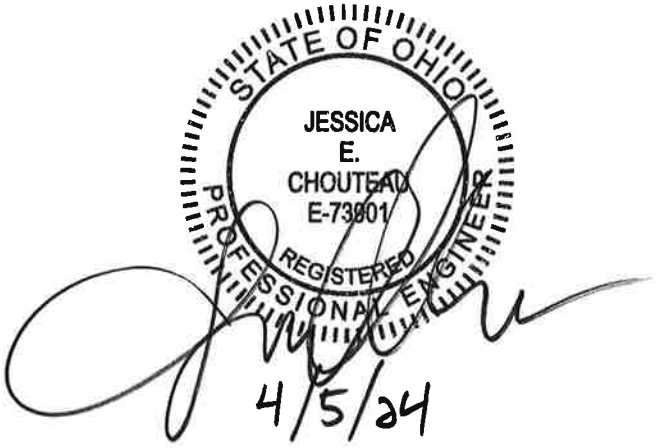
AVONDALE WOODS SECTIONS 2 & 3

Stormwater Management Plan (SWMP)

Prepared For: Homewood Corporation

June 30, 2023

Revised: April 5, 2024



EMH&T

Engineers, Surveyors, Planners, Scientists
5500 New Albany Rd., Columbus, OH 43054
p. 614.775.4500 f. 614.775.4800
emht.com

2023-0604

TABLE OF CONTENTS

TABLES

APPENDICES

1.0 INTRODUCTION

The following report provides a detailed analysis and design of the Stormwater Management Plan for Avondale Woods Sections 2 & 3. The original Avondale Woods Phase 1 and 2 report was approved in October 2010. The initial basin grading and construction occurred with this plan and report approval. The Avondale Woods Section 1 plan and report were revised in April of 2017 to expand the basin contours on Wet Basin 01 to account for the final full build impervious area instead of just the sediment basin phase. This report revises the Section 1 report with final impervious and storm sewer layouts for the Avondale Woods Sections 2 & 3.

The proposed site is located north of Hayden Run Boulevard, west of Avery Road, and east of the existing railroad tracks. The proposed project area involves the development of agricultural land into a mixed residential development. The runoff from this site will be routed through a dry basin for quantity control and a wet basin for water quality and quantity control before discharging into an existing 48" storm sewer (per the allowable release rates set by the Stormwater Master Plan for Avery/Hayden Run/Cosgray Road Development dated January, 2004) which discharges to an existing detention facility and eventually discharges into Hayden Run near I-270.

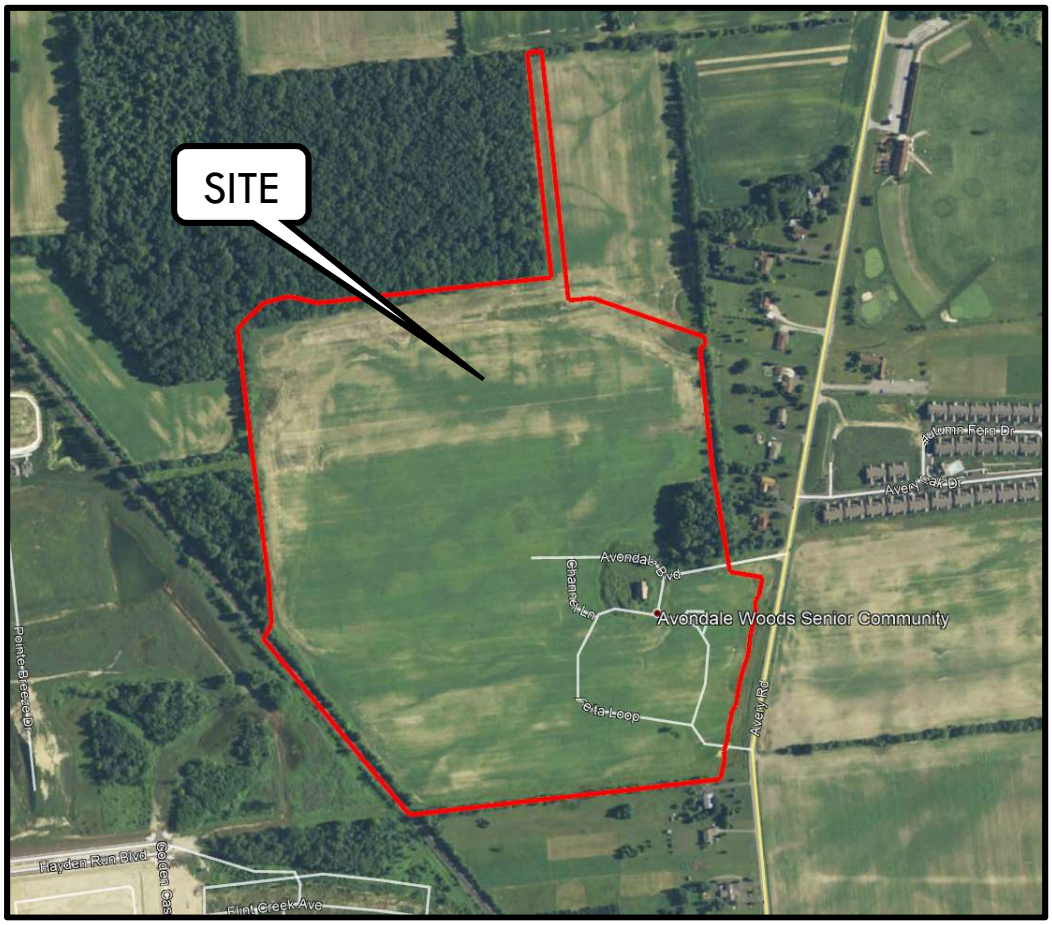


Figure 1 – Site Location Map

2.0 HYDROLOGIC ANALYSIS

Hydrologic parameters such as Runoff Curve Number (RCN) and Time of Concentration were determined using standard Natural Resources Conservation Service (NRCS) methodology. The 1-, 2-, 5-, 10-, 25-, 50-, and 100-year storm event discharge amounts were calculated using the NRCS TR-55 method. This analysis reflects the NRCS Type II distribution, 24-hr storm duration. Rainfall depths were obtained from NOAA Atlas 14, Volume 2, Version 3, 2004. The peak flow rates were computed using the HydroCAD 10.10 computer program.

3.0 PRE-DEVELOPED ANALYSIS

The pre-developed condition, as seen on Exhibit 1 in Appendix E, consists of agricultural land in good condition in Type "C" soils (Crosby silt loam, Kokomo silty clay loam, and Lewisburg-Crosby complex) which corresponds to a Runoff Curve Number of 78. The pre-developed subareas are located within subareas 120, 150, and 920 of the Brown/Horch Creek (120, 150) and Hirth/Wolpert Creek (920) Watersheds per the City of Dublin's Stormwater Master Plan. Pre-developed 01 naturally drains to the east toward Avery Road within the Brown/Horch Creek watersheds. Pre-developed 02 naturally drains to the northeast toward Avery Road in the Hirth/Wolpert Creek Watershed. The Brown/Horch Creek watershed is the ultimate outfall for the site. Therefore, Pre-developed 02 and any drainage in the Hirth/Wolpert Creek Watershed will be considered diversions.

All pre-developed subarea characteristics are summarized in Table 1. Pre-developed peak flow rates are provided in Table 2. Pre-developed 02 will be a diversion in the proposed condition, but pre-developed peak flow rates have still been provided in Table 2. All time of concentration calculations can be found in the HydroCAD output in Appendix D.

Table 1 -Pre-developed Subarea Characteristics

Subarea Identifier	Tributary Area (acres)	Land Usage	Runoff Curve Number	% Impervious (%)	Time of Concentration (min)	1-year Runoff Volume (ac-ft)
Pre-Developed 01	84.259	Agricultural and Wooded Land	78	0%	39.6	4.217
Pre-Developed 02	5.742	Agricultural Land	78	0%	29.3	0.287
Total	**90.001**	**-**	**78**	**0%**	**-**	**4.504**

Table 2 -Pre-developed Peak Flow Rates

Storm Event (year)	Pre-developed 01 Peak Flow Rates (cfs)	Pre-developed 02 Peak Flow Rates (cfs)
1	31.92	2.71
2	49.15	4.14
5	76.33	6.40
10	100.22	8.38
25	135.37	11.29
50	165.50	13.79
100	197.87	16.47

4.0 POST-DEVELOPED ANALYSIS

Exhibit 2, provided within Appendix E, shows the post-developed condition. The Avondale Woods Sections 2 & 3 project will utilize a dry basin for quantity control and a wet basin for water quality and quantity control for the proposed development. Subarea 01, which consists of multi-family residential, and Offsite 01, which consists of a section of Avery Road and open space on the east of the site, will drain to Dry Basin 02. Dry Basin 02 will be used for quantity control only before discharging to Wet Basin 01. Dry Basin 02 was designed under the stormwater management plan for Avondale Woods Phase 1 and 2 project dated October, 2010. The remaining onsite and offsite areas will drain to Wet Basin 01 directly. Subarea 02 and Subarea 03 consist of multi-family residential, while Subarea 04 consists of single-family residential. Offsite 02 consists of grassy open space southwest of the existing railroad tracks that drain to and existing 12" storm sewer onto the site. Offsite 03 and Offsite 04 both consist of a mixture of agricultural land and wooded area. Offsite 04 is being considered a diversion since it naturally drains to the Hirth/Wolpert Creek Watershed, but will be pulled into the Brown/Horch Creek Watershed with the development. The post-developed subarea characteristics are summarized in Table 3. All time of concentration calculations can be found in the HydroCAD output in Appendix D.

Table 3 -Post-developed Subarea Characteristics

Subarea Identifier	Tributary Area (acres)	Tributary to:	Land Usage	Runoff Curve Number	% Impervious (%)	Time of Concentration (min)	1-year Runoff Volume (ac-ft)
Subarea 01	10.927	Dry Basin 02	Multi-family residential	90	65%	10.7	1.153
Subarea 02	7.326	Wet Basin 01	Multi-family residential	90	65%	12.9	0.773
Subarea 03	28.438	Wet Basin 01	Multi-family residential	90	65%	16.1	3.001
Subarea 04	43.310	Wet Basin 01	Single-family residential	83	38%	15.8	3.014
Onsite Total	**90.001**	**-**	**-**	**87**	**52%**	**-**	**7.941**
Offsite 01	3.105	Dry Basin 02	Open Space and Impervious Area	79	19%	30.1	N/A
Offsite 02	4.238	Wet Basin 01	Open Space	74	0%	23.4	N/A
Offsite 03	7.199	Wet Basin 01	Agricultural and Wooded Land	72	0%	37.5	N/A
Offsite 04 (Diversion)	21.494	Wet Basin 01	Agricultural and Wooded Land	71	0%	62.4	0.627
Offsite Total	**36.036**	**-**	**-**	**72**	**2%**	**-**	**0.627**
Total	**126.037**	**-**	**-**		**38%**	**-**	**8.568**

The 1-year runoff volume for the post-developed site increases to 7.941 ac-ft and the diversion from Offsite 04 (which has a 1-year runoff volume of 0.627 ac-ft), which create an increase of 103.18% from the existing condition, which results in 25-year critical storm event.

$$\% \text{ Increase} = [(8.568 - 4.217)/4.217] \times 100 = 103.18\%$$
25-Yr Critical Storm

The approximate divisions of the proposed development between the three subareas of the Dublin Master Plan (120, 150, 920) as well as the allowable release rates per acre are shown in Table 4. The Dublin Master Plan areas that fall under the Hirth/Wolpert Creek watershed (920) will not be counted toward the allowable release rates for the site. Table 5 summarizes the total allowable release rates according to the Dublin Master Plan.

Table 4 -Allowable Release Rates per Acre (Dublin Master Plan)

Onsite Subareas

Allowable Release Rates per Acre							Brown/Horch and Hirth/Wolpert Creek
Sub-Basin	1-year	2-year	5-year	10-year	25-year	50-year	100-year
120	0.1	0.1	0.1	0.2	0.2	0.3	0.4
150	0.1	0.1	0.2	0.2	0.3	0.4	0.5
920	0.1	0.2	0.2	0.3	0.3	0.4	0.5

Post-Developed Area per Sub-Basin				
Sub-Basin	Subarea 01 (Acres)	Subarea 02 (Acres)	Subarea 03 (Acres)	Subarea 04 (Acres)
120	8.776	3.560	10.048	0.000
150	2.151	3.767	18.747	38.036
920*	0.000	0.000	0.000	4.916*
Total	10.927	7.326	28.795	42.953

Allowable Release Rates per Acre							Brown/Horch and Hirth/Wolpert Creek
Sub-Basin	1-year	2-year	5-year	10-year	25-year	50-year	100-year
Subarea 01	1.09	1.09	1.31	2.19	2.40	3.49	4.59
Subarea 02	0.73	0.73	1.11	1.47	1.84	2.57	3.31
Subarea 03	2.88	2.88	4.75	5.76	7.63	10.51	13.39
Subarea 04	3.80	3.80	7.61	7.61	11.41	15.21	19.02
Total	8.51	8.51	14.78	17.02	23.29	31.80	40.30

Offsite Subareas

Allowable Release Rates per Acre							Brown/Horch and Hirth/Wolpert Creek
Sub-Basin	1-year	2-year	5-year	10-year	25-year	50-year	100-year
120	0.1	0.1	0.1	0.2	0.2	0.3	0.4
150	0.1	0.1	0.2	0.2	0.3	0.4	0.5
920*	0.1	0.2	0.2	0.3	0.3	0.4	0.5

Post-Developed Area per Sub-Basin				
Sub-Basin	Offsite 01 (Acres)	Offsite 02 (Acres)	Offsite 03 (Acres)	Offsite 04 (Acres)
120	1.373	0.000	0.000	0.000
150	1.732	0.000	7.089	0.656
920*	0.000	0.000	0.109*	20.838*
Non-Dublin*	0.000	4.238*	0.000	0.000
Total	3.105	4.238	7.199	21.494

Allowable Release Rates per Acre							Brown/Horch and Hirth/Wolpert Creek
Sub-Basin	1-year	2-year	5-year	10-year	25-year	50-year	100-year
Offsite 01	0.31	0.31	0.48	0.62	0.79	1.10	1.42
Offsite 02	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Offsite 03	0.71	0.71	1.42	1.42	2.13	2.84	3.54
Offsite 04	0.07	0.07	0.13	0.13	0.20	0.26	0.33
Total	1.09	1.09	2.03	2.17	3.12	4.20	5.29

*Areas are not counted toward allowable release rate

Table 5 -Total Allowable Release Rates per the Dublin Master Plan

Storm Event (yr.)	Onsite Allowable Release Rates (cfs)	Onsite Allowable Release Rates with Critical Storm Applied **[1]** (cfs)	Offsite Allowable Release Rates **[2]** (cfs)	Total Allowable Release Rates **[1+2]** (cfs)
1	8.51	8.51	1.09	9.60
2	8.51	8.51	1.09	9.60
5	14.78	8.51	2.03	10.54
10	17.02	8.51	2.17	10.68
25	23.29	8.51	3.12	11.63
50	31.80	31.80	4.20	36.00
100	40.30	40.30	5.29	45.59

A separate stormwater master plan was submitted in January 2004 to delineate proposed development projects being planned within the area bounded by Cosgray Road on the west, Hayden Run Road on the south, Avery Road on the east, and Rings Road on the north, and to present a master plan for drainage and stormwater detention for the proposed developments. This master plan, titled "Hydrologic Report For Sewer Line Extension and Preliminary Master Plan For Stormwater Detention – Avery/Hayden Run/Cosgray Road Development," redefined the limits of the Brown/Horch Creek Watershed to extend beyond the existing railroad and created an allowable release rate for the developments both in the City of Columbus (west of existing railroad) and the City of Dublin. The majority of the developments in the area were proposed to discharge to a proposed extended storm sewer system which discharges to an existing detention system at Wilcox Road for The Commons at Tuttle Crossing and The Pines at Tuttle Crossing which eventually discharge at Hayden Run near I-270. The cfs/acre allowable release rates for the developments in the study drainage area are based on the available capacity of the extended storm sewer as well as taking into account the cfs/acre rates established by the City of Dublin Stormwater Master Plan and any diversions to the Brown/Horch Creek Watershed. Exhibit 3 shows the tributary map for the stormwater master plan (January 2004) which identifies the proposed subareas labeled as letters.

The proposed development and offsite areas lie within Subareas K, L, M, N, and O as shown in Drainage Study Exhibit 1 in Appendix E. The cfs/acre allowable release rates to the extended storm sewer (48" storm sewer) at Subarea N (the most downstream subarea) are shown below.

<u>Subarea N – 159.16 acres</u>
cfs/acre for critical storm – 0.05 cfs/acre
cfs/acre for 100-yr event – 0.23 cfs/acre

<u>Subarea L – 67.61 acres</u>
cfs/acre for 100-yr event – 0.65 cfs/acre

Subareas M and K are diversions to the extended storm sewer and are considered in (and will count towards) the cfs/acre release rates for Subarea N as these areas were intended to divert to the extended storm sewer after development as outlined in the stormwater master plan. Subarea O is a diversion and does not count towards the allowable release rates. The acreages of the proposed development and offsite areas within each of the subareas are shown below and the

allowable release rates to the 48" storm sewer in Subarea N are shown in Table 6, and displayed on Exhibit 3 in Appendix E.

Subarea K – 0.00 acres
Subarea L – 4.24 acres
Subarea M – 23.14 acres
Subarea N – 72.91 acres
Subarea O – 25.75 acres

Onsite Area in Subareas K, M, N = 84.60 acres (counts toward allowable release for Subarea N)
Onsite Area in Subarea O = 5.40 acres (does not count toward allowable release rates)

Offsite Area in Subarea L = 4.24 acres (counts toward allowable release for Subarea L)
Offsite Area in Subareas K, M, N = 11.45 acres (counts toward allowable release for Subarea N)
Offsite Area in Subarea O = 20.35 acres (does not count toward allowable release rates)

Table 6 -Allowable Release Rates per the "Hydrologic Report For Sewer Line Extension and Preliminary Master Plan For Stormwater Detention – Avery/Hayden Run/Cosgray Road Development" Master Plan

Storm Event (yr.)	Allowable Release from Subarea L (4.24 acres of Offsite at 0.65 cfs/acre – 100-yr) **[1]**	Allowable Release from Subarea N (11.45 acres of Offsite at 0.23 cfs/acre – 100 yr) **[2]**	Allowable Release from Subarea N (84.60 acres: 0.05 cfs/acre – critical storm, 0.23 cfs/acre – 100 yr)* **[3]**	Total Allowable Release Rates to 48" storm sewer **[1+2+3]**
1	<2.75	<2.63	<4.23	<9.62
2	<2.75	<2.63	<4.23	<9.62
5	<2.75	<2.63	<4.23	<9.62
10	<2.75	<2.63	<4.23	<9.62
25	<2.75	<2.63	4.23	9.62
50	<2.75	<2.63	<19.46	<24.85
100	2.75	2.63	19.46	24.85

*Critical storm is calculated to be a 25-year storm event.

Table 7 -Allowable Release Rate Comparison

Storm Event (yr.)	Pre-developed 01 Peak Flow Rates (cfs)	Dublin Master Plan Allowable Release Rates* (cfs)	Avery/Hayden Run/Cosgray Road Development Master Plan Allowable Release Rates** (cfs)
1	31.92	<9.60	<9.62
2	49.15	9.60	<9.62
5	76.33	10.54	<9.62
10	100.22	10.68	<9.62
25	135.37	11.63	9.62
50	165.50	36.00	<24.85
100	197.87	45.59	24.85

*From Table 5
**From Table 6

Table 7 displays the comparison between the Dublin Master Plan Allowable Release Rates and the "Hydrologic Report For Sewer Line Extension and Preliminary Master Plan For Stormwater Detention – Avery/Hayden Run/Cosgray Road Development" Master Plan release rates. The Avery/Hayden Run/Cosgray Road Development Master Plan allowable release rates are more restrictive than the Dublin Master Plan for the higher events and will therefore be used for the release rates for the site. The post-developed allowable release rates per the more restrictive release rates and the proposed release rates can be found in Table 8, along with the performance summary for Wet Basin 01. Table 9 provides the performance summary for Dry Basin 02. HydroCAD output for the basins can be found in Appendix D.

Table 8 -Allowable vs. Proposed Release Rates & Performance Summary for Wet Basin 01

Storm Event (yr.)	Peak Inflow Rates (cfs)	Allowable Release Rates (cfs)	Wet Basin 01 Proposed Release Rates (cfs)	Maximum W.S.E., T.O.B. = 927.00 (feet)	Storage Volume Utilized (ac-ft)
1	112.30	<9.62	1.26	921.03	7.897
2	150.14	<9.62	1.50	921.77	10.935
5	205.91	<9.62	2.99	922.74	15.135
10	252.91	<9.62	5.15	923.19	17.134
25	319.79	9.62	8.04	923.99	20.197
50	375.74	<24.85	9.82	924.72	24.197
100	434.87	24.85	15.27	925.31	27.086

Storage Utilized (100-yr event): 27.086 ac-ft
Storage Provided (Top of Bank = 927.00 ft.): 35.651 ac-ft

Table 9 -Elevation-Area-Storage Table for Wet Basin 01

Contour Elevation (ft)	Area (acres)	Cumulative Storage Volume (ac-ft)
919.00	3.709	0.00
920.00	3.881	3.795
921.00	4.061	7.766
922.00	4.255	11.924
923.00	4.446	16.274
924.00	4.641	20.818
925.00	4.838	25.557
926.00	5.055	30.504
927.00	5.240	35.651

Table 10 -Dry Basin 02 Performance Summary

Storm Event (yr.)	Peak Inflow Rates (cfs)	Dry Basin 02 Proposed Release Rates (cfs)	Maximum W.S.E., T.O.B. = 927.00 (feet)	Storage Volume Utilized (ac-ft)
1	21.31	9.19	923.37	0.322
2	27.75	10.66	923.73	0.444
5	37.05	12.20	924.22	0.642
10	44.75	13.25	924.59	0.822
25	55.56	14.50	925.07	1.094
50	64.53	15.19	925.46	1.350
100	73.95	15.48	925.89	1.659

Storage Utilized (100-yr event): 1.659 ac-ft
Storage Provided (Top of Bank = 927.00 ft.): 2.614 ac-ft

Table 11 -Elevation-Area-Storage Table for Dry Basin 02

Contour Elevation (ft)	Area (acres)	Cumulative Storage Volume (ac-ft)
921.00	0.014	0.000
922.00	0.097	0.055
923.00	0.239	0.223
924.00	0.411	0.548
925.00	0.601	1.055
926.00	0.780	1.745
927.00	0.958	2.614

5.0 OUTLET DESIGN

The outlet structure for Wet Basin 01 will be located on the northeast side of the basin. The outlet structure for Dry Basin 02 is located on the north side of the basin. The location of these structures can be seen on Exhibit 2 in Appendix E.

Wet Basin 01 - Outlet Control Structure (As-built)

- Normal Pool – 919.00 ft.
- Top of Bank – 927.00 ft.
- 100-year elevation – 925.32 ft
- 1st stage outlet – 6-inch orifice, cut into submerged riser pipe, invert at 919.00 ft.
- 2nd stage outlet – Open top of 12" riser pipe, top of crest at 922.50 ft.
- 3rd stage outlet – 8-inch orifice, cut into submerged riser pipe, invert at 923.00 ft
- 4th stage outlet – Open top of 15" riser pipe, top of crest at 924.80 ft.
- 5th stage outlet – Neenah R-4871 grate, top of casting at 926.28 ft.
- Tailwater Control – 24-inch outlet pipe with 0.14% slope, invert at 918.86 ft.

Dry Basin 02 - Outlet Control Structure

- Bottom of Basin – 921.00 ft.
- Top of Bank – 927.00 ft.
- 100-year elevation – 925.89 ft.
- 1st stage outlet – 18-inch outlet pipe with 0.33% slope, invert at 921.40 ft
- Tailwater Control – Wet Basin 01

6.0 WATER QUALITY

The entire development will utilize Wet Basin 01 for water quality. Wet Basin 01 was designed and constructed under the Ohio EPA general permit number OHC000004 which allowed 75% treatment of water quality for wet basins. However, Wet Basin 01 in its as-built condition can be brought up to the Ohio EPA general permit number OHC000006 without retrofitting the outlet structure.

The Ohio EPA requires that the water quality volume for wet basins be detained for a period of 24 hours while not discharging more than the first half of the water quality volume in less than 8 hours. Water quality drawdown for the basin will be provided by the basin's 1st stage outlet listed in Section 5.0. Water quality calculations are summarized in Table 10 for the old Ohio EPA general permit and Table 11 for the current Ohio EPA general permit. Full calculations are provided in Appendix C.

Table 12 -Water Quality Calculations per OHC000004

Basin Identifier	Tributary area (acres)	Percent Impervious (%)	Water Quality Volume* (ac-ft)	Water Quality Elevation (feet)
Wet Basin 01	126.037	38%	1.866	919.50

*75% of water quality for wet basins approved and constructed under Ohio EPA general permit #OH000004

Table 13 -Water Quality Calculations per OHC000006

Basin Identifier	Tributary area (acres)	Percent Impervious (%)	Water Quality Volume (ac-ft)	Water Quality Elevation (feet)
Wet Basin 01	126.037	38%	3.549	919.94

7.0 SEDIMENT BASIN CALCULATIONS

The Ohio EPA requires that during construction a site must provide a means by which to control the sediment laden runoff from the construction site. For each acre of drainage area that is tributary to the sediment basin, a drawdown volume of 67 yd^3 is provided above the normal pool elevation. The basin will additionally provide more than the required 37 yd^3 of settling volume below the normal pool elevation for each acre of disturbed area tributary to the basin.

Wet Basin 01 will be used as a sediment basin during construction. The required drawdown for sediment basins will be provided by skimmer attached to the permanent outlet structure at normal pool. Sediment Basin Calculations are described in Table 12 below and provided within Appendix C.

Table 14 -Sediment Basin Calculations

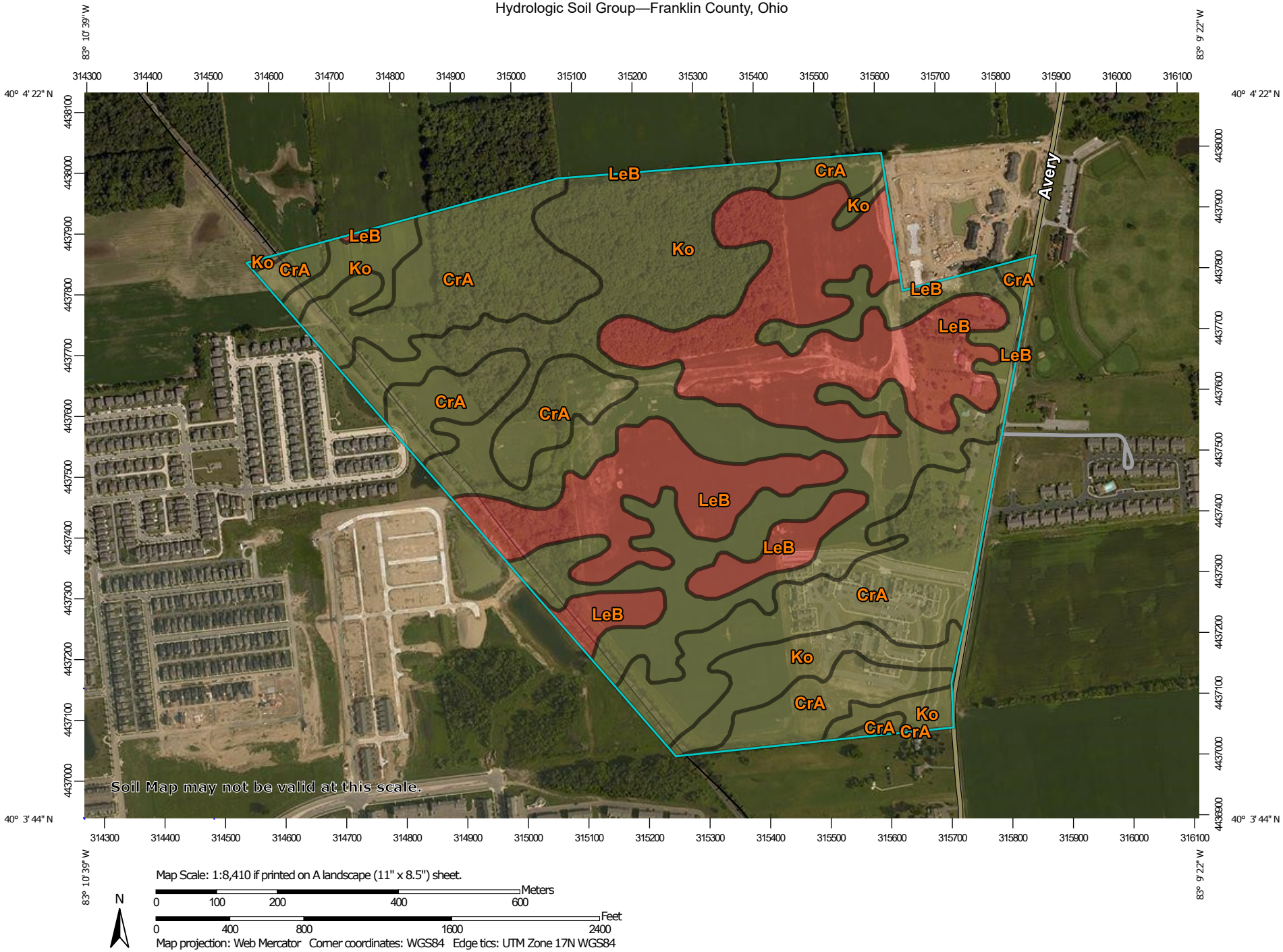
Basin Identifier	Tributary area (acres)	Disturbed area (acres)	Required Dewatering Volume (ac-ft)	Provided Dewatering Volume (ac-ft)	Provided Dewatering Volume Elevation (ft)	Required Sediment Storage Volume (ac-ft)	Provided Sediment Storage Volume (ac-ft)	Skimmer Orifice Size (inches)
Wet Basin 01	126.037	90.001	5.234	5.283	920.38	2.064	32.954	8.0"

8.0 CONCLUSION

The proposed stormwater management plan for Avondale Woods Sections 2 & 3 meets all requirements for detention and water quality as set forth by the City of Dublin and the Ohio EPA.

APPENDIX A:

USDA Soils Report



Map Scale: 1:8,410 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 100 200 400 600

Feet: 0 400 800 1600 2400

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 17N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Lines

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Points

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Franklin County, Ohio
Survey Area Data: Version 19, Jun 11, 2020

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

Date(s) aerial images were photographed: Aug 4, 2014—Aug 27, 2014

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

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
CrA	Crosby silt loam, Southern Ohio Till Plain, 0 to 2 percent slopes	C/D	62.1	30.7%
Ko	Kokomo silty clay loam, 0 to 2 percent slopes	C/D	83.2	41.2%
LeB	Lewisburg-Crosby complex, 2 to 6 percent slopes	D	56.9	28.1%
Totals for Area of Interest			**202.2**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

APPENDIX B:

Storm Sewer and Flood Routing Calculations

EMH&T
Engineers, Surveyors, Planners, Scientists

STORM SEWER COMPUTATION SHEET

SHT 1

Project: **Avondale Woods Sections 2** Date: 6/1/23
Job No.: **2020-1174** By: CRL
5 Yr Design Storm n= **0.013** Intensity Reference: Dublin Columbus,Roswell,Mec Checked: JCB
Revised:
Revised:

Struc.	Struc. Index	Sta.	Drainage Area Trib	Cumul.	C	Cumul CA	Time Delta t Min.	Sum t Min.	Intensity in/hr	Des Q CFS	Length ft.	Dia. In	Slope%	Vel	Cap. Flowing Full	Status	In	Out	TC	Remarks	**10** YEAR HYDRAULIC GRADE LINE 10 Yr Rainfall Intensity	Discharge Q	Slope %	Minor Losses	10 Yr HGL w/o minor losses
8	CB2	11+49.74	0.50	8.80	0.58		62.40	62.40	1.58	4.64							929.14		933.50						
Std. Catch Basin			8.30		0.32	2.95					210.66	18	0.30%	3.3	5.8	OK				2.65 ft. cover	1.75	5.16	0.2403	-	932.41
AA-S133A																				4.36 ft. depth					ok
7	CB2	9+39.08	0.50	13.10	0.58		1.08	63.48	1.56	6.93							928.41	928.51	932.30	0.10 DROP match crown/0.1 min					
Std. Catch Basin			3.80		0.32	4.45					174.08	18	0.45%	4.0	7.1	OK				2.08 ft. cover	1.73	7.71	0.5354	-	931.90
AA-S133A																				3.89 ft. depth					ok
6	CB3	7+65.00	0.30	14.80	0.58		0.73	64.20	1.54	8.40							927.53	927.63	932.20	0.10 DROP 8/10's dia					
Std. Catch Basin			1.40		0.58	5.44					113.50	24	0.20%	3.2	10.1	OK				2.42 ft. cover	1.72	9.34	0.1694	-	930.97
AA-S133B																				4.67 ft. depth					ok
5	CB3	6+51.50	0.20	15.50	0.58		0.59	64.79	1.53	8.76							927.20	927.30	932.00	0.10 DROP match crown/0.1 min					
Std. Catch Basin			0.50		0.32	5.71					111.50	24	0.20%	3.2	10.1	OK				2.45 ft. cover	1.71	9.75	0.1846	-	930.78
AA-S133B																				4.80 ft. depth					ok
4	CB5	5+40.00	0.20	16.70	0.58		0.58	65.36	1.52	9.77							926.88	926.98	932.90	0.10 DROP match crown/0.1 min					
Catch Basin			1.00		0.58	6.41					123.50	24	0.20%	3.2	10.1	OK		Win(W)	931.90	3.67 ft. cover	1.69	10.86	0.2294	-	930.57
AA-S134B																				6.02 ft. depth					ok
3	CB3	4+16.50	0.60	18.20	0.58		0.64	66.00	1.51	10.66							926.53	926.63	931.30	0.10 DROP match crown/0.1 min					
Std. Catch Basin			0.90		0.32	7.05					121.50	24	0.25%	3.6	11.3	OK				2.42 ft. cover	1.68	11.86	0.2733	-	930.29
AA-S133B																				4.77 ft. depth					ok
2	CB3	2+95.00	0.20	19.70	0.58		0.56	66.56	1.50	11.91							926.13	926.23	931.00	0.10 DROP 8/10's dia					
Std. Catch Basin			1.30		0.58	7.92					145.00	30	0.18%	3.6	17.4	OK				2.08 ft. cover	1.67	13.24	0.1036	-	929.96
AA-S133B																				4.87 ft. depth					ok
1	CB3	1+50.00	0.20	20.70	0.58		0.68	67.24	1.49	12.37							925.82	925.87	930.70	0.05 DROP 8/10's dia					
Std. Catch Basin			0.80		0.32	8.29					150.00	30	0.18%	3.6	17.4	OK				2.04 ft. cover	1.66	13.76	0.1120	-	929.81
AA-S133B																				4.88 ft. depth					ok
Ex33	CB0	0+00.00	0.30	23.10	0.58		0.70	67.94	1.48	13.78							925.55	925.55	930.30	0.00 DROP 8/10's dia					
Existing Catch Basin			2.10		0.40	9.30						30							(ATG)	1.96 ft. cover	1.65	15.33	0.1389	-	929.64
0																				4.75 ft. depth					ok
																				match crown/0.1 min					
10	CI3	1+63.00	0.80	0.80	0.58		10.00	10.00	4.71	2.19							927.21		931.49						
Double C&G Inlet			0.00		0.58	0.46					26.00	12	0.50%	3.2	2.5	OK				3.11 ft. cover	5.27	2.45	0.4690	-	930.27
AA-S125B																				4.28 ft. depth					ok
9	CI3	1+37.00	1.30	2.10	0.58		0.13	10.13	4.68	5.70							926.58	927.08	931.49	0.50 DROP match crown/0.1 min					
Double C&G Inlet			0.00		0.58	1.22					137.00	18	0.30%	3.3	5.8	OK				3.20 ft. cover	5.24	6.38	0.3673	-	930.14
AA-S125B																				4.91 ft. depth					ok
Ex33	CI0	0+00.00	0.00	2.10	0.58		0.70	10.83	4.55	5.54							925.55	926.17	930.30	0.62 DROP match crown/0.1 min					
Existing C&G Inlet			0.00		0.58	1.22						30							(ATG)	1.96 ft. cover	5.08	6.19	0.0227	-	929.64
0																				4.75 ft. depth					ok
																				match crown/0.1 min					
																				match crown/0.1 min					

EMH&T
Engineers, Surveyors, Planners, Scientists

5 Yr Design Storm n= 0.013

STORM SEWER COMPUTATION SHEET

SHT 2

Project: **Avondale Woods Sections 2**
Job No.: **2020-1174**
Intensity Reference: Dublin

Date: 6/1/23
By: CRL
Checked: JCB

Revised:
Revised:

Struc.	Struc. Index	Sta.	Drainage Area				Time		Intensity in/hr	Des Q CFS	Length ft.	Dia. In	Slope%	Vel	Cap. Flowing Full	Status	In	Out	TC	Remarks	10 YEAR HYDRAULIC GRADE LINE				
			Trib	Cumul.	C	Cumul CA	Delta t Min.	Sum t Min.													10 Yr Rainfall Intensity	Discharge Q	Slope %	Minor Losses	10 Yr HGL w/o minor losses
12	CI2	1+63.00	0.30	0.30	0.58		10.00	10.00	4.71	0.82							928.96		932.97						
C&G Inlet			0.00		0.58	0.17					26.00	12	0.50%	3.2	2.5	OK				2.84 ft. cover	5.27	0.92	0.0659	-	929.76
AA-S125A																				4.01 ft. depth					ok
11	CI2	1+37.00	0.50	0.80	0.58		0.13	10.13	4.68	2.17							928.73	928.83	932.97	0.10 DROP match crown/0.1 min					
C&G Inlet			0.00		0.58	0.46					137.00	12	0.80%	4.1	3.2	OK				2.97 ft. cover	5.24	2.43	0.4634	-	929.53
AA-S125A																				4.24 ft. depth					ok
2	CB3	0+00.00	0.00	0.80	0.58		0.56	10.70	4.57	2.12							926.13	927.63	931.00	1.50 DROP match crown/0.1 min					
Std. Catch Basin			0.00		0.58	0.46						30								2.08 ft. cover	5.11	2.37	0.0033	-	928.13
AA-S133B																				4.87 ft. depth					ok
																				match crown/0.1 min					
14	CI2	1+63.19	0.20	0.20	0.58		10.00	10.00	4.71	0.55							929.75		934.40						
C&G Inlet			0.00		0.58	0.12					26.17	12	0.50%	3.2	2.5	OK				3.48 ft. cover	5.27	0.61	0.0293	-	930.94
AA-S125A																				4.65 ft. depth					ok
13	CI2	1+37.02	0.40	0.60	0.58		0.14	10.14	4.68	1.63							929.52	929.62	934.35	0.10 DROP match crown/0.1 min					
C&G Inlet			0.00		0.58	0.35					137.02	12	1.20%	5.0	3.9	OK				3.56 ft. cover	5.24	1.82	0.2606	-	930.93
AA-S125A																				4.83 ft. depth					ok
4	CB5	0+00.00	0.00	0.60	0.58		0.46	10.59	4.59	1.60							926.88	927.88	932.90	1.00 DROP match crown/0.1 min					
Catch Basin			0.00		0.58	0.35						24								3.77 ft. cover	5.14	1.79	0.0062	-	930.57
AA-S134B																				6.02 ft. depth					ok
																				match crown/0.1 min					
16	CI2	1+69.94	0.20	0.20	0.58		10.00	10.00	4.71	0.55							930.50		935.00						
C&G Inlet			0.00		0.58	0.12					26.00	12	0.50%	3.2	2.5	OK				3.33 ft. cover	5.27	0.61	0.0293	-	931.65
AA-S125A																				4.50 ft. depth					ok
15	CI2	1+43.94	0.60	0.80	0.58		0.13	10.13	4.68	2.17							930.27	930.37	935.00	0.10 DROP match crown/0.1 min					
C&G Inlet			0.00		0.58	0.46					143.94	12	1.00%	4.5	3.6	OK				3.46 ft. cover	5.24	2.43	0.4634	-	931.64
AA-S125A																				4.73 ft. depth					ok
6	CB3	0+00.00	0.00	0.80	0.58		0.53	10.66	4.58	2.12							927.53	928.83	932.20	1.30 DROP match crown/0.1 min					
Std. Catch Basin			0.00		0.58	0.46						24								2.20 ft. cover	5.12	2.38	0.0110	-	930.97
AA-S133B																				4.67 ft. depth					ok
																				match crown/0.1 min					
																				match crown/0.1 min					
																				match crown/0.1 min					
																				match crown/0.1 min					

EMH&T
Engineers, Surveyors, Planners, Scientists

STORM SEWER COMPUTATION SHEET

SHT 5

Project: **Avondale Woods Sections 2**
Job No.: **2020-1174**
Intensity Reference: Dublin

Date: 6/1/23
By: CRL
Checked: JCB

Revised:
Revised:

5 Yr Design Storm n= **0.013**

Struc.	Struc. Index	Sta.	Drainage Area Trib	Cumul.	C	Cumul CA	Time Delta t Min.	Sum t Min.	Intensity in/hr	Des Q CFS	Length ft.	Dia. In	Slope%	Vel	Cap. Flowing Full	Status	In	Out	TC	Remarks	10 YEAR HYDRAULIC GRADE LINE 10 Yr Rainfall Intensity	Discharge Q	Slope %	Minor Losses	10 Yr HGL w/o minor losses
20	CB2	4+96.22	0.30	5.20	0.58		33.63	33.63	2.42	4.21							929.60		933.60						
Std. Catch Basin			4.90		0.32	1.74					127.10	18	0.30%	3.3	5.8	OK				2.29 ft. cover	2.68	4.67	0.1968	-	930.80
AA-S133A																				4.00 ft. depth					ok
19	MH2	3+69.12	0.00	6.60	0.58		0.65	34.28	2.39	5.22							928.72	929.22	935.20	0.50 DROP match crown/0.1 min					
Manhole Type C			1.40		0.32	2.19					125.68	24	0.20%	3.2	10.1	OK				4.23 ft. cover	2.65	5.80	0.0654	-	930.32
AA-S102																				6.48 ft. depth					ok
18	CB3	2+43.44	0.30	7.70	0.58		0.65	34.93	2.36	6.66							928.37	928.47	933.30	0.10 DROP match crown/0.1 min					
Std. Catch Basin			0.80		0.58	2.83					108.44	24	0.20%	3.2	10.1	OK				2.58 ft. cover	2.62	7.40	0.1064	-	929.97
AA-S133B																				4.93 ft. depth					ok
17	CB3	1+35.00	0.50	9.40	0.58		0.56	35.49	2.33	8.89							928.05	928.15	932.90	0.10 DROP match crown/0.1 min					
Std. Catch Basin			1.20		0.58	3.81					135.00	24	0.25%	3.6	11.3	OK				2.50 ft. cover	2.59	9.88	0.1895	-	929.65
AA-S133B																				4.85 ft. depth					ok
Ex30	CB0	0+00.00	0.00	9.40	0.58		0.62	36.11	2.30	8.79							927.66	927.71	932.06	0.05 DROP match crown/0.1 min					
Existing Catch Basin			0.00		0.58	3.81						24							(FO)	2.10 ft. cover	2.56	9.76	0.1852	-	929.21
0																				4.40 ft. depth					ok
																				match crown/0.1 min					
22	CI2	0+88.03	0.60	0.60	0.58		10.00	10.00	4.71	1.64							930.76		935.03						
C&G Inlet			0.00		0.58	0.35					26.00	12	0.50%	3.2	2.5	OK				3.10 ft. cover	5.27	1.83	0.2638	-	931.56
AA-S125A																				4.27 ft. depth					ok
21	CI2	0+62.03	0.20	0.80	0.58		0.13	10.13	4.68	2.17							930.53	930.63	935.03	0.10 DROP match crown/0.1 min					
C&G Inlet			0.00		0.58	0.46					62.03	12	1.87%	6.2	4.9	OK				3.23 ft. cover	5.24	2.43	0.4634	-	931.33
AA-S125A																				4.50 ft. depth					ok
18	CB3	0+00.00	0.00	0.80	0.58		0.17	10.30	4.65	2.16							928.37	929.37	933.30	1.00 DROP match crown/0.1 min					
Std. Catch Basin			0.00		0.58	0.46						24								2.68 ft. cover	5.20	2.41	0.0113	-	929.97
AA-S133B																				4.93 ft. depth					ok
																				match crown/0.1 min					
23	CI2	0+23.62	0.60	0.60	0.58		10.00	10.00	4.71	1.64							930.34		935.17						
C&G Inlet			0.00		0.58	0.35					23.62	12	0.50%	3.2	2.5	OK				3.66 ft. cover	5.27	1.83	0.2638	-	931.14
AA-S125A																				4.83 ft. depth					ok
19	MH2	0+00.00	0.00	0.60	0.58		0.12	10.12	4.69	1.63							928.72	930.22	935.20	1.50 DROP match crown/0.1 min					
Manhole Type C			0.00		0.58	0.35						24								3.81 ft. cover	5.24	1.82	0.0065	-	930.32
AA-S102																				6.48 ft. depth					ok
																				match crown/0.1 min					
																				match crown/0.1 min					
																				match crown/0.1 min					

EMH&T
Engineers, Surveyors, Planners, Scientists

INLET SPACING COMPUTATION SHEET

Project: **Avondale Section 2**
Job No.: **2020-1174**

Date: 06/01/23
By: CRL
Checked: JCB

INLET | GUTTER DISCHARGE | INLET DISCHARGE

Intensity Reference: Dublin
Design Frequency: 5 year
Allowable Spread: 13.5 ft
Mannings: 0.013
Gutter Width: 1.5 ft
Runoff Coefficient: 0.58
Min Tc: 10.0 min

No	Station	Area acre	Runoff Coefficient C	Tc min.	Rainfall I	Q=CIA/Ku cfs	Street Slope ft/ft	Cross Slope ft/ft	Prev. Bypass cfs	Total Gutter Flow cfs	Depth ft	Gutter width ft	Spread ft	W/T	Inlet Type	Intercept Flow cfs	By Pass Flow cfs
CI13	CG	0.40	0.58	10.0 min	4.15	1.0 cfs	0.77%	1.56%	0.0 cfs	1.0 cfs	0.13 ft	1.5 ft	8.2 ft	0.18	AA-S125A	0.6 cfs	0.4 cfs
CI11	CG	0.50	0.58	10.0 min	4.15	1.2 cfs	0.50%	1.56%	0.4 cfs	1.6 cfs	0.17 ft	1.5 ft	10.6 ft	0.14	AA-S125A	0.8 cfs	0.8 cfs
CI9	SUMP	1.30	0.58	10.0 min	4.15	3.1 cfs	0.50%	1.56%	0.8 cfs	3.9 cfs	0.12 ft	1.5 ft	7.5 ft	0.20	AA-S125B		
CI15	SUMP	0.60	0.58	10.0 min	4.15	1.4 cfs	0.50%	1.56%	0.0 cfs	1.4 cfs	0.07 ft	1.5 ft	4.3 ft	0.35	AA-S125A		
CI16	SUMP	0.20	0.58	10.0 min	4.15	0.5 cfs	0.50%	1.56%	0.0 cfs	0.5 cfs	0.02 ft	1.5 ft	1.5 ft	0.98	AA-S125A		
CI21	SUMP	0.20	0.58	10.0 min	4.15	0.5 cfs	0.50%	1.56%	0.0 cfs	0.5 cfs	0.02 ft	1.5 ft	1.5 ft	0.98	AA-S125A		
CI22	SUMP	0.60	0.58	10.0 min	4.15	1.4 cfs	0.50%	1.56%	0.0 cfs	1.4 cfs	0.07 ft	1.5 ft	4.3 ft	0.35	AA-S125A		
CI23	SUMP	0.60	0.58	10.0 min	4.15	1.4 cfs	0.50%	1.56%	0.0 cfs	1.4 cfs	0.07 ft	1.5 ft	4.3 ft	0.35	AA-S125A		
CI14	CG	0.20	0.58	10.0 min	4.15	0.5 cfs	0.50%	1.56%	0.0 cfs	0.5 cfs	0.11 ft	1.5 ft	6.9 ft	0.22	AA-S125A	0.3 cfs	0.2 cfs
EXCI29	SUMP	0.50	0.58	10.0 min	4.15	1.2 cfs	0.50%	1.56%	0.2 cfs	1.4 cfs	0.07 ft	1.5 ft	4.3 ft	0.35	AA-S125A		
CI12	CG	0.30	0.58	10.0 min	4.15	0.7 cfs	0.50%	1.56%	0.0 cfs	0.7 cfs	0.12 ft	1.5 ft	7.8 ft	0.19	AA-S125A	0.4 cfs	0.3 cfs
CI10	SUMP	0.80	0.58	10.0 min	4.15	1.9 cfs	0.50%	1.56%	0.3 cfs	2.2 cfs	0.11 ft	1.5 ft	6.7 ft	0.22	AA-S125A		

REVISIONS

MARK	DATE	DESCRIPTION

CITY OF DUBLIN, FRANKLIN COUNTY, OHIO
PUBLIC STREET, STORM, & WATER IMPROVEMENTS
FOR

AVONDALE WOODS
SECTION 2

STORM TRIBUTARY AREA MAP

EMHT

Evans, Mechwart, Hambleton & Tilton, Inc.
Engineers • Surveyors • Planners • Scientists
5500 New Albany Road, Columbus, OH 43054
emht.com

DATE
MAY 31, 2023

SCALE
1" = 50'

JOB NO.
2020-1174

SHEET
1/1

FLOOD ROUTING CALCS

Project:	Avondale Woods 2
Date:	5/24/2023
By:	JCB
Section:	A-A

Tc (Min)	72.4
i2	1.14
i5	1.41
i100	2.54
C0.5	0.5
C0.96	0.96

Area (Ac) 20.5

Q-overland = **25.01** cfs

Height = **0.65** ft

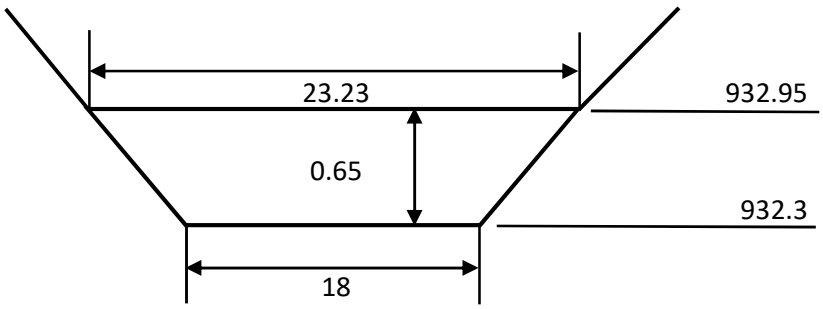
Max Spread = **23.23** ft

Elev @ Section = 932.3

100yr Elev = **932.95**

Weir width	18
C	2.63

1' Freeboard Elev = **933.95**



From Report	62.4	min
Standard Use	10	min
Tc (Min) =	**72.4**	min

FLOOD ROUTING CALCS

Project:	Avondale Woods 2
Date:	5/24/2023
By:	JCB
Section:	B-B

Tc (Min)	72.4
i2	1.14
i5	1.41
i100	2.54
C0.5	0.5
C0.96	0.96

Area (Ac) 20.5

Q-overland = **25.01** cfs

Height = **0.97** ft

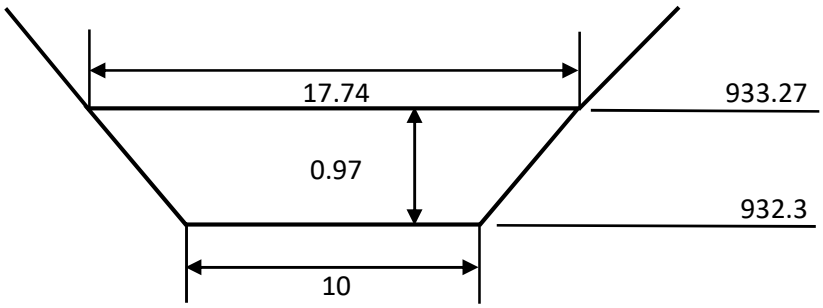
Max Spread = **17.74** ft

Elev @ Section = 932.3

100yr Elev = **933.27**

1' Freeboard Elev = **934.27**

Weir width	10
C	2.63



From Report	62.4	min
Standard Use	10	min
Tc (Min) =	**72.4**	min

FLOOD ROUTING CALCS

Project:	Avondale Woods 2
Date:	5/24/2023
By:	JCB
Section:	C-C

Tc (Min)	72.4
i2	1.14
i5	1.41
i100	2.54
C0.5	0.5
C0.96	0.96

Area (Ac) 20.1

Q-overland = **24.52** cfs

Height = **0.95** ft

max spread = **17.63** ft

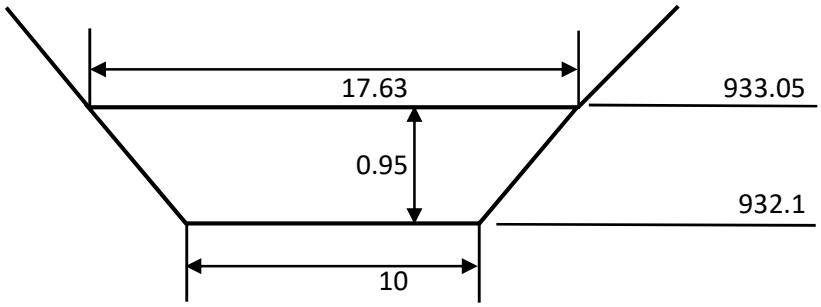
Elev @ Section = 932.1

100yr Elev = **933.05**

Weir width 10

C 2.63

1' Freeboard Elev = **934.05**



FLOOD ROUTING CALCS

Project:	Avondale Woods 2
Date:	5/24/2023
By:	JCB
Section:	D-D

Tc (Min)	72.4
i2	1.14
i5	1.41
i100	2.54
C0.5	0.5
C0.96	0.96

Area (Ac) 18.1

Q-overland = **22.08** cfs

Height = **0.89** ft

max spread = **17.12** ft

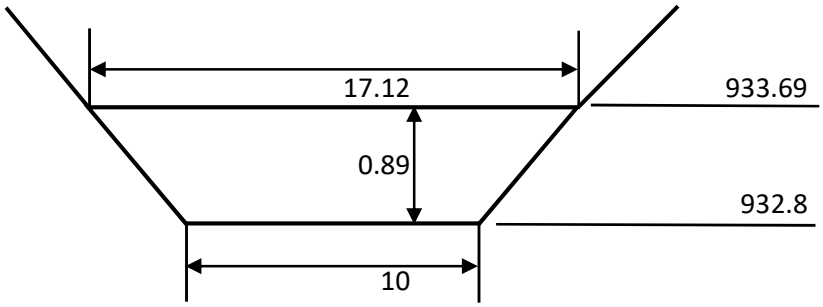
Elev @ Section = 932.8

100yr Elev = **933.69**

Weir width 10

C 2.63

1' Freeboard Elev = **934.69**



FLOOD ROUTING CALCS

Project:	Avondale Woods 2
Date:	5/24/2023
By:	JCB
Section:	E-E

Tc (Min)	72.4
i2	1.14
i5	1.41
i100	2.54
C0.5	0.5
C0.96	0.96

Area (Ac) 14.4

Q-overland = **17.57** cfs

Height = **0.76** ft

max spread = **16.11** ft

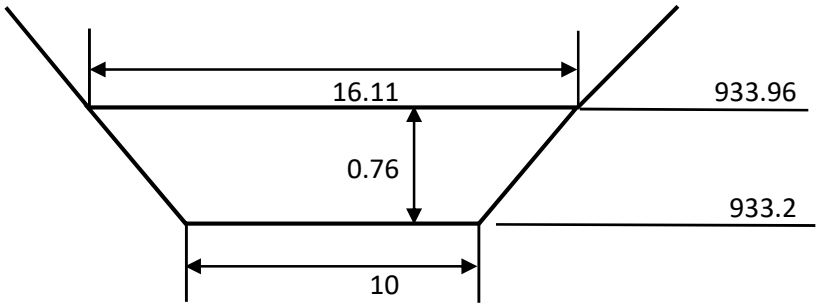
Elev @ Section = 933.2

100yr Elev = **933.96**

Weir width 10

C 2.63

1' Freeboard Elev = **934.96**



FLOOD ROUTING CALCS

Project:	Avondale Woods 2
Date:	5/24/2023
By:	JCB
Section:	F-F

Tc (Min)	72.4
i2	1.14
i5	1.41
i100	2.54
C0.5	0.5
C0.96	0.96

Area (Ac) 1.3

Q-overland = **1.59** cfs

Height = **0.24** ft

max spread = **6.95** ft

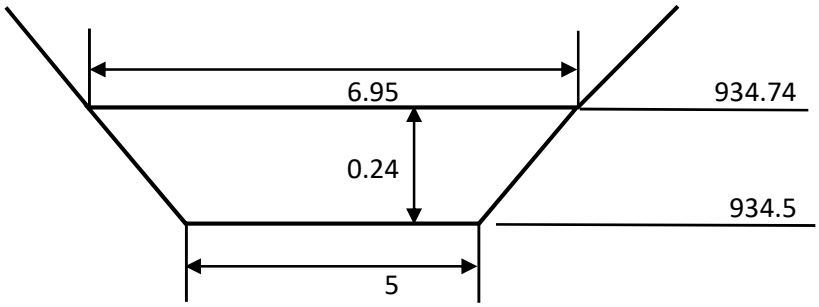
Elev @ Section = 934.5

100yr Elev = **934.74**

Weir width 5

C 2.63

1' Freeboard Elev = **935.74**



Section G-G

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.050
Channel Slope	0.015 ft/ft
Left Side Slope	8.330 H:V
Right Side Slope	8.330 H:V
Bottom Width	5.00 ft
Discharge	10.26 cfs

Results	
Normal Depth	6.7 in
Flow Area	5.4 ft²
Wetted Perimeter	14.4 ft
Hydraulic Radius	4.5 in
Top Width	14.33 ft
Critical Depth	4.8 in
Critical Slope	0.055 ft/ft
Velocity	1.90 ft/s
Velocity Head	0.06 ft
Specific Energy	0.62 ft
Froude Number	0.544
Flow Type	Subcritical

GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	0.00 ft/s
Upstream Velocity	0.00 ft/s
Normal Depth	6.7 in
Critical Depth	4.8 in
Channel Slope	0.015 ft/ft
Critical Slope	0.055 ft/ft

FLOOD ROUTING CALCS

Project:	Avondale Woods 2
Date:	5/24/2023
By:	JCB
Section:	H-H

Tc (Min)	10
i2	3.96
i5	4.71
i100	7.06
C0.5	0.5
C0.96	0.96

Area (Ac) 1.3

Q-overland = 3.42 cfs

Height = 0.47 ft

max spread = 7.78 ft

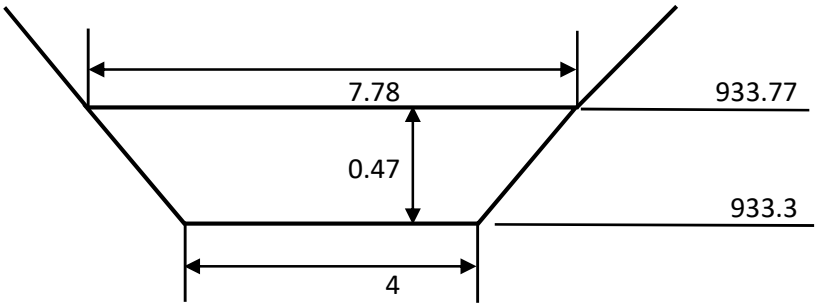
Elev @ Section = 933.3

100yr Elev = 933.77

Weir width 4

C 2.63

1' Freeboard Elev = 934.77



STORM SEWER COMPUTATION SHEET

EMH&T

SHT 1

Project: Avondale Woods Section 3
Job No.: 2023-0604
Intensity Reference: Dublin

Date: 5/23/24
By: CRL
Checked:

Revised:
Revised:

5 Yr Design Storm n= 0.013

Struc.	Struc. Index	Sta.	Drainage Area Trib	Cumul.	C	Cumul CA	Time Delta t Min.	Sum t Min.	Intensity in/hr	Des Q CFS	Length ft.	Dia. In	Slope%	Vel	Cap. Flowing Full	Status	In	Out	TC	Remarks	10 YEAR HYDRAULIC GRADE LINE: 10 Yr Rainfall Intensity	Discharge Q	Slope %	Minor Losses	10 Yr HGL w/o minor losses
10	CB2	9+08.88	0.20	0.20	0.58		10.00	10.00	4.71	0.55							930.36		933.90						
Std. Catch Basin			0.00		0.58	0.12					55.00	12	0.45%	3.1	2.4	OK				2.37 ft. cover	5.27	0.61	0.0293	-	932.25
AA-S133A																				3.54 ft. depth					ok
9	CB2	8+53.88	0.20	0.40	0.58		0.30	15.00	3.88	0.90							930.01	930.11	933.90	0.10 DROP					
Std. Catch Basin			0.00		0.58	0.23					27.88	12	0.45%	3.1	2.4	OK				2.62 ft. cover	4.33	1.00	0.0791	-	932.24
AA-S133A																				3.89 ft. depth					ok
8	CB2	8+26.00	0.10	2.10	0.58		0.15	15.15	3.86	3.59							929.78	929.88	933.90	0.10 DROP					
Std. Catch Basin			1.60		0.40	0.93					110.00	15	0.35%	3.1	3.8	OK				2.68 ft. cover	4.31	4.01	0.3824	-	932.21
AA-S133A																				4.12 ft. depth					ok
7	CB2	7+16.00	0.20	2.80	0.58		0.59	15.74	3.79	4.72							929.29	929.39	933.90	0.10 DROP					
Std. Catch Basin			0.50		0.40	1.25					110.00	18	0.30%	3.3	5.8	OK				2.90 ft. cover	4.22	5.26	0.2494	-	931.79
AA-S133A																				4.61 ft. depth					ok
6	CB2	6+06.00	0.20	3.20	0.58		0.56	16.30	3.72	5.36							928.86	928.96	933.90	0.10 DROP					
Std. Catch Basin			0.20		0.40	1.44					55.00	18	0.30%	3.3	5.8	OK				3.23 ft. cover	4.14	5.97	0.3216	-	931.52
AA-S133A																				5.04 ft. depth					ok
5	CB3	5+51.00	0.90	4.50	0.58		0.28	16.58	3.68	7.82							928.19	928.69	933.90	0.50 DROP					
Std. Catch Basin			0.40		0.40	2.12					110.00	24	0.19%	3.1	9.9	OK				3.46 ft. cover	4.10	8.72	0.1477	-	931.34
AA-S133B																				5.71 ft. depth					ok
4	CB3	4+41.00	0.20	5.10	0.58		0.58	17.16	3.62	8.68							927.88	927.98	933.90	0.10 DROP					
Std. Catch Basin			0.40		0.40	2.40					136.00	24	0.24%	3.5	11.1	OK				3.67 ft. cover	4.03	9.67	0.1816	-	931.18
AA-S133B																				6.02 ft. depth					ok
3	CB3	3+05.00	0.40	5.70	0.58		0.64	17.81	3.54	9.61							927.45	927.55	933.90	0.10 DROP					
Std. Catch Basin			0.20		0.40	2.71					137.00	24	0.28%	3.8	12.0	OK				4.10 ft. cover	3.95	10.70	0.2227	-	930.93
AA-S133B																				6.45 ft. depth					ok
2	MH5	1+68.00	0.20	5.90	0.58		0.60	18.40	3.48	9.84							926.97	927.07	935.19	0.10 DROP					
Curb Inlet MH AA-S121			0.00		0.58	2.83					26.00	24	0.30%	4.0	12.4	OK				5.87 ft. cover	3.87	10.96	0.2333	-	930.63
w/AA-S142 Grate																				8.22 ft. depth					ok
1	MH5	1+42.00	0.20	6.10	0.58		0.11	18.51	3.47	10.21							926.79	926.89	935.19	0.10 DROP					
Curb Inlet MH AA-S121			0.00		0.58	2.94					142.00	24	0.30%	4.0	12.4	OK				6.05 ft. cover	3.86	11.37	0.2512	-	930.57
w/AA-S142 Grate																				8.40 ft. depth					ok
Ex 13 S1	CB0	0+00.00	0.00	6.10	0.58		0.60	19.11	3.41	10.03								926.36	931.67	0.10 DROP					
Existing Catch Basin			0.00		0.58	2.94						24						(FO)	(FO)	3.06 ft. cover	3.79	11.17	0.2423	-	930.21
																				931.67 ft. depth					ok
12	CI2	1+63.00	0.30	0.30	0.58		10.00	10.00	4.71	0.82							930.03		935.12						
C&G Inlet			0.00		0.58	0.17					26.00	12	0.45%	3.1	2.4	OK				3.92 ft. cover	5.27	0.92	0.0659	-	931.84
AA-S125A																				5.09 ft. depth					ok
11	CI2	1+37.00	0.40	0.70	0.58		0.14	10.14	4.68	1.90							929.81	929.91	935.12	0.10 DROP					
C&G Inlet			0.00		0.58	0.41					137.00	12	0.45%	3.1	2.4	OK				4.04 ft. cover	5.24	2.13	0.3546	-	931.83
AA-S125A																				5.31 ft. depth					ok
5	CB3	0+00.00	0.00	0.70	0.58		0.75	10.89	4.54	1.84							928.19	929.19	933.90	1.00 DROP					
Std. Catch Basin			0.00		0.58	0.41						24								3.46 ft. cover	5.07	2.06	0.0082	-	931.34
AA-S133B																				5.71 ft. depth					ok

STORM SEWER COMPUTATION SHEET

SHT 2

Project: **Avondale Woods Section 3** | Date: 5/23/24
Job No.: **2023-0604** | By: CRL
Intensity Reference: Dublin | Checked:
Revised:
Revised:

5 Yr Design Storm n= **0.013**

Struc.	Struc. Index	Sta.	Drainage Area Trib	Cumul.	C	Cumul CA	Time Delta t Min.	Sum t Min.	Intensity in/hr	Des Q CFS	Length ft.	Dia. In	Slope%	Vel	Cap. Flowing Full	Status	In	Out	TC	Remarks	10 YEAR HYDRAULIC GRADE LINE: 10 Yr Rainfall Intensity	Discharge Q	Slope %	Minor Losses	10 Yr HGL w/o minor losses
15	CI2	1+29.42	0.40	0.40	0.58		10.00	10.00	4.71	1.09							929.21		934.17						
C&G Inlet			0.00		0.58	0.23					26.00	12	0.45%	3.1	2.4	OK				3.79 ft. cover	5.27	1.22	0.1172	-	930.01
AA-S125A																				4.96 ft. depth					ok
14	CI2	1+03.42	0.20	0.60	0.58		0.14	10.14	4.68	1.63							928.99	929.09	934.17	0.10 DROP					
C&G Inlet			0.00		0.58	0.35					21.87	12	0.45%	3.1	2.4	OK				3.91 ft. cover	5.24	1.82	0.2605	-	929.79
AA-S125A																				5.18 ft. depth					ok
13	MH2	0+81.55	0.00	0.60	0.58		0.12	10.26	4.66	1.62							928.79	928.89	934.40	0.10 DROP					
Manhole Type C			0.00		0.58	0.35					81.55	12	0.45%	3.1	2.4	OK				4.34 ft. cover	5.21	1.81	0.2578	-	929.59
AA-S102																				5.61 ft. depth					ok
Ex 41 S1	MH0	0+00.00	0.00	0.60	0.58		0.45	10.71	4.57	1.59								928.42	934.67	0.25 DROP					
Existing Manhole			0.00		0.58	0.35						15						(FO)	(FO)	5.08 ft. cover	5.11	1.78	0.0754	-	929.03
																				934.67 ft. depth					ok
16	CB2	1+12.17	0.20	3.80	0.58		33.63	33.63	2.42	3.06							930.49		934.00						
Std. Catch Basin			3.60		0.32	1.27					112.17	18	0.70%	5.0	8.8	OK				1.80 ft. cover	2.68	3.40	0.1043	-	931.69
AA-S133A																				3.51 ft. depth					ok
Ex 20 S2	CB0	0+00.00	0.30	5.10	0.58		0.37	34.00	2.40	4.22								929.70	933.60	0.10 DROP					
Existing Catch Basin			1.00		0.32	1.76						18						(PP)	(PP)	2.19 ft. cover	2.66	4.69	0.1985	-	930.80
																				933.60 ft. depth					ok
19	CI2	2+11.66	0.40	0.40	0.58		10.00	10.00	4.71	1.09							930.87		934.66						
C&G Inlet			0.00		0.58	0.23					36.01	12	0.45%	3.1	2.4	OK				2.62 ft. cover	5.27	1.22	0.1172	-	931.67
AA-S125A																				3.79 ft. depth					ok
18	CI2	1+75.65	0.20	0.60	0.58		0.20	10.20	4.67	1.63							930.61	930.71	934.66	0.10 DROP					
C&G Inlet			0.00		0.58	0.35					21.07	12	0.45%	3.1	2.4	OK				2.78 ft. cover	5.23	1.82	0.2592	-	931.41
AA-S125A																				4.05 ft. depth					ok
17	MH2	1+54.58	0.00	0.60	0.58		0.12	10.31	4.65	1.62							930.42	930.52	935.50	0.10 DROP					
Manhole Type C			0.00		0.58	0.35					154.58	12	0.45%	3.1	2.4	OK				3.81 ft. cover	5.20	1.81	0.2566	-	931.22
AA-S102																				5.08 ft. depth					ok
Ex 19 S2	MH0	0+00.00	0.00	0.60	0.58		0.84	11.16	4.49	1.56								929.72	935.20	1.00 DROP					
Existing Manhole			0.00		0.58	0.35						24						(PP)	(PP)	4.31 ft. cover	5.02	1.75	0.0059	-	930.32
																				935.20 ft. depth					ok

EMH&T

5 Yr Design Storm n= 0.013

STORM SEWER COMPUTATION SHEET

Project: **Avondale Woods Section 3**
Job No.: **2023-0604**
Intensity Reference: Dublin

Date: 5/23/24
By: CRL
Checked:

SHT 3

Revised:
Revised:

Struc.	Struc. Index	Sta.	Drainage Area Trib	Cumul.	C	Cumul CA	Time Delta t Min.	Sum t Min.	Intensity in/hr	Des Q CFS	Length ft.	Dia. In	Slope%	Vel	Cap. Flowing Full	Status	In	Out	TC	Remarks	10 YEAR HYDRAULIC GRADE LINE 10 Yr Rainfall Intensity	Discharge Q	Slope %	Minor Losses	10 Yr HGL w/o minor losses
23	CI2	1+78.00	0.30	0.30	0.58		10.00	10.00	4.71	0.82							929.20		934.92						
C&G Inlet			0.00		0.58	0.17					26.00	12	0.45%	3.1	2.4	OK				4.55 ft. cover	5.27	0.92	0.0659	-	930.00
AA-S125A																				5.72 ft. depth					ok
22	CI2	1+52.00	0.30	0.60	0.58		0.14	10.14	4.68	1.63							928.83	929.08	934.92	0.25 DROP					
C&G Inlet			0.00		0.58	0.35					152.00	15	0.45%	3.5	4.3	OK				4.65 ft. cover	5.24	1.82	0.0792	-	929.83
AA-S125A																				6.09 ft. depth					ok
Ex 17 S2	CB0	0+00.00	0.00	0.60	0.58		0.72	10.86	4.54	1.58								928.15	932.90	0.75 DROP					
Existing Catch Basin			0.00		0.58	0.35						24						(PP)	(PP)	3.31 ft. cover	5.08	1.77	0.0061	-	929.65
																				932.90 ft. depth					ok
21	CI2	0+85.58	0.20	0.20	0.58		10.00	10.00	4.71	0.55							931.20		934.99						
C&G Inlet			0.00		0.58	0.12					41.23	12	0.45%	3.1	2.4	OK				2.62 ft. cover	5.27	0.61	0.0293	-	932.00
AA-S125A																				3.79 ft. depth					ok
20	CI2	0+44.35	0.20	0.40	0.58		0.23	10.23	4.66	1.08							930.91	931.01	934.99	0.10 DROP					
C&G Inlet			0.00		0.58	0.23					44.35	12	0.45%	3.1	2.4	OK				2.81 ft. cover	5.22	1.21	0.1149	-	931.71
AA-S125A																				4.08 ft. depth					ok
18	CI2	0+00.00	0.00	0.40	0.58		0.24	10.47	4.62	1.07							930.61	930.71	934.66	0.10 DROP					
C&G Inlet			0.00		0.58	0.23						12								2.78 ft. cover	5.17	1.20	0.1125	-	931.41
AA-S125A																				4.05 ft. depth					ok

EMH&T
Engineers, Surveyors, Planners, Scientists

INLET SPACING COMPUTATION SHEET

Project: **Avondale Woods Section 3**
Job No.: **2023-0604**

Date: 05/23/24
By: CRL
Checked:

INLET | GUTTER DISCHARGE | INLET DISCHARGE

Intensity Reference: Dublin
Design Frequency: 5 year
Allowable Spread: 13.5 ft
Mannings: 0.013
Gutter Width: 1.5 ft
Runoff Coefficient: 0.58
Min Tc: 10.0 min

No	Station	Area acre	Runoff Coefficient C	Tc min.	Rainfall I	Q=CIA/Ku cfs	Street Slope ft/ft	Cross Slope ft/ft	Prev. Bypass cfs	Total Gutter Flow cfs	Depth ft	Gutter width ft	Spread ft	W/T	Inlet Type	Intercept Flow cfs	By Pass Flow cfs
CI1	SUMP	0.20	0.58	10.0 min	4.15	0.5 cfs	0.50%	1.56%	0.0 cfs	0.5 cfs	0.02 ft	1.5 ft	1.5 ft	0.98	AA-S125A		
CI2	SUMP	0.20	0.58	10.0 min	4.15	0.5 cfs	0.50%	1.56%	0.0 cfs	0.5 cfs	0.02 ft	1.5 ft	1.5 ft	0.98	AA-S125A		
CI11	SUMP	0.30	0.58	10.0 min	4.15	0.7 cfs	0.50%	1.56%	0.0 cfs	0.7 cfs	0.03 ft	1.5 ft	2.1 ft	0.70	AA-S125A		
CI12	SUMP	0.30	0.58	10.0 min	4.15	0.7 cfs	0.50%	1.56%	0.0 cfs	0.7 cfs	0.03 ft	1.5 ft	2.1 ft	0.70	AA-S125A		
CI14	SUMP	0.20	0.58	10.0 min	4.15	0.5 cfs	0.50%	1.56%	0.0 cfs	0.5 cfs	0.02 ft	1.5 ft	1.5 ft	0.98	AA-S125A		
CI15	SUMP	0.40	0.58	10.0 min	4.15	1.0 cfs	0.50%	1.56%	0.0 cfs	1.0 cfs	0.05 ft	1.5 ft	3.1 ft	0.49	AA-S125A		
CI18	SUMP	0.30	0.58	10.0 min	4.15	0.7 cfs	0.50%	1.56%	0.0 cfs	0.7 cfs	0.03 ft	1.5 ft	2.1 ft	0.70	AA-S125A		
CI19	SUMP	0.40	0.58	10.0 min	4.15	1.0 cfs	0.50%	1.56%	0.0 cfs	1.0 cfs	0.05 ft	1.5 ft	3.1 ft	0.49	AA-S125A		
CI20	SUMP	0.20	0.58	10.0 min	4.15	0.5 cfs	0.50%	1.56%	0.0 cfs	0.5 cfs	0.02 ft	1.5 ft	1.5 ft	0.98	AA-S125A		
CI21	SUMP	0.20	0.58	10.0 min	4.15	0.5 cfs	0.50%	1.56%	0.0 cfs	0.5 cfs	0.02 ft	1.5 ft	1.5 ft	0.98	AA-S125A		
CI22	SUMP	0.30	0.58	10.0 min	4.15	0.7 cfs	0.50%	1.56%	0.0 cfs	0.7 cfs	0.03 ft	1.5 ft	2.1 ft	0.70	AA-S125A		
CI23	SUMP	0.30	0.58	10.0 min	4.15	0.7 cfs	0.50%	1.56%	0.0 cfs	0.7 cfs	0.03 ft	1.5 ft	2.1 ft	0.70	AA-S125A		

PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION
PLANSET DATE APRIL, 2024

GRAPHIC SCALE
0 30 60 120
1 inch = 60 feet

MARK	DATE	DESCRIPTION
		REVISIONS

CITY OF DUBLIN, FRANKLIN COUNTY, OHIO
PUBLIC STREET, STORM, & WATER IMPROVEMENTS
FOR
AVONDALE WOODS SECTION 3
STORM TRIBUTARY MAP

EMHT
Evans, Mechwart, Hambleton & Tilton, Inc.
Engineers • Surveyors • Planners • Scientists
5500 New Albany Road, Columbus, OH 43054
Phone: 614.775.4500 Toll Free: 888.775.3648
emht.com

DATE
APRIL, 2024

SCALE
1" = 60'

JOB NO.
2023-0604

SHEET
1/1

FLOOD ROUTING CALCS

Project:	Avondale Woods 3
Date:	4/2/2024
By:	JCB
Section:	A-A

Tc (Min)	10
i2	3.96
i5	4.71
i100	7.06
C0.5	0.5
C0.96	0.96

Area (Ac) 5.3

Q-overland = 13.94 cfs

Height = 0.39 ft

Max Spread = 25.10 ft

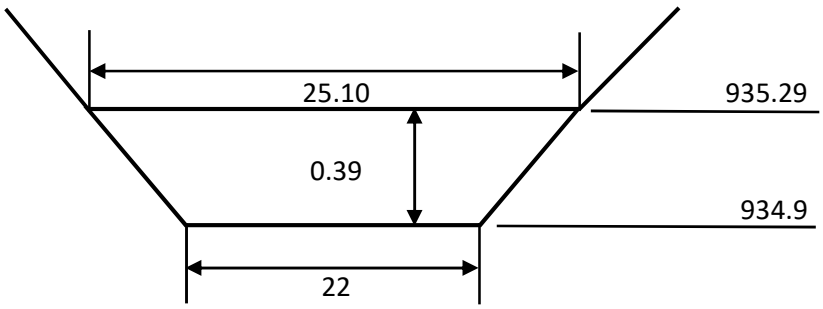
Elev @ Section = 934.9

100yr Elev = 935.29

Weir width 22

C 2.63

1' Freeboard Elev = 936.29



FLOOD ROUTING CALCS

Project:	Avondale Woods 3
Date:	4/2/2024
By:	JCB
Section:	B-B

Tc (Min)	10
i2	3.96
i5	4.71
i100	7.06
C0.5	0.5
C0.96	0.96

Area (Ac) 2.8

Q-overland = 7.37 cfs

Height = 0.33 ft

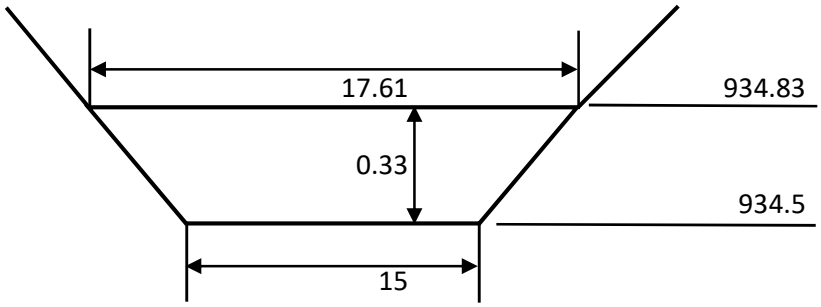
max spread = 17.61 ft

Elev @ Section = 934.5

100yr Elev = 934.83

Weir width	15
C	2.63

1' Freeboard Elev = 935.83



FLOOD ROUTING CALCS

Project:	Avondale Woods 3
Date:	4/2/2024
By:	JCB
Section:	Ex C - Ex C

Tc (Min)	10
i2	3.96
i5	4.71
i100	7.06
C0.5	0.5
C0.96	0.96

Area (Ac) 3.4

Q-overland = **8.95** cfs

Height = **0.37** ft

max spread = **17.97** ft

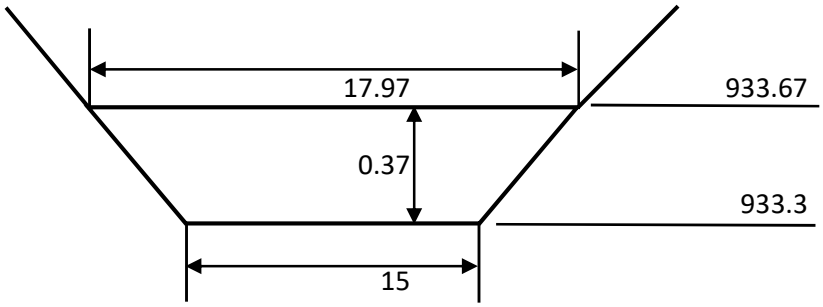
Elev @ Section = 933.3

100yr Elev = **933.67**

Weir width 15

C 2.63

1' Freeboard Elev = **934.67**



FLOOD ROUTING CALCS

Project:	Avondale Woods 3
Date:	4/2/2024
By:	JCB
Section:	Ex C1-C1

Tc (Min)	10
i2	3.96
i5	4.71
i100	7.06
C0.5	0.5
C0.96	0.96

Area (Ac) 2.9

Q-overland = 7.63 cfs

Height = 0.39 ft

max spread = 15.10 ft

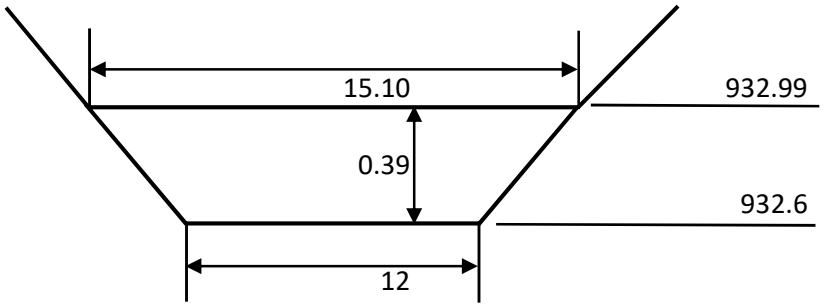
Elev @ Section = 932.6

100yr Elev = 932.99

Weir width 12

C 2.63

1' Freeboard Elev = 933.99



FLOOD ROUTING CALCS

Project:	Avondale Woods 3
Date:	4/2/2024
By:	JCB
Section:	Ex C2-C2

Tc (Min)	10
i2	3.96
i5	4.71
i100	7.06
C0.5	0.5
C0.96	0.96

Area (Ac) 2.5

Q-overland = 6.58 cfs

Height = 0.35 ft

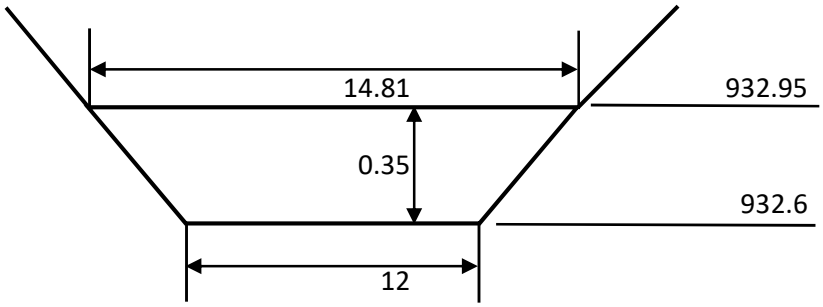
max spread = 14.81 ft

Elev @ Section = 932.6

100yr Elev = 932.95

Weir width	12
C	2.63

1' Freeboard Elev = 933.95



FLOOD ROUTING CALCS

Project:	Avondale Woods 3
Date:	4/2/2024
By:	JCB
Section:	Ex C3-C3

Tc (Min)	10
i2	3.96
i5	4.71
i100	7.06
C0.5	0.5
C0.96	0.96

Area (Ac) 1.8

Q-overland = **4.74** cfs

Height = **0.32** ft

max spread = **12.55** ft

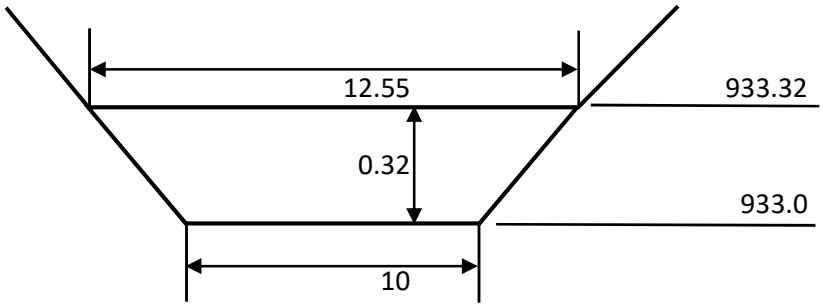
Elev @ Section = 933.0

100yr Elev = **933.32**

Weir width 10

C 2.63

1' Freeboard Elev = **934.32**



FLOOD ROUTING CALCS

Project:	Avondale Woods 3
Date:	4/2/2024
By:	JCB
Section:	Ex C4-C4

Tc (Min)	10
i2	3.96
i5	4.71
i100	7.06
C0.5	0.5
C0.96	0.96

Area (Ac) 1.3

Q-overland = 3.42 cfs

Height = 0.26 ft

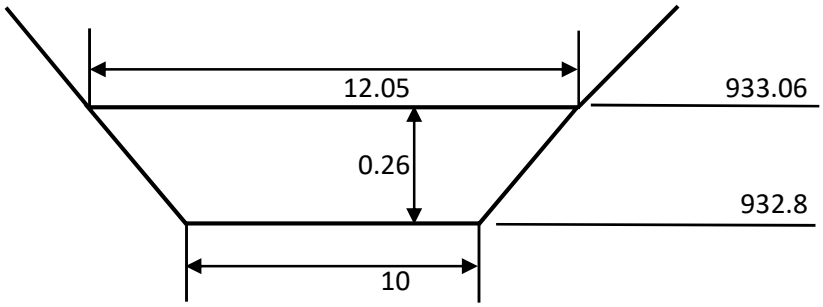
max spread = 12.05 ft

Elev @ Section = 932.8

100yr Elev = 933.06

Weir width	10
C	2.63

1' Freeboard Elev = 934.06



FLOOD ROUTING CALCS

Project:	Avondale Woods 3
Date:	4/2/2024
By:	JCB
Section:	Ex C5-C5

Tc (Min)	10
i2	3.96
i5	4.71
i100	7.06
C0.5	0.5
C0.96	0.96

Area (Ac) 0.8

Q-overland = **2.10** cfs

Height = **0.19** ft

max spread = **11.49** ft

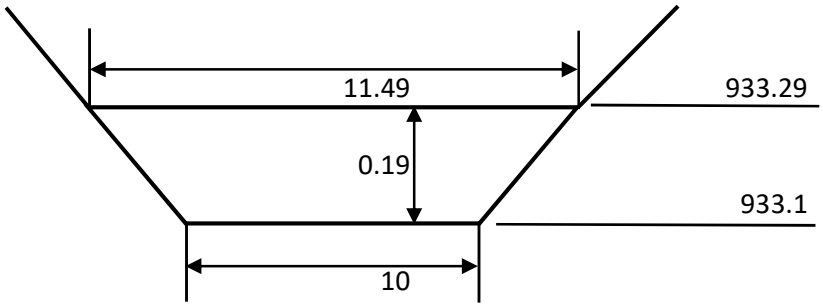
Elev @ Section = 933.1

100yr Elev = **933.29**

Weir width 10

C 2.63

1' Freeboard Elev = **934.29**



FLOOD ROUTING CALCS

Project:	Avondale Woods 3
Date:	4/2/2024
By:	JCB
Section:	Ex H-H

Tc (Min)	10
i2	3.96
i5	4.71
i100	7.06
C0.5	0.5
C0.96	0.96

Area (Ac) 1.3

Q-overland = **3.42** cfs

Height = **0.47** ft

max spread = **7.78** ft

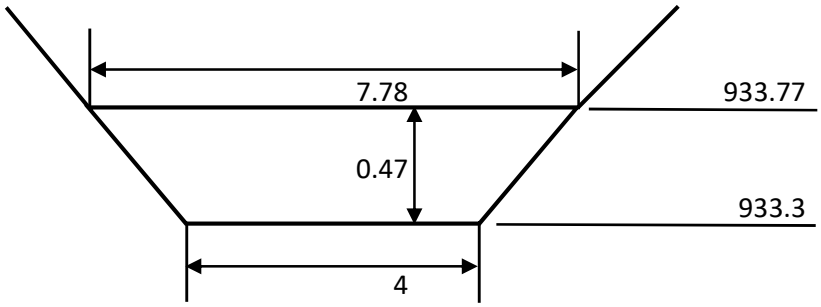
Elev @ Section = 933.3

100yr Elev = **933.77**

Weir width 4

C 2.63

1' Freeboard Elev = **934.77**



FLOOD ROUTING CALCS

Project:	Avondale Woods 3
Date:	4/2/2024
By:	JCB
Section:	Ex H1-H1

Tc (Min)	10
i2	3.96
i5	4.71
i100	7.06
C0.5	0.5
C0.96	0.96

Area (Ac) 0.7

Q-overland = **1.84** cfs

Height = **0.17** ft

max spread = **11.36** ft

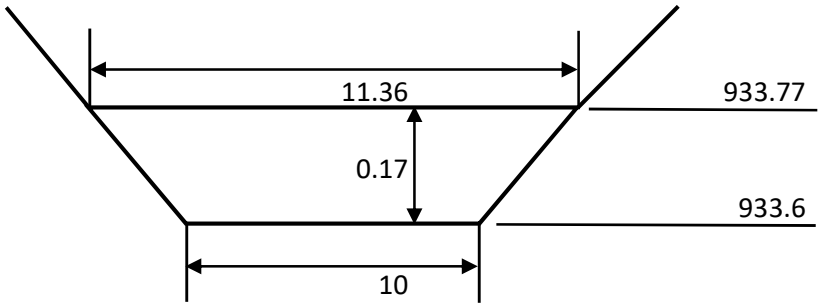
Elev @ Section = 933.6

100yr Elev = **933.77**

Weir width 10

C 2.63

1' Freeboard Elev = **934.77**



APPENDIX C:

Water Quality and Sediment Basin Calculations

EMH&T

A legacy of **experience**. A reputation for **excellence**.

Avondale Woods Sections 2 & 3

WATER QUALITY VOLUME CALCULATIONS (OHC000004)						
BMP	Subarea Identifier	Area (acres)	Percent Impervious (%)	Rv	Water Quality Volume (ac-ft)	Water Quality Volume Elevation (feet)
Wet Basin 01	Subarea 01	10.927	65%	0.45	0.307	-
	Subarea 02	7.326	65%	0.45	0.206	-
	Subarea 03	28.438	65%	0.45	0.798	-
	Subarea 04	43.310	38%	0.27	0.727	-
	Offsite 01	3.105	19%	0.20	0.039	-
	Offsite 02	4.238	0%	0.20	0.053	-
	Offsite 03	7.199	0%	0.20	0.090	-
	Offsite 04	21.494	0%	0.20	0.269	-
	Total	**126.037**	**38%**	**0.27**	**2.488**	**-**
Water Quality required under Ohio EPA Permit No. OHC000004 = 0.75*WQv:					**1.866**	**919.50**

Required Permanent Pool Volume =	130064	cu-ft
Provided Permanent Pool Volume =	1435476	cu-ft

Water Quality Volume calculated using the Ohio EPA formula:

$$WQ_v = \frac{R_v \times P \times A}{12}$$

where:
A = area draining into the BMP (acres)
P = 0.75" precipitation depth (per OHC000004)
Rv = the volumetric runoff coefficient (per OHC000004)
Rv = 0.858i^3 - 0.78i^2 + 0.774i +0.04
Where i = fraction of post-construction impervious surface

SEDIMENT BASIN CALCULATIONS					
BMP	Tributary Area (acres)	Disturbed Area (acres)	Required Dewatering Volume (67 CY/Tributary Acre) (ac-ft)	Dewatering Volume Elevation (feet)	Required Sediment Storage Volume (37 CY/Disturbed Acre) (ac-ft)
Basin 01	126.037	90.001	5.234	920.38	2.064

EMH&T

A legacy of **experience**. A reputation for **excellence**.

Avondale Woods Sections 2 & 3

WATER QUALITY VOLUME CALCULATIONS (OHC000006)						
BMP	Subarea Identifier	Area (acres)	Percent Impervious (%)	Rv	Water Quality Volume (ac-ft)	Water Quality Volume Elevation (feet)
Wet Basin 01	Subarea 01	10.927	65%	0.64	0.520	-
	Subarea 02	7.326	65%	0.64	0.349	-
	Subarea 03	28.438	65%	0.64	1.354	-
	Subarea 04	43.310	38%	0.39	1.273	-
	Offsite 01	3.105	19%	0.22	0.052	-
	Offsite 02	4.238	0%	0.05	0.016	-
	Offsite 03	7.199	0%	0.05	0.027	-
	Offsite 04	21.494	0%	0.05	0.081	-
	Total	**126.037**	**38%**	**0.39**	**3.549**	919.94

Required Permanent Pool Volume = 185,516 cu-ft

Provided Permanent Pool Volume = 1,435,476 cu-ft

Water Quality Volume calculated using the Ohio EPA formula (OHC000006):

$$WQ_v = \frac{R_v \times P \times A}{12}$$

where:

A = area draining into the BMP (acres)

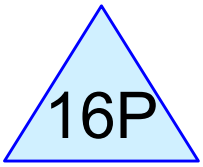
P = 0.90" precipitation depth

Rv = the volumetric runoff coefficient

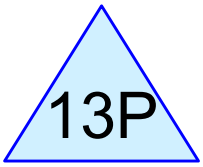
Rv = 0.05+0.9i

Where i = fraction of post-construction impervious surface

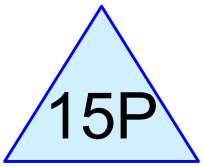
SEDIMENT BASIN CALCULATIONS					
BMP	Tributary Area (acres)	Disturbed Area (acres)	Required Dewatering Volume (67 CY/Tributary Acre) (ac-ft)	Dewatering Volume Elevation (feet)	Required Sediment Storage Volume (37 CY/Disturbed Acre) (ac-ft)
Basin 01	126.037	90.001	5.234	920.38	2.064



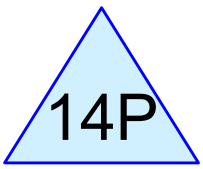
Wet Basin 01 WQ (OHC000006) @ 919.94



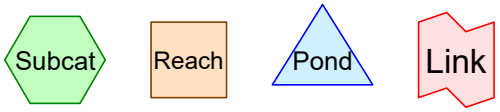
Wet Basin 01 WQ (OHC000004) @ 919.50



Wet Basin 01 Dewatering @ 920.38



Wet Basin 01 Below NP



Routing Diagram for 20230604 Avondale Woods Sections 2&3 2023-10-31
Prepared by EMH&T, Printed 10/31/2023
HydroCAD® 10.20-3d s/n 03828 © 2023 HydroCAD Software Solutions LLC

Summary for Pond 13P: Wet Basin 01 WQ (OHC000004) @ 919.50

Inflow	=	0.00 cfs @	0.00 hrs,	Volume=	0.000 af
Outflow	=	0.47 cfs @	0.00 hrs,	Volume=	1.177 af, Atten= 0%, Lag= 0.0 min
Primary	=	0.47 cfs @	0.00 hrs,	Volume=	1.177 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Starting Elev= 919.50' Surf.Area= 3.795 ac Storage= 1.876 af
Peak Elev= 919.50' @ 0.00 hrs Surf.Area= 3.795 ac Storage= 1.876 af

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no inflow)

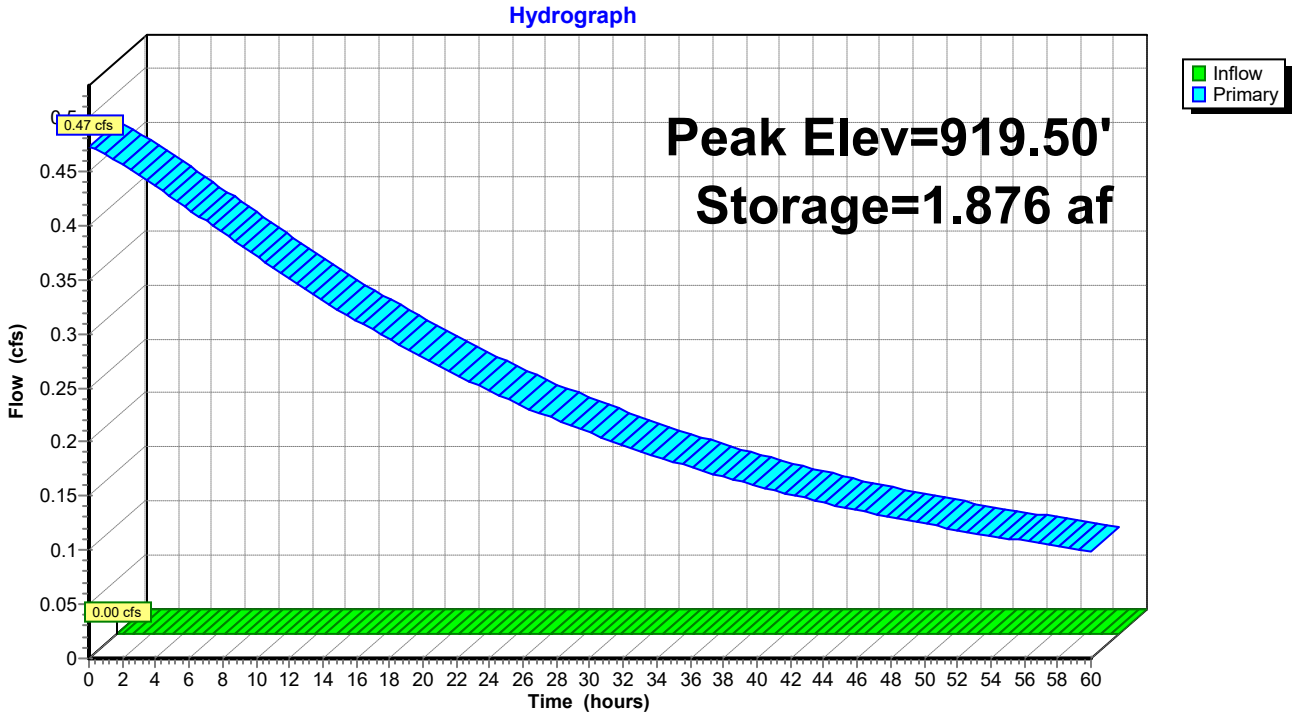
Volume	Invert	Avail.Storage	Storage Description
#1	919.00'	35.651 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
919.00	3.709	0.000	0.000
920.00	3.881	3.795	3.795
921.00	4.061	3.971	7.766
922.00	4.255	4.158	11.924
923.00	4.446	4.350	16.274
924.00	4.641	4.543	20.818
925.00	4.838	4.739	25.557
926.00	5.055	4.946	30.504
927.00	5.240	5.147	35.651

Device	Routing	Invert	Outlet Devices
#1	Primary	919.00'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.47 cfs @ 0.00 hrs HW=919.50' (Free Discharge)
↑—**1=Orifice/Grate** (Orifice Controls 0.47 cfs @ 2.41 fps)

Pond 13P: Wet Basin 01 WQ (OHC000004) @ 919.50



Hydrograph for Pond 13P: Wet Basin 01 WQ (OHC000004) @ 919.50

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Primary (cfs)
0.00	**0.00**	**1.876**	**919.50**	**0.47**
2.00	0.00	1.799	919.48	0.46
4.00	0.00	1.725	919.46	0.44
6.00	0.00	1.655	919.44	0.42
8.00	0.00	1.588	919.42	0.39
10.00	0.00	1.525	919.41	0.37
12.00	0.00	1.465	919.39	0.35
14.00	0.00	1.409	919.38	0.33
16.00	0.00	1.355	919.36	0.31
18.00	0.00	1.305	919.35	0.29
20.00	0.00	1.258	919.34	0.28
22.00	0.00	1.213	919.32	0.26
24.00	0.00	1.171	919.31	0.25
26.00	0.00	1.132	919.30	0.23
28.00	0.00	1.094	919.29	0.22
30.00	0.00	1.059	919.28	0.21
32.00	0.00	1.025	919.27	0.20
34.00	0.00	0.994	919.27	0.19
36.00	0.00	0.963	919.26	0.18
38.00	0.00	0.935	919.25	0.17
40.00	0.00	0.908	919.24	0.16
42.00	0.00	0.882	919.24	0.15
44.00	0.00	0.858	919.23	0.14
46.00	0.00	0.835	919.22	0.14
48.00	0.00	0.812	919.22	0.13
50.00	0.00	0.791	919.21	0.12
52.00	0.00	0.771	919.21	0.12
54.00	0.00	0.752	919.20	0.11
56.00	0.00	0.734	919.20	0.11
58.00	0.00	0.716	919.19	0.10
60.00	0.00	0.699	919.19	0.10

Summary for Pond 14P: Wet Basin 01 Below NP

Volume	Invert	Avail.Storage	Storage Description
#1	907.00'	32.954 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
907.00	1.805	0.000	0.000
908.00	1.870	1.837	1.837
909.00	1.934	1.902	3.739
910.00	2.001	1.967	5.707
911.00	2.068	2.035	7.741
912.00	2.965	2.516	10.258
913.00	3.039	3.002	13.260
914.00	3.113	3.076	16.336
915.00	3.188	3.150	19.486
916.00	3.263	3.225	22.712
917.00	3.340	3.301	26.014
918.00	3.416	3.378	29.391
919.00	3.709	3.562	32.954

Summary for Pond 15P: Wet Basin 01 Dewatering @ 920.38

Inflow	=	0.00 cfs @	0.00 hrs,	Volume=	0.000 af
Outflow	=	1.72 cfs @	0.00 hrs,	Volume=	4.276 af, Atten= 0%, Lag= 0.0 min
Primary	=	1.72 cfs @	0.00 hrs,	Volume=	4.276 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Starting Elev= 920.38' Surf.Area= 3.949 ac Storage= 5.283 af
Peak Elev= 920.38' @ 0.00 hrs Surf.Area= 3.949 ac Storage= 5.283 af

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no inflow)

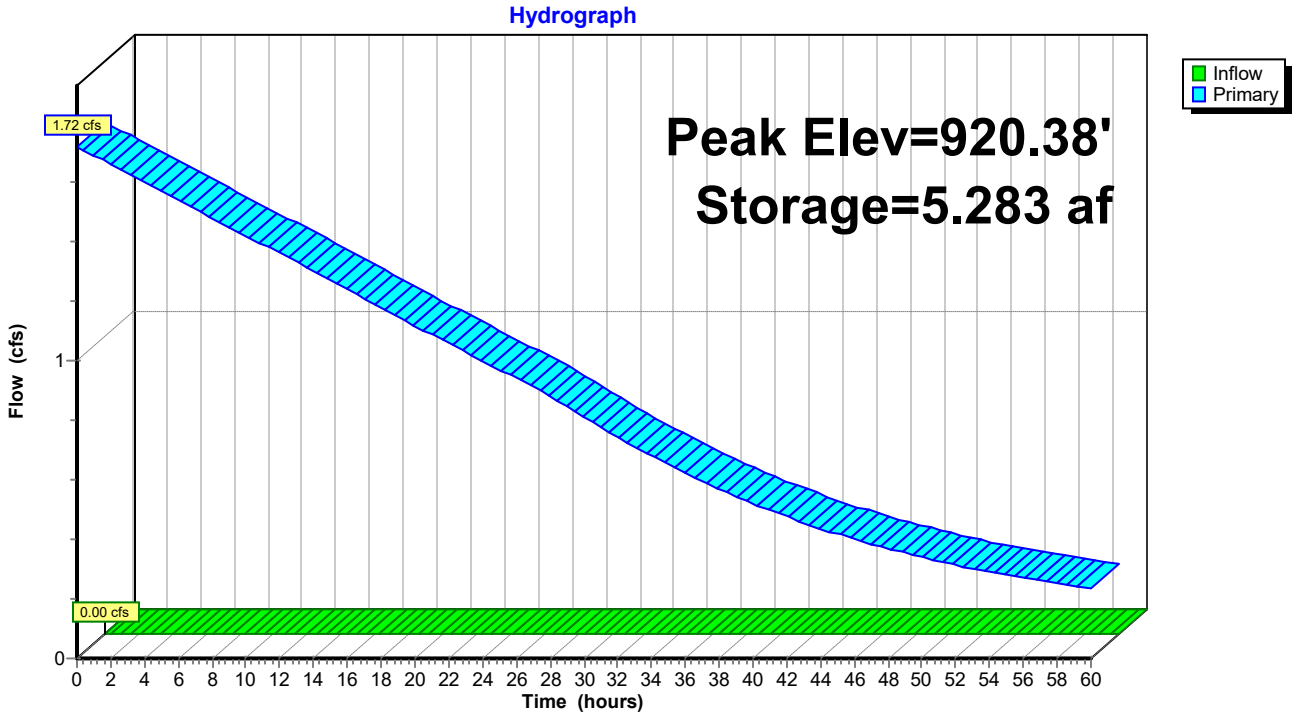
Volume	Invert	Avail.Storage	Storage Description
#1	919.00'	35.651 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
919.00	3.709	0.000	0.000
920.00	3.881	3.795	3.795
921.00	4.061	3.971	7.766
922.00	4.255	4.158	11.924
923.00	4.446	4.350	16.274
924.00	4.641	4.543	20.818
925.00	4.838	4.739	25.557
926.00	5.055	4.946	30.504
927.00	5.240	5.147	35.651

Device	Routing	Invert	Outlet Devices
#1	Primary	919.00'	**8.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.72 cfs @ 0.00 hrs HW=920.38' (Free Discharge)
↑—**1=Orifice/Grate** (Orifice Controls 1.72 cfs @ 4.93 fps)

Pond 15P: Wet Basin 01 Dewatering @ 920.38



Hydrograph for Pond 15P: Wet Basin 01 Dewatering @ 920.38

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Primary (cfs)
0.00	**0.00**	**5.283**	**920.38**	**1.72**
2.00	0.00	5.003	920.31	1.66
4.00	0.00	4.734	920.24	1.60
6.00	0.00	4.474	920.17	1.54
8.00	0.00	4.224	920.11	1.48
10.00	0.00	3.984	920.05	1.42
12.00	0.00	3.754	919.99	1.36
14.00	0.00	3.534	919.93	1.30
16.00	0.00	3.324	919.88	1.24
18.00	0.00	3.124	919.83	1.18
20.00	0.00	2.934	919.78	1.12
22.00	0.00	2.754	919.73	1.06
24.00	0.00	2.584	919.69	1.00
26.00	0.00	2.424	919.64	0.94
28.00	0.00	2.273	919.60	0.88
30.00	0.00	2.133	919.57	0.81
32.00	0.00	2.004	919.53	0.75
34.00	0.00	1.886	919.50	0.68
36.00	0.00	1.779	919.47	0.62
38.00	0.00	1.680	919.45	0.57
40.00	0.00	1.590	919.42	0.52
42.00	0.00	1.508	919.40	0.48
44.00	0.00	1.433	919.38	0.44
46.00	0.00	1.363	919.36	0.40
48.00	0.00	1.300	919.35	0.37
50.00	0.00	1.241	919.33	0.34
52.00	0.00	1.187	919.32	0.31
54.00	0.00	1.137	919.30	0.29
56.00	0.00	1.090	919.29	0.27
58.00	0.00	1.047	919.28	0.25
60.00	0.00	1.007	919.27	0.23

Summary for Pond 16P: Wet Basin 01 WQ (OHC000006) @ 919.94

Inflow	=	0.00 cfs @	0.00 hrs,	Volume=	0.000 af
Outflow	=	0.79 cfs @	0.00 hrs,	Volume=	2.461 af, Atten= 0%, Lag= 0.0 min
Primary	=	0.79 cfs @	0.00 hrs,	Volume=	2.461 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Starting Elev= 919.94' Surf.Area= 3.871 ac Storage= 3.562 af
Peak Elev= 919.94' @ 0.00 hrs Surf.Area= 3.871 ac Storage= 3.562 af

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no inflow)

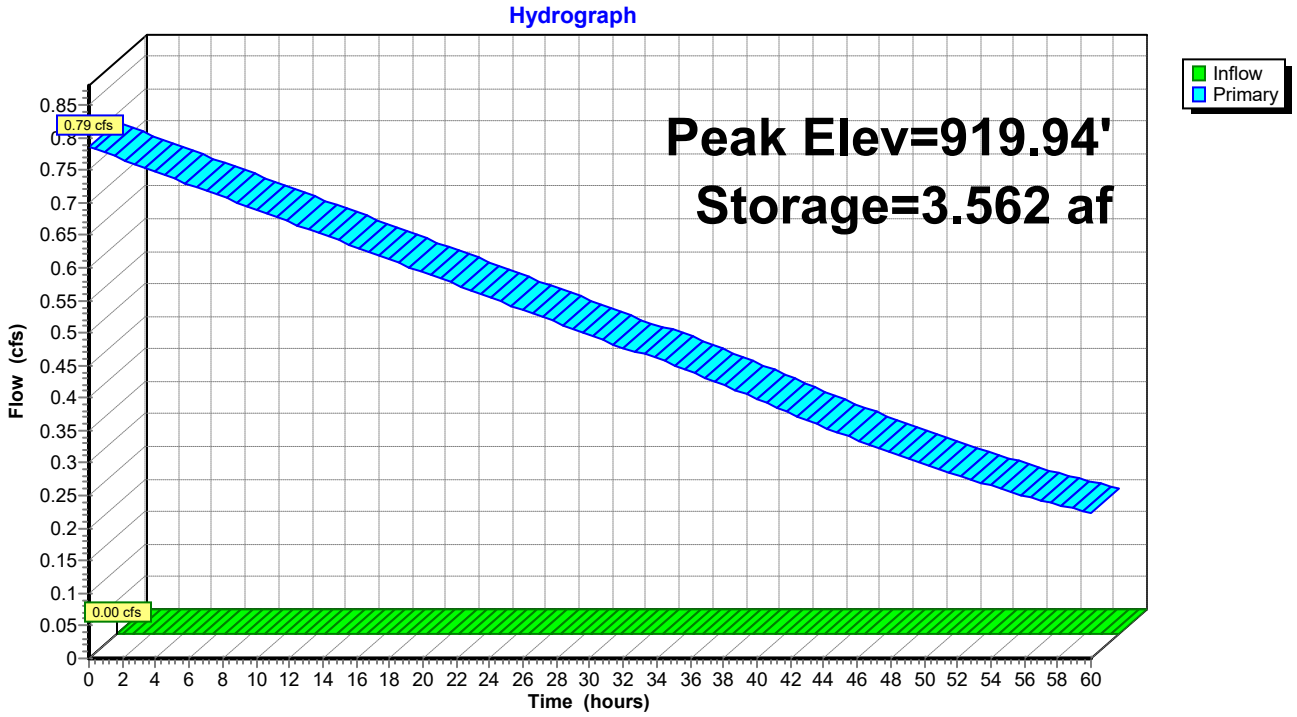
Volume	Invert	Avail.Storage	Storage Description
#1	919.00'	35.651 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
919.00	3.709	0.000	0.000
920.00	3.881	3.795	3.795
921.00	4.061	3.971	7.766
922.00	4.255	4.158	11.924
923.00	4.446	4.350	16.274
924.00	4.641	4.543	20.818
925.00	4.838	4.739	25.557
926.00	5.055	4.946	30.504
927.00	5.240	5.147	35.651

Device	Routing	Invert	Outlet Devices
#1	Primary	919.00'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.79 cfs @ 0.00 hrs HW=919.94' (Free Discharge)
↑—**1=Orifice/Grate** (Orifice Controls 0.79 cfs @ 4.00 fps)

Pond 16P: Wet Basin 01 WQ (OHC000006) @ 919.94



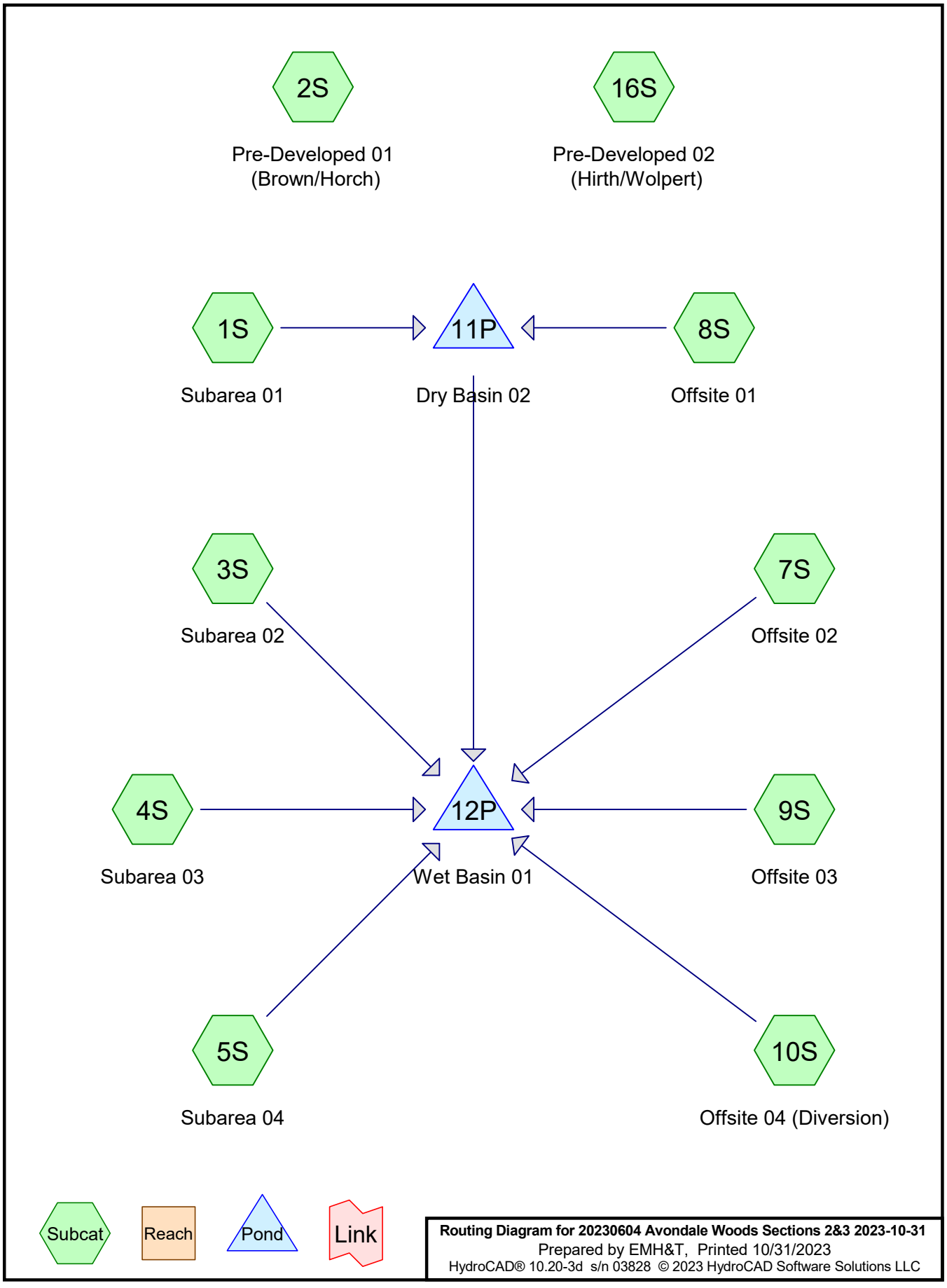
Hydrograph for Pond 16P: Wet Basin 01 WQ (OHC000006) @ 919.94

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Primary (cfs)
0.00	**0.00**	**3.562**	**919.94**	**0.79**
2.00	0.00	3.434	919.91	0.77
4.00	0.00	3.309	919.87	0.75
6.00	0.00	3.187	919.84	0.73
8.00	0.00	3.069	919.81	0.71
10.00	0.00	2.953	919.78	0.69
12.00	0.00	2.841	919.75	0.67
14.00	0.00	2.731	919.72	0.65
16.00	0.00	2.625	919.70	0.63
18.00	0.00	2.522	919.67	0.61
20.00	0.00	2.423	919.64	0.59
22.00	0.00	2.326	919.62	0.57
24.00	0.00	2.233	919.59	0.55
26.00	0.00	2.143	919.57	0.54
28.00	0.00	2.056	919.55	0.52
30.00	0.00	1.973	919.53	0.50
32.00	0.00	1.892	919.50	0.48
34.00	0.00	1.815	919.48	0.46
36.00	0.00	1.740	919.46	0.44
38.00	0.00	1.669	919.45	0.42
40.00	0.00	1.602	919.43	0.40
42.00	0.00	1.538	919.41	0.38
44.00	0.00	1.477	919.39	0.36
46.00	0.00	1.420	919.38	0.34
48.00	0.00	1.366	919.37	0.32
50.00	0.00	1.315	919.35	0.30
52.00	0.00	1.268	919.34	0.28
54.00	0.00	1.222	919.33	0.27
56.00	0.00	1.180	919.32	0.25
58.00	0.00	1.140	919.31	0.24
60.00	0.00	1.102	919.30	0.22

TABLE OF CONTENTS

APPENDIX D:

HydroCAD Output



Routing Diagram for 20230604 Avondale Woods Sections 2&3 2023-10-31
Prepared by EMH&T, Printed 10/31/2023

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	1-yr	Type II 24-hr		Default	24.00	1	2.20	2
2	2-yr	Type II 24-hr		Default	24.00	1	2.63	2
3	5-yr	Type II 24-hr		Default	24.00	1	3.24	2
4	10-yr	Type II 24-hr		Default	24.00	1	3.74	2
5	25-yr	Type II 24-hr		Default	24.00	1	4.44	2
6	50-yr	Type II 24-hr		Default	24.00	1	5.02	2
7	100-yr	Type II 24-hr		Default	24.00	1	5.63	2

Summary for Subcatchment 1S: Subarea 01

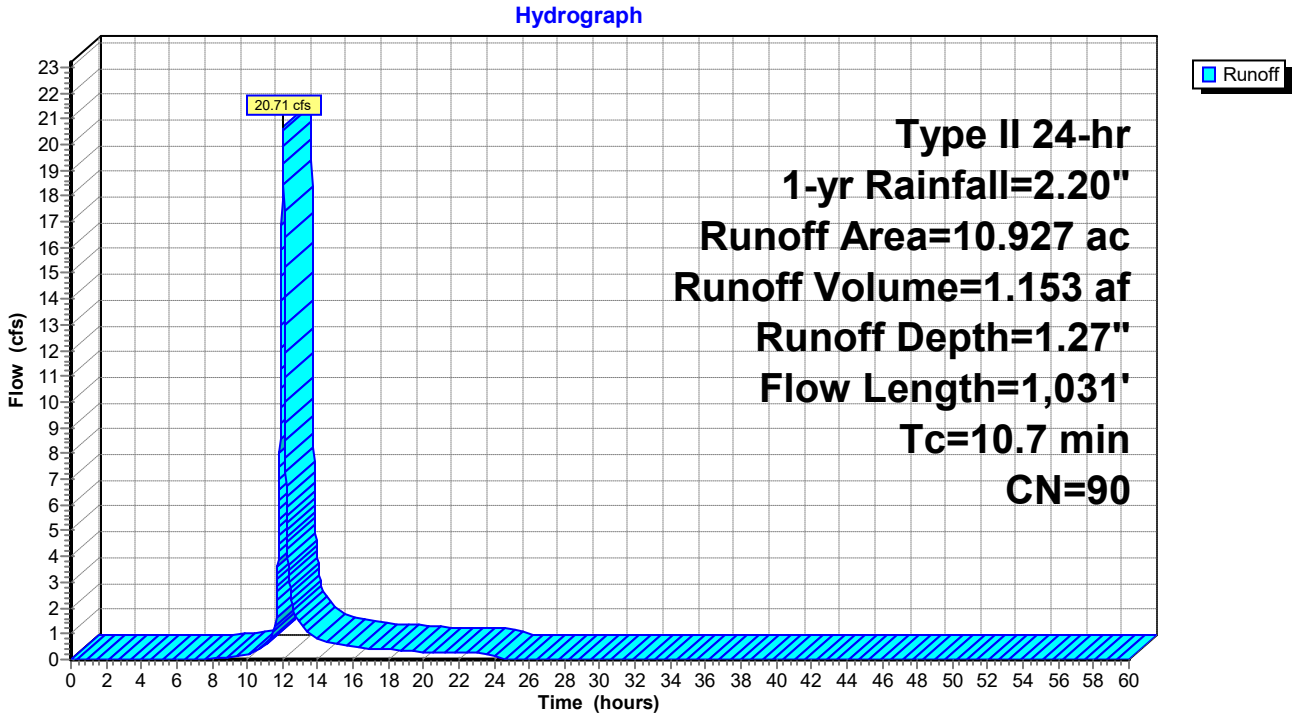
Runoff = 20.71 cfs @ 12.02 hrs, Volume= 1.153 af, Depth= 1.27"
Routed to Pond 11P : Dry Basin 02

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-yr Rainfall=2.20"

Area (ac)	CN	Description
10.927	90	1/8 acre lots, 65% imp, HSG C
3.824		35.00% Pervious Area
7.103		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, To catch basin**
5.7	1,031		3.00		**Direct Entry, Pipe flow**
10.7	1,031	Total			

Subcatchment 1S: Subarea 01



Summary for Subcatchment 2S: Pre-Developed 01 (Brown/Horch)

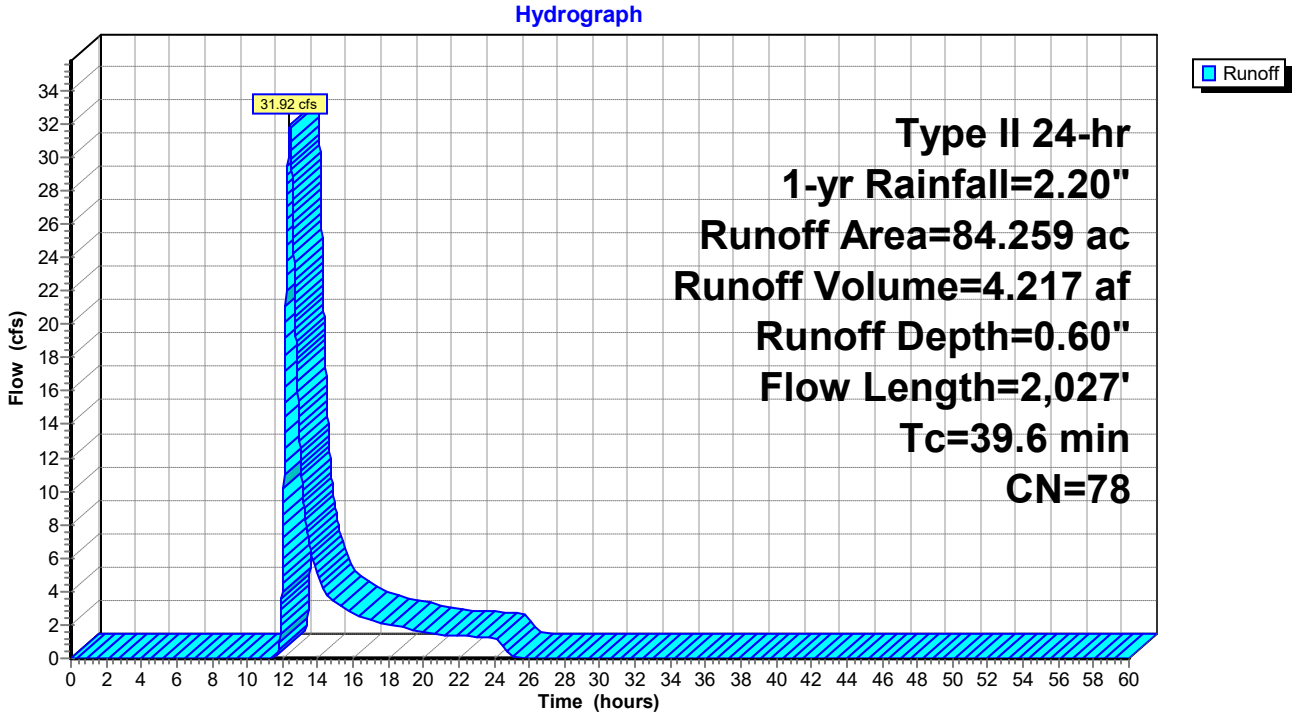
Runoff = 31.92 cfs @ 12.41 hrs, Volume= 4.217 af, Depth= 0.60"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-yr Rainfall=2.20"

Area (ac)	CN	Description
1.560	70	Woods, Good, HSG C
82.699	78	Row crops, C&T, Good, HSG C
84.259	78	Weighted Average
84.259		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	100	0.0260	0.15		**Sheet Flow, A to B sheet flow** Cultivated: Residue>20% n= 0.170 P2= 2.63"
28.8	1,927	0.0048	1.12		**Shallow Concentrated Flow, B to C shallow flow** Unpaved Kv= 16.1 fps
39.6	2,027	Total			

Subcatchment 2S: Pre-Developed 01 (Brown/Horch)



Summary for Subcatchment 3S: Subarea 02

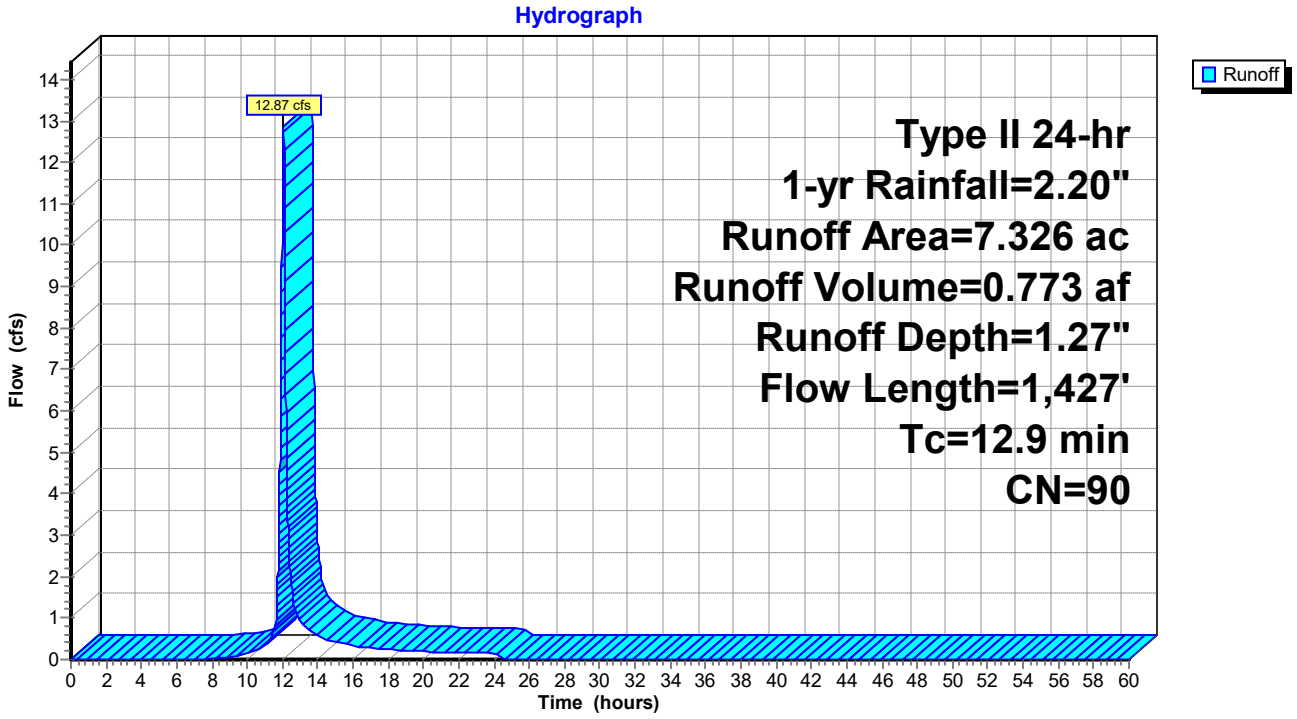
Runoff = 12.87 cfs @ 12.05 hrs, Volume= 0.773 af, Depth= 1.27"
Routed to Pond 12P : Wet Basin 01

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-yr Rainfall=2.20"

Area (ac)	CN	Description
7.326	90	1/8 acre lots, 65% imp, HSG C
2.564		35.00% Pervious Area
4.762		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, To catch basin**
7.9	1,427		3.00		**Direct Entry, Pipe flow**
12.9	1,427	Total			

Subcatchment 3S: Subarea 02



Summary for Subcatchment 4S: Subarea 03

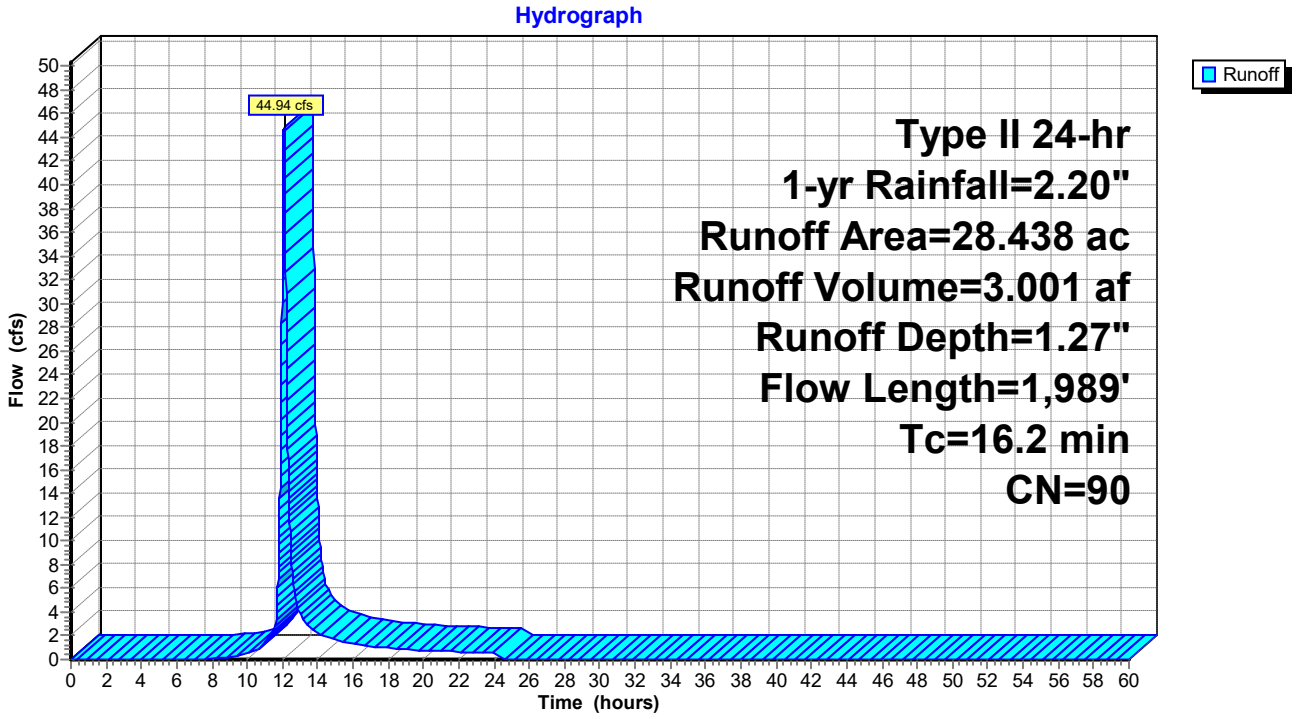
Runoff = 44.94 cfs @ 12.08 hrs, Volume= 3.001 af, Depth= 1.27"
Routed to Pond 12P : Wet Basin 01

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-yr Rainfall=2.20"

Area (ac)	CN	Description
28.438	90	1/8 acre lots, 65% imp, HSG C
9.953		35.00% Pervious Area
18.485		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.1					**Direct Entry, To catch basin**
11.0	1,989		3.00		**Direct Entry, Pipe flow**
16.2	1,989	Total			

Subcatchment 4S: Subarea 03



Summary for Subcatchment 5S: Subarea 04

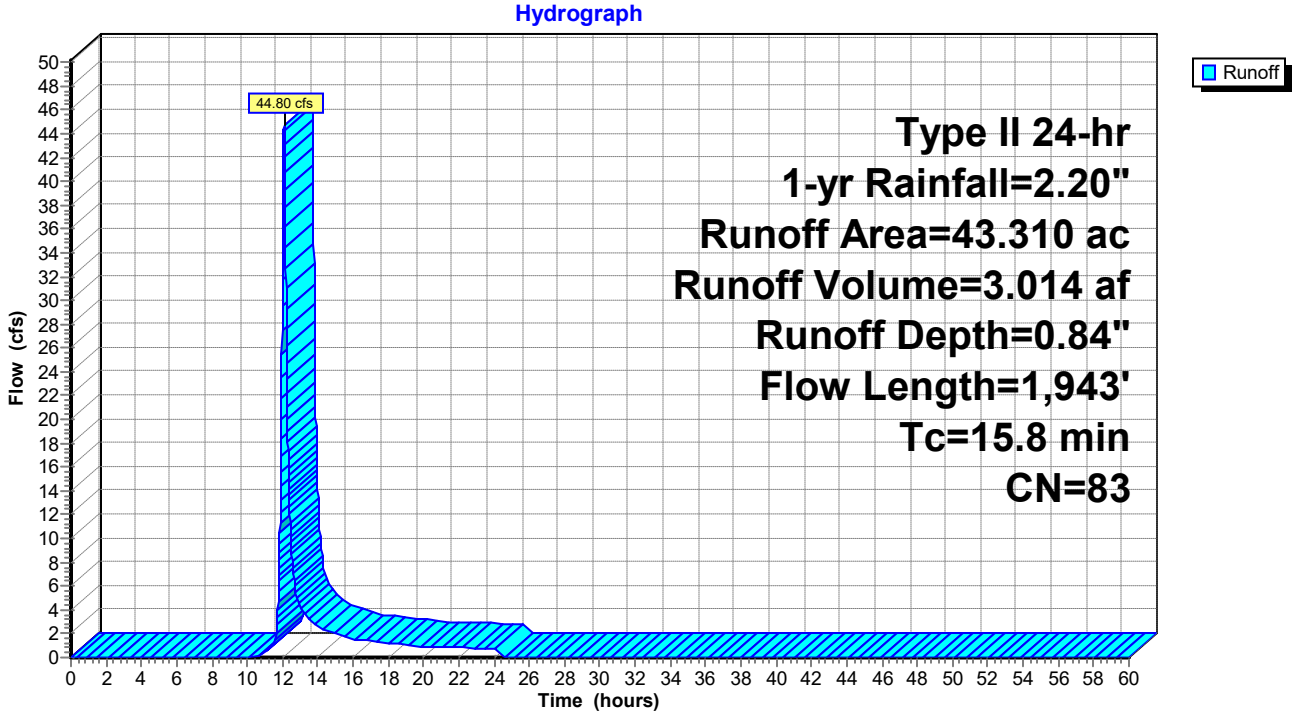
Runoff = 44.80 cfs @ 12.09 hrs, Volume= 3.014 af, Depth= 0.84"
Routed to Pond 12P : Wet Basin 01

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-yr Rainfall=2.20"

Area (ac)	CN	Description
43.310	83	1/4 acre lots, 38% imp, HSG C
26.852		62.00% Pervious Area
16.458		38.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, To catch basin**
10.8	1,943		3.00		**Direct Entry, Pipe flow**
15.8	1,943	Total			

Subcatchment 5S: Subarea 04



Summary for Subcatchment 7S: Offsite 02

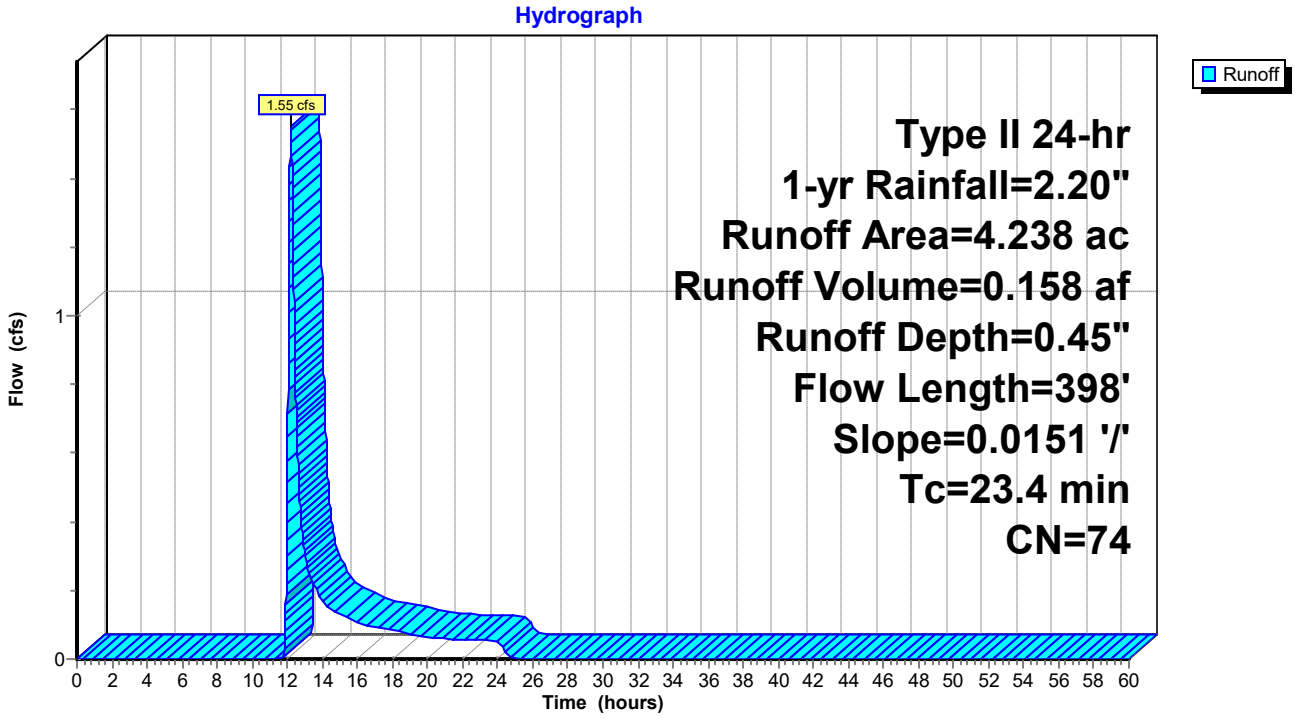
Runoff = 1.55 cfs @ 12.20 hrs, Volume= 0.158 af, Depth= 0.45"
Routed to Pond 12P : Wet Basin 01

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-yr Rainfall=2.20"

	Area (ac)	CN	Description
*	4.238	74	Open space
	4.238		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.6	100	0.0151	0.09		**Sheet Flow, A to B sheet flow** Grass: Dense n= 0.240 P2= 2.63"
5.8	298	0.0151	0.86		**Shallow Concentrated Flow, B to C shallow flow** Short Grass Pasture Kv= 7.0 fps
23.4	398	Total			

Subcatchment 7S: Offsite 02



Summary for Subcatchment 8S: Offsite 01

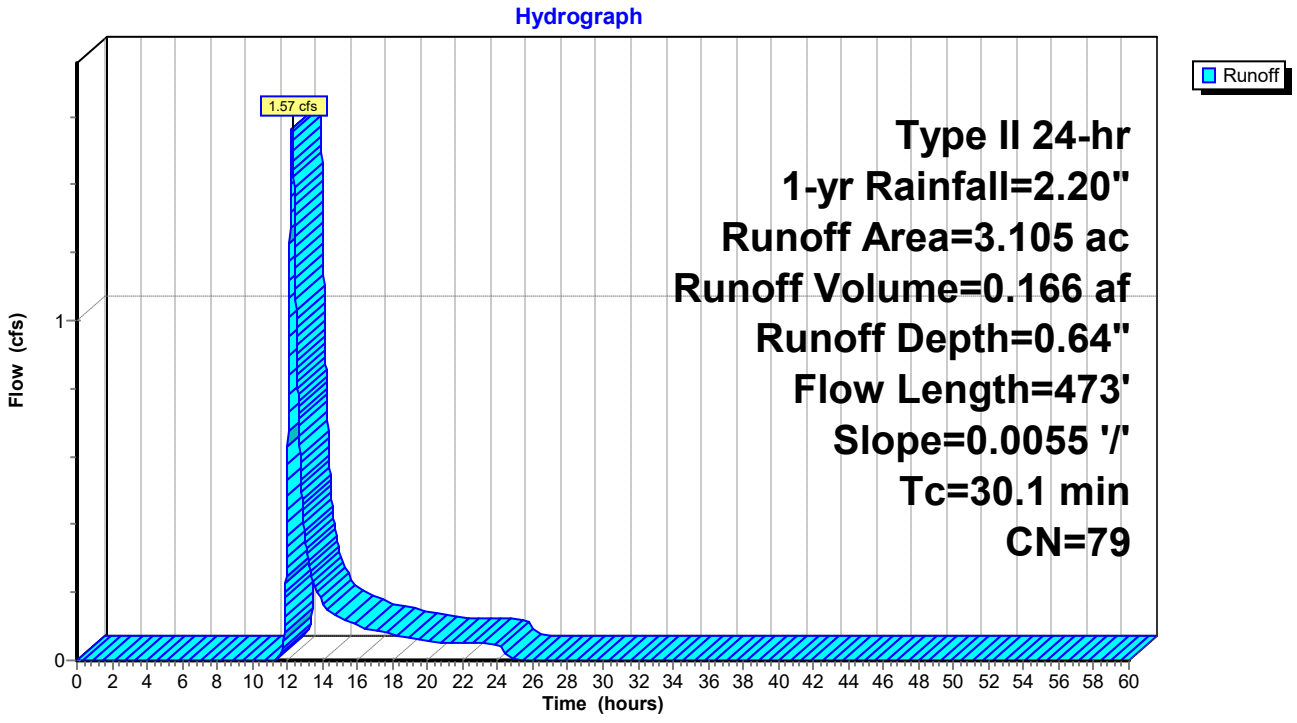
Runoff = 1.57 cfs @ 12.27 hrs, Volume= 0.166 af, Depth= 0.64"
Routed to Pond 11P : Dry Basin 02

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-yr Rainfall=2.20"

	Area (ac)	CN	Description
*	2.506	74	Open space
*	0.599	98	Existing Impervious
	3.105	79	Weighted Average
	2.506		80.71% Pervious Area
	0.599		19.29% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.1	100	0.0055	0.09		**Sheet Flow, A to B sheet flow** Grass: Short n= 0.150 P2= 2.63"
12.0	373	0.0055	0.52		**Shallow Concentrated Flow, B to C shallow flow** Short Grass Pasture Kv= 7.0 fps
30.1	473	Total			

Subcatchment 8S: Offsite 01



Summary for Subcatchment 9S: Offsite 03

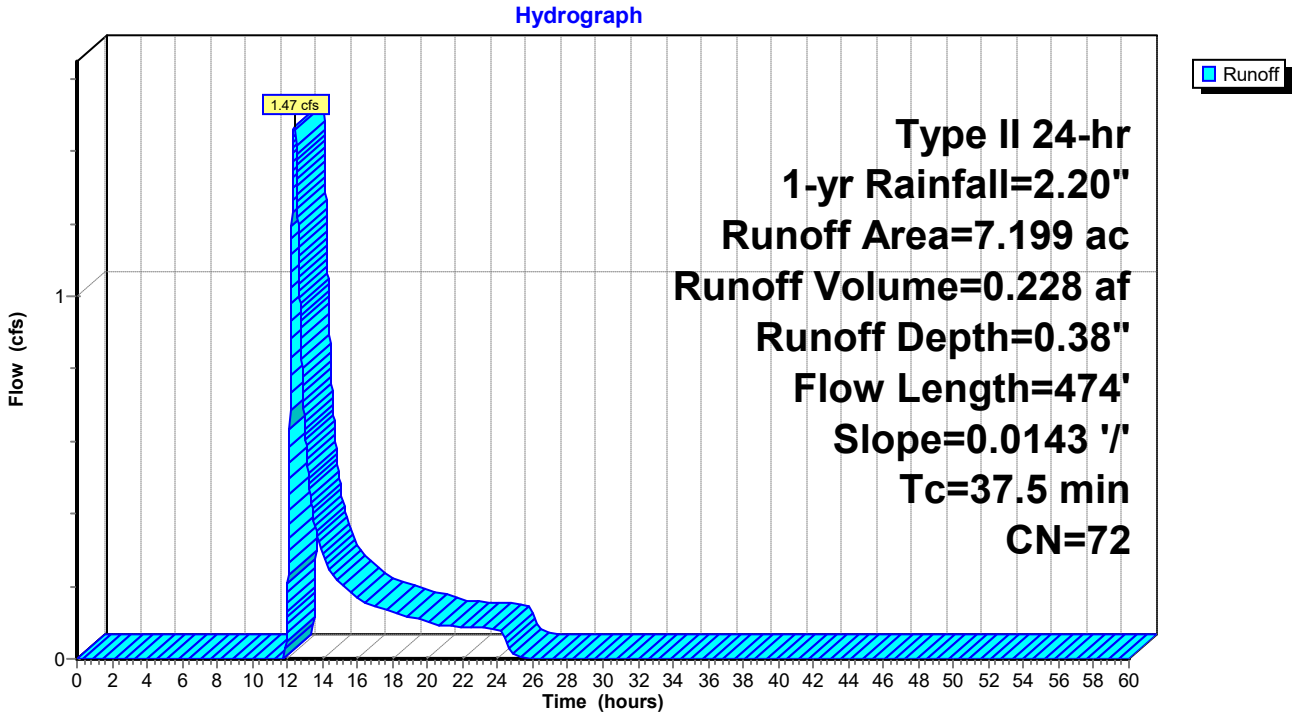
Runoff = 1.47 cfs @ 12.42 hrs, Volume= 0.228 af, Depth= 0.38"
Routed to Pond 12P : Wet Basin 01

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-yr Rainfall=2.20"

Area (ac)	CN	Description
2.228	78	Row crops, C&T, Good, HSG C
4.971	70	Woods, Good, HSG C
7.199	72	Weighted Average
7.199		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
27.1	100	0.0143	0.06		**Sheet Flow, A to B sheet flow** Woods: Light underbrush n= 0.400 P2= 2.63"
10.4	374	0.0143	0.60		**Shallow Concentrated Flow, B to C shallow flow** Woodland Kv= 5.0 fps
37.5	474	Total			

Subcatchment 9S: Offsite 03



Summary for Subcatchment 10S: Offsite 04 (Diversion)

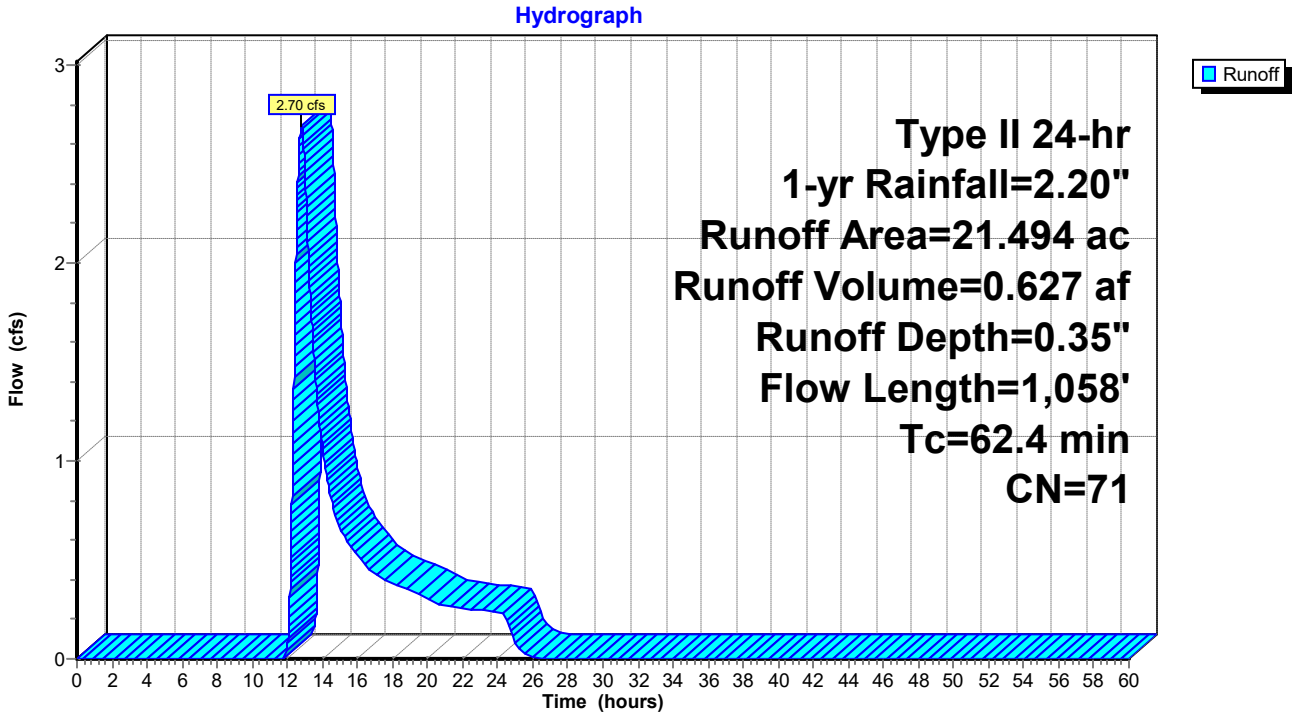
Runoff = 2.70 cfs @ 12.82 hrs, Volume= 0.627 af, Depth= 0.35"
Routed to Pond 12P : Wet Basin 01

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-yr Rainfall=2.20"

	Area (ac)	CN	Description
*	3.947	78	Woods, Agricultural
	17.547	70	Woods, Good, HSG C
	21.494	71	Weighted Average
	21.494		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
23.7	100	0.0200	0.07		**Sheet Flow, A to B sheet flow** Woods: Light underbrush n= 0.400 P2= 2.63"
38.7	958	0.0021	0.41		**Shallow Concentrated Flow, B to C shallow flow** Cultivated Straight Rows Kv= 9.0 fps
62.4	1,058	Total			

Subcatchment 10S: Offsite 04 (Diversion)



Summary for Subcatchment 16S: Pre-Developed 02 (Hirth/Wolpert)

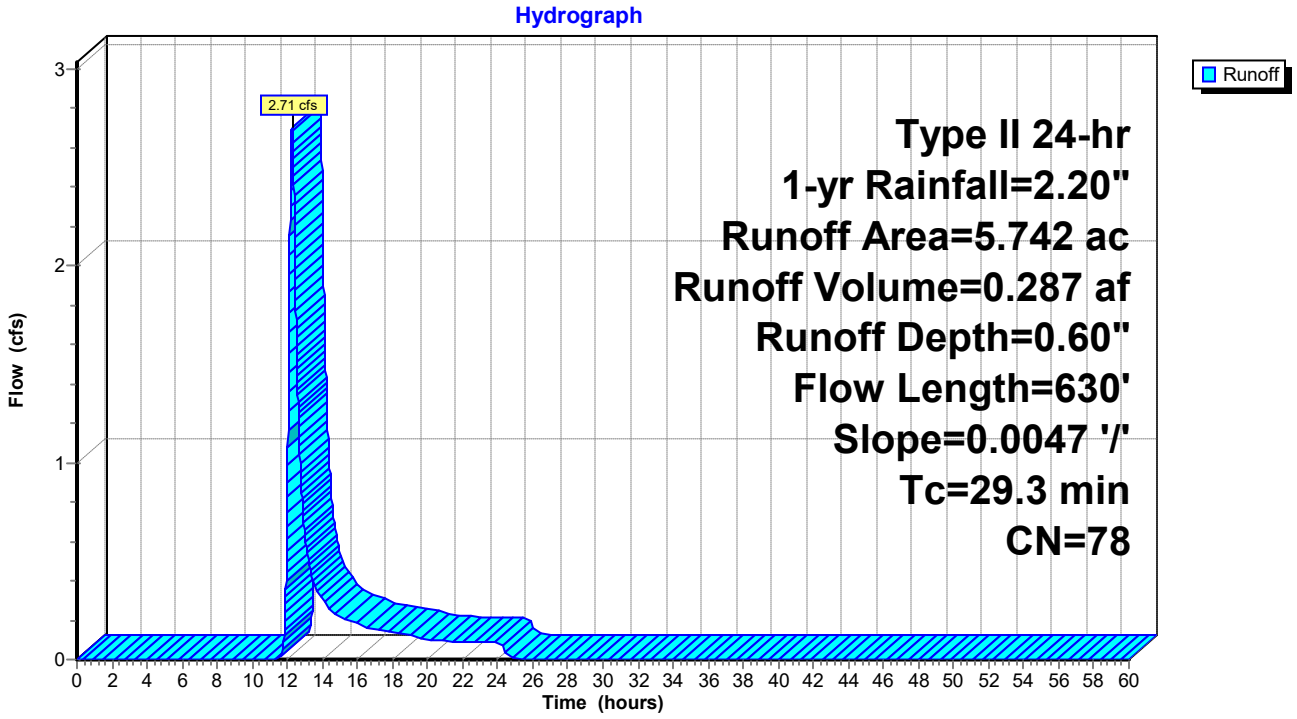
Runoff = 2.71 cfs @ 12.27 hrs, Volume= 0.287 af, Depth= 0.60"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-yr Rainfall=2.20"

Area (ac)	CN	Description
5.742	78	Row crops, C&T, Good, HSG C
5.742		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.3	100	0.0047	0.08		**Sheet Flow, A to B sheet flow** Cultivated: Residue>20% n= 0.170 P2= 2.63"
8.0	530	0.0047	1.10		**Shallow Concentrated Flow, B to C shallow flow** Unpaved Kv= 16.1 fps
29.3	630	Total			

Subcatchment 16S: Pre-Developed 02 (Hirth/Wolpert)



Summary for Pond 11P: Dry Basin 02

Inflow Area = 14.032 ac, 54.89% Impervious, Inflow Depth = 1.13" for 1-yr event
Inflow = 21.31 cfs @ 12.02 hrs, Volume= 1.320 af
Outflow = 9.19 cfs @ 12.18 hrs, Volume= 1.307 af, Atten= 57%, Lag= 9.4 min
Primary = 9.19 cfs @ 12.18 hrs, Volume= 1.307 af
Routed to Pond 12P : Wet Basin 01

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 923.37' @ 12.18 hrs Surf.Area= 0.302 ac Storage= 0.322 af

Plug-Flow detention time= 32.9 min calculated for 1.307 af (99% of inflow)
Center-of-Mass det. time= 26.9 min (858.4 - 831.6)

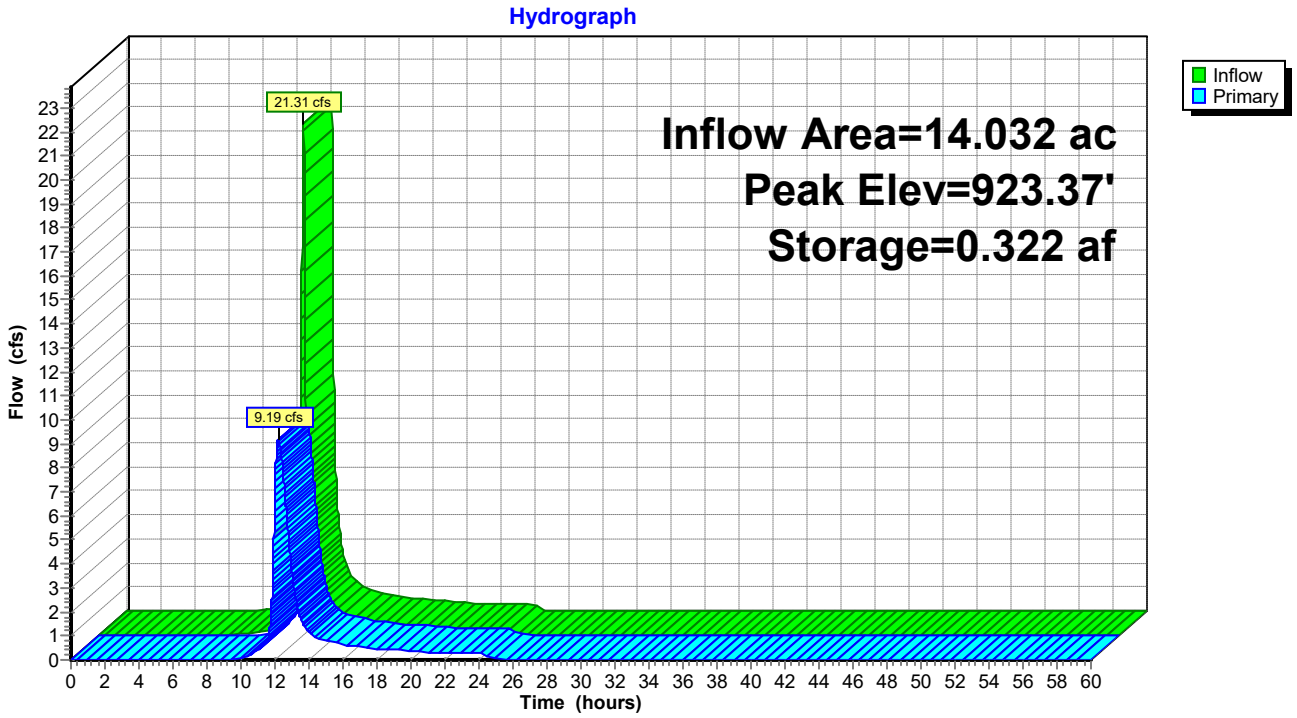
Volume	Invert	Avail.Storage	Storage Description
#1	921.00'	2.614 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
921.00	0.014	0.000	0.000
922.00	0.097	0.055	0.055
923.00	0.239	0.168	0.223
924.00	0.411	0.325	0.548
925.00	0.601	0.506	1.055
926.00	0.780	0.690	1.745
927.00	0.958	0.869	2.614

Device	Routing	Invert	Outlet Devices
#1	Primary	918.29'	**54.0" Round 1->HW1** L= 84.4' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 918.29' / 913.50' S= 0.0568 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 15.90 sf
#2	Device 1	918.87'	**54.0" Round 2->1** L= 292.2' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 918.87' / 918.29' S= 0.0020 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 15.90 sf
#3	Device 2	919.31'	**54.0" Round 3->2** L= 87.7' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 919.31' / 918.99' S= 0.0036 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 15.90 sf
#4	Device 3	921.10'	**24.0" Round 4->3** L= 330.5' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 921.10' / 919.45' S= 0.0050 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 3.14 sf
#5	Device 4	921.41'	**18.0" Round HW2->4** L= 9.1' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 921.41' / 921.20' S= 0.0231 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 1.77 sf

Primary OutFlow Max=9.19 cfs @ 12.18 hrs HW=923.37' TW=919.77' (Dynamic Tailwater)
- **1=1->HW1** (Passes 9.19 cfs of 128.72 cfs potential flow)
  - **2=2->1** (Passes 9.19 cfs of 85.32 cfs potential flow)
    - **3=3->2** (Passes 9.19 cfs of 79.01 cfs potential flow)
      - **4=4->3** (Passes 9.19 cfs of 15.70 cfs potential flow)
        - **5=HW2->4** (Barrel Controls 9.19 cfs @ 5.23 fps)

Pond 11P: Dry Basin 02



Summary for Pond 12P: Wet Basin 01

Inflow Area = 126.037 ac, 37.61% Impervious, Inflow Depth = 0.87" for 1-yr event
Inflow = 112.30 cfs @ 12.08 hrs, Volume= 9.108 af
Outflow = 1.26 cfs @ 24.24 hrs, Volume= 4.428 af, Atten= 99%, Lag= 729.2 min
Primary = 1.26 cfs @ 24.24 hrs, Volume= 4.428 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 921.03' @ 24.24 hrs Surf.Area= 4.067 ac Storage= 7.897 af

Plug-Flow detention time= 1,389.3 min calculated for 4.428 af (49% of inflow)
Center-of-Mass det. time= 1,255.5 min (2,110.4 - 854.9)

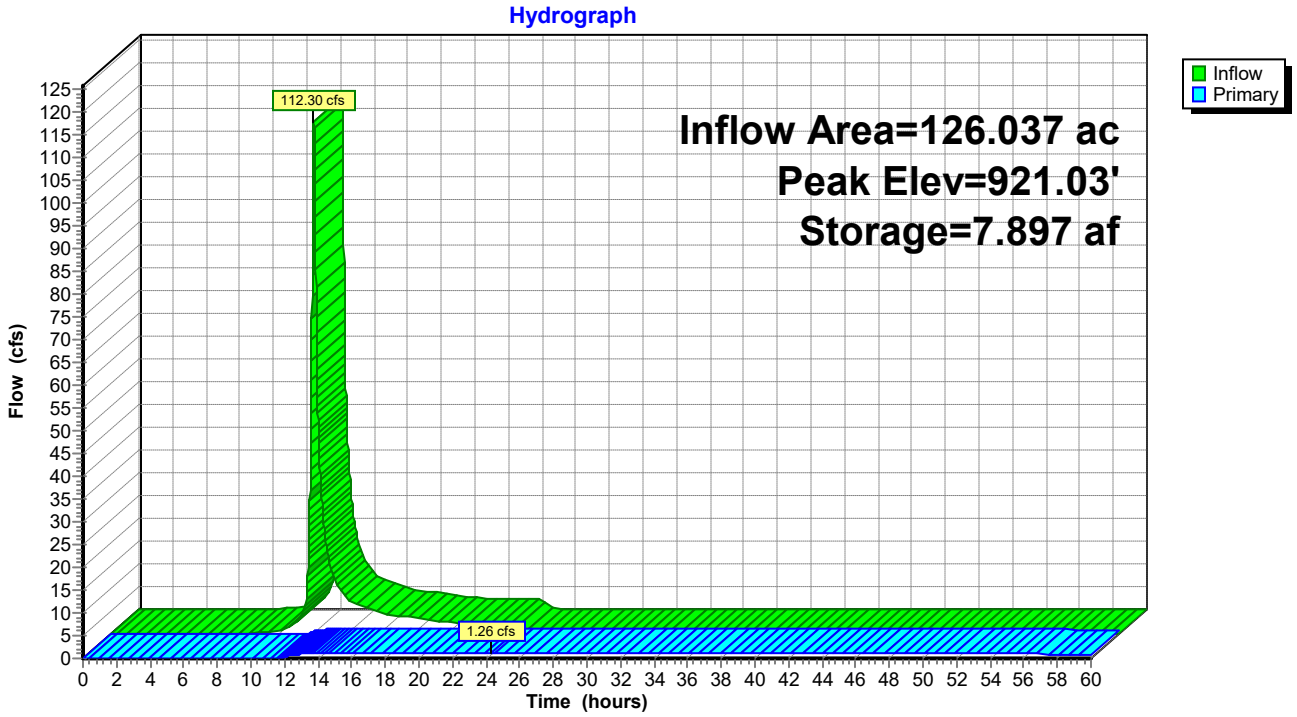
Volume	Invert	Avail.Storage	Storage Description
#1	919.00'	35.651 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
919.00	3.709	0.000	0.000
920.00	3.881	3.795	3.795
921.00	4.061	3.971	7.766
922.00	4.255	4.158	11.924
923.00	4.446	4.350	16.274
924.00	4.641	4.543	20.818
925.00	4.838	4.739	25.557
926.00	5.055	4.946	30.504
927.00	5.240	5.147	35.651

Device	Routing	Invert	Outlet Devices
#1	Primary	918.86'	**24.0" Round RCP_Round 24"** L= 29.0' Ke= 0.200 Inlet / Outlet Invert= 918.86' / 918.82' S= 0.0014 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#2	Device 1	919.00'	**6.0" Vert. WQ orifice** C= 0.600 Limited to weir flow at low heads
#3	Device 1	922.50'	**12.0" Horiz. Open top 12" pipe** C= 0.600 Limited to weir flow at low heads
#4	Device 1	923.00'	**8.0" Vert. 3rd stage orifice** C= 0.600 Limited to weir flow at low heads
#5	Device 1	924.80'	**15.0" Horiz. Open top 15" pipe** C= 0.600 Limited to weir flow at low heads
#6	Device 1	926.28'	**2.0" x 24.0" Horiz. Neenah grate X 8.00** C= 0.600 in 27.5" x 27.5" Grate (51% open area) Limited to weir flow at low heads

Primary OutFlow Max=1.26 cfs @ 24.24 hrs HW=921.03' (Free Discharge)
└─**1=RCP_Round 24"** (Passes 1.26 cfs of 13.81 cfs potential flow)
  ├─**2=WQ orifice** (Orifice Controls 1.26 cfs @ 6.43 fps)
  ├─**3=Open top 12" pipe** (Controls 0.00 cfs)
  ├─**4=3rd stage orifice** (Controls 0.00 cfs)
  ├─**5=Open top 15" pipe** (Controls 0.00 cfs)
  └─**6=Neenah grate** (Controls 0.00 cfs)

Pond 12P: Wet Basin 01



Summary for Subcatchment 1S: Subarea 01

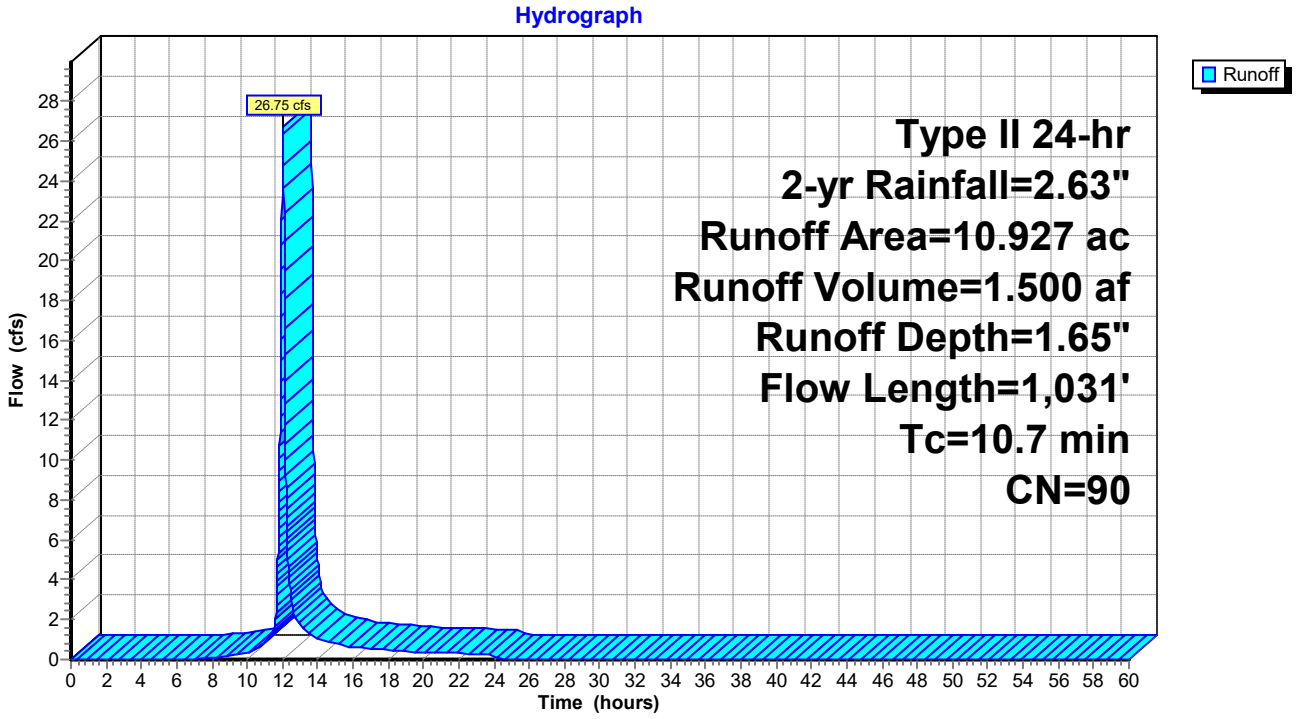
Runoff = 26.75 cfs @ 12.02 hrs, Volume= 1.500 af, Depth= 1.65"
Routed to Pond 11P : Dry Basin 02

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 2-yr Rainfall=2.63"

Area (ac)	CN	Description
10.927	90	1/8 acre lots, 65% imp, HSG C
3.824		35.00% Pervious Area
7.103		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, To catch basin**
5.7	1,031		3.00		**Direct Entry, Pipe flow**
10.7	1,031	Total			

Subcatchment 1S: Subarea 01



Summary for Subcatchment 2S: Pre-Developed 01 (Brown/Horch)

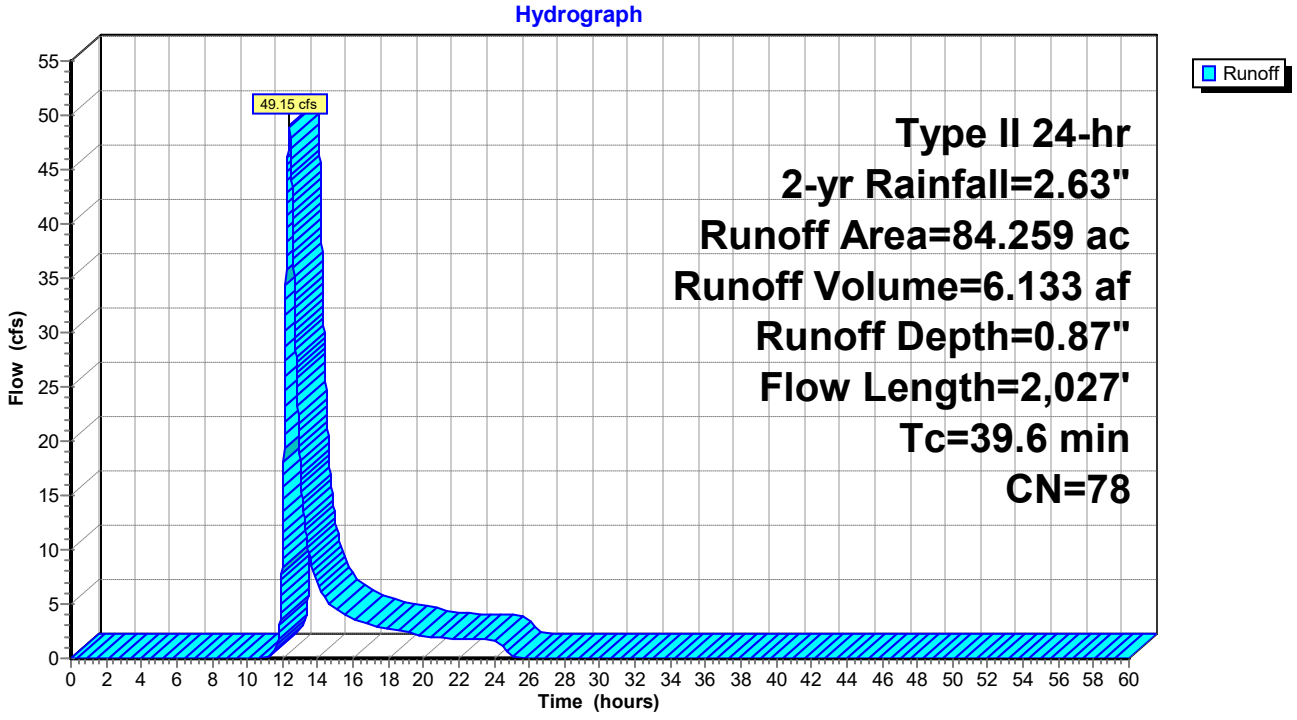
Runoff = 49.15 cfs @ 12.37 hrs, Volume= 6.133 af, Depth= 0.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 2-yr Rainfall=2.63"

Area (ac)	CN	Description
1.560	70	Woods, Good, HSG C
82.699	78	Row crops, C&T, Good, HSG C
84.259	78	Weighted Average
84.259		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	100	0.0260	0.15		**Sheet Flow, A to B sheet flow** Cultivated: Residue>20% n= 0.170 P2= 2.63"
28.8	1,927	0.0048	1.12		**Shallow Concentrated Flow, B to C shallow flow** Unpaved Kv= 16.1 fps
39.6	2,027	Total			

Subcatchment 2S: Pre-Developed 01 (Brown/Horch)



Summary for Subcatchment 3S: Subarea 02

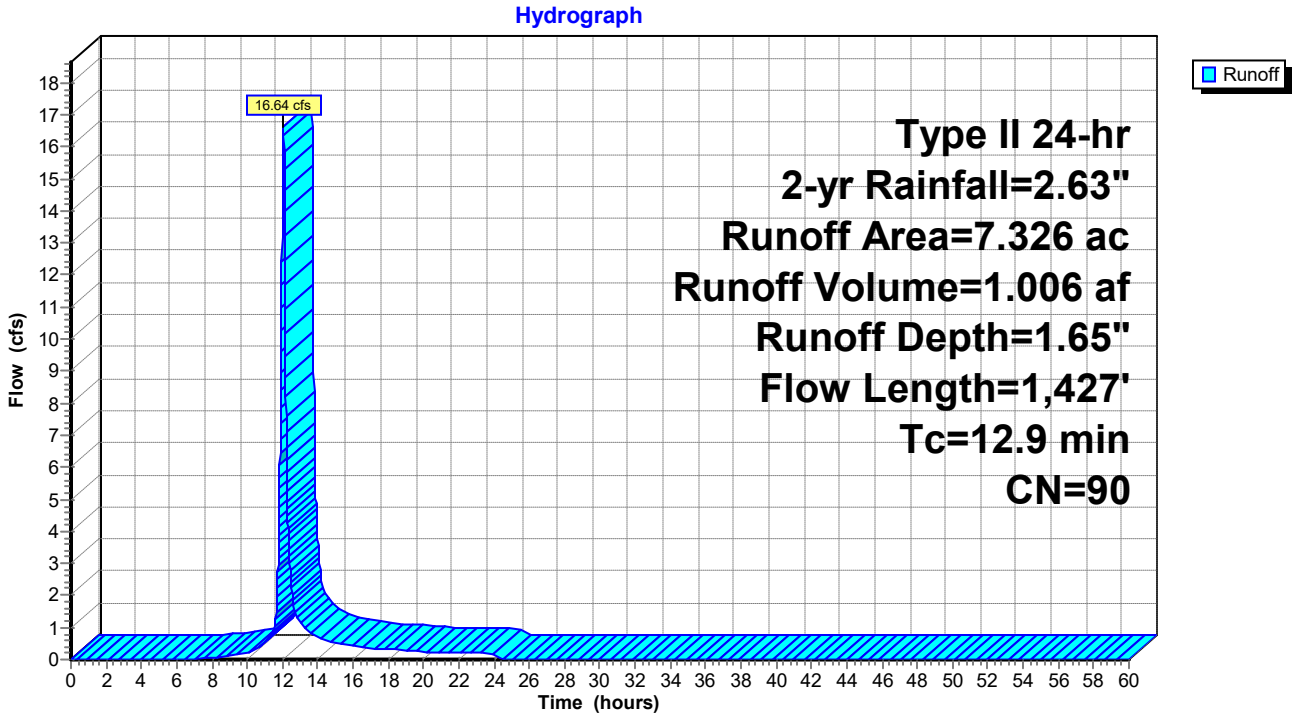
Runoff = 16.64 cfs @ 12.05 hrs, Volume= 1.006 af, Depth= 1.65"
Routed to Pond 12P : Wet Basin 01

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 2-yr Rainfall=2.63"

Area (ac)	CN	Description
7.326	90	1/8 acre lots, 65% imp, HSG C
2.564		35.00% Pervious Area
4.762		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, To catch basin**
7.9	1,427		3.00		**Direct Entry, Pipe flow**
12.9	1,427	Total			

Subcatchment 3S: Subarea 02



Summary for Subcatchment 4S: Subarea 03

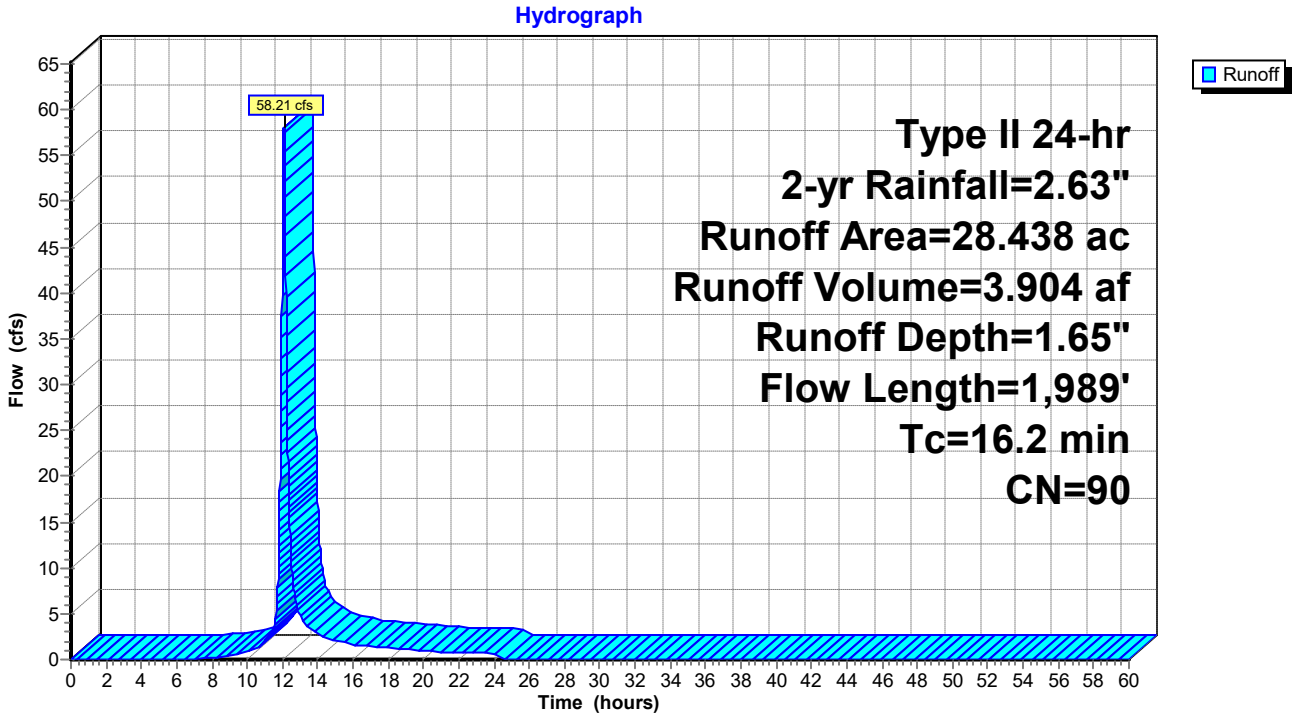
Runoff = 58.21 cfs @ 12.08 hrs, Volume= 3.904 af, Depth= 1.65"
Routed to Pond 12P : Wet Basin 01

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 2-yr Rainfall=2.63"

Area (ac)	CN	Description
28.438	90	1/8 acre lots, 65% imp, HSG C
9.953		35.00% Pervious Area
18.485		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.1					**Direct Entry, To catch basin**
11.0	1,989		3.00		**Direct Entry, Pipe flow**
16.2	1,989	Total			

Subcatchment 4S: Subarea 03



Summary for Subcatchment 5S: Subarea 04

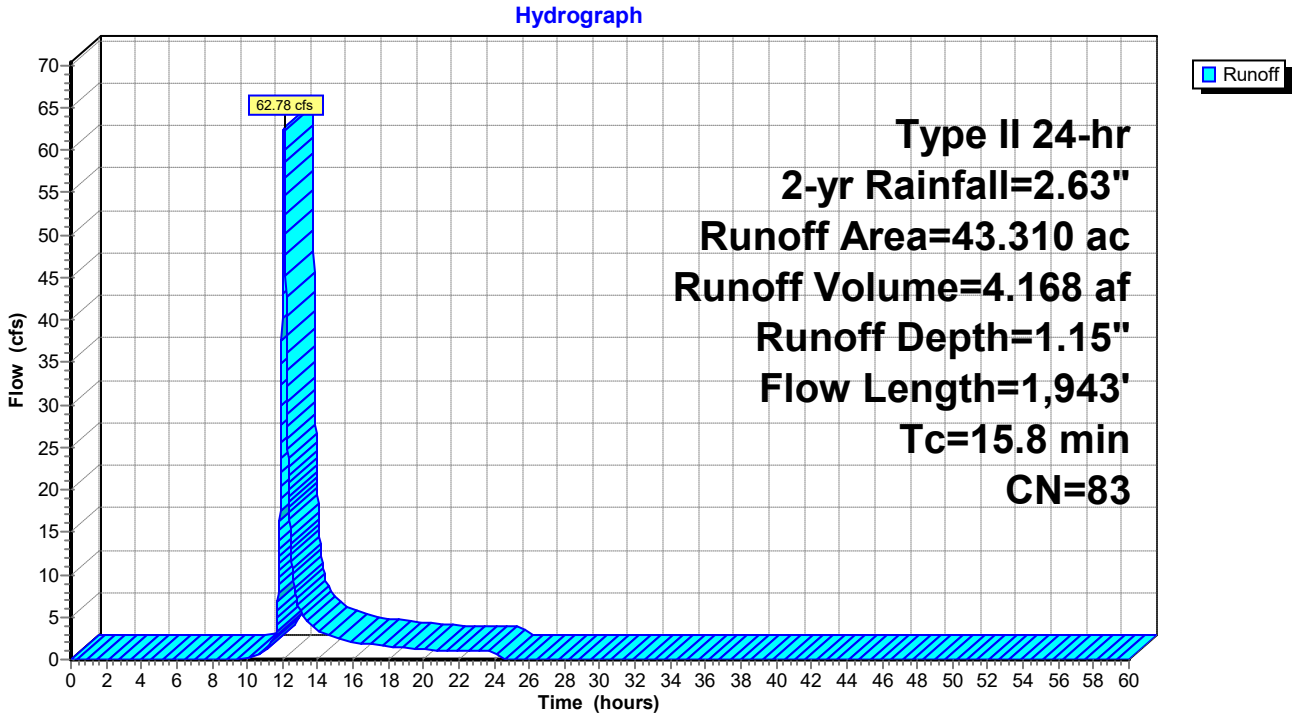
Runoff = 62.78 cfs @ 12.08 hrs, Volume= 4.168 af, Depth= 1.15"
Routed to Pond 12P : Wet Basin 01

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 2-yr Rainfall=2.63"

Area (ac)	CN	Description
43.310	83	1/4 acre lots, 38% imp, HSG C
26.852		62.00% Pervious Area
16.458		38.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, To catch basin**
10.8	1,943		3.00		**Direct Entry, Pipe flow**
15.8	1,943	Total			

Subcatchment 5S: Subarea 04



Summary for Subcatchment 7S: Offsite 02

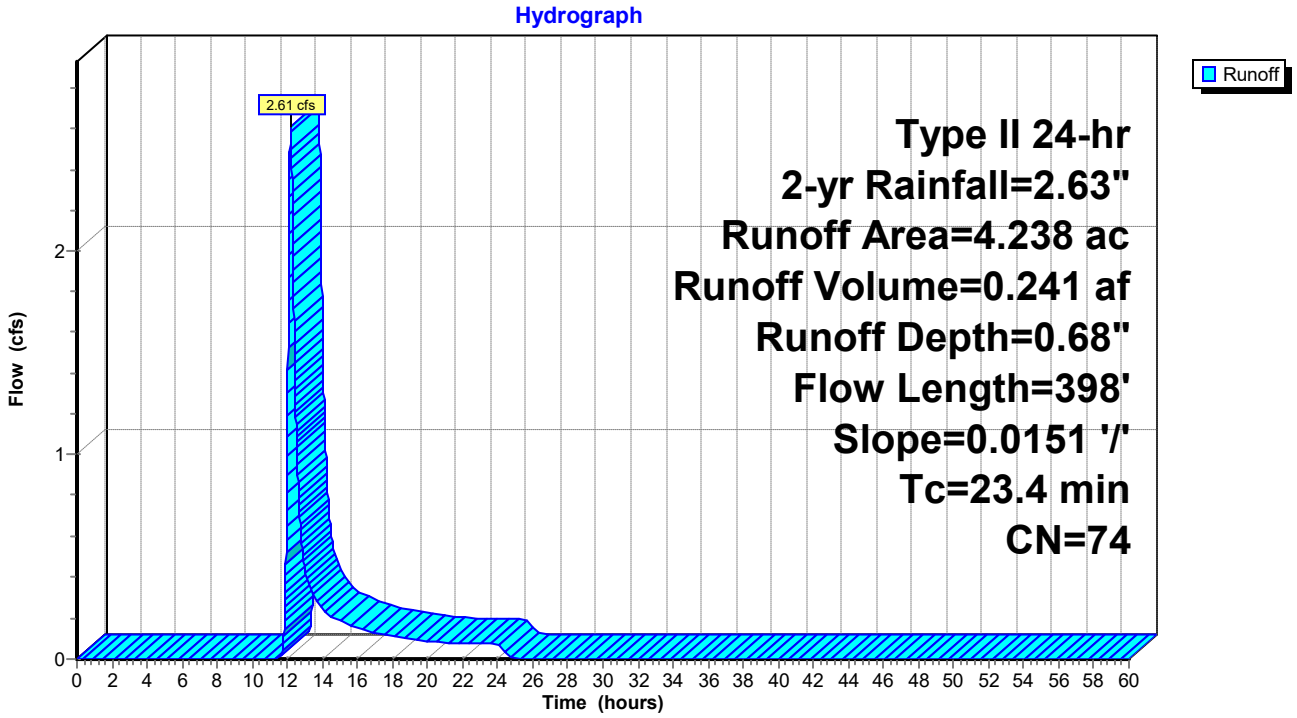
Runoff = 2.61 cfs @ 12.19 hrs, Volume= 0.241 af, Depth= 0.68"
Routed to Pond 12P : Wet Basin 01

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 2-yr Rainfall=2.63"

	Area (ac)	CN	Description
*	4.238	74	Open space
	4.238		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.6	100	0.0151	0.09		**Sheet Flow, A to B sheet flow** Grass: Dense n= 0.240 P2= 2.63"
5.8	298	0.0151	0.86		**Shallow Concentrated Flow, B to C shallow flow** Short Grass Pasture Kv= 7.0 fps
23.4	398	Total			

Subcatchment 7S: Offsite 02



Summary for Subcatchment 8S: Offsite 01

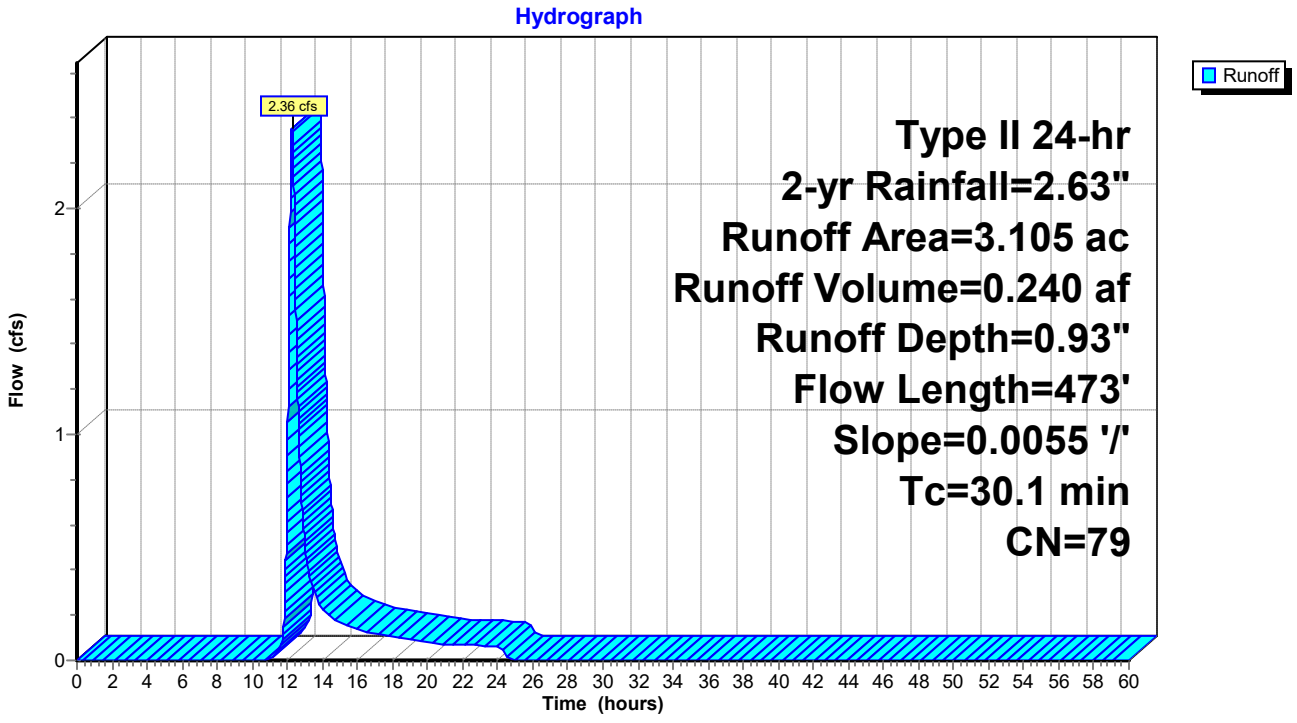
Runoff = 2.36 cfs @ 12.27 hrs, Volume= 0.240 af, Depth= 0.93"
Routed to Pond 11P : Dry Basin 02

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 2-yr Rainfall=2.63"

	Area (ac)	CN	Description
*	2.506	74	Open space
*	0.599	98	Existing Impervious
	3.105	79	Weighted Average
	2.506		80.71% Pervious Area
	0.599		19.29% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.1	100	0.0055	0.09		**Sheet Flow, A to B sheet flow** Grass: Short n= 0.150 P2= 2.63"
12.0	373	0.0055	0.52		**Shallow Concentrated Flow, B to C shallow flow** Short Grass Pasture Kv= 7.0 fps
30.1	473	Total			

Subcatchment 8S: Offsite 01



Summary for Subcatchment 9S: Offsite 03

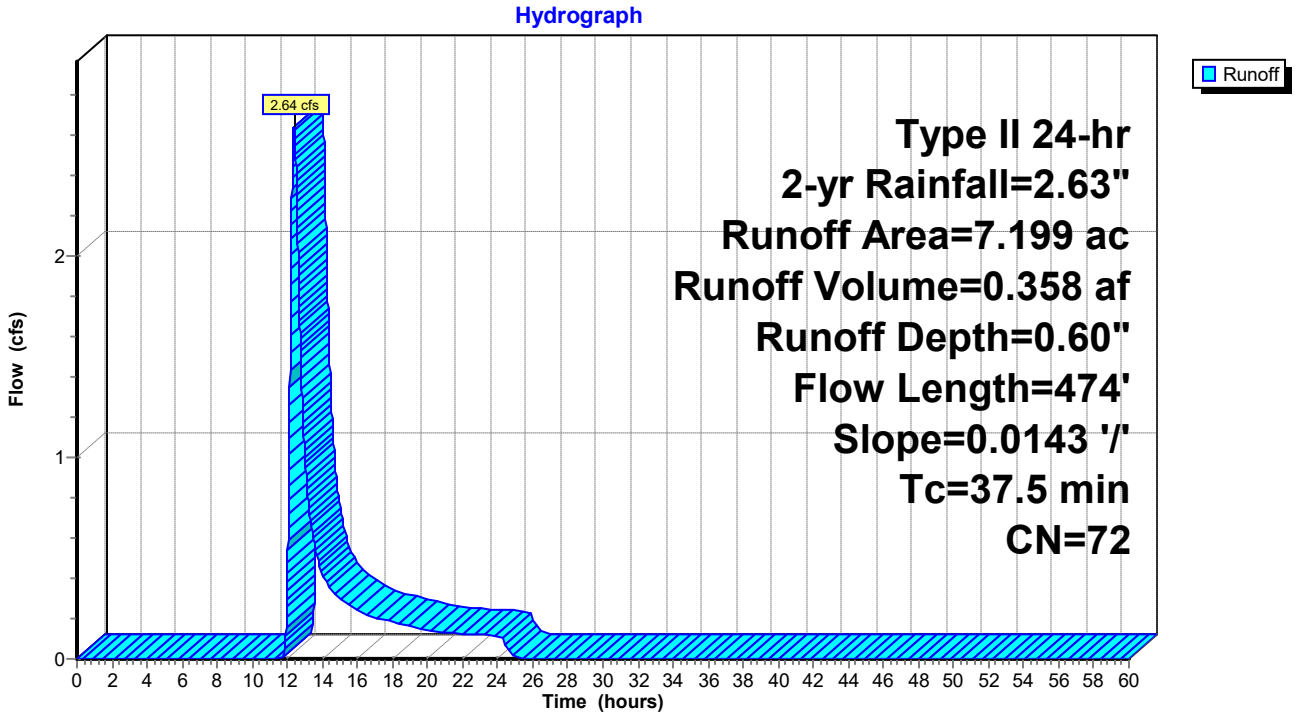
Runoff = 2.64 cfs @ 12.38 hrs, Volume= 0.358 af, Depth= 0.60"
Routed to Pond 12P : Wet Basin 01

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 2-yr Rainfall=2.63"

Area (ac)	CN	Description
2.228	78	Row crops, C&T, Good, HSG C
4.971	70	Woods, Good, HSG C
7.199	72	Weighted Average
7.199		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
27.1	100	0.0143	0.06		**Sheet Flow, A to B sheet flow** Woods: Light underbrush n= 0.400 P2= 2.63"
10.4	374	0.0143	0.60		**Shallow Concentrated Flow, B to C shallow flow** Woodland Kv= 5.0 fps
37.5	474	Total			

Subcatchment 9S: Offsite 03



Summary for Subcatchment 10S: Offsite 04 (Diversion)

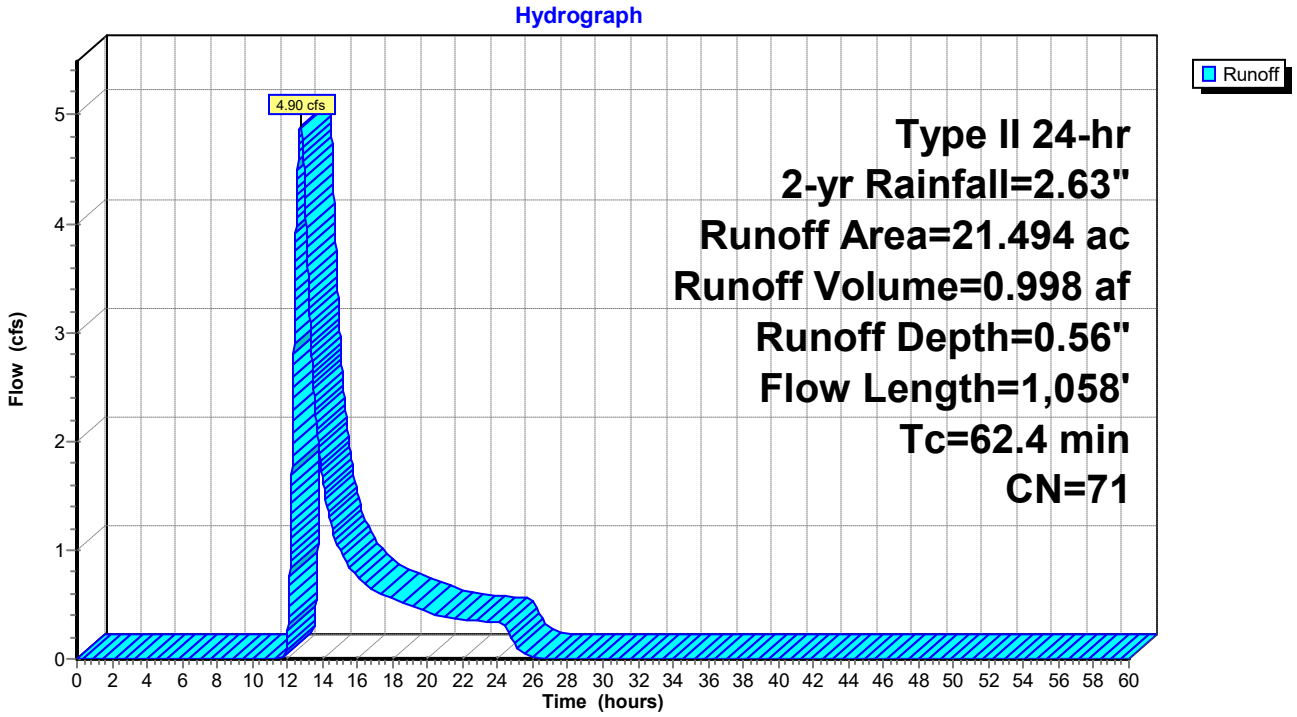
Runoff = 4.90 cfs @ 12.76 hrs, Volume= 0.998 af, Depth= 0.56"
Routed to Pond 12P : Wet Basin 01

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 2-yr Rainfall=2.63"

	Area (ac)	CN	Description
*	3.947	78	Woods, Agricultural
	17.547	70	Woods, Good, HSG C
	21.494	71	Weighted Average
	21.494		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
23.7	100	0.0200	0.07		**Sheet Flow, A to B sheet flow** Woods: Light underbrush n= 0.400 P2= 2.63"
38.7	958	0.0021	0.41		**Shallow Concentrated Flow, B to C shallow flow** Cultivated Straight Rows Kv= 9.0 fps
62.4	1,058	Total			

Subcatchment 10S: Offsite 04 (Diversion)



Summary for Subcatchment 16S: Pre-Developed 02 (Hirth/Wolpert)

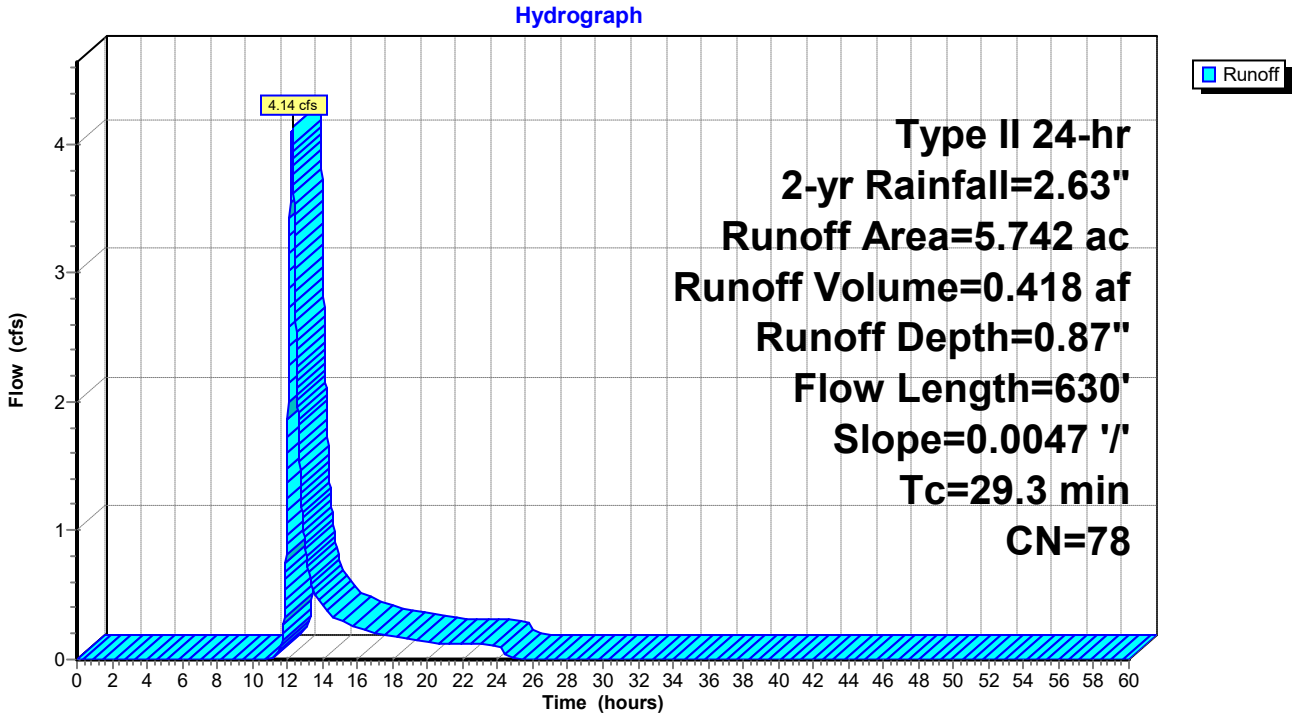
Runoff = 4.14 cfs @ 12.27 hrs, Volume= 0.418 af, Depth= 0.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 2-yr Rainfall=2.63"

Area (ac)	CN	Description
5.742	78	Row crops, C&T, Good, HSG C
5.742		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.3	100	0.0047	0.08		**Sheet Flow, A to B sheet flow** Cultivated: Residue>20% n= 0.170 P2= 2.63"
8.0	530	0.0047	1.10		**Shallow Concentrated Flow, B to C shallow flow** Unpaved Kv= 16.1 fps
29.3	630	Total			

Subcatchment 16S: Pre-Developed 02 (Hirth/Wolpert)



Summary for Pond 11P: Dry Basin 02

Inflow Area = 14.032 ac, 54.89% Impervious, Inflow Depth = 1.49" for 2-yr event
Inflow = 27.75 cfs @ 12.02 hrs, Volume= 1.740 af
Outflow = 10.66 cfs @ 12.20 hrs, Volume= 1.727 af, Atten= 62%, Lag= 10.8 min
Primary = 10.66 cfs @ 12.20 hrs, Volume= 1.727 af
Routed to Pond 12P : Wet Basin 01

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 923.73' @ 12.20 hrs Surf.Area= 0.365 ac Storage= 0.444 af

Plug-Flow detention time= 37.6 min calculated for 1.727 af (99% of inflow)
Center-of-Mass det. time= 33.0 min (857.2 - 824.2)

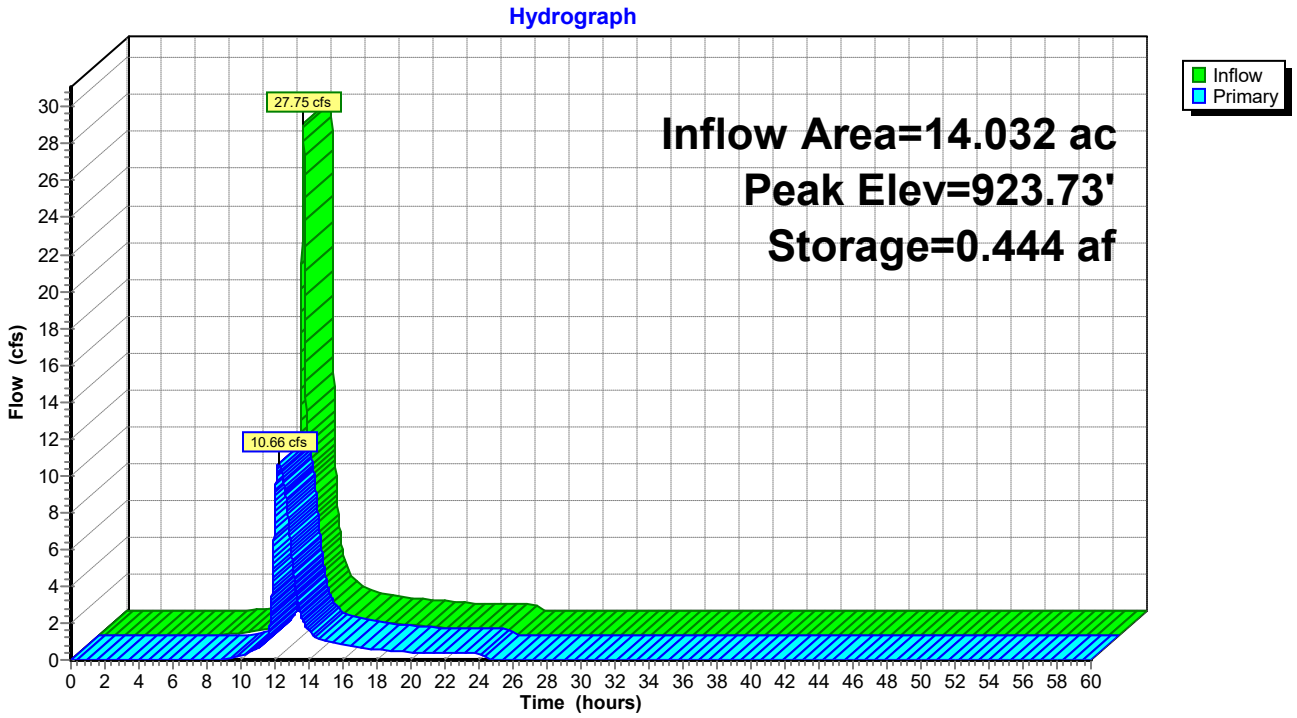
Volume	Invert	Avail.Storage	Storage Description
#1	921.00'	2.614 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
921.00	0.014	0.000	0.000
922.00	0.097	0.055	0.055
923.00	0.239	0.168	0.223
924.00	0.411	0.325	0.548
925.00	0.601	0.506	1.055
926.00	0.780	0.690	1.745
927.00	0.958	0.869	2.614

Device	Routing	Invert	Outlet Devices
#1	Primary	918.29'	**54.0" Round 1->HW1** L= 84.4' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 918.29' / 913.50' S= 0.0568 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 15.90 sf
#2	Device 1	918.87'	**54.0" Round 2->1** L= 292.2' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 918.87' / 918.29' S= 0.0020 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 15.90 sf
#3	Device 2	919.31'	**54.0" Round 3->2** L= 87.7' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 919.31' / 918.99' S= 0.0036 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 15.90 sf
#4	Device 3	921.10'	**24.0" Round 4->3** L= 330.5' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 921.10' / 919.45' S= 0.0050 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 3.14 sf
#5	Device 4	921.41'	**18.0" Round HW2->4** L= 9.1' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 921.41' / 921.20' S= 0.0231 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 1.77 sf

Primary OutFlow Max=10.66 cfs @ 12.20 hrs HW=923.73' TW=920.14' (Dynamic Tailwater)
└─**1=1->HW1** (Passes 10.66 cfs of 136.78 cfs potential flow)
└─**2=2->1** (Passes 10.66 cfs of 94.79 cfs potential flow)
└─**3=3->2** (Passes 10.66 cfs of 89.93 cfs potential flow)
└─**4=4->3** (Passes 10.66 cfs of 16.70 cfs potential flow)
└─**5=HW2->4** (Inlet Controls 10.66 cfs @ 6.03 fps)

Pond 11P: Dry Basin 02



Summary for Pond 12P: Wet Basin 01

Inflow Area = 126.037 ac, 37.61% Impervious, Inflow Depth = 1.18" for 2-yr event
Inflow = 150.14 cfs @ 12.08 hrs, Volume= 12.403 af
Outflow = 1.50 cfs @ 24.25 hrs, Volume= 5.384 af, Atten= 99%, Lag= 730.0 min
Primary = 1.50 cfs @ 24.25 hrs, Volume= 5.384 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 921.77' @ 24.25 hrs Surf.Area= 4.210 ac Storage= 10.935 af

Plug-Flow detention time= 1,408.2 min calculated for 5.383 af (43% of inflow)
Center-of-Mass det. time= 1,273.9 min (2,122.2 - 848.3)

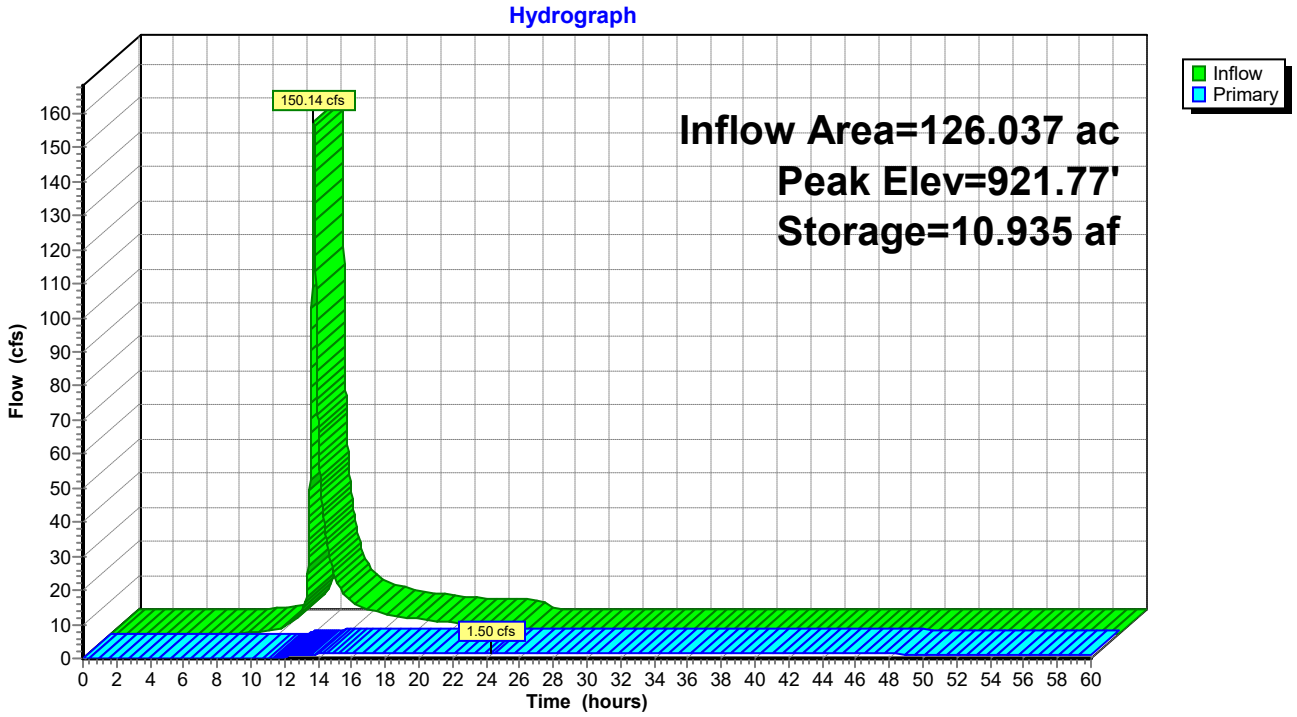
Volume	Invert	Avail.Storage	Storage Description
#1	919.00'	35.651 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
919.00	3.709	0.000	0.000
920.00	3.881	3.795	3.795
921.00	4.061	3.971	7.766
922.00	4.255	4.158	11.924
923.00	4.446	4.350	16.274
924.00	4.641	4.543	20.818
925.00	4.838	4.739	25.557
926.00	5.055	4.946	30.504
927.00	5.240	5.147	35.651

Device	Routing	Invert	Outlet Devices
#1	Primary	918.86'	**24.0" Round RCP_Round 24"** L= 29.0' Ke= 0.200 Inlet / Outlet Invert= 918.86' / 918.82' S= 0.0014 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#2	Device 1	919.00'	**6.0" Vert. WQ orifice** C= 0.600 Limited to weir flow at low heads
#3	Device 1	922.50'	**12.0" Horiz. Open top 12" pipe** C= 0.600 Limited to weir flow at low heads
#4	Device 1	923.00'	**8.0" Vert. 3rd stage orifice** C= 0.600 Limited to weir flow at low heads
#5	Device 1	924.80'	**15.0" Horiz. Open top 15" pipe** C= 0.600 Limited to weir flow at low heads
#6	Device 1	926.28'	**2.0" x 24.0" Horiz. Neenah grate X 8.00** C= 0.600 in 27.5" x 27.5" Grate (51% open area) Limited to weir flow at low heads

Primary OutFlow Max=1.50 cfs @ 24.25 hrs HW=921.77' (Free Discharge)
└**1=RCP_Round 24"** (Passes 1.50 cfs of 19.63 cfs potential flow)
  ├**2=WQ orifice** (Orifice Controls 1.50 cfs @ 7.64 fps)
  ├**3=Open top 12" pipe** (Controls 0.00 cfs)
  ├**4=3rd stage orifice** (Controls 0.00 cfs)
  ├**5=Open top 15" pipe** (Controls 0.00 cfs)
  └**6=Neenah grate** (Controls 0.00 cfs)

Pond 12P: Wet Basin 01



Summary for Subcatchment 1S: Subarea 01

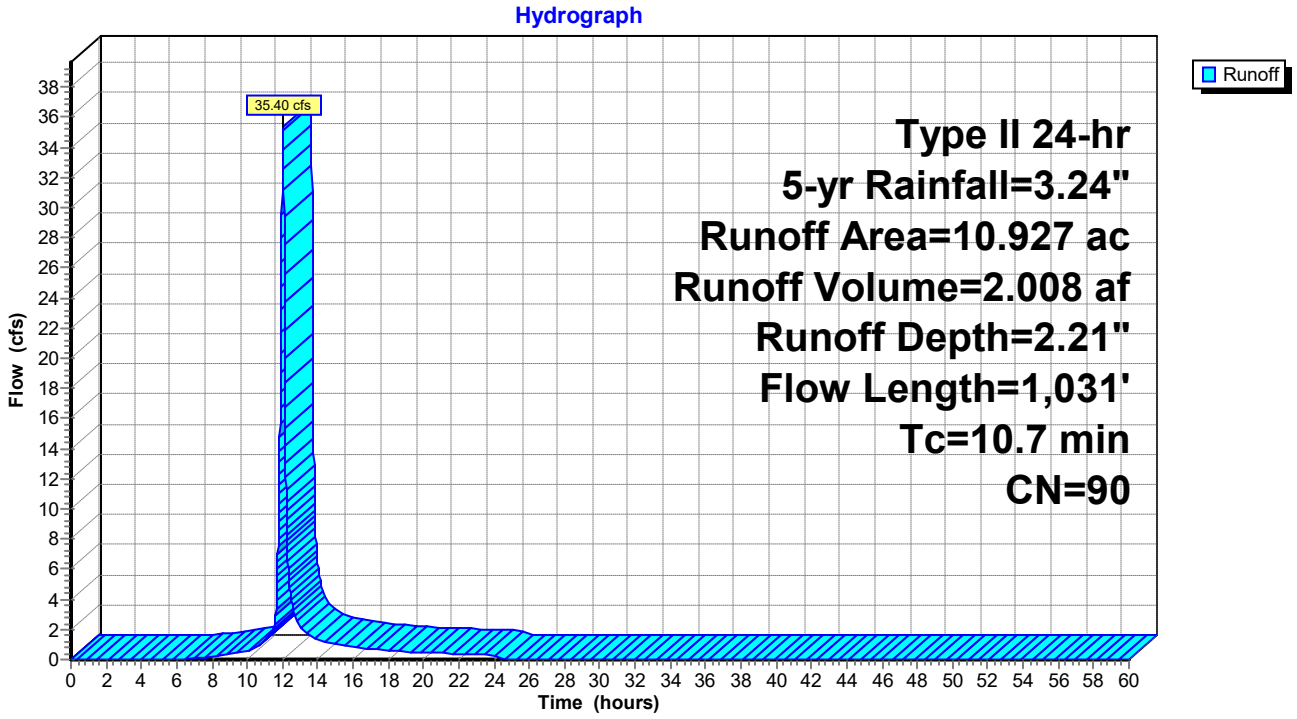
Runoff = 35.40 cfs @ 12.02 hrs, Volume= 2.008 af, Depth= 2.21"
Routed to Pond 11P : Dry Basin 02

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 5-yr Rainfall=3.24"

Area (ac)	CN	Description
10.927	90	1/8 acre lots, 65% imp, HSG C
3.824		35.00% Pervious Area
7.103		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, To catch basin**
5.7	1,031		3.00		**Direct Entry, Pipe flow**
10.7	1,031	Total			

Subcatchment 1S: Subarea 01



Summary for Subcatchment 2S: Pre-Developed 01 (Brown/Horch)

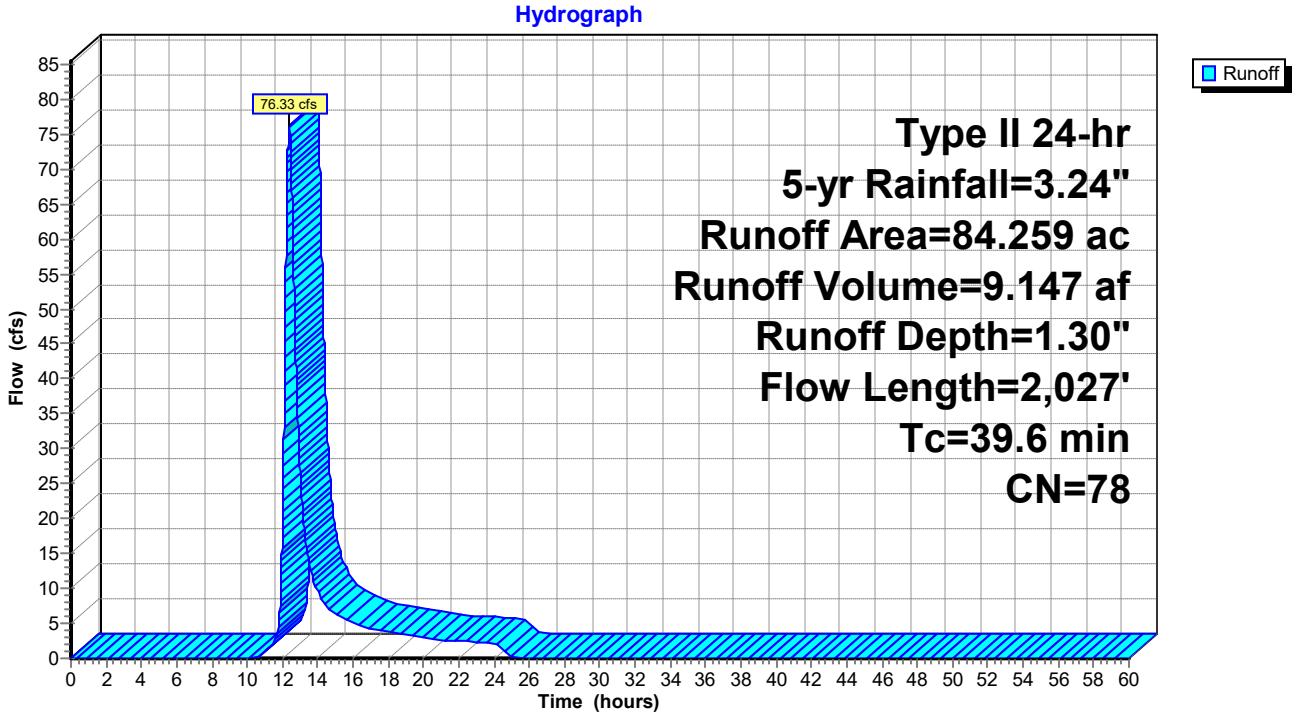
Runoff = 76.33 cfs @ 12.37 hrs, Volume= 9.147 af, Depth= 1.30"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 5-yr Rainfall=3.24"

Area (ac)	CN	Description
1.560	70	Woods, Good, HSG C
82.699	78	Row crops, C&T, Good, HSG C
84.259	78	Weighted Average
84.259		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	100	0.0260	0.15		**Sheet Flow, A to B sheet flow** Cultivated: Residue>20% n= 0.170 P2= 2.63"
28.8	1,927	0.0048	1.12		**Shallow Concentrated Flow, B to C shallow flow** Unpaved Kv= 16.1 fps
39.6	2,027	Total			

Subcatchment 2S: Pre-Developed 01 (Brown/Horch)



Summary for Subcatchment 3S: Subarea 02

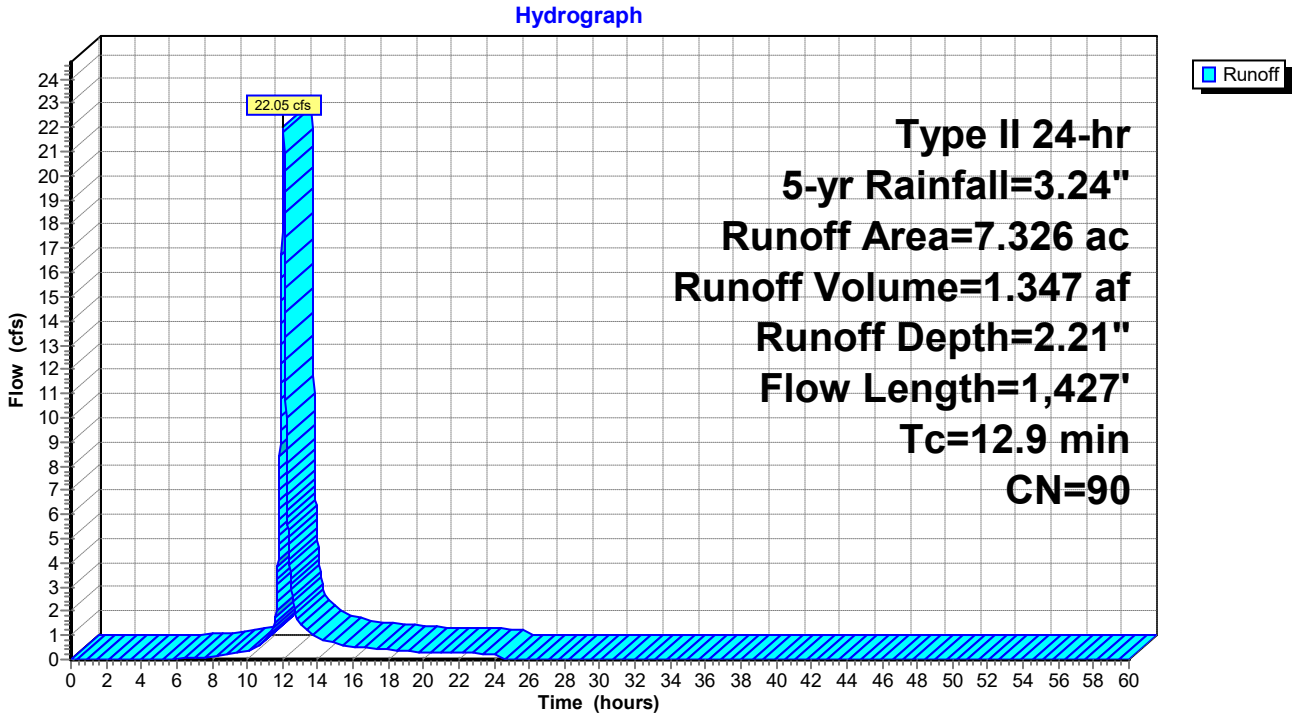
Runoff = 22.05 cfs @ 12.05 hrs, Volume= 1.347 af, Depth= 2.21"
Routed to Pond 12P : Wet Basin 01

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 5-yr Rainfall=3.24"

Area (ac)	CN	Description
7.326	90	1/8 acre lots, 65% imp, HSG C
2.564		35.00% Pervious Area
4.762		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, To catch basin**
7.9	1,427		3.00		**Direct Entry, Pipe flow**
12.9	1,427	Total			

Subcatchment 3S: Subarea 02



Summary for Subcatchment 4S: Subarea 03

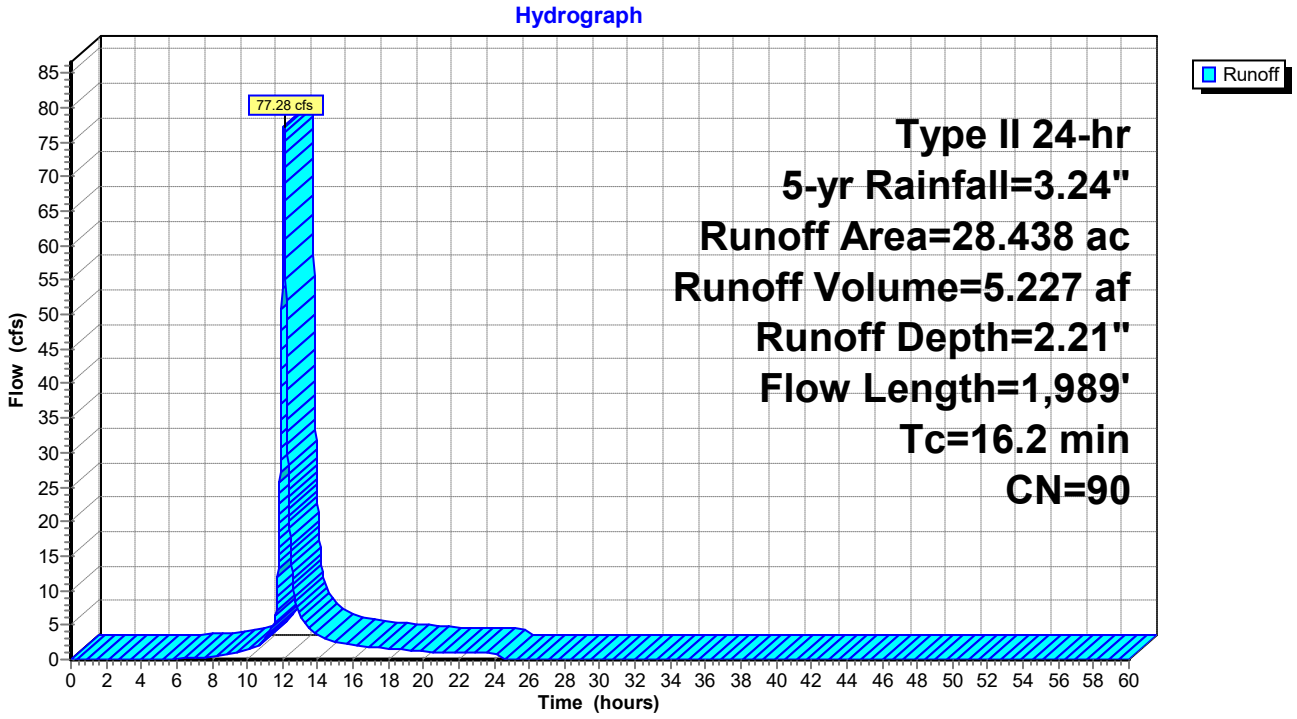
Runoff = 77.28 cfs @ 12.08 hrs, Volume= 5.227 af, Depth= 2.21"
Routed to Pond 12P : Wet Basin 01

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 5-yr Rainfall=3.24"

Area (ac)	CN	Description
28.438	90	1/8 acre lots, 65% imp, HSG C
9.953		35.00% Pervious Area
18.485		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.1					**Direct Entry, To catch basin**
11.0	1,989		3.00		**Direct Entry, Pipe flow**
16.2	1,989	Total			

Subcatchment 4S: Subarea 03



Summary for Subcatchment 5S: Subarea 04

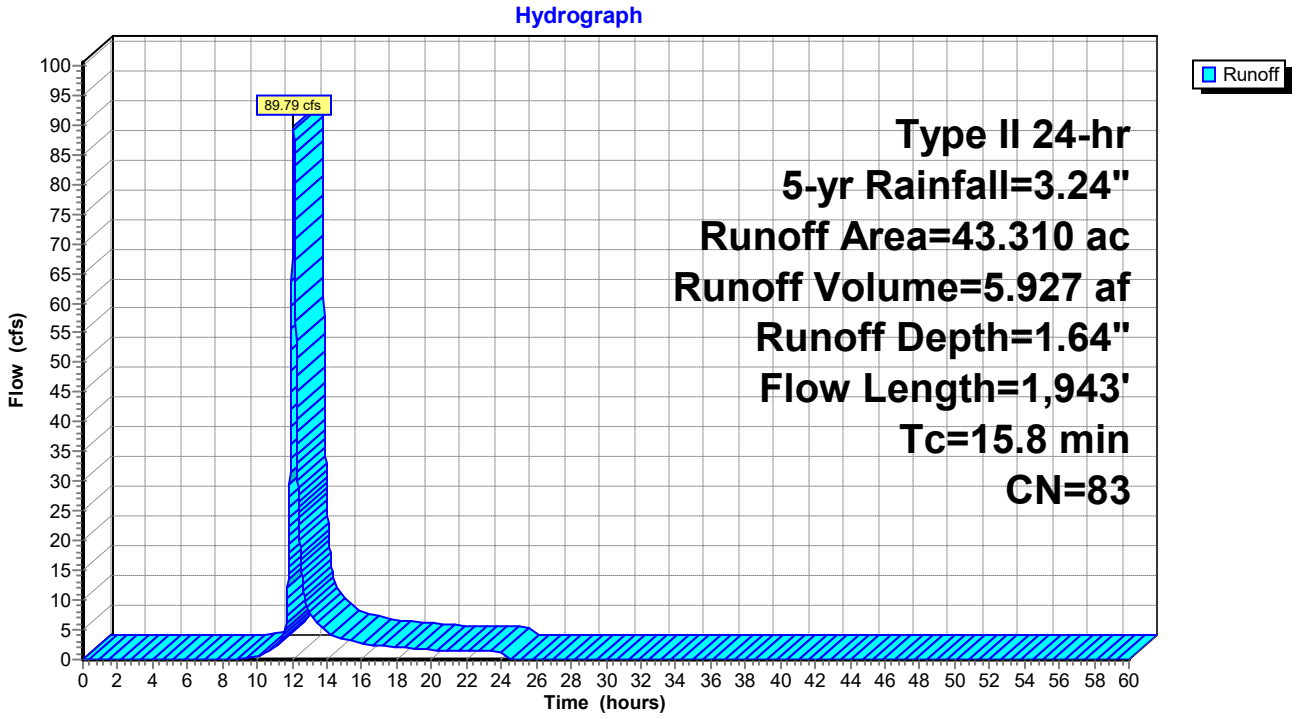
Runoff = 89.79 cfs @ 12.08 hrs, Volume= 5.927 af, Depth= 1.64"
Routed to Pond 12P : Wet Basin 01

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 5-yr Rainfall=3.24"

Area (ac)	CN	Description
43.310	83	1/4 acre lots, 38% imp, HSG C
26.852		62.00% Pervious Area
16.458		38.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, To catch basin**
10.8	1,943		3.00		**Direct Entry, Pipe flow**
15.8	1,943	Total			

Subcatchment 5S: Subarea 04



Summary for Subcatchment 7S: Offsite 02

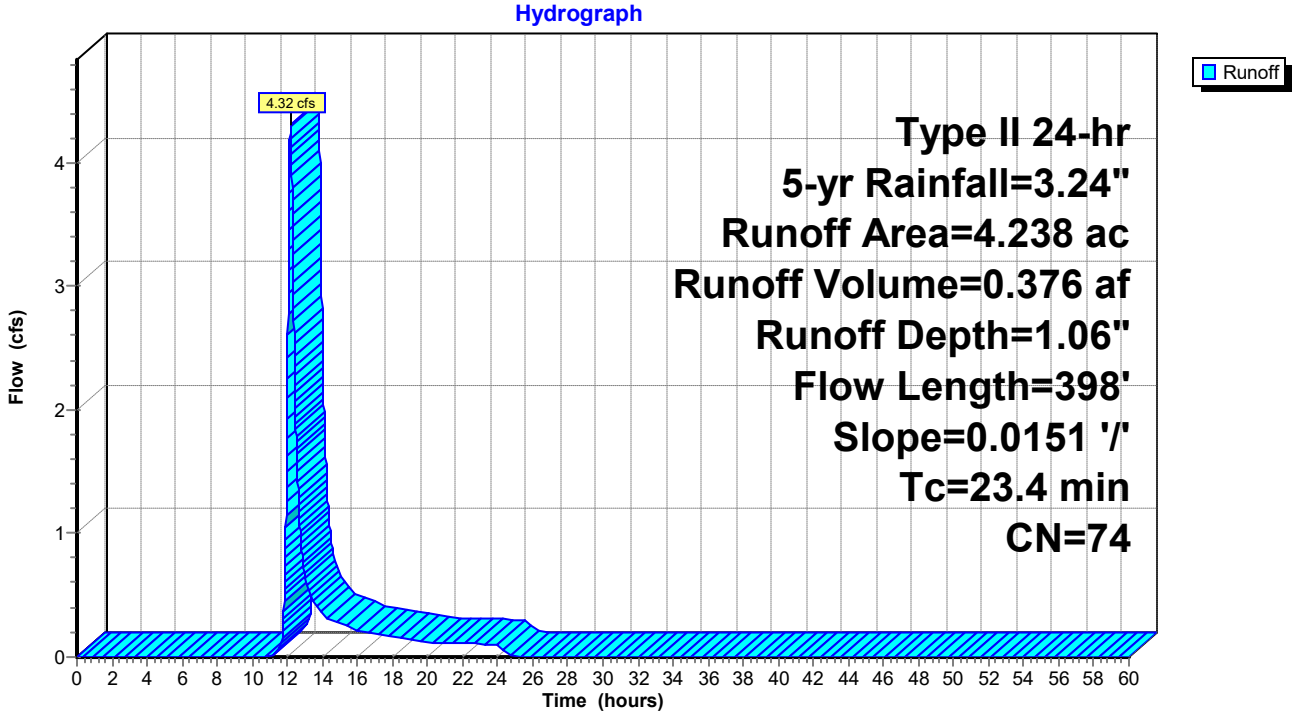
Runoff = 4.32 cfs @ 12.19 hrs, Volume= 0.376 af, Depth= 1.06"
Routed to Pond 12P : Wet Basin 01

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 5-yr Rainfall=3.24"

	Area (ac)	CN	Description
*	4.238	74	Open space
	4.238		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.6	100	0.0151	0.09		**Sheet Flow, A to B sheet flow** Grass: Dense n= 0.240 P2= 2.63"
5.8	298	0.0151	0.86		**Shallow Concentrated Flow, B to C shallow flow** Short Grass Pasture Kv= 7.0 fps
23.4	398	Total			

Subcatchment 7S: Offsite 02



Summary for Subcatchment 8S: Offsite 01

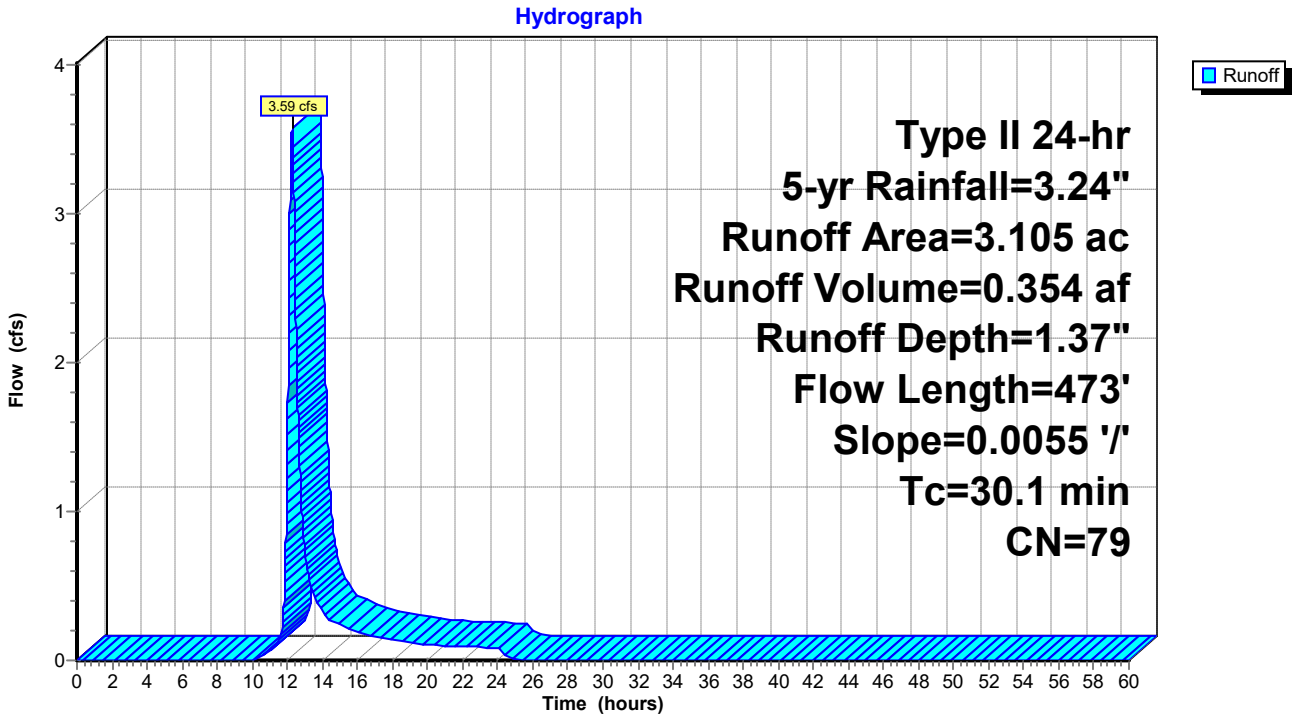
Runoff = 3.59 cfs @ 12.27 hrs, Volume= 0.354 af, Depth= 1.37"
Routed to Pond 11P : Dry Basin 02

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 5-yr Rainfall=3.24"

	Area (ac)	CN	Description
*	2.506	74	Open space
*	0.599	98	Existing Impervious
	3.105	79	Weighted Average
	2.506		80.71% Pervious Area
	0.599		19.29% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.1	100	0.0055	0.09		**Sheet Flow, A to B sheet flow** Grass: Short n= 0.150 P2= 2.63"
12.0	373	0.0055	0.52		**Shallow Concentrated Flow, B to C shallow flow** Short Grass Pasture Kv= 7.0 fps
30.1	473	Total			

Subcatchment 8S: Offsite 01



Summary for Subcatchment 9S: Offsite 03

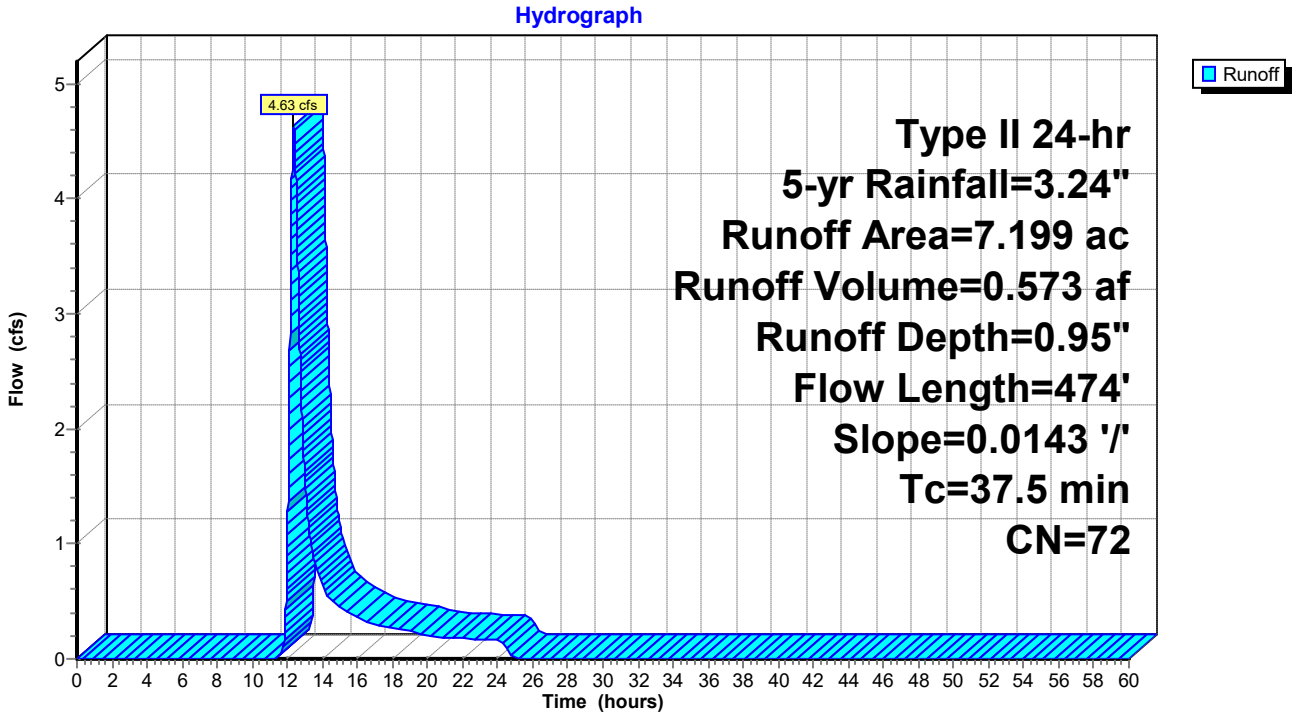
Runoff = 4.63 cfs @ 12.37 hrs, Volume= 0.573 af, Depth= 0.95"
Routed to Pond 12P : Wet Basin 01

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 5-yr Rainfall=3.24"

Area (ac)	CN	Description
2.228	78	Row crops, C&T, Good, HSG C
4.971	70	Woods, Good, HSG C
7.199	72	Weighted Average
7.199		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
27.1	100	0.0143	0.06		**Sheet Flow, A to B sheet flow** Woods: Light underbrush n= 0.400 P2= 2.63"
10.4	374	0.0143	0.60		**Shallow Concentrated Flow, B to C shallow flow** Woodland Kv= 5.0 fps
37.5	474	Total			

Subcatchment 9S: Offsite 03



Summary for Subcatchment 10S: Offsite 04 (Diversion)

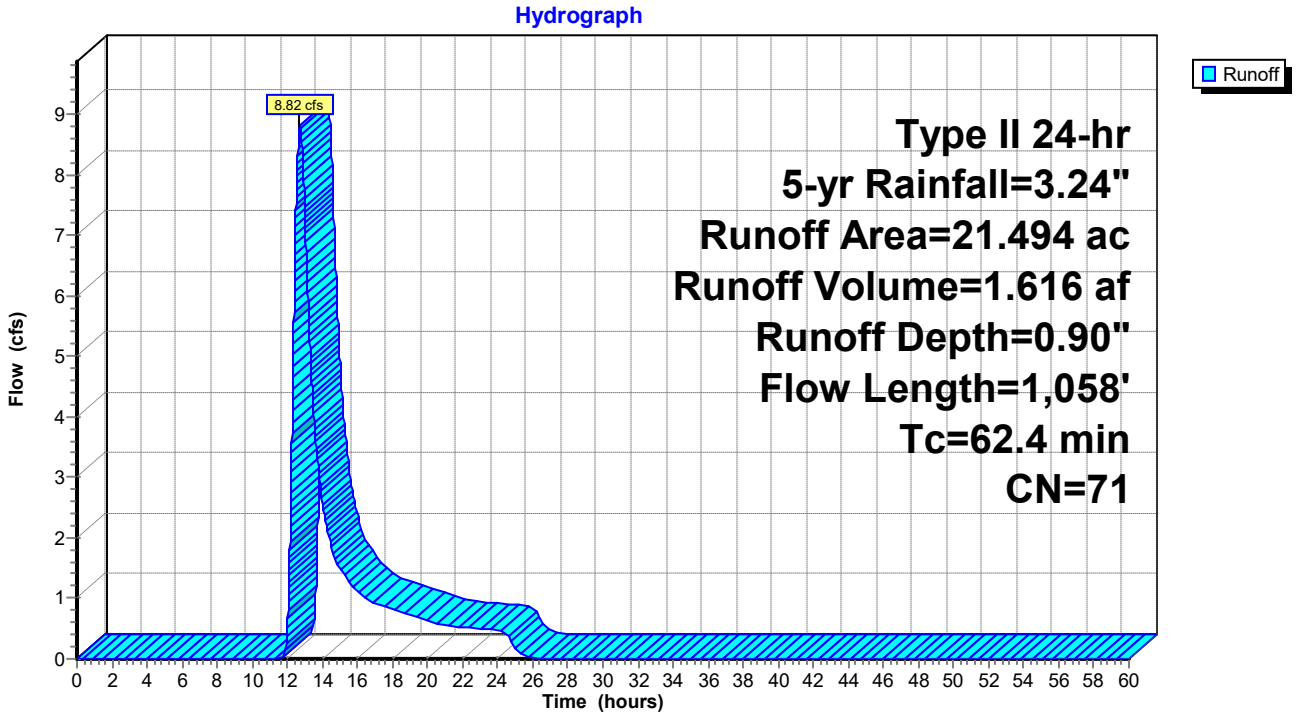
Runoff = 8.82 cfs @ 12.69 hrs, Volume= 1.616 af, Depth= 0.90"
Routed to Pond 12P : Wet Basin 01

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 5-yr Rainfall=3.24"

	Area (ac)	CN	Description
*	3.947	78	Woods, Agricultural
	17.547	70	Woods, Good, HSG C
	21.494	71	Weighted Average
	21.494		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
23.7	100	0.0200	0.07		**Sheet Flow, A to B sheet flow** Woods: Light underbrush n= 0.400 P2= 2.63"
38.7	958	0.0021	0.41		**Shallow Concentrated Flow, B to C shallow flow** Cultivated Straight Rows Kv= 9.0 fps
62.4	1,058	Total			

Subcatchment 10S: Offsite 04 (Diversion)



Summary for Subcatchment 16S: Pre-Developed 02 (Hirth/Wolpert)

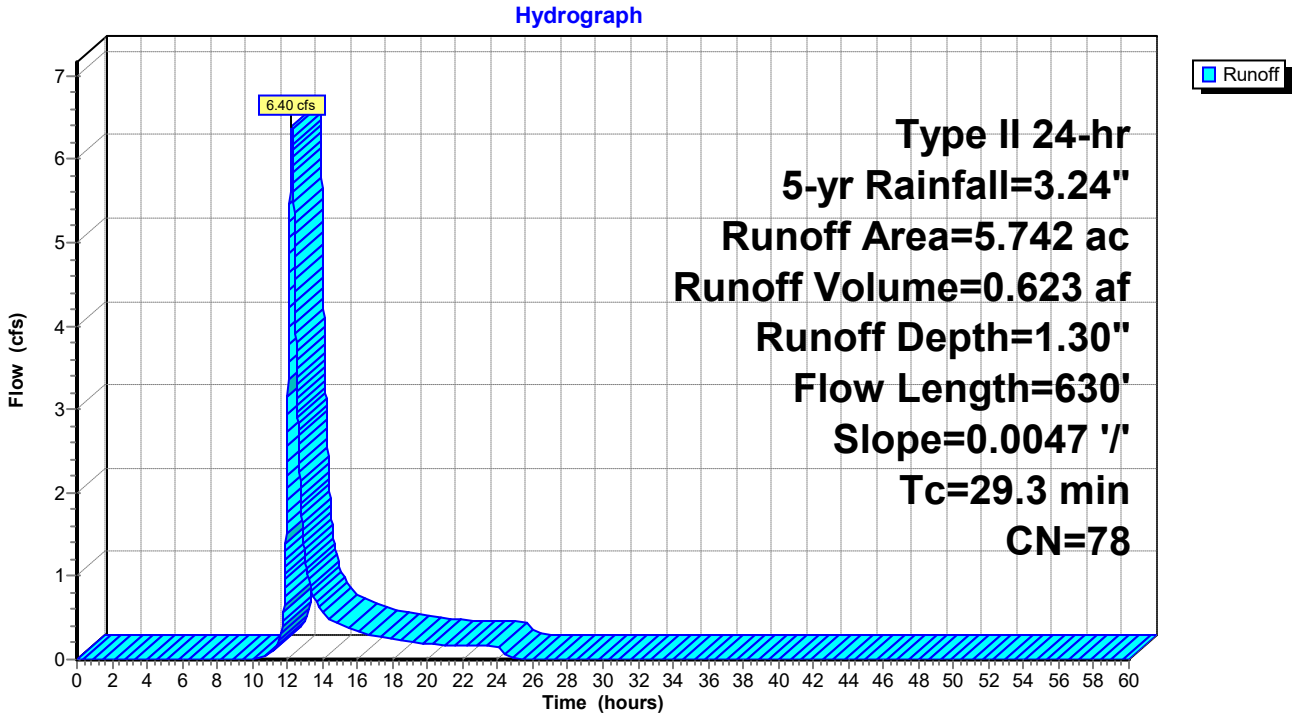
Runoff = 6.40 cfs @ 12.24 hrs, Volume= 0.623 af, Depth= 1.30"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 5-yr Rainfall=3.24"

Area (ac)	CN	Description
5.742	78	Row crops, C&T, Good, HSG C
5.742		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.3	100	0.0047	0.08		**Sheet Flow, A to B sheet flow** Cultivated: Residue>20% n= 0.170 P2= 2.63"
8.0	530	0.0047	1.10		**Shallow Concentrated Flow, B to C shallow flow** Unpaved Kv= 16.1 fps
29.3	630	Total			

Subcatchment 16S: Pre-Developed 02 (Hirth/Wolpert)



Summary for Pond 11P: Dry Basin 02

Inflow Area = 14.032 ac, 54.89% Impervious, Inflow Depth = 2.02" for 5-yr event
Inflow = 37.05 cfs @ 12.02 hrs, Volume= 2.362 af
Outflow = 12.20 cfs @ 12.24 hrs, Volume= 2.337 af, Atten= 67%, Lag= 13.2 min
Primary = 12.20 cfs @ 12.24 hrs, Volume= 2.337 af
Routed to Pond 12P : Wet Basin 01

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 924.22' @ 12.24 hrs Surf.Area= 0.452 ac Storage= 0.642 af

Plug-Flow detention time= 105.5 min calculated for 2.337 af (99% of inflow)
Center-of-Mass det. time= 99.3 min (915.4 - 816.2)

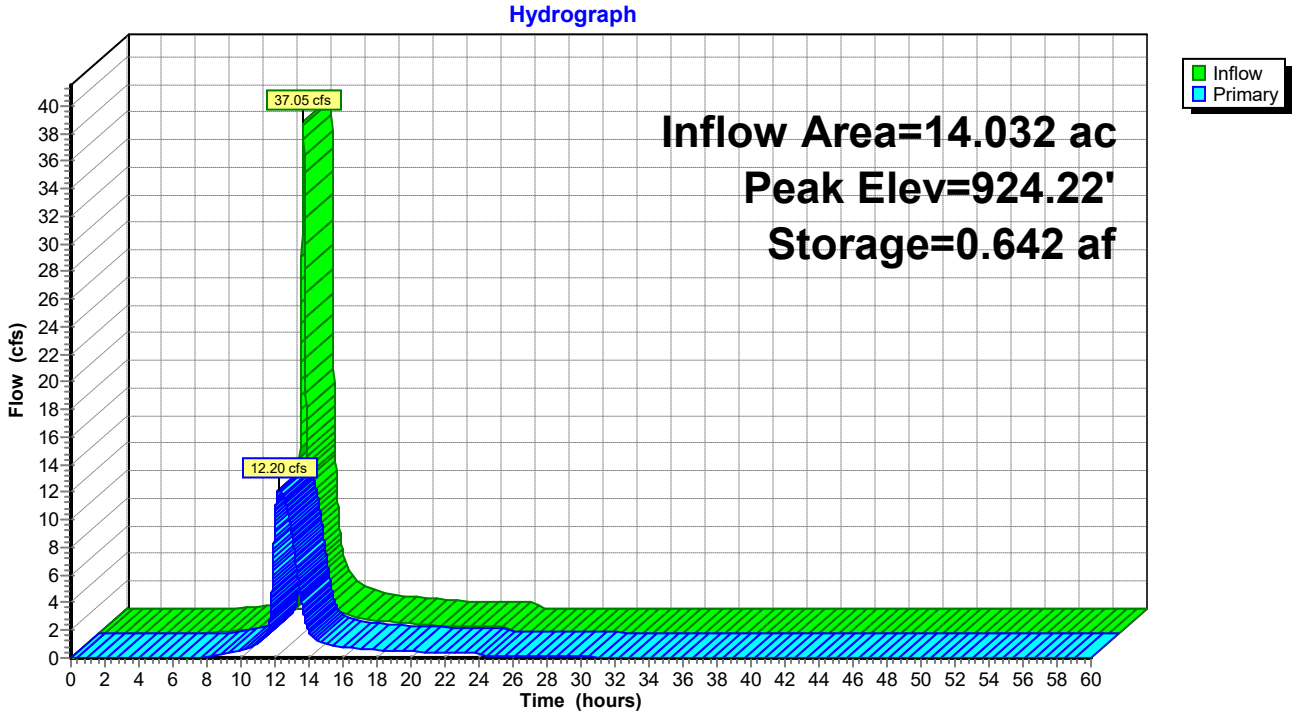
Volume	Invert	Avail.Storage	Storage Description
#1	921.00'	2.614 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
921.00	0.014	0.000	0.000
922.00	0.097	0.055	0.055
923.00	0.239	0.168	0.223
924.00	0.411	0.325	0.548
925.00	0.601	0.506	1.055
926.00	0.780	0.690	1.745
927.00	0.958	0.869	2.614

Device	Routing	Invert	Outlet Devices
#1	Primary	918.29'	**54.0" Round 1->HW1** L= 84.4' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 918.29' / 913.50' S= 0.0568 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 15.90 sf
#2	Device 1	918.87'	**54.0" Round 2->1** L= 292.2' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 918.87' / 918.29' S= 0.0020 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 15.90 sf
#3	Device 2	919.31'	**54.0" Round 3->2** L= 87.7' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 919.31' / 918.99' S= 0.0036 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 15.90 sf
#4	Device 3	921.10'	**24.0" Round 4->3** L= 330.5' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 921.10' / 919.45' S= 0.0050 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 3.14 sf
#5	Device 4	921.41'	**18.0" Round HW2->4** L= 9.1' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 921.41' / 921.20' S= 0.0231 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 1.77 sf

Primary OutFlow Max=12.20 cfs @ 12.24 hrs HW=924.22' TW=920.74' (Dynamic Tailwater)
└─**1=1->HW1** (Passes 12.20 cfs of 142.70 cfs potential flow)
└─**2=2->1** (Passes 12.20 cfs of 105.76 cfs potential flow)
└─**3=3->2** (Passes 12.20 cfs of 103.98 cfs potential flow)
└─**4=4->3** (Passes 12.20 cfs of 17.69 cfs potential flow)
└─**5=HW2->4** (Inlet Controls 12.20 cfs @ 6.90 fps)

Pond 11P: Dry Basin 02



Summary for Pond 12P: Wet Basin 01

Inflow Area = 126.037 ac, 37.61% Impervious, Inflow Depth > 1.66" for 5-yr event
Inflow = 205.91 cfs @ 12.08 hrs, Volume= 17.402 af
Outflow = 2.99 cfs @ 24.15 hrs, Volume= 7.074 af, Atten= 99%, Lag= 724.4 min
Primary = 2.99 cfs @ 24.15 hrs, Volume= 7.074 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 922.74' @ 24.15 hrs Surf.Area= 4.397 ac Storage= 15.135 af

Plug-Flow detention time= 1,356.1 min calculated for 7.074 af (41% of inflow)
Center-of-Mass det. time= 1,213.6 min (2,062.6 - 849.0)

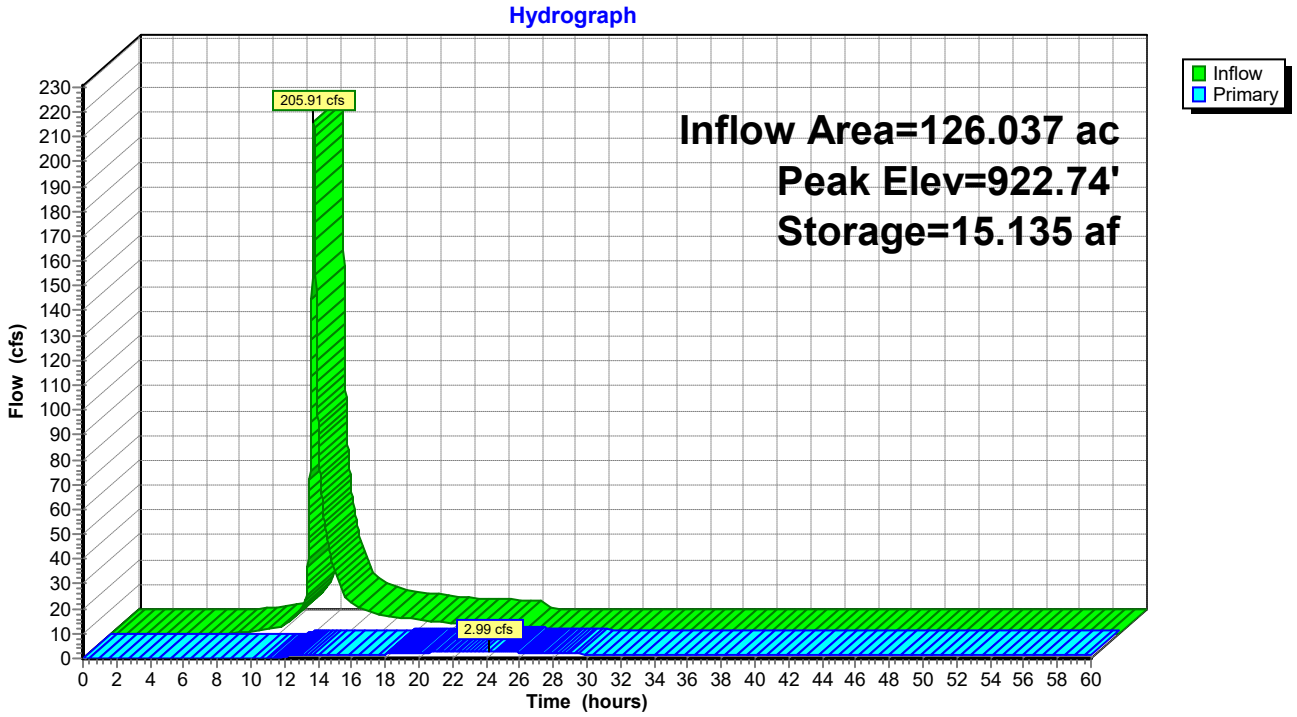
Volume	Invert	Avail.Storage	Storage Description
#1	919.00'	35.651 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
919.00	3.709	0.000	0.000
920.00	3.881	3.795	3.795
921.00	4.061	3.971	7.766
922.00	4.255	4.158	11.924
923.00	4.446	4.350	16.274
924.00	4.641	4.543	20.818
925.00	4.838	4.739	25.557
926.00	5.055	4.946	30.504
927.00	5.240	5.147	35.651

Device	Routing	Invert	Outlet Devices
#1	Primary	918.86'	**24.0" Round RCP_Round 24"** L= 29.0' Ke= 0.200 Inlet / Outlet Invert= 918.86' / 918.82' S= 0.0014 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#2	Device 1	919.00'	**6.0" Vert. WQ orifice** C= 0.600 Limited to weir flow at low heads
#3	Device 1	922.50'	**12.0" Horiz. Open top 12" pipe** C= 0.600 Limited to weir flow at low heads
#4	Device 1	923.00'	**8.0" Vert. 3rd stage orifice** C= 0.600 Limited to weir flow at low heads
#5	Device 1	924.80'	**15.0" Horiz. Open top 15" pipe** C= 0.600 Limited to weir flow at low heads
#6	Device 1	926.28'	**2.0" x 24.0" Horiz. Neenah grate X 8.00** C= 0.600 in 27.5" x 27.5" Grate (51% open area) Limited to weir flow at low heads

Primary OutFlow Max=2.99 cfs @ 24.15 hrs HW=922.74' (Free Discharge)
└**1=RCP_Round 24"** (Passes 2.99 cfs of 27.97 cfs potential flow)
  ├**2=WQ orifice** (Orifice Controls 1.77 cfs @ 9.00 fps)
  ├**3=Open top 12" pipe** (Weir Controls 1.22 cfs @ 1.61 fps)
  ├**4=3rd stage orifice** (Controls 0.00 cfs)
  ├**5=Open top 15" pipe** (Controls 0.00 cfs)
  └**6=Neenah grate** (Controls 0.00 cfs)

Pond 12P: Wet Basin 01



Summary for Subcatchment 1S: Subarea 01

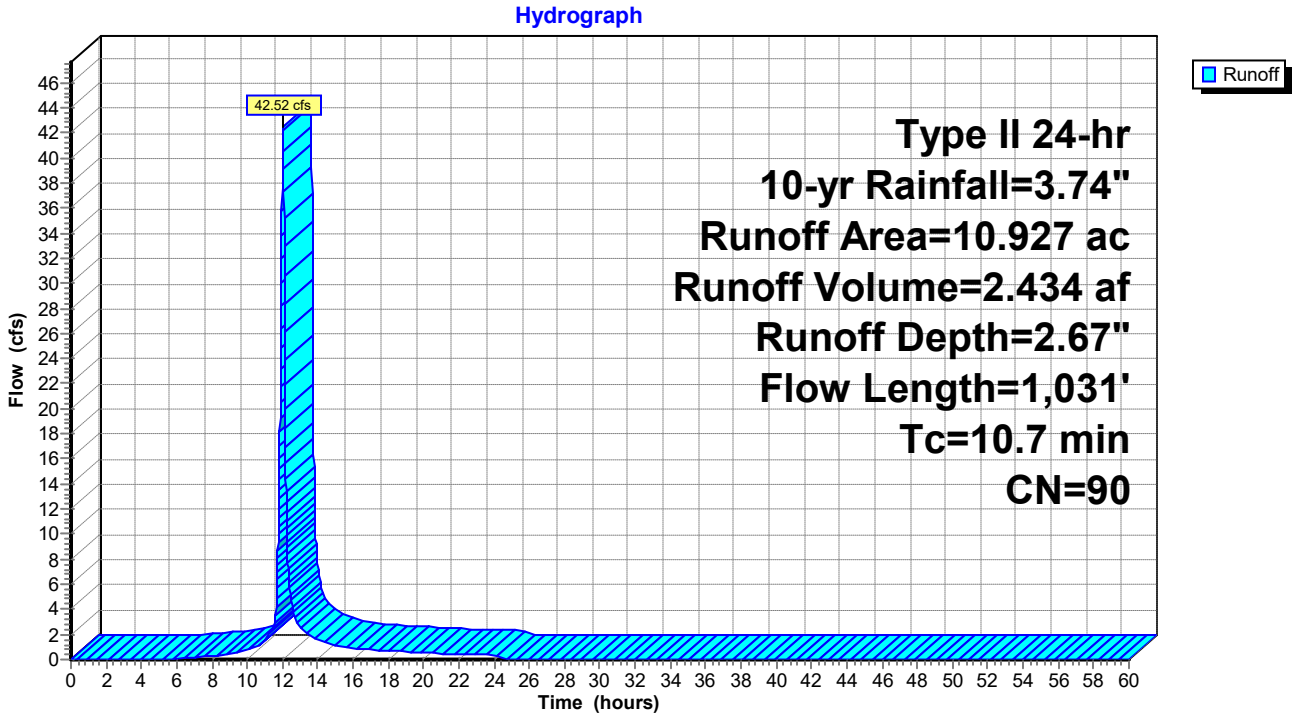
Runoff = 42.52 cfs @ 12.02 hrs, Volume= 2.434 af, Depth= 2.67"
Routed to Pond 11P : Dry Basin 02

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-yr Rainfall=3.74"

Area (ac)	CN	Description
10.927	90	1/8 acre lots, 65% imp, HSG C
3.824		35.00% Pervious Area
7.103		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, To catch basin**
5.7	1,031		3.00		**Direct Entry, Pipe flow**
10.7	1,031	Total			

Subcatchment 1S: Subarea 01



Summary for Subcatchment 2S: Pre-Developed 01 (Brown/Horch)

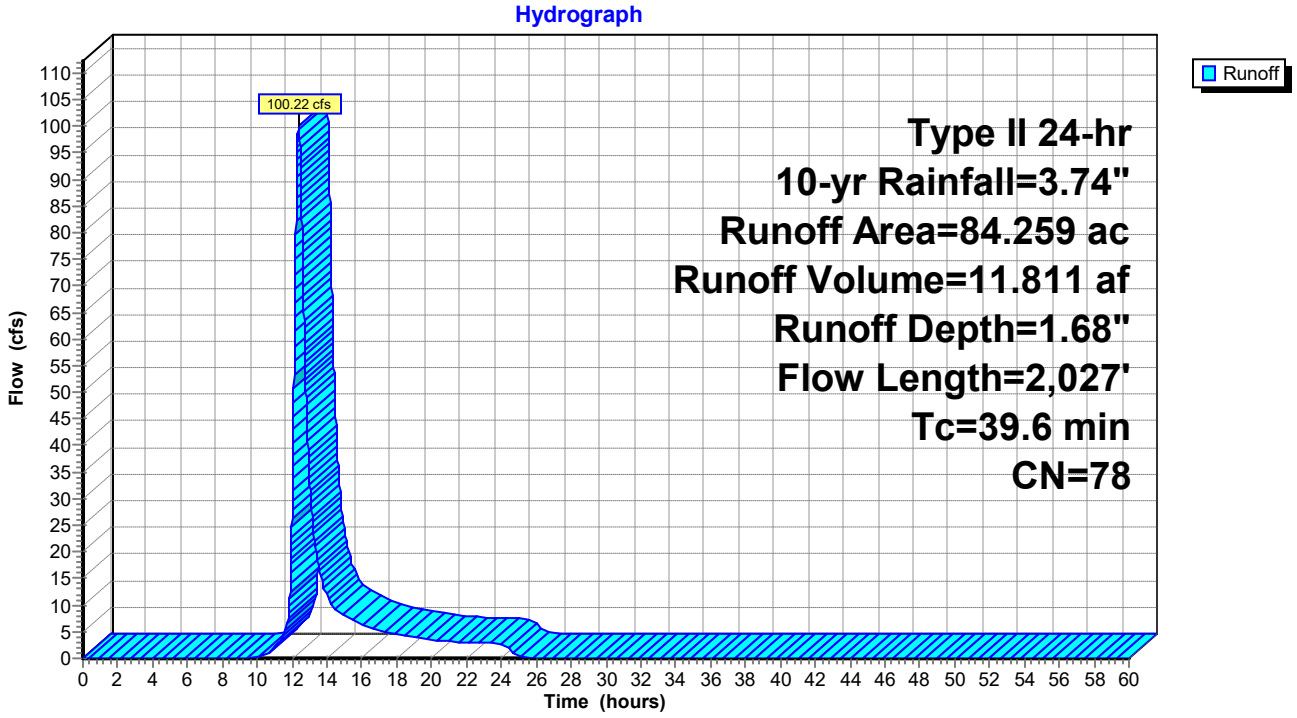
Runoff = 100.22 cfs @ 12.37 hrs, Volume= 11.811 af, Depth= 1.68"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-yr Rainfall=3.74"

Area (ac)	CN	Description
1.560	70	Woods, Good, HSG C
82.699	78	Row crops, C&T, Good, HSG C
84.259	78	Weighted Average
84.259		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	100	0.0260	0.15		**Sheet Flow, A to B sheet flow** Cultivated: Residue>20% n= 0.170 P2= 2.63"
28.8	1,927	0.0048	1.12		**Shallow Concentrated Flow, B to C shallow flow** Unpaved Kv= 16.1 fps
39.6	2,027	Total			

Subcatchment 2S: Pre-Developed 01 (Brown/Horch)



Summary for Subcatchment 3S: Subarea 02

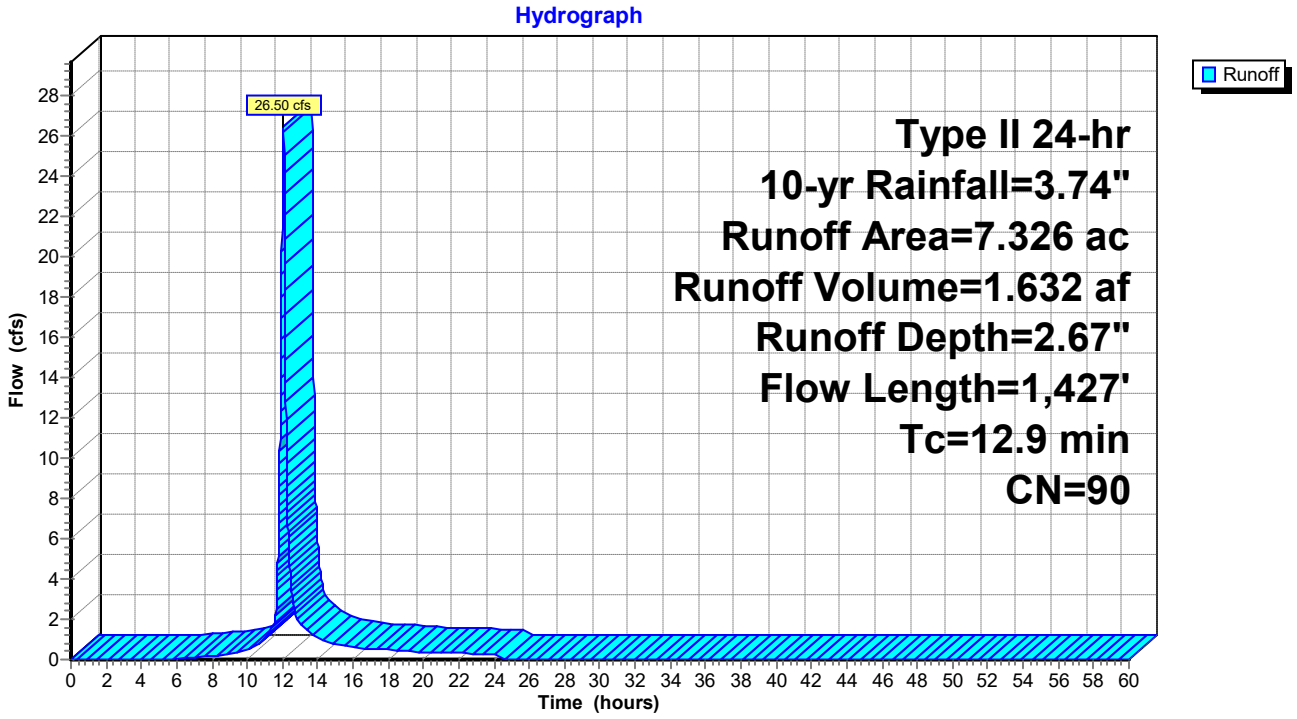
Runoff = 26.50 cfs @ 12.04 hrs, Volume= 1.632 af, Depth= 2.67"
Routed to Pond 12P : Wet Basin 01

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-yr Rainfall=3.74"

Area (ac)	CN	Description
7.326	90	1/8 acre lots, 65% imp, HSG C
2.564		35.00% Pervious Area
4.762		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, To catch basin**
7.9	1,427		3.00		**Direct Entry, Pipe flow**
12.9	1,427	Total			

Subcatchment 3S: Subarea 02



Summary for Subcatchment 4S: Subarea 03

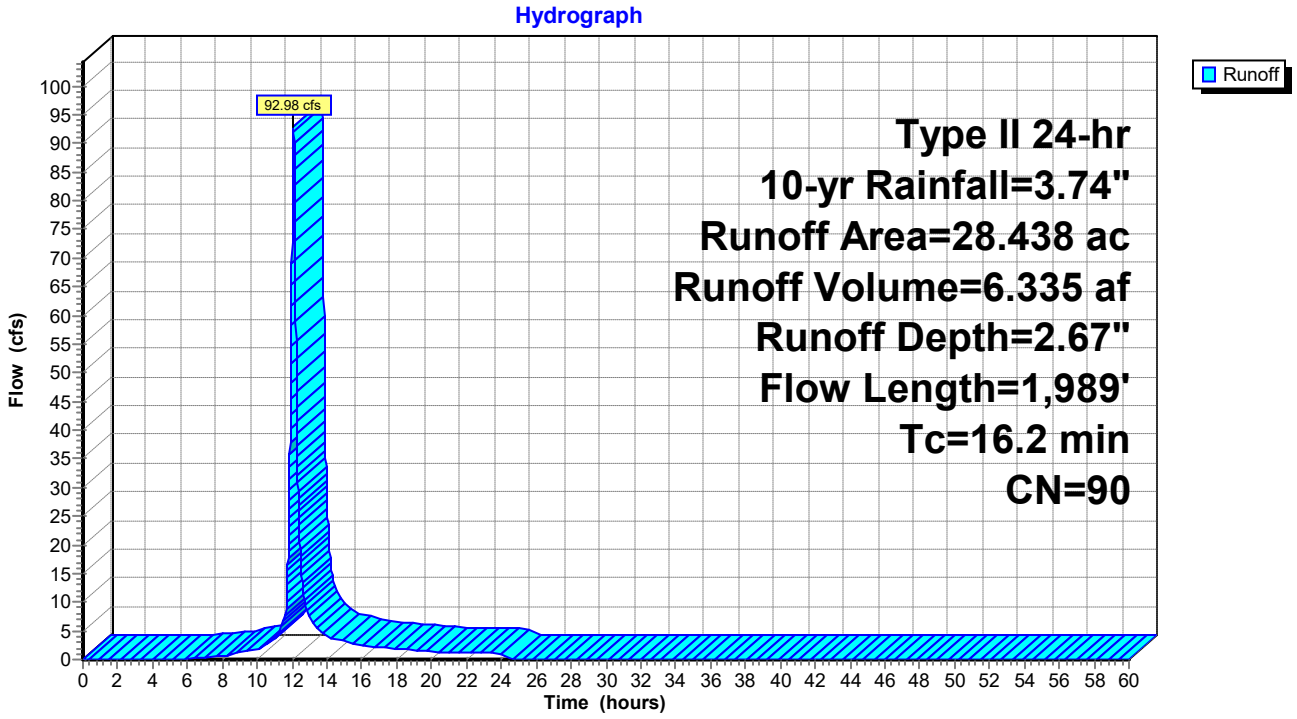
Runoff = 92.98 cfs @ 12.08 hrs, Volume= 6.335 af, Depth= 2.67"
Routed to Pond 12P : Wet Basin 01

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-yr Rainfall=3.74"

Area (ac)	CN	Description
28.438	90	1/8 acre lots, 65% imp, HSG C
9.953		35.00% Pervious Area
18.485		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.1					**Direct Entry, To catch basin**
11.0	1,989		3.00		**Direct Entry, Pipe flow**
16.2	1,989	Total			

Subcatchment 4S: Subarea 03



Summary for Subcatchment 5S: Subarea 04

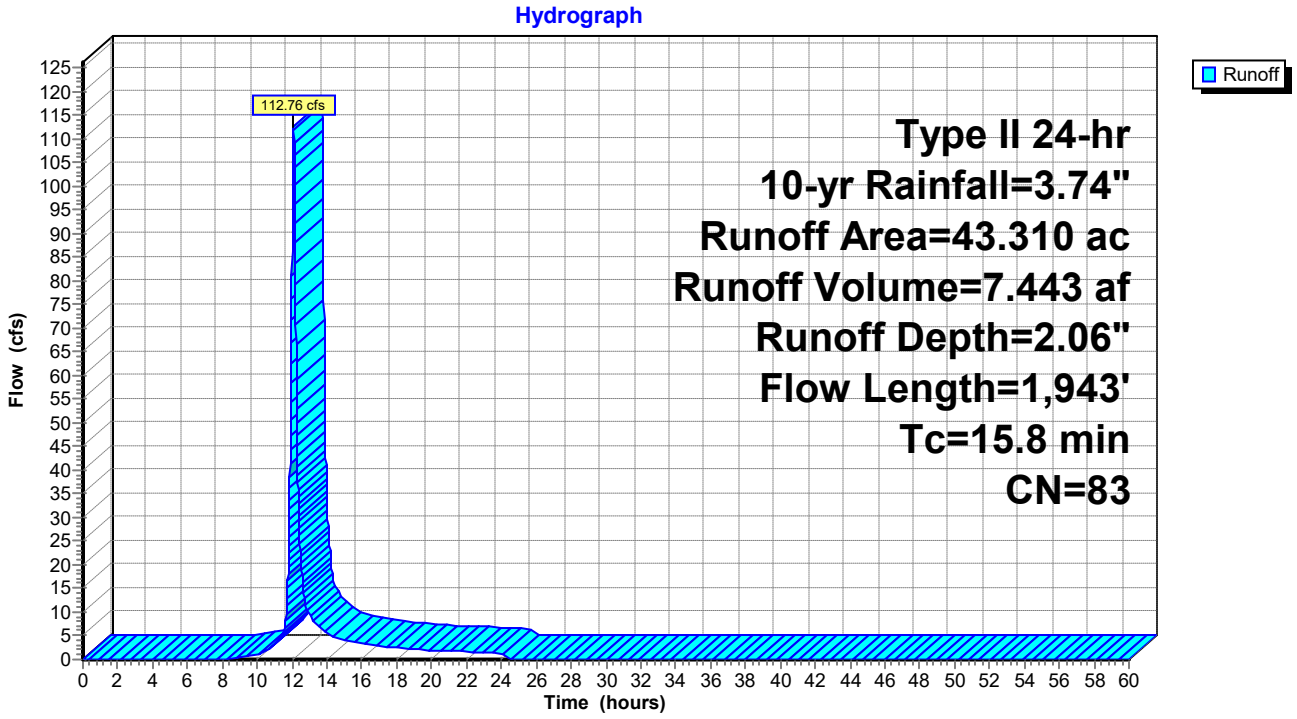
Runoff = 112.76 cfs @ 12.08 hrs, Volume= 7.443 af, Depth= 2.06"
Routed to Pond 12P : Wet Basin 01

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-yr Rainfall=3.74"

Area (ac)	CN	Description
43.310	83	1/4 acre lots, 38% imp, HSG C
26.852		62.00% Pervious Area
16.458		38.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, To catch basin**
10.8	1,943		3.00		**Direct Entry, Pipe flow**
15.8	1,943	Total			

Subcatchment 5S: Subarea 04



Summary for Subcatchment 7S: Offsite 02

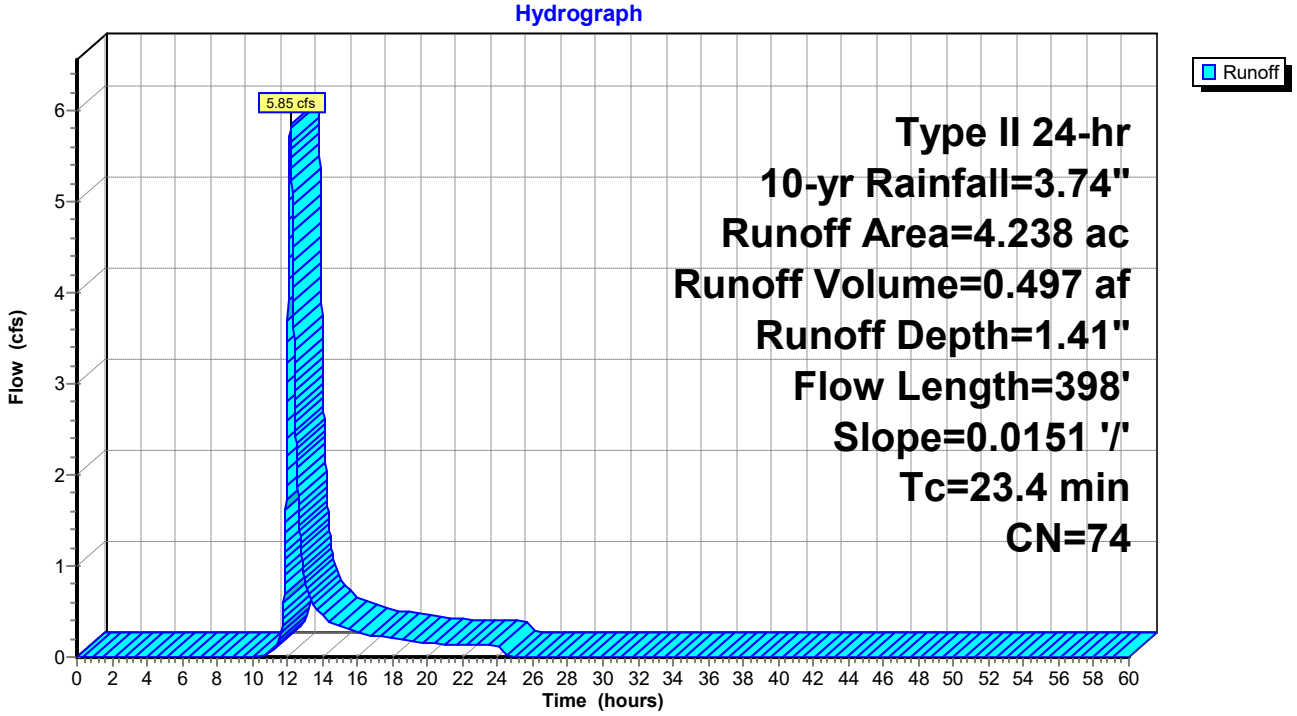
Runoff = 5.85 cfs @ 12.17 hrs, Volume= 0.497 af, Depth= 1.41"
Routed to Pond 12P : Wet Basin 01

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-yr Rainfall=3.74"

	Area (ac)	CN	Description
*	4.238	74	Open space
	4.238		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.6	100	0.0151	0.09		**Sheet Flow, A to B sheet flow** Grass: Dense n= 0.240 P2= 2.63"
5.8	298	0.0151	0.86		**Shallow Concentrated Flow, B to C shallow flow** Short Grass Pasture Kv= 7.0 fps
23.4	398	Total			

Subcatchment 7S: Offsite 02



Summary for Subcatchment 8S: Offsite 01

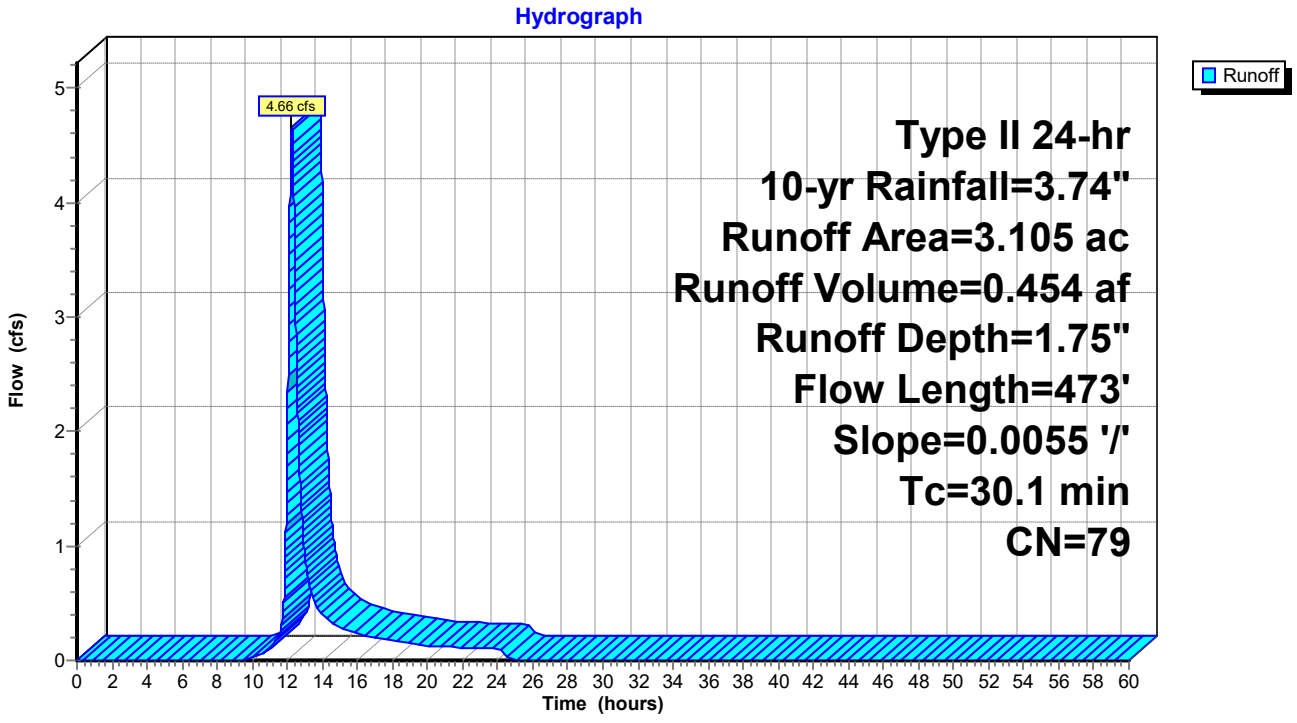
Runoff = 4.66 cfs @ 12.25 hrs, Volume= 0.454 af, Depth= 1.75"
Routed to Pond 11P : Dry Basin 02

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-yr Rainfall=3.74"

	Area (ac)	CN	Description
*	2.506	74	Open space
*	0.599	98	Existing Impervious
	3.105	79	Weighted Average
	2.506		80.71% Pervious Area
	0.599		19.29% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.1	100	0.0055	0.09		**Sheet Flow, A to B sheet flow** Grass: Short n= 0.150 P2= 2.63"
12.0	373	0.0055	0.52		**Shallow Concentrated Flow, B to C shallow flow** Short Grass Pasture Kv= 7.0 fps
30.1	473	Total			

Subcatchment 8S: Offsite 01



Summary for Subcatchment 9S: Offsite 03

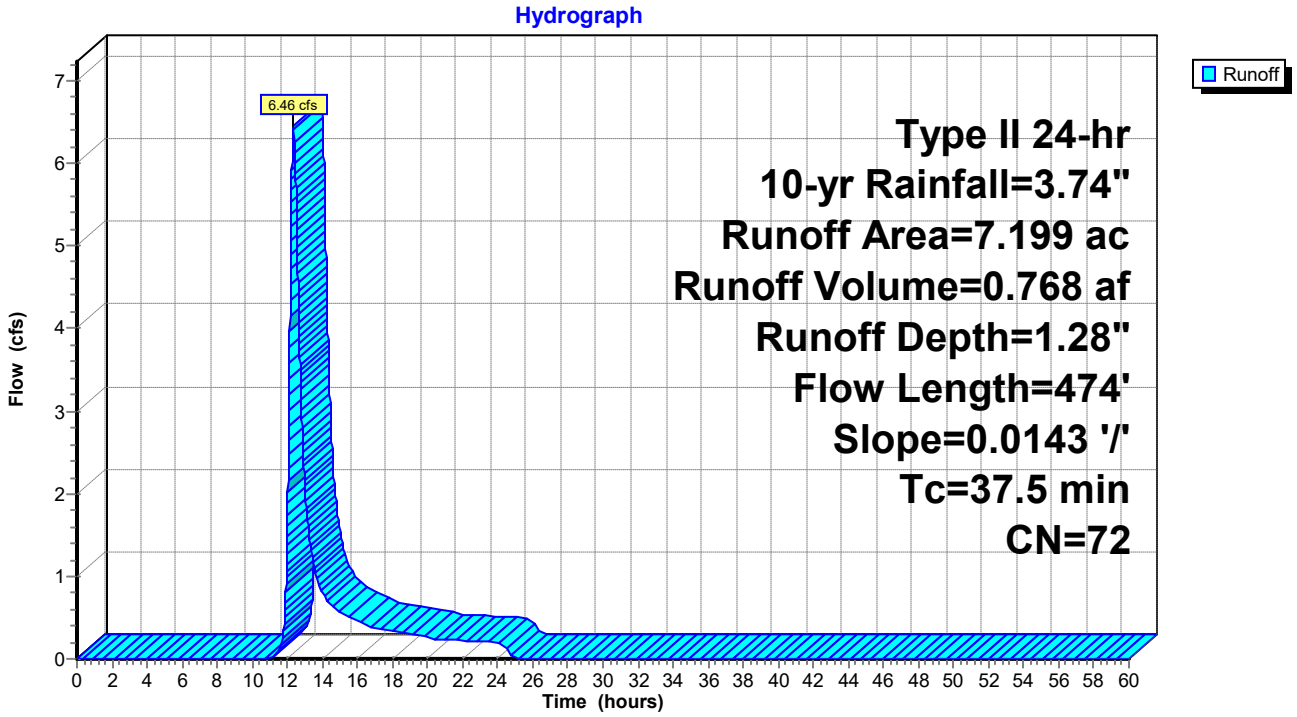
Runoff = 6.46 cfs @ 12.37 hrs, Volume= 0.768 af, Depth= 1.28"
Routed to Pond 12P : Wet Basin 01

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-yr Rainfall=3.74"

Area (ac)	CN	Description
2.228	78	Row crops, C&T, Good, HSG C
4.971	70	Woods, Good, HSG C
7.199	72	Weighted Average
7.199		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
27.1	100	0.0143	0.06		**Sheet Flow, A to B sheet flow** Woods: Light underbrush n= 0.400 P2= 2.63"
10.4	374	0.0143	0.60		**Shallow Concentrated Flow, B to C shallow flow** Woodland Kv= 5.0 fps
37.5	474	Total			

Subcatchment 9S: Offsite 03



Summary for Subcatchment 10S: Offsite 04 (Diversion)

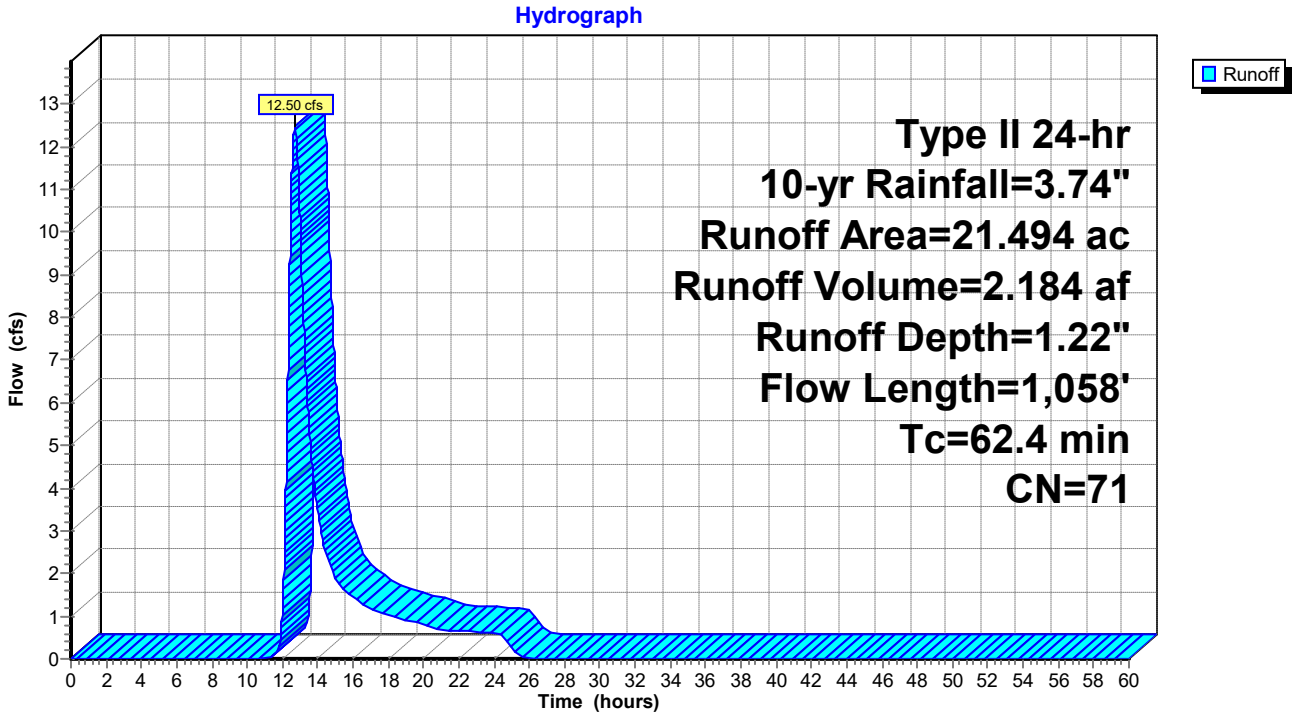
Runoff = 12.50 cfs @ 12.69 hrs, Volume= 2.184 af, Depth= 1.22"
Routed to Pond 12P : Wet Basin 01

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-yr Rainfall=3.74"

	Area (ac)	CN	Description
*	3.947	78	Woods, Agricultural
	17.547	70	Woods, Good, HSG C
	21.494	71	Weighted Average
	21.494		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
23.7	100	0.0200	0.07		**Sheet Flow, A to B sheet flow** Woods: Light underbrush n= 0.400 P2= 2.63"
38.7	958	0.0021	0.41		**Shallow Concentrated Flow, B to C shallow flow** Cultivated Straight Rows Kv= 9.0 fps
62.4	1,058	Total			

Subcatchment 10S: Offsite 04 (Diversion)



Summary for Subcatchment 16S: Pre-Developed 02 (Hirth/Wolpert)

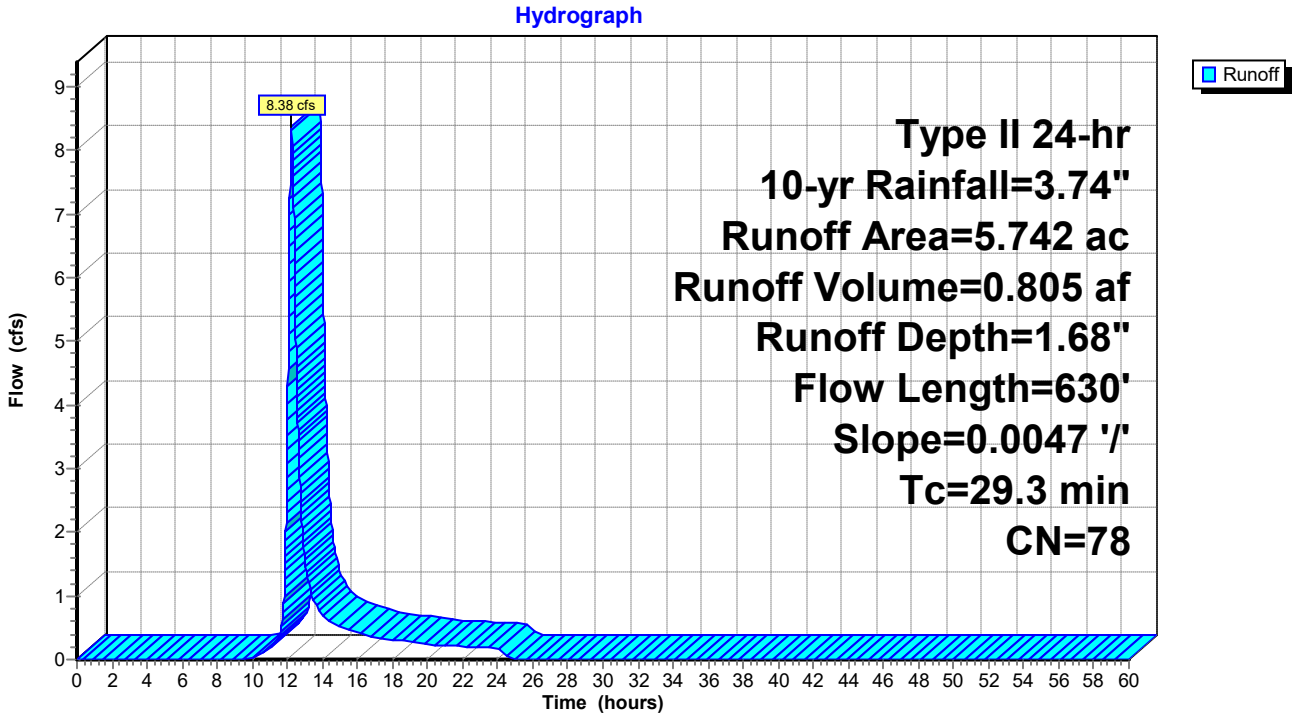
Runoff = 8.38 cfs @ 12.24 hrs, Volume= 0.805 af, Depth= 1.68"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-yr Rainfall=3.74"

Area (ac)	CN	Description
5.742	78	Row crops, C&T, Good, HSG C
5.742		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.3	100	0.0047	0.08		**Sheet Flow, A to B sheet flow** Cultivated: Residue>20% n= 0.170 P2= 2.63"
8.0	530	0.0047	1.10		**Shallow Concentrated Flow, B to C shallow flow** Unpaved Kv= 16.1 fps
29.3	630	Total			

Subcatchment 16S: Pre-Developed 02 (Hirth/Wolpert)



Summary for Pond 11P: Dry Basin 02

Inflow Area = 14.032 ac, 54.89% Impervious, Inflow Depth = 2.47" for 10-yr event
Inflow = 44.75 cfs @ 12.02 hrs, Volume= 2.888 af
Outflow = 13.25 cfs @ 12.28 hrs, Volume= 2.852 af, Atten= 70%, Lag= 15.3 min
Primary = 13.25 cfs @ 12.28 hrs, Volume= 2.852 af
Routed to Pond 12P : Wet Basin 01

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 924.59' @ 12.28 hrs Surf.Area= 0.522 ac Storage= 0.822 af

Plug-Flow detention time= 133.0 min calculated for 2.852 af (99% of inflow)
Center-of-Mass det. time= 125.0 min (935.9 - 810.9)

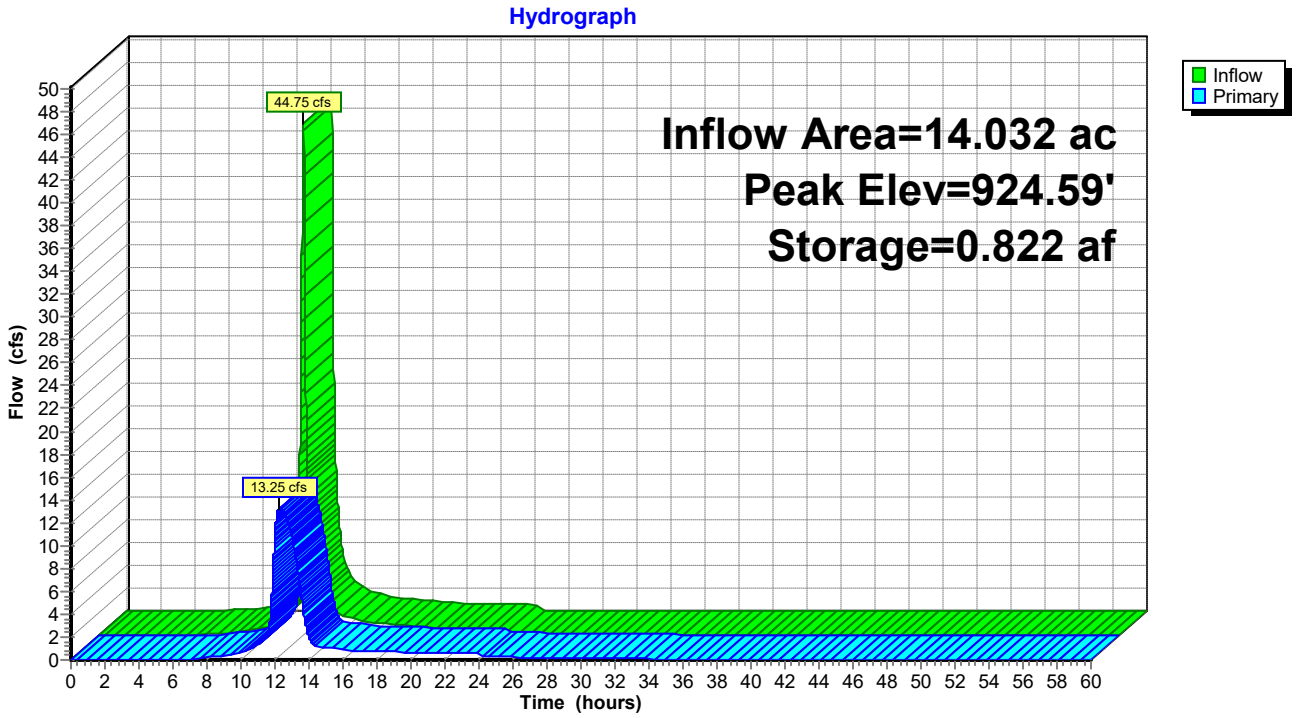
Volume	Invert	Avail.Storage	Storage Description
#1	921.00'	2.614 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
921.00	0.014	0.000	0.000
922.00	0.097	0.055	0.055
923.00	0.239	0.168	0.223
924.00	0.411	0.325	0.548
925.00	0.601	0.506	1.055
926.00	0.780	0.690	1.745
927.00	0.958	0.869	2.614

Device	Routing	Invert	Outlet Devices
#1	Primary	918.29'	**54.0" Round 1->HW1** L= 84.4' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 918.29' / 913.50' S= 0.0568 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 15.90 sf
#2	Device 1	918.87'	**54.0" Round 2->1** L= 292.2' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 918.87' / 918.29' S= 0.0020 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 15.90 sf
#3	Device 2	919.31'	**54.0" Round 3->2** L= 87.7' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 919.31' / 918.99' S= 0.0036 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 15.90 sf
#4	Device 3	921.10'	**24.0" Round 4->3** L= 330.5' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 921.10' / 919.45' S= 0.0050 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 3.14 sf
#5	Device 4	921.41'	**18.0" Round HW2->4** L= 9.1' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 921.41' / 921.20' S= 0.0231 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 1.77 sf

Primary OutFlow Max=13.25 cfs @ 12.28 hrs HW=924.59' TW=921.29' (Dynamic Tailwater)
- **1=1->HW1** (Passes 13.25 cfs of 138.95 cfs potential flow)
  - **2=2->1** (Passes 13.25 cfs of 111.66 cfs potential flow)
    - **3=3->2** (Passes 13.25 cfs of 113.74 cfs potential flow)
      - **4=4->3** (Passes 13.25 cfs of 18.83 cfs potential flow)
        - **5=HW2->4** (Inlet Controls 13.25 cfs @ 7.50 fps)

Pond 11P: Dry Basin 02



Summary for Pond 12P: Wet Basin 01

Inflow Area = 126.037 ac, 37.61% Impervious, Inflow Depth > 2.07" for 10-yr event
Inflow = 252.91 cfs @ 12.08 hrs, Volume= 21.712 af
Outflow = 5.15 cfs @ 20.48 hrs, Volume= 10.698 af, Atten= 98%, Lag= 504.2 min
Primary = 5.15 cfs @ 20.48 hrs, Volume= 10.698 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 923.19' @ 20.48 hrs Surf.Area= 4.484 ac Storage= 17.134 af

Plug-Flow detention time= 1,114.3 min calculated for 10.697 af (49% of inflow)
Center-of-Mass det. time= 976.9 min (1,823.8 - 846.8)

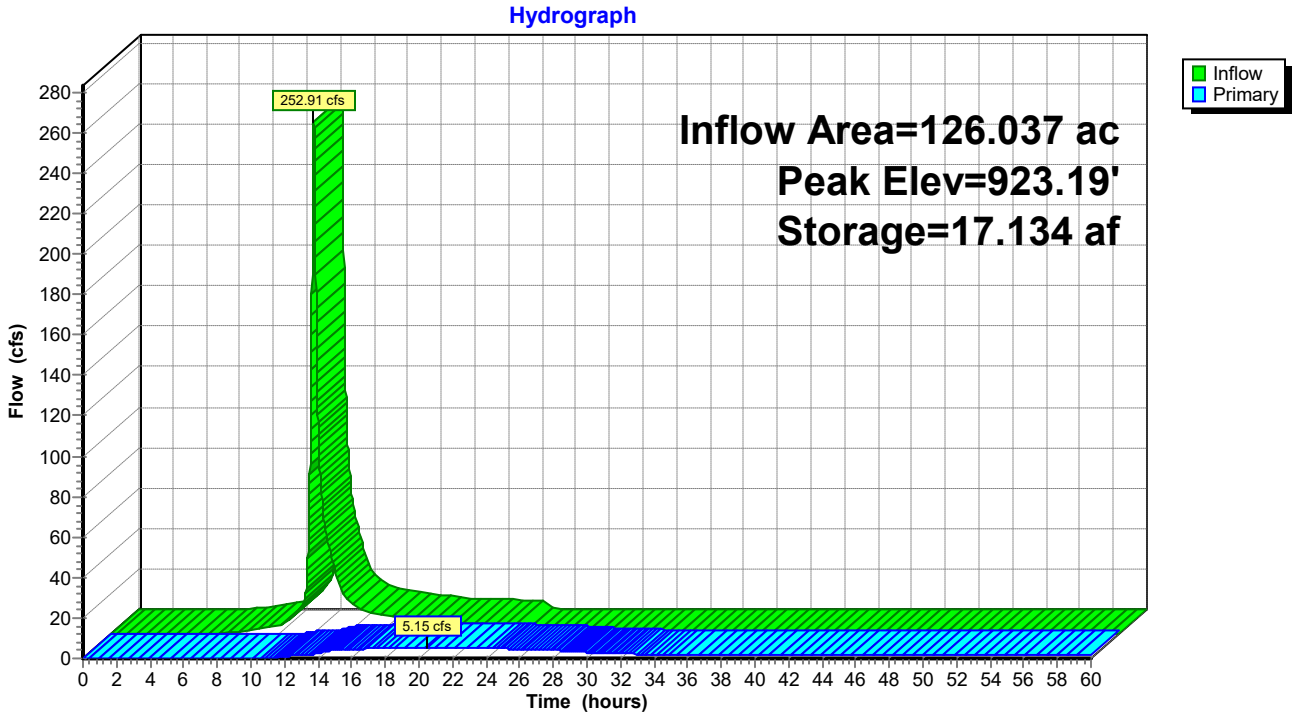
Volume	Invert	Avail.Storage	Storage Description
#1	919.00'	35.651 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
919.00	3.709	0.000	0.000
920.00	3.881	3.795	3.795
921.00	4.061	3.971	7.766
922.00	4.255	4.158	11.924
923.00	4.446	4.350	16.274
924.00	4.641	4.543	20.818
925.00	4.838	4.739	25.557
926.00	5.055	4.946	30.504
927.00	5.240	5.147	35.651

Device	Routing	Invert	Outlet Devices
#1	Primary	918.86'	**24.0" Round RCP_Round 24"** L= 29.0' Ke= 0.200 Inlet / Outlet Invert= 918.86' / 918.82' S= 0.0014 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#2	Device 1	919.00'	**6.0" Vert. WQ orifice** C= 0.600 Limited to weir flow at low heads
#3	Device 1	922.50'	**12.0" Horiz. Open top 12" pipe** C= 0.600 Limited to weir flow at low heads
#4	Device 1	923.00'	**8.0" Vert. 3rd stage orifice** C= 0.600 Limited to weir flow at low heads
#5	Device 1	924.80'	**15.0" Horiz. Open top 15" pipe** C= 0.600 Limited to weir flow at low heads
#6	Device 1	926.28'	**2.0" x 24.0" Horiz. Neenah grate X 8.00** C= 0.600 in 27.5" x 27.5" Grate (51% open area) Limited to weir flow at low heads

Primary OutFlow Max=5.15 cfs @ 20.48 hrs HW=923.19' (Free Discharge)
└**1=RCP_Round 24"** (Passes 5.15 cfs of 31.08 cfs potential flow)
  ├**2=WQ orifice** (Orifice Controls 1.88 cfs @ 9.56 fps)
  ├**3=Open top 12" pipe** (Orifice Controls 3.15 cfs @ 4.01 fps)
  ├**4=3rd stage orifice** (Orifice Controls 0.12 cfs @ 1.49 fps)
  ├**5=Open top 15" pipe** (Controls 0.00 cfs)
  └**6=Neenah grate** (Controls 0.00 cfs)

Pond 12P: Wet Basin 01



Summary for Subcatchment 1S: Subarea 01

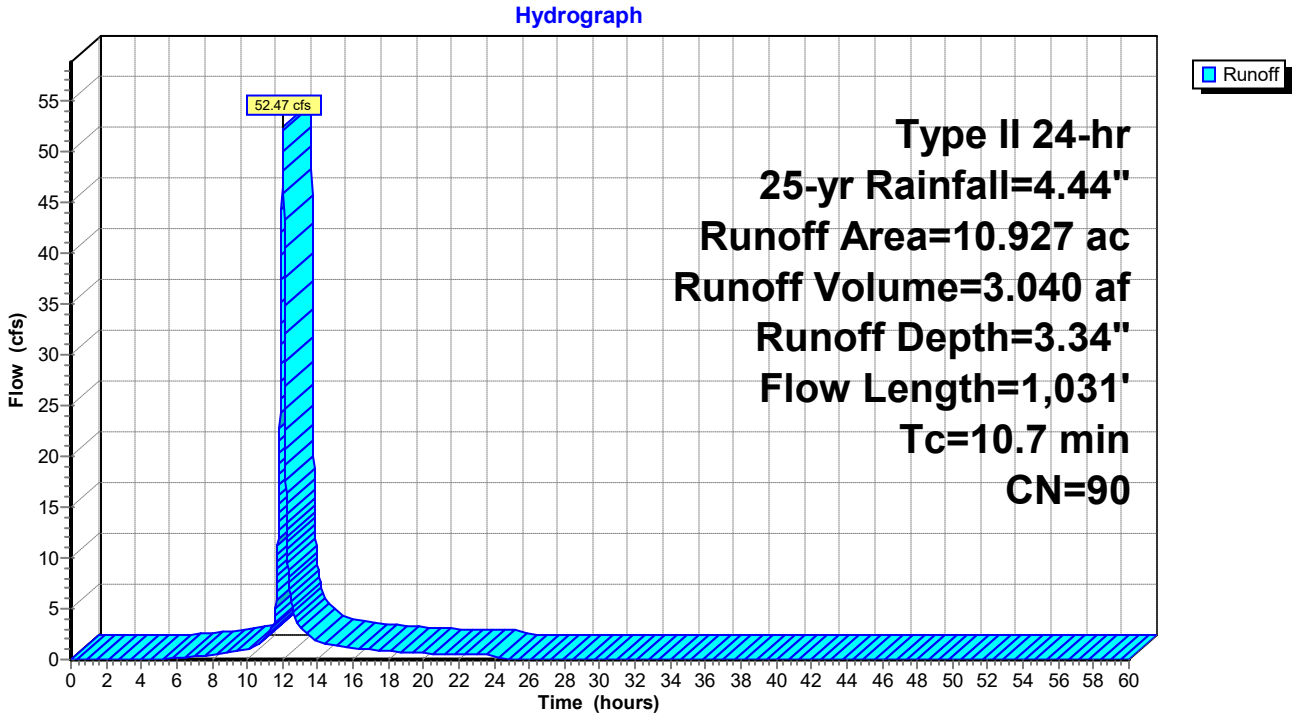
Runoff = 52.47 cfs @ 12.02 hrs, Volume= 3.040 af, Depth= 3.34"
Routed to Pond 11P : Dry Basin 02

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 25-yr Rainfall=4.44"

Area (ac)	CN	Description
10.927	90	1/8 acre lots, 65% imp, HSG C
3.824		35.00% Pervious Area
7.103		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, To catch basin**
5.7	1,031		3.00		**Direct Entry, Pipe flow**
10.7	1,031	Total			

Subcatchment 1S: Subarea 01



Summary for Subcatchment 2S: Pre-Developed 01 (Brown/Horch)

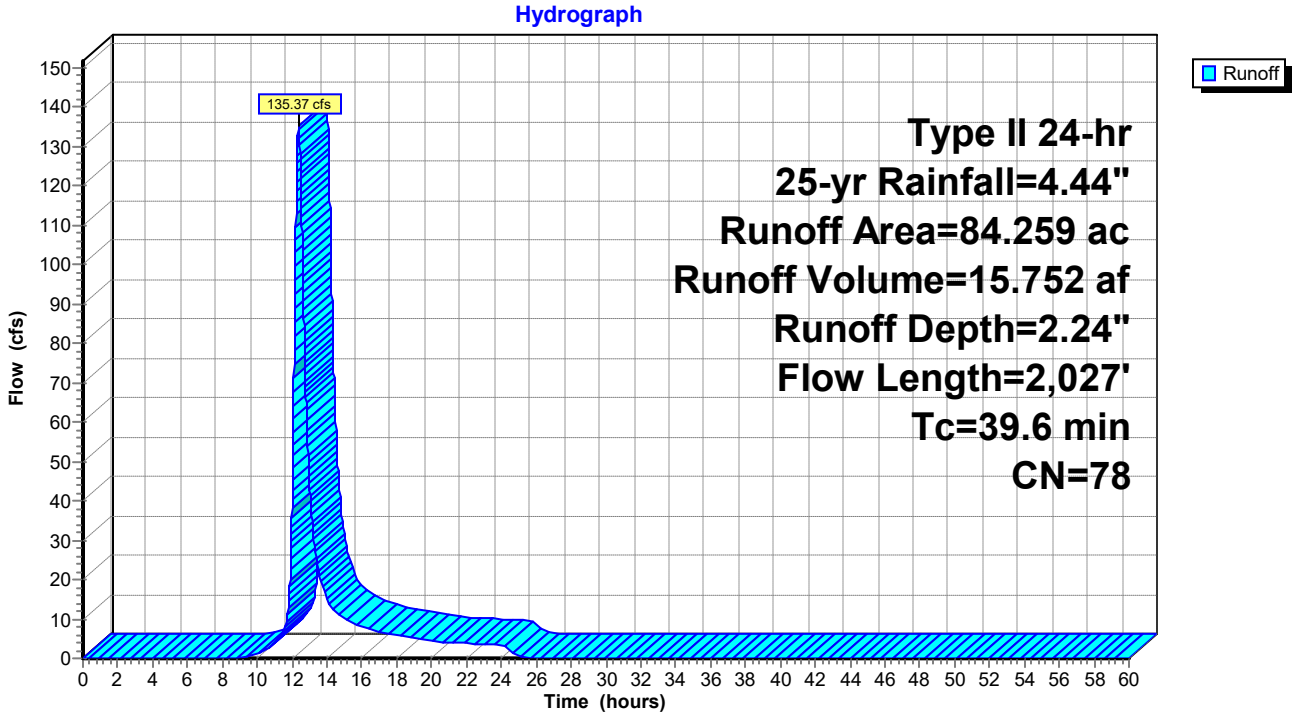
Runoff = 135.37 cfs @ 12.36 hrs, Volume= 15.752 af, Depth= 2.24"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 25-yr Rainfall=4.44"

Area (ac)	CN	Description
1.560	70	Woods, Good, HSG C
82.699	78	Row crops, C&T, Good, HSG C
84.259	78	Weighted Average
84.259		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	100	0.0260	0.15		**Sheet Flow, A to B sheet flow** Cultivated: Residue>20% n= 0.170 P2= 2.63"
28.8	1,927	0.0048	1.12		**Shallow Concentrated Flow, B to C shallow flow** Unpaved Kv= 16.1 fps
39.6	2,027	Total			

Subcatchment 2S: Pre-Developed 01 (Brown/Horch)



Summary for Subcatchment 3S: Subarea 02

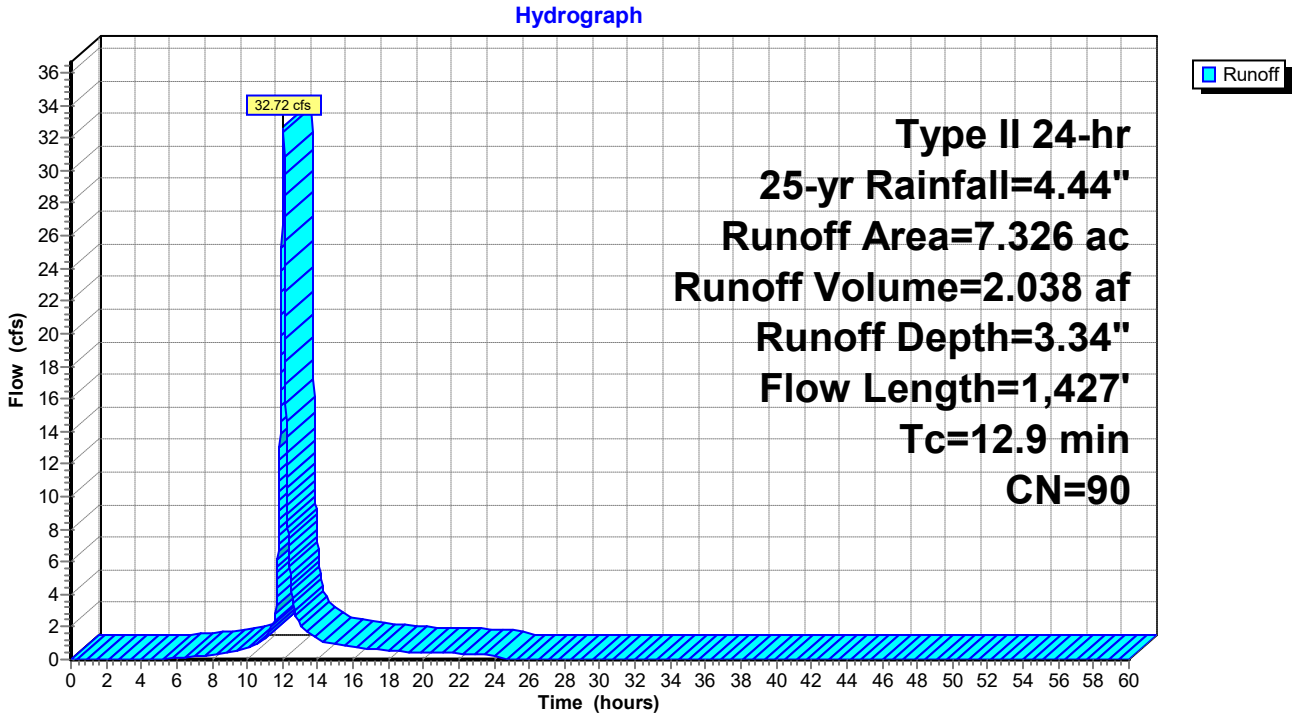
Runoff = 32.72 cfs @ 12.04 hrs, Volume= 2.038 af, Depth= 3.34"
Routed to Pond 12P : Wet Basin 01

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 25-yr Rainfall=4.44"

Area (ac)	CN	Description
7.326	90	1/8 acre lots, 65% imp, HSG C
2.564		35.00% Pervious Area
4.762		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, To catch basin**
7.9	1,427		3.00		**Direct Entry, Pipe flow**
12.9	1,427	Total			

Subcatchment 3S: Subarea 02



Summary for Subcatchment 4S: Subarea 03

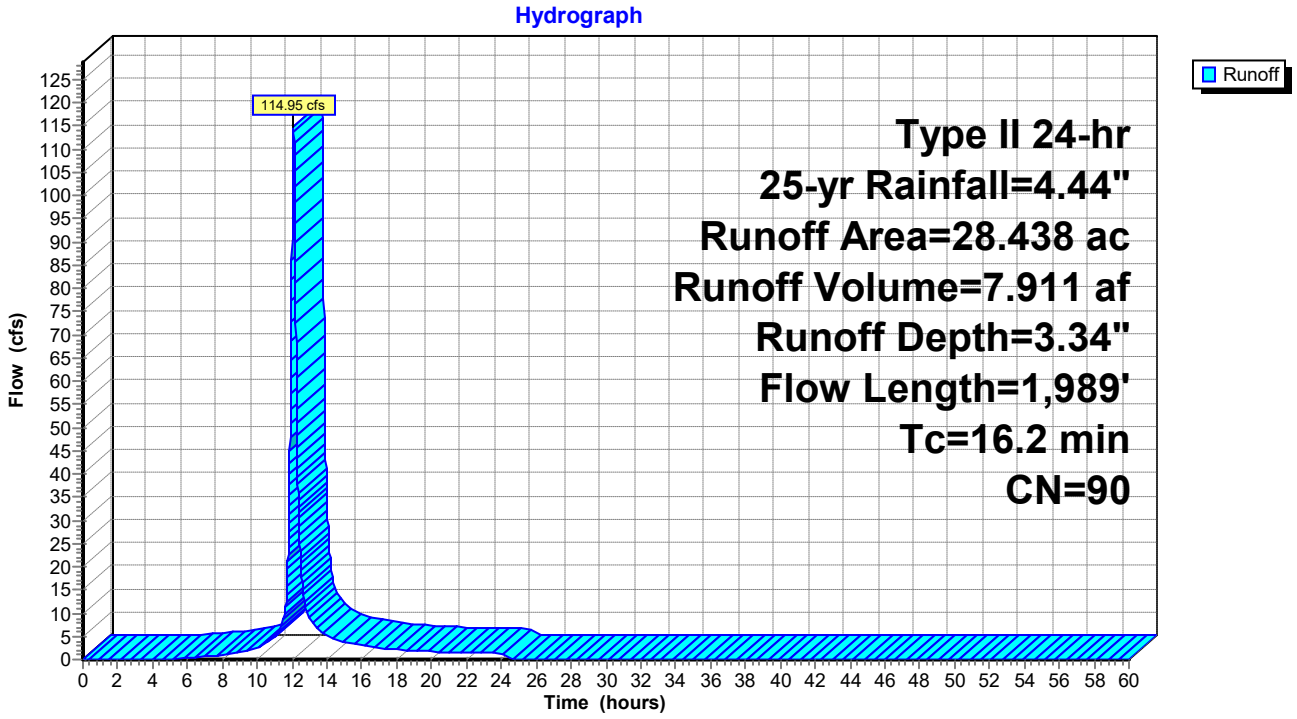
Runoff = 114.95 cfs @ 12.08 hrs, Volume= 7.911 af, Depth= 3.34"
Routed to Pond 12P : Wet Basin 01

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 25-yr Rainfall=4.44"

Area (ac)	CN	Description
28.438	90	1/8 acre lots, 65% imp, HSG C
9.953		35.00% Pervious Area
18.485		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.1					**Direct Entry, To catch basin**
11.0	1,989		3.00		**Direct Entry, Pipe flow**
16.2	1,989	Total			

Subcatchment 4S: Subarea 03



Summary for Subcatchment 5S: Subarea 04

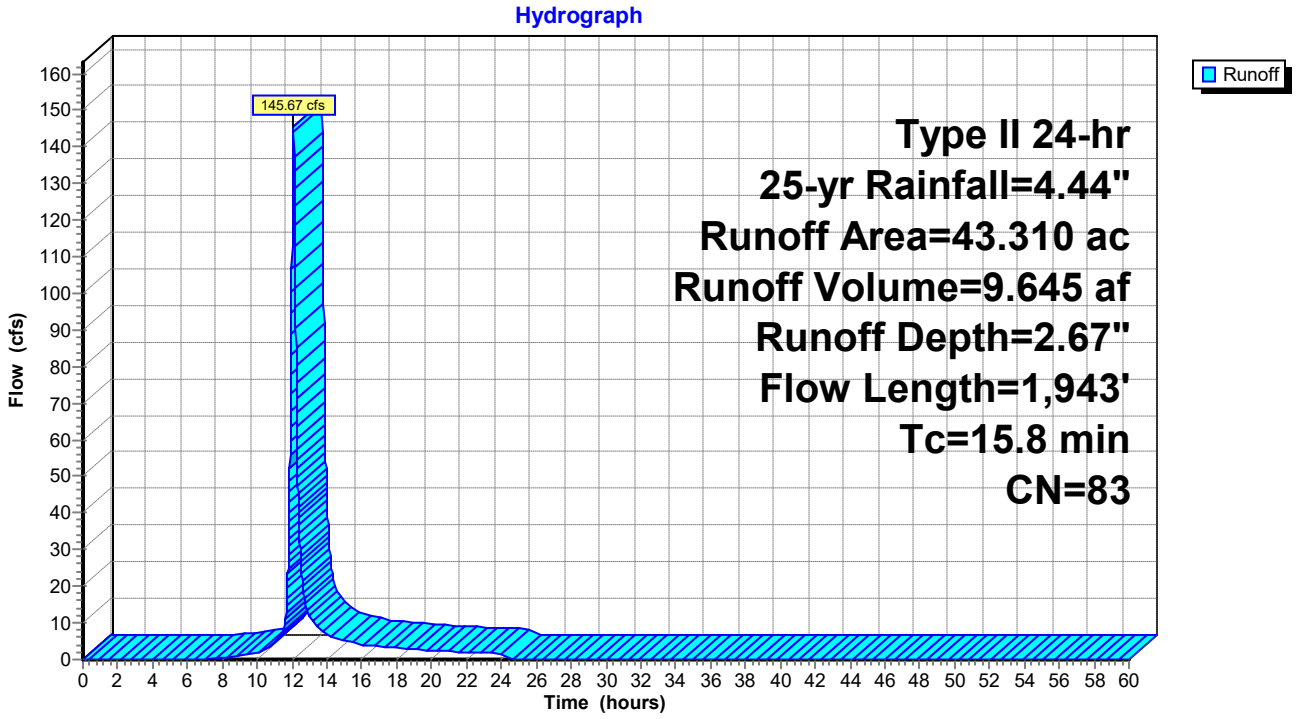
Runoff = 145.67 cfs @ 12.08 hrs, Volume= 9.645 af, Depth= 2.67"
Routed to Pond 12P : Wet Basin 01

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 25-yr Rainfall=4.44"

Area (ac)	CN	Description
43.310	83	1/4 acre lots, 38% imp, HSG C
26.852		62.00% Pervious Area
16.458		38.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, To catch basin**
10.8	1,943		3.00		**Direct Entry, Pipe flow**
15.8	1,943	Total			

Subcatchment 5S: Subarea 04



Summary for Subcatchment 7S: Offsite 02

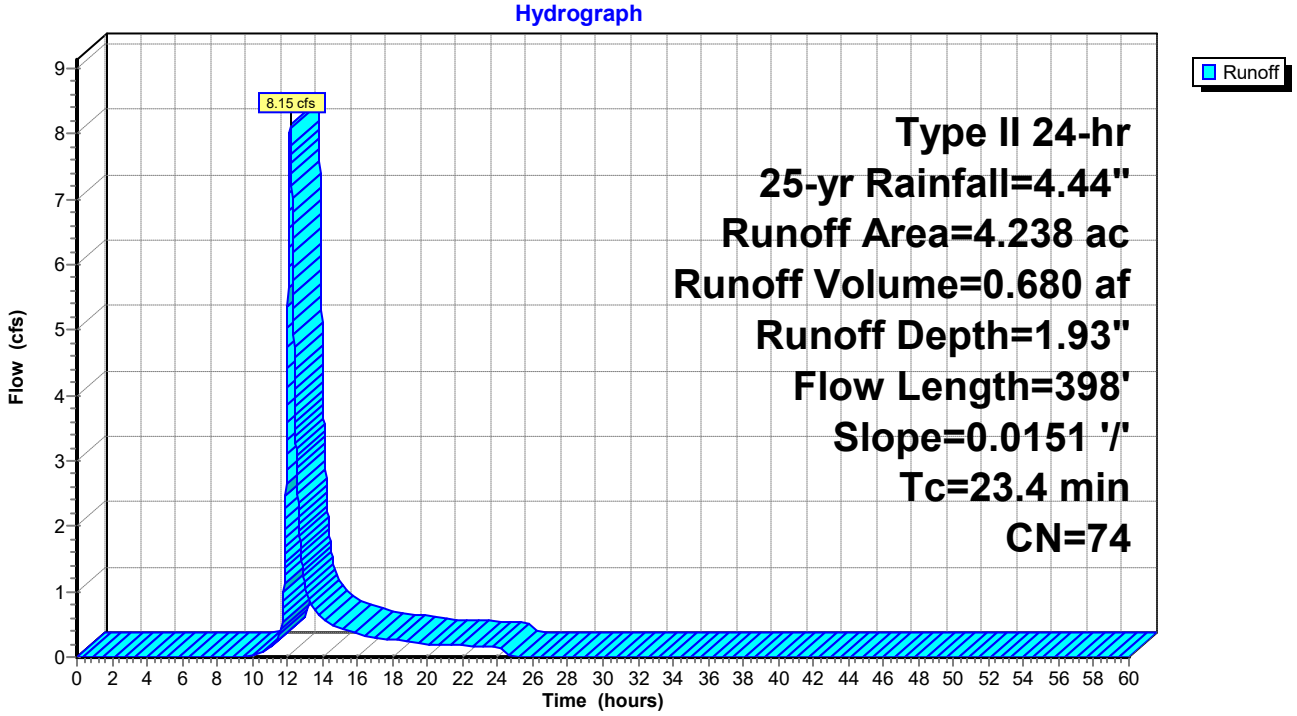
Runoff = 8.15 cfs @ 12.17 hrs, Volume= 0.680 af, Depth= 1.93"
Routed to Pond 12P : Wet Basin 01

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 25-yr Rainfall=4.44"

	Area (ac)	CN	Description
*	4.238	74	Open space
	4.238		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.6	100	0.0151	0.09		**Sheet Flow, A to B sheet flow** Grass: Dense n= 0.240 P2= 2.63"
5.8	298	0.0151	0.86		**Shallow Concentrated Flow, B to C shallow flow** Short Grass Pasture Kv= 7.0 fps
23.4	398	Total			

Subcatchment 7S: Offsite 02



Summary for Subcatchment 8S: Offsite 01

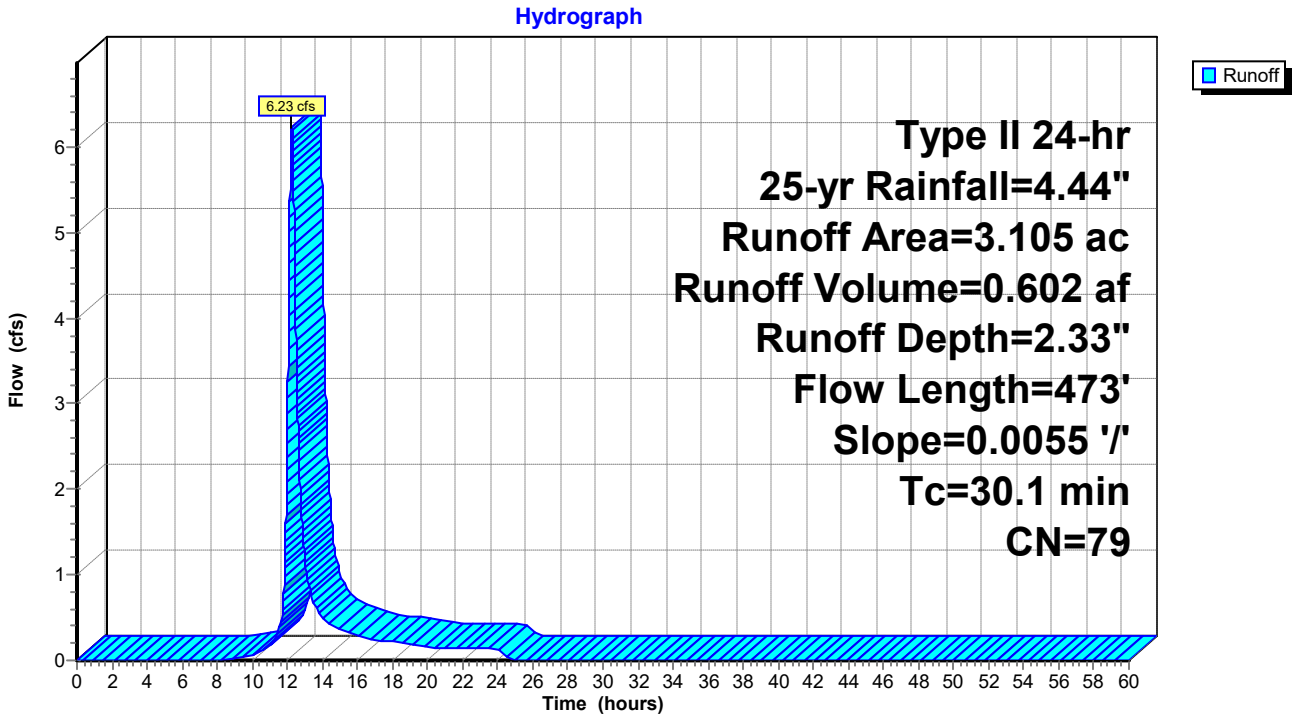
Runoff = 6.23 cfs @ 12.24 hrs, Volume= 0.602 af, Depth= 2.33"
Routed to Pond 11P : Dry Basin 02

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 25-yr Rainfall=4.44"

	Area (ac)	CN	Description
*	2.506	74	Open space
*	0.599	98	Existing Impervious
	3.105	79	Weighted Average
	2.506		80.71% Pervious Area
	0.599		19.29% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.1	100	0.0055	0.09		**Sheet Flow, A to B sheet flow** Grass: Short n= 0.150 P2= 2.63"
12.0	373	0.0055	0.52		**Shallow Concentrated Flow, B to C shallow flow** Short Grass Pasture Kv= 7.0 fps
30.1	473	Total			

Subcatchment 8S: Offsite 01



Summary for Subcatchment 9S: Offsite 03

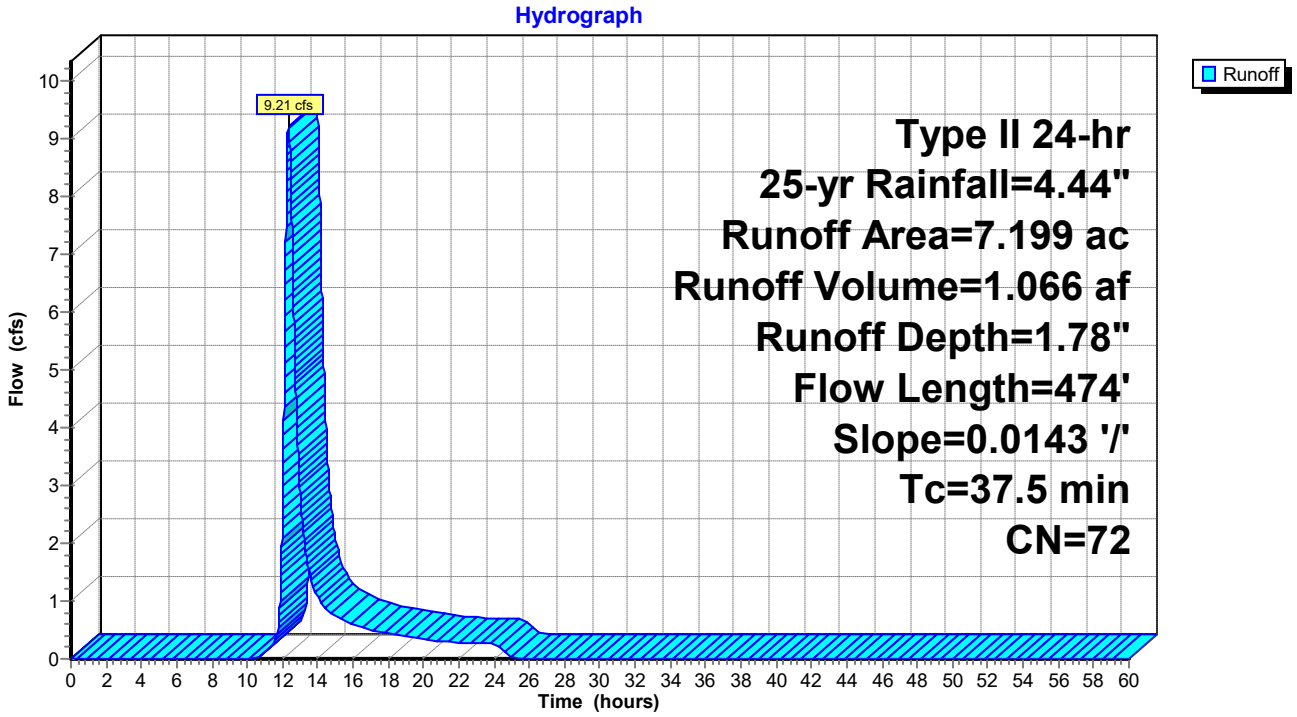
Runoff = 9.21 cfs @ 12.37 hrs, Volume= 1.066 af, Depth= 1.78"
Routed to Pond 12P : Wet Basin 01

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 25-yr Rainfall=4.44"

Area (ac)	CN	Description
2.228	78	Row crops, C&T, Good, HSG C
4.971	70	Woods, Good, HSG C
7.199	72	Weighted Average
7.199		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
27.1	100	0.0143	0.06		**Sheet Flow, A to B sheet flow** Woods: Light underbrush n= 0.400 P2= 2.63"
10.4	374	0.0143	0.60		**Shallow Concentrated Flow, B to C shallow flow** Woodland Kv= 5.0 fps
37.5	474	Total			

Subcatchment 9S: Offsite 03



Summary for Subcatchment 10S: Offsite 04 (Diversion)

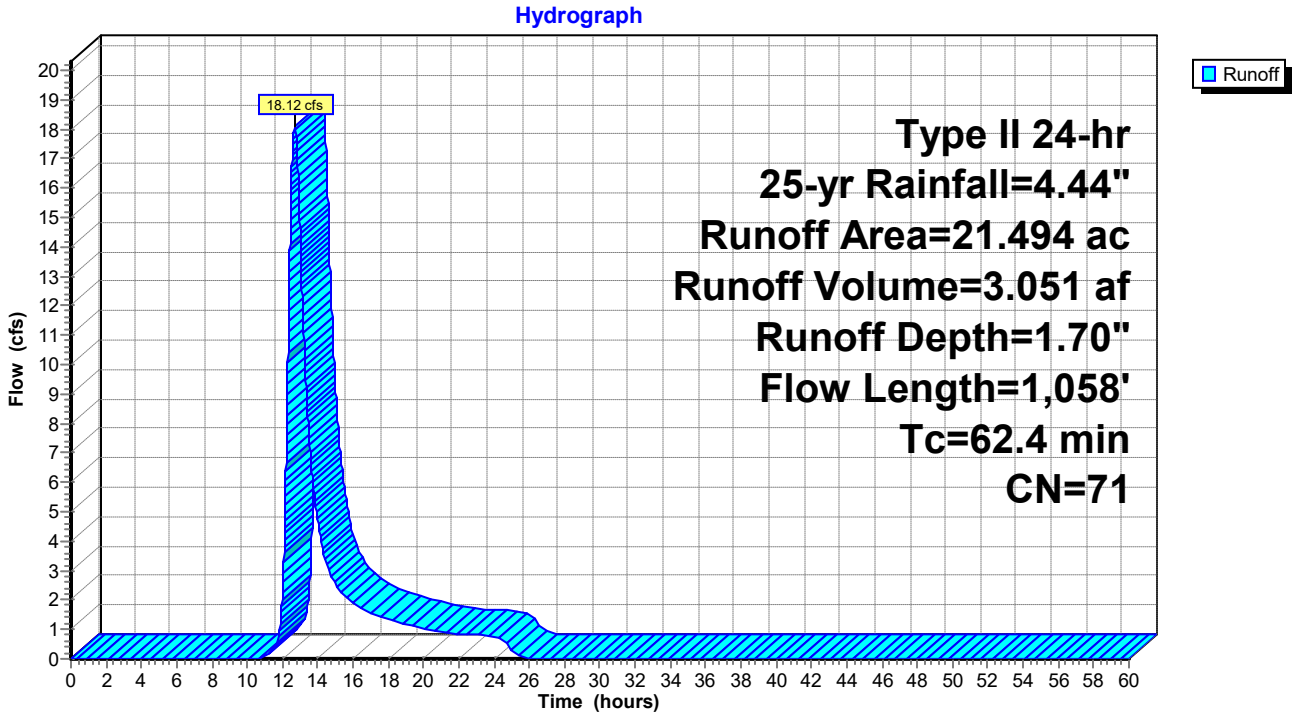
Runoff = 18.12 cfs @ 12.69 hrs, Volume= 3.051 af, Depth= 1.70"
Routed to Pond 12P : Wet Basin 01

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 25-yr Rainfall=4.44"

	Area (ac)	CN	Description
*	3.947	78	Woods, Agricultural
	17.547	70	Woods, Good, HSG C
	21.494	71	Weighted Average
	21.494		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
23.7	100	0.0200	0.07		**Sheet Flow, A to B sheet flow** Woods: Light underbrush n= 0.400 P2= 2.63"
38.7	958	0.0021	0.41		**Shallow Concentrated Flow, B to C shallow flow** Cultivated Straight Rows Kv= 9.0 fps
62.4	1,058	Total			

Subcatchment 10S: Offsite 04 (Diversion)



Summary for Subcatchment 16S: Pre-Developed 02 (Hirth/Wolpert)

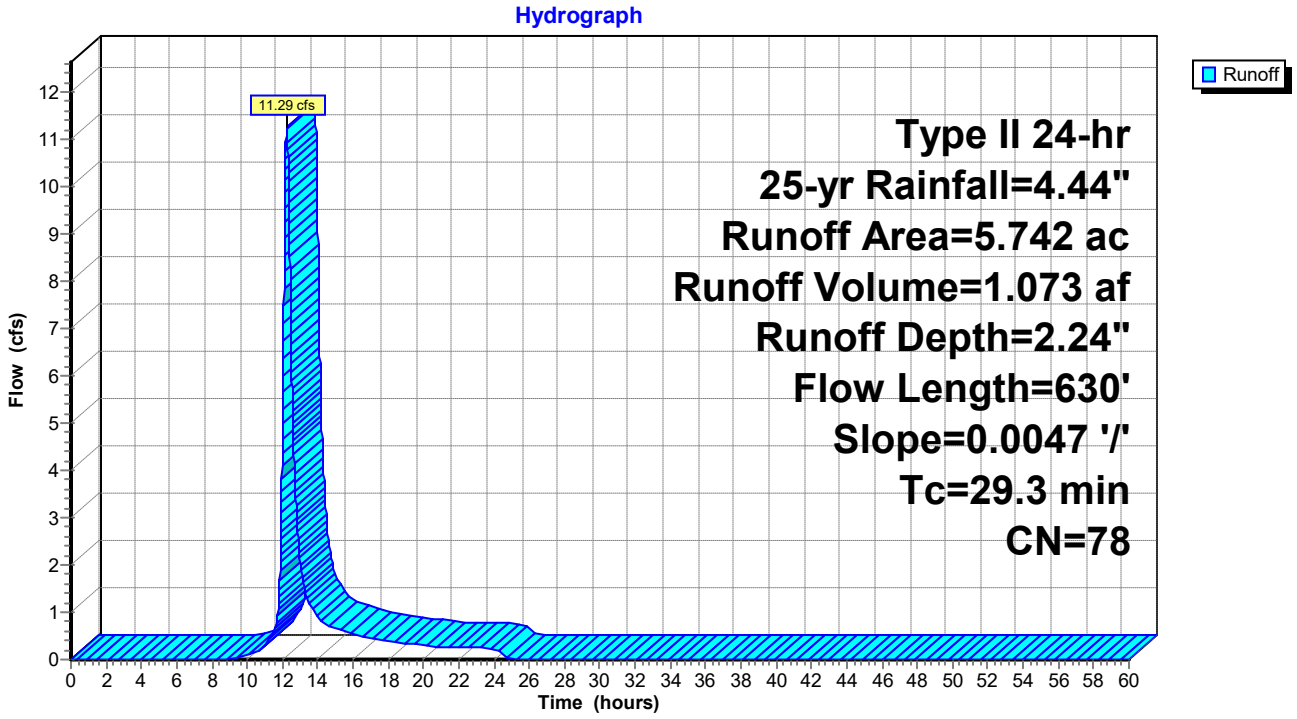
Runoff = 11.29 cfs @ 12.24 hrs, Volume= 1.073 af, Depth= 2.24"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 25-yr Rainfall=4.44"

Area (ac)	CN	Description
5.742	78	Row crops, C&T, Good, HSG C
5.742		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.3	100	0.0047	0.08		**Sheet Flow, A to B sheet flow** Cultivated: Residue>20% n= 0.170 P2= 2.63"
8.0	530	0.0047	1.10		**Shallow Concentrated Flow, B to C shallow flow** Unpaved Kv= 16.1 fps
29.3	630	Total			

Subcatchment 16S: Pre-Developed 02 (Hirth/Wolpert)



Summary for Pond 11P: Dry Basin 02

Inflow Area = 14.032 ac, 54.89% Impervious, Inflow Depth = 3.11" for 25-yr event
Inflow = 55.56 cfs @ 12.02 hrs, Volume= 3.642 af
Outflow = 14.50 cfs @ 12.33 hrs, Volume= 3.589 af, Atten= 74%, Lag= 18.4 min
Primary = 14.50 cfs @ 12.33 hrs, Volume= 3.589 af
Routed to Pond 12P : Wet Basin 01

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 925.07' @ 12.33 hrs Surf.Area= 0.613 ac Storage= 1.094 af

Plug-Flow detention time= 187.1 min calculated for 3.588 af (99% of inflow)
Center-of-Mass det. time= 178.3 min (983.1 - 804.8)

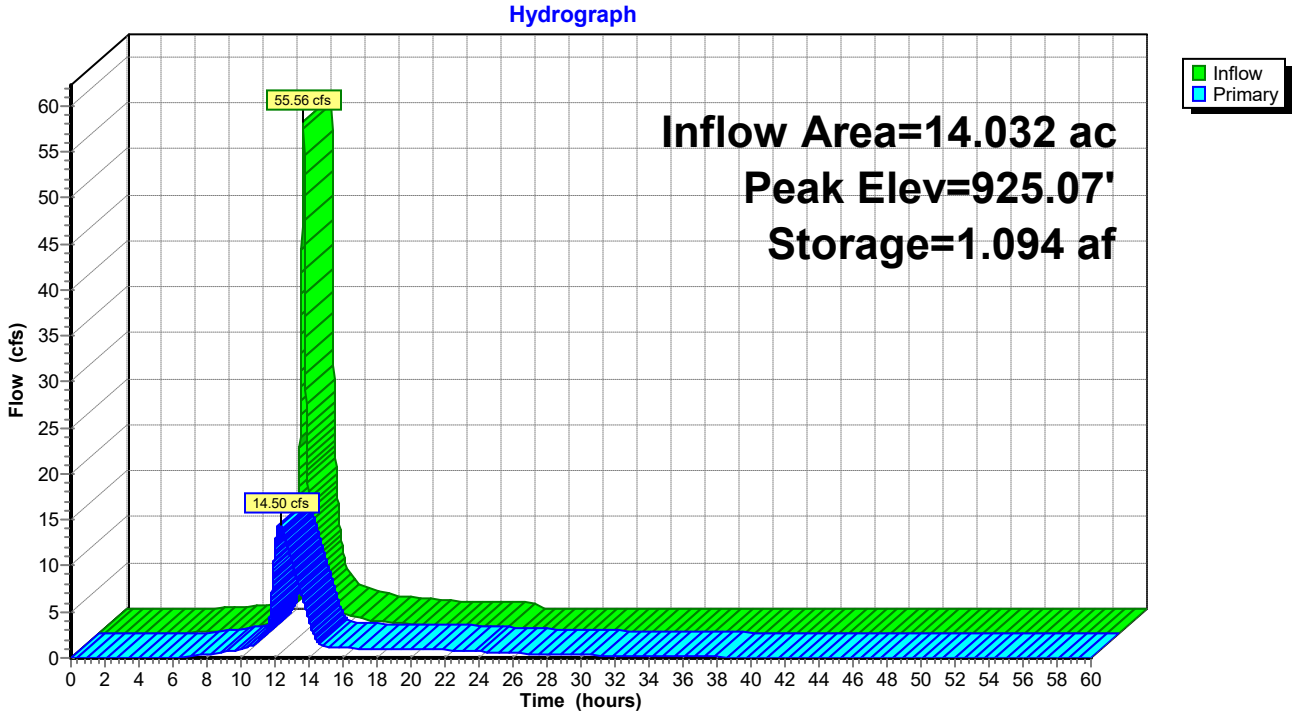
Volume	Invert	Avail.Storage	Storage Description
#1	921.00'	2.614 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
921.00	0.014	0.000	0.000
922.00	0.097	0.055	0.055
923.00	0.239	0.168	0.223
924.00	0.411	0.325	0.548
925.00	0.601	0.506	1.055
926.00	0.780	0.690	1.745
927.00	0.958	0.869	2.614

Device	Routing	Invert	Outlet Devices
#1	Primary	918.29'	**54.0" Round 1->HW1** L= 84.4' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 918.29' / 913.50' S= 0.0568 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 15.90 sf
#2	Device 1	918.87'	**54.0" Round 2->1** L= 292.2' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 918.87' / 918.29' S= 0.0020 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 15.90 sf
#3	Device 2	919.31'	**54.0" Round 3->2** L= 87.7' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 919.31' / 918.99' S= 0.0036 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 15.90 sf
#4	Device 3	921.10'	**24.0" Round 4->3** L= 330.5' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 921.10' / 919.45' S= 0.0050 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 3.14 sf
#5	Device 4	921.41'	**18.0" Round HW2->4** L= 9.1' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 921.41' / 921.20' S= 0.0231 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 1.77 sf

Primary OutFlow Max=14.50 cfs @ 12.33 hrs HW=925.07' TW=922.11' (Dynamic Tailwater)
- **1=1->HW1** (Passes 14.50 cfs of 131.65 cfs potential flow)
  - **2=2->1** (Passes 14.50 cfs of 116.41 cfs potential flow)
    - **3=3->2** (Passes 14.50 cfs of 123.94 cfs potential flow)
      - **4=4->3** (Passes 14.50 cfs of 18.28 cfs potential flow)
        - **5=HW2->4** (Inlet Controls 14.50 cfs @ 8.21 fps)

Pond 11P: Dry Basin 02



Summary for Pond 12P: Wet Basin 01

Inflow Area = 126.037 ac, 37.61% Impervious, Inflow Depth > 2.66" for 25-yr event
Inflow = 319.79 cfs @ 12.08 hrs, Volume= 27.980 af
Outflow = 8.04 cfs @ 18.91 hrs, Volume= 16.182 af, Atten= 97%, Lag= 410.1 min
Primary = 8.04 cfs @ 18.91 hrs, Volume= 16.182 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 923.99' @ 18.91 hrs Surf.Area= 4.639 ac Storage= 20.770 af

Plug-Flow detention time= 985.1 min calculated for 16.180 af (58% of inflow)
Center-of-Mass det. time= 850.7 min (1,697.9 - 847.2)

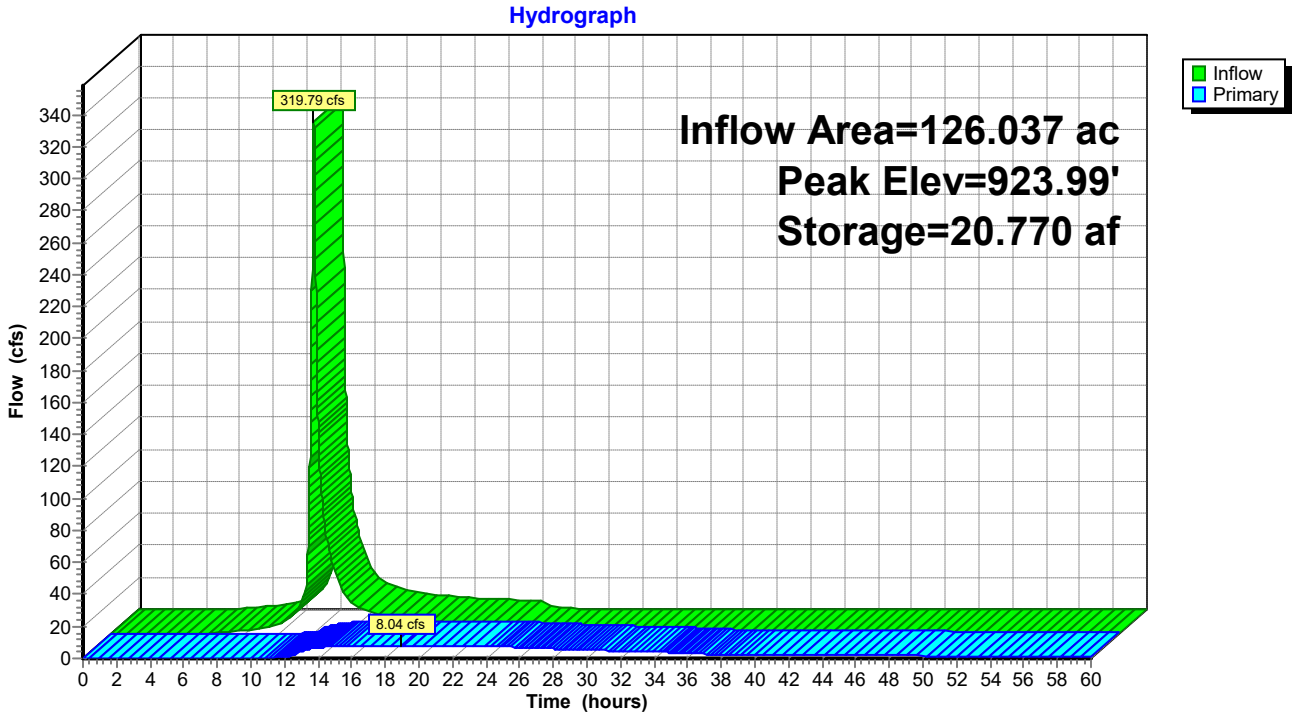
Volume	Invert	Avail.Storage	Storage Description
#1	919.00'	35.651 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
919.00	3.709	0.000	0.000
920.00	3.881	3.795	3.795
921.00	4.061	3.971	7.766
922.00	4.255	4.158	11.924
923.00	4.446	4.350	16.274
924.00	4.641	4.543	20.818
925.00	4.838	4.739	25.557
926.00	5.055	4.946	30.504
927.00	5.240	5.147	35.651

Device	Routing	Invert	Outlet Devices
#1	Primary	918.86'	**24.0" Round RCP_Round 24"** L= 29.0' Ke= 0.200 Inlet / Outlet Invert= 918.86' / 918.82' S= 0.0014 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#2	Device 1	919.00'	**6.0" Vert. WQ orifice** C= 0.600 Limited to weir flow at low heads
#3	Device 1	922.50'	**12.0" Horiz. Open top 12" pipe** C= 0.600 Limited to weir flow at low heads
#4	Device 1	923.00'	**8.0" Vert. 3rd stage orifice** C= 0.600 Limited to weir flow at low heads
#5	Device 1	924.80'	**15.0" Horiz. Open top 15" pipe** C= 0.600 Limited to weir flow at low heads
#6	Device 1	926.28'	**2.0" x 24.0" Horiz. Neenah grate X 8.00** C= 0.600 in 27.5" x 27.5" Grate (51% open area) Limited to weir flow at low heads

Primary OutFlow Max=8.04 cfs @ 18.91 hrs HW=923.99' (Free Discharge)
└─**1=RCP_Round 24"** (Passes 8.04 cfs of 35.92 cfs potential flow)
  ├─**2=WQ orifice** (Orifice Controls 2.06 cfs @ 10.48 fps)
  ├─**3=Open top 12" pipe** (Orifice Controls 4.62 cfs @ 5.88 fps)
  ├─**4=3rd stage orifice** (Orifice Controls 1.36 cfs @ 3.90 fps)
  ├─**5=Open top 15" pipe** (Controls 0.00 cfs)
  └─**6=Neenah grate** (Controls 0.00 cfs)

Pond 12P: Wet Basin 01



Summary for Subcatchment 1S: Subarea 01

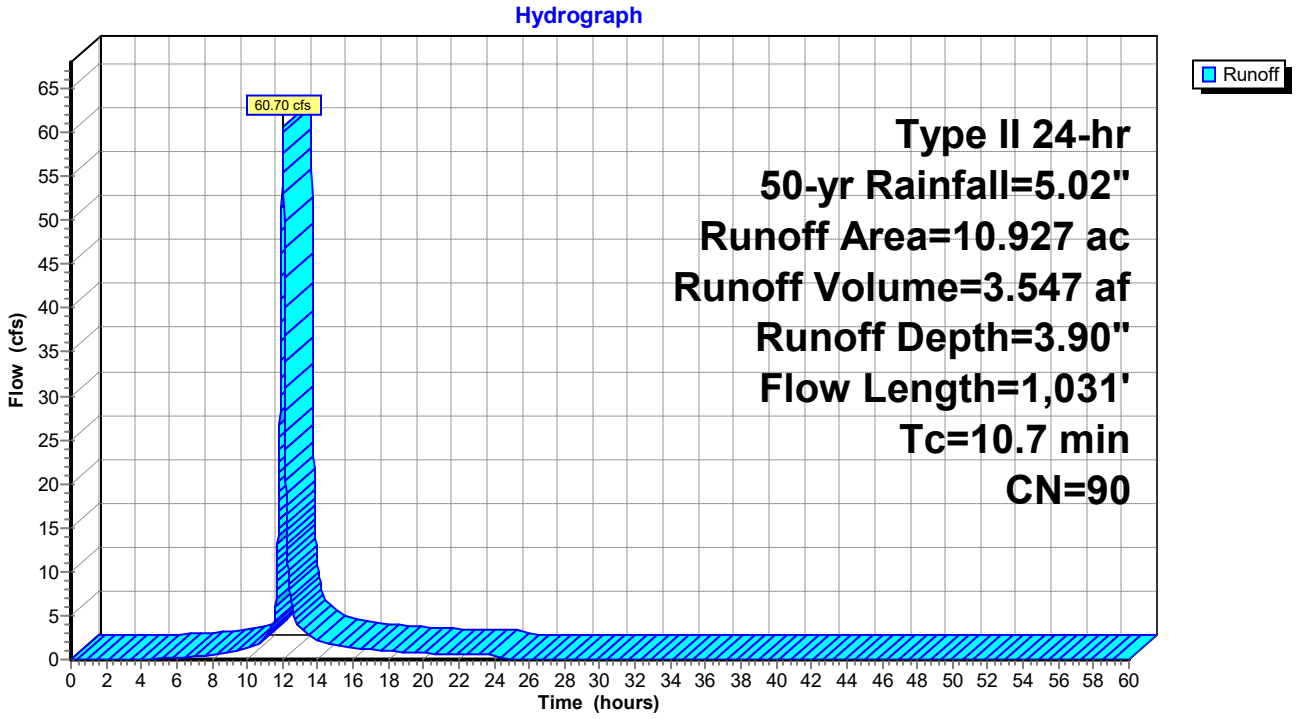
Runoff = 60.70 cfs @ 12.02 hrs, Volume= 3.547 af, Depth= 3.90"
Routed to Pond 11P : Dry Basin 02

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 50-yr Rainfall=5.02"

Area (ac)	CN	Description
10.927	90	1/8 acre lots, 65% imp, HSG C
3.824		35.00% Pervious Area
7.103		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, To catch basin**
5.7	1,031		3.00		**Direct Entry, Pipe flow**
10.7	1,031	Total			

Subcatchment 1S: Subarea 01



Summary for Subcatchment 2S: Pre-Developed 01 (Brown/Horch)

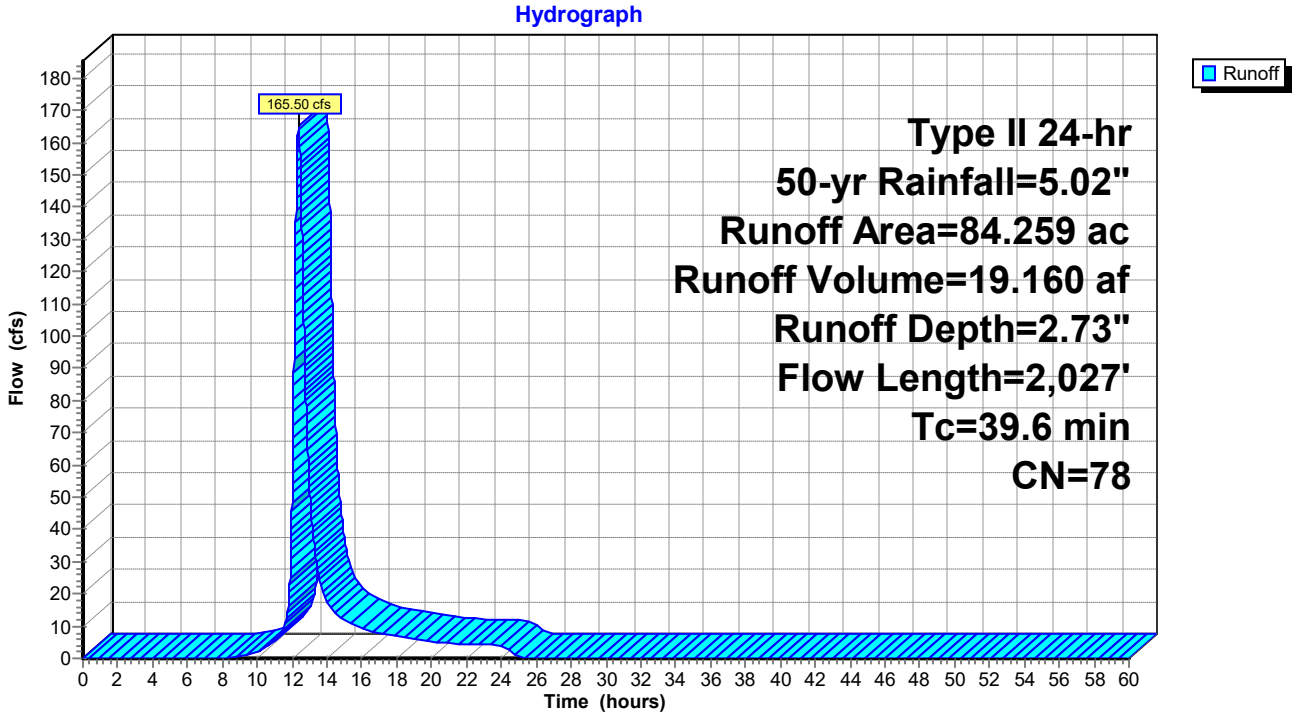
Runoff = 165.50 cfs @ 12.36 hrs, Volume= 19.160 af, Depth= 2.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 50-yr Rainfall=5.02"

Area (ac)	CN	Description
1.560	70	Woods, Good, HSG C
82.699	78	Row crops, C&T, Good, HSG C
84.259	78	Weighted Average
84.259		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	100	0.0260	0.15		**Sheet Flow, A to B sheet flow** Cultivated: Residue>20% n= 0.170 P2= 2.63"
28.8	1,927	0.0048	1.12		**Shallow Concentrated Flow, B to C shallow flow** Unpaved Kv= 16.1 fps
39.6	2,027	Total			

Subcatchment 2S: Pre-Developed 01 (Brown/Horch)



Summary for Subcatchment 3S: Subarea 02

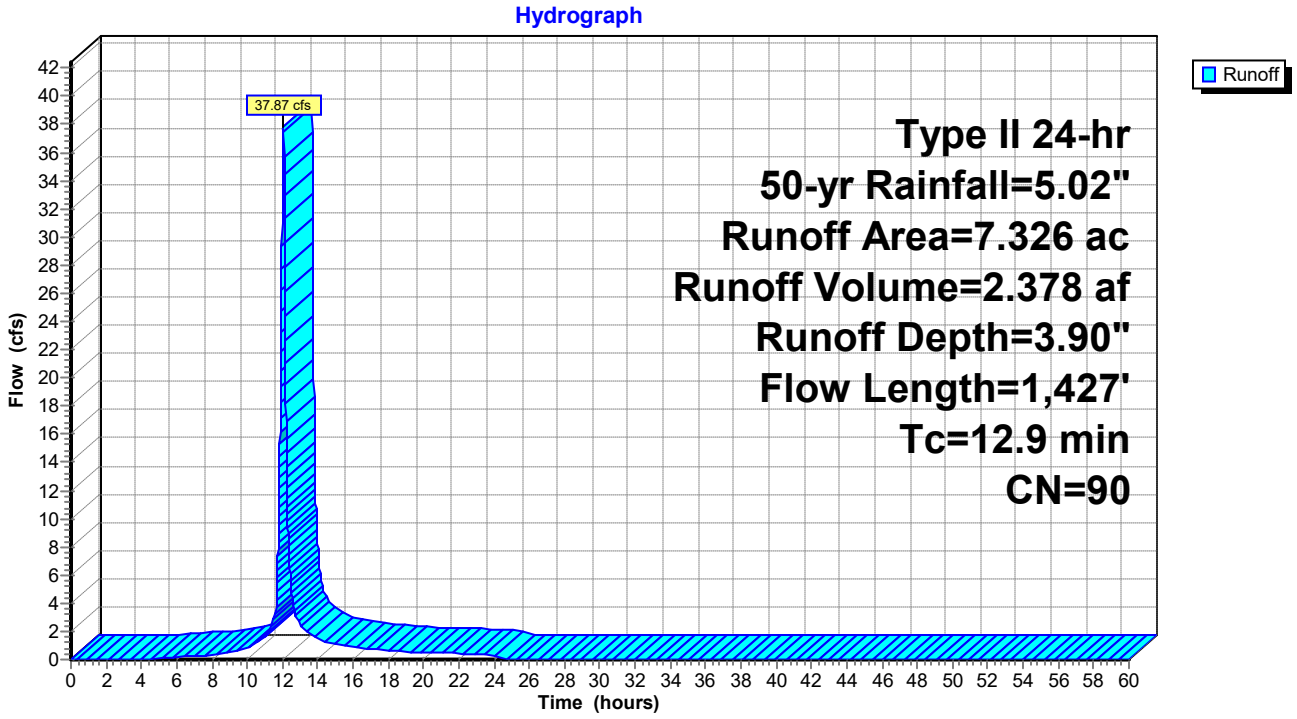
Runoff = 37.87 cfs @ 12.04 hrs, Volume= 2.378 af, Depth= 3.90"
Routed to Pond 12P : Wet Basin 01

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 50-yr Rainfall=5.02"

Area (ac)	CN	Description
7.326	90	1/8 acre lots, 65% imp, HSG C
2.564		35.00% Pervious Area
4.762		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, To catch basin**
7.9	1,427		3.00		**Direct Entry, Pipe flow**
12.9	1,427	Total			

Subcatchment 3S: Subarea 02



Summary for Subcatchment 4S: Subarea 03

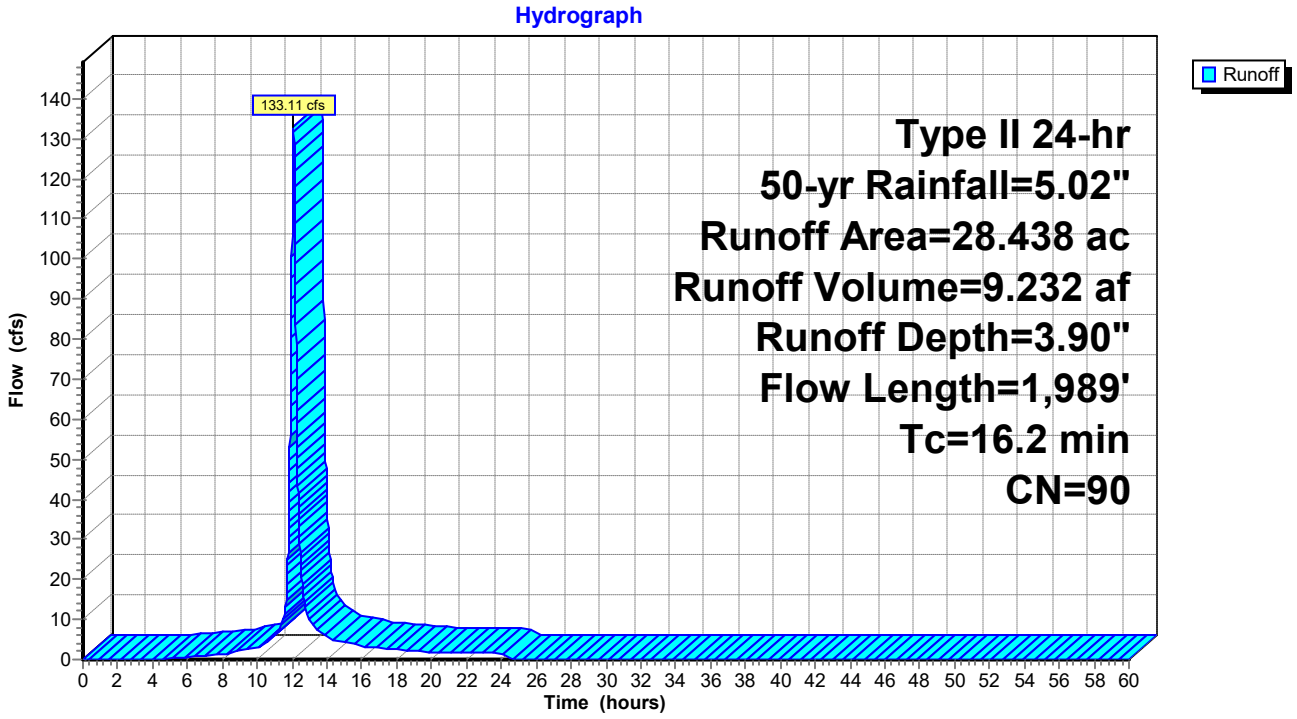
Runoff = 133.11 cfs @ 12.08 hrs, Volume= 9.232 af, Depth= 3.90"
Routed to Pond 12P : Wet Basin 01

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 50-yr Rainfall=5.02"

Area (ac)	CN	Description
28.438	90	1/8 acre lots, 65% imp, HSG C
9.953		35.00% Pervious Area
18.485		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.1					**Direct Entry, To catch basin**
11.0	1,989		3.00		**Direct Entry, Pipe flow**
16.2	1,989	Total			

Subcatchment 4S: Subarea 03



Summary for Subcatchment 5S: Subarea 04

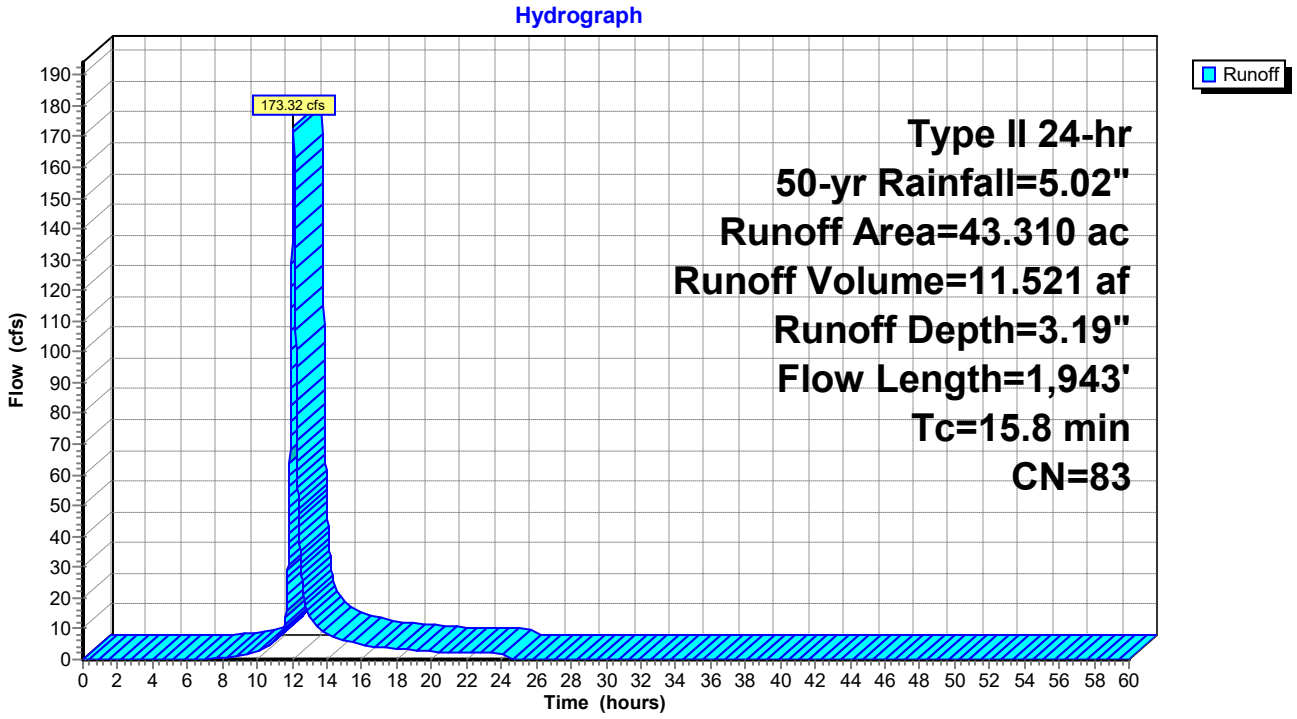
Runoff = 173.32 cfs @ 12.08 hrs, Volume= 11.521 af, Depth= 3.19"
Routed to Pond 12P : Wet Basin 01

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 50-yr Rainfall=5.02"

Area (ac)	CN	Description
43.310	83	1/4 acre lots, 38% imp, HSG C
26.852		62.00% Pervious Area
16.458		38.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, To catch basin**
10.8	1,943		3.00		**Direct Entry, Pipe flow**
15.8	1,943	Total			

Subcatchment 5S: Subarea 04



Summary for Subcatchment 7S: Offsite 02

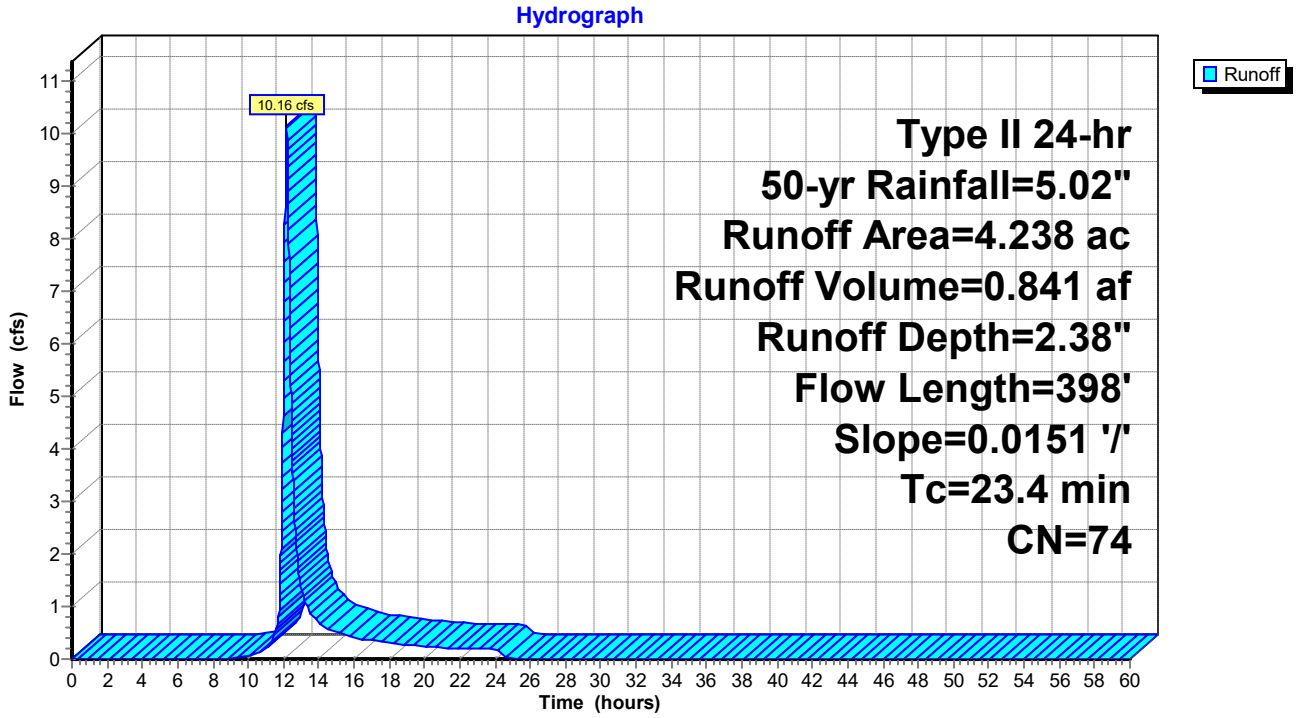
Runoff = 10.16 cfs @ 12.17 hrs, Volume= 0.841 af, Depth= 2.38"
Routed to Pond 12P : Wet Basin 01

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 50-yr Rainfall=5.02"

	Area (ac)	CN	Description
*	4.238	74	Open space
	4.238		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.6	100	0.0151	0.09		**Sheet Flow, A to B sheet flow** Grass: Dense n= 0.240 P2= 2.63"
5.8	298	0.0151	0.86		**Shallow Concentrated Flow, B to C shallow flow** Short Grass Pasture Kv= 7.0 fps
23.4	398	Total			

Subcatchment 7S: Offsite 02



Summary for Subcatchment 8S: Offsite 01

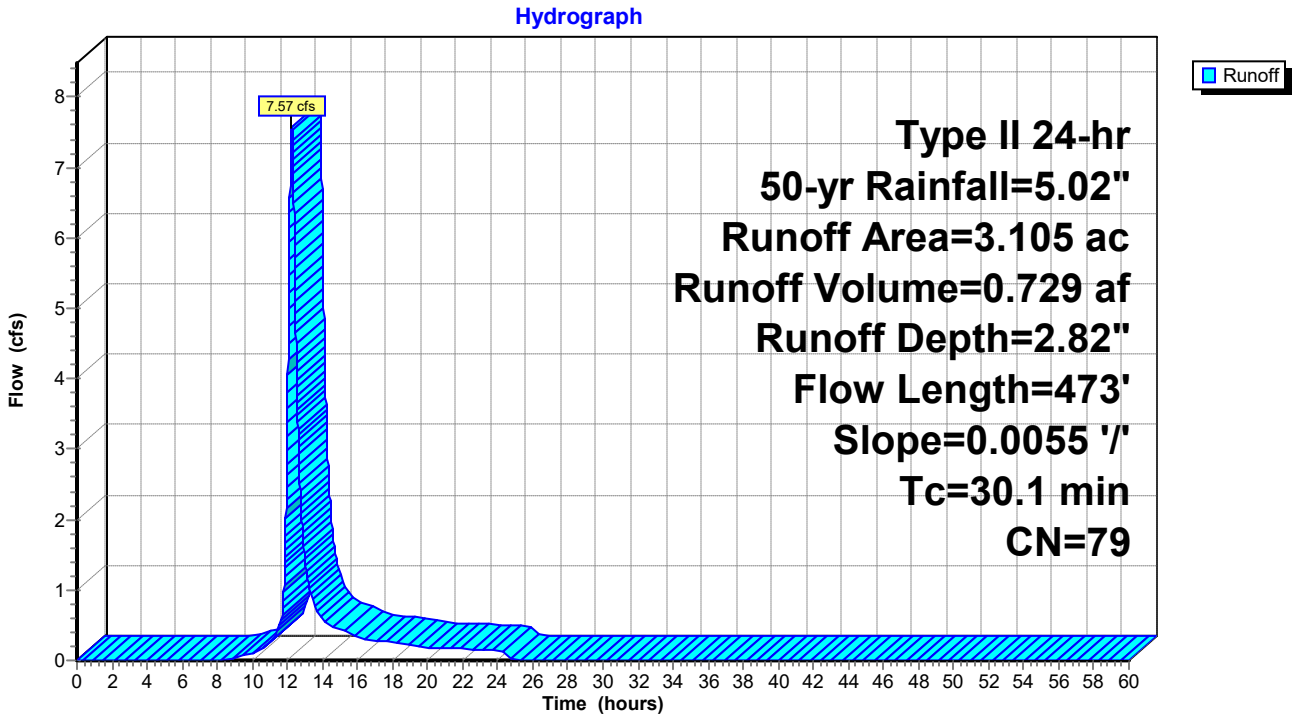
Runoff = 7.57 cfs @ 12.24 hrs, Volume= 0.729 af, Depth= 2.82"
Routed to Pond 11P : Dry Basin 02

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 50-yr Rainfall=5.02"

	Area (ac)	CN	Description
*	2.506	74	Open space
*	0.599	98	Existing Impervious
	3.105	79	Weighted Average
	2.506		80.71% Pervious Area
	0.599		19.29% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.1	100	0.0055	0.09		**Sheet Flow, A to B sheet flow** Grass: Short n= 0.150 P2= 2.63"
12.0	373	0.0055	0.52		**Shallow Concentrated Flow, B to C shallow flow** Short Grass Pasture Kv= 7.0 fps
30.1	473	Total			

Subcatchment 8S: Offsite 01



Summary for Subcatchment 9S: Offsite 03

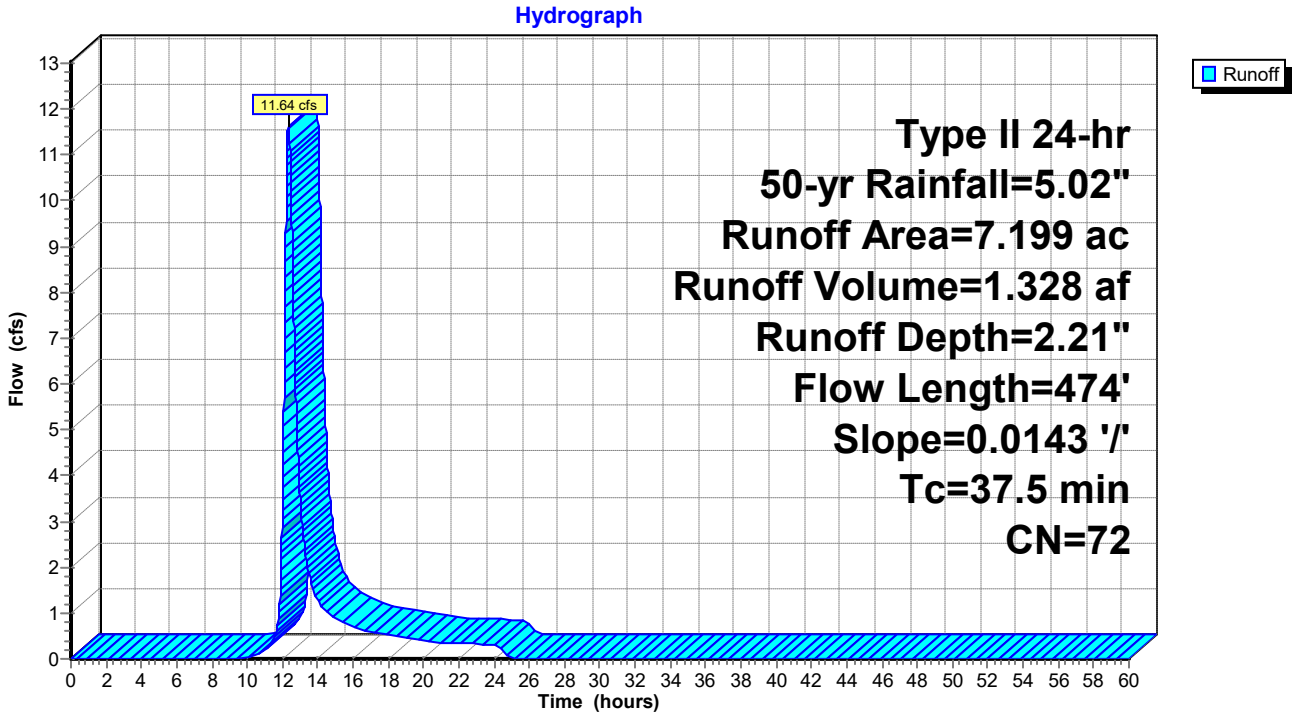
Runoff = 11.64 cfs @ 12.34 hrs, Volume= 1.328 af, Depth= 2.21"
Routed to Pond 12P : Wet Basin 01

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 50-yr Rainfall=5.02"

Area (ac)	CN	Description
2.228	78	Row crops, C&T, Good, HSG C
4.971	70	Woods, Good, HSG C
7.199	72	Weighted Average
7.199		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
27.1	100	0.0143	0.06		**Sheet Flow, A to B sheet flow** Woods: Light underbrush n= 0.400 P2= 2.63"
10.4	374	0.0143	0.60		**Shallow Concentrated Flow, B to C shallow flow** Woodland Kv= 5.0 fps
37.5	474	Total			

Subcatchment 9S: Offsite 03



Summary for Subcatchment 10S: Offsite 04 (Diversion)

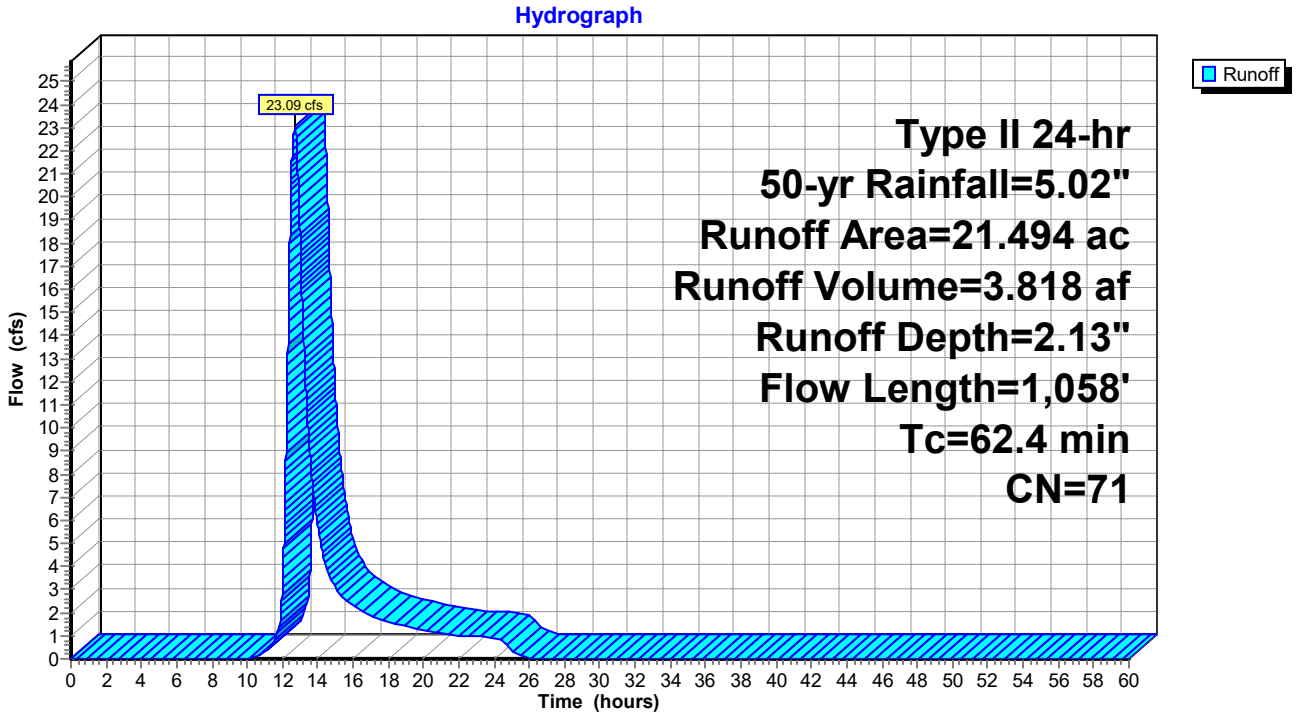
Runoff = 23.09 cfs @ 12.69 hrs, Volume= 3.818 af, Depth= 2.13"
Routed to Pond 12P : Wet Basin 01

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 50-yr Rainfall=5.02"

	Area (ac)	CN	Description
*	3.947	78	Woods, Agricultural
	17.547	70	Woods, Good, HSG C
	21.494	71	Weighted Average
	21.494		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
23.7	100	0.0200	0.07		**Sheet Flow, A to B sheet flow** Woods: Light underbrush n= 0.400 P2= 2.63"
38.7	958	0.0021	0.41		**Shallow Concentrated Flow, B to C shallow flow** Cultivated Straight Rows Kv= 9.0 fps
62.4	1,058	Total			

Subcatchment 10S: Offsite 04 (Diversion)



Summary for Subcatchment 16S: Pre-Developed 02 (Hirth/Wolpert)

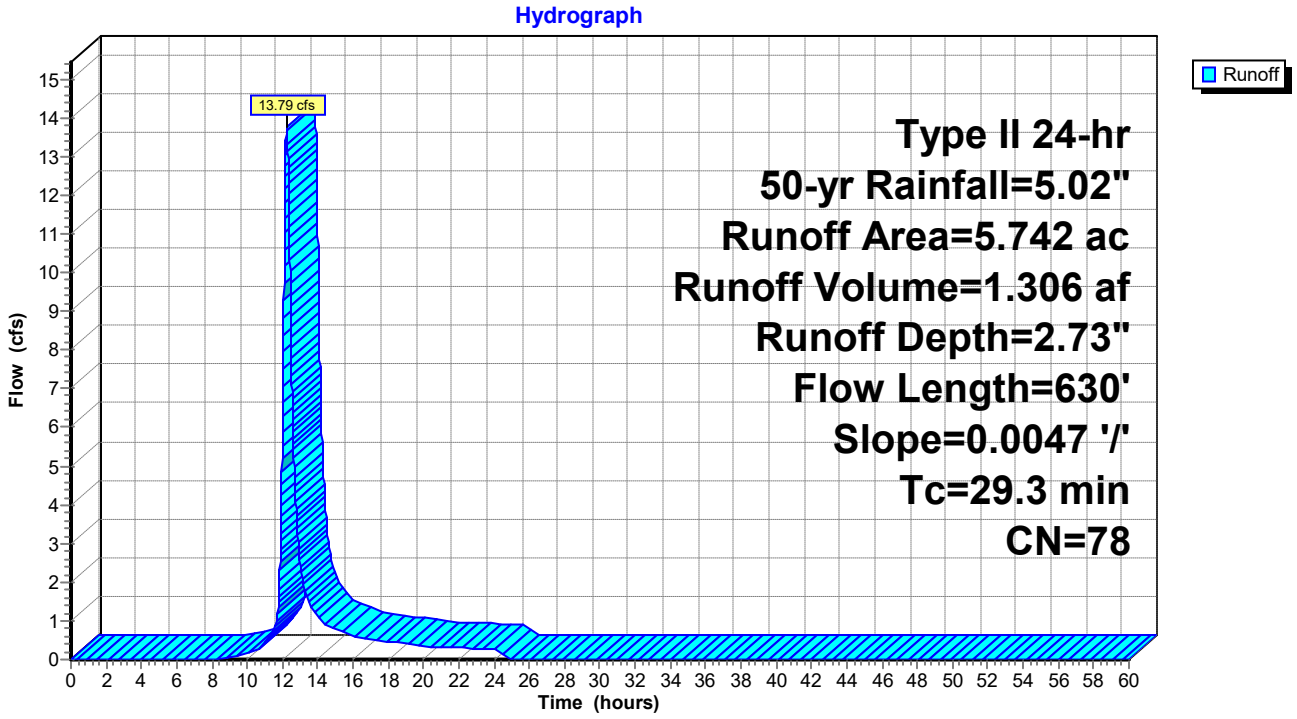
Runoff = 13.79 cfs @ 12.24 hrs, Volume= 1.306 af, Depth= 2.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 50-yr Rainfall=5.02"

Area (ac)	CN	Description
5.742	78	Row crops, C&T, Good, HSG C
5.742		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.3	100	0.0047	0.08		**Sheet Flow, A to B sheet flow** Cultivated: Residue>20% n= 0.170 P2= 2.63"
8.0	530	0.0047	1.10		**Shallow Concentrated Flow, B to C shallow flow** Unpaved Kv= 16.1 fps
29.3	630	Total			

Subcatchment 16S: Pre-Developed 02 (Hirth/Wolpert)



Summary for Pond 11P: Dry Basin 02

Inflow Area = 14.032 ac, 54.89% Impervious, Inflow Depth = 3.66" for 50-yr event
Inflow = 64.53 cfs @ 12.02 hrs, Volume= 4.277 af
Outflow = 15.19 cfs @ 12.20 hrs, Volume= 4.209 af, Atten= 76%, Lag= 10.5 min
Primary = 15.19 cfs @ 12.20 hrs, Volume= 4.209 af
Routed to Pond 12P : Wet Basin 01

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 925.46' @ 12.42 hrs Surf.Area= 0.683 ac Storage= 1.350 af

Plug-Flow detention time= 251.0 min calculated for 4.208 af (98% of inflow)
Center-of-Mass det. time= 241.3 min (1,041.9 - 800.6)

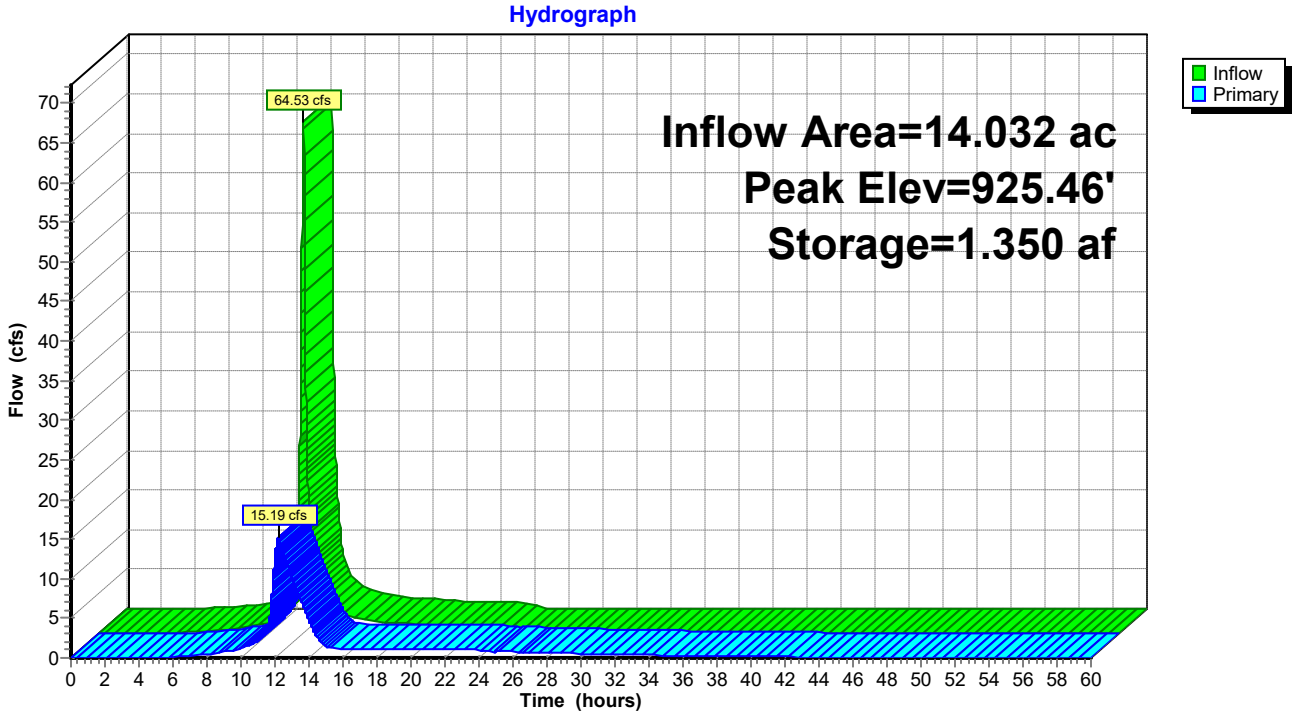
Volume	Invert	Avail.Storage	Storage Description
#1	921.00'	2.614 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
921.00	0.014	0.000	0.000
922.00	0.097	0.055	0.055
923.00	0.239	0.168	0.223
924.00	0.411	0.325	0.548
925.00	0.601	0.506	1.055
926.00	0.780	0.690	1.745
927.00	0.958	0.869	2.614

Device	Routing	Invert	Outlet Devices
#1	Primary	918.29'	**54.0" Round 1->HW1** L= 84.4' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 918.29' / 913.50' S= 0.0568 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 15.90 sf
#2	Device 1	918.87'	**54.0" Round 2->1** L= 292.2' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 918.87' / 918.29' S= 0.0020 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 15.90 sf
#3	Device 2	919.31'	**54.0" Round 3->2** L= 87.7' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 919.31' / 918.99' S= 0.0036 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 15.90 sf
#4	Device 3	921.10'	**24.0" Round 4->3** L= 330.5' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 921.10' / 919.45' S= 0.0050 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 3.14 sf
#5	Device 4	921.41'	**18.0" Round HW2->4** L= 9.1' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 921.41' / 921.20' S= 0.0231 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 1.77 sf

Primary OutFlow Max=15.09 cfs @ 12.20 hrs HW=925.34' TW=922.20' (Dynamic Tailwater)
- **1=1->HW1** (Passes 15.09 cfs of 135.79 cfs potential flow)
  - **2=2->1** (Passes 15.09 cfs of 123.34 cfs potential flow)
    - **3=3->2** (Passes 15.09 cfs of 127.07 cfs potential flow)
      - **4=4->3** (Passes 15.09 cfs of 18.86 cfs potential flow)
        - **5=HW2->4** (Inlet Controls 15.09 cfs @ 8.54 fps)

Pond 11P: Dry Basin 02



Summary for Pond 12P: Wet Basin 01

Inflow Area = 126.037 ac, 37.61% Impervious, Inflow Depth > 3.17" for 50-yr event
Inflow = 375.74 cfs @ 12.08 hrs, Volume= 33.327 af
Outflow = 9.82 cfs @ 18.54 hrs, Volume= 20.908 af, Atten= 97%, Lag= 387.9 min
Primary = 9.82 cfs @ 18.54 hrs, Volume= 20.908 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 924.72' @ 18.54 hrs Surf.Area= 4.782 ac Storage= 24.197 af

Plug-Flow detention time= 968.9 min calculated for 20.905 af (63% of inflow)
Center-of-Mass det. time= 833.4 min (1,684.0 - 850.6)

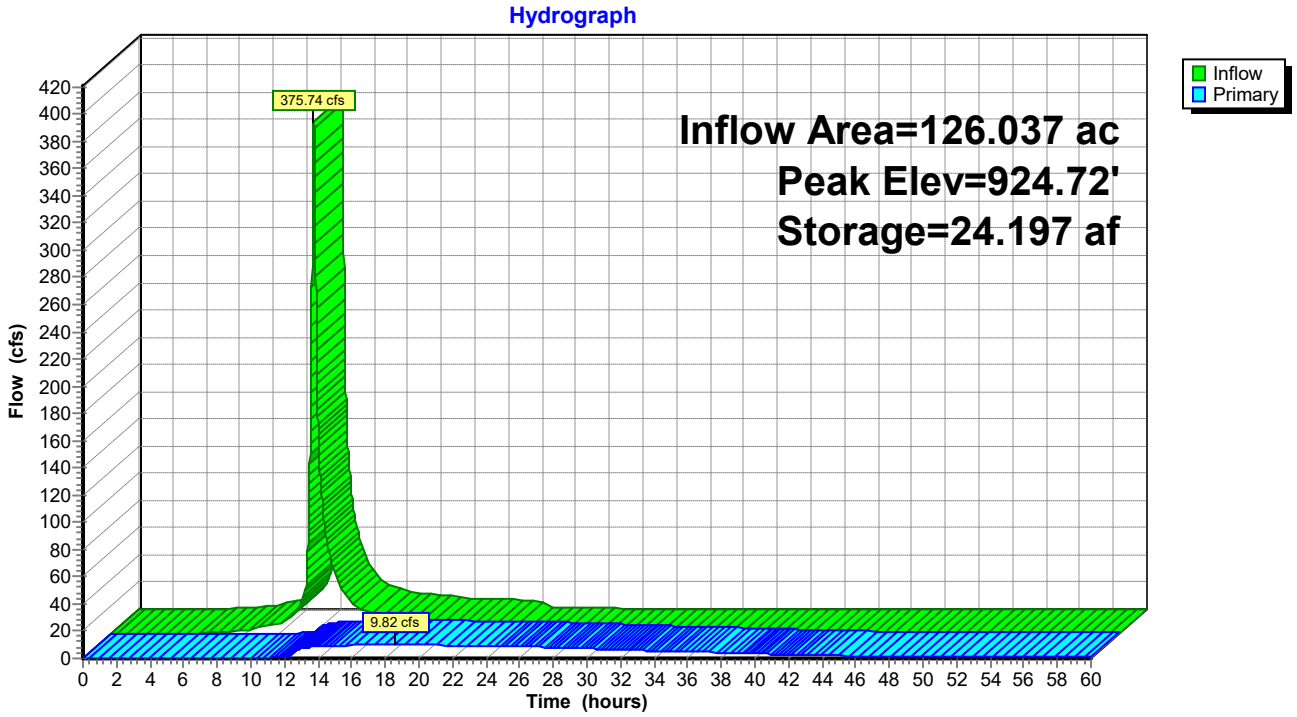
Volume	Invert	Avail.Storage	Storage Description
#1	919.00'	35.651 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
919.00	3.709	0.000	0.000
920.00	3.881	3.795	3.795
921.00	4.061	3.971	7.766
922.00	4.255	4.158	11.924
923.00	4.446	4.350	16.274
924.00	4.641	4.543	20.818
925.00	4.838	4.739	25.557
926.00	5.055	4.946	30.504
927.00	5.240	5.147	35.651

Device	Routing	Invert	Outlet Devices
#1	Primary	918.86'	**24.0" Round RCP_Round 24"** L= 29.0' Ke= 0.200 Inlet / Outlet Invert= 918.86' / 918.82' S= 0.0014 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#2	Device 1	919.00'	**6.0" Vert. WQ orifice** C= 0.600 Limited to weir flow at low heads
#3	Device 1	922.50'	**12.0" Horiz. Open top 12" pipe** C= 0.600 Limited to weir flow at low heads
#4	Device 1	923.00'	**8.0" Vert. 3rd stage orifice** C= 0.600 Limited to weir flow at low heads
#5	Device 1	924.80'	**15.0" Horiz. Open top 15" pipe** C= 0.600 Limited to weir flow at low heads
#6	Device 1	926.28'	**2.0" x 24.0" Horiz. Neenah grate X 8.00** C= 0.600 in 27.5" x 27.5" Grate (51% open area) Limited to weir flow at low heads

Primary OutFlow Max=9.82 cfs @ 18.54 hrs HW=924.72' (Free Discharge)
└**1=RCP_Round 24"** (Passes 9.82 cfs of 39.83 cfs potential flow)
  ├**2=WQ orifice** (Orifice Controls 2.21 cfs @ 11.26 fps)
  ├**3=Open top 12" pipe** (Orifice Controls 5.63 cfs @ 7.17 fps)
  ├**4=3rd stage orifice** (Orifice Controls 1.98 cfs @ 5.66 fps)
  ├**5=Open top 15" pipe** (Controls 0.00 cfs)
  └**6=Neenah grate** (Controls 0.00 cfs)

Pond 12P: Wet Basin 01



Summary for Subcatchment 1S: Subarea 01

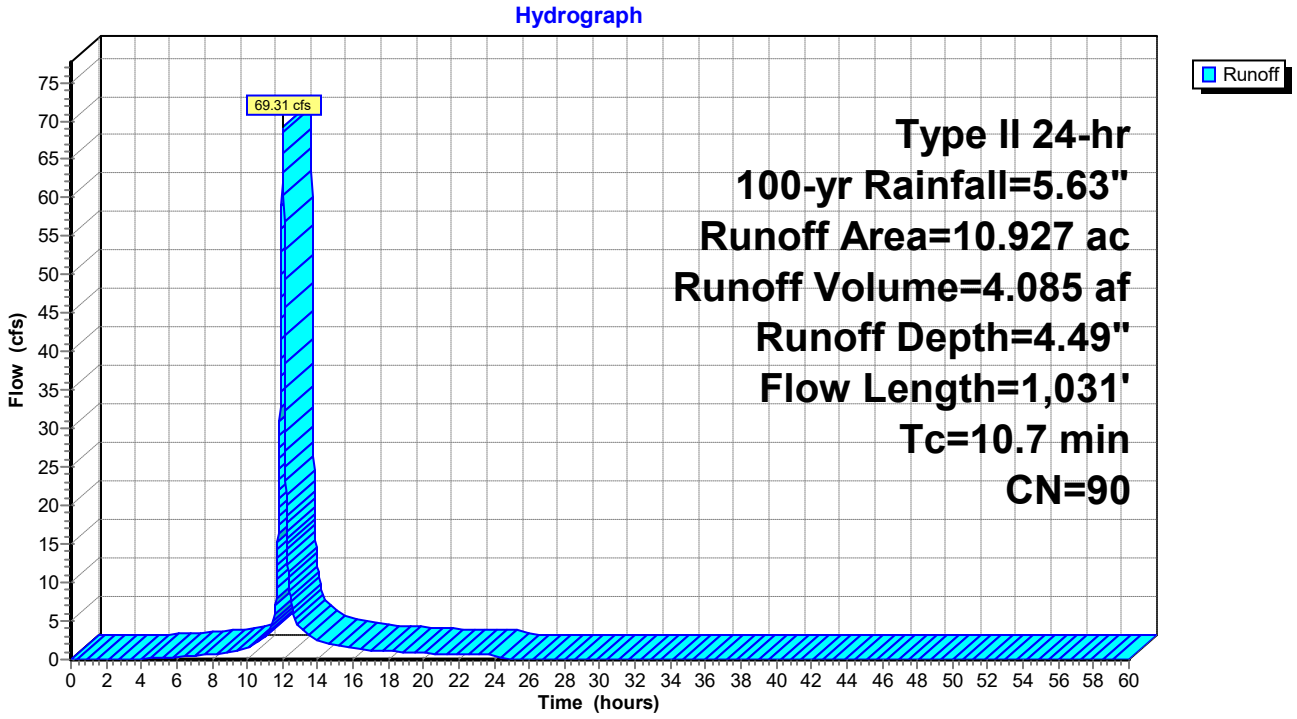
Runoff = 69.31 cfs @ 12.02 hrs, Volume= 4.085 af, Depth= 4.49"
Routed to Pond 11P : Dry Basin 02

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-yr Rainfall=5.63"

Area (ac)	CN	Description
10.927	90	1/8 acre lots, 65% imp, HSG C
3.824		35.00% Pervious Area
7.103		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, To catch basin**
5.7	1,031		3.00		**Direct Entry, Pipe flow**
10.7	1,031	Total			

Subcatchment 1S: Subarea 01



Summary for Subcatchment 2S: Pre-Developed 01 (Brown/Horch)

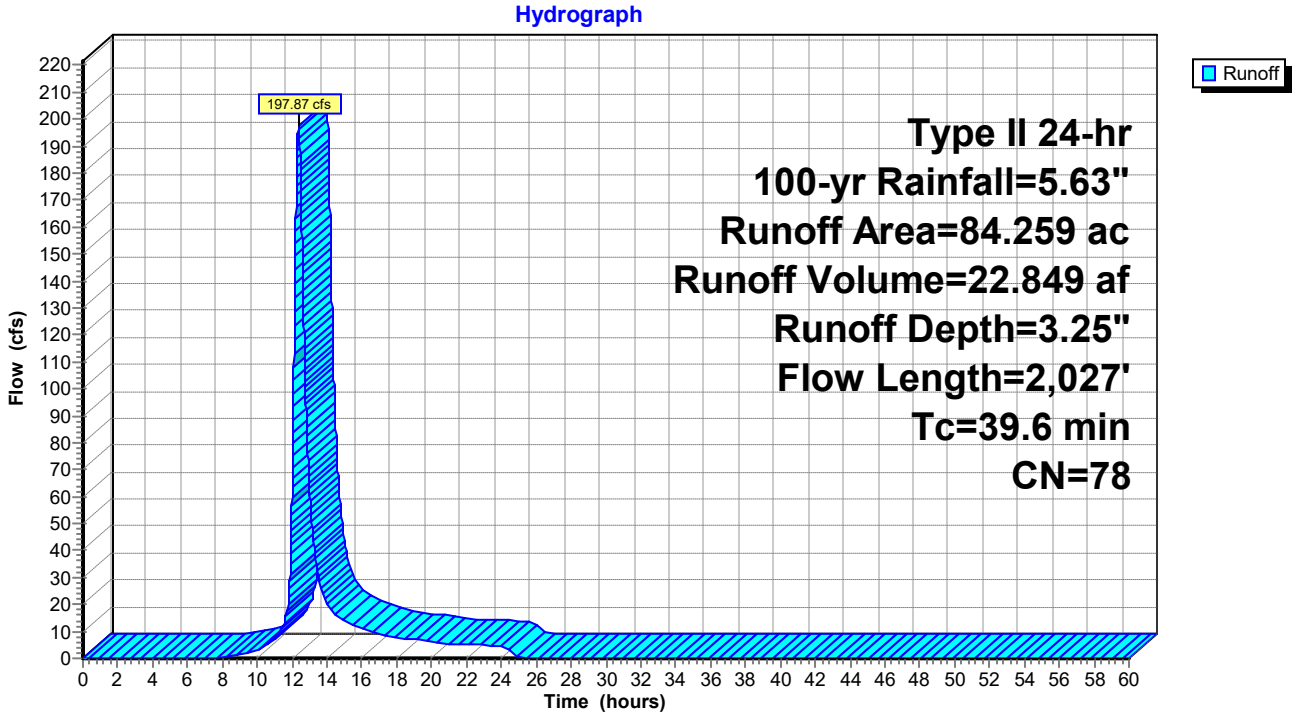
Runoff = 197.87 cfs @ 12.36 hrs, Volume= 22.849 af, Depth= 3.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-yr Rainfall=5.63"

Area (ac)	CN	Description
1.560	70	Woods, Good, HSG C
82.699	78	Row crops, C&T, Good, HSG C
84.259	78	Weighted Average
84.259		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	100	0.0260	0.15		**Sheet Flow, A to B sheet flow** Cultivated: Residue>20% n= 0.170 P2= 2.63"
28.8	1,927	0.0048	1.12		**Shallow Concentrated Flow, B to C shallow flow** Unpaved Kv= 16.1 fps
39.6	2,027	Total			

Subcatchment 2S: Pre-Developed 01 (Brown/Horch)



Summary for Subcatchment 3S: Subarea 02

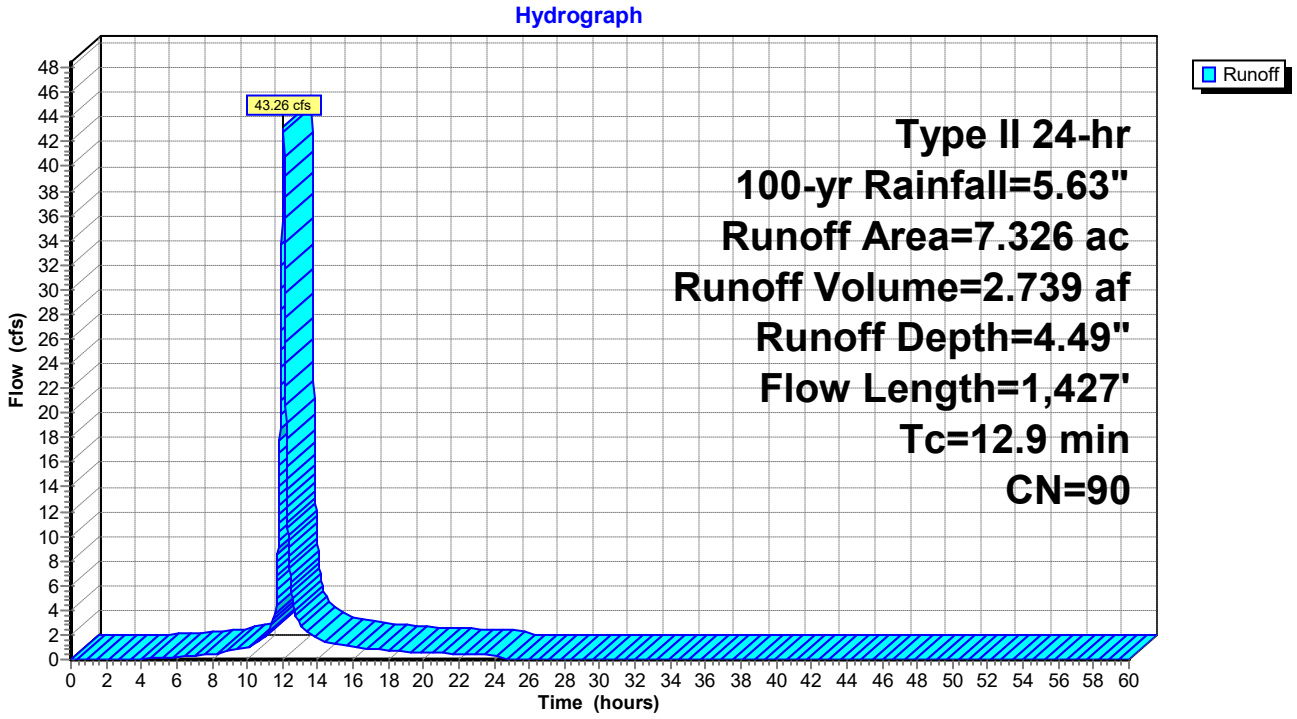
Runoff = 43.26 cfs @ 12.04 hrs, Volume= 2.739 af, Depth= 4.49"
Routed to Pond 12P : Wet Basin 01

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-yr Rainfall=5.63"

Area (ac)	CN	Description
7.326	90	1/8 acre lots, 65% imp, HSG C
2.564		35.00% Pervious Area
4.762		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, To catch basin**
7.9	1,427		3.00		**Direct Entry, Pipe flow**
12.9	1,427	Total			

Subcatchment 3S: Subarea 02



Summary for Subcatchment 4S: Subarea 03

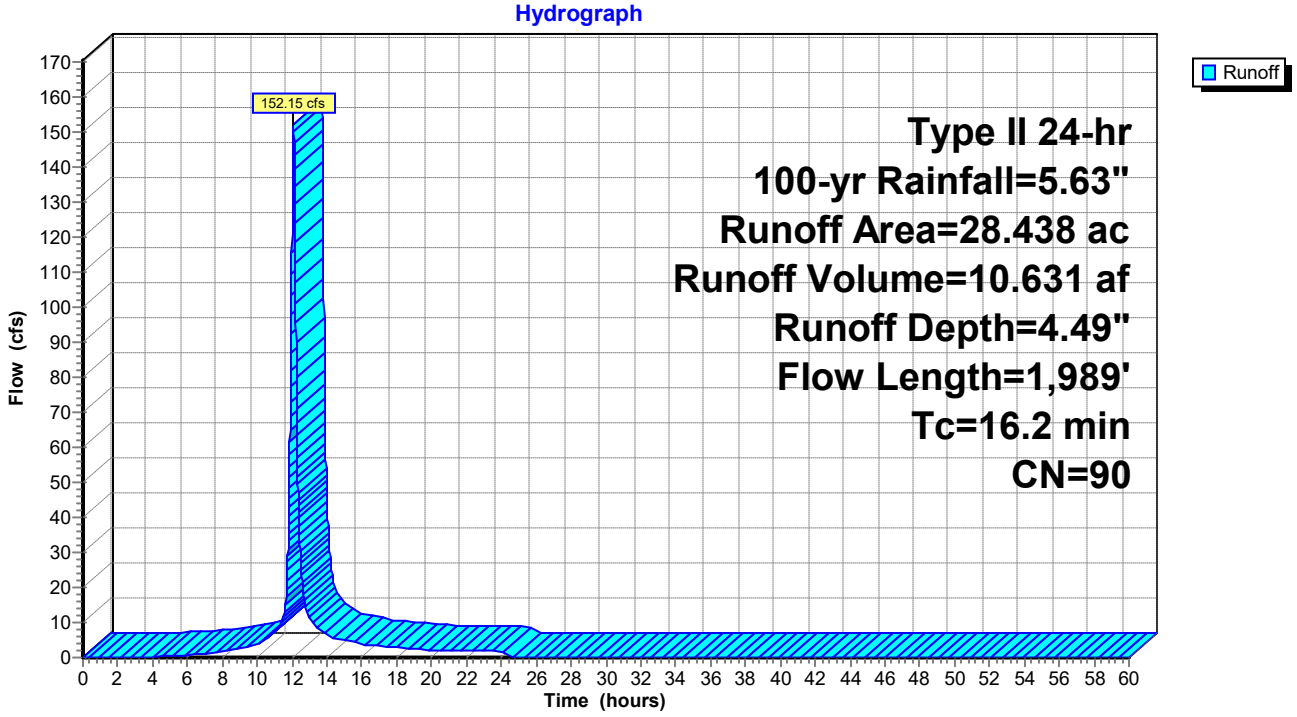
Runoff = 152.15 cfs @ 12.08 hrs, Volume= 10.631 af, Depth= 4.49"
Routed to Pond 12P : Wet Basin 01

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-yr Rainfall=5.63"

Area (ac)	CN	Description
28.438	90	1/8 acre lots, 65% imp, HSG C
9.953		35.00% Pervious Area
18.485		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.1					**Direct Entry, To catch basin**
11.0	1,989		3.00		**Direct Entry, Pipe flow**
16.2	1,989	Total			

Subcatchment 4S: Subarea 03



Summary for Subcatchment 5S: Subarea 04

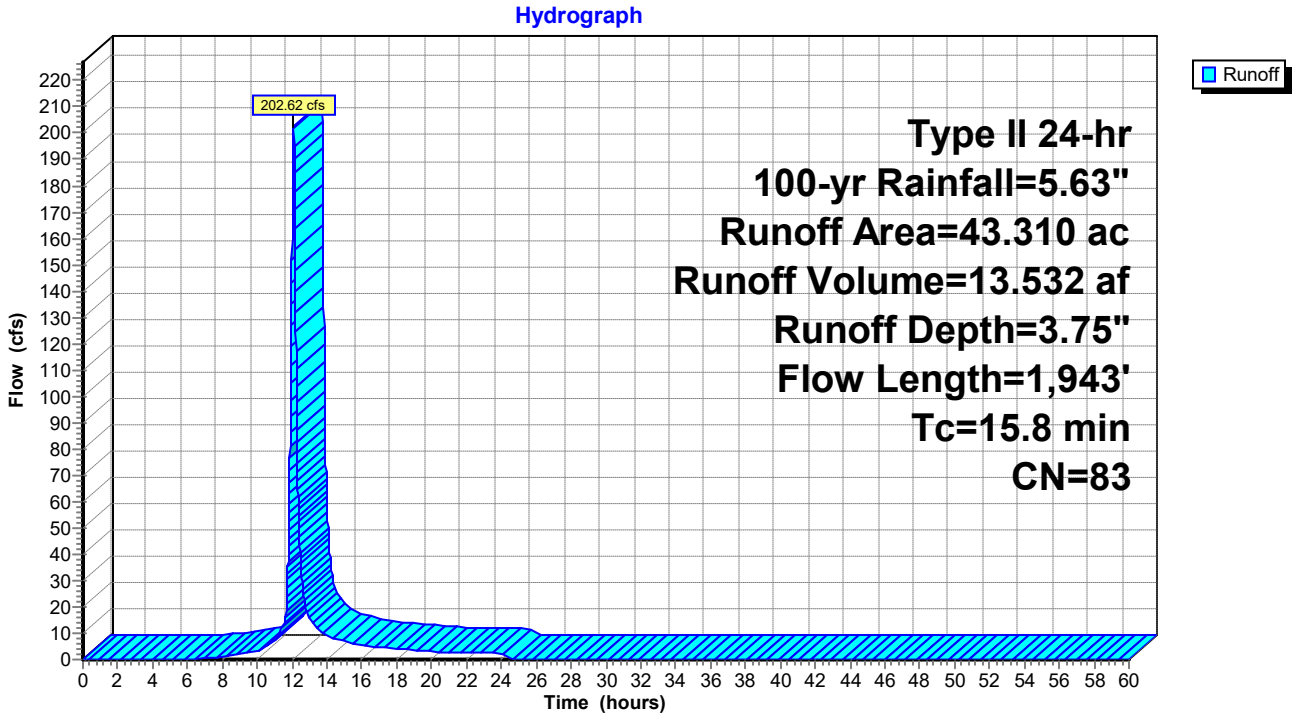
Runoff = 202.62 cfs @ 12.08 hrs, Volume= 13.532 af, Depth= 3.75"
Routed to Pond 12P : Wet Basin 01

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-yr Rainfall=5.63"

Area (ac)	CN	Description
43.310	83	1/4 acre lots, 38% imp, HSG C
26.852		62.00% Pervious Area
16.458		38.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, To catch basin**
10.8	1,943		3.00		**Direct Entry, Pipe flow**
15.8	1,943	Total			

Subcatchment 5S: Subarea 04



Summary for Subcatchment 7S: Offsite 02

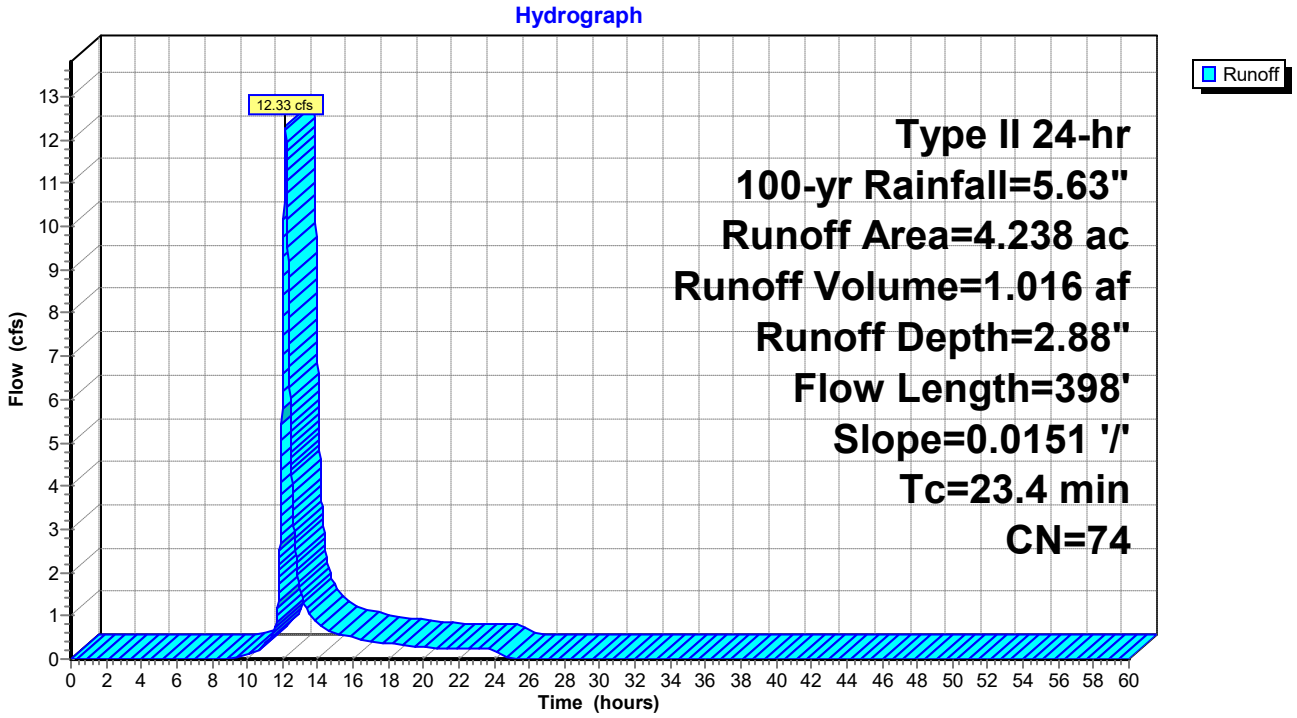
Runoff = 12.33 cfs @ 12.17 hrs, Volume= 1.016 af, Depth= 2.88"
Routed to Pond 12P : Wet Basin 01

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-yr Rainfall=5.63"

	Area (ac)	CN	Description
*	4.238	74	Open space
	4.238		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.6	100	0.0151	0.09		**Sheet Flow, A to B sheet flow** Grass: Dense n= 0.240 P2= 2.63"
5.8	298	0.0151	0.86		**Shallow Concentrated Flow, B to C shallow flow** Short Grass Pasture Kv= 7.0 fps
23.4	398	Total			

Subcatchment 7S: Offsite 02



Summary for Subcatchment 8S: Offsite 01

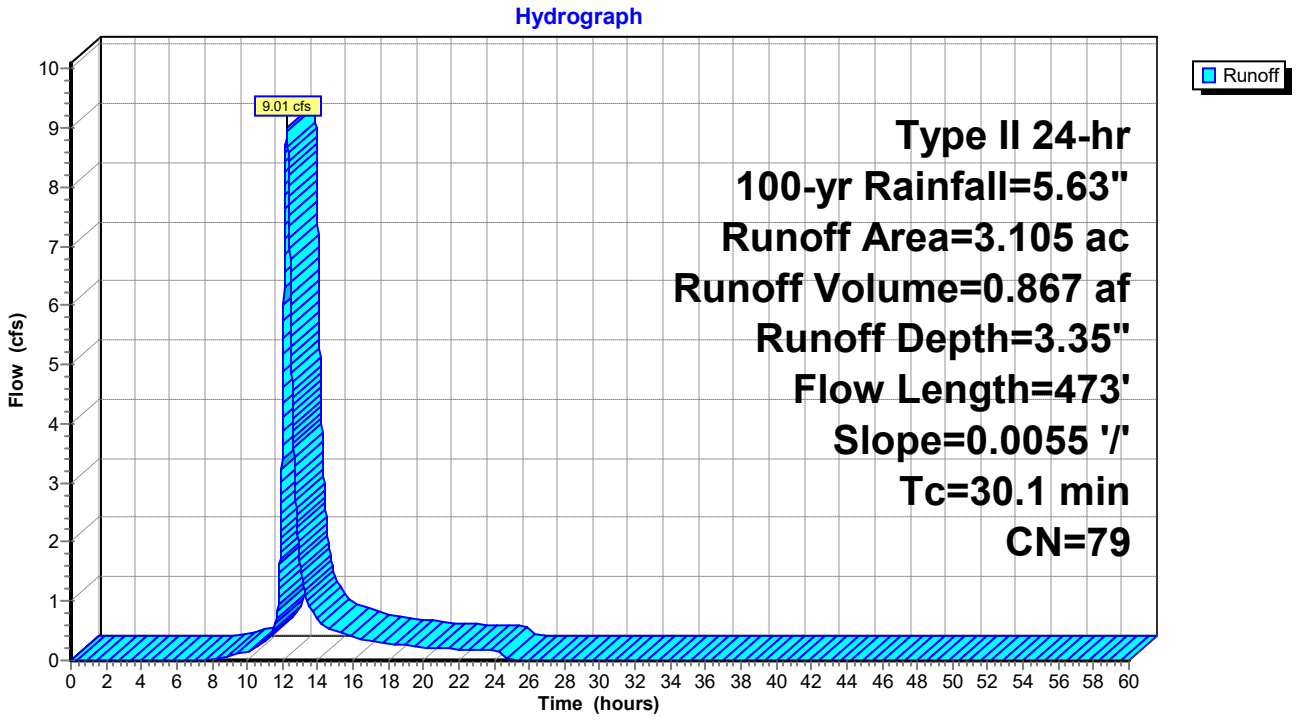
Runoff = 9.01 cfs @ 12.24 hrs, Volume= 0.867 af, Depth= 3.35"
Routed to Pond 11P : Dry Basin 02

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-yr Rainfall=5.63"

	Area (ac)	CN	Description
*	2.506	74	Open space
*	0.599	98	Existing Impervious
	3.105	79	Weighted Average
	2.506		80.71% Pervious Area
	0.599		19.29% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.1	100	0.0055	0.09		**Sheet Flow, A to B sheet flow** Grass: Short n= 0.150 P2= 2.63"
12.0	373	0.0055	0.52		**Shallow Concentrated Flow, B to C shallow flow** Short Grass Pasture Kv= 7.0 fps
30.1	473	Total			

Subcatchment 8S: Offsite 01



Summary for Subcatchment 9S: Offsite 03

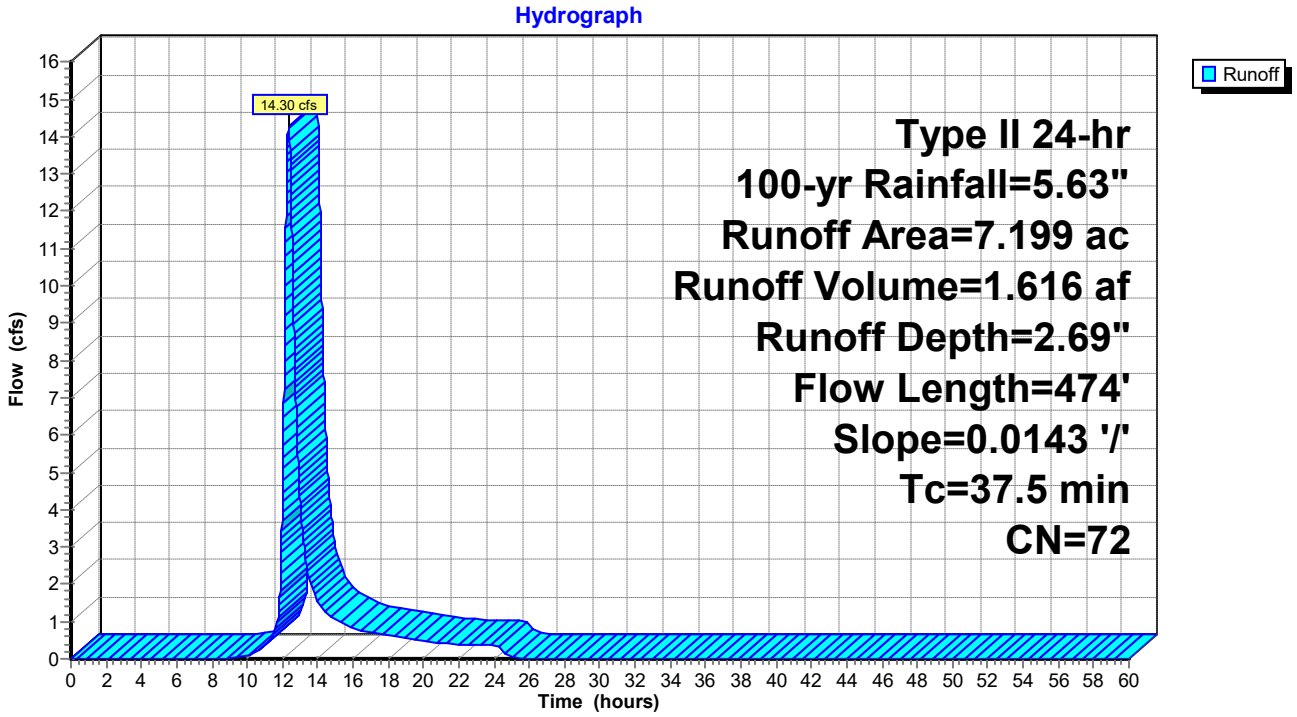
Runoff = 14.30 cfs @ 12.34 hrs, Volume= 1.616 af, Depth= 2.69"
Routed to Pond 12P : Wet Basin 01

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-yr Rainfall=5.63"

Area (ac)	CN	Description
2.228	78	Row crops, C&T, Good, HSG C
4.971	70	Woods, Good, HSG C
7.199	72	Weighted Average
7.199		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
27.1	100	0.0143	0.06		**Sheet Flow, A to B sheet flow** Woods: Light underbrush n= 0.400 P2= 2.63"
10.4	374	0.0143	0.60		**Shallow Concentrated Flow, B to C shallow flow** Woodland Kv= 5.0 fps
37.5	474	Total			

Subcatchment 9S: Offsite 03



Summary for Subcatchment 10S: Offsite 04 (Diversion)

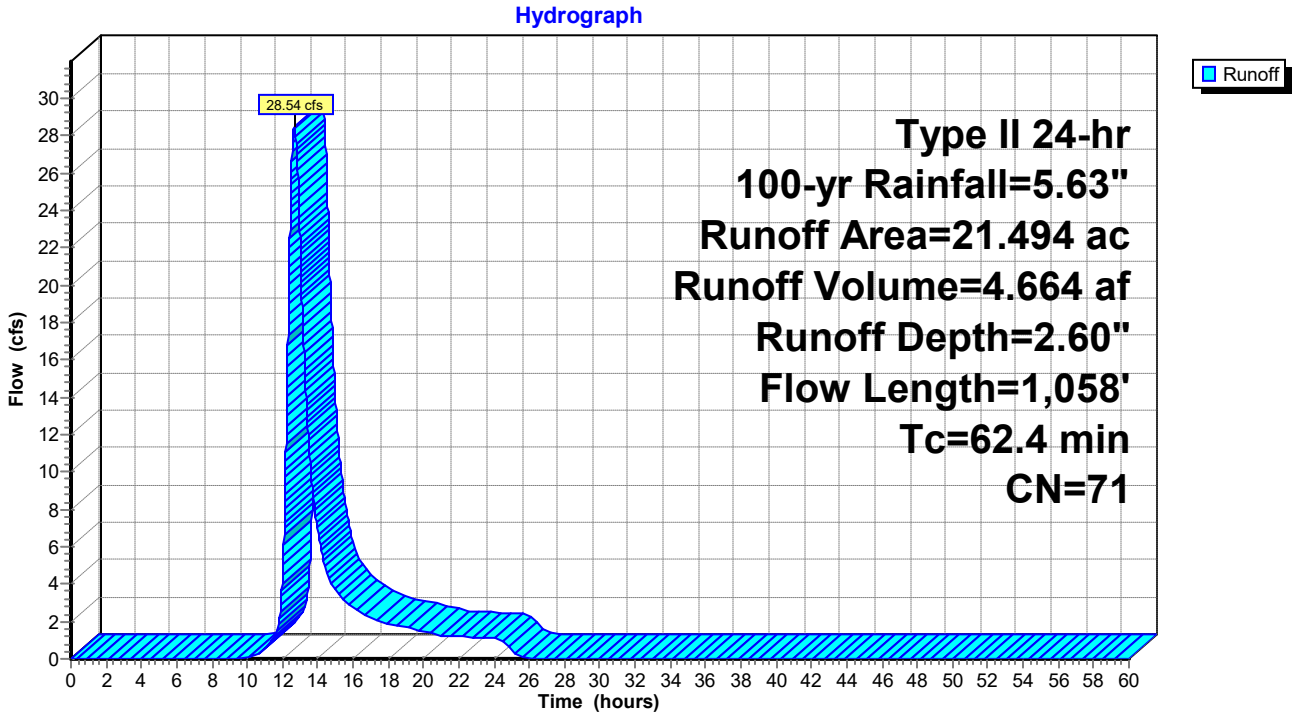
Runoff = 28.54 cfs @ 12.69 hrs, Volume= 4.664 af, Depth= 2.60"
Routed to Pond 12P : Wet Basin 01

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-yr Rainfall=5.63"

	Area (ac)	CN	Description
*	3.947	78	Woods, Agricultural
	17.547	70	Woods, Good, HSG C
	21.494	71	Weighted Average
	21.494		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
23.7	100	0.0200	0.07		**Sheet Flow, A to B sheet flow** Woods: Light underbrush n= 0.400 P2= 2.63"
38.7	958	0.0021	0.41		**Shallow Concentrated Flow, B to C shallow flow** Cultivated Straight Rows Kv= 9.0 fps
62.4	1,058	Total			

Subcatchment 10S: Offsite 04 (Diversion)



Summary for Subcatchment 16S: Pre-Developed 02 (Hirth/Wolpert)

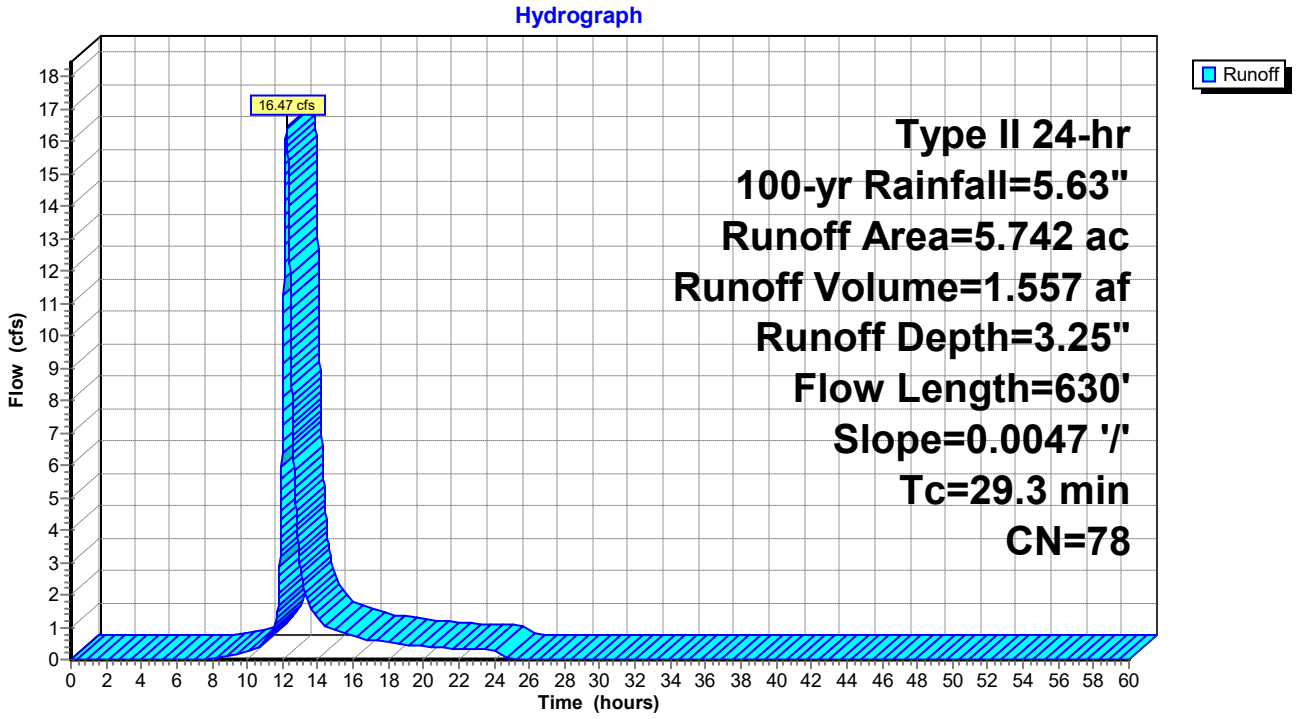
Runoff = 16.47 cfs @ 12.24 hrs, Volume= 1.557 af, Depth= 3.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-yr Rainfall=5.63"

Area (ac)	CN	Description
5.742	78	Row crops, C&T, Good, HSG C
5.742		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.3	100	0.0047	0.08		**Sheet Flow, A to B sheet flow** Cultivated: Residue>20% n= 0.170 P2= 2.63"
8.0	530	0.0047	1.10		**Shallow Concentrated Flow, B to C shallow flow** Unpaved Kv= 16.1 fps
29.3	630	Total			

Subcatchment 16S: Pre-Developed 02 (Hirth/Wolpert)



Summary for Pond 11P: Dry Basin 02

Inflow Area = 14.032 ac, 54.89% Impervious, Inflow Depth = 4.23" for 100-yr event
Inflow = 73.95 cfs @ 12.02 hrs, Volume= 4.952 af
Outflow = 15.48 cfs @ 12.12 hrs, Volume= 4.875 af, Atten= 79%, Lag= 5.9 min
Primary = 15.48 cfs @ 12.12 hrs, Volume= 4.875 af
Routed to Pond 12P : Wet Basin 01

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 925.89' @ 12.51 hrs Surf.Area= 0.760 ac Storage= 1.659 af

Plug-Flow detention time= 289.0 min calculated for 4.874 af (98% of inflow)
Center-of-Mass det. time= 279.4 min (1,076.2 - 796.7)

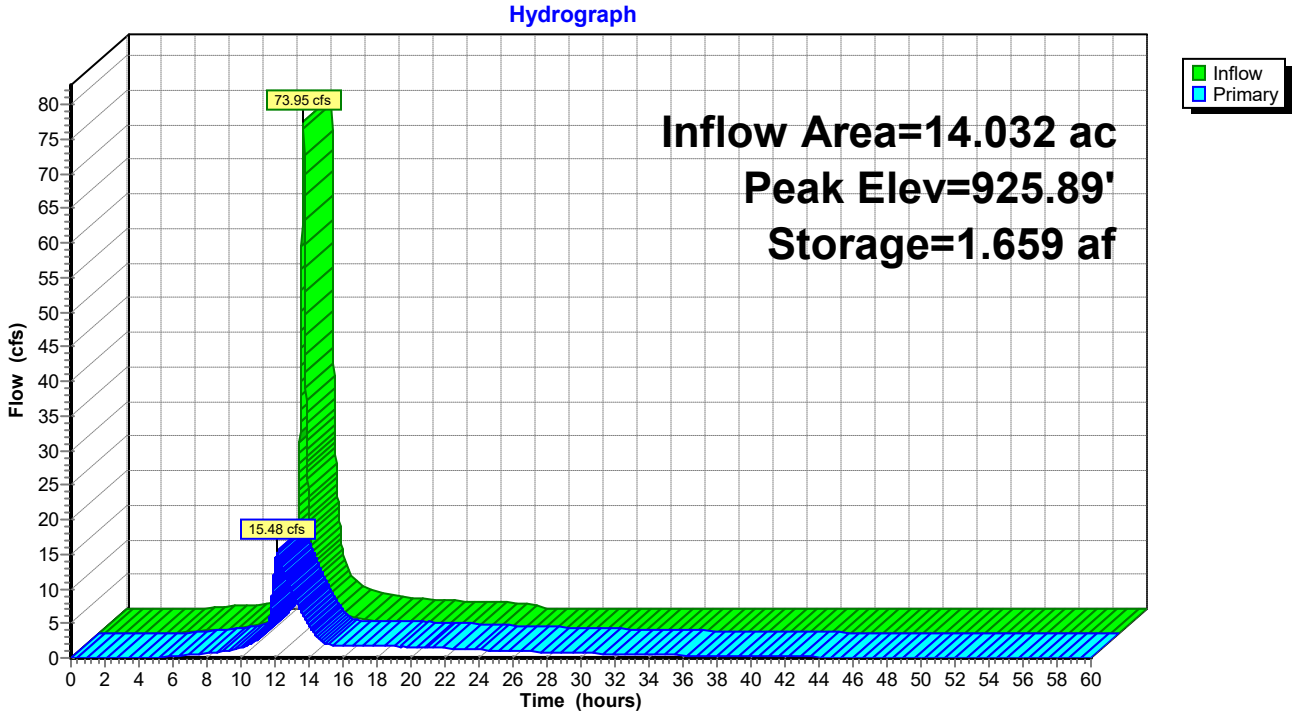
Volume	Invert	Avail.Storage	Storage Description
#1	921.00'	2.614 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
921.00	0.014	0.000	0.000
922.00	0.097	0.055	0.055
923.00	0.239	0.168	0.223
924.00	0.411	0.325	0.548
925.00	0.601	0.506	1.055
926.00	0.780	0.690	1.745
927.00	0.958	0.869	2.614

Device	Routing	Invert	Outlet Devices
#1	Primary	918.29'	**54.0" Round 1->HW1** L= 84.4' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 918.29' / 913.50' S= 0.0568 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 15.90 sf
#2	Device 1	918.87'	**54.0" Round 2->1** L= 292.2' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 918.87' / 918.29' S= 0.0020 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 15.90 sf
#3	Device 2	919.31'	**54.0" Round 3->2** L= 87.7' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 919.31' / 918.99' S= 0.0036 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 15.90 sf
#4	Device 3	921.10'	**24.0" Round 4->3** L= 330.5' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 921.10' / 919.45' S= 0.0050 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 3.14 sf
#5	Device 4	921.41'	**18.0" Round HW2->4** L= 9.1' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 921.41' / 921.20' S= 0.0231 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 1.77 sf

Primary OutFlow Max=15.31 cfs @ 12.12 hrs HW=925.47' TW=922.24' (Dynamic Tailwater)
└─**1=1->HW1** (Passes 15.31 cfs of 137.77 cfs potential flow)
└─**2=2->1** (Passes 15.31 cfs of 126.40 cfs potential flow)
└─**3=3->2** (Passes 15.31 cfs of 131.40 cfs potential flow)
└─**4=4->3** (Passes 15.31 cfs of 19.13 cfs potential flow)
└─**5=HW2->4** (Inlet Controls 15.31 cfs @ 8.66 fps)

Pond 11P: Dry Basin 02



Summary for Pond 12P: Wet Basin 01

Inflow Area = 126.037 ac, 37.61% Impervious, Inflow Depth > 3.72" for 100-yr event
Inflow = 434.87 cfs @ 12.08 hrs, Volume= 39.072 af
Outflow = 15.27 cfs @ 16.23 hrs, Volume= 26.325 af, Atten= 96%, Lag= 249.1 min
Primary = 15.27 cfs @ 16.23 hrs, Volume= 26.325 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 925.31' @ 16.23 hrs Surf.Area= 4.906 ac Storage= 27.086 af

Plug-Flow detention time= 906.6 min calculated for 26.320 af (67% of inflow)
Center-of-Mass det. time= 773.9 min (1,625.1 - 851.2)

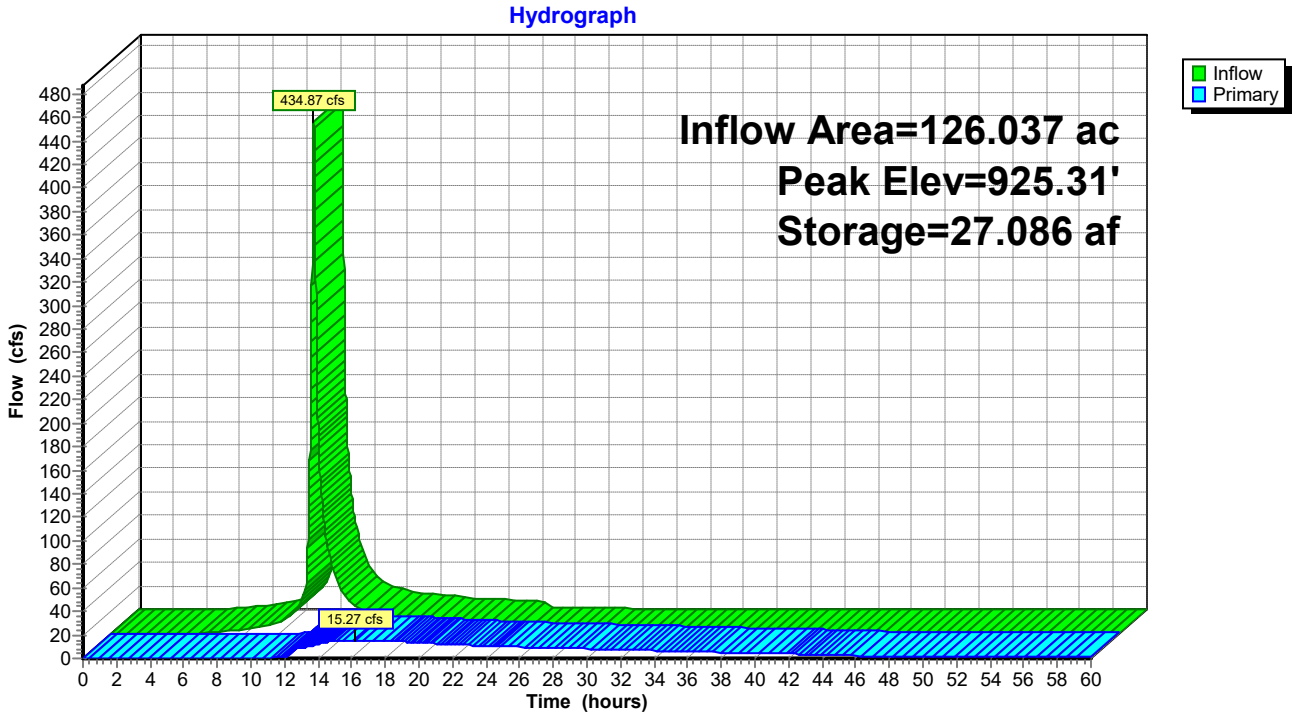
Volume	Invert	Avail.Storage	Storage Description
#1	919.00'	35.651 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
919.00	3.709	0.000	0.000
920.00	3.881	3.795	3.795
921.00	4.061	3.971	7.766
922.00	4.255	4.158	11.924
923.00	4.446	4.350	16.274
924.00	4.641	4.543	20.818
925.00	4.838	4.739	25.557
926.00	5.055	4.946	30.504
927.00	5.240	5.147	35.651

Device	Routing	Invert	Outlet Devices
#1	Primary	918.86'	**24.0" Round RCP_Round 24"** L= 29.0' Ke= 0.200 Inlet / Outlet Invert= 918.86' / 918.82' S= 0.0014 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#2	Device 1	919.00'	**6.0" Vert. WQ orifice** C= 0.600 Limited to weir flow at low heads
#3	Device 1	922.50'	**12.0" Horiz. Open top 12" pipe** C= 0.600 Limited to weir flow at low heads
#4	Device 1	923.00'	**8.0" Vert. 3rd stage orifice** C= 0.600 Limited to weir flow at low heads
#5	Device 1	924.80'	**15.0" Horiz. Open top 15" pipe** C= 0.600 Limited to weir flow at low heads
#6	Device 1	926.28'	**2.0" x 24.0" Horiz. Neenah grate X 8.00** C= 0.600 in 27.5" x 27.5" Grate (51% open area) Limited to weir flow at low heads

Primary OutFlow Max=15.27 cfs @ 16.23 hrs HW=925.31' (Free Discharge)
└**1=RCP_Round 24"** (Passes 15.27 cfs of 42.77 cfs potential flow)
- **2=WQ orifice** (Orifice Controls 2.33 cfs @ 11.86 fps)
- **3=Open top 12" pipe** (Orifice Controls 6.34 cfs @ 8.08 fps)
- **4=3rd stage orifice** (Orifice Controls 2.37 cfs @ 6.78 fps)
- **5=Open top 15" pipe** (Orifice Controls 4.24 cfs @ 3.45 fps)
- **6=Neenah grate** (Controls 0.00 cfs)

Pond 12P: Wet Basin 01



Events for Subcatchment 1S: Subarea 01

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
1-yr	2.20	20.71	1.153	1.27
2-yr	2.63	26.75	1.500	1.65
5-yr	3.24	35.40	2.008	2.21
10-yr	3.74	42.52	2.434	2.67
25-yr	4.44	52.47	3.040	3.34
50-yr	5.02	60.70	3.547	3.90
100-yr	**5.63**	**69.31**	**4.085**	**4.49**

Events for Subcatchment 2S: Pre-Developed 01 (Brown/Horch)

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
1-yr	2.20	31.92	4.217	0.60
2-yr	2.63	49.15	6.133	0.87
5-yr	3.24	76.33	9.147	1.30
10-yr	3.74	100.22	11.811	1.68
25-yr	4.44	135.37	15.752	2.24
50-yr	5.02	165.50	19.160	2.73
100-yr	**5.63**	**197.87**	**22.849**	**3.25**

Events for Subcatchment 3S: Subarea 02

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
1-yr	2.20	12.87	0.773	1.27
2-yr	2.63	16.64	1.006	1.65
5-yr	3.24	22.05	1.347	2.21
10-yr	3.74	26.50	1.632	2.67
25-yr	4.44	32.72	2.038	3.34
50-yr	5.02	37.87	2.378	3.90
100-yr	**5.63**	**43.26**	**2.739**	**4.49**

Events for Subcatchment 4S: Subarea 03

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
1-yr	2.20	44.94	3.001	1.27
2-yr	2.63	58.21	3.904	1.65
5-yr	3.24	77.28	5.227	2.21
10-yr	3.74	92.98	6.335	2.67
25-yr	4.44	114.95	7.911	3.34
50-yr	5.02	133.11	9.232	3.90
100-yr	**5.63**	**152.15**	**10.631**	**4.49**

Events for Subcatchment 5S: Subarea 04

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
1-yr	2.20	44.80	3.014	0.84
2-yr	2.63	62.78	4.168	1.15
5-yr	3.24	89.79	5.927	1.64
10-yr	3.74	112.76	7.443	2.06
25-yr	4.44	145.67	9.645	2.67
50-yr	5.02	173.32	11.521	3.19
100-yr	**5.63**	**202.62**	**13.532**	**3.75**

Events for Subcatchment 7S: Offsite 02

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
1-yr	2.20	1.55	0.158	0.45
2-yr	2.63	2.61	0.241	0.68
5-yr	3.24	4.32	0.376	1.06
10-yr	3.74	5.85	0.497	1.41
25-yr	4.44	8.15	0.680	1.93
50-yr	5.02	10.16	0.841	2.38
100-yr	**5.63**	**12.33**	**1.016**	**2.88**

Events for Subcatchment 8S: Offsite 01

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
1-yr	2.20	1.57	0.166	0.64
2-yr	2.63	2.36	0.240	0.93
5-yr	3.24	3.59	0.354	1.37
10-yr	3.74	4.66	0.454	1.75
25-yr	4.44	6.23	0.602	2.33
50-yr	5.02	7.57	0.729	2.82
100-yr	**5.63**	**9.01**	**0.867**	**3.35**

Events for Subcatchment 9S: Offsite 03

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
1-yr	2.20	1.47	0.228	0.38
2-yr	2.63	2.64	0.358	0.60
5-yr	3.24	4.63	0.573	0.95
10-yr	3.74	6.46	0.768	1.28
25-yr	4.44	9.21	1.066	1.78
50-yr	5.02	11.64	1.328	2.21
100-yr	**5.63**	**14.30**	**1.616**	**2.69**

Events for Subcatchment 10S: Offsite 04 (Diversion)

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
1-yr	2.20	2.70	0.627	0.35
2-yr	2.63	4.90	0.998	0.56
5-yr	3.24	8.82	1.616	0.90
10-yr	3.74	12.50	2.184	1.22
25-yr	4.44	18.12	3.051	1.70
50-yr	5.02	23.09	3.818	2.13
100-yr	**5.63**	**28.54**	**4.664**	**2.60**

Events for Subcatchment 16S: Pre-Developed 02 (Hirth/Wolpert)

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
1-yr	2.20	2.71	0.287	0.60
2-yr	2.63	4.14	0.418	0.87
5-yr	3.24	6.40	0.623	1.30
10-yr	3.74	8.38	0.805	1.68
25-yr	4.44	11.29	1.073	2.24
50-yr	5.02	13.79	1.306	2.73
100-yr	**5.63**	**16.47**	**1.557**	**3.25**

Events for Pond 11P: Dry Basin 02

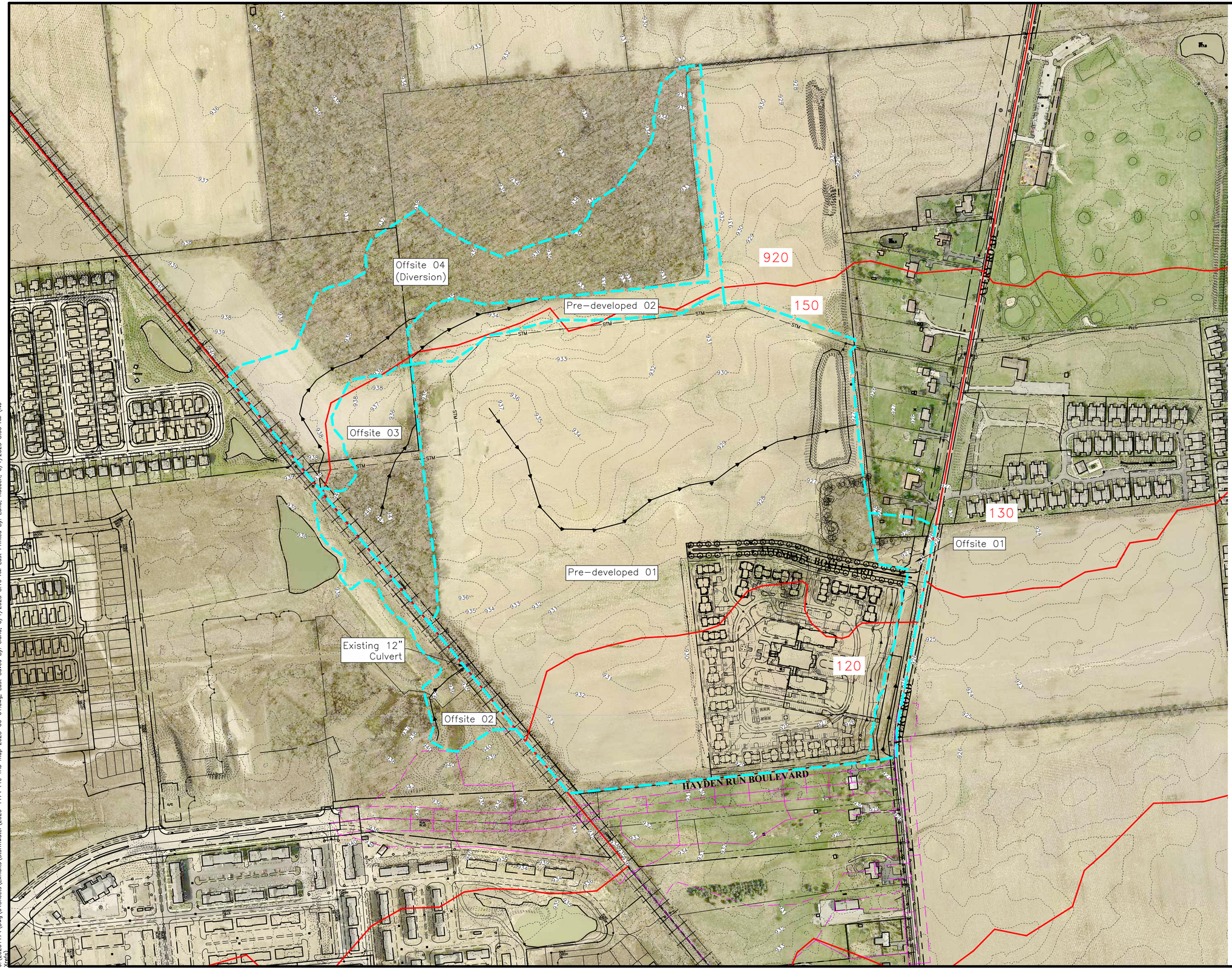
Event	Inflow (cfs)	Primary (cfs)	Elevation (feet)	Storage (acre-feet)
1-yr	21.31	9.19	923.37	0.322
2-yr	27.75	10.66	923.73	0.444
5-yr	37.05	12.20	924.22	0.642
10-yr	44.75	13.25	924.59	0.822
25-yr	55.56	14.50	925.07	1.094
50-yr	64.53	15.19	925.46	1.350
100-yr	**73.95**	**15.48**	**925.89**	**1.659**

Events for Pond 12P: Wet Basin 01

Event	Inflow (cfs)	Primary (cfs)	Elevation (feet)	Storage (acre-feet)
1-yr	112.30	1.26	921.03	7.897
2-yr	150.14	1.50	921.77	10.935
5-yr	205.91	2.99	922.74	15.135
10-yr	252.91	5.15	923.19	17.134
25-yr	319.79	8.04	923.99	20.770
50-yr	375.74	9.82	924.72	24.197
100-yr	**434.87**	**15.27**	**925.31**	**27.086**

APPENDIX E:

Exhibits



GRAPHIC SCALE

0 100 200 400

1 inch = 200 feet

LEGEND

- TRIBUTARY BOUNDARY
- HAYDEN RUN BOULEVARD TRIBUTARY BOUNDARY
- 920 / 150 DUBLIN MASTER PLANNED WATERSHED BOUNDARY
- TIME OF CONCENTRATION PATH

PRE-DEVELOPED CONDITIONS

PRE-DEVELOPED 01
TRIBUTARY AREA = 84.26 AC.
RCN = 78
TC = 39.6 MIN.

PRE-DEVELOPED 02
TRIBUTARY AREA = 5.74 AC.
RCN = 78
TC = 29.3 MIN.

OFFSITE 01
TRIBUTARY AREA = 3.11 AC.
RCN = 79
TC = 30.1 MIN.

OFFSITE 02
TRIBUTARY AREA = 4.24 AC.
RCN = 74
TC = 23.4 MIN.

OFFSITE 03
TRIBUTARY AREA = 7.20 AC.
RCN = 72
TC = 37.5 MIN.

OFFSITE 04 (DIVERSION)
TRIBUTARY AREA = 21.49 AC.
RCN = 71
TC = 62.4 MIN.

REVISIONS

MARK	DATE	DESCRIPTION

HOMEWOOD CORPORATION

CITY OF DUBLIN, FRANKLIN COUNTY, OHIO
STORMWATER MANAGEMENT PLAN
FOR

AVONDALE WOODS SECTIONS 2 & 3

PRE-DEVELOPED TRIBUTARY MAP

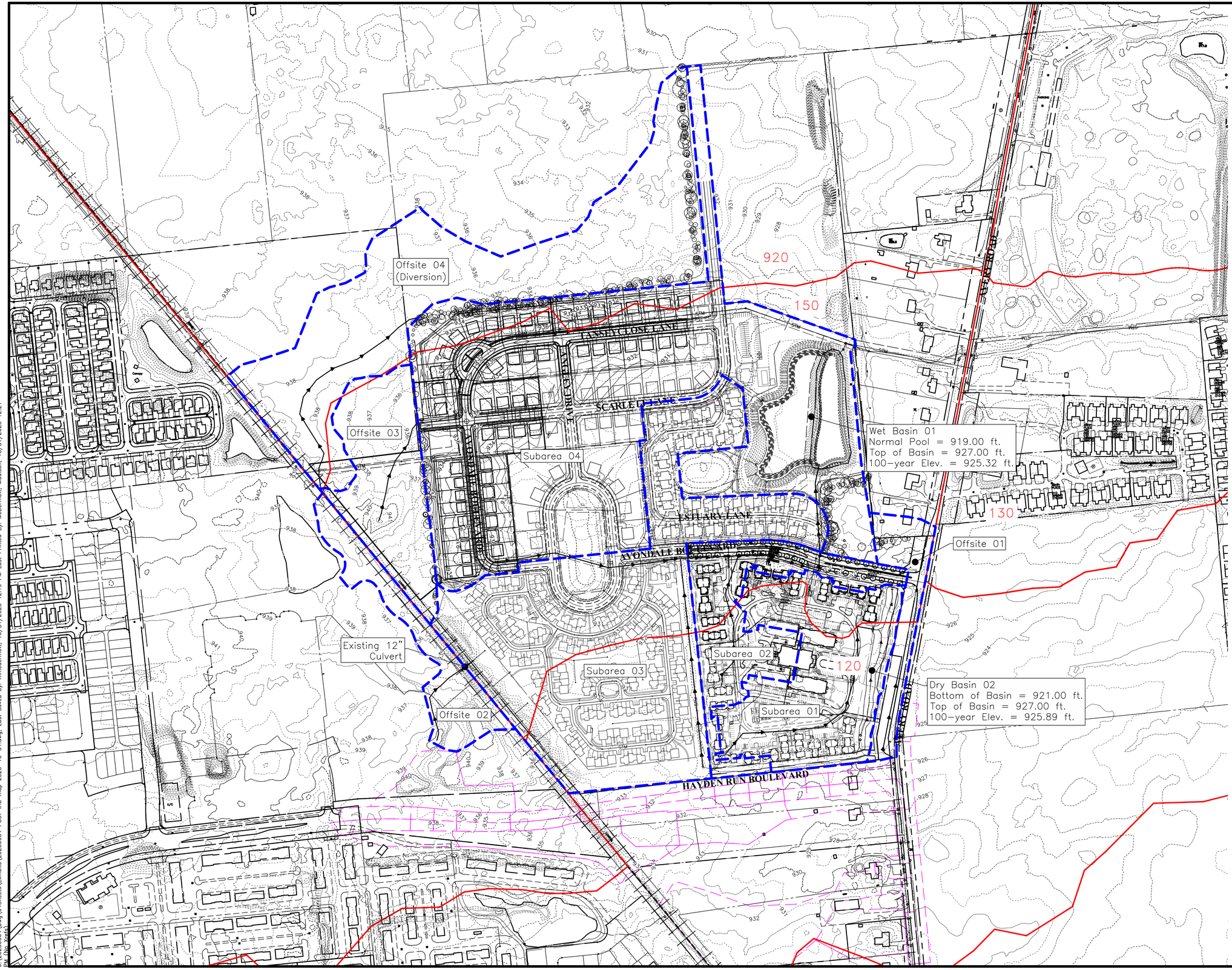
EMH&T
Evans, Mechwart, Hambleton & Tilton, Inc.
5500 New Albany Road, Columbus, OH 43054
Phone: 614.775.4500 Toll Free: 888.775.3648
emht.com

DATE
June 1, 2023

SCALE
1" = 200'

JOB NO.
2020-1174

SHEET
1/3



GRAPHIC SCALE
0 100 200 400
1 inch = 200 feet

LEGEND

- TRIBUTARY BOUNDARY
- HAYDEN RUN BOULEVARD TRIBUTARY BOUNDARY
- DUBLIN MASTER PLANNED WATERSHED BOUNDARY
- TIME OF CONCENTRATION PATH

PROPOSED CONDITIONS

SUBAREA 01
TRIBUTARY AREA = 10.93 AC.
RCN = 90
TC = 10.7 MIN.

SUBAREA 02
TRIBUTARY AREA = 7.33 AC.
RCN = 90
TC = 12.9 MIN.

SUBAREA 03
TRIBUTARY AREA = 28.44 AC.
RCN = 90
TC = 16.1 MIN.

SUBAREA 04
TRIBUTARY AREA = 43.31 AC.
RCN = 83
TC = 15.8 MIN.

OFFSITE 01
TRIBUTARY AREA = 3.11 AC.
RCN = 79
TC = 30.1 MIN.

OFFSITE 02
TRIBUTARY AREA = 4.24 AC.
RCN = 74
TC = 23.4 MIN.

OFFSITE 03
TRIBUTARY AREA = 7.20 AC.
RCN = 72
TC = 37.5 MIN.

OFFSITE 04 (DIVERSION)
TRIBUTARY AREA = 21.49 AC.
RCN = 71
TC = 62.4 MIN.

REVISIONS

MARK	DATE	DESCRIPTION

HOMEWOOD CORPORATION

CITY OF DUBLIN, FRANKLIN COUNTY, OHIO
STORMWATER MANAGEMENT PLAN
FOR
AVONDALE WOODS SECTIONS 2 & 3
POST-DEVELOPED TRIBUTARY MAP

EMHT
Evans, Mechwart, Hambleton & Tilton, Inc.
Engineers • Surveyors • Planners
5500 New Albany Road, Columbus, OH 43054
Phone: 614.775.4500 toll free: 888.775.3648
emht.com

DATE
October 31, 2023

SCALE
1" = 200'

JOB NO.
2023-0604

SHEET
2/3

J:\2020\1174\Dwg\04Sheets\Exhibits\Stormwater\2020-1174 Post Trib with Master Plan overlay.dwg, Last Saved By: manderson, 11/10/2022 2:22 PM Last Printed By: Anderson, Mariah, 11/10/2022 2:22 PM (No Xrefs)

REVISIONS

MARK	DATE	DESCRIPTION

HOMEWOOD CORPORATION

CITY OF DUBLIN, FRANKLIN COUNTY, OHIO
STORMWATER MANAGEMENT PLAN
FOR

AVONDALE WOODS SECTIONS 2 & 3
POST-DEVELOPED TRIBUTARY MAP WITH MASTER PLAN WATERSHED OVERLAY

EMH&T
Evans, Mechwart, Hambleton & Tilton, Inc.
Engineers • Surveyors • Planners • Scientists
5500 New Albany Road, Columbus, OH 43054
Phone: 614.775.4500 Toll free: 888.775.3648
emht.com

DATE
November 10, 2022

SCALE
1" = 200'

JOB NO.
2020-1174

SHEET
3/3

- **Outlet "K"**: On Clagg Tract, at railroad, approx. 2500' northwest of Avery Road crossing.

The natural drainage area to this outlet consists of 3.93 acres on the Rings Family Farm parcel, 0.21 acre on the Lifestyles parcel, and 6.40 acres on the Clagg Tract, all in the City of Columbus. Drainage from this area ultimately discharges into Hayden Run, just west of I-270. Under post-development conditions, it is assumed that all of the runoff associated with drainage areas to Outlet "K" will be captured and diverted to detention facilities on those above-mentioned sites. (In the case of the Clagg parcel, the post-development runoff is assumed to be diverted to a different outlet on the same project site). Since all drainage area associated with Outlet "K" is diverted, there is no allowable discharge associated with this area. See post-development Outlets "F", "I" and "L" for a description of the diverted areas.

- **Outlet "L"**: On Rings Family Farm, at railroad, approximately 3400' northwest of Avery Road crossing.

The natural drainage to this outlet consists of 74.75 acres on the Rings Family Farm (Columbus), 33.51 acres on Pembrooke Crossing (Columbus), 43.91 acres on the Miller Tract (Dublin), and 28.55 acres from parcels of individual land owners north of the Miller Tract (Dublin). Drainage from this area ultimately discharges to an existing 60-inch storm sewer line adjacent to The Vinings, a residential development east of Avery Road, and then into Hayden Run, just west of I-270. It is proposed to extend this 60-inch storm sewer line westward to the development area on the west side of the railroad, to provide an improved outlet for the area. For the post-development condition, it is anticipated that each of the above-mentioned project tracts will provide their own detention facilities. (See Outlet "R" for information pertinent to Pembrooke Crossing; Outlet "S" for information pertinent to the Miller Tract, and Outlet "T" for information pertinent to the parcels north of the Miller Tract). It is not known at this point whether the detention facilities for Outlets "L", "R", "S", and "T" will be connected in series, but their discharges will certainly be combined before passing under the railroad. Allowable discharges for these outlets are based on a combination of community requirements and storm sewer design parameters for the proposed sewer line extension. See the report text for a detailed accounting of allowable discharges for these outlets.

For calculation of the detention storage volume requirement on the Rings Family Farm parcel itself, the post-development drainage area is expected to lose approximately 4.03 acres to Outlet "C", and 11.90 acres to Outlet "D" of the previously mentioned 74.75 acres that is naturally tributary to Outlet "L". However, it will gain approximately 4.86 acres of site area that is naturally tributary to Outlet "W", and 3.93 acres that is naturally tributary to Outlet "K".

Post-development parameters at Outlet "L" for Rings Family Farm parcel:
Drainage area for post-development condition = 74.75 – 4.03 – 11.90 + 4.86 + 3.93 = 67.61 ac. = 0.1056 sq. mi.
Curve number for post-development condition: From previous calculation for Outlets C, D, and E, assume CN = 88.
Time of Concentration: Assume 10 minutes to first storm sewer inlet, plus travel time in approximately 2400 feet of storm sewer at an average velocity of 3 ft/sec.
Travel time in sewer = 2400 / 3 = 800 sec. = 0.22 hr.
Total Tc = 0.17 + 0.22 = 0.39 hr.

Allowable release rate: 44.0 cfs for 100-year storm.

- **Outlet "M"**: On Homewood Tract, at Avery Road, approx. 3500' north of Hayden Run Road..

The natural drainage area to this outlet consists of 23.20 acres on the Homewood parcel, and an unspecified amount of drainage area to the south of the Homewood parcel. The overall watershed also includes natural tributary area associated with Outlet "K". Drainage from this area ultimately discharges into Hayden Run, just west of I-270. Under post-development conditions, the 23.20 acres on the Homewood parcel will be diverted to Outlet "N". Since all drainage area associated with Outlet "M" is diverted, there is no allowable discharge associated with this area. See post-development Outlet "N" for a description of the diverted area.

- **Outlet "N"**: On Homewood/Patch Tract, at eastern property line near Avery Road.

The natural drainage to this outlet consists of 71.14 acres from the Homewood Tract (Dublin), and 3.10 acres from the Patch Tract (Columbus) on the eastern side of the railroad. In addition, this outlet contains flow associated with drainage area from Outlet "L" on the western side of the railroad. Drainage from this area ultimately discharges to an existing 60-inch storm sewer line adjacent to The Vinings, a residential development east of Avery Road, and then into Hayden Run, just west of I-270. It is proposed to extend this 60-inch storm sewer line westward to the development area on the west side of the railroad, to provide an improved outlet for the area. For the post-development condition, the drainage area to Outlet "N" will include the afore-mentioned 71.14 and 3.10 acres, plus the following onsite areas that are naturally tributary to other outlet points, as follows: 23.20 acres naturally tributary to Outlet "M"; 37.19 acres naturally tributary to Outlet "O"; 10.85 acres naturally tributary to Outlet "P", and 13.68 acres naturally tributary to Outlet "Q". Allowable discharges for this outlet are based on a combination of community requirements and storm sewer design parameters for the proposed sewer line extension. See the report text for a detailed accounting of allowable discharges for this outlet.

Post-development parameters at Outlet "N" for Homewood/Patch parcel:
Drainage area for post-development condition = 71.14 + 3.10 + 23.20 + 37.19 + 10.85 + 13.68 = 159.16 ac. = 0.2487 sq. mi.
Curve number for post-development condition: It is assumed that this area will develop as mainly single-family residential. Assume CN = 81.
Time of Concentration: Assume 10 minutes to first storm sewer inlet, plus travel time in approximately 3500 feet of storm sewer at an average velocity of 3 ft/sec.
Travel time in sewer = 3500 / 3 = 1167 sec. = 0.28 hr.
Total Tc = 0.17 + 0.32 = 0.49 hr.

Allowable release rate: 7.4 cfs for critical storm; 37.1 cfs for 100-year storm.

RINGS ROAD
FERRELL
GRIFFIN
FISHER
AGNEW
Dublin
MILLER TRACT (54s)
PATCH (60s)
PEMBROOKE CROSSING (61s)
HOMEWOOD (79s)
EXISTING 60" STORM
CSX R/R
CULVERT
RINGS FAMILY FARM (60s)
LIFESTYLES (60s)
CLAGG TRACT (60s)
AVERY ROAD
COSGRAY ROAD
HAYDEN RUN ROAD
KIPPERT ROAD
HAYDEN RUN
FAUST COUNTY DITCH
BENTLEY
DRIESWARD
A
B
C
D
E
F
G
G1
G2
H
I
J
K
L
M
N
O
P
Q
R
S
T
U
V
W

CRAMER CREEK WATERSHED PER CITY OF DUBLIN STORMWATER MASTER PLAN

HIRTH/WOOLPERT WATERSHED PER CITY OF DUBLIN STORMWATER MASTER PLAN

BROWN/HORCH WATERSHED PER CITY OF DUBLIN STORMWATER MASTER PLAN

TRIBUTARY AREA FOR 60" STORM SEWER INSTALLED WITH "THE VININGS"

DRAINAGE STUDY
EXISTING CONDITIONS
AVERY/HAYDEN RUN/COSGRAY ROAD VICINITY

SCALE: 1" = 300' AUGUST, 2003

EVANS, MECHWART, HAMBLETON & TILTON, INC.
CONSULTING ENGINEERS & SURVEYORS

1/1

EXHIBIT 1

\\CMDATA1\ROMER\PROJECT\HAYDEN RUN AREA\EX-DRAIN-STUDY.DWG - 1 XREFS: 20477XBS - PLOTTED BY BWRGIN - September 09, 2003 - 11:23 AM

- (A) 0.42 AC.
- (B) 0.32 AC.
- (C) 0.25 AC.
- (D) 0.12 AC.
- (E) 0.12 AC.
- (F) 0.12 AC.
- (G) 0.12 AC.
- (H) 0.17 AC.
- (I) 0.11 AC.
- (J) 0.17 AC.
- (K) 0.20 AC.
- (L) 0.30 AC.
- (M) 0.27 AC.
- (N) 0.26 AC.
- (O) 0.29 AC.
- (P) 0.22 AC.
- (Q) 0.24 AC.
- (R) 0.11 AC.
- (S) 0.12 AC.
- (T) 0.37 AC.
- (U) 0.39 AC.
- (V) 0.12 AC.
- (W) 0.12 AC.
- (X) 0.12 AC.
- (Y) 0.10 AC.

PROPOSED RETENTION POND ±1.4 AC.

HAYDEN RUN BOULEVARD, PART 2

CSX RAILROAD

2.36 AC. 2.20 AC. 0.26 AC. 0.89 AC. 0.31 AC. 0.33 AC. 0.65 AC. 0.22 AC. 0.79 AC. 1.60 AC. 0.82 AC. 2.54 AC. 0.44 AC. 0.22 AC. 6.58 AC. 0.20 AC. 0.16 AC. 0.37 AC. 5.44 AC. 0.53 AC. 1.59 AC. 0.24 AC.

u/c

REVISIONS		
MARK	DATE	DESCRIPTION

EMHT
Evans, Mechwart, Hambleton & Tilton, Inc.
Engineers • Surveyors • Planners • Scientists
5500 New Albany Road, Columbus, OH 43054
Phone: 614.775.4500 Fax: 614.775.4800
M C M X X V I

HAYDEN RUN BOULEVARD PART 2

CITY OF COLUMBUS, OHIO
DEPARTMENT OF PUBLIC SERVICE
DIVISION OF DESIGN AND CONSTRUCTION
PLAN FOR IMPROVEMENT OF
HAYDEN RUN BOULEVARD & AVERY ROAD
PROPOSED TRIBUTARY MAP

DATE	JOB NO.
FEB. 2014	2012-1129
SCALE	SHEET
1"=100'	1/1

J:\2012\2012129\Dwg\04Sheets\Exhibits\2013-06-28 Storm Tributary Maps - Hayden Run 2-Awg.dwg Last Saved By: mschaer, 2/11/2014 10:44 AM Last Printed By: Schaer, Matthew, 2/11/2014 10:47 AM
17 Xrefs: 2012129-CS-REFR-E, 20121129-CS-REFR-F_AVERY, 20121129-GP-REFR-N, 78357500 78357475, 78107500, 78107525, 78357525, 20121129-CU-REFR-Ext-N, 80107675, 80107700