

Hartland LCL

Senior Development

Village of Hartland, Wisconsin

Preliminary

Stormwater Management Plan

Prepared by:



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June 1, 2024

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Introduction

Three Leaf Partners, LLC is proposing to construct a senior living development on an 8.96-acre parcel located south of Campus Drive, east of WI-83, and north of STH-16 in the Village of Hartland, Waukesha County, Wisconsin. Refer to Figure 1 for a general location of the project 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 Village of Hartland 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:

Three Leaf Partners, LLC
504 W. Juneau Avenue
Milwaukee, Wisconsin 53203
Contact: John Ford
Phone: (414) 775-0857

Design Requirements

The following design standards have been used to develop the stormwater management plan for the Hartland LCL Senior Development project:

- Village of Hartland Chapter 76, Stormwater Management
- Wisconsin Department of Natural Resources (WDNR) Technical Standards, NR151, and NR216
- Summary of design requirements:
 - Peak Discharge:
Village of Hartland: Reduce the 100-yr, 24-hr post-development runoff rate to the 10-yr, 24-hr pre-development runoff rate. Reduce the 10-yr, 24-hr post-development runoff rate to no greater than the 2-yr, 24-hr pre-development runoff rate. In addition, control the 1-yr and 2-yr, 24-hr post-development runoff rates to the 1-yr and 2-yr, 24-hr pre-development rates, respectively.
 - Water Quality: Reduce to the maximum extent practicable the total suspended solids (TSS) load by 80%, based on an average annual rainfall, as compared to no runoff management controls. Reduce to the maximum extent possible the total phosphorus load by 30%, 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 Hartland LCL Senior Development has been designed in accordance with the Village of Hartland 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 10.20 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. Rainfall values for the hydrological analysis were taken from the National Oceanic and Atmospheric Administration (NOAA) Atlas 14 Precipitation Frequency Tables for Wisconsin Counties and are shown in the following table.

**TABLE 1
Design Rainfall Values**

Storm Recurrence Interval	24-hour Rainfall 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. The Soil Survey identifies the soils at the site as mostly Theresa silt loam and Hochheim loam with limited areas of Casco-Rodman complex soils. Based on this, a hydrologic soil group C was used to determine runoff curve numbers for the site. Refer to Appendix D for details.

Pre-Development Watershed Description

The project site is approximately 8.96-acres in size and is occupied by woodlands and grasslands. Surface drainage for the majority of the site is generally towards either on-site kettles or towards an existing 15-inch culvert that drains northwest, under Campus Drive, and discharges to the existing stormwater pond at Lake Country Lutheran (LCL) High School. A small portion of the site along Campus Drive drains towards storm sewer inlets within the road which also drain directly to the LCL High School pond.

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)	CN Value	Time of Conc. (minutes)	Peak Flow Rate (cfs)			
						1-year	2-year	10-year	100-year
1	Subarea	1.84	0.00	71	11	1.03	1.48	3.46	8.54
1K	Kettle	-	-	-	-	0.00	0.00	0.00	0.00
2	Subarea	1.16	0.00	70	6	0.75	1.09	2.57	6.38
2K	Kettle	-	-	-	-	0.00	0.00	0.00	0.27
3	Subarea	3.37	0.06	71	20	1.33	1.92	4.54	11.39
3K	Kettle	-	-	-	-	0.00	0.00	0.00	2.06
4	Subarea	1.25	0.14	74	17	0.75	1.03	2.21	5.16
4K	Kettle	-	-	-	-	0.00	0.00	0.00	0.53
5	Subarea	0.13	0.00	70	6	0.08	0.12	0.29	0.71
6-New	New Development Subarea	0.26	0.00	71	7	0.17	0.25	0.57	1.40
6-Redev	Redevelopment Subarea	0.13	0.05	83	7	0.23	0.28	0.49	0.95
7-Dist	Disturbed Subarea	0.06	0.00	71	15	0.03	0.04	0.10	0.24
7-Undist	Undisturbed Subarea	0.84	0.00	71	15	0.40	0.57	1.34	3.34
1a-L	West Link – New Development	2.16	0.00	71	-	0.19	0.28	0.64	1.58
1b-L	West Link – Redev & Undist	0.97	0.05	72	-	0.52	0.72	1.62	3.91
1L	West Link (1a-L & 1b-L)	3.13	0.05	71	-	0.68	0.96	2.17	5.27
2L	East Link	5.91	0.20	72	-	0.08	0.12	0.29	0.71

Post-Development Site Drainage Description

The proposed development includes the construction of a senior living development comprised of buildings, parking lots, access drives, hardscape, and greenspace areas. The proposed plan will disturb approximately 5.5-acres and will result in a net increase in impervious area of approximately 3.01 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)	CN Value	Time of Conc. (minutes)	Peak Flow Rate (cfs)			
						1-year	2-year	10-year	100-year
1	Subarea	1.29	0.72	87	6	2.95	3.54	5.77	10.60
1B	Basin	-	-	-	-	0.35	0.37	0.43	0.52
2	Subarea	3.55	1.86	87	13	5.98	7.21	11.86	21.97
2K	Kettle	-	-	-	-	0.00	0.06	0.23	1.03

**TABLE 3
Post-Development Conditions**

3	Subarea	1.12	0.24	79	12	1.18	1.52	2.87	6.06
3B	Basin	-	-	-	-	0.10	0.12	0.16	0.61
4	Subarea	1.53	0.34	79	13	1.56	2.00	3.80	8.00
4K	Kettle	-	-	-	-	0.00	0.00	0.00	0.25
5	Subarea	0.38	0.00	72	6	0.30	0.42	0.93	2.22
5K	Kettle	-	-	-	-	0.00	0.00	0.00	0.00
6	Subarea	0.03	0.00	70	6	0.02	0.03	0.07	0.16
7	Subarea	0.24	0.04	78	6	0.32	0.41	0.78	1.65
8	Subarea	0.90	0.06	73	16	0.50	0.69	1.53	3.66
1L	West Link	5.98	2.68	84	-	0.64	0.87	1.88	4.55
2L	East Link	3.06	0.58	78	-	0.02	0.03	0.07	0.25

Stormwater Detention Basin Design & Summary

The stormwater management plan proposes two (2) bioretention basins and three (3) existing kettles as the primary means of stormwater management for the site. The following tables summarize the detention system routing analysis for the bioretention basins. Details of the stormwater management facilities are included in Appendix B.

**TABLE 4
Routing Analysis Summary**

Basin 1B				
Basin Details:	Basin Outlet Control:			
Bottom of stone elevation = 1014.5	0.13 inch/hour native infiltration rate (1002 Table 2)			
Stone/engineered soil interface elev. = 1015.5	3-inch diameter orifice at I.E. 1015.0			
Top of engineered soil elevation = 1017.0	36-inch horizontal grate at elevation 1020.00			
Top of berm elevation = 1022.0	12-inch dia. outlet pipe at I.E. 1015.0			
	10-foot spillway at elevation 1021.0			
	1-year Storm	2-year Storm	10-year Storm	100-year Storm
Peak Inflow (cfs)	2.95	3.54	5.77	10.60
Peak Outflow (cfs)	0.35	0.37	0.43	0.52
Max Water Surface Elev.	1017.30	1017.55	1018.45	1019.98
Max Storage Volume (ac-ft)	0.06	0.08	0.14	0.30
Basin 3B				
Basin Details:	Basin Outlet Control:			
Bottom of stone elevation = 1008.5	0.24 inch/hour native infiltration rate (1002 Table 2)			
Stone/engineered soil interface elev. = 1009.5	2-inch diameter orifice at I.E. 1009.0			
Top of engineered soil elevation = 1011.0	36-inch horizontal grate at elevation 1012.25			
Top of berm elevation = 1013.5	12-inch diameter outlet pipe at I.E. 1009.0			
	10-foot spillway at elevation 1012.5			
	1-year Storm	2-year Storm	10-year Storm	100-year Storm
Peak Inflow (cfs)	1.18	1.52	2.87	6.06
Peak Outflow (cfs)	0.10	0.12	0.16	0.61
Max Water Surface Elev.	1009.99	1010.45	1011.47	1012.48
Max Storage Volume (ac-ft)	0.04	0.05	0.10	0.21

Peak Discharge Summaries

Village of Hartland requires post-development peak discharge rates for the 100-yr, 24-hr storm to be no greater than the pre-development discharge rates for the 10-yr, 24-hr storm event. In addition, the post-development peak discharge rates for the 2 and 10-yr, 24-hr storms shall be no greater than the pre-development discharge rates for the 2-yr, 24-hr storm. The 1-yr, 24-hr post-development runoff rate shall be no greater than the 1-yr, 24-hr pre-development rate. The following table compares the results of the analysis from a peak discharge standpoint.

**TABLE 5
Comparison of Peak Discharge**

West Sub-Watershed (West Link 1L)			
		1-yr Max Rate Allowed	1-yr Post-Development
		0.68 cfs	> 0.64 cfs
		2-yr Max Rate Allowed	10-yr Post-Development
		0.96 cfs	> 0.87 cfs
2-yr Pre-Development (Link 1a-L)	10-yr Redev. & Undist. Areas (Link 1b-L)	10-yr Max Rate Allowed	10-yr Post-Development
0.28 cfs	+ 1.62 cfs	= 1.90 cfs	> 1.88 cfs
10-yr Pre-Development (Link 1a-L)	100-yr Redev. & Undist. Areas (Link 1b-L)	100-yr Max Rate Allowed	100-yr Post-Development
0.64 cfs	+ 3.91 cfs	= 4.55 cfs	> 4.55 cfs
East Sub-Watershed (East Link 2L)			
	1-yr Pre-Development	1-yr Max Rate Allowed	1-yr Post-Development
	0.08 cfs	0.08 cfs	> 0.02 cfs
	2-yr Pre-Development	2-yr Max Rate Allowed	10-yr Post-Development
	0.12 cfs	= 0.12 cfs	> 0.03 cfs
	2-yr Pre-Development	10-yr Max Rate Allowed	10-yr Post-Development
	0.12 cfs	= 0.12 cfs	> 0.07 cfs
	10-yr Pre-Development	100-yr Max Rate Allowed	100-yr Post-Development
	0.29 cfs	= 0.29 cfs	> 0.25 cfs

Water Quality

The Village of Hartland 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 95.7 percent of TSS will be removed from stormwater as a result of the bioretention basins and existing kettles. Detailed computations are included in Appendix C.

Infiltration

The Village of Hartland 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.

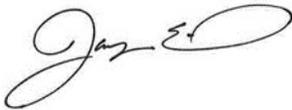
The development plan will disturb approximately 5.5-acres of area. In accordance with the Village's ordinance, the maximum effective infiltration area required is approximately 0.06 acres (1% of the project site). The two proposed bioretention basins will provide a total effective infiltration area of approximately 0.14 acres which exceeds the 1% requirement. Based on this, the site meets the requirements for infiltration and no additional infiltration analysis is warranted.

Conclusion

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

Prepared by:

SOUND STORMWATER DESIGN LLC

A handwritten signature in black ink, appearing to read "Jayme Sisel". The signature is fluid and cursive, with a large loop at the end.

Jayme Sisel, P.E.

FIGURES



**SOUND STORMWATER
DESIGN**

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

CLIENT:

PROJECT TITLE:
**HARTLAND LCL
SENIOR
DEVELOPMENT**
CAMPUS DRIVE
HARTLAND, WISCONSIN

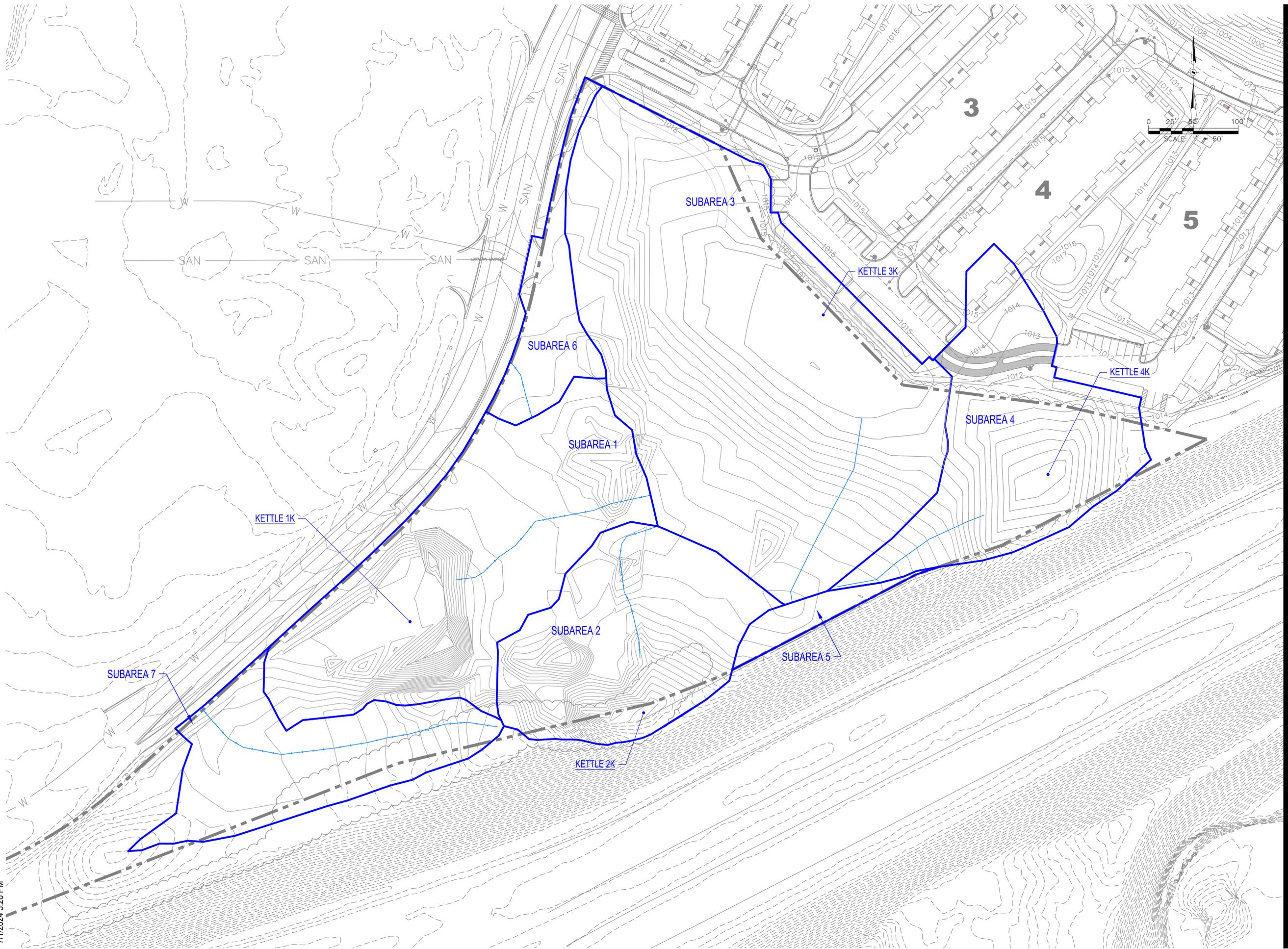
DATE: 06-27-24

JOB NO: 2024-005

SHEET TITLE:
**PRE-
DEVELOPMENT
CONDITIONS PLAN**

FIGURE:

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**SOUND STORMWATER
DESIGN**

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

CLIENT:

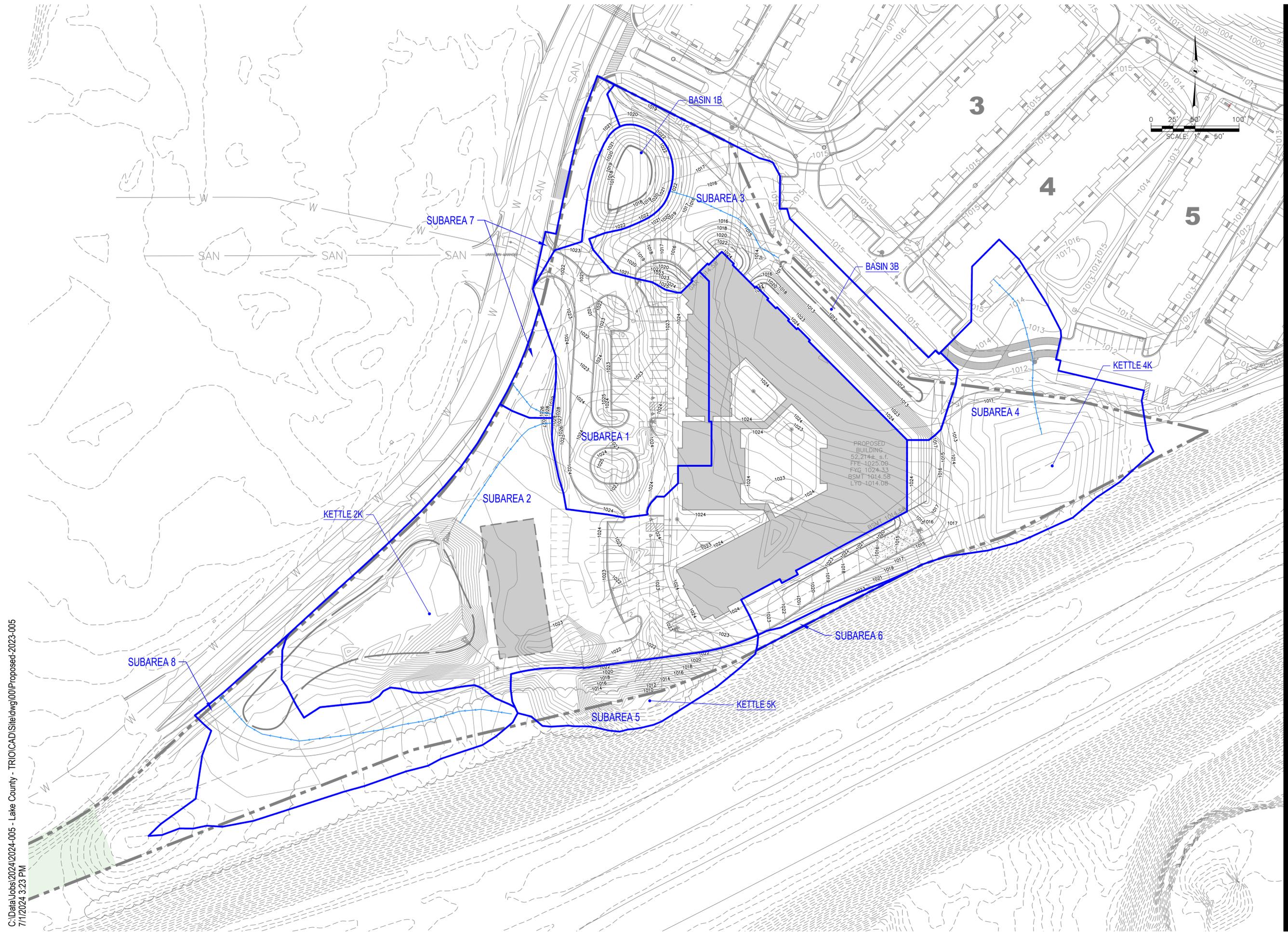
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**HARTLAND LCL
SENIOR
DEVELOPMENT**
CAMPUS DRIVE
HARTLAND, WISCONSIN

DATE: 06-27-24

JOB NO: 2024-005

SHEET TITLE:
**POST-
DEVELOPMENT
CONDITIONS PLAN**

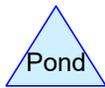
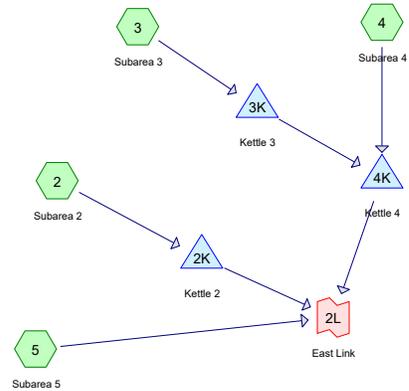
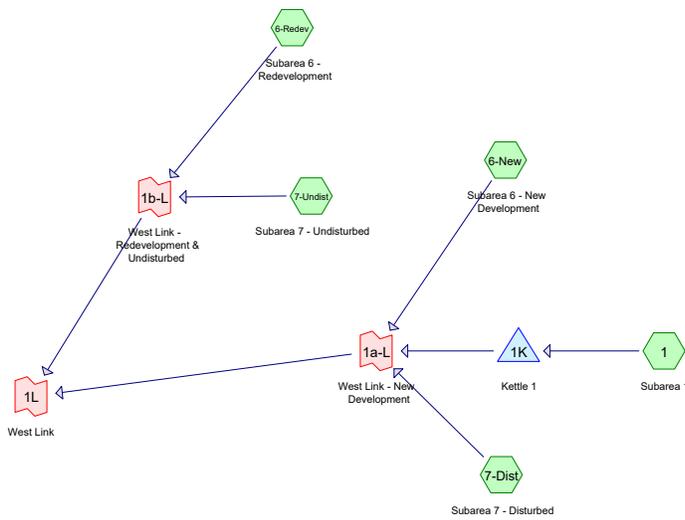
FIGURE:



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APPENDIX A

Pre-Development Hydrologic Analysis



Routing Diagram for Existing_005
 Prepared by Sound Stormwater Design, Printed 7/1/2024
 HydroCAD® 10.20-4b s/n 11025 © 2023 HydroCAD Software Solutions LLC

Existing_005

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Page 2

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

Existing_005

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Page 3

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.890	74	grass (1, 3, 4, 6-Redev, 7-Undist)
2.900	71	grassland (1, 2, 3, 6-New, 7-Dist, 7-Undist)
0.250	98	impervious (3, 4, 6-Redev)
5.000	70	woods (1, 2, 3, 4, 5, 7-Dist, 7-Undist)
9.040	71	TOTAL AREA

Existing_005

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MSE 24-hr 3 1 yr Rainfall=2.40"

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Page 4

Time span=0.00-24.00 hrs, dt=0.010 hrs, 2401 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1: Subarea 1	Runoff Area=1.840 ac 0.00% Impervious Runoff Depth>0.44" Flow Length=245' Tc=10.5 min CN=71 Runoff=1.03 cfs 0.068 af
Subcatchment2: Subarea 2	Runoff Area=1.160 ac 0.00% Impervious Runoff Depth>0.41" Flow Length=175' Tc=6.0 min CN=70 Runoff=0.75 cfs 0.039 af
Subcatchment3: Subarea 3	Runoff Area=3.370 ac 1.78% Impervious Runoff Depth>0.44" Flow Length=220' Tc=20.3 min CN=71 Runoff=1.33 cfs 0.124 af
Subcatchment4: Subarea 4	Runoff Area=1.250 ac 11.20% Impervious Runoff Depth>0.55" Flow Length=205' Tc=16.6 min CN=74 Runoff=0.75 cfs 0.057 af
Subcatchment5: Subarea 5	Runoff Area=0.130 ac 0.00% Impervious Runoff Depth>0.41" Flow Length=30' Slope=0.0600 '/' Tc=6.0 min CN=70 Runoff=0.08 cfs 0.004 af
Subcatchment6-New: Subarea 6 - New	Runoff Area=0.260 ac 0.00% Impervious Runoff Depth>0.44" Flow Length=70' Slope=0.0200 '/' Tc=7.2 min CN=71 Runoff=0.17 cfs 0.010 af
Subcatchment6-Redev: Subarea 6 -	Runoff Area=0.130 ac 38.46% Impervious Runoff Depth>0.98" Flow Length=70' Slope=0.0200 '/' Tc=7.2 min CN=83 Runoff=0.23 cfs 0.011 af
Subcatchment7-Dist: Subarea 7 - Disturbed	Runoff Area=0.060 ac 0.00% Impervious Runoff Depth>0.44" Flow Length=350' Tc=14.7 min CN=71 Runoff=0.03 cfs 0.002 af
Subcatchment7-Undist: Subarea 7 -	Runoff Area=0.840 ac 0.00% Impervious Runoff Depth>0.44" Flow Length=350' Tc=14.7 min CN=71 Runoff=0.40 cfs 0.031 af
Pond 1K: Kettle 1	Peak Elev=1,008.68' Storage=0.062 af Inflow=1.03 cfs 0.068 af Discarded=0.01 cfs 0.006 af Primary=0.00 cfs 0.000 af Outflow=0.01 cfs 0.006 af
Pond 2K: Kettle 2	Peak Elev=1,010.02' Storage=0.030 af Inflow=0.75 cfs 0.039 af Discarded=0.01 cfs 0.010 af Primary=0.00 cfs 0.000 af Outflow=0.01 cfs 0.010 af
Pond 3K: Kettle 3	Peak Elev=1,011.83' Storage=0.077 af Inflow=1.33 cfs 0.124 af Discarded=0.07 cfs 0.063 af Primary=0.00 cfs 0.000 af Outflow=0.07 cfs 0.063 af
Pond 4K: Kettle 4	Peak Elev=1,005.32' Storage=0.036 af Inflow=0.75 cfs 0.057 af Discarded=0.03 cfs 0.030 af Primary=0.00 cfs 0.000 af Outflow=0.03 cfs 0.030 af
Link 1a-L: West Link - New Development	Inflow=0.19 cfs 0.012 af Primary=0.19 cfs 0.012 af
Link 1b-L: West Link - Redevelopment& Undisturbed	Inflow=0.52 cfs 0.042 af Primary=0.52 cfs 0.042 af
Link 1L: West Link	Inflow=0.68 cfs 0.053 af Primary=0.68 cfs 0.053 af

Existing_005

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MSE 24-hr 3 1 yr Rainfall=2.40"

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Page 5

Link 2L: East Link

Inflow=0.08 cfs 0.004 af

Primary=0.08 cfs 0.004 af

Total Runoff Area = 9.040 ac Runoff Volume = 0.346 af Average Runoff Depth = 0.46"
97.23% Pervious = 8.790 ac 2.77% Impervious = 0.250 ac

Existing_005

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MSE 24-hr 3 2 yr Rainfall=2.70"

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Time span=0.00-24.00 hrs, dt=0.010 hrs, 2401 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1: Subarea 1	Runoff Area=1.840 ac 0.00% Impervious Runoff Depth>0.59" Flow Length=245' Tc=10.5 min CN=71 Runoff=1.48 cfs 0.091 af
Subcatchment2: Subarea 2	Runoff Area=1.160 ac 0.00% Impervious Runoff Depth>0.55" Flow Length=175' Tc=6.0 min CN=70 Runoff=1.09 cfs 0.054 af
Subcatchment3: Subarea 3	Runoff Area=3.370 ac 1.78% Impervious Runoff Depth>0.59" Flow Length=220' Tc=20.3 min CN=71 Runoff=1.92 cfs 0.167 af
Subcatchment4: Subarea 4	Runoff Area=1.250 ac 11.20% Impervious Runoff Depth>0.72" Flow Length=205' Tc=16.6 min CN=74 Runoff=1.03 cfs 0.075 af
Subcatchment5: Subarea 5	Runoff Area=0.130 ac 0.00% Impervious Runoff Depth>0.55" Flow Length=30' Slope=0.0600 '/' Tc=6.0 min CN=70 Runoff=0.12 cfs 0.006 af
Subcatchment6-New: Subarea 6 - New	Runoff Area=0.260 ac 0.00% Impervious Runoff Depth>0.59" Flow Length=70' Slope=0.0200 '/' Tc=7.2 min CN=71 Runoff=0.25 cfs 0.013 af
Subcatchment6-Redev: Subarea 6 -	Runoff Area=0.130 ac 38.46% Impervious Runoff Depth>1.21" Flow Length=70' Slope=0.0200 '/' Tc=7.2 min CN=83 Runoff=0.28 cfs 0.013 af
Subcatchment7-Dist: Subarea 7 - Disturbed	Runoff Area=0.060 ac 0.00% Impervious Runoff Depth>0.59" Flow Length=350' Tc=14.7 min CN=71 Runoff=0.04 cfs 0.003 af
Subcatchment7-Undist: Subarea 7 -	Runoff Area=0.840 ac 0.00% Impervious Runoff Depth>0.59" Flow Length=350' Tc=14.7 min CN=71 Runoff=0.57 cfs 0.042 af
Pond 1K: Kettle 1	Peak Elev=1,009.24' Storage=0.084 af Inflow=1.48 cfs 0.091 af Discarded=0.01 cfs 0.007 af Primary=0.00 cfs 0.000 af Outflow=0.01 cfs 0.007 af
Pond 2K: Kettle 2	Peak Elev=1,010.31' Storage=0.043 af Inflow=1.09 cfs 0.054 af Discarded=0.01 cfs 0.012 af Primary=0.00 cfs 0.000 af Outflow=0.01 cfs 0.012 af
Pond 3K: Kettle 3	Peak Elev=1,011.92' Storage=0.108 af Inflow=1.92 cfs 0.167 af Discarded=0.09 cfs 0.079 af Primary=0.00 cfs 0.000 af Outflow=0.09 cfs 0.079 af
Pond 4K: Kettle 4	Peak Elev=1,005.43' Storage=0.050 af Inflow=1.03 cfs 0.075 af Discarded=0.03 cfs 0.033 af Primary=0.00 cfs 0.000 af Outflow=0.03 cfs 0.033 af
Link 1a-L: West Link - New Development	Inflow=0.28 cfs 0.016 af Primary=0.28 cfs 0.016 af
Link 1b-L: West Link - Redevelopment& Undisturbed	Inflow=0.72 cfs 0.055 af Primary=0.72 cfs 0.055 af
Link 1L: West Link	Inflow=0.96 cfs 0.070 af Primary=0.96 cfs 0.070 af

Existing_005

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MSE 24-hr 3 2 yr Rainfall=2.70"

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Link 2L: East Link

Inflow=0.12 cfs 0.006 af

Primary=0.12 cfs 0.006 af

Total Runoff Area = 9.040 ac Runoff Volume = 0.463 af Average Runoff Depth = 0.61"
97.23% Pervious = 8.790 ac 2.77% Impervious = 0.250 ac

Existing_005

MSE 24-hr 3 10 yr Rainfall=3.81"

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Time span=0.00-24.00 hrs, dt=0.010 hrs, 2401 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1: Subarea 1	Runoff Area=1.840 ac 0.00% Impervious Runoff Depth>1.26" Flow Length=245' Tc=10.5 min CN=71 Runoff=3.46 cfs 0.194 af
Subcatchment2: Subarea 2	Runoff Area=1.160 ac 0.00% Impervious Runoff Depth>1.20" Flow Length=175' Tc=6.0 min CN=70 Runoff=2.57 cfs 0.116 af
Subcatchment3: Subarea 3	Runoff Area=3.370 ac 1.78% Impervious Runoff Depth>1.26" Flow Length=220' Tc=20.3 min CN=71 Runoff=4.54 cfs 0.355 af
Subcatchment4: Subarea 4	Runoff Area=1.250 ac 11.20% Impervious Runoff Depth>1.46" Flow Length=205' Tc=16.6 min CN=74 Runoff=2.21 cfs 0.152 af
Subcatchment5: Subarea 5	Runoff Area=0.130 ac 0.00% Impervious Runoff Depth>1.20" Flow Length=30' Slope=0.0600 '/' Tc=6.0 min CN=70 Runoff=0.29 cfs 0.013 af
Subcatchment6-New: Subarea 6 - New	Runoff Area=0.260 ac 0.00% Impervious Runoff Depth>1.27" Flow Length=70' Slope=0.0200 '/' Tc=7.2 min CN=71 Runoff=0.57 cfs 0.027 af
Subcatchment6-Redev: Subarea 6 -	Runoff Area=0.130 ac 38.46% Impervious Runoff Depth>2.12" Flow Length=70' Slope=0.0200 '/' Tc=7.2 min CN=83 Runoff=0.49 cfs 0.023 af
Subcatchment7-Dist: Subarea 7 - Disturbed	Runoff Area=0.060 ac 0.00% Impervious Runoff Depth>1.26" Flow Length=350' Tc=14.7 min CN=71 Runoff=0.10 cfs 0.006 af
Subcatchment7-Undist: Subarea 7 -	Runoff Area=0.840 ac 0.00% Impervious Runoff Depth>1.26" Flow Length=350' Tc=14.7 min CN=71 Runoff=1.34 cfs 0.088 af
Pond 1K: Kettle 1	Peak Elev=1,010.97' Storage=0.182 af Inflow=3.46 cfs 0.194 af Discarded=0.01 cfs 0.012 af Primary=0.00 cfs 0.000 af Outflow=0.01 cfs 0.012 af
Pond 2K: Kettle 2	Peak Elev=1,011.31' Storage=0.099 af Inflow=2.57 cfs 0.116 af Discarded=0.02 cfs 0.018 af Primary=0.00 cfs 0.000 af Outflow=0.02 cfs 0.018 af
Pond 3K: Kettle 3	Peak Elev=1,012.28' Storage=0.261 af Inflow=4.54 cfs 0.355 af Discarded=0.12 cfs 0.114 af Primary=0.00 cfs 0.000 af Outflow=0.12 cfs 0.114 af
Pond 4K: Kettle 4	Peak Elev=1,005.85' Storage=0.115 af Inflow=2.21 cfs 0.152 af Discarded=0.04 cfs 0.044 af Primary=0.00 cfs 0.000 af Outflow=0.04 cfs 0.044 af
Link 1a-L: West Link - New Development	Inflow=0.64 cfs 0.034 af Primary=0.64 cfs 0.034 af
Link 1b-L: West Link - Redevelopment& Undisturbed	Inflow=1.62 cfs 0.111 af Primary=1.62 cfs 0.111 af
Link 1L: West Link	Inflow=2.17 cfs 0.145 af Primary=2.17 cfs 0.145 af

Existing_005

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MSE 24-hr 3 10 yr Rainfall=3.81"

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Link 2L: East Link

Inflow=0.29 cfs 0.013 af

Primary=0.29 cfs 0.013 af

Total Runoff Area = 9.040 ac Runoff Volume = 0.975 af Average Runoff Depth = 1.29"
97.23% Pervious = 8.790 ac 2.77% Impervious = 0.250 ac

Existing_005

MSE 24-hr 3 100 yr Rainfall=6.18"

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Time span=0.00-24.00 hrs, dt=0.010 hrs, 2401 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1: Subarea 1	Runoff Area=1.840 ac 0.00% Impervious Runoff Depth>3.04" Flow Length=245' Tc=10.5 min CN=71 Runoff=8.54 cfs 0.466 af
Subcatchment2: Subarea 2	Runoff Area=1.160 ac 0.00% Impervious Runoff Depth>2.95" Flow Length=175' Tc=6.0 min CN=70 Runoff=6.38 cfs 0.285 af
Subcatchment3: Subarea 3	Runoff Area=3.370 ac 1.78% Impervious Runoff Depth>3.04" Flow Length=220' Tc=20.3 min CN=71 Runoff=11.39 cfs 0.854 af
Subcatchment4: Subarea 4	Runoff Area=1.250 ac 11.20% Impervious Runoff Depth>3.33" Flow Length=205' Tc=16.6 min CN=74 Runoff=5.16 cfs 0.347 af
Subcatchment5: Subarea 5	Runoff Area=0.130 ac 0.00% Impervious Runoff Depth>2.95" Flow Length=30' Slope=0.0600 '/' Tc=6.0 min CN=70 Runoff=0.71 cfs 0.032 af
Subcatchment6-New: Subarea 6 - New	Runoff Area=0.260 ac 0.00% Impervious Runoff Depth>3.04" Flow Length=70' Slope=0.0200 '/' Tc=7.2 min CN=71 Runoff=1.40 cfs 0.066 af
Subcatchment6-Redev: Subarea 6 -	Runoff Area=0.130 ac 38.46% Impervious Runoff Depth>4.26" Flow Length=70' Slope=0.0200 '/' Tc=7.2 min CN=83 Runoff=0.95 cfs 0.046 af
Subcatchment7-Dist: Subarea 7 - Disturbed	Runoff Area=0.060 ac 0.00% Impervious Runoff Depth>3.04" Flow Length=350' Tc=14.7 min CN=71 Runoff=0.24 cfs 0.015 af
Subcatchment7-Undist: Subarea 7 -	Runoff Area=0.840 ac 0.00% Impervious Runoff Depth>3.04" Flow Length=350' Tc=14.7 min CN=71 Runoff=3.34 cfs 0.213 af
Pond 1K: Kettle 1	Peak Elev=1,013.20' Storage=0.440 af Inflow=8.54 cfs 0.466 af Discarded=0.03 cfs 0.027 af Primary=0.00 cfs 0.000 af Outflow=0.03 cfs 0.027 af
Pond 2K: Kettle 2	Peak Elev=1,012.52' Storage=0.204 af Inflow=6.38 cfs 0.285 af Discarded=0.03 cfs 0.031 af Primary=0.27 cfs 0.053 af Outflow=0.30 cfs 0.083 af
Pond 3K: Kettle 3	Peak Elev=1,012.69' Storage=0.471 af Inflow=11.39 cfs 0.854 af Discarded=0.15 cfs 0.137 af Primary=2.06 cfs 0.352 af Outflow=2.20 cfs 0.489 af
Pond 4K: Kettle 4	Peak Elev=1,007.58' Storage=0.516 af Inflow=5.16 cfs 0.699 af Discarded=0.08 cfs 0.080 af Primary=0.53 cfs 0.130 af Outflow=0.61 cfs 0.209 af
Link 1a-L: West Link - New Development	Inflow=1.58 cfs 0.081 af Primary=1.58 cfs 0.081 af
Link 1b-L: West Link - Redevelopment& Undisturbed	Inflow=3.91 cfs 0.259 af Primary=3.91 cfs 0.259 af
Link 1L: West Link	Inflow=5.27 cfs 0.340 af Primary=5.27 cfs 0.340 af

Existing_005

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MSE 24-hr 3 100 yr Rainfall=6.18"

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Link 2L: East Link

Inflow=0.71 cfs 0.214 af

Primary=0.71 cfs 0.214 af

Total Runoff Area = 9.040 ac Runoff Volume = 2.324 af Average Runoff Depth = 3.09"
97.23% Pervious = 8.790 ac 2.77% Impervious = 0.250 ac

Existing_005

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MSE 24-hr 3 100 yr Rainfall=6.18"

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Summary for Subcatchment 1: Subarea 1

Runoff = 8.54 cfs @ 12.18 hrs, Volume= 0.466 af, Depth> 3.04"
 Routed to Pond 1K : Kettle 1

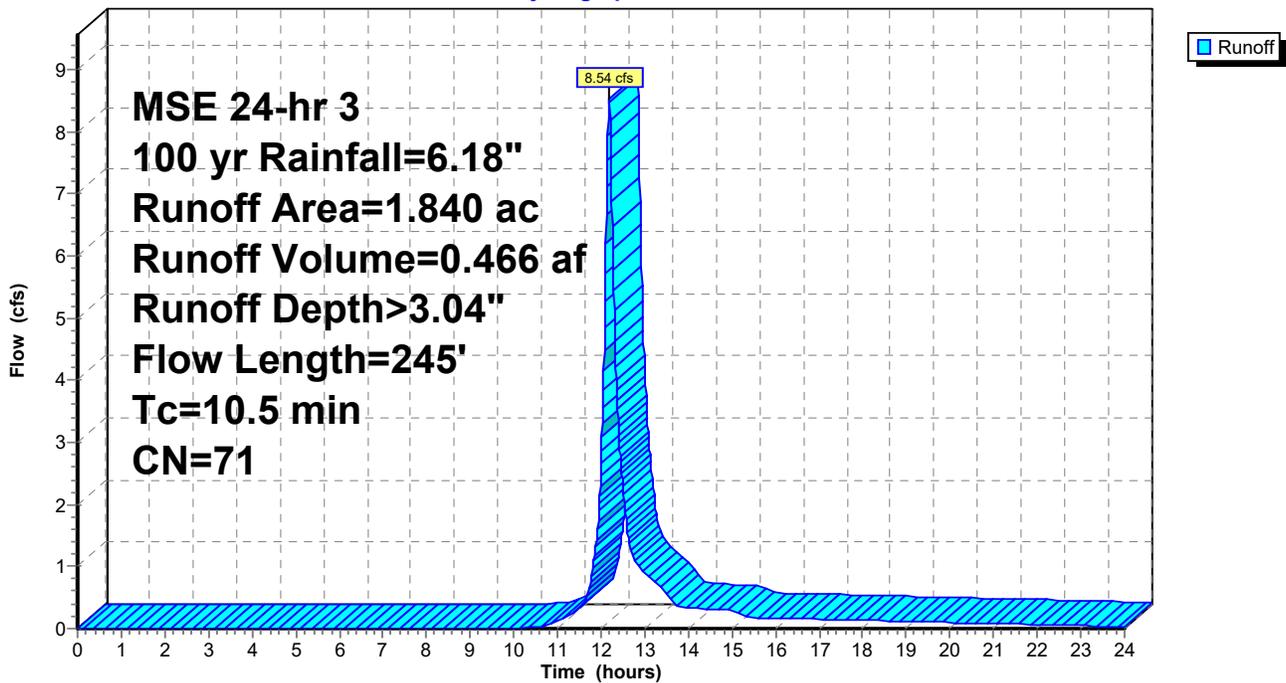
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.010 hrs
 MSE 24-hr 3 100 yr Rainfall=6.18"

Area (ac)	CN	Description
* 0.840	70	woods
* 0.920	71	grassland
* 0.080	74	grass
1.840	71	Weighted Average
1.840		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"
1.0	130	0.0200	2.28		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.0	15	0.3300	9.25		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
10.5	245	Total			

Subcatchment 1: Subarea 1

Hydrograph



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MSE 24-hr 3 100 yr Rainfall=6.18"

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Summary for Subcatchment 2: Subarea 2

Runoff = 6.38 cfs @ 12.13 hrs, Volume= 0.285 af, Depth> 2.95"
 Routed to Pond 2K : Kettle 2

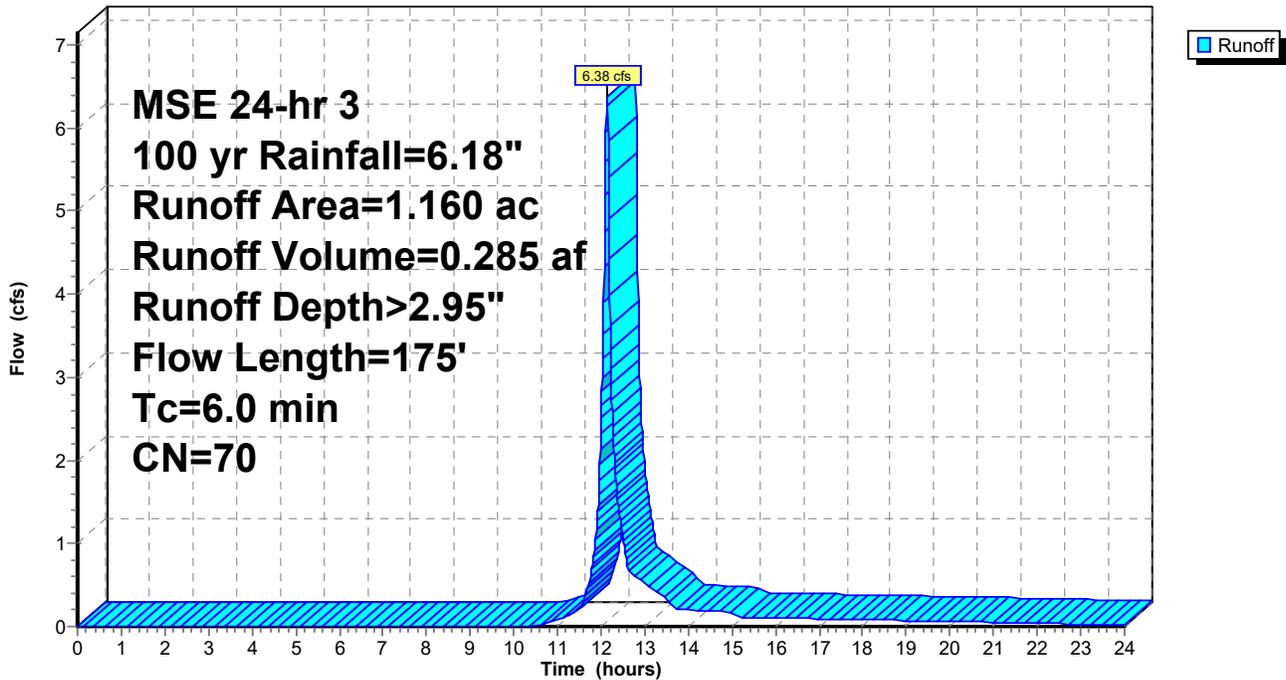
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.010 hrs
 MSE 24-hr 3 100 yr Rainfall=6.18"

Area (ac)	CN	Description
* 0.610	70	woods
* 0.550	71	grassland
1.160	70	Weighted Average
1.160		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.6	50	0.0300	0.18		Sheet Flow, Range n= 0.130 P2= 2.70"
0.3	50	0.0300	2.79		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.2	75	0.1300	5.80		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
5.1	175	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 2: Subarea 2

Hydrograph



Summary for Subcatchment 3: Subarea 3

Runoff = 11.39 cfs @ 12.30 hrs, Volume= 0.854 af, Depth> 3.04"
 Routed to Pond 3K : Kettle 3

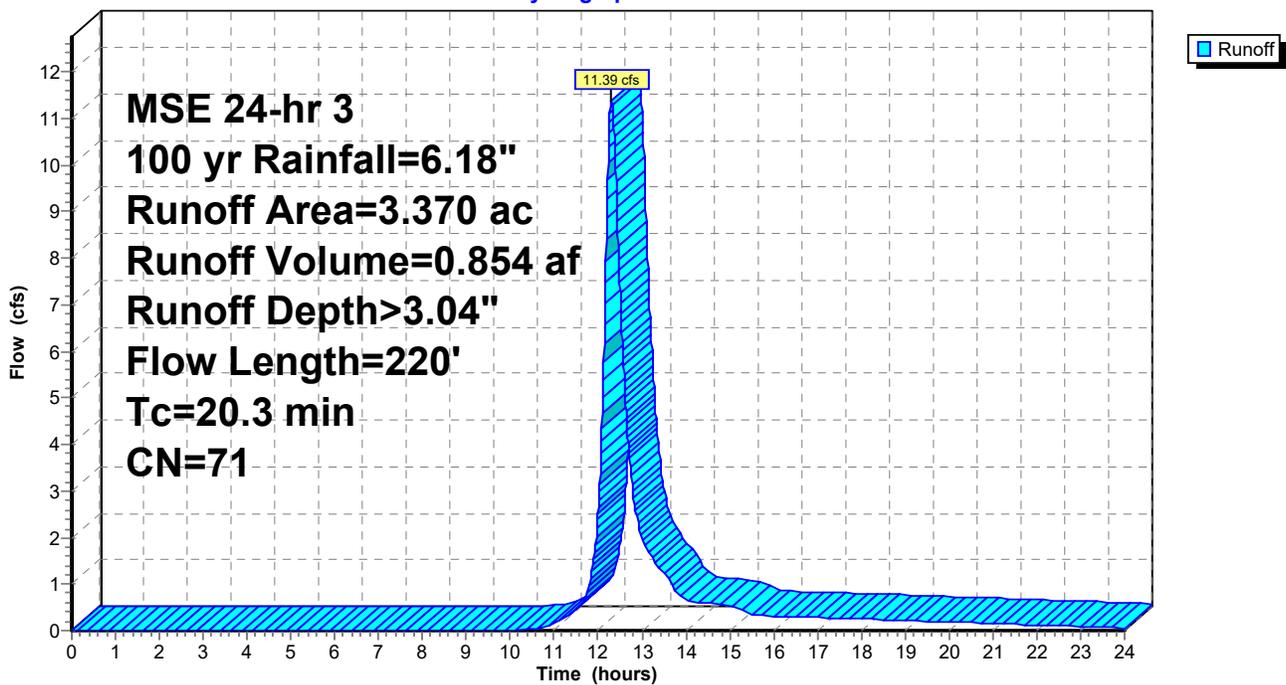
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.010 hrs
 MSE 24-hr 3 100 yr Rainfall=6.18"

Area (ac)	CN	Description
* 2.240	70	woods
* 0.680	71	grassland
* 0.390	74	grass
* 0.060	98	impervious
3.370	71	Weighted Average
3.310		98.22% Pervious Area
0.060		1.78% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.9	100	0.0300	0.08		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 2.70"
0.4	120	0.0800	4.55		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
20.3	220	Total			

Subcatchment 3: Subarea 3

Hydrograph



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MSE 24-hr 3 100 yr Rainfall=6.18"

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Summary for Subcatchment 4: Subarea 4

Runoff = 5.16 cfs @ 12.25 hrs, Volume= 0.347 af, Depth> 3.33"
 Routed to Pond 4K : Kettle 4

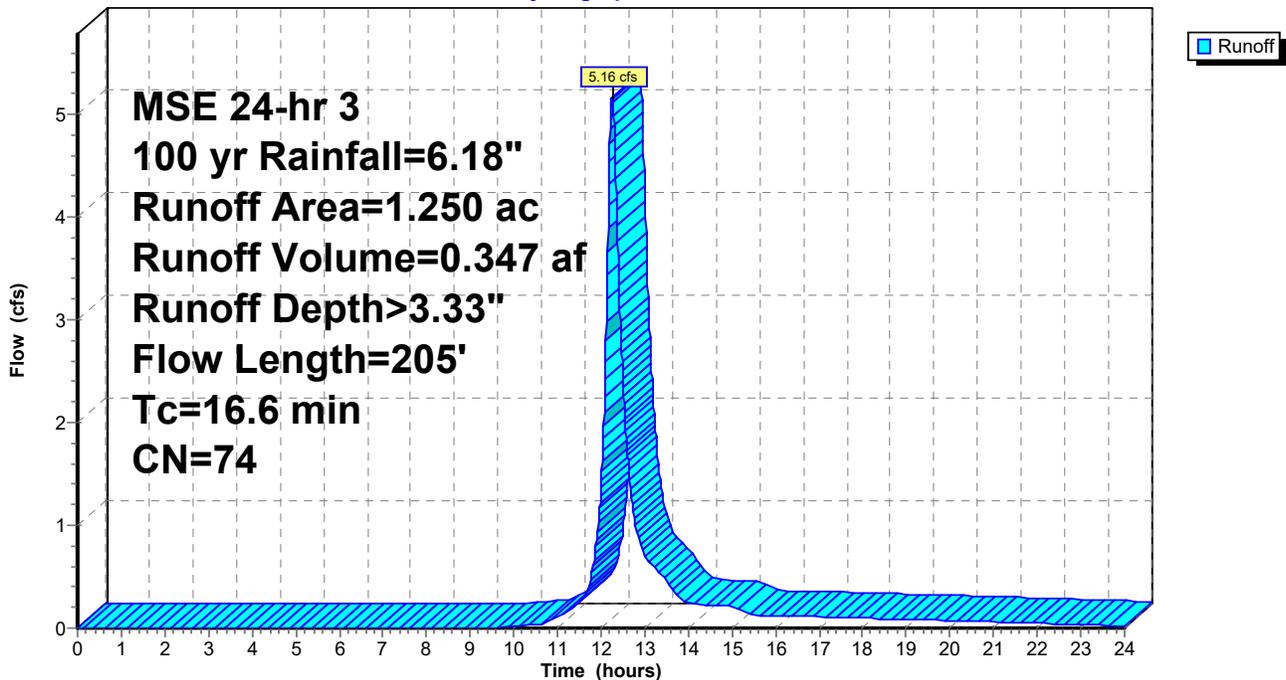
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.010 hrs
 MSE 24-hr 3 100 yr Rainfall=6.18"

Area (ac)	CN	Description
* 0.800	70	woods
* 0.310	74	grass
* 0.140	98	impervious
1.250	74	Weighted Average
1.110		88.80% Pervious Area
0.140		11.20% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.2	100	0.0500	0.10		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 2.70"
0.3	55	0.0500	3.60		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.1	50	0.2200	7.55		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
16.6	205	Total			

Subcatchment 4: Subarea 4

Hydrograph



Summary for Subcatchment 5: Subarea 5

Runoff = 0.71 cfs @ 12.13 hrs, Volume= 0.032 af, Depth> 2.95"
 Routed to Link 2L : East Link

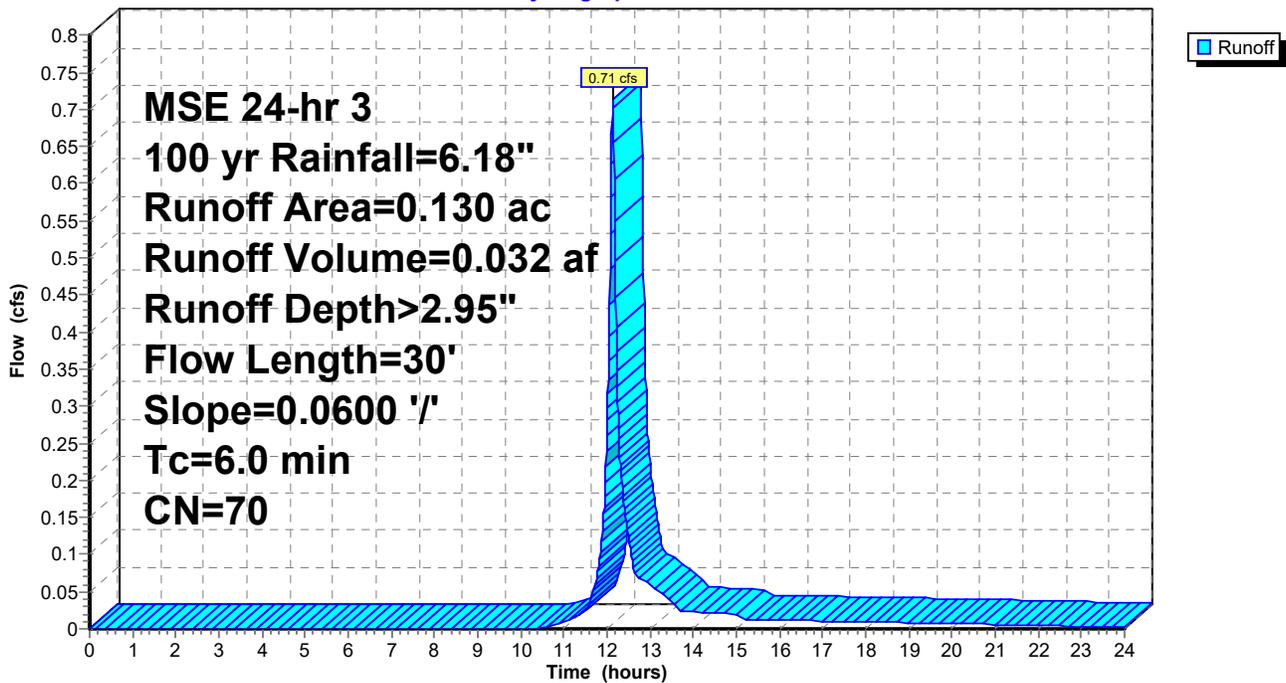
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.010 hrs
 MSE 24-hr 3 100 yr Rainfall=6.18"

Area (ac)	CN	Description
* 0.130	70	woods
0.130		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	30	0.0600	0.09		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 2.70"
5.7	30	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 5: Subarea 5

Hydrograph



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MSE 24-hr 3 100 yr Rainfall=6.18"

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Summary for Subcatchment 6-New: Subarea 6 - New Development

Runoff = 1.40 cfs @ 12.15 hrs, Volume= 0.066 af, Depth> 3.04"

Routed to Link 1a-L : West Link - New Development

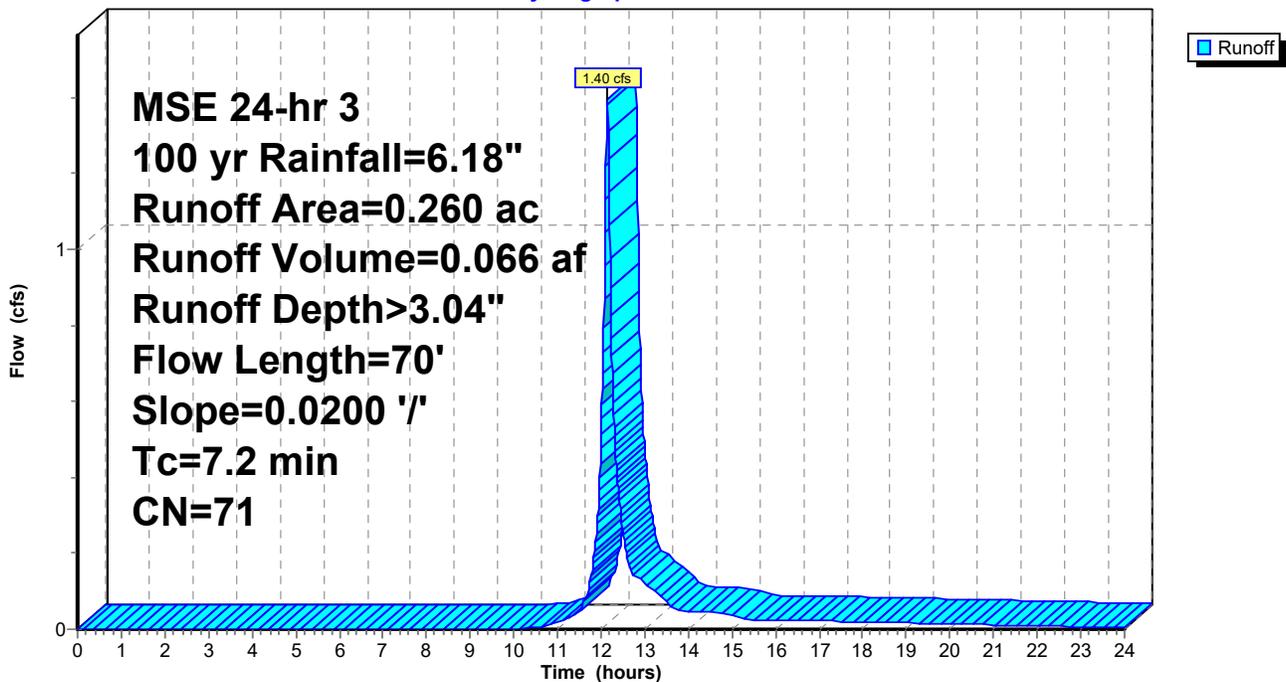
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.010 hrs
MSE 24-hr 3 100 yr Rainfall=6.18"

Area (ac)	CN	Description
* 0.260	71	grassland
0.260		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.2	70	0.0200	0.16		Sheet Flow, Range n= 0.130 P2= 2.70"

Subcatchment 6-New: Subarea 6 - New Development

Hydrograph



Summary for Subcatchment 6-Redev: Subarea 6 - Redevelopment

Runoff = 0.95 cfs @ 12.14 hrs, Volume= 0.046 af, Depth> 4.26"

Routed to Link 1b-L : West Link - Redevelopment & Undisturbed

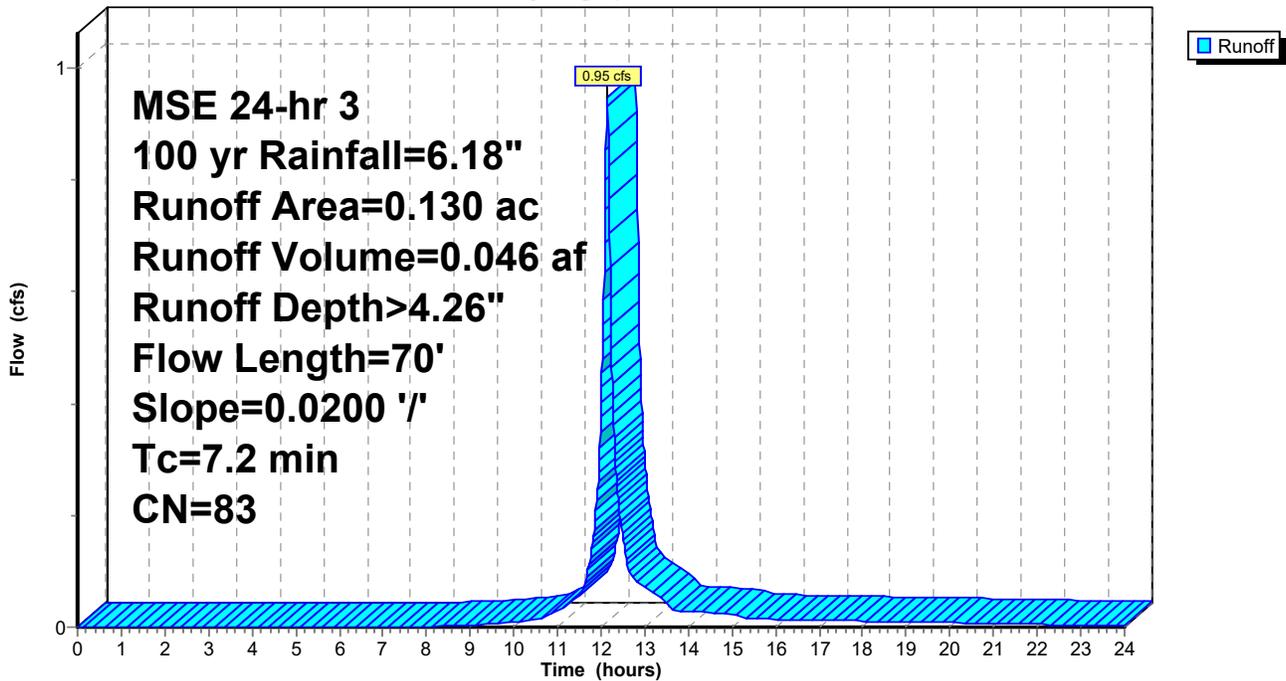
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.010 hrs
MSE 24-hr 3 100 yr Rainfall=6.18"

Area (ac)	CN	Description
* 0.080	74	grass
* 0.050	98	impervious
0.130	83	Weighted Average
0.080		61.54% Pervious Area
0.050		38.46% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.2	70	0.0200	0.16		Sheet Flow, Range n= 0.130 P2= 2.70"

Subcatchment 6-Redev: Subarea 6 - Redevelopment

Hydrograph



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MSE 24-hr 3 100 yr Rainfall=6.18"

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Summary for Subcatchment 7-Dist: Subarea 7 - Disturbed

Runoff = 0.24 cfs @ 12.23 hrs, Volume= 0.015 af, Depth> 3.04"

Routed to Link 1a-L : West Link - New Development

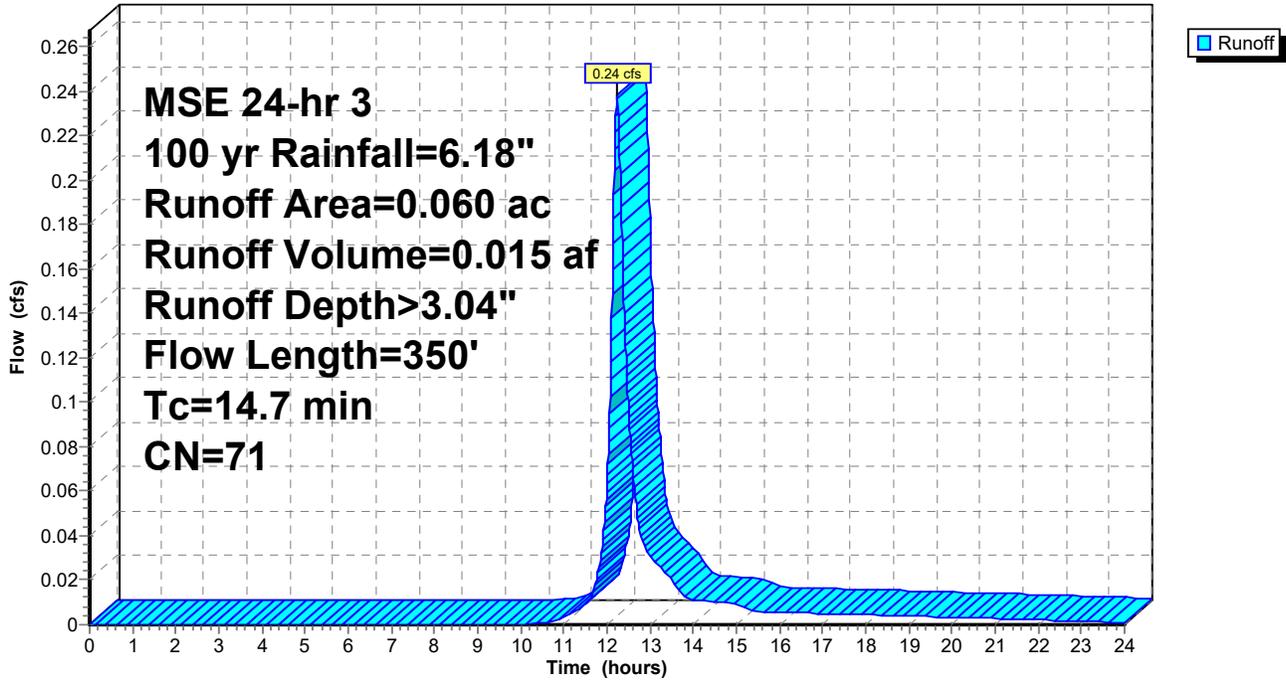
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.010 hrs
MSE 24-hr 3 100 yr Rainfall=6.18"

Area (ac)	CN	Description
* 0.020	70	woods
* 0.040	71	grassland
0.060	71	Weighted Average
0.060		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.3	75	0.0700	0.11		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 2.70"
1.9	25	0.0700	0.22		Sheet Flow, Range n= 0.130 P2= 2.70"
0.4	85	0.0400	3.22		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
1.1	150	0.0200	2.28		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.0	15	0.2000	7.20		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
14.7	350	Total			

Subcatchment 7-Dist: Subarea 7 - Disturbed

Hydrograph



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MSE 24-hr 3 100 yr Rainfall=6.18"

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Summary for Subcatchment 7-Undist: Subarea 7 - Undisturbed

Runoff = 3.34 cfs @ 12.23 hrs, Volume= 0.213 af, Depth> 3.04"

Routed to Link 1b-L : West Link - Redevelopment & Undisturbed

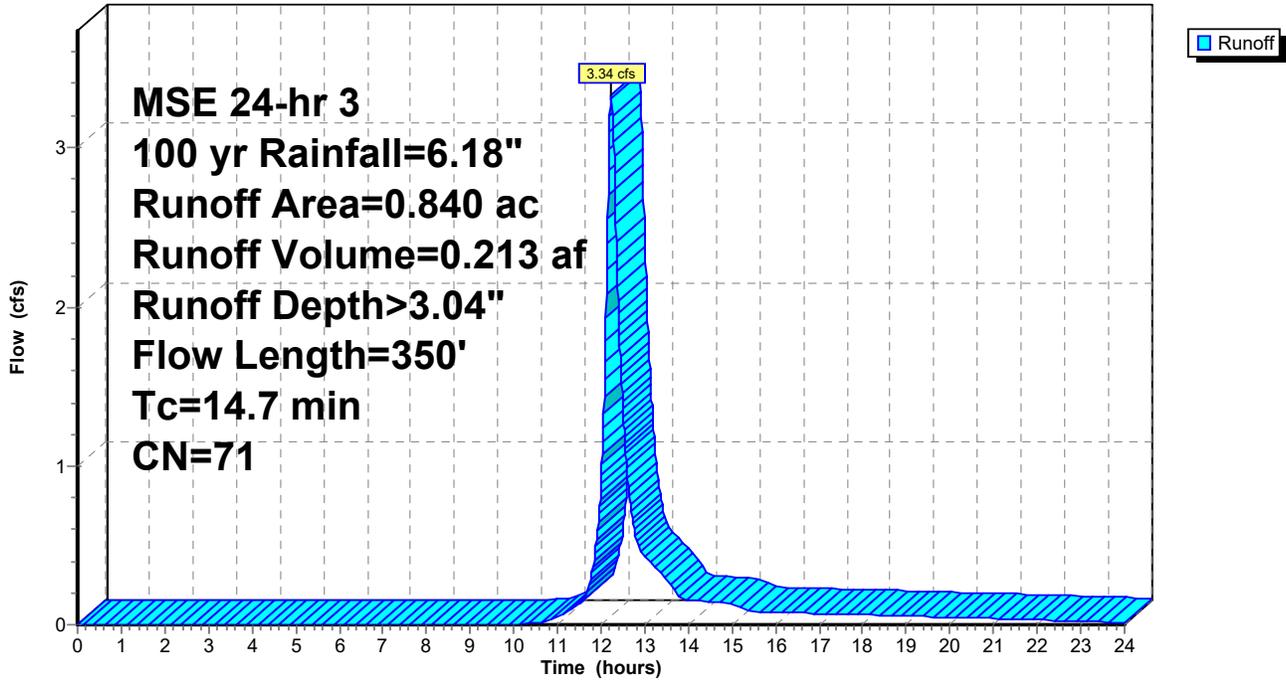
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.010 hrs
 MSE 24-hr 3 100 yr Rainfall=6.18"

Area (ac)	CN	Description
* 0.360	70	woods
* 0.450	71	grassland
* 0.030	74	grass
0.840	71	Weighted Average
0.840		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.3	75	0.0700	0.11		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 2.70"
1.9	25	0.0700	0.22		Sheet Flow, Range n= 0.130 P2= 2.70"
0.4	85	0.0400	3.22		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
1.1	150	0.0200	2.28		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.0	15	0.2000	7.20		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
14.7	350	Total			

Subcatchment 7-Undist: Subarea 7 - Undisturbed

Hydrograph



Summary for Pond 1K: Kettle 1

Inflow Area = 1.840 ac, 0.00% Impervious, Inflow Depth > 3.04" for 100 yr event
 Inflow = 8.54 cfs @ 12.18 hrs, Volume= 0.466 af
 Outflow = 0.03 cfs @ 23.83 hrs, Volume= 0.027 af, Atten= 100%, Lag= 698.8 min
 Discarded = 0.03 cfs @ 23.83 hrs, Volume= 0.027 af
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routed to Link 1a-L : West Link - New Development

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.010 hrs
 Peak Elev= 1,013.20' @ 23.83 hrs Surf.Area= 0.173 ac Storage= 0.440 af

Plug-Flow detention time= 413.7 min calculated for 0.027 af (6% of inflow)
 Center-of-Mass det. time= 289.0 min (1,101.1 - 812.1)

Volume	Invert	Avail.Storage	Storage Description		
#1	1,006.00'	0.995 af	Custom Stage Data (Conic) Listed below (Recalc)		
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)	
1,006.00	0.010	0.000	0.000	0.010	
1,007.00	0.020	0.015	0.015	0.020	
1,008.00	0.030	0.025	0.040	0.031	
1,009.00	0.040	0.035	0.074	0.041	
1,010.00	0.050	0.045	0.119	0.052	
1,011.00	0.080	0.064	0.184	0.082	
1,012.00	0.110	0.095	0.278	0.112	
1,013.00	0.150	0.129	0.408	0.153	
1,014.00	0.280	0.212	0.619	0.283	
1,015.00	0.480	0.376	0.995	0.483	

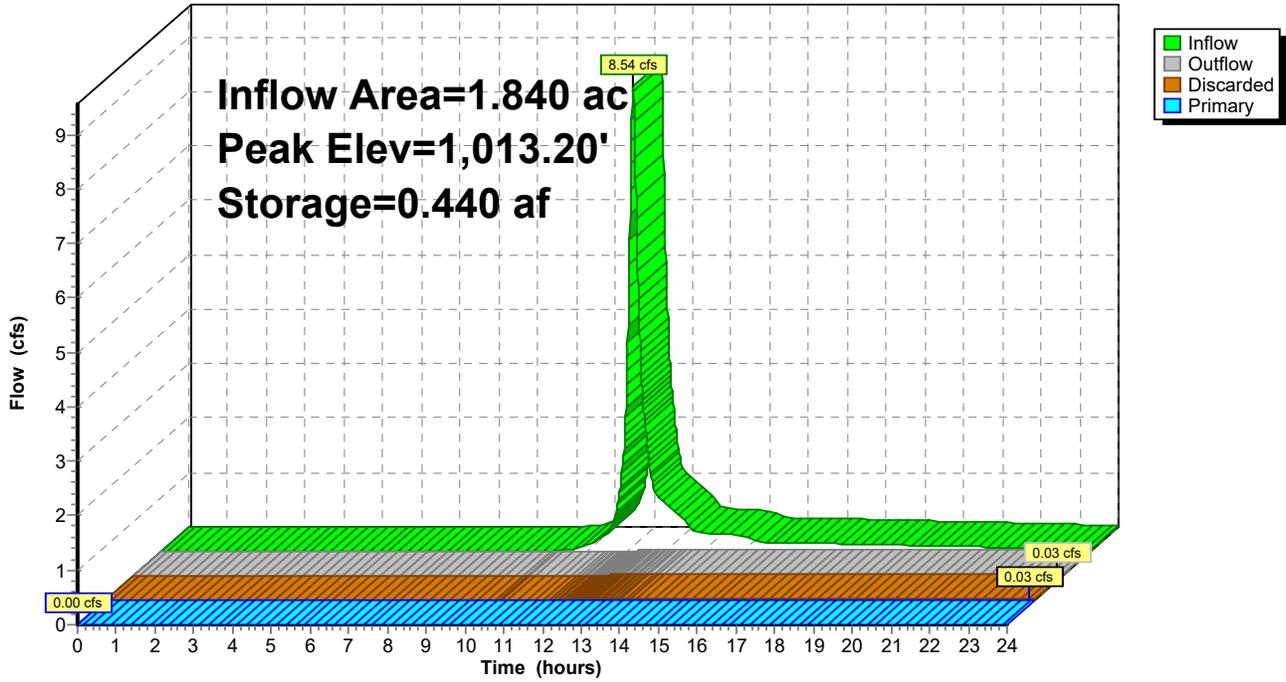
Device	Routing	Invert	Outlet Devices	
#1	Discarded	1,006.00'	0.130 in/hr Exfiltration over Wetted area Conductivity to Groundwater Elevation = 1,000.00' Phase-In= 0.01'	
#2	Primary	1,013.39'	15.0" Round Culvert L= 190.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1,013.39' / 1,011.49' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf	

Discarded OutFlow Max=0.03 cfs @ 23.83 hrs HW=1,013.20' (Free Discharge)
 ↑1=Exfiltration (Controls 0.03 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=1,006.00' TW=0.00' (Dynamic Tailwater)
 ↑2=Culvert (Controls 0.00 cfs)

Pond 1K: Kettle 1

Hydrograph



Existing_005

MSE 24-hr 3 100 yr Rainfall=6.18"

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Summary for Pond 2K: Kettle 2

Inflow Area = 1.160 ac, 0.00% Impervious, Inflow Depth > 2.95" for 100 yr event
 Inflow = 6.38 cfs @ 12.13 hrs, Volume= 0.285 af
 Outflow = 0.30 cfs @ 13.56 hrs, Volume= 0.083 af, Atten= 95%, Lag= 85.3 min
 Discarded = 0.03 cfs @ 13.56 hrs, Volume= 0.031 af
 Primary = 0.27 cfs @ 13.56 hrs, Volume= 0.053 af
 Routed to Link 2L : East Link

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.010 hrs
 Peak Elev= 1,012.52' @ 13.56 hrs Surf.Area= 0.105 ac Storage= 0.204 af

Plug-Flow detention time= 289.0 min calculated for 0.083 af (29% of inflow)
 Center-of-Mass det. time= 194.0 min (1,003.8 - 809.8)

Volume	Invert	Avail.Storage	Storage Description		
#1	1,009.00'	0.258 af	Custom Stage Data (Conic) Listed below (Recalc)		
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)	
1,009.00	0.020	0.000	0.000	0.020	
1,010.00	0.040	0.029	0.029	0.040	
1,011.00	0.060	0.050	0.079	0.061	
1,012.00	0.090	0.074	0.154	0.091	
1,013.00	0.120	0.105	0.258	0.121	

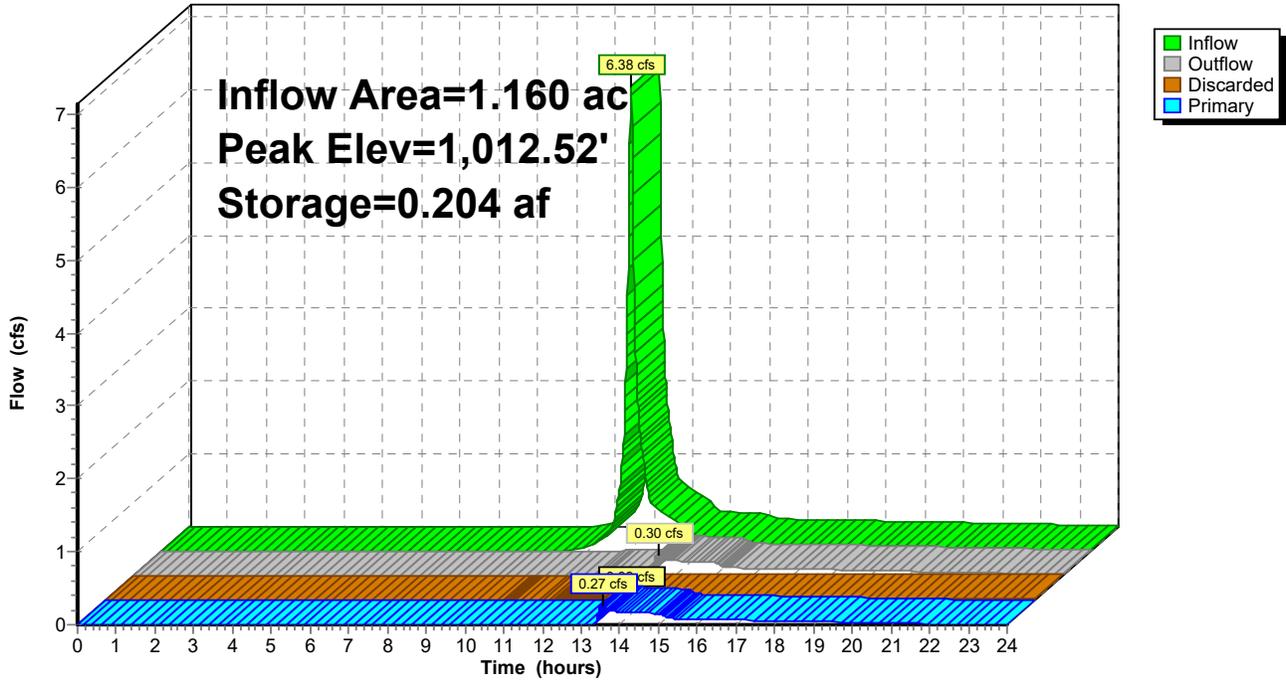
Device	Routing	Invert	Outlet Devices							
#1	Discarded	1,009.00'	0.240 in/hr Exfiltration over Wetted area							
			Conductivity to Groundwater Elevation = 1,000.00' Phase-In= 0.01'							
#2	Primary	1,012.50'	35.0' long x 10.0' breadth Broad-Crested Rectangular Weir							
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60							
			Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64							

Discarded OutFlow Max=0.03 cfs @ 13.56 hrs HW=1,012.52' (Free Discharge)
 ↑1=Exfiltration (Controls 0.03 cfs)

Primary OutFlow Max=0.27 cfs @ 13.56 hrs HW=1,012.52' TW=0.00' (Dynamic Tailwater)
 ↑2=Broad-Crested Rectangular Weir(Weir Controls 0.27 cfs @ 0.36 fps)

Pond 2K: Kettle 2

Hydrograph



Existing_005

MSE 24-hr 3 100 yr Rainfall=6.18"

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Summary for Pond 3K: Kettle 3

Inflow Area = 3.370 ac, 1.78% Impervious, Inflow Depth > 3.04" for 100 yr event
 Inflow = 11.39 cfs @ 12.30 hrs, Volume= 0.854 af
 Outflow = 2.20 cfs @ 12.94 hrs, Volume= 0.489 af, Atten= 81%, Lag= 38.4 min
 Discarded = 0.15 cfs @ 12.94 hrs, Volume= 0.137 af
 Primary = 2.06 cfs @ 12.94 hrs, Volume= 0.352 af
 Routed to Pond 4K : Kettle 4

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.010 hrs
 Peak Elev= 1,012.69' @ 12.94 hrs Surf.Area= 0.563 ac Storage= 0.471 af

Plug-Flow detention time= 193.2 min calculated for 0.489 af (57% of inflow)
 Center-of-Mass det. time= 109.1 min (929.9 - 820.7)

Volume	Invert	Avail.Storage	Storage Description		
#1	1,011.00'	1.428 af	Custom Stage Data (Conic) Listed below (Recalc)		
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)	
1,011.00	0.000	0.000	0.000	0.000	
1,012.00	0.410	0.137	0.137	0.410	
1,013.00	0.640	0.521	0.657	0.640	
1,014.00	0.910	0.771	1.428	0.911	

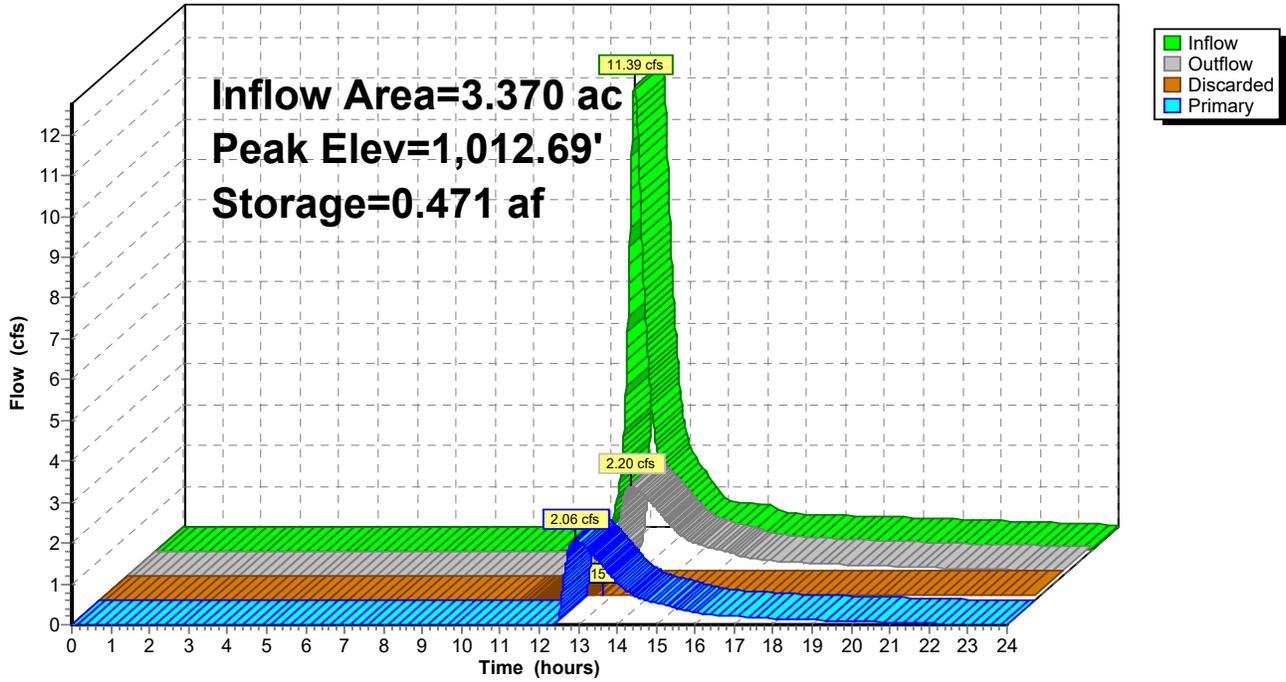
Device	Routing	Invert	Outlet Devices							
#1	Discarded	1,011.00'	0.240 in/hr Exfiltration over Wetted area Conductivity to Groundwater Elevation = 1,001.00' Phase-In= 0.01'							
#2	Primary	1,012.50'	10.0' long x 10.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64							

Discarded OutFlow Max=0.15 cfs @ 12.94 hrs HW=1,012.69' (Free Discharge)
 ↑1=Exfiltration (Controls 0.15 cfs)

Primary OutFlow Max=2.06 cfs @ 12.94 hrs HW=1,012.69' TW=1,006.63' (Dynamic Tailwater)
 ↑2=Broad-Crested Rectangular Weir(Weir Controls 2.06 cfs @ 1.08 fps)

Pond 3K: Kettle 3

Hydrograph



Existing_005

MSE 24-hr 3 100 yr Rainfall=6.18"

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Summary for Pond 4K: Kettle 4

Inflow Area = 4.620 ac, 4.33% Impervious, Inflow Depth > 1.82" for 100 yr event
 Inflow = 5.16 cfs @ 12.25 hrs, Volume= 0.699 af
 Outflow = 0.61 cfs @ 15.33 hrs, Volume= 0.209 af, Atten= 88%, Lag= 184.5 min
 Discarded = 0.08 cfs @ 15.33 hrs, Volume= 0.080 af
 Primary = 0.53 cfs @ 15.33 hrs, Volume= 0.130 af
 Routed to Link 2L : East Link

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.010 hrs
 Peak Elev= 1,007.58' @ 15.33 hrs Surf.Area= 0.284 ac Storage= 0.516 af

Plug-Flow detention time= 310.8 min calculated for 0.209 af (30% of inflow)
 Center-of-Mass det. time= 199.2 min (1,042.8 - 843.5)

Volume	Invert	Avail.Storage	Storage Description		
#1	1,005.00'	0.976 af	Custom Stage Data (Conic) Listed below (Recalc)		
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)	
1,005.00	0.100	0.000	0.000	0.100	
1,006.00	0.190	0.143	0.143	0.190	
1,007.00	0.250	0.219	0.362	0.251	
1,008.00	0.310	0.279	0.641	0.311	
1,009.00	0.360	0.335	0.976	0.362	

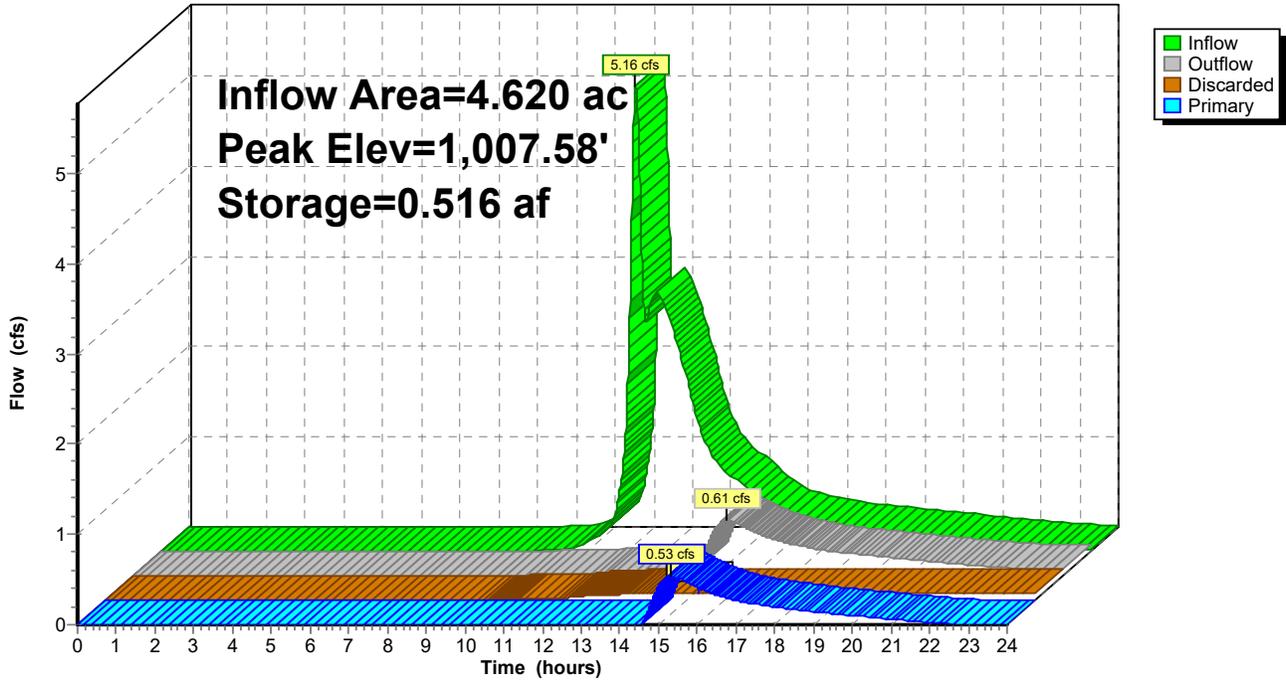
Device	Routing	Invert	Outlet Devices									
#1	Discarded	1,005.00'	0.240 in/hr Exfiltration over Wetted area									
			Conductivity to Groundwater Elevation = 995.00' Phase-In= 0.01'									
#2	Primary	1,007.50'	10.0' long x 10.0' breadth Broad-Crested Rectangular Weir									
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60									
			Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64									

Discarded OutFlow Max=0.08 cfs @ 15.33 hrs HW=1,007.58' (Free Discharge)
 ↑1=Exfiltration (Controls 0.08 cfs)

Primary OutFlow Max=0.53 cfs @ 15.33 hrs HW=1,007.58' TW=0.00' (Dynamic Tailwater)
 ↑2=Broad-Crested Rectangular Weir(Weir Controls 0.53 cfs @ 0.69 fps)

Pond 4K: Kettle 4

Hydrograph

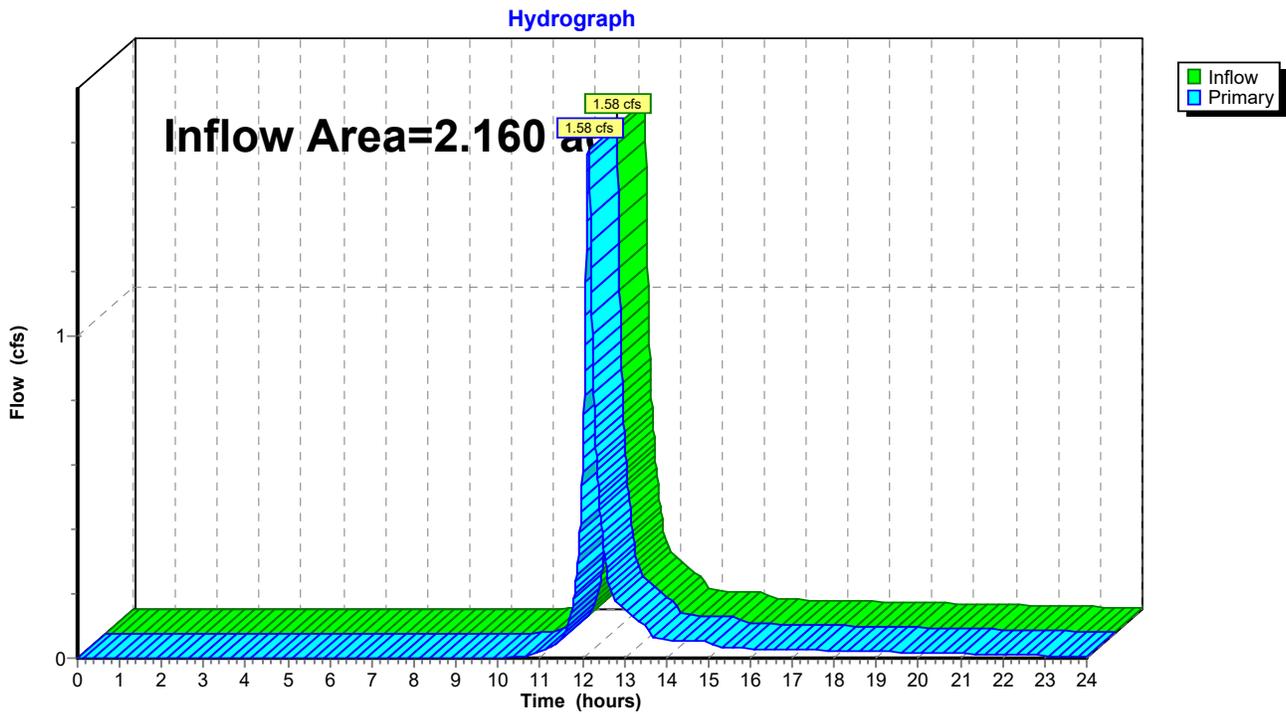


Summary for Link 1a-L: West Link - New Development

Inflow Area = 2.160 ac, 0.00% Impervious, Inflow Depth > 0.45" for 100 yr event
Inflow = 1.58 cfs @ 12.15 hrs, Volume= 0.081 af
Primary = 1.58 cfs @ 12.15 hrs, Volume= 0.081 af, Atten= 0%, Lag= 0.0 min
Routed to Link 1L : West Link

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.010 hrs

Link 1a-L: West Link - New Development

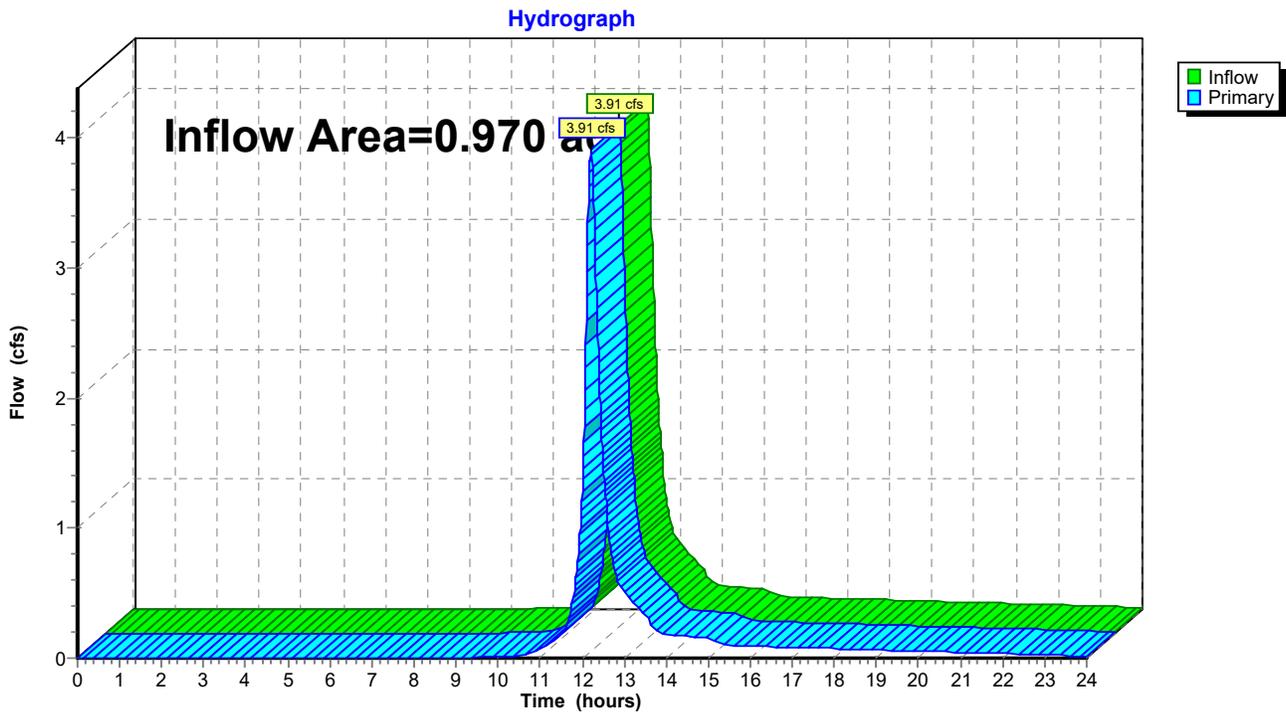


Summary for Link 1b-L: West Link - Redevelopment & Undisturbed

Inflow Area = 0.970 ac, 5.15% Impervious, Inflow Depth > 3.20" for 100 yr event
Inflow = 3.91 cfs @ 12.21 hrs, Volume= 0.259 af
Primary = 3.91 cfs @ 12.21 hrs, Volume= 0.259 af, Atten= 0%, Lag= 0.0 min
Routed to Link 1L : West Link

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.010 hrs

Link 1b-L: West Link - Redevelopment & Undisturbed



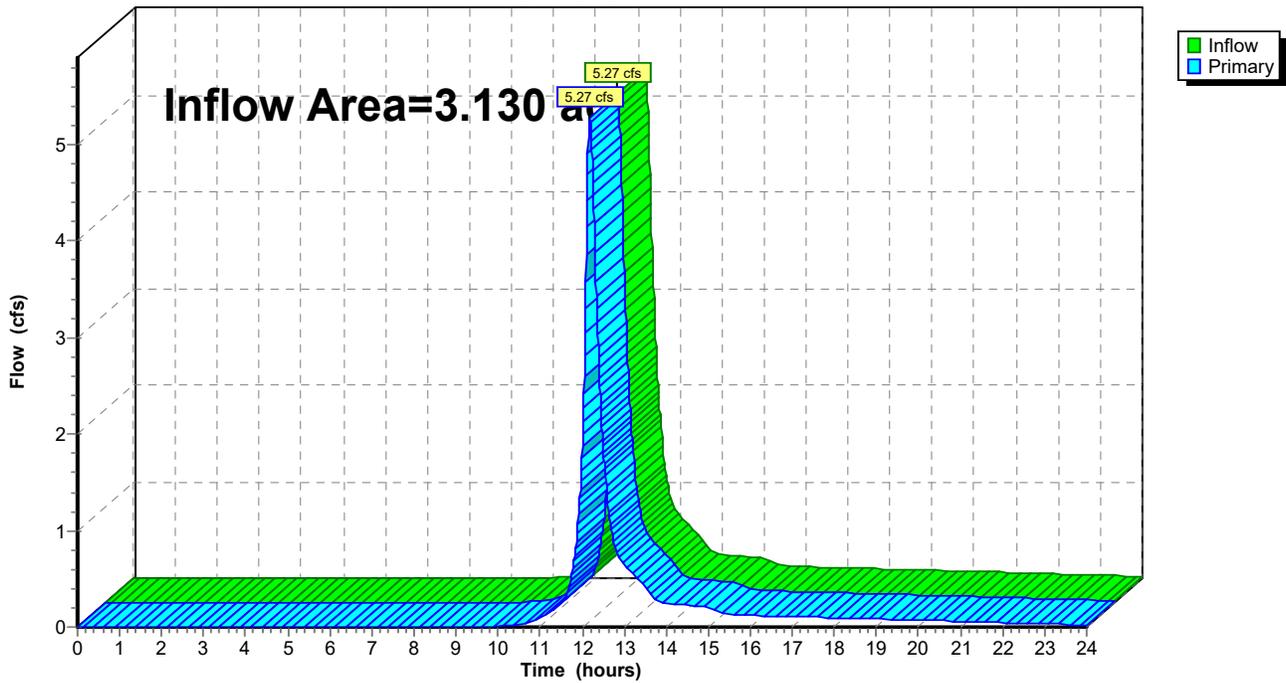
Summary for Link 1L: West Link

Inflow Area = 3.130 ac, 1.60% Impervious, Inflow Depth > 1.30" for 100 yr event
Inflow = 5.27 cfs @ 12.18 hrs, Volume= 0.340 af
Primary = 5.27 cfs @ 12.18 hrs, Volume= 0.340 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.010 hrs

Link 1L: West Link

Hydrograph



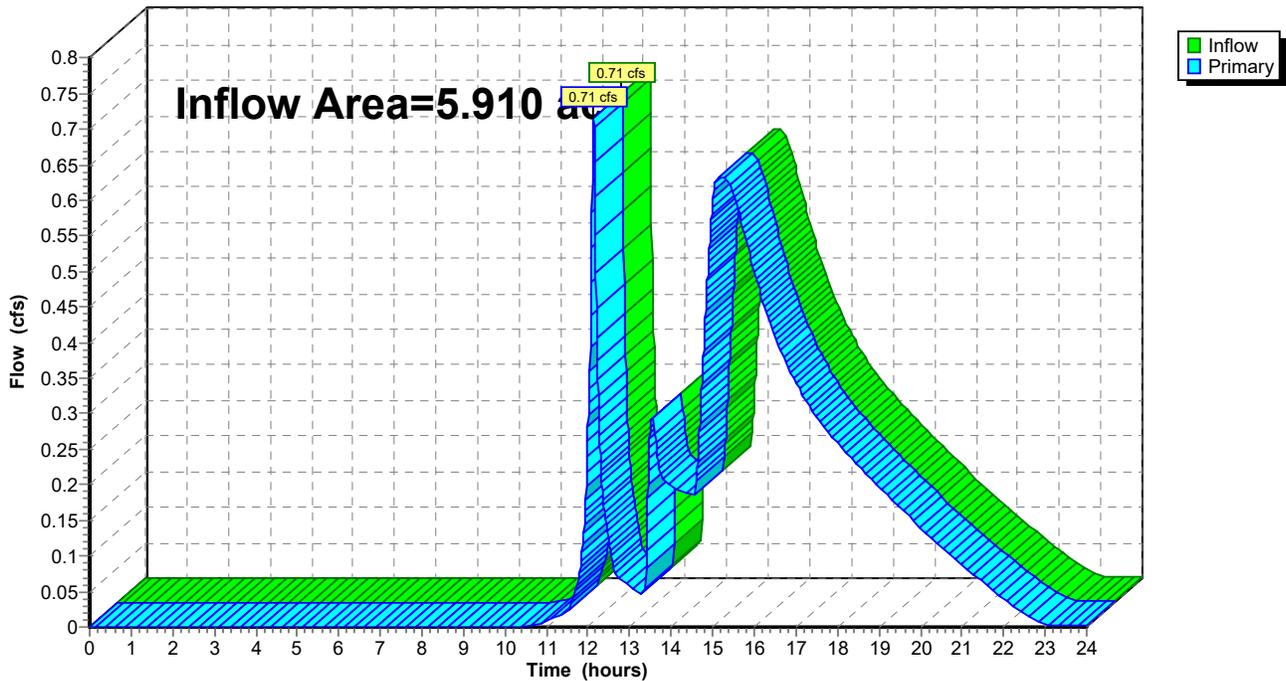
Summary for Link 2L: East Link

Inflow Area = 5.910 ac, 3.38% Impervious, Inflow Depth > 0.44" for 100 yr event
Inflow = 0.71 cfs @ 12.13 hrs, Volume= 0.214 af
Primary = 0.71 cfs @ 12.13 hrs, Volume= 0.214 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.010 hrs

Link 2L: East Link

Hydrograph



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Multi-Event Tables

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Events for Subcatchment 1: Subarea 1

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
1 yr	2.40	1.03	0.068	0.44
2 yr	2.70	1.48	0.091	0.59
10 yr	3.81	3.46	0.194	1.26
100 yr	6.18	8.54	0.466	3.04

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Page 105

Events for Subcatchment 2: Subarea 2

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
1 yr	2.40	0.75	0.039	0.41
2 yr	2.70	1.09	0.054	0.55
10 yr	3.81	2.57	0.116	1.20
100 yr	6.18	6.38	0.285	2.95

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Page 106

Events for Subcatchment 3: Subarea 3

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
1 yr	2.40	1.33	0.124	0.44
2 yr	2.70	1.92	0.167	0.59
10 yr	3.81	4.54	0.355	1.26
100 yr	6.18	11.39	0.854	3.04

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Page 107

Events for Subcatchment 4: Subarea 4

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
1 yr	2.40	0.75	0.057	0.55
2 yr	2.70	1.03	0.075	0.72
10 yr	3.81	2.21	0.152	1.46
100 yr	6.18	5.16	0.347	3.33

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Events for Subcatchment 5: Subarea 5

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
1 yr	2.40	0.08	0.004	0.41
2 yr	2.70	0.12	0.006	0.55
10 yr	3.81	0.29	0.013	1.20
100 yr	6.18	0.71	0.032	2.95

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Events for Subcatchment 6-New: Subarea 6 - New Development

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
1 yr	2.40	0.17	0.010	0.44
2 yr	2.70	0.25	0.013	0.59
10 yr	3.81	0.57	0.027	1.27
100 yr	6.18	1.40	0.066	3.04

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Events for Subcatchment 6-Redev: Subarea 6 - Redevelopment

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
1 yr	2.40	0.23	0.011	0.98
2 yr	2.70	0.28	0.013	1.21
10 yr	3.81	0.49	0.023	2.12
100 yr	6.18	0.95	0.046	4.26

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Events for Subcatchment 7-Dist: Subarea 7 - Disturbed

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
1 yr	2.40	0.03	0.002	0.44
2 yr	2.70	0.04	0.003	0.59
10 yr	3.81	0.10	0.006	1.26
100 yr	6.18	0.24	0.015	3.04

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Events for Subcatchment 7-Undist: Subarea 7 - Undisturbed

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
1 yr	2.40	0.40	0.031	0.44
2 yr	2.70	0.57	0.042	0.59
10 yr	3.81	1.34	0.088	1.26
100 yr	6.18	3.34	0.213	3.04

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Events for Pond 1K: Kettle 1

Event	Inflow (cfs)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)	Elevation (feet)	Storage (acre-feet)
1 yr	1.03	0.01	0.01	0.00	1,008.68	0.062
2 yr	1.48	0.01	0.01	0.00	1,009.24	0.084
10 yr	3.46	0.01	0.01	0.00	1,010.97	0.182
100 yr	8.54	0.03	0.03	0.00	1,013.20	0.440

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Events for Pond 2K: Kettle 2

Event	Inflow (cfs)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)	Elevation (feet)	Storage (acre-feet)
1 yr	0.75	0.01	0.01	0.00	1,010.02	0.030
2 yr	1.09	0.01	0.01	0.00	1,010.31	0.043
10 yr	2.57	0.02	0.02	0.00	1,011.31	0.099
100 yr	6.38	0.30	0.03	0.27	1,012.52	0.204

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Events for Pond 3K: Kettle 3

Event	Inflow (cfs)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)	Elevation (feet)	Storage (acre-feet)
1 yr	1.33	0.07	0.07	0.00	1,011.83	0.077
2 yr	1.92	0.09	0.09	0.00	1,011.92	0.108
10 yr	4.54	0.12	0.12	0.00	1,012.28	0.261
100 yr	11.39	2.20	0.15	2.06	1,012.69	0.471

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Events for Pond 4K: Kettle 4

Event	Inflow (cfs)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)	Elevation (feet)	Storage (acre-feet)
1 yr	0.75	0.03	0.03	0.00	1,005.32	0.036
2 yr	1.03	0.03	0.03	0.00	1,005.43	0.050
10 yr	2.21	0.04	0.04	0.00	1,005.85	0.115
100 yr	5.16	0.61	0.08	0.53	1,007.58	0.516

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Events for Link 1a-L: West Link - New Development

Event	Inflow (cfs)	Primary (cfs)	Elevation (feet)
1 yr	0.19	0.19	0.00
2 yr	0.28	0.28	0.00
10 yr	0.64	0.64	0.00
100 yr	1.58	1.58	0.00

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Events for Link 1b-L: West Link - Redevelopment & Undisturbed

Event	Inflow (cfs)	Primary (cfs)	Elevation (feet)
1 yr	0.52	0.52	0.00
2 yr	0.72	0.72	0.00
10 yr	1.62	1.62	0.00
100 yr	3.91	3.91	0.00

Existing_005

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Events for Link 1L: West Link

Event	Inflow (cfs)	Primary (cfs)	Elevation (feet)
1 yr	0.68	0.68	0.00
2 yr	0.96	0.96	0.00
10 yr	2.17	2.17	0.00
100 yr	5.27	5.27	0.00

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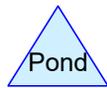
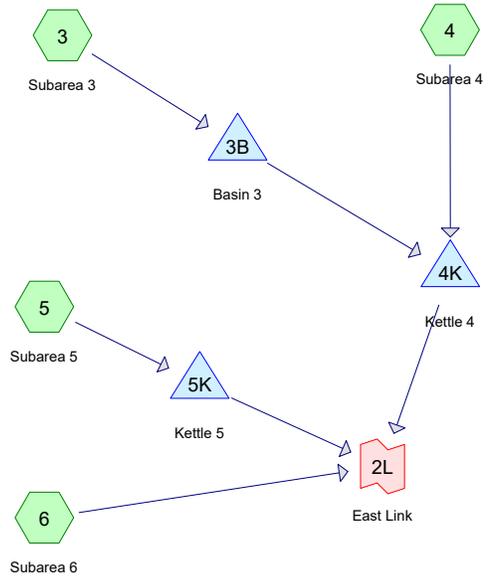
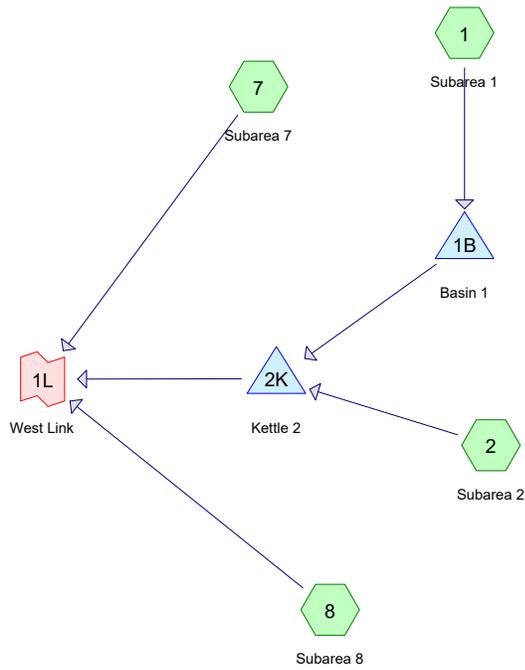
Page 120

Events for Link 2L: East Link

Event	Inflow (cfs)	Primary (cfs)	Elevation (feet)
1 yr	0.08	0.08	0.00
2 yr	0.12	0.12	0.00
10 yr	0.29	0.29	0.00
100 yr	0.71	0.71	0.00

APPENDIX B

Post-Development Hydrologic Analysis



Proposed_005

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Page 2

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

Proposed_005

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Page 3

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
4.720	74	grass (1, 2, 3, 4, 5, 7, 8)
0.450	71	grassland (8)
3.260	98	impervious (1, 2, 3, 4, 7, 8)
0.610	70	woods (2, 5, 6, 8)
9.040	82	TOTAL AREA

Proposed_005

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MSE 24-hr 3 1 yr Rainfall=2.40"

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Page 4

Time span=0.00-24.00 hrs, dt=0.010 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1: Subarea 1 Runoff Area=1.290 ac 55.81% Impervious Runoff Depth>1.23"
Tc=6.0 min CN=87 Runoff=2.95 cfs 0.132 af

Subcatchment2: Subarea 2 Runoff Area=3.550 ac 52.39% Impervious Runoff Depth>1.23"
Flow Length=160' Tc=13.3 min CN=87 Runoff=5.98 cfs 0.363 af

Subcatchment3: Subarea 3 Runoff Area=1.120 ac 21.43% Impervious Runoff Depth>0.77"
Flow Length=150' Tc=12.4 min CN=79 Runoff=1.18 cfs 0.072 af

Subcatchment4: Subarea 4 Runoff Area=1.530 ac 22.22% Impervious Runoff Depth>0.77"
Flow Length=185' Tc=13.3 min CN=79 Runoff=1.56 cfs 0.098 af

Subcatchment5: Subarea 5 Runoff Area=0.380 ac 0.00% Impervious Runoff Depth>0.48"
Tc=6.0 min CN=72 Runoff=0.30 cfs 0.015 af

Subcatchment6: Subarea 6 Runoff Area=0.030 ac 0.00% Impervious Runoff Depth>0.41"
Tc=6.0 min CN=70 Runoff=0.02 cfs 0.001 af

Subcatchment7: Subarea 7 Runoff Area=0.240 ac 16.67% Impervious Runoff Depth>0.72"
Tc=6.0 min CN=78 Runoff=0.32 cfs 0.014 af

Subcatchment8: Subarea 8 Runoff Area=0.900 ac 6.67% Impervious Runoff Depth>0.51"
Flow Length=350' Tc=16.0 min CN=73 Runoff=0.50 cfs 0.039 af

Pond 1B: Basin 1 Peak Elev=1,017.30' Storage=0.063 af Inflow=2.95 cfs 0.132 af
Discarded=0.01 cfs 0.010 af Primary=0.35 cfs 0.113 af Outflow=0.36 cfs 0.122 af

Pond 2K: Kettle 2 Peak Elev=1,013.25' Storage=0.449 af Inflow=6.32 cfs 0.476 af
Discarded=0.03 cfs 0.027 af Primary=0.00 cfs 0.000 af Outflow=0.03 cfs 0.027 af

Pond 3B: Basin 3 Peak Elev=1,009.99' Storage=0.036 af Inflow=1.18 cfs 0.072 af
Discarded=0.02 cfs 0.022 af Primary=0.10 cfs 0.040 af Outflow=0.12 cfs 0.062 af

Pond 4K: Kettle 4 Peak Elev=1,005.79' Storage=0.105 af Inflow=1.58 cfs 0.138 af
Discarded=0.04 cfs 0.041 af Primary=0.00 cfs 0.000 af Outflow=0.04 cfs 0.041 af

Pond 5K: Kettle 5 Peak Elev=1,009.42' Storage=0.010 af Inflow=0.30 cfs 0.015 af
Discarded=0.01 cfs 0.007 af Primary=0.00 cfs 0.000 af Outflow=0.01 cfs 0.007 af

Link 1L: West Link Inflow=0.64 cfs 0.053 af
Primary=0.64 cfs 0.053 af

Link 2L: East Link Inflow=0.02 cfs 0.001 af
Primary=0.02 cfs 0.001 af

Total Runoff Area = 9.040 ac Runoff Volume = 0.734 af Average Runoff Depth = 0.97"
63.94% Pervious = 5.780 ac 36.06% Impervious = 3.260 ac

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MSE 24-hr 3 2 yr Rainfall=2.70"

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Time span=0.00-24.00 hrs, dt=0.010 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1: Subarea 1 Runoff Area=1.290 ac 55.81% Impervious Runoff Depth>1.48"
Tc=6.0 min CN=87 Runoff=3.54 cfs 0.159 af

Subcatchment2: Subarea 2 Runoff Area=3.550 ac 52.39% Impervious Runoff Depth>1.48"
Flow Length=160' Tc=13.3 min CN=87 Runoff=7.21 cfs 0.437 af

Subcatchment3: Subarea 3 Runoff Area=1.120 ac 21.43% Impervious Runoff Depth>0.97"
Flow Length=150' Tc=12.4 min CN=79 Runoff=1.52 cfs 0.091 af

Subcatchment4: Subarea 4 Runoff Area=1.530 ac 22.22% Impervious Runoff Depth>0.97"
Flow Length=185' Tc=13.3 min CN=79 Runoff=2.00 cfs 0.124 af

Subcatchment5: Subarea 5 Runoff Area=0.380 ac 0.00% Impervious Runoff Depth>0.64"
Tc=6.0 min CN=72 Runoff=0.42 cfs 0.020 af

Subcatchment6: Subarea 6 Runoff Area=0.030 ac 0.00% Impervious Runoff Depth>0.55"
Tc=6.0 min CN=70 Runoff=0.03 cfs 0.001 af

Subcatchment7: Subarea 7 Runoff Area=0.240 ac 16.67% Impervious Runoff Depth>0.92"
Tc=6.0 min CN=78 Runoff=0.41 cfs 0.018 af

Subcatchment8: Subarea 8 Runoff Area=0.900 ac 6.67% Impervious Runoff Depth>0.68"
Flow Length=350' Tc=16.0 min CN=73 Runoff=0.69 cfs 0.051 af

Pond 1B: Basin 1 Peak Elev=1,017.55' Storage=0.079 af Inflow=3.54 cfs 0.159 af
Discarded=0.01 cfs 0.010 af Primary=0.37 cfs 0.139 af Outflow=0.38 cfs 0.149 af

Pond 2K: Kettle 2 Peak Elev=1,013.60' Storage=0.519 af Inflow=7.56 cfs 0.577 af
Discarded=0.04 cfs 0.033 af Primary=0.06 cfs 0.033 af Outflow=0.10 cfs 0.066 af

Pond 3B: Basin 3 Peak Elev=1,010.45' Storage=0.047 af Inflow=1.52 cfs 0.091 af
Discarded=0.02 cfs 0.022 af Primary=0.12 cfs 0.057 af Outflow=0.15 cfs 0.080 af

Pond 4K: Kettle 4 Peak Elev=1,006.00' Storage=0.142 af Inflow=2.06 cfs 0.181 af
Discarded=0.05 cfs 0.047 af Primary=0.00 cfs 0.000 af Outflow=0.05 cfs 0.047 af

Pond 5K: Kettle 5 Peak Elev=1,009.56' Storage=0.014 af Inflow=0.42 cfs 0.020 af
Discarded=0.01 cfs 0.008 af Primary=0.00 cfs 0.000 af Outflow=0.01 cfs 0.008 af

Link 1L: West Link Inflow=0.87 cfs 0.102 af
Primary=0.87 cfs 0.102 af

Link 2L: East Link Inflow=0.03 cfs 0.001 af
Primary=0.03 cfs 0.001 af

Total Runoff Area = 9.040 ac Runoff Volume = 0.902 af Average Runoff Depth = 1.20"
63.94% Pervious = 5.780 ac 36.06% Impervious = 3.260 ac

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MSE 24-hr 3 10 yr Rainfall=3.81"

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Time span=0.00-24.00 hrs, dt=0.010 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1: Subarea 1 Runoff Area=1.290 ac 55.81% Impervious Runoff Depth>2.46"
Tc=6.0 min CN=87 Runoff=5.77 cfs 0.265 af

Subcatchment2: Subarea 2 Runoff Area=3.550 ac 52.39% Impervious Runoff Depth>2.46"
Flow Length=160' Tc=13.3 min CN=87 Runoff=11.86 cfs 0.728 af

Subcatchment3: Subarea 3 Runoff Area=1.120 ac 21.43% Impervious Runoff Depth>1.81"
Flow Length=150' Tc=12.4 min CN=79 Runoff=2.87 cfs 0.169 af

Subcatchment4: Subarea 4 Runoff Area=1.530 ac 22.22% Impervious Runoff Depth>1.81"
Flow Length=185' Tc=13.3 min CN=79 Runoff=3.80 cfs 0.231 af

Subcatchment5: Subarea 5 Runoff Area=0.380 ac 0.00% Impervious Runoff Depth>1.33"
Tc=6.0 min CN=72 Runoff=0.93 cfs 0.042 af

Subcatchment6: Subarea 6 Runoff Area=0.030 ac 0.00% Impervious Runoff Depth>1.20"
Tc=6.0 min CN=70 Runoff=0.07 cfs 0.003 af

Subcatchment7: Subarea 7 Runoff Area=0.240 ac 16.67% Impervious Runoff Depth>1.74"
Tc=6.0 min CN=78 Runoff=0.78 cfs 0.035 af

Subcatchment8: Subarea 8 Runoff Area=0.900 ac 6.67% Impervious Runoff Depth>1.39"
Flow Length=350' Tc=16.0 min CN=73 Runoff=1.53 cfs 0.104 af

Pond 1B: Basin 1 Peak Elev=1,018.45' Storage=0.144 af Inflow=5.77 cfs 0.265 af
Discarded=0.01 cfs 0.012 af Primary=0.43 cfs 0.242 af Outflow=0.44 cfs 0.254 af

Pond 2K: Kettle 2 Peak Elev=1,014.48' Storage=0.776 af Inflow=12.26 cfs 0.970 af
Discarded=0.06 cfs 0.054 af Primary=0.23 cfs 0.195 af Outflow=0.29 cfs 0.249 af

Pond 3B: Basin 3 Peak Elev=1,011.47' Storage=0.099 af Inflow=2.87 cfs 0.169 af
Discarded=0.03 cfs 0.027 af Primary=0.16 cfs 0.125 af Outflow=0.19 cfs 0.151 af

Pond 4K: Kettle 4 Peak Elev=1,006.72' Storage=0.295 af Inflow=3.92 cfs 0.355 af
Discarded=0.06 cfs 0.060 af Primary=0.00 cfs 0.000 af Outflow=0.06 cfs 0.060 af

Pond 5K: Kettle 5 Peak Elev=1,010.08' Storage=0.033 af Inflow=0.93 cfs 0.042 af
Discarded=0.01 cfs 0.011 af Primary=0.00 cfs 0.000 af Outflow=0.01 cfs 0.011 af

Link 1L: West Link Inflow=1.88 cfs 0.334 af
Primary=1.88 cfs 0.334 af

Link 2L: East Link Inflow=0.07 cfs 0.003 af
Primary=0.07 cfs 0.003 af

Total Runoff Area = 9.040 ac Runoff Volume = 1.576 af Average Runoff Depth = 2.09"
63.94% Pervious = 5.780 ac 36.06% Impervious = 3.260 ac

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MSE 24-hr 3 100 yr Rainfall=6.18"

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Time span=0.00-24.00 hrs, dt=0.010 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1: Subarea 1 Runoff Area=1.290 ac 55.81% Impervious Runoff Depth>4.69"
Tc=6.0 min CN=87 Runoff=10.60 cfs 0.504 af

Subcatchment2: Subarea 2 Runoff Area=3.550 ac 52.39% Impervious Runoff Depth>4.69"
Flow Length=160' Tc=13.3 min CN=87 Runoff=21.97 cfs 1.386 af

Subcatchment3: Subarea 3 Runoff Area=1.120 ac 21.43% Impervious Runoff Depth>3.84"
Flow Length=150' Tc=12.4 min CN=79 Runoff=6.06 cfs 0.358 af

Subcatchment4: Subarea 4 Runoff Area=1.530 ac 22.22% Impervious Runoff Depth>3.84"
Flow Length=185' Tc=13.3 min CN=79 Runoff=8.00 cfs 0.489 af

Subcatchment5: Subarea 5 Runoff Area=0.380 ac 0.00% Impervious Runoff Depth>3.14"
Tc=6.0 min CN=72 Runoff=2.22 cfs 0.099 af

Subcatchment6: Subarea 6 Runoff Area=0.030 ac 0.00% Impervious Runoff Depth>2.95"
Tc=6.0 min CN=70 Runoff=0.16 cfs 0.007 af

Subcatchment7: Subarea 7 Runoff Area=0.240 ac 16.67% Impervious Runoff Depth>3.74"
Tc=6.0 min CN=78 Runoff=1.65 cfs 0.075 af

Subcatchment8: Subarea 8 Runoff Area=0.900 ac 6.67% Impervious Runoff Depth>3.23"
Flow Length=350' Tc=16.0 min CN=73 Runoff=3.66 cfs 0.243 af

Pond 1B: Basin 1 Peak Elev=1,019.98' Storage=0.302 af Inflow=10.60 cfs 0.504 af
Discarded=0.02 cfs 0.018 af Primary=0.52 cfs 0.452 af Outflow=0.54 cfs 0.471 af

Pond 2K: Kettle 2 Peak Elev=1,015.48' Storage=1.225 af Inflow=22.45 cfs 1.839 af
Discarded=0.08 cfs 0.080 af Primary=1.03 cfs 0.570 af Outflow=1.11 cfs 0.650 af

Pond 3B: Basin 3 Peak Elev=1,012.48' Storage=0.210 af Inflow=6.06 cfs 0.358 af
Discarded=0.05 cfs 0.040 af Primary=0.61 cfs 0.231 af Outflow=0.66 cfs 0.271 af

Pond 4K: Kettle 4 Peak Elev=1,007.55' Storage=0.507 af Inflow=8.17 cfs 0.721 af
Discarded=0.08 cfs 0.083 af Primary=0.25 cfs 0.136 af Outflow=0.33 cfs 0.219 af

Pond 5K: Kettle 5 Peak Elev=1,011.08' Storage=0.084 af Inflow=2.22 cfs 0.099 af
Discarded=0.02 cfs 0.017 af Primary=0.00 cfs 0.000 af Outflow=0.02 cfs 0.017 af

Link 1L: West Link Inflow=4.55 cfs 0.888 af
Primary=4.55 cfs 0.888 af

Link 2L: East Link Inflow=0.25 cfs 0.143 af
Primary=0.25 cfs 0.143 af

Total Runoff Area = 9.040 ac Runoff Volume = 3.162 af Average Runoff Depth = 4.20"
63.94% Pervious = 5.780 ac 36.06% Impervious = 3.260 ac

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MSE 24-hr 3 100 yr Rainfall=6.18"

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Summary for Subcatchment 1: Subarea 1

Runoff = 10.60 cfs @ 12.13 hrs, Volume= 0.504 af, Depth> 4.69"
Routed to Pond 1B : Basin 1

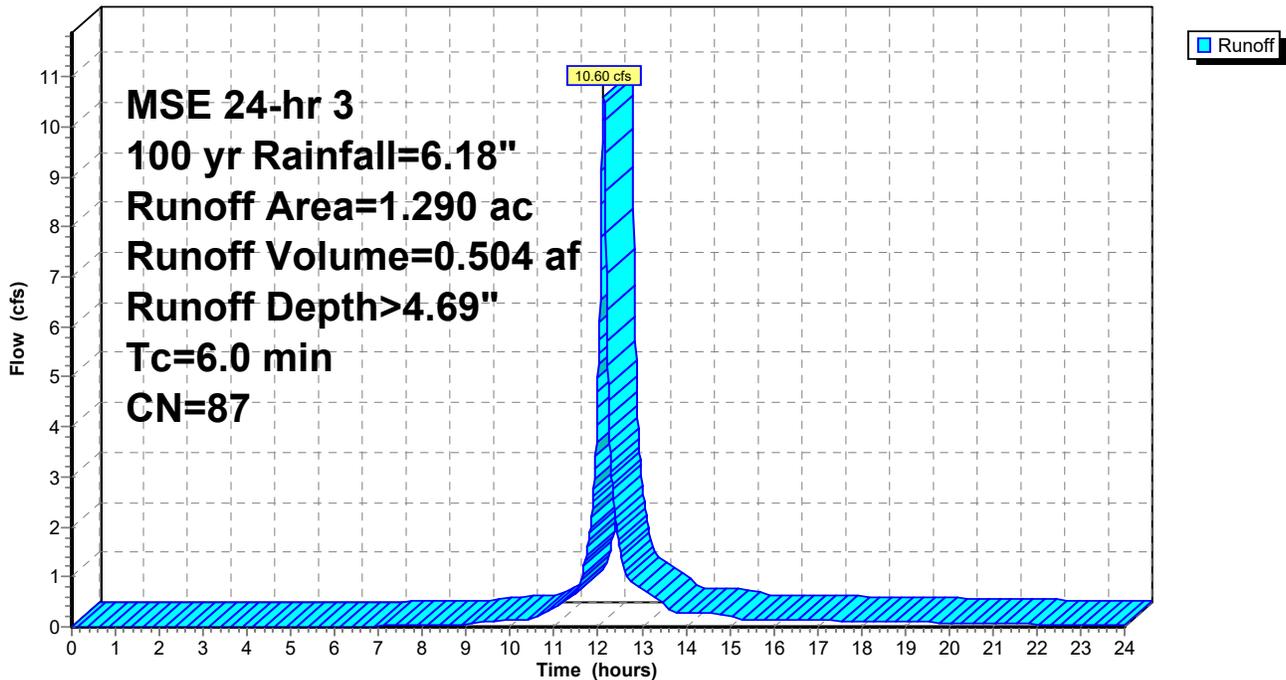
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.010 hrs
MSE 24-hr 3 100 yr Rainfall=6.18"

Area (ac)	CN	Description
* 0.570	74	grass
* 0.720	98	impervious
1.290	87	Weighted Average
0.570		44.19% Pervious Area
0.720		55.81% Impervious Area

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

Subcatchment 1: Subarea 1

Hydrograph



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MSE 24-hr 3 100 yr Rainfall=6.18"

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Summary for Subcatchment 2: Subarea 2

Runoff = 21.97 cfs @ 12.21 hrs, Volume= 1.386 af, Depth> 4.69"
 Routed to Pond 2K : Kettle 2

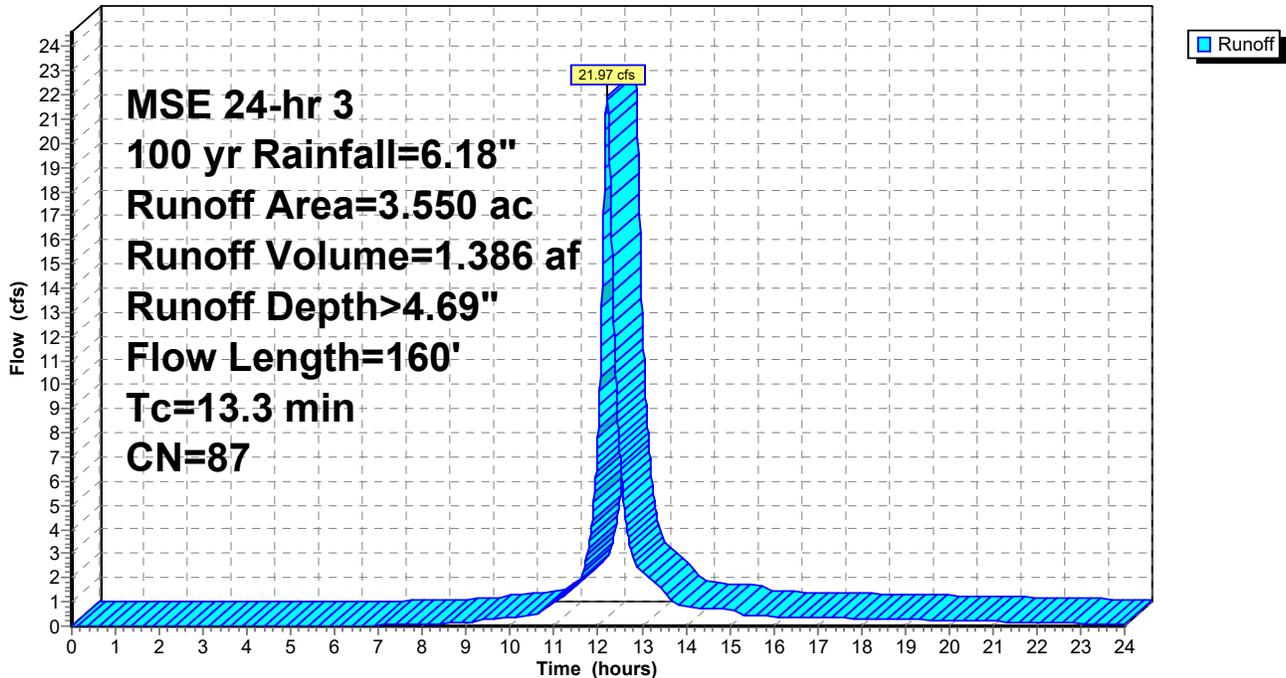
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.010 hrs
 MSE 24-hr 3 100 yr Rainfall=6.18"

Area (ac)	CN	Description
* 0.010	70	woods
* 1.680	74	grass
* 1.860	98	impervious
3.550	87	Weighted Average
1.690		47.61% Pervious Area
1.860		52.39% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	10	0.3000	0.20		Sheet Flow, Grass: Dense n= 0.240 P2= 2.70"
12.1	90	0.0300	0.12		Sheet Flow, Grass: Dense n= 0.240 P2= 2.70"
0.4	60	0.0300	2.79		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
13.3	160	Total			

Subcatchment 2: Subarea 2

Hydrograph



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MSE 24-hr 3 100 yr Rainfall=6.18"

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Summary for Subcatchment 3: Subarea 3

Runoff = 6.06 cfs @ 12.20 hrs, Volume= 0.358 af, Depth> 3.84"
 Routed to Pond 3B : Basin 3

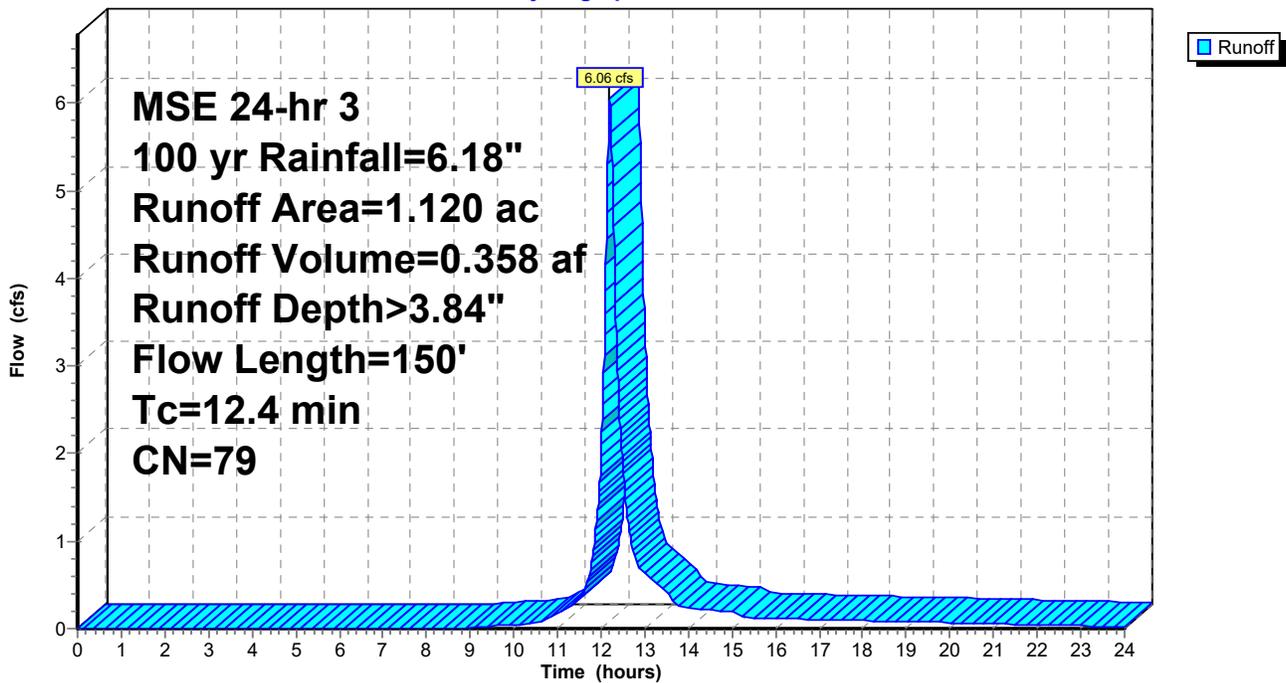
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.010 hrs
 MSE 24-hr 3 100 yr Rainfall=6.18"

Area (ac)	CN	Description
* 0.880	74	grass
* 0.240	98	impervious
1.120	79	Weighted Average
0.880		78.57% Pervious Area
0.240		21.43% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.4	30	0.2000	0.21		Sheet Flow, Grass: Dense n= 0.240 P2= 2.70"
9.6	55	0.0200	0.10		Sheet Flow, Grass: Dense n= 0.240 P2= 2.70"
0.4	65	0.0300	2.79		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
12.4	150	Total			

Subcatchment 3: Subarea 3

Hydrograph



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MSE 24-hr 3 100 yr Rainfall=6.18"

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Summary for Subcatchment 4: Subarea 4

Runoff = 8.00 cfs @ 12.21 hrs, Volume= 0.489 af, Depth> 3.84"
Routed to Pond 4K : Kettle 4

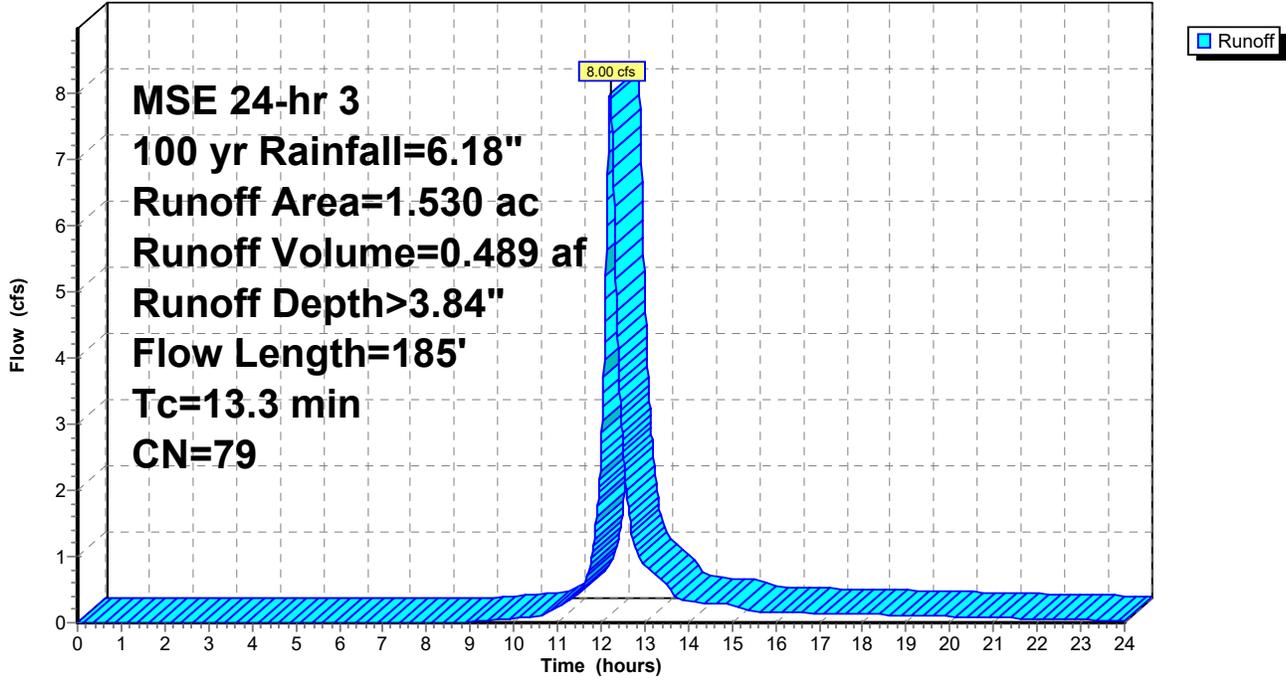
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.010 hrs
MSE 24-hr 3 100 yr Rainfall=6.18"

Area (ac)	CN	Description
* 1.190	74	grass
* 0.340	98	impervious
1.530	79	Weighted Average
1.190		77.78% Pervious Area
0.340		22.22% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	20	0.0200	0.08		Sheet Flow, Grass: Dense n= 0.240 P2= 2.70"
0.1	5	0.0300	0.82		Sheet Flow, Smooth surfaces n= 0.011 P2= 2.70"
8.2	55	0.0300	0.11		Sheet Flow, Grass: Dense n= 0.240 P2= 2.70"
0.3	20	0.0300	1.08		Sheet Flow, Smooth surfaces n= 0.011 P2= 2.70"
0.4	85	0.0600	3.94		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
13.3	185	Total			

Subcatchment 4: Subarea 4

Hydrograph



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MSE 24-hr 3 100 yr Rainfall=6.18"

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Summary for Subcatchment 5: Subarea 5

Runoff = 2.22 cfs @ 12.13 hrs, Volume= 0.099 af, Depth> 3.14"
Routed to Pond 5K : Kettle 5

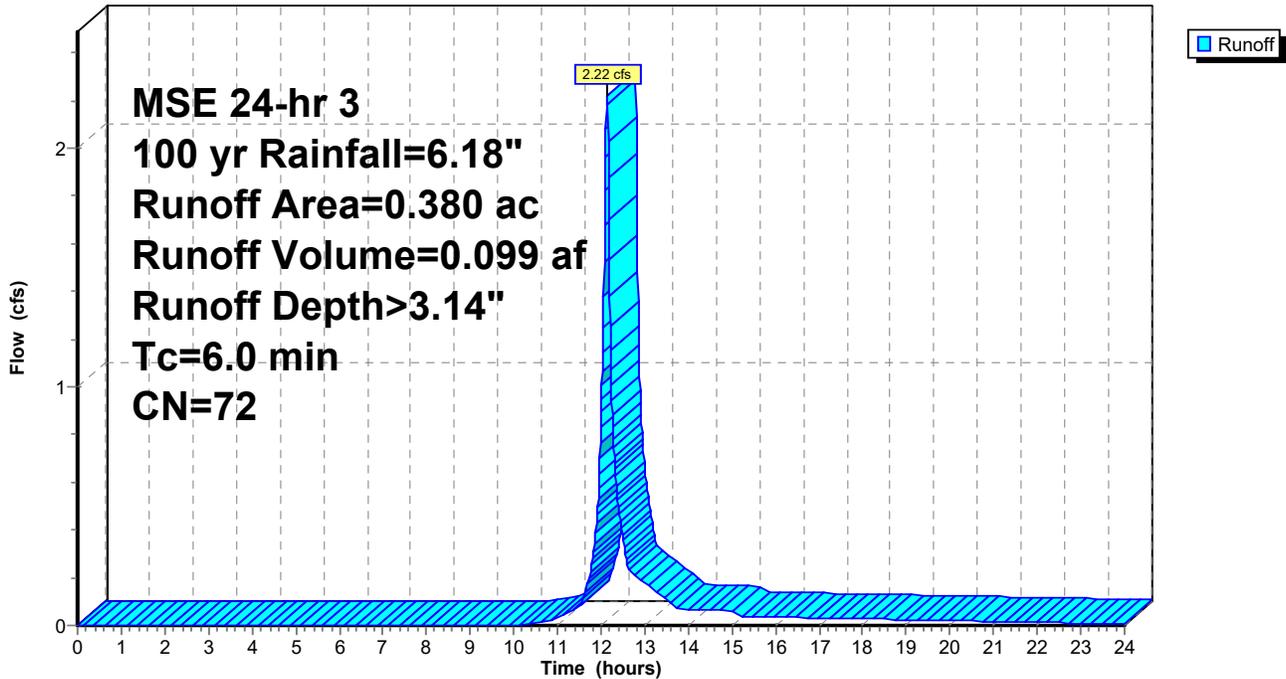
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.010 hrs
MSE 24-hr 3 100 yr Rainfall=6.18"

Area (ac)	CN	Description
* 0.210	70	woods
* 0.170	74	grass
0.380	72	Weighted Average
0.380		100.00% Pervious Area

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

Subcatchment 5: Subarea 5

Hydrograph



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MSE 24-hr 3 100 yr Rainfall=6.18"

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Summary for Subcatchment 6: Subarea 6

Runoff = 0.16 cfs @ 12.13 hrs, Volume= 0.007 af, Depth> 2.95"
Routed to Link 2L : East Link

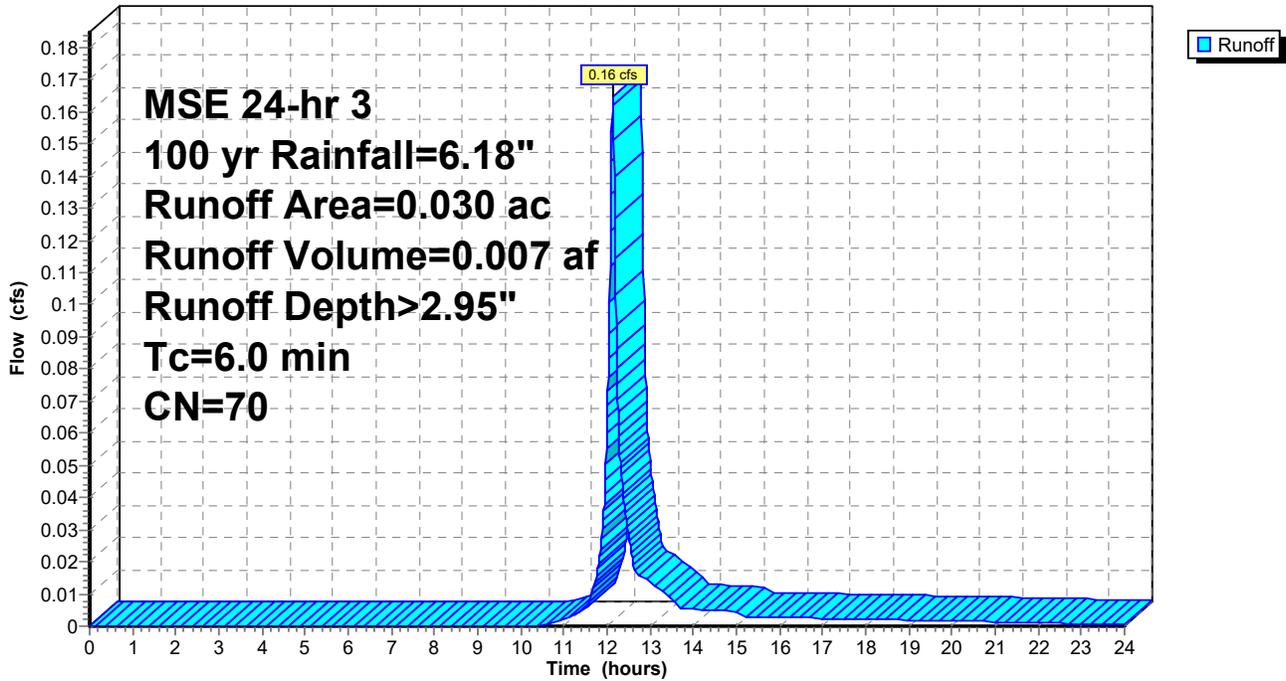
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.010 hrs
MSE 24-hr 3 100 yr Rainfall=6.18"

Area (ac)	CN	Description
* 0.030	70	woods
0.030		100.00% Pervious Area

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

Subcatchment 6: Subarea 6

Hydrograph



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MSE 24-hr 3 100 yr Rainfall=6.18"

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Summary for Subcatchment 7: Subarea 7

Runoff = 1.65 cfs @ 12.13 hrs, Volume= 0.075 af, Depth> 3.74"
Routed to Link 1L : West Link

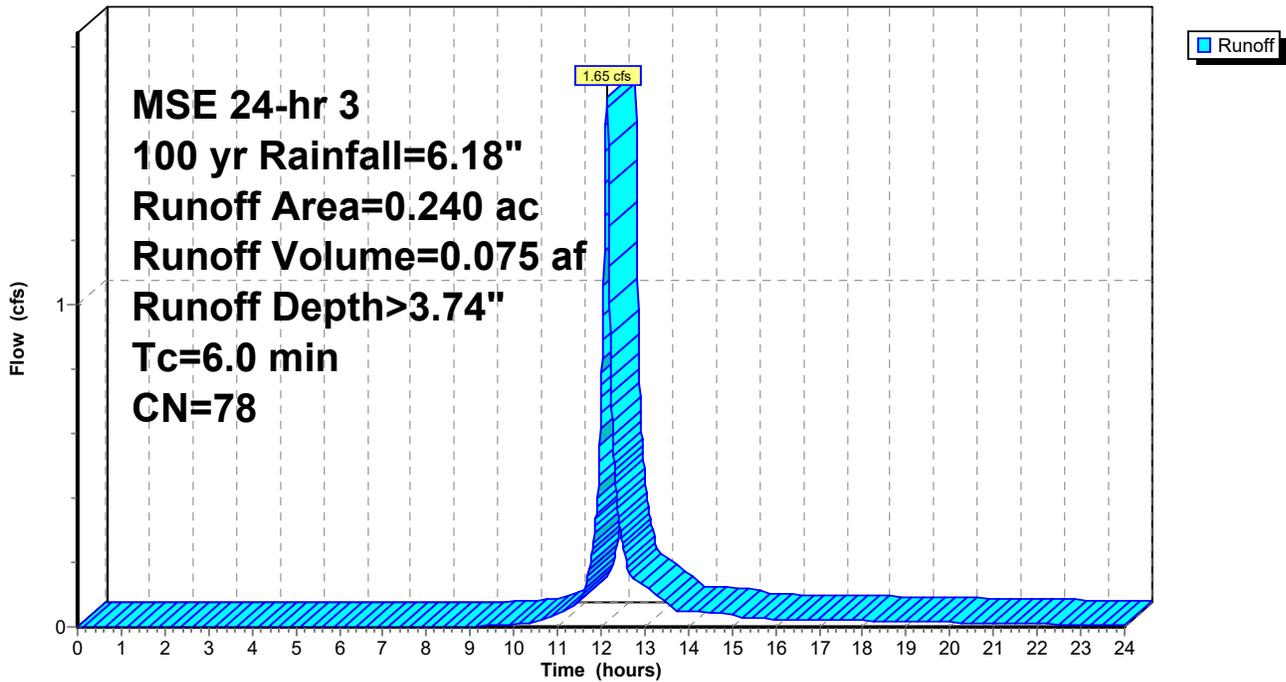
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.010 hrs
MSE 24-hr 3 100 yr Rainfall=6.18"

Area (ac)	CN	Description
* 0.200	74	grass
* 0.040	98	impervious
0.240	78	Weighted Average
0.200		83.33% Pervious Area
0.040		16.67% Impervious Area

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

Subcatchment 7: Subarea 7

Hydrograph



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MSE 24-hr 3 100 yr Rainfall=6.18"

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Summary for Subcatchment 8: Subarea 8

Runoff = 3.66 cfs @ 12.25 hrs, Volume= 0.243 af, Depth> 3.23"
 Routed to Link 1L : West Link

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.010 hrs
 MSE 24-hr 3 100 yr Rainfall=6.18"

Area (ac)	CN	Description
* 0.360	70	woods
* 0.450	71	grassland
* 0.030	74	grass
* 0.060	98	impervious
0.900	73	Weighted Average
0.840		93.33% Pervious Area
0.060		6.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.3	75	0.0700	0.11		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 2.70"
3.1	25	0.0700	0.13		Sheet Flow, Grass: Dense n= 0.240 P2= 2.70"
0.3	50	0.0400	3.22		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.1	25	0.0400	4.06		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.1	10	0.0400	3.22		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
1.1	150	0.0200	2.28		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.0	15	0.2000	7.20		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
16.0	350	Total			

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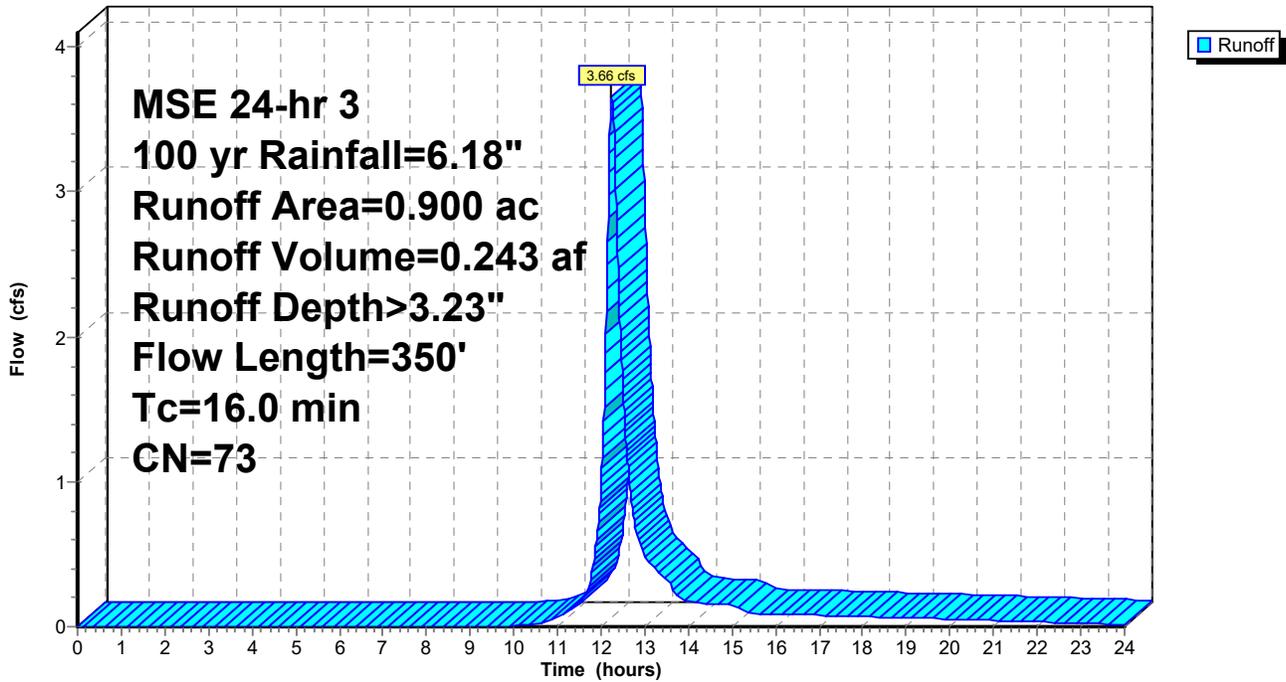
MSE 24-hr 3 100 yr Rainfall=6.18"

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Subcatchment 8: Subarea 8

Hydrograph



Proposed_005

MSE 24-hr 3 100 yr Rainfall=6.18"

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Summary for Pond 1B: Basin 1

Inflow Area = 1.290 ac, 55.81% Impervious, Inflow Depth > 4.69" for 100 yr event
 Inflow = 10.60 cfs @ 12.13 hrs, Volume= 0.504 af
 Outflow = 0.54 cfs @ 12.97 hrs, Volume= 0.471 af, Atten= 95%, Lag= 50.2 min
 Discarded = 0.02 cfs @ 13.38 hrs, Volume= 0.018 af
 Primary = 0.52 cfs @ 12.97 hrs, Volume= 0.452 af
 Routed to Pond 2K : Kettle 2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.010 hrs
 Peak Elev= 1,019.98' @ 13.38 hrs Surf.Area= 0.120 ac Storage= 0.302 af

Plug-Flow detention time= 269.5 min calculated for 0.471 af (93% of inflow)
 Center-of-Mass det. time= 238.5 min (1,017.9 - 779.4)

Volume	Invert	Avail.Storage	Storage Description			
#1	1,014.50'	0.599 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)	
1,014.50	0.060	0.0	0.000	0.000	0.060	
1,015.00	0.060	30.0	0.009	0.009	0.062	
1,016.00	0.060	30.0	0.018	0.027	0.066	
1,017.00	0.060	30.0	0.018	0.045	0.070	
1,018.00	0.070	100.0	0.065	0.110	0.081	
1,019.00	0.100	100.0	0.085	0.194	0.112	
1,020.00	0.120	100.0	0.110	0.304	0.132	
1,021.00	0.150	100.0	0.135	0.439	0.163	
1,022.00	0.170	100.0	0.160	0.599	0.184	

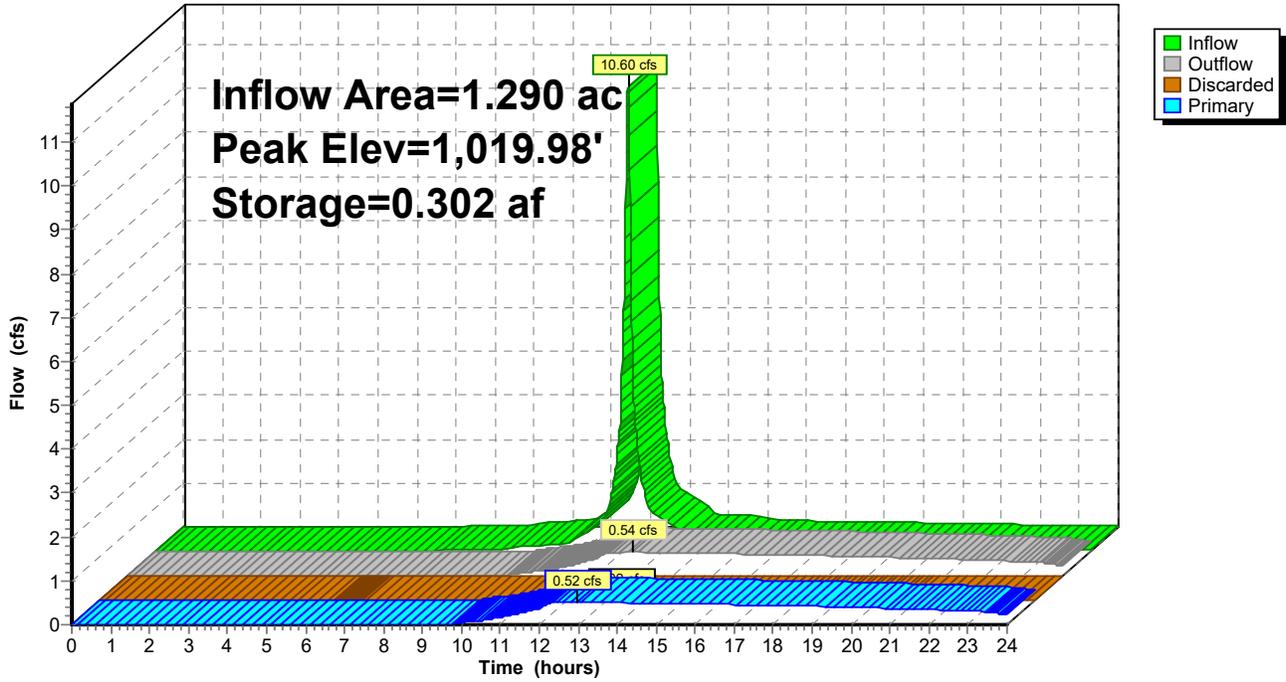
Device	Routing	Invert	Outlet Devices
#1	Discarded	1,014.50'	0.130 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 1,000.00' Phase-In= 0.01'
#2	Primary	1,015.00'	12.0" Round Culvert L= 412.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,015.00' / 1,013.00' S= 0.0049 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#3	Device 2	1,015.00'	3.0" Vert. Underdrain C= 0.600 Limited to weir flow at low heads
#4	Device 2	1,020.00'	36.0" Horiz. Grate C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.02 cfs @ 13.38 hrs HW=1,019.98' (Free Discharge)
 ↑ **1=Exfiltration** (Controls 0.02 cfs)

Primary OutFlow Max=0.52 cfs @ 12.97 hrs HW=1,019.95' TW=1,015.13' (Dynamic Tailwater)
 ↑ **2=Culvert** (Passes 0.52 cfs of 3.64 cfs potential flow)
 ↑ **3=Underdrain** (Orifice Controls 0.52 cfs @ 10.57 fps)
 ↑ **4=Grate** (Controls 0.00 cfs)

Pond 1B: Basin 1

Hydrograph



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Summary for Pond 2K: Kettle 2

Inflow Area = 4.840 ac, 53.31% Impervious, Inflow Depth > 4.56" for 100 yr event
 Inflow = 22.45 cfs @ 12.21 hrs, Volume= 1.839 af
 Outflow = 1.11 cfs @ 15.13 hrs, Volume= 0.650 af, Atten= 95%, Lag= 175.4 min
 Discarded = 0.08 cfs @ 15.13 hrs, Volume= 0.080 af
 Primary = 1.03 cfs @ 15.13 hrs, Volume= 0.570 af
 Routed to Link 1L : West Link

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.010 hrs
 Peak Elev= 1,015.48' @ 15.13 hrs Surf.Area= 0.480 ac Storage= 1.225 af

Plug-Flow detention time= 373.0 min calculated for 0.650 af (35% of inflow)
 Center-of-Mass det. time= 229.3 min (1,073.1 - 843.8)

Volume	Invert	Avail.Storage	Storage Description		
#1	1,006.00'	1.475 af	Custom Stage Data (Conic) Listed below (Recalc)		
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)	
1,006.00	0.010	0.000	0.000	0.010	
1,007.00	0.020	0.015	0.015	0.020	
1,008.00	0.030	0.025	0.040	0.031	
1,009.00	0.040	0.035	0.074	0.041	
1,010.00	0.050	0.045	0.119	0.052	
1,011.00	0.080	0.064	0.184	0.082	
1,012.00	0.110	0.095	0.278	0.112	
1,013.00	0.150	0.129	0.408	0.153	
1,014.00	0.280	0.212	0.619	0.283	
1,015.00	0.480	0.376	0.995	0.483	
1,016.00	0.480	0.480	1.475	0.495	

Device	Routing	Invert	Outlet Devices	
#1	Discarded	1,006.00'	0.130 in/hr Exfiltration over Wetted area Conductivity to Groundwater Elevation = 1,000.00' Phase-In= 0.01'	
#2	Primary	1,013.39'	15.0" Round Culvert L= 190.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1,013.39' / 1,011.49' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf	
#3	Device 2	1,013.40'	3.0" Vert. Orifice C= 0.600 Limited to weir flow at low heads	
#4	Device 2	1,015.40'	36.0" Horiz. Grate C= 0.600 Limited to weir flow at low heads	
#5	Primary	1,015.75'	10.0' long x 10.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64	

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Discarded OutFlow Max=0.08 cfs @ 15.13 hrs HW=1,015.48' (Free Discharge)

1=Exfiltration (Controls 0.08 cfs)

Primary OutFlow Max=1.03 cfs @ 15.13 hrs HW=1,015.48' TW=0.00' (Dynamic Tailwater)

2=Culvert (Passes 1.03 cfs of 6.69 cfs potential flow)

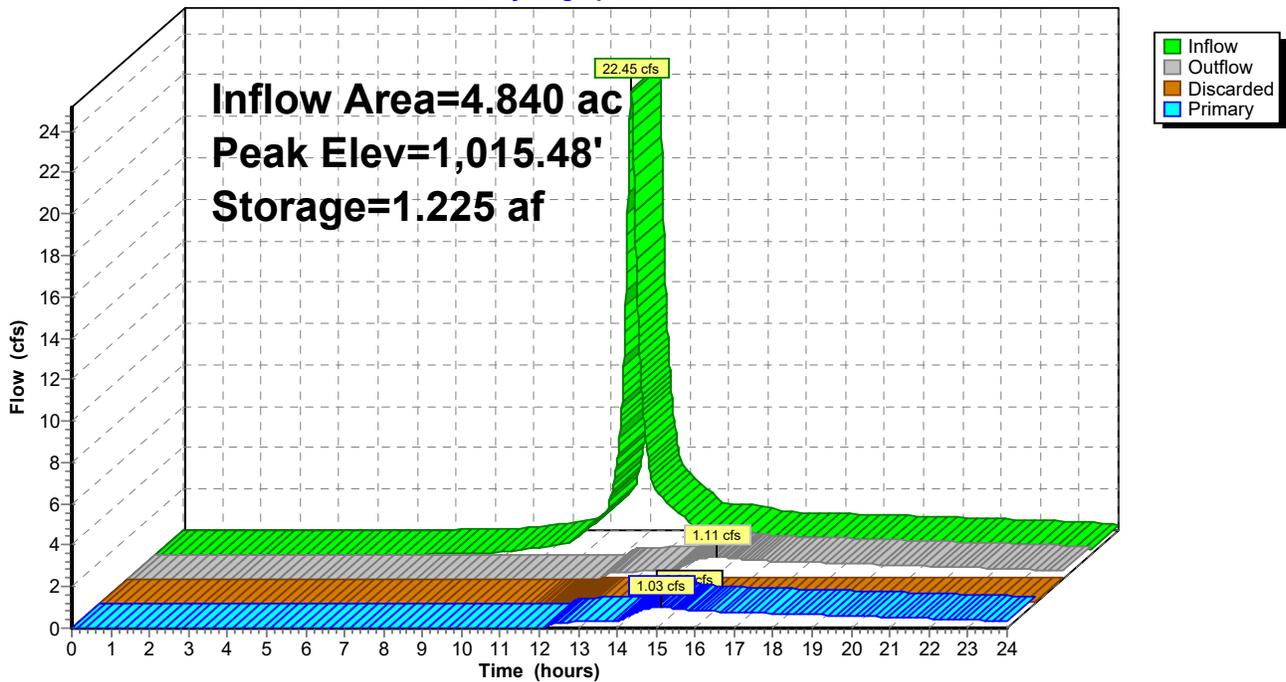
3=Orifice (Orifice Controls 0.33 cfs @ 6.73 fps)

4=Grate (Weir Controls 0.70 cfs @ 0.93 fps)

5=Broad-Crested Rectangular Weir(Controls 0.00 cfs)

Pond 2K: Kettle 2

Hydrograph



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Summary for Pond 3B: Basin 3

Inflow Area = 1.120 ac, 21.43% Impervious, Inflow Depth > 3.84" for 100 yr event
 Inflow = 6.06 cfs @ 12.20 hrs, Volume= 0.358 af
 Outflow = 0.66 cfs @ 12.95 hrs, Volume= 0.271 af, Atten= 89%, Lag= 45.2 min
 Discarded = 0.05 cfs @ 12.95 hrs, Volume= 0.040 af
 Primary = 0.61 cfs @ 12.95 hrs, Volume= 0.231 af
 Routed to Pond 4K : Kettle 4

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.010 hrs
 Peak Elev= 1,012.48' @ 12.95 hrs Surf.Area= 0.152 ac Storage= 0.210 af

Plug-Flow detention time= 273.0 min calculated for 0.271 af (76% of inflow)
 Center-of-Mass det. time= 206.1 min (1,006.6 - 800.5)

Volume	Invert	Avail.Storage	Storage Description			
#1	1,008.50'	0.306 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)	
1,008.50	0.080	0.0	0.000	0.000	0.080	
1,009.00	0.080	30.0	0.012	0.012	0.082	
1,010.00	0.080	30.0	0.024	0.036	0.087	
1,011.00	0.080	30.0	0.024	0.060	0.092	
1,012.00	0.100	100.0	0.090	0.150	0.113	
1,013.00	0.220	100.0	0.156	0.306	0.233	

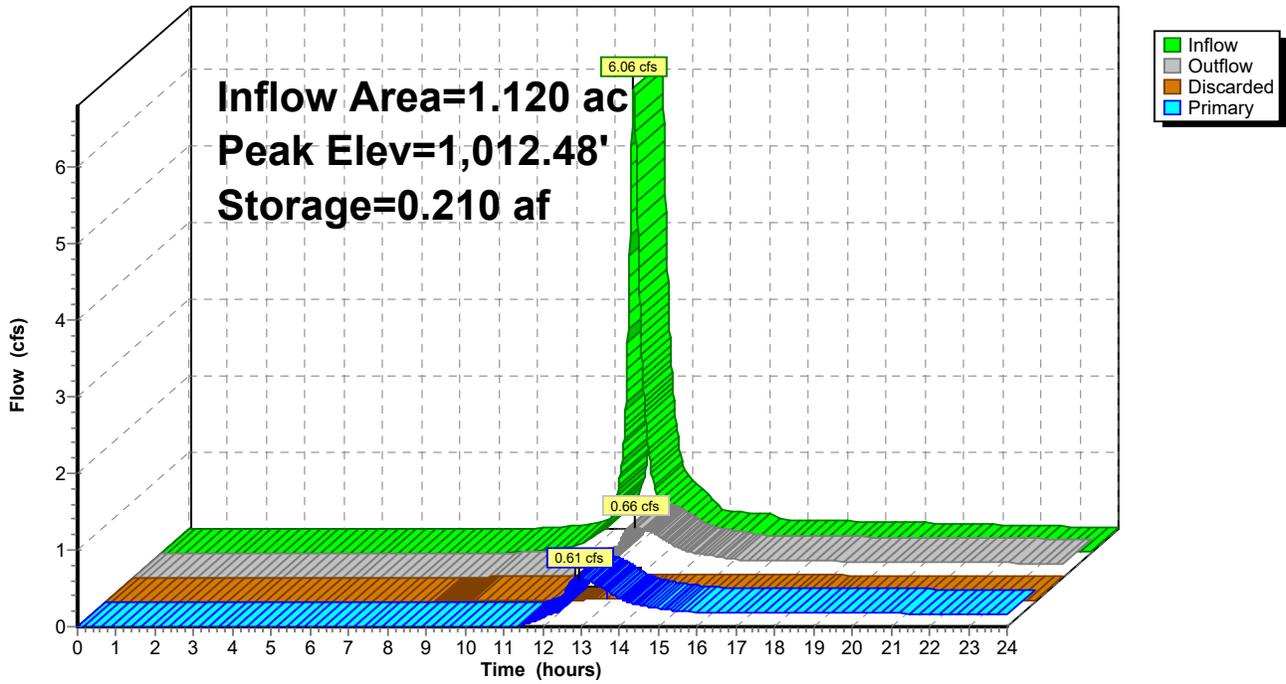
Device	Routing	Invert	Outlet Devices
#1	Discarded	1,008.50'	0.240 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 1,000.00' Phase-In= 0.01'
#2	Primary	1,009.00'	12.0" Round Culvert L= 65.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,009.00' / 1,008.50' S= 0.0077 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#3	Device 2	1,009.00'	2.0" Vert. Underdrain C= 0.600 Limited to weir flow at low heads
#4	Device 2	1,012.25'	36.0" Vert. Grate C= 0.600 Limited to weir flow at low heads
#5	Primary	1,012.50'	10.0' long x 10.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Discarded OutFlow Max=0.05 cfs @ 12.95 hrs HW=1,012.48' (Free Discharge)
 ↑1=Exfiltration (Controls 0.05 cfs)

Primary OutFlow Max=0.61 cfs @ 12.95 hrs HW=1,012.48' TW=1,006.99' (Dynamic Tailwater)
 ↑2=Culvert (Passes 0.61 cfs of 5.79 cfs potential flow)
 ↑3=Underdrain (Orifice Controls 0.19 cfs @ 8.88 fps)
 ↑4=Grate (Orifice Controls 0.42 cfs @ 1.65 fps)
 ↑5=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond 3B: Basin 3

Hydrograph



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Summary for Pond 4K: Kettle 4

Inflow Area = 2.650 ac, 21.89% Impervious, Inflow Depth > 3.26" for 100 yr event
 Inflow = 8.17 cfs @ 12.22 hrs, Volume= 0.721 af
 Outflow = 0.33 cfs @ 16.87 hrs, Volume= 0.219 af, Atten= 96%, Lag= 279.1 min
 Discarded = 0.08 cfs @ 16.87 hrs, Volume= 0.083 af
 Primary = 0.25 cfs @ 16.87 hrs, Volume= 0.136 af
 Routed to Link 2L : East Link

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.010 hrs
 Peak Elev= 1,007.55' @ 16.87 hrs Surf.Area= 0.282 ac Storage= 0.507 af

Plug-Flow detention time= 403.2 min calculated for 0.219 af (30% of inflow)
 Center-of-Mass det. time= 251.8 min (1,119.4 - 867.6)

Volume	Invert	Avail.Storage	Storage Description		
#1	1,005.00'	0.976 af	Custom Stage Data (Conic) Listed below (Recalc)		
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)	
1,005.00	0.100	0.000	0.000	0.100	
1,006.00	0.190	0.143	0.143	0.190	
1,007.00	0.250	0.219	0.362	0.251	
1,008.00	0.310	0.279	0.641	0.311	
1,009.00	0.360	0.335	0.976	0.362	

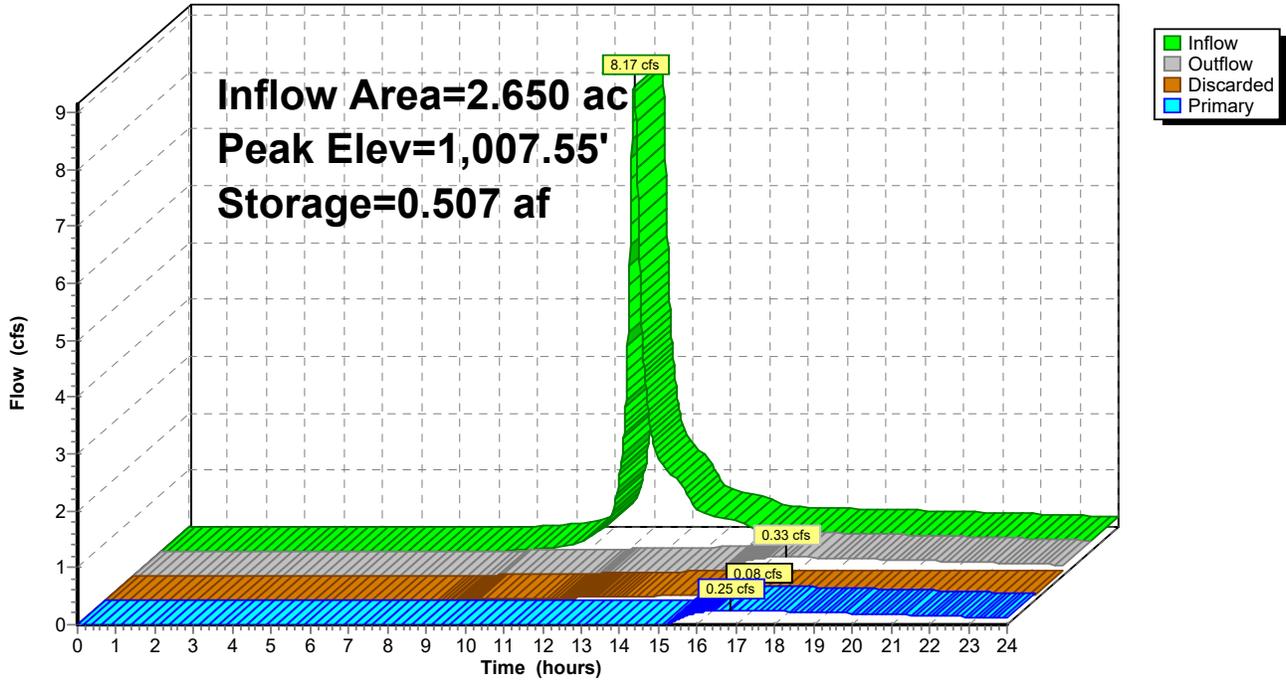
Device	Routing	Invert	Outlet Devices							
#1	Discarded	1,005.00'	0.240 in/hr Exfiltration over Wetted area							
			Conductivity to Groundwater Elevation = 995.00' Phase-In= 0.01'							
#2	Primary	1,007.50'	10.0' long x 10.0' breadth Broad-Crested Rectangular Weir							
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60							
			Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64							

Discarded OutFlow Max=0.08 cfs @ 16.87 hrs HW=1,007.55' (Free Discharge)
 ↑1=Exfiltration (Controls 0.08 cfs)

Primary OutFlow Max=0.25 cfs @ 16.87 hrs HW=1,007.55' TW=0.00' (Dynamic Tailwater)
 ↑2=Broad-Crested Rectangular Weir(Weir Controls 0.25 cfs @ 0.54 fps)

Pond 4K: Kettle 4

Hydrograph



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Summary for Pond 5K: Kettle 5

Inflow Area = 0.380 ac, 0.00% Impervious, Inflow Depth > 3.14" for 100 yr event
 Inflow = 2.22 cfs @ 12.13 hrs, Volume= 0.099 af
 Outflow = 0.02 cfs @ 20.88 hrs, Volume= 0.017 af, Atten= 99%, Lag= 524.9 min
 Discarded = 0.02 cfs @ 20.88 hrs, Volume= 0.017 af
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Routed to Link 2L : East Link

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.010 hrs
 Peak Elev= 1,011.08' @ 20.88 hrs Surf.Area= 0.062 ac Storage= 0.084 af

Plug-Flow detention time= 368.6 min calculated for 0.017 af (17% of inflow)
 Center-of-Mass det. time= 265.9 min (1,072.4 - 806.5)

Volume	Invert	Avail.Storage	Storage Description		
#1	1,009.00'	0.258 af	Custom Stage Data (Conic) Listed below (Recalc)		
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)	
1,009.00	0.020	0.000	0.000	0.020	
1,010.00	0.040	0.029	0.029	0.040	
1,011.00	0.060	0.050	0.079	0.061	
1,012.00	0.090	0.074	0.154	0.091	
1,013.00	0.120	0.105	0.258	0.121	

Device	Routing	Invert	Outlet Devices							
#1	Discarded	1,009.00'	0.240 in/hr Exfiltration over Wetted area							
			Conductivity to Groundwater Elevation = 1,000.00' Phase-In= 0.01'							
#2	Primary	1,012.50'	35.0' long x 10.0' breadth Broad-Crested Rectangular Weir							
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60							
			Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64							

Discarded OutFlow Max=0.02 cfs @ 20.88 hrs HW=1,011.08' (Free Discharge)
 ↑1=Exfiltration (Controls 0.02 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=1,009.00' TW=0.00' (Dynamic Tailwater)
 ↑2=Broad-Crested Rectangular Weir(Controls 0.00 cfs)

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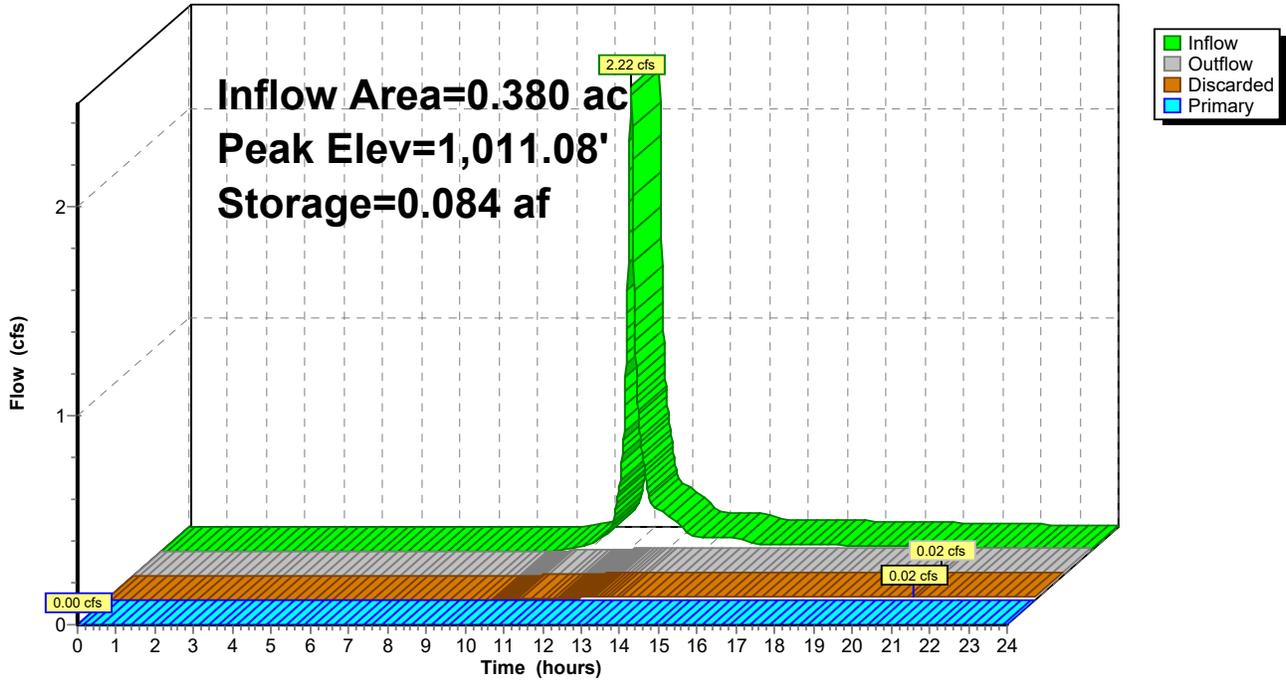
MSE 24-hr 3 100 yr Rainfall=6.18"

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Pond 5K: Kettle 5

Hydrograph



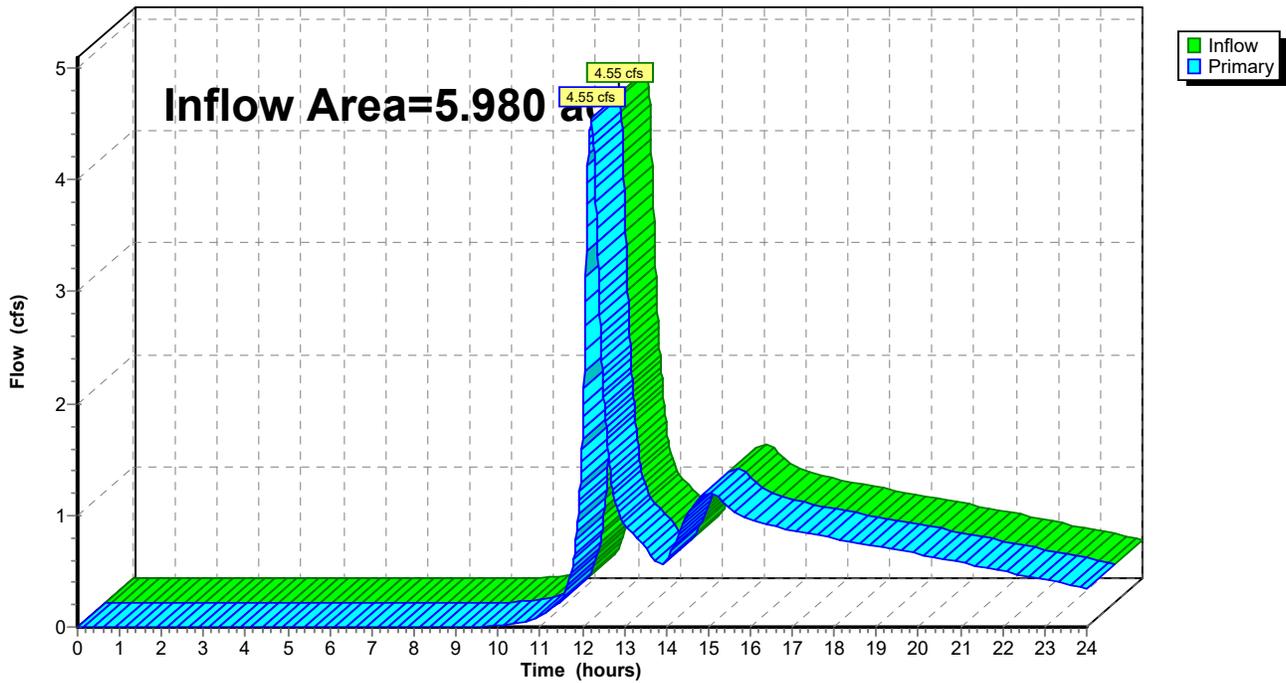
Summary for Link 1L: West Link

Inflow Area = 5.980 ac, 44.82% Impervious, Inflow Depth > 1.78" for 100 yr event
Inflow = 4.55 cfs @ 12.23 hrs, Volume= 0.888 af
Primary = 4.55 cfs @ 12.23 hrs, Volume= 0.888 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.010 hrs

Link 1L: West Link

Hydrograph



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MSE 24-hr 3 100 yr Rainfall=6.18"

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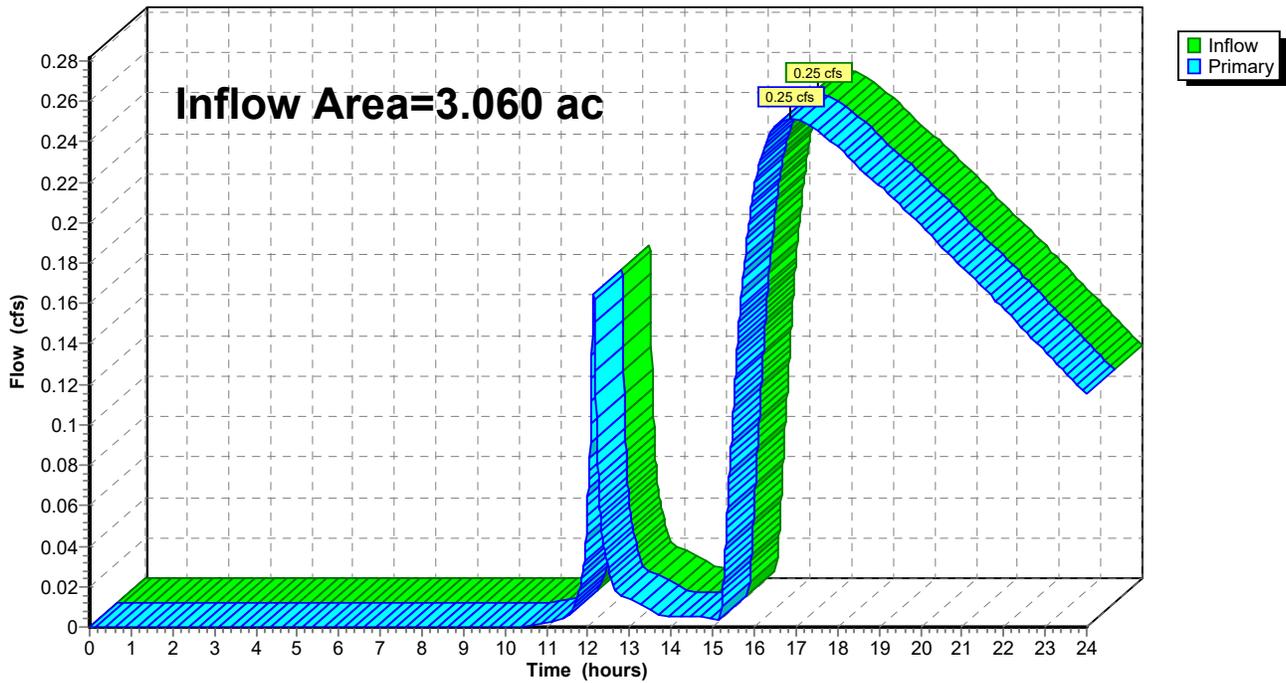
Summary for Link 2L: East Link

Inflow Area = 3.060 ac, 18.95% Impervious, Inflow Depth > 0.56" for 100 yr event
Inflow = 0.25 cfs @ 16.86 hrs, Volume= 0.143 af
Primary = 0.25 cfs @ 16.86 hrs, Volume= 0.143 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.010 hrs

Link 2L: East Link

Hydrograph



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Multi-Event Tables

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Events for Subcatchment 1: Subarea 1

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
1 yr	2.40	2.95	0.132	1.23
2 yr	2.70	3.54	0.159	1.48
10 yr	3.81	5.77	0.265	2.46
100 yr	6.18	10.60	0.504	4.69

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Multi-Event Tables

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Events for Subcatchment 2: Subarea 2

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
1 yr	2.40	5.98	0.363	1.23
2 yr	2.70	7.21	0.437	1.48
10 yr	3.81	11.86	0.728	2.46
100 yr	6.18	21.97	1.386	4.69

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Multi-Event Tables

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Events for Subcatchment 3: Subarea 3

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
1 yr	2.40	1.18	0.072	0.77
2 yr	2.70	1.52	0.091	0.97
10 yr	3.81	2.87	0.169	1.81
100 yr	6.18	6.06	0.358	3.84

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Multi-Event Tables

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Events for Subcatchment 4: Subarea 4

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
1 yr	2.40	1.56	0.098	0.77
2 yr	2.70	2.00	0.124	0.97
10 yr	3.81	3.80	0.231	1.81
100 yr	6.18	8.00	0.489	3.84

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Multi-Event Tables

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Events for Subcatchment 5: Subarea 5

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
1 yr	2.40	0.30	0.015	0.48
2 yr	2.70	0.42	0.020	0.64
10 yr	3.81	0.93	0.042	1.33
100 yr	6.18	2.22	0.099	3.14

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Multi-Event Tables

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Events for Subcatchment 6: Subarea 6

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
1 yr	2.40	0.02	0.001	0.41
2 yr	2.70	0.03	0.001	0.55
10 yr	3.81	0.07	0.003	1.20
100 yr	6.18	0.16	0.007	2.95

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Events for Subcatchment 7: Subarea 7

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
1 yr	2.40	0.32	0.014	0.72
2 yr	2.70	0.41	0.018	0.92
10 yr	3.81	0.78	0.035	1.74
100 yr	6.18	1.65	0.075	3.74

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Multi-Event Tables

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Events for Subcatchment 8: Subarea 8

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
1 yr	2.40	0.50	0.039	0.51
2 yr	2.70	0.69	0.051	0.68
10 yr	3.81	1.53	0.104	1.39
100 yr	6.18	3.66	0.243	3.23

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Multi-Event Tables

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Events for Pond 1B: Basin 1

Event	Inflow (cfs)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)	Elevation (feet)	Storage (acre-feet)
1 yr	2.95	0.36	0.01	0.35	1,017.30	0.063
2 yr	3.54	0.38	0.01	0.37	1,017.55	0.079
10 yr	5.77	0.44	0.01	0.43	1,018.45	0.144
100 yr	10.60	0.54	0.02	0.52	1,019.98	0.302

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Multi-Event Tables

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Events for Pond 2K: Kettle 2

Event	Inflow (cfs)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)	Elevation (feet)	Storage (acre-feet)
1 yr	6.32	0.03	0.03	0.00	1,013.25	0.449
2 yr	7.56	0.10	0.04	0.06	1,013.60	0.519
10 yr	12.26	0.29	0.06	0.23	1,014.48	0.776
100 yr	22.45	1.11	0.08	1.03	1,015.48	1.225

Proposed_005

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Multi-Event Tables

Printed 7/1/2024

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Events for Pond 3B: Basin 3

Event	Inflow (cfs)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)	Elevation (feet)	Storage (acre-feet)
1 yr	1.18	0.12	0.02	0.10	1,009.99	0.036
2 yr	1.52	0.15	0.02	0.12	1,010.45	0.047
10 yr	2.87	0.19	0.03	0.16	1,011.47	0.099
100 yr	6.06	0.66	0.05	0.61	1,012.48	0.210

Proposed_005

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Multi-Event Tables

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Events for Pond 4K: Kettle 4

Event	Inflow (cfs)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)	Elevation (feet)	Storage (acre-feet)
1 yr	1.58	0.04	0.04	0.00	1,005.79	0.105
2 yr	2.06	0.05	0.05	0.00	1,006.00	0.142
10 yr	3.92	0.06	0.06	0.00	1,006.72	0.295
100 yr	8.17	0.33	0.08	0.25	1,007.55	0.507

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Multi-Event Tables

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Events for Pond 5K: Kettle 5

Event	Inflow (cfs)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)	Elevation (feet)	Storage (acre-feet)
1 yr	0.30	0.01	0.01	0.00	1,009.42	0.010
2 yr	0.42	0.01	0.01	0.00	1,009.56	0.014
10 yr	0.93	0.01	0.01	0.00	1,010.08	0.033
100 yr	2.22	0.02	0.02	0.00	1,011.08	0.084

Proposed_005

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Multi-Event Tables

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Events for Link 1L: West Link

Event	Inflow (cfs)	Primary (cfs)	Elevation (feet)
1 yr	0.64	0.64	0.00
2 yr	0.87	0.87	0.00
10 yr	1.88	1.88	0.00
100 yr	4.55	4.55	0.00

Proposed_005

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Multi-Event Tables

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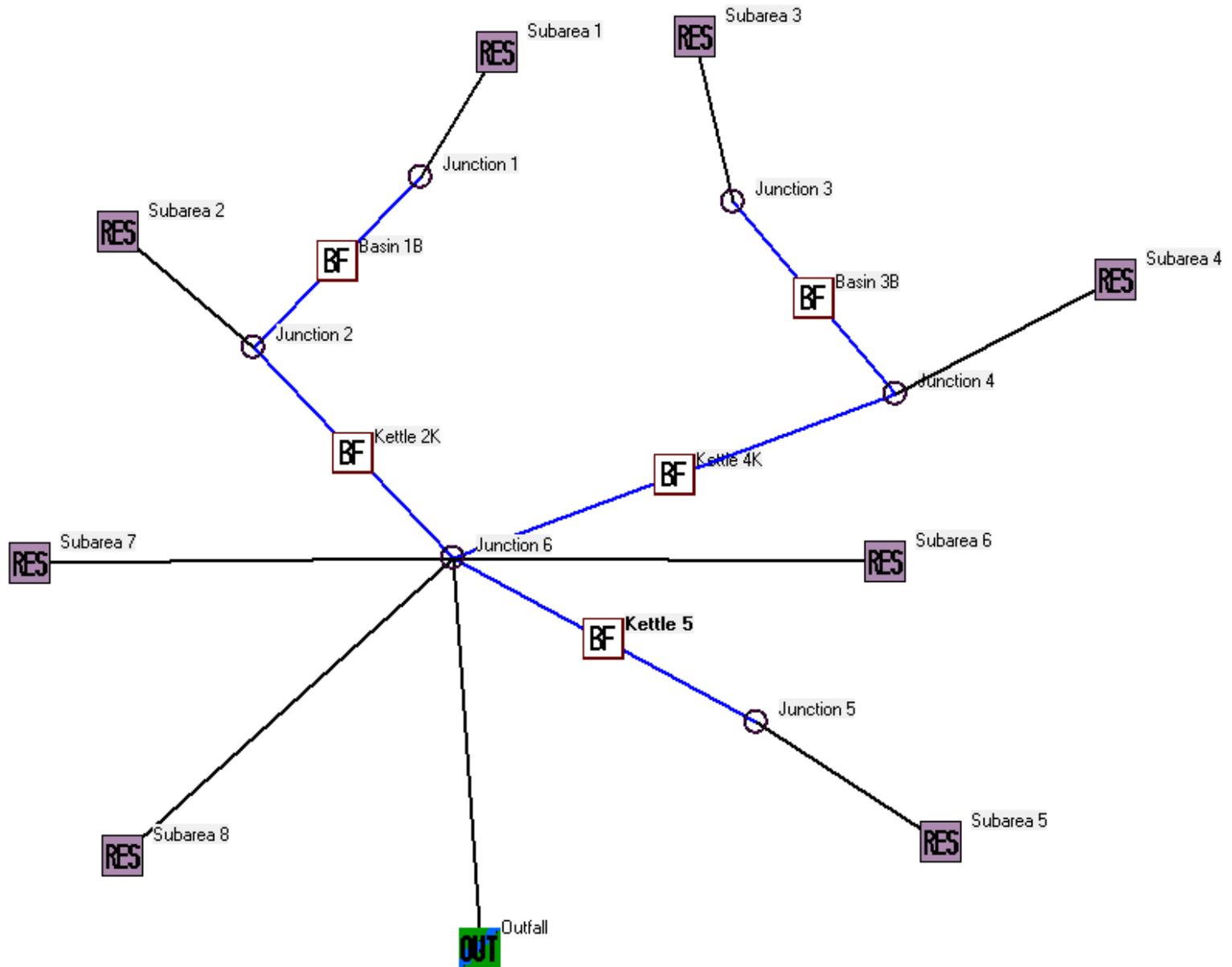
Events for Link 2L: East Link

Event	Inflow (cfs)	Primary (cfs)	Elevation (feet)
1 yr	0.02	0.02	0.00
2 yr	0.03	0.03	0.00
10 yr	0.07	0.07	0.00
100 yr	0.25	0.25	0.00

APPENDIX C

Treatment Analysis

Treatment Analysis



SLAMM for Windows Version 10.5.0

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Data file name: C:\Data\Jobs\2024\2024-005 - Lake County - TRIO\Project_Information\Calcs\SLAMM\Proposed.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: 07-01-2024 Time of run: 15:57:16

Total Area Modeled (acres): 9.040

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:	277182	-	94.35	1633	-
Outfall Total with Controls:	15735	94.32%	71.88	70.60	95.68%
Annualized Total After Outfall Controls:	15953			71.58	

Data file name: C:\Data\Jobs\2024\2024-005 - Lake County - TRIO\Project_Information\Calcs\SLAMM\Proposed.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.ppd
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: 07-01-2024 Time: 15:57:24
Site information:

LU# 1 - Residential: Subarea 1 Total area (ac): 1.290
1 - Roofs 1: 0.130 ac. Flat Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
13 - Paved Parking 1: 0.540 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
31 - Sidewalks 1: 0.050 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
51 - Small Landscaped Areas 1: 0.570 ac. Normal Clayey Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
LU# 2 - Residential: Subarea 2 Total area (ac): 3.550
1 - Roofs 1: 1.280 ac. Flat Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
13 - Paved Parking 1: 0.520 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
51 - Small Landscaped Areas 1: 1.680 ac. Normal Clayey Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
57 - Undeveloped Areas 1: 0.010 ac. Normal Clayey Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
LU# 3 - Residential: Subarea 3 Total area (ac): 1.120
1 - Roofs 1: 0.060 ac. Flat 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
31 - Sidewalks 1: 0.120 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
51 - Small Landscaped Areas 1: 0.880 ac. Normal Clayey Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
LU# 4 - Residential: Subarea 4 Total area (ac): 1.530
1 - Roofs 1: 0.070 ac. Flat Disconnected Normal Clayey Low Density Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
25 - Driveways 1: 0.170 ac. Disconnected Normal Clayey Low Density Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
31 - Sidewalks 1: 0.100 ac. Disconnected Normal Clayey Low Density Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
51 - Small Landscaped Areas 1: 1.190 ac. Normal Clayey Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
LU# 5 - Residential: Subarea 5 Total area (ac): 0.380
51 - Small Landscaped Areas 1: 0.170 ac. Normal Clayey Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
57 - Undeveloped Areas 1: 0.210 ac. Normal Clayey Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
LU# 6 - Residential: Subarea 6 Total area (ac): 0.030
57 - Undeveloped Areas 1: 0.030 ac. Normal Clayey Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
LU# 7 - Residential: Subarea 7 Total area (ac): 0.240
25 - Driveways 1: 0.010 ac. 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

51 - Small Landscaped Areas 1: 0.200 ac. Normal Clayey Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
LU# 8 - Residential: Subarea 8 Total area (ac): 0.900
31 - Sidewalks 1: 0.060 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
51 - Small Landscaped Areas 1: 0.030 ac. Normal Clayey Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
57 - Undeveloped Areas 1: 0.810 ac. Normal Clayey Source Area PSD File: C:\WinSLAMM Files\NURP.cpz

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

1. Top area (square feet) = 7562
2. Bottom area (square feet) = 2427
3. Depth (ft): 7.5
4. Biofilter width (ft) - for Cost Purposes Only: 10
5. Infiltration rate (in/hr) = 0.13
6. Random infiltration rate generation? No
7. Infiltration rate fraction (side): 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: 6.5

Outlet type: Vertical Stand Pipe

1. Stand pipe diameter (ft): 3
2. Stand pipe height above datum (ft): 5.5

Outlet type: Drain Tile/Underdrain

1. Underdrain outlet diameter (ft): 0.25
2. Invert elevation above datum (ft): 0.5
3. Number of underdrain outlets: 1

Control Practice 2: Biofilter CP# 2 (DS) - Kettle 2K

1. Top area (square feet) = 20923
2. Bottom area (square feet) = 524
3. Depth (ft): 10
4. Biofilter width (ft) - for Cost Purposes Only: 10
5. Infiltration rate (in/hr) = 0.13
6. Random infiltration rate generation? No

- 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: Drain Tile/Underdrain
- 1. Underdrain outlet diameter (ft): 0.17
 - 2. Invert elevation above datum (ft): 0.5
 - 3. Number of underdrain outlets: 1

Control Practice 4: Biofilter CP# 4 (DS) - Kettle 4K

- 1. Top area (square feet) = 15680
 - 2. Bottom area (square feet) = 4397
 - 3. Depth (ft): 4
 - 4. Biofilter width (ft) - for Cost Purposes Only: 10
 - 5. Infiltration rate (in/hr) = 0.24
 - 6. Random infiltration rate generation? No
 - 7. Infiltration rate fraction (side): 1
 - 8. Infiltration rate fraction (bottom): 1
 - 9. Depth of biofilter that is rock filled (ft) 0
 - 10. Porosity of rock filled volume = 0
 - 11. Engineered soil infiltration rate: 0
 - 12. Engineered soil depth (ft) = 0
 - 13. Engineered soil porosity = 0
 - 14. Percent solids reduction due to flow through engineered soil = 0
 - 15. Biofilter peak to average flow ratio = 3.8
 - 16. Number of biofiltration control devices = 1
 - 17. Particle size distribution file: Not needed - calculated by program
 - 18. Initial water surface elevation (ft): 0
- Soil Data Soil Type Fraction in Eng. Soil
- Biofilter Outlet/Discharge Characteristics:
- Outlet type: Broad Crested Weir
- 1. Weir crest length (ft): 10
 - 2. Weir crest width (ft): 10
 - 3. Height of datum to bottom of weir opening: 2.5

Control Practice 5: Biofilter CP# 5 (DS) - Kettle 5

- 1. Top area (square feet) = 5356
- 2. Bottom area (square feet) = 1060
- 3. Depth (ft): 4
- 4. Biofilter width (ft) - for Cost Purposes Only: 10
- 5. Infiltration rate (in/hr) = 0.24
- 6. Random infiltration rate generation? No
- 7. Infiltration rate fraction (side): 1
- 8. Infiltration rate fraction (bottom): 1
- 9. Depth of biofilter that is rock filled (ft) 0
- 10. Porosity of rock filled volume = 0
- 11. Engineered soil infiltration rate: 0
- 12. Engineered soil depth (ft) = 0
- 13. Engineered soil porosity = 0
- 14. Percent solids reduction due to flow through engineered soil = 0

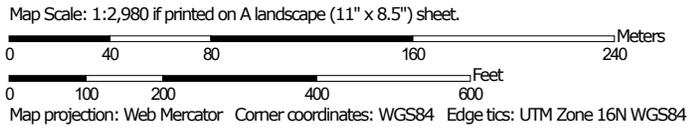
APPENDIX D

Soil Survey

Hydrologic Soil Group—Milwaukee and Waukesha Counties, Wisconsin



Soil Map may not be valid at this scale.



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 19, Sep 8, 2023

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

Date(s) aerial images were photographed: Aug 4, 2022—Sep 13, 2022

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
CrF	Casco-Rodman complex, 30 to 45 percent slopes	B	0.7	4.5%
HmC2	Hochheim loam, 6 to 12 percent slopes, eroded	D	2.9	19.7%
HoD3	Hochheim soils, 12 to 20 percent slopes, severely eroded	B	3.8	26.2%
ThB	Theresa silt loam, 2 to 6 percent slopes	C	7.3	49.7%
Totals for Area of Interest			14.7	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