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Job Number: 2021-1301

DUBLIN SCIOTO HITTING FACILITY

Stormwater Management Plan (SWMP)

Prepared For: Dublin Schools

October 19, 2022

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PROJECT SUMMARY

Project: Dublin Scioto Hitting Facility
Location: City of Dublin, Franklin County, Ohio
Type: Stormwater Management Plan
Reviewing Agency: City of Dublin, Ohio EPA

HYDROLOGIC SUMMARY

Rainfall Data: NOAA Atlas 14, Volume 2, Version 3, 2004

1-yr	2.20"
2-yr	2.63"
5-yr	3.24"
10-yr	3.74"
25-yr	4.44"
50-yr	5.02"
100-yr	5.63"

Rainfall Distribution: NRCS Type II 24 hour
Detention Policy: City of Dublin
Water Quality: City of Dublin, Ohio EPA
Hydrology Modeling Program: HydroCAD 10.20

DESIGN SUMMARY

Detention: Pipe Storage
Water Quality: N/A – Disturbing less than one acre
Receiving Water Body: City of Dublin MS4 which discharges to the Scioto River

REVISIONS



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1.0 INTRODUCTION

The following report provides a detailed analysis and design of the Stormwater Management Plan for Dublin Scioto Hitting Facility. The proposed site is located north of Hard Road just northeast of the existing school building. The proposed project area involves the development of an open space area into a hitting facility. The Stormwater Management Plan was prepared in accordance with the requirements of both the City of Dublin and the Ohio EPA. Post construction water quality is not required for this project due to the project disturbing less than one acre. The runoff from this site will be routed through pipe storage for water quantity control before discharging to the Scioto River to the southwest.

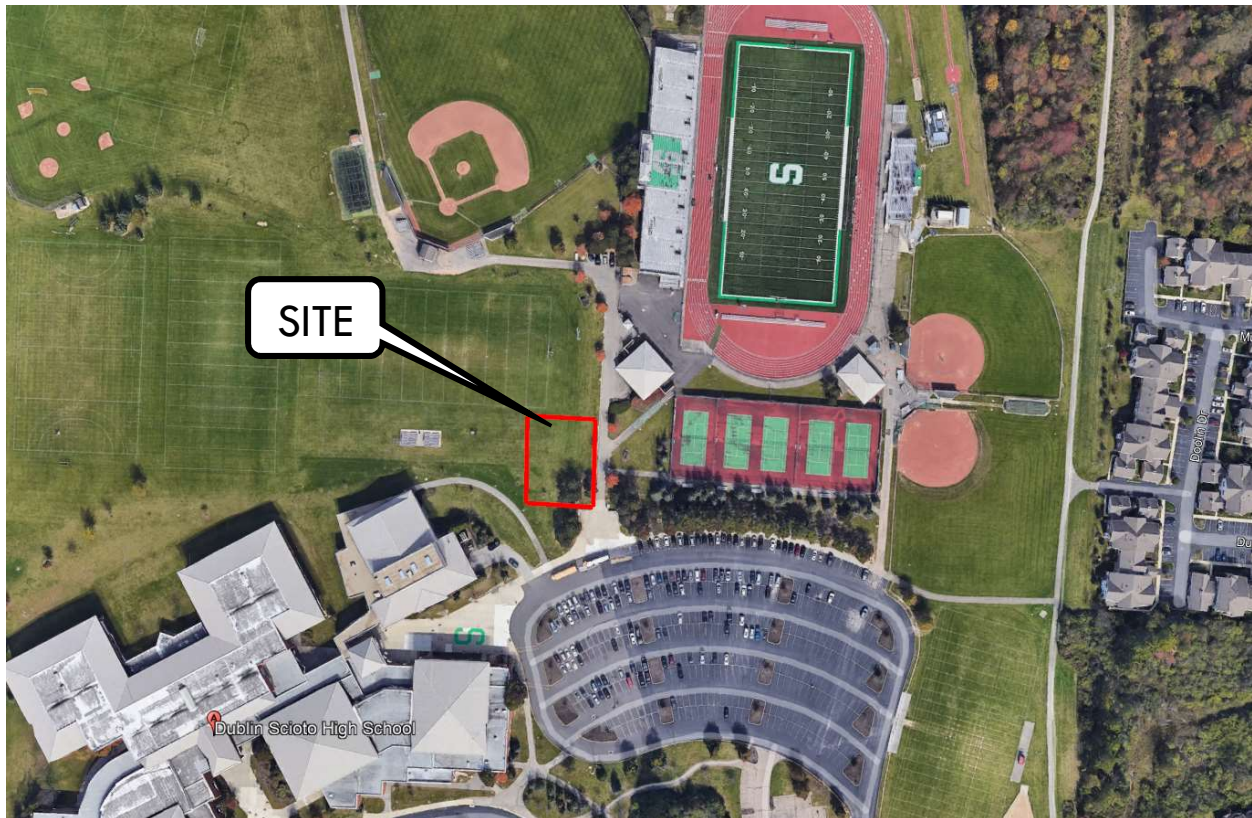


Figure 1 – Site Location Map

2.0 HYDROLOGIC ANALYSIS

Hydrologic parameters such as Runoff Curve Number (RCN) and Time of Concentration were determined using standard Natural Resources Conservation Service (NRCS) methodology. The 1-, 2-, 5-, 10-, 25-, 50-, and 100-year storm event discharge amounts were calculated using the NRCS TR-55 method. This analysis reflects the NRCS Type II distribution, 24-hr storm duration. Rainfall depths were obtained from NOAA Atlas 14, Volume 2, Version 3, 2004. The peak flow rates were computed using the HydroCAD 10.20 computer program.



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3.0 PRE-DEVELOPED ANALYSIS

The pre-developed condition, as seen on Exhibit 1 in Appendix D, consists of open space located in Dublin Master Planned Sub-Basins. Pre-developed 01 naturally drains to the southwest to the Scioto River. The project area is located within hydrologic soil group D (Blount silt loam).

Pre-developed subarea characteristics are summarized in Table 1. The City of Dublin Master Planned Allowable Release Rates are provided in Table 2. Time of concentration calculations can be found in the HydroCAD 10.20 output in Appendix C.

Table 1 -Pre-developed Subarea Characteristics

Subarea Identifier	Tributary Area (acres)	Land Usage	Runoff Curve Number	% Impervious (%)	Time of Concentration (min)	1-year Runoff Volume (ac-ft)
Pre-developed 01	0.28	Open Space	80	0%	5.0	0.016
Total	0.28	-	80	0%	-	0.016

Table 2 -City of Dublin Master Planned Allowable Release Rates

Allowable Release Rates per Acre								Northeast Area
Sub-Basin	1-year	2-year	5-year	10-year	25-year	50-year	100-year	
100	0.1	0.2	0.2	0.8	1.9	3.3	4.7	
Post-Developed Area per Sub-Basin								
Sub-Basin	Area (Acres)							
100	0.28							
Total	0.28							
Allowable Release Rates per Acre								Cramer Creek
Sub-Basin	1-year	2-year	5-year	10-year	25-year	50-year	100-year	
100	0.03	0.06	0.06	0.22	0.52	0.91	1.29	
Total	0.03	0.06	0.06	0.22	0.52	0.91	1.29	

Note: Allowable Release Rates per Acre were taken from the City of Dublin Master Plan. These values were then multiplied by the total acreage in that Sub-Basin to generate the Allowable Release Rates.

4.0 POST-DEVELOPED ANALYSIS

Exhibit 2, provided within Appendix D, shows the post-developed Phase 1 condition. The Dublin Scioto Hitting Facility project will utilize pipe storage to provide water quantity control for the proposed development. Subarea 01 will drain to the south to Pipe Storage 01, which will discharge



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to the storm sewer along John Shields Parkway. The post-developed subarea characteristics are summarized in Table 3. The post-developed allowable release rates and proposed release rates can be found in Table 4.

Table 3 -Post-developed Subarea Characteristics

Subarea Identifier	Tributary Area (acres)	Land Usage	Runoff Curve Number	% Impervious (%)	Time of Concentration (min)	1-year Runoff Volume (ac-ft)
Subarea 01	0.28	Open Space, Impervious cover	94	83%	5.0	0.039
Total	0.28	-	94	83%	-	0.039

The 1-year runoff volume for the post-developed site increases to 0.039 ac-ft, an increase of 143.75% from the existing condition, which results in 25-year critical storm event.

$$\% \text{ Increase} = [(0.039 - 0.016)/0.016] \times 100 = 143.75\%$$

25-Yr Critical Storm

Table 4 -Allowable vs. Proposed Release Rates

Storm Event (yr.)	Pre-developed 01 Peak Flow Rates (cfs)	Allowable Release Rates (cfs)	Proposed Release Rates (cfs)	Maximum W.S.E., Lowest Top of Pipe = 903.50 (feet)	Storage Volume Utilized (cu-ft)
1	0.03	0.03	0.02	901.53	1,036
2	0.06	0.03	0.02	901.71	1,348
5	0.06	0.03	0.02	901.94	1,811
10	0.22	0.03	0.02	902.12	2,206
25	0.52	0.03	0.02	902.36	2,779
50	0.91	0.91	0.08	902.42	2,916
100	1.29	1.29	0.20	902.45	2,997

Storage Utilized (100-yr event): 2,997 cu-ft
 Storage Provided (Top of System = 903.50 ft.): 6,959 cu-ft



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5.0 OUTLET DESIGN

The outlet structure for the pipe storage described below. The location of this structure can be seen on Exhibit 2 in Appendix D.

Pipe Storage 01 - Outlet Control Structure

- 723.3-feet of 42-inch pipe, invert 900.00 ft.
- 1st stage outlet – 0.75-inch orifice, cut into weir wall, invert at 900.00 ft.
- 2nd stage outlet – 4-foot long weir wall, crest of weir at 902.40 ft.
- Tailwater Control – 12-inch outlet pipe with 0.50% slope, invert at 900.00 ft. (controls 1st through 2nd stage outlets)

6.0 WATER QUALITY

Post-construction water quality is not required for this project to the project proposing to disturb less than one acre.

7.0 CONCLUSION

The proposed stormwater management plan for Dublin Scioto Hitting Facility meets all requirements for detention and water quality as set forth by the City of Dublin and the Ohio EPA.

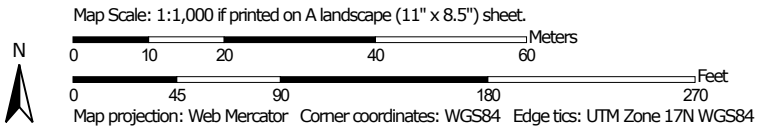


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APPENDIX A:

USDA Soils Report

Hydrologic Soil Group—Franklin County, Ohio



MAP LEGEND

Area of Interest (AOI)









 Area of Interest (AOI)

Soils

Soil Rating Polygons





 A
 A/D
 B
 B/D
 C
 C/D
 D
 Not rated or not available

Soil Rating Lines

 A
 A/D
 B
 B/D
 C
 C/D
 D
 Not rated or not available

Soil Rating Points





 A
 A/D
 B
 B/D

 C
 C/D
 D
 Not rated or not available

Water Features

 Streams and Canals

Transportation

 Rails
 Interstate Highways
 US Routes
 Major Roads
 Local Roads

Background

 Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
 Web Soil Survey URL:
 Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Franklin County, Ohio
 Survey Area Data: Version 21, Sep 8, 2022

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Aug 4, 2014—Aug 27, 2014

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
Ble1B1	Blount silt loam, end moraine, 2 to 4 percent slopes	D	3.9	100.0%
Totals for Area of Interest			3.9	100.0%

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher



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APPENDIX B:

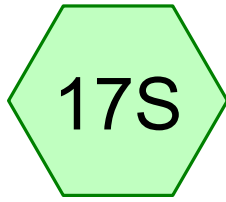
Storm Sewer Calculations



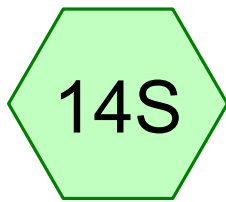
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APPENDIX C:

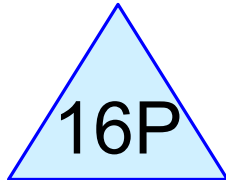
HydroCAD Output



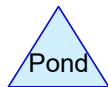
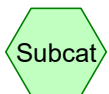
Pre-developed 01



Subarea 01



Pipe Storage 01



Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	1 year	Type II 24-hr		Default	24.00	1	2.20	2
2	2 year	Type II 24-hr		Default	24.00	1	2.63	2
3	5 year	Type II 24-hr		Default	24.00	1	3.24	2
4	10 year	Type II 24-hr		Default	24.00	1	3.74	2
5	25 year	Type II 24-hr		Default	24.00	1	4.44	2
6	50 year	Type II 24-hr		Default	24.00	1	5.02	2
7	100 year	Type II 24-hr		Default	24.00	1	5.63	2

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.330	80	>75% Grass cover, Good, HSG D (14S, 17S)
0.230	98	Paved parking, HSG D (14S)
0.560	87	TOTAL AREA

Soil Listing (selected nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
0.560	HSG D	14S, 17S
0.000	Other	
0.560		TOTAL AREA

Ground Covers (selected nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	0.330	0.000	0.330	>75% Grass cover, Good	14S, 17S
0.000	0.000	0.000	0.230	0.000	0.230	Paved parking	14S
0.000	0.000	0.000	0.560	0.000	0.560	TOTAL AREA	

Pipe Listing (selected nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Width (inches)	Diam/Height (inches)	Inside-Fill (inches)
1	16P	900.00	899.75	50.0	0.0050	0.013	0.00	12.00	0.00

Summary for Subcatchment 14S: Subarea 01

Runoff = 0.81 cfs @ 11.96 hrs, Volume= 0.039 af, Depth= 1.67"
 Routed to Pond 16P : Pipe Storage 01

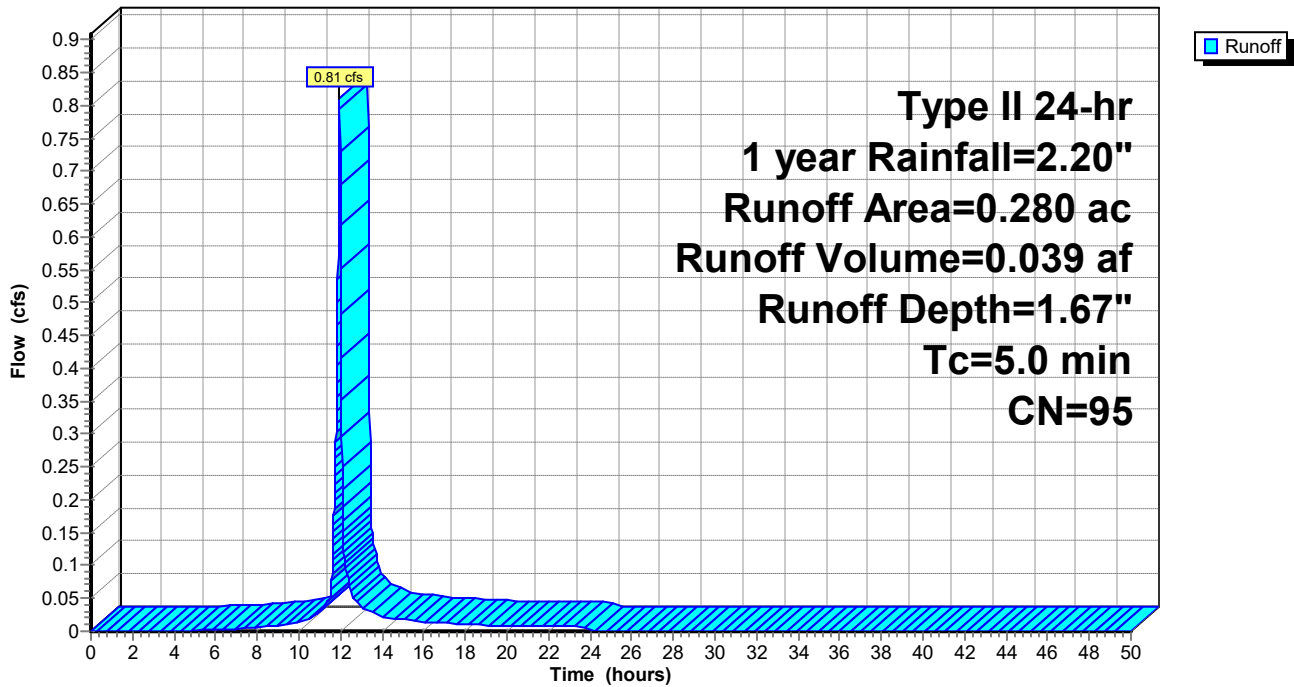
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
 Type II 24-hr 1 year Rainfall=2.20"

Area (ac)	CN	Description
0.230	98	Paved parking, HSG D
0.050	80	>75% Grass cover, Good, HSG D
0.280	95	Weighted Average
0.050		17.86% Pervious Area
0.230		82.14% Impervious Area

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

Subcatchment 14S: Subarea 01

Hydrograph



Summary for Subcatchment 17S: Pre-developed 01

Runoff = 0.35 cfs @ 11.97 hrs, Volume= 0.016 af, Depth= 0.69"

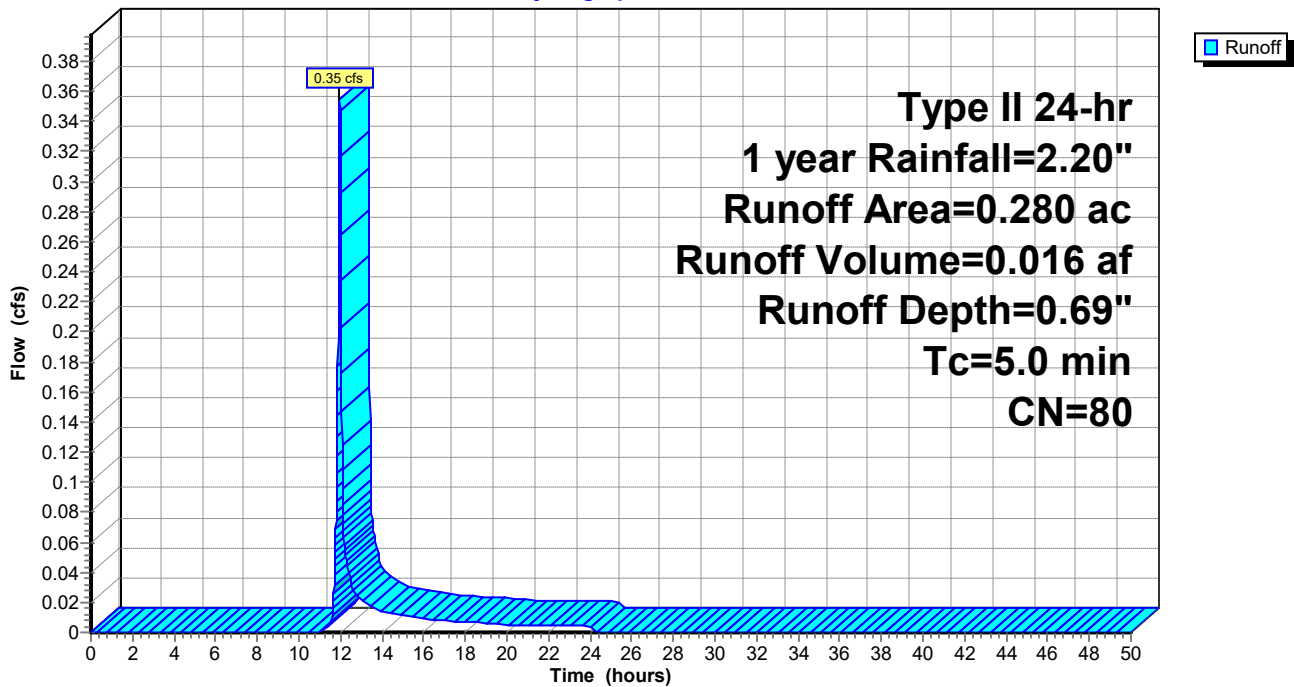
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
 Type II 24-hr 1 year Rainfall=2.20"

Area (ac)	CN	Description
0.280	80	>75% Grass cover, Good, HSG D
0.280		100.00% Pervious Area

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

Subcatchment 17S: Pre-developed 01

Hydrograph



Summary for Pond 16P: Pipe Storage 01

Inflow Area = 0.280 ac, 82.14% Impervious, Inflow Depth = 1.67" for 1 year event
 Inflow = 0.81 cfs @ 11.96 hrs, Volume= 0.039 af
 Outflow = 0.02 cfs @ 14.98 hrs, Volume= 0.039 af, Atten= 98%, Lag= 181.0 min
 Primary = 0.02 cfs @ 14.98 hrs, Volume= 0.039 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
 Peak Elev= 901.53' @ 14.98 hrs Surf.Area= 1,614 sf Storage= 1,036 cf

Plug-Flow detention time= 606.4 min calculated for 0.039 af (100% of inflow)
 Center-of-Mass det. time= 606.4 min (1,395.5 - 789.1)

Volume	Invert	Avail.Storage	Storage Description
#1	900.00'	6,959 cf	42.00" Round RCP_Round 42" L= 723.3' S= 0.0025 '/'

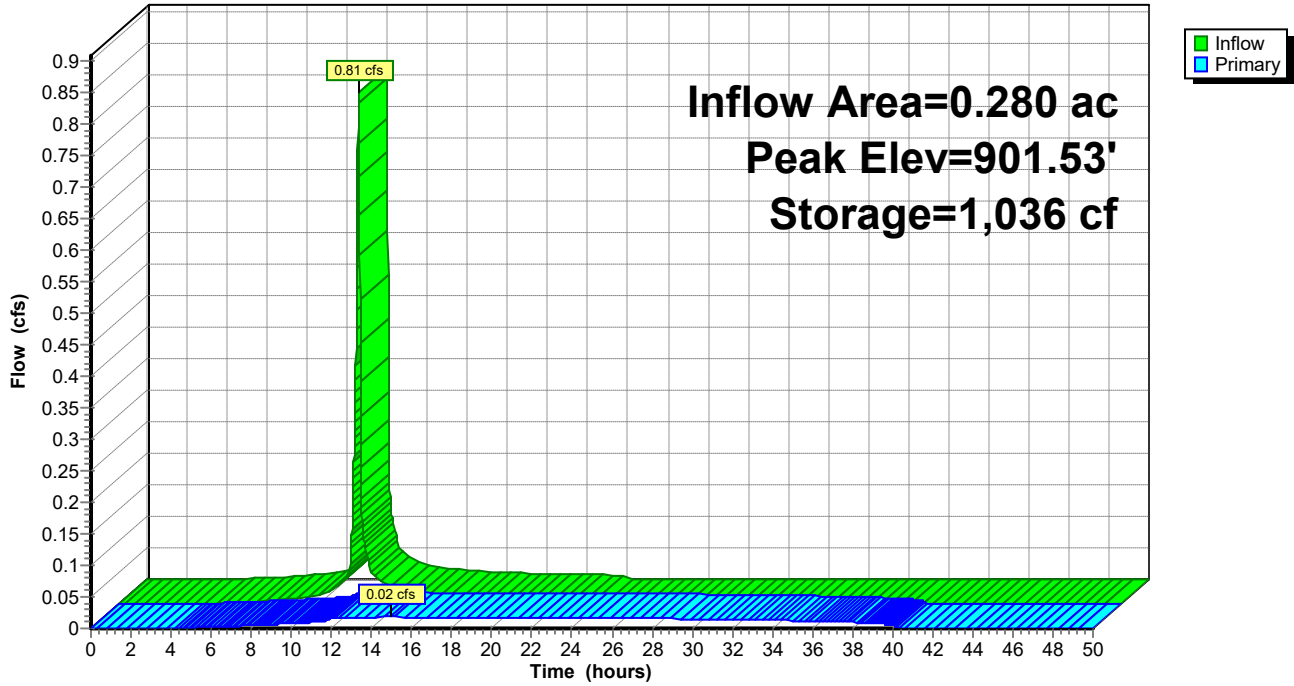
Device	Routing	Invert	Outlet Devices
#1	Primary	900.00'	12.00" Round RCP_Round 12" L= 50.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 900.00' / 899.75' S= 0.0050 '/ Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 0.79 sf
#2	Device 1	900.00'	0.75" Vert. Orifice C= 0.600 Limited to weir flow at low heads
#3	Device 1	902.40'	4.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Primary OutFlow Max=0.02 cfs @ 14.98 hrs HW=901.53' (Free Discharge)

- 1=RCP_Round 12" (Passes 0.02 cfs of 3.17 cfs potential flow)
- 2=Orifice (Orifice Controls 0.02 cfs @ 5.89 fps)
- 3=Sharp-Crested Rectangular Weir (Controls 0.00 cfs)

Pond 16P: Pipe Storage 01

Hydrograph



Summary for Subcatchment 14S: Subarea 01

Runoff = 1.00 cfs @ 11.96 hrs, Volume= 0.049 af, Depth= 2.09"

Routed to Pond 16P : Pipe Storage 01

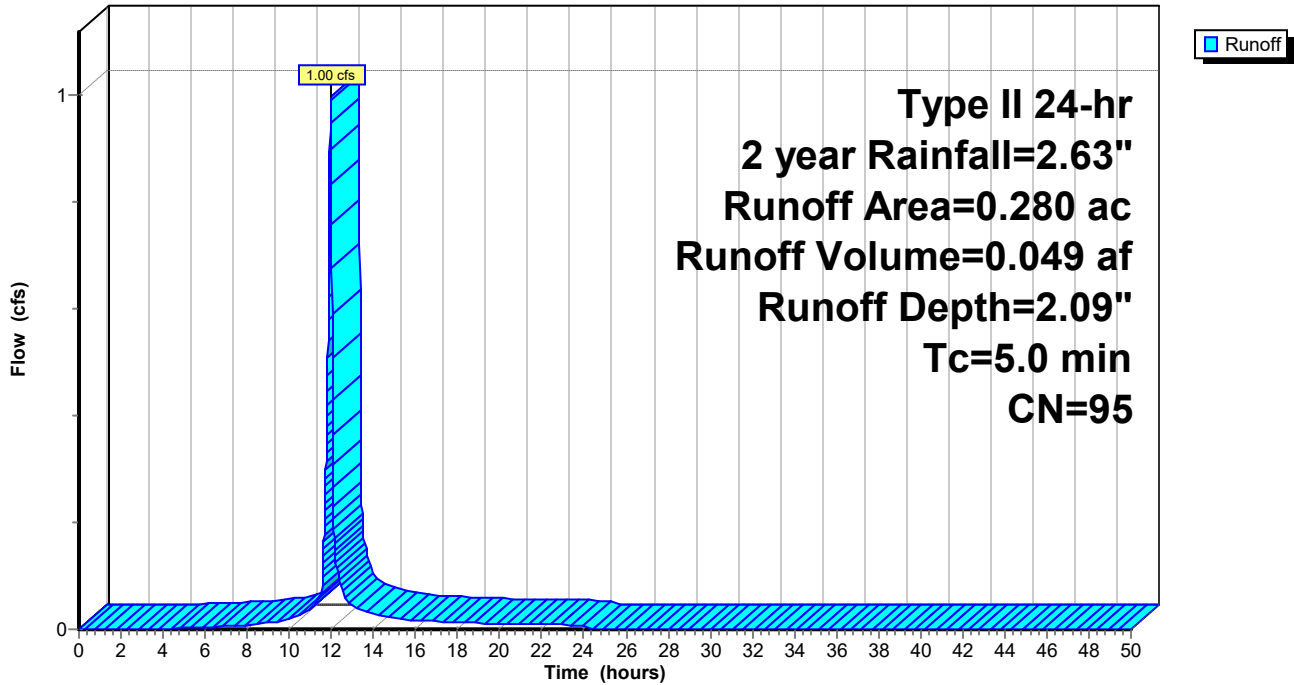
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type II 24-hr 2 year Rainfall=2.63"

Area (ac)	CN	Description
0.230	98	Paved parking, HSG D
0.050	80	>75% Grass cover, Good, HSG D
0.280	95	Weighted Average
0.050		17.86% Pervious Area
0.230		82.14% Impervious Area

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

Subcatchment 14S: Subarea 01

Hydrograph



Summary for Subcatchment 17S: Pre-developed 01

Runoff = 0.51 cfs @ 11.97 hrs, Volume= 0.023 af, Depth= 0.98"

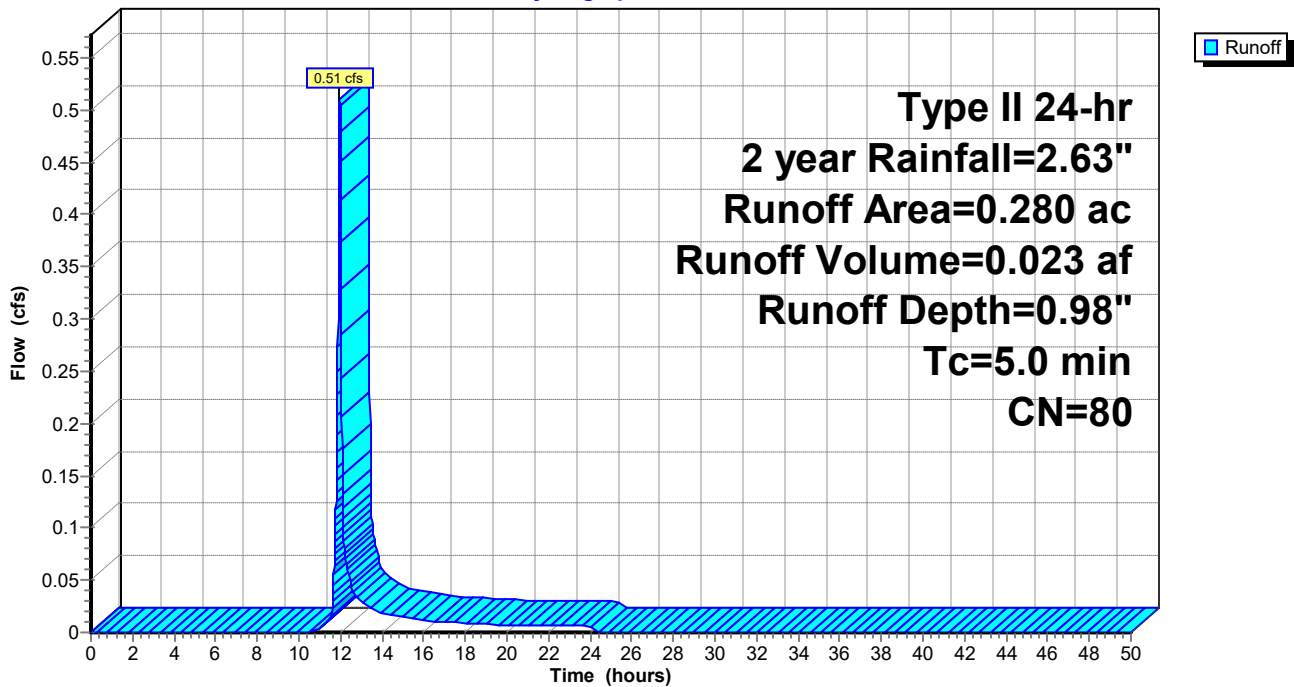
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type II 24-hr 2 year Rainfall=2.63"

Area (ac)	CN	Description
0.280	80	>75% Grass cover, Good, HSG D
0.280		100.00% Pervious Area

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

Subcatchment 17S: Pre-developed 01

Hydrograph



Summary for Pond 16P: Pipe Storage 01

Inflow Area = 0.280 ac, 82.14% Impervious, Inflow Depth = 2.09" for 2 year event
 Inflow = 1.00 cfs @ 11.96 hrs, Volume= 0.049 af
 Outflow = 0.02 cfs @ 15.54 hrs, Volume= 0.049 af, Atten= 98%, Lag= 214.9 min
 Primary = 0.02 cfs @ 15.54 hrs, Volume= 0.049 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
 Peak Elev= 901.71' @ 15.54 hrs Surf.Area= 1,865 sf Storage= 1,348 cf

Plug-Flow detention time= 739.2 min calculated for 0.049 af (100% of inflow)
 Center-of-Mass det. time= 739.3 min (1,522.4 - 783.0)

Volume	Invert	Avail.Storage	Storage Description
#1	900.00'	6,959 cf	42.00" Round RCP_Round 42" L= 723.3' S= 0.0025 '/'

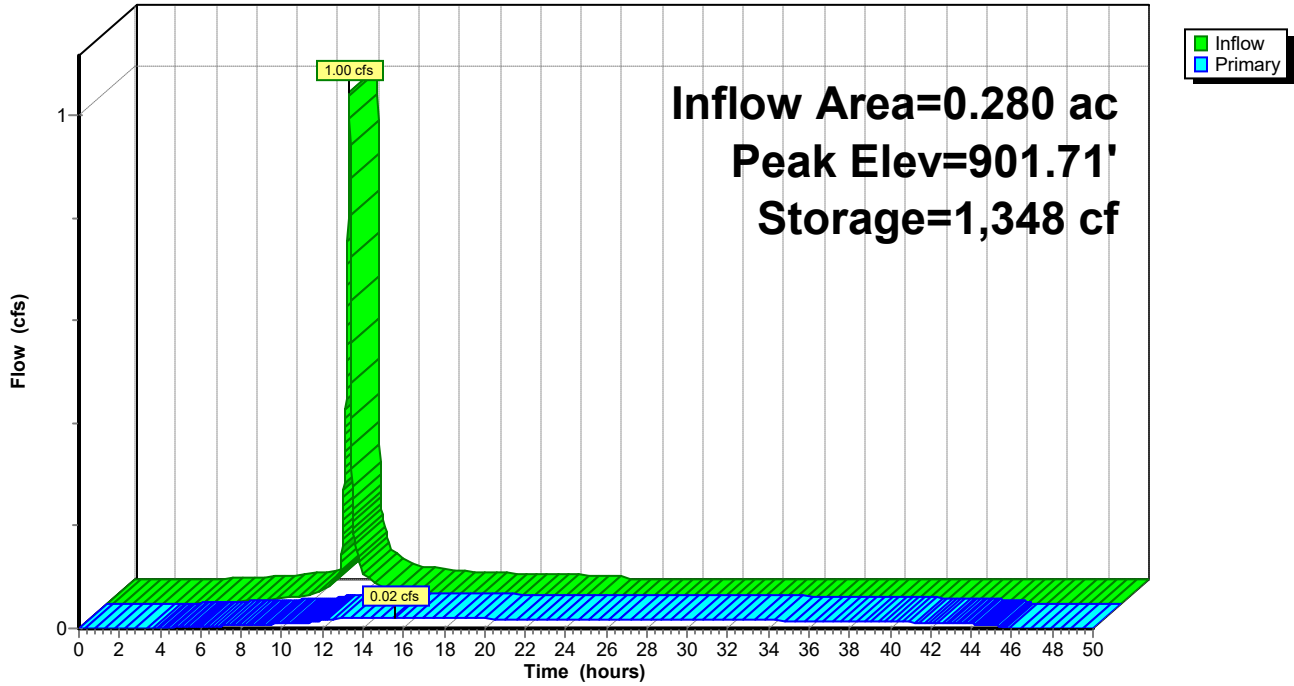
Device	Routing	Invert	Outlet Devices
#1	Primary	900.00'	12.00" Round RCP_Round 12" L= 50.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 900.00' / 899.75' S= 0.0050 '/ Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 0.79 sf
#2	Device 1	900.00'	0.75" Vert. Orifice C= 0.600 Limited to weir flow at low heads
#3	Device 1	902.40'	4.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Primary OutFlow Max=0.02 cfs @ 15.54 hrs HW=901.71' (Free Discharge)

- 1=RCP_Round 12" (Passes 0.02 cfs of 3.52 cfs potential flow)
- 2=Orifice (Orifice Controls 0.02 cfs @ 6.23 fps)
- 3=Sharp-Crested Rectangular Weir (Controls 0.00 cfs)

Pond 16P: Pipe Storage 01

Hydrograph



Summary for Subcatchment 14S: Subarea 01

Runoff = 1.26 cfs @ 11.96 hrs, Volume= 0.063 af, Depth= 2.68"

Routed to Pond 16P : Pipe Storage 01

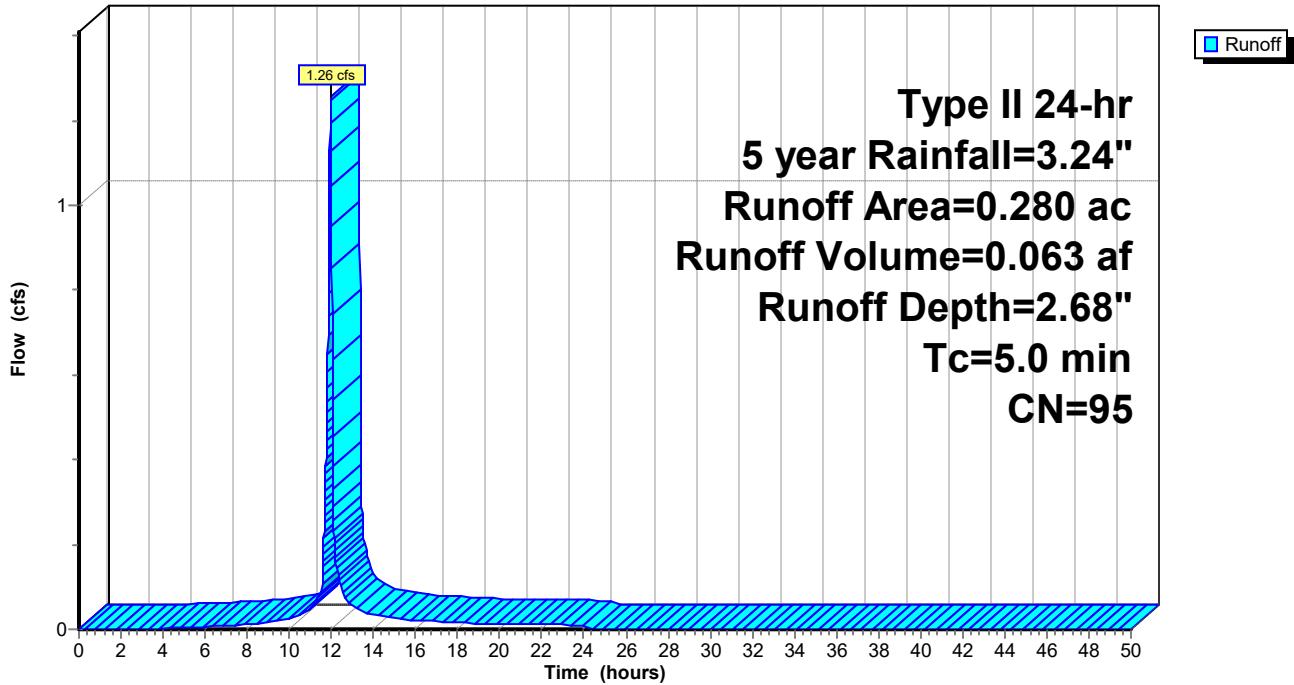
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type II 24-hr 5 year Rainfall=3.24"

Area (ac)	CN	Description
0.230	98	Paved parking, HSG D
0.050	80	>75% Grass cover, Good, HSG D
0.280	95	Weighted Average
0.050		17.86% Pervious Area
0.230		82.14% Impervious Area

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

Subcatchment 14S: Subarea 01

Hydrograph



Summary for Subcatchment 17S: Pre-developed 01

Runoff = 0.75 cfs @ 11.96 hrs, Volume= 0.033 af, Depth= 1.43"

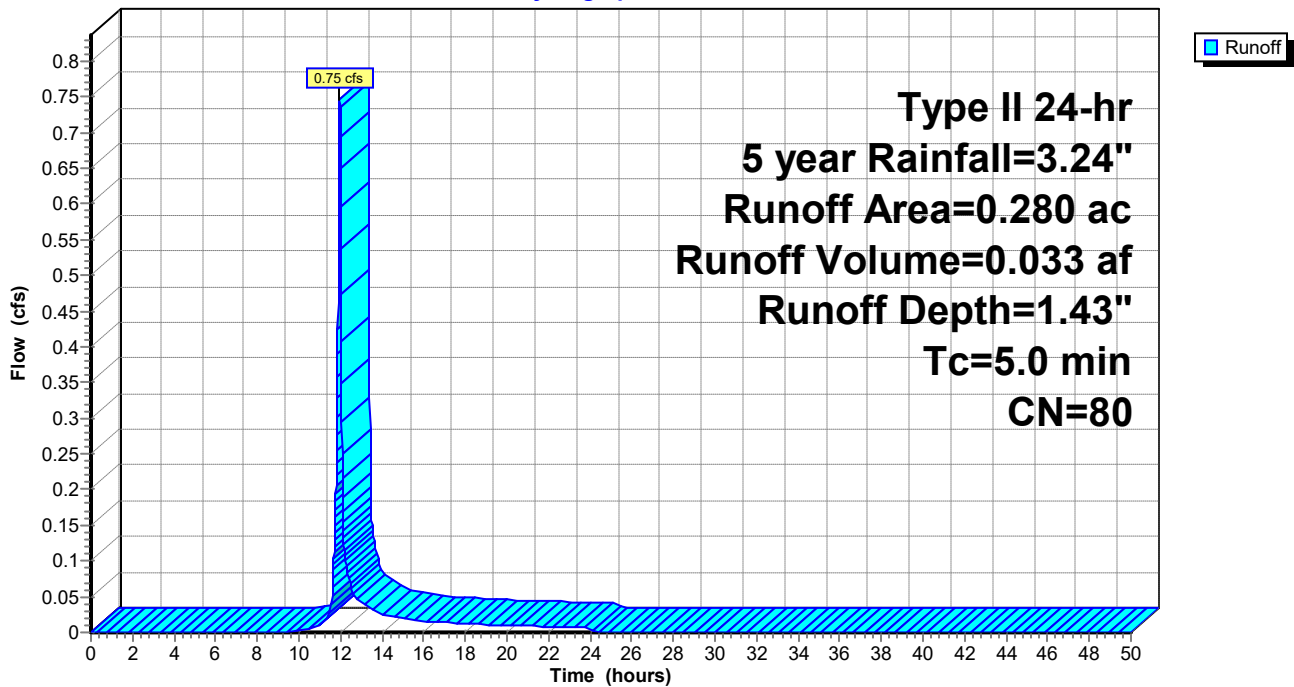
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
 Type II 24-hr 5 year Rainfall=3.24"

Area (ac)	CN	Description
0.280	80	>75% Grass cover, Good, HSG D
0.280		100.00% Pervious Area

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

Subcatchment 17S: Pre-developed 01

Hydrograph



Summary for Pond 16P: Pipe Storage 01

Inflow Area = 0.280 ac, 82.14% Impervious, Inflow Depth = 2.68" for 5 year event
 Inflow = 1.26 cfs @ 11.96 hrs, Volume= 0.063 af
 Outflow = 0.02 cfs @ 16.13 hrs, Volume= 0.061 af, Atten= 98%, Lag= 250.3 min
 Primary = 0.02 cfs @ 16.13 hrs, Volume= 0.061 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
 Peak Elev= 901.94' @ 16.13 hrs Surf.Area= 2,140 sf Storage= 1,811 cf

Plug-Flow detention time= 898.4 min calculated for 0.061 af (97% of inflow)
 Center-of-Mass det. time= 879.5 min (1,655.7 - 776.3)

Volume	Invert	Avail.Storage	Storage Description
#1	900.00'	6,959 cf	42.00" Round RCP_Round 42" L= 723.3' S= 0.0025 '/'

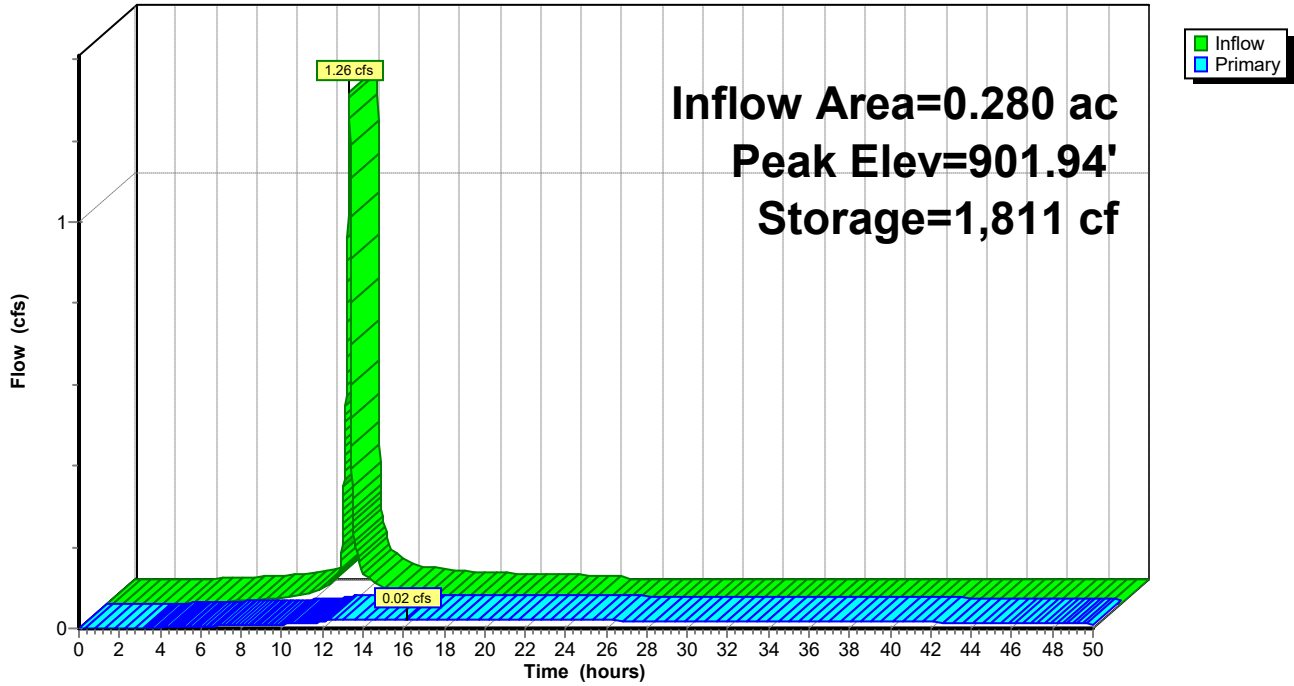
Device	Routing	Invert	Outlet Devices
#1	Primary	900.00'	12.00" Round RCP_Round 12" L= 50.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 900.00' / 899.75' S= 0.0050 '/ Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 0.79 sf
#2	Device 1	900.00'	0.75" Vert. Orifice C= 0.600 Limited to weir flow at low heads
#3	Device 1	902.40'	4.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Primary OutFlow Max=0.02 cfs @ 16.13 hrs HW=901.94' (Free Discharge)

- 1=RCP_Round 12" (Passes 0.02 cfs of 3.92 cfs potential flow)
- 2=Orifice (Orifice Controls 0.02 cfs @ 6.65 fps)
- 3=Sharp-Crested Rectangular Weir (Controls 0.00 cfs)

Pond 16P: Pipe Storage 01

Hydrograph



Summary for Subcatchment 14S: Subarea 01

Runoff = 1.47 cfs @ 11.96 hrs, Volume= 0.074 af, Depth= 3.17"
 Routed to Pond 16P : Pipe Storage 01

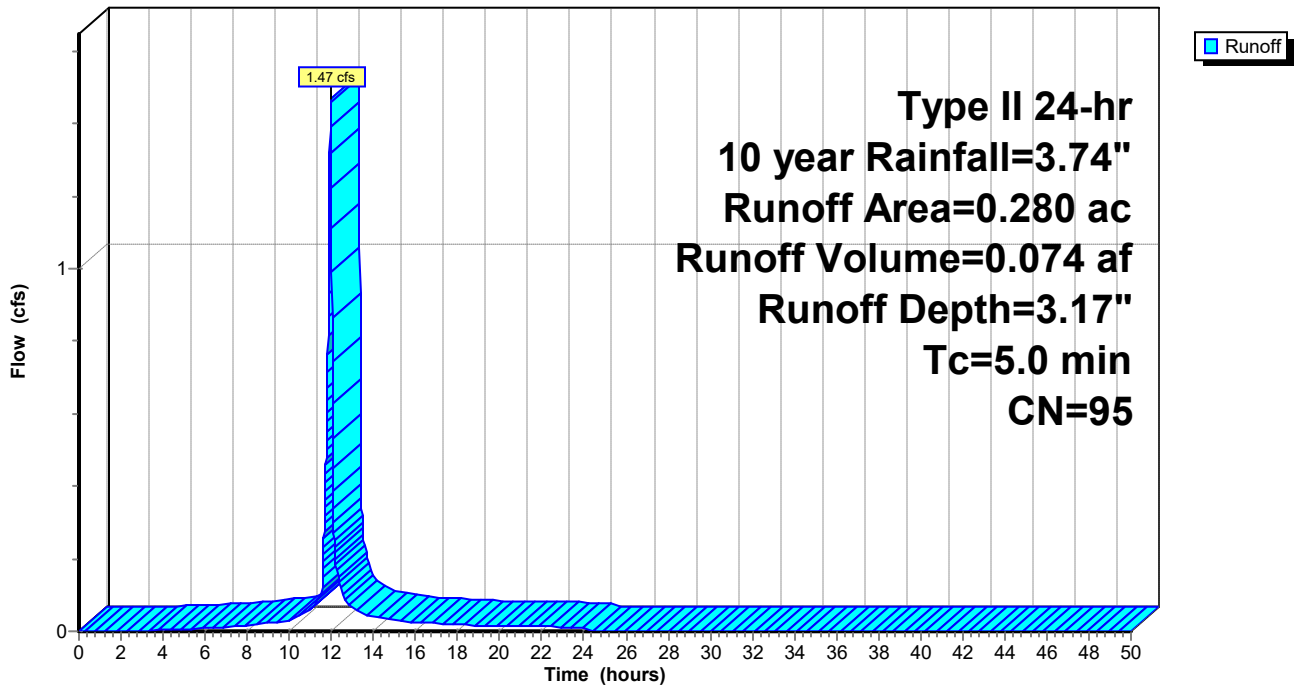
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
 Type II 24-hr 10 year Rainfall=3.74"

Area (ac)	CN	Description
0.230	98	Paved parking, HSG D
0.050	80	>75% Grass cover, Good, HSG D
0.280	95	Weighted Average
0.050		17.86% Pervious Area
0.230		82.14% Impervious Area

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

Subcatchment 14S: Subarea 01

Hydrograph



Summary for Subcatchment 17S: Pre-developed 01

Runoff = 0.95 cfs @ 11.96 hrs, Volume= 0.043 af, Depth= 1.83"

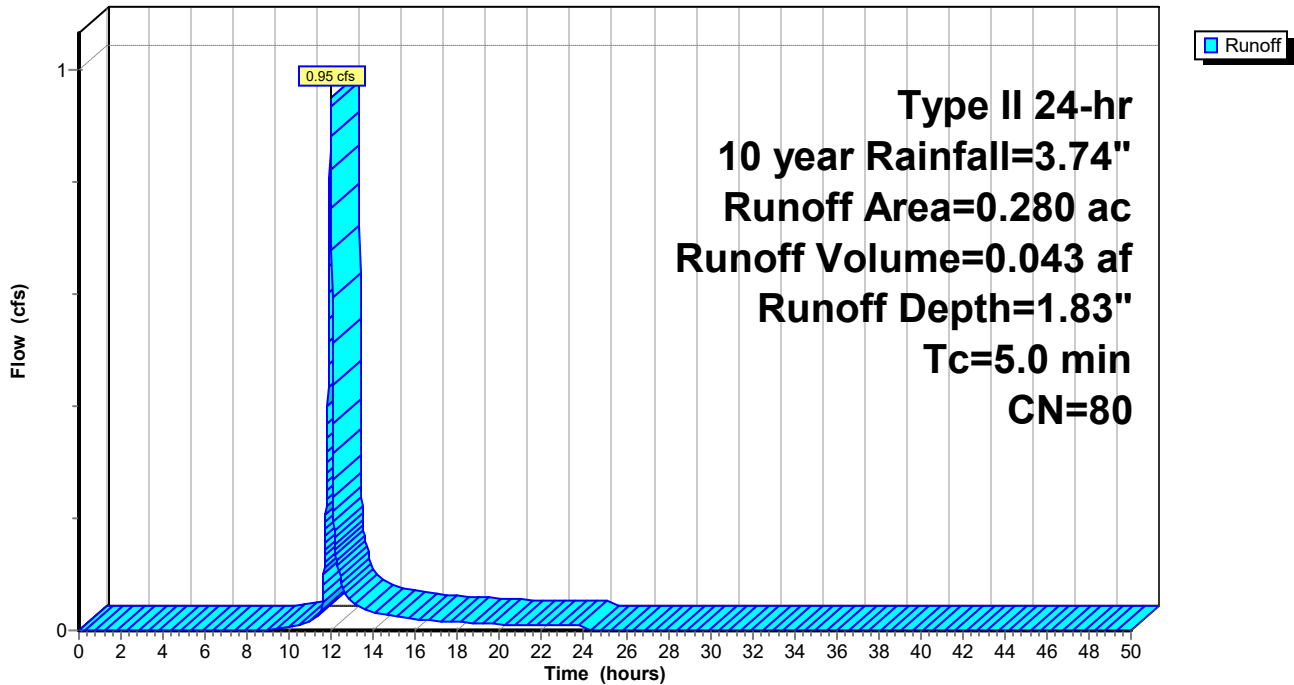
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type II 24-hr 10 year Rainfall=3.74"

Area (ac)	CN	Description
0.280	80	>75% Grass cover, Good, HSG D
0.280		100.00% Pervious Area

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

Subcatchment 17S: Pre-developed 01

Hydrograph



Summary for Pond 16P: Pipe Storage 01

Inflow Area = 0.280 ac, 82.14% Impervious, Inflow Depth = 3.17" for 10 year event
 Inflow = 1.47 cfs @ 11.96 hrs, Volume= 0.074 af
 Outflow = 0.02 cfs @ 17.04 hrs, Volume= 0.066 af, Atten= 99%, Lag= 304.9 min
 Primary = 0.02 cfs @ 17.04 hrs, Volume= 0.066 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
 Peak Elev= 902.12' @ 17.04 hrs Surf.Area= 2,267 sf Storage= 2,206 cf

Plug-Flow detention time= 956.2 min calculated for 0.066 af (89% of inflow)
 Center-of-Mass det. time= 901.9 min (1,673.8 - 771.9)

Volume	Invert	Avail.Storage	Storage Description
#1	900.00'	6,959 cf	42.00" Round RCP_Round 42" L= 723.3' S= 0.0025 '/'

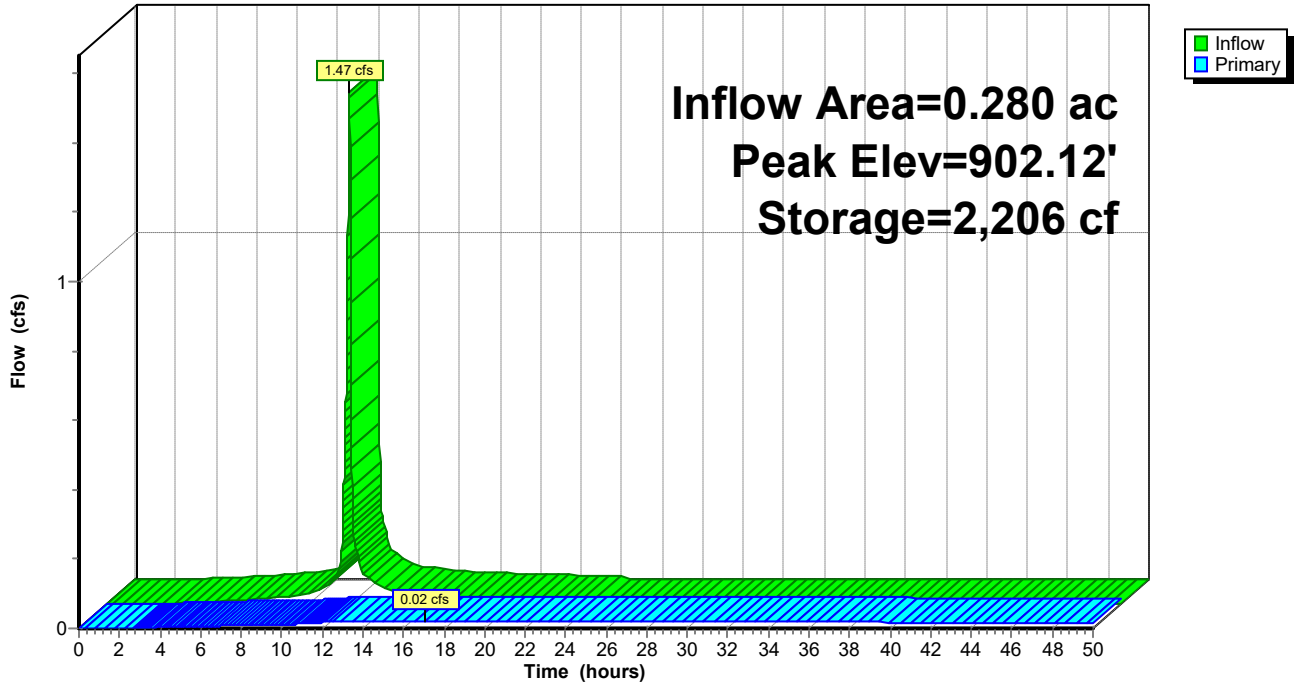
Device	Routing	Invert	Outlet Devices
#1	Primary	900.00'	12.00" Round RCP_Round 12" L= 50.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 900.00' / 899.75' S= 0.0050 '/ Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 0.79 sf
#2	Device 1	900.00'	0.75" Vert. Orifice C= 0.600 Limited to weir flow at low heads
#3	Device 1	902.40'	4.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Primary OutFlow Max=0.02 cfs @ 17.04 hrs HW=902.12' (Free Discharge)

- 1=RCP_Round 12" (Passes 0.02 cfs of 4.20 cfs potential flow)
- 2=Orifice (Orifice Controls 0.02 cfs @ 6.95 fps)
- 3=Sharp-Crested Rectangular Weir (Controls 0.00 cfs)

Pond 16P: Pipe Storage 01

Hydrograph



Summary for Subcatchment 14S: Subarea 01

Runoff = 1.77 cfs @ 11.96 hrs, Volume= 0.090 af, Depth= 3.87"
Routed to Pond 16P : Pipe Storage 01

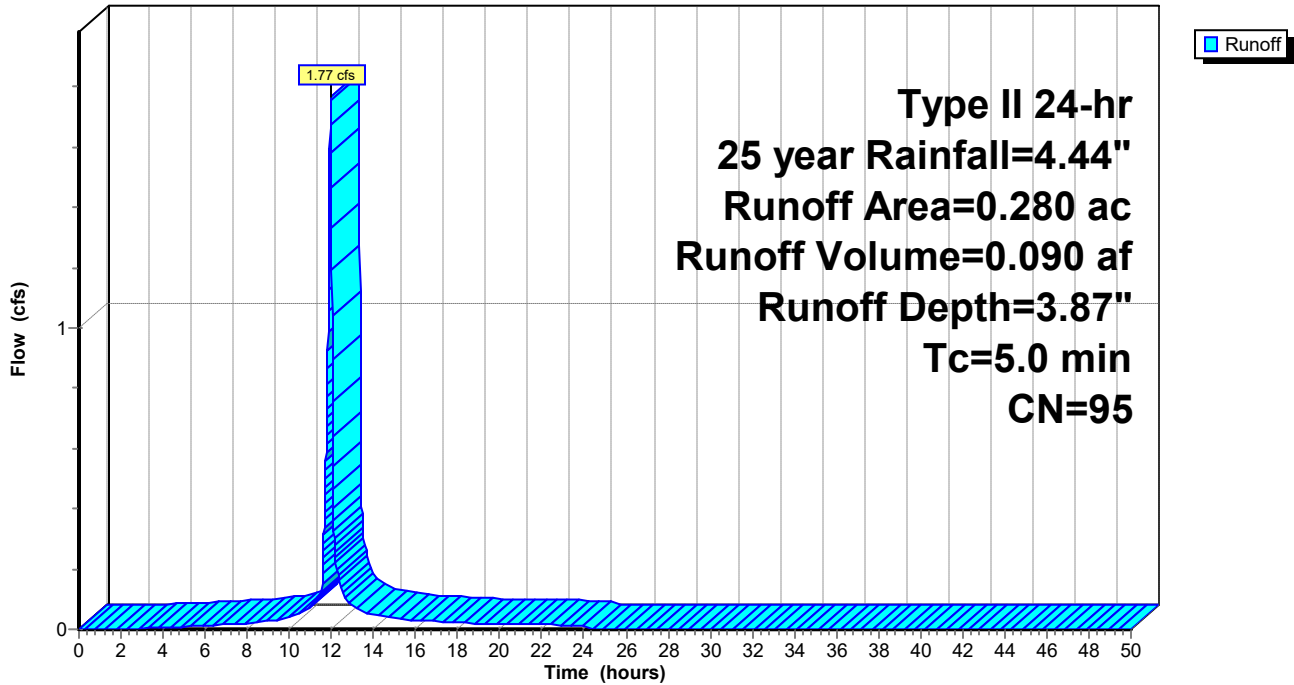
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type II 24-hr 25 year Rainfall=4.44"

Area (ac)	CN	Description
0.230	98	Paved parking, HSG D
0.050	80	>75% Grass cover, Good, HSG D
0.280	95	Weighted Average
0.050		17.86% Pervious Area
0.230		82.14% Impervious Area

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

Subcatchment 14S: Subarea 01

Hydrograph



Summary for Subcatchment 17S: Pre-developed 01

Runoff = 1.24 cfs @ 11.96 hrs, Volume= 0.056 af, Depth= 2.41"

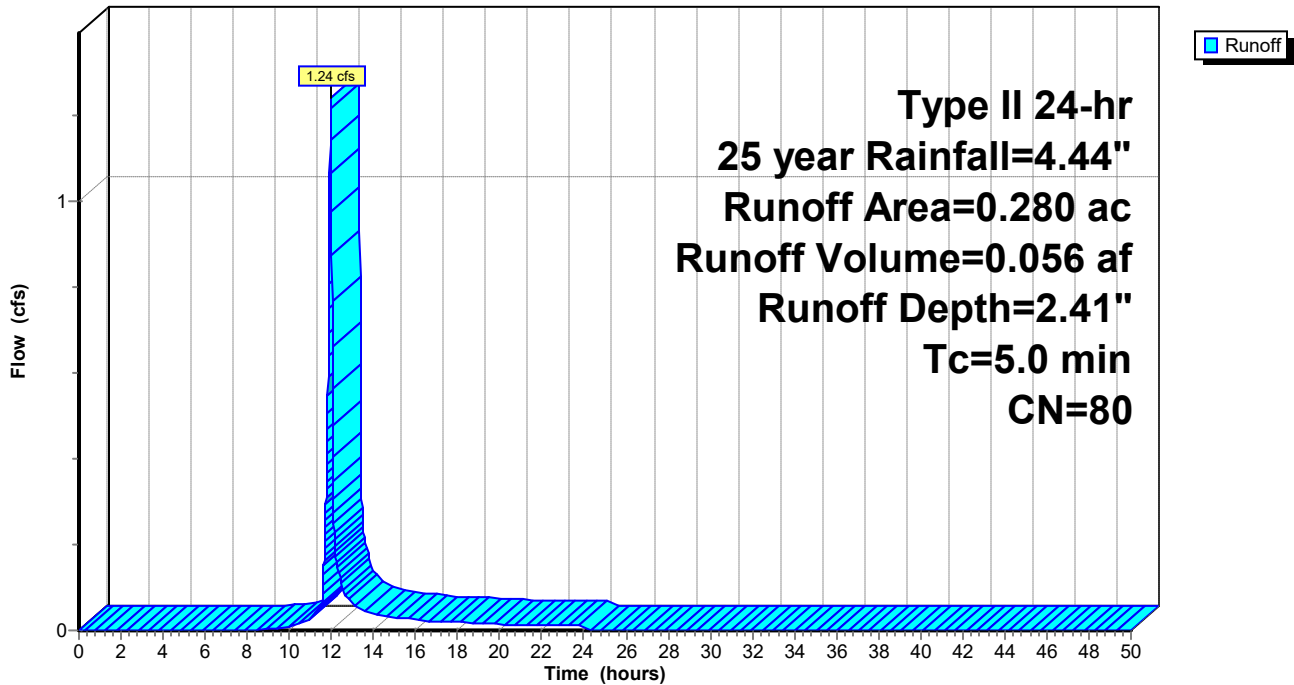
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type II 24-hr 25 year Rainfall=4.44"

Area (ac)	CN	Description
0.280	80	>75% Grass cover, Good, HSG D
0.280		100.00% Pervious Area

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

Subcatchment 17S: Pre-developed 01

Hydrograph



Summary for Pond 16P: Pipe Storage 01

Inflow Area = 0.280 ac, 82.14% Impervious, Inflow Depth = 3.87" for 25 year event
 Inflow = 1.77 cfs @ 11.96 hrs, Volume= 0.090 af
 Outflow = 0.02 cfs @ 17.98 hrs, Volume= 0.072 af, Atten= 99%, Lag= 361.4 min
 Primary = 0.02 cfs @ 17.98 hrs, Volume= 0.072 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
 Peak Elev= 902.36' @ 17.98 hrs Surf.Area= 2,372 sf Storage= 2,779 cf

Plug-Flow detention time= 994.0 min calculated for 0.072 af (80% of inflow)
 Center-of-Mass det. time= 913.9 min (1,680.8 - 766.9)

Volume	Invert	Avail.Storage	Storage Description
#1	900.00'	6,959 cf	42.00" Round RCP_Round 42" L= 723.3' S= 0.0025 '/'

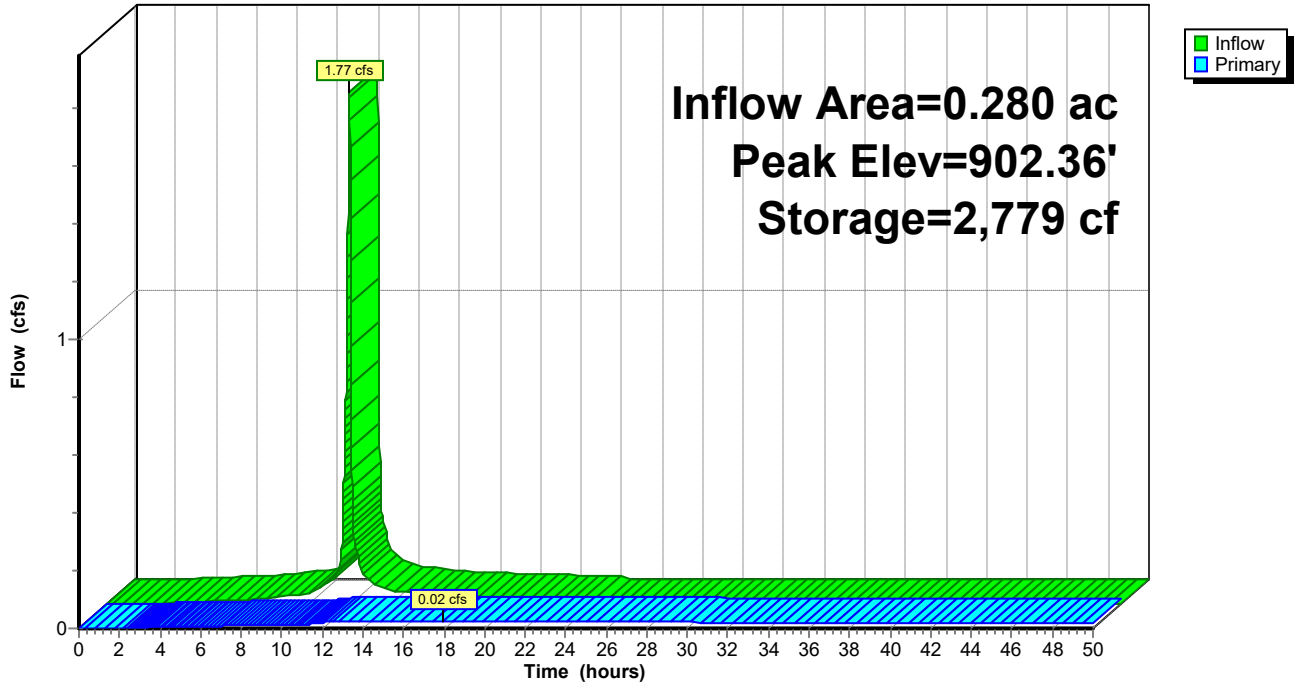
Device	Routing	Invert	Outlet Devices
#1	Primary	900.00'	12.00" Round RCP_Round 12" L= 50.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 900.00' / 899.75' S= 0.0050 '/ Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 0.79 sf
#2	Device 1	900.00'	0.75" Vert. Orifice C= 0.600 Limited to weir flow at low heads
#3	Device 1	902.40'	4.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Primary OutFlow Max=0.02 cfs @ 17.98 hrs HW=902.36' (Free Discharge)

- 1=RCP_Round 12" (Passes 0.02 cfs of 4.57 cfs potential flow)
- 2=Orifice (Orifice Controls 0.02 cfs @ 7.35 fps)
- 3=Sharp-Crested Rectangular Weir (Controls 0.00 cfs)

Pond 16P: Pipe Storage 01

Hydrograph



Summary for Subcatchment 14S: Subarea 01

Runoff = 2.02 cfs @ 11.96 hrs, Volume= 0.104 af, Depth= 4.44"
Routed to Pond 16P : Pipe Storage 01

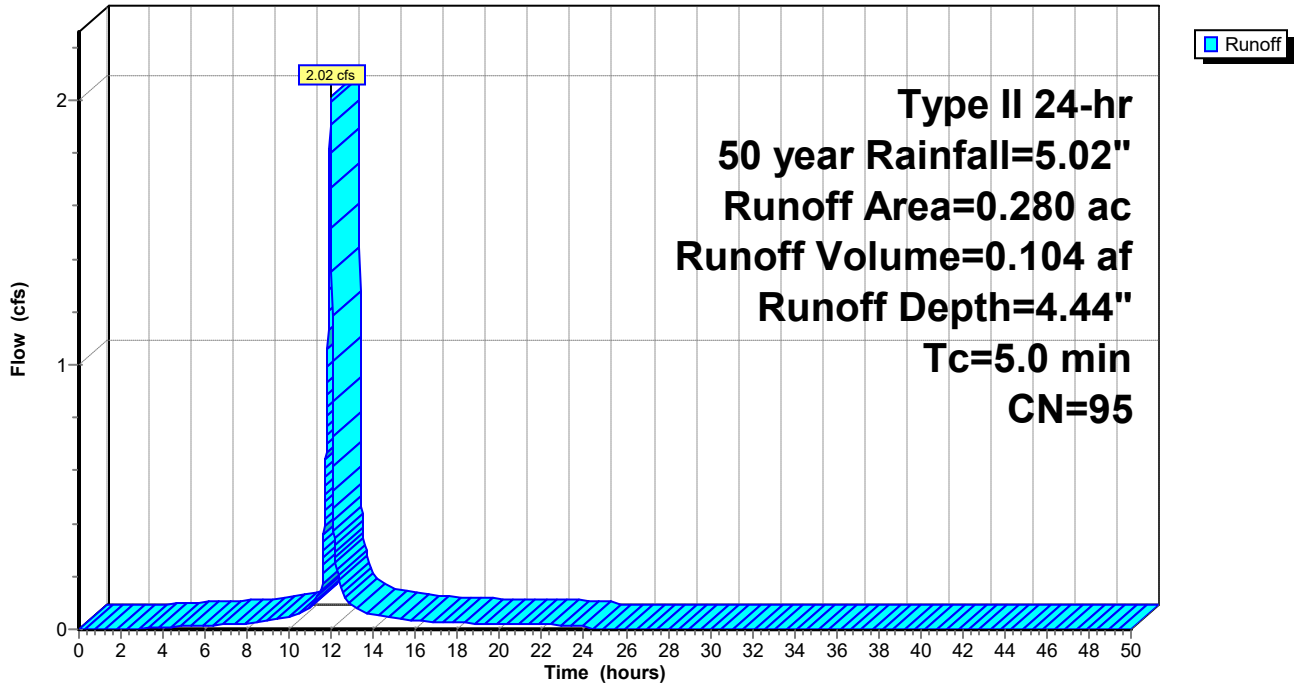
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type II 24-hr 50 year Rainfall=5.02"

Area (ac)	CN	Description
0.230	98	Paved parking, HSG D
0.050	80	>75% Grass cover, Good, HSG D
0.280	95	Weighted Average
0.050		17.86% Pervious Area
0.230		82.14% Impervious Area

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

Subcatchment 14S: Subarea 01

Hydrograph



Summary for Subcatchment 17S: Pre-developed 01

Runoff = 1.49 cfs @ 11.96 hrs, Volume= 0.068 af, Depth= 2.91"

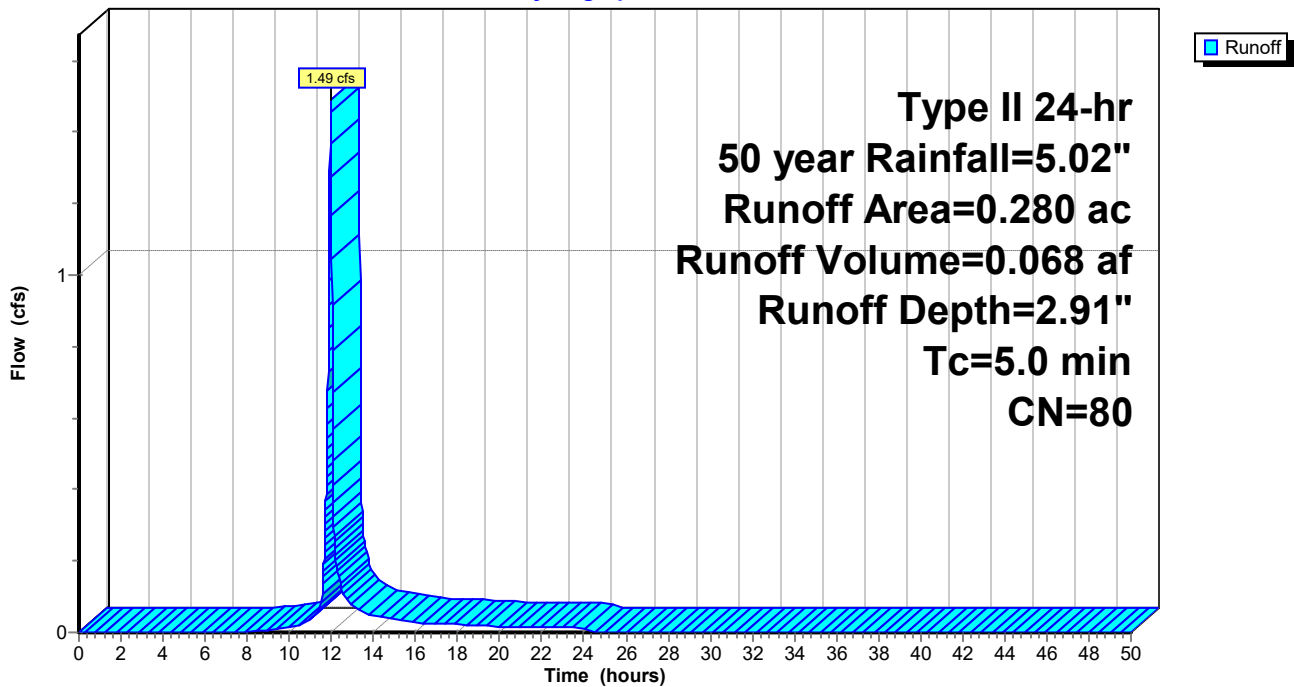
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type II 24-hr 50 year Rainfall=5.02"

Area (ac)	CN	Description
0.280	80	>75% Grass cover, Good, HSG D
0.280		100.00% Pervious Area

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

Subcatchment 17S: Pre-developed 01

Hydrograph



Summary for Pond 16P: Pipe Storage 01

Inflow Area = 0.280 ac, 82.14% Impervious, Inflow Depth = 4.44" for 50 year event
 Inflow = 2.02 cfs @ 11.96 hrs, Volume= 0.104 af
 Outflow = 0.08 cfs @ 13.33 hrs, Volume= 0.083 af, Atten= 96%, Lag= 82.5 min
 Primary = 0.08 cfs @ 13.33 hrs, Volume= 0.083 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
 Peak Elev= 902.42' @ 13.33 hrs Surf.Area= 2,387 sf Storage= 2,916 cf

Plug-Flow detention time= 896.3 min calculated for 0.083 af (80% of inflow)
 Center-of-Mass det. time= 817.2 min (1,580.7 - 763.6)

Volume	Invert	Avail.Storage	Storage Description
#1	900.00'	6,959 cf	42.00" Round RCP_Round 42" L= 723.3' S= 0.0025 '/'

Device	Routing	Invert	Outlet Devices
#1	Primary	900.00'	12.00" Round RCP_Round 12" L= 50.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 900.00' / 899.75' S= 0.0050 '/ Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 0.79 sf
#2	Device 1	900.00'	0.75" Vert. Orifice C= 0.600 Limited to weir flow at low heads
#3	Device 1	902.40'	4.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Primary OutFlow Max=0.06 cfs @ 13.33 hrs HW=902.42' (Free Discharge)

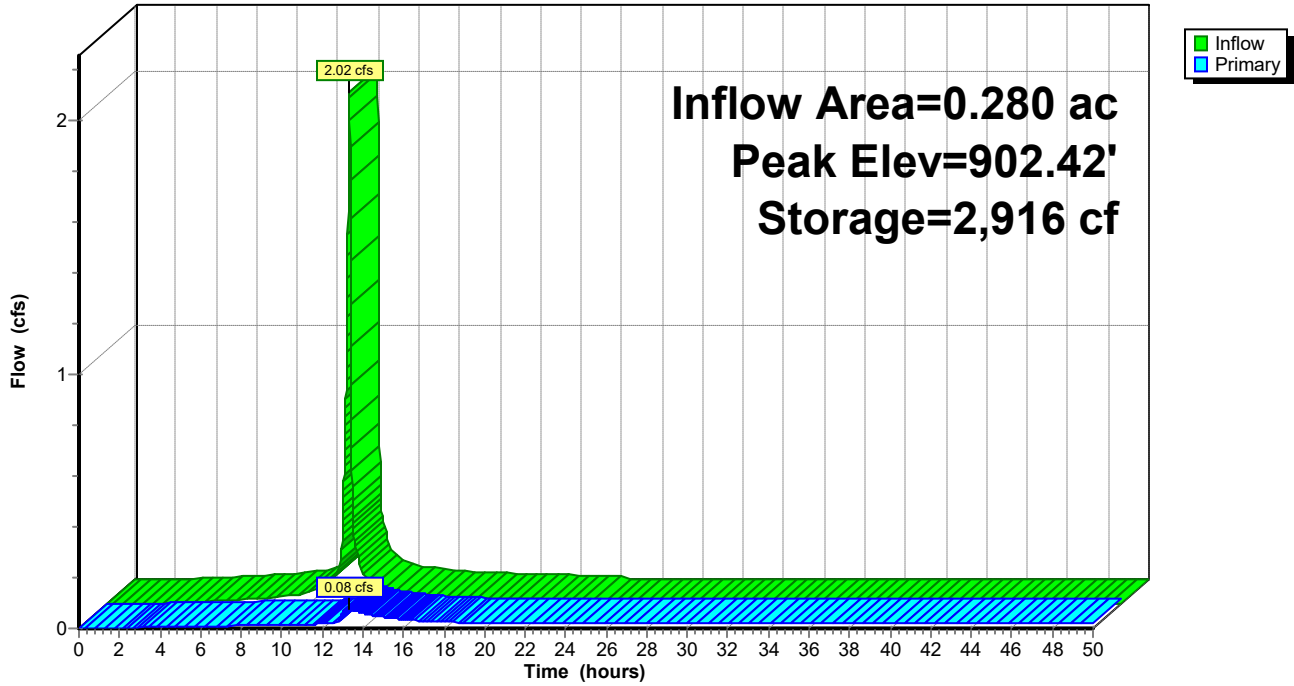
1=RCP_Round 12" (Passes 0.06 cfs of 4.65 cfs potential flow)

2=Orifice (Orifice Controls 0.02 cfs @ 7.44 fps)

3=Sharp-Crested Rectangular Weir (Weir Controls 0.04 cfs @ 0.46 fps)

Pond 16P: Pipe Storage 01

Hydrograph



Summary for Subcatchment 14S: Subarea 01

Runoff = 2.27 cfs @ 11.96 hrs, Volume= 0.118 af, Depth= 5.04"
 Routed to Pond 16P : Pipe Storage 01

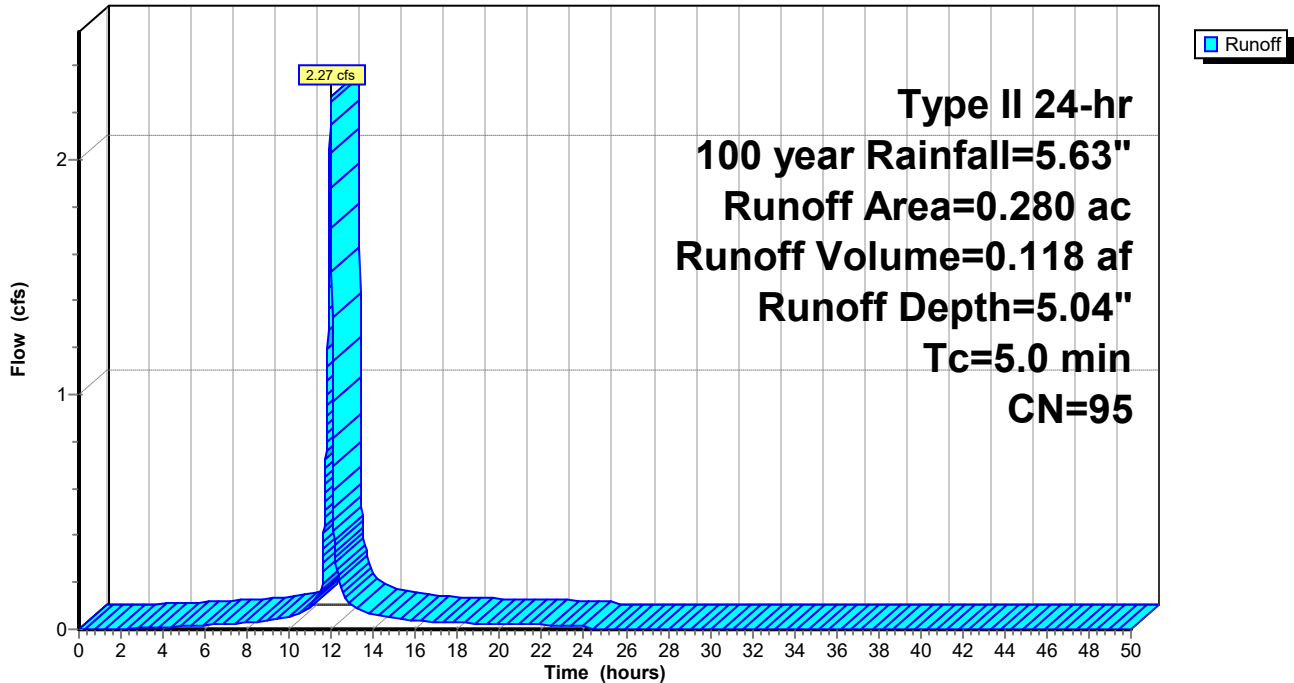
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
 Type II 24-hr 100 year Rainfall=5.63"

Area (ac)	CN	Description
0.230	98	Paved parking, HSG D
0.050	80	>75% Grass cover, Good, HSG D
0.280	95	Weighted Average
0.050		17.86% Pervious Area
0.230		82.14% Impervious Area

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

Subcatchment 14S: Subarea 01

Hydrograph



Summary for Subcatchment 17S: Pre-developed 01

Runoff = 1.75 cfs @ 11.96 hrs, Volume= 0.080 af, Depth= 3.45"

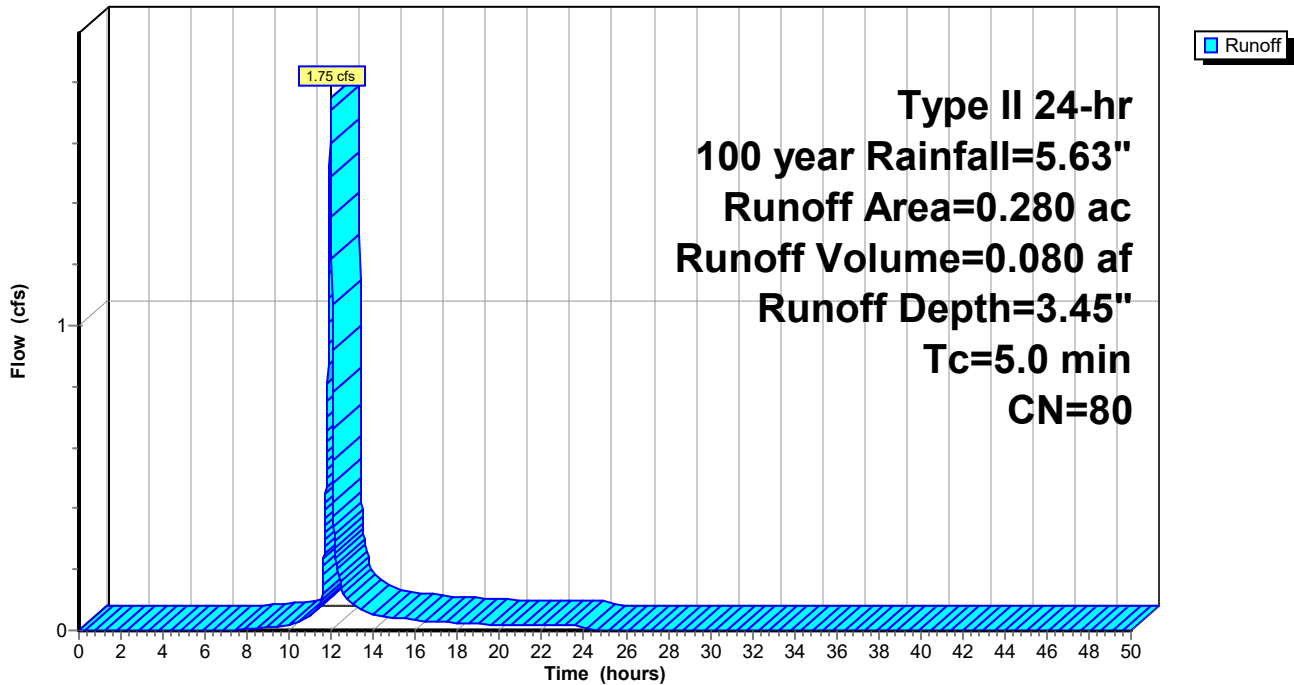
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type II 24-hr 100 year Rainfall=5.63"

Area (ac)	CN	Description
0.280	80	>75% Grass cover, Good, HSG D
0.280		100.00% Pervious Area

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

Subcatchment 17S: Pre-developed 01

Hydrograph



Summary for Pond 16P: Pipe Storage 01

Inflow Area = 0.280 ac, 82.14% Impervious, Inflow Depth = 5.04" for 100 year event
 Inflow = 2.27 cfs @ 11.96 hrs, Volume= 0.118 af
 Outflow = 0.20 cfs @ 12.41 hrs, Volume= 0.097 af, Atten= 91%, Lag= 27.3 min
 Primary = 0.20 cfs @ 12.41 hrs, Volume= 0.097 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
 Peak Elev= 902.45' @ 12.41 hrs Surf.Area= 2,394 sf Storage= 2,997 cf

Plug-Flow detention time= 786.4 min calculated for 0.097 af (82% of inflow)
 Center-of-Mass det. time= 710.9 min (1,471.4 - 760.6)

Volume	Invert	Avail.Storage	Storage Description
#1	900.00'	6,959 cf	42.00" Round RCP_Round 42" L= 723.3' S= 0.0025 '/'

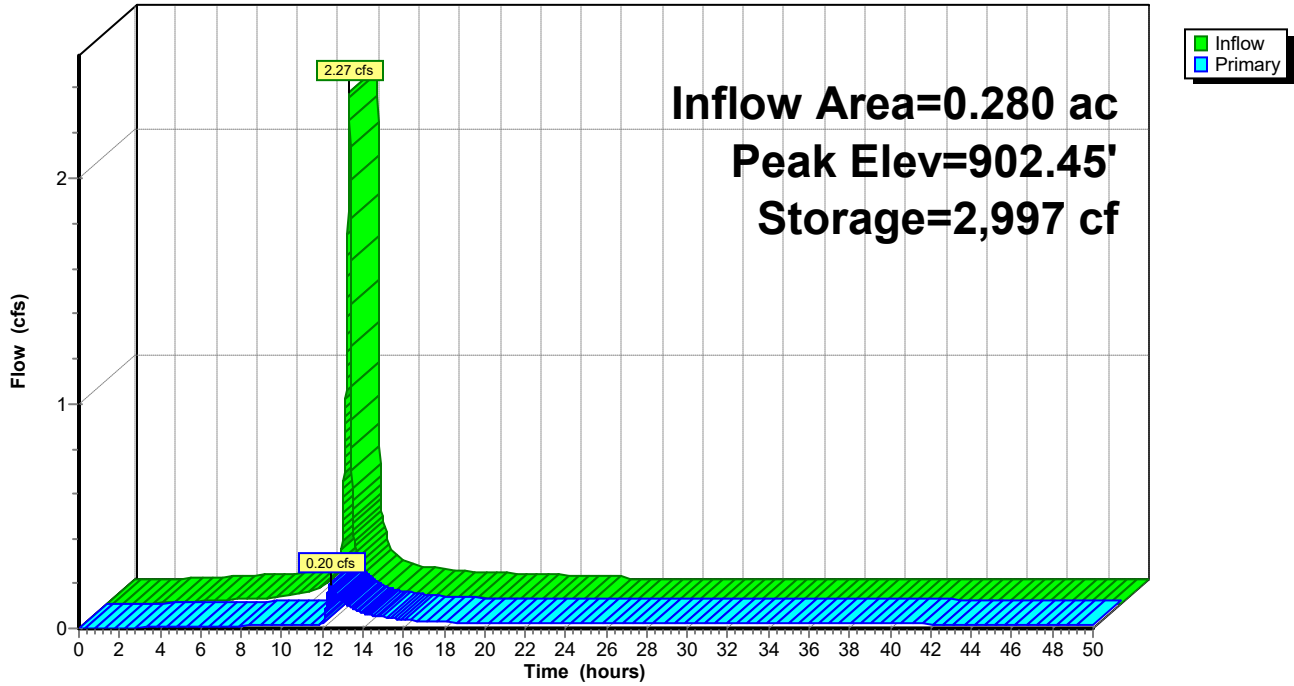
Device	Routing	Invert	Outlet Devices
#1	Primary	900.00'	12.00" Round RCP_Round 12" L= 50.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 900.00' / 899.75' S= 0.0050 '/ Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 0.79 sf
#2	Device 1	900.00'	0.75" Vert. Orifice C= 0.600 Limited to weir flow at low heads
#3	Device 1	902.40'	4.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Primary OutFlow Max=0.19 cfs @ 12.41 hrs HW=902.45' (Free Discharge)

- 1=RCP_Round 12" (Passes 0.19 cfs of 4.70 cfs potential flow)
- 2=Orifice (Orifice Controls 0.02 cfs @ 7.49 fps)
- 3=Sharp-Crested Rectangular Weir (Weir Controls 0.16 cfs @ 0.76 fps)

Pond 16P: Pipe Storage 01

Hydrograph



Events for Subcatchment 14S: Subarea 01

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
1 year	2.20	0.81	0.039	1.67
2 year	2.63	1.00	0.049	2.09
5 year	3.24	1.26	0.063	2.68
10 year	3.74	1.47	0.074	3.17
25 year	4.44	1.77	0.090	3.87
50 year	5.02	2.02	0.104	4.44
100 year	5.63	2.27	0.118	5.04

Events for Subcatchment 17S: Pre-developed 01

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
1 year	2.20	0.35	0.016	0.69
2 year	2.63	0.51	0.023	0.98
5 year	3.24	0.75	0.033	1.43
10 year	3.74	0.95	0.043	1.83
25 year	4.44	1.24	0.056	2.41
50 year	5.02	1.49	0.068	2.91
100 year	5.63	1.75	0.080	3.45

Events for Pond 16P: Pipe Storage 01

Event	Inflow (cfs)	Primary (cfs)	Elevation (feet)	Storage (cubic-feet)
1 year	0.81	0.02	901.53	1,036
2 year	1.00	0.02	901.71	1,348
5 year	1.26	0.02	901.94	1,811
10 year	1.47	0.02	902.12	2,206
25 year	1.77	0.02	902.36	2,779
50 year	2.02	0.08	902.42	2,916
100 year	2.27	0.20	902.45	2,997

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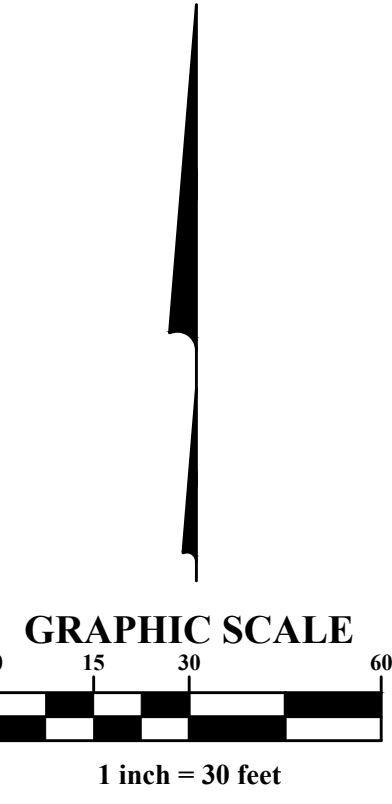
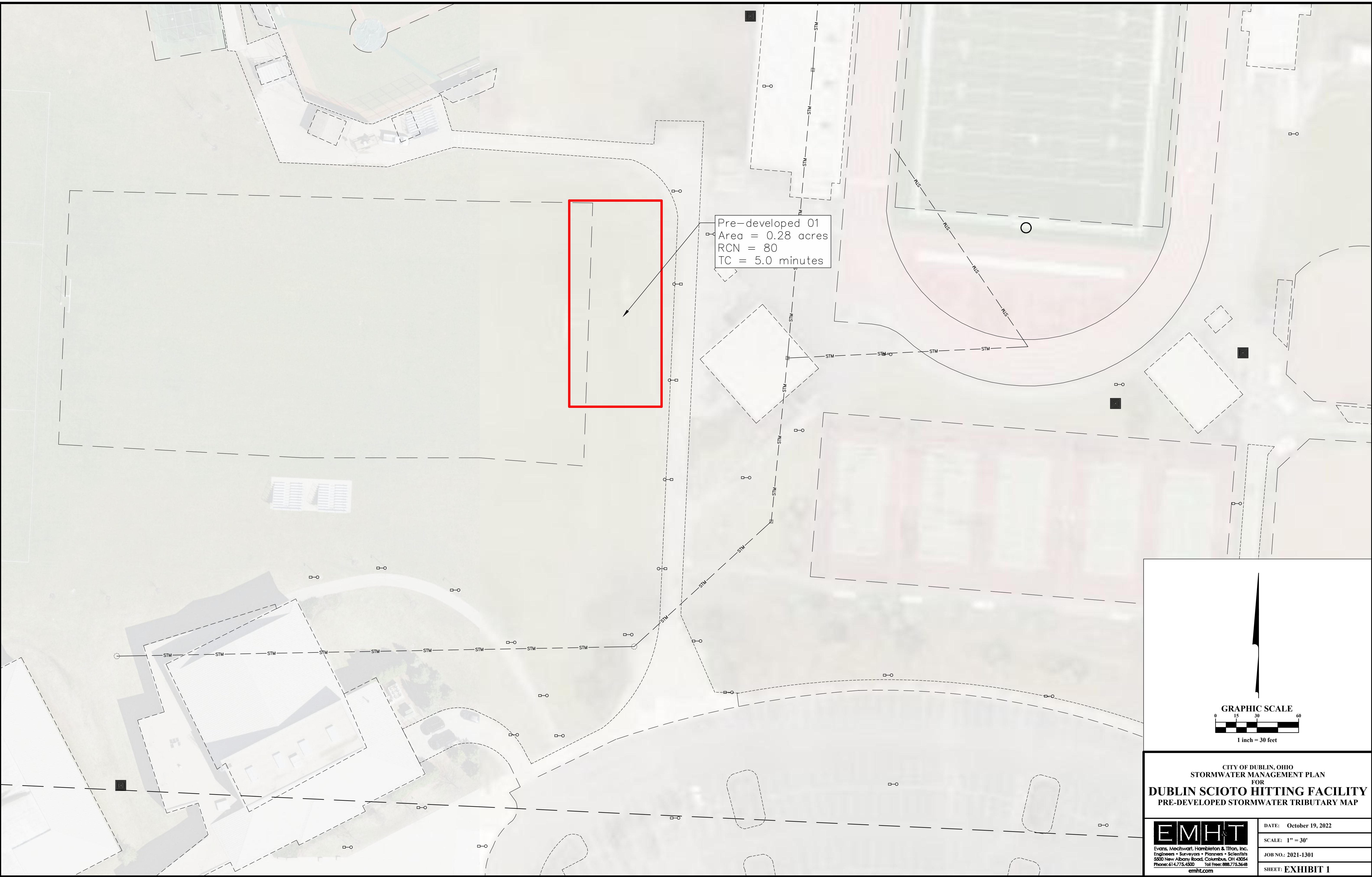


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APPENDIX D:

Exhibits

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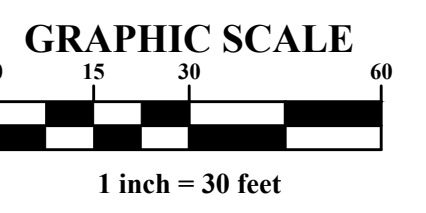
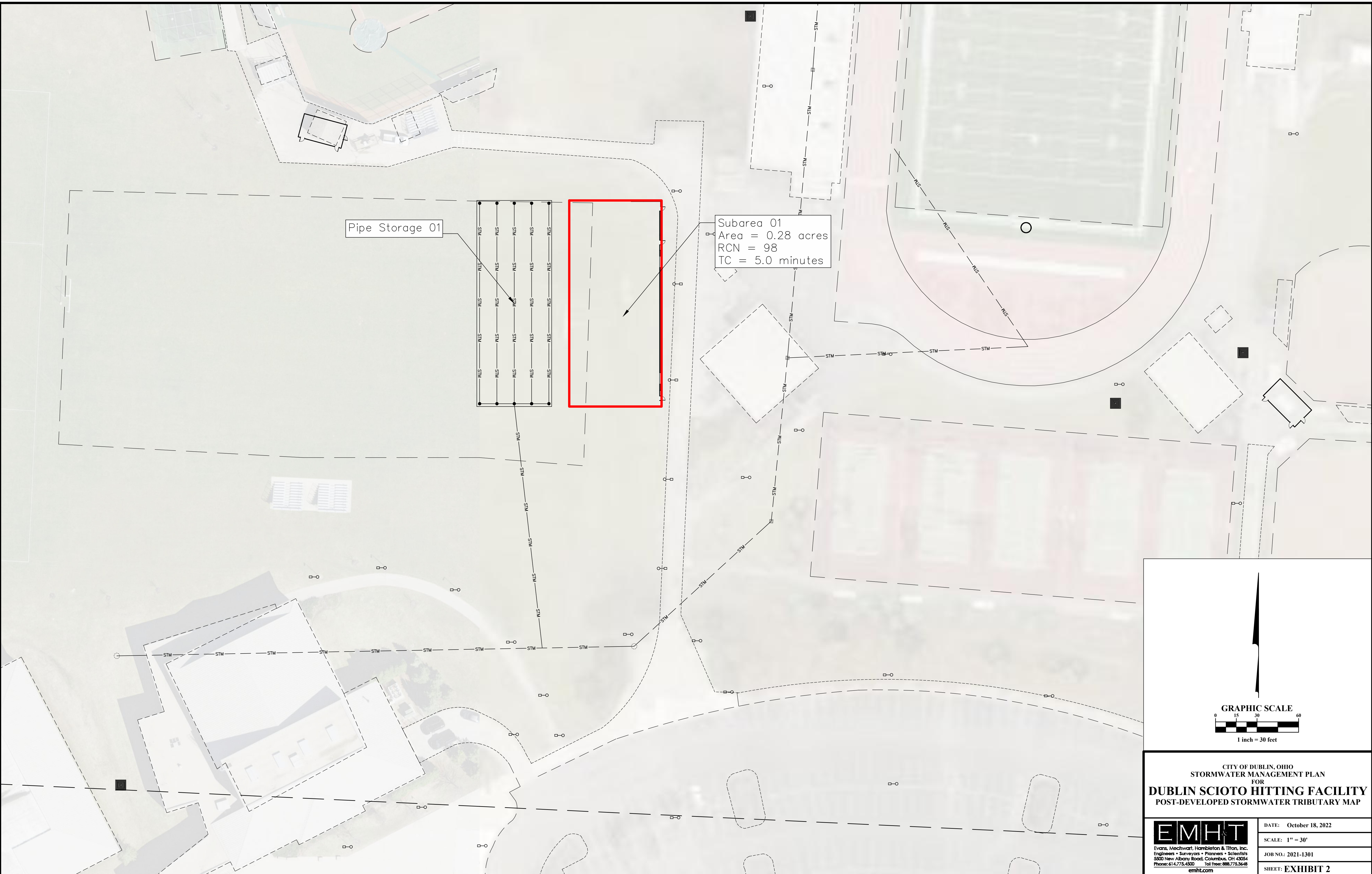


CITY OF DUBLIN, OHIO
STORMWATER MANAGEMENT PLAN
FOR
DUBLIN SCIOTO HITTING FACILITY
PRE-DEVELOPED STORMWATER TRIBUTARY MAP



DATE:	October 19, 2022
SCALE:	1" = 30'
JOB NO.:	2021-1301
SHEET:	EXHIBIT 1

J:\2021\1301\Drawings\45Sheets\Exhibits\Stormwater\2021-1301 Hitting Facility POST.dwg, Last Saved By: matechschulte, 10/18/2022 1:23 PM Last Printed By: Stechschulte, Matthew, 10/19/2022 8:16 AM (No Xrefs)



CITY OF DUBLIN, OHIO
STORMWATER MANAGEMENT PLAN
FOR
DUBLIN SCIOTO HITTING FACILITY
POST-DEVELOPED STORMWATER TRIBUTARY MAP

EMHT
Evans, Mechwart, Hambleton & Tilton, Inc.
Engineers • Surveyors • Planners • Scientists
5500 New Albany Road, Columbus, OH 43054
Phone: 614.775.4500 Toll Free: 888.775.3648
emht.com

DATE: October 18, 2022
SCALE: 1" = 30'
JOB NO.: 2021-1301
SHEET: **EXHIBIT 2**