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July 15, 2025

Peterson Wetland Design Report
Site No. HAM892326B
Hamilton County, Iowa

This wetland improvement is planned to provide nutrient reduction benefits to a part of the watershed of Drainage District #20 in Hamilton County, Iowa. Nitrates will be converted to nitrogen gas through natural processes as the water passes through the wetland. Sediment with phosphorus will also be captured but will need to be removed from time to time.

The project location is on the property of Gerald and Janelle Peterson and Joel and Debbie Peterson, near Williams, Iowa. The existing site includes one tile main, one branch district tile, and one private tile. The existing main and branch tiles will be re-laid and diverted to the wetland inlet channel. The private tile will be re-laid and diverted to the future Hamilton County borrow pit north of the wetland pool. A temporary channel will be dug from the private tile outlet to the connection channel between the borrow pit and wetland pool. A partial capture inlet will divert most of the water from the private tile and carry it through a tile, providing sufficient head to push water through the rectangular wetland inlet structure at the wetland inlet channel. From the inlet channel, water will meander through the wetland pool, where nutrient concentrations will be reduced by natural processes. The water will leave the pool at the rectangular wetland outlet structure and be carried through an 18” outlet tile that will connect to the existing district tile main east of the wetland pool. A separation berm is proposed between the wetland pool and the proposed Hamilton County borrow pit pool. A connection channel is proposed to be placed between the two pools to maintain consistent water surface elevations. A proposed diversion berm is to be placed in the wetland pool near the connection channel to ensure water from the borrow pond has sufficient detention time for nutrient reduction. A proposed cover berm will be placed at the southwest side of the pool to cover the tile re-lays and ensure the land can still be farmed. During large storm events, the pothole will fill and runoff will flow overland at the existing low point northeast of the wetland. Constructing the wetland will not have adverse effects on the existing hydrology of the pothole.

This site was deemed viable because of the size of its watershed (518 acres) and its topography. The existing pothole can be converted to a wetland, and the drainage district tiles that currently drain the pothole can be re-laid to the ground surface. Initial payment information was presented to the landowner, who wished to proceed with the project.

Bolton & Menk reviewed the soil survey data for the location and found the soils to be primarily loam. After this review, it was determined that soil borings were unnecessary. The wetland watersheds were analyzed using LiDAR data, with land uses delineated and existing potholes and culverts accounted for. A map of the contributing watersheds is included with this report. Curve number calculations and runoff analysis are provided in the attached hydrology outputs.

Site features were surveyed with survey-grade GPS equipment, and additional topographic information was obtained from a publicly available LiDAR database. The existing tiles were surveyed at locations of existing blowouts to obtain profile data for the existing facilities. Elevations are referenced to NAVD88, and the Iowa State Plane North (Survey Foot) coordinate system was used for horizontal coordinates. Survey data was collected electronically and is available in .csv files.

Iowa NRCS Conservation Practice Standard (CPS) 656, dated December 2023, was used to develop this project. CPS 587 (Structure for Water Control) was used for the water control structure. The project is NRCS Job Class IV under CPS 656 because the watershed is between 300 and 1000 acres.

The excavation elevations and permanent pool elevations were selected based on the ability to daylight existing tiles into the wetland pool. The watershed information and rainfall data were used to develop hydrographs in HydroCAD. The storm distribution used was MSE 3, with rainfall depths from the National Engineering Handbook. These hydrographs and the proposed stage-storage information were used to size the outlet for the wetland. HydroCAD outputs are provided in the appendix.

Two tiles are planned to be re-laid into the wetland pool, one tile will be re-laid into the borrow pit pool, and a partial capture inlet will be routed to the wetland pool. Profiles are provided in the plans for the tiles. Pipe sizing calculations are provided in the appendix.

The permanent easement for this project will be on the Peterson property. IDALS-DSWQ is currently in the process of updating the abstracts and will have a signed easement recorded for the area as shown in the plans. No additional land rights are needed.

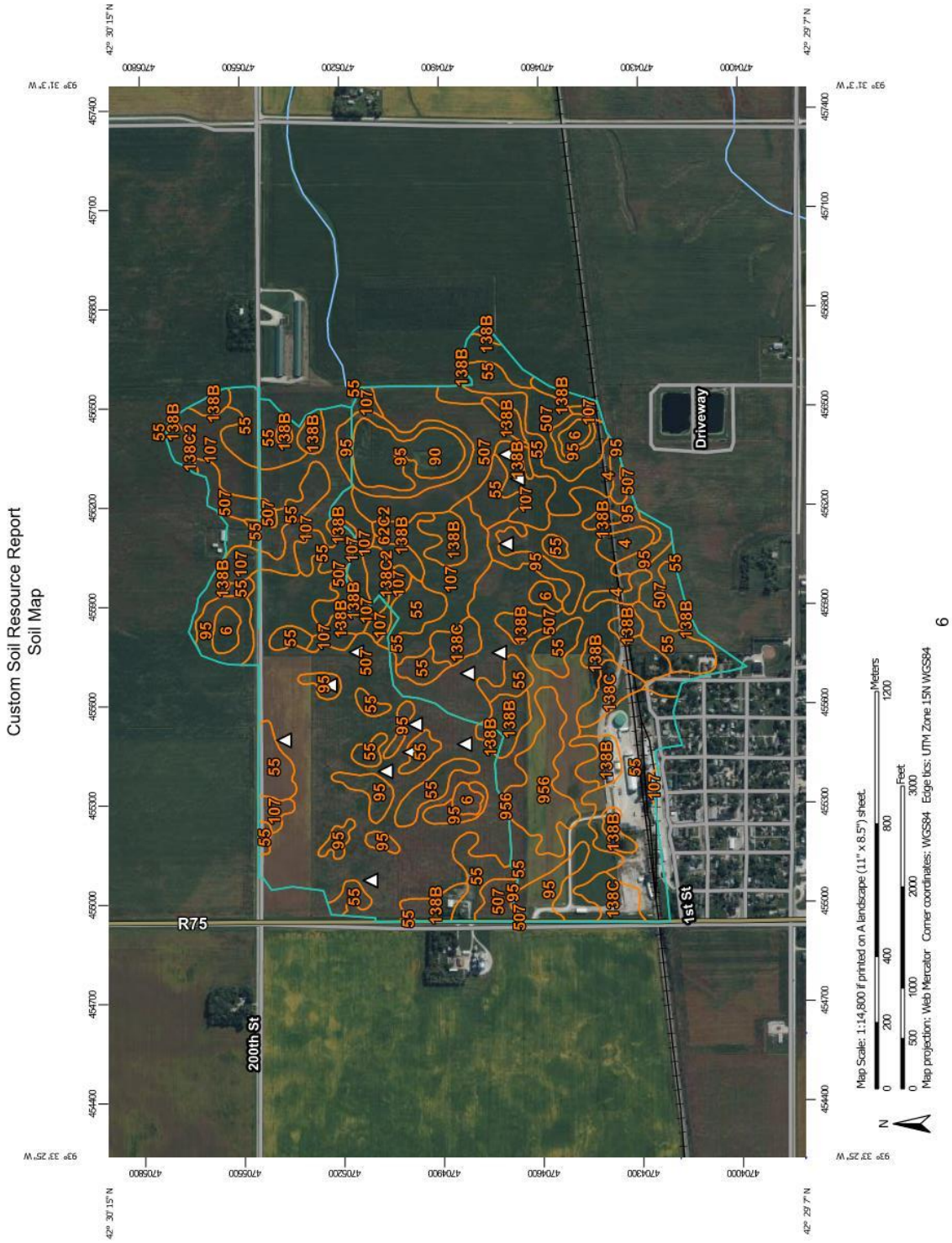
All necessary permits for this project will be obtained by IDALS.

Sincerely,

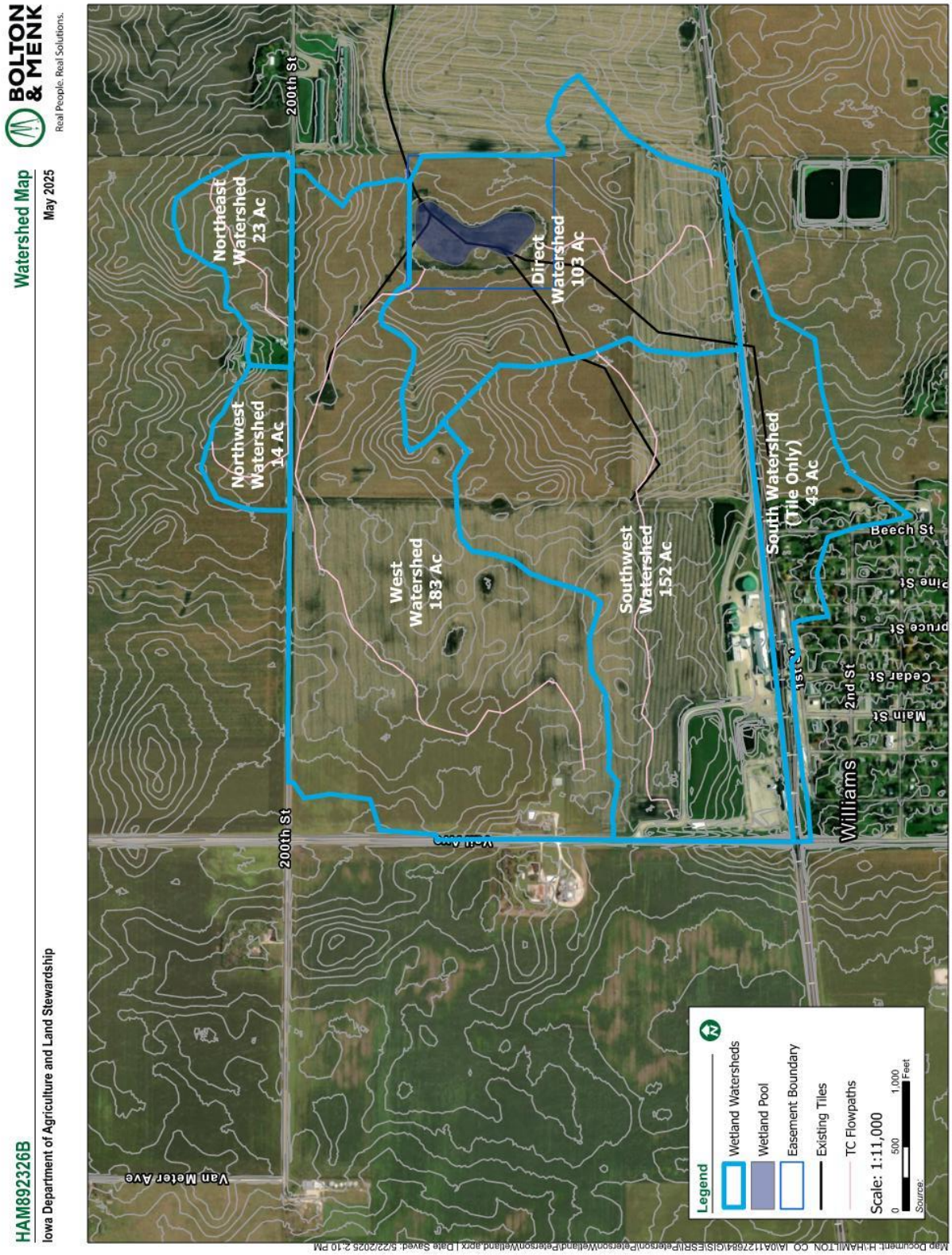
Brandon C. Short, PE
Project Engineer
Bolton & Menk, Inc.

Appendices:
Soil Survey Map
Watershed and Land Use
Hydrology Report
HydroCAD Output
Pipe Capacity Calculations

Web Soil Survey Map



Watersheds and Land Use



Hydrology Report

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Report Summary

Design Parameters and Procedures:

Design hydrology and hydraulic study of this site was completed. The drainage area was determined and a stage-area-storage curve was developed based on the topographic survey, Lidar data available from the Iowa Department of Natural Resources, and grading design for the wetland. Land use and treatment were determined through a site visit and aerial photo review and depression areas were found. Hydrologic data was compiled, sediment calculations were made, the structure was flood routed using the SCS method in HydroCAD Software, and all the output was reviewed.

Rainfall events used for this site were MSE 3, 24-hour, 5-, 10-, 25-, and 100-year events. The primary spillway is an outlet structure with a rectangular weir and a four-foot wide opening that discharges to the existing drain tile main. The secondary spillway is a the natural overflow of the existing pothole. Values shown below for Q Out include overland flow and tile flow, including some flow that does not pass through the wetland.

Hydrology Analysis Summary

25-year Event: 5.50'' **100-year Event: 7.2''**

* Hydrologic Soil Groups: B, C, C/D
* Runoff Curve Number: 84.7 (based on Land use shown in this report)
* Tc = 1.5 hours determined by the sum of sheet, shallow concentrated and channel flow times.
* Normal Pool area is 6.54 ac; surface watershed area is approx. 475 ac or 0.74 square miles

Summary Table:

Overflow Elevation: 1174.25 (Data for Surface Flow)

	Q_{max} In (cfs)	Q_{max} Out (cfs)	Max Elev (ft)	Duration - Hours at elevation		
				1173.00	1174.00	1174.50
5-year	212.89	21.98	1174.07	26.3	6.6	
10-year	271.71	57.96	1174.50	30.6	13.8	0.8
25-year	358.58	149.89	1174.88	32.0	15.6	6.3
100-year	516.28	348.82	1175.31	33.2	17.1	8.6

Rainfall Data

Surface-Drained DA = 475 ac
= .74 sq mi

The following rainfall data was used for the hydrology analysis of the site. Rainfall depths from three sources are shown, and the rainfall depths from the NEH Title 210 figure were used. MSE 3 was used for the rainfall distribution.

Frequency	24-hr		
yr	in [1]	in [2]	in [3]
2	3.07	3.08	3.10
5	3.78	3.81	3.80
10	4.44	4.46	4.50
25	5.43	5.44	5.50
50	6.26	6.26	6.30
100	7.16	7.12	7.20

References

[ ] Box indicates value selected.

[1] NOAA Atlas 14, Volume 8, Version 2

[2] SUDAS Design 2025 Edition

[3] 24-hour rainfall depths by county from NEH Title 210 (Figure IA2-25)

Tributary Watershed Data

Watershed	Area (ac)	Area (sq. mi.)	Tile/Surface Drained
Direct	103	0.16	Surface & Tile
South	43	0.07	Tile
Southwest	152	0.24	Surface & Tile
West	183	0.29	Surface & Tile
Northwest	14	0.02	Surface & Tile
Northeast	23	0.04	Surface & Tile

Surface Total	475	0.74
Tile Total	518	0.81

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IDALS ID Number: HAM892326B
Job: Peterson
BMI Project Number: 0A1.127685
Designed By: BCS Date: 6/18/2025

Runoff Curve Number

Surface-Drained DA = 475 ac
= .74 sq mi

Soil Name[1]	HSG[1]	Cover Type and Hyd. Condition	Portion of W/S percent	CN[2]	Product
Canisteo, Nicollet Loam, et al	C, C/D	Straight Row Crops, Good	96.2%	85	81.77
Clarion Loam, et al	B	Straight Row Crops, Good	3.8%	78	2.964
		Total	100.0%		84.7

References

[1] USDA - NRCS Soil Survey of Hamilton Co., Iowa.

[2] USDA - NRCS Technical Release 55, Chapter 2, June 1986.

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IDALS ID Number: HAM892326B
Job: Peterson
BMI Project Number: 0A1.127685
Designed By: BCS Date: 6/18/2025

Stage-Storage

Surface-Drained DA = 475 ac
= .74 sq mi

Contour Elev.	Area (sq ft)	Area (Acres)	Incremental Volume (Ac-ft)	Cumulative Volume (Ac-ft)	Volume Above Weir (Ac-ft)
1169.50	268800	6.17	0.00	0.00	
1170.00	278800	6.40	3.14	3.14	
1170.50	**284800**	**6.54**	**3.23**	**6.38**	**0.00**
1171.00	292300	6.71	3.31	9.69	3.31
1172.00	537600	12.34	9.53	19.22	12.84
1173.00	724400	16.63	14.49	33.70	27.32
1174.00	990700	22.74	19.69	53.39	47.01
1175.00	1346900	30.92	26.83	80.22	73.84
1176.00	1707400	39.20	35.06	115.28	108.90
1177.00	1944300	44.63	41.92	157.19	150.82
1178.00	2199900	50.50	47.57	204.76	198.39

Storage at Normal Pool	**6.38**	**Acre-feet**
Elevation of weir =		**1170.50**
Storage at Overflow	**53.39**	**Acre-feet**
Elevation =		**1174.00**

Average Depth = storage at normal pool / area at normal pool

Average Depth = 0.98 feet

Notes:

Storage areas include final earthwork in pool area. Contour data is compiled from LiDAR, topographic survey, and proposed grading.

Wetland Outlet Weir Capacities

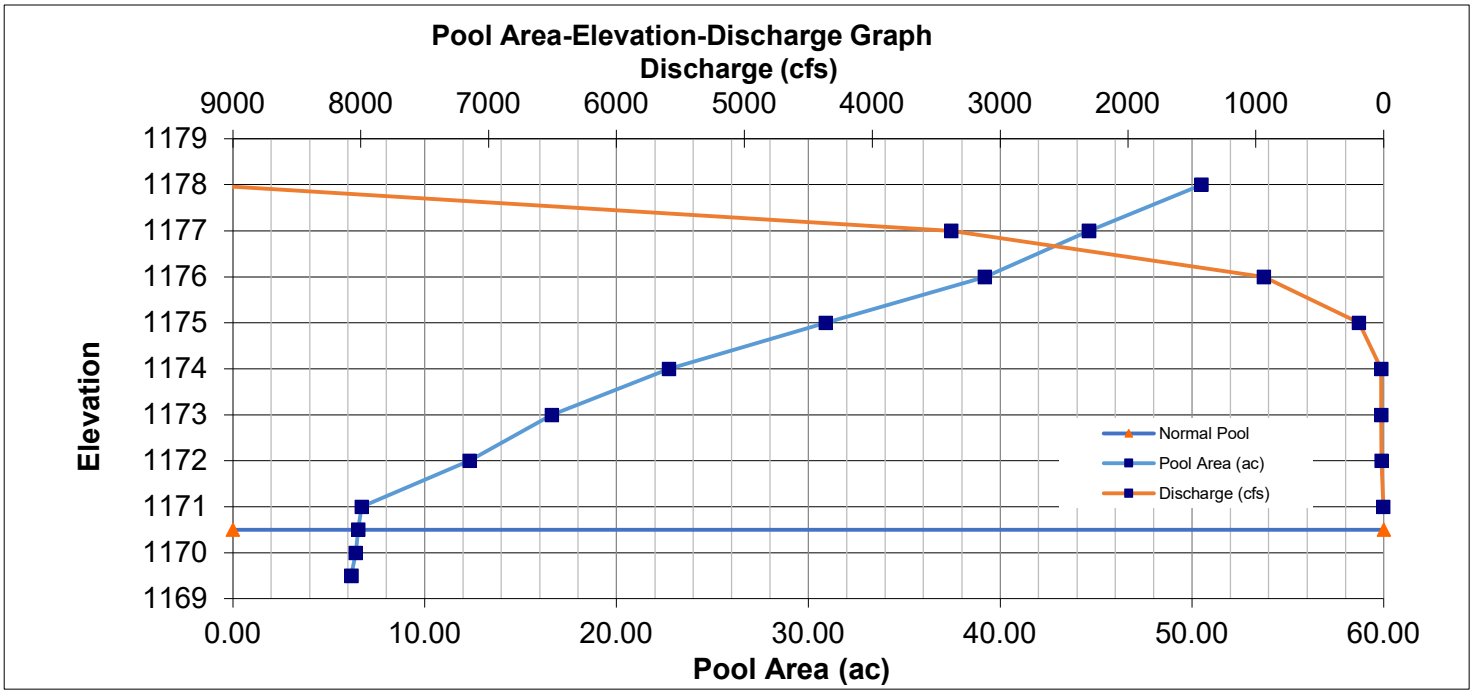
The following parameters are used to design the combination v-notch and rectangular weir for the wetland outlet structure.

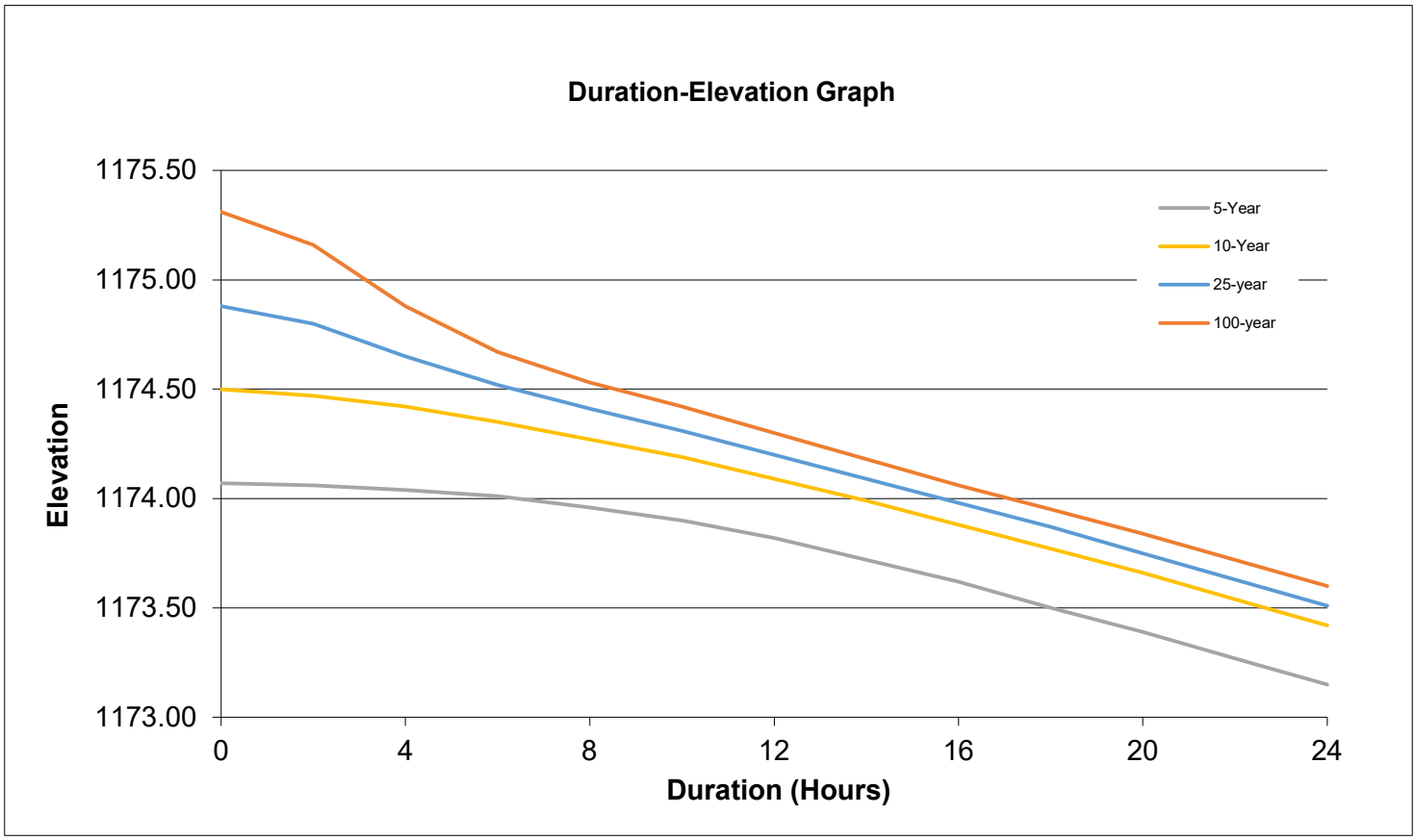
Base Flow (cfs)	0.81	=1 csm
Base Flow Weir Height (ft)	0.16	
Average Flow (cfs)	0.76	Based on StreamStats data
Average Flow Weir Height (ft)	0.16	
Pool Elevation at 1 csm	1170.66	
Pool Elevation at Average Flow	1170.66	

Results

Surface-Drained DA = 475 ac = .74 sq mi

The following are based on surface flows and storm response. Discharge includes tile flow and overland flow.





Results

Surface-Drained DA = 475 ac
= .74 sq mi

The Elevation-Discharge table below shows tile and surface outflows from the wetland for various elevations. The tile discharge is very small compared to the surface discharge at higher elevations.

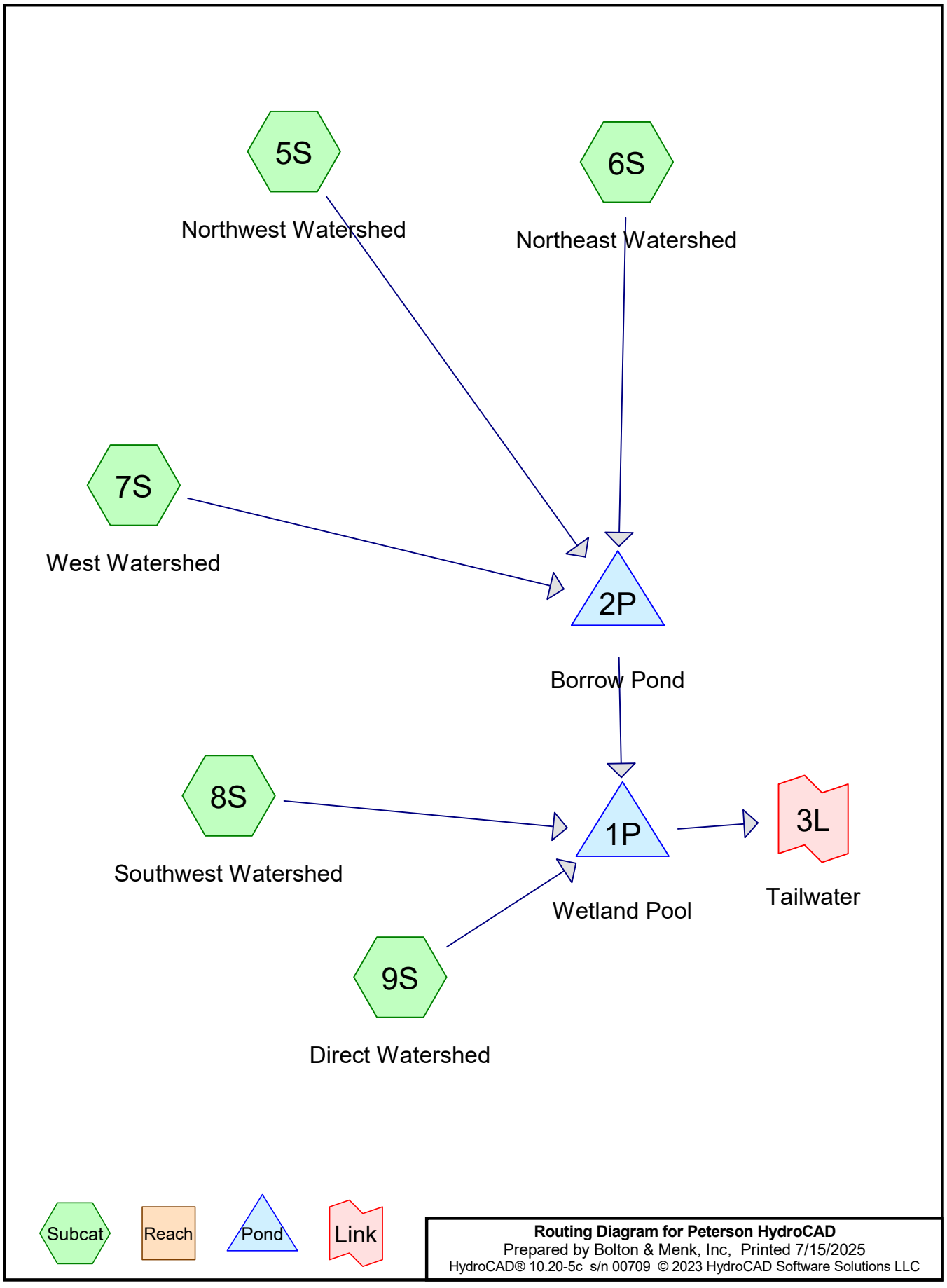
Elevation	Pool Area (ac)	Tile Discharge (cfs)	Surface Discharge (cfs)	Total Discharge (cfs)
1169.50	6.17	0	0	0
1170.00	6.40	0	0	0
1170.50	6.54	0	0	0
1171.00	6.71	4.51	0	4.51
1172.00	12.34	18.56	0	18.56
1173.00	16.63	19.89	0	19.89
1174.00	22.74	21.14	0	21.14
1175.00	30.92	22.31	172.92	195.23
1176.00	39.20	23.43	913.06	936.49
1177.00	44.63	24.5	3358.4	3382.9
1178.00	50.50	25.52	9208.44	9233.96

The Duration-Elevation table below shows the duration that the pool is at each listed elevation during the design storms. This is based on surface inflows during the design storms listed. The design for the wetland is based on tile flows, but the entire watershed is analyzed, including surface flows, to show that the proposed wetland does not have adverse impacts on surrounding properties during rainfall events.

Duration-Elevation Table

5-year Duration	Elevation	10-year Duration	Elevation	25-year Duration	Elevation	100-year Duration	Elevation
0	1174.07	0	1174.50	0	1174.88	0	1175.31
2	1174.06	2	1174.47	2	1174.80	2	1175.16
4	1174.04	4	1174.42	4	1174.65	4	1174.88
6	1174.01	6	1174.35	6	1174.52	6	1174.67
8	1173.96	8	1174.27	8	1174.41	8	1174.53
10	1173.90	10	1174.19	10	1174.31	10	1174.42
12	1173.82	12	1174.09	12	1174.20	12	1174.30
14	1173.72	14	1173.99	14	1174.09	14	1174.18
16	1173.62	16	1173.88	16	1173.98	16	1174.06
18	1173.50	18	1173.77	18	1173.87	18	1173.95
20	1173.39	20	1173.66	20	1173.75	20	1173.84
22	1173.27	22	1173.54	22	1173.63	22	1173.72
24	1173.15	24	1173.42	24	1173.51	24	1173.60

HydroCAD Output



Routing Diagram for Peterson HydroCAD
Prepared by Bolton & Menk, Inc, Printed 7/15/2025

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-yr	MSE 24-hr	3	Default	24.00	1	3.10	2
2	5-yr	MSE 24-hr	3	Default	24.00	1	3.80	2
3	10-yr	MSE 24-hr	3	Default	24.00	1	4.50	2
4	25-yr	MSE 24-hr	3	Default	24.00	1	5.50	2
5	50-yr	MSE 24-hr	3	Default	24.00	1	6.30	2
6	100-yr	MSE 24-hr	3	Default	24.00	1	7.20	2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
475.000	85	Row crops, straight row, Good, HSG C (5S, 6S, 7S, 8S, 9S)
475.000	**85**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
475.000	HSG C	5S, 6S, 7S, 8S, 9S
0.000	HSG D	
0.000	Other	
475.000		**TOTAL AREA**

Ground Covers (all 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	475.000	0.000	0.000	475.000	Row crops, straight row, Good	5S, 6S, 7S, 8S, 9S
0.000	**0.000**	**475.000**	**0.000**	**0.000**	**475.000**	**TOTAL AREA**	

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Width (inches)	Diam/Height (inches)	Inside-Fill (inches)	Node Name
1	1P	1,164.00	1,163.76	100.0	0.0024	0.015	0.0	18.0	0.0	

Time span=5.00-96.00 hrs, dt=0.05 hrs, 1821 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 5S: Northwest Watershed Runoff Area=14.000 ac 0.00% Impervious Runoff Depth=1.67"
Flow Length=1,279' Tc=48.4 min CN=85 Runoff=15.60 cfs 1.951 af

Subcatchment 6S: Northeast Watershed Runoff Area=23.000 ac 0.00% Impervious Runoff Depth=1.67"
Flow Length=1,402' Tc=36.1 min CN=85 Runoff=30.84 cfs 3.206 af

Subcatchment 7S: West Watershed Runoff Area=183.000 ac 0.00% Impervious Runoff Depth=1.67"
Flow Length=6,267' Tc=181.2 min CN=85 Runoff=78.29 cfs 25.507 af

Subcatchment 8S: Southwest Watershed Runoff Area=152.000 ac 0.00% Impervious Runoff Depth=1.67"
Flow Length=4,051' Tc=117.6 min CN=85 Runoff=90.90 cfs 21.186 af

Subcatchment 9S: Direct Watershed Runoff Area=103.000 ac 0.00% Impervious Runoff Depth=1.67"
Flow Length=1,993' Tc=59.2 min CN=85 Runoff=100.70 cfs 14.356 af

Pond 1P: Wetland Pool Peak Elev=1,173.29' Storage=38.635 af Inflow=154.26 cfs 65.629 af
Primary=20.25 cfs 64.965 af Secondary=0.00 cfs 0.000 af Outflow=20.25 cfs 64.965 af

Pond 2P: Borrow Pond Peak Elev=1,173.30' Storage=22.218 af Inflow=82.76 cfs 30.664 af
Outflow=40.86 cfs 30.086 af

Link 3L: Tailwater Inflow=20.25 cfs 64.965 af
Primary=20.25 cfs 64.965 af

Total Runoff Area = 475.000 ac Runoff Volume = 66.207 af Average Runoff Depth = 1.67"
100.00% Pervious = 475.000 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 5S: Northwest Watershed

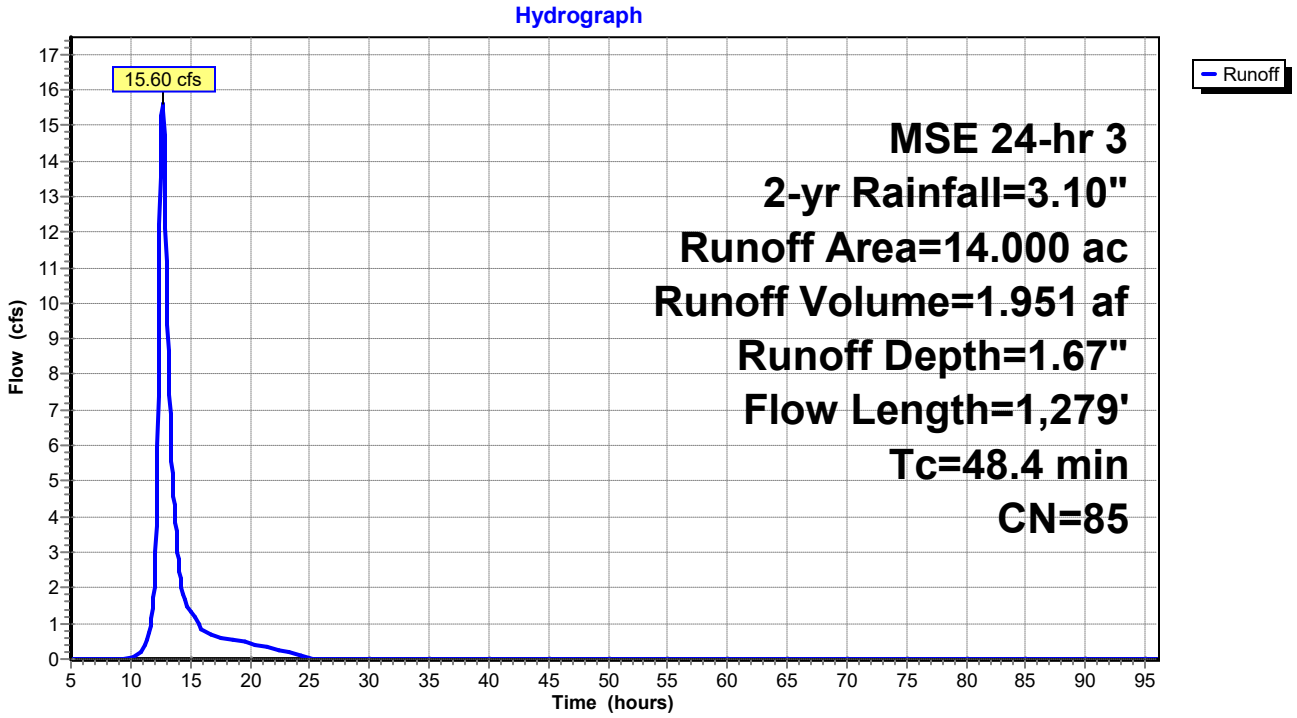
Runoff = 15.60 cfs @ 12.67 hrs, Volume= 1.951 af, Depth= 1.67"
Routed to Pond 2P : Borrow Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-96.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 2-yr Rainfall=3.10"

Area (ac)	CN	Description
14.000	85	Row crops, straight row, Good, HSG C
14.000		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.0	100	0.0200	0.15		**Sheet Flow,** Cultivated: Residue>20% n= 0.170 P2= 3.10"
37.4	1,179	0.0034	0.52		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
48.4	1,279	Total			

Subcatchment 5S: Northwest Watershed



Summary for Subcatchment 6S: Northeast Watershed

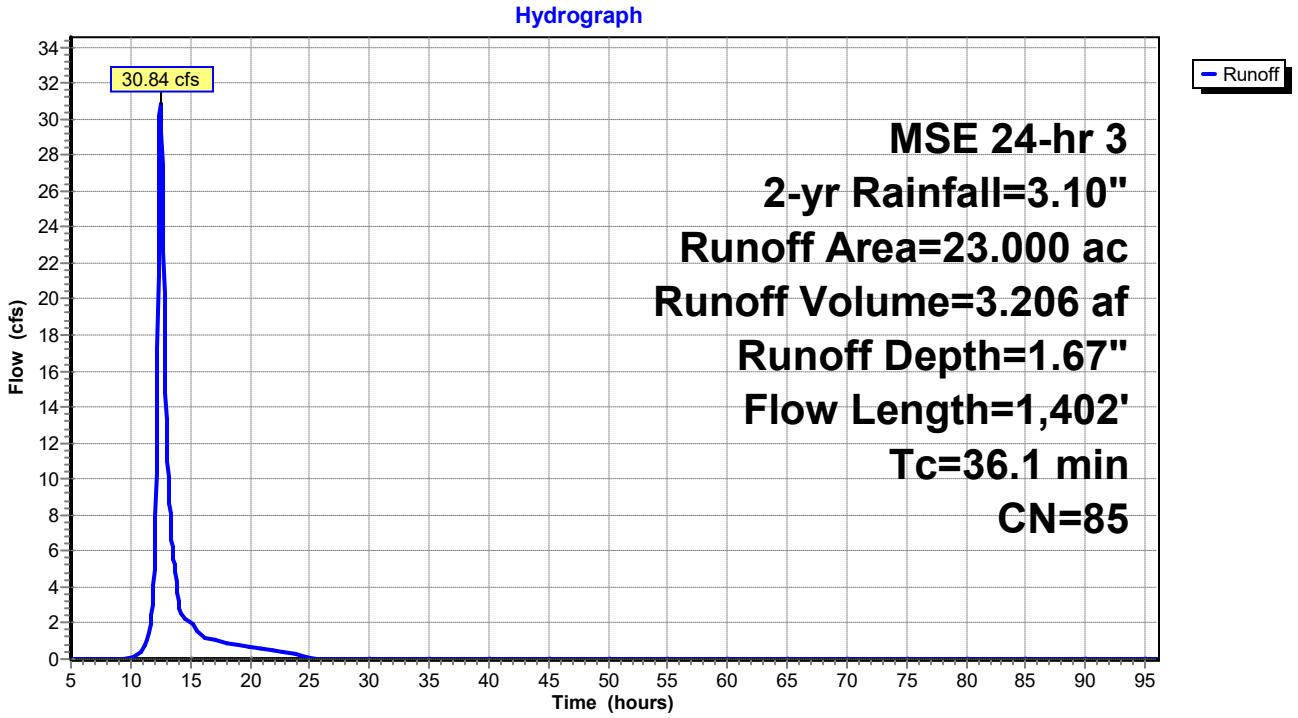
Runoff = 30.84 cfs @ 12.51 hrs, Volume= 3.206 af, Depth= 1.67"
Routed to Pond 2P : Borrow Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-96.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 2-yr Rainfall=3.10"

Area (ac)	CN	Description
23.000	85	Row crops, straight row, Good, HSG C
23.000		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.0	100	0.0200	0.15		**Sheet Flow,** Cultivated: Residue>20% n= 0.170 P2= 3.10"
25.1	1,302	0.0092	0.86		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
36.1	1,402	Total			

Subcatchment 6S: Northeast Watershed



Summary for Subcatchment 7S: West Watershed

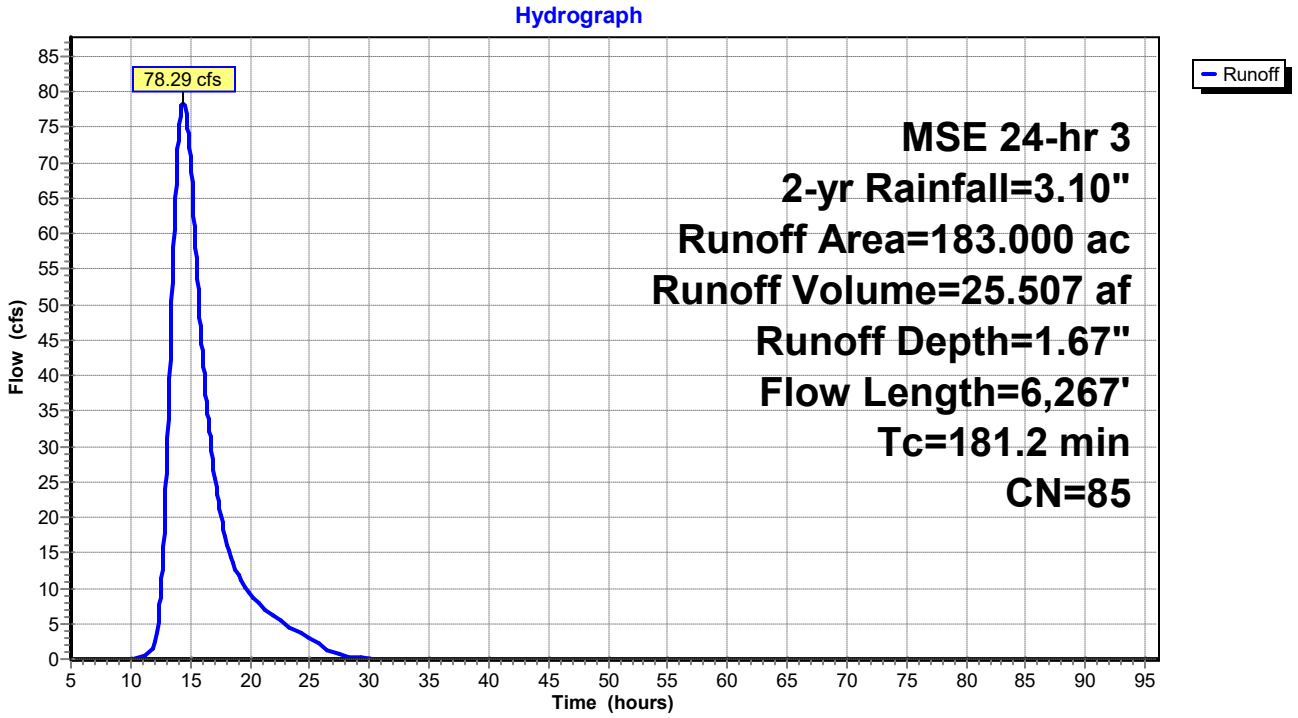
Runoff = 78.29 cfs @ 14.33 hrs, Volume= 25.507 af, Depth= 1.67"
Routed to Pond 2P : Borrow Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-96.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 2-yr Rainfall=3.10"

Area (ac)	CN	Description
183.000	85	Row crops, straight row, Good, HSG C
183.000		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.0	100	0.0200	0.15		**Sheet Flow,** Cultivated: Residue>20% n= 0.170 P2= 3.10"
170.2	6,167	0.0045	0.60		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
181.2	6,267	Total			

Subcatchment 7S: West Watershed



Summary for Subcatchment 8S: Southwest Watershed

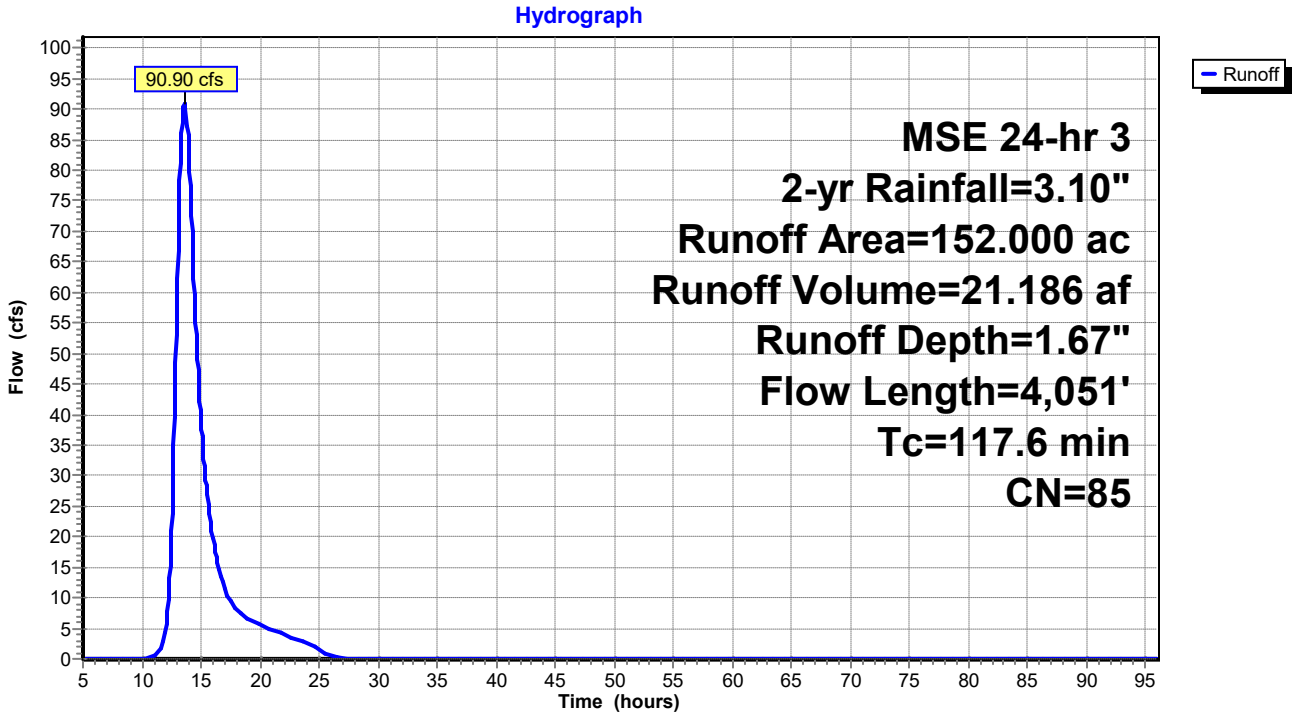
Runoff = 90.90 cfs @ 13.61 hrs, Volume= 21.186 af, Depth= 1.67"
Routed to Pond 1P : Wetland Pool

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-96.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 2-yr Rainfall=3.10"

Area (ac)	CN	Description
152.000	85	Row crops, straight row, Good, HSG C
152.000		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.0	100	0.0200	0.15		**Sheet Flow,** Cultivated: Residue>20% n= 0.170 P2= 3.10"
70.0	2,037	0.0029	0.48		**Shallow Concentrated Flow, middle (even)** Cultivated Straight Rows Kv= 9.0 fps
36.6	1,914	0.0094	0.87		**Shallow Concentrated Flow, east (steep)** Cultivated Straight Rows Kv= 9.0 fps
117.6	4,051	Total			

Subcatchment 8S: Southwest Watershed



Summary for Subcatchment 9S: Direct Watershed

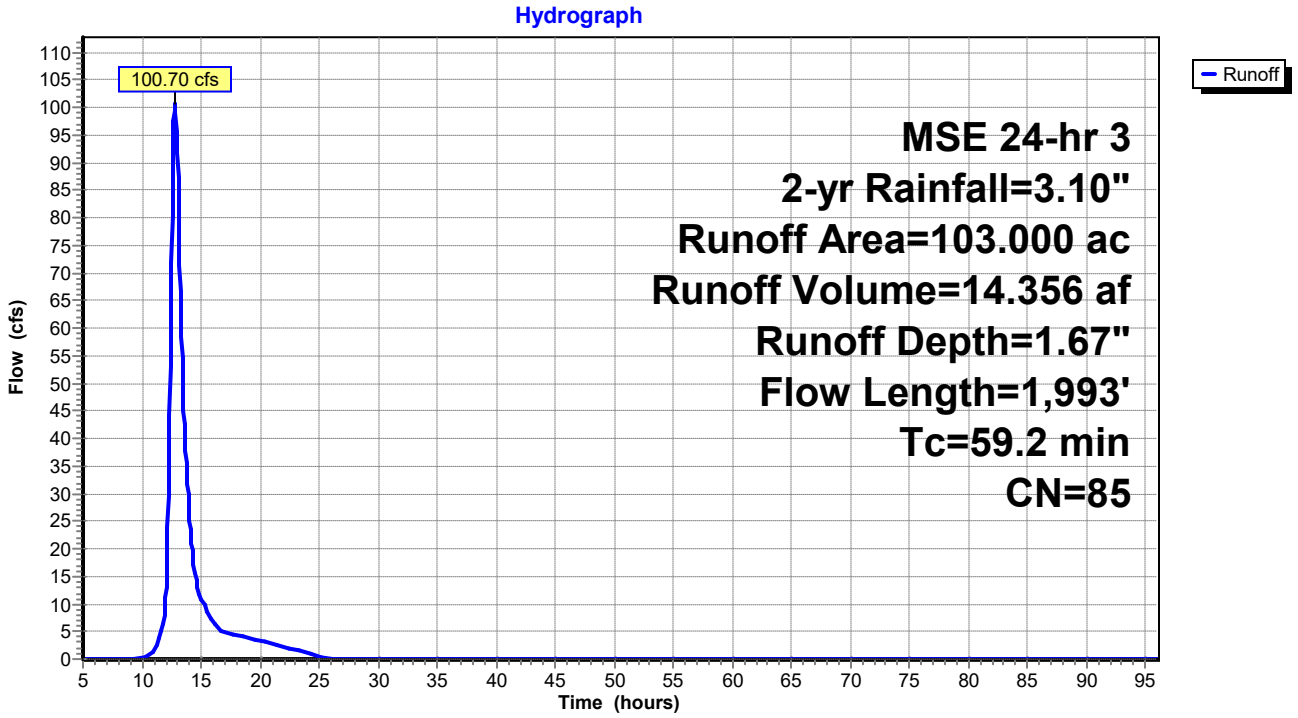
Runoff = 100.70 cfs @ 12.81 hrs, Volume= 14.356 af, Depth= 1.67"
Routed to Pond 1P : Wetland Pool

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-96.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 2-yr Rainfall=3.10"

Area (ac)	CN	Description
103.000	85	Row crops, straight row, Good, HSG C
103.000		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.0	100	0.0200	0.15		**Sheet Flow,** Cultivated: Residue>20% n= 0.170 P2= 3.10"
48.2	1,893	0.0053	0.66		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
59.2	1,993	Total			

Subcatchment 9S: Direct Watershed



Summary for Pond 1P: Wetland Pool

[80] Warning: Exceeded Pond 2P by 0.45' @ 13.40 hrs (58.57 cfs 6.723 af)

Inflow Area = 475.000 ac, 0.00% Impervious, Inflow Depth > 1.66" for 2-yr event
Inflow = 154.26 cfs @ 13.03 hrs, Volume= 65.629 af
Outflow = 20.25 cfs @ 19.78 hrs, Volume= 64.965 af, Atten= 87%, Lag= 404.6 min
Primary = 20.25 cfs @ 19.78 hrs, Volume= 64.965 af
Routed to Link 3L : Tailwater
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-96.00 hrs, dt= 0.05 hrs / 3
Starting Elev= 1,170.50' Surf.Area= 6.403 ac Storage= 6.341 af
Peak Elev= 1,173.29' @ 19.78 hrs Surf.Area= 18.377 ac Storage= 38.635 af (32.294 af above start)

Plug-Flow detention time= 1,097.8 min calculated for 58.591 af (89% of inflow)
Center-of-Mass det. time= 734.7 min (2,070.2 - 1,335.5)

Volume	Invert	Avail.Storage	Storage Description
#1	1,169.50'	204.694 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,169.50	6.171	0.000	0.000
1,170.00	6.396	3.142	3.142
1,170.50	6.403	3.200	6.341
1,171.00	6.710	3.278	9.620
1,172.00	12.342	9.526	19.146
1,173.00	16.630	14.486	33.632
1,174.00	22.743	19.686	53.318
1,175.00	30.921	26.832	80.150
1,176.00	39.197	35.059	115.209
1,177.00	44.635	41.916	157.125
1,178.00	50.503	47.569	204.694

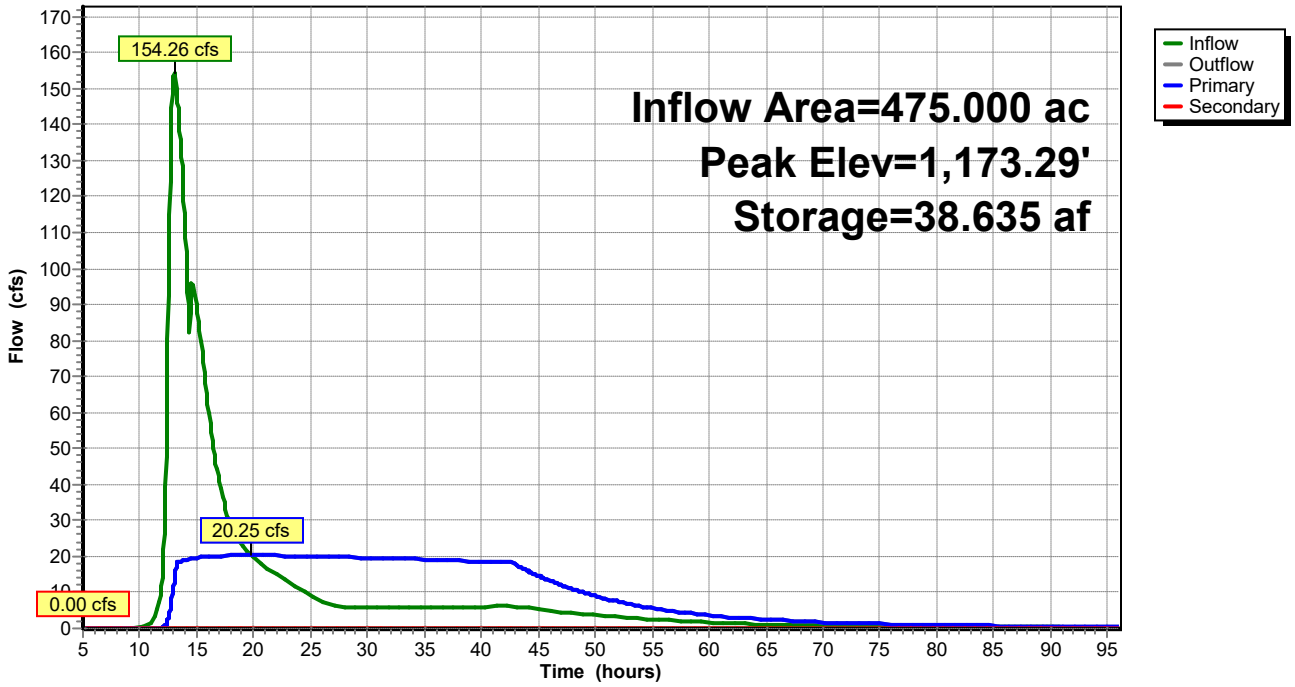
Device	Routing	Invert	Outlet Devices
#1	Primary	1,164.00'	**18.0" Round Culvert** L= 100.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,164.00' / 1,163.76' S= 0.0024 '/' Cc= 0.900 n= 0.015, Flow Area= 1.77 sf
#2	Device 1	1,170.50'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#3	Secondary	1,174.00'	**Custom Weir/Orifice, Cv= 2.62 (C= 3.28)** Head (feet) 0.00 1.00 2.00 3.00 4.00 Width (feet) 10.00 117.00 245.00 1,020.00 1,213.00

Primary OutFlow Max=20.25 cfs @ 19.78 hrs HW=1,173.29' TW=1,165.26' (Dynamic Tailwater)
↑**1=Culvert** (Barrel Controls 20.25 cfs @ 11.46 fps)
↑**2=Sharp-Crested Rectangular Weir** (Passes 20.25 cfs of 52.35 cfs potential flow)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=1,170.50' (Free Discharge)
↑**3=Custom Weir/Orifice** (Controls 0.00 cfs)

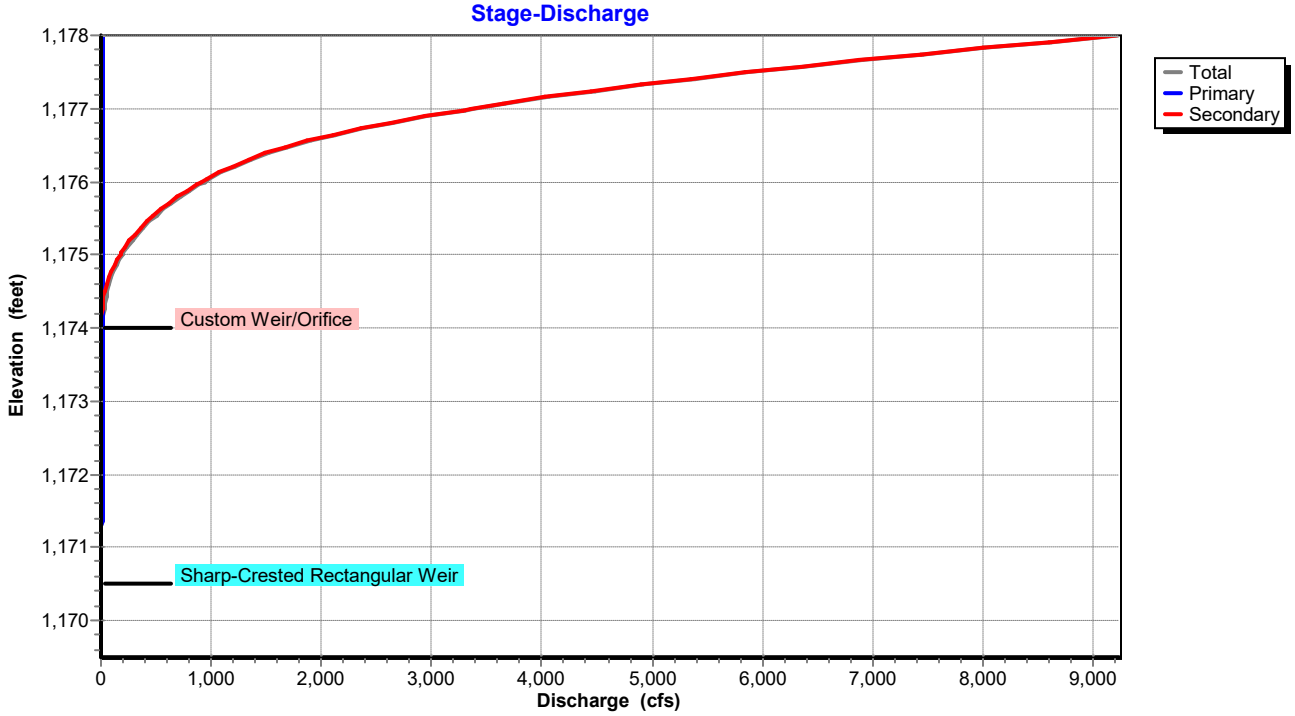
Pond 1P: Wetland Pool

Hydrograph

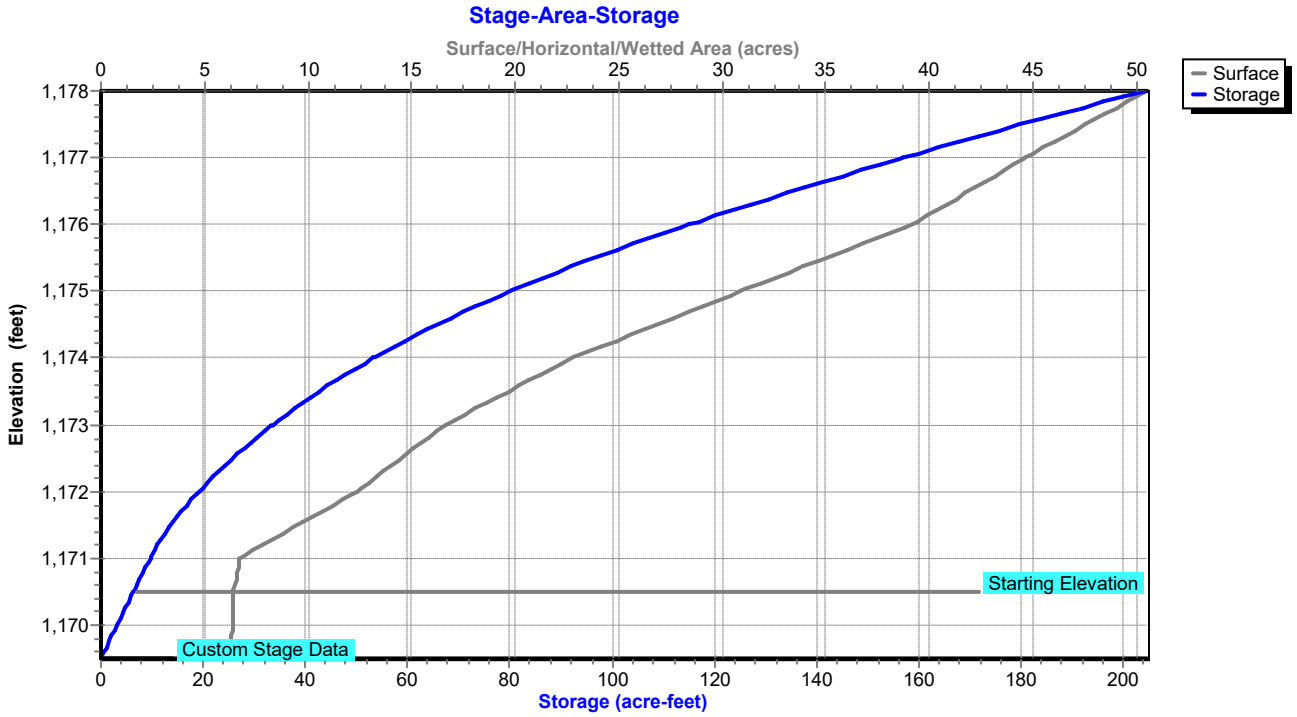


Pond 1P: Wetland Pool

Stage-Discharge



Pond 1P: Wetland Pool



Summary for Pond 2P: Borrow Pond

[95] Warning: Outlet Device #2 rise exceeded

Inflow Area = 220.000 ac, 0.00% Impervious, Inflow Depth = 1.67" for 2-yr event
Inflow = 82.76 cfs @ 14.31 hrs, Volume= 30.664 af
Outflow = 40.86 cfs @ 15.27 hrs, Volume= 30.086 af, Atten= 51%, Lag= 57.5 min
Primary = 40.86 cfs @ 15.27 hrs, Volume= 30.086 af
Routed to Pond 1P : Wetland Pool

Routing by Dyn-Stor-Ind method, Time Span= 5.00-96.00 hrs, dt= 0.05 hrs / 3
Starting Elev= 1,170.50' Surf.Area= 5.513 ac Storage= 5.457 af
Peak Elev= 1,173.30' @ 19.52 hrs Surf.Area= 6.719 ac Storage= 22.218 af (16.761 af above start)

Plug-Flow detention time= 1,204.7 min calculated for 24.630 af (80% of inflow)
Center-of-Mass det. time= 924.0 min (1,867.3 - 943.4)

Volume	Invert	Avail.Storage	Storage Description
#1	1,169.50'	62.467 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

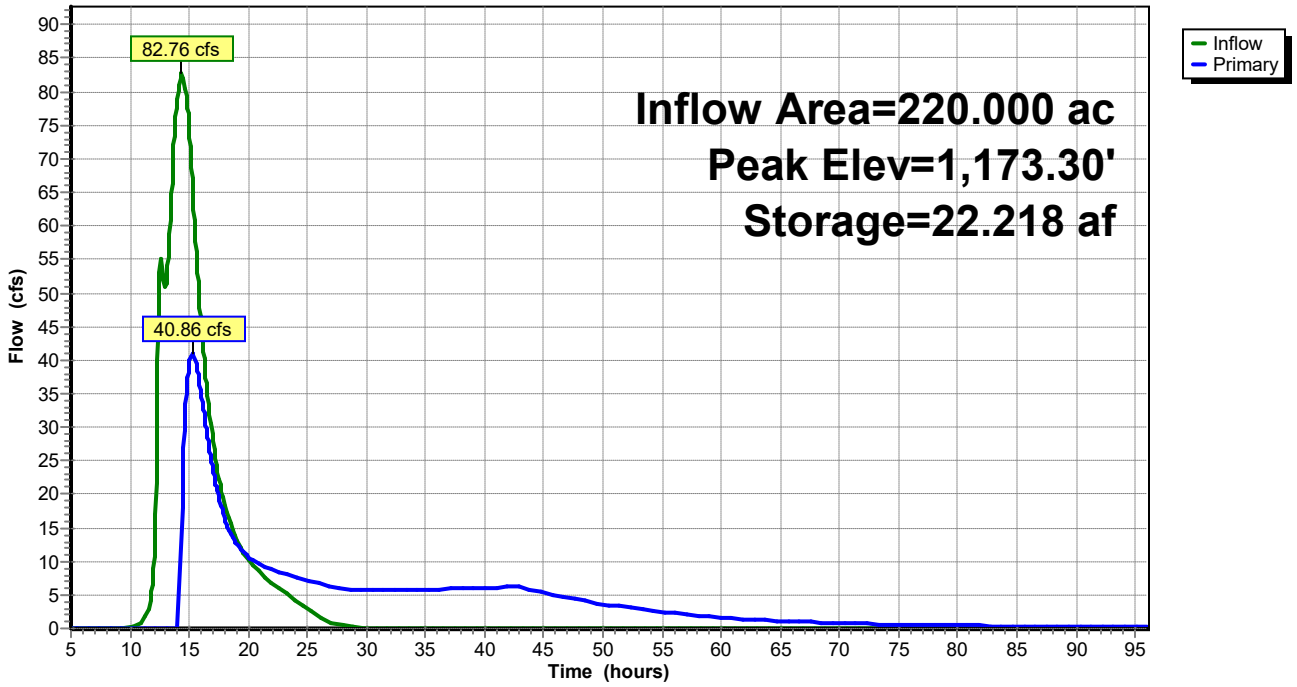
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,169.50	5.400	0.000	0.000
1,171.00	5.570	8.228	8.228
1,172.00	5.980	5.775	14.003
1,173.00	6.520	6.250	20.252
1,174.00	7.190	6.855	27.108
1,175.00	8.110	7.650	34.758
1,176.00	8.870	8.490	43.248
1,177.00	9.580	9.225	52.473
1,178.00	10.410	9.995	62.467

Device	Routing	Invert	Outlet Devices
#1	Primary	1,173.50'	**550.0' 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
#2	Primary	1,170.50'	**Custom Weir/Orifice, Cv= 2.62 (C= 3.28)** Head (feet) 0.00 0.50 1.00 1.50 Width (feet) 10.00 13.00 16.00 19.00

Primary OutFlow Max=40.85 cfs @ 15.27 hrs HW=1,173.01' TW=1,172.86' (Dynamic Tailwater)
1=Broad-Crested Rectangular Weir (Controls 0.00 cfs)
2=Custom Weir/Orifice (Orifice Controls 40.85 cfs @ 1.88 fps)

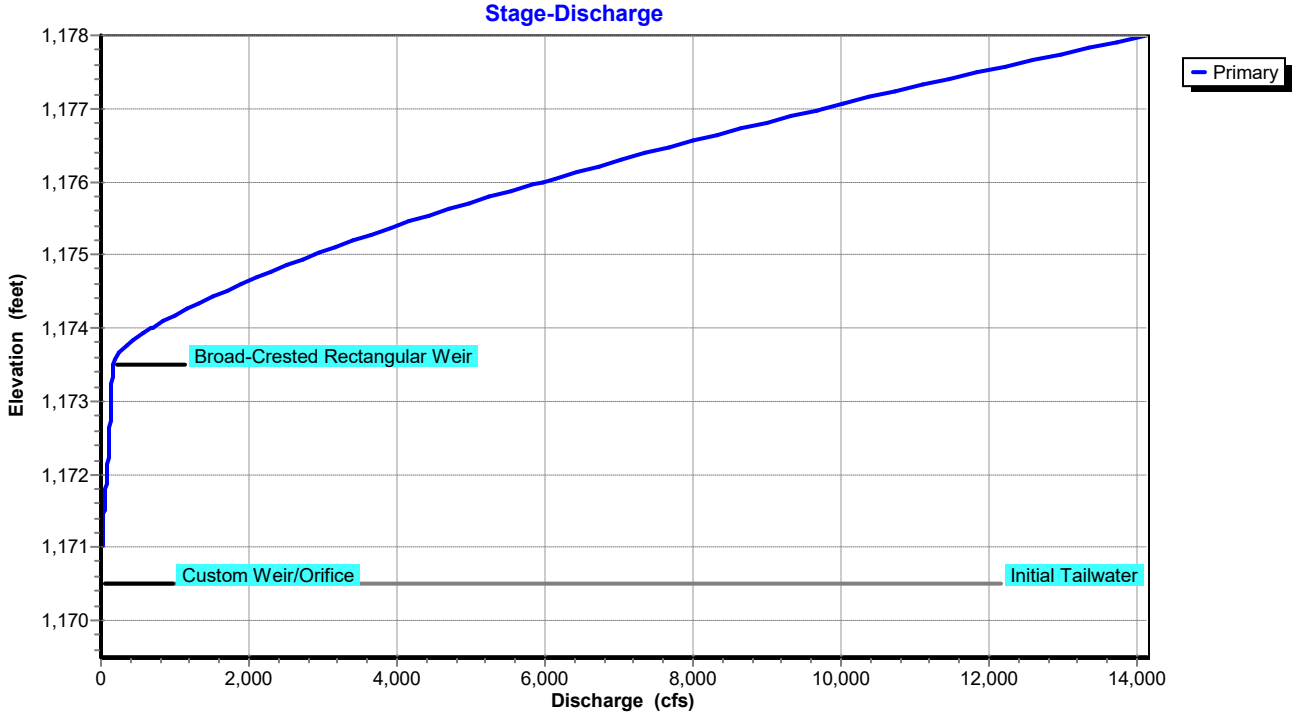
Pond 2P: Borrow Pond

Hydrograph

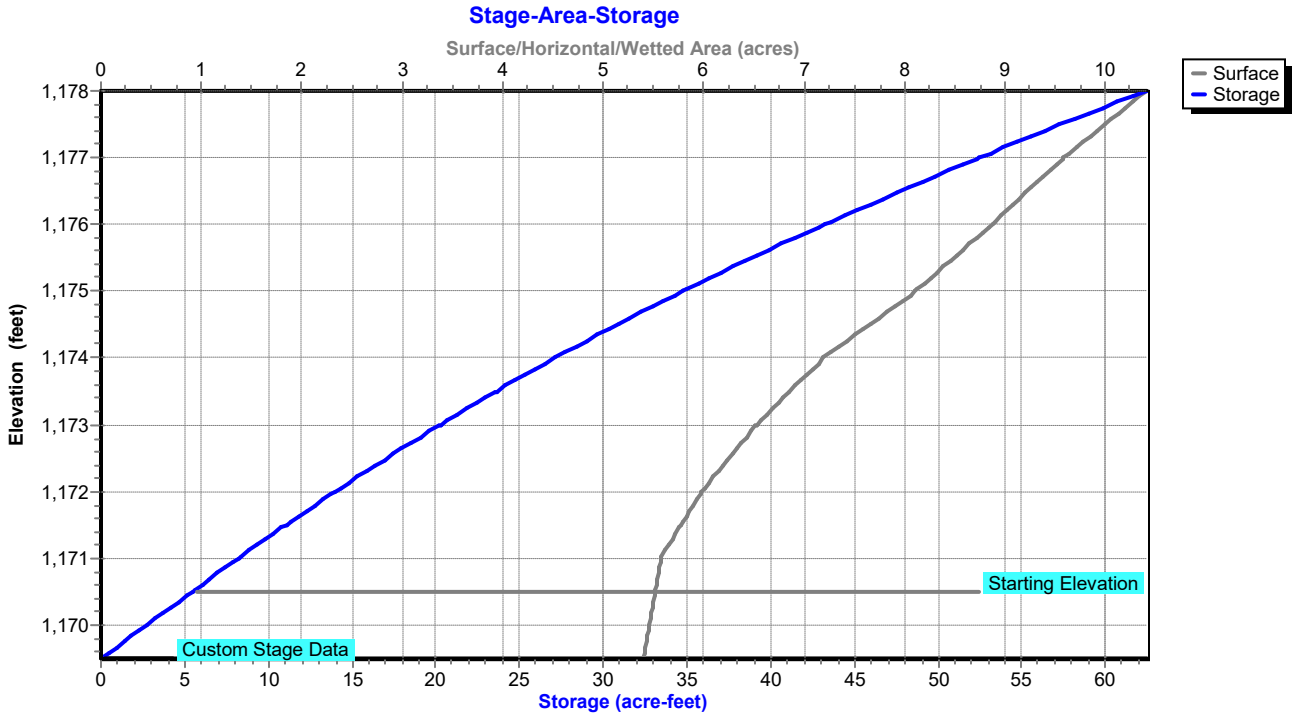


Pond 2P: Borrow Pond

Stage-Discharge



Pond 2P: Borrow Pond



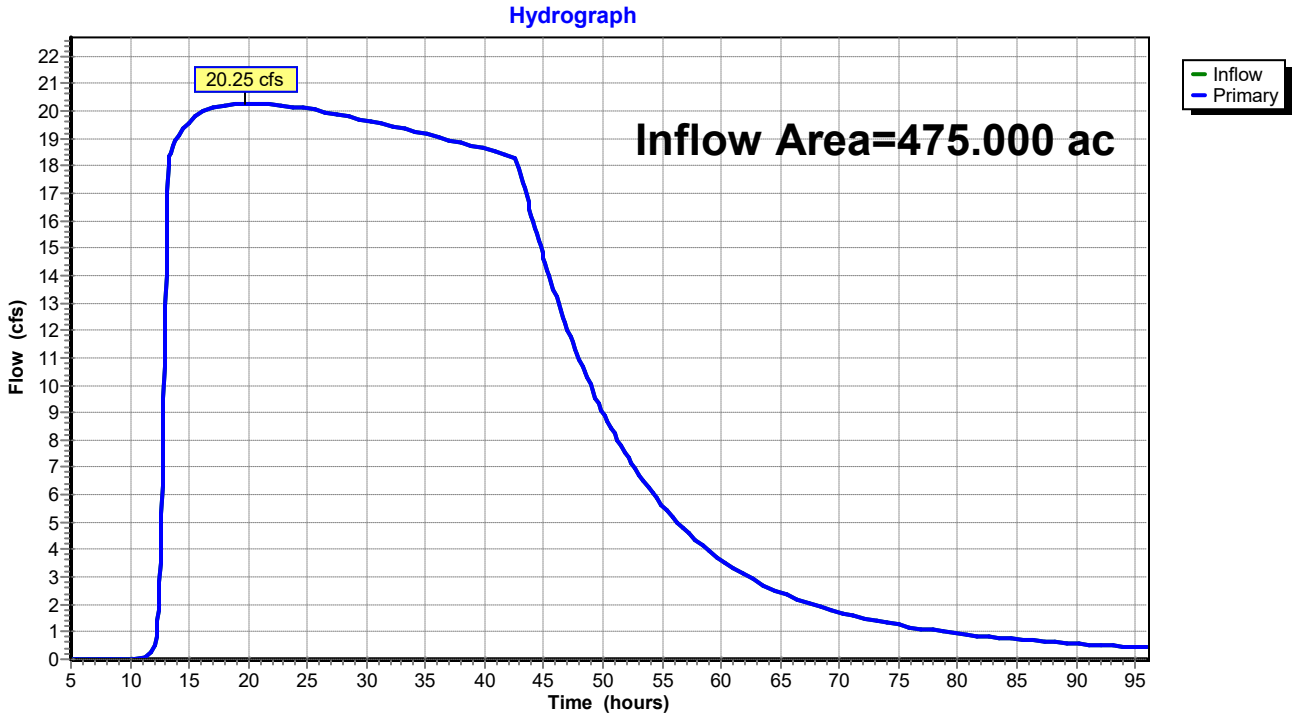
Summary for Link 3L: Tailwater

Inflow Area = 475.000 ac, 0.00% Impervious, Inflow Depth > 1.64" for 2-yr event
Inflow = 20.25 cfs @ 19.78 hrs, Volume= 64.965 af
Primary = 20.25 cfs @ 19.78 hrs, Volume= 64.965 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-96.00 hrs, dt= 0.05 hrs

Fixed water surface Elevation= 1,165.26'

Link 3L: Tailwater



Time span=5.00-96.00 hrs, dt=0.05 hrs, 1821 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 5S: Northwest Watershed Runoff Area=14.000 ac 0.00% Impervious Runoff Depth=2.28"
Flow Length=1,279' Tc=48.4 min CN=85 Runoff=21.31 cfs 2.660 af

Subcatchment 6S: Northeast Watershed Runoff Area=23.000 ac 0.00% Impervious Runoff Depth=2.28"
Flow Length=1,402' Tc=36.1 min CN=85 Runoff=42.07 cfs 4.370 af

Subcatchment 7S: West Watershed Runoff Area=183.000 ac 0.00% Impervious Runoff Depth=2.28"
Flow Length=6,267' Tc=181.2 min CN=85 Runoff=107.72 cfs 34.768 af

Subcatchment 8S: Southwest Watershed Runoff Area=152.000 ac 0.00% Impervious Runoff Depth=2.28"
Flow Length=4,051' Tc=117.6 min CN=85 Runoff=124.48 cfs 28.879 af

Subcatchment 9S: Direct Watershed Runoff Area=103.000 ac 0.00% Impervious Runoff Depth=2.28"
Flow Length=1,993' Tc=59.2 min CN=85 Runoff=137.65 cfs 19.569 af

Pond 1P: Wetland Pool Peak Elev=1,174.07' Storage=54.901 af Inflow=212.10 cfs 89.367 af
Primary=21.22 cfs 88.109 af Secondary=0.76 cfs 0.246 af Outflow=21.98 cfs 88.355 af

Pond 2P: Borrow Pond Peak Elev=1,174.07' Storage=27.604 af Inflow=113.47 cfs 41.798 af
Outflow=89.10 cfs 40.920 af

Link 3L: Tailwater Inflow=21.22 cfs 88.109 af
Primary=21.22 cfs 88.109 af

Total Runoff Area = 475.000 ac Runoff Volume = 90.245 af Average Runoff Depth = 2.28"
100.00% Pervious = 475.000 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 5S: Northwest Watershed

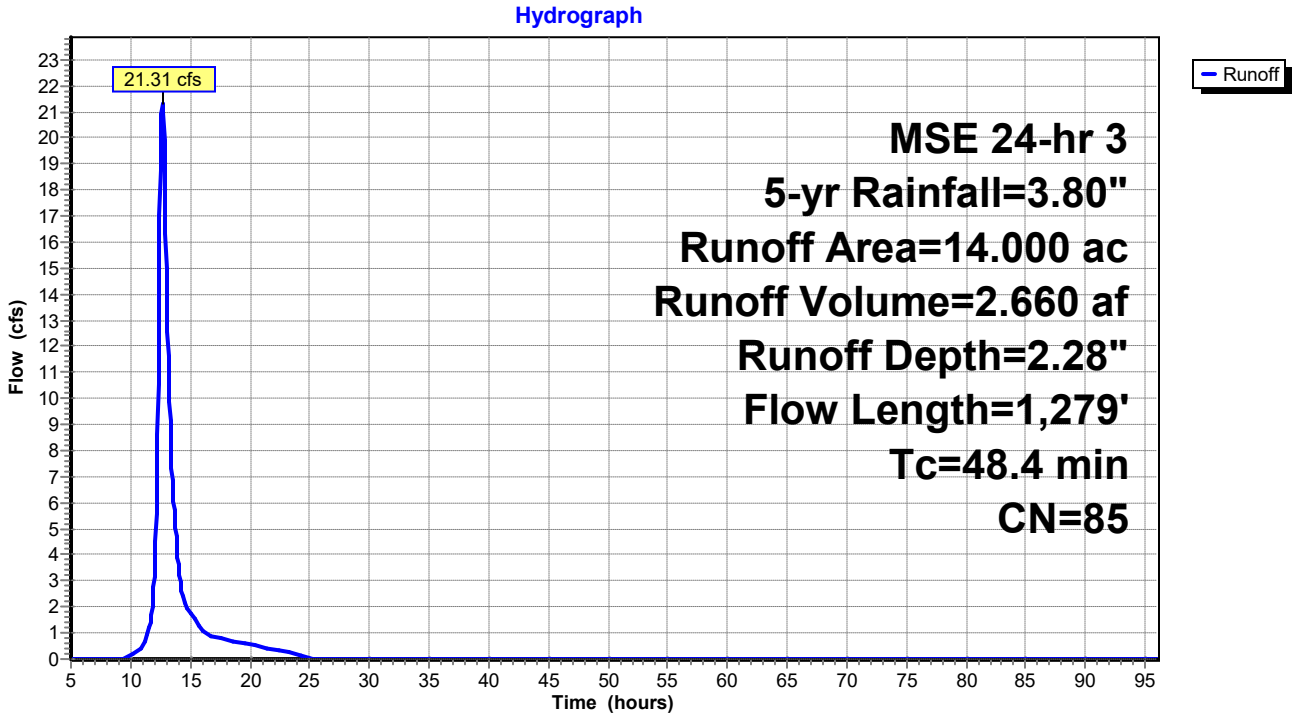
Runoff = 21.31 cfs @ 12.66 hrs, Volume= 2.660 af, Depth= 2.28"
Routed to Pond 2P : Borrow Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-96.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 5-yr Rainfall=3.80"

Area (ac)	CN	Description
14.000	85	Row crops, straight row, Good, HSG C
14.000		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.0	100	0.0200	0.15		**Sheet Flow,** Cultivated: Residue>20% n= 0.170 P2= 3.10"
37.4	1,179	0.0034	0.52		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
48.4	1,279	Total			

Subcatchment 5S: Northwest Watershed



Summary for Subcatchment 6S: Northeast Watershed

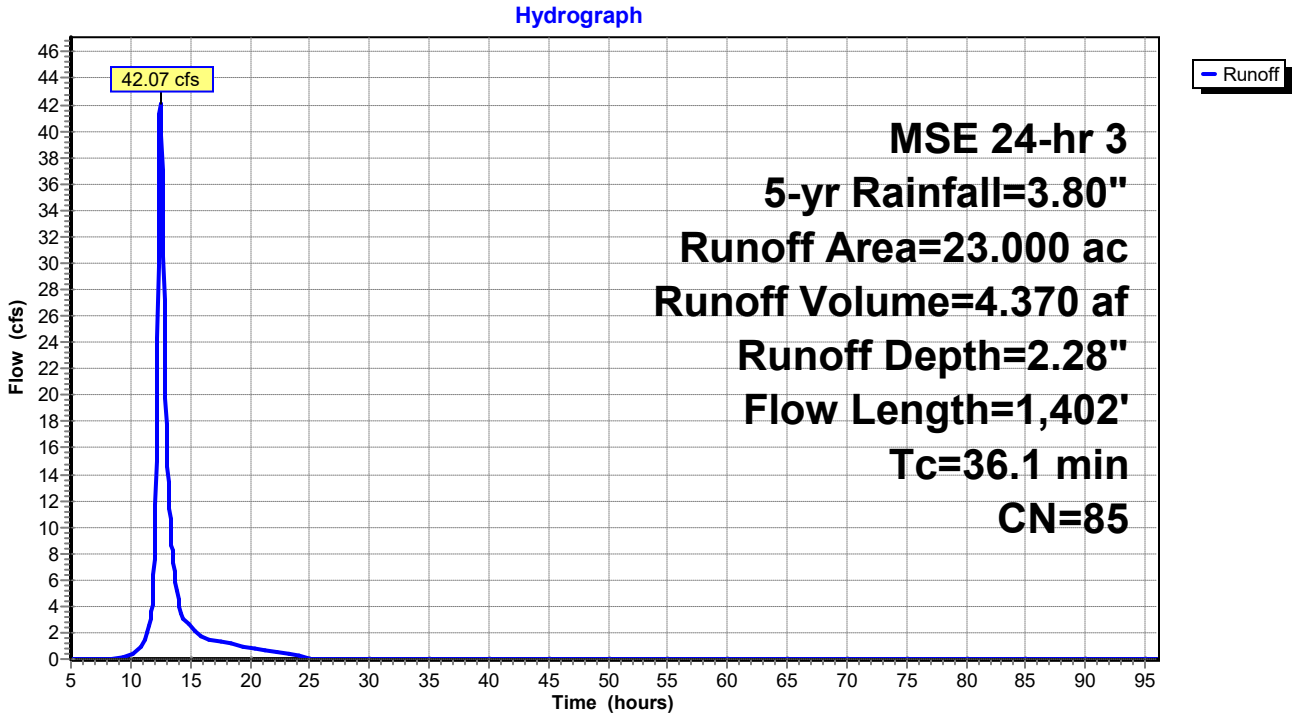
Runoff = 42.07 cfs @ 12.50 hrs, Volume= 4.370 af, Depth= 2.28"
Routed to Pond 2P : Borrow Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-96.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 5-yr Rainfall=3.80"

Area (ac)	CN	Description
23.000	85	Row crops, straight row, Good, HSG C
23.000		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.0	100	0.0200	0.15		**Sheet Flow,** Cultivated: Residue>20% n= 0.170 P2= 3.10"
25.1	1,302	0.0092	0.86		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
36.1	1,402	Total			

Subcatchment 6S: Northeast Watershed



Summary for Subcatchment 7S: West Watershed

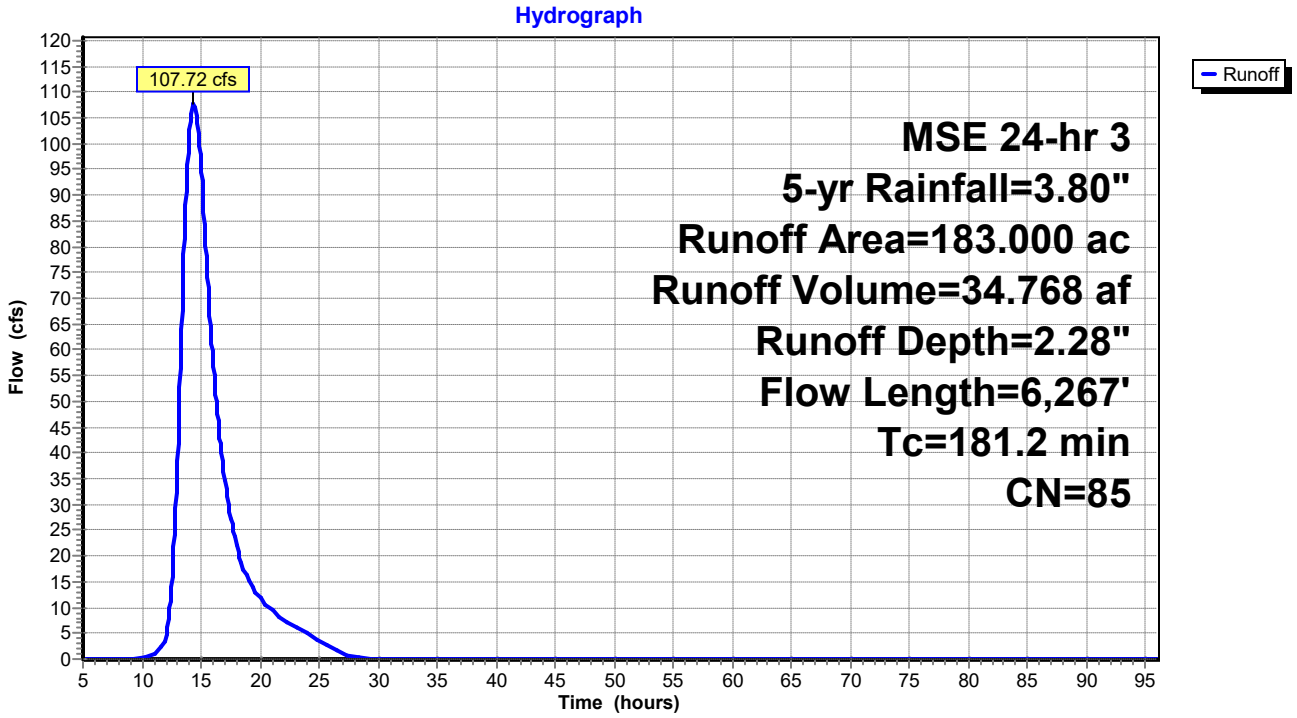
Runoff = 107.72 cfs @ 14.32 hrs, Volume= 34.768 af, Depth= 2.28"
Routed to Pond 2P : Borrow Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-96.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 5-yr Rainfall=3.80"

Area (ac)	CN	Description
183.000	85	Row crops, straight row, Good, HSG C
183.000		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.0	100	0.0200	0.15		**Sheet Flow,** Cultivated: Residue>20% n= 0.170 P2= 3.10"
170.2	6,167	0.0045	0.60		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
181.2	6,267	Total			

Subcatchment 7S: West Watershed



Summary for Subcatchment 8S: Southwest Watershed

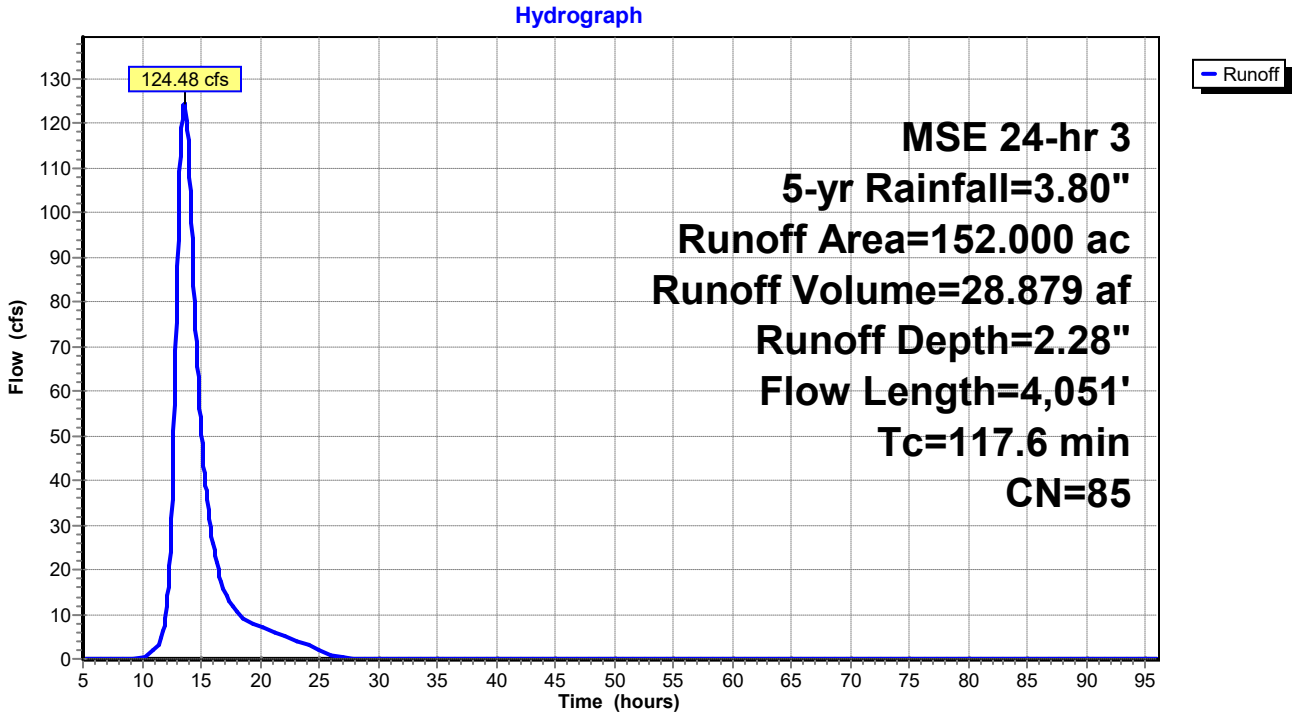
Runoff = 124.48 cfs @ 13.59 hrs, Volume= 28.879 af, Depth= 2.28"
Routed to Pond 1P : Wetland Pool

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-96.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 5-yr Rainfall=3.80"

Area (ac)	CN	Description
152.000	85	Row crops, straight row, Good, HSG C
152.000		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.0	100	0.0200	0.15		**Sheet Flow,** Cultivated: Residue>20% n= 0.170 P2= 3.10"
70.0	2,037	0.0029	0.48		**Shallow Concentrated Flow, middle (even)** Cultivated Straight Rows Kv= 9.0 fps
36.6	1,914	0.0094	0.87		**Shallow Concentrated Flow, east (steep)** Cultivated Straight Rows Kv= 9.0 fps
117.6	4,051	Total			

Subcatchment 8S: Southwest Watershed



Summary for Subcatchment 9S: Direct Watershed

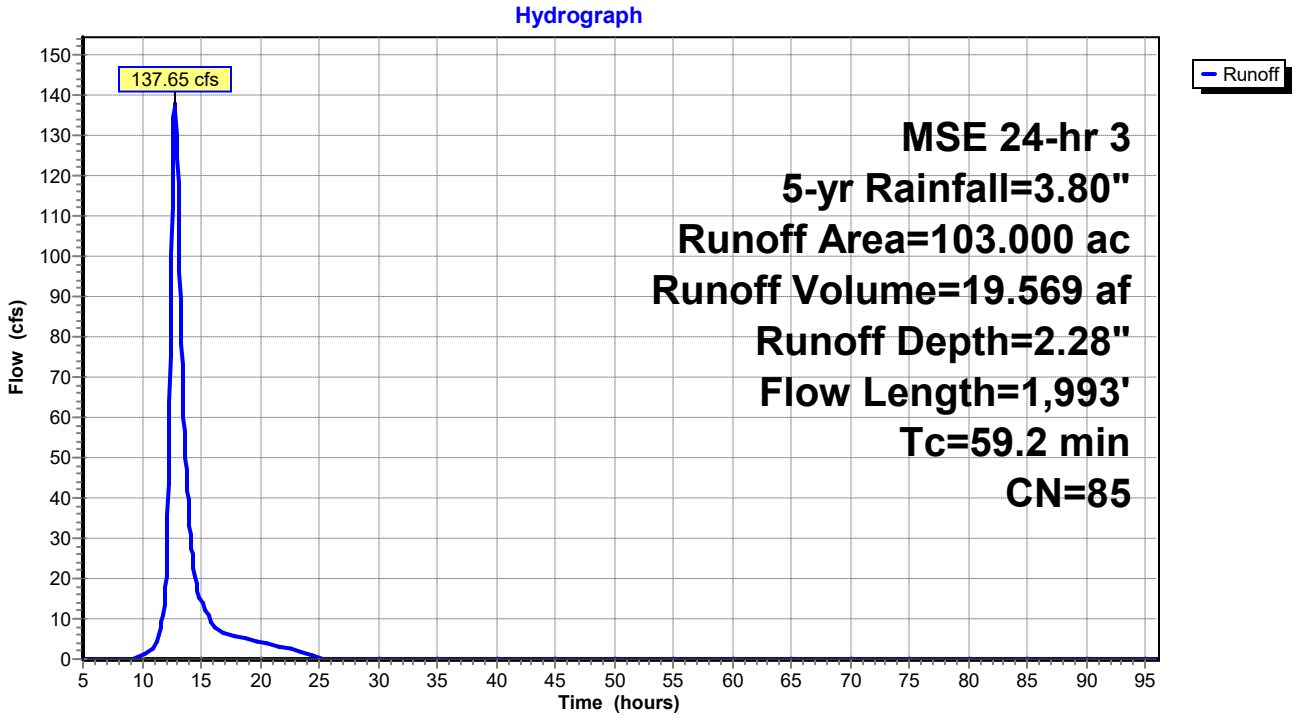
Runoff = 137.65 cfs @ 12.80 hrs, Volume= 19.569 af, Depth= 2.28"
Routed to Pond 1P : Wetland Pool

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-96.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 5-yr Rainfall=3.80"

Area (ac)	CN	Description
103.000	85	Row crops, straight row, Good, HSG C
103.000		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.0	100	0.0200	0.15		**Sheet Flow,** Cultivated: Residue>20% n= 0.170 P2= 3.10"
48.2	1,893	0.0053	0.66		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
59.2	1,993	Total			

Subcatchment 9S: Direct Watershed



Summary for Pond 1P: Wetland Pool

[80] Warning: Exceeded Pond 2P by 0.43' @ 13.30 hrs (68.49 cfs 16.254 af)

Inflow Area = 475.000 ac, 0.00% Impervious, Inflow Depth > 2.26" for 5-yr event
Inflow = 212.10 cfs @ 13.02 hrs, Volume= 89.367 af
Outflow = 21.98 cfs @ 20.62 hrs, Volume= 88.355 af, Atten= 90%, Lag= 456.4 min
Primary = 21.22 cfs @ 20.62 hrs, Volume= 88.109 af
Routed to Link 3L : Tailwater
Secondary = 0.76 cfs @ 20.62 hrs, Volume= 0.246 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-96.00 hrs, dt= 0.05 hrs / 3
Starting Elev= 1,170.50' Surf.Area= 6.403 ac Storage= 6.341 af
Peak Elev= 1,174.07' @ 20.62 hrs Surf.Area= 23.305 ac Storage= 54.901 af (48.560 af above start)

Plug-Flow detention time= 1,324.9 min calculated for 81.968 af (92% of inflow)
Center-of-Mass det. time= 980.0 min (2,381.9 - 1,401.9)

Volume	Invert	Avail.Storage	Storage Description
#1	1,169.50'	204.694 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,169.50	6.171	0.000	0.000
1,170.00	6.396	3.142	3.142
1,170.50	6.403	3.200	6.341
1,171.00	6.710	3.278	9.620
1,172.00	12.342	9.526	19.146
1,173.00	16.630	14.486	33.632
1,174.00	22.743	19.686	53.318
1,175.00	30.921	26.832	80.150
1,176.00	39.197	35.059	115.209
1,177.00	44.635	41.916	157.125
1,178.00	50.503	47.569	204.694

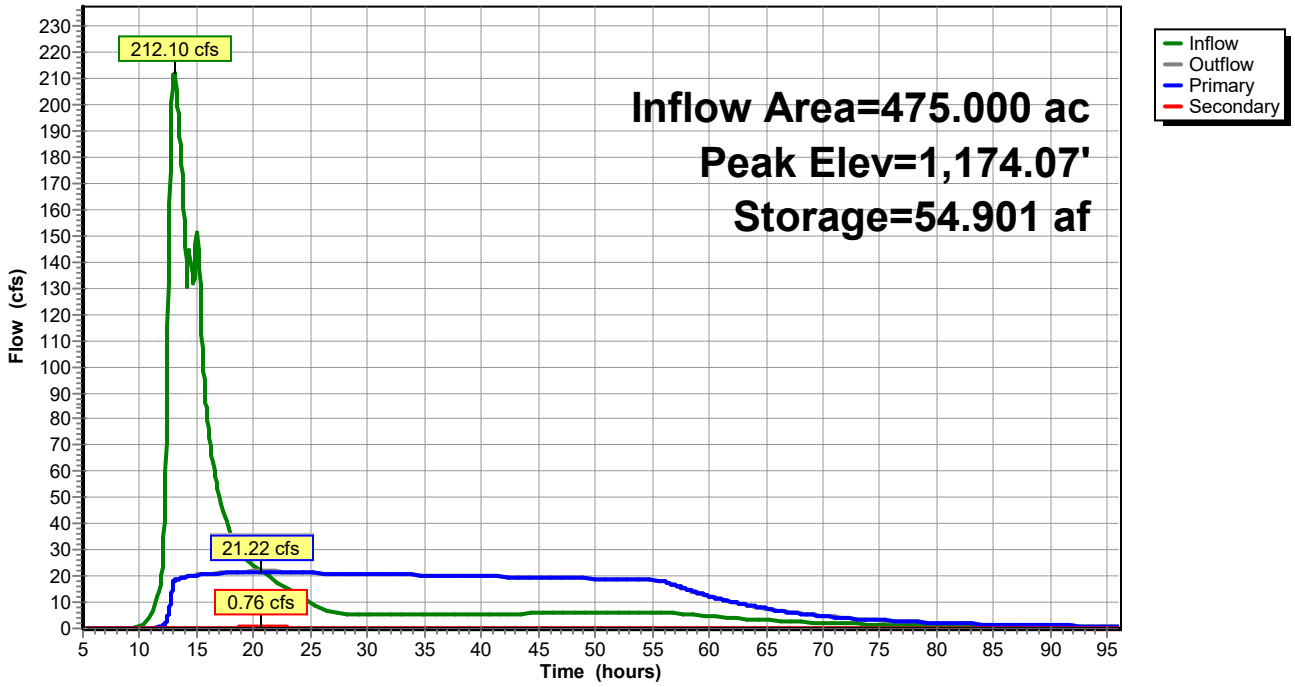
Device	Routing	Invert	Outlet Devices
#1	Primary	1,164.00'	**18.0" Round Culvert** L= 100.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,164.00' / 1,163.76' S= 0.0024 '/' Cc= 0.900 n= 0.015, Flow Area= 1.77 sf
#2	Device 1	1,170.50'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#3	Secondary	1,174.00'	**Custom Weir/Orifice, Cv= 2.62 (C= 3.28)** Head (feet) 0.00 1.00 2.00 3.00 4.00 Width (feet) 10.00 117.00 245.00 1,020.00 1,213.00

Primary OutFlow Max=21.22 cfs @ 20.62 hrs HW=1,174.07' TW=1,165.26' (Dynamic Tailwater)
↑**1=Culvert** (Barrel Controls 21.22 cfs @ 12.01 fps)
↑**2=Sharp-Crested Rectangular Weir** (Passes 21.22 cfs of 72.45 cfs potential flow)

Secondary OutFlow Max=0.76 cfs @ 20.62 hrs HW=1,174.07' (Free Discharge)
↑**3=Custom Weir/Orifice** (Weir Controls 0.76 cfs @ 0.81 fps)

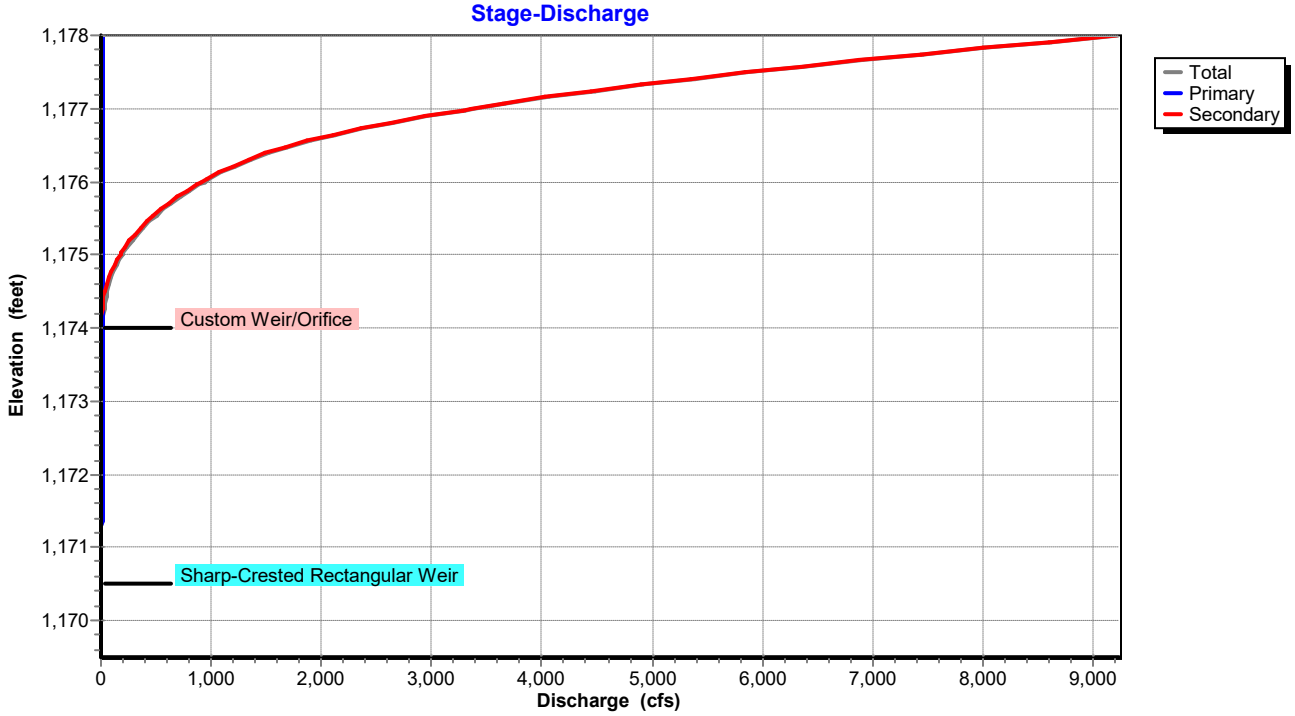
Pond 1P: Wetland Pool

Hydrograph

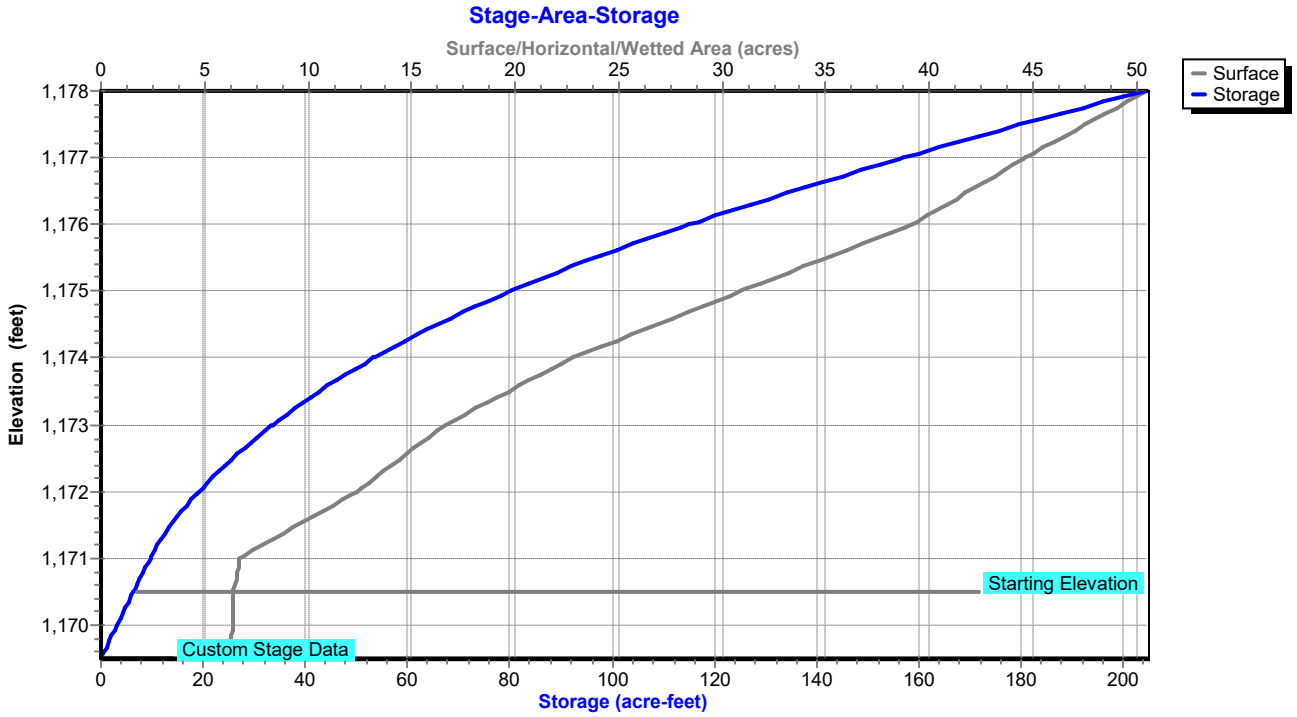


Pond 1P: Wetland Pool

Stage-Discharge



Pond 1P: Wetland Pool



Summary for Pond 2P: Borrow Pond

[95] Warning: Outlet Device #2 rise exceeded

Inflow Area = 220.000 ac, 0.00% Impervious, Inflow Depth = 2.28" for 5-yr event
Inflow = 113.47 cfs @ 14.30 hrs, Volume= 41.798 af
Outflow = 89.10 cfs @ 15.10 hrs, Volume= 40.920 af, Atten= 21%, Lag= 47.9 min
Primary = 89.10 cfs @ 15.10 hrs, Volume= 40.920 af
Routed to Pond 1P : Wetland Pool

Routing by Dyn-Stor-Ind method, Time Span= 5.00-96.00 hrs, dt= 0.05 hrs / 3
Starting Elev= 1,170.50' Surf.Area= 5.513 ac Storage= 5.457 af
Peak Elev= 1,174.07' @ 20.63 hrs Surf.Area= 7.253 ac Storage= 27.604 af (22.147 af above start)

Plug-Flow detention time= 1,317.1 min calculated for 35.463 af (85% of inflow)
Center-of-Mass det. time= 1,083.8 min (2,020.9 - 937.1)

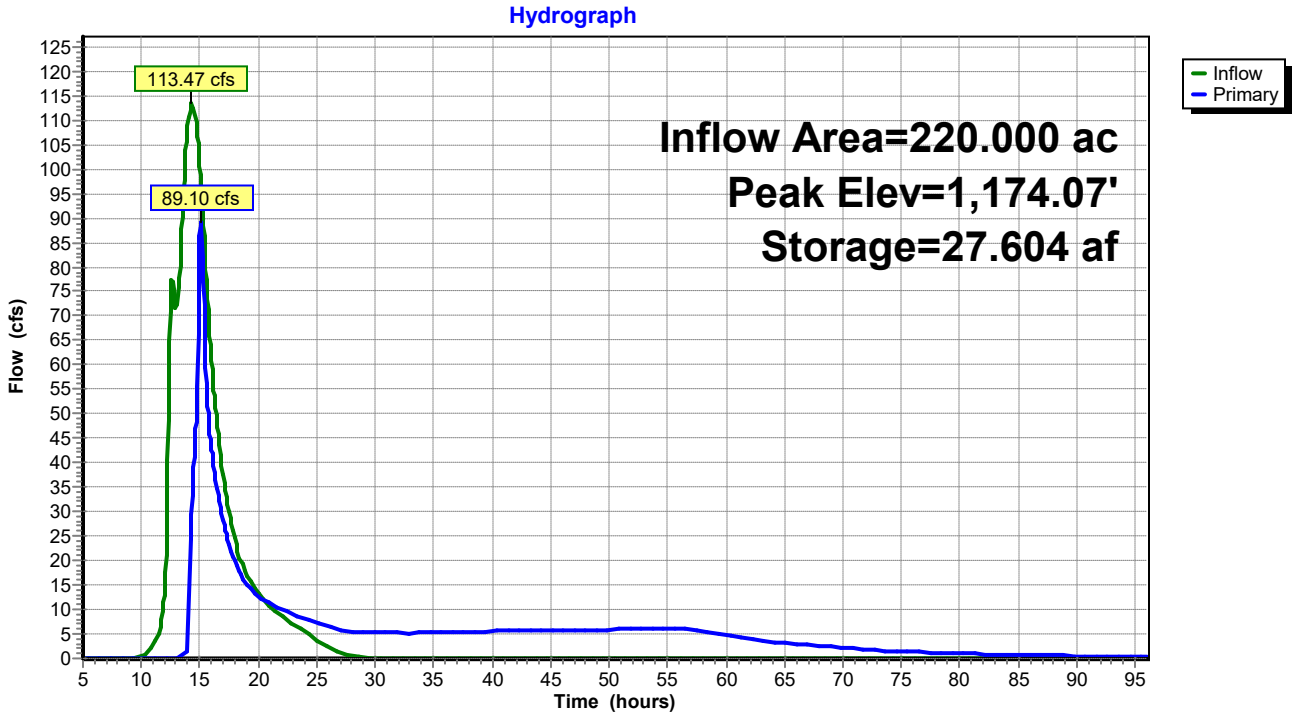
Volume	Invert	Avail.Storage	Storage Description
#1	1,169.50'	62.467 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,169.50	5.400	0.000	0.000
1,171.00	5.570	8.228	8.228
1,172.00	5.980	5.775	14.003
1,173.00	6.520	6.250	20.252
1,174.00	7.190	6.855	27.108
1,175.00	8.110	7.650	34.758
1,176.00	8.870	8.490	43.248
1,177.00	9.580	9.225	52.473
1,178.00	10.410	9.995	62.467

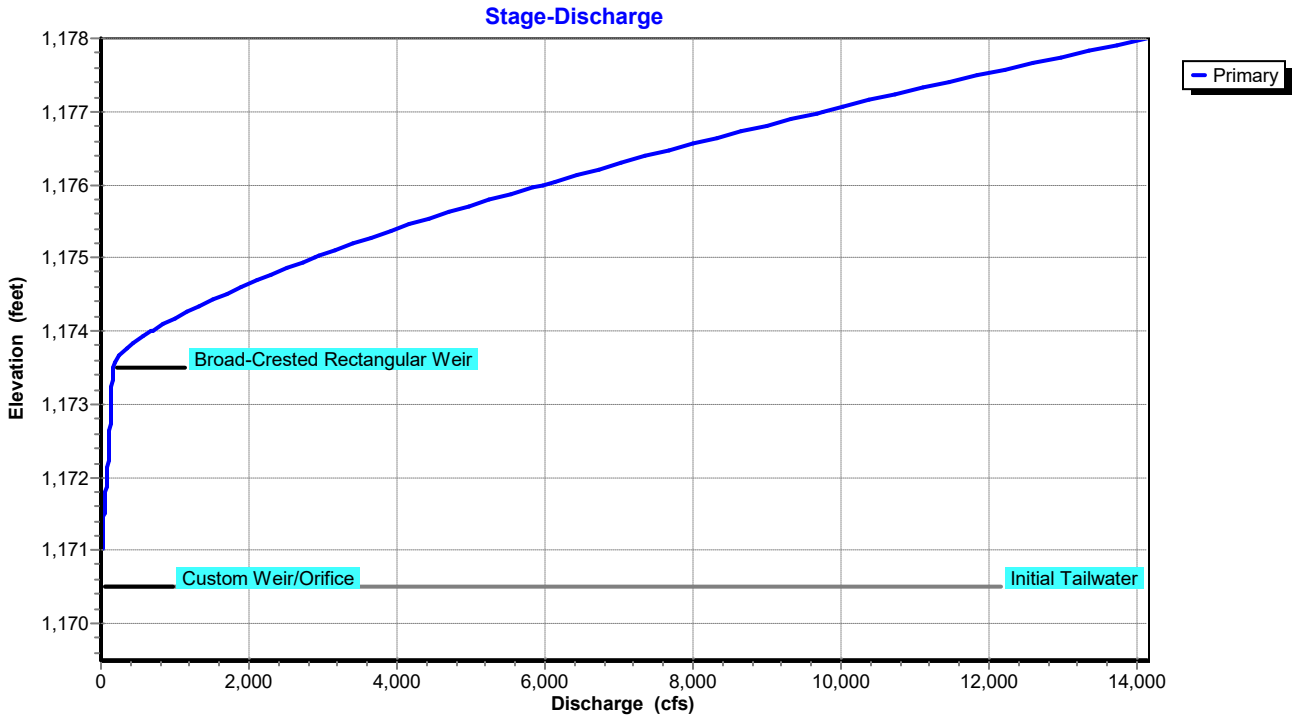
Device	Routing	Invert	Outlet Devices
#1	Primary	1,173.50'	**550.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
#2	Primary	1,170.50'	**Custom Weir/Orifice, Cv= 2.62 (C= 3.28)** Head (feet) 0.00 0.50 1.00 1.50 Width (feet) 10.00 13.00 16.00 19.00

Primary OutFlow Max=89.07 cfs @ 15.10 hrs HW=1,173.61' TW=1,173.47' (Dynamic Tailwater)
1=Broad-Crested Rectangular Weir (Weir Controls 49.03 cfs @ 0.82 fps)
2=Custom Weir/Orifice (Orifice Controls 40.04 cfs @ 1.84 fps)

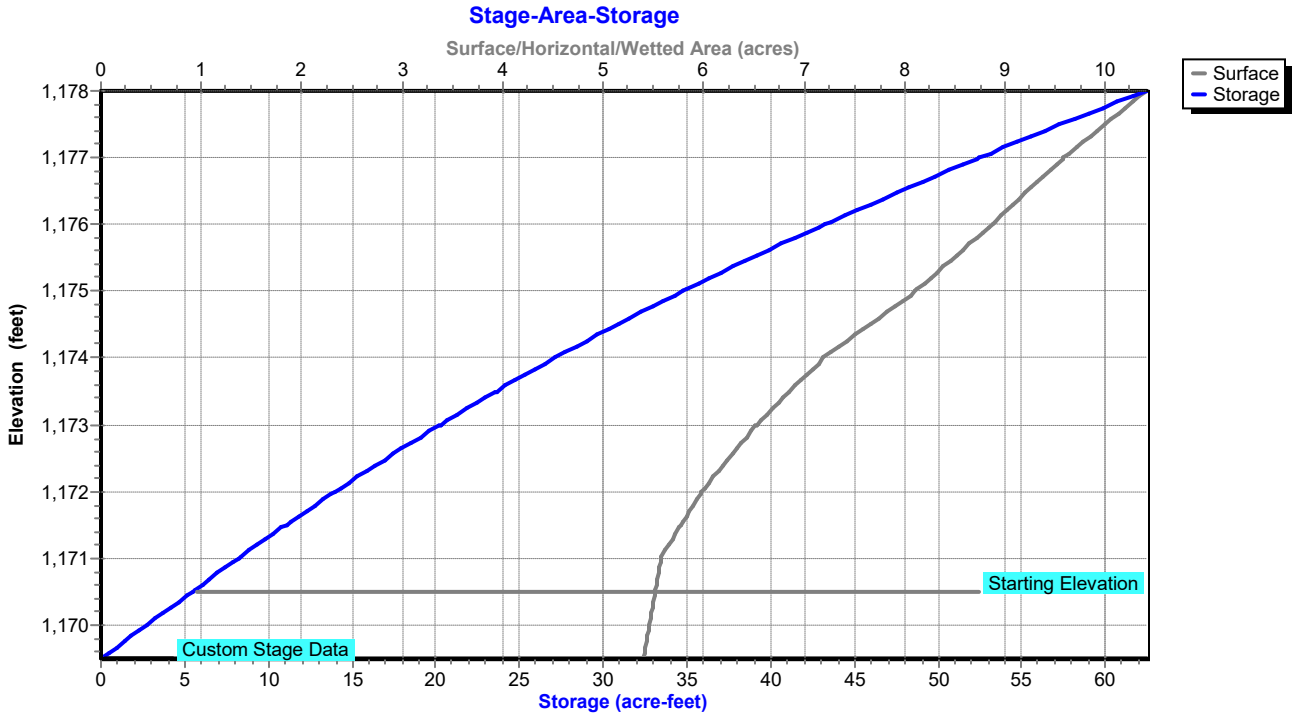
Pond 2P: Borrow Pond



Pond 2P: Borrow Pond



Pond 2P: Borrow Pond



Summary for Link 3L: Tailwater

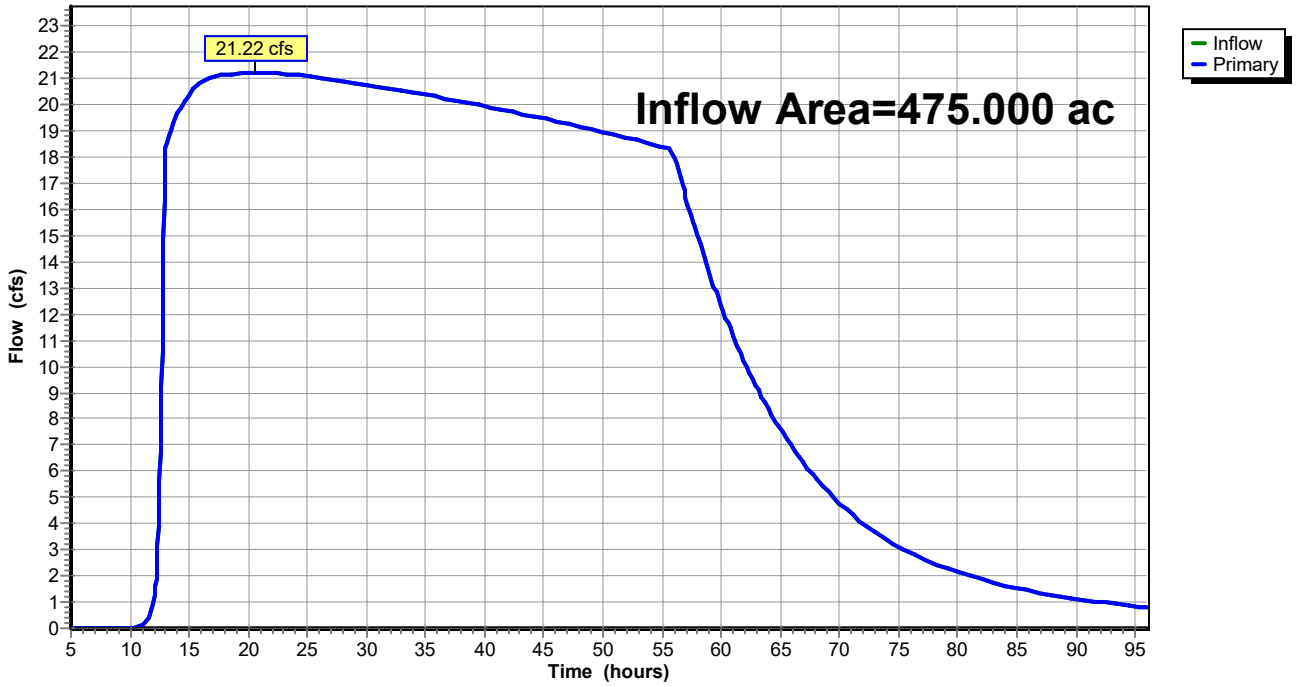
Inflow Area = 475.000 ac, 0.00% Impervious, Inflow Depth > 2.23" for 5-yr event
Inflow = 21.22 cfs @ 20.62 hrs, Volume= 88.109 af
Primary = 21.22 cfs @ 20.62 hrs, Volume= 88.109 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-96.00 hrs, dt= 0.05 hrs

Fixed water surface Elevation= 1,165.26'

Link 3L: Tailwater

Hydrograph



Time span=5.00-96.00 hrs, dt=0.05 hrs, 1821 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 5S: Northwest Watershed Runoff Area=14.000 ac 0.00% Impervious Runoff Depth=2.91"
Flow Length=1,279' Tc=48.4 min CN=85 Runoff=27.14 cfs 3.394 af

Subcatchment 6S: Northeast Watershed Runoff Area=23.000 ac 0.00% Impervious Runoff Depth=2.91"
Flow Length=1,402' Tc=36.1 min CN=85 Runoff=53.54 cfs 5.576 af

Subcatchment 7S: West Watershed Runoff Area=183.000 ac 0.00% Impervious Runoff Depth=2.91"
Flow Length=6,267' Tc=181.2 min CN=85 Runoff=137.95 cfs 44.364 af

Subcatchment 8S: Southwest Watershed Runoff Area=152.000 ac 0.00% Impervious Runoff Depth=2.91"
Flow Length=4,051' Tc=117.6 min CN=85 Runoff=158.95 cfs 36.849 af

Subcatchment 9S: Direct Watershed Runoff Area=103.000 ac 0.00% Impervious Runoff Depth=2.91"
Flow Length=1,993' Tc=59.2 min CN=85 Runoff=175.47 cfs 24.970 af

Pond 1P: Wetland Pool Peak Elev=1,174.50' Storage=65.689 af Inflow=271.67 cfs 114.149 af
Primary=21.73 cfs 95.098 af Secondary=36.22 cfs 17.893 af Outflow=57.95 cfs 112.991 af

Pond 2P: Borrow Pond Peak Elev=1,174.50' Storage=30.811 af Inflow=145.03 cfs 53.334 af
Outflow=105.57 cfs 52.330 af

Link 3L: Tailwater Inflow=21.73 cfs 95.098 af
Primary=21.73 cfs 95.098 af

Total Runoff Area = 475.000 ac Runoff Volume = 115.153 af Average Runoff Depth = 2.91"
100.00% Pervious = 475.000 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 5S: Northwest Watershed

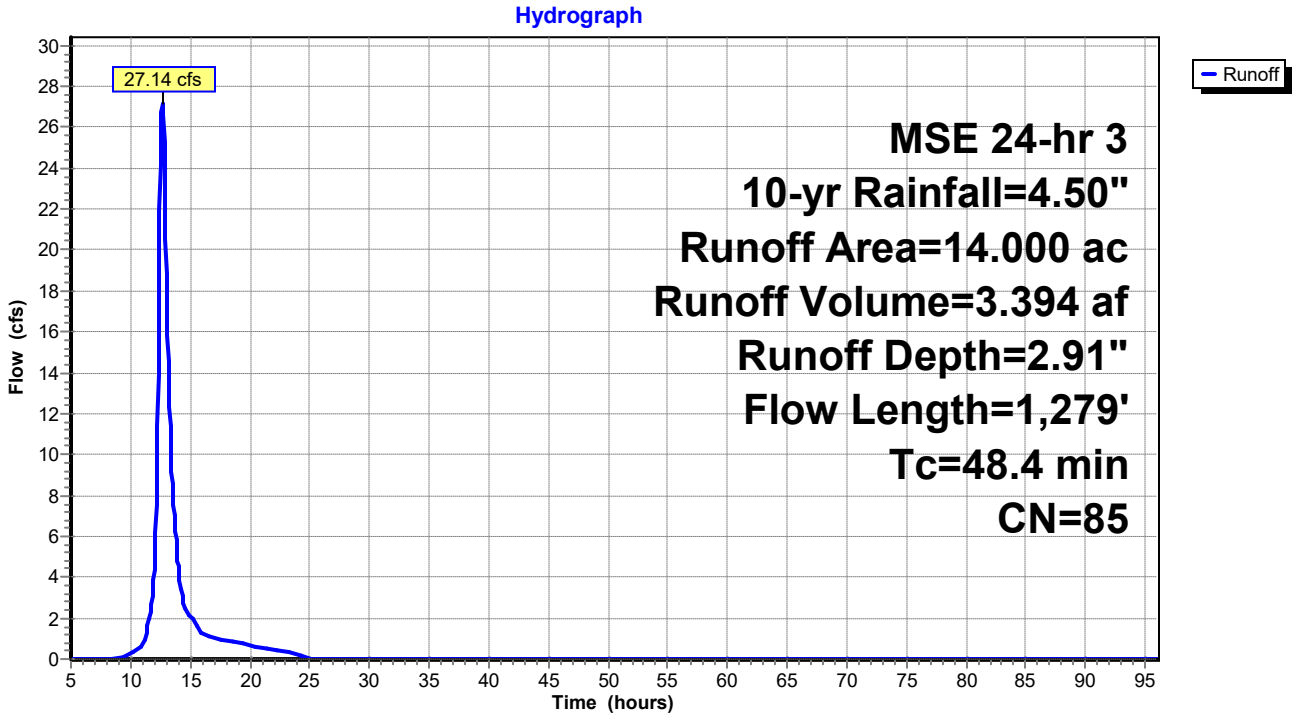
Runoff = 27.14 cfs @ 12.66 hrs, Volume= 3.394 af, Depth= 2.91"
Routed to Pond 2P : Borrow Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-96.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10-yr Rainfall=4.50"

Area (ac)	CN	Description
14.000	85	Row crops, straight row, Good, HSG C
14.000		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.0	100	0.0200	0.15		**Sheet Flow,** Cultivated: Residue>20% n= 0.170 P2= 3.10"
37.4	1,179	0.0034	0.52		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
48.4	1,279	Total			

Subcatchment 5S: Northwest Watershed



Summary for Subcatchment 6S: Northeast Watershed

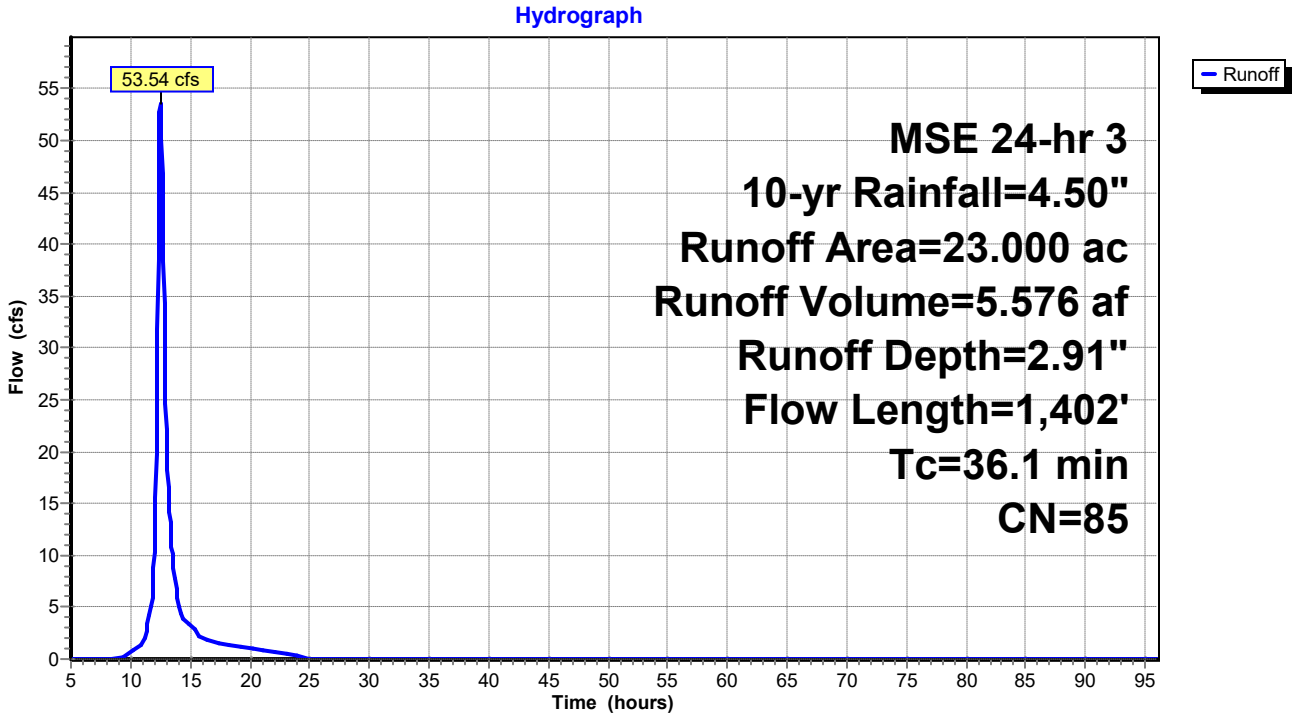
Runoff = 53.54 cfs @ 12.50 hrs, Volume= 5.576 af, Depth= 2.91"
Routed to Pond 2P : Borrow Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-96.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10-yr Rainfall=4.50"

Area (ac)	CN	Description
23.000	85	Row crops, straight row, Good, HSG C
23.000		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.0	100	0.0200	0.15		**Sheet Flow,** Cultivated: Residue>20% n= 0.170 P2= 3.10"
25.1	1,302	0.0092	0.86		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
36.1	1,402	Total			

Subcatchment 6S: Northeast Watershed



Summary for Subcatchment 7S: West Watershed

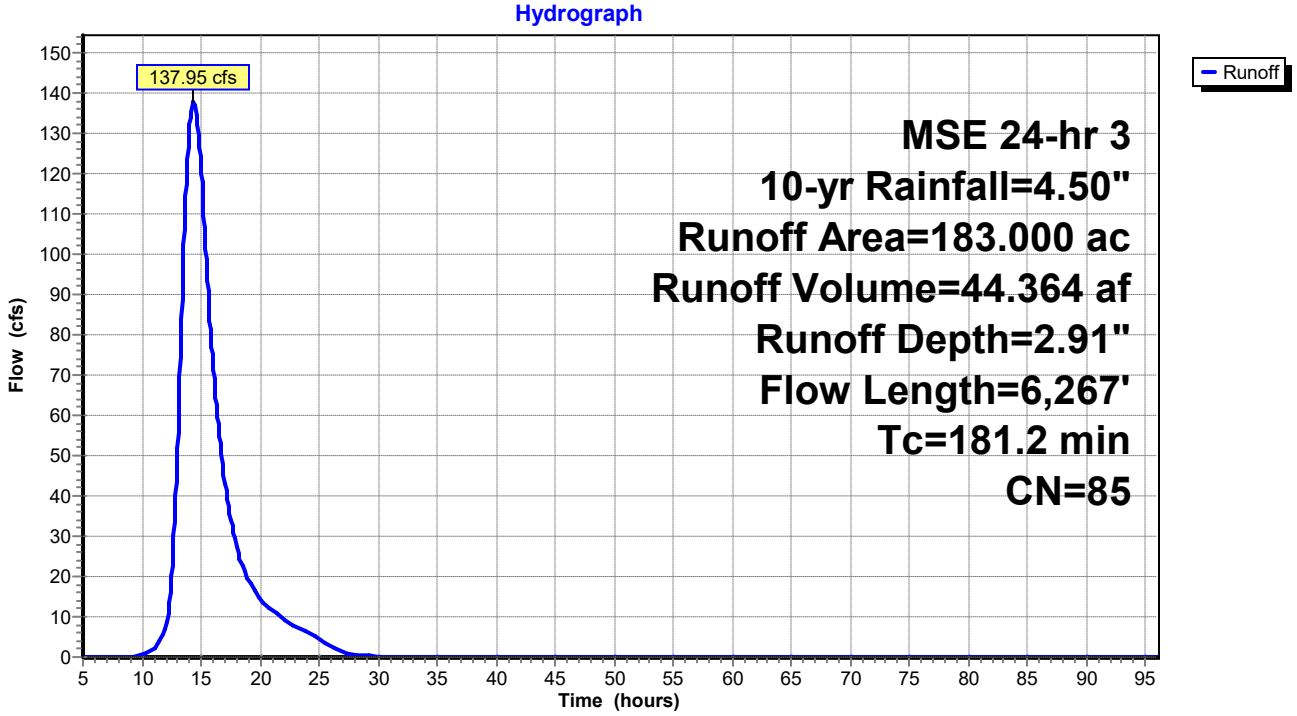
Runoff = 137.95 cfs @ 14.31 hrs, Volume= 44.364 af, Depth= 2.91"
Routed to Pond 2P : Borrow Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-96.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10-yr Rainfall=4.50"

Area (ac)	CN	Description
183.000	85	Row crops, straight row, Good, HSG C
183.000		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.0	100	0.0200	0.15		**Sheet Flow,** Cultivated: Residue>20% n= 0.170 P2= 3.10"
170.2	6,167	0.0045	0.60		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
181.2	6,267	Total			

Subcatchment 7S: West Watershed



Summary for Subcatchment 8S: Southwest Watershed

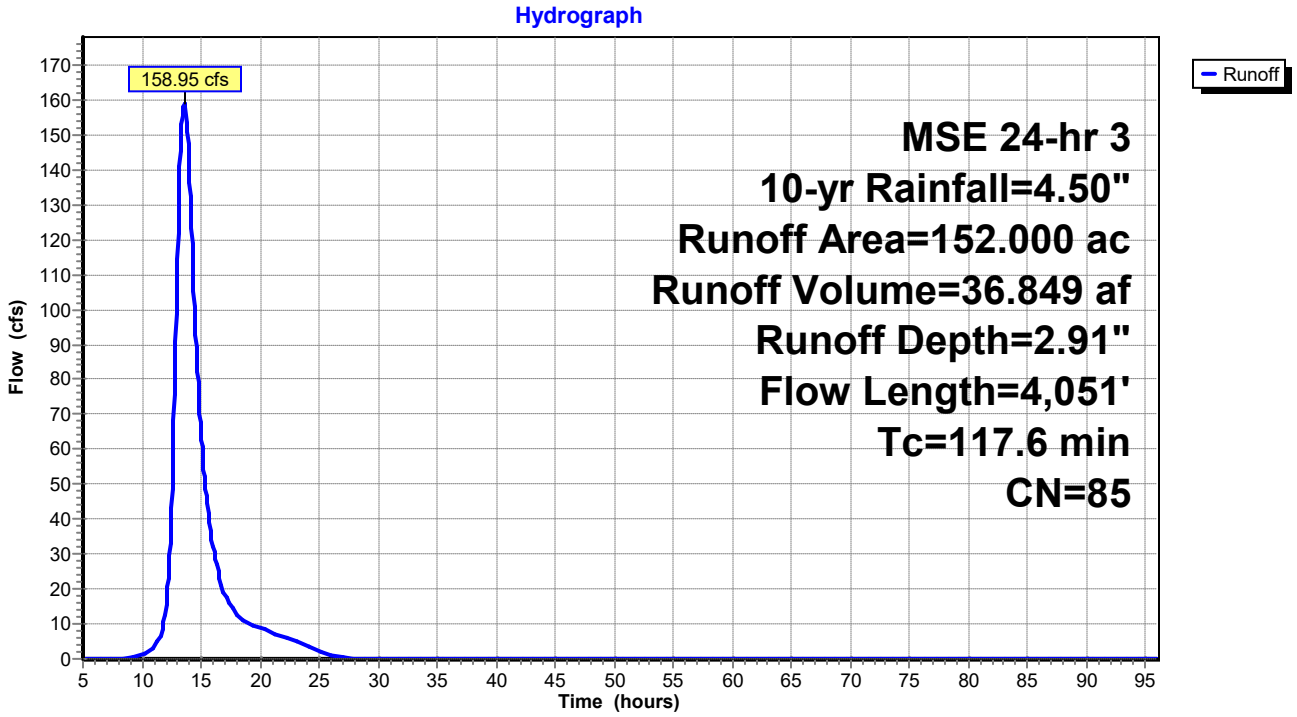
Runoff = 158.95 cfs @ 13.58 hrs, Volume= 36.849 af, Depth= 2.91"
Routed to Pond 1P : Wetland Pool

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-96.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10-yr Rainfall=4.50"

Area (ac)	CN	Description
152.000	85	Row crops, straight row, Good, HSG C
152.000		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.0	100	0.0200	0.15		**Sheet Flow,** Cultivated: Residue>20% n= 0.170 P2= 3.10"
70.0	2,037	0.0029	0.48		**Shallow Concentrated Flow, middle (even)** Cultivated Straight Rows Kv= 9.0 fps
36.6	1,914	0.0094	0.87		**Shallow Concentrated Flow, east (steep)** Cultivated Straight Rows Kv= 9.0 fps
117.6	4,051	Total			

Subcatchment 8S: Southwest Watershed



Summary for Subcatchment 9S: Direct Watershed

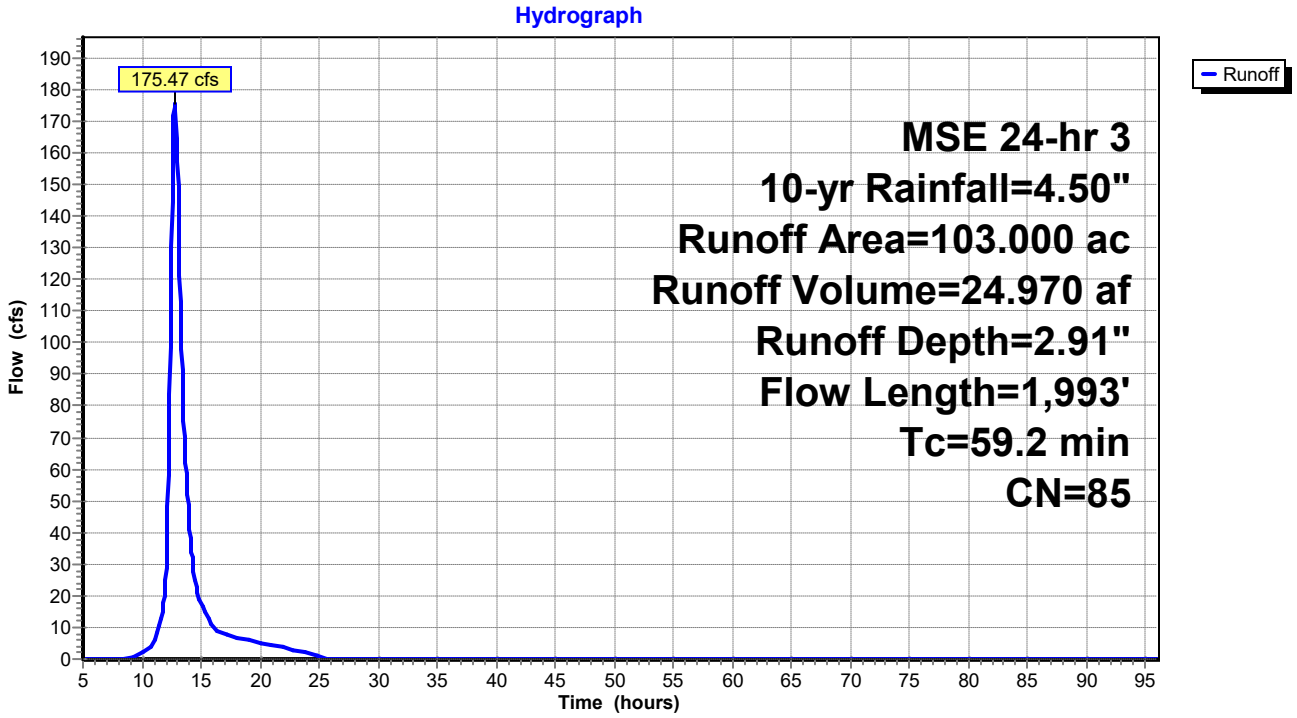
Runoff = 175.47 cfs @ 12.79 hrs, Volume= 24.970 af, Depth= 2.91"
Routed to Pond 1P : Wetland Pool

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-96.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10-yr Rainfall=4.50"

Area (ac)	CN	Description
103.000	85	Row crops, straight row, Good, HSG C
103.000		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.0	100	0.0200	0.15		**Sheet Flow,** Cultivated: Residue>20% n= 0.170 P2= 3.10"
48.2	1,893	0.0053	0.66		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
59.2	1,993	Total			

Subcatchment 9S: Direct Watershed



Summary for Pond 1P: Wetland Pool

[80] Warning: Exceeded Pond 2P by 0.38' @ 13.25 hrs (65.60 cfs 21.729 af)

Inflow Area = 475.000 ac, 0.00% Impervious, Inflow Depth > 2.88" for 10-yr event
Inflow = 271.67 cfs @ 13.00 hrs, Volume= 114.149 af
Outflow = 57.95 cfs @ 17.56 hrs, Volume= 112.991 af, Atten= 79%, Lag= 273.6 min
Primary = 21.73 cfs @ 17.56 hrs, Volume= 95.098 af
Routed to Link 3L : Tailwater
Secondary = 36.22 cfs @ 17.56 hrs, Volume= 17.893 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-96.00 hrs, dt= 0.05 hrs / 3
Starting Elev= 1,170.50' Surf.Area= 6.403 ac Storage= 6.341 af
Peak Elev= 1,174.50' @ 17.56 hrs Surf.Area= 26.825 ac Storage= 65.689 af (59.348 af above start)

Plug-Flow detention time= 1,194.5 min calculated for 106.649 af (93% of inflow)
Center-of-Mass det. time= 915.8 min (2,260.6 - 1,344.8)

Volume	Invert	Avail.Storage	Storage Description
#1	1,169.50'	204.694 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,169.50	6.171	0.000	0.000
1,170.00	6.396	3.142	3.142
1,170.50	6.403	3.200	6.341
1,171.00	6.710	3.278	9.620
1,172.00	12.342	9.526	19.146
1,173.00	16.630	14.486	33.632
1,174.00	22.743	19.686	53.318
1,175.00	30.921	26.832	80.150
1,176.00	39.197	35.059	115.209
1,177.00	44.635	41.916	157.125
1,178.00	50.503	47.569	204.694

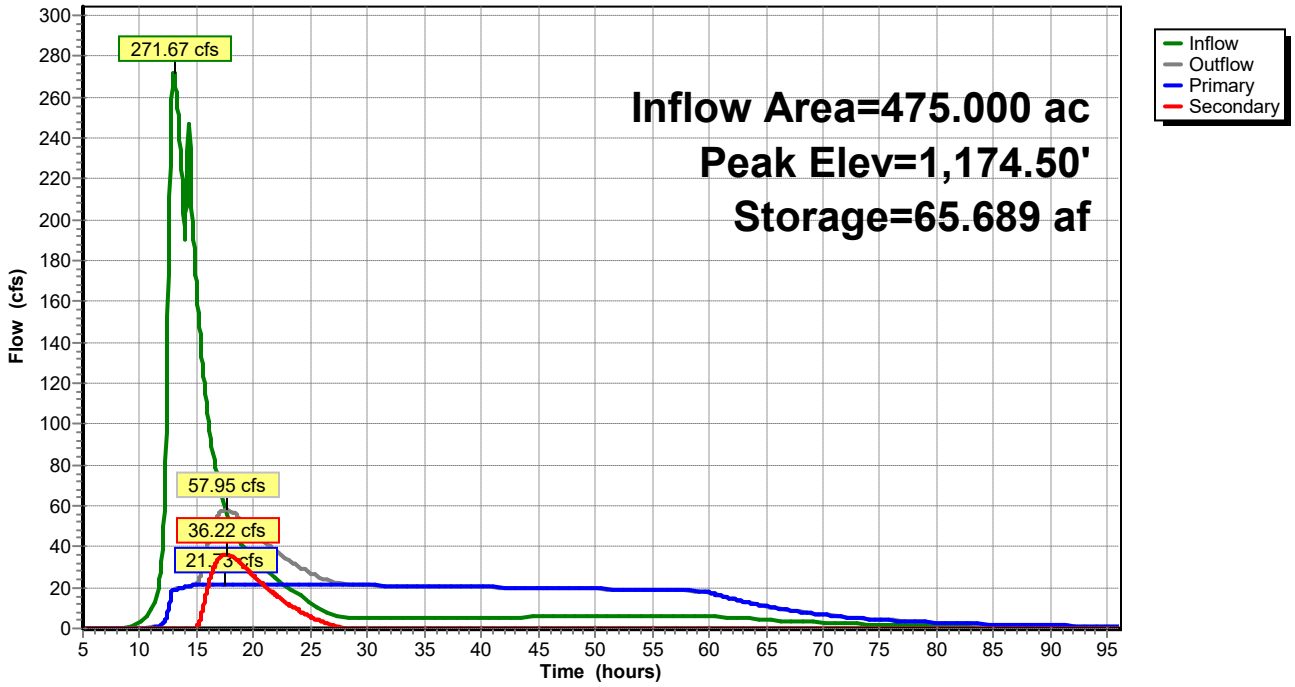
Device	Routing	Invert	Outlet Devices
#1	Primary	1,164.00'	**18.0" Round Culvert** L= 100.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,164.00' / 1,163.76' S= 0.0024 '/' Cc= 0.900 n= 0.015, Flow Area= 1.77 sf
#2	Device 1	1,170.50'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#3	Secondary	1,174.00'	**Custom Weir/Orifice, Cv= 2.62 (C= 3.28)** Head (feet) 0.00 1.00 2.00 3.00 4.00 Width (feet) 10.00 117.00 245.00 1,020.00 1,213.00

Primary OutFlow Max=21.73 cfs @ 17.56 hrs HW=1,174.50' TW=1,165.26' (Dynamic Tailwater)
↑**1=Culvert** (Barrel Controls 21.73 cfs @ 12.30 fps)
↑**2=Sharp-Crested Rectangular Weir** (Passes 21.73 cfs of 83.69 cfs potential flow)

Secondary OutFlow Max=36.22 cfs @ 17.56 hrs HW=1,174.50' (Free Discharge)
↑**3=Custom Weir/Orifice** (Weir Controls 36.22 cfs @ 1.98 fps)

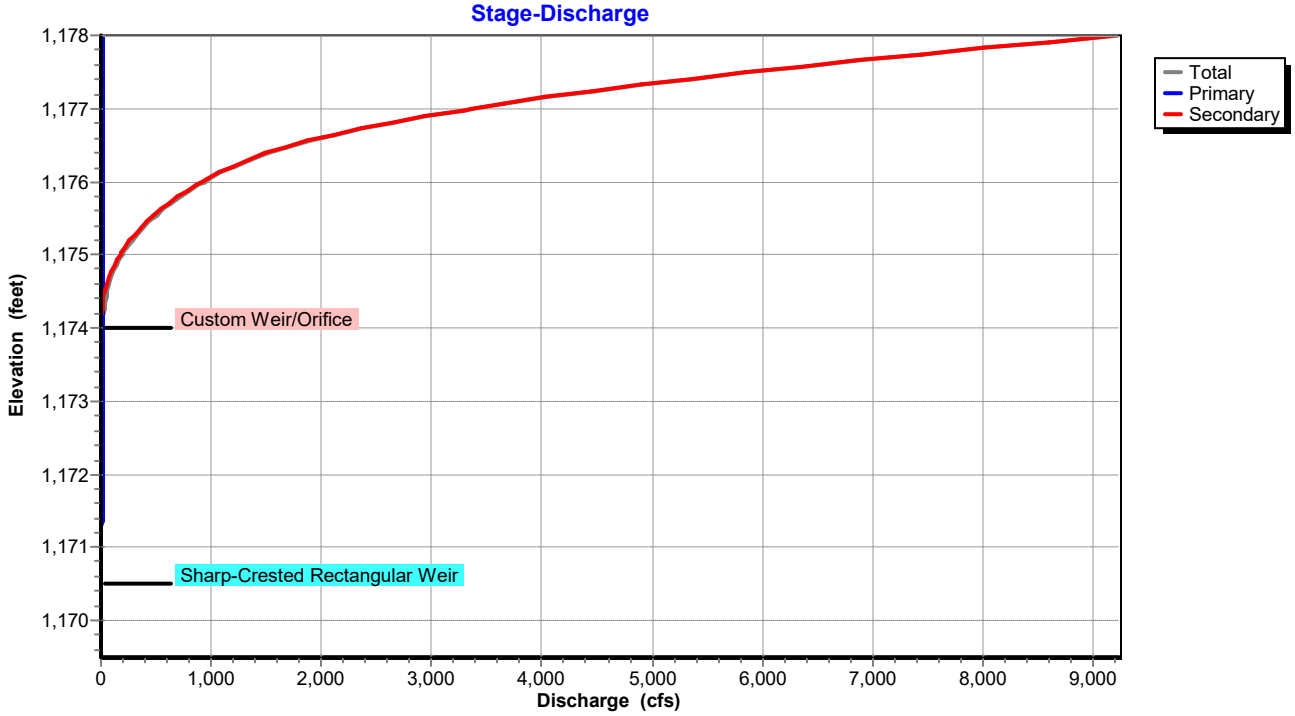
Pond 1P: Wetland Pool

Hydrograph

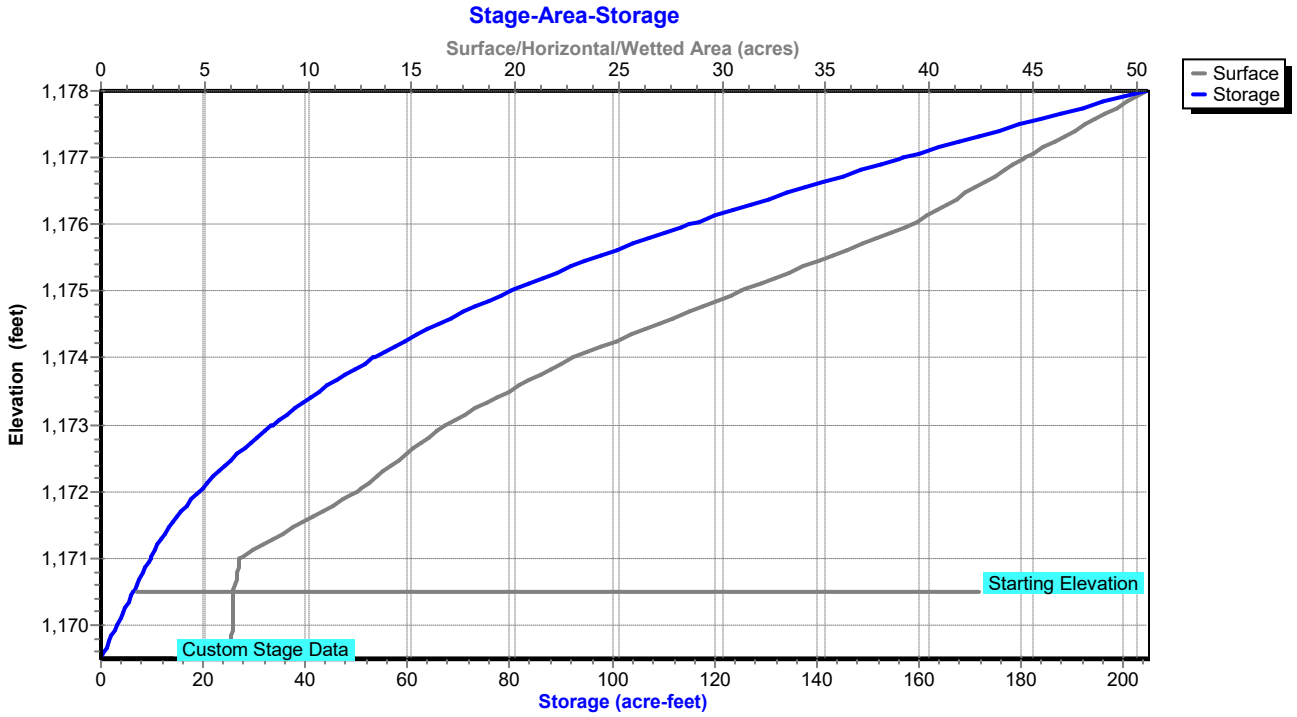


Pond 1P: Wetland Pool

Stage-Discharge



Pond 1P: Wetland Pool



Summary for Pond 2P: Borrow Pond

[95] Warning: Outlet Device #2 rise exceeded

Inflow Area = 220.000 ac, 0.00% Impervious, Inflow Depth = 2.91" for 10-yr event
Inflow = 145.03 cfs @ 14.30 hrs, Volume= 53.334 af
Outflow = 105.57 cfs @ 14.34 hrs, Volume= 52.330 af, Atten= 27%, Lag= 2.3 min
Primary = 105.57 cfs @ 14.34 hrs, Volume= 52.330 af
Routed to Pond 1P : Wetland Pool

Routing by Dyn-Stor-Ind method, Time Span= 5.00-96.00 hrs, dt= 0.05 hrs / 3
Starting Elev= 1,170.50' Surf.Area= 5.513 ac Storage= 5.457 af
Peak Elev= 1,174.50' @ 17.56 hrs Surf.Area= 7.649 ac Storage= 30.811 af (25.355 af above start)

Plug-Flow detention time= 1,139.9 min calculated for 46.874 af (88% of inflow)
Center-of-Mass det. time= 968.5 min (1,900.8 - 932.2)

Volume	Invert	Avail.Storage	Storage Description
#1	1,169.50'	62.467 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

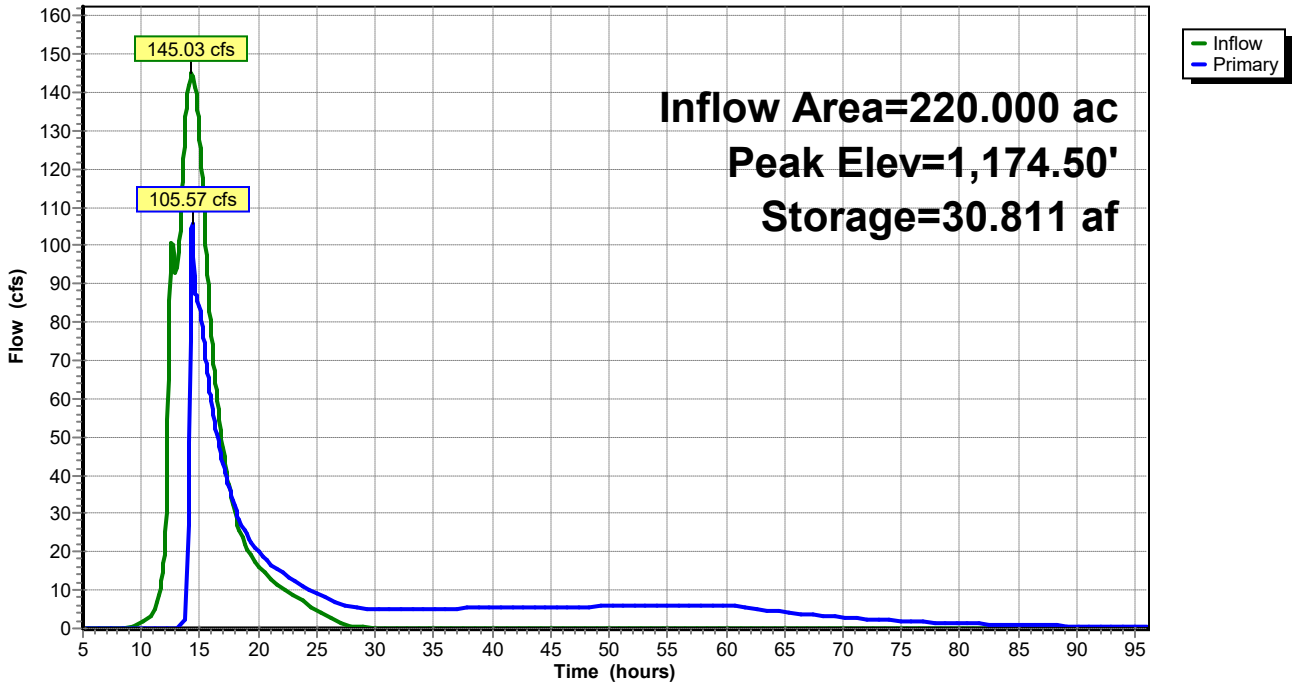
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,169.50	5.400	0.000	0.000
1,171.00	5.570	8.228	8.228
1,172.00	5.980	5.775	14.003
1,173.00	6.520	6.250	20.252
1,174.00	7.190	6.855	27.108
1,175.00	8.110	7.650	34.758
1,176.00	8.870	8.490	43.248
1,177.00	9.580	9.225	52.473
1,178.00	10.410	9.995	62.467

Device	Routing	Invert	Outlet Devices
#1	Primary	1,173.50'	**550.0' 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
#2	Primary	1,170.50'	**Custom Weir/Orifice, Cv= 2.62 (C= 3.28)** Head (feet) 0.00 0.50 1.00 1.50 Width (feet) 10.00 13.00 16.00 19.00

Primary OutFlow Max=105.63 cfs @ 14.34 hrs HW=1,173.67' TW=1,173.60' (Dynamic Tailwater)
1=Broad-Crested Rectangular Weir (Weir Controls 77.31 cfs @ 0.82 fps)
2=Custom Weir/Orifice (Orifice Controls 28.32 cfs @ 1.30 fps)

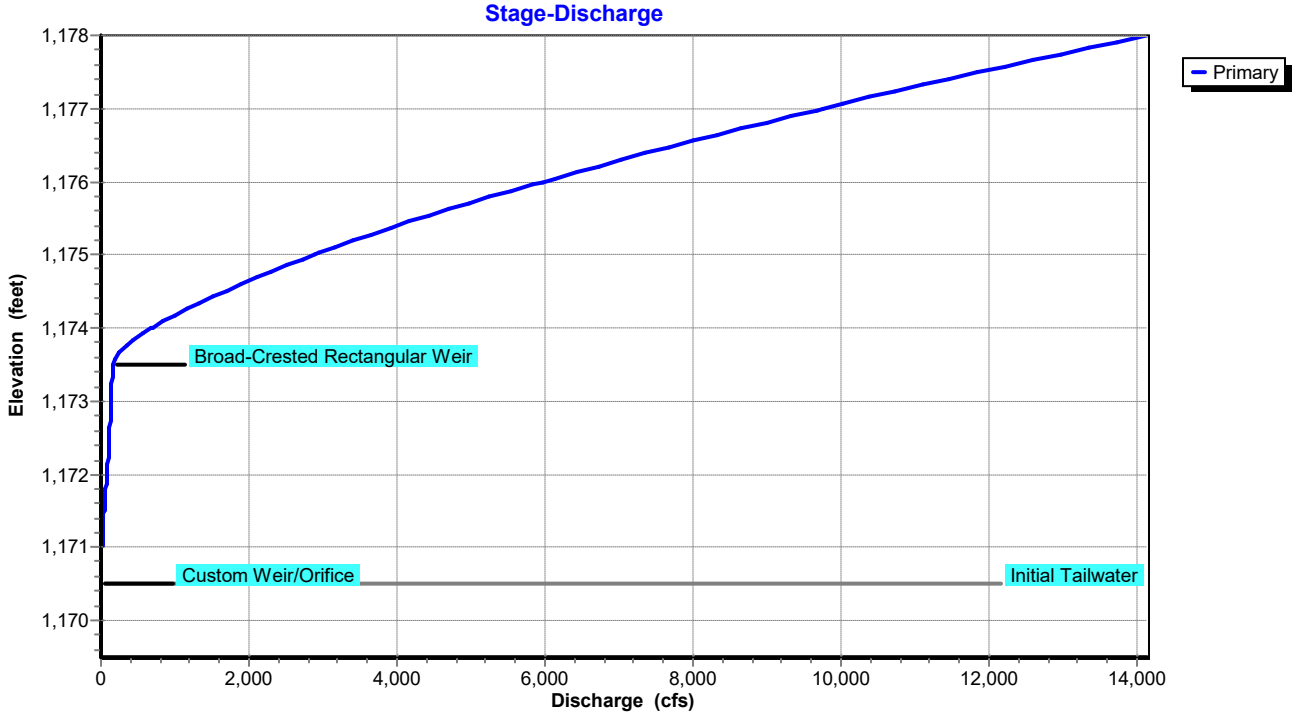
Pond 2P: Borrow Pond

Hydrograph

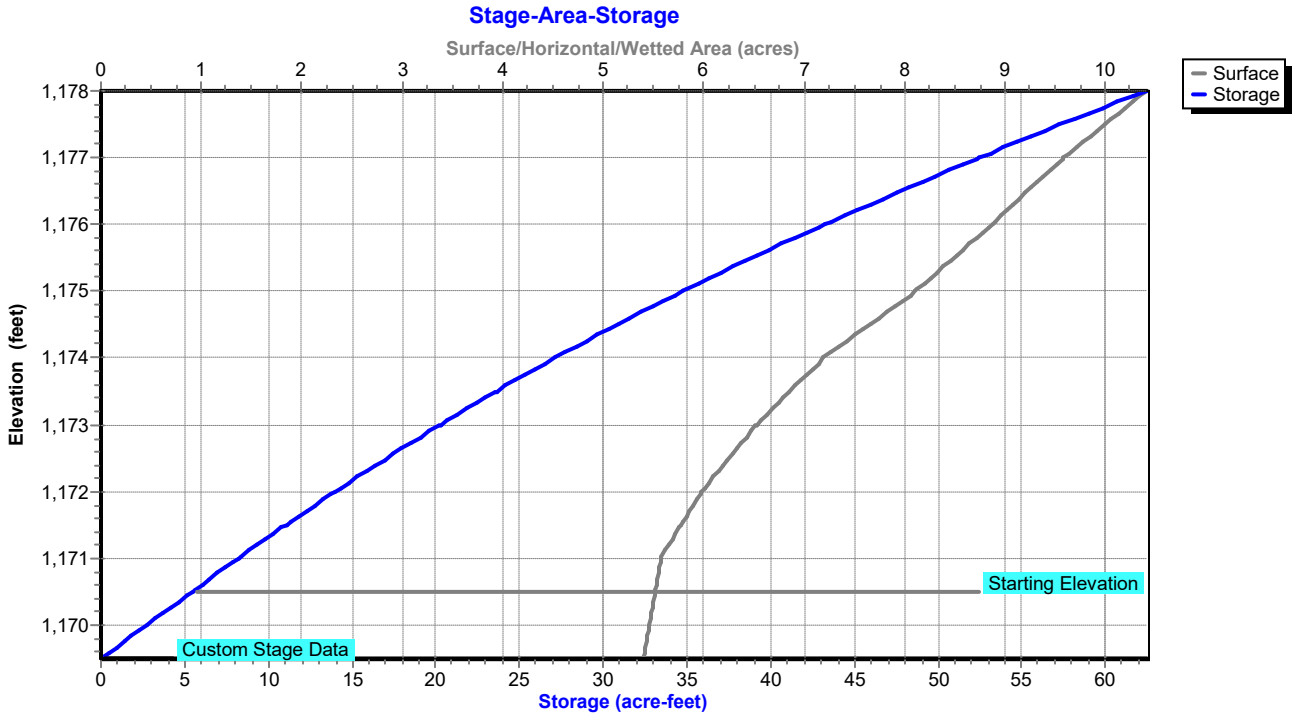


Pond 2P: Borrow Pond

Stage-Discharge



Pond 2P: Borrow Pond



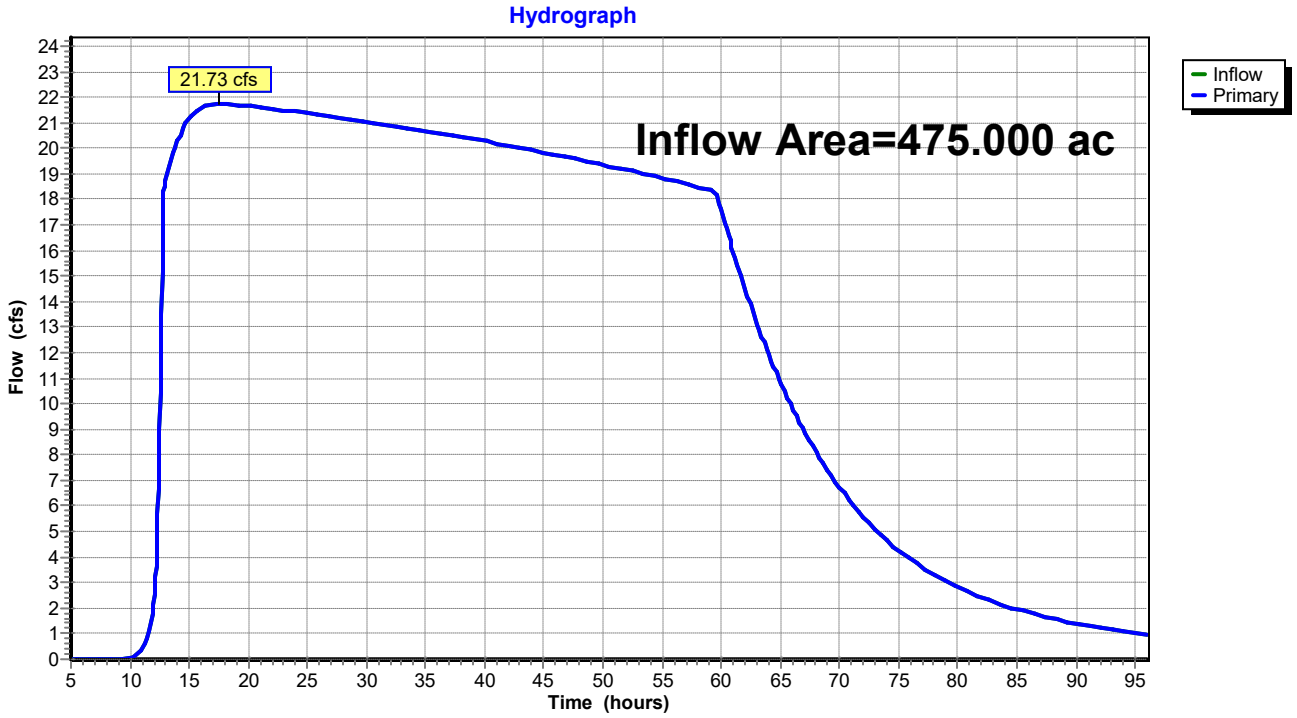
Summary for Link 3L: Tailwater

Inflow Area = 475.000 ac, 0.00% Impervious, Inflow Depth > 2.40" for 10-yr event
Inflow = 21.73 cfs @ 17.56 hrs, Volume= 95.098 af
Primary = 21.73 cfs @ 17.56 hrs, Volume= 95.098 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-96.00 hrs, dt= 0.05 hrs

Fixed water surface Elevation= 1,165.26'

Link 3L: Tailwater



Time span=5.00-96.00 hrs, dt=0.05 hrs, 1821 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 5S: Northwest Watershed Runoff Area=14.000 ac 0.00% Impervious Runoff Depth=3.83"
Flow Length=1,279' Tc=48.4 min CN=85 Runoff=35.59 cfs 4.472 af

Subcatchment 6S: Northeast Watershed Runoff Area=23.000 ac 0.00% Impervious Runoff Depth=3.83"
Flow Length=1,402' Tc=36.1 min CN=85 Runoff=70.13 cfs 7.346 af

Subcatchment 7S: West Watershed Runoff Area=183.000 ac 0.00% Impervious Runoff Depth=3.83"
Flow Length=6,267' Tc=181.2 min CN=85 Runoff=181.94 cfs 58.452 af

Subcatchment 8S: Southwest Watershed Runoff Area=152.000 ac 0.00% Impervious Runoff Depth=3.83"
Flow Length=4,051' Tc=117.6 min CN=85 Runoff=208.98 cfs 48.550 af

Subcatchment 9S: Direct Watershed Runoff Area=103.000 ac 0.00% Impervious Runoff Depth=3.83"
Flow Length=1,993' Tc=59.2 min CN=85 Runoff=230.25 cfs 32.899 af

Pond 1P: Wetland Pool Peak Elev=1,174.88' Storage=76.392 af Inflow=358.35 cfs 150.678 af
Primary=22.17 cfs 97.484 af Secondary=127.67 cfs 51.992 af Outflow=149.84 cfs 149.476 af

Pond 2P: Borrow Pond Peak Elev=1,174.88' Storage=33.764 af Inflow=190.94 cfs 70.270 af
Outflow=129.89 cfs 69.229 af

Link 3L: Tailwater Inflow=22.17 cfs 97.484 af
Primary=22.17 cfs 97.484 af

Total Runoff Area = 475.000 ac Runoff Volume = 151.720 af Average Runoff Depth = 3.83"
100.00% Pervious = 475.000 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 5S: Northwest Watershed

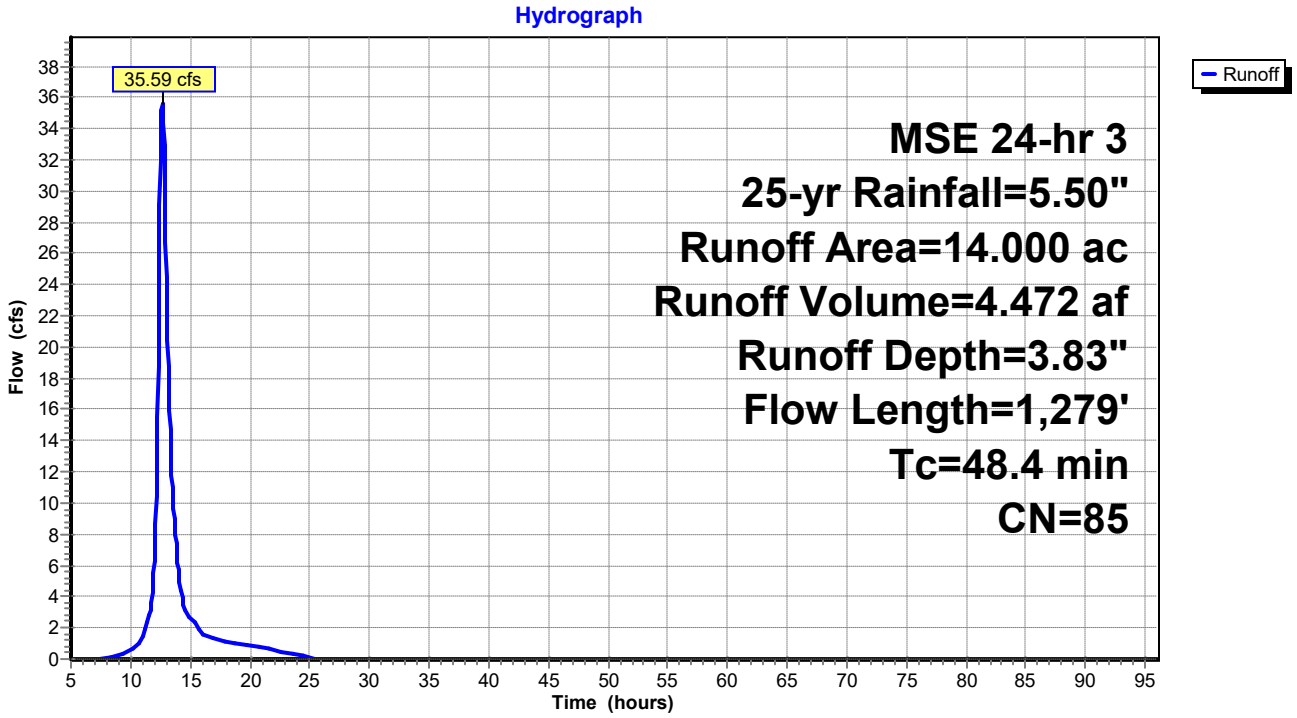
Runoff = 35.59 cfs @ 12.65 hrs, Volume= 4.472 af, Depth= 3.83"
Routed to Pond 2P : Borrow Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-96.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 25-yr Rainfall=5.50"

Area (ac)	CN	Description
14.000	85	Row crops, straight row, Good, HSG C
14.000		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.0	100	0.0200	0.15		**Sheet Flow,** Cultivated: Residue>20% n= 0.170 P2= 3.10"
37.4	1,179	0.0034	0.52		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
48.4	1,279	Total			

Subcatchment 5S: Northwest Watershed



Summary for Subcatchment 6S: Northeast Watershed

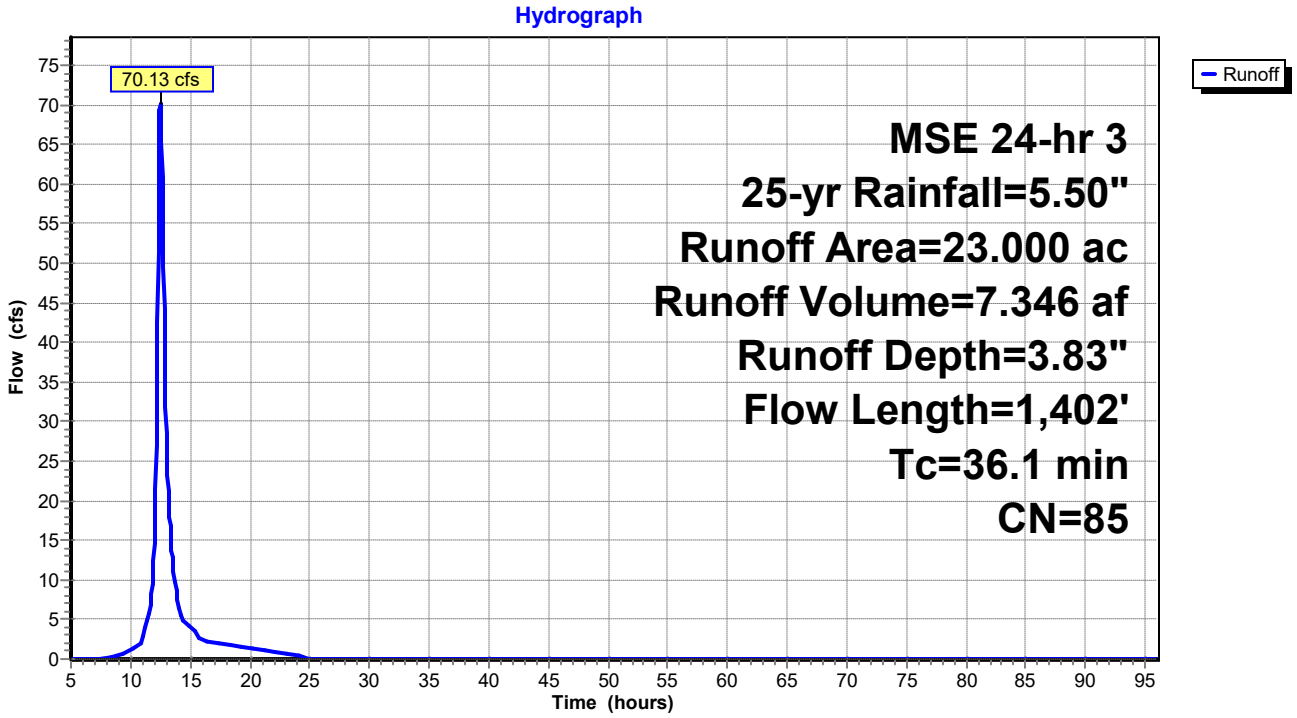
Runoff = 70.13 cfs @ 12.49 hrs, Volume= 7.346 af, Depth= 3.83"
Routed to Pond 2P : Borrow Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-96.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 25-yr Rainfall=5.50"

Area (ac)	CN	Description
23.000	85	Row crops, straight row, Good, HSG C
23.000		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.0	100	0.0200	0.15		**Sheet Flow,** Cultivated: Residue>20% n= 0.170 P2= 3.10"
25.1	1,302	0.0092	0.86		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
36.1	1,402	Total			

Subcatchment 6S: Northeast Watershed



Summary for Subcatchment 7S: West Watershed

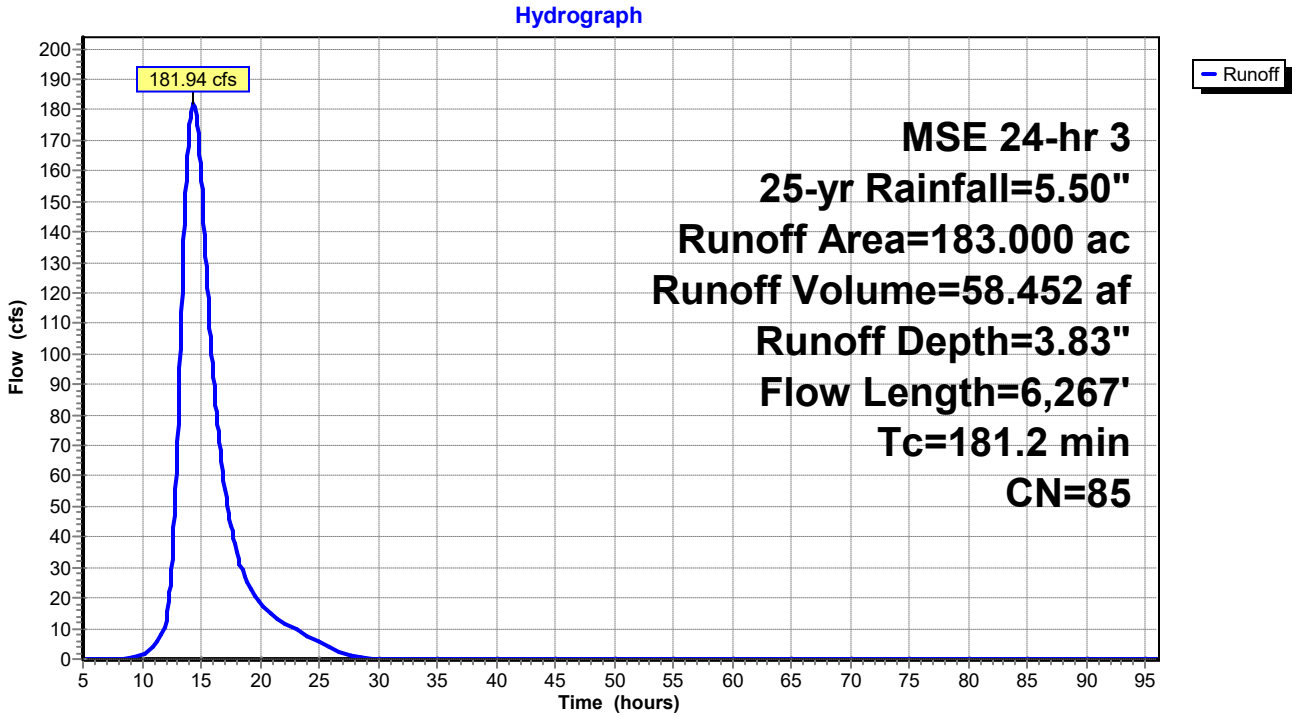
Runoff = 181.94 cfs @ 14.31 hrs, Volume= 58.452 af, Depth= 3.83"
Routed to Pond 2P : Borrow Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-96.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 25-yr Rainfall=5.50"

Area (ac)	CN	Description
183.000	85	Row crops, straight row, Good, HSG C
183.000		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.0	100	0.0200	0.15		**Sheet Flow,** Cultivated: Residue>20% n= 0.170 P2= 3.10"
170.2	6,167	0.0045	0.60		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
181.2	6,267	Total			

Subcatchment 7S: West Watershed



Summary for Subcatchment 8S: Southwest Watershed

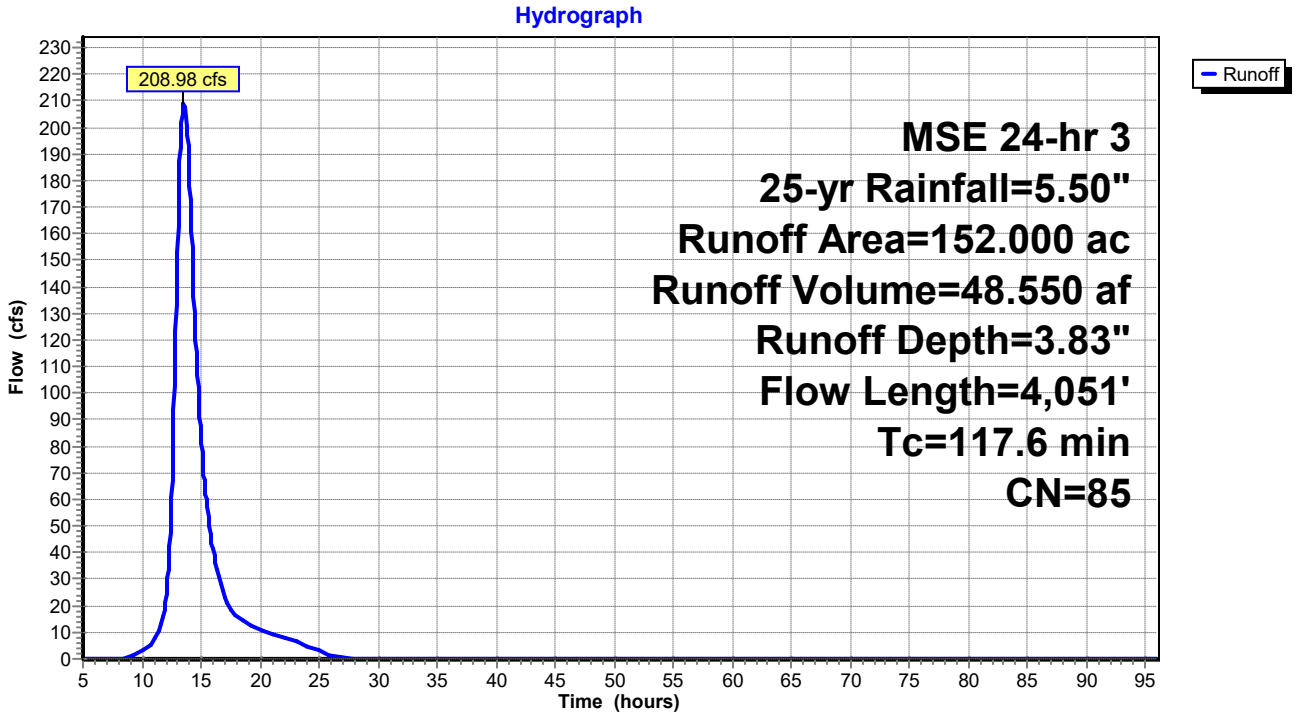
Runoff = 208.98 cfs @ 13.54 hrs, Volume= 48.550 af, Depth= 3.83"
Routed to Pond 1P : Wetland Pool

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-96.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 25-yr Rainfall=5.50"

Area (ac)	CN	Description
152.000	85	Row crops, straight row, Good, HSG C
152.000		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.0	100	0.0200	0.15		**Sheet Flow,** Cultivated: Residue>20% n= 0.170 P2= 3.10"
70.0	2,037	0.0029	0.48		**Shallow Concentrated Flow, middle (even)** Cultivated Straight Rows Kv= 9.0 fps
36.6	1,914	0.0094	0.87		**Shallow Concentrated Flow, east (steep)** Cultivated Straight Rows Kv= 9.0 fps
117.6	4,051	Total			

Subcatchment 8S: Southwest Watershed



Summary for Subcatchment 9S: Direct Watershed

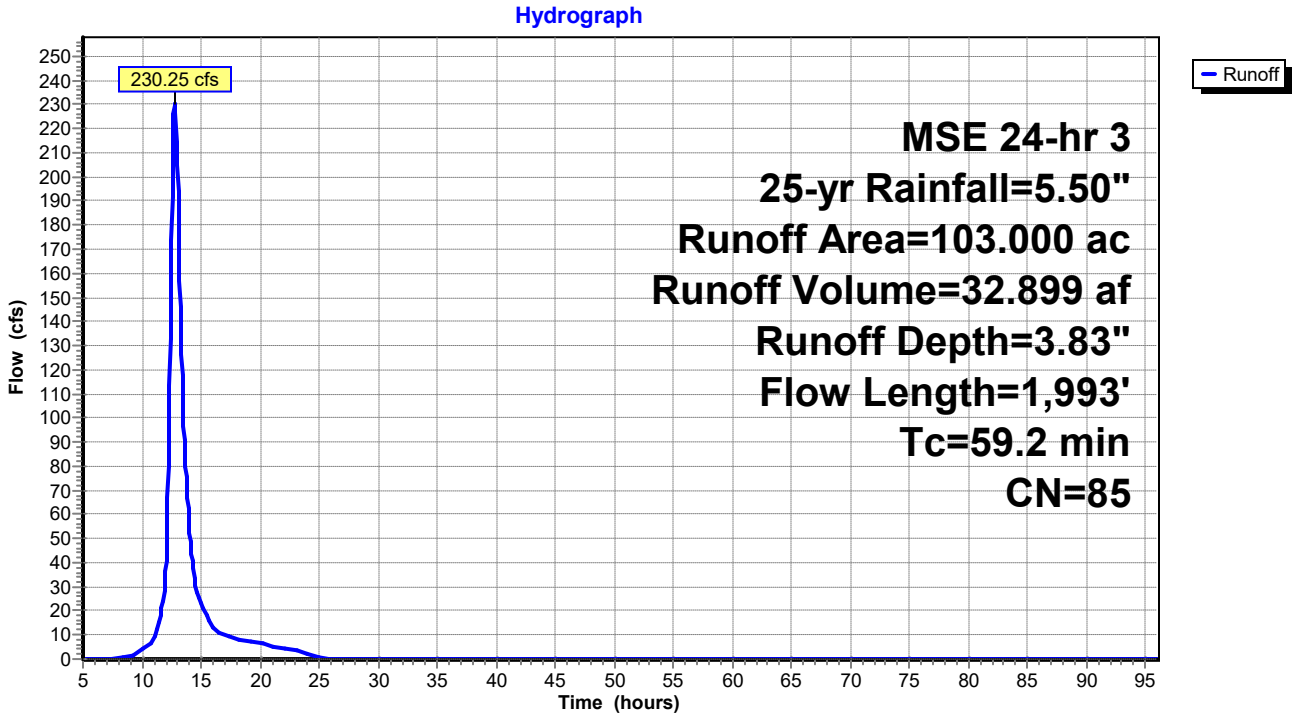
Runoff = 230.25 cfs @ 12.79 hrs, Volume= 32.899 af, Depth= 3.83"
Routed to Pond 1P : Wetland Pool

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-96.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 25-yr Rainfall=5.50"

Area (ac)	CN	Description
103.000	85	Row crops, straight row, Good, HSG C
103.000		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.0	100	0.0200	0.15		**Sheet Flow,** Cultivated: Residue>20% n= 0.170 P2= 3.10"
48.2	1,893	0.0053	0.66		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
59.2	1,993	Total			

Subcatchment 9S: Direct Watershed



Summary for Pond 1P: Wetland Pool

[80] Warning: Exceeded Pond 2P by 0.26' @ 13.15 hrs (54.25 cfs 23.315 af)

Inflow Area = 475.000 ac, 0.00% Impervious, Inflow Depth > 3.81" for 25-yr event
Inflow = 358.35 cfs @ 12.99 hrs, Volume= 150.678 af
Outflow = 149.84 cfs @ 16.04 hrs, Volume= 149.476 af, Atten= 58%, Lag= 183.6 min
Primary = 22.17 cfs @ 16.04 hrs, Volume= 97.484 af
Routed to Link 3L : Tailwater
Secondary = 127.67 cfs @ 16.04 hrs, Volume= 51.992 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-96.00 hrs, dt= 0.05 hrs / 3
Starting Elev= 1,170.50' Surf.Area= 6.403 ac Storage= 6.341 af
Peak Elev= 1,174.88' @ 16.04 hrs Surf.Area= 29.910 ac Storage= 76.392 af (70.050 af above start)

Plug-Flow detention time= 949.9 min calculated for 143.056 af (95% of inflow)
Center-of-Mass det. time= 745.3 min (1,995.6 - 1,250.3)

Volume	Invert	Avail.Storage	Storage Description
#1	1,169.50'	204.694 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,169.50	6.171	0.000	0.000
1,170.00	6.396	3.142	3.142
1,170.50	6.403	3.200	6.341
1,171.00	6.710	3.278	9.620
1,172.00	12.342	9.526	19.146
1,173.00	16.630	14.486	33.632
1,174.00	22.743	19.686	53.318
1,175.00	30.921	26.832	80.150
1,176.00	39.197	35.059	115.209
1,177.00	44.635	41.916	157.125
1,178.00	50.503	47.569	204.694

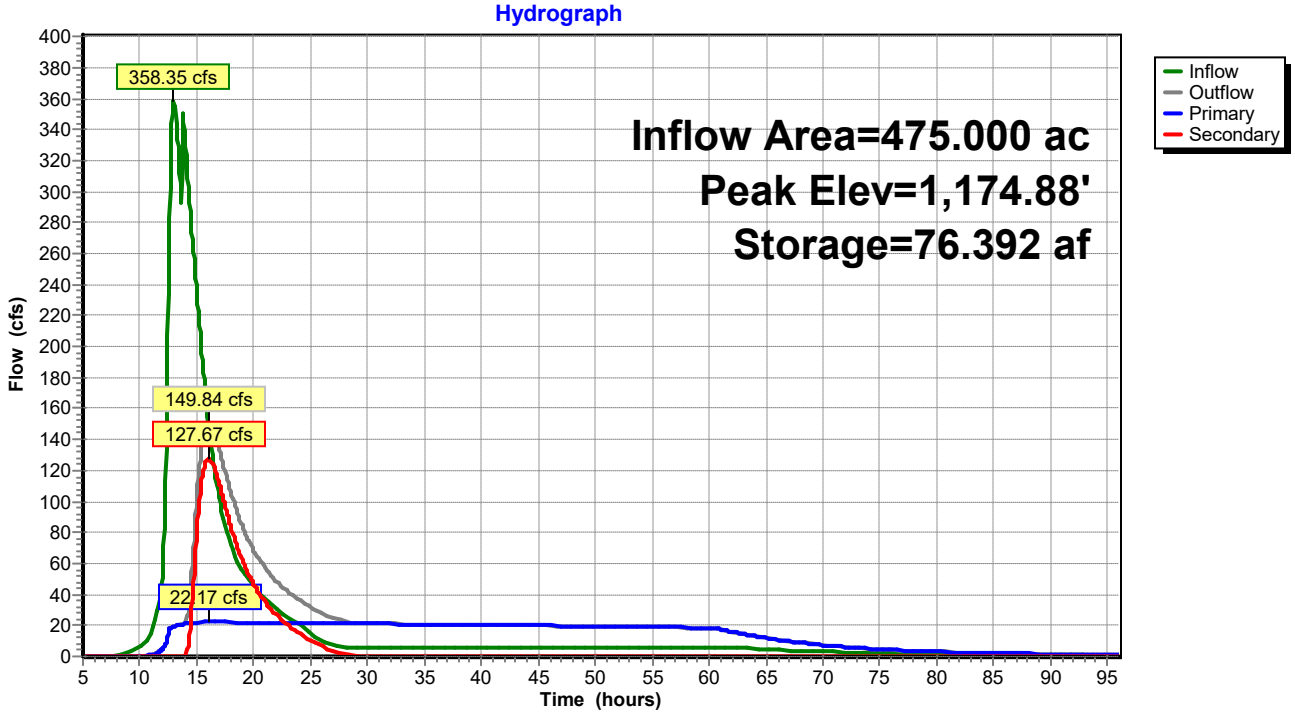
Device	Routing	Invert	Outlet Devices
#1	Primary	1,164.00'	**18.0" Round Culvert** L= 100.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,164.00' / 1,163.76' S= 0.0024 '/' Cc= 0.900 n= 0.015, Flow Area= 1.77 sf
#2	Device 1	1,170.50'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#3	Secondary	1,174.00'	**Custom Weir/Orifice, Cv= 2.62 (C= 3.28)** Head (feet) 0.00 1.00 2.00 3.00 4.00 Width (feet) 10.00 117.00 245.00 1,020.00 1,213.00

Primary OutFlow Max=22.17 cfs @ 16.04 hrs HW=1,174.88' TW=1,165.26' (Dynamic Tailwater)
↑—**1=Culvert** (Barrel Controls 22.17 cfs @ 12.55 fps)
↑—**2=Sharp-Crested Rectangular Weir** (Passes 22.17 cfs of 93.55 cfs potential flow)

Secondary OutFlow Max=127.66 cfs @ 16.04 hrs HW=1,174.88' (Free Discharge)
↑—**3=Custom Weir/Orifice** (Weir Controls 127.66 cfs @ 2.56 fps)

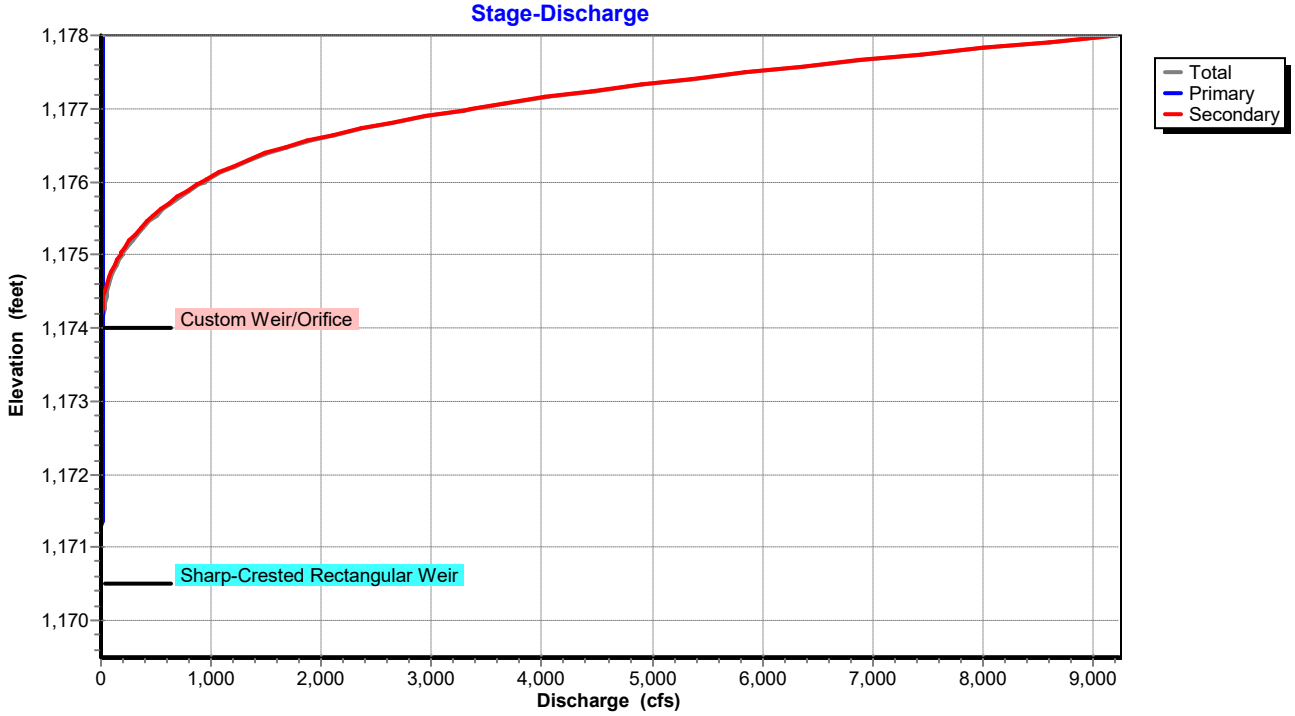
Pond 1P: Wetland Pool

Hydrograph

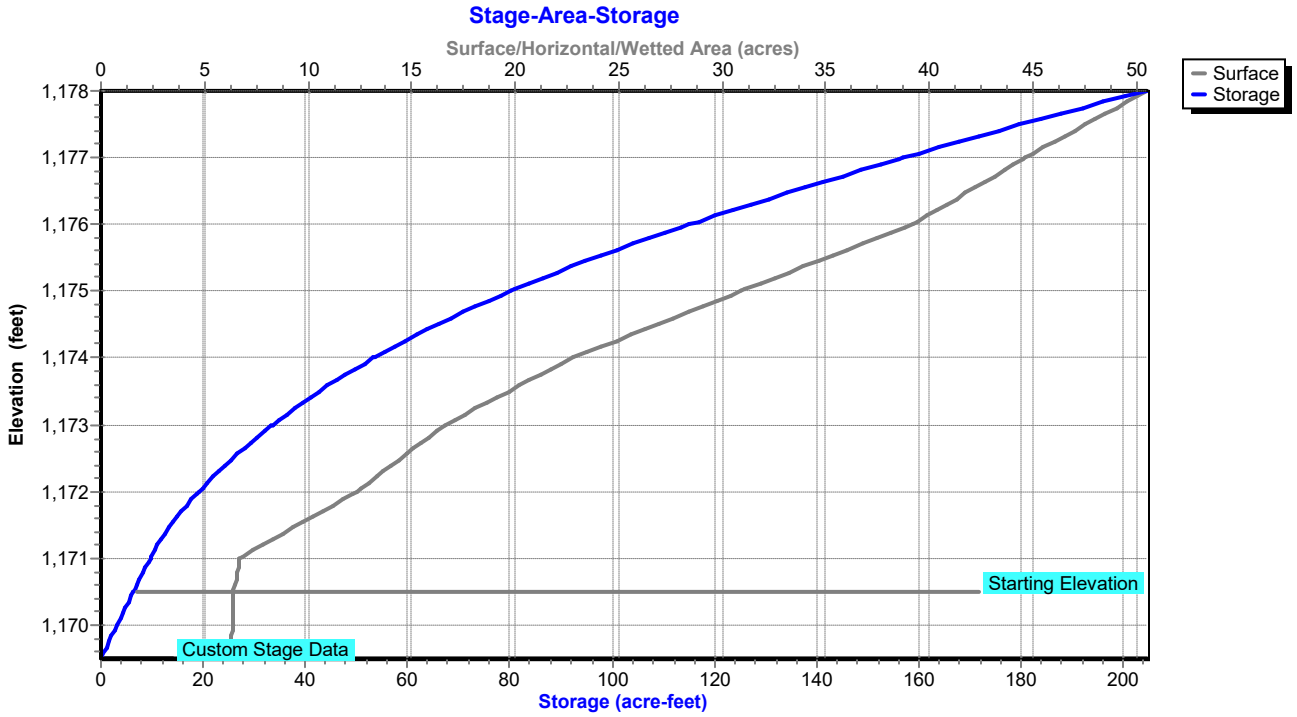


Pond 1P: Wetland Pool

Stage-Discharge



Pond 1P: Wetland Pool



Summary for Pond 2P: Borrow Pond

[95] Warning: Outlet Device #2 rise exceeded

Inflow Area = 220.000 ac, 0.00% Impervious, Inflow Depth = 3.83" for 25-yr event
Inflow = 190.94 cfs @ 14.29 hrs, Volume= 70.270 af
Outflow = 129.89 cfs @ 14.91 hrs, Volume= 69.229 af, Atten= 32%, Lag= 36.7 min
Primary = 129.89 cfs @ 14.91 hrs, Volume= 69.229 af
Routed to Pond 1P : Wetland Pool

Routing by Dyn-Stor-Ind method, Time Span= 5.00-96.00 hrs, dt= 0.05 hrs / 3
Starting Elev= 1,170.50' Surf.Area= 5.513 ac Storage= 5.457 af
Peak Elev= 1,174.88' @ 16.05 hrs Surf.Area= 7.996 ac Storage= 33.764 af (28.307 af above start)

Plug-Flow detention time= 885.7 min calculated for 63.737 af (91% of inflow)
Center-of-Mass det. time= 772.6 min (1,699.3 - 926.8)

Volume	Invert	Avail.Storage	Storage Description
#1	1,169.50'	62.467 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

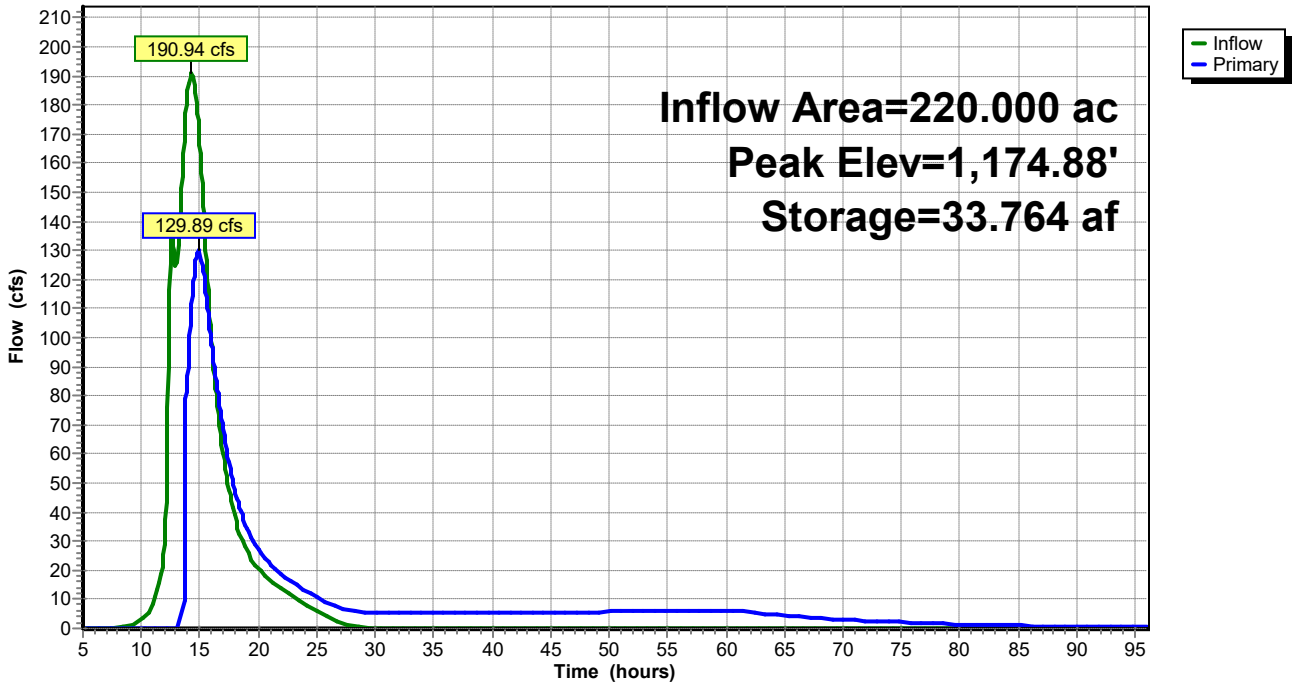
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,169.50	5.400	0.000	0.000
1,171.00	5.570	8.228	8.228
1,172.00	5.980	5.775	14.003
1,173.00	6.520	6.250	20.252
1,174.00	7.190	6.855	27.108
1,175.00	8.110	7.650	34.758
1,176.00	8.870	8.490	43.248
1,177.00	9.580	9.225	52.473
1,178.00	10.410	9.995	62.467

Device	Routing	Invert	Outlet Devices
#1	Primary	1,173.50'	**550.0' 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
#2	Primary	1,170.50'	**Custom Weir/Orifice, Cv= 2.62 (C= 3.28)** Head (feet) 0.00 0.50 1.00 1.50 Width (feet) 10.00 13.00 16.00 19.00

Primary OutFlow Max=0.00 cfs @ 14.91 hrs HW=1,174.67' TW=1,174.67' (Dynamic Tailwater)
1=Broad-Crested Rectangular Weir (Controls 0.00 cfs)
2=Custom Weir/Orifice (Controls 0.00 cfs)

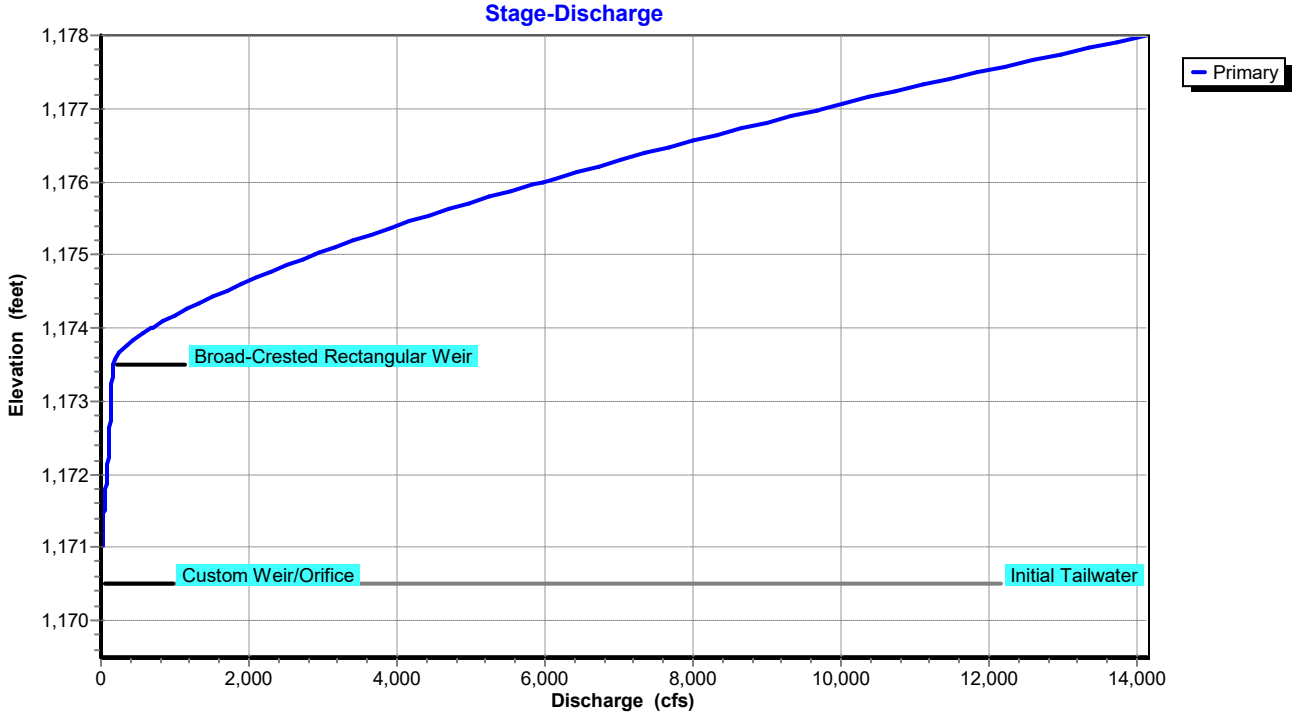
Pond 2P: Borrow Pond

Hydrograph

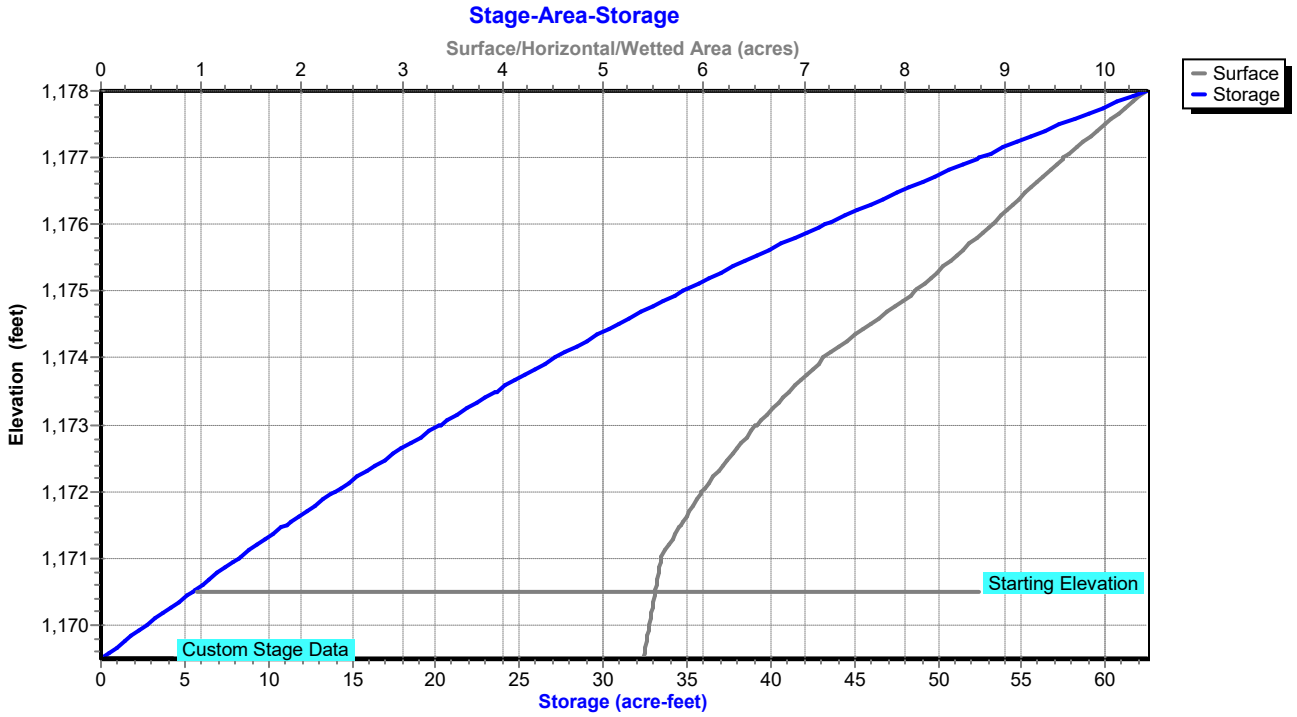


Pond 2P: Borrow Pond

Stage-Discharge



Pond 2P: Borrow Pond



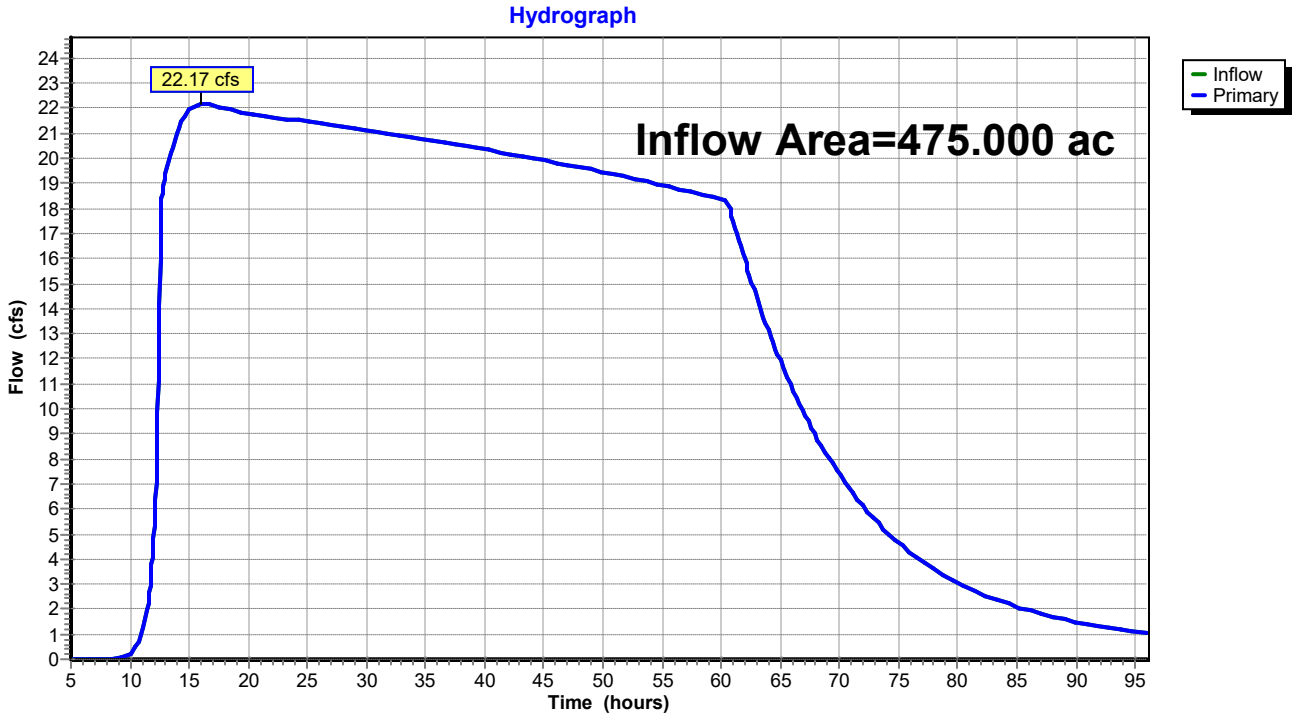
Summary for Link 3L: Tailwater

Inflow Area = 475.000 ac, 0.00% Impervious, Inflow Depth > 2.46" for 25-yr event
Inflow = 22.17 cfs @ 16.04 hrs, Volume= 97.484 af
Primary = 22.17 cfs @ 16.04 hrs, Volume= 97.484 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-96.00 hrs, dt= 0.05 hrs

Fixed water surface Elevation= 1,165.26'

Link 3L: Tailwater



Time span=5.00-96.00 hrs, dt=0.05 hrs, 1821 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 5S: Northwest Watershed Runoff Area=14.000 ac 0.00% Impervious Runoff Depth=4.59"
Flow Length=1,279' Tc=48.4 min CN=85 Runoff=42.38 cfs 5.351 af

Subcatchment 6S: Northeast Watershed Runoff Area=23.000 ac 0.00% Impervious Runoff Depth=4.59"
Flow Length=1,402' Tc=36.1 min CN=85 Runoff=83.46 cfs 8.790 af

Subcatchment 7S: West Watershed Runoff Area=183.000 ac 0.00% Impervious Runoff Depth=4.59"
Flow Length=6,267' Tc=181.2 min CN=85 Runoff=217.50 cfs 69.939 af

Subcatchment 8S: Southwest Watershed Runoff Area=152.000 ac 0.00% Impervious Runoff Depth=4.59"
Flow Length=4,051' Tc=117.6 min CN=85 Runoff=249.51 cfs 58.092 af

Subcatchment 9S: Direct Watershed Runoff Area=103.000 ac 0.00% Impervious Runoff Depth=4.59"
Flow Length=1,993' Tc=59.2 min CN=85 Runoff=274.34 cfs 39.365 af

Pond 1P: Wetland Pool Peak Elev=1,175.11' Storage=83.501 af Inflow=429.92 cfs 180.905 af
Primary=22.43 cfs 98.764 af Secondary=218.90 cfs 80.918 af Outflow=241.33 cfs 179.682 af

Pond 2P: Borrow Pond Peak Elev=1,175.11' Storage=35.632 af Inflow=228.03 cfs 84.080 af
Outflow=177.77 cfs 83.021 af

Link 3L: Tailwater Inflow=22.43 cfs 98.764 af
Primary=22.43 cfs 98.764 af

Total Runoff Area = 475.000 ac Runoff Volume = 181.536 af Average Runoff Depth = 4.59"
100.00% Pervious = 475.000 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 5S: Northwest Watershed

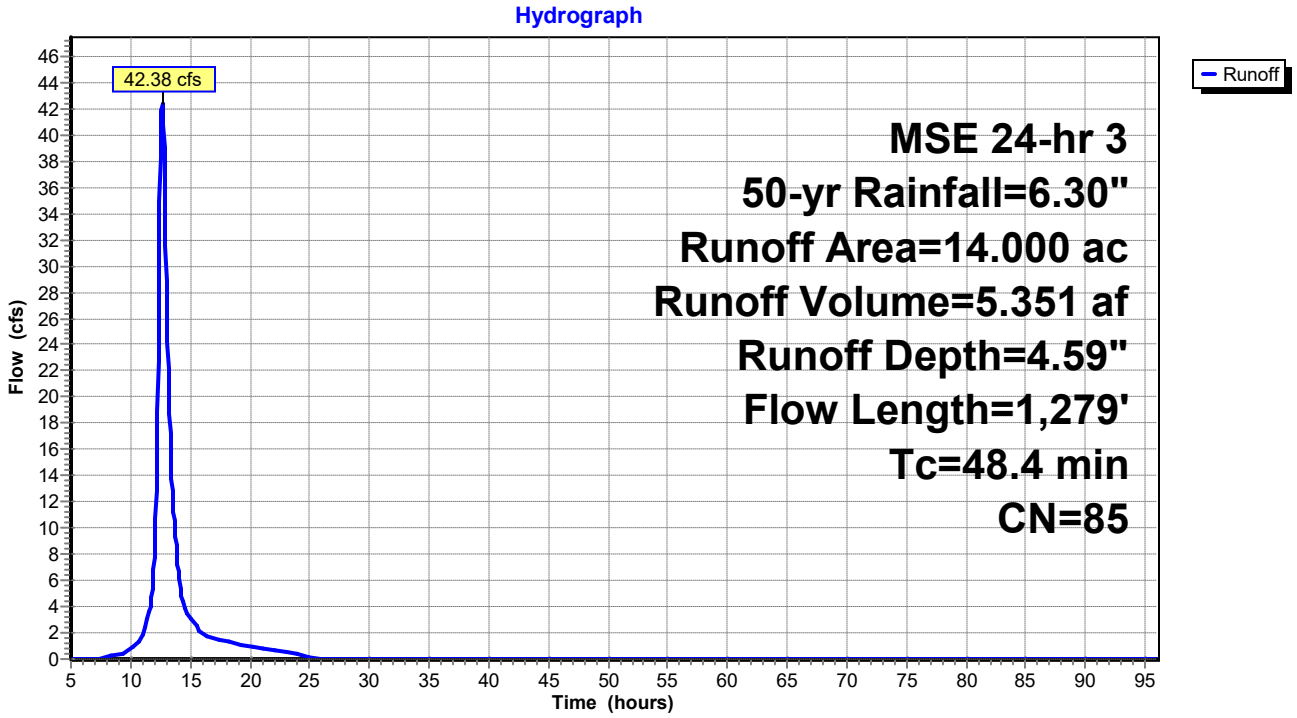
Runoff = 42.38 cfs @ 12.65 hrs, Volume= 5.351 af, Depth= 4.59"
Routed to Pond 2P : Borrow Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-96.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 50-yr Rainfall=6.30"

Area (ac)	CN	Description
14.000	85	Row crops, straight row, Good, HSG C
14.000		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.0	100	0.0200	0.15		**Sheet Flow,** Cultivated: Residue>20% n= 0.170 P2= 3.10"
37.4	1,179	0.0034	0.52		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
48.4	1,279	Total			

Subcatchment 5S: Northwest Watershed



Summary for Subcatchment 6S: Northeast Watershed

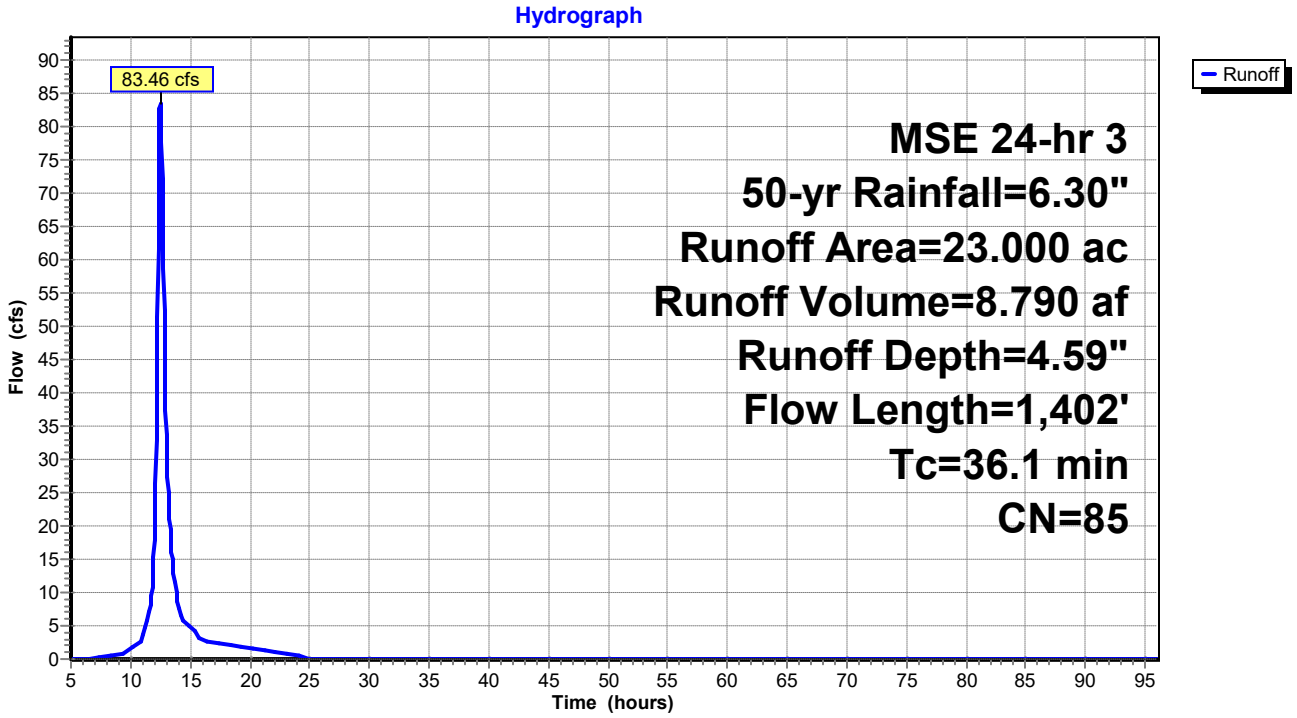
Runoff = 83.46 cfs @ 12.49 hrs, Volume= 8.790 af, Depth= 4.59"
Routed to Pond 2P : Borrow Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-96.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 50-yr Rainfall=6.30"

Area (ac)	CN	Description
23.000	85	Row crops, straight row, Good, HSG C
23.000		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.0	100	0.0200	0.15		**Sheet Flow,** Cultivated: Residue>20% n= 0.170 P2= 3.10"
25.1	1,302	0.0092	0.86		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
36.1	1,402	Total			

Subcatchment 6S: Northeast Watershed



Summary for Subcatchment 7S: West Watershed

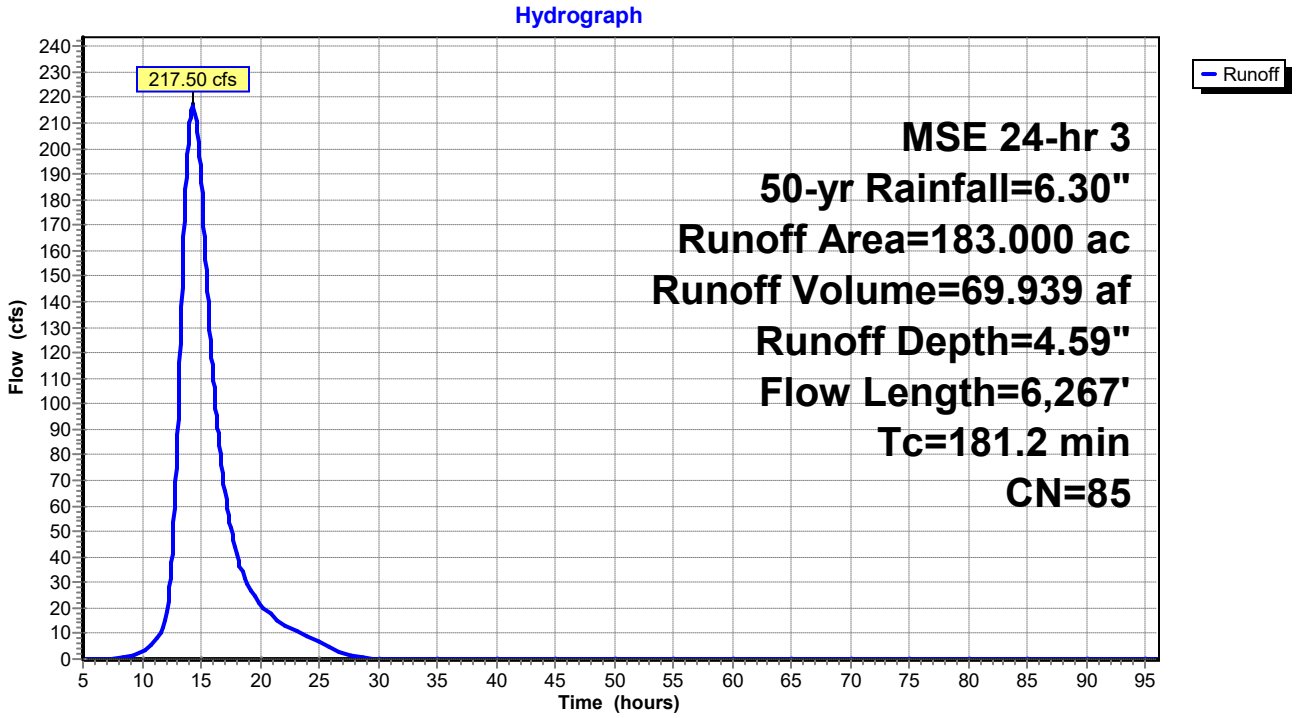
Runoff = 217.50 cfs @ 14.31 hrs, Volume= 69.939 af, Depth= 4.59"
Routed to Pond 2P : Borrow Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-96.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 50-yr Rainfall=6.30"

Area (ac)	CN	Description
183.000	85	Row crops, straight row, Good, HSG C
183.000		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.0	100	0.0200	0.15		**Sheet Flow,** Cultivated: Residue>20% n= 0.170 P2= 3.10"
170.2	6,167	0.0045	0.60		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
181.2	6,267	Total			

Subcatchment 7S: West Watershed



Summary for Subcatchment 8S: Southwest Watershed

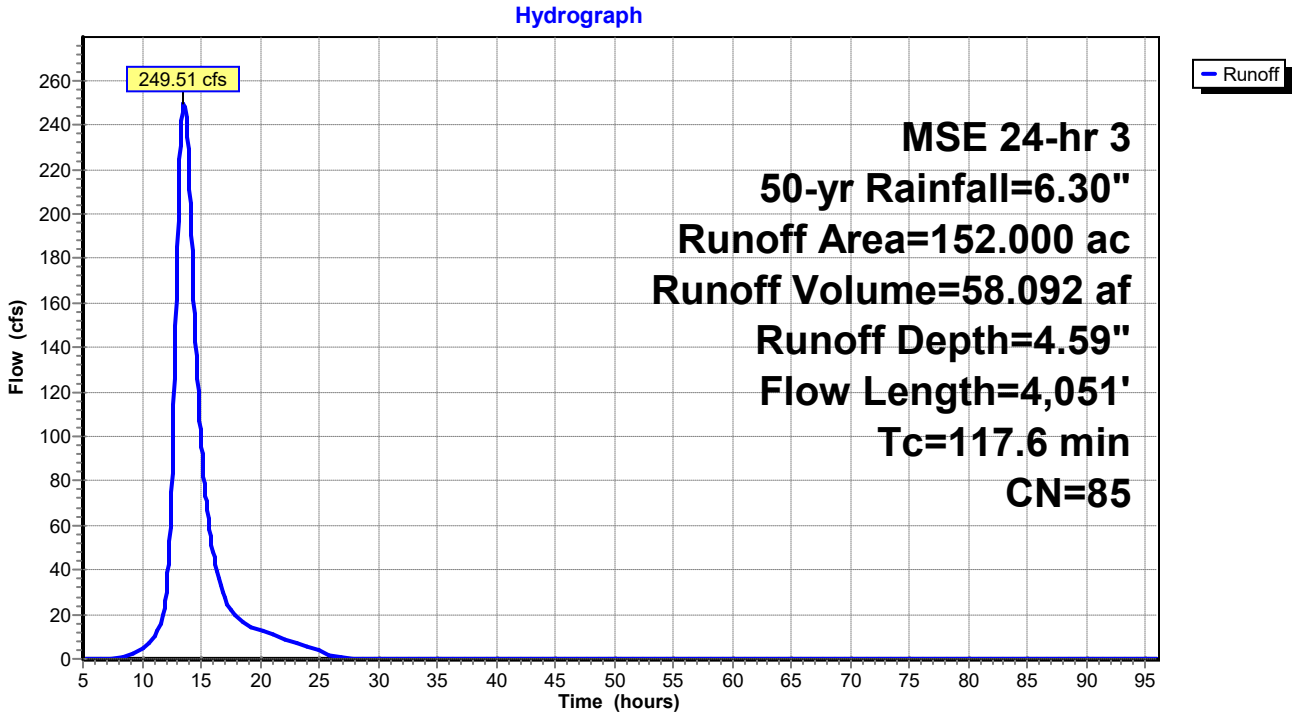
Runoff = 249.51 cfs @ 13.52 hrs, Volume= 58.092 af, Depth= 4.59"
Routed to Pond 1P : Wetland Pool

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-96.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 50-yr Rainfall=6.30"

Area (ac)	CN	Description
152.000	85	Row crops, straight row, Good, HSG C
152.000		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.0	100	0.0200	0.15		**Sheet Flow,** Cultivated: Residue>20% n= 0.170 P2= 3.10"
70.0	2,037	0.0029	0.48		**Shallow Concentrated Flow, middle (even)** Cultivated Straight Rows Kv= 9.0 fps
36.6	1,914	0.0094	0.87		**Shallow Concentrated Flow, east (steep)** Cultivated Straight Rows Kv= 9.0 fps
117.6	4,051	Total			

Subcatchment 8S: Southwest Watershed



Summary for Subcatchment 9S: Direct Watershed

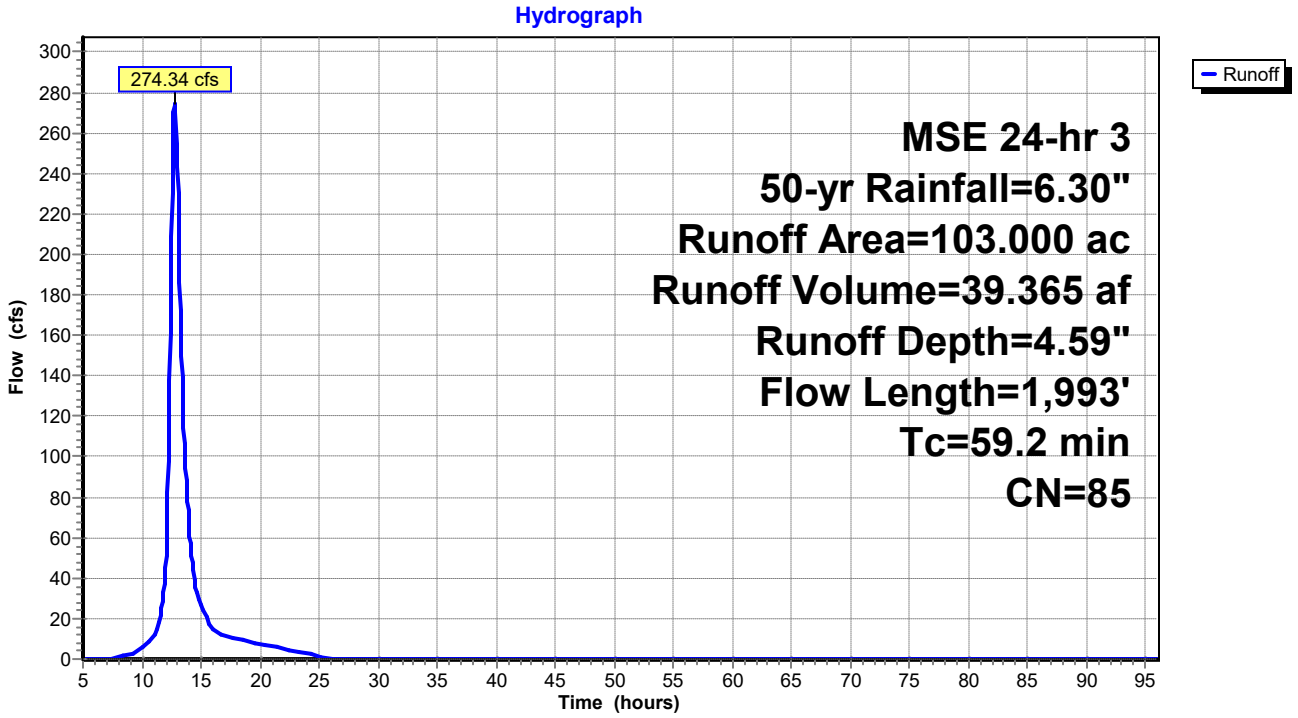
Runoff = 274.34 cfs @ 12.78 hrs, Volume= 39.365 af, Depth= 4.59"
Routed to Pond 1P : Wetland Pool

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-96.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 50-yr Rainfall=6.30"

Area (ac)	CN	Description
103.000	85	Row crops, straight row, Good, HSG C
103.000		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.0	100	0.0200	0.15		**Sheet Flow,** Cultivated: Residue>20% n= 0.170 P2= 3.10"
48.2	1,893	0.0053	0.66		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
59.2	1,993	Total			

Subcatchment 9S: Direct Watershed



Summary for Pond 1P: Wetland Pool

[80] Warning: Exceeded Pond 2P by 0.19' @ 12.10 hrs (18.59 cfs 24.549 af)

Inflow Area = 475.000 ac, 0.00% Impervious, Inflow Depth > 4.57" for 50-yr event
Inflow = 429.92 cfs @ 13.56 hrs, Volume= 180.905 af
Outflow = 241.33 cfs @ 15.51 hrs, Volume= 179.682 af, Atten= 44%, Lag= 117.3 min
Primary = 22.43 cfs @ 15.51 hrs, Volume= 98.764 af
Routed to Link 3L : Tailwater
Secondary = 218.90 cfs @ 15.51 hrs, Volume= 80.918 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-96.00 hrs, dt= 0.05 hrs / 3
Starting Elev= 1,170.50' Surf.Area= 6.403 ac Storage= 6.341 af
Peak Elev= 1,175.11' @ 15.51 hrs Surf.Area= 31.805 ac Storage= 83.501 af (77.159 af above start)

Plug-Flow detention time= 811.8 min calculated for 173.340 af (96% of inflow)
Center-of-Mass det. time= 643.7 min (1,839.1 - 1,195.4)

Volume	Invert	Avail.Storage	Storage Description
#1	1,169.50'	204.694 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,169.50	6.171	0.000	0.000
1,170.00	6.396	3.142	3.142
1,170.50	6.403	3.200	6.341
1,171.00	6.710	3.278	9.620
1,172.00	12.342	9.526	19.146
1,173.00	16.630	14.486	33.632
1,174.00	22.743	19.686	53.318
1,175.00	30.921	26.832	80.150
1,176.00	39.197	35.059	115.209
1,177.00	44.635	41.916	157.125
1,178.00	50.503	47.569	204.694

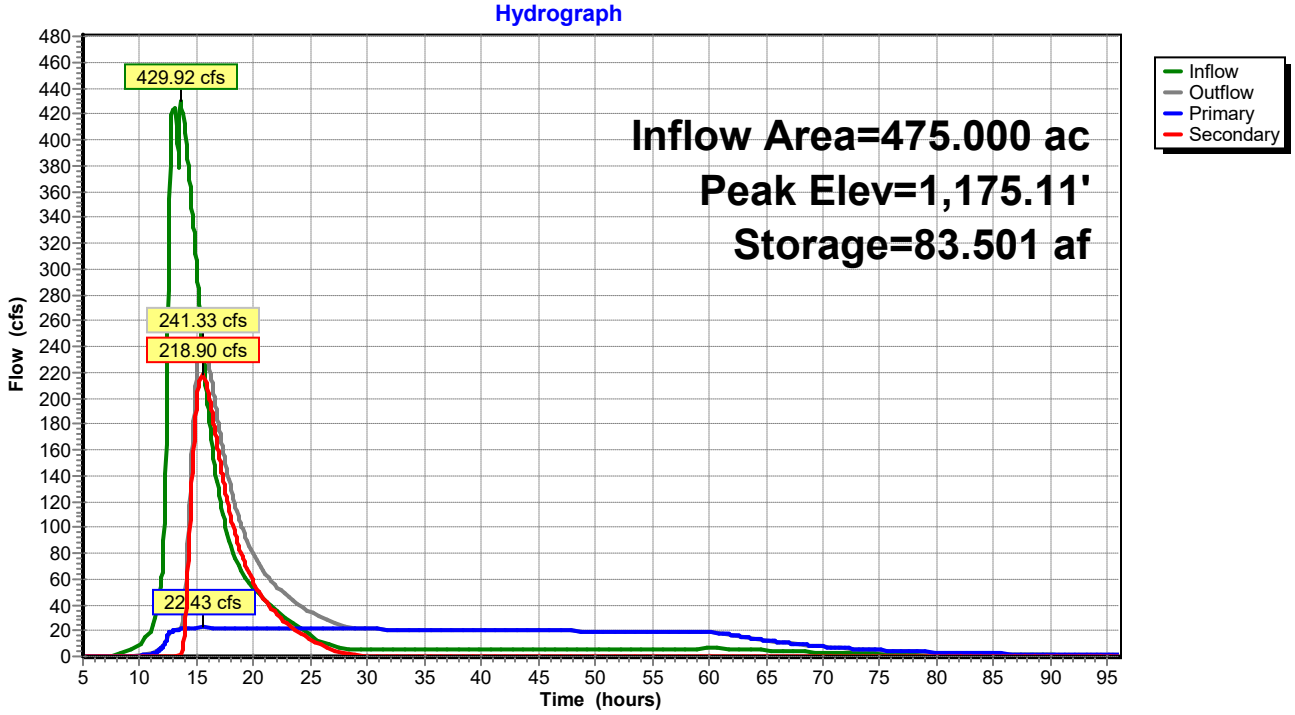
Device	Routing	Invert	Outlet Devices
#1	Primary	1,164.00'	**18.0" Round Culvert** L= 100.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,164.00' / 1,163.76' S= 0.0024 '/' Cc= 0.900 n= 0.015, Flow Area= 1.77 sf
#2	Device 1	1,170.50'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#3	Secondary	1,174.00'	**Custom Weir/Orifice, Cv= 2.62 (C= 3.28)** Head (feet) 0.00 1.00 2.00 3.00 4.00 Width (feet) 10.00 117.00 245.00 1,020.00 1,213.00

Primary OutFlow Max=22.43 cfs @ 15.51 hrs HW=1,175.11' TW=1,165.26' (Dynamic Tailwater)
↑**1=Culvert** (Barrel Controls 22.43 cfs @ 12.69 fps)
↑**2=Sharp-Crested Rectangular Weir** (Passes 22.43 cfs of 99.54 cfs potential flow)

Secondary OutFlow Max=218.86 cfs @ 15.51 hrs HW=1,175.11' (Free Discharge)
↑**3=Custom Weir/Orifice** (Weir Controls 218.86 cfs @ 2.85 fps)

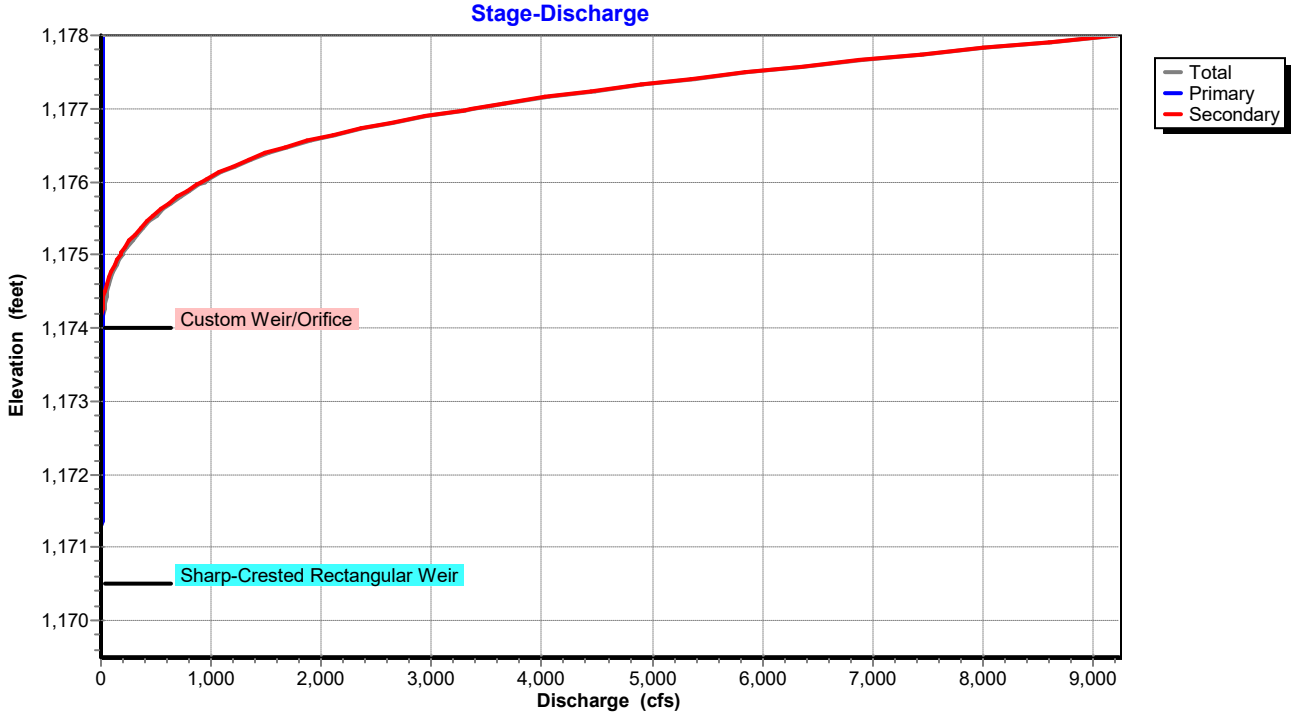
Pond 1P: Wetland Pool

Hydrograph

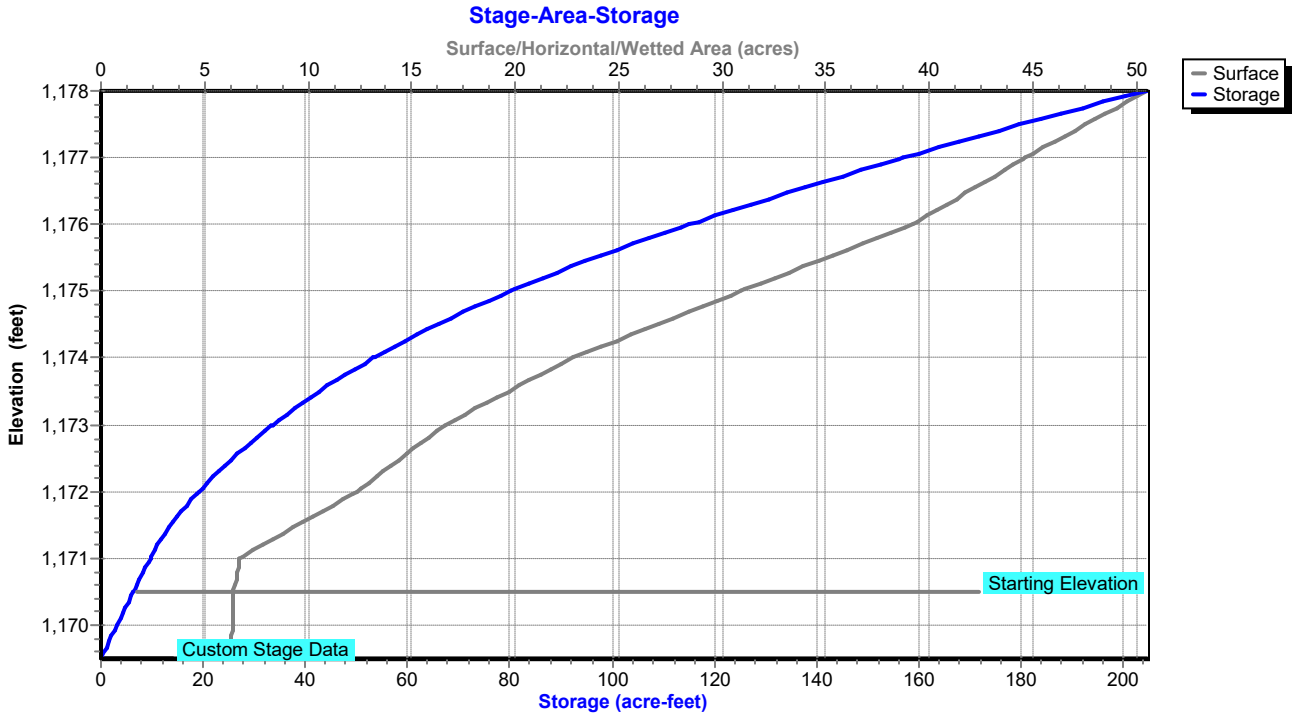


Pond 1P: Wetland Pool

Stage-Discharge



Pond 1P: Wetland Pool



Summary for Pond 2P: Borrow Pond

[95] Warning: Outlet Device #2 rise exceeded

Inflow Area = 220.000 ac, 0.00% Impervious, Inflow Depth = 4.59" for 50-yr event
Inflow = 228.03 cfs @ 14.29 hrs, Volume= 84.080 af
Outflow = 177.77 cfs @ 14.87 hrs, Volume= 83.021 af, Atten= 22%, Lag= 34.5 min
Primary = 177.77 cfs @ 14.87 hrs, Volume= 83.448 af
Routed to Pond 1P : Wetland Pool

Routing by Dyn-Stor-Ind method, Time Span= 5.00-96.00 hrs, dt= 0.05 hrs / 3
Starting Elev= 1,170.50' Surf.Area= 5.513 ac Storage= 5.457 af
Peak Elev= 1,175.11' @ 15.52 hrs Surf.Area= 8.192 ac Storage= 35.632 af (30.175 af above start)

Plug-Flow detention time= 752.0 min calculated for 77.564 af (92% of inflow)
Center-of-Mass det. time= 662.2 min (1,585.3 - 923.2)

Volume	Invert	Avail.Storage	Storage Description
#1	1,169.50'	62.467 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

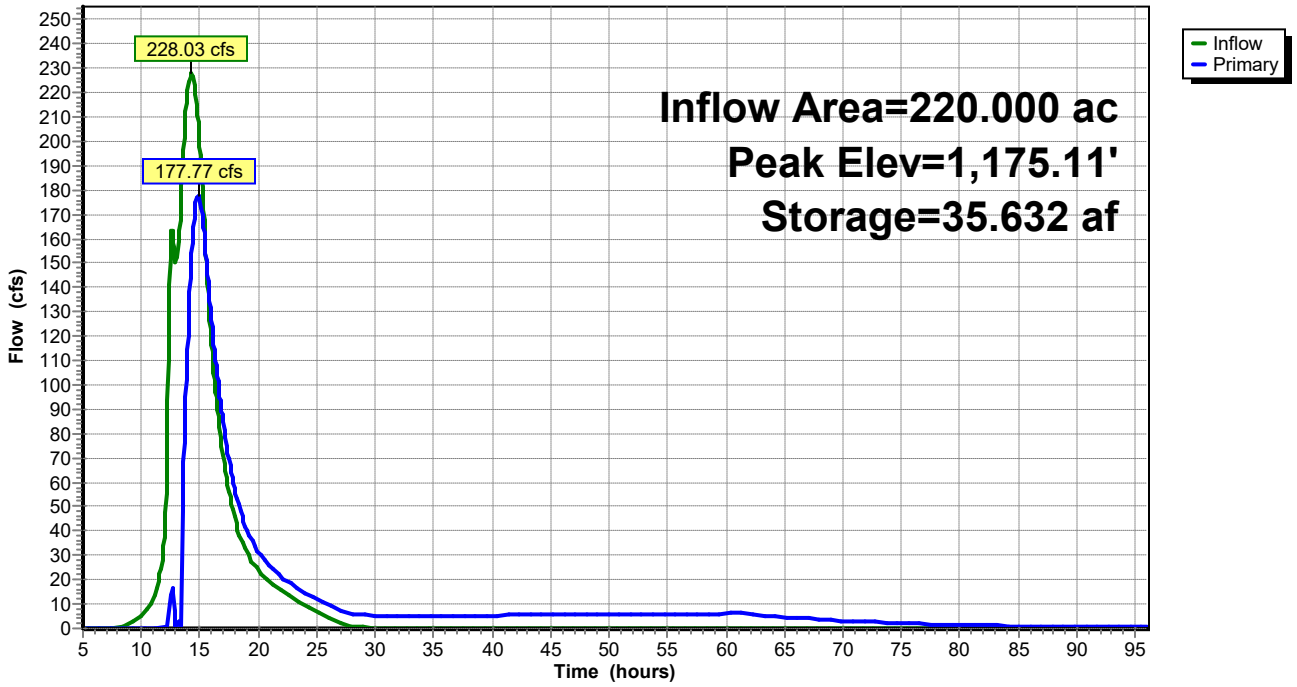
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,169.50	5.400	0.000	0.000
1,171.00	5.570	8.228	8.228
1,172.00	5.980	5.775	14.003
1,173.00	6.520	6.250	20.252
1,174.00	7.190	6.855	27.108
1,175.00	8.110	7.650	34.758
1,176.00	8.870	8.490	43.248
1,177.00	9.580	9.225	52.473
1,178.00	10.410	9.995	62.467

Device	Routing	Invert	Outlet Devices
#1	Primary	1,173.50'	**550.0' 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
#2	Primary	1,170.50'	**Custom Weir/Orifice, Cv= 2.62 (C= 3.28)** Head (feet) 0.00 0.50 1.00 1.50 Width (feet) 10.00 13.00 16.00 19.00

Primary OutFlow Max=0.00 cfs @ 14.87 hrs HW=1,175.02' TW=1,175.02' (Dynamic Tailwater)
1=Broad-Crested Rectangular Weir (Controls 0.00 cfs)
2=Custom Weir/Orifice (Controls 0.00 cfs)

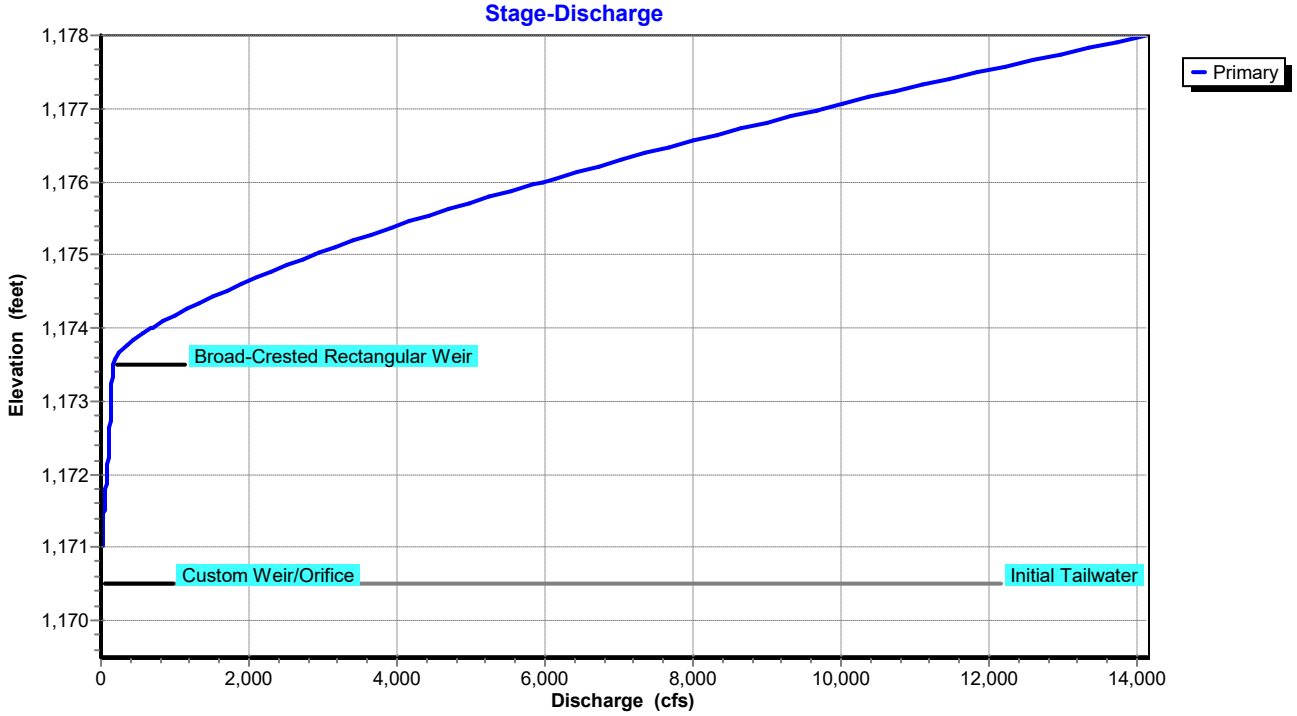
Pond 2P: Borrow Pond

Hydrograph

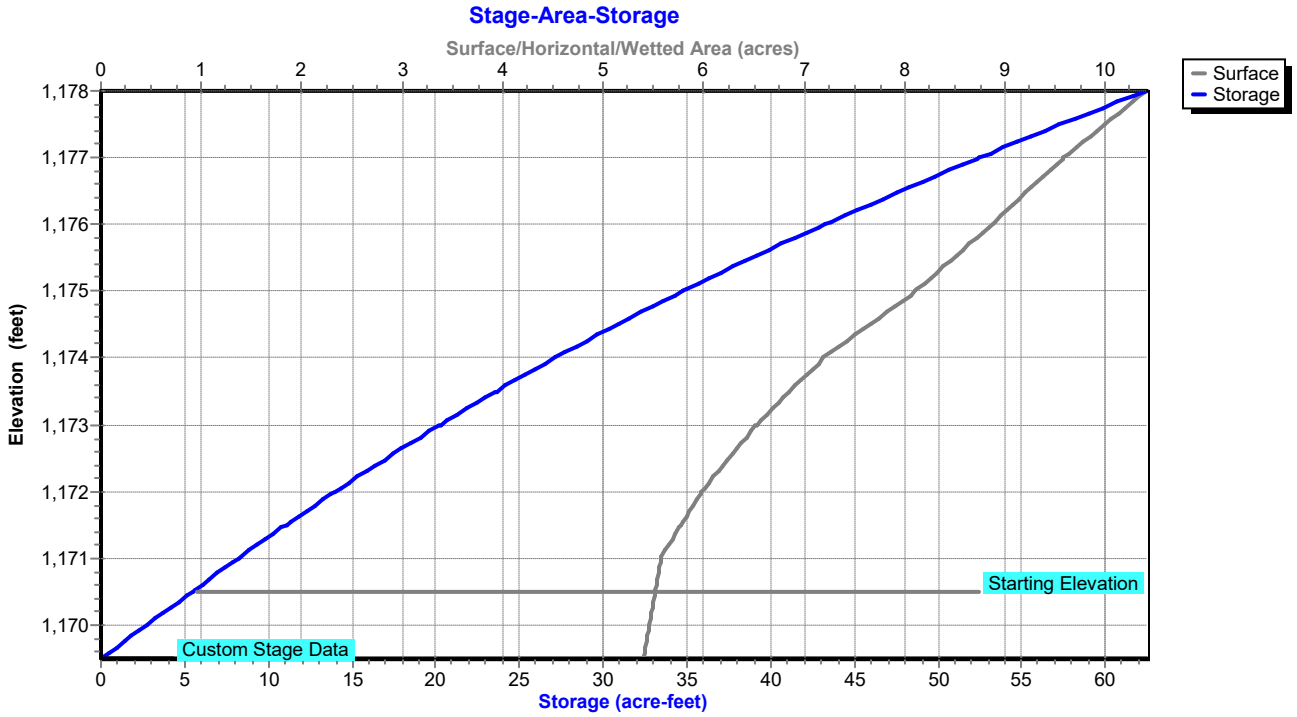


Pond 2P: Borrow Pond

Stage-Discharge



Pond 2P: Borrow Pond



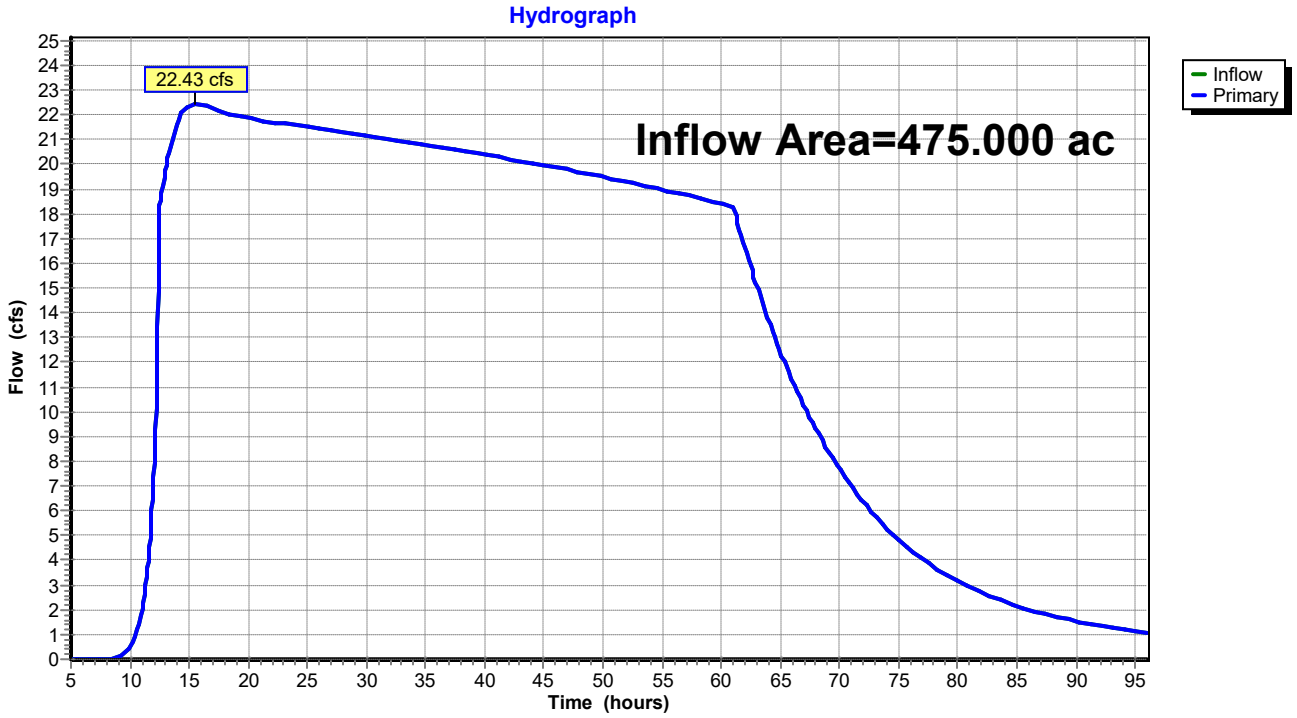
Summary for Link 3L: Tailwater

Inflow Area = 475.000 ac, 0.00% Impervious, Inflow Depth > 2.50" for 50-yr event
Inflow = 22.43 cfs @ 15.51 hrs, Volume= 98.764 af
Primary = 22.43 cfs @ 15.51 hrs, Volume= 98.764 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-96.00 hrs, dt= 0.05 hrs

Fixed water surface Elevation= 1,165.26'

Link 3L: Tailwater



Time span=5.00-96.00 hrs, dt=0.05 hrs, 1821 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 5S: Northwest Watershed Runoff Area=14.000 ac 0.00% Impervious Runoff Depth=5.44"
Flow Length=1,279' Tc=48.4 min CN=85 Runoff=50.03 cfs 6.351 af

Subcatchment 6S: Northeast Watershed Runoff Area=23.000 ac 0.00% Impervious Runoff Depth=5.44"
Flow Length=1,402' Tc=36.1 min CN=85 Runoff=98.46 cfs 10.434 af

Subcatchment 7S: West Watershed Runoff Area=183.000 ac 0.00% Impervious Runoff Depth=5.44"
Flow Length=6,267' Tc=181.2 min CN=85 Runoff=257.68 cfs 83.021 af

Subcatchment 8S: Southwest Watershed Runoff Area=152.000 ac 0.00% Impervious Runoff Depth=5.44"
Flow Length=4,051' Tc=117.6 min CN=85 Runoff=295.23 cfs 68.957 af

Subcatchment 9S: Direct Watershed Runoff Area=103.000 ac 0.00% Impervious Runoff Depth=5.44"
Flow Length=1,993' Tc=59.2 min CN=85 Runoff=324.03 cfs 46.727 af

Pond 1P: Wetland Pool Peak Elev=1,175.31' Storage=90.179 af Inflow=517.08 cfs 214.581 af
Primary=22.67 cfs 99.996 af Secondary=326.71 cfs 113.344 af Outflow=349.38 cfs 213.340 af

Pond 2P: Borrow Pond Peak Elev=1,175.31' Storage=37.326 af Inflow=269.92 cfs 99.806 af
Outflow=232.20 cfs 98.731 af

Link 3L: Tailwater Inflow=22.67 cfs 99.996 af
Primary=22.67 cfs 99.996 af

Total Runoff Area = 475.000 ac Runoff Volume = 215.491 af Average Runoff Depth = 5.44"
100.00% Pervious = 475.000 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 5S: Northwest Watershed

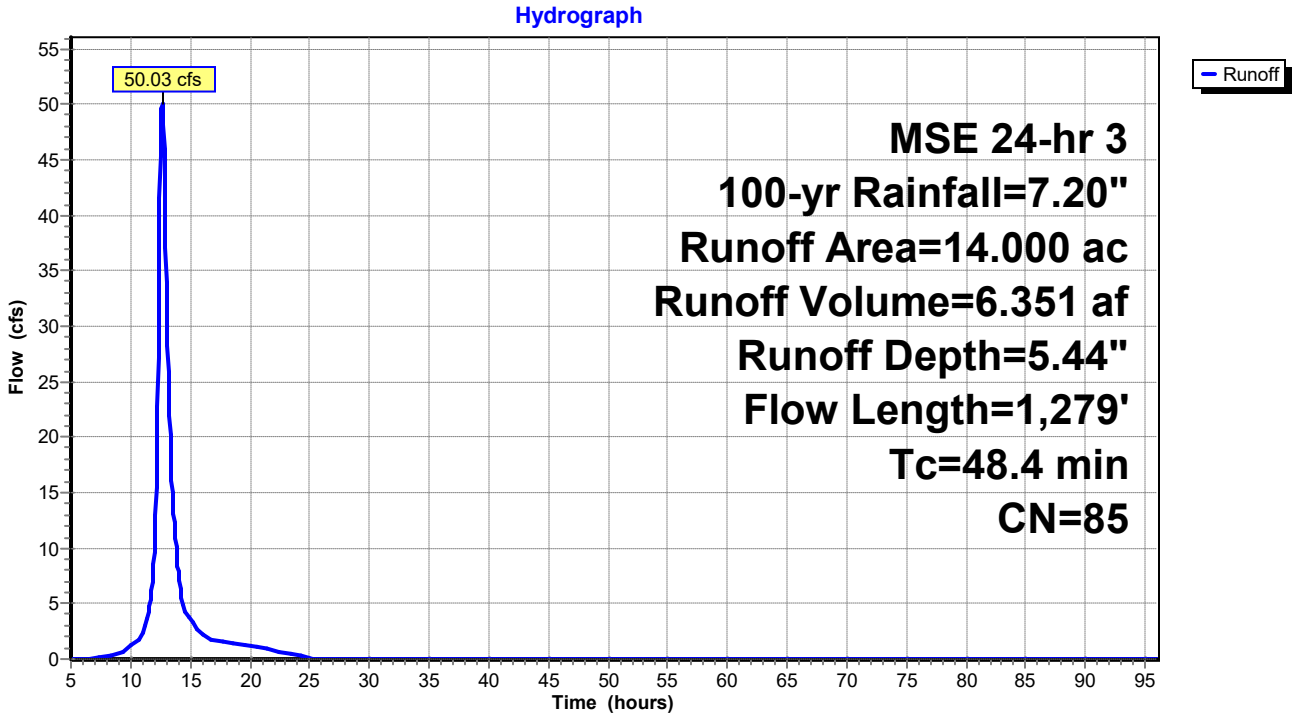
Runoff = 50.03 cfs @ 12.65 hrs, Volume= 6.351 af, Depth= 5.44"
Routed to Pond 2P : Borrow Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-96.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-yr Rainfall=7.20"

Area (ac)	CN	Description
14.000	85	Row crops, straight row, Good, HSG C
14.000		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.0	100	0.0200	0.15		**Sheet Flow,** Cultivated: Residue>20% n= 0.170 P2= 3.10"
37.4	1,179	0.0034	0.52		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
48.4	1,279	Total			

Subcatchment 5S: Northwest Watershed



Summary for Subcatchment 6S: Northeast Watershed

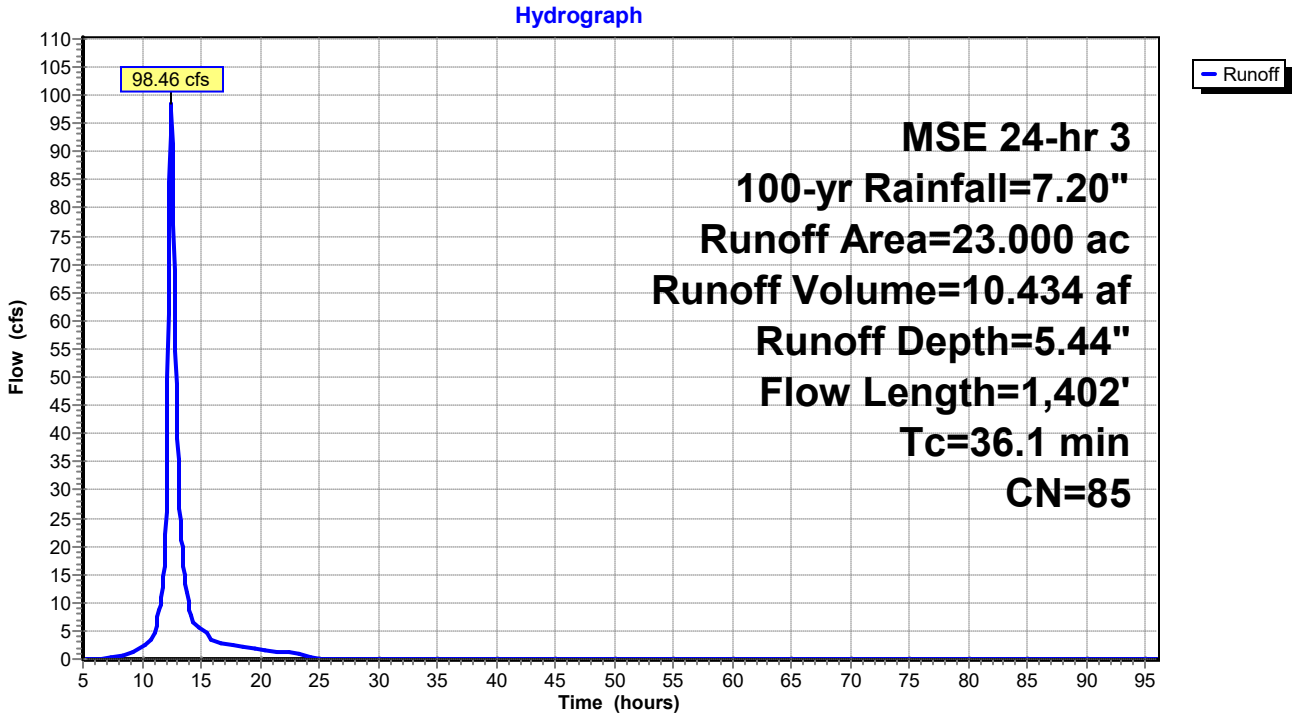
Runoff = 98.46 cfs @ 12.49 hrs, Volume= 10.434 af, Depth= 5.44"
Routed to Pond 2P : Borrow Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-96.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-yr Rainfall=7.20"

Area (ac)	CN	Description
23.000	85	Row crops, straight row, Good, HSG C
23.000		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.0	100	0.0200	0.15		**Sheet Flow,** Cultivated: Residue>20% n= 0.170 P2= 3.10"
25.1	1,302	0.0092	0.86		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
36.1	1,402	Total			

Subcatchment 6S: Northeast Watershed



Summary for Subcatchment 7S: West Watershed

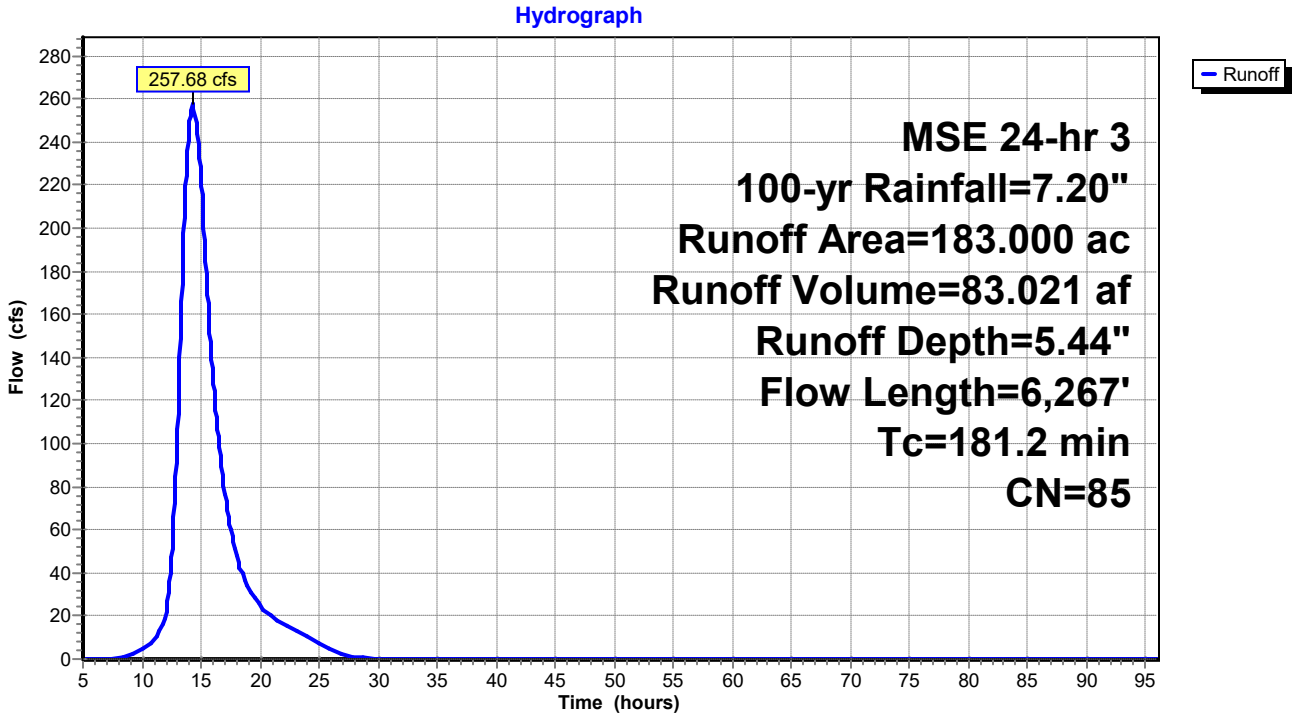
Runoff = 257.68 cfs @ 14.30 hrs, Volume= 83.021 af, Depth= 5.44"
Routed to Pond 2P : Borrow Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-96.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-yr Rainfall=7.20"

Area (ac)	CN	Description
183.000	85	Row crops, straight row, Good, HSG C
183.000		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.0	100	0.0200	0.15		**Sheet Flow,** Cultivated: Residue>20% n= 0.170 P2= 3.10"
170.2	6,167	0.0045	0.60		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
181.2	6,267	Total			

Subcatchment 7S: West Watershed



Summary for Subcatchment 8S: Southwest Watershed

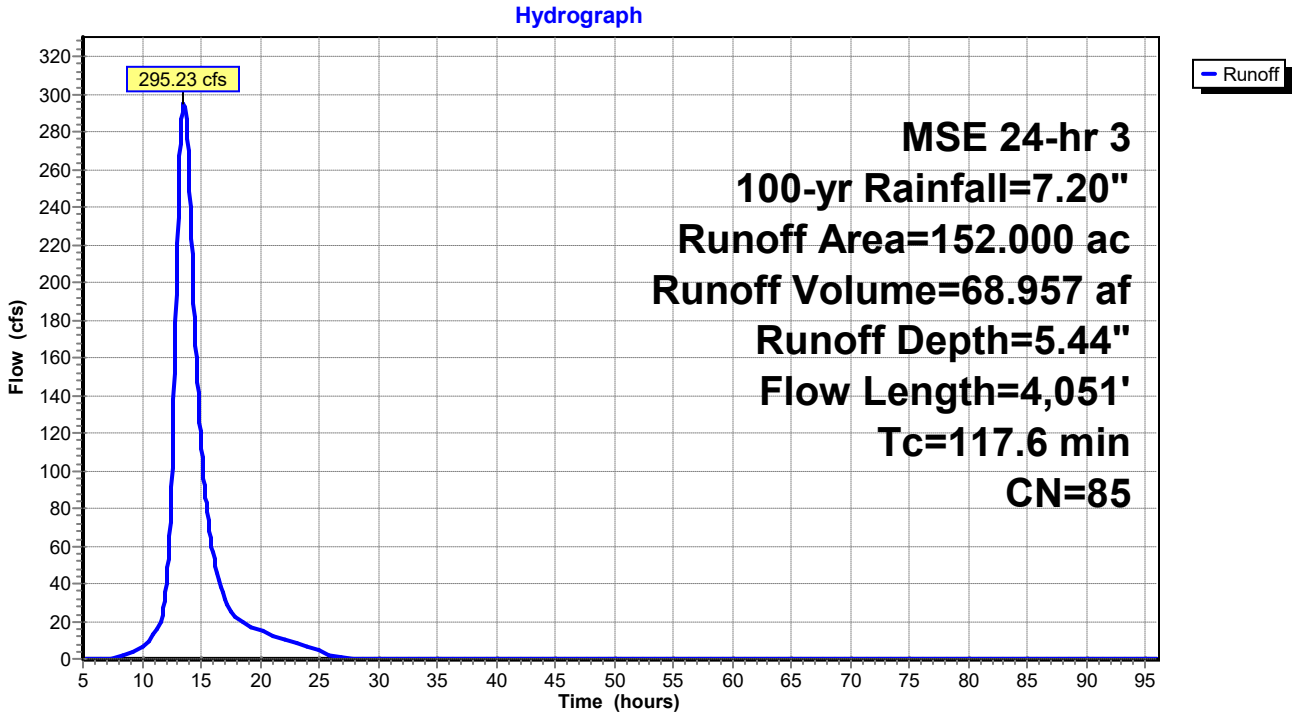
Runoff = 295.23 cfs @ 13.51 hrs, Volume= 68.957 af, Depth= 5.44"
Routed to Pond 1P : Wetland Pool

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-96.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-yr Rainfall=7.20"

Area (ac)	CN	Description
152.000	85	Row crops, straight row, Good, HSG C
152.000		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.0	100	0.0200	0.15		**Sheet Flow,** Cultivated: Residue>20% n= 0.170 P2= 3.10"
70.0	2,037	0.0029	0.48		**Shallow Concentrated Flow, middle (even)** Cultivated Straight Rows Kv= 9.0 fps
36.6	1,914	0.0094	0.87		**Shallow Concentrated Flow, east (steep)** Cultivated Straight Rows Kv= 9.0 fps
117.6	4,051	Total			

Subcatchment 8S: Southwest Watershed



Summary for Subcatchment 9S: Direct Watershed

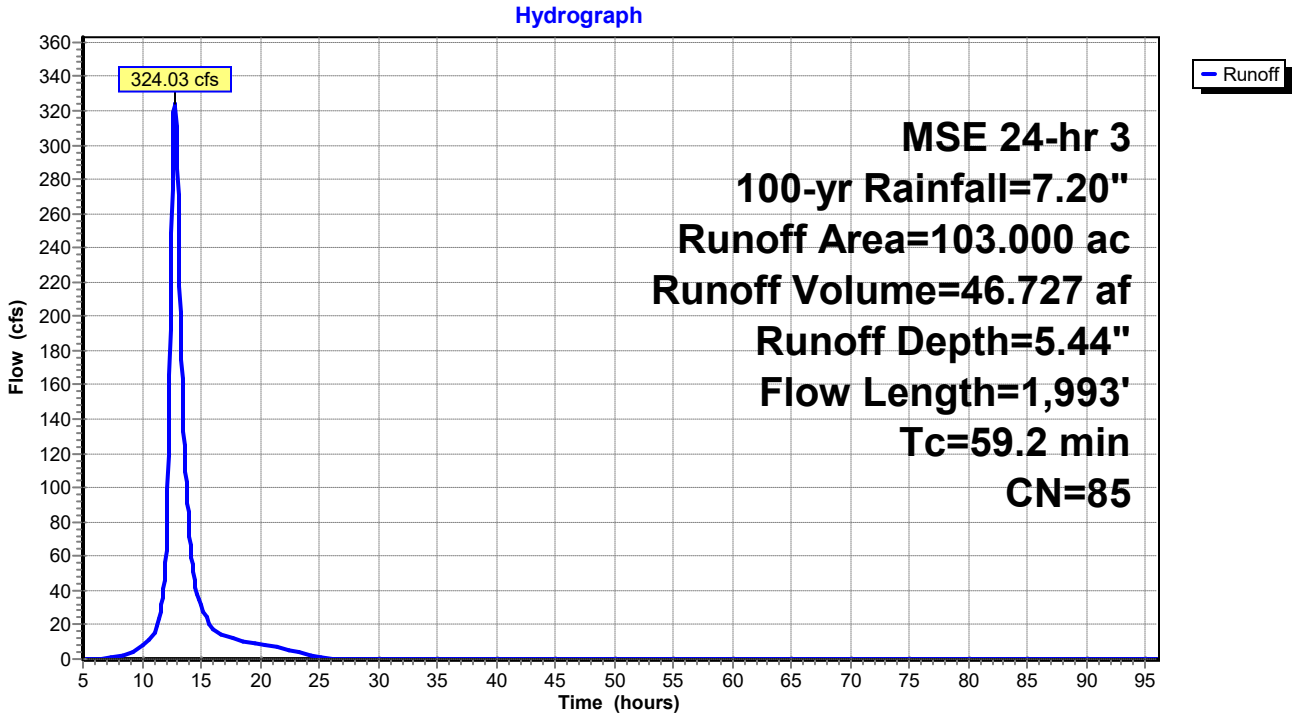
Runoff = 324.03 cfs @ 12.78 hrs, Volume= 46.727 af, Depth= 5.44"
Routed to Pond 1P : Wetland Pool

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-96.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-yr Rainfall=7.20"

Area (ac)	CN	Description
103.000	85	Row crops, straight row, Good, HSG C
103.000		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.0	100	0.0200	0.15		**Sheet Flow,** Cultivated: Residue>20% n= 0.170 P2= 3.10"
48.2	1,893	0.0053	0.66		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
59.2	1,993	Total			

Subcatchment 9S: Direct Watershed



Summary for Pond 1P: Wetland Pool

[80] Warning: Exceeded Pond 2P by 0.18' @ 11.95 hrs (20.52 cfs 24.162 af)

Inflow Area = 475.000 ac, 0.00% Impervious, Inflow Depth > 5.42" for 100-yr event
Inflow = 517.08 cfs @ 13.45 hrs, Volume= 214.581 af
Outflow = 349.38 cfs @ 15.16 hrs, Volume= 213.340 af, Atten= 32%, Lag= 102.3 min
Primary = 22.67 cfs @ 15.16 hrs, Volume= 99.996 af
Routed to Link 3L : Tailwater
Secondary = 326.71 cfs @ 15.16 hrs, Volume= 113.344 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-96.00 hrs, dt= 0.05 hrs / 3
Starting Elev= 1,170.50' Surf.Area= 6.403 ac Storage= 6.341 af
Peak Elev= 1,175.31' @ 15.16 hrs Surf.Area= 33.498 ac Storage= 90.179 af (83.838 af above start)

Plug-Flow detention time= 700.0 min calculated for 206.999 af (96% of inflow)
Center-of-Mass det. time= 560.1 min (1,710.8 - 1,150.8)

Volume	Invert	Avail.Storage	Storage Description
#1	1,169.50'	204.694 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,169.50	6.171	0.000	0.000
1,170.00	6.396	3.142	3.142
1,170.50	6.403	3.200	6.341
1,171.00	6.710	3.278	9.620
1,172.00	12.342	9.526	19.146
1,173.00	16.630	14.486	33.632
1,174.00	22.743	19.686	53.318
1,175.00	30.921	26.832	80.150
1,176.00	39.197	35.059	115.209
1,177.00	44.635	41.916	157.125
1,178.00	50.503	47.569	204.694

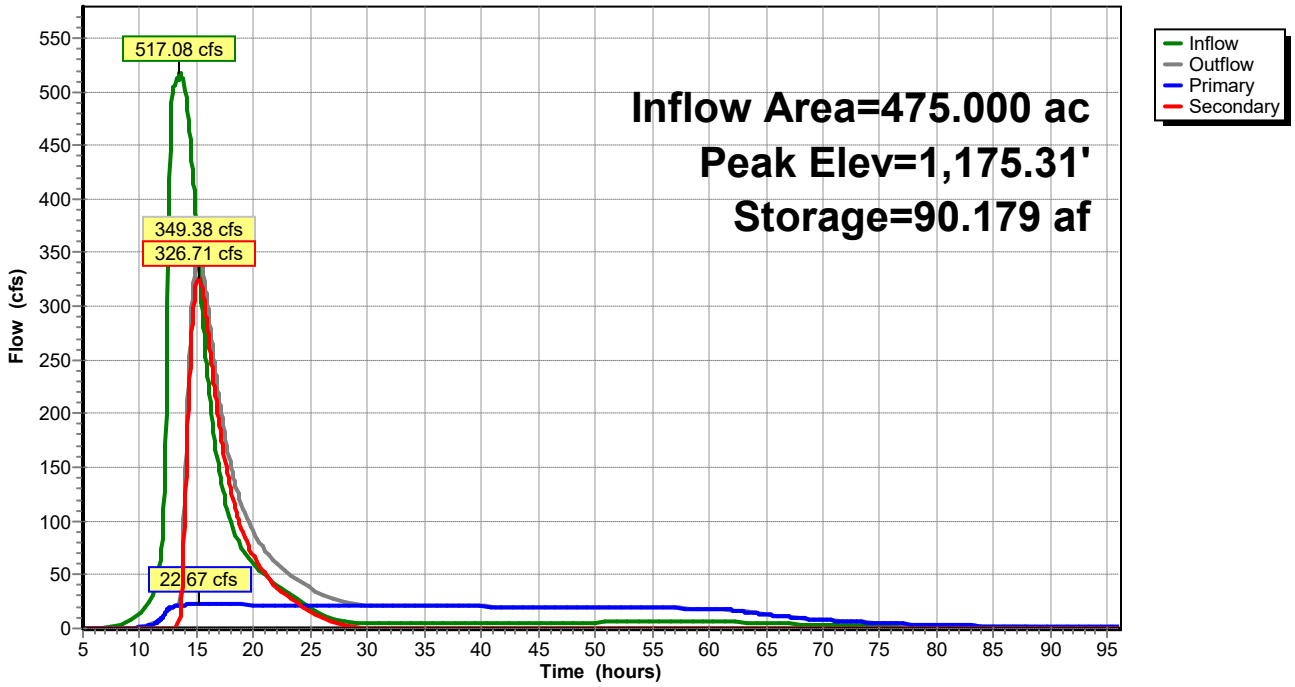
Device	Routing	Invert	Outlet Devices
#1	Primary	1,164.00'	**18.0" Round Culvert** L= 100.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,164.00' / 1,163.76' S= 0.0024 '/' Cc= 0.900 n= 0.015, Flow Area= 1.77 sf
#2	Device 1	1,170.50'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#3	Secondary	1,174.00'	**Custom Weir/Orifice, Cv= 2.62 (C= 3.28)** Head (feet) 0.00 1.00 2.00 3.00 4.00 Width (feet) 10.00 117.00 245.00 1,020.00 1,213.00

Primary OutFlow Max=22.67 cfs @ 15.16 hrs HW=1,175.31' TW=1,165.26' (Dynamic Tailwater)
↑**1=Culvert** (Barrel Controls 22.67 cfs @ 12.83 fps)
↑**2=Sharp-Crested Rectangular Weir** (Passes 22.67 cfs of 104.83 cfs potential flow)

Secondary OutFlow Max=326.68 cfs @ 15.16 hrs HW=1,175.31' (Free Discharge)
↑**3=Custom Weir/Orifice** (Weir Controls 326.68 cfs @ 3.08 fps)

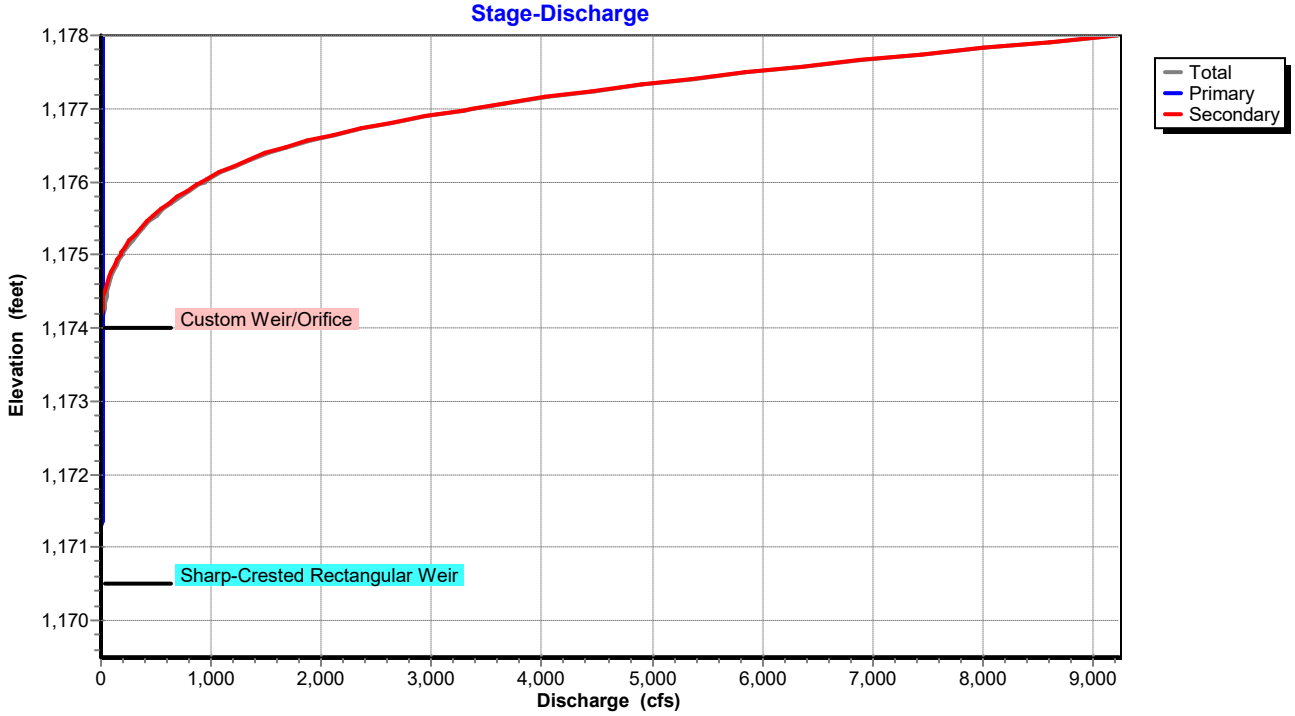
Pond 1P: Wetland Pool

Hydrograph

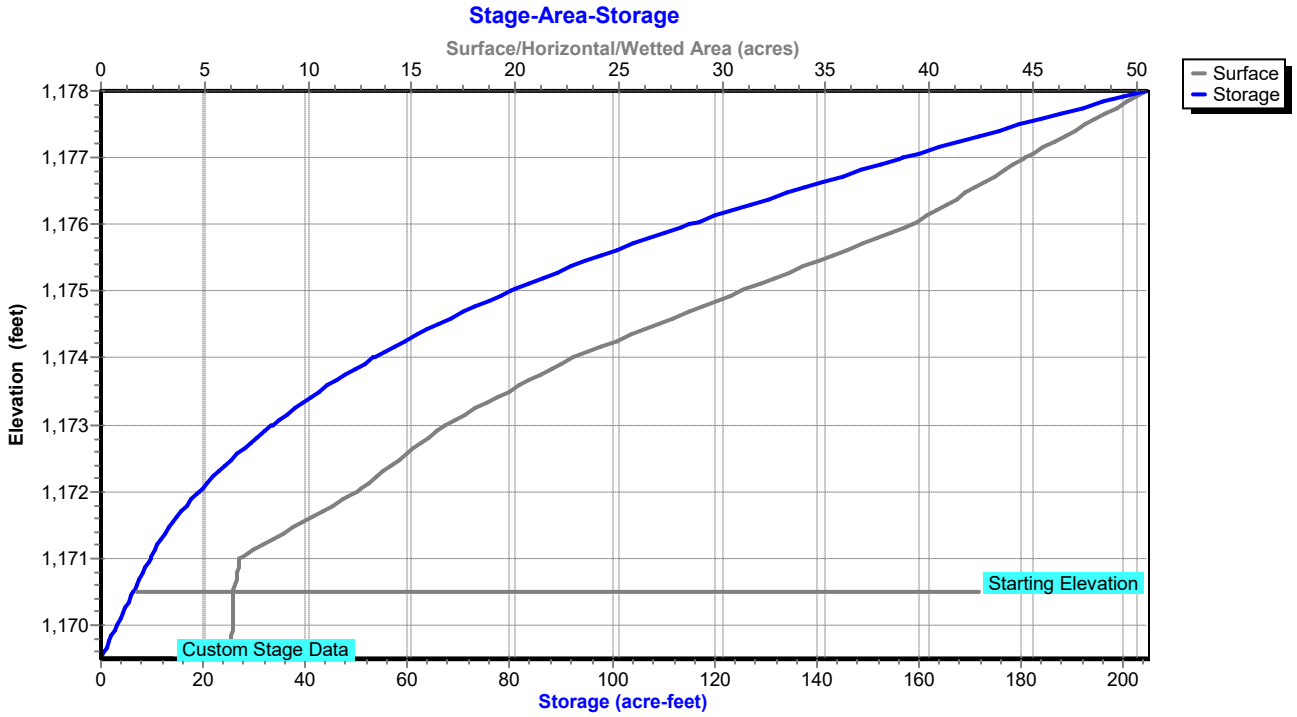


Pond 1P: Wetland Pool

Stage-Discharge



Pond 1P: Wetland Pool



Summary for Pond 2P: Borrow Pond

[95] Warning: Outlet Device #2 rise exceeded

Inflow Area = 220.000 ac, 0.00% Impervious, Inflow Depth = 5.44" for 100-yr event
Inflow = 269.92 cfs @ 14.29 hrs, Volume= 99.806 af
Outflow = 232.20 cfs @ 14.74 hrs, Volume= 98.731 af, Atten= 14%, Lag= 27.2 min
Primary = 232.20 cfs @ 14.74 hrs, Volume= 98.897 af
Routed to Pond 1P : Wetland Pool

Routing by Dyn-Stor-Ind method, Time Span= 5.00-96.00 hrs, dt= 0.05 hrs / 3
Starting Elev= 1,170.50' Surf.Area= 5.513 ac Storage= 5.457 af
Peak Elev= 1,175.31' @ 15.16 hrs Surf.Area= 8.347 ac Storage= 37.326 af (31.870 af above start)

Plug-Flow detention time= 640.2 min calculated for 93.223 af (93% of inflow)
Center-of-Mass det. time= 570.4 min (1,490.2 - 919.8)

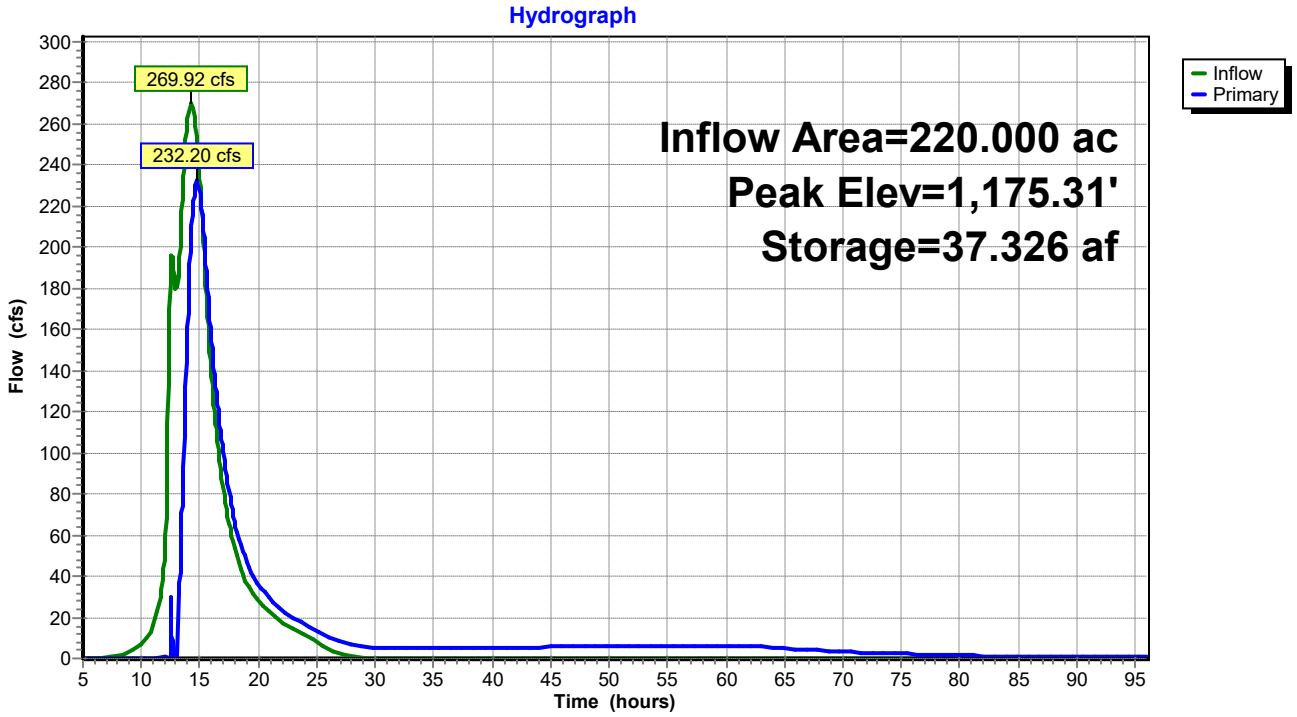
Volume	Invert	Avail.Storage	Storage Description
#1	1,169.50'	62.467 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,169.50	5.400	0.000	0.000
1,171.00	5.570	8.228	8.228
1,172.00	5.980	5.775	14.003
1,173.00	6.520	6.250	20.252
1,174.00	7.190	6.855	27.108
1,175.00	8.110	7.650	34.758
1,176.00	8.870	8.490	43.248
1,177.00	9.580	9.225	52.473
1,178.00	10.410	9.995	62.467

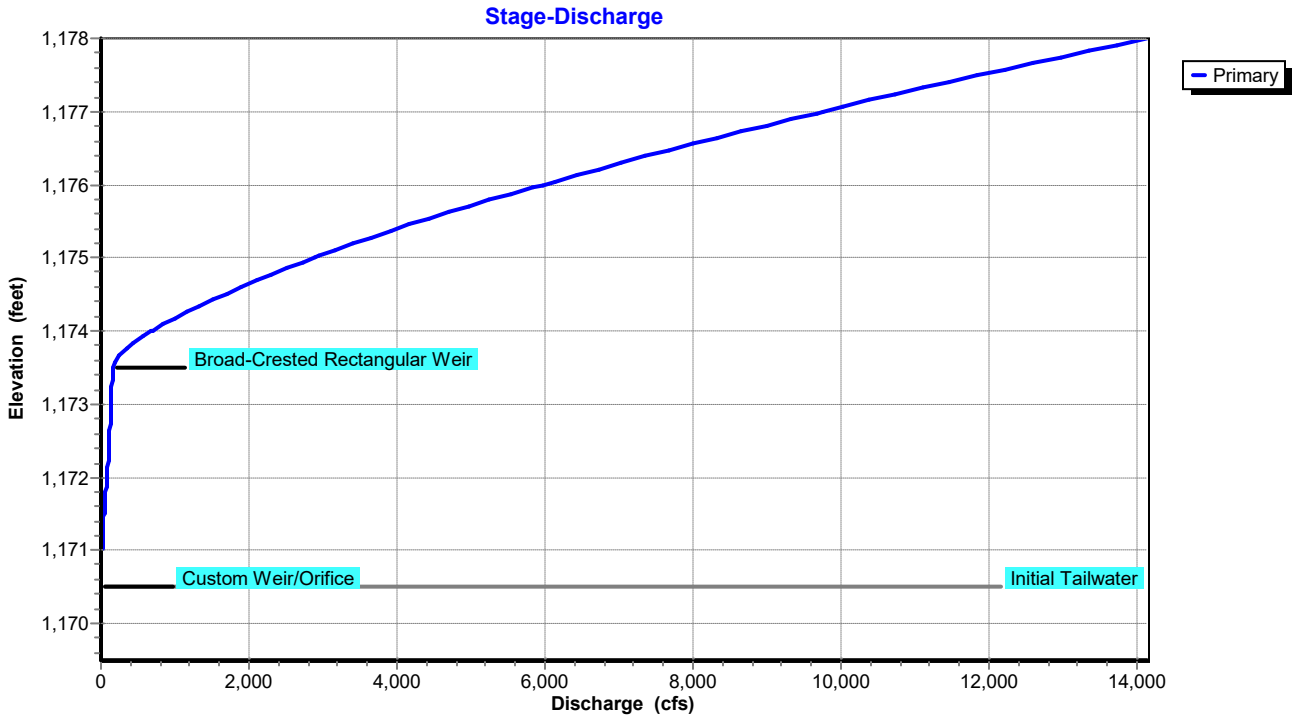
Device	Routing	Invert	Outlet Devices
#1	Primary	1,173.50'	**550.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
#2	Primary	1,170.50'	**Custom Weir/Orifice, Cv= 2.62 (C= 3.28)** Head (feet) 0.00 0.50 1.00 1.50 Width (feet) 10.00 13.00 16.00 19.00

Primary OutFlow Max=148.52 cfs @ 14.74 hrs HW=1,175.27' TW=1,175.27' (Dynamic Tailwater)
1=Broad-Crested Rectangular Weir (Weir Controls 146.58 cfs @ 0.15 fps)
2=Custom Weir/Orifice (Orifice Controls 1.94 cfs @ 0.09 fps)

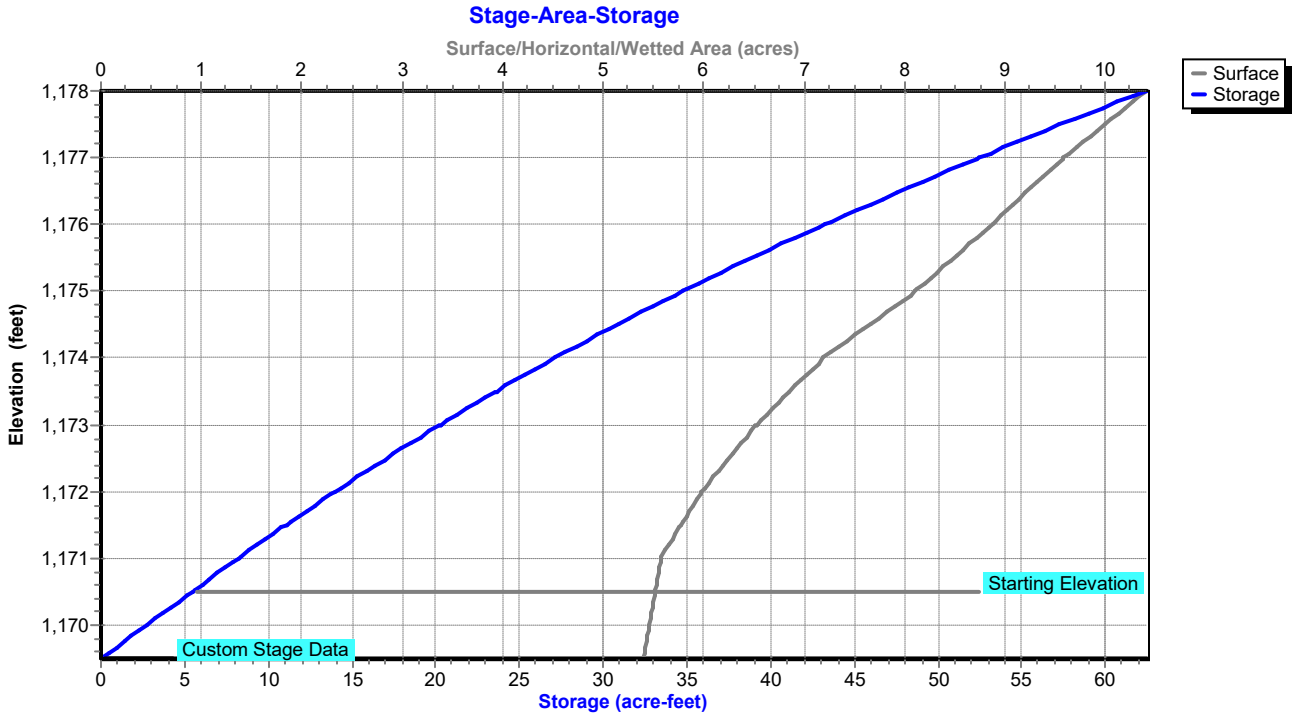
Pond 2P: Borrow Pond



Pond 2P: Borrow Pond



Pond 2P: Borrow Pond



Summary for Link 3L: Tailwater

Inflow Area = 475.000 ac, 0.00% Impervious, Inflow Depth > 2.53" for 100-yr event
Inflow = 22.67 cfs @ 15.16 hrs, Volume= 99.996 af
Primary = 22.67 cfs @ 15.16 hrs, Volume= 99.996 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-96.00 hrs, dt= 0.05 hrs

Fixed water surface Elevation= 1,165.26'

Link 3L: Tailwater

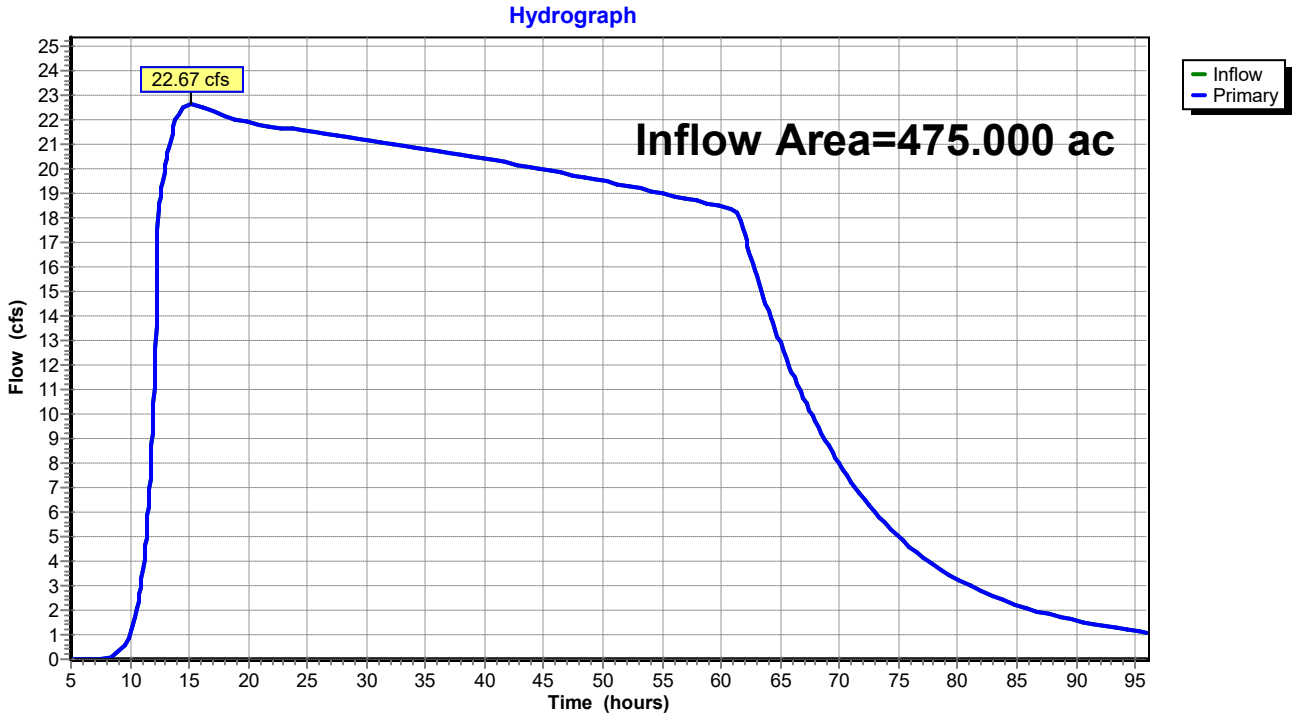


TABLE OF CONTENTS

Pipe Capacity Calculations

Name	Dia (in)	A (sf)	P (ft)	r (ft)	s (%)	n	Q (cfs)
Existing Main Upstream of Re-lay	10	0.545415	2.617994	0.208333	0.43%	0.015	**1.245169**
Proposed Main Re-Lay	12	0.785398	3.141593	0.25	0.13%	0.013	**1.284587**
Existing Branch	12	0.785398	3.141593	0.25	0.40%	0.015	**1.952873**
Proposed Branch Re-Lay	15	1.227185	3.926991	0.3125	0.11%	0.013	**2.142472**
Existing Private Main	12	0.785398	3.141593	0.25	0.70%	0.015	**2.583409**
Proposed Private Re-Lay	12	0.785398	3.141593	0.25	0.66%	0.013	**2.894436**
Proposed Partial Capture Inlet Upstream of Grade Break	15	1.227185	3.926991	0.3125	0.64%	0.013	**5.167836**
Proposed Partial Capture Inlet Downstream of Grade Break	15	1.227185	3.926991	0.3125	0.10%	0.013	**2.042766**
Wetland Outlet	18	1.767146	4.712389	0.375	0.50%	0.013	**7.427689**
Existing Tile Downstream of Pool	12	0.785398	3.141593	0.25	0.24%	0.013	**1.745411**