STORMWATER MANAGEMENT PLAN

for

SKYLINE SUBDIVISION

Summit Avenue (USH 18)
City of Waukesha, Wisconsin

Prepared for:

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All plans and supporting documents have been reviewed and approved by the engineer. This certifies that the requirements of Chapter 32 of the City of Waukesha's Ordinance have been read and that to the best of the engineer's knowledge, the submitted plans and report comply with the requirements.

May 6, 2022

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INTRODUCTION

Bielinski Homes is proposing to construct a new residential subdivision on an 80-acre parcel located north of Summit Avenue (U.S.H. 18), in the City of Waukesha, Wisconsin. The proposed development includes the construction of 143 residential homes and associated roadways, drives, a public park area, and sidewalks. The proposed plan also includes the construction of 6 ponds and 3 infiltration basins to treat and manage stormwater runoff from the site. The proposed development will result in a net increase in impervious area of approximately 26.16 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 10.10 software by HydroCAD Software Solutions.

Soil types for the site were determined from soil boring logs and from the NRCS Soil Survey for Waukesha County. Soils at the site are predominantly hydrologic soil group D soils. Maximum pre-development runoff curve numbers (CN) were taken from Chapter 32 of Waukesha's City Ordinance.

Rainfall values were taken from Table 3 of Chapter 32 of Waukesha's City Ordinance. MSE3 rainfall distributions were used for peak flow calculations.

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 is approximately 80-acres in size and is occupied by a farmstead and two residential properties. The site is mostly utilized as cropland with some areas of woodlands and wetlands. Surface drainage for the site generally slopes in all directions, towards existing wetlands to the north, west, and east. Limited areas of the site also drain towards storm inlets and stormwater basins located within the Woodland Hills Condominium development, and towards storm inlets and a drainage ditch along Summit Avenue (U.S.H. 18). Flow from this site eventually drains to a series of unnamed tributaries of Pebble Creek, which is located within the Fox River Watershed.

The location of the project site is shown on Figure 1. Land cover types, drainage subareas and flow paths are shown on the 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
10N	North Subarea	14.60	0.00	19 min.	15.07	18.87	33.92	68.24
15	Link – North Drainage	-	-	-	15.07	18.87	33.92	68.24
20E	East Subarea	18.96	0.00	27 min.	16.34	20.48	36.96	74.84
30E	East Subarea	2.16	0.00	20 min.	2.31	2.87	5.07	10.05
35	Link – White Oak Way	-	-	-	18.41	23.07	41.66	84.05
40E	East Subarea	4.46	0.00	22 min.	4.59	5.70	10.11	20.04
45	Link – Hawthorn Hill Dr	-	-	-	4.59	5.70	10.11	20.04
50E	East Subarea	4.91	0.51	17 min.	5.73	7.12	12.56	24.83
55	Link – Summit Avenue	-	-	-	5.73	7.12	12.56	24.83
60W	West Subarea	2.41	0.00	19 min.	2.70	3.35	5.92	11.75
70W	West Subarea	3.76	0.00	16 min.	4.54	5.64	9.93	19.61
80W	West Subarea	20.77	0.00	56 min.	9.08	11.72	22.57	48.41
90W	West Subarea	7.87	0.21	17 min.	9.19	11.41	20.13	39.79
95	Link – West Drainage	-	-	-	18.47	23.33	42.94	88.56
99	**Total Flow**	**79.90**	**0.72**	**-**	**60.68**	**76.17**	**137.92**	**279.59**

POST-DEVELOPMENT CONDITIONS

The proposed development includes the construction of 143 residential homes and associated roadways, drives, a public park area, and sidewalks. The proposed plan also includes the construction of 6 ponds and 3 infiltration basins to treat and manage stormwater runoff from the site. The proposed development will result in a net increase in impervious area of approximately 26.16 acres.

Figure 2, Post-Development Conditions Plan, shows the proposed land cover, grading, drainage subarea boundaries, flow paths, and proposed site and stormwater management improvements. The hydrological analysis of post-development conditions was performed using the same methodology as used for pre-development conditions. Table 3 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
5N	North Subarea	17.50	6.57	14 min.	29.06	35.01	57.69	106.89
5P	North Pond	-	-	-	1.39	1.55	13.42	48.80
10N	North Subarea	4.96	0.64	18 min.	5.36	6.71	12.08	24.30
15	Link – North Drainage	-	-	-	6.36	7.84	18.25	69.56
20E	East Subarea	5.40	2.07	16 min.	8.32	10.03	16.54	30.68
20P	East Pond	-	-	-	3.55	5.38	12.55	22.14
25E	East Subarea	3.51	0.39	34 min.	2.47	3.12	5.77	11.89
30E	East Subarea	8.81	3.60	17 min.	13.81	16.55	26.95	49.36
30B	East Pond/Basin	-	-	-	0.54	0.59	4.12	17.85
35E	East Subarea	0.33	0.00	6 min.	0.47	0.60	1.11	2.32
35	Link – White Oak Way	-	-	-	6.57	9.10	18.57	51.02
40E	East Subarea	3.62	1.75	6 min.	9.14	10.83	17.17	30.67
45	Link – Hawthorn Hill Dr	-	-	-	9.14	10.83	17.17	30.67
50E	East Subarea	2.51	0.52	13 min.	3.64	4.48	7.74	15.01
55	Link – Summit Avenue	-	-	-	3.64	4.48	7.74	15.01
60W	West Subarea	1.78	0.36	12 min.	2.68	3.30	5.70	11.03
70W	West Subarea	13.08	5.59	17 min.	20.51	24.57	40.01	73.29
70P	West Pond	-	-	-	0.98	2.39	20.02	64.20
75W	West Subarea	1.29	0.17	8 min.	2.14	2.64	4.62	9.03
75B	West Basin	-	-	-	0.71	0.92	7.61	32.78
80W	West Subarea	11.02	4.60	13 min.	20.19	24.14	39.10	71.32
80P	West Pond	-	-	-	0.86	0.93	3.79	47.38
85W	West Subarea	3.37	0.62	10 min.	5.49	6.75	11.63	22.45
85B	West Pond/Basin	-	-	-	0.47	0.56	0.97	11.70
90W	West Subarea	2.72	0.00	34 min.	1.53	1.99	3.91	8.51
95	Link – West Drainage	-	-	-	3.21	4.04	10.78	50.86
99	**Total Flow**	**79.90**	**26.88**	**-**	**20.48**	**25.20**	**48.89**	**177.10**

DETENTION SYSTEM ROUTING

The stormwater management ponds and infiltration basins are designed in accordance with WDNR's Technical Standard 1001 (Wet Detention Basin) and 1003 (Infiltration Basin), respectively. Details of the outlet control structures for each system are identified below.

Table 4 summarizes the detention system routing analysis for post-development conditions.

TABLE 4
Detention System Routing Analysis Summary

Pond 5P (North Pond)

System Details:
Bottom elevation = 210.00
Normal Water Level elevation = 215.00
Top of berm elevation = 220.00

Outlet Control:
6.5-inch diameter orifice at I.E. 215.00
27-inch horizontal grate (x2) at elevation 217.50
10-foot spillway at elevation 219.00

	1-Year Storm	2-Year Storm	10-Year Storm	100-Year Storm
Peak Inflow	29.06 cfs	35.01 cfs	57.69 cfs	106.89 cfs
Peak Outflow	1.39 cfs	1.55 cfs	13.42 cfs	48.80 cfs
Max Water Surface Elev.	216.85	217.22	217.90	218.99
Maximum Storage Volume	1.18 ac-ft	1.45 ac-ft	1.97 ac-ft	2.91 ac-ft

Pond 20P (East Pond)

System Details:
Bottom elevation = 216.00
Normal Water Level elevation = 221.00
Top of berm elevation = 224.30

Outlet Control:
6-inch diameter orifice at I.E. 221.00
27-inch horizontal grate at elevation 222.00
10-foot spillway at elevation 223.30

	1-Year Storm	2-Year Storm	10-Year Storm	100-Year Storm
Peak Inflow	8.32 cfs	10.03 cfs	16.54 cfs	30.68 cfs
Peak Outflow	3.55 cfs	5.38 cfs	12.55 cfs	22.14 cfs
Max Water Surface Elev.	222.23	222.33	222.63	223.18
Maximum Storage Volume	0.23 ac-ft	0.25 ac-ft	0.32 ac-ft	0.47 ac-ft

Basin 30B (East Pond/Basin)

Pond Details:
Bottom elevation = 207.50
Normal water level elevation = 213.50
Top of berm elevation = 218.00

Pond Outlet Control:
4-inch diameter orifice at I.E. 213.50
10-foot spillway at elevation 215.00

Infiltration Basin Details:
Bottom elevation = 212.50
Top of berm elevation = 218.00

Infiltration Basin Outlet Control:
0.50 in/hr infiltration rate (per WDNR TS 1002)
4-inch orifice at I.E. 213.00
24-inch horizontal grate at elevation 215.50
10-foot spillway at elevation 217.00

	1-Year Storm	2-Year Storm	10-Year Storm	100-Year Storm
Peak Inflow	13.81 cfs	16.55 cfs	26.95 cfs	49.36 cfs
Peak Outflow	0.54 cfs	0.59 cfs	4.12 cfs	17.85 cfs
Max Water Surface Elev.	214.80	215.12	215.80	216.77
Maximum Storage Volume	0.63 ac-ft	0.78 ac-ft	1.12 ac-ft	1.67 ac-ft

TABLE 4
Detention System Routing Analysis Summary

Basin 70P (West Pond)

Pond Details:
Bottom elevation = 206.00
Normal water level elevation = 212.00
Top of berm elevation = 217.00

Pond Outlet Control:
5-inch diameter orifice at I.E. 212.00
24-inch horizontal grate at elevation 214.75
30-foot spillway at elevation 215.00

	1-Year Storm	2-Year Storm	10-Year Storm	100-Year Storm
Peak Inflow	20.51 cfs	24.57 cfs	40.01 cfs	73.29 cfs
Peak Outflow	0.98 cfs	2.39 cfs	20.02 cfs	64.20 cfs
Max Water Surface Elev.	214.62	214.92	215.34	216.02
Maximum Storage Volume	0.94 ac-ft	1.07 ac-ft	1.27 ac-ft	1.62 ac-ft

Basin 75B (West Basin)

Infiltration Basin Details:
Bottom elevation = 211.50
Top of berm elevation = 217.00

Infiltration Basin Outlet Control:
0.50 in/hr infiltration rate (per WDNR TS 1002)
6-inch orifice at I.E. 212.00
30-inch horizontal grate at elevation 214.25
10-foot spillway at elevation 216.00

	1-Year Storm	2-Year Storm	10-Year Storm	100-Year Storm
Peak Inflow	2.65 cfs	3.23 cfs	21.01 cfs	68.00 cfs
Peak Outflow	0.71 cfs	0.92 cfs	7.61 cfs	32.78 cfs
Max Water Surface Elev.	212.81	213.20	214.64	215.97
Maximum Storage Volume	0.25 ac-ft	0.33 ac-ft	0.71 ac-ft	1.16 ac-ft

Basin 80P (West Pond)

Pond Details:
Bottom elevation = 206.00
Normal water level elevation = 212.00
Top of berm elevation = 217.00

Pond Outlet Control:
5-inch diameter orifice at I.E. 212.00
24-inch horizontal grate at elevation 215.00
50-foot spillway at elevation 215.50

	1-Year Storm	2-Year Storm	10-Year Storm	100-Year Storm
Peak Inflow	20.19 cfs	24.14 cfs	39.10 cfs	71.32 cfs
Peak Outflow	0.86 cfs	0.93 cfs	3.79 cfs	47.38 cfs
Max Water Surface Elev.	213.93	214.29	215.26	215.97
Maximum Storage Volume	0.79 ac-ft	0.97 ac-ft	1.48 ac-ft	1.90 ac-ft

Basin 85B (West Pond/Basin)

Pond Details:
Bottom elevation = 207.00
Normal water level elevation = 212.00
Top of berm elevation = 217.00

Pond Outlet Control:
3-inch diameter orifice at I.E. 212.00
40-foot spillway at elevation 213.50

Infiltration Basin Details:
Bottom of elevation = 211.50
Top of berm elevation = 217.00

Infiltration Basin Outlet Control:
0.50 in/hr infiltration rate (per WDNR TS 1002)
6-inch orifice at I.E. 212.00
24-inch horizontal grate at elevation 214.25
10-foot spillway at elevation 216.00

	1-Year Storm	2-Year Storm	10-Year Storm	100-Year Storm
Peak Inflow	6.00 cfs	7.33 cfs	12.44 cfs	58.77 cfs
Peak Outflow	0.47 cfs	0.56 cfs	0.97 cfs	11.70 cfs
Max Water Surface Elev.	212.50	212.60	213.30	214.88
Maximum Storage Volume	0.44 ac-ft	0.49 ac-ft	0.88 ac-ft	1.94 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 following 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
60.68 cfs	>	20.48 cfs
2-yr Pre-Development		2-yr Post-Development
76.17 cfs	>	25.20 cfs
10-yr Pre-Development		10-yr Post-Development
137.92 cfs		48.89 cfs
100-yr Pre-Development		100-yr Post-Development
279.59 cfs	>	177.10 cfs

STORMWATER QUALITY

The City of Waukesha's Ordinance requires BMPs to be designed to control 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. 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 80.2 percent of TSS will be removed from stormwater as a result of the stormwater management ponds and infiltration basins. Detailed computations are provided in Appendix C.

INFILTRATION

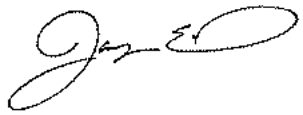
The City of Waukesha's Ordinance requires medium density residential developments to infiltrate sufficient runoff volume so that the post-development infiltration volume is at least 75 percent of pre-development infiltration volume, based on an average annual rainfall. However, no more than 2 percent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

The infiltration analysis was performed using WinSLAMM modeling software. The results of the WinSLAMM analysis indicate that post-development conditions will infiltrate approximately 85 percent of the pre-development infiltration volume. Detailed computations are provided in Appendix D.

CONCLUSIONS

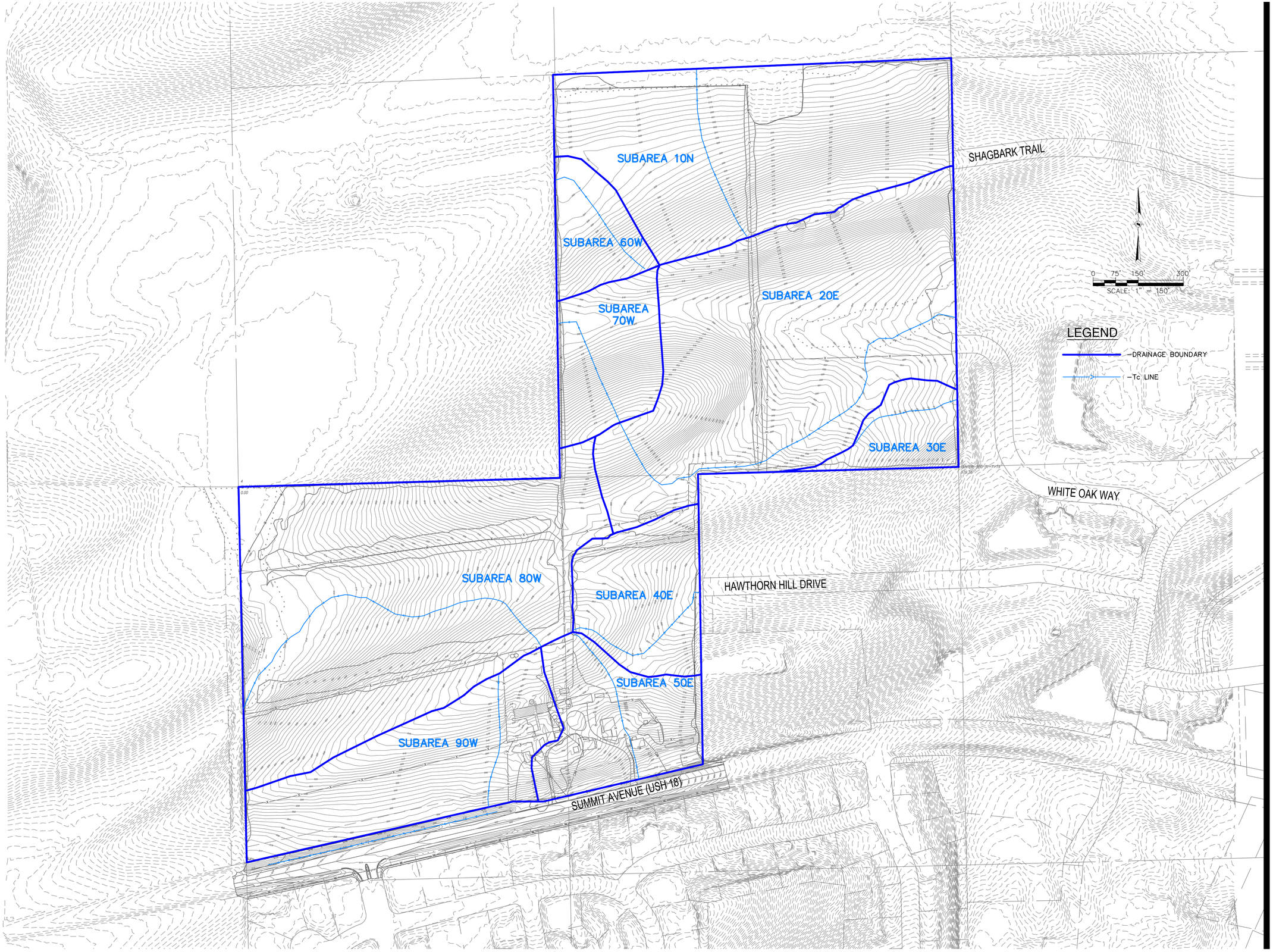
The proposed development will maintain compliance with the City of Waukesha's and the WDNR's requirements for control of storm water quantity, quality, and infiltration. We request, on behalf of Bielinski Homes, approval of this Stormwater Management Plan to allow for construction of the new Skyline Subdivision development.

Prepared by:



Jayme L. Sisel, P.E.

FIGURES



SOUND STORMWATER DESIGN

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PROJECT TITLE:
SKYLINE SUBDIVISION
SUMMIT AVENUE (USH 18)
WAUKESHA, WISCONSIN

DATE: 03-22-21

JOB NO: 2019-006

SHEET TITLE:
PRE-DEVELOPMENT CONDITIONS PLAN

FIGURE:
1

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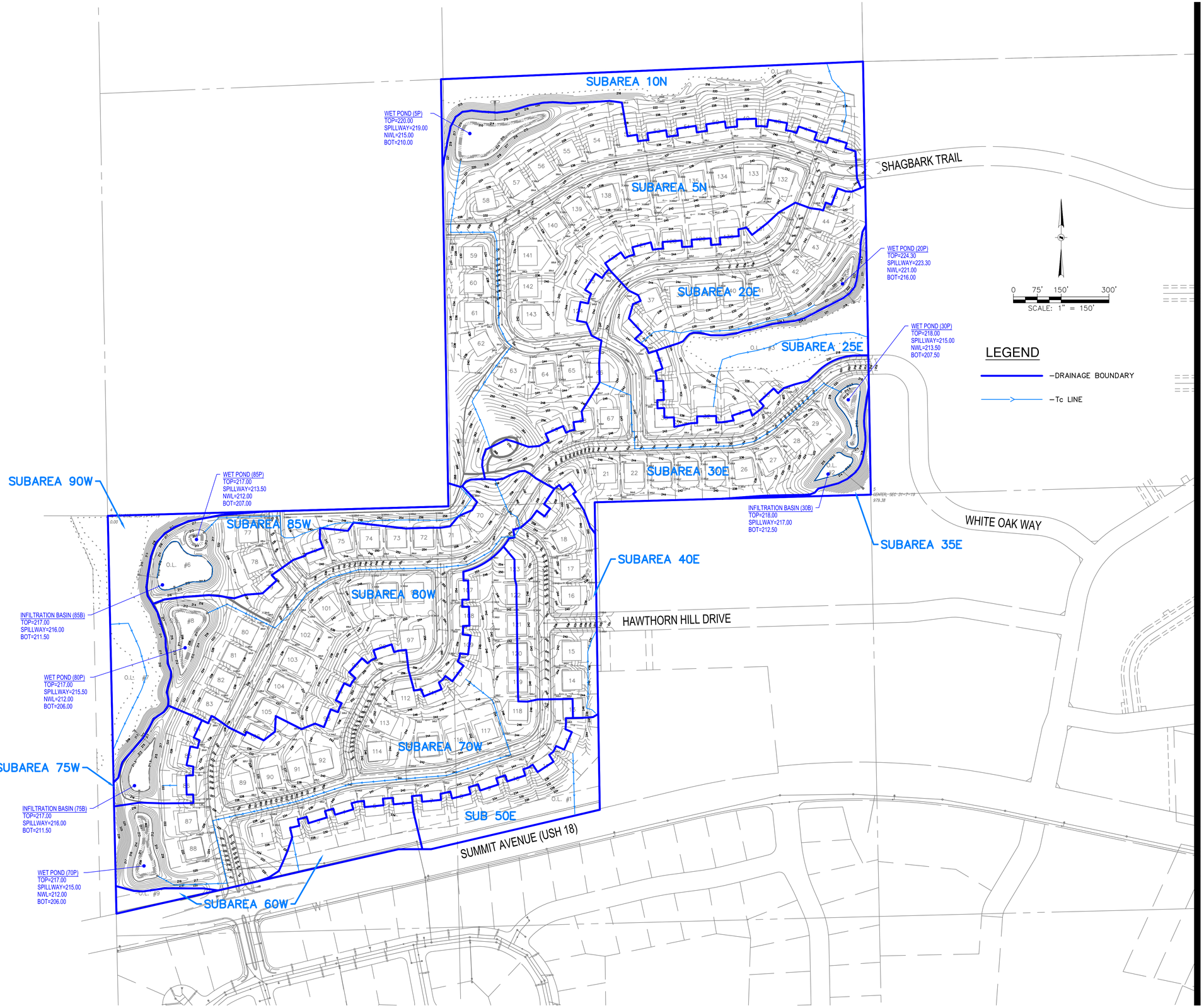

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WAUKESHA, WISCONSIN

DATE: 03-22-21

JOB NO: 2019-006

SHEET TITLE:
POST-DEVELOPMENT CONDITIONS PLAN

FIGURE:
2

INFILTRATION BASIN (75B)
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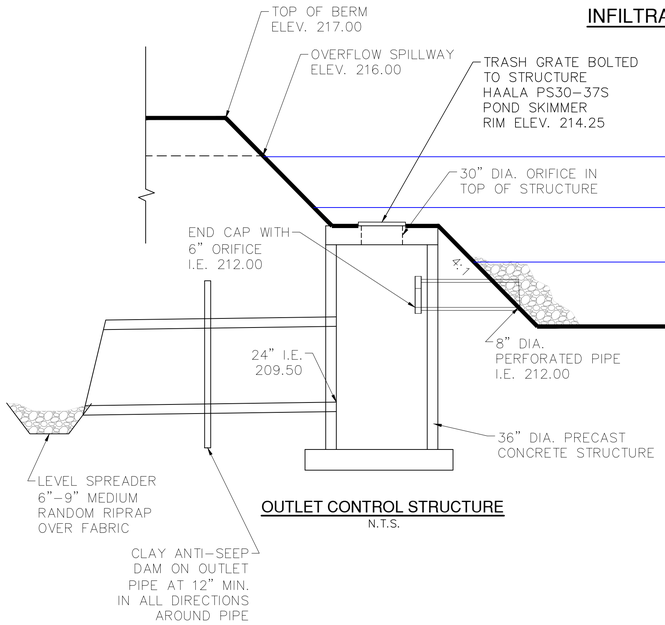

OUTLET CONTROL STRUCTURE
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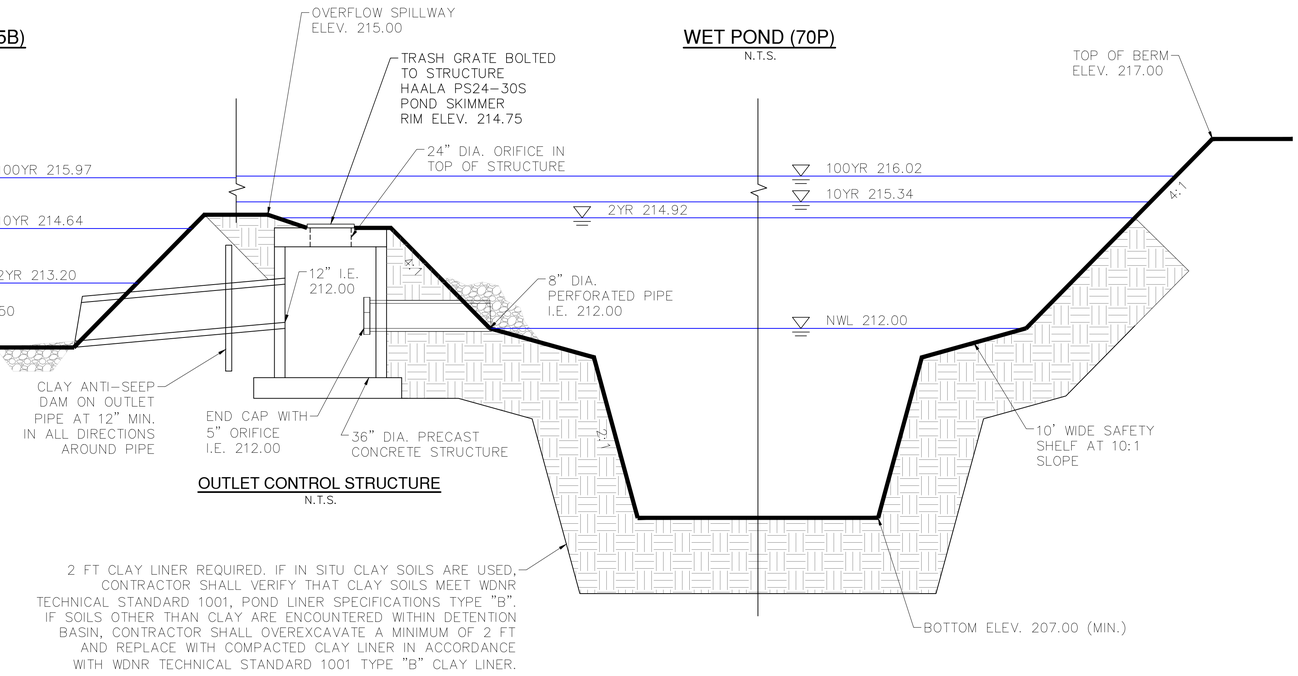

WET POND (70P)
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INFILTRATION BASIN (85B)
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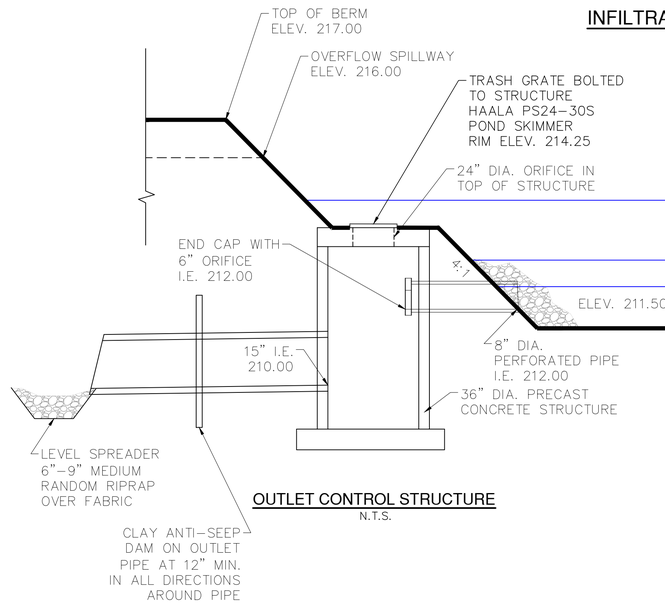

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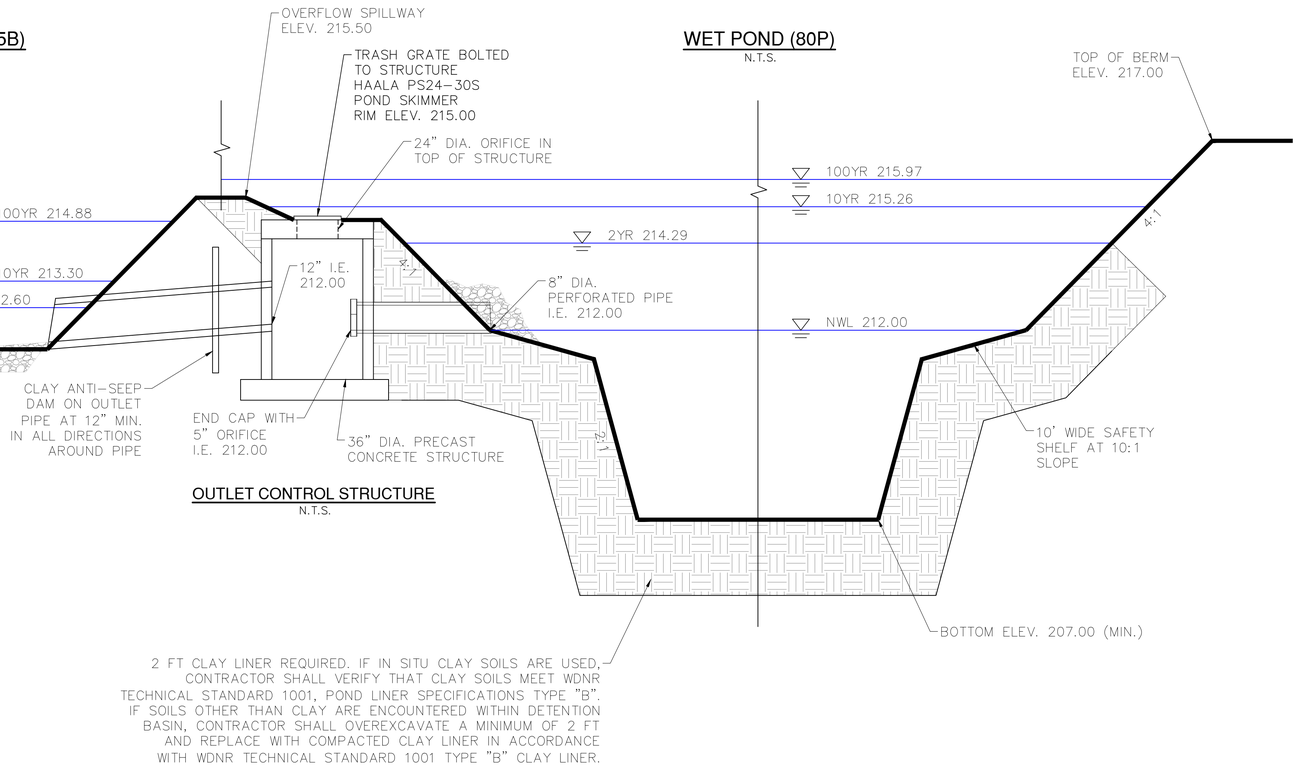

WET POND (80P)
N.T.S.

OUTLET CONTROL STRUCTURE
N.T.S.

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SHEET TITLE:
STORMWATER DETAILS

FIGURE:
3

INFILTRATION BASIN (85B)
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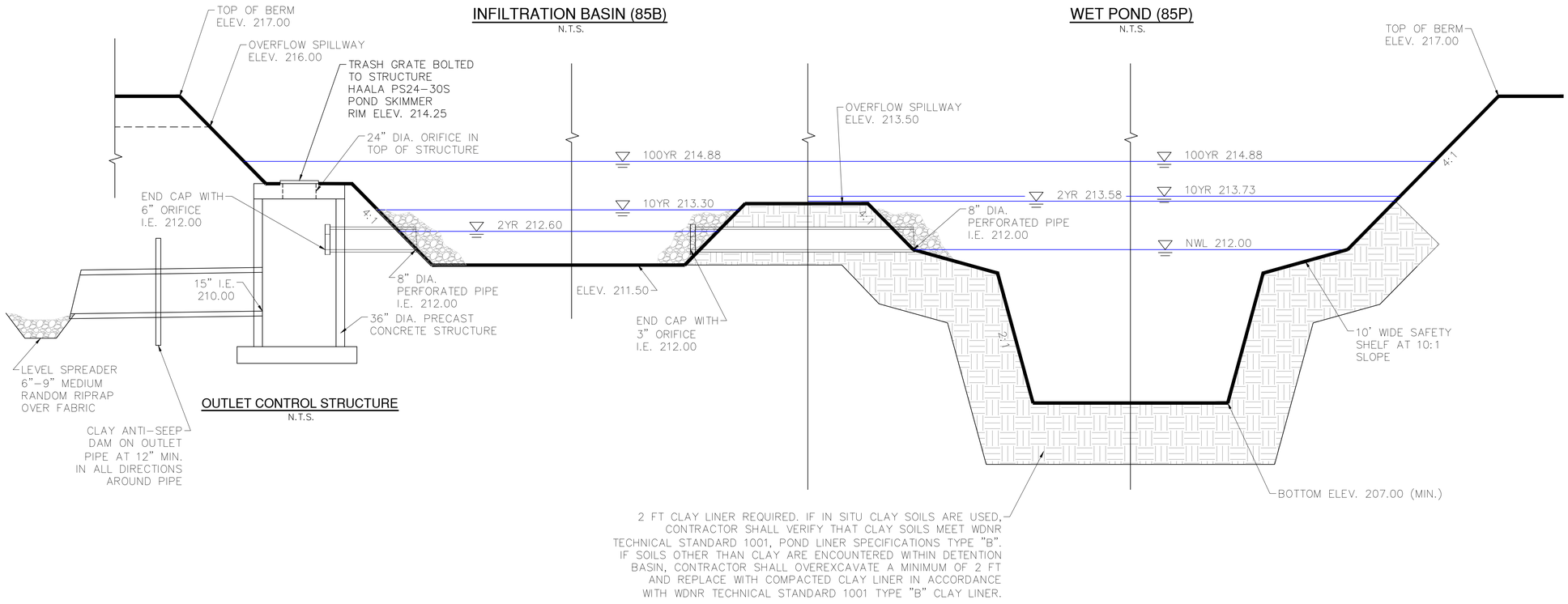

WET POND (85P)
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OUTLET CONTROL STRUCTURE
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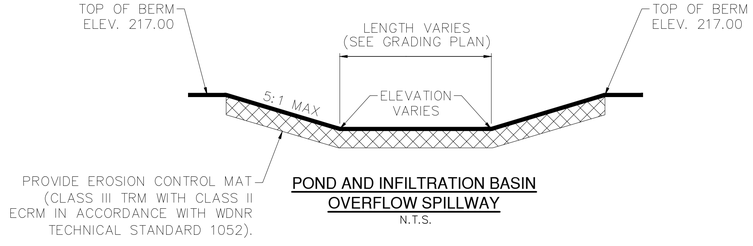

POND AND INFILTRATION BASIN OVERFLOW SPILLWAY
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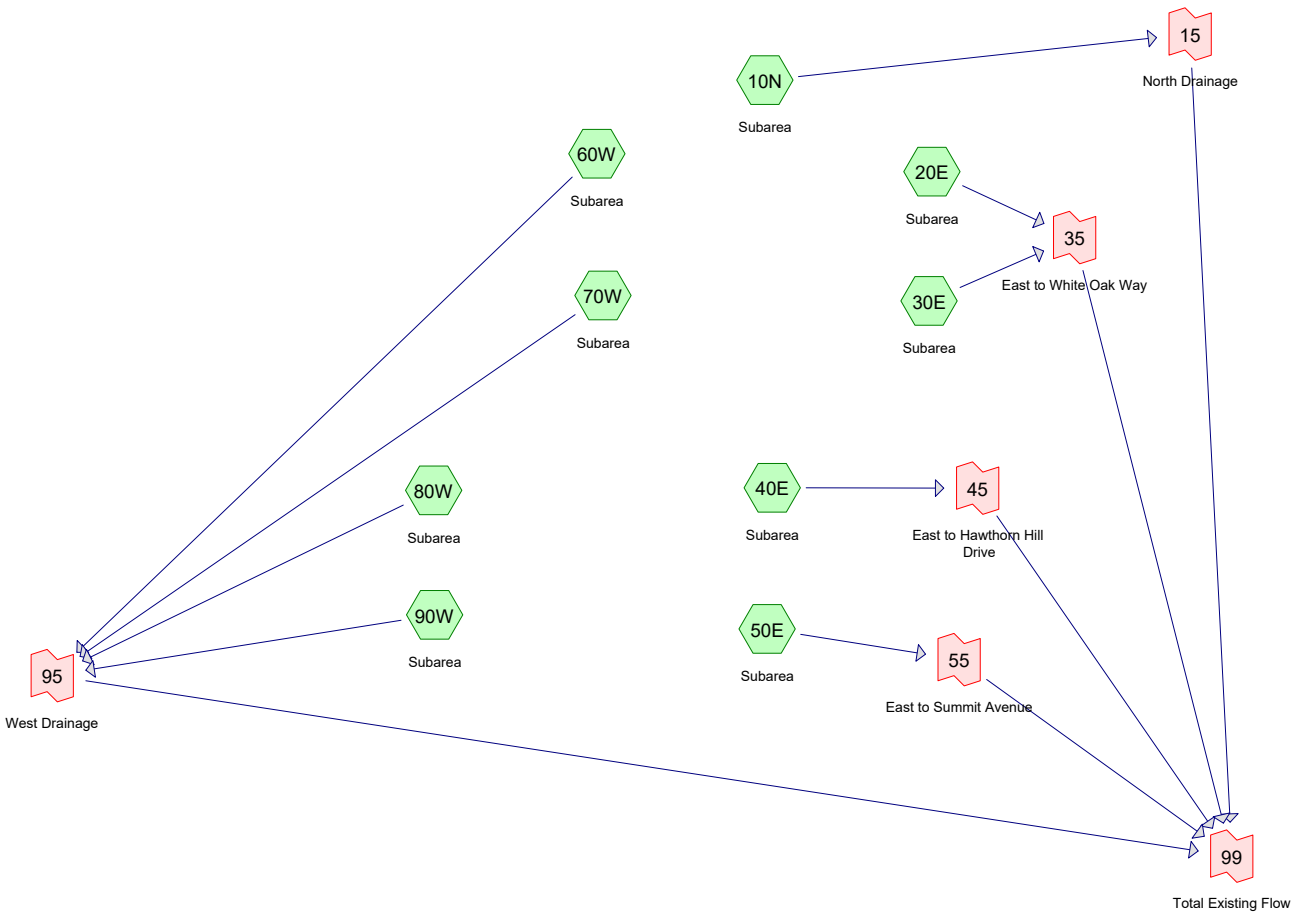
SHEET TITLE:
STORMWATER DETAILS

FIGURE:
4

APPENDIX A

Pre-Settlement Hydrologic Analysis



Subcat Reach Pond Link

Routing Diagram for Existing_006
Prepared by HP Inc., Printed 3/16/2021

Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	1-yr	MSE 24-hr	3	Default	24.00	1	2.40	2
2	2-yr	MSE 24-hr	3	Default	24.00	1	2.70	2
3	10-yr	MSE 24-hr	3	Default	24.00	1	3.81	2
4	100-yr	MSE 24-hr	3	Default	24.00	1	6.18	2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
54.390	83	cropland - D soils (10N, 20E, 30E, 40E, 50E, 60W, 70W, 80W, 90W)
3.690	80	grass - D soils (50E, 80W, 90W)
0.250	96	gravel (50E, 90W)
0.470	98	impervious (50E, 90W)
6.600	78	meadow - D soils (80W)
2.080	78	wetland - D soils (10N, 20E, 80W)
12.420	77	woodland - D soils (10N, 20E, 30E, 40E, 50E, 60W, 70W, 80W, 90W)
79.900	**82**	**TOTAL AREA**

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment10N: Subarea Runoff Area=14.600 ac 0.00% Impervious Runoff Depth>0.92"
Flow Length=590' Slope=0.0700 '/' Tc=19.2 min CN=82 Runoff=15.07 cfs 1.124 af

Subcatchment20E: Subarea Runoff Area=18.960 ac 0.00% Impervious Runoff Depth>0.92"
Flow Length=1,495' Tc=26.7 min CN=82 Runoff=16.34 cfs 1.459 af

Subcatchment30E: Subarea Runoff Area=2.160 ac 0.00% Impervious Runoff Depth>0.98"
Flow Length=390' Slope=0.0500 '/' Tc=20.4 min CN=83 Runoff=2.31 cfs 0.176 af

Subcatchment40E: Subarea Runoff Area=4.460 ac 0.00% Impervious Runoff Depth>0.98"
Flow Length=550' Slope=0.0500 '/' Tc=21.8 min CN=83 Runoff=4.59 cfs 0.364 af

Subcatchment50E: Subarea Runoff Area=4.910 ac 6.31% Impervious Runoff Depth>0.98"
Flow Length=545' Slope=0.0800 '/' Tc=17.2 min CN=83 Runoff=5.73 cfs 0.401 af

Subcatchment60W: Subarea Runoff Area=2.410 ac 0.00% Impervious Runoff Depth>0.98"
Flow Length=445' Tc=18.5 min CN=83 Runoff=2.70 cfs 0.197 af

Subcatchment70W: Subarea Runoff Area=3.760 ac 0.00% Impervious Runoff Depth>0.98"
Flow Length=430' Tc=16.0 min CN=83 Runoff=4.54 cfs 0.307 af

Subcatchment80W: Subarea Runoff Area=20.770 ac 0.00% Impervious Runoff Depth>0.77"
Flow Length=1,275' Tc=56.1 min CN=79 Runoff=9.08 cfs 1.326 af

Subcatchment90W: Subarea Runoff Area=7.870 ac 2.03% Impervious Runoff Depth>0.98"
Flow Length=445' Slope=0.0800 '/' Tc=17.2 min CN=83 Runoff=9.19 cfs 0.643 af

Link 15: North Drainage Inflow=15.07 cfs 1.124 af
Primary=15.07 cfs 1.124 af

Link 35: East to White Oak Way Inflow=18.41 cfs 1.635 af
Primary=18.41 cfs 1.635 af

Link 45: East to Hawthorn Hill Drive Inflow=4.59 cfs 0.364 af
Primary=4.59 cfs 0.364 af

Link 55: East to Summit Avenue Inflow=5.73 cfs 0.401 af
Primary=5.73 cfs 0.401 af

Link 95: West Drainage Inflow=18.47 cfs 2.473 af
Primary=18.47 cfs 2.473 af

Link 99: Total Existing Flow Inflow=60.68 cfs 5.997 af
Primary=60.68 cfs 5.997 af

Total Runoff Area = 79.900 ac Runoff Volume = 5.997 af Average Runoff Depth = 0.90"
99.41% Pervious = 79.430 ac 0.59% Impervious = 0.470 ac

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment10N: Subarea Runoff Area=14.600 ac 0.00% Impervious Runoff Depth>1.15"
Flow Length=590' Slope=0.0700 '/' Tc=19.2 min CN=82 Runoff=18.87 cfs 1.394 af

Subcatchment20E: Subarea Runoff Area=18.960 ac 0.00% Impervious Runoff Depth>1.14"
Flow Length=1,495' Tc=26.7 min CN=82 Runoff=20.48 cfs 1.809 af

Subcatchment30E: Subarea Runoff Area=2.160 ac 0.00% Impervious Runoff Depth>1.21"
Flow Length=390' Slope=0.0500 '/' Tc=20.4 min CN=83 Runoff=2.87 cfs 0.217 af

Subcatchment40E: Subarea Runoff Area=4.460 ac 0.00% Impervious Runoff Depth>1.21"
Flow Length=550' Slope=0.0500 '/' Tc=21.8 min CN=83 Runoff=5.70 cfs 0.449 af

Subcatchment50E: Subarea Runoff Area=4.910 ac 6.31% Impervious Runoff Depth>1.21"
Flow Length=545' Slope=0.0800 '/' Tc=17.2 min CN=83 Runoff=7.12 cfs 0.494 af

Subcatchment60W: Subarea Runoff Area=2.410 ac 0.00% Impervious Runoff Depth>1.21"
Flow Length=445' Tc=18.5 min CN=83 Runoff=3.35 cfs 0.243 af

Subcatchment70W: Subarea Runoff Area=3.760 ac 0.00% Impervious Runoff Depth>1.21"
Flow Length=430' Tc=16.0 min CN=83 Runoff=5.64 cfs 0.378 af

Subcatchment80W: Subarea Runoff Area=20.770 ac 0.00% Impervious Runoff Depth>0.97"
Flow Length=1,275' Tc=56.1 min CN=79 Runoff=11.72 cfs 1.676 af

Subcatchment90W: Subarea Runoff Area=7.870 ac 2.03% Impervious Runoff Depth>1.21"
Flow Length=445' Slope=0.0800 '/' Tc=17.2 min CN=83 Runoff=11.41 cfs 0.792 af

Link 15: North Drainage Inflow=18.87 cfs 1.394 af
Primary=18.87 cfs 1.394 af

Link 35: East to White Oak Way Inflow=23.07 cfs 2.026 af
Primary=23.07 cfs 2.026 af

Link 45: East to Hawthorn Hill Drive Inflow=5.70 cfs 0.449 af
Primary=5.70 cfs 0.449 af

Link 55: East to Summit Avenue Inflow=7.12 cfs 0.494 af
Primary=7.12 cfs 0.494 af

Link 95: West Drainage Inflow=23.33 cfs 3.089 af
Primary=23.33 cfs 3.089 af

Link 99: Total Existing Flow Inflow=76.17 cfs 7.452 af
Primary=76.17 cfs 7.452 af

Total Runoff Area = 79.900 ac Runoff Volume = 7.452 af Average Runoff Depth = 1.12"
99.41% Pervious = 79.430 ac 0.59% Impervious = 0.470 ac

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment10N: Subarea Runoff Area=14.600 ac 0.00% Impervious Runoff Depth>2.04"
Flow Length=590' Slope=0.0700 '/' Tc=19.2 min CN=82 Runoff=33.92 cfs 2.481 af

Subcatchment20E: Subarea Runoff Area=18.960 ac 0.00% Impervious Runoff Depth>2.04"
Flow Length=1,495' Tc=26.7 min CN=82 Runoff=36.96 cfs 3.220 af

Subcatchment30E: Subarea Runoff Area=2.160 ac 0.00% Impervious Runoff Depth>2.12"
Flow Length=390' Slope=0.0500 '/' Tc=20.4 min CN=83 Runoff=5.07 cfs 0.381 af

Subcatchment40E: Subarea Runoff Area=4.460 ac 0.00% Impervious Runoff Depth>2.12"
Flow Length=550' Slope=0.0500 '/' Tc=21.8 min CN=83 Runoff=10.11 cfs 0.788 af

Subcatchment50E: Subarea Runoff Area=4.910 ac 6.31% Impervious Runoff Depth>2.12"
Flow Length=545' Slope=0.0800 '/' Tc=17.2 min CN=83 Runoff=12.56 cfs 0.867 af

Subcatchment60W: Subarea Runoff Area=2.410 ac 0.00% Impervious Runoff Depth>2.12"
Flow Length=445' Tc=18.5 min CN=83 Runoff=5.92 cfs 0.426 af

Subcatchment70W: Subarea Runoff Area=3.760 ac 0.00% Impervious Runoff Depth>2.12"
Flow Length=430' Tc=16.0 min CN=83 Runoff=9.93 cfs 0.664 af

Subcatchment80W: Subarea Runoff Area=20.770 ac 0.00% Impervious Runoff Depth>1.80"
Flow Length=1,275' Tc=56.1 min CN=79 Runoff=22.57 cfs 3.117 af

Subcatchment90W: Subarea Runoff Area=7.870 ac 2.03% Impervious Runoff Depth>2.12"
Flow Length=445' Slope=0.0800 '/' Tc=17.2 min CN=83 Runoff=20.13 cfs 1.390 af

Link 15: North Drainage Inflow=33.92 cfs 2.481 af
Primary=33.92 cfs 2.481 af

Link 35: East to White Oak Way Inflow=41.66 cfs 3.601 af
Primary=41.66 cfs 3.601 af

Link 45: East to Hawthorn Hill Drive Inflow=10.11 cfs 0.788 af
Primary=10.11 cfs 0.788 af

Link 55: East to Summit Avenue Inflow=12.56 cfs 0.867 af
Primary=12.56 cfs 0.867 af

Link 95: West Drainage Inflow=42.94 cfs 5.598 af
Primary=42.94 cfs 5.598 af

Link 99: Total Existing Flow Inflow=137.92 cfs 13.335 af
Primary=137.92 cfs 13.335 af

Total Runoff Area = 79.900 ac Runoff Volume = 13.335 af Average Runoff Depth = 2.00"
99.41% Pervious = 79.430 ac 0.59% Impervious = 0.470 ac

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment10N: Subarea Runoff Area=14.600 ac 0.00% Impervious Runoff Depth>4.15"
Flow Length=590' Slope=0.0700 '/' Tc=19.2 min CN=82 Runoff=68.24 cfs 5.047 af

Subcatchment20E: Subarea Runoff Area=18.960 ac 0.00% Impervious Runoff Depth>4.15"
Flow Length=1,495' Tc=26.7 min CN=82 Runoff=74.84 cfs 6.551 af

Subcatchment30E: Subarea Runoff Area=2.160 ac 0.00% Impervious Runoff Depth>4.25"
Flow Length=390' Slope=0.0500 '/' Tc=20.4 min CN=83 Runoff=10.05 cfs 0.766 af

Subcatchment40E: Subarea Runoff Area=4.460 ac 0.00% Impervious Runoff Depth>4.25"
Flow Length=550' Slope=0.0500 '/' Tc=21.8 min CN=83 Runoff=20.04 cfs 1.581 af

Subcatchment50E: Subarea Runoff Area=4.910 ac 6.31% Impervious Runoff Depth>4.25"
Flow Length=545' Slope=0.0800 '/' Tc=17.2 min CN=83 Runoff=24.83 cfs 1.741 af

Subcatchment60W: Subarea Runoff Area=2.410 ac 0.00% Impervious Runoff Depth>4.25"
Flow Length=445' Tc=18.5 min CN=83 Runoff=11.75 cfs 0.854 af

Subcatchment70W: Subarea Runoff Area=3.760 ac 0.00% Impervious Runoff Depth>4.26"
Flow Length=430' Tc=16.0 min CN=83 Runoff=19.61 cfs 1.333 af

Subcatchment80W: Subarea Runoff Area=20.770 ac 0.00% Impervious Runoff Depth>3.82"
Flow Length=1,275' Tc=56.1 min CN=79 Runoff=48.41 cfs 6.619 af

Subcatchment90W: Subarea Runoff Area=7.870 ac 2.03% Impervious Runoff Depth>4.25"
Flow Length=445' Slope=0.0800 '/' Tc=17.2 min CN=83 Runoff=39.79 cfs 2.790 af

Link 15: North Drainage Inflow=68.24 cfs 5.047 af
Primary=68.24 cfs 5.047 af

Link 35: East to White Oak Way Inflow=84.05 cfs 7.317 af
Primary=84.05 cfs 7.317 af

Link 45: East to Hawthorn Hill Drive Inflow=20.04 cfs 1.581 af
Primary=20.04 cfs 1.581 af

Link 55: East to Summit Avenue Inflow=24.83 cfs 1.741 af
Primary=24.83 cfs 1.741 af

Link 95: West Drainage Inflow=88.56 cfs 11.597 af
Primary=88.56 cfs 11.597 af

Link 99: Total Existing Flow Inflow=279.59 cfs 27.282 af
Primary=279.59 cfs 27.282 af

Total Runoff Area = 79.900 ac Runoff Volume = 27.282 af Average Runoff Depth = 4.10"
99.41% Pervious = 79.430 ac 0.59% Impervious = 0.470 ac

Summary for Subcatchment 10N: Subarea

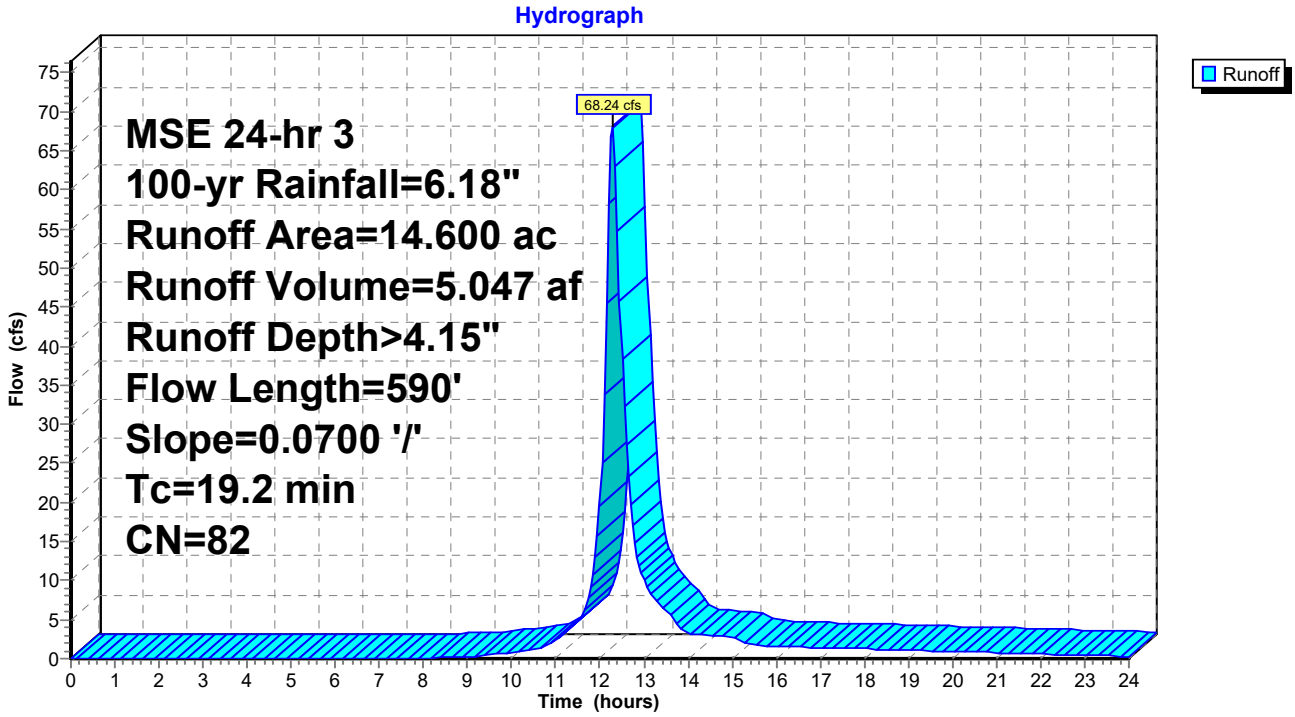
Runoff = 68.24 cfs @ 12.28 hrs, Volume= 5.047 af, Depth> 4.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-yr Rainfall=6.18"

	Area (ac)	CN	Description
*	12.830	83	cropland - D soils
*	1.200	77	woodland - D soils
*	0.570	78	wetland - D soils
	14.600	82	Weighted Average
	14.600		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.2	300	0.0700	0.29		**Sheet Flow,** Cultivated: Residue>20% n= 0.170 P2= 2.70"
2.0	290	0.0700	2.38		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
19.2	590	Total			

Subcatchment 10N: Subarea



Summary for Subcatchment 20E: Subarea

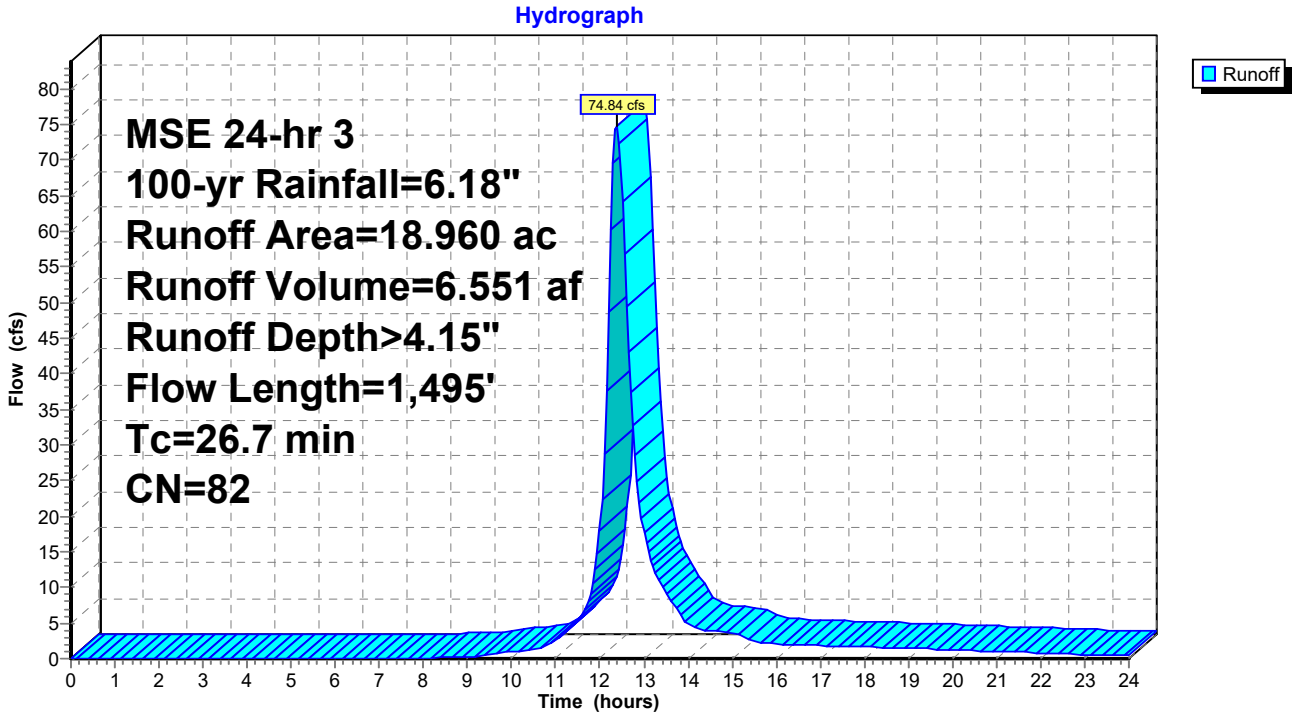
Runoff = 74.84 cfs @ 12.37 hrs, Volume= 6.551 af, Depth> 4.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-yr Rainfall=6.18"

	Area (ac)	CN	Description
*	16.870	83	cropland - D soils
*	0.780	77	woodland - D soils
*	1.310	78	wetland - D soils
	18.960	82	Weighted Average
	18.960		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.4	250	0.0900	0.31		**Sheet Flow,** Cultivated: Residue>20% n= 0.170 P2= 2.70"
13.3	1,245	0.0300	1.56		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
26.7	1,495	Total			

Subcatchment 20E: Subarea



Summary for Subcatchment 30E: Subarea

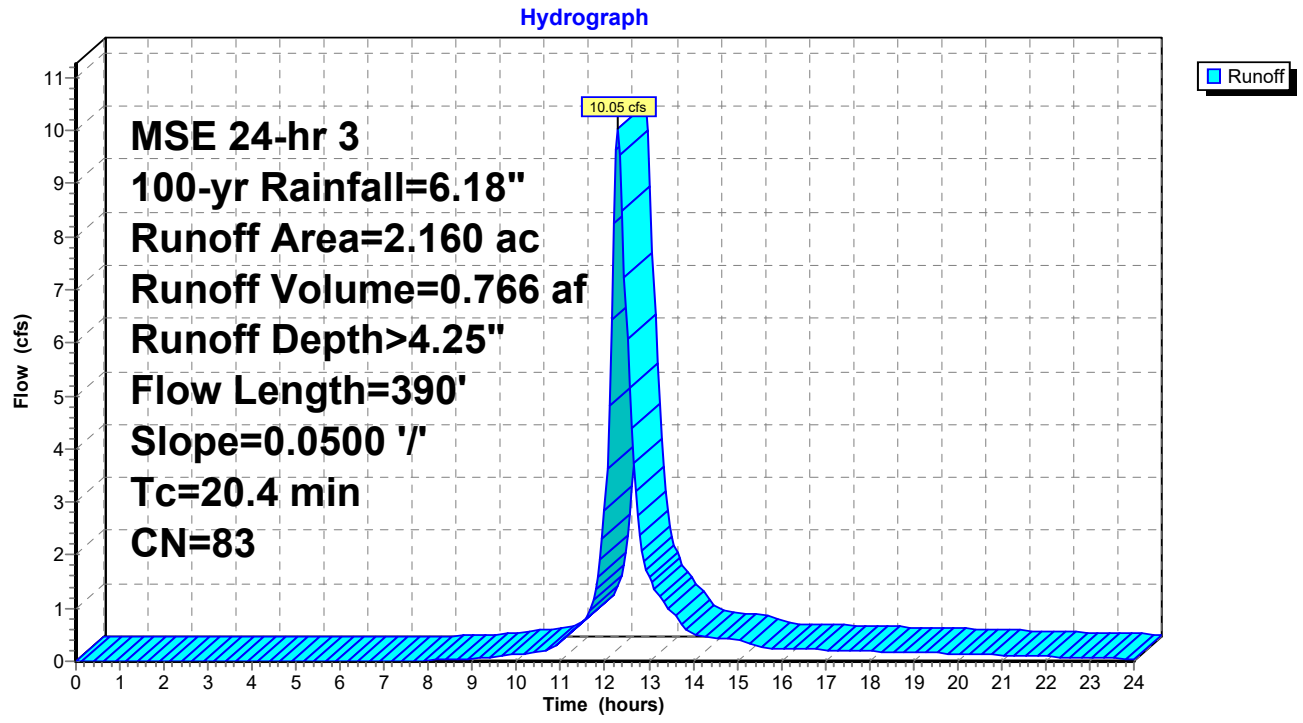
Runoff = 10.05 cfs @ 12.30 hrs, Volume= 0.766 af, Depth> 4.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-yr Rainfall=6.18"

	Area (ac)	CN	Description
*	1.980	83	cropland - D soils
*	0.180	77	woodland - D soils
	2.160	83	Weighted Average
	2.160		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.7	300	0.0500	0.25		**Sheet Flow,** Cultivated: Residue>20% n= 0.170 P2= 2.70"
0.7	90	0.0500	2.01		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
20.4	390	Total			

Subcatchment 30E: Subarea



Summary for Subcatchment 40E: Subarea

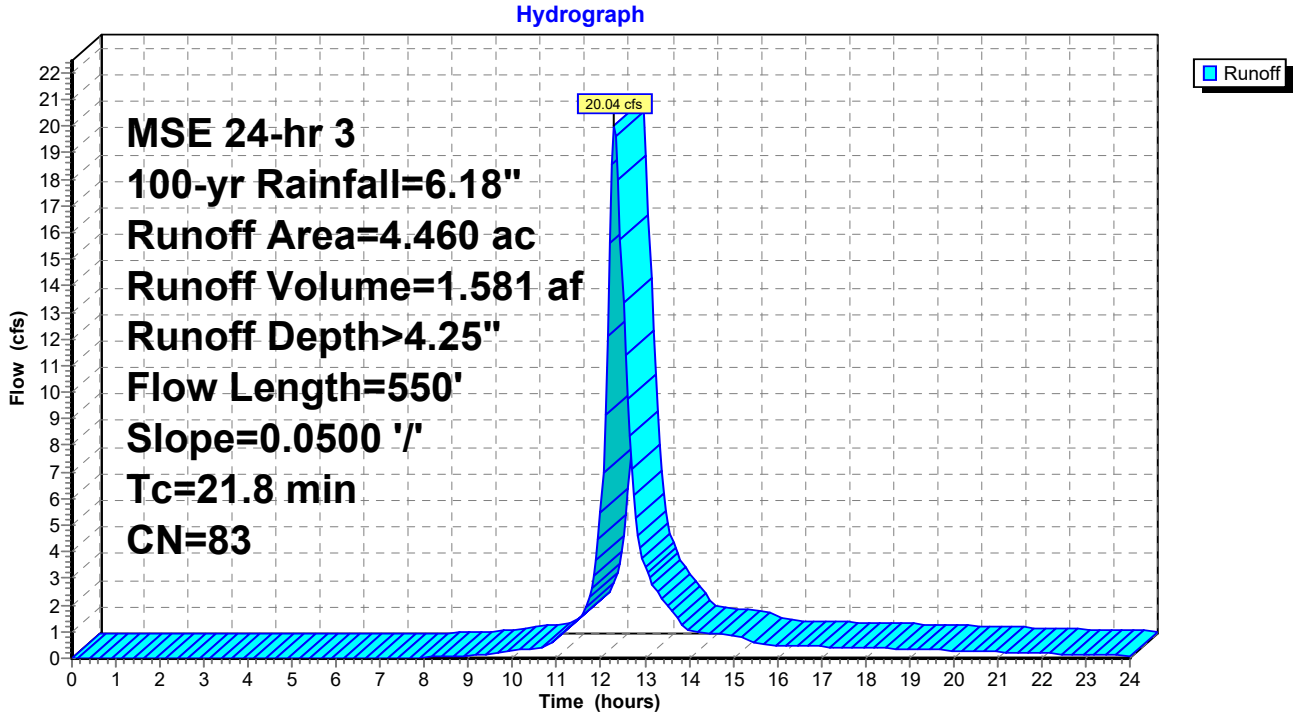
Runoff = 20.04 cfs @ 12.31 hrs, Volume= 1.581 af, Depth> 4.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-yr Rainfall=6.18"

	Area (ac)	CN	Description
*	4.170	83	cropland - D soils
*	0.290	77	woodland - D soils
	4.460	83	Weighted Average
	4.460		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.7	300	0.0500	0.25		**Sheet Flow,** Cultivated: Residue>20% n= 0.170 P2= 2.70"
2.1	250	0.0500	2.01		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
21.8	550	Total			

Subcatchment 40E: Subarea



Summary for Subcatchment 50E: Subarea

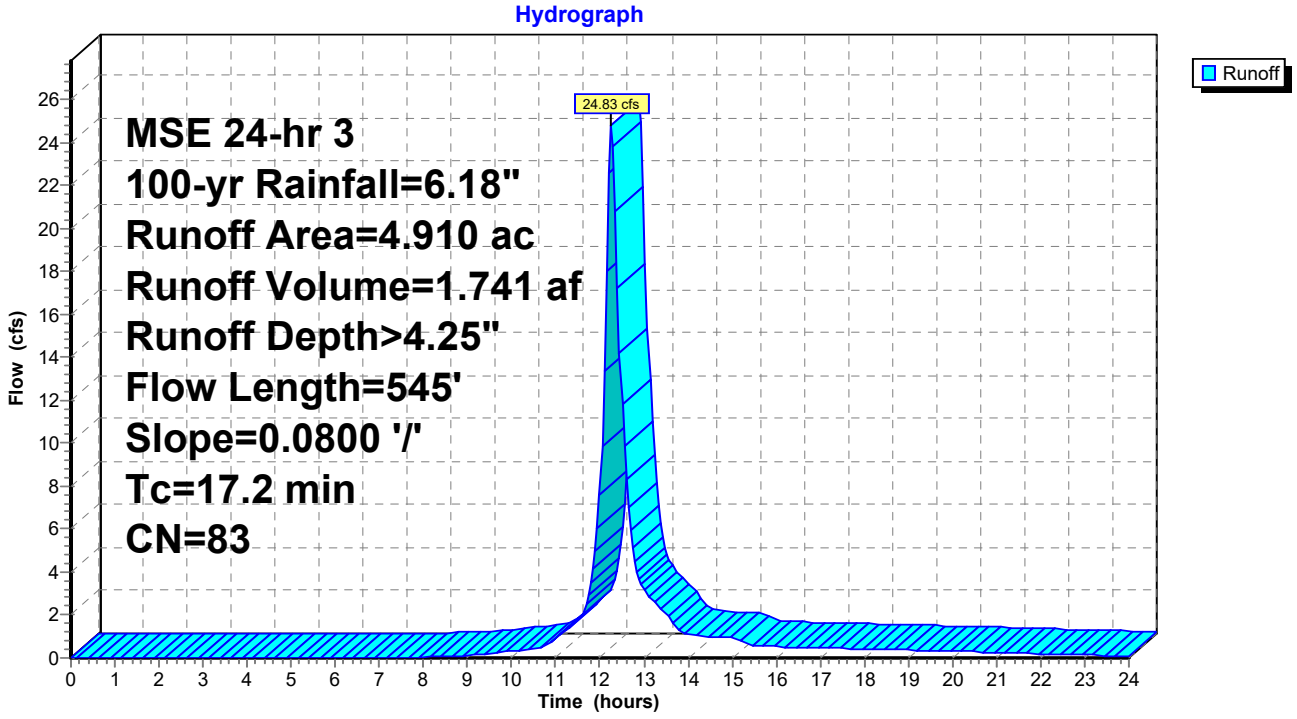
Runoff = 24.83 cfs @ 12.26 hrs, Volume= 1.741 af, Depth> 4.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-yr Rainfall=6.18"

	Area (ac)	CN	Description
*	1.710	83	cropland - D soils
*	0.470	77	woodland - D soils
*	2.220	80	grass - D soils
*	0.200	96	gravel
*	0.310	98	impervious
	4.910	83	Weighted Average
	4.600		93.69% Pervious Area
	0.310		6.31% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	300	0.0800	0.31		**Sheet Flow,** Cultivated: Residue>20% n= 0.170 P2= 2.70"
0.9	245	0.0800	4.55		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
17.2	545	Total			

Subcatchment 50E: Subarea



Summary for Subcatchment 60W: Subarea

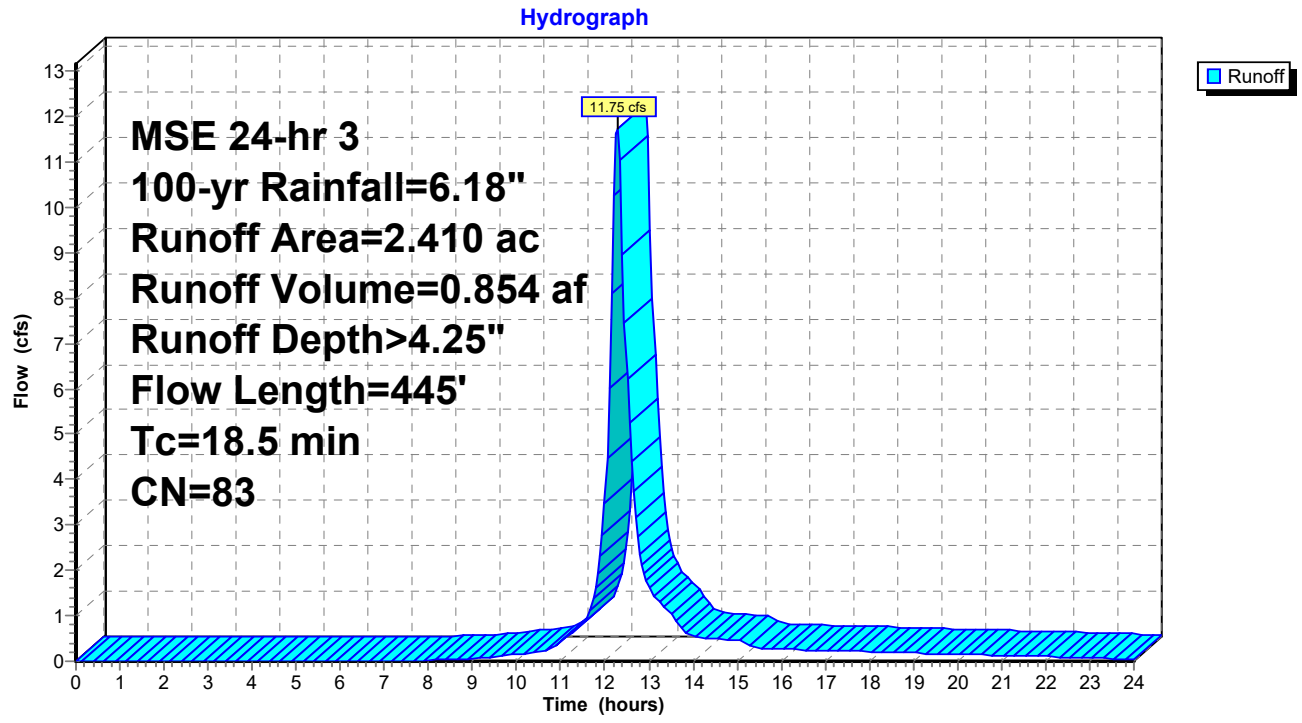
Runoff = 11.75 cfs @ 12.27 hrs, Volume= 0.854 af, Depth> 4.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-yr Rainfall=6.18"

	Area (ac)	CN	Description
*	2.350	83	cropland - D soils
*	0.060	77	woodland - D soils
	2.410	83	Weighted Average
	2.410		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.4	280	0.0800	0.30		**Sheet Flow,** Cultivated: Residue>20% n= 0.170 P2= 2.70"
3.1	165	0.0100	0.90		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
18.5	445	Total			

Subcatchment 60W: Subarea



Summary for Subcatchment 70W: Subarea

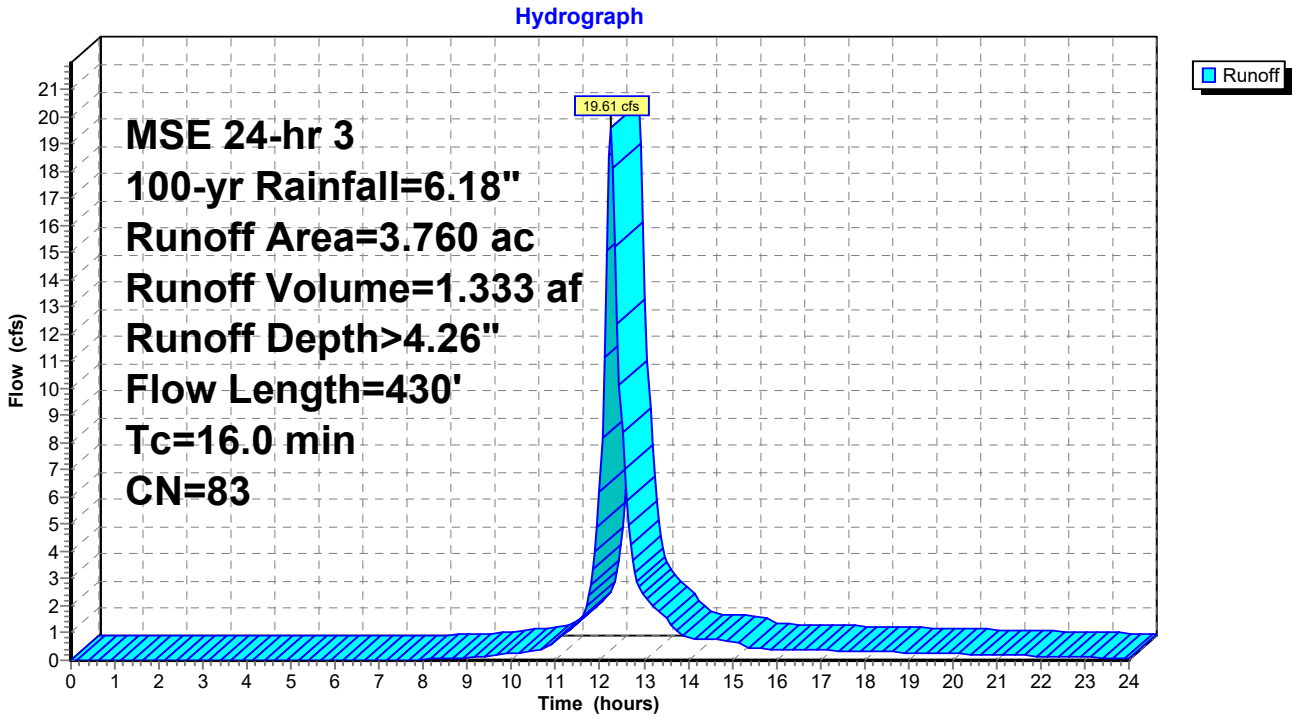
Runoff = 19.61 cfs @ 12.25 hrs, Volume= 1.333 af, Depth> 4.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-yr Rainfall=6.18"

	Area (ac)	CN	Description
*	3.630	83	cropland - D soils
*	0.130	77	woodland - D soils
	3.760	83	Weighted Average
	3.760		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.9	300	0.1200	0.36		**Sheet Flow,** Cultivated: Residue>20% n= 0.170 P2= 2.70"
0.1	20	0.1200	3.12		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
2.0	110	0.0100	0.90		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
16.0	430	Total			

Subcatchment 70W: Subarea



Summary for Subcatchment 80W: Subarea

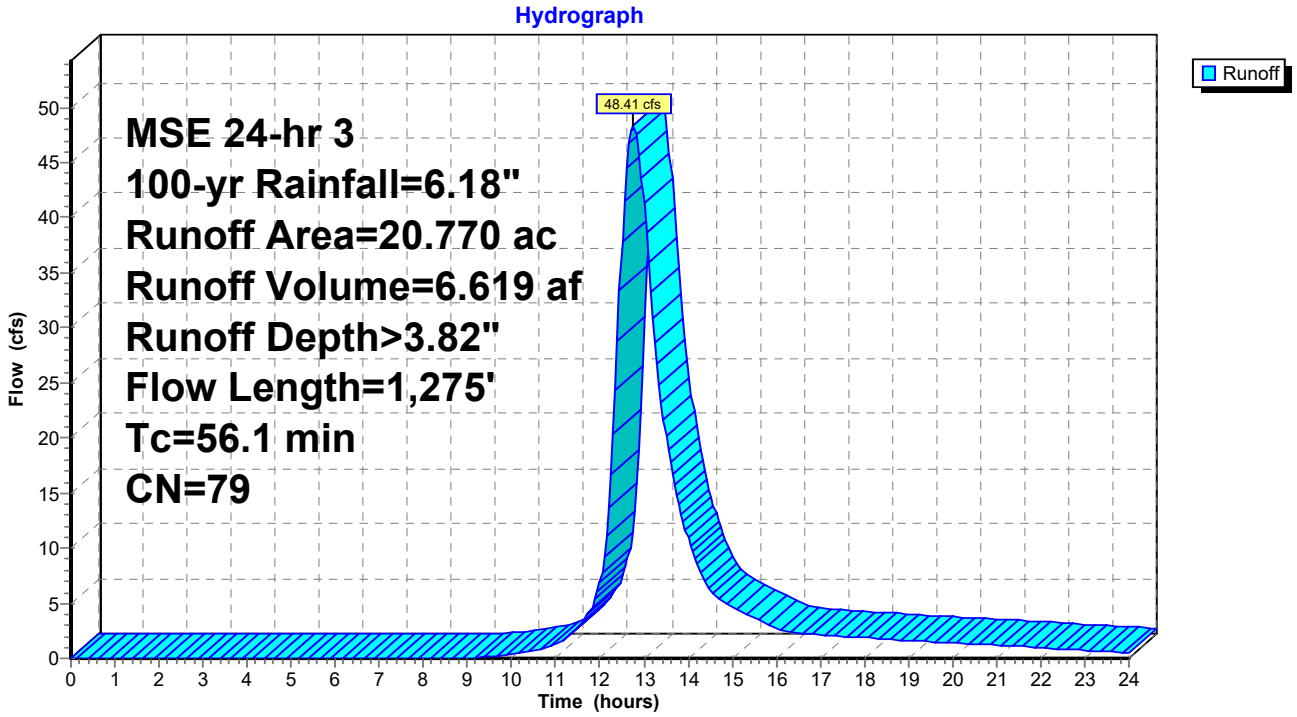
Runoff = 48.41 cfs @ 12.76 hrs, Volume= 6.619 af, Depth> 3.82"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-yr Rainfall=6.18"

	Area (ac)	CN	Description
*	4.430	83	cropland - D soils
*	9.200	77	woodland - D soils
*	0.200	78	wetland - D soils
*	6.600	78	meadow - D soils
*	0.340	80	grass - D soils
	20.770	79	Weighted Average
	20.770		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.1	80	0.0600	0.26		**Sheet Flow,** Range n= 0.130 P2= 2.70"
28.3	220	0.0600	0.13		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
6.7	495	0.0600	1.22		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
16.0	480	0.0100	0.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
56.1	1,275	Total			

Subcatchment 80W: Subarea



Summary for Subcatchment 90W: Subarea

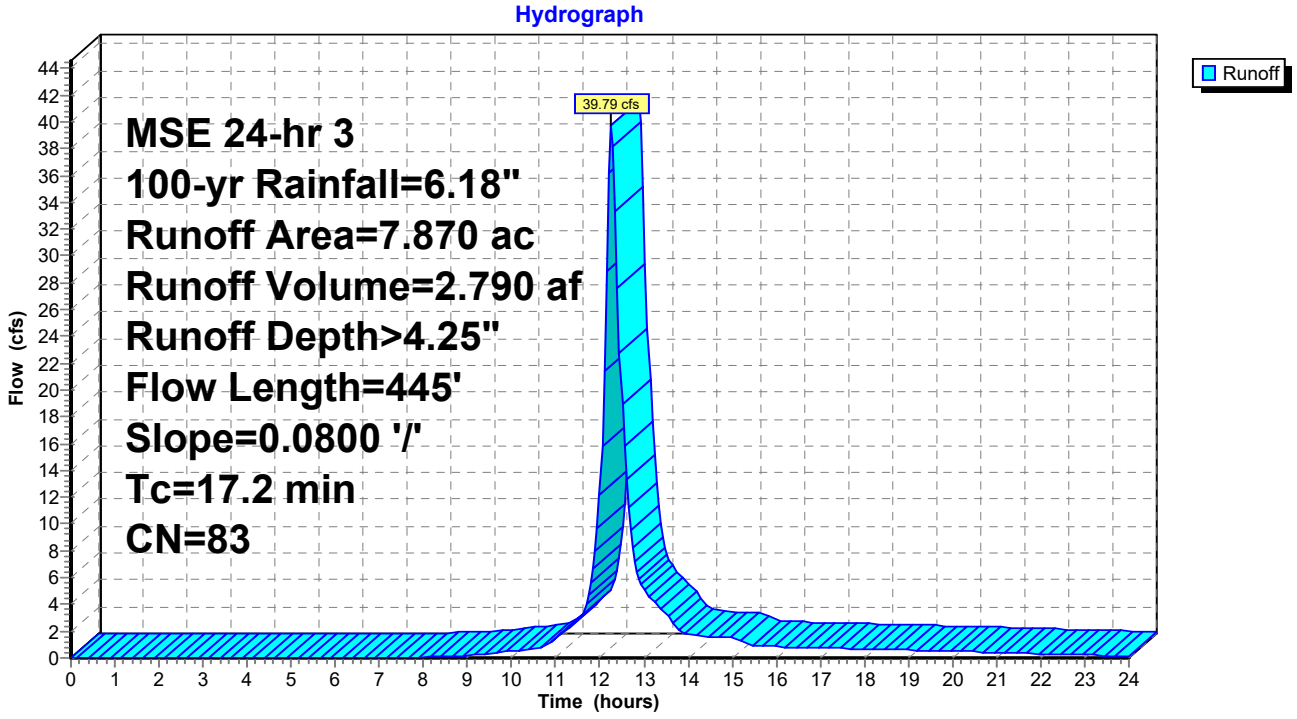
Runoff = 39.79 cfs @ 12.26 hrs, Volume= 2.790 af, Depth> 4.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-yr Rainfall=6.18"

	Area (ac)	CN	Description
*	6.420	83	cropland - D soils
*	0.110	77	woodland - D soils
*	1.130	80	grass - D soils
*	0.050	96	gravel
*	0.160	98	impervious
	7.870	83	Weighted Average
	7.710		97.97% Pervious Area
	0.160		2.03% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	300	0.0800	0.31		**Sheet Flow,** Cultivated: Residue>20% n= 0.170 P2= 2.70"
0.9	145	0.0800	2.55		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
17.2	445	Total			

Subcatchment 90W: Subarea

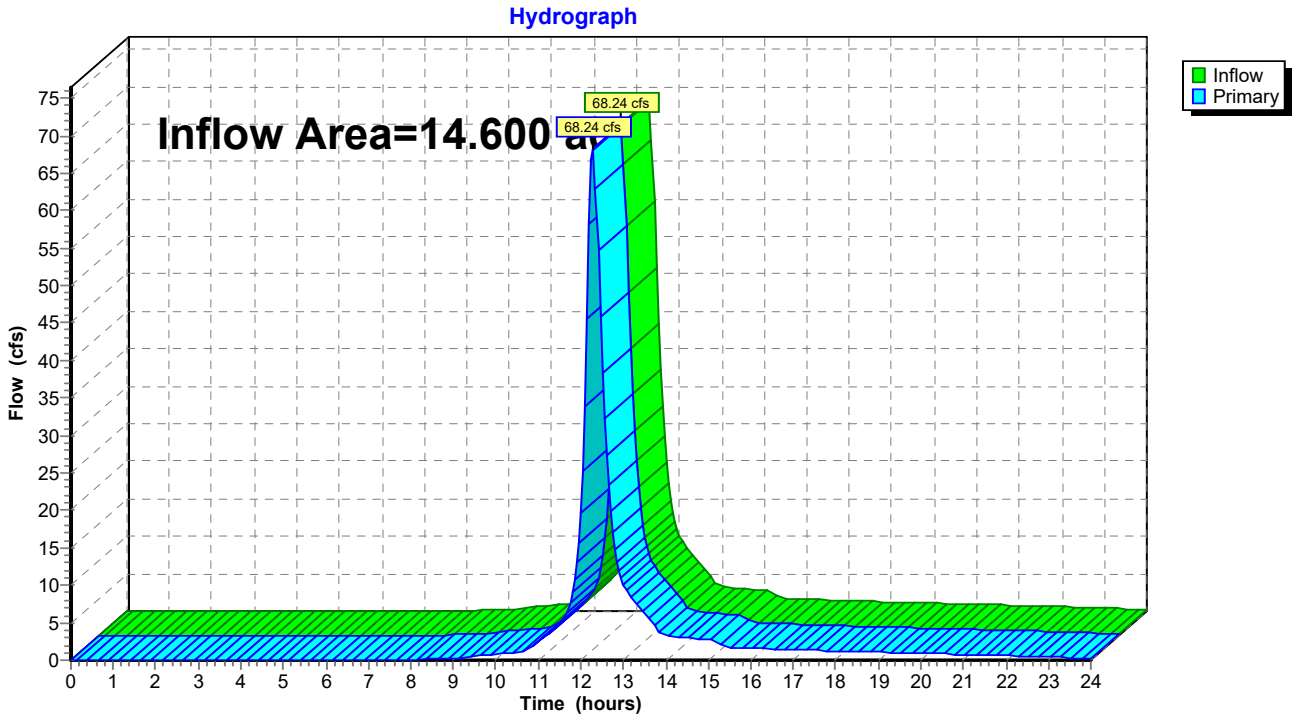


Summary for Link 15: North Drainage

Inflow Area = 14.600 ac, 0.00% Impervious, Inflow Depth > 4.15" for 100-yr event
Inflow = 68.24 cfs @ 12.28 hrs, Volume= 5.047 af
Primary = 68.24 cfs @ 12.28 hrs, Volume= 5.047 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 15: North Drainage

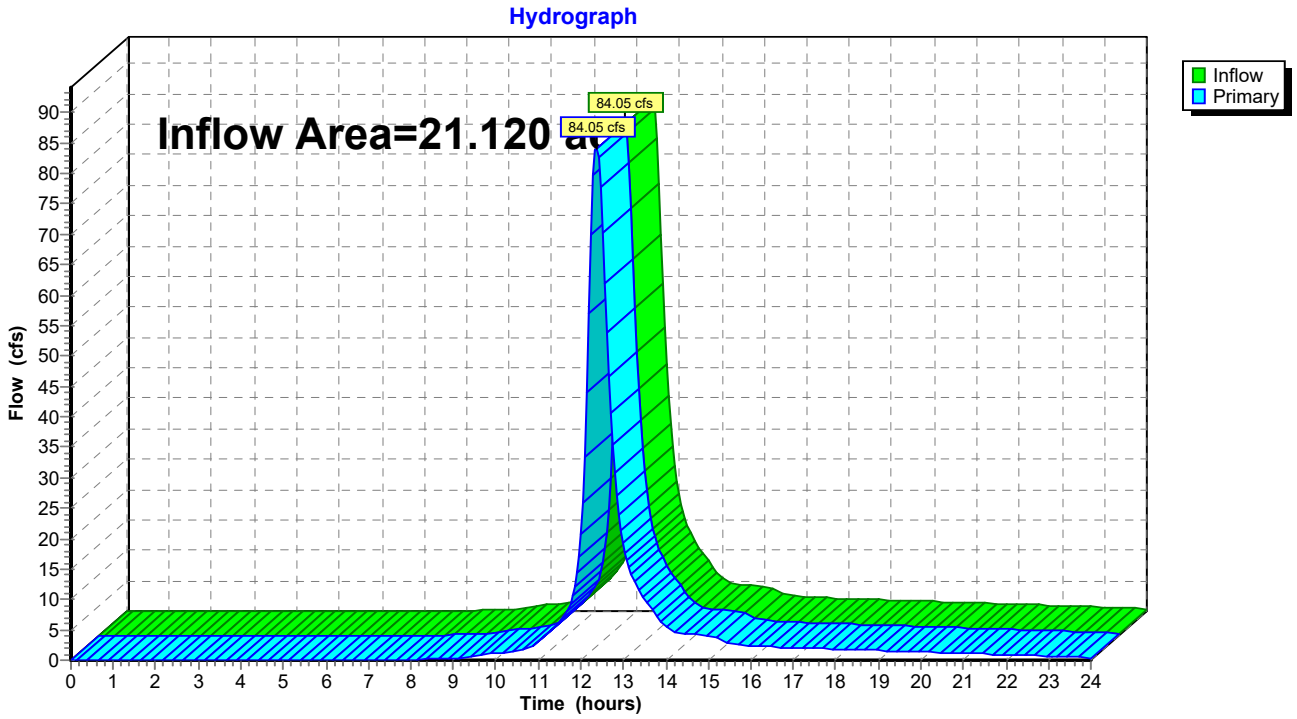


Summary for Link 35: East to White Oak Way

Inflow Area = 21.120 ac, 0.00% Impervious, Inflow Depth > 4.16" for 100-yr event
Inflow = 84.05 cfs @ 12.36 hrs, Volume= 7.317 af
Primary = 84.05 cfs @ 12.36 hrs, Volume= 7.317 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 35: East to White Oak Way

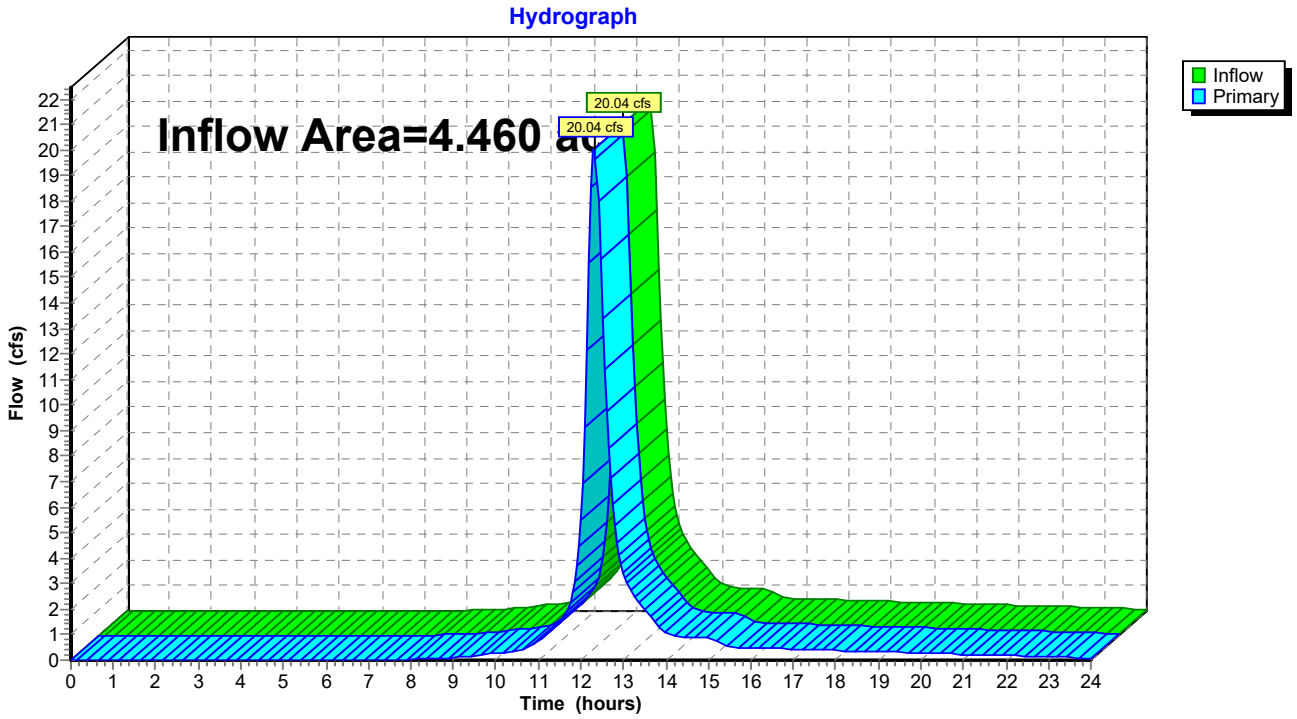


Summary for Link 45: East to Hawthorn Hill Drive

Inflow Area = 4.460 ac, 0.00% Impervious, Inflow Depth > 4.25" for 100-yr event
Inflow = 20.04 cfs @ 12.31 hrs, Volume= 1.581 af
Primary = 20.04 cfs @ 12.31 hrs, Volume= 1.581 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 45: East to Hawthorn Hill Drive

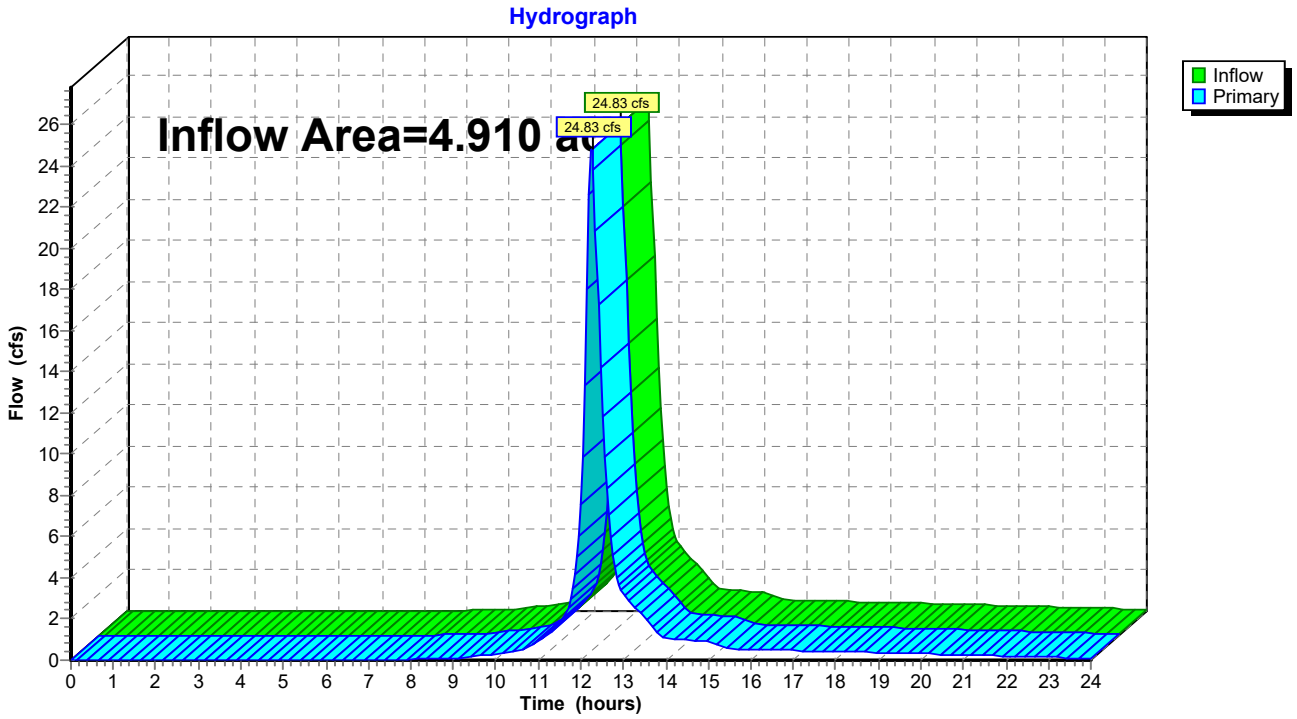


Summary for Link 55: East to Summit Avenue

Inflow Area = 4.910 ac, 6.31% Impervious, Inflow Depth > 4.25" for 100-yr event
Inflow = 24.83 cfs @ 12.26 hrs, Volume= 1.741 af
Primary = 24.83 cfs @ 12.26 hrs, Volume= 1.741 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 55: East to Summit Avenue

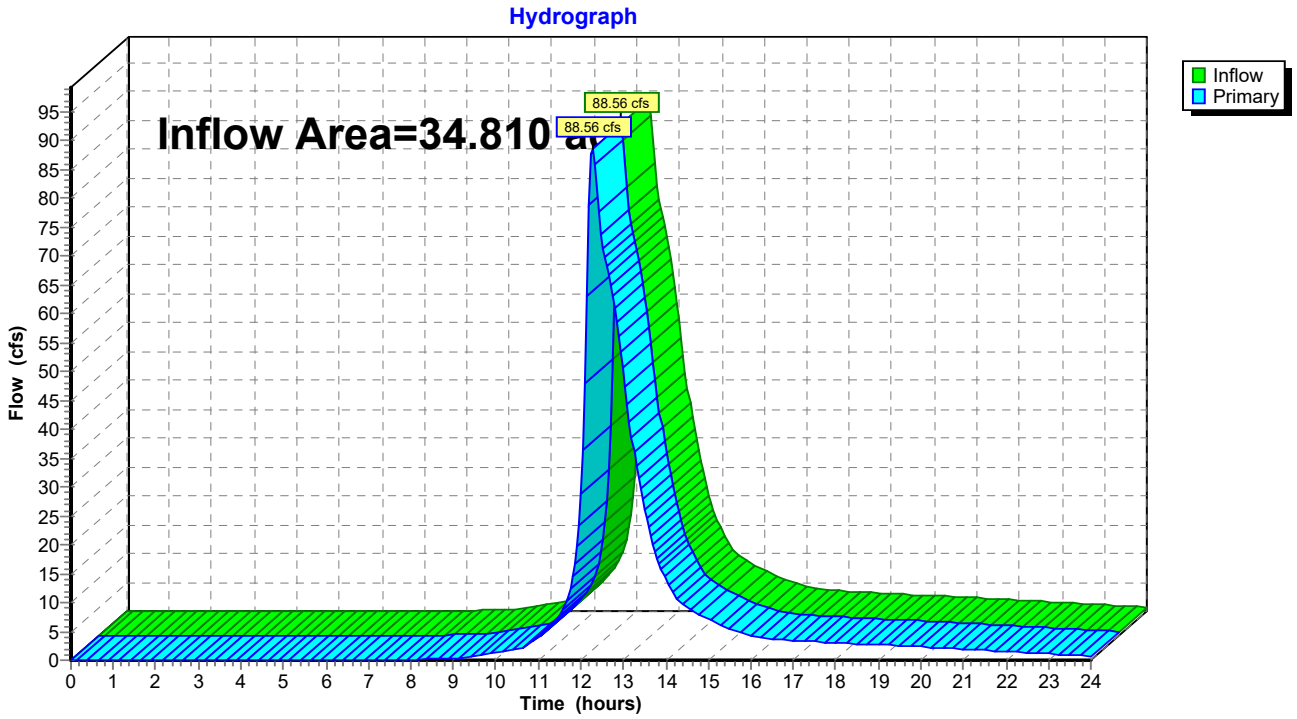


Summary for Link 95: West Drainage

Inflow Area = 34.810 ac, 0.46% Impervious, Inflow Depth > 4.00" for 100-yr event
Inflow = 88.56 cfs @ 12.28 hrs, Volume= 11.597 af
Primary = 88.56 cfs @ 12.28 hrs, Volume= 11.597 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 95: West Drainage

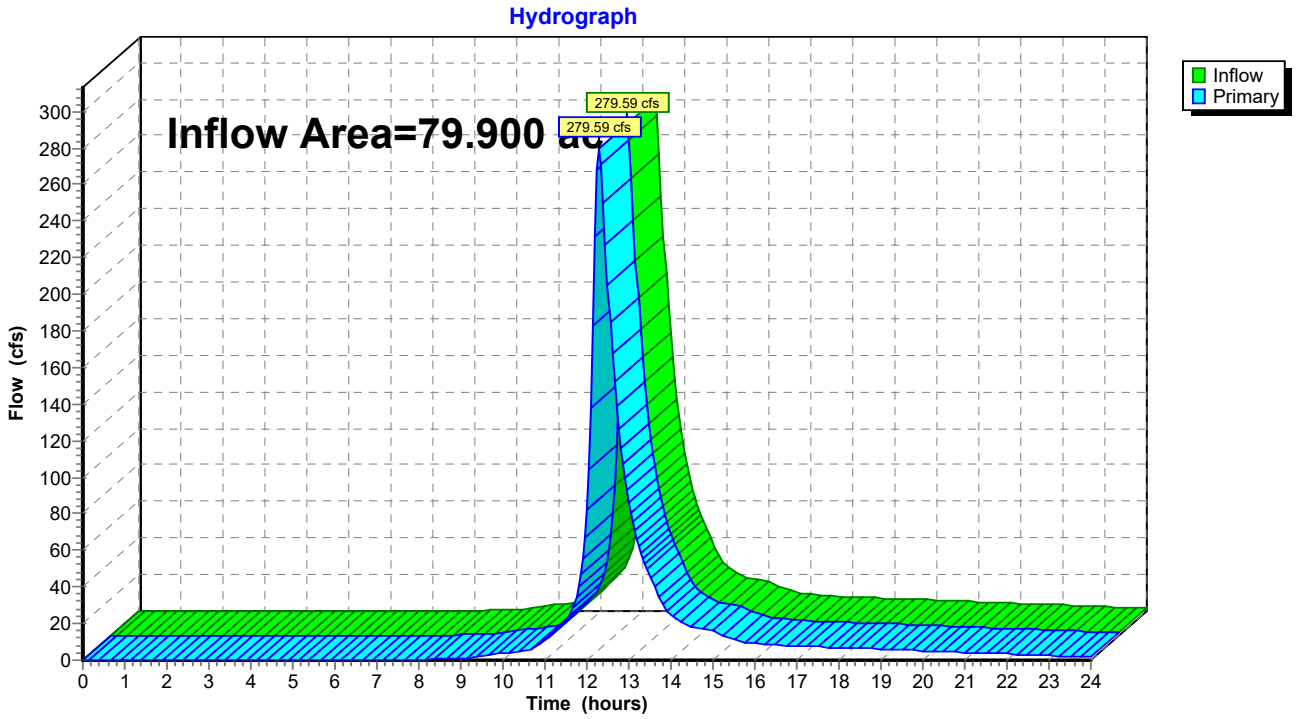


Summary for Link 99: Total Existing Flow

Inflow Area = 79.900 ac, 0.59% Impervious, Inflow Depth > 4.10" for 100-yr event
Inflow = 279.59 cfs @ 12.30 hrs, Volume= 27.282 af
Primary = 279.59 cfs @ 12.30 hrs, Volume= 27.282 af, Atten= 0%, Lag= 0.0 min

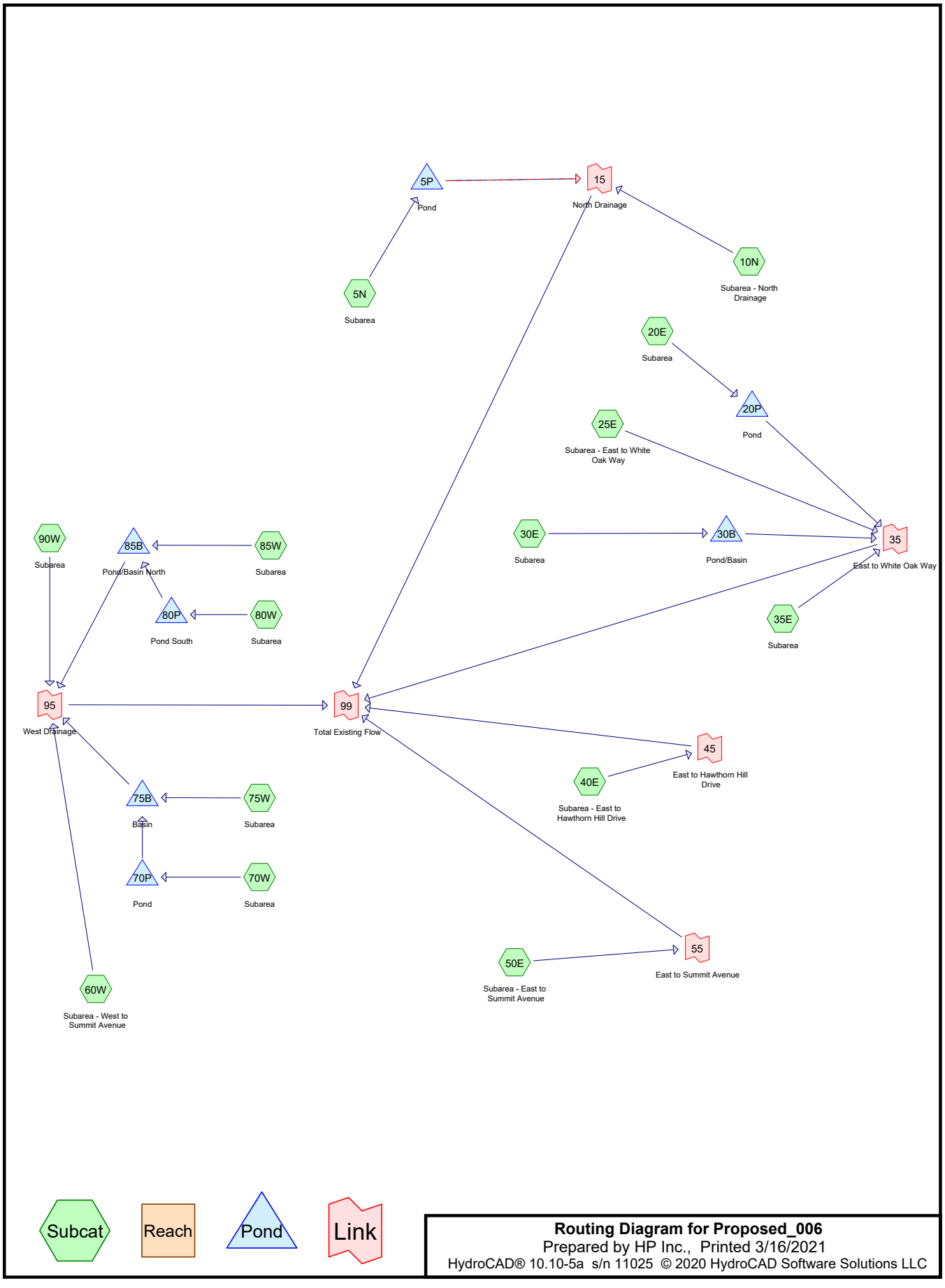
Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 99: Total Existing Flow



APPENDIX B

Post-Development Hydrologic Analysis



Routing Diagram for Proposed_006
Prepared by HP Inc., Printed 3/16/2021
HydroCAD® 10.10-5a s/n 11025 © 2020 HydroCAD Software Solutions LLC

Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	1-yr	MSE 24-hr	3	Default	24.00	1	2.40	2
2	2-yr	MSE 24-hr	3	Default	24.00	1	2.70	2
3	10-yr	MSE 24-hr	3	Default	24.00	1	3.81	2
4	100-yr	MSE 24-hr	3	Default	24.00	1	6.18	2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
7.910	86	1/3 acre lots, 30% imp, HSG D (10N, 25E, 50E, 60W, 75W, 85W)
42.580	87	1/4 acre lots, 38% imp, HSG D (5N, 20E, 30E, 40E, 70W, 80W)
14.180	80	grass - D soils (5N, 10N, 20E, 25E, 30E, 35E, 50E, 60W, 70W, 75W, 80W, 85W, 90W)
8.070	98	road (5N, 10N, 20E, 30E, 40E, 70W, 80W, 85W)
0.260	98	sidewalk (10N, 30E, 50E, 60W, 70W)
1.620	98	water (5N, 20E, 30E, 70W, 80W, 85W)
2.070	78	wetland - D soils (10N, 25E, 90W)
3.210	77	woodland - D soils (5N, 10N, 20E, 25E, 30E, 35E, 85W, 90W)
79.900	**86**	**TOTAL AREA**

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

Subcatchment5N: Subarea Runoff Area=17.500 ac 40.79% Impervious Runoff Depth>1.23"
Flow Length=1,100' Tc=13.7 min CN=87 Runoff=29.06 cfs 1.789 af

Subcatchment10N: Subarea - North Runoff Area=4.960 ac 12.94% Impervious Runoff Depth>0.92"
Flow Length=235' Slope=0.0800 '/' Tc=17.7 min CN=82 Runoff=5.36 cfs 0.382 af

Subcatchment20E: Subarea Runoff Area=5.400 ac 41.01% Impervious Runoff Depth>1.23"
Flow Length=575' Tc=16.0 min CN=87 Runoff=8.32 cfs 0.552 af

Subcatchment25E: Subarea - East to Runoff Area=3.510 ac 11.03% Impervious Runoff Depth>0.87"
Flow Length=625' Slope=0.0300 '/' Tc=33.7 min CN=81 Runoff=2.47 cfs 0.254 af

Subcatchment30E: Subarea Runoff Area=8.810 ac 43.05% Impervious Runoff Depth>1.29"
Flow Length=1,000' Tc=17.2 min CN=88 Runoff=13.81 cfs 0.951 af

Subcatchment35E: Subarea Runoff Area=0.330 ac 0.00% Impervious Runoff Depth>0.77"
Tc=6.0 min CN=79 Runoff=0.47 cfs 0.021 af

Subcatchment40E: Subarea - East to Runoff Area=3.620 ac 48.45% Impervious Runoff Depth>1.37"
Flow Length=285' Tc=6.0 min CN=89 Runoff=9.14 cfs 0.412 af

Subcatchment50E: Subarea - East to Runoff Area=2.510 ac 20.72% Impervious Runoff Depth>1.04"
Flow Length=190' Slope=0.1200 '/' Tc=12.7 min CN=84 Runoff=3.64 cfs 0.217 af

Subcatchment60W: Subarea - West to Runoff Area=1.780 ac 20.11% Impervious Runoff Depth>1.04"
Flow Length=110' Slope=0.0500 '/' Tc=11.6 min CN=84 Runoff=2.68 cfs 0.154 af

Subcatchment70W: Subarea Runoff Area=13.080 ac 44.87% Impervious Runoff Depth>1.29"
Flow Length=1,675' Slope=0.0500 '/' Tc=17.2 min CN=88 Runoff=20.51 cfs 1.411 af

Subcatchment75W: Subarea Runoff Area=1.290 ac 13.26% Impervious Runoff Depth>0.98"
Flow Length=45' Slope=0.0200 '/' Tc=8.2 min CN=83 Runoff=2.14 cfs 0.105 af

Subcatchment80W: Subarea Runoff Area=11.020 ac 45.02% Impervious Runoff Depth>1.30"
Flow Length=1,295' Slope=0.1100 '/' Tc=12.5 min CN=88 Runoff=20.19 cfs 1.189 af

Subcatchment85W: Subarea Runoff Area=3.370 ac 20.62% Impervious Runoff Depth>1.04"
Flow Length=1,000' Tc=9.9 min CN=84 Runoff=5.49 cfs 0.292 af

Subcatchment90W: Subarea Runoff Area=2.720 ac 0.00% Impervious Runoff Depth>0.72"
Flow Length=490' Tc=33.9 min CN=78 Runoff=1.53 cfs 0.163 af

Pond 5P: Pond Peak Elev=216.85' Storage=1.175 af Inflow=29.06 cfs 1.789 af
Primary=1.39 cfs 1.202 af Secondary=0.00 cfs 0.000 af Outflow=1.39 cfs 1.202 af

Pond 20P: Pond Peak Elev=222.23' Storage=0.225 af Inflow=8.32 cfs 0.552 af
Outflow=3.55 cfs 0.528 af

Pond 30B: Pond/Basin Peak Elev=214.80' Storage=0.633 af Inflow=13.81 cfs 0.951 af
Discarded=0.11 cfs 0.109 af Primary=0.54 cfs 0.483 af Outflow=0.64 cfs 0.591 af

Pond 70P: Pond Peak Elev=214.62' Storage=0.940 af Inflow=20.51 cfs 1.411 af
Outflow=0.98 cfs 0.821 af

Pond 75B: Basin Peak Elev=212.81' Storage=0.245 af Inflow=2.65 cfs 0.926 af
Discarded=0.12 cfs 0.117 af Primary=0.71 cfs 0.584 af Outflow=0.83 cfs 0.701 af

Pond 80P: Pond South Peak Elev=213.93' Storage=0.794 af Inflow=20.19 cfs 1.189 af
Outflow=0.86 cfs 0.717 af

Pond 85B: Pond/Basin North Peak Elev=212.50' Storage=0.438 af Inflow=6.00 cfs 1.008 af
Discarded=0.23 cfs 0.233 af Primary=0.47 cfs 0.351 af Outflow=0.71 cfs 0.584 af

Link 15: North Drainage Inflow=6.36 cfs 1.583 af
Primary=6.36 cfs 1.583 af

Link 35: East to White Oak Way Inflow=6.57 cfs 1.287 af
Primary=6.57 cfs 1.287 af

Link 45: East to Hawthorn Hill Drive Inflow=9.14 cfs 0.412 af
Primary=9.14 cfs 0.412 af

Link 55: East to Summit Avenue Inflow=3.64 cfs 0.217 af
Primary=3.64 cfs 0.217 af

Link 95: West Drainage Inflow=3.21 cfs 1.253 af
Primary=3.21 cfs 1.253 af

Link 99: Total Existing Flow Inflow=20.48 cfs 4.752 af
Primary=20.48 cfs 4.752 af

Total Runoff Area = 79.900 ac Runoff Volume = 7.893 af Average Runoff Depth = 1.19"
64.33% Pervious = 51.397 ac 35.67% Impervious = 28.503 ac

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

Subcatchment5N: Subarea Runoff Area=17.500 ac 40.79% Impervious Runoff Depth>1.48"
Flow Length=1,100' Tc=13.7 min CN=87 Runoff=35.01 cfs 2.156 af

Subcatchment10N: Subarea - North Runoff Area=4.960 ac 12.94% Impervious Runoff Depth>1.15"
Flow Length=235' Slope=0.0800 '/' Tc=17.7 min CN=82 Runoff=6.71 cfs 0.474 af

Subcatchment20E: Subarea Runoff Area=5.400 ac 41.01% Impervious Runoff Depth>1.48"
Flow Length=575' Tc=16.0 min CN=87 Runoff=10.03 cfs 0.665 af

Subcatchment25E: Subarea - East to Runoff Area=3.510 ac 11.03% Impervious Runoff Depth>1.08"
Flow Length=625' Slope=0.0300 '/' Tc=33.7 min CN=81 Runoff=3.12 cfs 0.317 af

Subcatchment30E: Subarea Runoff Area=8.810 ac 43.05% Impervious Runoff Depth>1.55"
Flow Length=1,000' Tc=17.2 min CN=88 Runoff=16.55 cfs 1.140 af

Subcatchment35E: Subarea Runoff Area=0.330 ac 0.00% Impervious Runoff Depth>0.97"
Tc=6.0 min CN=79 Runoff=0.60 cfs 0.027 af

Subcatchment40E: Subarea - East to Runoff Area=3.620 ac 48.45% Impervious Runoff Depth>1.63"
Flow Length=285' Tc=6.0 min CN=89 Runoff=10.83 cfs 0.492 af

Subcatchment50E: Subarea - East to Runoff Area=2.510 ac 20.72% Impervious Runoff Depth>1.27"
Flow Length=190' Slope=0.1200 '/' Tc=12.7 min CN=84 Runoff=4.48 cfs 0.266 af

Subcatchment60W: Subarea - West to Runoff Area=1.780 ac 20.11% Impervious Runoff Depth>1.27"
Flow Length=110' Slope=0.0500 '/' Tc=11.6 min CN=84 Runoff=3.30 cfs 0.189 af

Subcatchment70W: Subarea Runoff Area=13.080 ac 44.87% Impervious Runoff Depth>1.55"
Flow Length=1,675' Slope=0.0500 '/' Tc=17.2 min CN=88 Runoff=24.57 cfs 1.692 af

Subcatchment75W: Subarea Runoff Area=1.290 ac 13.26% Impervious Runoff Depth>1.21"
Flow Length=45' Slope=0.0200 '/' Tc=8.2 min CN=83 Runoff=2.64 cfs 0.130 af

Subcatchment80W: Subarea Runoff Area=11.020 ac 45.02% Impervious Runoff Depth>1.55"
Flow Length=1,295' Slope=0.1100 '/' Tc=12.5 min CN=88 Runoff=24.14 cfs 1.426 af

Subcatchment85W: Subarea Runoff Area=3.370 ac 20.62% Impervious Runoff Depth>1.27"
Flow Length=1,000' Tc=9.9 min CN=84 Runoff=6.75 cfs 0.357 af

Subcatchment90W: Subarea Runoff Area=2.720 ac 0.00% Impervious Runoff Depth>0.92"
Flow Length=490' Tc=33.9 min CN=78 Runoff=1.99 cfs 0.208 af

Pond 5P: Pond Peak Elev=217.22' Storage=1.445 af Inflow=35.01 cfs 2.156 af
Primary=1.55 cfs 1.372 af Secondary=0.00 cfs 0.000 af Outflow=1.55 cfs 1.372 af

Pond 20P: Pond Peak Elev=222.33' Storage=0.247 af Inflow=10.03 cfs 0.665 af
Outflow=5.38 cfs 0.640 af

Pond 30B: Pond/Basin Peak Elev=215.12' Storage=0.777 af Inflow=16.55 cfs 1.140 af
Discarded=0.11 cfs 0.118 af Primary=0.59 cfs 0.538 af Outflow=0.70 cfs 0.656 af

Pond 70P: Pond Peak Elev=214.92' Storage=1.071 af Inflow=24.57 cfs 1.692 af
Outflow=2.39 cfs 0.994 af

Pond 75B: Basin Peak Elev=213.20' Storage=0.330 af Inflow=3.23 cfs 1.124 af
Discarded=0.13 cfs 0.127 af Primary=0.92 cfs 0.749 af Outflow=1.05 cfs 0.876 af

Pond 80P: Pond South Peak Elev=214.29' Storage=0.972 af Inflow=24.14 cfs 1.426 af
Outflow=0.93 cfs 0.800 af

Pond 85B: Pond/Basin North Peak Elev=212.60' Storage=0.489 af Inflow=7.33 cfs 1.157 af
Discarded=0.24 cfs 0.242 af Primary=0.56 cfs 0.439 af Outflow=0.80 cfs 0.681 af

Link 15: North Drainage Inflow=7.84 cfs 1.845 af
Primary=7.84 cfs 1.845 af

Link 35: East to White Oak Way Inflow=9.10 cfs 1.522 af
Primary=9.10 cfs 1.522 af

Link 45: East to Hawthorn Hill Drive Inflow=10.83 cfs 0.492 af
Primary=10.83 cfs 0.492 af

Link 55: East to Summit Avenue Inflow=4.48 cfs 0.266 af
Primary=4.48 cfs 0.266 af

Link 95: West Drainage Inflow=4.04 cfs 1.585 af
Primary=4.04 cfs 1.585 af

Link 99: Total Existing Flow Inflow=25.20 cfs 5.710 af
Primary=25.20 cfs 5.710 af

Total Runoff Area = 79.900 ac Runoff Volume = 9.539 af Average Runoff Depth = 1.43"
64.33% Pervious = 51.397 ac 35.67% Impervious = 28.503 ac

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

Subcatchment5N: Subarea Runoff Area=17.500 ac 40.79% Impervious Runoff Depth>2.46"
Flow Length=1,100' Tc=13.7 min CN=87 Runoff=57.69 cfs 3.589 af

Subcatchment10N: Subarea - North Runoff Area=4.960 ac 12.94% Impervious Runoff Depth>2.04"
Flow Length=235' Slope=0.0800 '/' Tc=17.7 min CN=82 Runoff=12.08 cfs 0.843 af

Subcatchment20E: Subarea Runoff Area=5.400 ac 41.01% Impervious Runoff Depth>2.46"
Flow Length=575' Tc=16.0 min CN=87 Runoff=16.54 cfs 1.107 af

Subcatchment25E: Subarea - East to Runoff Area=3.510 ac 11.03% Impervious Runoff Depth>1.96"
Flow Length=625' Slope=0.0300 '/' Tc=33.7 min CN=81 Runoff=5.77 cfs 0.573 af

Subcatchment30E: Subarea Runoff Area=8.810 ac 43.05% Impervious Runoff Depth>2.55"
Flow Length=1,000' Tc=17.2 min CN=88 Runoff=26.95 cfs 1.872 af

Subcatchment35E: Subarea Runoff Area=0.330 ac 0.00% Impervious Runoff Depth>1.81"
Tc=6.0 min CN=79 Runoff=1.11 cfs 0.050 af

Subcatchment40E: Subarea - East to Runoff Area=3.620 ac 48.45% Impervious Runoff Depth>2.64"
Flow Length=285' Tc=6.0 min CN=89 Runoff=17.17 cfs 0.798 af

Subcatchment50E: Subarea - East to Runoff Area=2.510 ac 20.72% Impervious Runoff Depth>2.20"
Flow Length=190' Slope=0.1200 '/' Tc=12.7 min CN=84 Runoff=7.74 cfs 0.461 af

Subcatchment60W: Subarea - West to Runoff Area=1.780 ac 20.11% Impervious Runoff Depth>2.20"
Flow Length=110' Slope=0.0500 '/' Tc=11.6 min CN=84 Runoff=5.70 cfs 0.327 af

Subcatchment70W: Subarea Runoff Area=13.080 ac 44.87% Impervious Runoff Depth>2.55"
Flow Length=1,675' Slope=0.0500 '/' Tc=17.2 min CN=88 Runoff=40.01 cfs 2.780 af

Subcatchment75W: Subarea Runoff Area=1.290 ac 13.26% Impervious Runoff Depth>2.12"
Flow Length=45' Slope=0.0200 '/' Tc=8.2 min CN=83 Runoff=4.62 cfs 0.228 af

Subcatchment80W: Subarea Runoff Area=11.020 ac 45.02% Impervious Runoff Depth>2.55"
Flow Length=1,295' Slope=0.1100 '/' Tc=12.5 min CN=88 Runoff=39.10 cfs 2.343 af

Subcatchment85W: Subarea Runoff Area=3.370 ac 20.62% Impervious Runoff Depth>2.20"
Flow Length=1,000' Tc=9.9 min CN=84 Runoff=11.63 cfs 0.619 af

Subcatchment90W: Subarea Runoff Area=2.720 ac 0.00% Impervious Runoff Depth>1.73"
Flow Length=490' Tc=33.9 min CN=78 Runoff=3.91 cfs 0.393 af

Pond 5P: Pond Peak Elev=217.90' Storage=1.971 af Inflow=57.69 cfs 3.589 af
Primary=7.61 cfs 2.049 af Secondary=5.81 cfs 0.457 af Outflow=13.42 cfs 2.506 af

Pond 20P: Pond Peak Elev=222.63' Storage=0.318 af Inflow=16.54 cfs 1.107 af
Outflow=12.55 cfs 1.076 af

Pond 30B: Pond/Basin Peak Elev=215.80' Storage=1.115 af Inflow=26.95 cfs 1.872 af
Discarded=0.13 cfs 0.140 af Primary=4.12 cfs 1.022 af Outflow=4.25 cfs 1.161 af

Pond 70P: Pond Peak Elev=215.34' Storage=1.269 af Inflow=40.01 cfs 2.780 af
Outflow=20.02 cfs 1.923 af

Pond 75B: Basin Peak Elev=214.64' Storage=0.711 af Inflow=21.01 cfs 2.151 af
Discarded=0.18 cfs 0.165 af Primary=7.61 cfs 1.674 af Outflow=7.79 cfs 1.840 af

Pond 80P: Pond South Peak Elev=215.26' Storage=1.483 af Inflow=39.10 cfs 2.343 af
Outflow=3.79 cfs 1.265 af

Pond 85B: Pond/Basin North Peak Elev=213.30' Storage=0.884 af Inflow=12.44 cfs 1.884 af
Discarded=0.28 cfs 0.290 af Primary=0.97 cfs 0.855 af Outflow=1.25 cfs 1.145 af

Link 15: North Drainage Inflow=18.25 cfs 3.348 af
Primary=18.25 cfs 3.348 af

Link 35: East to White Oak Way Inflow=18.57 cfs 2.721 af
Primary=18.57 cfs 2.721 af

Link 45: East to Hawthorn Hill Drive Inflow=17.17 cfs 0.798 af
Primary=17.17 cfs 0.798 af

Link 55: East to Summit Avenue Inflow=7.74 cfs 0.461 af
Primary=7.74 cfs 0.461 af

Link 95: West Drainage Inflow=10.78 cfs 3.249 af
Primary=10.78 cfs 3.249 af

Link 99: Total Existing Flow Inflow=48.89 cfs 10.576 af
Primary=48.89 cfs 10.576 af

Total Runoff Area = 79.900 ac Runoff Volume = 15.981 af Average Runoff Depth = 2.40"
64.33% Pervious = 51.397 ac 35.67% Impervious = 28.503 ac

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

Subcatchment5N: Subarea Runoff Area=17.500 ac 40.79% Impervious Runoff Depth>4.69"
Flow Length=1,100' Tc=13.7 min CN=87 Runoff=106.89 cfs 6.834 af

Subcatchment10N: Subarea - North Runoff Area=4.960 ac 12.94% Impervious Runoff Depth>4.15"
Flow Length=235' Slope=0.0800 '/' Tc=17.7 min CN=82 Runoff=24.30 cfs 1.715 af

Subcatchment20E: Subarea Runoff Area=5.400 ac 41.01% Impervious Runoff Depth>4.69"
Flow Length=575' Tc=16.0 min CN=87 Runoff=30.68 cfs 2.108 af

Subcatchment25E: Subarea - East to Runoff Area=3.510 ac 11.03% Impervious Runoff Depth>4.04"
Flow Length=625' Slope=0.0300 '/' Tc=33.7 min CN=81 Runoff=11.89 cfs 1.181 af

Subcatchment30E: Subarea Runoff Area=8.810 ac 43.05% Impervious Runoff Depth>4.79"
Flow Length=1,000' Tc=17.2 min CN=88 Runoff=49.36 cfs 3.520 af

Subcatchment35E: Subarea Runoff Area=0.330 ac 0.00% Impervious Runoff Depth>3.84"
Tc=6.0 min CN=79 Runoff=2.32 cfs 0.106 af

Subcatchment40E: Subarea - East to Runoff Area=3.620 ac 48.45% Impervious Runoff Depth>4.91"
Flow Length=285' Tc=6.0 min CN=89 Runoff=30.67 cfs 1.481 af

Subcatchment50E: Subarea - East to Runoff Area=2.510 ac 20.72% Impervious Runoff Depth>4.36"
Flow Length=190' Slope=0.1200 '/' Tc=12.7 min CN=84 Runoff=15.01 cfs 0.912 af

Subcatchment60W: Subarea - West to Runoff Area=1.780 ac 20.11% Impervious Runoff Depth>4.36"
Flow Length=110' Slope=0.0500 '/' Tc=11.6 min CN=84 Runoff=11.03 cfs 0.647 af

Subcatchment70W: Subarea Runoff Area=13.080 ac 44.87% Impervious Runoff Depth>4.79"
Flow Length=1,675' Slope=0.0500 '/' Tc=17.2 min CN=88 Runoff=73.29 cfs 5.226 af

Subcatchment75W: Subarea Runoff Area=1.290 ac 13.26% Impervious Runoff Depth>4.26"
Flow Length=45' Slope=0.0200 '/' Tc=8.2 min CN=83 Runoff=9.03 cfs 0.458 af

Subcatchment80W: Subarea Runoff Area=11.020 ac 45.02% Impervious Runoff Depth>4.80"
Flow Length=1,295' Slope=0.1100 '/' Tc=12.5 min CN=88 Runoff=71.32 cfs 4.405 af

Subcatchment85W: Subarea Runoff Area=3.370 ac 20.62% Impervious Runoff Depth>4.36"
Flow Length=1,000' Tc=9.9 min CN=84 Runoff=22.45 cfs 1.225 af

Subcatchment90W: Subarea Runoff Area=2.720 ac 0.00% Impervious Runoff Depth>3.73"
Flow Length=490' Tc=33.9 min CN=78 Runoff=8.51 cfs 0.845 af

Pond 5P: Pond Peak Elev=218.99' Storage=2.914 af Inflow=106.89 cfs 6.834 af
Primary=25.47 cfs 3.642 af Secondary=23.33 cfs 1.859 af Outflow=48.80 cfs 5.501 af

Pond 20P: Pond Peak Elev=223.18' Storage=0.471 af Inflow=30.68 cfs 2.108 af
Outflow=22.14 cfs 2.066 af

Pond 30B: Pond/Basin Peak Elev=216.77' Storage=1.673 af Inflow=49.36 cfs 3.520 af
Discarded=0.17 cfs 0.159 af Primary=17.85 cfs 2.531 af Outflow=18.01 cfs 2.690 af

Pond 70P: Pond Peak Elev=216.02' Storage=1.618 af Inflow=73.29 cfs 5.226 af
Outflow=64.20 cfs 4.271 af

Pond 75B: Basin Peak Elev=215.97' Storage=1.160 af Inflow=68.00 cfs 4.728 af
Discarded=0.24 cfs 0.195 af Primary=32.78 cfs 4.144 af Outflow=33.02 cfs 4.339 af

Pond 80P: Pond South Peak Elev=215.97' Storage=1.897 af Inflow=71.32 cfs 4.405 af
Outflow=47.38 cfs 3.122 af

Pond 85B: Pond/Basin North Peak Elev=214.88' Storage=1.936 af Inflow=58.77 cfs 4.347 af
Discarded=0.36 cfs 0.380 af Primary=11.70 cfs 2.768 af Outflow=12.06 cfs 3.149 af

Link 15: North Drainage Inflow=69.56 cfs 7.216 af
Primary=69.56 cfs 7.216 af

Link 35: East to White Oak Way Inflow=51.02 cfs 5.884 af
Primary=51.02 cfs 5.884 af

Link 45: East to Hawthorn Hill Drive Inflow=30.67 cfs 1.481 af
Primary=30.67 cfs 1.481 af

Link 55: East to Summit Avenue Inflow=15.01 cfs 0.912 af
Primary=15.01 cfs 0.912 af

Link 95: West Drainage Inflow=50.86 cfs 8.405 af
Primary=50.86 cfs 8.405 af

Link 99: Total Existing Flow Inflow=177.10 cfs 23.898 af
Primary=177.10 cfs 23.898 af

Total Runoff Area = 79.900 ac Runoff Volume = 30.664 af Average Runoff Depth = 4.61"
64.33% Pervious = 51.397 ac 35.67% Impervious = 28.503 ac

Summary for Subcatchment 5N: Subarea

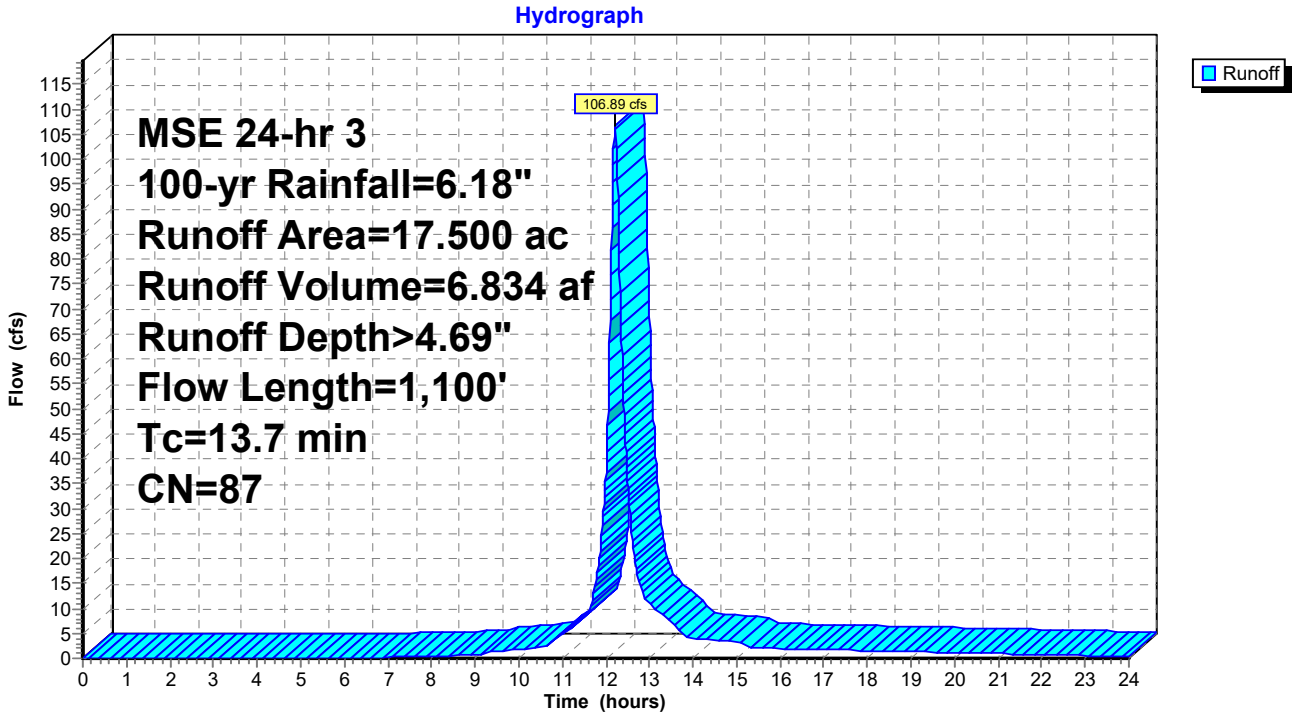
Runoff = 106.89 cfs @ 12.22 hrs, Volume= 6.834 af, Depth> 4.69"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100-yr Rainfall=6.18"

	Area (ac)	CN	Description
*	0.200	77	woodland - D soils
*	0.570	98	water
*	1.800	98	road
	12.550	87	1/4 acre lots, 38% imp, HSG D
*	2.380	80	grass - D soils
	17.500	87	Weighted Average
	10.361		59.21% Pervious Area
	7.139		40.79% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.2	150	0.1300	0.25		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
1.0	215	0.0500	3.60		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.1	20	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
2.4	715		5.00		**Direct Entry,**
13.7	1,100	Total			

Subcatchment 5N: Subarea



Summary for Subcatchment 10N: Subarea - North Drainage

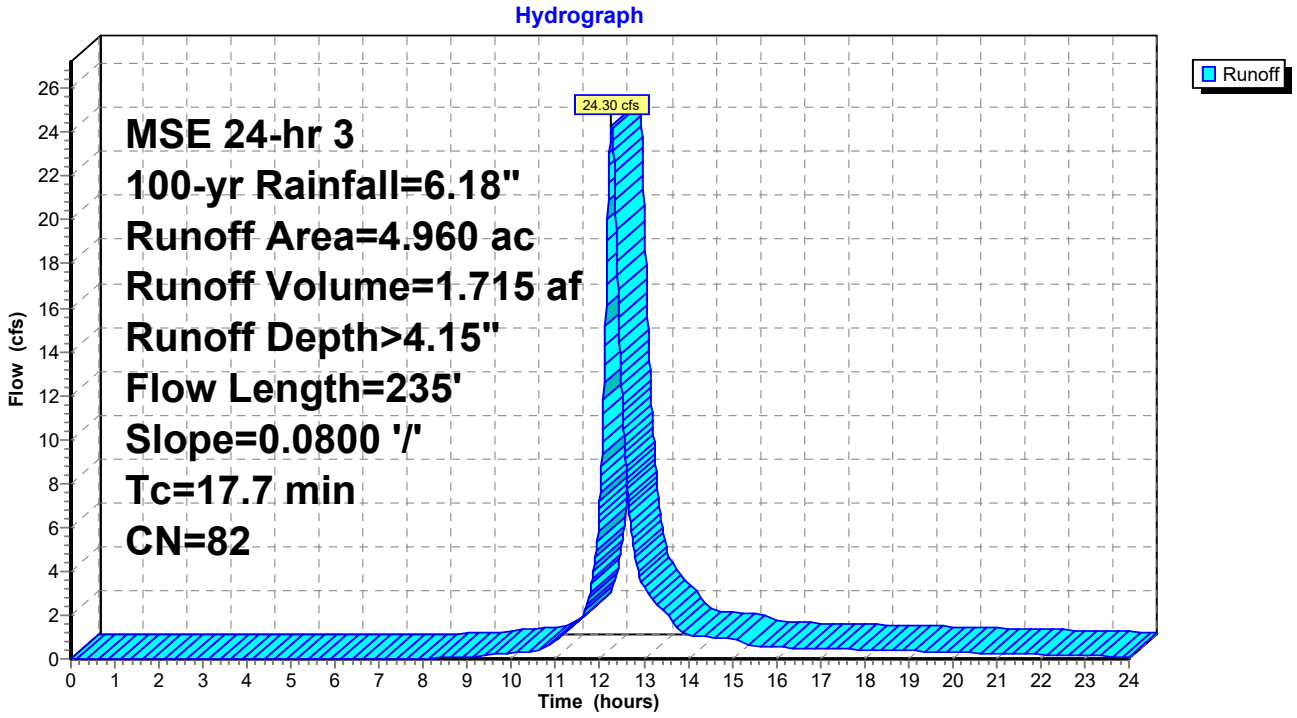
Runoff = 24.30 cfs @ 12.26 hrs, Volume= 1.715 af, Depth> 4.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100-yr Rainfall=6.18"

	Area (ac)	CN	Description
*	0.940	77	woodland - D soils
*	0.570	78	wetland - D soils
*	1.380	80	grass - D soils
	2.040	86	1/3 acre lots, 30% imp, HSG D
*	0.020	98	road
*	0.010	98	sidewalk
	4.960	82	Weighted Average
	4.318		87.06% Pervious Area
	0.642		12.94% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.7	235	0.0800	0.22		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"

Subcatchment 10N: Subarea - North Drainage



Summary for Subcatchment 20E: Subarea

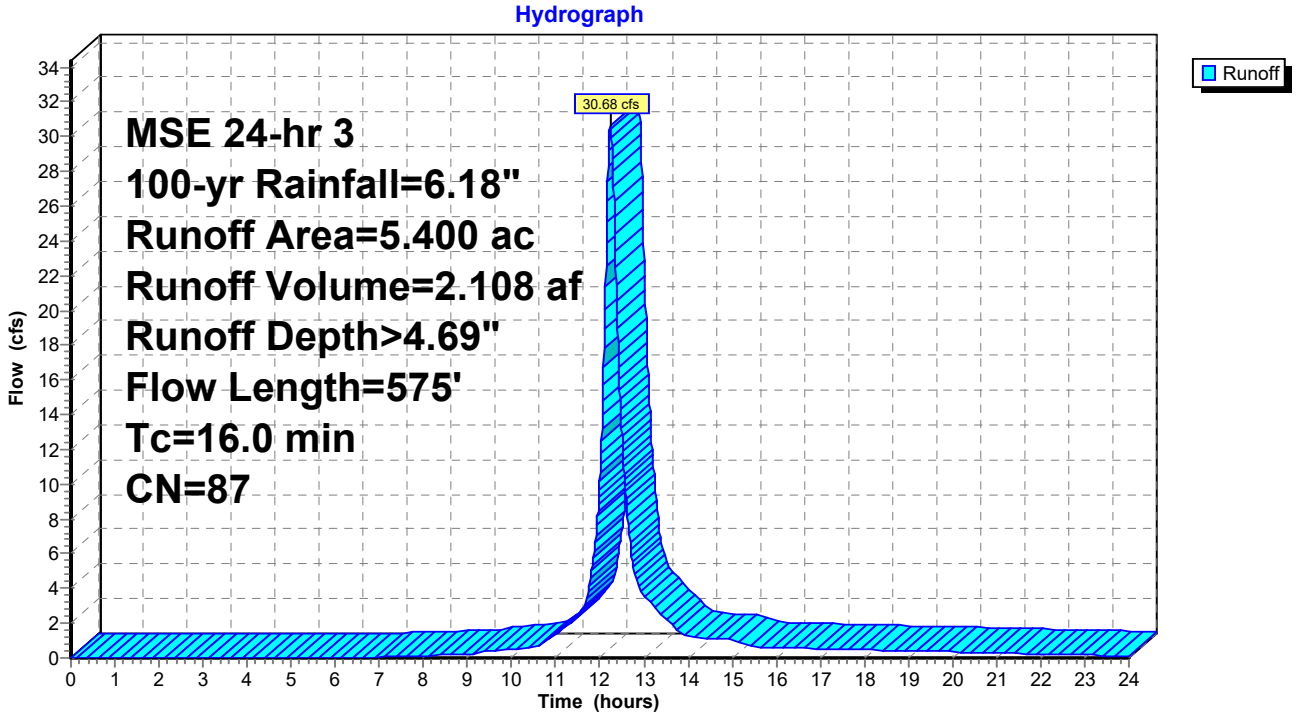
Runoff = 30.68 cfs @ 12.24 hrs, Volume= 2.108 af, Depth> 4.69"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100-yr Rainfall=6.18"

	Area (ac)	CN	Description
*	0.570	98	road
	3.960	87	1/4 acre lots, 38% imp, HSG D
*	0.690	80	grass - D soils
*	0.140	98	water
*	0.040	77	woodland - D soils
	5.400	87	Weighted Average
	3.185		58.99% Pervious Area
	2.215		41.01% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.0	170	0.0900	0.22		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
3.0	405	0.0200	2.28		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
16.0	575	Total			

Subcatchment 20E: Subarea



Summary for Subcatchment 25E: Subarea - East to White Oak Way

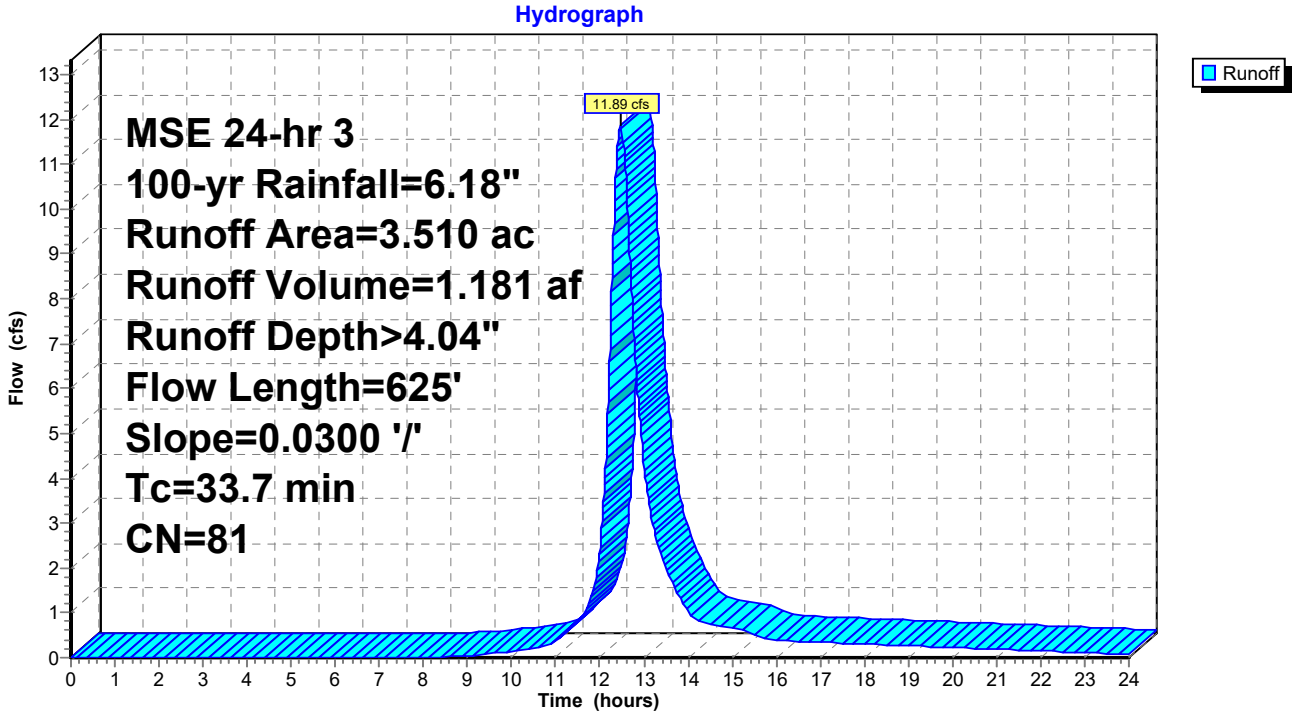
Runoff = 11.89 cfs @ 12.47 hrs, Volume= 1.181 af, Depth> 4.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100-yr Rainfall=6.18"

	Area (ac)	CN	Description
*	0.110	77	woodland - D soils
*	1.310	78	wetland - D soils
	1.290	86	1/3 acre lots, 30% imp, HSG D
*	0.800	80	grass - D soils
	3.510	81	Weighted Average
	3.123		88.97% Pervious Area
	0.387		11.03% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
31.8	300	0.0300	0.16		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
1.9	325	0.0300	2.79		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
33.7	625	Total			

Subcatchment 25E: Subarea - East to White Oak Way



Summary for Subcatchment 30E: Subarea

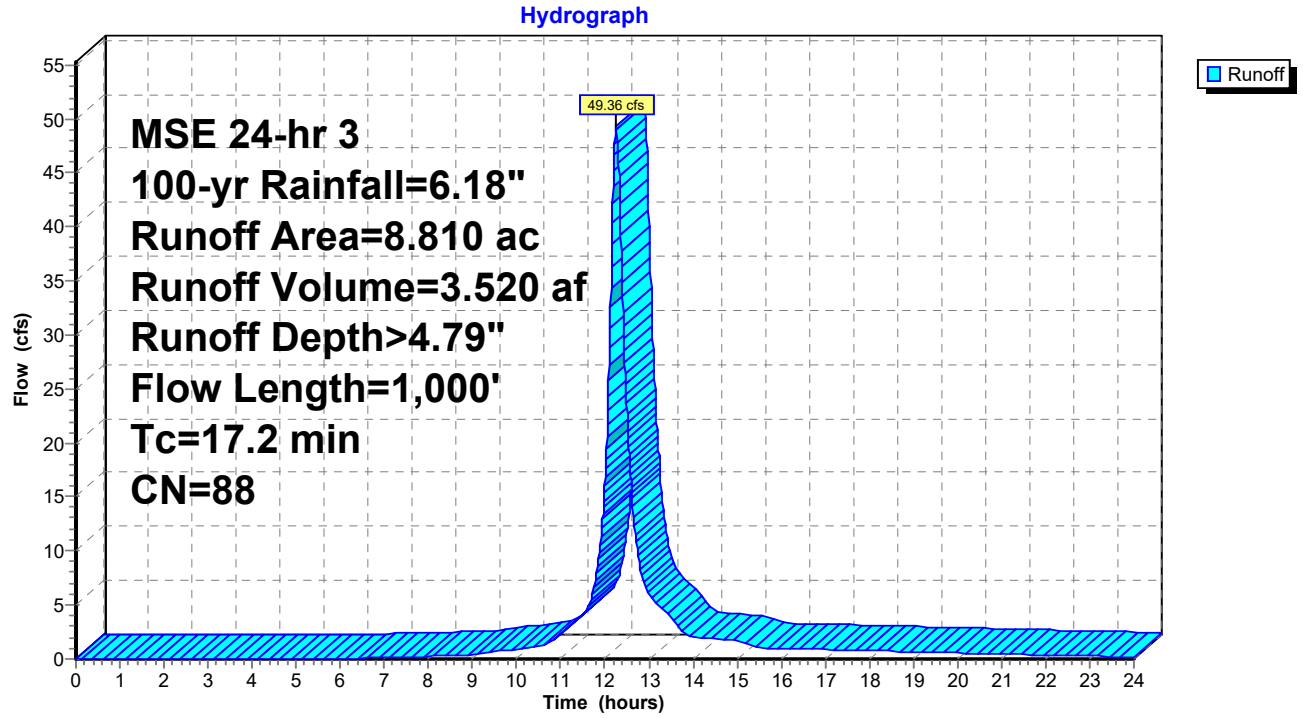
Runoff = 49.36 cfs @ 12.25 hrs, Volume= 3.520 af, Depth> 4.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100-yr Rainfall=6.18"

	Area (ac)	CN	Description
*	0.160	77	woodland - D soils
*	0.190	98	water
*	1.450	98	road
	5.480	87	1/4 acre lots, 38% imp, HSG D
*	1.460	80	grass - D soils
*	0.070	98	sidewalk
	8.810	88	Weighted Average
	5.018		56.95% Pervious Area
	3.792		43.05% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.7	105	0.0300	0.13		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
0.9	115	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
2.6	780		5.00		**Direct Entry,**
17.2	1,000	Total			

Subcatchment 30E: Subarea



Summary for Subcatchment 35E: Subarea

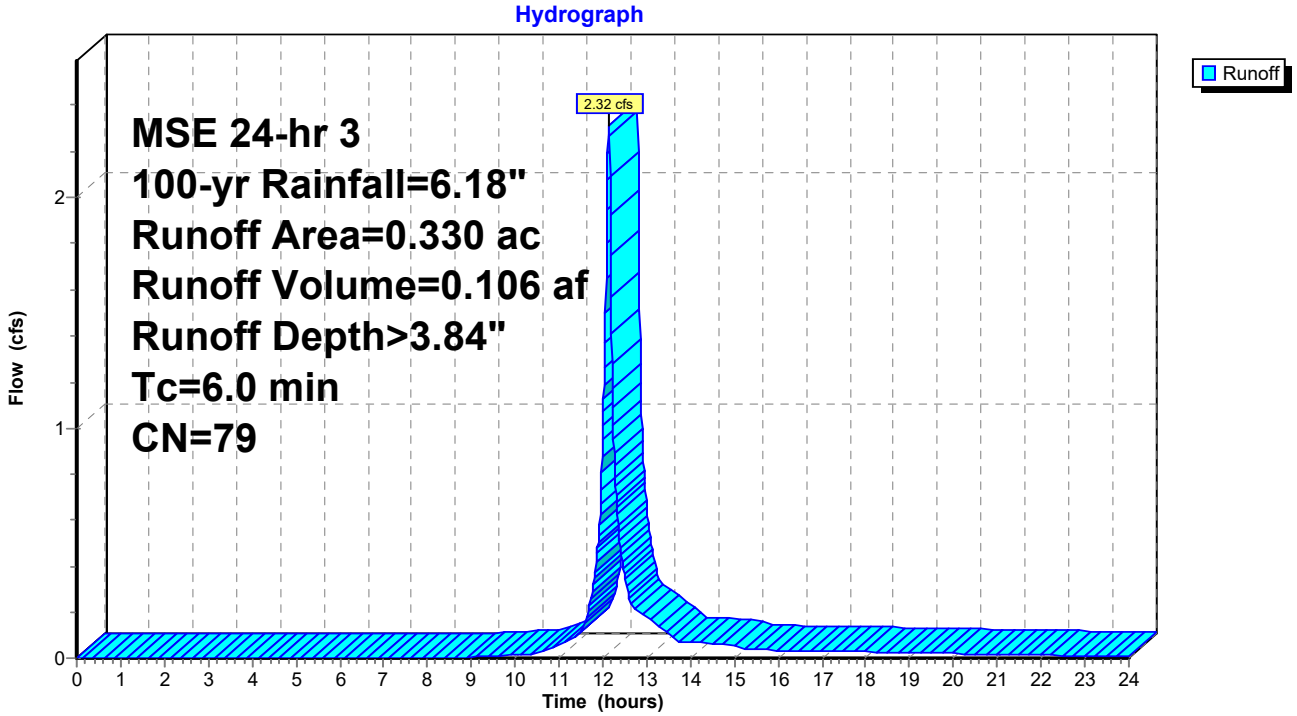
Runoff = 2.32 cfs @ 12.13 hrs, Volume= 0.106 af, Depth> 3.84"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100-yr Rainfall=6.18"

	Area (ac)	CN	Description
*	0.090	77	woodland - D soils
*	0.240	80	grass - D soils
	0.330	79	Weighted Average
	0.330		100.00% Pervious Area

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

Subcatchment 35E: Subarea



Summary for Subcatchment 40E: Subarea - East to Hawthorn Hill Drive

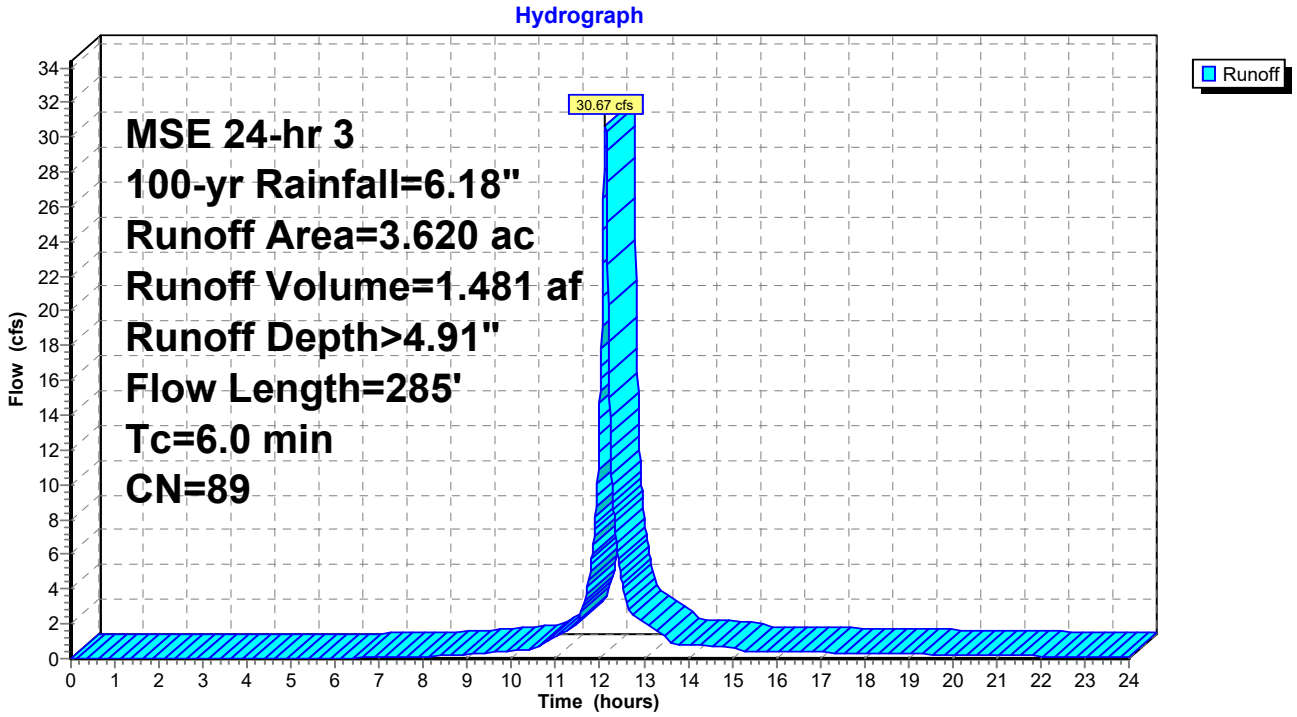
Runoff = 30.67 cfs @ 12.13 hrs, Volume= 1.481 af, Depth> 4.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100-yr Rainfall=6.18"

	Area (ac)	CN	Description
*	0.610	98	road
	3.010	87	1/4 acre lots, 38% imp, HSG D
	3.620	89	Weighted Average
	1.866		51.55% Pervious Area
	1.754		48.45% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.4	35	0.1100	0.17		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
1.2	250	0.0500	3.60		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
4.6	285	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 40E: Subarea - East to Hawthorn Hill Drive



Summary for Subcatchment 50E: Subarea - East to Summit Avenue

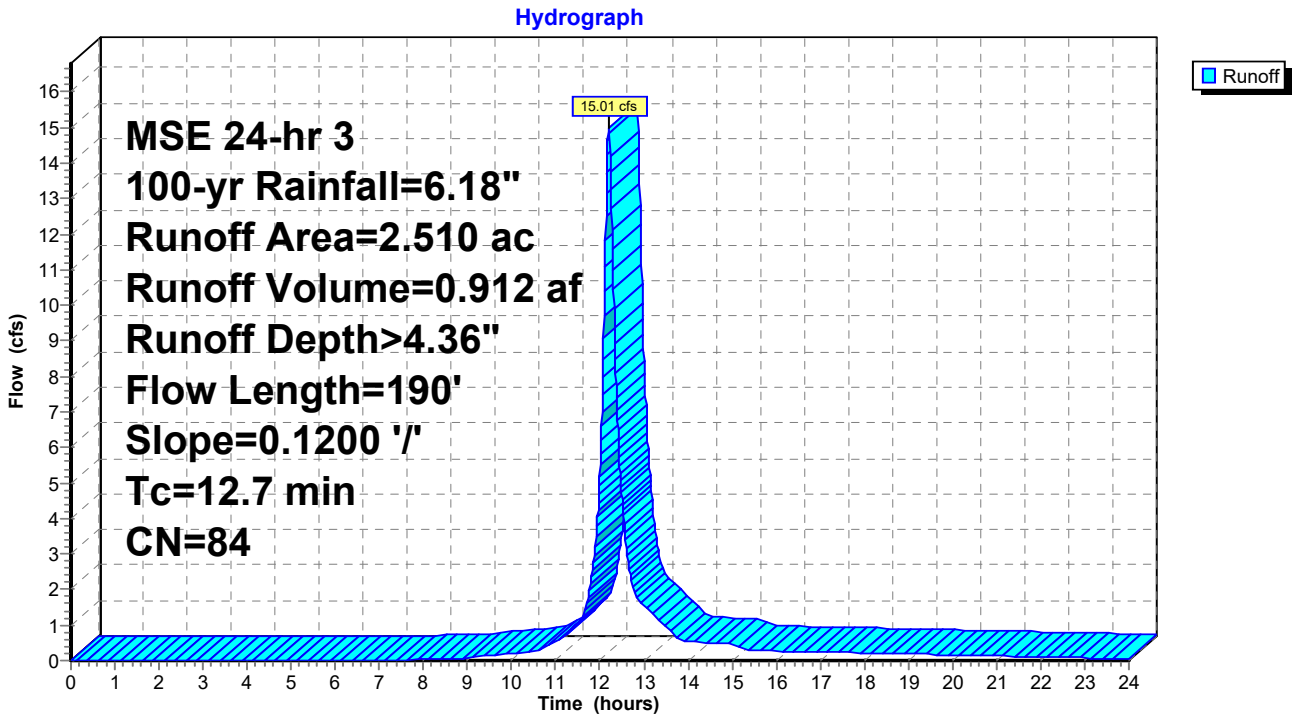
Runoff = 15.01 cfs @ 12.20 hrs, Volume= 0.912 af, Depth> 4.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100-yr Rainfall=6.18"

	Area (ac)	CN	Description
	1.500	86	1/3 acre lots, 30% imp, HSG D
*	0.940	80	grass - D soils
*	0.070	98	sidewalk
	2.510	84	Weighted Average
	1.990		79.28% Pervious Area
	0.520		20.72% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.7	190	0.1200	0.25		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"

Subcatchment 50E: Subarea - East to Summit Avenue



Summary for Subcatchment 60W: Subarea - West to Summit Avenue

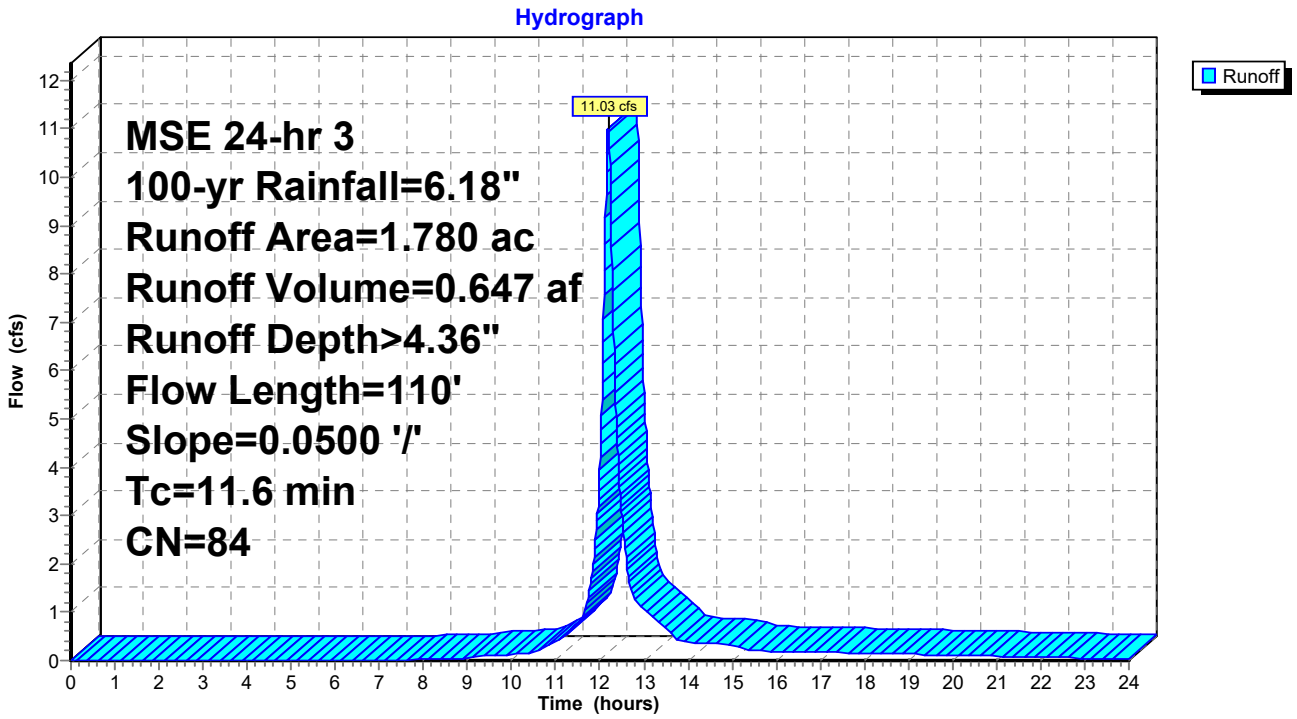
Runoff = 11.03 cfs @ 12.19 hrs, Volume= 0.647 af, Depth> 4.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100-yr Rainfall=6.18"

	Area (ac)	CN	Description
	0.960	86	1/3 acre lots, 30% imp, HSG D
*	0.750	80	grass - D soils
*	0.070	98	sidewalk
	1.780	84	Weighted Average
	1.422		79.89% Pervious Area
	0.358		20.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.6	110	0.0500	0.16		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"

Subcatchment 60W: Subarea - West to Summit Avenue



Summary for Subcatchment 70W: Subarea

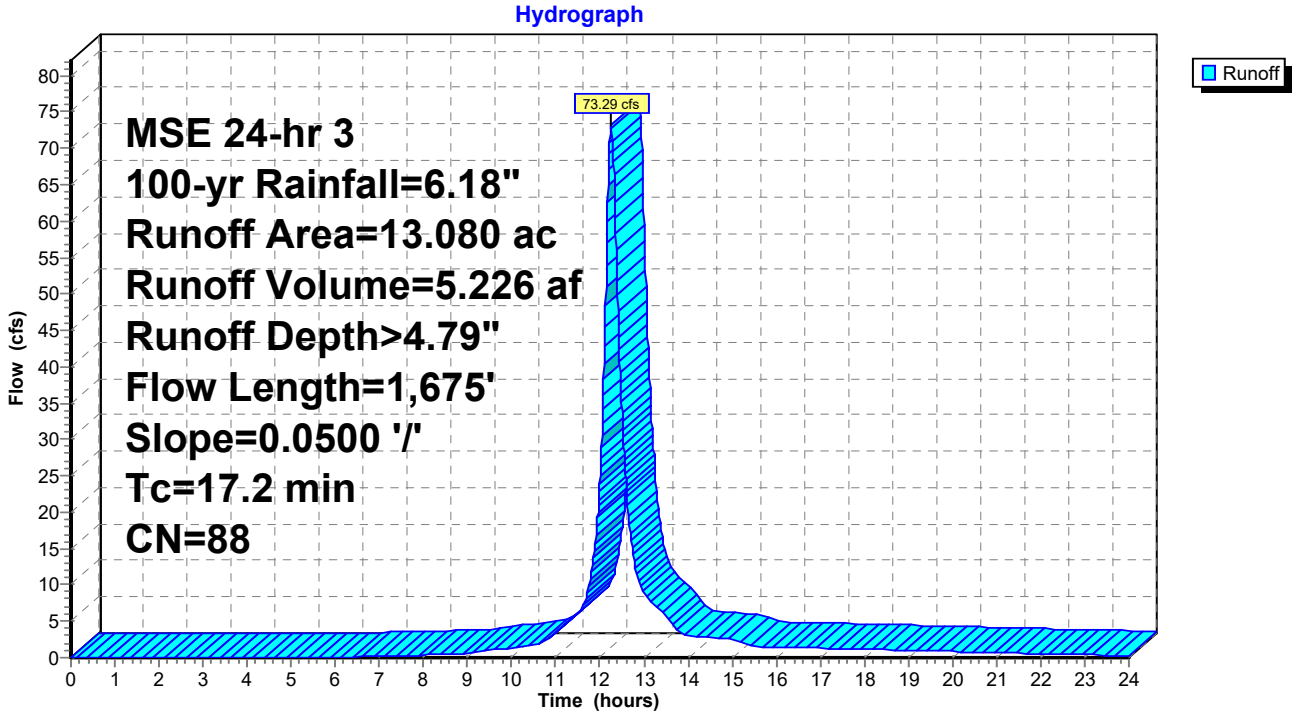
Runoff = 73.29 cfs @ 12.25 hrs, Volume= 5.226 af, Depth> 4.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100-yr Rainfall=6.18"

	Area (ac)	CN	Description
*	1.890	98	road
	9.630	87	1/4 acre lots, 38% imp, HSG D
*	1.240	80	grass - D soils
*	0.280	98	water
*	0.040	98	sidewalk
	13.080	88	Weighted Average
	7.211		55.13% Pervious Area
	5.869		44.87% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.0	115	0.0500	0.16		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
5.2	1,560		5.00		**Direct Entry,**
17.2	1,675	Total			

Subcatchment 70W: Subarea



Summary for Subcatchment 75W: Subarea

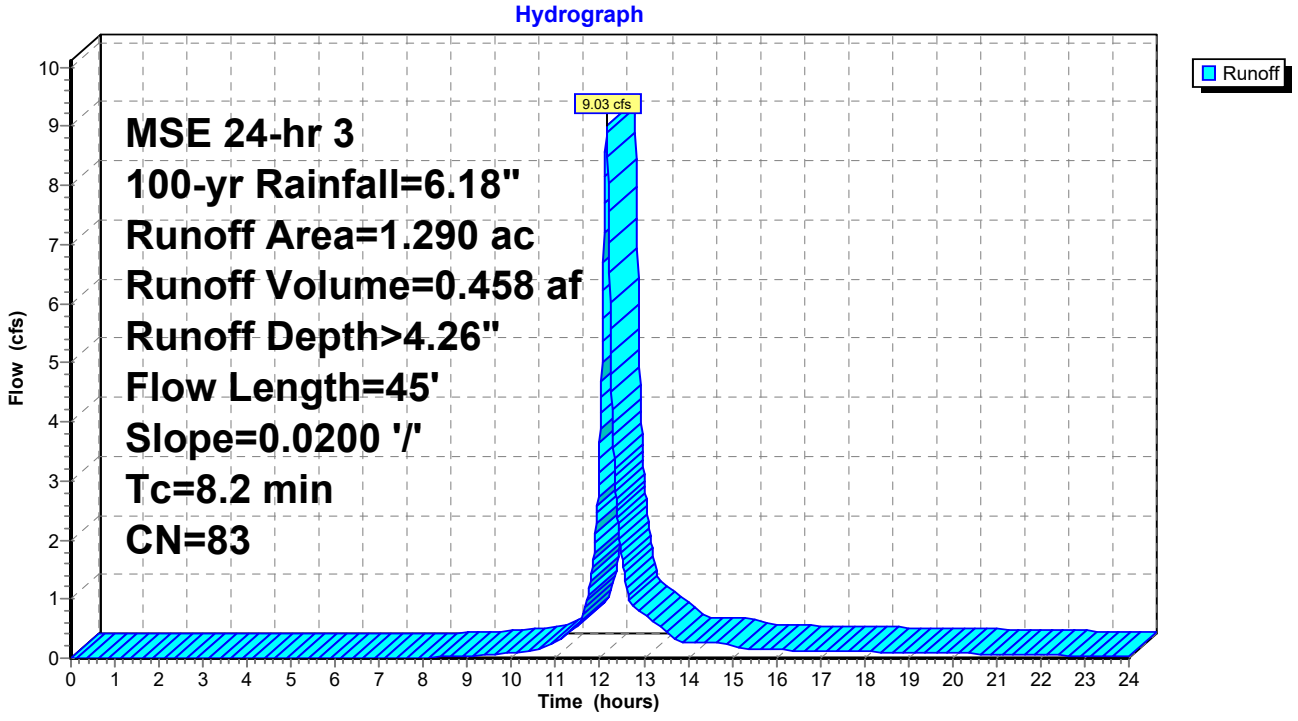
Runoff = 9.03 cfs @ 12.15 hrs, Volume= 0.458 af, Depth> 4.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100-yr Rainfall=6.18"

	Area (ac)	CN	Description
	0.570	86	1/3 acre lots, 30% imp, HSG D
*	0.720	80	grass - D soils
	1.290	83	Weighted Average
	1.119		86.74% Pervious Area
	0.171		13.26% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	45	0.0200	0.09		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"

Subcatchment 75W: Subarea



Summary for Subcatchment 80W: Subarea

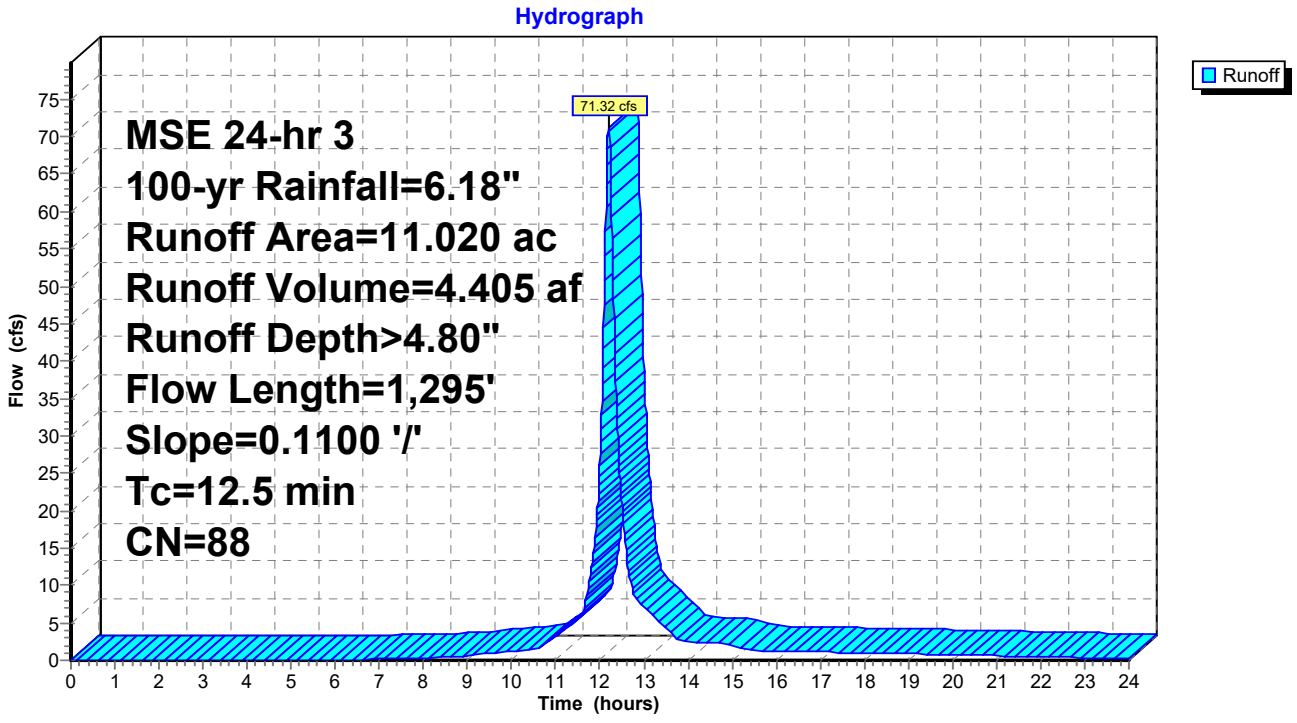
Runoff = 71.32 cfs @ 12.20 hrs, Volume= 4.405 af, Depth> 4.80"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100-yr Rainfall=6.18"

	Area (ac)	CN	Description
*	0.360	98	water
*	1.580	98	road
	7.950	87	1/4 acre lots, 38% imp, HSG D
*	1.130	80	grass - D soils
	11.020	88	Weighted Average
	6.059		54.98% Pervious Area
	4.961		45.02% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.5	110	0.1100	0.22		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
3.9	1,185		5.00		**Direct Entry,**
12.5	1,295	Total			

Subcatchment 80W: Subarea



Summary for Subcatchment 85W: Subarea

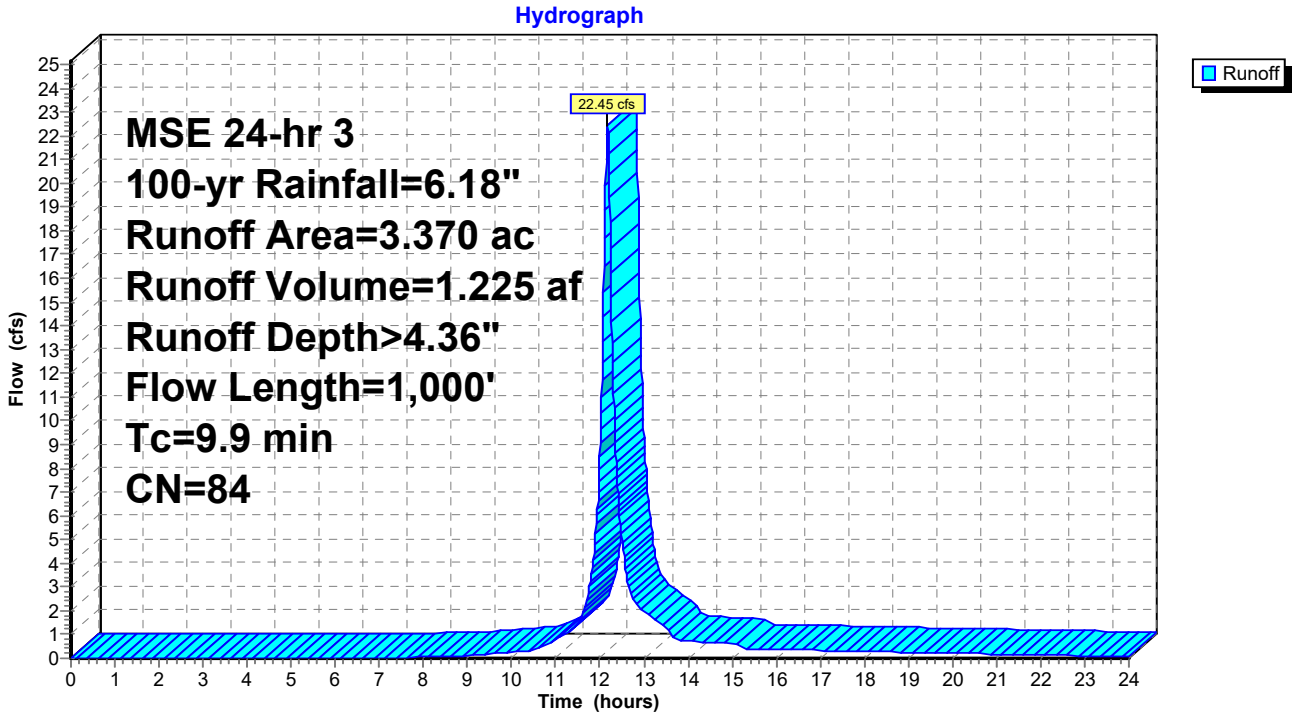
Runoff = 22.45 cfs @ 12.17 hrs, Volume= 1.225 af, Depth> 4.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100-yr Rainfall=6.18"

	Area (ac)	CN	Description
*	0.040	77	woodland - D soils
*	0.080	98	water
*	0.150	98	road
	1.550	86	1/3 acre lots, 30% imp, HSG D
*	1.550	80	grass - D soils
	3.370	84	Weighted Average
	2.675		79.38% Pervious Area
	0.695		20.62% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.4	50	0.0700	0.15		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
3.3	635	0.0400	3.22		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.3	60	0.0300	3.52		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.8	255		5.00		**Direct Entry,**
9.9	1,000	Total			

Subcatchment 85W: Subarea



Summary for Subcatchment 90W: Subarea

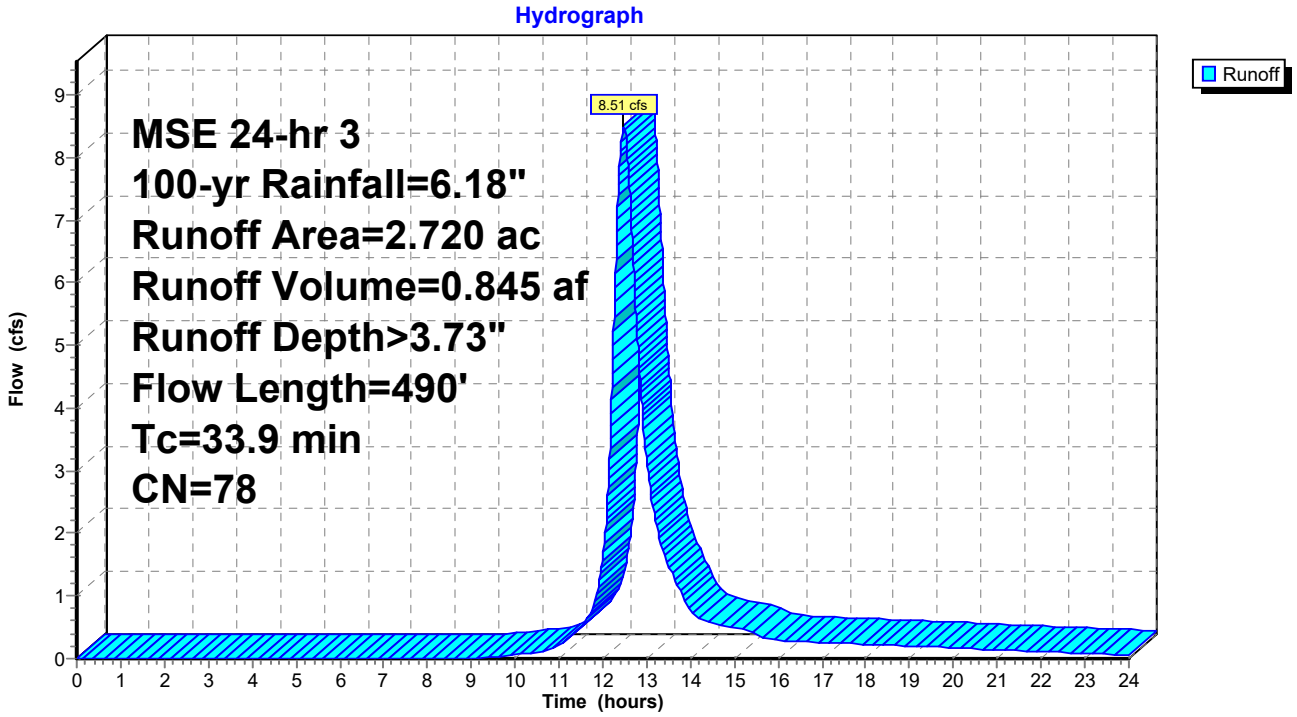
Runoff = 8.51 cfs @ 12.47 hrs, Volume= 0.845 af, Depth> 3.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100-yr Rainfall=6.18"

	Area (ac)	CN	Description
*	1.630	77	woodland - D soils
*	0.190	78	wetland - D soils
*	0.900	80	grass - D soils
	2.720	78	Weighted Average
	2.720		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.6	60	0.0100	0.07		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
20.3	430	0.0050	0.35		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
33.9	490	Total			

Subcatchment 90W: Subarea



Summary for Pond 5P: Pond

Inflow Area = 17.500 ac, 40.79% Impervious, Inflow Depth > 4.69" for 100-yr event
Inflow = 106.89 cfs @ 12.22 hrs, Volume= 6.834 af
Outflow = 48.80 cfs @ 12.42 hrs, Volume= 5.501 af, Atten= 54%, Lag= 12.3 min
Primary = 25.47 cfs @ 12.42 hrs, Volume= 3.642 af
Secondary = 23.33 cfs @ 12.42 hrs, Volume= 1.859 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 218.99' @ 12.42 hrs Surf.Area= 0.928 ac Storage= 2.914 af

Plug-Flow detention time= 134.5 min calculated for 5.499 af (80% of inflow)
Center-of-Mass det. time= 76.0 min (862.3 - 786.3)

Volume	Invert	Avail.Storage	Storage Description
#1	215.00'	3.913 af	**Pond (Conic)** Listed below (Recalc)

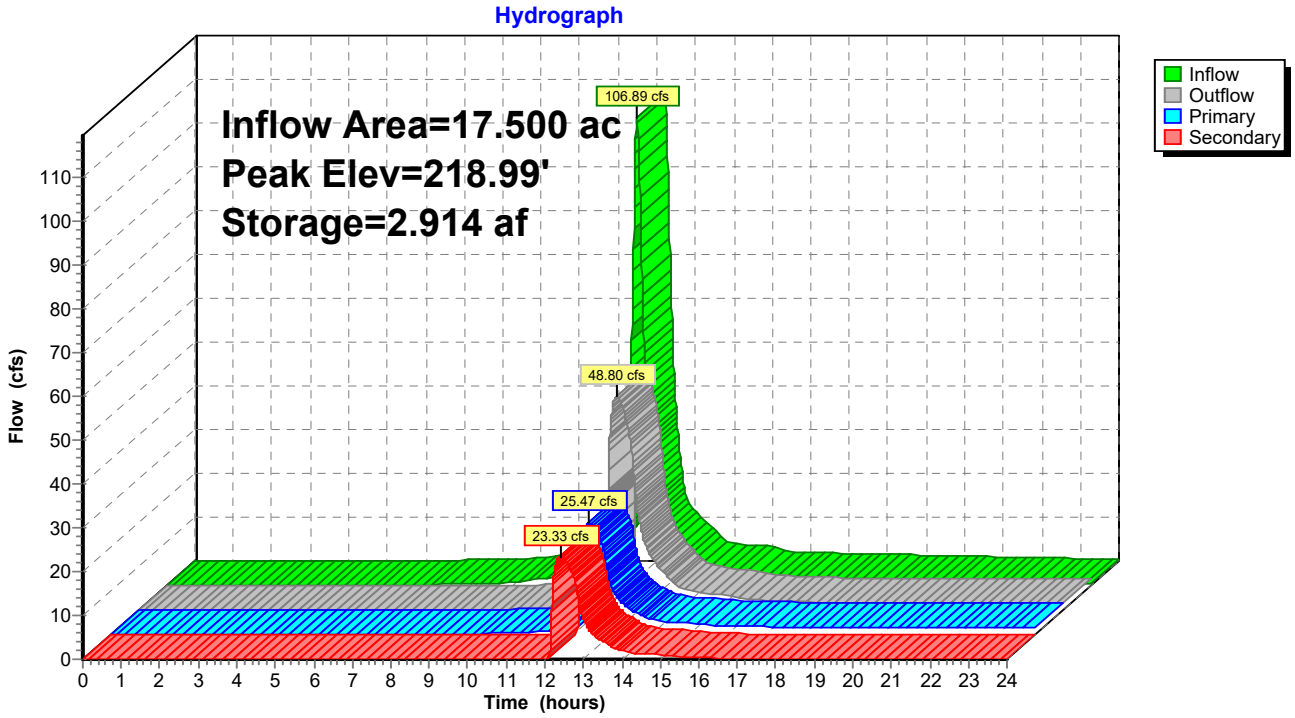
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
215.00	0.570	0.000	0.000	0.570
216.00	0.640	0.605	0.605	0.641
217.00	0.720	0.680	1.284	0.722
218.00	0.820	0.769	2.054	0.824
219.00	0.930	0.874	2.928	0.935
220.00	1.040	0.984	3.913	1.046

Device	Routing	Invert	Outlet Devices
#1	Primary	214.25'	**24.0" Round Culvert** L= 30.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 214.25' / 214.00' S= 0.0083 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#2	Device 1	215.00'	**6.5" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	217.50'	**27.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Secondary	214.25'	**24.0" Round Culvert** L= 30.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 214.25' / 214.00' S= 0.0083 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#5	Device 4	217.50'	**27.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#6	Primary	219.00'	**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=25.47 cfs @ 12.42 hrs HW=218.99' TW=0.00' (Dynamic Tailwater)
- **1=Culvert** (Passes 25.47 cfs of 29.24 cfs potential flow)
  - **2=Orifice/Grate** (Orifice Controls 2.14 cfs @ 9.28 fps)
  - **3=Orifice/Grate** (Orifice Controls 23.33 cfs @ 5.87 fps)
- **6=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Secondary OutFlow Max=23.33 cfs @ 12.42 hrs HW=218.99' TW=0.00' (Dynamic Tailwater)
- **4=Culvert** (Passes 23.33 cfs of 29.24 cfs potential flow)
  - **5=Orifice/Grate** (Orifice Controls 23.33 cfs @ 5.87 fps)

Pond 5P: Pond



Summary for Pond 20P: Pond

Inflow Area = 5.400 ac, 41.01% Impervious, Inflow Depth > 4.69" for 100-yr event
Inflow = 30.68 cfs @ 12.24 hrs, Volume= 2.108 af
Outflow = 22.14 cfs @ 12.36 hrs, Volume= 2.066 af, Atten= 28%, Lag= 7.3 min
Primary = 22.14 cfs @ 12.36 hrs, Volume= 2.066 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 223.18' @ 12.36 hrs Surf.Area= 0.296 ac Storage= 0.471 af

Plug-Flow detention time= 55.4 min calculated for 2.066 af (98% of inflow)
Center-of-Mass det. time= 43.9 min (832.2 - 788.3)

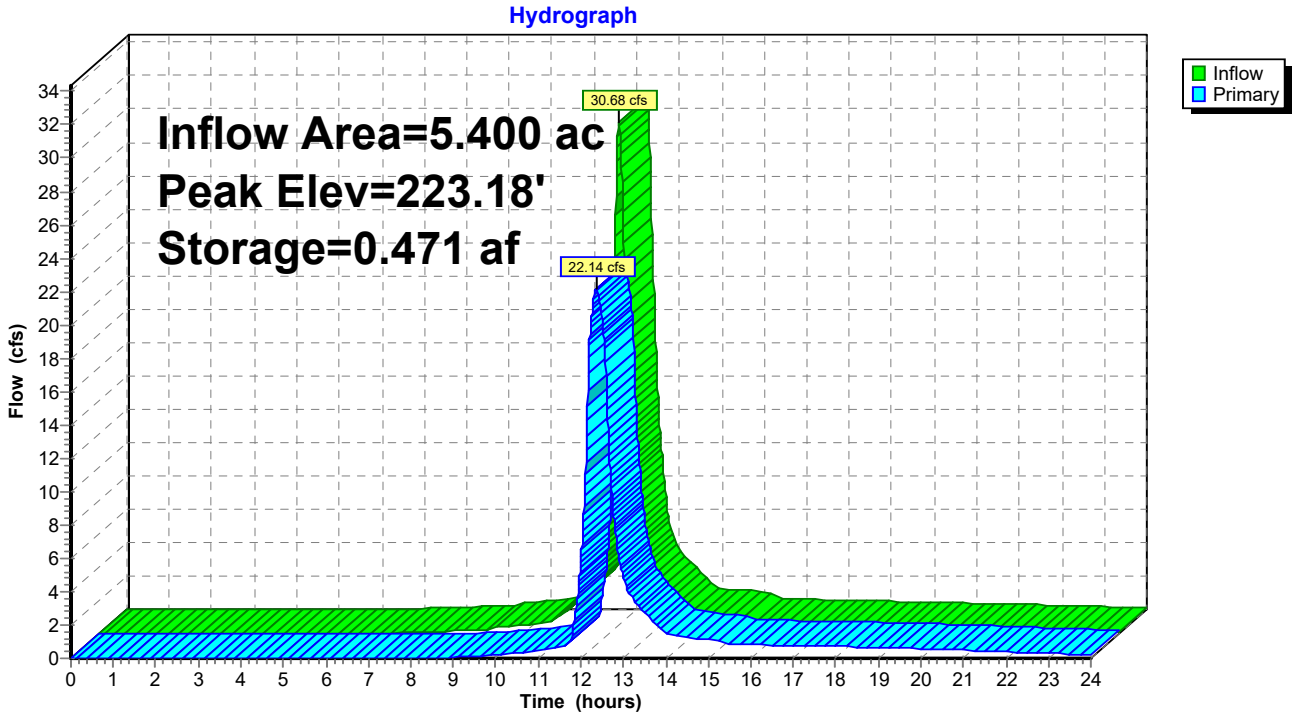
Volume	Invert	Avail.Storage	Storage Description
#1	221.00'	0.742 af	**Pond (Conic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
221.00	0.140	0.000	0.000	0.140
222.00	0.210	0.174	0.174	0.210
223.00	0.280	0.244	0.418	0.281
224.00	0.370	0.324	0.742	0.371

Device	Routing	Invert	Outlet Devices
#1	Primary	217.25'	**21.0" Round Culvert** L= 30.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 217.25' / 217.00' S= 0.0083 '/' Cc= 0.900 n= 0.013, Flow Area= 2.41 sf
#2	Device 1	221.00'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	222.00'	**27.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Primary	223.30'	**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=22.14 cfs @ 12.36 hrs HW=223.18' TW=0.00' (Dynamic Tailwater)
- **1=Culvert** (Passes 22.14 cfs of 26.05 cfs potential flow)
  - **2=Orifice/Grate** (Orifice Controls 1.31 cfs @ 6.70 fps)
  - **3=Orifice/Grate** (Orifice Controls 20.83 cfs @ 5.24 fps)
- **4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 20P: Pond



Summary for Pond 30B: Pond/Basin

Inflow Area = 8.810 ac, 43.05% Impervious, Inflow Depth > 4.79" for 100-yr event
Inflow = 49.36 cfs @ 12.25 hrs, Volume= 3.520 af
Outflow = 18.01 cfs @ 12.56 hrs, Volume= 2.690 af, Atten= 64%, Lag= 18.8 min
Discarded = 0.17 cfs @ 12.56 hrs, Volume= 0.159 af
Primary = 17.85 cfs @ 12.56 hrs, Volume= 2.531 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 216.77' @ 12.56 hrs Surf.Area= 0.268 ac Storage= 1.673 af

Plug-Flow detention time= 144.4 min calculated for 2.690 af (76% of inflow)
Center-of-Mass det. time= 81.8 min (868.9 - 787.1)

Volume	Invert	Avail.Storage	Storage Description
#1	213.50'	1.371 af	**Pond (Conic)** Listed below (Recalc) -Impervious
#2	212.50'	1.139 af	**Infiltration Basin (Conic)** Listed below (Recalc)
		2.510 af	Total Available Storage

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
213.50	0.190	0.000	0.000	0.190
214.00	0.220	0.102	0.102	0.220
215.00	0.260	0.240	0.342	0.261
216.00	0.320	0.289	0.632	0.322
217.00	0.370	0.345	0.976	0.373
218.00	0.420	0.395	1.371	0.424

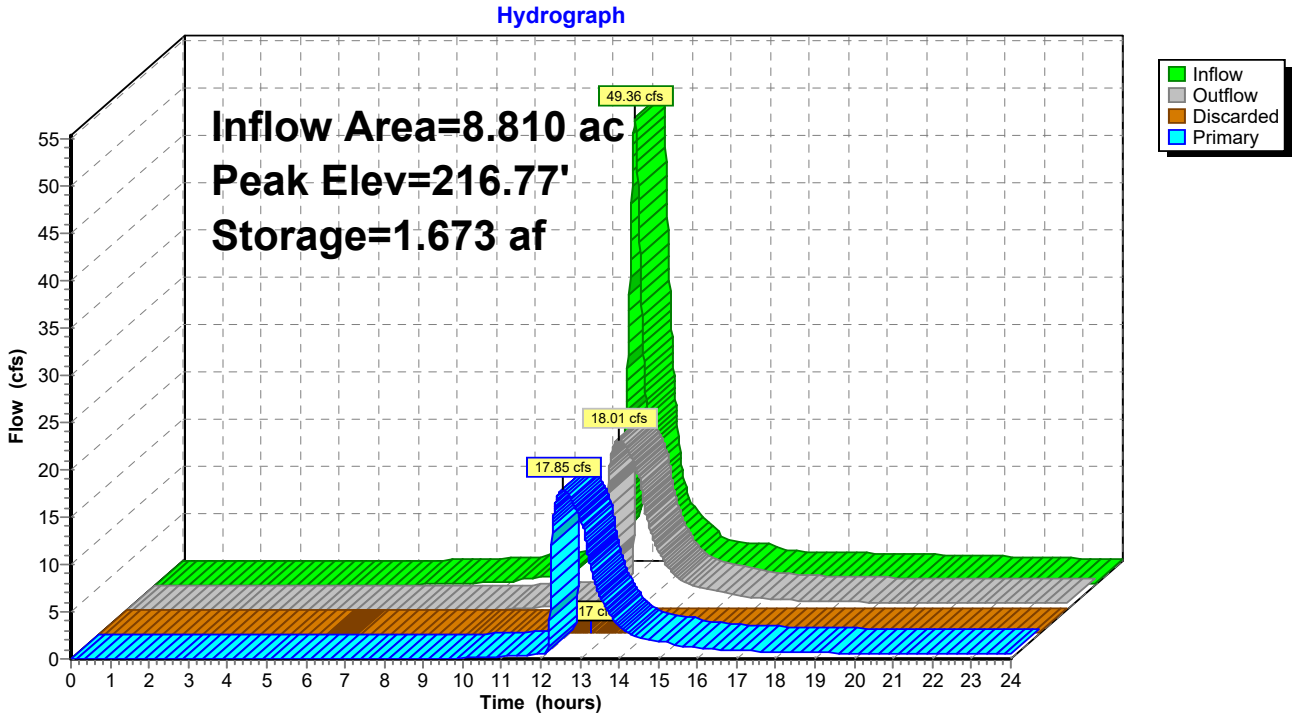
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
212.50	0.110	0.000	0.000	0.110
213.00	0.130	0.060	0.060	0.130
214.00	0.160	0.145	0.205	0.161
215.00	0.190	0.175	0.379	0.192
216.00	0.230	0.210	0.589	0.232
217.00	0.280	0.255	0.844	0.283
218.00	0.310	0.295	1.139	0.315

Device	Routing	Invert	Outlet Devices
#1	Discarded	212.50'	**0.500 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 200.00' Phase-In= 0.01'
#2	Primary	210.00'	**15.0" Round Culvert** L= 50.0' RCP, rounded edge headwall, Ke= 0.100 Inlet / Outlet Invert= 210.00' / 204.00' S= 0.1200 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf
#3	Device 2	213.00'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 2	215.50'	**24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.17 cfs @ 12.56 hrs HW=216.77' (Free Discharge)
└**1=Exfiltration** (Controls 0.17 cfs)

Primary OutFlow Max=17.85 cfs @ 12.56 hrs HW=216.77' TW=0.00' (Dynamic Tailwater)
└**2=Culvert** (Passes 17.85 cfs of 19.97 cfs potential flow)
  └**3=Orifice/Grate** (Orifice Controls 0.80 cfs @ 9.14 fps)
  └**4=Orifice/Grate** (Orifice Controls 17.05 cfs @ 5.43 fps)

Pond 30B: Pond/Basin



Summary for Pond 70P: Pond

Inflow Area = 13.080 ac, 44.87% Impervious, Inflow Depth > 4.79" for 100-yr event
Inflow = 73.29 cfs @ 12.25 hrs, Volume= 5.226 af
Outflow = 64.20 cfs @ 12.30 hrs, Volume= 4.271 af, Atten= 12%, Lag= 2.6 min
Primary = 64.20 cfs @ 12.30 hrs, Volume= 4.271 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 216.02' @ 12.52 hrs Surf.Area= 0.543 ac Storage= 1.618 af

Plug-Flow detention time= 104.8 min calculated for 4.269 af (82% of inflow)
Center-of-Mass det. time= 48.2 min (835.4 - 787.1)

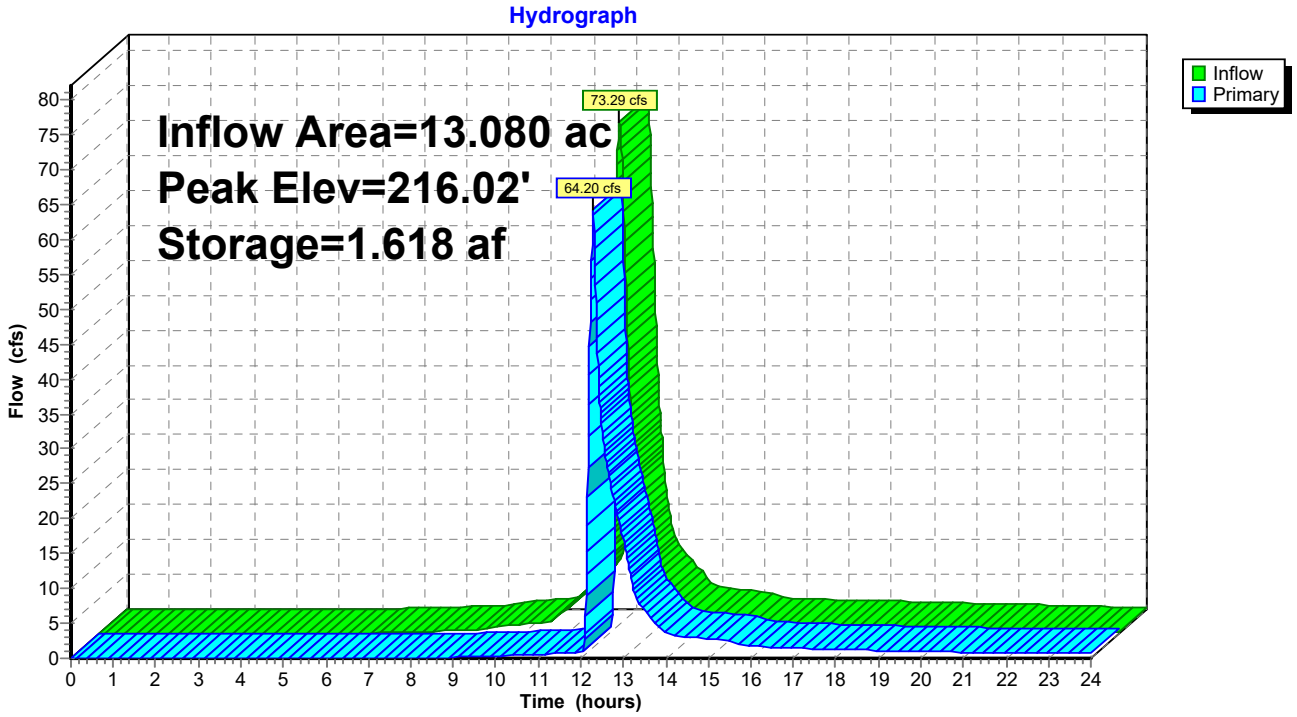
Volume	Invert	Avail.Storage	Storage Description
#1	212.00'	2.250 af	**Pond (Conic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
212.00	0.280	0.000	0.000	0.280
213.00	0.340	0.310	0.310	0.341
214.00	0.400	0.370	0.679	0.402
215.00	0.460	0.430	1.109	0.463
216.00	0.540	0.499	1.608	0.544
217.00	0.750	0.642	2.250	0.754

Device	Routing	Invert	Outlet Devices
#1	Primary	212.00'	**12.0" Round Culvert** L= 55.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 212.00' / 211.50' S= 0.0091 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	212.00'	**5.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	214.75'	**24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Primary	215.00'	**30.0' 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=62.39 cfs @ 12.30 hrs HW=215.83' TW=215.15' (Dynamic Tailwater)
- **1=Culvert** (Outlet Controls 2.90 cfs @ 3.70 fps)
  - **2=Orifice/Grate** (Passes < 0.54 cfs potential flow)
  - **3=Orifice/Grate** (Passes < 12.51 cfs potential flow)
- **4=Broad-Crested Rectangular Weir** (Weir Controls 59.49 cfs @ 2.38 fps)

Pond 70P: Pond



Summary for Pond 75B: Basin

Inflow Area = 14.370 ac, 42.03% Impervious, Inflow Depth > 3.95" for 100-yr event
Inflow = 68.00 cfs @ 12.29 hrs, Volume= 4.728 af
Outflow = 33.02 cfs @ 12.52 hrs, Volume= 4.339 af, Atten= 51%, Lag= 13.8 min
Discarded = 0.24 cfs @ 12.52 hrs, Volume= 0.195 af
Primary = 32.78 cfs @ 12.52 hrs, Volume= 4.144 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 215.97' @ 12.52 hrs Surf.Area= 0.378 ac Storage= 1.160 af

Plug-Flow detention time= 85.7 min calculated for 4.337 af (92% of inflow)
Center-of-Mass det. time= 46.6 min (877.6 - 830.9)

Volume	Invert	Avail.Storage	Storage Description
#1	211.50'	1.583 af	**Infiltration Basin (Conic)** Listed below (Recalc)

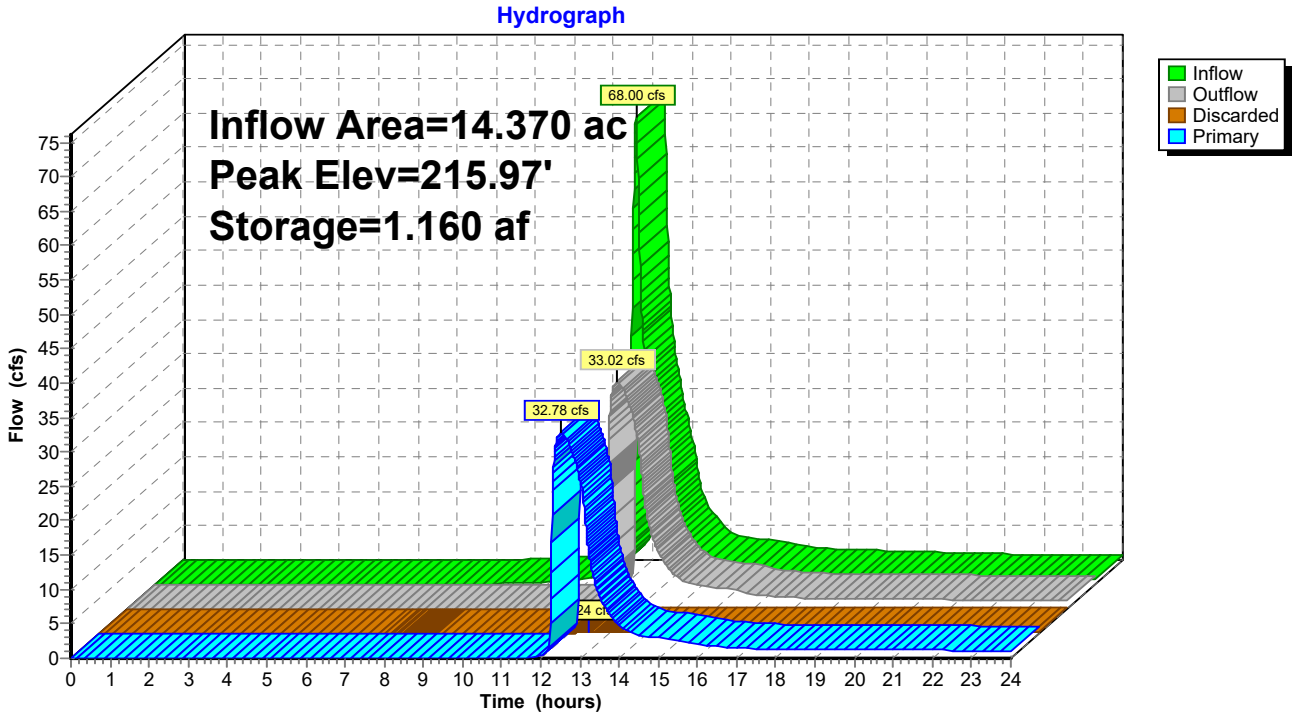
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
211.50	0.160	0.000	0.000	0.160
212.00	0.180	0.085	0.085	0.180
213.00	0.220	0.200	0.285	0.221
214.00	0.270	0.245	0.529	0.272
215.00	0.320	0.295	0.824	0.323
216.00	0.380	0.350	1.173	0.383
217.00	0.440	0.410	1.583	0.444

Device	Routing	Invert	Outlet Devices
#1	Discarded	211.50'	**0.500 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 200.00' Phase-In= 0.01'
#2	Primary	209.50'	**24.0" Round Culvert** L= 50.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 209.50' / 209.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#3	Device 2	212.00'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 2	214.25'	**30.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.24 cfs @ 12.52 hrs HW=215.96' (Free Discharge)
└**1=Exfiltration** (Controls 0.24 cfs)

Primary OutFlow Max=32.77 cfs @ 12.52 hrs HW=215.96' TW=0.00' (Dynamic Tailwater)
└**2=Culvert** (Passes 32.77 cfs of 35.36 cfs potential flow)
  ├**3=Orifice/Grate** (Orifice Controls 1.82 cfs @ 9.28 fps)
  └**4=Orifice/Grate** (Orifice Controls 30.95 cfs @ 6.31 fps)

Pond 75B: Basin



Summary for Pond 80P: Pond South

Inflow Area = 11.020 ac, 45.02% Impervious, Inflow Depth > 4.80" for 100-yr event
Inflow = 71.32 cfs @ 12.20 hrs, Volume= 4.405 af
Outflow = 47.38 cfs @ 12.31 hrs, Volume= 3.122 af, Atten= 34%, Lag= 6.6 min
Primary = 47.38 cfs @ 12.31 hrs, Volume= 3.122 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 215.97' @ 12.31 hrs Surf.Area= 0.617 ac Storage= 1.897 af

Plug-Flow detention time= 142.7 min calculated for 3.122 af (71% of inflow)
Center-of-Mass det. time= 75.3 min (858.3 - 783.0)

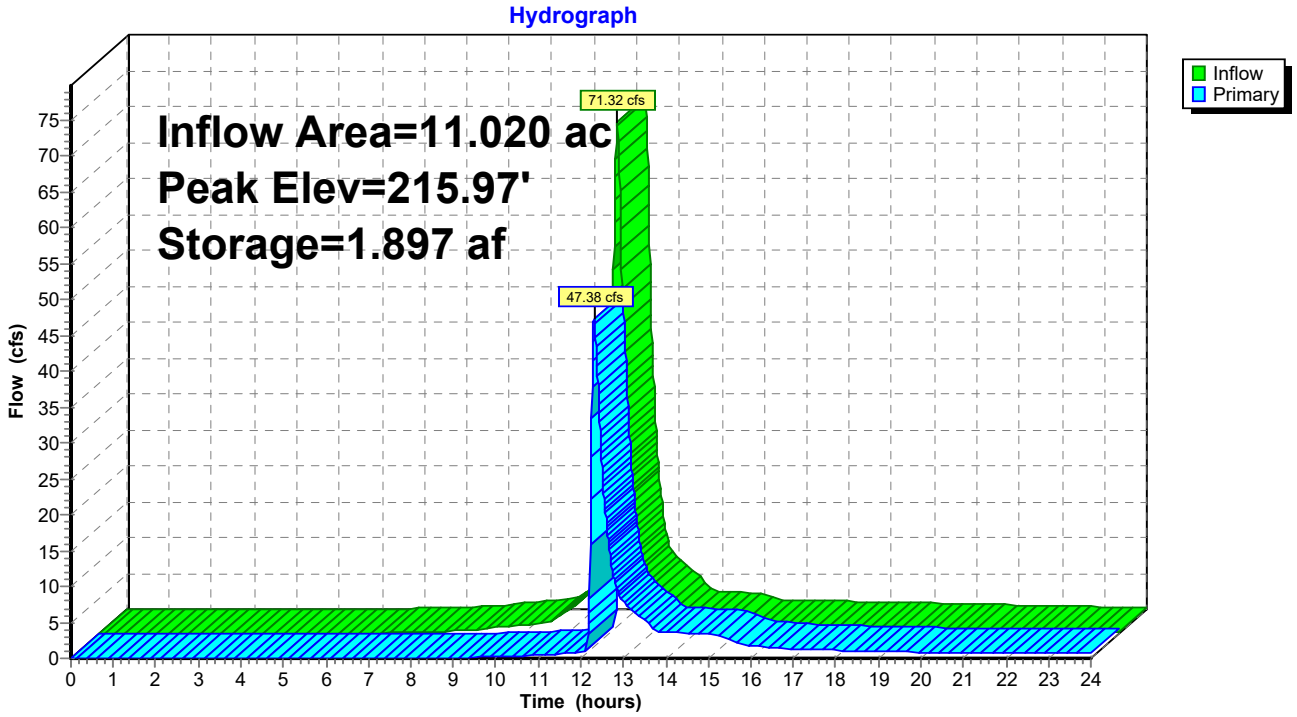
Volume	Invert	Avail.Storage	Storage Description
#1	212.00'	2.593 af	**Larger Pond (Conic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
212.00	0.360	0.000	0.000	0.360
213.00	0.410	0.385	0.385	0.411
214.00	0.480	0.445	0.829	0.482
215.00	0.540	0.510	1.339	0.543
216.00	0.620	0.580	1.919	0.624
217.00	0.730	0.674	2.593	0.735

Device	Routing	Invert	Outlet Devices
#1	Primary	212.00'	**12.0" Round Culvert** L= 40.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 212.00' / 211.50' S= 0.0125 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	212.00'	**5.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	215.00'	**24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Primary	215.50'	**50.0' 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=47.25 cfs @ 12.31 hrs HW=215.96' TW=213.50' (Dynamic Tailwater)
- **1=Culvert** (Inlet Controls 5.94 cfs @ 7.56 fps)
  - **2=Orifice/Grate** (Passes < 1.03 cfs potential flow)
  - **3=Orifice/Grate** (Passes < 14.86 cfs potential flow)
- **4=Broad-Crested Rectangular Weir** (Weir Controls 41.31 cfs @ 1.78 fps)

Pond 80P: Pond South



Summary for Pond 85B: Pond/Basin North

Inflow Area = 14.390 ac, 39.31% Impervious, Inflow Depth > 3.63" for 100-yr event
Inflow = 58.77 cfs @ 12.30 hrs, Volume= 4.347 af
Outflow = 12.06 cfs @ 12.84 hrs, Volume= 3.149 af, Atten= 79%, Lag= 32.4 min
Discarded = 0.36 cfs @ 12.84 hrs, Volume= 0.380 af
Primary = 11.70 cfs @ 12.84 hrs, Volume= 2.768 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 214.88' @ 12.84 hrs Surf.Area= 0.574 ac Storage= 1.936 af

Plug-Flow detention time= 201.2 min calculated for 3.149 af (72% of inflow)
Center-of-Mass det. time= 115.3 min (954.1 - 838.8)

Volume	Invert	Avail.Storage	Storage Description
#1	212.00'	0.702 af	**Smaller Pond (Conic)**Listed below (Recalc) -Impervious
#2	211.50'	2.948 af	**Infiltration Basin (Conic)**Listed below (Recalc)
		3.650 af	Total Available Storage

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
212.00	0.080	0.000	0.000	0.080
213.00	0.110	0.095	0.095	0.110
213.50	0.120	0.057	0.152	0.121
214.00	0.140	0.065	0.217	0.141
215.00	0.150	0.145	0.362	0.153
216.00	0.170	0.160	0.522	0.174
217.00	0.190	0.180	0.702	0.195

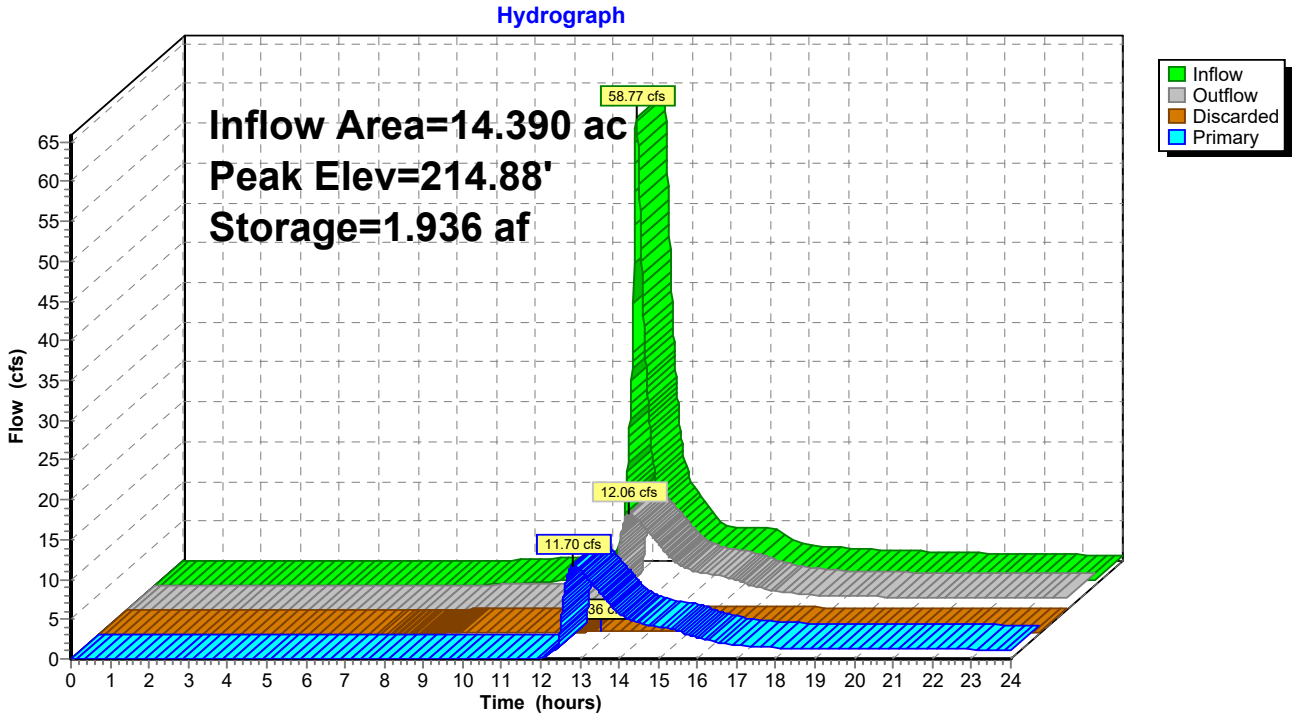
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
211.50	0.370	0.000	0.000	0.370
212.00	0.390	0.190	0.190	0.391
213.00	0.460	0.425	0.614	0.462
214.00	0.530	0.495	1.109	0.533
215.00	0.580	0.555	1.664	0.584
216.00	0.640	0.610	2.274	0.646
217.00	0.710	0.675	2.948	0.717

Device	Routing	Invert	Outlet Devices
#1	Discarded	211.50'	**0.500 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 200.00' Phase-In= 0.01'
#2	Primary	210.00'	**15.0" Round Culvert** L= 45.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 210.00' / 209.70' S= 0.0067 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf
#3	Device 2	212.00'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 2	214.25'	**24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.36 cfs @ 12.84 hrs HW=214.88' (Free Discharge)
└**1=Exfiltration** (Controls 0.36 cfs)

Primary OutFlow Max=11.70 cfs @ 12.84 hrs HW=214.88' TW=0.00' (Dynamic Tailwater)
└**2=Culvert** (Passes 11.70 cfs of 12.18 cfs potential flow)
  └**3=Orifice/Grate** (Orifice Controls 1.53 cfs @ 7.80 fps)
  └**4=Orifice/Grate** (Weir Controls 10.17 cfs @ 2.59 fps)

Pond 85B: Pond/Basin North

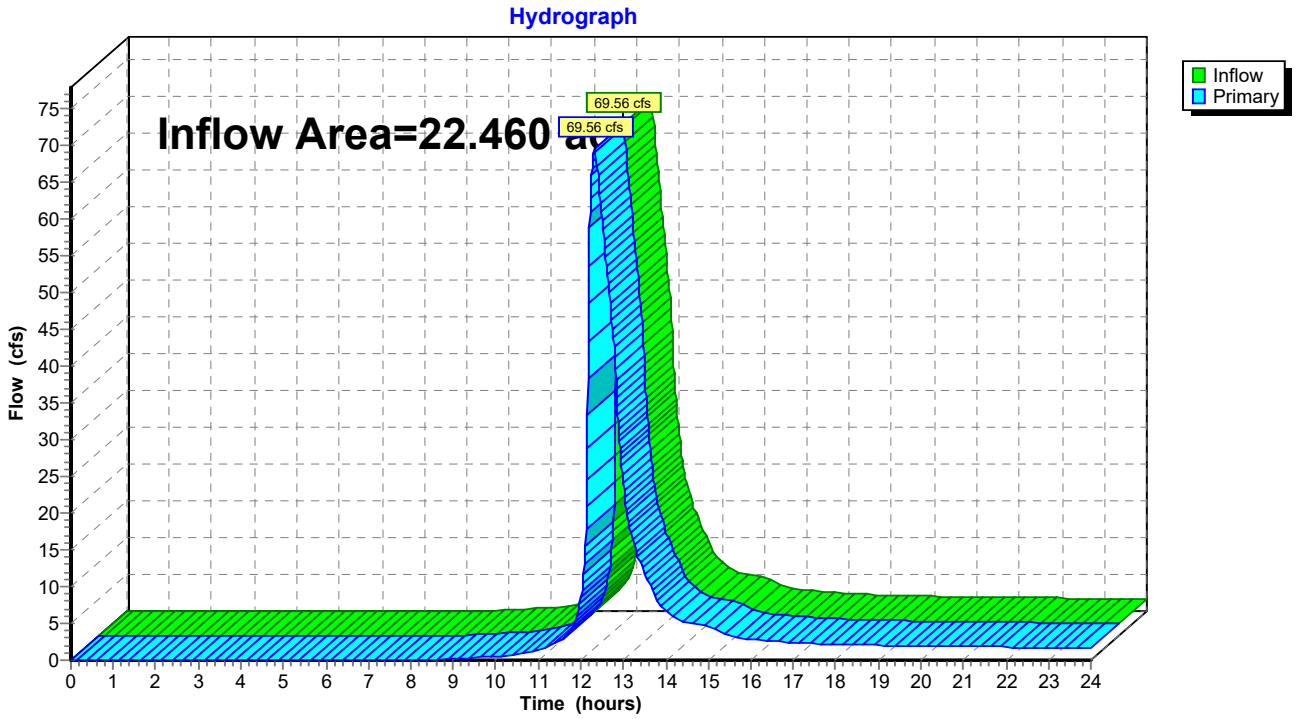


Summary for Link 15: North Drainage

Inflow Area = 22.460 ac, 34.64% Impervious, Inflow Depth > 3.86" for 100-yr event
Inflow = 69.56 cfs @ 12.32 hrs, Volume= 7.216 af
Primary = 69.56 cfs @ 12.32 hrs, Volume= 7.216 af, Atten= 0%, Lag= 0.0 min

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

Link 15: North Drainage

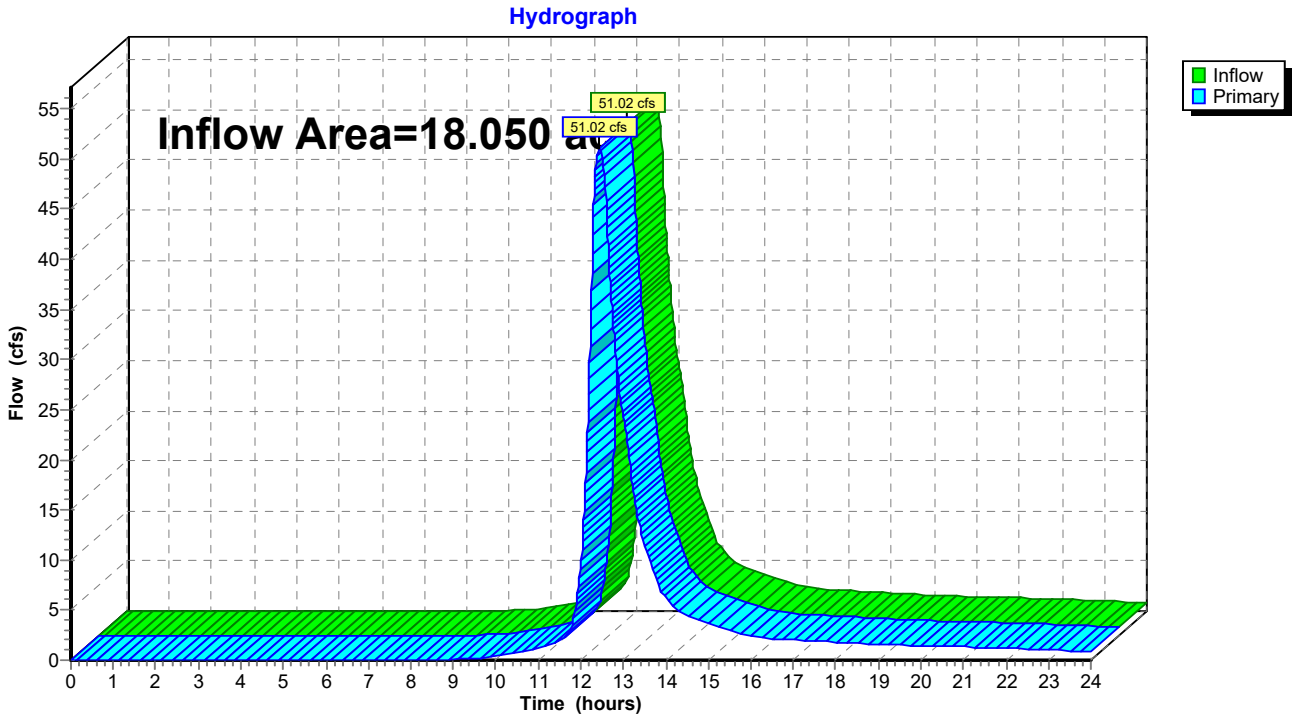


Summary for Link 35: East to White Oak Way

Inflow Area = 18.050 ac, 35.42% Impervious, Inflow Depth > 3.91" for 100-yr event
Inflow = 51.02 cfs @ 12.44 hrs, Volume= 5.884 af
Primary = 51.02 cfs @ 12.44 hrs, Volume= 5.884 af, Atten= 0%, Lag= 0.0 min

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

Link 35: East to White Oak Way

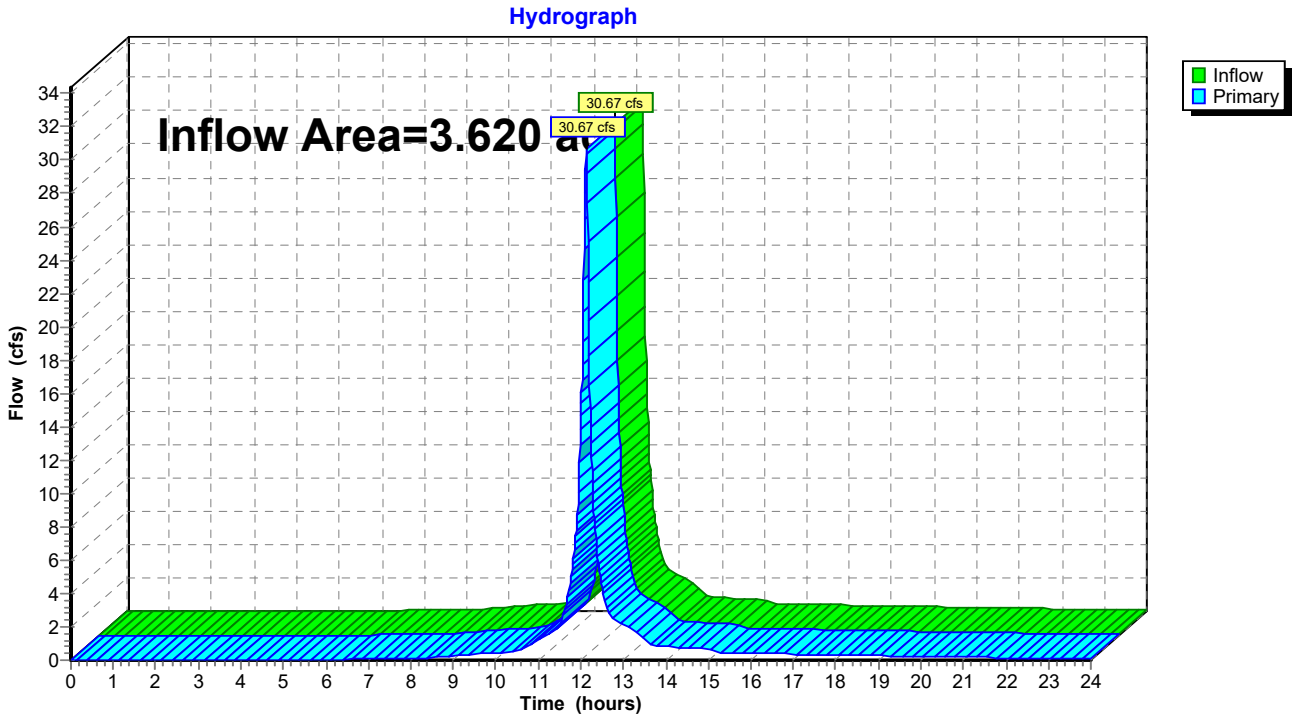


Summary for Link 45: East to Hawthorn Hill Drive

Inflow Area = 3.620 ac, 48.45% Impervious, Inflow Depth > 4.91" for 100-yr event
Inflow = 30.67 cfs @ 12.13 hrs, Volume= 1.481 af
Primary = 30.67 cfs @ 12.13 hrs, Volume= 1.481 af, Atten= 0%, Lag= 0.0 min

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

Link 45: East to Hawthorn Hill Drive

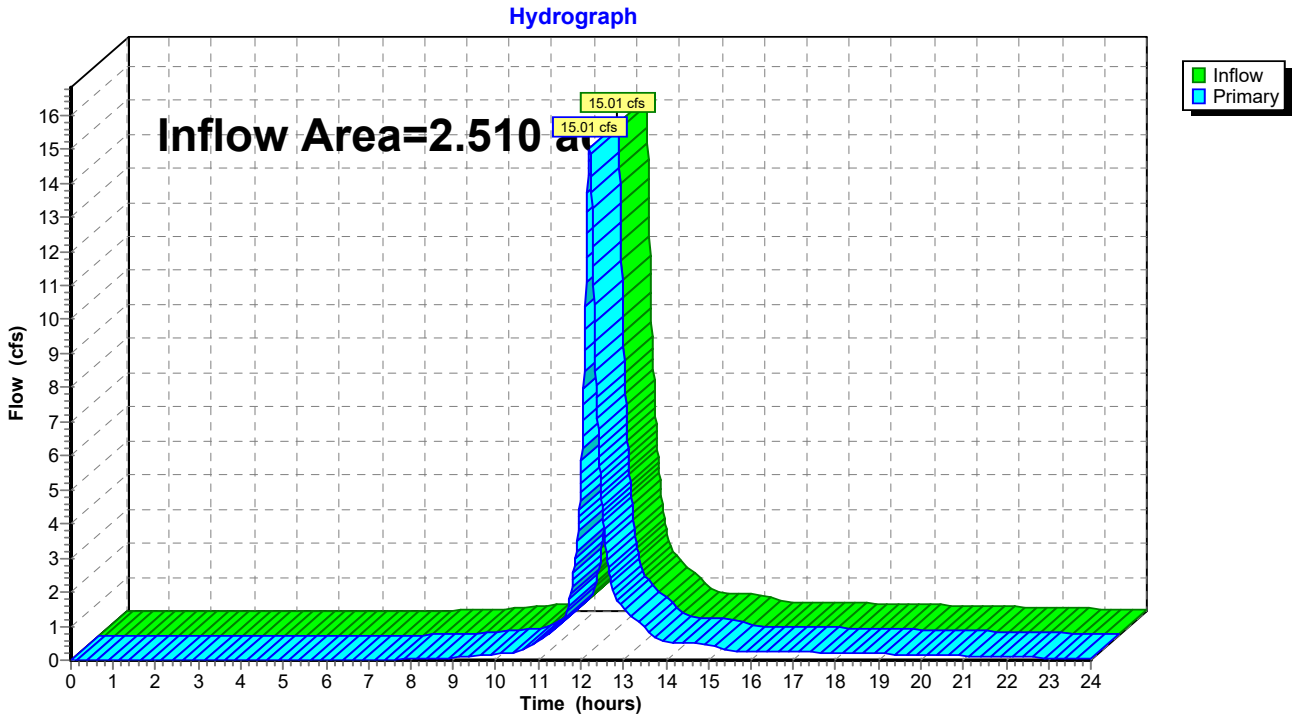


Summary for Link 55: East to Summit Avenue

Inflow Area = 2.510 ac, 20.72% Impervious, Inflow Depth > 4.36" for 100-yr event
Inflow = 15.01 cfs @ 12.20 hrs, Volume= 0.912 af
Primary = 15.01 cfs @ 12.20 hrs, Volume= 0.912 af, Atten= 0%, Lag= 0.0 min

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

Link 55: East to Summit Avenue

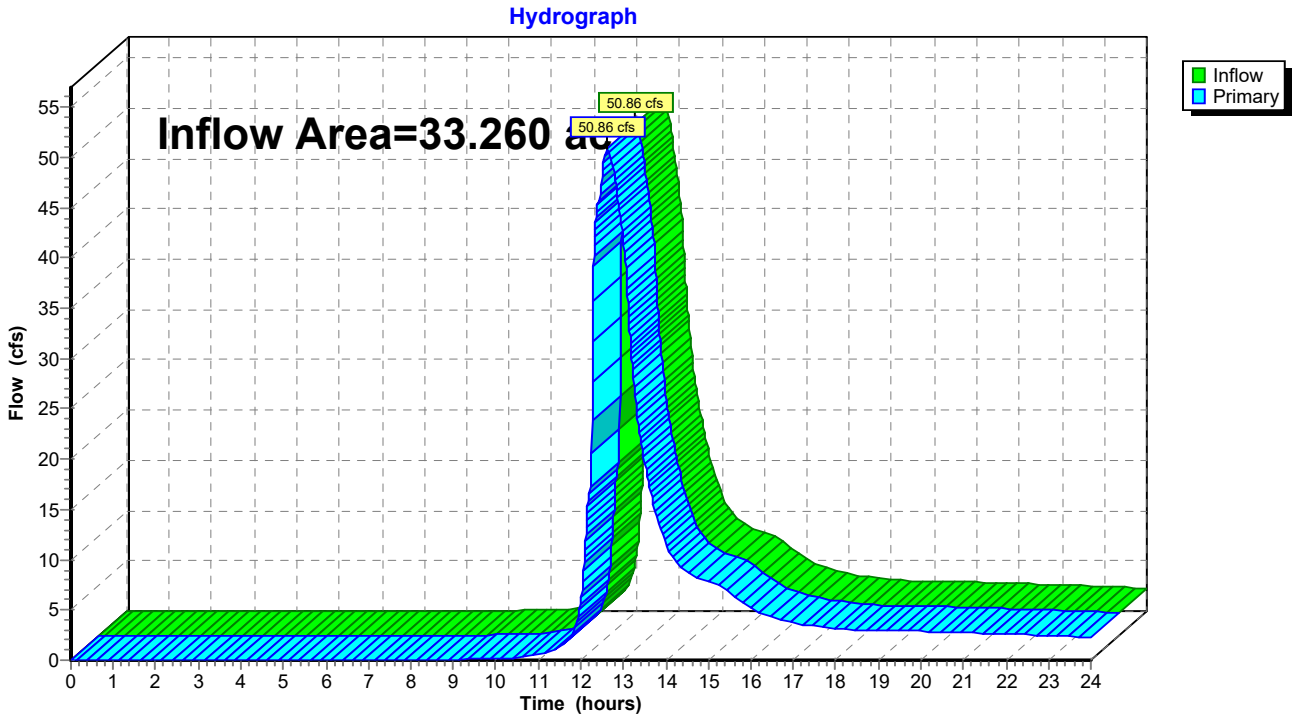


Summary for Link 95: West Drainage

Inflow Area = 33.260 ac, 36.24% Impervious, Inflow Depth > 3.03" for 100-yr event
Inflow = 50.86 cfs @ 12.62 hrs, Volume= 8.405 af
Primary = 50.86 cfs @ 12.62 hrs, Volume= 8.405 af, Atten= 0%, Lag= 0.0 min

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

Link 95: West Drainage

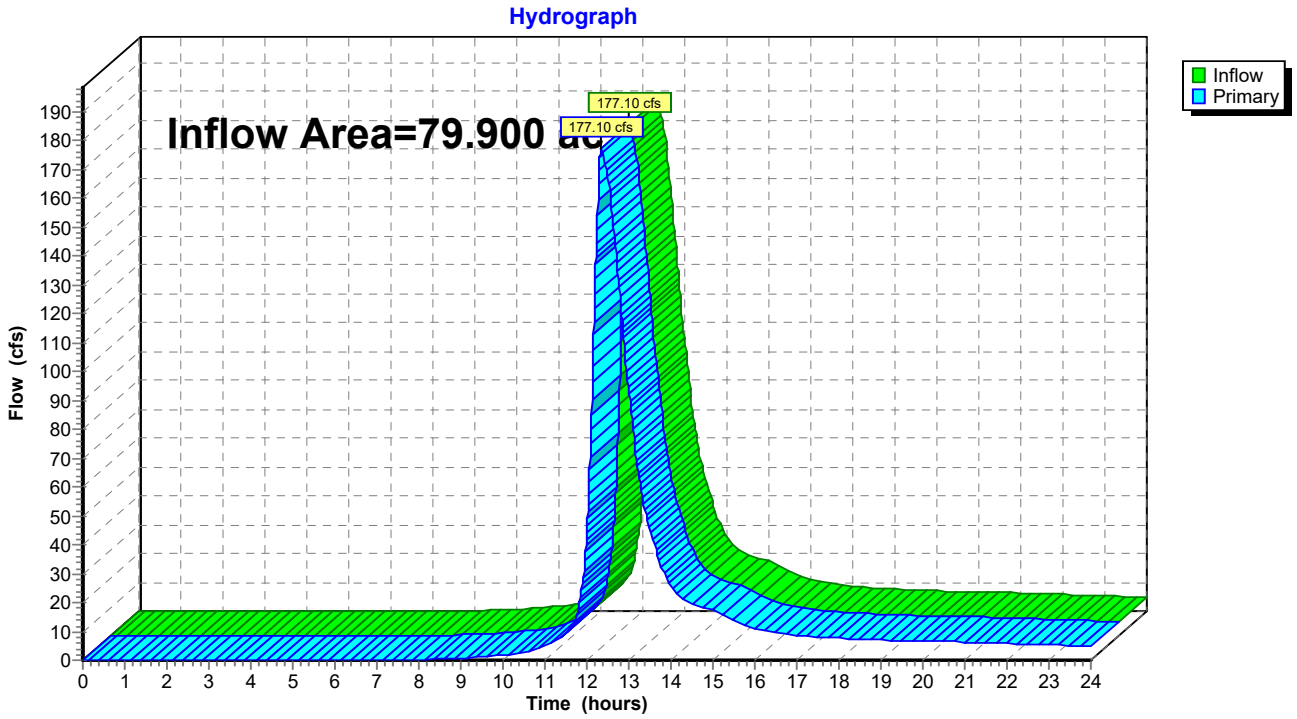


Summary for Link 99: Total Existing Flow

Inflow Area = 79.900 ac, 35.67% Impervious, Inflow Depth > 3.59" for 100-yr event
Inflow = 177.10 cfs @ 12.35 hrs, Volume= 23.898 af
Primary = 177.10 cfs @ 12.35 hrs, Volume= 23.898 af, Atten= 0%, Lag= 0.0 min

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

Link 99: Total Existing Flow



Events for Pond 30B: Pond/Basin

Event	Inflow (cfs)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)	Elevation (feet)	Storage (acre-feet)
1-yr	13.81	0.64	0.11	0.54	214.80	0.633
2-yr	16.55	0.70	0.11	0.59	215.12	0.777
10-yr	26.95	4.25	0.13	4.12	215.80	1.115
100-yr	**49.36**	**18.01**	**0.17**	**17.85**	**216.77**	**1.673**

Events for Pond 70P: Pond

Event	Inflow (cfs)	Primary (cfs)	Elevation (feet)	Storage (acre-feet)
1-yr	20.51	0.98	214.62	0.940
2-yr	24.57	2.39	214.92	1.071
10-yr	40.01	20.02	215.34	1.269
100-yr	**73.29**	**64.20**	**216.02**	**1.618**

Events for Pond 75B: Basin

Event	Inflow (cfs)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)	Elevation (feet)	Storage (acre-feet)
1-yr	2.65	0.83	0.12	0.71	212.81	0.245
2-yr	3.23	1.05	0.13	0.92	213.20	0.330
10-yr	21.01	7.79	0.18	7.61	214.64	0.711
100-yr	**68.00**	**33.02**	**0.24**	**32.78**	**215.97**	**1.160**

Events for Pond 80P: Pond South

Event	Inflow (cfs)	Primary (cfs)	Elevation (feet)	Storage (acre-feet)
1-yr	20.19	0.86	213.93	0.794
2-yr	24.14	0.93	214.29	0.972
10-yr	39.10	3.79	215.26	1.483
100-yr	**71.32**	**47.38**	**215.97**	**1.897**

Events for Pond 85B: Pond/Basin North

Event	Inflow (cfs)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)	Elevation (feet)	Storage (acre-feet)
1-yr	6.00	0.71	0.23	0.47	212.50	0.438
2-yr	7.33	0.80	0.24	0.56	212.60	0.489
10-yr	12.44	1.25	0.28	0.97	213.30	0.884
100-yr	**58.77**	**12.06**	**0.36**	**11.70**	**214.88**	**1.936**

APPENDIX C

WinSLAMM Treatment Analysis

WinSLAMM Treatment Analysis

WinSLAMM v 10 Data File: [D:\Jobs\2019\2019-006_Skyline Subdivision\Project_Information\Calcs\SLAMM\Proposed_006.mdb] - [Land Use Model]

File Current File Data Pollutants Tools Run Utilities Help

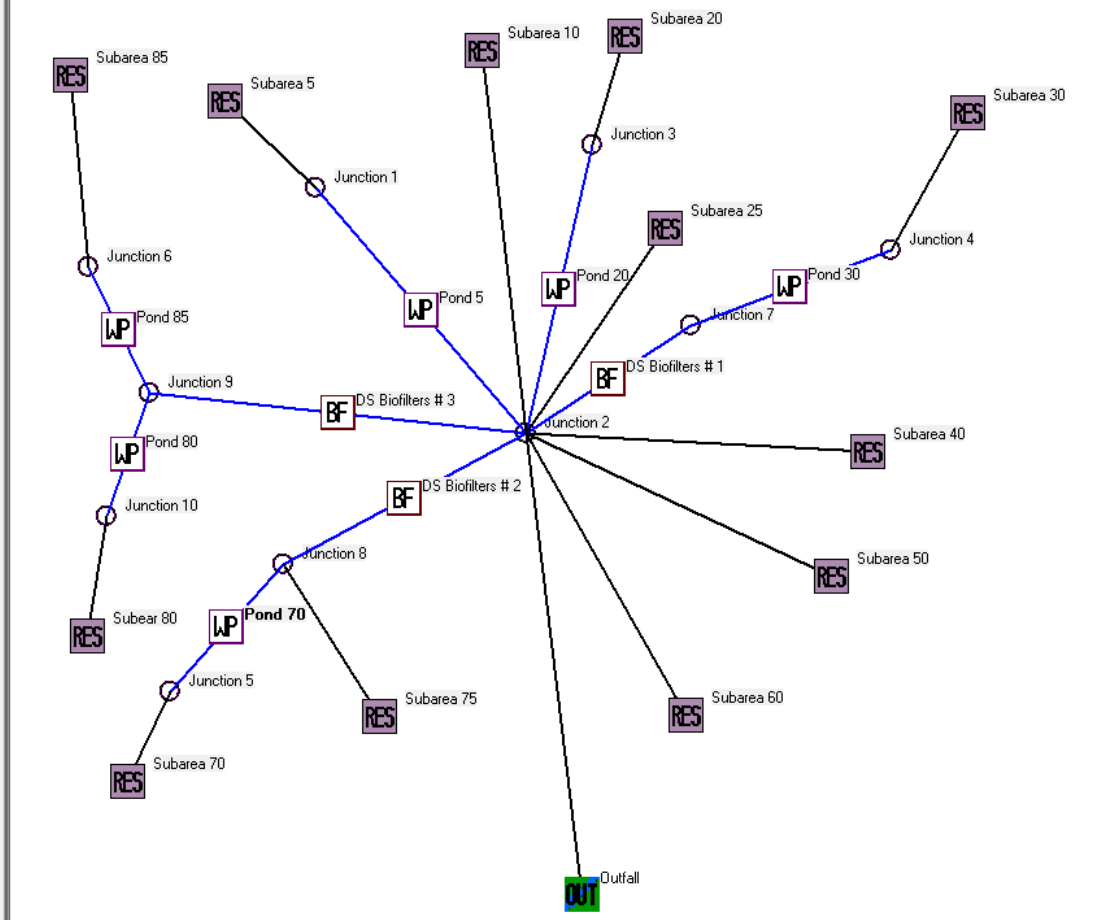
RES INS COM IND OU FRE GS CB WP BF PP HD OD FS SF UF IR

Control Practice:

Pond 70

Land Use #	Land Use Type	Land Use Label	Land Use Area (acres)
1	Residential	Subarea 5	17.500
2	Residential	Subarea 20	5.400
3	Residential	Subarea 25	0.390
4	Residential	Subarea 30	8.810
5	Residential	Subarea 40	3.620
6	Residential	Subarea 50	0.520
7	Residential	Subarea 60	0.360
8	Residential	Subarea 70	13.080
9	Residential	Subarea 85	3.370
10	Residential	Subarea 10	0.640
11	Residential	Subear 80	11.020
12	Residential	Subarea 75	1.290

CP #	Control Practice Type	Control Practice Name or Location
1	Wet Detention Pond	Pond 5
2	Wet Detention Pond	Pond 20
3	Wet Detention Pond	Pond 30
4	**Wet Detention Pond**	**Pond 70**
5	Wet Detention Pond	Pond 85
6	Biofilter	DS Biofilters # 1
7	Biofilter	DS Biofilters # 2
8	Biofilter	DS Biofilters # 3
9	Wet Detention Pond	Pond 80



SLAMM for Windows Version 10.4.1

Data file name: D:\Jobs\2019\2019-006_Skyline Subdivision\Project_Information\Calcs\SLAMM\Proposed_006.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: 03-16-2021 Time of run: 14:58:58
Total Area Modeled (acres): 66.000
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:	2.678E+06	-	101.7	17010	-
Outfall Total with Controls:	1.690E+06	36.89%	31.97	3372	80.18%
Annualized Total After Outfall Controls:	1.713E+06			3419	

Data file name: D:\Jobs\2019\2019-006_Skyline Subdivision\Project_Information\Calcs\SLAMM\Proposed_006.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: 03-16-2021 Time: 14:59:07
Site information:

LU# 1 - Residential: Subarea 5 Total area (ac): 17.500
  1 - Roofs 1: 2.800 ac. Pitched Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
  25 - Driveways 1: 1.500 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
  31 - Sidewalks 1: 0.470 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
  37 - Streets 1: 1.800 ac. Smooth Street Length = 0.803 curb-mi Street Width (assuming two curb-mi per street mile) = 36.9863 ft
    Default St. Dirt Accum. Annual Winter Load = 2500 lbs Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
  45 - Large Landscaped Areas 1: 7.780 ac. Normal Clayey Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
  46 - Large Landscaped Areas 2: 2.380 ac. Normal Clayey Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
  57 - Undeveloped Areas 1: 0.200 ac. Normal Clayey Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
  70 - Water Body Areas: 0.570 ac. Source Area PSD File:
LU# 2 - Residential: Subarea 20 Total area (ac): 5.400

```
     1 - Roofs 1:  0.990 ac.    Pitched    Connected    Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     25 - Driveways 1:  0.360 ac.    Connected    Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     31 - Sidewalks 1:  0.150 ac.    Connected    Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     37 - Streets 1:  0.570 ac.    Smooth    Street Length = 0.254 curb-mi    Street Width (assuming two curb-
mi per street mile) = 37.02756 ft
           Default St. Dirt Accum.    Annual Winter Load = 2500 lbs    Source Area PSD File: C:\WinSLAMM
Files\NURP.cpz
     45 - Large Landscaped Areas 1:  2.460 ac.    Normal Clayey    Source Area PSD File: C:\WinSLAMM
Files\NURP.cpz
     46 - Large Landscaped Areas 2:  0.690 ac.    Normal Clayey    Source Area PSD File: C:\WinSLAMM
Files\NURP.cpz
     57 - Undeveloped Areas 1:  0.040 ac.    Normal Clayey    Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     70 - Water Body Areas:  0.140 ac.    Source Area PSD File:
LU# 3 - Residential:  Subarea 25     Total area (ac):  0.390
     1 - Roofs 1:  0.230 ac.    Pitched    Disconnected    Normal Clayey    Low Density    Source Area PSD
File: C:\WinSLAMM Files\NURP.cpz
     31 - Sidewalks 1:  0.160 ac.    Disconnected    Normal Clayey    Low Density    Source Area PSD File:
C:\WinSLAMM Files\NURP.cpz
LU# 4 - Residential:  Subarea 30     Total area (ac):  8.810
     1 - Roofs 1:  1.400 ac.    Pitched    Connected    Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     25 - Driveways 1:  0.360 ac.    Connected    Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     31 - Sidewalks 1:  0.320 ac.    Connected    Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     32 - Sidewalks 2:  0.070 ac.    Connected    Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     37 - Streets 1:  1.450 ac.    Smooth    Street Length = 0.647 curb-mi    Street Width (assuming two curb-
mi per street mile) = 36.97836 ft
           Default St. Dirt Accum.    Annual Winter Load = 2500 lbs    Source Area PSD File: C:\WinSLAMM
Files\NURP.cpz
     45 - Large Landscaped Areas 1:  3.400 ac.    Normal Clayey    Source Area PSD File: C:\WinSLAMM
Files\NURP.cpz
     46 - Large Landscaped Areas 2:  1.460 ac.    Normal Clayey    Source Area PSD File: C:\WinSLAMM
Files\NURP.cpz
     57 - Undeveloped Areas 1:  0.160 ac.    Normal Clayey    Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     70 - Water Body Areas:  0.190 ac.    Source Area PSD File:
LU# 5 - Residential:  Subarea 40     Total area (ac):  3.620
     1 - Roofs 1:  0.740 ac.    Pitched    Connected    Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     25 - Driveways 1:  0.240 ac.    Connected    Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     31 - Sidewalks 1:  0.160 ac.    Connected    Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
```

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     37 - Streets 1:  0.610 ac.    Smooth    Street Length = 0.272 curb-mi    Street Width (assuming two curb-
mi per street mile) = 37.00367 ft
           Default St. Dirt Accum.    Annual Winter Load = 2500 lbs    Source Area PSD File: C:\WinSLAMM
Files\NURP.cpz
     45 - Large Landscaped Areas 1:  1.870 ac.    Normal Clayey    Source Area PSD File: C:\WinSLAMM
Files\NURP.cpz
LU# 6 - Residential:  Subarea 50     Total area (ac):  0.520
     1 - Roofs 1:  0.250 ac.    Pitched    Disconnected    Normal Clayey    Low Density    Source Area PSD
File: C:\WinSLAMM Files\NURP.cpz
     31 - Sidewalks 1:  0.200 ac.    Disconnected    Normal Clayey    Low Density    Source Area PSD File:
C:\WinSLAMM Files\NURP.cpz
     32 - Sidewalks 2:  0.070 ac.    Disconnected    Normal Clayey    Low Density    Source Area PSD File:
C:\WinSLAMM Files\NURP.cpz
LU# 7 - Residential:  Subarea 60     Total area (ac):  0.360
     1 - Roofs 1:  0.190 ac.    Pitched    Disconnected    Normal Clayey    Low Density    Source Area PSD
File: C:\WinSLAMM Files\NURP.cpz
     31 - Sidewalks 1:  0.100 ac.    Disconnected    Normal Clayey    Low Density    Source Area PSD File:
C:\WinSLAMM Files\NURP.cpz
     32 - Sidewalks 2:  0.070 ac.    Disconnected    Normal Clayey    Low Density    Source Area PSD File:
C:\WinSLAMM Files\NURP.cpz
LU# 8 - Residential:  Subarea 70     Total area (ac):  13.080
     1 - Roofs 1:  2.420 ac.    Pitched    Connected    Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     25 - Driveways 1:  0.810 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:  0.040 ac.    Connected    Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     37 - Streets 1:  1.890 ac.    Smooth    Street Length = 0.843 curb-mi    Street Width (assuming two curb-
mi per street mile) = 36.99288 ft
           Default St. Dirt Accum.    Annual Winter Load = 2500 lbs    Source Area PSD File: C:\WinSLAMM
Files\NURP.cpz
     45 - Large Landscaped Areas 1:  1.240 ac.    Normal Clayey    Source Area PSD File: C:\WinSLAMM
Files\NURP.cpz
     46 - Large Landscaped Areas 2:  5.970 ac.    Normal Clayey    Source Area PSD File: C:\WinSLAMM
Files\NURP.cpz
     70 - Water Body Areas:  0.280 ac.    Source Area PSD File:
LU# 9 - Residential:  Subarea 85     Total area (ac):  3.370
     1 - Roofs 1:  0.250 ac.    Pitched    Connected    Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     25 - Driveways 1:  0.180 ac.    Connected    Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     31 - Sidewalks 1:  0.040 ac.    Connected    Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
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     37 - Streets 1:  0.150 ac.    Smooth    Street Length = 0.067 curb-mi    Street Width (assuming two curb-
mi per street mile) = 36.9403 ft
           Default St. Dirt Accum.    Annual Winter Load = 2500 lbs    Source Area PSD File: C:\WinSLAMM
Files\NURP.cpz
     45 - Large Landscaped Areas 1:  1.550 ac.    Normal Clayey    Source Area PSD File: C:\WinSLAMM
Files\NURP.cpz
     46 - Large Landscaped Areas 2:  1.080 ac.    Normal Clayey    Source Area PSD File: C:\WinSLAMM
Files\NURP.cpz
     57 - Undeveloped Areas 1:  0.040 ac.    Normal Clayey    Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     70 - Water Body Areas:  0.080 ac.    Source Area PSD File:
LU# 10 - Residential:  Subarea 10     Total area (ac):  0.640
     1 - Roofs 1:  0.310 ac.    Pitched    Disconnected    Normal Clayey    Low Density    Source Area PSD
File: C:\WinSLAMM Files\NURP.cpz
     31 - Sidewalks 1:  0.310 ac.    Disconnected    Normal Clayey    Low Density    Source Area PSD File:
C:\WinSLAMM Files\NURP.cpz
     37 - Streets 1:  0.020 ac.    Smooth    Street Length = 0.009 curb-mi    Street Width (assuming two curb-
mi per street mile) = 36.66667 ft
           Default St. Dirt Accum.    Annual Winter Load = 2500 lbs    Source Area PSD File: C:\WinSLAMM
Files\NURP.cpz
LU# 11 - Residential:  Subear 80     Total area (ac):  11.020
     1 - Roofs 1:  2.090 ac.    Pitched    Connected    Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     25 - Driveways 1:  0.520 ac.    Connected    Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     31 - Sidewalks 1:  0.410 ac.    Connected    Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     37 - Streets 1:  1.580 ac.    Smooth    Street Length = 0.705 curb-mi    Street Width (assuming two curb-
mi per street mile) = 36.97873 ft
           Default St. Dirt Accum.    Annual Winter Load = 2500 lbs    Source Area PSD File: C:\WinSLAMM
Files\NURP.cpz
     51 - Small Landscaped Areas 1:  1.130 ac.    Normal Clayey    Source Area PSD File: C:\WinSLAMM
Files\NURP.cpz
     52 - Small Landscaped Areas 2:  4.930 ac.    Normal Clayey    Source Area PSD File: C:\WinSLAMM
Files\NURP.cpz
     70 - Water Body Areas:  0.360 ac.    Source Area PSD File:
LU# 12 - Residential:  Subarea 75     Total area (ac):  1.290
     1 - Roofs 1:  0.120 ac.    Pitched    Disconnected    Normal Clayey    Low Density    Source Area PSD
File: C:\WinSLAMM Files\NURP.cpz
     31 - Sidewalks 1:  0.050 ac.    Disconnected    Normal Clayey    Low Density    Source Area PSD File:
C:\WinSLAMM Files\NURP.cpz
```

51 - Small Landscaped Areas 1: 0.720 ac. Normal Clayey Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
52 - Small Landscaped Areas 2: 0.400 ac. Normal Clayey Source Area PSD File: C:\WinSLAMM Files\NURP.cpz

Control Practice 1: Wet Detention Pond CP# 1 (DS) - Pond 5
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): 0.54
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: 9
Outlet type: Vertical Stand Pipe
1. Stand pipe diameter (ft): 2.25
2. Stand pipe height above datum (ft): 7.5
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	0.3000	0.00	0.00
2	1.00	0.3500	0.00	0.00
3	2.00	0.4000	0.00	0.00
4	3.00	0.4500	0.00	0.00
5	4.00	0.5000	0.00	0.00
6	5.00	0.5700	0.00	0.00
7	6.00	0.6400	0.00	0.00
8	7.00	0.7200	0.00	0.00
9	8.00	0.8200	0.00	0.00
10	9.00	0.9300	0.00	0.00
11	10.00	1.0400	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):   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):   0.5
              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: 7.3
        Outlet type: Vertical Stand Pipe
              1. Stand pipe diameter (ft):   2.25
              2. Stand pipe height above datum (ft):   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	0.0300	0.00	0.00
4	3.00	0.0400	0.00	0.00
5	4.00	0.0500	0.00	0.00
6	5.00	0.1400	0.00	0.00
7	6.00	0.2100	0.00	0.00
8	7.00	0.2800	0.00	0.00
9	8.00	0.3700	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):   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: 2
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: 6.5

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	0.0050	0.00	0.00
2	1.00	0.0100	0.00	0.00
3	2.00	0.0500	0.00	0.00
4	3.00	0.1000	0.00	0.00
5	4.00	0.1500	0.00	0.00
6	5.00	0.1900	0.00	0.00
7	5.50	0.2200	0.00	0.00
8	6.50	0.2600	0.00	0.00
9	7.50	0.3200	0.00	0.00
10	8.50	0.3700	0.00	0.00
11	9.50	0.4200	0.00	0.00

Control Practice 4: Wet Detention Pond CP# 4 (DS) - Pond 70

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): 0.42
2. Number of orifices: 1
3. Invert elevation above datum (ft): 5

Outlet type: Broad Crested Weir

1. Weir crest length (ft): 30
2. Weir crest width (ft): 10
3. Height from datum to bottom of weir opening: 8

Outlet type: Vertical Stand Pipe

1. Stand pipe diameter (ft): 2
2. Stand pipe height above datum (ft): 7.75

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	0.0500	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	0.1500	0.00	0.00
5	4.00	0.2000	0.00	0.00
6	5.00	0.2800	0.00	0.00
7	6.00	0.3400	0.00	0.00
8	7.00	0.4000	0.00	0.00
9	8.00	0.4600	0.00	0.00
10	9.00	0.5400	0.00	0.00
11	10.00	0.7500	0.00	0.00

Control Practice 5: Wet Detention Pond CP# 5 (DS) - Pond 85

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): 40
2. Weir crest width (ft): 5
3. Height from datum to bottom of weir opening: 6.5

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	0.0300	0.00	0.00
4	3.00	0.0400	0.00	0.00
5	4.00	0.0500	0.00	0.00
6	5.00	0.0800	0.00	0.00
7	6.00	0.1100	0.00	0.00
8	7.00	0.1400	0.00	0.00
9	8.00	0.1500	0.00	0.00
10	9.00	0.1700	0.00	0.00
11	10.00	0.1900	0.00	0.00

Control Practice 6: Biofilter CP# 1 (DS) - DS Biofilters # 1

1. Top area (square feet) = 13540
2. Bottom aea (square feet) = 4923
3. Depth (ft): 5.5
4. Biofilter width (ft) - for Cost Purposes Only: 10
5. Infiltration rate (in/hr) = 0.5
6. Random infiltration rate generation? No
7. Infiltration rate fraction (side): 0.01
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: 0.5
12. Engineered soil depth (ft) = 0.01
13. Engineered soil porosity = 0.35
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: 4.5

Outlet type: Vertical Stand Pipe

1. Stand pipe diameter (ft): 2
2. Stand pipe height above datum (ft): 3

```
        Outlet type:  Surface Discharge Pipe
                1.  Surface discharge pipe outlet diameter (ft):   0.33
                2.  Pipe invert elevation above datum (ft):   0.5
                3.  Number of surface pipe outlets:   1

Control Practice 7:  Biofilter CP# 2 (DS) - DS Biofilters # 2
   1.  Top area (square feet) =  19095
   2.  Bottom aea (square feet) =  6924
   3.  Depth (ft):   5.5
   4.  Biofilter width (ft) - for Cost Purposes Only:   10
   5.  Infiltration rate (in/hr) =  0.5
   6.  Random infiltration rate generation?  No
   7.  Infiltration rate fraction (side):   0.01
   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:   0.5
   12.  Engineered soil depth (ft) =  0.01
   13.  Engineered soil porosity =  0.35
   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:   4.5
       Outlet type:  Vertical Stand Pipe
               1.  Stand pipe diameter (ft):   2.5
               2.  Stand pipe height above datum (ft):   2.75
       Outlet type:  Surface Discharge Pipe
               1.  Surface discharge pipe outlet diameter (ft):   0.5
               2.  Pipe invert elevation above datum (ft):   0.5
               3.  Number of surface pipe outlets:   1
```

```
Control Practice 8:  Biofilter CP# 3 (DS) - DS Biofilters # 3
   1.  Top area (square feet) =  30993
   2.  Bottom aea (square feet) =  16143
   3.  Depth (ft):   5.5
   4.  Biofilter width (ft) - for Cost Purposes Only:   10
   5.  Infiltration rate (in/hr) =  0.5
   6.  Random infiltration rate generation?  No
   7.  Infiltration rate fraction (side):   0.01
   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:   0.5
   12.  Engineered soil depth (ft) =  0.01
   13.  Engineered soil porosity =  0.35
   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:   4.5
       Outlet type:  Vertical Stand Pipe
               1.  Stand pipe diameter (ft):   2
               2.  Stand pipe height above datum (ft):   3
       Outlet type:  Surface Discharge Pipe
               1.  Surface discharge pipe outlet diameter (ft):   0.5
               2.  Pipe invert elevation above datum (ft):   0.5
               3.  Number of surface pipe outlets:   1

Control Practice 9:  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): 0.42
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: 8.5

Outlet type: Vertical Stand Pipe

1. Stand pipe diameter (ft): 2
2. Stand pipe height above datum (ft): 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	0.1000	0.00	0.00
2	1.00	0.1500	0.00	0.00
3	2.00	0.2000	0.00	0.00
4	3.00	0.2500	0.00	0.00
5	4.00	0.3000	0.00	0.00
6	5.00	0.3600	0.00	0.00
7	6.00	0.4100	0.00	0.00
8	7.00	0.4800	0.00	0.00
9	8.00	0.5400	0.00	0.00
10	9.00	0.6200	0.00	0.00
11	10.00	0.7300	0.00	0.00

APPENDIX D

WinSLAMM Infiltration Analysis

INFILTRATION

INFILTRATION SUMMARY

PRE-DEVELOPMENT

Area = 79.90 acres (3,480,444 sf)
Average Annual Rainfall (Milwaukee) = 29.02 inches (2.42 ft)
Total Rainfall Volume = 3,480,444 x 2.42 = 8,422,674 cu-ft

Total Runoff = 655,724 cu-ft (from SLAMM Output)
Total Pre-Development Infiltrated Volume = 8,422,674 – 655,724 = 7,766,950 cu-ft

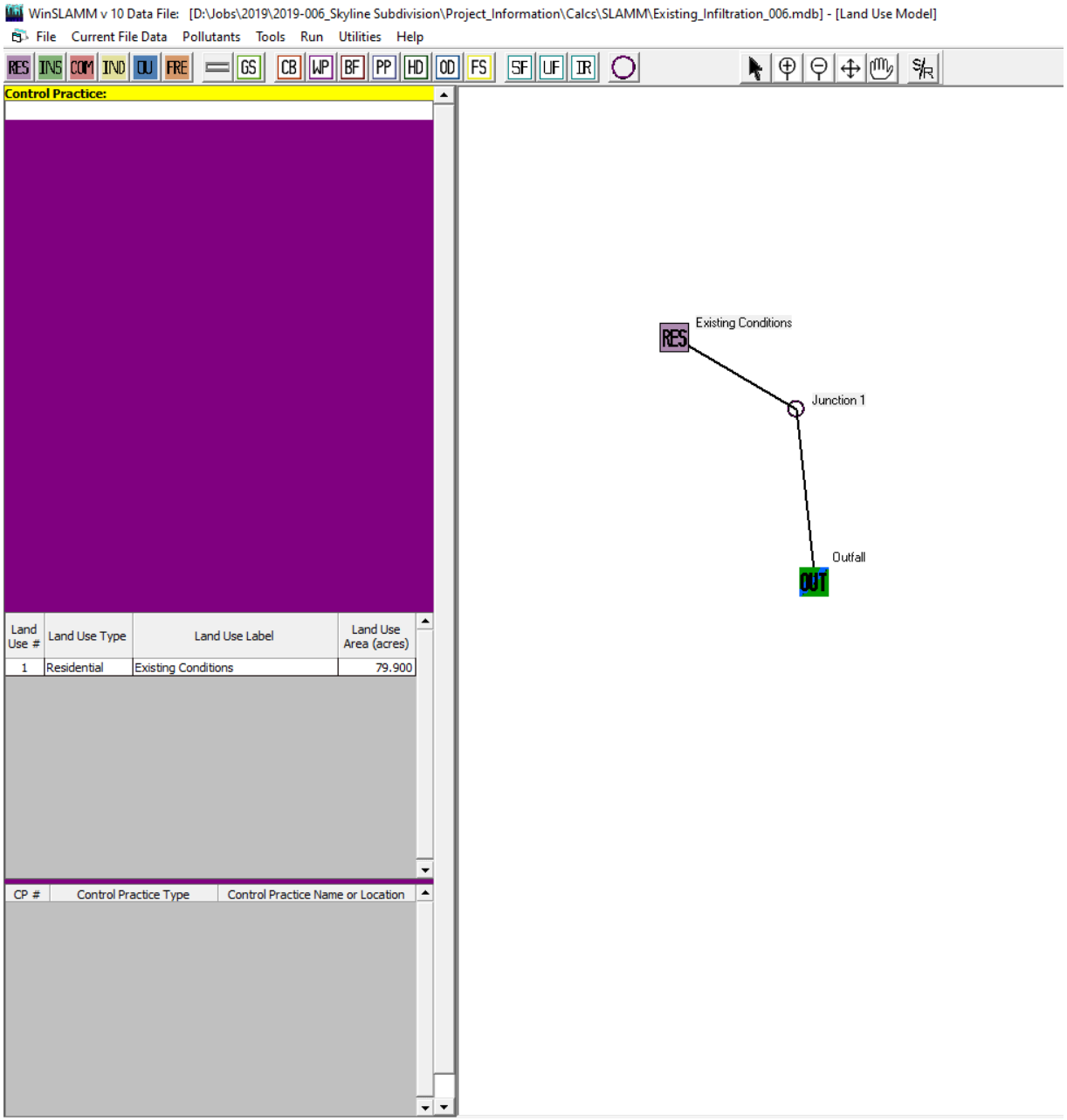
POST-DEVELOPMENT

Total Runoff = 1,794,000 cu-ft (from SLAMM Output)
Total Post-Development Infiltration Volume = 8,422,674 – 1,794,000 = 6,628,674 cu-ft

PERCENT INFILTRATED

Post Infiltration Vol / Pre Infiltration Vol = (6,628,674 / 7,766,950) x 100 = 85%

WinSLAMM Infiltration Analysis - Pre-Development



SLAMM for Windows Version 10.4.1

Data file name: D:\Jobs\2019\2019-006_Skyline Subdivision\Project_Information\Calcs\SLAMM\Existing_Infiltration_006.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: 03-16-2021 Time of run: 14:49:01
Total Area Modeled (acres): 79.900
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:	655725	-	31.30	1281	-
Outfall Total with Controls:	655724	0.00%	31.30	1281	0.00%
Annualized Total After Outfall Controls:	664831			1299	

Data file name: D:\Jobs\2019\2019-006_Skyline Subdivision\Project_Information\Calcs\SLAMM\Existing_Infiltration_006.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: 03-16-2021 Time: 14:49:16
Site information:

LU# 1 - Residential: Existing Conditions Total area (ac): 79.900
     1 - Roofs 1: 0.360 ac. Pitched Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     19 - Unpaved Parking 1: 0.250 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     25 - Driveways 1: 0.110 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     51 - Small Landscaped Areas 1: 3.690 ac. Normal Clayey Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     57 - Undeveloped Areas 1: 54.390 ac. Normal Clayey Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     58 - Undeveloped Areas 2: 6.600 ac. Normal Clayey Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     59 - Undeveloped Areas 3: 2.080 ac. Normal Clayey Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     60 - Undeveloped Areas 4: 12.420 ac. Normal Clayey Source Area PSD File: C:\WinSLAMM Files\NURP.cpz

WinSLAMM Infiltration Analysis - Post-Development

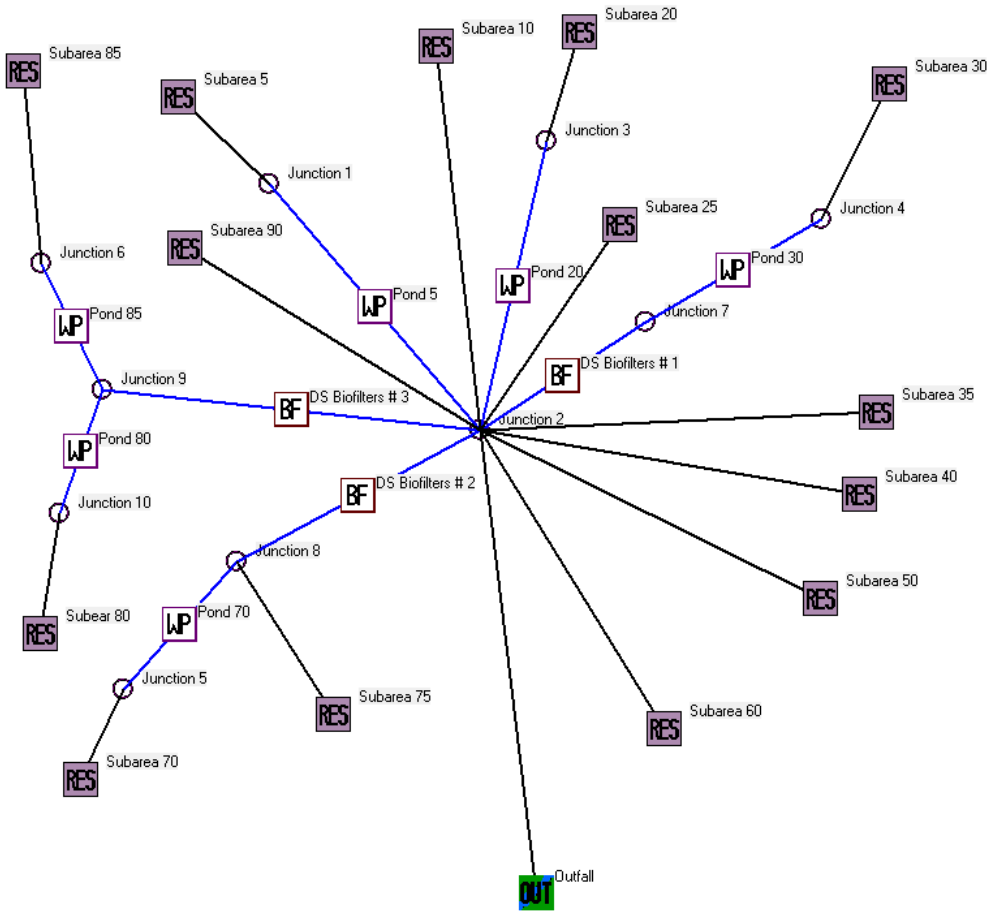
WinSLAMM v 10 Data File: [D:\Jobs\2019\2019-006_Skyline Subdivision\Project_Information\Calcs\SLAMM\Proposed_Infiltration_006.mdb] - [Land Use Model]

File Current File Data Pollutants Tools Run Utilities Help

Control Practice:

Land Use #	Land Use Type	Land Use Label	Land Use Area (acres)
1	Residential	Subarea 5	17.500
2	Residential	Subarea 20	5.400
3	Residential	Subarea 25	3.510
4	Residential	Subarea 30	8.810
5	Residential	Subarea 40	3.620
6	Residential	Subarea 50	2.510
7	Residential	Subarea 60	1.780
8	Residential	Subarea 70	13.080
9	Residential	Subarea 85	3.370
10	Residential	Subarea 10	4.960
11	Residential	Subear 80	11.020
12	Residential	Subarea 75	1.290
13	Residential	Subarea 35	0.330

CP #	Control Practice Type	Control Practice Name or Location
1	Wet Detention Pond	Pond 5
2	Wet Detention Pond	Pond 20
3	Wet Detention Pond	Pond 30
4	**Wet Detention Pond**	**Pond 70**
5	Wet Detention Pond	Pond 85
6	Biofilter	DS Biofilters # 1
7	Biofilter	DS Biofilters # 2
8	Biofilter	DS Biofilters # 3
9	Wet Detention Pond	Pond 80



SLAMM for Windows Version 10.4.1

Data file name: D:\Jobs\2019\2019-006_Skyline Subdivision\Project_Information\Calcs\SLAMM\Proposed_Infiltration_006.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: 03-16-2021 Time of run: 15:01:09
Total Area Modeled (acres): 79.900
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:	2.783E+06	-	103.7	18013	-
Outfall Total with Controls:	1.794E+06	35.54%	39.06	4375	75.71%
Annualized Total After Outfall Controls:	1.819E+06			4436	

Data file name: D:\Jobs\2019\2019-006_Skyline Subdivision\Project_Information\Calcs\SLAMM\Proposed_Infiltration_006.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: 03-16-2021 Time: 15:01:16
Site information:

LU# 1 - Residential: Subarea 5 Total area (ac): 17.500
1 - Roofs 1: 2.800 ac. Pitched Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
25 - Driveways 1: 1.500 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
31 - Sidewalks 1: 0.470 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
37 - Streets 1: 1.800 ac. Smooth Street Length = 0.803 curb-mi Street Width (assuming two curb-mi per street mile) = 36.9863 ft
Default St. Dirt Accum. Annual Winter Load = 2500 lbs Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
45 - Large Landscaped Areas 1: 7.780 ac. Normal Clayey Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
46 - Large Landscaped Areas 2: 2.380 ac. Normal Clayey Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
57 - Undeveloped Areas 1: 0.200 ac. Normal Clayey Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
70 - Water Body Areas: 0.570 ac. Source Area PSD File:

LU# 2 - Residential: Subarea 20   Total area (ac): 5.400
     1 - Roofs 1: 0.990 ac.   Pitched   Connected   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     25 - Driveways 1: 0.360 ac.   Connected   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     31 - Sidewalks 1: 0.150 ac.   Connected   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     37 - Streets 1: 0.570 ac.   Smooth   Street Length = 0.254 curb-mi   Street Width (assuming two curb-mi per street mile) = 37.02756 ft
          Default St. Dirt Accum.   Annual Winter Load = 2500 lbs   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     45 - Large Landscaped Areas 1: 2.460 ac.   Normal Clayey   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     46 - Large Landscaped Areas 2: 0.690 ac.   Normal Clayey   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     57 - Undeveloped Areas 1: 0.040 ac.   Normal Clayey   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     70 - Water Body Areas: 0.140 ac.   Source Area PSD File:
LU# 3 - Residential: Subarea 25   Total area (ac): 3.510
     1 - Roofs 1: 0.230 ac.   Pitched   Disconnected   Normal Clayey   Low Density   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     31 - Sidewalks 1: 0.160 ac.   Disconnected   Normal Clayey   Low Density   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     51 - Small Landscaped Areas 1: 0.800 ac.   Normal Clayey   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     52 - Small Landscaped Areas 2: 0.900 ac.   Normal Clayey   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     57 - Undeveloped Areas 1: 0.110 ac.   Normal Clayey   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     58 - Undeveloped Areas 2: 1.310 ac.   Normal Clayey   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
LU# 4 - Residential: Subarea 30   Total area (ac): 8.810
     1 - Roofs 1: 1.400 ac.   Pitched   Connected   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     25 - Driveways 1: 0.360 ac.   Connected   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     31 - Sidewalks 1: 0.320 ac.   Connected   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     32 - Sidewalks 2: 0.070 ac.   Connected   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     37 - Streets 1: 1.450 ac.   Smooth   Street Length = 0.647 curb-mi   Street Width (assuming two curb-mi per street mile) = 36.97836 ft
          Default St. Dirt Accum.   Annual Winter Load = 2500 lbs   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     45 - Large Landscaped Areas 1: 3.400 ac.   Normal Clayey   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     46 - Large Landscaped Areas 2: 1.460 ac.   Normal Clayey   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz

```
     57 - Undeveloped Areas 1:  0.160 ac.    Normal Clayey    Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     70 - Water Body Areas:  0.190 ac.    Source Area PSD File:
LU# 5 - Residential:  Subarea 40     Total area (ac):  3.620
     1 - Roofs 1:  0.740 ac.    Pitched    Connected    Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     25 - Driveways 1:  0.240 ac.    Connected    Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     31 - Sidewalks 1:  0.160 ac.    Connected    Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     37 - Streets 1:  0.610 ac.    Smooth    Street Length = 0.272 curb-mi    Street Width (assuming two curb-
mi per street mile) = 37.00367 ft
           Default St. Dirt Accum.    Annual Winter Load = 2500 lbs    Source Area PSD File: C:\WinSLAMM
Files\NURP.cpz
     45 - Large Landscaped Areas 1:  1.870 ac.    Normal Clayey    Source Area PSD File: C:\WinSLAMM
Files\NURP.cpz
LU# 6 - Residential:  Subarea 50     Total area (ac):  2.510
     1 - Roofs 1:  0.250 ac.    Pitched    Disconnected    Normal Clayey    Low Density    Source Area PSD
File: C:\WinSLAMM Files\NURP.cpz
     31 - Sidewalks 1:  0.200 ac.    Disconnected    Normal Clayey    Low Density    Source Area PSD File:
C:\WinSLAMM Files\NURP.cpz
     32 - Sidewalks 2:  0.070 ac.    Disconnected    Normal Clayey    Low Density    Source Area PSD File:
C:\WinSLAMM Files\NURP.cpz
     51 - Small Landscaped Areas 1:  1.050 ac.    Normal Clayey    Source Area PSD File: C:\WinSLAMM
Files\NURP.cpz
     52 - Small Landscaped Areas 2:  0.940 ac.    Normal Clayey    Source Area PSD File: C:\WinSLAMM
Files\NURP.cpz
LU# 7 - Residential:  Subarea 60     Total area (ac):  1.780
     1 - Roofs 1:  0.190 ac.    Pitched    Disconnected    Normal Clayey    Low Density    Source Area PSD
File: C:\WinSLAMM Files\NURP.cpz
     31 - Sidewalks 1:  0.100 ac.    Disconnected    Normal Clayey    Low Density    Source Area PSD File:
C:\WinSLAMM Files\NURP.cpz
     32 - Sidewalks 2:  0.070 ac.    Disconnected    Normal Clayey    Low Density    Source Area PSD File:
C:\WinSLAMM Files\NURP.cpz
     51 - Small Landscaped Areas 1:  0.670 ac.    Normal Clayey    Source Area PSD File: C:\WinSLAMM
Files\NURP.cpz
     52 - Small Landscaped Areas 2:  0.750 ac.    Normal Clayey    Source Area PSD File: C:\WinSLAMM
Files\NURP.cpz
LU# 8 - Residential:  Subarea 70     Total area (ac):  13.080
     1 - Roofs 1:  2.420 ac.    Pitched    Connected    Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     25 - Driveways 1:  0.810 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:  0.040 ac.    Connected    Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     37 - Streets 1:  1.890 ac.    Smooth    Street Length = 0.843 curb-mi    Street Width (assuming two curb-
mi per street mile) = 36.99288 ft
           Default St. Dirt Accum.    Annual Winter Load = 2500 lbs    Source Area PSD File: C:\WinSLAMM
Files\NURP.cpz
     45 - Large Landscaped Areas 1:  1.240 ac.    Normal Clayey    Source Area PSD File: C:\WinSLAMM
Files\NURP.cpz
     46 - Large Landscaped Areas 2:  5.970 ac.    Normal Clayey    Source Area PSD File: C:\WinSLAMM
Files\NURP.cpz
     70 - Water Body Areas:  0.280 ac.    Source Area PSD File:
LU# 9 - Residential:  Subarea 85     Total area (ac):  3.370
     1 - Roofs 1:  0.250 ac.    Pitched    Connected    Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     25 - Driveways 1:  0.180 ac.    Connected    Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     31 - Sidewalks 1:  0.040 ac.    Connected    Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     37 - Streets 1:  0.150 ac.    Smooth    Street Length = 0.067 curb-mi    Street Width (assuming two curb-
mi per street mile) = 36.9403 ft
           Default St. Dirt Accum.    Annual Winter Load = 2500 lbs    Source Area PSD File: C:\WinSLAMM
Files\NURP.cpz
     45 - Large Landscaped Areas 1:  1.550 ac.    Normal Clayey    Source Area PSD File: C:\WinSLAMM
Files\NURP.cpz
     46 - Large Landscaped Areas 2:  1.080 ac.    Normal Clayey    Source Area PSD File: C:\WinSLAMM
Files\NURP.cpz
     57 - Undeveloped Areas 1:  0.040 ac.    Normal Clayey    Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     70 - Water Body Areas:  0.080 ac.    Source Area PSD File:
LU# 10 - Residential:  Subarea 10     Total area (ac):  4.960
     1 - Roofs 1:  0.310 ac.    Pitched    Disconnected    Normal Clayey    Low Density    Source Area PSD
File: C:\WinSLAMM Files\NURP.cpz
     31 - Sidewalks 1:  0.310 ac.    Disconnected    Normal Clayey    Low Density    Source Area PSD File:
C:\WinSLAMM Files\NURP.cpz
     37 - Streets 1:  0.020 ac.    Smooth    Street Length = 0.009 curb-mi    Street Width (assuming two curb-
mi per street mile) = 36.66667 ft
           Default St. Dirt Accum.    Annual Winter Load = 2500 lbs    Source Area PSD File: C:\WinSLAMM
Files\NURP.cpz
     51 - Small Landscaped Areas 1:  1.380 ac.    Normal Clayey    Source Area PSD File: C:\WinSLAMM
Files\NURP.cpz
     52 - Small Landscaped Areas 2:  1.430 ac.    Normal Clayey    Source Area PSD File: C:\WinSLAMM
Files\NURP.cpz
     57 - Undeveloped Areas 1:  0.940 ac.    Normal Clayey    Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
```

```
     58 - Undeveloped Areas 2:  0.570 ac.    Normal Clayey    Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
LU# 11 - Residential:  Subear 80     Total area (ac):  11.020
     1 - Roofs 1:  2.090 ac.    Pitched    Connected    Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     25 - Driveways 1:  0.520 ac.    Connected    Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     31 - Sidewalks 1:  0.410 ac.    Connected    Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     37 - Streets 1:  1.580 ac.    Smooth    Street Length = 0.705 curb-mi    Street Width (assuming two curb-
mi per street mile) = 36.97873 ft
           Default St. Dirt Accum.    Annual Winter Load = 2500 lbs    Source Area PSD File: C:\WinSLAMM
Files\NURP.cpz
     51 - Small Landscaped Areas 1:  1.130 ac.    Normal Clayey    Source Area PSD File: C:\WinSLAMM
Files\NURP.cpz
     52 - Small Landscaped Areas 2:  4.930 ac.    Normal Clayey    Source Area PSD File: C:\WinSLAMM
Files\NURP.cpz
     70 - Water Body Areas:  0.360 ac.    Source Area PSD File:
LU# 12 - Residential:  Subarea 75     Total area (ac):  1.290
     1 - Roofs 1:  0.120 ac.    Pitched    Disconnected    Normal Clayey    Low Density    Source Area PSD
File: C:\WinSLAMM Files\NURP.cpz
     31 - Sidewalks 1:  0.050 ac.    Disconnected    Normal Clayey    Low Density    Source Area PSD File:
C:\WinSLAMM Files\NURP.cpz
     51 - Small Landscaped Areas 1:  0.720 ac.    Normal Clayey    Source Area PSD File: C:\WinSLAMM
Files\NURP.cpz
     52 - Small Landscaped Areas 2:  0.400 ac.    Normal Clayey    Source Area PSD File: C:\WinSLAMM
Files\NURP.cpz
LU# 13 - Residential:  Subarea 35     Total area (ac):  0.330
     51 - Small Landscaped Areas 1:  0.240 ac.    Normal Clayey    Source Area PSD File: C:\WinSLAMM
Files\NURP.cpz
     57 - Undeveloped Areas 1:  0.090 ac.    Normal Clayey    Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
LU# 14 - Residential:  Subarea 90     Total area (ac):  2.720
     51 - Small Landscaped Areas 1:  0.900 ac.    Normal Clayey    Source Area PSD File: C:\WinSLAMM
Files\NURP.cpz
     57 - Undeveloped Areas 1:  1.630 ac.    Normal Clayey    Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     58 - Undeveloped Areas 2:  0.190 ac.    Normal Clayey    Source Area PSD File: C:\WinSLAMM Files\NURP.cpz

      Control Practice 1:  Wet Detention Pond CP# 1 (DS) - Pond 5
         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): 0.54
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: 9
Outlet type: Vertical Stand Pipe
1. Stand pipe diameter (ft): 2.25
2. Stand pipe height above datum (ft): 7.5
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	0.3000	0.00	0.00
2	1.00	0.3500	0.00	0.00
3	2.00	0.4000	0.00	0.00
4	3.00	0.4500	0.00	0.00
5	4.00	0.5000	0.00	0.00
6	5.00	0.5700	0.00	0.00
7	6.00	0.6400	0.00	0.00
8	7.00	0.7200	0.00	0.00
9	8.00	0.8200	0.00	0.00
10	9.00	0.9300	0.00	0.00
11	10.00	1.0400	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): 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): 0.5
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: 7.3
Outlet type: Vertical Stand Pipe
1. Stand pipe diameter (ft): 2.25
2. Stand pipe height above datum (ft): 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	0.0300	0.00	0.00
4	3.00	0.0400	0.00	0.00
5	4.00	0.0500	0.00	0.00
6	5.00	0.1400	0.00	0.00
7	6.00	0.2100	0.00	0.00
8	7.00	0.2800	0.00	0.00
9	8.00	0.3700	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): 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: 2
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: 6.5
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	0.0050	0.00	0.00
2	1.00	0.0100	0.00	0.00
3	2.00	0.0500	0.00	0.00
4	3.00	0.1000	0.00	0.00
5	4.00	0.1500	0.00	0.00
6	5.00	0.1900	0.00	0.00
7	5.50	0.2200	0.00	0.00
8	6.50	0.2600	0.00	0.00
9	7.50	0.3200	0.00	0.00
10	8.50	0.3700	0.00	0.00
11	9.50	0.4200	0.00	0.00

Control Practice 4: Wet Detention Pond CP# 4 (DS) - Pond 70
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): 0.42
2. Number of orifices: 1
3. Invert elevation above datum (ft): 5
Outlet type: Broad Crested Weir
1. Weir crest length (ft): 30
2. Weir crest width (ft): 10
3. Height from datum to bottom of weir opening: 8
Outlet type: Vertical Stand Pipe
1. Stand pipe diameter (ft): 2
2. Stand pipe height above datum (ft): 7.75
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	0.0500	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	0.1500	0.00	0.00

5	4.00	0.2000	0.00	0.00
6	5.00	0.2800	0.00	0.00
7	6.00	0.3400	0.00	0.00
8	7.00	0.4000	0.00	0.00
9	8.00	0.4600	0.00	0.00
10	9.00	0.5400	0.00	0.00
11	10.00	0.7500	0.00	0.00

Control Practice 5: Wet Detention Pond CP# 5 (DS) - Pond 85
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): 40
2. Weir crest width (ft): 5
3. Height from datum to bottom of weir opening: 6.5
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	0.0300	0.00	0.00
4	3.00	0.0400	0.00	0.00
5	4.00	0.0500	0.00	0.00
6	5.00	0.0800	0.00	0.00
7	6.00	0.1100	0.00	0.00
8	7.00	0.1400	0.00	0.00
9	8.00	0.1500	0.00	0.00
10	9.00	0.1700	0.00	0.00
11	10.00	0.1900	0.00	0.00

```
Control Practice 6:  Biofilter CP# 1 (DS) - DS Biofilters # 1
   1.  Top area (square feet) =  13540
   2.  Bottom aea (square feet) =  4923
   3.  Depth (ft):   5.5
   4.  Biofilter width (ft) - for Cost Purposes Only:   10
   5.  Infiltration rate (in/hr) =  0.5
   6.  Random infiltration rate generation?  No
   7.  Infiltration rate fraction (side):   0.01
   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:   0.5
   12.  Engineered soil depth (ft) =  0.01
   13.  Engineered soil porosity =  0.35
   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:   4.5
       Outlet type:  Vertical Stand Pipe
               1.  Stand pipe diameter (ft):   2
               2.  Stand pipe height above datum (ft):   3
       Outlet type:  Surface Discharge Pipe
               1.  Surface discharge pipe outlet diameter (ft):   0.33
               2.  Pipe invert elevation above datum (ft):   0.5
               3.  Number of surface pipe outlets:   1

Control Practice 7:  Biofilter CP# 2 (DS) - DS Biofilters # 2
   1.  Top area (square feet) =  19095
   2.  Bottom aea (square feet) =  6924
   3.  Depth (ft):   5.5
   4.  Biofilter width (ft) - for Cost Purposes Only:   10
```

```
   5.  Infiltration rate (in/hr) =  0.5
   6.  Random infiltration rate generation?  No
   7.  Infiltration rate fraction (side):   0.01
   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:   0.5
   12.  Engineered soil depth (ft) =  0.01
   13.  Engineered soil porosity =  0.35
   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:   4.5
       Outlet type:  Vertical Stand Pipe
              1.  Stand pipe diameter (ft):   2.5
              2.  Stand pipe height above datum (ft):   2.75
       Outlet type:  Surface Discharge Pipe
              1.  Surface discharge pipe outlet diameter (ft):   0.5
              2.  Pipe invert elevation above datum (ft):   0.5
              3.  Number of surface pipe outlets:   1

Control Practice 8:  Biofilter CP# 3 (DS) - DS Biofilters # 3
   1.  Top area (square feet) =  30993
   2.  Bottom aea (square feet) =  16143
   3.  Depth (ft):   5.5
   4.  Biofilter width (ft) - for Cost Purposes Only:   10
   5.  Infiltration rate (in/hr) =  0.5
   6.  Random infiltration rate generation?  No
   7.  Infiltration rate fraction (side):   0.01
   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:   0.5
   12.  Engineered soil depth (ft) =  0.01
   13.  Engineered soil porosity =  0.35
   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:   4.5
       Outlet type:  Vertical Stand Pipe
              1.  Stand pipe diameter (ft):   2
              2.  Stand pipe height above datum (ft):   3
       Outlet type:  Surface Discharge Pipe
              1.  Surface discharge pipe outlet diameter (ft):   0.5
              2.  Pipe invert elevation above datum (ft):   0.5
              3.  Number of surface pipe outlets:   1

Control Practice 9:  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):   0.42
              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:   8.5
        Outlet type:  Vertical Stand Pipe
```

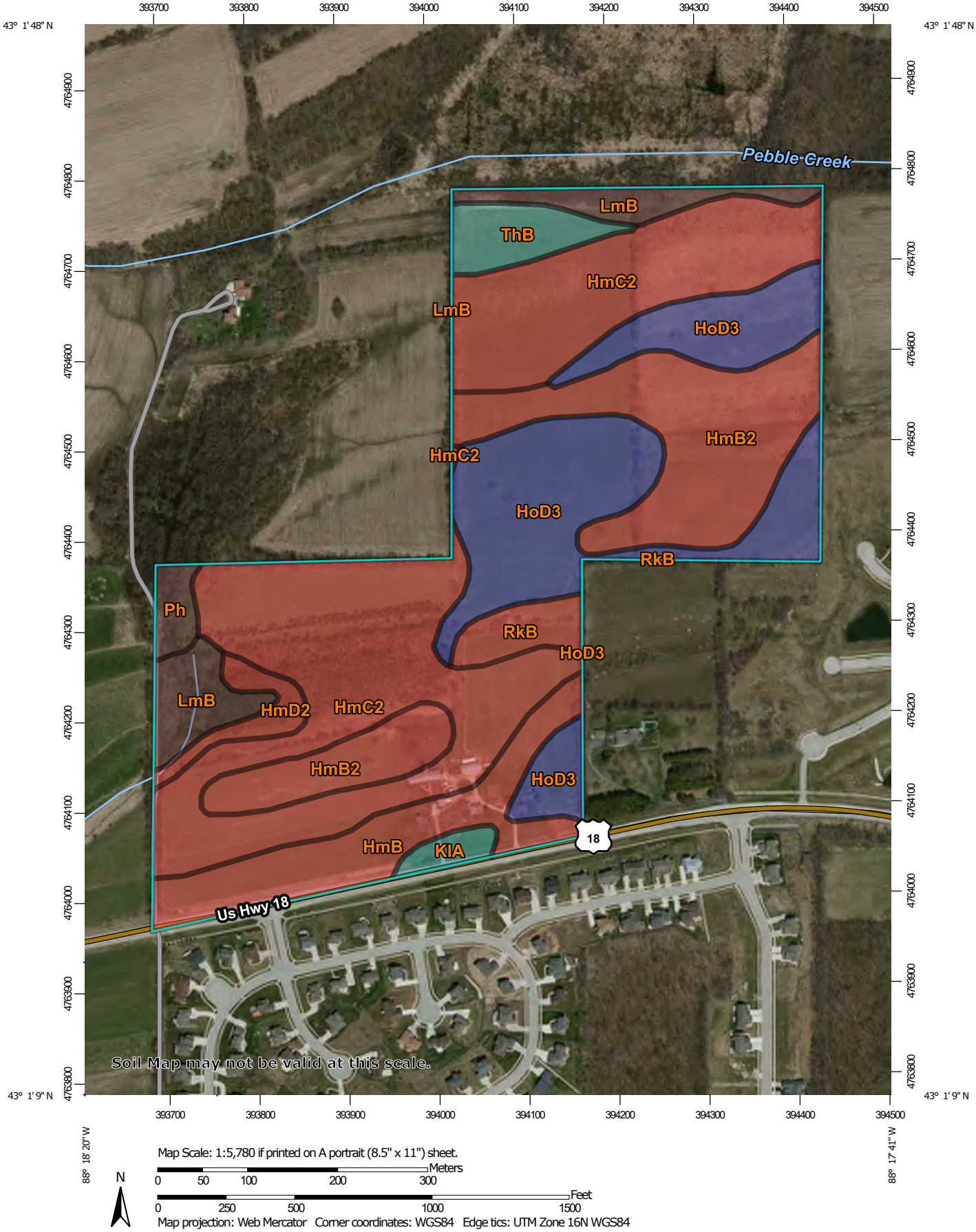
1. Stand pipe diameter (ft): 2
2. Stand pipe height above datum (ft): 8

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	0.1000	0.00	0.00
2	1.00	0.1500	0.00	0.00
3	2.00	0.2000	0.00	0.00
4	3.00	0.2500	0.00	0.00
5	4.00	0.3000	0.00	0.00
6	5.00	0.3600	0.00	0.00
7	6.00	0.4100	0.00	0.00
8	7.00	0.4800	0.00	0.00
9	8.00	0.5400	0.00	0.00
10	9.00	0.6200	0.00	0.00
11	10.00	0.7300	0.00	0.00

APPENDIX E

NRCS Soil Survey
and
Soil Boring Logs



Map Scale: 1:5,780 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 50 100 200 300

Feet: 0 250 500 1000 1500

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 14, Sep 12, 2018

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

Date(s) aerial images were photographed: Data not available.

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
HmB	Hochheim loam, 2 to 6 percent slopes	D	7.6	9.0%
HmB2	Hochheim loam, 2 to 6 percent slopes, eroded	D	15.3	18.1%
HmC2	Hochheim loam, 6 to 12 percent slopes, eroded	D	30.8	36.5%
HmD2	Hochheim loam, 12 to 20 percent slopes, eroded	D	1.6	1.9%
HoD3	Hochheim soils, 12 to 20 percent slopes, severely eroded	B	17.9	21.2%
KlA	Kendall silt loam, 1 to 3 percent slopes	C	0.9	1.0%
LmB	Lamartine silt loam, 0 to 3 percent slopes	B/D	4.8	5.6%
Ph	Pella silt loam, 0 to 2 percent slopes	B/D	1.1	1.3%
RkB	Ritchey silt loam, 1 to 6 percent slopes	D	1.9	2.3%
ThB	Theresa silt loam, 2 to 6 percent slopes	C	2.6	3.0%
Totals for Area of Interest			**84.4**	**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.

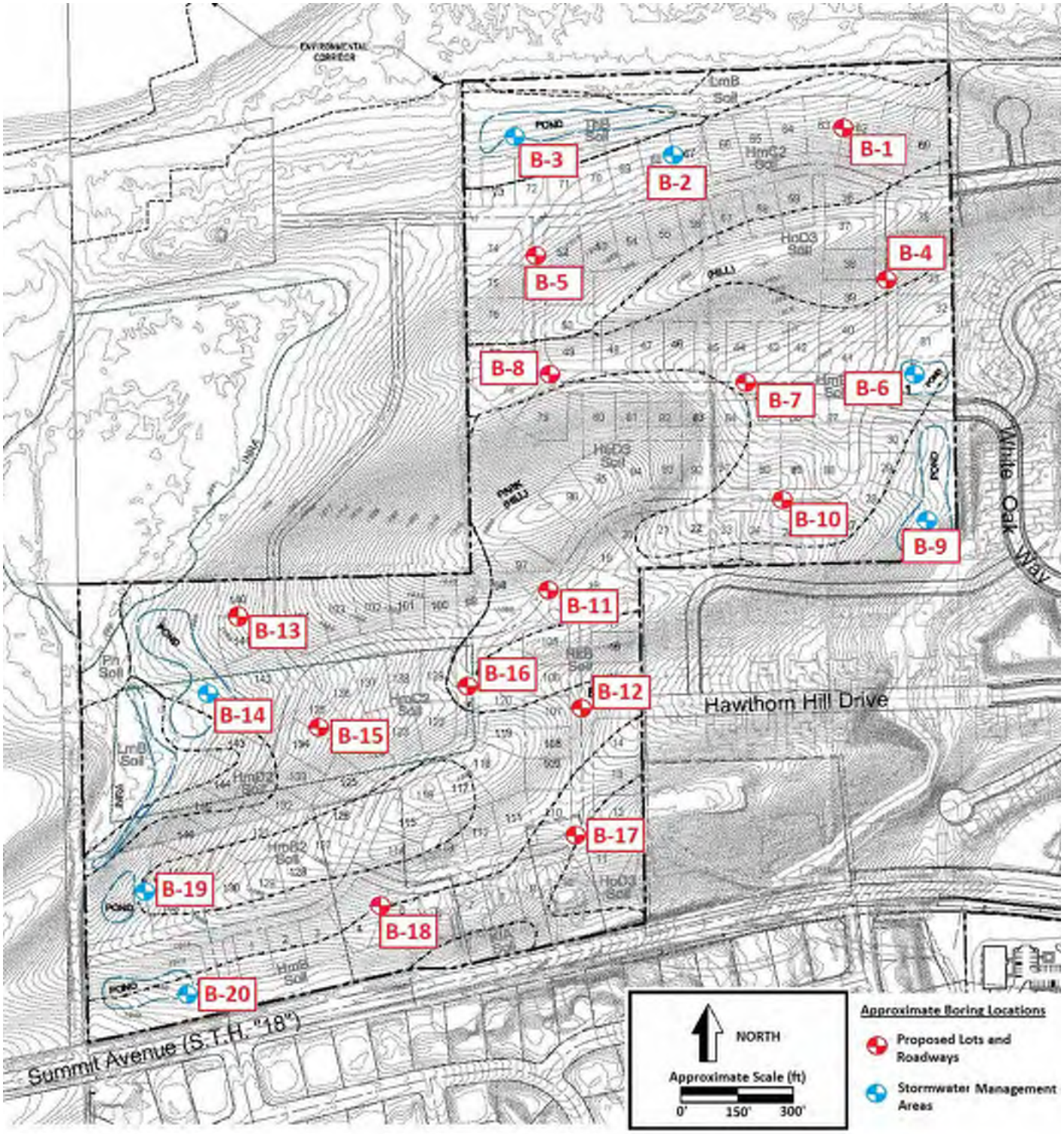
If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher



intertek psi	Proposed Subdivision - Downing Property Summit Avenue Waukesha, Wisconsin	**SCALE:** SHOWN ABOVE
		PROJECT NO: 0094875
	FIGURE 1: BORING LOCATION PLAN	**PAGE 1 OF 1**

SOIL BORING LOG: B - 1

Project: Proposed Preliminary Exploration - Downing Farm Subdivision
Project No.: 0094875

Location: North Side of State Highway 18
Waukesha, Wisconsin

Drill Date: May 8, 2019
Drilled By: GW/KH

DEPTH/EL. (feet)	VISUAL SOIL CLASSIFICATION GROUND SURFACE ELEVATION: 1003.5	SAMPLE NO.	N (bpf)	Qp (tsf)	Qu (tsf)	MC (%)	REMARKS
1 1002.5	0-9": Dark brown CLAY, with silt and trace root matter, moist (TOPSOIL)			-	-	24	
	Brown CLAY, with silt and trace root matter, moist	1-SS	7	1.5	-	20	
2 1001.5							▽
3 1000.5	Light brown Sandy CLAY, with silt and trace gravel, very moist to wet	2-SS	6	-	-	10	
4 999.5							
5 998.5							
6 997.5	Light brown Silty Fine SAND, with trace clay and gravel, very moist to wet	3-SS	9	-	-	9	
7 996.5							⊥
8 995.5		4-SS	11	-	-	10	
9 994.5							
10 993.5							
11 992.5		5-SS*	21	-	-	7	
12 991.5							
13 990.5							
14 989.5	Light brown Gravelly SAND, with trace silt, wet	6-SS	70	-	-	7	
15 988.5							
16 987.5							
17 986.5							
18 985.5	**AUGER REFUSAL ON POSSIBLE COBBLES, BOULDERS, AND/OR BEDROCK @ 17± FEET** **END OF BORING @ 17± FEET**						
19 984.5							
20 983.5							

FIELD OBSERVATIONS:

Water Level $_{\text{during drilling}}$: 2.5± feet below ground surface (EL. 1001.0±) ▽
Water Level $_{\text{upon completion}}$: Not Present ▼
Caved at $_{\text{upon completion}}$: 7± feet below ground surface (EL. 996.5±) ⊥
Delay Time: N/A
Water Level $_{\text{delayed}}$: N/A ¥
Caved at $_{\text{delayed}}$: N/A

ADDITIONAL COMMENTS:

***Poor Sample Recovery - pushed rock.**

Note: Lines of stratification represent an approximate boundary between soil types. Variations may occur between sampling intervals and/or boring locations. Transitions may also be gradual.

SOIL BORING LOG: B - 2

Project: Proposed Preliminary Exploration - Downing Farm Subdivision
Project No.: 0094875

Location: North Side of State Highway 18
Waukesha, Wisconsin

Drill Date: May 8, 2019
Drilled By: GW/KH

DEPTH/EL. (feet)	VISUAL SOIL CLASSIFICATION GROUND SURFACE ELEVATION: 1005.4	SAMPLE NO.	N (bpf)	Qp (tsf)	Qu (tsf)	MC (%)	REMARKS
1 / 1004.4	0-12": 10YR 4/2 Dark grayish brown CLAY, with roots (2,vf), 0,m, mvfr-moist (TOPSOIL)	1-SS	5	-	-	29	
2 / 1003.4	10YR 4/3 Brown CLAY, with roots (1,vf), 0,m, mvfr-moist			2.5	2.6	25	
3 / 1002.4	2.5Y 6/4 Light yellowish brown GRAVELLY LOAM, 0,m, mvfr-very moist to wet	2-SS	5	-	-	10	▽
4 / 1001.4							
5 / 1000.4		3-SS	8	-	-	10	
6 / 999.4							
7 / 998.4		4-SS*	76	-	-	7	
8 / 997.4							
9 / 996.4	2.5Y 6/4 Light yellowish brown GRAVELLY FINE SANDY LOAM, 0,m, mefi-moist	5-SS	50/3"	-	-	7	
10 / 995.4							⊥
11 / 994.4	2.5Y 6/4 Light yellowish brown VERY GRAVELLY FINE SANDY LOAM, 0,m, mefi-moist	6-SS*	50/S2"	-	-	9	
12 / 993.4							
13 / 992.4		7-SS*	50/2"	-	-	4	
14 / 991.4							
15 / 990.4		8-SS**	50/S5"				
16 / 989.4	**AUGER REFUSAL ON POSSIBLE COBBLES, BOULDERS, AND/OR BEDROCK @ 15.5± FEET** **END OF BORING @ 15.5± FEET**						
17 / 988.4							
18 / 987.4							
19 / 986.4							
20 / 985.4							

FIELD OBSERVATIONS

Water Level $_{\text{during drilling}}$: 3± feet below existing grade (EL. 1002.4±) ▽
Water Level $_{\text{upon completion}}$: Not Present ▼
Caved at $_{\text{upon completion}}$: 10± feet below existing grade (EL. 995.4±) ⊥
Delay Time: N/A
Water Level $_{\text{delayed}}$: N/A ¥
Caved at $_{\text{delayed}}$: N/A

ADDITIONAL COMMENTS:

***Poor Sample Recovery - pushed rock.**
****No Sample Recovery.**

Note: Lines of stratification represent an approximate boundary between soil types. Variations may occur between sampling intervals and/or boring locations. Transitions may also be gradual. Dashed lines are indicative of potentially erratic or unknown transitions, such as fill-to-natural soil zone transitions.

SOIL BORING LOG: B - 3

Project: Proposed Preliminary Exploration - Downing Farm Subdivision
Project No.: 0094875

Location: North Side of State Highway 18
Waukesha, Wisconsin

Drill Date: May 9, 2019
Drilled By: GW/KH

DEPTH/EL. (feet)	VISUAL SOIL CLASSIFICATION GROUND SURFACE ELEVATION: 998.6	SAMPLE NO.	N (bpf)	Qp (tsf)	Qu (tsf)	MC (%)	REMARKS
1 997.6	0-10": 10YR 3/3 Dark brown CLAY, with roots (1,f), 0,m, mvfr-moist (TOPSOIL)	1-SS	5	-	-	31	
2 996.6	10YR 4/3 Brown CLAY, with roots (1,vf), 0,m, mvfr-moist			1.8	1.9	28	
3 995.6		2-SS	8	-	-	10	▽
4 994.6	2.5Y 6/4 Light yellowish brown SANDY LOAM, 0,m, mvfr-wet						
5 993.6	2.5Y 6/4 Light yellowish brown GRAVELLY LOAM, 0,m, mfr-moist	3-SS	9	-	-	10	
6 992.6							
7 991.6		4-SS	81	-	-	12	
8 990.6	2.5Y 6/4 Light yellowish brown GRAVELLY SANDY LOAM, 0,m, mvfr-wet						
9 989.6		5-SS	10	-	-	9	⊥
10 988.6							
11 987.6		6-SS	14	-	-	11	
12 986.6							
13 985.6		7-SS	80/10"	-	-	7	
14 984.6							
15 983.6	2.5Y 6/4 Light yellowish brown GRAVELLY LOAMY FINE SAND, 0,m, mefi-wet	8-SS	50/3"	-	-	6	
16 982.6	**AUGER REFUSAL ON POSSIBLE COBBLES, BOULDERS, AND/OR BEDROCK @ 15.5± FEET** **END OF BORING @ 15.5± FEET**						
17 981.6							
18 980.6							
19 979.6							
20 978.6							

FIELD OBSERVATIONS

Water Level $_{\text{during drilling}}$: 3± feet below existing grade (EL. 995.6±) ▽
Water Level $_{\text{upon completion}}$: Not Present ▼
Caved at $_{\text{upon completion}}$: 9± feet below existing grade (EL. 989.6±) ⊥
Delay Time: N/A
Water Level $_{\text{delayed}}$: N/A ¥
Caved at $_{\text{delayed}}$: N/A

ADDITIONAL COMMENTS:

Note: Lines of stratification represent an approximate boundary between soil types. Variations may occur between sampling intervals and/or boring locations. Transitions may also be gradual. Dashed lines are indicative of potentially erratic or unknown transitions, such as fill-to-natural soil zone transitions.

SOIL BORING LOG: B - 4

Project: Proposed Preliminary Exploration - Downing Farm Subdivision
Project No.: 0094875

Location: North Side of State Highway 18, Waukesha, Wisconsin
Drill Date: May 8, 2019
Drilled By: GW/KH

DEPTH/EL. (feet)	VISUAL SOIL CLASSIFICATION GROUND SURFACE ELEVATION: 1011.8	SAMPLE NO.	N (bpf)	Qp (tsf)	Qu (tsf)	MC (%)	REMARKS
	0-7": Dark brown CLAY, with silt and trace root matter, moist (TOPSOIL)			-	-	30	
1 / 1010.8	Brown CLAY, with trace root matter, moist	1-SS	4	1.5	-	23	
2 / 1009.8							
3 / 1008.8	Light brown Silty Fine SAND, with gravel and trace clay, moist	2-SS	17	-	-	9	
4 / 1007.8							
5 / 1006.8							
6 / 1005.8	Light brown Gravelly Fine SAND, with silt and trace clay, moist	3-SS	19	-	-	8	
7 / 1004.8							
8 / 1003.8		4-SS*	11	-	-	10	
9 / 1002.8							⊥
10 / 1001.8							v
11 / 1000.8	Light brown Gravelly Fine SAND, with silt and trace clay, moist to wet	5-SS*	6	-	-	10	
12 / 999.8							
13 / 998.8							
14 / 997.8		6-SS	13	-	-	10	
15 / 996.8							
16 / 995.8							
17 / 994.8							
18 / 993.8							
19 / 992.8	Light brown Silty Fine SAND, with gravel and trace clay, wet	7-SS	14	-	-	9	
20 / 991.8							
	END OF BORING @ 20± FEET						

FIELD OBSERVATIONS:

Water Level $_{\text{during drilling}}$: 10± feet below ground surface (EL. 1001.8±) v
Water Level $_{\text{upon completion}}$: Not Present ▼
Caved at $_{\text{upon completion}}$: 9± feet below ground surface (EL. 1002.8±) ⊥
Delay Time: N/A
Water Level $_{\text{delayed}}$: N/A ¥
Caved at $_{\text{delayed}}$: N/A

ADDITIONAL COMMENTS:

***Poor Sample Recovery - pushed rock.**

Note: Lines of stratification represent an approximate boundary between soil types. Variations may occur between sampling intervals and/or boring locations. Transitions may also be gradual.

SOIL BORING LOG: B - 5

Project: Proposed Preliminary Exploration - Downing Farm Subdivision
Project No.: 0094875

Location: North Side of State Highway 18, Waukesha, Wisconsin
Drill Date: May 8, 2019
Drilled By: GW/KH

DEPTH/EL. (feet)	VISUAL SOIL CLASSIFICATION GROUND SURFACE ELEVATION: 1007.9	SAMPLE NO.	N (bpf)	Qp (tsf)	Qu (tsf)	MC (%)	REMARKS
1 1006.9	0-9": Dark brown CLAY, with silt and trace root matter, moist (TOPSOIL)			-	-	32	
2 1005.9	Brown CLAY, with silt and trace root matter, moist	1-SS	5	1.3	-	22	▽
3 1004.9	Light brown Gravelly CLAY, with fine sand and silt, moist to wet	2-SS	8	-	-	13	
4 1003.9							
5 1002.9							
6 1001.9		3-SS*	19	-	-	14	
7 1000.9							
8 999.9	Light brown Gravelly Fine SAND, with silt, wet	4-SS*	19	-	-	13	
9 998.9							⊥
10 997.9							
11 996.9	Light brown Gravelly Fine SAND, with silt, moist	5-SS	26	-	-	8	
12 995.9							
13 994.9							
14 993.9		6-SS	53	-	-	8	
15 992.9							
16 991.9							
17 990.9	**AUGER REFUSAL ON POSSIBLE COBBLES, BOULDERS, AND/OR BEDROCK @ 16± FEET** **END OF BORING @ 16± FEET**						
18 989.9							
19 988.9							
20 987.9							

FIELD OBSERVATIONS:

Water Level $_{\text{during drilling}}$: 2.5± feet below ground surface (EL. 1004.4±) ▽
Water Level $_{\text{upon completion}}$: Not Present ▼
Caved at $_{\text{upon completion}}$: 9± feet below ground surface (EL. 998.9±) ⊥
Delay Time: N/A
Water Level $_{\text{delayed}}$: N/A ¥
Caved at $_{\text{delayed}}$: N/A

ADDITIONAL COMMENTS:

***Poor Sample Recovery - pushed rock.**

Note: Lines of stratification represent an approximate boundary between soil types. Variations may occur between sampling intervals and/or boring locations. Transitions may also be gradual.

SOIL BORING LOG: B - 6

Project: Proposed Preliminary Exploration - Downing Farm Subdivision
Project No.: 0094875

Location: North Side of State Highway 18, Waukesha, Wisconsin
Drill Date: May 8, 2019
Drilled By: GW/KH

DEPTH/EL. (feet)	VISUAL SOIL CLASSIFICATION GROUND SURFACE ELEVATION: 997.2	SAMPLE NO.	N (bpf)	Qp (tsf)	Qu (tsf)	MC (%)	REMARKS
1 / 996.2	0-11": 10YR 2/2 Very dark brown CLAY, with roots (2,vf), 0,m, mvfr-moist (TOPSOIL)	1-SS	4	-	-	55	
2 / 995.2	2.5Y 4/3 Olive brown CLAY, with roots (1,vf), 0,m, mvfr-moist			1.5	-	29	
3 / 994.2		2-SS	10	-	-	8	▽
4 / 993.2	2.5Y 6/4 Light yellowish brown VERY GRAVELLY SANDY LOAM, 0,m, mvfr-wet						
5 / 992.2		3-SS	8	-	-	8	
6 / 991.2							▼ ⊥
7 / 990.2		4-SS	9	-	-	9	
8 / 989.2							
9 / 988.2		5-SS	15	-	-	12	
10 / 987.2							
11 / 986.2	2.5Y 6/4 Light yellowish brown GRAVELLY SANDY LOAM, 0,m, mefi- very moist to wet	6-SS	47	-	-	7	
12 / 985.2							
13 / 984.2		7-SS	56	-	-	9	
14 / 983.2							
15 / 982.2		8-SS	7	-	-	12	
16 / 981.2		9-SS**	50/51"	-	-	-	
17 / 980.2	**AUGER REFUSAL ON POSSIBLE COBBLES, BOULDERS, AND/OR BEDROCK @ 16± FEET** **END OF BORING @ 16± FEET**						
18 / 979.2							
19 / 978.2							
20 / 977.2							

FIELD OBSERVATIONS

Water Level $_{\text{during drilling}}$: 3± feet below existing grade (EL. 994.2±) ▽
Water Level $_{\text{upon completion}}$: 6± feet below existing grade (EL. 991.2±) ▼
Caved at $_{\text{upon completion}}$: 6± feet below existing grade (EL. 991.2±) ⊥
Delay Time: N/A
Water Level $_{\text{delayed}}$: N/A ¥
Caved at $_{\text{delayed}}$: N/A

ADDITIONAL COMMENTS:

****No Sample Recovery.**

Note: Lines of stratification represent an approximate boundary between soil types. Variations may occur between sampling intervals and/or boring locations. Transitions may also be gradual. Dashed lines are indicative of potentially erratic or unknown transitions, such as fill-to-natural soil zone transitions.

SOIL BORING LOG: B - 7

Project: Proposed Preliminary Exploration - Downing Farm Subdivision
Project No.: 0094875

Location: North Side of State Highway 18, Waukesha, Wisconsin
Drill Date: May 7, 2019
Drilled By: GW/KH

DEPTH/EL. (feet)	VISUAL SOIL CLASSIFICATION GROUND SURFACE ELEVATION: 1007.2	SAMPLE NO.	N (bpf)	Qp (tsf)	Qu (tsf)	MC (%)	REMARKS
1 1006.2	0-19": Dark brown CLAY, with silt and trace root matter, moist (TOPSOIL)	1-SS	4	-	-	52	
2 1005.2	Brown CLAY, with silt and gray blotches, moist					28	
3 1004.2		2-SS	4	0.8	0.8	28	
4 1003.2							
5 1002.2							
6 1001.2		3-SS	6	0.5	0.4	23	
7 1000.2							▼ ⊥
8 999.2	Brown GRAVEL, with trace sand, wet	4-SS	30	-	-	10	v
9 998.2							
10 997.2	Brown SAND, with gravel, wet						
11 996.2		5-SS	50/2"	-	-	9	
12 995.2							
13 994.2	**AUGER REFUSAL ON POSSIBLE COBBLES, BOULDERS, AND/OR BEDROCK @ 12± FEET** **END OF BORING @ 12± FEET**						
14 993.2							
15 992.2							
16 991.2							
17 990.2							
18 989.2							
19 988.2							
20 987.2							

FIELD OBSERVATIONS:

Water Level $_{during\ drilling}$: 8± feet below ground surface (EL. 999.2±) v
Water Level $_{upon\ completion}$: 7± feet below ground surface (EL. 1000.2±) ▼
Caved at $_{upon\ completion}$: 7± feet below ground surface (EL. 1000.2±) ⊥
Delay Time: N/A
Water Level $_{delayed}$: N/A ¥
Caved at $_{delayed}$: N/A

ADDITIONAL COMMENTS:

Note: Lines of stratification represent an approximate boundary between soil types. Variations may occur between sampling intervals and/or boring locations. Transitions may also be gradual.

SOIL BORING LOG: B - 8

Project: Proposed Preliminary Exploration - Downing Farm Subdivision
Project No.: 0094875

Location: North Side of State Highway 18, Waukesha, Wisconsin
Drill Date: May 8, 2019
Drilled By: GW/KH

DEPTH/EL. (feet)	VISUAL SOIL CLASSIFICATION GROUND SURFACE ELEVATION: 1017.0	SAMPLE NO.	N (bpf)	Qp (tsf)	Qu (tsf)	MC (%)	REMARKS
1016.0	0-9": Dark brown SILT, with clay and trace root matter moist (TOPSOIL)			-	-	33	
1	Brown CLAY, with sand, silt and trace root matter, moist	1-SS	7	1.8	-	19	
1015.0							
1014.0	Light brown CLAY, with silt, moist	2-SS	7	0.5	1.2	26	
1013.0							
1012.0							
1011.0		3-SS	4	0.8	-	23	
1010.0							
1009.0							
	Light brown SILT, with clay and trace gravel, moist to wet	4-SS	8	-	-	17	
1008.0							
1007.0							
	Light brown Gravelly Fine SAND, with silt, moist to wet						
1006.0		5-SS	12	-	-	9	
1005.0							
1004.0							
1003.0		6-SS	63	-	-	6	
1002.0							
1001.0							
1000.0							
	AUGER REFUSAL ON POSSIBLE COBBLES, BOULDERS, AND/OR BEDROCK @ 17± FEET **END OF BORING @ 17± FEET**						
999.0							
998.0							
997.0							

FIELD OBSERVATIONS:

Water Level $_{\text{during drilling}}$: 8± feet below ground surface (EL. 1009.0±)
Water Level $_{\text{upon completion}}$: Not Present
Caved at $_{\text{upon completion}}$: 8± feet below ground surface (EL. 1009.0±)
Delay Time: N/A
Water Level $_{\text{delayed}}$: N/A
Caved at $_{\text{delayed}}$: N/A

ADDITIONAL COMMENTS:

Note: Lines of stratification represent an approximate boundary between soil types. Variations may occur between sampling intervals and/or boring locations. Transitions may also be gradual.

SOIL BORING LOG: B - 9

Project: Proposed Preliminary Exploration - Downing Farm Subdivision
Project No.: 0094875

Location: North Side of State Highway 18
Waukesha, Wisconsin

Drill Date: May 8, 2019
Drilled By: GW/KH

DEPTH/EL. (feet)	VISUAL SOIL CLASSIFICATION GROUND SURFACE ELEVATION: 1000.3	SAMPLE NO.	N (bpf)	Qp (tsf)	Qu (tsf)	MC (%)	REMARKS
1 / 999.3	DRILLED WITHOUT SAMPLING	1-AU	-	-	-	-	
2 / 998.3	AUGER REFUSAL ON PROBABLE COBBLES AND/OR BOULDERS @ 1± FOOT END OF BORING @ 1± FOOT						
3 / 997.3							
4 / 996.3							
5 / 995.3							
6 / 994.3							
7 / 993.3							
8 / 992.3							
9 / 991.3							
10 / 990.3							
11 / 989.3							
12 / 988.3							
13 / 987.3							
14 / 986.3							
15 / 985.3							
16 / 984.3							
17 / 983.3							
18 / 982.3							
19 / 981.3							
20 / 980.3							

FIELD OBSERVATIONS

Water Level $_{\text{during drilling}}$: Not Encountered
Water Level $_{\text{upon completion}}$: Not Present
Caved at $_{\text{upon completion}}$: N/A
Delay Time: N/A
Water Level $_{\text{delayed}}$: N/A
Caved at $_{\text{delayed}}$: N/A

ADDITIONAL COMMENTS:

Note: Lines of stratification represent an approximate boundary between soil types. Variations may occur between sampling intervals and/or boring locations. Transitions may also be gradual. Dashed lines are indicative of potentially erratic or unknown transitions, such as fill-to-natural soil zone transitions.

SOIL BORING LOG: B - 9A

Project: Proposed Preliminary Exploration - Downing Farm Subdivision
Project No.: 0094875

Location: North Side of State Highway 18
Waukesha, Wisconsin

Drill Date: May 7, 2019
Drilled By: GW/KH

DEPTH/EL. (feet)	VISUAL SOIL CLASSIFICATION GROUND SURFACE ELEVATION: 1000.3	SAMPLE NO.	N (bpf)	Qp (tsf)	Qu (tsf)	MC (%)	REMARKS
0	0-7": 10YR 4/2 Dark grayish brown SILTY CLAY LOAM, with roots (2,f), mvfr-moist (TOPSOIL)			-	-	21	
1 / 999.3	10YR 4/3 Brown CLAY, with roots (2,f), 0,m, mvfr-moist	1-SS	5	1.0	-	15	
2 / 998.3	2.5Y 6/4 Light yellowish brown GRAVELLY FINE SANDY LOAM, 0,m, mfr-moist	2-SS	10	-	-	8	
3 / 997.3							
4 / 996.3							
5 / 995.3		3-SS	12	-	-	7	
6 / 994.3							
7 / 993.3		4-SS	14	-	-	8	⊥
8 / 992.3	2.5Y 6/4 Light yellowish brown VERY GRAVELLY FINE SANDY LOAM, 0,m, mfi-moist						
9 / 991.3		5-SS	16	-	-	5	
10 / 990.3							
11 / 989.3		6-SS**	77/10"	-	-	-	
12 / 988.3	**AUGER REFUSAL ON POSSIBLE COBBLES, BOULDERS, AND/OR BEDROCK @ 12± FEET** **END OF BORING @ 12± FEET**						
13 / 987.3							
14 / 986.3							
15 / 985.3							
16 / 984.3							
17 / 983.3							
18 / 982.3							
19 / 981.3							
20 / 980.3							

FIELD OBSERVATIONS

Water Level $_{\text{during drilling}}$: Not Encountered ▽
Water Level $_{\text{upon completion}}$: Not Present ▼
Caved at $_{\text{upon completion}}$: 7± feet below existing grade (EL. 993.3±) ⊥
Delay Time: N/A
Water Level $_{\text{delayed}}$: N/A ¥
Caved at $_{\text{delayed}}$: N/A

ADDITIONAL COMMENTS:

****No Sample Recovery.**

NOTE: Boring offset approximately 5-feet north of B-9 due to shallow refusal.

Note: Lines of stratification represent an approximate boundary between soil types. Variations may occur between sampling intervals and/or boring locations. Transitions may also be gradual. Dashed lines are indicative of potentially erratic or unknown transitions, such as fill-to-natural soil zone transitions.

SOIL BORING LOG: B - 10

Project: Proposed Preliminary Exploration - Downing Farm Subdivision
Project No.: 0094875

Location: North Side of State Highway 18, Waukesha, Wisconsin
Drill Date: May 8, 2019
Drilled By: GW/KH

DEPTH/EL. (feet)	VISUAL SOIL CLASSIFICATION GROUND SURFACE ELEVATION: 1014.3	SAMPLE NO.	N (bpf)	Qp (tsf)	Qu (tsf)	MC (%)	REMARKS
1 1013.3	0-11": Dark brown CLAY, with silt and trace root matter, moist (TOPSOIL)	1-SS	4	-	-	24	
2 1012.3	Brown CLAY, with dark brown seams, moist (REGRADED SOIL)			1.0	-	19	
3 1011.3		2-SS	4	-	-	8	▽
4 1010.3	Light brown Silty Fine SAND, with gravel and trace clay, very moist to wet						
5 1009.3		3-SS	9	-	-	10	
6 1008.3							
7 1007.3		4-SS	6	-	-	9	▼ ⊥
8 1006.3	Light brown Gravelly Fine SAND, with silt, and trace clay, very moist to wet						
9 1005.3		5-SS	7	-	-	11	
10 1004.3							
11 1003.3		6-SS	6	-	-	10	
12 1002.3							
13 1001.3		7-SS	12	-	-	9	
14 1000.3							
15 999.3							
16 998.3							
17 997.3							
18 996.3							
19 995.3							
20 994.3	**END OF BORING @ 20± FEET**						

FIELD OBSERVATIONS:

Water Level $_{\text{during drilling}}$: 3± feet below ground surface (EL. 1011.3±) ▽
Water Level $_{\text{upon completion}}$: 8± feet below ground surface (EL. 1006.3±) ▼
Caved at $_{\text{upon completion}}$: 8± feet below ground surface (EL. 1006.3±) ⊥
Delay Time: N/A
Water Level $_{\text{delayed}}$: N/A ¥
Caved at $_{\text{delayed}}$: N/A

ADDITIONAL COMMENTS:

Note: Lines of stratification represent an approximate boundary between soil types. Variations may occur between sampling intervals and/or boring locations. Transitions may also be gradual.

SOIL BORING LOG: B - 11

Project: Proposed Preliminary Exploration - Downing Farm Subdivision
Project No.: 0094875

Location: North Side of State Highway 18, Waukesha, Wisconsin
Drill Date: May 8, 2019
Drilled By: GW/KH

DEPTH/EL. (feet)	VISUAL SOIL CLASSIFICATION GROUND SURFACE ELEVATION: 1033.7	SAMPLE NO.	N (bpf)	Qp (tsf)	Qu (tsf)	MC (%)	REMARKS
	0-7": Dark brown CLAY, with silt and trace root matter, moist (TOPSOIL)			-	-	40	
1 / 1032.7	Brown CLAY, with silt, moist	1-SS	6	2.0	2.5	22	
2 / 1031.7							
3 / 1030.7		2-SS	6	0.5	0.7	25	
4 / 1029.7							
5 / 1028.7	Brown SILT, with trace fine sand and gravel, moist	3-SS	10	-	-	16	⊥
6 / 1027.7							
7 / 1026.7		4-SS	23	-	-	11	
8 / 1025.7							
9 / 1024.7							
10 / 1023.7	Light brown Silty Fine SAND, with gravel, moist	5-SS	14	-	-	8	
11 / 1022.7							
12 / 1021.7		6-SS	79/10"	-	-	9	
13 / 1020.7							
14 / 1019.7							
15 / 1018.7							
16 / 1017.7							
17 / 1016.7							
18 / 1015.7	**AUGER REFUSAL ON POSSIBLE COBBLES, BOULDERS, AND/OR BEDROCK @ 17± FEET** **END OF BORING @ 17± FEET**						
19 / 1014.7							
20 / 1013.7							

FIELD OBSERVATIONS:

Water Level $_{\text{during drilling}}$: Not Encountered ▽
Water Level $_{\text{upon completion}}$: Not Present ▼
Caved at $_{\text{upon completion}}$: 6± feet below ground surface (EL. 1027.7±) ⊥
Delay Time: N/A
Water Level $_{\text{delayed}}$: N/A ¥
Caved at $_{\text{delayed}}$: N/A

ADDITIONAL COMMENTS:

Note: Lines of stratification represent an approximate boundary between soil types. Variations may occur between sampling intervals and/or boring locations. Transitions may also be gradual.

SOIL BORING LOG: B - 12

Project: Proposed Preliminary Exploration - Downing Farm Subdivision
Project No.: 0094875

Location: North Side of State Highway 18
Waukesha, Wisconsin

Drill Date: May 8, 2019
Drilled By: GW/KH

DEPTH/EL. (feet)	VISUAL SOIL CLASSIFICATION GROUND SURFACE ELEVATION: 1024.7	SAMPLE NO.	N (bpf)	Qp (tsf)	Qu (tsf)	MC (%)	REMARKS
1 1023.7	0-8": Dark brown CLAY, with silt and trace root matter, moist (TOPSOIL)			-	-	26	
2 1022.7	Brown CLAY, with trace root matter, moist	1-SS	4	0.8	-	23	
3 1021.7	Light brown Silty Fine SAND, with gravel and trace clay, moist	2-SS	12	-	-	8	
4 1020.7							
5 1019.7							
6 1018.7	Light brown Gravelly Fine SAND, with silt, moist	3-SS	10	-	-	8	
7 1017.7							⊥
8 1016.7		4-SS	14	-	-	9	
9 1015.7							
10 1014.7	(WET @ 10')						▽
11 1013.7		5-SS	52	-	-	11	
12 1012.7							
13 1011.7							
14 1010.7		6-SS	50/2"	-	-	8	
15 1009.7							
16 1008.7							
17 1007.7							
18 1006.7	**AUGER REFUSAL ON POSSIBLE COBBLES, BOULDERS, AND/OR BEDROCK @ 17± FEET** **END OF BORING @ 17± FEET**						
19 1005.7							
20 1004.7							

FIELD OBSERVATIONS:

Water Level $_{\text{during drilling}}$: 10± feet below ground surface (EL. 1014.7±) ▽
Water Level $_{\text{upon completion}}$: Not Present ▼
Caved at $_{\text{upon completion}}$: 7± feet below ground surface (EL. 1017.7±) ⊥
Delay Time: N/A
Water Level $_{\text{delayed}}$: N/A ¥
Caved at $_{\text{delayed}}$: N/A

ADDITIONAL COMMENTS:

Note: Lines of stratification represent an approximate boundary between soil types. Variations may occur between sampling intervals and/or boring locations. Transitions may also be gradual.

SOIL BORING LOG: B - 13

Project: Proposed Preliminary Exploration - Downing Farm Subdivision
Project No.: 0094875

Location: North Side of State Highway 18
Waukesha, Wisconsin

Drill Date: May 8, 2019
Drilled By: GW/KH

DEPTH/EL. (feet)	VISUAL SOIL CLASSIFICATION GROUND SURFACE ELEVATION: 1007.8	SAMPLE NO.	N (bpf)	Qp (tsf)	Qu (tsf)	MC (%)	REMARKS
	0-4": Dark brown CLAY, with silt and trace root matter, moist (TOPSOIL)			-	-	39	
1 / 1006.8	Brown CLAY, moist	1-SS	5	1.3	-	23	
2 / 1005.8							
3 / 1004.8	Light brown Gravelly Fine SAND, with silt, and trace clay, moist	2-SS	25	-	-	8	
4 / 1003.8							
5 / 1002.8		3-SS*	10	-	-	11	
6 / 1001.8							
7 / 1000.8		4-SS	13	-	-	9	
8 / 999.8							
9 / 998.8		5-SS	23	-	-	9	
10 / 997.8							
11 / 996.8		6-SS*	45	-	-	5	
12 / 995.8							
13 / 994.8							
14 / 993.8							
15 / 992.8							
16 / 991.8							
17 / 990.8	**AUGER REFUSAL ON POSSIBLE COBBLES, BOULDERS, AND/OR BEDROCK @ 17± FEET** **END OF BORING @ 17± FEET**						
18 / 989.8							
19 / 988.8							
20 / 987.8							

FIELD OBSERVATIONS:

Water Level $_{\text{during drilling}}$: Not Encountered
Water Level $_{\text{upon completion}}$: Not Present
Caved at $_{\text{upon completion}}$: 7± feet below ground surface (EL. 1000.8±)
Delay Time: N/A
Water Level $_{\text{delayed}}$: N/A
Caved at $_{\text{delayed}}$: N/A

ADDITIONAL COMMENTS:

***Poor Sample Recovery- Pushed rock**

Note: Lines of stratification represent an approximate boundary between soil types. Variations may occur between sampling intervals and/or boring locations. Transitions may also be gradual.

SOIL BORING LOG: B - 14

Project: Proposed Preliminary Exploration - Downing Farm Subdivision
Project No.: 0094875

Location: North Side of State Highway 18, Waukesha, Wisconsin
Drill Date: May 8, 2019
Drilled By: GW/KH

DEPTH/EL. (feet)	VISUAL SOIL CLASSIFICATION GROUND SURFACE ELEVATION: 994.2	SAMPLE NO.	N (bpf)	Qp (tsf)	Qu (tsf)	MC (%)	REMARKS
0 / 994.2	0-5": 10YR 4/2 Dark grayish brown CLAY, with roots (1,f), 0,m, mvfr-moist (TOPSOIL)			-	-	30	
1 / 993.2	10YR 3/3 Dark brown CLAY, 0,m, mvfr-moist	1-SS	5	1.8	2.1	23	
2 / 992.2							
3 / 991.2		2-SS	4	-	-	10	▼
4 / 990.2	2.5Y 6/4 Light yellowish brown SANDY LOAM, 0,m, mvfr-moist						
5 / 989.2	2.5Y 6/4 Light yellowish brown GRAVELLY SANDY LOAM, 0,m, mfr-very moist to wet	3-SS	11	-	-	10	
6 / 988.2							
7 / 987.2		4-SS	4	-	-	11	⊥
8 / 986.2							
9 / 985.2		5-SS*	14	-	-	14	
10 / 984.2							
11 / 983.2		6-SS*	14	-	-	10	
12 / 982.2							
13 / 981.2		7-SS	30	-	-	9	
14 / 980.2							
15 / 979.2		8-SS	33	-	-	8	
16 / 978.2							
17 / 977.2	**AUGER REFUSAL ON POSSIBLE COBBLES, BOULDERS, OR BEDROCK @ 16± FEET** **END OF BORING @ 16± FEET**						
18 / 976.2							
19 / 975.2							
20 / 974.2							

FIELD OBSERVATIONS

Water Level $_{\text{during drilling}}$: 3± feet below existing grade (EL. 991.2±) ▼
Water Level $_{\text{upon completion}}$: Not Present ▼
Caved at $_{\text{upon completion}}$: 7± feet below existing grade (EL. 987.2±) ⊥
Delay Time: N/A
Water Level $_{\text{delayed}}$: N/A ¥
Caved at $_{\text{delayed}}$: N/A

ADDITIONAL COMMENTS:

Boring offset approximately 35 feet north from its originally planned location due to trees

***Poor Sample Recovery- Pushed rock**

Note: Lines of stratification represent an approximate boundary between soil types. Variations may occur between sampling intervals and/or boring locations. Transitions may also be gradual. Dashed lines are indicative of potentially erratic or unknown transitions, such as fill-to-natural soil zone transitions.

SOIL BORING LOG: B - 15

Project: Proposed Preliminary Exploration - Downing Farm Subdivision
Project No.: 0094875

Location: North Side of State Highway 18, Waukesha, Wisconsin
Drill Date: May 8, 2019
Drilled By: GW/KH

DEPTH/EL. (feet)	VISUAL SOIL CLASSIFICATION GROUND SURFACE ELEVATION: 1032.5	SAMPLE NO.	N (bpf)	Qp (tsf)	Qu (tsf)	MC (%)	REMARKS
	0-6": Dark brown CLAY, with silt and trace root matter, moist (TOPSOIL)			-	-	29	
1 / 1031.5	Brown CLAY, moist	1-SS	4	0.8	-	25	
2 / 1030.5							
3 / 1029.5	Light brown Silty Fine SAND, with gravel and trace clay, moist	2-SS	6	-	-	11	
4 / 1028.5							
5 / 1027.5	(WET @ 5')						▽
6 / 1026.5		3-SS	7	-	-	8	
7 / 1025.5							
8 / 1024.5		4-SS**	50/51"	-	-	-	⊥
9 / 1023.5							
10 / 1022.5							
11 / 1021.5		5-SS	11	-	-	10	
12 / 1020.5							
13 / 1019.5							
14 / 1018.5		6-SS	57	-	-	11	
15 / 1017.5							
16 / 1016.5							
17 / 1015.5							
18 / 1014.5	**AUGER REFUSAL ON POSSIBLE COBBLES, BOULDERS, AND/OR BEDROCK @ 17± FEET** **END OF BORING @ 17± FEET**						
19 / 1013.5							
20 / 1012.5							

FIELD OBSERVATIONS:

Water Level $_{\text{during drilling}}$: 5± feet below ground surface (EL. 1027.5±) ▽
Water Level $_{\text{upon completion}}$: Not Present ▼
Caved at $_{\text{upon completion}}$: 8± feet below ground surface (EL. 1024.5±) ⊥
Delay Time: N/A
Water Level $_{\text{delayed}}$: N/A ¥
Caved at $_{\text{delayed}}$: N/A

ADDITIONAL COMMENTS:

Boring offset approximately 30 feet northeast from its originally planned location due to trees

***Poor Sample Recovery- Pushed rock**

Note: Lines of stratification represent an approximate boundary between soil types. Variations may occur between sampling intervals and/or boring locations. Transitions may also be gradual.

SOIL BORING LOG: B - 16

Project: Proposed Preliminary Exploration - Downing Farm Subdivision
Project No.: 0094875

Location: North Side of State Highway 18, Waukesha, Wisconsin
Drill Date: May 8, 2019
Drilled By: GW/KH

DEPTH/EL. (feet)	VISUAL SOIL CLASSIFICATION GROUND SURFACE ELEVATION: 1030.6	SAMPLE NO.	N (bpf)	Qp (tsf)	Qu (tsf)	MC (%)	REMARKS
1 1029.6	Brown CLAY, with gravel and dark brown seams, (FILL)	1-SS	7	-	-	16	
2 1028.6	Brown CLAY, moist			1.3	-	24	
3 1027.6	Brown Clayey SAND, with silt and trace gravel, wet	2-SS	4	-	-	16	▽
4 1026.6							
5 1025.6							⊥
6 1024.6	Light brown Silty Fine SAND, with trace gravel, wet	3-SS	9	-	-	11	
7 1023.6							
8 1022.6		4-SS	11	-	-	9	
9 1021.6							
10 1020.6							
11 1019.6		5-SS*	50/4"	-	-	1	
12 1018.6							
13 1017.6							
14 1016.6	**AUGER REFUSAL ON POSSIBLE COBBLES, BOULDERS, AND/OR BEDROCK @ 13± FEET** **END OF BORING @ 13± FEET**						
15 1015.6							
16 1014.6							
17 1013.6							
18 1012.6							
19 1011.6							
20 1010.6							

FIELD OBSERVATIONS:

Water Level $_{\text{during drilling}}$: 2.5± feet below ground surface (EL. 1028.1±) ▽
Water Level $_{\text{upon completion}}$: Not Present ▼
Caved at $_{\text{upon completion}}$: 5± feet below ground surface (EL. 1025.6±) ⊥
Delay Time: N/A
Water Level $_{\text{delayed}}$: N/A ¥
Caved at $_{\text{delayed}}$: N/A

ADDITIONAL COMMENTS:

***Poor Sample Recovery- Pushed rock**

Note: Lines of stratification represent an approximate boundary between soil types. Variations may occur between sampling intervals and/or boring locations. Transitions may also be gradual.

SOIL BORING LOG: B - 17

Project: Proposed Preliminary Exploration - Downing Farm Subdivision
Project No.: 0094875

Location: North Side of State Highway 18
Waukesha, Wisconsin

Drill Date: May 8, 2019
Drilled By: GW/KH

DEPTH/EL. (feet)	VISUAL SOIL CLASSIFICATION GROUND SURFACE ELEVATION: 1021.4	SAMPLE NO.	N (bpf)	Qp (tsf)	Qu (tsf)	MC (%)	REMARKS
1 1020.4	0-9": Dark brown CLAY, with silt, and trace root matter, moist (TOPSOIL)	1-SS	4	-	-	29	
2 1019.4	Brown Gravelly Fine SAND, with silt and trace clay, moist					15	
3 1018.4	Light brown SILT, with fine sand and trace gravel, and clay, moist	2-SS	9	-	-	8	
4 1017.4							
5 1016.4							▽
6 1015.4	Light brown Silty Fine SAND, with gravel, and trace clay, moist to wet	3-SS	16	-	-	9	
7 1014.4							⊥
8 1013.4		4-SS	11	-	-	10	
9 1012.4							
10 1011.4							
11 1010.4	Light brown Silty Fine SAND, with gravel and trace clay, moist	5-SS	12	-	-	9	
12 1009.4							
13 1008.4							
14 1007.4		6-SS	14	-	-	9	
15 1006.4							
16 1005.4							
17 1004.4							
18 1003.4							
19 1002.4		7-SS	9	-	-	-	
20 1001.4							
	END OF BORING @ 20± FEET						

FIELD OBSERVATIONS:

Water Level $_{during\ drilling}$: 5± feet below ground surface (EL. 1016.4±) ▽
Water Level $_{upon\ completion}$: Not Present ▼
Caved at $_{upon\ completion}$: 7± feet below ground surface (EL. 1014.4±) ⊥
Delay Time: N/A
Water Level $_{delayed}$: N/A ¥
Caved at $_{delayed}$: N/A

ADDITIONAL COMMENTS:

Note: Lines of stratification represent an approximate boundary between soil types. Variations may occur between sampling intervals and/or boring locations. Transitions may also be gradual.

SOIL BORING LOG: B - 18

Project: Proposed Preliminary Exploration - Downing Farm Subdivision
Project No.: 0094875

Location: North Side of State Highway 18, Waukesha, Wisconsin
Drill Date: May 8, 2019
Drilled By: GW/KH

DEPTH/EL. (feet)	VISUAL SOIL CLASSIFICATION GROUND SURFACE ELEVATION: 1017.4	SAMPLE NO.	N (bpf)	Qp (tsf)	Qu (tsf)	MC (%)	REMARKS
	0-7": Dark brown CLAY, with silt and trace root matter, moist (TOPSOIL)					28	
1 / 1016.4	Brown CLAY, with silt, moist	1-SS	6	-	-	23	
2 / 1015.4							
3 / 1014.4	Light brown SILT, with fine sand, and gravel, moist	2-SS	19	-	-	4	
4 / 1013.4							
5 / 1012.4	Light brown Fine SAND, with trace silt and gravel, moist	3-SS	35	-	-	6	
6 / 1011.4							
7 / 1010.4							⊥ v
8 / 1009.4	Light brown Silty Fine SAND, with trace gravel and clay, very moist to wet	4-SS	14	-	-	10	
9 / 1008.4							
10 / 1007.4		5-SS	6	-	-	12	
11 / 1006.4							
12 / 1005.4							
13 / 1004.4		6-SS	50/4"	-	-	9	
14 / 1003.4							
15 / 1002.4							
16 / 1001.4							
17 / 1000.4							
18 / 999.4	**AUGER REFUSAL ON POSSIBLE COBBLES, BOULDERS, AND/OR BEDROCK @ 17± FEET** **END OF BORING @ 17± FEET**						
19 / 998.4							
20 / 997.4							

FIELD OBSERVATIONS:

Water Level $_{\text{during drilling}}$: 7.5± feet below ground surface (EL. 1009.9±) v
Water Level $_{\text{upon completion}}$: Not Present ▼
Caved at $_{\text{upon completion}}$: 7± feet below ground surface (EL. 1010.4±) ⊥
Delay Time: N/A
Water Level $_{\text{delayed}}$: N/A ¥
Caved at $_{\text{delayed}}$: N/A

ADDITIONAL COMMENTS:

Note: Lines of stratification represent an approximate boundary between soil types. Variations may occur between sampling intervals and/or boring locations. Transitions may also be gradual.

SOIL BORING LOG: B - 19

Project: Proposed Preliminary Exploration - Downing Farm Subdivision
Project No.: 0094875

Location: North Side of State Highway 18
Waukesha, Wisconsin

Drill Date: May 8, 2019
Drilled By: GW/KH

DEPTH/EL. (feet)	VISUAL SOIL CLASSIFICATION GROUND SURFACE ELEVATION: 1010.4	SAMPLE NO.	N (bpf)	Qp (tsf)	Qu (tsf)	MC (%)	REMARKS
1 1009.4	0-6": 10YR 3/2 Very dark grayish brown, CLAY, with roots (2,vf), 0,m, mvfr-moist (TOPSOIL) 10YR 4/3 Brown CLAY, with roots (1,vf), 0,m, mvfr-moist	1-SS	4	-	-	31 23	
2 1008.4	2.5Y 6/4 Light yellowish brown GRAVELLY FINE SANDY LOAM, 0,m, mfr-very moist to wet						▼
3 1007.4		2-SS	12	-	-	9	
4 1006.4							
5 1005.4		3-SS	11	-	-	8	
6 1004.4							
7 1003.4		4-SS*	69/9"	-	-	19	
8 1002.4							
9 1001.4	2.5Y 6/4 Light yellowish brown VERY GRAVELLY FINE SANDY LOAM, 0,m, mefi-moist	5-SS	52	-	-	5	⊥
10 1000.4							
11 999.4	2.5Y 6/4 Light yellowish brown GRAVELLY FINE SAND, 0,sg, mefi-moist	6-SS	67/9"	-	-	8	
12 998.4							
13 997.4		7-SS	50/4"	-	-	4	
14 996.4							
15 995.4		8-SS*	50/2"	-	-	6	
16 994.4	**AUGER REFUSAL ON POSSIBLE COBBLES, BOULDERS, AND/OR BEDROCK @ 15± FEET** **END OF BORING @ 15± FEET**						
17 993.4							
18 992.4							
19 991.4							
20 990.4							

FIELD OBSERVATIONS

Water Level $_{\text{during drilling}}$: 2± feet below existing grade (EL. 1008.4±) ▼
Water Level $_{\text{upon completion}}$: Not Present ▼
Caved at $_{\text{upon completion}}$: 9± feet below existing grade (EL. 1001.4±) ⊥
Delay Time: N/A
Water Level $_{\text{delayed}}$: N/A ¥
Caved at $_{\text{delayed}}$: N/A

ADDITIONAL COMMENTS:

***Poor Sample Recovery- Pushed rock**

Note: Lines of stratification represent an approximate boundary between soil types. Variations may occur between sampling intervals and/or boring locations. Transitions may also be gradual. Dashed lines are indicative of potentially erratic or unknown transitions, such as fill-to-natural soil zone transitions.

SOIL BORING LOG: B - 20

Project: Proposed Preliminary Exploration - Downing Farm Subdivision
Project No.: 0094875

Location: North Side of State Highway 18
Waukesha, Wisconsin

Drill Date: May 8, 2019
Drilled By: GW/KH

DEPTH/EL. (feet)	VISUAL SOIL CLASSIFICATION GROUND SURFACE ELEVATION: 1005.3	SAMPLE NO.	N (bpf)	Qp (tsf)	Qu (tsf)	MC (%)	REMARKS
1 1004.3	0-11": 10YR 4/2 Dark grayish brown CLAY, with roots (3,f), mvfr-moist (TOPSOIL)	1-SS	4	-	-	31	
2 1003.3	10YR 4/3 Brown CLAY, with roots (2,vf), 0,m, mvfr-moist			0.8	-	18	
3 1002.3	2.5Y 6/4 Light yellowish brown GRAVELLY FINE SANDY LOAM, 0,m, mefi-moist	2-SS	7	-	-	9	
4 1001.3							
5 1000.3		3-SS	25	-	-	5	
6 999.3							
7 998.3	2.5Y 6/4 Light Yellowish brown VERY GRAVELLY FINE SANDY LOAM, 0,m, mefi-moist	4-SS	84/9"	-	-	5	
8 997.3							
9 996.3		5-SS*	50/2"	-	-	6	
10 995.3							
11 994.3		6-SS*	50/54"	-	-	5	
12 993.3							⊥
13 992.3	2.5Y 6/4 Light Yellowish brown VERY GRAVELLY LOAMY FINE SAND, 0,sg, mefi-moist	7-SS	50/3"	-	-	6	
14 991.3							¥
15 990.3	2.5Y 6/4 Light Yellowish brown GRAVELLY FINE SAND, 0,sg, mefi-moist	8-SS	69/11"	-	-	13	
16 989.3							
17 988.3	**AUGER REFUSAL ON POSSIBLE COBBLES, BOULDERS, OR BEDROCK @ 16± FEET** **END OF BORING @ 16± FEET**						
18 987.3							
19 986.3							
20 985.3							

FIELD OBSERVATIONS

Water Level $_{\text{during drilling}}$: 14± feet below existing grade (EL. 991.3±) ¥
Water Level $_{\text{upon completion}}$: Not Present ▼
Caved at $_{\text{upon completion}}$: 12± feet below existing grade (EL. 993.3±) ⊥
Delay Time: N/A
Water Level $_{\text{delayed}}$: N/A ¥
Caved at $_{\text{delayed}}$: N/A

ADDITIONAL COMMENTS:

Note: Lines of stratification represent an approximate boundary between soil types. Variations may occur between sampling intervals and/or boring locations. Transitions may also be gradual. Dashed lines are indicative of potentially erratic or unknown transitions, such as fill-to-natural soil zone transitions.