PRELIMINARY STORMWATER MANAGEMENT PLAN

for

STANDING STONE DEVELOPMENT

Tenny Avenue (extended) and Les Paul Parkway
City of Waukesha, Wisconsin

Prepared for:

Cornerstone Development of S.E. WI
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TABLE OF CONTENTS

APPENDICES

Standing Stone Development
Preliminary Stormwater Management Plan

INTRODUCTION

Cornerstone Development of S.E. WI is proposing to construct a new residential development on a parcel located near the northwest corner of Tenny Avenue (extended) and Les Paul Parkway, in the City of Waukesha, Wisconsin. The proposed development also includes plans for a future multifamily development expansion on the north end of the site. Several stormwater management ponds, rain gardens and an infiltration basin will be constructed as part of the development plan to treat and manage stormwater runoff from the site. The proposed development, including future buildout, will result in a net increase in impervious area of approximately 21.52 acres.

The purpose of this report is to document design computations for existing and proposed stormwater management facilities for this area, and to present a plan for stormwater management that meets the requirements of the City of Waukesha and the Wisconsin Department of Natural Resources (WDNR).

DESIGN REQUIREMENTS

City of Waukesha

Chapter 32 of the City of Waukesha's Code of Ordinance includes criteria for peak discharge, water quality, and infiltration practices.

- The Ordinance requires post-development peak discharge rates to be no greater than pre-development discharge rates for the 1, 2, 10 and 100-year, 24-hour design storms.
- The Ordinance requires best management practices (BMPs) to be designed to control total suspended solids (TSS) carried by runoff from redevelopment sites by 40 percent and from new development sites by 80 percent, based on an average annual rainfall, as compared to no runoff management controls.
- The Ordinance requires medium density residential developments to infiltrate sufficient runoff volume so that the post-development infiltration volume is at least 75 percent of pre-development infiltration volume, based on an average annual rainfall. However, no more than 2 percent of the post-construction site is required as an effective infiltration area.

ANALYSIS OVERVIEW

Peak runoff rates and volumes were computed using NRCS's TR-55 and TR-20 methodologies, as implemented by HydroCAD Version 10.00 software by HydroCAD Software Solutions.

Soil types for the site were determined from NRCS Soil Survey for Waukesha County. Soils at the site were identified as mostly Fox silt loam and Casco loam with some limited areas of Hochheim loam and Matherton silt loam soils. Based on this, a hydrologic soil group B was used to determine runoff curve numbers for the site.

MSE3 rainfall distributions were used for peak flow calculations. Rainfall values for the hydrological analysis were taken from the National Oceanic and Atmospheric Administration (NOAA) Atlas 14 Precipitation Frequency Tables for Wisconsin Counties and are shown in the following table.

TABLE 1
Design Rainfall Values

Storm Recurrence Interval	24-hour Rainfall Volume
1-year	2.4 inches
2-year	2.7 inches
10-year	3.81 inches
100-year	6.18 inches

PRE-DEVELOPMENT CONDITIONS

The project site was previously occupied by agricultural fields. Surface drainage for the site is generally from north to south towards Pebble Brook located just south of the project site. Pebble Brook is a tributary to the Fox River.

The location of the project site, land cover types, drainage subareas and flow paths are shown on Figure 1, Pre-Development Conditions Plan. The following table presents the results of the hydrological analysis for pre-development conditions. A schematic plan of the hydrological analysis and detailed hydrological computations for pre-development conditions are included in Appendix A.

TABLE 2
Pre-Development Site Conditions

Subarea or Junction	Description	Area (ac)	Impervious Area (ac)	Time of Cons.	Peak Flow Rate (cfs)			
					1-year	2-year	10-year	100-year
10	Subarea (drains to existing basin)	14.99	0.00	36 min.	3.40	5.05	12.79	33.98
20	Subarea	42.38	0.20	23 min.	12.49	18.73	47.95	126.69
99	**Total Flow**	**57.37**	**0.20**	**-**	**14.88**	**22.37**	**57.40**	**153.11**

POST-DEVELOPMENT CONDITIONS

The proposed development includes the construction of a new residential subdivision including new roadways, a clubhouse and pool, walking paths, and stormwater management ponds and an infiltration basin. The development plan also includes a future multifamily development on the north end of the site. The proposed development plan, including future buildout conditions, will disturb approximately 57 acres and will result in a net increase in impervious area of approximately 21.52 acres.

Refer to Figure 2 for drainage subareas, travel paths, and land cover types for post-development conditions. The hydrological analysis of post-development conditions was performed using the same methodology as used for pre-development conditions. The following table summarizes the results of the analysis of post-development conditions for the site.

Appendix B contains a schematic plan of the hydrological analysis and detailed hydrological computations for post-development conditions.

TABLE 3
Post-Development Site Conditions

Subarea or Junction	Description	Area (ac)	Impervious Area (ac)	Time of Cons.	Peak Flow Rate (cfs)			
					1-year	2-year	10-year	100-year
10	Subarea (Future Dev.)	5.43	2.13	33 min.	2.62	3.49	7.15	16.17
10P	Pond	-	-	-	0.24	0.43	2.36	5.20
20	Subarea	6.86	2.69	10 min.	6.67	8.72	17.14	37.29
20P	Pond	-	-	-	0.18	0.46	3.55	9.70
30	Subarea	17.03	7.78	26 min.	12.18	15.68	29.97	63.90
30P	Pond	-	-	-	0.78	1.87	15.54	58.23
40	Subarea	3.98	2.01	9 min.	5.48	6.89	12.51	25.36
40P	Pond	-	-	-	0.26	0.29	0.38	2.51
45	Subarea	2.40	0.42	9 min.	0.84	1.34	3.68	10.20
45B	Infiltration Basin	-	-	-	0.37	0.97	7.06	22.39
50	Subarea (Undetained)	3.63	0.78	6 min.	1.97	2.94	7.21	18.42
60	Subarea (Undetained – drains to existing basin)	2.33	0.39	9 min.	0.81	1.30	3.54	9.79
65L	Link	-	-	-	2.69	4.13	10.61	27.94
70	Subarea	2.69	0.49	23 min.	0.70	1.07	2.86	7.76
70B	Dry Basin	-	-	-	0.19	0.23	0.37	1.00
80	Subarea	9.66	4.11	29 min.	5.45	7.18	14.35	31.77
80P	Pond	-	-	-	0.90	2.47	11.32	27.36
90	Subarea	1.27	0.36	6 min.	0.89	1.25	2.85	6.94
90B	Rain Garden	-	-	-	0.24	0.33	0.66	3.47
100	Subarea	2.12	0.56	10 min.	1.22	1.74	4.03	9.98
100B	Rani Garden	-	-	-	0.30	0.40	1.22	4.23
105L	Link	-	-	-	1.16	3.07	12.97	33.35
110L	**Total Flow**	**57.37**	**21.72**	**-**	**2.79**	**4.48**	**14.90**	**51.18**

DETENTION SYSTEM ROUTING

The stormwater management ponds, rain gardens, and infiltration basin are designed in accordance with WDNR's Technical Standard 1001 (Wet Detention Basin), 1009 (Rain Garden) and 1003 (Infiltration Basin), respectively. Details of the outlet control structures for each

system are identified on below. The following table summarizes the routing analysis for each stormwater management system.

TABLE 4
Detention System Routing Analysis Summary

Pond 10P (Future Pond)

System Details:
Bottom Elevation = 85.00
Normal Water Level Elevation = 90.00
Top of Berm Elevation = 95.00

Outlet Control:
3- inch diameter orifice at I.E. 90.00
11-inch diameter orifice at I.E. 91.25
10-spillway at Elevation 94.00

	1-Year Storm	2-Year Storm	10-Year Storm	100-Year Storm
Peak Inflow	2.62 cfs	3.49 cfs	7.15 cfs	16.17 cfs
Peak Outflow	0.24 cfs	0.43 cfs	2.36 cfs	5.20 cfs
Max Water Surface Elev.	91.16	91.45	92.11	93.93
Maximum Storage Volume	0.17 ac-ft	0.21 ac-ft	0.33 ac-ft	0.71 ac-ft

Pond 20P

System Details:
Bottom Elevation = 54.00
Normal Water Level Elevation = 62.00
Top of Berm Elevation = 65.00

Outlet Control:
3- inch diameter orifice at I.E. 62.00
18-inch standpipe, rim Elevation 62.75
10-foot spillway at Elevation 64.00

	1-Year Storm	2-Year Storm	10-Year Storm	100-Year Storm
Peak Inflow	6.67 cfs	8.72 cfs	17.14 cfs	37.29 cfs
Peak Outflow	0.18 cfs	0.46 cfs	3.55 cfs	9.70 cfs
Max Water Surface Elev.	62.70	62.82	63.11	63.96
Maximum Storage Volume	0.26 ac-ft	0.32 ac-ft	0.46 ac-ft	0.93 ac-ft

Pond 30P

System Details:
Bottom Elevation = 47.00
Normal Water Level Elevation = 53.00
Top of Berm Elevation = 58.00

Outlet Control:
3- inch diameter orifice at I.E. 53.00
10-foot spillway at Elevation 55.00
10-foot spillway at Elevation 57.00

	1-Year Storm	2-Year Storm	10-Year Storm	100-Year Storm
Peak Inflow	12.39 cfs	15.94 cfs	32.92 cfs	75.54 cfs
Peak Outflow	0.78 cfs	1.87 cfs	15.54 cfs	58.23 cfs
Max Water Surface Elev.	55.07	55.16	55.68	56.87
Maximum Storage Volume	0.97 ac-ft	1.02 ac-ft	1.32 ac-ft	2.08 ac-ft

Pond 40P

System Details:
Bottom Elevation = 50.00
Normal Water Level Elevation = 58.60
Top of Berm Elevation = 60.00

Outlet Control:
3- inch diameter orifice at I.E. 55.00
10-foot spillway at Elevation 58.60

	1-Year Storm	2-Year Storm	10-Year Storm	100-Year Storm
Peak Inflow	5.48 cfs	6.90 cfs	12.60 cfs	25.63 cfs
Peak Outflow	0.26 cfs	0.29 cfs	0.38 cfs	2.51 cfs
Max Water Surface Elev.	56.30	56.62	57.73	58.80
Maximum Storage Volume	0.21 ac-ft	0.28 ac-ft	0.57 ac-ft	0.94 ac-ft

TABLE 4
Detention System Routing Analysis Summary

Infiltration Basin 45B

System Details:
Bottom Elevation = 52.00
Top of Berm Elevation = 58.00

Outlet Control:
0.13 in/hr infiltration rate (per WDNR TS 1002)
3-inch diameter orifice at I.E. 52.25
24-inch diameter orifice at I.E. 53.75
10-foot spillway at Elevation 57.00

	1-Year Storm	2-Year Storm	10-Year Storm	100-Year Storm
Peak Inflow	1.06 cfs	2.24 cfs	16.40 cfs	60.71 cfs
Peak Outflow	0.37 cfs	0.97 cfs	7.06 cfs	22.39 cfs
Max Water Surface Elev.	53.80	54.06	54.88	56.82
Maximum Storage Volume	0.67 ac-ft	0.78 ac-ft	1.18 ac-ft	2.29 ac-ft

Dry Basin 70B

System Details:
Bottom Elevation = 63.50
Top of Berm Elevation = 67.00

Outlet Control:
4-inch diameter orifice at I.E. 63.50
12-inch diameter inlet grate rim elev. 65.50
10-foot spillway at Elevation 66.00

	1-Year Storm	2-Year Storm	10-Year Storm	100-Year Storm
Peak Inflow	0.70 cfs	1.07 cfs	2.86 cfs	7.76 cfs
Peak Outflow	0.19 cfs	0.23 cfs	0.37 cfs	1.00 cfs
Max Water Surface Elev.	63.87	63.98	64.45	65.62
Maximum Storage Volume	0.03 ac-ft	0.04 ac-ft	0.12 ac-ft	0.35 ac-ft

Pond 80P

Pond Details:
Bottom Elevation = 50.50
Normal Water Level Elevation = 55.50
Top of Berm Elevation = 59.75

Outlet Control:
4-inch diameter underdrain at I.E. 55.50
30-inch diameter inlet grate at rim elev. 57.33
10-foot spillway at Elevation 58.75

	1-Year Storm	2-Year Storm	10-Year Storm	100-Year Storm
Peak Inflow	5.45 cfs	7.18 cfs	14.35 cfs	31.77 cfs
Peak Outflow	0.90 cfs	2.47 cfs	11.32 cfs	27.36 cfs
Max Water Surface Elev.	57.39	57.51	57.89	58.60
Maximum Storage Volume	0.29 ac-ft	0.31 ac-ft	0.39 ac-ft	0.54 ac-ft

Rain Garden 90B

System Details:
Bottom Elevation = 58.50
Top of Soil Elevation = 60.00
Top of Berm Elevation = 61.90

Outlet Control:
0.13 in/hr infiltration rate (per WDNR TS 1002)
4-inch diameter underdrain at I.E. 58.75
12-inch standpipe, rim Elevation 60.25
10-foot spillway at Elevation 60.90

	1-Year Storm	2-Year Storm	10-Year Storm	100-Year Storm
Peak Inflow	0.89 cfs	1.25 cfs	2.85 cfs	6.94 cfs
Peak Outflow	0.24 cfs	0.33 cfs	0.66 cfs	3.47 cfs
Max Water Surface Elev.	59.22	59.51	60.31	60.83
Maximum Storage Volume	0.01 ac-ft	0.02 ac-ft	0.05 ac-ft	0.09 ac-ft

TABLE 4
Detention System Routing Analysis Summary

Rain Garden 100B

System Details:
Bottom Elevation = 53.50
Top of Soil Elevation = 55.00
Top of Berm Elevation = 57.50

Outlet Control:
0.13 in/hr infiltration rate (per WDNR TS 1002)
4-inch diameter underdrain at I.E. 53.75
12-inch standpipe, rim Elevation 55.25
10-foot spillway at Elevation 56.50

	1-Year Storm	2-Year Storm	10-Year Storm	100-Year Storm
Peak Inflow	1.22 cfs	1.74 cfs	4.03 cfs	9.98 cfs
Peak Outflow	0.30 cfs	0.40 cfs	1.22 cfs	4.23 cfs
Max Water Surface Elev.	54.39	54.78	55.42	56.14
Maximum Storage Volume	0.02 ac-ft	0.03 ac-ft	0.08 ac-ft	0.17 ac-ft

PEAK DISCHARGE SUMMARIES

The stormwater management system will maintain post-development peak discharge rates to be no greater than pre-development discharge rates for the 1, 2, 10 and 100-year, 24-hour design storms. This is in accordance with Waukesha's City Ordinance. The follow table compares the results of the analyses from a peak discharge standpoint.

TABLE 5
Comparison of Peak Discharge

1-yr Pre-Development		1-yr Post-Development
14.88 cfs	>	2.79 cfs
2-yr Pre-Development		2-yr Post-Development
22.37 cfs	>	4.48 cfs
10-yr Pre-Development		10-yr Post-Development
57.40 cfs	>	14.90 cfs
100-yr Pre-Development		100-yr Post-Development
153.11 cfs	>	51.18 cfs

STORMWATER QUALITY

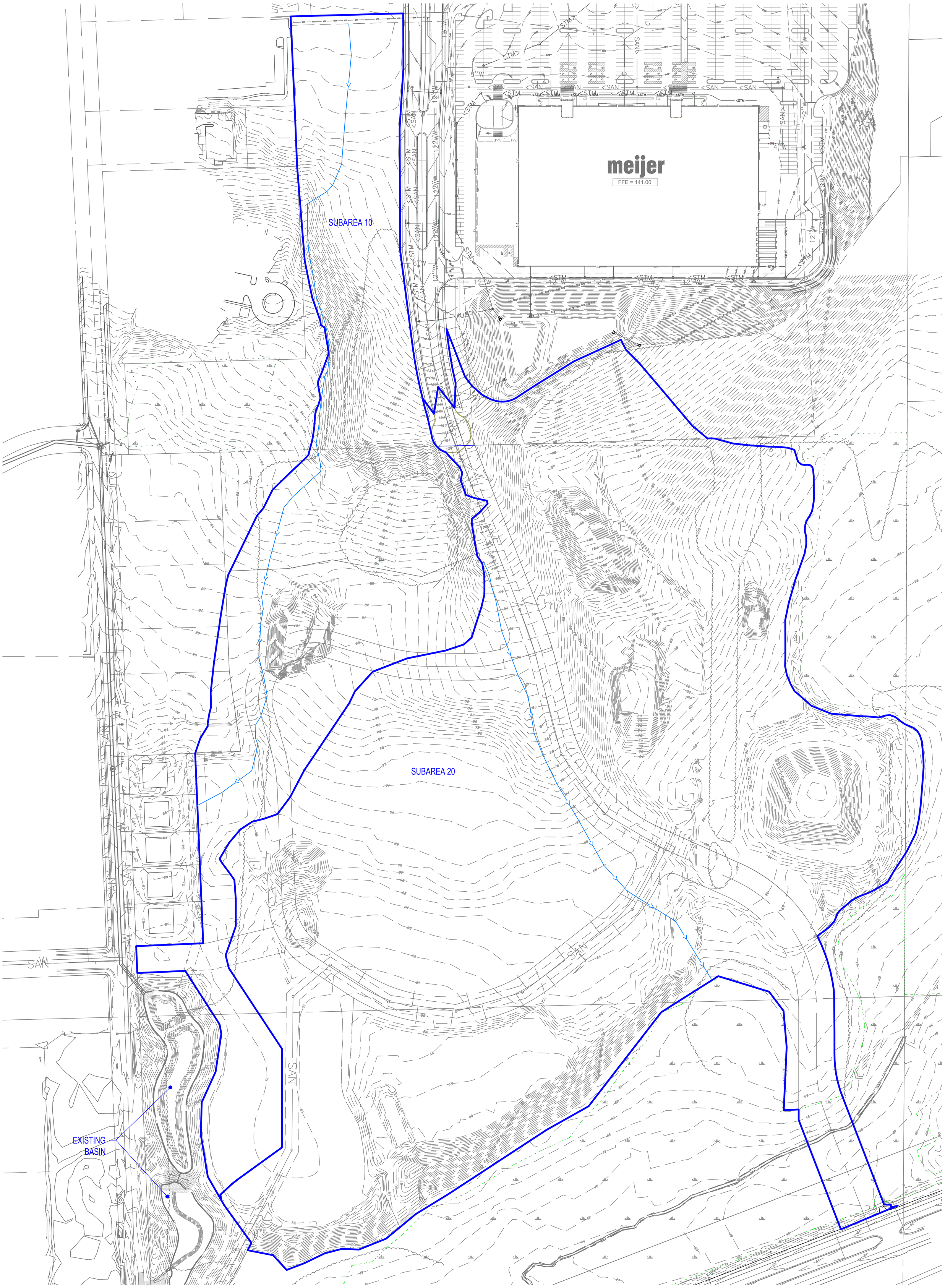
The City of Waukesha's Ordinance requires new development sites to be designed to remove 80 percent of TSS, based on an average annual rainfall as compared to no runoff management controls. Stormwater quality was analyzed using WinSLAMM Version 10.4.1 software, developed by Robert Pitt and John Voorhees. The results of the WinSLAMM analysis indicate that approximately 80 percent of TSS will be removed from stormwater as a result of the stormwater management ponds, rain gardens, infiltration basin, and two (2) sumped catch basins near the intersection of Tenny Avenue and Les Paul Parkway. Detailed computations are provided in Appendix C.

INFILTRATION

The City of Waukesha's Ordinance requires medium density residential developments to infiltrate sufficient runoff volume so that the post-development infiltration volume is at least 75 percent of pre-development infiltration volume, based on an average annual rainfall. However, no more than 2 percent of the post-construction site is required as an effective infiltration area.

The infiltration analysis was performed using WinSLAMM. The results of the WinSLAMM analysis indicate that post-development conditions will infiltrate approximately 78 percent of the pre-development infiltration volume. Detailed computations are provided in Appendix D.

FIGURES



PRE-DEVELOPMENT CONDITIONS

STANDING STONE
DEVELOPMENT
WAUKESHA, WISCONSIN

LEGEND

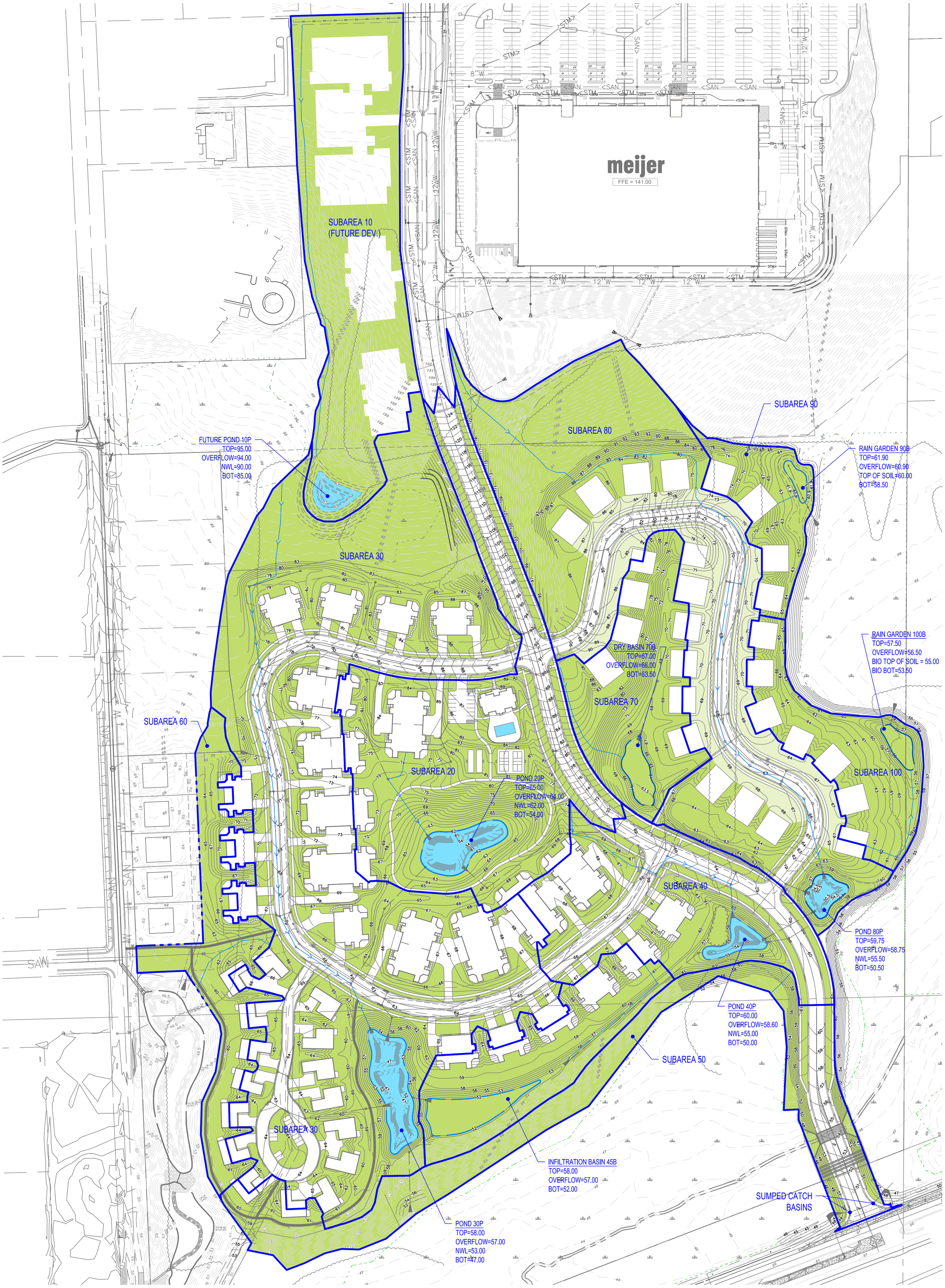
—DRAINAGE BASIN BOUNDARY

—Tc LINE

0 50' 100' 200'

SCALE: 1" = 100'

FIGURE 1



LEGEND

- GRASS
- ASSUMED 30% GRASS (ACCOUNTS FOR SIDEWALK AND DRIVES)
- WATER
- DRAINAGE BASIN BOUNDARY
- Tc LINE

POST-DEVELOPMENT CONDITIONS

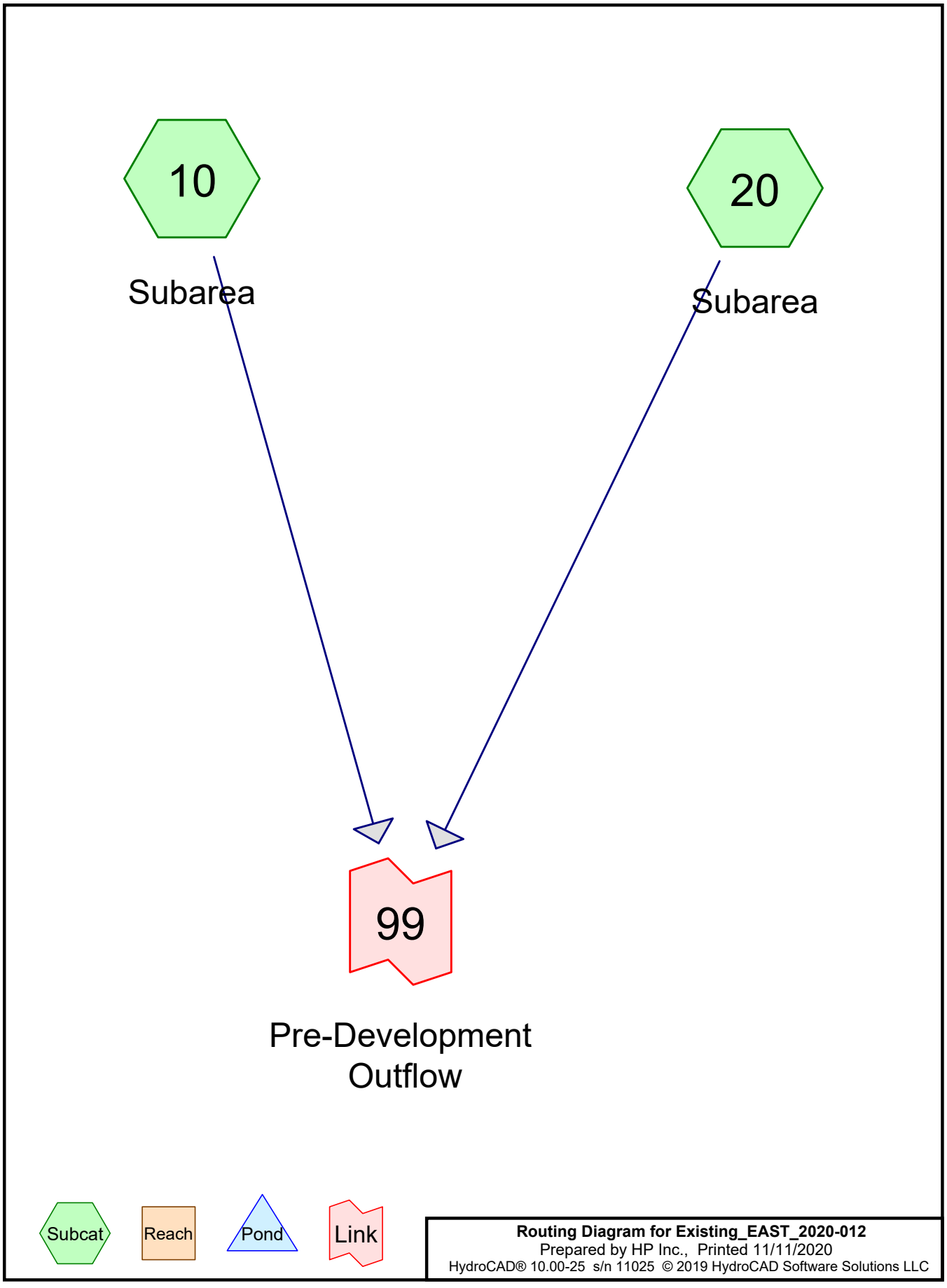
STANDING STONE
DEVELOPMENT
WAUKESHA, WISCONSIN

0 50' 100' 200'
SCALE: 1" = 100'

FIGURE 2

APPENDIX A

Pre-Development Hydrologic Analysis



Routing Diagram for Existing_EAST_2020-012
Prepared by HP Inc., Printed 11/11/2020

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
57.170	69	cropland - B soils (10, 20)
0.200	98	impervious (20)
57.370	**69**	**TOTAL AREA**

Time span=0.00-20.00 hrs, dt=0.05 hrs, 401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment10: Subarea Runoff Area=14.990 ac 0.00% Impervious Runoff Depth>0.34"
Flow Length=1,910' Tc=36.2 min CN=69 Runoff=3.40 cfs 0.428 af

Subcatchment20: Subarea Runoff Area=42.380 ac 0.47% Impervious Runoff Depth>0.35"
Flow Length=1,100' Slope=0.0500 '/' Tc=22.5 min CN=69 Runoff=12.49 cfs 1.220 af

Link 99: Pre-DevelopmentOutflow Inflow=14.88 cfs 1.648 af
Primary=14.88 cfs 1.648 af

Total Runoff Area = 57.370 ac Runoff Volume = 1.648 af Average Runoff Depth = 0.34"
99.65% Pervious = 57.170 ac 0.35% Impervious = 0.200 ac

Time span=0.00-20.00 hrs, dt=0.05 hrs, 401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment10: Subarea Runoff Area=14.990 ac 0.00% Impervious Runoff Depth>0.47"
Flow Length=1,910' Tc=36.2 min CN=69 Runoff=5.05 cfs 0.592 af

Subcatchment20: Subarea Runoff Area=42.380 ac 0.47% Impervious Runoff Depth>0.48"
Flow Length=1,100' Slope=0.0500 '/' Tc=22.5 min CN=69 Runoff=18.73 cfs 1.684 af

Link 99: Pre-DevelopmentOutflow Inflow=22.37 cfs 2.276 af
Primary=22.37 cfs 2.276 af

Total Runoff Area = 57.370 ac Runoff Volume = 2.276 af Average Runoff Depth = 0.48"
99.65% Pervious = 57.170 ac 0.35% Impervious = 0.200 ac

Time span=0.00-20.00 hrs, dt=0.05 hrs, 401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment10: Subarea Runoff Area=14.990 ac 0.00% Impervious Runoff Depth>1.07"
Flow Length=1,910' Tc=36.2 min CN=69 Runoff=12.79 cfs 1.335 af

Subcatchment20: Subarea Runoff Area=42.380 ac 0.47% Impervious Runoff Depth>1.07"
Flow Length=1,100' Slope=0.0500 '/' Tc=22.5 min CN=69 Runoff=47.95 cfs 3.794 af

Link 99: Pre-DevelopmentOutflow Inflow=57.40 cfs 5.129 af
Primary=57.40 cfs 5.129 af

Total Runoff Area = 57.370 ac Runoff Volume = 5.129 af Average Runoff Depth = 1.07"
99.65% Pervious = 57.170 ac 0.35% Impervious = 0.200 ac

Time span=0.00-20.00 hrs, dt=0.05 hrs, 401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment10: Subarea Runoff Area=14.990 ac 0.00% Impervious Runoff Depth>2.70"
Flow Length=1,910' Tc=36.2 min CN=69 Runoff=33.98 cfs 3.371 af

Subcatchment20: Subarea Runoff Area=42.380 ac 0.47% Impervious Runoff Depth>2.71"
Flow Length=1,100' Slope=0.0500 '/' Tc=22.5 min CN=69 Runoff=126.69 cfs 9.572 af

Link 99: Pre-DevelopmentOutflow Inflow=153.11 cfs 12.943 af
Primary=153.11 cfs 12.943 af

Total Runoff Area = 57.370 ac Runoff Volume = 12.943 af Average Runoff Depth = 2.71"
99.65% Pervious = 57.170 ac 0.35% Impervious = 0.200 ac

Summary for Subcatchment 10: Subarea

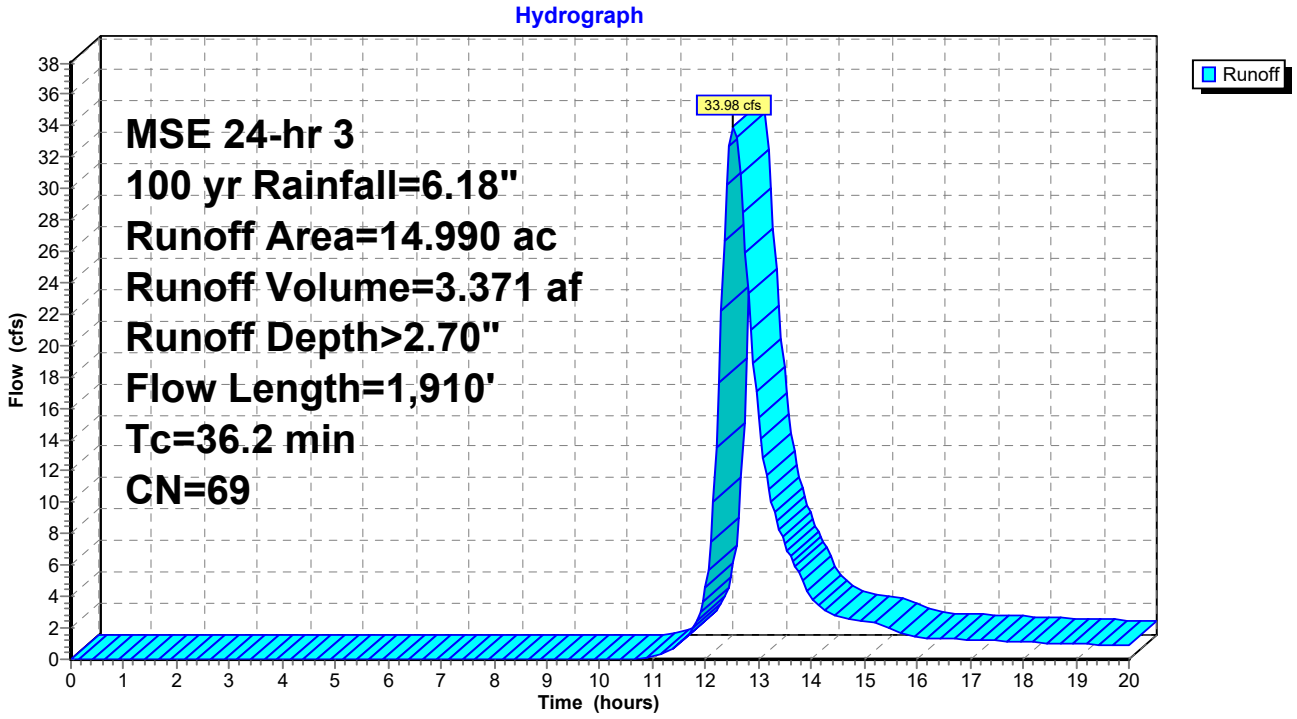
Runoff = 33.98 cfs @ 12.52 hrs, Volume= 3.371 af, Depth> 2.70"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100 yr Rainfall=6.18"

	Area (ac)	CN	Description
*	14.990	69	cropland - B soils
	14.990		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.9	300	0.0200	0.22		**Sheet Flow,** Range n= 0.130 P2= 2.70"
13.3	1,610	0.0500	2.01		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
36.2	1,910	Total			

Subcatchment 10: Subarea



Summary for Subcatchment 20: Subarea

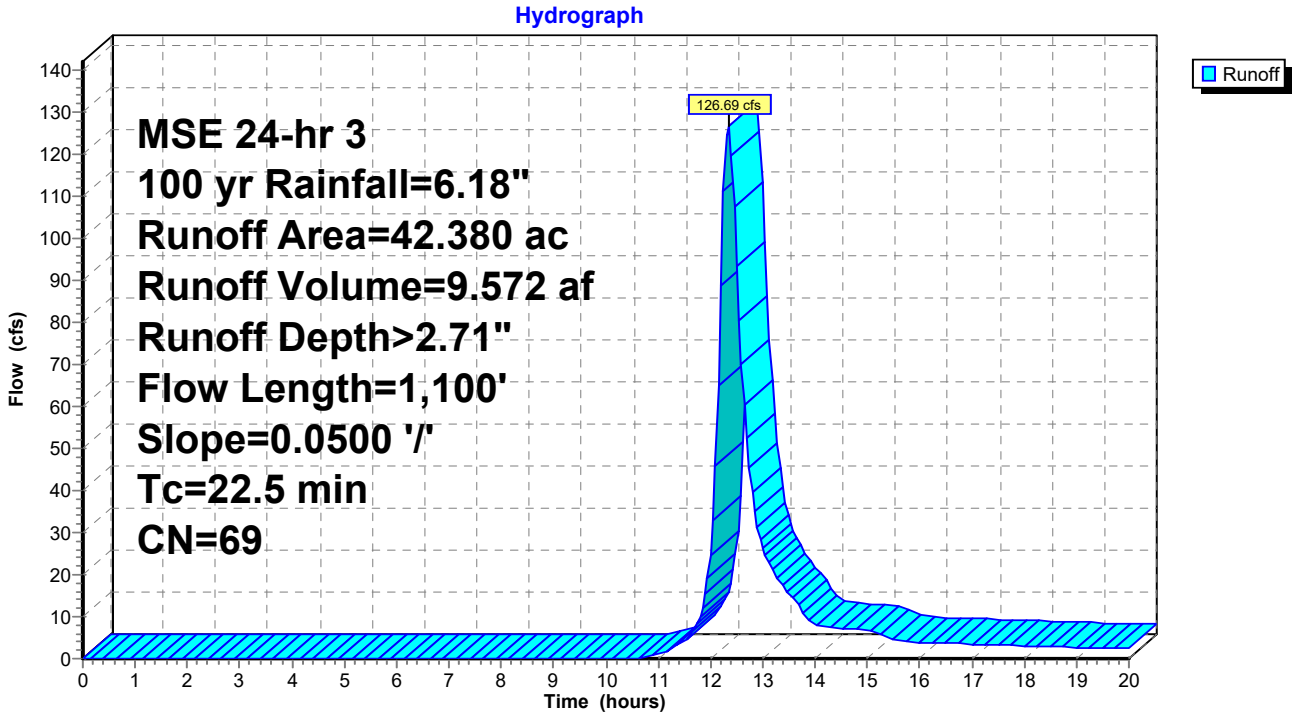
Runoff = 126.69 cfs @ 12.34 hrs, Volume= 9.572 af, Depth> 2.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100 yr Rainfall=6.18"

	Area (ac)	CN	Description
*	42.180	69	cropland - B soils
*	0.200	98	impervious
	42.380	69	Weighted Average
	42.180		99.53% Pervious Area
	0.200		0.47% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.9	300	0.0500	0.31		**Sheet Flow,** Range n= 0.130 P2= 2.70"
6.6	800	0.0500	2.01		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
22.5	1,100	Total			

Subcatchment 20: Subarea

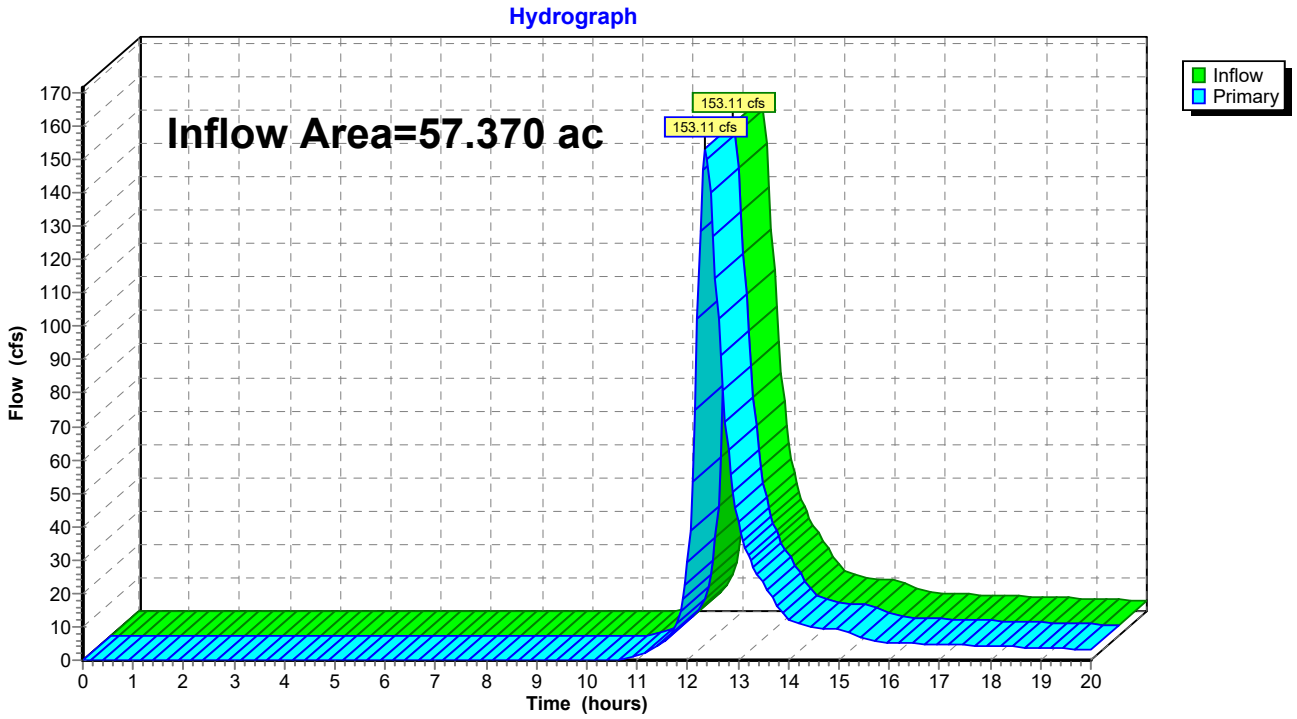


Summary for Link 99: Pre-Development Outflow

Inflow Area = 57.370 ac, 0.35% Impervious, Inflow Depth > 2.71" for 100 yr event
Inflow = 153.11 cfs @ 12.36 hrs, Volume= 12.943 af
Primary = 153.11 cfs @ 12.36 hrs, Volume= 12.943 af, Atten= 0%, Lag= 0.0 min

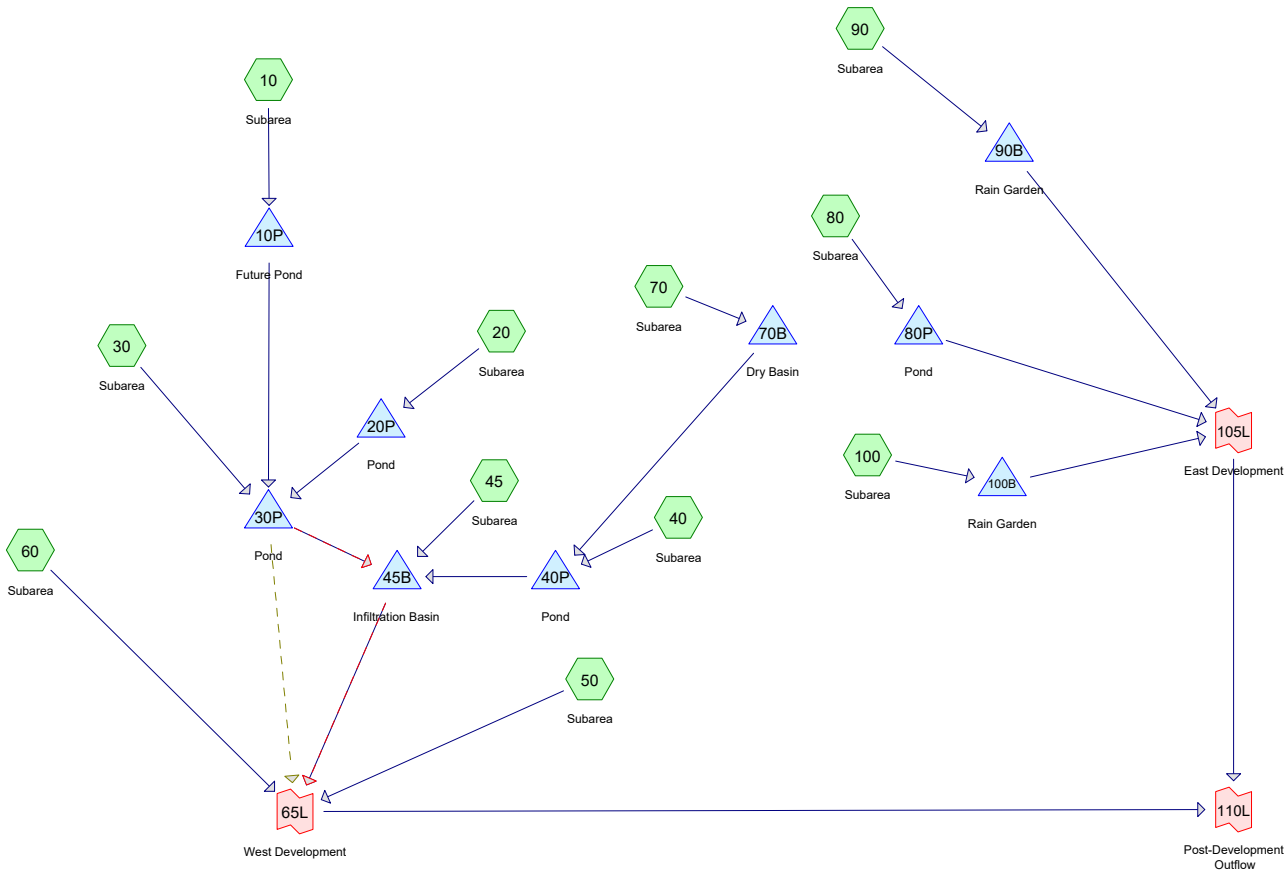
Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

Link 99: Pre-Development Outflow



APPENDIX B

Post-Development Hydrologic Analysis



Subcat Reach Pond Link

Routing Diagram for Proposed_EAST_2020-012
Prepared by HP Inc., Printed 11/11/2020

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
34.530	61	grass - B soils (10, 20, 30, 40, 45, 50, 60, 70, 80, 90, 100)
21.720	98	impervious (10, 20, 30, 40, 45, 50, 60, 70, 80, 90, 100)
1.120	98	water (10, 20, 30, 40, 80)
57.370	**76**	**TOTAL AREA**

Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 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

Subcatchment10: Subarea Runoff Area=5.430 ac 41.62% Impervious Runoff Depth=0.63"
Flow Length=975' Tc=33.3 min CN=76 Runoff=2.62 cfs 0.287 af

Subcatchment20: Subarea Runoff Area=6.860 ac 43.88% Impervious Runoff Depth=0.68"
Flow Length=235' Slope=0.0400 '/' Tc=10.3 min CN=77 Runoff=6.67 cfs 0.388 af

Subcatchment30: Subarea Runoff Area=17.030 ac 48.03% Impervious Runoff Depth=0.77"
Flow Length=1,365' Tc=25.6 min CN=79 Runoff=12.18 cfs 1.094 af

Subcatchment40: Subarea Runoff Area=3.950 ac 54.43% Impervious Runoff Depth=0.87"
Flow Length=550' Tc=8.7 min CN=81 Runoff=5.48 cfs 0.287 af

Subcatchment45: Subarea Runoff Area=2.400 ac 17.50% Impervious Runoff Depth=0.32"
Flow Length=325' Tc=9.0 min CN=67 Runoff=0.84 cfs 0.063 af

Subcatchment50: Subarea Runoff Area=3.630 ac 21.49% Impervious Runoff Depth=0.38"
Flow Length=60' Tc=6.4 min CN=69 Runoff=1.97 cfs 0.114 af

Subcatchment60: Subarea Runoff Area=2.330 ac 16.74% Impervious Runoff Depth=0.32"
Flow Length=220' Slope=0.0400 '/' Tc=9.1 min CN=67 Runoff=0.81 cfs 0.061 af

Subcatchment70: Subarea Runoff Area=2.690 ac 18.22% Impervious Runoff Depth=0.35"
Flow Length=260' Tc=22.5 min CN=68 Runoff=0.70 cfs 0.077 af

Subcatchment80: Subarea Runoff Area=9.660 ac 43.89% Impervious Runoff Depth=0.68"
Flow Length=1,855' Tc=29.4 min CN=77 Runoff=5.45 cfs 0.546 af

Subcatchment90: Subarea Runoff Area=1.270 ac 28.35% Impervious Runoff Depth=0.44"
Flow Length=45' Slope=0.0500 '/' Tc=6.0 min CN=71 Runoff=0.89 cfs 0.047 af

Subcatchment100: Subarea Runoff Area=2.120 ac 26.42% Impervious Runoff Depth=0.44"
Flow Length=275' Tc=9.6 min CN=71 Runoff=1.22 cfs 0.078 af

Pond 10P: Future Pond Peak Elev=91.16' Storage=0.166 af Inflow=2.62 cfs 0.287 af
Outflow=0.24 cfs 0.283 af

Pond 20P: Pond Peak Elev=62.70' Storage=0.264 af Inflow=6.67 cfs 0.388 af
Outflow=0.18 cfs 0.349 af

Pond 30P: Pond Peak Elev=55.07' Storage=0.971 af Inflow=12.39 cfs 1.726 af
Primary=0.33 cfs 0.792 af Secondary=0.45 cfs 0.239 af Tertiary=0.00 cfs 0.000 af Outflow=0.78 cfs 1.031 af

Pond 40P: Pond Peak Elev=56.30' Storage=0.211 af Inflow=5.48 cfs 0.364 af
Outflow=0.26 cfs 0.358 af

Pond 45B: Infiltration Basin Peak Elev=53.80' Storage=0.668 af Inflow=1.06 cfs 1.453 af
Discarded=0.07 cfs 0.180 af Primary=0.30 cfs 0.701 af Outflow=0.37 cfs 0.881 af

Pond 70B: Dry Basin Peak Elev=63.87' Storage=0.025 af Inflow=0.70 cfs 0.077 af
Outflow=0.19 cfs 0.077 af

Pond 80P: Pond Peak Elev=57.39' Storage=0.291 af Inflow=5.45 cfs 0.546 af
Outflow=0.90 cfs 0.542 af

Pond 90B: Rain Garden Peak Elev=59.22' Storage=0.013 af Inflow=0.89 cfs 0.047 af
Discarded=0.01 cfs 0.013 af Primary=0.23 cfs 0.034 af Outflow=0.24 cfs 0.047 af

Pond 100B: Rain Garden Peak Elev=54.39' Storage=0.024 af Inflow=1.22 cfs 0.078 af
Discarded=0.01 cfs 0.020 af Primary=0.29 cfs 0.058 af Outflow=0.30 cfs 0.078 af

Link 65L: West Development Inflow=2.69 cfs 0.876 af
Primary=2.69 cfs 0.876 af

Link 105L: East Development Inflow=1.16 cfs 0.635 af
Primary=1.16 cfs 0.635 af

Link 110L: Post-DevelopmentOutflow Inflow=2.79 cfs 1.510 af
Primary=2.79 cfs 1.510 af

Total Runoff Area = 57.370 ac Runoff Volume = 3.043 af Average Runoff Depth = 0.64"
60.19% Pervious = 34.530 ac 39.81% Impervious = 22.840 ac

Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 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

Subcatchment10: Subarea Runoff Area=5.430 ac 41.62% Impervious Runoff Depth=0.82"
Flow Length=975' Tc=33.3 min CN=76 Runoff=3.49 cfs 0.370 af

Subcatchment20: Subarea Runoff Area=6.860 ac 43.88% Impervious Runoff Depth=0.87"
Flow Length=235' Slope=0.0400 '/' Tc=10.3 min CN=77 Runoff=8.72 cfs 0.497 af

Subcatchment30: Subarea Runoff Area=17.030 ac 48.03% Impervious Runoff Depth=0.97"
Flow Length=1,365' Tc=25.6 min CN=79 Runoff=15.68 cfs 1.382 af

Subcatchment40: Subarea Runoff Area=3.950 ac 54.43% Impervious Runoff Depth=1.09"
Flow Length=550' Tc=8.7 min CN=81 Runoff=6.89 cfs 0.358 af

Subcatchment45: Subarea Runoff Area=2.400 ac 17.50% Impervious Runoff Depth=0.44"
Flow Length=325' Tc=9.0 min CN=67 Runoff=1.34 cfs 0.089 af

Subcatchment50: Subarea Runoff Area=3.630 ac 21.49% Impervious Runoff Depth=0.52"
Flow Length=60' Tc=6.4 min CN=69 Runoff=2.94 cfs 0.156 af

Subcatchment60: Subarea Runoff Area=2.330 ac 16.74% Impervious Runoff Depth=0.44"
Flow Length=220' Slope=0.0400 '/' Tc=9.1 min CN=67 Runoff=1.30 cfs 0.086 af

Subcatchment70: Subarea Runoff Area=2.690 ac 18.22% Impervious Runoff Depth=0.48"
Flow Length=260' Tc=22.5 min CN=68 Runoff=1.07 cfs 0.107 af

Subcatchment80: Subarea Runoff Area=9.660 ac 43.89% Impervious Runoff Depth=0.87"
Flow Length=1,855' Tc=29.4 min CN=77 Runoff=7.18 cfs 0.699 af

Subcatchment90: Subarea Runoff Area=1.270 ac 28.35% Impervious Runoff Depth=0.59"
Flow Length=45' Slope=0.0500 '/' Tc=6.0 min CN=71 Runoff=1.25 cfs 0.063 af

Subcatchment100: Subarea Runoff Area=2.120 ac 26.42% Impervious Runoff Depth=0.59"
Flow Length=275' Tc=9.6 min CN=71 Runoff=1.74 cfs 0.105 af

Pond 10P: Future Pond Peak Elev=91.45' Storage=0.213 af Inflow=3.49 cfs 0.370 af
Outflow=0.43 cfs 0.365 af

Pond 20P: Pond Peak Elev=62.82' Storage=0.315 af Inflow=8.72 cfs 0.497 af
Outflow=0.46 cfs 0.452 af

Pond 30P: Pond Peak Elev=55.16' Storage=1.018 af Inflow=15.94 cfs 2.199 af
Primary=0.34 cfs 0.752 af Secondary=1.53 cfs 0.710 af Tertiary=0.00 cfs 0.000 af Outflow=1.87 cfs 1.462 af

Pond 40P: Pond Peak Elev=56.62' Storage=0.278 af Inflow=6.90 cfs 0.465 af
Outflow=0.29 cfs 0.458 af

Pond 45B: Infiltration Basin Peak Elev=54.06' Storage=0.784 af Inflow=2.24 cfs 2.009 af
Discarded=0.07 cfs 0.192 af Primary=0.90 cfs 1.217 af Outflow=0.97 cfs 1.409 af

Pond 70B: Dry Basin Peak Elev=63.98' Storage=0.040 af Inflow=1.07 cfs 0.107 af
Outflow=0.23 cfs 0.107 af

Pond 80P: Pond Peak Elev=57.51' Storage=0.313 af Inflow=7.18 cfs 0.699 af
Outflow=2.47 cfs 0.695 af

Pond 90B: Rain Garden Peak Elev=59.51' Storage=0.018 af Inflow=1.25 cfs 0.063 af
Discarded=0.01 cfs 0.013 af Primary=0.32 cfs 0.050 af Outflow=0.33 cfs 0.063 af

Pond 100B: Rain Garden Peak Elev=54.78' Storage=0.034 af Inflow=1.74 cfs 0.105 af
Discarded=0.01 cfs 0.020 af Primary=0.39 cfs 0.085 af Outflow=0.40 cfs 0.105 af

Link 65L: West Development Inflow=4.13 cfs 1.459 af
Primary=4.13 cfs 1.459 af

Link 105L: East Development Inflow=3.07 cfs 0.830 af
Primary=3.07 cfs 0.830 af

Link 110L: Post-DevelopmentOutflow Inflow=4.48 cfs 2.289 af
Primary=4.48 cfs 2.289 af

Total Runoff Area = 57.370 ac Runoff Volume = 3.912 af Average Runoff Depth = 0.82"
60.19% Pervious = 34.530 ac 39.81% Impervious = 22.840 ac

Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 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

Subcatchment10: Subarea Runoff Area=5.430 ac 41.62% Impervious Runoff Depth=1.59"
Flow Length=975' Tc=33.3 min CN=76 Runoff=7.15 cfs 0.721 af

Subcatchment20: Subarea Runoff Area=6.860 ac 43.88% Impervious Runoff Depth=1.66"
Flow Length=235' Slope=0.0400 '/' Tc=10.3 min CN=77 Runoff=17.14 cfs 0.952 af

Subcatchment30: Subarea Runoff Area=17.030 ac 48.03% Impervious Runoff Depth=1.81"
Flow Length=1,365' Tc=25.6 min CN=79 Runoff=29.97 cfs 2.569 af

Subcatchment40: Subarea Runoff Area=3.950 ac 54.43% Impervious Runoff Depth=1.96"
Flow Length=550' Tc=8.7 min CN=81 Runoff=12.51 cfs 0.646 af

Subcatchment45: Subarea Runoff Area=2.400 ac 17.50% Impervious Runoff Depth=1.03"
Flow Length=325' Tc=9.0 min CN=67 Runoff=3.68 cfs 0.206 af

Subcatchment50: Subarea Runoff Area=3.630 ac 21.49% Impervious Runoff Depth=1.14"
Flow Length=60' Tc=6.4 min CN=69 Runoff=7.21 cfs 0.346 af

Subcatchment60: Subarea Runoff Area=2.330 ac 16.74% Impervious Runoff Depth=1.03"
Flow Length=220' Slope=0.0400 '/' Tc=9.1 min CN=67 Runoff=3.54 cfs 0.200 af

Subcatchment70: Subarea Runoff Area=2.690 ac 18.22% Impervious Runoff Depth=1.09"
Flow Length=260' Tc=22.5 min CN=68 Runoff=2.86 cfs 0.244 af

Subcatchment80: Subarea Runoff Area=9.660 ac 43.89% Impervious Runoff Depth=1.66"
Flow Length=1,855' Tc=29.4 min CN=77 Runoff=14.35 cfs 1.340 af

Subcatchment90: Subarea Runoff Area=1.270 ac 28.35% Impervious Runoff Depth=1.27"
Flow Length=45' Slope=0.0500 '/' Tc=6.0 min CN=71 Runoff=2.85 cfs 0.134 af

Subcatchment100: Subarea Runoff Area=2.120 ac 26.42% Impervious Runoff Depth=1.27"
Flow Length=275' Tc=9.6 min CN=71 Runoff=4.03 cfs 0.224 af

Pond 10P: Future Pond Peak Elev=92.11' Storage=0.328 af Inflow=7.15 cfs 0.721 af
Outflow=2.36 cfs 0.716 af

Pond 20P: Pond Peak Elev=63.11' Storage=0.456 af Inflow=17.14 cfs 0.952 af
Outflow=3.55 cfs 0.902 af

Pond 30P: Pond Peak Elev=55.68' Storage=1.316 af Inflow=32.92 cfs 4.187 af
Primary=0.38 cfs 0.689 af Secondary=15.17 cfs 2.721 af Tertiary=0.00 cfs 0.000 af Outflow=15.54 cfs 3.409 af

Pond 40P: Pond Peak Elev=57.73' Storage=0.572 af Inflow=12.60 cfs 0.889 af
Outflow=0.38 cfs 0.855 af

Pond 45B: Infiltration Basin Peak Elev=54.88' Storage=1.177 af Inflow=16.40 cfs 4.470 af
Discarded=0.08 cfs 0.208 af Primary=6.98 cfs 3.589 af Outflow=7.06 cfs 3.797 af

Pond 70B: Dry Basin Peak Elev=64.45' Storage=0.119 af Inflow=2.86 cfs 0.244 af
Outflow=0.37 cfs 0.243 af

Pond 80P: Pond Peak Elev=57.89' Storage=0.389 af Inflow=14.35 cfs 1.340 af
Outflow=11.32 cfs 1.336 af

Pond 90B: Rain Garden Peak Elev=60.31' Storage=0.048 af Inflow=2.85 cfs 0.134 af
Discarded=0.01 cfs 0.014 af Primary=0.65 cfs 0.120 af Outflow=0.66 cfs 0.134 af

Pond 100B: Rain Garden Peak Elev=55.42' Storage=0.081 af Inflow=4.03 cfs 0.224 af
Discarded=0.02 cfs 0.022 af Primary=1.20 cfs 0.202 af Outflow=1.22 cfs 0.224 af

Link 65L: West Development Inflow=10.61 cfs 4.135 af
Primary=10.61 cfs 4.135 af

Link 105L: East Development Inflow=12.97 cfs 1.657 af
Primary=12.97 cfs 1.657 af

Link 110L: Post-DevelopmentOutflow Inflow=14.90 cfs 5.793 af
Primary=14.90 cfs 5.793 af

Total Runoff Area = 57.370 ac Runoff Volume = 7.582 af Average Runoff Depth = 1.59"
60.19% Pervious = 34.530 ac 39.81% Impervious = 22.840 ac

Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 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

Subcatchment10: Subarea Runoff Area=5.430 ac 41.62% Impervious Runoff Depth=3.54"
Flow Length=975' Tc=33.3 min CN=76 Runoff=16.17 cfs 1.600 af

Subcatchment20: Subarea Runoff Area=6.860 ac 43.88% Impervious Runoff Depth=3.64"
Flow Length=235' Slope=0.0400 '/' Tc=10.3 min CN=77 Runoff=37.29 cfs 2.079 af

Subcatchment30: Subarea Runoff Area=17.030 ac 48.03% Impervious Runoff Depth=3.84"
Flow Length=1,365' Tc=25.6 min CN=79 Runoff=63.90 cfs 5.451 af

Subcatchment40: Subarea Runoff Area=3.950 ac 54.43% Impervious Runoff Depth=4.05"
Flow Length=550' Tc=8.7 min CN=81 Runoff=25.36 cfs 1.333 af

Subcatchment45: Subarea Runoff Area=2.400 ac 17.50% Impervious Runoff Depth=2.67"
Flow Length=325' Tc=9.0 min CN=67 Runoff=10.20 cfs 0.533 af

Subcatchment50: Subarea Runoff Area=3.630 ac 21.49% Impervious Runoff Depth=2.85"
Flow Length=60' Tc=6.4 min CN=69 Runoff=18.42 cfs 0.863 af

Subcatchment60: Subarea Runoff Area=2.330 ac 16.74% Impervious Runoff Depth=2.67"
Flow Length=220' Slope=0.0400 '/' Tc=9.1 min CN=67 Runoff=9.79 cfs 0.518 af

Subcatchment70: Subarea Runoff Area=2.690 ac 18.22% Impervious Runoff Depth=2.76"
Flow Length=260' Tc=22.5 min CN=68 Runoff=7.76 cfs 0.619 af

Subcatchment80: Subarea Runoff Area=9.660 ac 43.89% Impervious Runoff Depth=3.64"
Flow Length=1,855' Tc=29.4 min CN=77 Runoff=31.77 cfs 2.928 af

Subcatchment90: Subarea Runoff Area=1.270 ac 28.35% Impervious Runoff Depth=3.04"
Flow Length=45' Slope=0.0500 '/' Tc=6.0 min CN=71 Runoff=6.94 cfs 0.322 af

Subcatchment100: Subarea Runoff Area=2.120 ac 26.42% Impervious Runoff Depth=3.04"
Flow Length=275' Tc=9.6 min CN=71 Runoff=9.98 cfs 0.538 af

Pond 10P: Future Pond Peak Elev=93.93' Storage=0.712 af Inflow=16.17 cfs 1.600 af
Outflow=5.20 cfs 1.594 af

Pond 20P: Pond Peak Elev=63.96' Storage=0.929 af Inflow=37.29 cfs 2.079 af
Outflow=9.70 cfs 2.026 af

Pond 30P: Pond Peak Elev=56.87' Storage=2.081 af Inflow=75.54 cfs 9.070 af
Primary=0.41 cfs 0.638 af Secondary=57.91 cfs 7.627 af Tertiary=0.00 cfs 0.000 af Outflow=58.23 cfs 8.265 af

Pond 40P: Pond Peak Elev=58.80' Storage=0.942 af Inflow=25.63 cfs 1.951 af
Outflow=2.51 cfs 1.718 af

Pond 45B: Infiltration Basin Peak Elev=56.82' Storage=2.287 af Inflow=60.71 cfs 10.516 af
Discarded=0.11 cfs 0.226 af Primary=22.28 cfs 9.576 af Outflow=22.39 cfs 9.802 af

Pond 70B: Dry Basin Peak Elev=65.62' Storage=0.352 af Inflow=7.76 cfs 0.619 af
Outflow=1.00 cfs 0.618 af

Pond 80P: Pond Peak Elev=58.60' Storage=0.543 af Inflow=31.77 cfs 2.928 af
Outflow=27.36 cfs 2.923 af

Pond 90B: Rain Garden Peak Elev=60.83' Storage=0.091 af Inflow=6.94 cfs 0.322 af
Discarded=0.01 cfs 0.016 af Primary=3.45 cfs 0.307 af Outflow=3.47 cfs 0.322 af

Pond 100B: Rain Garden Peak Elev=56.14' Storage=0.169 af Inflow=9.98 cfs 0.538 af
Discarded=0.02 cfs 0.025 af Primary=4.20 cfs 0.513 af Outflow=4.23 cfs 0.538 af

Link 65L: West Development Inflow=27.94 cfs 10.957 af
Primary=27.94 cfs 10.957 af

Link 105L: East Development Inflow=33.35 cfs 3.743 af
Primary=33.35 cfs 3.743 af

Link 110L: Post-DevelopmentOutflow Inflow=51.18 cfs 14.700 af
Primary=51.18 cfs 14.700 af

Total Runoff Area = 57.370 ac Runoff Volume = 16.783 af Average Runoff Depth = 3.51"
60.19% Pervious = 34.530 ac 39.81% Impervious = 22.840 ac

Summary for Subcatchment 10: Subarea

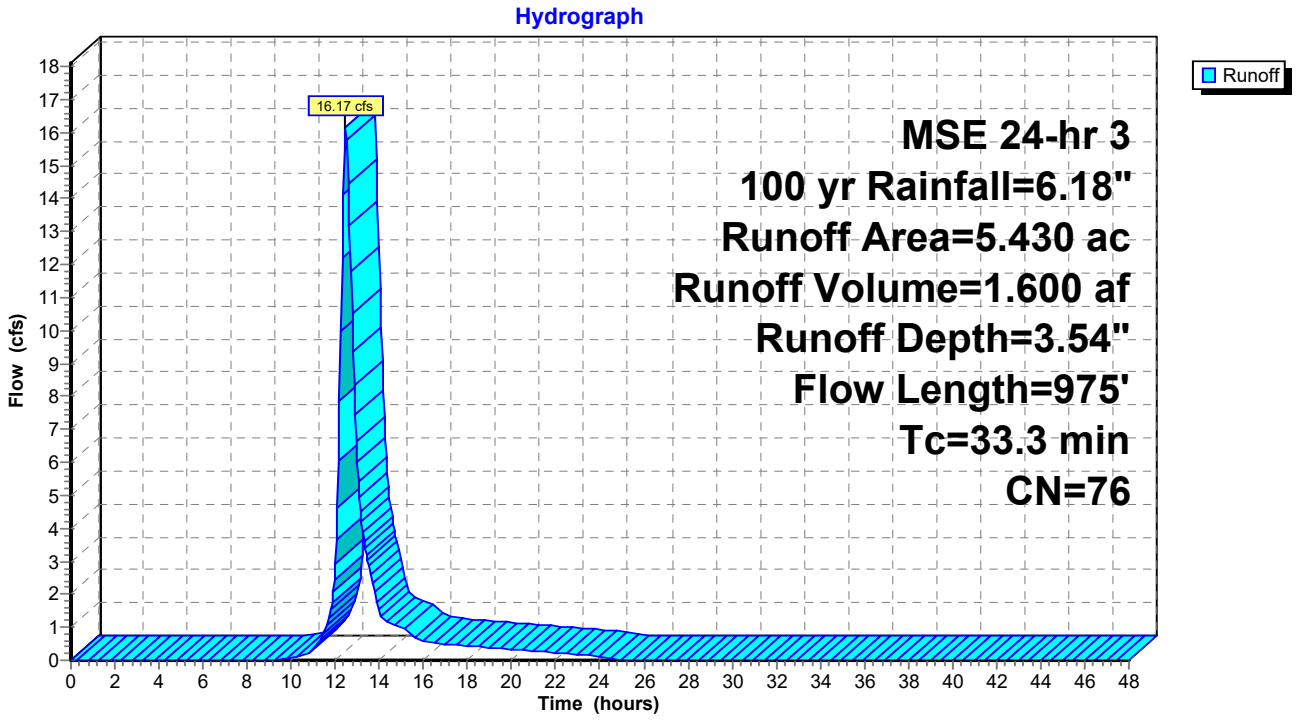
Runoff = 16.17 cfs @ 12.47 hrs, Volume= 1.600 af, Depth= 3.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100 yr Rainfall=6.18"

	Area (ac)	CN	Description
*	3.170	61	grass - B soils
*	0.130	98	water
*	2.130	98	impervious
	5.430	76	Weighted Average
	3.170		58.38% Pervious Area
	2.260		41.62% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.2	230	0.0200	0.13		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
3.1	745	0.0600	3.94		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
33.3	975	Total			

Subcatchment 10: Subarea



Summary for Subcatchment 20: Subarea

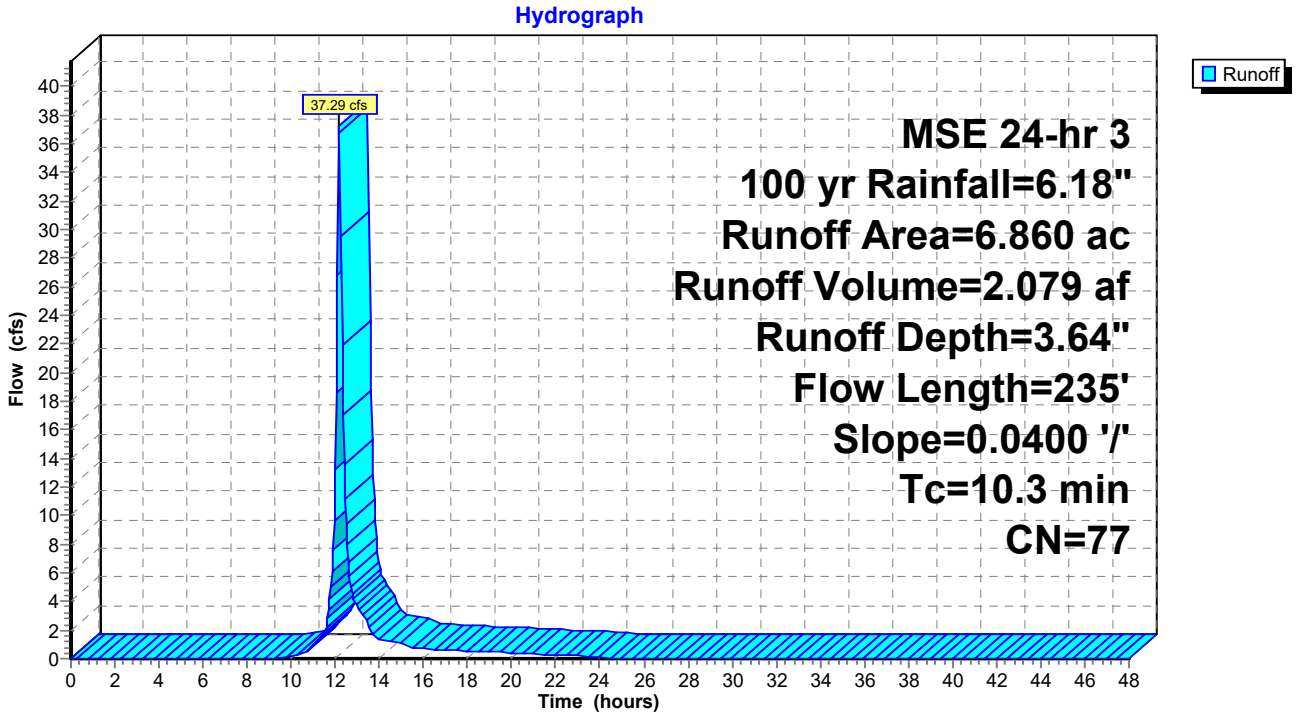
Runoff = 37.29 cfs @ 12.18 hrs, Volume= 2.079 af, Depth= 3.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100 yr Rainfall=6.18"

	Area (ac)	CN	Description
*	3.850	61	grass - B soils
*	0.320	98	water
*	2.690	98	impervious
	6.860	77	Weighted Average
	3.850		56.12% Pervious Area
	3.010		43.88% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	80	0.0400	0.14		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
0.5	155		5.00		**Direct Entry, Pipe**
10.3	235	Total			

Subcatchment 20: Subarea



Summary for Subcatchment 30: Subarea

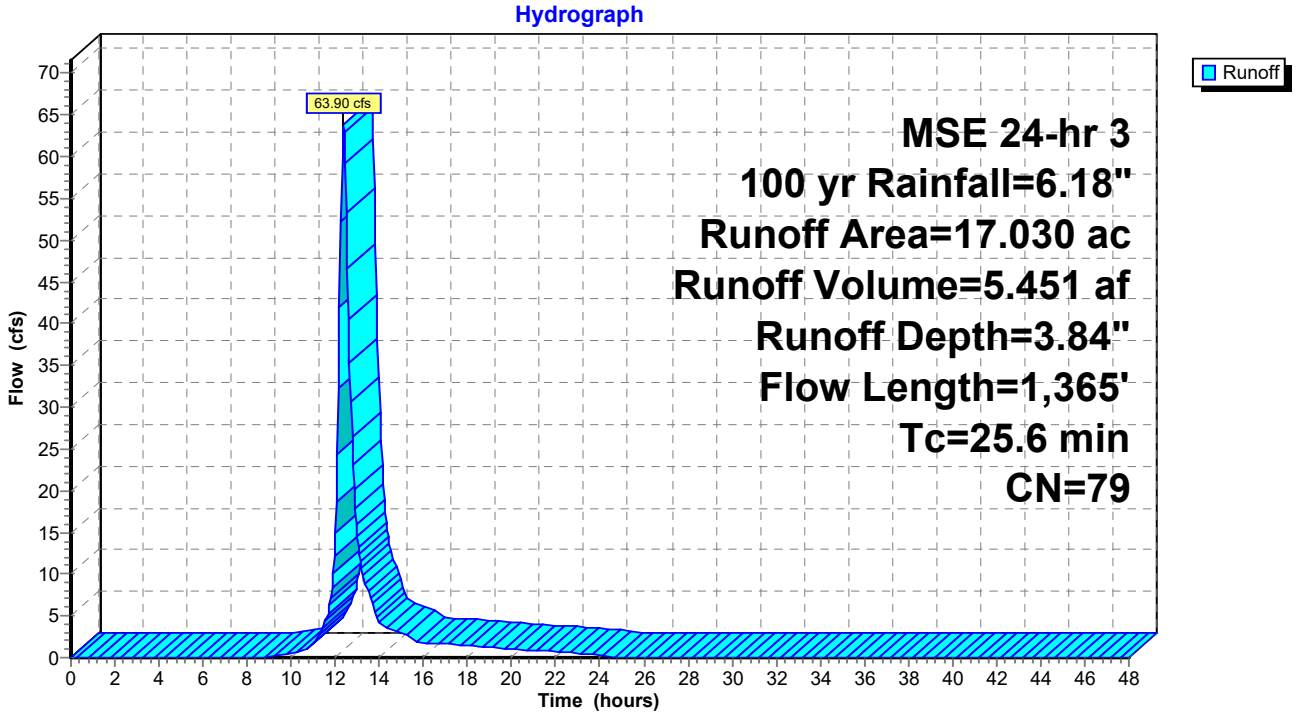
Runoff = 63.90 cfs @ 12.37 hrs, Volume= 5.451 af, Depth= 3.84"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100 yr Rainfall=6.18"

	Area (ac)	CN	Description
*	8.850	61	grass - B soils
*	0.400	98	water
*	7.780	98	impervious
	17.030	79	Weighted Average
	8.850		51.97% Pervious Area
	8.180		48.03% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.8	180	0.0400	0.16		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
2.5	30	0.1700	0.20		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
0.7	65	0.0100	1.61		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
3.6	1,090		5.00		**Direct Entry, Pipe**
25.6	1,365	Total			

Subcatchment 30: Subarea



Summary for Subcatchment 40: Subarea

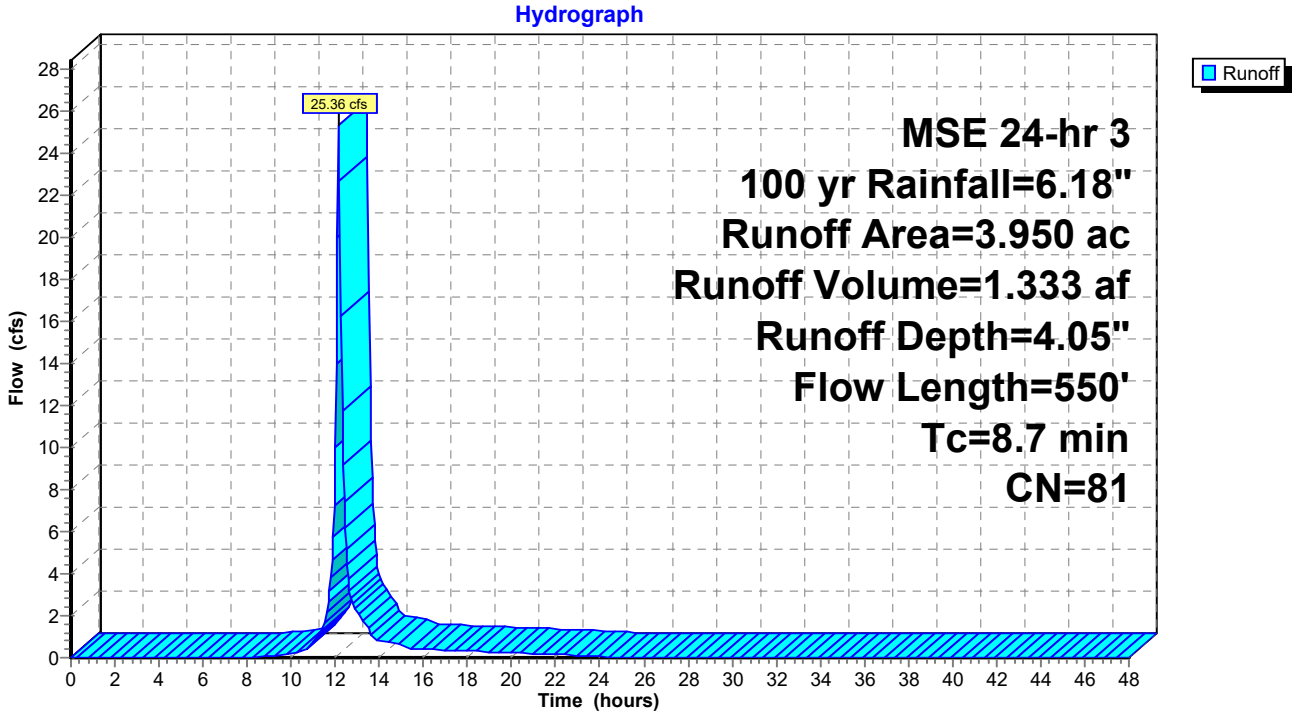
Runoff = 25.36 cfs @ 12.16 hrs, Volume= 1.333 af, Depth= 4.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100 yr Rainfall=6.18"

	Area (ac)	CN	Description
*	1.800	61	grass - B soils
*	0.140	98	water
*	2.010	98	impervious
	3.950	81	Weighted Average
	1.800		45.57% Pervious Area
	2.150		54.43% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.4	70	0.0900	0.18		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
1.3	175	0.0200	2.28		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
1.0	305		5.00		**Direct Entry, Pipe**
8.7	550	Total			

Subcatchment 40: Subarea



Summary for Subcatchment 45: Subarea

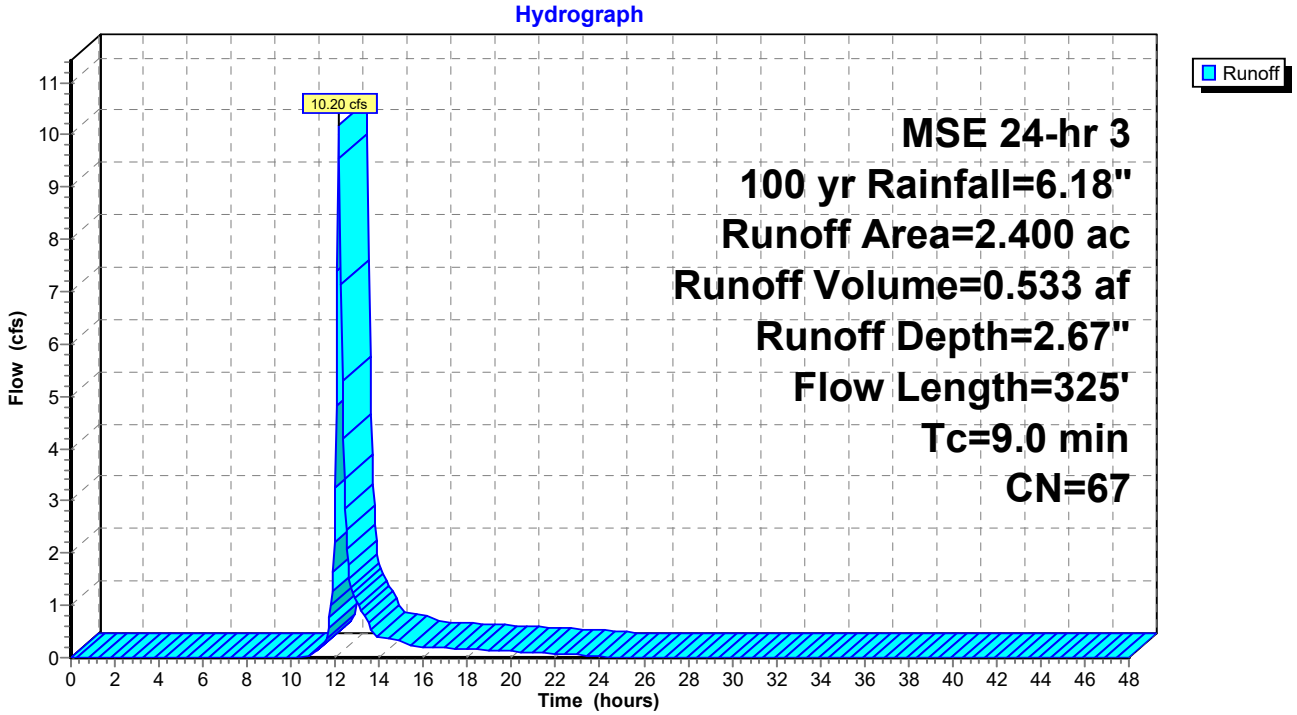
Runoff = 10.20 cfs @ 12.17 hrs, Volume= 0.533 af, Depth= 2.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100 yr Rainfall=6.18"

	Area (ac)	CN	Description
*	1.980	61	grass - B soils
*	0.420	98	impervious
	2.400	67	Weighted Average
	1.980		82.50% Pervious Area
	0.420		17.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	40	0.0400	0.12		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
1.0	10	0.2000	0.17		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
2.3	275	0.0150	1.97		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
9.0	325	Total			

Subcatchment 45: Subarea



Summary for Subcatchment 50: Subarea

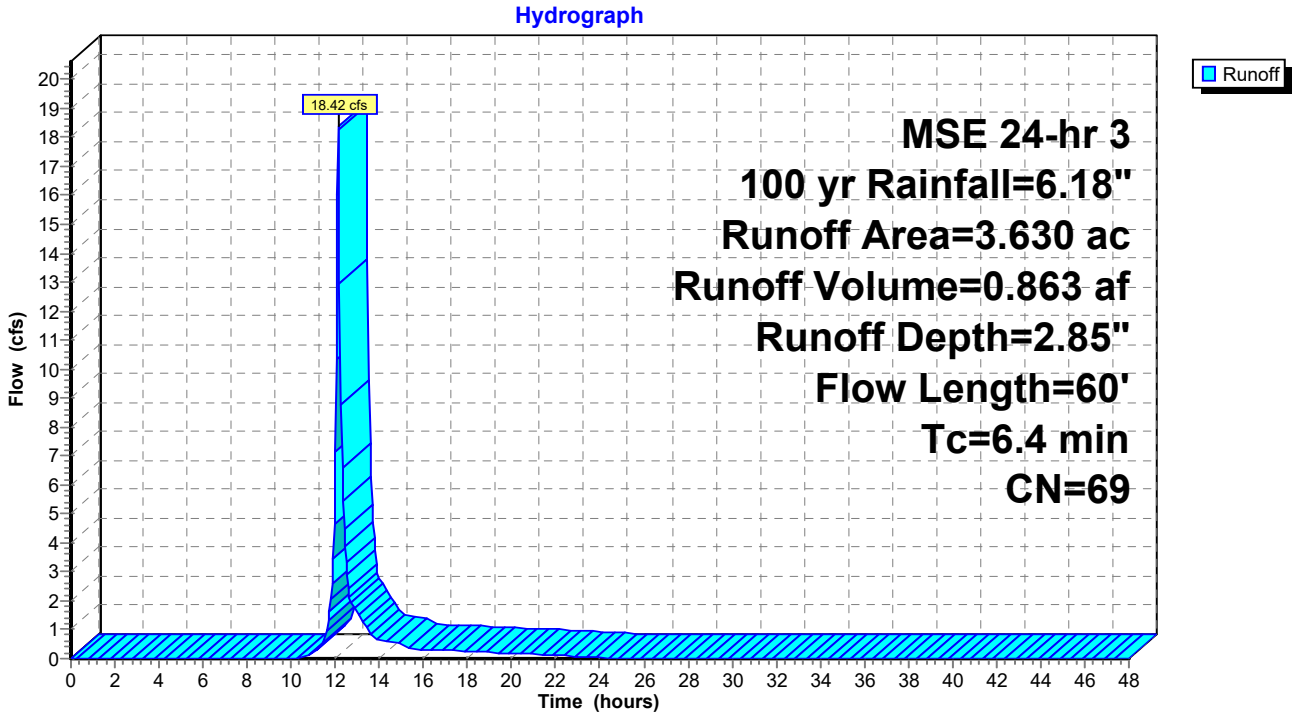
Runoff = 18.42 cfs @ 12.14 hrs, Volume= 0.863 af, Depth= 2.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100 yr Rainfall=6.18"

	Area (ac)	CN	Description
*	2.850	61	grass - B soils
*	0.780	98	impervious
	3.630	69	Weighted Average
	2.850		78.51% Pervious Area
	0.780		21.49% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.3	30	0.2200	0.22		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
4.1	30	0.0500	0.12		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
6.4	60	Total			

Subcatchment 50: Subarea



Summary for Subcatchment 60: Subarea

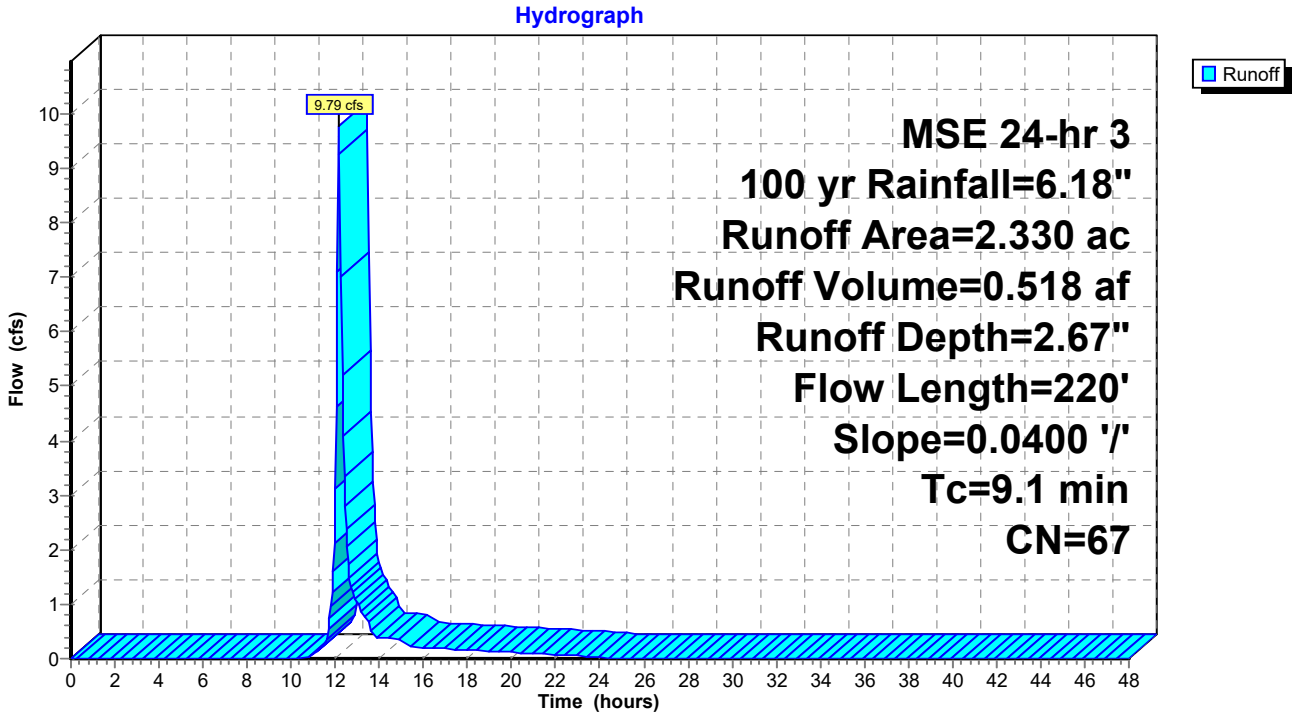
Runoff = 9.79 cfs @ 12.17 hrs, Volume= 0.518 af, Depth= 2.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100 yr Rainfall=6.18"

	Area (ac)	CN	Description
*	1.940	61	grass - B soils
*	0.390	98	impervious
	2.330	67	Weighted Average
	1.940		83.26% Pervious Area
	0.390		16.74% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.3	65	0.0400	0.13		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
0.8	155	0.0400	3.22		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
9.1	220	Total			

Subcatchment 60: Subarea



Summary for Subcatchment 70: Subarea

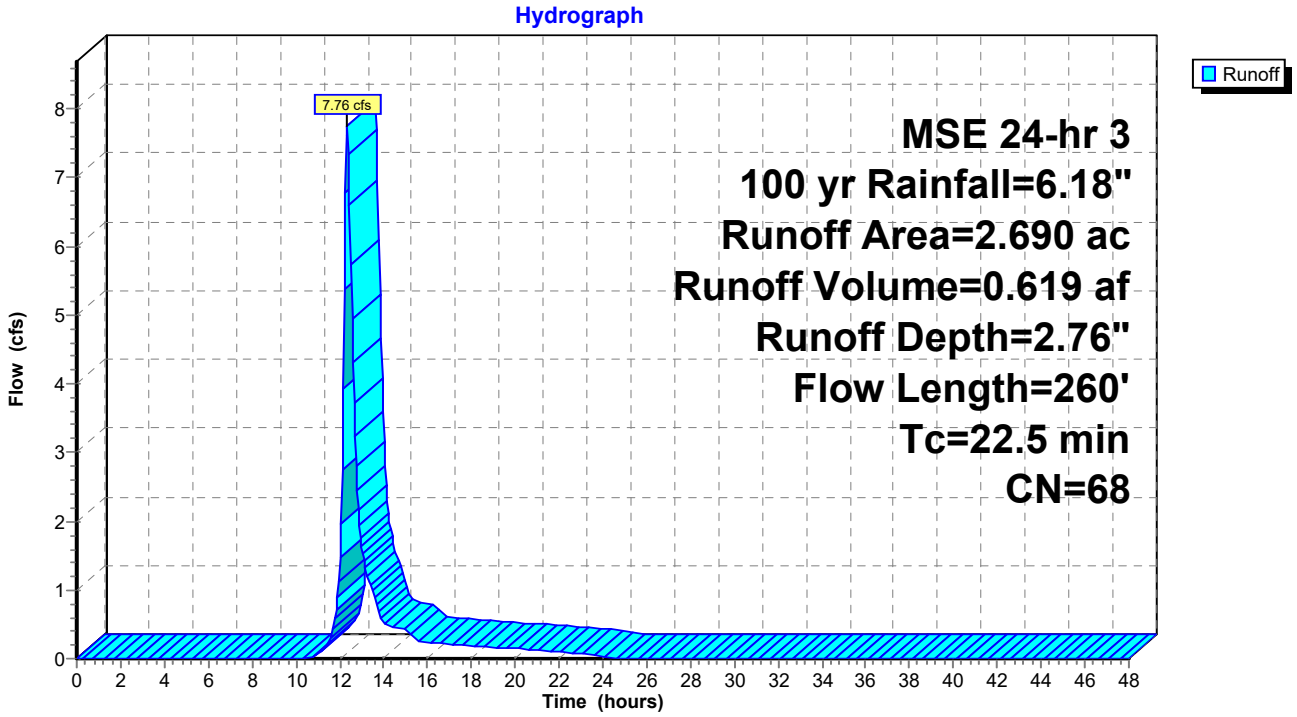
Runoff = 7.76 cfs @ 12.34 hrs, Volume= 0.619 af, Depth= 2.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100 yr Rainfall=6.18"

	Area (ac)	CN	Description
*	2.200	61	grass - B soils
*	0.490	98	impervious
	2.690	68	Weighted Average
	2.200		81.78% Pervious Area
	0.490		18.22% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.4	195	0.0500	0.18		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
4.1	65	0.2300	0.26		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
22.5	260	Total			

Subcatchment 70: Subarea



Summary for Subcatchment 80: Subarea

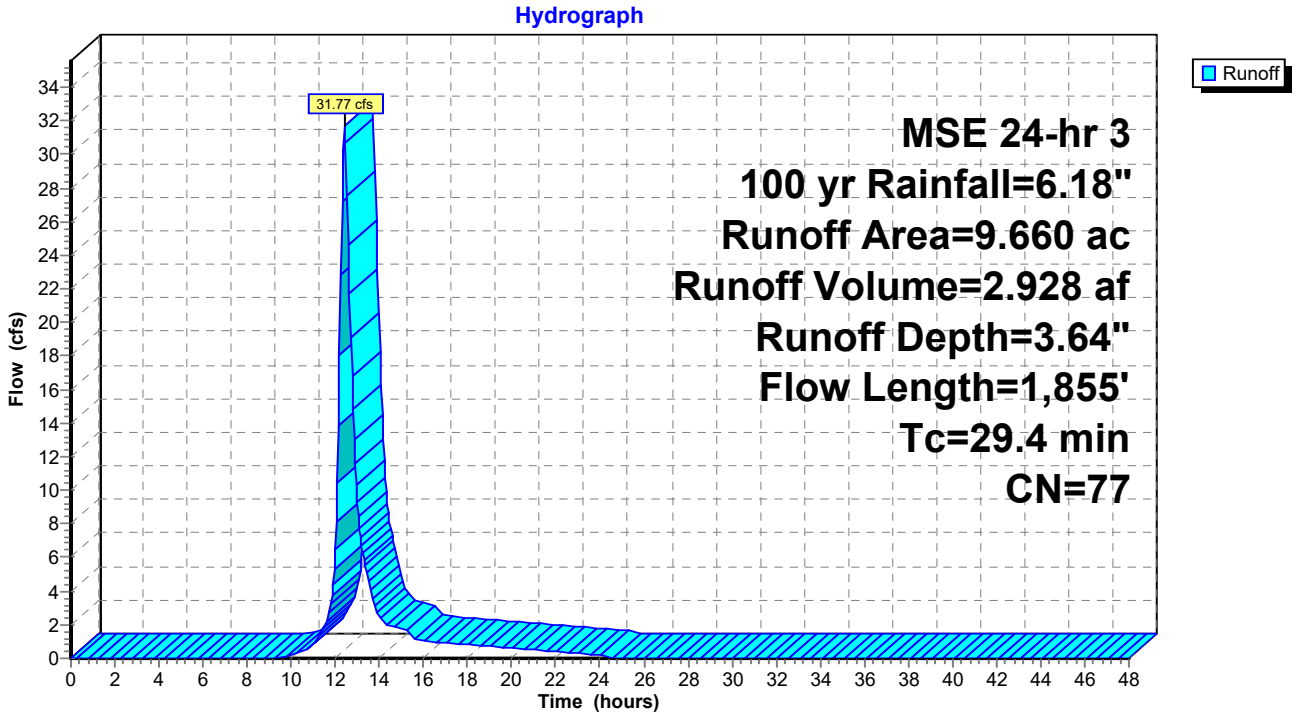
Runoff = 31.77 cfs @ 12.42 hrs, Volume= 2.928 af, Depth= 3.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100 yr Rainfall=6.18"

	Area (ac)	CN	Description
*	5.420	61	grass - B soils
*	0.130	98	water
*	4.110	98	impervious
	9.660	77	Weighted Average
	5.420		56.11% Pervious Area
	4.240		43.89% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.2	210	0.0800	0.22		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
7.0	90	0.1200	0.22		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
0.4	130	0.1200	5.58		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.1	25	0.2400	7.89		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
2.1	400	0.0400	3.22		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
1.0	220	0.0300	3.52		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
2.6	780		5.00		**Direct Entry, Pipe**
29.4	1,855	Total			

Subcatchment 80: Subarea



Summary for Subcatchment 90: Subarea

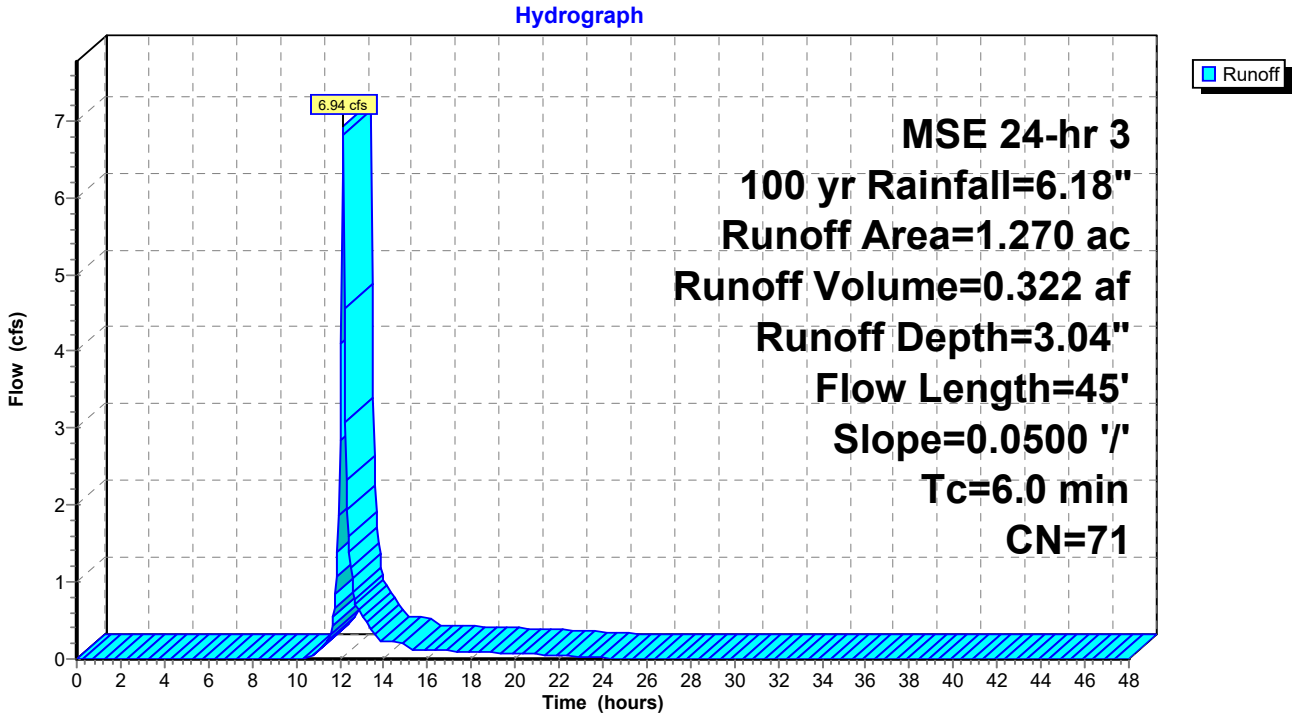
Runoff = 6.94 cfs @ 12.13 hrs, Volume= 0.322 af, Depth= 3.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100 yr Rainfall=6.18"

	Area (ac)	CN	Description
*	0.910	61	grass - B soils
*	0.360	98	impervious
	1.270	71	Weighted Average
	0.910		71.65% Pervious Area
	0.360		28.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	45	0.0500	0.13		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
5.7	45	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 90: Subarea



Summary for Subcatchment 100: Subarea

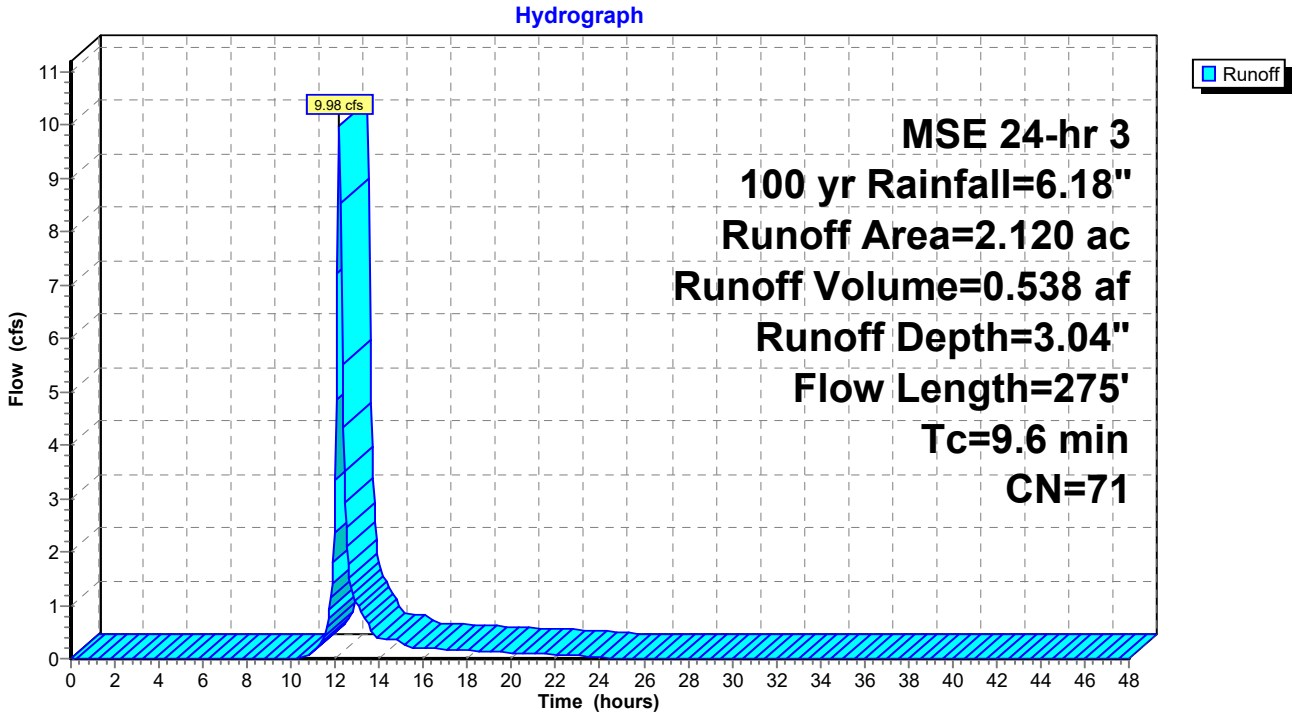
Runoff = 9.98 cfs @ 12.17 hrs, Volume= 0.538 af, Depth= 3.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100 yr Rainfall=6.18"

	Area (ac)	CN	Description
*	1.560	61	grass - B soils
*	0.560	98	impervious
	2.120	71	Weighted Average
	1.560		73.58% Pervious Area
	0.560		26.42% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.1	70	0.0500	0.14		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
1.5	205	0.0200	2.28		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
9.6	275	Total			

Subcatchment 100: Subarea



Summary for Pond 10P: Future Pond

Inflow Area = 5.430 ac, 41.62% Impervious, Inflow Depth = 3.54" for 100 yr event
Inflow = 16.17 cfs @ 12.47 hrs, Volume= 1.600 af
Outflow = 5.20 cfs @ 13.07 hrs, Volume= 1.594 af, Atten= 68%, Lag= 36.1 min
Primary = 5.20 cfs @ 13.07 hrs, Volume= 1.594 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 93.93' @ 13.07 hrs Surf.Area= 0.238 ac Storage= 0.712 af

Plug-Flow detention time= 174.9 min calculated for 1.594 af (100% of inflow)
Center-of-Mass det. time= 172.3 min (997.9 - 825.5)

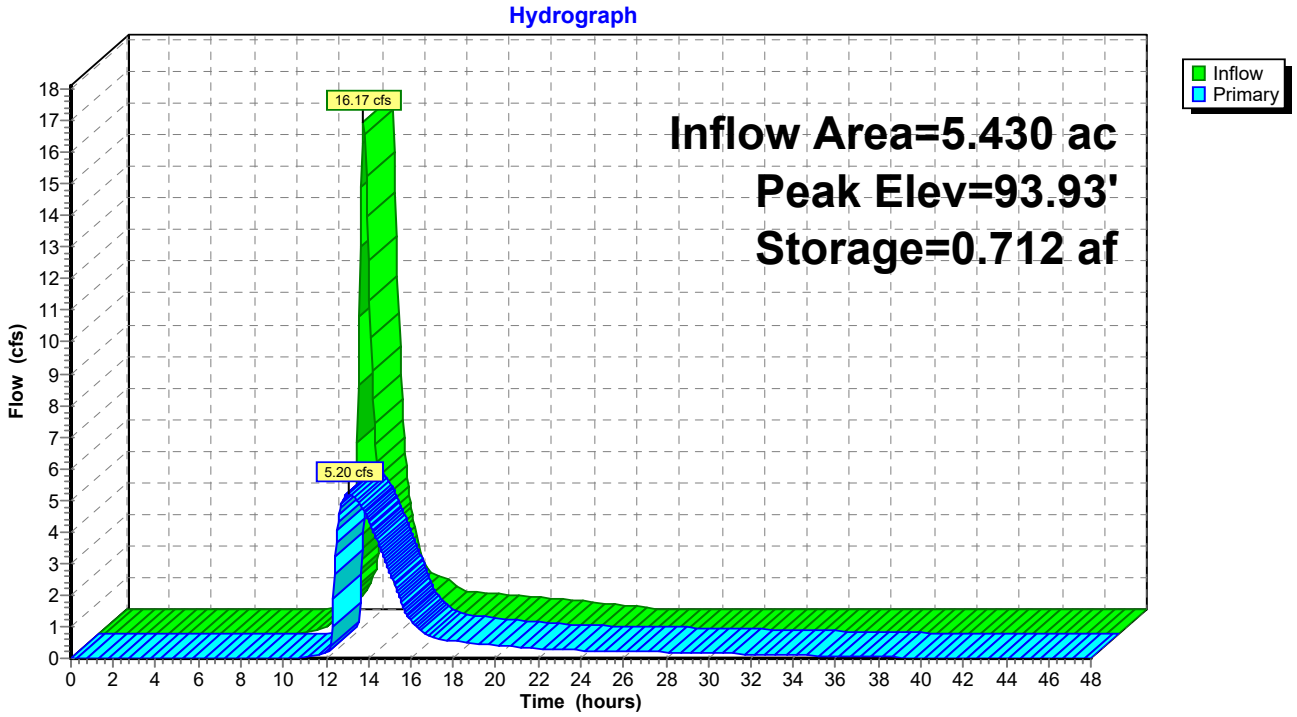
Volume	Invert	Avail.Storage	Storage Description
#1	90.00'	0.987 af	**Custom Stage Data (Conic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
90.00	0.130	0.000	0.000	0.130
92.00	0.180	0.309	0.309	0.182
94.00	0.240	0.419	0.727	0.244
95.00	0.280	0.260	0.987	0.285

Device	Routing	Invert	Outlet Devices
#1	Primary	90.00'	**3.0" Vert. Orifice/Grate** C= 0.600
#2	Primary	91.25'	**11.0" Vert. Orifice/Grate** C= 0.600
#3	Primary	94.00'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=5.20 cfs @ 13.07 hrs HW=93.93' TW=56.78' (Dynamic Tailwater)
- **1=Orifice/Grate** (Orifice Controls 0.46 cfs @ 9.40 fps)
- **2=Orifice/Grate** (Orifice Controls 4.74 cfs @ 7.18 fps)
- **3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 10P: Future Pond



Summary for Pond 20P: Pond

Inflow Area = 6.860 ac, 43.88% Impervious, Inflow Depth = 3.64" for 100 yr event
Inflow = 37.29 cfs @ 12.18 hrs, Volume= 2.079 af
Outflow = 9.70 cfs @ 12.49 hrs, Volume= 2.026 af, Atten= 74%, Lag= 18.8 min
Primary = 9.70 cfs @ 12.49 hrs, Volume= 2.026 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 63.96' @ 12.49 hrs Surf.Area= 0.605 ac Storage= 0.929 af

Plug-Flow detention time= 206.7 min calculated for 2.026 af (97% of inflow)
Center-of-Mass det. time= 192.6 min (995.0 - 802.5)

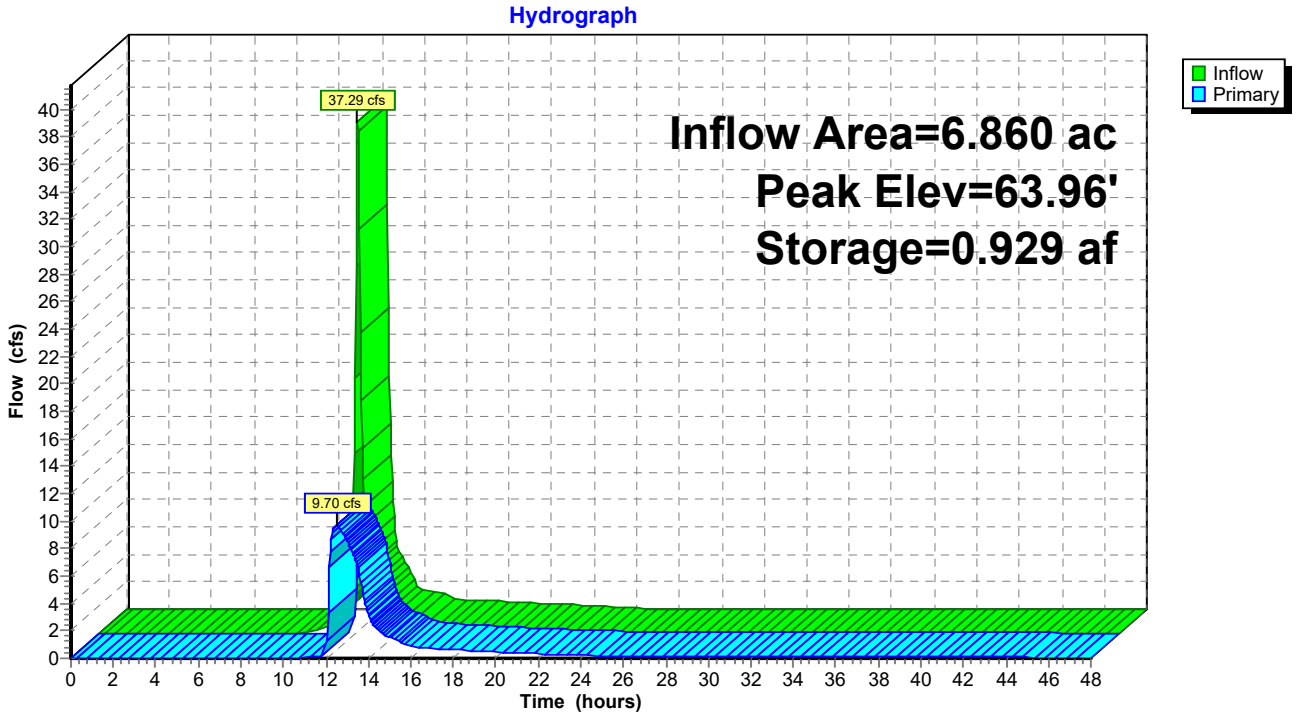
Volume	Invert	Avail.Storage	Storage Description
#1	62.00'	2.419 af	**Custom Stage Data (Conic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
62.00	0.320	0.000	0.000	0.320
63.00	0.490	0.402	0.402	0.490
64.00	0.610	0.549	0.951	0.611
65.00	0.730	0.669	1.620	0.732
66.00	0.870	0.799	2.419	0.873

Device	Routing	Invert	Outlet Devices
#1	Primary	58.00'	**18.0" Round Culvert** L= 425.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 58.00' / 53.00' S= 0.0118 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#2	Device 1	62.00'	**3.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	62.75'	**18.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Primary	64.00'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=9.69 cfs @ 12.49 hrs HW=63.96' TW=56.64' (Dynamic Tailwater)
- **1=Culvert** (Passes 9.69 cfs of 12.61 cfs potential flow)
  - **2=Orifice/Grate** (Orifice Controls 0.32 cfs @ 6.53 fps)
  - **3=Orifice/Grate** (Orifice Controls 9.37 cfs @ 5.30 fps)
- **4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 20P: Pond



Summary for Pond 30P: Pond

Inflow Area = 29.320 ac, 45.87% Impervious, Inflow Depth > 3.71" for 100 yr event
Inflow = 75.54 cfs @ 12.38 hrs, Volume= 9.070 af
Outflow = 58.23 cfs @ 12.56 hrs, Volume= 8.265 af, Atten= 23%, Lag= 10.9 min
Primary = 0.41 cfs @ 12.37 hrs, Volume= 0.638 af
Secondary = 57.91 cfs @ 12.56 hrs, Volume= 7.627 af
Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 56.87' @ 13.53 hrs Surf.Area= 0.698 ac Storage= 2.081 af

Plug-Flow detention time= 150.2 min calculated for 8.265 af (91% of inflow)
Center-of-Mass det. time= 77.6 min (963.9 - 886.3)

Volume	Invert	Avail.Storage	Storage Description
#1	53.00'	2.942 af	**Custom Stage Data (Conic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
53.00	0.400	0.000	0.000	0.400
54.00	0.470	0.435	0.435	0.471
55.00	0.530	0.500	0.934	0.532
56.00	0.620	0.574	1.509	0.623
57.00	0.710	0.664	2.173	0.714
58.00	0.830	0.769	2.942	0.835

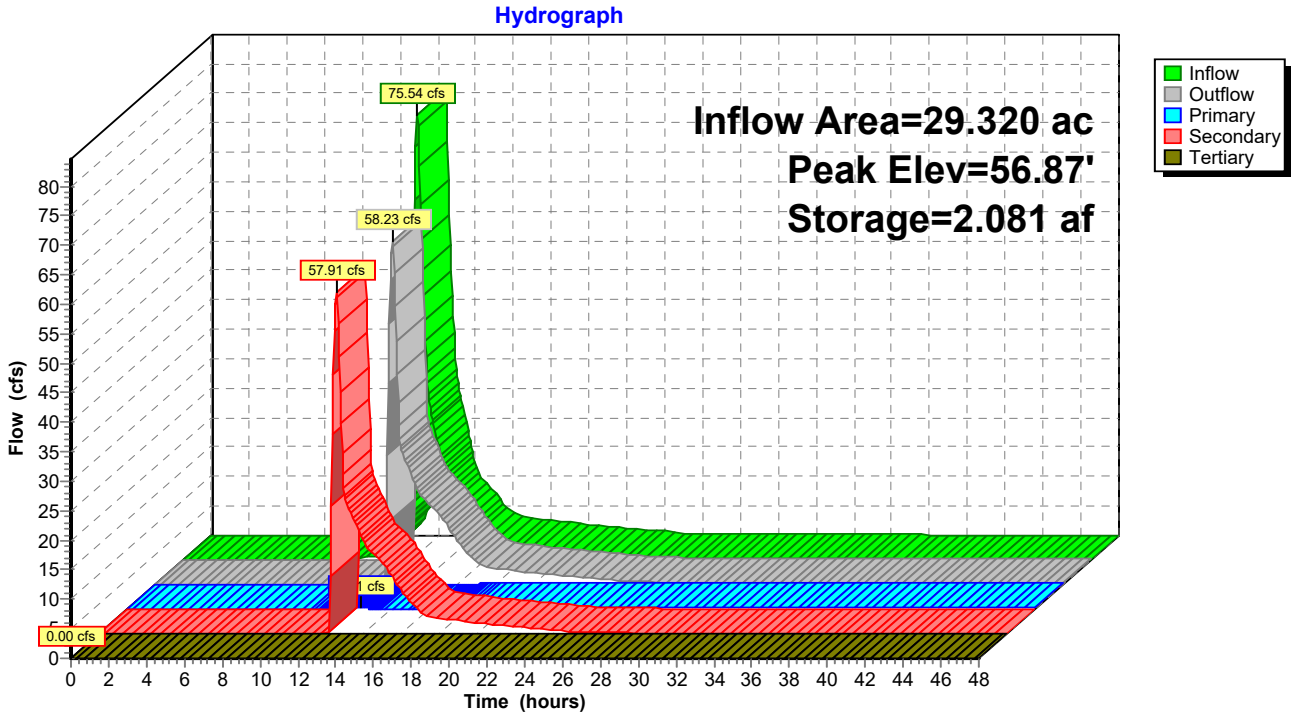
Device	Routing	Invert	Outlet Devices
#1	Primary	53.00'	**3.0" Vert. Orifice/Grate** C= 0.600
#2	Secondary	55.00'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
#3	Tertiary	57.00'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.39 cfs @ 12.37 hrs HW=56.25' TW=53.56' (Dynamic Tailwater)
1=Orifice/Grate (Orifice Controls 0.39 cfs @ 7.90 fps)

Secondary OutFlow Max=56.61 cfs @ 12.56 hrs HW=56.69' TW=55.24' (Dynamic Tailwater)
2=Broad-Crested Rectangular Weir (Weir Controls 56.61 cfs @ 3.36 fps)

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=53.00' TW=0.00' (Dynamic Tailwater)
3=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond 30P: Pond



Summary for Pond 40P: Pond

Inflow Area = 6.640 ac, 39.76% Impervious, Inflow Depth = 3.53" for 100 yr event
Inflow = 25.63 cfs @ 12.16 hrs, Volume= 1.951 af
Outflow = 2.51 cfs @ 13.43 hrs, Volume= 1.718 af, Atten= 90%, Lag= 76.3 min
Primary = 2.51 cfs @ 13.43 hrs, Volume= 1.718 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 58.80' @ 13.43 hrs Surf.Area= 0.385 ac Storage= 0.942 af

Plug-Flow detention time= 649.5 min calculated for 1.716 af (88% of inflow)
Center-of-Mass det. time= 577.0 min (1,475.5 - 898.5)

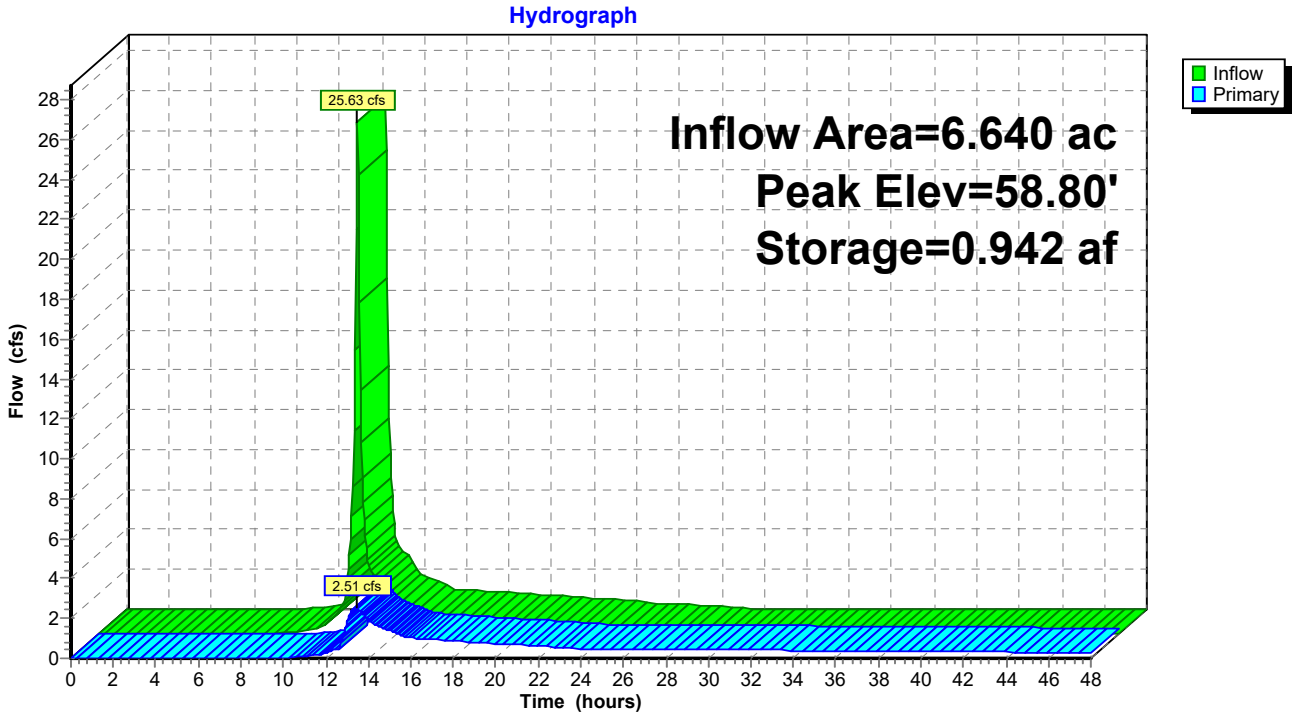
Volume	Invert	Avail.Storage	Storage Description
#1	55.00'	1.466 af	**Custom Stage Data (Conic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
55.00	0.130	0.000	0.000	0.130
56.00	0.180	0.154	0.154	0.180
57.00	0.250	0.214	0.368	0.251
58.00	0.330	0.289	0.657	0.331
59.00	0.400	0.364	1.022	0.402
60.00	0.490	0.444	1.466	0.493

Device	Routing	Invert	Outlet Devices
#1	Primary	55.00'	**3.0" Vert. Orifice/Grate** C= 0.600
#2	Primary	58.60'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=2.50 cfs @ 13.43 hrs HW=58.80' TW=56.82' (Dynamic Tailwater)
1=Orifice/Grate (Orifice Controls 0.33 cfs @ 6.77 fps)
2=Broad-Crested Rectangular Weir (Weir Controls 2.17 cfs @ 1.10 fps)

Pond 40P: Pond



Summary for Pond 45B: Infiltration Basin

Inflow Area = 38.360 ac, 43.04% Impervious, Inflow Depth > 3.29" for 100 yr event
Inflow = 60.71 cfs @ 12.55 hrs, Volume= 10.516 af
Outflow = 22.39 cfs @ 13.52 hrs, Volume= 9.802 af, Atten= 63%, Lag= 57.8 min
Discarded = 0.11 cfs @ 13.52 hrs, Volume= 0.226 af
Primary = 22.28 cfs @ 13.52 hrs, Volume= 9.576 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 56.82' @ 13.52 hrs Surf.Area= 0.629 ac Storage= 2.287 af

Plug-Flow detention time= 168.2 min calculated for 9.791 af (93% of inflow)
Center-of-Mass det. time= 69.3 min (1,109.4 - 1,040.1)

Volume	Invert	Avail.Storage	Storage Description
#1	52.00'	3.070 af	**Custom Stage Data (Conic)** Listed below (Recalc)

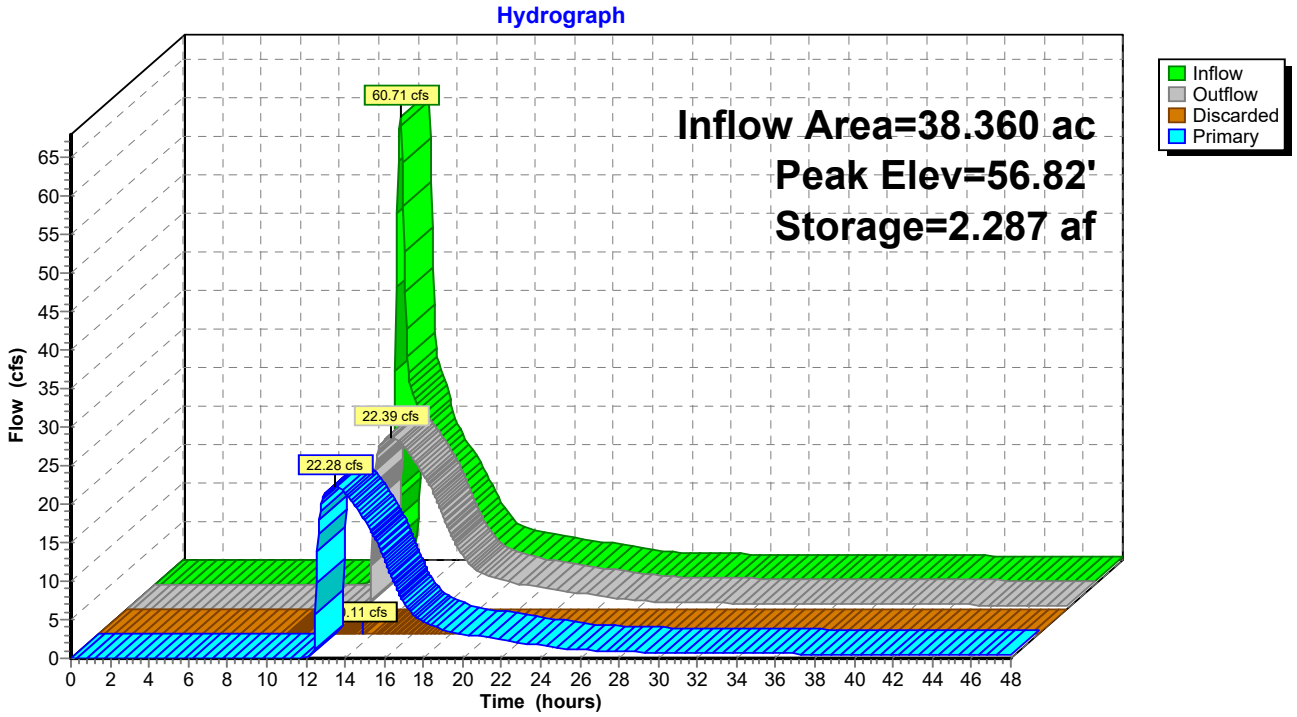
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
52.00	0.310	0.000	0.000	0.310
54.00	0.450	0.756	0.756	0.452
55.00	0.520	0.485	1.240	0.523
56.00	0.580	0.550	1.790	0.584
57.00	0.640	0.610	2.400	0.645
58.00	0.700	0.670	3.070	0.707

Device	Routing	Invert	Outlet Devices
#1	Discarded	52.00'	**0.130 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 42.00' Phase-In= 0.01'
#2	Primary	52.00'	**24.0" Round Culvert** L= 205.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 52.00' / 51.00' S= 0.0049 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#3	Device 2	52.25'	**3.0" Vert. Orifice/Grate** C= 0.600
#4	Device 2	53.75'	**24.0" Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=0.11 cfs @ 13.52 hrs HW=56.82' (Free Discharge)
└**1=Exfiltration** (Controls 0.11 cfs)

Primary OutFlow Max=22.28 cfs @ 13.52 hrs HW=56.82' TW=0.00' (Dynamic Tailwater)
└**2=Culvert** (Passes 22.28 cfs of 24.48 cfs potential flow)
  ├**3=Orifice/Grate** (Orifice Controls 0.50 cfs @ 10.15 fps)
  └**4=Orifice/Grate** (Orifice Controls 21.78 cfs @ 6.93 fps)

Pond 45B: Infiltration Basin



Summary for Pond 70B: Dry Basin

Inflow Area = 2.690 ac, 18.22% Impervious, Inflow Depth = 2.76" for 100 yr event
Inflow = 7.76 cfs @ 12.34 hrs, Volume= 0.619 af
Outflow = 1.00 cfs @ 13.47 hrs, Volume= 0.618 af, Atten= 87%, Lag= 67.7 min
Primary = 1.00 cfs @ 13.47 hrs, Volume= 0.618 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 65.62' @ 13.47 hrs Surf.Area= 0.218 ac Storage= 0.352 af

Plug-Flow detention time= 294.7 min calculated for 0.618 af (100% of inflow)
Center-of-Mass det. time= 295.0 min (1,123.7 - 828.7)

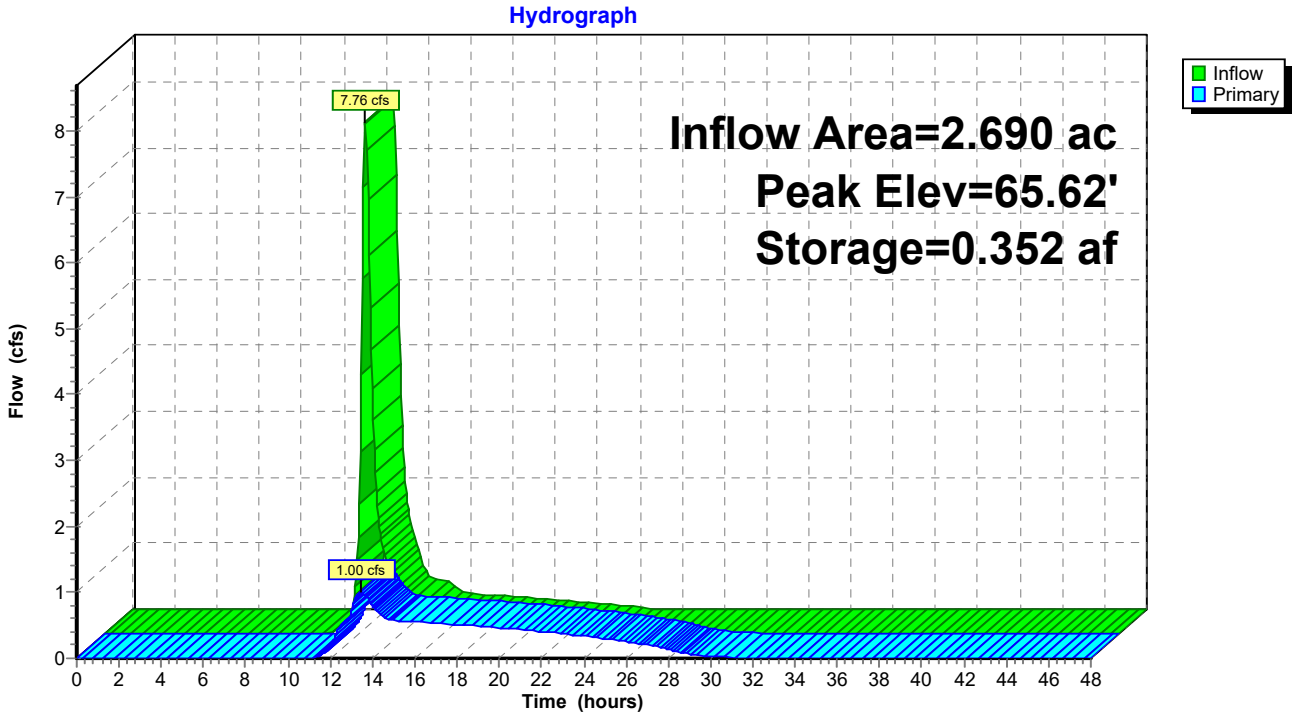
Volume	Invert	Avail.Storage	Storage Description
#1	63.50'	0.697 af	**Custom Stage Data (Conic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
63.50	0.030	0.000	0.000	0.030
64.00	0.160	0.043	0.043	0.160
65.00	0.200	0.180	0.223	0.201
66.00	0.230	0.215	0.438	0.232
67.00	0.290	0.259	0.697	0.292

Device	Routing	Invert	Outlet Devices
#1	Primary	63.00'	**12.0" Round Culvert** L= 75.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 63.00' / 62.25' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	63.50'	**4.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	65.50'	**12.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Primary	66.00'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=1.00 cfs @ 13.47 hrs HW=65.62' TW=58.80' (Dynamic Tailwater)
- **1=Culvert** (Passes 1.00 cfs of 4.94 cfs potential flow)
  - **2=Orifice/Grate** (Orifice Controls 0.59 cfs @ 6.72 fps)
  - **3=Orifice/Grate** (Weir Controls 0.41 cfs @ 1.12 fps)
- **4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 70B: Dry Basin



Summary for Pond 80P: Pond

Inflow Area = 9.660 ac, 43.89% Impervious, Inflow Depth = 3.64" for 100 yr event
Inflow = 31.77 cfs @ 12.42 hrs, Volume= 2.928 af
Outflow = 27.36 cfs @ 12.55 hrs, Volume= 2.923 af, Atten= 14%, Lag= 8.1 min
Primary = 27.36 cfs @ 12.55 hrs, Volume= 2.923 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 58.60' @ 12.55 hrs Surf.Area= 0.228 ac Storage= 0.543 af

Plug-Flow detention time= 96.5 min calculated for 2.923 af (100% of inflow)
Center-of-Mass det. time= 95.5 min (915.7 - 820.2)

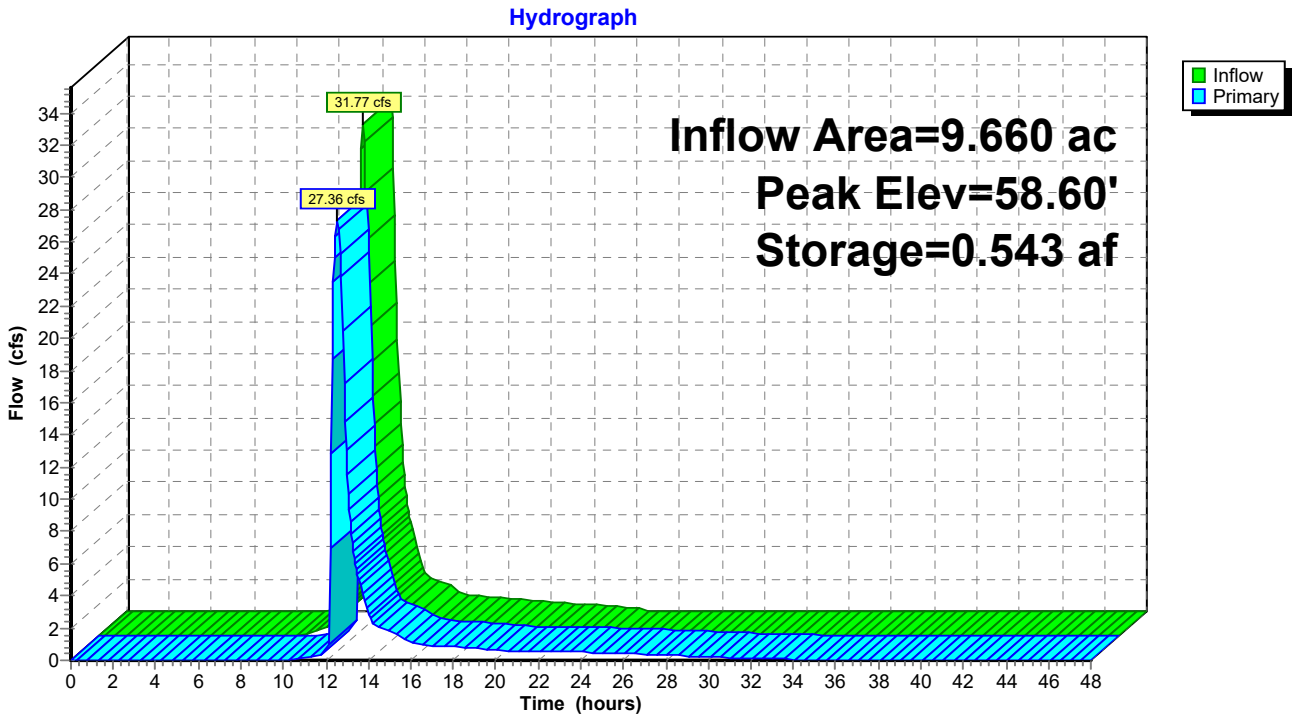
Volume	Invert	Avail.Storage	Storage Description
#1	55.50'	0.767 af	**Pond (Conic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
55.50	0.130	0.000	0.000	0.130
56.00	0.140	0.067	0.067	0.140
57.00	0.170	0.155	0.222	0.171
58.00	0.210	0.190	0.412	0.212
59.00	0.240	0.225	0.637	0.243
59.50	0.280	0.130	0.767	0.283

Device	Routing	Invert	Outlet Devices
#1	Primary	54.20'	**24.0" Round Culvert** L= 40.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 54.20' / 54.00' S= 0.0050 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#2	Device 1	55.50'	**4.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	57.33'	**30.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Primary	58.75'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=27.35 cfs @ 12.55 hrs HW=58.60' TW=0.00' (Dynamic Tailwater)
- **1=Culvert** (Passes 27.35 cfs of 27.89 cfs potential flow)
  - **2=Orifice/Grate** (Orifice Controls 0.72 cfs @ 8.25 fps)
  - **3=Orifice/Grate** (Orifice Controls 26.63 cfs @ 5.43 fps)
- **4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 80P: Pond



Summary for Pond 90B: Rain Garden

Inflow Area = 1.270 ac, 28.35% Impervious, Inflow Depth = 3.04" for 100 yr event
Inflow = 6.94 cfs @ 12.13 hrs, Volume= 0.322 af
Outflow = 3.47 cfs @ 12.24 hrs, Volume= 0.322 af, Atten= 50%, Lag= 6.5 min
Discarded = 0.01 cfs @ 12.24 hrs, Volume= 0.016 af
Primary = 3.45 cfs @ 12.24 hrs, Volume= 0.307 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 60.83' @ 12.24 hrs Surf.Area= 0.096 ac Storage= 0.091 af

Plug-Flow detention time= 44.1 min calculated for 0.322 af (100% of inflow)
Center-of-Mass det. time= 44.5 min (853.0 - 808.4)

Volume	Invert	Avail.Storage	Storage Description
#1	58.50'	0.232 af	**Custom Stage Data (Conic)** Listed below (Recalc)

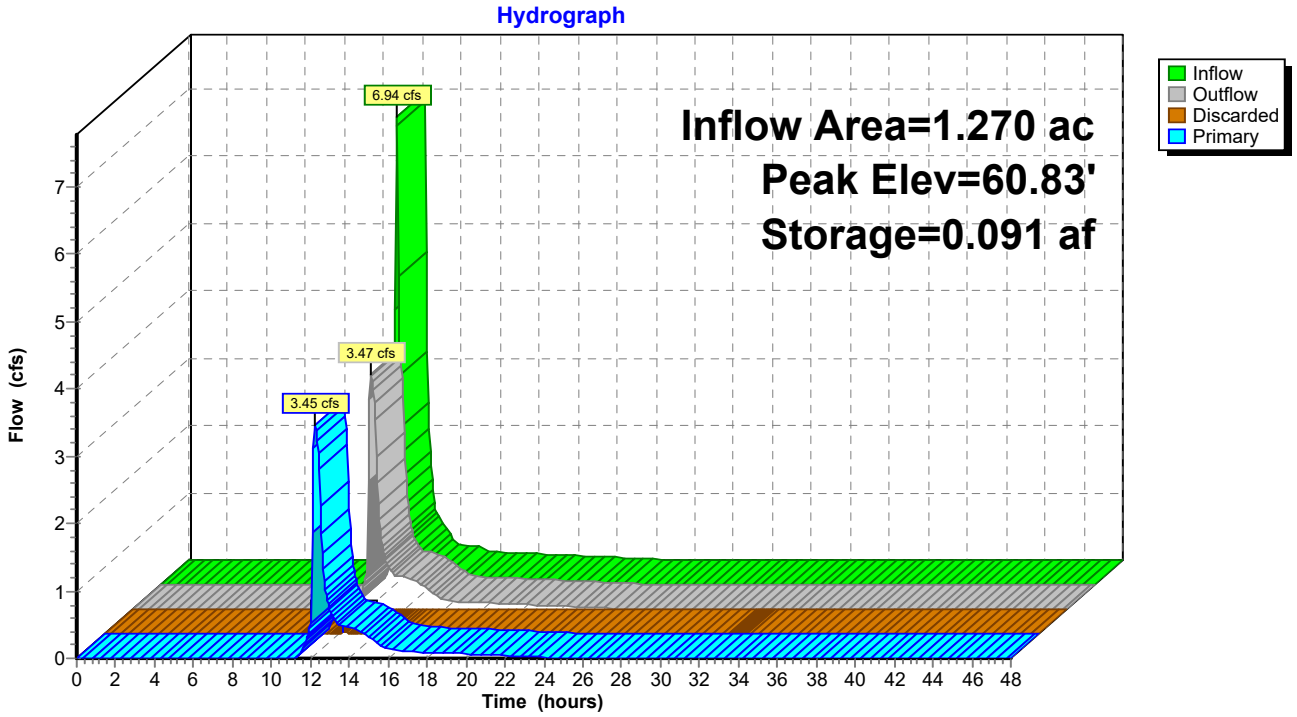
Elevation (feet)	Surf.Area (acres)	Voids (%)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
58.50	0.060	0.0	0.000	0.000	0.060
59.00	0.060	30.0	0.009	0.009	0.062
60.00	0.060	30.0	0.018	0.027	0.066
60.90	0.100	100.0	0.071	0.098	0.106
61.90	0.170	100.0	0.133	0.232	0.177

Device	Routing	Invert	Outlet Devices
#1	Discarded	58.50'	**0.130 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 42.00' Phase-In= 0.01'
#2	Primary	58.75'	**4.0" Vert. Orifice/Grate** C= 0.600
#3	Primary	60.25'	**12.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Primary	60.90'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Discarded OutFlow Max=0.01 cfs @ 12.24 hrs HW=60.82' (Free Discharge)
└**1=Exfiltration** (Controls 0.01 cfs)

Primary OutFlow Max=3.45 cfs @ 12.24 hrs HW=60.82' TW=0.00' (Dynamic Tailwater)
├**2=Orifice/Grate** (Orifice Controls 0.58 cfs @ 6.65 fps)
├**3=Orifice/Grate** (Orifice Controls 2.86 cfs @ 3.65 fps)
└**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 90B: Rain Garden



Summary for Pond 100B: Rain Garden

Inflow Area = 2.120 ac, 26.42% Impervious, Inflow Depth = 3.04" for 100 yr event
Inflow = 9.98 cfs @ 12.17 hrs, Volume= 0.538 af
Outflow = 4.23 cfs @ 12.36 hrs, Volume= 0.538 af, Atten= 58%, Lag= 11.2 min
Discarded = 0.02 cfs @ 12.36 hrs, Volume= 0.025 af
Primary = 4.20 cfs @ 12.36 hrs, Volume= 0.513 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 56.14' @ 12.36 hrs Surf.Area= 0.135 ac Storage= 0.169 af

Plug-Flow detention time= 54.2 min calculated for 0.538 af (100% of inflow)
Center-of-Mass det. time= 54.0 min (865.7 - 811.7)

Volume	Invert	Avail.Storage	Storage Description
#1	53.50'	0.494 af	**Custom Stage Data (Conic)** Listed below (Recalc)

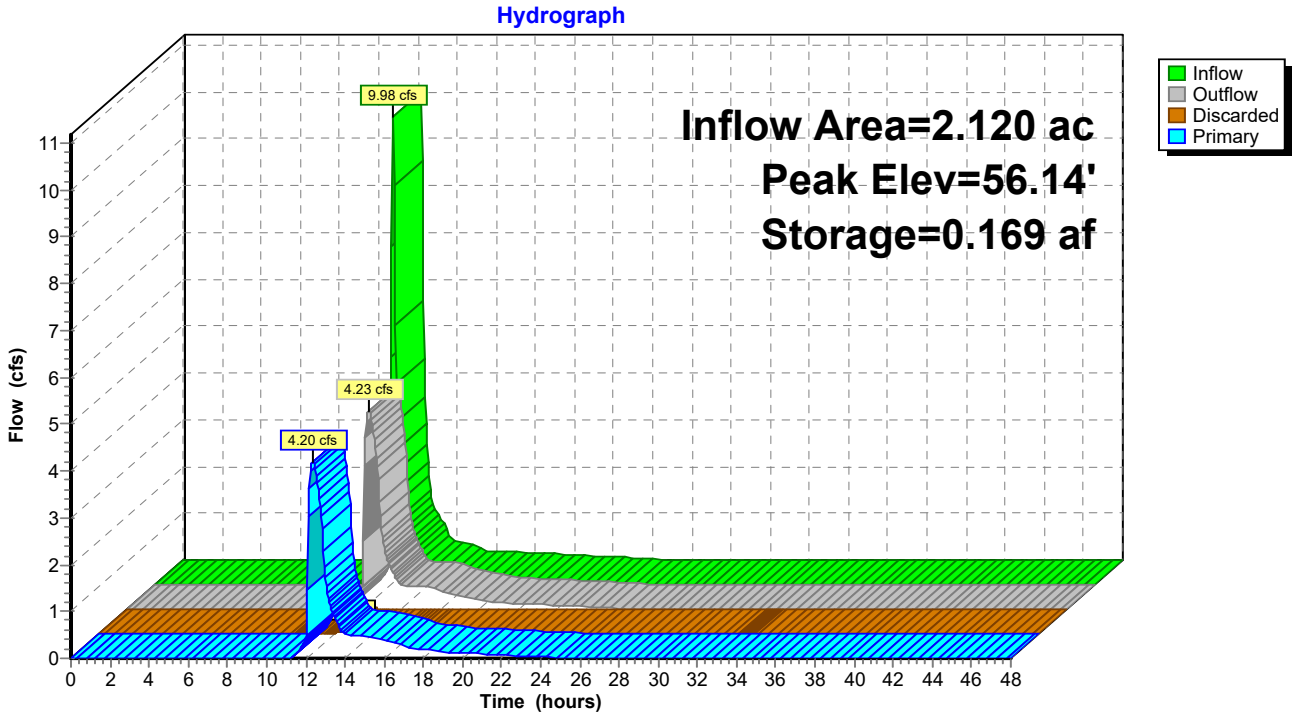
Elevation (feet)	Surf.Area (acres)	Voids (%)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
53.50	0.090	0.0	0.000	0.000	0.090
54.00	0.090	30.0	0.013	0.013	0.093
55.00	0.090	30.0	0.027	0.040	0.098
56.00	0.130	100.0	0.109	0.150	0.138
57.00	0.170	100.0	0.150	0.299	0.179
58.00	0.220	100.0	0.194	0.494	0.229

Device	Routing	Invert	Outlet Devices
#1	Discarded	53.50'	**0.130 in/hr Exfiltration over Wetted area**
			Conductivity to Groundwater Elevation = 42.00' Phase-In= 0.01'
#2	Primary	53.75'	**4.0" Vert. Orifice/Grate** C= 0.600
#3	Primary	55.25'	**12.0" Horiz. Orifice/Grate** C= 0.600
			Limited to weir flow at low heads
#4	Primary	56.50'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
			Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Discarded OutFlow Max=0.02 cfs @ 12.36 hrs HW=56.14' (Free Discharge)
└**1=Exfiltration** (Controls 0.02 cfs)

Primary OutFlow Max=4.20 cfs @ 12.36 hrs HW=56.14' TW=0.00' (Dynamic Tailwater)
├**2=Orifice/Grate** (Orifice Controls 0.63 cfs @ 7.18 fps)
├**3=Orifice/Grate** (Orifice Controls 3.57 cfs @ 4.55 fps)
└**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 100B: Rain Garden

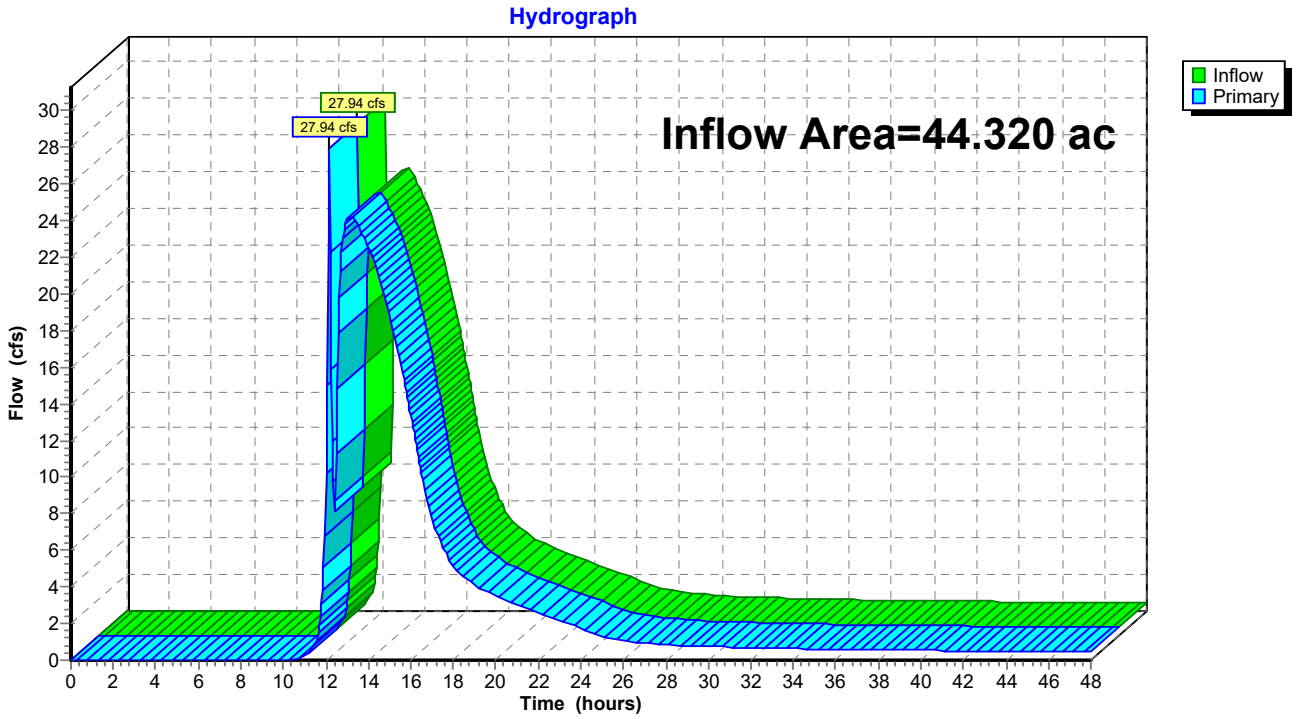


Summary for Link 65L: West Development

Inflow Area = 44.320 ac, 39.89% Impervious, Inflow Depth > 2.97" for 100 yr event
Inflow = 27.94 cfs @ 12.15 hrs, Volume= 10.957 af
Primary = 27.94 cfs @ 12.15 hrs, Volume= 10.957 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Link 65L: West Development

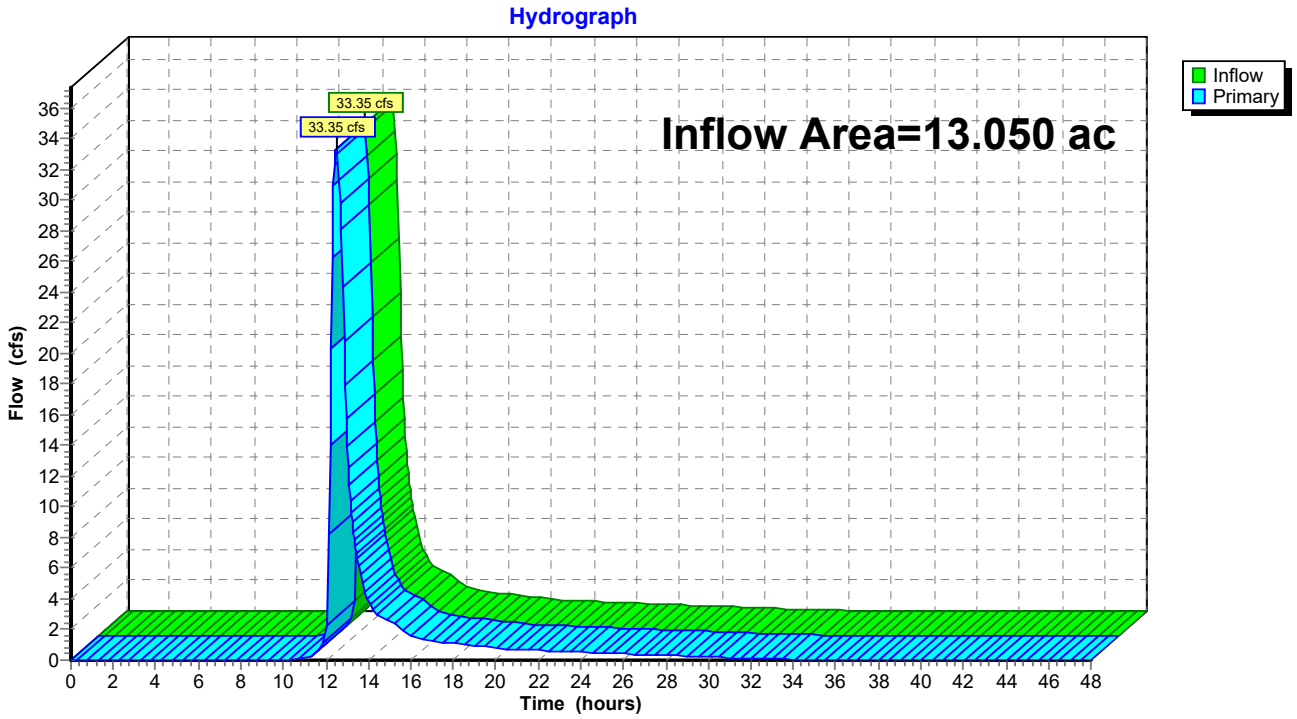


Summary for Link 105L: East Development

Inflow Area = 13.050 ac, 39.54% Impervious, Inflow Depth = 3.44" for 100 yr event
Inflow = 33.35 cfs @ 12.49 hrs, Volume= 3.743 af
Primary = 33.35 cfs @ 12.49 hrs, Volume= 3.743 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Link 105L: East Development

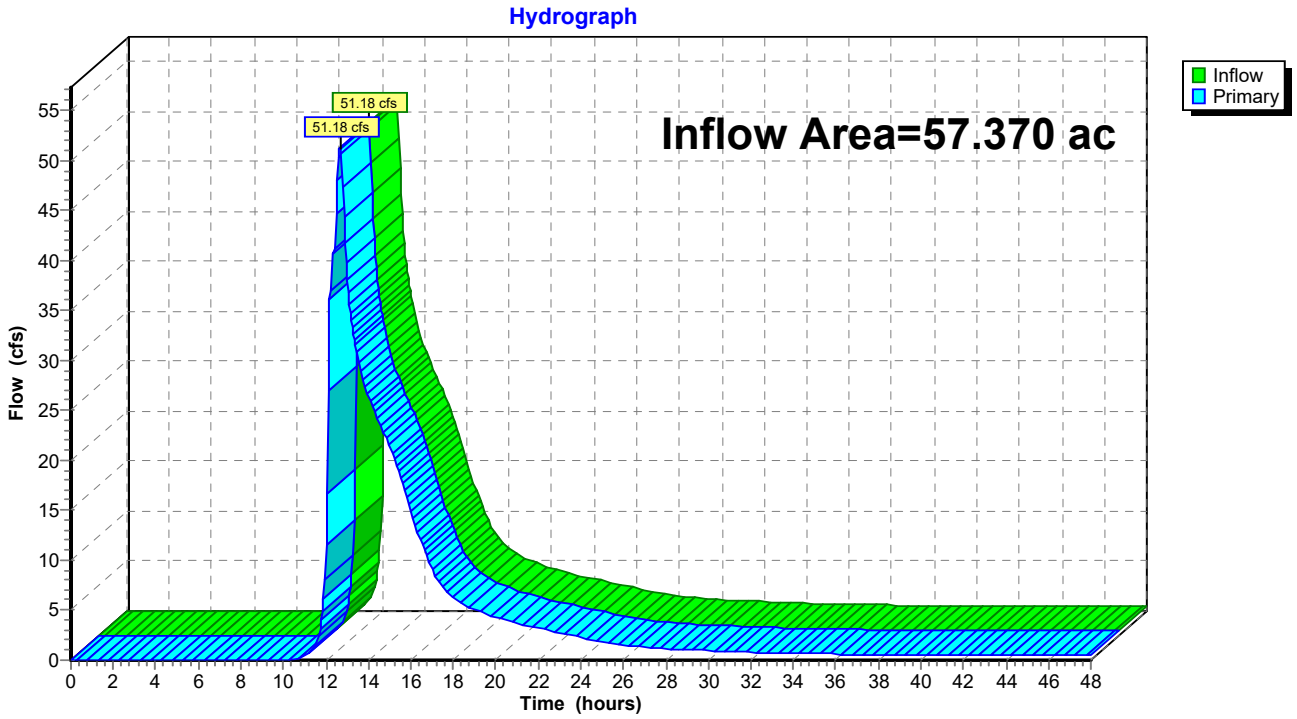


Summary for Link 110L: Post-Development Outflow

Inflow Area = 57.370 ac, 39.81% Impervious, Inflow Depth > 3.07" for 100 yr event
Inflow = 51.18 cfs @ 12.67 hrs, Volume= 14.700 af
Primary = 51.18 cfs @ 12.67 hrs, Volume= 14.700 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

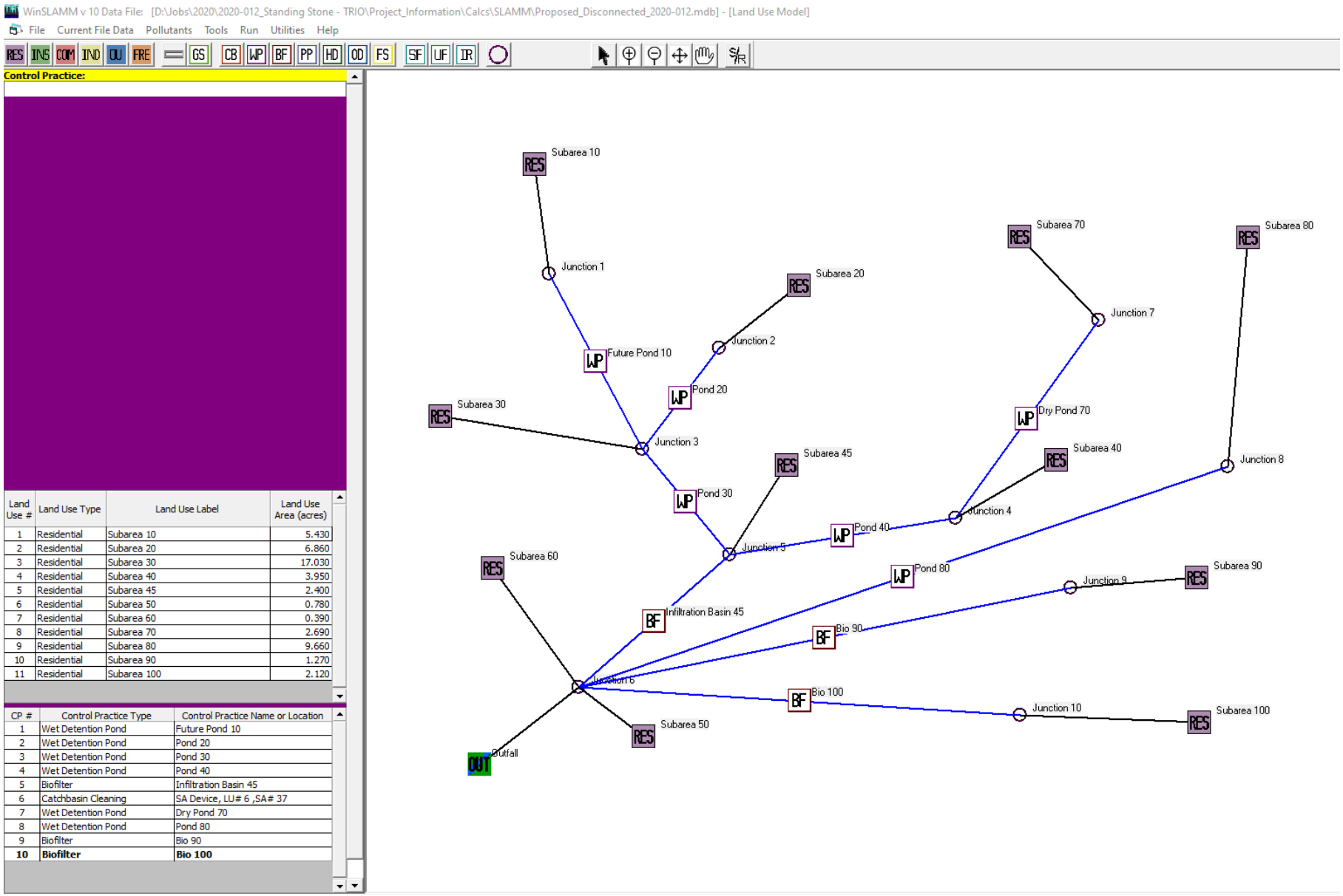
Link 110L: Post-Development Outflow



APPENDIX C

WinSLAMM Treatment Analysis

WinSLAMM Analysis



Land Use #	Land Use Type	Land Use Label	Land Use Area (acres)
1	Residential	Subarea 10	5.430
2	Residential	Subarea 20	6.860
3	Residential	Subarea 30	17.030
4	Residential	Subarea 40	3.950
5	Residential	Subarea 45	2.400
6	Residential	Subarea 50	0.780
7	Residential	Subarea 60	0.390
8	Residential	Subarea 70	2.690
9	Residential	Subarea 80	9.660
10	Residential	Subarea 90	1.270
11	Residential	Subarea 100	2.120

CP #	Control Practice Type	Control Practice Name or Location
1	Wet Detention Pond	Future Pond 10
2	Wet Detention Pond	Pond 20
3	Wet Detention Pond	Pond 30
4	Wet Detention Pond	Pond 40
5	Biofilter	Infiltration Basin 45
6	Catchbasin Cleaning	SA Device, LU# 6 ,SA# 37
7	Wet Detention Pond	Dry Pond 70
8	Wet Detention Pond	Pond 80
9	Biofilter	Bio 90
10	**Biofilter**	**Bio 100**

SLAMM for Windows Version 10.4.1

Data file name: D:\Jobs\2020\2020-012_Standing Stone - TRIO\Project_Information\Calcs\SLAMM\Proposed_Disconnected_2020-012.mdb
Data file description:
Rain file name: C:\WinSLAMM Files\Rain Files\WisReg - Milwaukee WI 1969.RAN
Particulate Solids Concentration file name: C:\WinSLAMM Files\v10.1 WI_AVG01.pscx
Runoff Coefficient file name: C:\WinSLAMM Files\WI_SL06 Dec06.rsvx
Pollutant Relative Concentration file name: C:\WinSLAMM Files\WI_GEO03.ppdx
Residential Street Delivery file name: C:\WinSLAMM Files\WI_Res and Other Urban Dec06.std
Institutional Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Commercial Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Industrial Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Other Urban Street Delivery file name: C:\WinSLAMM Files\WI_Res and Other Urban Dec06.std
Freeway Street Delivery file name: C:\WinSLAMM Files\Freeway Dec06.std
Apply Street Delivery Files to Adjust the After Event Load Street Dirt Mass Balance: False
Source Area PSD and Peak to Average Flow Ratio File: C:\WinSLAMM Files\NURP Source Area PSD Files.csv
Cost Data file name:
If Other Device Pollutant Load Reduction Values = 1, Off-site Pollutant Loads are Removed from Pollutant Load % Reduction calculations
Seed for random number generator: -42
Start of Winter Season: 12/06 End of Winter Season: 03/28
Model Run Start Date: 01/05/69 Model Run End Date: 12/31/69
Date of run: 11-11-2020 Time of run: 20:51:48
Total Area Modeled (acres): 52.580
Years in Model Run: 0.99

	Runoff Volume (cu ft)	Percent Runoff Volume Reduction	Particulate Solids Conc. (mg/L)	Particulate Solids Yield (lbs)	Percent Particulate Solids Reduction
Total of all Land Uses without Controls:	2.087E+06	-	99.59	12976	-
Outfall Total with Controls:	1.569E+06	24.82%	26.42	2588	80.06%
Annualized Total After Outfall Controls:	1.591E+06			2624	

```
Data file name:  D:\Jobs\2020\2020-012_Standing Stone -
TRIO\Project_Information\Calcs\SLAMM\Proposed_Disconnected_2020-012.mdb
WinSLAMM Version 10.4.1
Rain file name:  C:\WinSLAMM Files\Rain Files\WisReg - Milwaukee WI 1969.RAN
Particulate Solids Concentration file name:  C:\WinSLAMM Files\v10.1 WI_AVG01.pscx
Runoff Coefficient file name:  C:\WinSLAMM Files\WI_SL06 Dec06.rsvx
Residential Street Delivery file name:  C:\WinSLAMM Files\WI_Res and Other Urban Dec06.std
Institutional Street Delivery file name:  C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Commercial Street Delivery file name:  C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Industrial Street Delivery file name:  C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Other Urban Street Delivery file name:  C:\WinSLAMM Files\WI_Res and Other Urban Dec06.std
Freeway Street Delivery file name:  C:\WinSLAMM Files\Freeway Dec06.std
Apply Street Delivery Files to Adjust the After Event Load Street Dirt Mass Balance:  False
Pollutant Relative Concentration file name:  C:\WinSLAMM Files\WI_GEO03.ppdx
Source Area PSD and Peak to Average Flow Ratio File:  C:\WinSLAMM Files\NURP Source Area PSD Files.csv
Cost Data file name:
If Other Device Pollutant Load Reduction Values = 1, Off-site Pollutant Loads are Removed from Pollutant Load
% Reduction calculations
Seed for random number generator:  -42
Study period starting date:  01/05/69       Study period ending date:  12/31/69
Start of Winter Season:  12/06              End of Winter Season:  03/28
Date:  11-11-2020                           Time:  20:51:56
Site information:

LU# 1 - Residential:  Subarea 10     Total area (ac):  5.430
     1 - Roofs 1:  1.160 ac.    Pitched    Connected    Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     13 - Paved Parking 1:  0.970 ac.    Connected    Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     45 - Large Landscaped Areas 1:  3.170 ac.    Normal Silty    Source Area PSD File: C:\WinSLAMM
Files\NURP.cpz
     70 - Water Body Areas:  0.130 ac.    Source Area PSD File:
LU# 2 - Residential:  Subarea 20     Total area (ac):  6.860
     1 - Roofs 1:  0.650 ac.    Pitched    Connected    Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     25 - Driveways 1:  0.270 ac.    Connected    Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     31 - Sidewalks 1:  0.740 ac.    Connected    Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     37 - Streets 1:  1.010 ac.    Smooth    Street Length = 0.427 curb-mi    Street Width (assuming two curb-
mi per street mile) = 39.0281 ft
          Default St. Dirt Accum.    Annual Winter Load = 2500 lbs    Source Area PSD File: C:\WinSLAMM
Files\NURP.cpz
```

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     45 - Large Landscaped Areas 1:  3.850 ac.    Normal Silty    Source Area PSD File: C:\WinSLAMM
Files\NURP.cpz
     69 - Isolated Areas:  0.020 ac.    Source Area PSD File:
     70 - Water Body Areas:  0.320 ac.    Source Area PSD File:
LU# 3 - Residential:  Subarea 30     Total area (ac):  17.030
     1 - Roofs 1:  2.250 ac.    Pitched    Connected    Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     2 - Roofs 2:  0.880 ac.    Pitched    Connected    Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     25 - Driveways 1:  1.610 ac.    Connected    Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     26 - Driveways 2:  0.240 ac.    Connected    Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     31 - Sidewalks 1:  0.430 ac.    Connected    Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     32 - Sidewalks 2:  0.330 ac.    Connected    Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     37 - Streets 1:  1.310 ac.    Smooth    Street Length = 0.554 curb-mi    Street Width (assuming two curb-
mi per street mile) = 39.01624 ft
          Default St. Dirt Accum.    Annual Winter Load = 2500 lbs    Source Area PSD File: C:\WinSLAMM
Files\NURP.cpz
     38 - Streets 2:  0.730 ac.    Smooth    Street Length = 0.309 curb-mi    Street Width (assuming two curb-
mi per street mile) = 38.98059 ft
          Default St. Dirt Accum.    Annual Winter Load = 2500 lbs    Source Area PSD File: C:\WinSLAMM
Files\NURP.cpz
     45 - Large Landscaped Areas 1:  8.850 ac.    Normal Silty    Source Area PSD File: C:\WinSLAMM
Files\NURP.cpz
     70 - Water Body Areas:  0.400 ac.    Source Area PSD File:
LU# 4 - Residential:  Subarea 40     Total area (ac):  3.950
     1 - Roofs 1:  0.470 ac.    Pitched    Connected    Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     25 - Driveways 1:  0.310 ac.    Connected    Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     31 - Sidewalks 1:  0.300 ac.    Connected    Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     37 - Streets 1:  0.930 ac.    Smooth    Street Length = 0.393 curb-mi    Street Width (assuming two curb-
mi per street mile) = 39.0458 ft
          Default St. Dirt Accum.    Annual Winter Load = 2500 lbs    Source Area PSD File: C:\WinSLAMM
Files\NURP.cpz
     45 - Large Landscaped Areas 1:  1.800 ac.    Normal Silty    Source Area PSD File: C:\WinSLAMM
Files\NURP.cpz
     70 - Water Body Areas:  0.140 ac.    Source Area PSD File:
LU# 5 - Residential:  Subarea 45     Total area (ac):  2.400
     1 - Roofs 1:  0.310 ac.    Pitched    Connected    Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     31 - Sidewalks 1:  0.110 ac.    Connected    Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     45 - Large Landscaped Areas 1:  1.980 ac.    Normal Silty    Source Area PSD File: C:\WinSLAMM
Files\NURP.cpz
```

LU# 6 - Residential: Subarea 50   Total area (ac): 0.780
     1 - Roofs 1: 0.060 ac.   Pitched   Disconnected   Normal Silty   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     25 - Driveways 1: 0.020 ac.   Disconnected   Normal Silty   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     31 - Sidewalks 1: 0.040 ac.   Disconnected   Normal Silty   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     32 - Sidewalks 2: 0.130 ac.   Connected   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     37 - Streets 1: 0.530 ac.   Smooth   Street Length = 0.224 curb-mi   Street Width (assuming two curb-mi per street mile) = 39.04018 ft
          Default St. Dirt Accum.   Annual Winter Load = 2500 lbs   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz   CB-CP#6
LU# 7 - Residential: Subarea 60   Total area (ac): 0.390
     1 - Roofs 1: 0.200 ac.   Pitched   Disconnected   Normal Silty   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     31 - Sidewalks 1: 0.190 ac.   Disconnected   Normal Silty   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
LU# 8 - Residential: Subarea 70   Total area (ac): 2.690
     1 - Roofs 1: 0.480 ac.   Pitched   Disconnected   Normal Silty   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     31 - Sidewalks 1: 0.010 ac.   Disconnected   Normal Silty   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     45 - Large Landscaped Areas 1: 2.200 ac.   Normal Silty   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
LU# 9 - Residential: Subarea 80   Total area (ac): 9.660
     1 - Roofs 1: 0.720 ac.   Pitched   Connected   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     2 - Roofs 2: 0.310 ac.   Pitched   Connected   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     25 - Driveways 1: 1.430 ac.   Connected   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     31 - Sidewalks 1: 0.370 ac.   Connected   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     37 - Streets 1: 1.280 ac.   Smooth   Street Length = 0.542 curb-mi   Street Width (assuming two curb-mi per street mile) = 38.96679 ft
          Default St. Dirt Accum.   Annual Winter Load = 2500 lbs   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     45 - Large Landscaped Areas 1: 5.420 ac.   Normal Silty   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     70 - Water Body Areas: 0.130 ac.   Source Area PSD File:
LU# 10 - Residential: Subarea 90   Total area (ac): 1.270
     1 - Roofs 1: 0.360 ac.   Pitched   Connected   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz

45 - Large Landscaped Areas 1: 0.910 ac. Normal Silty Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
LU# 11 - Residential: Subarea 100 Total area (ac): 2.120
1 - Roofs 1: 0.560 ac. Pitched Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
45 - Large Landscaped Areas 1: 1.560 ac. Normal Silty Source Area PSD File: C:\WinSLAMM Files\NURP.cpz

Control Practice 1: Wet Detention Pond CP# 1 (DS) - Future Pond 10
Particle Size Distribution file name: Not needed - calculated by program
Initial stage elevation (ft): 5
Peak to Average Flow Ratio: 3.8
Maximum flow allowed into pond (cfs): No maximum value entered
Outlet Characteristics:
Outlet type: Orifice 1
1. Orifice diameter (ft): 0.25
2. Number of orifices: 1
3. Invert elevation above datum (ft): 5
Outlet type: Orifice 2
1. Orifice diameter (ft): 0.92
2. Number of orifices: 1
3. Invert elevation above datum (ft): 6.25
Outlet type: Broad Crested Weir
1. Weir crest length (ft): 10
2. Weir crest width (ft): 10
3. Height from datum to bottom of weir opening: 9
Pond stage and surface area

Entry Number	Stage (ft)	Pond Area (acres)	Natural Seepage (in/hr)	Other Outflow (cfs)
0	0.00	0.0000	0.00	0.00
1	0.01	0.0200	0.00	0.00
2	1.00	0.0300	0.00	0.00
3	3.00	0.0500	0.00	0.00
4	4.00	0.0700	0.00	0.00
5	5.00	0.1300	0.00	0.00
6	7.00	0.1800	0.00	0.00
7	9.00	0.2400	0.00	0.00
8	10.00	0.2800	0.00	0.00

Control Practice 2: Wet Detention Pond CP# 2 (DS) - Pond 20
Particle Size Distribution file name: Not needed - calculated by program
Initial stage elevation (ft): 8
Peak to Average Flow Ratio: 3.8
Maximum flow allowed into pond (cfs): No maximum value entered
Outlet Characteristics:
Outlet type: Orifice 1
1. Orifice diameter (ft): 0.25
2. Number of orifices: 1
3. Invert elevation above datum (ft): 8
Outlet type: Broad Crested Weir
1. Weir crest length (ft): 10
2. Weir crest width (ft): 10
3. Height from datum to bottom of weir opening: 10
Outlet type: Vertical Stand Pipe
1. Stand pipe diameter (ft): 1.5
2. Stand pipe height above datum (ft): 8.75
Pond stage and surface area

Entry Number	Stage (ft)	Pond Area (acres)	Natural Seepage (in/hr)	Other Outflow (cfs)
0	0.00	0.0000	0.00	0.00
1	0.01	0.0800	0.00	0.00
2	1.00	0.1000	0.00	0.00
3	2.00	0.1200	0.00	0.00
4	3.00	0.1400	0.00	0.00
5	4.00	0.1500	0.00	0.00
6	5.00	0.1700	0.00	0.00
7	6.00	0.1900	0.00	0.00
8	7.00	0.2100	0.00	0.00
9	8.00	0.3200	0.00	0.00
10	9.00	0.4900	0.00	0.00
11	10.00	0.6100	0.00	0.00
12	11.00	0.7300	0.00	0.00
13	12.00	0.8700	0.00	0.00

Control Practice 3: Wet Detention Pond CP# 3 (DS) - Pond 30
Particle Size Distribution file name: Not needed - calculated by program
Initial stage elevation (ft): 6

Peak to Average Flow Ratio: 3.8
Maximum flow allowed into pond (cfs): No maximum value entered
Outlet Characteristics:
Outlet type: Orifice 1
1. Orifice diameter (ft): 0.25
2. Number of orifices: 1
3. Invert elevation above datum (ft): 6
Outlet type: Broad Crested Weir
1. Weir crest length (ft): 10
2. Weir crest width (ft): 10
3. Height from datum to bottom of weir opening: 8
Pond stage and surface area

Entry Number	Stage (ft)	Pond Area (acres)	Natural Seepage (in/hr)	Other Outflow (cfs)
0	0.00	0.0000	0.00	0.00
1	0.01	0.1100	0.00	0.00
2	1.00	0.1300	0.00	0.00
3	2.00	0.1600	0.00	0.00
4	3.00	0.1800	0.00	0.00
5	4.00	0.2100	0.00	0.00
6	5.00	0.2500	0.00	0.00
7	6.00	0.4000	0.00	0.00
8	7.00	0.4700	0.00	0.00
9	8.00	0.5300	0.00	0.00
10	9.00	0.6200	0.00	0.00
11	10.00	0.7100	0.00	0.00
12	11.00	0.8300	0.00	0.00

Control Practice 4: Wet Detention Pond CP# 4 (DS) - Pond 40
Particle Size Distribution file name: Not needed - calculated by program
Initial stage elevation (ft): 5
Peak to Average Flow Ratio: 3.8
Maximum flow allowed into pond (cfs): No maximum value entered
Outlet Characteristics:
Outlet type: Orifice 1
1. Orifice diameter (ft): 0.25
2. Number of orifices: 1
3. Invert elevation above datum (ft): 5

Outlet type: Broad Crested Weir
1. Weir crest length (ft): 10
2. Weir crest width (ft): 10
3. Height from datum to bottom of weir opening: 8.6

Pond stage and surface area

Entry Number	Stage (ft)	Pond Area (acres)	Natural Seepage (in/hr)	Other Outflow (cfs)
0	0.00	0.0000	0.00	0.00
1	0.01	0.0100	0.00	0.00
2	1.00	0.0200	0.00	0.00
3	2.00	0.0250	0.00	0.00
4	3.00	0.0300	0.00	0.00
5	4.00	0.0500	0.00	0.00
6	5.00	0.1300	0.00	0.00
7	6.00	0.1800	0.00	0.00
8	7.00	0.2500	0.00	0.00
9	8.00	0.3300	0.00	0.00
10	9.00	0.4000	0.00	0.00
11	10.00	0.4900	0.00	0.00

Control Practice 5: Biofilter CP# 1 (DS) - Infiltration Basin 45
1. Top area (square feet) = 30500
2. Bottom aea (square feet) = 13453
3. Depth (ft): 6
4. Biofilter width (ft) - for Cost Purposes Only: 10
5. Infiltration rate (in/hr) = 0.13
6. Random infiltration rate generation? No
7. Infiltration rate fraction (side): 1
8. Infiltration rate fraction (bottom): 1
9. Depth of biofilter that is rock filled (ft) 0
10. Porosity of rock filled volume = 0
11. Engineered soil infiltration rate: 0
12. Engineered soil depth (ft) = 0
13. Engineered soil porosity = 0
14. Percent solids reduction due to flow through engineered soil = 0
15. Biofilter peak to average flow ratio = 3.8
16. Number of biofiltration control devices = 1
17. Particle size distribution file: Not needed - calculated by program

18. Initial water surface elevation (ft): 0
Soil Data Soil Type Fraction in Eng. Soil
Biofilter Outlet/Discharge Characteristics:
Outlet type: Broad Crested Weir
1. Weir crest length (ft): 10
2. Weir crest width (ft): 10
3. Height of datum to bottom of weir opening: 5
Outlet type: Surface Discharge Pipe
1. Surface discharge pipe outlet diameter (ft): 0.25
2. Pipe invert elevation above datum (ft): 0.25
3. Number of surface pipe outlets: 1
Outlet type: Other Outlet

Stage Number	Stage (ft)	Discharge Rate (cfs)
2	1.00	0.000
3	2.00	0.390
4	3.00	7.860
5	4.00	16.910
6	5.00	22.690
7	6.00	27.270

Control Practice 6: Catchbasin Cleaning CP# 1 (SA) - SA Device, LU# 6 ,SA# 37
1. Fraction of area served by catchbasins = 1.00
2. Number of catchbasins = 2
3. Average sump depth below catchbasin outlet invert (feet) = 3
4. Depth of sediment in catchbasin sump at beginning of study period (ft) = 0
5. Typical outlet pipe diameter (ft) = 1
6. Typical outlet pipe Mannings n = 0.013
7. Typical outlet pipe slope (ft/ft) = 0.02
8. Typical catchbasin sump surface area (square feet) = 16
9. Total catchbasin depth (feet) = 8
10. Inflow hydrograph peak to average flow ratio = 3.8
11. Leakage rate through sump bottom (in/hr) = 0
12. Catchbasin Critical Particle Size File Name: Not needed - calculated by program
13. Catchbasin cleaning frequency: Annually

Control Practice 7: Wet Detention Pond CP# 5 (DS) - Dry Pond 70
Particle Size Distribution file name: Not needed - calculated by program

Initial stage elevation (ft): 0
Peak to Average Flow Ratio: 3.8
Maximum flow allowed into pond (cfs): No maximum value entered
Outlet Characteristics:
Outlet type: Orifice 1
1. Orifice diameter (ft): 0.33
2. Number of orifices: 1
3. Invert elevation above datum (ft): 0
Outlet type: Broad Crested Weir
1. Weir crest length (ft): 10
2. Weir crest width (ft): 10
3. Height from datum to bottom of weir opening: 2.5
Outlet type: Vertical Stand Pipe
1. Stand pipe diameter (ft): 1
2. Stand pipe height above datum (ft): 2
Pond stage and surface area

Entry Number	Stage (ft)	Pond Area (acres)	Natural Seepage (in/hr)	Other Outflow (cfs)
0	0.00	0.0000	0.00	0.00
1	0.01	0.0300	0.00	0.00
2	0.50	0.1600	0.00	0.00
3	1.50	0.2000	0.00	0.00
4	2.50	0.2300	0.00	0.00
5	3.50	0.2900	0.00	0.00

Control Practice 8: Wet Detention Pond CP# 6 (DS) - Pond 80
Particle Size Distribution file name: Not needed - calculated by program
Initial stage elevation (ft): 5
Peak to Average Flow Ratio: 3.8
Maximum flow allowed into pond (cfs): No maximum value entered
Outlet Characteristics:
Outlet type: Orifice 1
1. Orifice diameter (ft): 0.33
2. Number of orifices: 1
3. Invert elevation above datum (ft): 5
Outlet type: Broad Crested Weir
1. Weir crest length (ft): 10
2. Weir crest width (ft): 10

3. Height from datum to bottom of weir opening: 8.25

Outlet type: Vertical Stand Pipe

1. Stand pipe diameter (ft): 2.5
2. Stand pipe height above datum (ft): 6.83

Pond stage and surface area

Entry Number	Stage (ft)	Pond Area (acres)	Natural Seepage (in/hr)	Other Outflow (cfs)
0	0.00	0.0000	0.00	0.00
1	0.01	0.0300	0.00	0.00
2	1.00	0.0400	0.00	0.00
3	2.00	0.0500	0.00	0.00
4	3.00	0.0600	0.00	0.00
5	4.00	0.0700	0.00	0.00
6	5.00	0.1300	0.00	0.00
7	5.50	0.1400	0.00	0.00
8	6.50	0.1700	0.00	0.00
9	7.50	0.2100	0.00	0.00
10	8.50	0.2400	0.00	0.00
11	9.00	0.2800	0.00	0.00

Control Practice 9: Biofilter CP# 2 (DS) - Bio 90

1. Top area (square feet) = 7466
2. Bottom aea (square feet) = 2451
3. Depth (ft): 3.4
4. Biofilter width (ft) - for Cost Purposes Only: 10
5. Infiltration rate (in/hr) = 0.13
6. Random infiltration rate generation? No
7. Infiltration rate fraction (side): 1
8. Infiltration rate fraction (bottom): 1
9. Depth of biofilter that is rock filled (ft) 0
10. Porosity of rock filled volume = 0
11. Engineered soil infiltration rate: 3.6
12. Engineered soil depth (ft) = 1.5
13. Engineered soil porosity = 0.26
14. Percent solids reduction due to flow through engineered soil = 80
15. Biofilter peak to average flow ratio = 3.8
16. Number of biofiltration control devices = 1
17. Particle size distribution file: Not needed - calculated by program

```
   18. Initial water surface elevation (ft):   0
   Soil Data                          Soil Type Fraction in Eng. Soil
       User-Defined Soil Type           1.000
   Biofilter Outlet/Discharge Characteristics:
       Outlet type:  Broad Crested Weir
               1.  Weir crest length (ft):   10
               2.  Weir crest width (ft):   10
               3.  Height of datum to bottom of weir opening:   2.4
       Outlet type:  Vertical Stand Pipe
               1.  Stand pipe diameter (ft):   1
               2.  Stand pipe height above datum (ft):   1.75
       Outlet type:  Drain Tile/Underdrain
               1.  Underdrain outlet diameter (ft):   0.33
               2.  Invert elevation above datum (ft):   0.25
               3.  Number of underdrain outlets:   1

Control Practice 10:  Biofilter CP# 3 (DS) - Bio 100
   1.  Top area (square feet) =  9713
   2.  Bottom aea (square feet) =  4069
   3.  Depth (ft):   5.5
   4.  Biofilter width (ft) - for Cost Purposes Only:   10
   5.  Infiltration rate (in/hr) =  0.13
   6.  Random infiltration rate generation?  No
   7.  Infiltration rate fraction (side):   1
   8.  Infiltration rate fraction (bottom):   1
   9.  Depth of biofilter that is rock filled (ft) 0
   10.  Porosity of rock filled volume =  0
   11.  Engineered soil infiltration rate:   3.6
   12.  Engineered soil depth (ft) =  1.5
   13.  Engineered soil porosity =  0.26
   14. Percent solids reduction due to flow through engineered soil =  80
   15. Biofilter peak to average flow ratio =  3.8
   16. Number of biofiltration control devices =  1
   17. Particle size distribution file:  Not needed - calculated by program
   18. Initial water surface elevation (ft):   0
   Soil Data                          Soil Type Fraction in Eng. Soil
       User-Defined Soil Type           1.000
   Biofilter Outlet/Discharge Characteristics:
```

```
Outlet type:  Broad Crested Weir
        1.  Weir crest length (ft):   10
        2.  Weir crest width (ft):   10
        3.  Height of datum to bottom of weir opening:   3
Outlet type:  Vertical Stand Pipe
        1.  Stand pipe diameter (ft):   1
        2.  Stand pipe height above datum (ft):   1.75
Outlet type:  Drain Tile/Underdrain
        1.  Underdrain outlet diameter (ft):   0.33
        2.  Invert elevation above datum (ft):   0.25
        3.  Number of underdrain outlets:   1
```

APPENDIX D

WinSLAMM Infiltration Analysis

INFILTRATION

INFILTRATION SUMMARY

PRE-DEVELOPMENT

Area = 57.37 acres (2,499,037 sf)
Average Annual Rainfall (Milwaukee) = 29.02 inches (2.42 ft)
Total Rainfall Volume = 2,499,037 x 2.42 = 6,047,669 cu-ft

Total Runoff = 317,396 cu-ft (from SLAMM Output)
Total Pre-Development Infiltrated Volume = 6,047,669 – 317,396 = 5,730,273 cu-ft

POST-DEVELOPMENT

Total Runoff = 1,594,000 cu-ft (from SLAMM Output)
Total Post-Development Infiltration Volume = 6,047,669 – 1,594,000 = 4,453,669 cu-ft

PERCENT INFILTRATED

Post Infiltration Vol / Pre Infiltration Vol = (4,453,669 / 5,730,273) x 100 = 78%

SLAMM for Windows Version 10.4.1

Data file name: D:\Jobs\2020\2020-012_Standing Stone - TRIO\Project_Information\Calcs\SLAMM\Infiltration\Pre-Development_Infiltration_2020-012.mdb
Data file description:
Rain file name: C:\WinSLAMM Files\Rain Files\WI Milwaukee 69.RAN
Particulate Solids Concentration file name: C:\WinSLAMM Files\v10.1 WI_AVG01.pscx
Runoff Coefficient file name: C:\WinSLAMM Files\WI_SL06 Dec06.rsvx
Pollutant Relative Concentration file name: C:\WinSLAMM Files\WI_GEO03.ppdx
Residential Street Delivery file name: C:\WinSLAMM Files\WI_Res and Other Urban Dec06.std
Institutional Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Commercial Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Industrial Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Other Urban Street Delivery file name: C:\WinSLAMM Files\WI_Res and Other Urban Dec06.std
Freeway Street Delivery file name: C:\WinSLAMM Files\Freeway Dec06.std
Apply Street Delivery Files to Adjust the After Event Load Street Dirt Mass Balance: False
Source Area PSD and Peak to Average Flow Ratio File: C:\WinSLAMM Files\NURP Source Area PSD Files.csv
Cost Data file name:
If Other Device Pollutant Load Reduction Values = 1, Off-site Pollutant Loads are Removed from Pollutant Load % Reduction calculations
Seed for random number generator: -42
Start of Winter Season: 12/06 End of Winter Season: 03/28
Model Run Start Date: 01/05/69 Model Run End Date: 12/31/69
Date of run: 11-11-2020 Time of run: 21:00:41
Total Area Modeled (acres): 57.370
Years in Model Run: 0.99

	Runoff Volume (cu ft)	Percent Runoff Volume Reduction	Particulate Solids Conc. (mg/L)	Particulate Solids Yield (lbs)	Percent Particulate Solids Reduction
Total of all Land Uses without Controls:	317397	-	23.37	463.0	-
Outfall Total with Controls:	317396	0.00%	23.37	463.0	0.00%
Annualized Total After Outfall Controls:	321804			469.4	

Data file name: D:\Jobs\2020\2020-012_Standing Stone - TRIO\Project_Information\Calcs\SLAMM\Infiltration\Pre-Development_Infiltration_2020-012.mdb
WinSLAMM Version 10.4.1
Rain file name: C:\WinSLAMM Files\Rain Files\WI Milwaukee 69.RAN
Particulate Solids Concentration file name: C:\WinSLAMM Files\v10.1 WI_AVG01.pscx
Runoff Coefficient file name: C:\WinSLAMM Files\WI_SL06 Dec06.rsvx
Residential Street Delivery file name: C:\WinSLAMM Files\WI_Res and Other Urban Dec06.std
Institutional Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Commercial Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Industrial Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Other Urban Street Delivery file name: C:\WinSLAMM Files\WI_Res and Other Urban Dec06.std
Freeway Street Delivery file name: C:\WinSLAMM Files\Freeway Dec06.std
Apply Street Delivery Files to Adjust the After Event Load Street Dirt Mass Balance: False
Pollutant Relative Concentration file name: C:\WinSLAMM Files\WI_GEO03.ppdx
Source Area PSD and Peak to Average Flow Ratio File: C:\WinSLAMM Files\NURP Source Area PSD Files.csv
Cost Data file name:
If Other Device Pollutant Load Reduction Values = 1, Off-site Pollutant Loads are Removed from Pollutant Load % Reduction calculations
Seed for random number generator: -42
Study period starting date: 01/05/69 Study period ending date: 12/31/69
Start of Winter Season: 12/06 End of Winter Season: 03/28
Date: 11-11-2020 Time: 21:00:49
Site information:

LU# 1 - Residential: Pre-Development Total area (ac): 57.370
  37 - Streets 1: 0.200 ac. Smooth Street Length = 0.085 curb-mi Street Width (assuming two curb-mi per street mile) = 38.82353 ft
    Default St. Dirt Accum. Annual Winter Load = 2500 lbs Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
  57 - Undeveloped Areas 1: 57.170 ac. Normal Silty Source Area PSD File: C:\WinSLAMM Files\NURP.cpz

SLAMM for Windows Version 10.4.1

Data file name: D:\Jobs\2020\2020-012_Standing Stone - TRIO\Project_Information\Calcs\SLAMM\Infiltration\Proposed_Disconnected_2020-012.mdb
Data file description:
Rain file name: C:\WinSLAMM Files\Rain Files\WisReg - Milwaukee WI 1969.RAN
Particulate Solids Concentration file name: C:\WinSLAMM Files\v10.1 WI_AVG01.pscx
Runoff Coefficient file name: C:\WinSLAMM Files\WI_SL06 Dec06.rsvx
Pollutant Relative Concentration file name: C:\WinSLAMM Files\WI_GEO03.ppdx
Residential Street Delivery file name: C:\WinSLAMM Files\WI_Res and Other Urban Dec06.std
Institutional Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Commercial Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Industrial Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Other Urban Street Delivery file name: C:\WinSLAMM Files\WI_Res and Other Urban Dec06.std
Freeway Street Delivery file name: C:\WinSLAMM Files\Freeway Dec06.std
Apply Street Delivery Files to Adjust the After Event Load Street Dirt Mass Balance: False
Source Area PSD and Peak to Average Flow Ratio File: C:\WinSLAMM Files\NURP Source Area PSD Files.csv
Cost Data file name:
If Other Device Pollutant Load Reduction Values = 1, Off-site Pollutant Loads are Removed from Pollutant Load % Reduction calculations
Seed for random number generator: -42
Start of Winter Season: 12/06 End of Winter Season: 03/28
Model Run Start Date: 01/05/69 Model Run End Date: 12/31/69
Date of run: 11-11-2020 Time of run: 21:09:27
Total Area Modeled (acres): 57.370
Years in Model Run: 0.99

	Runoff Volume (cu ft)	Percent Runoff Volume Reduction	Particulate Solids Conc. (mg/L)	Particulate Solids Yield (lbs)	Percent Particulate Solids Reduction
Total of all Land Uses without Controls:	2.112E+06	-	101.1	13332	-
Outfall Total with Controls:	1.594E+06	24.53%	29.58	2944	77.92%
Annualized Total After Outfall Controls:	1.616E+06			2985	

```
Data file name:  D:\Jobs\2020\2020-012_Standing Stone -
TRIO\Project_Information\Calcs\SLAMM\Infiltration\Proposed_Disconnected_2020-012.mdb
WinSLAMM Version 10.4.1
Rain file name:  C:\WinSLAMM Files\Rain Files\WisReg - Milwaukee WI 1969.RAN
Particulate Solids Concentration file name:  C:\WinSLAMM Files\v10.1 WI_AVG01.pscx
Runoff Coefficient file name:  C:\WinSLAMM Files\WI_SL06 Dec06.rsvx
Residential Street Delivery file name:  C:\WinSLAMM Files\WI_Res and Other Urban Dec06.std
Institutional Street Delivery file name:  C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Commercial Street Delivery file name:  C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Industrial Street Delivery file name:  C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Other Urban Street Delivery file name:  C:\WinSLAMM Files\WI_Res and Other Urban Dec06.std
Freeway Street Delivery file name:  C:\WinSLAMM Files\Freeway Dec06.std
Apply Street Delivery Files to Adjust the After Event Load Street Dirt Mass Balance:  False
Pollutant Relative Concentration file name:  C:\WinSLAMM Files\WI_GEO03.ppdx
Source Area PSD and Peak to Average Flow Ratio File:  C:\WinSLAMM Files\NURP Source Area PSD Files.csv
Cost Data file name:
If Other Device Pollutant Load Reduction Values = 1, Off-site Pollutant Loads are Removed from Pollutant Load
% Reduction calculations
Seed for random number generator:  -42
Study period starting date:  01/05/69       Study period ending date:  12/31/69
Start of Winter Season:  12/06              End of Winter Season:  03/28
Date:  11-11-2020                           Time:  21:09:35
Site information:

LU# 1 - Residential:  Subarea 10     Total area (ac):  5.430
     1 - Roofs 1:  1.160 ac.    Pitched    Connected    Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     13 - Paved Parking 1:  0.970 ac.    Connected    Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     45 - Large Landscaped Areas 1:  3.170 ac.    Normal Silty    Source Area PSD File: C:\WinSLAMM
Files\NURP.cpz
     70 - Water Body Areas:  0.130 ac.    Source Area PSD File:
LU# 2 - Residential:  Subarea 20     Total area (ac):  6.860
     1 - Roofs 1:  0.650 ac.    Pitched    Connected    Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     25 - Driveways 1:  0.270 ac.    Connected    Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     31 - Sidewalks 1:  0.740 ac.    Connected    Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     37 - Streets 1:  1.010 ac.    Smooth    Street Length = 0.427 curb-mi    Street Width (assuming two curb-
mi per street mile) = 39.0281 ft
          Default St. Dirt Accum.    Annual Winter Load = 2500 lbs    Source Area PSD File: C:\WinSLAMM
Files\NURP.cpz
```

```
     45 - Large Landscaped Areas 1:  3.850 ac.    Normal Silty    Source Area PSD File: C:\WinSLAMM
Files\NURP.cpz
     69 - Isolated Areas:  0.020 ac.    Source Area PSD File:
     70 - Water Body Areas:  0.320 ac.    Source Area PSD File:
LU# 3 - Residential:  Subarea 30     Total area (ac):  17.030
     1 - Roofs 1:  2.250 ac.    Pitched    Connected    Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     2 - Roofs 2:  0.880 ac.    Pitched    Connected    Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     25 - Driveways 1:  1.610 ac.    Connected    Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     26 - Driveways 2:  0.240 ac.    Connected    Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     31 - Sidewalks 1:  0.430 ac.    Connected    Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     32 - Sidewalks 2:  0.330 ac.    Connected    Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     37 - Streets 1:  1.310 ac.    Smooth    Street Length = 0.554 curb-mi    Street Width (assuming two curb-
mi per street mile) = 39.01624 ft
          Default St. Dirt Accum.    Annual Winter Load = 2500 lbs    Source Area PSD File: C:\WinSLAMM
Files\NURP.cpz
     38 - Streets 2:  0.730 ac.    Smooth    Street Length = 0.309 curb-mi    Street Width (assuming two curb-
mi per street mile) = 38.98059 ft
          Default St. Dirt Accum.    Annual Winter Load = 2500 lbs    Source Area PSD File: C:\WinSLAMM
Files\NURP.cpz
     45 - Large Landscaped Areas 1:  8.850 ac.    Normal Silty    Source Area PSD File: C:\WinSLAMM
Files\NURP.cpz
     70 - Water Body Areas:  0.400 ac.    Source Area PSD File:
LU# 4 - Residential:  Subarea 40     Total area (ac):  3.950
     1 - Roofs 1:  0.470 ac.    Pitched    Connected    Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     25 - Driveways 1:  0.310 ac.    Connected    Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     31 - Sidewalks 1:  0.300 ac.    Connected    Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     37 - Streets 1:  0.930 ac.    Smooth    Street Length = 0.393 curb-mi    Street Width (assuming two curb-
mi per street mile) = 39.0458 ft
          Default St. Dirt Accum.    Annual Winter Load = 2500 lbs    Source Area PSD File: C:\WinSLAMM
Files\NURP.cpz
     45 - Large Landscaped Areas 1:  1.800 ac.    Normal Silty    Source Area PSD File: C:\WinSLAMM
Files\NURP.cpz
     70 - Water Body Areas:  0.140 ac.    Source Area PSD File:
LU# 5 - Residential:  Subarea 45     Total area (ac):  2.400
     1 - Roofs 1:  0.310 ac.    Pitched    Connected    Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     31 - Sidewalks 1:  0.110 ac.    Connected    Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     45 - Large Landscaped Areas 1:  1.980 ac.    Normal Silty    Source Area PSD File: C:\WinSLAMM
Files\NURP.cpz
```

LU# 6 - Residential: Subarea 50   Total area (ac): 3.630
     1 - Roofs 1: 0.060 ac.   Pitched   Disconnected   Normal Silty   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     25 - Driveways 1: 0.020 ac.   Disconnected   Normal Silty   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     31 - Sidewalks 1: 0.040 ac.   Disconnected   Normal Silty   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     32 - Sidewalks 2: 0.130 ac.   Connected   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     37 - Streets 1: 0.530 ac.   Smooth   Street Length = 0.224 curb-mi   Street Width (assuming two curb-mi per street mile) = 39.04018 ft
          Default St. Dirt Accum.   Annual Winter Load = 2500 lbs   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz   CB-CP#6
     45 - Large Landscaped Areas 1: 2.850 ac.   Normal Silty   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
LU# 7 - Residential: Subarea 60   Total area (ac): 2.330
     1 - Roofs 1: 0.200 ac.   Pitched   Disconnected   Normal Silty   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     31 - Sidewalks 1: 0.190 ac.   Disconnected   Normal Silty   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     45 - Large Landscaped Areas 1: 1.940 ac.   Normal Silty   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
LU# 8 - Residential: Subarea 70   Total area (ac): 2.690
     1 - Roofs 1: 0.480 ac.   Pitched   Disconnected   Normal Silty   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     31 - Sidewalks 1: 0.010 ac.   Disconnected   Normal Silty   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     45 - Large Landscaped Areas 1: 2.200 ac.   Normal Silty   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
LU# 9 - Residential: Subarea 80   Total area (ac): 9.660
     1 - Roofs 1: 0.720 ac.   Pitched   Connected   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     2 - Roofs 2: 0.310 ac.   Pitched   Connected   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     25 - Driveways 1: 1.430 ac.   Connected   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     31 - Sidewalks 1: 0.370 ac.   Connected   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     37 - Streets 1: 1.280 ac.   Smooth   Street Length = 0.542 curb-mi   Street Width (assuming two curb-mi per street mile) = 38.96679 ft
          Default St. Dirt Accum.   Annual Winter Load = 2500 lbs   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz

45 - Large Landscaped Areas 1: 5.420 ac. Normal Silty Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
70 - Water Body Areas: 0.130 ac. Source Area PSD File:
LU# 10 - Residential: Subarea 90 Total area (ac): 1.270
1 - Roofs 1: 0.360 ac. Pitched Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
45 - Large Landscaped Areas 1: 0.910 ac. Normal Silty Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
LU# 11 - Residential: Subarea 100 Total area (ac): 2.120
1 - Roofs 1: 0.560 ac. Pitched Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
45 - Large Landscaped Areas 1: 1.560 ac. Normal Silty Source Area PSD File: C:\WinSLAMM Files\NURP.cpz

Control Practice 1: Wet Detention Pond CP# 1 (DS) - Future Pond 10
Particle Size Distribution file name: Not needed - calculated by program
Initial stage elevation (ft): 5
Peak to Average Flow Ratio: 3.8
Maximum flow allowed into pond (cfs): No maximum value entered
Outlet Characteristics:
Outlet type: Orifice 1
1. Orifice diameter (ft): 0.25
2. Number of orifices: 1
3. Invert elevation above datum (ft): 5
Outlet type: Orifice 2
1. Orifice diameter (ft): 0.92
2. Number of orifices: 1
3. Invert elevation above datum (ft): 6.25
Outlet type: Broad Crested Weir
1. Weir crest length (ft): 10
2. Weir crest width (ft): 10
3. Height from datum to bottom of weir opening: 9
Pond stage and surface area

Entry Number	Stage (ft)	Pond Area (acres)	Natural Seepage (in/hr)	Other Outflow (cfs)
0	0.00	0.0000	0.00	0.00
1	0.01	0.0200	0.00	0.00
2	1.00	0.0300	0.00	0.00
3	3.00	0.0500	0.00	0.00
4	4.00	0.0700	0.00	0.00

5	5.00	0.1300	0.00	0.00
6	7.00	0.1800	0.00	0.00
7	9.00	0.2400	0.00	0.00
8	10.00	0.2800	0.00	0.00

Control Practice 2: Wet Detention Pond CP# 2 (DS) - Pond 20
Particle Size Distribution file name: Not needed - calculated by program
Initial stage elevation (ft): 8
Peak to Average Flow Ratio: 3.8
Maximum flow allowed into pond (cfs): No maximum value entered
Outlet Characteristics:
Outlet type: Orifice 1
1. Orifice diameter (ft): 0.25
2. Number of orifices: 1
3. Invert elevation above datum (ft): 8
Outlet type: Broad Crested Weir
1. Weir crest length (ft): 10
2. Weir crest width (ft): 10
3. Height from datum to bottom of weir opening: 10
Outlet type: Vertical Stand Pipe
1. Stand pipe diameter (ft): 1.5
2. Stand pipe height above datum (ft): 8.75
Pond stage and surface area

Entry Number	Stage (ft)	Pond Area (acres)	Natural Seepage (in/hr)	Other Outflow (cfs)
0	0.00	0.0000	0.00	0.00
1	0.01	0.0800	0.00	0.00
2	1.00	0.1000	0.00	0.00
3	2.00	0.1200	0.00	0.00
4	3.00	0.1400	0.00	0.00
5	4.00	0.1500	0.00	0.00
6	5.00	0.1700	0.00	0.00
7	6.00	0.1900	0.00	0.00
8	7.00	0.2100	0.00	0.00
9	8.00	0.3200	0.00	0.00
10	9.00	0.4900	0.00	0.00
11	10.00	0.6100	0.00	0.00
12	11.00	0.7300	0.00	0.00

13	12.00	0.8700	0.00	0.00

Control Practice 3: Wet Detention Pond CP# 3 (DS) - Pond 30
Particle Size Distribution file name: Not needed - calculated by program
Initial stage elevation (ft): 6
Peak to Average Flow Ratio: 3.8
Maximum flow allowed into pond (cfs): No maximum value entered
Outlet Characteristics:
Outlet type: Orifice 1
1. Orifice diameter (ft): 0.25
2. Number of orifices: 1
3. Invert elevation above datum (ft): 6
Outlet type: Broad Crested Weir
1. Weir crest length (ft): 10
2. Weir crest width (ft): 10
3. Height from datum to bottom of weir opening: 8
Pond stage and surface area

Entry Number	Stage (ft)	Pond Area (acres)	Natural Seepage (in/hr)	Other Outflow (cfs)
0	0.00	0.0000	0.00	0.00
1	0.01	0.1100	0.00	0.00
2	1.00	0.1300	0.00	0.00
3	2.00	0.1600	0.00	0.00
4	3.00	0.1800	0.00	0.00
5	4.00	0.2100	0.00	0.00
6	5.00	0.2500	0.00	0.00
7	6.00	0.4000	0.00	0.00
8	7.00	0.4700	0.00	0.00
9	8.00	0.5300	0.00	0.00
10	9.00	0.6200	0.00	0.00
11	10.00	0.7100	0.00	0.00
12	11.00	0.8300	0.00	0.00

Control Practice 4: Wet Detention Pond CP# 4 (DS) - Pond 40
Particle Size Distribution file name: Not needed - calculated by program
Initial stage elevation (ft): 5
Peak to Average Flow Ratio: 3.8
Maximum flow allowed into pond (cfs): No maximum value entered

Outlet Characteristics:

Outlet type: Orifice 1

1. Orifice diameter (ft): 0.25
2. Number of orifices: 1
3. Invert elevation above datum (ft): 5

Outlet type: Broad Crested Weir

1. Weir crest length (ft): 10
2. Weir crest width (ft): 10
3. Height from datum to bottom of weir opening: 8.6

Pond stage and surface area

Entry Number	Stage (ft)	Pond Area (acres)	Natural Seepage (in/hr)	Other Outflow (cfs)
0	0.00	0.0000	0.00	0.00
1	0.01	0.0100	0.00	0.00
2	1.00	0.0200	0.00	0.00
3	2.00	0.0250	0.00	0.00
4	3.00	0.0300	0.00	0.00
5	4.00	0.0500	0.00	0.00
6	5.00	0.1300	0.00	0.00
7	6.00	0.1800	0.00	0.00
8	7.00	0.2500	0.00	0.00
9	8.00	0.3300	0.00	0.00
10	9.00	0.4000	0.00	0.00
11	10.00	0.4900	0.00	0.00

Control Practice 5: Biofilter CP# 1 (DS) - Infiltration Basin 45

1. Top area (square feet) = 30500
2. Bottom aea (square feet) = 13453
3. Depth (ft): 6
4. Biofilter width (ft) - for Cost Purposes Only: 10
5. Infiltration rate (in/hr) = 0.13
6. Random infiltration rate generation? No
7. Infiltration rate fraction (side): 1
8. Infiltration rate fraction (bottom): 1
9. Depth of biofilter that is rock filled (ft) 0
10. Porosity of rock filled volume = 0
11. Engineered soil infiltration rate: 0
12. Engineered soil depth (ft) = 0

13. Engineered soil porosity = 0
14. Percent solids reduction due to flow through engineered soil = 0
15. Biofilter peak to average flow ratio = 3.8
16. Number of biofiltration control devices = 1
17. Particle size distribution file: Not needed - calculated by program
18. Initial water surface elevation (ft): 0

Soil Data Soil Type Fraction in Eng. Soil

Biofilter Outlet/Discharge Characteristics:

Outlet type: Broad Crested Weir

1. Weir crest length (ft): 10
2. Weir crest width (ft): 10
3. Height of datum to bottom of weir opening: 5

Outlet type: Surface Discharge Pipe

1. Surface discharge pipe outlet diameter (ft): 0.25
2. Pipe invert elevation above datum (ft): 0.25
3. Number of surface pipe outlets: 1

Outlet type: Other Outlet

Stage Number	Stage (ft)	Discharge Rate (cfs)
2	1.00	0.000
3	2.00	0.390
4	3.00	7.860
5	4.00	16.910
6	5.00	22.690
7	6.00	27.270

Control Practice 6: Catchbasin Cleaning CP# 1 (SA) - SA Device, LU# 6 ,SA# 37

1. Fraction of area served by catchbasins = 1.00
2. Number of catchbasins = 2
3. Average sump depth below catchbasin outlet invert (feet) = 3
4. Depth of sediment in catchbasin sump at beginning of study period (ft) = 0
5. Typical outlet pipe diameter (ft) = 1
6. Typical outlet pipe Mannings n = 0.013
7. Typical outlet pipe slope (ft/ft) = 0.02
8. Typical catchbasin sump surface area (square feet) = 16
9. Total catchbasin depth (feet) = 8
10. Inflow hydrograph peak to average flow ratio = 3.8
11. Leakage rate through sump bottom (in/hr) = 0

12. Catchbasin Critical Particle Size File Name: Not needed - calculated by program
13. Catchbasin cleaning frequency: Annually

Control Practice 7: Wet Detention Pond CP# 5 (DS) - Dry Pond 70
Particle Size Distribution file name: Not needed - calculated by program
Initial stage elevation (ft): 0
Peak to Average Flow Ratio: 3.8
Maximum flow allowed into pond (cfs): No maximum value entered
Outlet Characteristics:
Outlet type: Orifice 1
1. Orifice diameter (ft): 0.33
2. Number of orifices: 1
3. Invert elevation above datum (ft): 0
Outlet type: Broad Crested Weir
1. Weir crest length (ft): 10
2. Weir crest width (ft): 10
3. Height from datum to bottom of weir opening: 2.5
Outlet type: Vertical Stand Pipe
1. Stand pipe diameter (ft): 1
2. Stand pipe height above datum (ft): 2
Pond stage and surface area

Entry Number	Stage (ft)	Pond Area (acres)	Natural Seepage (in/hr)	Other Outflow (cfs)
0	0.00	0.0000	0.00	0.00
1	0.01	0.0300	0.00	0.00
2	0.50	0.1600	0.00	0.00
3	1.50	0.2000	0.00	0.00
4	2.50	0.2300	0.00	0.00
5	3.50	0.2900	0.00	0.00

Control Practice 8: Wet Detention Pond CP# 6 (DS) - Pond 80
Particle Size Distribution file name: Not needed - calculated by program
Initial stage elevation (ft): 5
Peak to Average Flow Ratio: 3.8
Maximum flow allowed into pond (cfs): No maximum value entered
Outlet Characteristics:
Outlet type: Orifice 1
1. Orifice diameter (ft): 0.33

2. Number of orifices: 1
3. Invert elevation above datum (ft): 5

Outlet type: Broad Crested Weir
1. Weir crest length (ft): 10
2. Weir crest width (ft): 10
3. Height from datum to bottom of weir opening: 8.25

Outlet type: Vertical Stand Pipe
1. Stand pipe diameter (ft): 2.5
2. Stand pipe height above datum (ft): 6.83

Pond stage and surface area

Entry Number	Stage (ft)	Pond Area (acres)	Natural Seepage (in/hr)	Other Outflow (cfs)
0	0.00	0.0000	0.00	0.00
1	0.01	0.0300	0.00	0.00
2	1.00	0.0400	0.00	0.00
3	2.00	0.0500	0.00	0.00
4	3.00	0.0600	0.00	0.00
5	4.00	0.0700	0.00	0.00
6	5.00	0.1300	0.00	0.00
7	5.50	0.1400	0.00	0.00
8	6.50	0.1700	0.00	0.00
9	7.50	0.2100	0.00	0.00
10	8.50	0.2400	0.00	0.00
11	9.00	0.2800	0.00	0.00

Control Practice 9: Biofilter CP# 2 (DS) - Bio 90
1. Top area (square feet) = 7466
2. Bottom aea (square feet) = 2451
3. Depth (ft): 3.4
4. Biofilter width (ft) - for Cost Purposes Only: 10
5. Infiltration rate (in/hr) = 0.13
6. Random infiltration rate generation? No
7. Infiltration rate fraction (side): 1
8. Infiltration rate fraction (bottom): 1
9. Depth of biofilter that is rock filled (ft) 0
10. Porosity of rock filled volume = 0
11. Engineered soil infiltration rate: 3.6
12. Engineered soil depth (ft) = 1.5

13. Engineered soil porosity = 0.26
14. Percent solids reduction due to flow through engineered soil = 80
15. Biofilter peak to average flow ratio = 3.8
16. Number of biofiltration control devices = 1
17. Particle size distribution file: Not needed - calculated by program
18. Initial water surface elevation (ft): 0

Soil Data — Soil Type Fraction in Eng. Soil

User-Defined Soil Type — 1.000

Biofilter Outlet/Discharge Characteristics:

Outlet type: Broad Crested Weir

1. Weir crest length (ft): 10
2. Weir crest width (ft): 10
3. Height of datum to bottom of weir opening: 2.4

Outlet type: Vertical Stand Pipe

1. Stand pipe diameter (ft): 1
2. Stand pipe height above datum (ft): 1.75

Outlet type: Drain Tile/Underdrain

1. Underdrain outlet diameter (ft): 0.33
2. Invert elevation above datum (ft): 0.25
3. Number of underdrain outlets: 1

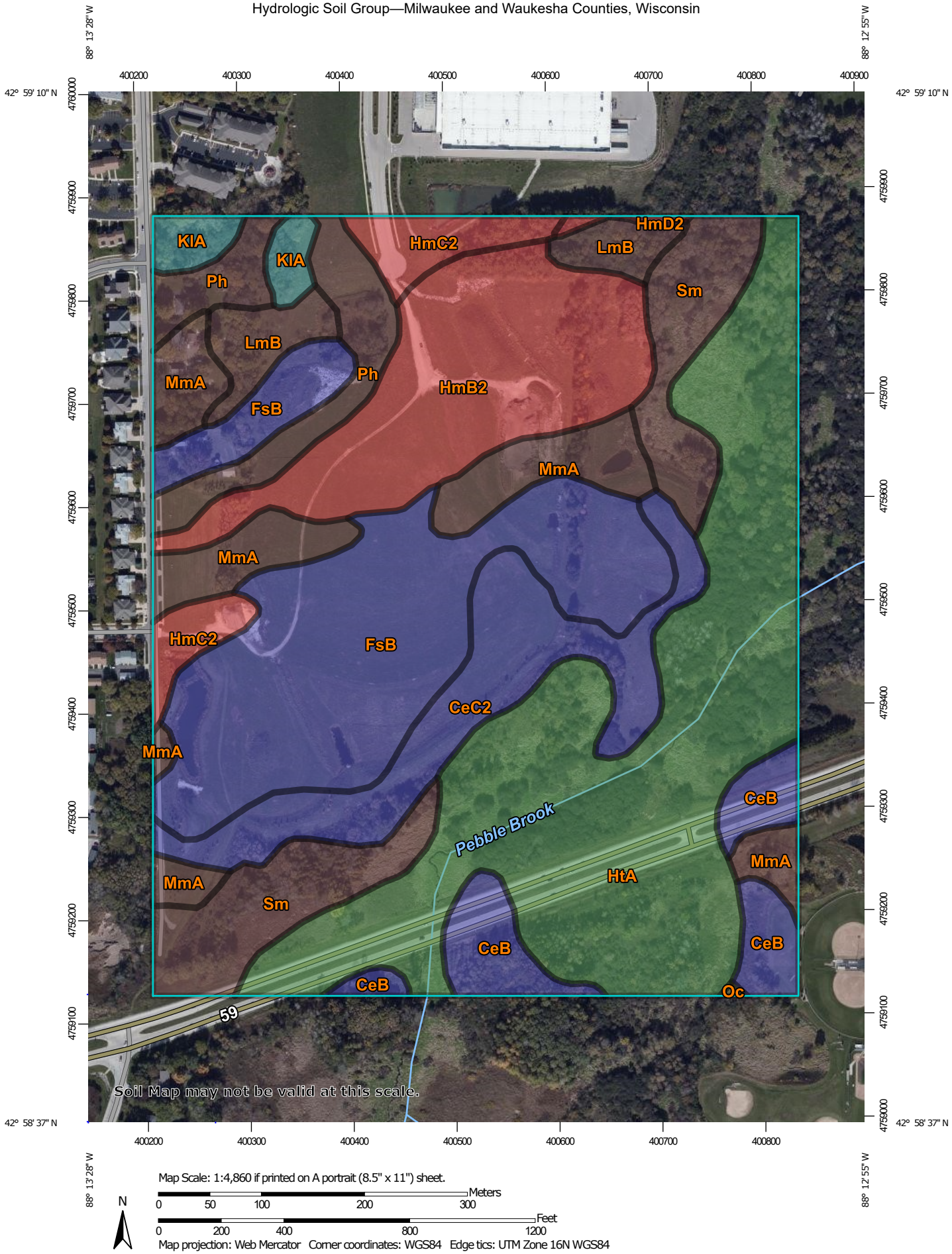
Control Practice 10: Biofilter CP# 3 (DS) - Bio 100

1. Top area (square feet) = 9713
2. Bottom aea (square feet) = 4069
3. Depth (ft): 5.5
4. Biofilter width (ft) - for Cost Purposes Only: 10
5. Infiltration rate (in/hr) = 0.13
6. Random infiltration rate generation? No
7. Infiltration rate fraction (side): 1
8. Infiltration rate fraction (bottom): 1
9. Depth of biofilter that is rock filled (ft) 0
10. Porosity of rock filled volume = 0
11. Engineered soil infiltration rate: 3.6
12. Engineered soil depth (ft) = 1.5
13. Engineered soil porosity = 0.26
14. Percent solids reduction due to flow through engineered soil = 80
15. Biofilter peak to average flow ratio = 3.8
16. Number of biofiltration control devices = 1

17. Particle size distribution file: Not needed - calculated by program
18. Initial water surface elevation (ft): 0
Soil Data Soil Type Fraction in Eng. Soil
    User-Defined Soil Type 1.000
Biofilter Outlet/Discharge Characteristics:
    Outlet type: Broad Crested Weir
        1. Weir crest length (ft): 10
        2. Weir crest width (ft): 10
        3. Height of datum to bottom of weir opening: 3
    Outlet type: Vertical Stand Pipe
        1. Stand pipe diameter (ft): 1
        2. Stand pipe height above datum (ft): 1.75
    Outlet type: Drain Tile/Underdrain
        1. Underdrain outlet diameter (ft): 0.33
        2. Invert elevation above datum (ft): 0.25
        3. Number of underdrain outlets: 1

APPENDIX E

NRCS Soil Survey



Map Scale: 1:4,860 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 50 100 200 300

Feet: 0 200 400 800 1200

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 16N WGS84

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: Milwaukee and Waukesha Counties, Wisconsin
Survey Area Data: Version 16, Jun 8, 2020

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

Date(s) aerial images were photographed: Aug 1, 2019—Oct 20, 2019

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
CeB	Casco loam, 2 to 6 percent slopes	B	5.4	4.6%
CeC2	Casco loam, 6 to 12 percent slopes, eroded	B	9.7	8.3%
FsB	Fox silt loam, 2 to 6 percent slopes	B	22.1	18.8%
HmB2	Hochheim loam, 2 to 6 percent slopes, eroded	D	14.3	12.2%
HmC2	Hochheim loam, 6 to 12 percent slopes, eroded	D	3.5	3.0%
HmD2	Hochheim loam, 12 to 20 percent slopes, eroded	D	0.2	0.2%
HtA	Houghton muck, 0 to 2 percent slopes	A/D	33.0	28.0%
KlA	Kendall silt loam, 1 to 3 percent slopes	C	1.8	1.5%
LmB	Lamartine silt loam, 0 to 3 percent slopes	B/D	3.3	2.8%
MmA	Matherton silt loam, 1 to 3 percent slopes	B/D	8.8	7.5%
Oc	Ogden muck	C/D	0.0	0.0%
Ph	Pella silt loam, 0 to 2 percent slopes	B/D	5.6	4.8%
Sm	Sebewa silt loam, 0 to 2 percent slopes	B/D	9.7	8.3%
Totals for Area of Interest			**117.5**	**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