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MEMORANDUM

TO: Josh Pudelko

FROM: Jayme Sisel

DATE: April 21, 2020

SUBJECT: Skyline Subdivision Stormwater Management Update

The following is an updated summary of preliminary stormwater assumptions and calculations for the proposed Skyline Subdivision project. Note that this update is consistent with the September 2019 plans and also reflects the revised residential densities identified on the February 2020 Overall Proposed Site Plan. This revised stormwater management plan still meets and exceeds the City of Waukesha's stormwater requirements.

Design Requirements:
Chapter 32 of the City of Waukesha's Code of Ordinance includes criteria for peak discharge, water quality, and infiltration practices.

- The Ordinance requires post-development peak discharge rates to be no greater than pre-development discharge rates for the 1, 2, 10 and 100-year, 24-hour design storms.
- The Ordinance requires best management practices (BMPs) to be designed to control total suspended solids (TSS) carried by runoff from redevelopment sites by 40 percent and from new development sites by 80 percent, based on an average annual rainfall, as compared to no runoff management controls.
- The Ordinance requires medium density residential developments to infiltrate sufficient runoff volume so that the post-development infiltration volume is at least 75 percent of pre-development infiltration volume, based on an average annual rainfall. However, no more than 2 percent of the post-construction site is required as an effective infiltration area.

Analysis Overview:
Peak runoff rates and volumes were computed using NRCS's TR-55 and TR-20 methodologies, as implemented by HydroCAD Version 10.00 software by HydroCAD Software Solutions.

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

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

Existing Conditions:

The project site is approximately 80-acres in size and is occupied by a farmstead and two residential properties. The site is mostly cropland with some areas of woodlands and wetlands. Peak flow rates for existing conditions are as follows:

Q(1yr) = 60.68 cfs
Q(2yr) = 76.17 cfs
Q(10yr) = 137.92 cfs
Q(100yr) = 279.59 cfs

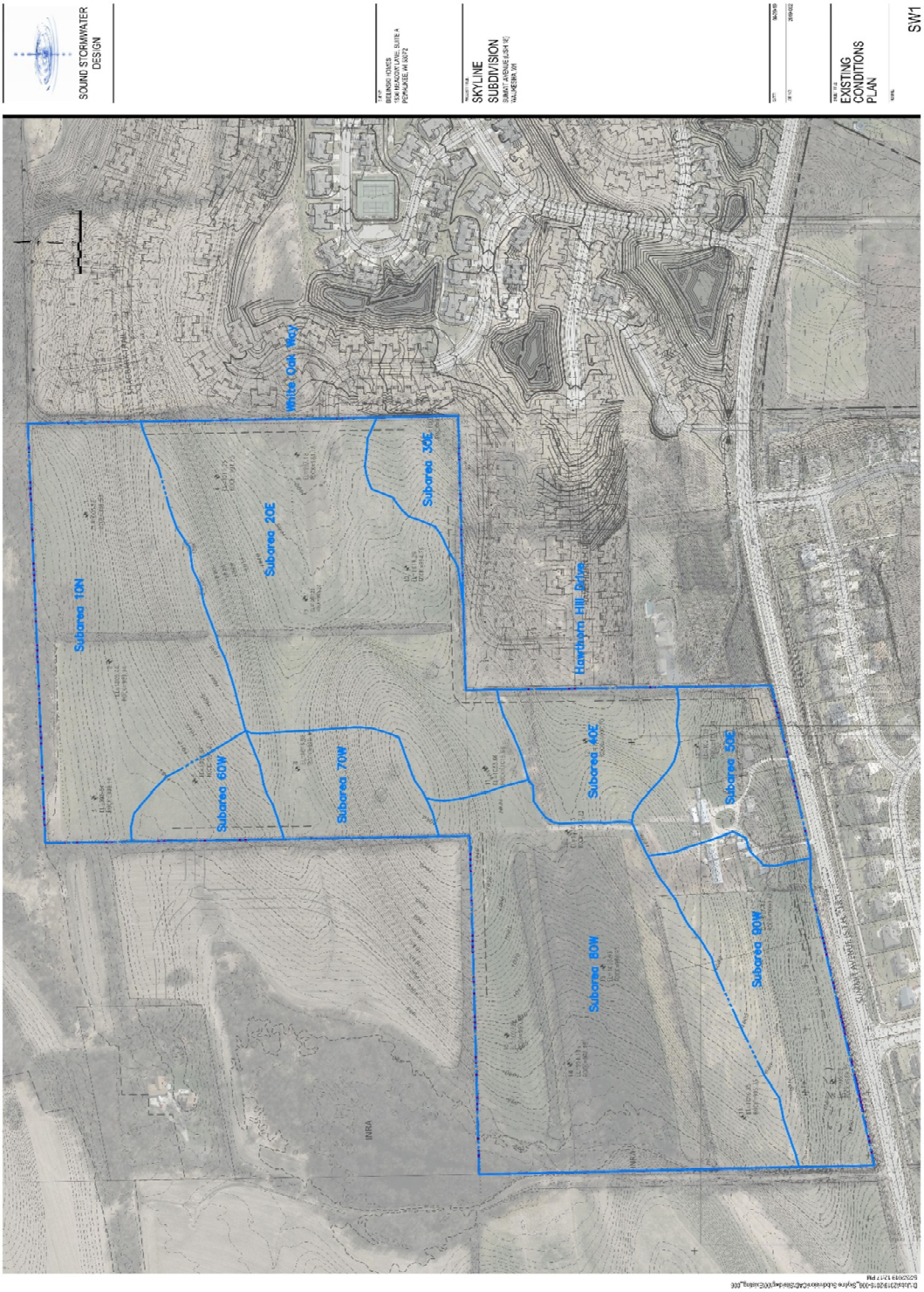


Figure 1 – Existing Conditions Plan

Proposed Conditions:
The proposed development includes the construction of a new residential subdivision including new roadways, a public park, stormwater management ponds and infiltration basins. The proposed plan will disturb approximately 75 acres and will result in a net increase in impervious area of approximately 25.8 acres. Development assumptions are as follows:

- 1/3-acre residential lots ~ assumed 30 percent impervious
- 1/4-acre residential lots ~ assumed 38 percent impervious
- New road cross-section to match neighboring subdivision
    - 5-foot sidewalk, both sides
    - 5½-foot landscape, both sides
    - 39-foot road, curb to curb

Overall peak flow rates for proposed conditions are shown as follows:

Q(1yr) = 19.46 cfs
Q(2yr) = 24.28 cfs
Q(10yr) = 64.44 cfs
Q(100yr) = 192.20 cfs

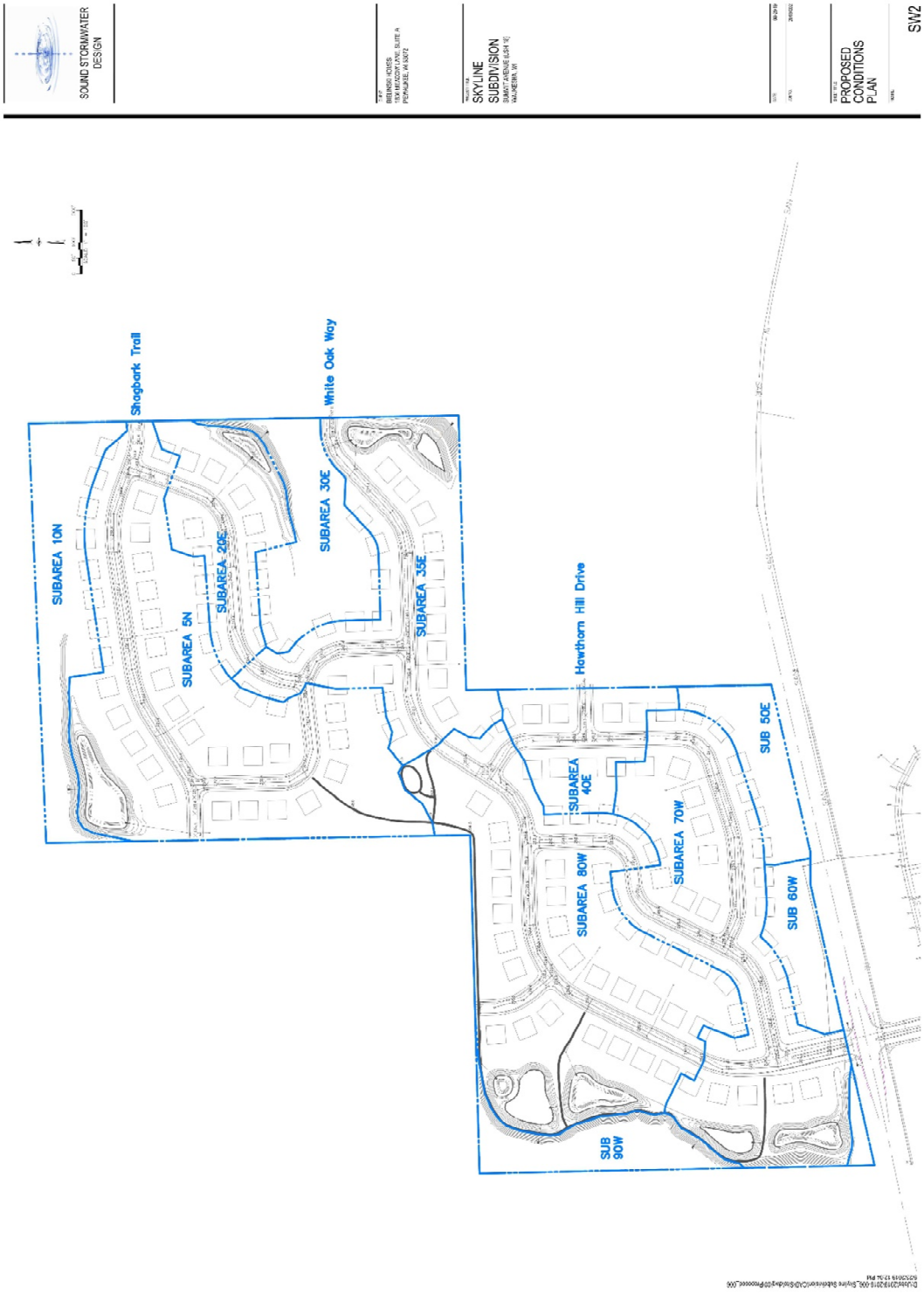


Figure 2 – Proposed Conditions Plan

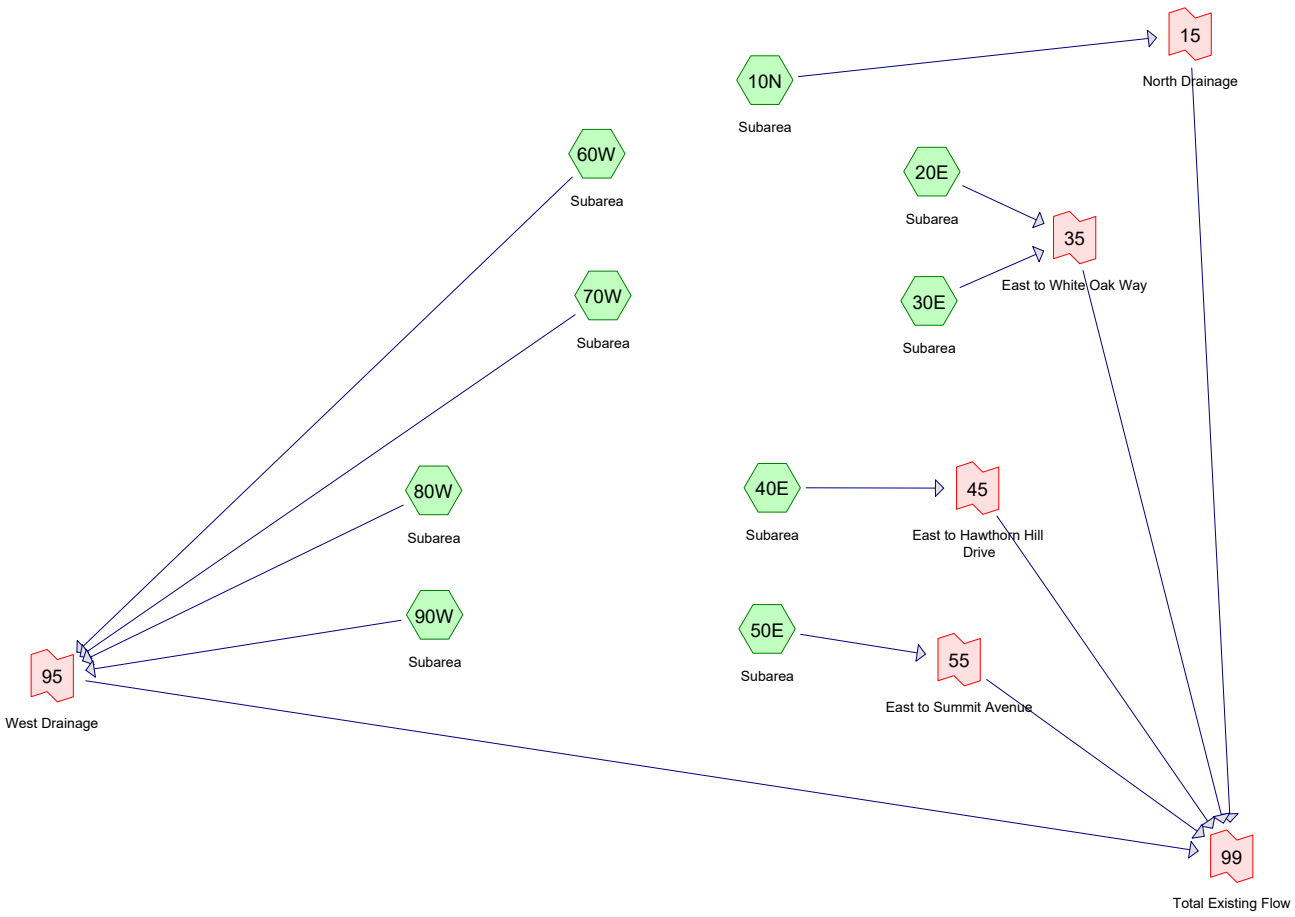
Stormwater Quality:
Stormwater quality will be accomplished by six stormwater management ponds and three infiltration basins. The stormwater management ponds and infiltration basins are designed in accordance with WDNR's Technical Standard 1001 (Wet Detention Basin) and 1003 (Infiltration Basin), respectively.

Stormwater quality was analyzed using SLAMM Version 10.4.1 software, developed by Robert Pitt and John Voorhees. The results of the SLAMM analysis indicate that approximately 80 percent of TSS will be removed from stormwater as a result of the proposed stormwater management ponds and infiltration basins. Detailed computations are included.

Infiltration:
The soil boring logs indicate soils at the site as generally 3 to 8 feet of clay underlain by silt, loam or sand with varying amounts of gravel. Based on this, infiltration will be incorporated into areas of the site where groundwater is not a limiting factor and unsuitable surficial clays can be excavated to access soils suitable for infiltration.

HYDROLOGIC ANALYSIS

EXISTING CONDITIONS



Subcat Reach Pond Link

Routing Diagram for Existing_006
Prepared by HP Inc., Printed 9/23/2019

Area Listing (all nodes)

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

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment10N: Subarea Runoff Area=14.600 ac 0.00% Impervious Runoff Depth>0.88"
Flow Length=590' Slope=0.0700 '/' Tc=19.2 min CN=82 Runoff=15.07 cfs 1.065 af

Subcatchment20E: Subarea Runoff Area=18.960 ac 0.00% Impervious Runoff Depth>0.87"
Flow Length=1,495' Tc=26.7 min CN=82 Runoff=16.34 cfs 1.380 af

Subcatchment30E: Subarea Runoff Area=2.160 ac 0.00% Impervious Runoff Depth>0.93"
Flow Length=390' Slope=0.0500 '/' Tc=20.4 min CN=83 Runoff=2.31 cfs 0.167 af

Subcatchment40E: Subarea Runoff Area=4.460 ac 0.00% Impervious Runoff Depth>0.93"
Flow Length=550' Slope=0.0500 '/' Tc=21.8 min CN=83 Runoff=4.59 cfs 0.345 af

Subcatchment50E: Subarea Runoff Area=4.910 ac 6.31% Impervious Runoff Depth>0.93"
Flow Length=545' Slope=0.0800 '/' Tc=17.2 min CN=83 Runoff=5.73 cfs 0.381 af

Subcatchment60W: Subarea Runoff Area=2.410 ac 0.00% Impervious Runoff Depth>0.93"
Flow Length=445' Tc=18.5 min CN=83 Runoff=2.70 cfs 0.187 af

Subcatchment70W: Subarea Runoff Area=3.760 ac 0.00% Impervious Runoff Depth>0.93"
Flow Length=430' Tc=16.0 min CN=83 Runoff=4.54 cfs 0.292 af

Subcatchment80W: Subarea Runoff Area=20.770 ac 0.00% Impervious Runoff Depth>0.72"
Flow Length=1,275' Tc=56.1 min CN=79 Runoff=9.08 cfs 1.238 af

Subcatchment90W: Subarea Runoff Area=7.870 ac 2.03% Impervious Runoff Depth>0.93"
Flow Length=445' Slope=0.0800 '/' Tc=17.2 min CN=83 Runoff=9.19 cfs 0.610 af

Link 15: North Drainage Inflow=15.07 cfs 1.065 af
Primary=15.07 cfs 1.065 af

Link 35: East to White Oak Way Inflow=18.41 cfs 1.547 af
Primary=18.41 cfs 1.547 af

Link 45: East to Hawthorn Hill Drive Inflow=4.59 cfs 0.345 af
Primary=4.59 cfs 0.345 af

Link 55: East to Summit Avenue Inflow=5.73 cfs 0.381 af
Primary=5.73 cfs 0.381 af

Link 95: West Drainage Inflow=18.47 cfs 2.327 af
Primary=18.47 cfs 2.327 af

Link 99: Total Existing Flow Inflow=60.68 cfs 5.664 af
Primary=60.68 cfs 5.664 af

Total Runoff Area = 79.900 ac Runoff Volume = 5.664 af Average Runoff Depth = 0.85"
99.41% Pervious = 79.430 ac 0.59% Impervious = 0.470 ac

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment10N: Subarea Runoff Area=14.600 ac 0.00% Impervious Runoff Depth>1.09"
Flow Length=590' Slope=0.0700 '/' Tc=19.2 min CN=82 Runoff=18.87 cfs 1.324 af

Subcatchment20E: Subarea Runoff Area=18.960 ac 0.00% Impervious Runoff Depth>1.09"
Flow Length=1,495' Tc=26.7 min CN=82 Runoff=20.48 cfs 1.715 af

Subcatchment30E: Subarea Runoff Area=2.160 ac 0.00% Impervious Runoff Depth>1.15"
Flow Length=390' Slope=0.0500 '/' Tc=20.4 min CN=83 Runoff=2.87 cfs 0.207 af

Subcatchment40E: Subarea Runoff Area=4.460 ac 0.00% Impervious Runoff Depth>1.15"
Flow Length=550' Slope=0.0500 '/' Tc=21.8 min CN=83 Runoff=5.70 cfs 0.427 af

Subcatchment50E: Subarea Runoff Area=4.910 ac 6.31% Impervious Runoff Depth>1.15"
Flow Length=545' Slope=0.0800 '/' Tc=17.2 min CN=83 Runoff=7.12 cfs 0.470 af

Subcatchment60W: Subarea Runoff Area=2.410 ac 0.00% Impervious Runoff Depth>1.15"
Flow Length=445' Tc=18.5 min CN=83 Runoff=3.35 cfs 0.231 af

Subcatchment70W: Subarea Runoff Area=3.760 ac 0.00% Impervious Runoff Depth>1.15"
Flow Length=430' Tc=16.0 min CN=83 Runoff=5.64 cfs 0.360 af

Subcatchment80W: Subarea Runoff Area=20.770 ac 0.00% Impervious Runoff Depth>0.91"
Flow Length=1,275' Tc=56.1 min CN=79 Runoff=11.72 cfs 1.571 af

Subcatchment90W: Subarea Runoff Area=7.870 ac 2.03% Impervious Runoff Depth>1.15"
Flow Length=445' Slope=0.0800 '/' Tc=17.2 min CN=83 Runoff=11.41 cfs 0.754 af

Link 15: North Drainage Inflow=18.87 cfs 1.324 af
Primary=18.87 cfs 1.324 af

Link 35: East to White Oak Way Inflow=23.07 cfs 1.922 af
Primary=23.07 cfs 1.922 af

Link 45: East to Hawthorn Hill Drive Inflow=5.70 cfs 0.427 af
Primary=5.70 cfs 0.427 af

Link 55: East to Summit Avenue Inflow=7.12 cfs 0.470 af
Primary=7.12 cfs 0.470 af

Link 95: West Drainage Inflow=23.33 cfs 2.915 af
Primary=23.33 cfs 2.915 af

Link 99: Total Existing Flow Inflow=76.17 cfs 7.058 af
Primary=76.17 cfs 7.058 af

Total Runoff Area = 79.900 ac Runoff Volume = 7.058 af Average Runoff Depth = 1.06"
99.41% Pervious = 79.430 ac 0.59% Impervious = 0.470 ac

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment10N: Subarea Runoff Area=14.600 ac 0.00% Impervious Runoff Depth>1.95"
Flow Length=590' Slope=0.0700 '/' Tc=19.2 min CN=82 Runoff=33.92 cfs 2.371 af

Subcatchment20E: Subarea Runoff Area=18.960 ac 0.00% Impervious Runoff Depth>1.94"
Flow Length=1,495' Tc=26.7 min CN=82 Runoff=36.96 cfs 3.072 af

Subcatchment30E: Subarea Runoff Area=2.160 ac 0.00% Impervious Runoff Depth>2.03"
Flow Length=390' Slope=0.0500 '/' Tc=20.4 min CN=83 Runoff=5.07 cfs 0.365 af

Subcatchment40E: Subarea Runoff Area=4.460 ac 0.00% Impervious Runoff Depth>2.03"
Flow Length=550' Slope=0.0500 '/' Tc=21.8 min CN=83 Runoff=10.11 cfs 0.753 af

Subcatchment50E: Subarea Runoff Area=4.910 ac 6.31% Impervious Runoff Depth>2.03"
Flow Length=545' Slope=0.0800 '/' Tc=17.2 min CN=83 Runoff=12.56 cfs 0.830 af

Subcatchment60W: Subarea Runoff Area=2.410 ac 0.00% Impervious Runoff Depth>2.03"
Flow Length=445' Tc=18.5 min CN=83 Runoff=5.92 cfs 0.407 af

Subcatchment70W: Subarea Runoff Area=3.760 ac 0.00% Impervious Runoff Depth>2.03"
Flow Length=430' Tc=16.0 min CN=83 Runoff=9.93 cfs 0.636 af

Subcatchment80W: Subarea Runoff Area=20.770 ac 0.00% Impervious Runoff Depth>1.70"
Flow Length=1,275' Tc=56.1 min CN=79 Runoff=22.57 cfs 2.946 af

Subcatchment90W: Subarea Runoff Area=7.870 ac 2.03% Impervious Runoff Depth>2.03"
Flow Length=445' Slope=0.0800 '/' Tc=17.2 min CN=83 Runoff=20.13 cfs 1.330 af

Link 15: North Drainage Inflow=33.92 cfs 2.371 af
Primary=33.92 cfs 2.371 af

Link 35: East to White Oak Way Inflow=41.66 cfs 3.437 af
Primary=41.66 cfs 3.437 af

Link 45: East to Hawthorn Hill Drive Inflow=10.11 cfs 0.753 af
Primary=10.11 cfs 0.753 af

Link 55: East to Summit Avenue Inflow=12.56 cfs 0.830 af
Primary=12.56 cfs 0.830 af

Link 95: West Drainage Inflow=42.94 cfs 5.320 af
Primary=42.94 cfs 5.320 af

Link 99: Total Existing Flow Inflow=137.92 cfs 12.710 af
Primary=137.92 cfs 12.710 af

Total Runoff Area = 79.900 ac Runoff Volume = 12.710 af Average Runoff Depth = 1.91"
99.41% Pervious = 79.430 ac 0.59% Impervious = 0.470 ac

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment10N: Subarea Runoff Area=14.600 ac 0.00% Impervious Runoff Depth>3.99"
Flow Length=590' Slope=0.0700 '/' Tc=19.2 min CN=82 Runoff=68.24 cfs 4.852 af

Subcatchment20E: Subarea Runoff Area=18.960 ac 0.00% Impervious Runoff Depth>3.98"
Flow Length=1,495' Tc=26.7 min CN=82 Runoff=74.84 cfs 6.289 af

Subcatchment30E: Subarea Runoff Area=2.160 ac 0.00% Impervious Runoff Depth>4.09"
Flow Length=390' Slope=0.0500 '/' Tc=20.4 min CN=83 Runoff=10.05 cfs 0.736 af

Subcatchment40E: Subarea Runoff Area=4.460 ac 0.00% Impervious Runoff Depth>4.09"
Flow Length=550' Slope=0.0500 '/' Tc=21.8 min CN=83 Runoff=20.04 cfs 1.520 af

Subcatchment50E: Subarea Runoff Area=4.910 ac 6.31% Impervious Runoff Depth>4.09"
Flow Length=545' Slope=0.0800 '/' Tc=17.2 min CN=83 Runoff=24.83 cfs 1.675 af

Subcatchment60W: Subarea Runoff Area=2.410 ac 0.00% Impervious Runoff Depth>4.09"
Flow Length=445' Tc=18.5 min CN=83 Runoff=11.75 cfs 0.822 af

Subcatchment70W: Subarea Runoff Area=3.760 ac 0.00% Impervious Runoff Depth>4.10"
Flow Length=430' Tc=16.0 min CN=83 Runoff=19.61 cfs 1.283 af

Subcatchment80W: Subarea Runoff Area=20.770 ac 0.00% Impervious Runoff Depth>3.64"
Flow Length=1,275' Tc=56.1 min CN=79 Runoff=48.41 cfs 6.306 af

Subcatchment90W: Subarea Runoff Area=7.870 ac 2.03% Impervious Runoff Depth>4.09"
Flow Length=445' Slope=0.0800 '/' Tc=17.2 min CN=83 Runoff=39.79 cfs 2.685 af

Link 15: North Drainage Inflow=68.24 cfs 4.852 af
Primary=68.24 cfs 4.852 af

Link 35: East to White Oak Way Inflow=84.05 cfs 7.025 af
Primary=84.05 cfs 7.025 af

Link 45: East to Hawthorn Hill Drive Inflow=20.04 cfs 1.520 af
Primary=20.04 cfs 1.520 af

Link 55: East to Summit Avenue Inflow=24.83 cfs 1.675 af
Primary=24.83 cfs 1.675 af

Link 95: West Drainage Inflow=88.56 cfs 11.096 af
Primary=88.56 cfs 11.096 af

Link 99: Total Existing Flow Inflow=279.59 cfs 26.168 af
Primary=279.59 cfs 26.168 af

Total Runoff Area = 79.900 ac Runoff Volume = 26.168 af Average Runoff Depth = 3.93"
99.41% Pervious = 79.430 ac 0.59% Impervious = 0.470 ac

Summary for Subcatchment 10N: Subarea

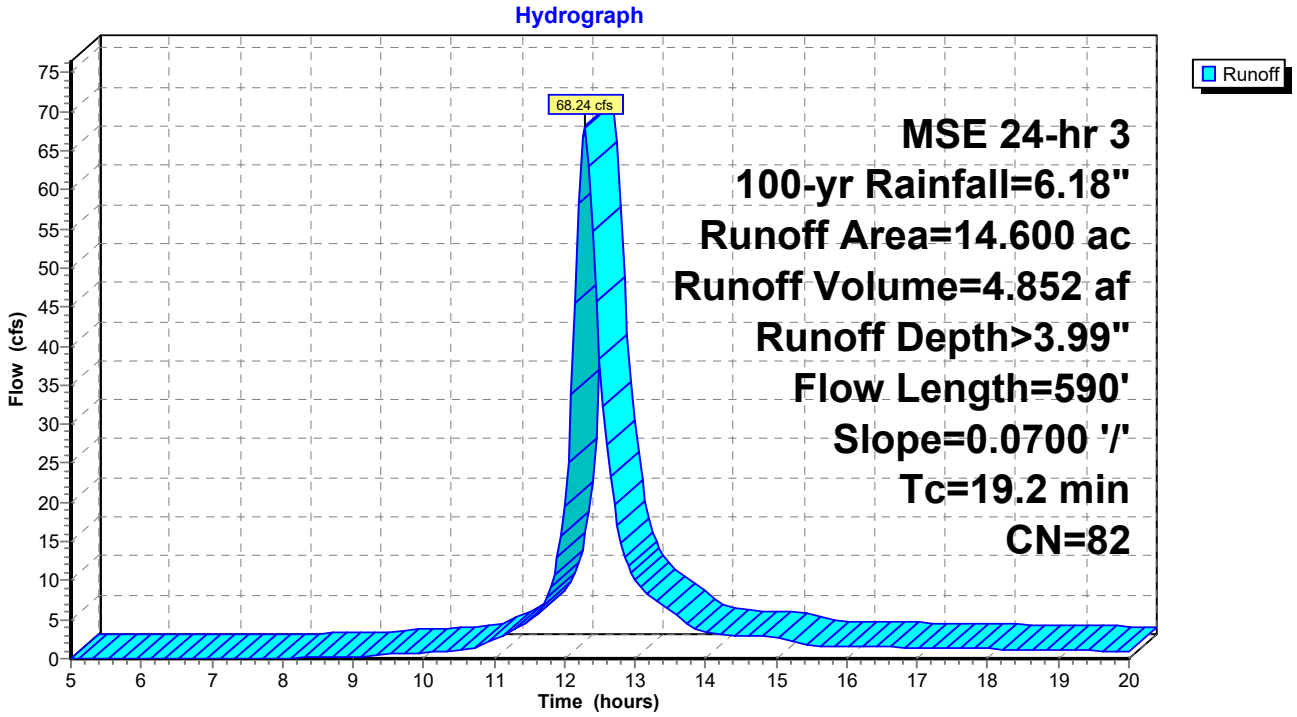
Runoff = 68.24 cfs @ 12.28 hrs, Volume= 4.852 af, Depth> 3.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-yr Rainfall=6.18"

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

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

Subcatchment 10N: Subarea



Summary for Subcatchment 20E: Subarea

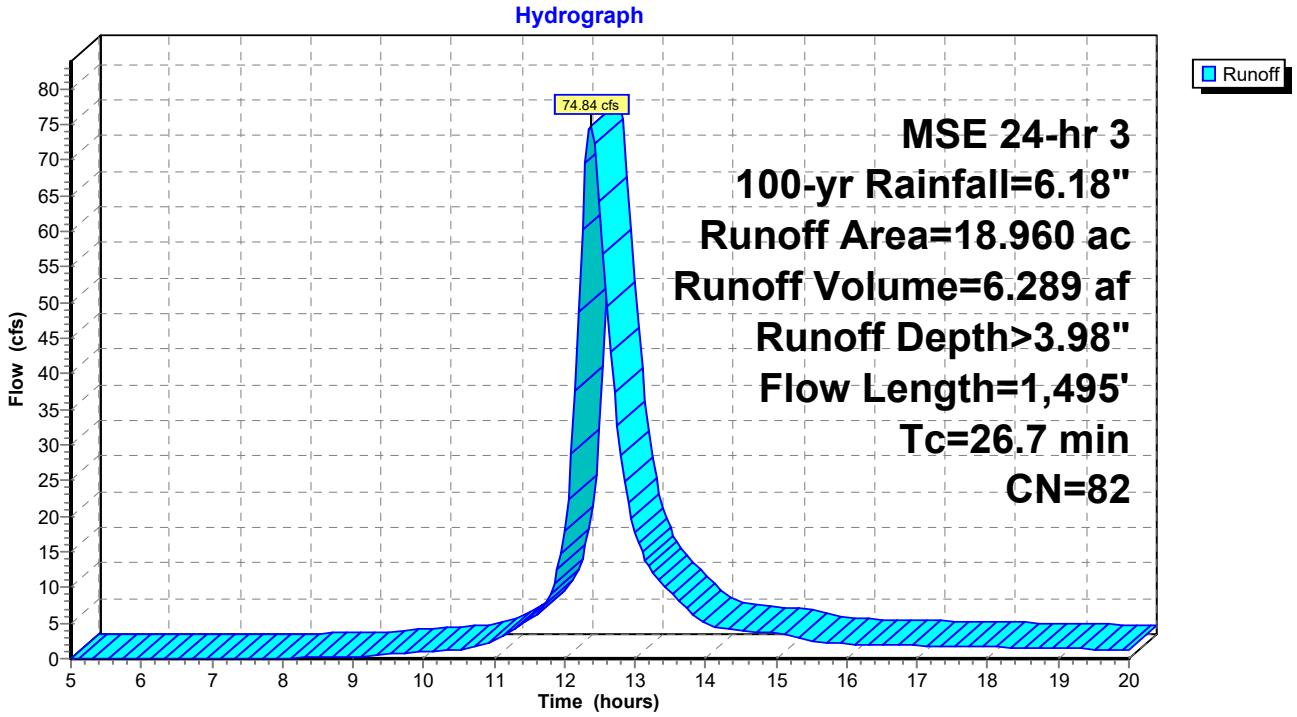
Runoff = 74.84 cfs @ 12.37 hrs, Volume= 6.289 af, Depth> 3.98"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-yr Rainfall=6.18"

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

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

Subcatchment 20E: Subarea



Summary for Subcatchment 30E: Subarea

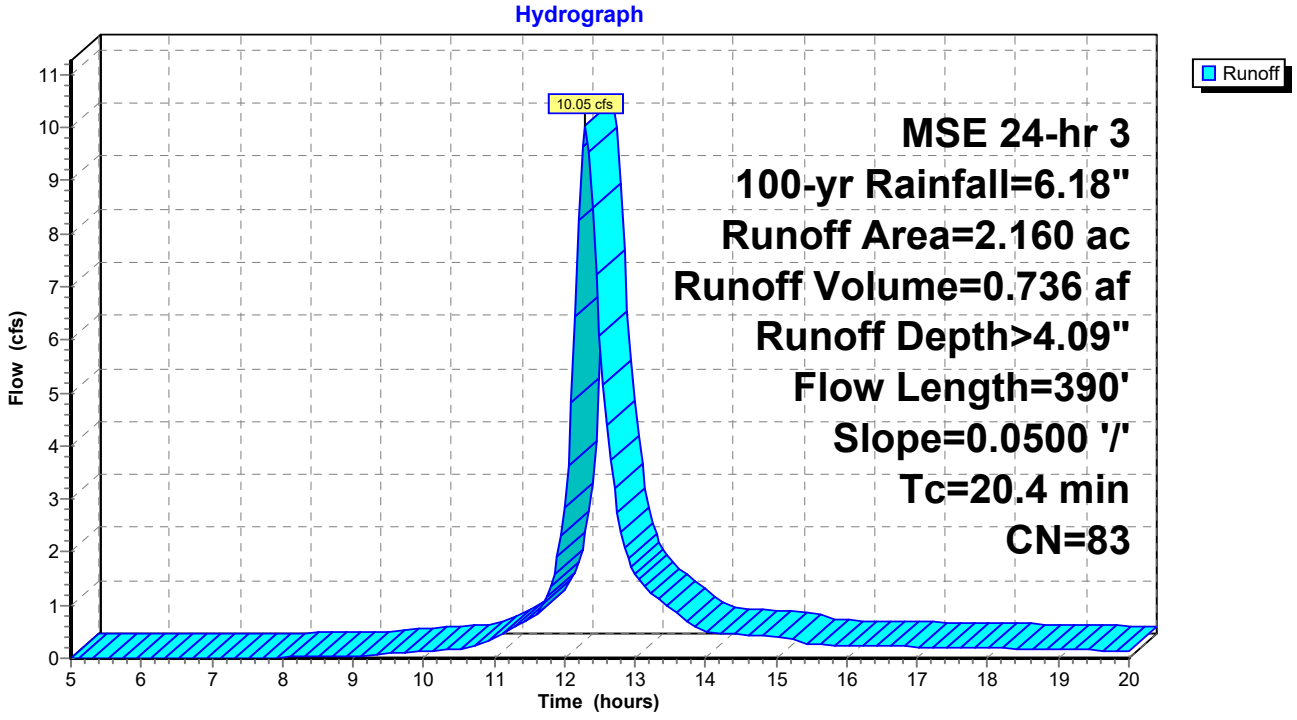
Runoff = 10.05 cfs @ 12.30 hrs, Volume= 0.736 af, Depth> 4.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-yr Rainfall=6.18"

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

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

Subcatchment 30E: Subarea



Summary for Subcatchment 40E: Subarea

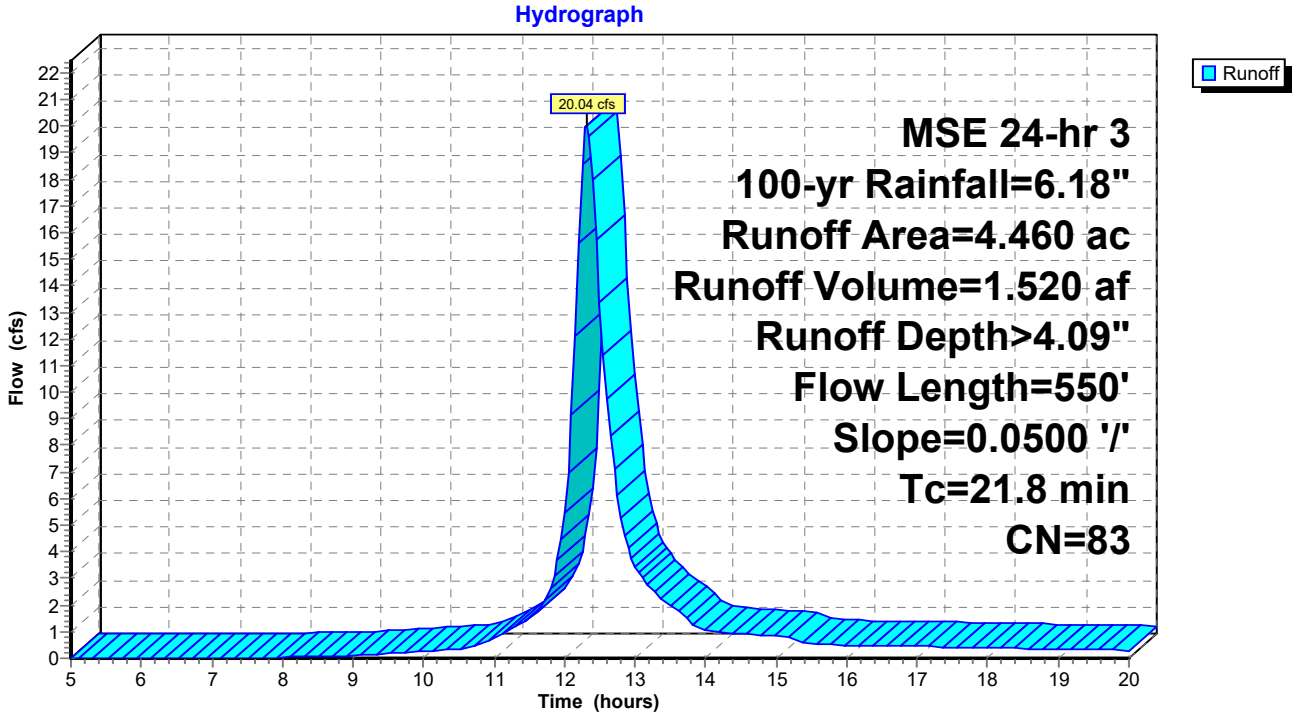
Runoff = 20.04 cfs @ 12.31 hrs, Volume= 1.520 af, Depth> 4.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-yr Rainfall=6.18"

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

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

Subcatchment 40E: Subarea



Summary for Subcatchment 50E: Subarea

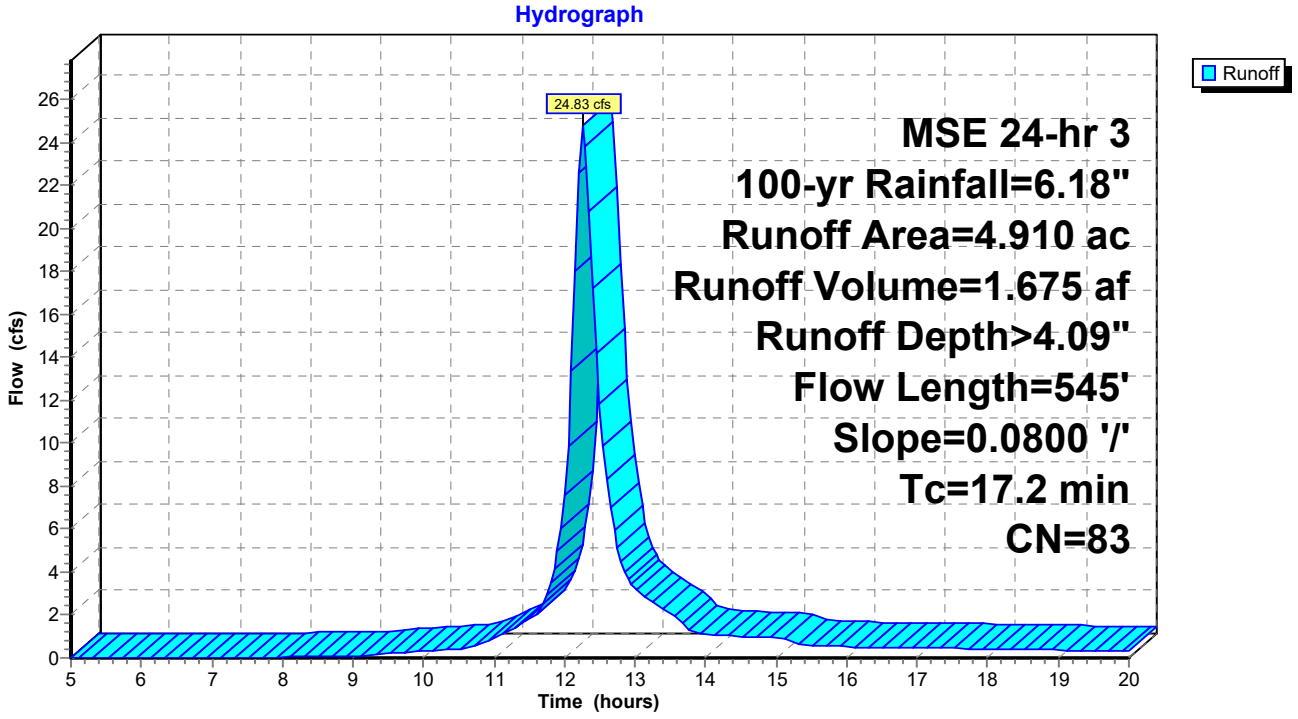
Runoff = 24.83 cfs @ 12.26 hrs, Volume= 1.675 af, Depth> 4.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-yr Rainfall=6.18"

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

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

Subcatchment 50E: Subarea



Summary for Subcatchment 60W: Subarea

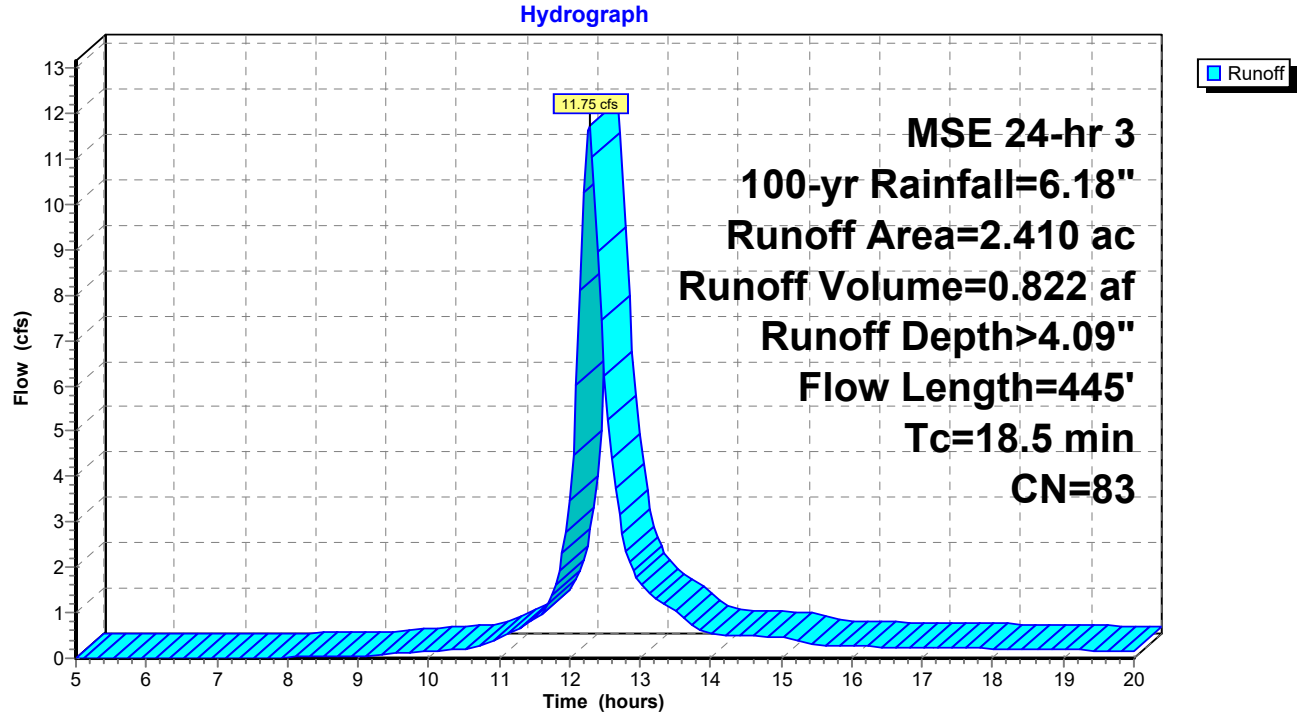
Runoff = 11.75 cfs @ 12.27 hrs, Volume= 0.822 af, Depth> 4.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-yr Rainfall=6.18"

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

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

Subcatchment 60W: Subarea



Summary for Subcatchment 70W: Subarea

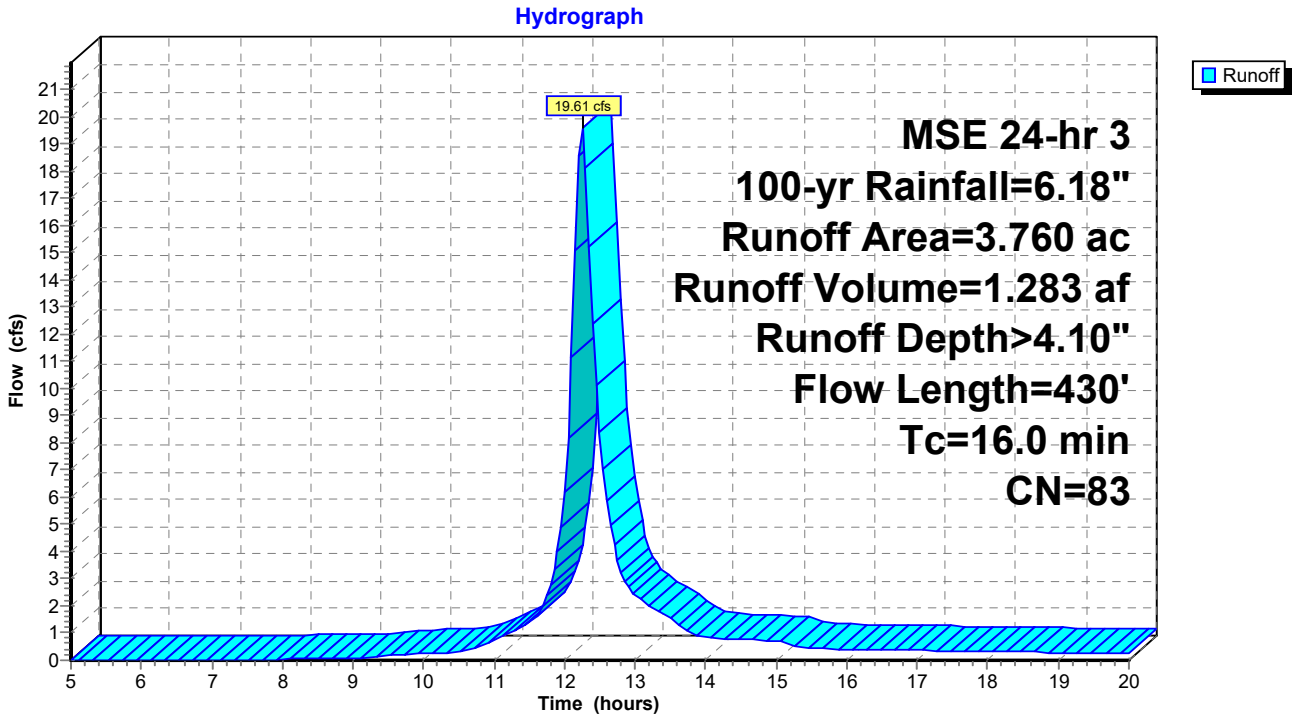
Runoff = 19.61 cfs @ 12.25 hrs, Volume= 1.283 af, Depth> 4.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-yr Rainfall=6.18"

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

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

Subcatchment 70W: Subarea



Summary for Subcatchment 80W: Subarea

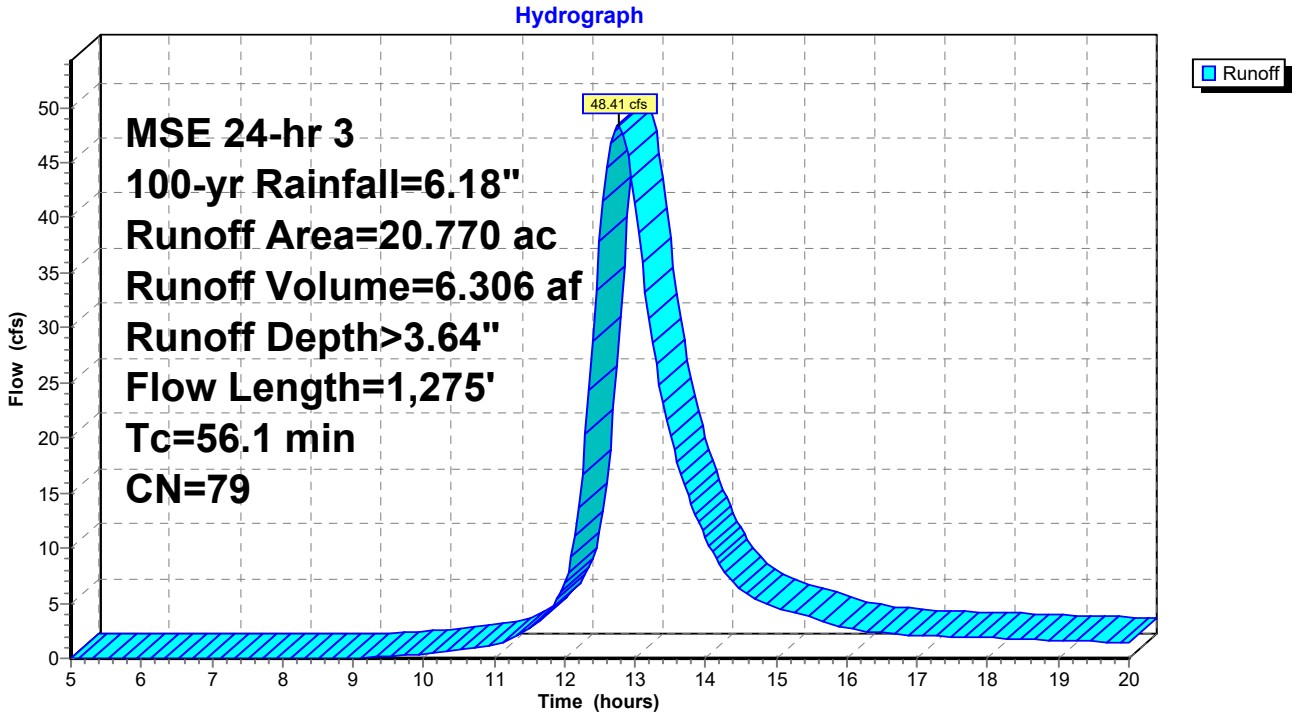
Runoff = 48.41 cfs @ 12.76 hrs, Volume= 6.306 af, Depth> 3.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-yr Rainfall=6.18"

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

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

Subcatchment 80W: Subarea



Summary for Subcatchment 90W: Subarea

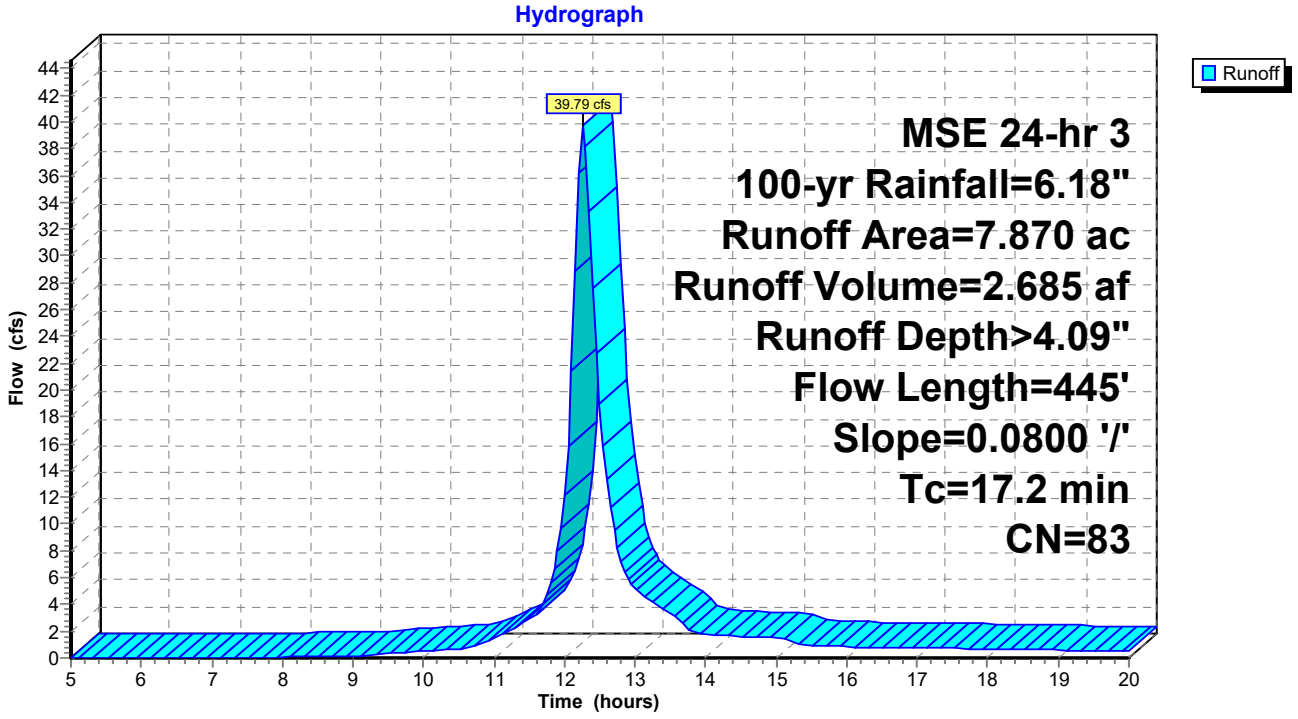
Runoff = 39.79 cfs @ 12.26 hrs, Volume= 2.685 af, Depth> 4.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-yr Rainfall=6.18"

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

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

Subcatchment 90W: Subarea

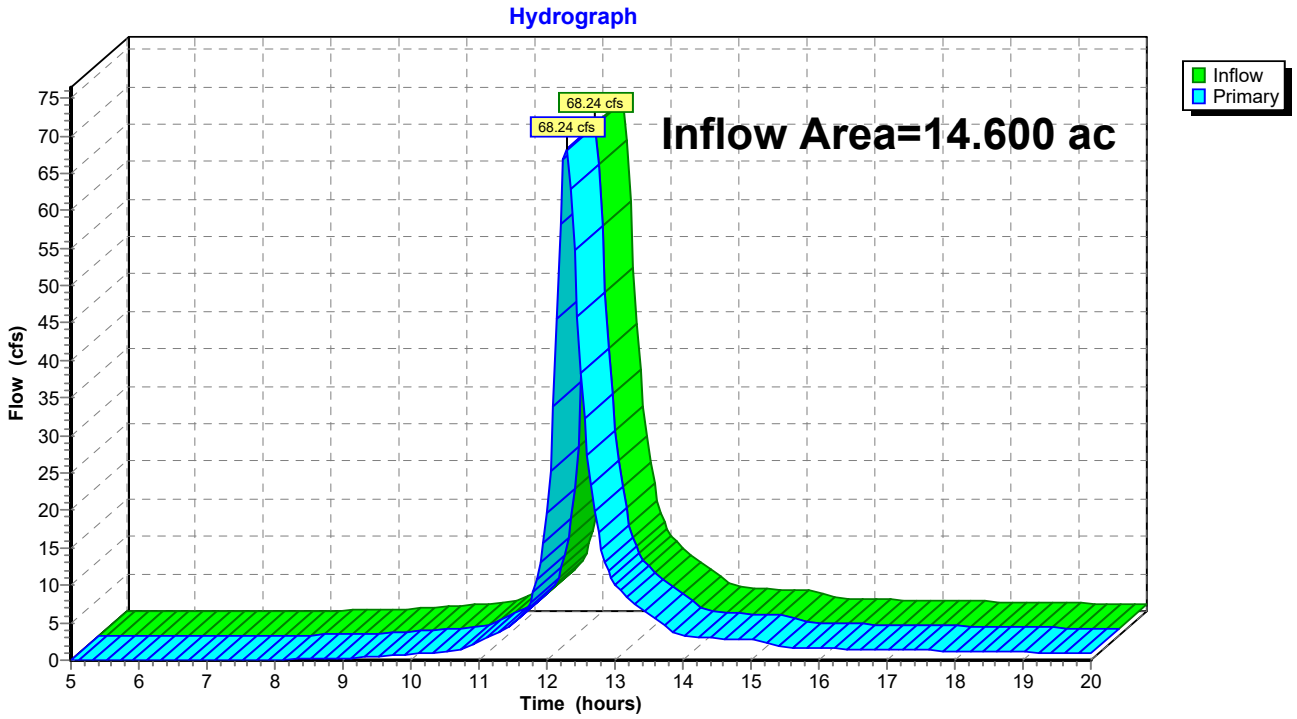


Summary for Link 15: North Drainage

Inflow Area = 14.600 ac, 0.00% Impervious, Inflow Depth > 3.99" for 100-yr event
Inflow = 68.24 cfs @ 12.28 hrs, Volume= 4.852 af
Primary = 68.24 cfs @ 12.28 hrs, Volume= 4.852 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link 15: North Drainage

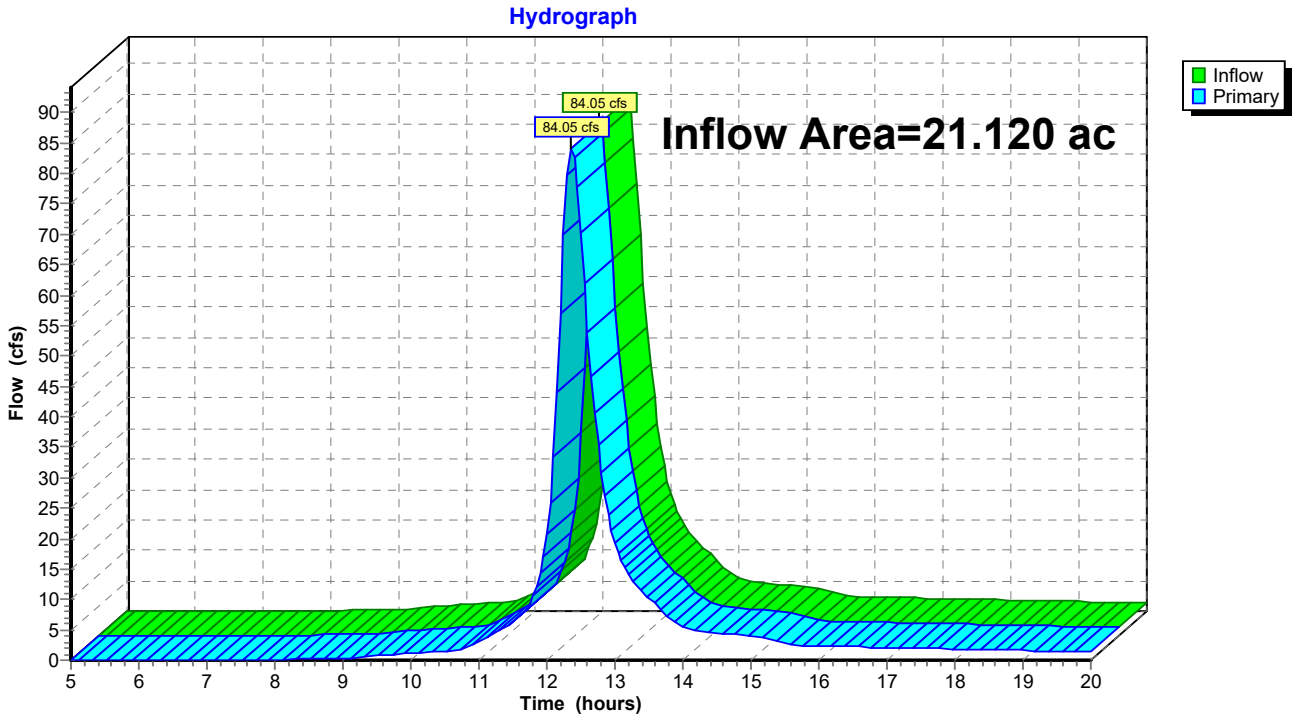


Summary for Link 35: East to White Oak Way

Inflow Area = 21.120 ac, 0.00% Impervious, Inflow Depth > 3.99" for 100-yr event
Inflow = 84.05 cfs @ 12.36 hrs, Volume= 7.025 af
Primary = 84.05 cfs @ 12.36 hrs, Volume= 7.025 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link 35: East to White Oak Way

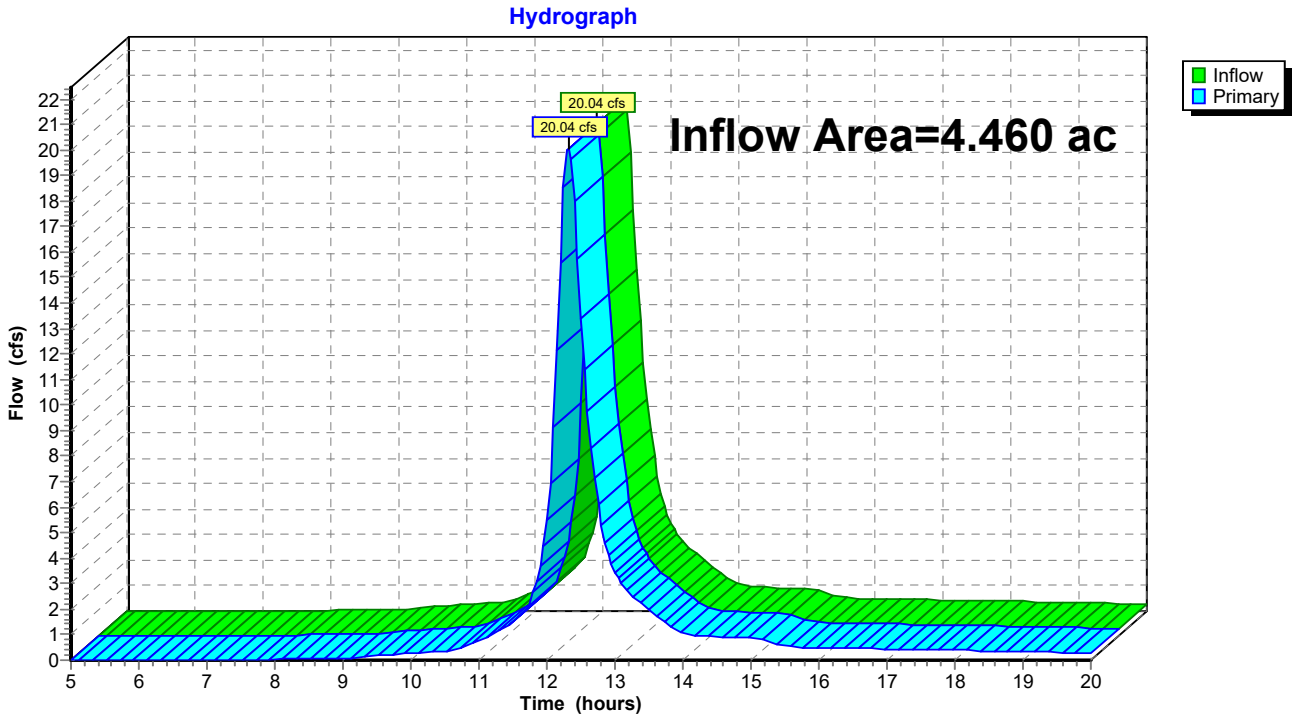


Summary for Link 45: East to Hawthorn Hill Drive

Inflow Area = 4.460 ac, 0.00% Impervious, Inflow Depth > 4.09" for 100-yr event
Inflow = 20.04 cfs @ 12.31 hrs, Volume= 1.520 af
Primary = 20.04 cfs @ 12.31 hrs, Volume= 1.520 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link 45: East to Hawthorn Hill Drive

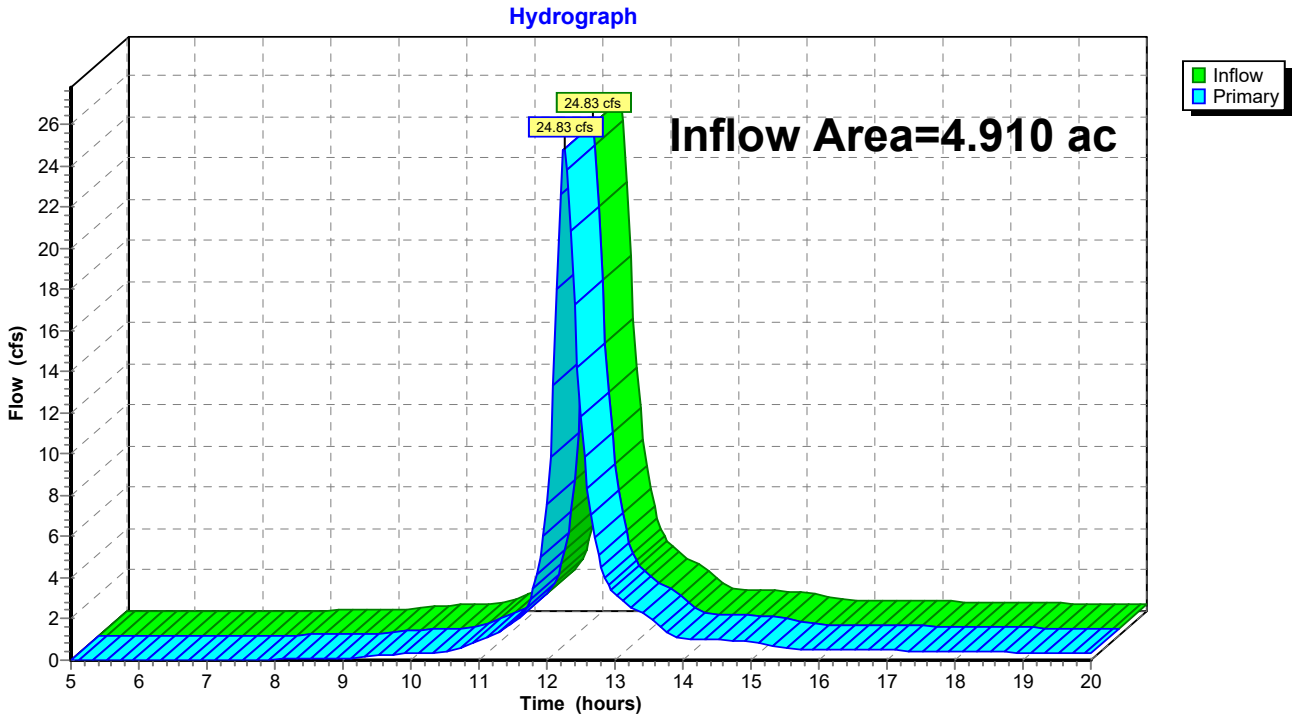


Summary for Link 55: East to Summit Avenue

Inflow Area = 4.910 ac, 6.31% Impervious, Inflow Depth > 4.09" for 100-yr event
Inflow = 24.83 cfs @ 12.26 hrs, Volume= 1.675 af
Primary = 24.83 cfs @ 12.26 hrs, Volume= 1.675 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link 55: East to Summit Avenue

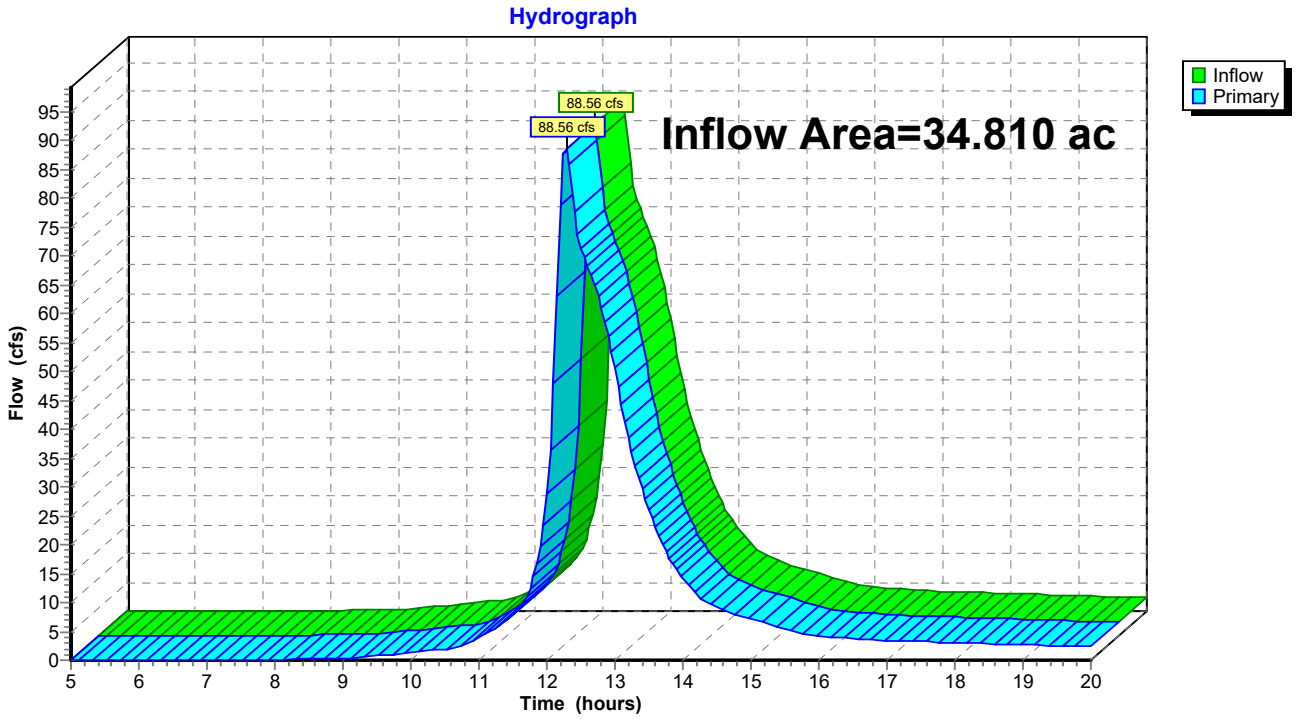


Summary for Link 95: West Drainage

Inflow Area = 34.810 ac, 0.46% Impervious, Inflow Depth > 3.82" for 100-yr event
Inflow = 88.56 cfs @ 12.28 hrs, Volume= 11.096 af
Primary = 88.56 cfs @ 12.28 hrs, Volume= 11.096 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link 95: West Drainage

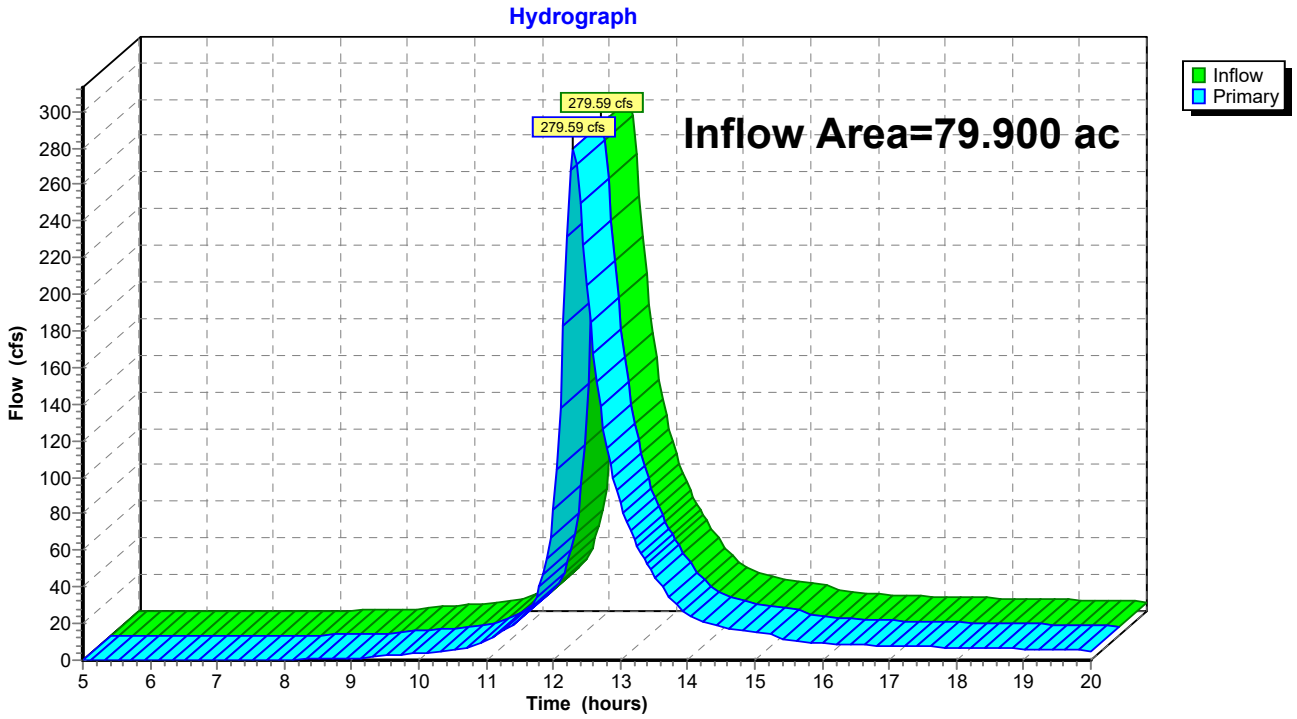


Summary for Link 99: Total Existing Flow

Inflow Area = 79.900 ac, 0.59% Impervious, Inflow Depth > 3.93" for 100-yr event
Inflow = 279.59 cfs @ 12.30 hrs, Volume= 26.168 af
Primary = 279.59 cfs @ 12.30 hrs, Volume= 26.168 af, Atten= 0%, Lag= 0.0 min

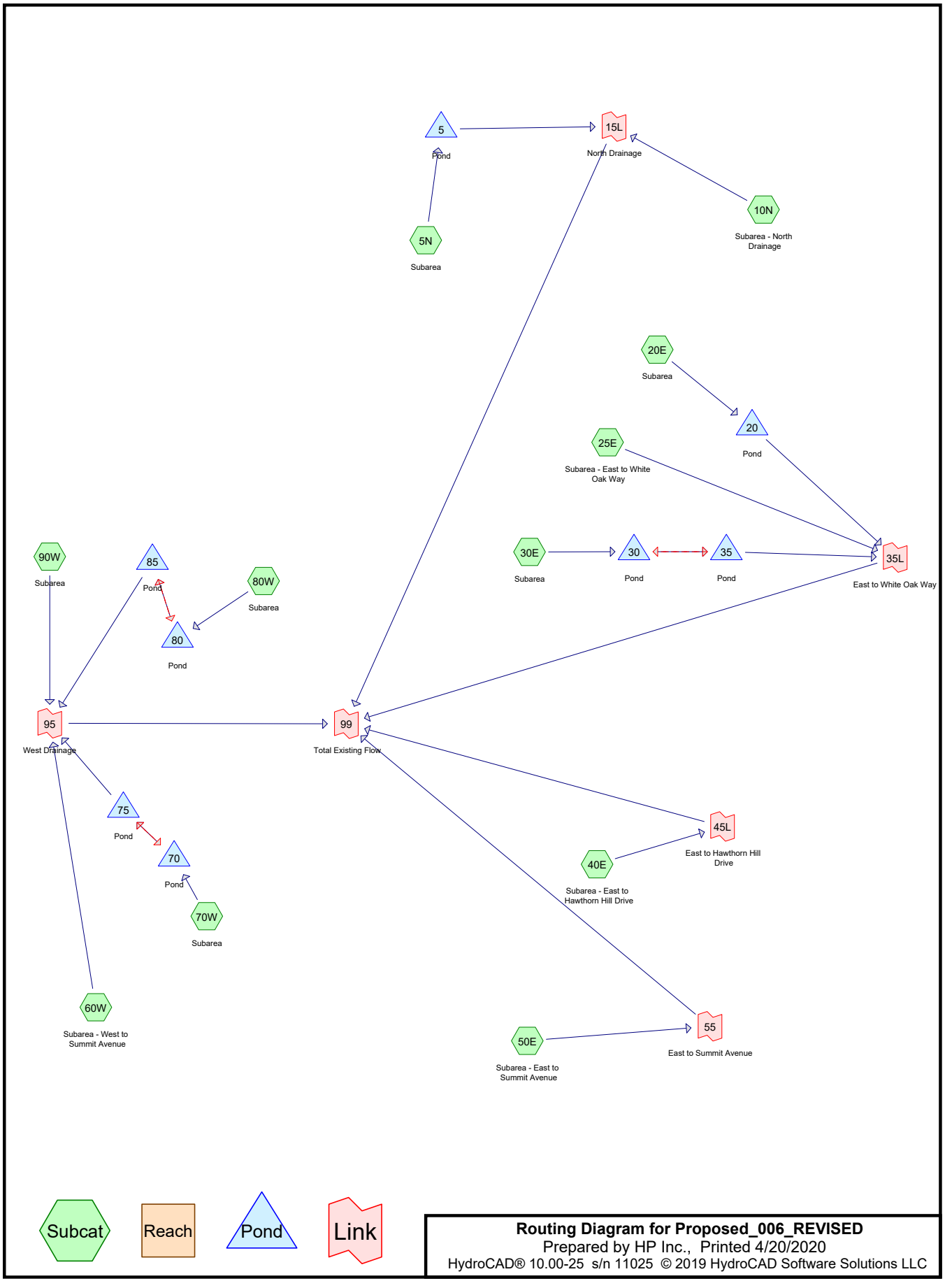
Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link 99: Total Existing Flow



HYDROLOGIC ANALYSIS

PROPOSED CONDITIONS



Routing Diagram for Proposed_006_REVISED
Prepared by HP Inc., Printed 4/20/2020
HydroCAD® 10.00-25 s/n 11025 © 2019 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
19.850	86	1/3 acre lots, 30% imp, HSG D (5N, 10N, 30E, 70W, 80W)
26.050	87	1/4 acre lots, 38% imp, HSG D (5N, 20E, 25E, 30E, 40E, 50E, 60W, 70W, 80W)
14.350	80	grass - D soils (5N, 10N, 20E, 25E, 30E, 50E, 60W, 70W, 80W, 90W)
12.950	95	road (5N, 20E, 30E, 40E, 70W, 80W)
1.600	98	water (5N, 20E, 30E, 70W, 80W)
2.070	78	wetland - D soils (10N, 25E, 90W)
3.030	77	woodland - D soils (5N, 10N, 25E, 30E, 80W, 90W)
79.900	**86**	**TOTAL AREA**

Time span=0.00-20.00 hrs, dt=0.01 hrs, 2001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Sim-Route method - Pond routing by Sim-Route method

Subcatchment5N: Subarea Runoff Area=17.070 ac 24.17% Impervious Runoff Depth>1.17"
Flow Length=185' Slope=0.0300 '/' Tc=21.6 min CN=87 Runoff=22.64 cfs 1.663 af

Subcatchment10N: Subarea - North Runoff Area=4.870 ac 12.51% Impervious Runoff Depth>0.88"
Flow Length=185' Slope=0.0700 '/' Tc=15.4 min CN=82 Runoff=5.65 cfs 0.356 af

Subcatchment20E: Subarea Runoff Area=4.600 ac 27.91% Impervious Runoff Depth>1.24"
Flow Length=240' Slope=0.0500 '/' Tc=21.7 min CN=88 Runoff=6.43 cfs 0.474 af

Subcatchment25E: Subarea - East to Runoff Area=4.340 ac 16.90% Impervious Runoff Depth>0.87"
Flow Length=645' Slope=0.0300 '/' Tc=33.9 min CN=82 Runoff=3.26 cfs 0.315 af

Subcatchment30E: Subarea Runoff Area=9.460 ac 23.24% Impervious Runoff Depth>1.24"
Flow Length=85' Slope=0.0600 '/' Tc=8.8 min CN=88 Runoff=20.08 cfs 0.978 af

Subcatchment40E: Subarea - East to Runoff Area=3.480 ac 29.59% Impervious Runoff Depth>1.31"
Flow Length=300' Slope=0.0700 '/' Tc=22.7 min CN=89 Runoff=5.01 cfs 0.379 af

Subcatchment50E: Subarea - East to Runoff Area=2.300 ac 20.32% Impervious Runoff Depth>0.99"
Flow Length=160' Slope=0.1000 '/' Tc=11.9 min CN=84 Runoff=3.43 cfs 0.189 af

Subcatchment60W: Subarea - West to Runoff Area=2.150 ac 17.67% Impervious Runoff Depth>0.93"
Flow Length=165' Slope=0.0800 '/' Tc=13.3 min CN=83 Runoff=2.87 cfs 0.167 af

Subcatchment70W: Subarea Runoff Area=12.480 ac 23.64% Impervious Runoff Depth>1.24"
Flow Length=140' Slope=0.0600 '/' Tc=13.1 min CN=88 Runoff=22.36 cfs 1.289 af

Subcatchment80W: Subarea Runoff Area=16.430 ac 22.37% Impervious Runoff Depth>1.17"
Flow Length=190' Slope=0.0900 '/' Tc=14.2 min CN=87 Runoff=26.82 cfs 1.604 af

Subcatchment90W: Subarea Runoff Area=2.720 ac 0.00% Impervious Runoff Depth>0.67"
Flow Length=495' Slope=0.0100 '/' Tc=39.9 min CN=78 Runoff=1.38 cfs 0.153 af

Pond 5: Pond Peak Elev=216.84' Storage=1.169 af Inflow=22.64 cfs 1.663 af
Outflow=1.19 cfs 0.731 af

Pond 20: Pond Peak Elev=222.19' Storage=0.216 af Inflow=6.43 cfs 0.474 af
Outflow=2.59 cfs 0.437 af

Pond 30: Pond Peak Elev=215.37' Storage=0.433 af Inflow=20.08 cfs 0.978 af
Primary=3.68 cfs 0.911 af Secondary=1.10 cfs 0.026 af Outflow=4.78 cfs 0.937 af

Pond 35: Pond Peak Elev=214.47' Storage=0.283 af Inflow=4.78 cfs 0.937 af
Discarded=0.10 cfs 0.062 af Primary=1.79 cfs 0.771 af Secondary=0.00 cfs 0.000 af Outflow=1.89 cfs 0.833 af

Pond 70: Pond Peak Elev=214.13' Storage=0.732 af Inflow=22.36 cfs 1.289 af
Primary=1.91 cfs 0.914 af Secondary=1.19 cfs 0.085 af Outflow=3.10 cfs 0.999 af

Pond 75: Pond Peak Elev=212.70' Storage=0.221 af Inflow=3.10 cfs 0.998 af
Discarded=0.11 cfs 0.076 af Primary=1.67 cfs 0.746 af Secondary=0.00 cfs 0.000 af Outflow=1.79 cfs 0.822 af

Pond 80: Pond Peak Elev=214.03' Storage=0.843 af Inflow=26.82 cfs 1.604 af
Primary=3.82 cfs 1.381 af Secondary=0.12 cfs 0.003 af Outflow=3.94 cfs 1.384 af

Pond 85: Pond Peak Elev=212.73' Storage=0.577 af Inflow=3.94 cfs 1.383 af
Discarded=0.30 cfs 0.191 af Primary=1.78 cfs 0.752 af Secondary=0.00 cfs 0.000 af Outflow=2.08 cfs 0.943 af

Link 15L: North Drainage Inflow=6.20 cfs 1.085 af
Primary=6.20 cfs 1.085 af

Link 35L: East to White Oak Way Inflow=6.70 cfs 1.522 af
Primary=6.70 cfs 1.522 af

Link 45L: East to Hawthorn Hill Drive Inflow=5.01 cfs 0.379 af
Primary=5.01 cfs 0.379 af

Link 55: East to Summit Avenue Inflow=3.43 cfs 0.189 af
Primary=3.43 cfs 0.189 af

Link 95: West Drainage Inflow=3.42 cfs 1.816 af
Primary=3.42 cfs 1.816 af

Link 99: Total Existing Flow Inflow=19.46 cfs 4.989 af
Primary=19.46 cfs 4.989 af

Total Runoff Area = 79.900 ac Runoff Volume = 7.566 af Average Runoff Depth = 1.14"
78.16% Pervious = 62.446 ac 21.84% Impervious = 17.454 ac

Time span=0.00-20.00 hrs, dt=0.01 hrs, 2001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Sim-Route method - Pond routing by Sim-Route method

Subcatchment5N: Subarea Runoff Area=17.070 ac 24.17% Impervious Runoff Depth>1.41"
Flow Length=185' Slope=0.0300 '/' Tc=21.6 min CN=87 Runoff=27.33 cfs 2.009 af

Subcatchment10N: Subarea - North Runoff Area=4.870 ac 12.51% Impervious Runoff Depth>1.09"
Flow Length=185' Slope=0.0700 '/' Tc=15.4 min CN=82 Runoff=7.07 cfs 0.442 af

Subcatchment20E: Subarea Runoff Area=4.600 ac 27.91% Impervious Runoff Depth>1.48"
Flow Length=240' Slope=0.0500 '/' Tc=21.7 min CN=88 Runoff=7.71 cfs 0.569 af

Subcatchment25E: Subarea - East to Runoff Area=4.340 ac 16.90% Impervious Runoff Depth>1.08"
Flow Length=645' Slope=0.0300 '/' Tc=33.9 min CN=82 Runoff=4.09 cfs 0.392 af

Subcatchment30E: Subarea Runoff Area=9.460 ac 23.24% Impervious Runoff Depth>1.49"
Flow Length=85' Slope=0.0600 '/' Tc=8.8 min CN=88 Runoff=23.98 cfs 1.174 af

Subcatchment40E: Subarea - East to Runoff Area=3.480 ac 29.59% Impervious Runoff Depth>1.56"
Flow Length=300' Slope=0.0700 '/' Tc=22.7 min CN=89 Runoff=5.96 cfs 0.452 af

Subcatchment50E: Subarea - East to Runoff Area=2.300 ac 20.32% Impervious Runoff Depth>1.21"
Flow Length=160' Slope=0.1000 '/' Tc=11.9 min CN=84 Runoff=4.22 cfs 0.233 af

Subcatchment60W: Subarea - West to Runoff Area=2.150 ac 17.67% Impervious Runoff Depth>1.15"
Flow Length=165' Slope=0.0800 '/' Tc=13.3 min CN=83 Runoff=3.56 cfs 0.206 af

Subcatchment70W: Subarea Runoff Area=12.480 ac 23.64% Impervious Runoff Depth>1.49"
Flow Length=140' Slope=0.0600 '/' Tc=13.1 min CN=88 Runoff=26.75 cfs 1.548 af

Subcatchment80W: Subarea Runoff Area=16.430 ac 22.37% Impervious Runoff Depth>1.41"
Flow Length=190' Slope=0.0900 '/' Tc=14.2 min CN=87 Runoff=32.31 cfs 1.937 af

Subcatchment90W: Subarea Runoff Area=2.720 ac 0.00% Impervious Runoff Depth>0.86"
Flow Length=495' Slope=0.0100 '/' Tc=39.9 min CN=78 Runoff=1.80 cfs 0.195 af

Pond 5: Pond Peak Elev=217.14' Storage=1.384 af Inflow=27.33 cfs 2.008 af
Outflow=2.30 cfs 0.921 af

Pond 20: Pond Peak Elev=222.29' Storage=0.237 af Inflow=7.71 cfs 0.569 af
Outflow=3.96 cfs 0.529 af

Pond 30: Pond Peak Elev=215.56' Storage=0.485 af Inflow=23.98 cfs 1.174 af
Primary=3.90 cfs 0.979 af Secondary=4.34 cfs 0.147 af Outflow=8.24 cfs 1.126 af

Pond 35: Pond Peak Elev=214.76' Storage=0.335 af Inflow=8.24 cfs 1.126 af
Discarded=0.11 cfs 0.067 af Primary=2.03 cfs 0.942 af Secondary=0.00 cfs 0.000 af Outflow=2.14 cfs 1.009 af

Pond 70: Pond Peak Elev=214.32' Storage=0.811 af Inflow=26.75 cfs 1.547 af
Primary=2.00 cfs 0.929 af Secondary=4.61 cfs 0.296 af Outflow=6.56 cfs 1.226 af

Pond 75: Pond Peak Elev=213.03' Storage=0.290 af Inflow=6.56 cfs 1.225 af
Discarded=0.12 cfs 0.080 af Primary=2.74 cfs 0.965 af Secondary=0.00 cfs 0.000 af Outflow=2.87 cfs 1.045 af

Pond 80: Pond Peak Elev=214.28' Storage=0.968 af Inflow=32.31 cfs 1.937 af
Primary=4.07 cfs 1.496 af Secondary=3.82 cfs 0.189 af Outflow=7.88 cfs 1.685 af

Pond 85: Pond Peak Elev=212.83' Storage=0.632 af Inflow=7.88 cfs 1.685 af
Discarded=0.31 cfs 0.200 af Primary=2.16 cfs 1.009 af Secondary=0.00 cfs 0.000 af Outflow=2.46 cfs 1.210 af

Link 15L: North Drainage Inflow=7.73 cfs 1.362 af
Primary=7.73 cfs 1.362 af

Link 35L: East to White Oak Way Inflow=9.54 cfs 1.862 af
Primary=9.54 cfs 1.862 af

Link 45L: East to Hawthorn Hill Drive Inflow=5.96 cfs 0.452 af
Primary=5.96 cfs 0.452 af

Link 55: East to Summit Avenue Inflow=4.22 cfs 0.233 af
Primary=4.22 cfs 0.233 af

Link 95: West Drainage Inflow=5.08 cfs 2.374 af
Primary=5.08 cfs 2.374 af

Link 99: Total Existing Flow Inflow=24.28 cfs 6.278 af
Primary=24.28 cfs 6.278 af

Total Runoff Area = 79.900 ac Runoff Volume = 9.157 af Average Runoff Depth = 1.38"
78.16% Pervious = 62.446 ac 21.84% Impervious = 17.454 ac

Time span=0.00-20.00 hrs, dt=0.01 hrs, 2001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Sim-Route method - Pond routing by Sim-Route method

Subcatchment5N: Subarea Runoff Area=17.070 ac 24.17% Impervious Runoff Depth>2.36"
Flow Length=185' Slope=0.0300 '/' Tc=21.6 min CN=87 Runoff=45.24 cfs 3.358 af

Subcatchment10N: Subarea - North Runoff Area=4.870 ac 12.51% Impervious Runoff Depth>1.95"
Flow Length=185' Slope=0.0700 '/' Tc=15.4 min CN=82 Runoff=12.70 cfs 0.791 af

Subcatchment20E: Subarea Runoff Area=4.600 ac 27.91% Impervious Runoff Depth>2.45"
Flow Length=240' Slope=0.0500 '/' Tc=21.7 min CN=88 Runoff=12.55 cfs 0.939 af

Subcatchment25E: Subarea - East to Runoff Area=4.340 ac 16.90% Impervious Runoff Depth>1.94"
Flow Length=645' Slope=0.0300 '/' Tc=33.9 min CN=82 Runoff=7.41 cfs 0.701 af

Subcatchment30E: Subarea Runoff Area=9.460 ac 23.24% Impervious Runoff Depth>2.46"
Flow Length=85' Slope=0.0600 '/' Tc=8.8 min CN=88 Runoff=38.72 cfs 1.937 af

Subcatchment40E: Subarea - East to Runoff Area=3.480 ac 29.59% Impervious Runoff Depth>2.54"
Flow Length=300' Slope=0.0700 '/' Tc=22.7 min CN=89 Runoff=9.57 cfs 0.736 af

Subcatchment50E: Subarea - East to Runoff Area=2.300 ac 20.32% Impervious Runoff Depth>2.11"
Flow Length=160' Slope=0.1000 '/' Tc=11.9 min CN=84 Runoff=7.29 cfs 0.405 af

Subcatchment60W: Subarea - West to Runoff Area=2.150 ac 17.67% Impervious Runoff Depth>2.03"
Flow Length=165' Slope=0.0800 '/' Tc=13.3 min CN=83 Runoff=6.26 cfs 0.364 af

Subcatchment70W: Subarea Runoff Area=12.480 ac 23.64% Impervious Runoff Depth>2.45"
Flow Length=140' Slope=0.0600 '/' Tc=13.1 min CN=88 Runoff=43.38 cfs 2.552 af

Subcatchment80W: Subarea Runoff Area=16.430 ac 22.37% Impervious Runoff Depth>2.36"
Flow Length=190' Slope=0.0900 '/' Tc=14.2 min CN=87 Runoff=53.21 cfs 3.238 af

Subcatchment90W: Subarea Runoff Area=2.720 ac 0.00% Impervious Runoff Depth>1.64"
Flow Length=495' Slope=0.0100 '/' Tc=39.9 min CN=78 Runoff=3.53 cfs 0.371 af

Pond 5: Pond Peak Elev=217.73' Storage=1.833 af Inflow=45.24 cfs 3.357 af
Outflow=13.63 cfs 2.155 af

Pond 20: Pond Peak Elev=222.56' Storage=0.302 af Inflow=12.55 cfs 0.939 af
Outflow=9.35 cfs 0.887 af

Pond 30: Pond Peak Elev=216.08' Storage=0.642 af Inflow=38.72 cfs 1.936 af
Primary=4.28 cfs 1.127 af Secondary=20.34 cfs 0.738 af Outflow=24.09 cfs 1.865 af

Pond 35: Pond Peak Elev=215.45' Storage=0.469 af Inflow=24.09 cfs 1.865 af
Discarded=0.12 cfs 0.077 af Primary=13.91 cfs 1.643 af Secondary=0.00 cfs 0.000 af Outflow=14.04 cfs 1.720 af

Pond 70: Pond Peak Elev=214.87' Storage=1.049 af Inflow=43.38 cfs 2.552 af
Primary=2.15 cfs 0.858 af Secondary=21.74 cfs 1.271 af Outflow=23.59 cfs 2.130 af

Pond 75: Pond Peak Elev=214.43' Storage=0.650 af Inflow=23.59 cfs 2.129 af
Discarded=0.18 cfs 0.098 af Primary=8.01 cfs 1.840 af Secondary=0.00 cfs 0.000 af Outflow=8.19 cfs 1.938 af

Pond 80: Pond Peak Elev=214.91' Storage=1.291 af Inflow=53.21 cfs 3.237 af
Primary=4.58 cfs 1.525 af Secondary=23.36 cfs 1.304 af Outflow=27.75 cfs 2.828 af

Pond 85: Pond Peak Elev=213.81' Storage=1.223 af Inflow=27.75 cfs 2.827 af
Discarded=0.38 cfs 0.244 af Primary=4.33 cfs 1.997 af Secondary=0.00 cfs 0.000 af Outflow=4.71 cfs 2.242 af

Link 15L: North Drainage Inflow=16.23 cfs 2.945 af
Primary=16.23 cfs 2.945 af

Link 35L: East to White Oak Way Inflow=30.57 cfs 3.230 af
Primary=30.57 cfs 3.230 af

Link 45L: East to Hawthorn Hill Drive Inflow=9.57 cfs 0.736 af
Primary=9.57 cfs 0.736 af

Link 55: East to Summit Avenue Inflow=7.29 cfs 0.405 af
Primary=7.29 cfs 0.405 af

Link 95: West Drainage Inflow=15.70 cfs 4.570 af
Primary=15.70 cfs 4.570 af

Link 99: Total Existing Flow Inflow=64.44 cfs 11.881 af
Primary=64.44 cfs 11.881 af

Total Runoff Area = 79.900 ac Runoff Volume = 15.392 af Average Runoff Depth = 2.31"
78.16% Pervious = 62.446 ac 21.84% Impervious = 17.454 ac

Time span=0.00-20.00 hrs, dt=0.01 hrs, 2001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Sim-Route method - Pond routing by Sim-Route method

Subcatchment5N: Subarea Runoff Area=17.070 ac 24.17% Impervious Runoff Depth>4.51"
Flow Length=185' Slope=0.0300 '/' Tc=21.6 min CN=87 Runoff=84.24 cfs 6.421 af

Subcatchment10N: Subarea - North Runoff Area=4.870 ac 12.51% Impervious Runoff Depth>3.99"
Flow Length=185' Slope=0.0700 '/' Tc=15.4 min CN=82 Runoff=25.50 cfs 1.619 af

Subcatchment20E: Subarea Runoff Area=4.600 ac 27.91% Impervious Runoff Depth>4.62"
Flow Length=240' Slope=0.0500 '/' Tc=21.7 min CN=88 Runoff=22.99 cfs 1.772 af

Subcatchment25E: Subarea - East to Runoff Area=4.340 ac 16.90% Impervious Runoff Depth>3.97"
Flow Length=645' Slope=0.0300 '/' Tc=33.9 min CN=82 Runoff=15.01 cfs 1.436 af

Subcatchment30E: Subarea Runoff Area=9.460 ac 23.24% Impervious Runoff Depth>4.64"
Flow Length=85' Slope=0.0600 '/' Tc=8.8 min CN=88 Runoff=70.38 cfs 3.654 af

Subcatchment40E: Subarea - East to Runoff Area=3.480 ac 29.59% Impervious Runoff Depth>4.73"
Flow Length=300' Slope=0.0700 '/' Tc=22.7 min CN=89 Runoff=17.29 cfs 1.372 af

Subcatchment50E: Subarea - East to Runoff Area=2.300 ac 20.32% Impervious Runoff Depth>4.20"
Flow Length=160' Slope=0.1000 '/' Tc=11.9 min CN=84 Runoff=14.12 cfs 0.806 af

Subcatchment60W: Subarea - West to Runoff Area=2.150 ac 17.67% Impervious Runoff Depth>4.10"
Flow Length=165' Slope=0.0800 '/' Tc=13.3 min CN=83 Runoff=12.32 cfs 0.734 af

Subcatchment70W: Subarea Runoff Area=12.480 ac 23.64% Impervious Runoff Depth>4.63"
Flow Length=140' Slope=0.0600 '/' Tc=13.1 min CN=88 Runoff=79.19 cfs 4.817 af

Subcatchment80W: Subarea Runoff Area=16.430 ac 22.37% Impervious Runoff Depth>4.52"
Flow Length=190' Slope=0.0900 '/' Tc=14.2 min CN=87 Runoff=98.63 cfs 6.191 af

Subcatchment90W: Subarea Runoff Area=2.720 ac 0.00% Impervious Runoff Depth>3.56"
Flow Length=495' Slope=0.0100 '/' Tc=39.9 min CN=78 Runoff=7.70 cfs 0.807 af

Pond 5: Pond Peak Elev=218.77' Storage=2.719 af Inflow=84.24 cfs 6.420 af
Outflow=48.06 cfs 5.114 af

Pond 20: Pond Peak Elev=222.97' Storage=0.408 af Inflow=22.99 cfs 1.772 af
Outflow=19.84 cfs 1.688 af

Pond 30: Pond Peak Elev=216.91' Storage=0.920 af Inflow=70.38 cfs 3.654 af
Primary=3.63 cfs 1.481 af Secondary=47.14 cfs 2.038 af Outflow=49.88 cfs 3.519 af

Pond 35: Pond Peak Elev=216.33' Storage=0.667 af Inflow=49.88 cfs 3.518 af
Discarded=0.15 cfs 0.095 af Primary=41.82 cfs 3.217 af Secondary=0.00 cfs 0.000 af Outflow=41.97 cfs 3.311 af

Pond 70: Pond Peak Elev=215.83' Storage=1.518 af Inflow=79.19 cfs 4.816 af
Primary=1.92 cfs 0.919 af Secondary=52.53 cfs 3.330 af Outflow=53.99 cfs 4.249 af

Pond 75: Pond Peak Elev=215.68' Storage=1.057 af Inflow=53.99 cfs 4.248 af
Discarded=0.23 cfs 0.123 af Primary=28.20 cfs 3.922 af Secondary=0.00 cfs 0.000 af Outflow=28.43 cfs 4.045 af

Pond 80: Pond Peak Elev=215.89' Storage=1.853 af Inflow=98.63 cfs 6.190 af
Primary=4.57 cfs 0.863 af Secondary=68.81 cfs 4.510 af Outflow=72.87 cfs 5.373 af

Pond 85: Pond Peak Elev=215.52' Storage=2.449 af Inflow=72.87 cfs 5.371 af
Discarded=0.50 cfs 0.345 af Primary=10.28 cfs 3.984 af Secondary=0.00 cfs 0.000 af Outflow=10.77 cfs 4.329 af

Link 15L: North Drainage Inflow=57.91 cfs 6.732 af
Primary=57.91 cfs 6.732 af

Link 35L: East to White Oak Way Inflow=71.97 cfs 6.339 af
Primary=71.97 cfs 6.339 af

Link 45L: East to Hawthorn Hill Drive Inflow=17.29 cfs 1.372 af
Primary=17.29 cfs 1.372 af

Link 55: East to Summit Avenue Inflow=14.12 cfs 0.805 af
Primary=14.12 cfs 0.805 af

Link 95: West Drainage Inflow=46.06 cfs 9.441 af
Primary=46.06 cfs 9.441 af

Link 99: Total Existing Flow Inflow=192.20 cfs 24.681 af
Primary=192.20 cfs 24.681 af

Total Runoff Area = 79.900 ac Runoff Volume = 29.629 af Average Runoff Depth = 4.45"
78.16% Pervious = 62.446 ac 21.84% Impervious = 17.454 ac

Summary for Subcatchment 5N: Subarea

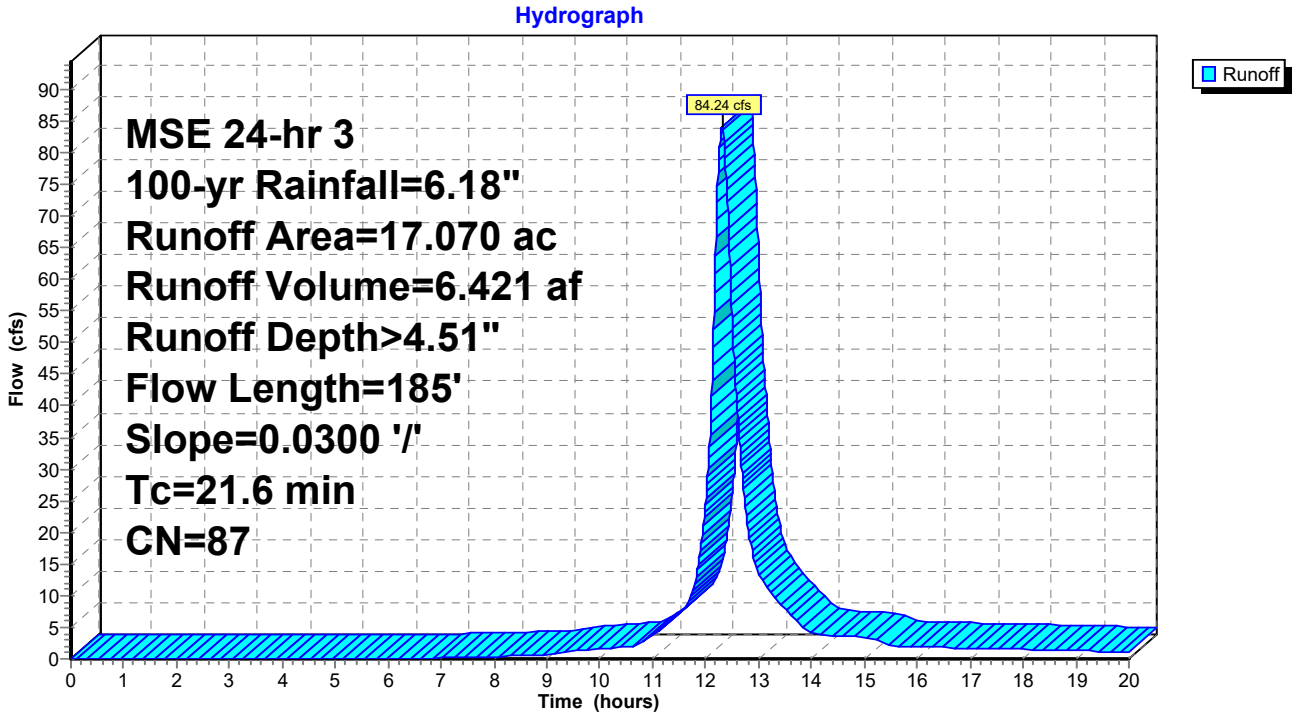
Runoff = 84.24 cfs @ 12.31 hrs, Volume= 6.421 af, Depth> 4.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100-yr Rainfall=6.18"

	Area (ac)	CN	Description
*	0.130	77	woodland - D soils
*	0.570	98	water
*	2.910	95	road
	8.980	86	1/3 acre lots, 30% imp, HSG D
	2.270	87	1/4 acre lots, 38% imp, HSG D
*	2.210	80	grass - D soils
	17.070	87	Weighted Average
	12.943		75.83% Pervious Area
	4.127		24.17% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.6	185	0.0300	0.14		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"

Subcatchment 5N: Subarea



Summary for Subcatchment 10N: Subarea - North Drainage

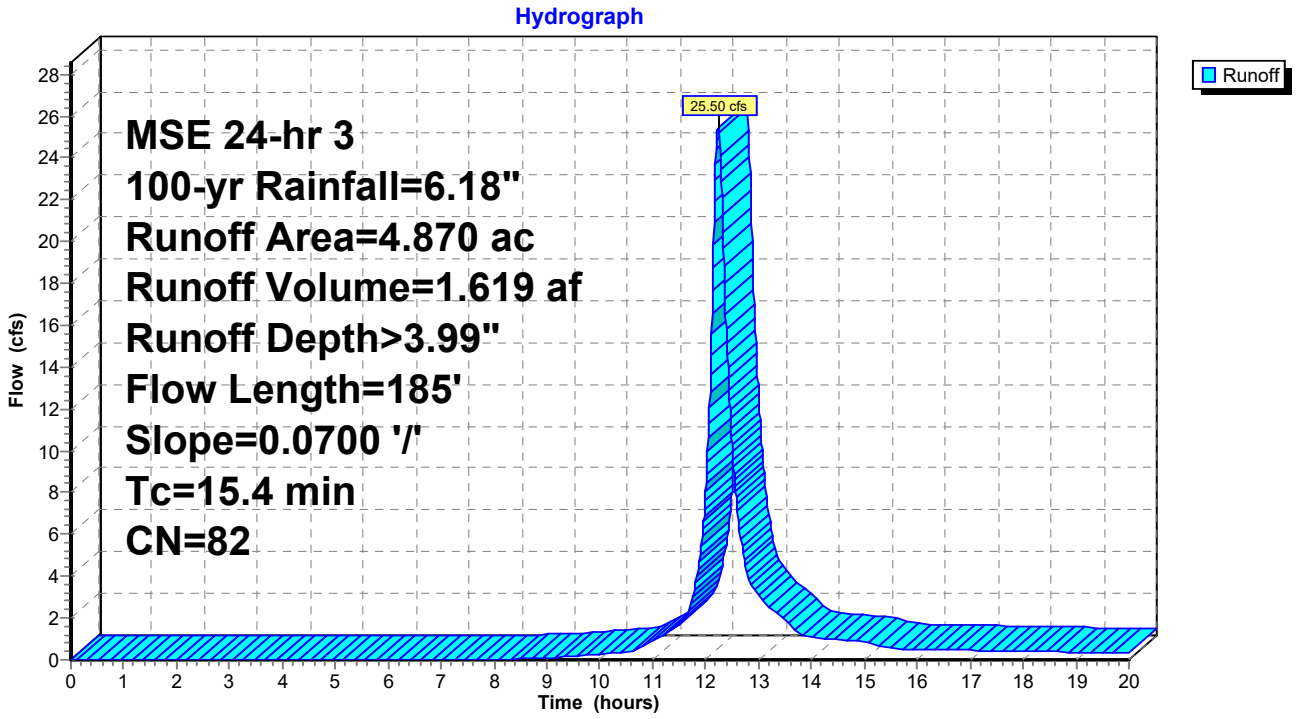
Runoff = 25.50 cfs @ 12.24 hrs, Volume= 1.619 af, Depth> 3.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100-yr Rainfall=6.18"

	Area (ac)	CN	Description
*	0.940	77	woodland - D soils
*	0.570	78	wetland - D soils
*	1.330	80	grass - D soils
	2.030	86	1/3 acre lots, 30% imp, HSG D
	4.870	82	Weighted Average
	4.261		87.49% Pervious Area
	0.609		12.51% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.4	185	0.0700	0.20		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"

Subcatchment 10N: Subarea - North Drainage



Summary for Subcatchment 20E: Subarea

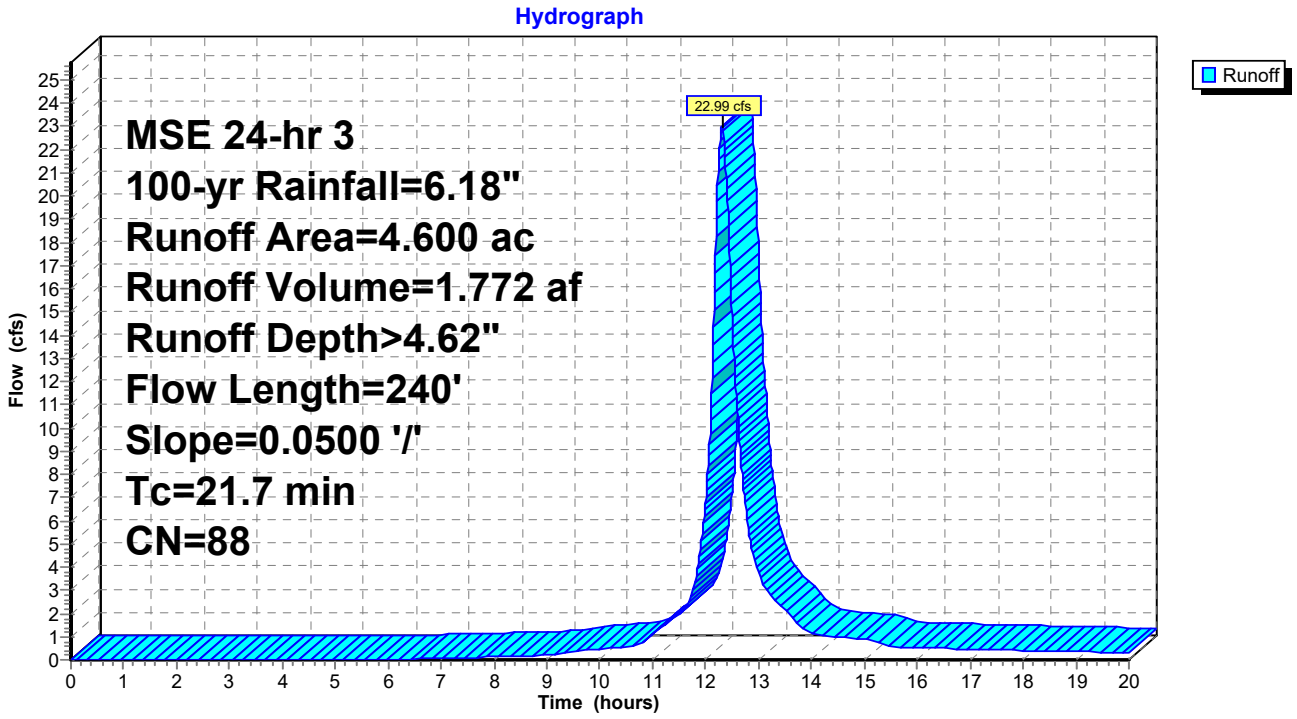
Runoff = 22.99 cfs @ 12.31 hrs, Volume= 1.772 af, Depth> 4.62"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100-yr Rainfall=6.18"

	Area (ac)	CN	Description
*	0.930	95	road
	3.010	87	1/4 acre lots, 38% imp, HSG D
*	0.520	80	grass - D soils
*	0.140	98	water
	4.600	88	Weighted Average
	3.316		72.09% Pervious Area
	1.284		27.91% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.7	240	0.0500	0.18		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"

Subcatchment 20E: Subarea



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

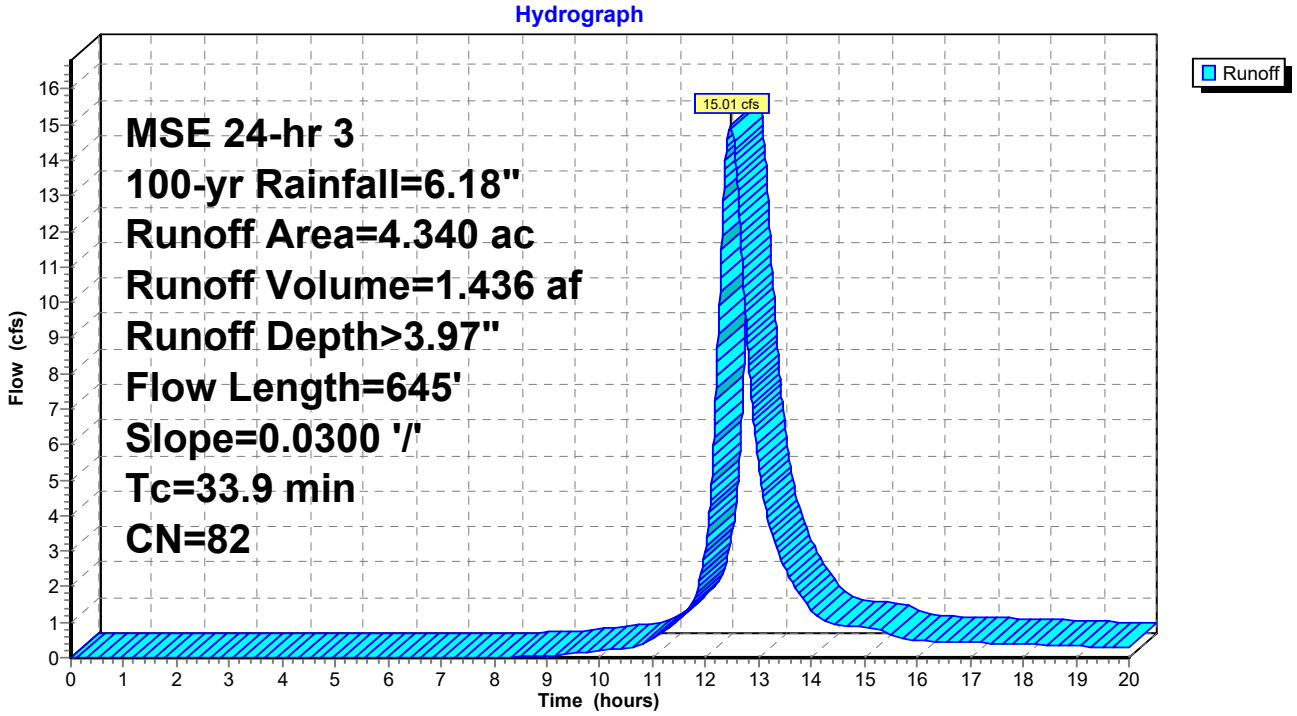
Runoff = 15.01 cfs @ 12.47 hrs, Volume= 1.436 af, Depth> 3.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100-yr Rainfall=6.18"

	Area (ac)	CN	Description
*	0.040	77	woodland - D soils
*	1.310	78	wetland - D soils
	1.930	87	1/4 acre lots, 38% imp, HSG D
*	1.060	80	grass - D soils
	4.340	82	Weighted Average
	3.607		83.10% Pervious Area
	0.733		16.90% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
31.8	300	0.0300	0.16		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
2.1	345	0.0300	2.79		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
33.9	645	Total			

Subcatchment 25E: Subarea - East to White Oak Way



Summary for Subcatchment 30E: Subarea

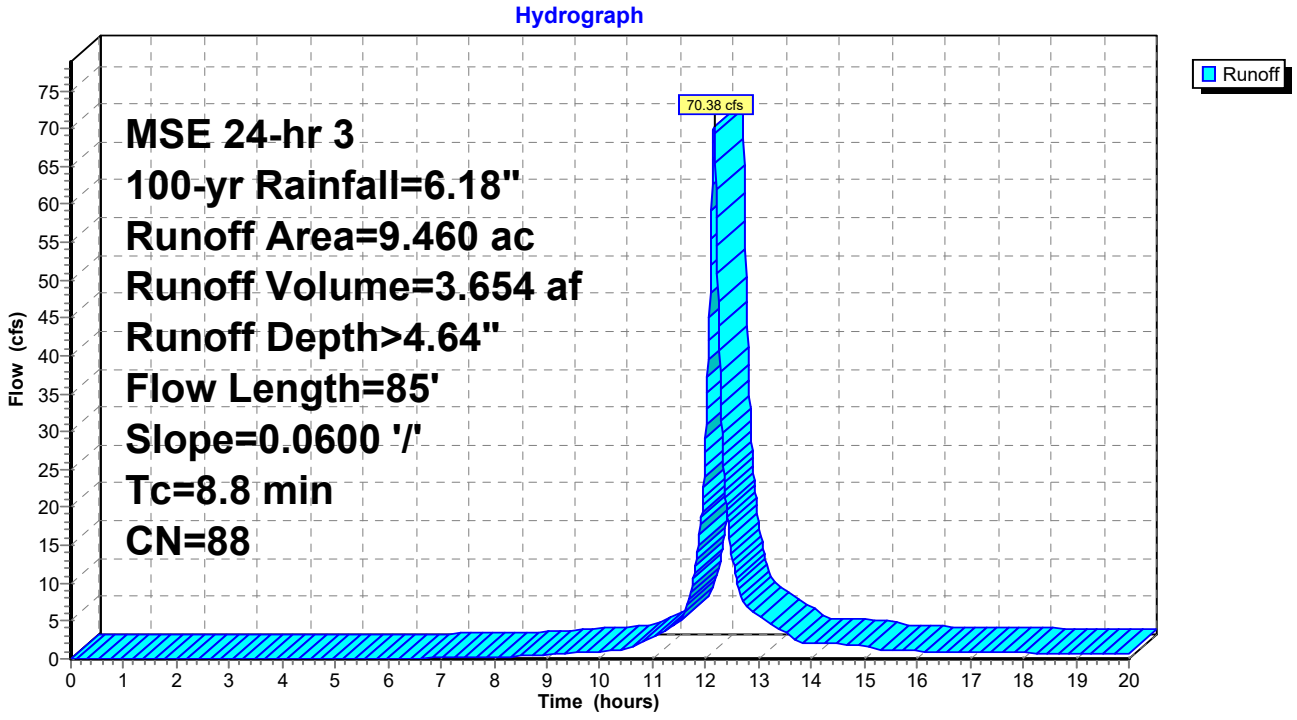
Runoff = 70.38 cfs @ 12.16 hrs, Volume= 3.654 af, Depth> 4.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100-yr Rainfall=6.18"

	Area (ac)	CN	Description
*	0.250	77	woodland - D soils
*	0.180	98	water
*	2.310	95	road
	0.800	86	1/3 acre lots, 30% imp, HSG D
	4.680	87	1/4 acre lots, 38% imp, HSG D
*	1.240	80	grass - D soils
	9.460	88	Weighted Average
	7.262		76.76% Pervious Area
	2.198		23.24% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.8	85	0.0600	0.16		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"

Subcatchment 30E: Subarea



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

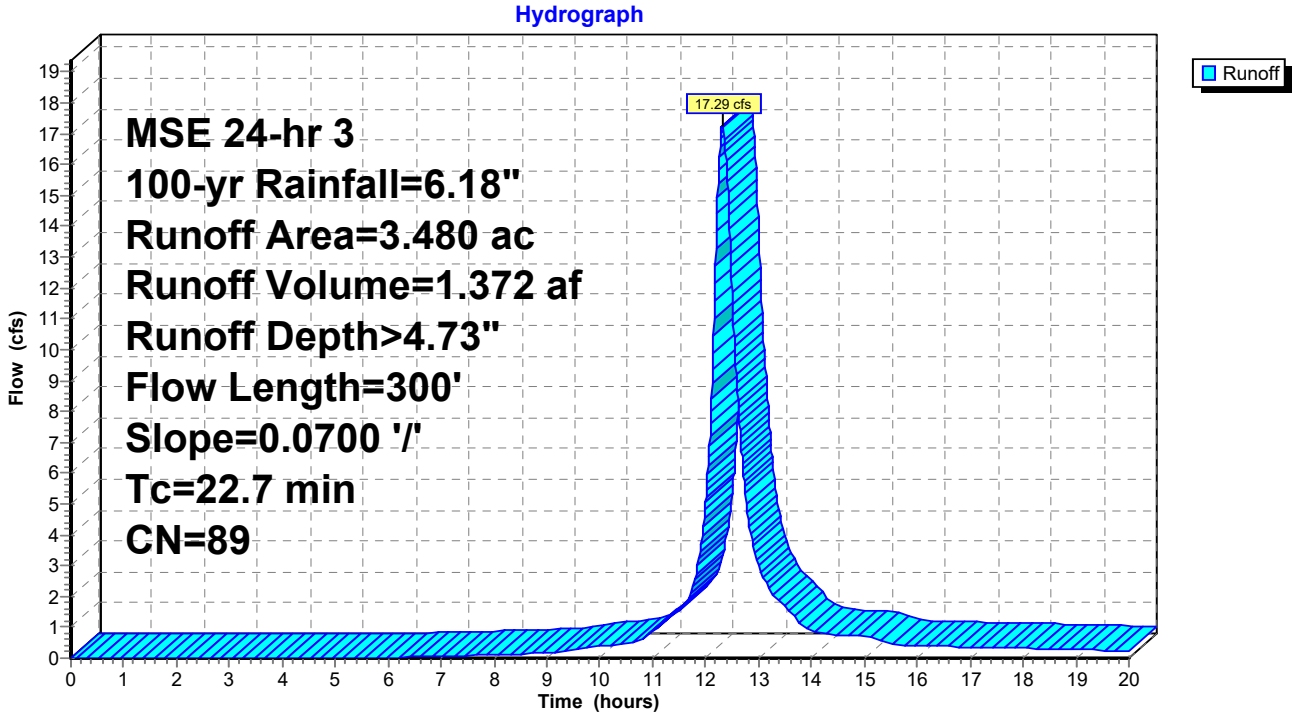
Runoff = 17.29 cfs @ 12.33 hrs, Volume= 1.372 af, Depth> 4.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100-yr Rainfall=6.18"

	Area (ac)	CN	Description
*	0.770	95	road
	2.710	87	1/4 acre lots, 38% imp, HSG D
	3.480	89	Weighted Average
	2.450		70.41% Pervious Area
	1.030		29.59% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.7	300	0.0700	0.22		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"

Subcatchment 40E: Subarea - East to Hawthorn Hill Drive



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

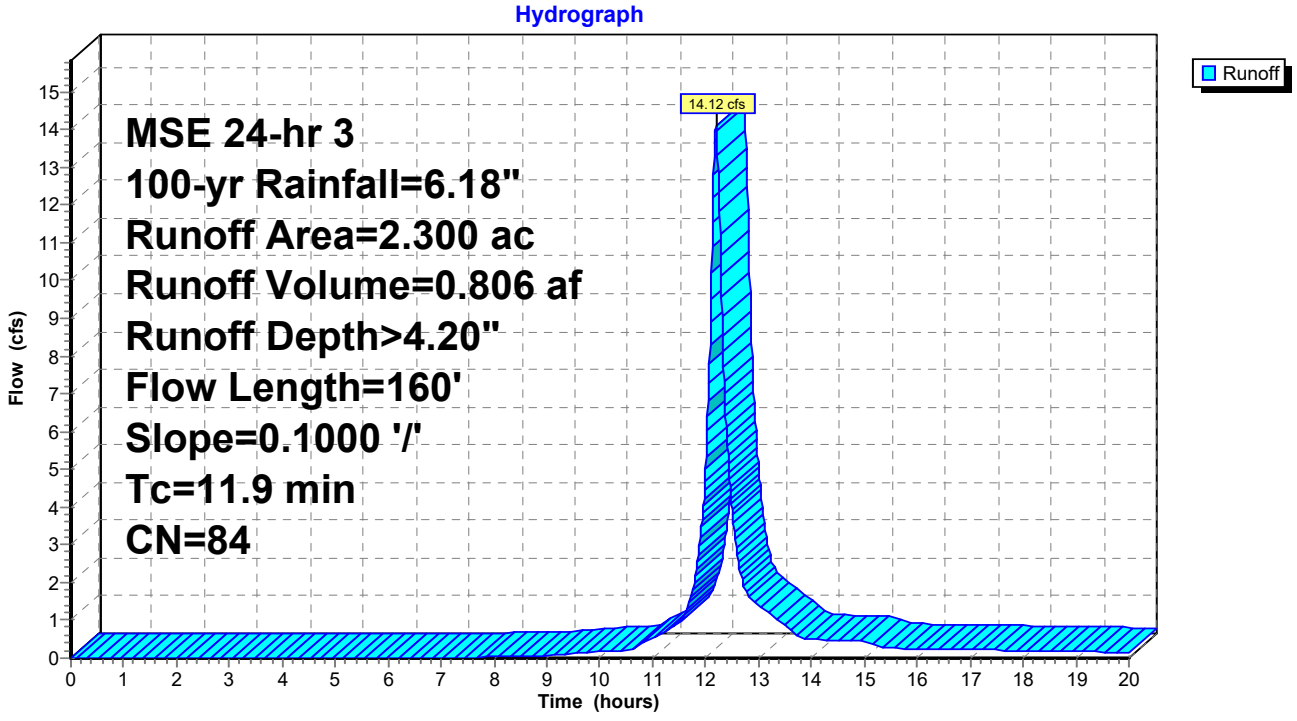
Runoff = 14.12 cfs @ 12.20 hrs, Volume= 0.806 af, Depth> 4.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100-yr Rainfall=6.18"

	Area (ac)	CN	Description
	1.230	87	1/4 acre lots, 38% imp, HSG D
*	1.070	80	grass - D soils
	2.300	84	Weighted Average
	1.833		79.68% Pervious Area
	0.467		20.32% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.9	160	0.1000	0.22		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"

Subcatchment 50E: Subarea - East to Summit Avenue



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

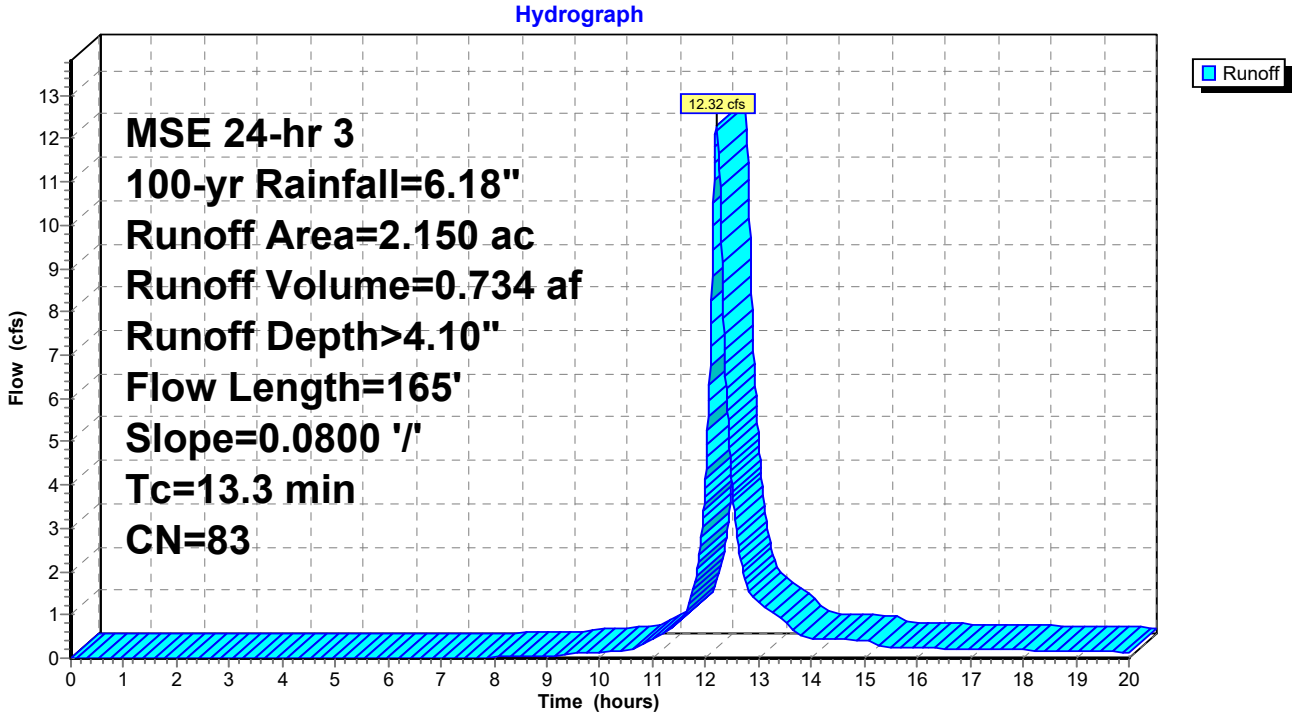
Runoff = 12.32 cfs @ 12.21 hrs, Volume= 0.734 af, Depth> 4.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100-yr Rainfall=6.18"

	Area (ac)	CN	Description
	1.000	87	1/4 acre lots, 38% imp, HSG D
*	1.150	80	grass - D soils
	2.150	83	Weighted Average
	1.770		82.33% Pervious Area
	0.380		17.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.3	165	0.0800	0.21		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"

Subcatchment 60W: Subarea - West to Summit Avenue



Summary for Subcatchment 70W: Subarea

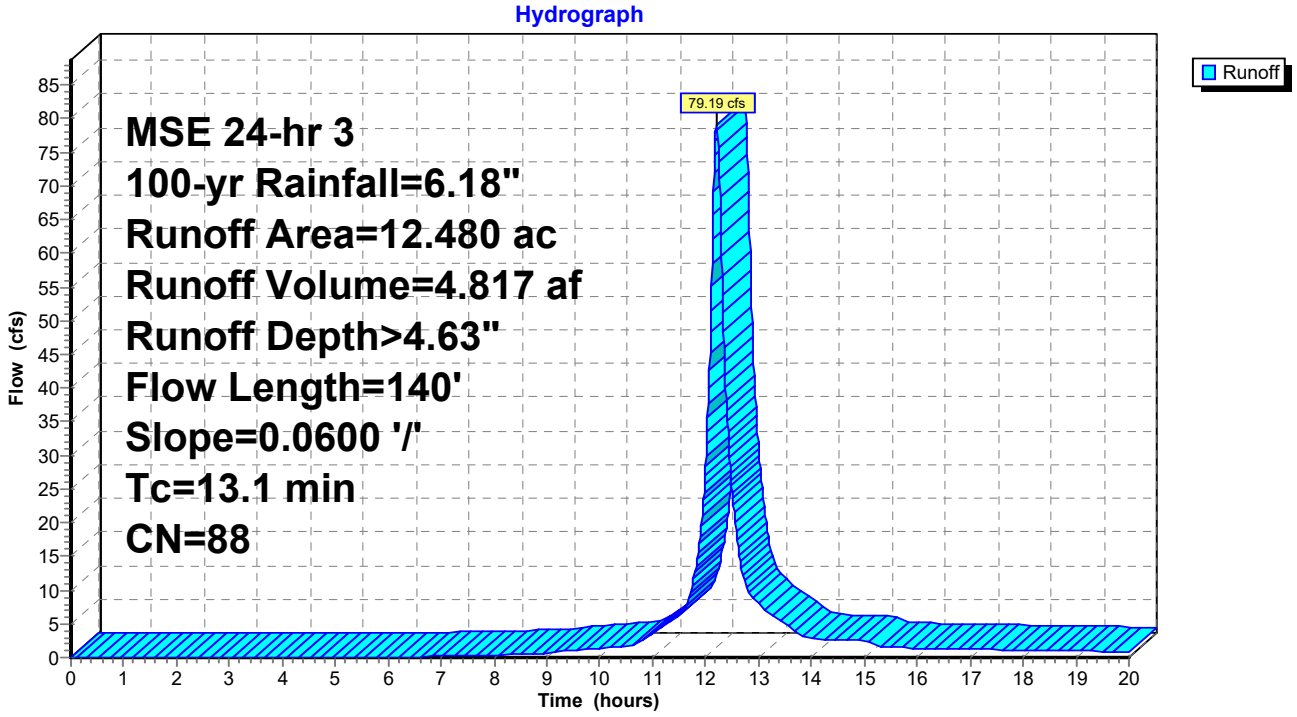
Runoff = 79.19 cfs @ 12.21 hrs, Volume= 4.817 af, Depth> 4.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100-yr Rainfall=6.18"

	Area (ac)	CN	Description
*	3.090	95	road
	1.530	86	1/3 acre lots, 30% imp, HSG D
	5.820	87	1/4 acre lots, 38% imp, HSG D
*	1.760	80	grass - D soils
*	0.280	98	water
	12.480	88	Weighted Average
	9.529		76.36% Pervious Area
	2.951		23.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.1	140	0.0600	0.18		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"

Subcatchment 70W: Subarea



Summary for Subcatchment 80W: Subarea

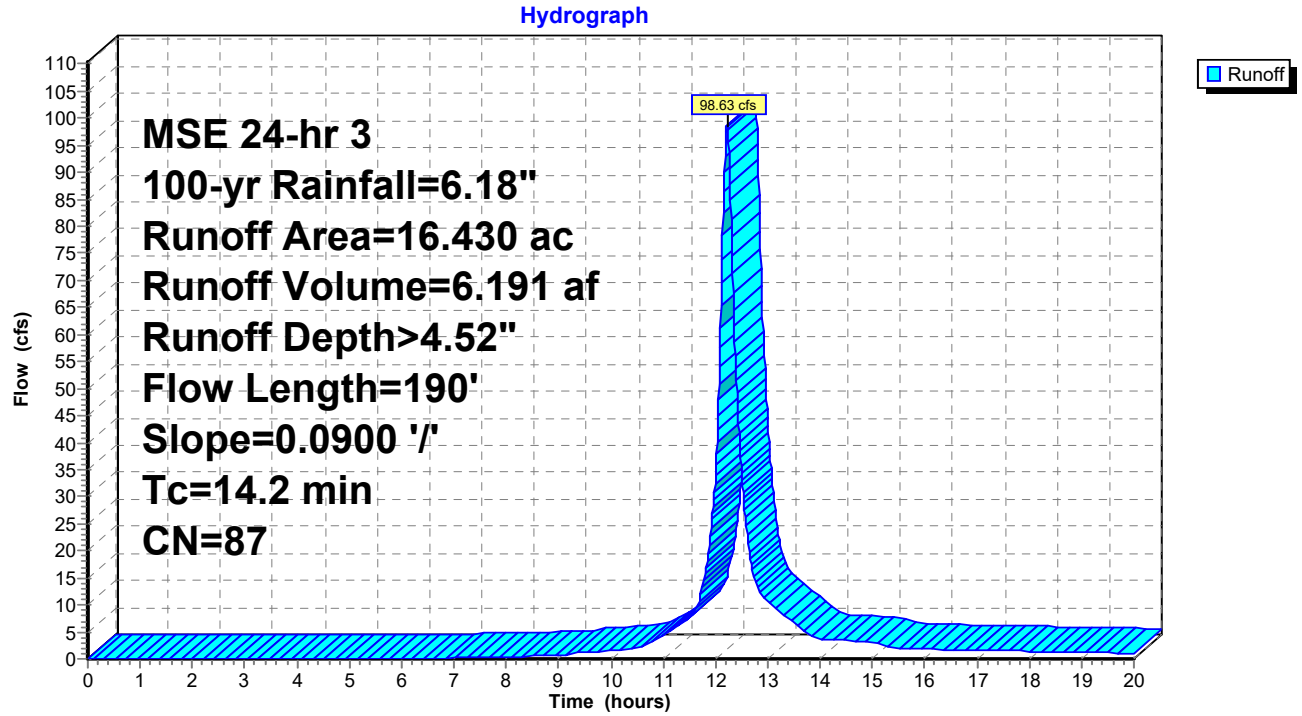
Runoff = 98.63 cfs @ 12.22 hrs, Volume= 6.191 af, Depth> 4.52"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100-yr Rainfall=6.18"

	Area (ac)	CN	Description
*	0.040	77	woodland - D soils
*	0.430	98	water
*	2.940	95	road
	6.510	86	1/3 acre lots, 30% imp, HSG D
	3.400	87	1/4 acre lots, 38% imp, HSG D
*	3.110	80	grass - D soils
	16.430	87	Weighted Average
	12.755		77.63% Pervious Area
	3.675		22.37% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.2	190	0.0900	0.22		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"

Subcatchment 80W: Subarea



Summary for Subcatchment 90W: Subarea

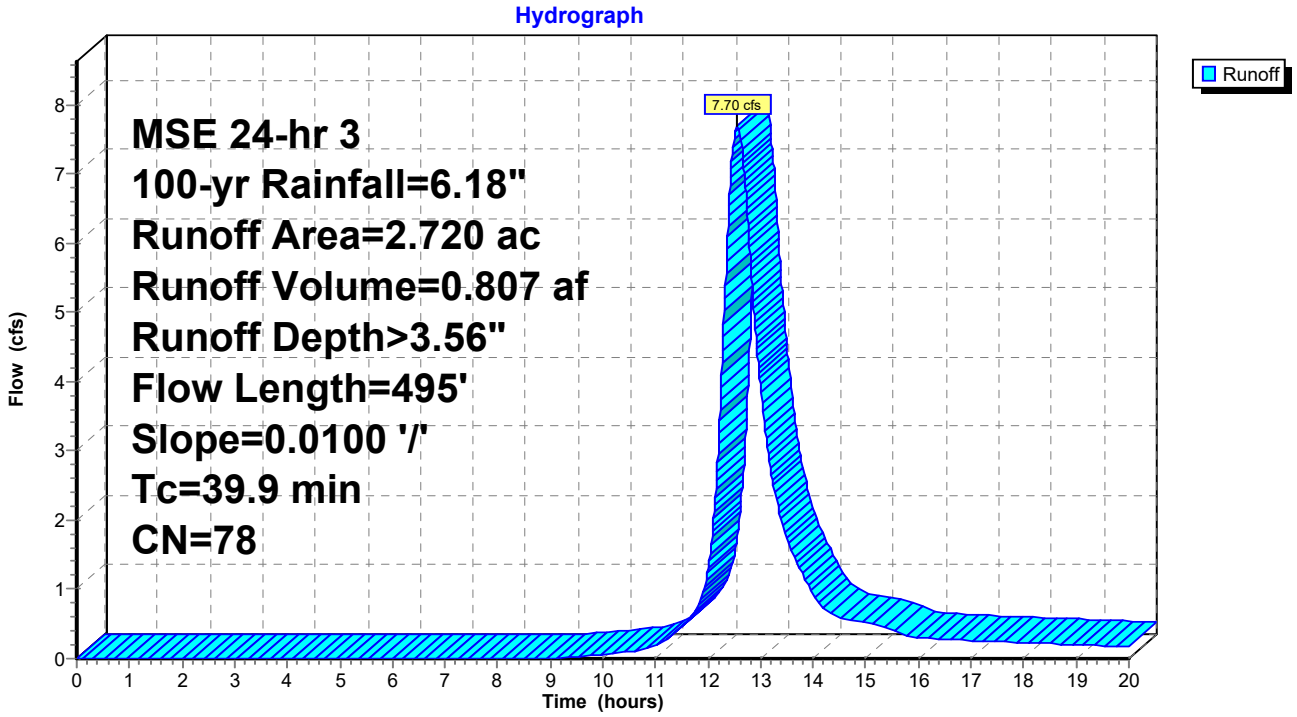
Runoff = 7.70 cfs @ 12.55 hrs, Volume= 0.807 af, Depth> 3.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100-yr Rainfall=6.18"

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

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.4	150	0.0100	0.09		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
11.5	345	0.0100	0.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
39.9	495	Total			

Subcatchment 90W: Subarea



Summary for Pond 5: Pond

Inflow Area = 17.070 ac, 24.17% Impervious, Inflow Depth > 4.51" for 100-yr event
Inflow = 84.24 cfs @ 12.31 hrs, Volume= 6.420 af
Outflow = 48.06 cfs @ 12.54 hrs, Volume= 5.114 af, Atten= 43%, Lag= 13.9 min
Primary = 48.06 cfs @ 12.54 hrs, Volume= 5.114 af

Routing by Sim-Route method, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs
Peak Elev= 218.77' @ 12.54 hrs Surf.Area= 0.904 ac Storage= 2.719 af

Plug-Flow detention time= 91.7 min calculated for 5.114 af (80% of inflow)
Center-of-Mass det. time= 48.2 min (822.4 - 774.2)

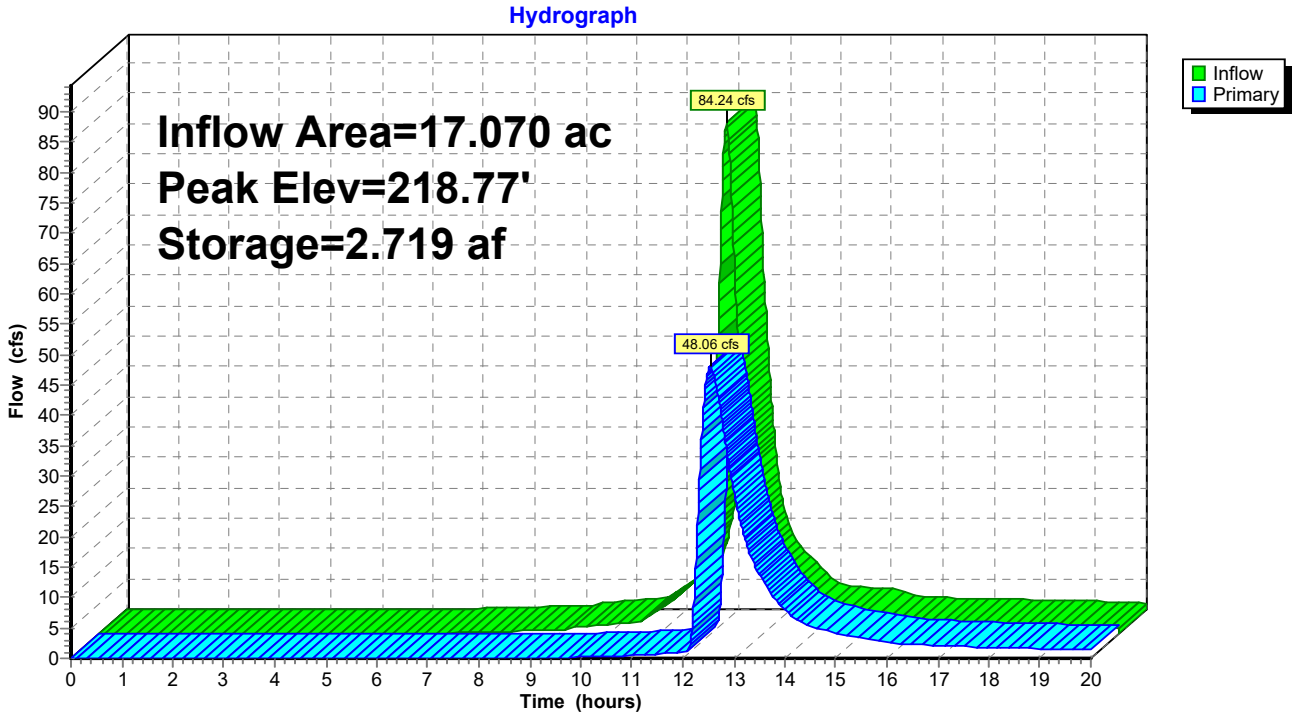
Volume	Invert	Avail.Storage	Storage Description
#1	215.00'	3.913 af	**Custom Stage Data (Conic)** Listed below (Recalc)

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

Device	Routing	Invert	Outlet Devices
#1	Primary	215.00'	**6.0" Vert. Orifice/Grate** C= 0.600
#2	Primary	217.00'	**3.0' long Sharp-Crested Rectangular Weir X 2.00** 0 End Contraction(s)
#3	Primary	219.00'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=48.06 cfs @ 12.54 hrs HW=218.77' TW=0.00' (Dynamic Tailwater)
- **1=Orifice/Grate** (Orifice Controls 1.77 cfs @ 9.04 fps)
- **2=Sharp-Crested Rectangular Weir** (Weir Controls 46.28 cfs @ 4.35 fps)
- **3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 5: Pond


Hydrograph
Inflow Area=17.070 ac
Peak Elev=218.77'
Storage=2.719 af
84.24 cfs
48.06 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

Stage-Discharge for Pond 5: Pond

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
215.00	0.00	217.60	10.57
215.05	0.01	217.65	11.75
215.10	0.03	217.70	12.97
215.15	0.07	217.75	14.24
215.20	0.11	217.80	15.55
215.25	0.17	217.85	16.90
215.30	0.23	217.90	18.29
215.35	0.30	217.95	19.72
215.40	0.36	218.00	21.19
215.45	0.43	218.05	22.69
215.50	0.47	218.10	24.23
215.55	0.52	218.15	25.81
215.60	0.56	218.20	27.41
215.65	0.60	218.25	29.06
215.70	0.63	218.30	30.73
215.75	0.67	218.35	32.44
215.80	0.70	218.40	34.18
215.85	0.73	218.45	35.95
215.90	0.76	218.50	37.75
215.95	0.79	218.55	39.58
216.00	0.82	218.60	41.44
216.05	0.85	218.65	43.33
216.10	0.87	218.70	45.24
216.15	0.90	218.75	47.19
216.20	0.92	218.80	49.16
216.25	0.95	218.85	51.16
216.30	0.97	218.90	53.19
216.35	0.99	218.95	55.24
216.40	1.01	219.00	57.32
216.45	1.04	219.05	59.71
216.50	1.06	219.10	62.35
216.55	1.08	219.15	65.17
216.60	1.10	219.20	68.13
216.65	1.12	219.25	71.24
216.70	1.14	219.30	74.49
216.75	1.16	219.35	77.86
216.80	1.18	219.40	81.35
216.85	1.20	219.45	85.01
216.90	1.21	219.50	88.80
216.95	1.23	219.55	92.72
217.00	1.25	219.60	96.77
217.05	1.49	219.65	100.76
217.10	1.91	219.70	104.82
217.15	2.44	219.75	108.97
217.20	3.08	219.80	113.19
217.25	3.79	219.85	117.49
217.30	4.58	219.90	121.86
217.35	5.43	219.95	126.30
217.40	6.35	220.00	**130.81**
217.45	7.32		
217.50	8.35		
217.55	9.44		

Summary for Pond 20: Pond

Inflow Area = 4.600 ac, 27.91% Impervious, Inflow Depth > 4.62" for 100-yr event
Inflow = 22.99 cfs @ 12.31 hrs, Volume= 1.772 af
Outflow = 19.84 cfs @ 12.41 hrs, Volume= 1.688 af, Atten= 14%, Lag= 6.2 min
Primary = 19.84 cfs @ 12.41 hrs, Volume= 1.688 af

Routing by Sim-Route method, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs
Peak Elev= 222.97' @ 12.41 hrs Surf.Area= 0.277 ac Storage= 0.408 af

Plug-Flow detention time= 53.2 min calculated for 1.687 af (95% of inflow)
Center-of-Mass det. time= 36.3 min (808.6 - 772.3)

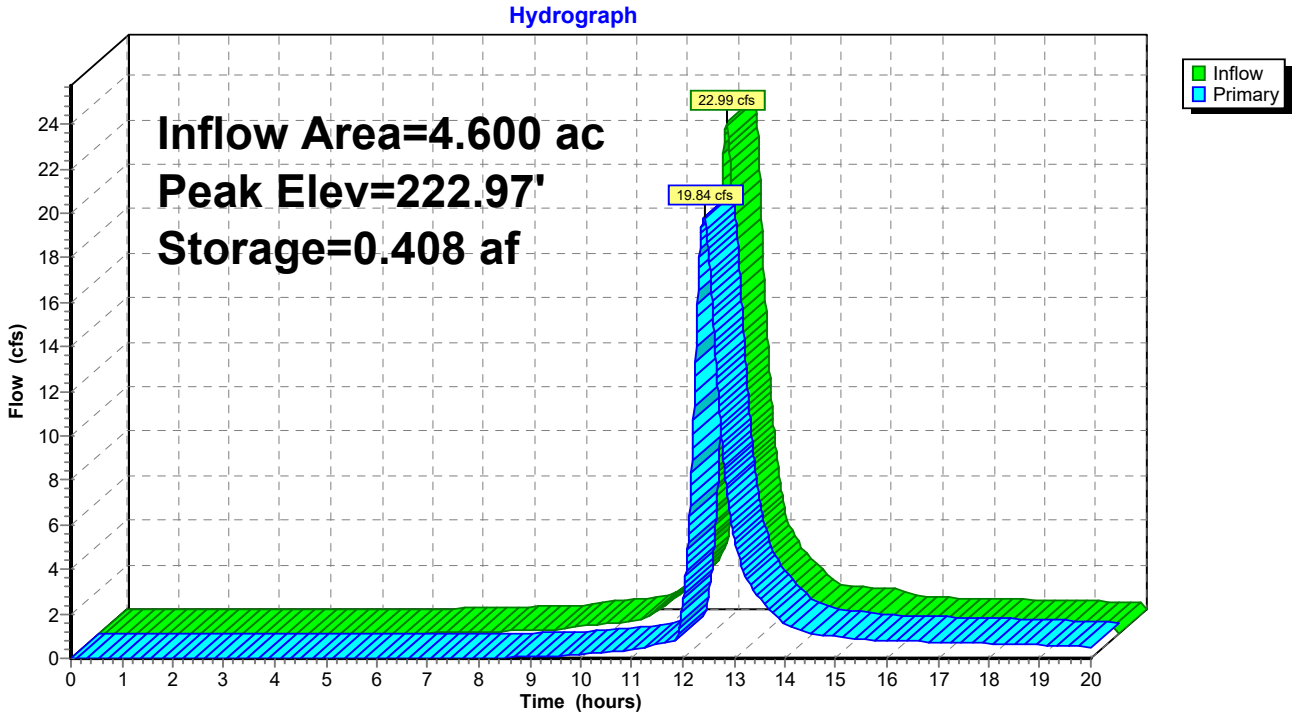
Volume	Invert	Avail.Storage	Storage Description
#1	221.00'	0.742 af	**Custom Stage Data (Conic)** Listed below (Recalc)

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

Device	Routing	Invert	Outlet Devices
#1	Primary	221.00'	**6.0" Vert. Orifice/Grate** C= 0.600
#2	Primary	222.00'	**3.0' long Sharp-Crested Rectangular Weir X 2.00** 0 End Contraction(s)
#3	Primary	223.00'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=19.84 cfs @ 12.41 hrs HW=222.97' TW=0.00' (Dynamic Tailwater)
- **1=Orifice/Grate** (Orifice Controls 1.24 cfs @ 6.31 fps)
- **2=Sharp-Crested Rectangular Weir** (Weir Controls 18.60 cfs @ 3.21 fps)
- **3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 20: Pond


Hydrograph
Inflow Area=4.600 ac
Peak Elev=222.97'
Storage=0.408 af
22.99 cfs
19.84 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0 2 4 6 8 10 12 14 16 18 20 22 24
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

Stage-Discharge for Pond 20: Pond

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
221.00	0.00	222.04	1.00	223.08	23.86
221.02	0.00	222.06	1.14	223.10	24.71
221.04	0.01	222.08	1.31	223.12	25.58
221.06	0.01	222.10	1.49	223.14	26.49
221.08	0.02	222.12	1.70	223.16	27.41
221.10	0.03	222.14	1.92	223.18	28.36
221.12	0.04	222.16	2.16	223.20	29.34
221.14	0.06	222.18	2.41	223.22	30.34
221.16	0.07	222.20	2.68	223.24	31.37
221.18	0.09	222.22	2.96	223.26	32.42
221.20	0.11	222.24	3.25	223.28	33.49
221.22	0.13	222.26	3.55	223.30	34.58
221.24	0.16	222.28	3.87	223.32	35.70
221.26	0.18	222.30	4.19	223.34	36.83
221.28	0.20	222.32	4.53	223.36	37.99
221.30	0.23	222.34	4.88	223.38	39.17
221.32	0.26	222.36	5.23	223.40	40.36
221.34	0.28	222.38	5.60	223.42	41.60
221.36	0.31	222.40	5.98	223.44	42.86
221.38	0.34	222.42	6.36	223.46	44.14
221.40	0.36	222.44	6.76	223.48	45.44
221.42	0.39	222.46	7.16	223.50	46.76
221.44	0.41	222.48	7.57	223.52	48.11
221.46	0.44	222.50	7.99	223.54	49.47
221.48	0.46	222.52	8.42	223.56	50.86
221.50	0.47	222.54	8.86	223.58	52.27
221.52	0.49	222.56	9.30	223.60	53.71
221.54	0.51	222.58	9.76	223.62	55.09
221.56	0.53	222.60	10.22	223.64	56.48
221.58	0.54	222.62	10.68	223.66	57.89
221.60	0.56	222.64	11.16	223.68	59.31
221.62	0.58	222.66	11.64	223.70	60.75
221.64	0.59	222.68	12.13	223.72	62.20
221.66	0.61	222.70	12.63	223.74	63.67
221.68	0.62	222.72	13.13	223.76	65.14
221.70	0.63	222.74	13.64	223.78	66.64
221.72	0.65	222.76	14.16	223.80	68.14
221.74	0.66	222.78	14.69	223.82	69.66
221.76	0.68	222.80	15.22	223.84	71.19
221.78	0.69	222.82	15.75	223.86	72.73
221.80	0.70	222.84	16.30	223.88	74.28
221.82	0.71	222.86	16.85	223.90	75.85
221.84	0.73	222.88	17.40	223.92	77.43
221.86	0.74	222.90	17.97	223.94	79.02
221.88	0.75	222.92	18.54	223.96	80.62
221.90	0.76	222.94	19.11	223.98	82.24
221.92	0.77	222.96	19.69	224.00	**83.86**
221.94	0.79	222.98	20.28		
221.96	0.80	223.00	20.87		
221.98	0.81	223.02	21.54		
222.00	0.82	223.04	22.27		
222.02	0.89	223.06	23.05		

Summary for Pond 30: Pond

Inflow	=	70.38 cfs @	12.16 hrs, Volume=	3.654 af
Outflow	=	49.88 cfs @	12.21 hrs, Volume=	3.519 af, Atten= 29%, Lag= 3.0 min
Primary	=	3.63 cfs @	12.01 hrs, Volume=	1.481 af
Secondary	=	47.14 cfs @	12.21 hrs, Volume=	2.038 af

Routing by Sim-Route method, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs
Peak Elev= 216.91' @ 12.24 hrs Surf.Area= 0.356 ac Storage= 0.920 af

Plug-Flow detention time= 53.2 min calculated for 3.517 af (96% of inflow)
Center-of-Mass det. time= 39.1 min (800.7 - 761.6)

Volume	Invert	Avail.Storage	Storage Description
#1	213.50'	1.341 af	**Custom Stage Data (Conic)** Listed below (Recalc)

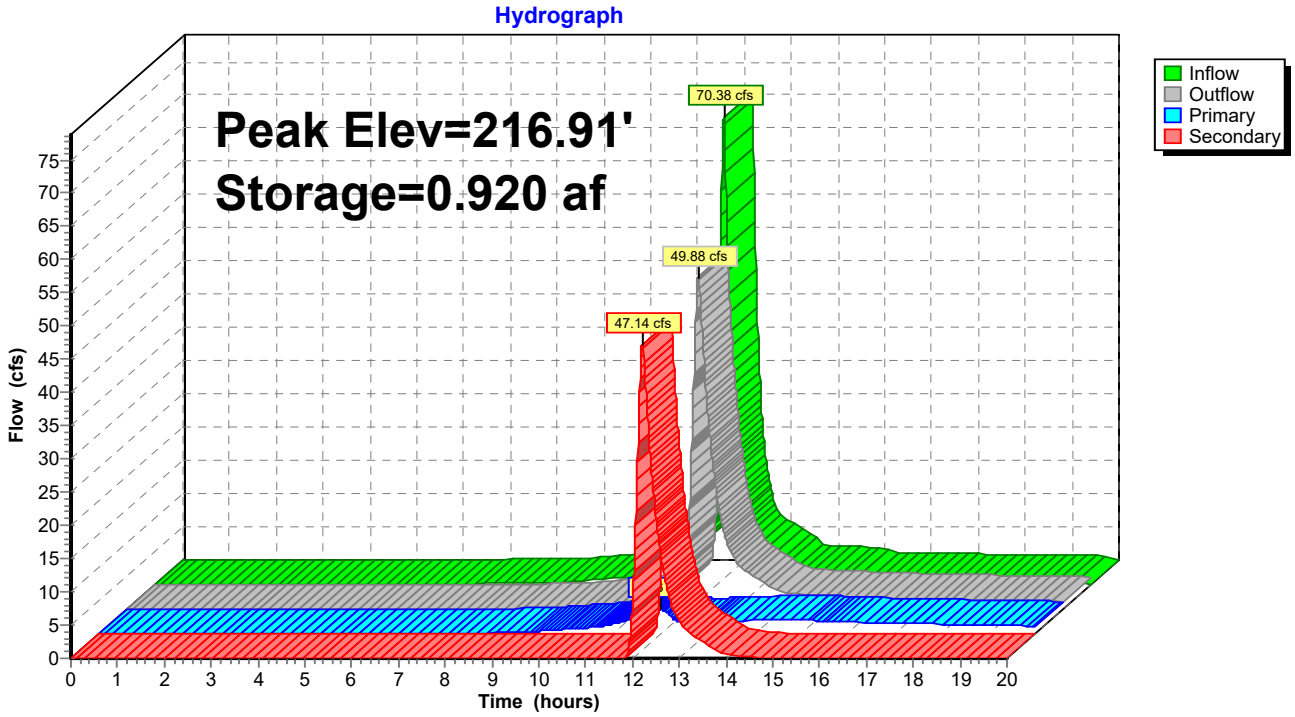
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
213.50	0.180	0.000	0.000	0.180
214.00	0.210	0.097	0.097	0.210
215.00	0.260	0.235	0.332	0.261
216.00	0.310	0.285	0.617	0.312
217.00	0.360	0.335	0.951	0.363
218.00	0.420	0.390	1.341	0.424

Device	Routing	Invert	Outlet Devices
#1	Primary	213.50'	**8.0" Round Culvert X 2.00** L= 35.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 213.50' / 212.50' S= 0.0286 '/' Cc= 0.900 n= 0.011, Flow Area= 0.35 sf
#2	Secondary	215.25'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=3.57 cfs @ 12.01 hrs HW=215.77' TW=214.32' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 3.57 cfs @ 5.11 fps)

Secondary OutFlow Max=45.95 cfs @ 12.21 hrs HW=216.88' TW=216.09' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 45.95 cfs @ 2.82 fps)

Pond 30: Pond


Hydrograph
Peak Elev=216.91'
Storage=0.920 af
70.38 cfs
49.88 cfs
47.14 cfs
Inflow
Outflow
Primary
Secondary
Flow (cfs)
Time (hours)
0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

Stage-Discharge for Pond 30: Pond

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
213.50	0.00	0.00	0.00
213.55	0.02	0.02	0.00
213.60	0.06	0.06	0.00
213.65	0.14	0.14	0.00
213.70	0.24	0.24	0.00
213.75	0.36	0.36	0.00
213.80	0.50	0.50	0.00
213.85	0.66	0.66	0.00
213.90	0.83	0.83	0.00
213.95	1.01	1.01	0.00
214.00	1.19	1.19	0.00
214.05	1.37	1.37	0.00
214.10	1.54	1.54	0.00
214.15	1.68	1.68	0.00
214.20	1.80	1.80	0.00
214.25	1.91	1.91	0.00
214.30	2.03	2.03	0.00
214.35	2.13	2.13	0.00
214.40	2.23	2.23	0.00
214.45	2.33	2.33	0.00
214.50	2.42	2.42	0.00
214.55	2.51	2.51	0.00
214.60	2.60	2.60	0.00
214.65	2.68	2.68	0.00
214.70	2.76	2.76	0.00
214.75	2.84	2.84	0.00
214.80	2.92	2.92	0.00
214.85	2.99	2.99	0.00
214.90	3.06	3.06	0.00
214.95	3.13	3.13	0.00
215.00	3.20	3.20	0.00
215.05	3.27	3.27	0.00
215.10	3.34	3.34	0.00
215.15	3.40	3.40	0.00
215.20	3.47	3.47	0.00
215.25	3.53	3.53	0.00
215.30	3.87	3.59	0.28
215.35	4.44	3.65	0.79
215.40	5.16	3.71	1.45
215.45	6.00	3.77	2.23
215.50	6.96	3.83	3.13
215.55	8.04	3.89	4.15
215.60	9.21	3.94	5.26
215.65	10.47	4.00	6.48
215.70	11.89	4.05	7.83
215.75	13.40	4.11	9.30
215.80	15.03	4.16	10.87
215.85	16.76	4.21	12.55
215.90	18.40	4.26	14.14
215.95	20.10	4.32	15.78
216.00	21.85	4.37	17.49
216.05	23.66	4.42	19.25
216.10	25.53	4.47	21.06
216.15	27.44	4.51	22.92
216.20	29.40	4.56	24.84
216.25	31.41	4.61	26.80
216.30	33.52	4.66	28.86
216.35	35.68	4.71	30.98
216.40	37.90	4.75	33.14
216.45	40.16	4.80	35.36
216.50	42.37	4.84	37.52
216.55	44.61	4.89	39.72
216.60	46.89	4.93	41.96
216.65	49.21	4.98	44.23
216.70	51.51	5.02	46.49
216.75	53.84	5.07	48.78
216.80	56.20	5.11	51.09
216.85	58.58	5.15	53.43
216.90	61.15	5.19	55.95
216.95	63.75	5.24	58.52
217.00	66.39	5.28	61.12
217.05	69.07	5.32	63.75
217.10	71.79	5.36	66.43
217.15	74.54	5.40	69.14
217.20	77.33	5.44	71.89
217.25	80.15	5.48	74.67
217.30	83.01	5.52	77.49
217.35	85.90	5.56	80.34
217.40	88.83	5.60	83.23
217.45	91.79	5.64	86.15
217.50	94.78	5.68	89.10
217.55	97.80	5.72	92.09
217.60	100.86	5.76	95.11
217.65	103.95	5.79	98.16
217.70	107.07	5.83	101.24
217.75	110.23	5.87	104.36
217.80	113.41	5.91	107.50
217.85	116.62	5.94	110.68
217.90	119.87	5.98	113.89
217.95	123.14	6.02	117.12
218.00	**126.45**	**6.05**	**120.39**

Summary for Pond 35: Pond

Inflow	=	49.88 cfs @	12.21 hrs,	Volume=	3.518 af
Outflow	=	41.97 cfs @	12.30 hrs,	Volume=	3.311 af, Atten= 16%, Lag= 5.1 min
Discarded	=	0.15 cfs @	12.30 hrs,	Volume=	0.095 af
Primary	=	41.82 cfs @	12.30 hrs,	Volume=	3.217 af
Secondary	=	0.00 cfs @	0.00 hrs,	Volume=	0.000 af

Routing by Sim-Route method, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs
Peak Elev= 216.33' @ 12.30 hrs Surf.Area= 0.246 ac Storage= 0.667 af

Plug-Flow detention time= 48.7 min calculated for 3.310 af (94% of inflow)
Center-of-Mass det. time= 27.6 min (828.2 - 800.6)

Volume	Invert	Avail.Storage	Storage Description
#1	212.50'	1.139 af	**Custom Stage Data (Conic)** Listed below (Recalc)

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

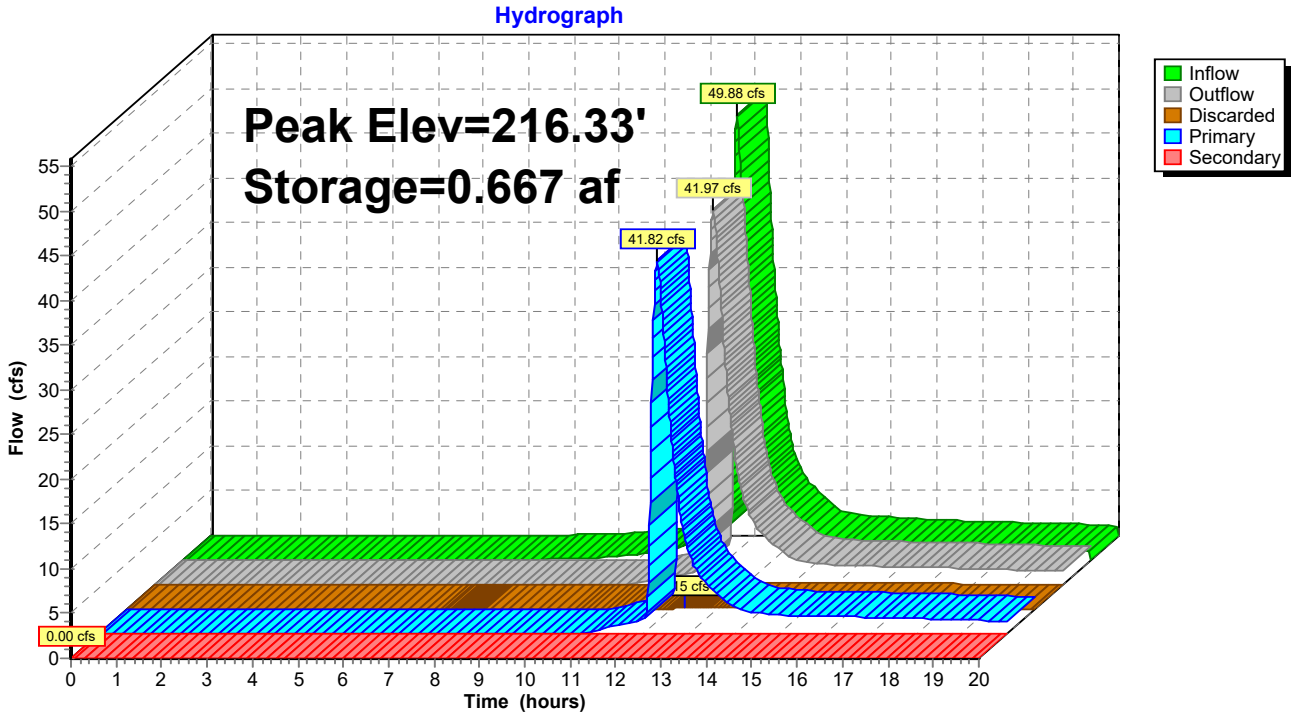
Device	Routing	Invert	Outlet Devices
#1	Discarded	212.50'	**0.500 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 200.00' Phase-In= 0.01'
#2	Primary	213.00'	**8.0" Vert. Orifice/Grate** C= 0.600
#3	Primary	214.75'	**3.0' long Sharp-Crested Rectangular Weir X 2.00** 0 End Contraction(s)
#4	Secondary	215.25'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Discarded OutFlow Max=0.15 cfs @ 12.30 hrs HW=216.33' (Free Discharge)
└**1=Exfiltration** (Controls 0.15 cfs)

Primary OutFlow Max=41.80 cfs @ 12.30 hrs HW=216.33' TW=0.00' (Dynamic Tailwater)
├**2=Orifice/Grate** (Orifice Controls 2.91 cfs @ 8.33 fps)
└**3=Sharp-Crested Rectangular Weir** (Weir Controls 38.89 cfs @ 4.11 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=212.50' TW=213.50' (Dynamic Tailwater)
└**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 35: Pond


Hydrograph
Peak Elev=216.33'
Storage=0.667 af
49.88 cfs
41.97 cfs
41.82 cfs
0.00 cfs
Inflow
Outflow
Discarded
Primary
Secondary
Flow (cfs)
Time (hours)

Stage-Discharge for Pond 35: Pond

Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)	Secondary (cfs)
212.50	0.00	0.00	0.00	0.00
212.70	0.06	0.06	0.00	0.00
212.90	0.07	0.07	0.00	0.00
213.10	0.11	0.07	0.04	0.00
213.30	0.36	0.07	0.28	0.00
213.50	0.75	0.08	0.68	0.00
213.70	1.10	0.08	1.02	0.00
213.90	1.35	0.09	1.27	0.00
214.10	1.56	0.09	1.47	0.00
214.30	1.75	0.10	1.65	0.00
214.50	1.92	0.10	1.82	0.00
214.70	2.07	0.10	1.96	0.00
214.90	3.35	0.11	3.24	0.00
215.10	6.41	0.11	6.30	0.00
215.30	10.76	0.12	10.36	0.28
215.50	18.48	0.13	15.22	3.13
215.70	28.72	0.13	20.75	7.83
215.90	41.16	0.14	26.89	14.14
216.10	54.78	0.14	33.57	21.06
216.30	69.77	0.15	40.76	28.86
216.50	86.09	0.16	48.41	37.52
216.70	103.16	0.16	56.51	46.49
216.90	121.15	0.17	65.03	55.95
217.10	140.55	0.18	73.94	66.43
217.30	160.91	0.18	83.24	77.49
217.50	182.19	0.19	92.91	89.10
217.70	204.36	0.19	102.92	101.24
217.90	**227.37**	**0.20**	**113.28**	**113.89**

Summary for Pond 70: Pond

Inflow	=	79.19 cfs @	12.21 hrs,	Volume=	4.816 af
Outflow	=	53.99 cfs @	12.26 hrs,	Volume=	4.249 af, Atten= 32%, Lag= 2.9 min
Primary	=	1.92 cfs @	12.07 hrs,	Volume=	0.919 af
Secondary	=	52.53 cfs @	12.26 hrs,	Volume=	3.330 af

Routing by Sim-Route method, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs
Peak Elev= 215.83' @ 12.44 hrs Surf.Area= 0.526 ac Storage= 1.518 af

Plug-Flow detention time= 77.4 min calculated for 4.247 af (88% of inflow)
Center-of-Mass det. time= 44.2 min (809.4 - 765.2)

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

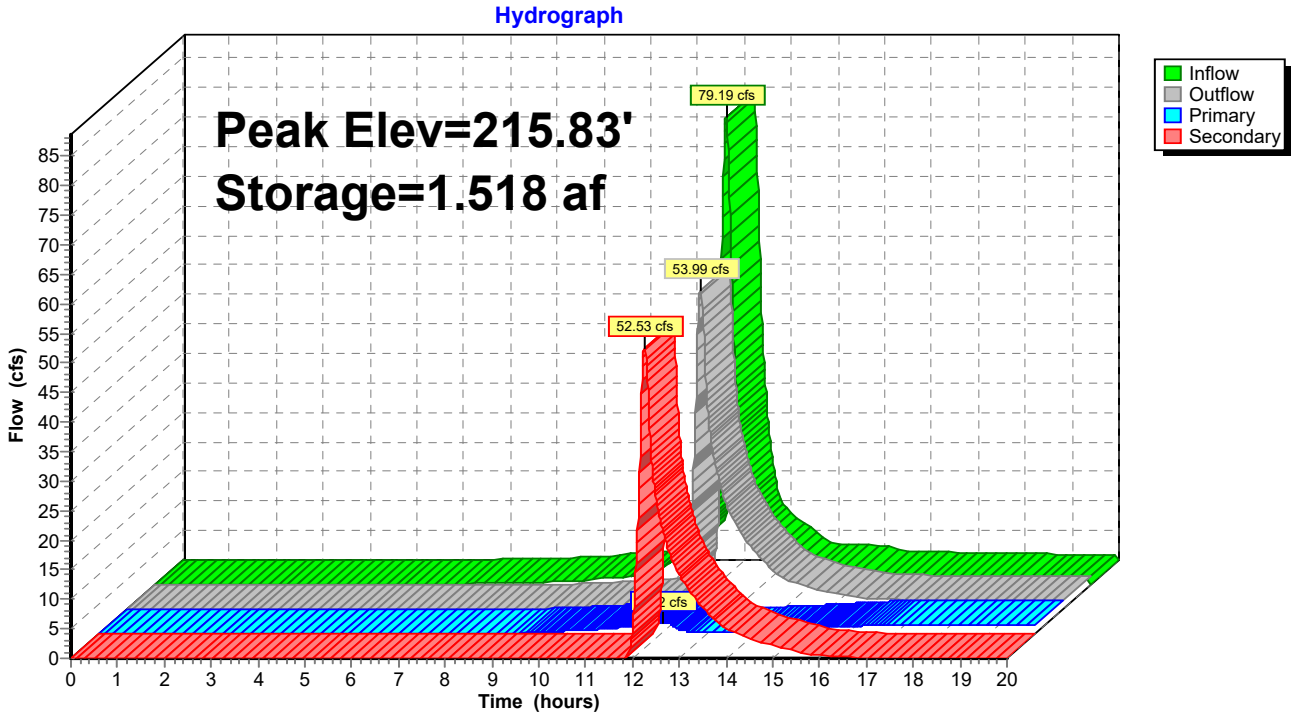
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
212.00	0.280	0.000	0.000	0.280
213.00	0.340	0.310	0.310	0.341
214.00	0.400	0.370	0.679	0.402
215.00	0.460	0.430	1.109	0.463
216.00	0.540	0.499	1.608	0.544
217.00	0.750	0.642	2.250	0.754

Device	Routing	Invert	Outlet Devices
#1	Primary	212.00'	**8.0" Round Culvert** L= 65.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 212.00' / 211.50' S= 0.0077 '/' Cc= 0.900 n= 0.011, Flow Area= 0.35 sf
#2	Secondary	214.00'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=1.90 cfs @ 12.07 hrs HW=214.64' TW=212.71' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 1.90 cfs @ 5.44 fps)

Secondary OutFlow Max=50.85 cfs @ 12.26 hrs HW=215.66' TW=214.65' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 50.85 cfs @ 3.06 fps)

Pond 70: Pond


Hydrograph
Peak Elev=215.83'
Storage=1.518 af
79.19 cfs
53.99 cfs
52.53 cfs
Inflow
Outflow
Primary
Secondary
Flow (cfs)
Time (hours)

Stage-Discharge for Pond 70: Pond

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
212.00	0.00	0.00	0.00
212.05	0.01	0.01	0.00
212.10	0.03	0.03	0.00
212.15	0.07	0.07	0.00
212.20	0.12	0.12	0.00
212.25	0.18	0.18	0.00
212.30	0.25	0.25	0.00
212.35	0.33	0.33	0.00
212.40	0.42	0.42	0.00
212.45	0.51	0.51	0.00
212.50	0.60	0.60	0.00
212.55	0.69	0.69	0.00
212.60	0.77	0.77	0.00
212.65	0.84	0.84	0.00
212.70	0.90	0.90	0.00
212.75	0.96	0.96	0.00
212.80	1.01	1.01	0.00
212.85	1.07	1.07	0.00
212.90	1.12	1.12	0.00
212.95	1.16	1.16	0.00
213.00	1.21	1.21	0.00
213.05	1.26	1.26	0.00
213.10	1.30	1.30	0.00
213.15	1.34	1.34	0.00
213.20	1.38	1.38	0.00
213.25	1.42	1.42	0.00
213.30	1.45	1.45	0.00
213.35	1.49	1.49	0.00
213.40	1.52	1.52	0.00
213.45	1.55	1.55	0.00
213.50	1.58	1.58	0.00
213.55	1.61	1.61	0.00
213.60	1.63	1.63	0.00
213.65	1.66	1.66	0.00
213.70	1.69	1.69	0.00
213.75	1.72	1.72	0.00
213.80	1.75	1.75	0.00
213.85	1.77	1.77	0.00
213.90	1.80	1.80	0.00
213.95	1.82	1.82	0.00
214.00	1.85	1.85	0.00
214.05	2.15	1.87	0.28
214.10	2.69	1.90	0.79
214.15	3.37	1.92	1.45
214.20	4.17	1.95	2.23
214.25	5.11	1.97	3.13
214.30	6.14	1.99	4.15
214.35	7.28	2.02	5.26
214.40	8.52	2.04	6.48
214.45	9.90	2.06	7.83
214.50	11.38	2.09	9.30
214.55	12.98	2.11	10.87
214.60	14.68	2.13	12.55
214.65	16.29	2.15	14.14
214.70	17.96	2.17	15.78
214.75	19.68	2.19	17.49
214.80	21.46	2.22	19.25
214.85	23.30	2.24	21.06
214.90	25.18	2.26	22.92
214.95	27.12	2.28	24.84
215.00	29.10	2.30	26.80
215.05	31.18	2.32	28.86
215.10	33.32	2.34	30.98
215.15	35.50	2.36	33.14
215.20	37.74	2.38	35.36
215.25	39.92	2.40	37.52
215.30	42.14	2.42	39.72
215.35	44.40	2.44	41.96
215.40	46.68	2.46	44.23
215.45	48.96	2.47	46.49
215.50	51.27	2.49	48.78
215.55	53.60	2.51	51.09
215.60	55.96	2.53	53.43
215.65	58.50	2.55	55.95
215.70	61.08	2.57	58.52
215.75	63.70	2.58	61.12
215.80	66.36	2.60	63.75
215.85	69.05	2.62	66.43
215.90	71.78	2.64	69.14
215.95	74.54	2.66	71.89
216.00	77.34	2.67	74.67
216.05	80.18	2.69	77.49
216.10	83.05	2.71	80.34
216.15	85.95	2.73	83.23
216.20	88.89	2.74	86.15
216.25	91.86	2.76	89.10
216.30	94.86	2.78	92.09
216.35	97.90	2.79	95.11
216.40	100.97	2.81	98.16
216.45	104.07	2.83	101.24
216.50	107.20	2.84	104.36
216.55	110.36	2.86	107.50
216.60	113.55	2.88	110.68
216.65	116.78	2.89	113.89
216.70	120.03	2.91	117.12
216.75	123.32	2.92	120.39
216.80	126.63	2.94	123.69
216.85	129.97	2.95	127.02
216.90	133.35	2.97	130.38
216.95	136.75	2.99	133.76
217.00	**140.18**	**3.00**	**137.18**

Summary for Pond 75: Pond

Inflow	=	53.99 cfs @	12.26 hrs,	Volume=	4.248 af
Outflow	=	28.43 cfs @	12.49 hrs,	Volume=	4.045 af, Atten= 47%, Lag= 14.1 min
Discarded	=	0.23 cfs @	12.49 hrs,	Volume=	0.123 af
Primary	=	28.20 cfs @	12.49 hrs,	Volume=	3.922 af
Secondary	=	0.00 cfs @	0.00 hrs,	Volume=	0.000 af

Routing by Sim-Route method, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs
Peak Elev= 215.68' @ 12.49 hrs Surf.Area= 0.361 ac Storage= 1.057 af

Plug-Flow detention time= 51.4 min calculated for 4.043 af (95% of inflow)
Center-of-Mass det. time= 34.4 min (843.7 - 809.3)

Volume	Invert	Avail.Storage	Storage Description
#1	211.50'	1.583 af	**Custom Stage Data (Conic)** Listed below (Recalc)

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

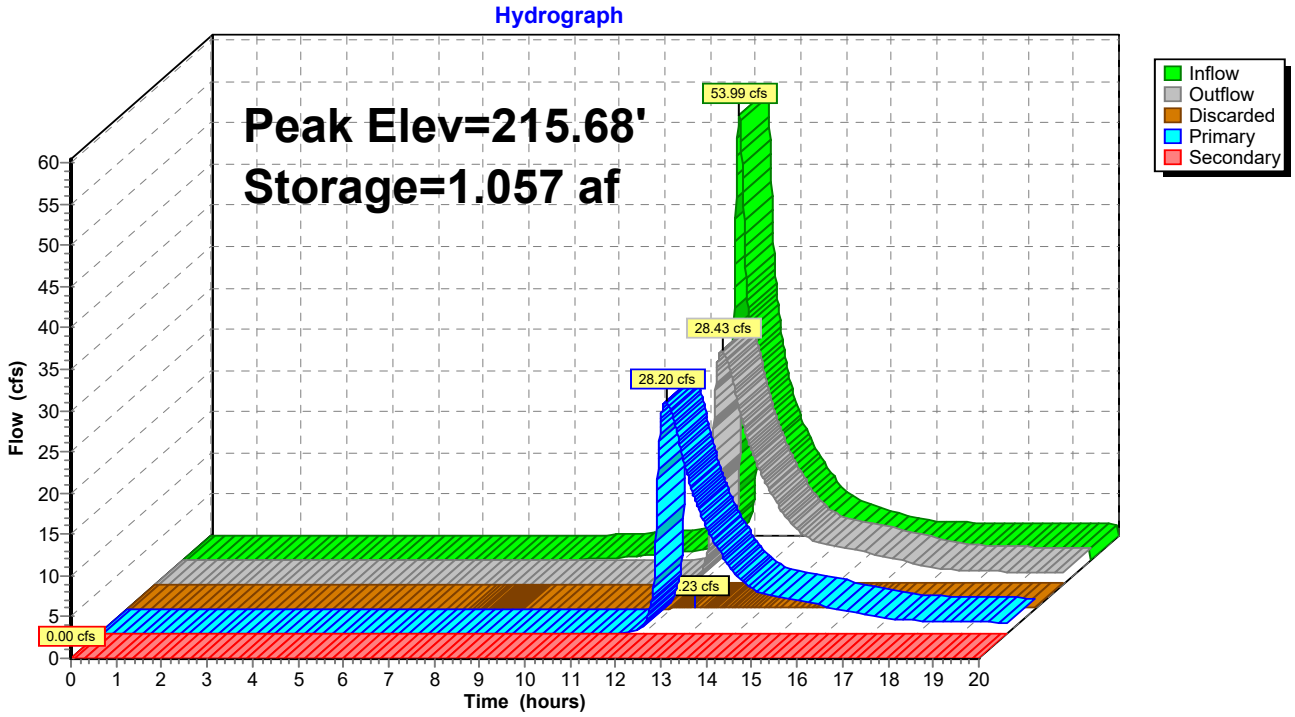
Device	Routing	Invert	Outlet Devices
#1	Discarded	211.50'	**0.500 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 200.00' Phase-In= 0.01'
#2	Primary	212.00'	**12.0" Vert. Orifice/Grate** C= 0.600
#3	Primary	214.00'	**3.0' long Sharp-Crested Rectangular Weir** 0 End Contraction(s)
#4	Secondary	214.00'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Discarded OutFlow Max=0.23 cfs @ 12.49 hrs HW=215.68' (Free Discharge)
└**1=Exfiltration** (Controls 0.23 cfs)

Primary OutFlow Max=28.20 cfs @ 12.49 hrs HW=215.68' TW=0.00' (Dynamic Tailwater)
├**2=Orifice/Grate** (Orifice Controls 6.75 cfs @ 8.59 fps)
└**3=Sharp-Crested Rectangular Weir** (Weir Controls 21.45 cfs @ 4.24 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=211.50' TW=212.00' (Dynamic Tailwater)
└**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 75: Pond


Hydrograph
Peak Elev=215.68'
Storage=1.057 af
53.99 cfs
28.43 cfs
28.20 cfs
.23 cfs
0.00 cfs
Inflow
Outflow
Discarded
Primary
Secondary
Flow (cfs)
Time (hours)
0 5 10 15 20 25 30 35 40 45 50 55 60
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

Stage-Discharge for Pond 75: Pond

Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)	Secondary (cfs)
211.50	0.00	0.00	0.00	0.00
211.70	0.09	0.09	0.00	0.00
211.90	0.09	0.09	0.00	0.00
212.10	0.14	0.10	0.04	0.00
212.30	0.47	0.10	0.37	0.00
212.50	1.05	0.11	0.95	0.00
212.70	1.79	0.11	1.67	0.00
212.90	2.53	0.12	2.40	0.00
213.10	3.06	0.13	2.93	0.00
213.30	3.52	0.13	3.38	0.00
213.50	3.92	0.14	3.78	0.00
213.70	4.29	0.15	4.14	0.00
213.90	4.63	0.16	4.47	0.00
214.10	6.04	0.16	5.09	0.79
214.30	11.01	0.17	6.69	4.15
214.50	18.29	0.18	8.82	9.30
214.70	27.32	0.19	11.35	15.78
214.90	37.35	0.19	14.23	22.92
215.10	48.59	0.20	17.42	30.98
215.30	60.80	0.21	20.87	39.72
215.50	73.57	0.22	24.57	48.78
215.70	87.25	0.23	28.51	58.52
215.90	102.04	0.24	32.67	69.14
216.10	117.62	0.25	37.03	80.34
216.30	133.93	0.26	41.59	92.09
216.50	150.96	0.27	46.34	104.36
216.70	168.67	0.27	51.27	117.12
216.90	**187.04**	**0.28**	**56.38**	**130.38**

Summary for Pond 80: Pond

Inflow	=	98.63 cfs @	12.22 hrs, Volume=	6.190 af
Outflow	=	72.87 cfs @	12.33 hrs, Volume=	5.373 af, Atten= 26%, Lag= 6.4 min
Primary	=	4.57 cfs @	12.21 hrs, Volume=	0.863 af
Secondary	=	68.81 cfs @	12.33 hrs, Volume=	4.510 af

Routing by Sim-Route method, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs
Peak Elev= 215.89' @ 12.33 hrs Surf.Area= 0.611 ac Storage= 1.853 af

Plug-Flow detention time= 88.9 min calculated for 5.373 af (87% of inflow)
Center-of-Mass det. time= 53.4 min (821.5 - 768.1)

Volume	Invert	Avail.Storage	Storage Description
#1	212.00'	2.598 af	**Custom Stage Data (Conic)** Listed below (Recalc)

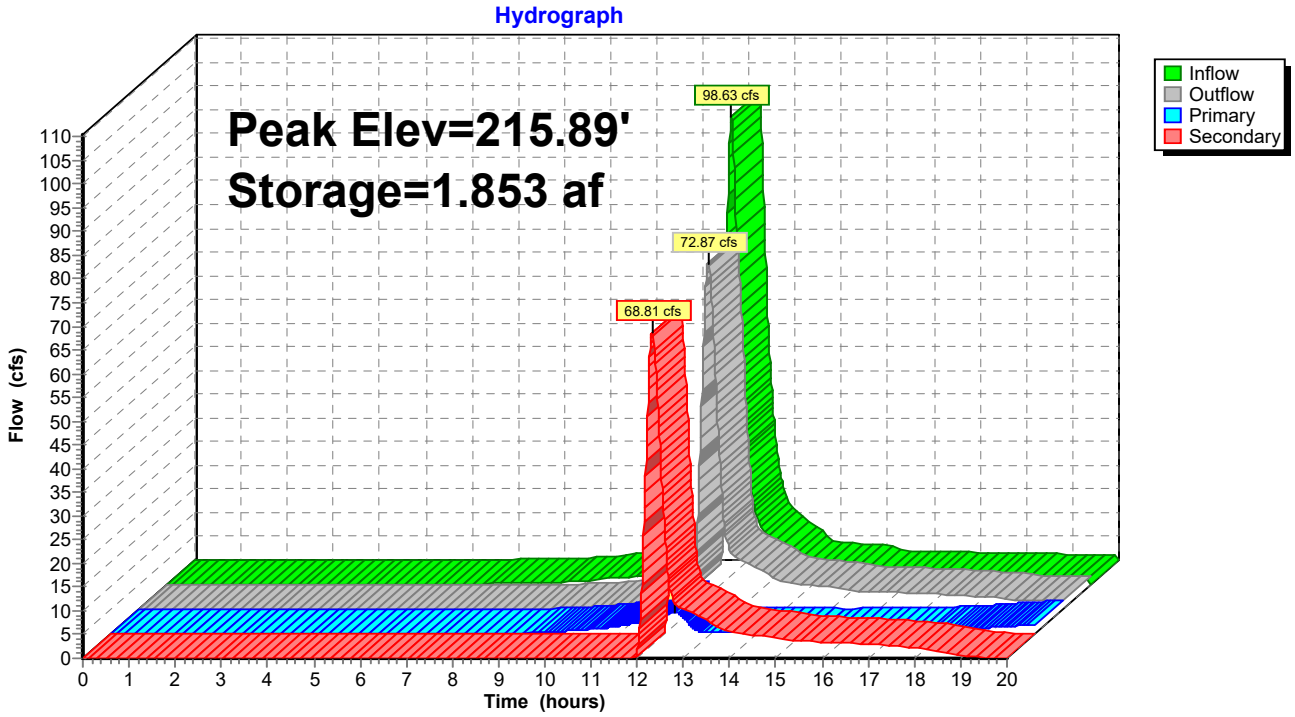
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
212.00	0.360	0.000	0.000	0.360
213.00	0.410	0.385	0.385	0.411
214.00	0.480	0.445	0.829	0.482
215.00	0.540	0.510	1.339	0.543
216.00	0.620	0.580	1.919	0.624
217.00	0.740	0.679	2.598	0.745

Device	Routing	Invert	Outlet Devices
#1	Primary	212.00'	**8.0" Round Culvert X 2.00** L= 60.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 212.00' / 211.50' S= 0.0083 '/' Cc= 0.900 n= 0.011, Flow Area= 0.35 sf
#2	Secondary	214.00'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=4.51 cfs @ 12.21 hrs HW=215.47' TW=212.87' (Dynamic Tailwater)
1=Culvert (Outlet Controls 4.51 cfs @ 6.46 fps)

Secondary OutFlow Max=68.81 cfs @ 12.33 hrs HW=215.89' TW=213.88' (Dynamic Tailwater)
2=Broad-Crested Rectangular Weir (Weir Controls 68.81 cfs @ 3.63 fps)

Pond 80: Pond


Hydrograph
Peak Elev=215.89'
Storage=1.853 af
98.63 cfs
72.87 cfs
68.81 cfs
Inflow
Outflow
Primary
Secondary
Flow (cfs)
Time (hours)

Stage-Discharge for Pond 80: Pond

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
212.00	0.00	0.00	0.00
212.05	0.02	0.02	0.00
212.10	0.06	0.06	0.00
212.15	0.14	0.14	0.00
212.20	0.24	0.24	0.00
212.25	0.36	0.36	0.00
212.30	0.50	0.50	0.00
212.35	0.66	0.66	0.00
212.40	0.83	0.83	0.00
212.45	1.01	1.01	0.00
212.50	1.19	1.19	0.00
212.55	1.37	1.37	0.00
212.60	1.54	1.54	0.00
212.65	1.68	1.68	0.00
212.70	1.80	1.80	0.00
212.75	1.91	1.91	0.00
212.80	2.03	2.03	0.00
212.85	2.13	2.13	0.00
212.90	2.23	2.23	0.00
212.95	2.33	2.33	0.00
213.00	2.42	2.42	0.00
213.05	2.51	2.51	0.00
213.10	2.60	2.60	0.00
213.15	2.68	2.68	0.00
213.20	2.76	2.76	0.00
213.25	2.84	2.84	0.00
213.30	2.92	2.92	0.00
213.35	2.99	2.99	0.00
213.40	3.06	3.06	0.00
213.45	3.13	3.13	0.00
213.50	3.20	3.20	0.00
213.55	3.27	3.27	0.00
213.60	3.34	3.34	0.00
213.65	3.40	3.40	0.00
213.70	3.46	3.46	0.00
213.75	3.52	3.52	0.00
213.80	3.57	3.57	0.00
213.85	3.63	3.63	0.00
213.90	3.68	3.68	0.00
213.95	3.73	3.73	0.00
214.00	3.79	3.79	0.00
214.05	4.12	3.84	0.28
214.10	4.67	3.89	0.79
214.15	5.38	3.94	1.45
214.20	6.21	3.99	2.23
214.25	7.17	4.04	3.13
214.30	8.23	4.08	4.15
214.35	9.40	4.13	5.26
214.40	10.65	4.18	6.48
214.45	12.06	4.22	7.83
214.50	13.57	4.27	9.30
214.55	15.19	4.32	10.87
214.60	16.91	4.36	12.55
214.65	18.54	4.41	14.14
214.70	20.23	4.45	15.78
214.75	21.98	4.49	17.49
214.80	23.78	4.54	19.25
214.85	25.64	4.58	21.06
214.90	27.55	4.62	22.92
214.95	29.50	4.66	24.84
215.00	31.51	4.71	26.80
215.05	33.61	4.75	28.86
215.10	35.76	4.79	30.98
215.15	37.97	4.83	33.14
215.20	40.23	4.87	35.36
215.25	42.43	4.91	37.52
215.30	44.67	4.95	39.72
215.35	46.95	4.99	41.96
215.40	49.26	5.03	44.23
215.45	51.55	5.07	46.49
215.50	53.88	5.10	48.78
215.55	56.23	5.14	51.09
215.60	58.61	5.18	53.43
215.65	61.17	5.22	55.95
215.70	63.77	5.26	58.52
215.75	66.41	5.29	61.12
215.80	69.08	5.33	63.75
215.85	71.80	5.37	66.43
215.90	74.54	5.40	69.14
215.95	77.33	5.44	71.89
216.00	80.14	5.47	74.67
216.05	83.00	5.51	77.49
216.10	85.88	5.54	80.34
216.15	88.81	5.58	83.23
216.20	91.76	5.61	86.15
216.25	94.75	5.65	89.10
216.30	97.77	5.68	92.09
216.35	100.82	5.72	95.11
216.40	103.91	5.75	98.16
216.45	107.03	5.79	101.24
216.50	110.18	5.82	104.36
216.55	113.35	5.85	107.50
216.60	116.57	5.89	110.68
216.65	119.81	5.92	113.89
216.70	123.08	5.95	117.12
216.75	126.38	5.99	120.39
216.80	129.71	6.02	123.69
216.85	133.07	6.05	127.02
216.90	136.46	6.08	130.38
216.95	139.88	6.11	133.76
217.00	**143.32**	**6.15**	**137.18**

Summary for Pond 85: Pond

Inflow	=	72.87 cfs @	12.33 hrs,	Volume=	5.371 af
Outflow	=	10.77 cfs @	12.99 hrs,	Volume=	4.329 af, Atten= 85%, Lag= 40.0 min
Discarded	=	0.50 cfs @	12.99 hrs,	Volume=	0.345 af
Primary	=	10.28 cfs @	12.99 hrs,	Volume=	3.984 af
Secondary	=	0.00 cfs @	0.00 hrs,	Volume=	0.000 af

Routing by Sim-Route method, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs
Peak Elev= 215.52' @ 12.99 hrs Surf.Area= 0.776 ac Storage= 2.449 af

Plug-Flow detention time= 163.1 min calculated for 4.327 af (81% of inflow)
Center-of-Mass det. time= 109.0 min (930.3 - 821.4)

Volume	Invert	Avail.Storage	Storage Description
#1	211.50'	3.672 af	**Custom Stage Data (Conic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
211.50	0.370	0.000	0.000	0.370
212.00	0.470	0.210	0.210	0.470
213.00	0.570	0.519	0.729	0.571
214.00	0.670	0.619	1.348	0.672
215.00	0.740	0.705	2.053	0.743
216.00	0.810	0.775	2.827	0.815
217.00	0.880	0.845	3.672	0.887

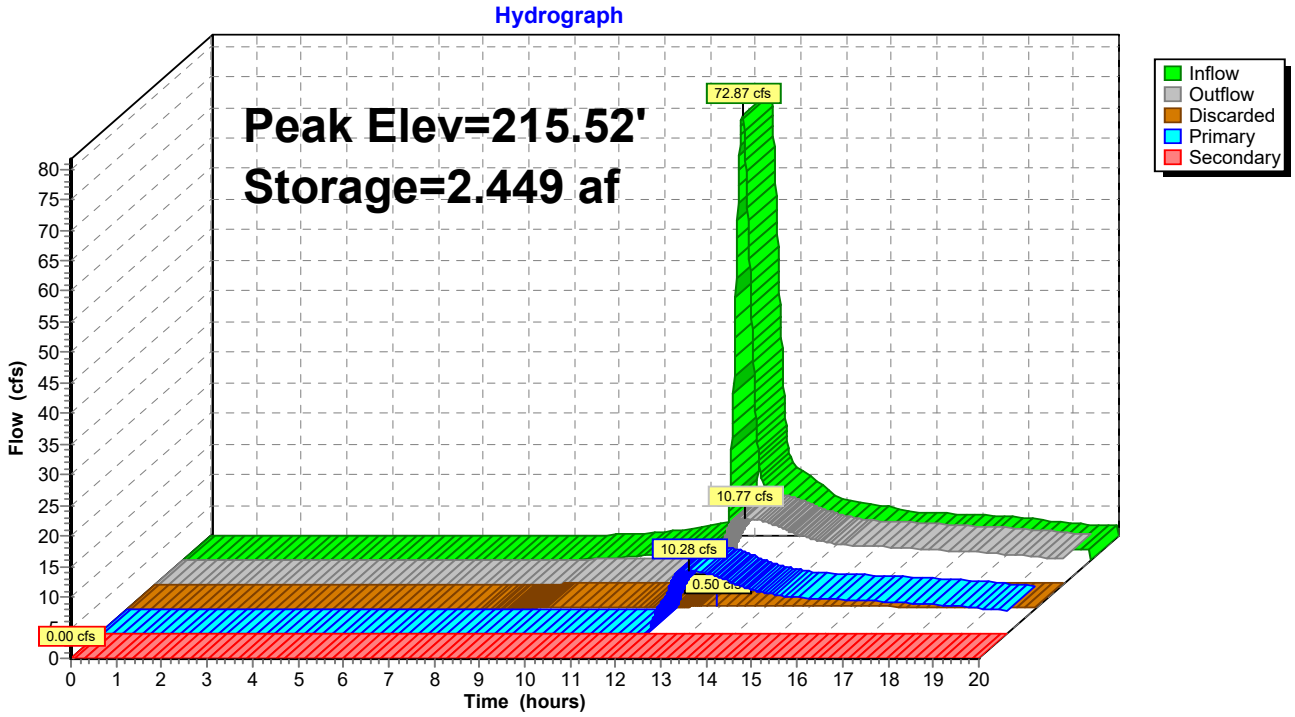
Device	Routing	Invert	Outlet Devices
#1	Discarded	211.50'	**0.500 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 200.00' Phase-In= 0.01'
#2	Primary	212.00'	**12.0" Vert. Orifice/Grate** C= 0.600
#3	Primary	215.00'	**3.0' long Sharp-Crested Rectangular Weir** 0 End Contraction(s)
#4	Secondary	214.00'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Discarded OutFlow Max=0.50 cfs @ 12.99 hrs HW=215.52' (Free Discharge)
└**1=Exfiltration** (Controls 0.50 cfs)

Primary OutFlow Max=10.28 cfs @ 12.99 hrs HW=215.52' TW=0.00' (Dynamic Tailwater)
├**2=Orifice/Grate** (Orifice Controls 6.57 cfs @ 8.37 fps)
└**3=Sharp-Crested Rectangular Weir** (Weir Controls 3.70 cfs @ 2.36 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=211.50' TW=212.00' (Dynamic Tailwater)
└**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 85: Pond


Hydrograph
Peak Elev=215.52'
Storage=2.449 af
72.87 cfs
10.77 cfs
10.28 cfs
0.50 cfs
0.00 cfs
Inflow
Outflow
Discarded
Primary
Secondary
Flow (cfs)
Time (hours)

Stage-Discharge for Pond 85: Pond

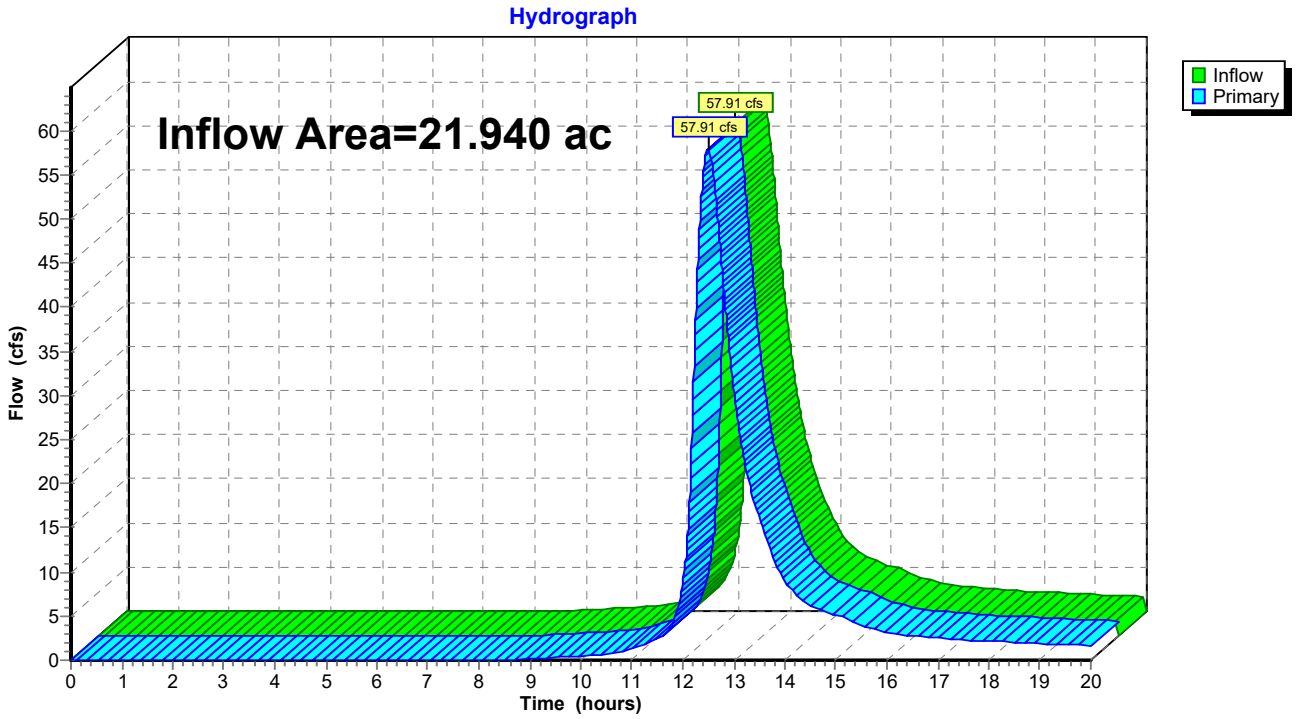
Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)	Secondary (cfs)
211.50	0.00	0.00	0.00	0.00
211.70	0.21	0.21	0.00	0.00
211.90	0.23	0.23	0.00	0.00
212.10	0.30	0.25	0.04	0.00
212.30	0.64	0.27	0.37	0.00
212.50	1.23	0.28	0.95	0.00
212.70	1.97	0.30	1.67	0.00
212.90	2.72	0.31	2.40	0.00
213.10	3.26	0.33	2.93	0.00
213.30	3.72	0.34	3.38	0.00
213.50	4.14	0.36	3.78	0.00
213.70	4.52	0.37	4.14	0.00
213.90	4.86	0.39	4.47	0.00
214.10	5.97	0.40	4.78	0.79
214.30	9.64	0.42	5.07	4.15
214.50	15.08	0.43	5.35	9.30
214.70	21.83	0.44	5.61	15.78
214.90	29.24	0.46	5.86	22.92
215.10	37.85	0.47	6.41	30.98
215.30	48.15	0.48	7.94	39.72
215.50	59.29	0.50	10.02	48.78
215.70	71.54	0.51	12.51	58.52
215.90	85.01	0.52	15.35	69.14
216.10	99.37	0.54	18.49	80.34
216.30	114.55	0.55	21.91	92.09
216.50	130.51	0.56	25.59	104.36
216.70	147.20	0.58	29.49	117.12
216.90	**164.59**	**0.59**	**33.62**	**130.38**

Summary for Link 15L: North Drainage

Inflow Area = 21.940 ac, 21.58% Impervious, Inflow Depth > 3.68" for 100-yr event
Inflow = 57.91 cfs @ 12.48 hrs, Volume= 6.732 af
Primary = 57.91 cfs @ 12.49 hrs, Volume= 6.732 af, Atten= 0%, Lag= 0.6 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs

Link 15L: North Drainage

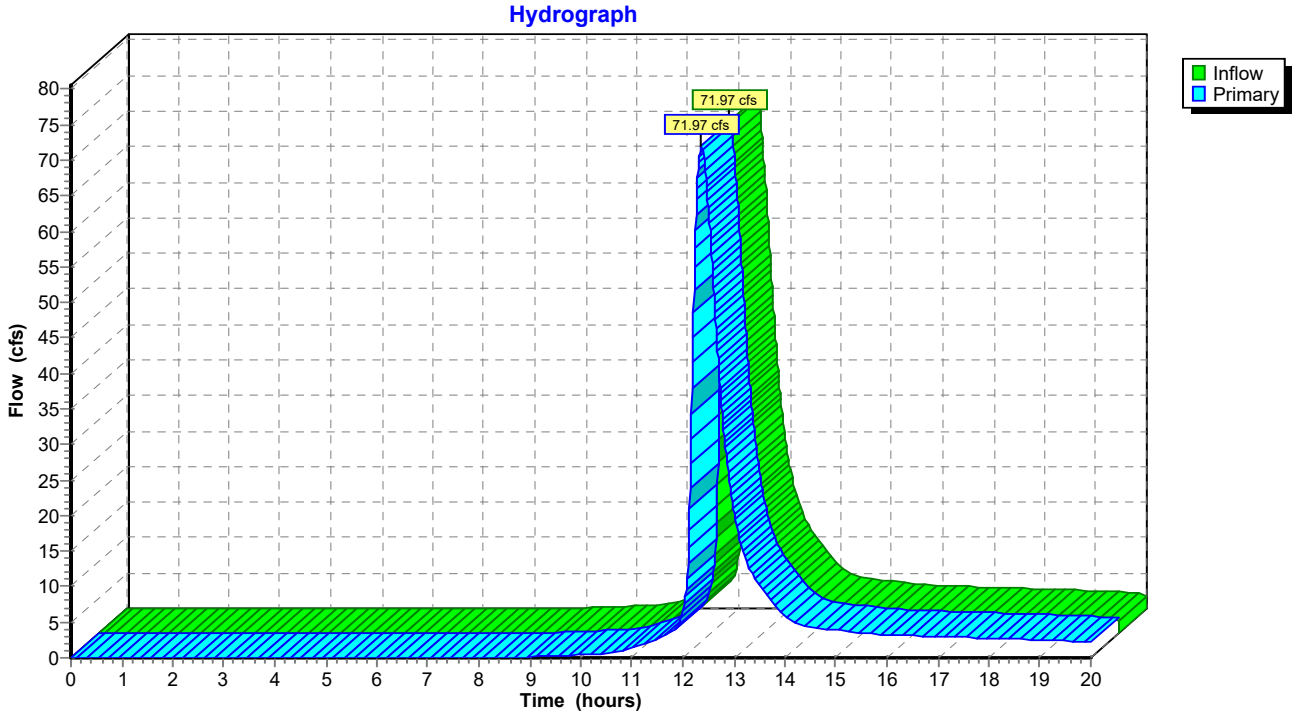


Summary for Link 35L: East to White Oak Way

Inflow = 71.97 cfs @ 12.35 hrs, Volume= 6.339 af
Primary = 71.97 cfs @ 12.36 hrs, Volume= 6.339 af, Atten= 0%, Lag= 0.6 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs

Link 35L: East to White Oak Way

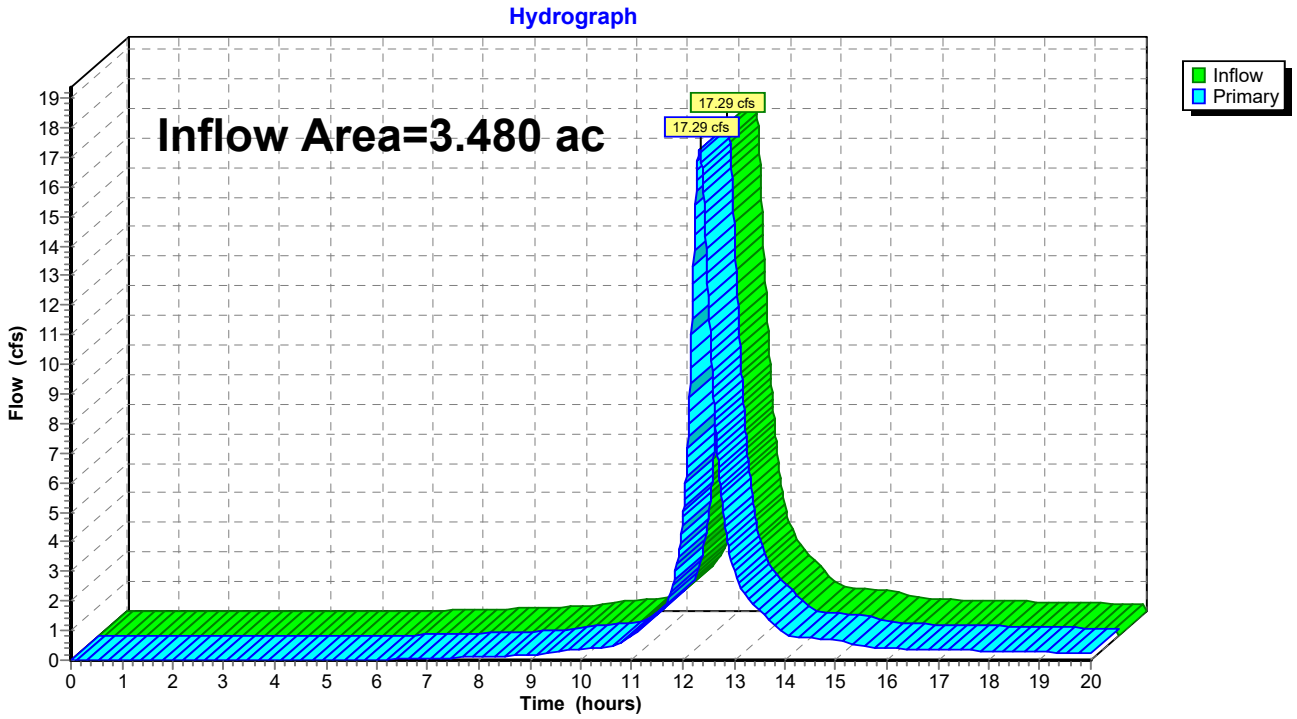


Summary for Link 45L: East to Hawthorn Hill Drive

Inflow Area = 3.480 ac, 29.59% Impervious, Inflow Depth > 4.73" for 100-yr event
Inflow = 17.29 cfs @ 12.33 hrs, Volume= 1.372 af
Primary = 17.29 cfs @ 12.34 hrs, Volume= 1.372 af, Atten= 0%, Lag= 0.6 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs

Link 45L: East to Hawthorn Hill Drive

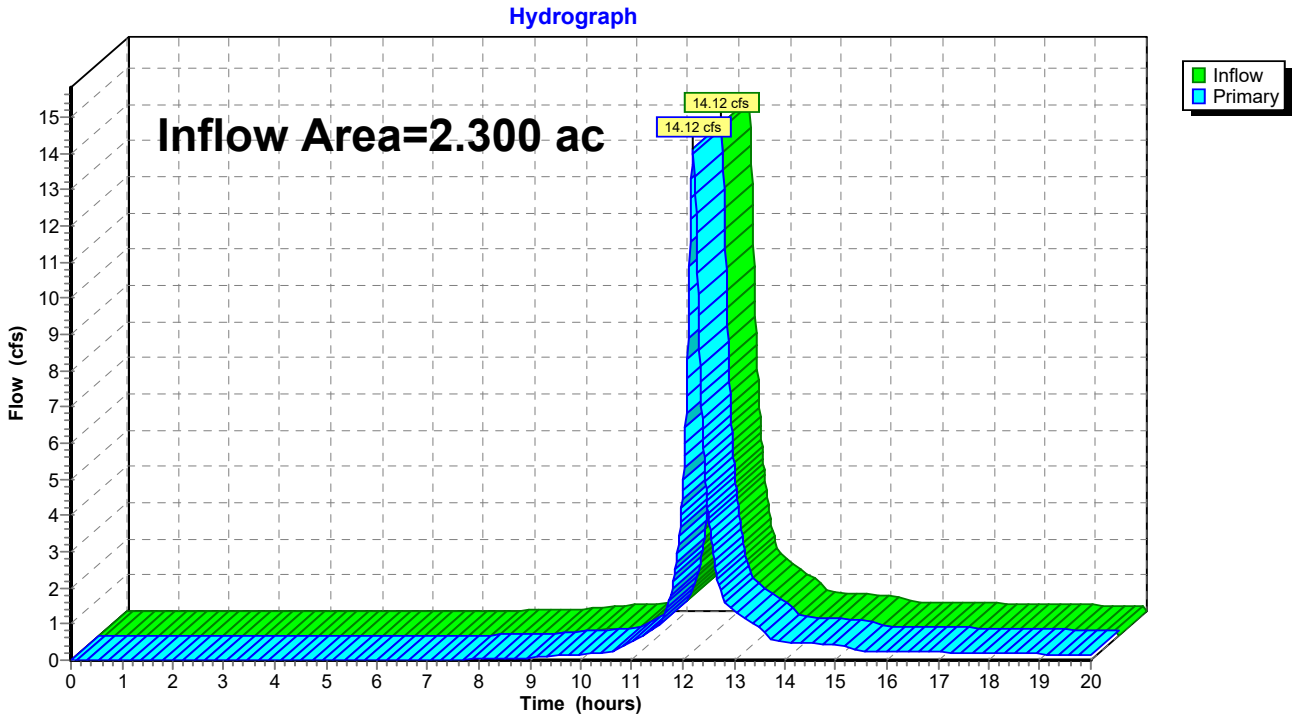


Summary for Link 55: East to Summit Avenue

Inflow Area = 2.300 ac, 20.32% Impervious, Inflow Depth > 4.20" for 100-yr event
Inflow = 14.12 cfs @ 12.20 hrs, Volume= 0.805 af
Primary = 14.12 cfs @ 12.21 hrs, Volume= 0.805 af, Atten= 0%, Lag= 0.6 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs

Link 55: East to Summit Avenue

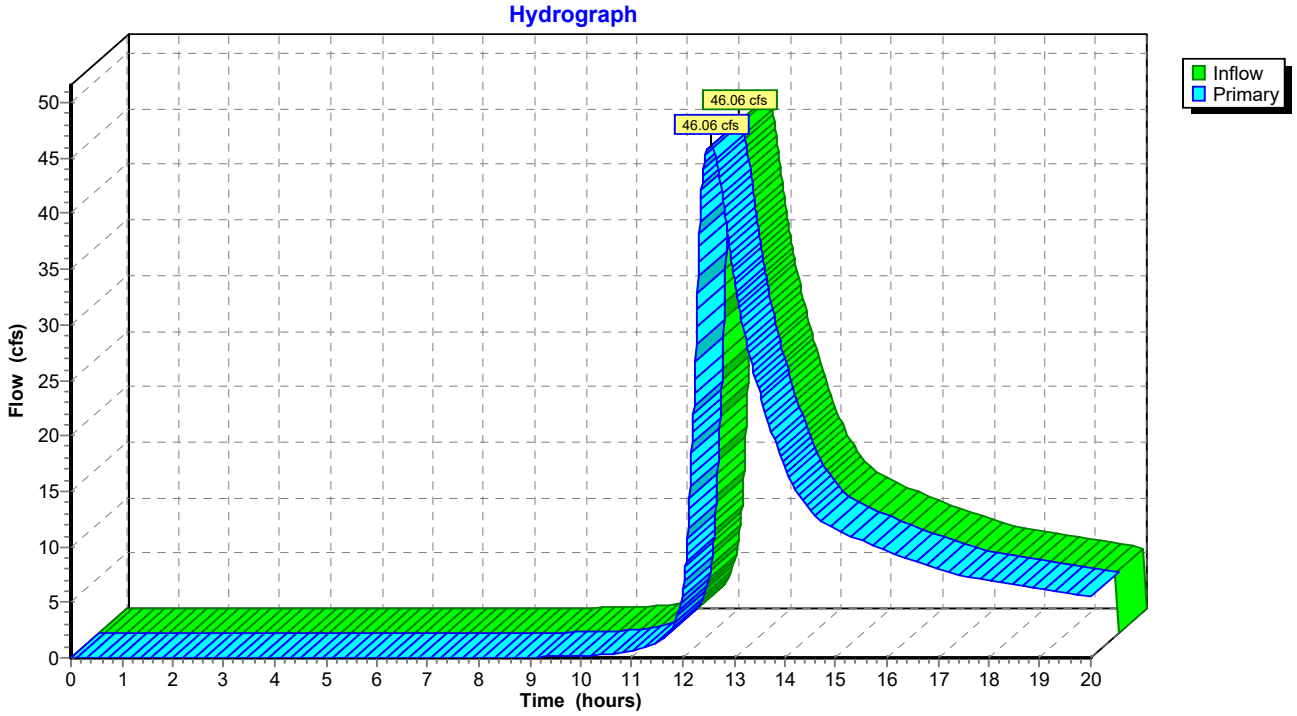


Summary for Link 95: West Drainage

Inflow = 46.06 cfs @ 12.55 hrs, Volume= 9.441 af
Primary = 46.06 cfs @ 12.56 hrs, Volume= 9.441 af, Atten= 0%, Lag= 0.6 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs

Link 95: West Drainage

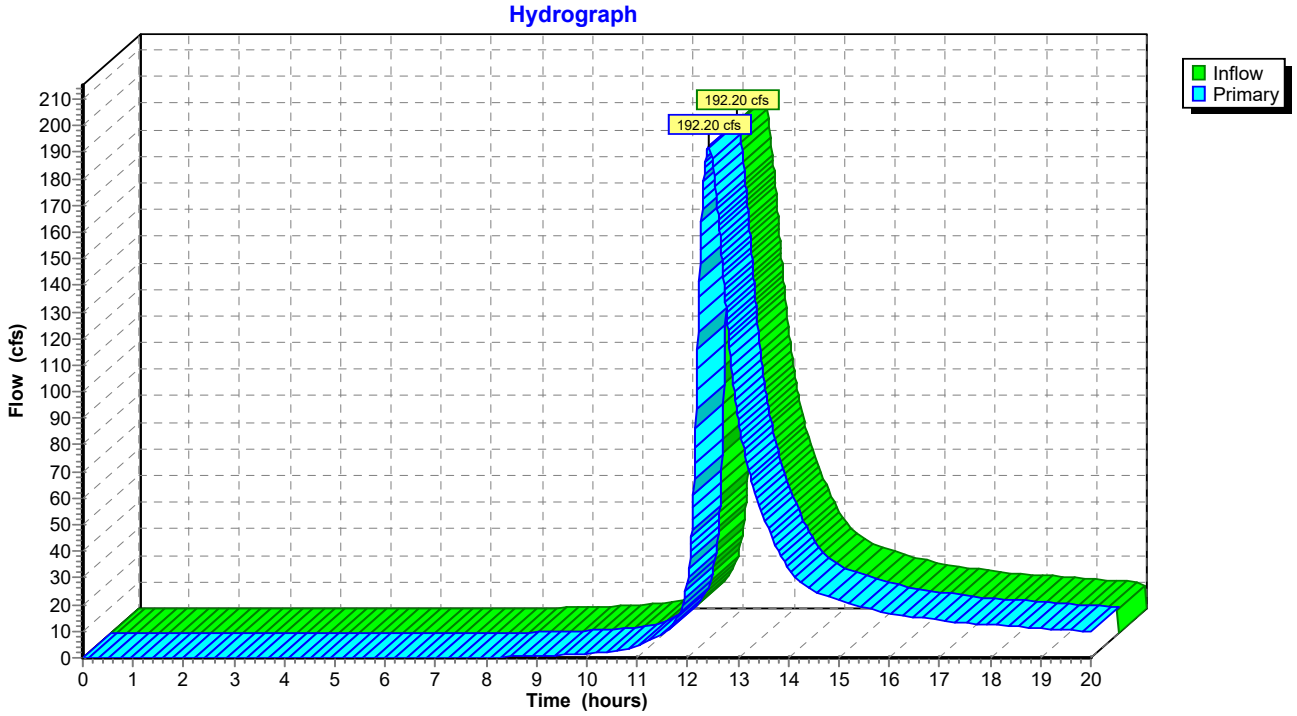


Summary for Link 99: Total Existing Flow

Inflow = 192.20 cfs @ 12.41 hrs, Volume= 24.681 af
Primary = 192.20 cfs @ 12.42 hrs, Volume= 24.681 af, Atten= 0%, Lag= 0.6 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs

Link 99: Total Existing Flow



SLAMM ANALYSIS

SLAMM Analysis Results

FOR: Skyline Subdivision
LOCATION: Waukesha, Wisconsin

Land Use	Particulate Solids (lbs)							Treatment System		% Removed	
	Roof	Drive	Street	Sidewalk	Landscape	Undeveloped	Total	lbs IN	lbs OUT		
Subarea 5	378.2	997.1	1539.0	298.6	1131.5	1.0	4345.4	4345.4	714.0	84%	Pond 5
Subarea 10 - undetained	67.1			107.9			175.0	175.0	15.8	91%	Disconnected Impevious
Subarea 20	100.7	265.9	488.6	89.9	298.6		1243.7	1243.7	304.8	75%	Pond 25
Subarea 25 - undetained	64.9			104.3			169.2	169.2	15.3	91%	Disconnected Impevious
Subarea 30	183.5	487.5	1222.0	197.9	586.6	1.9	2679.3	2679.3	506.1	81%	Pond 35 and Infiltration Basin
Subarea 40 - undetained	91.7	236.3	407.8	75.5	217.53		1028.9	1028.9	1028.9	0%	
Subarea 50 - undetained	40.3			64.7			105.0	105.0	9.5	91%	Disconnected Impevious
Subarea 60 - undetained	33.6			54.0			87.5	87.5	7.9	91%	Disconnected Impevious
Subarea 70	246.1	649.9	1652.0	266.2	794.6		3608.8	3608.8	519.9	86%	Pond 75 and Infiltration Basin
Subarea 80	331.2	878.9	1554.0	284.2	1129.4	0.3	4178.0	4178.0	399.0	90%	Pond 80 and Infiltration Basin
Subarea 90 - undetained							0.0				
Total	1537.3	3515.6	6863.4	1543.3	4158.2	3.2	17620.9	17620.9	3521.1	80%	

NR151.122 TSS Removal Summary

Redevelopment ~ 4.41 acres @ 40% TSS
New Development ~ 75.49 acres @ 80% TSS
Total Site ~ 79.90 acres

Weighted Removal Rate: **78%**