flow Area= 1.77 sf

Primary OutFlow Max=1.73 cfs @ 12.08 hrs HW=91.23' TW=0.00' (Dynamic Tailwater)
 ←1=Culvert (Barrel Controls 1.73 cfs @ 2.98 fps)

Pond 29P: CB #29

Hydrograph



Summary for Pond 30P: CB #30

Inflow Area = 0.193 ac, 68.94% Impervious, Inflow Depth > 4.54" for 10-yr storm event
 Inflow = 0.96 cfs @ 12.08 hrs, Volume= 0.073 af
 Outflow = 0.96 cfs @ 12.08 hrs, Volume= 0.073 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.96 cfs @ 12.08 hrs, Volume= 0.073 af

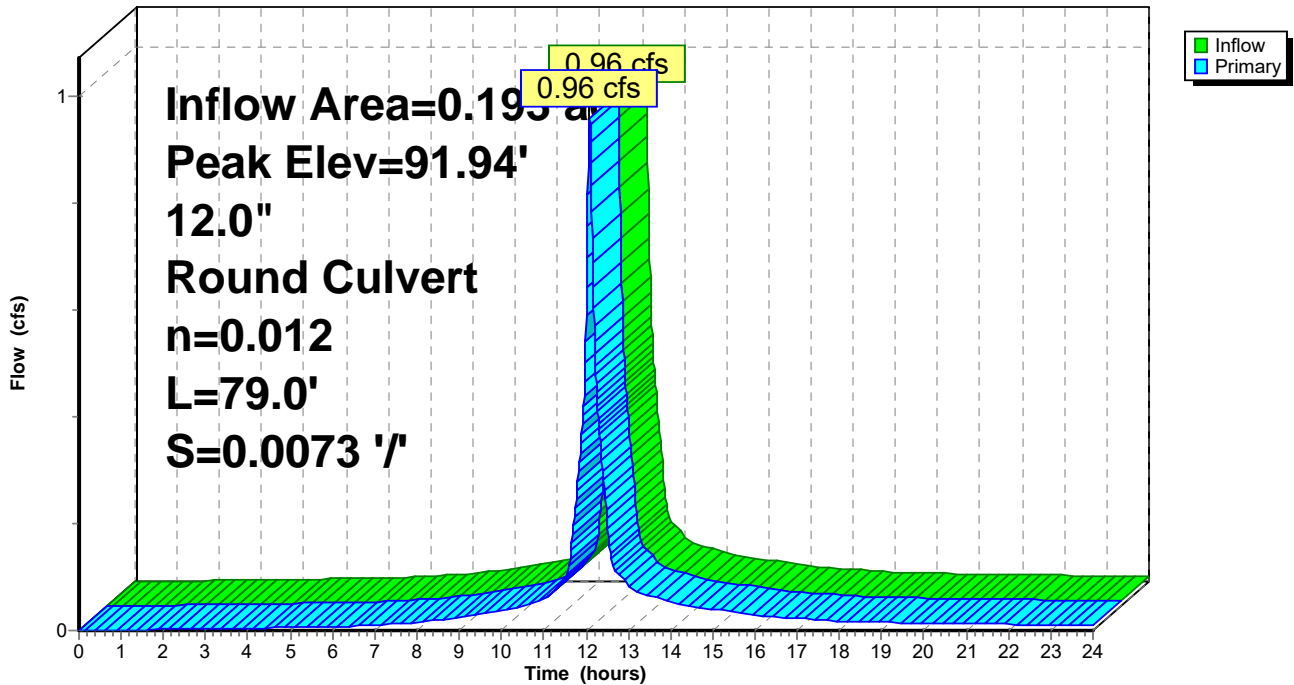
Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 91.94' @ 12.08 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	91.36'	12.0" Round Culvert L= 79.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 91.36' / 90.78' S= 0.0073 '/ Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.96 cfs @ 12.08 hrs HW=91.94' TW=91.23' (Dynamic Tailwater)
 ←1=Culvert (Inlet Controls 0.96 cfs @ 2.04 fps)

Pond 30P: CB #30

Hydrograph



Summary for Pond 32P: CB #32

Inflow Area = 0.033 ac, 100.00% Impervious, Inflow Depth > 5.38" for 10-yr storm event
 Inflow = 0.18 cfs @ 12.08 hrs, Volume= 0.015 af
 Outflow = 0.18 cfs @ 12.08 hrs, Volume= 0.015 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.18 cfs @ 12.08 hrs, Volume= 0.015 af

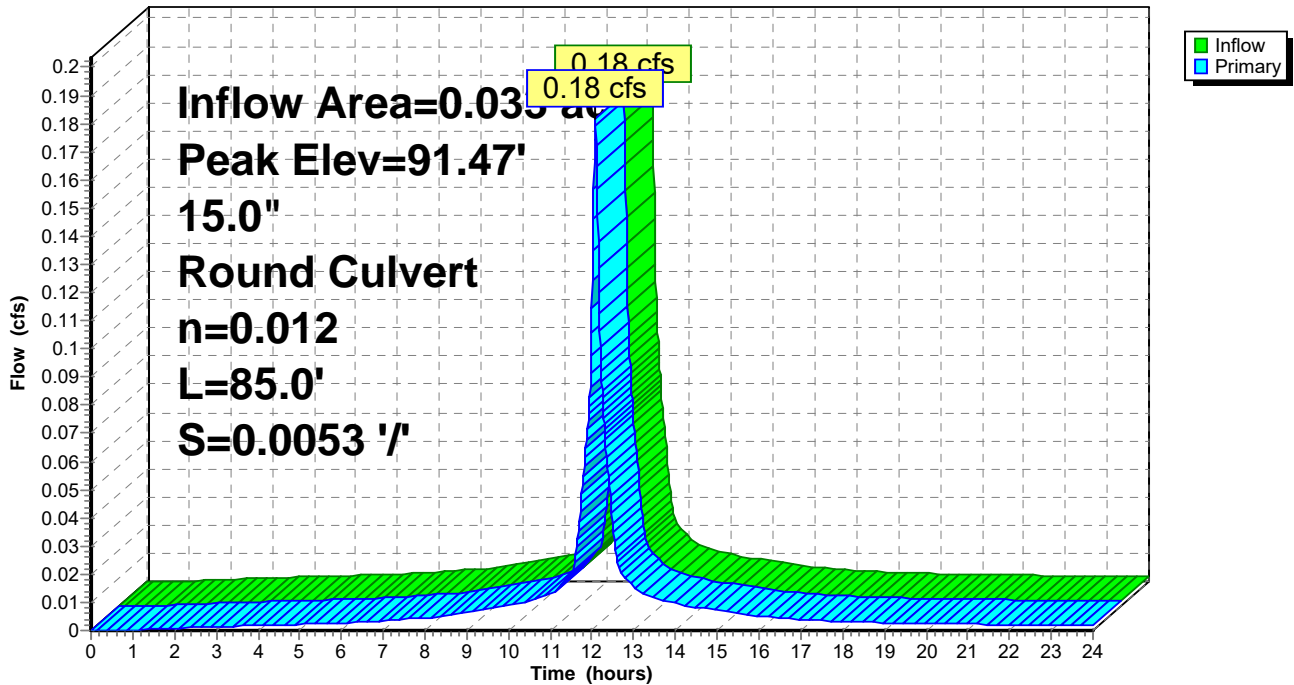
Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 91.47' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	91.20'	15.0" Round Culvert L= 85.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 91.20' / 90.75' S= 0.0053 '/ Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=0.18 cfs @ 12.08 hrs HW=91.47' TW=91.23' (Dynamic Tailwater)
 ←1=Culvert (Outlet Controls 0.18 cfs @ 1.42 fps)

Pond 32P: CB #32

Hydrograph



Summary for Pond 48P: CB #48

Inflow Area = 0.029 ac, 100.00% Impervious, Inflow Depth > 5.38" for 10-yr storm event
 Inflow = 0.16 cfs @ 12.08 hrs, Volume= 0.013 af
 Outflow = 0.16 cfs @ 12.08 hrs, Volume= 0.013 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.16 cfs @ 12.08 hrs, Volume= 0.013 af

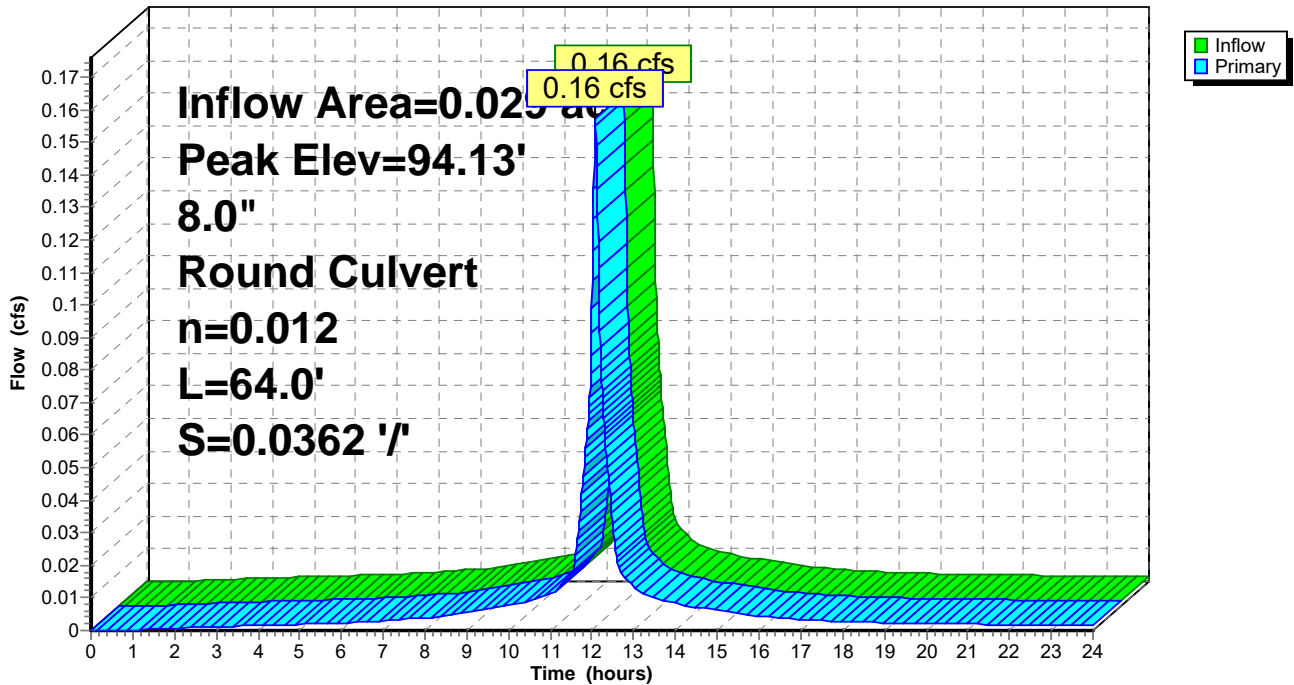
Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 94.13' @ 12.08 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	93.88'	8.0" Round Culvert L= 64.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 93.88' / 91.56' S= 0.0362 '/ Cc= 0.900 n= 0.012, Flow Area= 0.35 sf

Primary OutFlow Max=0.16 cfs @ 12.08 hrs HW=94.13' TW=92.21' (Dynamic Tailwater)
 ←1=Culvert (Inlet Controls 0.16 cfs @ 1.34 fps)

Pond 48P: CB #48

Hydrograph



Summary for Pond 49P: CB #49

Inflow Area = 0.081 ac, 100.00% Impervious, Inflow Depth > 5.38" for 10-yr storm event
 Inflow = 0.45 cfs @ 12.08 hrs, Volume= 0.036 af
 Outflow = 0.45 cfs @ 12.08 hrs, Volume= 0.036 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.45 cfs @ 12.08 hrs, Volume= 0.036 af

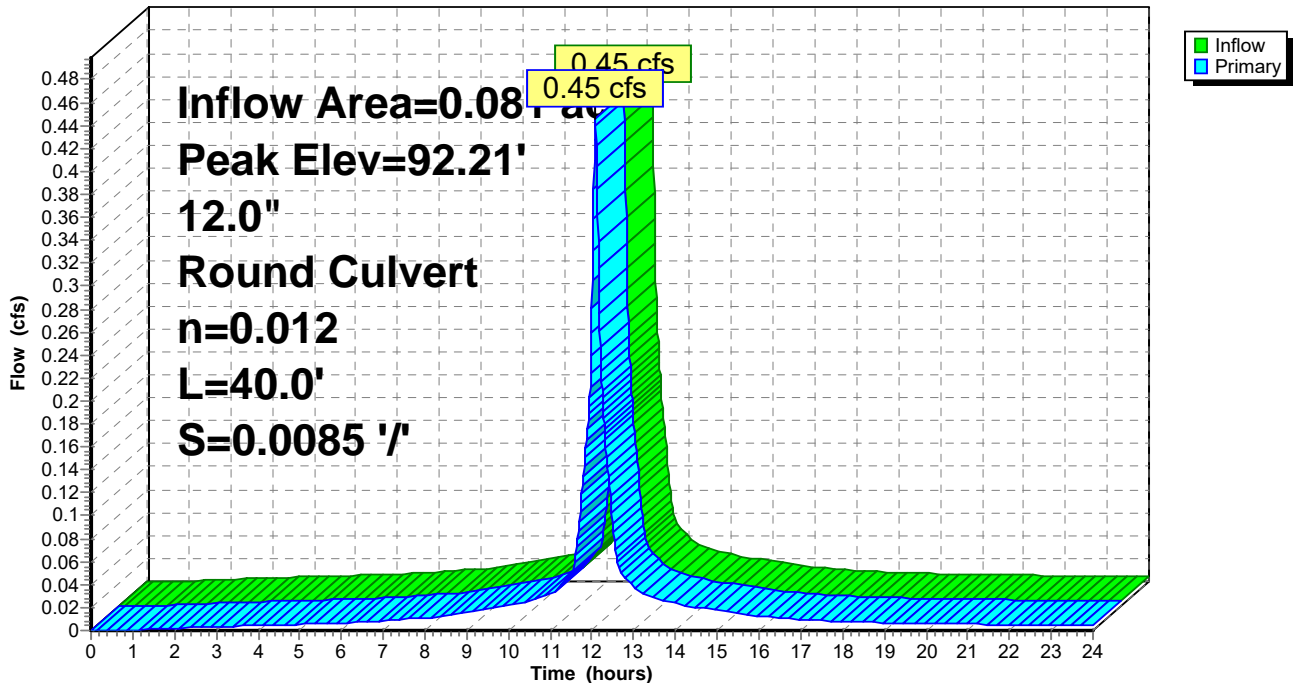
Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 92.21' @ 12.09 hrs

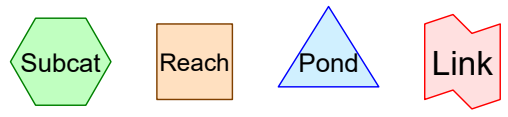
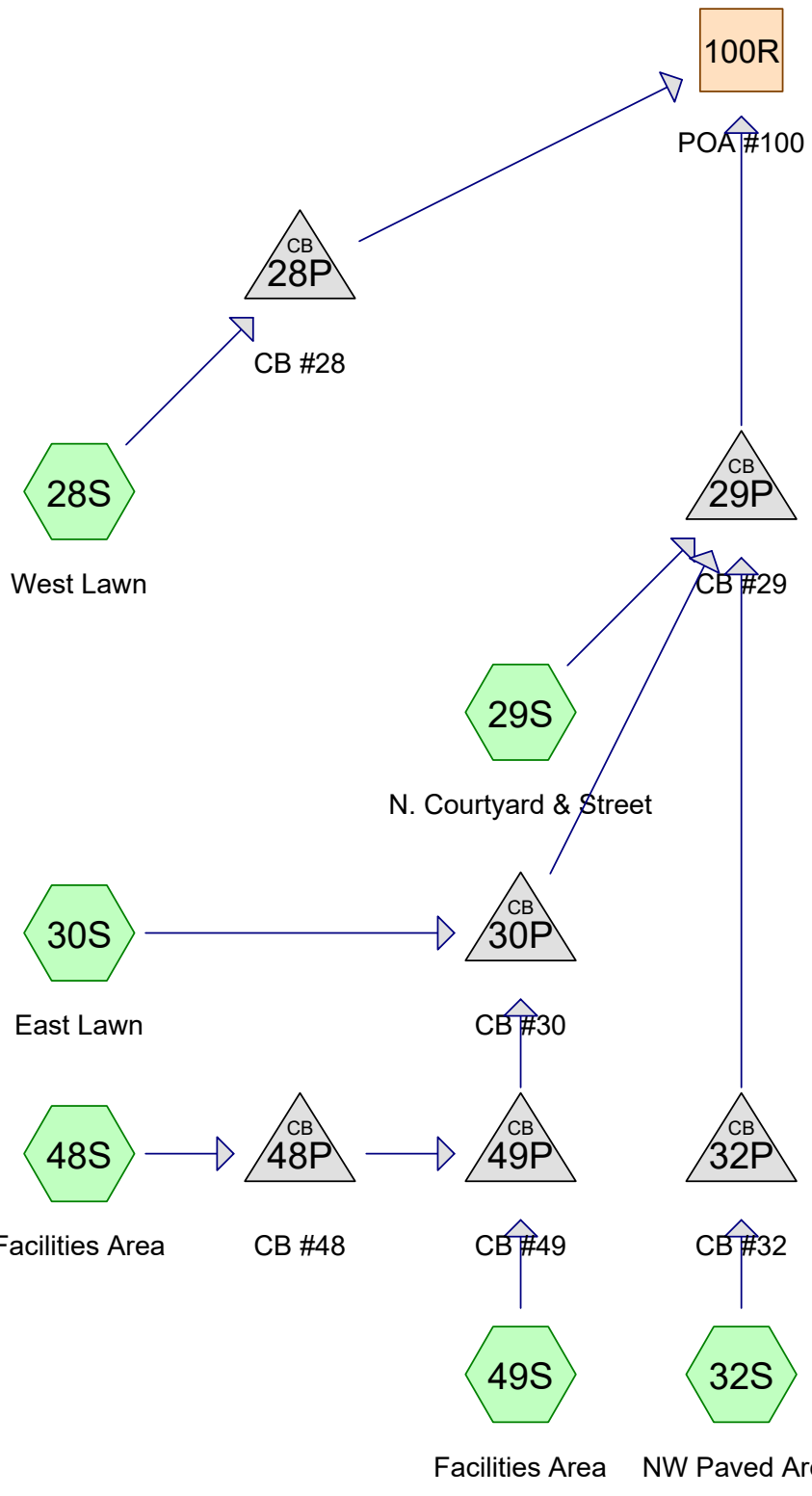
Device #	Routing	Invert	Outlet Devices
1	Primary	91.80'	12.0" Round Culvert L= 40.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 91.80' / 91.46' S= 0.0085 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.44 cfs @ 12.08 hrs HW=92.21' TW=91.94' (Dynamic Tailwater)
 ←1=Culvert (Outlet Controls 0.44 cfs @ 2.18 fps)

Pond 49P: CB #49

Hydrograph



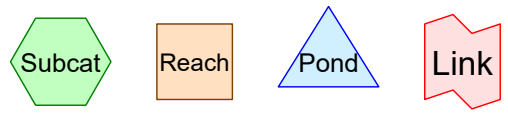
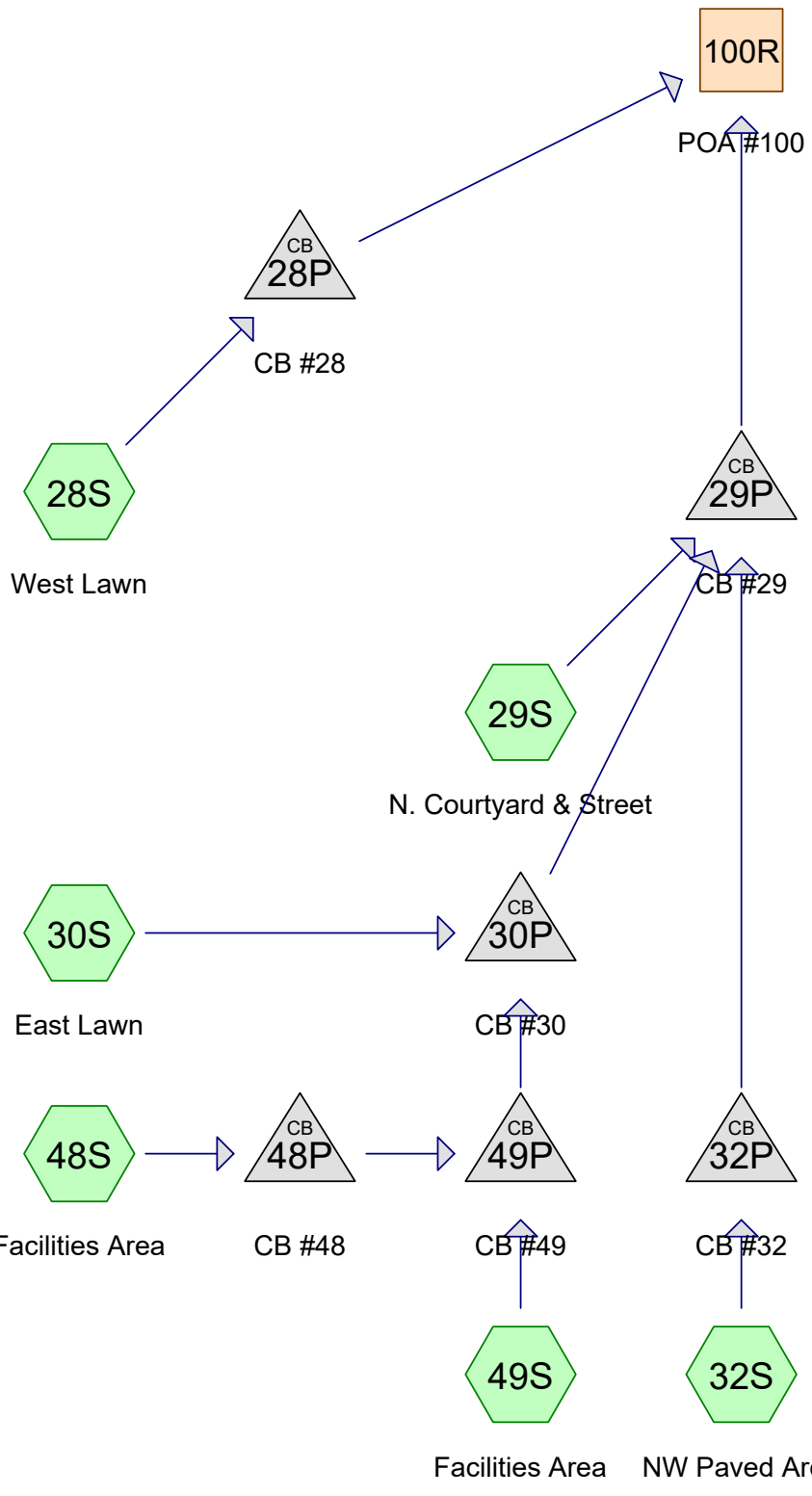


Routing Diagram for 5056-PRE-rev040120
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Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 28S: West Lawn	Runoff Area=9,719 sf 33.08% Impervious Runoff Depth>5.04" Tc=6.0 min CN=82 Runoff=1.30 cfs 0.094 af
Subcatchment 29S: N. Courtyard & Street	Runoff Area=4,826 sf 84.44% Impervious Runoff Depth>6.42" Tc=6.0 min CN=94 Runoff=0.76 cfs 0.059 af
Subcatchment 30S: East Lawn	Runoff Area=4,902 sf 46.59% Impervious Runoff Depth>5.38" Tc=6.0 min CN=85 Runoff=0.69 cfs 0.050 af
Subcatchment 32S: NW Paved Area	Runoff Area=1,437 sf 100.00% Impervious Runoff Depth>6.90" Tc=6.0 min CN=98 Runoff=0.23 cfs 0.019 af
Subcatchment 48S: Facilities Area	Runoff Area=1,243 sf 100.00% Impervious Runoff Depth>6.90" Tc=6.0 min CN=98 Runoff=0.20 cfs 0.016 af
Subcatchment 49S: Facilities Area	Runoff Area=2,283 sf 100.00% Impervious Runoff Depth>6.90" Tc=6.0 min CN=98 Runoff=0.37 cfs 0.030 af
Reach 100R: POA #100	Inflow=3.55 cfs 0.269 af Outflow=3.55 cfs 0.269 af
Pond 28P: CB #28	Peak Elev=92.59' Inflow=1.30 cfs 0.094 af 12.0" Round Culvert n=0.012 L=60.0' S=0.0183 '/' Outflow=1.30 cfs 0.094 af
Pond 29P: CB #29	Peak Elev=91.35' Inflow=2.25 cfs 0.175 af 18.0" Round Culvert n=0.012 L=41.0' S=0.0049 '/' Outflow=2.25 cfs 0.175 af
Pond 30P: CB #30	Peak Elev=92.04' Inflow=1.26 cfs 0.097 af 12.0" Round Culvert n=0.012 L=79.0' S=0.0073 '/' Outflow=1.26 cfs 0.097 af
Pond 32P: CB #32	Peak Elev=91.53' Inflow=0.23 cfs 0.019 af 15.0" Round Culvert n=0.012 L=85.0' S=0.0053 '/' Outflow=0.23 cfs 0.019 af
Pond 48P: CB #48	Peak Elev=94.16' Inflow=0.20 cfs 0.016 af 8.0" Round Culvert n=0.012 L=64.0' S=0.0362 '/' Outflow=0.20 cfs 0.016 af
Pond 49P: CB #49	Peak Elev=92.29' Inflow=0.57 cfs 0.047 af 12.0" Round Culvert n=0.012 L=40.0' S=0.0085 '/' Outflow=0.57 cfs 0.047 af

Total Runoff Area = 0.560 ac Runoff Volume = 0.269 af Average Runoff Depth = 5.76"
40.45% Pervious = 0.227 ac 59.55% Impervious = 0.334 ac



Routing Diagram for 5056-PRE-rev040120
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Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 28S: West Lawn	Runoff Area=9,719 sf 33.08% Impervious Runoff Depth>6.41" Tc=6.0 min CN=82 Runoff=1.63 cfs 0.119 af
Subcatchment 29S: N. Courtyard & Street	Runoff Area=4,826 sf 84.44% Impervious Runoff Depth>7.85" Tc=6.0 min CN=94 Runoff=0.92 cfs 0.072 af
Subcatchment 30S: East Lawn	Runoff Area=4,902 sf 46.59% Impervious Runoff Depth>6.77" Tc=6.0 min CN=85 Runoff=0.86 cfs 0.063 af
Subcatchment 32S: NW Paved Area	Runoff Area=1,437 sf 100.00% Impervious Runoff Depth>8.33" Tc=6.0 min CN=98 Runoff=0.28 cfs 0.023 af
Subcatchment 48S: Facilities Area	Runoff Area=1,243 sf 100.00% Impervious Runoff Depth>8.33" Tc=6.0 min CN=98 Runoff=0.24 cfs 0.020 af
Subcatchment 49S: Facilities Area	Runoff Area=2,283 sf 100.00% Impervious Runoff Depth>8.33" Tc=6.0 min CN=98 Runoff=0.44 cfs 0.036 af
Reach 100R: POA #100	Inflow=4.37 cfs 0.334 af Outflow=4.37 cfs 0.334 af
Pond 28P: CB #28	Peak Elev=92.70' Inflow=1.63 cfs 0.119 af 12.0" Round Culvert n=0.012 L=60.0' S=0.0183 '/' Outflow=1.63 cfs 0.119 af
Pond 29P: CB #29	Peak Elev=91.45' Inflow=2.74 cfs 0.215 af 18.0" Round Culvert n=0.012 L=41.0' S=0.0049 '/' Outflow=2.74 cfs 0.215 af
Pond 30P: CB #30	Peak Elev=92.13' Inflow=1.54 cfs 0.120 af 12.0" Round Culvert n=0.012 L=79.0' S=0.0073 '/' Outflow=1.54 cfs 0.120 af
Pond 32P: CB #32	Peak Elev=91.59' Inflow=0.28 cfs 0.023 af 15.0" Round Culvert n=0.012 L=85.0' S=0.0053 '/' Outflow=0.28 cfs 0.023 af
Pond 48P: CB #48	Peak Elev=94.19' Inflow=0.24 cfs 0.020 af 8.0" Round Culvert n=0.012 L=64.0' S=0.0362 '/' Outflow=0.24 cfs 0.020 af
Pond 49P: CB #49	Peak Elev=92.36' Inflow=0.68 cfs 0.056 af 12.0" Round Culvert n=0.012 L=40.0' S=0.0085 '/' Outflow=0.68 cfs 0.056 af

Total Runoff Area = 0.560 ac Runoff Volume = 0.334 af Average Runoff Depth = 7.16"
40.45% Pervious = 0.227 ac 59.55% Impervious = 0.334 ac

Section 4

Drainage Calculations

Post-Development

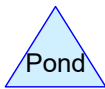
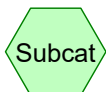
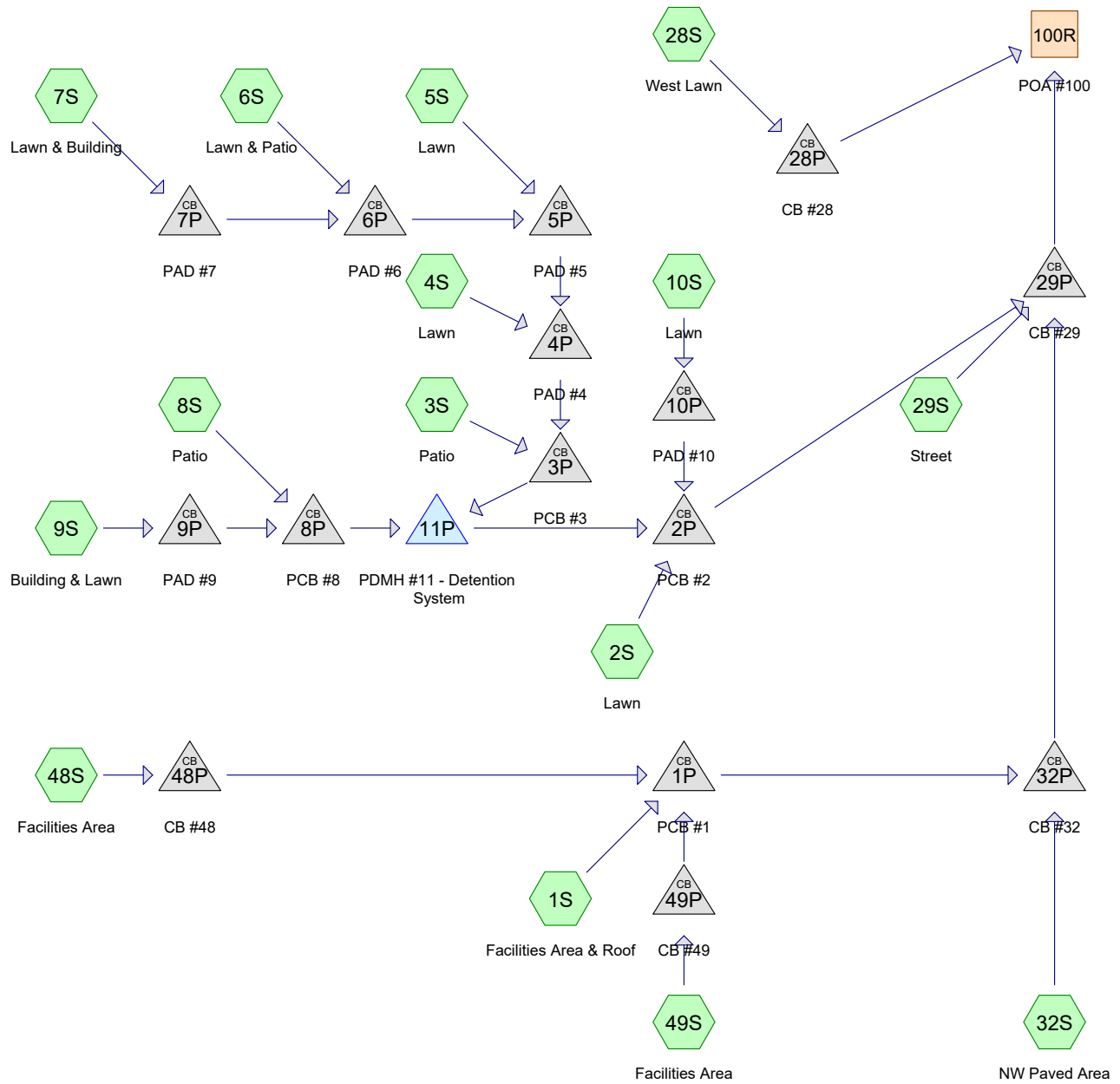
2-Year, 24-Hour Summary

10-Year, 24-Hour Complete

25-Year, 24-Hour Summary

50-Year, 24-Hour Summary

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Routing Diagram for 5056-POST-rev040120
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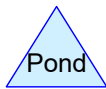
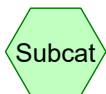
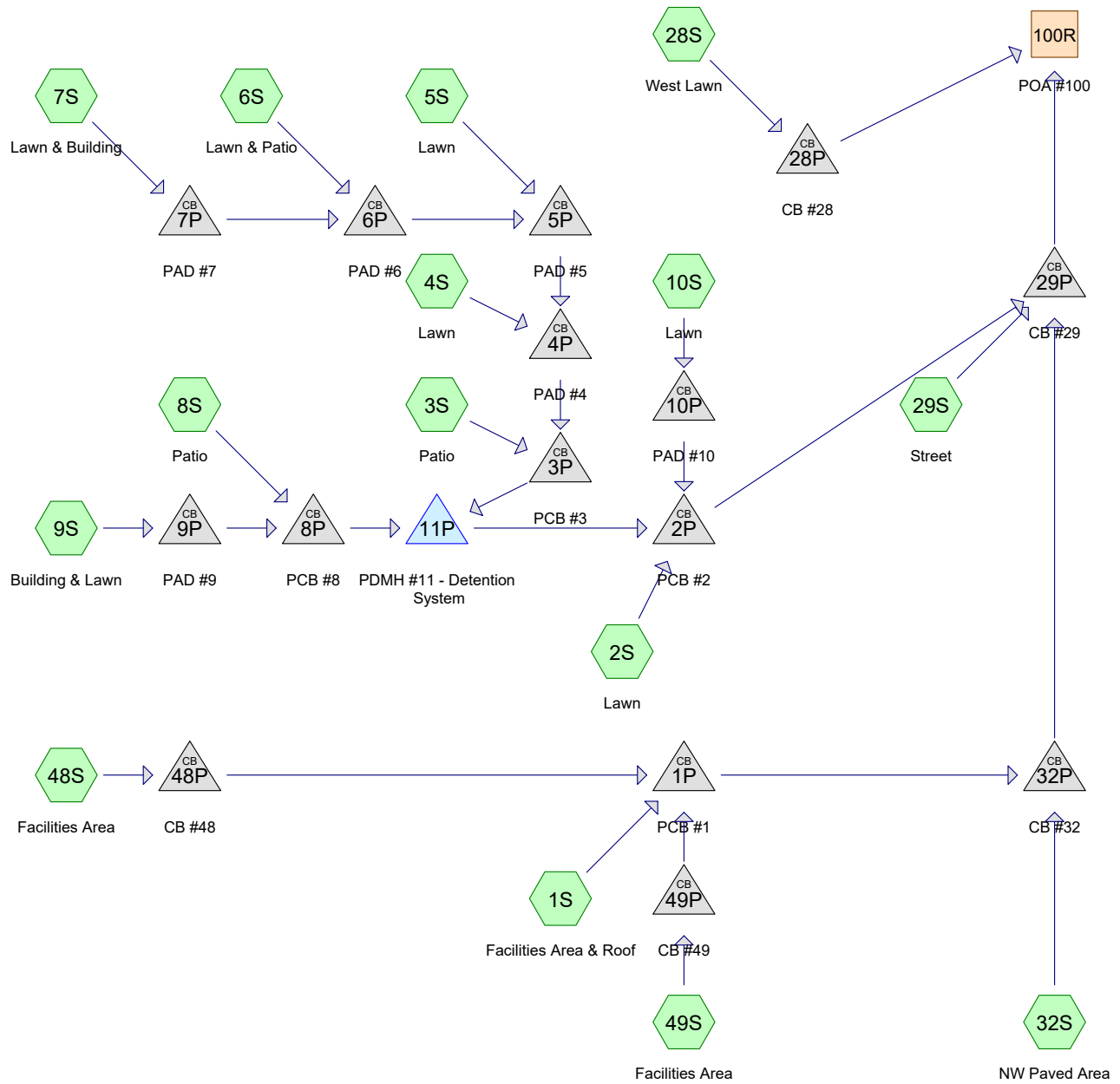
Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Facilities Area & Roof	Runoff Area=1,851 sf 100.00% Impervious Runoff Depth>3.43" Tc=6.0 min CN=98 Runoff=0.15 cfs 0.012 af
Subcatchment 2S: Lawn	Runoff Area=601 sf 31.95% Impervious Runoff Depth>1.92" Tc=6.0 min CN=82 Runoff=0.03 cfs 0.002 af
Subcatchment 3S: Patio	Runoff Area=1,813 sf 72.15% Impervious Runoff Depth>2.70" Tc=6.0 min CN=91 Runoff=0.13 cfs 0.009 af
Subcatchment 4S: Lawn	Runoff Area=249 sf 40.16% Impervious Runoff Depth>2.08" Tc=6.0 min CN=84 Runoff=0.01 cfs 0.001 af
Subcatchment 5S: Lawn	Runoff Area=423 sf 9.69% Impervious Runoff Depth>1.49" Tc=0.0 min CN=76 Runoff=0.02 cfs 0.001 af
Subcatchment 6S: Lawn & Patio	Runoff Area=990 sf 54.95% Impervious Runoff Depth>2.33" Tc=6.0 min CN=87 Runoff=0.06 cfs 0.004 af
Subcatchment 7S: Lawn & Building	Runoff Area=2,310 sf 62.12% Impervious Runoff Depth>2.51" Tc=6.0 min CN=89 Runoff=0.15 cfs 0.011 af
Subcatchment 8S: Patio	Runoff Area=1,575 sf 76.95% Impervious Runoff Depth>2.80" Tc=6.0 min CN=92 Runoff=0.11 cfs 0.008 af
Subcatchment 9S: Building & Lawn	Runoff Area=2,123 sf 89.92% Impervious Runoff Depth>3.21" Tc=6.0 min CN=96 Runoff=0.17 cfs 0.013 af
Subcatchment 10S: Lawn	Runoff Area=555 sf 29.91% Impervious Runoff Depth>1.84" Tc=6.0 min CN=81 Runoff=0.03 cfs 0.002 af
Subcatchment 28S: West Lawn	Runoff Area=5,706 sf 24.04% Impervious Runoff Depth>1.77" Tc=6.0 min CN=80 Runoff=0.27 cfs 0.019 af
Subcatchment 29S: Street	Runoff Area=2,264 sf 91.21% Impervious Runoff Depth>3.21" Tc=6.0 min CN=96 Runoff=0.18 cfs 0.014 af
Subcatchment 32S: NW Paved Area	Runoff Area=1,437 sf 100.00% Impervious Runoff Depth>3.43" Tc=6.0 min CN=98 Runoff=0.12 cfs 0.009 af
Subcatchment 48S: Facilities Area	Runoff Area=1,471 sf 100.00% Impervious Runoff Depth>3.43" Tc=6.0 min CN=98 Runoff=0.12 cfs 0.010 af
Subcatchment 49S: Facilities Area	Runoff Area=1,004 sf 100.00% Impervious Runoff Depth>3.43" Tc=6.0 min CN=98 Runoff=0.08 cfs 0.007 af
Reach 100R: POA #100	Inflow=1.55 cfs 0.120 af Outflow=1.55 cfs 0.120 af

Pond 1P: PCB #1	Peak Elev=91.90' Inflow=0.35 cfs 0.028 af 12.0" Round Culvert n=0.012 L=56.0' S=0.0045 '/ Outflow=0.35 cfs 0.028 af
Pond 2P: PCB #2	Peak Elev=91.43' Inflow=0.65 cfs 0.049 af 12.0" Round Culvert n=0.012 L=36.0' S=0.0042 '/ Outflow=0.65 cfs 0.049 af
Pond 3P: PCB #3	Peak Elev=93.74' Inflow=0.37 cfs 0.027 af 15.0" Round Culvert n=0.012 L=5.0' S=0.0000 '/ Outflow=0.37 cfs 0.027 af
Pond 4P: PAD #4	Peak Elev=94.37' Inflow=0.24 cfs 0.018 af 8.0" Round Culvert n=0.012 L=19.0' S=0.0047 '/ Outflow=0.24 cfs 0.018 af
Pond 5P: PAD #5	Peak Elev=94.52' Inflow=0.23 cfs 0.017 af 8.0" Round Culvert n=0.012 L=11.0' S=0.0055 '/ Outflow=0.23 cfs 0.017 af
Pond 6P: PAD #6	Peak Elev=94.77' Inflow=0.22 cfs 0.016 af 8.0" Round Culvert n=0.012 L=31.0' S=0.0048 '/ Outflow=0.22 cfs 0.016 af
Pond 7P: PAD #7	Peak Elev=94.97' Inflow=0.15 cfs 0.011 af 8.0" Round Culvert n=0.012 L=31.0' S=0.0048 '/ Outflow=0.15 cfs 0.011 af
Pond 8P: PCB #8	Peak Elev=93.72' Inflow=0.28 cfs 0.021 af 15.0" Round Culvert n=0.012 L=3.0' S=0.0000 '/ Outflow=0.28 cfs 0.021 af
Pond 9P: PAD #9	Peak Elev=94.40' Inflow=0.17 cfs 0.013 af 8.0" Round Culvert n=0.012 L=21.0' S=0.0100 '/ Outflow=0.17 cfs 0.013 af
Pond 10P: PAD #10	Peak Elev=91.64' Inflow=0.03 cfs 0.002 af 8.0" Round Culvert n=0.012 L=18.0' S=0.0100 '/ Outflow=0.03 cfs 0.002 af
Pond 11P: PDMH #11 - Detention System	Peak Elev=93.67' Storage=92 cf Inflow=0.65 cfs 0.049 af Discarded=0.00 cfs 0.003 af Primary=0.59 cfs 0.045 af Outflow=0.59 cfs 0.048 af
Pond 28P: CB #28	Peak Elev=92.19' Inflow=0.27 cfs 0.019 af 12.0" Round Culvert n=0.012 L=60.0' S=0.0183 '/ Outflow=0.27 cfs 0.019 af
Pond 29P: CB #29	Peak Elev=91.11' Inflow=1.28 cfs 0.101 af 18.0" Round Culvert n=0.012 L=41.0' S=0.0049 '/ Outflow=1.28 cfs 0.101 af
Pond 32P: CB #32	Peak Elev=91.58' Inflow=0.47 cfs 0.038 af 15.0" Round Culvert n=0.012 L=85.0' S=0.0053 '/ Outflow=0.47 cfs 0.038 af
Pond 48P: CB #48	Peak Elev=94.09' Inflow=0.12 cfs 0.010 af 8.0" Round Culvert n=0.012 L=64.0' S=0.0423 '/ Outflow=0.12 cfs 0.010 af
Pond 49P: CB #49	Peak Elev=92.01' Inflow=0.08 cfs 0.007 af 12.0" Round Culvert n=0.012 L=40.0' S=0.0225 '/ Outflow=0.08 cfs 0.007 af

Total Runoff Area = 0.560 ac Runoff Volume = 0.124 af Average Runoff Depth = 2.66"
33.91% Pervious = 0.190 ac 66.09% Impervious = 0.370 ac

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Routing Diagram for 5056-POST-rev040120
 Prepared by Altus Engineering, Inc., Printed 4/3/2020
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Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.190	74	>75% Grass cover, Good, HSG C (2S, 3S, 4S, 5S, 6S, 7S, 8S, 9S, 10S, 28S, 29S)
0.370	98	Impervious (1S, 2S, 3S, 4S, 5S, 6S, 7S, 8S, 9S, 10S, 28S, 29S, 32S, 48S, 49S)
0.560	90	TOTAL AREA

Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Facilities Area & Roof	Runoff Area=1,851 sf 100.00% Impervious Runoff Depth>5.38" Tc=6.0 min CN=98 Runoff=0.23 cfs 0.019 af
Subcatchment 2S: Lawn	Runoff Area=601 sf 31.95% Impervious Runoff Depth>3.64" Tc=6.0 min CN=82 Runoff=0.06 cfs 0.004 af
Subcatchment 3S: Patio	Runoff Area=1,813 sf 72.15% Impervious Runoff Depth>4.58" Tc=6.0 min CN=91 Runoff=0.21 cfs 0.016 af
Subcatchment 4S: Lawn	Runoff Area=249 sf 40.16% Impervious Runoff Depth>3.84" Tc=6.0 min CN=84 Runoff=0.03 cfs 0.002 af
Subcatchment 5S: Lawn	Runoff Area=423 sf 9.69% Impervious Runoff Depth>3.05" Tc=0.0 min CN=76 Runoff=0.04 cfs 0.002 af
Subcatchment 6S: Lawn & Patio	Runoff Area=990 sf 54.95% Impervious Runoff Depth>4.15" Tc=6.0 min CN=87 Runoff=0.11 cfs 0.008 af
Subcatchment 7S: Lawn & Building	Runoff Area=2,310 sf 62.12% Impervious Runoff Depth>4.36" Tc=6.0 min CN=89 Runoff=0.26 cfs 0.019 af
Subcatchment 8S: Patio	Runoff Area=1,575 sf 76.95% Impervious Runoff Depth>4.69" Tc=6.0 min CN=92 Runoff=0.19 cfs 0.014 af
Subcatchment 9S: Building & Lawn	Runoff Area=2,123 sf 89.92% Impervious Runoff Depth>5.14" Tc=6.0 min CN=96 Runoff=0.26 cfs 0.021 af
Subcatchment 10S: Lawn	Runoff Area=555 sf 29.91% Impervious Runoff Depth>3.54" Tc=6.0 min CN=81 Runoff=0.05 cfs 0.004 af
Subcatchment 28S: West Lawn	Runoff Area=5,706 sf 24.04% Impervious Runoff Depth>3.44" Tc=6.0 min CN=80 Runoff=0.53 cfs 0.038 af
Subcatchment 29S: Street	Runoff Area=2,264 sf 91.21% Impervious Runoff Depth>5.14" Tc=6.0 min CN=96 Runoff=0.28 cfs 0.022 af
Subcatchment 32S: NW Paved Area	Runoff Area=1,437 sf 100.00% Impervious Runoff Depth>5.38" Tc=6.0 min CN=98 Runoff=0.18 cfs 0.015 af
Subcatchment 48S: Facilities Area	Runoff Area=1,471 sf 100.00% Impervious Runoff Depth>5.38" Tc=6.0 min CN=98 Runoff=0.19 cfs 0.015 af
Subcatchment 49S: Facilities Area	Runoff Area=1,004 sf 100.00% Impervious Runoff Depth>5.38" Tc=6.0 min CN=98 Runoff=0.13 cfs 0.010 af
Reach 100R: POA #100	Inflow=2.50 cfs 0.206 af Outflow=2.50 cfs 0.206 af

Pond 1P: PCB #1	Peak Elev=92.01'	Inflow=0.55 cfs	0.045 af
12.0" Round Culvert n=0.012 L=56.0' S=0.0045 '/	Outflow=0.55 cfs	0.045 af	
Pond 2P: PCB #2	Peak Elev=91.59'	Inflow=1.01 cfs	0.086 af
12.0" Round Culvert n=0.012 L=36.0' S=0.0042 '/	Outflow=1.01 cfs	0.086 af	
Pond 3P: PCB #3	Peak Elev=94.22'	Inflow=0.63 cfs	0.047 af
15.0" Round Culvert n=0.012 L=5.0' S=0.0000 '/	Outflow=0.63 cfs	0.047 af	
Pond 4P: PAD #4	Peak Elev=94.50'	Inflow=0.42 cfs	0.031 af
8.0" Round Culvert n=0.012 L=19.0' S=0.0047 '/	Outflow=0.42 cfs	0.031 af	
Pond 5P: PAD #5	Peak Elev=94.66'	Inflow=0.39 cfs	0.030 af
8.0" Round Culvert n=0.012 L=11.0' S=0.0055 '/	Outflow=0.39 cfs	0.030 af	
Pond 6P: PAD #6	Peak Elev=94.89'	Inflow=0.37 cfs	0.027 af
8.0" Round Culvert n=0.012 L=31.0' S=0.0048 '/	Outflow=0.37 cfs	0.027 af	
Pond 7P: PAD #7	Peak Elev=95.08'	Inflow=0.26 cfs	0.019 af
8.0" Round Culvert n=0.012 L=31.0' S=0.0048 '/	Outflow=0.26 cfs	0.019 af	
Pond 8P: PCB #8	Peak Elev=94.21'	Inflow=0.45 cfs	0.035 af
15.0" Round Culvert n=0.012 L=3.0' S=0.0000 '/	Outflow=0.45 cfs	0.035 af	
Pond 9P: PAD #9	Peak Elev=94.47'	Inflow=0.26 cfs	0.021 af
8.0" Round Culvert n=0.012 L=21.0' S=0.0100 '/	Outflow=0.26 cfs	0.021 af	
Pond 10P: PAD #10	Peak Elev=91.69'	Inflow=0.05 cfs	0.004 af
8.0" Round Culvert n=0.012 L=18.0' S=0.0100 '/	Outflow=0.05 cfs	0.004 af	
Pond 11P: PDMH #11 - Detention System	Peak Elev=94.20'	Storage=180 cf	Inflow=1.08 cfs 0.082 af
Discarded=0.00 cfs 0.003 af	Primary=0.91 cfs 0.079 af	Outflow=0.91 cfs 0.082 af	
Pond 28P: CB #28	Peak Elev=92.31'	Inflow=0.53 cfs	0.038 af
12.0" Round Culvert n=0.012 L=60.0' S=0.0183 '/	Outflow=0.53 cfs	0.038 af	
Pond 29P: CB #29	Peak Elev=91.28'	Inflow=1.97 cfs	0.168 af
18.0" Round Culvert n=0.012 L=41.0' S=0.0049 '/	Outflow=1.97 cfs	0.168 af	
Pond 32P: CB #32	Peak Elev=91.69'	Inflow=0.73 cfs	0.059 af
15.0" Round Culvert n=0.012 L=85.0' S=0.0053 '/	Outflow=0.73 cfs	0.059 af	
Pond 48P: CB #48	Peak Elev=94.15'	Inflow=0.19 cfs	0.015 af
8.0" Round Culvert n=0.012 L=64.0' S=0.0423 '/	Outflow=0.19 cfs	0.015 af	
Pond 49P: CB #49	Peak Elev=92.08'	Inflow=0.13 cfs	0.010 af
12.0" Round Culvert n=0.012 L=40.0' S=0.0225 '/	Outflow=0.13 cfs	0.010 af	

Total Runoff Area = 0.560 ac Runoff Volume = 0.209 af Average Runoff Depth = 4.49"
33.91% Pervious = 0.190 ac 66.09% Impervious = 0.370 ac

Summary for Subcatchment 1S: Facilities Area & Roof

Runoff = 0.23 cfs @ 12.08 hrs, Volume= 0.019 af, Depth> 5.38"

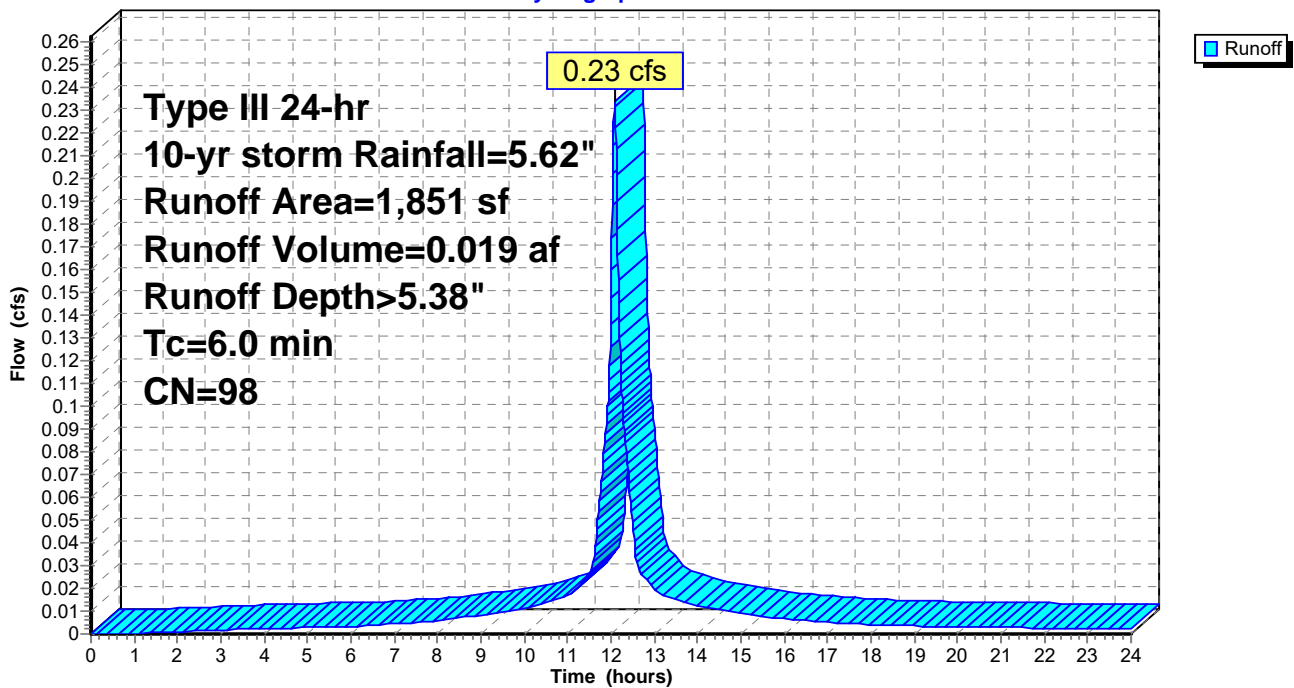
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Type III 24-hr 10-yr storm Rainfall=5.62"

Area (sf)	CN	Description
* 1,851	98	Impervious
1,851		100.00% Impervious Area

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

Subcatchment 1S: Facilities Area & Roof

Hydrograph



Summary for Subcatchment 2S: Lawn

Runoff = 0.06 cfs @ 12.09 hrs, Volume= 0.004 af, Depth> 3.64"

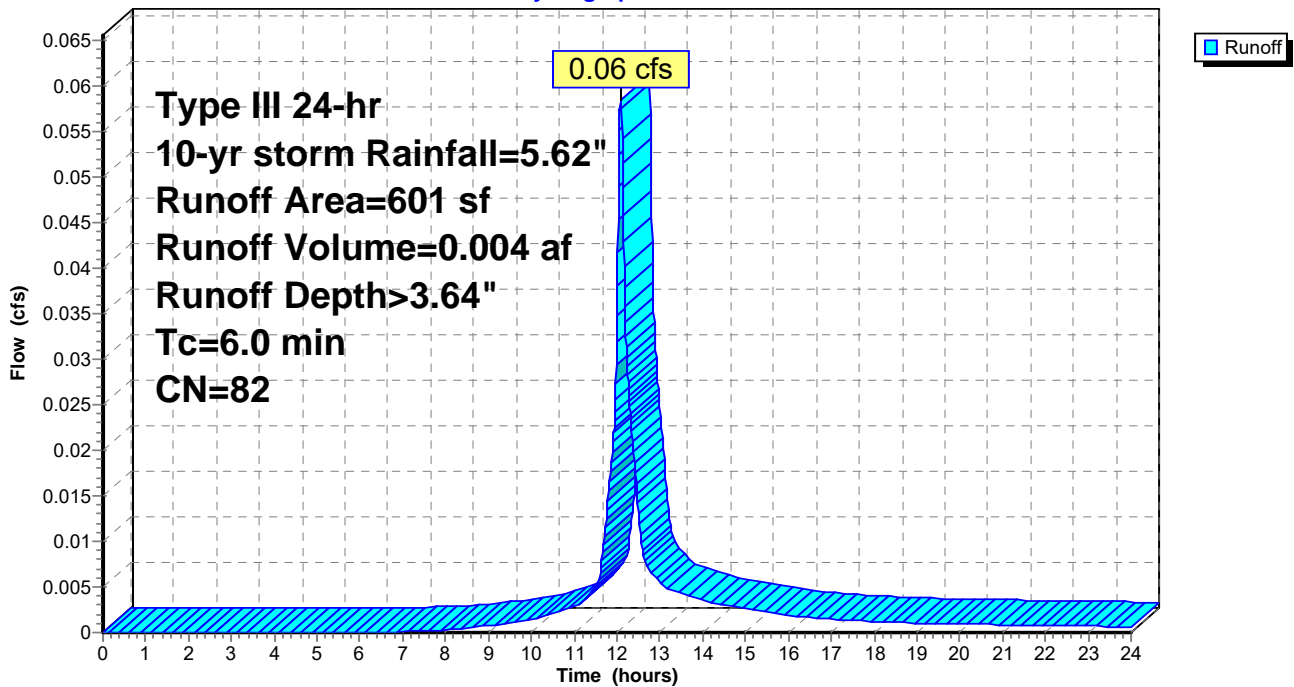
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Type III 24-hr 10-yr storm Rainfall=5.62"

Area (sf)	CN	Description
* 192	98	Impervious
409	74	>75% Grass cover, Good, HSG C
601	82	Weighted Average
409		68.05% Pervious Area
192		31.95% Impervious Area

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

Subcatchment 2S: Lawn

Hydrograph



Summary for Subcatchment 3S: Patio

Runoff = 0.21 cfs @ 12.08 hrs, Volume= 0.016 af, Depth> 4.58"

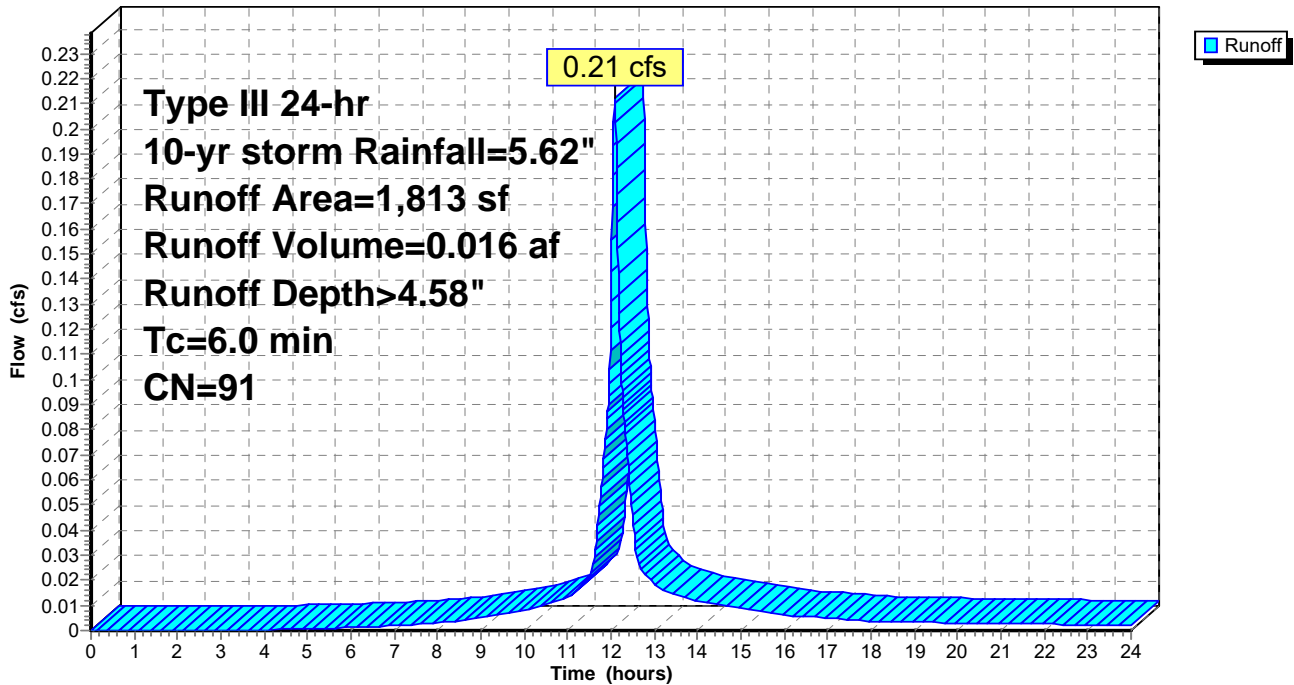
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Type III 24-hr 10-yr storm Rainfall=5.62"

	Area (sf)	CN	Description
*	1,308	98	Impervious
	505	74	>75% Grass cover, Good, HSG C
	1,813	91	Weighted Average
	505		27.85% Pervious Area
	1,308		72.15% Impervious Area

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

Subcatchment 3S: Patio

Hydrograph



Summary for Subcatchment 4S: Lawn

Runoff = 0.03 cfs @ 12.09 hrs, Volume= 0.002 af, Depth> 3.84"

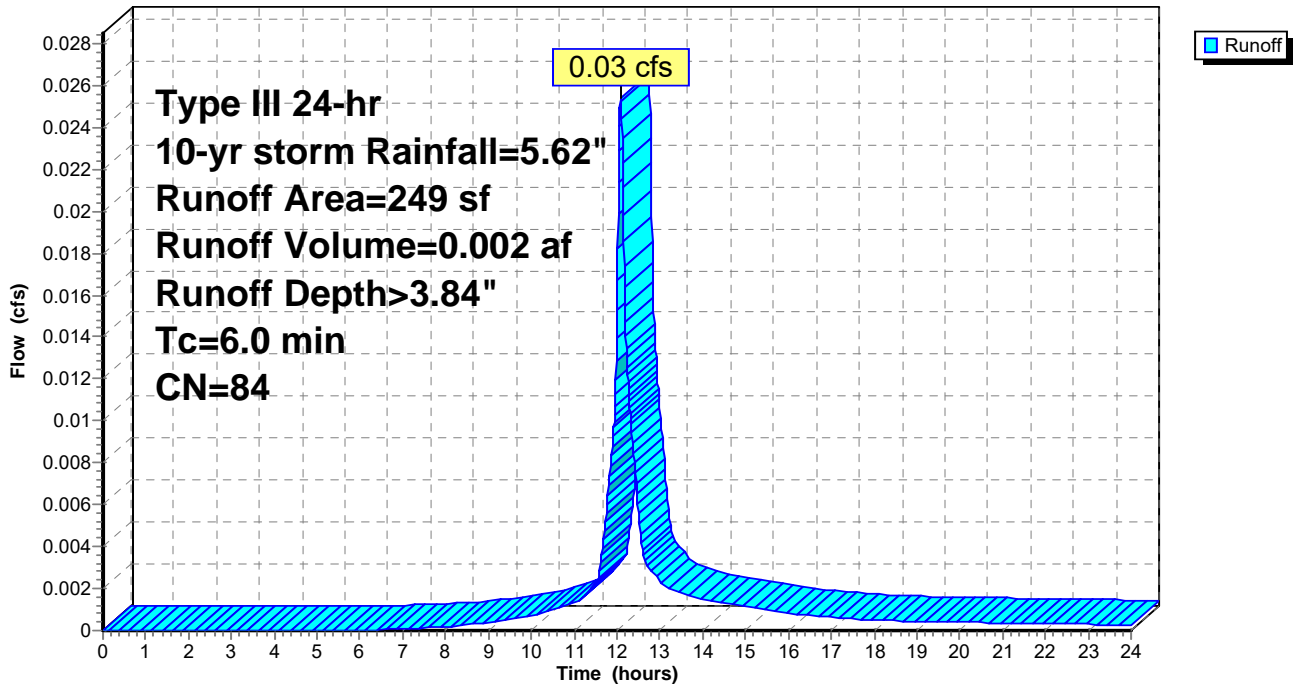
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Type III 24-hr 10-yr storm Rainfall=5.62"

Area (sf)	CN	Description
* 100	98	Impervious
149	74	>75% Grass cover, Good, HSG C
249	84	Weighted Average
149		59.84% Pervious Area
100		40.16% Impervious Area

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

Subcatchment 4S: Lawn

Hydrograph



Summary for Subcatchment 5S: Lawn

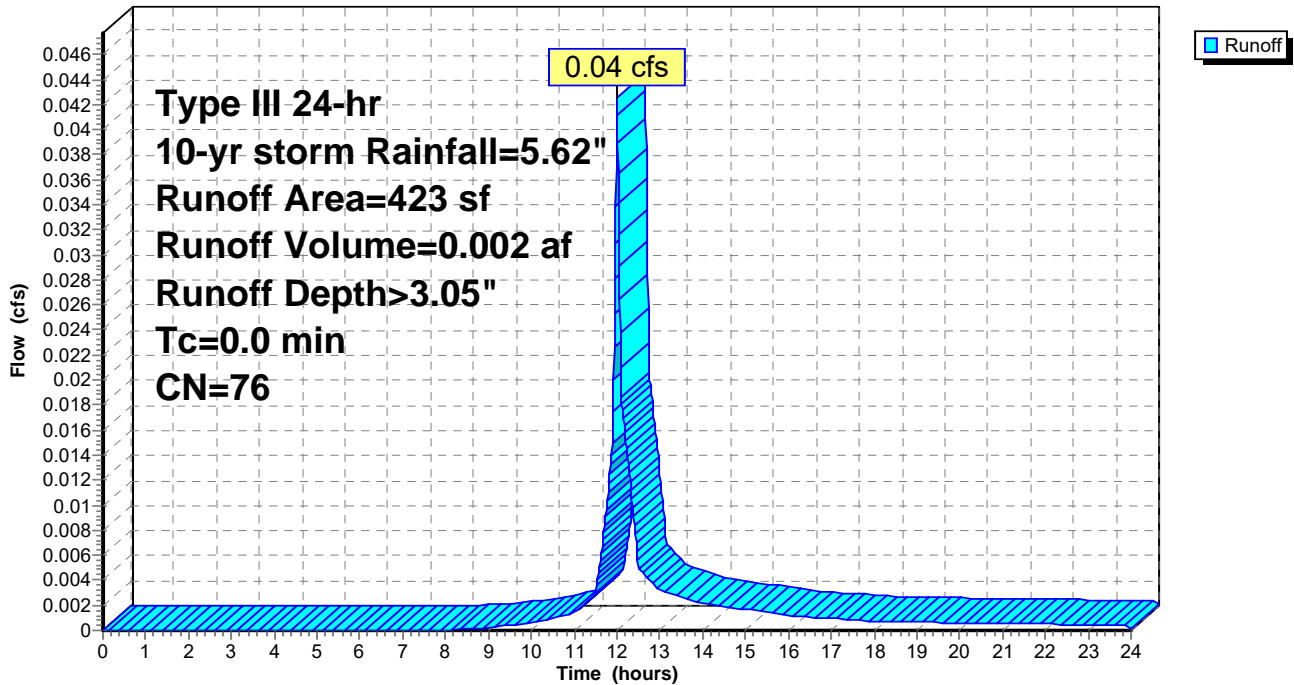
Runoff = 0.04 cfs @ 12.00 hrs, Volume= 0.002 af, Depth> 3.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Type III 24-hr 10-yr storm Rainfall=5.62"

Area (sf)	CN	Description
41	98	Impervious
382	74	>75% Grass cover, Good, HSG C
423	76	Weighted Average
382		90.31% Pervious Area
41		9.69% Impervious Area

Subcatchment 5S: Lawn

Hydrograph



Summary for Subcatchment 6S: Lawn & Patio

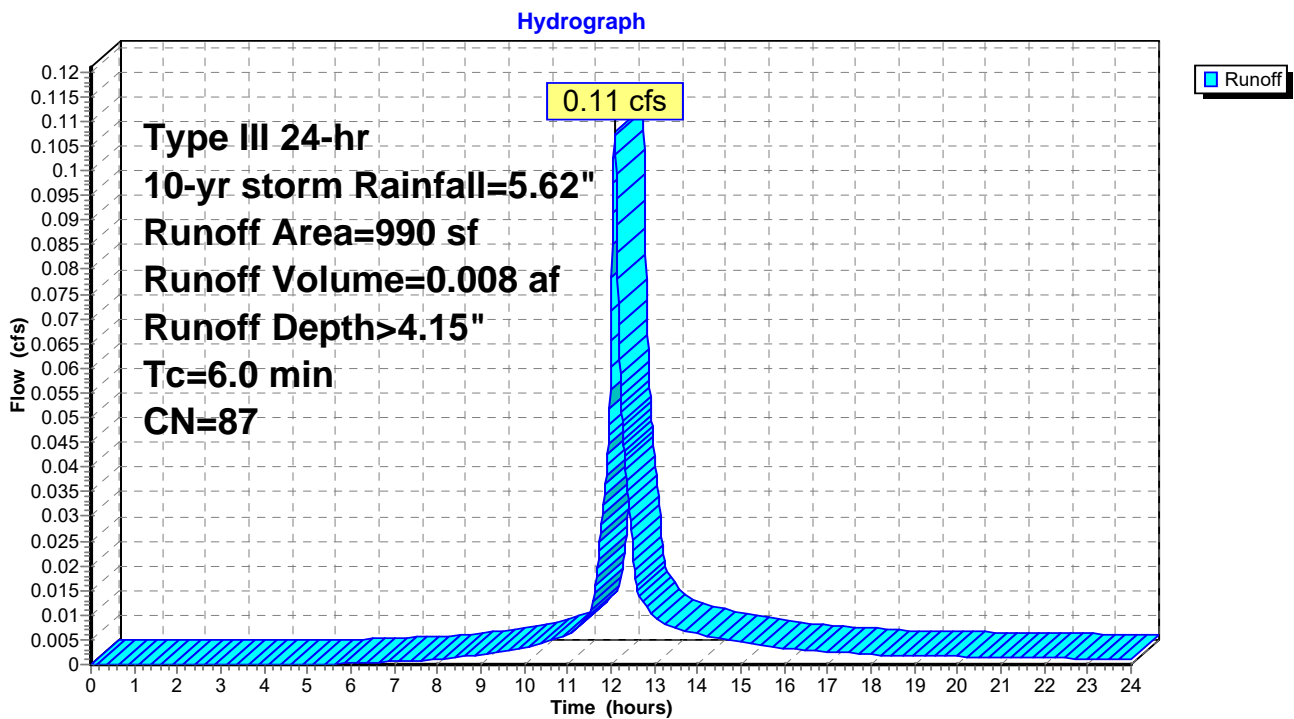
Runoff = 0.11 cfs @ 12.09 hrs, Volume= 0.008 af, Depth> 4.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Type III 24-hr 10-yr storm Rainfall=5.62"

Area (sf)	CN	Description
* 544	98	Impervious
446	74	>75% Grass cover, Good, HSG C
990	87	Weighted Average
446		45.05% Pervious Area
544		54.95% Impervious Area

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

Subcatchment 6S: Lawn & Patio



Summary for Subcatchment 7S: Lawn & Building

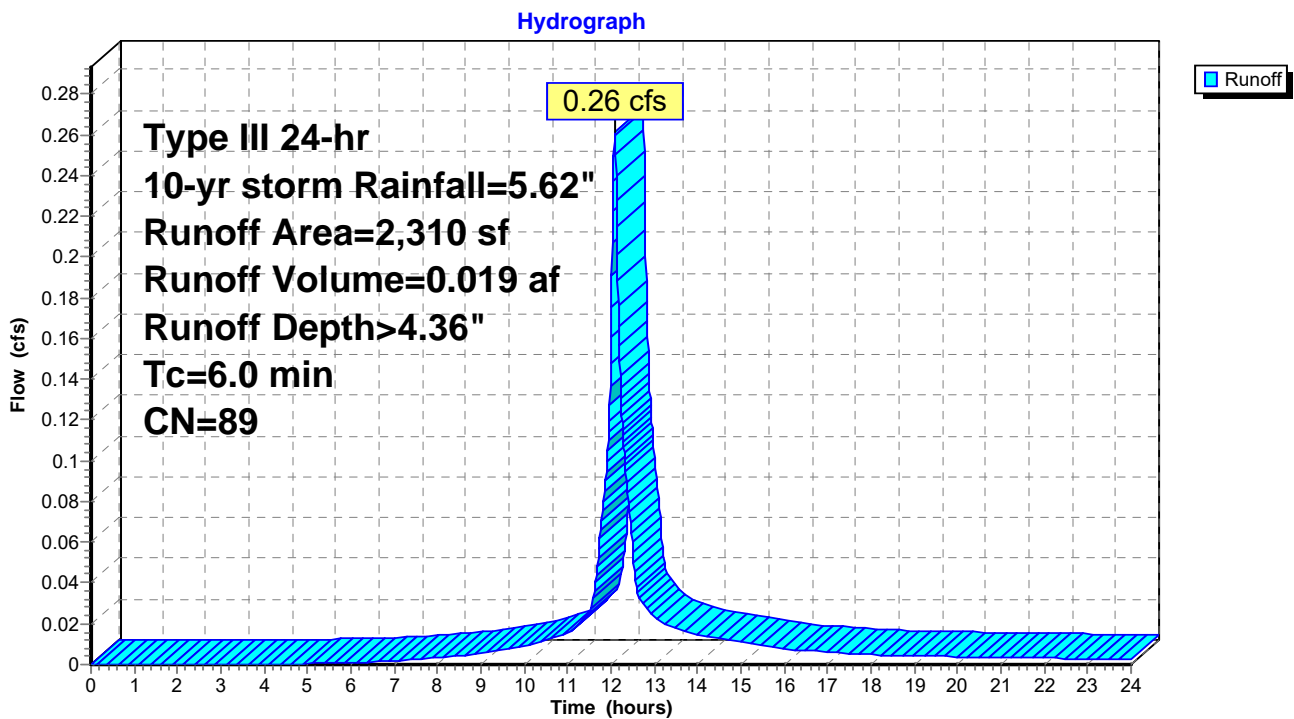
Runoff = 0.26 cfs @ 12.09 hrs, Volume= 0.019 af, Depth> 4.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Type III 24-hr 10-yr storm Rainfall=5.62"

	Area (sf)	CN	Description
*	1,435	98	Impervious
	875	74	>75% Grass cover, Good, HSG C
	2,310	89	Weighted Average
	875		37.88% Pervious Area
	1,435		62.12% Impervious Area

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

Subcatchment 7S: Lawn & Building



Summary for Subcatchment 8S: Patio

Runoff = 0.19 cfs @ 12.08 hrs, Volume= 0.014 af, Depth> 4.69"

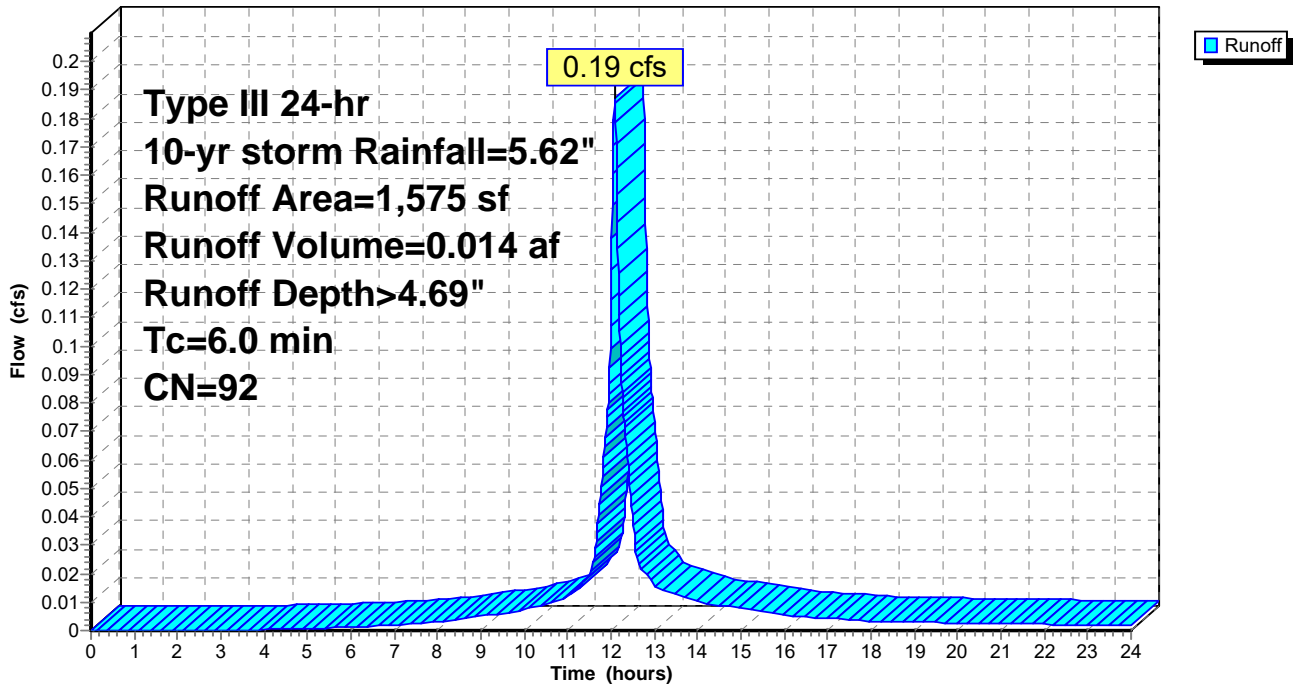
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Type III 24-hr 10-yr storm Rainfall=5.62"

	Area (sf)	CN	Description
*	1,212	98	Impervious
	363	74	>75% Grass cover, Good, HSG C
	1,575	92	Weighted Average
	363		23.05% Pervious Area
	1,212		76.95% Impervious Area

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

Subcatchment 8S: Patio

Hydrograph



Summary for Subcatchment 9S: Building & Lawn

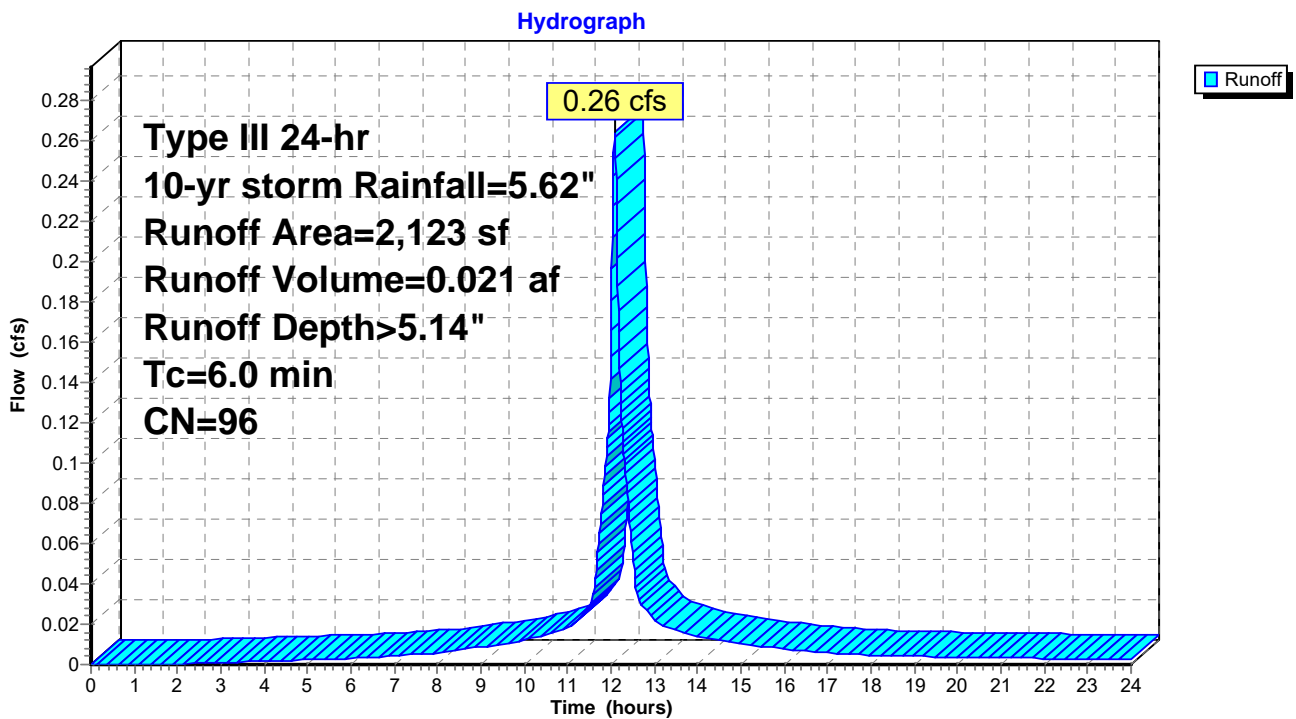
Runoff = 0.26 cfs @ 12.08 hrs, Volume= 0.021 af, Depth> 5.14"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Type III 24-hr 10-yr storm Rainfall=5.62"

Area (sf)	CN	Description
* 1,909	98	Impervious
214	74	>75% Grass cover, Good, HSG C
2,123	96	Weighted Average
214		10.08% Pervious Area
1,909		89.92% Impervious Area

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

Subcatchment 9S: Building & Lawn



Summary for Subcatchment 10S: Lawn

Runoff = 0.05 cfs @ 12.09 hrs, Volume= 0.004 af, Depth> 3.54"

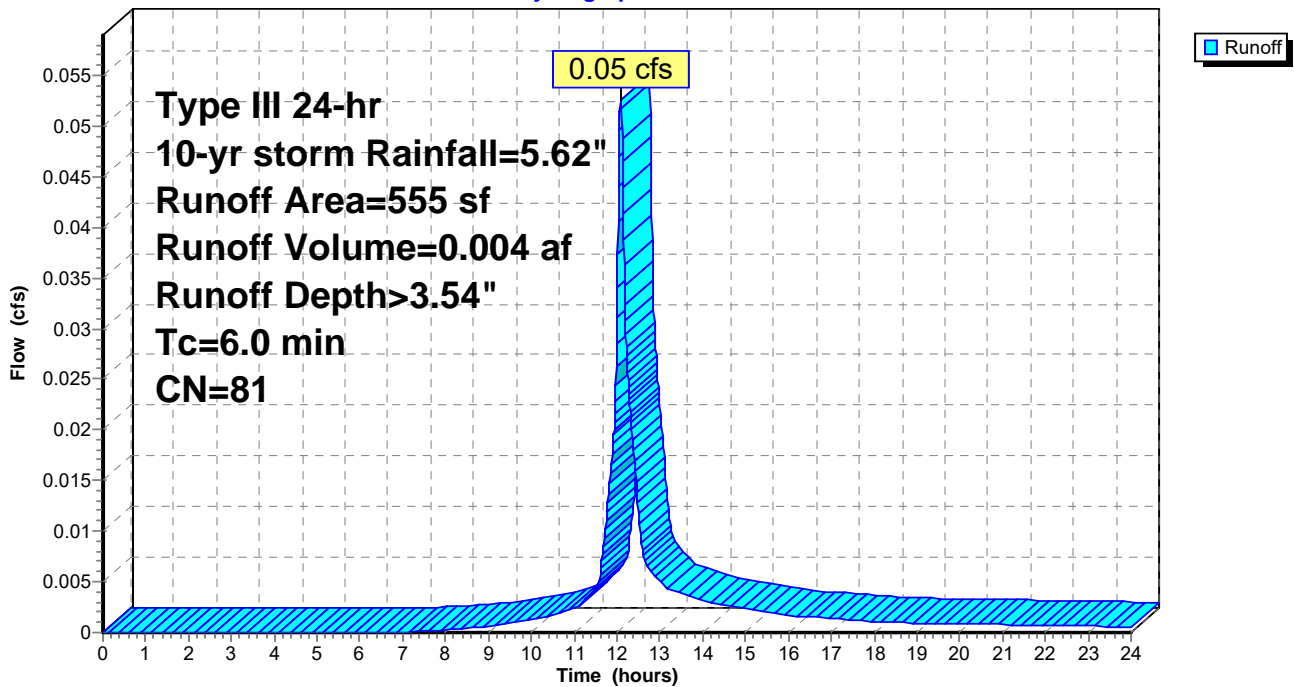
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Type III 24-hr 10-yr storm Rainfall=5.62"

Area (sf)	CN	Description
* 166	98	Impervious
389	74	>75% Grass cover, Good, HSG C
555	81	Weighted Average
389		70.09% Pervious Area
166		29.91% Impervious Area

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

Subcatchment 10S: Lawn

Hydrograph



Summary for Subcatchment 28S: West Lawn

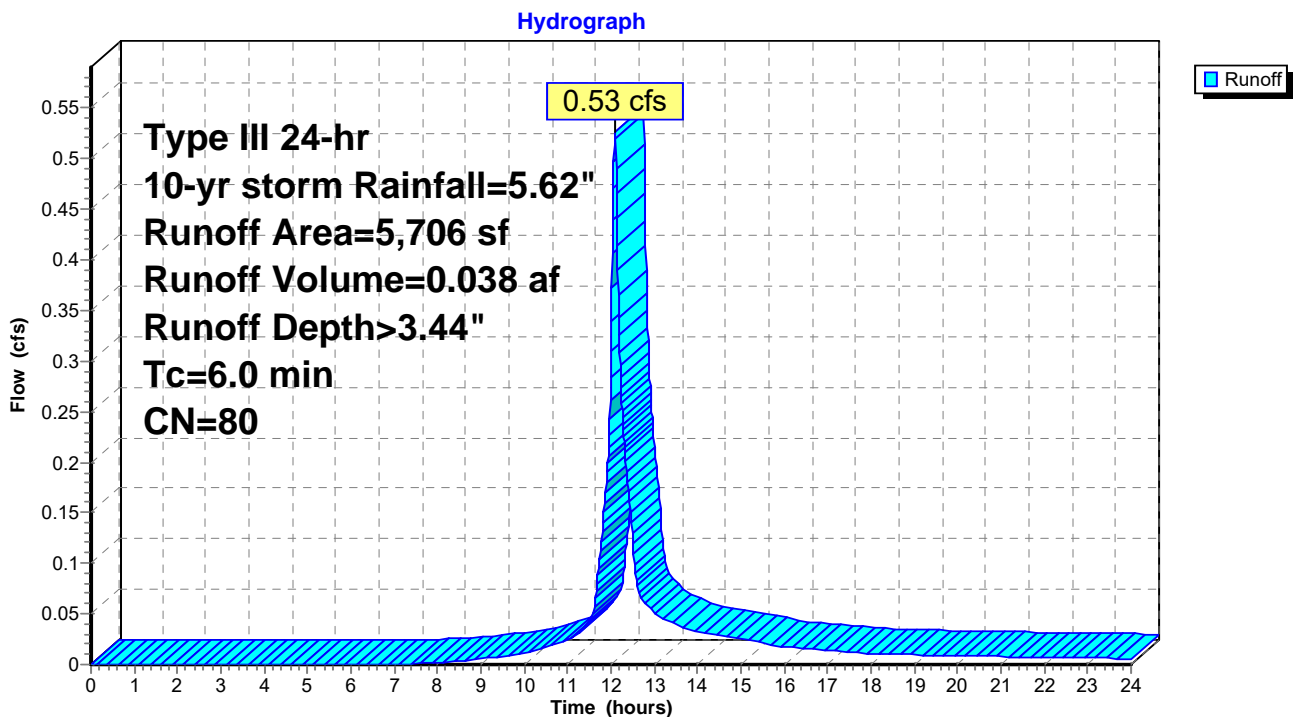
Runoff = 0.53 cfs @ 12.09 hrs, Volume= 0.038 af, Depth> 3.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Type III 24-hr 10-yr storm Rainfall=5.62"

	Area (sf)	CN	Description
*	1,372	98	Impervious
	4,334	74	>75% Grass cover, Good, HSG C
	5,706	80	Weighted Average
	4,334		75.96% Pervious Area
	1,372		24.04% Impervious Area

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

Subcatchment 28S: West Lawn



Summary for Subcatchment 29S: Street

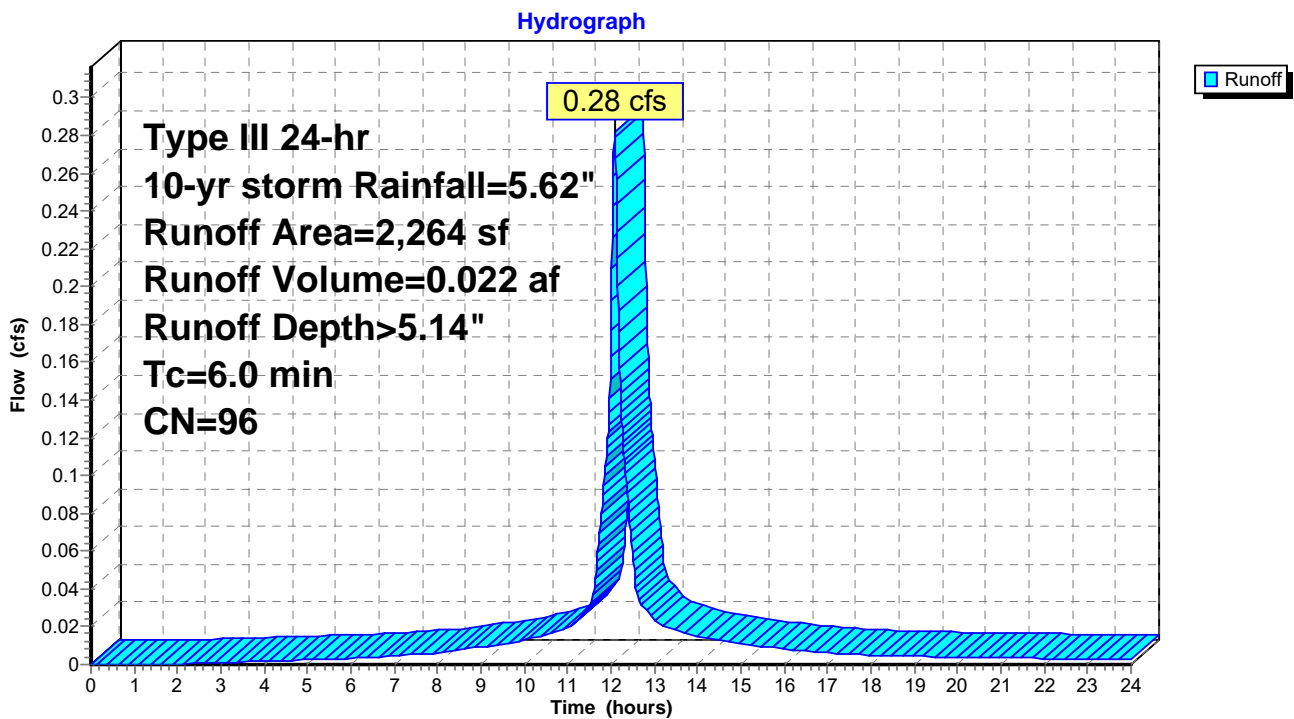
Runoff = 0.28 cfs @ 12.08 hrs, Volume= 0.022 af, Depth> 5.14"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Type III 24-hr 10-yr storm Rainfall=5.62"

Area (sf)	CN	Description
* 2,065	98	Impervious
199	74	>75% Grass cover, Good, HSG C
2,264	96	Weighted Average
199		8.79% Pervious Area
2,065		91.21% Impervious Area

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

Subcatchment 29S: Street



Summary for Subcatchment 32S: NW Paved Area

Runoff = 0.18 cfs @ 12.08 hrs, Volume= 0.015 af, Depth> 5.38"

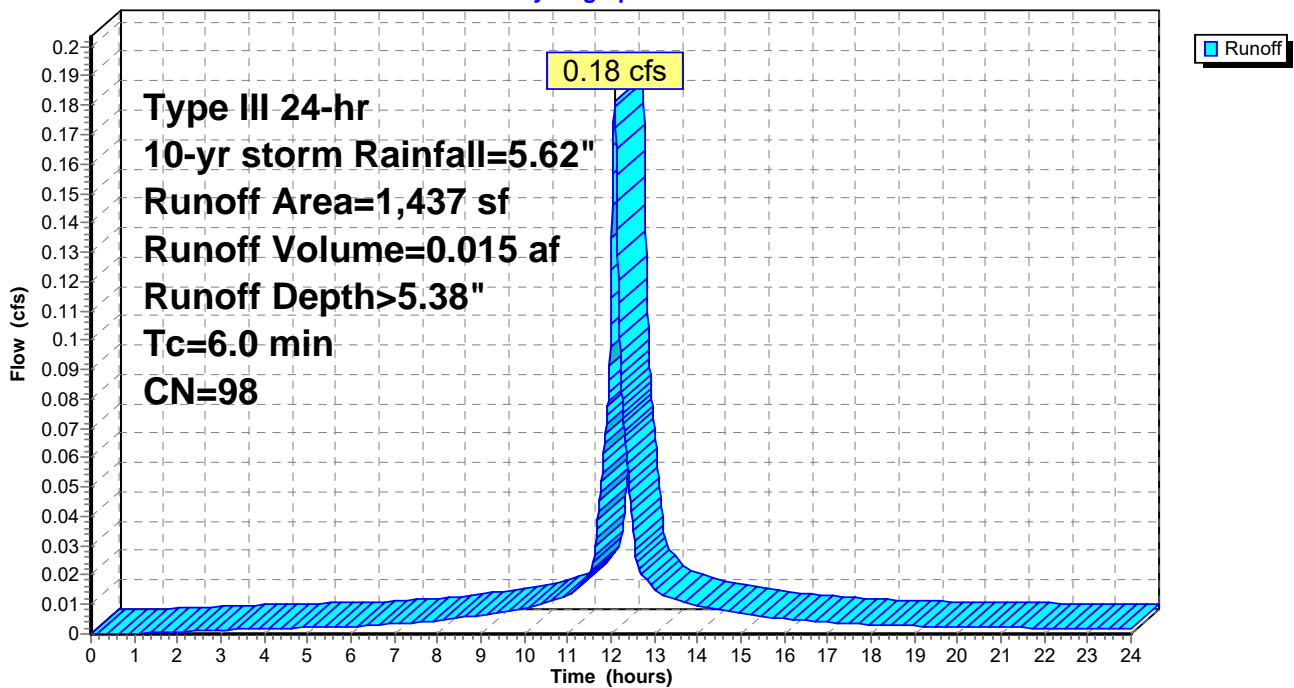
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Type III 24-hr 10-yr storm Rainfall=5.62"

Area (sf)	CN	Description
* 1,437	98	Impervious
1,437		100.00% Impervious Area

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

Subcatchment 32S: NW Paved Area

Hydrograph



Summary for Subcatchment 48S: Facilities Area

Runoff = 0.19 cfs @ 12.08 hrs, Volume= 0.015 af, Depth> 5.38"

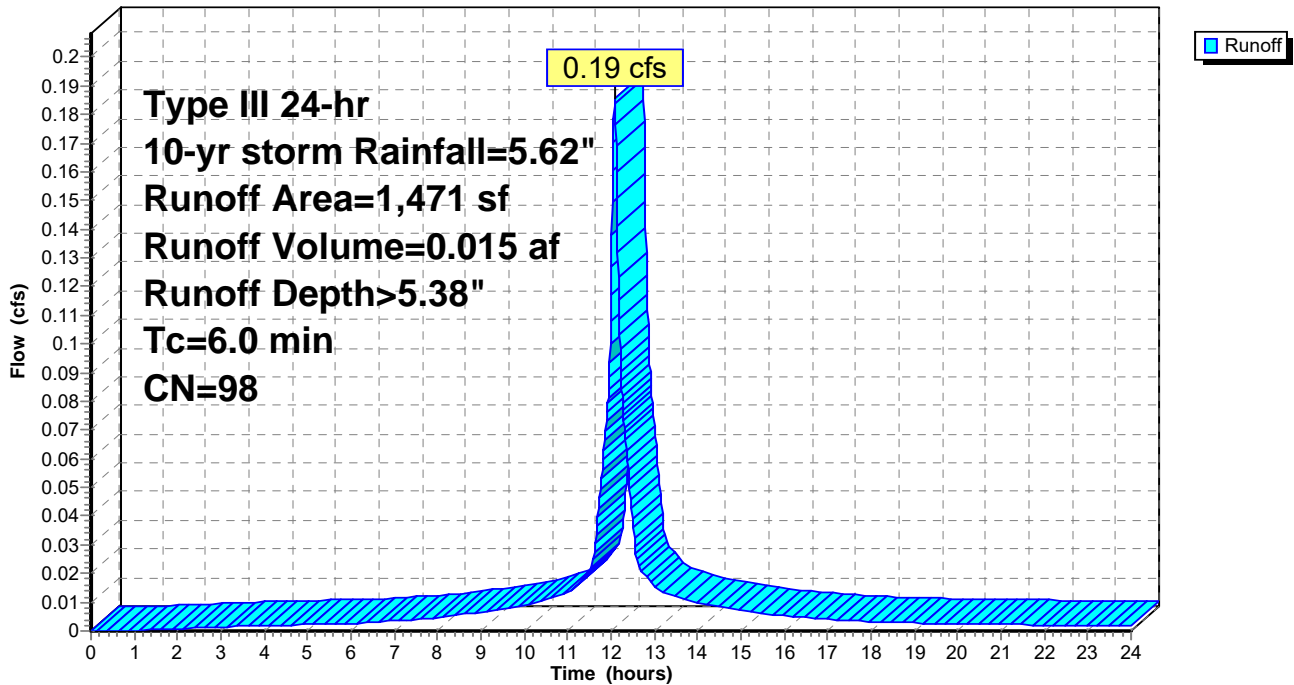
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Type III 24-hr 10-yr storm Rainfall=5.62"

Area (sf)	CN	Description
* 1,471	98	Impervious
1,471		100.00% Impervious Area

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

Subcatchment 48S: Facilities Area

Hydrograph



Summary for Subcatchment 49S: Facilities Area

Runoff = 0.13 cfs @ 12.08 hrs, Volume= 0.010 af, Depth> 5.38"

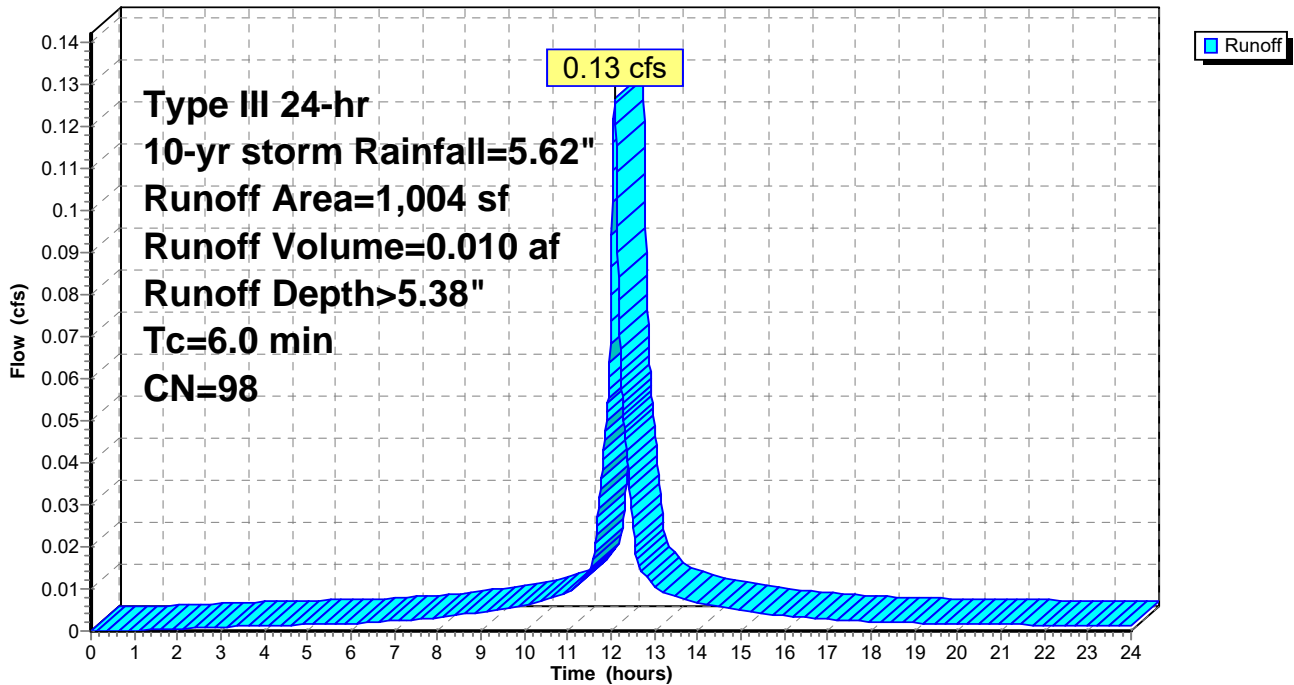
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Type III 24-hr 10-yr storm Rainfall=5.62"

Area (sf)	CN	Description
* 1,004	98	Impervious
1,004		100.00% Impervious Area

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

Subcatchment 49S: Facilities Area

Hydrograph

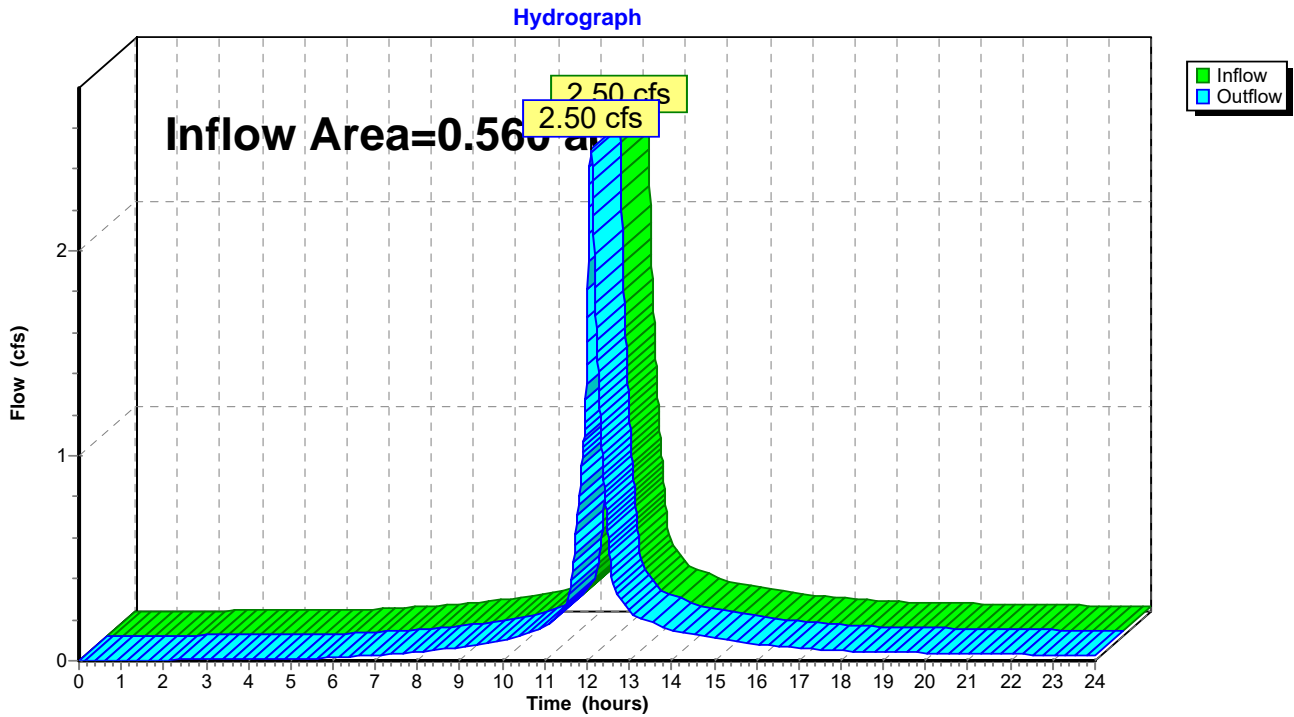


Summary for Reach 100R: POA #100

Inflow Area = 0.560 ac, 66.09% Impervious, Inflow Depth > 4.41" for 10-yr storm event
Inflow = 2.50 cfs @ 12.09 hrs, Volume= 0.206 af
Outflow = 2.50 cfs @ 12.09 hrs, Volume= 0.206 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach 100R: POA #100



Summary for Pond 1P: PCB #1

Inflow Area = 0.099 ac, 100.00% Impervious, Inflow Depth > 5.38" for 10-yr storm event
 Inflow = 0.55 cfs @ 12.08 hrs, Volume= 0.045 af
 Outflow = 0.55 cfs @ 12.08 hrs, Volume= 0.045 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.55 cfs @ 12.08 hrs, Volume= 0.045 af

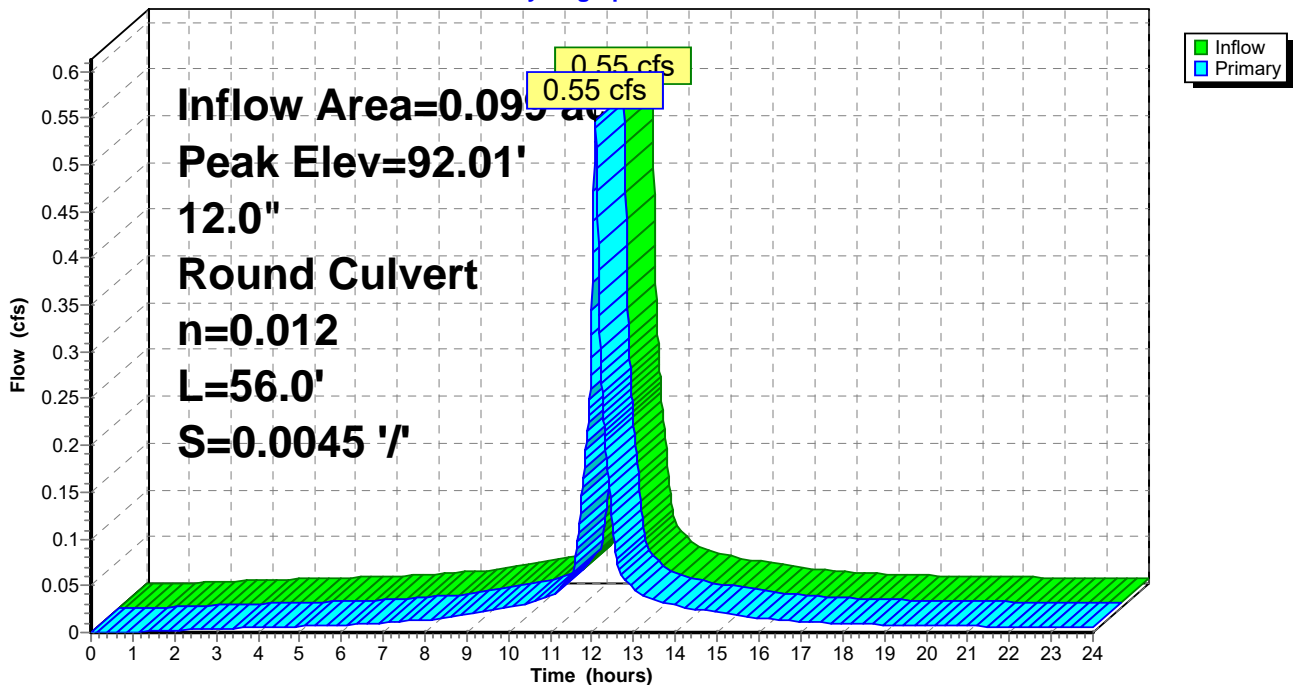
Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 92.01' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	91.55'	12.0" Round Culvert L= 56.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 91.55' / 91.30' S= 0.0045 '/ Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.54 cfs @ 12.08 hrs HW=92.01' TW=91.69' (Dynamic Tailwater)
 ←1=Culvert (Outlet Controls 0.54 cfs @ 2.25 fps)

Pond 1P: PCB #1

Hydrograph



Summary for Pond 2P: PCB #2

Inflow Area = 0.244 ac, 64.92% Impervious, Inflow Depth > 4.25" for 10-yr storm event
 Inflow = 1.01 cfs @ 12.13 hrs, Volume= 0.086 af
 Outflow = 1.01 cfs @ 12.13 hrs, Volume= 0.086 af, Atten= 0%, Lag= 0.0 min
 Primary = 1.01 cfs @ 12.13 hrs, Volume= 0.086 af

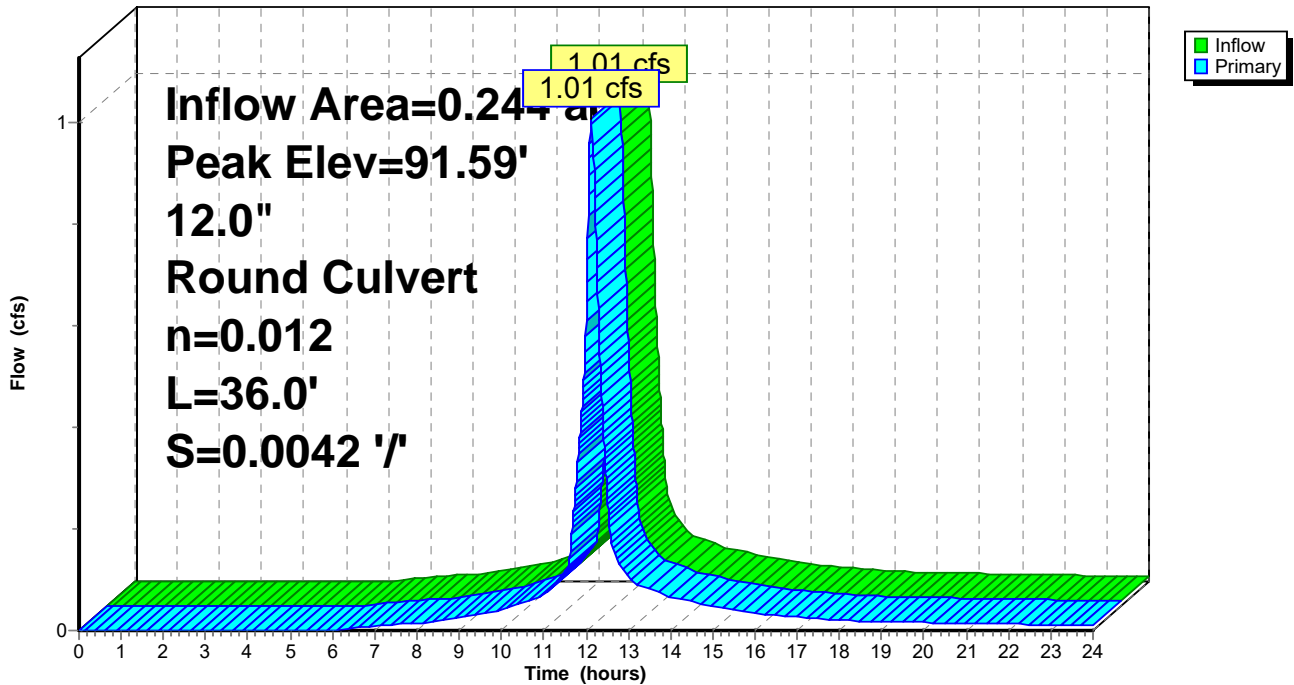
Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 91.59' @ 12.12 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	90.93'	12.0" Round Culvert L= 36.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 90.93' / 90.78' S= 0.0042 '/ Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=1.01 cfs @ 12.13 hrs HW=91.58' TW=91.26' (Dynamic Tailwater)
 ←1=Culvert (Barrel Controls 1.01 cfs @ 2.65 fps)

Pond 2P: PCB #2

Hydrograph



Summary for Pond 3P: PCB #3

Inflow Area = 0.133 ac, 59.26% Impervious, Inflow Depth > 4.28" for 10-yr storm event
 Inflow = 0.63 cfs @ 12.08 hrs, Volume= 0.047 af
 Outflow = 0.63 cfs @ 12.08 hrs, Volume= 0.047 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.63 cfs @ 12.08 hrs, Volume= 0.047 af

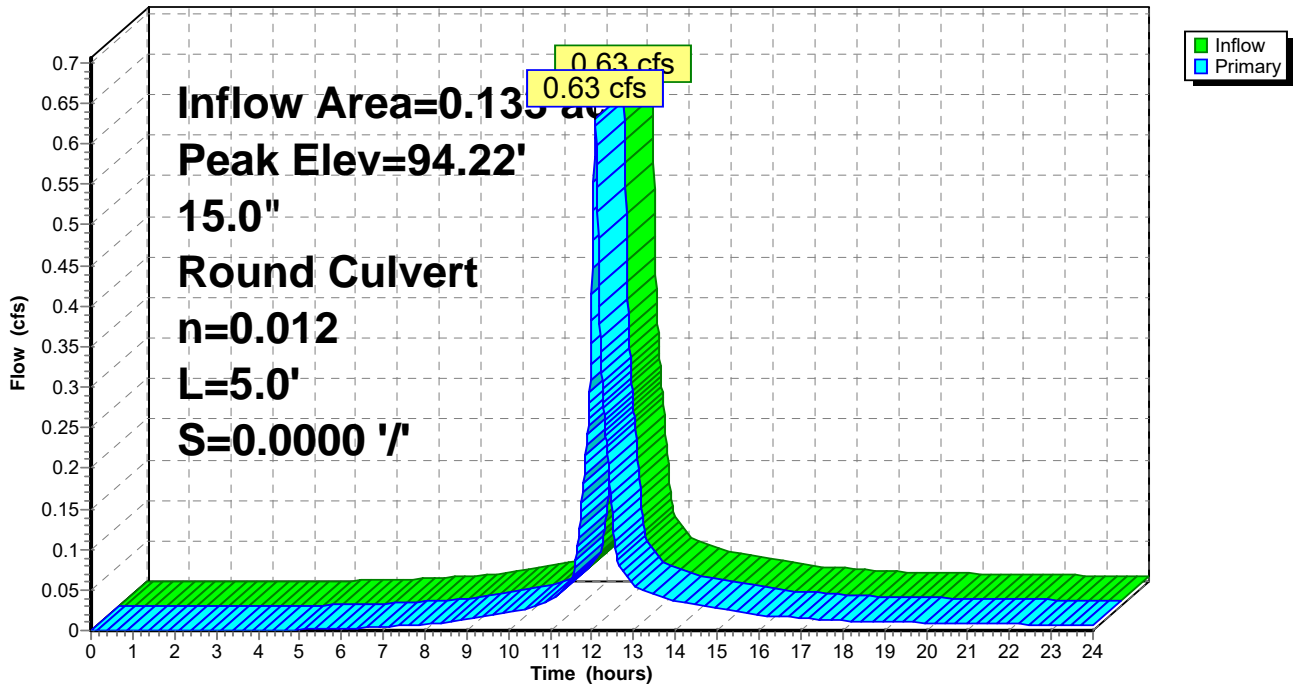
Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 94.22' @ 12.14 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	93.35'	15.0" Round Culvert L= 5.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 93.35' / 93.35' S= 0.0000 '/ Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=0.02 cfs @ 12.08 hrs HW=94.04' TW=94.04' (Dynamic Tailwater)
 ←1=Culvert (Inlet Controls 0.02 cfs @ 0.03 fps)

Pond 3P: PCB #3

Hydrograph



Summary for Pond 4P: PAD #4

Inflow Area = 0.091 ac, 53.37% Impervious, Inflow Depth > 4.14" for 10-yr storm event
 Inflow = 0.42 cfs @ 12.08 hrs, Volume= 0.031 af
 Outflow = 0.42 cfs @ 12.08 hrs, Volume= 0.031 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.42 cfs @ 12.08 hrs, Volume= 0.031 af

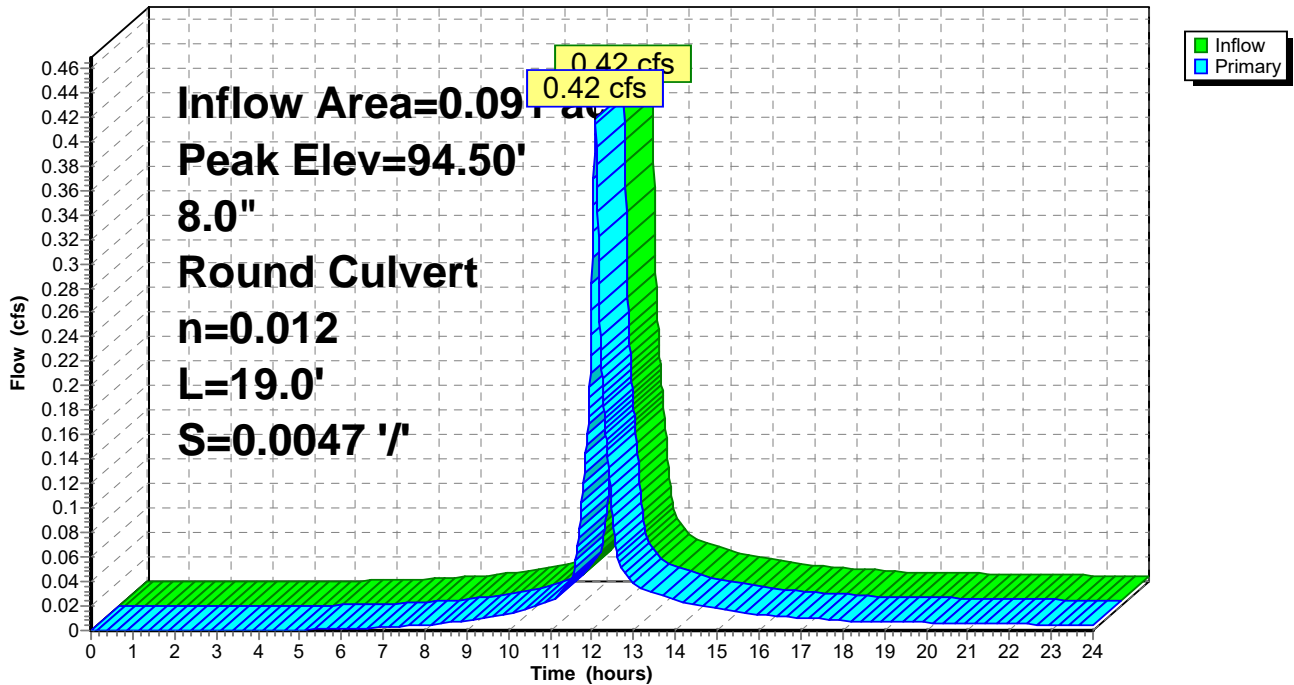
Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 94.50' @ 12.08 hrs

Device #1	Routing Primary	Invert 94.03'	Outlet Devices
			8.0" Round Culvert
			L= 19.0' CPP, projecting, no headwall, Ke= 0.900
			Inlet / Outlet Invert= 94.03' / 93.94' S= 0.0047 '/' Cc= 0.900
			n= 0.012, Flow Area= 0.35 sf

Primary OutFlow Max=0.42 cfs @ 12.08 hrs HW=94.50' TW=94.04' (Dynamic Tailwater)
 ←1=Culvert (Barrel Controls 0.42 cfs @ 2.22 fps)

Pond 4P: PAD #4

Hydrograph



Summary for Pond 5P: PAD #5

Inflow Area = 0.085 ac, 54.26% Impervious, Inflow Depth > 4.16" for 10-yr storm event
 Inflow = 0.39 cfs @ 12.08 hrs, Volume= 0.030 af
 Outflow = 0.39 cfs @ 12.08 hrs, Volume= 0.030 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.39 cfs @ 12.08 hrs, Volume= 0.030 af

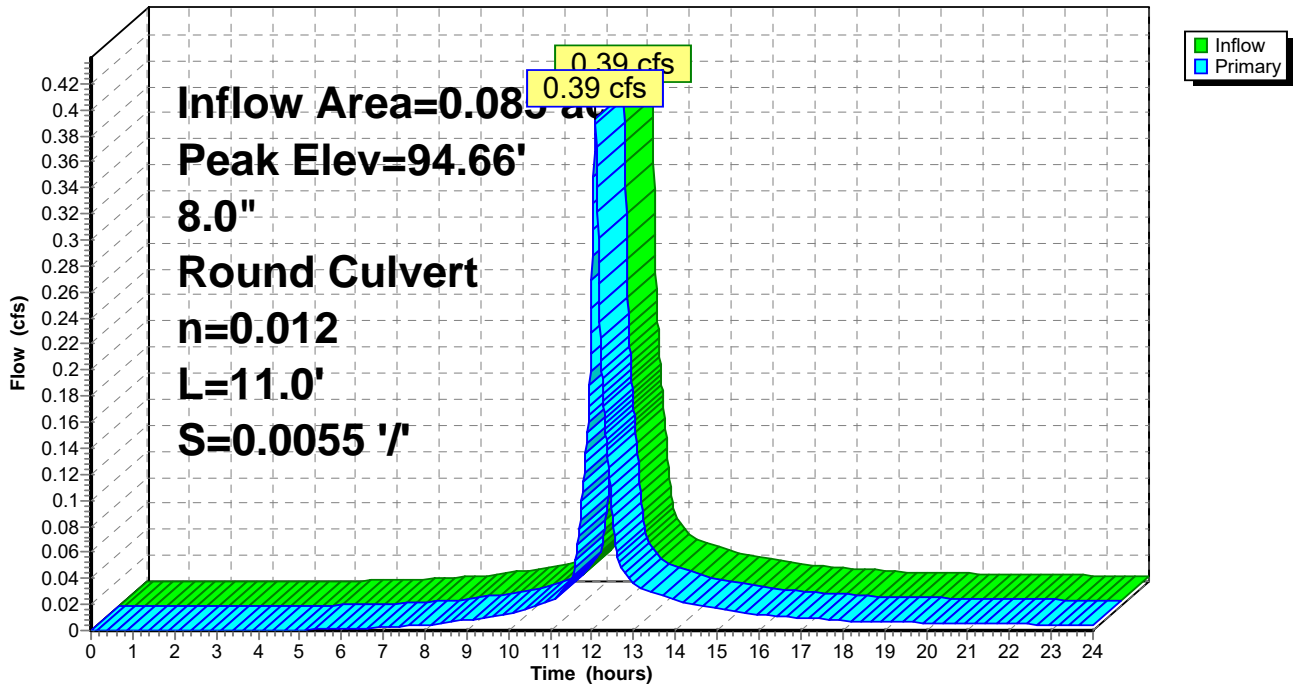
Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 94.66' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	94.19'	8.0" Round Culvert L= 11.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 94.19' / 94.13' S= 0.0055 '/ Cc= 0.900 n= 0.012, Flow Area= 0.35 sf

Primary OutFlow Max=0.39 cfs @ 12.08 hrs HW=94.66' TW=94.50' (Dynamic Tailwater)
 ←1=Culvert (Outlet Controls 0.39 cfs @ 2.07 fps)

Pond 5P: PAD #5

Hydrograph



Summary for Pond 6P: PAD #6

Inflow Area = 0.076 ac, 59.97% Impervious, Inflow Depth > 4.30" for 10-yr storm event
 Inflow = 0.37 cfs @ 12.09 hrs, Volume= 0.027 af
 Outflow = 0.37 cfs @ 12.09 hrs, Volume= 0.027 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.37 cfs @ 12.09 hrs, Volume= 0.027 af

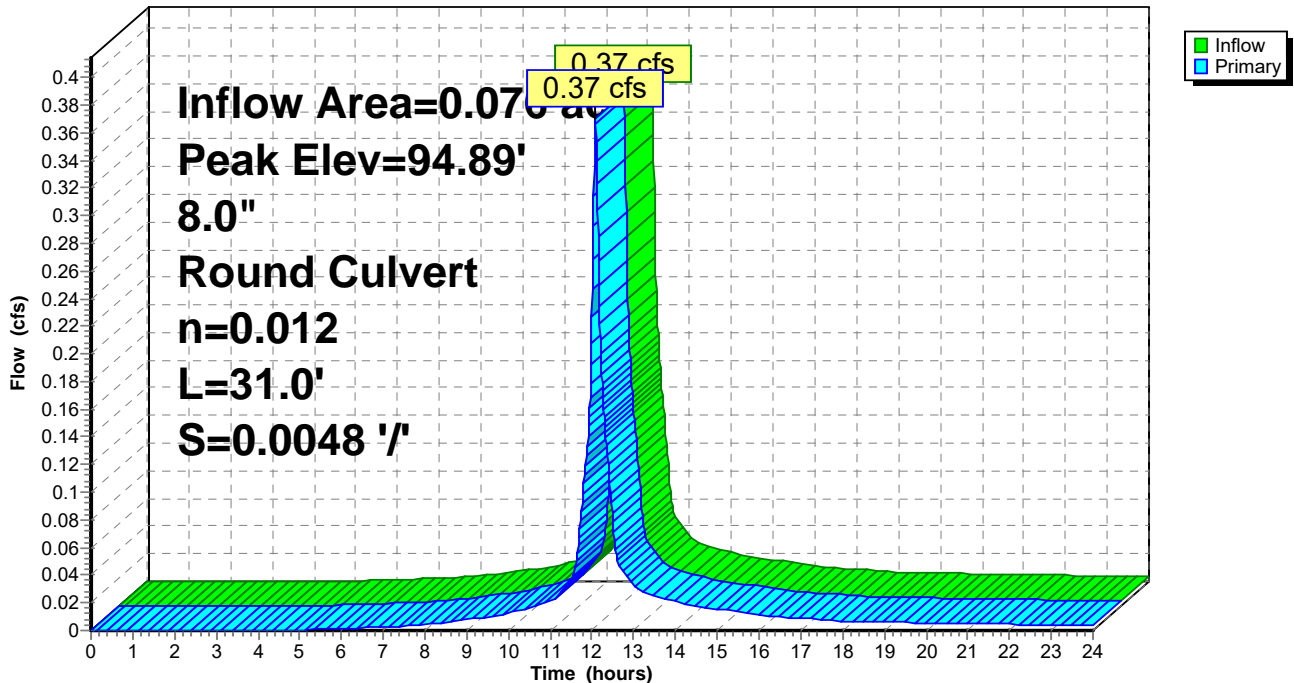
Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 94.89' @ 12.09 hrs

Device #	Routing	Invert	Outlet Devices
#1	Primary	94.45'	8.0" Round Culvert L= 31.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 94.45' / 94.30' S= 0.0048 '/ Cc= 0.900 n= 0.012, Flow Area= 0.35 sf

Primary OutFlow Max=0.37 cfs @ 12.09 hrs HW=94.89' TW=94.66' (Dynamic Tailwater)
 ←1=Culvert (Outlet Controls 0.37 cfs @ 2.11 fps)

Pond 6P: PAD #6

Hydrograph



Summary for Pond 7P: PAD #7

Inflow Area = 0.053 ac, 62.12% Impervious, Inflow Depth > 4.36" for 10-yr storm event
 Inflow = 0.26 cfs @ 12.09 hrs, Volume= 0.019 af
 Outflow = 0.26 cfs @ 12.09 hrs, Volume= 0.019 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.26 cfs @ 12.09 hrs, Volume= 0.019 af

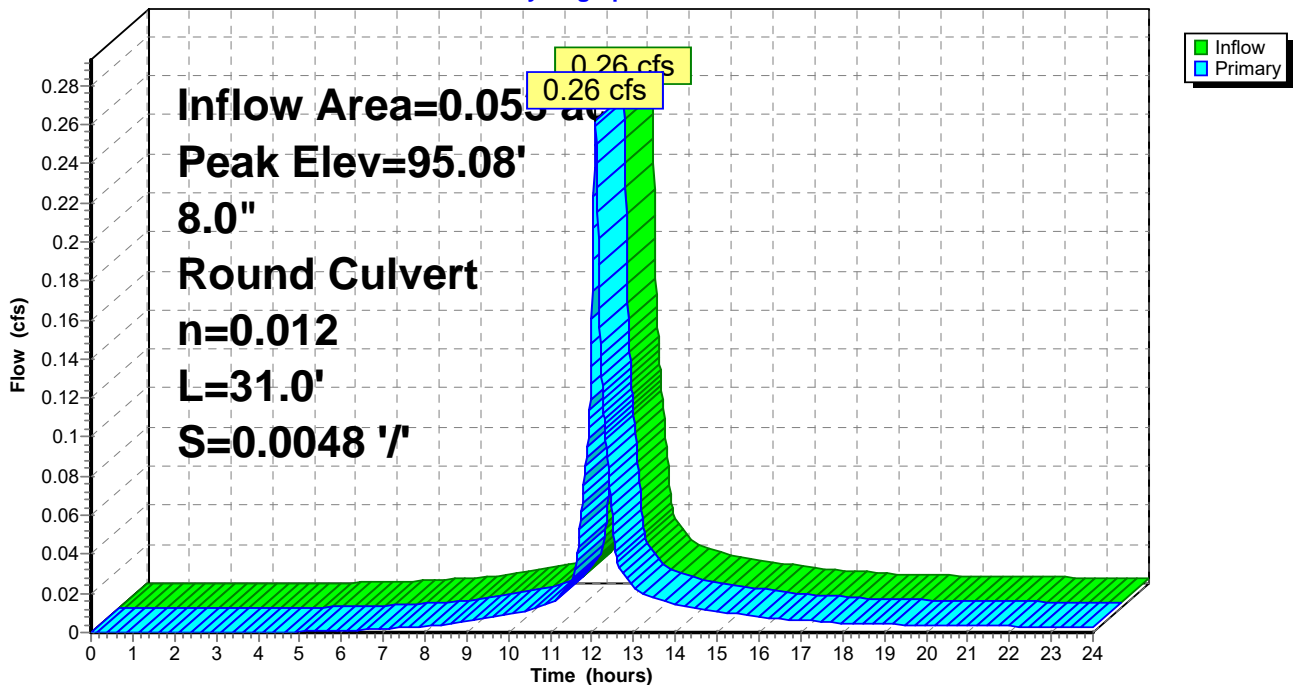
Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 95.08' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	94.71'	8.0" Round Culvert L= 31.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 94.71' / 94.56' S= 0.0048 '/ Cc= 0.900 n= 0.012, Flow Area= 0.35 sf

Primary OutFlow Max=0.26 cfs @ 12.09 hrs HW=95.08' TW=94.89' (Dynamic Tailwater)
 ←1=Culvert (Outlet Controls 0.26 cfs @ 1.86 fps)

Pond 7P: PAD #7

Hydrograph



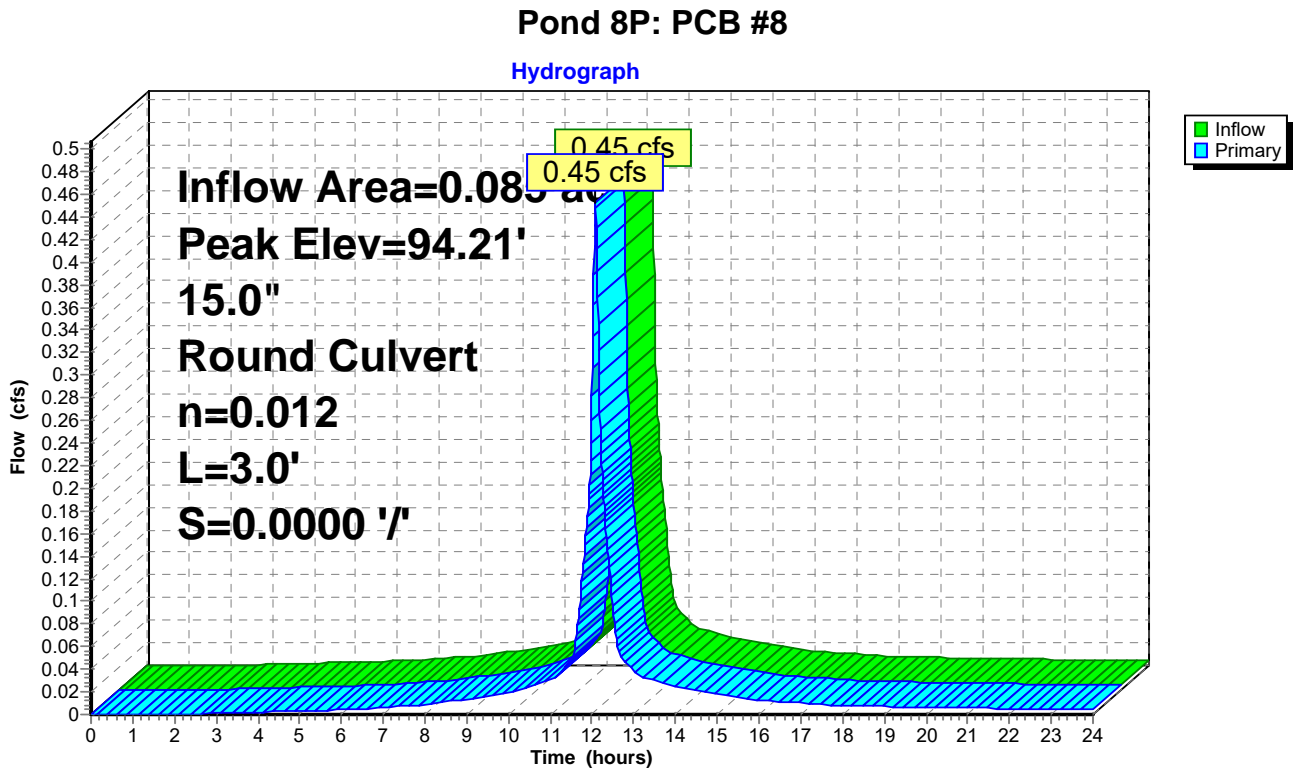
Summary for Pond 8P: PCB #8

Inflow Area = 0.085 ac, 84.40% Impervious, Inflow Depth > 4.95" for 10-yr storm event
 Inflow = 0.45 cfs @ 12.08 hrs, Volume= 0.035 af
 Outflow = 0.45 cfs @ 12.08 hrs, Volume= 0.035 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.45 cfs @ 12.08 hrs, Volume= 0.035 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 94.21' @ 12.14 hrs

Device #1	Routing Primary	Invert 93.35'	Outlet Devices
			15.0" Round Culvert
			L= 3.0' CPP, projecting, no headwall, Ke= 0.900
			Inlet / Outlet Invert= 93.35' / 93.35' S= 0.0000 '/' Cc= 0.900
			n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=0.00 cfs @ 12.08 hrs HW=94.03' TW=94.05' (Dynamic Tailwater)
 ←1=Culvert (Controls 0.00 cfs)



Summary for Pond 9P: PAD #9

Inflow Area = 0.049 ac, 89.92% Impervious, Inflow Depth > 5.14" for 10-yr storm event
 Inflow = 0.26 cfs @ 12.08 hrs, Volume= 0.021 af
 Outflow = 0.26 cfs @ 12.08 hrs, Volume= 0.021 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.26 cfs @ 12.08 hrs, Volume= 0.021 af

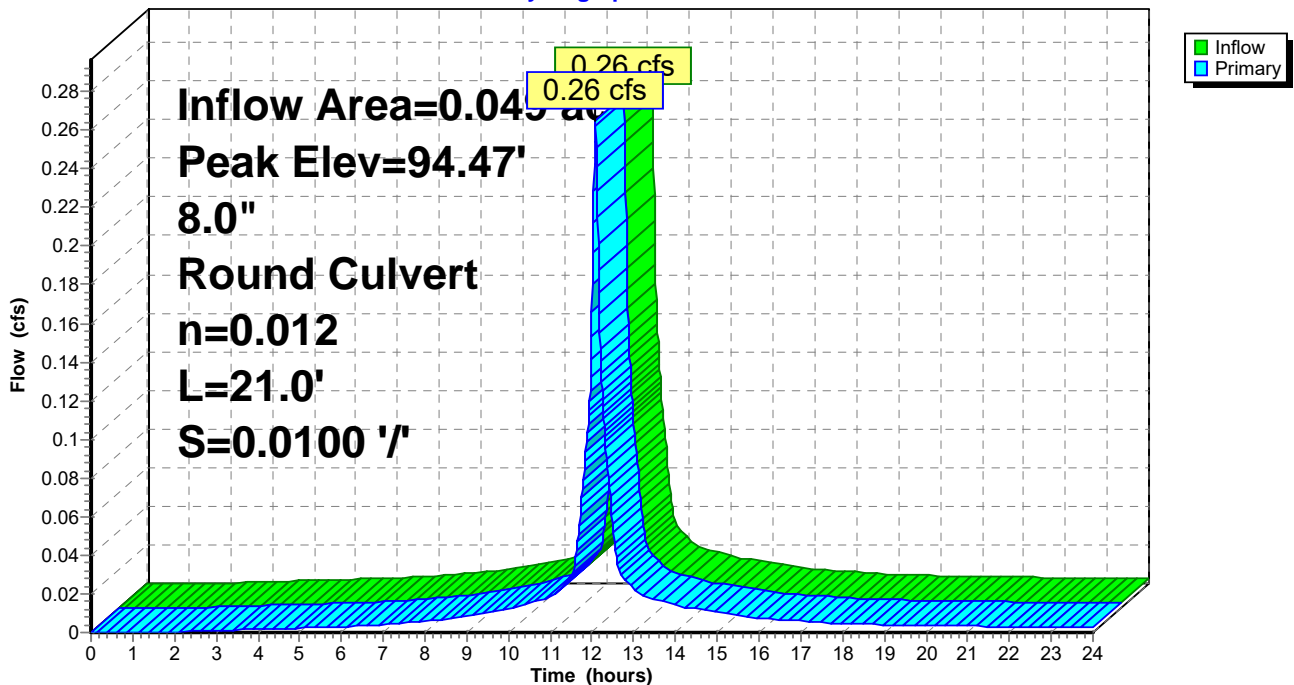
Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 94.47' @ 12.08 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	94.14'	8.0" Round Culvert L= 21.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 94.14' / 93.93' S= 0.0100 '/ Cc= 0.900 n= 0.012, Flow Area= 0.35 sf

Primary OutFlow Max=0.26 cfs @ 12.08 hrs HW=94.47' TW=94.03' (Dynamic Tailwater)
 ←1=Culvert (Inlet Controls 0.26 cfs @ 1.54 fps)

Pond 9P: PAD #9

Hydrograph



Summary for Pond 10P: PAD #10

Inflow Area = 0.013 ac, 29.91% Impervious, Inflow Depth > 3.54" for 10-yr storm event
 Inflow = 0.05 cfs @ 12.09 hrs, Volume= 0.004 af
 Outflow = 0.05 cfs @ 12.09 hrs, Volume= 0.004 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.05 cfs @ 12.09 hrs, Volume= 0.004 af

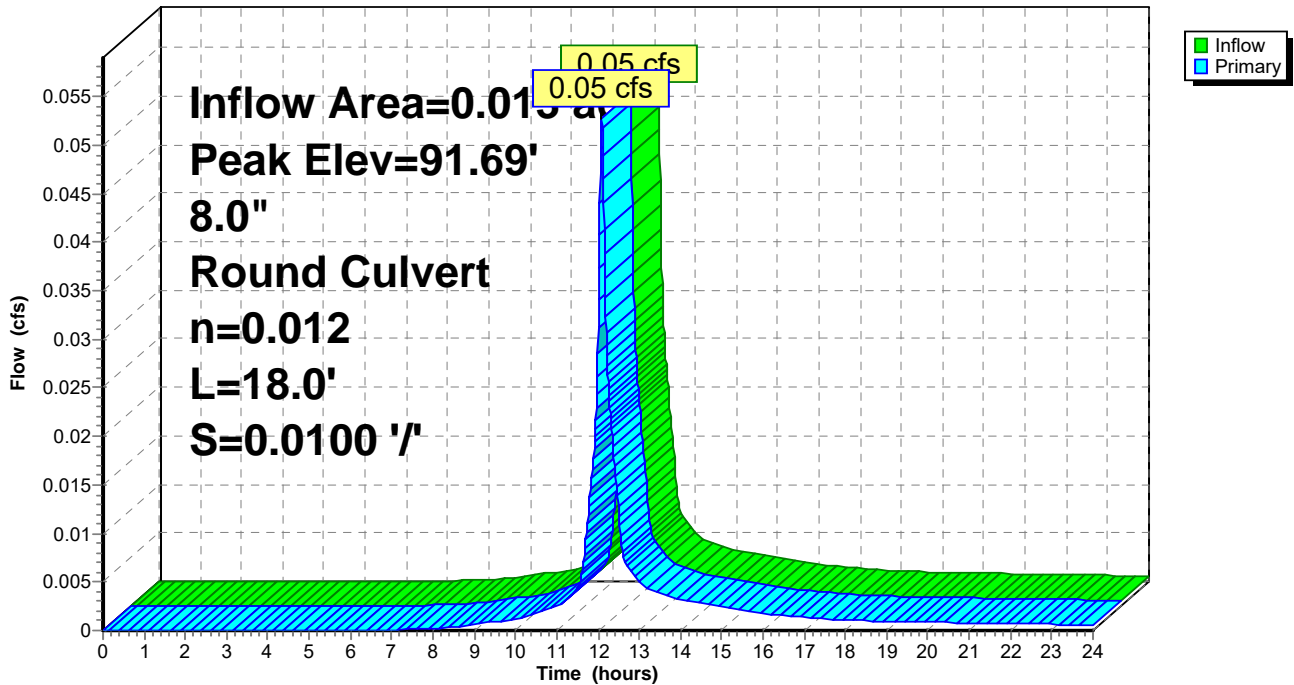
Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 91.69' @ 12.11 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	91.54'	8.0" Round Culvert L= 18.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 91.54' / 91.36' S= 0.0100 '/ Cc= 0.900 n= 0.012, Flow Area= 0.35 sf

Primary OutFlow Max=0.05 cfs @ 12.09 hrs HW=91.69' TW=91.57' (Dynamic Tailwater)
 ←1=Culvert (Outlet Controls 0.05 cfs @ 1.30 fps)

Pond 10P: PAD #10

Hydrograph



Summary for Pond 11P: PDMH #11 - Detention System

Inflow Area = 0.218 ac, 69.06% Impervious, Inflow Depth > 4.54" for 10-yr storm event
 Inflow = 1.08 cfs @ 12.08 hrs, Volume= 0.082 af
 Outflow = 0.91 cfs @ 12.14 hrs, Volume= 0.082 af, Atten= 16%, Lag= 3.2 min
 Discarded = 0.00 cfs @ 12.14 hrs, Volume= 0.003 af
 Primary = 0.91 cfs @ 12.14 hrs, Volume= 0.079 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 94.20' @ 12.14 hrs Surf.Area= 248 sf Storage= 180 cf
 Flood Elev= 95.60' Surf.Area= 248 sf Storage= 334 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 5.0 min (785.6 - 780.6)

Volume	Invert	Avail.Storage	Storage Description
#1	92.85'	208 cf	Custom Stage Data (Prismatic) Listed below (Recalc) 682 cf Overall - 161 cf Embedded = 521 cf x 40.0% Voids
#2	93.35'	125 cf	15.0" Round Pipe Storage x 3 Inside #1 L= 34.0' 161 cf Overall - 1.0" Wall Thickness = 125 cf
		334 cf	Total Available Storage

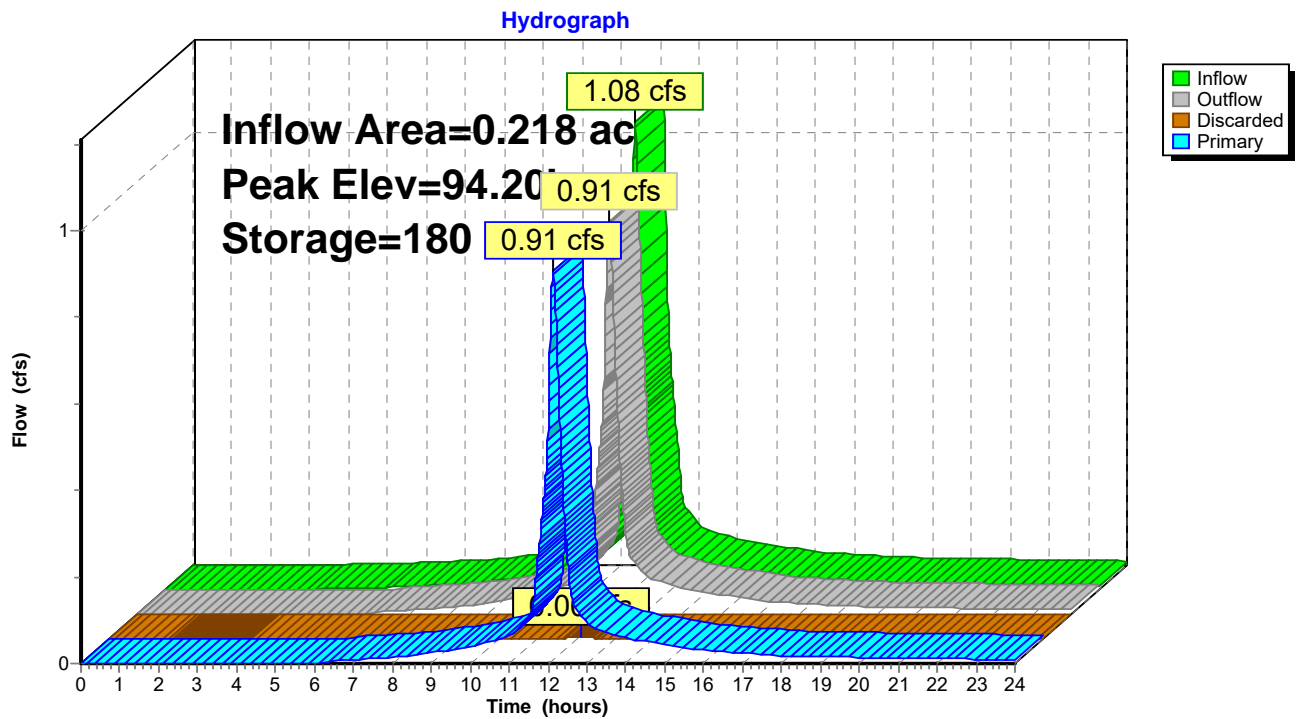
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
92.85	248	0	0
93.03	248	45	45
95.60	248	637	682

Device	Routing	Invert	Outlet Devices
#1	Primary	91.20'	12.0" Round Culvert L= 35.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 91.20' / 91.03' S= 0.0049 ' / ' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Device 1	93.03'	6.0" Vert. Orifice C= 0.600
#3	Device 1	95.10'	12.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#4	Discarded	92.85'	0.300 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 90.00'

Discarded OutFlow Max=0.00 cfs @ 12.14 hrs HW=94.20' (Free Discharge)
 ↳4=Exfiltration (Controls 0.00 cfs)

Primary OutFlow Max=0.91 cfs @ 12.14 hrs HW=94.20' TW=91.58' (Dynamic Tailwater)
 ↳1=Culvert (Passes 0.91 cfs of 4.72 cfs potential flow)
 ↳2=Orifice (Orifice Controls 0.91 cfs @ 4.62 fps)
 ↳3=Orifice/Grate (Controls 0.00 cfs)

Pond 11P: PDMH #11 - Detention System



Summary for Pond 28P: CB #28

Inflow Area = 0.131 ac, 24.04% Impervious, Inflow Depth > 3.44" for 10-yr storm event
 Inflow = 0.53 cfs @ 12.09 hrs, Volume= 0.038 af
 Outflow = 0.53 cfs @ 12.09 hrs, Volume= 0.038 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.53 cfs @ 12.09 hrs, Volume= 0.038 af

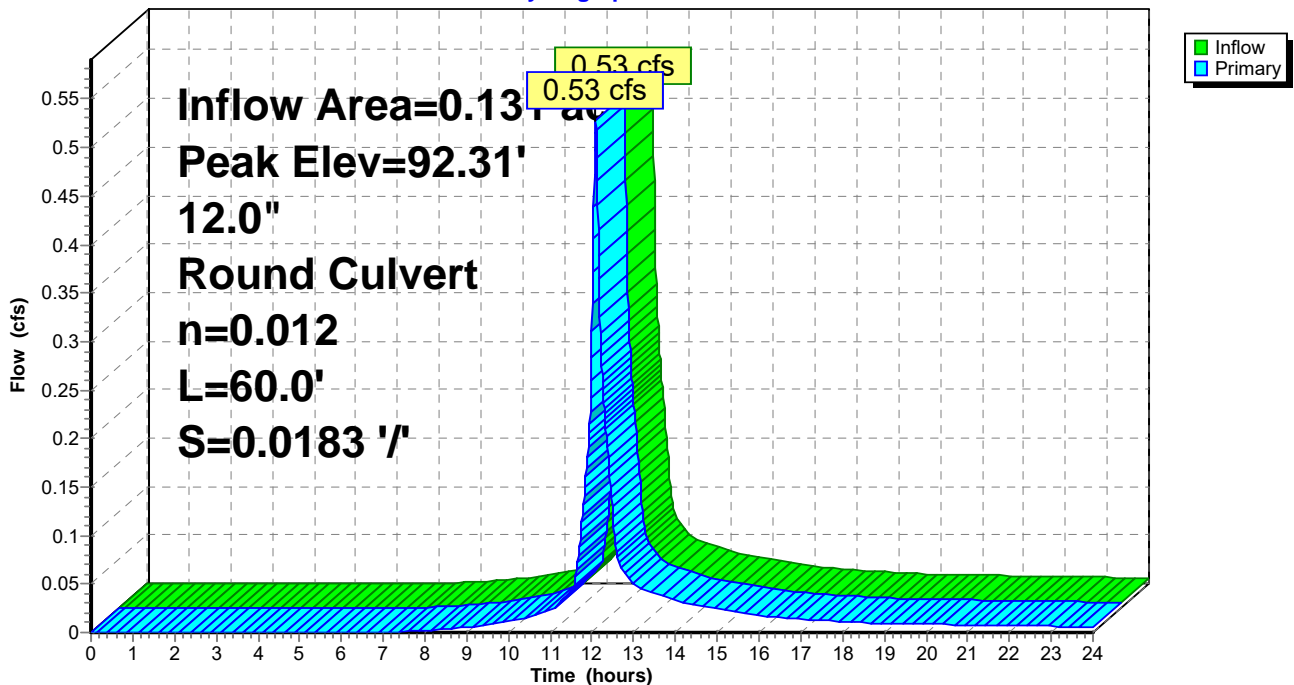
Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 92.31' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	91.90'	12.0" Round Culvert L= 60.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 91.90' / 90.80' S= 0.0183 '/ Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.53 cfs @ 12.09 hrs HW=92.31' TW=0.00' (Dynamic Tailwater)
 ←1=Culvert (Inlet Controls 0.53 cfs @ 1.73 fps)

Pond 28P: CB #28

Hydrograph



Summary for Pond 29P: CB #29

Inflow Area = 0.429 ac, 78.94% Impervious, Inflow Depth > 4.71" for 10-yr storm event
 Inflow = 1.97 cfs @ 12.10 hrs, Volume= 0.168 af
 Outflow = 1.97 cfs @ 12.10 hrs, Volume= 0.168 af, Atten= 0%, Lag= 0.0 min
 Primary = 1.97 cfs @ 12.10 hrs, Volume= 0.168 af

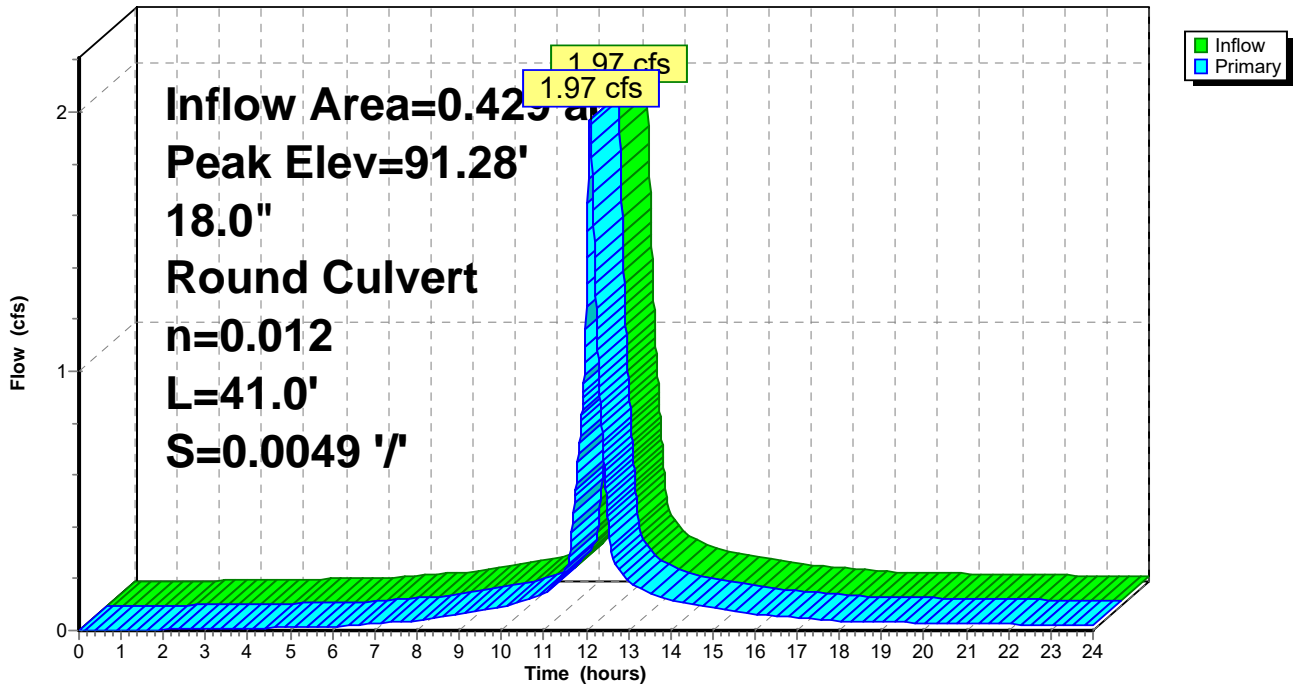
Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 91.28' @ 12.10 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	90.50'	18.0" Round Culvert L= 41.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 90.50' / 90.30' S= 0.0049 '/ Cc= 0.900 n= 0.012, Flow Area= 1.77 sf

Primary OutFlow Max=1.97 cfs @ 12.10 hrs HW=91.28' TW=0.00' (Dynamic Tailwater)
 ←1=Culvert (Barrel Controls 1.97 cfs @ 3.07 fps)

Pond 29P: CB #29

Hydrograph



Summary for Pond 32P: CB #32

Inflow Area = 0.132 ac, 100.00% Impervious, Inflow Depth > 5.38" for 10-yr storm event
 Inflow = 0.73 cfs @ 12.08 hrs, Volume= 0.059 af
 Outflow = 0.73 cfs @ 12.08 hrs, Volume= 0.059 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.73 cfs @ 12.08 hrs, Volume= 0.059 af

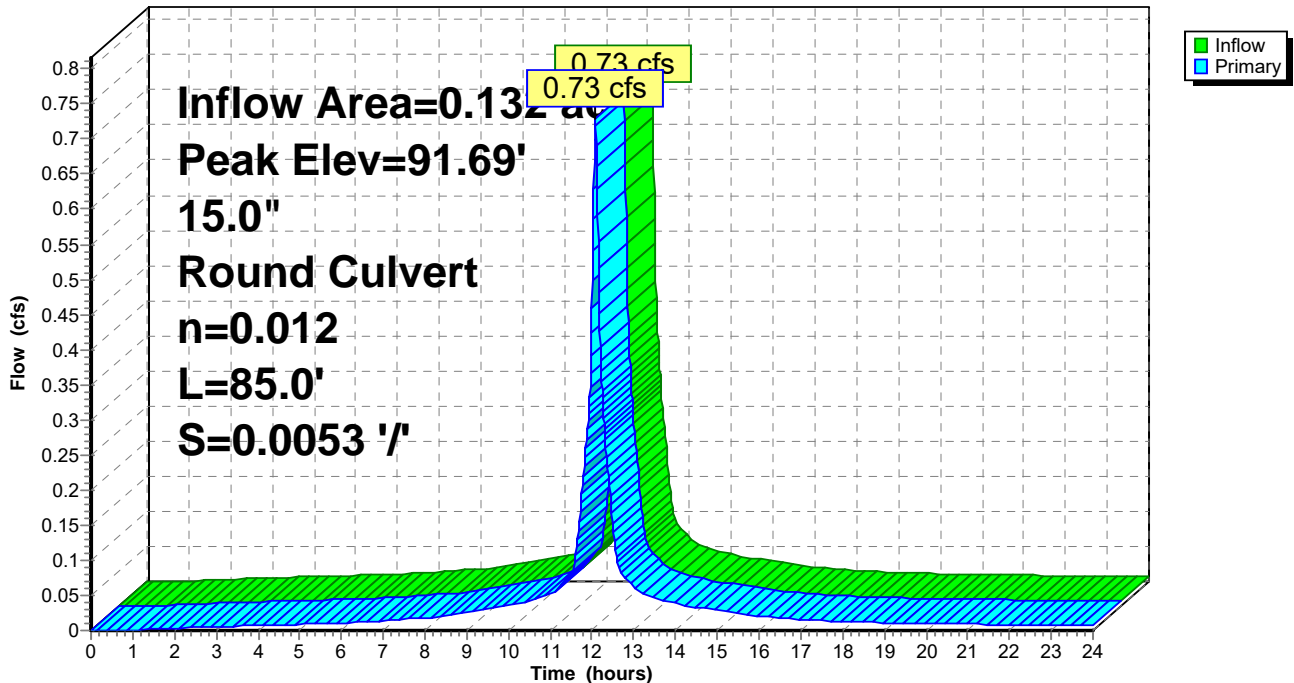
Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 91.69' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	91.20'	15.0" Round Culvert L= 85.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 91.20' / 90.75' S= 0.0053 '/ Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=0.72 cfs @ 12.08 hrs HW=91.69' TW=91.28' (Dynamic Tailwater)
 ←1=Culvert (Outlet Controls 0.72 cfs @ 2.37 fps)

Pond 32P: CB #32

Hydrograph



Summary for Pond 48P: CB #48

Inflow Area = 0.034 ac, 100.00% Impervious, Inflow Depth > 5.38" for 10-yr storm event
 Inflow = 0.19 cfs @ 12.08 hrs, Volume= 0.015 af
 Outflow = 0.19 cfs @ 12.08 hrs, Volume= 0.015 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.19 cfs @ 12.08 hrs, Volume= 0.015 af

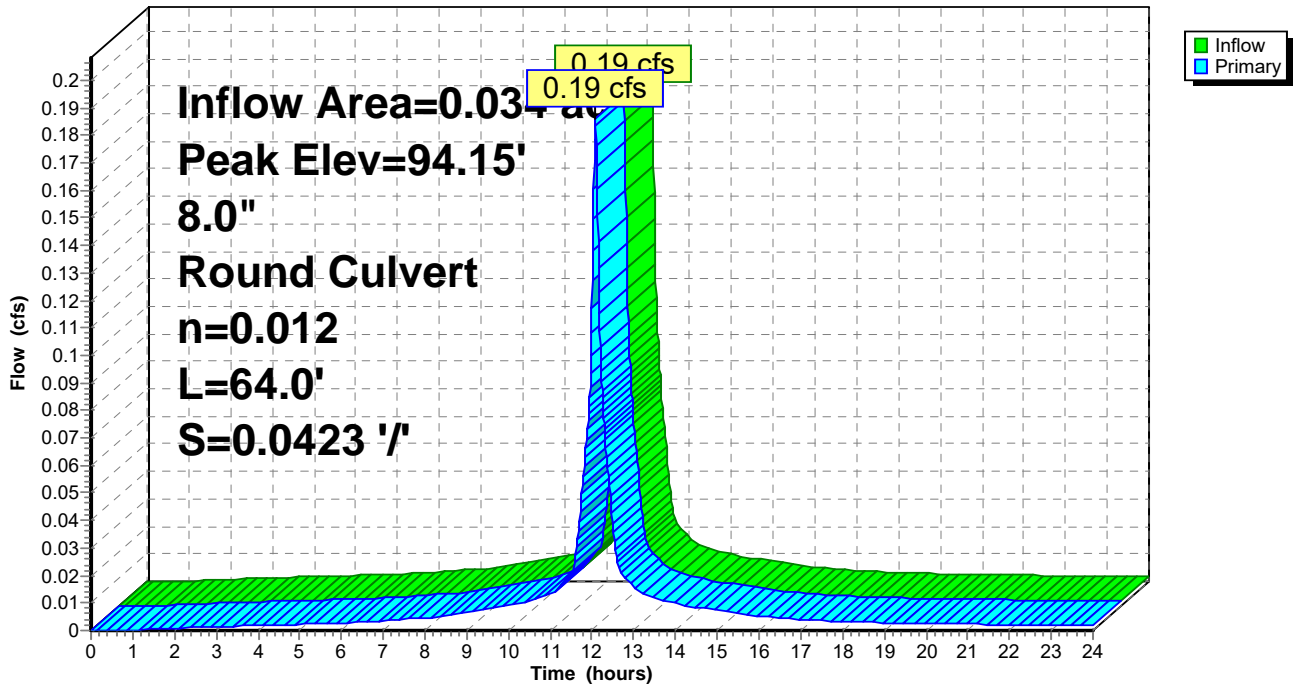
Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 94.15' @ 12.08 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	93.88'	8.0" Round Culvert L= 64.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 93.88' / 91.17' S= 0.0423 '/ Cc= 0.900 n= 0.012, Flow Area= 0.35 sf

Primary OutFlow Max=0.19 cfs @ 12.08 hrs HW=94.15' TW=92.01' (Dynamic Tailwater)
 ←1=Culvert (Inlet Controls 0.19 cfs @ 1.40 fps)

Pond 48P: CB #48

Hydrograph



Summary for Pond 49P: CB #49

Inflow Area = 0.023 ac, 100.00% Impervious, Inflow Depth > 5.38" for 10-yr storm event
 Inflow = 0.13 cfs @ 12.08 hrs, Volume= 0.010 af
 Outflow = 0.13 cfs @ 12.08 hrs, Volume= 0.010 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.13 cfs @ 12.08 hrs, Volume= 0.010 af

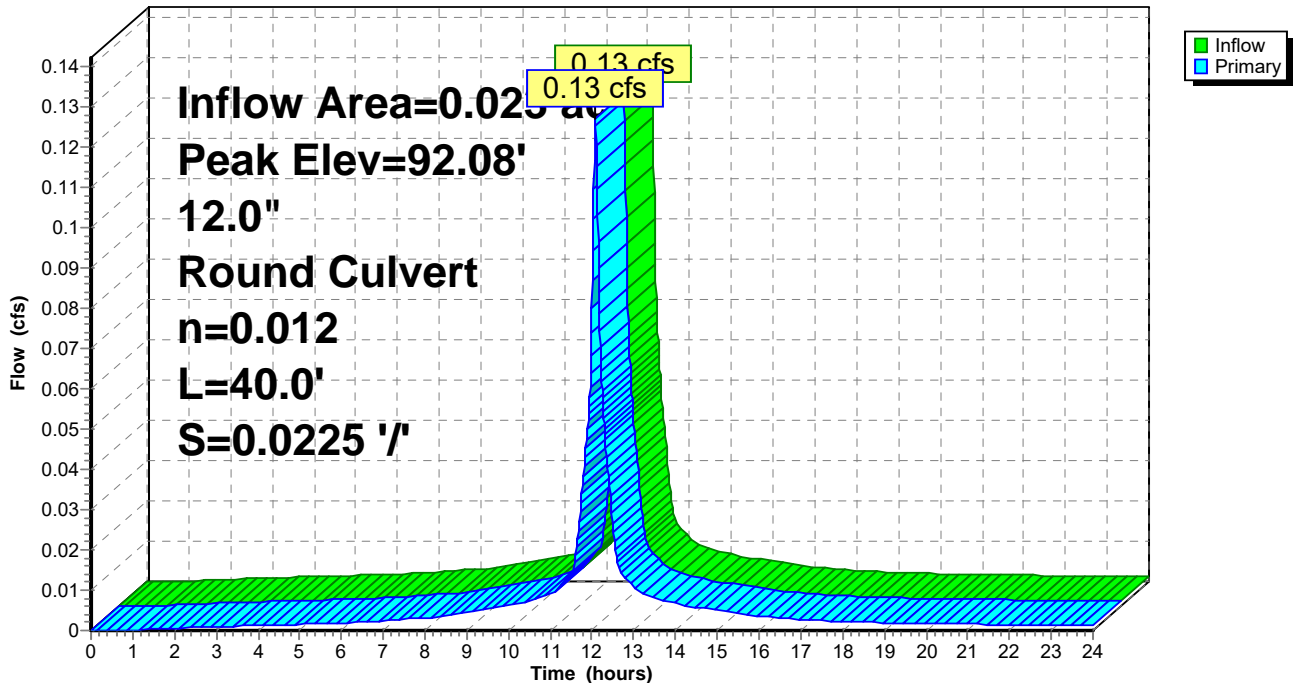
Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 92.08' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	91.80'	12.0" Round Culvert L= 40.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 91.80' / 90.90' S= 0.0225 '/ Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

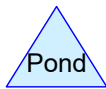
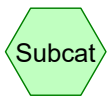
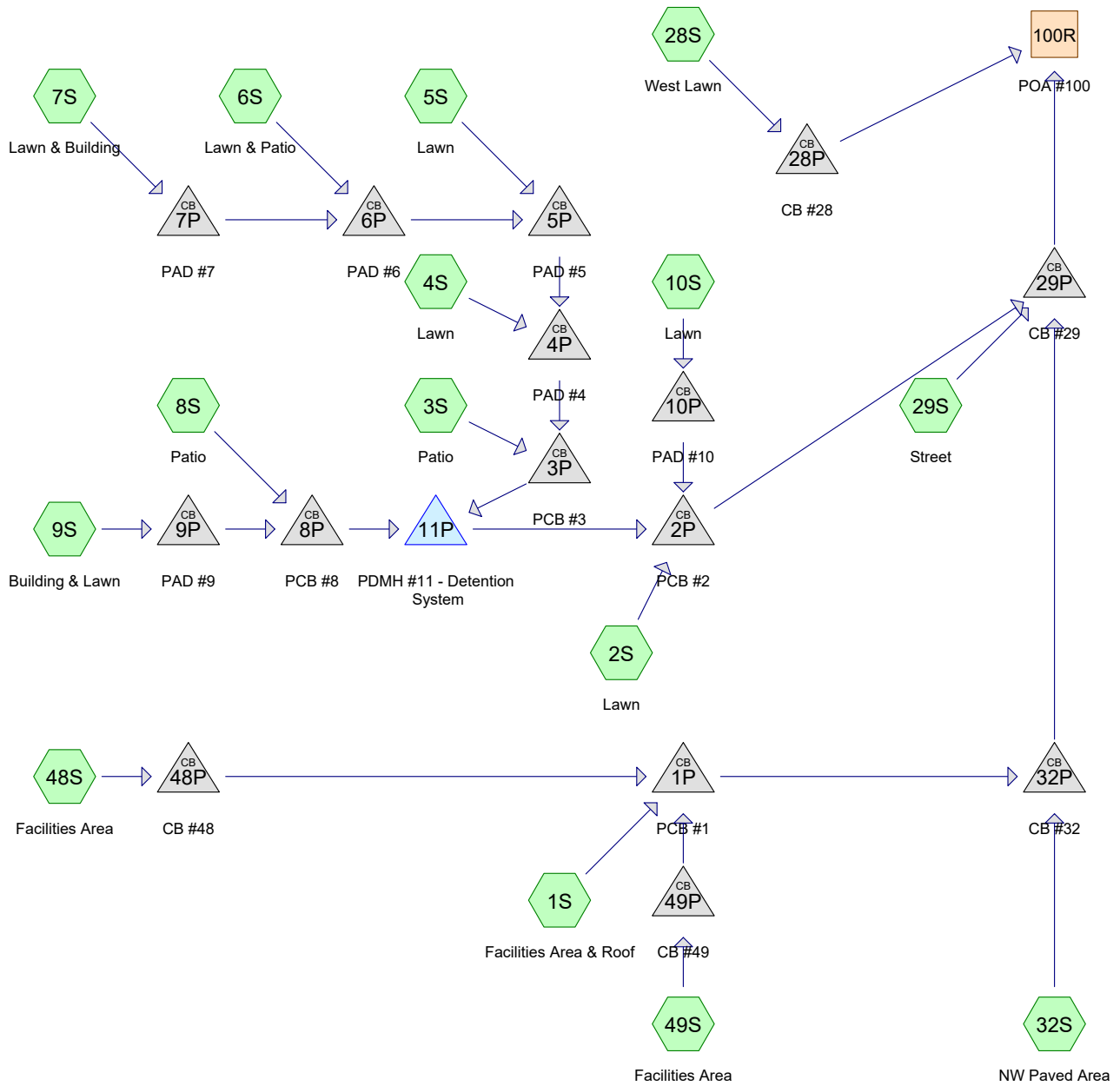
Primary OutFlow Max=0.12 cfs @ 12.08 hrs HW=92.08' TW=92.01' (Dynamic Tailwater)
 ←1=Culvert (Outlet Controls 0.12 cfs @ 1.01 fps)

Pond 49P: CB #49

Hydrograph



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Routing Diagram for 5056-POST-rev040120
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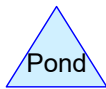
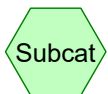
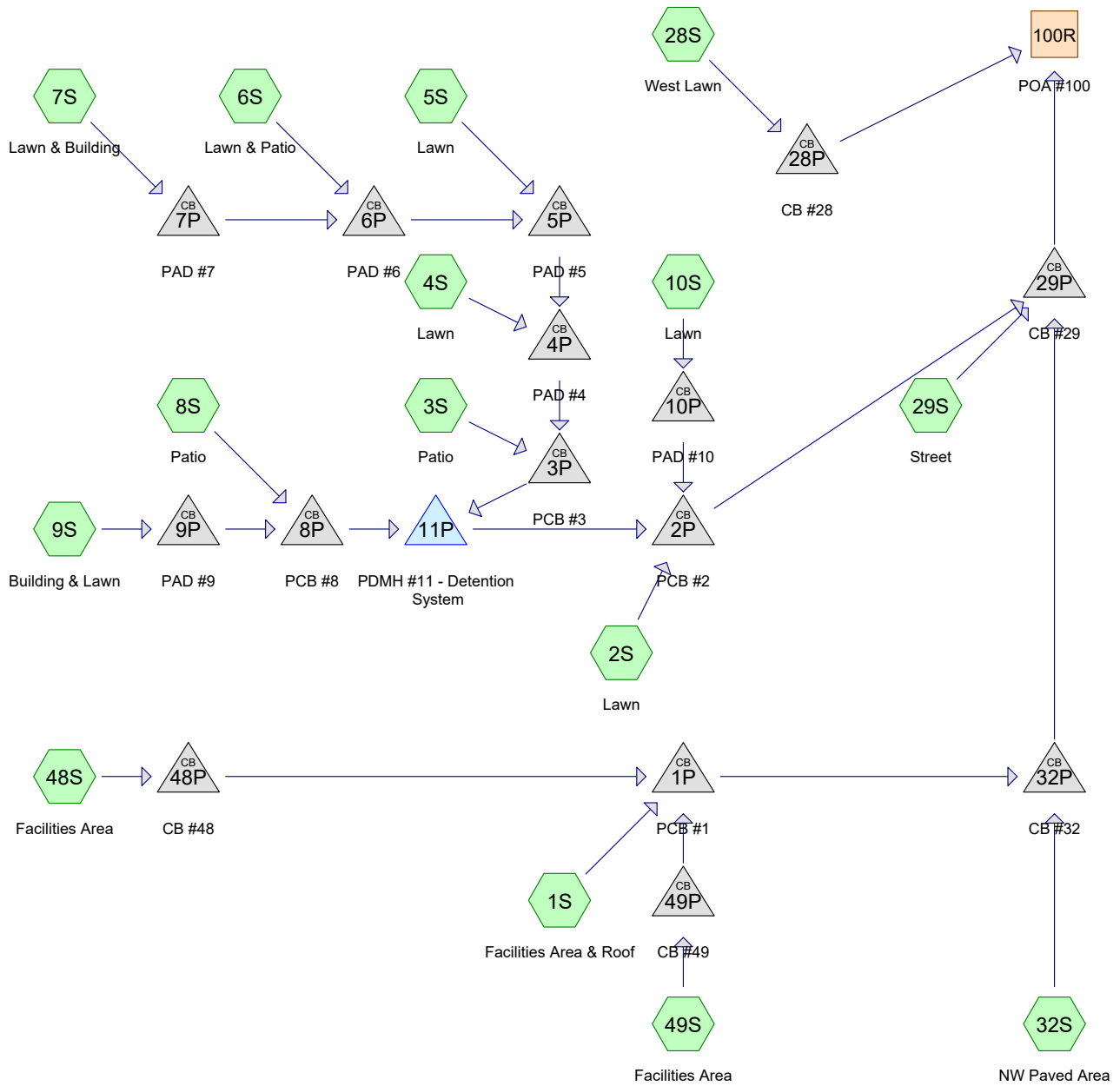
Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Facilities Area & Roof	Runoff Area=1,851 sf 100.00% Impervious Runoff Depth>6.90" Tc=6.0 min CN=98 Runoff=0.30 cfs 0.024 af
Subcatchment 2S: Lawn	Runoff Area=601 sf 31.95% Impervious Runoff Depth>5.04" Tc=6.0 min CN=82 Runoff=0.08 cfs 0.006 af
Subcatchment 3S: Patio	Runoff Area=1,813 sf 72.15% Impervious Runoff Depth>6.07" Tc=6.0 min CN=91 Runoff=0.28 cfs 0.021 af
Subcatchment 4S: Lawn	Runoff Area=249 sf 40.16% Impervious Runoff Depth>5.27" Tc=6.0 min CN=84 Runoff=0.03 cfs 0.003 af
Subcatchment 5S: Lawn	Runoff Area=423 sf 9.69% Impervious Runoff Depth>4.38" Tc=0.0 min CN=76 Runoff=0.06 cfs 0.004 af
Subcatchment 6S: Lawn & Patio	Runoff Area=990 sf 54.95% Impervious Runoff Depth>5.61" Tc=6.0 min CN=87 Runoff=0.14 cfs 0.011 af
Subcatchment 7S: Lawn & Building	Runoff Area=2,310 sf 62.12% Impervious Runoff Depth>5.84" Tc=6.0 min CN=89 Runoff=0.34 cfs 0.026 af
Subcatchment 8S: Patio	Runoff Area=1,575 sf 76.95% Impervious Runoff Depth>6.19" Tc=6.0 min CN=92 Runoff=0.24 cfs 0.019 af
Subcatchment 9S: Building & Lawn	Runoff Area=2,123 sf 89.92% Impervious Runoff Depth>6.66" Tc=6.0 min CN=96 Runoff=0.34 cfs 0.027 af
Subcatchment 10S: Lawn	Runoff Area=555 sf 29.91% Impervious Runoff Depth>4.93" Tc=6.0 min CN=81 Runoff=0.07 cfs 0.005 af
Subcatchment 28S: West Lawn	Runoff Area=5,706 sf 24.04% Impervious Runoff Depth>4.82" Tc=6.0 min CN=80 Runoff=0.73 cfs 0.053 af
Subcatchment 29S: Street	Runoff Area=2,264 sf 91.21% Impervious Runoff Depth>6.66" Tc=6.0 min CN=96 Runoff=0.36 cfs 0.029 af
Subcatchment 32S: NW Paved Area	Runoff Area=1,437 sf 100.00% Impervious Runoff Depth>6.90" Tc=6.0 min CN=98 Runoff=0.23 cfs 0.019 af
Subcatchment 48S: Facilities Area	Runoff Area=1,471 sf 100.00% Impervious Runoff Depth>6.90" Tc=6.0 min CN=98 Runoff=0.24 cfs 0.019 af
Subcatchment 49S: Facilities Area	Runoff Area=1,004 sf 100.00% Impervious Runoff Depth>6.90" Tc=6.0 min CN=98 Runoff=0.16 cfs 0.013 af
Reach 100R: POA #100	Inflow=3.25 cfs 0.274 af Outflow=3.25 cfs 0.274 af

Pond 1P: PCB #1	Peak Elev=92.09'	Inflow=0.70 cfs	0.057 af
12.0" Round Culvert n=0.012 L=56.0' S=0.0045 '/	Outflow=0.70 cfs	0.057 af	
Pond 2P: PCB #2	Peak Elev=91.72'	Inflow=1.31 cfs	0.116 af
12.0" Round Culvert n=0.012 L=36.0' S=0.0042 '/	Outflow=1.31 cfs	0.116 af	
Pond 3P: PCB #3	Peak Elev=94.86'	Inflow=0.83 cfs	0.064 af
15.0" Round Culvert n=0.012 L=5.0' S=0.0000 '/	Outflow=0.83 cfs	0.064 af	
Pond 4P: PAD #4	Peak Elev=94.96'	Inflow=0.56 cfs	0.042 af
8.0" Round Culvert n=0.012 L=19.0' S=0.0047 '/	Outflow=0.56 cfs	0.042 af	
Pond 5P: PAD #5	Peak Elev=95.04'	Inflow=0.52 cfs	0.040 af
8.0" Round Culvert n=0.012 L=11.0' S=0.0055 '/	Outflow=0.52 cfs	0.040 af	
Pond 6P: PAD #6	Peak Elev=95.11'	Inflow=0.49 cfs	0.036 af
8.0" Round Culvert n=0.012 L=31.0' S=0.0048 '/	Outflow=0.49 cfs	0.036 af	
Pond 7P: PAD #7	Peak Elev=95.19'	Inflow=0.34 cfs	0.026 af
8.0" Round Culvert n=0.012 L=31.0' S=0.0048 '/	Outflow=0.34 cfs	0.026 af	
Pond 8P: PCB #8	Peak Elev=94.85'	Inflow=0.58 cfs	0.046 af
15.0" Round Culvert n=0.012 L=3.0' S=0.0000 '/	Outflow=0.58 cfs	0.046 af	
Pond 9P: PAD #9	Peak Elev=94.89'	Inflow=0.34 cfs	0.027 af
8.0" Round Culvert n=0.012 L=21.0' S=0.0100 '/	Outflow=0.34 cfs	0.027 af	
Pond 10P: PAD #10	Peak Elev=91.77'	Inflow=0.07 cfs	0.005 af
8.0" Round Culvert n=0.012 L=18.0' S=0.0100 '/	Outflow=0.07 cfs	0.005 af	
Pond 11P: PDMH #11 - Detention System	Peak Elev=94.84'	Storage=258 cf	Inflow=1.41 cfs
Discarded=0.00 cfs	0.003 af	Primary=1.18 cfs	0.105 af
		Outflow=1.18 cfs	0.109 af
Pond 28P: CB #28	Peak Elev=92.39'	Inflow=0.73 cfs	0.053 af
12.0" Round Culvert n=0.012 L=60.0' S=0.0183 '/	Outflow=0.73 cfs	0.053 af	
Pond 29P: CB #29	Peak Elev=91.41'	Inflow=2.53 cfs	0.221 af
18.0" Round Culvert n=0.012 L=41.0' S=0.0049 '/	Outflow=2.53 cfs	0.221 af	
Pond 32P: CB #32	Peak Elev=91.78'	Inflow=0.93 cfs	0.076 af
15.0" Round Culvert n=0.012 L=85.0' S=0.0053 '/	Outflow=0.93 cfs	0.076 af	
Pond 48P: CB #48	Peak Elev=94.19'	Inflow=0.24 cfs	0.019 af
8.0" Round Culvert n=0.012 L=64.0' S=0.0423 '/	Outflow=0.24 cfs	0.019 af	
Pond 49P: CB #49	Peak Elev=92.15'	Inflow=0.16 cfs	0.013 af
12.0" Round Culvert n=0.012 L=40.0' S=0.0225 '/	Outflow=0.16 cfs	0.013 af	

Total Runoff Area = 0.560 ac Runoff Volume = 0.278 af Average Runoff Depth = 5.96"
33.91% Pervious = 0.190 ac 66.09% Impervious = 0.370 ac

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Routing Diagram for 5056-POST-rev040120
 Prepared by Altus Engineering, Inc., Printed 4/3/2020
 HydroCAD® 10.00-25 s/n 01222 © 2019 HydroCAD Software Solutions LLC

Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Facilities Area & Roof	Runoff Area=1,851 sf 100.00% Impervious Runoff Depth>8.33" Tc=6.0 min CN=98 Runoff=0.36 cfs 0.030 af
Subcatchment 2S: Lawn	Runoff Area=601 sf 31.95% Impervious Runoff Depth>6.41" Tc=6.0 min CN=82 Runoff=0.10 cfs 0.007 af
Subcatchment 3S: Patio	Runoff Area=1,813 sf 72.15% Impervious Runoff Depth>7.49" Tc=6.0 min CN=91 Runoff=0.34 cfs 0.026 af
Subcatchment 4S: Lawn	Runoff Area=249 sf 40.16% Impervious Runoff Depth>6.65" Tc=6.0 min CN=84 Runoff=0.04 cfs 0.003 af
Subcatchment 5S: Lawn	Runoff Area=423 sf 9.69% Impervious Runoff Depth>5.69" Tc=0.0 min CN=76 Runoff=0.08 cfs 0.005 af
Subcatchment 6S: Lawn & Patio	Runoff Area=990 sf 54.95% Impervious Runoff Depth>7.01" Tc=6.0 min CN=87 Runoff=0.18 cfs 0.013 af
Subcatchment 7S: Lawn & Building	Runoff Area=2,310 sf 62.12% Impervious Runoff Depth>7.25" Tc=6.0 min CN=89 Runoff=0.42 cfs 0.032 af
Subcatchment 8S: Patio	Runoff Area=1,575 sf 76.95% Impervious Runoff Depth>7.61" Tc=6.0 min CN=92 Runoff=0.30 cfs 0.023 af
Subcatchment 9S: Building & Lawn	Runoff Area=2,123 sf 89.92% Impervious Runoff Depth>8.09" Tc=6.0 min CN=96 Runoff=0.41 cfs 0.033 af
Subcatchment 10S: Lawn	Runoff Area=555 sf 29.91% Impervious Runoff Depth>6.29" Tc=6.0 min CN=81 Runoff=0.09 cfs 0.007 af
Subcatchment 28S: West Lawn	Runoff Area=5,706 sf 24.04% Impervious Runoff Depth>6.16" Tc=6.0 min CN=80 Runoff=0.93 cfs 0.067 af
Subcatchment 29S: Street	Runoff Area=2,264 sf 91.21% Impervious Runoff Depth>8.09" Tc=6.0 min CN=96 Runoff=0.44 cfs 0.035 af
Subcatchment 32S: NW Paved Area	Runoff Area=1,437 sf 100.00% Impervious Runoff Depth>8.33" Tc=6.0 min CN=98 Runoff=0.28 cfs 0.023 af
Subcatchment 48S: Facilities Area	Runoff Area=1,471 sf 100.00% Impervious Runoff Depth>8.33" Tc=6.0 min CN=98 Runoff=0.28 cfs 0.023 af
Subcatchment 49S: Facilities Area	Runoff Area=1,004 sf 100.00% Impervious Runoff Depth>8.33" Tc=6.0 min CN=98 Runoff=0.19 cfs 0.016 af
Reach 100R: POA #100	Inflow=4.32 cfs 0.339 af Outflow=4.32 cfs 0.339 af

Pond 1P: PCB #1	Peak Elev=92.16'	Inflow=0.84 cfs	0.069 af
12.0" Round Culvert n=0.012 L=56.0' S=0.0045 '/	Outflow=0.84 cfs	0.069 af	
Pond 2P: PCB #2	Peak Elev=91.98'	Inflow=1.89 cfs	0.145 af
12.0" Round Culvert n=0.012 L=36.0' S=0.0042 '/	Outflow=1.89 cfs	0.145 af	
Pond 3P: PCB #3	Peak Elev=95.25'	Inflow=1.02 cfs	0.079 af
15.0" Round Culvert n=0.012 L=5.0' S=0.0000 '/	Outflow=1.02 cfs	0.079 af	
Pond 4P: PAD #4	Peak Elev=95.48'	Inflow=0.68 cfs	0.053 af
8.0" Round Culvert n=0.012 L=19.0' S=0.0047 '/	Outflow=0.68 cfs	0.053 af	
Pond 5P: PAD #5	Peak Elev=95.67'	Inflow=0.64 cfs	0.050 af
8.0" Round Culvert n=0.012 L=11.0' S=0.0055 '/	Outflow=0.64 cfs	0.050 af	
Pond 6P: PAD #6	Peak Elev=95.82'	Inflow=0.60 cfs	0.045 af
8.0" Round Culvert n=0.012 L=31.0' S=0.0048 '/	Outflow=0.60 cfs	0.045 af	
Pond 7P: PAD #7	Peak Elev=95.88'	Inflow=0.42 cfs	0.032 af
8.0" Round Culvert n=0.012 L=31.0' S=0.0048 '/	Outflow=0.42 cfs	0.032 af	
Pond 8P: PCB #8	Peak Elev=95.23'	Inflow=0.70 cfs	0.056 af
15.0" Round Culvert n=0.012 L=3.0' S=0.0000 '/	Outflow=0.70 cfs	0.056 af	
Pond 9P: PAD #9	Peak Elev=95.31'	Inflow=0.41 cfs	0.033 af
8.0" Round Culvert n=0.012 L=21.0' S=0.0100 '/	Outflow=0.41 cfs	0.033 af	
Pond 10P: PAD #10	Peak Elev=91.99'	Inflow=0.09 cfs	0.007 af
8.0" Round Culvert n=0.012 L=18.0' S=0.0100 '/	Outflow=0.09 cfs	0.007 af	
Pond 11P: PDMH #11 - Detention System	Peak Elev=95.21'	Storage=295 cf	Inflow=1.73 cfs 0.135 af
Discarded=0.00 cfs 0.004 af	Primary=1.70 cfs 0.131 af	Outflow=1.70 cfs 0.134 af	
Pond 28P: CB #28	Peak Elev=92.47'	Inflow=0.93 cfs	0.067 af
12.0" Round Culvert n=0.012 L=60.0' S=0.0183 '/	Outflow=0.93 cfs	0.067 af	
Pond 29P: CB #29	Peak Elev=91.58'	Inflow=3.40 cfs	0.272 af
18.0" Round Culvert n=0.012 L=41.0' S=0.0049 '/	Outflow=3.40 cfs	0.272 af	
Pond 32P: CB #32	Peak Elev=91.89'	Inflow=1.11 cfs	0.092 af
15.0" Round Culvert n=0.012 L=85.0' S=0.0053 '/	Outflow=1.11 cfs	0.092 af	
Pond 48P: CB #48	Peak Elev=94.22'	Inflow=0.28 cfs	0.023 af
8.0" Round Culvert n=0.012 L=64.0' S=0.0423 '/	Outflow=0.28 cfs	0.023 af	
Pond 49P: CB #49	Peak Elev=92.21'	Inflow=0.19 cfs	0.016 af
12.0" Round Culvert n=0.012 L=40.0' S=0.0225 '/	Outflow=0.19 cfs	0.016 af	

Total Runoff Area = 0.560 ac Runoff Volume = 0.343 af Average Runoff Depth = 7.36"
33.91% Pervious = 0.190 ac 66.09% Impervious = 0.370 ac

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Section 5

Groundwater Recharge Calculations

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Groundwater Recharge Volume (GRV) Calculation

	ac	Area of HSG A soil that was replaced by impervious cover	0.40"
	ac	Area of HSG B soil that was replaced by impervious cover	0.25"
0.05	ac	Area of HSG C soil that was replaced by impervious cover	0.10"
	ac	Area of HSG D soil or impervious cover that was replaced by impervious cover	0.0"
0.10 inches		Rd = weighted groundwater recharge depth	
0.0054 ac-in		GRV = AI * Rd	
20 cf		GRV conversion (ac-in x 43,560 sf/ac x 1ft/12")	

Provide calculations below showing that the project meets the groundwater recharge requirements (Env-Wq 1507.04):

Proposed SMG has 47 cf of storage below the invert of the lowest outlet.

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Section 6

Stormwater Operations & Maintenance

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CATCH BASINS

Function – Catch basins collect stormwater, primarily from paved surfaces and roofs. Stormwater from paved areas often contains sediment and contaminants. Catch basin sumps serve to trap sediment, trace metals, nutrients and debris. Hooded catch basins trap hydrocarbons and floating debris.

Maintenance

- Remove leaves and debris from structure grates on an as-needed basis.
- Sumps shall be inspected on an annual basis and cleaned with a vacuum truck when sediment is more than half the depth of the sump. Catch basin debris shall be disposed of at a solid waste disposal facility.

STORMWATER MANAGEMENT GALLERY

Function – Stormwater Management Galleries (SMG) are subsurface stormwater storage chambers surrounded by open graded stone. SMGs provide several important stormwater functions including pre-treatment in “isolation rows” and detention of stormwater to attenuate peak rates of runoff.

Maintenance:

- Inspect Isolation Row for built-up sediment and debris annually. Sediment and debris accumulation in excess of 3” shall be removed.
- Sediment removal shall be done with a JetVac and vacuum truck. JetVac shall have a fixed floor rear-facing cleaning nozzle with a spread of 45 inches or more. JetVac nozzle shall be propelled down the full length of the isolation row and retrieved towards the vacuum. The process shall be repeated until the backflush water is clean.

LANDSCAPED AREAS - FERTILIZER MANAGEMENT

Function – Fertilizer management involves controlling the rate, timing and method of fertilizer application so that the nutrients are taken up by the plants thereby reducing the chance of polluting the surface and ground waters. Fertilizer management can be effective in reducing the amounts of phosphorus and nitrogen in runoff from landscaped areas, particularly lawns.

Maintenance

- Have the soil tested by your landscaper or local Soil Conservation Service for nutrient requirements and follow the recommendations.
- Do not apply fertilizer to frozen ground.
- Clean up any fertilizer spills.
- Do not allow fertilizer to be broadcast into water bodies.
- When fertilizing a lawn, water thoroughly, but do not create a situation where water runs off the surface of the lawn.

LANDSCAPED AREAS - LITTER CONTROL

Function – Landscaped areas tend to filter debris and contaminants that may block drainage systems and pollute the surface and ground waters.

Maintenance

- Litter Control and lawn maintenance involves removing litter such as trash, leaves, lawn clippings, pet wastes, oil and chemicals from streets, parking lots, and lawns before materials are transported into surface waters.
- Litter control shall be implemented as part of the grounds maintenance program.

GENERAL CLEAN UP

Upon completion of the project, the contractor shall remove all temporary stormwater structures (i.e., temporary stone check dams, silt fence, temporary diversion swales, catch basin inlet basket, etc.). Any sediment deposits remaining in place after the silt fence or filter barrier is no longer required shall be dressed to conform to the existing grade, prepared, and seeded. Remove any sediment in catch basins and clean drain pipes that may have accumulated during construction.

Once in operation, all paved areas of the site should be swept at least once annually, preferably at the end of winter prior to significant spring rains.

APPENDIX

- A. Stormwater System Operations and Maintenance Report
- B. Site Plan

STORM WATER SYSTEM OPERATION AND MAINTENANCE REPORT

General Information	
Project Name	"The Ridge" Administration Wing
Owner	RiverWoods at Exeter
Inspector's Name(s)	
Inspector's Contact Information	
Date of Inspection	Start Time: End Time:
Type of Inspection: <input type="checkbox"/> Annual Report <input type="checkbox"/> Post-storm event <input type="checkbox"/> Due to a discharge of significant amounts of sediment	
Notes:	

General Site Questions and Discharges of Significant Amounts of Sediment		
Subject	Status	Notes
<i>A discharge of significant amounts of sediment may be indicated by (but is not limited to) observations of the following. Note whether any are observed during this inspection:</i>		
<i>Notes/ Action taken:</i>		
1	Do the current site conditions reflect the attached site plan?	<input type="checkbox"/> Yes <input type="checkbox"/> No
2	Is the site permanently stabilized, temporary erosion and sediment controls are removed, and stormwater discharges from construction activity are eliminated?	<input type="checkbox"/> Yes <input type="checkbox"/> No
3	Is there evidence of the discharge of significant amounts of sediment to surface waters, or conveyance systems leading to surface waters?	<input type="checkbox"/> Yes <input type="checkbox"/> No

Permit Coverage and Plans				
#	BMP/Facility	Inspected	Corrective Action Needed and Notes	Date Corrected
	Catch Basins	<input type="checkbox"/> Yes <input type="checkbox"/> No		
	Stormwater Management Gallery	<input type="checkbox"/> Yes <input type="checkbox"/> No		
	Landscape Areas	<input type="checkbox"/> Yes <input type="checkbox"/> No		
		<input type="checkbox"/> Yes <input type="checkbox"/> No		
		<input type="checkbox"/> Yes <input type="checkbox"/> No		
		<input type="checkbox"/> Yes <input type="checkbox"/> No		

*** Owner shall submit annual inspection reports to the Town of Exeter Building Inspector by September 1.**

Section 7

Plans

Pre-Development Drainage Area Plan

Post-Development Drainage Area Plan

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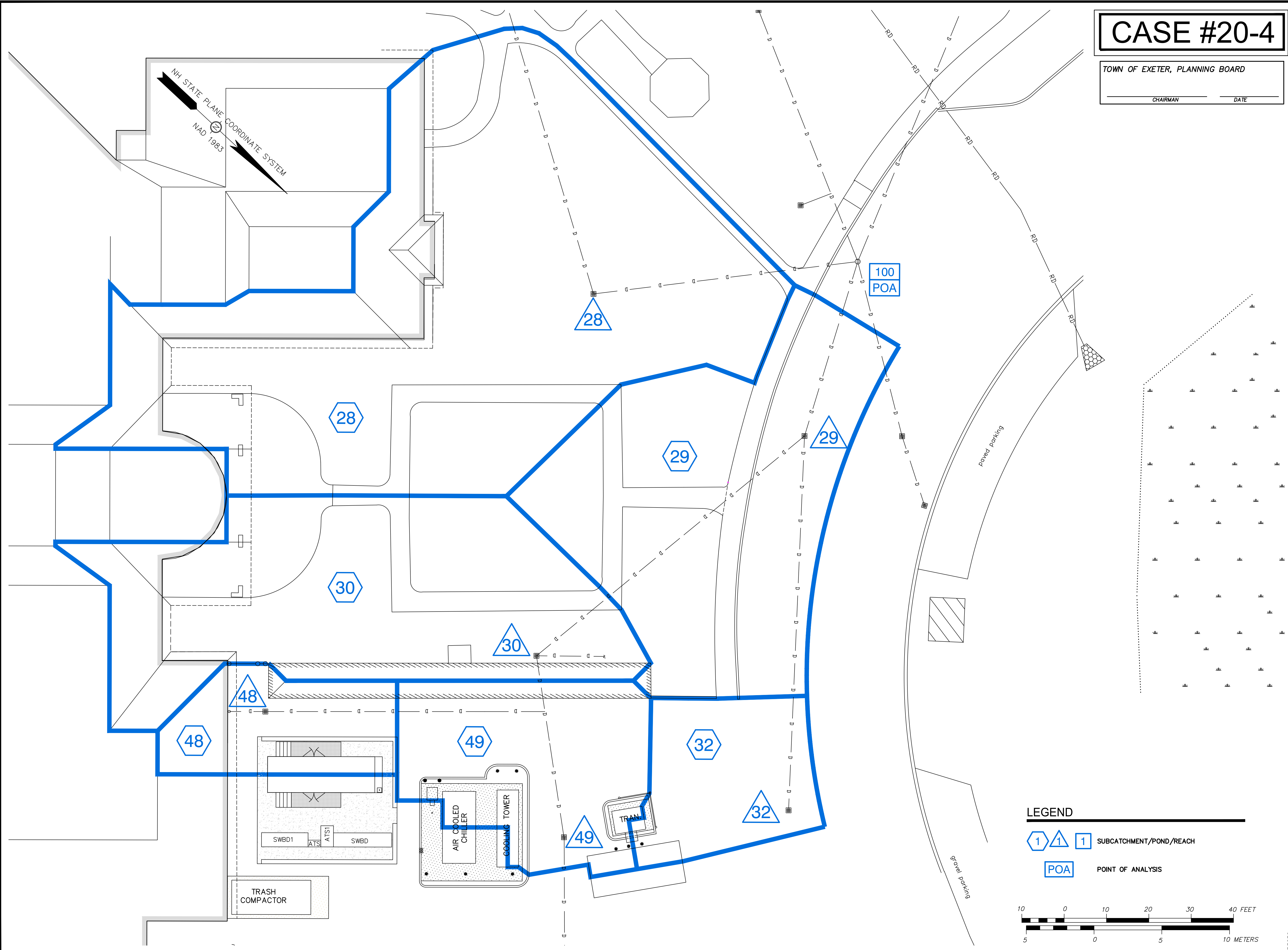
CASE #20-4

TOWN OF EXETER, PLANNING BOARD

CHAIRMAN _____ DATE _____

ALTUS
ENGINEERING, INC.

133 COURT STREET PORTSMOUTH, NH 03801
VOICE: (603) 433-2335
FAX: (603) 433-4194



ISSUED FOR: PB APPROVAL

ISSUE DATE: APRIL 3, 2020

REVISIONS

NO.	DESCRIPTION	BY	DATE
0	INITIAL SUBMISSION	EBS	3/03/20
0	REVISED PER COMMENTS	EBS	04/03/20

DRAWN BY: EBS

APPROVED BY: JKC/EBS

DRAWING FILE: 5056SITE.DWG

SCALE: 1" = 10' (24"x36")

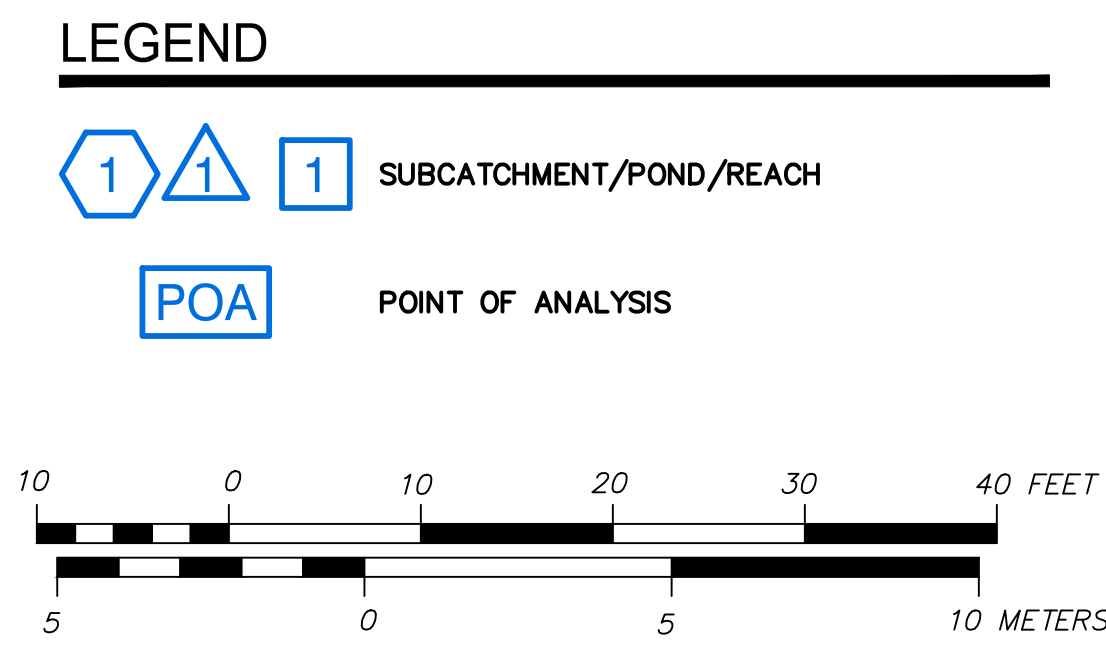
OWNER/APPLICANT: RIVERWOODS AT EXETER
5 WHITE OAK DRIVE
EXETER, NH 03833

PROJECT: "THE RIDGE"
ADMINISTRATION WING

TAX MAP 80 LOT 18
6 WHITE OAK DRIVE
EXETER, NH 03833

TITLE: PRE-DEVELOPMENT WATERSHED PLAN

SHEET NUMBER: WS-1



P5056

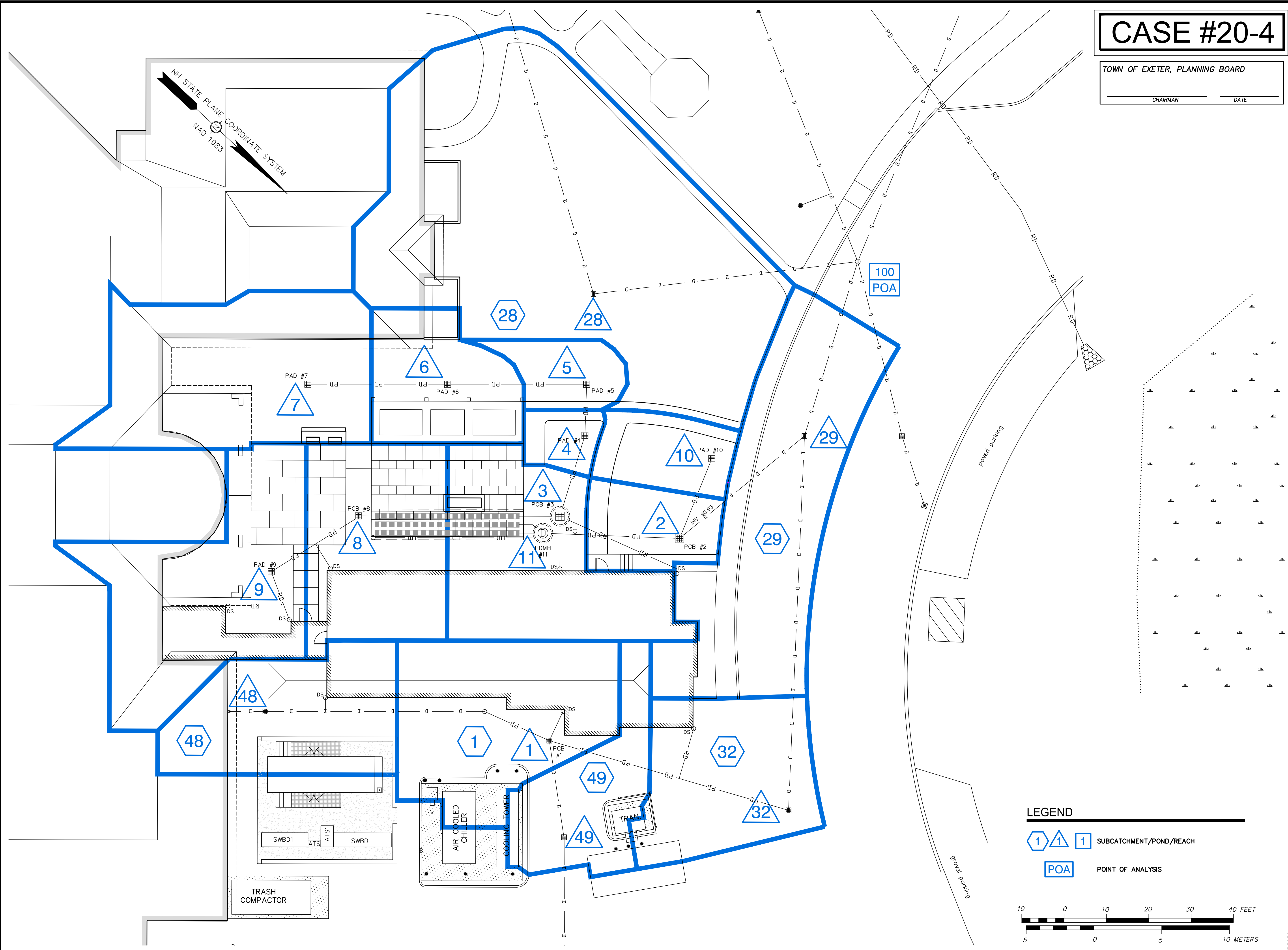
CASE #20-4

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EXETER, NH 03833

PROJECT:
"THE RIDGE"
ADMINISTRATION WING

TAX MAP 80 LOT 18
6 WHITE OAK DRIVE
EXETER, NH 03833

TITLE:
POST-DEVELOPMENT WATERSHED PLAN

SHEET NUMBER:
WS-2

