Welshire Farm

Town of Delafield, Wisconsin

Preliminary

Stormwater Management Plan

Prepared by:

Trio Engineering LLC
4100 N. Calhoun Road
Brookfield, Wisconsin 53005
Contact: Josh Pudelko, P.E.
Telephone: (262) 790-1480
Email: info@trioeng.com

Sound Stormwater Design LLC
Contact: Jayme Sisel, P.E.
Telephone: (414) 286-4739
Email: jayme.sisel@soundstormwater.com

WISCONSIN
JAYME L
SISEL
E-37791
MUSKEGO
WI
PROFESSIONAL ENGINEER

March 20, 2023
Revised June 22, 2023
Revised December 22, 2023

TABLE OF CONTENTS

APPENDICES

Introduction

"Welshire Farm" is a proposed multi-family and single-family residential development on a 151.05-acre parcel located northwest of the intersection of Golf Road and Elmhurst Road in the Town of Delafield, Waukesha County, Wisconsin. Refer to Figure 1 for a general location of the project site.

The proposed subdivision design integrates with the existing topography, preserving trees and wetlands to the maximum extent practicable, and situates ponds and basins where runoff naturally flows, but with controlled outlets that reduce runoff rates and redirect runoff to adequate discharge points. This design approach minimizes site grading and maximizes the existing trees and wetlands that can be retained on the site.

This report documents the design computations for pre-development and post-development conditions and presents a plan for stormwater management that meets the requirements of the Town of Delafield, Waukesha County, and the Wisconsin Department of Natural Resources (WDNR).

Owner/ Developer

The owner, developer, and responsible entity for installation and maintenance of the stormwater management practices is:

> **Neumann Developments, Inc**
> N27 W24025 Paul Ct, Suite 100
> Pewaukee, Wisconsin 53072
> Contact: Bryan Lindgren
> Phone: (262) 542-9200

Design Requirements

The following design standards have been used to develop the stormwater management plan for the "Welshire Farm" project:

- <u>Waukesha County</u> Chapter 14, Article VIII, Stormwater Management & Erosion Control Ordinance

- <u>Wisconsin Department of Natural Resources (WDNR)</u> Technical Standards, NR151, and NR216

- Summary of design requirements:
    - <u>Peak Discharge</u>:
        - Waukesha County: The peak flow discharge rates of stormwater runoff from the site under the post-development site conditions shall not exceed the rates under the pre-development conditions for the 1, 2, 10, and 100-year, 24-hour design storm events.

- Water Quality (Total Suspended Solids): Reduce to the maximum extent practicable the total suspended solids load by 80%, based on an average annual rainfall, as compared to no runoff management controls.
- Infiltration: For low impervious developments:
  - Infiltrate sufficient runoff volume so that the post-development infiltration volume is at least 90 percent of pre-development infiltration volume, based on an average annual rainfall.
  - No more than 1 percent of the post-construction site is required as an effective infiltration area.

Analysis Overview

The Stormwater Management Plan for the "Welshire Farm" subdivision has been designed in accordance with the Town of Delafield, Waukesha County, and all applicable state requirements. Pre-development and post-development stormwater runoff conditions for the site were analyzed for: runoff volume, peak volume, discharge, detention basin storage capacity required, outlet structure and storm sewer system requirements. The software package used for modeling and analysis was HydroCAD Version 10.10 software by HydroCAD Software Solutions. HydroCAD uses NRCS methods to generate runoff and pond routing hydrographs. The model's capabilities include modeling simple drainage basins, combining hydrographs to determine runoff and storage requirements, and detention basin and outlet structure sizing.

MSE3 rainfall distributions were used for modeling the 1, 2, 10 and 100-year, 24-hour storm events. The corresponding rainfall data used for the modeling was taken from Table 3 of Chapter 14 of the County's Ordinance and is shown in the following table.

TABLE 1
Design Rainfall Values

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

Soil types for the site were determined from NRCS Soil Survey for Waukesha County and from soil boring logs prepared by Professional Service Industries (PSI). The Soil Survey identifies the soils at the site as mostly Theresa silt loam and Knowles silt loam with some limited areas of Hochheim loam and Ritchey silt loam soils. The soil boring logs indicated the soils encountered as generally 1 to 4 feet of dark brown clay to silty clay with organics underlain by clayey sand and sand with gravel extending to the termination of the borings. Groundwater was encountered with boring B-2, which was completed within the wetland area, at a depth of about 4 feet below existing grade. Groundwater was not observed during or at completion of drilling within the remaining boring locations. Based on this, a hydrologic soil group C was used to determine runoff curve numbers for the site. Refer to Appendix E for details.

Pre-Development Watershed Description

The project site is approximately 151.05-acres in size and is occupied by agricultural fields, woodlands, wetlands, residential homes, and a former farmstead with outbuildings. Surface drainage for the majority of the site is generally towards an on-site wetland that flows south to north and eventually drains to a culvert at Oakton Road that discharges to Pewaukee Lake. The remainder of the site slopes towards roadside ditches at Glen Cove Road, Elmhurst Road, and Gold Road.

Land cover types, drainage boundaries and flow paths are shown on Figure 2, Pre-Development Conditions Plan. The following table summarizes the results of the stormwater model 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 Conditions

Subarea, or Junction	Description	Area (acres)	Imp. Area (acres)	Time of Conc. (minutes)	Peak Flow Rate (cfs)			
					1-year	2-year	10-year	100-year
1	Subarea	11.87	0.00	12	10.95	14.33	28.30	61.73
1D	Depression	-	-	-	0.00	0.00	0.00	0.65
2	Subarea	14.48	0.00	13	13.44	17.42	34.00	73.06
3	Subarea	4.56	0.00	10	3.51	4.76	10.07	23.21
4	Subarea	1.10	0.00	9	1.24	1.61	3.10	6.62
5	Subarea	28.78	0.00	14	24.09	31.58	62.53	136.90
6	Subarea	11.23	0.21	22	8.19	10.65	20.84	45.09
6D	Depression	-	-	-	2.16	3.09	7.15	16.64
7	Subarea	12.83	0.03	29	7.24	9.53	19.06	42.19
7D	Depression	-	-	-	5.13	7.49	17.31	39.43
8	Subarea	26.11	0.72	28	13.97	18.61	38.15	85.99
1L	**West Subwatershed**	**26.35**	**0.00**	**-**	**13.44**	**17.42**	**34.00**	**73.06**
2L	**Northwest Subwatershed**	**4.56**	**0.00**	**-**	**3.51**	**4.76**	**10.07**	**23.21**
3L	**North Subwatershed**	**29.88**	**0.00**	**-**	**24.99**	**32.75**	**64.83**	**142.66**
4L	**Southeast Subwatershed**	**50.17**	**0.96**	**-**	**17.42**	**23.83**	**51.96**	**119.33**

Post-Development Site Drainage Description

The proposed development includes the construction of twenty-eight (28) 2-family condominium units and one hundred fifty-five (155) single-family lots. The proposed plan will disturb approximately 100-acres and will result in a net increase in impervious area of approximately 28.42 acres. Figure 3, Post-Development Conditions Plan, shows the proposed land cover, grading, drainage boundaries, flow paths, and proposed site and stormwater management improvements. The following table summarizes the results of the stormwater model for post-development conditions. A schematic plan of the hydrological analysis and detailed hydrological computations for post-development conditions are included in Appendix B.

TABLE 3
Post-Development Conditions

Subarea, or Junction	Description	Area (acres)	Imp. Area (acres)	Time of Conc. (minutes)	Peak Flow Rate (cfs)			
					1-year	2-year	10-year	100-year
1	Subarea	11.05	3.17	10	14.43	18.14	32.93	66.94
1B	Bioretention Basin	-	-	-	0.87	1.16	1.84	5.42
2	Subarea	1.62	0.69	6	3.38	4.08	6.77	12.61
2B	Infiltration Basin	-	-	-	0.59	0.97	2.09	10.14
3	Subarea	13.36	5.72	15	18.90	23.09	39.32	75.17
3P	Pond	-	-	-	0.43	2.33	19.78	36.55
4	Subarea	4.39	0.58	10	4.65	6.01	11.57	24.71
4B	Infiltration Basin	-	-	-	0.00	0.00	0.00	0.39
5	Subarea	2.59	0.29	10	2.54	3.32	6.54	14.21
5RG	Rain Garden	-	-	-	0.19	0.23	2.53	13.05
6	Subarea	8.80	2.99	10	12.26	15.29	27.25	54.50
6P	Pond	-	-	-	0.37	1.44	13.29	25.56
7a	Subarea	6.38	1.00	10	6.76	8.74	16.82	35.91
7RG	Rain Garden	-	-	-	3.77	6.19	15.43	34.12
7b	Subarea	5.22	1.67	10	7.74	9.57	16.77	33.02
7P	Pond	-	-	-	1.16	1.56	4.08	12.97
8	Subarea	4.61	0.72	10	4.88	6.31	12.15	25.95
8B	Infiltration Basin	-	-	-	0.15	0.20	0.32	9.74
9	Subarea	10.82	3.51	6	19.06	23.51	40.89	79.67
9P	Pond	-	-	-	0.29	0.35	2.16	8.76
10	Subarea	2.04	0.25	10	2.16	2.79	5.38	11.48
10B	Infiltration Basin	-	-	-	0.00	0.00	0.00	0.17
11	Subarea	7.98	2.96	6	14.06	17.34	30.16	58.76
11P	Pond	-	-	-	0.39	0.85	3.31	15.76
12	Subarea	7.03	1.88	10	8.59	10.89	20.14	41.52
12P	Pond	-	-	-	0.31	0.60	8.01	14.97
13	Subarea	5.25	1.11	10	6.41	8.13	15.04	31.01
13P	Pond	-	-	-	0.40	0.46	1.11	9.41
14	Subarea	0.41	0.03	10	0.34	0.46	0.94	2.13
15	Subarea	4.28	0.73	10	4.53	5.86	11.28	24.09
16	Subarea	11.57	1.42	10	10.50	13.88	27.91	61.86
17	Subarea	3.56	0.66	10	3.77	4.88	9.38	20.04
1L	**West Subwatershed**	**21.31**	**6.96**	**-**	**4.01**	**5.15**	**22.80**	**52.33**
2L	**Northwest Subwatershed**	**5.66**	**1.14**	**-**	**0.58**	**0.75**	**1.38**	**10.36**
3L	**North Subwatershed**	**49.43**	**13.91**	**-**	**5.14**	**6.56**	**18.21**	**67.12**
4L	**Southeast Subwatershed**	**34.56**	**7.37**	**-**	**10.98**	**14.56**	**30.27**	**89.93**

Stormwater Detention Basin Design & Summary

The stormwater management plan proposes one (1) bioretention basin, two (2) rain gardens, and four (4) infiltration basins as the primary means of stormwater management for the site. In conformance with the County and WDNR requirements, the ponds and basins have been designed with 4:1 side slopes on the berms, 10-foot top of berm widths, and 10-foot wide safety shelfs below the normal water level within the ponds. Additionally, all outfall structures discharge to energy dissipating level spreaders prior to discharging into the adjacent wetlands.

Understanding the sensitivity of the site, additional measures were taken to maximize infiltration opportunities. This included over-excavating the infiltration basins and enhancing them with engineered soil in order to expose existing granular subsoils that are more suitable for infiltration. In addition, rain gardens were placed in select open space areas where water can have the opportunity to pond (maximum depth 9-inch) and infiltrate slowly into the subsurface at a lesser rate (0.07 to 0.11 in/hr) without negatively impacting the development. These measures were done to significantly reduce peak discharge rates and volumes at all four discharge points for the 1, 2, 10, and 100-yr, 24-hour storms. The only exception where there was a slight increase in runoff volume was for the Northwest Subwatershed which discharges to a larger wetland/stormwater complex to the west.

Peak Discharge Summaries

Waukesha County requires post-development peak discharge rates to be no greater than pre-development discharge rates for the 1, 2, 10, and 100-yr, 24-hr design storms. The following table compares the results of the analysis from a peak discharge standpoint.

TABLE 4
Comparison of Peak Discharge

West Subwatershed (Link 1L)			
	Pre-Development		Post-Development
1-year	13.44 cfs	>	4.01 cfs
2-year	17.42 cfs	>	5.15 cfs
10-year	34.00 cfs	>	22.80 cfs
100-year	73.06 cfs	>	52.33 cfs
Northwest Subwatershed (Link 2L)			
	Pre-Development		Post-Development
1-year	3.51 cfs	>	0.58 cfs
2-year	4.76 cfs	>	0.75 cfs
10-year	10.07 cfs	>	1.38 cfs
100-year	23.21 cfs	>	10.36 cfs

TABLE 4
Comparison of Peak Discharge

North Subwatershed (Link 3L)

	Pre-Development		Post-Development
1-year	24.99 cfs	>	5.14 cfs
2-year	32.75 cfs	>	6.56 cfs
10-year	64.83 cfs	>	18.21 cfs
100-year	142.66 cfs	>	67.12 cfs

Southeast Subwatershed (Link 4L)

	Pre-Development		Post-Development
1-year	17.42 cfs	>	10.98 cfs
2-year	23.83 cfs	>	14.56 cfs
10-year	51.96 cfs	>	30.27 cfs
100-year	119.33 cfs	>	89.93 cfs

Water Quality

The Waukesha County requires new development sites to be designed to remove 80 percent of TSS, based on an average annual rainfall as compared to no runoff management controls. Stormwater quality was analyzed using SLAMM Version 10.5.0 software, developed by Robert Pitt and John Voorhees. The results of the SLAMM analysis indicate that approximately 81.8 percent of TSS will be removed from stormwater as a result of the proposed wet detention ponds, rain gardens, bioretention basin, infiltration basins and the disconnected nature of select roof and patio areas in conformance with WDNR's connected impervious guidance outlined in Document 3800-2020-1.

Based on conversations with the WDNR, to realize the treatment credit for disconnected surfaces two models are created. The first model is run with all surfaces modeled as connected to determine the total TSS loading produced prior to any treatment practices. The second model is run with select surfaces disconnected (such as backyard roof and patio areas) to determine the total TSS loading released after treatment practices. The particulate solids reduction percentage is calculated by dividing the total TSS removed by the total TSS loading produced (prior to any BMPs). Detailed computations are included in Appendix C.

Infiltration

Waukesha County's Chapter 14 requires low imperviousness developments to infiltrate sufficient runoff volume so that the post-development infiltration volume is at least 90% of the pre-development infiltration volume, based on an average annual rainfall. However, no more than 1% of the project site is required as an effective infiltration area.

One (1) bioretention basin, two (2) rain gardens, and four (4) infiltration basins were incorporated into the development plan to meet infiltration performance standards for the proposed subdivision. Design infiltration rates for the site were taken from Table 2 of WDNR Technical Standard 1002, Site Evaluation for Stormwater Infiltration. Static infiltrations rates for the in-situ soils at each basin were based on the least permeable soil horizon within 5 feet below the native soil interface. Infiltration calculations were based on the entire 151.05-acre site and were analyzed using winSLAMM to determine runoff volumes for both pre-development and post-development conditions. The results of the winSLAMM analysis indicate that the site will infiltrate approximately 94.1 percent of the pre-development infiltration volume. Detailed computations are included in Appendix D.

Conclusion

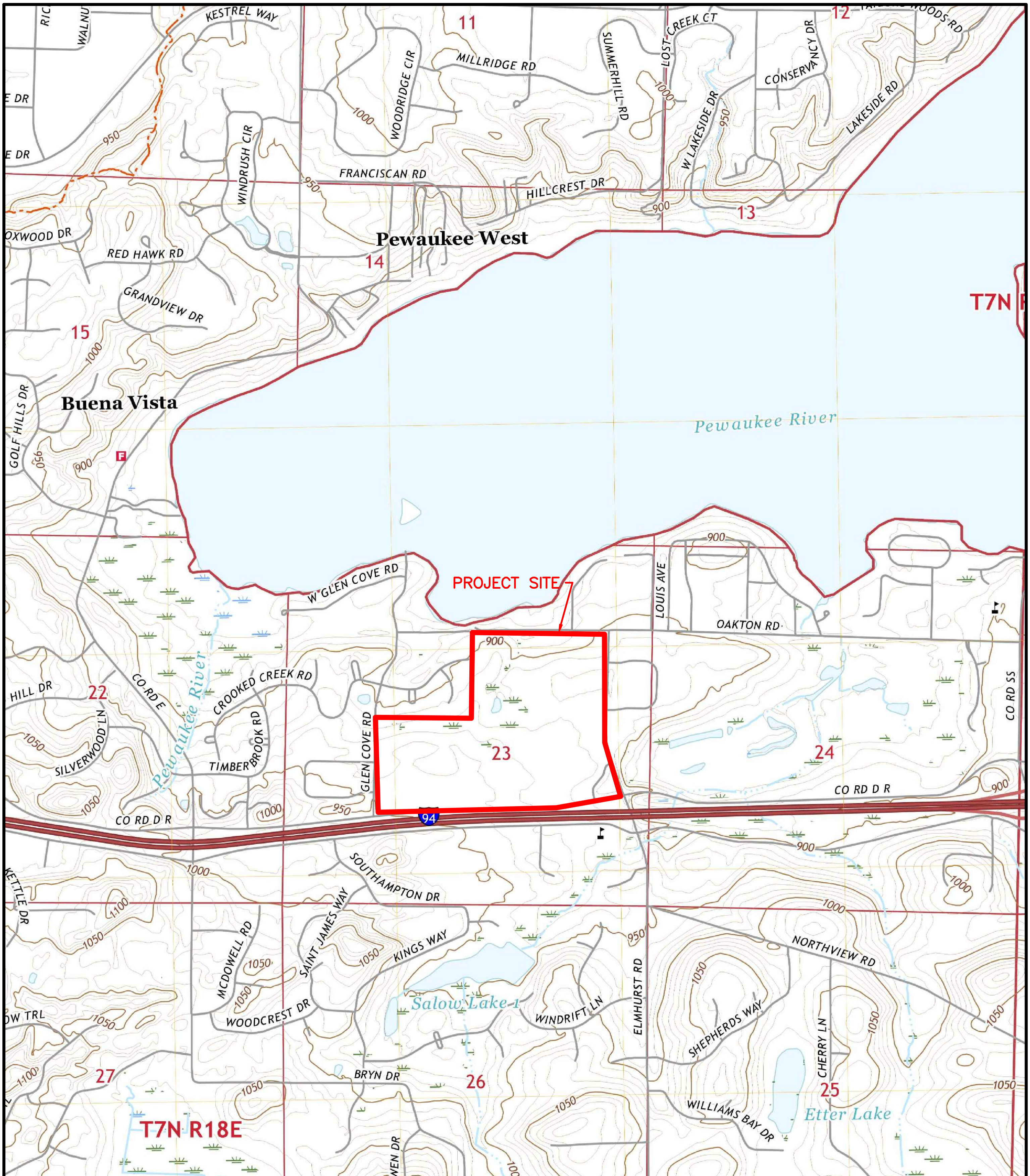
The proposed development will maintain compliance with the Town of Delafield, Waukesha County, and the WDNR's requirements for control of stormwater quantity, quality, and infiltration.

Prepared by:

SOUND STORMWATER DESIGN LLC

Jayme Sisel, P.E.

FIGURES



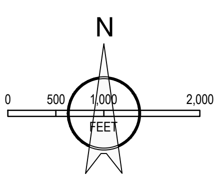


FIGURE 1

SITE LOCATION MAP

WELSHIRE FARM
TOWN OF DELAFIELD,
WISCONSIN

SOUND STORMWATER DESIGN

D:\Jobs\2023\2023-003 - Thomas Farm - Welshire Farm - TRIO\CAD\Site\dwg\00\Existing-2023-003
6/21/2023 10:14 PM

SOUND STORMWATER DESIGN

Copper Oaks Ct.
Muskego, WI 53150
414.286.4739
jayme.sisel@soundstormwater.com

CLIENT:
NEUMANN DEVELOPMENT, INC.

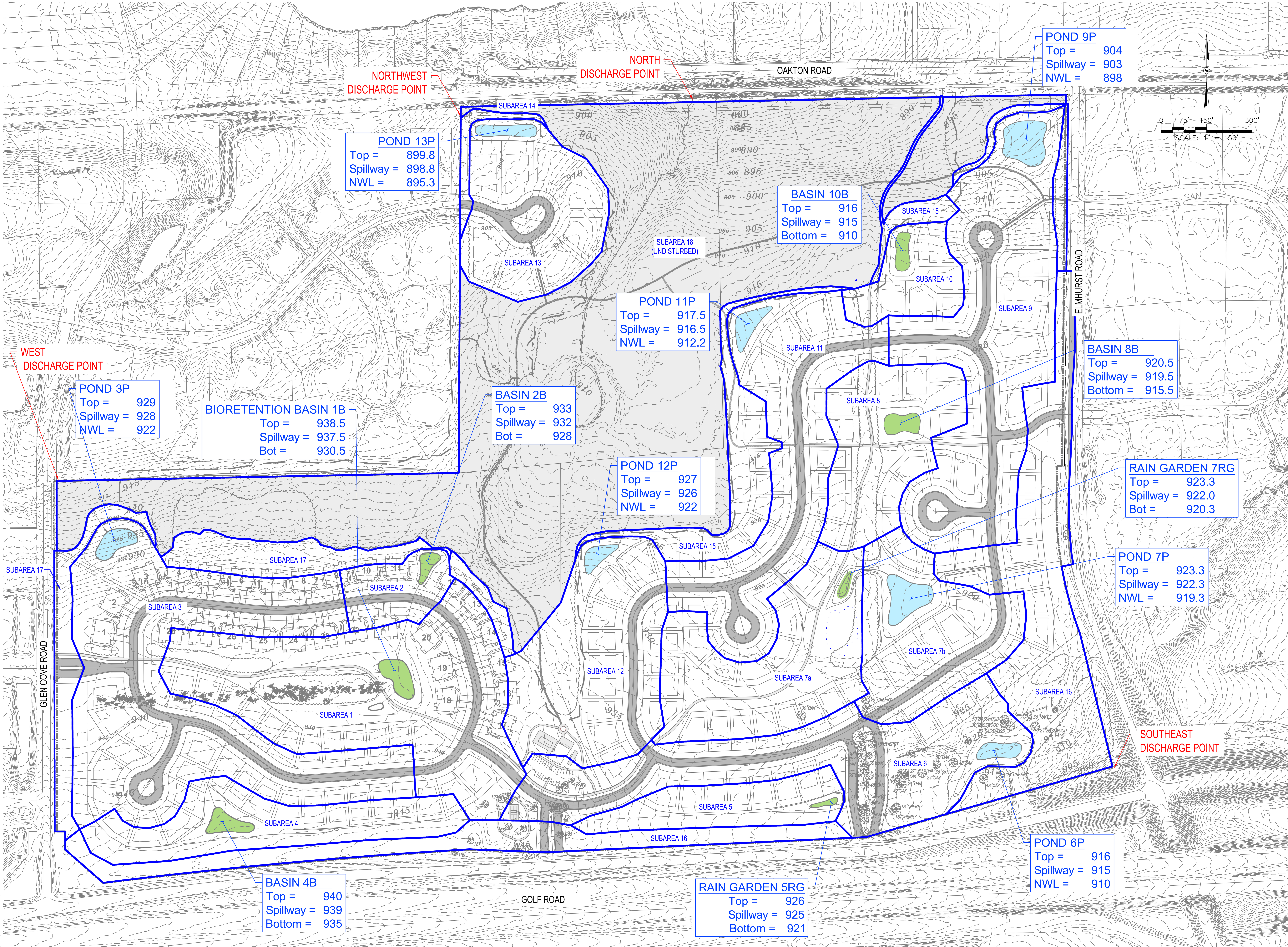
PROJECT TITLE:
WELSHIRE FARM DEVELOPMENT
GOLF ROAD
TOWN OF DELAFIELD, WISCONSIN

DATE: 02-03-23

JOB NO: 2023-003

SHEET TITLE:
PRE-DEVELOPMENT CONDITIONS PLAN

FIGURE:
2



D:\Jobs\2023\2023-003 - Thomas Farm - Welshire Farm - TRIO\CAD\Site\dwg\00\Proposed-2023-003
6/21/2023 10:13 PM

SOUND STORMWATER DESIGN

Copper Oaks Ct.
Muskego, WI 53150
414.286.4739
jayme.sisel@soundstormwater.com

CLIENT:
NEUMANN DEVELOPMENT, INC.

PROJECT TITLE:
WELSHIRE FARM DEVELOPMENT
GOLF ROAD
TOWN OF DELAFIELD, WISCONSIN

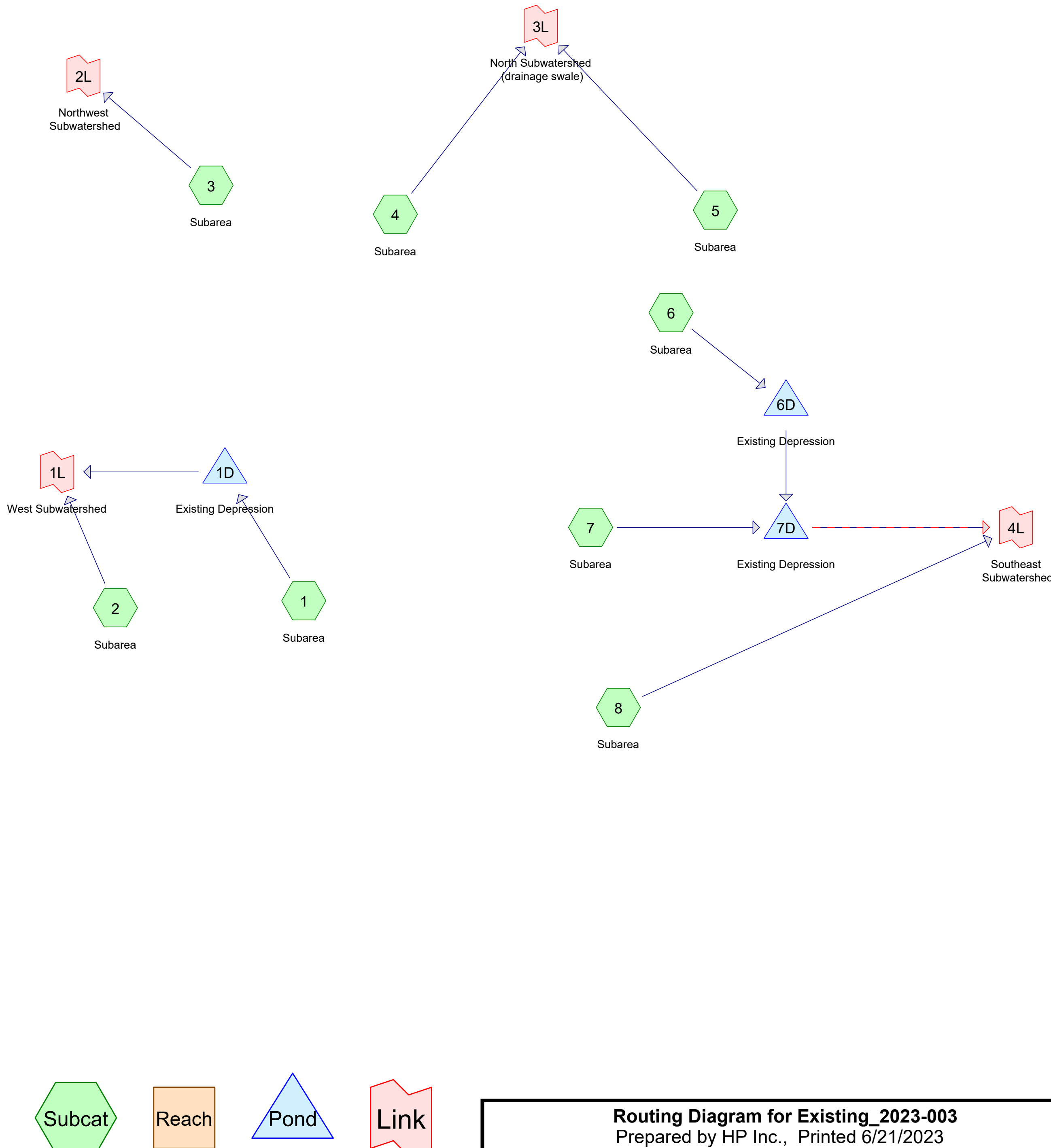
DATE: 02-03-23
JOB NO: 2023-003

SHEET TITLE:
POST-DEVELOPMENT CONDITIONS PLAN

FIGURE:
3

APPENDIX A

Pre-Development Hydrologic Analysis



Routing Diagram for Existing_2023-003
Prepared by HP Inc., Printed 6/21/2023
HydroCAD® 10.10-6a 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)
92.150	78	cropland - C soils (1, 2, 3, 4, 5, 6, 7, 8)
0.720	98	impervious (8)
4.130	74	maintained lawn - C soils (7, 8)
0.440	74	offsite lawn (ROW) - C soils (6, 7)
0.240	98	offsite road (6, 7)
13.280	70	woodland - C soils (1, 2, 3, 5, 6, 7, 8)
110.960	**77**	**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 Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1: Subarea Runoff Area=11.870 ac 0.00% Impervious Runoff Depth>0.68"
Flow Length=400' Slope=0.0200 '/' Tc=11.7 min CN=77 Runoff=10.95 cfs 0.670 af

Subcatchment 2: Subarea Runoff Area=14.480 ac 0.00% Impervious Runoff Depth>0.72"
Flow Length=630' Slope=0.0200 '/' Tc=13.4 min CN=78 Runoff=13.44 cfs 0.872 af

Subcatchment 3: Subarea Runoff Area=4.560 ac 0.00% Impervious Runoff Depth>0.55"
Flow Length=630' Slope=0.0400 '/' Tc=9.9 min CN=74 Runoff=3.51 cfs 0.210 af

Subcatchment 4: Subarea Runoff Area=1.100 ac 0.00% Impervious Runoff Depth>0.72"
Flow Length=190' Slope=0.0300 '/' Tc=8.6 min CN=78 Runoff=1.24 cfs 0.066 af

Subcatchment 5: Subarea Runoff Area=28.780 ac 0.00% Impervious Runoff Depth>0.68"
Flow Length=740' Slope=0.0200 '/' Tc=14.2 min CN=77 Runoff=24.09 cfs 1.625 af

Subcatchment 6: Subarea Runoff Area=11.230 ac 1.87% Impervious Runoff Depth>0.72"
Flow Length=760' Tc=21.5 min CN=78 Runoff=8.19 cfs 0.676 af

Subcatchment 7: Subarea Runoff Area=12.830 ac 0.23% Impervious Runoff Depth>0.68"
Flow Length=1,725' Slope=0.0100 '/' Tc=29.4 min CN=77 Runoff=7.24 cfs 0.723 af

Subcatchment 8: Subarea Runoff Area=26.110 ac 2.76% Impervious Runoff Depth>0.63"
Flow Length=1,580' Slope=0.0100 '/' Tc=27.9 min CN=76 Runoff=13.97 cfs 1.377 af

Pond 1D: Existing Depression Peak Elev=938.58' Storage=0.510 af Inflow=10.95 cfs 0.670 af
Discarded=0.19 cfs 0.184 af Primary=0.00 cfs 0.000 af Outflow=0.19 cfs 0.184 af

Pond 6D: Existing Depression Peak Elev=917.77' Storage=0.339 af Inflow=8.19 cfs 0.676 af
Discarded=0.07 cfs 0.042 af Primary=2.16 cfs 0.512 af Outflow=2.22 cfs 0.554 af

Pond 7D: Existing Depression Peak Elev=917.76' Storage=0.158 af Inflow=7.24 cfs 1.235 af
Discarded=0.03 cfs 0.020 af Primary=5.13 cfs 1.161 af Outflow=5.17 cfs 1.182 af

Link 1L: West Subwatershed Inflow=13.44 cfs 0.872 af
Primary=13.44 cfs 0.872 af

Link 2L: Northwest Subwatershed Inflow=3.51 cfs 0.210 af
Primary=3.51 cfs 0.210 af

Link 3L: North Subwatershed (drainage swale) Inflow=24.99 cfs 1.691 af
Primary=24.99 cfs 1.691 af

Link 4L: Southeast Subwatershed Inflow=17.42 cfs 2.539 af
Primary=17.42 cfs 2.539 af

Total Runoff Area = 110.960 ac Runoff Volume = 6.221 af Average Runoff Depth = 0.67"
99.13% Pervious = 110.000 ac 0.87% Impervious = 0.960 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 Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1: Subarea Runoff Area=11.870 ac 0.00% Impervious Runoff Depth>0.87"
Flow Length=400' Slope=0.0200 '/' Tc=11.7 min CN=77 Runoff=14.33 cfs 0.858 af

Subcatchment 2: Subarea Runoff Area=14.480 ac 0.00% Impervious Runoff Depth>0.92"
Flow Length=630' Slope=0.0200 '/' Tc=13.4 min CN=78 Runoff=17.42 cfs 1.110 af

Subcatchment 3: Subarea Runoff Area=4.560 ac 0.00% Impervious Runoff Depth>0.72"
Flow Length=630' Slope=0.0400 '/' Tc=9.9 min CN=74 Runoff=4.76 cfs 0.275 af

Subcatchment 4: Subarea Runoff Area=1.100 ac 0.00% Impervious Runoff Depth>0.92"
Flow Length=190' Slope=0.0300 '/' Tc=8.6 min CN=78 Runoff=1.61 cfs 0.084 af

Subcatchment 5: Subarea Runoff Area=28.780 ac 0.00% Impervious Runoff Depth>0.87"
Flow Length=740' Slope=0.0200 '/' Tc=14.2 min CN=77 Runoff=31.58 cfs 2.081 af

Subcatchment 6: Subarea Runoff Area=11.230 ac 1.87% Impervious Runoff Depth>0.92"
Flow Length=760' Tc=21.5 min CN=78 Runoff=10.65 cfs 0.860 af

Subcatchment 7: Subarea Runoff Area=12.830 ac 0.23% Impervious Runoff Depth>0.87"
Flow Length=1,725' Slope=0.0100 '/' Tc=29.4 min CN=77 Runoff=9.53 cfs 0.926 af

Subcatchment 8: Subarea Runoff Area=26.110 ac 2.76% Impervious Runoff Depth>0.82"
Flow Length=1,580' Slope=0.0100 '/' Tc=27.9 min CN=76 Runoff=18.61 cfs 1.777 af

Pond 1D: Existing Depression Peak Elev=938.68' Storage=0.669 af Inflow=14.33 cfs 0.858 af
Discarded=0.23 cfs 0.216 af Primary=0.00 cfs 0.000 af Outflow=0.23 cfs 0.216 af

Pond 6D: Existing Depression Peak Elev=917.86' Storage=0.423 af Inflow=10.65 cfs 0.860 af
Discarded=0.08 cfs 0.045 af Primary=3.09 cfs 0.690 af Outflow=3.17 cfs 0.735 af

Pond 7D: Existing Depression Peak Elev=917.84' Storage=0.200 af Inflow=9.53 cfs 1.616 af
Discarded=0.04 cfs 0.022 af Primary=7.49 cfs 1.540 af Outflow=7.53 cfs 1.561 af

Link 1L: West Subwatershed Inflow=17.42 cfs 1.110 af
Primary=17.42 cfs 1.110 af

Link 2L: Northwest Subwatershed Inflow=4.76 cfs 0.275 af
Primary=4.76 cfs 0.275 af

Link 3L: North Subwatershed (drainage swale) Inflow=32.75 cfs 2.165 af
Primary=32.75 cfs 2.165 af

Link 4L: Southeast Subwatershed Inflow=23.83 cfs 3.316 af
Primary=23.83 cfs 3.316 af

Total Runoff Area = 110.960 ac Runoff Volume = 7.971 af Average Runoff Depth = 0.86"
99.13% Pervious = 110.000 ac 0.87% Impervious = 0.960 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 Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1: Subarea Runoff Area=11.870 ac 0.00% Impervious Runoff Depth>1.66"
Flow Length=400' Slope=0.0200 '/' Tc=11.7 min CN=77 Runoff=28.30 cfs 1.645 af

Subcatchment 2: Subarea Runoff Area=14.480 ac 0.00% Impervious Runoff Depth>1.74"
Flow Length=630' Slope=0.0200 '/' Tc=13.4 min CN=78 Runoff=34.00 cfs 2.094 af

Subcatchment 3: Subarea Runoff Area=4.560 ac 0.00% Impervious Runoff Depth>1.46"
Flow Length=630' Slope=0.0400 '/' Tc=9.9 min CN=74 Runoff=10.07 cfs 0.554 af

Subcatchment 4: Subarea Runoff Area=1.100 ac 0.00% Impervious Runoff Depth>1.74"
Flow Length=190' Slope=0.0300 '/' Tc=8.6 min CN=78 Runoff=3.10 cfs 0.159 af

Subcatchment 5: Subarea Runoff Area=28.780 ac 0.00% Impervious Runoff Depth>1.66"
Flow Length=740' Slope=0.0200 '/' Tc=14.2 min CN=77 Runoff=62.53 cfs 3.989 af

Subcatchment 6: Subarea Runoff Area=11.230 ac 1.87% Impervious Runoff Depth>1.73"
Flow Length=760' Tc=21.5 min CN=78 Runoff=20.84 cfs 1.623 af

Subcatchment 7: Subarea Runoff Area=12.830 ac 0.23% Impervious Runoff Depth>1.66"
Flow Length=1,725' Slope=0.0100 '/' Tc=29.4 min CN=77 Runoff=19.06 cfs 1.776 af

Subcatchment 8: Subarea Runoff Area=26.110 ac 2.76% Impervious Runoff Depth>1.59"
Flow Length=1,580' Slope=0.0100 '/' Tc=27.9 min CN=76 Runoff=38.15 cfs 3.461 af

Pond 1D: Existing Depression Peak Elev=939.00' Storage=1.346 af Inflow=28.30 cfs 1.645 af
Discarded=0.35 cfs 0.335 af Primary=0.00 cfs 0.000 af Outflow=0.35 cfs 0.335 af

Pond 6D: Existing Depression Peak Elev=918.13' Storage=0.766 af Inflow=20.84 cfs 1.623 af
Discarded=0.12 cfs 0.055 af Primary=7.15 cfs 1.433 af Outflow=7.27 cfs 1.488 af

Pond 7D: Existing Depression Peak Elev=918.11' Storage=0.368 af Inflow=21.36 cfs 3.209 af
Discarded=0.06 cfs 0.026 af Primary=17.31 cfs 3.123 af Outflow=17.37 cfs 3.149 af

Link 1L: West Subwatershed Inflow=34.00 cfs 2.094 af
Primary=34.00 cfs 2.094 af

Link 2L: Northwest Subwatershed Inflow=10.07 cfs 0.554 af
Primary=10.07 cfs 0.554 af

Link 3L: North Subwatershed (drainage swale) Inflow=64.83 cfs 4.148 af
Primary=64.83 cfs 4.148 af

Link 4L: Southeast Subwatershed Inflow=51.96 cfs 6.584 af
Primary=51.96 cfs 6.584 af

Total Runoff Area = 110.960 ac Runoff Volume = 15.301 af Average Runoff Depth = 1.65"
99.13% Pervious = 110.000 ac 0.87% Impervious = 0.960 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 Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1: Subarea Runoff Area=11.870 ac 0.00% Impervious Runoff Depth>3.63"
Flow Length=400' Slope=0.0200 '/' Tc=11.7 min CN=77 Runoff=61.73 cfs 3.595 af

Subcatchment 2: Subarea Runoff Area=14.480 ac 0.00% Impervious Runoff Depth>3.74"
Flow Length=630' Slope=0.0200 '/' Tc=13.4 min CN=78 Runoff=73.06 cfs 4.508 af

Subcatchment 3: Subarea Runoff Area=4.560 ac 0.00% Impervious Runoff Depth>3.33"
Flow Length=630' Slope=0.0400 '/' Tc=9.9 min CN=74 Runoff=23.21 cfs 1.267 af

Subcatchment 4: Subarea Runoff Area=1.100 ac 0.00% Impervious Runoff Depth>3.74"
Flow Length=190' Slope=0.0300 '/' Tc=8.6 min CN=78 Runoff=6.62 cfs 0.343 af

Subcatchment 5: Subarea Runoff Area=28.780 ac 0.00% Impervious Runoff Depth>3.63"
Flow Length=740' Slope=0.0200 '/' Tc=14.2 min CN=77 Runoff=136.90 cfs 8.715 af

Subcatchment 6: Subarea Runoff Area=11.230 ac 1.87% Impervious Runoff Depth>3.73"
Flow Length=760' Tc=21.5 min CN=78 Runoff=45.09 cfs 3.494 af

Subcatchment 7: Subarea Runoff Area=12.830 ac 0.23% Impervious Runoff Depth>3.63"
Flow Length=1,725' Slope=0.0100 '/' Tc=29.4 min CN=77 Runoff=42.19 cfs 3.881 af

Subcatchment 8: Subarea Runoff Area=26.110 ac 2.76% Impervious Runoff Depth>3.53"
Flow Length=1,580' Slope=0.0100 '/' Tc=27.9 min CN=76 Runoff=85.99 cfs 7.679 af

Pond 1D: Existing Depression Peak Elev=939.53' Storage=2.911 af Inflow=61.73 cfs 3.595 af
Discarded=0.49 cfs 0.489 af Primary=0.65 cfs 0.296 af Outflow=1.14 cfs 0.785 af

Pond 6D: Existing Depression Peak Elev=918.54' Storage=1.692 af Inflow=45.09 cfs 3.494 af
Discarded=0.23 cfs 0.080 af Primary=16.64 cfs 3.261 af Outflow=16.85 cfs 3.340 af

Pond 7D: Existing Depression Peak Elev=918.52' Storage=0.742 af Inflow=48.15 cfs 7.141 af
Discarded=0.08 cfs 0.036 af Primary=39.43 cfs 7.038 af Outflow=39.52 cfs 7.074 af

Link 1L: West Subwatershed Inflow=73.06 cfs 4.803 af
Primary=73.06 cfs 4.803 af

Link 2L: Northwest Subwatershed Inflow=23.21 cfs 1.267 af
Primary=23.21 cfs 1.267 af

Link 3L: North Subwatershed (drainage swale) Inflow=142.66 cfs 9.057 af
Primary=142.66 cfs 9.057 af

Link 4L: Southeast Subwatershed Inflow=119.33 cfs 14.717 af
Primary=119.33 cfs 14.717 af

Total Runoff Area = 110.960 ac Runoff Volume = 33.481 af Average Runoff Depth = 3.62"
99.13% Pervious = 110.000 ac 0.87% Impervious = 0.960 ac

Summary for Subcatchment 1: Subarea

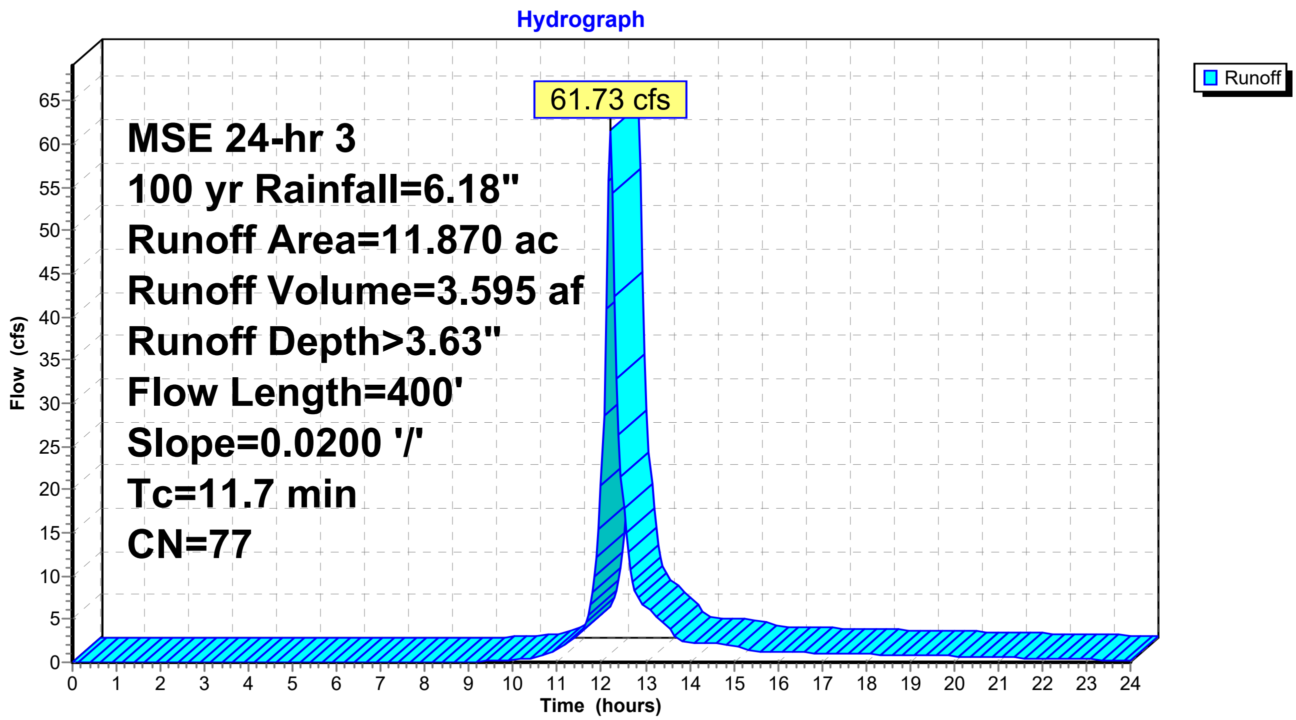
Runoff = 61.73 cfs @ 12.20 hrs, Volume= 3.595 af, Depth> 3.63"
Routed to Pond 1D : Existing Depression

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
*	10.990	78	cropland - C soils
*	0.880	70	woodland - C soils
	11.870	77	Weighted Average
	11.870		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.5	100	0.0200	0.18		**Sheet Flow,** Range n= 0.130 P2= 2.70"
2.2	300	0.0200	2.28		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
11.7	400	Total			

Subcatchment 1: Subarea



Summary for Subcatchment 2: Subarea

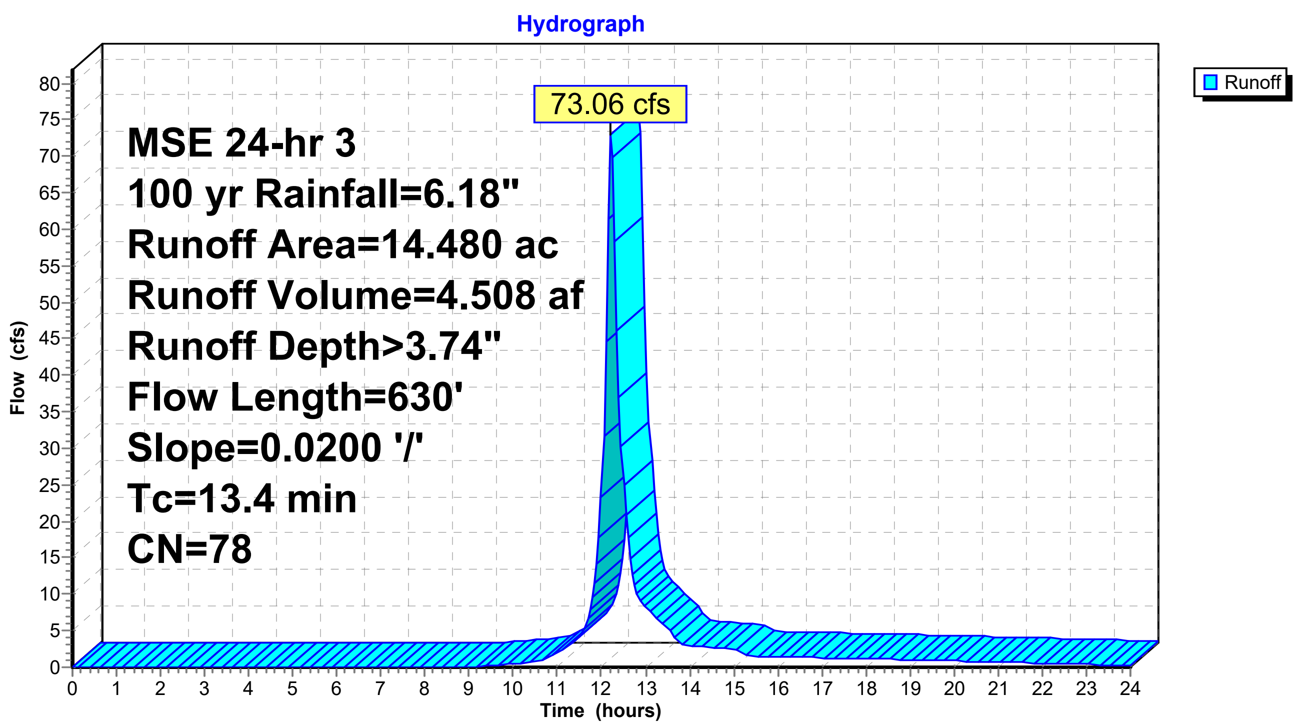
Runoff = 73.06 cfs @ 12.22 hrs, Volume= 4.508 af, Depth> 3.74"
Routed to Link 1L : West Subwatershed

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
*	13.900	78	cropland - C soils
*	0.580	70	woodland - C soils
	14.480	78	Weighted Average
	14.480		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.5	100	0.0200	0.18		**Sheet Flow,** Range n= 0.130 P2= 2.70"
3.9	530	0.0200	2.28		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
13.4	630	Total			

Subcatchment 2: Subarea



Summary for Subcatchment 3: Subarea

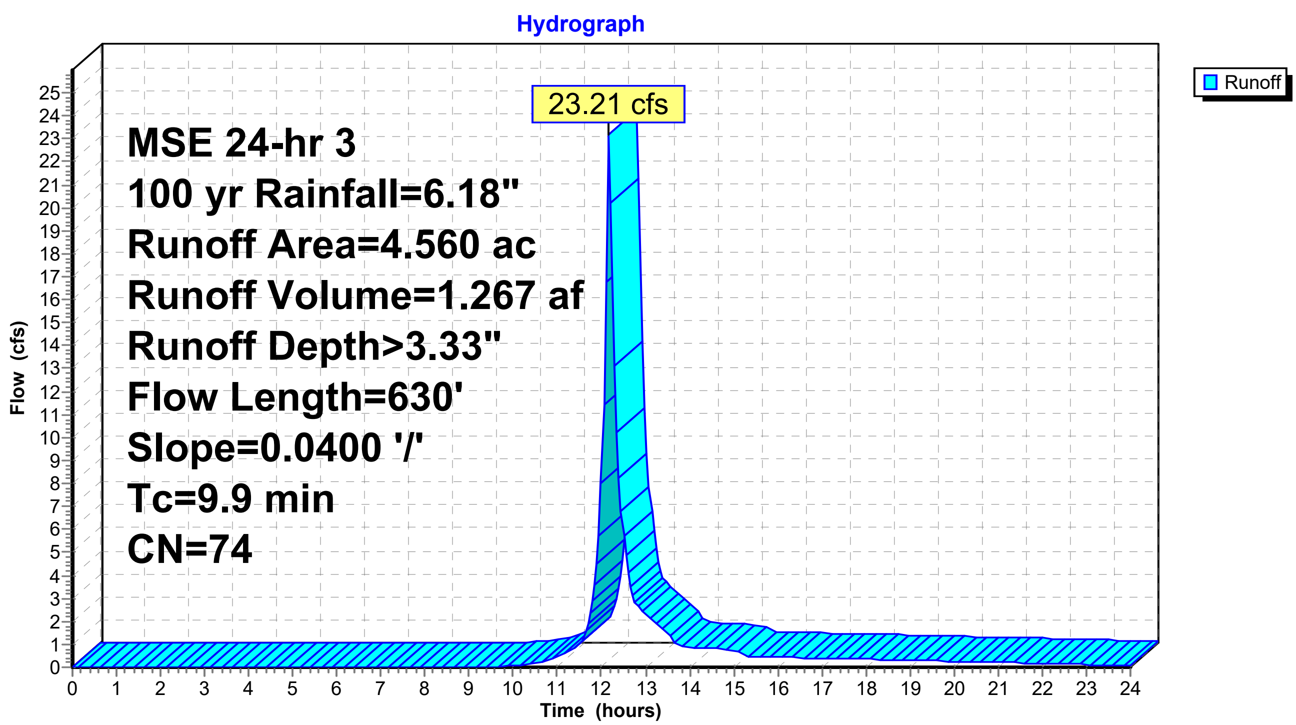
Runoff = 23.21 cfs @ 12.18 hrs, Volume= 1.267 af, Depth> 3.33"
Routed to Link 2L : Northwest Subwatershed

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
*	2.460	78	cropland - C soils
*	2.100	70	woodland - C soils
	4.560	74	Weighted Average
	4.560		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.2	100	0.0400	0.23		**Sheet Flow,** Range n= 0.130 P2= 2.70"
2.7	530	0.0400	3.22		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
9.9	630	Total			

Subcatchment 3: Subarea



Summary for Subcatchment 4: Subarea

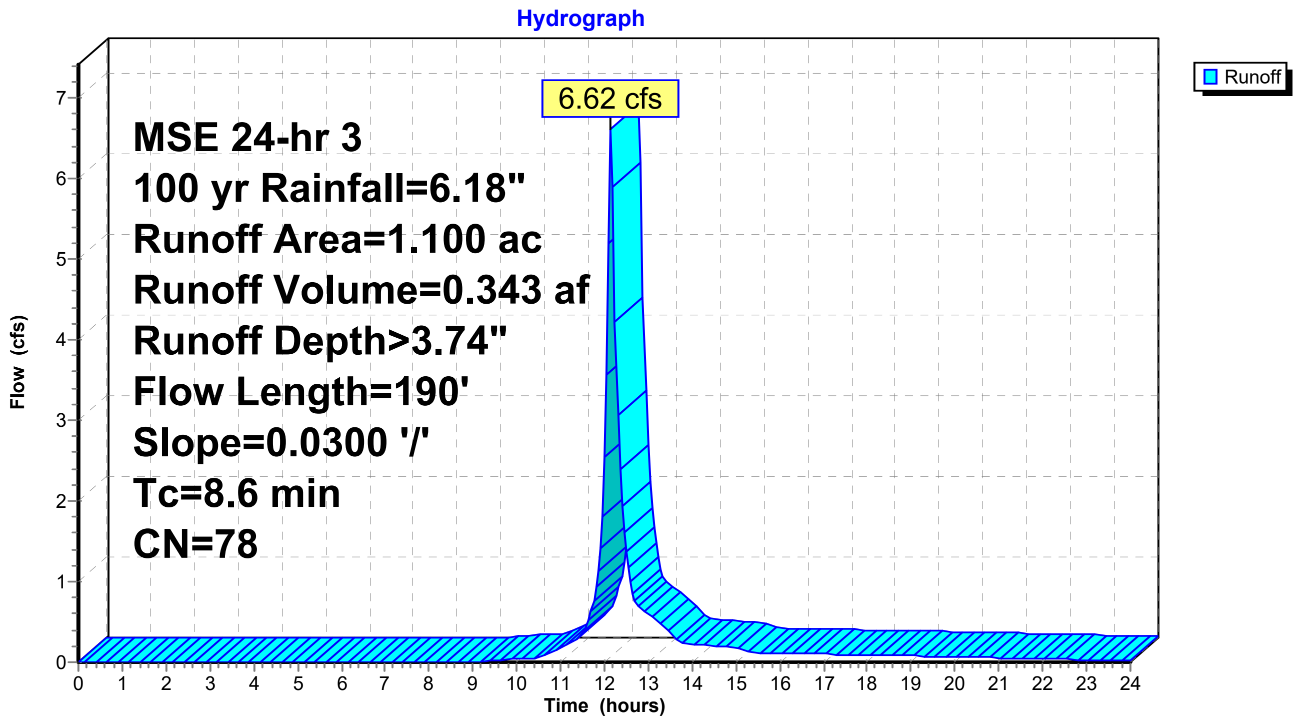
Runoff = 6.62 cfs @ 12.16 hrs, Volume= 0.343 af, Depth> 3.74"
Routed to Link 3L : North Subwatershed (drainage swale)

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
*	1.100	78	cropland - C soils
	1.100		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.1	100	0.0300	0.21		**Sheet Flow,** Range n= 0.130 P2= 2.70"
0.5	90	0.0300	2.79		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
8.6	190	Total			

Subcatchment 4: Subarea



Summary for Subcatchment 5: Subarea

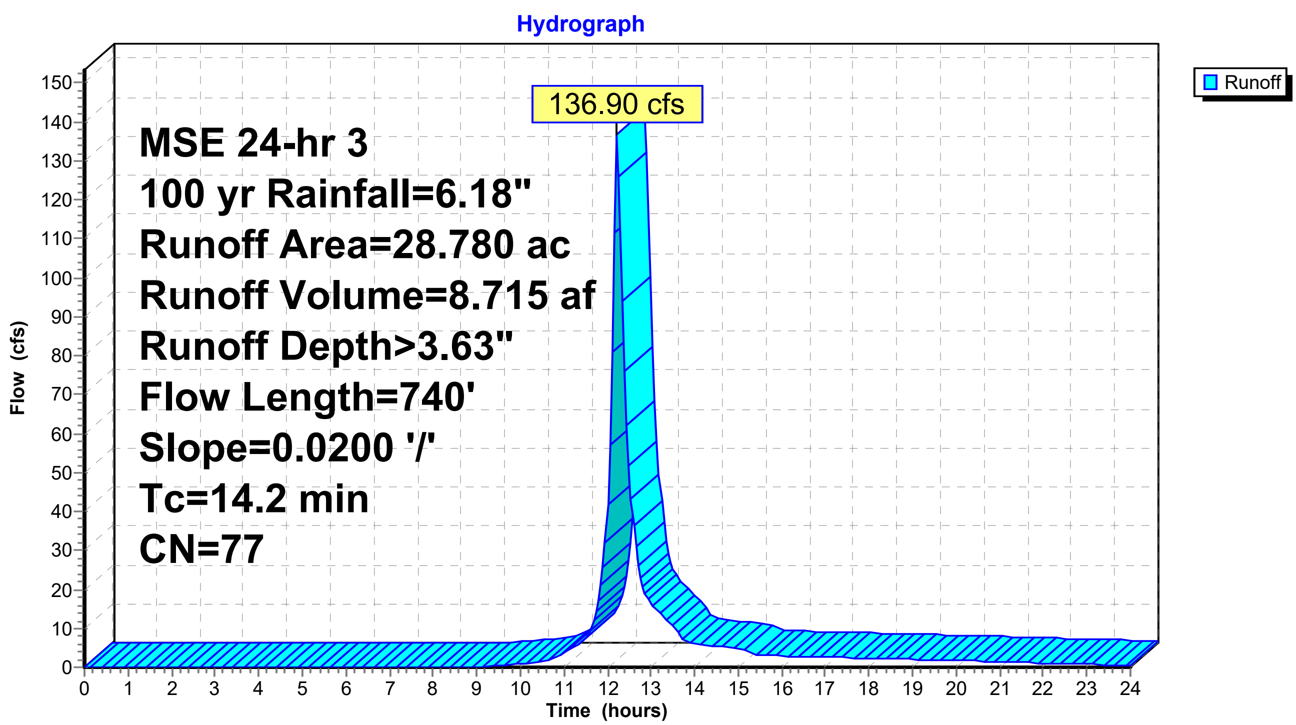
Runoff = 136.90 cfs @ 12.23 hrs, Volume= 8.715 af, Depth> 3.63"
Routed to Link 3L : North Subwatershed (drainage swale)

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
*	25.850	78	cropland - C soils
*	2.930	70	woodland - C soils
	28.780	77	Weighted Average
	28.780		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.5	100	0.0200	0.18		**Sheet Flow,** Range n= 0.130 P2= 2.70"
4.7	640	0.0200	2.28		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
14.2	740	Total			

Subcatchment 5: Subarea



Summary for Subcatchment 6: Subarea

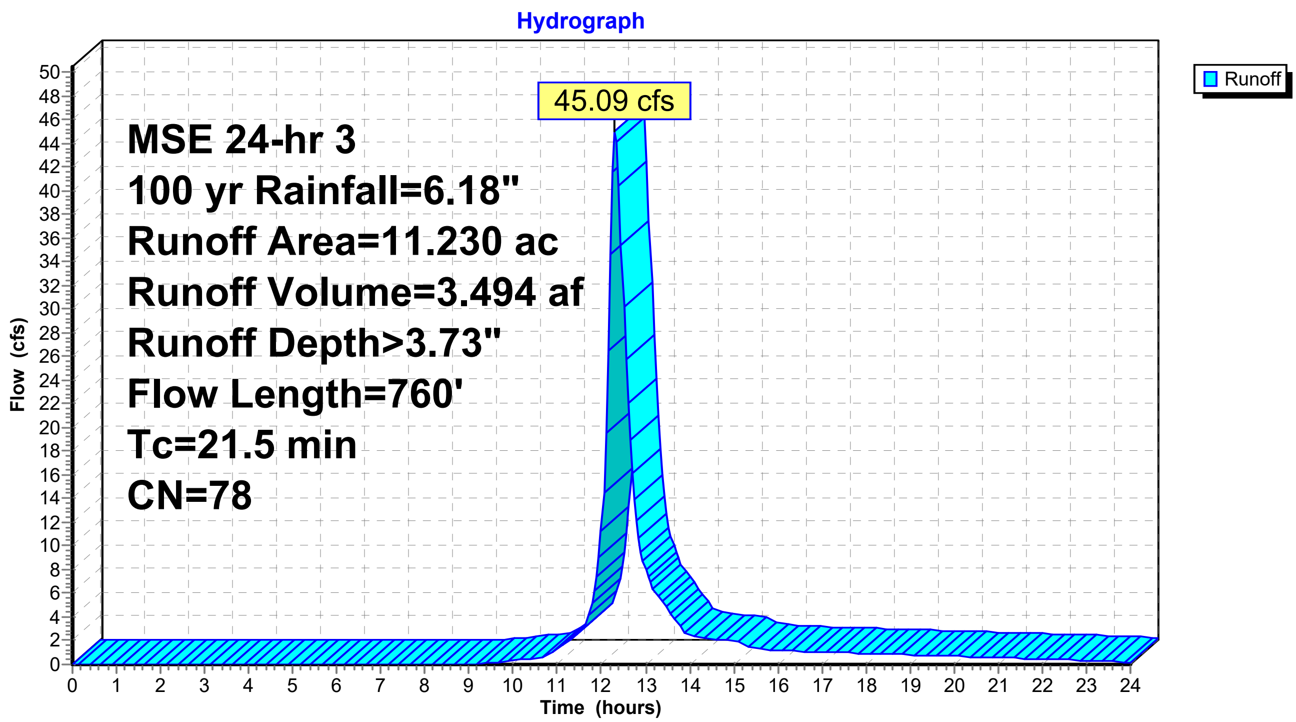
Runoff = 45.09 cfs @ 12.32 hrs, Volume= 3.494 af, Depth> 3.73"
Routed to Pond 6D : Existing Depression

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
*	10.200	78	cropland - C soils
*	0.550	70	woodland - C soils
*	0.210	98	offsite road
*	0.270	74	offsite lawn (ROW) - C soils
	11.230	78	Weighted Average
	11.020		98.13% Pervious Area
	0.210		1.87% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.6	100	0.0100	0.13		**Sheet Flow,** Range n= 0.130 P2= 2.70"
2.0	190	0.0100	1.61		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
6.9	470	0.0050	1.14		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
21.5	760	Total			

Subcatchment 6: Subarea



Summary for Subcatchment 7: Subarea

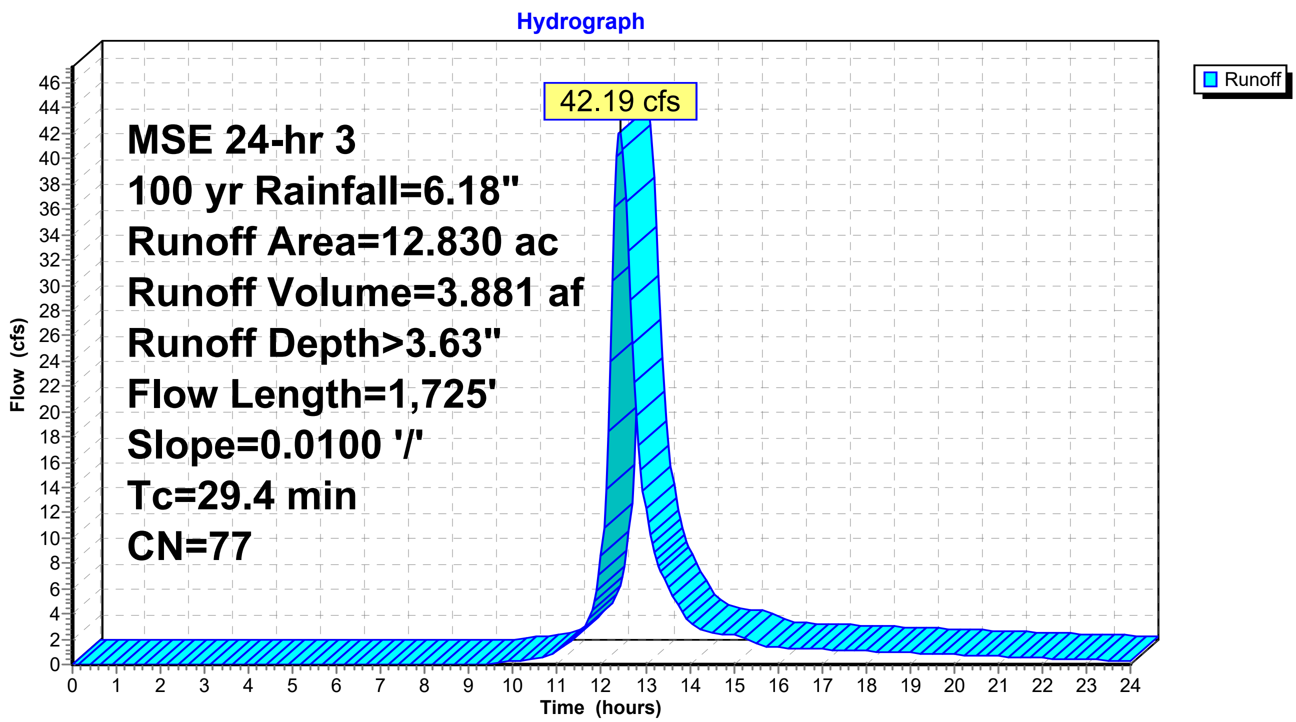
Runoff = 42.19 cfs @ 12.42 hrs, Volume= 3.881 af, Depth> 3.63"
Routed to Pond 7D : Existing Depression

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
*	11.180	78	cropland - C soils
*	1.440	70	woodland - C soils
*	0.010	74	maintained lawn - C soils
*	0.030	98	offsite road
*	0.170	74	offsite lawn (ROW) - C soils
	12.830	77	Weighted Average
	12.800		99.77% Pervious Area
	0.030		0.23% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.6	100	0.0100	0.13		**Sheet Flow,** Range n= 0.130 P2= 2.70"
16.8	1,625	0.0100	1.61		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
29.4	1,725	Total			

Subcatchment 7: Subarea



Summary for Subcatchment 8: Subarea

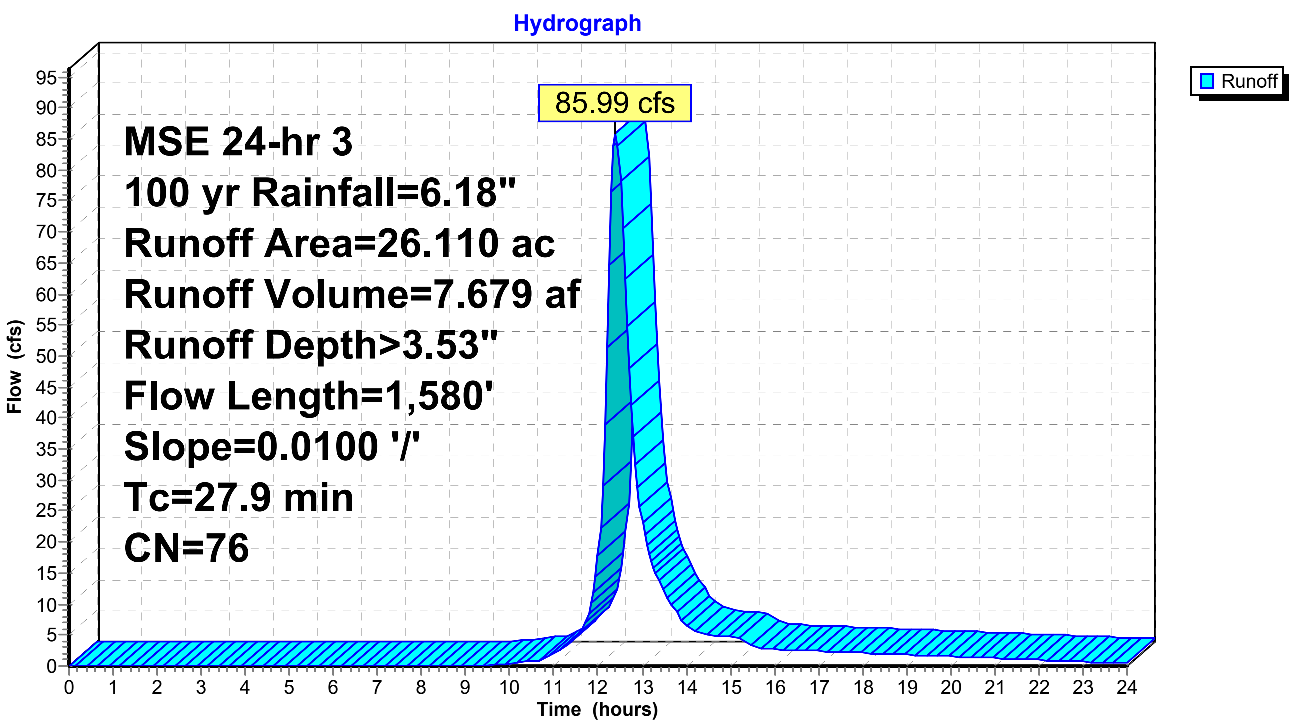
Runoff = 85.99 cfs @ 12.40 hrs, Volume= 7.679 af, Depth> 3.53"
Routed to Link 4L : Southeast Subwatershed

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
*	16.470	78	cropland - C soils
*	4.800	70	woodland - C soils
*	4.120	74	maintained lawn - C soils
*	0.720	98	impervious
	26.110	76	Weighted Average
	25.390		97.24% Pervious Area
	0.720		2.76% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.6	100	0.0100	0.13		**Sheet Flow,** Range n= 0.130 P2= 2.70"
15.3	1,480	0.0100	1.61		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
27.9	1,580	Total			

Subcatchment 8: Subarea



Summary for Pond 1D: Existing Depression

Inflow Area = 11.870 ac, 0.00% Impervious, Inflow Depth > 3.63" for 100 yr event
Inflow = 61.73 cfs @ 12.20 hrs, Volume= 3.595 af
Outflow = 1.14 cfs @ 16.45 hrs, Volume= 0.785 af, Atten= 98%, Lag= 255.3 min
Discarded = 0.49 cfs @ 16.45 hrs, Volume= 0.489 af
Primary = 0.65 cfs @ 16.45 hrs, Volume= 0.296 af
Routed to Link 1L : West Subwatershed

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 939.53' @ 16.45 hrs Surf.Area= 3.442 ac Storage= 2.911 af

Plug-Flow detention time= 372.3 min calculated for 0.785 af (22% of inflow)
Center-of-Mass det. time= 272.0 min (1,075.4 - 803.4)

Volume	Invert	Avail.Storage	Storage Description
#1	938.00'	4.745 af	**Custom Stage Data (Conic)** Listed below (Recalc)

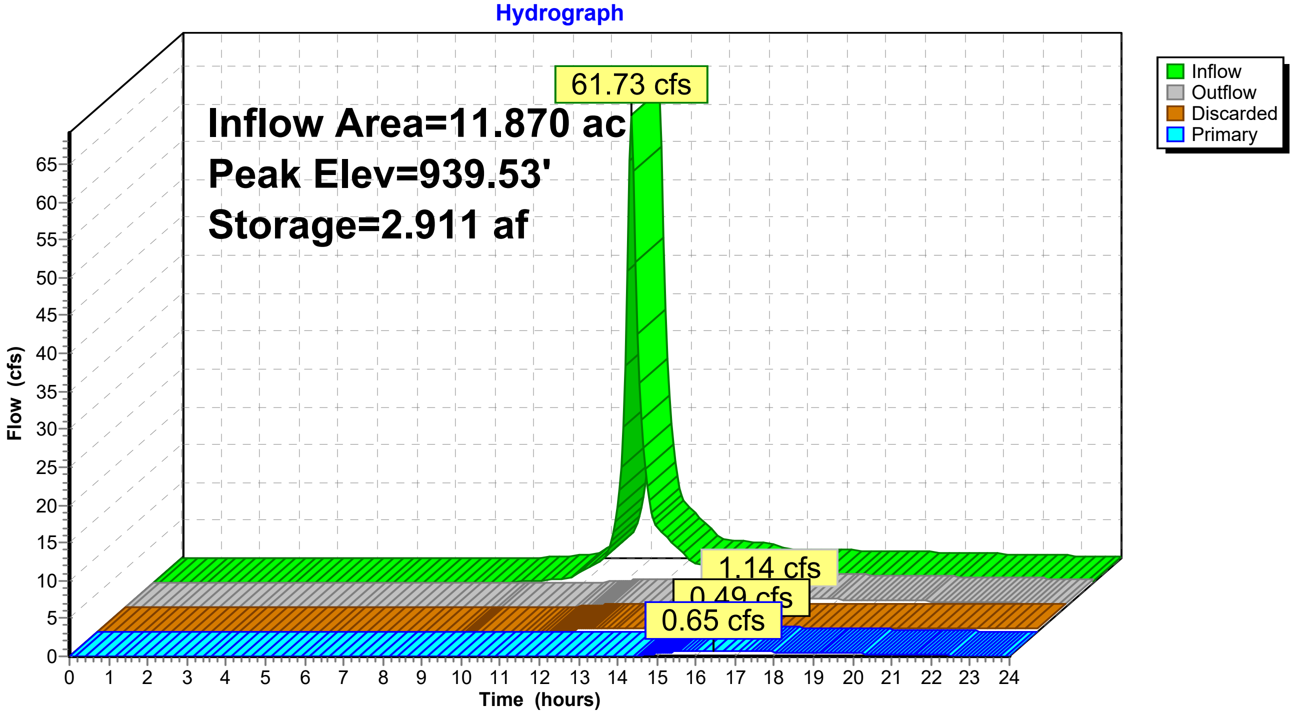
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
938.00	0.440	0.000	0.000	0.440
939.00	2.520	1.338	1.338	2.520
940.00	4.380	3.407	4.745	4.380

Device	Routing	Invert	Outlet Devices
#1	Discarded	938.00'	**0.130 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 928.00' Phase-In= 0.01'
#2	Primary	939.50'	**50.0' long + 10.0 '/' SideZ x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Discarded OutFlow Max=0.49 cfs @ 16.45 hrs HW=939.53' (Free Discharge)
└─**1=Exfiltration** (Controls 0.49 cfs)

Primary OutFlow Max=0.65 cfs @ 16.45 hrs HW=939.53' TW=0.00' (Dynamic Tailwater)
└─**2=Broad-Crested Rectangular Weir** (Weir Controls 0.65 cfs @ 0.43 fps)

Pond 1D: Existing Depression



Summary for Pond 6D: Existing Depression

Inflow Area = 11.230 ac, 1.87% Impervious, Inflow Depth > 3.73" for 100 yr event
Inflow = 45.09 cfs @ 12.32 hrs, Volume= 3.494 af
Outflow = 16.85 cfs @ 13.07 hrs, Volume= 3.340 af, Atten= 63%, Lag= 45.0 min
Discarded = 0.23 cfs @ 12.76 hrs, Volume= 0.080 af
Primary = 16.64 cfs @ 13.07 hrs, Volume= 3.261 af
Routed to Pond 7D : Existing Depression

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 918.54' @ 12.76 hrs Surf.Area= 2.945 ac Storage= 1.692 af

Plug-Flow detention time= 87.8 min calculated for 3.340 af (96% of inflow)
Center-of-Mass det. time= 65.6 min (875.9 - 810.3)

Volume	Invert	Avail.Storage	Storage Description
#1	916.90'	3.474 af	**Custom Stage Data (Conic)** Listed below (Recalc)

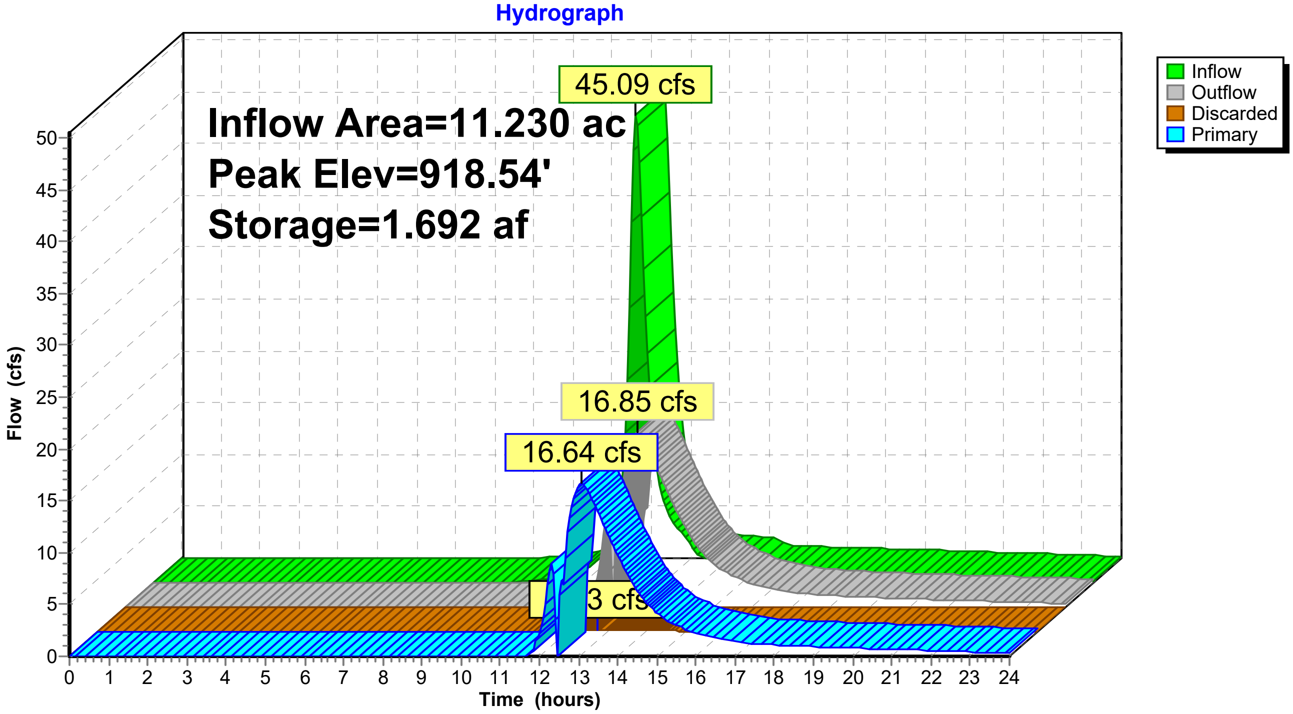
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
916.90	0.000	0.000	0.000	0.000
917.00	0.110	0.004	0.004	0.110
918.00	1.260	0.581	0.584	1.260
919.00	4.920	2.890	3.474	4.920

Device	Routing	Invert	Outlet Devices
#1	Discarded	916.90'	**0.070 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 911.00' Phase-In= 0.01'
#2	Primary	917.40'	**8.0' long + 5.0 '/' SideZ x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Discarded OutFlow Max=0.23 cfs @ 12.76 hrs HW=918.54' (Free Discharge)
└─**1=Exfiltration** (Controls 0.23 cfs)

Primary OutFlow Max=18.05 cfs @ 13.07 hrs HW=918.49' TW=918.39' (Dynamic Tailwater)
└─**2=Broad-Crested Rectangular Weir** (Weir Controls 18.05 cfs @ 1.24 fps)

Pond 6D: Existing Depression



Summary for Pond 7D: Existing Depression

Inflow Area = 24.060 ac, 1.00% Impervious, Inflow Depth > 3.56" for 100 yr event
Inflow = 48.15 cfs @ 12.35 hrs, Volume= 7.141 af
Outflow = 39.52 cfs @ 12.62 hrs, Volume= 7.074 af, Atten= 18%, Lag= 15.9 min
Discarded = 0.08 cfs @ 12.62 hrs, Volume= 0.036 af
Primary = 39.43 cfs @ 12.62 hrs, Volume= 7.038 af
Routed to Link 4L : Southeast Subwatershed

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 918.52' @ 12.62 hrs Surf.Area= 1.091 ac Storage= 0.742 af

Plug-Flow detention time= 19.2 min calculated for 7.060 af (99% of inflow)
Center-of-Mass det. time= 14.1 min (858.1 - 844.1)

Volume	Invert	Avail.Storage	Storage Description
#1	916.90'	1.386 af	**Custom Stage Data (Conic)** Listed below (Recalc)

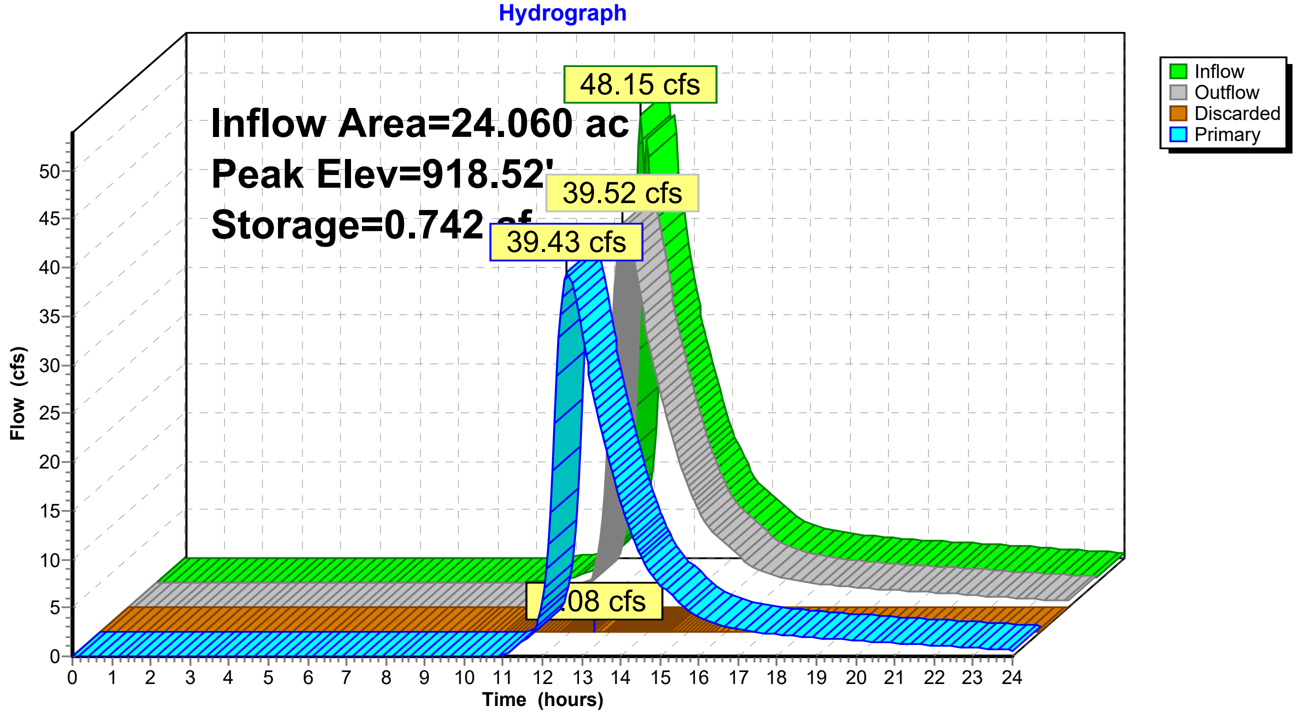
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
916.90	0.000	0.000	0.000	0.000
917.00	0.040	0.001	0.001	0.040
918.00	0.670	0.291	0.293	0.670
919.00	1.580	1.093	1.386	1.580

Device	Routing	Invert	Outlet Devices
#1	Discarded	916.90'	**0.070 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 911.00' Phase-In= 0.01'
#2	Primary	917.40'	**8.0' long + 5.0 '/' SideZ x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Discarded OutFlow Max=0.08 cfs @ 12.62 hrs HW=918.51' (Free Discharge)
└─**1=Exfiltration** (Controls 0.08 cfs)

Primary OutFlow Max=39.35 cfs @ 12.62 hrs HW=918.51' TW=0.00' (Dynamic Tailwater)
└─**2=Broad-Crested Rectangular Weir** (Weir Controls 39.35 cfs @ 2.60 fps)

Pond 7D: Existing Depression

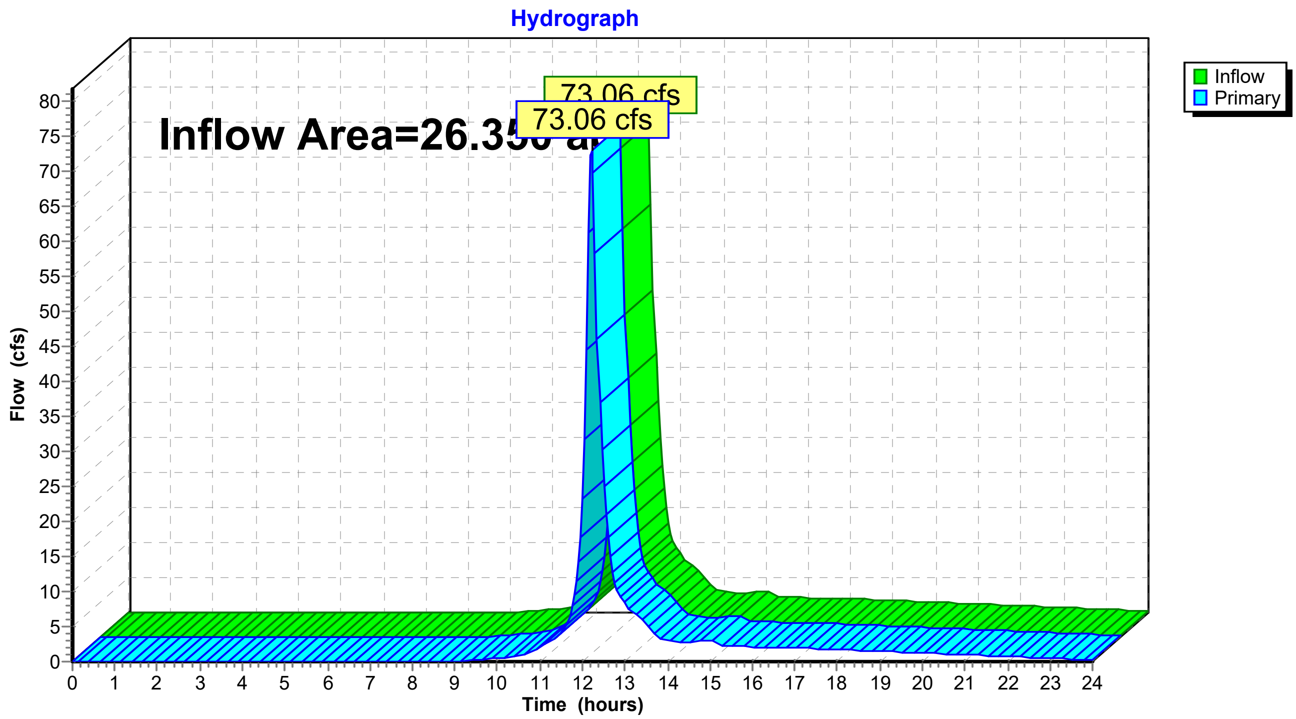


Summary for Link 1L: West Subwatershed

Inflow Area = 26.350 ac, 0.00% Impervious, Inflow Depth > 2.19" for 100 yr event
Inflow = 73.06 cfs @ 12.22 hrs, Volume= 4.803 af
Primary = 73.06 cfs @ 12.22 hrs, Volume= 4.803 af, Atten= 0%, Lag= 0.0 min
Routed to nonexistent node 99L

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

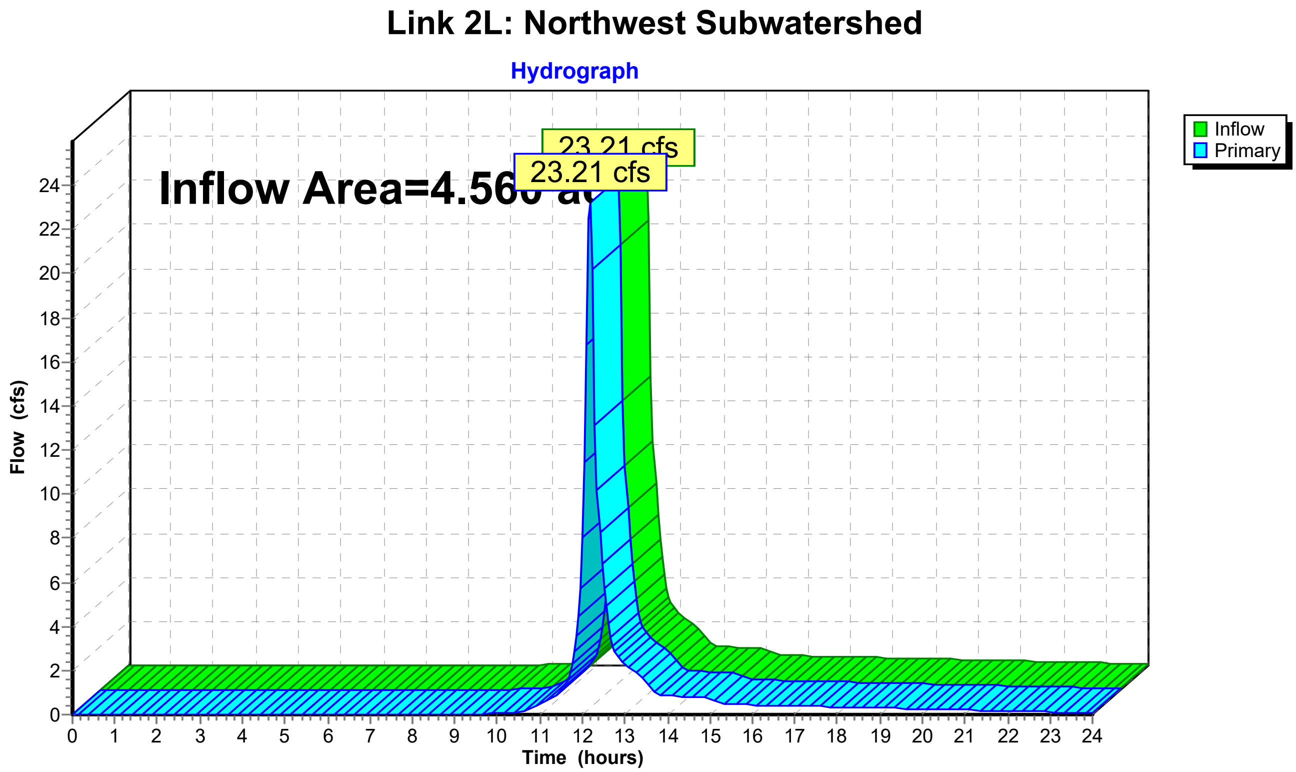
Link 1L: West Subwatershed



Summary for Link 2L: Northwest Subwatershed

Inflow Area = 4.560 ac, 0.00% Impervious, Inflow Depth > 3.33" for 100 yr event
Inflow = 23.21 cfs @ 12.18 hrs, Volume= 1.267 af
Primary = 23.21 cfs @ 12.18 hrs, Volume= 1.267 af, Atten= 0%, Lag= 0.0 min
Routed to nonexistent node 99L

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

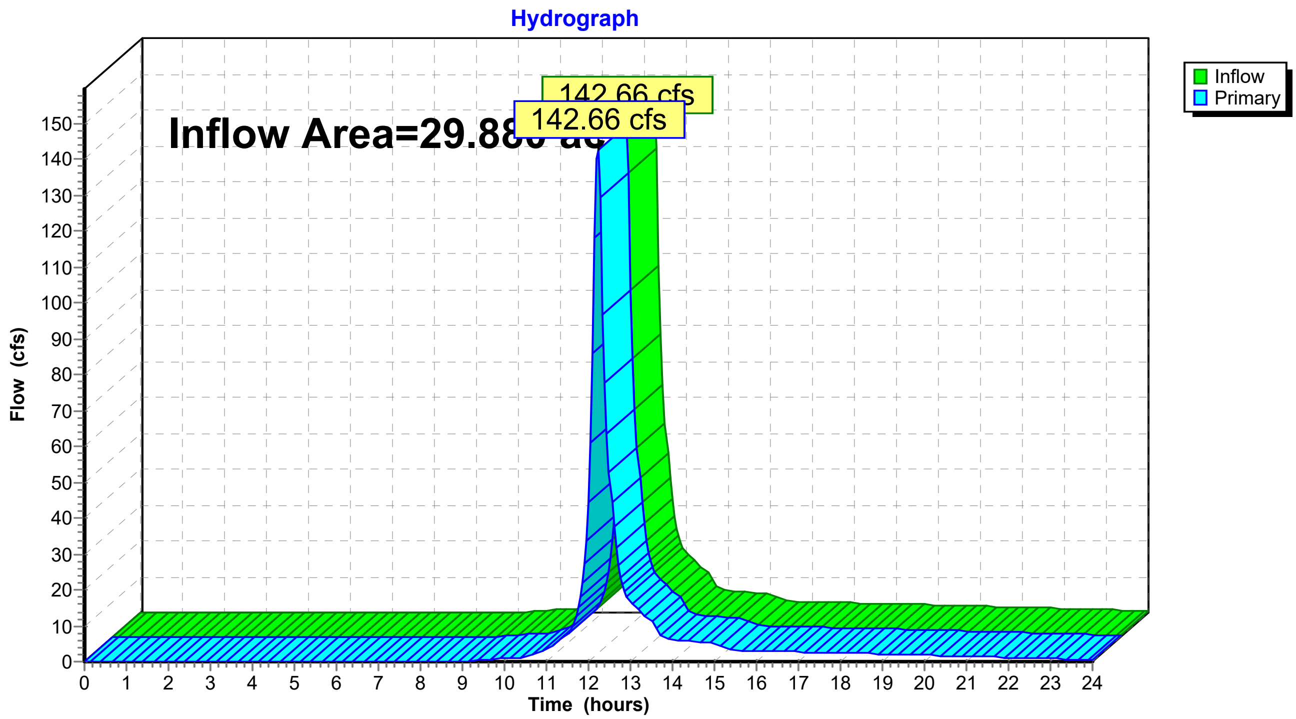


Summary for Link 3L: North Subwatershed (drainage swale)

Inflow Area = 29.880 ac, 0.00% Impervious, Inflow Depth > 3.64" for 100 yr event
Inflow = 142.66 cfs @ 12.22 hrs, Volume= 9.057 af
Primary = 142.66 cfs @ 12.22 hrs, Volume= 9.057 af, Atten= 0%, Lag= 0.0 min
Routed to nonexistent node 99L

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

Link 3L: North Subwatershed (drainage swale)

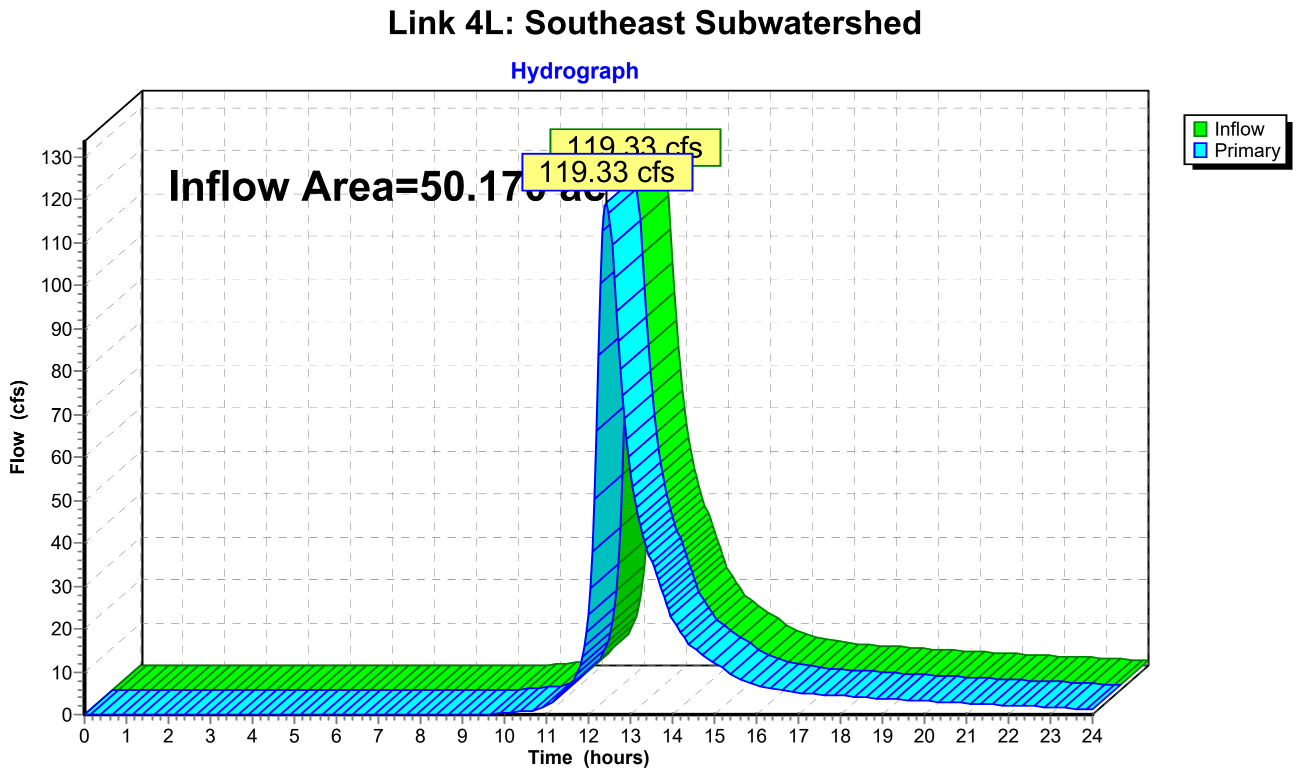


Summary for Link 4L: Southeast Subwatershed

Inflow Area =	50.170 ac,	1.91% Impervious,	Inflow Depth > 3.52"	for 100 yr event	
Inflow =	119.33 cfs @	12.43 hrs,	Volume=	14.717 af	
Primary =	119.33 cfs @	12.43 hrs,	Volume=	14.717 af,	Atten= 0%, Lag= 0.0 min

Routed to nonexistent node 99L

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



Events for Subcatchment 1: Subarea

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
1 yr	2.40	10.95	0.670	0.68
2 yr	2.70	14.33	0.858	0.87
10 yr	3.81	28.30	1.645	1.66
100 yr	**6.18**	**61.73**	**3.595**	**3.63**

Events for Subcatchment 2: Subarea

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
1 yr	2.40	13.44	0.872	0.72
2 yr	2.70	17.42	1.110	0.92
10 yr	3.81	34.00	2.094	1.74
100 yr	**6.18**	**73.06**	**4.508**	**3.74**

Events for Subcatchment 3: Subarea

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
1 yr	2.40	3.51	0.210	0.55
2 yr	2.70	4.76	0.275	0.72
10 yr	3.81	10.07	0.554	1.46
100 yr	**6.18**	**23.21**	**1.267**	**3.33**

Events for Subcatchment 4: Subarea

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
1 yr	2.40	1.24	0.066	0.72
2 yr	2.70	1.61	0.084	0.92
10 yr	3.81	3.10	0.159	1.74
100 yr	**6.18**	**6.62**	**0.343**	**3.74**

Events for Subcatchment 5: Subarea

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
1 yr	2.40	24.09	1.625	0.68
2 yr	2.70	31.58	2.081	0.87
10 yr	3.81	62.53	3.989	1.66
100 yr	**6.18**	**136.90**	**8.715**	**3.63**

Events for Subcatchment 6: Subarea

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
1 yr	2.40	8.19	0.676	0.72
2 yr	2.70	10.65	0.860	0.92
10 yr	3.81	20.84	1.623	1.73
100 yr	**6.18**	**45.09**	**3.494**	**3.73**

Events for Subcatchment 7: Subarea

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
1 yr	2.40	7.24	0.723	0.68
2 yr	2.70	9.53	0.926	0.87
10 yr	3.81	19.06	1.776	1.66
100 yr	**6.18**	**42.19**	**3.881**	**3.63**

Events for Subcatchment 8: Subarea

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
1 yr	2.40	13.97	1.377	0.63
2 yr	2.70	18.61	1.777	0.82
10 yr	3.81	38.15	3.461	1.59
100 yr	**6.18**	**85.99**	**7.679**	**3.53**

Events for Pond 1D: Existing Depression

Event	Inflow (cfs)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)	Volume (acre-feet)	Elevation (feet)	Storage (acre-feet)
1 yr	10.95	0.19	0.19	0.00	0.000	938.58	0.510
2 yr	14.33	0.23	0.23	0.00	0.000	938.68	0.669
10 yr	28.30	0.35	0.35	0.00	0.000	939.00	1.346
100 yr	**61.73**	**1.14**	**0.49**	**0.65**	**0.296**	**939.53**	**2.911**

Events for Pond 6D: Existing Depression

Event	Inflow (cfs)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)	Volume (acre-feet)	Elevation (feet)	Storage (acre-feet)
1 yr	8.19	2.22	0.07	2.16	0.512	917.77	0.339
2 yr	10.65	3.17	0.08	3.09	0.690	917.86	0.423
10 yr	20.84	7.27	0.12	7.15	1.433	918.13	0.766
100 yr	**45.09**	**16.85**	**0.23**	**16.64**	**3.261**	**918.54**	**1.692**

Events for Pond 7D: Existing Depression

Event	Inflow (cfs)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)	Volume (acre-feet)	Elevation (feet)	Storage (acre-feet)
1 yr	7.24	5.17	0.03	5.13	1.161	917.76	0.158
2 yr	9.53	7.53	0.04	7.49	1.540	917.84	0.200
10 yr	21.36	17.37	0.06	17.31	3.123	918.11	0.368
100 yr	**48.15**	**39.52**	**0.08**	**39.43**	**7.038**	**918.52**	**0.742**

Events for Link 1L: West Subwatershed

Event	Inflow (cfs)	Primary (cfs)	Volume (acre-feet)
1 yr	13.44	13.44	0.872
2 yr	17.42	17.42	1.110
10 yr	34.00	34.00	2.094
100 yr	**73.06**	**73.06**	**4.803**

Events for Link 2L: Northwest Subwatershed

Event	Inflow (cfs)	Primary (cfs)	Volume (acre-feet)
1 yr	3.51	3.51	0.210
2 yr	4.76	4.76	0.275
10 yr	10.07	10.07	0.554
100 yr	**23.21**	**23.21**	**1.267**

Events for Link 3L: North Subwatershed (drainage swale)

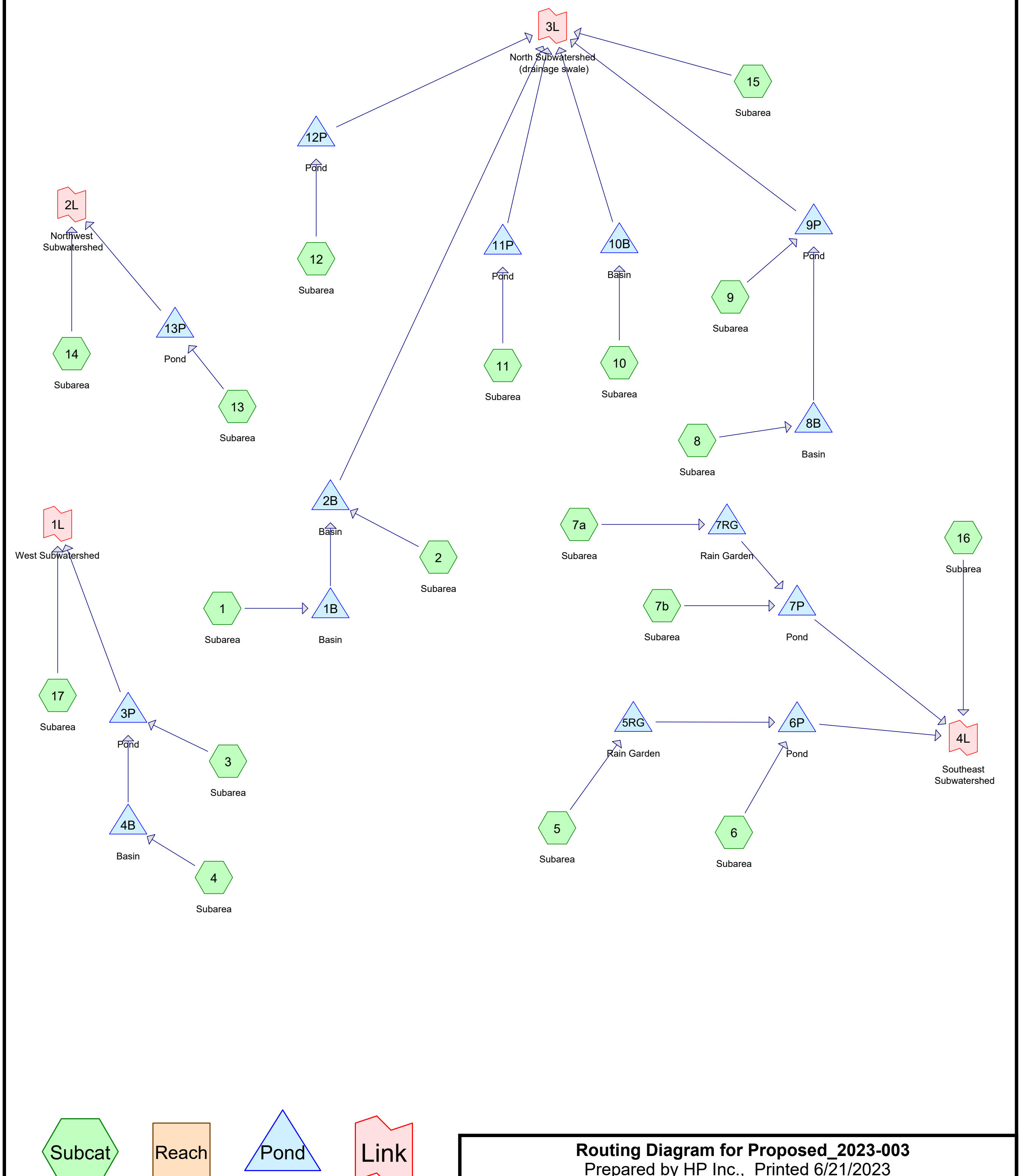
Event	Inflow (cfs)	Primary (cfs)	Volume (acre-feet)
1 yr	24.99	24.99	1.691
2 yr	32.75	32.75	2.165
10 yr	64.83	64.83	4.148
100 yr	**142.66**	**142.66**	**9.057**

Events for Link 4L: Southeast Subwatershed

Event	Inflow (cfs)	Primary (cfs)	Volume (acre-feet)
1 yr	17.42	17.42	2.539
2 yr	23.83	23.83	3.316
10 yr	51.96	51.96	6.584
100 yr	**119.33**	**119.33**	**14.717**

APPENDIX B

Pre-Development Hydrologic Analysis



Routing Diagram for Proposed_2023-003
Prepared by HP Inc., Printed 6/21/2023
HydroCAD® 10.10-6a 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)
29.140	98	impervious (1, 2, 3, 4, 5, 6, 7a, 7b, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17)
71.590	74	lawn - C (1, 2, 3, 4, 5, 6, 7a, 7b, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17)
0.440	74	offsite lawn (ROW) - C (16)
0.240	98	offsite road (16)
2.500	98	water or effective infiltration area (1, 2, 3, 4, 5, 6, 7a, 7b, 8, 9, 10, 11, 12, 13)
7.050	70	woods - C (1, 3, 6, 7a, 7b, 8, 10, 12, 14, 16)
110.960	**81**	**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 Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1: Subarea Runoff Area=11.050 ac 30.86% Impervious Runoff Depth>0.87"
Tc=10.0 min CN=81 Runoff=14.43 cfs 0.802 af

Subcatchment 2: Subarea Runoff Area=1.620 ac 48.15% Impervious Runoff Depth>1.16"
Tc=6.0 min CN=86 Runoff=3.38 cfs 0.157 af

Subcatchment 3: Subarea Runoff Area=13.360 ac 44.31% Impervious Runoff Depth>1.10"
Tc=15.0 min CN=85 Runoff=18.90 cfs 1.223 af

Subcatchment 4: Subarea Runoff Area=4.390 ac 17.31% Impervious Runoff Depth>0.72"
Tc=10.0 min CN=78 Runoff=4.65 cfs 0.265 af

Subcatchment 5: Subarea Runoff Area=2.590 ac 12.36% Impervious Runoff Depth>0.68"
Tc=10.0 min CN=77 Runoff=2.54 cfs 0.146 af

Subcatchment 6: Subarea Runoff Area=8.800 ac 35.68% Impervious Runoff Depth>0.92"
Tc=10.0 min CN=82 Runoff=12.26 cfs 0.678 af

Subcatchment 7a: Subarea Runoff Area=6.380 ac 16.61% Impervious Runoff Depth>0.72"
Tc=10.0 min CN=78 Runoff=6.76 cfs 0.385 af

Subcatchment 7b: Subarea Runoff Area=5.220 ac 38.89% Impervious Runoff Depth>0.98"
Tc=10.0 min CN=83 Runoff=7.74 cfs 0.426 af

Subcatchment 8: Subarea Runoff Area=4.610 ac 19.09% Impervious Runoff Depth>0.72"
Tc=10.0 min CN=78 Runoff=4.88 cfs 0.278 af

Subcatchment 9: Subarea Runoff Area=10.820 ac 36.23% Impervious Runoff Depth>0.98"
Tc=6.0 min CN=83 Runoff=19.06 cfs 0.884 af

Subcatchment 10: Subarea Runoff Area=2.040 ac 18.63% Impervious Runoff Depth>0.72"
Tc=10.0 min CN=78 Runoff=2.16 cfs 0.123 af

Subcatchment 11: Subarea Runoff Area=7.980 ac 39.47% Impervious Runoff Depth>0.98"
Tc=6.0 min CN=83 Runoff=14.06 cfs 0.652 af

Subcatchment 12: Subarea Runoff Area=7.030 ac 28.59% Impervious Runoff Depth>0.82"
Tc=10.0 min CN=80 Runoff=8.59 cfs 0.480 af

Subcatchment 13: Subarea Runoff Area=5.250 ac 24.38% Impervious Runoff Depth>0.82"
Tc=10.0 min CN=80 Runoff=6.41 cfs 0.359 af

Subcatchment 14: Subarea Runoff Area=0.410 ac 7.32% Impervious Runoff Depth>0.59"
Tc=10.0 min CN=75 Runoff=0.34 cfs 0.020 af

Subcatchment 15: Subarea Runoff Area=4.280 ac 17.06% Impervious Runoff Depth>0.72"
Tc=10.0 min CN=78 Runoff=4.53 cfs 0.258 af

Subcatchment 16: Subarea Runoff Area=11.570 ac 12.27% Impervious Runoff Depth>0.63"
Tc=10.0 min CN=76 Runoff=10.50 cfs 0.612 af

Subcatchment 17: Subarea Runoff Area=3.560 ac 18.54% Impervious Runoff Depth>0.72"
Tc=10.0 min CN=78 Runoff=3.77 cfs 0.215 af

Pond 1B: Basin Peak Elev=934.48' Storage=0.474 af Inflow=14.43 cfs 0.802 af
Discarded=0.11 cfs 0.093 af Primary=0.87 cfs 0.452 af Outflow=0.98 cfs 0.545 af

Pond 2B: Basin Peak Elev=931.39' Storage=0.119 af Inflow=3.38 cfs 0.609 af
Discarded=0.37 cfs 0.348 af Primary=0.59 cfs 0.187 af Outflow=0.96 cfs 0.536 af

Pond 3P: Pond Peak Elev=925.48' Storage=0.908 af Inflow=18.90 cfs 1.223 af
Outflow=0.43 cfs 0.418 af

Pond 4B: Basin Peak Elev=936.14' Storage=0.080 af Inflow=4.65 cfs 0.265 af
Discarded=1.05 cfs 0.265 af Primary=0.00 cfs 0.000 af Outflow=1.05 cfs 0.265 af

Pond 5RG: Rain Garden Peak Elev=923.51' Storage=0.080 af Inflow=2.54 cfs 0.146 af
Discarded=0.01 cfs 0.005 af Primary=0.19 cfs 0.099 af Outflow=0.19 cfs 0.105 af

Pond 6P: Pond Peak Elev=912.56' Storage=0.513 af Inflow=12.26 cfs 0.777 af
Outflow=0.37 cfs 0.352 af

Pond 7P: Pond Peak Elev=920.11' Storage=0.361 af Inflow=8.67 cfs 0.717 af
Outflow=1.16 cfs 0.620 af

Pond 7RG: Rain Garden Peak Elev=922.35' Storage=0.112 af Inflow=6.76 cfs 0.385 af
Discarded=0.02 cfs 0.014 af Primary=3.77 cfs 0.291 af Outflow=3.79 cfs 0.305 af

Pond 8B: Basin Peak Elev=917.29' Storage=0.187 af Inflow=4.88 cfs 0.278 af
Discarded=0.01 cfs 0.009 af Primary=0.15 cfs 0.127 af Outflow=0.16 cfs 0.136 af

Pond 9P: Pond Peak Elev=899.66' Storage=0.750 af Inflow=19.06 cfs 1.012 af
Outflow=0.29 cfs 0.279 af

Pond 10B: Basin Peak Elev=911.88' Storage=0.073 af Inflow=2.16 cfs 0.123 af
Discarded=0.09 cfs 0.086 af Primary=0.00 cfs 0.000 af Outflow=0.09 cfs 0.086 af

Pond 11P: Pond Peak Elev=914.08' Storage=0.450 af Inflow=14.06 cfs 0.652 af
Outflow=0.39 cfs 0.310 af

Pond 12P: Pond Peak Elev=923.89' Storage=0.309 af Inflow=8.59 cfs 0.480 af
Outflow=0.31 cfs 0.289 af

Pond 13P: Pond Peak Elev=896.37' Storage=0.206 af Inflow=6.41 cfs 0.359 af
Outflow=0.40 cfs 0.303 af

Link 1L: West Subwatershed Inflow=4.01 cfs 0.632 af
Primary=4.01 cfs 0.632 af

Link 2L: Northwest Subwatershed Inflow=0.58 cfs 0.323 af
Primary=0.58 cfs 0.323 af

Link 3L: North Subwatershed (drainage swale) Inflow=5.14 cfs 1.324 af
Primary=5.14 cfs 1.324 af

Link 4L: Southeast Subwatershed Inflow=10.98 cfs 1.584 af
Primary=10.98 cfs 1.584 af

Total Runoff Area = 110.960 ac Runoff Volume = 7.962 af Average Runoff Depth = 0.86"
71.27% Pervious = 79.080 ac 28.73% Impervious = 31.880 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 Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1: Subarea Runoff Area=11.050 ac 30.86% Impervious Runoff Depth>1.09"
Tc=10.0 min CN=81 Runoff=18.14 cfs 1.001 af

Subcatchment 2: Subarea Runoff Area=1.620 ac 48.15% Impervious Runoff Depth>1.41"
Tc=6.0 min CN=86 Runoff=4.08 cfs 0.190 af

Subcatchment 3: Subarea Runoff Area=13.360 ac 44.31% Impervious Runoff Depth>1.34"
Tc=15.0 min CN=85 Runoff=23.09 cfs 1.490 af

Subcatchment 4: Subarea Runoff Area=4.390 ac 17.31% Impervious Runoff Depth>0.92"
Tc=10.0 min CN=78 Runoff=6.01 cfs 0.336 af

Subcatchment 5: Subarea Runoff Area=2.590 ac 12.36% Impervious Runoff Depth>0.87"
Tc=10.0 min CN=77 Runoff=3.32 cfs 0.187 af

Subcatchment 6: Subarea Runoff Area=8.800 ac 35.68% Impervious Runoff Depth>1.15"
Tc=10.0 min CN=82 Runoff=15.29 cfs 0.841 af

Subcatchment 7a: Subarea Runoff Area=6.380 ac 16.61% Impervious Runoff Depth>0.92"
Tc=10.0 min CN=78 Runoff=8.74 cfs 0.489 af

Subcatchment 7b: Subarea Runoff Area=5.220 ac 38.89% Impervious Runoff Depth>1.21"
Tc=10.0 min CN=83 Runoff=9.57 cfs 0.526 af

Subcatchment 8: Subarea Runoff Area=4.610 ac 19.09% Impervious Runoff Depth>0.92"
Tc=10.0 min CN=78 Runoff=6.31 cfs 0.353 af

Subcatchment 9: Subarea Runoff Area=10.820 ac 36.23% Impervious Runoff Depth>1.21"
Tc=6.0 min CN=83 Runoff=23.51 cfs 1.090 af

Subcatchment 10: Subarea Runoff Area=2.040 ac 18.63% Impervious Runoff Depth>0.92"
Tc=10.0 min CN=78 Runoff=2.79 cfs 0.156 af

Subcatchment 11: Subarea Runoff Area=7.980 ac 39.47% Impervious Runoff Depth>1.21"
Tc=6.0 min CN=83 Runoff=17.34 cfs 0.804 af

Subcatchment 12: Subarea Runoff Area=7.030 ac 28.59% Impervious Runoff Depth>1.03"
Tc=10.0 min CN=80 Runoff=10.89 cfs 0.603 af

Subcatchment 13: Subarea Runoff Area=5.250 ac 24.38% Impervious Runoff Depth>1.03"
Tc=10.0 min CN=80 Runoff=8.13 cfs 0.450 af

Subcatchment 14: Subarea Runoff Area=0.410 ac 7.32% Impervious Runoff Depth>0.77"
Tc=10.0 min CN=75 Runoff=0.46 cfs 0.026 af

Subcatchment 15: Subarea Runoff Area=4.280 ac 17.06% Impervious Runoff Depth>0.92"
Tc=10.0 min CN=78 Runoff=5.86 cfs 0.328 af

Subcatchment 16: Subarea Runoff Area=11.570 ac 12.27% Impervious Runoff Depth>0.82"
Tc=10.0 min CN=76 Runoff=13.88 cfs 0.789 af

Subcatchment 17: Subarea Runoff Area=3.560 ac 18.54% Impervious Runoff Depth>0.92"
Tc=10.0 min CN=78 Runoff=4.88 cfs 0.273 af

Pond 1B: Basin Peak Elev=934.78' Storage=0.586 af Inflow=18.14 cfs 1.001 af
Discarded=0.12 cfs 0.100 af Primary=1.16 cfs 0.621 af Outflow=1.28 cfs 0.721 af

Pond 2B: Basin Peak Elev=931.52' Storage=0.132 af Inflow=4.06 cfs 0.811 af
Discarded=0.38 cfs 0.363 af Primary=0.97 cfs 0.368 af Outflow=1.35 cfs 0.731 af

Pond 3P: Pond Peak Elev=925.63' Storage=0.959 af Inflow=23.09 cfs 1.490 af
Outflow=2.33 cfs 0.656 af

Pond 4B: Basin Peak Elev=936.32' Storage=0.115 af Inflow=6.01 cfs 0.336 af
Discarded=1.13 cfs 0.336 af Primary=0.00 cfs 0.000 af Outflow=1.13 cfs 0.336 af

Pond 5RG: Rain Garden Peak Elev=923.86' Storage=0.104 af Inflow=3.32 cfs 0.187 af
Discarded=0.01 cfs 0.006 af Primary=0.23 cfs 0.139 af Outflow=0.24 cfs 0.145 af

Pond 6P: Pond Peak Elev=912.69' Storage=0.547 af Inflow=15.30 cfs 0.980 af
Outflow=1.44 cfs 0.518 af

Pond 7P: Pond Peak Elev=920.33' Storage=0.475 af Inflow=13.64 cfs 0.920 af
Outflow=1.56 cfs 0.812 af

Pond 7RG: Rain Garden Peak Elev=922.45' Storage=0.125 af Inflow=8.74 cfs 0.489 af
Discarded=0.02 cfs 0.015 af Primary=6.19 cfs 0.395 af Outflow=6.20 cfs 0.409 af

Pond 8B: Basin Peak Elev=917.56' Storage=0.238 af Inflow=6.31 cfs 0.353 af
Discarded=0.01 cfs 0.009 af Primary=0.20 cfs 0.170 af Outflow=0.20 cfs 0.179 af

Pond 9P: Pond Peak Elev=900.07' Storage=0.953 af Inflow=23.51 cfs 1.260 af
Outflow=0.35 cfs 0.321 af

Pond 10B: Basin Peak Elev=912.16' Storage=0.099 af Inflow=2.79 cfs 0.156 af
Discarded=0.10 cfs 0.095 af Primary=0.00 cfs 0.000 af Outflow=0.10 cfs 0.095 af

Pond 11P: Pond Peak Elev=914.31' Storage=0.517 af Inflow=17.34 cfs 0.804 af
Outflow=0.85 cfs 0.439 af

Pond 12P: Pond Peak Elev=924.24' Storage=0.385 af Inflow=10.89 cfs 0.603 af
Outflow=0.60 cfs 0.346 af

Pond 13P: Pond Peak Elev=896.65' Storage=0.268 af Inflow=8.13 cfs 0.450 af
Outflow=0.46 cfs 0.367 af

Link 1L: West Subwatershed Inflow=5.15 cfs 0.929 af
Primary=5.15 cfs 0.929 af

Link 2L: Northwest Subwatershed Inflow=0.75 cfs 0.393 af
Primary=0.75 cfs 0.393 af

Link 3L: North Subwatershed (drainage swale) Inflow=6.56 cfs 1.802 af
Primary=6.56 cfs 1.802 af

Link 4L: Southeast Subwatershed Inflow=14.56 cfs 2.119 af
Primary=14.56 cfs 2.119 af

Total Runoff Area = 110.960 ac Runoff Volume = 9.933 af Average Runoff Depth = 1.07"
71.27% Pervious = 79.080 ac 28.73% Impervious = 31.880 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 Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1: Subarea Runoff Area=11.050 ac 30.86% Impervious Runoff Depth>1.96"
Tc=10.0 min CN=81 Runoff=32.93 cfs 1.806 af

Subcatchment 2: Subarea Runoff Area=1.620 ac 48.15% Impervious Runoff Depth>2.37"
Tc=6.0 min CN=86 Runoff=6.77 cfs 0.321 af

Subcatchment 3: Subarea Runoff Area=13.360 ac 44.31% Impervious Runoff Depth>2.29"
Tc=15.0 min CN=85 Runoff=39.32 cfs 2.546 af

Subcatchment 4: Subarea Runoff Area=4.390 ac 17.31% Impervious Runoff Depth>1.74"
Tc=10.0 min CN=78 Runoff=11.57 cfs 0.635 af

Subcatchment 5: Subarea Runoff Area=2.590 ac 12.36% Impervious Runoff Depth>1.66"
Tc=10.0 min CN=77 Runoff=6.54 cfs 0.359 af

Subcatchment 6: Subarea Runoff Area=8.800 ac 35.68% Impervious Runoff Depth>2.04"
Tc=10.0 min CN=82 Runoff=27.25 cfs 1.496 af

Subcatchment 7a: Subarea Runoff Area=6.380 ac 16.61% Impervious Runoff Depth>1.74"
Tc=10.0 min CN=78 Runoff=16.82 cfs 0.923 af

Subcatchment 7b: Subarea Runoff Area=5.220 ac 38.89% Impervious Runoff Depth>2.12"
Tc=10.0 min CN=83 Runoff=16.77 cfs 0.923 af

Subcatchment 8: Subarea Runoff Area=4.610 ac 19.09% Impervious Runoff Depth>1.74"
Tc=10.0 min CN=78 Runoff=12.15 cfs 0.667 af

Subcatchment 9: Subarea Runoff Area=10.820 ac 36.23% Impervious Runoff Depth>2.12"
Tc=6.0 min CN=83 Runoff=40.89 cfs 1.913 af

Subcatchment 10: Subarea Runoff Area=2.040 ac 18.63% Impervious Runoff Depth>1.74"
Tc=10.0 min CN=78 Runoff=5.38 cfs 0.295 af

Subcatchment 11: Subarea Runoff Area=7.980 ac 39.47% Impervious Runoff Depth>2.12"
Tc=6.0 min CN=83 Runoff=30.16 cfs 1.411 af

Subcatchment 12: Subarea Runoff Area=7.030 ac 28.59% Impervious Runoff Depth>1.88"
Tc=10.0 min CN=80 Runoff=20.14 cfs 1.104 af

Subcatchment 13: Subarea Runoff Area=5.250 ac 24.38% Impervious Runoff Depth>1.88"
Tc=10.0 min CN=80 Runoff=15.04 cfs 0.825 af

Subcatchment 14: Subarea Runoff Area=0.410 ac 7.32% Impervious Runoff Depth>1.52"
Tc=10.0 min CN=75 Runoff=0.94 cfs 0.052 af

Subcatchment 15: Subarea Runoff Area=4.280 ac 17.06% Impervious Runoff Depth>1.74"
Tc=10.0 min CN=78 Runoff=11.28 cfs 0.619 af

Subcatchment 16: Subarea Runoff Area=11.570 ac 12.27% Impervious Runoff Depth>1.59"
Tc=10.0 min CN=76 Runoff=27.91 cfs 1.536 af

Subcatchment 17: Subarea Runoff Area=3.560 ac 18.54% Impervious Runoff Depth>1.74"
Tc=10.0 min CN=78 Runoff=9.38 cfs 0.515 af

Pond 1B: Basin Peak Elev=935.84' Storage=1.119 af Inflow=32.93 cfs 1.806 af
Discarded=0.16 cfs 0.134 af Primary=1.84 cfs 1.301 af Outflow=2.00 cfs 1.436 af

Pond 2B: Basin Peak Elev=931.84' Storage=0.167 af Inflow=7.47 cfs 1.622 af
Discarded=0.42 cfs 0.406 af Primary=2.09 cfs 1.115 af Outflow=2.51 cfs 1.521 af

Pond 3P: Pond Peak Elev=926.10' Storage=1.127 af Inflow=39.32 cfs 2.546 af
Outflow=19.78 cfs 1.669 af

Pond 4B: Basin Peak Elev=937.08' Storage=0.271 af Inflow=11.57 cfs 0.635 af
Discarded=1.51 cfs 0.635 af Primary=0.00 cfs 0.000 af Outflow=1.51 cfs 0.635 af

Pond 5RG: Rain Garden Peak Elev=924.42' Storage=0.153 af Inflow=6.54 cfs 0.359 af
Discarded=0.01 cfs 0.007 af Primary=2.53 cfs 0.302 af Outflow=2.54 cfs 0.310 af

Pond 6P: Pond Peak Elev=913.06' Storage=0.650 af Inflow=27.46 cfs 1.798 af
Outflow=13.29 cfs 1.293 af

Pond 7P: Pond Peak Elev=921.04' Storage=0.890 af Inflow=31.46 cfs 1.750 af
Outflow=4.08 cfs 1.604 af

Pond 7RG: Rain Garden Peak Elev=922.71' Storage=0.160 af Inflow=16.82 cfs 0.923 af
Discarded=0.02 cfs 0.016 af Primary=15.43 cfs 0.827 af Outflow=15.45 cfs 0.842 af

Pond 8B: Basin Peak Elev=918.66' Storage=0.474 af Inflow=12.15 cfs 0.667 af
Discarded=0.01 cfs 0.012 af Primary=0.32 cfs 0.292 af Outflow=0.33 cfs 0.304 af

Pond 9P: Pond Peak Elev=900.73' Storage=1.303 af Inflow=40.99 cfs 2.205 af
Outflow=2.16 cfs 1.164 af

Pond 10B: Basin Peak Elev=912.89' Storage=0.208 af Inflow=5.38 cfs 0.295 af
Discarded=0.12 cfs 0.123 af Primary=0.00 cfs 0.000 af Outflow=0.12 cfs 0.123 af

Pond 11P: Pond Peak Elev=915.09' Storage=0.778 af Inflow=30.16 cfs 1.411 af
Outflow=3.31 cfs 1.008 af

Pond 12P: Pond Peak Elev=924.59' Storage=0.470 af Inflow=20.14 cfs 1.104 af
Outflow=8.01 cfs 0.797 af

Pond 13P: Pond Peak Elev=897.60' Storage=0.501 af Inflow=15.04 cfs 0.825 af
Outflow=1.11 cfs 0.609 af

Link 1L: West Subwatershed Inflow=22.80 cfs 2.184 af
Primary=22.80 cfs 2.184 af

Link 2L: Northwest Subwatershed Inflow=1.38 cfs 0.661 af
Primary=1.38 cfs 0.661 af

Link 3L: North Subwatershed (drainage swale) Inflow=18.21 cfs 4.703 af
Primary=18.21 cfs 4.703 af

Link 4L: Southeast Subwatershed Inflow=30.27 cfs 4.432 af
Primary=30.27 cfs 4.432 af

Total Runoff Area = 110.960 ac Runoff Volume = 17.945 af Average Runoff Depth = 1.94"
71.27% Pervious = 79.080 ac 28.73% Impervious = 31.880 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 Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1: Subarea Runoff Area=11.050 ac 30.86% Impervious Runoff Depth>4.05"
Tc=10.0 min CN=81 Runoff=66.94 cfs 3.726 af

Subcatchment 2: Subarea Runoff Area=1.620 ac 48.15% Impervious Runoff Depth>4.58"
Tc=6.0 min CN=86 Runoff=12.61 cfs 0.618 af

Subcatchment 3: Subarea Runoff Area=13.360 ac 44.31% Impervious Runoff Depth>4.47"
Tc=15.0 min CN=85 Runoff=75.17 cfs 4.976 af

Subcatchment 4: Subarea Runoff Area=4.390 ac 17.31% Impervious Runoff Depth>3.74"
Tc=10.0 min CN=78 Runoff=24.71 cfs 1.367 af

Subcatchment 5: Subarea Runoff Area=2.590 ac 12.36% Impervious Runoff Depth>3.63"
Tc=10.0 min CN=77 Runoff=14.21 cfs 0.785 af

Subcatchment 6: Subarea Runoff Area=8.800 ac 35.68% Impervious Runoff Depth>4.15"
Tc=10.0 min CN=82 Runoff=54.50 cfs 3.044 af

Subcatchment 7a: Subarea Runoff Area=6.380 ac 16.61% Impervious Runoff Depth>3.74"
Tc=10.0 min CN=78 Runoff=35.91 cfs 1.987 af

Subcatchment 7b: Subarea Runoff Area=5.220 ac 38.89% Impervious Runoff Depth>4.26"
Tc=10.0 min CN=83 Runoff=33.02 cfs 1.852 af

Subcatchment 8: Subarea Runoff Area=4.610 ac 19.09% Impervious Runoff Depth>3.74"
Tc=10.0 min CN=78 Runoff=25.95 cfs 1.435 af

Subcatchment 9: Subarea Runoff Area=10.820 ac 36.23% Impervious Runoff Depth>4.26"
Tc=6.0 min CN=83 Runoff=79.67 cfs 3.839 af

Subcatchment 10: Subarea Runoff Area=2.040 ac 18.63% Impervious Runoff Depth>3.74"
Tc=10.0 min CN=78 Runoff=11.48 cfs 0.635 af

Subcatchment 11: Subarea Runoff Area=7.980 ac 39.47% Impervious Runoff Depth>4.26"
Tc=6.0 min CN=83 Runoff=58.76 cfs 2.831 af

Subcatchment 12: Subarea Runoff Area=7.030 ac 28.59% Impervious Runoff Depth>3.94"
Tc=10.0 min CN=80 Runoff=41.52 cfs 2.309 af

Subcatchment 13: Subarea Runoff Area=5.250 ac 24.38% Impervious Runoff Depth>3.94"
Tc=10.0 min CN=80 Runoff=31.01 cfs 1.725 af

Subcatchment 14: Subarea Runoff Area=0.410 ac 7.32% Impervious Runoff Depth>3.43"
Tc=10.0 min CN=75 Runoff=2.13 cfs 0.117 af

Subcatchment 15: Subarea Runoff Area=4.280 ac 17.06% Impervious Runoff Depth>3.74"
Tc=10.0 min CN=78 Runoff=24.09 cfs 1.333 af

Subcatchment 16: Subarea Runoff Area=11.570 ac 12.27% Impervious Runoff Depth>3.53"
Tc=10.0 min CN=76 Runoff=61.86 cfs 3.407 af

Subcatchment 17: Subarea Runoff Area=3.560 ac 18.54% Impervious Runoff Depth>3.74"
Tc=10.0 min CN=78 Runoff=20.04 cfs 1.108 af

Pond 1B: Basin Peak Elev=937.46' Storage=2.350 af Inflow=66.94 cfs 3.726 af
Discarded=0.24 cfs 0.216 af Primary=5.42 cfs 2.524 af Outflow=5.66 cfs 2.740 af

Pond 2B: Basin Peak Elev=932.38' Storage=0.234 af Inflow=14.38 cfs 3.142 af
Discarded=0.49 cfs 0.468 af Primary=10.14 cfs 2.529 af Outflow=10.63 cfs 2.997 af

Pond 3P: Pond Peak Elev=927.84' Storage=1.822 af Inflow=75.32 cfs 5.050 af
Outflow=36.55 cfs 4.142 af

Pond 4B: Basin Peak Elev=938.54' Storage=0.661 af Inflow=24.71 cfs 1.367 af
Discarded=2.60 cfs 1.293 af Primary=0.39 cfs 0.074 af Outflow=2.99 cfs 1.367 af

Pond 5RG: Rain Garden Peak Elev=924.80' Storage=0.194 af Inflow=14.21 cfs 0.785 af
Discarded=0.01 cfs 0.009 af Primary=13.05 cfs 0.704 af Outflow=13.06 cfs 0.713 af

Pond 6P: Pond Peak Elev=914.99' Storage=1.310 af Inflow=66.31 cfs 3.748 af
Outflow=25.56 cfs 3.223 af

Pond 7P: Pond Peak Elev=922.28' Storage=1.829 af Inflow=66.09 cfs 3.739 af
Outflow=12.97 cfs 3.520 af

Pond 7RG: Rain Garden Peak Elev=923.08' Storage=0.218 af Inflow=35.91 cfs 1.987 af
Discarded=0.02 cfs 0.018 af Primary=34.12 cfs 1.887 af Outflow=34.14 cfs 1.905 af

Pond 8B: Basin Peak Elev=919.45' Storage=0.683 af Inflow=25.95 cfs 1.435 af
Discarded=0.02 cfs 0.015 af Primary=9.74 cfs 0.926 af Outflow=9.76 cfs 0.940 af

Pond 9P: Pond Peak Elev=902.93' Storage=2.697 af Inflow=79.95 cfs 4.765 af
Outflow=8.76 cfs 3.663 af

Pond 10B: Basin Peak Elev=914.16' Storage=0.449 af Inflow=11.48 cfs 0.635 af
Discarded=0.17 cfs 0.173 af Primary=0.17 cfs 0.123 af Outflow=0.34 cfs 0.296 af

Pond 11P: Pond Peak Elev=916.48' Storage=1.332 af Inflow=58.76 cfs 2.831 af
Outflow=15.76 cfs 2.395 af

Pond 12P: Pond Peak Elev=926.00' Storage=0.892 af Inflow=41.52 cfs 2.309 af
Outflow=14.97 cfs 1.959 af

Pond 13P: Pond Peak Elev=898.69' Storage=0.824 af Inflow=31.01 cfs 1.725 af
Outflow=9.41 cfs 1.425 af

Link 1L: West Subwatershed Inflow=52.33 cfs 5.250 af
Primary=52.33 cfs 5.250 af

Link 2L: Northwest Subwatershed Inflow=10.36 cfs 1.543 af
Primary=10.36 cfs 1.543 af

Link 3L: North Subwatershed (drainage swale)
Inflow=67.12 cfs 12.002 af
Primary=67.12 cfs 12.002 af

Link 4L: Southeast Subwatershed
Inflow=89.93 cfs 10.150 af
Primary=89.93 cfs 10.150 af

Total Runoff Area = 110.960 ac Runoff Volume = 37.094 af Average Runoff Depth = 4.01"
71.27% Pervious = 79.080 ac 28.73% Impervious = 31.880 ac

Summary for Subcatchment 1: Subarea

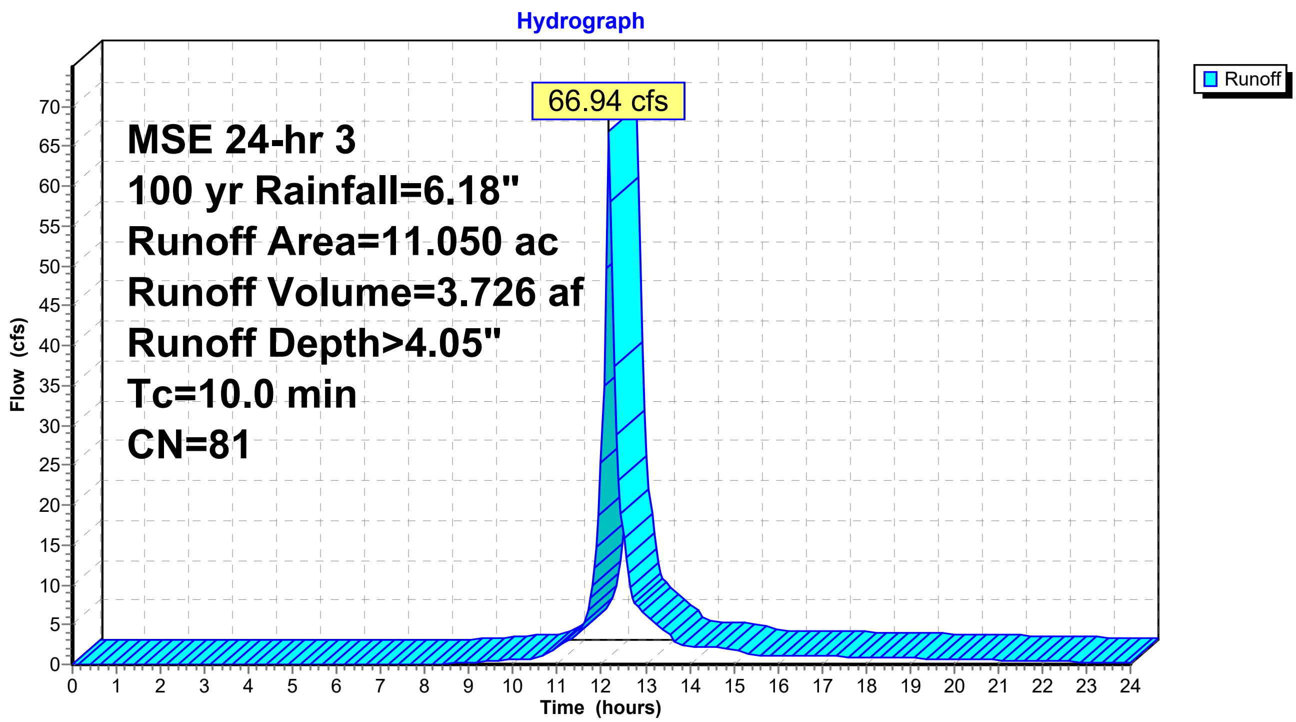
Runoff = 66.94 cfs @ 12.17 hrs, Volume= 3.726 af, Depth> 4.05"
Routed to Pond 1B : Basin

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
*	3.170	98	impervious
*	6.510	74	lawn - C
*	0.240	98	water or effective infiltration area
*	1.130	70	woods - C
	11.050	81	Weighted Average
	7.640		69.14% Pervious Area
	3.410		30.86% Impervious Area

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

Subcatchment 1: Subarea



Summary for Subcatchment 2: Subarea

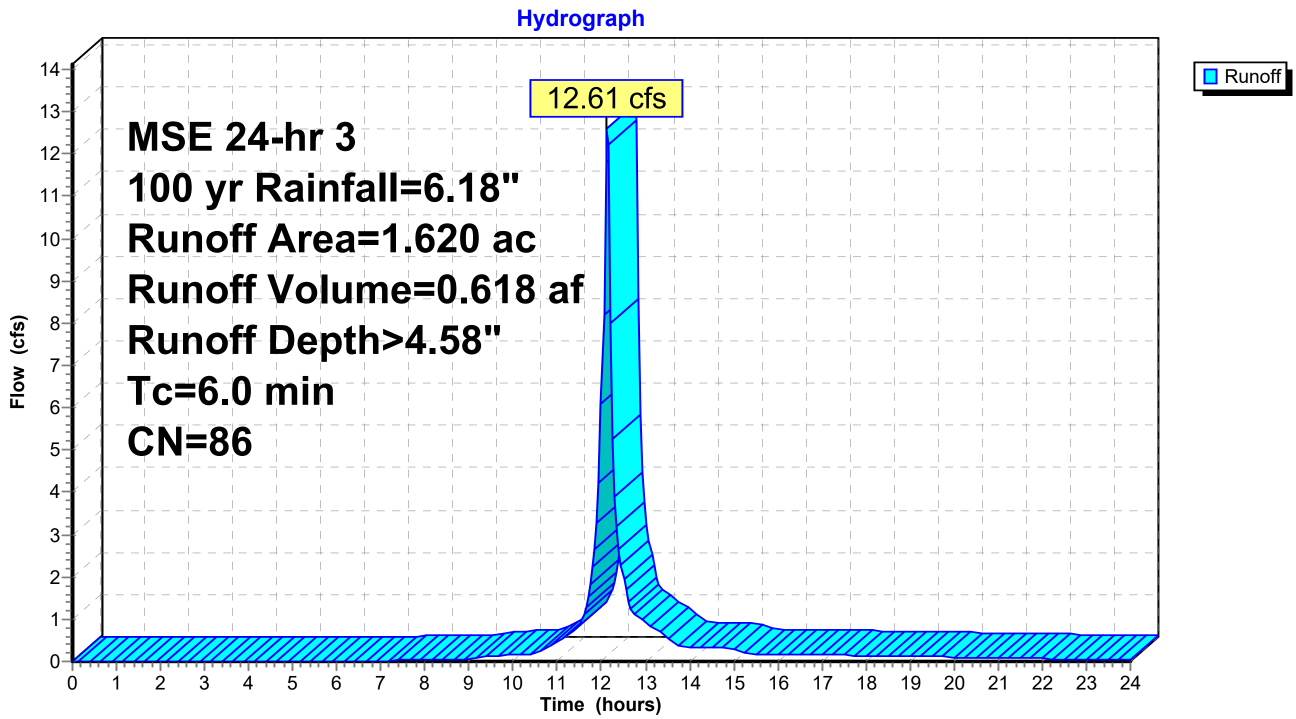
Runoff = 12.61 cfs @ 12.13 hrs, Volume= 0.618 af, Depth> 4.58"
Routed to Pond 2B : Basin

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
*	0.690	98	impervious
*	0.840	74	lawn - C
*	0.090	98	water or effective infiltration area
	1.620	86	Weighted Average
	0.840		51.85% Pervious Area
	0.780		48.15% Impervious Area

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

Subcatchment 2: Subarea



Summary for Subcatchment 3: Subarea

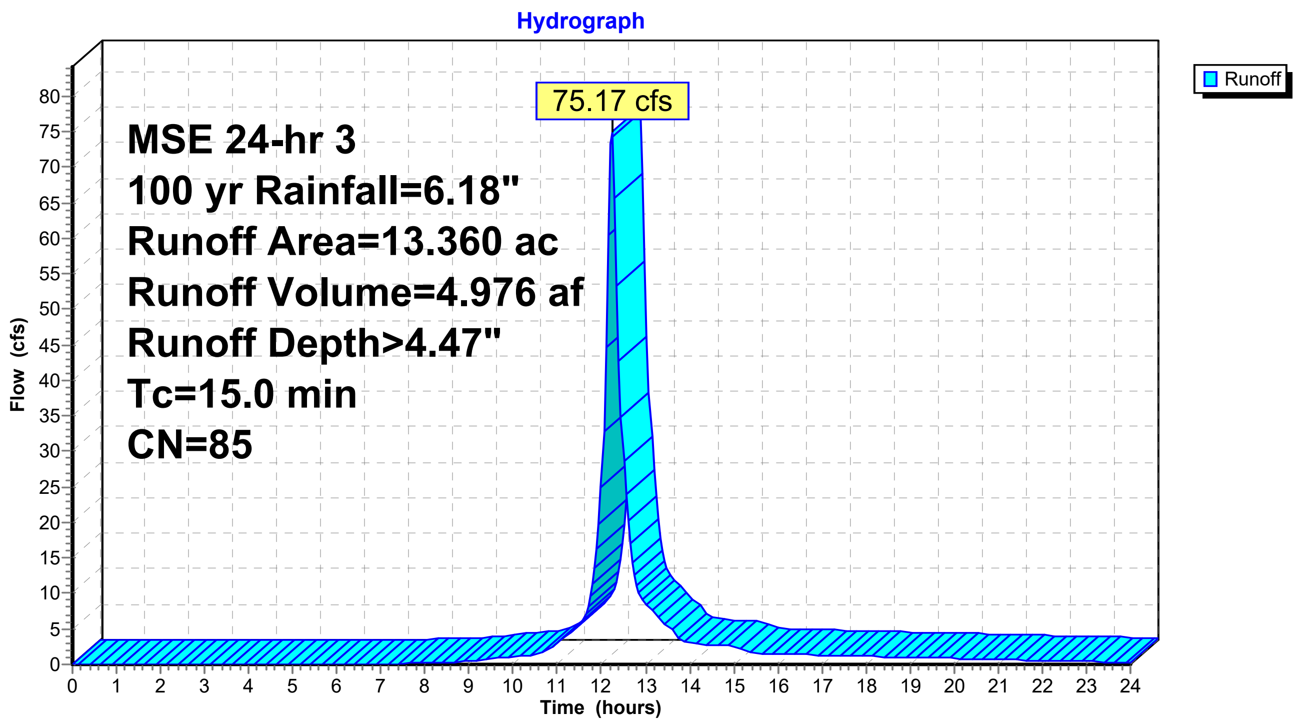
Runoff = 75.17 cfs @ 12.23 hrs, Volume= 4.976 af, Depth> 4.47"
Routed to Pond 3P : Pond

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
*	5.720	98	impervious
*	7.390	74	lawn - C
*	0.200	98	water or effective infiltration area
*	0.050	70	woods - C
	13.360	85	Weighted Average
	7.440		55.69% Pervious Area
	5.920		44.31% Impervious Area

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

Subcatchment 3: Subarea



Summary for Subcatchment 4: Subarea

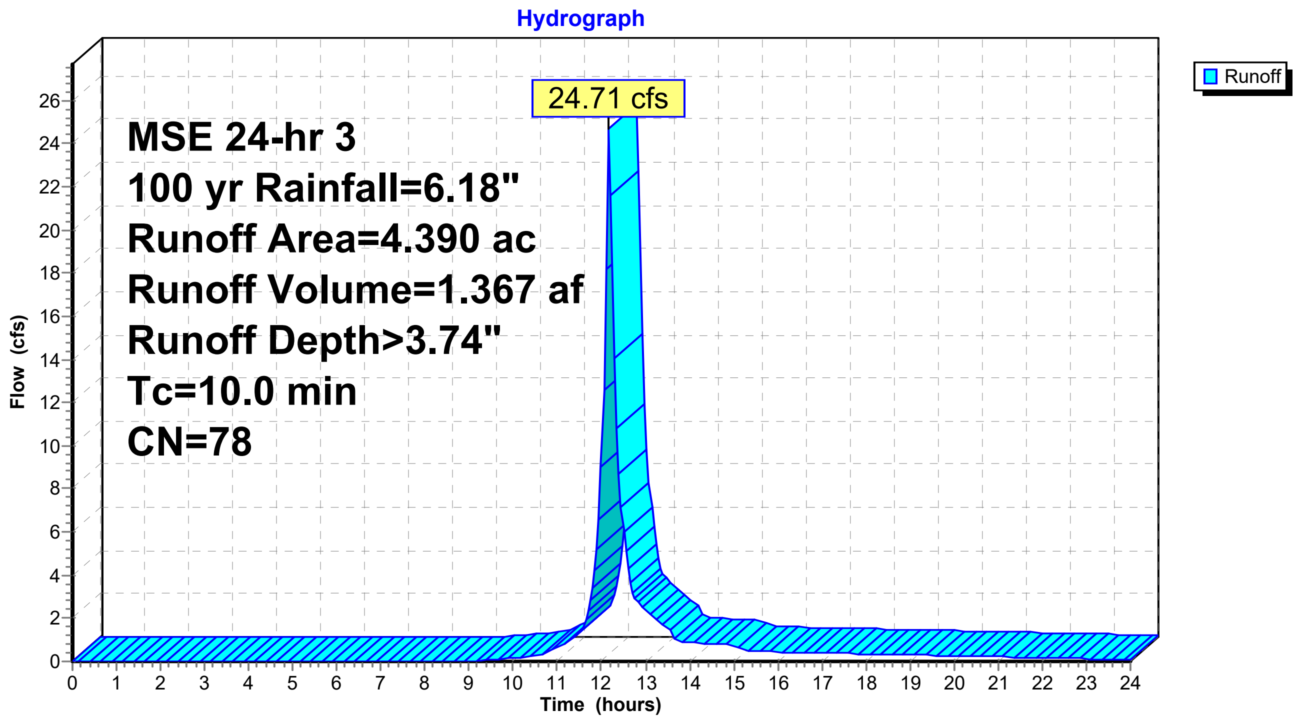
Runoff = 24.71 cfs @ 12.18 hrs, Volume= 1.367 af, Depth> 3.74"
Routed to Pond 4B : Basin

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
*	0.580	98	impervious
*	3.630	74	lawn - C
*	0.180	98	water or effective infiltration area
	4.390	78	Weighted Average
	3.630		82.69% Pervious Area
	0.760		17.31% Impervious Area

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

Subcatchment 4: Subarea



Summary for Subcatchment 5: Subarea

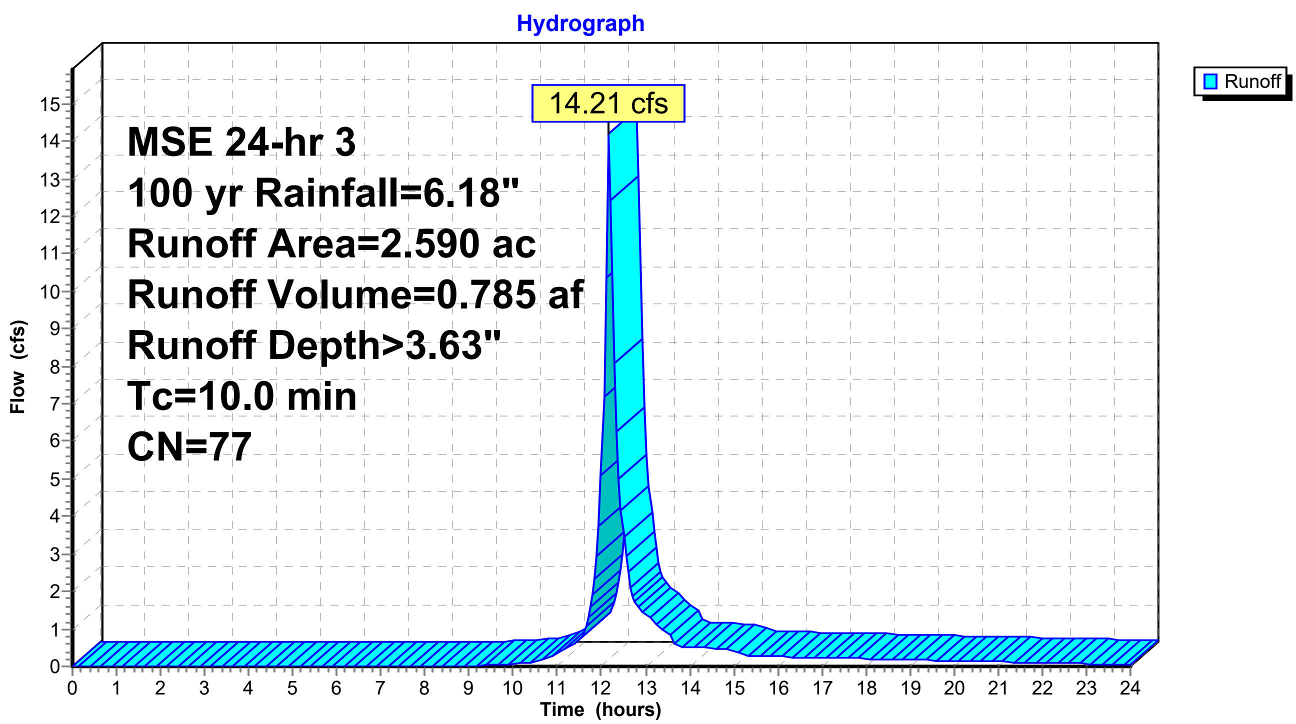
Runoff = 14.21 cfs @ 12.18 hrs, Volume= 0.785 af, Depth> 3.63"
Routed to Pond 5RG : Rain Garden

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
*	0.290	98	impervious
*	2.270	74	lawn - C
*	0.030	98	water or effective infiltration area
	2.590	77	Weighted Average
	2.270		87.64% Pervious Area
	0.320		12.36% Impervious Area

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

Subcatchment 5: Subarea



Summary for Subcatchment 6: Subarea

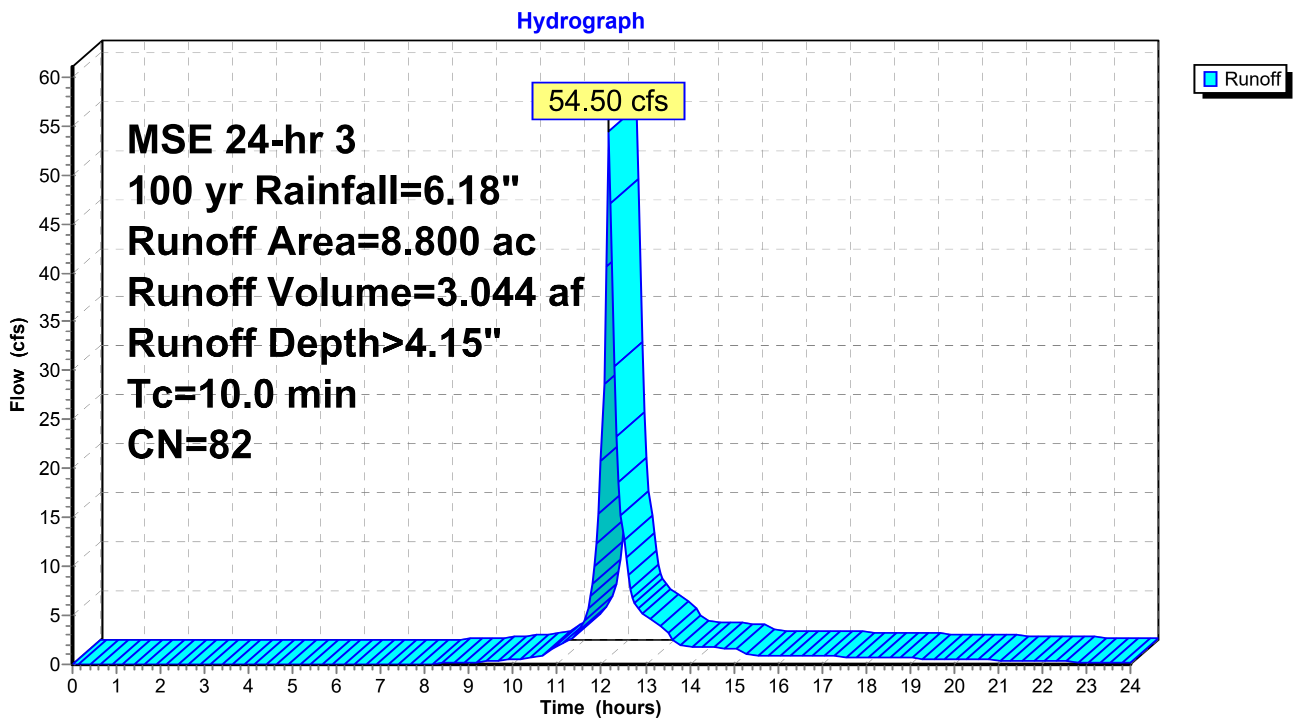
Runoff = 54.50 cfs @ 12.17 hrs, Volume= 3.044 af, Depth> 4.15"
Routed to Pond 6P : Pond

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
*	2.990	98	impervious
*	4.250	74	lawn - C
*	0.150	98	water or effective infiltration area
*	1.410	70	woods - C
	8.800	82	Weighted Average
	5.660		64.32% Pervious Area
	3.140		35.68% Impervious Area

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

Subcatchment 6: Subarea



Summary for Subcatchment 7a: Subarea

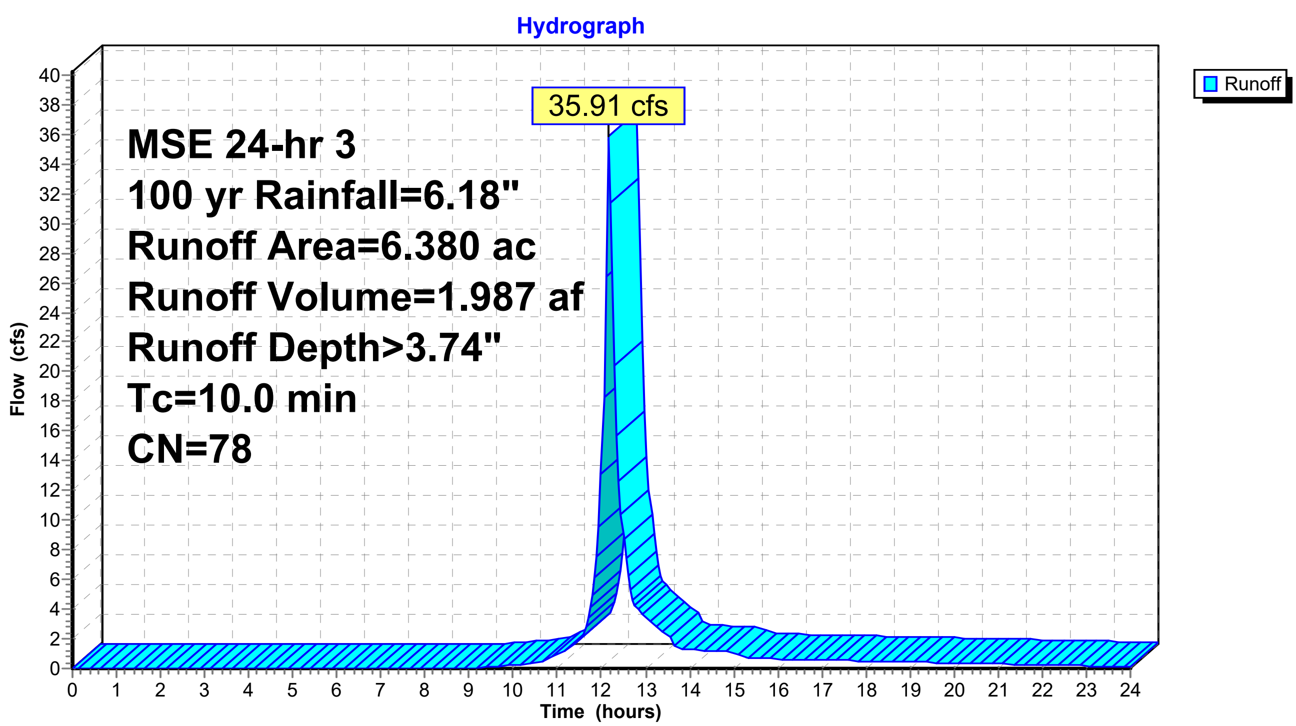
Runoff = 35.91 cfs @ 12.18 hrs, Volume= 1.987 af, Depth> 3.74"
Routed to Pond 7RG : Rain Garden

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
*	1.000	98	impervious
*	4.990	74	lawn - C
*	0.330	70	woods - C
*	0.060	98	water or effective infiltration area
	6.380	78	Weighted Average
	5.320		83.39% Pervious Area
	1.060		16.61% Impervious Area

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

Subcatchment 7a: Subarea



Summary for Subcatchment 7b: Subarea

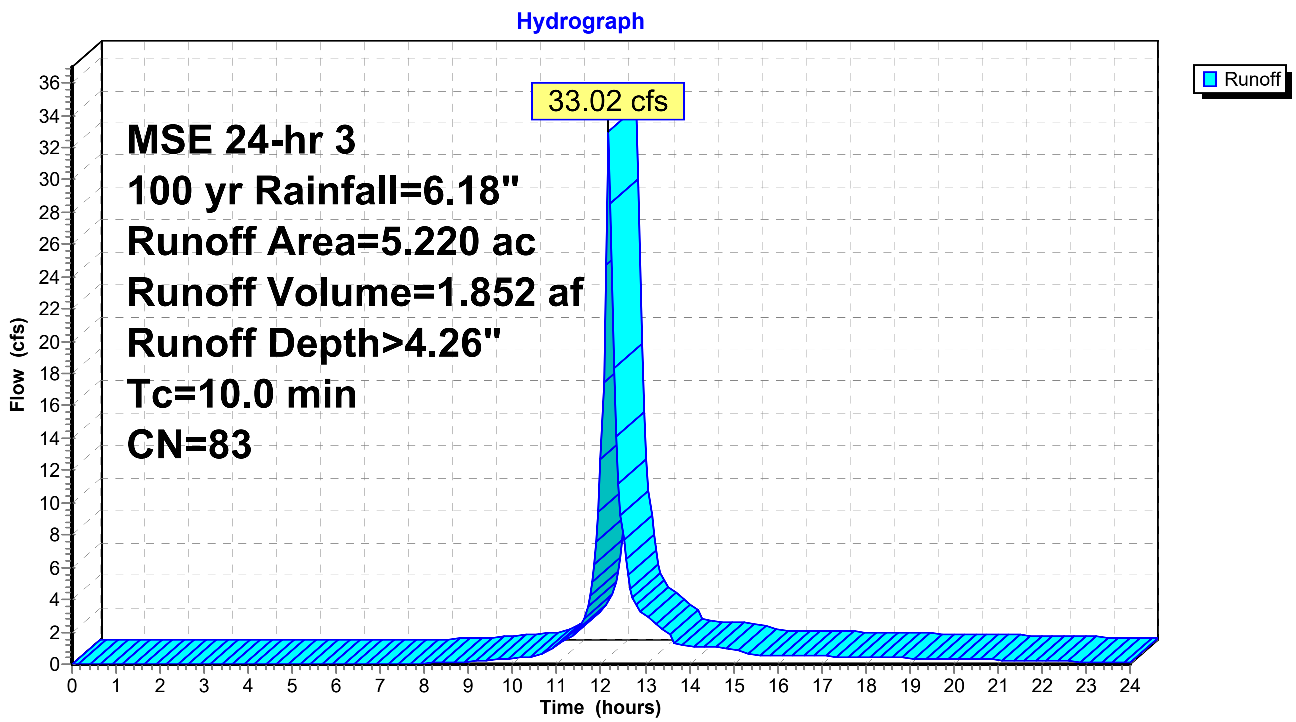
Runoff = 33.02 cfs @ 12.17 hrs, Volume= 1.852 af, Depth> 4.26"
Routed to Pond 7P : Pond

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
*	1.670	98	impervious
*	2.800	74	lawn - C
*	0.360	98	water or effective infiltration area
*	0.390	70	woods - C
	5.220	83	Weighted Average
	3.190		61.11% Pervious Area
	2.030		38.89% Impervious Area

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

Subcatchment 7b: Subarea



Summary for Subcatchment 8: Subarea

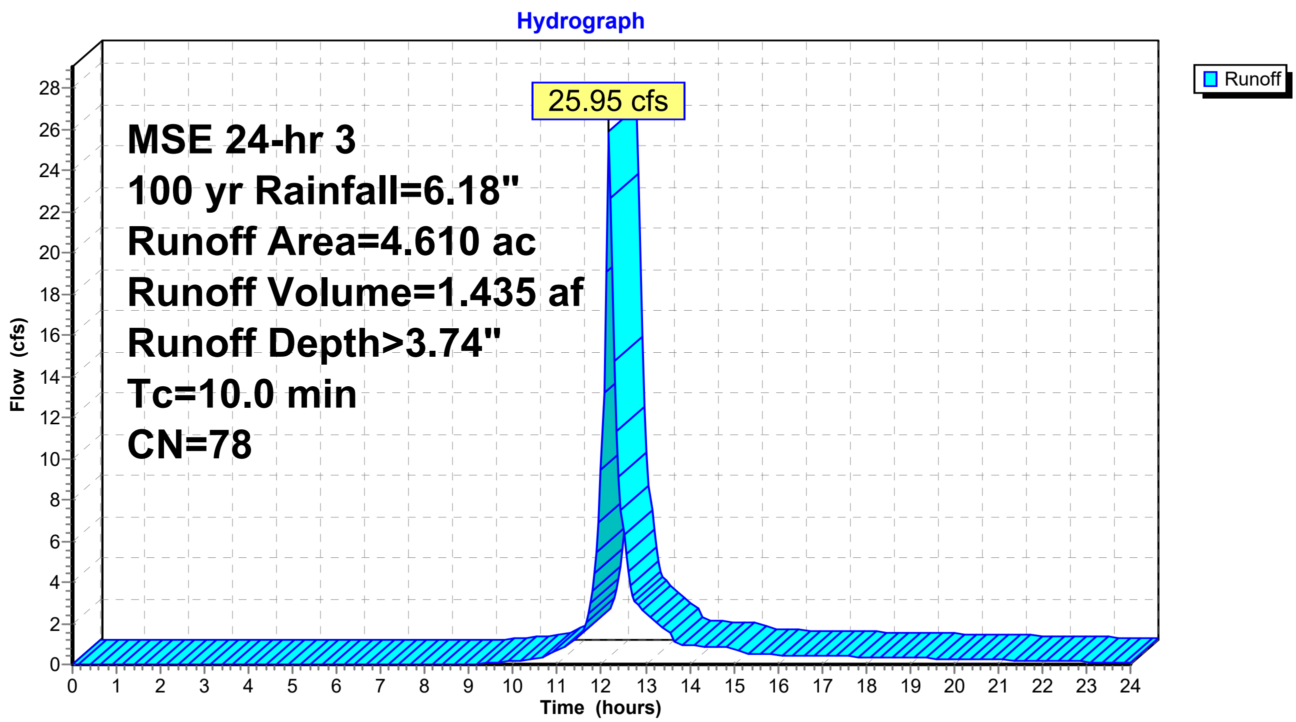
Runoff = 25.95 cfs @ 12.18 hrs, Volume= 1.435 af, Depth> 3.74"
Routed to Pond 8B : Basin

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
*	0.720	98	impervious
*	2.940	74	lawn - C
*	0.160	98	water or effective infiltration area
*	0.790	70	woods - C
	4.610	78	Weighted Average
	3.730		80.91% Pervious Area
	0.880		19.09% Impervious Area

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

Subcatchment 8: Subarea



Summary for Subcatchment 9: Subarea

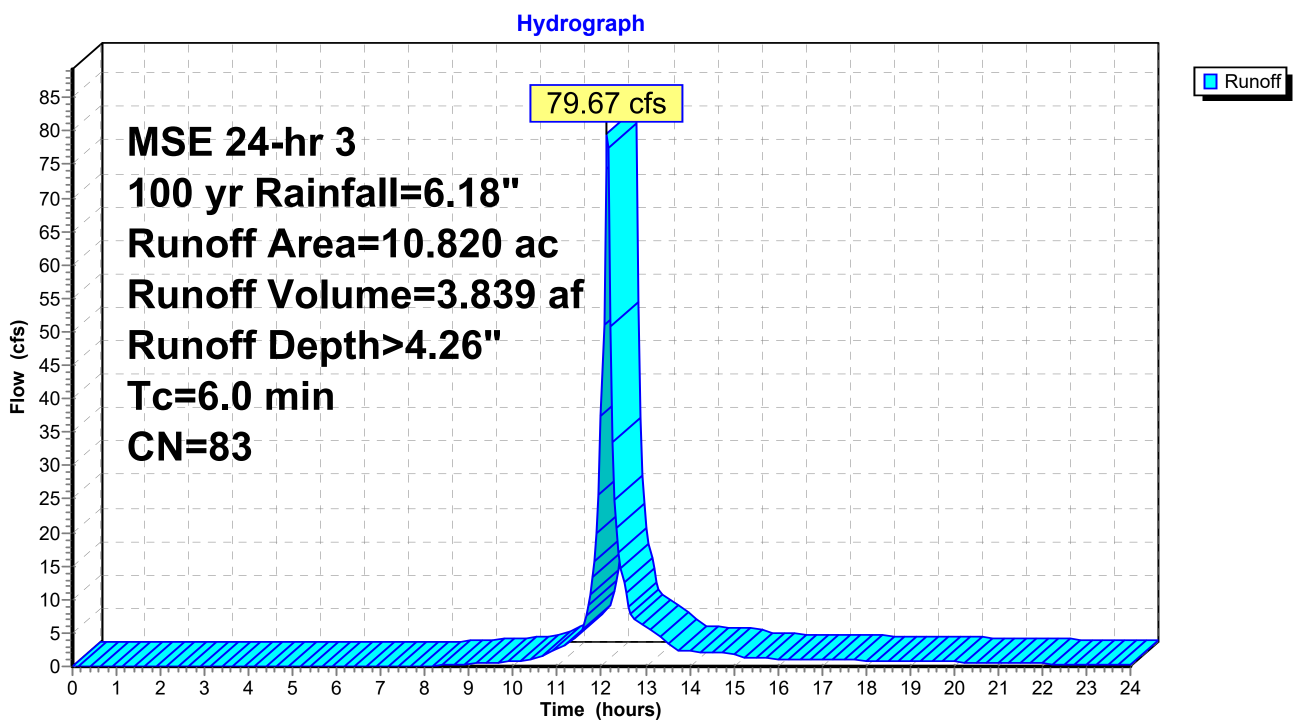
Runoff = 79.67 cfs @ 12.13 hrs, Volume= 3.839 af, Depth> 4.26"
Routed to Pond 9P : Pond

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
*	3.510	98	impervious
*	6.900	74	lawn - C
*	0.410	98	water or effective infiltration area
	10.820	83	Weighted Average
	6.900		63.77% Pervious Area
	3.920		36.23% Impervious Area

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

Subcatchment 9: Subarea



Summary for Subcatchment 10: Subarea

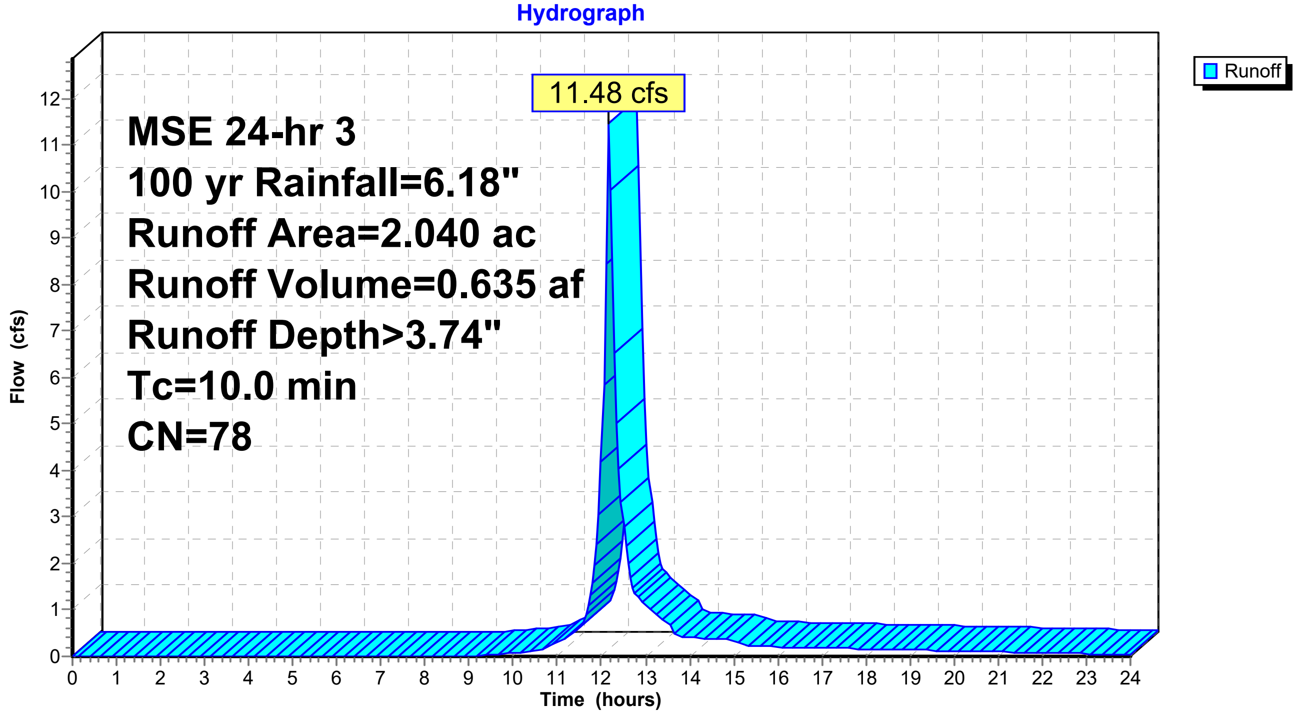
Runoff = 11.48 cfs @ 12.18 hrs, Volume= 0.635 af, Depth> 3.74"
Routed to Pond 10B : Basin

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
*	0.250	98	impervious
*	1.500	74	lawn - C
*	0.130	98	water or effective infiltration area
*	0.160	70	woods - C
	2.040	78	Weighted Average
	1.660		81.37% Pervious Area
	0.380		18.63% Impervious Area

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

Subcatchment 10: Subarea



Summary for Subcatchment 11: Subarea

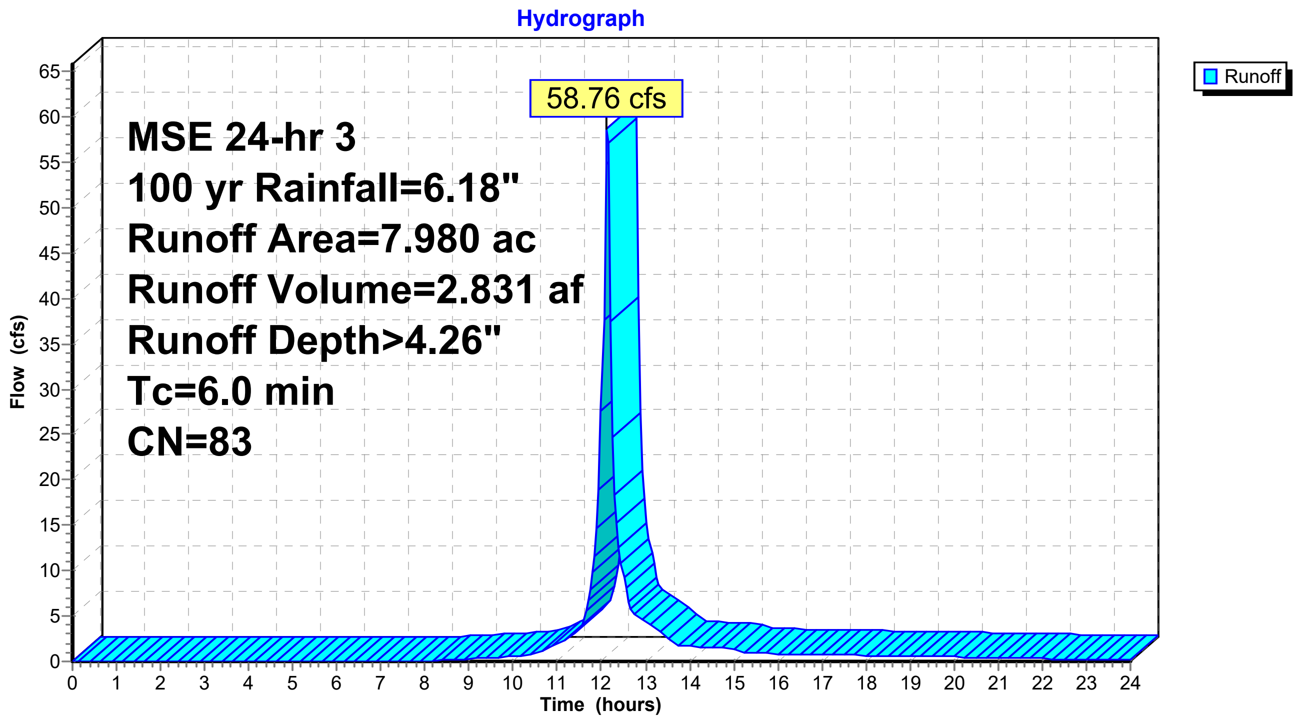
Runoff = 58.76 cfs @ 12.13 hrs, Volume= 2.831 af, Depth> 4.26"
Routed to Pond 11P : Pond

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
*	2.960	98	impervious
*	4.830	74	lawn - C
*	0.190	98	water or effective infiltration area
	7.980	83	Weighted Average
	4.830		60.53% Pervious Area
	3.150		39.47% Impervious Area

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

Subcatchment 11: Subarea



Summary for Subcatchment 12: Subarea

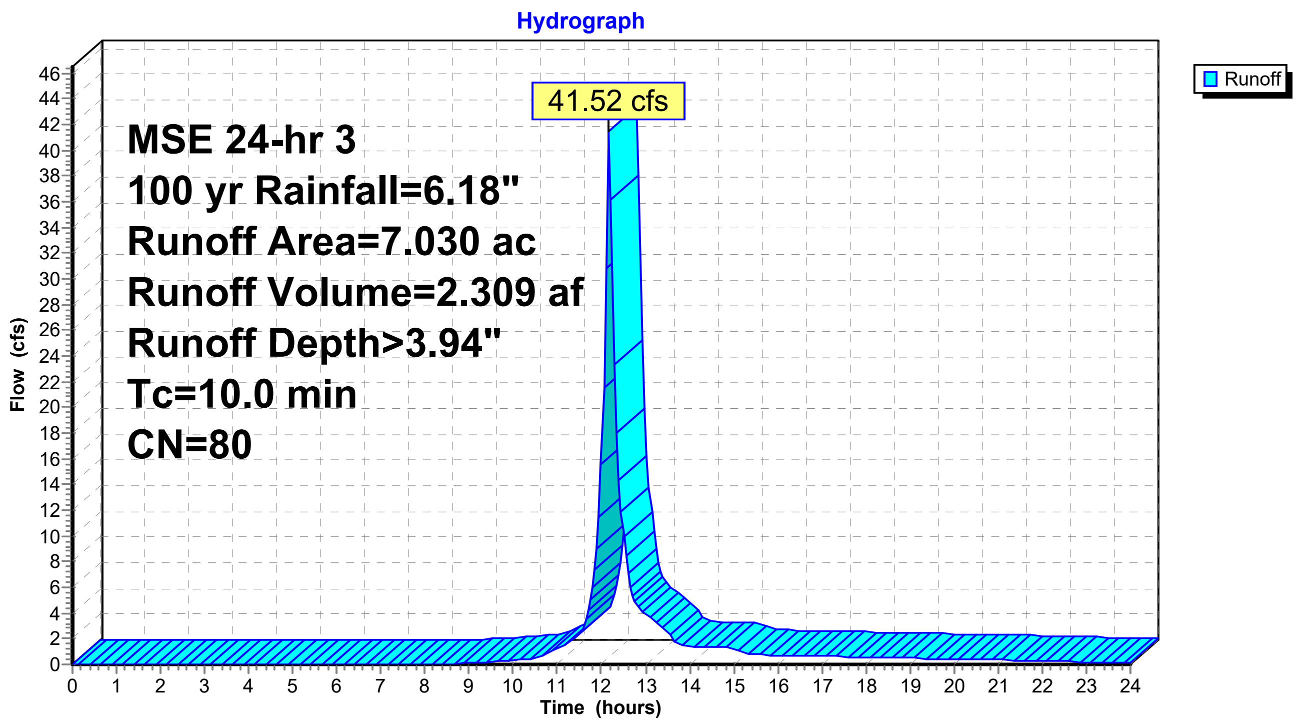
Runoff = 41.52 cfs @ 12.18 hrs, Volume= 2.309 af, Depth> 3.94"
Routed to Pond 12P : Pond

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
*	1.880	98	impervious
*	3.960	74	lawn - C
*	0.130	98	water or effective infiltration area
*	1.060	70	woods - C
	7.030	80	Weighted Average
	5.020		71.41% Pervious Area
	2.010		28.59% Impervious Area

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

Subcatchment 12: Subarea



Summary for Subcatchment 13: Subarea

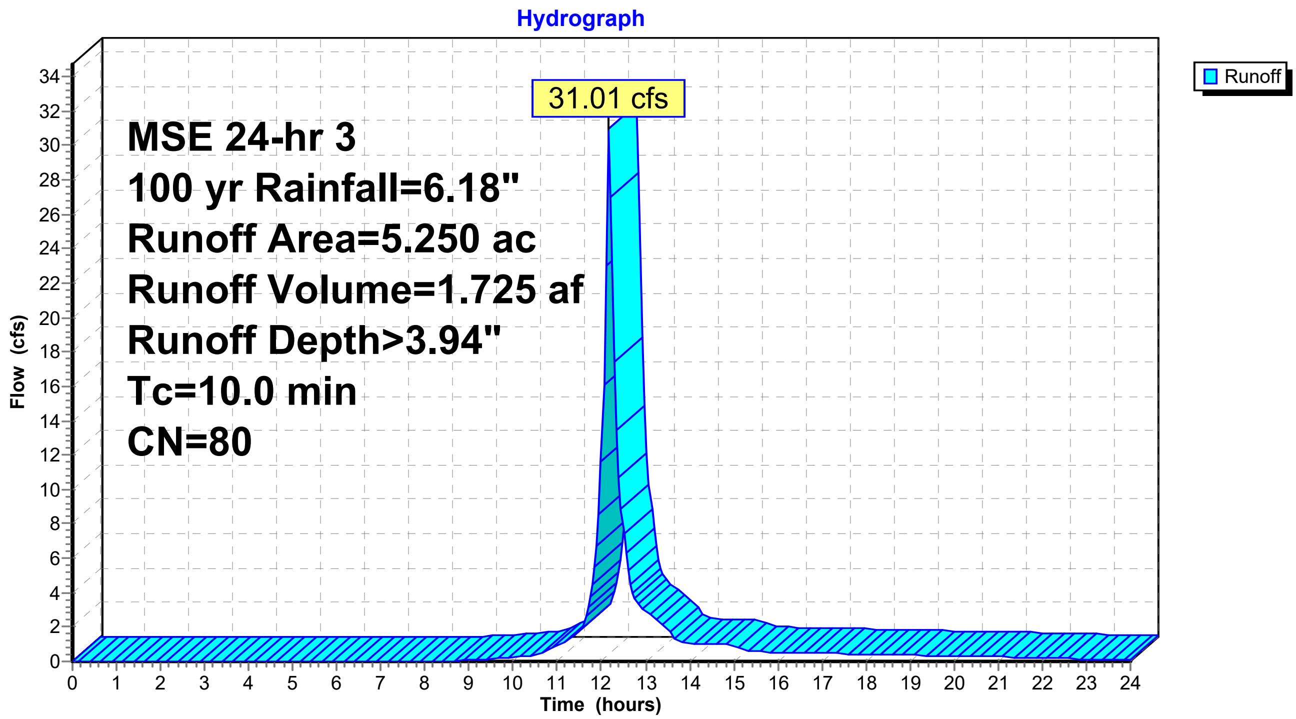
Runoff = 31.01 cfs @ 12.18 hrs, Volume= 1.725 af, Depth> 3.94"
Routed to Pond 13P : Pond

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
*	1.110	98	impervious
*	3.970	74	lawn - C
*	0.170	98	water or effective infiltration area
	5.250	80	Weighted Average
	3.970		75.62% Pervious Area
	1.280		24.38% Impervious Area

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

Subcatchment 13: Subarea



Summary for Subcatchment 14: Subarea

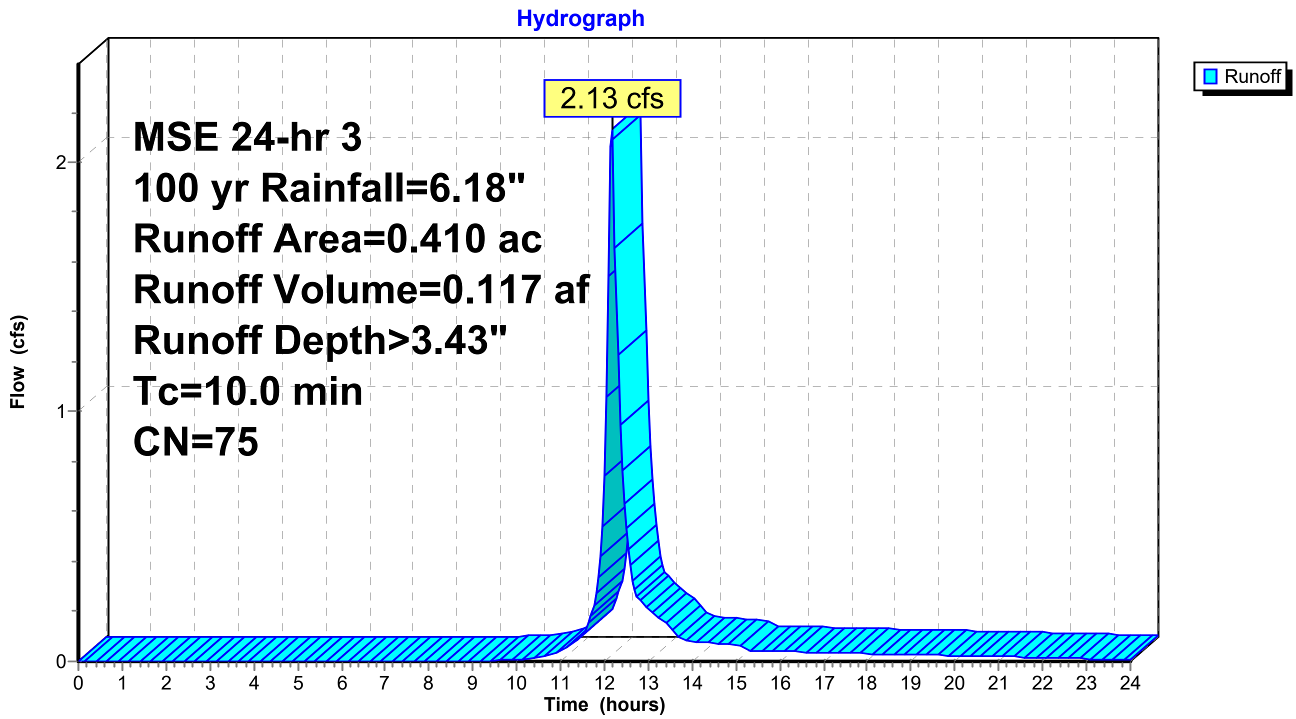
Runoff = 2.13 cfs @ 12.18 hrs, Volume= 0.117 af, Depth> 3.43"
Routed to Link 2L : Northwest Subwatershed

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
*	0.030	98	impervious
*	0.300	74	lawn - C
*	0.080	70	woods - C
	0.410	75	Weighted Average
	0.380		92.68% Pervious Area
	0.030		7.32% Impervious Area

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

Subcatchment 14: Subarea



Summary for Subcatchment 15: Subarea

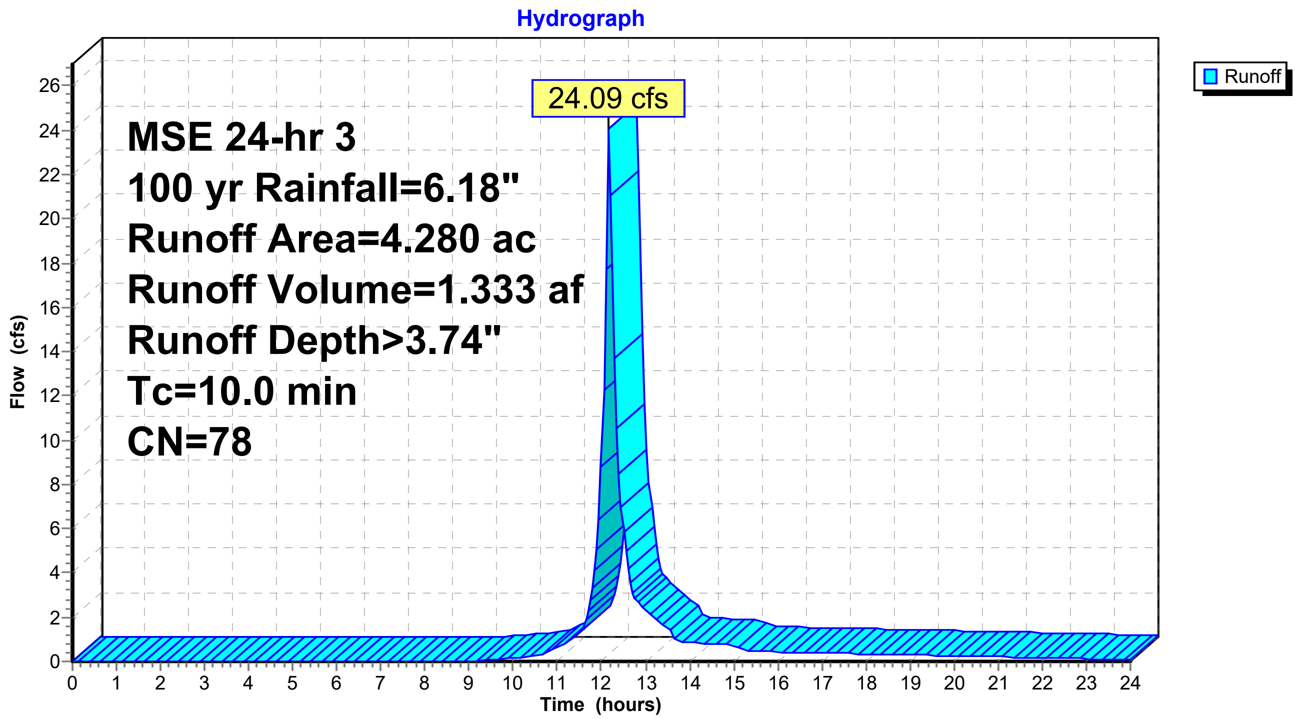
Runoff = 24.09 cfs @ 12.18 hrs, Volume= 1.333 af, Depth> 3.74"
Routed to Link 3L : North Subwatershed (drainage swale)

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
*	0.730	98	impervious
*	3.550	74	lawn - C
*	0.000	98	water or effective infiltration area
	4.280	78	Weighted Average
	3.550		82.94% Pervious Area
	0.730		17.06% Impervious Area

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

Subcatchment 15: Subarea



Summary for Subcatchment 16: Subarea

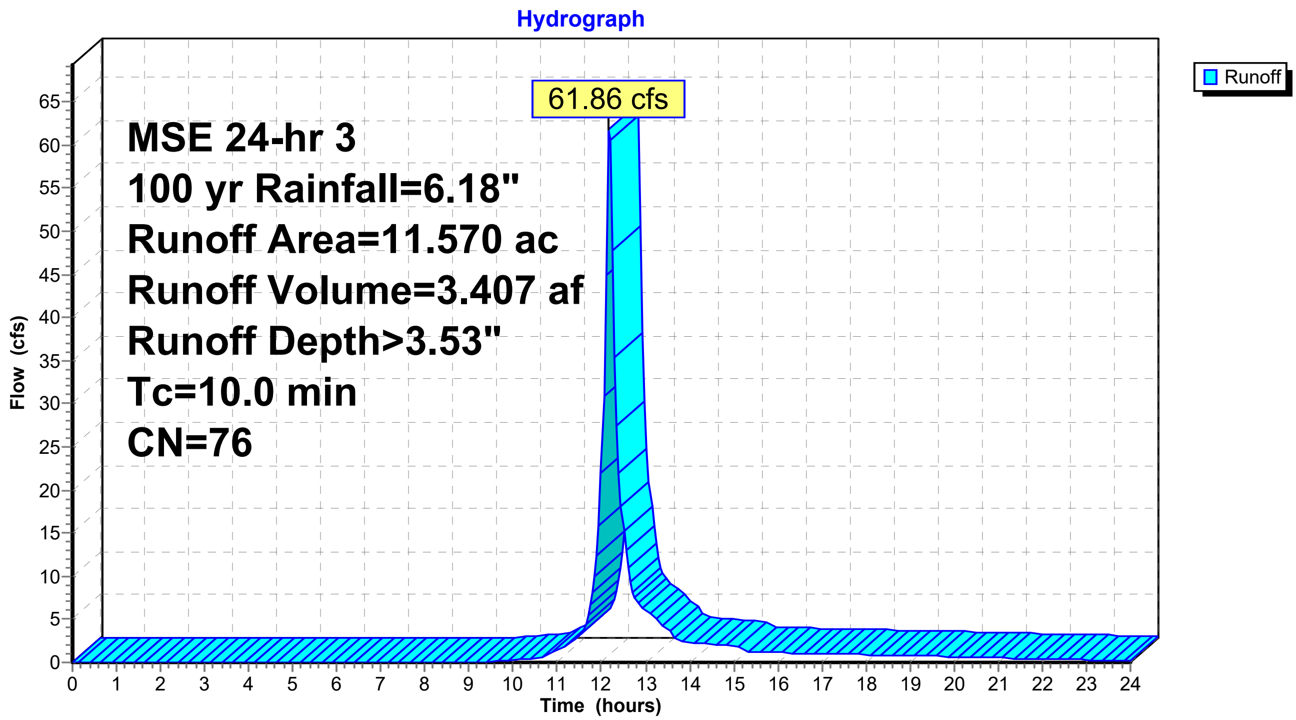
Runoff = 61.86 cfs @ 12.18 hrs, Volume= 3.407 af, Depth> 3.53"
Routed to Link 4L : Southeast Subwatershed

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
*	1.180	98	impervious
*	0.240	98	offsite road
*	8.060	74	lawn - C
*	0.440	74	offsite lawn (ROW) - C
*	1.650	70	woods - C
	11.570	76	Weighted Average
	10.150		87.73% Pervious Area
	1.420		12.27% Impervious Area

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

Subcatchment 16: Subarea



Summary for Subcatchment 17: Subarea

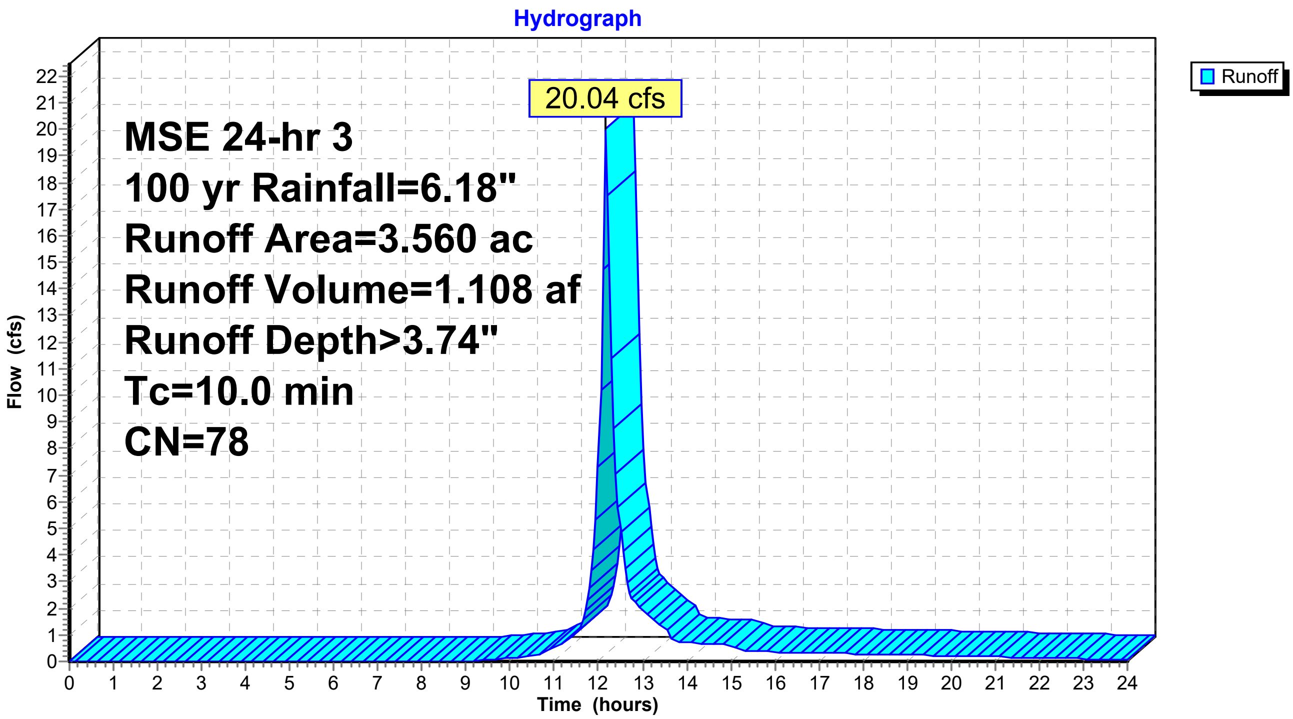
Runoff = 20.04 cfs @ 12.18 hrs, Volume= 1.108 af, Depth> 3.74"
Routed to Link 1L : West Subwatershed

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
*	0.660	98	impervious
*	2.900	74	lawn - C
*	0.000	98	water or effective infiltration area
	3.560	78	Weighted Average
	2.900		81.46% Pervious Area
	0.660		18.54% Impervious Area

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

Subcatchment 17: Subarea



Summary for Pond 1B: Basin

Inflow Area = 11.050 ac, 30.86% Impervious, Inflow Depth > 4.05" for 100 yr event
Inflow = 66.94 cfs @ 12.17 hrs, Volume= 3.726 af
Outflow = 5.66 cfs @ 13.13 hrs, Volume= 2.740 af, Atten= 92%, Lag= 57.6 min
Discarded = 0.24 cfs @ 13.13 hrs, Volume= 0.216 af
Primary = 5.42 cfs @ 13.13 hrs, Volume= 2.524 af
Routed to Pond 2B : Basin

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 937.46' @ 13.13 hrs Surf.Area= 0.922 ac Storage= 2.350 af

Plug-Flow detention time= 300.8 min calculated for 2.734 af (73% of inflow)
Center-of-Mass det. time= 233.4 min (1,028.3 - 794.9)

Volume	Invert	Avail.Storage	Storage Description
#1	930.50'	3.476 af	**Custom Stage Data (Conic)**Listed below (Recalc)

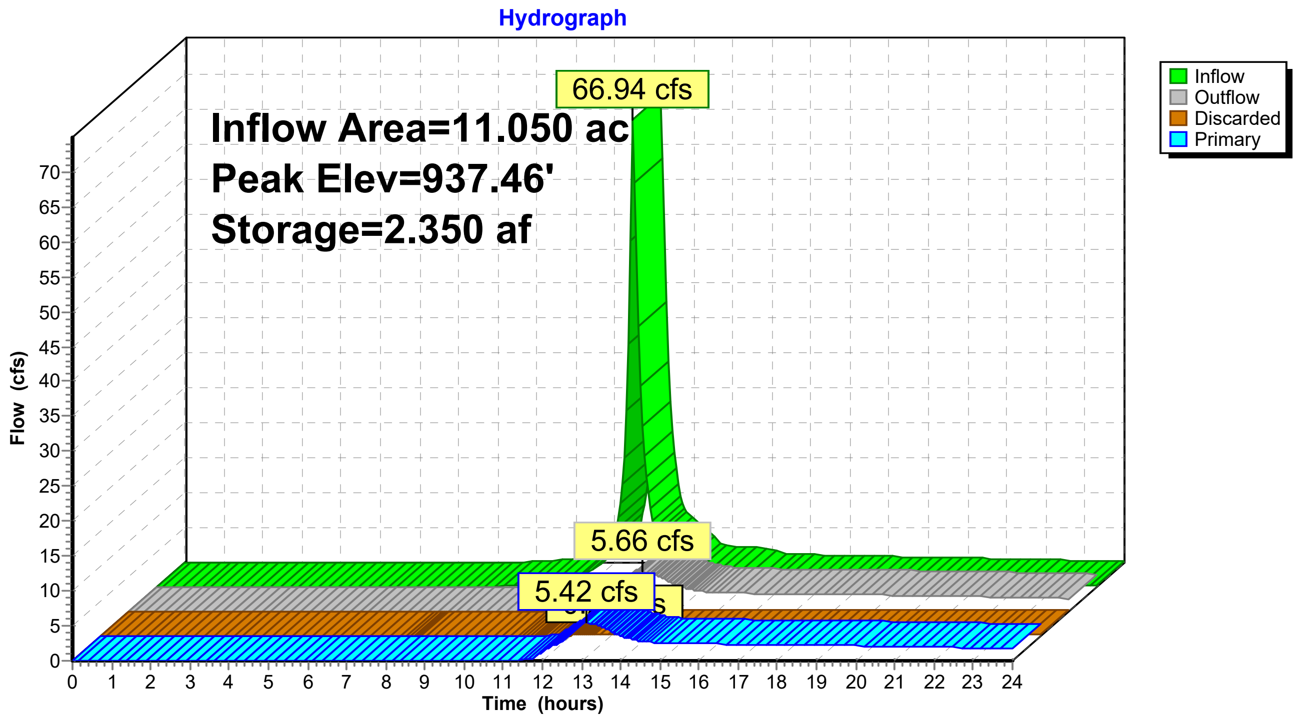
Elevation (feet)	Surf.Area (acres)	Voids (%)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
930.50	0.220	0.0	0.000	0.000	0.220
931.00	0.220	30.0	0.033	0.033	0.224
932.00	0.220	30.0	0.066	0.099	0.232
933.00	0.220	30.0	0.066	0.165	0.240
933.50	0.220	30.0	0.033	0.198	0.244
934.00	0.280	100.0	0.125	0.323	0.304
936.00	0.640	100.0	0.896	1.218	0.665
938.00	1.040	100.0	1.664	2.882	1.066
938.50	1.340	100.0	0.593	3.476	1.366

Device	Routing	Invert	Outlet Devices
#1	Discarded	930.50'	**0.110 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 929.00' Phase-In= 0.01'
#2	Primary	933.50'	**12.0" Round Culvert** L= 100.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 933.50' / 933.00' S= 0.0050 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#3	Device 2	931.25'	**4.0" Vert. Underdrain** C= 0.600 Limited to weir flow at low heads
#4	Device 2	934.00'	**6.0" Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#5	Device 2	937.25'	**36.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads
#6	Primary	937.50'	**10.0' long + 5.0 '/' SideZ x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Discarded OutFlow Max=0.24 cfs @ 13.13 hrs HW=937.46' (Free Discharge)
1=Exfiltration (Controls 0.24 cfs)

Primary OutFlow Max=5.42 cfs @ 13.13 hrs HW=937.46' TW=932.21' (Dynamic Tailwater)
2=Culvert (Passes 5.42 cfs of 5.44 cfs potential flow)
3=Underdrain (Orifice Controls 0.84 cfs @ 9.58 fps)
4=Orifice (Orifice Controls 1.69 cfs @ 8.62 fps)
5=Grate (Weir Controls 2.89 cfs @ 1.49 fps)
6=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond 1B: Basin



Summary for Pond 2B: Basin

Inflow Area = 12.670 ac, 33.07% Impervious, Inflow Depth > 2.98" for 100 yr event
Inflow = 14.38 cfs @ 12.13 hrs, Volume= 3.142 af
Outflow = 10.63 cfs @ 12.21 hrs, Volume= 2.997 af, Atten= 26%, Lag= 4.5 min
Discarded = 0.49 cfs @ 12.21 hrs, Volume= 0.468 af
Primary = 10.14 cfs @ 12.21 hrs, Volume= 2.529 af
Routed to Link 3L : North Subwatershed (drainage swale)

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 932.38' @ 12.21 hrs Surf.Area= 0.138 ac Storage= 0.234 af

Plug-Flow detention time= 40.5 min calculated for 2.991 af (95% of inflow)
Center-of-Mass det. time= 19.6 min (999.2 - 979.7)

Volume	Invert	Avail.Storage	Storage Description
#1	928.00'	0.330 af	**Custom Stage Data (Conic)**Listed below (Recalc)

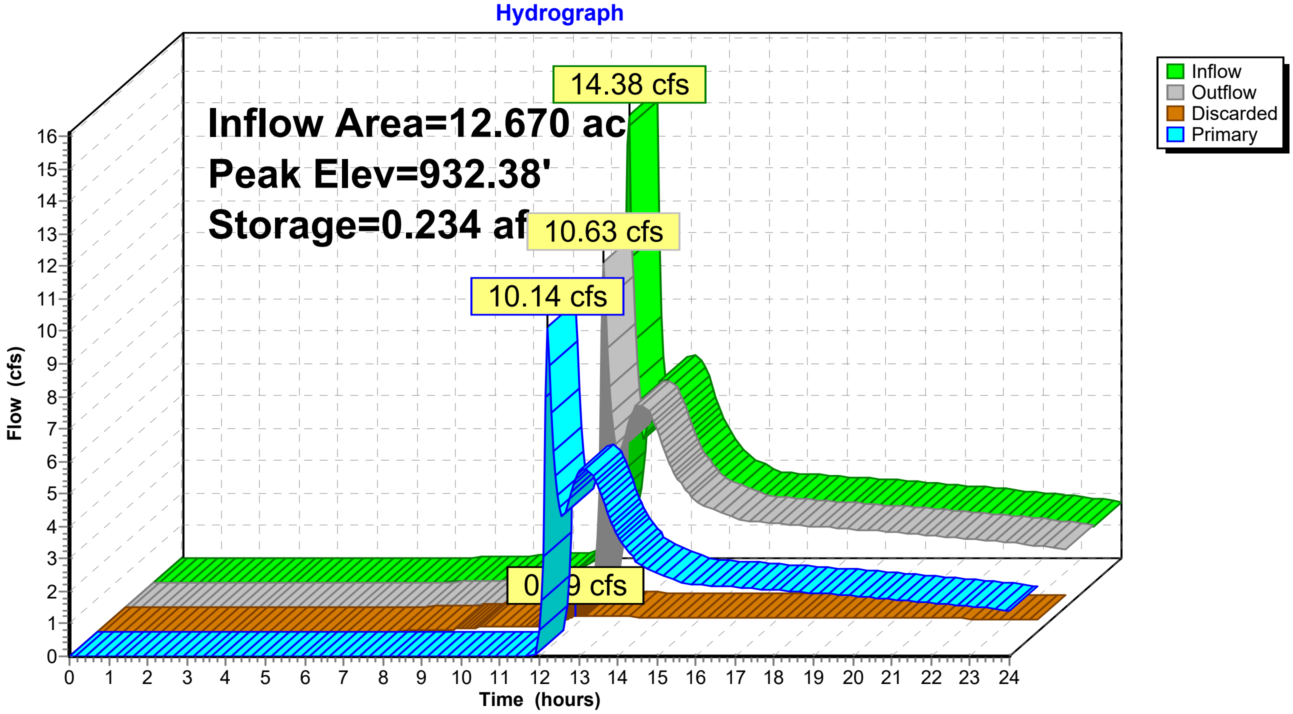
Elevation (feet)	Surf.Area (acres)	Voids (%)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
928.00	0.090	0.0	0.000	0.000	0.090
929.00	0.090	30.0	0.027	0.027	0.095
930.00	0.090	30.0	0.027	0.054	0.100
931.00	0.090	30.0	0.027	0.081	0.105
932.00	0.120	100.0	0.105	0.186	0.136
933.00	0.170	100.0	0.144	0.330	0.186

Device	Routing	Invert	Outlet Devices
#1	Discarded	928.00'	**1.630 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 925.50' Phase-In= 0.01'
#2	Primary	931.00'	**12.0" Round Culvert** L= 50.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 931.00' / 930.50' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#3	Primary	932.00'	**10.0' long + 5.0 '/' SideZ x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Discarded OutFlow Max=0.49 cfs @ 12.21 hrs HW=932.37' (Free Discharge)
└─**1=Exfiltration** (Controls 0.49 cfs)

Primary OutFlow Max=9.93 cfs @ 12.21 hrs HW=932.37' TW=0.00' (Dynamic Tailwater)
├─**2=Culvert** (Barrel Controls 3.35 cfs @ 4.27 fps)
└─**3=Broad-Crested Rectangular Weir** (Weir Controls 6.57 cfs @ 1.50 fps)

Pond 2B: Basin



Summary for Pond 3P: Pond

Inflow Area = 17.750 ac, 37.63% Impervious, Inflow Depth > 3.41" for 100 yr event
Inflow = 75.32 cfs @ 12.23 hrs, Volume= 5.050 af
Outflow = 36.55 cfs @ 12.44 hrs, Volume= 4.142 af, Atten= 51%, Lag= 12.7 min
Primary = 36.55 cfs @ 12.44 hrs, Volume= 4.142 af
Routed to Link 1L : West Subwatershed

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 927.84' @ 12.44 hrs Surf.Area= 0.442 ac Storage= 1.822 af

Plug-Flow detention time= 94.4 min calculated for 4.133 af (82% of inflow)
Center-of-Mass det. time= 38.8 min (830.7 - 792.0)

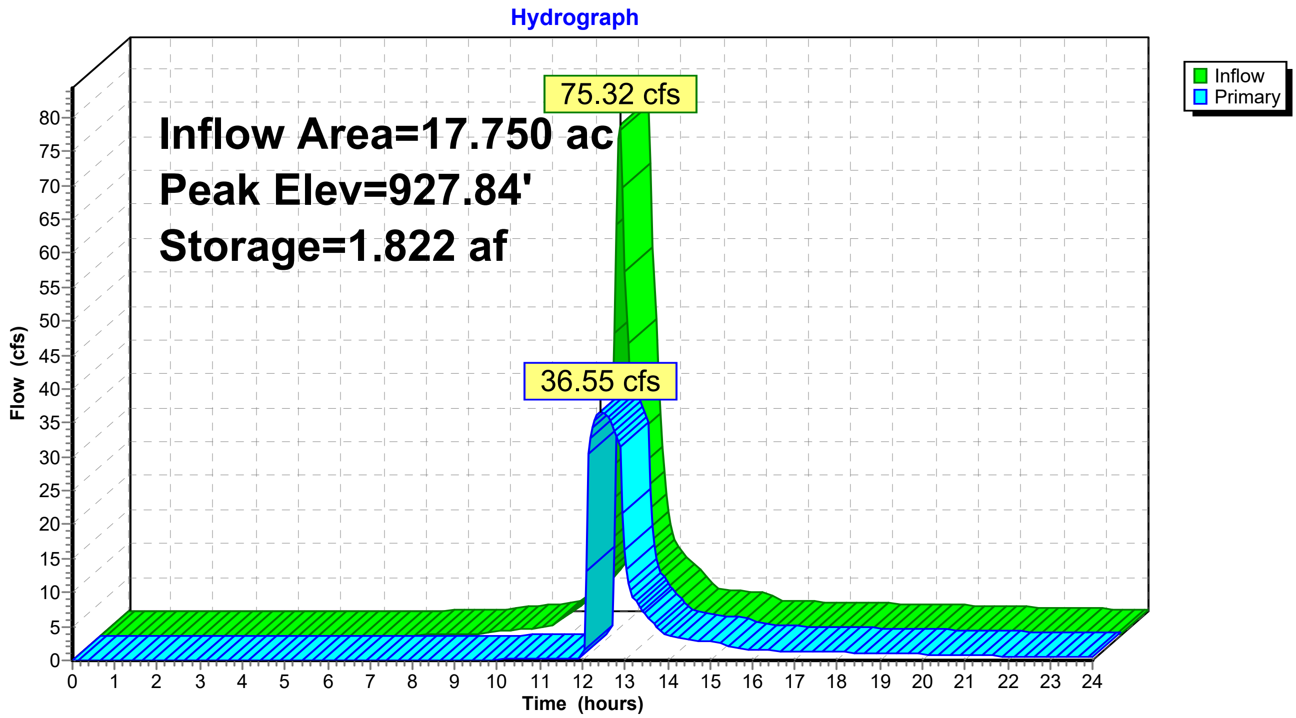
Volume	Invert	Avail.Storage	Storage Description
#1	922.00'	2.383 af	**Custom Stage Data (Conic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
922.00	0.200	0.000	0.000	0.200
923.00	0.230	0.215	0.215	0.231
924.00	0.270	0.250	0.465	0.272
925.00	0.310	0.290	0.754	0.313
926.00	0.360	0.335	1.089	0.364
927.00	0.400	0.380	1.469	0.405
928.00	0.450	0.425	1.894	0.456
929.00	0.530	0.489	2.383	0.537

Device	Routing	Invert	Outlet Devices
#1	Primary	921.00'	**24.0" Round Culvert** L= 50.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 921.00' / 920.00' S= 0.0200 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#2	Device 1	922.00'	**3.0" Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#3	Device 1	925.50'	**48.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads
#4	Primary	928.00'	**10.0' long + 5.0 '/' SideZ 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=36.54 cfs @ 12.44 hrs HW=927.84' TW=0.00' (Dynamic Tailwater)
1=Culvert (Inlet Controls 36.54 cfs @ 11.63 fps)
2=Orifice (Passes < 0.56 cfs potential flow)
3=Grate (Passes < 92.49 cfs potential flow)
4=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond 3P: Pond


Hydrograph
Inflow
Primary
75.32 cfs
36.55 cfs
Inflow Area=17.750 ac
Peak Elev=927.84'
Storage=1.822 af
Flow (cfs)
80
75
70
65
60
55
50
45
40
35
30
25
20
15
10
5
0
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
Time (hours)

Summary for Pond 4B: Basin

Inflow Area = 4.390 ac, 17.31% Impervious, Inflow Depth > 3.74" for 100 yr event
Inflow = 24.71 cfs @ 12.18 hrs, Volume= 1.367 af
Outflow = 2.99 cfs @ 12.75 hrs, Volume= 1.367 af, Atten= 88%, Lag= 34.2 min
Discarded = 2.60 cfs @ 12.75 hrs, Volume= 1.293 af
Primary = 0.39 cfs @ 12.75 hrs, Volume= 0.074 af
Routed to Pond 3P : Pond

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 938.54' @ 12.75 hrs Surf.Area= 0.360 ac Storage= 0.661 af

Plug-Flow detention time= 119.3 min calculated for 1.364 af (100% of inflow)
Center-of-Mass det. time= 119.0 min (919.1 - 800.2)

Volume	Invert	Avail.Storage	Storage Description
#1	935.00'	1.426 af	**Custom Stage Data (Conic)**Listed below (Recalc)

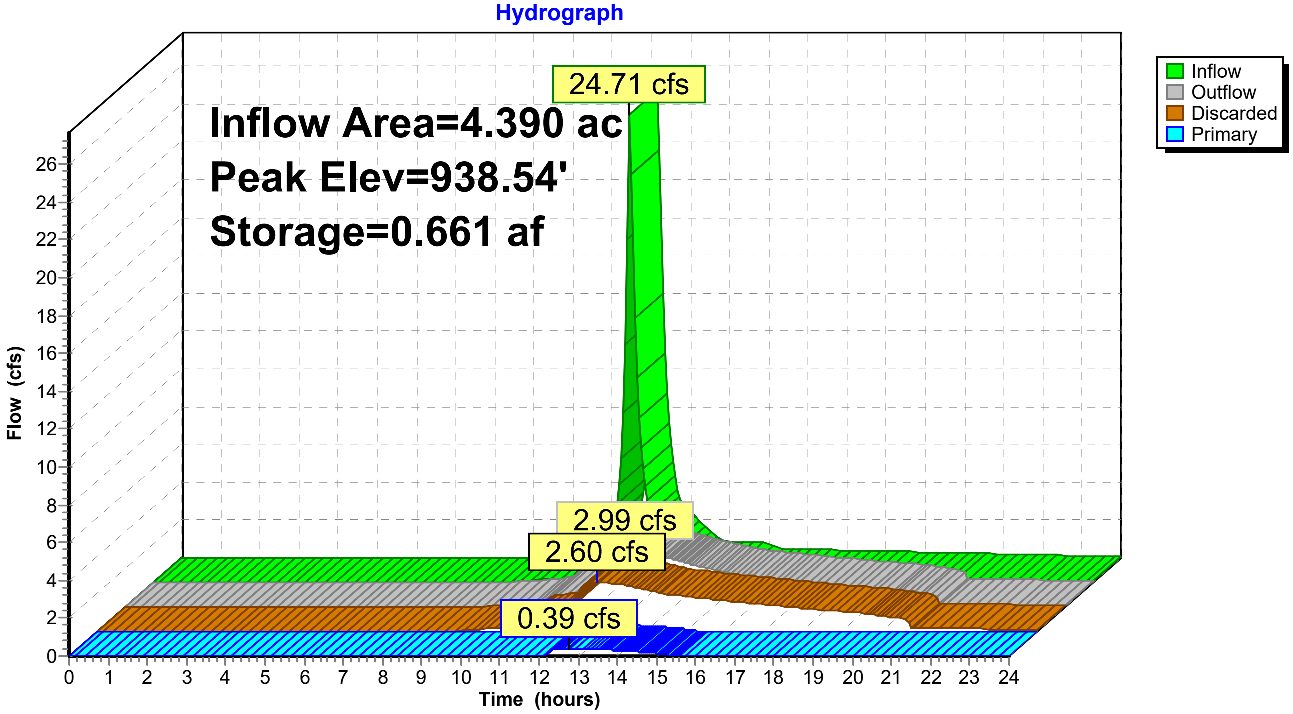
Elevation (feet)	Surf.Area (acres)	Voids (%)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
935.00	0.180	0.0	0.000	0.000	0.180
936.00	0.180	30.0	0.054	0.054	0.187
937.00	0.220	100.0	0.200	0.254	0.228
938.00	0.260	100.0	0.240	0.493	0.269
940.00	0.710	100.0	0.933	1.426	0.719

Device	Routing	Invert	Outlet Devices
#1	Discarded	935.00'	**3.600 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 933.00' Phase-In= 0.02'
#2	Primary	937.50'	**4.0" Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#3	Primary	938.75'	**36.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads
#4	Primary	939.00'	**10.0' long + 5.0 '/' SideZ x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Discarded OutFlow Max=2.60 cfs @ 12.75 hrs HW=938.54' (Free Discharge)
└─**1=Exfiltration** (Controls 2.60 cfs)

Primary OutFlow Max=0.39 cfs @ 12.75 hrs HW=938.54' TW=927.04' (Dynamic Tailwater)
├─**2=Orifice** (Orifice Controls 0.39 cfs @ 4.51 fps)
├─**3=Grate** (Controls 0.00 cfs)
└─**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 4B: Basin



Summary for Pond 5RG: Rain Garden

Inflow Area = 2.590 ac, 12.36% Impervious, Inflow Depth > 3.63" for 100 yr event
Inflow = 14.21 cfs @ 12.18 hrs, Volume= 0.785 af
Outflow = 13.06 cfs @ 12.22 hrs, Volume= 0.713 af, Atten= 8%, Lag= 2.6 min
Discarded = 0.01 cfs @ 12.22 hrs, Volume= 0.009 af
Primary = 13.05 cfs @ 12.22 hrs, Volume= 0.704 af
Routed to Pond 6P : Pond

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 924.80' @ 12.22 hrs Surf.Area= 0.119 ac Storage= 0.194 af

Plug-Flow detention time= 103.2 min calculated for 0.713 af (91% of inflow)
Center-of-Mass det. time= 63.5 min (865.3 - 801.9)

Volume	Invert	Avail.Storage	Storage Description
#1	921.00'	0.377 af	**Custom Stage Data (Conic)**Listed below (Recalc)

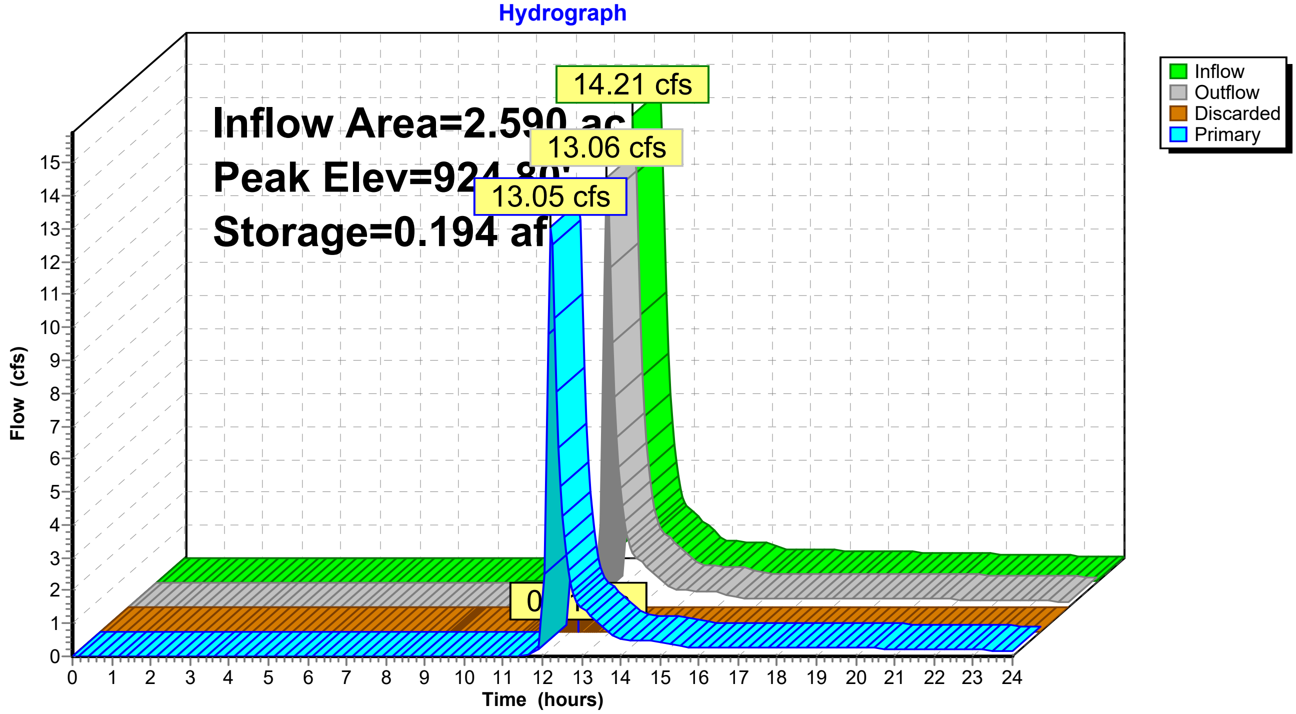
Elevation (feet)	Surf.Area (acres)	Voids (%)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
921.00	0.030	0.0	0.000	0.000	0.030
922.00	0.030	30.0	0.009	0.009	0.033
924.00	0.080	100.0	0.106	0.115	0.084
926.00	0.190	100.0	0.262	0.377	0.194

Device	Routing	Invert	Outlet Devices
#1	Discarded	921.00'	**0.070 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 917.00' Phase-In= 0.01'
#2	Primary	922.75'	**3.0" Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#3	Primary	924.25'	**36.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads
#4	Primary	925.00'	**10.0' long + 5.0 '/' SideZ x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Discarded OutFlow Max=0.01 cfs @ 12.22 hrs HW=924.79' (Free Discharge)
└─**1=Exfiltration** (Controls 0.01 cfs)

Primary OutFlow Max=12.66 cfs @ 12.22 hrs HW=924.79' TW=914.38' (Dynamic Tailwater)
├─**2=Orifice** (Orifice Controls 0.33 cfs @ 6.67 fps)
├─**3=Grate** (Weir Controls 12.33 cfs @ 2.41 fps)
└─**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 5RG: Rain Garden



Summary for Pond 6P: Pond

Inflow Area = 11.390 ac, 30.38% Impervious, Inflow Depth > 3.95" for 100 yr event
Inflow = 66.31 cfs @ 12.18 hrs, Volume= 3.748 af
Outflow = 25.56 cfs @ 12.40 hrs, Volume= 3.223 af, Atten= 61%, Lag= 12.9 min
Primary = 25.56 cfs @ 12.40 hrs, Volume= 3.223 af
Routed to Link 4L : Southeast Subwatershed

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 914.99' @ 12.40 hrs Surf.Area= 0.402 ac Storage= 1.310 af

Plug-Flow detention time= 88.7 min calculated for 3.216 af (86% of inflow)
Center-of-Mass det. time= 33.2 min (839.5 - 806.3)

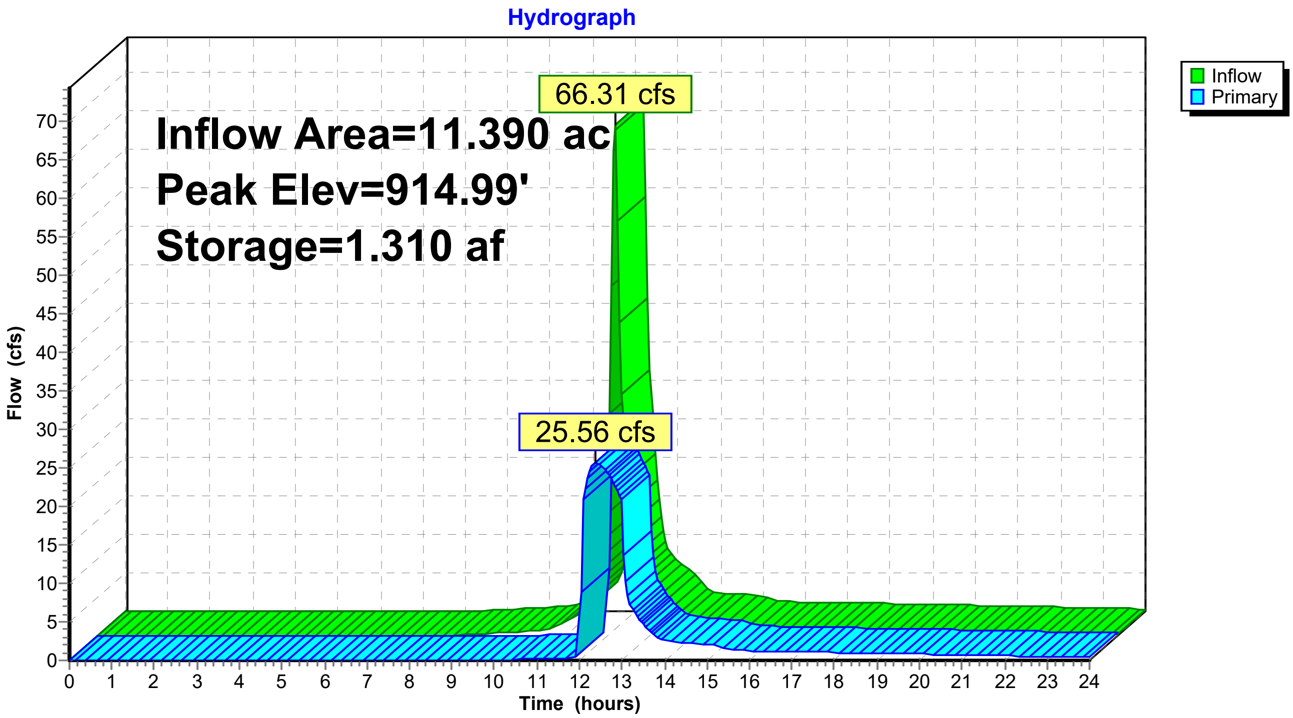
Volume	Invert	Avail.Storage	Storage Description
#1	910.00'	1.750 af	**Custom Stage Data (Conic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
910.00	0.150	0.000	0.000	0.150
912.00	0.230	0.377	0.377	0.231
914.00	0.340	0.566	0.944	0.343
916.00	0.470	0.806	1.750	0.475

Device	Routing	Invert	Outlet Devices
#1	Primary	909.00'	**21.0" Round Culvert** L= 100.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 909.00' / 908.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 2.41 sf
#2	Device 1	910.00'	**3.0" Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#3	Device 1	912.60'	**48.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads
#4	Primary	915.00'	**10.0' long + 5.0 '/' SideZ 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=25.56 cfs @ 12.40 hrs HW=914.99' TW=0.00' (Dynamic Tailwater)
- **1=Culvert** (Barrel Controls 25.56 cfs @ 10.63 fps)
  - **2=Orifice** (Passes < 0.52 cfs potential flow)
  - **3=Grate** (Passes < 93.54 cfs potential flow)
- **4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 6P: Pond


Hydrograph
66.31 cfs
25.56 cfs
Inflow Area=11.390 ac
Peak Elev=914.99'
Storage=1.310 af
Inflow
Primary
Flow (cfs)
Time (hours)

Summary for Pond 7P: Pond

Inflow Area = 11.600 ac, 26.64% Impervious, Inflow Depth > 3.87" for 100 yr event
Inflow = 66.09 cfs @ 12.19 hrs, Volume= 3.739 af
Outflow = 12.97 cfs @ 12.60 hrs, Volume= 3.520 af, Atten= 80%, Lag= 24.3 min
Primary = 12.97 cfs @ 12.60 hrs, Volume= 3.520 af
Routed to Link 4L : Southeast Subwatershed

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 922.28' @ 12.60 hrs Surf.Area= 0.867 ac Storage= 1.829 af

Plug-Flow detention time= 134.8 min calculated for 3.512 af (94% of inflow)
Center-of-Mass det. time= 107.1 min (907.8 - 800.8)

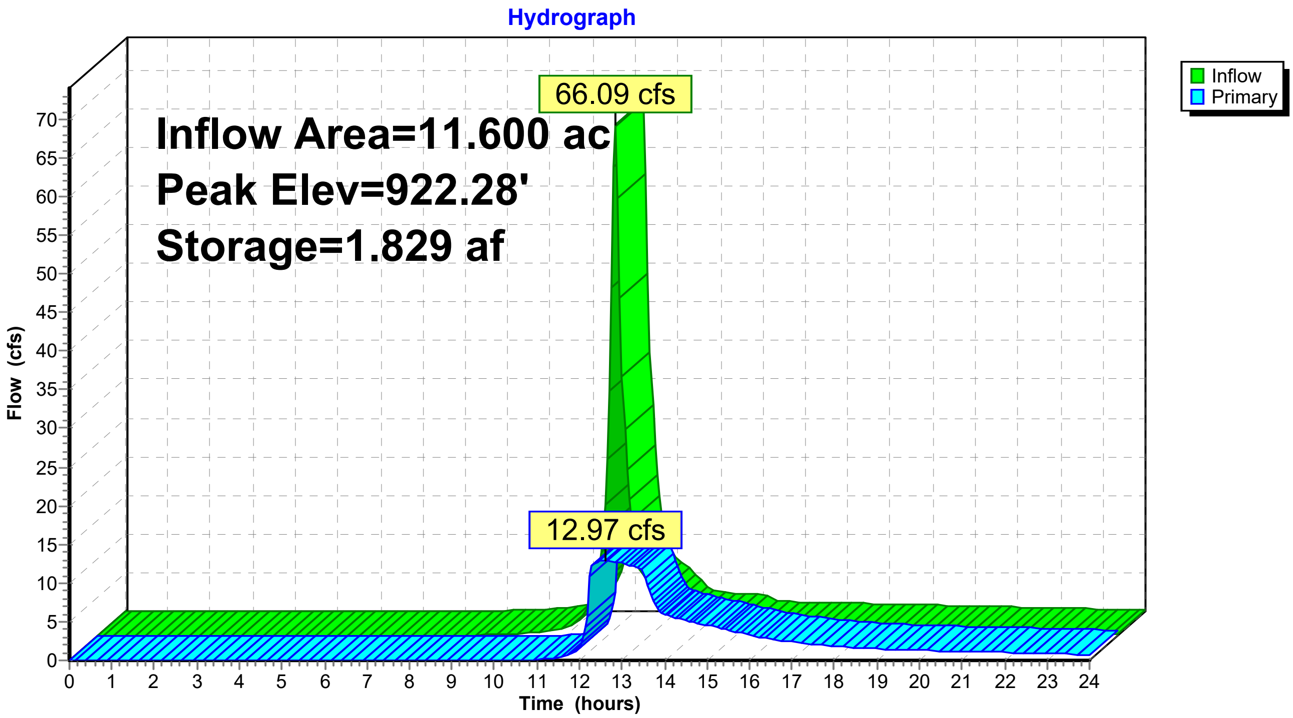
Volume	Invert	Avail.Storage	Storage Description
#1	919.30'	2.859 af	**Custom Stage Data (Conic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
919.30	0.390	0.000	0.000	0.390
922.30	0.870	1.842	1.842	0.872
923.30	1.170	1.016	2.859	1.172

Device	Routing	Invert	Outlet Devices
#1	Primary	918.30'	**18.0" Round Culvert** L= 100.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 918.30' / 918.00' S= 0.0030 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#2	Device 1	919.30'	**8.0" Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#3	Device 1	920.20'	**1.0' long x 1.30' rise Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#4	Device 1	921.50'	**36.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads
#5	Primary	922.30'	**10.0' long + 5.0 '/' SideZ 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=12.97 cfs @ 12.60 hrs HW=922.28' TW=0.00' (Dynamic Tailwater)
1=Culvert (Barrel Controls 12.97 cfs @ 7.34 fps)
2=Orifice (Passes < 2.74 cfs potential flow)
3=Sharp-Crested Rectangular Weir (Passes < 5.60 cfs potential flow)
4=Grate (Passes < 21.41 cfs potential flow)
5=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond 7P: Pond


Hydrograph
Inflow
Primary
66.09 cfs
12.97 cfs
Inflow Area=11.600 ac
Peak Elev=922.28'
Storage=1.829 af
Flow (cfs)
70
65
60
55
50
45
40
35
30
25
20
15
10
5
0
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
Time (hours)

Summary for Pond 7RG: Rain Garden

Inflow Area = 6.380 ac, 16.61% Impervious, Inflow Depth > 3.74" for 100 yr event
Inflow = 35.91 cfs @ 12.18 hrs, Volume= 1.987 af
Outflow = 34.14 cfs @ 12.21 hrs, Volume= 1.905 af, Atten= 5%, Lag= 2.0 min
Discarded = 0.02 cfs @ 12.21 hrs, Volume= 0.018 af
Primary = 34.12 cfs @ 12.21 hrs, Volume= 1.887 af
Routed to Pond 7P : Pond

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 923.08' @ 12.21 hrs Surf.Area= 0.166 ac Storage= 0.218 af

Plug-Flow detention time= 32.4 min calculated for 1.901 af (96% of inflow)
Center-of-Mass det. time= 11.8 min (811.9 - 800.2)

Volume	Invert	Avail.Storage	Storage Description
#1	920.30'	0.255 af	**Custom Stage Data (Conic)** Listed below (Recalc)

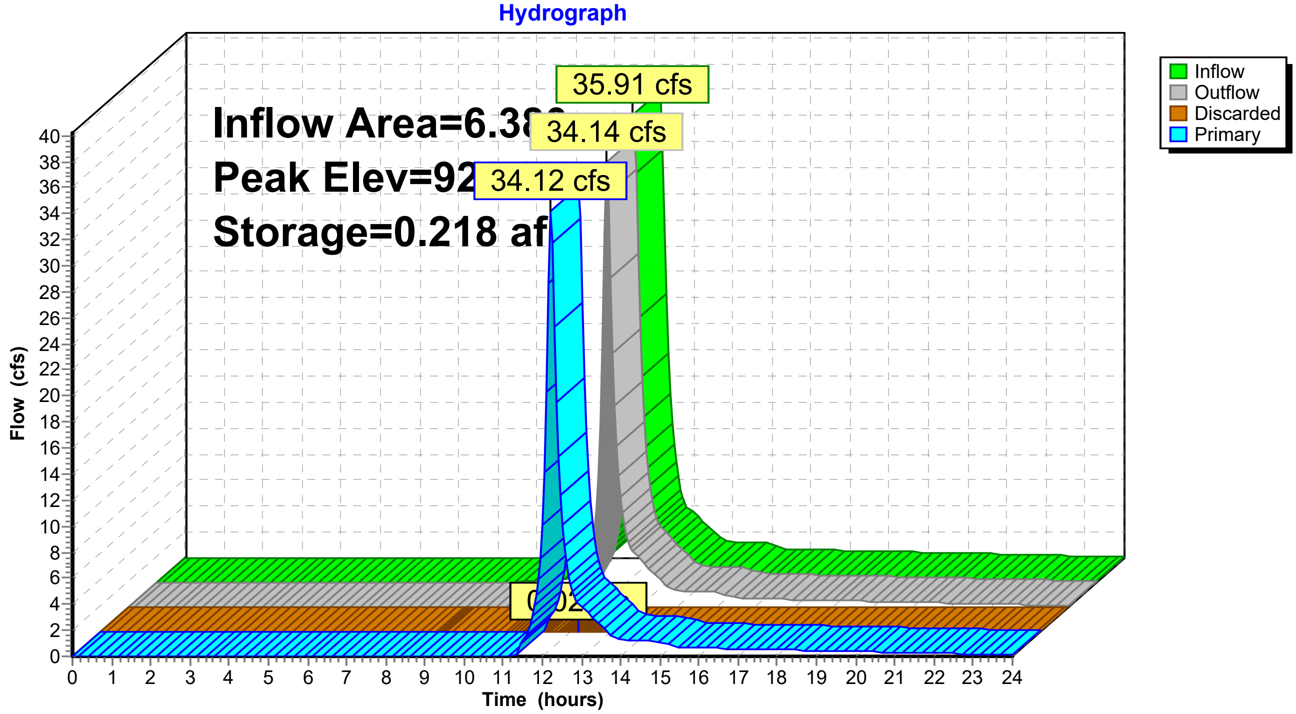
Elevation (feet)	Surf.Area (acres)	Voids (%)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
920.30	0.060	0.0	0.000	0.000	0.060
921.30	0.060	30.0	0.018	0.018	0.064
922.30	0.120	100.0	0.088	0.106	0.124
923.30	0.180	100.0	0.149	0.255	0.185

Device	Routing	Invert	Outlet Devices
#1	Discarded	920.30'	**0.110 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 915.00' Phase-In= 0.01'
#2	Primary	922.05'	**8.0' long + 5.0 '/' SideZ x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Discarded OutFlow Max=0.02 cfs @ 12.21 hrs HW=923.07' (Free Discharge)
└─**1=Exfiltration** (Controls 0.02 cfs)

Primary OutFlow Max=33.49 cfs @ 12.21 hrs HW=923.07' TW=921.52' (Dynamic Tailwater)
└─**2=Broad-Crested Rectangular Weir** (Weir Controls 33.49 cfs @ 2.50 fps)

Pond 7RG: Rain Garden



Summary for Pond 8B: Basin

Inflow Area = 4.610 ac, 19.09% Impervious, Inflow Depth > 3.74" for 100 yr event
Inflow = 25.95 cfs @ 12.18 hrs, Volume= 1.435 af
Outflow = 9.76 cfs @ 12.39 hrs, Volume= 0.940 af, Atten= 62%, Lag= 12.9 min
Discarded = 0.02 cfs @ 12.39 hrs, Volume= 0.015 af
Primary = 9.74 cfs @ 12.39 hrs, Volume= 0.926 af
Routed to Pond 9P : Pond

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 919.45' @ 12.39 hrs Surf.Area= 0.307 ac Storage= 0.683 af

Plug-Flow detention time= 171.4 min calculated for 0.940 af (66% of inflow)
Center-of-Mass det. time= 96.0 min (896.2 - 800.2)

Volume	Invert	Avail.Storage	Storage Description
#1	915.50'	1.082 af	**Custom Stage Data (Conic)**Listed below (Recalc)

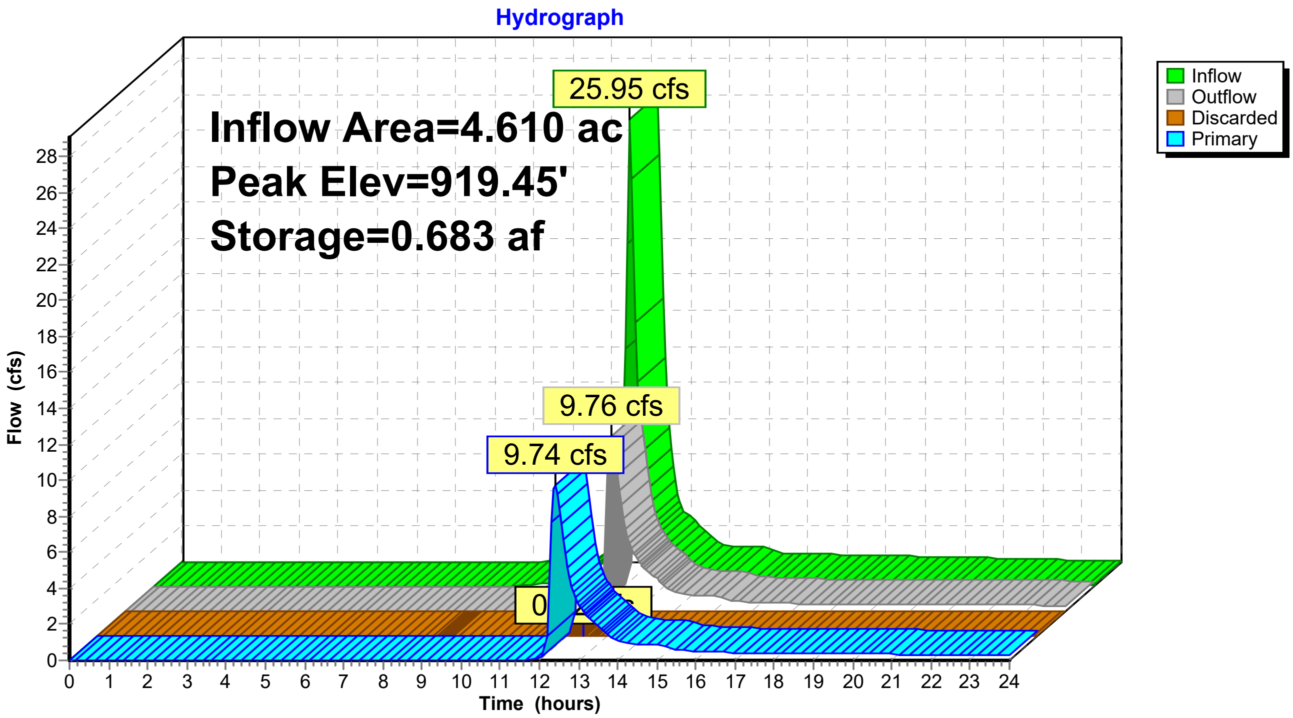
Elevation (feet)	Surf.Area (acres)	Voids (%)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
915.50	0.160	0.0	0.000	0.000	0.160
916.50	0.160	30.0	0.048	0.048	0.167
917.00	0.180	100.0	0.085	0.133	0.187
918.00	0.210	100.0	0.195	0.328	0.218
919.00	0.250	100.0	0.230	0.557	0.259
920.50	0.460	100.0	0.525	1.082	0.469

Device	Routing	Invert	Outlet Devices
#1	Discarded	915.50'	**0.040 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 906.50' Phase-In= 0.01'
#2	Primary	916.50'	**18.0" Round Culvert** L= 100.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 916.50' / 916.00' S= 0.0050 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#3	Device 2	916.75'	**3.0" Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#4	Device 2	919.00'	**36.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads
#5	Primary	919.50'	**10.0' long + 5.0 '/' SideZ x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Discarded OutFlow Max=0.02 cfs @ 12.39 hrs HW=919.45' (Free Discharge)
└─**1=Exfiltration** (Controls 0.02 cfs)

Primary OutFlow Max=9.69 cfs @ 12.39 hrs HW=919.45' TW=902.39' (Dynamic Tailwater)
├─**2=Culvert** (Passes 9.69 cfs of 10.85 cfs potential flow)
│ ├─**3=Orifice** (Orifice Controls 0.38 cfs @ 7.73 fps)
│ └─**4=Grate** (Weir Controls 9.31 cfs @ 2.19 fps)
└─**5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 8B: Basin



Summary for Pond 9P: Pond

Inflow Area = 15.430 ac, 31.11% Impervious, Inflow Depth > 3.71" for 100 yr event
Inflow = 79.95 cfs @ 12.13 hrs, Volume= 4.765 af
Outflow = 8.76 cfs @ 13.04 hrs, Volume= 3.663 af, Atten= 89%, Lag= 54.5 min
Primary = 8.76 cfs @ 13.04 hrs, Volume= 3.663 af
Routed to Link 3L : North Subwatershed (drainage swale)

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 902.93' @ 13.04 hrs Surf.Area= 0.733 ac Storage= 2.697 af

Plug-Flow detention time= 228.5 min calculated for 3.655 af (77% of inflow)
Center-of-Mass det. time= 155.1 min (963.4 - 808.3)

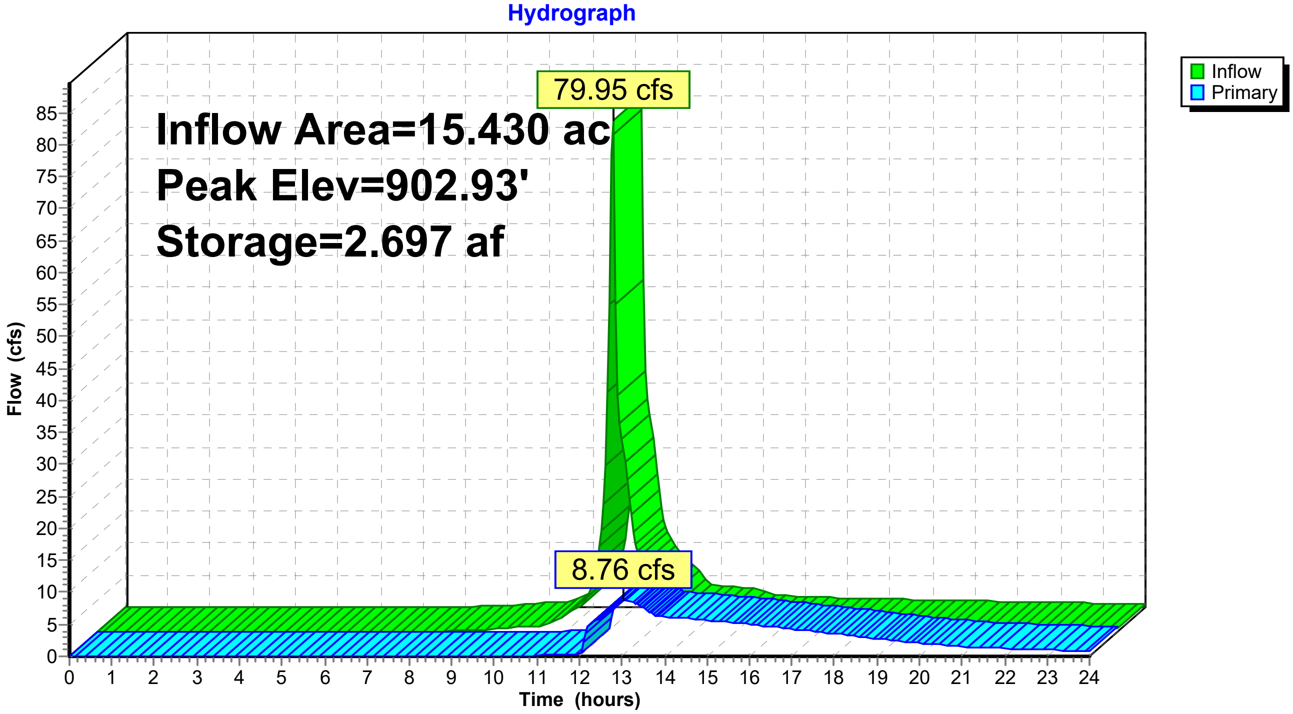
Volume	Invert	Avail.Storage	Storage Description
#1	898.00'	3.524 af	**Custom Stage Data (Conic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
898.00	0.410	0.000	0.000	0.410
899.00	0.460	0.435	0.435	0.461
901.00	0.560	1.018	1.453	0.564
903.00	0.740	1.296	2.749	0.746
904.00	0.810	0.775	3.524	0.818

Device	Routing	Invert	Outlet Devices
#1	Primary	898.00'	**3.0" Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#2	Primary	900.00'	**12.0" Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#3	Primary	902.75'	**36.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads
#4	Primary	903.00'	**10.0' long + 5.0 '/' SideZ 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=8.76 cfs @ 13.04 hrs HW=902.93' TW=0.00' (Dynamic Tailwater)
1=Orifice (Orifice Controls 0.52 cfs @ 10.55 fps)
2=Orifice (Orifice Controls 5.89 cfs @ 7.51 fps)
3=Grate (Weir Controls 2.35 cfs @ 1.39 fps)
4=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond 9P: Pond


Hydrograph
79.95 cfs
Inflow Area=15.430 ac
Peak Elev=902.93'
Storage=2.697 af
8.76 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0
5
10
15
20
25
30
35
40
45
50
55
60
65
70
75
80
85
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24

Summary for Pond 10B: Basin

Inflow Area = 2.040 ac, 18.63% Impervious, Inflow Depth > 3.74" for 100 yr event
Inflow = 11.48 cfs @ 12.18 hrs, Volume= 0.635 af
Outflow = 0.34 cfs @ 15.07 hrs, Volume= 0.296 af, Atten= 97%, Lag= 173.9 min
Discarded = 0.17 cfs @ 15.07 hrs, Volume= 0.173 af
Primary = 0.17 cfs @ 15.07 hrs, Volume= 0.123 af
Routed to Link 3L : North Subwatershed (drainage swale)

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 914.16' @ 15.07 hrs Surf.Area= 0.216 ac Storage= 0.449 af

Plug-Flow detention time= 324.6 min calculated for 0.296 af (47% of inflow)
Center-of-Mass det. time= 240.6 min (1,040.7 - 800.2)

Volume	Invert	Avail.Storage	Storage Description
#1	910.00'	0.913 af	**Custom Stage Data (Conic)**Listed below (Recalc)

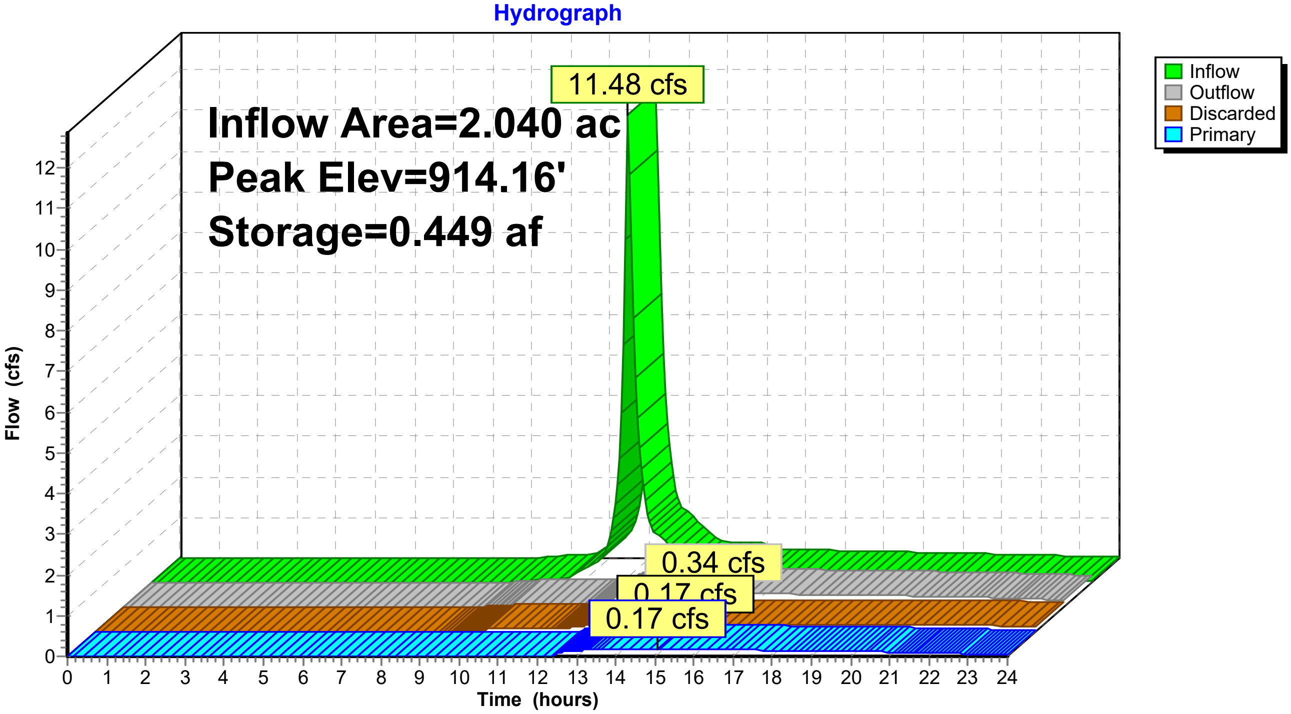
Elevation (feet)	Surf.Area (acres)	Voids (%)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
910.00	0.130	0.0	0.000	0.000	0.130
912.00	0.130	30.0	0.078	0.078	0.142
914.00	0.210	100.0	0.337	0.415	0.223
916.00	0.290	100.0	0.498	0.913	0.305

Device	Routing	Invert	Outlet Devices
#1	Discarded	910.00'	**0.500 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 905.00' Phase-In= 0.01'
#2	Primary	913.50'	**3.0" Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#3	Primary	914.50'	**36.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads
#4	Primary	915.00'	**10.0' long + 5.0 '/' SideZ x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Discarded OutFlow Max=0.17 cfs @ 15.07 hrs HW=914.16' (Free Discharge)
└─**1=Exfiltration** (Controls 0.17 cfs)

Primary OutFlow Max=0.17 cfs @ 15.07 hrs HW=914.16' TW=0.00' (Dynamic Tailwater)
├─**2=Orifice** (Orifice Controls 0.17 cfs @ 3.52 fps)
├─**3=Grate** (Controls 0.00 cfs)
└─**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 10B: Basin



Summary for Pond 11P: Pond

Inflow Area = 7.980 ac, 39.47% Impervious, Inflow Depth > 4.26" for 100 yr event
Inflow = 58.76 cfs @ 12.13 hrs, Volume= 2.831 af
Outflow = 15.76 cfs @ 12.34 hrs, Volume= 2.395 af, Atten= 73%, Lag= 12.8 min
Primary = 15.76 cfs @ 12.34 hrs, Volume= 2.395 af
Routed to Link 3L : North Subwatershed (drainage swale)

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 916.48' @ 12.34 hrs Surf.Area= 0.444 ac Storage= 1.332 af

Plug-Flow detention time= 130.0 min calculated for 2.390 af (84% of inflow)
Center-of-Mass det. time= 77.1 min (864.7 - 787.6)

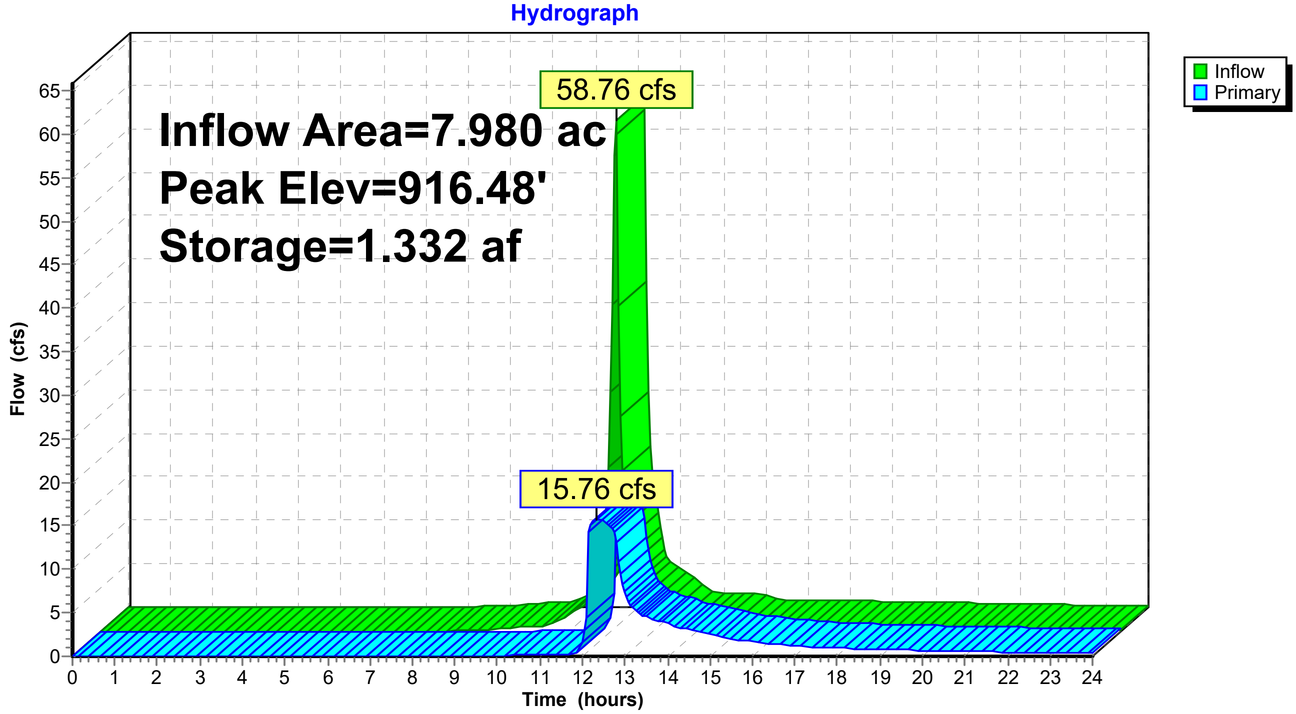
Volume	Invert	Avail.Storage	Storage Description
#1	912.20'	1.821 af	**Custom Stage Data (Conic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
912.20	0.190	0.000	0.000	0.190
915.00	0.350	0.745	0.745	0.352
917.00	0.480	0.827	1.571	0.484
917.50	0.520	0.250	1.821	0.524

Device	Routing	Invert	Outlet Devices
#1	Primary	912.20'	**18.0" Round Culvert** L= 50.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 912.20' / 912.00' S= 0.0040 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#2	Device 1	912.20'	**3.0" Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#3	Device 1	914.00'	**1.0' long x 1.50' rise Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#4	Device 1	915.50'	**36.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads
#5	Primary	916.50'	**10.0' long + 5.0 '/' SideZ 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=15.76 cfs @ 12.34 hrs HW=916.48' TW=0.00' (Dynamic Tailwater)
- **1=Culvert** (Barrel Controls 15.76 cfs @ 8.92 fps)
  - **2=Orifice** (Passes < 0.48 cfs potential flow)
  - **3=Sharp-Crested Rectangular Weir** (Passes < 6.72 cfs potential flow)
  - **4=Grate** (Passes < 29.92 cfs potential flow)
- **5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 11P: Pond



Summary for Pond 12P: Pond

Inflow Area = 7.030 ac, 28.59% Impervious, Inflow Depth > 3.94" for 100 yr event
Inflow = 41.52 cfs @ 12.18 hrs, Volume= 2.309 af
Outflow = 14.97 cfs @ 12.40 hrs, Volume= 1.959 af, Atten= 64%, Lag= 13.2 min
Primary = 14.97 cfs @ 12.40 hrs, Volume= 1.959 af
Routed to Link 3L : North Subwatershed (drainage swale)

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 926.00' @ 12.40 hrs Surf.Area= 0.350 ac Storage= 0.892 af

Plug-Flow detention time= 96.3 min calculated for 1.955 af (85% of inflow)
Center-of-Mass det. time= 43.1 min (839.8 - 796.7)

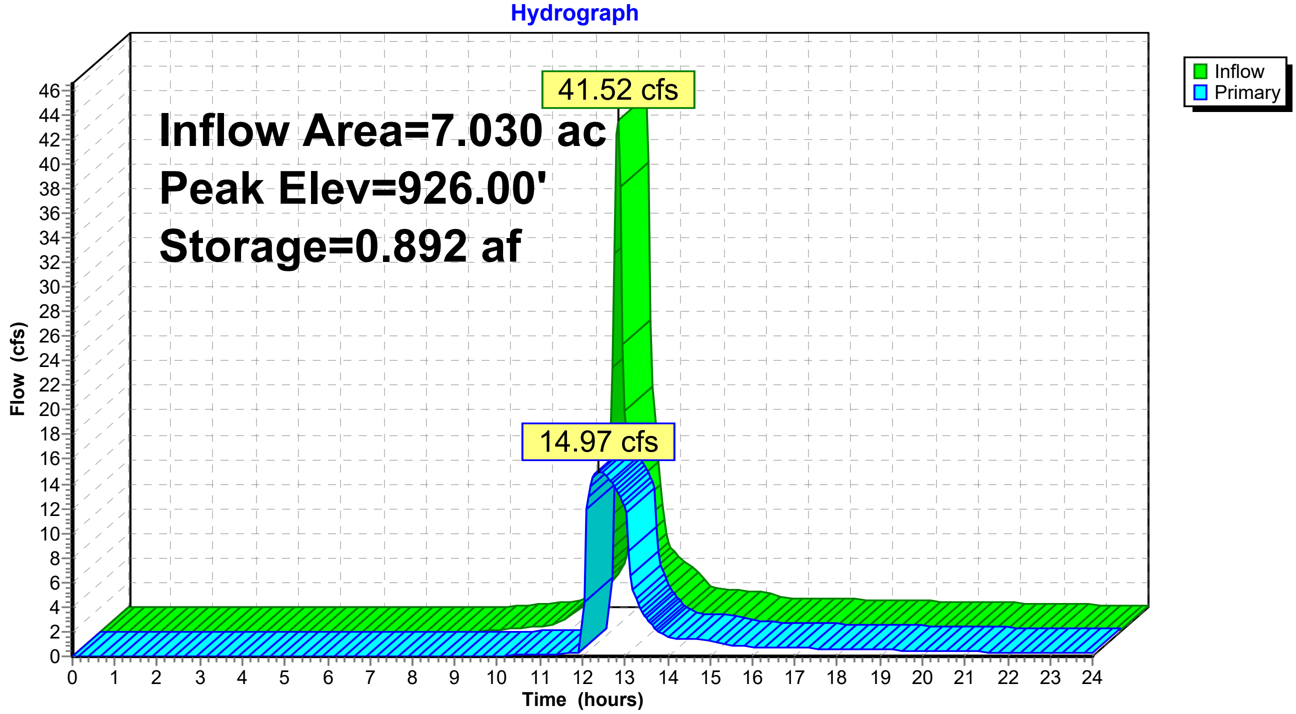
Volume	Invert	Avail.Storage	Storage Description
#1	922.00'	1.276 af	**Custom Stage Data (Conic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
922.00	0.130	0.000	0.000	0.130
923.00	0.160	0.145	0.145	0.161
926.00	0.350	0.747	0.891	0.352
927.00	0.420	0.384	1.276	0.423

Device	Routing	Invert	Outlet Devices
#1	Primary	922.00'	**18.0" Round Culvert** L= 90.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 922.00' / 921.00' S= 0.0111 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#2	Device 1	922.00'	**3.0" Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#3	Device 1	924.20'	**36.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads
#4	Primary	926.00'	**10.0' long + 5.0 '/' SideZ 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=14.96 cfs @ 12.40 hrs HW=926.00' TW=0.00' (Dynamic Tailwater)
—**1=Culvert** (Barrel Controls 14.96 cfs @ 8.47 fps)
  —**2=Orifice** (Passes < 0.47 cfs potential flow)
  —**3=Grate** (Passes < 45.67 cfs potential flow)
—**4=Broad-Crested Rectangular Weir** (Weir Controls 0.00 cfs @ 0.07 fps)

Pond 12P: Pond



Summary for Pond 13P: Pond

Inflow Area = 5.250 ac, 24.38% Impervious, Inflow Depth > 3.94" for 100 yr event
Inflow = 31.01 cfs @ 12.18 hrs, Volume= 1.725 af
Outflow = 9.41 cfs @ 12.44 hrs, Volume= 1.425 af, Atten= 70%, Lag= 15.7 min
Primary = 9.41 cfs @ 12.44 hrs, Volume= 1.425 af
Routed to Link 2L : Northwest Subwatershed

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 898.69' @ 12.44 hrs Surf.Area= 0.324 ac Storage= 0.824 af

Plug-Flow detention time= 167.3 min calculated for 1.422 af (82% of inflow)
Center-of-Mass det. time= 110.3 min (907.0 - 796.7)

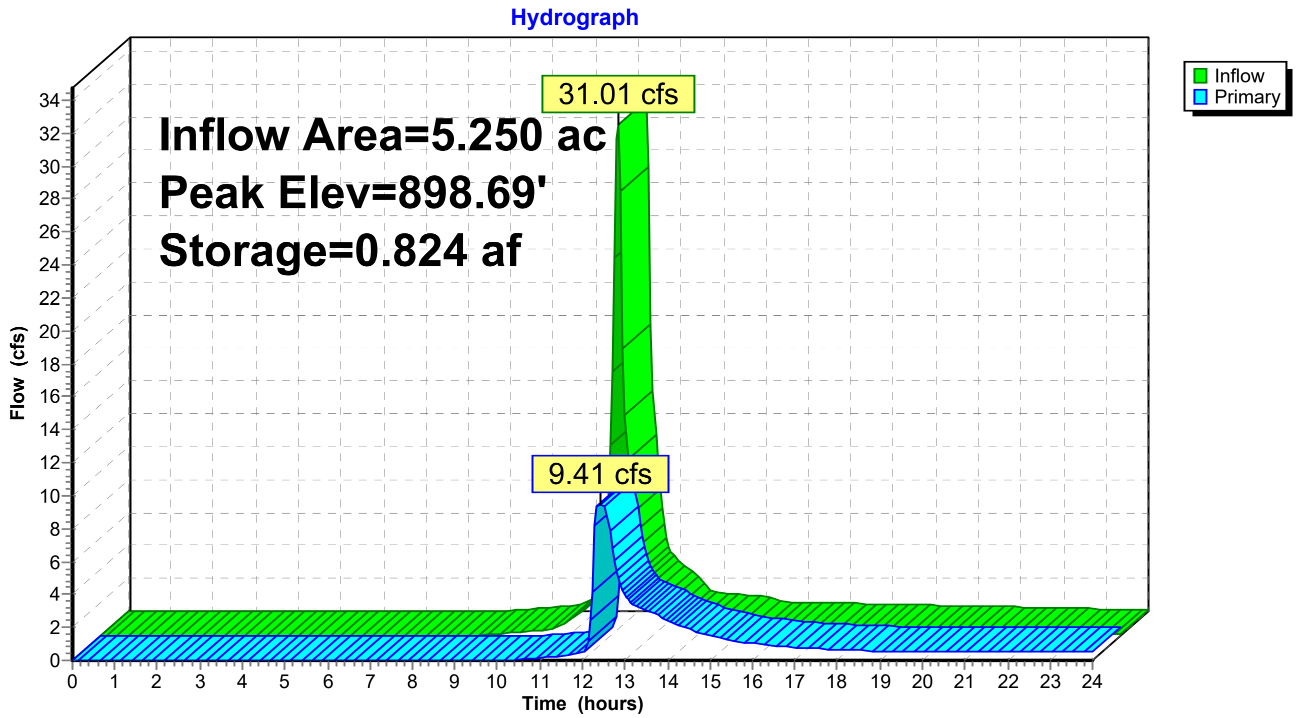
Volume	Invert	Avail.Storage	Storage Description
#1	895.30'	1.216 af	**Custom Stage Data (Conic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
895.30	0.170	0.000	0.000	0.170
896.00	0.200	0.129	0.129	0.200
897.00	0.240	0.220	0.349	0.241
898.00	0.290	0.265	0.614	0.292
898.80	0.330	0.248	0.861	0.333
899.80	0.380	0.355	1.216	0.384

Device	Routing	Invert	Outlet Devices
#1	Primary	895.30'	**15.0" Round Culvert** L= 50.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 895.30' / 895.00' S= 0.0060 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf
#2	Device 1	895.30'	**4.0" Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#3	Device 1	897.30'	**1.0' long x 1.00' rise Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#4	Device 1	898.30'	**36.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads
#5	Primary	898.80'	**10.0' long + 5.0 '/' SideZ x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=9.41 cfs @ 12.44 hrs HW=898.68' TW=0.00' (Dynamic Tailwater)
- **1=Culvert** (Barrel Controls 9.41 cfs @ 7.67 fps)
  - **2=Orifice** (Passes < 0.75 cfs potential flow)
  - **3=Sharp-Crested Rectangular Weir** (Passes < 3.64 cfs potential flow)
  - **4=Grate** (Passes < 7.34 cfs potential flow)
- **5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 13P: Pond

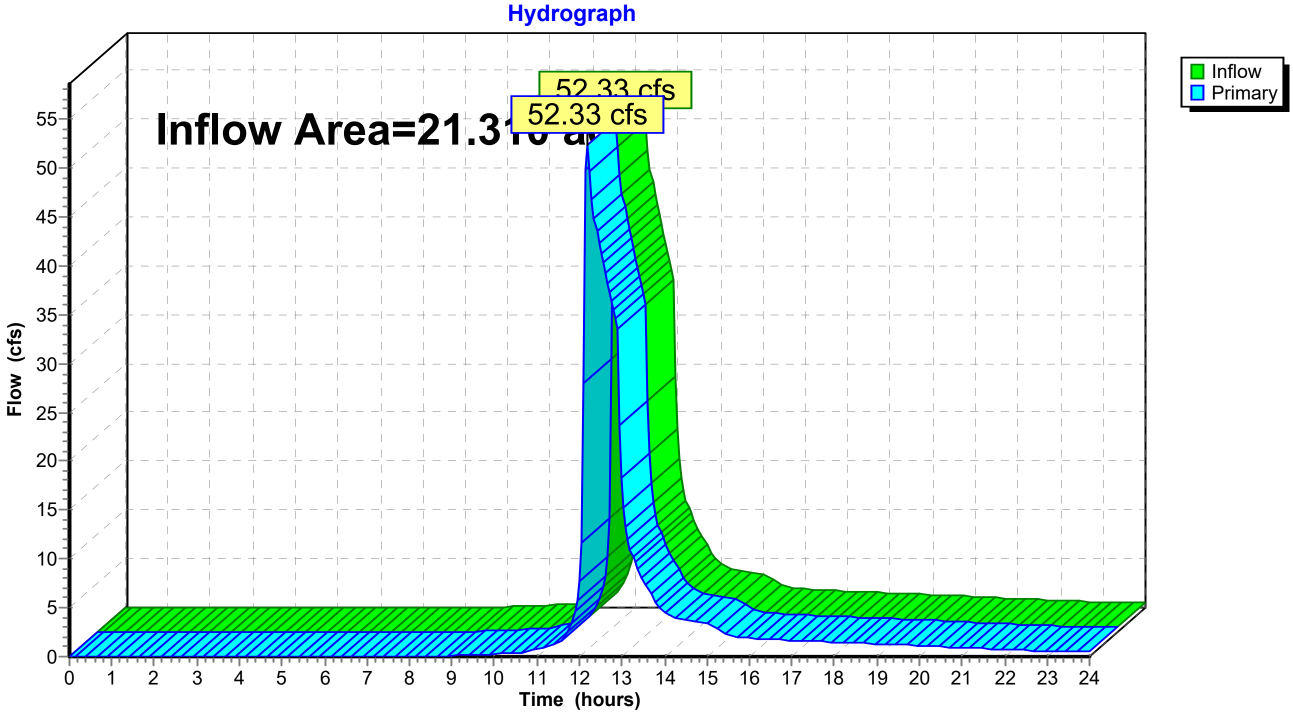


Summary for Link 1L: West Subwatershed

Inflow Area = 21.310 ac, 34.44% Impervious, Inflow Depth > 2.96" for 100 yr event
Inflow = 52.33 cfs @ 12.20 hrs, Volume= 5.250 af
Primary = 52.33 cfs @ 12.20 hrs, Volume= 5.250 af, Atten= 0%, Lag= 0.0 min
Routed to nonexistent node 99L

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

Link 1L: West Subwatershed

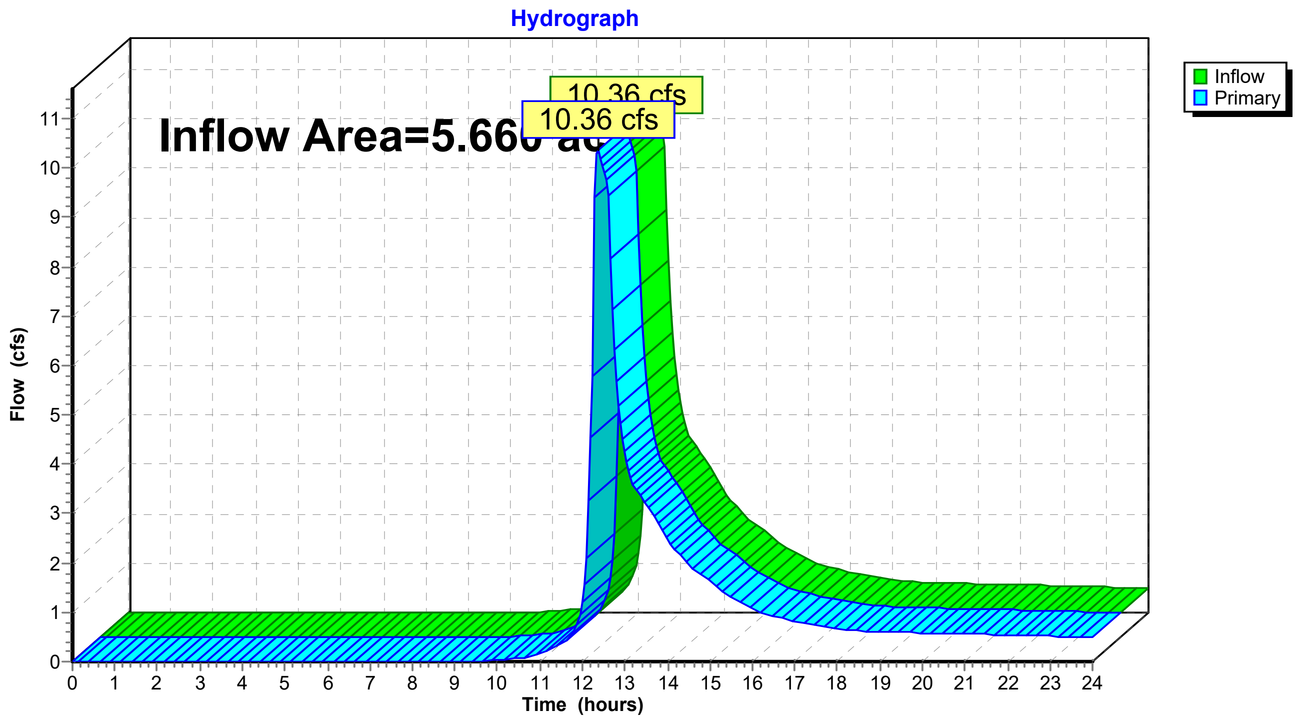


Summary for Link 2L: Northwest Subwatershed

Inflow Area = 5.660 ac, 23.14% Impervious, Inflow Depth > 3.27" for 100 yr event
Inflow = 10.36 cfs @ 12.37 hrs, Volume= 1.543 af
Primary = 10.36 cfs @ 12.37 hrs, Volume= 1.543 af, Atten= 0%, Lag= 0.0 min
Routed to nonexistent node 99L

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

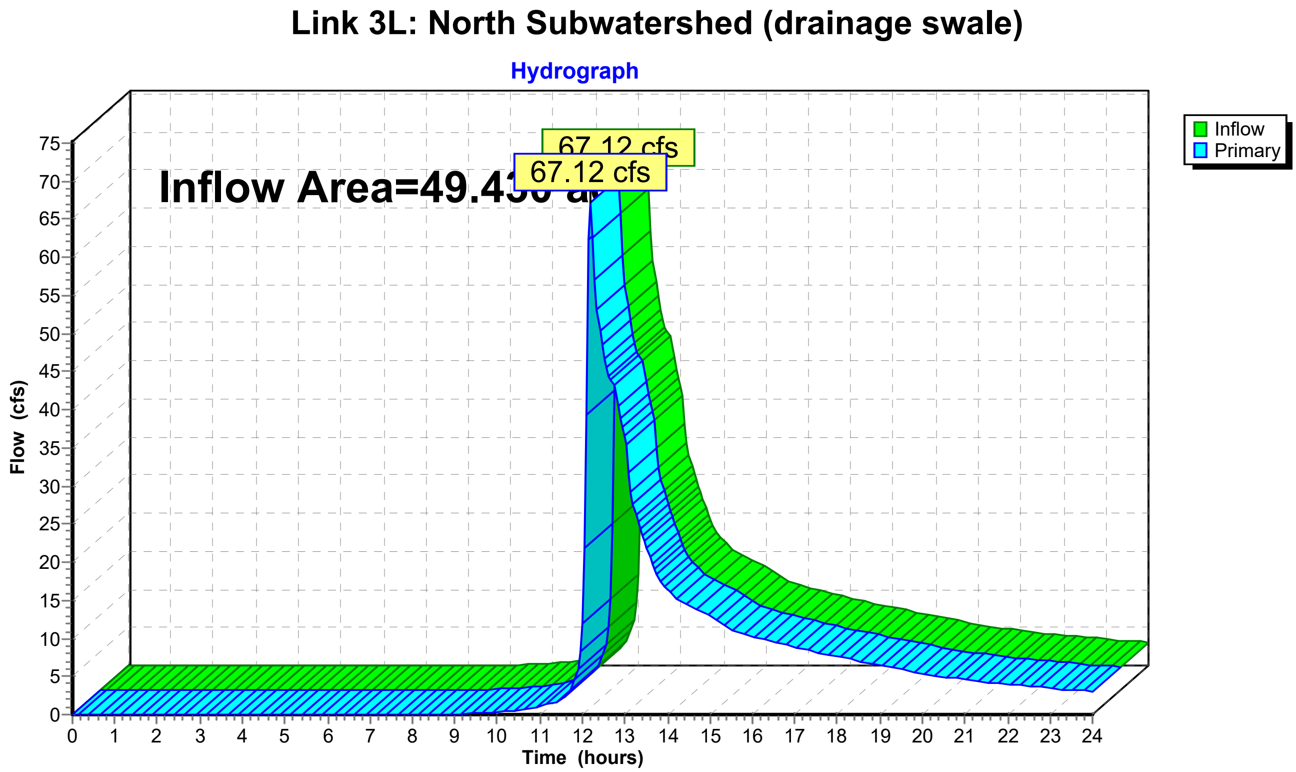
Link 2L: Northwest Subwatershed



Summary for Link 3L: North Subwatershed (drainage swale)

Inflow Area = 49.430 ac, 30.87% Impervious, Inflow Depth > 2.91" for 100 yr event
Inflow = 67.12 cfs @ 12.20 hrs, Volume= 12.002 af
Primary = 67.12 cfs @ 12.20 hrs, Volume= 12.002 af, Atten= 0%, Lag= 0.0 min
Routed to nonexistent node 99L

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

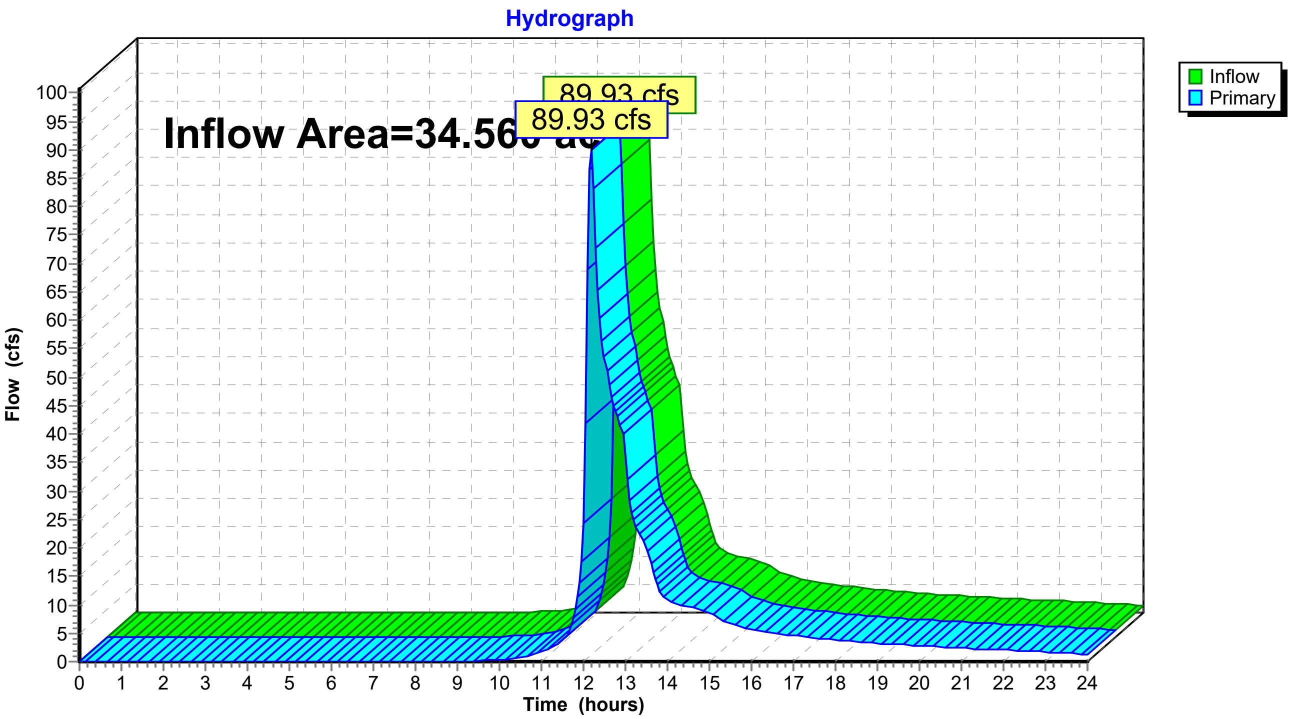


Summary for Link 4L: Southeast Subwatershed

Inflow Area = 34.560 ac, 23.06% Impervious, Inflow Depth > 3.52" for 100 yr event
Inflow = 89.93 cfs @ 12.19 hrs, Volume= 10.150 af
Primary = 89.93 cfs @ 12.19 hrs, Volume= 10.150 af, Atten= 0%, Lag= 0.0 min
Routed to nonexistent node 99L

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

Link 4L: Southeast Subwatershed



Events for Subcatchment 1: Subarea

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
1 yr	2.40	14.43	0.802	0.87
2 yr	2.70	18.14	1.001	1.09
10 yr	3.81	32.93	1.806	1.96
100 yr	**6.18**	**66.94**	**3.726**	**4.05**

Events for Subcatchment 2: Subarea

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
1 yr	2.40	3.38	0.157	1.16
2 yr	2.70	4.08	0.190	1.41
10 yr	3.81	6.77	0.321	2.37
100 yr	**6.18**	**12.61**	**0.618**	**4.58**

Events for Subcatchment 3: Subarea

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
1 yr	2.40	18.90	1.223	1.10
2 yr	2.70	23.09	1.490	1.34
10 yr	3.81	39.32	2.546	2.29
100 yr	**6.18**	**75.17**	**4.976**	**4.47**

Events for Subcatchment 4: Subarea

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
1 yr	2.40	4.65	0.265	0.72
2 yr	2.70	6.01	0.336	0.92
10 yr	3.81	11.57	0.635	1.74
100 yr	**6.18**	**24.71**	**1.367**	**3.74**

Events for Subcatchment 5: Subarea

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
1 yr	2.40	2.54	0.146	0.68
2 yr	2.70	3.32	0.187	0.87
10 yr	3.81	6.54	0.359	1.66
100 yr	**6.18**	**14.21**	**0.785**	**3.63**

Events for Subcatchment 6: Subarea

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
1 yr	2.40	12.26	0.678	0.92
2 yr	2.70	15.29	0.841	1.15
10 yr	3.81	27.25	1.496	2.04
100 yr	**6.18**	**54.50**	**3.044**	**4.15**

Events for Subcatchment 7a: Subarea

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
1 yr	2.40	6.76	0.385	0.72
2 yr	2.70	8.74	0.489	0.92
10 yr	3.81	16.82	0.923	1.74
100 yr	**6.18**	**35.91**	**1.987**	**3.74**

Events for Subcatchment 7b: Subarea

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
1 yr	2.40	7.74	0.426	0.98
2 yr	2.70	9.57	0.526	1.21
10 yr	3.81	16.77	0.923	2.12
100 yr	**6.18**	**33.02**	**1.852**	**4.26**

Events for Subcatchment 8: Subarea

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
1 yr	2.40	4.88	0.278	0.72
2 yr	2.70	6.31	0.353	0.92
10 yr	3.81	12.15	0.667	1.74
100 yr	**6.18**	**25.95**	**1.435**	**3.74**

Events for Subcatchment 9: Subarea

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
1 yr	2.40	19.06	0.884	0.98
2 yr	2.70	23.51	1.090	1.21
10 yr	3.81	40.89	1.913	2.12
100 yr	**6.18**	**79.67**	**3.839**	**4.26**

Events for Subcatchment 10: Subarea

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
1 yr	2.40	2.16	0.123	0.72
2 yr	2.70	2.79	0.156	0.92
10 yr	3.81	5.38	0.295	1.74
100 yr	**6.18**	**11.48**	**0.635**	**3.74**

Events for Subcatchment 11: Subarea

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
1 yr	2.40	14.06	0.652	0.98
2 yr	2.70	17.34	0.804	1.21
10 yr	3.81	30.16	1.411	2.12
100 yr	**6.18**	**58.76**	**2.831**	**4.26**

Events for Subcatchment 12: Subarea

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
1 yr	2.40	8.59	0.480	0.82
2 yr	2.70	10.89	0.603	1.03
10 yr	3.81	20.14	1.104	1.88
100 yr	**6.18**	**41.52**	**2.309**	**3.94**

Events for Subcatchment 13: Subarea

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
1 yr	2.40	6.41	0.359	0.82
2 yr	2.70	8.13	0.450	1.03
10 yr	3.81	15.04	0.825	1.88
100 yr	**6.18**	**31.01**	**1.725**	**3.94**

Events for Subcatchment 14: Subarea

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
1 yr	2.40	0.34	0.020	0.59
2 yr	2.70	0.46	0.026	0.77
10 yr	3.81	0.94	0.052	1.52
100 yr	**6.18**	**2.13**	**0.117**	**3.43**

Events for Subcatchment 15: Subarea

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
1 yr	2.40	4.53	0.258	0.72
2 yr	2.70	5.86	0.328	0.92
10 yr	3.81	11.28	0.619	1.74
100 yr	**6.18**	**24.09**	**1.333**	**3.74**

Events for Subcatchment 16: Subarea

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
1 yr	2.40	10.50	0.612	0.63
2 yr	2.70	13.88	0.789	0.82
10 yr	3.81	27.91	1.536	1.59
100 yr	**6.18**	**61.86**	**3.407**	**3.53**

Events for Subcatchment 17: Subarea

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
1 yr	2.40	3.77	0.215	0.72
2 yr	2.70	4.88	0.273	0.92
10 yr	3.81	9.38	0.515	1.74
100 yr	**6.18**	**20.04**	**1.108**	**3.74**

Events for Pond 1B: Basin

Event	Inflow (cfs)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)	Volume (acre-feet)	Elevation (feet)	Storage (acre-feet)
1 yr	14.43	0.98	0.11	0.87	0.452	934.48	0.474
2 yr	18.14	1.28	0.12	1.16	0.621	934.78	0.586
10 yr	32.93	2.00	0.16	1.84	1.301	935.84	1.119
100 yr	**66.94**	**5.66**	**0.24**	**5.42**	**2.524**	**937.46**	**2.350**

Events for Pond 2B: Basin

Event	Inflow (cfs)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)	Volume (acre-feet)	Elevation (feet)	Storage (acre-feet)
1 yr	3.38	0.96	0.37	0.59	0.187	931.39	0.119
2 yr	4.06	1.35	0.38	0.97	0.368	931.52	0.132
10 yr	7.47	2.51	0.42	2.09	1.115	931.84	0.167
100 yr	**14.38**	**10.63**	**0.49**	**10.14**	**2.529**	**932.38**	**0.234**

Events for Pond 3P: Pond

Event	Inflow (cfs)	Primary (cfs)	Volume (acre-feet)	Elevation (feet)	Storage (acre-feet)
1 yr	18.90	0.43	0.418	925.48	0.908
2 yr	23.09	2.33	0.656	925.63	0.959
10 yr	39.32	19.78	1.669	926.10	1.127
100 yr	**75.32**	**36.55**	**4.142**	**927.84**	**1.822**

Events for Pond 4B: Basin

Event	Inflow (cfs)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)	Volume (acre-feet)	Elevation (feet)	Storage (acre-feet)
1 yr	4.65	1.05	1.05	0.00	0.000	936.14	0.080
2 yr	6.01	1.13	1.13	0.00	0.000	936.32	0.115
10 yr	11.57	1.51	1.51	0.00	0.000	937.08	0.271
100 yr	**24.71**	**2.99**	**2.60**	**0.39**	**0.074**	**938.54**	**0.661**

Events for Pond 5RG: Rain Garden

Event	Inflow (cfs)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)	Volume (acre-feet)	Elevation (feet)	Storage (acre-feet)
1 yr	2.54	0.19	0.01	0.19	0.099	923.51	0.080
2 yr	3.32	0.24	0.01	0.23	0.139	923.86	0.104
10 yr	6.54	2.54	0.01	2.53	0.302	924.42	0.153
100 yr	**14.21**	**13.06**	**0.01**	**13.05**	**0.704**	**924.80**	**0.194**

Events for Pond 6P: Pond

Event	Inflow (cfs)	Primary (cfs)	Volume (acre-feet)	Elevation (feet)	Storage (acre-feet)
1 yr	12.26	0.37	0.352	912.56	0.513
2 yr	15.30	1.44	0.518	912.69	0.547
10 yr	27.46	13.29	1.293	913.06	0.650
100 yr	**66.31**	**25.56**	**3.223**	**914.99**	**1.310**

Events for Pond 7P: Pond

Event	Inflow (cfs)	Primary (cfs)	Volume (acre-feet)	Elevation (feet)	Storage (acre-feet)
1 yr	8.67	1.16	0.620	920.11	0.361
2 yr	13.64	1.56	0.812	920.33	0.475
10 yr	31.46	4.08	1.604	921.04	0.890
100 yr	**66.09**	**12.97**	**3.520**	**922.28**	**1.829**

Events for Pond 7RG: Rain Garden

Event	Inflow (cfs)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)	Volume (acre-feet)	Elevation (feet)	Storage (acre-feet)
1 yr	6.76	3.79	0.02	3.77	0.291	922.35	0.112
2 yr	8.74	6.20	0.02	6.19	0.395	922.45	0.125
10 yr	16.82	15.45	0.02	15.43	0.827	922.71	0.160
100 yr	**35.91**	**34.14**	**0.02**	**34.12**	**1.887**	**923.08**	**0.218**

Events for Pond 8B: Basin

Event	Inflow (cfs)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)	Volume (acre-feet)	Elevation (feet)	Storage (acre-feet)
1 yr	4.88	0.16	0.01	0.15	0.127	917.29	0.187
2 yr	6.31	0.20	0.01	0.20	0.170	917.56	0.238
10 yr	12.15	0.33	0.01	0.32	0.292	918.66	0.474
100 yr	**25.95**	**9.76**	**0.02**	**9.74**	**0.926**	**919.45**	**0.683**

Events for Pond 9P: Pond

Event	Inflow (cfs)	Primary (cfs)	Volume (acre-feet)	Elevation (feet)	Storage (acre-feet)
1 yr	19.06	0.29	0.279	899.66	0.750
2 yr	23.51	0.35	0.321	900.07	0.953
10 yr	40.99	2.16	1.164	900.73	1.303
100 yr	**79.95**	**8.76**	**3.663**	**902.93**	**2.697**

Events for Pond 10B: Basin

Event	Inflow (cfs)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)	Volume (acre-feet)	Elevation (feet)	Storage (acre-feet)
1 yr	2.16	0.09	0.09	0.00	0.000	911.88	0.073
2 yr	2.79	0.10	0.10	0.00	0.000	912.16	0.099
10 yr	5.38	0.12	0.12	0.00	0.000	912.89	0.208
100 yr	**11.48**	**0.34**	**0.17**	**0.17**	**0.123**	**914.16**	**0.449**

Events for Pond 11P: Pond

Event	Inflow (cfs)	Primary (cfs)	Volume (acre-feet)	Elevation (feet)	Storage (acre-feet)
1 yr	14.06	0.39	0.310	914.08	0.450
2 yr	17.34	0.85	0.439	914.31	0.517
10 yr	30.16	3.31	1.008	915.09	0.778
100 yr	**58.76**	**15.76**	**2.395**	**916.48**	**1.332**

Events for Pond 12P: Pond

Event	Inflow (cfs)	Primary (cfs)	Volume (acre-feet)	Elevation (feet)	Storage (acre-feet)
1 yr	8.59	0.31	0.289	923.89	0.309
2 yr	10.89	0.60	0.346	924.24	0.385
10 yr	20.14	8.01	0.797	924.59	0.470
100 yr	**41.52**	**14.97**	**1.959**	**926.00**	**0.892**

Events for Pond 13P: Pond

Event	Inflow (cfs)	Primary (cfs)	Volume (acre-feet)	Elevation (feet)	Storage (acre-feet)
1 yr	6.41	0.40	0.303	896.37	0.206
2 yr	8.13	0.46	0.367	896.65	0.268
10 yr	15.04	1.11	0.609	897.60	0.501
100 yr	**31.01**	**9.41**	**1.425**	**898.69**	**0.824**

Events for Link 1L: West Subwatershed

Event	Inflow (cfs)	Primary (cfs)	Volume (acre-feet)
1 yr	4.01	4.01	0.632
2 yr	5.15	5.15	0.929
10 yr	22.80	22.80	2.184
100 yr	**52.33**	**52.33**	**5.250**

Events for Link 2L: Northwest Subwatershed

Event	Inflow (cfs)	Primary (cfs)	Volume (acre-feet)
1 yr	0.58	0.58	0.323
2 yr	0.75	0.75	0.393
10 yr	1.38	1.38	0.661
100 yr	**10.36**	**10.36**	**1.543**

Events for Link 3L: North Subwatershed (drainage swale)

Event	Inflow (cfs)	Primary (cfs)	Volume (acre-feet)
1 yr	5.14	5.14	1.324
2 yr	6.56	6.56	1.802
10 yr	18.21	18.21	4.703
100 yr	**67.12**	**67.12**	**12.002**

Events for Link 4L: Southeast Subwatershed

Event	Inflow (cfs)	Primary (cfs)	Volume (acre-feet)
1 yr	10.98	10.98	1.584
2 yr	14.56	14.56	2.119
10 yr	30.27	30.27	4.432
100 yr	**89.93**	**89.93**	**10.150**

APPENDIX C

Treatment Analysis

Treatment Analysis Results

FOR: Welshire Farm

LOCATION: Town of Delafield, Wisconsin

Land Use	Total Loading (lbs)	BMP Type	BMP lbs IN	BMP lbs OUT	Total Solids Yield (lbs)	% TSS Removed
Subarea 1	2243	Bioretention Basin 1B and Disconnected roof/patios	2243	239	drains to 2B	89.3%
Subarea 2	506	Infiltration Basin 2B Disconnected roof/patios	746	484	484	35.1%
Subarea 3	4323	Pond 3P	4323	747	747	82.7%
Subarea 4	528	Infiltration Basin 4B and Disconnected roof/patios	528	0	0	100.0%
Subarea 5	312	Rain Garden 5B and Disconnected roof/patios	312	91	drains to 6P	70.8%
Subarea 6	2658	Pond 6P and Disconnected roof/patios	2750	501	501	81.8%
Subarea 7a	808	Rain Garden 7B and Disconnected roof/patios	808	186	drains to 7P	77.1%
Subarea 7b	1238	Pond 7P and Disconnected roof/patios	1423	212	212	85.1%
Subarea 8	515	Infiltration Basin 8B and Disconnected roof/patios	515	128	drains to 9P	75.1%
Subarea 9	3094	Pond 9P and Disconnected roof/patios	3222	259	259	92.0%
Subarea 10	225	Infiltration Basin 10B and Disconnected roof/patios	225	0	0	100.0%
Subarea 11	2530	Pond 11P	2530	414	414	83.6%
Subarea 12	1393	Infiltration Basin 12B and Disconnected roof/patios	1393	220	220	84.2%
Subarea 13	1084	Infiltration Basin 13B and Disconnected roof/patios	1084	164	164	84.9%
Subarea 14	51	--	51	51	51	0.0%
Subarea 15	341	Disconnection of roof/patios	341	165	165	51.5%
Subarea 16	1087	Disconnection of roof/patios	1087	838	838	22.9%
Subarea 17	288	Disconnection of roof/patios	288	164	164	43.0%
Total	***23225***	**--**	**--**	**--**	***4219***	***81.8%***

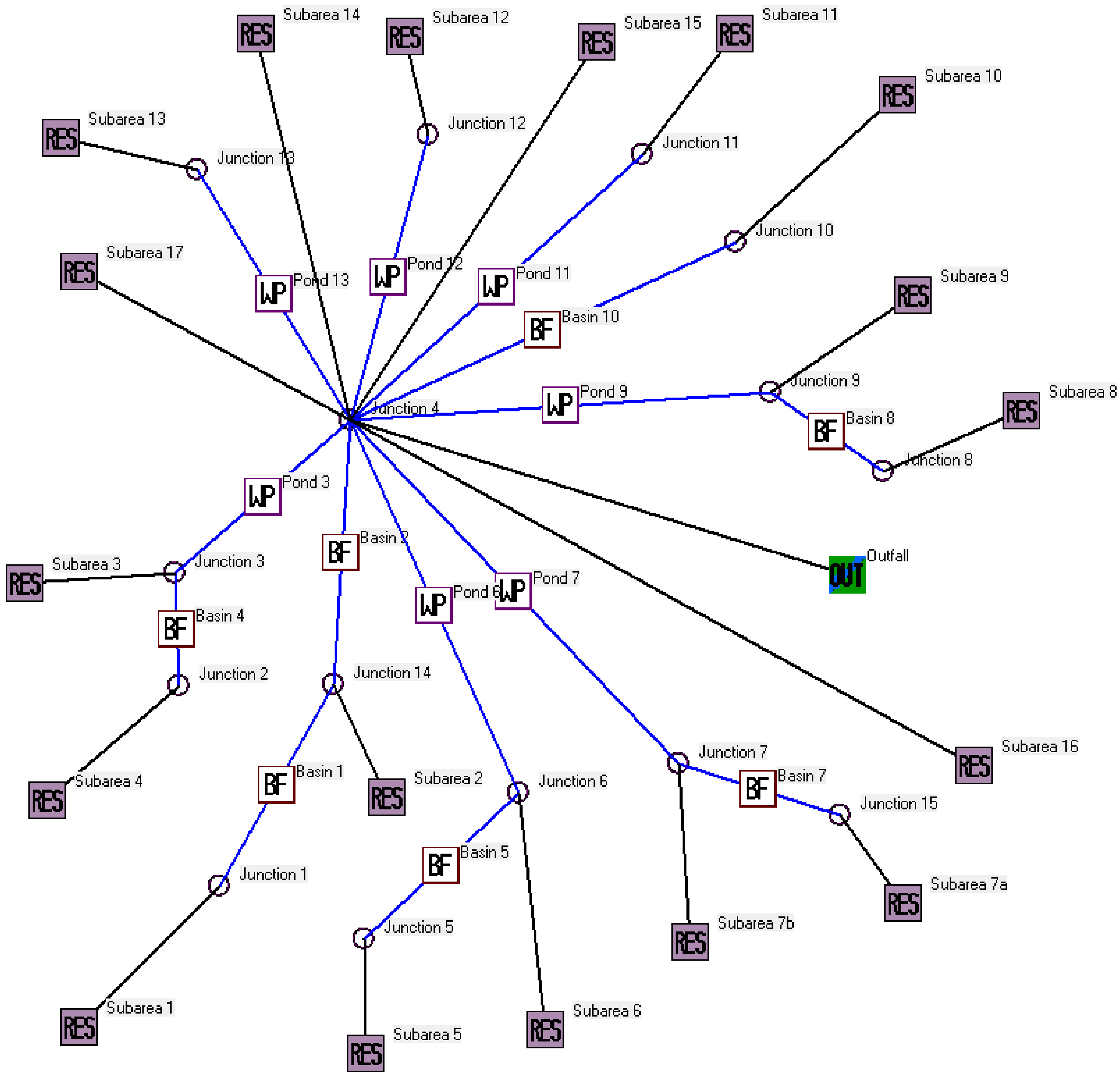
Connected Model Total lbs without Controls = 23225 **lbs (from WinSLAMM output)**

Disconnected Model Total lbs with Controls = 4219 **lbs (from WinSLAMM output)**

Total lbs Removed = 23225 - 4219 = 19006 lbs

% TSS Removed = 100 x (19006 / 23225) = 81.8 %

Treatment Analysis - Connected Model



SLAMM for Windows Version 10.4.1

Data file name: D:\Jobs\2023\2023-003 - Thomas Farm - Welshire Farm - TRIO\Project_Information\Calcs\SLAMM\Treatment_Connected.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: 06-21-2023 Time of run: 14:07:31
Total Area Modeled (acres): 110.280
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:	3.435E+06	-	108.3	23225	-
Outfall Total with Controls:	2.834E+06	17.50%	30.07	5321	77.09%
Annualized Total After Outfall Controls:	2.874E+06			5395	

Data file name: D:\Jobs\2023\2023-003 - Thomas Farm - Welshire Farm - TRIO\Project_Information\Calcs\SLAMM\Treatment_Connected.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: 06-21-2023 Time: 14:07:49
Site information:

LU# 1 - Residential: Subarea 1 Total area (ac): 11.050
1 - Roofs 1: 0.820 ac. Pitched Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
2 - Roofs 2: 0.810 ac. Pitched Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
13 - Paved Parking 1: 0.010 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
25 - Driveways 1: 0.080 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
26 - Driveways 2: 0.350 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
31 - Sidewalks 1: 0.130 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
32 - Sidewalks 2: 0.120 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
33 - Sidewalks 3: 0.230 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
37 - Streets 1: 0.620 ac. Smooth Street Length = 0.353 curb-mi Street Width (assuming two curb-mi per street mile) = 28.98017 ft
Default St. Dirt Accum. Annual Winter Load = 2500 lbs Source Area PSD File: C:\WinSLAMM Files\NURP.cpz

51 - Small Landscaped Areas 1: 6.510 ac. Normal Clayey Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
57 - Undeveloped Areas 1: 1.130 ac. Normal Clayey Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
70 - Water Body Areas: 0.240 ac. Source Area PSD File:
LU# 2 - Residential: Subarea 2 Total area (ac): 1.620
1 - Roofs 1: 0.150 ac. Pitched Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
2 - Roofs 2: 0.140 ac. Pitched Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
25 - Driveways 1: 0.160 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
31 - Sidewalks 1: 0.020 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
32 - Sidewalks 2: 0.020 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
37 - Streets 1: 0.200 ac. Smooth Street Length = 0.114 curb-mi Street Width (assuming two curb-mi per street mile) = 28.94737 ft
Default St. Dirt Accum. Annual Winter Load = 2500 lbs Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
51 - Small Landscaped Areas 1: 0.840 ac. Normal Clayey Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
70 - Water Body Areas: 0.090 ac. Source Area PSD File:
LU# 3 - Residential: Subarea 3 Total area (ac): 13.360
1 - Roofs 1: 1.120 ac. Pitched Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
2 - Roofs 2: 1.120 ac. Pitched Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
25 - Driveways 1: 0.680 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
26 - Driveways 2: 0.610 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
31 - Sidewalks 1: 0.190 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
32 - Sidewalks 2: 0.190 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
33 - Sidewalks 3: 0.050 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
37 - Streets 1: 1.760 ac. Smooth Street Length = 1.001 curb-mi Street Width (assuming two curb-mi per street mile) = 29.01099 ft
Default St. Dirt Accum. Annual Winter Load = 2500 lbs Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
51 - Small Landscaped Areas 1: 7.390 ac. Normal Clayey Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
57 - Undeveloped Areas 1: 0.050 ac. Normal Clayey Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
70 - Water Body Areas: 0.200 ac. Source Area PSD File:
LU# 4 - Residential: Subarea 4 Total area (ac): 4.390
1 - Roofs 1: 0.500 ac. Pitched Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
31 - Sidewalks 1: 0.080 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
51 - Small Landscaped Areas 1: 3.630 ac. Normal Clayey Source Area PSD File: C:\WinSLAMM Files\NURP.cpz

70 - Water Body Areas: 0.180 ac.   Source Area PSD File:
LU# 5 - Residential: Subarea 5   Total area (ac): 2.590
1 - Roofs 1: 0.250 ac.   Pitched   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
51 - Small Landscaped Areas 1: 2.270 ac.   Normal Clayey   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
70 - Water Body Areas: 0.030 ac.   Source Area PSD File:
LU# 6 - Residential: Subarea 6   Total area (ac): 8.800
1 - Roofs 1: 0.360 ac.   Pitched   Connected   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
2 - Roofs 2: 0.350 ac.   Pitched   Connected   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
13 - Paved Parking 1: 0.260 ac.   Connected   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
25 - Driveways 1: 0.310 ac.   Connected   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
31 - Sidewalks 1: 0.060 ac.   Connected   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
32 - Sidewalks 2: 0.050 ac.   Connected   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
33 - Sidewalks 3: 0.200 ac.   Connected   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
37 - Streets 1: 1.400 ac.   Smooth   Street Length = 0.797 curb-mi   Street Width (assuming two curb-mi per street mile) = 28.98369 ft
Default St. Dirt Accum.   Annual Winter Load = 2500 lbs   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
51 - Small Landscaped Areas 1: 4.250 ac.   Normal Clayey   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
57 - Undeveloped Areas 1: 1.410 ac.   Normal Clayey   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
70 - Water Body Areas: 0.150 ac.   Source Area PSD File:
LU# 7 - Residential: Subarea 7b   Total area (ac): 5.220
1 - Roofs 1: 0.390 ac.   Pitched   Connected   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
2 - Roofs 2: 0.390 ac.   Pitched   Connected   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
25 - Driveways 1: 0.330 ac.   Connected   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
31 - Sidewalks 1: 0.070 ac.   Connected   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
32 - Sidewalks 2: 0.060 ac.   Connected   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
37 - Streets 1: 0.430 ac.   Smooth   Street Length = 0.245 curb-mi   Street Width (assuming two curb-mi per street mile) = 28.95918 ft
Default St. Dirt Accum.   Annual Winter Load = 2500 lbs   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
51 - Small Landscaped Areas 1: 2.800 ac.   Normal Clayey   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
57 - Undeveloped Areas 1: 0.390 ac.   Normal Clayey   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
70 - Water Body Areas: 0.360 ac.   Source Area PSD File:
LU# 8 - Residential: Subarea 8   Total area (ac): 4.610

1 - Roofs 1: 0.470 ac. Pitched Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
31 - Sidewalks 1: 0.080 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
32 - Sidewalks 2: 0.170 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
51 - Small Landscaped Areas 1: 2.940 ac. Normal Clayey Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
57 - Undeveloped Areas 1: 0.790 ac. Normal Clayey Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
70 - Water Body Areas: 0.160 ac. Source Area PSD File:
LU# 9 - Residential: Subarea 9 Total area (ac): 10.820
1 - Roofs 1: 0.620 ac. Pitched Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
2 - Roofs 2: 0.620 ac. Pitched Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
25 - Driveways 1: 0.640 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
31 - Sidewalks 1: 0.110 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
32 - Sidewalks 2: 0.100 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
33 - Sidewalks 3: 0.030 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
37 - Streets 1: 1.390 ac. Smooth Street Length = 0.791 curb-mi Street Width (assuming two curb-mi per street mile) = 28.99494 ft
Default St. Dirt Accum. Annual Winter Load = 2500 lbs Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
51 - Small Landscaped Areas 1: 6.900 ac. Normal Clayey Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
70 - Water Body Areas: 0.410 ac. Source Area PSD File:
LU# 10 - Residential: Subarea 10 Total area (ac): 2.040
1 - Roofs 1: 0.190 ac. Pitched Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
31 - Sidewalks 1: 0.030 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
32 - Sidewalks 2: 0.030 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
51 - Small Landscaped Areas 1: 1.500 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: 0.130 ac. Source Area PSD File:
LU# 11 - Residential: Subarea 11 Total area (ac): 7.980
1 - Roofs 1: 0.960 ac. Pitched Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
25 - Driveways 1: 0.640 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
31 - Sidewalks 1: 0.170 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
32 - Sidewalks 2: 0.050 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
37 - Streets 1: 1.140 ac. Smooth Street Length = 0.649 curb-mi Street Width (assuming two curb-mi per street mile) = 28.98305 ft
Default St. Dirt Accum. Annual Winter Load = 2500 lbs Source Area PSD File: C:\WinSLAMM Files\NURP.cpz

51 - Small Landscaped Areas 1: 4.830 ac. Normal Clayey Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
70 - Water Body Areas: 0.190 ac. Source Area PSD File:
LU# 12 - Residential: Subarea 12 Total area (ac): 7.030
1 - Roofs 1: 0.440 ac. Pitched Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
2 - Roofs 2: 0.430 ac. Pitched Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
25 - Driveways 1: 0.290 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
31 - Sidewalks 1: 0.070 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
32 - Sidewalks 2: 0.060 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
33 - Sidewalks 3: 0.190 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
37 - Streets 1: 0.400 ac. Smooth Street Length = 0.228 curb-mi Street Width (assuming two curb-mi per street mile) = 28.94737 ft
Default St. Dirt Accum. Annual Winter Load = 2500 lbs Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
51 - Small Landscaped Areas 1: 3.960 ac. Normal Clayey Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
57 - Undeveloped Areas 1: 1.060 ac. Normal Clayey Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
70 - Water Body Areas: 0.130 ac. Source Area PSD File:
LU# 13 - Residential: Subarea 13 Total area (ac): 5.250
1 - Roofs 1: 0.250 ac. Pitched Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
2 - Roofs 2: 0.250 ac. Pitched Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
25 - Driveways 1: 0.170 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
32 - Sidewalks 2: 0.040 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
37 - Streets 1: 0.360 ac. Smooth Street Length = 0.205 curb-mi Street Width (assuming two curb-mi per street mile) = 28.97561 ft
Default St. Dirt Accum. Annual Winter Load = 2500 lbs Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
51 - Small Landscaped Areas 1: 3.970 ac. Normal Clayey Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
70 - Water Body Areas: 0.170 ac. Source Area PSD File:
LU# 14 - Residential: Subarea 14 Total area (ac): 0.410
37 - Streets 1: 0.030 ac. Smooth Street Length = 0.017 curb-mi Street Width (assuming two curb-mi per street mile) = 29.11765 ft
Default St. Dirt Accum. Annual Winter Load = 2500 lbs Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
51 - Small Landscaped Areas 1: 0.160 ac. Normal Clayey Source Area PSD File: C:\WinSLAMM Files\NURP.cpz

57 - Undeveloped Areas 1: 0.220 ac.   Normal Clayey   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
LU# 15 - Residential: Subarea 15   Total area (ac): 4.280
1 - Roofs 1: 0.340 ac.   Pitched   Connected   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
2 - Roofs 2: 0.180 ac.   Pitched   Connected   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
31 - Sidewalks 1: 0.060 ac.   Connected   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
32 - Sidewalks 2: 0.130 ac.   Connected   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
33 - Sidewalks 3: 0.020 ac.   Connected   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
51 - Small Landscaped Areas 1: 1.230 ac.   Normal Clayey   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
57 - Undeveloped Areas 1: 2.320 ac.   Normal Clayey   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
LU# 16 - Residential: Subarea 16   Total area (ac): 10.890
1 - Roofs 1: 0.500 ac.   Pitched   Connected   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
2 - Roofs 2: 0.020 ac.   Pitched   Connected   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
25 - Driveways 1: 0.060 ac.   Connected   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
26 - Driveways 2: 0.160 ac.   Connected   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
31 - Sidewalks 1: 0.080 ac.   Connected   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
32 - Sidewalks 2: 0.030 ac.   Connected   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
37 - Streets 1: 0.330 ac.   Smooth   Street Length = 0.188 curb-mi   Street Width (assuming two curb-mi per street mile) = 28.96277 ft
Default St. Dirt Accum.   Annual Winter Load = 2500 lbs   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
51 - Small Landscaped Areas 1: 3.370 ac.   Normal Clayey   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
57 - Undeveloped Areas 1: 6.340 ac.   Normal Clayey   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
LU# 17 - Residential: Subarea 17   Total area (ac): 3.560
1 - Roofs 1: 0.490 ac.   Pitched   Connected   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
31 - Sidewalks 1: 0.010 ac.   Connected   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
32 - Sidewalks 2: 0.060 ac.   Connected   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
37 - Streets 1: 0.100 ac.   Smooth   Street Length = 5.689655E-02 curb-mi   Street Width (assuming two curb-mi per street mile) = 29 ft
Default St. Dirt Accum.   Annual Winter Load = 2500 lbs   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
51 - Small Landscaped Areas 1: 0.220 ac.   Normal Clayey   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
57 - Undeveloped Areas 1: 2.680 ac.   Normal Clayey   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
LU# 18 - Residential: Subarea 7a   Total area (ac): 6.380
1 - Roofs 1: 0.680 ac.   Pitched   Connected   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
31 - Sidewalks 1: 0.110 ac.   Connected   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz

32 - Sidewalks 2: 0.210 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
51 - Small Landscaped Areas 1: 5.050 ac. Normal Clayey Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
57 - Undeveloped Areas 1: 0.330 ac. Normal Clayey Source Area PSD File: C:\WinSLAMM Files\NURP.cpz

Control Practice 1: Wet Detention Pond CP# 1 (DS) - Pond 3
Particle Size Distribution file name: Not needed - calculated by program
Initial stage elevation (ft): 5
Peak to Average Flow Ratio: 3.8
Maximum flow allowed into pond (cfs): No maximum value entered
Outlet Characteristics:
Outlet type: Orifice 1
1. Orifice diameter (ft): 0.25
2. Number of orifices: 1
3. Invert elevation above datum (ft): 5
Outlet type: Broad Crested Weir
1. Weir crest length (ft): 10
2. Weir crest width (ft): 10
3. Height from datum to bottom of weir opening: 11
Outlet type: Vertical Stand Pipe
1. Stand pipe diameter (ft): 4
2. Stand pipe height above datum (ft): 8.5
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	0.0500	0.00	0.00
2	4.00	0.1500	0.00	0.00
3	5.00	0.2000	0.00	0.00
4	6.00	0.2300	0.00	0.00
5	7.00	0.2700	0.00	0.00
6	8.00	0.3100	0.00	0.00
7	9.00	0.3600	0.00	0.00
8	10.00	0.4000	0.00	0.00
9	11.00	0.4500	0.00	0.00
10	12.00	0.5300	0.00	0.00

Control Practice 2: Biofilter CP# 1 (DS) - Basin 4

1. Top area (square feet) = 31089
2. Bottom aea (square feet) = 7746
3. Depth (ft): 5
4. Biofilter width (ft) - for Cost Purposes Only: 10
5. Infiltration rate (in/hr) = 3.6
6. Random infiltration rate generation? No
7. Infiltration rate fraction (side): 0.001
8. Infiltration rate fraction (bottom): 1
9. Depth of biofilter that is rock filled (ft) 0
10. Porosity of rock filled volume = 0
11. Engineered soil infiltration rate: 3.6
12. Engineered soil depth (ft) = 1
13. Engineered soil porosity = 0.27
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
    User-Defined Soil Type   1.000
     Saturation water content percent (Porosity) = 0
     Field capacity (%) = 0
     Permanent Wilting Point (%) = 0
     Infiltration rate (in/hr) = 3.6

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
    Outlet type: Vertical Stand Pipe
        1. Stand pipe diameter (ft): 3
        2. Stand pipe height above datum (ft): 3.75
    Outlet type: Surface Discharge Pipe
        1. Surface discharge pipe outlet diameter (ft): 0.33
        2. Pipe invert elevation above datum (ft): 2.5
        3. Number of surface pipe outlets: 1

Control Practice 3: Biofilter CP# 2 (DS) - Basin 5

1. Top area (square feet) = 8150
2. Bottom aea (square feet) = 1446
3. Depth (ft): 5
4. Biofilter width (ft) - for Cost Purposes Only: 10
5. Infiltration rate (in/hr) = 0.07
6. Random infiltration rate generation? No
7. Infiltration rate fraction (side): 0.001
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: 0.07
12. Engineered soil depth (ft) = 1
13. Engineered soil porosity = 0.27
14. Percent solids reduction due to flow through engineered soil = 80
15. Biofilter peak to average flow ratio = 3.8
16. Number of biofiltration control devices = 1
17. Particle size distribution file: Not needed - calculated by program
18. Initial water surface elevation (ft): 0

Soil Data   Soil Type Fraction in Eng. Soil
User-Defined Soil Type   1.000
Saturation water content percent (Porosity) = 0
Field capacity (%) = 0
Permanent Wilting Point (%) = 0
Infiltration rate (in/hr) = 0.07

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

Outlet type: Vertical Stand Pipe
1. Stand pipe diameter (ft): 3
2. Stand pipe height above datum (ft): 3.25

Outlet type: Surface Discharge Pipe
1. Surface discharge pipe outlet diameter (ft): 0.25
2. Pipe invert elevation above datum (ft): 1.75
3. Number of surface pipe outlets: 1

Control Practice 4: Wet Detention Pond CP# 2 (DS) - Pond 6

Particle Size Distribution file name: Not needed - calculated by program
Initial stage elevation (ft):   5
Peak to Average Flow Ratio: 3.8
Maximum flow allowed into pond (cfs): No maximum value entered
Outlet Characteristics:

Outlet type: Orifice 1

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

Outlet type: Broad Crested Weir

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

Outlet type: Vertical Stand Pipe

1. Stand pipe diameter (ft):   4
2. Stand pipe height above datum (ft):   7.6

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	4.00	0.1000	0.00	0.00
3	5.00	0.1500	0.00	0.00
4	7.00	0.2300	0.00	0.00
5	9.00	0.3400	0.00	0.00
6	11.00	0.4700	0.00	0.00

Control Practice 5: Wet Detention Pond CP# 3 (DS) - Pond 7

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: Sharp Crested Weir

1. Sharp crested weir length (ft):   1
2. Sharp crested weir height from invert: 3.1
3. Sharp crested weir invert elevation above datum (ft):   5.9

Outlet type: Orifice 1

1. Orifice diameter (ft): 0.67
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

Outlet type: Vertical Stand Pipe

1. Stand pipe diameter (ft): 3
2. Stand pipe height above datum (ft): 7.2

Pond stage and surface area

Entry Number	Stage (ft)	Pond Area (acres)	Natural Seepage (in/hr)	Other Outflow (cfs)
0	0.00	0.0000	0.00	0.00
1	0.01	0.1500	0.00	0.00
2	4.00	0.3000	0.00	0.00
3	5.00	0.3900	0.00	0.00
4	8.00	0.8700	0.00	0.00
5	9.00	1.1700	0.00	0.00

Control Practice 6: Biofilter CP# 3 (DS) - Basin 8

1. Top area (square feet) = 20057
2. Bottom aea (square feet) = 7055
3. Depth (ft): 5
4. Biofilter width (ft) - for Cost Purposes Only: 10
5. Infiltration rate (in/hr) = 0.04
6. Random infiltration rate generation? No
7. Infiltration rate fraction (side): 0.001
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: 0.04
12. Engineered soil depth (ft) = 1
13. Engineered soil porosity = 0.27
14. Percent solids reduction due to flow through engineered soil = 80
15. Biofilter peak to average flow ratio = 3.8
16. Number of biofiltration control devices = 1
17. Particle size distribution file: Not needed - calculated by program

```
   18. Initial water surface elevation (ft):   0
   Soil Data                        Soil Type Fraction in Eng. Soil
       User-Defined Soil Type         1.000
        Saturation water content percent (Porosity) =   0
        Field capacity (%) =   0
        Permanent Wilting Point (%) =   0
        Infiltration rate (in/hr) =   0.04
   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
       Outlet type:  Vertical Stand Pipe
               1.  Stand pipe diameter (ft):   3
               2.  Stand pipe height above datum (ft):   3.5
       Outlet type:  Surface Discharge Pipe
               1.  Surface discharge pipe outlet diameter (ft):   0.25
               2.  Pipe invert elevation above datum (ft):   1.25
               3.  Number of surface pipe outlets:   1

Control Practice 7:  Wet Detention Pond CP# 4 (DS) - Pond 9
   Particle Size Distribution file name:  Not needed - calculated by program
   Initial stage elevation (ft):   5
   Peak to Average Flow Ratio:   3.8
   Maximum flow allowed into pond (cfs):  No maximum value entered
   Outlet Characteristics:
        Outlet type:  Orifice 1
               1.  Orifice diameter (ft):   0.25
               2.  Number of orifices:   1
               3.  Invert elevation above datum (ft):   5
        Outlet type:  Orifice 2
               1.  Orifice diameter (ft):   1
               2.  Number of orifices:   1
               3.  Invert elevation above datum (ft):   7
        Outlet type:  Broad Crested Weir
               1.  Weir crest length (ft):   10
               2.  Weir crest width (ft):   10
               3.  Height from datum to bottom of weir opening:   10
```

Outlet type: Vertical Stand Pipe
1. Stand pipe diameter (ft):   3
2. Stand pipe height above datum (ft):   9.75

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	0.1500	0.00	0.00
2	4.00	0.3500	0.00	0.00
3	5.00	0.4100	0.00	0.00
4	6.00	0.4600	0.00	0.00
5	8.00	0.5600	0.00	0.00
6	10.00	0.7400	0.00	0.00
7	11.00	0.8100	0.00	0.00

Control Practice 8: Biofilter CP# 4 (DS) - Basin 10

1. Top area (square feet) = 12432
2. Bottom aea (square feet) = 5480
3. Depth (ft):   6
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):   0.001
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) = 2
13. Engineered soil porosity = 0.27
14. Percent solids reduction due to flow through engineered soil = 80
15. Biofilter peak to average flow ratio = 3.8
16. Number of biofiltration control devices = 1
17. Particle size distribution file: Not needed - calculated by program
18. Initial water surface elevation (ft):   0

Soil Data	Soil Type Fraction in Eng. Soil
User-Defined Soil Type	1.000

Saturation water content percent (Porosity) =   0
Field capacity (%) =   0

Permanent Wilting Point (%) = 0
Infiltration rate (in/hr) = 0.5

Biofilter Outlet/Discharge Characteristics:

Outlet type: Broad Crested Weir

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

Outlet type: Vertical Stand Pipe

1. Stand pipe diameter (ft): 3
2. Stand pipe height above datum (ft): 4.5

Outlet type: Surface Discharge Pipe

1. Surface discharge pipe outlet diameter (ft): 0.25
2. Pipe invert elevation above datum (ft): 3.5
3. Number of surface pipe outlets: 1

Control Practice 9: Wet Detention Pond CP# 5 (DS) - Pond 11

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: Sharp Crested Weir

1. Sharp crested weir length (ft): 1
2. Sharp crested weir height from invert: 3.5
3. Sharp crested weir invert elevation above datum (ft): 6.8

Outlet type: Orifice 1

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

Outlet type: Broad Crested Weir

1. Weir crest length (ft): 10
2. Weir crest width (ft): 10
3. Height from datum to bottom of weir opening: 9.3

Outlet type: Vertical Stand Pipe

1. Stand pipe diameter (ft): 3
2. Stand pipe height above datum (ft): 8.3

Pond stage and surface area

Entry	Stage	Pond Area	Natural Seepage	Other Outflow

Number	(ft)	(acres)	(in/hr)	(cfs)
0	0.00	0.0000	0.00	0.00
1	0.01	0.0500	0.00	0.00
2	4.00	0.1200	0.00	0.00
3	5.00	0.1900	0.00	0.00
4	7.80	0.3500	0.00	0.00
5	9.80	0.4800	0.00	0.00
6	10.30	0.5200	0.00	0.00

Control Practice 10: Wet Detention Pond CP# 6 (DS) - Pond 12

Particle Size Distribution file name: Not needed - calculated by program
Initial stage elevation (ft): 5
Peak to Average Flow Ratio: 3.8
Maximum flow allowed into pond (cfs): No maximum value entered
Outlet Characteristics:

Outlet type: Orifice 1

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

Outlet type: Broad Crested Weir

1. Weir crest length (ft): 10
2. Weir crest width (ft): 10
3. Height from datum to bottom of weir opening: 9

Outlet type: Vertical Stand Pipe

1. Stand pipe diameter (ft): 3
2. Stand pipe height above datum (ft): 7.2

Pond stage and surface area

Entry Number	Stage (ft)	Pond Area (acres)	Natural Seepage (in/hr)	Other Outflow (cfs)
0	0.00	0.0000	0.00	0.00
1	0.10	0.0100	0.00	0.00
2	4.00	0.1000	0.00	0.00
3	5.00	0.1300	0.00	0.00
4	6.00	0.1600	0.00	0.00
5	9.00	0.3500	0.00	0.00
6	10.00	0.4200	0.00	0.00

Control Practice 11: Wet Detention Pond CP# 7 (DS) - Pond 13

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: Sharp Crested Weir
  1. Sharp crested weir length (ft):   1
  2. Sharp crested weir height from invert: 2.5
  3. Sharp crested weir invert elevation above datum (ft):   7
- Outlet type: Orifice 1
  1. Orifice diameter (ft):   0.33
  2. Number of orifices: 1
  3. Invert elevation above datum (ft):   5
- Outlet type: Broad Crested Weir
  1. Weir crest length (ft):   10
  2. Weir crest width (ft):   10
  3. Height from datum to bottom of weir opening: 8.5
- Outlet type: Vertical Stand Pipe
  1. Stand pipe diameter (ft):   3
  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	0.0300	0.00	0.00
2	4.00	0.1000	0.00	0.00
3	5.00	0.1700	0.00	0.00
4	5.70	0.2000	0.00	0.00
5	6.70	0.2400	0.00	0.00
6	7.70	0.2900	0.00	0.00
7	8.50	0.3300	0.00	0.00
8	9.50	0.3800	0.00	0.00

Control Practice 12: Biofilter CP# 5 (DS) - Basin 1
1. Top area (square feet) = 58153
2. Bottom aea (square feet) = 9693
3. Depth (ft):   8
4. Biofilter width (ft) - for Cost Purposes Only: 10

5. Infiltration rate (in/hr) = 0.11
6. Random infiltration rate generation? No
7. Infiltration rate fraction (side): 0.001
8. Infiltration rate fraction (bottom): 1
9. Depth of biofilter that is rock filled (ft) 1
10. Porosity of rock filled volume = 0.33
11. Engineered soil infiltration rate: 3.6
12. Engineered soil depth (ft) = 2
13. Engineered soil porosity = 0.27
14. Percent solids reduction due to flow through engineered soil = 80
15. Biofilter peak to average flow ratio = 3.8
16. Number of biofiltration control devices = 1
17. Particle size distribution file: Not needed - calculated by program
18. Initial water surface elevation (ft): 0

Soil Data Soil Type Fraction in Eng. Soil

User-Defined Soil Type 1.000

Saturation water content percent (Porosity) = 0
Field capacity (%) = 0
Permanent Wilting Point (%) = 0
Infiltration rate (in/hr) = 3.6

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: 7

Outlet type: Vertical Stand Pipe

1. Stand pipe diameter (ft): 3
2. Stand pipe height above datum (ft): 6.75

Outlet type: Surface Discharge Pipe

1. Surface discharge pipe outlet diameter (ft): 0.5
2. Pipe invert elevation above datum (ft): 3.5
3. Number of surface pipe outlets: 1

Outlet type: Drain Tile/Underdrain

1. Underdrain outlet diameter (ft): 0.33
2. Invert elevation above datum (ft): 0.75
3. Number of underdrain outlets: 1

Control Practice 13: Biofilter CP# 6 (DS) - Basin 2

1. Top area (square feet) = 7377
2. Bottom aea (square feet) = 4102
3. Depth (ft): 5
4. Biofilter width (ft) - for Cost Purposes Only: 10
5. Infiltration rate (in/hr) = 1.63
6. Random infiltration rate generation? No
7. Infiltration rate fraction (side): 0.001
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: 1.63
12. Engineered soil depth (ft) = 3
13. Engineered soil porosity = 0.27
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
Sands	0.750
Compost as Amendment	0.250

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

Outlet type: Surface Discharge Pipe

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

Control Practice 14: Biofilter CP# 7 (DS) - Basin 7

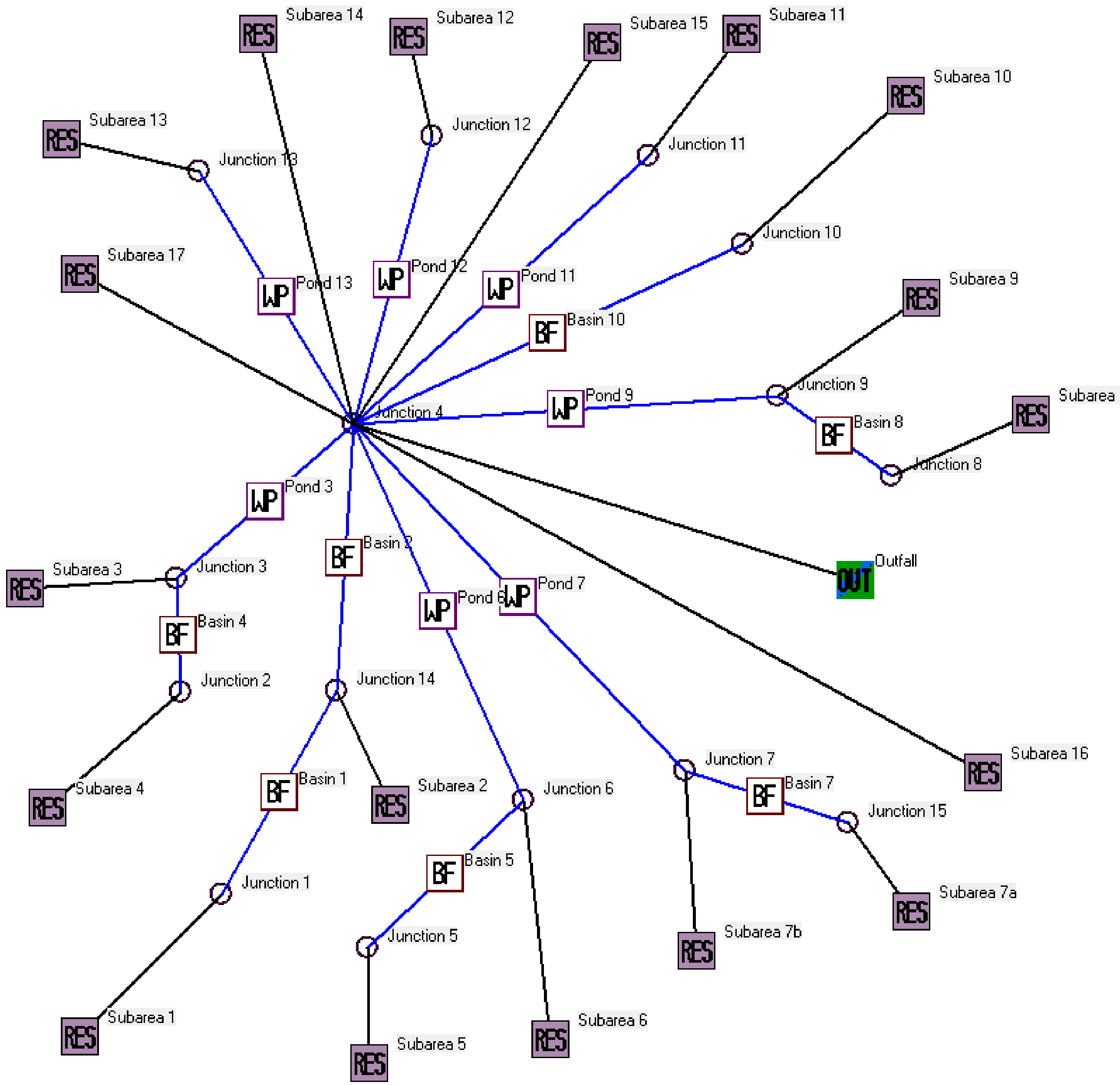
1. Top area (square feet) = 7720
2. Bottom aea (square feet) = 2687
3. Depth (ft): 3
4. Biofilter width (ft) - for Cost Purposes Only: 10
5. Infiltration rate (in/hr) = 0.11
6. Random infiltration rate generation? No

7. Infiltration rate fraction (side):   1
8. Infiltration rate fraction (bottom):   1
9. Depth of biofilter that is rock filled (ft) 0
10. Porosity of rock filled volume = 0
11. Engineered soil infiltration rate: 0.11
12. Engineered soil depth (ft) = 1
13. Engineered soil porosity = 0.27
14. Percent solids reduction due to flow through engineered soil = 80
15. Biofilter peak to average flow ratio = 3.8
16. Number of biofiltration control devices = 1
17. Particle size distribution file: Not needed - calculated by program
18. Initial water surface elevation (ft):   0

Soil Data   Soil Type Fraction in Eng. Soil
    User-Defined Soil Type   1.000
     Saturation water content percent (Porosity) =   0
     Field capacity (%) =   0
     Permanent Wilting Point (%) =   0
     Infiltration rate (in/hr) =   0.11

Biofilter Outlet/Discharge Characteristics:
    Outlet type: Broad Crested Weir
        1. Weir crest length (ft):   8
        2. Weir crest width (ft):   10
        3. Height of datum to bottom of weir opening: 1.75

Treatment Analysis - Disconnected Model



SLAMM for Windows Version 10.5.0

Data file name: C:\Data\Jobs\2023\2023-003 - Thomas Farm - Welshire Farm - TRIO\Project_Information\Calcs\SLAMM\Treatment_Disconnected.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: 12-21-2023 Time of run: 16:28:45
Total Area Modeled (acres): 110.280
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:	2.576E+06	-	129.3	20784	-
Outfall Total with Controls:	2.232E+06	13.35%	30.28	4219	79.70%
Annualized Total After Outfall Controls:	2.263E+06			4278	

Data file name: C:\Data\Jobs\2023\2023-003 - Thomas Farm - Welshire Farm - TRIO\Project_Information\Calcs\SLAMM\Treatment_Disconnected.mdb
WinSLAMM Version 10.5.0
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: 12-21-2023   Time: 16:28:54
Site information:

LU# 1 - Residential: Subarea 1   Total area (ac): 11.050
1 - Roofs 1: 0.820 ac.   Pitched   Connected   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
2 - Roofs 2: 0.810 ac.   Pitched   Disconnected   Normal Clayey   Low Density   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
13 - Paved Parking 1: 0.010 ac.   Connected   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
25 - Driveways 1: 0.080 ac.   Connected   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
26 - Driveways 2: 0.350 ac.   Connected   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
31 - Sidewalks 1: 0.130 ac.   Connected   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
32 - Sidewalks 2: 0.120 ac.   Disconnected   Normal Clayey   Low Density   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
33 - Sidewalks 3: 0.230 ac.   Disconnected   Normal Clayey   Low Density   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
37 - Streets 1: 0.620 ac.   Smooth   Street Length = 0.1765 mi   Street Width = 28.98017 ft   Street Edges = 2

Default St. Dirt Accum.   Annual Winter Load = 2500 lbs   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
51 - Small Landscaped Areas 1: 6.510 ac.   Normal Clayey   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
57 - Undeveloped Areas 1: 1.130 ac.   Normal Clayey   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
70 - Water Body Areas: 0.240 ac.   Source Area PSD File: C:\WinSLAMM Files\\Residential Land Use
LU# 2 - Residential: Subarea 2   Total area (ac): 1.620
1 - Roofs 1: 0.150 ac.   Pitched   Connected   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
2 - Roofs 2: 0.140 ac.   Pitched   Disconnected   Normal Clayey   Low Density   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
25 - Driveways 1: 0.160 ac.   Connected   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
31 - Sidewalks 1: 0.020 ac.   Connected   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
32 - Sidewalks 2: 0.020 ac.   Disconnected   Normal Clayey   Low Density   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
37 - Streets 1: 0.200 ac.   Smooth   Street Length = 0.057 mi   Street Width = 28.94737 ft   Street Edges = 2
Default St. Dirt Accum.   Annual Winter Load = 2500 lbs   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
51 - Small Landscaped Areas 1: 0.840 ac.   Normal Clayey   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
70 - Water Body Areas: 0.090 ac.   Source Area PSD File: C:\WinSLAMM Files\\Residential Land Use
LU# 3 - Residential: Subarea 3   Total area (ac): 13.360
1 - Roofs 1: 1.120 ac.   Pitched   Connected   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
2 - Roofs 2: 1.120 ac.   Pitched   Disconnected   Normal Clayey   Low Density   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
25 - Driveways 1: 0.680 ac.   Connected   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
26 - Driveways 2: 0.610 ac.   Connected   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
31 - Sidewalks 1: 0.190 ac.   Connected   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
32 - Sidewalks 2: 0.190 ac.   Disconnected   Normal Clayey   Low Density   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
33 - Sidewalks 3: 0.050 ac.   Disconnected   Normal Clayey   Low Density   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
37 - Streets 1: 1.760 ac.   Smooth   Street Length = 0.5005 mi   Street Width = 29.01099 ft   Street Edges = 2
Default St. Dirt Accum.   Annual Winter Load = 2500 lbs   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz

51 - Small Landscaped Areas 1: 7.390 ac.   Normal Clayey   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
57 - Undeveloped Areas 1: 0.050 ac.   Normal Clayey   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
70 - Water Body Areas: 0.200 ac.   Source Area PSD File: C:\WinSLAMM Files\\Residential Land Use
LU# 4 - Residential: Subarea 4   Total area (ac): 4.390
1 - Roofs 1: 0.500 ac.   Pitched   Disconnected   Normal Clayey   Low Density   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
31 - Sidewalks 1: 0.080 ac.   Disconnected   Normal Clayey   Low Density   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
51 - Small Landscaped Areas 1: 3.630 ac.   Normal Clayey   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
70 - Water Body Areas: 0.180 ac.   Source Area PSD File: C:\WinSLAMM Files\\Residential Land Use
LU# 5 - Residential: Subarea 5   Total area (ac): 2.590
1 - Roofs 1: 0.250 ac.   Pitched   Disconnected   Normal Clayey   Low Density   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
31 - Sidewalks 1: 0.040 ac.   Disconnected   Normal Clayey   Low Density   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
51 - Small Landscaped Areas 1: 2.270 ac.   Normal Clayey   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
70 - Water Body Areas: 0.030 ac.   Source Area PSD File: C:\WinSLAMM Files\\Residential Land Use
LU# 6 - Residential: Subarea 6   Total area (ac): 8.800
1 - Roofs 1: 0.360 ac.   Pitched   Connected   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
2 - Roofs 2: 0.350 ac.   Pitched   Disconnected   Normal Clayey   Low Density   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
13 - Paved Parking 1: 0.260 ac.   Connected   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
25 - Driveways 1: 0.310 ac.   Connected   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
31 - Sidewalks 1: 0.060 ac.   Connected   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
32 - Sidewalks 2: 0.050 ac.   Disconnected   Normal Clayey   Low Density   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
33 - Sidewalks 3: 0.200 ac.   Connected   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
37 - Streets 1: 1.400 ac.   Smooth   Street Length = 0.3985 mi   Street Width = 28.98369 ft   Street Edges = 2
Default St. Dirt Accum.   Annual Winter Load = 2500 lbs   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
51 - Small Landscaped Areas 1: 4.250 ac.   Normal Clayey   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz

57 - Undeveloped Areas 1: 1.410 ac.   Normal Clayey   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
70 - Water Body Areas: 0.150 ac.   Source Area PSD File: C:\WinSLAMM Files\\Residential Land Use
LU# 7 - Residential: Subarea 7b   Total area (ac): 5.220
1 - Roofs 1: 0.390 ac.   Pitched   Connected   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
2 - Roofs 2: 0.390 ac.   Pitched   Disconnected   Normal Clayey   Low Density   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
25 - Driveways 1: 0.330 ac.   Connected   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
31 - Sidewalks 1: 0.070 ac.   Connected   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
32 - Sidewalks 2: 0.060 ac.   Disconnected   Normal Clayey   Low Density   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
37 - Streets 1: 0.430 ac.   Smooth   Street Length = 0.1225 mi   Street Width = 28.95918 ft   Street Edges = 2
Default St. Dirt Accum.   Annual Winter Load = 2500 lbs   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
51 - Small Landscaped Areas 1: 2.800 ac.   Normal Clayey   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
57 - Undeveloped Areas 1: 0.390 ac.   Normal Clayey   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
70 - Water Body Areas: 0.360 ac.   Source Area PSD File: C:\WinSLAMM Files\\Residential Land Use
LU# 8 - Residential: Subarea 8   Total area (ac): 4.610
1 - Roofs 1: 0.470 ac.   Pitched   Disconnected   Normal Clayey   Low Density   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
31 - Sidewalks 1: 0.080 ac.   Disconnected   Normal Clayey   Low Density   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
32 - Sidewalks 2: 0.170 ac.   Disconnected   Normal Clayey   Low Density   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
51 - Small Landscaped Areas 1: 2.940 ac.   Normal Clayey   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
57 - Undeveloped Areas 1: 0.790 ac.   Normal Clayey   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
70 - Water Body Areas: 0.160 ac.   Source Area PSD File: C:\WinSLAMM Files\\Residential Land Use
LU# 9 - Residential: Subarea 9   Total area (ac): 10.820
1 - Roofs 1: 0.620 ac.   Pitched   Connected   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
2 - Roofs 2: 0.620 ac.   Pitched   Disconnected   Normal Clayey   Low Density   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
25 - Driveways 1: 0.640 ac.   Connected   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
31 - Sidewalks 1: 0.110 ac.   Connected   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz

32 - Sidewalks 2: 0.100 ac. Disconnected Normal Clayey Low Density Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
33 - Sidewalks 3: 0.030 ac. Disconnected Normal Clayey Low Density Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
37 - Streets 1: 1.390 ac. Smooth Street Length = 0.3955 mi Street Width = 28.99494 ft Street Edges = 2
Default St. Dirt Accum. Annual Winter Load = 2500 lbs Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
51 - Small Landscaped Areas 1: 6.900 ac. Normal Clayey Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
70 - Water Body Areas: 0.410 ac. Source Area PSD File: C:\WinSLAMM Files\\Residential Land Use
LU# 10 - Residential: Subarea 10 Total area (ac): 2.040
1 - Roofs 1: 0.190 ac. Pitched Disconnected Normal Clayey Low Density Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
31 - Sidewalks 1: 0.030 ac. Disconnected Normal Clayey Low Density Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
32 - Sidewalks 2: 0.030 ac. Disconnected Normal Clayey Low Density Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
51 - Small Landscaped Areas 1: 1.500 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: 0.130 ac. Source Area PSD File: C:\WinSLAMM Files\\Residential Land Use
LU# 11 - Residential: Subarea 11 Total area (ac): 7.980
1 - Roofs 1: 0.960 ac. Pitched Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
25 - Driveways 1: 0.640 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
31 - Sidewalks 1: 0.170 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
32 - Sidewalks 2: 0.050 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
37 - Streets 1: 1.140 ac. Smooth Street Length = 0.3245 mi Street Width = 28.98305 ft Street Edges = 2
Default St. Dirt Accum. Annual Winter Load = 2500 lbs Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
51 - Small Landscaped Areas 1: 4.830 ac. Normal Clayey Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
70 - Water Body Areas: 0.190 ac. Source Area PSD File: C:\WinSLAMM Files\\Residential Land Use
LU# 12 - Residential: Subarea 12 Total area (ac): 7.030
1 - Roofs 1: 0.440 ac. Pitched Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz

2 - Roofs 2: 0.430 ac. Pitched Disconnected Normal Clayey Low Density Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
25 - Driveways 1: 0.290 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
31 - Sidewalks 1: 0.070 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
32 - Sidewalks 2: 0.060 ac. Disconnected Normal Clayey Low Density Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
33 - Sidewalks 3: 0.190 ac. Disconnected Normal Clayey Low Density Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
37 - Streets 1: 0.400 ac. Smooth Street Length = 0.114 mi Street Width = 28.94737 ft Street Edges = 2
Default St. Dirt Accum. Annual Winter Load = 2500 lbs Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
51 - Small Landscaped Areas 1: 3.960 ac. Normal Clayey Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
57 - Undeveloped Areas 1: 1.060 ac. Normal Clayey Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
70 - Water Body Areas: 0.130 ac. Source Area PSD File: C:\WinSLAMM Files\\Residential Land Use
LU# 13 - Residential: Subarea 13 Total area (ac): 5.250
1 - Roofs 1: 0.250 ac. Pitched Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
2 - Roofs 2: 0.250 ac. Pitched Disconnected Normal Clayey Low Density Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
25 - Driveways 1: 0.170 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
32 - Sidewalks 2: 0.040 ac. Disconnected Normal Clayey Low Density Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
37 - Streets 1: 0.360 ac. Smooth Street Length = 0.1025 mi Street Width = 28.97561 ft Street Edges = 2
Default St. Dirt Accum. Annual Winter Load = 2500 lbs Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
51 - Small Landscaped Areas 1: 3.970 ac. Normal Clayey Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
70 - Water Body Areas: 0.170 ac. Source Area PSD File: C:\WinSLAMM Files\\Residential Land Use
LU# 14 - Residential: Subarea 14 Total area (ac): 0.410
37 - Streets 1: 0.030 ac. Smooth Street Length = 0.0085 mi Street Width = 29.11765 ft Street Edges = 2
Default St. Dirt Accum. Annual Winter Load = 2500 lbs Source Area PSD File: C:\WinSLAMM Files\NURP.cpz

51 - Small Landscaped Areas 1: 0.160 ac.   Normal Clayey   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
57 - Undeveloped Areas 1: 0.220 ac.   Normal Clayey   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
LU# 15 - Residential: Subarea 15   Total area (ac): 4.280
1 - Roofs 1: 0.340 ac.   Pitched   Disconnected   Normal Clayey   Low Density   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
2 - Roofs 2: 0.180 ac.   Pitched   Disconnected   Normal Clayey   Low Density   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
31 - Sidewalks 1: 0.060 ac.   Disconnected   Normal Clayey   Low Density   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
32 - Sidewalks 2: 0.130 ac.   Disconnected   Normal Clayey   Low Density   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
33 - Sidewalks 3: 0.020 ac.   Disconnected   Normal Clayey   Low Density   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
51 - Small Landscaped Areas 1: 1.230 ac.   Normal Clayey   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
57 - Undeveloped Areas 1: 2.320 ac.   Normal Clayey   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
LU# 16 - Residential: Subarea 16   Total area (ac): 10.890
1 - Roofs 1: 0.500 ac.   Pitched   Disconnected   Normal Clayey   Low Density   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
2 - Roofs 2: 0.020 ac.   Pitched   Disconnected   Normal Clayey   Low Density   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
25 - Driveways 1: 0.060 ac.   Connected   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
26 - Driveways 2: 0.160 ac.   Disconnected   Normal Clayey   Low Density   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
31 - Sidewalks 1: 0.080 ac.   Disconnected   Normal Clayey   Low Density   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
32 - Sidewalks 2: 0.030 ac.   Disconnected   Normal Clayey   Low Density   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
37 - Streets 1: 0.330 ac.   Smooth   Street Length = 0.094 mi   Street Width = 28.96277 ft   Street Edges = 2
Default St. Dirt Accum.   Annual Winter Load = 2500 lbs   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
51 - Small Landscaped Areas 1: 3.370 ac.   Normal Clayey   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz

57 - Undeveloped Areas 1: 6.340 ac.   Normal Clayey   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz

LU# 17 - Residential: Subarea 17   Total area (ac): 3.560

1 - Roofs 1: 0.490 ac.   Pitched   Disconnected   Normal Clayey   Low Density   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz

31 - Sidewalks 1: 0.010 ac.   Disconnected   Normal Clayey   Low Density   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz

32 - Sidewalks 2: 0.060 ac.   Disconnected   Normal Clayey   Low Density   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz

37 - Streets 1: 0.100 ac.   Smooth   Street Length = 2.844828E-02 mi   Street Width = 29 ft   Street Edges = 2

Default St. Dirt Accum.   Annual Winter Load = 2500 lbs   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz

51 - Small Landscaped Areas 1: 0.220 ac.   Normal Clayey   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz

57 - Undeveloped Areas 1: 2.680 ac.   Normal Clayey   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz

LU# 18 - Residential: Subarea 7a   Total area (ac): 6.380

1 - Roofs 1: 0.680 ac.   Pitched   Disconnected   Normal Clayey   Low Density   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz

31 - Sidewalks 1: 0.110 ac.   Disconnected   Normal Clayey   Low Density   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz

32 - Sidewalks 2: 0.210 ac.   Disconnected   Normal Clayey   Low Density   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz

51 - Small Landscaped Areas 1: 5.050 ac.   Normal Clayey   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz

57 - Undeveloped Areas 1: 0.330 ac.   Normal Clayey   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz

Control Practice 1: Wet Detention Pond CP# 1 (DS) - Pond 3

Particle Size Distribution file name: Not needed - calculated by program

Initial stage elevation (ft):   5

Peak to Average Flow Ratio: 3.8

Maximum flow allowed into pond (cfs): No maximum value entered

Outlet Characteristics:

Outlet type: Orifice 1

1. Orifice diameter (ft):   0.25
2. Number of orifices: 1

3. Invert elevation above datum (ft): 5

Outlet type: Broad Crested Weir

1. Weir crest length (ft): 10
2. Weir crest width (ft): 10
3. Height from datum to bottom of weir opening: 11

Outlet type: Vertical Stand Pipe

1. Stand pipe diameter (ft): 4
2. Stand pipe height above datum (ft): 8.5

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	0.0500	0.00	0.00
2	4.00	0.1500	0.00	0.00
3	5.00	0.2000	0.00	0.00
4	6.00	0.2300	0.00	0.00
5	7.00	0.2700	0.00	0.00
6	8.00	0.3100	0.00	0.00
7	9.00	0.3600	0.00	0.00
8	10.00	0.4000	0.00	0.00
9	11.00	0.4500	0.00	0.00
10	12.00	0.5300	0.00	0.00

Control Practice 2: Biofilter CP# 1 (DS) - Basin 4

1. Top area (square feet) = 31089
2. Bottom aea (square feet) = 7746
3. Depth (ft): 5
4. Biofilter width (ft) - for Cost Purposes Only: 10
5. Infiltration rate (in/hr) = 3.6
6. Random infiltration rate generation? No
7. Infiltration rate fraction (side): 0.001
8. Infiltration rate fraction (bottom): 1
9. Depth of biofilter that is rock filled (ft) 0
10. Porosity of rock filled volume = 0
11. Engineered soil infiltration rate: 3.6
12. Engineered soil depth (ft) = 1
13. Engineered soil porosity = 0.27
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

User-Defined Media Type   1.000

Saturation water content (Porosity) =   0

Field capacity (fraction) =   0

Permanent Wilting Point (fraction) =   0

Infiltration rate (in/hr) =   3.6

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

Outlet type: Vertical Stand Pipe

1. Stand pipe diameter (ft):   3
2. Stand pipe height above datum (ft):   3.75

Outlet type: Surface Discharge Pipe

1. Surface discharge pipe outlet diameter (ft):   0.33
2. Pipe invert elevation above datum (ft):   2.5
3. Number of surface pipe outlets: 1

Control Practice 3: Biofilter CP# 2 (DS) - Basin 5

1. Top area (square feet) = 8150
2. Bottom aea (square feet) = 1446
3. Depth (ft):   5
4. Biofilter width (ft) - for Cost Purposes Only: 10
5. Infiltration rate (in/hr) = 0.07
6. Random infiltration rate generation? No
7. Infiltration rate fraction (side):   0.001
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: 0.07
12. Engineered soil depth (ft) = 1
13. Engineered soil porosity = 0.27
14. Percent solids reduction due to flow through engineered soil = 80

15. Biofilter peak to average flow ratio = 3.8
16. Number of biofiltration control devices = 1
17. Particle size distribution file: Not needed - calculated by program
18. Initial water surface elevation (ft): 0

Soil Data — Soil Type Fraction in Eng. Soil

User-Defined Media Type — 1.000

Saturation water content (Porosity) = 0
Field capacity (fraction) = 0
Permanent Wilting Point (fraction) = 0
Infiltration rate (in/hr) = 0.07

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

Outlet type: Vertical Stand Pipe
1. Stand pipe diameter (ft): 3
2. Stand pipe height above datum (ft): 3.25

Outlet type: Surface Discharge Pipe
1. Surface discharge pipe outlet diameter (ft): 0.25
2. Pipe invert elevation above datum (ft): 1.75
3. Number of surface pipe outlets: 1

Control Practice 4: Wet Detention Pond CP# 2 (DS) - Pond 6

Particle Size Distribution file name: Not needed - calculated by program
Initial stage elevation (ft): 5
Peak to Average Flow Ratio: 3.8
Maximum flow allowed into pond (cfs): No maximum value entered
Outlet Characteristics:

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

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

Outlet type: Vertical Stand Pipe

1. Stand pipe diameter (ft): 4
2. Stand pipe height above datum (ft): 7.6

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	4.00	0.1000	0.00	0.00
3	5.00	0.1500	0.00	0.00
4	7.00	0.2300	0.00	0.00
5	9.00	0.3400	0.00	0.00
6	11.00	0.4700	0.00	0.00

Control Practice 5: Wet Detention Pond CP# 3 (DS) - Pond 7

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: Sharp Crested Weir
1. Sharp crested weir length (ft): 1
2. Sharp crested weir height from invert: 3.1
3. Sharp crested weir invert elevation above datum (ft): 5.9

Outlet type: Orifice 1
1. Orifice diameter (ft): 0.67
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

Outlet type: Vertical Stand Pipe
1. Stand pipe diameter (ft): 3
2. Stand pipe height above datum (ft): 7.2

Pond stage and surface area

Entry Number	Stage (ft)	Pond Area (acres)	Natural Seepage (in/hr)	Other Outflow (cfs)
0	0.00	0.0000	0.00	0.00

1	0.01	0.1500	0.00	0.00
2	4.00	0.3000	0.00	0.00
3	5.00	0.3900	0.00	0.00
4	8.00	0.8700	0.00	0.00
5	9.00	1.1700	0.00	0.00

Control Practice 6: Biofilter CP# 3 (DS) - Basin 8

1. Top area (square feet) = 20057
2. Bottom aea (square feet) = 7055
3. Depth (ft): 5
4. Biofilter width (ft) - for Cost Purposes Only: 10
5. Infiltration rate (in/hr) = 0.04
6. Random infiltration rate generation? No
7. Infiltration rate fraction (side): 0.001
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: 0.04
12. Engineered soil depth (ft) = 1
13. Engineered soil porosity = 0.27
14. Percent solids reduction due to flow through engineered soil = 80
15. Biofilter peak to average flow ratio = 3.8
16. Number of biofiltration control devices = 1
17. Particle size distribution file: Not needed - calculated by program
18. Initial water surface elevation (ft): 0

Soil Data	Soil Type Fraction in Eng. Soil
User-Defined Media Type	1.000

Saturation water content (Porosity) = 0
Field capacity (fraction) = 0
Permanent Wilting Point (fraction) = 0
Infiltration rate (in/hr) = 0.04
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

Outlet type: Vertical Stand Pipe

1. Stand pipe diameter (ft): 3

2. Stand pipe height above datum (ft): 3.5

Outlet type: Surface Discharge Pipe

1. Surface discharge pipe outlet diameter (ft): 0.25
2. Pipe invert elevation above datum (ft): 1.25
3. Number of surface pipe outlets: 1

Control Practice 7: Wet Detention Pond CP# 4 (DS) - Pond 9

Particle Size Distribution file name: Not needed - calculated by program

Initial stage elevation (ft): 5

Peak to Average Flow Ratio: 3.8

Maximum flow allowed into pond (cfs): No maximum value entered

Outlet Characteristics:

Outlet type: Orifice 1

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

Outlet type: Orifice 2

1. Orifice diameter (ft): 1
2. Number of orifices: 1
3. Invert elevation above datum (ft): 7

Outlet type: Broad Crested Weir

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

Outlet type: Vertical Stand Pipe

1. Stand pipe diameter (ft): 3
2. Stand pipe height above datum (ft): 9.75

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	0.1500	0.00	0.00
2	4.00	0.3500	0.00	0.00
3	5.00	0.4100	0.00	0.00
4	6.00	0.4600	0.00	0.00
5	8.00	0.5600	0.00	0.00
6	10.00	0.7400	0.00	0.00
7	11.00	0.8100	0.00	0.00

Control Practice 8: Biofilter CP# 4 (DS) - Basin 10

1. Top area (square feet) = 12432
2. Bottom aea (square feet) = 5480
3. Depth (ft):   6
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):   0.001
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) = 2
13. Engineered soil porosity = 0.27
14. Percent solids reduction due to flow through engineered soil = 80
15. Biofilter peak to average flow ratio = 3.8
16. Number of biofiltration control devices = 1
17. Particle size distribution file: Not needed - calculated by program
18. Initial water surface elevation (ft):   0

Soil Data	Soil Type Fraction in Eng. Soil
User-Defined Media Type	1.000

Saturation water content (Porosity) =   0

Field capacity (fraction) =   0

Permanent Wilting Point (fraction) =   0

Infiltration rate (in/hr) =   0.5

Biofilter Outlet/Discharge Characteristics:

Outlet type: Broad Crested Weir

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

Outlet type: Vertical Stand Pipe

1. Stand pipe diameter (ft):   3
2. Stand pipe height above datum (ft):   4.5

Outlet type: Surface Discharge Pipe

1. Surface discharge pipe outlet diameter (ft):   0.25
2. Pipe invert elevation above datum (ft):   3.5
3. Number of surface pipe outlets: 1

Control Practice 9: Wet Detention Pond CP# 5 (DS) - Pond 11

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: Sharp Crested Weir

1. Sharp crested weir length (ft): 1
2. Sharp crested weir height from invert: 3.5
3. Sharp crested weir invert elevation above datum (ft): 6.8

Outlet type: Orifice 1

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

Outlet type: Broad Crested Weir

1. Weir crest length (ft): 10
2. Weir crest width (ft): 10
3. Height from datum to bottom of weir opening: 9.3

Outlet type: Vertical Stand Pipe

1. Stand pipe diameter (ft): 3
2. Stand pipe height above datum (ft): 8.3

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	4.00	0.1200	0.00	0.00
3	5.00	0.1900	0.00	0.00
4	7.80	0.3500	0.00	0.00
5	9.80	0.4800	0.00	0.00
6	10.30	0.5200	0.00	0.00

Control Practice 10: Wet Detention Pond CP# 6 (DS) - Pond 12

Particle Size Distribution file name: Not needed - calculated by program

Initial stage elevation (ft): 5

Peak to Average Flow Ratio: 3.8

Maximum flow allowed into pond (cfs): No maximum value entered

Outlet Characteristics:
Outlet type: Orifice 1
1. Orifice diameter (ft): 0.25
2. Number of orifices: 1
3. Invert elevation above datum (ft): 5
Outlet type: Broad Crested Weir
1. Weir crest length (ft): 10
2. Weir crest width (ft): 10
3. Height from datum to bottom of weir opening: 9
Outlet type: Vertical Stand Pipe
1. Stand pipe diameter (ft): 3
2. Stand pipe height above datum (ft): 7.2
Pond stage and surface area

Entry Number	Stage (ft)	Pond Area (acres)	Natural Seepage (in/hr)	Other Outflow (cfs)
0	0.00	0.0000	0.00	0.00
1	0.10	0.0100	0.00	0.00
2	4.00	0.1000	0.00	0.00
3	5.00	0.1300	0.00	0.00
4	6.00	0.1600	0.00	0.00
5	9.00	0.3500	0.00	0.00
6	10.00	0.4200	0.00	0.00

Control Practice 11: Wet Detention Pond CP# 7 (DS) - Pond 13
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: Sharp Crested Weir
1. Sharp crested weir length (ft): 1
2. Sharp crested weir height from invert: 2.5
3. Sharp crested weir invert elevation above datum (ft): 7
Outlet type: Orifice 1
1. Orifice diameter (ft): 0.33
2. Number of orifices: 1
3. Invert elevation above datum (ft): 5
Outlet type: Broad Crested Weir

1. Weir crest length (ft): 10
2. Weir crest width (ft): 10
3. Height from datum to bottom of weir opening: 8.5

Outlet type: Vertical Stand Pipe

1. Stand pipe diameter (ft): 3
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	0.0300	0.00	0.00
2	4.00	0.1000	0.00	0.00
3	5.00	0.1700	0.00	0.00
4	5.70	0.2000	0.00	0.00
5	6.70	0.2400	0.00	0.00
6	7.70	0.2900	0.00	0.00
7	8.50	0.3300	0.00	0.00
8	9.50	0.3800	0.00	0.00

Control Practice 12: Biofilter CP# 5 (DS) - Basin 1

1. Top area (square feet) = 58153
2. Bottom aea (square feet) = 9693
3. Depth (ft): 8
4. Biofilter width (ft) - for Cost Purposes Only: 10
5. Infiltration rate (in/hr) = 0.11
6. Random infiltration rate generation? No
7. Infiltration rate fraction (side): 0.001
8. Infiltration rate fraction (bottom): 1
9. Depth of biofilter that is rock filled (ft) 1
10. Porosity of rock filled volume = 0.33
11. Engineered soil infiltration rate: 3.6
12. Engineered soil depth (ft) = 2
13. Engineered soil porosity = 0.27
14. Percent solids reduction due to flow through engineered soil = 80
15. Biofilter peak to average flow ratio = 3.8
16. Number of biofiltration control devices = 1
17. Particle size distribution file: Not needed - calculated by program
18. Initial water surface elevation (ft): 0

Soil Data Soil Type Fraction in Eng. Soil

User-Defined Media Type 1.000

Saturation water content (Porosity) = 0

Field capacity (fraction) = 0

Permanent Wilting Point (fraction) = 0

Infiltration rate (in/hr) = 3.6

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: 7

Outlet type: Vertical Stand Pipe

1. Stand pipe diameter (ft): 3
2. Stand pipe height above datum (ft): 6.75

Outlet type: Surface Discharge Pipe

1. Surface discharge pipe outlet diameter (ft): 0.5
2. Pipe invert elevation above datum (ft): 3.5
3. Number of surface pipe outlets: 1

Outlet type: Drain Tile/Underdrain

1. Underdrain outlet diameter (ft): 0.33
2. Invert elevation above datum (ft): 0.75
3. Number of underdrain outlets: 1

Control Practice 13: Biofilter CP# 6 (DS) - Basin 2

1. Top area (square feet) = 7377
2. Bottom aea (square feet) = 4102
3. Depth (ft): 5
4. Biofilter width (ft) - for Cost Purposes Only: 10
5. Infiltration rate (in/hr) = 1.63
6. Random infiltration rate generation? No
7. Infiltration rate fraction (side): 0.001
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: 1.63
12. Engineered soil depth (ft) = 3
13. Engineered soil porosity = 0.27
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
Sand	0.750
Compost	0.250

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

Outlet type: Surface Discharge Pipe

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

Control Practice 14: Biofilter CP# 7 (DS) - Basin 7

1. Top area (square feet) = 7720
2. Bottom aea (square feet) = 2687
3. Depth (ft): 3
4. Biofilter width (ft) - for Cost Purposes Only: 10
5. Infiltration rate (in/hr) = 0.11
6. Random infiltration rate generation? No
7. Infiltration rate fraction (side): 1
8. Infiltration rate fraction (bottom): 1
9. Depth of biofilter that is rock filled (ft) 0
10. Porosity of rock filled volume = 0
11. Engineered soil infiltration rate: 0.11
12. Engineered soil depth (ft) = 1
13. Engineered soil porosity = 0.27
14. Percent solids reduction due to flow through engineered soil = 80
15. Biofilter peak to average flow ratio = 3.8
16. Number of biofiltration control devices = 1
17. Particle size distribution file: Not needed - calculated by program
18. Initial water surface elevation (ft): 0

Soil Data	Soil Type Fraction in Eng. Soil
User-Defined Media Type	1.000

Saturation water content (Porosity) = 0
Field capacity (fraction) = 0
Permanent Wilting Point (fraction) = 0
Infiltration rate (in/hr) = 0.11
Biofilter Outlet/Discharge Characteristics:
Outlet type: Broad Crested Weir

1. Weir crest length (ft): 8
2. Weir crest width (ft): 10
3. Height of datum to bottom of weir opening: 1.75

APPENDIX D

Infiltration Analysis

Infiltration Analysis Results

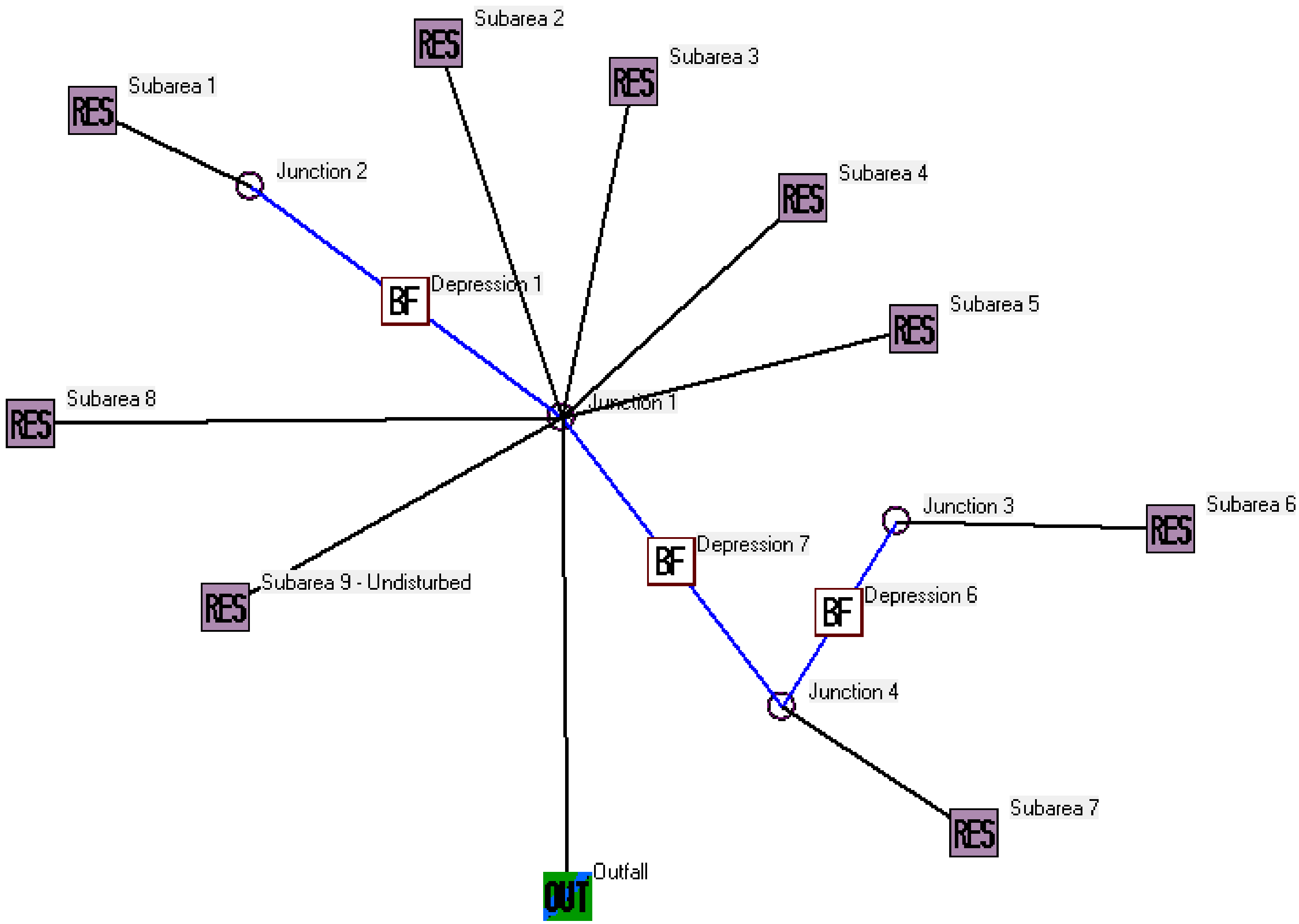
FOR: Welshire Farm
LOCATION: Town of Delafield, Wisconsin

Pre-Development					
Project Site	151.05	acres	=	6,579,738	sq-ft
Average Annual Rainfall	29.02	inches	=	2.42	feet
Total Rainfall Volume	15,912,000	cu-ft			
Total Runoff (from SLAMM Output)	1,694,305	cu-ft			
Total Pre-Development Infiltration Volume	14,217,695	cu-ft			

Post-Development		
Total Runoff (from SLAMM Output)	2,539,000	cu-ft
Total Post-Development Infiltration Volume	13,373,000	cu-ft

Percent Infiltrated	
Post Infiltration Vol / Pre Infiltration Vol	94.1%

Infiltration Analysis - Pre-Development



Data File: C:\Data\Jobs\2023\2023-003 - Thomas Farm - Welshire Farm - TRIO\Project_Information\Calcs\SLAMM\Pre-Development.mdb
Rain File: WisReg - Milwaukee WI 1969.RAN
Date: 12-21-23 Time: 4:29:49 PM
Site Description:

Runoff Volume Total (cf) at the Outfall

Rain Number	Rain Total (in)	Outfall Total (cf)	Total Losses (in.)	Calculated CN*	Event Peak Flow (cfs)	Pre-Dev Runoff Vol. (cf)
Minimum:	0	0	0.01	74.1	0	0
Maximum:	1.96	196287	1.6	99.6	27.422	317661
Average:	0.25	8915	0.23	76.5	10.811	47064
Total:	29.02	1.03E+06	27.12			1694305

Data file name: C:\Data\Jobs\2023\2023-003 - Thomas Farm - Welshire Farm - TRIO\Project_Information\Calcs\SLAMM\Pre-Development.mdb
WinSLAMM Version 10.5.0
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: 12-21-2023   Time: 16:11:41
Site information:

Pre-Development Area Description	Pre-Development Area (ac)	Pre-Development CN
cropland	92.150	83
impervious	.720	98
lawn	4.130	80
woods	54.050	77
Total Area (ac)/Composite CN	151.050	81

LU# 1 - Residential: Subarea 1   Total area (ac): 11.870
     45 - Large Landscaped Areas 1: 11.870 ac.   Normal Clayey   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
LU# 2 - Residential: Subarea 2   Total area (ac): 14.480
     45 - Large Landscaped Areas 1: 14.480 ac.   Normal Clayey   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
LU# 3 - Residential: Subarea 3   Total area (ac): 4.560

45 - Large Landscaped Areas 1: 4.560 ac.   Normal Clayey   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
LU# 4 - Residential: Subarea 4   Total area (ac): 1.100
45 - Large Landscaped Areas 1: 1.100 ac.   Normal Clayey   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
LU# 5 - Residential: Subarea 5   Total area (ac): 28.780
45 - Large Landscaped Areas 1: 28.780 ac.   Normal Clayey   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
LU# 6 - Residential: Subarea 6   Total area (ac): 10.750
45 - Large Landscaped Areas 1: 10.750 ac.   Normal Clayey   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
LU# 7 - Residential: Subarea 7   Total area (ac): 12.630
45 - Large Landscaped Areas 1: 12.630 ac.   Normal Clayey   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
LU# 8 - Residential: Subarea 8   Total area (ac): 26.110
1 - Roofs 1: 0.200 ac.   Pitched   Disconnected   Normal Clayey   Low Density   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
25 - Driveways 1: 0.520 ac.   Disconnected   Normal Clayey   Low Density   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
45 - Large Landscaped Areas 1: 25.390 ac.   Normal Clayey   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
LU# 9 - Residential: Subarea 9 - Undisturbed   Total area (ac): 40.770
57 - Undeveloped Areas 1: 40.770 ac.   Normal Clayey   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz

Control Practice 1: Biofilter CP# 1 (DS) - Depression 1

1. Top area (square feet) = 190628
2. Bottom aea (square feet) = 19166
3. Depth (ft):   2
4. Biofilter width (ft) - for Cost Purposes Only: 10
5. Infiltration rate (in/hr) = 0.04
6. Random infiltration rate generation? No
7. Infiltration rate fraction (side):   0.001
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: 0.04
12. Engineered soil depth (ft) = 0

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

Soil Data Soil Type Fraction in Eng. Soil

Biofilter Outlet/Discharge Characteristics:

Outlet type: Broad Crested Weir

1. Weir crest length (ft): 50
2. Weir crest width (ft): 10
3. Height of datum to bottom of weir opening: 1.5

Control Practice 2: Biofilter CP# 2 (DS) - Depression 6

1. Top area (square feet) = 55025
2. Bottom aea (square feet) = 200
3. Depth (ft): 1.1
4. Biofilter width (ft) - for Cost Purposes Only: 10
5. Infiltration rate (in/hr) = 0.07
6. Random infiltration rate generation? No
7. Infiltration rate fraction (side): 0.001
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: 0.07
12. Engineered soil depth (ft) = 0
13. Engineered soil porosity = 0
14. Percent solids reduction due to flow through engineered soil = 0
15. Biofilter peak to average flow ratio = 3.8
16. Number of biofiltration control devices = 1
17. Particle size distribution file: Not needed - calculated by program
18. Initial water surface elevation (ft): 0

Soil Data Soil Type Fraction in Eng. Soil

Biofilter Outlet/Discharge Characteristics:

Outlet type: Broad Crested Weir

1. Weir crest length (ft): 8
2. Weir crest width (ft): 10
3. Height of datum to bottom of weir opening: 0.5

Control Practice 3: Biofilter CP# 3 (DS) - Depression 7

1. Top area (square feet) = 29349
2. Bottom aea (square feet) = 100
3. Depth (ft):   1.1
4. Biofilter width (ft) - for Cost Purposes Only: 10
5. Infiltration rate (in/hr) = 0.07
6. Random infiltration rate generation? No
7. Infiltration rate fraction (side):   0.001
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: 0.07
12. Engineered soil depth (ft) = 0
13. Engineered soil porosity = 0
14. Percent solids reduction due to flow through engineered soil = 0
15. Biofilter peak to average flow ratio = 3.8
16. Number of biofiltration control devices = 1
17. Particle size distribution file: Not needed - calculated by program
18. Initial water surface elevation (ft):   0

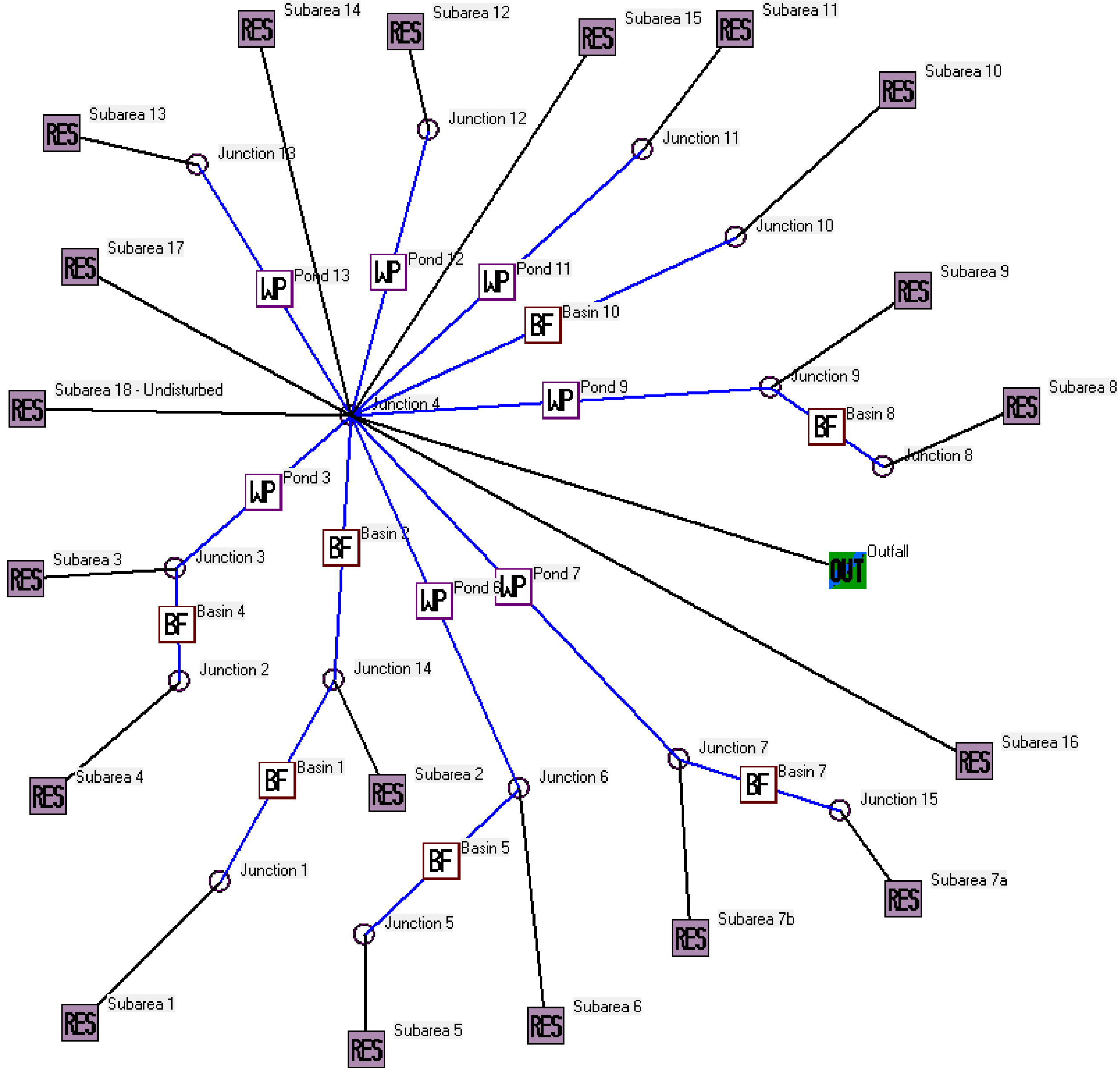
Soil Data   Soil Type Fraction in Eng. Soil

Biofilter Outlet/Discharge Characteristics:

Outlet type: Broad Crested Weir

1. Weir crest length (ft):   8
2. Weir crest width (ft):   10
3. Height of datum to bottom of weir opening: 0.5

Infiltration Analysis - Post-Development



SLAMM for Windows Version 10.5.0

Data file name: C:\Data\Jobs\2023\2023-003 - Thomas Farm - Welshire Farm - TRIO\Project_Information\Calcs\SLAMM\Proposed_Disconnected.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: 12-21-2023 Time of run: 16:18:00
Total Area Modeled (acres): 151.050
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:	2.882E+06	-	117.2	21090	-
Outfall Total with Controls:	2.539E+06	11.90%	28.55	4525	78.54%
Annualized Total After Outfall Controls:	2.574E+06			4588	

Data file name: C:\Data\Jobs\2023\2023-003 - Thomas Farm - Welshire Farm - TRIO\Project_Information\Calcs\SLAMM\Proposed_Disconnected.mdb
WinSLAMM Version 10.5.0
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: 12-21-2023 Time: 16:18:09
Site information:

LU# 1 - Residential: Subarea 1 Total area (ac): 11.050
1 - Roofs 1: 0.820 ac. Pitched Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
2 - Roofs 2: 0.810 ac. Pitched Disconnected Normal Clayey Low Density Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
13 - Paved Parking 1: 0.010 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
25 - Driveways 1: 0.080 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
26 - Driveways 2: 0.350 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
31 - Sidewalks 1: 0.130 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
32 - Sidewalks 2: 0.120 ac. Disconnected Normal Clayey Low Density Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
33 - Sidewalks 3: 0.230 ac. Disconnected Normal Clayey Low Density Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
37 - Streets 1: 0.620 ac. Smooth Street Length = 0.1765 mi Street Width = 28.98017 ft Street Edges = 2

Default St. Dirt Accum.   Annual Winter Load = 2500 lbs   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
51 - Small Landscaped Areas 1: 6.510 ac.   Normal Clayey   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
57 - Undeveloped Areas 1: 1.130 ac.   Normal Clayey   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
70 - Water Body Areas: 0.240 ac.   Source Area PSD File: C:\WinSLAMM Files\\Residential Land Use
LU# 2 - Residential: Subarea 2   Total area (ac): 1.620
1 - Roofs 1: 0.150 ac.   Pitched   Connected   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
2 - Roofs 2: 0.140 ac.   Pitched   Disconnected   Normal Clayey   Low Density   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
25 - Driveways 1: 0.160 ac.   Connected   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
31 - Sidewalks 1: 0.020 ac.   Connected   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
32 - Sidewalks 2: 0.020 ac.   Disconnected   Normal Clayey   Low Density   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
37 - Streets 1: 0.200 ac.   Smooth   Street Length = 0.057 mi   Street Width = 28.94737 ft Street Edges = 2
Default St. Dirt Accum.   Annual Winter Load = 2500 lbs   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
51 - Small Landscaped Areas 1: 0.840 ac.   Normal Clayey   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
70 - Water Body Areas: 0.090 ac.   Source Area PSD File: C:\WinSLAMM Files\\Residential Land Use
LU# 3 - Residential: Subarea 3   Total area (ac): 13.360
1 - Roofs 1: 1.120 ac.   Pitched   Connected   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
2 - Roofs 2: 1.120 ac.   Pitched   Disconnected   Normal Clayey   Low Density   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
25 - Driveways 1: 0.680 ac.   Connected   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
26 - Driveways 2: 0.610 ac.   Connected   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
31 - Sidewalks 1: 0.190 ac.   Connected   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
32 - Sidewalks 2: 0.190 ac.   Disconnected   Normal Clayey   Low Density   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
33 - Sidewalks 3: 0.050 ac.   Disconnected   Normal Clayey   Low Density   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
37 - Streets 1: 1.760 ac.   Smooth   Street Length = 0.5005 mi   Street Width = 29.01099 ft Street Edges = 2
Default St. Dirt Accum.   Annual Winter Load = 2500 lbs   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz

51 - Small Landscaped Areas 1: 7.390 ac. Normal Clayey Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
57 - Undeveloped Areas 1: 0.050 ac. Normal Clayey Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
70 - Water Body Areas: 0.200 ac. Source Area PSD File: C:\WinSLAMM Files\\Residential Land Use
LU# 4 - Residential: Subarea 4 Total area (ac): 4.390
1 - Roofs 1: 0.500 ac. Pitched Disconnected Normal Clayey Low Density Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
31 - Sidewalks 1: 0.080 ac. Disconnected Normal Clayey Low Density Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
51 - Small Landscaped Areas 1: 3.630 ac. Normal Clayey Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
70 - Water Body Areas: 0.180 ac. Source Area PSD File: C:\WinSLAMM Files\\Residential Land Use
LU# 5 - Residential: Subarea 5 Total area (ac): 2.590
1 - Roofs 1: 0.250 ac. Pitched Disconnected Normal Clayey Low Density Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
31 - Sidewalks 1: 0.040 ac. Disconnected Normal Clayey Low Density Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
51 - Small Landscaped Areas 1: 2.270 ac. Normal Clayey Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
70 - Water Body Areas: 0.030 ac. Source Area PSD File: C:\WinSLAMM Files\\Residential Land Use
LU# 6 - Residential: Subarea 6 Total area (ac): 8.800
1 - Roofs 1: 0.360 ac. Pitched Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
2 - Roofs 2: 0.350 ac. Pitched Disconnected Normal Clayey Low Density Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
13 - Paved Parking 1: 0.260 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
25 - Driveways 1: 0.310 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
31 - Sidewalks 1: 0.060 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
32 - Sidewalks 2: 0.050 ac. Disconnected Normal Clayey Low Density Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
33 - Sidewalks 3: 0.200 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
37 - Streets 1: 1.400 ac. Smooth Street Length = 0.3985 mi Street Width = 28.98369 ft Street Edges = 2
Default St. Dirt Accum. Annual Winter Load = 2500 lbs Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
51 - Small Landscaped Areas 1: 4.250 ac. Normal Clayey Source Area PSD File: C:\WinSLAMM Files\NURP.cpz

57 - Undeveloped Areas 1: 1.410 ac. Normal Clayey Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
70 - Water Body Areas: 0.150 ac. Source Area PSD File: C:\WinSLAMM Files\\Residential Land Use
LU# 7 - Residential: Subarea 7b Total area (ac): 5.220
1 - Roofs 1: 0.390 ac. Pitched Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
2 - Roofs 2: 0.390 ac. Pitched Disconnected Normal Clayey Low Density Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
25 - Driveways 1: 0.330 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
31 - Sidewalks 1: 0.070 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
32 - Sidewalks 2: 0.060 ac. Disconnected Normal Clayey Low Density Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
37 - Streets 1: 0.430 ac. Smooth Street Length = 0.1225 mi Street Width = 28.95918 ft Street Edges = 2
Default St. Dirt Accum. Annual Winter Load = 2500 lbs Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
51 - Small Landscaped Areas 1: 2.800 ac. Normal Clayey Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
57 - Undeveloped Areas 1: 0.390 ac. Normal Clayey Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
70 - Water Body Areas: 0.360 ac. Source Area PSD File: C:\WinSLAMM Files\\Residential Land Use
LU# 8 - Residential: Subarea 8 Total area (ac): 4.610
1 - Roofs 1: 0.470 ac. Pitched Disconnected Normal Clayey Low Density Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
31 - Sidewalks 1: 0.080 ac. Disconnected Normal Clayey Low Density Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
32 - Sidewalks 2: 0.170 ac. Disconnected Normal Clayey Low Density Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
51 - Small Landscaped Areas 1: 2.940 ac. Normal Clayey Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
57 - Undeveloped Areas 1: 0.790 ac. Normal Clayey Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
70 - Water Body Areas: 0.160 ac. Source Area PSD File: C:\WinSLAMM Files\\Residential Land Use
LU# 9 - Residential: Subarea 9 Total area (ac): 10.820
1 - Roofs 1: 0.620 ac. Pitched Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
2 - Roofs 2: 0.620 ac. Pitched Disconnected Normal Clayey Low Density Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
25 - Driveways 1: 0.640 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
31 - Sidewalks 1: 0.110 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz

32 - Sidewalks 2: 0.100 ac. Disconnected Normal Clayey Low Density Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
33 - Sidewalks 3: 0.030 ac. Disconnected Normal Clayey Low Density Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
37 - Streets 1: 1.390 ac. Smooth Street Length = 0.3955 mi Street Width = 28.99494 ft Street Edges = 2
Default St. Dirt Accum. Annual Winter Load = 2500 lbs Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
51 - Small Landscaped Areas 1: 6.900 ac. Normal Clayey Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
70 - Water Body Areas: 0.410 ac. Source Area PSD File: C:\WinSLAMM Files\\Residential Land Use
LU# 10 - Residential: Subarea 10 Total area (ac): 2.040
1 - Roofs 1: 0.190 ac. Pitched Disconnected Normal Clayey Low Density Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
31 - Sidewalks 1: 0.030 ac. Disconnected Normal Clayey Low Density Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
32 - Sidewalks 2: 0.030 ac. Disconnected Normal Clayey Low Density Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
51 - Small Landscaped Areas 1: 1.500 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: 0.130 ac. Source Area PSD File: C:\WinSLAMM Files\\Residential Land Use
LU# 11 - Residential: Subarea 11 Total area (ac): 7.980
1 - Roofs 1: 0.960 ac. Pitched Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
25 - Driveways 1: 0.640 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
31 - Sidewalks 1: 0.170 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
32 - Sidewalks 2: 0.050 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
37 - Streets 1: 1.140 ac. Smooth Street Length = 0.3245 mi Street Width = 28.98305 ft Street Edges = 2
Default St. Dirt Accum. Annual Winter Load = 2500 lbs Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
51 - Small Landscaped Areas 1: 4.830 ac. Normal Clayey Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
70 - Water Body Areas: 0.190 ac. Source Area PSD File: C:\WinSLAMM Files\\Residential Land Use
LU# 12 - Residential: Subarea 12 Total area (ac): 7.030
1 - Roofs 1: 0.440 ac. Pitched Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz

2 - Roofs 2: 0.430 ac. Pitched Disconnected Normal Clayey Low Density Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
25 - Driveways 1: 0.290 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
31 - Sidewalks 1: 0.070 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
32 - Sidewalks 2: 0.060 ac. Disconnected Normal Clayey Low Density Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
33 - Sidewalks 3: 0.190 ac. Disconnected Normal Clayey Low Density Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
37 - Streets 1: 0.400 ac. Smooth Street Length = 0.114 mi Street Width = 28.94737 ft Street Edges = 2
Default St. Dirt Accum. Annual Winter Load = 2500 lbs Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
51 - Small Landscaped Areas 1: 3.960 ac. Normal Clayey Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
57 - Undeveloped Areas 1: 1.060 ac. Normal Clayey Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
70 - Water Body Areas: 0.130 ac. Source Area PSD File: C:\WinSLAMM Files\\Residential Land Use
LU# 13 - Residential: Subarea 13 Total area (ac): 5.250
1 - Roofs 1: 0.250 ac. Pitched Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
2 - Roofs 2: 0.250 ac. Pitched Disconnected Normal Clayey Low Density Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
25 - Driveways 1: 0.170 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
32 - Sidewalks 2: 0.040 ac. Disconnected Normal Clayey Low Density Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
37 - Streets 1: 0.360 ac. Smooth Street Length = 0.1025 mi Street Width = 28.97561 ft Street Edges = 2
Default St. Dirt Accum. Annual Winter Load = 2500 lbs Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
51 - Small Landscaped Areas 1: 3.970 ac. Normal Clayey Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
70 - Water Body Areas: 0.170 ac. Source Area PSD File: C:\WinSLAMM Files\\Residential Land Use
LU# 14 - Residential: Subarea 14 Total area (ac): 0.410
37 - Streets 1: 0.030 ac. Smooth Street Length = 0.0085 mi Street Width = 29.11765 ft Street Edges = 2
Default St. Dirt Accum. Annual Winter Load = 2500 lbs Source Area PSD File: C:\WinSLAMM Files\NURP.cpz

51 - Small Landscaped Areas 1: 0.160 ac.   Normal Clayey   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
57 - Undeveloped Areas 1: 0.220 ac.   Normal Clayey   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
LU# 15 - Residential: Subarea 15   Total area (ac): 4.280
1 - Roofs 1: 0.340 ac.   Pitched   Disconnected   Normal Clayey   Low Density   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
2 - Roofs 2: 0.180 ac.   Pitched   Disconnected   Normal Clayey   Low Density   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
31 - Sidewalks 1: 0.060 ac.   Disconnected   Normal Clayey   Low Density   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
32 - Sidewalks 2: 0.130 ac.   Disconnected   Normal Clayey   Low Density   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
33 - Sidewalks 3: 0.020 ac.   Disconnected   Normal Clayey   Low Density   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
51 - Small Landscaped Areas 1: 1.230 ac.   Normal Clayey   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
57 - Undeveloped Areas 1: 2.320 ac.   Normal Clayey   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
LU# 16 - Residential: Subarea 16   Total area (ac): 10.890
1 - Roofs 1: 0.500 ac.   Pitched   Disconnected   Normal Clayey   Low Density   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
2 - Roofs 2: 0.020 ac.   Pitched   Disconnected   Normal Clayey   Low Density   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
25 - Driveways 1: 0.060 ac.   Connected   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
26 - Driveways 2: 0.160 ac.   Disconnected   Normal Clayey   Low Density   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
31 - Sidewalks 1: 0.080 ac.   Disconnected   Normal Clayey   Low Density   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
32 - Sidewalks 2: 0.030 ac.   Disconnected   Normal Clayey   Low Density   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
37 - Streets 1: 0.330 ac.   Smooth   Street Length = 0.094 mi   Street Width = 28.96277 ft   Street Edges = 2
Default St. Dirt Accum.   Annual Winter Load = 2500 lbs   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
51 - Small Landscaped Areas 1: 3.370 ac.   Normal Clayey   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz

57 - Undeveloped Areas 1: 6.340 ac.   Normal Clayey   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
LU# 17 - Residential: Subarea 17   Total area (ac): 3.560
1 - Roofs 1: 0.490 ac.   Pitched   Disconnected   Normal Clayey   Low Density   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
31 - Sidewalks 1: 0.010 ac.   Disconnected   Normal Clayey   Low Density   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
32 - Sidewalks 2: 0.060 ac.   Disconnected   Normal Clayey   Low Density   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
37 - Streets 1: 0.100 ac.   Smooth   Street Length = 2.844828E-02 mi   Street Width = 29 ft   Street Edges = 2
Default St. Dirt Accum.   Annual Winter Load = 2500 lbs   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
51 - Small Landscaped Areas 1: 0.220 ac.   Normal Clayey   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
57 - Undeveloped Areas 1: 2.680 ac.   Normal Clayey   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
LU# 18 - Residential: Subarea 18 - Undisturbed   Total area (ac): 40.770
57 - Undeveloped Areas 1: 40.770 ac.   Normal Clayey   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
LU# 19 - Residential: Subarea 7a   Total area (ac): 6.380
1 - Roofs 1: 0.680 ac.   Pitched   Disconnected   Normal Clayey   Low Density   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
31 - Sidewalks 1: 0.110 ac.   Disconnected   Normal Clayey   Low Density   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
32 - Sidewalks 2: 0.210 ac.   Disconnected   Normal Clayey   Low Density   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
51 - Small Landscaped Areas 1: 5.050 ac.   Normal Clayey   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
57 - Undeveloped Areas 1: 0.330 ac.   Normal Clayey   Source Area PSD File: C:\WinSLAMM Files\NURP.cpz

Control Practice 1: Wet Detention Pond CP# 1 (DS) - Pond 3
Particle Size Distribution file name: Not needed - calculated by program
Initial stage elevation (ft):   5
Peak to Average Flow Ratio: 3.8
Maximum flow allowed into pond (cfs): No maximum value entered
Outlet Characteristics:

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

Outlet type: Broad Crested Weir
1. Weir crest length (ft): 10
2. Weir crest width (ft): 10
3. Height from datum to bottom of weir opening: 11

Outlet type: Vertical Stand Pipe
1. Stand pipe diameter (ft): 4
2. Stand pipe height above datum (ft): 8.5

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	0.0500	0.00	0.00
2	4.00	0.1500	0.00	0.00
3	5.00	0.2000	0.00	0.00
4	6.00	0.2300	0.00	0.00
5	7.00	0.2700	0.00	0.00
6	8.00	0.3100	0.00	0.00
7	9.00	0.3600	0.00	0.00
8	10.00	0.4000	0.00	0.00
9	11.00	0.4500	0.00	0.00
10	12.00	0.5300	0.00	0.00

Control Practice 2: Biofilter CP# 1 (DS) - Basin 4
1. Top area (square feet) = 31089
2. Bottom aea (square feet) = 7746
3. Depth (ft): 5
4. Biofilter width (ft) - for Cost Purposes Only: 10
5. Infiltration rate (in/hr) = 3.6
6. Random infiltration rate generation? No
7. Infiltration rate fraction (side): 0.001
8. Infiltration rate fraction (bottom): 1
9. Depth of biofilter that is rock filled (ft) 0
10. Porosity of rock filled volume = 0
11. Engineered soil infiltration rate: 3.6

12. Engineered soil depth (ft) = 1
13. Engineered soil porosity = 0.27
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

User-Defined Media Type — 1.000

Saturation water content (Porosity) = 0

Field capacity (fraction) = 0

Permanent Wilting Point (fraction) = 0

Infiltration rate (in/hr) = 3.6

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

Outlet type: Vertical Stand Pipe

1. Stand pipe diameter (ft): 3
2. Stand pipe height above datum (ft): 3.75

Outlet type: Surface Discharge Pipe

1. Surface discharge pipe outlet diameter (ft): 0.33
2. Pipe invert elevation above datum (ft): 2.5
3. Number of surface pipe outlets: 1

Control Practice 3: Biofilter CP# 2 (DS) - Basin 5

1. Top area (square feet) = 8150
2. Bottom aea (square feet) = 1446
3. Depth (ft): 5
4. Biofilter width (ft) - for Cost Purposes Only: 10
5. Infiltration rate (in/hr) = 0.07
6. Random infiltration rate generation? No
7. Infiltration rate fraction (side): 0.001
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: 0.07

12. Engineered soil depth (ft) = 1
13. Engineered soil porosity = 0.27
14. Percent solids reduction due to flow through engineered soil = 80
15. Biofilter peak to average flow ratio = 3.8
16. Number of biofiltration control devices = 1
17. Particle size distribution file: Not needed - calculated by program
18. Initial water surface elevation (ft): 0

Soil Data — Soil Type Fraction in Eng. Soil

User-Defined Media Type — 1.000

Saturation water content (Porosity) = 0

Field capacity (fraction) = 0

Permanent Wilting Point (fraction) = 0

Infiltration rate (in/hr) = 0.07

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

Outlet type: Vertical Stand Pipe

1. Stand pipe diameter (ft): 3
2. Stand pipe height above datum (ft): 3.25

Outlet type: Surface Discharge Pipe

1. Surface discharge pipe outlet diameter (ft): 0.25
2. Pipe invert elevation above datum (ft): 1.75
3. Number of surface pipe outlets: 1

Control Practice 4: Wet Detention Pond CP# 2 (DS) - Pond 6

Particle Size Distribution file name: Not needed - calculated by program

Initial stage elevation (ft): 5

Peak to Average Flow Ratio: 3.8

Maximum flow allowed into pond (cfs): No maximum value entered

Outlet Characteristics:

Outlet type: Orifice 1

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

Outlet type: Broad Crested Weir

1. Weir crest length (ft): 10

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

Outlet type: Vertical Stand Pipe

1. Stand pipe diameter (ft): 4
2. Stand pipe height above datum (ft): 7.6

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	4.00	0.1000	0.00	0.00
3	5.00	0.1500	0.00	0.00
4	7.00	0.2300	0.00	0.00
5	9.00	0.3400	0.00	0.00
6	11.00	0.4700	0.00	0.00

Control Practice 5: Wet Detention Pond CP# 3 (DS) - Pond 7

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: Sharp Crested Weir

1. Sharp crested weir length (ft): 1
2. Sharp crested weir height from invert: 3.1
3. Sharp crested weir invert elevation above datum (ft): 5.9

Outlet type: Orifice 1

1. Orifice diameter (ft): 0.67
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

Outlet type: Vertical Stand Pipe

1. Stand pipe diameter (ft): 3
2. Stand pipe height above datum (ft): 7.2

Pond stage and surface area

Entry Number	Stage (ft)	Pond Area (acres)	Natural Seepage (in/hr)	Other Outflow (cfs)
0	0.00	0.0000	0.00	0.00
1	0.01	0.1500	0.00	0.00
2	4.00	0.3000	0.00	0.00
3	5.00	0.3900	0.00	0.00
4	8.00	0.8700	0.00	0.00
5	9.00	1.1700	0.00	0.00

Control Practice 6: Biofilter CP# 3 (DS) - Basin 8

1. Top area (square feet) = 20057
2. Bottom aea (square feet) = 7055
3. Depth (ft): 5
4. Biofilter width (ft) - for Cost Purposes Only: 10
5. Infiltration rate (in/hr) = 0.04
6. Random infiltration rate generation? No
7. Infiltration rate fraction (side): 0.001
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: 0.04
12. Engineered soil depth (ft) = 1
13. Engineered soil porosity = 0.27
14. Percent solids reduction due to flow through engineered soil = 80
15. Biofilter peak to average flow ratio = 3.8
16. Number of biofiltration control devices = 1
17. Particle size distribution file: Not needed - calculated by program
18. Initial water surface elevation (ft): 0

Soil Data	Soil Type Fraction in Eng. Soil
User-Defined Media Type	1.000

Saturation water content (Porosity) = 0
Field capacity (fraction) = 0
Permanent Wilting Point (fraction) = 0
Infiltration rate (in/hr) = 0.04

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

Outlet type: Vertical Stand Pipe

1. Stand pipe diameter (ft): 3
2. Stand pipe height above datum (ft): 3.5

Outlet type: Surface Discharge Pipe

1. Surface discharge pipe outlet diameter (ft): 0.25
2. Pipe invert elevation above datum (ft): 1.25
3. Number of surface pipe outlets: 1

Control Practice 7: Wet Detention Pond CP# 4 (DS) - Pond 9

Particle Size Distribution file name: Not needed - calculated by program

Initial stage elevation (ft): 5

Peak to Average Flow Ratio: 3.8

Maximum flow allowed into pond (cfs): No maximum value entered

Outlet Characteristics:

Outlet type: Orifice 1

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

Outlet type: Orifice 2

1. Orifice diameter (ft): 1
2. Number of orifices: 1
3. Invert elevation above datum (ft): 7

Outlet type: Broad Crested Weir

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

Outlet type: Vertical Stand Pipe

1. Stand pipe diameter (ft): 3
2. Stand pipe height above datum (ft): 9.75

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	0.1500	0.00	0.00
2	4.00	0.3500	0.00	0.00
3	5.00	0.4100	0.00	0.00
4	6.00	0.4600	0.00	0.00

5	8.00	0.5600	0.00	0.00
6	10.00	0.7400	0.00	0.00
7	11.00	0.8100	0.00	0.00

Control Practice 8: Biofilter CP# 4 (DS) - Basin 10

1. Top area (square feet) = 12432
2. Bottom aea (square feet) = 5480
3. Depth (ft): 6
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): 0.001
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) = 2
13. Engineered soil porosity = 0.27
14. Percent solids reduction due to flow through engineered soil = 80
15. Biofilter peak to average flow ratio = 3.8
16. Number of biofiltration control devices = 1
17. Particle size distribution file: Not needed - calculated by program
18. Initial water surface elevation (ft): 0

Soil Data — Soil Type Fraction in Eng. Soil

User-Defined Media Type 1.000

Saturation water content (Porosity) = 0

Field capacity (fraction) = 0

Permanent Wilting Point (fraction) = 0

Infiltration rate (in/hr) = 0.5

Biofilter Outlet/Discharge Characteristics:

Outlet type: Broad Crested Weir

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

Outlet type: Vertical Stand Pipe

1. Stand pipe diameter (ft): 3
2. Stand pipe height above datum (ft): 4.5

Outlet type: Surface Discharge Pipe

1. Surface discharge pipe outlet diameter (ft): 0.25
2. Pipe invert elevation above datum (ft): 3.5
3. Number of surface pipe outlets: 1

Control Practice 9: Wet Detention Pond CP# 5 (DS) - Pond 11
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: Sharp Crested Weir
1. Sharp crested weir length (ft): 1
2. Sharp crested weir height from invert: 3.5
3. Sharp crested weir invert elevation above datum (ft): 6.8
Outlet type: Orifice 1
1. Orifice diameter (ft): 0.25
2. Number of orifices: 1
3. Invert elevation above datum (ft): 5
Outlet type: Broad Crested Weir
1. Weir crest length (ft): 10
2. Weir crest width (ft): 10
3. Height from datum to bottom of weir opening: 9.3
Outlet type: Vertical Stand Pipe
1. Stand pipe diameter (ft): 3
2. Stand pipe height above datum (ft): 8.3
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	4.00	0.1200	0.00	0.00
3	5.00	0.1900	0.00	0.00
4	7.80	0.3500	0.00	0.00
5	9.80	0.4800	0.00	0.00
6	10.30	0.5200	0.00	0.00

Control Practice 10: Wet Detention Pond CP# 6 (DS) - Pond 12
Particle Size Distribution file name: Not needed - calculated by program

Initial stage elevation (ft): 5
Peak to Average Flow Ratio: 3.8
Maximum flow allowed into pond (cfs): No maximum value entered
Outlet Characteristics:
Outlet type: Orifice 1
1. Orifice diameter (ft): 0.25
2. Number of orifices: 1
3. Invert elevation above datum (ft): 5
Outlet type: Broad Crested Weir
1. Weir crest length (ft): 10
2. Weir crest width (ft): 10
3. Height from datum to bottom of weir opening: 9
Outlet type: Vertical Stand Pipe
1. Stand pipe diameter (ft): 3
2. Stand pipe height above datum (ft): 7.2
Pond stage and surface area

Entry Number	Stage (ft)	Pond Area (acres)	Natural Seepage (in/hr)	Other Outflow (cfs)
0	0.00	0.0000	0.00	0.00
1	0.10	0.0100	0.00	0.00
2	4.00	0.1000	0.00	0.00
3	5.00	0.1300	0.00	0.00
4	6.00	0.1600	0.00	0.00
5	9.00	0.3500	0.00	0.00
6	10.00	0.4200	0.00	0.00

Control Practice 11: Wet Detention Pond CP# 7 (DS) - Pond 13
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: Sharp Crested Weir
1. Sharp crested weir length (ft): 1
2. Sharp crested weir height from invert: 2.5
3. Sharp crested weir invert elevation above datum (ft): 7
Outlet type: Orifice 1
1. Orifice diameter (ft): 0.33

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

Outlet type: Broad Crested Weir

1. Weir crest length (ft): 10
2. Weir crest width (ft): 10
3. Height from datum to bottom of weir opening: 8.5

Outlet type: Vertical Stand Pipe

1. Stand pipe diameter (ft): 3
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	0.0300	0.00	0.00
2	4.00	0.1000	0.00	0.00
3	5.00	0.1700	0.00	0.00
4	5.70	0.2000	0.00	0.00
5	6.70	0.2400	0.00	0.00
6	7.70	0.2900	0.00	0.00
7	8.50	0.3300	0.00	0.00
8	9.50	0.3800	0.00	0.00

Control Practice 12: Biofilter CP# 5 (DS) - Basin 1

1. Top area (square feet) = 58153
2. Bottom aea (square feet) = 9693
3. Depth (ft): 8
4. Biofilter width (ft) - for Cost Purposes Only: 10
5. Infiltration rate (in/hr) = 0.11
6. Random infiltration rate generation? No
7. Infiltration rate fraction (side): 0.001
8. Infiltration rate fraction (bottom): 1
9. Depth of biofilter that is rock filled (ft) 1
10. Porosity of rock filled volume = 0.33
11. Engineered soil infiltration rate: 3.6
12. Engineered soil depth (ft) = 2
13. Engineered soil porosity = 0.27
14. Percent solids reduction due to flow through engineered soil = 80
15. Biofilter peak to average flow ratio = 3.8

16. Number of biofiltration control devices = 1
17. Particle size distribution file: Not needed - calculated by program
18. Initial water surface elevation (ft): 0

Soil Data — Soil Type Fraction in Eng. Soil

User-Defined Media Type 1.000

Saturation water content (Porosity) = 0

Field capacity (fraction) = 0

Permanent Wilting Point (fraction) = 0

Infiltration rate (in/hr) = 3.6

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: 7

Outlet type: Vertical Stand Pipe
1. Stand pipe diameter (ft): 3
2. Stand pipe height above datum (ft): 6.75

Outlet type: Surface Discharge Pipe
1. Surface discharge pipe outlet diameter (ft): 0.5
2. Pipe invert elevation above datum (ft): 3.5
3. Number of surface pipe outlets: 1

Outlet type: Drain Tile/Underdrain
1. Underdrain outlet diameter (ft): 0.33
2. Invert elevation above datum (ft): 0.75
3. Number of underdrain outlets: 1

Control Practice 13: Biofilter CP# 6 (DS) - Basin 2
1. Top area (square feet) = 7377
2. Bottom aea (square feet) = 4102
3. Depth (ft): 5
4. Biofilter width (ft) - for Cost Purposes Only: 10
5. Infiltration rate (in/hr) = 1.63
6. Random infiltration rate generation? No
7. Infiltration rate fraction (side): 0.001
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: 1.63

12. Engineered soil depth (ft) = 3
13. Engineered soil porosity = 0.27
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
Sand	0.750
Compost	0.250

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

Outlet type: Surface Discharge Pipe

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

Control Practice 14: Biofilter CP# 7 (DS) - Basin 7

1. Top area (square feet) = 7720
2. Bottom aea (square feet) = 2687
3. Depth (ft): 3
4. Biofilter width (ft) - for Cost Purposes Only: 10
5. Infiltration rate (in/hr) = 0.11
6. Random infiltration rate generation? No
7. Infiltration rate fraction (side): 1
8. Infiltration rate fraction (bottom): 1
9. Depth of biofilter that is rock filled (ft) 0
10. Porosity of rock filled volume = 0
11. Engineered soil infiltration rate: 0.11
12. Engineered soil depth (ft) = 1
13. Engineered soil porosity = 0.27
14. Percent solids reduction due to flow through engineered soil = 80
15. Biofilter peak to average flow ratio = 3.8
16. Number of biofiltration control devices = 1
17. Particle size distribution file: Not needed - calculated by program

18. Initial water surface elevation (ft): 0

Soil Data Soil Type Fraction in Eng. Soil

User-Defined Media Type 1.000

Saturation water content (Porosity) = 0

Field capacity (fraction) = 0

Permanent Wilting Point (fraction) = 0

Infiltration rate (in/hr) = 0.11

Biofilter Outlet/Discharge Characteristics:

Outlet type: Broad Crested Weir

1. Weir crest length (ft): 8
2. Weir crest width (ft): 10
3. Height of datum to bottom of weir opening: 1.75

APPENDIX E

Soil Survey and Soil Boring Logs

Map Scale: 1:6,700 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0, 50, 100, 200, 300

Feet: 0, 300, 600, 1200, 1800

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 18, Sep 7, 2022

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

Date(s) aerial images were photographed: Jun 6, 2020—Jun 28, 2020

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
BsA	Brookston silt loam, 0 to 2 percent slopes	C/D	9.4	6.0%
HmB	Hochheim loam, 2 to 6 percent slopes	D	18.7	12.1%
HmC2	Hochheim loam, 6 to 12 percent slopes, eroded	D	16.9	10.9%
KlA	Kendall silt loam, 1 to 3 percent slopes	C	1.4	0.9%
KwA	Knowles silt loam, 0 to 2 percent slopes	C	8.6	5.6%
KwB	Knowles silt loam, 2 to 6 percent slopes	C	17.0	11.0%
LmB	Lamartine silt loam, 0 to 3 percent slopes	B/D	5.2	3.3%
Lu	Loamy land	D	1.9	1.2%
MoB	Mayville silt loam, 2 to 6 percent slopes	C	0.9	0.6%
RkB	Ritchey silt loam, 1 to 6 percent slopes	D	11.2	7.2%
RkE	Ritchey silt loam, 12 to 30 percent slopes	D	1.5	1.0%
ThA	Theresa silt loam, 0 to 2 percent slopes	C	20.6	13.2%
ThB	Theresa silt loam, 2 to 6 percent slopes	C	26.1	16.8%
ThB2	Theresa silt loam, 2 to 6 percent slopes, eroded	C	15.7	10.1%
Totals for Area of Interest			**155.2**	**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

GEOTECHNICAL ENGINEERING REPORT

Thomas Farm Development
NWC Golf Road and Elmhurst Road
Town of Delafield, Wisconsin

GESTRA Project No.: 23083-10
May 15, 2023

Prepared For:
Neumann Developments, Inc.
N27W24025 Paul Court, Suite 100
Pewaukee, WI 53072

GESTRA

Geotechnical Engineering Report

Thomas Farm Development
NWC Golf Road and Elmhurst Road
Town of Delafield, Wisconsin

GESTRA Project No. 23083-10
May 15, 2023

Prepared For:

Neumann Developments, Inc.
N27W24025 Paul Court, Suite 100
Pewaukee, WI 53072

Prepared By:

GESTRA Engineering, Inc.
191 W. Edgerton Avenue
Milwaukee, WI 53207
(414) 933-7444

Table of Contents

Geotechnical Engineering Report

Thomas Farm Development
NWC Golf Road and Elmhurst Road
Town of Delafield, Wisconsin

1.0 INTRODUCTION

GESTRA Engineering, Inc. (GESTRA) was authorized by Neuman Developments, Inc. (Neumann) to complete a subsurface exploration and geotechnical engineering report for the Thomas Farms Development project located at the northwest corner of Golf Road and Elmhurst Road in the Town of Delafield, Wisconsin. This report presents the results from the subsurface soil exploration and describes the field exploration, laboratory test results, and provides recommendations pertaining to the design and construction of the proposed buildings, roads and stormwater basins.

The engineering recommendations and analysis contained within this report are based on the following project information which is a projection of GESTRA's understanding of the project. If for any reason the actual project information differs from what is reported below, GESTRA should be contacted so that we can review our recommendations in light of any new information.

1.1 PROJECT INFORMATION

The site is bounded by the Lake County Recreation Trail on the north, Elmhurst Road on the east, an existing subdivision in the northwest, Glen Cove Road on the west and Golf Road on the south. The site plan is divided into 4 zones, described as follows and shown on the Borehole Location Plan in the Appendix. At this time, preliminary stormwater elevations are available, but detailed grading plans have not been completed.

Zone 1 – northwest quadrant. This section will include an eastern cul-de-sac extension of Crooked Creek Road and 8 single-family house lots around the cul-de-sac. A detention pond is planned on the north side.

Zone 2 – northeast quadrant. This zone includes 29 single-family house lots, a portion of the east loop road and a cul-de-sac. Detention ponds are planned on the north and west sides, a biofiltration basin near the center and dry pond basin in the southern part.

Zone 3 – southwest quadrant. This zone includes 37 single-family house lots, 28 duplex condos, west loop road with cul-de-sac and connection to the east loop road, and clubhouse amenities building. Three detention ponds are planned in the northern part and a biofiltration basin on the south side.

Zone 4 – southeast quadrant. This zone includes 81 single-family house lots, part of the east loop road with two cul-de-sacs and connection to the west loop road. Three detention ponds are planned in the west, center and southeast portions and rain garden on the south side.

2.0 SCOPE OF SERVICES

GESTRA has performed the following services for the project:

- Contacted Diggers Hotline to locate the public utilities at the site.
- Completed thirty-nine (39) standard penetration test (SPT) soil borings to depths between 4 ½ feet and 19 feet below existing grades. All borings encountered split spoon and/or auger refusal at termination. At the completion of drilling, boreholes were abandoned per WDNR requirements.
- Performed laboratory soil testing to assign classification and engineering properties to the soils encountered. The laboratory testing included hand penetrometer, moisture content, mechanical analysis, hydrometers, and Atterberg limits.
- Prepared this geotechnical engineering report presenting the results of the field exploration, laboratory testing, and providing a discussion of the subsurface conditions and the following recommendations:
    a. Buildings: general recommendations for allowable soil bearing capacity for spread foundations, estimates of settlement, anticipation and management of groundwater, subgrade modulus for design of slab on grade, lateral earth pressures, seismic site classification, and site preparation/ soil correction.
    b. Pavement: soil parameters for the pavement design consisting of estimated CBR values, and asphalt, concrete and base course thickness for the proposed roadways based on anticipated traffic volumes.
    c. Stormwater: The soil from the borings were classified per the USCS system and the Field Book for Describing and Sampling Soils, USDA, NRCS, 2012. Provided DSPS Soil and Site Evaluation – Storm forms and a discussion of soils conditions and recommendations related to infiltration and detention basin design.

3.0 EXPLORATION RESULTS

3.1 SITE CONDITIONS

The development is planned within the undeveloped parcels bounded by Golf Road to the south, Elmhurst Road to the east, Glen Cove Road to the west and the Lake County Recreation Trail/Oakton Road to the north. The majority of the development is in the southern and eastern portion which is currently farm field with several tree lines. The development in the northwest portion is located in an area that is a combination of open field and woods. Two existing residential buildings are located in the southeast part of the development and are accessible from Thomas Road which connects Golf Road and Elmhurst Road. A third residential building is located on the south side of the property near the approximate mid-point of the development. Based on historical aerial photographs available on the Waukesha County GIS website, the site has remained unchanged since the 1960's.

The topography varies significantly across the development area. The northwest portion ranges from approximately 895 feet to 915 feet, generally sloping upward from the north to the south. The highest elevation portion of the development is in the southwest part around 945 feet. From this location it slopes downward to the north to around 915 feet and slopes downward toward the east with elevations ranging from 910 or 915 feet in the southeast portion and 900 feet in the northeast portion. Ground surface elevations at our boring locations range from 946.1 feet at B-29 in the southwest, 916.3 feet at B-22 in the southeast, 899.7 feet at B-1 in the northeast, and 899.3 feet at B-37 in the northwest.

3.2 SUBSURFACE SOIL PROFILE

The general soil profile consisted of topsoil underlain by lean clay or silty clay over granular soil with various amounts of fines (silt and clay soil). At multiple boring location auger refusal was encountered and can be an indication of possible bedrock. Table 3-1 provides the depth and elevation of auger refusal at the boring locations. The topsoil thickness was typically less than 1 foot at each boring location with the exception of B-30 where approximately 2-feet of topsoil was observed.

The native lean clay was typically encountered with a medium stiff to very stiff consistency and extended to approximate depths of 2 feet to 11 ½ feet. In some shallower borings the clay extended to auger refusal. The native clay had varying amounts of sand and moisture contents of samples tested ranged from 8.3% to 30.3% with the majority of the samples tested having moisture contents greater than 20%.

Clayey sand was observed in approximately half the borings and was typically below the upper lean clay or silty clay. Based on SPT N-values, the clayey sand ranged from very loose to medium dense. Varying amounts of gravel were noted in the material.

The majority of the borings included a granular layer (sand or gravel) with varying amounts of silt above auger refusal. Based on SPT N-values, the granular material typically ranged from medium dense to very dense. Some locations of very dense soil encountered may be considered weathered bedrock. An exception to this was boring B-33 where a blueish gray medium dense to very dense silt was encountered between the upper clayey sand and auger refusal.

Table 3-1: Auger Refusal Depths (feet)

Ground Surface Elevation	Boring	Refusal Depth	Refusal Elevation
899.7	B-1	12.5	887.2
906.9	B-2	8.5	898.4
915.6	B-3	10	905.6
919.8	B-4	9.5	910.3
917.7	B-5	6.5	911.2
912.4	B-6	13.5	898.9
916.3	B-7	9.5	906.8
918.7	B-8	6.5	912.2
919.2	B-9	9	910.2
920.8	B-10	12	908.8
917.8	B-11	5.5	912.3
917.4	B-12	5	912.4
921.7	B-13	4.5	917.2
925.2	B-14	7.5	917.7
926.8	B-15	9.5	917.3
930.5	B-16	8.5	922.0

Ground Surface Elevation	Boring	Refusal Depth	Refusal Elevation
917.7	B-21	4.5	913.2
916.3	B-22	8	908.3
940.4	B-23	10.5	929.9
940.7	B-24	10.5	930.2
932.6	B-25	12	920.6
938.3	B-26	16	922.3
939.0	B-27	15	924.0
943.4	B-28	16	927.4
946.1	B-29	20	926.1
948.5	B-30	13	935.5
939.7	B-31	15	924.7
939.7	B-32	16	923.7
924.1	B-33	17	907.1
929.6	B-34	11	918.6
937.8	B-35	13	924.8
900.7	B-36	15.5	885.2

Ground Surface Elevation	Boring	Refusal Depth	Refusal Elevation
925.0	B-17	8.5	916.5
931.2	B-18	6.5	924.7
934.9	B-19	9.5	925.4
925.6	B-20	6.5	919.1

Ground Surface Elevation	Boring	Refusal Depth	Refusal Elevation
899.3	B-37	17.5	881.8
910.0	B-38	19	891.0
911.7	B-39	17.5	894.2

Notes: Ground surface elevation at B-36 obtained by GESTRA, all other ground surface elevations provided by Trio.

GESTRA reviewed the "Preliminary depth to bedrock map of Waukesha County, Wisconsin" available from the Wisconsin Geological and Natural History Survey. The map indicates that depth to bedrock in the project area is typically less than 50 feet in the project area.

Results of the field and laboratory tests and observations are depicted on the individual boring logs included in Appendix I of this report. Soils were grouped together based on similar observed properties. The stratification lines were estimated by the reviewing engineer based on available data and experience. The actual in-situ changes between layers may differ slightly and may be more gradual than depicted on the boring logs. Subsurface and groundwater conditions can vary between borehole locations and in areas not explored.

It is important to note that the soil observations, fill depths, and topsoil thickness estimates were made in small diameter boreholes. Therefore, it should be understood that thicker or thinner deposits of the individual strata are likely to be encountered within other portions of the project. Furthermore, the estimation of strata thickness at a particular location can differ from person to person due to a sometimes indistinct transition between the soils encountered. Additionally, it must be recognized that in the absence of foreign substances and/or debris within the soil samples obtained, it is sometimes difficult to distinguish between natural soils and clean soil fill.

3.3 GROUNDWATER OBSERVATIONS

Groundwater observations were typically completed during and at the completion of drilling operations. Select borings were left open for extended water level readings. The shallower groundwater appeared to be more common in the western portion of the project site. Table 3-2 provides a summary of the highest water level measured at each boring. If the extended water level readings varied by more than 1 foot from the during or after drilling water levels, both values are listed. Refer to the individual boring logs for specific information.

Table 3-2: Groundwater Measurements (feet)

Ground Surface Elevation	Boring	Groundwater	
		Depth	Elevation
899.7	B-1	4	895.7
906.9	B-2	5	901.9
915.6	B-3	NE	-
919.8	B-4	NE	-
917.7	B-5	NE	-
912.4	B-6	NE	-

Ground Surface Elevation	Boring	Groundwater	
		Depth	Elevation
917.7	B-21	NE	-
916.3	B-22	NE	-
940.4	B-23	NE	-
940.7	B-24	NE	-
932.6	B-25	7	925.6
938.3	B-26	11 [a] 5 [b]	927.3 [a] 933.3 [b]

Ground Surface Elevation	Boring	Groundwater	
		Depth	Elevation
916.3	B-7	3 [a] 0.4 [b]	913.3 [a] 915.9 [b]
918.7	B-8	NMR	NMR
919.2	B-9	NMR	NMR
920.8	B-10	NE	-
917.8	B-11	NE	-
917.4	B-12	NE	-
921.7	B-13	NE	-
925.2	B-14	NE	-
926.8	B-15	NE	-
930.5	B-16	7.5	923.0
925.0	B-17	8	917.0
931.2	B-18	NE	-
934.9	B-19	NE	-
925.6	B-20	NE	-
939.0	B-27	10	928.96
943.4	B-28	14 [a] 12 [b]	929.4 [a] 931.4 [b]
946.1	B-29	13	933.1
948.5	B-30	NE	-
939.7	B-31	8	931.7
939.7	B-32	8	931.7
924.1	B-33	3.5 [a] 2 [b]	920.6 [a] 922.1 [b]
929.6	B-34	8 [a] 3 [b]	921.6 [a] 926.6 [b]
937.8	B-35	9	928.8
900.7	B-36	4	896.7
899.3	B-37	7 [a] 5.5 [b]	892.3 [a] 893.8 [b]
910.0	B-38	NE	-
911.7	B-39	13 [a] 2 [b]	898.7 [a] 909.7 [b]

Notes: *Ground surface elevation at B-36 obtained by GESTRA, all other ground surface elevations provided by Trio.*

B-8, B-9: Clayey soils to depth of boring.

a – At completion of drilling water level reading.

b- Extended water level reading.

Groundwater level fluctuations may occur with time and seasonal changes due to variations in precipitation, evaporation, surface water runoff and local dewatering. Perched water pockets and a higher water table may also be encountered during wet weather periods, particularly in more permeable silt and sand seams or granular fill material overlying less permeable clays. Installation and monitoring of an observation well would be required to assess true groundwater elevation.

4.0 ANALYSIS AND RECOMMENDATIONS

4.1 GEOTECHNICAL CONSIDERATIONS

Based on the conditions encountered at site, we have identified potential subsurface conditions that may impact future building and site development in the following paragraphs.

Difficult Excavation: One of the primary concerns is the presence of very dense (SPT N>50) materials and possible bedrock at shallower depths. Based on preliminary plan elevation, some locations of stormwater features are designed at a lower elevation than the possible bedrock encountered. The remaining site grades have not been established, but other portions of this project may require excavation through dense to very dense ground conditions or bedrock which can result in increased excavation costs. Additional exploration with test pits can provide a better indication of the anticipated difficulty in excavation of the material when additional project design elevations are available. Depending on the depth of excavation, the project may want to evaluate blasting.

High Moisture Content Clay Soils: Another geotechnical concern identified is the presence of higher moisture content lean clay generally located immediately below the topsoil. These soils are often unstable during earthwork, prone to disturbance by construction traffic and can lose strength over time when subjected to freeze thaw cycles, moisture entering through cracks in pavement, and repetitive traffic loading. Consolidation of this soft soil layer will occur if any new loads either from new fill and/or new structure are applied on this deposit which may lead to excessive settlement for future site construction or buildings.

Potential for Large Fill Placement: Significant cut and fill may be required during grading operations. Large and deeper fills over lower strength material may result in consolidation of the material and excessive settlement due to the weight of the new fill. Further evaluation may be required when design elevations are available.

Groundwater: Based on preliminary plan elevation, some locations of stormwater features are designed at a lower elevation than the water noted in our borings. The water may also be a concern for below grade levels for new buildings and in some excavation areas localized water should be expected. Groundwater was observed higher after completion or in next day water level readings at some locations. Further evaluation may be required when design elevations are available.

Variable Depths to Bearing Material: The estimated depth to recommended bearing material presented in this report is variable across the site. When design elevations and building loads are available, the foundations recommendations should be reviewed as significant cuts or fill may affect the foundation recommendations. Areas with lower strength soil near the surface may require a lower design bearing pressure or soil improvement if significant fills are planned.

The recommendations presented in this report include assumptions related to the project design because detailed design information has not been developed. When additional design information is known, the recommendations presented in this report should be reviewed as information such as structural loads and changes in design elevations could impact the recommendations in this report.

4.2 SITE PREPARATION

Site preparation should start with removal of any trees/bushes and vegetation, as well as surficial debris or other deleterious material (if present), organic soils and topsoil. Any additional unsuitable soil/materials exposed such as buried topsoil (if encountered), excessive vegetation roots, deleterious material, soil that contains significant amounts of organics, or other unsuitable material should be removed in their entirety from the footprint of future building and pavement areas. Existing buildings and structures should be razed and completely removed to expose suitable native material. In addition, all unused utilities (if present) should be properly removed or abandoned. Field drain tile (if present) should be properly removed or abandoned or redesigned/reconnected. Material removed from the project site should be disposed in accordance with all applicable federal, state, and local regulations. Soil should not be stockpiled near or adjacent to the excavations.

In building slab on grade area and pavement areas, after the initial site preparation described above, we recommend recompacting the exposed material. Any areas of significant deflection during re-compaction may be disked, dried, and re-compacted if weather permits, or removed and replaced with engineered fill. After re-compaction, before any initial fill lifts are placed, and before base material is placed, a proof roll is recommended with a minimum 20-ton tri-axle dump truck, or like machinery imparting similar static loading on the soil and moving at no more than walking speed. A geotechnical engineer or their designated representative should be present during the proof roll in order to identify soft or unstable areas, if any, and subsequently recommend remediation procedures. Where soil correction is needed, the options for improvement include the methods described in the following paragraphs.

Recondition the subgrade through moisture/density control:

If this option is chosen, the upper 12-inches of subgrade should be aerated through disking and dried to within two (2) percent of its optimum moisture content. After which, the dried soils can be re-compacted in place to at least 95% of the maximum modified Proctor dry density (ASTM D1557). However, this method may not be effective if lower strength soils extend to depths greater than 1 foot below grade.

Removal and replacement:

The soft or unstable subgrade soils should be removed and the excavated subgrade material replaced with suitable engineered fill or well graded granular fill. The new fill should be compacted to at least 95% of the maximum dry density as obtained by the maximum modified Proctor dry density (ASTM D1557). To potentially reduce the amount of subgrade excavation, geogrid with appropriate granular fill may be used in the excavation correction.

Chemical Stabilization

The soft or unstable clayey (lean clay or clayey sand) or silty soil can also be stabilized with cement or fly ash. Lime stabilization may be considered for clay soil. Chemical stabilization is typically more cost effective if performed over large areas in a single mobilization. In the case of soil stabilization, a proper mix design should be performed prior to the performance of any soil modification as the variability of the soil may limit the effectiveness of soil modification. GESTRA did not perform a mix design as it was not part of our scope of services.

The type of improvement and the depth of correction needed should be determined at the time of construction based on drainage, weather, and soil conditions. If the project construction schedule does not allow for adequate time to rework site subgrade soils, excavation and replacement will likely be required or alternate site preparations could be considered such as chemical stabilization or utilizing geotextile fabric or geogrid and granular fill to provide a stable pavement subgrade. The native clay soils encountered below the topsoil in the majority of the borings were observed with high moisture content (20% or more) which is an indication of potentially unstable subgrade conditions.

As a general rule for new fill placement, the lift thickness should not exceed 12 inches for granular soils and 9 inches for cohesive soil and the maximum particle size should be limited to 25% of the lift thickness. For typical earthwork, new engineered fill placed within the building pad or in the pavement subgrade/base course should be compacted to a minimum of 95% of the modified Proctor maximum dry density value. Alternate compaction may be required where new fill is around 10 feet (or greater) as clayey fill have a greater potential to consolidate post compaction. Structural soil fill should be placed a minimum of five feet beyond the edges of the new building and pavement areas, and an additional foot horizontally for each vertical foot of new fill to be placed to provide adequate lateral confinement. The inorganic site soils free of any deleterious material and debris that would be removed from excavations could be reused as structural fill; however, moisture conditioning of the material may be necessary and sorting of unsuitable soils from existing material may be required before it is placed as engineered fill.

Site grading should direct runoff away from planned pavement areas and should be maintained throughout construction so that the potential for the softening of the subgrade soils is reduced. Equipment and working traffic should also be kept to a minimum on subgrade surfaces, especially during times of precipitation or following spring thaw. The contractor is responsible for maintaining completed earthwork areas. Consideration should be given to installing construction roads to reduce disturbance to the subgrade soils.

The information presented in this report may be used to evaluate the site conditions for construction, but the contractor is responsible for determining site preparation means and methods required to complete the project. An aggressive construction schedule or construction during seasons with limited drying time may not allow for reconditioning of the subgrade and soil correction may require removal and replacement with imported granular fill or use of chemical stabilization.

This geotechnical report identifies or recommends material that may be used as engineered fill, but the contractor is responsible for utilizing materials that meet the project requirements and determining means and methods required for placement and compaction. Typically, clay soils are easier to dry or rework when placed over large open areas during favorable weather conditions. Clay soils can be difficult to compact or moisture condition in trench backfill situations and may increase potential for consolidation and settlement of the backfill if it is not placed or compacted properly. Granular soils may be easier to place and compact in trench backfill situations but may increase construction costs if the material has to be imported.

4.3 FOUNDATION RECOMMENDATIONS

Due to variable existing terrain, the foundations will be dependent on the final grading plan and earthwork performed during the mass grading work. The following section is provided as a general discussion for building foundation design for preliminary design purposes. The most economical foundation should consider the actual structural loads, design elevations, and building design requirements. Modifications may be required for individual buildings depending on actual design information, including building location, grades and structural loads. Soil borings were not performed at each planned building location and future building owners may want to consider performing a geotechnical exploration specific to an individual building.

Based on the conditions encountered, a typical shallow spread/strip footing system designed for an allowable bearing capacity of 1,500 psf to 2,000 psf can be considered for the proposed buildings. Spread foundations designed for a maximum net allowable soil bearing capacity of up to 2,000 psf should be supported by the medium dense native granular soil, native clay soil with a minimum unconfined compressive strength (Qp) of 1 tsf or new engineered fill placed over suitable native soil.

Layers of lower strength soil were noted that may require correction at some boring locations such as B-1, B-5, B-7, B-11, B-13, B-16, B-20, B-24, B-26, B-32, B-33, and B-38. However, the impact of these layers on future construction will in part depend on future design elevations.

Bedrock depth was variable across the project site. If bedrock is present at or near a building foundation bearing elevation, the building should be designed such that the foundations bear entirely on bedrock or suitable soil/engineered fill to avoid potential for differential settlement.

Where unsuitable soils are encountered at the foundation elevation, soil correction should consist of additional excavation to remove the unsuitable soils. If the over-excavation is being filled with engineered fill, we recommend the over-excavation be widened at a minimum 1H:1V ratio from the edge of the foundation. The over-excavation can then be filled to grade with suitable engineered fill placed in lifts not exceeding 12 inches and compacted to at least 95% of maximum dry density as determined by the modified Proctor (ASTM D1557). Alternatively, lean concrete with a minimum compressive strength of 500 psi could be used to fill the over-excavation to grade and lateral over-excavation will not be required.

The depth of excavation required to expose suitable bearing material may vary in areas not explored by GESTRA; therefore, we recommend the foundation excavations be reviewed by a geotechnical engineer or their designated representative to determine when soils suitable to support the recommended bearing capacity are observed.

The shallow foundation design should incorporate a minimum strip footing width of 18 inches and column pad width of 24 inches, even if the allowable bearing capacity has not been fully utilized. All perimeter foundations should meet code depth requirements and are recommended to bear a minimum of 48 inches below grade for heated structures and 60 inches for unheated structures in order to protect the structure from frost heave. Interior foundations in heated buildings may bear at a shallower depth provided the bearing soils will not freeze. If the structure includes load bearing thickened slabs, subgrade preparation under the thickened slabs should follow the recommendations in this report for foundations. We recommend that foundations also be suitably reinforced in order to compensate for the effects of minor differential movements due to subsurface soil variations.

4.4 Floor Slab Recommendations

The subgrade material evaluated and prepared according to the recommendations in this report should be suitable to support slab on grade concrete. We recommend that a subgrade reaction modulus of 125 pounds per square inch per inch of deflection (pci) be used in the design of the floor slab at grade. The modulus value was assumed based on clay and/ or sand soil as the subgrade soil, assumes a 1-foot plate is used to determine the modulus and should be adjusted for the size of the foundation and confinement effect. We recommend that the floor slabs be suitably reinforced and designed to be separate from the foundation system in order to allow for separate movements. It is recommended the structural engineer specify the floor slab thickness, reinforcing, joint details and other parameters. At a minimum, the floor slabs are recommended to be reinforced or the concrete contain an appropriate fiber mesh additive to help control shrinkage cracking.

We recommend the installation of a capillary moisture break directly below the slab. A typical capillary moisture break may consist of at least 6 inches of sand or gravel with a maximum particle size of 1-1/2 inches, containing 15-55% passing the number 4 sieve and no more than 12% passing the number 200 sieve (fines) and should follow the recommendations of ACI 302.1R-15, Chapter 6. The structural engineer, architect, or manufacturer of a floor covering should determine the need of a vapor retarder, specify the vapor retarder location, and consider the concrete curing and the effects of moisture on future flooring materials or building end use. The vapor retarder should include proper sealing at penetrations, overlap at joints, and sealing at the interface of the wall and slab and may require an adequate cushion material to prevent damage.

Given the presence of groundwater encountered in our exploration, it may be necessary to address groundwater issues in the design of a below grade slab for some structures. In these cases, a groundwater management system is recommended to maintain water level below the slab system for the serviceability of the proposed structure. This may be accomplished by installing an underslab drainage system incorporated with the recommendations for below grade wall drainage presented in this report. We recommend including cleanouts for the system in the event the subsurface drainage system becomes blocked or fails and is unable to remove the water from under the slab. A mechanical engineer should design the pumping and disposal of the water from the underslab drain and the perimeter drain system and the spacing of the cleanouts should be determined in conjunction with the structural engineer. We recommend including a redundant sump and pump system in the event larger groundwater events occur and evaluate if the system should include a backup power system. Further details for underslab drainage design will depend on the individual structure and subsurface conditions.

4.5 LATERAL EARTH PRESSURES

It is our understanding that some buildings will be designed with a below grade. Below grade walls will need to be designed to resist lateral earth pressures. The values presented in Table 4-1 assume that the walls are vertical; that a clean, free-draining granular fill is used as backfill within 2 feet behind the wall; the backfill condition at the ground surface is level; and that adequate drainage is provided to prevent the buildup of any hydrostatic pressure. In addition, the below grade walls will also be required to resist the surcharge of traffic that may occur during or after construction.

Table 4-1: Below-Grade Wall Design Parameters

Below-Grade Wall Design Parameters [a]	
Total Unit Weight of Backfill (γ)	125 pcf
Angle of Internal Friction (Φ)	26°
At-Rest Earth Pressure Coefficient, (K_o)	0.56
Active Earth Pressure Coefficient, (K_a)	0.39
Passive Earth Pressure Coefficient, (K_p)	2.56

a - Based on lean clay soil encountered

For walls that are free to rotate at least 0.001 times the height of the wall, such as a temporary earth retention system and retaining walls, then an active earth pressure condition will develop. Equivalent fluid densities can be calculated by multiplying unit weight by the listed pressure coefficients at different conditions. For passive resistance, we recommend using a minimum factor of safety of 2.0 in passive earth pressure calculations because of the large strains required to mobilize the full passive resistance, ignoring the upper 1 foot of soil in frost protected areas and ignoring the soil within the frost depth for other areas.

Drainage should be provided behind below-grade and retaining walls to prevent the buildup of hydrostatic pressures. We recommend that free-draining granular drainage aggregate be placed within 2 feet behind the back face of the walls. Drainage pipes are recommended to be installed behind the walls and be drained by gravity or a sump pit and pump system. The drainage pipes should be surrounded by a minimum of 6 inches of drainage aggregate. Due to the native soils containing a significant percentage of fine material, the drainage aggregate should be completely wrapped in a non-woven, high survivability, geotextile fabric with an apparent opening size (AOS) in the range of 70 to 100. The geotextile fabric should prevent migration of any adjacent soil into the drainage aggregate. We do not recommend using a drainage pipe that includes a geotextile sleeve in immediate contact with the pipe.

We recommend a relatively impermeable barrier that may consist of a minimum 2 foot thick clay cap or Bituminous or Portland cement concrete (i.e. walkways and drives) be placed around each of the below-grade structures to minimize surface water infiltration into the backfill against the walls. The clay material, if used, should be placed and compacted as recommended in this report and should extend from final grade to a depth of at least 2 feet. The clay cap or impermeable barrier should slope away from the structure at a minimum 2 percent grade. Surcharge loads, including those from adjacent (present and future) structures, as well as temporary construction equipment, within a zone defined by a plane extending at a 45 degree angle above the base of the wall should also be included in the design. The size of the compactor used behind the wall and requirements before backfilling should be confirmed by the structural engineer.

Given the presence of groundwater encountered in our exploration, it may be necessary to address groundwater issues in the below grade wall drainage system for some structures. In these cases, a groundwater management system and water proofing are recommended and may require incorporation of an underslab drainage system. We recommend including cleanouts for any drainage system in the event the subsurface drainage system becomes blocked or fails and is unable to remove the water from under the slab. A mechanical engineer should design the pumping and disposal of the water from the drainage system. We recommend including a redundant sump and pump system in the event larger groundwater events occur and evaluate if the system should include a backup power system. Further details for drainage design will depend on the individual structure and subsurface conditions.

4.6 SEISMIC SITE CLASSIFICATION

Section 1613 of the International Building Code 2015 (IBC) was used to assign a soil site classification. Based on the native soil conditions observed and assuming these are consistent or better to a depth of 100 feet, the soil site classification **D** (stiff soil) may be used in the structural design of the proposed buildings. Based on site class D, and mapped spectral response acceleration S_s and S_1 for Delafield, Wisconsin, the site coefficient F_a and F_v are 1.6 and 2.4, respectively. Portions of the site may be eligible for a soil site classification C (very dense soil and soft rock), but individual structures should be evaluated on a project by project basis.

4.7 PAVEMENT RECOMMENDATIONS

The pavement subgrade soil should be prepared and proof rolled following the recommendations in this report. Our recommendations below assume the subgrade conditions are consistent with the results of our subsurface testing evaluation and that the subgrade is thoroughly prepared for construction based on the recommendations developed in this report and pass a thorough proof roll prior to base material placement. As previously noted, the native clay soils encountered below the topsoil in the majority of the borings were observed with high moisture content (20% or more) which is an indication of potentially unstable subgrade conditions. Additional corrective action should be determined at the time of construction for areas where it is necessary to provide a more consistent subgrade. Alternatively the project could consider a subgrade stabilization or a geogrid and granular stabilization layer as part of the design.

The Wisconsin Asphalt Pavement Association (WAPA) Asphalt Pavement Design Guide, AASHTO 2021, and the results of the geotechnical evaluation were used to provide the recommendations for the new asphalt pavement. Based on clayey soils or clayey sand as the subgrade soil, GESTRA recommends that "poor soils" (estimated CBR value between 2 and 5, SSV = 2.5) conditions should be assumed as the subgrade soils. Table 4-2 below presents the recommended hot mix asphalt and base course thicknesses for planned roadways. Pavement sections may be modified if the traffic volumes are different than presented below and should be confirmed with the requirements of the local municipality.

Base course material should be placed at moisture content within 2% of optimum and compacted to a minimum of 95% of maximum dry density as determined by the modified Proctor. Hot Mix Asphalt (HMA) should be placed and compacted following the guidelines of WisDOT Standard Specifications for Highway and Structure Construction, section 460.3.

Table 4-2: Pavement Design Recommendations

Traffic Class	Pavement Layer Type	Thickness (inches)	Material Type	WisDOT Specifications
Traffic Class II, (subdivision streets, 20-year ESALs < 1 million) [a]	Hot Mix Asphalt	4.5	LT	Section 460
	Base Course (Dense Graded)	12.0	1-1/4 inch Crushed Stone	Section 305

a- Based on Table 7.2 of WAPA Asphalt Pavement Design Guide.

One of the important considerations in designing a high quality and durable pavement is providing adequate drainage. Drainage design for the proposed pavement section is out of GESTRA's scope for this project. It is important that bird baths (leeching basins) and surface waves are not created during construction of the HMA layer. A proper slope should be allowed and drainage should be provided along the edges of pavements and catch basins to prevent the accumulation of free water within the base course, which otherwise may result in subgrade softening or swelling, and pavement deterioration under exposure and repeated traffic conditions.

Pavement sections presented in the above table should not be used for areas which experience repeated truck traffic, equipment or truck parking areas, entrances and exit aprons, or contain trash dumpster loading zones. In the areas listed above, a Portland Cement Concrete (PCC) pavement should be used. The PCC layer thickness is recommended to be 6.0 inches, with a minimum of 6.0 inch-thick crushed stone base course, but may be modified depending on the final design. The reinforcement details for PCC layers should be designed by the project design engineer as the project conditions dictate.

All pavements require regular maintenance and repair in order to maintain the serviceability of the pavement. These repairs and maintenance are due to normal wear and tear of the pavement surface and are required in order to extend the serviceability life of the pavement. However, after 20 years of service, a normal pavement structure is likely to deteriorate to a point where pavement rehabilitation may be required to maintain the serviceability.

4.8 STORMWATER FEATURES

Multiple stormwater features are planned for the project which include detention ponds and bioinfiltration basins. Trio provided a summary of the preliminary stormwater plan which generally included normal water elevation for detention ponds and bottom of basin elevations for bioinfiltration basins. For the purpose of our analyses, we assumed the bottom of wet retention stormwater ponds at 5 feet below normal water level as provided by Trio. Within this report, the bottom of basin elevation identified is termed the native soil interface. At this time, design details are not finalized, so we have provided a summary of the elevations, conditions and comments related to infiltration and retention at each boring location and separated the summary by the different zones of the development.

The samples collected from the borings were evaluated for the stormwater features, and the WDNR Soil and Site Evaluation-Storm forms are included in Appendix I. The texture of the samples collected was identified visually. The stratification lines between the soil types were identified based on the available data. The actual in-situ changes between layers may differ slightly and may be more gradual than depicted on the evaluation form. Subsurface and groundwater conditions can vary in areas not explored by GESTRA. Infiltration rates for the observed soil textures were estimated based on the information provided in WDNR Technical Standard 1002, Table 2 (dated December 2022), and are presented in the Soil and Site Evaluation-Storm forms attached in Appendix I (separated by existing parcels).

In the following tables we have provided details for the individual stormwater features planned and evaluated each for wet retention and infiltration regardless of the current plan. Within each table we have provided comments related to a wet retention pond liner and infiltration. The information presented in this report should be reviewed in conjunction with the attached boring logs and Soil Evaluation-Storm forms. Typically, the comments will fall under the following conditions.

- Liner required:

GESTRA evaluated the native soil conditions following the general guidelines of the WDNR Conservation Practice Standard 1001 for the design of Wet Detention Ponds. The existing native soil conditions were compared to Appendix D (Liner Flow Chart for Wet Detention Ponds) to determine if a liner is required. At locations where *sandy clay, silty clay or clay* were not present to at least 3 feet below the native soil interface or if bedrock (possible bedrock/auger refusal) was within 2 feet or above the native soil interface, the location is recommended for a constructed liner.

- Not suitable for infiltration:

GESTRA evaluated the native soil conditions following the general guidelines of NR 151.124(4)(c) and Wisconsin Department of Natural Resources (WDNR) Conservation Standard Practice 1002. Locations were noted as eligible for exemption from infiltration where *sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay, or clay* was present at the native soil interface. Locations where bedrock (possible bedrock/auger refusal) or groundwater was less than 3 feet from native soil interface were also noted as not suitable for infiltration as adequate separation and filtering layer would not be present.

Additional exploration through test pits and further laboratory testing is required if a basin will be designed for infiltration per WDNR Conservation Standard Practice 1002. When final design elevations are determined, additional evaluation of infiltration device is also recommended to establish if the soil meets the filtering layer requirements if the bottom of the pond will be within 3 feet of the bedrock or groundwater levels encountered. NR 151 requires the soil between the bottom of the infiltration system and seasonal high groundwater have at least a 3-foot layer of soil with 20% fines or greater or a 5-foot soil layer with 10% fines or greater. Per WDNR CPS 1002, *sandy loams, loams, silt loams, silts and all clay textural classifications* are assumed to meet the percent fines limitations of a filtering layer.

Zone 1 – northwest quadrant

Pond 13P – Wet Retention

<table>
<tr><th>Boring Location</th><th>Existing Ground Elevation</th><th>Plan Native Soil Interface Elevation</th><th>Bedrock Elev. (feet)</th><th>Groundwater Elev. (feet)</th><th>Comments</th></tr>
<tr><td>B-36 [a]</td><td>900.7</td><td rowspan="2">890.3</td><td>885.2</td><td>896.7</td><td>Liner required. Silt loam at native soil interface.
Not suitable for infiltration. Groundwater above native soil interface.</td></tr>
<tr><td>B-37</td><td>899.3</td><td>881.8</td><td>893.8</td><td>Liner required. Sandy clay loam at native soil interface.
Not suitable for infiltration. Groundwater above native soil interface and soil eligible for infiltration exemption.</td></tr>
</table>

Notes: a – B-36 offset as directed by Trio. Staked location in wooded area and not accessible.

Zone 2 – northeast quadrant

Pond 9P – Wet Retention

<table>
<tr><th>Boring Location</th><th>Existing Ground Elevation</th><th>Plan Native Soil Interface Elevation</th><th>Bedrock Elev. (feet)</th><th>Groundwater Elev. (feet)</th><th>Comments</th></tr>
<tr><td>B-1</td><td>899.7</td><td rowspan="2">893</td><td>887.2</td><td>895.7</td><td>Liner required. Sandy clay loam at native soil interface.
Not suitable for infiltration. Groundwater above native soil interface and soil eligible for infiltration exemption.</td></tr>
<tr><td>B-2</td><td>906.9</td><td>898.4</td><td>901.9</td><td>Liner required. Possible bedrock above native soil interface.
Not suitable for infiltration. Groundwater and possible bedrock above native soil interface.</td></tr>
</table>

Basin 10B – Bioinfiltration

<table>
<tr><th>Boring Location</th><th>Existing Ground Elevation</th><th>Plan Native Soil Interface Elevation</th><th>Bedrock Elev. (feet)</th><th>Groundwater Elev. (feet)</th><th>Comments</th></tr>
<tr><td>B-3</td><td>915.6</td><td rowspan="2">912</td><td>905.6</td><td>Not encountered</td><td>Liner required. Sand at native soil interface.
Suitable for infiltration. Possible additional evaluation of filtering layer, sand at native soil interface.</td></tr>
<tr><td>B-4</td><td>919.8</td><td>910.3</td><td>Not encountered</td><td>Liner required. Silt loam at native soil interface.
Not suitable for infiltration. Possible bedrock within 2 feet of native soil interface.</td></tr>
</table>

Pond 11P – Wet Retention

Boring Location	Existing Ground Elevation	Plan Native Soil Interface Elevation	Bedrock Elev. (feet)	Groundwater Elev. (feet)	Comments
B-5	917.7	907.2	911.2	Not encountered	Liner required. Possible bedrock above native soil interface. Not suitable for infiltration. Possible bedrock higher than native soil interface.
B-6	912.4		898.9	Not encountered	Liner potentially required. Sandy clay loam at native soil interface. At native soil interface, soil eligible for infiltration exemption.

Basin 8B – Dry Pond

Boring Location	Existing Ground Elevation	Plan Native Soil Interface Elevation	Bedrock Elev. (feet)	Groundwater Elev. (feet)	Comments
B-8	918.7	916.5	912.2	NMR	Liner potentially required. Sand clay loam at native soil interface. At native soil interface, soil eligible for infiltration exemption.
B-9	919.2		910.2	NMR	Liner potentially required. Clay at native soil interface but does not extend 3 feet. At native soil interface, soil eligible for infiltration exemption.

Notes: NMR = no measurement recorded. B-8, B-9, predominately clayey soils to depth of boring.

Zone 3 – southwest quadrant

Pond 3P – Wet Retention

Boring Location	Existing Ground Elevation	Plan Native Soil Interface Elevation	Bedrock Elev. (feet)	Groundwater Elev. (feet)	Comments
B-33	924.1	917	907.1	922.1	Liner required. Sandy loam at native soil interface. Not suitable for infiltration. Groundwater above native soil interface.
B-34	929.6		918.6	926.6	Liner required. Groundwater and possible bedrock above native soil interface. Not suitable for infiltration. Possible bedrock above native soil interface.

Notes: Groundwater elevation is extended reading. At completion of drilling groundwater at 920.6 feet in B-33 and 921.6 feet in B-34 which are also higher than plan native soil interface.

Pond 1B – Wet Retention

Boring Location	Existing Ground Elevation	Plan Native Soil Interface Elevation	Bedrock Elev. (feet)	Groundwater Elev. (feet)	Comments
B-26	938.3	933.5	922.3	933.3	Liner potentially required. Silty clay loam at native soil interface. Not suitable for infiltration. Groundwater within 1-foot of native soil interface. Eligible for infiltration exemption.
B-27	939		924.0	929	Liner potentially required. Silty clay loam at native soil interface. Eligible for infiltration exemption.

Notes: Groundwater elevation is extended reading, At completion of drilling groundwater at 927.3 feet in B-26. Extended water level reading used in our evaluation.

Pond 2B – Wet Retention

Boring Location	Existing Ground Elevation	Plan Native Soil Interface Elevation	Bedrock Elev. (feet)	Groundwater Elev. (feet)	Comments
B-25	932.6	931	920.6	925.6	Liner potentially required. Clay loam at native soil interface. Eligible for infiltration exemption. Additional excavation required to expose non-exempt material.

Basin 4B – Bioinfiltration

<table>
<tr><th>Boring Location</th><th>Existing Ground Elevation</th><th>Plan Native Soil Interface Elevation</th><th>Bedrock Elev. (feet)</th><th>Groundwater Elev. (feet)</th><th>Comments</th></tr>
<tr><td>B-29</td><td>946.1</td><td rowspan="2">936</td><td>926.1</td><td>933.1</td><td>Liner required. Sand at native soil interface.
Suitable for infiltration. May require filtering layer.</td></tr>
<tr><td>B-30</td><td>948.5</td><td>935.5</td><td>Not encountered</td><td>Liner required. Sand at native soil interface. Possible bedrock within 1 foot of native soil interface.
Not suitable for infiltration. Possible bedrock within 1 foot of native soil interface.</td></tr>
</table>

Zone 4 – southeast quadrant

Pond 12P – Wet Retention

Boring Location	Existing Ground Elevation	Plan Native Soil Interface Elevation	Bedrock Elev. (feet)	Groundwater Elev. (feet)	Comments
B-17	925.0	917	916.5	917.0	Liner required. Loamy sand at native soil interface. Possible bedrock within 1 foot of native soil interface. Not suitable for infiltration. Possible bedrock within 1 foot of native soil interface.
B-18	931.2		924.7	Not encountered	Liner required. Possible bedrock above native soil interface. Not suitable for infiltration. Possible bedrock above native soil interface.

Pond 7P – Wet Retention

Boring Location	Existing Ground Elevation	Plan Native Soil Interface Elevation	Bedrock Elev. (feet)	Groundwater Elev. (feet)	Comments
B-13	921.7	919.3	917.2	Not encountered	Liner required. Sandy clay loam at native soil interface. Possible bedrock within 3 feet of native soil interface. Not suitable for infiltration. Possible bedrock within 3 feet of native soil interface.
B-14	925.2		917.7	Not encountered	Liner required. Loamy sand and sandy clay loam at native soil interface. Possible bedrock within 2 feet of native soil interface. Not suitable for infiltration. Possible bedrock within 2 feet of native soil interface.

Pond 6P – Wet Retention

<table>
<tr><th>Boring Location</th><th>Existing Ground Elevation</th><th>Plan Native Soil Interface Elevation</th><th>Bedrock Elev. (feet)</th><th>Groundwater Elev. (feet)</th><th>Comments</th></tr>
<tr><td>B-21</td><td>917.7</td><td rowspan="2">905</td><td>913.2</td><td>Not encountered</td><td>Liner required. Possible bedrock above native soil interface.
Not suitable for infiltration. Possible bedrock above native soil interface.</td></tr>
<tr><td>B-22</td><td>916.3</td><td>908.3</td><td>Not encountered</td><td>Liner required. Possible bedrock above native soil interface.
Not suitable for infiltration. Possible bedrock above native soil interface.</td></tr>
</table>

Rain Garden 5B

Boring Location	Existing Ground Elevation	Plan Native Soil Interface Elevation	Bedrock Elev. (feet)	Groundwater Elev. (feet)	Comments
B-20	925.6	922	919.1	Not encountered	Liner may not be required. Silty clay at native soil interface, but possible bedrock within 3 feet of native soil interface. At native soil interface, soil eligible for infiltration exemption. Not suitable for infiltration. Possible bedrock within 3 feet of native soil interface.

The following recommendations are for the construction of a storm water basin as a wet detention pond and are in part developed based on the information available in the Wisconsin Department of Safety and Professional Services Chapter SPS 382.365 and 360.30 and Appendix D of Technical Standard 1001. At this time the design requirements are not known and our recommendations are based on an assumed Type A liner.

For an assumed Type A liner, as a minimum the base, sides and berms at elevations below the design high-water level should be constructed out of clay soils with the following properties:

- an average plasticity index (PI) of 12 or more with none less than 10,
- an average liquid limit (LL) of 25 or greater with none less than 20,
- a minimum of 50% of the soil by weight finer than the #200 sieve,
- a minimum of 90% of the soil by weight finer than the #4 sieve, and
- in-place hydraulic conductivity of the compacted soils should be 1x10-7 cm/sec or less.

The fine-grained cohesive soils encountered in the borings that meet the above requirements will require sifting and sorting of the soil to remove large gravel, cobbles and boulders before placing it as liner material. Otherwise, the project should consider importing suitable clayey soil for the liner construction. A complete testing program of the proposed liner material should be performed to confirm it meets the project requirements before and after placement. The native soil encountered near the pond bottom elevation typically included gravel, cobbles and boulders.

Alternatively, a high density polyethylene (HDPE) or geosynthetic clay liner (GCL) could be considered in lieu of the installation of a clay liner. Another option would be constructing the liner using a soil-bentonite clay mix, but this system typically requires design and construction by a specialty contractor. Refer to Appendix D of Technical Standard 1001 for additional information related to the clay liner and these alternative liners.

The clay liner soils should be compacted using a sheepsfoot (or similar type) compactor to a minimum of 90% of the modified Proctor dry density value and at a moisture content at least 2% wet of optimum as determined by ASTM D1557. This material should be compacted in maximum 6-inch loose lifts and the compacted clay should be free of organics, cobbles, boulders, debris and any other unsuitable soils. The clay shall be disked or otherwise mechanically processed before compaction to break up clods so that the maximum clod size is 4 inches. The resulting clay liner should have a minimum thickness of 2 feet. Refer to NRCS Wisconsin Construction Specification 300 – Clay Liners for additional information pertaining to the placement and compaction of clay liner material.

Additional quality assurance testing is recommended during construction to confirm the material being placed meets the project requirements, including testing the clay liner materials for hydraulic conductivity and material properties. Regardless of the liner system selected, we recommend it be installed by a company with demonstrated prior experience with the product.

4.9 CONSTRUCTION CONSIDERATIONS

The detailed means and method of excavation and construction should be decided by the contractor and approved by the project design team. Based on the specific site information, geotechnical exploration results and requirements for the proposed structure, the following issues should be taken into consideration during construction.

Dewatering

For shallow excavations, substantial water is not anticipated to be encountered during excavation. If water is encountered during shallow excavations, we anticipate the appropriate number of temporary sump pits and pumps should be sufficient to remove anticipated volume of water in the excavation. The contractor should be prepared to control groundwater and surface water and prevent it from accumulating in excavations or otherwise affecting construction.

Multiple borings encountered water at depths of 10 feet or less. Therefore, water should be anticipated during excavation in these areas and may be present in other areas not explored. Perched or trapped water may also be encountered. Where excavations below water are anticipated, the contractor should be prepared to install a construction dewatering system and we recommend the water level during construction should be kept a minimum of 2 feet below the deepest excavation during construction and until the final structure below grade drainage system is operating. A specialty dewatering contractor should be consulted for appropriate dewatering methods during construction as well as to evaluate potential impact on the proposed construction and surrounding structures. If the dewatering system is not properly designed, a boiling and/or heaving subgrade could occur possibly resulting in loss of ground support and detrimental effect to the nearby existing structures. Further exploration and evaluation of the groundwater is recommended when final design elevations are established.

Excavation Stability

Caving is a common issue for excavation side walls during construction, especially if fill material, granular soils, and/or water seepage are observed. An excavation plan should be developed and the length of excavation left open should be limited to prevent caving soil from covering the suitable bearing soils.

A temporary soil retention system may also be necessary in order to prevent caving or provide support of surrounding structures or utilities during construction. Providing recommendations or designing the retention system is out of the scope of services for GESTRA. The contractor must comply with the federal, state, local and updated OSHA regulations during excavation and in retention system design to ensure excavation safety.

Occupational Safety and Health Act (OSHA) has instituted strict standards for temporary construction excavations. These standards are outlined in 29 CFR Part 1926 Subpart P. Excavations within unstable soil conditions or extending five feet or more in depth should be adequately sloped or braced according to these standards. Excavation safety is the responsibility of the contractor. Material stockpiles or heavy equipment should not be placed near the edge of the excavation slopes. The actual stable slope angle should be determined during construction and will depend upon the loading, soil, and groundwater conditions encountered.

Weather Implications

The subgrade soil or the soil at foundation level might become unstable with exposure to adverse weather such as rain, snow and freezing temperatures. The unstable areas due to weather exposure may require an additional undercut or stabilization and the representative geotechnical engineer should assist with the determination of the depth of additional undercut or stabilization procedure based on observation of the field condition.

Soil Sensitivity

Soil at the construction site will be exposed to moisture and disturbance from construction traffic, construction equipment and human factors. Due to the disturbance, soil may become sensitive with contact of water. Contractor should try to lessen the exposure the soil at the construction site may encounter to moisture and disturbances. Therefore, the foundations, floor slabs and pavements should be constructed immediately after the review of the representative geotechnical engineer.

5.0 EXPLORATION AND TESTING PROCEDURES

5.1 Layout and Elevation Procedures

A total of thirty-nine (39) soil borings were completed at the approximate locations shown on the attached Borehole Location Map in Appendix I. The location of the borings were selected, located in the field, and ground surface elevation provided by Trio (project civil engineer). One boring location B-36 was in a wooded area and inaccessible. GESTRA adjusted the location per the direction of Trio and noted the offset location and ground elevation.

5.2 Field Testing Procedures

The boreholes were drilled using a track mounted drill rig. The boreholes were initiated and advanced by using hollow stem augers. 24-inch split spoon samples were collected continuously to the depth of the boring. Borings were planned to be drilled to a maximum depth of 20 feet, but were terminated at auger refusal shallower than planned depth.

All representative soil samples were taken in general accordance with the "Standard Method for Penetration Test and Split-Barrel Sampling of Soils" (ASTM D1586). After each sampling, a soil sample was retained and placed in a jar and recorded for type, color, consistency, and moisture, sealed and then transported to the laboratory for further review and testing, if required. The specific drilling method used including the depths, rig type, crew chief, are included on each of the individual boring logs as it may change for each borehole.

5.3 Laboratory Testing Procedures

After completion of drilling operations, all of the retained soil samples were transported to GESTRA's laboratory and classified by a geotechnical engineer using the Unified Soil Classification System (USCS) and the Field Book for Describing and Sampling Soils, USDA, NRCS, 2012. Charts describing the classification systems used are included in Appendix I of this report. The engineer assigned laboratory testing suited to extract important index properties of the soil layers. These tests included hand penetrometer, moisture content, mechanical analysis, hydrometers, and Atterberg limits.

STANDARD OF CARE

Our exploration was limited to evaluating subsurface soil and groundwater conditions pertaining to the proposed project. GESTRA did not perform any environmental, chemical, or hydrogeologic testing as these were not part of our work scope.

This report should be made available in its entirety to bidding contractors for information purposes. The soil boring logs and borehole location map should not be detached from this report. Our report is not valid if used for purposes other than what is described in the report.

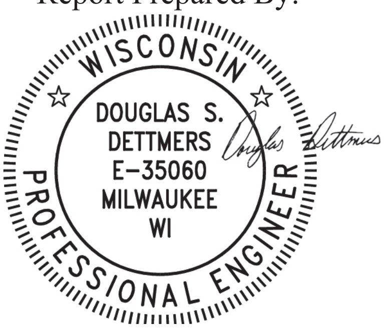
All OSHA regulations such as those regarding proper sloping and temporary shoring of excavations should be followed during the entire construction process.

GESTRA has presented our professional opinions in this report in the form of recommendations. Our opinions are based on our understanding of current project information and related accepted engineering practices at the time of this report. Other than this, no warranty is implied or intended.

Sincerely,

GESTRA Engineering, Inc.

Report Prepared By:



Douglas Dettmers
Digitally signed by Douglas Dettmers
Date: 2023.05.16 11:06:29 -05'00'

Douglas Dettmers, P.E.
Senior Engineer

Report Reviewed By:

Eric Jeske
Digitally signed by Eric Jeske
Date: 2023.05.16 11:06:58 -05'00'

Eric Jeske, P.E.
Senior Engineer

Appendix I

Site Location Map, Borehole Location Map, Test Boring Logs, Soil Evaluation-Storm Forms, General Notes and Soils Classification

N

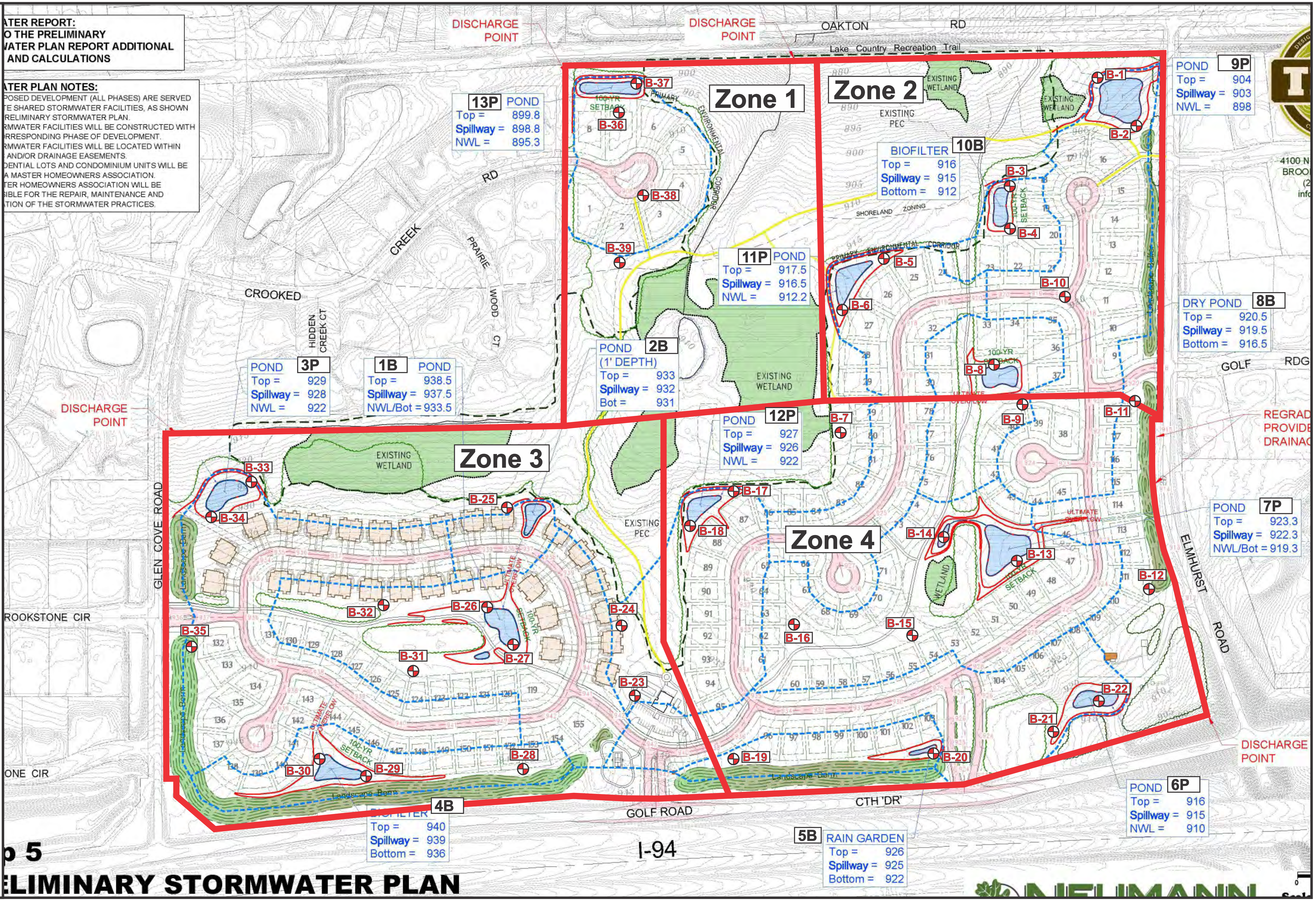
= Project Area

Base map obtained from Waukesha County GIS website

GESTRA

GESTRA Engineering, Inc.
191 W Edgerton Avenue
Milwaukee, WI 53207
Phone: (414) 933-7444
Fax: (414) 933-7844

Project Name & Location: Thomas Farm Development NWC Golf Road and Elmhurst Road Town of Delafield, Wisconsin	Scale: Not to Scale
	Drawing No.: 1 of 2
	Prepared by: JM
Drawing Title: Site Location Map	Checked by: DD
Project No.: 23083-10	Date: May 6th, 2023



N

= Borehole Location

= Zone Boundary

GESTRA

GESTRA Engineering, Inc.
191 W Edgerton Avenue
Milwaukee, WI 53207
Phone: (414) 933-7444
Fax: (414) 933-7844

Base Map obtained from "Map 5 - Preliminary Stormwater Plan" dated 04/07/2023 provided to GESTRA

Document Size = 11"x17"

Project Name & Location: Thomas Farms Development, NWC Golf Road and Elmhurst Road, Town of Delafield, Wisconsin	Scale: 1 inch = 300 feet
Drawing Title: Borehole Location Map	Drawing No.: 2 of 2
	Prepared by: JM
	Checked by: DD
Project No.: 23083-10	Date: May 6th, 2023

SOIL BORING LOG

GESTRA Engineering Inc.
191 W Edgerton Avenue
Milwaukee, WI 53207
Phone: 414-933-7444, Fax: 414-933-7844

PROJECT NAME: Thomas Farms Development	DATE DRILLING STARTED: 4/10/2023	BORING NUMBER: B-1	
PROJECT LOCATION: Delafield, Wisconsin	DATE DRILLING ENDED: 4/10/2023	PROJECT NUMBER: 23083-10	DRILLING RIG: Geoprobe
BORING DRILLED BY: FIRM: GESTRA; CREW CHIEF: D. Harvey	FIELD LOG: B. Griffin	NORTHING: 389790	DRILLING METHOD: 2¼" HSA
	LAB LOG / QC: D. Dettmers	EASTING: 2415434	SURFACE ELEVATION: 899.7 ft

Number and Type	Recovery (in)	Blow Counts	N - Value	Depth (ft) / Elevation	Soil Description and Geological Origin for Each Major Unit	USCS Classification	Graphic	Well Diagram	Unconfined Comp. Strength (Q_u or Q_p) (tsf)	Liquid Limit	Plasticity Index	Moisture Content (%)	Comments
					TOPSOIL (10-inches) — 0.8 (898.9)								
SS - 1	17	0 1 1 2	2		LEAN CLAY WITH SAND, brown, moist, medium stiff — 2 (897.7)	CL			.50			21.9	Driller noted standing water around boring.
SS - 2	18	2 2 4 4	6		CLAYEY SAND WITH GRAVEL, light brown at 3', trace gray mottling, moist, loose — 3.8 (895.9)	SC			.50				Gravel = 21.3% Sand = 29.4% P200 =49.2%
SS - 3	12	4 6 4 4	10	5 / 895.0	CLAYEY SAND, light brown, wet, medium dense, trace gravel	SC							
SS - 4	14	5 5 9 6	14		— 8 (891.7)								
SS - 5	12	5 9 14 17	23	10 / 890.0	SILTY SAND WITH GRAVEL, light brown, moist to wet, medium dense	SM							
SS - 6	18	3 4 17 16	21		— 12.2 (887.5)								
SS - 7	2	50/2"	R		End of Boring at 12.2 ft.								Auger Refusal at 12.5'. Possible bedrock.
				15 / 885.0									
				20 / 880.0									

WATER & CAVE-IN OBSERVATION DATA

∇ WATER ENCOUNTERED DURING DRILLING: 6 ft.	CAVE DEPTH AT COMPLETION: NMR (WET ☐ DRY ☐)
▼ WATER LEVEL AT COMPLETION: 4 ft.	CAVE DEPTH AFTER 0 HOURS: NMR (WET ☐ DRY ☐)
▼ WATER LEVEL AFTER 2 HOURS: 4 ft.	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

GESTRA

GESTRA Engineering Inc.
191 W Edgerton Avenue
Milwaukee, WI 53207
Phone: 414-933-7444, Fax: 414-933-7844

SOIL BORING LOG

PROJECT NAME: Thomas Farms Development	DATE DRILLING STARTED: 4/12/2023	BORING NUMBER: B-2	
PROJECT LOCATION: Delafield, Wisconsin	DATE DRILLING ENDED: 4/12/2023	PROJECT NUMBER: 23083-10	DRILLING RIG: Geoprobe
BORING DRILLED BY: FIRM: GESTRA, CREW CHIEF: D. Harvey	FIELD LOG: C. Dietz	NORTHING: 389629	DRILLING METHOD: 2¼" HSA
	LAB LOG / QC: D. Dettmers	EASTING: 2415563	SURFACE ELEVATION: 906.9 ft

Number and Type	Recovery (in)	Blow Counts	N - Value	Depth (ft) / Elevation	Soil Description and Geological Origin for Each Major Unit	USCS Classification	Graphic	Well Diagram	Unconfined Comp. Strength (Q_u or Q_p) (tsf)	Liquid Limit	Plasticity Index	Moisture Content (%)	Comments
					TOPSOIL (7-inches) — 0.6 (906.3)								
SS - 1	15	5 6 6 6	12	905.0	LEAN CLAY, brown, moist, stiff, trace sand and gravel — 2 (904.9)	CL			1.5	43	26	22.6	
SS - 2	12	3 7 8 5	15		CLAYEY SAND WITH GRAVEL, light brown, very moist, medium dense — 4 (902.9)	SC							
SS - 3	14	8 20 27 16	47	5	SILTY CLAYEY SAND, light brown, moist to wet, medium dense to dense, gray gravel with sand layer around 5'	SC-SM							
SS - 4	12	3 8 7 38	15	900.0									
SS - 5	6	12 50/5"	R		— 8.9 (898)								
				10 / 895.0 / 15 / 890.0 / 20	End of Boring at 8.9 ft.								Driller noted auger refusal at 8.5'. Possible bedrock.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: 6 ft.	CAVE DEPTH AT COMPLETION: NMR (WET / DRY)
WATER LEVEL AT COMPLETION: 6 ft.	CAVE DEPTH AFTER 0 HOURS: NMR (WET / DRY)
WATER LEVEL AFTER 3 HOURS: 5 ft.	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

SOIL BORING LOG

GESTRA Engineering Inc.
191 W Edgerton Avenue
Milwaukee, WI 53207
Phone: 414-933-7444, Fax: 414-933-7844

PROJECT NAME: Thomas Farms Development	DATE DRILLING STARTED: 4/7/2023	BORING NUMBER: **B-3**	
PROJECT LOCATION: Delafield, Wisconsin	DATE DRILLING ENDED: 4/7/2023	PROJECT NUMBER: 23083-10	DRILLING RIG: Geoprobe
BORING DRILLED BY: FIRM: GESTRA; CREW CHIEF: D. Harvey	FIELD LOG: C. Dietz	NORTHING: 389426	DRILLING METHOD: 2¼" HSA
	LAB LOG / QC: D. Dettmers	EASTING: 2415140	SURFACE ELEVATION: 915.6 ft

Number and Type	Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation	Soil Description and Geological Origin for Each Major Unit	USCS Classification	Graphic	Well Diagram	Unconfined Comp. Strength (Q_u or Q_p) (tsf)	Liquid Limit	Plasticity Index	Moisture Content (%)	Comments
					915.0	TOPSOIL (6-inches) — 0.5 (915.1)								
SS - 1	14	2 3 4 6	7			LEAN CLAY, brown, moist, stiff, trace sand, gravelly (1'-2') — 2 (913.6)	CL			1.50			26.2	
SS - 2	12	3 23 42 29	55			GRAVEL WITH SAND, light brown, moist, medium dense to very dense, sand with gravel layers, (Possible Weathered Bedrock) 3.6 in/hr but adjusted to 0.50 in/hr due to very dense characteristics								
SS - 3	10	21 14 12 14	26	5	910.0	top of engineered soil at basin 10 (elev 912.0); bottom of basin 10 (elev 910.0)								
SS - 4	14	7 15 48 18	63				GP							
SS - 5	14	18 50/3" 15 14	65/3			SS-5: with silt — 10 (905.6)								
SS - 6	0	50/1"	R	10	905.0	End of Boring at 10.0 ft.								Driller noted auger refusal at 10'. Possible bedrock.
				15	900.0									
				20	895.0									

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE ft.	CAVE DEPTH AT COMPLETION: NMR (WET ☐ DRY ☐)
WATER LEVEL AT COMPLETION: NE	CAVE DEPTH AFTER 0 HOURS: NMR (WET ☐ DRY ☐)
WATER LEVEL AFTER NE HOURS: NMR	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

GESTRA Engineering Inc.
191 W Edgerton Avenue
Milwaukee, WI 53207
Phone: 414-933-7444, Fax: 414-933-7844

SOIL BORING LOG

PROJECT NAME: Thomas Farms Development	DATE DRILLING STARTED: 4/7/2023	BORING NUMBER: B-4	
PROJECT LOCATION: Delafield, Wisconsin	DATE DRILLING ENDED: 4/7/2023	PROJECT NUMBER: 23083-10	DRILLING RIG: Geoprobe
BORING DRILLED BY: FIRM: GESTRA, CREW CHIEF: D. Harvey	FIELD LOG: C. Dietz	NORTHING: 389283	DRILLING METHOD: 2¼" HSA
	LAB LOG / QC: D. Dettmers	EASTING: 2415140	SURFACE ELEVATION: 919.8 ft

Number and Type	Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation	Soil Description and Geological Origin for Each Major Unit	USCS Classification	Graphic	Well Diagram	Unconfined Comp. Strength (Q_u or Q_p) (tsf)	Liquid Limit	Plasticity Index	Moisture Content (%)	Comments
						TOPSOIL (10-inches) — 0.8 (919)								
SS - 1	20	2 1 2 2	3			LEAN CLAY, brown, moist, stiff, trace sand, with gravel at 3'	CL			1.75			22.1	
SS - 2	10	1 4 6 10	10			— 4 (915.8)				1.00			23.1	
SS - 3	10	25 31 28 15	59	5	915.0	SAND WITH SILT AND GRAVEL, light brown, moist, very dense, possible cobbles — 6 (913.8)	SP-SM							
SS - 4	11	10 10 8 14	18			CLAYEY GRAVEL WITH SAND, light brown, moist, medium dense to very dense, sand with silt layers	GC							P200 = 32.5%
SS - 5	10	28 38 50/3	R			— 9.3 (910.5)								
				10	910.0	End of Boring at 9.3 ft.								Auger Refusal at 9.5'. Possible bedrock
				15	905.0									
				20	900.0									

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE ft.	CAVE DEPTH AT COMPLETION: NMR (WET ☐ DRY ☐)
WATER LEVEL AT COMPLETION: NE	CAVE DEPTH AFTER 0 HOURS: NMR (WET ☐ DRY ☐)
WATER LEVEL AFTER NE HOURS: NMR	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

GESTRA Engineering Inc.
191 W Edgerton Avenue
Milwaukee, WI 53207
Phone: 414-933-7444, Fax: 414-933-7844

SOIL BORING LOG

PROJECT NAME: Thomas Farms Development	DATE DRILLING STARTED: 4/11/2023	BORING NUMBER: B-5	
PROJECT LOCATION: Delafield, Wisconsin	DATE DRILLING ENDED: 4/11/2023	PROJECT NUMBER: 23083-10	DRILLING RIG: Geoprobe
BORING DRILLED BY: FIRM: GESTRA, CREW CHIEF: D. Harvey	FIELD LOG: B. Griffin	NORTHING: 389182	DRILLING METHOD: 2¼" HSA
	LAB LOG / QC: D. Dettmers	EASTING: 2414717	SURFACE ELEVATION: 917.7 ft

Number and Type	Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation	Soil Description and Geological Origin for Each Major Unit	USCS Classification	Graphic	Well Diagram	Unconfined Comp. Strength (Q_u or Q_p) (tsf)	Liquid Limit	Plasticity Index	Moisture Content (%)	Comments
						TOPSOIL (10-inches) 0.8 (916.9)								
SS - 1	9	2 2 3 3	5			CLAYEY SAND, light brown, moist, very loose to dense								
SS - 2	15	3 3 3 4	6		915.0		SC							
SS - 3	15	2 16 22 31	38	5		5 (912.7) GRAVEL WITH SAND AND SILT, brown and gray, moist, dense to very dense								
SS - 4	3	4 50/5"	R			6.9 (910.8)	GP-GM							
					910.0	End of Boring at 6.9 ft.								Driller noted auger refusal at 6.5. Possible bedrock.
				10										
					905.0									
				15										
					900.0									
				20										

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE ft.	CAVE DEPTH AT COMPLETION: NMR (WET ☐ DRY ☐)
WATER LEVEL AT COMPLETION: NE	CAVE DEPTH AFTER 0 HOURS: NMR (WET ☐ DRY ☐)
WATER LEVEL AFTER 0 HOURS: NE	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

SOIL BORING LOG

GESTRA Engineering Inc.
191 W Edgerton Avenue
Milwaukee, WI 53207
Phone: 414-933-7444, Fax: 414-933-7844

PROJECT NAME: Thomas Farms Development	DATE DRILLING STARTED: 4/11/2023	BORING NUMBER: B-6	
PROJECT LOCATION: Delafield, Wisconsin	DATE DRILLING ENDED: 4/11/2023	PROJECT NUMBER: 23083-10	DRILLING RIG: Geoprobe
BORING DRILLED BY: FIRM: GESTRA, CREW CHIEF: D. Harvey	FIELD LOG: C. Dietz	NORTHING: 389011	DRILLING METHOD: 2¼" HSA
	LAB LOG / QC: D. Dettmers	EASTING: 2414577	SURFACE ELEVATION: 912.4 ft

Number and Type	Recovery (in)	Blow Counts	N - Value	Depth (ft) / Elevation	Soil Description and Geological Origin for Each Major Unit	USCS Classification	Graphic	Well Diagram	Unconfined Comp. Strength (Q_u or Q_p) (tsf)	Liquid Limit	Plasticity Index	Moisture Content (%)	Comments
					TOPSOIL (11-inches) — 0.9 (911.5)								
SS - 1	14	1, 2, 1, 2	3		LEAN CLAY, brown, moist, stiff	CL			1.0			20.1	
SS - 2	14	2, 6, 7, 6	13	910.0	— 3 (909.4)								
					CLAYEY SAND WITH GRAVEL, light brown, moist, medium dense to very dense, brown sand layer at 6'	SC-SM							Gravel = 25.0% Sand = 33.2% P200 =41.8%
SS - 3	16	4, 16, 9, 4	25	5									
SS - 4	12	13, 9, 10, 43	19	905.0									
SS - 5	13	16, 15, 14, 12	29	10									
SS - 6	14	24, 32, 32, 25	64										
SS - 7	18	64, 55, 60/2"	R	900.0	— 13.5 (898.9)								
					End of Boring at 13.2 ft.								Driller noted auger refusal at 13.5'. Possible bedrock.
				15									
				895.0									
				20									

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE ft.	CAVE DEPTH AT COMPLETION: NMR (WET ☐ DRY ☐)
WATER LEVEL AT COMPLETION: NE	CAVE DEPTH AFTER 0 HOURS: NMR (WET ☐ DRY ☐)
WATER LEVEL AFTER 0 HOURS: NMR	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

SOIL BORING LOG

GESTRA Engineering Inc.
191 W Edgerton Avenue
Milwaukee, WI 53207
Phone: 414-933-7444, Fax: 414-933-7844

PAGE NUMBER	1 of 1		
PROJECT NAME	Thomas Farms Development	DATE DRILLING STARTED	4/11/2023
PROJECT LOCATION	Delafield, Wisconsin	DATE DRILLING ENDED	4/11/2023
BORING NUMBER	B-7	PROJECT NUMBER	23083-10
DRILLING RIG	Geoprobe	DRILLING METHOD	2¼" HSA
BORING DRILLED BY	FIRM: GESTRA CREW CHIEF: D. Harvey	SURFACE ELEVATION	916.3 ft
FIELD LOG	B. Griffin	NORTHING	388598
LAB LOG / QC	D. Dettmers	EASTING	2414571

Number and Type	Recovery (in)	Blow Counts	N - Value	Depth (ft) / Elevation	Soil Description and Geological Origin for Each Major Unit	USCS Classification	Graphic	Well Diagram	Unconfined Comp. Strength (Q_u or Q_p) (tsf)	Liquid Limit	Plasticity Index	Moisture Content (%)	Comments
					TOPSOIL (10-inches) 0.8 (915.5)								
SS - 1	18	0 1 2 4	3	915.0	LEAN CLAY, brown, moist, stiff, trace sand 2 (914.3)	CL			1.00			22.7	
SS - 2	14	0 2 3 2	5		LEAN CLAY WITH SAND, light brown, moist to very moist, medium stiff, trace gravel				0.50			12.3	
SS - 3	12	2 5 6 8	11	5		CL			0-0.25			9.2	
SS - 4	9	3 5 4 3	9	910.0	8 (908.3)				0-0.25			9	
SS - 5	14	8 30 50/3"	R		GRAVEL WITH SAND, brown and gray, wet, very dense 9.3 (907)	GP							
				10	End of Boring at 9.3 ft.								Driller noted auger refusal at 9.5'. Possible bedrock.
				905.0 / 15 / 900.0 / 20									

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: 7.5 ft.	CAVE DEPTH AT COMPLETION: NMR (WET ☐ DRY ☐)
WATER LEVEL AT COMPLETION: 3 ft.	CAVE DEPTH AFTER 0 HOURS: NMR (WET ☐ DRY ☐)
WATER LEVEL AFTER 3 HOURS: 0.4 ft.	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

SOIL BORING LOG

GESTRA Engineering Inc.
191 W Edgerton Avenue
Milwaukee, WI 53207
Phone: 414-933-7444, Fax: 414-933-7844

PROJECT NAME	Thomas Farms Development
DATE DRILLING STARTED	4/10/2023
BORING NUMBER	B-8
PROJECT LOCATION	Delafield, Wisconsin
DATE DRILLING ENDED	4/10/2023
PROJECT NUMBER	23083-10
DRILLING RIG	Geoprobe
BORING DRILLED BY	FIRM: GESTRA CREW CHIEF: D. Harvey
FIELD LOG	B. Griffin
LAB LOG / QC	D. Dettmers
NORTHING	388826
EASTING	2415086
DRILLING METHOD	2¼" HSA
SURFACE ELEVATION	918.7 ft

Number and Type	Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation	Soil Description and Geological Origin for Each Major Unit	USCS Classification	Graphic	Well Diagram	Unconfined Comp. Strength (Q_u or Q_p) (tsf)	Liquid Limit	Plasticity Index	Moisture Content (%)	Comments
						TOPSOIL (10-inches) 0.8 (917.9)								
SS - 1	16	2 2 2 2	4			SANDY LEAN CLAY, brown, moist, stiff	CL			1.00	48	27	21.7	
						top of engineered soil at basin 8 (elev 916.5)								
SS - 2	13	2 2 3 2	5		915.0	0.04 in/hr				1.00			27.6	P200 = 52.8%
						bottom of basin 8 (elev 915.5)								
SS - 3	12	1 1 2 50/5"	3	5		5.9 (912.8)							9.2	
						Gravelly at 5.5' End of Boring at 5.9 ft.								Auger Refusal at 6.5'. Possible bedrock.
				10	910.0									
				15	905.0									
				20	900.0									

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NMR ft.	CAVE DEPTH AT COMPLETION: NMR (WET / DRY)
WATER LEVEL AT COMPLETION: NMR	CAVE DEPTH AFTER 0 HOURS: NMR (WET / DRY)
WATER LEVEL AFTER 0 HOURS: NMR	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

SOIL BORING LOG

GESTRA Engineering Inc.
191 W Edgerton Avenue
Milwaukee, WI 53207
Phone: 414-933-7444, Fax: 414-933-7844

PROJECT NAME: Thomas Farms Development	DATE DRILLING STARTED: 4/10/2023	BORING NUMBER: B-9	
PROJECT LOCATION: Delafield, Wisconsin	DATE DRILLING ENDED: 4/10/2023	PROJECT NUMBER: 23083-10	DRILLING RIG: Geoprobe
BORING DRILLED BY: FIRM: GESTRA, CREW CHIEF: D. Harvey	FIELD LOG: B. Griffin	NORTHING: 388693	DRILLING METHOD: 2¼" HSA
	LAB LOG / QC: D. Dettmers	EASTING: 2415182	SURFACE ELEVATION: 919.2 ft

Number and Type	Recovery (in)	Blow Counts	N - Value	Depth (ft) / Elevation	Soil Description and Geological Origin for Each Major Unit	USCS Classification	Graphic	Well Diagram	Unconfined Comp. Strength (Q_u or Q_p) (tsf)	Liquid Limit	Plasticity Index	Moisture Content (%)	Comments
					TOPSOIL (thickness not recorded)								
SS - 1	15	2 2 3 3	5		LEAN CLAY, brown, moist, stiff, trace to with sand	CL			1.00			23.8	
SS - 2	17	2 4 3 3	7		4 (915.2)				1.00			26	
SS - 3	13	2 6 3 3	9	915.0 / 5	CLAYEY SAND WITH GRAVEL, brown, moist to wet, loose; 6 (913.2)	SC-SM							Gravel = 17.1% Sand = 36.5% P200 =46.4%
SS - 4	17	1 2 3 5	5		LEAN CLAY, brown, moist, stiff, with gravel and sand at 8.5'	CL			1.50			20	
SS - 5	4	11 50/3"	R		8.8 (910.4)				0.50			20.1	
				910.0 / 10	End of Boring at 8.8 ft.								Driller noted auger refusal at 9'. Possible bedrock.
				905.0 / 15									
				900.0 / 20									

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NMR ft.	CAVE DEPTH AT COMPLETION: NMR (WET ☐ DRY ☐)
WATER LEVEL AT COMPLETION: NMR	CAVE DEPTH AFTER 0 HOURS: NMR (WET ☐ DRY ☐)
WATER LEVEL AFTER 0 HOURS: NMR	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

GESTRA Engineering Inc.
191 W Edgerton Avenue
Milwaukee, WI 53207
Phone: 414-933-7444, Fax: 414-933-7844

SOIL BORING LOG

PROJECT NAME: Thomas Farms Development	DATE DRILLING STARTED: 4/7/2023	BORING NUMBER: B-10	
PROJECT LOCATION: Delafield, Wisconsin	DATE DRILLING ENDED: 4/7/2023	PROJECT NUMBER: 23083-10	DRILLING RIG: Geoprobe
BORING DRILLED BY: FIRM: GESTRA; CREW CHIEF: D. Harvey	FIELD LOG: C. Dietz	NORTHING: 389054	DRILLING METHOD: 2¼" HSA
	LAB LOG / QC: D. Dettmers	EASTING: 2415325	SURFACE ELEVATION: 920.8 ft

Number and Type	Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation	Soil Description and Geological Origin for Each Major Unit	USCS Classification	Graphic	Well Diagram	Unconfined Comp. Strength (Q_u or Q_p) (tsf)	Liquid Limit	Plasticity Index	Moisture Content (%)	Comments
					920.0	TOPSOIL (9-inches) 0.8 (920)								
SS - 1	18	2 1 2 3	3			LEAN CLAY, brown, moist, stiff to very stiff, trace sand, with gravel at 3'	CL			1.25-2.00			21.1	
SS - 2	9	2 3 3 4	6							1.25			18.7	
SS - 3	15	2 4 16 19	20	5	915.0	5 (915.8) GRAVEL WITH SILT AND SAND, light brown, moist, medium dense to dense	GP-GM							
SS - 4	19	16 20 25 22	45											
SS - 5	14	18 26 26 24	52	10										
SS - 6	14	9 34 50/4"	R		910.0	SS-6: Silty Sand with gravel layer 11.3 (909.5)								
						End of Boring at 11.3 ft.								Auger Refusal at 12'. Possible bedrock.
				15	905.0									
				20	900.0									

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE ft.	CAVE DEPTH AT COMPLETION: NMR (WET ☐ DRY ☐)
WATER LEVEL AT COMPLETION: NE	CAVE DEPTH AFTER 0 HOURS: NMR (WET ☐ DRY ☐)
WATER LEVEL AFTER NE HOURS: NMR	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

SOIL BORING LOG

GESTRA Engineering Inc.
191 W Edgerton Avenue
Milwaukee, WI 53207
Phone: 414-933-7444, Fax: 414-933-7844

PROJECT NAME: Thomas Farms Development	DATE DRILLING STARTED: 4/7/2023	BORING NUMBER: B-11	
PROJECT LOCATION: Delafield, Wisconsin	DATE DRILLING ENDED: 4/7/2023	PROJECT NUMBER: 23083-10	DRILLING RIG: Geoprobe
BORING DRILLED BY: FIRM: GESTRA; CREW CHIEF: D. Harvey	FIELD LOG: C. Dietz	NORTHING: 388704	DRILLING METHOD: 2¼" HSA
	LAB LOG / QC: D. Dettmers	EASTING: 2415559	SURFACE ELEVATION: 917.8 ft

Number and Type	Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation	Soil Description and Geological Origin for Each Major Unit	USCS Classification	Graphic	Well Diagram	Unconfined Comp. Strength (Q_u or Q_p) (tsf)	Liquid Limit	Plasticity Index	Moisture Content (%)	Comments
						TOPSOIL (9-inches) 0.8 (917)								
SS - 1	24	2 2 3 3	5			LEAN CLAY, brown, moist, stiff to very stiff, trace sand 2 (915.8)	CL			1.25-2.00			25	
SS - 2	18	2 1 1 2	2		915.0	CLAYEY SAND WITH GRAVEL, light brown, very moist, very loose 4 (913.8)	SC							
SS - 3	9	4 50/3"	R	5		LEAN CLAY, light brown, moist, very stiff, trace sand 4.8 (913)	CL			2.5			14.4	
						End of Boring at 4.8 ft.								Driller noted auger refusal at 5.5'. Possible bedrock.
					910.0									
				10										
					905.0									
				15										
					900.0									
				20										

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE ft.	CAVE DEPTH AT COMPLETION: NMR (WET ☐ DRY ☐)
WATER LEVEL AT COMPLETION: NE	CAVE DEPTH AFTER 0 HOURS: NMR (WET ☐ DRY ☐)
WATER LEVEL AFTER NE HOURS: NMR	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

SOIL BORING LOG

GESTRA

GESTRA Engineering Inc.
191 W Edgerton Avenue
Milwaukee, WI 53207
Phone: 414-933-7444, Fax: 414-933-7844

PROJECT NAME: Thomas Farms Development		DATE DRILLING STARTED: 4/7/2023	BORING NUMBER: B-12
PROJECT LOCATION: Delafield, Wisconsin		DATE DRILLING ENDED: 4/7/2023	PROJECT NUMBER: 23083-10
			DRILLING RIG: Geoprobe
BORING DRILLED BY: FIRM: GESTRA; CREW CHIEF: D. Harvey	FIELD LOG: C. Dietz	NORTHING: 388072	DRILLING METHOD: 2¼" HSA
	LAB LOG / QC: D. Dettmers	EASTING: 2415606	SURFACE ELEVATION: 917.4 ft

Number and Type	Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation	Soil Description and Geological Origin for Each Major Unit	USCS Classification	Graphic	Well Diagram	Unconfined Comp. Strength (Q_u or Q_p) (tsf)	Liquid Limit	Plasticity Index	Moisture Content (%)	Comments
						TOPSOIL (10.5-inches) 0.9 (916.5)								
SS - 1	21	2 2 2 3	4			LEAN CLAY, brown, moist, stiff, trace sand	CL			1.25			18.3	
					915.0	3 (914.4)								
SS - 2	14	2 39 50/2	R			GRAVEL WITH SAND, light brown, moist, very dense, trace to with silt, (Possible Weathered Bedrock)	GP							
SS - 3	4	13 15 50/0"	R	5		5 (912.4)								Driller noted auger refusal at 5'. Possible bedrock.
						End of Boring at 5.0 ft.								
					910.0									
				10										
					905.0									
				15										
					900.0									
				20										

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE ft.	CAVE DEPTH AT COMPLETION: NMR (WET ☐ DRY ☐)
WATER LEVEL AT COMPLETION: NE	CAVE DEPTH AFTER 0 HOURS: NMR (WET ☐ DRY ☐)
WATER LEVEL AFTER NE HOURS: NMR	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

SOIL BORING LOG

GESTRA

GESTRA Engineering Inc.
191 W Edgerton Avenue
Milwaukee, WI 53207
Phone: 414-933-7444, Fax: 414-933-7844

PROJECT NAME: Thomas Farms Development	DATE DRILLING STARTED: 4/10/2023	BORING NUMBER: **B-13**	
PROJECT LOCATION: Delafield, Wisconsin	DATE DRILLING ENDED: 4/10/2023	PROJECT NUMBER: 23083-10	DRILLING RIG: Geoprobe
BORING DRILLED BY: FIRM: GESTRA, CREW CHIEF: D. Harvey	FIELD LOG: B. Griffin	NORTHING: 388168	DRILLING METHOD: 2¼" HSA
	LAB LOG / QC: D. Dettmers	EASTING: 2415163	SURFACE ELEVATION: 921.7 ft

Number and Type	Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation	Soil Description and Geological Origin for Each Major Unit	USCS Classification	Graphic	Well Diagram	Unconfined Comp. Strength (Q_u or Q_p) (tsf)	Liquid Limit	Plasticity Index	Moisture Content (%)	Comments
						TOPSOIL (10-inches) 0.8 (920.9)								
SS - 1	14	2 2 4 3	6		920.0	LEAN CLAY, brown, moist, very stiff 2 (919.7)	CL			2.50			25.1	
SS - 2	15	2 2 2 1	4			CLAYEY SAND, light brown, moist to wet, very loose 4.2 (917.5)	SC							
SS - 3	1	50/2"	R			End of Boring at 4.2 ft.								Driller noted auger refusal at 4.5'. Possible bedrock.
				5										
					915.0									
				10										
					910.0									
				15										
					905.0									
				20										

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE ft.	CAVE DEPTH AT COMPLETION: NMR (WET ☐ DRY ☐)
WATER LEVEL AT COMPLETION: NE	CAVE DEPTH AFTER 0 HOURS: NMR (WET ☐ DRY ☐)
WATER LEVEL AFTER NE HOURS: NMR	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

SOIL BORING LOG

GESTRA

GESTRA Engineering Inc.
191 W Edgerton Avenue
Milwaukee, WI 53207
Phone: 414-933-7444, Fax: 414-933-7844

PROJECT NAME: Thomas Farms Development	DATE DRILLING STARTED: 4/11/2023	BORING NUMBER: B-14	
PROJECT LOCATION: Delafield, Wisconsin	DATE DRILLING ENDED: 4/11/2023	PROJECT NUMBER: 23083-10	DRILLING RIG: Geoprobe
BORING DRILLED BY: FIRM: GESTRA; CREW CHIEF: D. Harvey	FIELD LOG: B. Griffin	NORTHING: 388248	DRILLING METHOD: 2¼" HSA
	LAB LOG / QC: D. Dettmers	EASTING: 2414917	SURFACE ELEVATION: 925.2 ft

Number and Type	Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation	Soil Description and Geological Origin for Each Major Unit	USCS Classification	Graphic	Well Diagram	Unconfined Comp. Strength (Q_u or Q_p) (tsf)	Liquid Limit	Plasticity Index	Moisture Content (%)	Comments
						TOPSOIL (10-inches) — 0.8 (924.4)								
SS - 1	15	2 1 2 6	3			LEAN CLAY, brown, moist, very stiff, trace sand — 2 (923.2)	CL			2.5			25.4	
SS - 2	18	6 10 15 14	25			SILTY SAND WITH CLAY AND GRAVEL, reddish brown, moist, medium dense	SP-SM							
SS - 3	12	13 21 15 14	36	5	920.0									P200 = 22.5%
SS - 4	15	7 9 16 23	25			— 7.6 (917.6)								
SS - 5		50/1"	R			End of Boring at 7.6 ft.								Driller noted no recovery for SS-5. Auger refusal at 7.5'. Possible bedrock.
				10	915.0									
				15	910.0									
				20	905.0									

top of engineered soil at rain garden 7 (elev 921.3)

0.11 in/hr

bottom of rain garden 7 (elev 920.3)

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE ft.	CAVE DEPTH AT COMPLETION: NMR (WET / DRY)
WATER LEVEL AT COMPLETION: NE	CAVE DEPTH AFTER 0 HOURS: NMR (WET / DRY)
WATER LEVEL AFTER 0 HOURS: NMR	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

GESTRA

GESTRA Engineering Inc.
191 W Edgerton Avenue
Milwaukee, WI 53207
Phone: 414-933-7444, Fax: 414-933-7844

SOIL BORING LOG

PROJECT NAME	Thomas Farms Development
PROJECT LOCATION	Delafield, Wisconsin
DATE DRILLING STARTED	4/11/2023
DATE DRILLING ENDED	4/11/2023
BORING NUMBER	B-15
PROJECT NUMBER	23083-10
DRILLING RIG	Geoprobe
BORING DRILLED BY	FIRM: GESTRA CREW CHIEF: D. Harvey
FIELD LOG	B. Griffin
LAB LOG / QC	D. Dettmers
NORTHING	387917
EASTING	2414812
DRILLING METHOD	2¼" HSA
SURFACE ELEVATION	926.8 ft

Number and Type	Recovery (in)	Blow Counts	N - Value	Depth (ft) / Elevation	Soil Description and Geological Origin for Each Major Unit	USCS Classification	Graphic	Well Diagram	Unconfined Comp. Strength (Q_u or Q_p) (tsf)	Liquid Limit	Plasticity Index	Moisture Content (%)	Comments
					TOPSOIL (10-inches) 0.8 (926)								
SS - 1	15	2 2 2 2	4	925.0	LEAN CLAY, brown, moist, stiff	CL			1.0			21.8	
SS - 2	8	1 4 5 5	9		4 (922.8)				1.5			27.3	
SS - 3	17	4 4 9 5	13	5	CLAYEY SAND, light brown, moist to very moist, loose to very dense, trace to with gravel	SC							
SS - 4	12	4 5 5 6	10	920.0	SS-4: black sand layer								
SS - 5	0	5 50/5"	R		8.9 (917.9)								
				10	End of Boring at 8.9 ft.								Driller noted auger refusal at 9.5'. Possible bedrock.
				915.0									
				15									
				910.0									
				20									

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE ft.	CAVE DEPTH AT COMPLETION: NMR (WET / DRY)
WATER LEVEL AT COMPLETION: NE	CAVE DEPTH AFTER 0 HOURS: NMR (WET / DRY)
WATER LEVEL AFTER 0 HOURS: NMR	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

GESTRA

GESTRA Engineering Inc.
191 W Edgerton Avenue
Milwaukee, WI 53207
Phone: 414-933-7444, Fax: 414-933-7844

SOIL BORING LOG

PROJECT NAME: Thomas Farms Development	DATE DRILLING STARTED: 4/11/2023	BORING NUMBER: B-16	
PROJECT LOCATION: Delafield, Wisconsin	DATE DRILLING ENDED: 4/11/2023	PROJECT NUMBER: 23083-10	DRILLING RIG: Geoprobe
BORING DRILLED BY: FIRM: GESTRA; CREW CHIEF: D. Harvey	FIELD LOG: C. Dietz; LAB LOG / QC: D. Dettmers	NORTHING: 387955; EASTING: 2414415	DRILLING METHOD: 2¼" HSA; SURFACE ELEVATION: 930.5 ft

Number and Type	Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation	Soil Description and Geological Origin for Each Major Unit	USCS Classification	Graphic	Well Diagram	Unconfined Comp. Strength (Q_u or Q_p) (tsf)	Liquid Limit	Plasticity Index	Moisture Content (%)	Comments
					930.0	TOPSOIL (9-inches) — 0.8 (929.7)								
SS - 1	18	1 1 2 2	3			LEAN CLAY, brown, moist, stiff, trace sand	CL			1.0			21.2	
SS - 2	9	2 17 5 5	22			— 4 (926.5)				1.5			22.8	
SS - 3	9	2 3 4 3	7	5	925.0	LEAN CLAY WITH SAND, light brown to brown, moist, medium stiff, trace to with gravel — 6 (924.5)	CL			0.5			12.3	
SS - 4	6	2 5 6 9	11			GRAVEL WITH SAND AND SILT, light brown, moist to wet, medium dense to very dense	GP-GM							
SS - 5	4	50/5"	R			— 8.4 (922.1)								
						End of Boring at 8.4 ft.								Driller noted auger refusal at 8.5'. Possible bedrock.
				10	920.0									
				15	915.0									
				20	910.0									

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: 8 ft.	CAVE DEPTH AT COMPLETION: NMR (WET ☐ DRY ☐)
WATER LEVEL AT COMPLETION: 8 ft.	CAVE DEPTH AFTER 0 HOURS: NMR (WET ☐ DRY ☐)
WATER LEVEL AFTER 1.5 HOURS: 7.5 ft.	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

GESTRA Engineering Inc.
191 W Edgerton Avenue
Milwaukee, WI 53207
Phone: 414-933-7444, Fax: 414-933-7844

SOIL BORING LOG

PROJECT NAME: Thomas Farms Development	DATE DRILLING STARTED: 4/11/2023	BORING NUMBER: B-17	
PROJECT LOCATION: Delafield, Wisconsin	DATE DRILLING ENDED: 4/11/2023	PROJECT NUMBER: 23083-10	DRILLING RIG: Geoprobe
BORING DRILLED BY: FIRM: GESTRA, CREW CHIEF: D. Harvey	FIELD LOG: C. Dietz	NORTHING: 388402	DRILLING METHOD: 2¼" HSA
	LAB LOG / QC: D. Dettmers	EASTING: 2414212	SURFACE ELEVATION: 925 ft

Number and Type	Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation	Soil Description and Geological Origin for Each Major Unit	USCS Classification	Graphic	Well Diagram	Unconfined Comp. Strength (Q_u or Q_p) (tsf)	Liquid Limit	Plasticity Index	Moisture Content (%)	Comments
						TOPSOIL (6.5-inches) — 0.5 (924.5)								
SS - 1	15	1 1 2 3	3			LEAN CLAY, brown, moist, stiff, trace sand	CL			1.5			26	
SS - 2	11	1 3 4 12	7			— 3.5 (921.5)							13.2	
SS - 3	15	4 17 14 9	31	5	920.0	SAND WITH SILT AND GRAVEL, brown, moist to wet, medium dense to very dense SS-3: sandy lean clay layer	SP-SM							
SS - 4	15	14 17 12 9	29											
SS - 5	2	50/5"	R			— 8.4 (916.6)								
						End of Boring at 8.4 ft.								Driller noted auger refusal at 8.5'. Possible bedrock.
				10	915.0									
				15	910.0									
				20	905.0									

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: 8 ft.	CAVE DEPTH AT COMPLETION: NMR (WET ☐ DRY ☐)
WATER LEVEL AT COMPLETION: 8 ft.	CAVE DEPTH AFTER 0 HOURS: NMR (WET ☐ DRY ☐)
WATER LEVEL AFTER 2 HOURS: 8 ft.	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

SOIL BORING LOG

GESTRA
GESTRA Engineering Inc.
191 W Edgerton Avenue
Milwaukee, WI 53207
Phone: 414-933-7444, Fax: 414-933-7844

PROJECT NAME: Thomas Farms Development	DATE DRILLING STARTED: 4/11/2023	BORING NUMBER: **B-18**	
PROJECT LOCATION: Delafield, Wisconsin	DATE DRILLING ENDED: 4/11/2023	PROJECT NUMBER: 23083-10	DRILLING RIG: Geoprobe
BORING DRILLED BY: FIRM: GESTRA; CREW CHIEF: D. Harvey	FIELD LOG: B. Griffin	NORTHING: 388286	DRILLING METHOD: 2¼" HSA
	LAB LOG / QC: D. Dettmers	EASTING: 2414066	SURFACE ELEVATION: 931.2 ft

Number and Type	Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation	Soil Description and Geological Origin for Each Major Unit	USCS Classification	Graphic	Well Diagram	Unconfined Comp. Strength (Q_u or Q_p) (tsf)	Liquid Limit	Plasticity Index	Moisture Content (%)	Comments
						TOPSOIL (6-inches)								
SS - 1	12	2 2 3 3	5		930.0	0.5 (930.7) LEAN CLAY, brown, moist, stiff, trace sand and gravel	CL			1.0			26.5	
SS - 2	11	2 4 16 20	20			3 (928.2) GRAVEL WITH SILT AND SAND, light brown, moist, medium dense to dense								
SS - 3	13	16 15 17 18	32	5			GP-GM							P200 = 17.9%
SS - 4	1	50/3"	R		925.0	6.3 (924.9)								
						End of Boring at 6.3 ft.								Driller noted auger refusal at 6.5'. Possible bedrock.
				10	920.0									
				15	915.0									
				20										

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE ft.	CAVE DEPTH AT COMPLETION: NMR (WET ☐ DRY ☐)
WATER LEVEL AT COMPLETION: NE	CAVE DEPTH AFTER 0 HOURS: NMR (WET ☐ DRY ☐)
WATER LEVEL AFTER 0 HOURS: NMR	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

SOIL BORING LOG

GESTRA Engineering Inc.
191 W Edgerton Avenue
Milwaukee, WI 53207
Phone: 414-933-7444, Fax: 414-933-7844

PROJECT NAME	Thomas Farms Development
PROJECT LOCATION	Delafield, Wisconsin
DATE DRILLING STARTED	4/11/2023
DATE DRILLING ENDED	4/11/2023
BORING NUMBER	B-19
PROJECT NUMBER	23083-10
DRILLING RIG	Geoprobe
BORING DRILLED BY	FIRM: GESTRA CREW CHIEF: D. Harvey
FIELD LOG	B. Griffin
LAB LOG / QC	D. Dettmers
NORTHING	387504
EASTING	2414212
DRILLING METHOD	2¼" HSA
SURFACE ELEVATION	934.9 ft

Number and Type	Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation	Soil Description and Geological Origin for Each Major Unit	USCS Classification	Graphic	Well Diagram	Unconfined Comp. Strength (Q_u or Q_p) (tsf)	Liquid Limit	Plasticity Index	Moisture Content (%)	Comments
						TOPSOIL (10") 0.8 (934.1)								
SS - 1	18	4 5 4 5	9			CLAYEY SAND, brown, moist, loose to medium dense 3 (931.9)	SC							P200 = 44.5%
SS - 2	18	4 5 13 12	18			SAND, brown, moist, medium dense 4.7 (930.2)	SP							
SS - 3	18	15 18 22 22	40	5	930.0	CLAYEY SAND, red brown, dry to moist, dense to very dense, trace gravel	SC							P200 = 42.9%
SS - 4	18	9 20 24 22	44											
SS - 5		16 22 50/1"	R			9.1 (925.8)								Driller did not record recovery on field log.
				10	925.0	End of Boring at 9.1 ft.								Driller noted auger refusal at 9.5'. Possible bedrock.
				15	920.0									
				20	915.0									

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE ft.	CAVE DEPTH AT COMPLETION: NMR (WET ☐ DRY ☐)
WATER LEVEL AT COMPLETION: NE	CAVE DEPTH AFTER 0 HOURS: NMR (WET ☐ DRY ☐)
WATER LEVEL AFTER 0 HOURS: NMR	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

SOIL BORING LOG

GESTRA

GESTRA Engineering Inc.
191 W Edgerton Avenue
Milwaukee, WI 53207
Phone: 414-933-7444, Fax: 414-933-7844

PROJECT NAME: Thomas Farms Development		DATE DRILLING STARTED: 4/11/2023	BORING NUMBER: B-20
PROJECT LOCATION: Delafield, Wisconsin		DATE DRILLING ENDED: 4/11/2023	PROJECT NUMBER: 23083-10
			DRILLING RIG: Geoprobe
BORING DRILLED BY: FIRM: GESTRA; CREW CHIEF: D. Harvey	FIELD LOG: B. Griffin	NORTHING: 387522	DRILLING METHOD: 2¼" HSA
	LAB LOG / QC: D. Dettmers	EASTING: 2414883	SURFACE ELEVATION: 925.6 ft

Number and Type	Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation	Soil Description and Geological Origin for Each Major Unit	USCS Classification	Graphic	Well Diagram	Unconfined Comp. Strength (Q_u or Q_p) (tsf)	Liquid Limit	Plasticity Index	Moisture Content (%)	Comments
					925.0	TOPSOIL (9-inches) 0.8 (924.8)								
SS - 1	10	2 3 3 4	6			LEAN CLAY, brown with gray and black mottling, moist, very soft to very stiff, trace sand	CL			1.0			24.7	
SS - 2	14	2 4 3 4	7							2.0	35	20	22.1	
SS - 3	10	1 0 1 1	1	5	920.0	SS-3: with silt				0-0.25			20.6	
SS - 4	0	0 50/1"	R			SS-4: with silt 6.6 (919)				0.5-1.5			18.6	Driller noted auger refusal at 6.5'. Possible bedrock.
						End of Boring at 6.6 ft.								
				10	915.0									
				15	910.0									
				20	905.0									

07 in/hr

top of engineered soil at rain garden 5 (elev 922.0)

bottom of rain garden 5 (elev 921.0)

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE ft.	CAVE DEPTH AT COMPLETION: NMR (WET ☐ DRY ☐)
WATER LEVEL AT COMPLETION: NE	CAVE DEPTH AFTER 0 HOURS: NMR (WET ☐ DRY ☐)
WATER LEVEL AFTER 0 HOURS: NMR	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

SOIL BORING LOG

GESTRA

GESTRA Engineering Inc.
191 W Edgerton Avenue
Milwaukee, WI 53207
Phone: 414-933-7444, Fax: 414-933-7844

PROJECT NAME: Thomas Farms Development	DATE DRILLING STARTED: 4/12/2023	BORING NUMBER: B-21	PROJECT NUMBER: 23083-10
PROJECT LOCATION: Delafield, Wisconsin	DATE DRILLING ENDED: 4/12/2023	DRILLING RIG: Geoprobe	
BORING DRILLED BY: FIRM: GESTRA, CREW CHIEF: D. Harvey	FIELD LOG: C. Dietz	NORTHING: 387595	DRILLING METHOD: 2¼" HSA
	LAB LOG / QC: D. Dettmers	EASTING: 2415285	SURFACE ELEVATION: 917.7 ft

Number and Type	Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation	Soil Description and Geological Origin for Each Major Unit	USCS Classification	Graphic	Well Diagram	Unconfined Comp. Strength (Q_u or Q_p) (tsf)	Liquid Limit	Plasticity Index	Moisture Content (%)	Comments
SS - 1	9	3 50/3"				TOPSOIL (8-inches) 0.7 (917)								
SS - 2	3	10 18 26 35	44		915.0	GRAVEL WITH SAND, brown and light brown, moist, dense to very dense, possible cobbles or boulders at 1' 4.6 (913.1)	GP							
SS - 3	1	50/1"	R	5		End of Boring at 4.6 ft.								Driller noted auger refusal at 4.5'. Possible bedrock.
				10	910.0									
				15	905.0									
				20	900.0									

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE ft.	CAVE DEPTH AT COMPLETION: NMR (WET ☐ DRY ☐)
WATER LEVEL AT COMPLETION: NE	CAVE DEPTH AFTER 0 HOURS: NMR (WET ☐ DRY ☐)
WATER LEVEL AFTER 0 HOURS: NMR	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

SOIL BORING LOG

GESTRA Engineering Inc.
191 W Edgerton Avenue
Milwaukee, WI 53207
Phone: 414-933-7444, Fax: 414-933-7844

PROJECT NAME: Thomas Farms Development	DATE DRILLING STARTED: 4/12/2023	BORING NUMBER: **B-22**	
PROJECT LOCATION: Delafield, Wisconsin	DATE DRILLING ENDED: 4/12/2023	PROJECT NUMBER: 23083-10	DRILLING RIG: Geoprobe
BORING DRILLED BY: FIRM: GESTRA; CREW CHIEF: D. Harvey	FIELD LOG: C. Dietz	NORTHING: 387698	DRILLING METHOD: 2¼" HSA
	LAB LOG / QC: D. Dettmers	EASTING: 2415438	SURFACE ELEVATION: 916.3 ft

Number and Type	Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation	Soil Description and Geological Origin for Each Major Unit	USCS Classification	Graphic	Well Diagram	Unconfined Comp. Strength (Q_u or Q_p) (tsf)	Liquid Limit	Plasticity Index	Moisture Content (%)	Comments
						TOPSOIL (9-inches) 0.8 (915.5)								
SS - 1	20	0 0 1 2	1		915.0	LEAN CLAY WITH SAND, brown, moist, stiff, trace gravel, layer of brown/gray silty clay at 5'	CL			1			22.8	
SS - 2	19	0 3 3 3	6							2.25			23.5	
SS - 3	10	2 1 2 5	3	5		5 (911.3)				1.5				
						CLAYEY SAND WITH GRAVEL, brown, moist, medium dense								Gravel = 21.1% Sand = 33.6% P200 =45.4%
SS - 4	23	6 8 12 29	20		910.0	7.5 (908.8)	SC-SM							
SS - 5	1	50/1"	R			GRAVEL, light brown, moist, medium dense, with sand 8.1 (908.2)	GP							Driller noted auger refusal at 8.1'. Possible bedrock.
						End of Boring at 8.1 ft.								
				10	905.0									
				15	900.0									
				20										

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE ft.	CAVE DEPTH AT COMPLETION: NMR (WET ☐ DRY ☐)
WATER LEVEL AT COMPLETION: NE	CAVE DEPTH AFTER 0 HOURS: NMR (WET ☐ DRY ☐)
WATER LEVEL AFTER 0 HOURS: NMR	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

SOIL BORING LOG

GESTRA Engineering Inc.
191 W Edgerton Avenue
Milwaukee, WI 53207
Phone: 414-933-7444, Fax: 414-933-7844

PROJECT NAME: Thomas Farms Development		DATE DRILLING STARTED: 4/11/2023	BORING NUMBER: B-23
PROJECT LOCATION: Delafield, Wisconsin		DATE DRILLING ENDED: 4/11/2023	PROJECT NUMBER: 23083-10
			DRILLING RIG: Geoprobe
BORING DRILLED BY: FIRM: GESTRA; CREW CHIEF: D. Harvey	FIELD LOG: C. Dietz	NORTHING: 387716	DRILLING METHOD: 2¼" HSA
	LAB LOG / QC: D. Dettmers	EASTING: 2413881	SURFACE ELEVATION: 940.4 ft

Number and Type	Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation	Soil Description and Geological Origin for Each Major Unit	USCS Classification	Graphic	Well Diagram	Unconfined Comp. Strength (Q_u or Q_p) (tsf)	Liquid Limit	Plasticity Index	Moisture Content (%)	Comments
					940.0	TOPSOIL (10-inches) — 0.8 (939.6)								
SS - 1	20	2 4 12 9	16			CLAYEY SAND WITH GRAVEL, brown, moist, medium dense	SC							
SS - 2	9	9 9 9 7	18											
SS - 3	9	3 9 12 10	21	5	935.0	6 (934.4)								
SS - 4	12	7 10 10 7	20			SAND WITH SILT AND GRAVEL, light brown, moist, medium dense — 8 (932.4)	SP-SM							
SS - 5	16	19 24 33 29	57	10		SILTY SAND WITH GRAVEL, light brown to brown, moist, very dense, trace clay	SM							
SS - 6	5	21 50/2"	R		930.0	10.7 (929.7)								Driller noted auger refusal at 10.5'. Possible bedrock.
						End of Boring at 10.7 ft.								
				15	925.0									
				20	920.0									

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE ft.	CAVE DEPTH AT COMPLETION: NMR (WET ☐ DRY ☐)
WATER LEVEL AT COMPLETION: NE	CAVE DEPTH AFTER 0 HOURS: NMR (WET ☐ DRY ☐)
WATER LEVEL AFTER 0 HOURS: NMR	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

SOIL BORING LOG

GESTRA Engineering Inc.
191 W Edgerton Avenue
Milwaukee, WI 53207
Phone: 414-933-7444, Fax: 414-933-7844

PROJECT NAME	Thomas Farms Development
DATE DRILLING STARTED	4/11/2023
BORING NUMBER	B-24
PROJECT LOCATION	Delafield, Wisconsin
DATE DRILLING ENDED	4/11/2023
PROJECT NUMBER	23083-10
DRILLING RIG	Geoprobe
BORING DRILLED BY	FIRM: GESTRA CREW CHIEF: D. Harvey
FIELD LOG	C. Dietz
LAB LOG / QC	D. Dettmers
NORTHING	387950
EASTING	2413836
DRILLING METHOD	2¼" HSA
SURFACE ELEVATION	940.7 ft

Number and Type	Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation	Soil Description and Geological Origin for Each Major Unit	USCS Classification	Graphic	Well Diagram	Unconfined Comp. Strength (Q_u or Q_p) (tsf)	Liquid Limit	Plasticity Index	Moisture Content (%)	Comments
					940.0	TOPSOIL (8-inches) — 0.7 (940)								
SS - 1	14	2 6 12 12	18			SAND WITH GRAVEL, light brown, moist, medium dense — 2 (938.7)	SP							
SS - 2	17	3 3 3 3	6			CLAYEY SAND, light brown, moist, trace to with gravel	SC							
SS - 3	24	1 4 6 7	10	5	935.0									
SS - 4	21	3 14 16 18	30			7 (933.7) SILTY/CLAYEY SAND WITH GRAVEL, light brown, moist, dense SS-4: 10" clay layer	SC-SM							
SS - 5	21	5 14 22 50/3"	36			9.8 (930.9)								
				10	930.0	End of Boring at 9.8 ft.								Driller noted auger refusal at 10.5'. Possible bedrock.
				15	925.0									
				20	920.0									

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE ft.	CAVE DEPTH AT COMPLETION: NMR (WET ☐ DRY ☐)
WATER LEVEL AT COMPLETION: NE	CAVE DEPTH AFTER 0 HOURS: NMR (WET ☐ DRY ☐)
WATER LEVEL AFTER 0 HOURS: NMR	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

GESTRA
GESTRA Engineering Inc.
191 W Edgerton Avenue
Milwaukee, WI 53207
Phone: 414-933-7444, Fax: 414-933-7844

SOIL BORING LOG

PROJECT NAME: Thomas Farms Development	DATE DRILLING STARTED: 4/12/2023	BORING NUMBER: B-25	
PROJECT LOCATION: Delafield, Wisconsin	DATE DRILLING ENDED: 4/12/2023	PROJECT NUMBER: 23083-10	DRILLING RIG: Geoprobe
BORING DRILLED BY: FIRM: GESTRA, CREW CHIEF: D. Harvey	FIELD LOG: C. Dietz	NORTHING: 388347	DRILLING METHOD: 2¼" HSA
	LAB LOG / QC: D. Dettmers	EASTING: 2413452	SURFACE ELEVATION: 932.6 ft

Number and Type	Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation	Soil Description and Geological Origin for Each Major Unit	USCS Classification	Graphic	Well Diagram	Unconfined Comp. Strength (Q_u or Q_p) (tsf)	Liquid Limit	Plasticity Index	Moisture Content (%)	Comments
						TOPSOIL (7.5-inches) — 0.6 (932)								
SS - 1	18	2 1 2 2	3			LEAN CLAY WITH SAND, brown, moist, stiff, possible cobble or boulder at 2.5'	CL			1.5			21.5	
SS - 2	6	1 50/2"	R		930.0	— 4 (928.6)				1.0			25	
SS - 3	9	6 6 6 5	12	5		SILTY SAND WITH GRAVEL, moist, medium dense	SM							P200 = 19.5%
SS - 4	12	3 7 5 5	12		925.0	— 8 (924.6)								
SS - 5	6	15 30 18 14	48			GRAVEL WITH SAND, brown, very dense, trace silt	GP							
SS - 6	12	18 41 24	65	10		— 12.1 (920.5)								
SS - 7	1	50/1"	R		920.0	End of Boring at 12.1 ft.								Driller noted auger refusal at 12'. Possible bedrock
				15	915.0									
				20										

top of engineered soil at basin 2 (elev 931.0)

1.63 in/hr

bottom of basin 2 (elev 928.0)

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: 8 ft.	CAVE DEPTH AT COMPLETION: NMR (WET / DRY)
WATER LEVEL AT COMPLETION: 7 ft.	CAVE DEPTH AFTER 0 HOURS: NMR (WET / DRY)
WATER LEVEL AFTER 3 HOURS: 7 ft.	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

SOIL BORING LOG

GESTRA

GESTRA Engineering Inc.
191 W Edgerton Avenue
Milwaukee, WI 53207
Phone: 414-933-7444, Fax: 414-933-7844

PROJECT NAME: Thomas Farms Development	DATE DRILLING STARTED: 4/11/2023	BORING NUMBER: B-26	PROJECT NUMBER: 23083-10
PROJECT LOCATION: Delafield, Wisconsin	DATE DRILLING ENDED: 4/11/2023	DRILLING RIG: Geoprobe	
BORING DRILLED BY: FIRM: GESTRA; CREW CHIEF: S. Gonyer	FIELD LOG: C. Ray	NORTHING: 388013	DRILLING METHOD: 3¼" HSA
	LAB LOG / QC: D. Dettmers	EASTING: 2413386	SURFACE ELEVATION: 938.3 ft

Number and Type	Recovery (in)	Blow Counts	N - Value	Depth (ft) / Elevation	Soil Description and Geological Origin for Each Major Unit	USCS Classification	Graphic	Well Diagram	Unconfined Comp. Strength (Q_u or Q_p) (tsf)	Liquid Limit	Plasticity Index	Moisture Content (%)	Comments
					TOPSOIL (8-inches) — 0.7 (937.6)								
SS - 1	13	1 1 2 2	3		LEAN CLAY, brown, moist, very stiff, trace sand	CL			2.5			21.4	
SS - 2	14	1 3 3 3	6	935.0	— 4 (934.3)				2.0			26.9	
SS - 3	14	1 2 3 4	5	5	SILTY CLAY, light brown, moist, medium stiff to stiff	CL-ML			0.5-1.0			19.3	P200 = 97.2%
SS - 4	15	1 3 14 5	17		— 7 (931.3); SANDY LEAN CLAY WITH GRAVEL, brown, moist to wet, stiff	CL			1.0			20.2	
SS - 5	15	4 15 17 19	32	930.0 / 10					1.5			9.3	
SS - 6	14	5 14 19 21	33		SS-6: rock pieces				1.5			8.3	
SS - 7	19	9 45 19 16	64	925.0	— 13 (925.3); GRAVEL WITH SILT AND SAND, light brown, wet, very dense, rock pieces (possible weathered bedrock)	GP-GM							
SS - 8	12	6 24 50/3"	R	15	— 15.3 (923)								
				920.0 / 20	End of Boring at 15.3 ft.								Driller noted auger refusal at 16'. Possible bedrock.

0.11 in/hr

top of engineered soil at basin 1 (elev 933.5)

0.11 in/hr

bottom of basin 1 (elev 930.5)

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: 14 ft.	CAVE DEPTH AT COMPLETION: NMR (WET / DRY)
WATER LEVEL AT COMPLETION: 11 ft.	CAVE DEPTH AFTER 0 HOURS: NMR (WET / DRY)
WATER LEVEL AFTER 48 HOURS: 5 ft.	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

SOIL BORING LOG

GESTRA

GESTRA Engineering Inc.
191 W Edgerton Avenue
Milwaukee, WI 53207
Phone: 414-933-7444, Fax: 414-933-7844

PROJECT NAME: Thomas Farms Development	DATE DRILLING STARTED: 4/12/2023	BORING NUMBER: B-27	
PROJECT LOCATION: Delafield, Wisconsin	DATE DRILLING ENDED: 4/12/2023	PROJECT NUMBER: 23083-10	DRILLING RIG: Diedrich D50 ATV
BORING DRILLED BY: FIRM: GESTRA, CREW CHIEF: A. Woerpel	FIELD LOG: B. Griffin	NORTHING: 387887	DRILLING METHOD: 3¼" HSA
	LAB LOG / QC: D. Dettmers	EASTING: 2413473	SURFACE ELEVATION: 939 ft

Number and Type	Recovery (in)	Blow Counts	N - Value	Depth (ft) / Elevation	Soil Description and Geological Origin for Each Major Unit	USCS Classification	Graphic	Well Diagram	Unconfined Comp. Strength (Q_u or Q_p) (tsf)	Liquid Limit	Plasticity Index	Moisture Content (%)	Comments
					TOPSOIL (4-inches) 0.3 (938.7)								
SS - 1	4	2 2 3 4	5		LEAN CLAY, dark brown, moist, medium stiff 1.1 (937.9)	CL			0.5			25	
					LEAN CLAY, brown, moist, medium stiff, trace sand 1.6 (937.4)	CL							
SS - 2	15	2 3 4 5	7	935.0	LEAN CLAY, light brown with gray mottling, moist, medium stiff to stiff	CL			1.0	25	10	18.9	
SS - 3	16	2 2 2 4	4	5	top of engineered soil at basin 1 (elev 933.5)				1.0			18	
					6.5 (932.5)								
SS - 4	11	1 3 4 8	7		SANDY LEAN CLAY WITH GRAVEL, light brown, moist, stiff 0.11 in/hr	CL			1.5			10.1	
SS - 5	10	5 28 30 16	58	930.0 / 10	SS-5: rock pieces bottom of basin 1 (elev 930.5)							8.8	
SS - 6	13	19 12 17 34	29		11.5 (927.5)								
SS - 7	10	9 5 23 23	28	925.0	GRAVEL, brown, wet, medium dense to very dense 3.6 in/hr	GP							
SS - 8	12	4 7 50/2"	R	15	clayey gravel at 14' 15.2 (923.8) End of Boring at 15.2 ft.								Driller noted auger refusal at 15'. Possible bedrock.
				920.0 / 20									

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: 11.5 ft.	CAVE DEPTH AT COMPLETION: NMR (WET / DRY)
WATER LEVEL AT COMPLETION: 15 ft.	CAVE DEPTH AFTER 0 HOURS: NMR (WET / DRY)
WATER LEVEL AFTER 24 HOURS: 10 ft.	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

SOIL BORING LOG

GESTRA

GESTRA Engineering Inc.
191 W Edgerton Avenue
Milwaukee, WI 53207
Phone: 414-933-7444, Fax: 414-933-7844

PROJECT NAME	Thomas Farms Development
PROJECT LOCATION	Delafield, Wisconsin
DATE DRILLING STARTED	4/11/2023
DATE DRILLING ENDED	4/11/2023
BORING NUMBER	B-28
PROJECT NUMBER	23083-10
DRILLING RIG	LC 55
DRILLING METHOD	3¼" HSA
SURFACE ELEVATION	943.4 ft
BORING DRILLED BY	FIRM: GESTRA CREW CHIEF: S. Gonyer
FIELD LOG	C. Ray
LAB LOG / QC	D. Dettmers
NORTHING	387470
EASTING	2413507

Number and Type	Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation	Soil Description and Geological Origin for Each Major Unit	USCS Classification	Graphic	Well Diagram	Unconfined Comp. Strength (Q_u or Q_p) (tsf)	Liquid Limit	Plasticity Index	Moisture Content (%)	Comments
						TOPSOIL (10-inches) — 0.8 (942.6)								
SS - 1	17	1 1 2 3	3			LEAN CLAY, brown, moist, stiff	CL			1.5			19.8	
SS - 2	16	2 3 4 5	7		940.0	with gravel at 2-4' — 4 (939.4)	CL			1.5			15.8	
SS - 3	16	2 4 5 7	9	5		CLAYEY GRAVEL WITH SAND, light brown, moist, loose — 5.5 (937.9)	GC							Gravel = 45.8% Sand = 25.7% P200 =28.5%
SS - 4	19	5 12 17 16	29			SAND WITH GRAVEL, brown, moist, medium dense — 8 (935.4)	SP							
SS - 5	20	7 17 27 14	44		935.0	SAND WITH SILT AND GRAVEL, light brown, moist, medium dense to dense	SP-SM							
SS - 6	18	4 12 14 18	26	10		— 12 (931.4)	SP-SM							
SS - 7	17	12 24 30 54	54		930.0	GRAVEL WITH CLAY AND SAND, brown, moist to wet, very dense	GP-GC							
SS - 8	5	7 50/3"	R			clayey sand layer at 14' SS-8: rock pieces	GP-GC							
SS - 9	0	50/1"		15		— 16.1 (927.3)	GP-GC							Driller noted no recovery. Auger refusal at 16'. Possible bedrock.
					925.0	End of Boring at 16.1 ft.								
				20										

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: 14 ft.	CAVE DEPTH AT COMPLETION: NMR (WET ☐ DRY ☐)
WATER LEVEL AT COMPLETION: 16 ft.	CAVE DEPTH AFTER 0 HOURS: NMR (WET ☐ DRY ☐)
WATER LEVEL AFTER 48 HOURS: 12 ft.	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

GESTRA

GESTRA Engineering Inc.
191 W Edgerton Avenue
Milwaukee, WI 53207
Phone: 414-933-7444, Fax: 414-933-7844

SOIL BORING LOG

PROJECT NAME: Thomas Farms Development	DATE DRILLING STARTED: 4/11/2023	BORING NUMBER: B-29	
PROJECT LOCATION: Delafield, Wisconsin	DATE DRILLING ENDED: 4/11/2023	PROJECT NUMBER: 23083-10	DRILLING RIG: LC 55
BORING DRILLED BY: FIRM: GESTRA, CREW CHIEF: S. Gonyer	FIELD LOG: C. Ray	NORTHING: 387445	DRILLING METHOD: 3¼" HSA
	LAB LOG / QC: D. Dettmers	EASTING: 2412979	SURFACE ELEVATION: 946.1 ft

Number and Type	Recovery (in)	Blow Counts	N - Value	Unconfined Comp. Strength (Q_u or Q_p) (tsf)	Liquid Limit	Plasticity Index	Moisture Content (%)	Comments
SS - 1	13	2 2 3 5	5	1.0-2.0			21.7	
SS - 2	18	2 3 3 4	6	1.0			7.6	
SS - 3	16	3 4 5 5	9	1.0			8.5	
SS - 4	19	5 11 16 20	27	0.5				
SS - 5	16	5 14 18 18	32					P200 = 23.6%
SS - 6	18	5 12 17 20	29					
SS - 7	20	12 35 24 42	59					
SS - 8	0	12 20 13 16	33					
SS - 9	7	22 50/5"						
SS - 10	1	50/1"	R					Driller noted auger refusal at 20'. Possible bedrock.

Depth (ft): 5, 10, 15, 20
Elevation: 945.0, 940.0, 935.0, 930.0

Soil Description and Geological Origin for Each Major Unit	Depth (Elevation)	USCS Classification
TOPSOIL (9-inches)	0.8 (945.3)	
LEAN CLAY, brown, moist, stiff to very stiff	2 (944.1)	CL
SANDY LEAN CLAY, brown to light brown, moist, stiff, trace gravel	7 (939.1)	CL
SILTY SAND WITH GRAVEL, light brown, moist, medium dense	9 (937.1)	SM
SILTY SAND, light brown, moist, medium dense to dense	12 (934.1)	SM
SILTY SAND WITH GRAVEL, light brown, moist to wet, dense to very dense	17 (929.1)	SM
GRAVEL WITH SAND, light brown, wet, very dense, rock pieces (possible weathered bedrock)	18.1 (928)	GP

End of Boring at 18.1 ft.

top of engineered soil at basin 4 (elev 936.0)

3.6 in/hr

bottom of basin 4 (elev 935.0)

3.6 in/hr

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: 13 ft.	CAVE DEPTH AT COMPLETION: NMR
WATER LEVEL AT COMPLETION: NE	CAVE DEPTH AFTER 0 HOURS: NMR
WATER LEVEL AFTER 0 HOURS: NMR	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

SOIL BORING LOG

GESTRA

GESTRA Engineering Inc.
191 W Edgerton Avenue
Milwaukee, WI 53207
Phone: 414-933-7444, Fax: 414-933-7844

PROJECT NAME: Thomas Farms Development	DATE DRILLING STARTED: 4/11/2023	BORING NUMBER: B-30	
PROJECT LOCATION: Delafield, Wisconsin	DATE DRILLING ENDED: 4/11/2023	PROJECT NUMBER: 23083-10	DRILLING RIG: LC 55
BORING DRILLED BY: FIRM: GESTRA; CREW CHIEF: S. Gonyer	FIELD LOG: C. Ray	NORTHING: 387504	DRILLING METHOD: 3¼" HSA
	LAB LOG / QC: D. Dettmers	EASTING: 2412823	SURFACE ELEVATION: 948.5 ft

Number and Type	Recovery (in)	Blow Counts	N - Value	Depth (ft) / Elevation	Soil Description and Geological Origin for Each Major Unit	USCS Classification	Graphic	Well Diagram	Unconfined Comp. Strength (Q_u or Q_p) (tsf)	Liquid Limit	Plasticity Index	Moisture Content (%)	Comments
SS - 1	8	2 2 2 4	4		TOPSOIL (24-inches), LEAN CLAY, dark brown, moist — 2 (946.5)							21	
SS - 2	13	2 3 4 7	7	945.0	SANDY LEAN CLAY, light brown, moist, stiff, trace gravel — 4 (944.5)	CL			1.0			9.1	
SS - 3	12	5 6 7 8	13	5	SILTY CLAY WITH GRAVEL, light brown, moist, stiff	CL-ML			1.0			10.7	
SS - 4	15	9 10 10 13	20		— 7 (941.5)								
					GRAVEL WITH SAND, light brown, moist, medium dense	GP							
SS - 5	5	16 25 50/5"	R	940.0	— 9 (939.5)								
SS - 6	4	35 50/3"	R	10	GRAVEL WITH SAND, gray and light brown, moist, very dense, rock pieces (possible weathered bedrock)	GP							
SS - 7	4	20 50/1"	R		— 12.7 (935.8)								
				935.0	End of Boring at 12.7 ft.								Driller noted auger refusal at 13'. Possible bedrock.
				15									
				930.0									
				20									

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE ft.	CAVE DEPTH AT COMPLETION: NMR (WET ☐ DRY ☐)
WATER LEVEL AT COMPLETION: NE	CAVE DEPTH AFTER 0 HOURS: NMR (WET ☐ DRY ☐)
WATER LEVEL AFTER 0 HOURS: NE	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

SOIL BORING LOG

GESTRA

GESTRA Engineering Inc.
191 W Edgerton Avenue
Milwaukee, WI 53207
Phone: 414-933-7444, Fax: 414-933-7844

PROJECT NAME: Thomas Farms Development	DATE DRILLING STARTED: 4/12/2023	BORING NUMBER: B-31	
PROJECT LOCATION: Delafield, Wisconsin	DATE DRILLING ENDED: 4/12/2023	PROJECT NUMBER: 23083-10	DRILLING RIG: Geoprobe
BORING DRILLED BY: FIRM: GESTRA, CREW CHIEF: A. Woerpel	FIELD LOG: B. Griffin	NORTHING: 387799	DRILLING METHOD: 2¼" HSA
	LAB LOG / QC: D. Dettmers	EASTING: 2413138	SURFACE ELEVATION: 939.7 ft

Number and Type	Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation	Soil Description and Geological Origin for Each Major Unit	USCS Classification	Graphic	Well Diagram	Unconfined Comp. Strength (Q_u or Q_p) (tsf)	Liquid Limit	Plasticity Index	Moisture Content (%)	Comments
						TOPSOIL (10-inches) 0.8 (938.9)								
SS - 1	16	3 3 3 6	6			LEAN CLAY, brown, moist, stiff to very stiff	CL			2.5			22.3	
SS - 2	10	3 4 4 5	8			trace of black lean clay at 2-4' 4.3 (935.4)	CL			1.5-2.0			26.1	
SS - 3	12	2 2 4 8	6	5	935.0	CLAYEY SAND WITH GRAVEL, brown to light brown, moist to wet, loose to medium dense	SC							
SS - 4	12	3 7 10 22	17	▽			SC							
SS - 5	13	7 6 8 8	14	10	930.0	11 (928.7)	SC							
SS - 6	17	11 15 50/5"	R	▼		SILTY SAND, light brown, wet, very dense, possible weathered bedrock	SM							
SS - 7	8	50/5"	R				SM							
SS - 8	5	50/5"	R	15	925.0	14.5 (925.2) End of Boring at 14.5 ft.	SM							Driller noted auger refusal at 15'. Possible bedrock.
				20	920.0									

WATER & CAVE-IN OBSERVATION DATA

▽ WATER ENCOUNTERED DURING DRILLING: 8 ft.	CAVE DEPTH AT COMPLETION: NMR (WET ☐ DRY ☐)
▼ WATER LEVEL AT COMPLETION: 12 ft.	CAVE DEPTH AFTER 0 HOURS: NMR (WET ☐ DRY ☐)
▼ WATER LEVEL AFTER 0 HOURS: NMR	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

SOIL BORING LOG

GESTRA Engineering Inc.
191 W Edgerton Avenue
Milwaukee, WI 53207
Phone: 414-933-7444, Fax: 414-933-7844

PAGE NUMBER	1 of 1	BORING NUMBER	B-32
PROJECT NAME	Thomas Farms Development	DATE DRILLING STARTED	4/11/2023
PROJECT LOCATION	Delafield, Wisconsin	DATE DRILLING ENDED	4/11/2023
PROJECT NUMBER	23083-10	DRILLING RIG	LC 55
BORING DRILLED BY	FIRM: GESTRA CREW CHIEF: S. Gonyer	DRILLING METHOD	3¼" HSA
FIELD LOG	C. Ray	NORTHING	388020
LAB LOG / QC	D. Dettmers	EASTING	2413038
SURFACE ELEVATION	939.7 ft		

Number and Type	Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation	Soil Description and Geological Origin for Each Major Unit	USCS Classification	Graphic	Well Diagram	Unconfined Comp. Strength (Q_u or Q_p) (tsf)	Liquid Limit	Plasticity Index	Moisture Content (%)	Comments
						TOPSOIL (8-inches) — 0.7 (939)								
SS - 1	15	1 2 3 3	5			LEAN CLAY, brown, moist, stiff to very stiff — 3 (936.7)	CL			1.5-2.5			21.1	
SS - 2	14	1 2 3 2	5							1.5			20.3	
						CLAYEY SAND, light brown, moist, loose, trace gravel — 7 (932.7)	SC							
SS - 3	17	1 1 4 5	5	5	935.0									
SS - 4	12	16 40 18 12	58			SAND WITH SILT AND GRAVEL, light brown, moist, very dense — 8 (931.7)	SP-SM							
SS - 5	17	12 16 20 21	36	10	930.0	GRAVEL WITH SAND, light brown, wet, dense — 10 (929.7)	GP							
SS - 6	15	13 25 19 18	44			SILTY SAND WITH GRAVEL, light brown, wet, dense to very dense, trace clay	SM							
SS - 7	0	50/1"	R			possible weathered bedrock 12' to EOB								Driller noted no reovery.
SS - 8	5	9 50/3"	R	15	925.0	14.8 (924.9)								
						End of Boring at 14.8 ft.								Driller noted auger refusal at 16'. Possible bedrock.
				20	920.0									

WATER & CAVE-IN OBSERVATION DATA

▽ WATER ENCOUNTERED DURING DRILLING: 8 ft.	CAVE DEPTH AT COMPLETION: NMR (WET ☐ DRY ☐)
▼ WATER LEVEL AT COMPLETION: 9 ft.	CAVE DEPTH AFTER 0 HOURS: NMR (WET ☐ DRY ☐)
▼ WATER LEVEL AFTER 48 HOURS: 9 ft.	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

SOIL BORING LOG

GESTRA Engineering Inc.
191 W Edgerton Avenue
Milwaukee, WI 53207
Phone: 414-933-7444, Fax: 414-933-7844

PROJECT NAME: Thomas Farms Development	DATE DRILLING STARTED: 4/12/2023	BORING NUMBER: B-33	PROJECT NUMBER: 23083-10
PROJECT LOCATION: Delafield, Wisconsin	DATE DRILLING ENDED: 4/12/2023	DRILLING RIG: Geoprobe	
BORING DRILLED BY: FIRM: GESTRA, CREW CHIEF: A. Woerpel	FIELD LOG: B. Griffin	NORTHING: 388433	DRILLING METHOD: 2¼" HSA
	LAB LOG / QC: D. Dettmers	EASTING: 2412595	SURFACE ELEVATION: 924.1 ft

Number and Type	Recovery (in)	Blow Counts	N - Value	Depth (ft) / Elevation	Soil Description and Geological Origin for Each Major Unit	USCS Classification	Graphic	Well Diagram	Unconfined Comp. Strength (Q_u or Q_p) (tsf)	Liquid Limit	Plasticity Index	Moisture Content (%)	Comments
					TOPSOIL (6-inches) 0.5 (923.6)								
SS - 1	10	4 4 5 6	9		LEAN CLAY WITH GRAVEL, brown, moist, very stiff, organics (possible fill) 2.2 (921.9)	CL			2.0			21.8	
SS - 2	13	3 5 3 2	8	920.0	CLAYEY SAND, light brown, loose to medium dense, trace gravel	SC							
SS - 3	13	2 3 4 6	7	5									
SS - 4	8	3 4 12 9	16										Gravel = 14.9% Sand = 42.9% P200 =42.2%
SS - 5	13	4 11 11 11	22	915.0 / 10	10.4 (913.7)								
SS - 6	19	5 14 14 21	28		SILT, blueish gray with brown mottling, dry to moist, medium dense to very dense	ML						7.8	
SS - 7	16	6 11 12	23	910.0								9.8	
SS - 8	17	9 19 31 27	50	15	16 (908.1)								
SS - 9	6	50/0"	R		End of Boring at 16.0 ft.								Driller noted auger refusal at 17'. Possible bedrock.
				905.0 / 20									

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE ft.	CAVE DEPTH AT COMPLETION: NMR (WET ☐ DRY ☐)
WATER LEVEL AT COMPLETION: 3.5 ft.	CAVE DEPTH AFTER 0 HOURS: NMR (WET ☐ DRY ☐)
WATER LEVEL AFTER 24 HOURS: 2 ft.	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

SOIL BORING LOG

GESTRA

GESTRA Engineering Inc.
191 W Edgerton Avenue
Milwaukee, WI 53207
Phone: 414-933-7444, Fax: 414-933-7844

PROJECT NAME: Thomas Farms Development	DATE DRILLING STARTED: 4/12/2023	BORING NUMBER: B-34	PROJECT NUMBER: 23083-10
PROJECT LOCATION: Delafield, Wisconsin	DATE DRILLING ENDED: 4/12/2023	DRILLING RIG: Geoprobe	
BORING DRILLED BY: FIRM: GESTRA; CREW CHIEF: A. Woerpel	FIELD LOG: B. Griffin	NORTHING: 388315	DRILLING METHOD: 2¼" HSA
	LAB LOG / QC: D. Dettmers	EASTING: 2412460	SURFACE ELEVATION: 929.6 ft

Number and Type	Recovery (in)	Blow Counts	N - Value	Depth (ft) / Elevation	Soil Description and Geological Origin for Each Major Unit	USCS Classification	Graphic	Well Diagram	Unconfined Comp. Strength (Q_u or Q_p) (tsf)	Liquid Limit	Plasticity Index	Moisture Content (%)	Comments
					TOPSOIL (5-inches) 0.4 (929.2)								
SS - 1	11	3 3 4 6	7		LEAN CLAY, brown, moist, very stiff 2.5 (927.1)	CL			3.0			21.7	
SS - 2	12	3 4 6 5	10		CLAYEY SAND, light brown, moist to wet, medium dense, trace to with gravel	SC							P200 = 21.0%
SS - 3	0	5 7 10 7	17	5 / 925.0									Driller noted no recovery.
SS - 4	0	4 5 6 8	11										Driller noted no recovery. Flight auger sample.
SS - 5	15	6 11 16 38	27	10 / 920.0	10.5 (919.1)								
SS - 6	10	27 50/4"	R		GRAVEL WITH SAND, dark brown, wet, very dense 10.8 (918.8)	GP							Driller noted auger refusal at 11'. Possible bedrock.
				15 / 915.0	End of Boring at 10.8 ft.								
				20 / 910.0									

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: 9 ft.	CAVE DEPTH AT COMPLETION: NMR (WET ☐ DRY ☐)
WATER LEVEL AT COMPLETION: 8 ft.	CAVE DEPTH AFTER 0 HOURS: NMR (WET ☐ DRY ☐)
WATER LEVEL AFTER 24 HOURS: 3 ft.	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

SOIL BORING LOG

GESTRA Engineering Inc.
191 W Edgerton Avenue
Milwaukee, WI 53207
Phone: 414-933-7444, Fax: 414-933-7844

PROJECT NAME	Thomas Farms Development
PROJECT LOCATION	Delafield, Wisconsin
DATE DRILLING STARTED	4/11/2023
DATE DRILLING ENDED	4/11/2023
BORING NUMBER	B-35
PROJECT NUMBER	23083-10
DRILLING RIG	LC 55
DRILLING METHOD	3¼" HSA
SURFACE ELEVATION	937.8 ft
BORING DRILLED BY	FIRM: GESTRA CREW CHIEF: S. Gonyer
FIELD LOG	C. Ray
LAB LOG / QC	D. Dettmers
NORTHING	387880
EASTING	2412395

Number and Type	Recovery (in)	Blow Counts	N - Value	Depth (ft) / Elevation	Soil Description and Geological Origin for Each Major Unit	USCS Classification	Graphic	Well Diagram	Unconfined Comp. Strength (Q_u or Q_p) (tsf)	Liquid Limit	Plasticity Index	Moisture Content (%)	Comments
					TOPSOIL (9-inches) — 0.8 (937)								
SS - 1	15	1 2 2 2	4		LEAN CLAY, brown, moist, stiff to very stiff	CL			2.0			21.2	
SS - 2	12	1 2 3 4	5	935.0	sandy lean clay 2-4' — 4 (933.8)	CL			1.0				
SS - 3	19	2 3 3 5	6	5	CLAYEY SAND WITH GRAVEL, light brown, moist, loose — 7 (930.8)	SC							
SS - 4	16	7 18 18 16	36	930.0	SAND WITH SILT AND GRAVEL, light brown, moist, dense to very dense — 8.5 (929.3)	SP-SM							
SS - 5	4	26 50/6"	R		GRAVEL WITH SAND, light brown, moist to wet, very dense, possible weathered bedrock	GP							
SS - 6	3	50/5"	R	10		GP							
SS - 7	6	7 50/5"	R	925.0	SS-7: trace to with clay — 12.9 (924.9)	GP							
				15, 920.0, 20	End of Boring at 12.9 ft.								Driller noted auger refusal at 13'. Possible bedrock.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: 10 ft.	CAVE DEPTH AT COMPLETION: NMR (WET ☐ DRY ☐)
WATER LEVEL AT COMPLETION: 10 ft.	CAVE DEPTH AFTER 0 HOURS: NMR (WET ☐ DRY ☐)
WATER LEVEL AFTER 48 HOURS: 9 ft.	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

SOIL BORING LOG

GESTRA Engineering Inc.
191 W Edgerton Avenue
Milwaukee, WI 53207
Phone: 414-933-7444, Fax: 414-933-7844

PROJECT NAME	Thomas Farms Development
PROJECT LOCATION	Delafield, Wisconsin
DATE DRILLING STARTED	4/12/2023
DATE DRILLING ENDED	4/12/2023
BORING NUMBER	B-36
PROJECT NUMBER	23083-10
DRILLING RIG	Geoprobe
DRILLING METHOD	2¼" HSA
SURFACE ELEVATION	900.7 ft
BORING DRILLED BY	FIRM: GESTRA CREW CHIEF: D. Harvey
FIELD LOG	C. Dietz
LAB LOG / QC	D. Dettmers
NORTHING	389672
EASTING	2413827

Number and Type	Recovery (in)	Blow Counts	N - Value	Depth (ft) / Elevation	Soil Description and Geological Origin for Each Major Unit	USCS Classification	Graphic	Well Diagram	Unconfined Comp. Strength (Q_u or Q_p) (tsf)	Liquid Limit	Plasticity Index	Moisture Content (%)	Comments
				900.0	TOPSOIL (9-inches) — 0.8 (899.9)								
SS - 1	24	0 1 3 3	4		LEAN CLAY, brown, moist, stiff to very stiff, trace sand	CL			1.5			25.9	Staked location not accessible. B-36 offset 100' S and 135' E. GESTRA obtained coordinates and elevations.
SS - 2	11	0 2 1 1	3		— 4 (896.7)				1.5-2.5			26.1	
SS - 3	11	4 6 5 4	11	5 / 895.0	CLAYEY SILTY SAND, light brown, very moist to wet, loose to dense	SC-SM							
SS - 4	20	3 4 5 4	9										
SS - 5	7	11 12 22 13	34	10	— 10 (890.7)								
SS - 6	14	16 50 50/4"	R	890.0	SILTY SAND, light brown, moist, very dense	SM							Driller noted possible cobbles or boulders at 11'.
SS - 7	17	20 32 50/5"	R										
SS - 8	16	36 56 50/4"	R	15	— 15.4 (885.3)								
				885.0	End of Boring at 15.4 ft.								Driller noted auger refusal at 15.5'. Possible bedrock.
				20 / 880.0									

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: 4 ft.	CAVE DEPTH AT COMPLETION: NMR (WET ☐ DRY ☐)
WATER LEVEL AT COMPLETION: 4 ft.	CAVE DEPTH AFTER 0 HOURS: NMR (WET ☐ DRY ☐)
WATER LEVEL AFTER 0.5 HOURS: 4 ft.	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

SOIL BORING LOG

GESTRA

GESTRA Engineering Inc.
191 W Edgerton Avenue
Milwaukee, WI 53207
Phone: 414-933-7444, Fax: 414-933-7844

PROJECT NAME: Thomas Farms Development	DATE DRILLING STARTED: 4/12/2023	BORING NUMBER: B-37	
PROJECT LOCATION: Delafield, Wisconsin	DATE DRILLING ENDED: 4/12/2023	PROJECT NUMBER: 23083-10	DRILLING RIG: Geoprobe
BORING DRILLED BY: FIRM: GESTRA; CREW CHIEF: D. Harvey	FIELD LOG: C. Dietz	NORTHING: 389770	DRILLING METHOD: 2¼" HSA
	LAB LOG / QC: D. Dettmers	EASTING: 2413886	SURFACE ELEVATION: 899.3 ft

Number and Type	Recovery (in)	Blow Counts	N - Value	Depth (ft) / Elevation	Soil Description and Geological Origin for Each Major Unit	USCS Classification	Graphic	Well Diagram	Unconfined Comp. Strength (Q_u or Q_p) (tsf)	Liquid Limit	Plasticity Index	Moisture Content (%)	Comments
					TOPSOIL (7.5-inches) — 0.6 (898.7)								
SS - 1	19	2 2 3 3	5		LEAN CLAY WITH SAND, brown, moist, stiff — 3 (896.3)	CL			1.25			17.3	
SS - 2	17	2 3 5 9	8		CLAYEY SAND, light brown, very moist, loose to medium dense, trace gravel	SC						11	Gravel = 14.7% Sand = 40.8% P200 =44.5%
SS - 3	1	5 7 7 6	14	895.0 / 5	— 6 (893.3)	SC							Driller noted rock in SS-3. Possible cobble and/or boulder.
SS - 4	20	4 8 9 10	17		SILTY CLAYEY SAND, light brown, moist, medium dense to very dense, trace gravel	SC-SM							
SS - 5	23	10 18 17 23	35	890.0 / 10		SC-SM							
SS - 6	24	13 21 23 23	44			SC-SM							
SS - 7	24	28 36 34 33	70			SC-SM							
SS - 8	19	19 32 42 39	74	885.0 / 15	wet at 14'; moist at 15'	SC-SM							
SS - 9	14	31 41 50/2"	R		wet at 16' — 17.2 (882.1)	SC-SM							
				880.0 / 20	End of Boring at 17.2 ft.								Driller noted auger refusal at 17.5'. Possible bedrock.

WATER & CAVE-IN OBSERVATION DATA

▽ WATER ENCOUNTERED DURING DRILLING: 14 ft.	CAVE DEPTH AT COMPLETION: NMR (WET ☐ DRY ☐)
▼ WATER LEVEL AT COMPLETION: 7 ft.	CAVE DEPTH AFTER 0 HOURS: NMR (WET ☐ DRY ☐)
▼ WATER LEVEL AFTER 1 HOURS: 5.5 ft.	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

SOIL BORING LOG

GESTRA

GESTRA Engineering Inc.
191 W Edgerton Avenue
Milwaukee, WI 53207
Phone: 414-933-7444, Fax: 414-933-7844

PROJECT NAME: Thomas Farms Development		DATE DRILLING STARTED: 4/12/2023	BORING NUMBER: B-38
PROJECT LOCATION: Delafield, Wisconsin		DATE DRILLING ENDED: 4/12/2023	PROJECT NUMBER: 23083-10
			DRILLING RIG: Diedrich D50 ATV
BORING DRILLED BY: FIRM: GESTRA, CREW CHIEF: A. Woerpel	FIELD LOG: B. Griffin	NORTHING: 389394	DRILLING METHOD: 3¼" HSA
	LAB LOG / QC: D. Dettmers	EASTING: 2413909	SURFACE ELEVATION: 910 ft

Number and Type	Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation	Soil Description and Geological Origin for Each Major Unit	USCS Classification	Graphic	Well Diagram	Unconfined Comp. Strength (Q_u or Q_p) (tsf)	Liquid Limit	Plasticity Index	Moisture Content (%)	Comments
						TOPSOIL (measurement not recorded) 0.5 (909.5)								
SS - 1	8	2 3 4 35	7			LEAN CLAY, red and brown with black mottling, moist, stiff 2 (908)	CL			1.0			24.3	Driller noted possible boulder.
SS - 2	12	3 3 4 6	7			CLAYEY SAND, light brown, moist to very moist, loose to medium dense	SC							
SS - 3	13	3 5 11 8	16	5	905.0	sandy gravel layer at 4.5'								
SS - 4	14	3 4 10 8	14			8 (902)								
SS - 5	10	4 31 15 11	46			SANDY LEAN CLAY, light brown, moist, very stiff; gravel layer at 9'	CL			2.5			7.4	
				10	900.0									
SS - 6	16	6 9 13	22			12 (898)				2.0			5.7	
SS - 7	15	3 3 5	8			SANDY LEAN CLAY, gray, moist, stiff 14 (896)	CL			1.0			10.1	
SS - 8	12	4 8 7	15	15	895.0	CLAYEY/SILTY SAND, gray, very moist to moist, medium dense to very dense, trace to with gravel	SC-SM							
SS - 9	10	15 30 50/2"	R			17.2 (892.8)								
						End of Boring at 17.2 ft.								
				20	890.0									Driller noted auger refusal at 19'. Possible bedrock.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE ft.	CAVE DEPTH AT COMPLETION: NMR (WET ☐ DRY ☐)
WATER LEVEL AT COMPLETION: NE	CAVE DEPTH AFTER 0 HOURS: NMR (WET ☐ DRY ☐)
WATER LEVEL AFTER 0 HOURS: NMR	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

SOIL BORING LOG

GESTRA Engineering Inc.
191 W Edgerton Avenue
Milwaukee, WI 53207
Phone: 414-933-7444, Fax: 414-933-7844

PAGE NUMBER	1 of 1
PROJECT NAME	Thomas Farms Development
DATE DRILLING STARTED	4/12/2023
BORING NUMBER	B-39
PROJECT LOCATION	Delafield, Wisconsin
DATE DRILLING ENDED	4/12/2023
PROJECT NUMBER	23083-10
DRILLING RIG	Geoprobe
BORING DRILLED BY	FIRM: GESTRA CREW CHIEF: A. Woerpel
FIELD LOG	B. Griffin
LAB LOG / QC	D. Dettmers
NORTHING	389169
EASTING	2413830
DRILLING METHOD	2¼" HSA
SURFACE ELEVATION	911.7 ft

Number and Type	Recovery (in)	Blow Counts	N - Value	Depth (ft) / Elevation	Soil Description and Geological Origin for Each Major Unit	USCS Classification	Graphic	Well Diagram	Unconfined Comp. Strength (Q_u or Q_p) (tsf)	Liquid Limit	Plasticity Index	Moisture Content (%)	Comments
					TOPSOIL (5-inches) 0.4 (911.3)								
SS - 1	12	2 3 4 4	7	910.0	LEAN CLAY, brown, moist, very stiff, trace sand 2 (909.7)	CL			2.0			30.3	
SS - 2	12	2 6 7 6	13		LEAN CLAY WITH SAND, light brown with gray mottling, moist, stiff, trace gravel 4.8 (906.9)	CL			1.5			16.5	
SS - 3	18	3 9 8 16	17	5	CLAYEY SAND, light brown, moist, medium dense, trace gravel gravelly at 5'	SC							
SS - 4	24	2 3 3 5	6	905.0	8 (903.7)								
SS - 5	18	3 4 6 8	10	10	SANDY LEAN CLAY, light brown, moist to very moist, stiff	CL			1.0			9.9	
SS - 6	24	7 8 12 11	20	900.0	12 (899.7)				1.0			9	
SS - 7	22	2 3 6 13	9		CLAYEY SAND, gray, moist, loose to medium dense, trace gravel	SC							
SS - 8	14	3 11 11 25	22	15	Wet black sand at 14' 15 (896.7) SANDY SILT, gray, moist, very dense, trace gravel	ML						9.5	
SS - 9	13	21 47 50/1"	R	895.0	17.1 (894.6)							7	
				20	End of Boring at 17.1 ft.								Driller noted auger refusal at 17.5'. Possible bedrock.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: 13 ft.	CAVE DEPTH AT COMPLETION: NMR (WET / DRY)
WATER LEVEL AT COMPLETION: 14 ft.	CAVE DEPTH AFTER 0 HOURS: NMR (WET / DRY)
WATER LEVEL AFTER 24 HOURS: 2 ft.	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

Wis. Dept. of Safety and Professional Services
Division of Industry Services

SOIL EVALUATION - STORM

in accordance with SPS 382.365 and 385, Wis. Adm. Code

County: Waukesha
Parcel I.D.: DELT0809995
Reviewed by: J. Metzinger, E.I.T
Date: 04/24/2023

Attach complete site plan on paper not less than 8 1/2 x 11 inches in size. Plan must include, but not limited to: vertical and horizontal reference point (BM), direction and percent slope, scale or dimensions, north arrow, and BM referenced to nearest road.

Please print all information.

Personal information you provide may be used for secondary purposes (Privacy Law, s. 15.04 (1) (m)).

Property Owner	Property Location
THE ROBERT G AND ANN B THOMAS REVOCABLE TRUST	Govt. Lot SE 1/4 NE 1/4 S 23 T 7 N R 18 ☑ E (or) ☐ W
Property Owner's Mailing Address: N20W29352 OAKTON RD	Lot #: Block #: Subd. Name or CSM#:
City: PEWAUKEE State: WI Zip Code: 53072 Phone Number: ( )	☐ City ☐ Village ☒ Town: DELAFIELD Nearest Road: THOMAS ROAD

Drainage area ______ ☐ sq. ft. ☐ acres
Optional:
Test Site Suitable for (check all that apply)
☐ Irrigation ☐ Bioretention trench ☐ Trench(es)
☐ Rain garden ☐ Grassed swale ☐ Reuse
☐ Infiltration trench ☐ SDS (> 15' wide) ☐ Other ______

Hydraulic Application Test Method:
☒ Morphological Evaluation
☐ Double-Ring Infiltrometer
☐ Other (specify) ______

B-1 Obs. # ☒ Boring ☐ Pit Ground surface elev. 899.7 ft. Depth to limiting factor -48 in.

Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frag.	Hydraulic App. Rate Inches/Hr
A	10	10YR 3/3	-	SIL	2, VF, SBK	MFR	-	< 5	0.13
B	36	10YR 3/4	-	CL	2, VF, SBK	MFI	-	< 10	0.03
C	45	10YR 6/4	c, 2, D, 10YR 7/1	GRSL	0, M	MFR	-	26.9	0.50
C	96	10YR 6/6	-	GRSCL	0, SG	MVFR	-	15 - 30	0.11
C	150	10YR 6/4	-	XGRLS	0, M	MFR	-	50 - 65	1.63

B-2 Obs. # ☒ Boring ☐ Pit Ground surface elev. 906.9 ft. Depth to limiting factor -60 in.

Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frag.	Hydraulic App. Rate Inches/Hr
A	7	10YR 3/3	-	SIL	2, VF, SBK	MFR	-	< 5	0.13
BC	24	10YR 3/4	-	C	2, VF, SBK	MVFI	-	<10	0.07
C	48	10YR 6/6	-	GRSL	0, M	MFR	-	15 - 20	0.50
C	60	10YR 6/4	-	GRSIL	0, M	MFR	-	15 - 30	0.13
C	66	10YR 8/1	-	VGRS	0, SG	MLO	-	35 - 55	3.60
C	102	10YR 6/4	-	GRSIL	0, M	MFR	-	15 - 30	0.13

CST/PSS Name (Please Print)	Signature	CST/PSS Number
Douglas Dettmers, PE	Douglas Dettmers	35060-6
Address	**Date Evaluation Conducted**	**Telephone Number**
GESTRA Engineering, Inc. - 191 W. Edgerton Avenue, Milwaukee, WI 53207	04/24/2023	414-933-7444

Property Owner THE ROBERT G AND ANN B THOMAS REVOCABLE TRU   Parcel ID # DELT0809995

B-3 Obs. # ☒ Boring ☐ Pit   Ground surface elev. 915.6 ft.   Depth to limiting factor -120 in.

Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frag.	Hydraulic App. Rate Inches/Hr
A	6	10YR 3/3	-	SIL	2, VF, SBK	MFR	-	< 5	0.13
B	24	10YR 3/6	-	SC	2, VF, SBK	MFI	-	5 - 14	0.04
Cr	120	10YR 8/2	-	XGRS	0, SG	MLO	-	60 - 80	3.60

B-4 Obs. # ☒ Boring ☐ Pit   Ground surface elev. 919.8 ft.   Depth to limiting factor -114 in.

Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frag.	Hydraulic App. Rate Inches/Hr
A	10	10YR 3/3	-	SIL	2, VF, SBK	MFR	-	< 5	0.13
B	36	10YR 3/4	-	C	2, VF, SBK	MFI	-	< 10	0.07
C	48	10YR 3/4	-	VGRC	0, M	MFI	-	35 - 45	0.07
C	72	10YR 7/2	-	XGRSL	0, SG	0, SG	-	70 - 80	0.50
C	114	10YR 6/4	-	VGRSIL	0, M	MFR	-	50 - 59	0.13

B-8 Obs. # ☒ Boring ☐ Pit   Ground surface elev. 918.7 ft.   Depth to limiting factor -78 in.

Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frag.	Hydraulic App. Rate Inches/Hr
A	10	10YR 3/1	-	SIL	2, VF, SBK	MFR	-	< 5	0.13
B	66	10YR 3/6	-	SCL	2, VF, SBK	MFI	-	< 5	0.11
C	78	10YR 5/4	-	GRSICL	0, M	MFI	-	20 - 30	0.04

Property Owner THE ROBERT G AND ANN B THOMAS REVOCABLE TRU

Parcel ID # DELT0809995

B-13 Obs. # ☒ Boring ☐ Pit Ground surface elev. 921.7 ft. Depth to limiting factor -54 in.

Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frag.	Hydraulic App. Rate Inches/Hr
A	10	10YR 3/3	-	SIL	2, VF, SBK	MFR		< 5	0.13
B	24	10YR 3/6	-	C	2, VF, SBK	MVFI		< 10	0.07
C	54	10YR 5/8	-	SCL	0, M	MVFR		5 - 14	0.11

B-14 Obs. # ☒ Boring ☐ Pit Ground surface elev. 925.2 ft. Depth to limiting factor -90 in.

Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frag.	Hydraulic App. Rate Inches/Hr
A	10	10YR 3/3	-	SIL	2, VF, SBK	MFR	-	< 5	0.13
B	24	10YR 3/6	-	C	2, VF, SBK	MVFI	-	< 10	0.07
C	72	10YR 5/4	-	VGRLS	0, SG	MLO	-	35 - 45	1.63
C	90	7.5YR 4/3	-	VGRSCL	0, M	MVFI	-	40 - 50	0.11

B-21 Obs. # ☒ Boring ☐ Pit Ground surface elev. 917.7 ft. Depth to limiting factor -54 in.

Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frag.	Hydraulic App. Rate Inches/Hr
A	8	10YR 2/1	-	L	2, VF, SBK	MFR	-	< 5	0.24
C	54	10YR 7/2 and 10YR 4/1	-	GR/CB	0, SG	MLO	-	> 90	3.60

Property Owner THE ROBERT G AND ANN B THOMAS REVOCABLE TRU

Parcel ID # DELT0809995

B-22 Obs. #

☒ Boring ☐ Pit

Ground surface elev. 916.3 ft. Depth to limiting factor -96 in.

Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frag.	Hydraulic App. Rate Inches/Hr
A	9	10YR 2/2	-	L	2, VF, SBK	MFR	-	< 5	0.24
B	60	10YR 3/6	-	CL	2, VF, SBK	MFI	-	< 5	0.03
C	90	10YR 4/6	-	GRSL	0, M	MFI	-	32.9	0.50
C	97	10YR 6/6	-	XGRS	0, SG	MLO	-	70 - 85	3.60

B-9 Obs. #

☒ Boring ☐ Pit

Ground surface elev. 919.2 ft. Depth to limiting factor -108 in.

Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frag.	Hydraulic App. Rate Inches/Hr
A	12	10YR 3/3	-	SIL	2, VF, SBK	MFR	-	< 5	0.13
B	48	10YR 3/4	-	C	2, VF, SBK	MFI	-	< 10	0.03
C	72	10YR 5/6	-	GRSL	0, M	MVFR	-	23.7	0.50
C	102	10YR 5/6	-	SICL	0, M	MFI	-	< 10	0.04
C	108	10YR 5/6	-	GRSICL	0, M	MFI	-	15 - 20	0.04

B-10 Obs. #

☒ Boring ☐ Pit

Ground surface elev. 920.8 ft. Depth to limiting factor -144 in.

Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frag.	Hydraulic App. Rate Inches/Hr
A	9	10YR 3/3	-	SICL	2, VF, SBK	MFI	-	< 5	0.04
B	36	10YR 3/4	-	CL	2, VF, SBK	MFI	-	< 10	0.03
C	60	10YR 5/6	-	GRSL	0, M	MFR	-	15 - 20	0.50
C	72	10YR 6/6	-	XGRLS	0, SG	MLO	-	70 - 80	1.63
C	96	10YR 5/8	-	VGRLS	0, SG	MLO	-	35 - 50	1.63
C	144	10YR 6/6	-	XGRLS	0, SG	MLO	-	60 - 80	1.63

B-11 Obs. # ☒ Boring ☐ Pit Ground surface elev. 917.8 ft. Depth to limiting factor -66 in.

Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frag.	Hydraulic App. Rate Inches/Hr
A	10	10YR 3/3	-	SIL	2, VF, SBK	MFR	-	< 5	0.13
B	24	10YR 3/4	-	C	2, VF, SBK	MFI	-	< 10	0.07
C	48	10YR 5/6	-	SCL	0, M	MVFR	-	10 - 14	0.11
C	66	10YR 5/8	-	SICL	0, M	MFI	-	< 10	0.04

B-12 Obs. # ☒ Boring ☐ Pit Ground surface elev. 917.4 ft. Depth to limiting factor -60 in.

Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frag.	Hydraulic App. Rate Inches/Hr
A	10.5	10YR 2/1	-	SIL	2, VF, SBK	MFR	-	< 5	0.13
B	36	10YR 3.5/6	-	CL	2, VF, SBK	MFI	-	< 10	0.03
Cr	48	10YR 7/6	-	XGRLS	0, SG	MLO	-	60 - 80	1.63
Cr	60	10YR 5/8	-	XGRS	0, SG	MLO	-	60 - 80	3.60

Test Results and/or Summary Comments

*All borings terminated on possible bedrock refusal.

**Depth to limiting layer determined based on shallowest groundwater level observed during/after drilling, or depth to top of bedrock refusal.

B-9: Topsoil thickness assumed (not measured)

Wis. Dept. of Safety and Professional Services
Division of Industry Services

SOIL EVALUATION - STORM

in accordance with SPS 382.365 and 385, Wis. Adm. Code

County	Waukesha
Parcel I.D.	DELT0809996
Reviewed by	J. Metzinger, E.I.T.
Date	04/24/2023

Attach complete site plan on paper not less than 8 1/2 x 11 inches in size. Plan must include, but not limited to: vertical and horizontal reference point (BM), direction and percent slope, scale or dimensions, north arrow, and BM referenced to nearest road.

Please print all information.

Personal information you provide may be used for secondary purposes (Privacy Law, s. 15.04 (1) (m)).

Property Owner: KELLEN H WESSON	Property Location: Govt. Lot SW 1/4 NE 1/4 S 23 T 7 N R 18 ☑ E (or) ☐ W
Property Owner's Mailing Address: 11663 N BOBOLINK LN	Lot # / Block # / Subd. Name or CSM#
City: MEQUON / State: WI / Zip Code: 53092 / Phone Number: ( )	☐ City ☒ Village ☐ Town: DELAFIELD / Nearest Road: CROOKED CREEK ROAD

Drainage area ______ ☐ sq. ft. ☐ acres
Optional:
Test Site Suitable for (check all that apply)
☐ Irrigation ☐ Bioretention trench ☐ Trench(es)
☐ Rain garden ☐ Grassed swale ☐ Reuse
☐ Infiltration trench ☐ SDS (> 15' wide) ☐ Other ________

Hydraulic Application Test Method:
☒ Morphological Evaluation
☐ Double-Ring Infiltrometer
☐ Other (specify) ________

B-5 Obs. # ☒ Boring ☐ Pit Ground surface elev. 917.7 ft. Depth to limiting factor -78 in.

Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frag.	Hydraulic App. Rate Inches/Hr
A	10	10YR 3/3	-	SIL	2, VF, SBK	MFR	-	< 5	0.13
C	60	10YR 6/6	-	GRSCL	0, M	MFR	-	15 - 25	0.11
C	83	10YR 6/6	-	XGRLS	0, SG	MLO	-	60 - 75	1.63

B-6 Obs. # ☒ Boring ☐ Pit Ground surface elev. 912.4 ft. Depth to limiting factor -162 in.

Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frag.	Hydraulic App. Rate Inches/Hr
A	11	10YR 3/2	-	SIL	2, VF, SBK	MFI	-	< 5	0.13
B	36	10YR 4/6	-	GRSL	0, M	MFR	-	30.6	0.50
C	108*	10YR 6/6	c, 1, P, 10YR 6/1	VGRSCL	0, M	MFI	-	35 - 45	0.11
C	162	10YR 5/8	-	XGRSCL	0, M	MVFI	-	60 - 75	0.11
	*With 10YR 3/4 sand layer at 72 inches								

CST/PSS Name (Please Print)	Signature	CST/PSS Number
Douglas Dettmers, PE	Douglas Dettmers	35060-6
Address	**Date Evaluation Conducted**	**Telephone Number**
GESTRA Engineering, Inc. - 191 W. Edgerton Avenue, Milwaukee, WI 53207	04/24/2023	414-933-7444

Property Owner KELLEN H WESSON Parcel ID # DELT0809996

B-36 Obs. # ☒ Boring ☐ Pit Ground surface elev. 900.7 ft. Depth to limiting factor -48 in.

Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frag.	Hydraulic App. Rate Inches/Hr
A	9	10YR 2/1	-	SICL	2, VF. SBK	MFR	-	< 5	0.04
B	48	10YR 3/4	-	C	2, VF. SBK	MVFI	-	< 10	0.07
C	72	10YR 5/8	-	GRSL	0, M	MVFR	-	15 - 25	0.50
C	120	10YR 5/8	-	GRSCL	0, M	MFI	-	15 - 25	0.11
C	144	10YR 6/4	-	GRSIL	0, M	MFR	-	15 - 20	0.13
C	186	10YR 5/6	-	VGRSIL	0, M	MVFI	-	35 - 45	0.13

B-37 Obs. # ☒ Boring ☐ Pit Ground surface elev. 899.3 ft. Depth to limiting factor -66 in.

Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frag.	Hydraulic App. Rate Inches/Hr
A	7.5	10YR 2/2	-	SIL	2, VF, SBK	MFR		< 5	0.13
B	36	10YR 3/4	-	C	2, VF, SBK	MVFI		< 10	0.07
C	72	10YR 5/8	-	GRSL	0, M	MVFR		22.3	0.50
C	144	10YR 5/8	-	GRSCL	0, M	MFI - MVFI		15 - 25	0.11
C	168	10YR 6/6	-	VGRSIL	0, M	MVFI		35 - 45	0.13
C	210	10YR 5/8	-	VGRLS	0, SG	MLO		40 - 50	1.63

B-38 Obs. # ☒ Boring ☐ Pit Ground surface elev. 910.0 ft. Depth to limiting factor -228 in.

Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frag.	Hydraulic App. Rate Inches/Hr
A	6	10YR 2/2	-	L	2, VF, SBK	MFR	-	< 5	0.24
B	24	10YR 3/4	-	C	2, VF, SBK	MVFI	-	< 10	0.07
C	54	10YR 5/8	-	GRSCL	0, M	MFR	-	15 - 25	0.11
C	96	10YR 5/8	-	GRSICL	0, M	MFI	-	15 - 25	0.04
C	144	10YR 5/6 to 10YR 6/4	-	GRSCL	0, M	MFI - MVFI	-	15 - 30	0.11
C	168	10YR 5/1	-	GRSC	0, M	MVFI	-	15 - 20	0.04
C	228	10YR 6/1	-	GRSIL	0, M	MFR - MVFI	-	20 - 34	0.13

Property Owner KELLEN H WESSON   Parcel ID # DELT0809996

B-39 Obs. #   ☒ Boring   ☐ Pit   Ground surface elev. 911.7 ft.   Depth to limiting factor -24 in.

Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frag.	Hydraulic App. Rate Inches/Hr
A	5	10YR 2/2	-	SICL	2, VF, SBK	MFR	-	< 5	0.04
B	24	10YR 3/4	-	C	2, VF, SBK	MFI	-	< 10	0.07
C	57	10YR 6/4	m, 1, D, 10YR 6/1	SICL	0, M	MFI	-	5 - 14	0.04
C	96	10YR 5/8	-	GRSCL	0, M	MFI	-	15 - 25	0.11
C	144	10YR 6/4	-	GRSICL	0, M	MFI	-	15 - 25	0.04
C	168	10YR 5/1	-	SIC	0, M	MFI	-	10 -14	0.07
C	180	N 1/	-	S	0, SG	MLO	-	< 5	3.60
C	210	10YR 6/1	-	VGRSIL	0, M	MFR	-	35 - 45	0.13

Obs. #   ☐ Boring   ☐ Pit   Ground surface elev. __________ ft.   Depth to limiting factor __________ in.

Horizon	Depth ft.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frag.	Hydraulic App. Rate Inches/Hr

Test Results and/or Summary Comments

*All borings terminated on possible bedrock refusal.

**Depth to limiting layer determined based on shallowest groundwater level observed during/after drilling, or depth to top of bedrock refusal.

B-38: Topsoil thickness assumed (not measured).

Wis. Dept. of Safety and Professional Services
Division of Industry Services

SOIL EVALUATION - STORM

in accordance with SPS 382.365 and 385, Wis. Adm. Code

County: Waukesha

Parcel I.D.: DELT0811999

Reviewed by: J. Metzinger, E.I.T | Date: 04/24/2023

Attach complete site plan on paper not less than 8 1/2 x 11 inches in size. Plan must include, but not limited to: vertical and horizontal reference point (BM), direction and percent slope, scale or dimensions, north arrow, and BM referenced to nearest road.

Please print all information.

Personal information you provide may be used for secondary purposes (Privacy Law, s. 15.04 (1) (m)).

Property Owner: KELLEN H WESSON

Property Location: Govt. Lot NE 1/4 SE 1/4 S 23 T 7 N R 18 ☑ E (or) ☐ W

Property Owner's Mailing Address: 11663 N BOBOLINK LN

Lot # | Block # | Subd. Name or CSM#

City: MEQUON | State: WI | Zip Code: 53092 | Phone Number: ( )

☐ City ☐ Village ☒ Town: DELAFIELD | Nearest Road: GOLF ROAD

Drainage area ______ ☐ sq. ft. ☐ acres
Optional:
Test Site Suitable for (check all that apply)
☐ Irrigation ☐ Bioretention trench ☐ Trench(es)
☐ Rain garden ☐ Grassed swale ☐ Reuse
☐ Infiltration trench ☐ SDS (> 15' wide) ☐ Other ________

Hydraulic Application Test Method:
☒ Morphological Evaluation
☐ Double-Ring Infiltrometer
☐ Other (specify) ______________

B-17 Obs. # ☒ Boring ☐ Pit Ground surface elev. 925.0 ft. Depth to limiting factor -96 in.

Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frag.	Hydraulic App. Rate Inches/Hr
A	6	10YR 3/3	-	SIL	2, VF, SBK	MFR	-	< 5	0.13
B	42	10YR 3/6	-	C	2, VF, SBK	MVFI	-	< 5	0.07
C	102	10YR 7/6	-	XGRLS	0, SG	MLO	-	70 - 85	1.63

B-18 Obs. # ☒ Boring ☐ Pit Ground surface elev. 931.2 ft. Depth to limiting factor -78 in.

Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frag.	Hydraulic App. Rate Inches/Hr
A	6	10YR 3/3	-	SIL	2, VF, SBK	MFR		< 5	0.13
B	36	10YR 3/6	-	C	2, VF, SBK	MFI		< 10	0.07
C	48	10YR 8/2	-	XGRS	0, SG	MLO		80 - 89	3.60
Cr	78	10YR 7/6	-	XGRLS	0, SG	MLO		70 - 85	1.63

CST/PSS Name (Please Print): Douglas Dettmers, PE | Signature: Douglas Dettmers | CST/PSS Number: 35060-6

Address: GESTRA Engineering, Inc. - 191 W. Edgerton Avenue, Milwaukee, WI 53207 | Date Evaluation Conducted: 04/24/2023 | Telephone Number: 414-933-7444

Property Owner KELLEN H WESSON Parcel ID # DELT0811999 Page 2 of 8

B-25 Obs. # ☒ Boring ☐ Pit Ground surface elev. 932.6 ft. Depth to limiting factor -84 in.

Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frag.	Hydraulic App. Rate Inches/Hr
A	7.5	10YR 3/3	-	SIL	2, VF, SBK	MFR	-	< 5	0.13
B	48	10YR 3/6	-	CL	2, VF, SBK	MFI	-	< 5	0.03
C	96	10YR 4/4	-	VGRLS	0, SG	MLO	-	35 - 45	1.63
C	144	10YR 5/8	-	XGRS	0, SG	MLO	-	80 - 89	3.60

B-26 Obs. # ☒ Boring ☐ Pit Ground surface elev. 938.3 ft. Depth to limiting factor -60 in.

Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frag.	Hydraulic App. Rate Inches/Hr
A	8	10YR 3/3	-	SIL	2, VF, SBK	MFR	-	< 5	0.13
B	48	10YR 4/6	-	CL	2, VF, SBK	MFI	-	< 10	0.03
C	84	10YR 5/6	-	SICL	0, M	MFI	-	< 5	0.04
C	120	10YR 5/6	-	GRSCL	0, M	MFR - MFI	-	15 - 25	0.11
C	156	10YR 5/8	-	GRSCL	0, M	MVFI	-	20 - 34	0.11
Cr	180	10YR 5/6	-	XGRS	0, SG	MLO	-	60 - 70	3.60
Cr	192	10YR 6/6	-	XGRLS	0, SG	MLO	-	65 - 85	1.63

B-27 Obs. # ☒ Boring ☐ Pit Ground surface elev. 939.0 ft. Depth to limiting factor -120 in.

Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frag.	Hydraulic App. Rate Inches/Hr
A	13	10YR 3/3	-	SIL	2, VF, SBK	MFR	-	< 5	0.13
B	19	10YR 4/6	-	SC	2, VF, SBK	MFI	-	< 10	0.04
C	78	10YR 5/6	f, 1, P, 10YR 6/1	SICL	0, M	MFI	-	< 5	0.04
C	138	10YR 5/6	-	GRSCL	0, M	MFI	-	15 - 25	0.11
C	168	10YR 5/8	-	GR	0, SG	MLO	-	> 90	3.60
C	180	10YR 5/4	-	XGRCL	0, SG	MLO	-	70 - 85	0.03

Property Owner KELLEN H WESSON Parcel ID # DELT0811999

B-29 Obs. # ☒ Boring ☐ Pit Ground surface elev. 946.1 ft. Depth to limiting factor -156 in.

Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frag.	Hydraulic App. Rate Inches/Hr
A	9	10YR 3/3	-	SIL	2, VF, SBK	MFR	-	< 5	0.13
B	24	10YR 3/6	-	CL	2, VF, SBK	MFI	-	< 5	0.03
C	48	10YR 4/6	-	GRSCL	0, M	MFI	-	15 - 20	0.11
C	84	10YR 6/4	-	GRSL	0, M	MFR	-	15 - 20	0.50
C	108	10YR 5/6	-	VGRLS	0, SG	MLO	-	35 - 45	1.63
C	144	10YR 5/8	-	S	0, SG	MLO	-	< 5	3.60
C	204	10YR 5/8	-	L	0, M	MFR	-	< 10	0.24
Cr	240	10YR 7/4	-	GR	0, SG	MLO	-	< 90	3.60

B-30 Obs. # ☒ Boring ☐ Pit Ground surface elev. 948.5 ft. Depth to limiting factor -156 in.

Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frag.	Hydraulic App. Rate Inches/Hr
A	24	10YR 3/3	-	SIL	2, VF, SBK	MFR	-	< 5	0.13
B	48	10YR 3/6	c, 1, P, 10YR 3/3	C	2, VF, SBK	MFI	-	< 10	0.07
C	84	10YR 5/8	-	GRSCL	0, M	MFI	-	15 - 34	0.11
C	108	10YR 5/8	-	VGRS	0, SG	MLO	-	35 - 45	3.60
Cr	156	10YR 7/2	-	XGRS	0, SG	MLO	-	75 - 89	3.60

B-33 Obs. # ☒ Boring ☐ Pit Ground surface elev. 924.1 ft. Depth to limiting factor -24 in.

Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frag.	Hydraulic App. Rate Inches/Hr
A	6	10YR 2/2	-	L	2, VF, SBK	MFR	-	< 5	0.24
B/FILL	24	10YR 3/4	-	C	2, VF, PL	MFI	-	< 10	0.07
B/FILL	29	10YR 3/3	-	GRSC	2, VF, SBK	MFI	-	14 - 20	0.04
C	125	10YR 5/6	-	GRSL	0, M	MFR	-	23.8	0.50
Cg	204	5G 5/1	c, 2, D, 2.5Y 4/2	SICL	0, M	DEH	-	5 - 10	0.04

Property Owner KELLEN H WESSON Parcel ID # DELT0811999

B-34 Obs. # ☒ Boring ☐ Pit Ground surface elev. 929.6 ft. Depth to limiting factor -36 in.

Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frag.	Hydraulic App. Rate Inches/Hr
A	5	10YR 3/3	-	SIL	2, VF, SBK	MFR	-	< 5	0.13
B	30	10YR 3/4	-	C	2, VF, SBK	MVFI	-	< 10	0.07
C	132*	10YR 5/6	-	VGRSL	0, M	MFR	-	35 - 55	0.50
	*With 10YR 2/1 gravel layer at 126 inches								

B-7 Obs. # ☒ Boring ☐ Pit Ground surface elev. 916.2 ft. Depth to limiting factor -4.8 in.

Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frag.	Hydraulic App. Rate Inches/Hr
A	10	10YR 2/1	-	SICL	2, VF, SBK	MFR	-	< 5	0.04
B	24	10YR 5/3	f, 1, D, 10YR 4/6	SICL	2, VF, SBK	MFR	-	< 10	0.04
C	48	10YR 6/6	-	GRSCL	0, M	MFR	-	15 - 30	0.11
C	96	10YR 6/4	c, 1, D, 10YR 6/1	VGRSCL	0, M	MFR	-	35 - 45	0.11
C	114	10YR 6/2	-	XGRLS	0, SG	MLO	-	75 - 84	1.63

B-15 Obs. # ☒ Boring ☐ Pit Ground surface elev. 926.8 ft. Depth to limiting factor -114 in.

Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frag.	Hydraulic App. Rate Inches/Hr
A	10	10YR 3/3	-	SIL	2, VF, SBK	MFR	-	< 5	0.13
B	48	10YR 3/4	-	CL	2, VF, SBK	MFI	-	< 10	0.03
C	72	10YR 5/8	-	GRSCL	0, M	MFR	-	20 - 30	0.11
C	78	10YR 2/2	-	VGRS	0, SG	MLO	-	35 - 40	3.60
C	114	10YR 5/6	-	GRSIL	0, SG	MLO	-	15 - 25	0.13

Property Owner KELLEN H WESSON Parcel ID # DELT0811999

B-16 Obs. # ☒ Boring ☐ Pit Ground surface elev. 930.5 ft. Depth to limiting factor -90 in.

Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frag.	Hydraulic App. Rate Inches/Hr
A	9	10YR 3/3	-	SIL	2, VF, SBK	MFR	-	< 5	0.13
B	48	10YR 3/4	-	CL	2, VF, SBK	MFI	-	< 10	0.03
C	72	10YR 5/8	-	GRSCL	0, M	MFR	-	15 - 25	0.11
C	102	10YR 5/8	-	VGRLS	0, SG	MLO	-	40 - 55	1.63

B-19 Obs. # ☒ Boring ☐ Pit Ground surface elev. 934.9 ft. Depth to limiting factor -114 in.

Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frag.	Hydraulic App. Rate Inches/Hr
A	9	10YR 3/3	-	SICL	2, VF, SBK	MFI	-	< 5	0.04
B	36	10YR 5/4	-	SC	2, VF, SBK	MVFI	-	< 5	0.04
C	56	10YR 5/6	-	S	0, SG	MLO	-	< 5	3.60
C	114	10YR 5/6	-	GRSCL	0, M	MEF	-	15 - 25	0.11

B-20 Obs. # ☒ Boring ☐ Pit Ground surface elev. 925.6 ft. Depth to limiting factor -78 in.

Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frag.	Hydraulic App. Rate Inches/Hr
A	9	10YR 2/1	-	SIL	2, VF, SBK	MFR	-	< 10	0.13
B	24	10YR 3/4	f, 1, D, 10YR 2/1	C	2, VF, SBK	MVFI	-	< 10	0.07
B	48	10YR 4/3	c, 1, D, 10YR 7/1	SIC	2, VF, SBK	MFR	-	5 - 14	0.07
C	78	10YR 5/8	c, 1, P, 10YR 6/2	SIC	0, M	MFR	-	< 10	0.07

Property Owner KELLEN H WESSON   Parcel ID # DELT0811999

B-23 Obs. #   ☒ Boring ☐ Pit   Ground surface elev. 940.9 ft.   Depth to limiting factor -126 in.

Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frag.	Hydraulic App. Rate Inches/Hr
A	10	10YR 3/3	-	SIL	2, VF, SBK	MFR	-	< 5	0.13
B	48	10YR 3/6	-	GRL	2, VF, SBK	MFI	-	15 - 30	0.24
C	72	10YR 5/8	-	VGRLS	0, SG	MVFR	-	35 -45	1.63
C	96	10YR 5/6	-	VGRS	0, SG	MLO	-	35 - 45	3.60
C	126	10YR 5/6	-	VGRLS	0, SG	MVFR	-	40 - 50	1.63

B-24 Obs. #   ☒ Boring ☐ Pit   Ground surface elev. 940.7 ft.   Depth to limiting factor -10.5 in.

Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frag.	Hydraulic App. Rate Inches/Hr
A	8	10YR 3/3	-	L	2, VF, SBK	MFR	-	< 5	0.24
C	24	10YR 7/4	-	XGRS	0, SG	MLO	-	70 - 85	3.60
C	84	10YR 5/6	-	GRSCL	0, M	MFI	-	15 - 30	0.11
C	126	10YR 5/8	-	VGRSICL	0, M	MVFI	-	35 - 45	0.04

B-28 Obs. #   ☒ Boring ☐ Pit   Ground surface elev. 943.4 ft.   Depth to limiting factor -144 in.

Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frag.	Hydraulic App. Rate Inches/Hr
A	10	10YR 3/3	-	SIL	2, VF, SBK	MFR	-	< 5	0.13
B	48	10YR 3/4	-	C	2, VF, SBK	MFI	-	5 - 14	0.07
C	66	10YR 5/8	-	VGRSL	0, M	MFR	-	51.9	0.50
C	96	10YR 5/8	-	XGRS	0, SG	MLO	-	70 - 80	3.60
C	144	10YR 5/8	-	VGRS	0, SG	MLO	-	40 - 59	3.60
C	168	10YR 5/4	-	XGRLS	0, SG	MLO	-	80 - 89	1.63
C	193	10YR 4/4	-	VGRSCL	0, M	MVFI	-	45 - 55	0.11

Property Owner KELLEN H WESSON Parcel ID # DELT0811999

B-31 Obs. # ☒ Boring ☐ Pit Ground surface elev. 939.7 ft. Depth to limiting factor -96 in.

Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frag.	Hydraulic App. Rate Inches/Hr
A	10	10YR 3/3	-	SIL	2, VF, SBK	MFR	-	< 5	0.13
B	52	10YR 3/6	-	SICL	2, VF, SBK	MFI	-	< 5	0.04
C	132	10YR 5/8	-	GRSIL	0, M	MFR - MFI	-	15 - 25	0.13
Cr	180	10YR 7/4	-	XGRSL	0, SG	MLO	-	75 - 85	0.50

B-32 Obs. # ☒ Boring ☐ Pit Ground surface elev. 939.7 ft. Depth to limiting factor -96 in.

Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frag.	Hydraulic App. Rate Inches/Hr
A	8	10YR 3/3	-	SIL	2, VF, SBK	MFR	-	< 5	0.13
B	36	10YR 3/6	-	SICL	2, VF, SBK	MFI	-	< 10	0.04
C	84	10YR 6/4	-	GRSCL	0, M	MFR	-	15 - 25	0.11
C	96	10YR 8/2	-	XGRS	0, SG	MLO	-	60 - 75	3.60
C	120	10YR 6/6	-	XGRLS	0, SG	MLO	-	60 - 75	1.63
C	144	10YR 6/6	-	XGRSICL	0, M	MFR	-	60 - 75	0.04
Cr	192	10YR 6/6	-	XGRLS	0, SG	MLO	-	70 - 85	1.63

B-35 Obs. # ☒ Boring ☐ Pit Ground surface elev. 937.8 ft. Depth to limiting factor -108 in.

Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frag.	Hydraulic App. Rate Inches/Hr
A	9	10YR 3/3	-	SIL	2, VF, SBK	MFR	-	< 5	0.13
B	24	10YR 3/6	-	SIC	2, VF, SBK	MFI	-	< 10	0.07
C	48	10YR 3/4	-	SC	0, M	MFR	-	10 - 14	0.04
C	84	10YR 5/8	-	GRSCL	0, M	MFR	-	15 - 25	0.11
C	102	10YR 6/6	-	VGRS	0, SG	MLO	-	40 - 55	3.60
C	144	10YR 7/6	-	XGRS	0, SG	MLO	-	70 - 80	3.60
C	156	10YR 4/6	-	VGRSCL	0, M	MLO	-	70 - 80	0.11

Property Owner KELLEN H WESSON

Parcel ID # DELT0811999

☐ Obs. # ☐ Boring ☐ Pit Ground surface elev. __________ ft. Depth to limiting factor __________ in.

Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frag.	Hydraulic App. Rate Inches/Hr

☐ Obs. # ☐ Boring ☐ Pit Ground surface elev. __________ ft. Depth to limiting factor __________ in.

Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frag.	Hydraulic App. Rate Inches/Hr

Test Results and/or Summary Comments

*All borings terminated on possible bedrock refusal.

**Depth to limiting layer determined based on shallowest groundwater level observed during/after drilling, or depth to top of bedrock refusal.

GENERAL NOTES

DRILLING AND SAMPLING SYMBOLS

SYMBOL	DEFINITION
HSA	Hollow Stem Auger
HSA w/ RW	Hollow Stem Auger converted to Rotary Wash Boring (initiated with Mudding Fluid)
SS	2” O.D. Split Spoon Sample – (ASTM D 1586)
SH	3” Thin-Walled Tube Sample (Shelby Tube) – (ASTM D 1587)
AU	Solid Stem Auger Sample
CA	Modified California Sample – (ASTM D 3550)
RC	Rock Core Sample – (ASTM D 2113)
HA	Hand Auger Sample
GB	Grab Bag Sample
R	SPT Refusal (N-value of 50 blows for less than 6 inches of penetration)
NMR	No Measurement Recorded
NE	Not Encountered

TEST SYMBOLS

SYMBOL	DEFINITION
MC	Moisture Content (%) – (ASTM D 2216)
LOI	Organic Content (Loss on Ignition) (%) – (ASTM D 2974)
Qp	Hand Penetrometer Reading (tsf)
Qu	Unconfined Comp. Strength (tsf) – (ASTM D 2166)
γ_d	Dry Density (pcf) – (ASTM D 7263)
γ_T	Total (Moist) Density (pcf)
LL, PL	Liquid and Plastic Limit (%) – (ASTM D 4318)
PI	Plasticity Index (%)
P200	Percent passing the #200 Sieve – (ASTM D 1140)
Ts	Hand Torvane Reading (tsf)
SG	Specific Gravity – (ASTM D854)
pH	Hydrogen Ion Content – (ASTM D4972)
RQD	Rock Quality Designation (%) – (ASTM D6032)

WATER LEVEL

Water levels shown on the boring logs are the levels measured in the borings at the time and under the conditions indicated. In some soils, it may not be possible to determine the groundwater level within the normal time required for test borings and an extended period of time may be necessary to reach equilibrium. Therefore, the position of the water level symbol may not indicate the true level of the groundwater table. Perched water refers to water above an impervious layer, thus impeded in reaching the water table. The available water level information is given at the bottom of the respective boring log sheet.

DESCRIPTIVE TERMINOLOGY

DENSITY TERM	SPT N-VALUE
Very Loose	0 - 4
Loose	4 - 10
Medium Dense	10 - 30
Dense	30 - 50
Very Dense	Over 50

CONSISTENCY TERM	Unconfined Compressive Strength, (tsf)	SPT N-VALUE
Very Soft	<0.25	0 - 2
Soft	0.25 - 0.49	2 - 4
Medium Stiff	0.50 - 0.99	4 - 8
Stiff	1.00 - 1.99	8 - 16
Very Stiff	2.00 - 3.99	16 - 30
Hard	4.0+	Over 30

Standard Penetration Test N-Value: Blows per Foot of a 140 Pound Hammer Falling 30 inches on a 2-inch OD Split Barrel Sampler

Note: If unconfined compressive strength data is not available, then N-value should be used to describe consistency term

Lamination	Up to 1/2” thick horizontal stratum
Layer	1/2” thick or greater horizontal stratum
Lens	1/2” to 6” discontinuous horizontal stratum
Varved	Alternating laminations
Dry	Powdery, dusty
Moist	Damp, below saturation
Wet	Saturated, above liquid limit

RELATIVE SIZES

U.S. Standard Sieve

	12"	3"	#4	#200	
Boulders	Cobbles	Gravel	Sand	Silt	Clay
	300	75	4.75	0.075	0.002

Grain Size (mm)

SOILS CLASSIFICATION FOR ENGINEERING PURPOSES ASTM Designation: D 2487 - 83 (Based on Unified Soil Classification System)	SOIL ENGINEERING

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests[A]					Soil Classification[B] Group Symbol	Group Name
Coarse-Grained Soils More than 50% retained on No. 200 sieve	Gravels More than 50% coarse fraction retained on No. 4 sieve	Clean Gravels Less than 5% fines[C]	$Cu \geq 4$ and $1 \leq Cc \leq 3$ [E]		GW	Well-graded gravel[F]
			$Cu < 4$ and/or $1 > Cc > 3$ [E]		GP	Poorly-graded gravel[F]
		Gravels with Fines more than 12% fines[C]	Fines Classify as ML or MH		GM	Silty gravel[F,G.]
			Fines classify as CL or CH		GC	Clayey gravel[F,G.]
	Sands 50% or more of coarse fraction passes No. 4 sieve	Clean sands Less than 5% fines[D]	$Cu \geq 6$ and $1 \leq Cc \leq 3$ [E]		SW	Well-graded sand[H]
			$Cu < 6$ and/or $1 > Cc > 3$ [E]		SP	Poorly-graded sand[H]
		Sands with Fines more than 12% fines[D]	Fines Classify as ML or MH		SM	Silty sand[G,H]
			Fines classify as CL or CH		SC	Clayey sand[G,H]
Fine-Grained Soils 50% or more passes the No. 200 sieve	Silts and Clays Liquid Limit less than 50	Inorganic	PI > 7 and plots on or above " A" line[I]		CL	Lean clay[J,K,L]
			PI < 4 or plots below " A " line[I]		ML	Silt[J,K,L]
		Organic	$\frac{\text{Liquid limit - oven dried}}{\text{Liquid limit - not dried}}$	< 0.75	OL	Organic clay[J,K,L,M] Organic Silt[J,K,L,N]
	Silts and Clays Liquid Limit 50 or more	Inorganic	PI plots on or above " A " line		CH	Fat clay[J,K,L]
			PI plots below " A " line		MH	Elastic silt[J,K,L]
		Organic	$\frac{\text{Liquid limit - oven dried}}{\text{Liquid limit - not dried}}$	< 0.75	OH	Organic clay[J,K,L,O] Organic Silt[J,K,L,P]
Highly organic soils		Primarily organic matter, dark in color, and organic odor			PT	Peat

[A] Based on the material passing the 3-in (75- mm) sieve

[B] If field sample contained cobbles or boulders, or both, add with cobbles and/or boulders after group name

[C] Gravels with 5 to 12 % fines require dual symbols:
GW - GM (well-graded gravel with silt)
GW - GC (well-graded gravel with clay)
GP - GM (poorly-graded gravel with silt)
GP - GC (poorly-graded gravel with clay)

[D] Sands with 5 to 12 % fines require dual symbols:
SW -SM (well-graded sand with silt)
SW - SC (well-graded sand with clay)
SP - SM (poorly-graded sand with silt)
SP - SC (poorly-graded sand with clay)

[E] $Cu = \frac{D_{60}}{D_{10}}$ $\qquad C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$

[F] If soil contains ≥ 15% sand, add "with sand" after group name

[G] If fines classify as CL-ML, use dual symbol GC-GM. or SC-SM

[H] If soil contains ≥ 15% gravel, add "with gravel" after group name.

[I] If Atterberg limits plot in hatched area, soil is a CL-ML (silty clay)

[J] If soil contains 15 to 29% plus No. 200, add, "with sand" or " with gravel", whichever is predominant

[K] If soil contains ≥ 30% plus No.200, and predominantly sand, add "sandy" before the group name

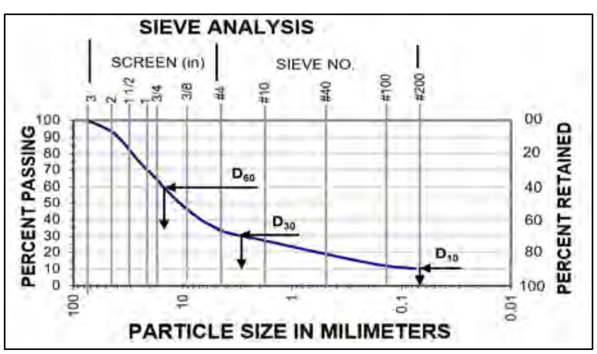
[L] If soil contains ≥ 30% plus No.200, and predominantly gravel, add "gravelly" before the group name

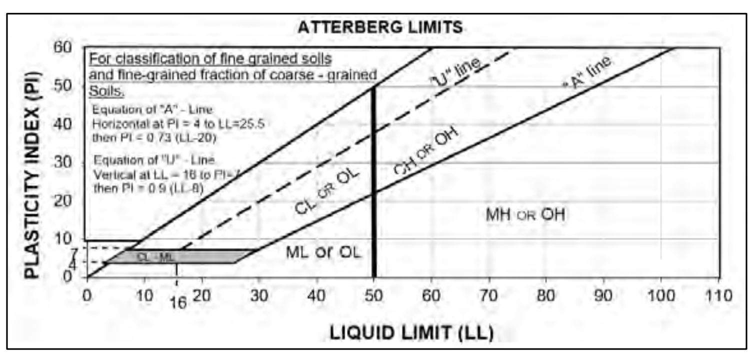
[M] PI ≥ 4 and plots on or above "A" Line

[N] PI < 4 or plots below "A" Line

[O] PI plots on or above "A" Line

[P] PI plots below "A" Line





SOILS CLASSIFICATION FOR ENGINEERING PURPOSES

(Based on United States Department of Agriculture - Natural Resources Conservations Service)

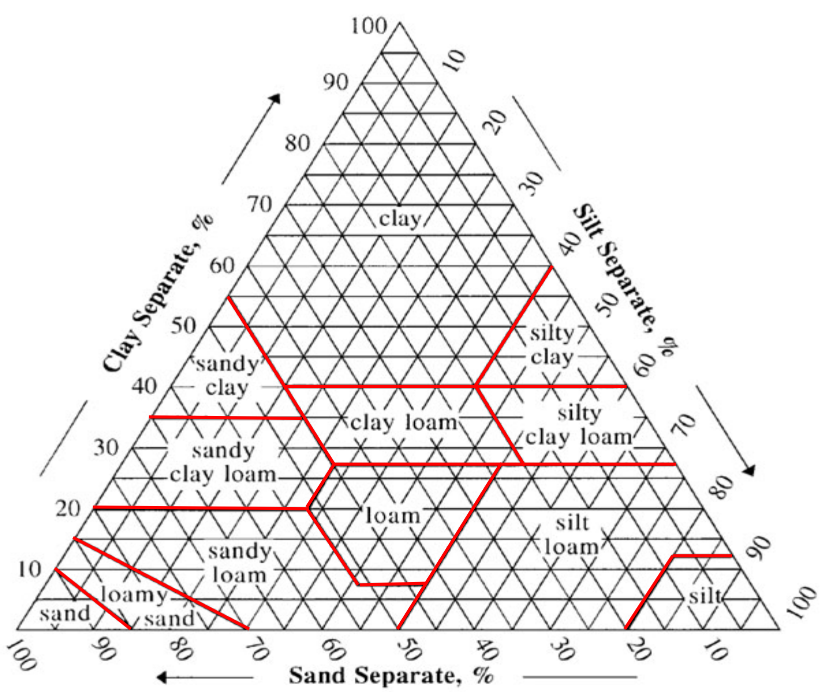
SOIL ENGINEERING

Criteria for Soil Classification Based on Particle Size Distribution [A]

		U.S. Standard Sieve No.	USDA Soil Name Classification
ROCK FRAGMENTS		> 25"	Boulders
		10" < 25"	Stones
		3" < 10"	Cobbles
		3/4" < 3"	Coarse Gravel
		#4 < 3/4"	Medium Gravel
		#10 < #4	Fine Gravel
FINE EARTH	Sand	#18 < #10	Very Coarse Sand
		#35 < #18	Coarse Sand
		#60 < #35	Medium Sand
		#140 < #60	Fine Sand
		#300 < #140	Very Fine Sand
	Silt	0.02 mm < 0.05 mm	Coarse Silt
		0.002 mm < 0.02 mm	Fine Silt
	Clay	0.0002 mm < 0.002 mm	Coarse Clay
		< 0.0002 mm	Fine Clay

(Soil) Textural Triangle: [B]

Fine Earth Texture Classes (—)



Texture Classes [C]	Code
Coarse Sand	COS
Sand	S
Fine Sand	FS
Very Fine Sand	VFS
Loamy Coarse Sand	LCOS
Loamy Sand	LS
Loamy Fine Sand	LFS
Loamy Very Fine Sand	LVFS
Coarse Sandy Loam	COSL
Sandy Loam	SL
Fine Sandy Loam	FSL
Very Fine Sandy Loam	VFSL
Loam	L
Silt Loam	SIL
Silt	SI
Sandy Clay Loam	SCL
Clay Loam	CL
Silty Clay Loam	SICL
Sandy Clay	SC
Silty Clay	SIC
Clay	C

Rock Fragment Texture Modifiers [B]	Vol. %
None	< 15
Size Adjective (i.e. Gravelly)	15 to < 35
Very (Size Adjective)	35 to < 60
Extremely (Size Adjective)	60 to < 90
Fragment Size Class Name	≥ 90

A Based on page 2-45 of Field Book for Describing and Sampling Soils V3.0

B Based on page 2-38 of Field Book for Describing and Sampling Soils V3.0

C Based on page 2-37 of Field Book for Describing and Sampling Soils V3.0

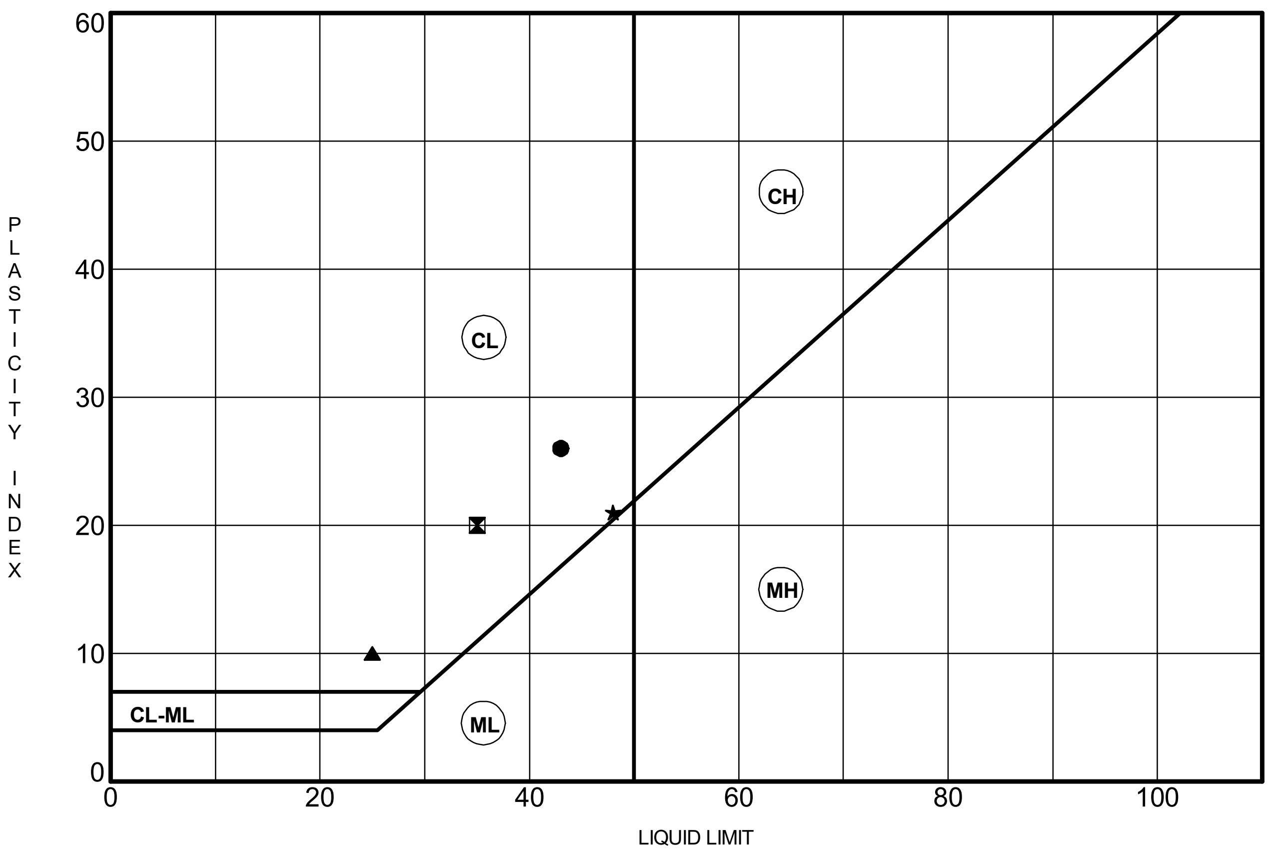
APPENDIX II

LABORATORY TEST RESULTS

GESTRA Engineering, Inc
191 W. Edgerton Avenue
Milwaukee, WI 53207
Phone: (414) 933-7444, Fax: (414) 933-7844

LABORATORY TEST RESULTS
ATTERBERG LIMITS RESULTS (ASTM D4318)

Project Name: Thomas Farms Development
Project Number: 23083-10
Project Location: Delafield, Wisconsin



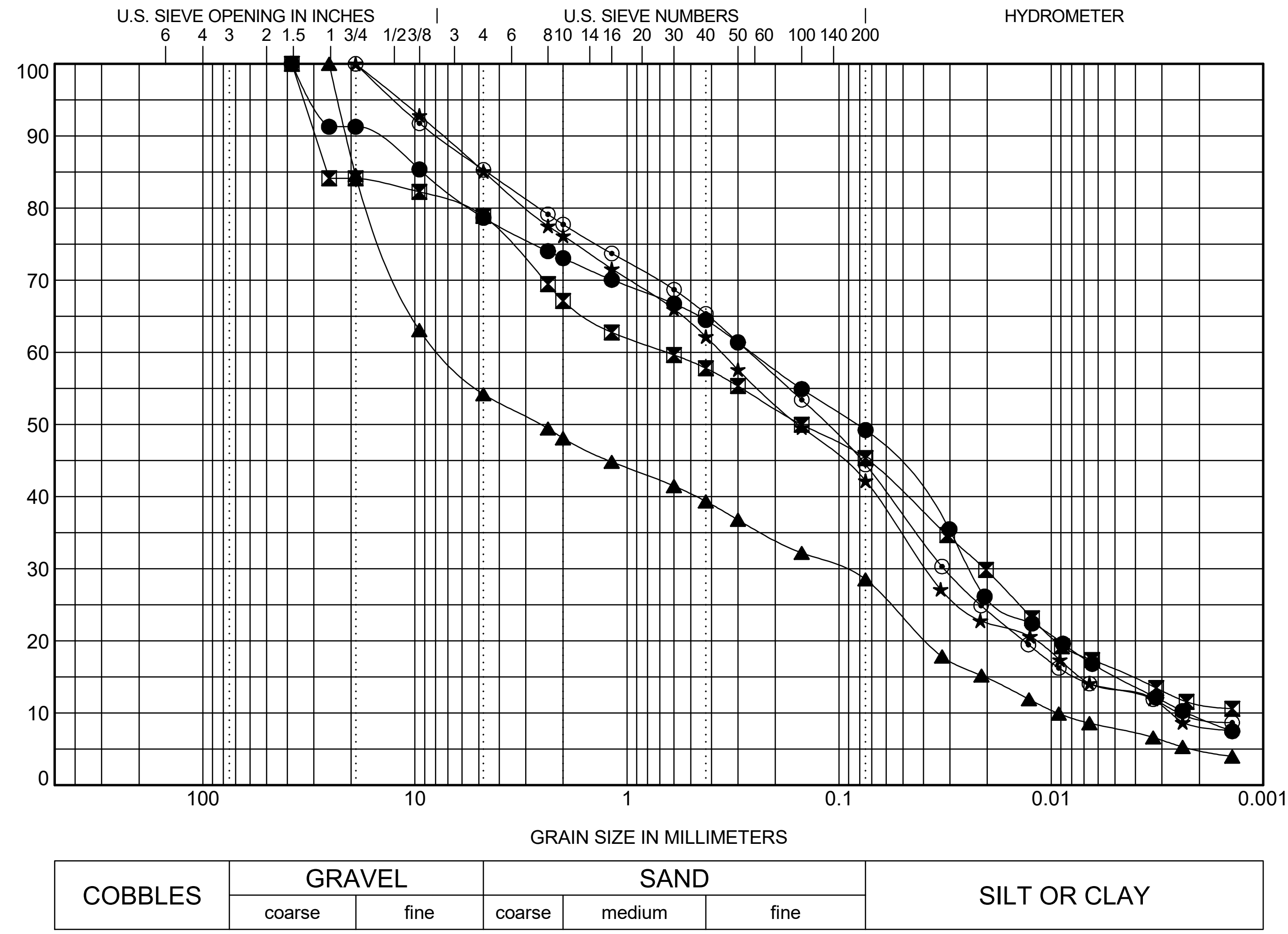
Unless otherwise noted, Atterberg limit sample was air-dried, Liquid limit was performed using mutiple points, and plastic limit test was hand rolled.

	Specimen Identification		LL	PL	PI	Fines	MC	Notes
●	**B-2, SS-1**	**0'-2'**	**43**	**17**	**26**		**22.6**	
⧗	**B-20, SS-2**	**2'-4'**	**35**	**15**	**20**		**22.1**	
▲	**B-27, SS-2**	**2'-4'**	**25**	**15**	**10**		**18.9**	
★	**B-8, SS-1**	**0'-2'**	**48**	**27**	**21**		**21.7**	

GESTRA Engineering, Inc
191 W. Edgerton Avenue
Milwaukee, WI 53207
Phone: (414) 933-7444, Fax: (414) 933-7844

LABORATORY TEST RESULTS
GRAIN SIZE DISTRIBUTION (ASTM D6913 and D7928)

Project Name: Thomas Farms Development
Project Number: 23083-10
Project Location: Delafield, Wisconsin



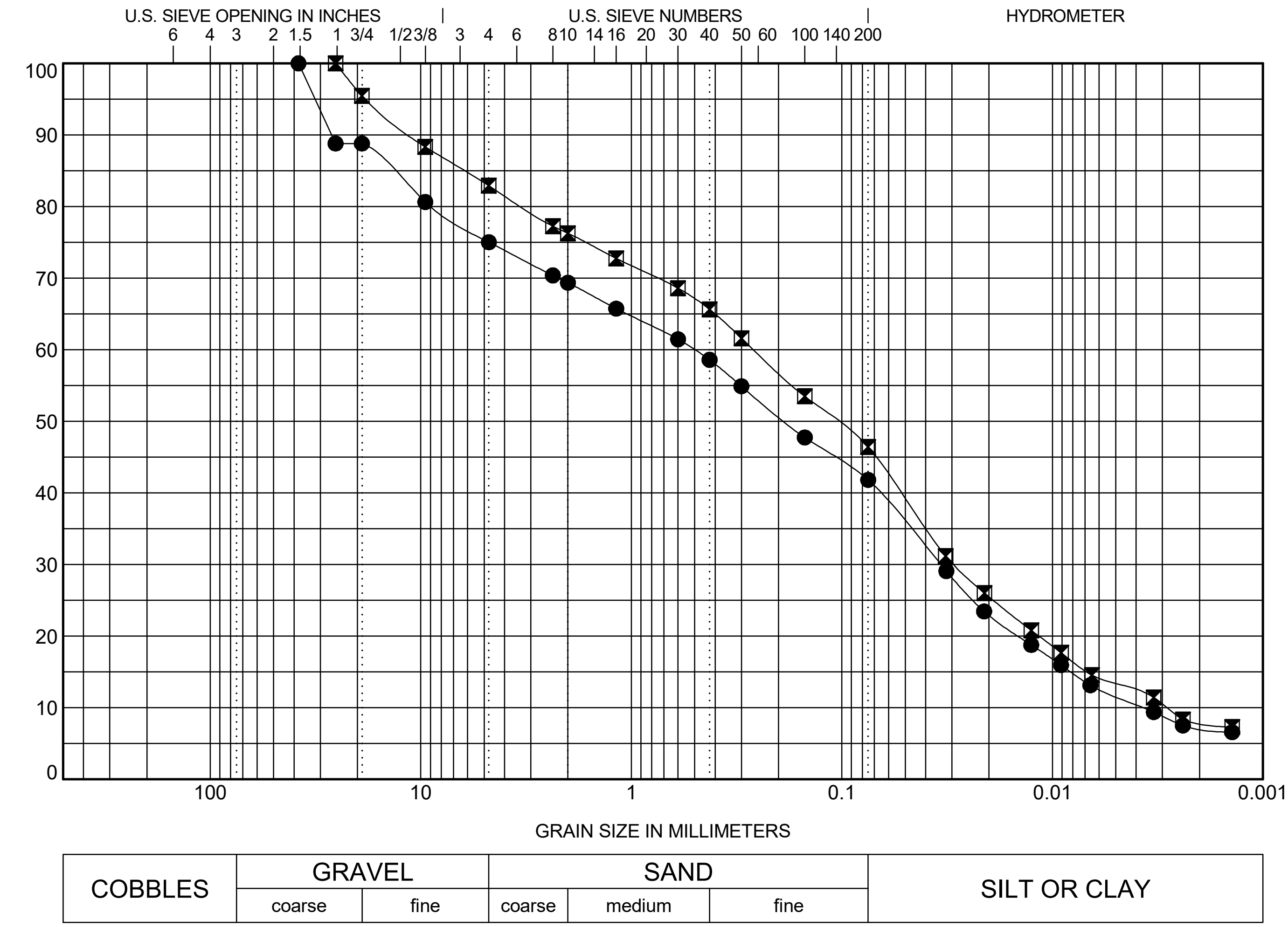
	Specimen Identification		Classification	LL	PL	PI	Cc	Cu
●	**B-1, SS-2**	**2'-4'**					**0.99**	**113.66**
⧗	**B-22, SS-3**	**4'-6'**						
▲	**B-28, SS-3**	**4'-6'**					**0.14**	**802.28**
★	**B-33, SS-4**	**6'-8'**					**1.53**	**131.83**
⊙	**B-37, SS-2**	**2'-4'**					**1.54**	**106.25**

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**B-1, SS-2**	**2'-4'**	**38.1**	**0.259**	**0.024**	**0.002**	**21.3**	**29.4**	**34.1**	**15.1**
⧗	**B-22, SS-3**	**4'-6'**	**38.1**	**0.65**	**0.021**		**21.1**	**33.6**	**29.4**	**16.0**
▲	**B-28, SS-3**	**4'-6'**	**25.4**	**7.489**	**0.099**	**0.009**	**45.8**	**25.7**	**20.7**	**7.8**
★	**B-33, SS-4**	**6'-8'**	**19.05**	**0.36**	**0.039**	**0.003**	**14.9**	**42.9**	**29.0**	**13.2**
⊙	**B-37, SS-2**	**2'-4'**	**19.05**	**0.265**	**0.032**	**0.002**	**14.7**	**40.8**	**31.3**	**13.2**

GESTRA Engineering, Inc
191 W. Edgerton Avenue
Milwaukee, WI 53207
Phone: (414) 933-7444, Fax: (414) 933-7844

LABORATORY TEST RESULTS
GRAIN SIZE DISTRIBUTION (ASTM D6913 and D7928)

Project Name: Thomas Farms Development
Project Number: 23083-10
Project Location: Delafield, Wisconsin



	Specimen Identification		Classification	LL	PL	PI	Cc	Cu
●	**B-6, SS-2**	**2'-4'**					**0.62**	**136.10**
⊠	**B-9, SS-3**	**4'-6'**					**1.14**	**91.81**

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**B-6, SS-2**	**2'-4'**	**38.1**	**0.504**	**0.034**	**0.004**	**25.0**	**33.2**	**30.2**	**11.6**
⊠	**B-9, SS-3**	**4'-6'**	**25.4**	**0.262**	**0.029**	**0.003**	**17.1**	**36.5**	**33.1**	**13.3**