Creekside

Montrose, Minnesota

Preliminary Storm Water Management Plan

May 27, 2022

Property Owner:

Sheffer Group
4655 Nicols Road Ste 206
Eagan, Minnesota 55122

Consultant to Project Owner:

PIONEER engineering P.A.

Pioneer Engineering, P.A.
2422 Enterprise Drive
Mendota Heights Minnesota 55120

Table of Contents

I hereby certify that this Specification, plan, or report was prepared by me or under my direct supervision and that I am a duly Registered Professional Engineer under the laws of the State of Minnesota.

John M. Molinaro
Minn. Reg. No. 45831

Date: 5-27-2022

I. Introduction

The following is a hydrology summary for the construction of a 80 unit single family home development to be called Creekside. The site is located east of Clementa Ave. SW at the end of Cole Avenue on the north and 7th St. N on the east boundary, in Montrose, Minnesota.

II. Existing Site Conditions

A. Current Land Use

The site consists of a 40 acre parcel of land. The site is generally divided into two areas, the western and eastern side of the creek that is a public water. The western portion is approximately 25 acres and consists of a large rolling field that was used as agricultural land for crops. The remainder of the western portion is a significant area of woods that located mostly along the creek and the southern portion of the land, there are a couple wetlands located on the western side of the creek. The eastern portion is approximately 15 acres with the majority of the upland land covered in woods, a small portion of the woods have been cleared adjacent to the eastern property boundary. There are a couple wetlands located on the eastern side of the creek.

B. Topography - Existing Hydrology

The existing topography is generally rolling with the majority of the upland areas draining to the creek. A small portion of the western area drains offsite to the west. A small portion of the eastern area drains to a wetland located on the south. All of the drainage makes it to the creek through offsite wetlands and overflows.

The Surface Waters & Wetland Areas that receive stormwater within one mile are shown in the Drainage Maps in APPENDIX A.

C. Special or Impaired Waters

A special and impaired waters search was completed using the MPCA search engine (http://pca-gis02.pca.state.mn.us/CSW/index.html) on November 18, 2021. The project has no discharge point within one mile of, and flows to, a special water listed in Appendix A, Part B of the NPDES Construction Site General Permit. The project does not have a discharge point within one mile of, and flows to, a water listed as impaired under Section 303(D) of the Federal Clean Water Act.

Waterbody ID	NA
Name of Waterbody	-
Type	Type
Special Water	No
Impaired Water	No
Pollutants	-
Approved TMDL	-
Site Discharges to	-

D. Soils

If a geotechnical report should be available shortly, (5-20-2022).

A review of the USDA Natural Resources Conservation Services Soils Survey Map (See Appendix H) indicated the following soils on site:

Soil Symbol	Soil Name	% of Site	Hydrologic Soil Group	Kf	T factor	Representative value			Erosion Potential
						% Sand	% Silt	% Clay	
106C2	Lester loam, 6 to 10 percent slopes, moderately eroded								
	Lester, moderately eroded	10.0	C	0.32	5	39	37	24	Not Rated
106D2	Lester loam, 10 to 16 percent slopes, moderately eroded								
	Lester, moderately eroded	0.7	C	0.32	5	39	37	24	Not Rated
109	Cordova clay loam, 0 to 2 percent slopes								
	Cordova	29.3	C/D	0.28	5	34.2	37.8	28	Not Rated
539	Klossner muck, 0 to 1 percent slopes								
	Klossner, drained	0.9	C/D	—	1	—	—	—	Not Rated
1080	Klossner, Okoboji and Glencoe soils, ponded, 0 to 1 percent slopes								
	Klossner, ponded	6.6	C/D	—	1	—	—	—	Not Rated
	Okoboji, ponded	6.6	C/D	0.32	5	11	53	36	Not Rated
	Glencoe, ponded	6.6	C/D	0.28	5	22	45	33	Not Rated
1362B	Angus loam, 2 to 6 percent slopes								
	Angus	6.7	C	0.28	5	39	37	24	Not Rated
1901B	Angus-Le Sueur complex, 1 to 6 percent slopes								
	Angus	45.8	C	0.28	5	39	37	24	Not Rated
	Le Sueur	45.8	C/D	0.28	5	39	37	24	Not Rated

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.

III. Proposed Site Conditions & Design Considerations

A. Proposed Development

The proposed development consists of an 80-unit single family home between Cole Ave. on the northwest and 7th Street North on the east. The general internal layout is a through street that is a collector located along the extension of 7th Street N from east to west. There is also a collector street connection on Cole Ave connected to the new 7th St. N. There is a cul-de-sac located on the easterly portion and a street connection to the land lying to the south. On the western side of the creek there is a large looped street with a cul-de-sac utilizing the interior land. There is also a small cul-de-sac located on the southern portion of the property.

The table below provides information on the estimated acreage of land cover before and after project development.

Cover Types	Before Acres	After Acres	CN Value
Types 1-8 wetlands	4.11	4.04	80
Wooded/forest	17.62	4.86	79
Cropland	18.48	-	89
Brush/grassland	-	-	-
Lawn/landscaping	-	19.69	80
Impervious surfaces *	-	11.63	98
Pond	-	-	-
TOTAL **	**40.22**	**40.22**	

B. Proposed Topography

The proposed drainage patterns will be reflective of the existing drainage patterns when possible. The drainage maps are shown in Appendix A.

C. Design Requirements

The City of Montrose Stormwater Management Ordinance requires all new developments to meet quality, flow rate requirements as denoted by the City Code. The City of Montrose also required that the Stormwater Management Plan meets or exceeds the requirements of the MN MPCA NPDES permit. These requirements are summarized as follows:

1. Rate Control

Montrose:
2 year: Must not increase from Existing
10 year: Must not increase from Existing
100 year: Must not increase from Existing

2. Water Quality

To meet the NPDES Construction Stormwater Permit the permanent sedimentation basins must:

- The basin must have a permanent volume of 1800 cubic feet of storage below the outlet pipe for each acre that drains to the basin.
- The basin must be designed to provide live storage for a water quality volume (calculated as an instantaneous volume) of one (1) inch of runoff from the new impervious surfaces created by the project.
- Basin outlets shall be designed such that the water quality volume is discharged at no more than 5.66 cubic feet per second (cfs) per acre of surface area of the pond. The basin's water quality volume is calculated as 1 inch of runoff from the new impervious surfaces created by the project.

3. Volume Control

To meet the NPDES Construction Stormwater Permit the infiltration systems must:

- Be design so that the water quality volume of one (1) inch of runoff from the new impervious surfaces created by the project is retained on site (i.e. infiltration or other volume reduction practices) and not discharged to a Surface Water.
- Discharge the water quality volume routed to the system through the soil surface or filter media within 48 hours or less.
- Verify soil type and to ensure a minimum of three (3) feet of separation from the seasonally saturated soils (or from bedrock) and the bottom of the proposed infiltration/filtration system.

4. Storm Sewer Design

The storm sewer must be designed to handle a 10 Year Storm Event.

5. Pad Elevations

Montrose
Low Opening Elevations are to be designed to the following standards:

Low opening elevations shall be at least:

2' Above E.O.F. of adjacent ponds.
3' Above the OHW or Highest Known water level (whichever is greater) for the Public Waters of the State.
3' Above 100-yr HWL of adjacent ponds or wetlands.

D. Proposed Hydrology

Three retention basins are proposed to collect site runoff from a majority of the improved areas of the development. There are no offsite flows that will enter the stormwater treatment system. The basins are all designed as wet sedimentation basins with no infiltration BMP's. This is due to the underlying soil type being classified as Type D soils. These basins will be constructed with the initial phases of grading and operate as temporary ponding locations. The small areas that are not collected by the onsite stormwater treatment system discharge to the existing locations. The non-treated areas are rear yards of lots with the corresponding non-connected impervious areas of the structures.

Basin Summary			
Basin Model Name (HydroCAD)	100P	200P	300P
Basin Description	Pond #1	Pond #2	Pond #3
NWL – Outlet Elevation	961.0	962.0	966.0
100-Year HWL	964.5	964.1	967.7
Emergency Overflow	965.0	964.6	969.0
Top of Berm	965.5	964.6	970.0
Surface Area at NWL (ac)	0.545	0.480	0.160
Structural Outlet	0.85' Weir	1.0' Weir	0.75' Weir
Wet Volume (af)	2.752	1.681	0.317
Live Volume (af) @ 100-Year	2.178	1.115	0.321
Drainage Area (ac)	16.49	4.64	1.89
Impervious Area (ac)	7.19	1.93	0.93
Lowest Floor Elevation	-	-	-
Lowest Opening Elevation	967.5	967.1	970.7

The majority of onsite soils have very low infiltration rates. These low rates are not favorable to infiltration BMPs.

IV. Results

1. Rate Control

The proposed flow rate from the proposed development shall not exceed the flow rate of the existing drainage areas for the two, ten and 100-year storm events.

The following table is a summary of the results of the flow rate derived by the HydroCAD models.

Drainage Designation	Drainage Description	2-Year Flow Rate (cfs)		10-Year Flow Rate (cfs)		100-Year Flow Rate (cfs)	
		Existing	Proposed	Existing	Proposed	Existing	Proposed
West	Drainage to West Boundary	19.75	9.85	34.59	18.16	70.08	38.54
Creek	Drainage to Creek	53.17	27.36	98.97	66.46	211.64	133.87
South	Drainage to South Wetland	14.74	10.85	26.28	20.78	54.14	45.56

2. Water Quality

The basin must have a permanent volume of 1800 cubic feet of storage below the outlet pipe for each acre that drains to the basin.

NPDES Basin Treatment Volume				
Basin Model Name (HydroCAD)	Drainage Area (acre)	Requirement (cf/acre)	Treatment Volume Req. (ac*ft)	Volume Proposed (ac*ft)
100P	16.49	1800	0.681	2.752
200P	4.64	1800	0.192	1.681
300P	1.89	1800	0.078	0.317

Basin outlets shall be designed such that the water quality volume is discharged at no more than 5.66 cubic feet per second (cfs) per acre of surface area of the pond. The basin's water quality volume is calculated as 1 inch of runoff from the new impervious surfaces created by the project.

NPDES Basin Water Quality Volume Discharge Requirement			
Basin Model Name (HydroCAD)	Surface area (acre)	WQ Discharge (cfs)	Discharge per acre (cfs/acre)
100P	0.545	3.00	5.50
200P	0.480	0.62	1.29
300P	0.160	0.77	4.81

The basin must be designed to provide live storage for a water quality volume (calculated as an instantaneous volume) of one (1) inch of runoff from the new impervious surfaces created by the project.

Basin Live Storage Requirement				
Basin Model Name	New Imp. Surface Area (acre)	Live Storage Required (1.0")	NWL / HWL Elev.	Water Quality Volume Proposed (ac*ft)
100P	7.19	0.599	961/964.5	2.178
200P	4.64	0.161	962/964.1	1.115
300P	1.89	0.077	966/967.7	0.321

3. Volume Control

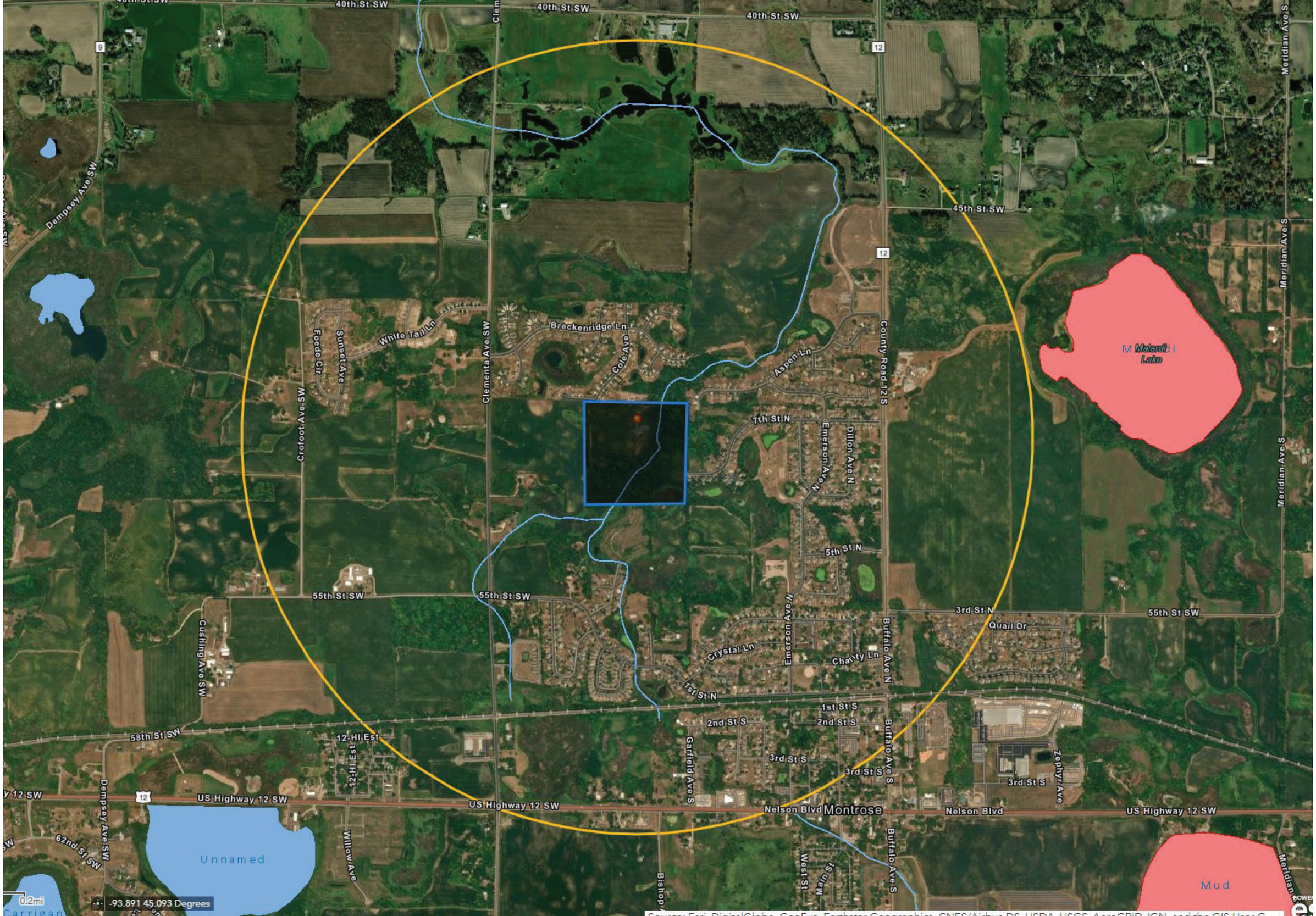
To meet the NPDES Permit the project must be design so that the water quality volume of one (1) inch of runoff from the new impervious surfaces created by the project is retained on site (i.e. infiltration or other volume reduction practices) and not discharged to a Surface Water.

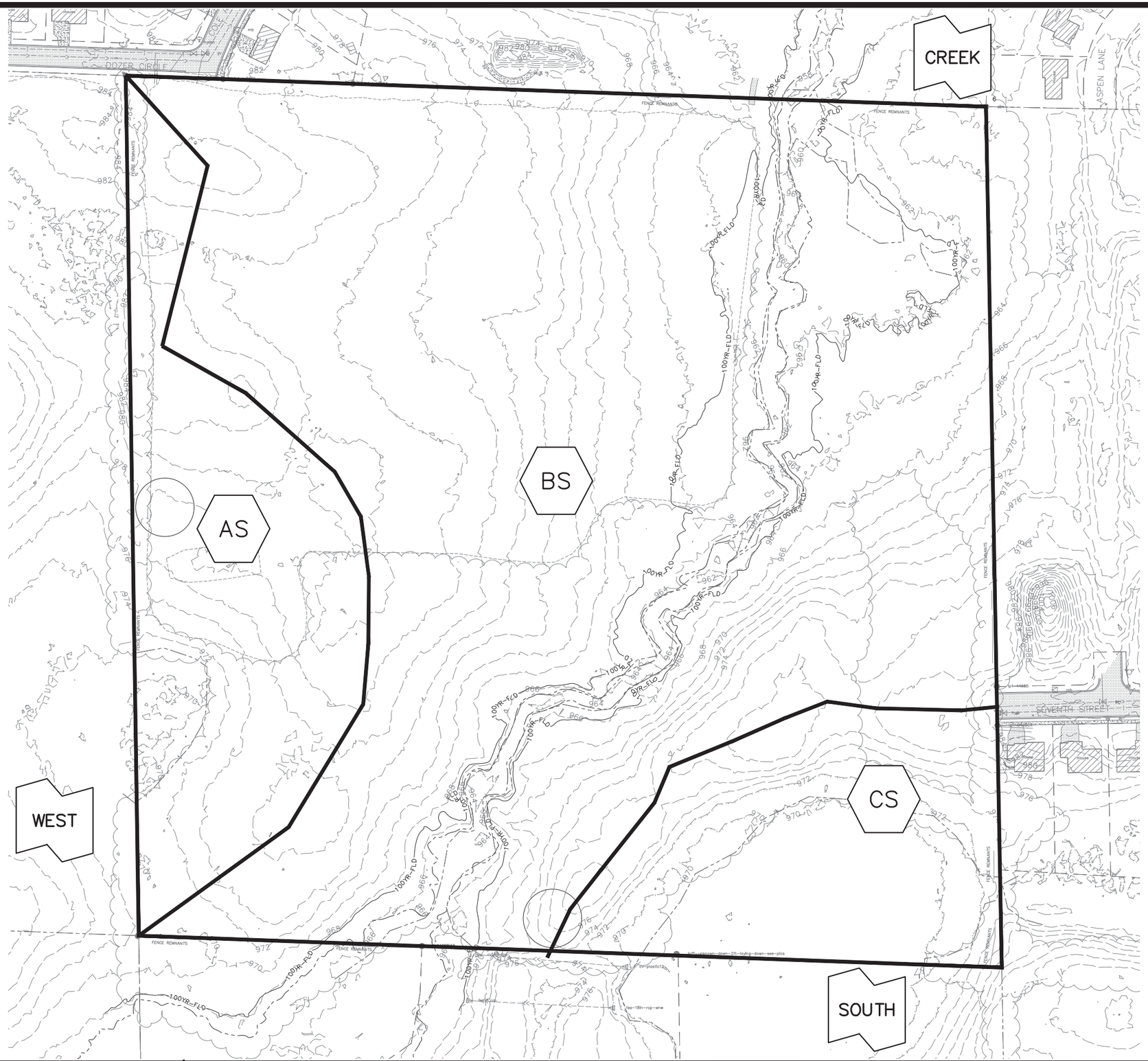
Due to Type D soils Infiltration is not possible per MN NPDES (16.18).

Runoff Quantity Reduction Required		
Total New Impervious Area (ac)	Treatment Depth (in/ac impervious)	Water Quality Volume (ac*ft)
-	-	-

	Infiltration Basin Volume Provided				
Basin Name	Captured Volume Below Outlet (ac*ft)	Surface area (sf)	Infiltration Rate (in/hr)	Draw Down Time (hr)	Volume (ac*ft)
-		-	-	-	-
Total					-

Appendix A: Hydrology Maps


40th St SW
40th St SW
40th St SW
45th St SW
Dempsey Ave SW
Clementa Ave SW
Crofoot Ave SW
Foede Cir
Sunset Ave
White Tail Ln
Breckenridge Ln
Cole Ave
Aspen Ln
7th St N
Emerson Ave N
Dillon Ave N
County Road 12 S
Meridian Ave S
Meridian Ave S
Meridian Ave S
Malardi
Lake
55th St SW
55th St SW
55th St SW
Cushing Ave SW
Crystal Ln
Emerson Ave N
Charity Ln
Buffalo Ave N
3rd St N
Quail Dr
5th St N
1st St N
1st St S
2nd St S
2nd St S
3rd St S
3rd St S
3rd St S
Buffalo Ave S
Buffalo Ave S
Zephyr Ave
Garfield Ave S
58th St SW
12-Hl Est
12-Hl Est
US Highway 12 SW
US Highway 12 SW
US Highway 12 SW
Dempsey Ave SW
62nd St SW
Willow Ave
Nelson Blvd
Montrose
Nelson Blvd
Bishop
West St
Main St
Unnamed
Mud
0.2mi
-93.891 45.093 Degrees



0 40 80 160

GRAPHIC SCALE IN FEET

BENCH MARK
TOP NUT HYDRANT AT NORTHWEST QUADRANT OF DOZER CIRCLE AND COLE AVE.
EL=986.16

00-ENG-121186-HYDR-PROP

PIONEER engineering
CIVIL ENGINEERS LAND PLANNERS LAND SURVEYORS LANDSCAPE ARCHITECTS
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www.pioneereng.com

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota

Name John M. Molinaro
Reg. No. 45831 Date 06-17-22

Revisions

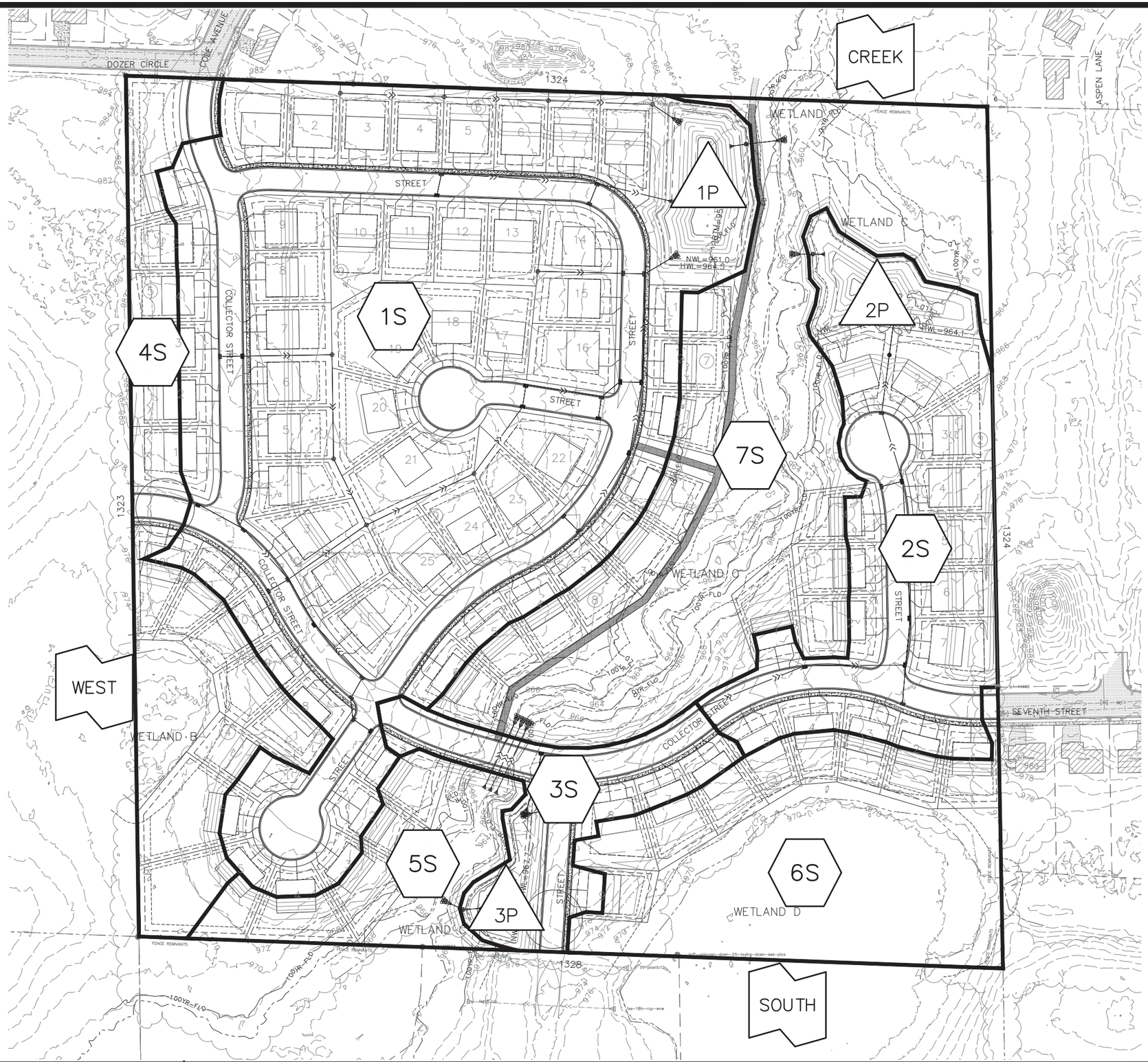
Date	06-17-22
Designed	JMM
Drawn	JMM

EXISTING HYDROLOGY MAP

SHEFFER GROUP
4655 NICOLS ROAD STE 206
EAGAN, MINNESOTA 55122

CREEKSIDE HOLLOW
MONTROSE, MINNESOTA

1 OF 1



0 40 80 160

GRAPHIC SCALE IN FEET

N

BENCH MARK
TOP NUT HYDRANT AT NORTHWEST QUADRANT OF DOZER CIRCLE AND COLE AVE.
EL=986.16

00-ENG-121186-HYDR-PROP

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Date	06-17-22
Designed	JMM
Drawn	JMM

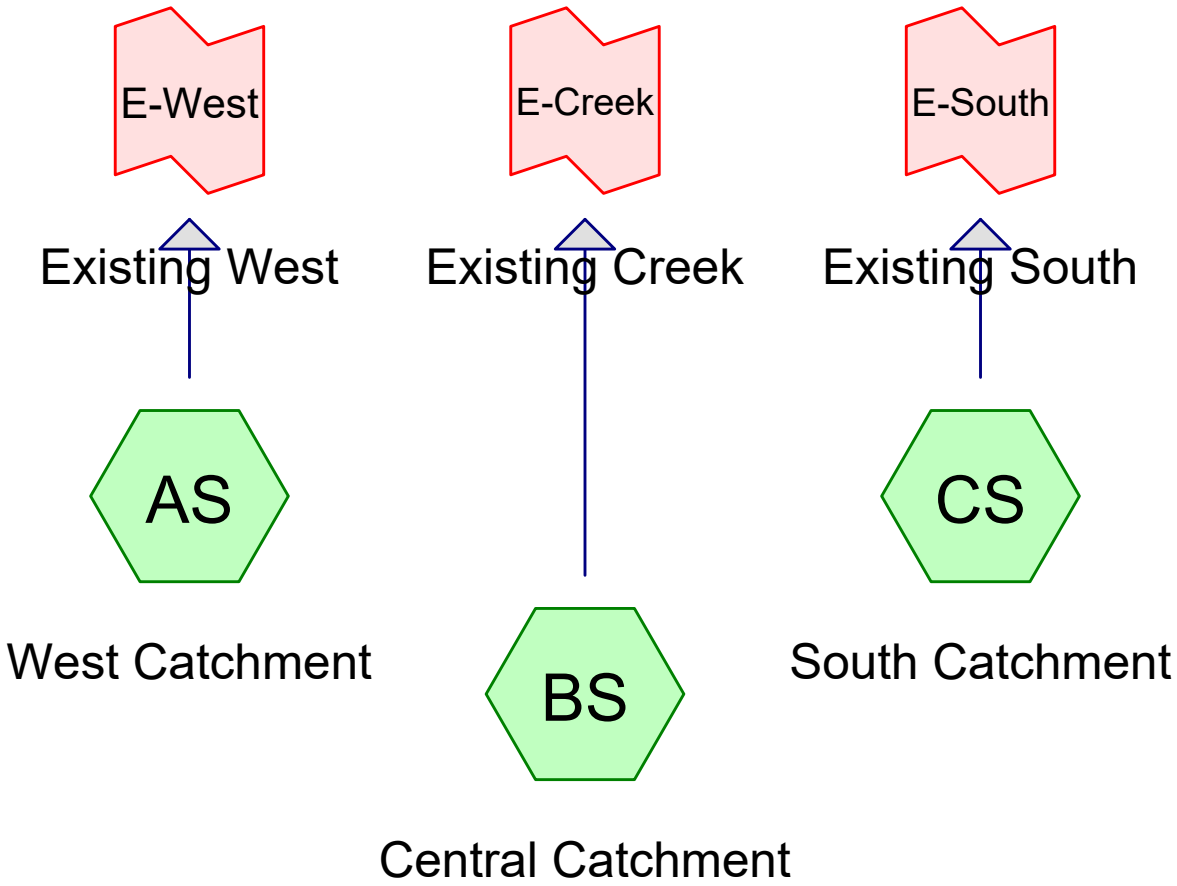
PROPOSED HYDROLOGY MAP

SHEFFER GROUP
4655 NICOLS ROAD STE 206
EAGAN, MINNESOTA 55122

CREEKSIDE HOLLOW
MONTROSE, MINNESOTA

1 OF 1

Appendix B: Hydrology Calculations



Subcat Reach Pond Link

Routing Diagram for 00-121186-PROPOSED- 05-26-22
Prepared by {enter your company name here}, Printed 6/21/2022

Rainfall Events Listing

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	2.46	2
2	2-yr	MSE 24-hr	3	Default	24.00	1	2.81	2
3	10-yr	MSE 24-hr	3	Default	24.00	1	4.19	2
4	100-yr	MSE 24-hr	3	Default	24.00	1	7.47	2

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
22.591	89	Row crops, straight row, Good, HSG D (AS, BS, CS)
17.625	79	Woods, Fair, HSG D (AS, BS, CS)
40.216	**85**	**TOTAL AREA**

Soil Listing (selected nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
40.216	HSG D	AS, BS, CS
0.000	Other	
40.216		**TOTAL AREA**

Ground Covers (selected nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	22.591	0.000	22.591	Row crops, straight row, Good	AS, BS, CS
0.000	0.000	0.000	17.625	0.000	17.625	Woods, Fair	AS, BS, CS
0.000	**0.000**	**0.000**	**40.216**	**0.000**	**40.216**	**TOTAL AREA**	

Time span=0.00-160.00 hrs, dt=0.001 hrs, 160001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Sim-Route method - Pond routing by Sim-Route method

Subcatchment AS: West Catchment Runoff Area=271,108 sf 0.00% Impervious Runoff Depth=1.21"
Flow Length=200' Slope=0.0700 '/' Tc=2.7 min CN=86 Runoff=16.09 cfs 0.628 af

Subcatchment BS: Central Catchment Runoff Area=1,266,338 sf 0.00% Impervious Runoff Depth=1.09"
Flow Length=850' Slope=0.0310 '/' Tc=13.9 min CN=84 Runoff=42.16 cfs 2.629 af

Subcatchment CS: South Catchment Runoff Area=214,369 sf 0.00% Impervious Runoff Depth=1.15"
Flow Length=220' Slope=0.0640 '/' Tc=3.2 min CN=85 Runoff=11.91 cfs 0.470 af

Link E-Creek: Existing Creek Inflow=42.16 cfs 2.629 af
Primary=42.16 cfs 2.629 af

Link E-South: Existing South Inflow=11.91 cfs 0.470 af
Primary=11.91 cfs 0.470 af

Link E-West: Existing West Inflow=16.09 cfs 0.628 af
Primary=16.09 cfs 0.628 af

Total Runoff Area = 40.216 ac Runoff Volume = 3.727 af Average Runoff Depth = 1.11"
100.00% Pervious = 40.216 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment AS: West Catchment

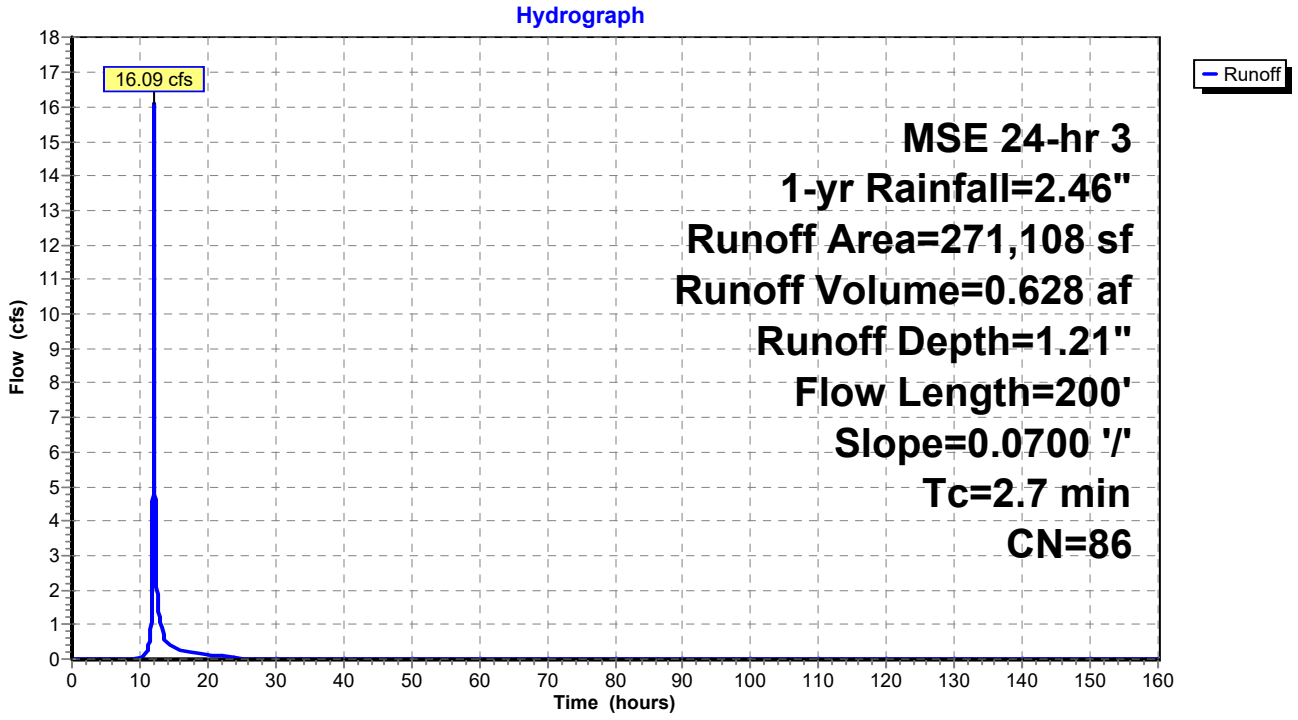
Runoff = 16.09 cfs @ 12.11 hrs, Volume= 0.628 af, Depth= 1.21"
Routed to Link E-West : Existing West

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-160.00 hrs, dt= 0.001 hrs
MSE 24-hr 3 1-yr Rainfall=2.46"

Area (sf)	CN	Description
188,355	89	Row crops, straight row, Good, HSG D
82,753	79	Woods, Fair, HSG D
271,108	86	Weighted Average
271,108		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.7	200	0.0700	1.23		**Lag/CN Method,**

Subcatchment AS: West Catchment



Summary for Subcatchment BS: Central Catchment

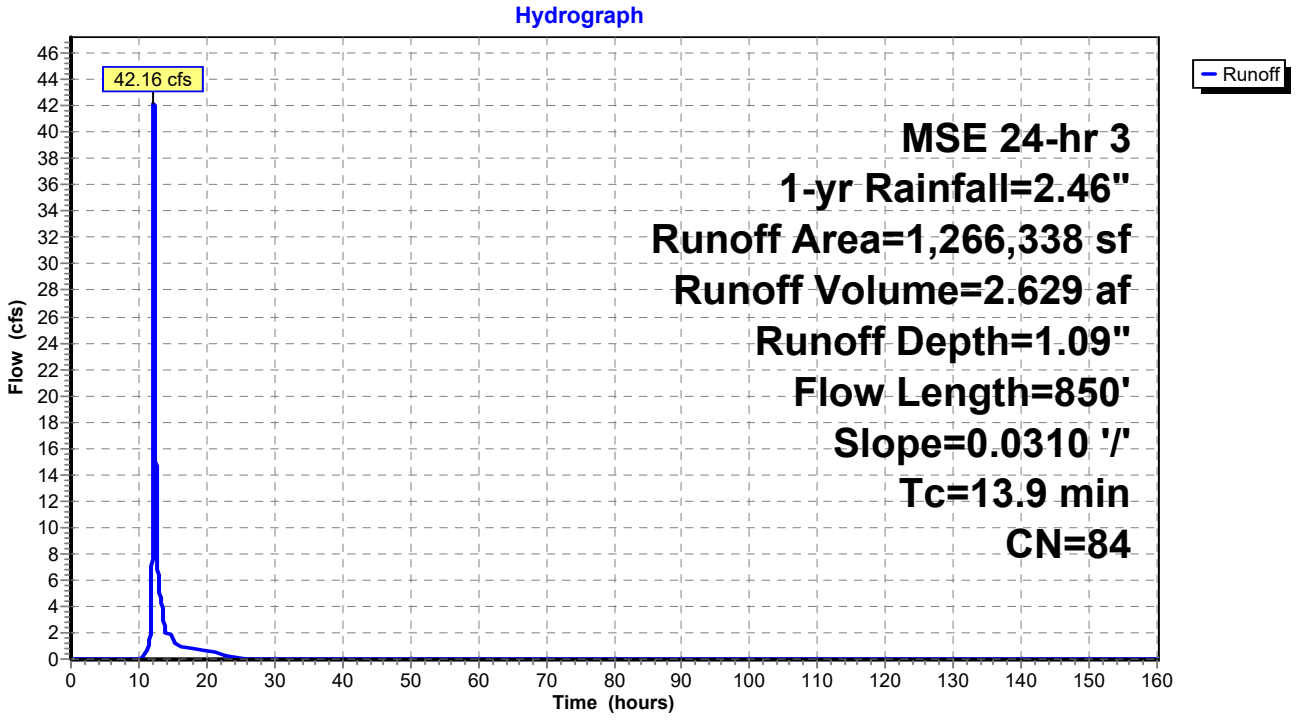
Runoff = 42.16 cfs @ 12.22 hrs, Volume= 2.629 af, Depth= 1.09"
Routed to Link E-Creek : Existing Creek

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-160.00 hrs, dt= 0.001 hrs
MSE 24-hr 3 1-yr Rainfall=2.46"

Area (sf)	CN	Description
664,670	89	Row crops, straight row, Good, HSG D
601,668	79	Woods, Fair, HSG D
1,266,338	84	Weighted Average
1,266,338		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.9	850	0.0310	1.02		**Lag/CN Method,**

Subcatchment BS: Central Catchment



Summary for Subcatchment CS: South Catchment

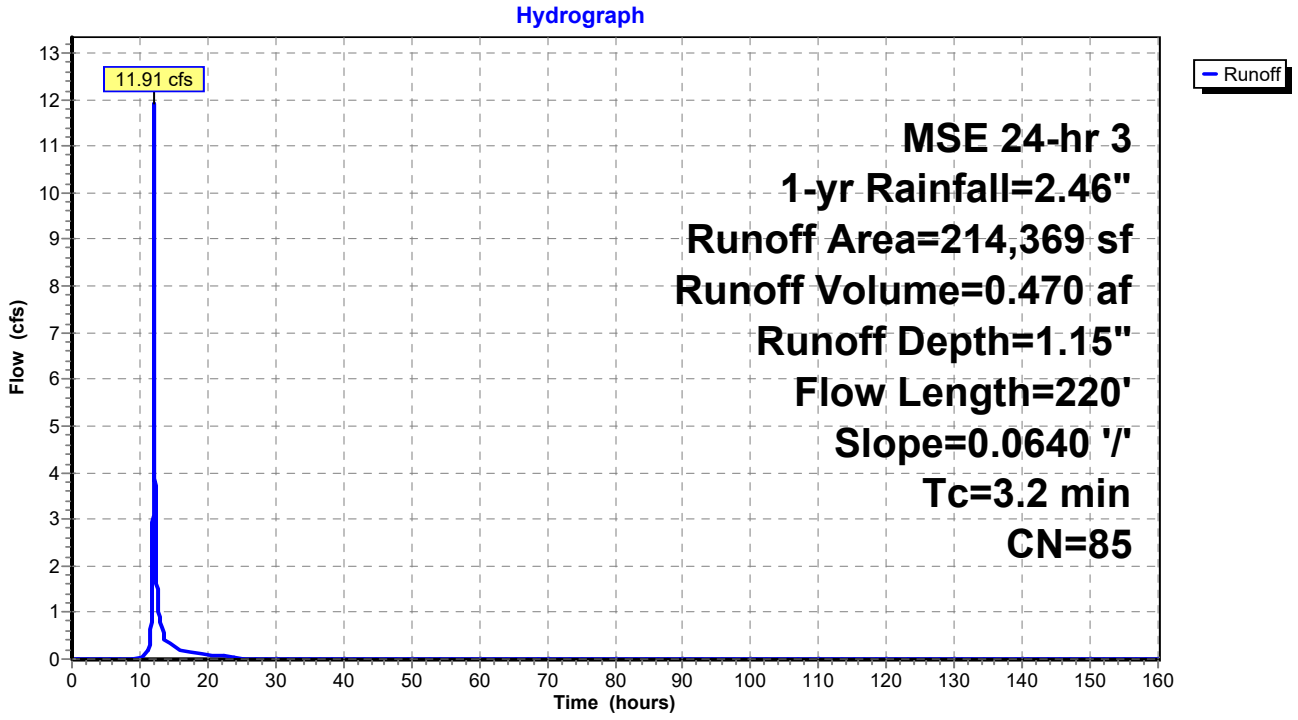
Runoff = 11.91 cfs @ 12.11 hrs, Volume= 0.470 af, Depth= 1.15"
Routed to Link E-South : Existing South

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-160.00 hrs, dt= 0.001 hrs
MSE 24-hr 3 1-yr Rainfall=2.46"

Area (sf)	CN	Description
131,049	89	Row crops, straight row, Good, HSG D
83,320	79	Woods, Fair, HSG D
214,369	85	Weighted Average
214,369		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.2	220	0.0640	1.16		**Lag/CN Method,**

Subcatchment CS: South Catchment

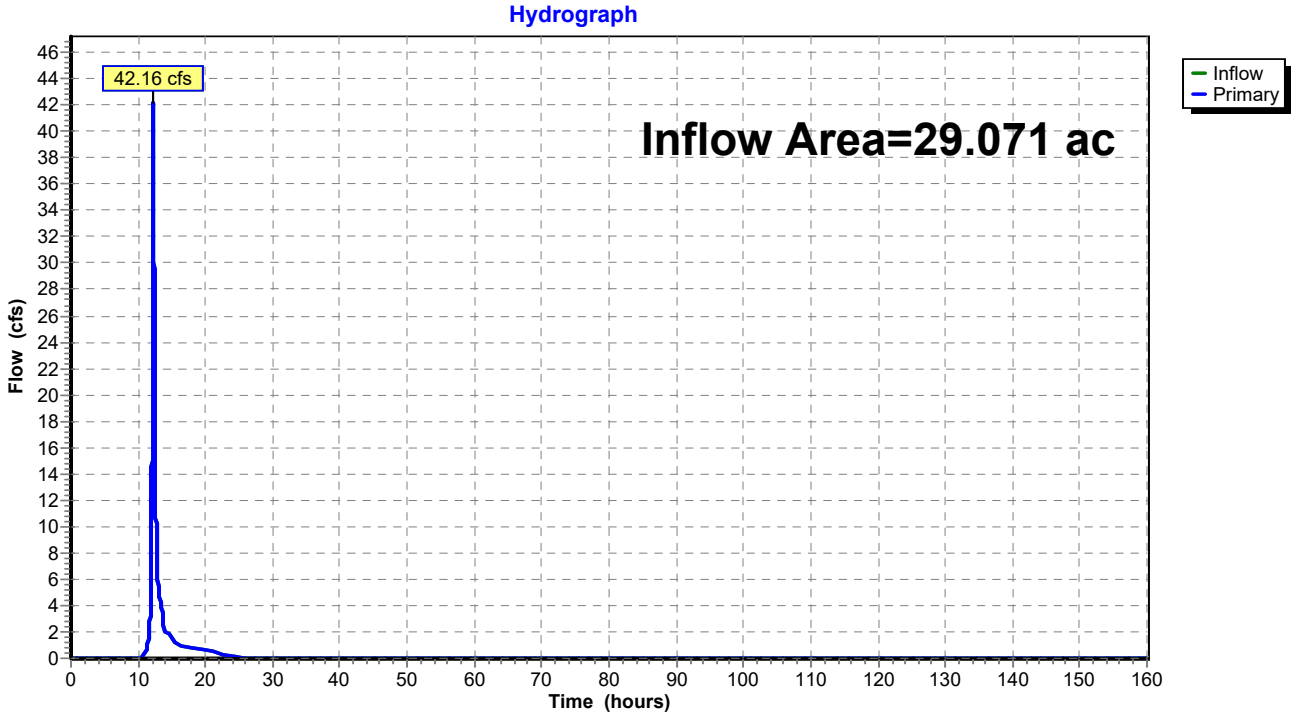


Summary for Link E-Creek: Existing Creek

Inflow Area = 29.071 ac, 0.00% Impervious, Inflow Depth = 1.09" for 1-yr event
Inflow = 42.16 cfs @ 12.22 hrs, Volume= 2.629 af
Primary = 42.16 cfs @ 12.22 hrs, Volume= 2.629 af, Atten= 0%, Lag= 0.1 min

Primary outflow = Inflow, Time Span= 0.00-160.00 hrs, dt= 0.001 hrs

Link E-Creek: Existing Creek

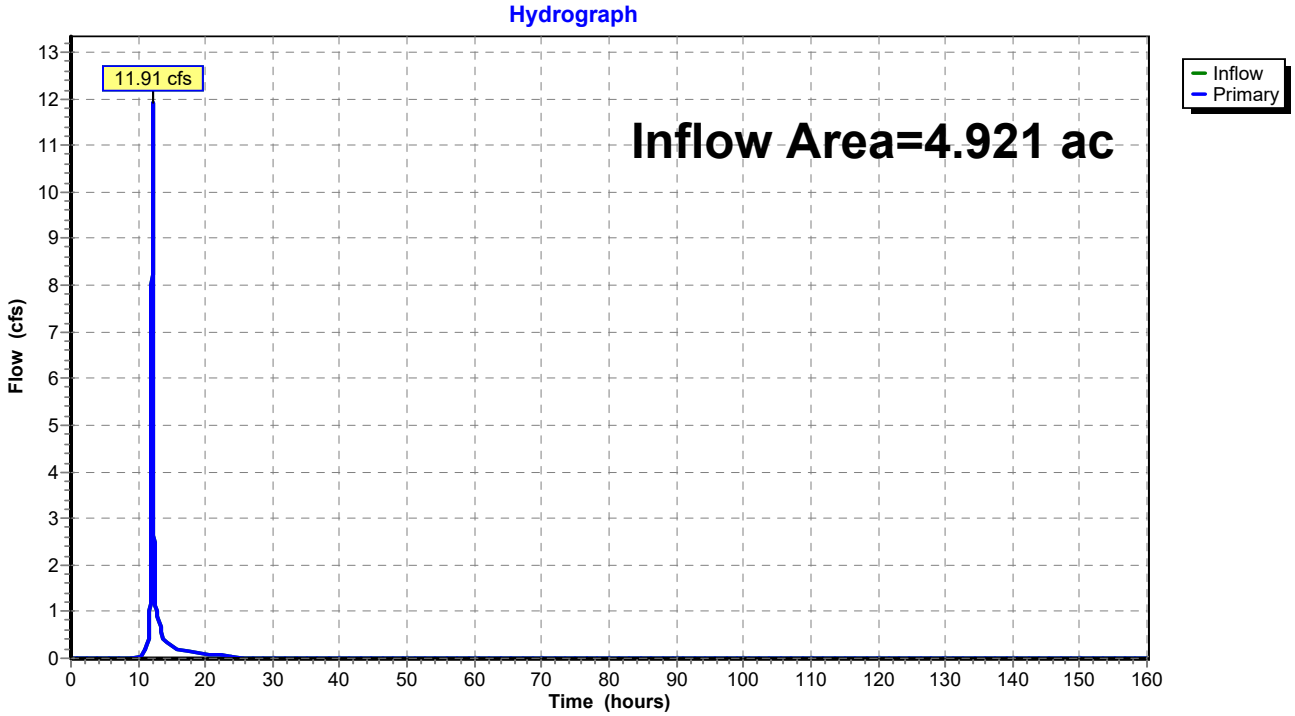


Summary for Link E-South: Existing South

Inflow Area = 4.921 ac, 0.00% Impervious, Inflow Depth = 1.15" for 1-yr event
Inflow = 11.91 cfs @ 12.11 hrs, Volume= 0.470 af
Primary = 11.91 cfs @ 12.11 hrs, Volume= 0.470 af, Atten= 0%, Lag= 0.1 min

Primary outflow = Inflow, Time Span= 0.00-160.00 hrs, dt= 0.001 hrs

Link E-South: Existing South

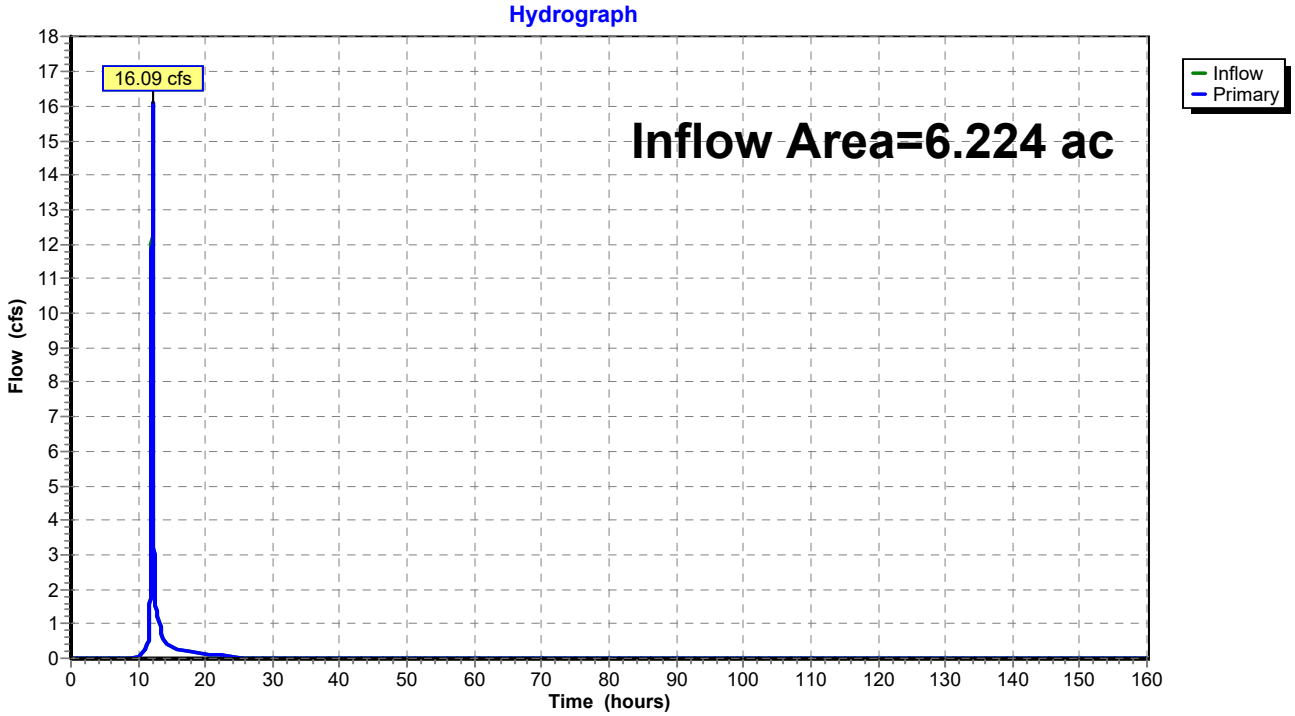


Summary for Link E-West: Existing West

Inflow Area = 6.224 ac, 0.00% Impervious, Inflow Depth = 1.21" for 1-yr event
Inflow = 16.09 cfs @ 12.11 hrs, Volume= 0.628 af
Primary = 16.09 cfs @ 12.11 hrs, Volume= 0.628 af, Atten= 0%, Lag= 0.1 min

Primary outflow = Inflow, Time Span= 0.00-160.00 hrs, dt= 0.001 hrs

Link E-West: Existing West



Time span=0.00-160.00 hrs, dt=0.001 hrs, 160001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Sim-Route method - Pond routing by Sim-Route method

Subcatchment AS: West Catchment Runoff Area=271,108 sf 0.00% Impervious Runoff Depth=1.50"
Flow Length=200' Slope=0.0700 '/' Tc=2.7 min CN=86 Runoff=19.75 cfs 0.778 af

Subcatchment BS: Central Catchment Runoff Area=1,266,338 sf 0.00% Impervious Runoff Depth=1.36"
Flow Length=850' Slope=0.0310 '/' Tc=13.9 min CN=84 Runoff=53.17 cfs 3.298 af

Subcatchment CS: South Catchment Runoff Area=214,369 sf 0.00% Impervious Runoff Depth=1.43"
Flow Length=220' Slope=0.0640 '/' Tc=3.2 min CN=85 Runoff=14.74 cfs 0.586 af

Link E-Creek: Existing Creek Inflow=53.17 cfs 3.298 af
Primary=53.17 cfs 3.298 af

Link E-South: Existing South Inflow=14.74 cfs 0.586 af
Primary=14.74 cfs 0.586 af

Link E-West: Existing West Inflow=19.75 cfs 0.778 af
Primary=19.75 cfs 0.778 af

Total Runoff Area = 40.216 ac Runoff Volume = 4.663 af Average Runoff Depth = 1.39"
100.00% Pervious = 40.216 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment AS: West Catchment

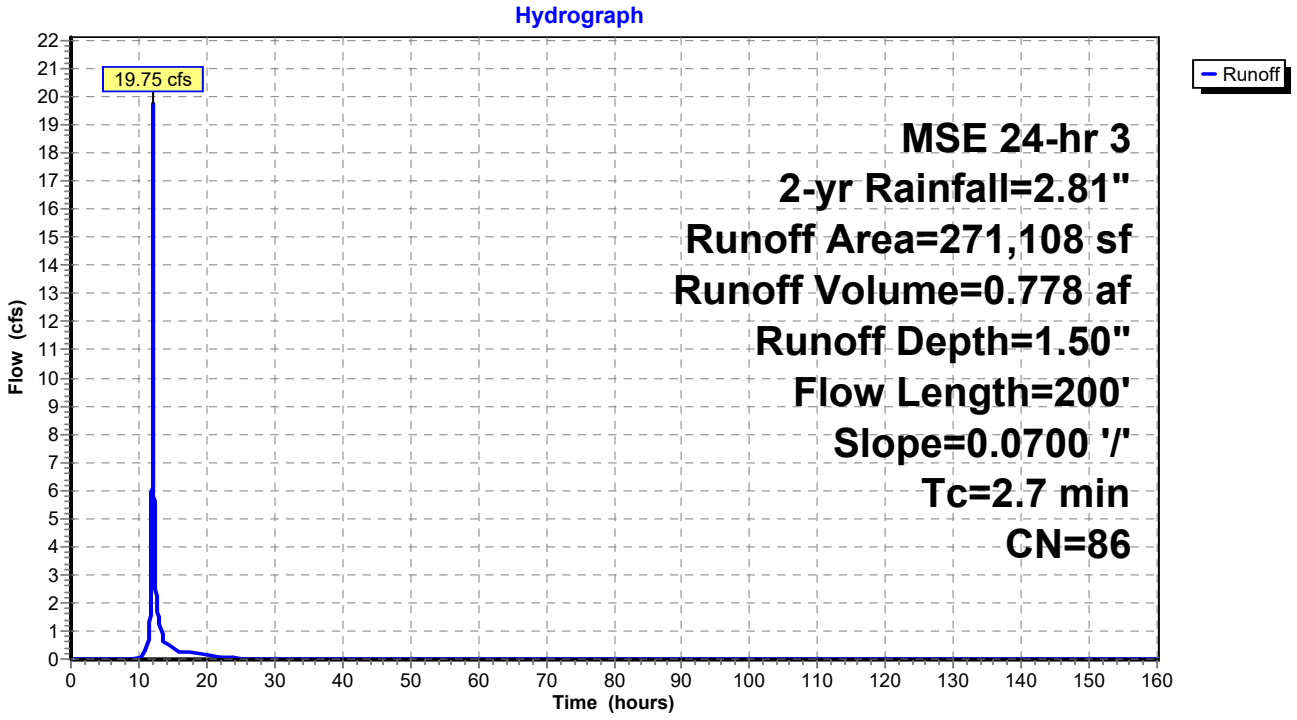
Runoff = 19.75 cfs @ 12.11 hrs, Volume= 0.778 af, Depth= 1.50"
Routed to Link E-West : Existing West

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-160.00 hrs, dt= 0.001 hrs
MSE 24-hr 3 2-yr Rainfall=2.81"

Area (sf)	CN	Description
188,355	89	Row crops, straight row, Good, HSG D
82,753	79	Woods, Fair, HSG D
271,108	86	Weighted Average
271,108		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.7	200	0.0700	1.23		**Lag/CN Method,**

Subcatchment AS: West Catchment



Summary for Subcatchment BS: Central Catchment

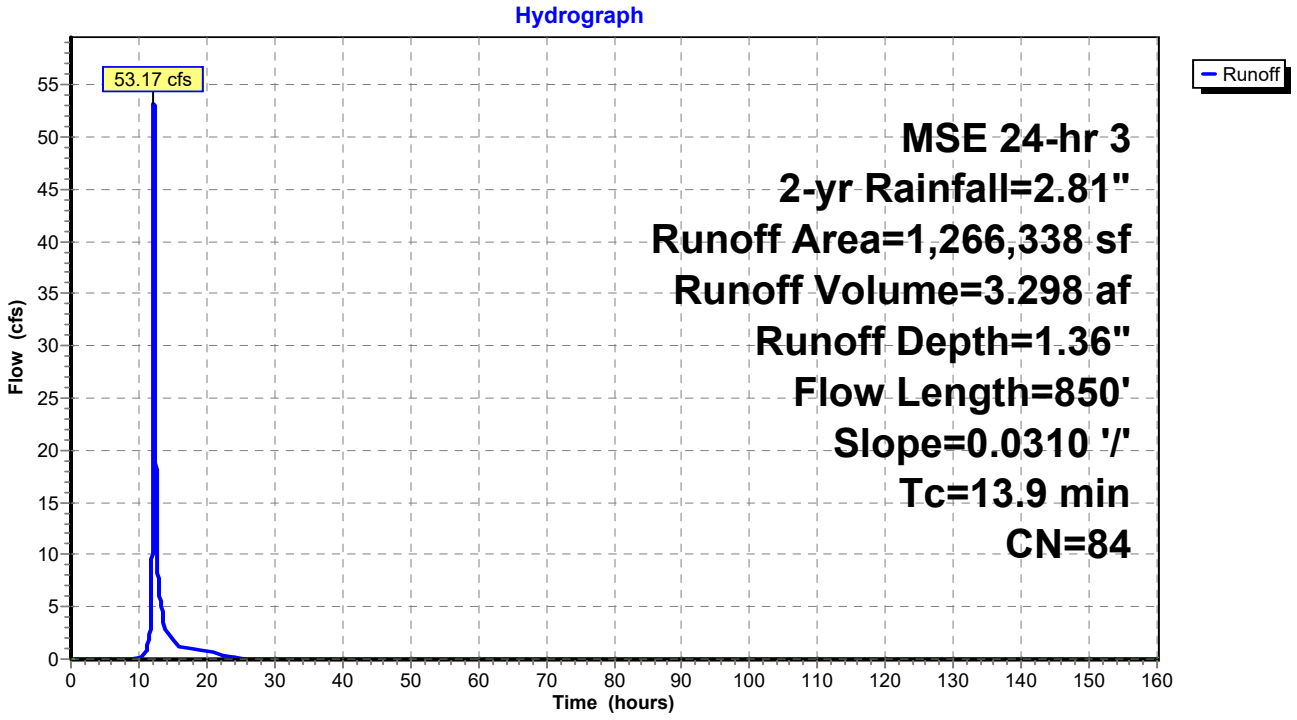
Runoff = 53.17 cfs @ 12.22 hrs, Volume= 3.298 af, Depth= 1.36"
Routed to Link E-Creek : Existing Creek

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-160.00 hrs, dt= 0.001 hrs
MSE 24-hr 3 2-yr Rainfall=2.81"

Area (sf)	CN	Description
664,670	89	Row crops, straight row, Good, HSG D
601,668	79	Woods, Fair, HSG D
1,266,338	84	Weighted Average
1,266,338		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.9	850	0.0310	1.02		**Lag/CN Method,**

Subcatchment BS: Central Catchment



Summary for Subcatchment CS: South Catchment

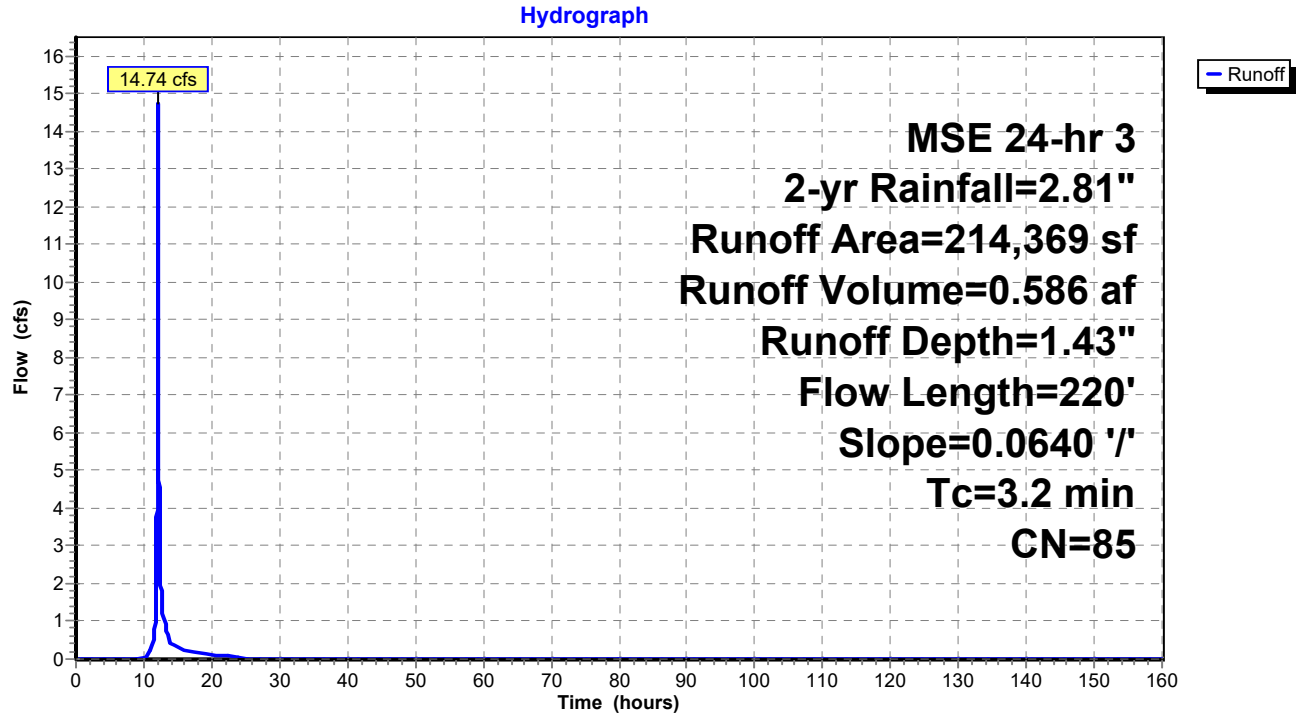
Runoff = 14.74 cfs @ 12.11 hrs, Volume= 0.586 af, Depth= 1.43"
Routed to Link E-South : Existing South

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-160.00 hrs, dt= 0.001 hrs
MSE 24-hr 3 2-yr Rainfall=2.81"

Area (sf)	CN	Description
131,049	89	Row crops, straight row, Good, HSG D
83,320	79	Woods, Fair, HSG D
214,369	85	Weighted Average
214,369		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.2	220	0.0640	1.16		**Lag/CN Method,**

Subcatchment CS: South Catchment

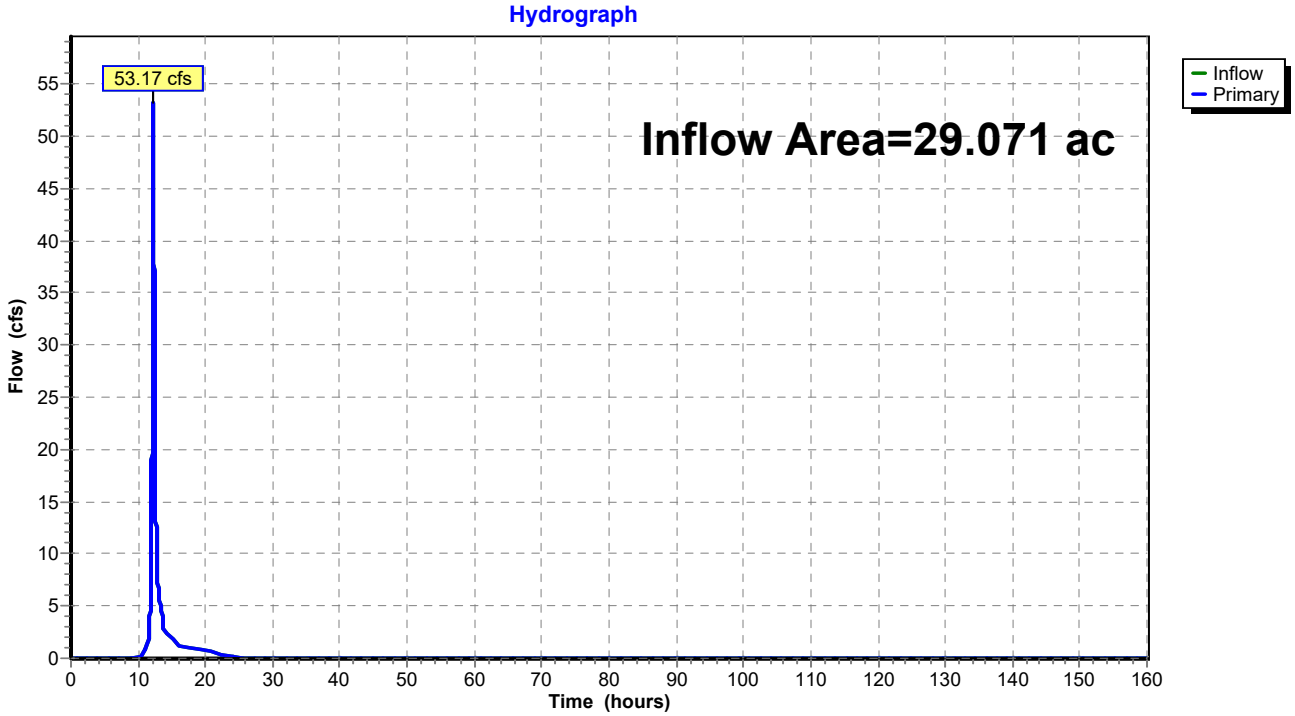


Summary for Link E-Creek: Existing Creek

Inflow Area = 29.071 ac, 0.00% Impervious, Inflow Depth = 1.36" for 2-yr event
Inflow = 53.17 cfs @ 12.22 hrs, Volume= 3.298 af
Primary = 53.17 cfs @ 12.22 hrs, Volume= 3.298 af, Atten= 0%, Lag= 0.1 min

Primary outflow = Inflow, Time Span= 0.00-160.00 hrs, dt= 0.001 hrs

Link E-Creek: Existing Creek

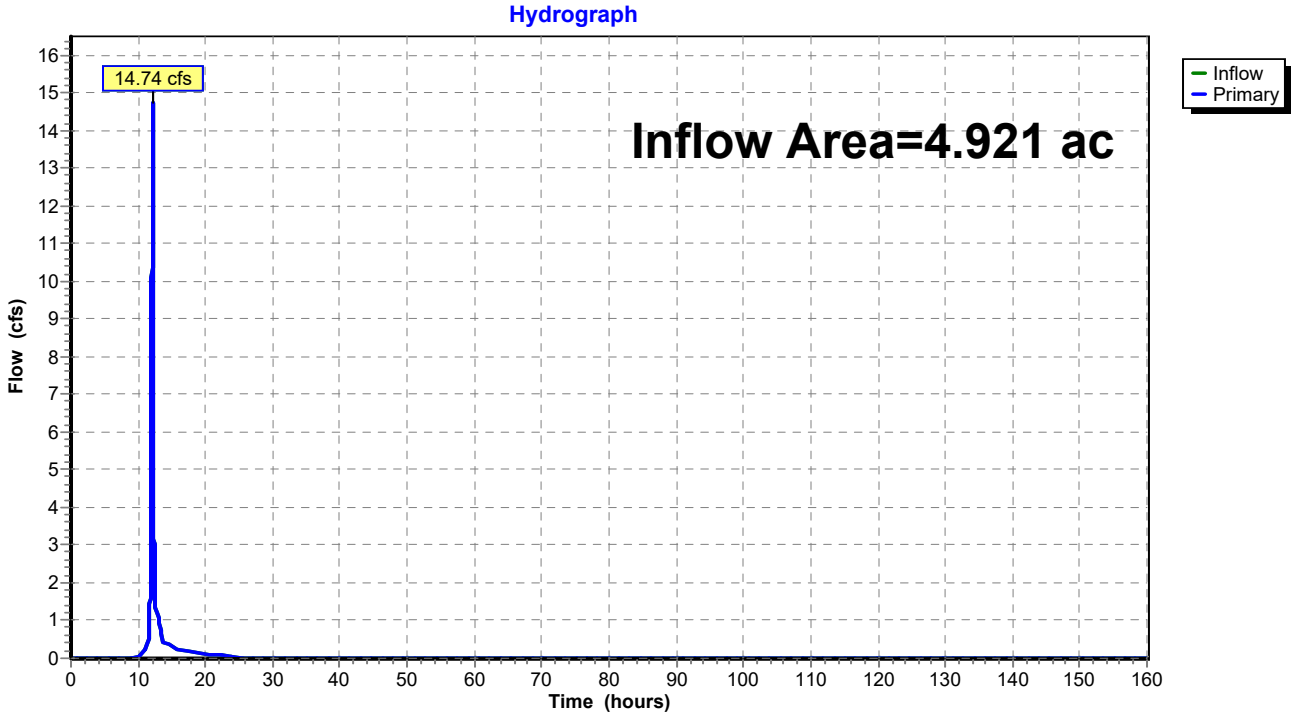


Summary for Link E-South: Existing South

Inflow Area = 4.921 ac, 0.00% Impervious, Inflow Depth = 1.43" for 2-yr event
Inflow = 14.74 cfs @ 12.11 hrs, Volume= 0.586 af
Primary = 14.74 cfs @ 12.11 hrs, Volume= 0.586 af, Atten= 0%, Lag= 0.1 min

Primary outflow = Inflow, Time Span= 0.00-160.00 hrs, dt= 0.001 hrs

Link E-South: Existing South

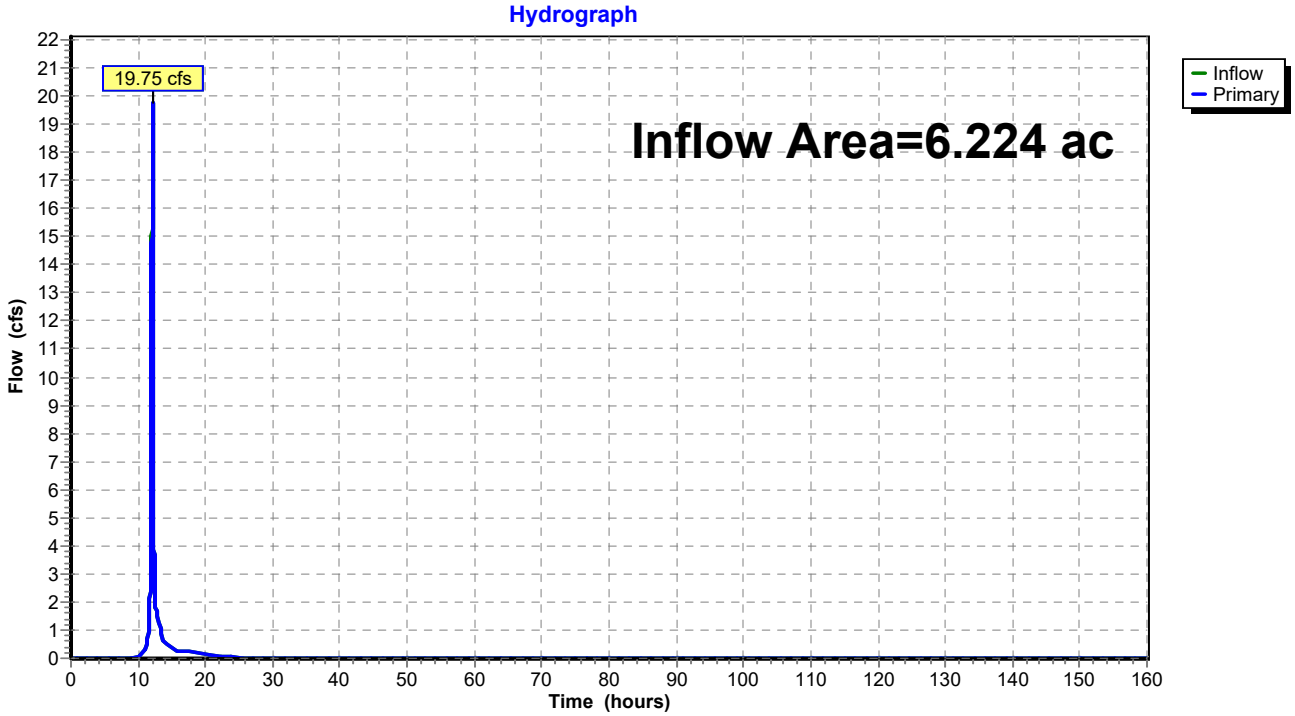


Summary for Link E-West: Existing West

Inflow Area = 6.224 ac, 0.00% Impervious, Inflow Depth = 1.50" for 2-yr event
Inflow = 19.75 cfs @ 12.11 hrs, Volume= 0.778 af
Primary = 19.75 cfs @ 12.11 hrs, Volume= 0.778 af, Atten= 0%, Lag= 0.1 min

Primary outflow = Inflow, Time Span= 0.00-160.00 hrs, dt= 0.001 hrs

Link E-West: Existing West



Time span=0.00-160.00 hrs, dt=0.001 hrs, 160001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Sim-Route method - Pond routing by Sim-Route method

Subcatchment AS: West Catchment Runoff Area=271,108 sf 0.00% Impervious Runoff Depth=2.72"
Flow Length=200' Slope=0.0700 '/' Tc=2.7 min CN=86 Runoff=34.59 cfs 1.410 af

Subcatchment BS: Central Catchment Runoff Area=1,266,338 sf 0.00% Impervious Runoff Depth=2.54"
Flow Length=850' Slope=0.0310 '/' Tc=13.9 min CN=84 Runoff=98.97 cfs 6.152 af

Subcatchment CS: South Catchment Runoff Area=214,369 sf 0.00% Impervious Runoff Depth=2.63"
Flow Length=220' Slope=0.0640 '/' Tc=3.2 min CN=85 Runoff=26.28 cfs 1.078 af

Link E-Creek: Existing Creek Inflow=98.97 cfs 6.152 af
Primary=98.97 cfs 6.152 af

Link E-South: Existing South Inflow=26.28 cfs 1.078 af
Primary=26.28 cfs 1.078 af

Link E-West: Existing West Inflow=34.59 cfs 1.410 af
Primary=34.59 cfs 1.410 af

Total Runoff Area = 40.216 ac Runoff Volume = 8.640 af Average Runoff Depth = 2.58"
100.00% Pervious = 40.216 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment AS: West Catchment

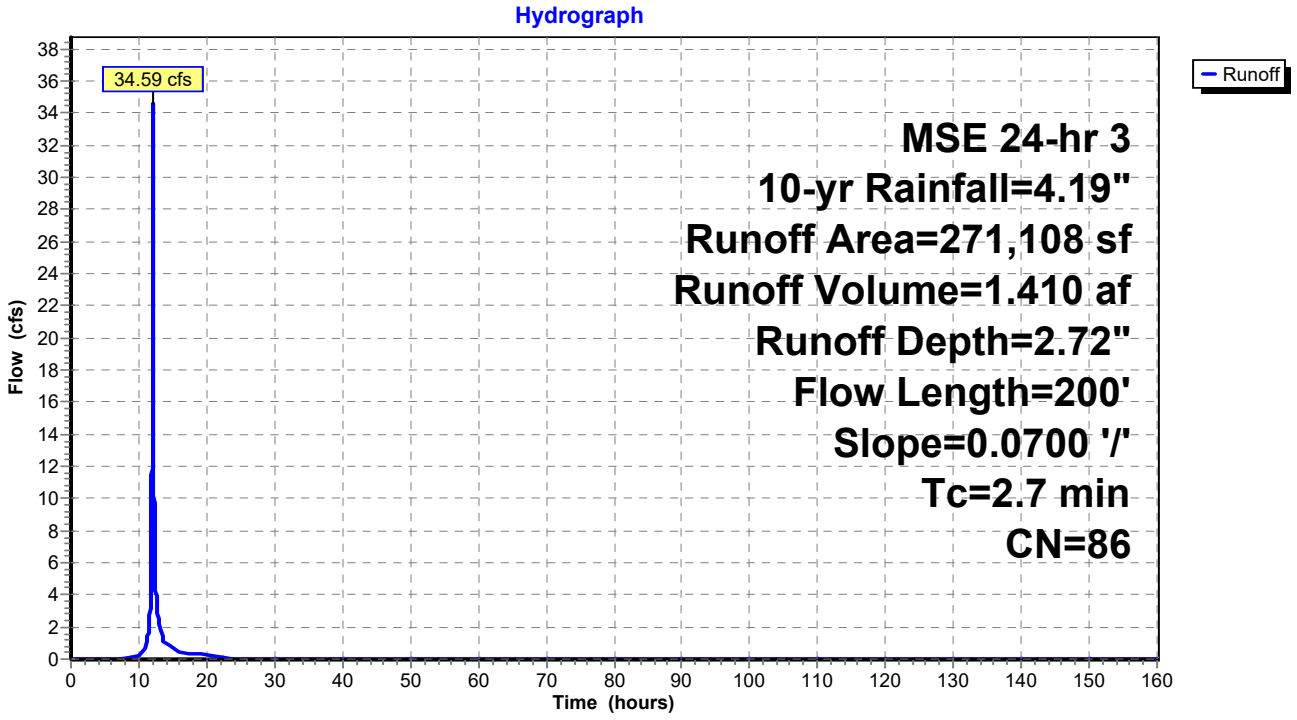
Runoff = 34.59 cfs @ 12.11 hrs, Volume= 1.410 af, Depth= 2.72"
Routed to Link E-West : Existing West

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-160.00 hrs, dt= 0.001 hrs
MSE 24-hr 3 10-yr Rainfall=4.19"

Area (sf)	CN	Description
188,355	89	Row crops, straight row, Good, HSG D
82,753	79	Woods, Fair, HSG D
271,108	86	Weighted Average
271,108		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.7	200	0.0700	1.23		**Lag/CN Method,**

Subcatchment AS: West Catchment



Summary for Subcatchment BS: Central Catchment

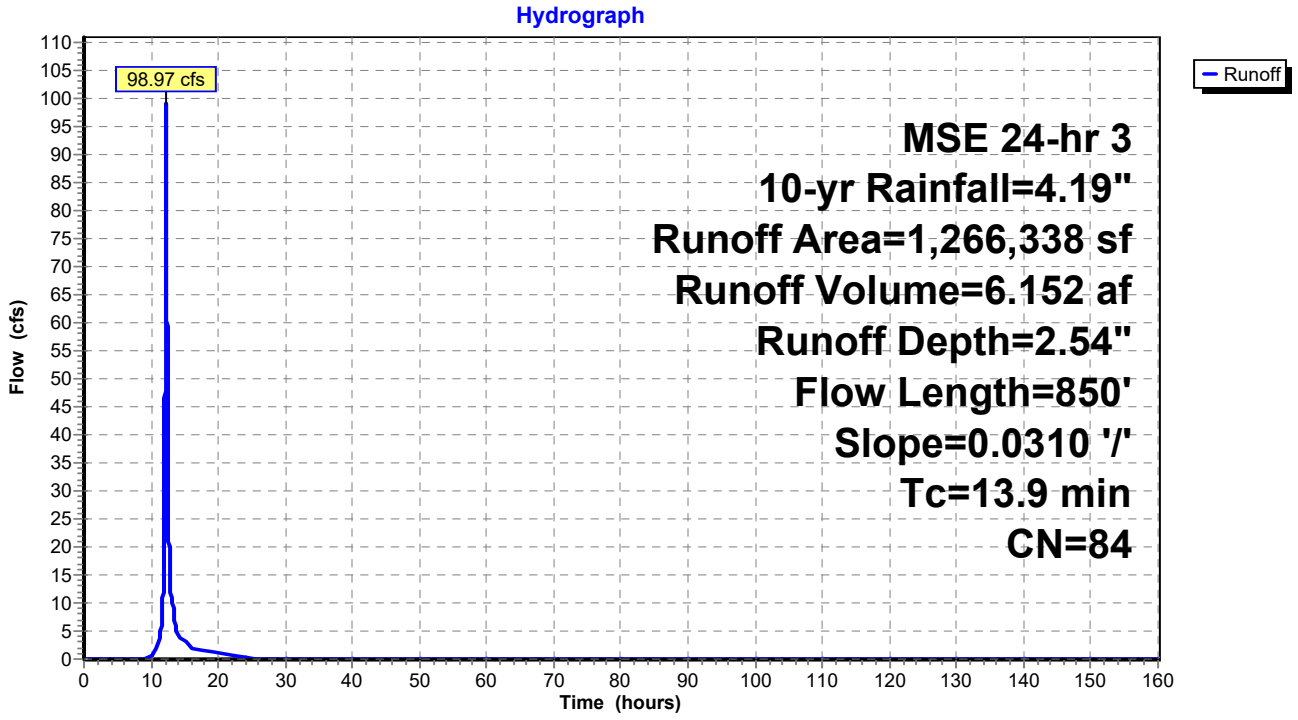
Runoff = 98.97 cfs @ 12.22 hrs, Volume= 6.152 af, Depth= 2.54"
Routed to Link E-Creek : Existing Creek

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-160.00 hrs, dt= 0.001 hrs
MSE 24-hr 3 10-yr Rainfall=4.19"

Area (sf)	CN	Description
664,670	89	Row crops, straight row, Good, HSG D
601,668	79	Woods, Fair, HSG D
1,266,338	84	Weighted Average
1,266,338		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.9	850	0.0310	1.02		**Lag/CN Method,**

Subcatchment BS: Central Catchment



Summary for Subcatchment CS: South Catchment

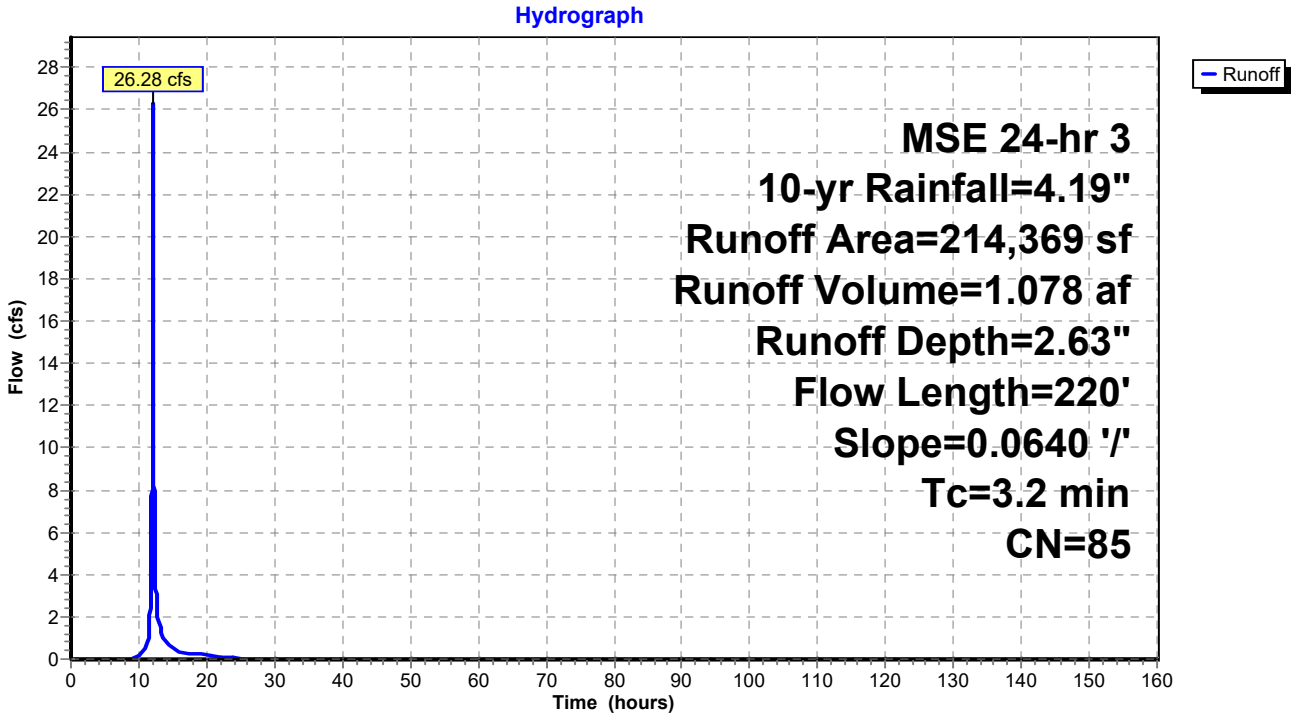
Runoff = 26.28 cfs @ 12.11 hrs, Volume= 1.078 af, Depth= 2.63"
Routed to Link E-South : Existing South

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-160.00 hrs, dt= 0.001 hrs
MSE 24-hr 3 10-yr Rainfall=4.19"

Area (sf)	CN	Description
131,049	89	Row crops, straight row, Good, HSG D
83,320	79	Woods, Fair, HSG D
214,369	85	Weighted Average
214,369		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.2	220	0.0640	1.16		**Lag/CN Method,**

Subcatchment CS: South Catchment

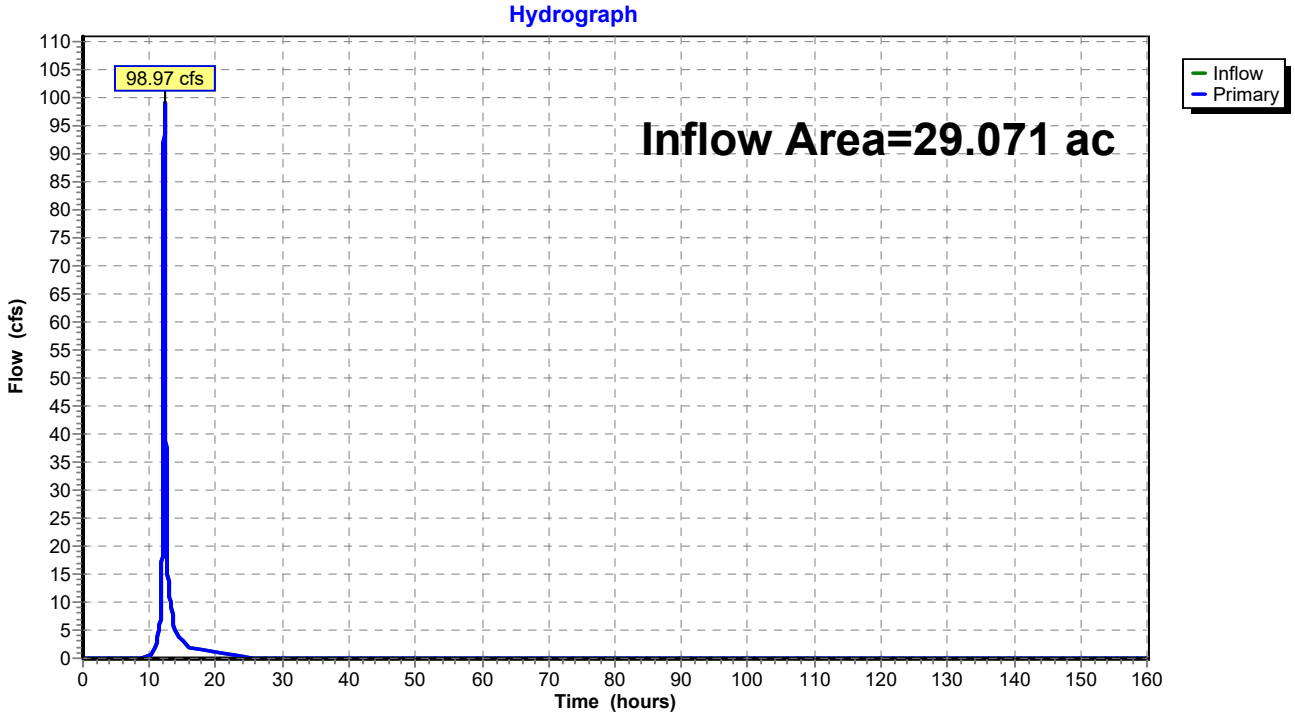


Summary for Link E-Creek: Existing Creek

Inflow Area = 29.071 ac, 0.00% Impervious, Inflow Depth = 2.54" for 10-yr event
Inflow = 98.97 cfs @ 12.22 hrs, Volume= 6.152 af
Primary = 98.97 cfs @ 12.22 hrs, Volume= 6.152 af, Atten= 0%, Lag= 0.1 min

Primary outflow = Inflow, Time Span= 0.00-160.00 hrs, dt= 0.001 hrs

Link E-Creek: Existing Creek

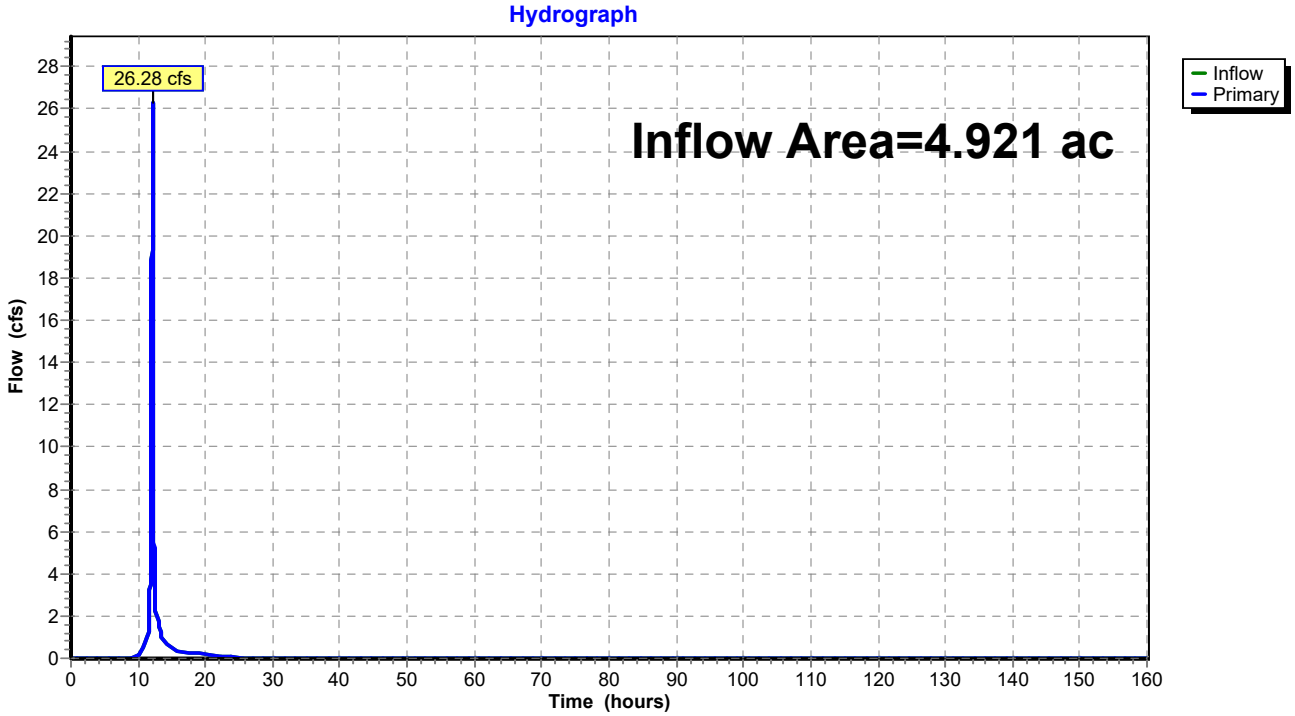


Summary for Link E-South: Existing South

Inflow Area = 4.921 ac, 0.00% Impervious, Inflow Depth = 2.63" for 10-yr event
Inflow = 26.28 cfs @ 12.11 hrs, Volume= 1.078 af
Primary = 26.28 cfs @ 12.11 hrs, Volume= 1.078 af, Atten= 0%, Lag= 0.1 min

Primary outflow = Inflow, Time Span= 0.00-160.00 hrs, dt= 0.001 hrs

Link E-South: Existing South

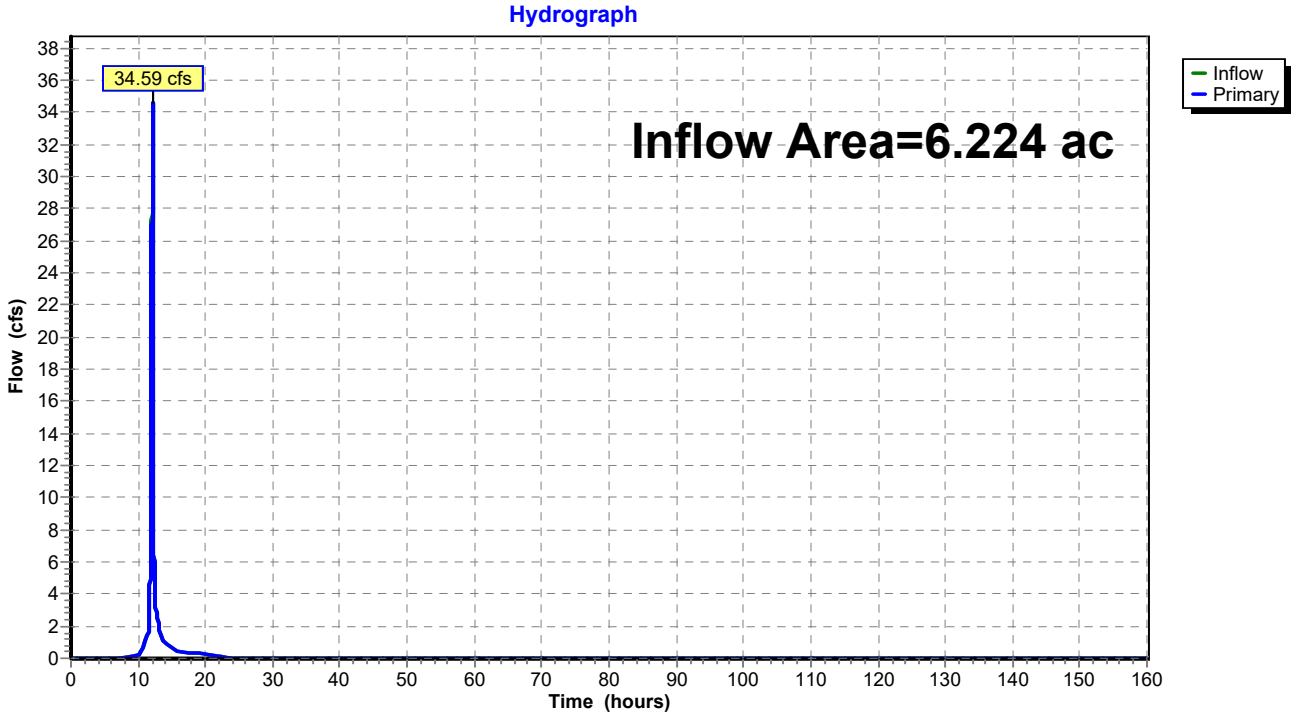


Summary for Link E-West: Existing West

Inflow Area = 6.224 ac, 0.00% Impervious, Inflow Depth = 2.72" for 10-yr event
Inflow = 34.59 cfs @ 12.11 hrs, Volume= 1.410 af
Primary = 34.59 cfs @ 12.11 hrs, Volume= 1.410 af, Atten= 0%, Lag= 0.1 min

Primary outflow = Inflow, Time Span= 0.00-160.00 hrs, dt= 0.001 hrs

Link E-West: Existing West



Time span=0.00-160.00 hrs, dt=0.001 hrs, 160001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Sim-Route method - Pond routing by Sim-Route method

Subcatchment AS: West Catchment Runoff Area=271,108 sf 0.00% Impervious Runoff Depth=5.82"
Flow Length=200' Slope=0.0700 '/' Tc=2.7 min CN=86 Runoff=70.08 cfs 3.018 af

Subcatchment BS: Central Catchment Runoff Area=1,266,338 sf 0.00% Impervious Runoff Depth=5.59"
Flow Length=850' Slope=0.0310 '/' Tc=13.9 min CN=84 Runoff=211.64 cfs 13.537 af

Subcatchment CS: South Catchment Runoff Area=214,369 sf 0.00% Impervious Runoff Depth=5.70"
Flow Length=220' Slope=0.0640 '/' Tc=3.2 min CN=85 Runoff=54.14 cfs 2.339 af

Link E-Creek: Existing Creek Inflow=211.64 cfs 13.537 af
Primary=211.64 cfs 13.537 af

Link E-South: Existing South Inflow=54.14 cfs 2.339 af
Primary=54.14 cfs 2.339 af

Link E-West: Existing West Inflow=70.08 cfs 3.018 af
Primary=70.08 cfs 3.018 af

Total Runoff Area = 40.216 ac Runoff Volume = 18.893 af Average Runoff Depth = 5.64"
100.00% Pervious = 40.216 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment AS: West Catchment

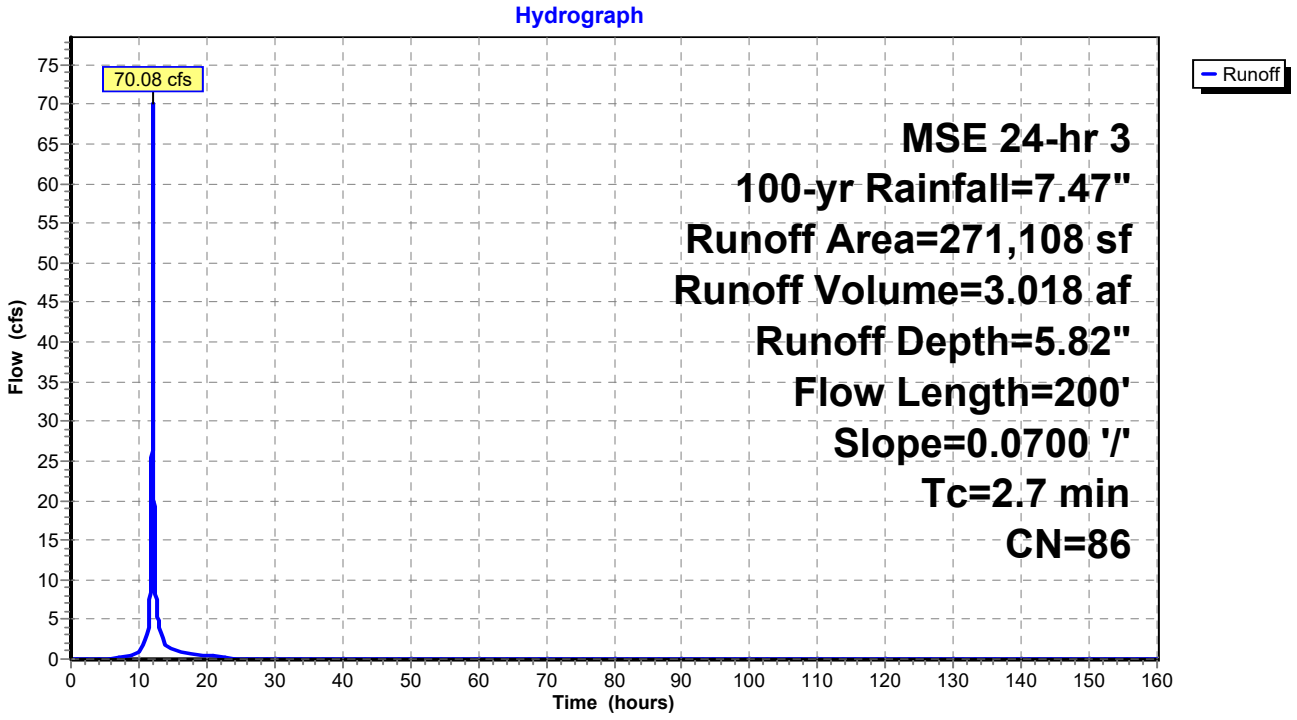
Runoff = 70.08 cfs @ 12.11 hrs, Volume= 3.018 af, Depth= 5.82"
Routed to Link E-West : Existing West

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-160.00 hrs, dt= 0.001 hrs
MSE 24-hr 3 100-yr Rainfall=7.47"

Area (sf)	CN	Description
188,355	89	Row crops, straight row, Good, HSG D
82,753	79	Woods, Fair, HSG D
271,108	86	Weighted Average
271,108		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.7	200	0.0700	1.23		**Lag/CN Method,**

Subcatchment AS: West Catchment



Summary for Subcatchment BS: Central Catchment

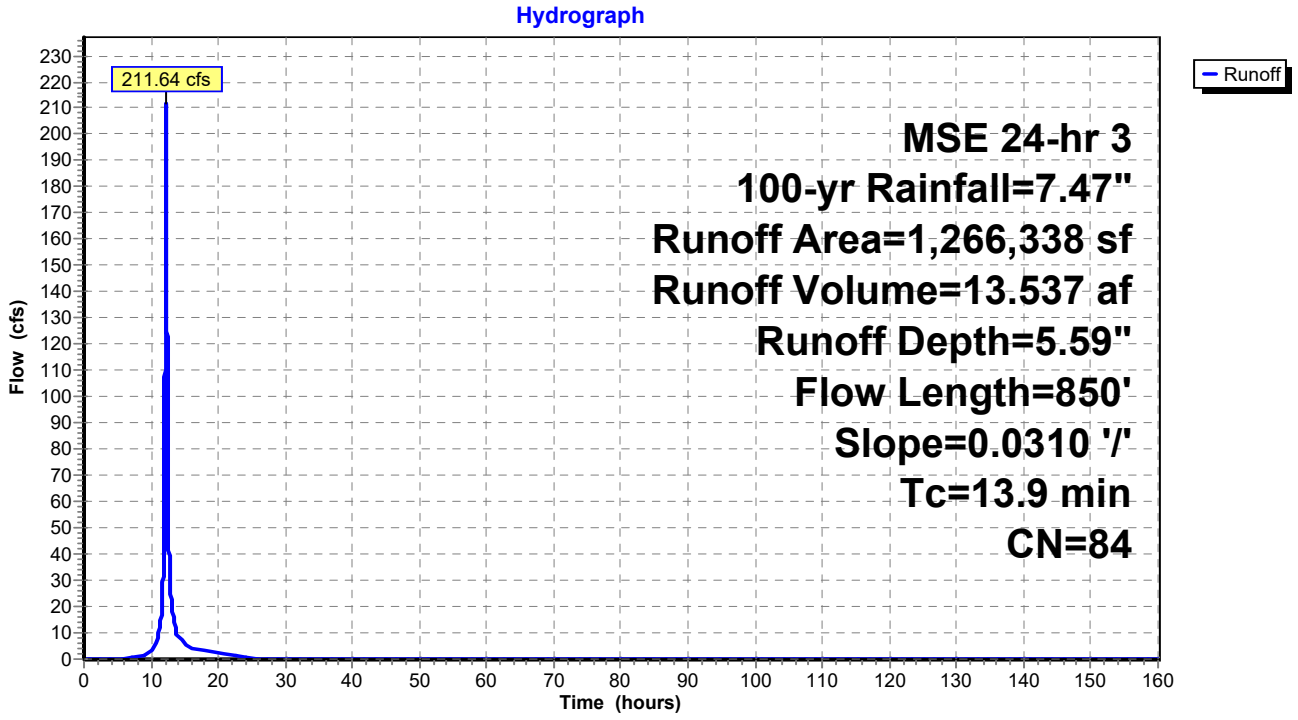
Runoff = 211.64 cfs @ 12.22 hrs, Volume= 13.537 af, Depth= 5.59"
Routed to Link E-Creek : Existing Creek

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-160.00 hrs, dt= 0.001 hrs
MSE 24-hr 3 100-yr Rainfall=7.47"

Area (sf)	CN	Description
664,670	89	Row crops, straight row, Good, HSG D
601,668	79	Woods, Fair, HSG D
1,266,338	84	Weighted Average
1,266,338		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.9	850	0.0310	1.02		**Lag/CN Method,**

Subcatchment BS: Central Catchment



Summary for Subcatchment CS: South Catchment

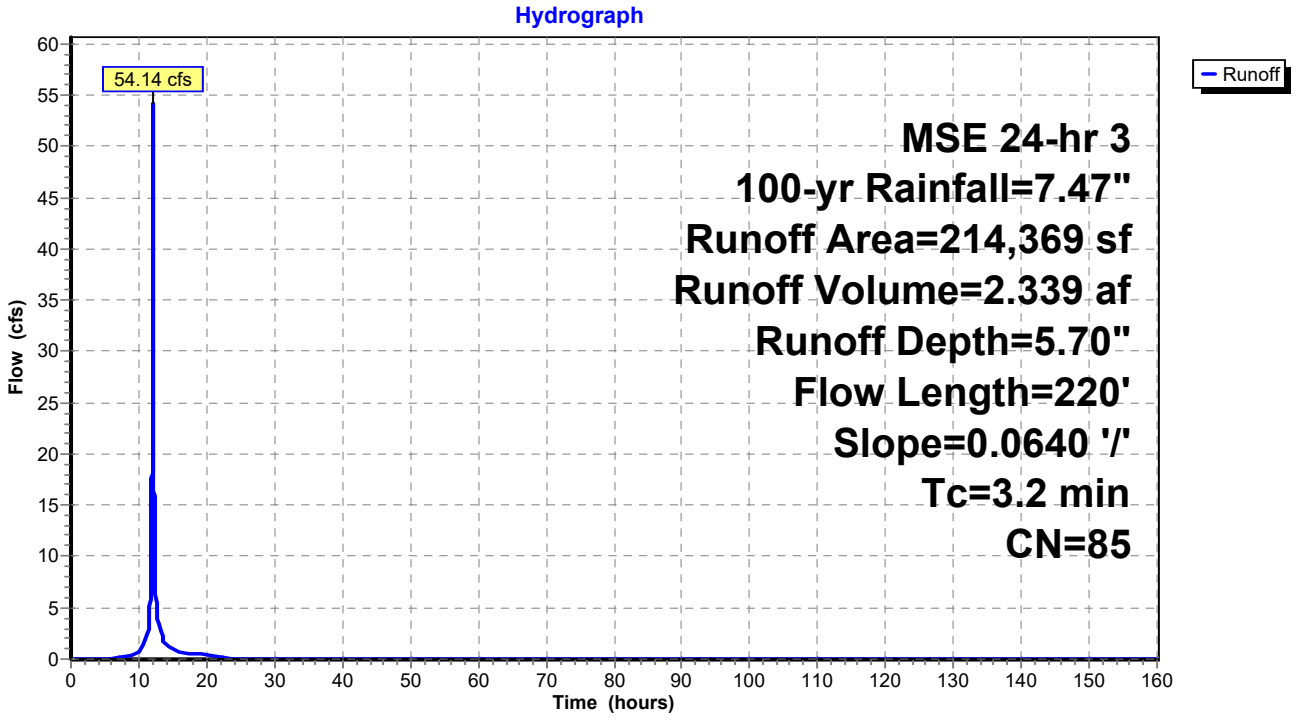
Runoff = 54.14 cfs @ 12.11 hrs, Volume= 2.339 af, Depth= 5.70"
Routed to Link E-South : Existing South

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-160.00 hrs, dt= 0.001 hrs
MSE 24-hr 3 100-yr Rainfall=7.47"

Area (sf)	CN	Description
131,049	89	Row crops, straight row, Good, HSG D
83,320	79	Woods, Fair, HSG D
214,369	85	Weighted Average
214,369		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.2	220	0.0640	1.16		**Lag/CN Method,**

Subcatchment CS: South Catchment

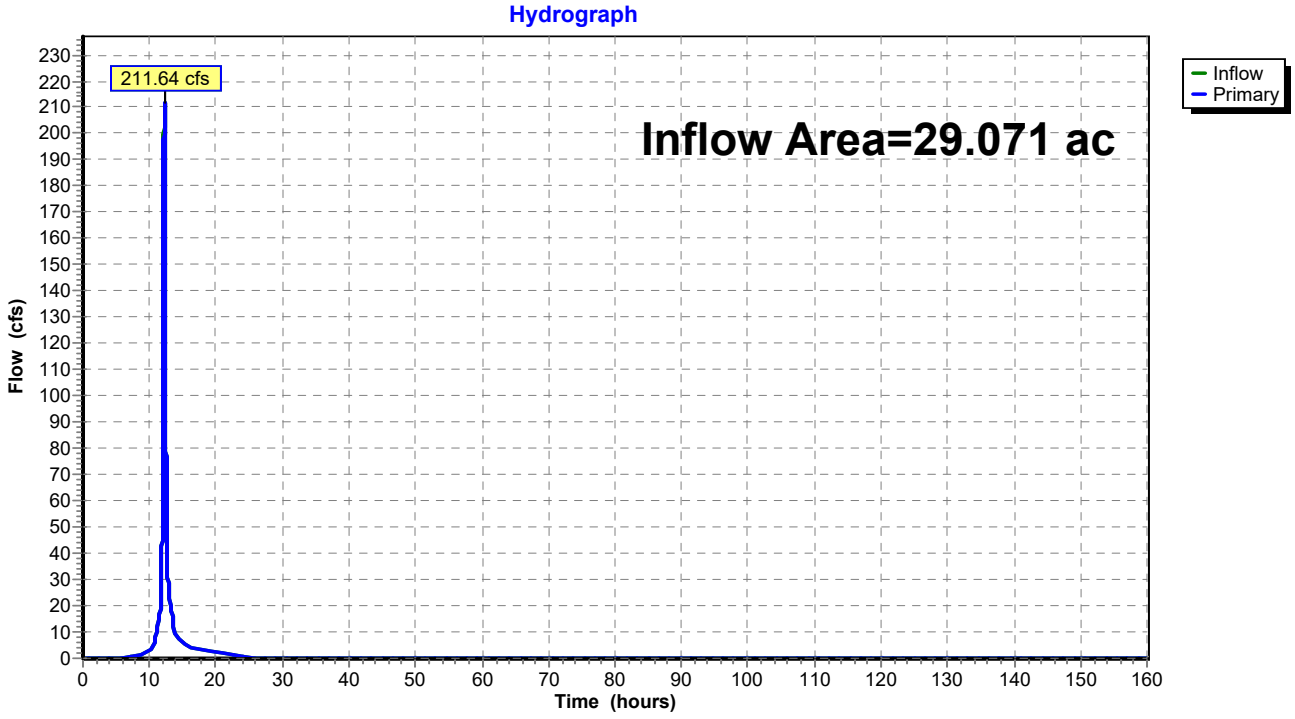


Summary for Link E-Creek: Existing Creek

Inflow Area = 29.071 ac, 0.00% Impervious, Inflow Depth = 5.59" for 100-yr event
Inflow = 211.64 cfs @ 12.22 hrs, Volume= 13.537 af
Primary = 211.64 cfs @ 12.22 hrs, Volume= 13.537 af, Atten= 0%, Lag= 0.1 min

Primary outflow = Inflow, Time Span= 0.00-160.00 hrs, dt= 0.001 hrs

Link E-Creek: Existing Creek

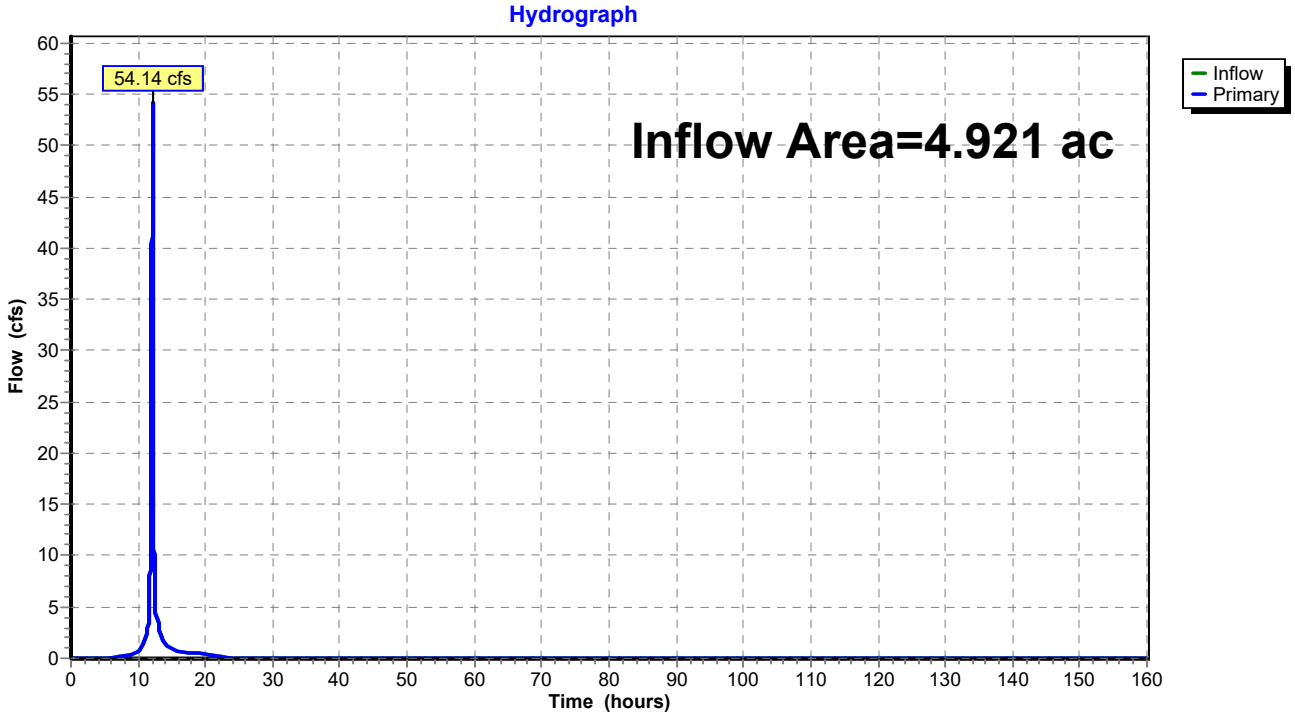


Summary for Link E-South: Existing South

Inflow Area = 4.921 ac, 0.00% Impervious, Inflow Depth = 5.70" for 100-yr event
Inflow = 54.14 cfs @ 12.11 hrs, Volume= 2.339 af
Primary = 54.14 cfs @ 12.11 hrs, Volume= 2.339 af, Atten= 0%, Lag= 0.1 min

Primary outflow = Inflow, Time Span= 0.00-160.00 hrs, dt= 0.001 hrs

Link E-South: Existing South

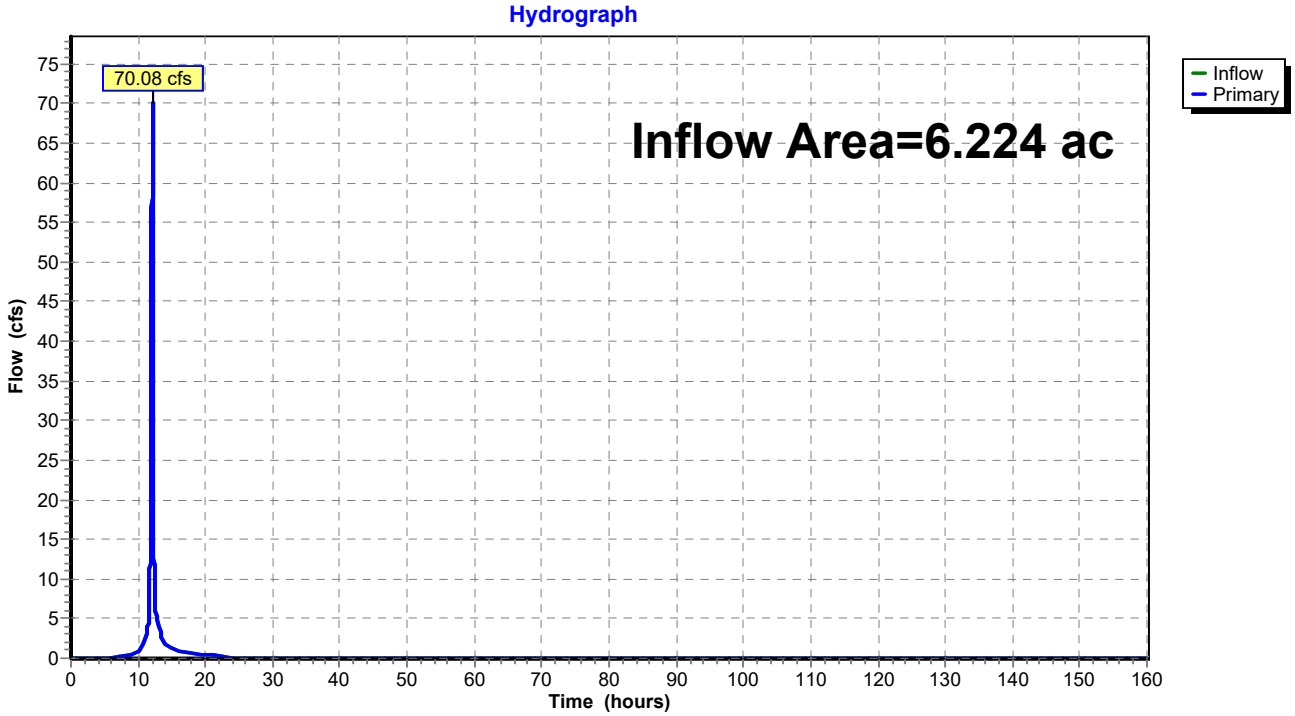


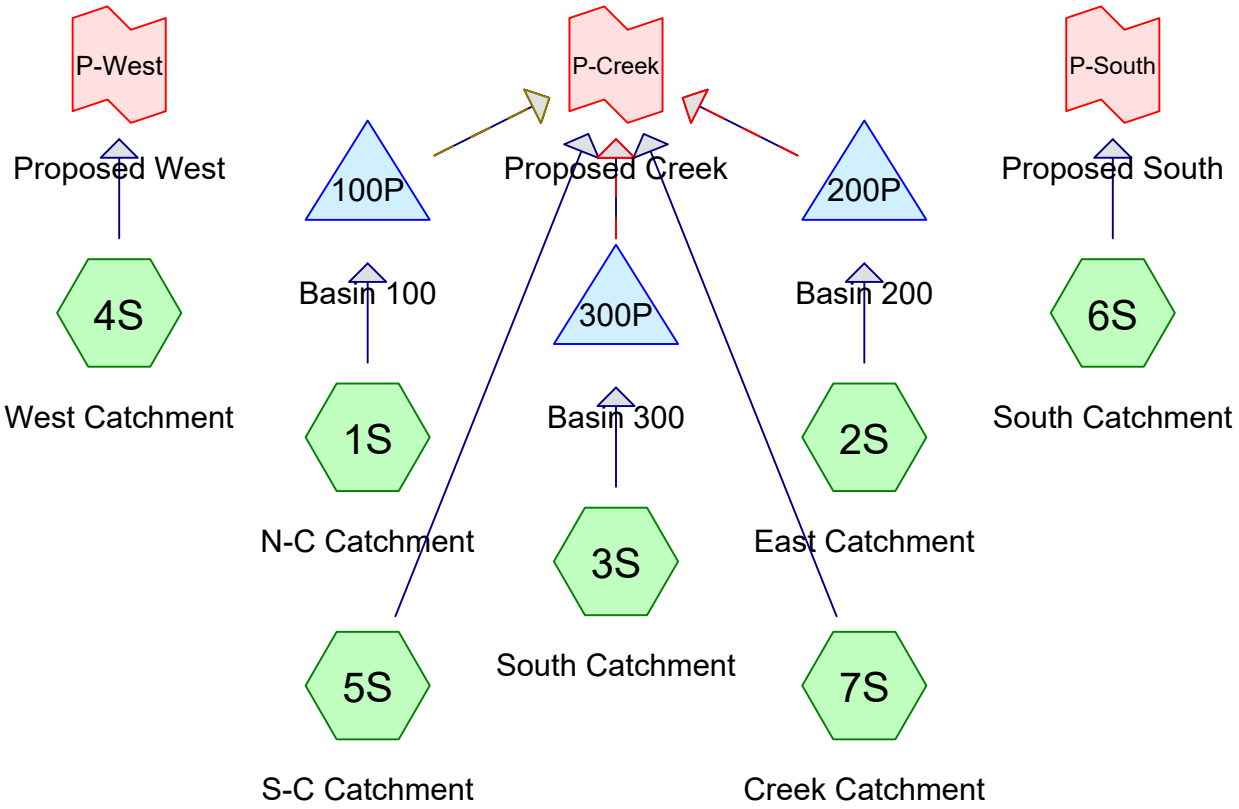
Summary for Link E-West: Existing West

Inflow Area = 6.224 ac, 0.00% Impervious, Inflow Depth = 5.82" for 100-yr event
Inflow = 70.08 cfs @ 12.11 hrs, Volume= 3.018 af
Primary = 70.08 cfs @ 12.11 hrs, Volume= 3.018 af, Atten= 0%, Lag= 0.1 min

Primary outflow = Inflow, Time Span= 0.00-160.00 hrs, dt= 0.001 hrs

Link E-West: Existing West





Subcat Reach Pond Link

Routing Diagram for 00-121186-PROPOSED- 05-26-22
Prepared by {enter your company name here}, Printed 6/21/2022

Rainfall Events Listing

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	2.46	2
2	2-yr	MSE 24-hr	3	Default	24.00	1	2.81	2
3	10-yr	MSE 24-hr	3	Default	24.00	1	4.19	2
4	100-yr	MSE 24-hr	3	Default	24.00	1	7.47	2

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
22.522	80	>75% Grass cover, Good, HSG D (1S, 2S, 3S, 4S, 5S, 6S, 7S)
11.631	98	Paved parking, HSG D (1S, 2S, 3S, 4S, 5S, 6S, 7S)
6.063	79	Woods, Fair, HSG D (4S, 5S, 6S, 7S)
40.216	**85**	**TOTAL AREA**

Soil Listing (selected nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
40.216	HSG D	1S, 2S, 3S, 4S, 5S, 6S, 7S
0.000	Other	
40.216		**TOTAL AREA**

Ground Covers (selected nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	22.522	0.000	22.522	>75% Grass cover, Good	1S, 2S, 3S, 4S, 5S, 6S, 7S
0.000	0.000	0.000	11.631	0.000	11.631	Paved parking	1S, 2S, 3S, 4S, 5S, 6S, 7S
0.000	0.000	0.000	6.063	0.000	6.063	Woods, Fair	4S, 5S, 6S, 7S
0.000	**0.000**	**0.000**	**40.216**	**0.000**	**40.216**	**TOTAL AREA**	

Time span=0.00-160.00 hrs, dt=0.001 hrs, 160001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Sim-Route method - Pond routing by Sim-Route method

Subcatchment 1S: N-C Catchment Runoff Area=718,098 sf 43.62% Impervious Runoff Depth=1.35"
Flow Length=975' Slope=0.0240 '/' Tc=15.3 min CN=88 Runoff=28.61 cfs 1.851 af

Subcatchment 2S: East Catchment Runoff Area=202,210 sf 41.66% Impervious Runoff Depth=1.28"
Flow Length=670' Slope=0.0310 '/' Tc=10.3 min CN=87 Runoff=9.12 cfs 0.494 af

Subcatchment 3S: South Catchment Runoff Area=82,515 sf 48.85% Impervious Runoff Depth=1.42"
Flow Length=442' Slope=0.0180 '/' Tc=9.0 min CN=89 Runoff=4.39 cfs 0.224 af

Subcatchment 4S: West Catchment Runoff Area=156,360 sf 18.01% Impervious Runoff Depth=1.03"
Flow Length=200' Slope=0.0650 '/' Tc=3.1 min CN=83 Runoff=7.85 cfs 0.307 af

Subcatchment 5S: S-C Catchment Runoff Area=75,496 sf 9.11% Impervious Runoff Depth=0.91"
Flow Length=150' Slope=0.0930 '/' Tc=2.2 min CN=81 Runoff=3.51 cfs 0.132 af

Subcatchment 6S: South Catchment Runoff Area=193,325 sf 7.41% Impervious Runoff Depth=0.91"
Flow Length=220' Slope=0.0640 '/' Tc=3.6 min CN=81 Runoff=8.49 cfs 0.338 af

Subcatchment 7S: Creek Catchment Runoff Area=323,811 sf 6.02% Impervious Runoff Depth=0.86"
Flow Length=850' Slope=0.0260 '/' Tc=17.3 min CN=80 Runoff=7.50 cfs 0.534 af

Pond 100P: Basin 100 Peak Elev=962.40' Storage=3.557 af Inflow=28.61 cfs 1.851 af
Primary=7.35 cfs 1.681 af Secondary=3.33 cfs 0.165 af Tertiary=0.00 cfs 0.000 af Outflow=10.68 cfs 1.846 af

Pond 200P: Basin 200 Peak Elev=962.52' Storage=1.939 af Inflow=9.12 cfs 0.494 af
Primary=1.24 cfs 0.490 af Secondary=0.00 cfs 0.000 af Outflow=1.24 cfs 0.490 af

Pond 300P: Basin 300 Peak Elev=966.57' Storage=0.413 af Inflow=4.39 cfs 0.224 af
Primary=1.27 cfs 0.224 af Secondary=0.00 cfs 0.000 af Outflow=1.27 cfs 0.224 af

Link P-Creek: Proposed Creek Inflow=17.76 cfs 3.225 af
Primary=17.76 cfs 3.225 af

Link P-South: Proposed South Inflow=8.49 cfs 0.338 af
Primary=8.49 cfs 0.338 af

Link P-West: Proposed West Inflow=7.85 cfs 0.307 af
Primary=7.85 cfs 0.307 af

Total Runoff Area = 40.216 ac Runoff Volume = 3.880 af Average Runoff Depth = 1.16"
71.08% Pervious = 28.585 ac 28.92% Impervious = 11.631 ac

Summary for Subcatchment 1S: N-C Catchment

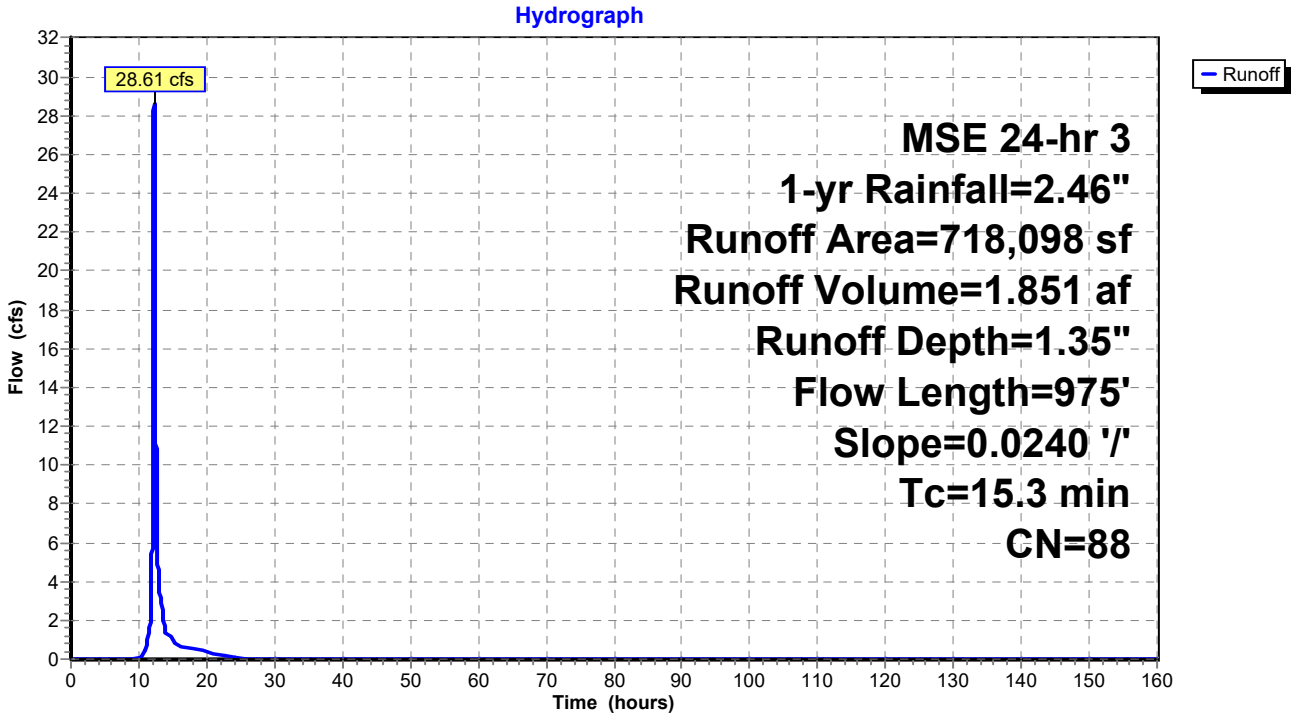
Runoff = 28.61 cfs @ 12.24 hrs, Volume= 1.851 af, Depth= 1.35"
Routed to Pond 100P : Basin 100

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-160.00 hrs, dt= 0.001 hrs
MSE 24-hr 3 1-yr Rainfall=2.46"

Area (sf)	CN	Description
404,877	80	>75% Grass cover, Good, HSG D
313,221	98	Paved parking, HSG D
0	79	Woods, Fair, HSG D
718,098	88	Weighted Average
404,877		56.38% Pervious Area
313,221		43.62% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.3	975	0.0240	1.06		**Lag/CN Method,**

Subcatchment 1S: N-C Catchment



Summary for Subcatchment 2S: East Catchment

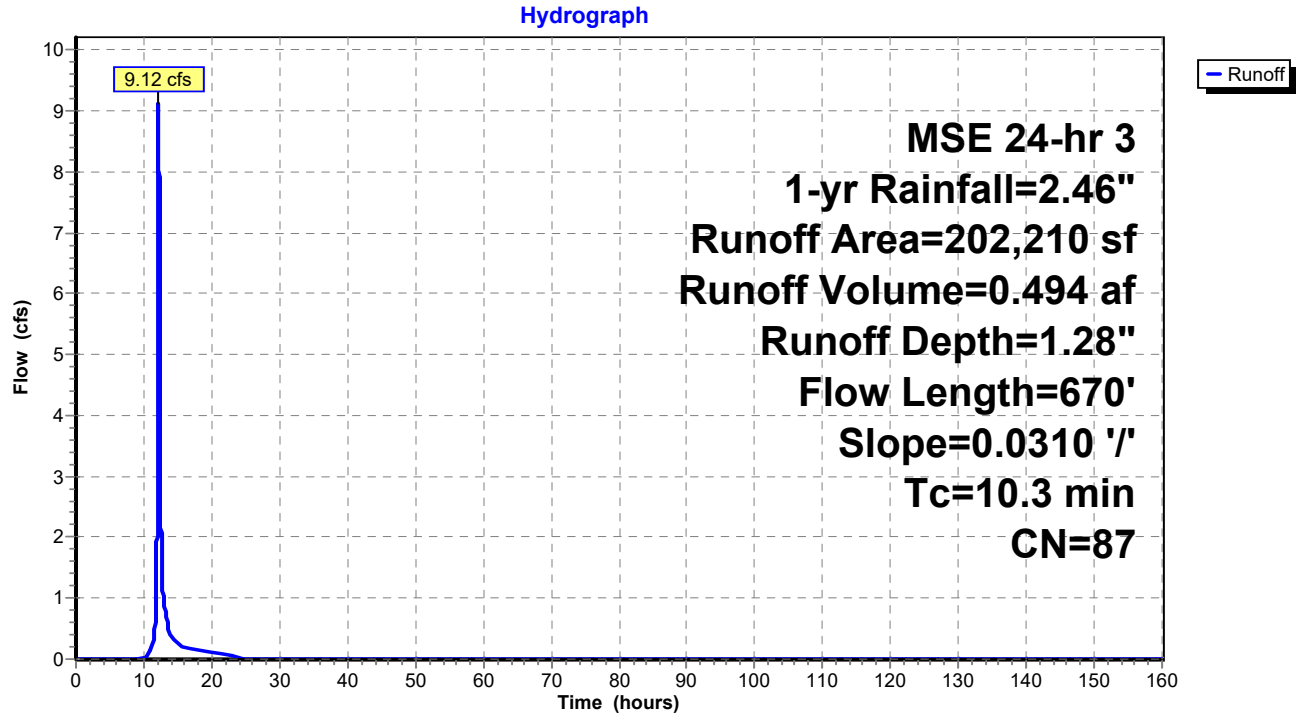
Runoff = 9.12 cfs @ 12.18 hrs, Volume= 0.494 af, Depth= 1.28"
Routed to Pond 200P : Basin 200

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-160.00 hrs, dt= 0.001 hrs
MSE 24-hr 3 1-yr Rainfall=2.46"

Area (sf)	CN	Description
117,965	80	>75% Grass cover, Good, HSG D
84,245	98	Paved parking, HSG D
0	79	Woods, Fair, HSG D
202,210	87	Weighted Average
117,965		58.34% Pervious Area
84,245		41.66% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.3	670	0.0310	1.08		**Lag/CN Method,**

Subcatchment 2S: East Catchment



Summary for Subcatchment 3S: South Catchment

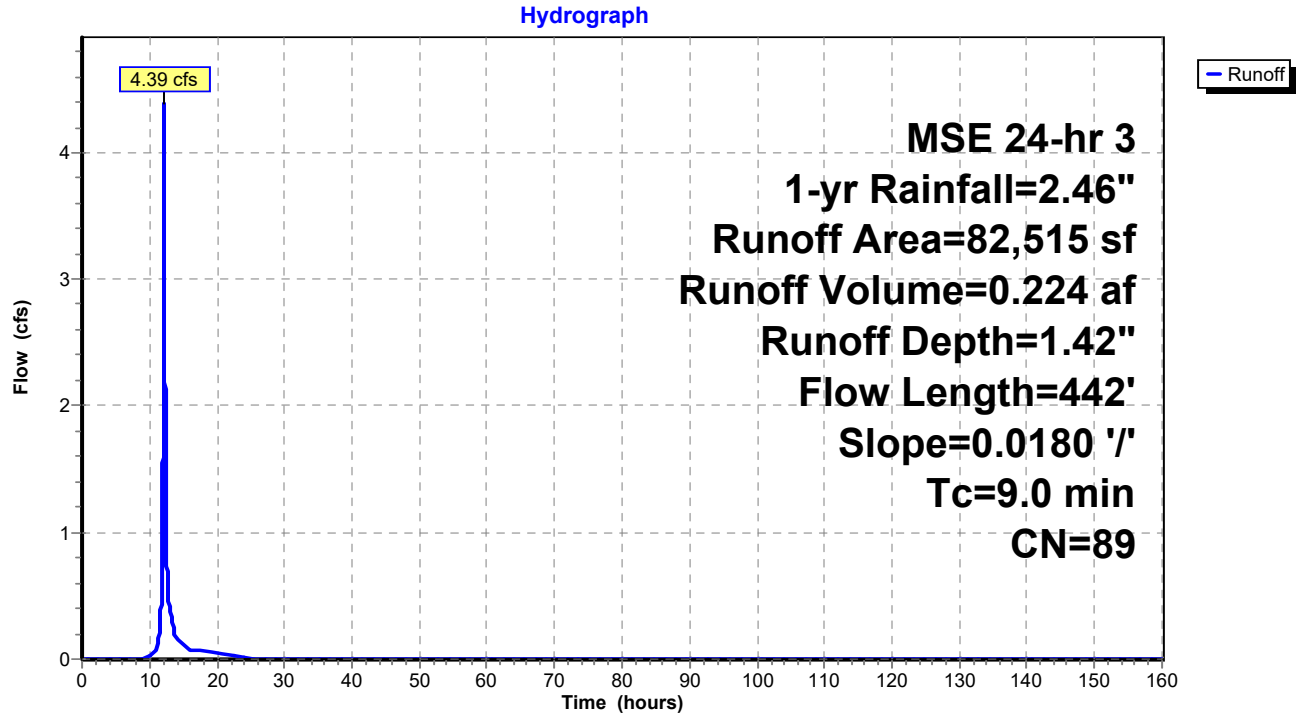
Runoff = 4.39 cfs @ 12.17 hrs, Volume= 0.224 af, Depth= 1.42"
Routed to Pond 300P : Basin 300

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-160.00 hrs, dt= 0.001 hrs
MSE 24-hr 3 1-yr Rainfall=2.46"

Area (sf)	CN	Description
42,205	80	>75% Grass cover, Good, HSG D
40,310	98	Paved parking, HSG D
0	79	Woods, Fair, HSG D
82,515	89	Weighted Average
42,205		51.15% Pervious Area
40,310		48.85% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.0	442	0.0180	0.82		**Lag/CN Method,**

Subcatchment 3S: South Catchment



Summary for Subcatchment 4S: West Catchment

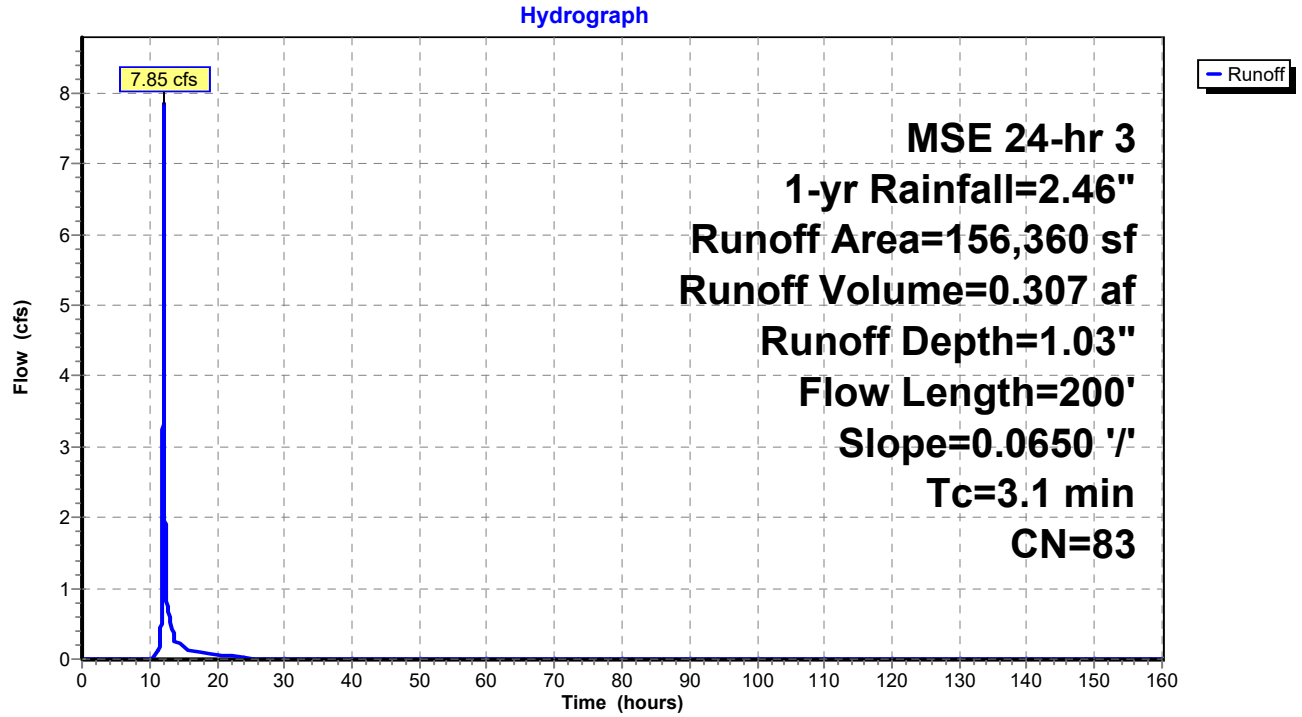
Runoff = 7.85 cfs @ 12.11 hrs, Volume= 0.307 af, Depth= 1.03"
Routed to Link P-West : Proposed West

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-160.00 hrs, dt= 0.001 hrs
MSE 24-hr 3 1-yr Rainfall=2.46"

Area (sf)	CN	Description
109,417	80	>75% Grass cover, Good, HSG D
28,163	98	Paved parking, HSG D
18,780	79	Woods, Fair, HSG D
156,360	83	Weighted Average
128,197		81.99% Pervious Area
28,163		18.01% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.1	200	0.0650	1.07		**Lag/CN Method,**

Subcatchment 4S: West Catchment



Summary for Subcatchment 5S: S-C Catchment

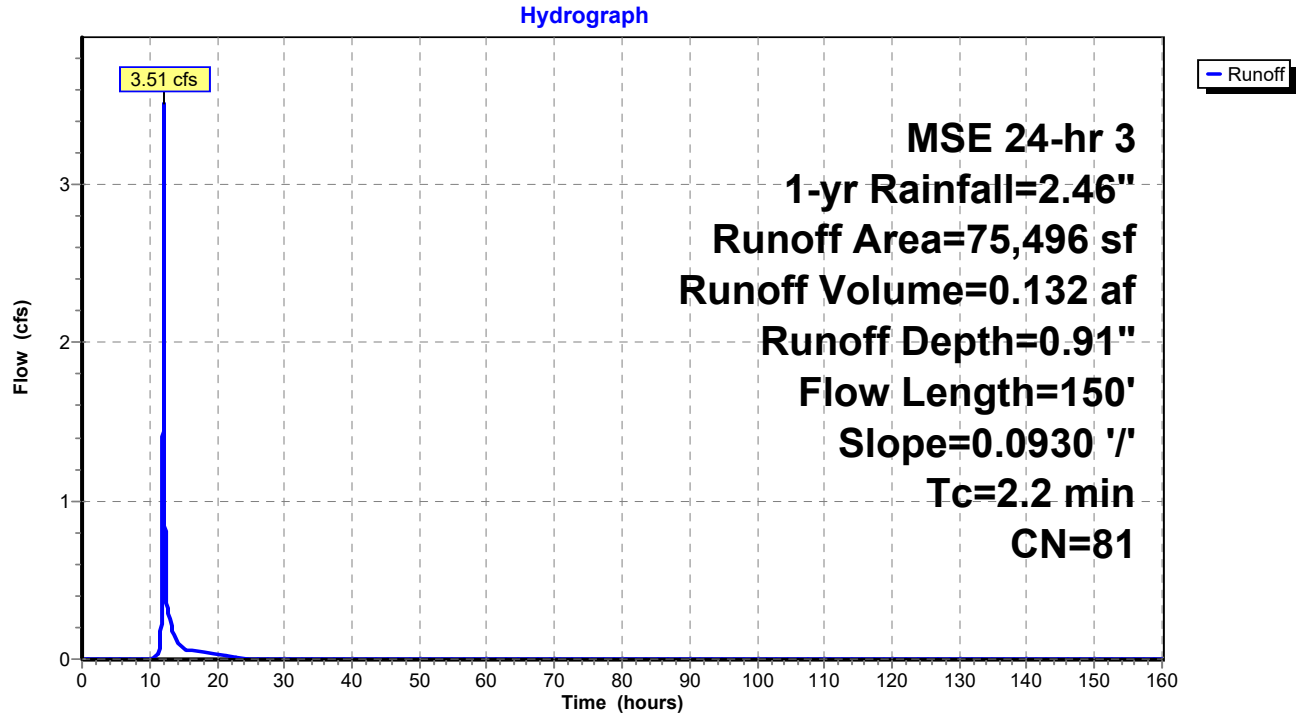
Runoff = 3.51 cfs @ 12.11 hrs, Volume= 0.132 af, Depth= 0.91"
Routed to Link P-Creek : Proposed Creek

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-160.00 hrs, dt= 0.001 hrs
MSE 24-hr 3 1-yr Rainfall=2.46"

Area (sf)	CN	Description
37,344	80	>75% Grass cover, Good, HSG D
6,876	98	Paved parking, HSG D
31,276	79	Woods, Fair, HSG D
75,496	81	Weighted Average
68,620		90.89% Pervious Area
6,876		9.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.2	150	0.0930	1.13		**Lag/CN Method,**

Subcatchment 5S: S-C Catchment



Summary for Subcatchment 6S: South Catchment

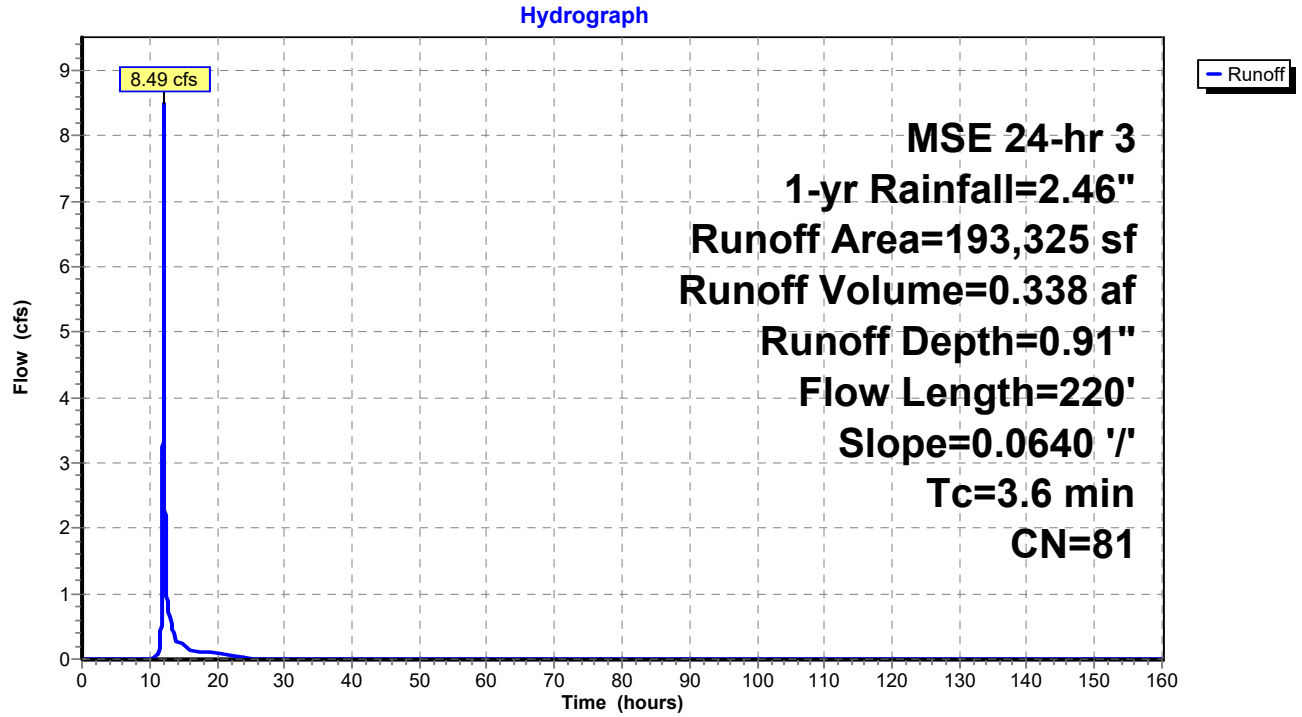
Runoff = 8.49 cfs @ 12.12 hrs, Volume= 0.338 af, Depth= 0.91"
Routed to Link P-South : Proposed South

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-160.00 hrs, dt= 0.001 hrs
MSE 24-hr 3 1-yr Rainfall=2.46"

Area (sf)	CN	Description
154,331	80	>75% Grass cover, Good, HSG D
14,333	98	Paved parking, HSG D
24,661	79	Woods, Fair, HSG D
193,325	81	Weighted Average
178,992		92.59% Pervious Area
14,333		7.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.6	220	0.0640	1.01		**Lag/CN Method,**

Subcatchment 6S: South Catchment



Summary for Subcatchment 7S: Creek Catchment

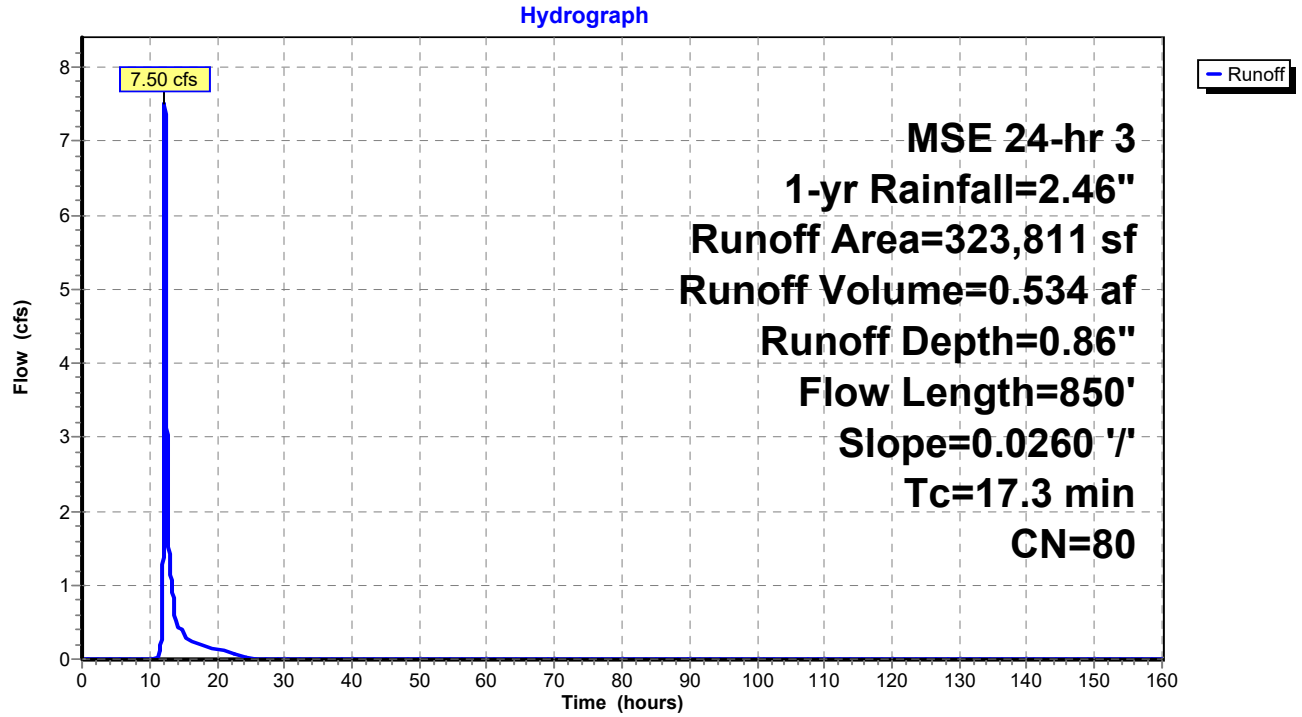
Runoff = 7.50 cfs @ 12.28 hrs, Volume= 0.534 af, Depth= 0.86"
Routed to Link P-Creek : Proposed Creek

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-160.00 hrs, dt= 0.001 hrs
MSE 24-hr 3 1-yr Rainfall=2.46"

Area (sf)	CN	Description
114,917	80	>75% Grass cover, Good, HSG D
19,500	98	Paved parking, HSG D
189,394	79	Woods, Fair, HSG D
323,811	80	Weighted Average
304,311		93.98% Pervious Area
19,500		6.02% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.3	850	0.0260	0.82		**Lag/CN Method,**

Subcatchment 7S: Creek Catchment



Summary for Pond 100P: Basin 100

Inflow Area = 16.485 ac, 43.62% Impervious, Inflow Depth = 1.35" for 1-yr event
Inflow = 28.61 cfs @ 12.24 hrs, Volume= 1.851 af
Outflow = 10.68 cfs @ 12.53 hrs, Volume= 1.846 af, Atten= 63%, Lag= 17.5 min
Primary = 7.35 cfs @ 12.53 hrs, Volume= 1.681 af
Routed to Link P-Creek : Proposed Creek
Secondary = 3.33 cfs @ 12.53 hrs, Volume= 0.165 af
Routed to Link P-Creek : Proposed Creek
Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Link P-Creek : Proposed Creek

Routing by Sim-Route method, Time Span= 0.00-160.00 hrs, dt= 0.001 hrs
Starting Elev= 961.00' Surf.Area= 0.545 ac Storage= 2.752 af
Peak Elev= 962.40' @ 12.53 hrs Surf.Area= 0.609 ac Storage= 3.557 af (0.805 af above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= 178.9 min (990.2 - 811.3)

Volume	Invert	Avail.Storage	Storage Description
#1	951.00'	7.655 af	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
951.00	0.119	0.000	0.000
952.00	0.145	0.132	0.132
954.00	0.201	0.347	0.479
956.00	0.263	0.465	0.944
958.00	0.332	0.595	1.539
960.00	0.406	0.738	2.277
961.00	0.545	0.476	2.752
962.00	0.590	0.568	3.320
964.00	0.685	1.275	4.595
965.00	0.735	0.710	5.305
966.00	0.786	0.760	6.065
968.00	0.803	1.589	7.655

Device	Routing	Invert	Outlet Devices
#1	Primary	961.00'	**30.0" Round RCP_Round 30"** L= 50.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 961.00' / 960.50' S= 0.0100 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 4.91 sf
#2	Device 1	961.00'	**Custom Weir/Orifice, Cv= 2.62 (C= 3.28)** Head (feet) 0.00 1.05 1.05 8.00 Width (feet) 0.85 0.85 5.00 5.00
#3	Device 2	957.50'	**30.0" Round RCP_Round 30"** L= 25.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 957.50' / 957.50' S= 0.0000 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 4.91 sf
#4	Tertiary	966.00'	**15.0' 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

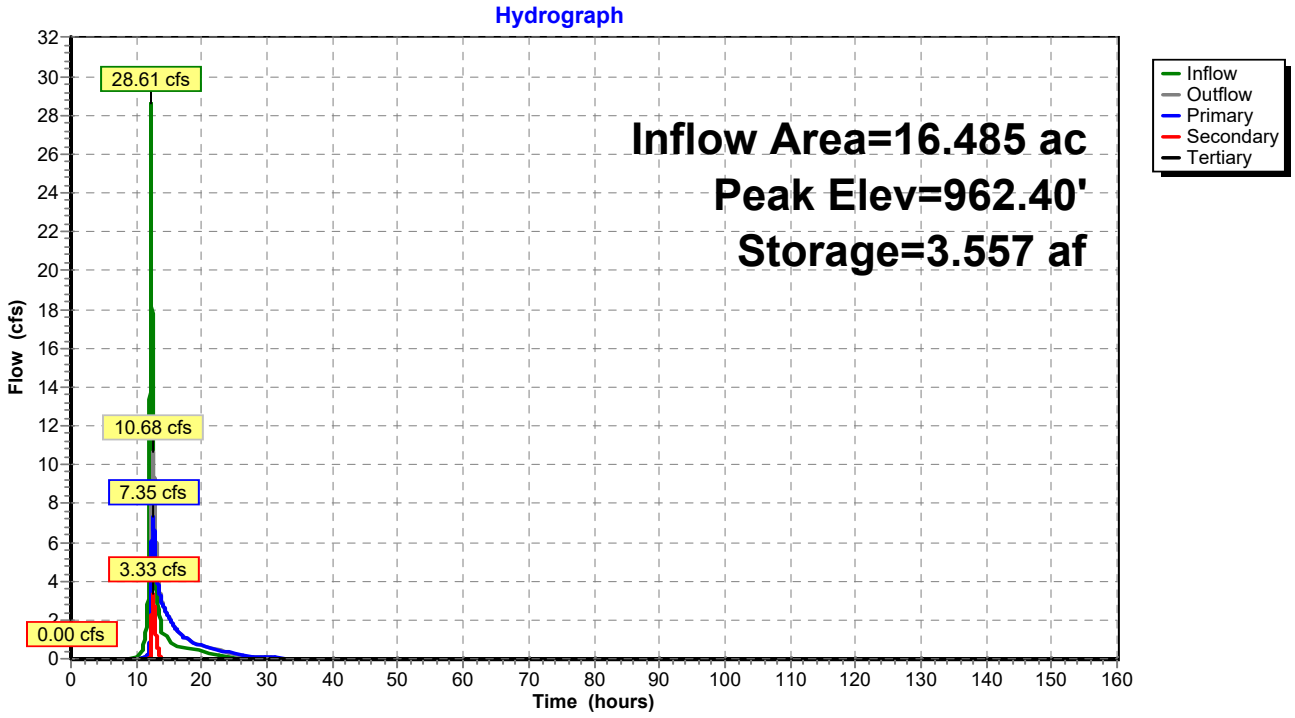
			Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
#5	Secondary	961.00'	**30.0" Round RCP_Round 30"** L= 50.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 961.00' / 960.50' S= 0.0100 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 4.91 sf
#6	Device 5	962.05'	**Custom Weir/Orifice, Cv= 2.62 (C= 3.28)** Head (feet) 0.00 5.00 Width (feet) 5.00 5.00
#7	Device 6	957.50'	**30.0" Round RCP_Round 30"** L= 25.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 957.50' / 957.50' S= 0.0000 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 4.91 sf

Primary OutFlow Max=7.35 cfs @ 12.53 hrs HW=962.40' TW=0.00' (Dynamic Tailwater)
└─**1=RCP_Round 30"** (Passes 7.35 cfs of 10.91 cfs potential flow)
└─**2=Custom Weir/Orifice** (Weir Controls 7.35 cfs @ 2.81 fps)
└─**3=RCP_Round 30"** (Passes 7.35 cfs of 27.92 cfs potential flow)

Secondary OutFlow Max=3.33 cfs @ 12.53 hrs HW=962.40' TW=0.00' (Dynamic Tailwater)
└─**5=RCP_Round 30"** (Passes 3.33 cfs of 10.91 cfs potential flow)
└─**6=Custom Weir/Orifice** (Weir Controls 3.33 cfs @ 1.93 fps)
└─**7=RCP_Round 30"** (Passes 3.33 cfs of 13.90 cfs potential flow)

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=961.00' TW=0.00' (Dynamic Tailwater)
└─**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 100P: Basin 100



Summary for Pond 200P: Basin 200

Inflow Area = 4.642 ac, 41.66% Impervious, Inflow Depth = 1.28" for 1-yr event
Inflow = 9.12 cfs @ 12.18 hrs, Volume= 0.494 af
Outflow = 1.24 cfs @ 12.70 hrs, Volume= 0.490 af, Atten= 86%, Lag= 31.4 min
Primary = 1.24 cfs @ 12.70 hrs, Volume= 0.490 af
Routed to Link P-Creek : Proposed Creek
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Link P-Creek : Proposed Creek

Routing by Sim-Route method, Time Span= 0.00-160.00 hrs, dt= 0.001 hrs
Starting Elev= 962.00' Surf.Area= 0.480 ac Storage= 1.681 af
Peak Elev= 962.52' @ 12.70 hrs Surf.Area= 0.509 ac Storage= 1.939 af (0.258 af above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= 297.8 min (1,107.4 - 809.6)

Volume	Invert	Avail.Storage	Storage Description
#1	952.00'	4.760 af	**Custom Stage Data (Prismatic)**Listed below (Recalc)

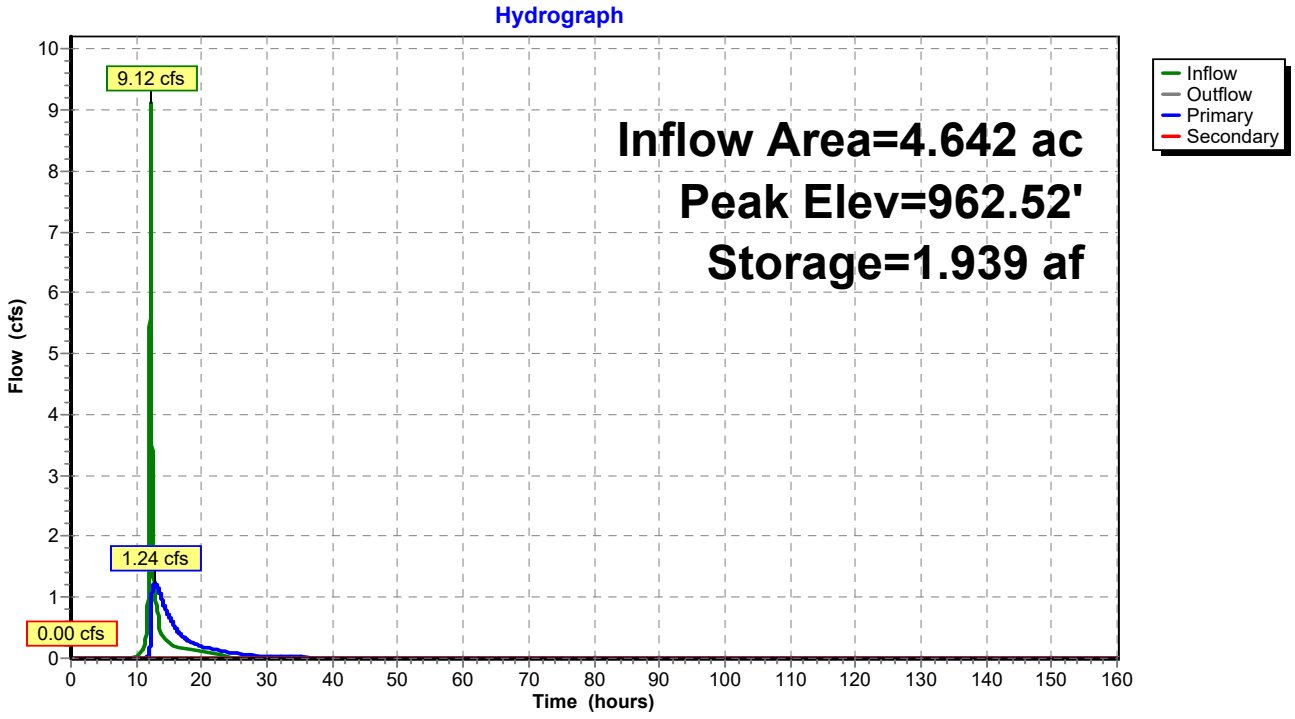
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
952.00	0.023	0.000	0.000
954.00	0.059	0.081	0.081
956.00	0.110	0.168	0.250
958.00	0.183	0.293	0.543
960.00	0.267	0.451	0.994
961.00	0.313	0.290	1.284
962.00	0.480	0.397	1.681
964.00	0.589	1.069	2.750
965.00	0.646	0.618	3.367
966.00	0.702	0.674	4.042
967.00	0.735	0.719	4.760

Device	Routing	Invert	Outlet Devices
#1	Primary	962.00'	**15.0" Round RCP_Round 15"** L= 25.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 962.00' / 961.50' S= 0.0200 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.23 sf
#2	Device 1	962.00'	**Custom Weir/Orifice, Cv= 2.62 (C= 3.28)** Head (feet) 0.00 1.00 1.00 8.00 Width (feet) 1.00 1.00 5.00 5.00
#3	Device 2	959.75'	**15.0" Round RCP_Round 15"** L= 25.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 959.75' / 959.75' S= 0.0000 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.23 sf
#4	Secondary	966.00'	**25.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=1.24 cfs @ 12.70 hrs HW=962.52' TW=0.00' (Dynamic Tailwater)
└─**1=RCP_Round 15"** (Passes 1.24 cfs of 1.44 cfs potential flow)
└─**2=Custom Weir/Orifice** (Weir Controls 1.24 cfs @ 2.37 fps)
└─**3=RCP_Round 15"** (Passes 1.24 cfs of 4.27 cfs potential flow)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=962.00' TW=0.00' (Dynamic Tailwater)
└─**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 200P: Basin 200



Summary for Pond 300P: Basin 300

Inflow Area = 1.894 ac, 48.85% Impervious, Inflow Depth = 1.42" for 1-yr event
Inflow = 4.39 cfs @ 12.17 hrs, Volume= 0.224 af
Outflow = 1.27 cfs @ 12.41 hrs, Volume= 0.224 af, Atten= 71%, Lag= 14.5 min
Primary = 1.27 cfs @ 12.41 hrs, Volume= 0.224 af
Routed to Link P-Creek : Proposed Creek
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Link P-Creek : Proposed Creek

Routing by Sim-Route method, Time Span= 0.00-160.00 hrs, dt= 0.001 hrs
Starting Elev= 966.00' Surf.Area= 0.160 ac Storage= 0.317 af
Peak Elev= 966.57' @ 12.41 hrs Surf.Area= 0.181 ac Storage= 0.413 af (0.096 af above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= 132.3 min (934.7 - 802.4)

Volume	Invert	Avail.Storage	Storage Description
#1	958.00'	1.594 af	**Custom Stage Data (Prismatic)**Listed below (Recalc)

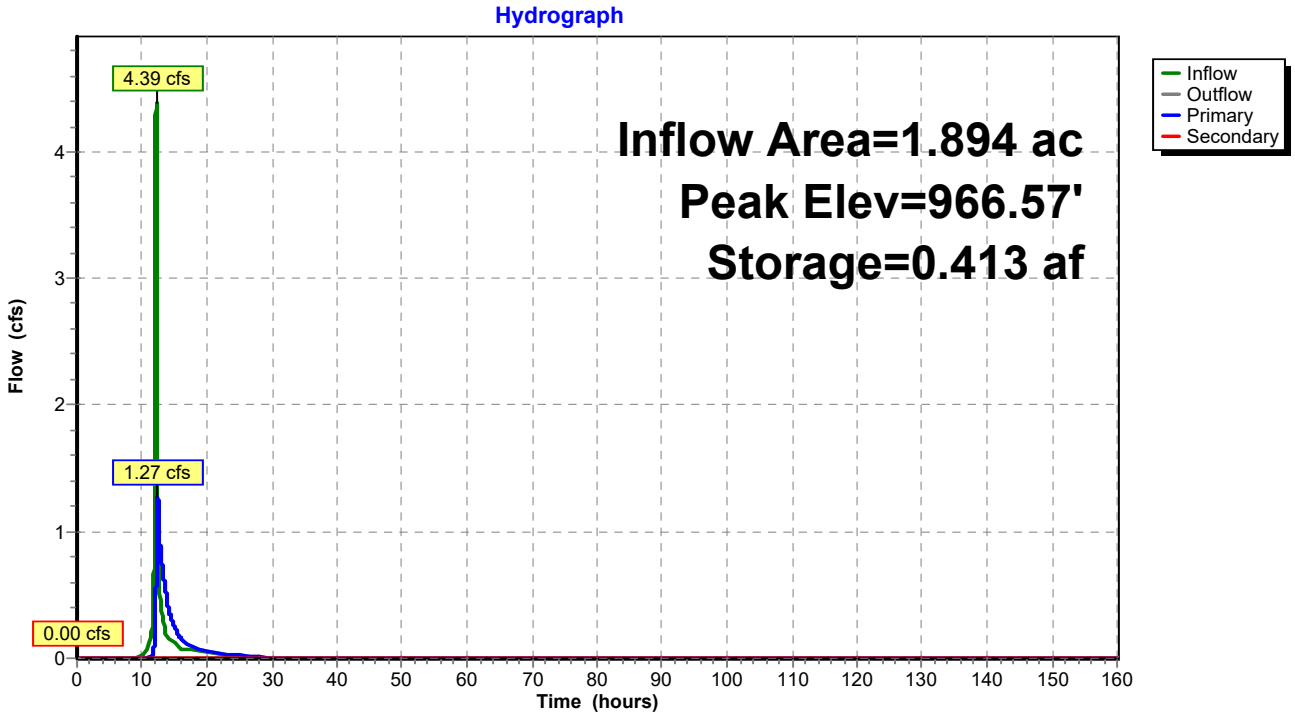
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
958.00	0.003	0.000	0.000
960.00	0.012	0.015	0.015
962.00	0.029	0.041	0.056
964.00	0.053	0.083	0.139
965.00	0.071	0.062	0.201
966.00	0.160	0.116	0.317
968.00	0.234	0.394	0.711
970.00	0.316	0.550	1.261
971.00	0.351	0.333	1.594

Device	Routing	Invert	Outlet Devices
#1	Primary	966.00'	**15.0" Round RCP_Round 15"** L= 25.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 966.00' / 965.50' S= 0.0200 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.23 sf
#2	Device 1	966.00'	**Custom Weir/Orifice, Cv= 2.62 (C= 3.28)** Head (feet) 0.00 0.50 0.50 5.00 Width (feet) 0.75 0.75 5.00 5.00
#3	Device 2	963.75'	**15.0" Round RCP_Round 15"** L= 30.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 963.75' / 963.75' S= 0.0000 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.23 sf
#4	Secondary	970.00'	**25.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=1.27 cfs @ 12.41 hrs HW=966.57' TW=0.00' (Dynamic Tailwater)
└─**1=RCP_Round 15"** (Passes 1.27 cfs of 1.65 cfs potential flow)
└─**2=Custom Weir/Orifice** (Weir Controls 1.27 cfs @ 1.82 fps)
└─**3=RCP_Round 15"** (Passes 1.27 cfs of 4.44 cfs potential flow)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=966.00' TW=0.00' (Dynamic Tailwater)
└─**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 300P: Basin 300

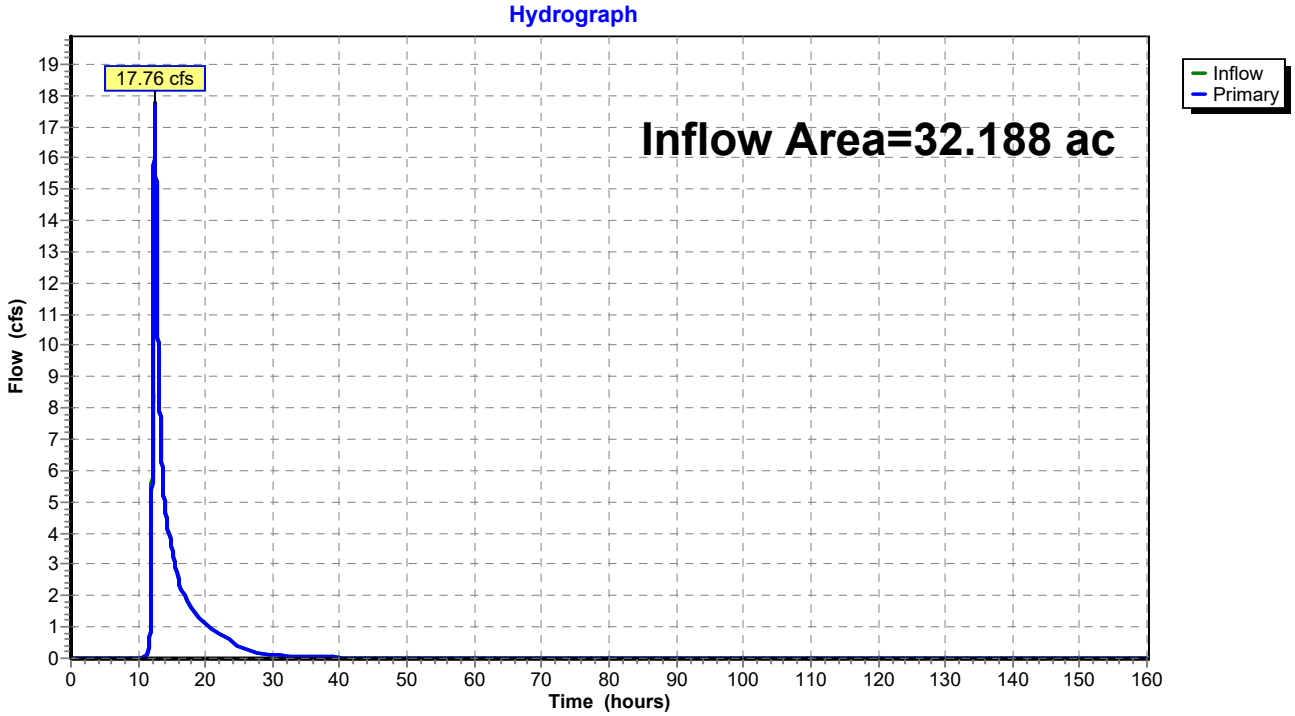


Summary for Link P-Creek: Proposed Creek

Inflow Area = 32.188 ac, 33.10% Impervious, Inflow Depth = 1.20" for 1-yr event
Inflow = 17.76 cfs @ 12.46 hrs, Volume= 3.225 af
Primary = 17.76 cfs @ 12.46 hrs, Volume= 3.225 af, Atten= 0%, Lag= 0.1 min

Primary outflow = Inflow, Time Span= 0.00-160.00 hrs, dt= 0.001 hrs

Link P-Creek: Proposed Creek

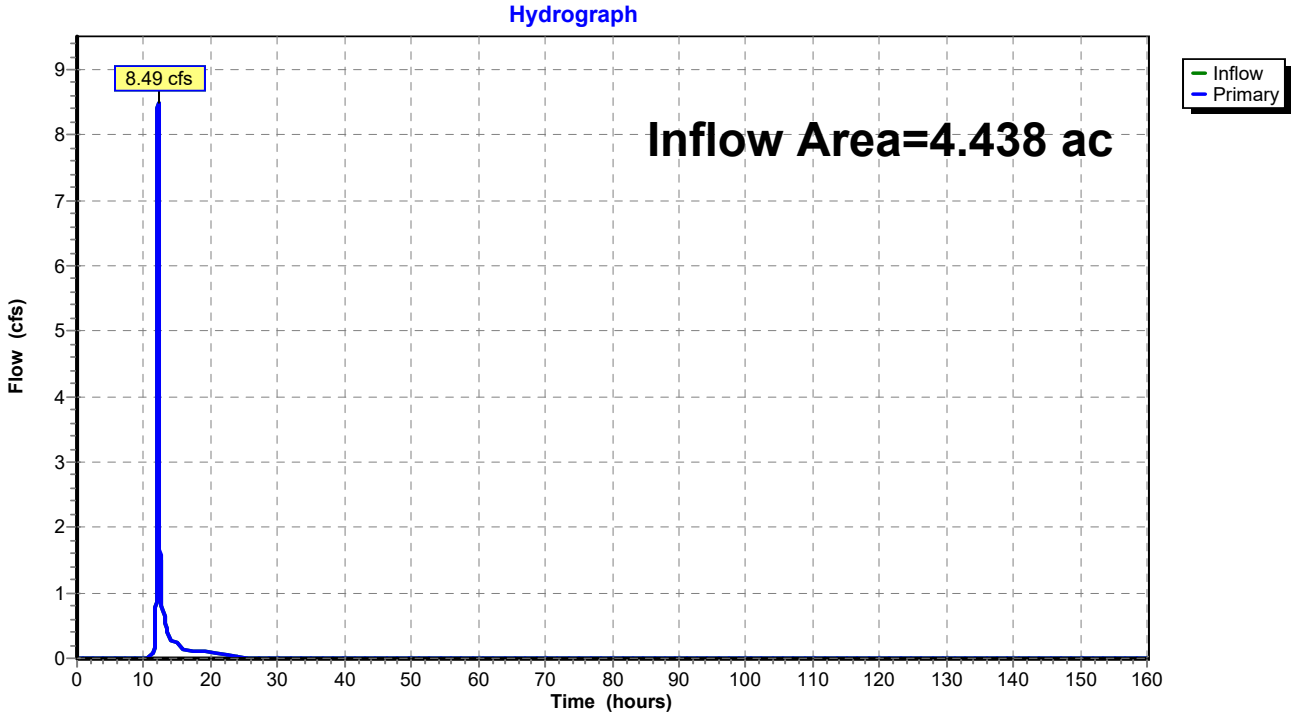


Summary for Link P-South: Proposed South

Inflow Area = 4.438 ac, 7.41% Impervious, Inflow Depth = 0.91" for 1-yr event
Inflow = 8.49 cfs @ 12.12 hrs, Volume= 0.338 af
Primary = 8.49 cfs @ 12.12 hrs, Volume= 0.338 af, Atten= 0%, Lag= 0.1 min

Primary outflow = Inflow, Time Span= 0.00-160.00 hrs, dt= 0.001 hrs

Link P-South: Proposed South

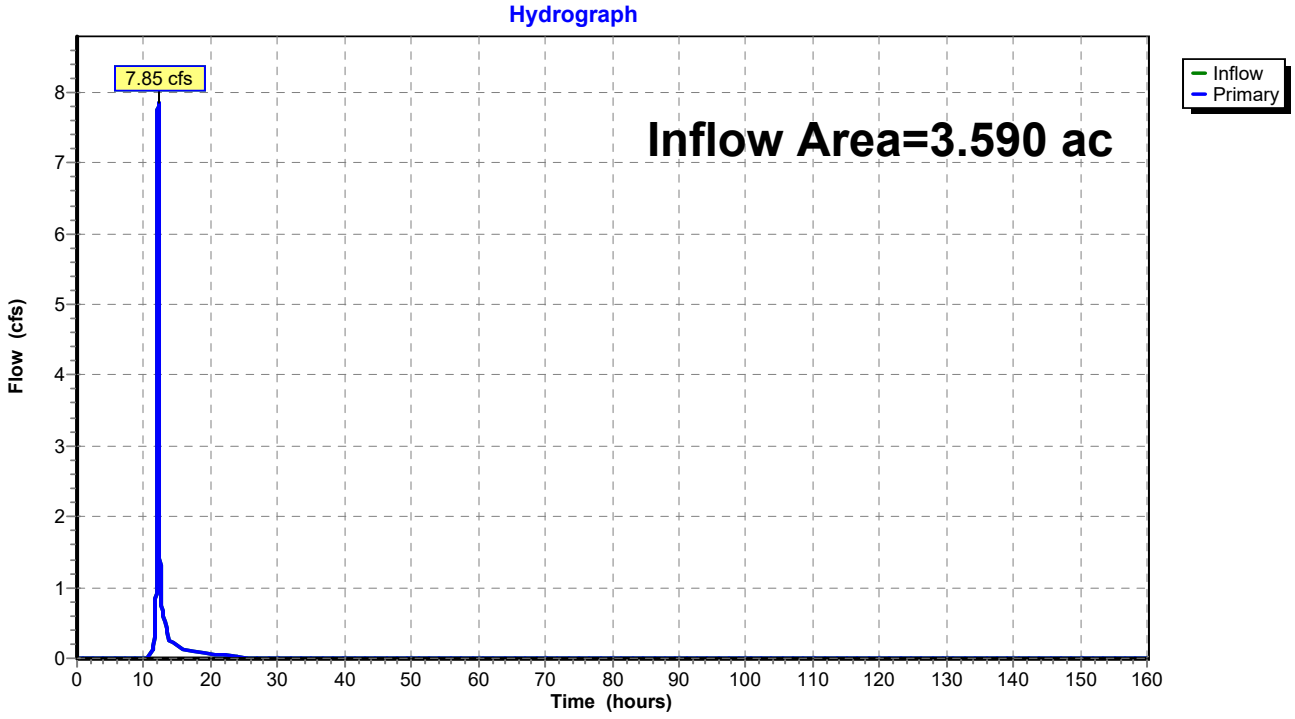


Summary for Link P-West: Proposed West

Inflow Area = 3.590 ac, 18.01% Impervious, Inflow Depth = 1.03" for 1-yr event
Inflow = 7.85 cfs @ 12.11 hrs, Volume= 0.307 af
Primary = 7.85 cfs @ 12.11 hrs, Volume= 0.307 af, Atten= 0%, Lag= 0.1 min

Primary outflow = Inflow, Time Span= 0.00-160.00 hrs, dt= 0.001 hrs

Link P-West: Proposed West



Time span=0.00-160.00 hrs, dt=0.001 hrs, 160001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Sim-Route method - Pond routing by Sim-Route method

Subcatchment 1S: N-C Catchment Runoff Area=718,098 sf 43.62% Impervious Runoff Depth=1.65"
Flow Length=975' Slope=0.0240 '/' Tc=15.3 min CN=88 Runoff=34.96 cfs 2.267 af

Subcatchment 2S: East Catchment Runoff Area=202,210 sf 41.66% Impervious Runoff Depth=1.57"
Flow Length=670' Slope=0.0310 '/' Tc=10.3 min CN=87 Runoff=11.21 cfs 0.609 af

Subcatchment 3S: South Catchment Runoff Area=82,515 sf 48.85% Impervious Runoff Depth=1.73"
Flow Length=442' Slope=0.0180 '/' Tc=9.0 min CN=89 Runoff=5.31 cfs 0.273 af

Subcatchment 4S: West Catchment Runoff Area=156,360 sf 18.01% Impervious Runoff Depth=1.30"
Flow Length=200' Slope=0.0650 '/' Tc=3.1 min CN=83 Runoff=9.85 cfs 0.387 af

Subcatchment 5S: S-C Catchment Runoff Area=75,496 sf 9.11% Impervious Runoff Depth=1.17"
Flow Length=150' Slope=0.0930 '/' Tc=2.2 min CN=81 Runoff=4.47 cfs 0.169 af

Subcatchment 6S: South Catchment Runoff Area=193,325 sf 7.41% Impervious Runoff Depth=1.17"
Flow Length=220' Slope=0.0640 '/' Tc=3.6 min CN=81 Runoff=10.85 cfs 0.432 af

Subcatchment 7S: Creek Catchment Runoff Area=323,811 sf 6.02% Impervious Runoff Depth=1.11"
Flow Length=850' Slope=0.0260 '/' Tc=17.3 min CN=80 Runoff=9.79 cfs 0.687 af

Pond 100P: Basin 100 Peak Elev=962.56' Storage=3.661 af Inflow=34.96 cfs 2.267 af
Primary=10.47 cfs 1.963 af Secondary=6.05 cfs 0.299 af Tertiary=0.00 cfs 0.000 af Outflow=16.51 cfs 2.262 af

Pond 200P: Basin 200 Peak Elev=962.64' Storage=1.998 af Inflow=11.21 cfs 0.609 af
Primary=1.67 cfs 0.605 af Secondary=0.00 cfs 0.000 af Outflow=1.67 cfs 0.605 af

Pond 300P: Basin 300 Peak Elev=966.64' Storage=0.427 af Inflow=5.31 cfs 0.273 af
Primary=2.00 cfs 0.272 af Secondary=0.00 cfs 0.000 af Outflow=2.00 cfs 0.272 af

Link P-Creek: Proposed Creek Inflow=27.36 cfs 3.996 af
Primary=27.36 cfs 3.996 af

Link P-South: Proposed South Inflow=10.85 cfs 0.432 af
Primary=10.85 cfs 0.432 af

Link P-West: Proposed West Inflow=9.85 cfs 0.387 af
Primary=9.85 cfs 0.387 af

Total Runoff Area = 40.216 ac Runoff Volume = 4.825 af Average Runoff Depth = 1.44"
71.08% Pervious = 28.585 ac 28.92% Impervious = 11.631 ac

Summary for Subcatchment 1S: N-C Catchment

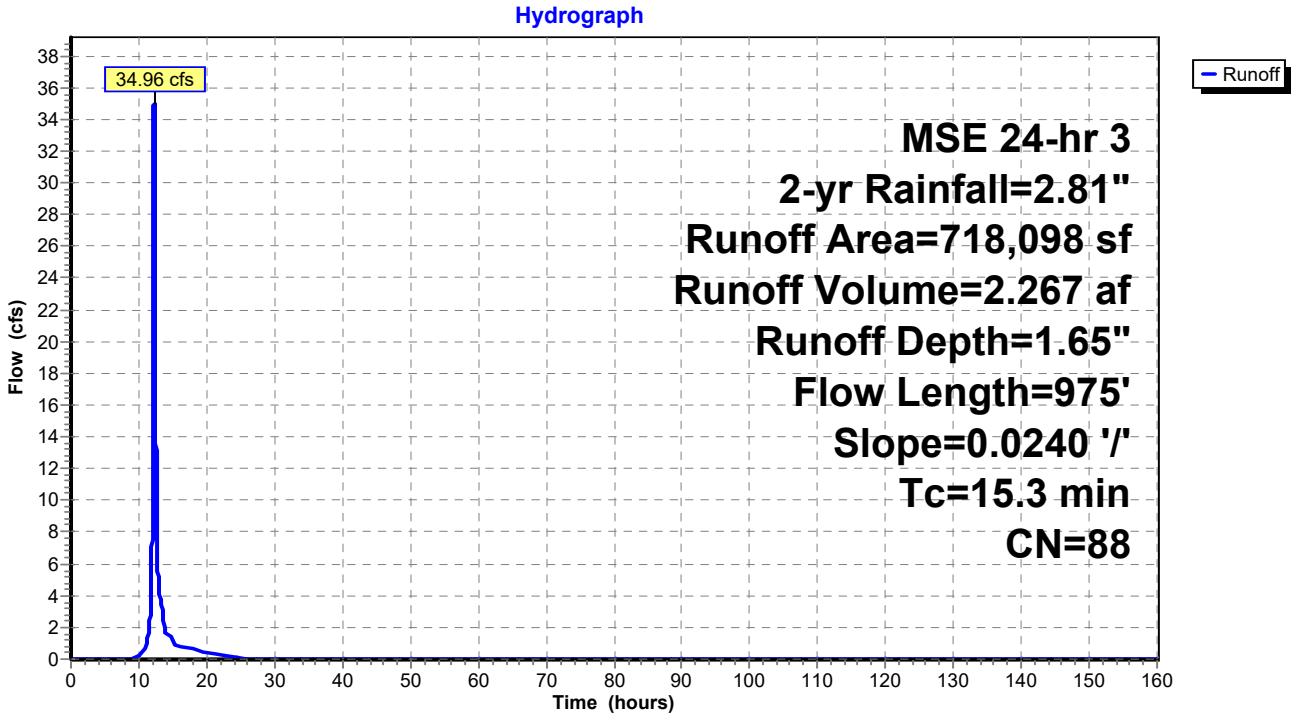
Runoff = 34.96 cfs @ 12.24 hrs, Volume= 2.267 af, Depth= 1.65"
Routed to Pond 100P : Basin 100

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-160.00 hrs, dt= 0.001 hrs
MSE 24-hr 3 2-yr Rainfall=2.81"

Area (sf)	CN	Description
404,877	80	>75% Grass cover, Good, HSG D
313,221	98	Paved parking, HSG D
0	79	Woods, Fair, HSG D
718,098	88	Weighted Average
404,877		56.38% Pervious Area
313,221		43.62% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.3	975	0.0240	1.06		**Lag/CN Method,**

Subcatchment 1S: N-C Catchment



Summary for Subcatchment 2S: East Catchment

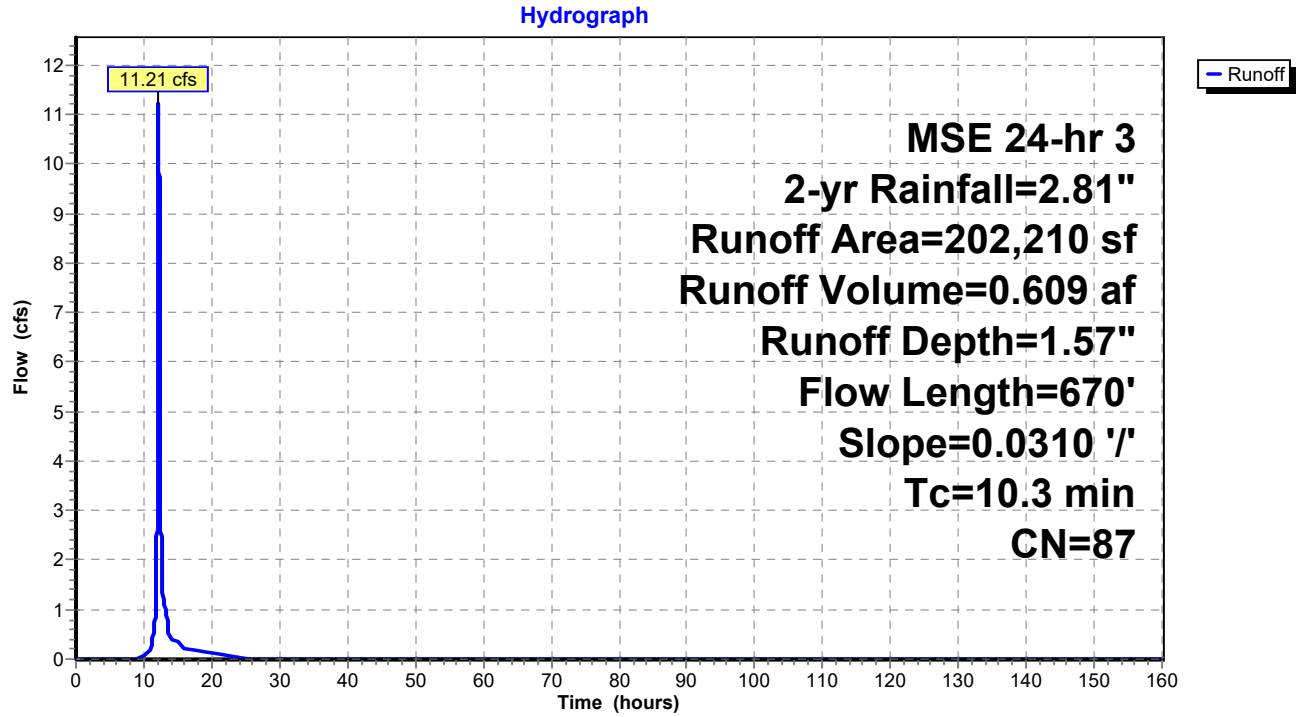
Runoff = 11.21 cfs @ 12.18 hrs, Volume= 0.609 af, Depth= 1.57"
Routed to Pond 200P : Basin 200

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-160.00 hrs, dt= 0.001 hrs
MSE 24-hr 3 2-yr Rainfall=2.81"

Area (sf)	CN	Description
117,965	80	>75% Grass cover, Good, HSG D
84,245	98	Paved parking, HSG D
0	79	Woods, Fair, HSG D
202,210	87	Weighted Average
117,965		58.34% Pervious Area
84,245		41.66% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.3	670	0.0310	1.08		**Lag/CN Method,**

Subcatchment 2S: East Catchment



Summary for Subcatchment 3S: South Catchment

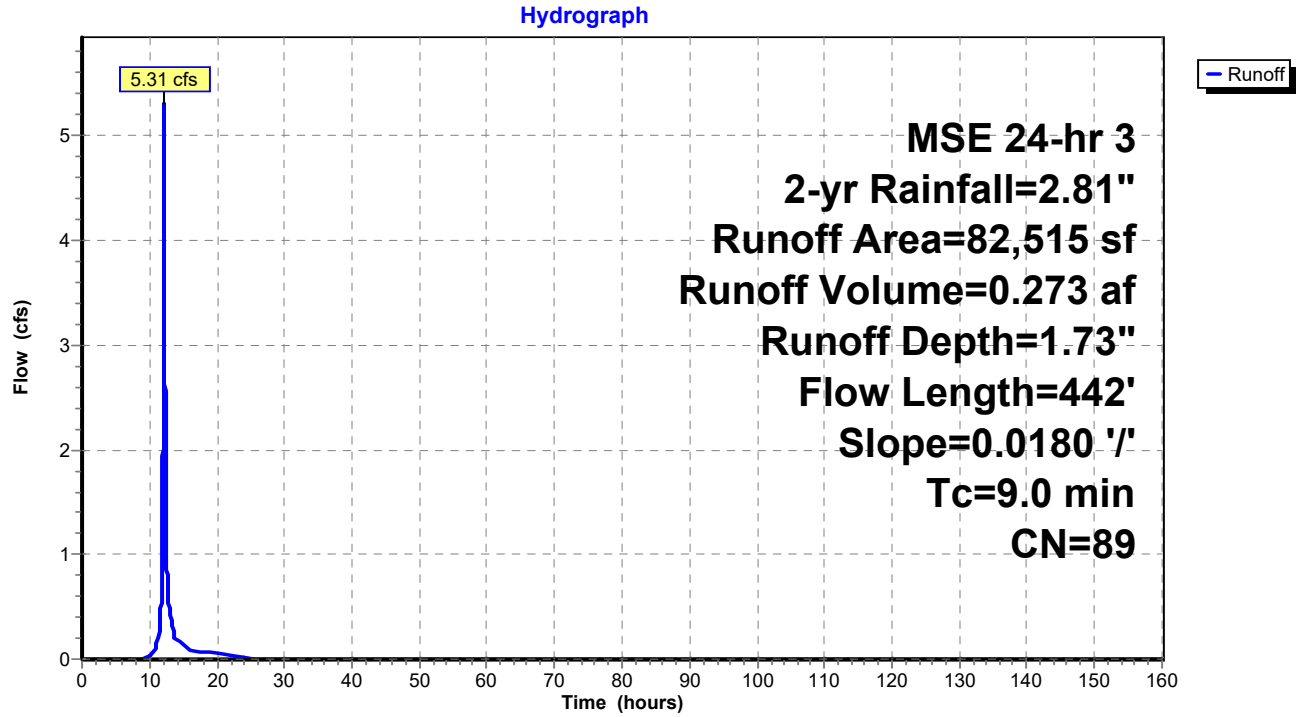
Runoff = 5.31 cfs @ 12.17 hrs, Volume= 0.273 af, Depth= 1.73"
Routed to Pond 300P : Basin 300

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-160.00 hrs, dt= 0.001 hrs
MSE 24-hr 3 2-yr Rainfall=2.81"

Area (sf)	CN	Description
42,205	80	>75% Grass cover, Good, HSG D
40,310	98	Paved parking, HSG D
0	79	Woods, Fair, HSG D
82,515	89	Weighted Average
42,205		51.15% Pervious Area
40,310		48.85% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.0	442	0.0180	0.82		**Lag/CN Method,**

Subcatchment 3S: South Catchment



Summary for Subcatchment 4S: West Catchment

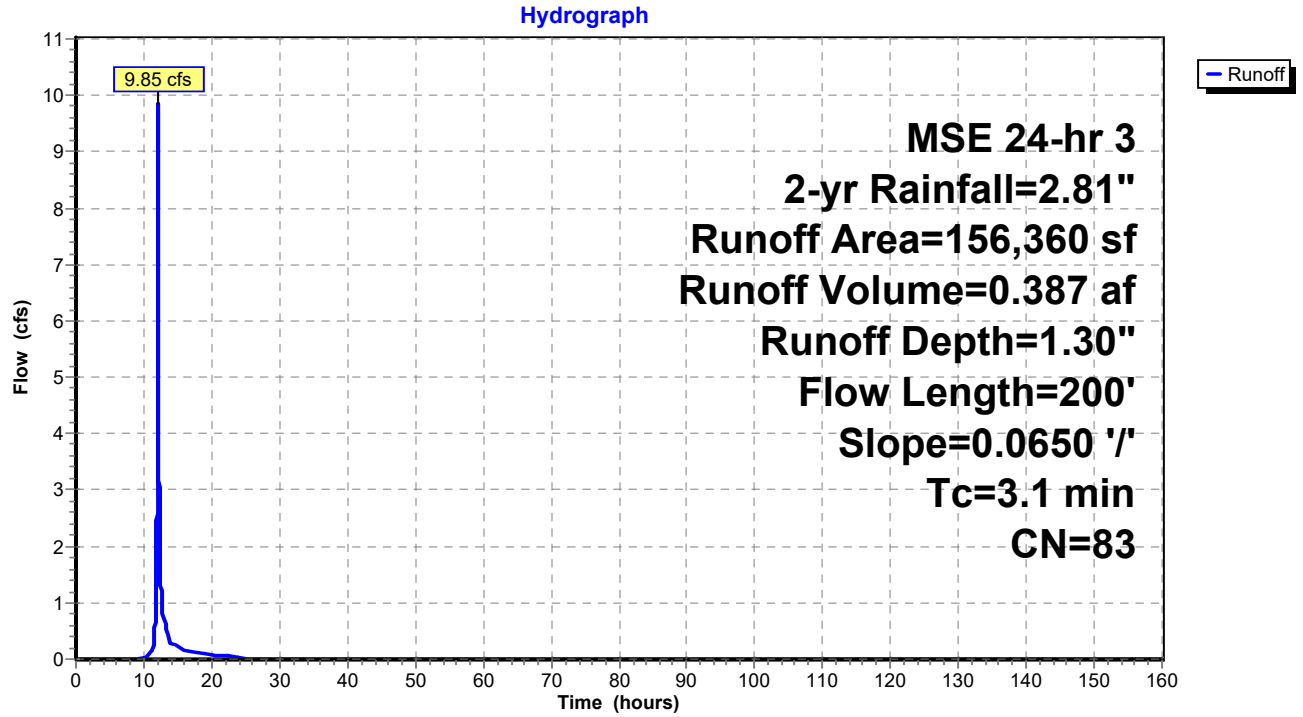
Runoff = 9.85 cfs @ 12.11 hrs, Volume= 0.387 af, Depth= 1.30"
Routed to Link P-West : Proposed West

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-160.00 hrs, dt= 0.001 hrs
MSE 24-hr 3 2-yr Rainfall=2.81"

Area (sf)	CN	Description
109,417	80	>75% Grass cover, Good, HSG D
28,163	98	Paved parking, HSG D
18,780	79	Woods, Fair, HSG D
156,360	83	Weighted Average
128,197		81.99% Pervious Area
28,163		18.01% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.1	200	0.0650	1.07		**Lag/CN Method,**

Subcatchment 4S: West Catchment



Summary for Subcatchment 5S: S-C Catchment

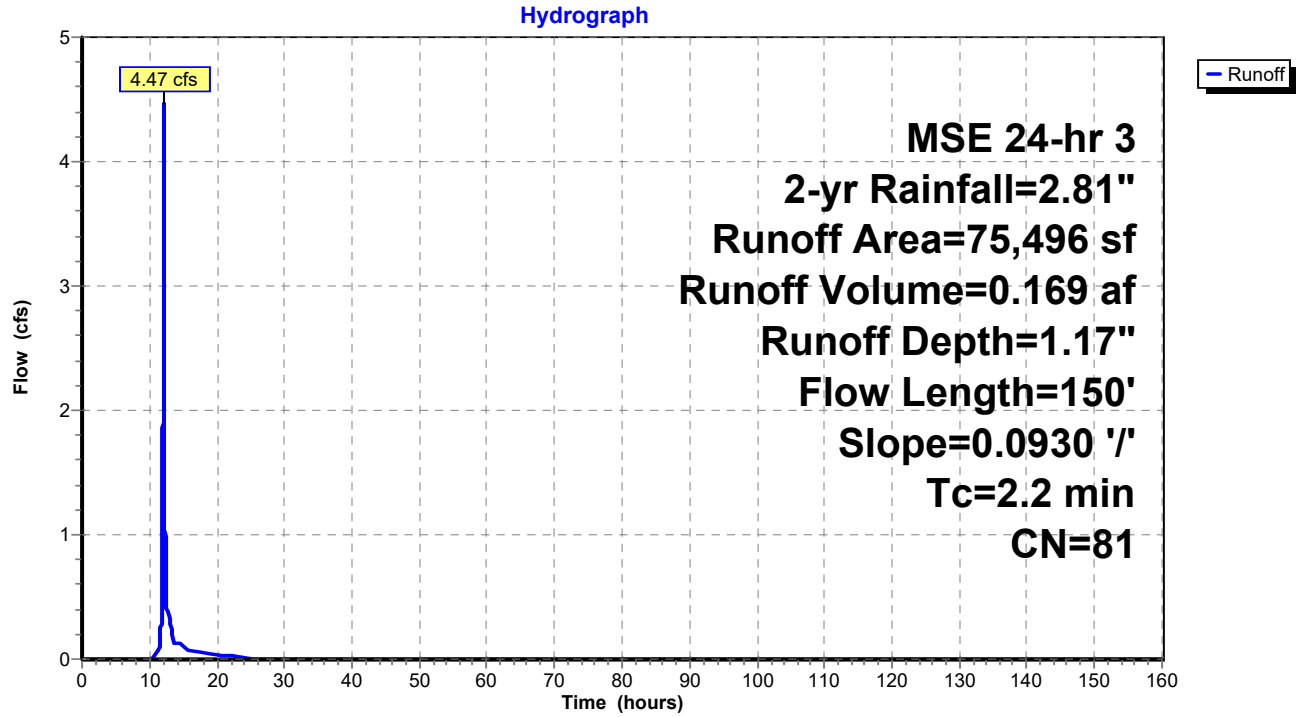
Runoff = 4.47 cfs @ 12.11 hrs, Volume= 0.169 af, Depth= 1.17"
Routed to Link P-Creek : Proposed Creek

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-160.00 hrs, dt= 0.001 hrs
MSE 24-hr 3 2-yr Rainfall=2.81"

Area (sf)	CN	Description
37,344	80	>75% Grass cover, Good, HSG D
6,876	98	Paved parking, HSG D
31,276	79	Woods, Fair, HSG D
75,496	81	Weighted Average
68,620		90.89% Pervious Area
6,876		9.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.2	150	0.0930	1.13		**Lag/CN Method,**

Subcatchment 5S: S-C Catchment



Summary for Subcatchment 6S: South Catchment

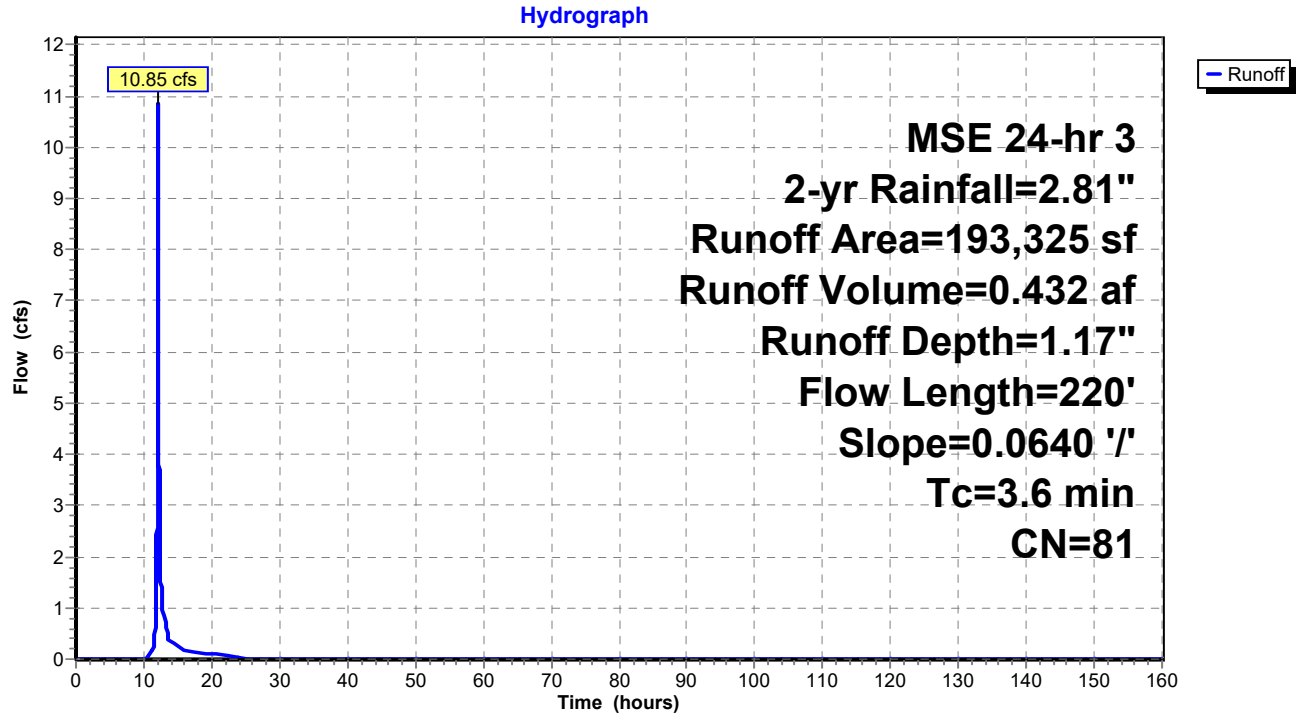
Runoff = 10.85 cfs @ 12.12 hrs, Volume= 0.432 af, Depth= 1.17"
Routed to Link P-South : Proposed South

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-160.00 hrs, dt= 0.001 hrs
MSE 24-hr 3 2-yr Rainfall=2.81"

Area (sf)	CN	Description
154,331	80	>75% Grass cover, Good, HSG D
14,333	98	Paved parking, HSG D
24,661	79	Woods, Fair, HSG D
193,325	81	Weighted Average
178,992		92.59% Pervious Area
14,333		7.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.6	220	0.0640	1.01		**Lag/CN Method,**

Subcatchment 6S: South Catchment



Summary for Subcatchment 7S: Creek Catchment

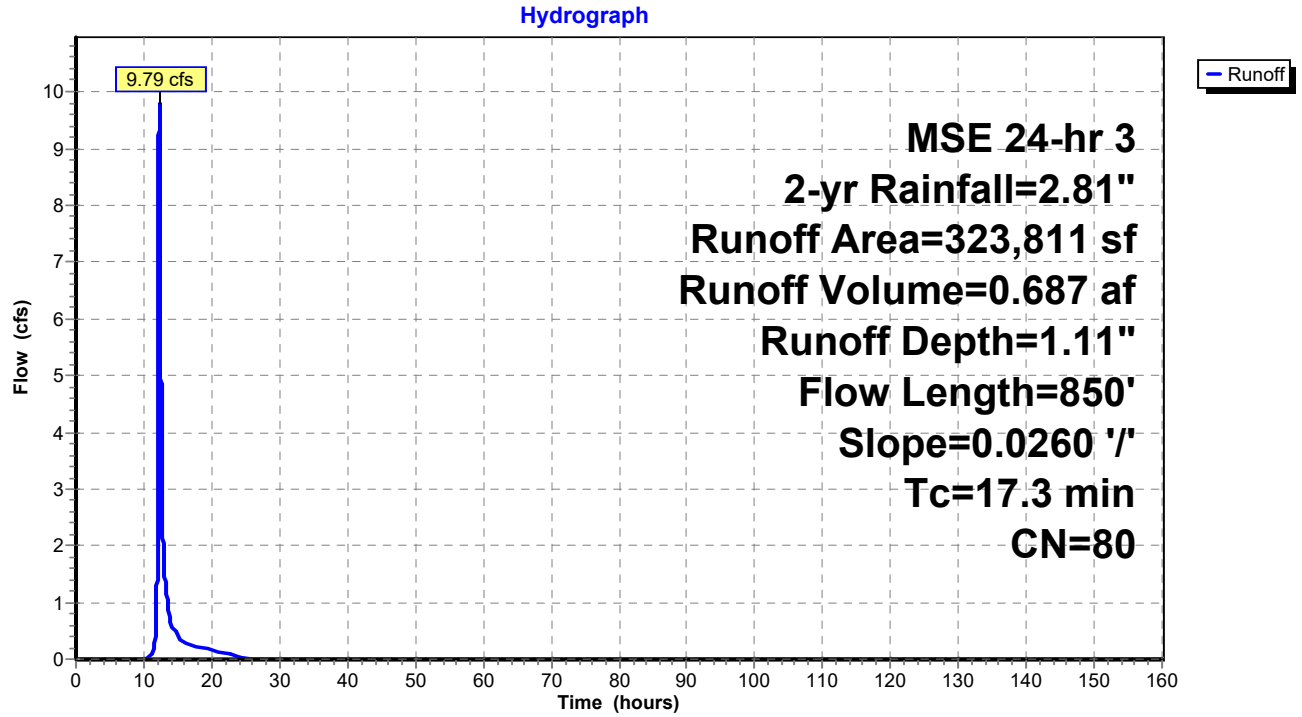
Runoff = 9.79 cfs @ 12.28 hrs, Volume= 0.687 af, Depth= 1.11"
Routed to Link P-Creek : Proposed Creek

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-160.00 hrs, dt= 0.001 hrs
MSE 24-hr 3 2-yr Rainfall=2.81"

Area (sf)	CN	Description
114,917	80	>75% Grass cover, Good, HSG D
19,500	98	Paved parking, HSG D
189,394	79	Woods, Fair, HSG D
323,811	80	Weighted Average
304,311		93.98% Pervious Area
19,500		6.02% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.3	850	0.0260	0.82		**Lag/CN Method,**

Subcatchment 7S: Creek Catchment



Summary for Pond 100P: Basin 100

Inflow Area = 16.485 ac, 43.62% Impervious, Inflow Depth = 1.65" for 2-yr event
Inflow = 34.96 cfs @ 12.24 hrs, Volume= 2.267 af
Outflow = 16.51 cfs @ 12.46 hrs, Volume= 2.262 af, Atten= 53%, Lag= 13.3 min
Primary = 10.47 cfs @ 12.46 hrs, Volume= 1.963 af
Routed to Link P-Creek : Proposed Creek
Secondary = 6.05 cfs @ 12.46 hrs, Volume= 0.299 af
Routed to Link P-Creek : Proposed Creek
Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Link P-Creek : Proposed Creek

Routing by Sim-Route method, Time Span= 0.00-160.00 hrs, dt= 0.001 hrs
Starting Elev= 961.00' Surf.Area= 0.545 ac Storage= 2.752 af
Peak Elev= 962.56' @ 12.46 hrs Surf.Area= 0.617 ac Storage= 3.661 af (0.908 af above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= 156.4 min (963.6 - 807.2)

Volume	Invert	Avail.Storage	Storage Description
#1	951.00'	7.655 af	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
951.00	0.119	0.000	0.000
952.00	0.145	0.132	0.132
954.00	0.201	0.347	0.479
956.00	0.263	0.465	0.944
958.00	0.332	0.595	1.539
960.00	0.406	0.738	2.277
961.00	0.545	0.476	2.752
962.00	0.590	0.568	3.320
964.00	0.685	1.275	4.595
965.00	0.735	0.710	5.305
966.00	0.786	0.760	6.065
968.00	0.803	1.589	7.655

Device	Routing	Invert	Outlet Devices
#1	Primary	961.00'	**30.0" Round RCP_Round 30"** L= 50.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 961.00' / 960.50' S= 0.0100 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 4.91 sf
#2	Device 1	961.00'	**Custom Weir/Orifice, Cv= 2.62 (C= 3.28)** Head (feet) 0.00 1.05 1.05 8.00 Width (feet) 0.85 0.85 5.00 5.00
#3	Device 2	957.50'	**30.0" Round RCP_Round 30"** L= 25.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 957.50' / 957.50' S= 0.0000 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 4.91 sf
#4	Tertiary	966.00'	**15.0' 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

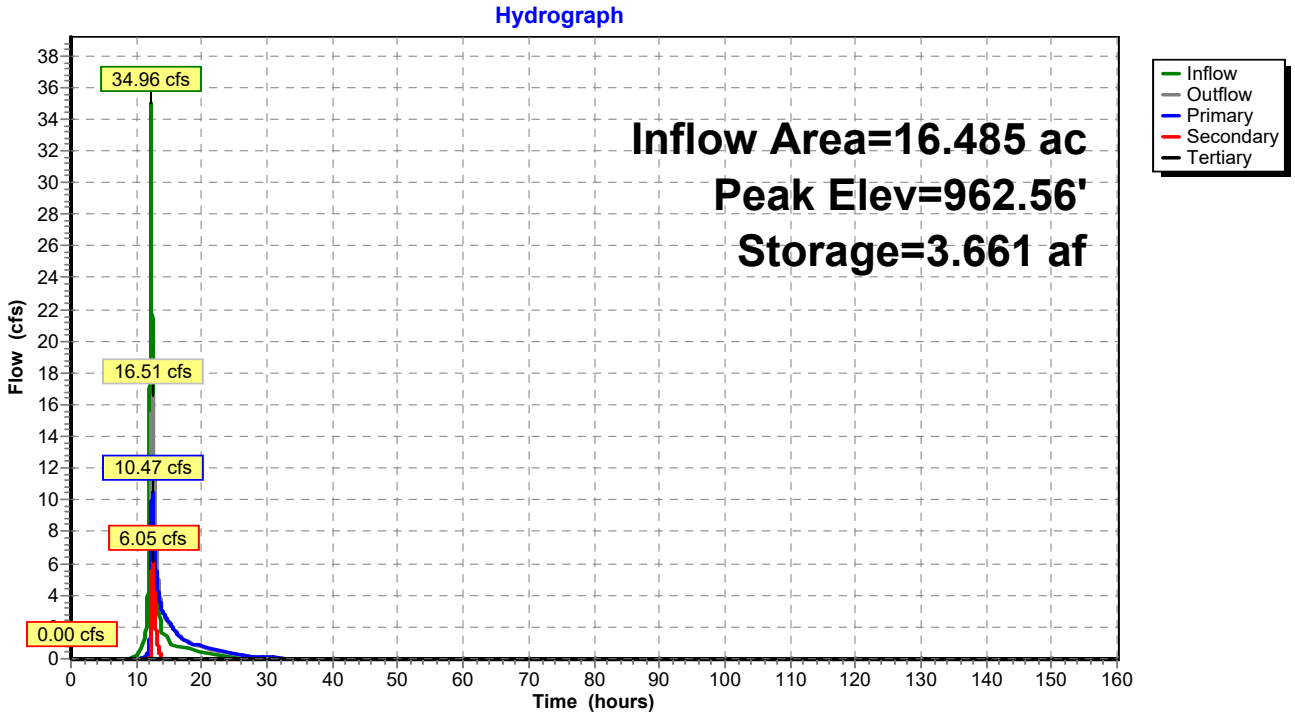
			Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
#5	Secondary	961.00'	**30.0" Round RCP_Round 30"** L= 50.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 961.00' / 960.50' S= 0.0100 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 4.91 sf
#6	Device 5	962.05'	**Custom Weir/Orifice, Cv= 2.62 (C= 3.28)** Head (feet) 0.00 5.00 Width (feet) 5.00 5.00
#7	Device 6	957.50'	**30.0" Round RCP_Round 30"** L= 25.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 957.50' / 957.50' S= 0.0000 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 4.91 sf

Primary OutFlow Max=10.47 cfs @ 12.46 hrs HW=962.56' TW=0.00' (Dynamic Tailwater)
└─**1=RCP_Round 30"** (Passes 10.47 cfs of 13.19 cfs potential flow)
└─**2=Custom Weir/Orifice** (Weir Controls 10.47 cfs @ 3.02 fps)
└─**3=RCP_Round 30"** (Passes 10.47 cfs of 29.57 cfs potential flow)

Secondary OutFlow Max=6.05 cfs @ 12.46 hrs HW=962.56' TW=0.00' (Dynamic Tailwater)
└─**5=RCP_Round 30"** (Passes 6.05 cfs of 13.19 cfs potential flow)
└─**6=Custom Weir/Orifice** (Weir Controls 6.05 cfs @ 2.35 fps)
└─**7=RCP_Round 30"** (Passes 6.05 cfs of 16.96 cfs potential flow)

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=961.00' TW=0.00' (Dynamic Tailwater)
└─**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 100P: Basin 100



Summary for Pond 200P: Basin 200

Inflow Area = 4.642 ac, 41.66% Impervious, Inflow Depth = 1.57" for 2-yr event
Inflow = 11.21 cfs @ 12.18 hrs, Volume= 0.609 af
Outflow = 1.67 cfs @ 12.66 hrs, Volume= 0.605 af, Atten= 85%, Lag= 28.7 min
Primary = 1.67 cfs @ 12.66 hrs, Volume= 0.605 af
Routed to Link P-Creek : Proposed Creek
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Link P-Creek : Proposed Creek

Routing by Sim-Route method, Time Span= 0.00-160.00 hrs, dt= 0.001 hrs
Starting Elev= 962.00' Surf.Area= 0.480 ac Storage= 1.681 af
Peak Elev= 962.64' @ 12.66 hrs Surf.Area= 0.515 ac Storage= 1.998 af (0.318 af above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= 266.3 min (1,071.6 - 805.4)

Volume	Invert	Avail.Storage	Storage Description
#1	952.00'	4.760 af	**Custom Stage Data (Prismatic)**Listed below (Recalc)

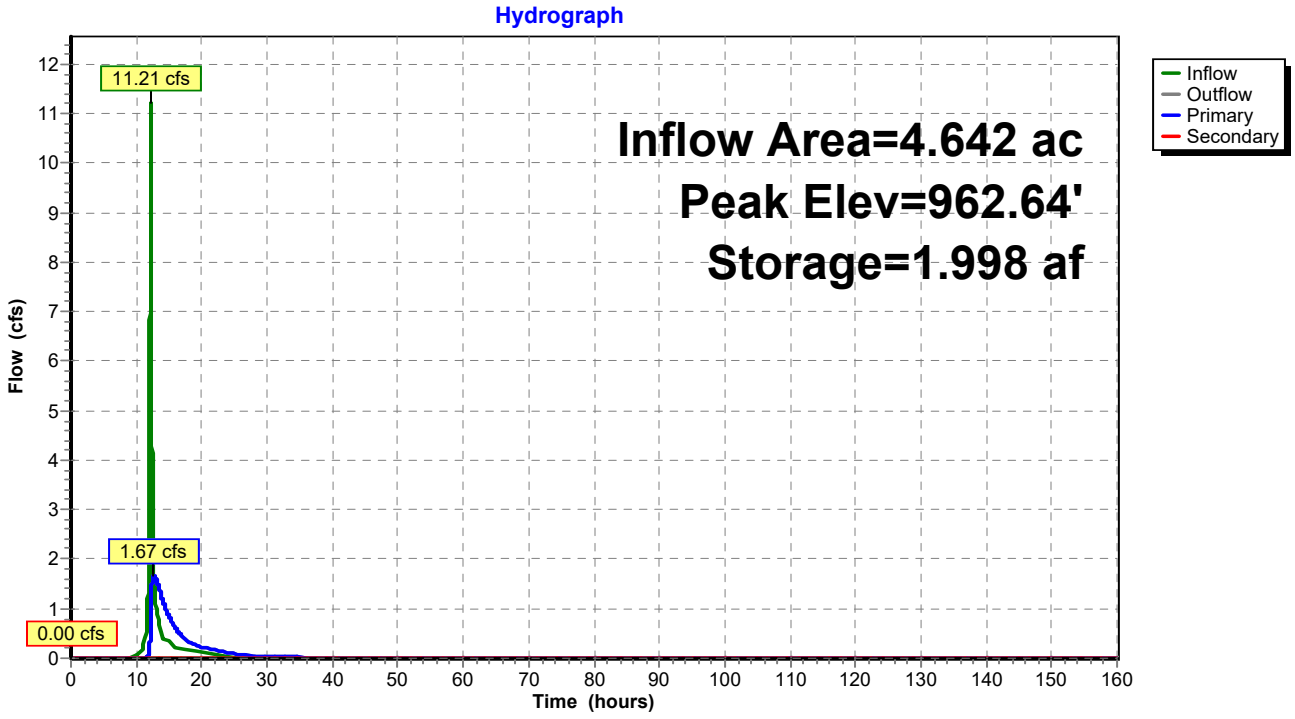
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
952.00	0.023	0.000	0.000
954.00	0.059	0.081	0.081
956.00	0.110	0.168	0.250
958.00	0.183	0.293	0.543
960.00	0.267	0.451	0.994
961.00	0.313	0.290	1.284
962.00	0.480	0.397	1.681
964.00	0.589	1.069	2.750
965.00	0.646	0.618	3.367
966.00	0.702	0.674	4.042
967.00	0.735	0.719	4.760

Device	Routing	Invert	Outlet Devices
#1	Primary	962.00'	**15.0" Round RCP_Round 15"** L= 25.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 962.00' / 961.50' S= 0.0200 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.23 sf
#2	Device 1	962.00'	**Custom Weir/Orifice, Cv= 2.62 (C= 3.28)** Head (feet) 0.00 1.00 1.00 8.00 Width (feet) 1.00 1.00 5.00 5.00
#3	Device 2	959.75'	**15.0" Round RCP_Round 15"** L= 25.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 959.75' / 959.75' S= 0.0000 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.23 sf
#4	Secondary	966.00'	**25.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=1.67 cfs @ 12.66 hrs HW=962.64' TW=0.00' (Dynamic Tailwater)
└─**1=RCP_Round 15"** (Passes 1.67 cfs of 2.02 cfs potential flow)
└─**2=Custom Weir/Orifice** (Weir Controls 1.67 cfs @ 2.62 fps)
└─**3=RCP_Round 15"** (Passes 1.67 cfs of 4.72 cfs potential flow)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=962.00' TW=0.00' (Dynamic Tailwater)
└─**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 200P: Basin 200



Summary for Pond 300P: Basin 300

Inflow Area = 1.894 ac, 48.85% Impervious, Inflow Depth = 1.73" for 2-yr event
Inflow = 5.31 cfs @ 12.17 hrs, Volume= 0.273 af
Outflow = 2.00 cfs @ 12.35 hrs, Volume= 0.272 af, Atten= 62%, Lag= 10.6 min
Primary = 2.00 cfs @ 12.35 hrs, Volume= 0.272 af
Routed to Link P-Creek : Proposed Creek
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Link P-Creek : Proposed Creek

Routing by Sim-Route method, Time Span= 0.00-160.00 hrs, dt= 0.001 hrs
Starting Elev= 966.00' Surf.Area= 0.160 ac Storage= 0.317 af
Peak Elev= 966.64' @ 12.35 hrs Surf.Area= 0.184 ac Storage= 0.427 af (0.110 af above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= 117.3 min (915.8 - 798.5)

Volume	Invert	Avail.Storage	Storage Description
#1	958.00'	1.594 af	**Custom Stage Data (Prismatic)**Listed below (Recalc)

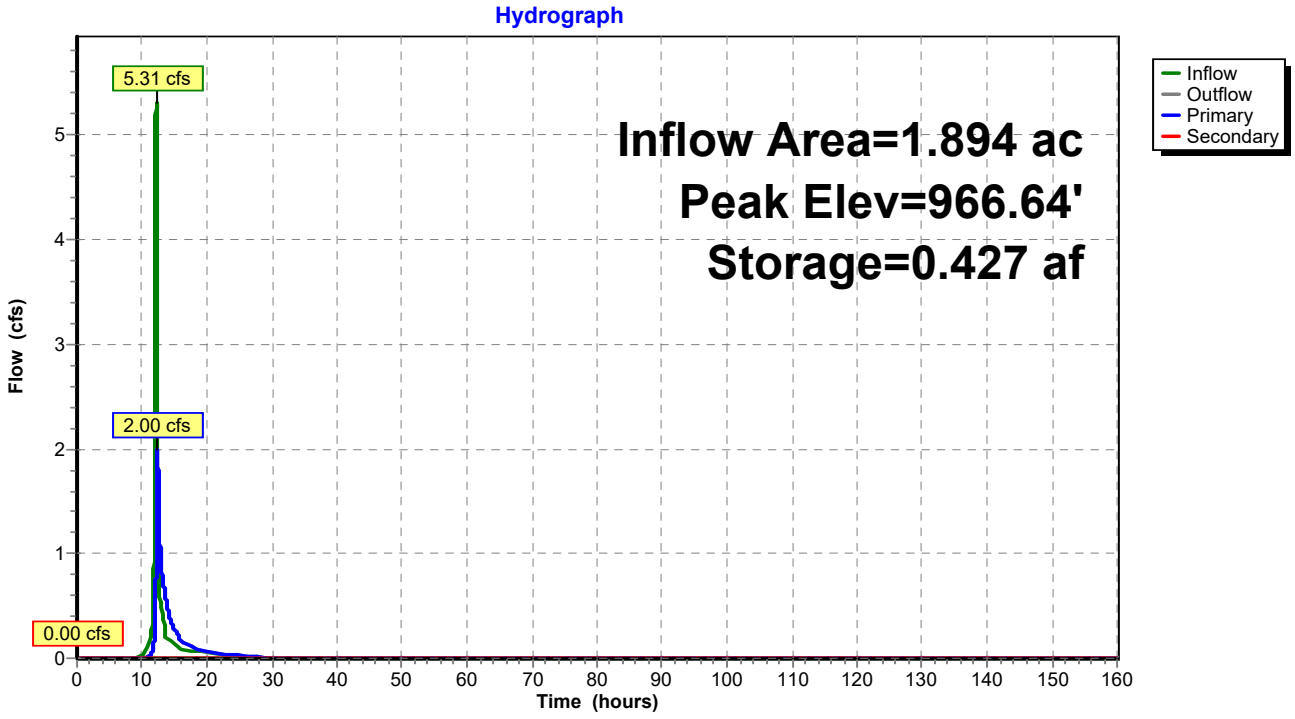
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
958.00	0.003	0.000	0.000
960.00	0.012	0.015	0.015
962.00	0.029	0.041	0.056
964.00	0.053	0.083	0.139
965.00	0.071	0.062	0.201
966.00	0.160	0.116	0.317
968.00	0.234	0.394	0.711
970.00	0.316	0.550	1.261
971.00	0.351	0.333	1.594

Device	Routing	Invert	Outlet Devices
#1	Primary	966.00'	**15.0" Round RCP_Round 15"** L= 25.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 966.00' / 965.50' S= 0.0200 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.23 sf
#2	Device 1	966.00'	**Custom Weir/Orifice, Cv= 2.62 (C= 3.28)** Head (feet) 0.00 0.50 0.50 5.00 Width (feet) 0.75 0.75 5.00 5.00
#3	Device 2	963.75'	**15.0" Round RCP_Round 15"** L= 30.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 963.75' / 963.75' S= 0.0000 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.23 sf
#4	Secondary	970.00'	**25.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=2.00 cfs @ 12.35 hrs HW=966.64' TW=0.00' (Dynamic Tailwater)
└─**1=RCP_Round 15"** (Passes 2.00 cfs of 2.03 cfs potential flow)
└─**2=Custom Weir/Orifice** (Weir Controls 2.00 cfs @ 1.85 fps)
└─**3=RCP_Round 15"** (Passes 2.00 cfs of 4.73 cfs potential flow)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=966.00' TW=0.00' (Dynamic Tailwater)
└─**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 300P: Basin 300

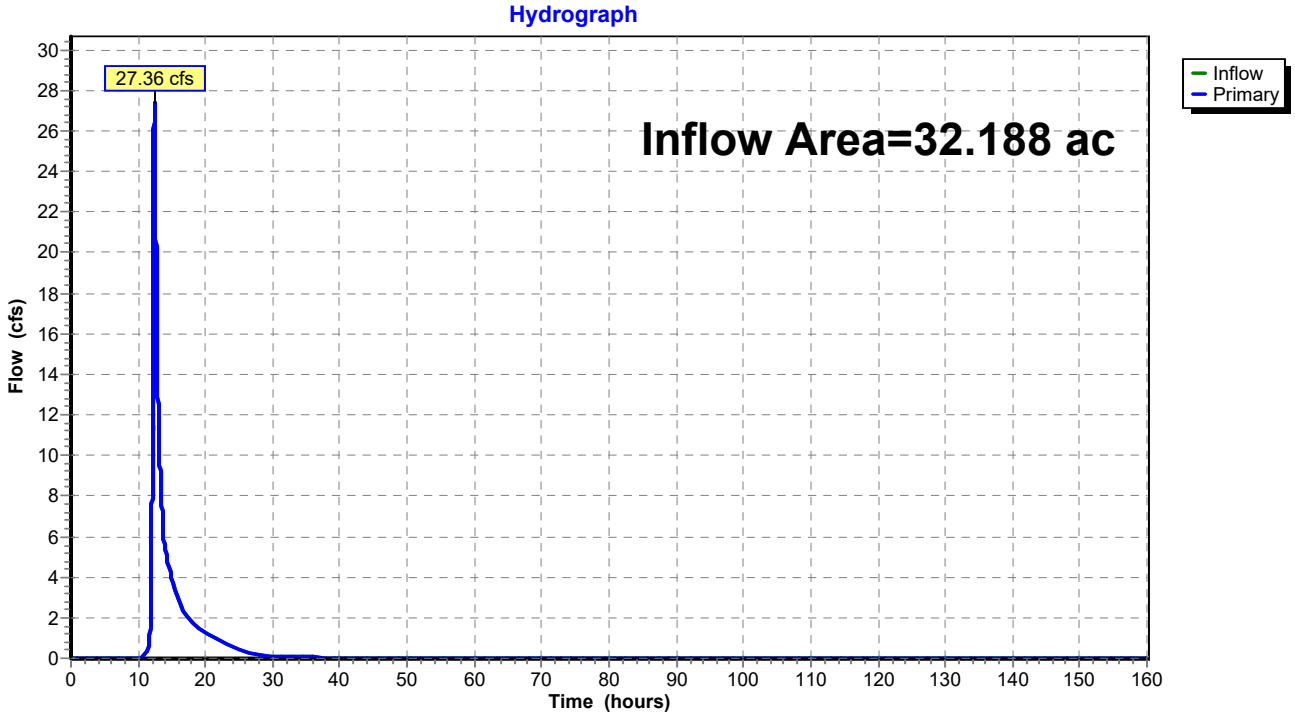


Summary for Link P-Creek: Proposed Creek

Inflow Area = 32.188 ac, 33.10% Impervious, Inflow Depth = 1.49" for 2-yr event
Inflow = 27.36 cfs @ 12.40 hrs, Volume= 3.996 af
Primary = 27.36 cfs @ 12.40 hrs, Volume= 3.996 af, Atten= 0%, Lag= 0.1 min

Primary outflow = Inflow, Time Span= 0.00-160.00 hrs, dt= 0.001 hrs

Link P-Creek: Proposed Creek

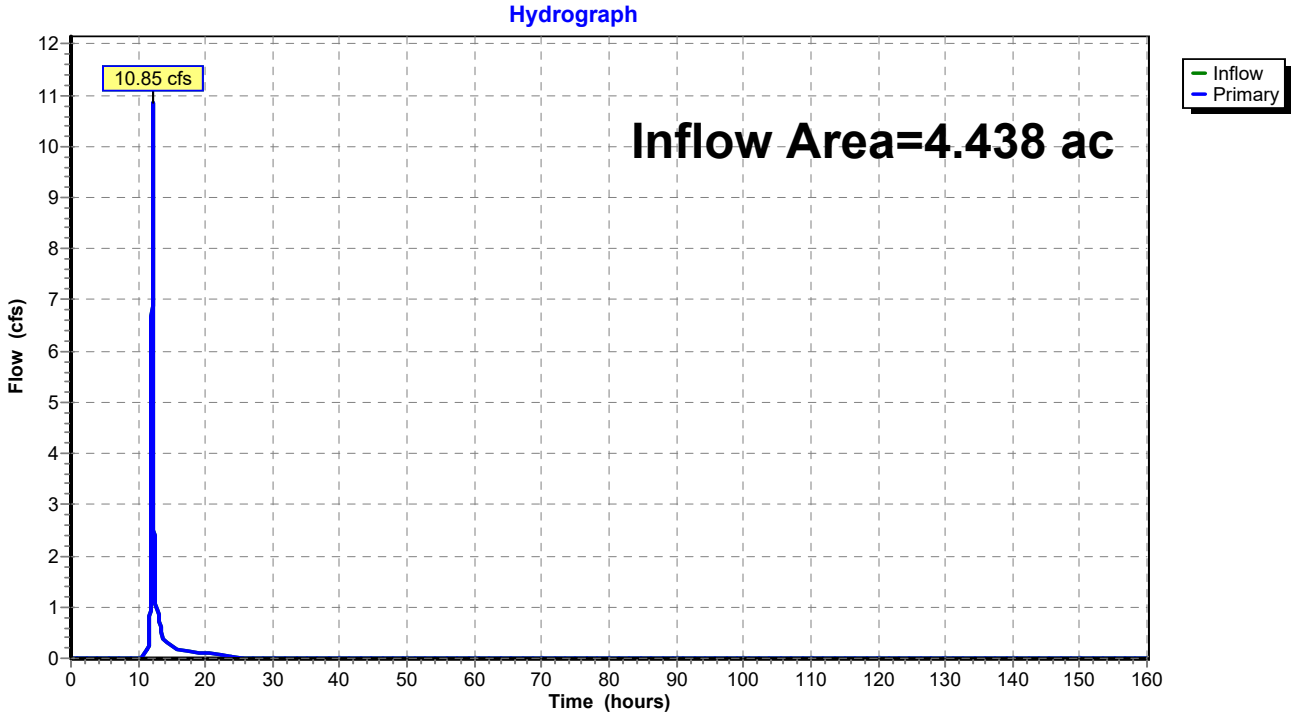


Summary for Link P-South: Proposed South

Inflow Area = 4.438 ac, 7.41% Impervious, Inflow Depth = 1.17" for 2-yr event
Inflow = 10.85 cfs @ 12.12 hrs, Volume= 0.432 af
Primary = 10.85 cfs @ 12.12 hrs, Volume= 0.432 af, Atten= 0%, Lag= 0.1 min

Primary outflow = Inflow, Time Span= 0.00-160.00 hrs, dt= 0.001 hrs

Link P-South: Proposed South

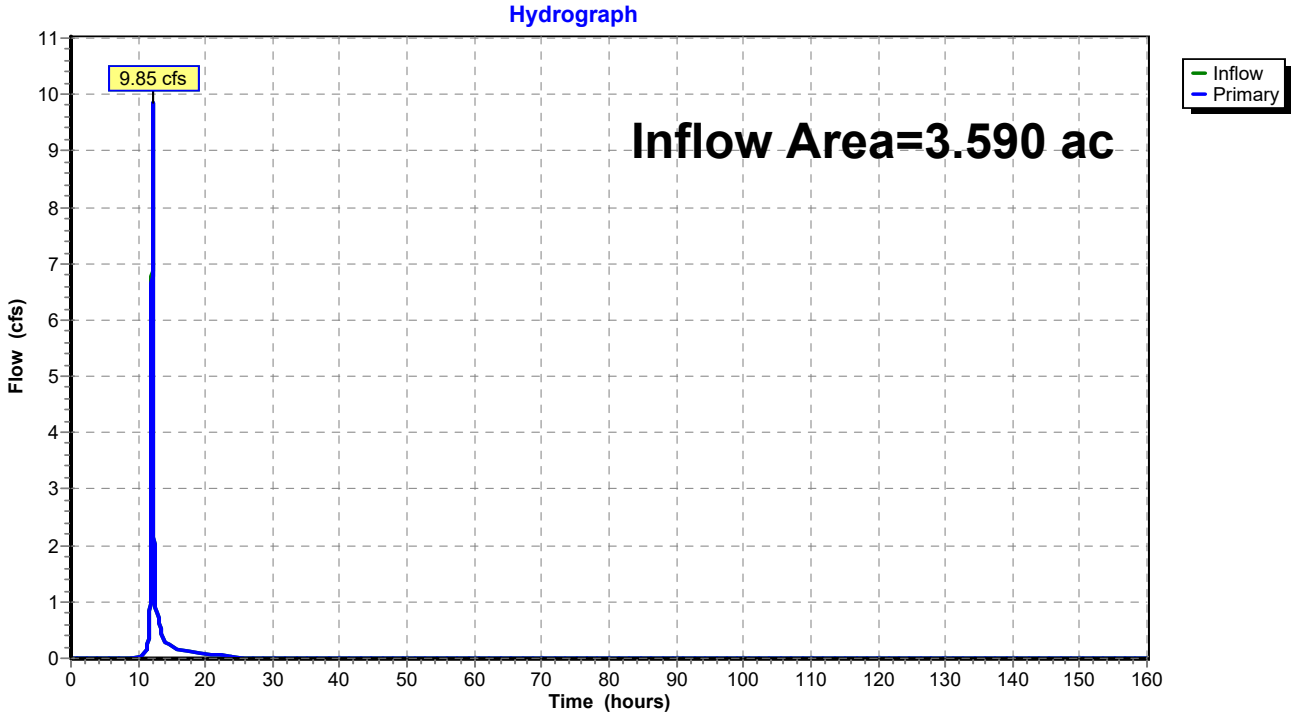


Summary for Link P-West: Proposed West

Inflow Area = 3.590 ac, 18.01% Impervious, Inflow Depth = 1.30" for 2-yr event
Inflow = 9.85 cfs @ 12.11 hrs, Volume= 0.387 af
Primary = 9.85 cfs @ 12.11 hrs, Volume= 0.387 af, Atten= 0%, Lag= 0.1 min

Primary outflow = Inflow, Time Span= 0.00-160.00 hrs, dt= 0.001 hrs

Link P-West: Proposed West



Time span=0.00-160.00 hrs, dt=0.001 hrs, 160001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Sim-Route method - Pond routing by Sim-Route method

Subcatchment 1S: N-C Catchment Runoff Area=718,098 sf 43.62% Impervious Runoff Depth=2.91"
Flow Length=975' Slope=0.0240 '/' Tc=15.3 min CN=88 Runoff=60.65 cfs 3.992 af

Subcatchment 2S: East Catchment Runoff Area=202,210 sf 41.66% Impervious Runoff Depth=2.81"
Flow Length=670' Slope=0.0310 '/' Tc=10.3 min CN=87 Runoff=19.69 cfs 1.088 af

Subcatchment 3S: South Catchment Runoff Area=82,515 sf 48.85% Impervious Runoff Depth=3.00"
Flow Length=442' Slope=0.0180 '/' Tc=9.0 min CN=89 Runoff=9.00 cfs 0.474 af

Subcatchment 4S: West Catchment Runoff Area=156,360 sf 18.01% Impervious Runoff Depth=2.45"
Flow Length=200' Slope=0.0650 '/' Tc=3.1 min CN=83 Runoff=18.16 cfs 0.733 af

Subcatchment 5S: S-C Catchment Runoff Area=75,496 sf 9.11% Impervious Runoff Depth=2.28"
Flow Length=150' Slope=0.0930 '/' Tc=2.2 min CN=81 Runoff=8.47 cfs 0.330 af

Subcatchment 6S: South Catchment Runoff Area=193,325 sf 7.41% Impervious Runoff Depth=2.28"
Flow Length=220' Slope=0.0640 '/' Tc=3.6 min CN=81 Runoff=20.78 cfs 0.844 af

Subcatchment 7S: Creek Catchment Runoff Area=323,811 sf 6.02% Impervious Runoff Depth=2.20"
Flow Length=850' Slope=0.0260 '/' Tc=17.3 min CN=80 Runoff=19.75 cfs 1.363 af

Pond 100P: Basin 100 Peak Elev=963.14' Storage=4.026 af Inflow=60.65 cfs 3.992 af
Primary=21.64 cfs 3.066 af Secondary=18.72 cfs 0.921 af Tertiary=0.00 cfs 0.000 af Outflow=40.36 cfs 3.987 af

Pond 200P: Basin 200 Peak Elev=963.08' Storage=2.232 af Inflow=19.69 cfs 1.088 af
Primary=4.00 cfs 1.084 af Secondary=0.00 cfs 0.000 af Outflow=4.00 cfs 1.084 af

Pond 300P: Basin 300 Peak Elev=966.97' Storage=0.489 af Inflow=9.00 cfs 0.474 af
Primary=3.90 cfs 0.473 af Secondary=0.00 cfs 0.000 af Outflow=3.90 cfs 0.473 af

Link P-Creek: Proposed Creek Inflow=66.46 cfs 7.236 af
Primary=66.46 cfs 7.236 af

Link P-South: Proposed South Inflow=20.78 cfs 0.844 af
Primary=20.78 cfs 0.844 af

Link P-West: Proposed West Inflow=18.16 cfs 0.733 af
Primary=18.16 cfs 0.733 af

Total Runoff Area = 40.216 ac Runoff Volume = 8.823 af Average Runoff Depth = 2.63"
71.08% Pervious = 28.585 ac 28.92% Impervious = 11.631 ac

Summary for Subcatchment 1S: N-C Catchment

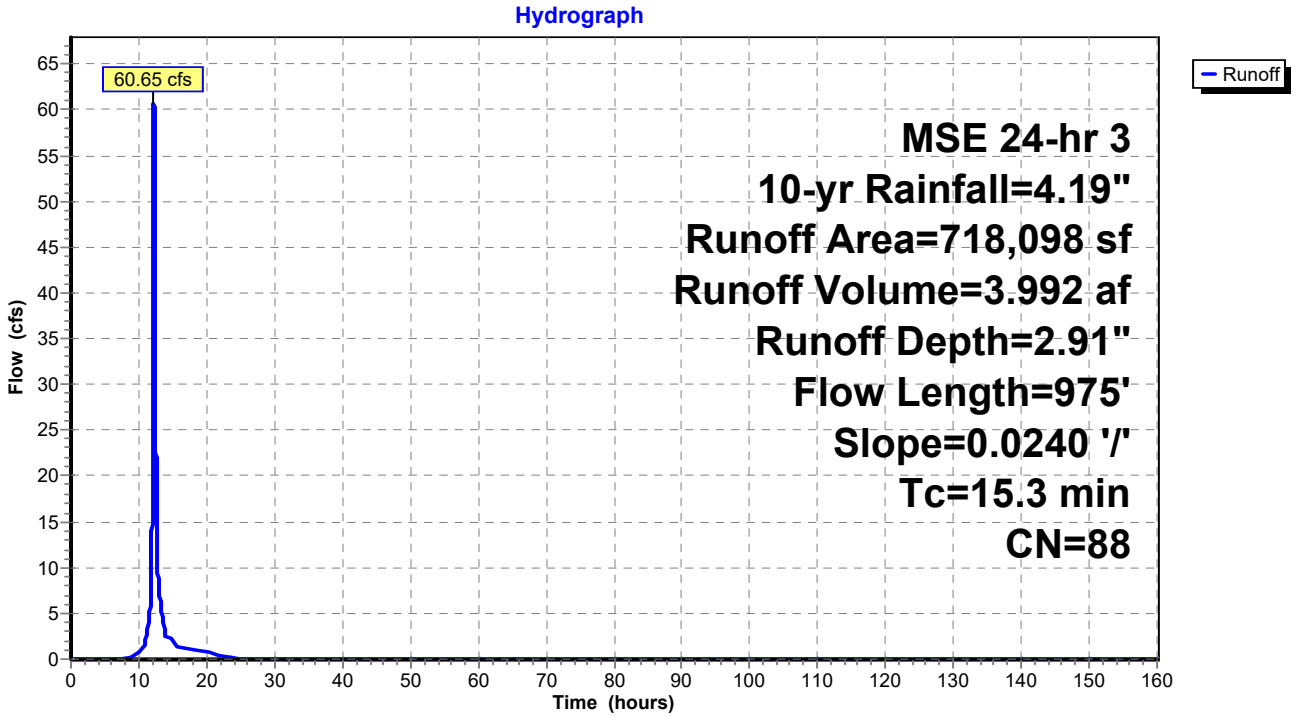
Runoff = 60.65 cfs @ 12.22 hrs, Volume= 3.992 af, Depth= 2.91"
Routed to Pond 100P : Basin 100

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-160.00 hrs, dt= 0.001 hrs
MSE 24-hr 3 10-yr Rainfall=4.19"

Area (sf)	CN	Description
404,877	80	>75% Grass cover, Good, HSG D
313,221	98	Paved parking, HSG D
0	79	Woods, Fair, HSG D
718,098	88	Weighted Average
404,877		56.38% Pervious Area
313,221		43.62% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.3	975	0.0240	1.06		**Lag/CN Method,**

Subcatchment 1S: N-C Catchment



Summary for Subcatchment 2S: East Catchment

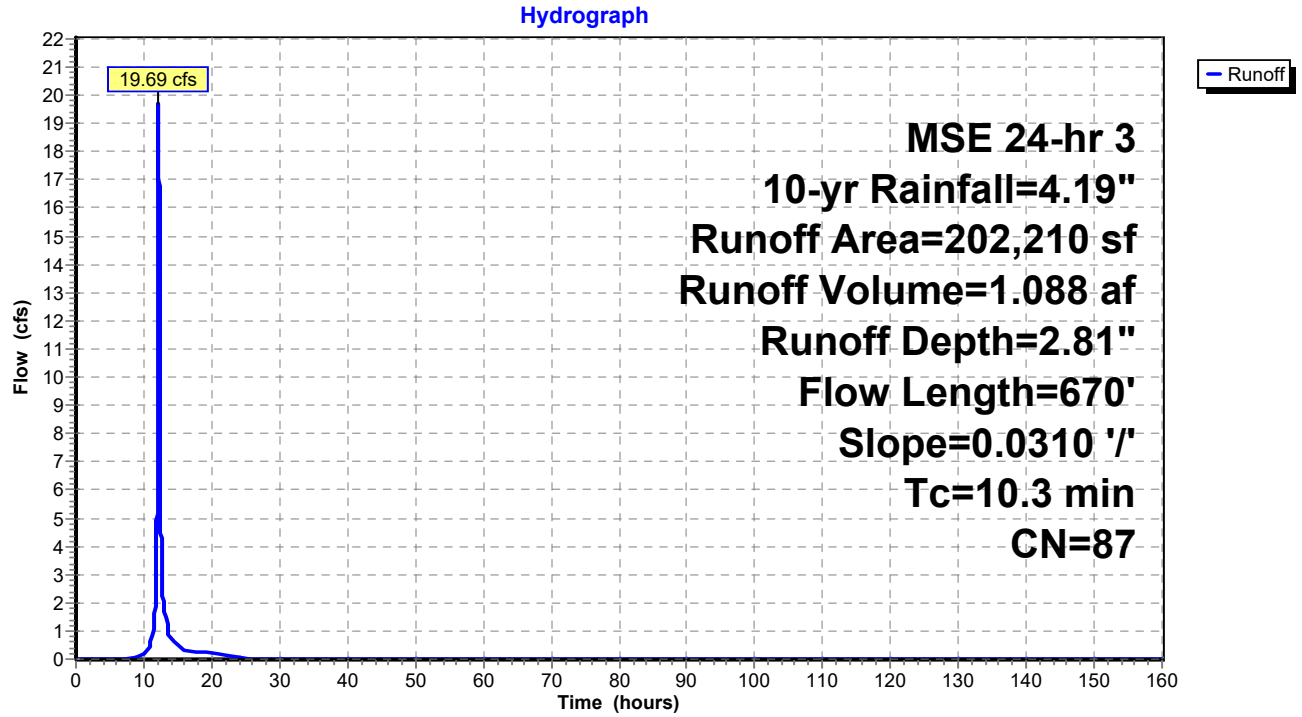
Runoff = 19.69 cfs @ 12.18 hrs, Volume= 1.088 af, Depth= 2.81"
Routed to Pond 200P : Basin 200

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-160.00 hrs, dt= 0.001 hrs
MSE 24-hr 3 10-yr Rainfall=4.19"

Area (sf)	CN	Description
117,965	80	>75% Grass cover, Good, HSG D
84,245	98	Paved parking, HSG D
0	79	Woods, Fair, HSG D
202,210	87	Weighted Average
117,965		58.34% Pervious Area
84,245		41.66% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.3	670	0.0310	1.08		**Lag/CN Method,**

Subcatchment 2S: East Catchment



Summary for Subcatchment 3S: South Catchment

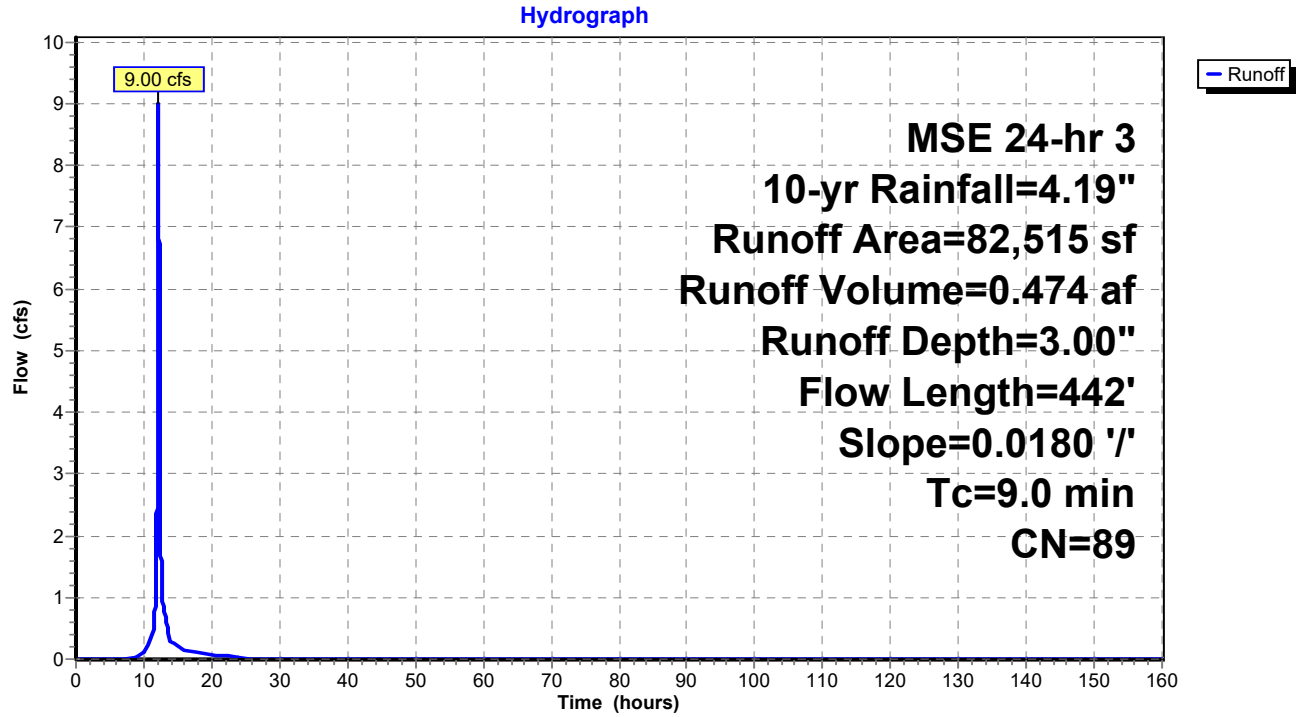
Runoff = 9.00 cfs @ 12.16 hrs, Volume= 0.474 af, Depth= 3.00"
Routed to Pond 300P : Basin 300

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-160.00 hrs, dt= 0.001 hrs
MSE 24-hr 3 10-yr Rainfall=4.19"

Area (sf)	CN	Description
42,205	80	>75% Grass cover, Good, HSG D
40,310	98	Paved parking, HSG D
0	79	Woods, Fair, HSG D
82,515	89	Weighted Average
42,205		51.15% Pervious Area
40,310		48.85% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.0	442	0.0180	0.82		**Lag/CN Method,**

Subcatchment 3S: South Catchment



Summary for Subcatchment 4S: West Catchment

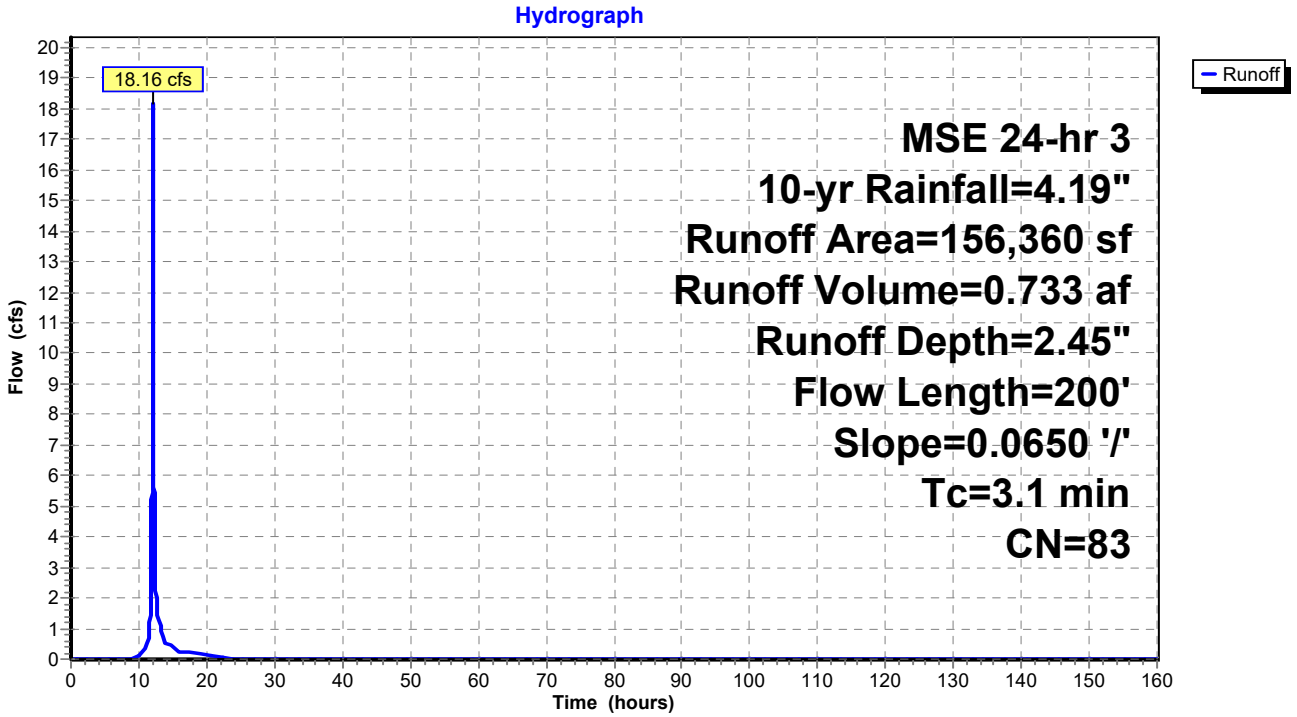
Runoff = 18.16 cfs @ 12.11 hrs, Volume= 0.733 af, Depth= 2.45"
Routed to Link P-West : Proposed West

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-160.00 hrs, dt= 0.001 hrs
MSE 24-hr 3 10-yr Rainfall=4.19"

Area (sf)	CN	Description
109,417	80	>75% Grass cover, Good, HSG D
28,163	98	Paved parking, HSG D
18,780	79	Woods, Fair, HSG D
156,360	83	Weighted Average
128,197		81.99% Pervious Area
28,163		18.01% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.1	200	0.0650	1.07		**Lag/CN Method,**

Subcatchment 4S: West Catchment



Summary for Subcatchment 5S: S-C Catchment

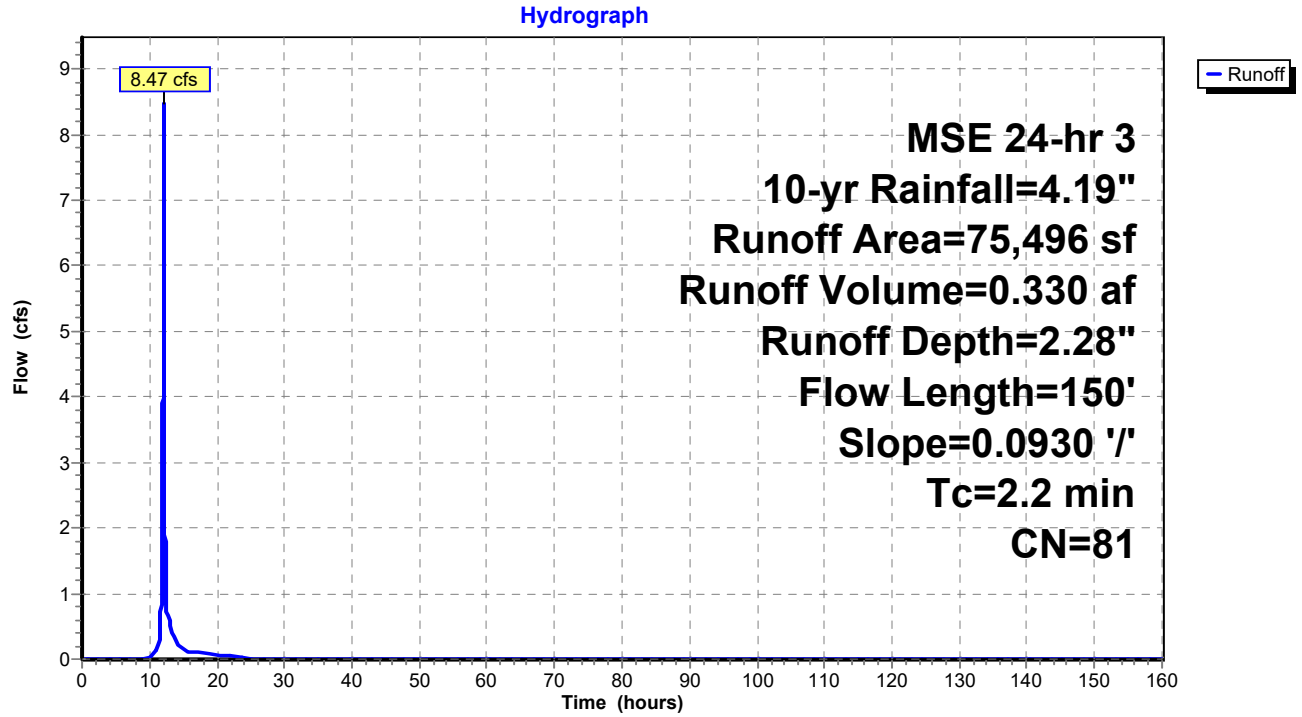
Runoff = 8.47 cfs @ 12.11 hrs, Volume= 0.330 af, Depth= 2.28"
Routed to Link P-Creek : Proposed Creek

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-160.00 hrs, dt= 0.001 hrs
MSE 24-hr 3 10-yr Rainfall=4.19"

Area (sf)	CN	Description
37,344	80	>75% Grass cover, Good, HSG D
6,876	98	Paved parking, HSG D
31,276	79	Woods, Fair, HSG D
75,496	81	Weighted Average
68,620		90.89% Pervious Area
6,876		9.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.2	150	0.0930	1.13		**Lag/CN Method,**

Subcatchment 5S: S-C Catchment



Summary for Subcatchment 6S: South Catchment

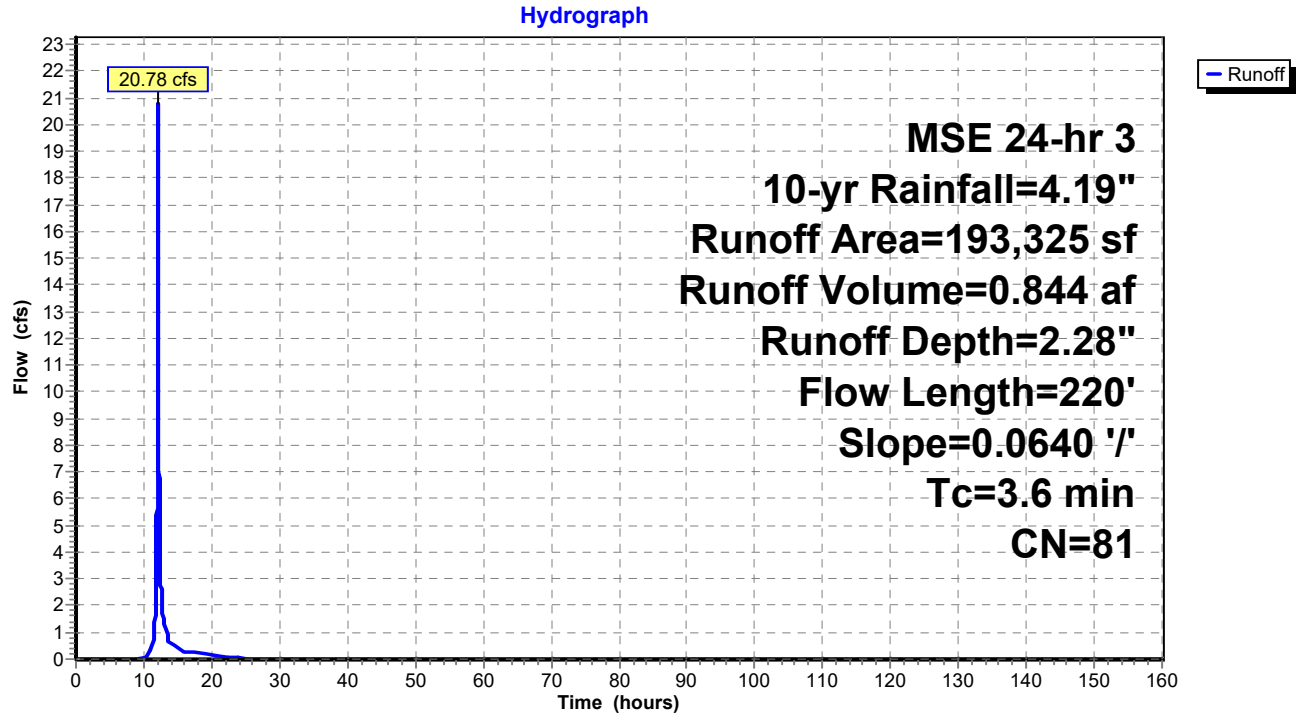
Runoff = 20.78 cfs @ 12.12 hrs, Volume= 0.844 af, Depth= 2.28"
Routed to Link P-South : Proposed South

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-160.00 hrs, dt= 0.001 hrs
MSE 24-hr 3 10-yr Rainfall=4.19"

Area (sf)	CN	Description
154,331	80	>75% Grass cover, Good, HSG D
14,333	98	Paved parking, HSG D
24,661	79	Woods, Fair, HSG D
193,325	81	Weighted Average
178,992		92.59% Pervious Area
14,333		7.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.6	220	0.0640	1.01		**Lag/CN Method,**

Subcatchment 6S: South Catchment



Summary for Subcatchment 7S: Creek Catchment

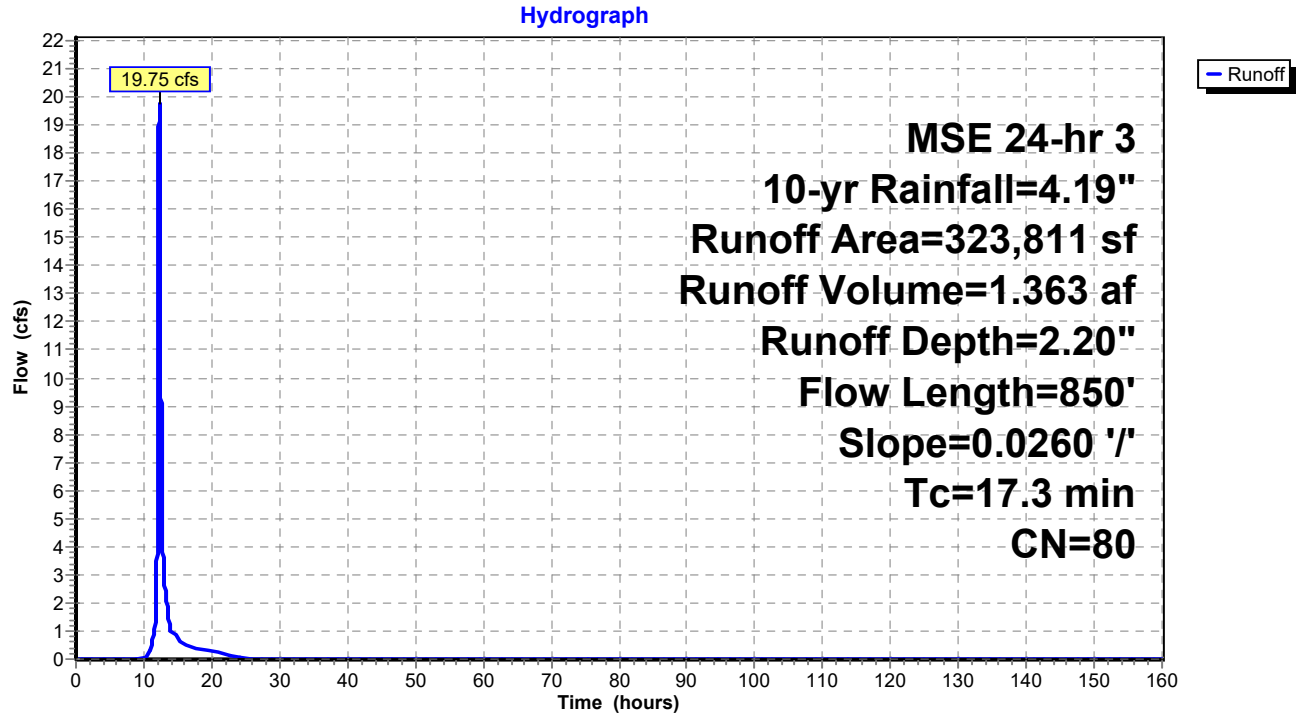
Runoff = 19.75 cfs @ 12.26 hrs, Volume= 1.363 af, Depth= 2.20"
Routed to Link P-Creek : Proposed Creek

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-160.00 hrs, dt= 0.001 hrs
MSE 24-hr 3 10-yr Rainfall=4.19"

Area (sf)	CN	Description
114,917	80	>75% Grass cover, Good, HSG D
19,500	98	Paved parking, HSG D
189,394	79	Woods, Fair, HSG D
323,811	80	Weighted Average
304,311		93.98% Pervious Area
19,500		6.02% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.3	850	0.0260	0.82		**Lag/CN Method,**

Subcatchment 7S: Creek Catchment



Summary for Pond 100P: Basin 100

Inflow Area = 16.485 ac, 43.62% Impervious, Inflow Depth = 2.91" for 10-yr event
Inflow = 60.65 cfs @ 12.22 hrs, Volume= 3.992 af
Outflow = 40.36 cfs @ 12.37 hrs, Volume= 3.987 af, Atten= 33%, Lag= 8.7 min
Primary = 21.64 cfs @ 12.37 hrs, Volume= 3.066 af
Routed to Link P-Creek : Proposed Creek
Secondary = 18.72 cfs @ 12.37 hrs, Volume= 0.921 af
Routed to Link P-Creek : Proposed Creek
Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Link P-Creek : Proposed Creek

Routing by Sim-Route method, Time Span= 0.00-160.00 hrs, dt= 0.001 hrs
Starting Elev= 961.00' Surf.Area= 0.545 ac Storage= 2.752 af
Peak Elev= 963.14' @ 12.37 hrs Surf.Area= 0.644 ac Storage= 4.026 af (1.273 af above start)

Plug-Flow detention time= 517.5 min calculated for 1.234 af (31% of inflow)
Center-of-Mass det. time= 109.9 min (905.8 - 795.9)

Volume	Invert	Avail.Storage	Storage Description
#1	951.00'	7.655 af	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
951.00	0.119	0.000	0.000
952.00	0.145	0.132	0.132
954.00	0.201	0.347	0.479
956.00	0.263	0.465	0.944
958.00	0.332	0.595	1.539
960.00	0.406	0.738	2.277
961.00	0.545	0.476	2.752
962.00	0.590	0.568	3.320
964.00	0.685	1.275	4.595
965.00	0.735	0.710	5.305
966.00	0.786	0.760	6.065
968.00	0.803	1.589	7.655

Device	Routing	Invert	Outlet Devices
#1	Primary	961.00'	**30.0" Round RCP_Round 30"** L= 50.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 961.00' / 960.50' S= 0.0100 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 4.91 sf
#2	Device 1	961.00'	**Custom Weir/Orifice, Cv= 2.62 (C= 3.28)** Head (feet) 0.00 1.05 1.05 8.00 Width (feet) 0.85 0.85 5.00 5.00
#3	Device 2	957.50'	**30.0" Round RCP_Round 30"** L= 25.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 957.50' / 957.50' S= 0.0000 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 4.91 sf
#4	Tertiary	966.00'	**15.0' 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

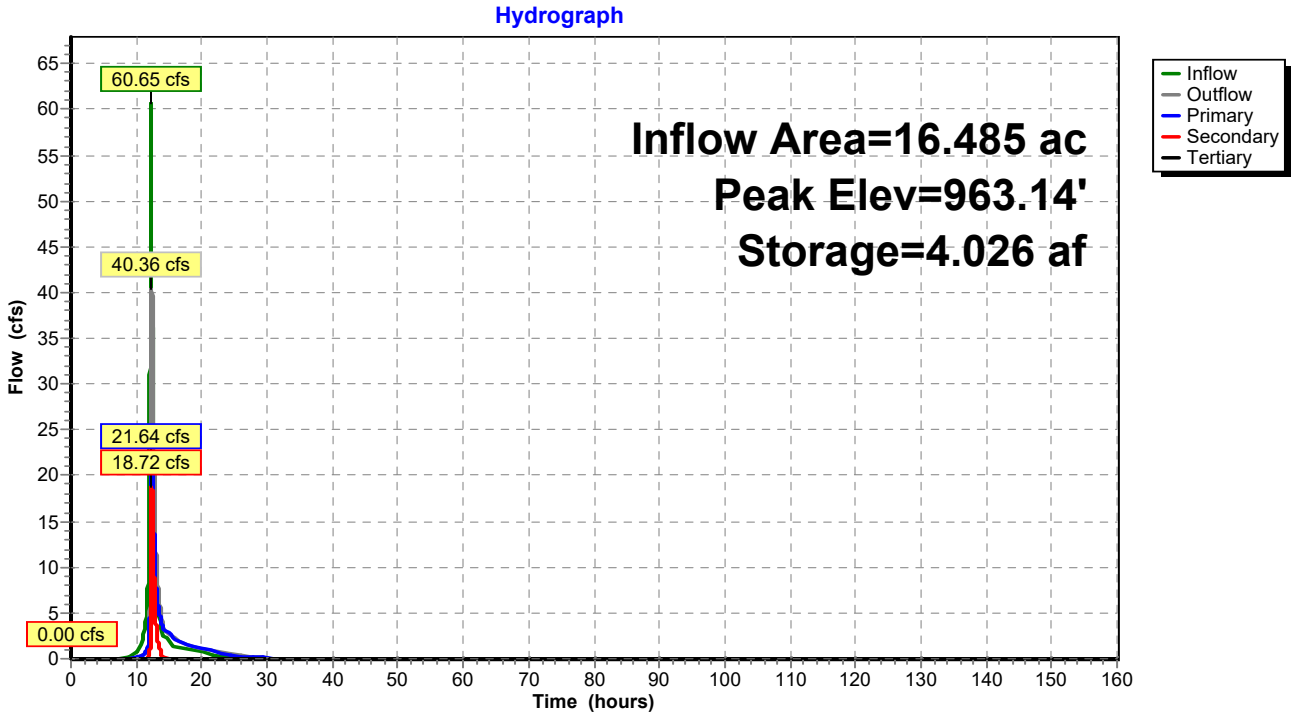
			Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
#5	Secondary	961.00'	**30.0" Round RCP_Round 30"** L= 50.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 961.00' / 960.50' S= 0.0100 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 4.91 sf
#6	Device 5	962.05'	**Custom Weir/Orifice, Cv= 2.62 (C= 3.28)** Head (feet) 0.00 5.00 Width (feet) 5.00 5.00
#7	Device 6	957.50'	**30.0" Round RCP_Round 30"** L= 25.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 957.50' / 957.50' S= 0.0000 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 4.91 sf

Primary OutFlow Max=21.64 cfs @ 12.37 hrs HW=963.14' TW=0.00' (Dynamic Tailwater)
└─**1=RCP_Round 30"** (Barrel Controls 21.64 cfs @ 6.49 fps)
└─**2=Custom Weir/Orifice** (Passes 21.64 cfs of 24.28 cfs potential flow)
└─**3=RCP_Round 30"** (Passes 21.64 cfs of 34.60 cfs potential flow)

Secondary OutFlow Max=18.72 cfs @ 12.37 hrs HW=963.14' TW=0.00' (Dynamic Tailwater)
└─**5=RCP_Round 30"** (Passes 18.72 cfs of 21.64 cfs potential flow)
└─**6=Custom Weir/Orifice** (Weir Controls 18.72 cfs @ 3.42 fps)
└─**7=RCP_Round 30"** (Passes 18.72 cfs of 24.71 cfs potential flow)

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=961.00' TW=0.00' (Dynamic Tailwater)
└─**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 100P: Basin 100



Summary for Pond 200P: Basin 200

Inflow Area = 4.642 ac, 41.66% Impervious, Inflow Depth = 2.81" for 10-yr event
Inflow = 19.69 cfs @ 12.18 hrs, Volume= 1.088 af
Outflow = 4.00 cfs @ 12.55 hrs, Volume= 1.084 af, Atten= 80%, Lag= 22.2 min
Primary = 4.00 cfs @ 12.55 hrs, Volume= 1.084 af
Routed to Link P-Creek : Proposed Creek
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Link P-Creek : Proposed Creek

Routing by Sim-Route method, Time Span= 0.00-160.00 hrs, dt= 0.001 hrs
Starting Elev= 962.00' Surf.Area= 0.480 ac Storage= 1.681 af
Peak Elev= 963.08' @ 12.55 hrs Surf.Area= 0.539 ac Storage= 2.232 af (0.552 af above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= 199.0 min (992.8 - 793.8)

Volume	Invert	Avail.Storage	Storage Description
#1	952.00'	4.760 af	**Custom Stage Data (Prismatic)**Listed below (Recalc)

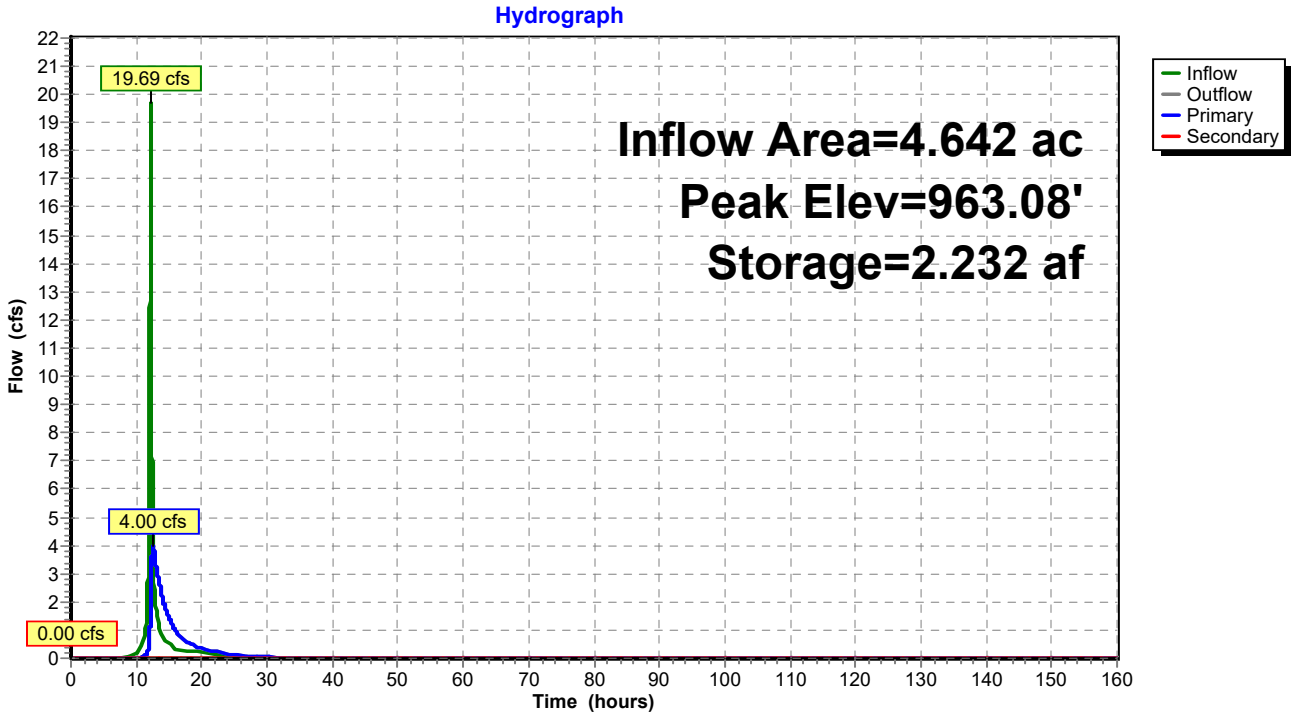
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
952.00	0.023	0.000	0.000
954.00	0.059	0.081	0.081
956.00	0.110	0.168	0.250
958.00	0.183	0.293	0.543
960.00	0.267	0.451	0.994
961.00	0.313	0.290	1.284
962.00	0.480	0.397	1.681
964.00	0.589	1.069	2.750
965.00	0.646	0.618	3.367
966.00	0.702	0.674	4.042
967.00	0.735	0.719	4.760

Device	Routing	Invert	Outlet Devices
#1	Primary	962.00'	**15.0" Round RCP_Round 15"** L= 25.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 962.00' / 961.50' S= 0.0200 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.23 sf
#2	Device 1	962.00'	**Custom Weir/Orifice, Cv= 2.62 (C= 3.28)** Head (feet) 0.00 1.00 1.00 8.00 Width (feet) 1.00 1.00 5.00 5.00
#3	Device 2	959.75'	**15.0" Round RCP_Round 15"** L= 25.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 959.75' / 959.75' S= 0.0000 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.23 sf
#4	Secondary	966.00'	**25.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=4.00 cfs @ 12.55 hrs HW=963.08' TW=0.00' (Dynamic Tailwater)
└─**1=RCP_Round 15"** (Passes 4.00 cfs of 4.58 cfs potential flow)
└─**2=Custom Weir/Orifice** (Weir Controls 4.00 cfs @ 2.83 fps)
└─**3=RCP_Round 15"** (Passes 4.00 cfs of 6.15 cfs potential flow)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=962.00' TW=0.00' (Dynamic Tailwater)
└─**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 200P: Basin 200



Summary for Pond 300P: Basin 300

Inflow Area = 1.894 ac, 48.85% Impervious, Inflow Depth = 3.00" for 10-yr event
Inflow = 9.00 cfs @ 12.16 hrs, Volume= 0.474 af
Outflow = 3.90 cfs @ 12.31 hrs, Volume= 0.473 af, Atten= 57%, Lag= 9.1 min
Primary = 3.90 cfs @ 12.31 hrs, Volume= 0.473 af
Routed to Link P-Creek : Proposed Creek
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Link P-Creek : Proposed Creek

Routing by Sim-Route method, Time Span= 0.00-160.00 hrs, dt= 0.001 hrs
Starting Elev= 966.00' Surf.Area= 0.160 ac Storage= 0.317 af
Peak Elev= 966.97' @ 12.31 hrs Surf.Area= 0.196 ac Storage= 0.489 af (0.172 af above start)

Plug-Flow detention time= 418.8 min calculated for 0.157 af (33% of inflow)
Center-of-Mass det. time= 86.9 min (874.3 - 787.5)

Volume	Invert	Avail.Storage	Storage Description
#1	958.00'	1.594 af	**Custom Stage Data (Prismatic)**Listed below (Recalc)

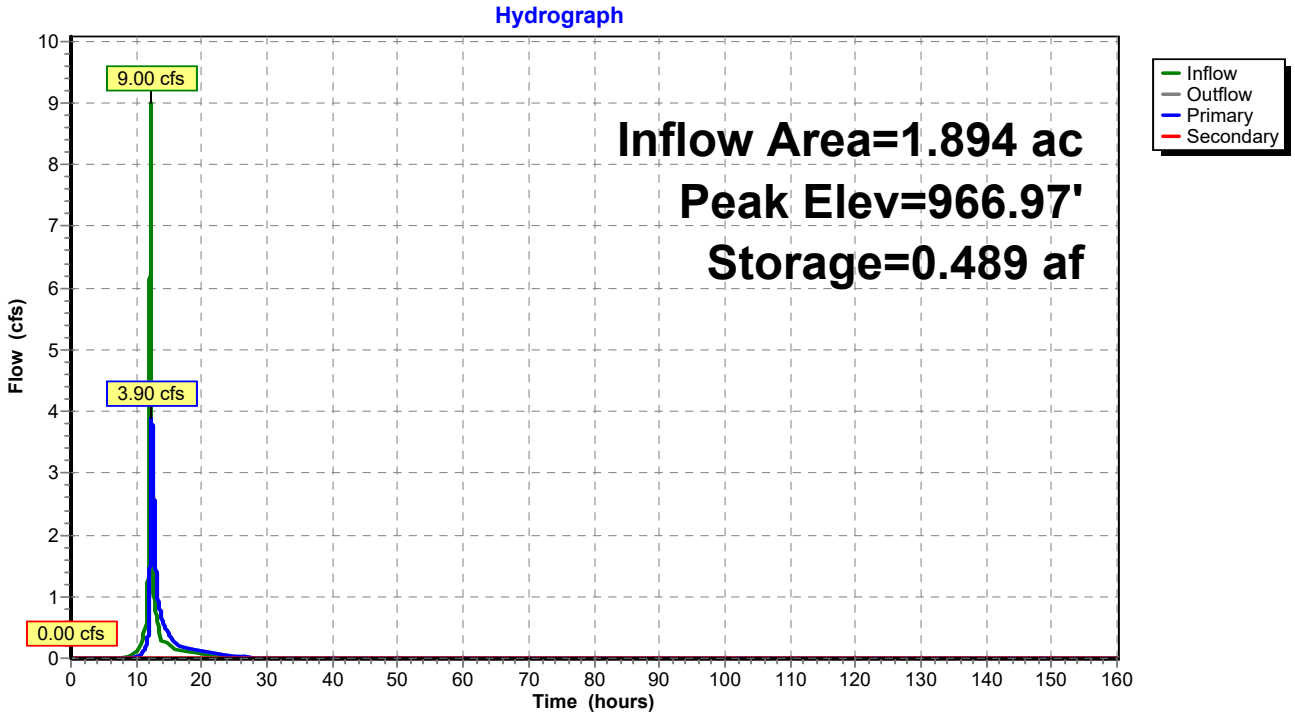
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
958.00	0.003	0.000	0.000
960.00	0.012	0.015	0.015
962.00	0.029	0.041	0.056
964.00	0.053	0.083	0.139
965.00	0.071	0.062	0.201
966.00	0.160	0.116	0.317
968.00	0.234	0.394	0.711
970.00	0.316	0.550	1.261
971.00	0.351	0.333	1.594

Device	Routing	Invert	Outlet Devices
#1	Primary	966.00'	**15.0" Round RCP_Round 15"** L= 25.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 966.00' / 965.50' S= 0.0200 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.23 sf
#2	Device 1	966.00'	**Custom Weir/Orifice, Cv= 2.62 (C= 3.28)** Head (feet) 0.00 0.50 0.50 5.00 Width (feet) 0.75 0.75 5.00 5.00
#3	Device 2	963.75'	**15.0" Round RCP_Round 15"** L= 30.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 963.75' / 963.75' S= 0.0000 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.23 sf
#4	Secondary	970.00'	**25.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=3.90 cfs @ 12.31 hrs HW=966.97' TW=0.00' (Dynamic Tailwater)
└─**1=RCP_Round 15"** (Barrel Controls 3.90 cfs @ 5.27 fps)
└─**2=Custom Weir/Orifice** (Passes 3.90 cfs of 6.81 cfs potential flow)
└─**3=RCP_Round 15"** (Passes 3.90 cfs of 5.82 cfs potential flow)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=966.00' TW=0.00' (Dynamic Tailwater)
└─**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 300P: Basin 300

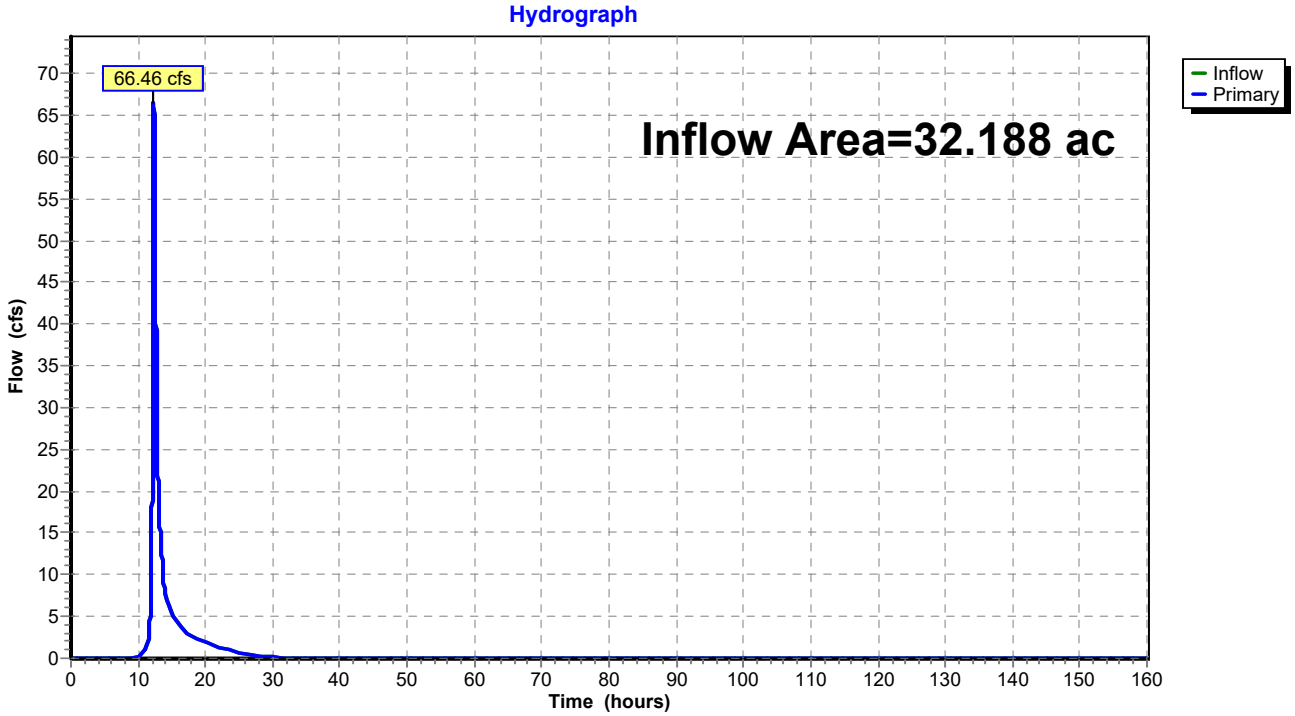


Summary for Link P-Creek: Proposed Creek

Inflow Area = 32.188 ac, 33.10% Impervious, Inflow Depth = 2.70" for 10-yr event
Inflow = 66.46 cfs @ 12.32 hrs, Volume= 7.236 af
Primary = 66.46 cfs @ 12.32 hrs, Volume= 7.236 af, Atten= 0%, Lag= 0.1 min

Primary outflow = Inflow, Time Span= 0.00-160.00 hrs, dt= 0.001 hrs

Link P-Creek: Proposed Creek

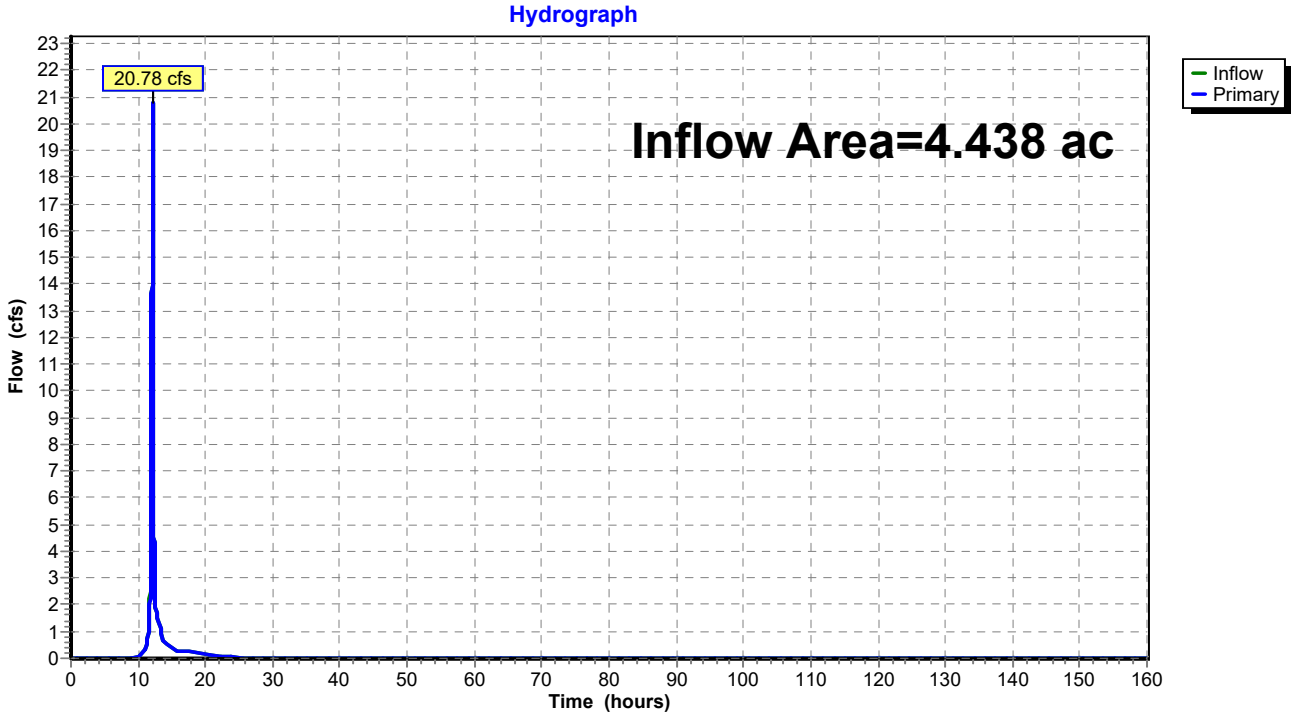


Summary for Link P-South: Proposed South

Inflow Area = 4.438 ac, 7.41% Impervious, Inflow Depth = 2.28" for 10-yr event
Inflow = 20.78 cfs @ 12.12 hrs, Volume= 0.844 af
Primary = 20.78 cfs @ 12.12 hrs, Volume= 0.844 af, Atten= 0%, Lag= 0.1 min

Primary outflow = Inflow, Time Span= 0.00-160.00 hrs, dt= 0.001 hrs

Link P-South: Proposed South

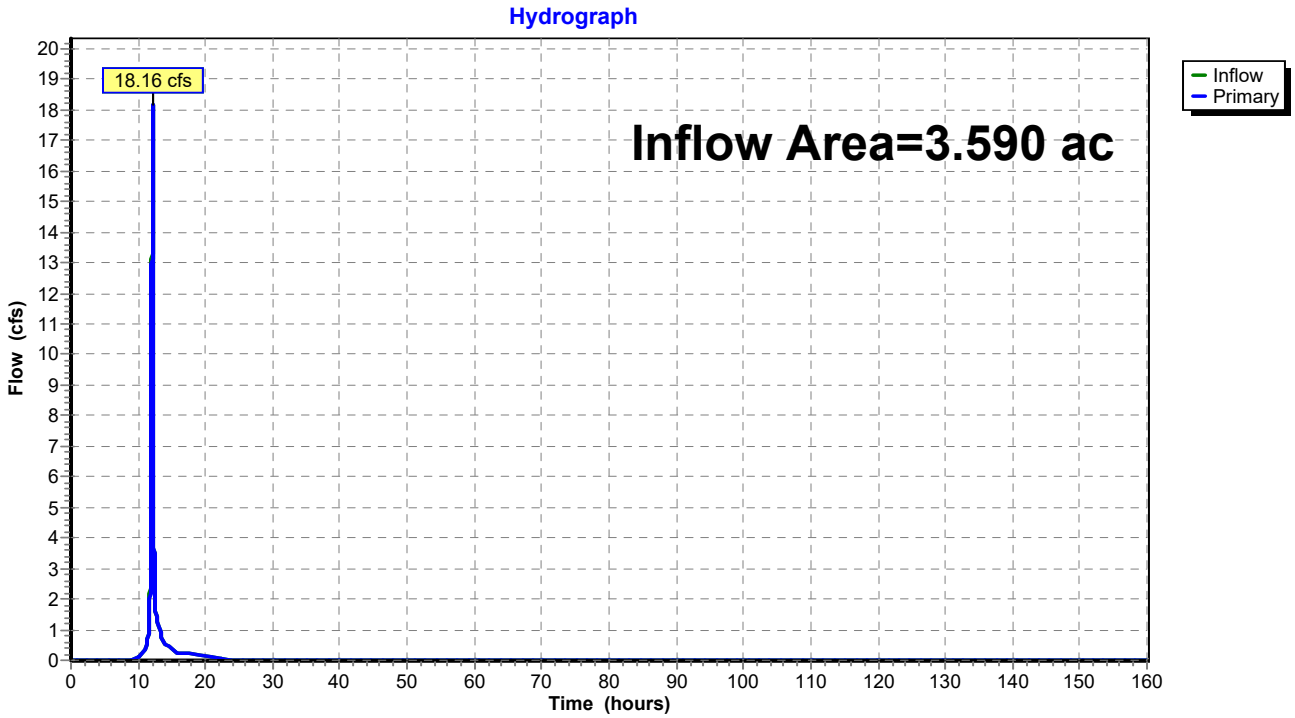


Summary for Link P-West: Proposed West

Inflow Area = 3.590 ac, 18.01% Impervious, Inflow Depth = 2.45" for 10-yr event
Inflow = 18.16 cfs @ 12.11 hrs, Volume= 0.733 af
Primary = 18.16 cfs @ 12.11 hrs, Volume= 0.733 af, Atten= 0%, Lag= 0.1 min

Primary outflow = Inflow, Time Span= 0.00-160.00 hrs, dt= 0.001 hrs

Link P-West: Proposed West



Time span=0.00-160.00 hrs, dt=0.001 hrs, 160001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Sim-Route method - Pond routing by Sim-Route method

Subcatchment 1S: N-C Catchment Runoff Area=718,098 sf 43.62% Impervious Runoff Depth=6.05"
Flow Length=975' Slope=0.0240 '/' Tc=15.3 min CN=88 Runoff=122.12 cfs 8.312 af

Subcatchment 2S: East Catchment Runoff Area=202,210 sf 41.66% Impervious Runoff Depth=5.93"
Flow Length=670' Slope=0.0310 '/' Tc=10.3 min CN=87 Runoff=39.98 cfs 2.296 af

Subcatchment 3S: South Catchment Runoff Area=82,515 sf 48.85% Impervious Runoff Depth=6.17"
Flow Length=442' Slope=0.0180 '/' Tc=9.0 min CN=89 Runoff=17.73 cfs 0.974 af

Subcatchment 4S: West Catchment Runoff Area=156,360 sf 18.01% Impervious Runoff Depth=5.47"
Flow Length=200' Slope=0.0650 '/' Tc=3.1 min CN=83 Runoff=38.54 cfs 1.637 af

Subcatchment 5S: S-C Catchment Runoff Area=75,496 sf 9.11% Impervious Runoff Depth=5.24"
Flow Length=150' Slope=0.0930 '/' Tc=2.2 min CN=81 Runoff=18.38 cfs 0.757 af

Subcatchment 6S: South Catchment Runoff Area=193,325 sf 7.41% Impervious Runoff Depth=5.24"
Flow Length=220' Slope=0.0640 '/' Tc=3.6 min CN=81 Runoff=45.56 cfs 1.939 af

Subcatchment 7S: Creek Catchment Runoff Area=323,811 sf 6.02% Impervious Runoff Depth=5.13"
Flow Length=850' Slope=0.0260 '/' Tc=17.3 min CN=80 Runoff=45.38 cfs 3.178 af

Pond 100P: Basin 100 Peak Elev=964.48' Storage=4.930 af Inflow=122.12 cfs 8.312 af
Primary=37.17 cfs 5.617 af Secondary=36.85 cfs 2.690 af Tertiary=0.00 cfs 0.000 af Outflow=74.01 cfs 8.307 af

Pond 200P: Basin 200 Peak Elev=964.08' Storage=2.796 af Inflow=39.98 cfs 2.296 af
Primary=8.50 cfs 2.292 af Secondary=0.00 cfs 0.000 af Outflow=8.50 cfs 2.292 af

Pond 300P: Basin 300 Peak Elev=967.68' Storage=0.638 af Inflow=17.73 cfs 0.974 af
Primary=7.13 cfs 0.973 af Secondary=0.00 cfs 0.000 af Outflow=7.13 cfs 0.973 af

Link P-Creek: Proposed Creek Inflow=133.87 cfs 15.507 af
Primary=133.87 cfs 15.507 af

Link P-South: Proposed South Inflow=45.56 cfs 1.939 af
Primary=45.56 cfs 1.939 af

Link P-West: Proposed West Inflow=38.54 cfs 1.637 af
Primary=38.54 cfs 1.637 af

Total Runoff Area = 40.216 ac Runoff Volume = 19.094 af Average Runoff Depth = 5.70"
71.08% Pervious = 28.585 ac 28.92% Impervious = 11.631 ac

Summary for Subcatchment 1S: N-C Catchment

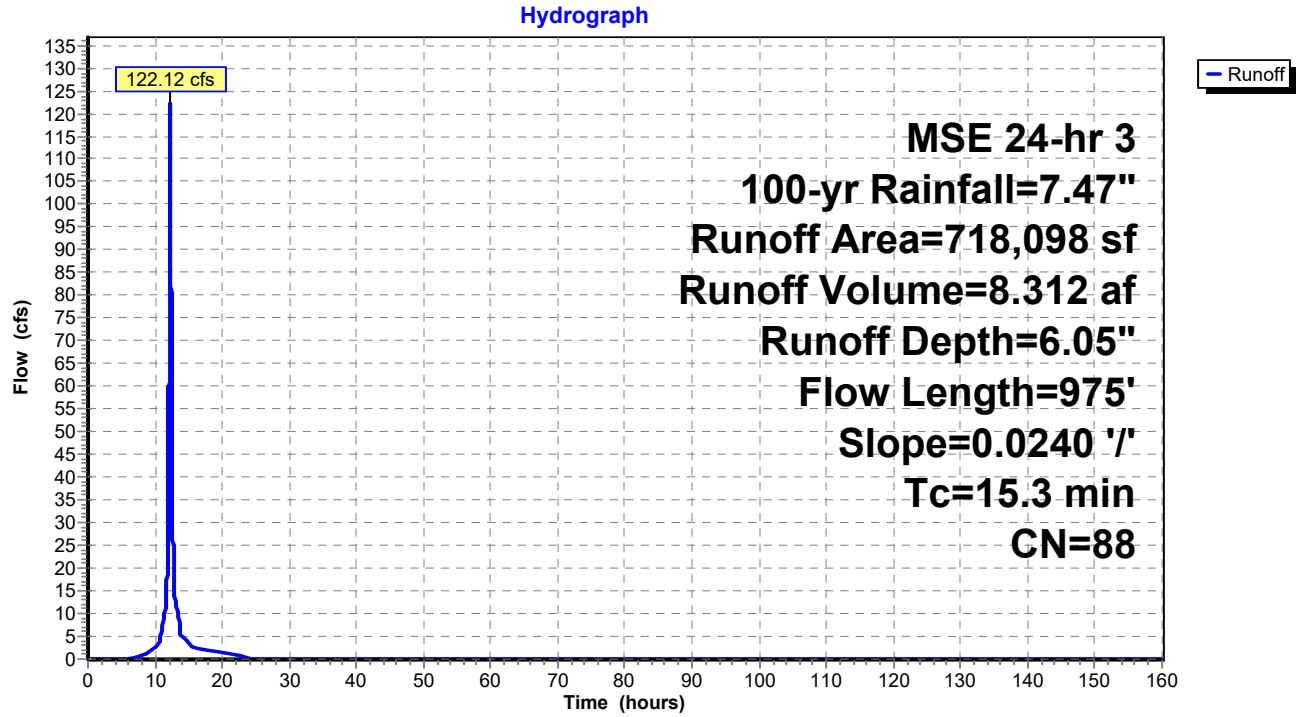
Runoff = 122.12 cfs @ 12.22 hrs, Volume= 8.312 af, Depth= 6.05"
Routed to Pond 100P : Basin 100

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-160.00 hrs, dt= 0.001 hrs
MSE 24-hr 3 100-yr Rainfall=7.47"

Area (sf)	CN	Description
404,877	80	>75% Grass cover, Good, HSG D
313,221	98	Paved parking, HSG D
0	79	Woods, Fair, HSG D
718,098	88	Weighted Average
404,877		56.38% Pervious Area
313,221		43.62% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.3	975	0.0240	1.06		**Lag/CN Method,**

Subcatchment 1S: N-C Catchment



Summary for Subcatchment 2S: East Catchment

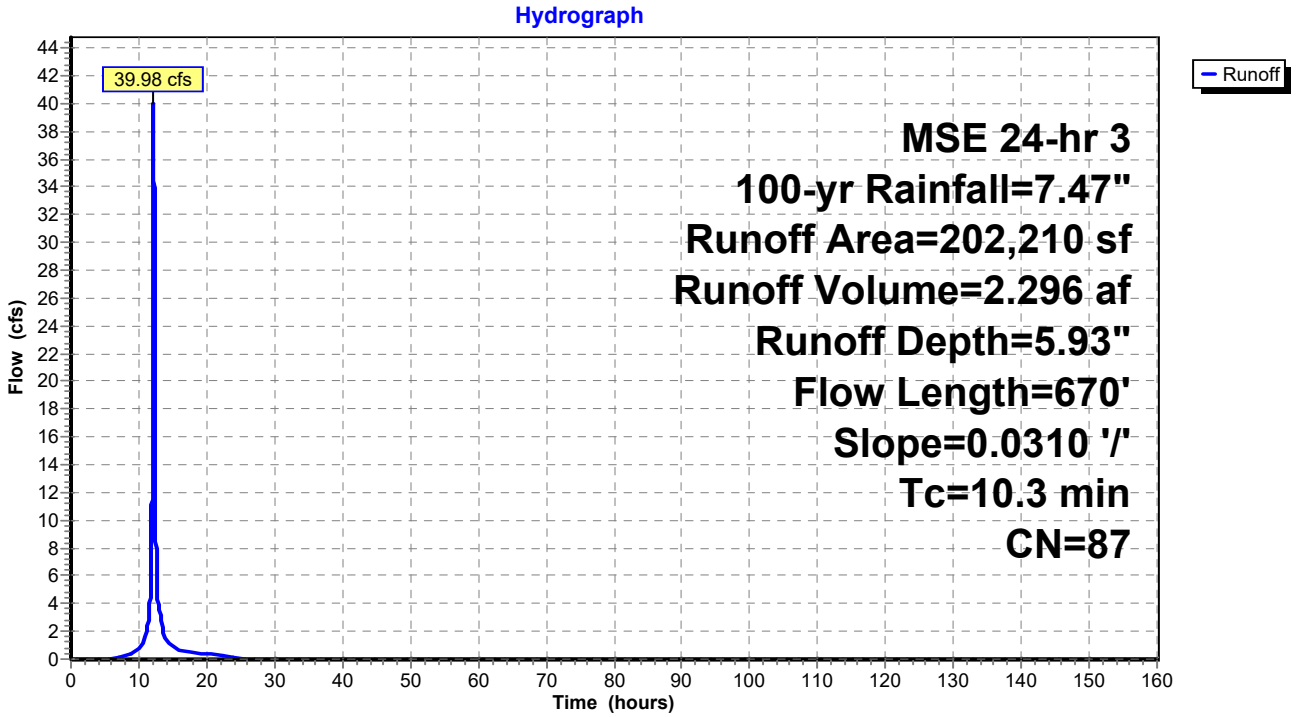
Runoff = 39.98 cfs @ 12.18 hrs, Volume= 2.296 af, Depth= 5.93"
Routed to Pond 200P : Basin 200

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-160.00 hrs, dt= 0.001 hrs
MSE 24-hr 3 100-yr Rainfall=7.47"

Area (sf)	CN	Description
117,965	80	>75% Grass cover, Good, HSG D
84,245	98	Paved parking, HSG D
0	79	Woods, Fair, HSG D
202,210	87	Weighted Average
117,965		58.34% Pervious Area
84,245		41.66% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.3	670	0.0310	1.08		**Lag/CN Method,**

Subcatchment 2S: East Catchment



Summary for Subcatchment 3S: South Catchment

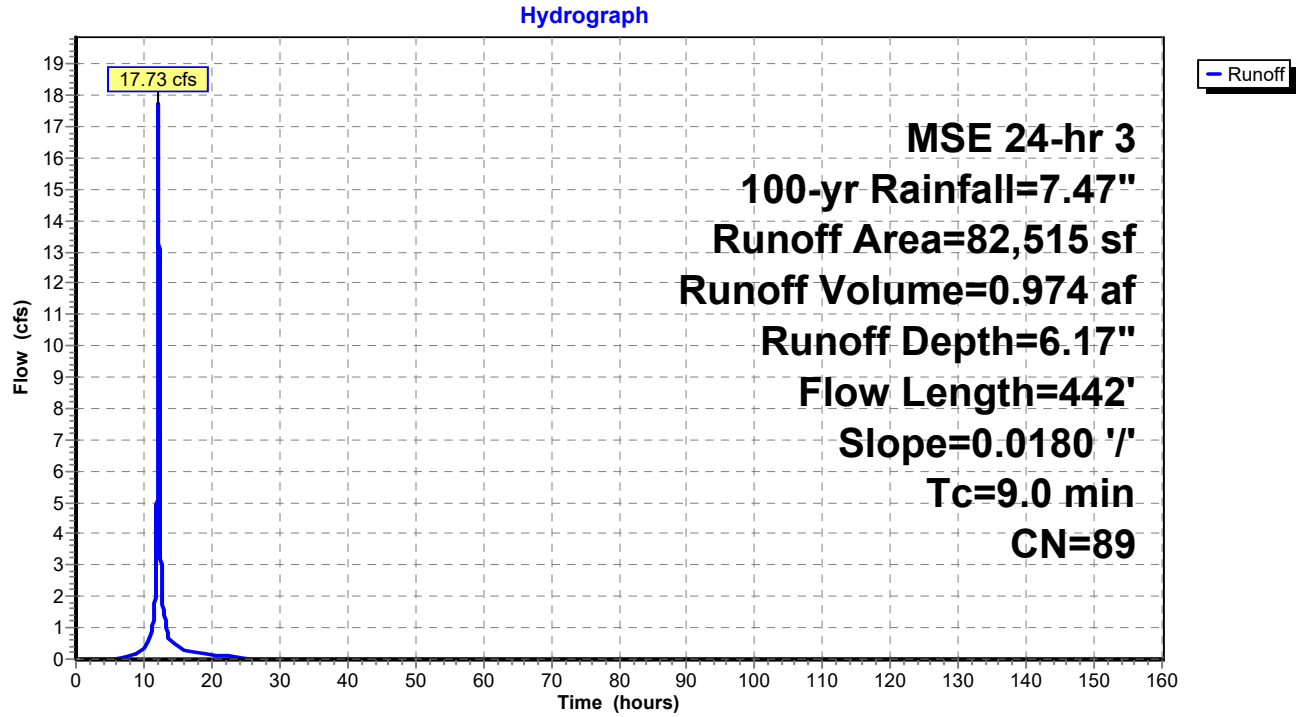
Runoff = 17.73 cfs @ 12.16 hrs, Volume= 0.974 af, Depth= 6.17"
Routed to Pond 300P : Basin 300

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-160.00 hrs, dt= 0.001 hrs
MSE 24-hr 3 100-yr Rainfall=7.47"

Area (sf)	CN	Description
42,205	80	>75% Grass cover, Good, HSG D
40,310	98	Paved parking, HSG D
0	79	Woods, Fair, HSG D
82,515	89	Weighted Average
42,205		51.15% Pervious Area
40,310		48.85% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.0	442	0.0180	0.82		**Lag/CN Method,**

Subcatchment 3S: South Catchment



Summary for Subcatchment 4S: West Catchment

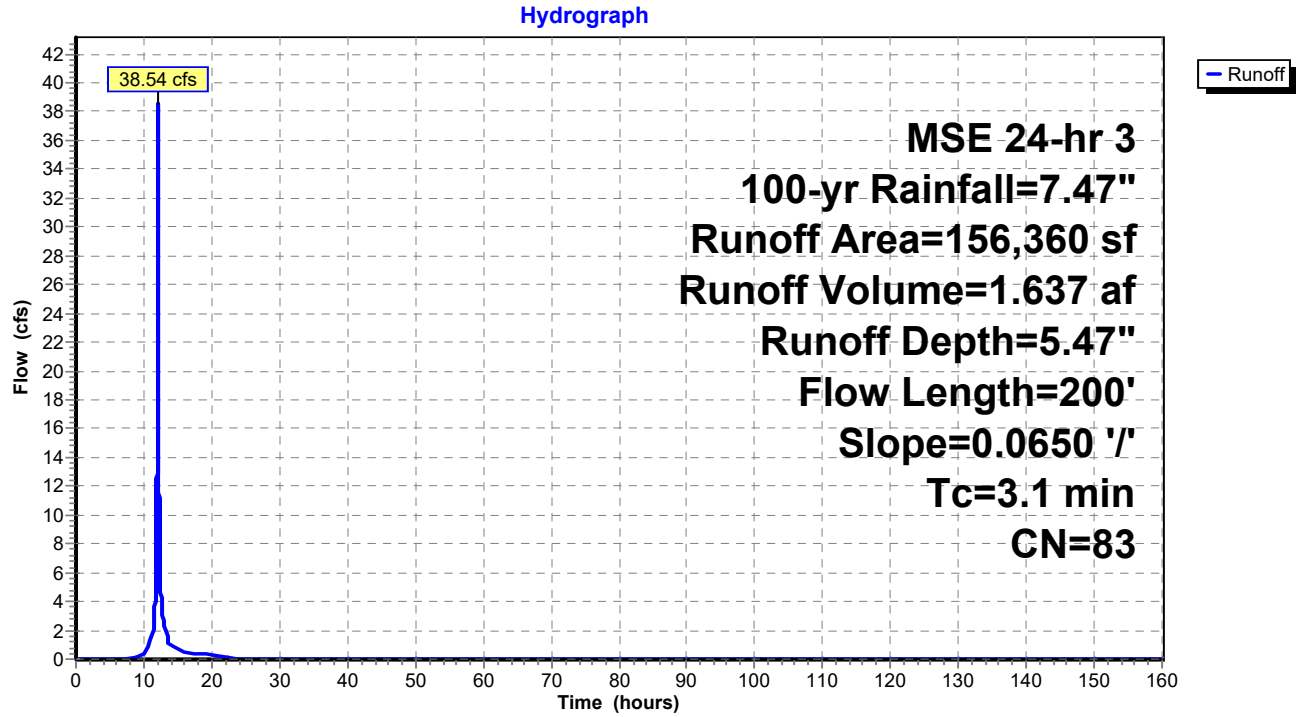
Runoff = 38.54 cfs @ 12.11 hrs, Volume= 1.637 af, Depth= 5.47"
Routed to Link P-West : Proposed West

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-160.00 hrs, dt= 0.001 hrs
MSE 24-hr 3 100-yr Rainfall=7.47"

Area (sf)	CN	Description
109,417	80	>75% Grass cover, Good, HSG D
28,163	98	Paved parking, HSG D
18,780	79	Woods, Fair, HSG D
156,360	83	Weighted Average
128,197		81.99% Pervious Area
28,163		18.01% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.1	200	0.0650	1.07		**Lag/CN Method,**

Subcatchment 4S: West Catchment



Summary for Subcatchment 5S: S-C Catchment

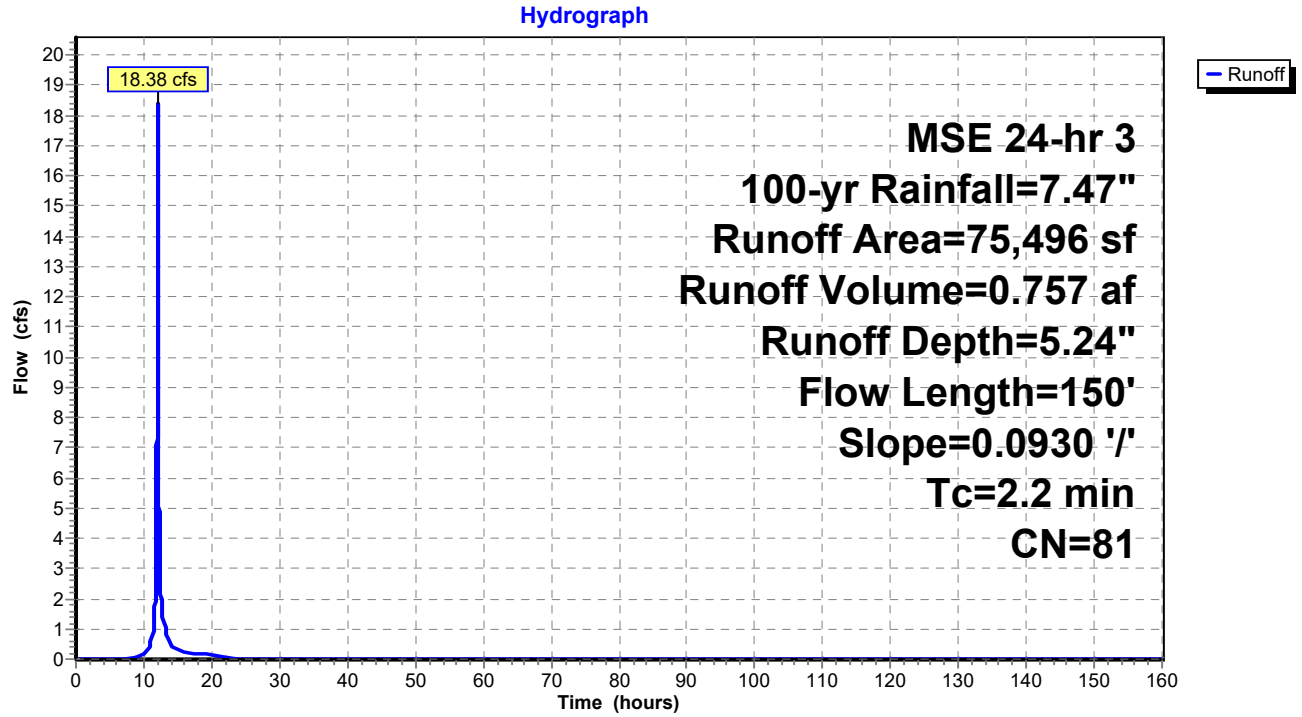
Runoff = 18.38 cfs @ 12.11 hrs, Volume= 0.757 af, Depth= 5.24"
Routed to Link P-Creek : Proposed Creek

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-160.00 hrs, dt= 0.001 hrs
MSE 24-hr 3 100-yr Rainfall=7.47"

Area (sf)	CN	Description
37,344	80	>75% Grass cover, Good, HSG D
6,876	98	Paved parking, HSG D
31,276	79	Woods, Fair, HSG D
75,496	81	Weighted Average
68,620		90.89% Pervious Area
6,876		9.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.2	150	0.0930	1.13		**Lag/CN Method,**

Subcatchment 5S: S-C Catchment



Summary for Subcatchment 6S: South Catchment

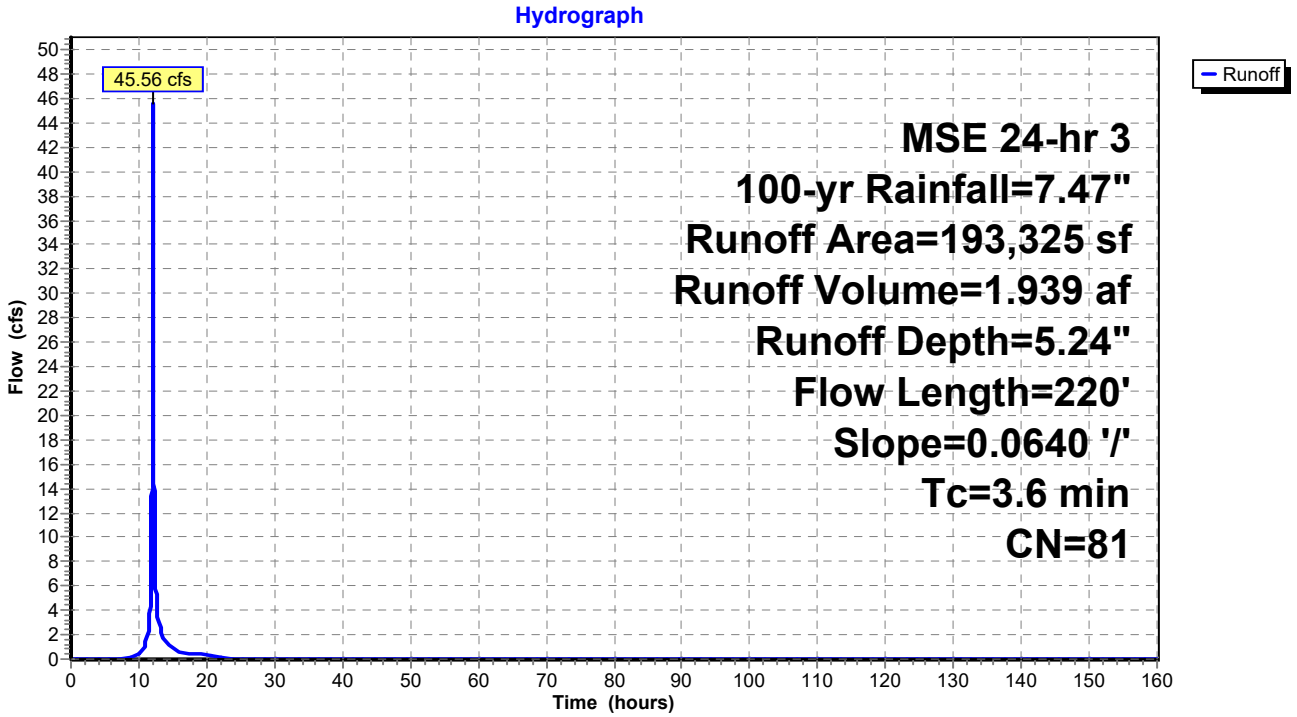
Runoff = 45.56 cfs @ 12.11 hrs, Volume= 1.939 af, Depth= 5.24"
Routed to Link P-South : Proposed South

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-160.00 hrs, dt= 0.001 hrs
MSE 24-hr 3 100-yr Rainfall=7.47"

Area (sf)	CN	Description
154,331	80	>75% Grass cover, Good, HSG D
14,333	98	Paved parking, HSG D
24,661	79	Woods, Fair, HSG D
193,325	81	Weighted Average
178,992		92.59% Pervious Area
14,333		7.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.6	220	0.0640	1.01		**Lag/CN Method,**

Subcatchment 6S: South Catchment



Summary for Subcatchment 7S: Creek Catchment

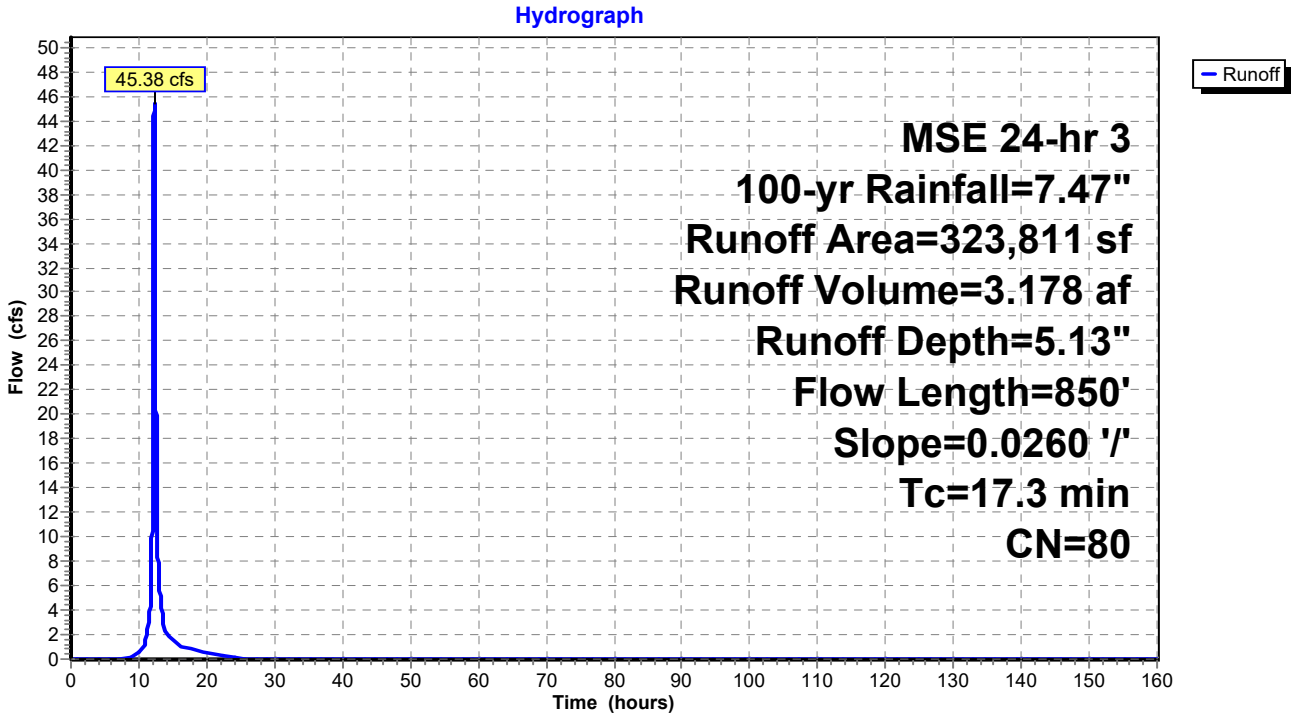
Runoff = 45.38 cfs @ 12.25 hrs, Volume= 3.178 af, Depth= 5.13"
Routed to Link P-Creek : Proposed Creek

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-160.00 hrs, dt= 0.001 hrs
MSE 24-hr 3 100-yr Rainfall=7.47"

Area (sf)	CN	Description
114,917	80	>75% Grass cover, Good, HSG D
19,500	98	Paved parking, HSG D
189,394	79	Woods, Fair, HSG D
323,811	80	Weighted Average
304,311		93.98% Pervious Area
19,500		6.02% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.3	850	0.0260	0.82		**Lag/CN Method,**

Subcatchment 7S: Creek Catchment



Summary for Pond 100P: Basin 100

Inflow Area = 16.485 ac, 43.62% Impervious, Inflow Depth = 6.05" for 100-yr event
Inflow = 122.12 cfs @ 12.22 hrs, Volume= 8.312 af
Outflow = 74.01 cfs @ 12.39 hrs, Volume= 8.307 af, Atten= 39%, Lag= 9.7 min
Primary = 37.17 cfs @ 12.39 hrs, Volume= 5.617 af
Routed to Link P-Creek : Proposed Creek
Secondary = 36.85 cfs @ 12.39 hrs, Volume= 2.690 af
Routed to Link P-Creek : Proposed Creek
Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Link P-Creek : Proposed Creek

Routing by Sim-Route method, Time Span= 0.00-160.00 hrs, dt= 0.001 hrs
Starting Elev= 961.00' Surf.Area= 0.545 ac Storage= 2.752 af
Peak Elev= 964.48' @ 12.39 hrs Surf.Area= 0.709 ac Storage= 4.930 af (2.178 af above start)

Plug-Flow detention time= 212.2 min calculated for 5.555 af (67% of inflow)
Center-of-Mass det. time= 74.5 min (855.9 - 781.5)

Volume	Invert	Avail.Storage	Storage Description
#1	951.00'	7.655 af	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
951.00	0.119	0.000	0.000
952.00	0.145	0.132	0.132
954.00	0.201	0.347	0.479
956.00	0.263	0.465	0.944
958.00	0.332	0.595	1.539
960.00	0.406	0.738	2.277
961.00	0.545	0.476	2.752
962.00	0.590	0.568	3.320
964.00	0.685	1.275	4.595
965.00	0.735	0.710	5.305
966.00	0.786	0.760	6.065
968.00	0.803	1.589	7.655

Device	Routing	Invert	Outlet Devices
#1	Primary	961.00'	**30.0" Round RCP_Round 30"** L= 50.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 961.00' / 960.50' S= 0.0100 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 4.91 sf
#2	Device 1	961.00'	**Custom Weir/Orifice, Cv= 2.62 (C= 3.28)** Head (feet) 0.00 1.05 1.05 8.00 Width (feet) 0.85 0.85 5.00 5.00
#3	Device 2	957.50'	**30.0" Round RCP_Round 30"** L= 25.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 957.50' / 957.50' S= 0.0000 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 4.91 sf
#4	Tertiary	966.00'	**15.0' 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

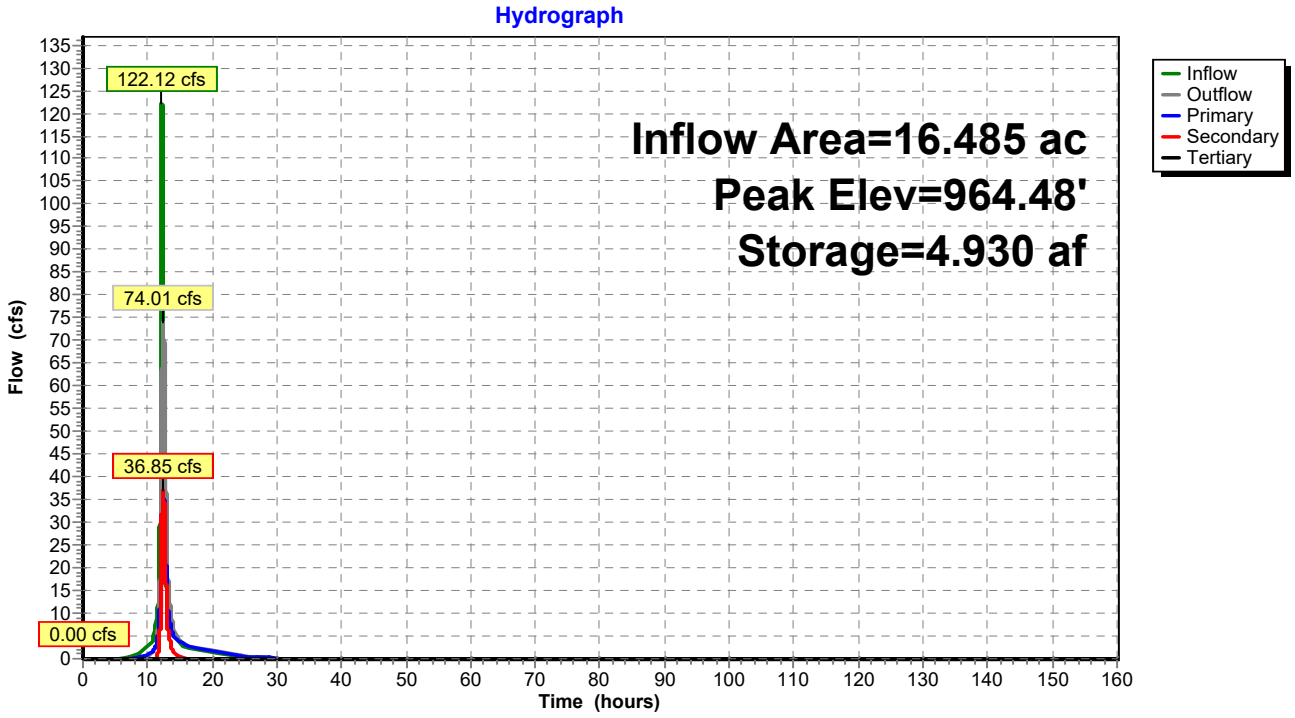
			Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
#5	Secondary	961.00'	**30.0" Round RCP_Round 30"** L= 50.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 961.00' / 960.50' S= 0.0100 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 4.91 sf
#6	Device 5	962.05'	**Custom Weir/Orifice, Cv= 2.62 (C= 3.28)** Head (feet) 0.00 5.00 Width (feet) 5.00 5.00
#7	Device 6	957.50'	**30.0" Round RCP_Round 30"** L= 25.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 957.50' / 957.50' S= 0.0000 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 4.91 sf

Primary OutFlow Max=37.17 cfs @ 12.39 hrs HW=964.48' TW=0.00' (Dynamic Tailwater)
└─**1=RCP_Round 30"** (Barrel Controls 37.17 cfs @ 7.57 fps)
└─**2=Custom Weir/Orifice** (Passes 37.17 cfs of 69.56 cfs potential flow)
└─**3=RCP_Round 30"** (Passes 37.17 cfs of 44.09 cfs potential flow)

Secondary OutFlow Max=36.85 cfs @ 12.39 hrs HW=964.48' TW=0.00' (Dynamic Tailwater)
└─**5=RCP_Round 30"** (Passes 36.85 cfs of 37.17 cfs potential flow)
└─**6=Custom Weir/Orifice** (Passes 36.85 cfs of 62.03 cfs potential flow)
└─**7=RCP_Round 30"** (Inlet Controls 36.85 cfs @ 7.51 fps)

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=961.00' TW=0.00' (Dynamic Tailwater)
└─**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 100P: Basin 100



Summary for Pond 200P: Basin 200

Inflow Area = 4.642 ac, 41.66% Impervious, Inflow Depth = 5.93" for 100-yr event
Inflow = 39.98 cfs @ 12.18 hrs, Volume= 2.296 af
Outflow = 8.50 cfs @ 12.52 hrs, Volume= 2.292 af, Atten= 79%, Lag= 20.5 min
Primary = 8.50 cfs @ 12.52 hrs, Volume= 2.292 af
Routed to Link P-Creek : Proposed Creek
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Link P-Creek : Proposed Creek

Routing by Sim-Route method, Time Span= 0.00-160.00 hrs, dt= 0.001 hrs
Starting Elev= 962.00' Surf.Area= 0.480 ac Storage= 1.681 af
Peak Elev= 964.08' @ 12.52 hrs Surf.Area= 0.594 ac Storage= 2.796 af (1.115 af above start)

Plug-Flow detention time= 605.1 min calculated for 0.611 af (27% of inflow)
Center-of-Mass det. time= 144.7 min (923.6 - 779.0)

Volume	Invert	Avail.Storage	Storage Description
#1	952.00'	4.760 af	**Custom Stage Data (Prismatic)**Listed below (Recalc)

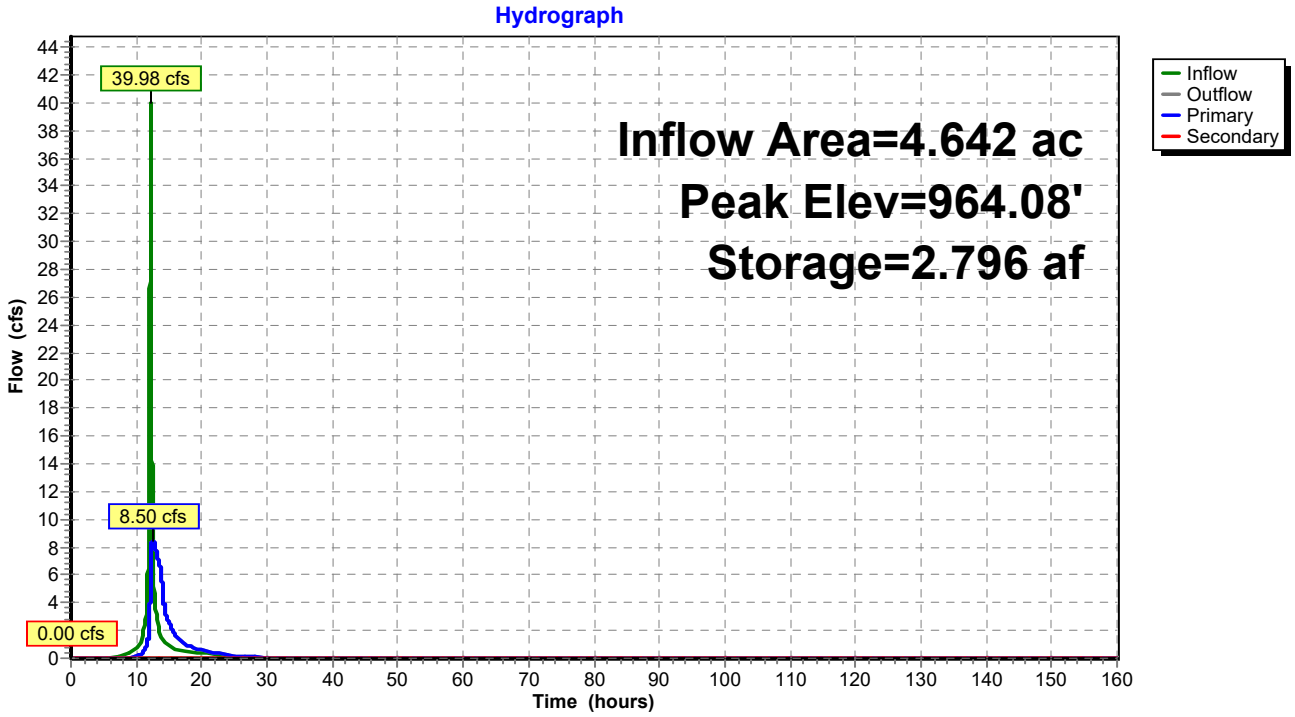
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
952.00	0.023	0.000	0.000
954.00	0.059	0.081	0.081
956.00	0.110	0.168	0.250
958.00	0.183	0.293	0.543
960.00	0.267	0.451	0.994
961.00	0.313	0.290	1.284
962.00	0.480	0.397	1.681
964.00	0.589	1.069	2.750
965.00	0.646	0.618	3.367
966.00	0.702	0.674	4.042
967.00	0.735	0.719	4.760

Device	Routing	Invert	Outlet Devices
#1	Primary	962.00'	**15.0" Round RCP_Round 15"** L= 25.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 962.00' / 961.50' S= 0.0200 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.23 sf
#2	Device 1	962.00'	**Custom Weir/Orifice, Cv= 2.62 (C= 3.28)** Head (feet) 0.00 1.00 1.00 8.00 Width (feet) 1.00 1.00 5.00 5.00
#3	Device 2	959.75'	**15.0" Round RCP_Round 15"** L= 25.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 959.75' / 959.75' S= 0.0000 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.23 sf
#4	Secondary	966.00'	**25.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=8.50 cfs @ 12.52 hrs HW=964.08' TW=0.00' (Dynamic Tailwater)
└─**1=RCP_Round 15"** (Barrel Controls 8.50 cfs @ 6.93 fps)
└─**2=Custom Weir/Orifice** (Passes 8.50 cfs of 24.48 cfs potential flow)
└─**3=RCP_Round 15"** (Passes 8.50 cfs of 8.52 cfs potential flow)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=962.00' TW=0.00' (Dynamic Tailwater)
└─**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 200P: Basin 200



Summary for Pond 300P: Basin 300

Inflow Area = 1.894 ac, 48.85% Impervious, Inflow Depth = 6.17" for 100-yr event
Inflow = 17.73 cfs @ 12.16 hrs, Volume= 0.974 af
Outflow = 7.13 cfs @ 12.40 hrs, Volume= 0.973 af, Atten= 60%, Lag= 14.4 min
Primary = 7.13 cfs @ 12.40 hrs, Volume= 0.973 af
Routed to Link P-Creek : Proposed Creek
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Link P-Creek : Proposed Creek

Routing by Sim-Route method, Time Span= 0.00-160.00 hrs, dt= 0.001 hrs
Starting Elev= 966.00' Surf.Area= 0.160 ac Storage= 0.317 af
Peak Elev= 967.68' @ 12.32 hrs Surf.Area= 0.222 ac Storage= 0.638 af (0.321 af above start)

Plug-Flow detention time= 195.0 min calculated for 0.656 af (67% of inflow)
Center-of-Mass det. time= 63.9 min (837.3 - 773.4)

Volume	Invert	Avail.Storage	Storage Description
#1	958.00'	1.594 af	**Custom Stage Data (Prismatic)**Listed below (Recalc)

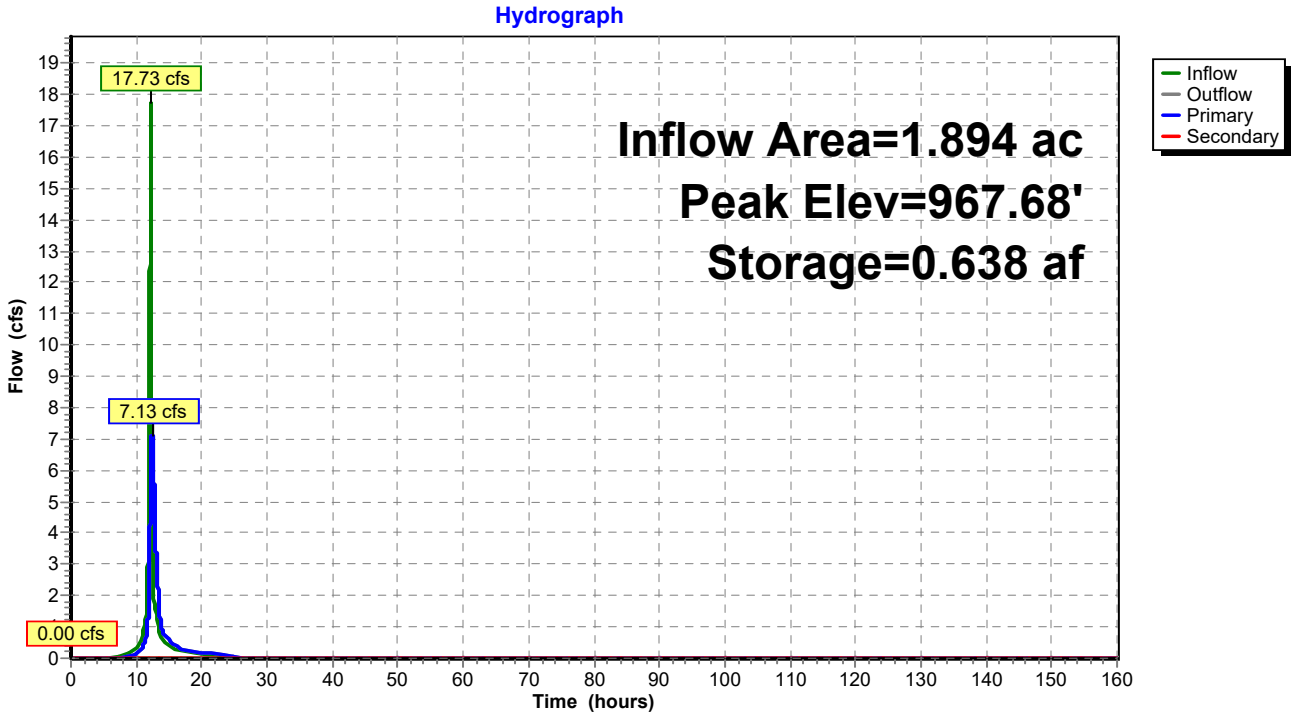
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
958.00	0.003	0.000	0.000
960.00	0.012	0.015	0.015
962.00	0.029	0.041	0.056
964.00	0.053	0.083	0.139
965.00	0.071	0.062	0.201
966.00	0.160	0.116	0.317
968.00	0.234	0.394	0.711
970.00	0.316	0.550	1.261
971.00	0.351	0.333	1.594

Device	Routing	Invert	Outlet Devices
#1	Primary	966.00'	**15.0" Round RCP_Round 15"** L= 25.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 966.00' / 965.50' S= 0.0200 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.23 sf
#2	Device 1	966.00'	**Custom Weir/Orifice, Cv= 2.62 (C= 3.28)** Head (feet) 0.00 0.50 0.50 5.00 Width (feet) 0.75 0.75 5.00 5.00
#3	Device 2	963.75'	**15.0" Round RCP_Round 15"** L= 30.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 963.75' / 963.75' S= 0.0000 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.23 sf
#4	Secondary	970.00'	**25.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=7.13 cfs @ 12.40 hrs HW=967.64' TW=0.00' (Dynamic Tailwater)
└─**1=RCP_Round 15"** (Barrel Controls 7.13 cfs @ 5.83 fps)
└─**2=Custom Weir/Orifice** (Passes 7.13 cfs of 22.18 cfs potential flow)
└─**3=RCP_Round 15"** (Passes 7.13 cfs of 7.57 cfs potential flow)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=966.00' TW=0.00' (Dynamic Tailwater)
└─**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 300P: Basin 300

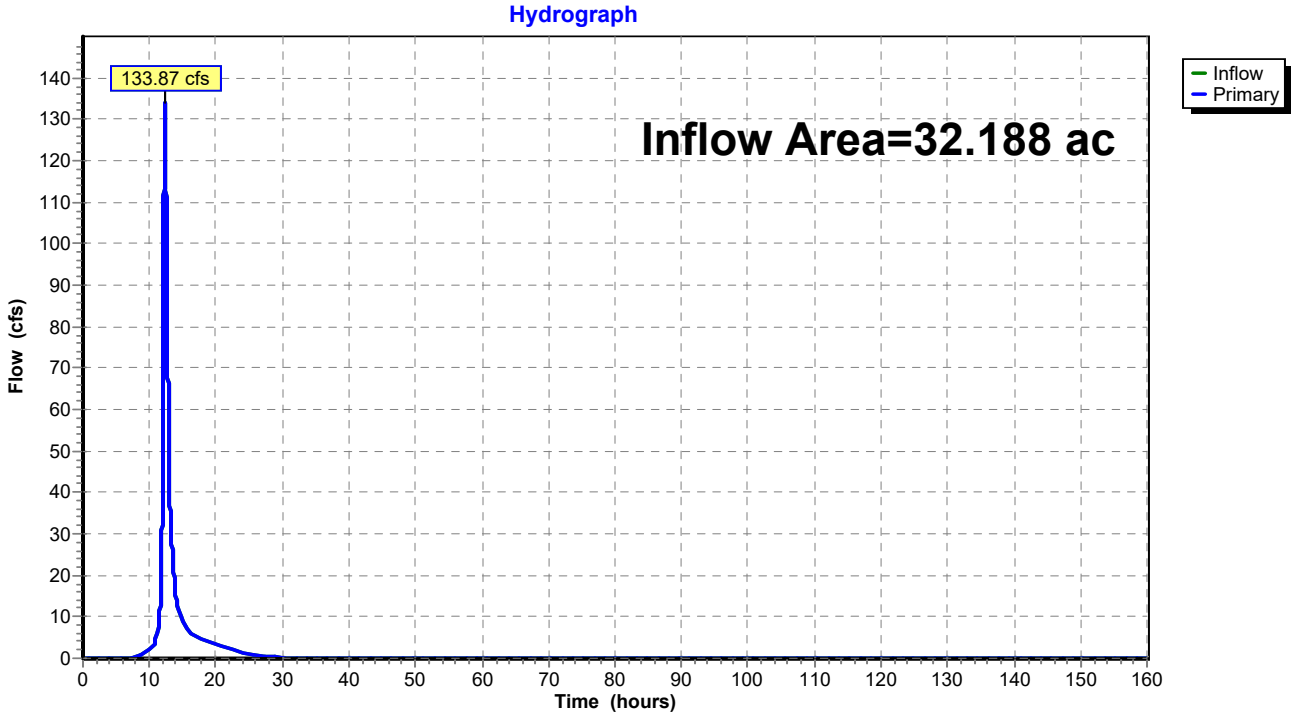


Summary for Link P-Creek: Proposed Creek

Inflow Area = 32.188 ac, 33.10% Impervious, Inflow Depth = 5.78" for 100-yr event
Inflow = 133.87 cfs @ 12.28 hrs, Volume= 15.507 af
Primary = 133.87 cfs @ 12.28 hrs, Volume= 15.507 af, Atten= 0%, Lag= 0.1 min

Primary outflow = Inflow, Time Span= 0.00-160.00 hrs, dt= 0.001 hrs

Link P-Creek: Proposed Creek

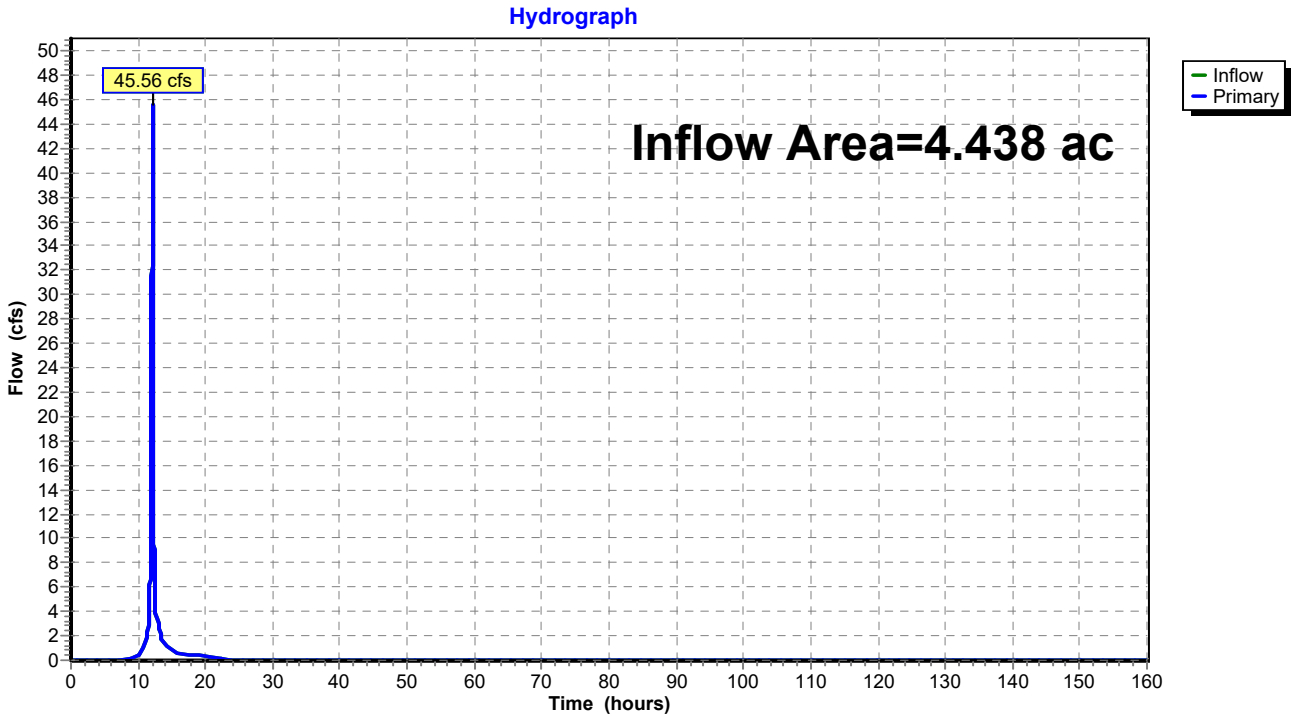


Summary for Link P-South: Proposed South

Inflow Area = 4.438 ac, 7.41% Impervious, Inflow Depth = 5.24" for 100-yr event
Inflow = 45.56 cfs @ 12.11 hrs, Volume= 1.939 af
Primary = 45.56 cfs @ 12.11 hrs, Volume= 1.939 af, Atten= 0%, Lag= 0.1 min

Primary outflow = Inflow, Time Span= 0.00-160.00 hrs, dt= 0.001 hrs

Link P-South: Proposed South

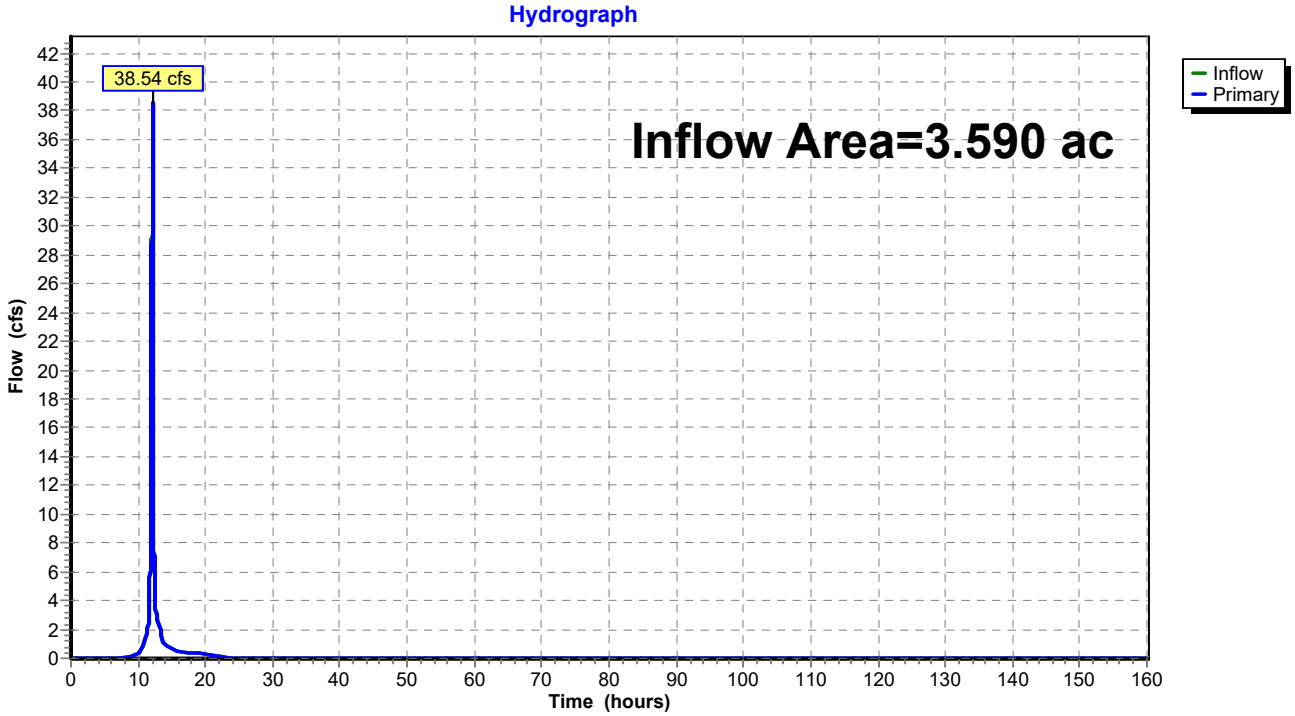


Summary for Link P-West: Proposed West

Inflow Area = 3.590 ac, 18.01% Impervious, Inflow Depth = 5.47" for 100-yr event
Inflow = 38.54 cfs @ 12.11 hrs, Volume= 1.637 af
Primary = 38.54 cfs @ 12.11 hrs, Volume= 1.637 af, Atten= 0%, Lag= 0.1 min

Primary outflow = Inflow, Time Span= 0.00-160.00 hrs, dt= 0.001 hrs

Link P-West: Proposed West



Appendix C: NRCS Soils Report

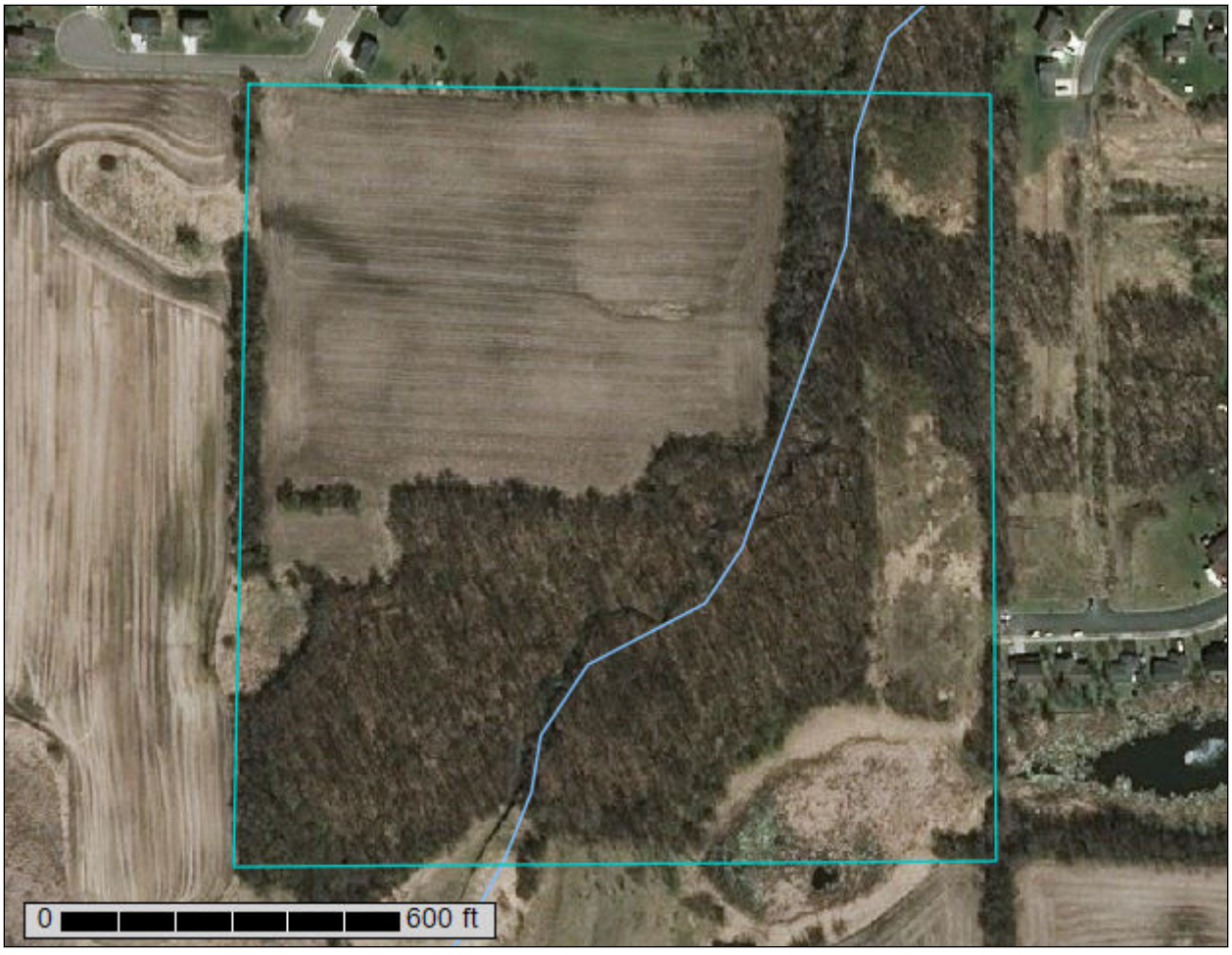
United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Wright County, Minnesota



April 25, 2022

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map (Creekside)

Map Scale: 1:3,190 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 45 90 180 270

Feet: 0 150 300 600 900

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 15N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

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 1:12,000.

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: Wright County, Minnesota
Survey Area Data: Version 15, Sep 10, 2021

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

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

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

Map Unit Legend (Creekside)

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
106C2	Lester loam, 6 to 10 percent slopes, moderately eroded	4.2	10.0%
106D2	Lester loam, 10 to 16 percent slopes, moderately eroded	0.3	0.7%
109	Cordova clay loam, 0 to 2 percent slopes	12.3	29.3%
539	Klossner muck, 0 to 1 percent slopes	0.4	0.9%
1080	Klossner, Okoboji and Glencoe soils, ponded, 0 to 1 percent slopes	2.8	6.6%
1362B	Angus loam, 2 to 6 percent slopes	2.8	6.7%
1901B	Angus-Le Sueur complex, 1 to 6 percent slopes	19.2	45.8%
Totals for Area of Interest		**42.0**	**100.0%**

Map Unit Descriptions (Creekside)

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit

descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Wright County, Minnesota

106C2—Lester loam, 6 to 10 percent slopes, moderately eroded

Map Unit Setting

National map unit symbol: 2ttc4
Elevation: 690 to 1,840 feet
Mean annual precipitation: 24 to 37 inches
Mean annual air temperature: 43 to 52 degrees F
Frost-free period: 140 to 180 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Lester, moderately eroded, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Lester, Moderately Eroded

Setting

Landform: Ground moraines, hillslopes
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Interfluve, rise
Down-slope shape: Convex
Across-slope shape: Linear, convex
Parent material: Fine-loamy till

Typical profile

Ap - 0 to 6 inches: loam
Bt - 6 to 38 inches: clay loam
C - 38 to 79 inches: loam

Properties and qualities

Slope: 6 to 10 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 2.00 in/hr)
Depth to water table: About 47 to 63 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 20 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 10.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: R103XY020MN - Loamy Upland Savannas
Forage suitability group: Sloping Upland, Acid (G103XS006MN)
Other vegetative classification: Sloping Upland, Acid (G103XS006MN)
Hydric soil rating: No

Minor Components

Storden, moderately eroded

Percent of map unit: 10 percent
Landform: Ground moraines
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Rise
Down-slope shape: Convex, linear
Across-slope shape: Linear, convex
Ecological site: R103XY020MN - Loamy Upland Savannas
Other vegetative classification: Sloping Upland, Calcareous (G103XS010MN)
Hydric soil rating: No

Le sueur

Percent of map unit: 3 percent
Landform: Hillslopes, ground moraines
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve, talf
Down-slope shape: Convex, linear
Across-slope shape: Linear
Ecological site: R103XY020MN - Loamy Upland Savannas
Other vegetative classification: Sloping Upland, Acid (G103XS006MN)
Hydric soil rating: No

Hamel

Percent of map unit: 2 percent
Landform: Ground moraines
Landform position (three-dimensional): Dip
Down-slope shape: Concave, linear
Across-slope shape: Linear, concave
Ecological site: F103XY030MN - Wet Footslope/Drainageway Forests
Other vegetative classification: Level Swale, Neutral (G103XS001MN)
Hydric soil rating: Yes

106D2—Lester loam, 10 to 16 percent slopes, moderately eroded

Map Unit Setting

National map unit symbol: 2ttc8
Elevation: 690 to 1,840 feet
Mean annual precipitation: 24 to 37 inches
Mean annual air temperature: 43 to 52 degrees F
Frost-free period: 140 to 180 days
Farmland classification: Not prime farmland

Map Unit Composition

Lester, moderately eroded, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Lester, Moderately Eroded

Setting

Landform: Hillslopes, ground moraines
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Nose slope, rise
Down-slope shape: Convex
Across-slope shape: Convex, linear
Parent material: Fine-loamy till

Typical profile

Ap - 0 to 6 inches: loam
Bt - 6 to 38 inches: clay loam
C - 38 to 79 inches: loam

Properties and qualities

Slope: 10 to 16 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 2.00 in/hr)
Depth to water table: About 55 to 71 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 20 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 10.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Ecological site: R103XY020MN - Loamy Upland Savannas
Forage suitability group: Sloping Upland, Acid (G103XS006MN)
Other vegetative classification: Sloping Upland, Acid (G103XS006MN)
Hydric soil rating: No

Minor Components

Storden, moderately eroded

Percent of map unit: 10 percent
Landform: Ground moraines
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Rise
Down-slope shape: Convex, linear
Across-slope shape: Linear, convex
Ecological site: R103XY020MN - Loamy Upland Savannas
Other vegetative classification: Sloping Upland, Calcareous (G103XS010MN)
Hydric soil rating: No

Lester, moderately eroded

Percent of map unit: 3 percent
Landform: Hillslopes, ground moraines
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Interfluve, rise
Down-slope shape: Convex

Across-slope shape: Convex, linear
Ecological site: R103XY020MN - Loamy Upland Savannas
Other vegetative classification: Sloping Upland, Acid (G103XS006MN)
Hydric soil rating: No

Le sueur

Percent of map unit: 2 percent
Landform: Hillslopes, ground moraines
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve, talf
Down-slope shape: Convex, linear
Across-slope shape: Linear
Ecological site: R103XY020MN - Loamy Upland Savannas
Other vegetative classification: Sloping Upland, Acid (G103XS006MN)
Hydric soil rating: No

109—Cordova clay loam, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2vvdk
Elevation: 690 to 1,840 feet
Mean annual precipitation: 24 to 37 inches
Mean annual air temperature: 43 to 52 degrees F
Frost-free period: 140 to 180 days
Farmland classification: Prime farmland if drained

Map Unit Composition

Cordova and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Cordova

Setting

Landform: Ground moraines
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Fine-loamy till

Typical profile

Ap - 0 to 10 inches: clay loam
A - 10 to 18 inches: clay loam
Btg - 18 to 38 inches: clay loam
Cg - 38 to 79 inches: loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 2.00 in/hr)
Depth to water table: About 0 to 8 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 20 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 10.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: C/D
Ecological site: F103XY027MN - Loamy Wet Forests
Forage suitability group: Level Swale, Neutral (G103XS001MN)
Other vegetative classification: Level Swale, Neutral (G103XS001MN)
Hydric soil rating: Yes

Minor Components

Le sueur

Percent of map unit: 10 percent
Landform: Hillslopes, ground moraines
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve, talf
Down-slope shape: Convex, linear
Across-slope shape: Linear
Ecological site: R103XY020MN - Loamy Upland Savannas
Other vegetative classification: Sloping Upland, Acid (G103XS006MN)
Hydric soil rating: No

Glencoe

Percent of map unit: 5 percent
Landform: Depressions
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: R103XY015MN - Depressional Marsh
Other vegetative classification: Ponded If Not Drained (G103XS013MN)
Hydric soil rating: Yes

539—Klossner muck, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: 2s8wz
Elevation: 690 to 1,840 feet
Mean annual precipitation: 24 to 37 inches
Mean annual air temperature: 43 to 52 degrees F
Frost-free period: 140 to 180 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Klossner, drained, and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Klossner, Drained

Setting

Landform: Depressions
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Organic material over alluvium

Typical profile

Oap - 0 to 9 inches: muck
Oa - 9 to 27 inches: muck
2A - 27 to 46 inches: silty clay loam
2Cg - 46 to 79 inches: silty clay loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 2.00 in/hr)
Depth to water table: About 0 to 6 inches
Frequency of flooding: None
Frequency of ponding: Occasional
Calcium carbonate, maximum content: 20 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very high (about 17.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: C/D
Ecological site: R103XY016MN - Organic Marsh
Forage suitability group: Organic (G103XS014MN)
Other vegetative classification: Organic (G103XS014MN)
Hydric soil rating: Yes

Minor Components

Canisteo

Percent of map unit: 5 percent
Landform: Rims on depressions, ground moraines
Landform position (three-dimensional): Talf
Down-slope shape: Concave, linear
Across-slope shape: Linear
Ecological site: R103XY001MN - Loamy Wet Prairies
Other vegetative classification: Level Swale, Calcareous (G103XS009MN)
Hydric soil rating: Yes

Okoboji

Percent of map unit: 5 percent
Landform: Depressions

Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: R103XY015MN - Depressional Marsh
Other vegetative classification: Ponded If Not Drained (G103XS013MN)
Hydric soil rating: Yes

1080—Klossner, Okoboji and Glencoe soils, ponded, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: 2t3ny
Elevation: 690 to 1,840 feet
Mean annual precipitation: 24 to 37 inches
Mean annual air temperature: 43 to 52 degrees F
Frost-free period: 140 to 180 days
Farmland classification: Not prime farmland

Map Unit Composition

Klossner, ponded, and similar soils: 35 percent
Okoboji, ponded, and similar soils: 30 percent
Glencoe, ponded, and similar soils: 25 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Klossner, Ponded

Setting

Landform: Depressions
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Organic material over alluvium

Typical profile

Oa1 - 0 to 9 inches: muck
Oa2 - 9 to 27 inches: muck
2A - 27 to 46 inches: silty clay loam
2Cg - 46 to 79 inches: silty clay loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 2.00 in/hr)
Depth to water table: About 0 to 6 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Calcium carbonate, maximum content: 20 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very high (about 17.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8w
Hydrologic Soil Group: C/D
Ecological site: R103XY016MN - Organic Marsh
Forage suitability group: Not Suited (G103XS024MN)
Other vegetative classification: Not Suited (G103XS024MN)
Hydric soil rating: Yes

Description of Okoboji, Ponded

Setting

Landform: Depressions
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Local alluvium over till

Typical profile

A1 - 0 to 8 inches: silty clay loam
A2 - 8 to 33 inches: silty clay loam
Bg - 33 to 38 inches: silty clay loam
Cg - 38 to 79 inches: silty clay loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 2.00 in/hr)
Depth to water table: About 0 to 6 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Calcium carbonate, maximum content: 20 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very high (about 12.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8w
Hydrologic Soil Group: C/D
Ecological site: R103XY016MN - Organic Marsh
Forage suitability group: Not Suited (G103XS024MN)
Other vegetative classification: Not Suited (G103XS024MN)
Hydric soil rating: Yes

Description of Glencoe, Ponded

Setting

Landform: Depressions
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Local alluvium over till

Typical profile

A1 - 0 to 9 inches: clay loam
A2 - 9 to 39 inches: clay loam
Bg - 39 to 50 inches: clay loam

Cg - 50 to 79 inches: clay loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 2.00 in/hr)
Depth to water table: About 0 to 6 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Calcium carbonate, maximum content: 20 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 10.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8w
Hydrologic Soil Group: C/D
Ecological site: R103XY015MN - Depressional Marsh
Forage suitability group: Not Suited (G103XS024MN)
Other vegetative classification: Not Suited (G103XS024MN)
Hydric soil rating: Yes

Minor Components

Glencoe

Percent of map unit: 5 percent
Landform: Depressions
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: R103XY015MN - Depressional Marsh
Other vegetative classification: Ponded If Not Drained (G103XS013MN)
Hydric soil rating: Yes

Canisteo

Percent of map unit: 3 percent
Landform: Rims on depressions, ground moraines
Landform position (three-dimensional): Talf
Down-slope shape: Concave, linear
Across-slope shape: Linear
Ecological site: R103XY001MN - Loamy Wet Prairies
Other vegetative classification: Level Swale, Calcareous (G103XS009MN)
Hydric soil rating: Yes

Houghton, ponded

Percent of map unit: 2 percent
Landform: Marshes
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: R103XY016MN - Organic Marsh
Other vegetative classification: Not Suited (G103XS024MN)
Hydric soil rating: Yes

1362B—Angus loam, 2 to 6 percent slopes

Map Unit Setting

National map unit symbol: 2syrq
Elevation: 690 to 1,840 feet
Mean annual precipitation: 24 to 37 inches
Mean annual air temperature: 43 to 52 degrees F
Frost-free period: 140 to 180 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Angus and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Angus

Setting

Landform: Hillslopes, ground moraines
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve, rise
Down-slope shape: Convex
Across-slope shape: Convex, linear
Parent material: Fine-loamy till

Typical profile

Ap - 0 to 7 inches: loam
Bt - 7 to 37 inches: clay loam
BC - 37 to 50 inches: clay loam
C - 50 to 79 inches: loam

Properties and qualities

Slope: 2 to 6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 2.00 in/hr)
Depth to water table: About 39 to 51 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 20 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 10.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e

Hydrologic Soil Group: C
Ecological site: R103XY020MN - Loamy Upland Savannas
Forage suitability group: Sloping Upland, Acid (G103XS006MN)
Other vegetative classification: Sloping Upland, Acid (G103XS006MN)
Hydric soil rating: No

Minor Components

Angus, moderately eroded
Percent of map unit: 10 percent
Landform: Hillslopes, ground moraines
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve, rise
Down-slope shape: Convex
Across-slope shape: Convex, linear
Ecological site: R103XY020MN - Loamy Upland Savannas
Other vegetative classification: Sloping Upland, Acid (G103XS006MN)
Hydric soil rating: No

Cordova
Percent of map unit: 5 percent
Landform: Ground moraines
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Linear
Ecological site: F103XY027MN - Loamy Wet Forests
Other vegetative classification: Level Swale, Neutral (G103XS001MN)
Hydric soil rating: Yes

Le sueur
Percent of map unit: 5 percent
Landform: Hillslopes, ground moraines
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve, talf
Down-slope shape: Convex, linear
Across-slope shape: Linear
Ecological site: R103XY020MN - Loamy Upland Savannas
Other vegetative classification: Sloping Upland, Acid (G103XS006MN)
Hydric soil rating: No

1901B—Angus-Le Sueur complex, 1 to 6 percent slopes

Map Unit Setting
National map unit symbol: 2vvgs
Elevation: 690 to 1,840 feet
Mean annual precipitation: 24 to 37 inches
Mean annual air temperature: 43 to 52 degrees F
Frost-free period: 140 to 180 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Angus and similar soils: 55 percent
Le sueur and similar soils: 35 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Angus

Setting

Landform: Hillslopes, ground moraines
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Interfluve, rise
Down-slope shape: Convex
Across-slope shape: Convex, linear
Parent material: Fine-loamy till

Typical profile

Ap - 0 to 7 inches: loam
Bt - 7 to 37 inches: clay loam
BC - 37 to 50 inches: clay loam
C - 50 to 79 inches: loam

Properties and qualities

Slope: 2 to 6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 2.00 in/hr)
Depth to water table: About 39 to 51 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 20 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 10.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Ecological site: F103XY025MN - Loamy Upland Forests
Forage suitability group: Sloping Upland, Acid (G103XS006MN)
Other vegetative classification: Sloping Upland, Acid (G103XS006MN)
Hydric soil rating: No

Description of Le Sueur

Setting

Landform: Hillslopes, ground moraines
Landform position (two-dimensional): Summit, backslope, footslope
Landform position (three-dimensional): Interfluve, talf
Down-slope shape: Convex, linear
Across-slope shape: Linear
Parent material: Fine-loamy till

Typical profile

Ap - 0 to 8 inches: loam

A - 8 to 14 inches: loam
Btg - 14 to 52 inches: clay loam
Cg - 52 to 79 inches: loam

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 2.00 in/hr)
Depth to water table: About 12 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 20 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 10.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 1
Hydrologic Soil Group: C/D
Ecological site: F103XY025MN - Loamy Upland Forests
Forage suitability group: Sloping Upland, Acid (G103XS006MN)
Other vegetative classification: Sloping Upland, Acid (G103XS006MN)
Hydric soil rating: No

Minor Components

Cordova

Percent of map unit: 10 percent
Landform: Ground moraines
Landform position (three-dimensional): Dip
Down-slope shape: Concave, linear
Across-slope shape: Concave
Ecological site: F103XY027MN - Loamy Wet Forests
Other vegetative classification: Level Swale, Neutral (G103XS001MN)
Hydric soil rating: Yes

Soil Information for All Uses

Suitabilities and Limitations for Use

The Suitabilities and Limitations for Use section includes various soil interpretations displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each interpretation.

Land Management

Land management interpretations are tools designed to guide the user in evaluating existing conditions in planning and predicting the soil response to various land management practices, for a variety of land uses, including cropland, forestland, hayland, pastureland, horticulture, and rangeland. Example interpretations include suitability for a variety of irrigation practices, log landings, haul roads and major skid trails, equipment operability, site preparation, suitability for hand and mechanical planting, potential erosion hazard associated with various practices, and ratings for fencing and waterline installation.

Erosion Hazard (Off-Road, Off-Trail) (Creekside)

As of 9/30/2021, this rating is not working as intended. All components appear as not rated. This rating will be fixed on 10/01/2022.

The ratings in this interpretation indicate the hazard of soil loss from off-road and off-trail areas after disturbance activities that expose the soil surface. The ratings are based on slope, soil erosion factor K, and an index of rainfall erosivity (R). The soil loss is caused by sheet or rill erosion in off-road or off-trail areas where 50 to 75 percent of the surface has been exposed by logging, grazing, mining, or other kinds of disturbance.

The ratings are both verbal and numerical. The hazard is described as "slight," "moderate," "severe," or "very severe." A rating of "slight" indicates that erosion is unlikely under ordinary climatic conditions; "moderate" indicates that some erosion is likely and that erosion-control measures may be needed; "severe" indicates that erosion is very likely and that erosion-control measures, including revegetation of bare areas, are advised; and "very severe" indicates that significant erosion is

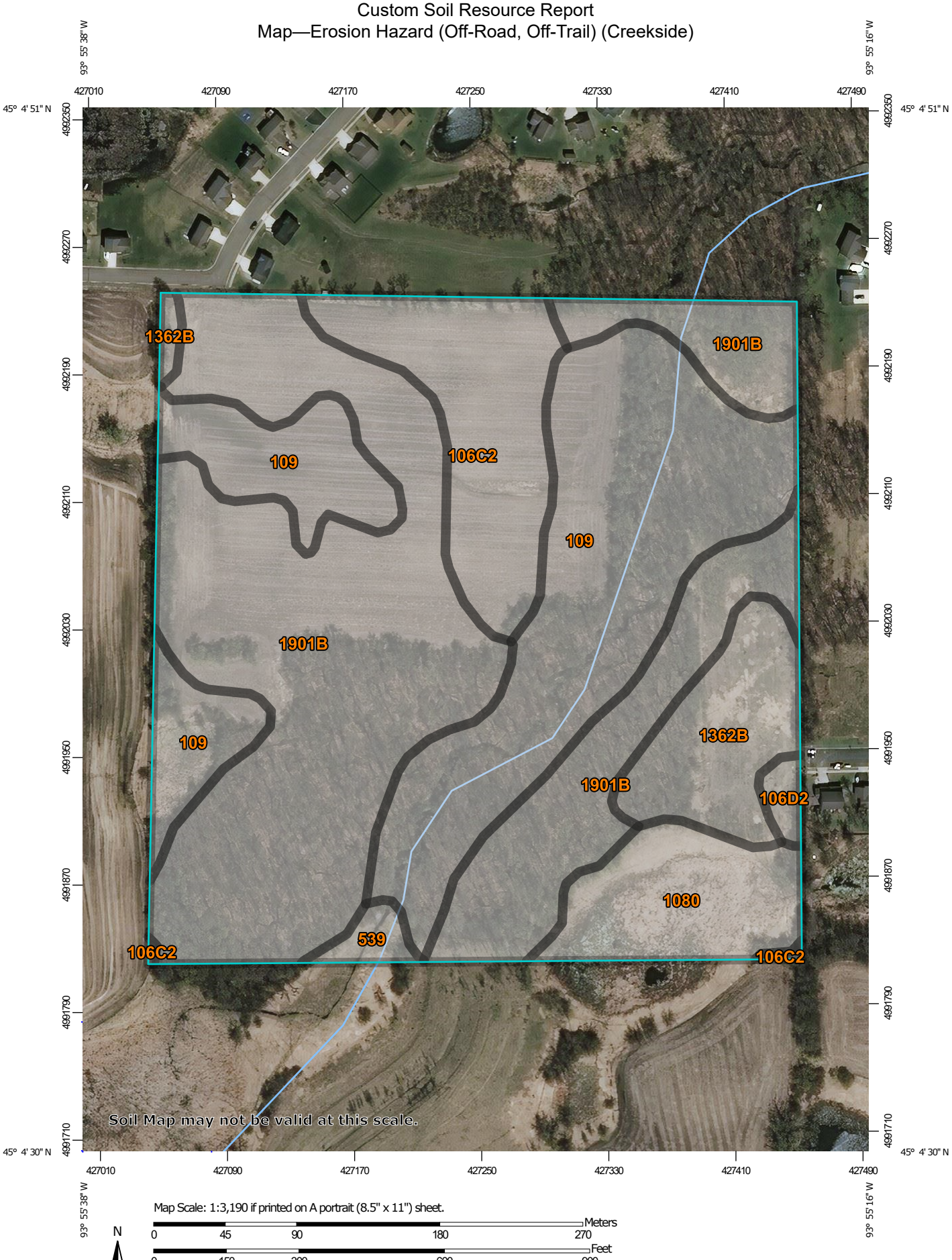
expected, loss of soil productivity and off-site damage are likely, and erosion-control measures are costly and generally impractical.

Numerical ratings indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the specified aspect of forestland management (1.00) and the point at which the soil feature is not a limitation (0.00).

The map unit components listed for each map unit in the accompanying Summary by Map Unit table in Web Soil Survey or the Aggregation Report in Soil Data Viewer are determined by the aggregation method chosen. An aggregated rating class is shown for each map unit. The components listed for each map unit are only those that have the same rating class as listed for the map unit. The percent composition of each component in a particular map unit is presented to help the user better understand the percentage of each map unit that has the rating presented.

Other components with different ratings may be present in each map unit. The ratings for all components, regardless of the map unit aggregated rating, can be viewed by generating the equivalent report from the Soil Reports tab in Web Soil Survey or from the Soil Data Mart site. Onsite investigation may be needed to validate these interpretations and to confirm the identity of the soil on a given site.

Map—Erosion Hazard (Off-Road, Off-Trail) (Creekside)



Map Scale: 1:3,190 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 45 90 180 270

Feet: 0 150 300 600 900

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 15N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils

Soil Rating Polygons
- Very severe
- Severe
- Moderate
- Slight
- Not rated or not available

Soil Rating Lines
- Very severe
- Severe
- Moderate
- Slight
- Not rated or not available

Soil Rating Points
- Very severe
- Severe
- Moderate
- Slight
- 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 1:12,000.

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: Wright County, Minnesota
Survey Area Data: Version 15, Sep 10, 2021

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

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

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

Tables—Erosion Hazard (Off-Road, Off-Trail) (Creekside)

Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
106C2	Lester loam, 6 to 10 percent slopes, moderately eroded	Not rated	Lester, moderately eroded (85%)		4.2	10.0%
			Storden, moderately eroded (10%)			
			Le Sueur (3%)			
			Hamel (2%)			
106D2	Lester loam, 10 to 16 percent slopes, moderately eroded	Not rated	Lester, moderately eroded (85%)		0.3	0.7%
			Storden, moderately eroded (10%)			
			Lester, moderately eroded (3%)			
			Le Sueur (2%)			
109	Cordova clay loam, 0 to 2 percent slopes	Not rated	Cordova (85%)		12.3	29.3%
			Le Sueur (10%)			
			Glencoe (5%)			
539	Klossner muck, 0 to 1 percent slopes	Not rated	Klossner, drained (90%)		0.4	0.9%
			Canisteo (5%)			
			Okoboji (5%)			
1080	Klossner, Okoboji and Glencoe soils, ponded, 0 to 1 percent slopes	Not rated	Klossner, ponded (35%)		2.8	6.6%
			Okoboji, ponded (30%)			
			Glencoe, ponded (25%)			
			Glencoe (5%)			
			Canisteo (3%)			
			Houghton, ponded (2%)			
1362B	Angus loam, 2 to 6 percent slopes	Not rated	Angus (80%)		2.8	6.7%
			Angus, moderately eroded (10%)			
			Cordova (5%)			
			Le Sueur (5%)			

Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
1901B	Angus-Le Sueur complex, 1 to 6 percent slopes	Not rated	Angus (55%)		19.2	45.8%
			Le Sueur (35%)			
			Cordova (10%)			
Totals for Area of Interest					**42.0**	**100.0%**

Rating	Acres in AOI	Percent of AOI
Null or Not Rated	42.0	100.0%
Totals for Area of Interest	**42.0**	**100.0%**

Rating Options—Erosion Hazard (Off-Road, Off-Trail) (Creekside)

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Soil Reports

The Soil Reports section includes various formatted tabular and narrative reports (tables) containing data for each selected soil map unit and each component of each unit. No aggregation of data has occurred as is done in reports in the Soil Properties and Qualities and Suitabilities and Limitations sections.

The reports contain soil interpretive information as well as basic soil properties and qualities. A description of each report (table) is included.

Soil Erosion

This folder contains a collection of tabular reports that present soil erosion factors and groupings. The reports (tables) include all selected map units and components for each map unit. Soil erosion factors are soil properties and interpretations used in evaluating the soil for potential erosion. Example soil erosion factors can include K factor for the whole soil or on a rock free basis, T factor, wind erodibility group and wind erodibility index.

RUSLE2 Related Attributes (Creekside)

This report summarizes those soil attributes used by the Revised Universal Soil Loss Equation Version 2 (RUSLE2) for the map units in the selected area. The report includes the map unit symbol, the component name, and the percent of the component in the map unit. Soil property data for each map unit component include the hydrologic soil group, erosion factor Kf for the surface horizon, erosion factor T, and the representative percentage of sand, silt, and clay in the mineral surface horizon. Missing surface data may indicate the presence of an organic layer.

Report—RUSLE2 Related Attributes (Creekside)

Soil properties and interpretations for erosion runoff calculations. The surface mineral horizon properties are displayed or the first mineral horizon below an organic surface horizon. Organic horizons are not displayed.

RUSLE2 Related Attributes–Wright County, Minnesota

Map symbol and soil name	Pct. of map unit	Slope length (ft)	Hydrologic group	Kf	T factor	Representative value		
						% Sand	% Silt	% Clay
106C2—Lester loam, 6 to 10 percent slopes, moderately eroded								
Lester, moderately eroded	85	98	C	.32	5	39.0	37.0	24.0
106D2—Lester loam, 10 to 16 percent slopes, moderately eroded								
Lester, moderately eroded	85	98	C	.32	5	39.0	37.0	24.0

RUSLE2 Related Attributes–Wright County, Minnesota								
Map symbol and soil name	Pct. of map unit	Slope length (ft)	Hydrologic group	Kf	T factor	Representative value		
						% Sand	% Silt	% Clay
109—Cordova clay loam, 0 to 2 percent slopes								
Cordova	85	82	C/D	.28	5	34.2	37.8	28.0
539—Klossner muck, 0 to 1 percent slopes								
Klossner, drained	90	689	C/D	—	1	—	—	—
1080—Klossner, Okoboji and Glencoe soils, ponded, 0 to 1 percent slopes								
Klossner, ponded	35	689	C/D	—	1	—	—	—
Okoboji, ponded	30	82	C/D	.32	5	11.0	53.0	36.0
Glencoe, ponded	25	82	C/D	.28	5	22.0	45.0	33.0
1362B—Angus loam, 2 to 6 percent slopes								
Angus	80	98	C	.28	5	39.0	37.0	24.0
1901B—Angus-Le Sueur complex, 1 to 6 percent slopes								
Angus	55	98	C	.28	5	39.0	37.0	24.0
Le Sueur	35	82	C/D	.28	5	39.0	37.0	24.0

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