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Job number: 2016-0707
2016-0706

Preliminary Stormwater Management Plan

Grove City Surgical Hospital Stringtown Road

City of Grove City, Ohio

August 2016

Engineers | Surveyors | Planners | Scientists

EMH&T
A legacy of experience. A reputation for excellence.

Project Summary:

Project Name:	Grove City Surgical Hospital Stringtown Road
Location:	City of Grove City, Ohio
Type:	Preliminary Stormwater Management Plan
Reviewing Agency:	City of Grove City, Ohio EPA

Hydrologic Summary:

Rainfall Data: Grove City – NOAA Atlas 14, Sullivant Ave. Station 33-1781, 12-hour rainfall depths

1-yr	1.88”
1-yr critical	2.20”
2-yr	2.25”
5-yr	2.79”
10-yr	3.24”
25-yr	3.88”
50-yr	4.42”
100-yr	5.00”

Rainfall Distribution:	Bulletin 71, 2nd Quartile, 0-10 sq. mile, 50% curve, 12-hr duration
Detention Policy:	City of Grove City
Water Quality:	City of Grove City, Ohio EPA
Hydrology Modeling Program:	HydroCAD 10.00

Design Summary:

Detention:	Wet Basin
Water Quality:	Wet Basin
Receiving Water Body:	Unnamed Tributary of the Scioto River

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1.0 INTRODUCTION

The following report provides a preliminary analysis and design of the Stormwater Management Plan for Grove City Surgical Hospital Stringtown Road in the City of Grove City, Ohio. The proposed site is located south of Stringtown Road between Buckeye Parkway and Jackson Pike. The proposed project area involves the development of open space into a proposed hospital building and it respective parking, drives and sidewalks. The Stormwater Management Plan was prepared in accordance with the requirements of both the City of Grove City and the Ohio EPA.

The runoff from this site will be routed through a proposed wet basin for quantity and quality control before discharging into an unnamed tributary if the Scioto River that runs adjacently south of the site.

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 discharge amounts were calculated using the NRCS TR-55 method. This analysis reflects the Bulletin 71, 2nd Quartile, 0-10 sq. mile, 50% curve, 12-hour storm duration. Rainfall depths were obtained from NOAA Atlas 14, Sullivant Avenue Station 33-1781, 12-hour rainfall depths. The hydrologic analysis is consistent with the rainfall data and distribution specified in the draft Grove City Stormwater Design Manual. The peak flow rates were computed using the HydroCAD 10.0 Computer Program.

3.0 EXISTING CONDITION ANALYSIS

Existing 01, as seen on Exhibit 1 in Appendix D, consists of 9.30 acres of tributary area consisting of open space in Type "C" soils (Crosby Silt Loam, Celina Silt Loam, Miamian Silty Clay Loam) which corresponds to a Runoff Curve Number of 74. The time of concentration for Existing 01 is 24.5 minutes and calculations can be found in HydroCAD output in Appendix C.

Offsite 01 corresponds to 2.08 acres of open space offsite area on the west boundary of the site that is naturally tributary to the proposed development. The existing subarea characteristics are summarized in Table 1. The existing peak flow rates can be found in Table 2. The 1-year existing runoff volume (1-year, 24-hour storm event, 2.20-inch rainfall depth) for Existing 01 is 0.347 ac-ft.

Table 1
Existing Subarea Characteristics

Subarea Identifier	Tributary Area (acres)	Land Usage	% Impervious	Composite Runoff Curve Number	Time of Concentration (minutes)
Existing 01	9.30	Open Space	0%	74	24.5
Offsite 01	2.08	Open Space	0%	74	10.0

Table 2
Existing Peak Flow Rates

Storm Event (year)	Existing 01 Peak Flow Rates (cfs)	Offsite 01 Peak Flow Rates (cfs)
1	0.61	0.14
2	1.02	0.23
5	1.71	0.39
10	2.36	0.54
25	3.36	0.76
50	4.25	0.97
100	5.25	1.19

4.0 POST-DEVELOPED CONDITION ANALYSIS

The post-developed condition, also shown on Exhibit 2 in Appendix D, consists of three subareas: Subarea 01, Offsite 01 and Offsite 2. Subarea 01 consists of 15.96 acres of tributary area to the proposed wet basin and corresponds to the proposed hospital building and its respective impervious area and portions of open space in Type "C" soils. The time of concentration for Subarea 01 is conservatively assumed to be 5 minutes. Offsite 01 (2.08 acres) corresponds to undeveloped land that is naturally tributary to Subarea 01 and therefore the proposed wet basin. The Offsite 01 tributary area will be passed through at a pre-developed rate through the proposed wet basin and therefore will be taken into account in the allowable and proposed release rates calculation.

Offsite 02 corresponds to 0.70 acres which correspond to a portion of the eastbound lane on Stringtown Road and its adjacent open space in the south side of the road. In the proposed condition, Offsite 02 will be tributary to Subarea 01. The Offsite 02 tributary area will be added to the critical storm calculation for the proposed condition given it was not previously tributary to the proposed outfall. Offsite 02 is not counted towards the allowable release rates calculation. Post-developed subarea characteristics area summarized in Table 3. The post-developed subareas were divided into impervious/pervious cover and were modeled that way as is required by section 3.2 of the Grove City drainage manual for directly connected impervious area.

Table 3
Post-developed Subarea Characteristics

Subarea Identifier	Tributary Area (acres)	Land Usage	% Impervious	Runoff Curve Number	Time of Concentration (minutes)
Subarea 01 Impervious	7.77	Hospital Building, Impervious cover	100%	98	5.0
Subarea 01 Pervious	8.19	Open Space	0%	74	5.0
Offsite 01	2.08	Open Space	0%	74	10.0
Offsite 02 Impervious	0.47	Roadway	100%	98	5.0
Offsite 02 Pervious	0.23	Open Space	0%	74	5.0
Total	**18.74**	**-**	**44%**	**-**	**-**

The total 1-year runoff volume for the post-developed condition (for Subarea 01 and Offsite 02) increases to 1.668 acre-feet, an increase of 380.7% from the existing condition, and results in a 50-year critical storm event. Critical storm calculations reference the runoff volume from the 1-year, 24-hour event.

% Increase = [(1.668 – 0.347)/0.347] x 100 = 380.7%
50-Year Critical Storm

The critical storm analysis is based on the City of Grove City Stormwater Design Manual detention requirements, which state that all storms up to and including the critical storm must be detained to the existing condition 1-year peak flow rate. A rainfall of 2.20" is used for critical storm calculations. All storms greater than the critical storm event will be required to be detained down to the existing peak flow rates for each respective storm event. The allowable and proposed release rates are summarized in Table 4. Table 5 shows the performance summary of Wet Basin 01.

Table 4
Allowable and Proposed Release Rates

Storm Event (year)	Existing 01 Peak Flow Rates (cfs)	Allowable Release Rates **[1]** (cfs)	Offsite 01 Peak Flow Rates **[2]** (cfs)	Total Allowable Release Rates **[1]+[2]** (cfs)	Proposed Release Rates* (cfs)
1	0.61	0.61	0.14	0.75	0.68
2	1.02	0.61	0.23	0.84	0.79
5	1.71	0.61	0.39	1.00	0.95
10	2.36	0.61	0.54	1.15	1.07
25	3.36	0.61	0.76	1.37	1.22
50	4.25	0.61	0.97	1.58	1.33
100	5.25	5.25	1.19	6.44	3.58

*Release Rates from Wet Basin 01

Table 5
Wet Basin 01 Detention Performance Summary

Storm Event (year)	Peak Inflow Rates* (cfs)	Wet Basin 01 01 Proposed Release Rates (cfs)	Wet Basin 01 Maximum W.S.E., T.o.B.=734.25 (feet)	Storage Volume Utilized (acre-feet)
1	3.47	0.68	731.20	1.000
2	4.55	0.79	731.50	1.327
5	6.22	0.95	731.97	1.855
10	7.69	1.07	732.38	2.335
25	9.87	1.22	732.99	3.059
50	11.79	1.33	733.50	3.701
100	13.90	3.58	733.72	3.987

*From Subarea 01, Offsite 01 and Offsite 02

Wet Basin 01 Storage Volume Utilized: 3.987 ac-ft (100-year storm event)
Wet Basin 01 Storage Volume Provided: 4.675 ac-ft (Top of Storage = 734.25 feet)

5.0 OUTLET DESIGN

The proposed outlet structure for Wet Basin 01 is described below. Releases to the existing stream that runs west to east, located south and adjacent to the project area.

Proposed Outlet Structure - Wet Basin 01

Normal Pool – 730.25 feet
Top of Bank – 734.25 feet
100-year elevation – 733.72 feet

- 1st stage outlet – (2) 3 ¾-inch orifices cut into submerged riser pipe, invert at 730.25 feet
- 2nd stage outlet – Neenah R-4871 grate, top of casting at 733.55 feet
- Emergency spillway – 20-ft earthen weir, crest elevation at 733.75 feet

6.0 POST-CONSTRCUTION WATER QUALITY

The Ohio EPA requires that the water quality volume for wet basins be detained for a period of 24 hours while releasing less than half of that volume in the first 8 hours. Water Quality Calculations and drawdown graph are included in Appendix B of this report and summarized in Table 6 below.

Table 6
Water Quality Calculations

Basin	Tributary Area (acres)	Water Quality Volume* (ac-ft)	Water Quality Elevation (feet)	Drawdown Orifice Size (inches)
01	18.74	0.266	730.51	(2) 3-3/4'

*75% of WQv for Wet basins

7.0 SEDIMENTATION

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 basins 01 will be utilized as sediment basin during construction for this project. The required 48 hour drawdown for sediment basins will be provided by skimmer attached to the permanent outlet structure at normal pool. Sedimentation calculations are provided in Appendix B of this report.

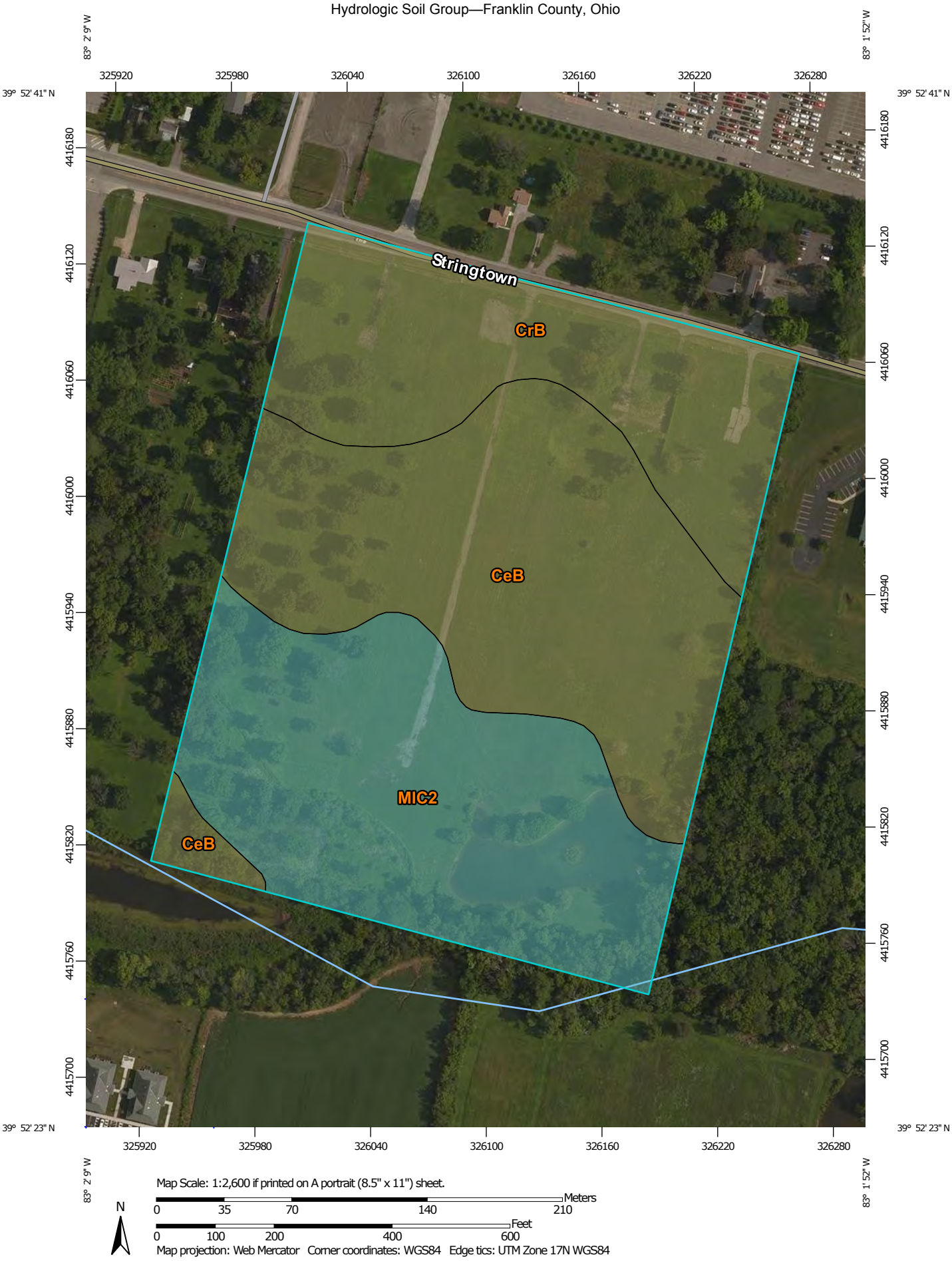
Table 7
Sedimentation Calculations

Basin	Tributary Area (acres)	Disturbed Area (acres)	Required Dewatering Volume (ac-ft)	Dewatering Elevation (feet)	Required Sediment Storage Volume (ac-ft)	Provided Sediment Storage Volume (ac-ft)	Skimmer Size (inches)
01	18.74	15.96	0.778	731.00	0.370	5.663	4

8.0 CONCLUSION

The proposed preliminary stormwater management plan for Grove City Surgical Hospital Stringtown Road meets all requirements for detention and water quality as set forth by the City of Grove City and the Ohio EPA.

Hydrologic Soil Group—Franklin County, Ohio



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: http://websoilsurvey.nrcs.usda.gov
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 13, Sep 26, 2015

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

Hydrologic Soil Group— Summary by Map Unit — Franklin County, Ohio (OH049)				
Map unit symbol	**Map unit name**	**Rating**	**Acres in AOI**	**Percent of AOI**
CeB	Celina silt loam, 2 to 6 percent slopes	C/D	8.8	39.3%
CrB	Crosby silt loam, Southern Ohio Till Plain, 2 to 6 percent slopes	C/D	5.6	25.0%
MIC2	Miamian silty clay loam, 6 to 12 percent slopes, eroded	C	8.0	35.7%
Totals for Area of Interest			**22.3**	**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 A:

Storm Sewer Calculations

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Engineers, Surveyors, Planners, Scientists

STORM SEWER COMPUTATION SHEET

SHT 10

Project: **OhioHealth - Grove City Surgical Hospital**
Job No.: **2016-0707**
Intensity Reference: Columbus

Date: 8/31/16
By: KSM
Checked:

Revised:
Revised:

2 Yr Design Storm n= **0.012**

Struc.	Struc. Index	Sta.	Drainage Area Trib	Drainage Area Cumul.	Drainage Area C	Drainage Area Cumul CA	Time Delta t Min.	Time Sum t Min.	Intensity in/hr	Des Q CFS	Length ft.	Dia. In	Slope%	Vel	Cap. Flowing Full	Status	In	Out	TC	Remarks	5 YEAR HYDRAULIC GRADE LINE: 5 Yr Rainfall Intensity	Discharge Q	Slope %	Minor Losses	5 Yr HGL w/o minor losses
EP		3+43.16	6.61	6.61	0.80		14.97	14.97	3.22	17.00							730.30		738.67						
			0.00		0.80	5.29					216.50	36	0.10%	3.2	22.9	OK				5.04 ft. cover	3.92	20.73	0.0819	-	732.70
																				8.37 ft. depth					ok
41		1+26.66	0.18	6.79	0.80		1.11	16.08	3.09	16.81							728.38	730.08	737.65	1.70 DROP					
			0.00		0.80	5.43					126.66	36	0.10%	3.2	22.9	OK				4.24 ft. cover	3.78	20.52	0.0802	-	730.78
																				9.27 ft. depth					ok
EW4		0+00.00	0.00	6.79	0.80		0.65	16.73	3.03	16.45							728.25	728.25	728.25	0.10 DROP					
			0.00		0.80	5.43					0.01	36	0.10%	3.2	22.9	OK				-3.33 ft. cover					
																				0.00 ft. depth					

EMH&T
Engineers, Surveyors, Planners, Scientists

STORM SEWER COMPUTATION SHEET

SHT 1

Project: OhioHealth - Grove City Surgical Hospital
Job No.: 2016-0707
Intensity Reference: Columbus

Date: 8/31/16
By: KSM
Checked:

Revised:
Revised:

2 Yr Design Storm n= 0.012

Struc.	Struc. Index	Sta.	Drainage Area Trib	Drainage Area Cumul.	Drainage Area C	Drainage Area Cumul CA	Time Delta t Min.	Time Sum t Min.	Intensity in/hr	Des Q CFS	Length ft.	Dia. In	Slope%	Vel	Cap. Flowing Full	Status	In	Out	TC	Remarks	5 YEAR HYDRAULIC GRADE LINE: 5 Yr Rainfall Intensity	Discharge Q	Slope %	Minor Losses	5 Yr HGL w/o minor losses
14		9+69.94	0.21	0.91	0.80		10.00	10.00	3.91	2.84							735.03		738.95						
			0.70		0.80	0.73					68.00	15	0.32%	3.2	4.0	OK				2.48 ft. cover	4.74	3.45	0.2423	-	#DIV/0!
																				3.92 ft. depth					#DIV/0!
13		9+01.94	0.36	1.27	0.80		0.35	10.35	3.85	3.91							734.71	734.81	738.85	0.10 DROP					
			0.00		0.80	1.02					55.00	15	0.32%	3.2	4.0	OK				2.60 ft. cover	4.67	4.75	0.4579	-	#DIV/0!
																				4.14 ft. depth					#DIV/0!
12		8+46.94	0.18	1.45	0.80		0.28	10.63	3.80	4.41							734.43	734.53	739.05	0.10 DROP					
			0.00		0.80	1.16					23.00	18	0.25%	3.2	5.7	OK				2.91 ft. cover	4.62	5.36	0.2204	-	#DIV/0!
																				4.62 ft. depth					#DIV/0!
11		8+23.94	0.00	1.45	0.80		0.12	10.75	3.78	4.39							734.27	734.37	739.05	0.10 DROP					
			0.00		0.80	1.16					64.00	18	0.25%	3.2	5.7	OK				2.97 ft. cover	4.59	5.33	0.2182	-	#DIV/0!
																				4.78 ft. depth					#DIV/0!
10		7+59.94	0.43	2.75	0.80		0.33	11.08	3.73	8.21							734.01	734.11	738.80	0.10 DROP					
			0.87		0.80	2.20					103.00	24	0.17%	3.2	10.1	OK				2.54 ft. cover	4.53	9.97	0.1646	-	#DIV/0!
																				4.79 ft. depth					#DIV/0!
9		6+56.94	0.41	3.16	0.80		0.53	11.62	3.65	9.23							733.73	733.83	738.80	0.10 DROP					
			0.00		0.80	2.53					99.00	24	0.17%	3.2	10.1	OK				2.72 ft. cover	4.44	11.21	0.2082	-	#DIV/0!
																				5.07 ft. depth					#DIV/0!
8		5+57.94	0.32	3.48	0.80		0.51	12.13	3.58	9.95							733.46	733.56	738.80	0.10 DROP					
			0.00		0.80	2.78					68.50	24	0.17%	3.2	10.1	OK				2.99 ft. cover	4.35	12.10	0.2425	-	#DIV/0!
																				5.34 ft. depth					#DIV/0!
7		4+89.44	0.34	4.50	0.80		0.35	12.48	3.53	12.69							733.24	733.34	738.75	0.10 DROP					
			0.68		0.80	3.60					90.00	30	0.13%	3.3	16.1	OK				2.72 ft. cover	4.29	15.44	0.1200	-	#DIV/0!
																				5.51 ft. depth					#DIV/0!
6		3+99.44	0.26	4.76	0.80		0.46	12.94	3.46	13.19							733.02	733.12	738.70	0.10 DROP					
			0.00		0.80	3.81					62.00	30	0.13%	3.3	16.1	OK				2.79 ft. cover	4.21	16.05	0.1297	-	#DIV/0!
																				5.68 ft. depth					#DIV/0!
5		3+37.44	0.09	4.99	0.80		0.32	13.25	3.42	13.66							732.84	732.94	738.60	0.10 DROP					
			0.14		0.80	3.99					87.00	30	0.13%	3.3	16.1	OK				2.87 ft. cover	4.17	16.63	0.1393	-	#DIV/0!
																				5.76 ft. depth					#DIV/0!
4		2+50.44	0.16	5.15	0.80		0.44	13.70	3.37	13.87							732.63	732.73	738.30	0.10 DROP					
			0.00		0.80	4.12					72.00	30	0.13%	3.3	16.1	OK				2.78 ft. cover	4.10	16.88	0.1436	-	#DIV/0!
																				5.67 ft. depth					#DIV/0!
3		1+78.44	0.34	5.49	0.80		0.37	14.06	3.32	14.59							732.44	732.54	738.30	0.10 DROP					
			0.00		0.80	4.39					81.00	30	0.13%	3.3	16.1	OK				2.97 ft. cover	4.04	17.76	0.1590	-	#DIV/0!
																				5.86 ft. depth					#DIV/0!
2		0+97.44	0.31	5.80	0.80		0.41	14.48	3.27	15.18							732.23	732.33	738.30	0.10 DROP					
			0.00		0.80	4.64					77.44	30	0.13%	3.3	16.1	OK				3.18 ft. cover	3.99	18.50	0.1724	-	#DIV/0!
																				6.07 ft. depth					#DIV/0!
1		0+20.00	0.18	6.61	0.80		0.39	14.87	3.23	17.06							732.03	732.13	738.25	0.10 DROP					
			0.63		0.80	5.29					20.00	30	0.15%	3.5	17.3	OK				3.33 ft. cover	3.93	20.80	0.2179	-	#DIV/0!
																				6.22 ft. depth					#DIV/0!
EW1		0+00.00	0.00	6.61	0.80		0.09	14.97	3.22	17.00								732.00	738.67	0.10 DROP					
			0.00		0.80	5.29														3.88 ft. cover	3.92	20.73	#DIV/0!	-	#DIV/0!
																				738.67 ft. depth					#DIV/0!

EMH&T
Engineers, Surveyors, Planners, Scientists

STORM SEWER COMPUTATION SHEET

SHT 2

Project: **OhioHealth - Grove City Surgical Hospital**
Job No.: **2016-0707**
Intensity Reference: Columbus

Date: 8/31/16
By: KSM
Checked:

Revised:
Revised:

2 Yr Design Storm n= **0.012**

Struc.	Struc. Index	Sta.	Drainage Area Trib	Drainage Area Cumul.	Drainage Area C	Drainage Area Cumul CA	Time Delta t Min.	Time Sum t Min.	Intensity in/hr	Des Q CFS	Length ft.	Dia. In	Slope%	Vel	Cap. Flowing Full	Status	In	Out	TC	Remarks	5 YEAR HYDRAULIC GRADE LINE: 5 Yr Rainfall Intensity	Discharge Q	Slope %	Minor Losses	5 Yr HGL w/o minor losses
18		2+83.82	0.18	0.18	0.80		10.00	10.00	3.91	0.56							735.63		739.20						
			0.00		0.80	0.14					60.00	12	0.40%	3.1	2.4	OK				2.40 ft. cover	4.74	0.68	0.0312	-	#VALUE!
																				3.57 ft. depth					#VALUE!
17		2+23.82	0.00	0.18	0.80		0.32	10.32	3.85	0.55							735.29	735.39	739.20	0.10 DROP					
			0.00		0.80	0.14					72.00	12	0.40%	3.1	2.4	OK				2.64 ft. cover	4.68	0.67	0.0303	-	#VALUE!
																				3.91 ft. depth					#VALUE!
16		1+51.82	0.20	0.38	0.80		0.39	10.71	3.79	1.15							734.90	735.00	739.20	0.10 DROP					
			0.00		0.80	0.30					62.50	12	0.40%	3.1	2.4	OK				3.03 ft. cover	4.60	1.40	0.1308	-	#VALUE!
																				4.30 ft. depth					#VALUE!
15		0+89.32	0.49	0.87	0.80		0.33	11.04	3.74	2.60							734.40	734.65	739.30	0.25 DROP					
			0.00		0.80	0.70					89.32	15	0.32%	3.2	4.0	OK				3.46 ft. cover	4.54	3.16	0.2028	-	#VALUE!
																				4.90 ft. depth					#VALUE!
10		0+00.00	0.00	0.87	0.80		0.46	11.50	3.67	2.55							734.01	734.11	738.80	0.10 DROP					
			0.00		0.80	0.70														3.25 ft. cover	4.46	3.10	#DIV/0!	-	#VALUE!
																				4.79 ft. depth					#VALUE!

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Engineers, Surveyors, Planners, Scientists

STORM SEWER COMPUTATION SHEET

SHT 3

Project: **OhioHealth - Grove City Surgical Hospital**
Job No.: **2016-0707**
Intensity Reference: Columbus

Date: 8/31/16
By: KSM
Checked:

Revised:
Revised:

2 Yr Design Storm n= **0.012**

Struc.	Struc. Index	Sta.	Drainage Area Trib	Drainage Area Cumul.	Drainage Area C	Drainage Area Cumul CA	Time Delta t Min.	Time Sum t Min.	Intensity in/hr	Des Q CFS	Length ft.	Dia. In	Slope%	Vel	Cap. Flowing Full	Status	In	Out	TC	Remarks	5 YEAR HYDRAULIC GRADE LINE: 5 Yr Rainfall Intensity	Discharge Q	Slope %	Minor Losses	5 Yr HGL w/o minor losses
21		2+02.51	0.35	0.35	0.80		10.00	10.00	3.91	1.09							736.25		739.30						
			0.00		0.80	0.28					60.00	12	0.40%	3.1	2.4	OK				1.88 ft. cover	4.74	1.33	0.1178	-	#VALUE!
																				3.05 ft. depth					#VALUE!
20		1+42.51	0.21	0.56	0.80		0.32	10.32	3.85	1.73							735.91	736.01	739.20	0.10 DROP					
			0.00		0.80	0.45					67.39	12	0.40%	3.1	2.4	OK				2.02 ft. cover	4.68	2.10	0.2934	-	#VALUE!
																				3.29 ft. depth					#VALUE!
19		0+75.12	0.12	0.68	0.80		0.36	10.68	3.79	2.06							733.64	735.64	739.20	2.00 DROP					
			0.00		0.80	0.54					75.12	12	0.40%	3.1	2.4	OK				2.39 ft. cover	4.61	2.51	0.4196	-	#VALUE!
																				5.56 ft. depth					#VALUE!
7		0+00.00	0.00	0.68	0.80		0.40	11.08	3.73	2.03							733.24	733.34	738.75	0.10 DROP					
			0.00		0.80	0.54														4.24 ft. cover	4.53	2.47	#DIV/0!	-	#VALUE!
																				5.51 ft. depth					#VALUE!

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STORM SEWER COMPUTATION SHEET

SHT 4

Project: **OhioHealth - Grove City Surgical Hospital**
Job No.: **2016-0707**
Intensity Reference: Columbus

Date: 8/31/16
By: KSM
Checked:

Revised:
Revised:

2 Yr Design Storm n= **0.012**

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	5 YEAR HYDRAULIC GRADE LINE: 5 Yr Rainfall Intensity	Discharge Q	Slope %	Minor Losses	5 Yr HGL w/o minor losses
23		1+48.97	0.06	0.06	0.80		10.00	10.00	3.91	0.19							736.04		738.71						
			0.00		0.80	0.05					49.88	12	0.40%	3.1	2.4	OK				1.50 ft. cover	4.74	0.23	0.0035	-	#VALUE!
																				2.67 ft. depth					#VALUE!
22		0+99.09	0.08	0.14	0.80		0.27	10.27	3.86	0.43							733.34	735.84	738.70	2.50 DROP					
			0.00		0.80	0.11					99.09	12	0.40%	3.1	2.4	OK				1.69 ft. cover	4.69	0.53	0.0184	-	#VALUE!
																				5.36 ft. depth					#VALUE!
5		0+00.00	0.00	0.14	0.80		0.53	10.80	3.78	0.42							732.84	732.94	738.60	0.10 DROP					
			0.00		0.80	0.11														4.49 ft. cover	4.59	0.51	#DIV/0!	-	#VALUE!
																				5.76 ft. depth					#VALUE!

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STORM SEWER COMPUTATION SHEET

SHT 5

Project: **OhioHealth - Grove City Surgical Hospital**
Job No.: **2016-0707**
Intensity Reference: Columbus

Date: 8/31/16
By: KSM
Checked:

Revised:
Revised:

2 Yr Design Storm n= **0.012**

Struc.	Struc. Index	Sta.	Drainage Area Trib	Drainage Area Cumul.	Drainage Area C	Drainage Area Cumul CA	Time Delta t Min.	Time Sum t Min.	Intensity in/hr	Des Q CFS	Length ft.	Dia. In	Slope%	Vel	Cap. Flowing Full	Status	In	Out	TC	Remarks	5 YEAR HYDRAULIC GRADE LINE: 5 Yr Rainfall Intensity	Discharge Q	Slope %	Minor Losses	5 Yr HGL w/o minor losses
25		2+89.00	0.34	0.34	0.80		10.00	10.00	3.91	1.06							737.79		739.55						
			0.00		0.80	0.27					87.46	12	0.40%	3.1	2.4	OK				0.59 ft. cover	4.74	1.29	0.1112	-	#VALUE!
																				1.76 ft. depth					#VALUE!
24		2+01.54	0.29	0.63	0.80		0.47	10.47	3.83	1.93							732.94	737.44	739.45	4.50 DROP					
			0.00		0.80	0.50					201.54	12	0.40%	3.1	2.4	OK				0.84 ft. cover	4.65	2.34	0.3667	-	#VALUE!
																				6.51 ft. depth					#VALUE!
1		0+00.00	0.00	0.63	0.80		1.08	11.55	3.66	1.84							732.03	732.13	738.25	0.10 DROP					
			0.00		0.80	0.50														4.95 ft. cover	4.45	2.24	#DIV/0!	-	#VALUE!
																				6.22 ft. depth					#VALUE!

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STORM SEWER COMPUTATION SHEET

SHT 10

Project: **OhioHealth - Grove City Surgical Hospital**
Job No.: **2016-0707**
Intensity Reference: Columbus

Date: 8/31/16
By: KSM
Checked:

Revised:
Revised:

2 Yr Design Storm n= **0.012**

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	5 YEAR HYDRAULIC GRADE LINE: 5 Yr Rainfall Intensity	Discharge Q	Slope %	Minor Losses	5 Yr HGL w/o minor losses
EP		4+84.15	3.10	3.10	0.80		12.19	12.19	3.57	8.85							733.73		738.00						
			0.00		0.80	2.48					20.00	18	0.65%	5.2	9.2	OK				2.56 ft. cover	4.34	10.76	0.8885	-	735.54
																				4.27 ft. depth					ok
37		4+64.15	0.21	3.31	0.80		0.06	12.25	3.56	9.42							733.50	733.60	739.60	0.10 DROP					
			0.00		0.80	2.65					181.00	18	0.70%	5.4	9.5	OK				4.29 ft. cover	4.33	11.46	1.0079	-	735.36
																				6.10 ft. depth					ok
36		2+83.15	0.25	3.56	0.80		0.56	12.81	3.48	9.91							732.13	732.23	738.95	0.10 DROP					
			0.00		0.80	2.85					96.15	18	0.80%	5.8	10.2	OK				5.01 ft. cover	4.23	12.06	1.1172	-	733.53
																				6.82 ft. depth					ok
35		1+87.00	0.00	3.56	0.80		0.28	13.09	3.44	9.81							731.26	731.36	738.85	0.10 DROP					
			0.00		0.80	2.85					108.00	18	0.80%	5.8	10.2	OK				5.78 ft. cover	4.19	11.94	1.0943	-	732.46
																				7.59 ft. depth					ok
34		0+79.00	2.49	6.05	0.80		0.31	13.40	3.40	16.48							728.65	730.40	738.75	1.75 DROP					
			0.00		0.80	4.84					79.00	24	0.50%	5.5	17.4	OK				6.64 ft. cover	4.14	20.05	0.6659	-	730.25
																				10.10 ft. depth					ok
EW3		0+00.00	0.00	6.05	0.80		0.24	13.64	3.37	16.33							728.25	728.25	728.25	0.10 DROP					
			0.00		0.80	4.84					0.01	24	0.50%	5.5	17.4	OK				-2.25 ft. cover					
																				0.00 ft. depth					

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STORM SEWER COMPUTATION SHEET

SHT 6

Project: **OhioHealth - Grove City Surgical Hospital**
Job No.: **2016-0707**
Intensity Reference: Columbus

Date: 8/31/16
By: KSM
Checked:

Revised:
Revised:

2 Yr Design Storm n= **0.012**

Struc.	Struc. Index	Sta.	Drainage Area Trib	Drainage Area Cumul.	Drainage Area C	Drainage Area Cumul CA	Time Delta t Min.	Time Sum t Min.	Intensity in/hr	Des Q CFS	Length ft.	Dia. In	Slope%	Vel	Cap. Flowing Full	Status	In	Out	TC	Remarks	5 YEAR HYDRAULIC GRADE LINE: 5 Yr Rainfall Intensity	Discharge Q	Slope %	Minor Losses	5 Yr HGL w/o minor losses
30		4+17.87	0.27	0.27	0.80		10.00	10.00	3.91	0.84							735.44		739.45						
			0.00		0.80	0.22					75.00	12	0.40%	3.1	2.4	OK				2.84 ft. cover	4.74	1.02	0.0701	-	736.65
																				4.01 ft. depth					ok
29		3+42.87	0.29	0.74	0.80		0.40	10.40	3.84	2.27							735.04	735.14	739.45	0.10 DROP					
			0.18		0.80	0.59					85.50	12	0.40%	3.1	2.4	OK				3.14 ft. cover	4.66	2.76	0.5088	-	736.59
																				4.41 ft. depth					ok
28		2+57.37	0.40	1.22	0.80		0.46	10.86	3.77	3.68							734.60	734.70	739.45	0.10 DROP					
			0.08		0.80	0.98					92.44	15	0.32%	3.2	4.0	OK				3.41 ft. cover	4.57	4.46	0.4048	-	736.16
																				4.85 ft. depth					ok
27		1+64.93	0.11	1.81	0.80		0.48	11.33	3.69	5.35							734.20	734.30	739.35	0.10 DROP					
			0.48		0.80	1.45					112.24	18	0.25%	3.2	5.7	OK				3.44 ft. cover	4.49	6.50	0.3240	-	735.78
																				5.15 ft. depth					ok
26		0+52.69	0.74	3.10	0.80		0.58	11.91	3.61	8.94							733.82	733.92	739.35	0.10 DROP					
			0.55		0.80	2.48					52.69	24	0.17%	3.2	10.1	OK				3.28 ft. cover	4.38	10.87	0.1957	-	735.42
																				5.53 ft. depth					ok
EW2		0+00.00	0.00	3.10	0.80		0.27	12.19	3.57	8.85								733.73	738.00	0.10 DROP					
			0.00		0.80	2.48														2.02 ft. cover					
																				738.00 ft. depth					

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STORM SEWER COMPUTATION SHEET

SHT 7

Project: **OhioHealth - Grove City Surgical Hospital**
Job No.: **2016-0707**
Intensity Reference: Columbus

Date: 8/31/16
By: KSM
Checked:

Revised:
Revised:

2 Yr Design Storm n= **0.012**

Struc.	Struc. Index	Sta.	Drainage Area Trib	Drainage Area Cumul.	Drainage Area C	Drainage Area Cumul CA	Time Delta t Min.	Time Sum t Min.	Intensity in/hr	Des Q CFS	Length ft.	Dia. In	Slope%	Vel	Cap. Flowing Full	Status	In	Out	TC	Remarks	5 YEAR HYDRAULIC GRADE LINE: 5 Yr Rainfall Intensity	Discharge Q	Slope %	Minor Losses	5 Yr HGL w/o minor losses
31		0+44.42	0.18	0.18	0.80		10.00	10.00	3.91	0.56							735.32		740.44						
			0.00		0.80	0.14					44.42	12	0.40%	3.1	2.4	OK				3.95 ft. cover	4.74	0.68	0.0312	-	#VALUE!
																				5.12 ft. depth					#VALUE!
29		0+00.00	0.00	0.18	0.80		0.24	10.24	3.87	0.56							735.04	735.14	739.45	0.10 DROP					
			0.00		0.80	0.14														3.14 ft. cover	4.70	0.68	#DIV/0!	-	#VALUE!
																				4.41 ft. depth					#VALUE!

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STORM SEWER COMPUTATION SHEET

SHT 8

Project: **OhioHealth - Grove City Surgical Hospital**
Job No.: **2016-0707**
Intensity Reference: Columbus

Date: 8/31/16
By: KSM
Checked:

Revised:
Revised:

2 Yr Design Storm n= **0.012**

Struc.	Struc. Index	Sta.	Drainage Area Trib	Drainage Area Cumul.	Drainage Area C	Drainage Area Cumul CA	Time Delta t Min.	Time Sum t Min.	Intensity in/hr	Des Q CFS	Length ft.	Dia. In	Slope%	Vel	Cap. Flowing Full	Status	In	Out	TC	Remarks	5 YEAR HYDRAULIC GRADE LINE: 5 Yr Rainfall Intensity	Discharge Q	Slope %	Minor Losses	5 Yr HGL w/o minor losses
32		0+44.29	0.08	0.08	0.80		10.00	10.00	3.91	0.25							734.88		740.04						
			0.00		0.80	0.06					44.29	12	0.40%	3.1	2.4	OK				3.99 ft. cover	4.74	0.30	0.0062	-	#VALUE!
																				5.16 ft. depth					#VALUE!
28		0+00.00	0.00	0.08	0.80		0.24	10.24	3.87	0.25							734.60	734.70	739.45	0.10 DROP					
			0.00		0.80	0.06														3.58 ft. cover	4.70	0.30	#DIV/0!	-	#VALUE!
																				4.85 ft. depth					#VALUE!

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STORM SEWER COMPUTATION SHEET

SHT 9

Project: **OhioHealth - Grove City Surgical Hospital**
Job No.: **2016-0707**
Intensity Reference: Columbus

Date: 8/31/16
By: KSM
Checked:

Revised:
Revised:

2 Yr Design Storm n= **0.012**

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	5 YEAR HYDRAULIC GRADE LINE: 5 Yr Rainfall Intensity	Discharge Q	Slope %	Minor Losses	5 Yr HGL w/o minor losses
33		1+35.93	0.55	0.55	0.80		10.00	10.00	3.91	1.72							735.86		739.55						
			0.00		0.80	0.44					135.93	12	0.40%	3.1	2.4	OK				2.52 ft. cover	4.74	2.09	0.2910	-	#VALUE!
																				3.69 ft. depth					#VALUE!
26		0+00.00	0.00	0.55	0.80		0.73	10.73	3.79	1.67							733.82	735.32	739.35	1.50 DROP					
			0.00		0.80	0.44														2.86 ft. cover	4.60	2.02	#DIV/0!	-	#VALUE!
																				5.53 ft. depth					#VALUE!

APPENDIX B:

Water Quality and Sedimentation Calculations

Water Quality Volume Calculation Spreadsheet

Project Name: Grove City Surgical Hospital

Wet Basin 01

Area =	18.74	acres
% imp =	0.44	
C =	0.30	
WQv =	0.354	ac-ft

Total WQv =	**0.354**	**ac-ft**
75% for Wet Basins =	**0.266**	**ac-ft**
WQv Elevation=	**730.51**	**feet**

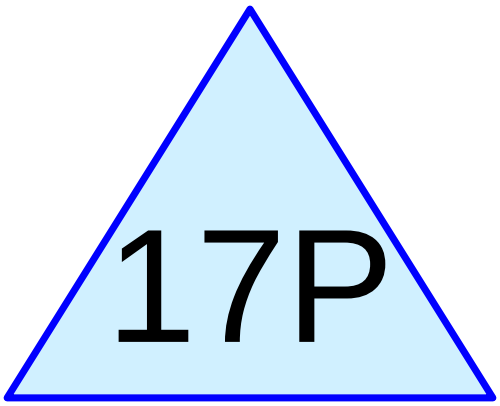
Water quality volume calculated using the Ohio EPA formula CPA/12

The "C" coefficient was calculated using the ASCE method

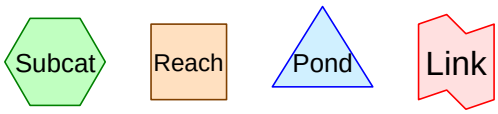
C= 0.858i^3 - 0.778i^2 + 0.774i + 0.04

Ohio EPA formula

WQv = CPA/12
A = area (acres)
P = 0.75"
C= 0.858i^3 - 0.778i^2 + 0.774i + 0.04



Wet Basin 01 WQ



Routing Diagram for 20160707 prelim-FSV
Prepared by Symanetc, Printed 8/26/2016
HydroCAD® 10.00-15 s/n 07459 © 2015 HydroCAD Software Solutions LLC

Summary for Pond 17P: Wet Basin 01 WQ

Inflow	=	0.00 cfs @	0.00 hrs,	Volume=	0.000 af
Outflow	=	0.24 cfs @	0.00 hrs,	Volume=	0.229 af, Atten= 0%, Lag= 0.0 min
Primary	=	0.24 cfs @	0.00 hrs,	Volume=	0.229 af

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Starting Elev= 730.51' Surf.Area= 1.031 ac Storage= 0.266 af
Peak Elev= 730.51' @ 0.00 hrs Surf.Area= 1.031 ac Storage= 0.266 af

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

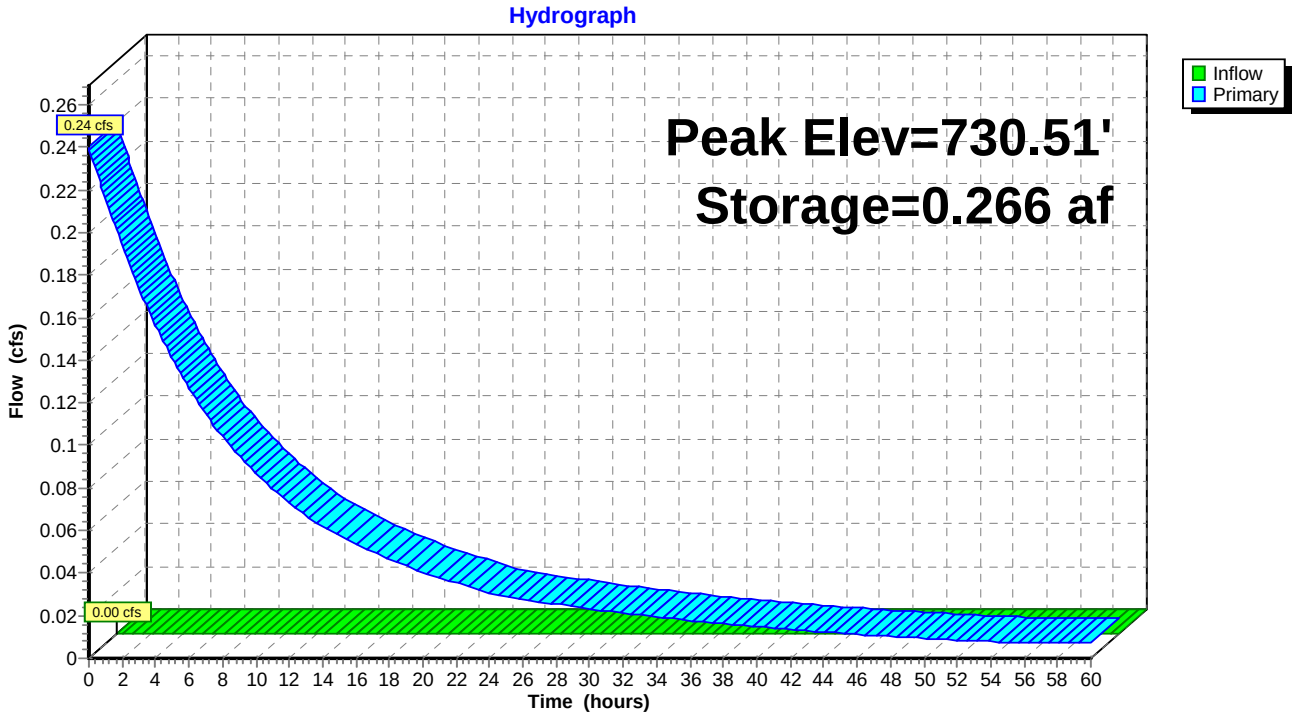
Volume	Invert	Avail.Storage	Storage Description
#1	730.25'	4.675 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
730.25	1.012	0.000	0.000
731.25	1.088	1.050	1.050
732.25	1.167	1.128	2.177
733.25	1.248	1.208	3.385
734.25	1.332	1.290	4.675

Device	Routing	Invert	Outlet Devices
#1	Primary	730.25'	**3.8" Vert. Orifice/Grate X 2.00** C= 0.600

Primary OutFlow Max=0.24 cfs @ 0.00 hrs HW=730.51' (Free Discharge)
└─**1=Orifice/Grate** (Orifice Controls 0.24 cfs @ 1.74 fps)

Pond 17P: Wet Basin 01 WQ



Hydrograph for Pond 17P: Wet Basin 01 WQ

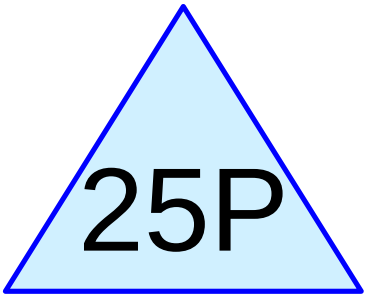
Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Primary (cfs)
0.00	**0.00**	**0.266**	**730.51**	**0.24**
2.00	0.00	0.230	730.48	0.19
4.00	0.00	0.201	730.45	0.16
6.00	0.00	0.178	730.42	0.13
8.00	0.00	0.159	730.41	0.10
10.00	0.00	0.143	730.39	0.09
12.00	0.00	0.130	730.38	0.07
14.00	0.00	0.119	730.37	0.06
16.00	0.00	0.109	730.36	0.05
18.00	0.00	0.101	730.35	0.05
20.00	0.00	0.094	730.34	0.04
22.00	0.00	0.087	730.34	0.04
24.00	0.00	0.082	730.33	0.03
26.00	0.00	0.077	730.33	0.03
28.00	0.00	0.073	730.32	0.03
30.00	0.00	0.069	730.32	0.02
32.00	0.00	0.065	730.31	0.02
34.00	0.00	0.062	730.31	0.02
36.00	0.00	0.059	730.31	0.02
38.00	0.00	0.056	730.31	0.02
40.00	0.00	0.053	730.30	0.01
42.00	0.00	0.051	730.30	0.01
44.00	0.00	0.049	730.30	0.01
46.00	0.00	0.047	730.30	0.01
48.00	0.00	0.045	730.29	0.01
50.00	0.00	0.043	730.29	0.01
52.00	0.00	0.042	730.29	0.01
54.00	0.00	0.041	730.29	0.01
56.00	0.00	0.039	730.29	0.01
58.00	0.00	0.038	730.29	0.01
60.00	0.00	0.037	730.29	0.01

Required Sediment Storage Volume Calculation Spreadsheet

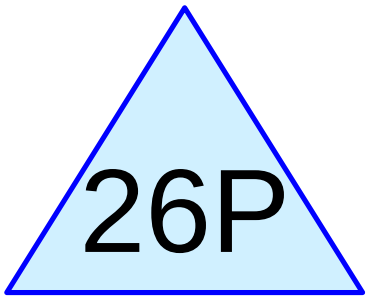
Project Name: grove City Surgical Hospital

Wet Basin 01

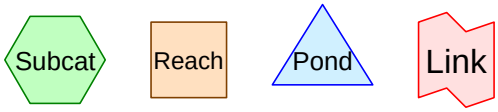
Drainage Area =	18.74	acres
Drawdown Volume = 67cy/ac*(Drainage Area)*(27/43560) =	0.778	ac-ft
Drawdown Volume Elevation within Basin =	731.00	ft
Disturbed Area =	15.96	acres
Settling Volume = 37cy/ac*(Disturbed Area)*(27/43560) =	0.37	ac-ft



Wet Basin 01 SED



Wet Basin 01 Below NP



Routing Diagram for 20160707 prelim-FSV
Prepared by Symanetc, Printed 8/26/2016
HydroCAD® 10.00-15 s/n 07459 © 2015 HydroCAD Software Solutions LLC

Summary for Pond 25P: Wet Basin 01 SED

Inflow	=	0.00 cfs @	0.00 hrs,	Volume=	0.000 af
Outflow	=	0.32 cfs @	0.00 hrs,	Volume=	0.675 af, Atten= 0%, Lag= 0.0 min
Primary	=	0.32 cfs @	0.00 hrs,	Volume=	0.675 af

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Starting Elev= 731.00' Surf.Area= 1.069 ac Storage= 0.780 af
Peak Elev= 731.00' @ 0.00 hrs Surf.Area= 1.069 ac Storage= 0.780 af

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

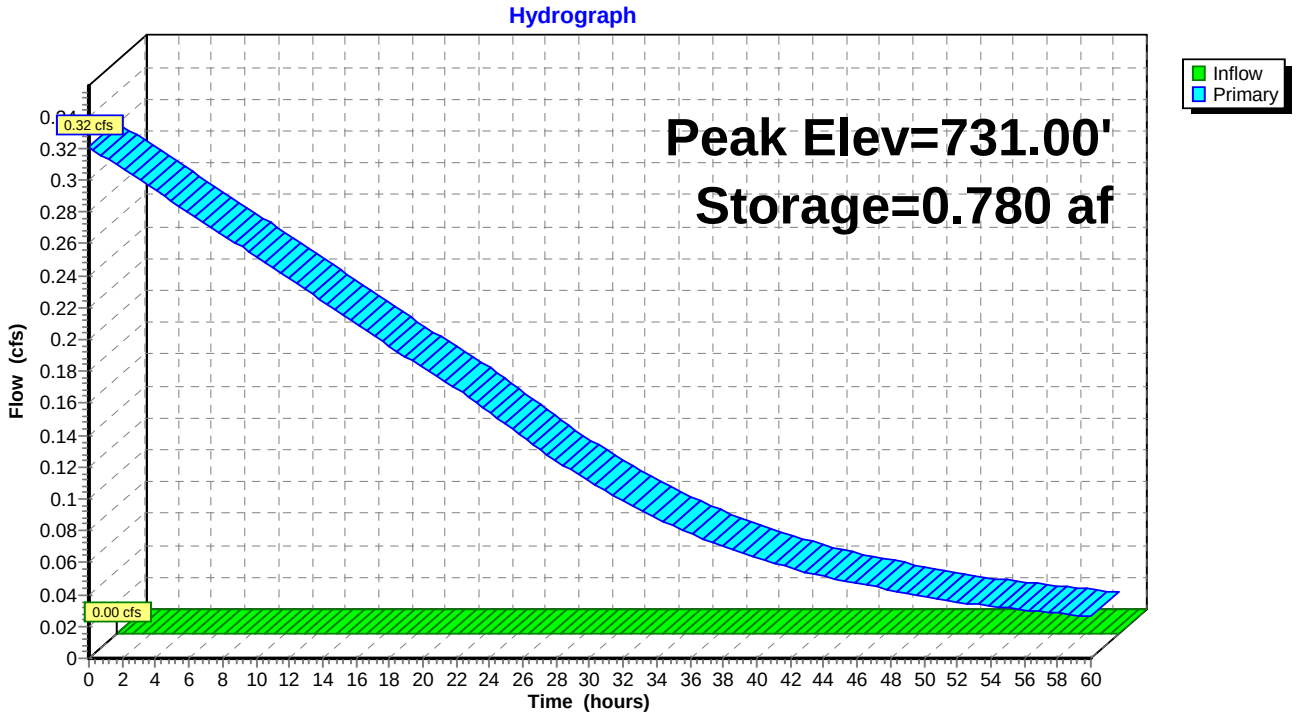
Volume	Invert	Avail.Storage	Storage Description
#1	730.25'	4.675 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
730.25	1.012	0.000	0.000
731.25	1.088	1.050	1.050
732.25	1.167	1.128	2.177
733.25	1.248	1.208	3.385
734.25	1.332	1.290	4.675

Device	Routing	Invert	Outlet Devices	
#1	Primary	730.25'	**4.0" Vert. Orifice/Grate**	C= 0.600

Primary OutFlow Max=0.32 cfs @ 0.00 hrs HW=731.00' (Free Discharge)
└─**1=Orifice/Grate** (Orifice Controls 0.32 cfs @ 3.68 fps)

Pond 25P: Wet Basin 01 SED



Hydrograph for Pond 25P: Wet Basin 01 SED

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Primary (cfs)
0.00	**0.00**	**0.780**	**731.00**	**0.32**
2.00	0.00	0.728	730.95	0.31
4.00	0.00	0.679	730.90	0.29
6.00	0.00	0.631	730.86	0.28
8.00	0.00	0.586	730.82	0.27
10.00	0.00	0.543	730.78	0.25
12.00	0.00	0.503	730.74	0.24
14.00	0.00	0.465	730.70	0.22
16.00	0.00	0.429	730.67	0.21
18.00	0.00	0.395	730.64	0.20
20.00	0.00	0.364	730.60	0.18
22.00	0.00	0.335	730.58	0.17
24.00	0.00	0.308	730.55	0.15
26.00	0.00	0.284	730.53	0.14
28.00	0.00	0.262	730.51	0.12
30.00	0.00	0.243	730.49	0.11
32.00	0.00	0.225	730.47	0.10
34.00	0.00	0.210	730.46	0.09
36.00	0.00	0.196	730.44	0.08
38.00	0.00	0.184	730.43	0.07
40.00	0.00	0.173	730.42	0.06
42.00	0.00	0.163	730.41	0.06
44.00	0.00	0.154	730.40	0.05
46.00	0.00	0.146	730.39	0.05
48.00	0.00	0.139	730.39	0.04
50.00	0.00	0.132	730.38	0.04
52.00	0.00	0.126	730.37	0.04
54.00	0.00	0.120	730.37	0.03
56.00	0.00	0.115	730.36	0.03
58.00	0.00	0.110	730.36	0.03
60.00	0.00	0.106	730.35	0.03

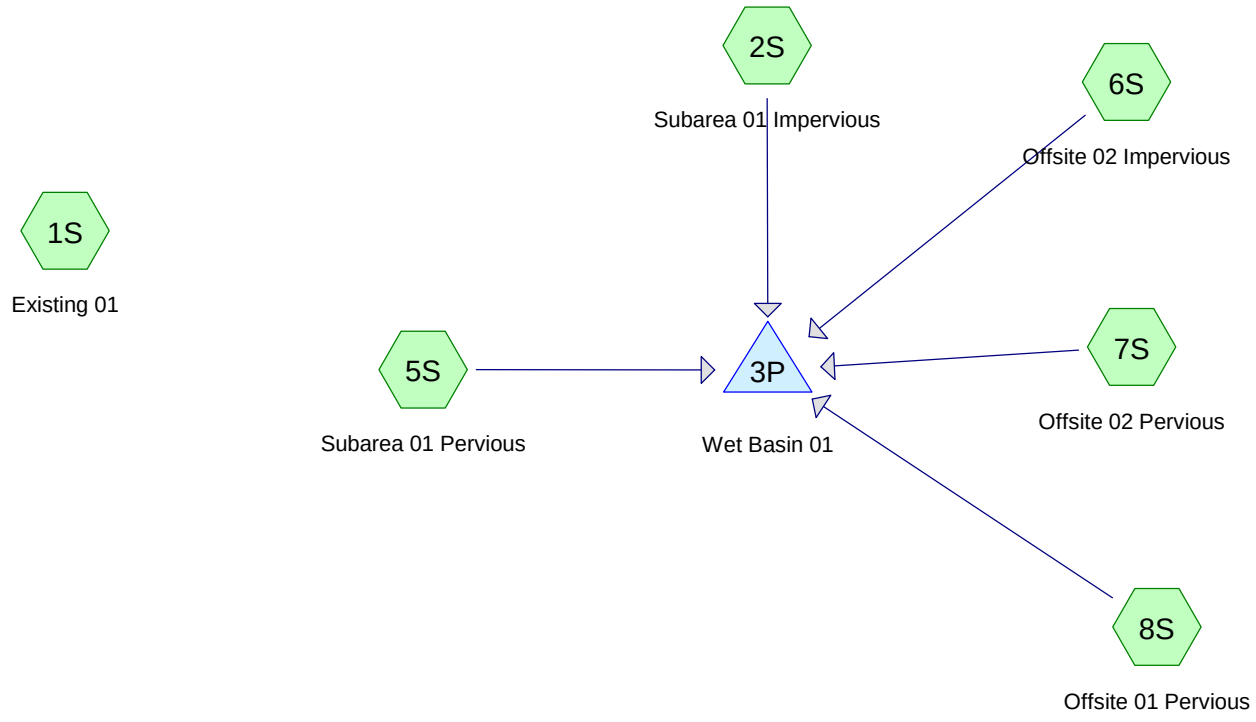
Summary for Pond 26P: Wet Basin 01 Below NP

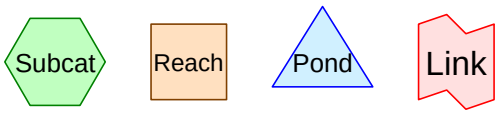
Volume	Invert	Avail.Storage	Storage Description
#1	720.25'	5.663 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
720.25	0.257	0.000	0.000
721.25	0.303	0.280	0.280
722.25	0.351	0.327	0.607
723.25	0.402	0.376	0.983
724.25	0.456	0.429	1.412
725.25	0.512	0.484	1.896
726.25	0.570	0.541	2.437
727.25	0.631	0.600	3.038
728.25	0.865	0.748	3.786
730.25	1.012	1.877	5.663

APPENDIX C:

HydroCAD Output





Routing Diagram for 20160707 prelim-FSV
Prepared by Symanetc, Printed 8/26/2016
HydroCAD® 10.00-15 s/n 07459 © 2015 HydroCAD Software Solutions LLC

Summary for Subcatchment 1S: Existing 01

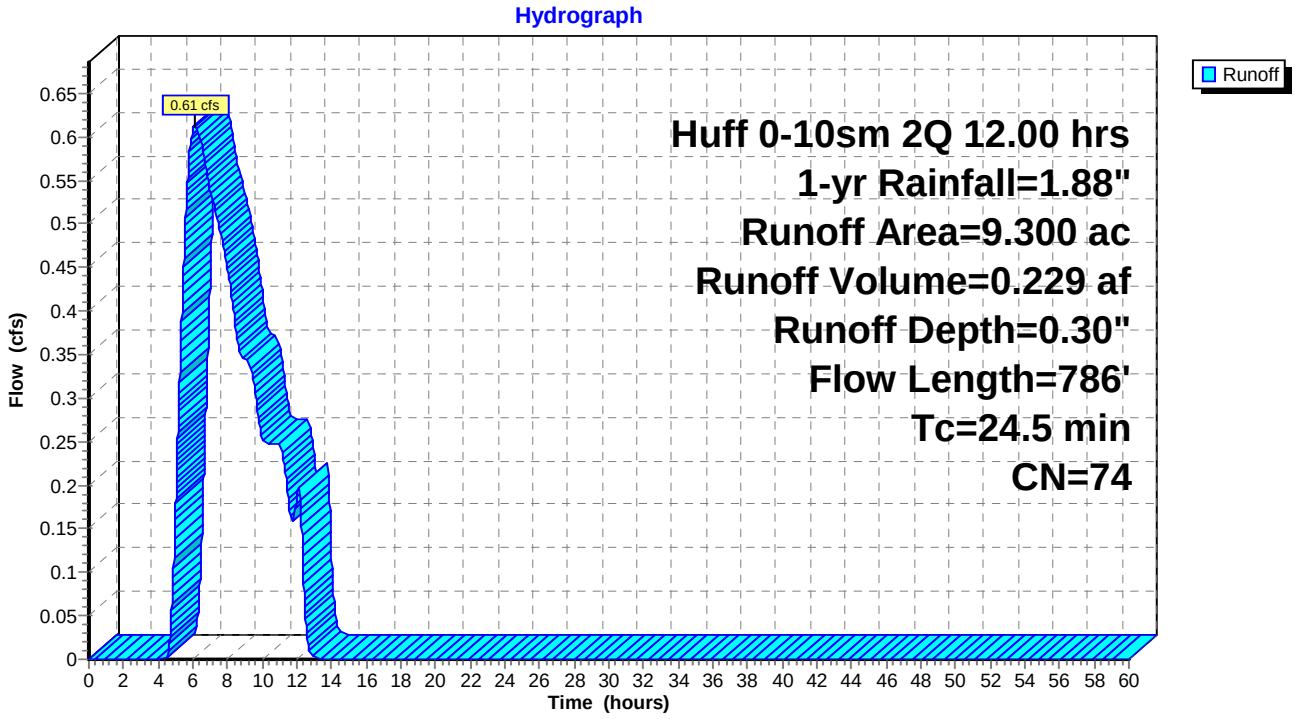
Runoff = 0.61 cfs @ 6.12 hrs, Volume= 0.229 af, Depth= 0.30"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Huff 0-10sm 2Q 12.00 hrs 1-yr Rainfall=1.88"

	Area (ac)	CN	Description
*	9.300	74	
	9.300		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.7	100	0.0200	0.16		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.70"
13.8	686	0.0140	0.83		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
24.5	786	Total			

Subcatchment 1S: Existing 01



Summary for Subcatchment 2S: Subarea 01 Impervious

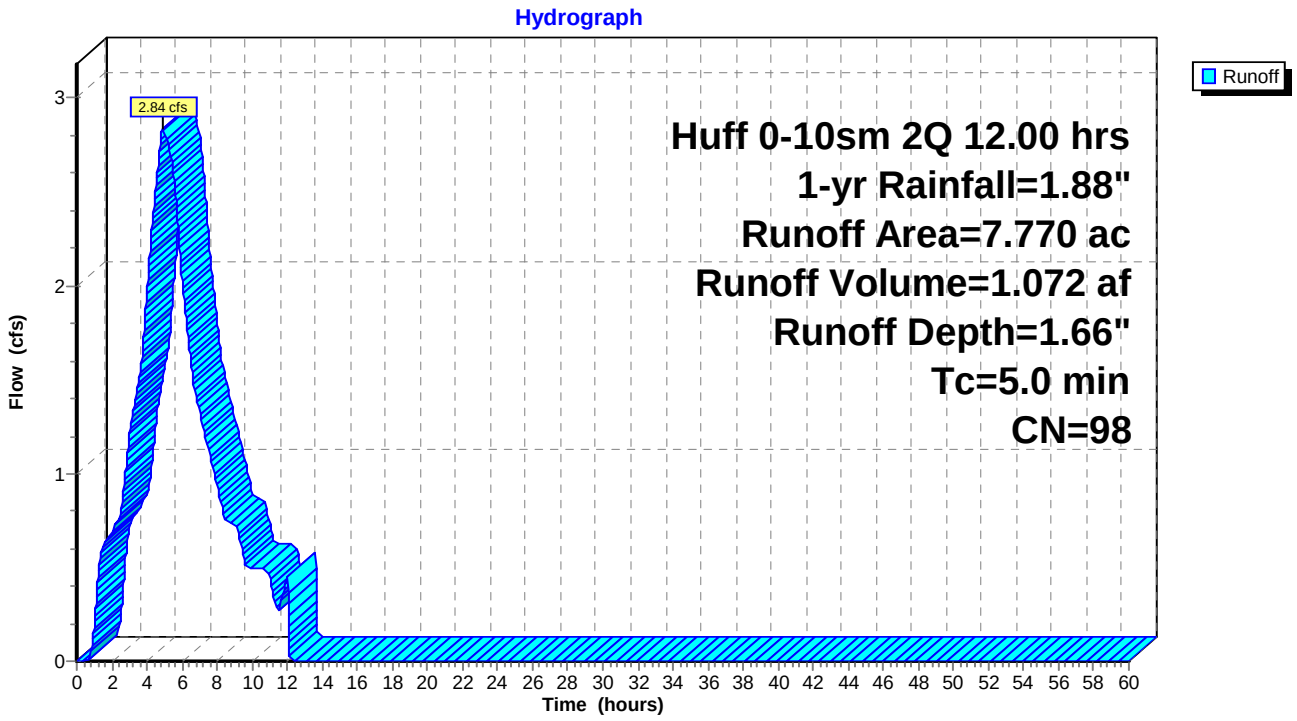
Runoff = 2.84 cfs @ 4.89 hrs, Volume= 1.072 af, Depth= 1.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Huff 0-10sm 2Q 12.00 hrs 1-yr Rainfall=1.88"

	Area (ac)	CN	Description
*	7.770	98	
	7.770		100.00% Impervious Area

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

Subcatchment 2S: Subarea 01 Impervious



Summary for Subcatchment 5S: Subarea 01 Pervious

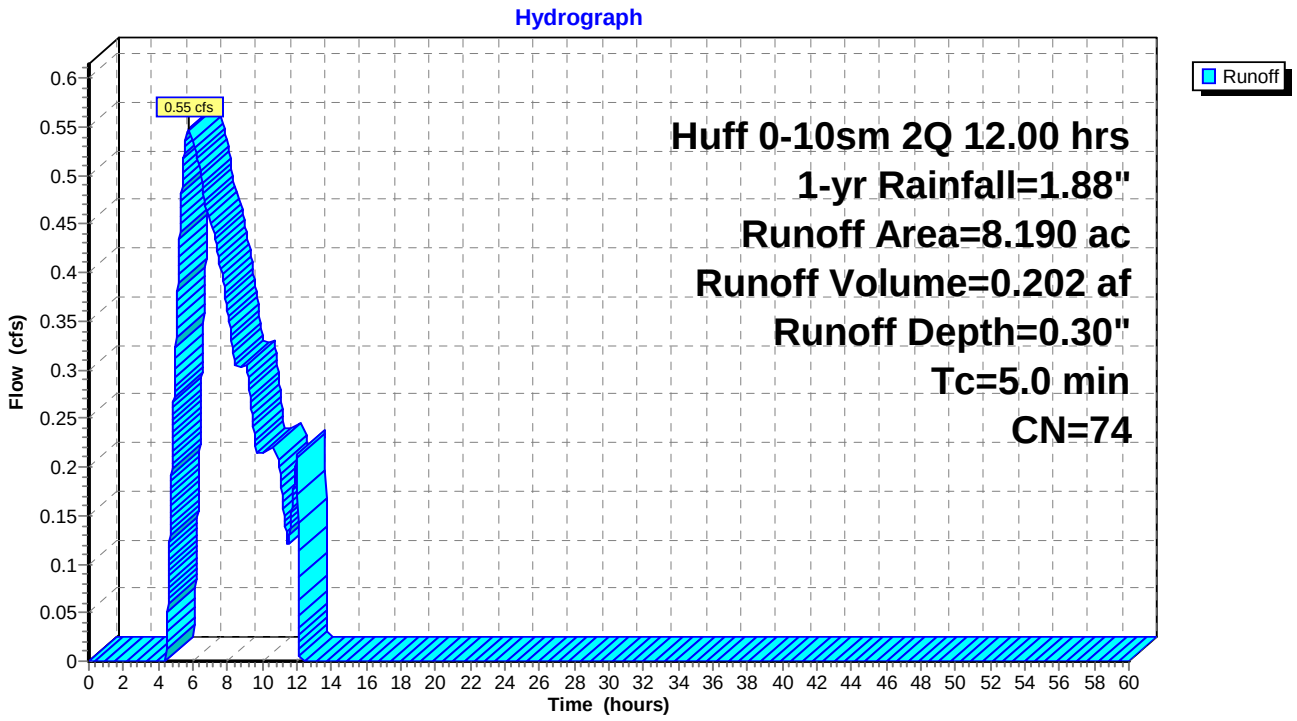
Runoff = 0.55 cfs @ 5.78 hrs, Volume= 0.202 af, Depth= 0.30"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Huff 0-10sm 2Q 12.00 hrs 1-yr Rainfall=1.88"

	Area (ac)	CN	Description
*	8.190	74	
	8.190		100.00% Pervious Area

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

Subcatchment 5S: Subarea 01 Pervious



Summary for Subcatchment 6S: Offsite 02 Impervious

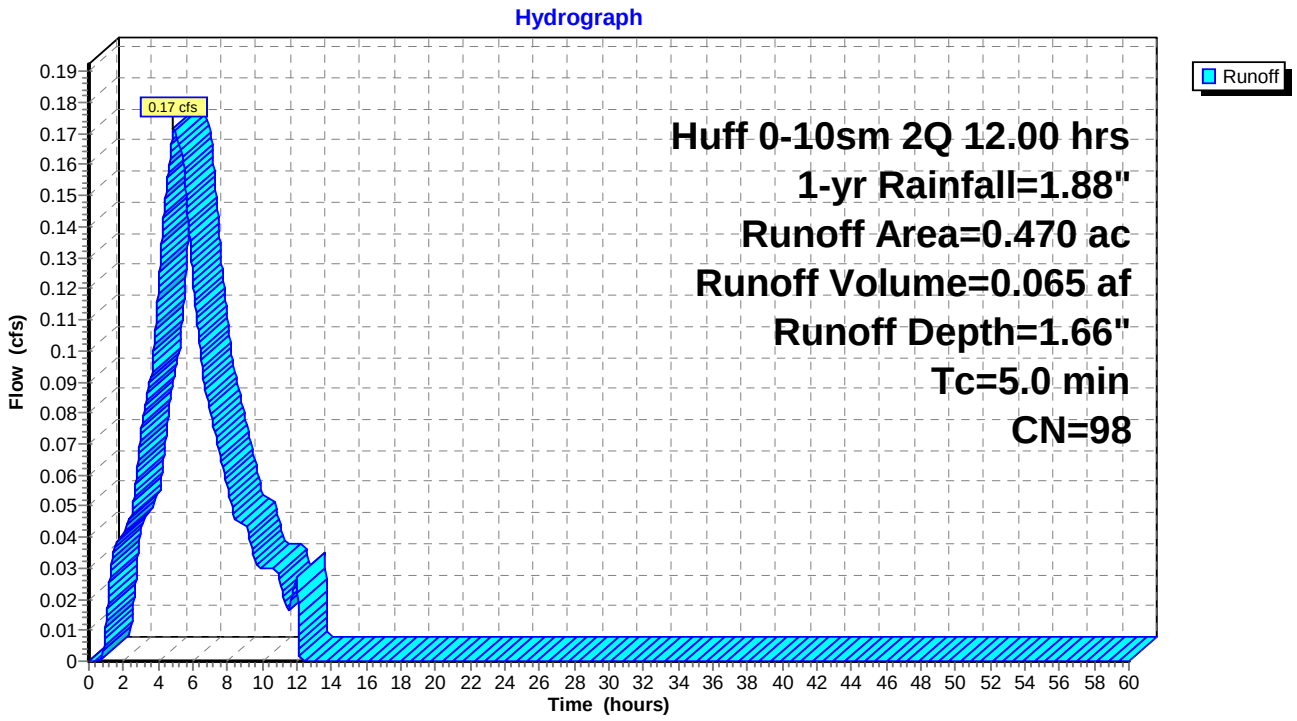
Runoff = 0.17 cfs @ 4.89 hrs, Volume= 0.065 af, Depth= 1.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Huff 0-10sm 2Q 12.00 hrs 1-yr Rainfall=1.88"

	Area (ac)	CN	Description
*	0.470	98	
	0.470		100.00% Impervious Area

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

Subcatchment 6S: Offsite 02 Impervious



Summary for Subcatchment 7S: Offsite 02 Pervious

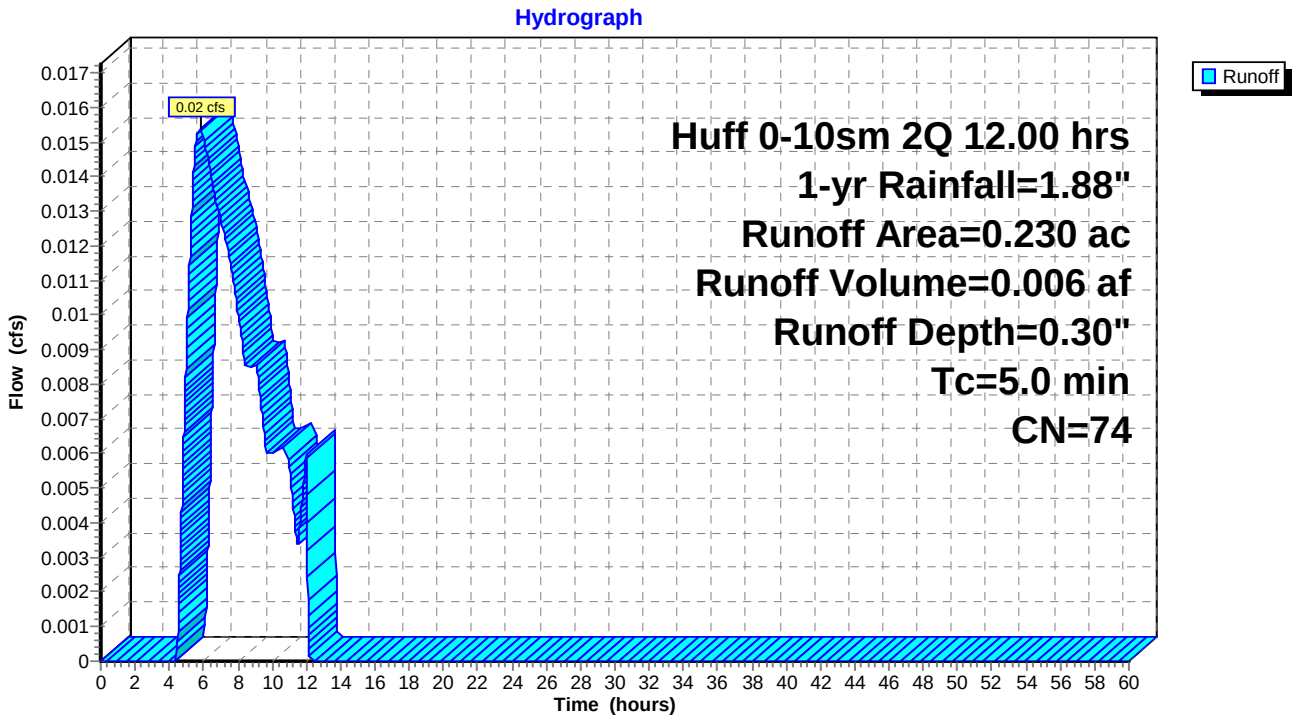
Runoff = 0.02 cfs @ 5.78 hrs, Volume= 0.006 af, Depth= 0.30"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Huff 0-10sm 2Q 12.00 hrs 1-yr Rainfall=1.88"

	Area (ac)	CN	Description
*	0.230	74	
	0.230		100.00% Pervious Area

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

Subcatchment 7S: Offsite 02 Pervious



Summary for Subcatchment 8S: Offsite 01 Pervious

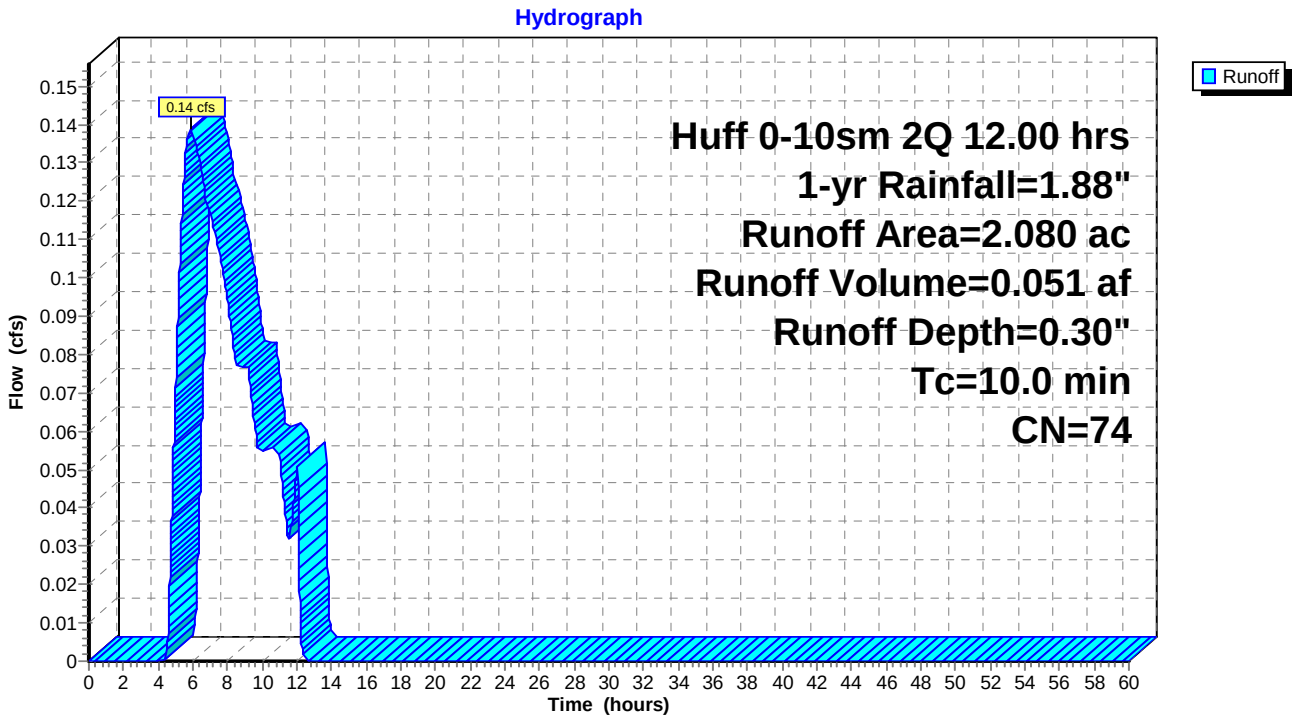
Runoff = 0.14 cfs @ 5.88 hrs, Volume= 0.051 af, Depth= 0.30"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Huff 0-10sm 2Q 12.00 hrs 1-yr Rainfall=1.88"

	Area (ac)	CN	Description
*	2.080	74	
	2.080		100.00% Pervious Area

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

Subcatchment 8S: Offsite 01 Pervious



Summary for Pond 3P: Wet Basin 01

Inflow Area = 18.740 ac, 43.97% Impervious, Inflow Depth = 0.89" for 1-yr event
Inflow = 3.47 cfs @ 5.44 hrs, Volume= 1.395 af
Outflow = 0.68 cfs @ 11.08 hrs, Volume= 1.324 af, Atten= 81%, Lag= 338.5 min
Primary = 0.68 cfs @ 11.08 hrs, Volume= 1.324 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 731.20' @ 11.08 hrs Surf.Area= 1.085 ac Storage= 1.000 af

Plug-Flow detention time= 820.8 min calculated for 1.324 af (95% of inflow)
Center-of-Mass det. time= 804.1 min (1,169.7 - 365.6)

Volume	Invert	Avail.Storage	Storage Description
#1	730.25'	4.675 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

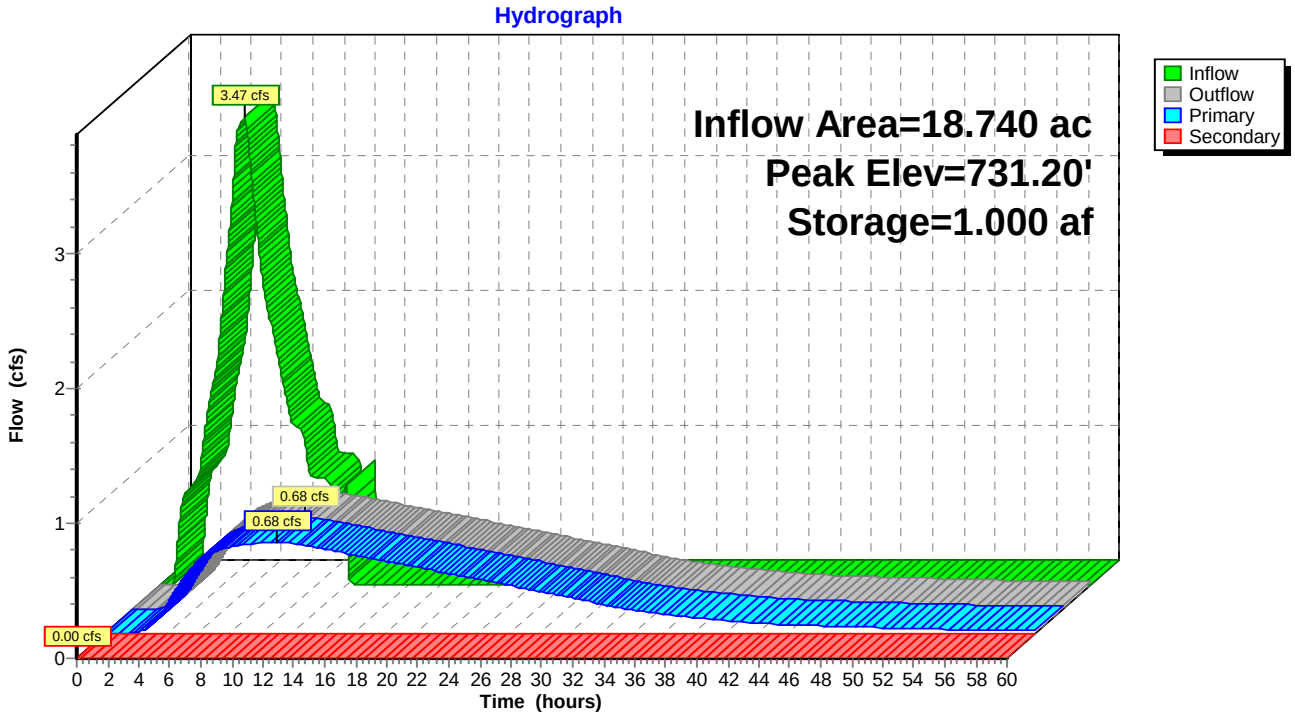
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
730.25	1.012	0.000	0.000
731.25	1.088	1.050	1.050
732.25	1.167	1.128	2.177
733.25	1.248	1.208	3.385
734.25	1.332	1.290	4.675

Device	Routing	Invert	Outlet Devices
#1	Primary	730.25'	**3.8" Vert. Orifice/Grate X 2.00** C= 0.600
#2	Primary	733.55'	**2.0" x 24.0" Horiz. Orifice/Grate X 8.00** C= 0.600 in 27.5" x 27.5" Grate (51% open area) Limited to weir flow at low heads
#3	Secondary	733.75'	**20.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.68 cfs @ 11.08 hrs HW=731.20' (Free Discharge)
└─**1=Orifice/Grate** (Orifice Controls 0.68 cfs @ 4.29 fps)
└─**2=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=730.25' (Free Discharge)
└─**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 3P: Wet Basin 01



Summary for Subcatchment 1S: Existing 01

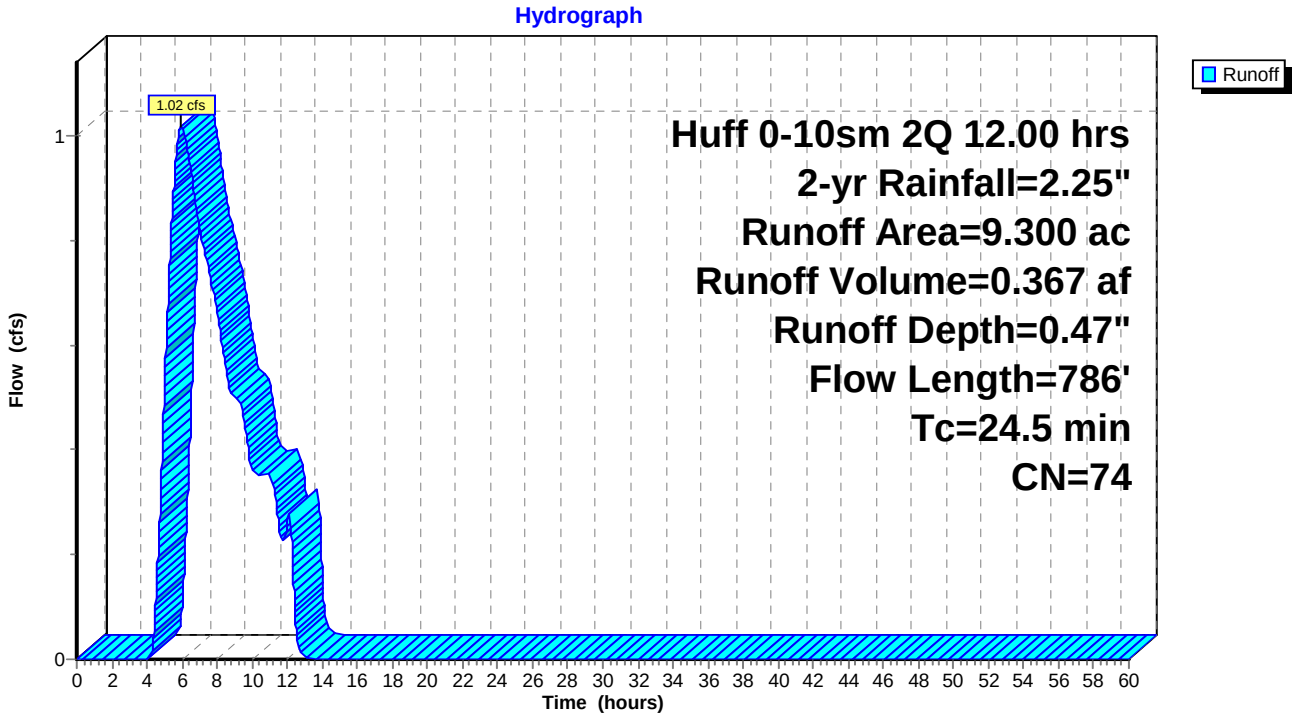
Runoff = 1.02 cfs @ 5.96 hrs, Volume= 0.367 af, Depth= 0.47"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Huff 0-10sm 2Q 12.00 hrs 2-yr Rainfall=2.25"

	Area (ac)	CN	Description
*	9.300	74	
	9.300		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.7	100	0.0200	0.16		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.70"
13.8	686	0.0140	0.83		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
24.5	786	Total			

Subcatchment 1S: Existing 01



Summary for Subcatchment 2S: Subarea 01 Impervious

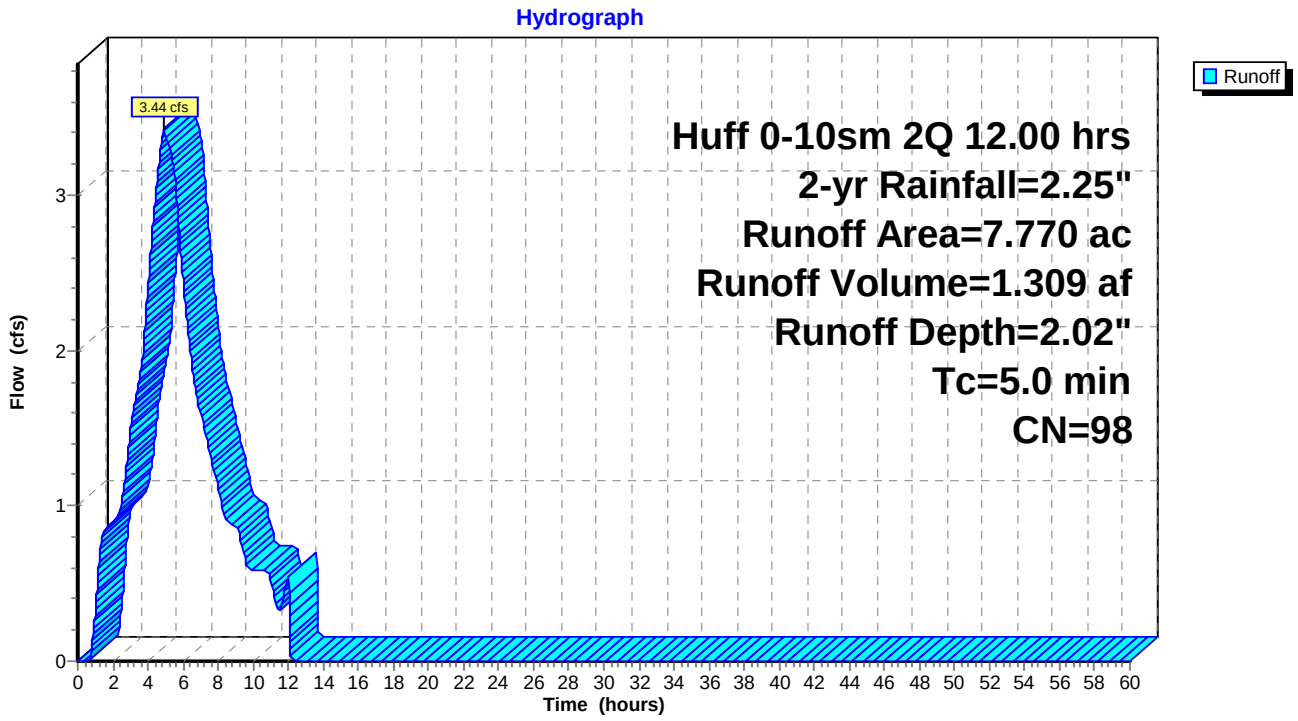
Runoff = 3.44 cfs @ 4.89 hrs, Volume= 1.309 af, Depth= 2.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Huff 0-10sm 2Q 12.00 hrs 2-yr Rainfall=2.25"

	Area (ac)	CN	Description
*	7.770	98	
	7.770		100.00% Impervious Area

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

Subcatchment 2S: Subarea 01 Impervious



Summary for Subcatchment 5S: Subarea 01 Pervious

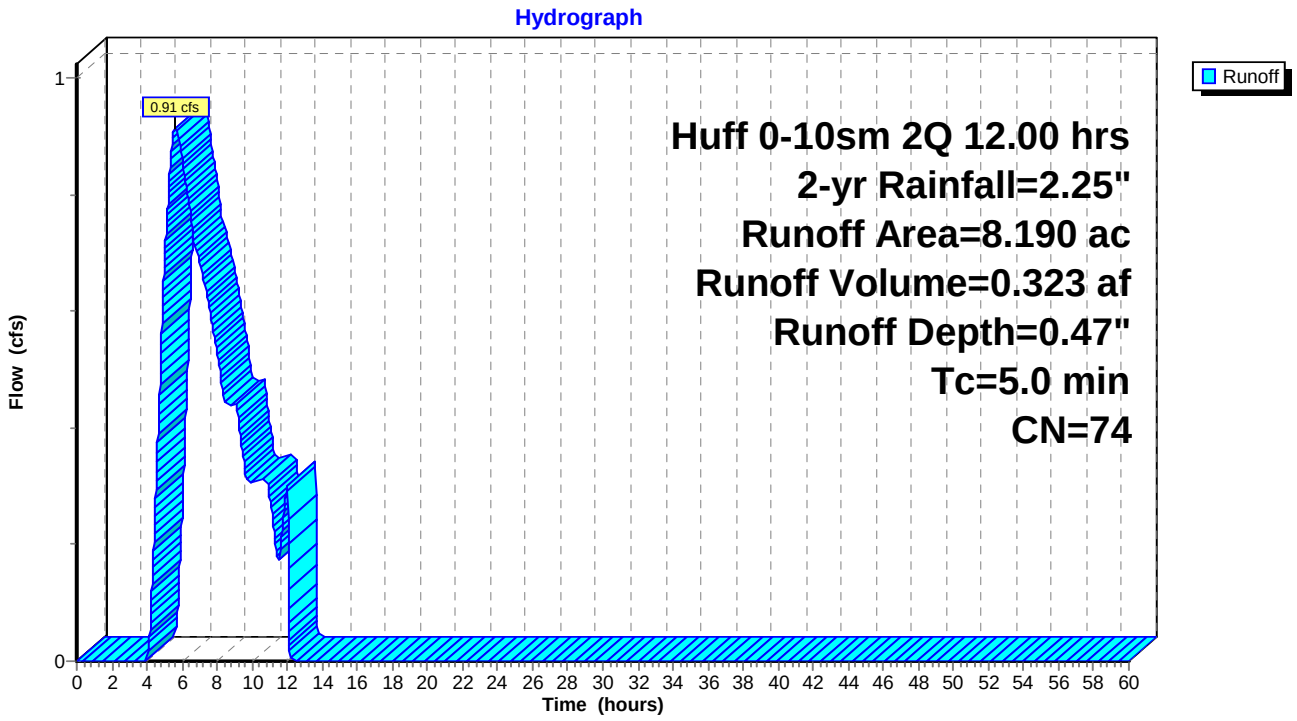
Runoff = 0.91 cfs @ 5.61 hrs, Volume= 0.323 af, Depth= 0.47"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Huff 0-10sm 2Q 12.00 hrs 2-yr Rainfall=2.25"

	Area (ac)	CN	Description
*	8.190	74	
	8.190		100.00% Pervious Area

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

Subcatchment 5S: Subarea 01 Pervious



Summary for Subcatchment 6S: Offsite 02 Impervious

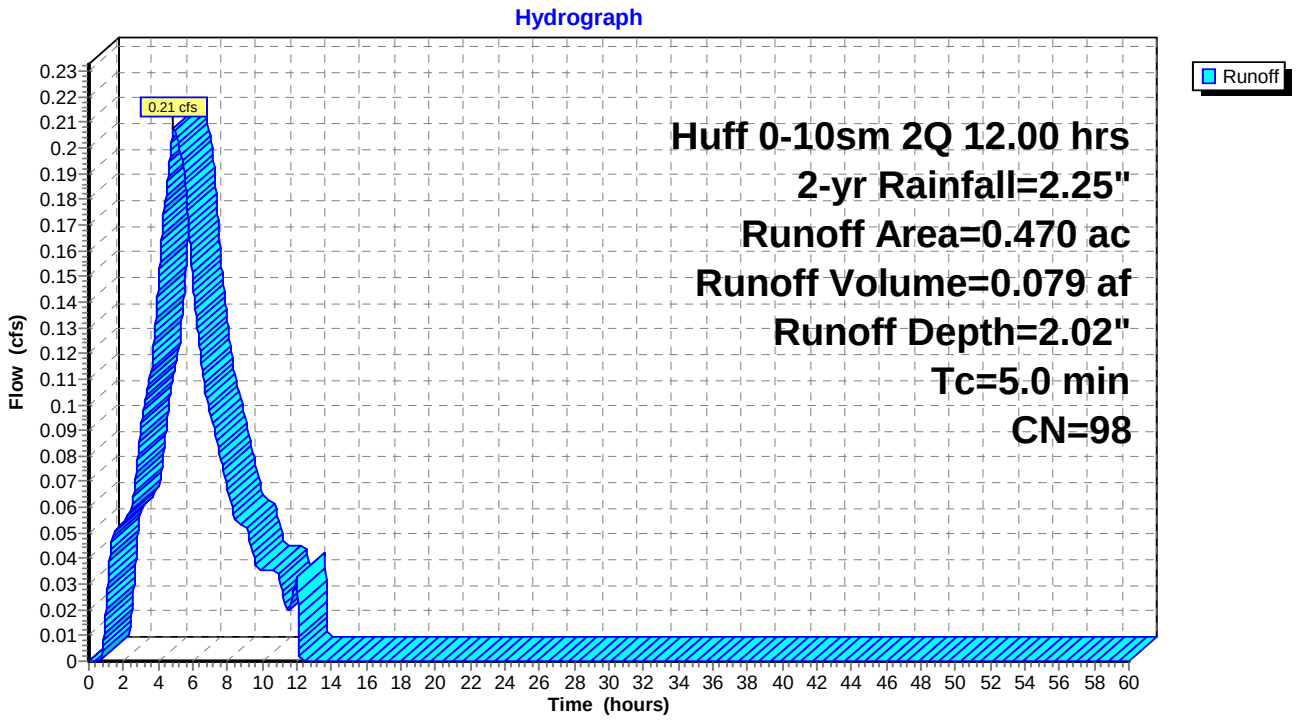
Runoff = 0.21 cfs @ 4.89 hrs, Volume= 0.079 af, Depth= 2.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Huff 0-10sm 2Q 12.00 hrs 2-yr Rainfall=2.25"

	Area (ac)	CN	Description
*	0.470	98	
	0.470		100.00% Impervious Area

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

Subcatchment 6S: Offsite 02 Impervious



Summary for Subcatchment 7S: Offsite 02 Pervious

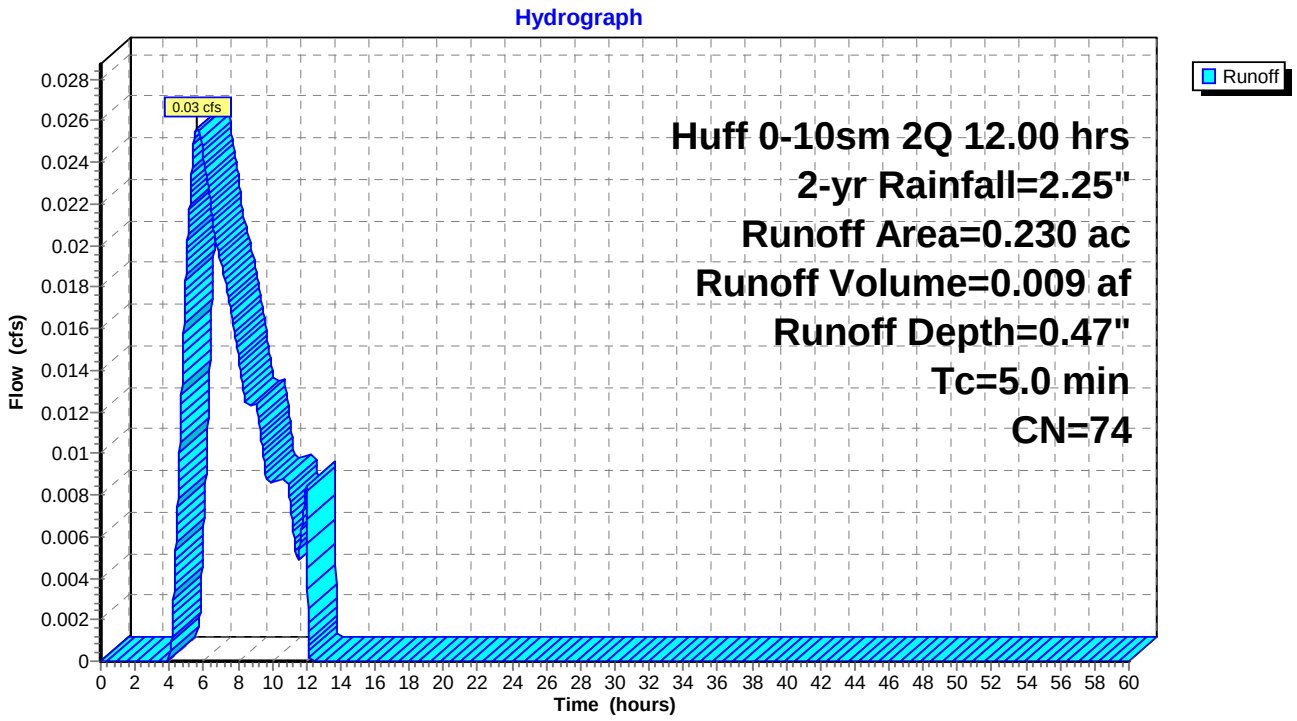
Runoff = 0.03 cfs @ 5.61 hrs, Volume= 0.009 af, Depth= 0.47"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Huff 0-10sm 2Q 12.00 hrs 2-yr Rainfall=2.25"

	Area (ac)	CN	Description
*	0.230	74	
	0.230		100.00% Pervious Area

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

Subcatchment 7S: Offsite 02 Pervious



Summary for Subcatchment 8S: Offsite 01 Pervious

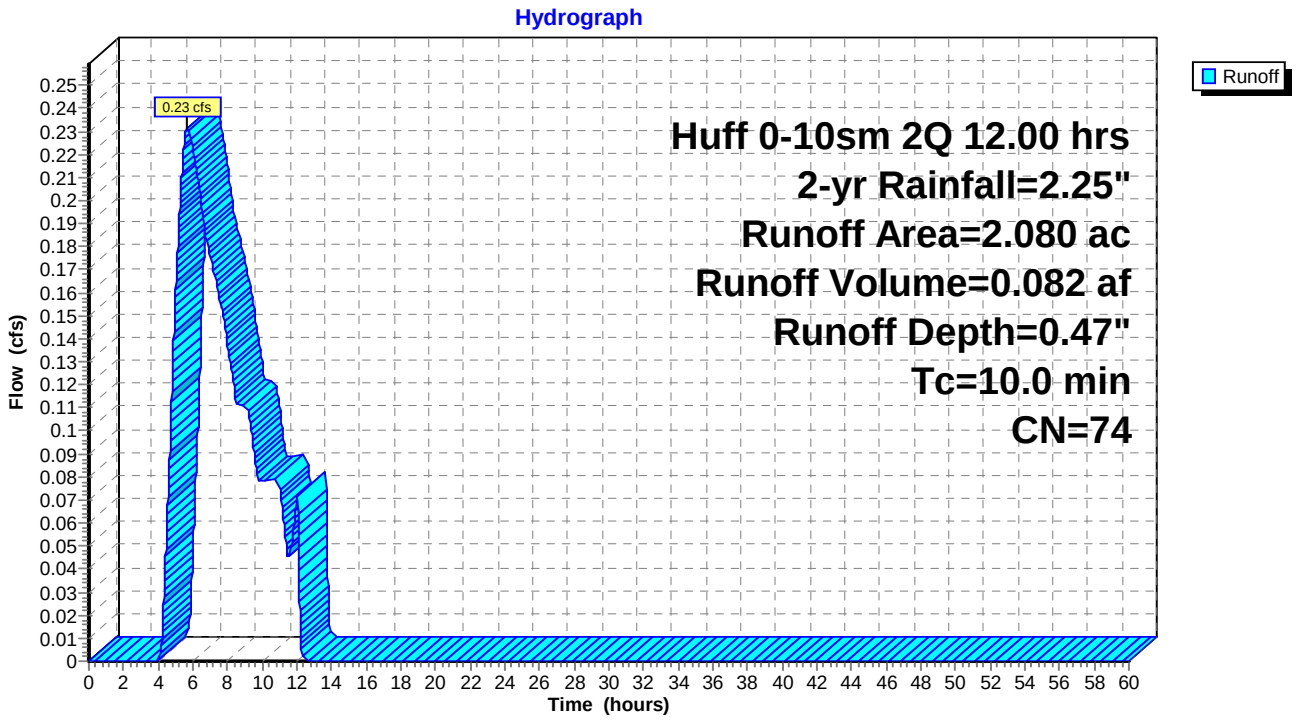
Runoff = 0.23 cfs @ 5.70 hrs, Volume= 0.082 af, Depth= 0.47"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Huff 0-10sm 2Q 12.00 hrs 2-yr Rainfall=2.25"

	Area (ac)	CN	Description
*	2.080	74	
	2.080		100.00% Pervious Area

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

Subcatchment 8S: Offsite 01 Pervious



Summary for Pond 3P: Wet Basin 01

Inflow Area =	18.740 ac, 43.97% Impervious, Inflow Depth = 1.15" for 2-yr event				
Inflow =	4.55 cfs @	5.43 hrs,	Volume=	1.803 af	
Outflow =	0.79 cfs @	11.16 hrs,	Volume=	1.719 af,	Atten= 83%, Lag= 343.9 min
Primary =	0.79 cfs @	11.16 hrs,	Volume=	1.719 af	
Secondary =	0.00 cfs @	0.00 hrs,	Volume=	0.000 af	

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 731.50' @ 11.16 hrs Surf.Area= 1.108 ac Storage= 1.327 af

Plug-Flow detention time= 891.3 min calculated for 1.719 af (95% of inflow)
Center-of-Mass det. time= 875.7 min (1,240.7 - 365.0)

Volume	Invert	Avail.Storage	Storage Description
#1	730.25'	4.675 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

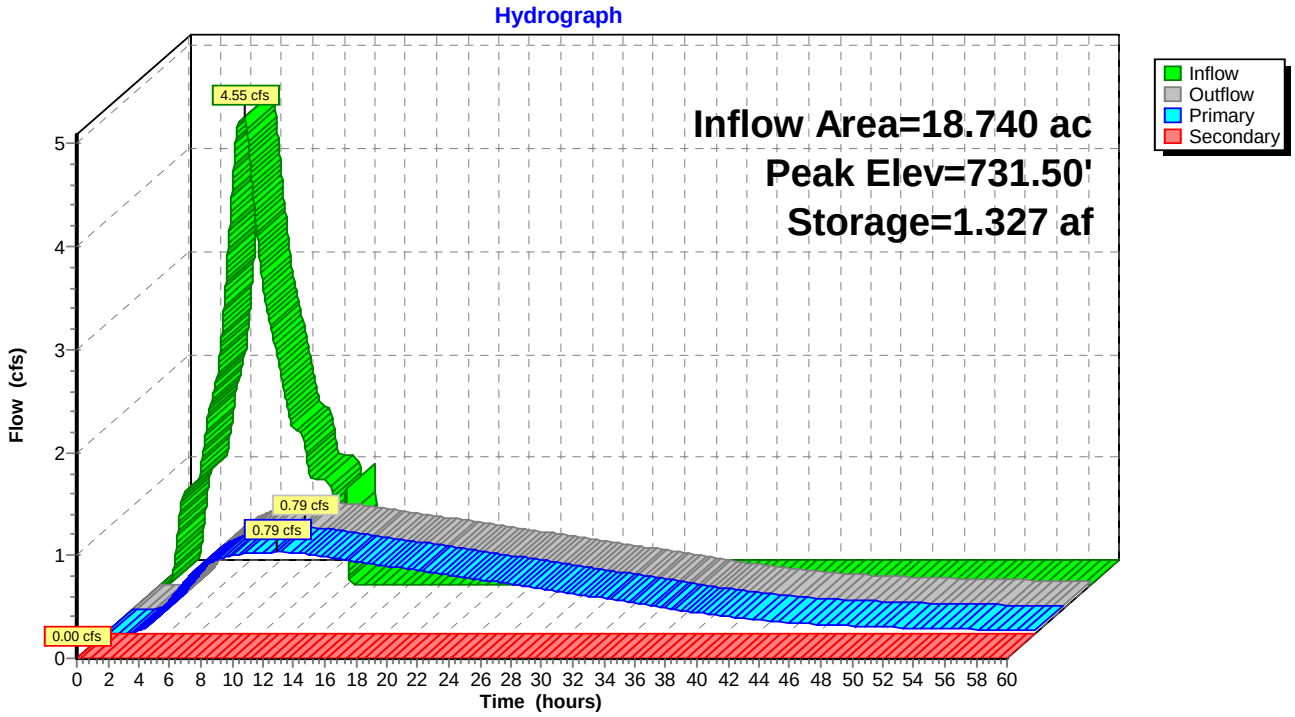
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
730.25	1.012	0.000	0.000
731.25	1.088	1.050	1.050
732.25	1.167	1.128	2.177
733.25	1.248	1.208	3.385
734.25	1.332	1.290	4.675

Device	Routing	Invert	Outlet Devices
#1	Primary	730.25'	**3.8" Vert. Orifice/Grate X 2.00** C= 0.600
#2	Primary	733.55'	**2.0" x 24.0" Horiz. Orifice/Grate X 8.00** C= 0.600 in 27.5" x 27.5" Grate (51% open area) Limited to weir flow at low heads
#3	Secondary	733.75'	**20.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.79 cfs @ 11.16 hrs HW=731.50' (Free Discharge)
└─**1=Orifice/Grate** (Orifice Controls 0.79 cfs @ 5.04 fps)
└─**2=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=730.25' (Free Discharge)
└─**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 3P: Wet Basin 01



Summary for Subcatchment 1S: Existing 01

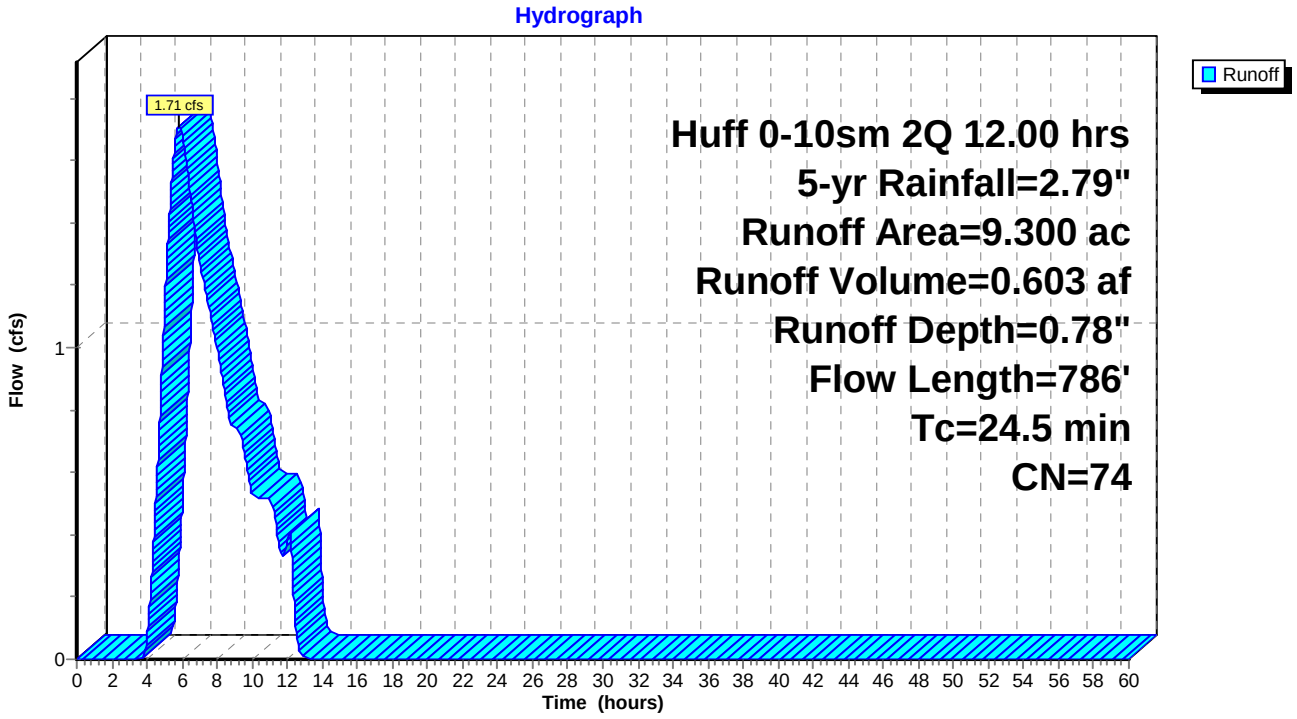
Runoff = 1.71 cfs @ 5.85 hrs, Volume= 0.603 af, Depth= 0.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Huff 0-10sm 2Q 12.00 hrs 5-yr Rainfall=2.79"

	Area (ac)	CN	Description
*	9.300	74	
	9.300		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.7	100	0.0200	0.16		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.70"
13.8	686	0.0140	0.83		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
24.5	786	Total			

Subcatchment 1S: Existing 01



Summary for Subcatchment 2S: Subarea 01 Impervious

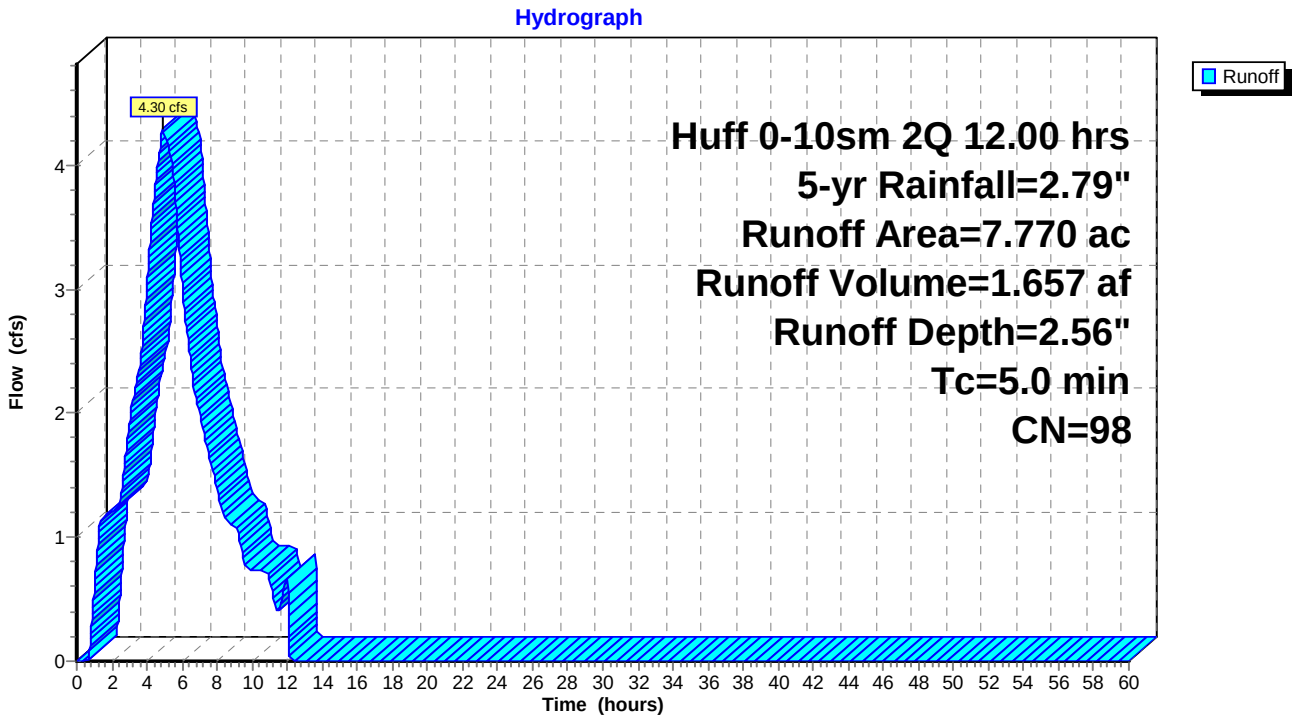
Runoff = 4.30 cfs @ 4.89 hrs, Volume= 1.657 af, Depth= 2.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Huff 0-10sm 2Q 12.00 hrs 5-yr Rainfall=2.79"

	Area (ac)	CN	Description
*	7.770	98	
	7.770		100.00% Impervious Area

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

Subcatchment 2S: Subarea 01 Impervious



Summary for Subcatchment 5S: Subarea 01 Pervious

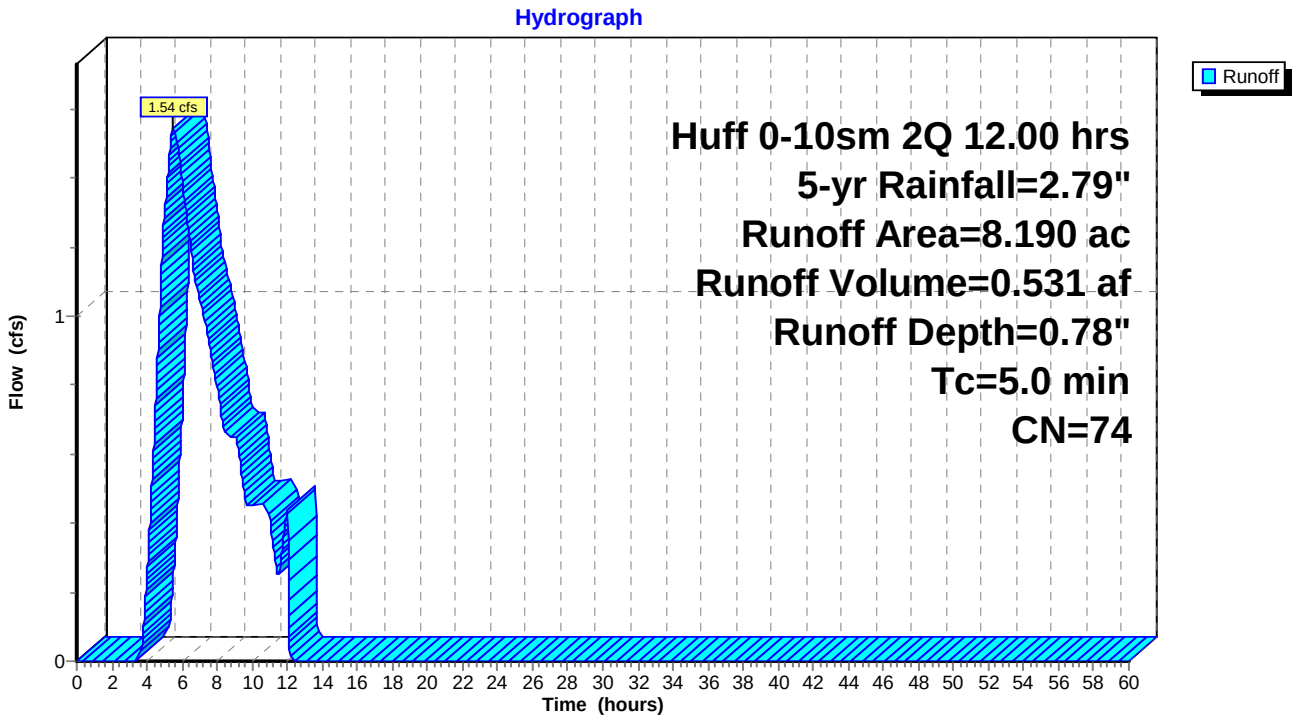
Runoff = 1.54 cfs @ 5.50 hrs, Volume= 0.531 af, Depth= 0.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Huff 0-10sm 2Q 12.00 hrs 5-yr Rainfall=2.79"

	Area (ac)	CN	Description
*	8.190	74	
	8.190		100.00% Pervious Area

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

Subcatchment 5S: Subarea 01 Pervious



Summary for Subcatchment 6S: Offsite 02 Impervious

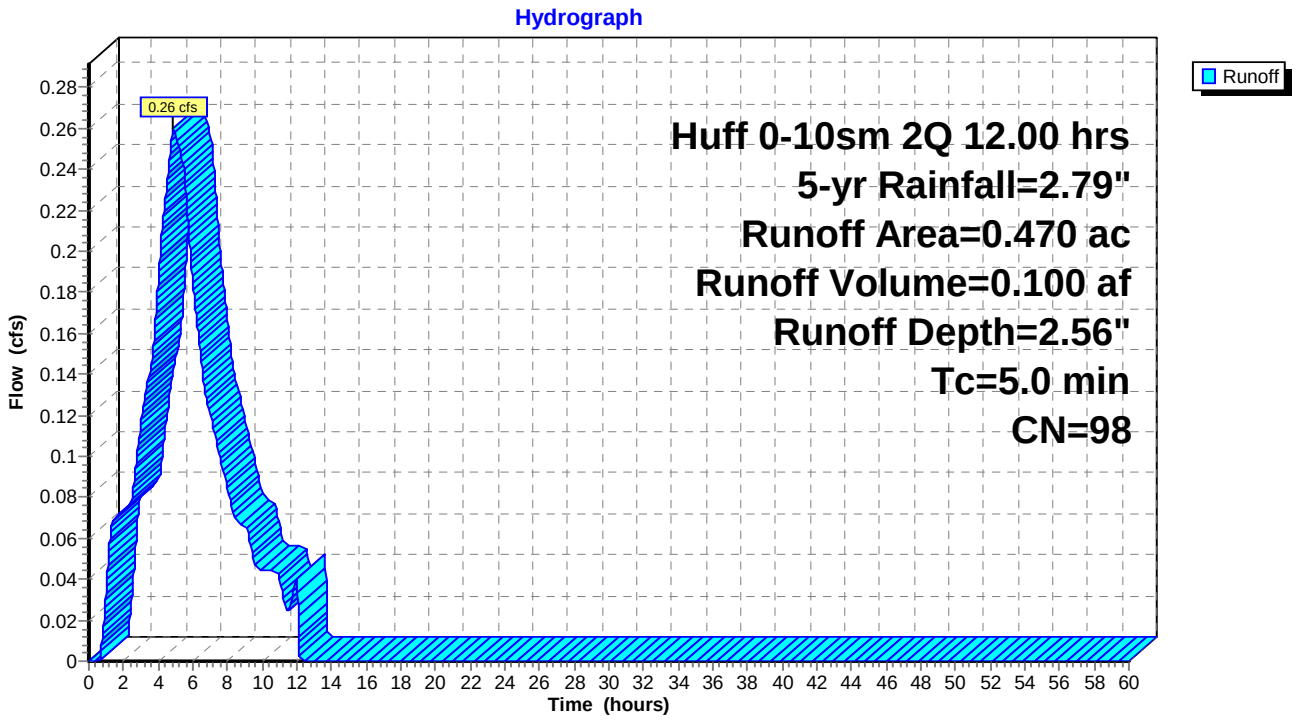
Runoff = 0.26 cfs @ 4.89 hrs, Volume= 0.100 af, Depth= 2.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Huff 0-10sm 2Q 12.00 hrs 5-yr Rainfall=2.79"

	Area (ac)	CN	Description
*	0.470	98	
	0.470		100.00% Impervious Area

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

Subcatchment 6S: Offsite 02 Impervious



Summary for Subcatchment 7S: Offsite 02 Pervious

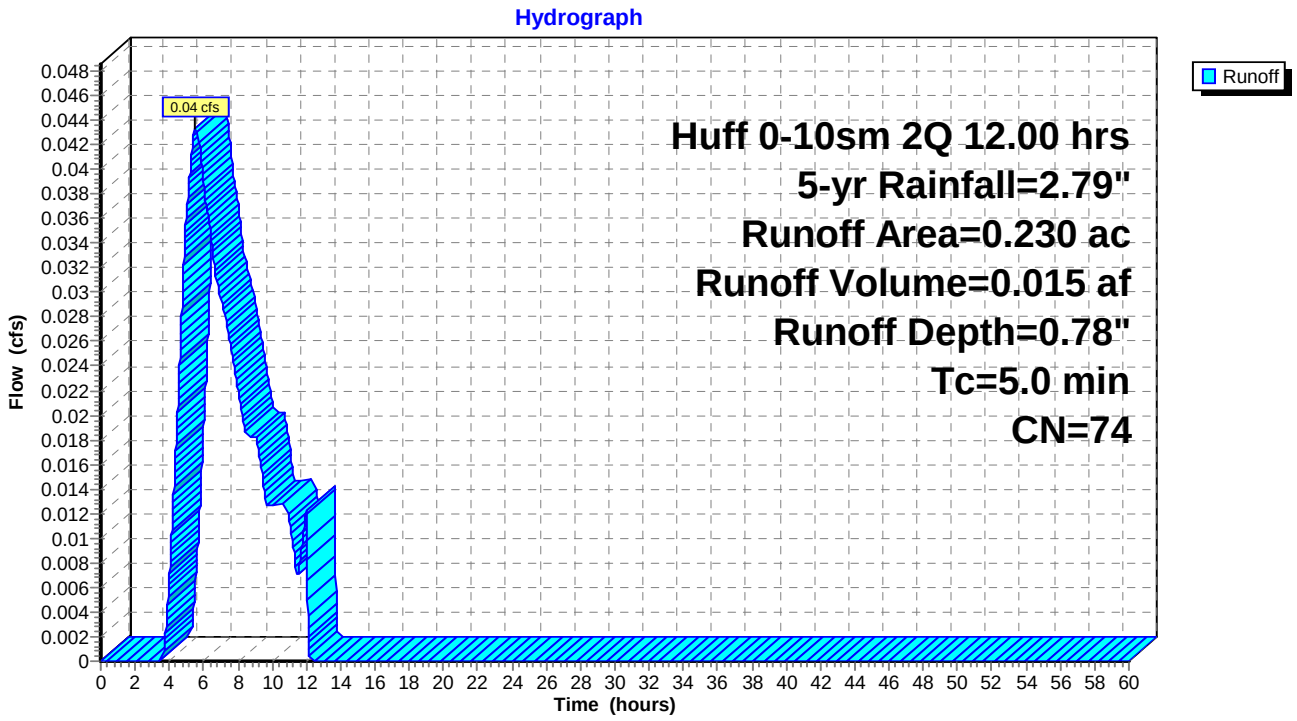
Runoff = 0.04 cfs @ 5.50 hrs, Volume= 0.015 af, Depth= 0.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Huff 0-10sm 2Q 12.00 hrs 5-yr Rainfall=2.79"

	Area (ac)	CN	Description
*	0.230	74	
	0.230		100.00% Pervious Area

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

Subcatchment 7S: Offsite 02 Pervious



Summary for Subcatchment 8S: Offsite 01 Pervious

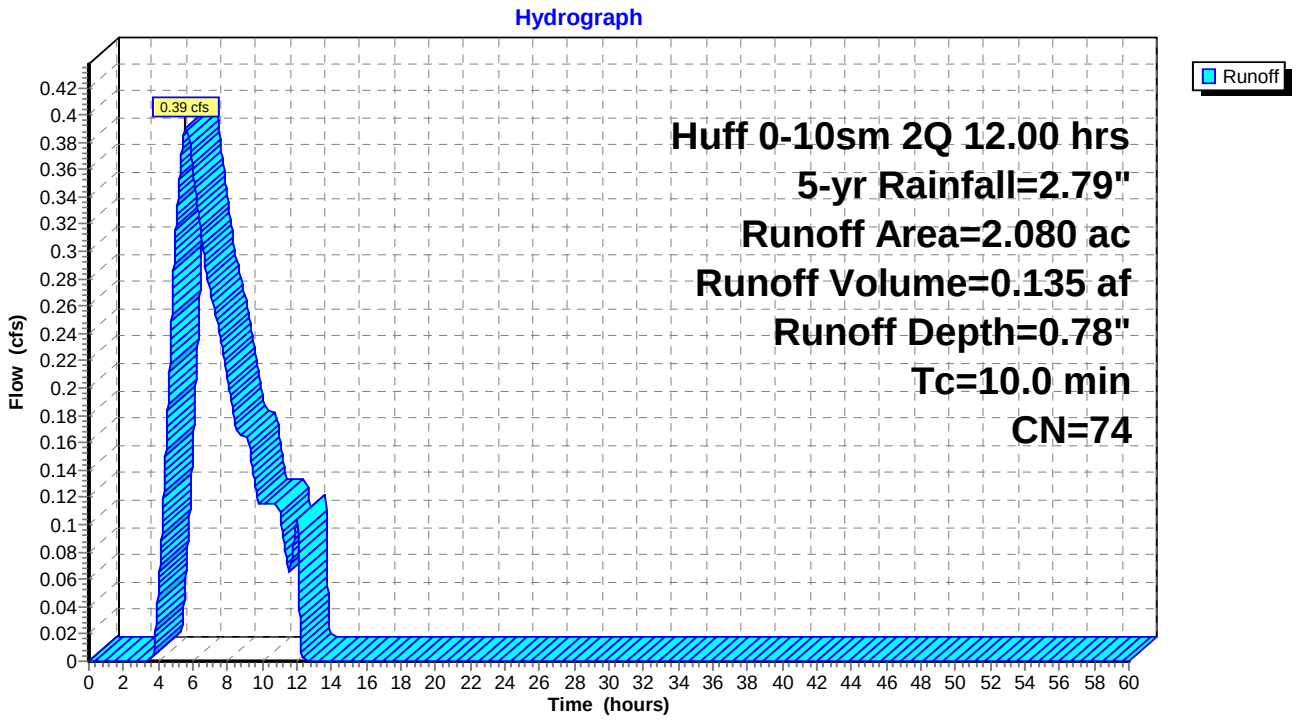
Runoff = 0.39 cfs @ 5.59 hrs, Volume= 0.135 af, Depth= 0.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Huff 0-10sm 2Q 12.00 hrs 5-yr Rainfall=2.79"

	Area (ac)	CN	Description
*	2.080	74	
	2.080		100.00% Pervious Area

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

Subcatchment 8S: Offsite 01 Pervious



Summary for Pond 3P: Wet Basin 01

Inflow Area = 18.740 ac, 43.97% Impervious, Inflow Depth = 1.56" for 5-yr event
Inflow = 6.22 cfs @ 5.35 hrs, Volume= 2.438 af
Outflow = 0.95 cfs @ 12.06 hrs, Volume= 2.328 af, Atten= 85%, Lag= 402.2 min
Primary = 0.95 cfs @ 12.06 hrs, Volume= 2.328 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 731.97' @ 12.06 hrs Surf.Area= 1.145 ac Storage= 1.855 af

Plug-Flow detention time= 997.7 min calculated for 2.328 af (96% of inflow)
Center-of-Mass det. time= 982.6 min (1,346.3 - 363.7)

Volume	Invert	Avail.Storage	Storage Description
#1	730.25'	4.675 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

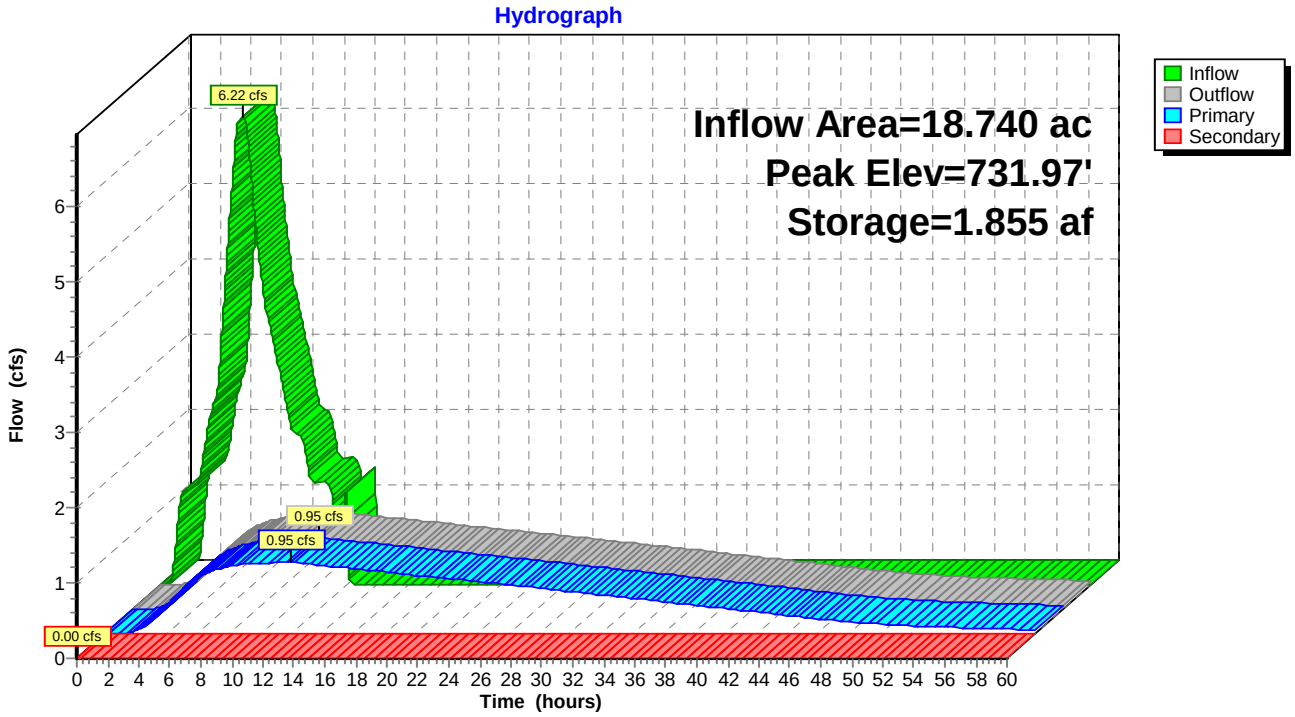
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
730.25	1.012	0.000	0.000
731.25	1.088	1.050	1.050
732.25	1.167	1.128	2.177
733.25	1.248	1.208	3.385
734.25	1.332	1.290	4.675

Device	Routing	Invert	Outlet Devices
#1	Primary	730.25'	**3.8" Vert. Orifice/Grate X 2.00** C= 0.600
#2	Primary	733.55'	**2.0" x 24.0" Horiz. Orifice/Grate X 8.00** C= 0.600 in 27.5" x 27.5" Grate (51% open area) Limited to weir flow at low heads
#3	Secondary	733.75'	**20.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.95 cfs @ 12.06 hrs HW=731.97' (Free Discharge)
└─**1=Orifice/Grate** (Orifice Controls 0.95 cfs @ 6.02 fps)
└─**2=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=730.25' (Free Discharge)
└─**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 3P: Wet Basin 01



Summary for Subcatchment 1S: Existing 01

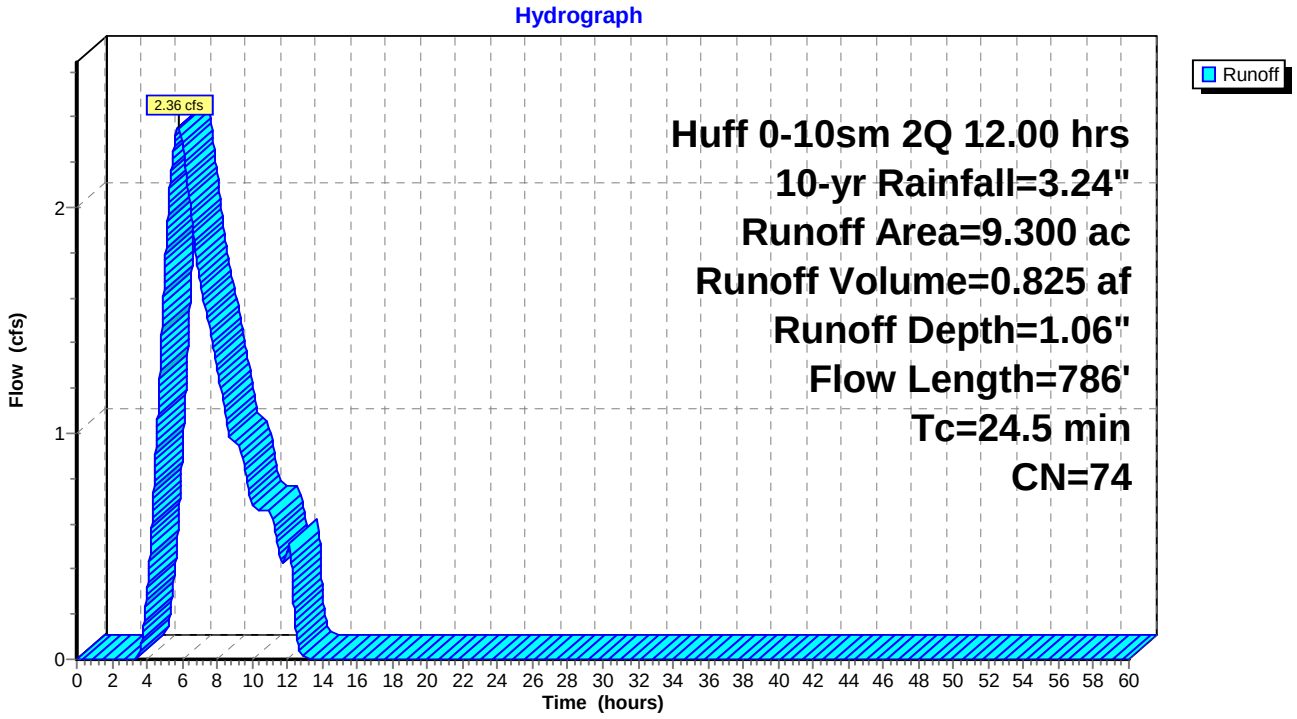
Runoff = 2.36 cfs @ 5.80 hrs, Volume= 0.825 af, Depth= 1.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Huff 0-10sm 2Q 12.00 hrs 10-yr Rainfall=3.24"

	Area (ac)	CN	Description
*	9.300	74	
	9.300		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.7	100	0.0200	0.16		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.70"
13.8	686	0.0140	0.83		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
24.5	786	Total			

Subcatchment 1S: Existing 01



Summary for Subcatchment 2S: Subarea 01 Impervious

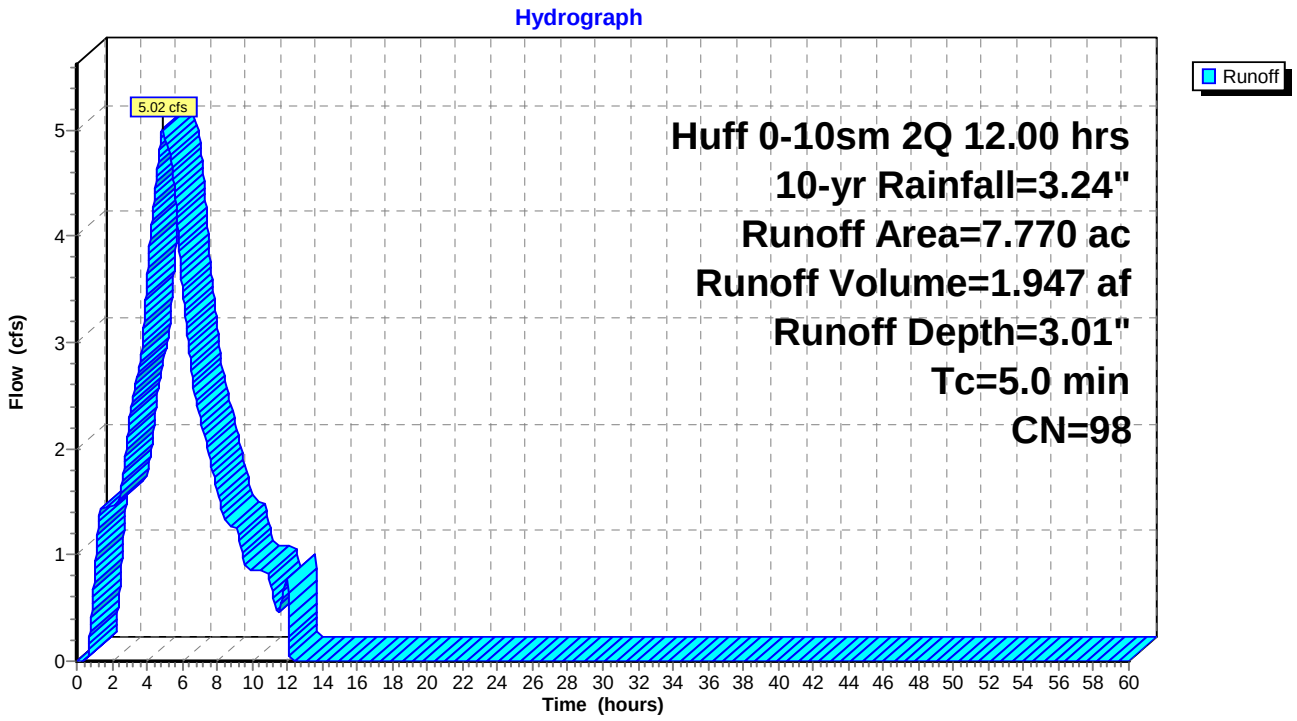
Runoff = 5.02 cfs @ 4.89 hrs, Volume= 1.947 af, Depth= 3.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Huff 0-10sm 2Q 12.00 hrs 10-yr Rainfall=3.24"

	Area (ac)	CN	Description
*	7.770	98	
	7.770		100.00% Impervious Area

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

Subcatchment 2S: Subarea 01 Impervious



Summary for Subcatchment 5S: Subarea 01 Pervious

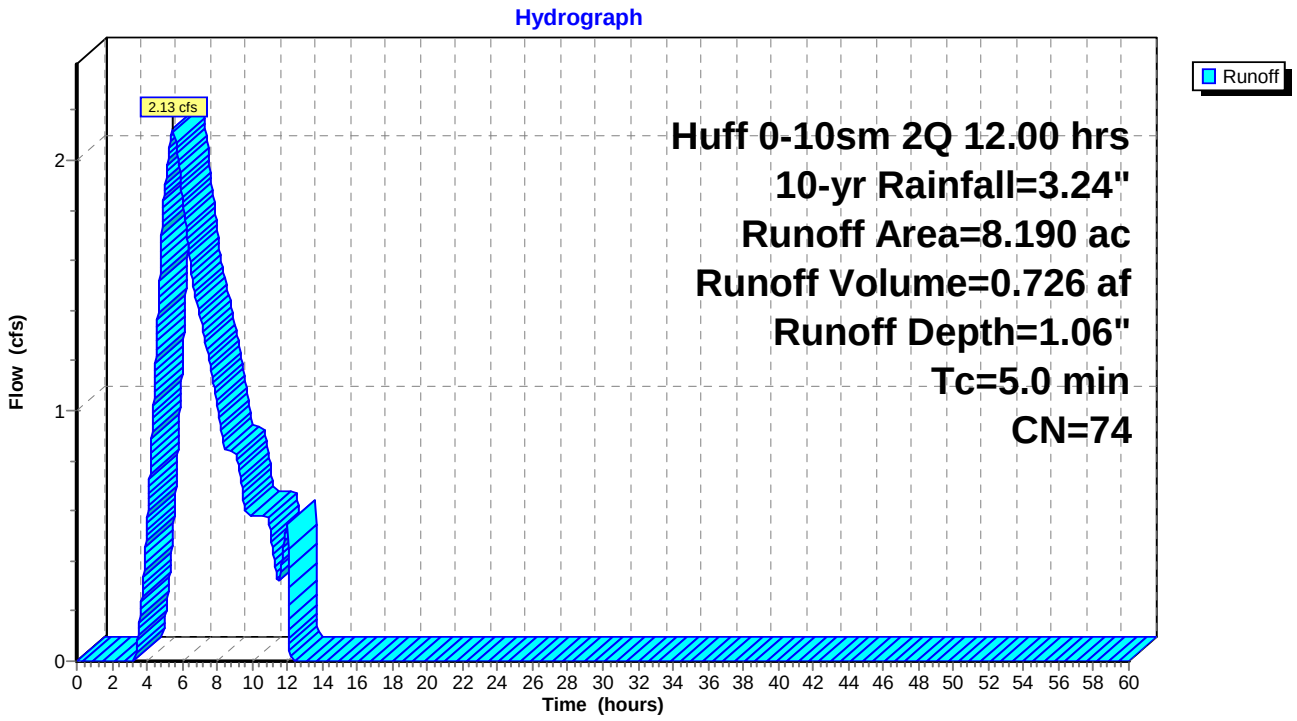
Runoff = 2.13 cfs @ 5.48 hrs, Volume= 0.726 af, Depth= 1.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Huff 0-10sm 2Q 12.00 hrs 10-yr Rainfall=3.24"

	Area (ac)	CN	Description
*	8.190	74	
	8.190		100.00% Pervious Area

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

Subcatchment 5S: Subarea 01 Pervious



Summary for Subcatchment 6S: Offsite 02 Impervious

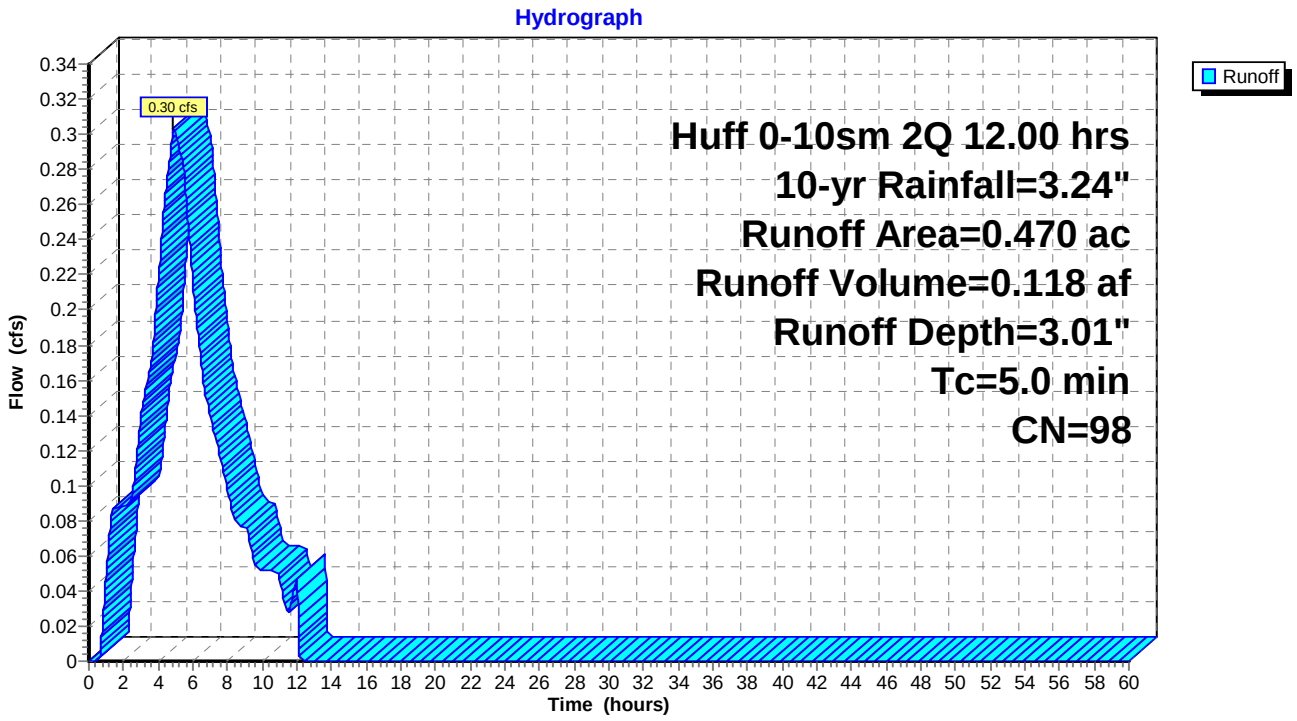
Runoff = 0.30 cfs @ 4.89 hrs, Volume= 0.118 af, Depth= 3.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Huff 0-10sm 2Q 12.00 hrs 10-yr Rainfall=3.24"

	Area (ac)	CN	Description
*	0.470	98	
	0.470		100.00% Impervious Area

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

Subcatchment 6S: Offsite 02 Impervious



Summary for Subcatchment 7S: Offsite 02 Pervious

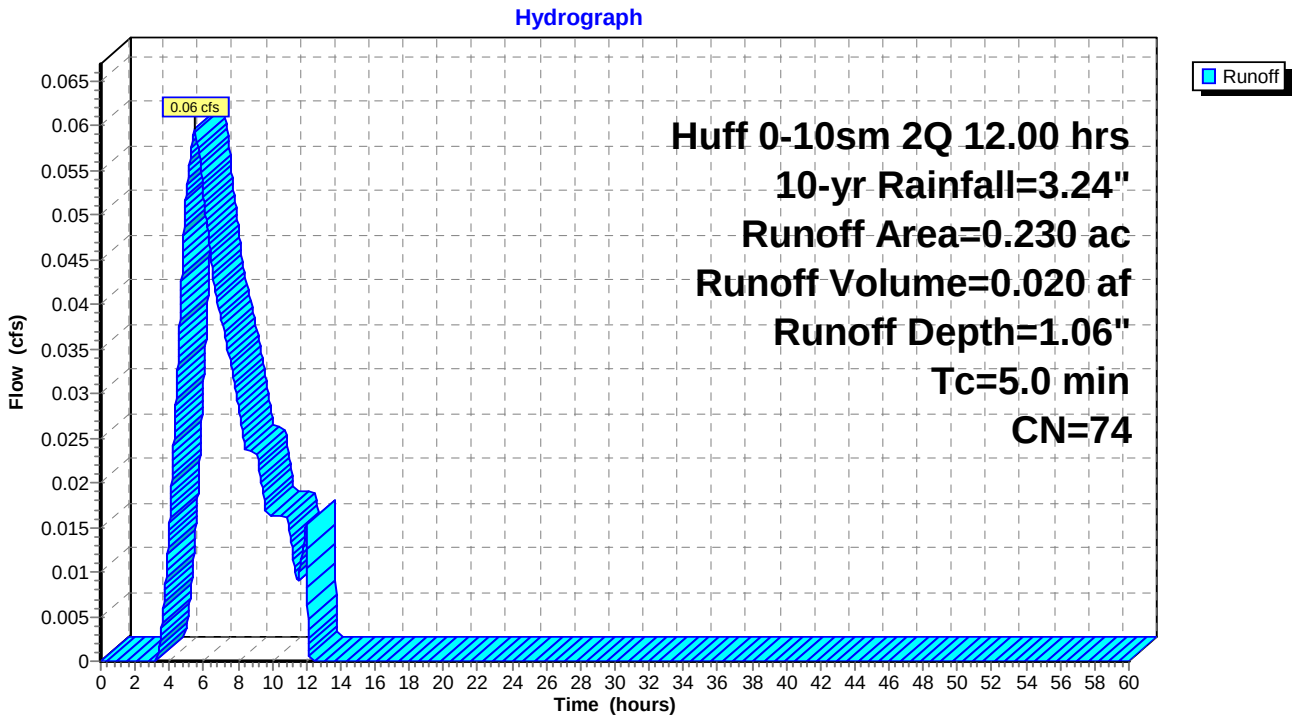
Runoff = 0.06 cfs @ 5.48 hrs, Volume= 0.020 af, Depth= 1.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Huff 0-10sm 2Q 12.00 hrs 10-yr Rainfall=3.24"

	Area (ac)	CN	Description
*	0.230	74	
	0.230		100.00% Pervious Area

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

Subcatchment 7S: Offsite 02 Pervious



Summary for Subcatchment 8S: Offsite 01 Pervious

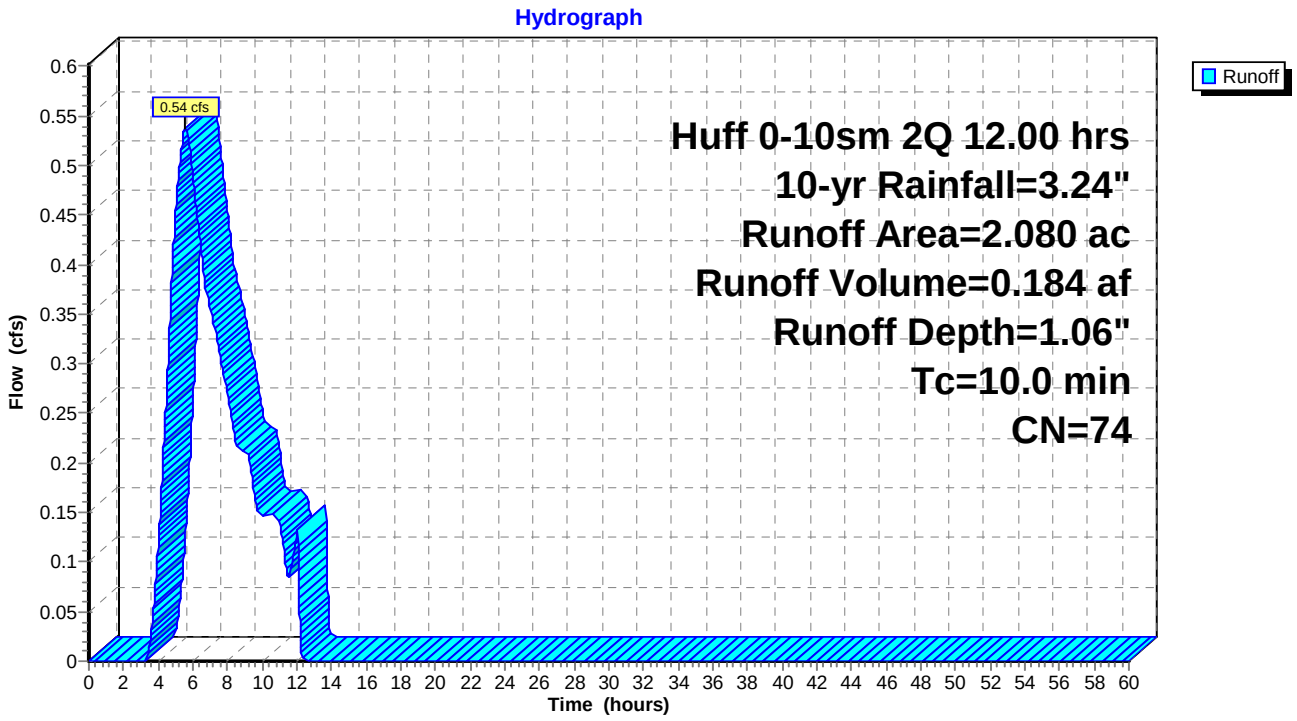
Runoff = 0.54 cfs @ 5.57 hrs, Volume= 0.184 af, Depth= 1.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Huff 0-10sm 2Q 12.00 hrs 10-yr Rainfall=3.24"

	Area (ac)	CN	Description
*	2.080	74	
	2.080		100.00% Pervious Area

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

Subcatchment 8S: Offsite 01 Pervious



Summary for Pond 3P: Wet Basin 01

Inflow Area = 18.740 ac, 43.97% Impervious, Inflow Depth = 1.92" for 10-yr event
Inflow = 7.69 cfs @ 5.26 hrs, Volume= 2.996 af
Outflow = 1.07 cfs @ 12.06 hrs, Volume= 2.854 af, Atten= 86%, Lag= 408.3 min
Primary = 1.07 cfs @ 12.06 hrs, Volume= 2.854 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 732.38' @ 12.06 hrs Surf.Area= 1.178 ac Storage= 2.335 af

Plug-Flow detention time= 1,083.8 min calculated for 2.854 af (95% of inflow)
Center-of-Mass det. time= 1,067.8 min (1,430.4 - 362.5)

Volume	Invert	Avail.Storage	Storage Description
#1	730.25'	4.675 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

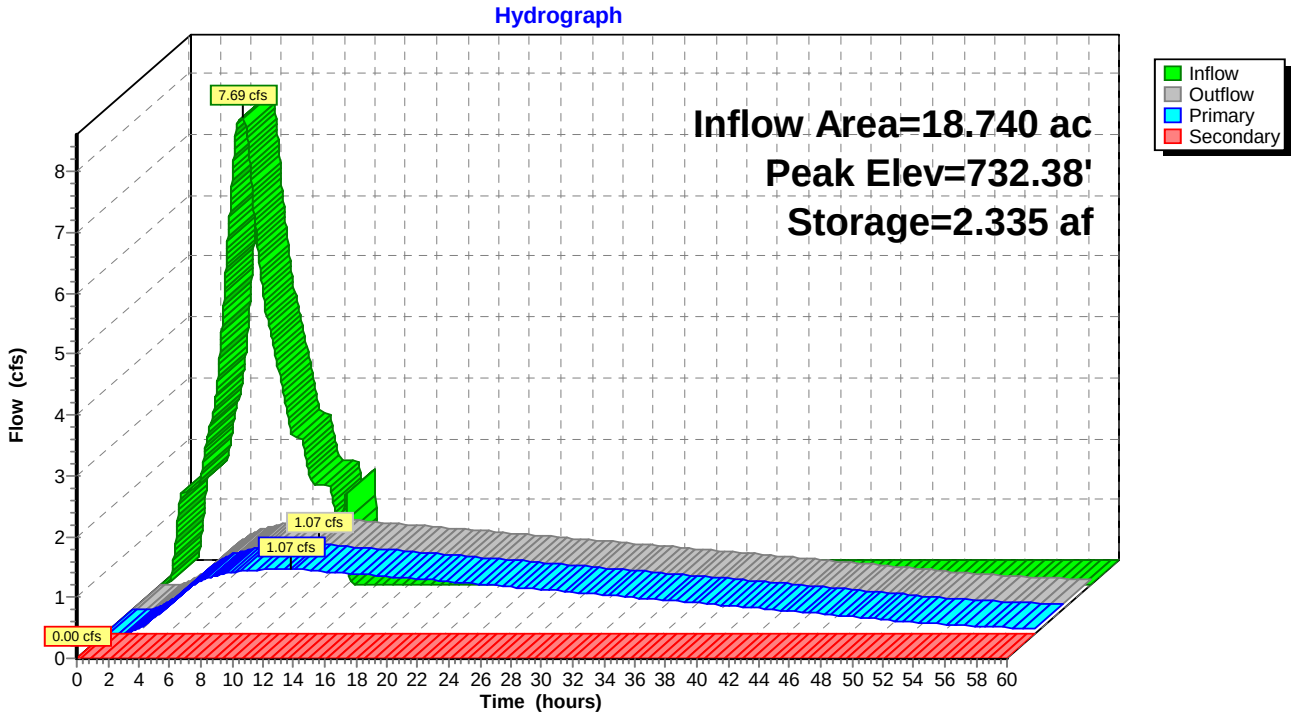
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
730.25	1.012	0.000	0.000
731.25	1.088	1.050	1.050
732.25	1.167	1.128	2.177
733.25	1.248	1.208	3.385
734.25	1.332	1.290	4.675

Device	Routing	Invert	Outlet Devices
#1	Primary	730.25'	**3.8" Vert. Orifice/Grate X 2.00** C= 0.600
#2	Primary	733.55'	**2.0" x 24.0" Horiz. Orifice/Grate X 8.00** C= 0.600 in 27.5" x 27.5" Grate (51% open area) Limited to weir flow at low heads
#3	Secondary	733.75'	**20.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=1.07 cfs @ 12.06 hrs HW=732.38' (Free Discharge)
└─**1=Orifice/Grate** (Orifice Controls 1.07 cfs @ 6.77 fps)
└─**2=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=730.25' (Free Discharge)
└─**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 3P: Wet Basin 01



Summary for Subcatchment 1S: Existing 01

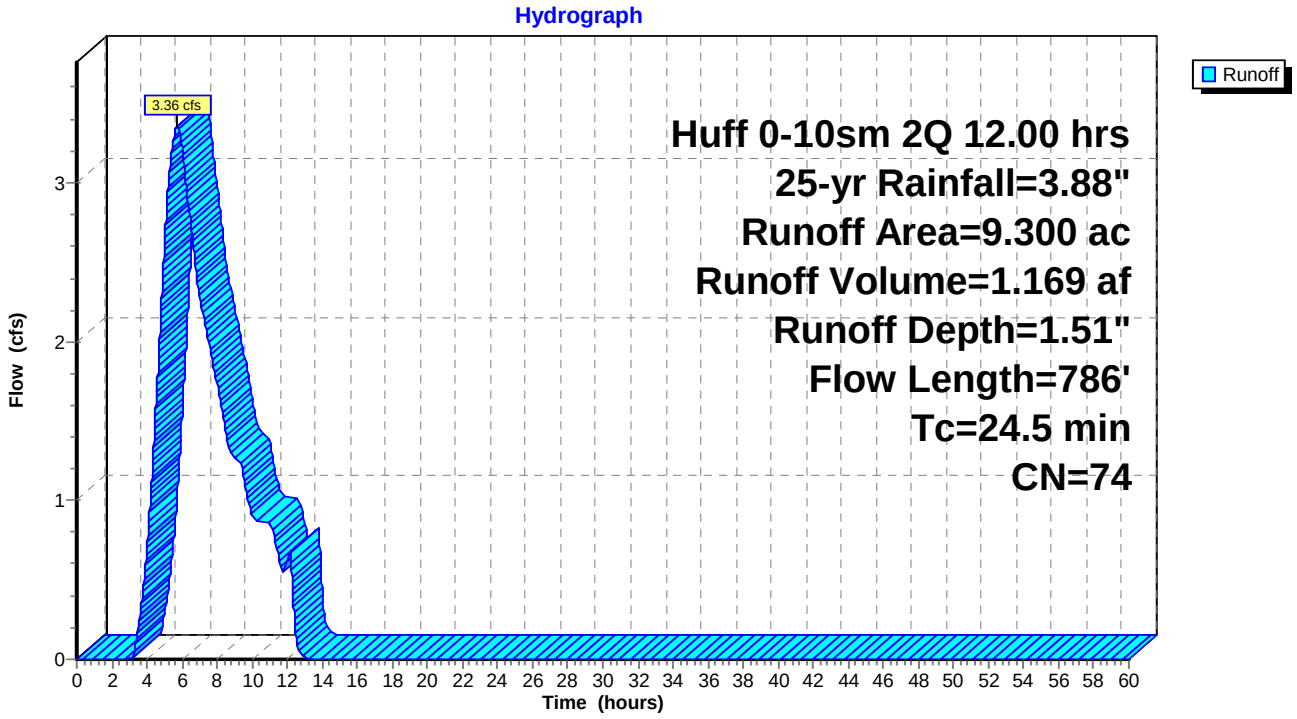
Runoff = 3.36 cfs @ 5.74 hrs, Volume= 1.169 af, Depth= 1.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Huff 0-10sm 2Q 12.00 hrs 25-yr Rainfall=3.88"

	Area (ac)	CN	Description
*	9.300	74	
	9.300		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.7	100	0.0200	0.16		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.70"
13.8	686	0.0140	0.83		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
24.5	786	Total			

Subcatchment 1S: Existing 01



Summary for Subcatchment 2S: Subarea 01 Impervious

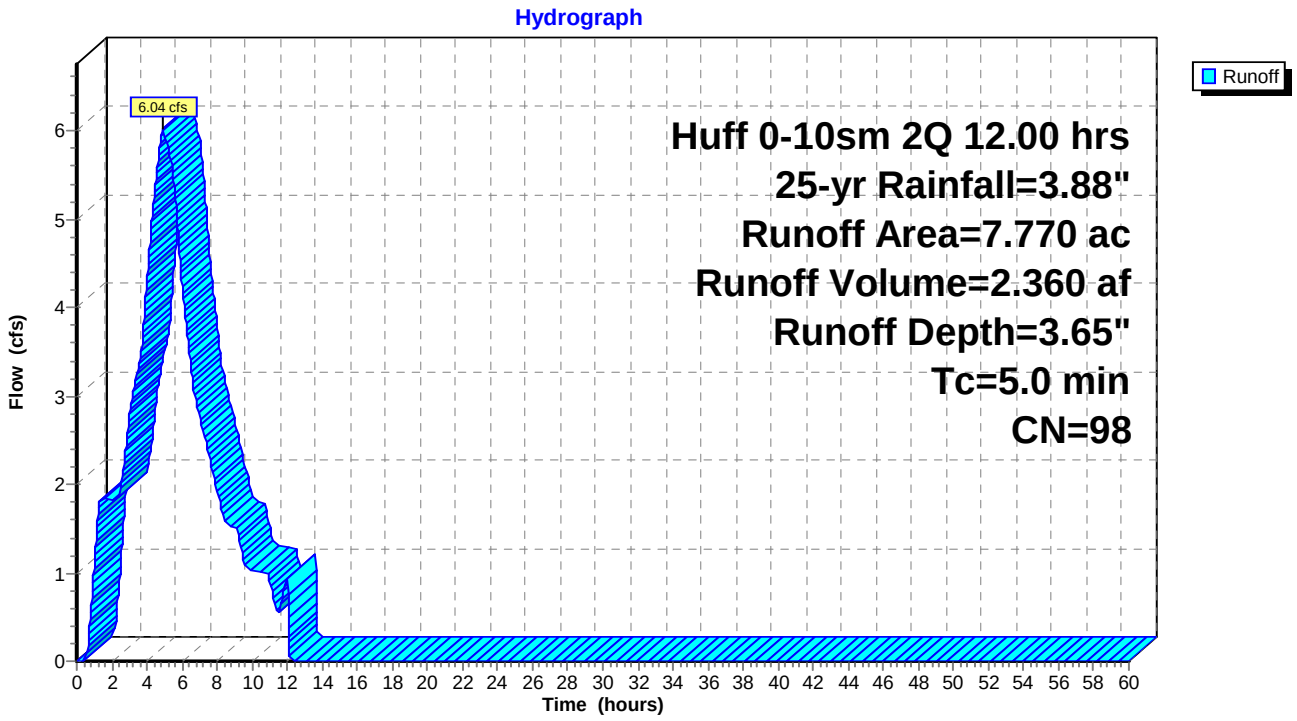
Runoff = 6.04 cfs @ 4.89 hrs, Volume= 2.360 af, Depth= 3.65"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Huff 0-10sm 2Q 12.00 hrs 25-yr Rainfall=3.88"

	Area (ac)	CN	Description
*	7.770	98	
	7.770		100.00% Impervious Area

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

Subcatchment 2S: Subarea 01 Impervious



Summary for Subcatchment 5S: Subarea 01 Pervious

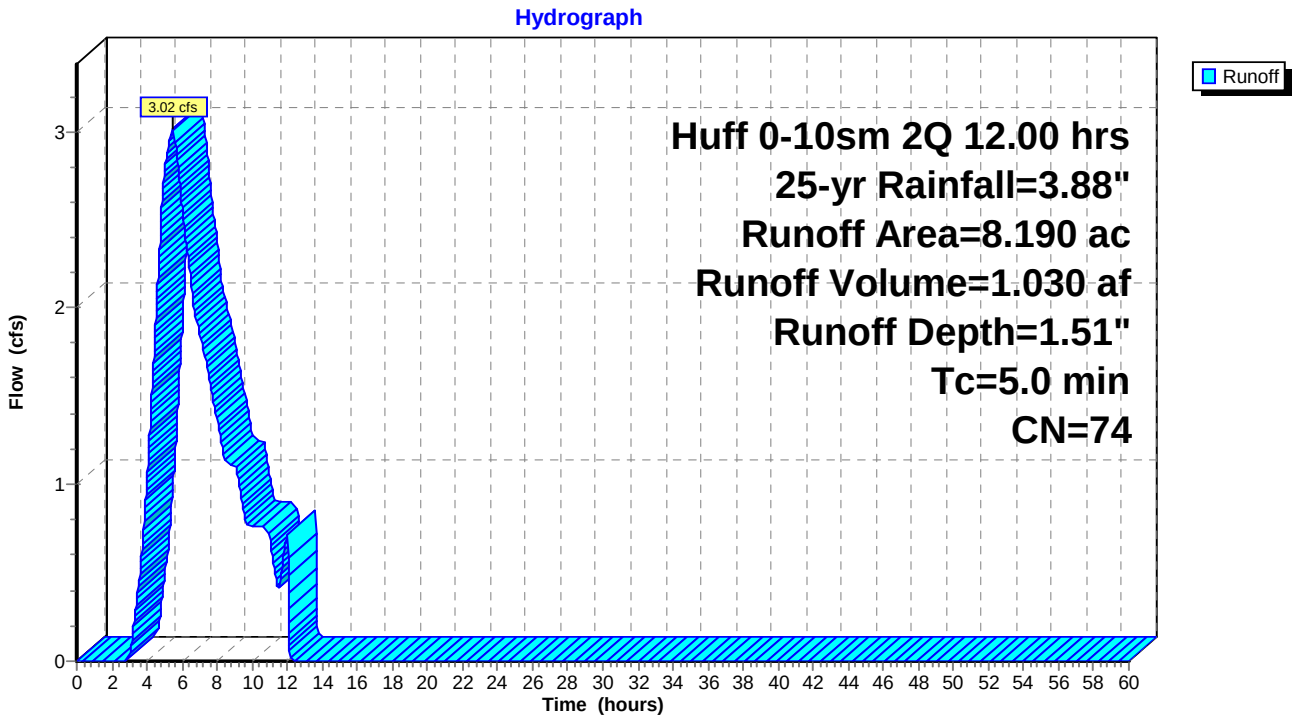
Runoff = 3.02 cfs @ 5.46 hrs, Volume= 1.030 af, Depth= 1.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Huff 0-10sm 2Q 12.00 hrs 25-yr Rainfall=3.88"

	Area (ac)	CN	Description
*	8.190	74	
	8.190		100.00% Pervious Area

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

Subcatchment 5S: Subarea 01 Pervious



Summary for Subcatchment 6S: Offsite 02 Impervious

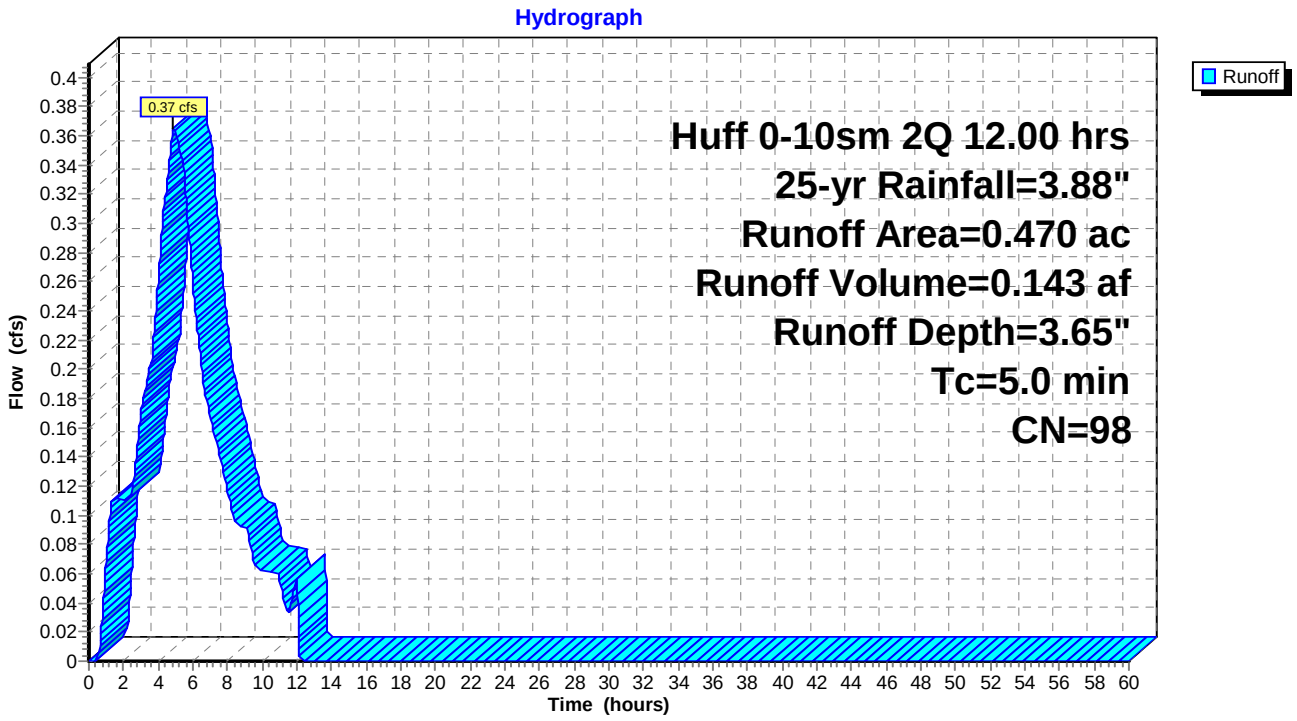
Runoff = 0.37 cfs @ 4.89 hrs, Volume= 0.143 af, Depth= 3.65"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Huff 0-10sm 2Q 12.00 hrs 25-yr Rainfall=3.88"

	Area (ac)	CN	Description
*	0.470	98	
	0.470		100.00% Impervious Area

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

Subcatchment 6S: Offsite 02 Impervious



Summary for Subcatchment 7S: Offsite 02 Pervious

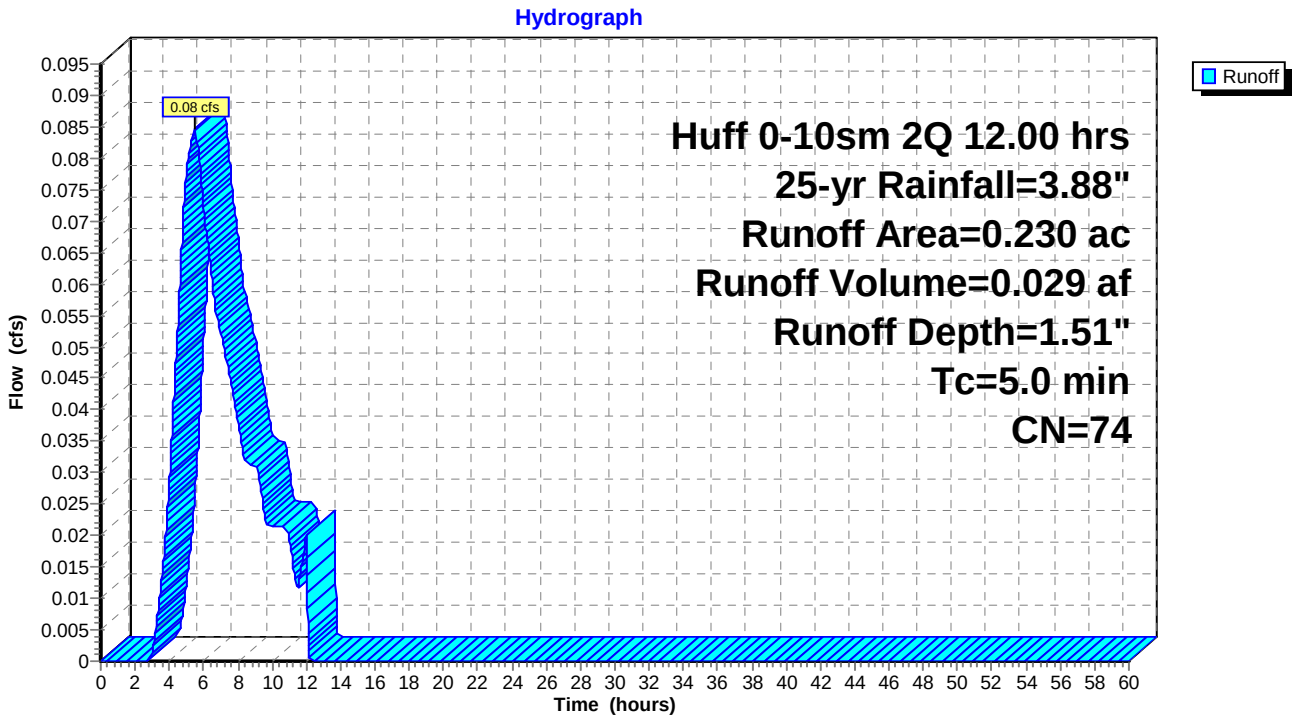
Runoff = 0.08 cfs @ 5.46 hrs, Volume= 0.029 af, Depth= 1.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Huff 0-10sm 2Q 12.00 hrs 25-yr Rainfall=3.88"

	Area (ac)	CN	Description
*	0.230	74	
	0.230		100.00% Pervious Area

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

Subcatchment 7S: Offsite 02 Pervious



Summary for Subcatchment 8S: Offsite 01 Pervious

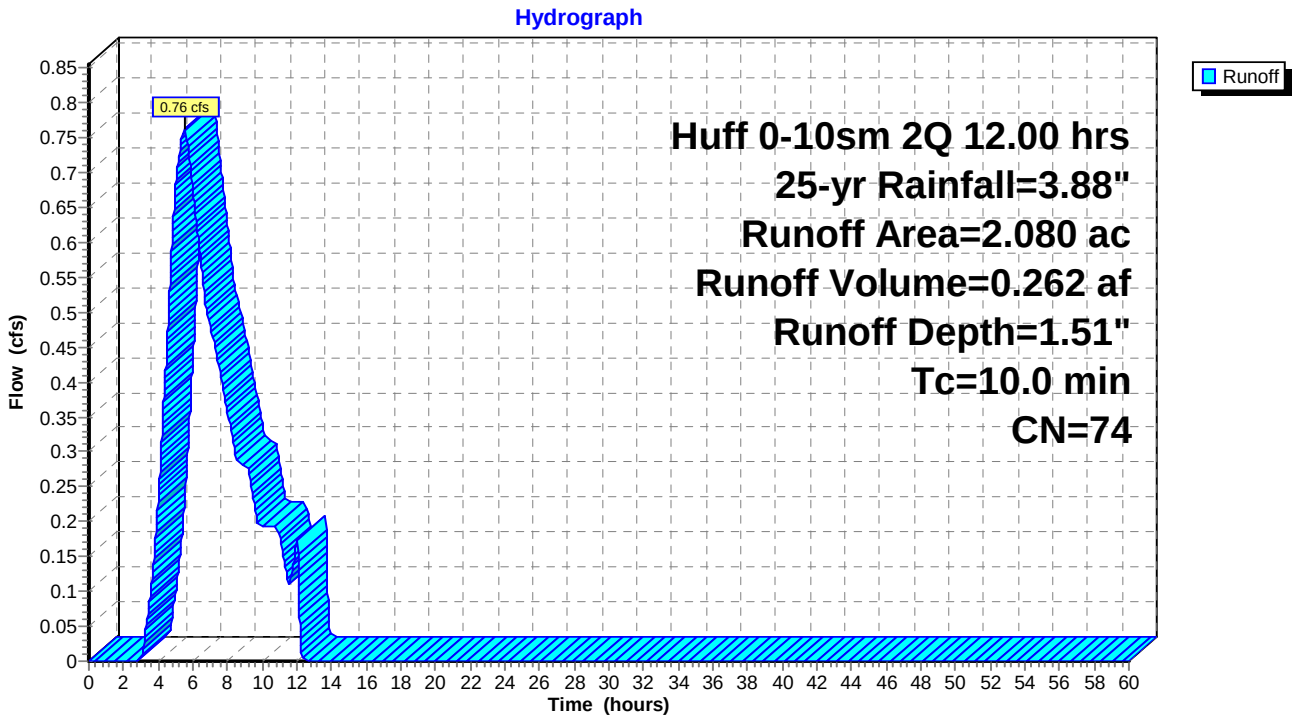
Runoff = 0.76 cfs @ 5.52 hrs, Volume= 0.262 af, Depth= 1.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Huff 0-10sm 2Q 12.00 hrs 25-yr Rainfall=3.88"

	Area (ac)	CN	Description
*	2.080	74	
	2.080		100.00% Pervious Area

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

Subcatchment 8S: Offsite 01 Pervious



Summary for Pond 3P: Wet Basin 01

Inflow Area = 18.740 ac, 43.97% Impervious, Inflow Depth = 2.45" for 25-yr event
Inflow = 9.87 cfs @ 5.15 hrs, Volume= 3.823 af
Outflow = 1.22 cfs @ 12.07 hrs, Volume= 3.601 af, Atten= 88%, Lag= 415.0 min
Primary = 1.22 cfs @ 12.07 hrs, Volume= 3.601 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 732.99' @ 12.07 hrs Surf.Area= 1.227 ac Storage= 3.059 af

Plug-Flow detention time= 1,192.2 min calculated for 3.601 af (94% of inflow)
Center-of-Mass det. time= 1,172.8 min (1,533.6 - 360.8)

Volume	Invert	Avail.Storage	Storage Description
#1	730.25'	4.675 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

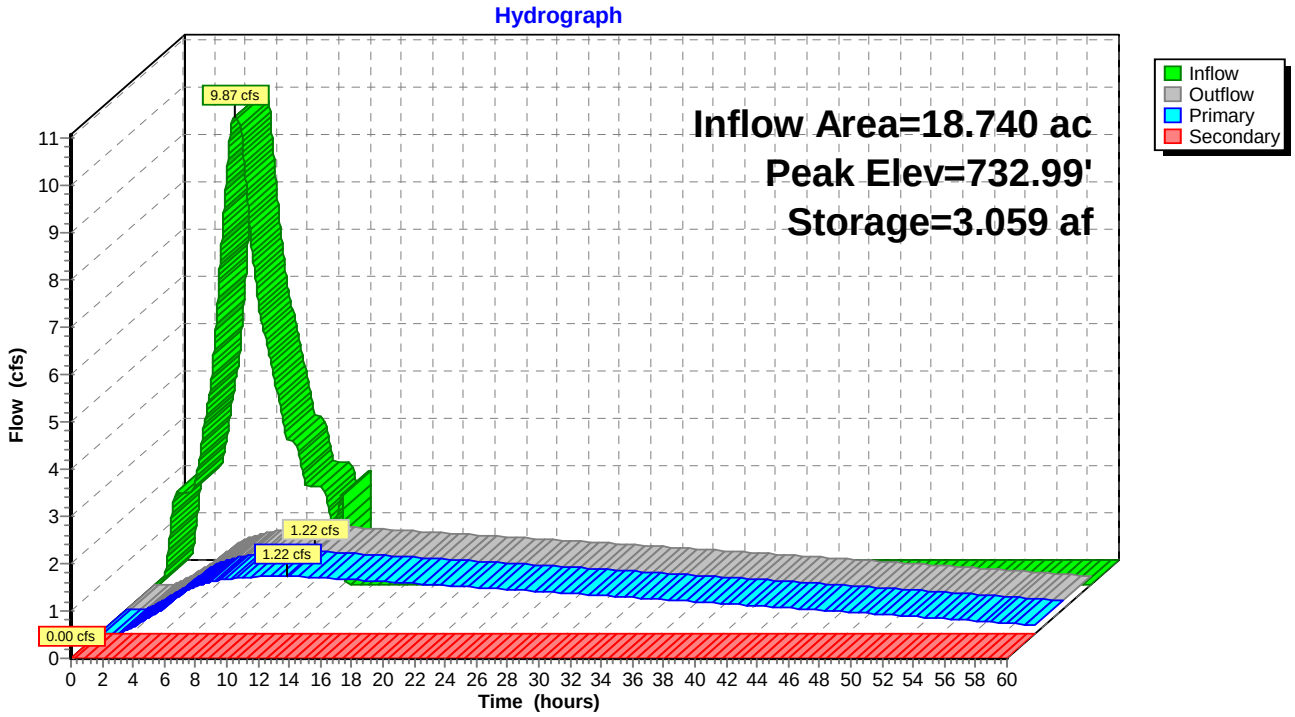
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
730.25	1.012	0.000	0.000
731.25	1.088	1.050	1.050
732.25	1.167	1.128	2.177
733.25	1.248	1.208	3.385
734.25	1.332	1.290	4.675

Device	Routing	Invert	Outlet Devices
#1	Primary	730.25'	**3.8" Vert. Orifice/Grate X 2.00** C= 0.600
#2	Primary	733.55'	**2.0" x 24.0" Horiz. Orifice/Grate X 8.00** C= 0.600 in 27.5" x 27.5" Grate (51% open area) Limited to weir flow at low heads
#3	Secondary	733.75'	**20.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=1.22 cfs @ 12.07 hrs HW=732.99' (Free Discharge)
└─**1=Orifice/Grate** (Orifice Controls 1.22 cfs @ 7.73 fps)
└─**2=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=730.25' (Free Discharge)
└─**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 3P: Wet Basin 01



Summary for Subcatchment 1S: Existing 01

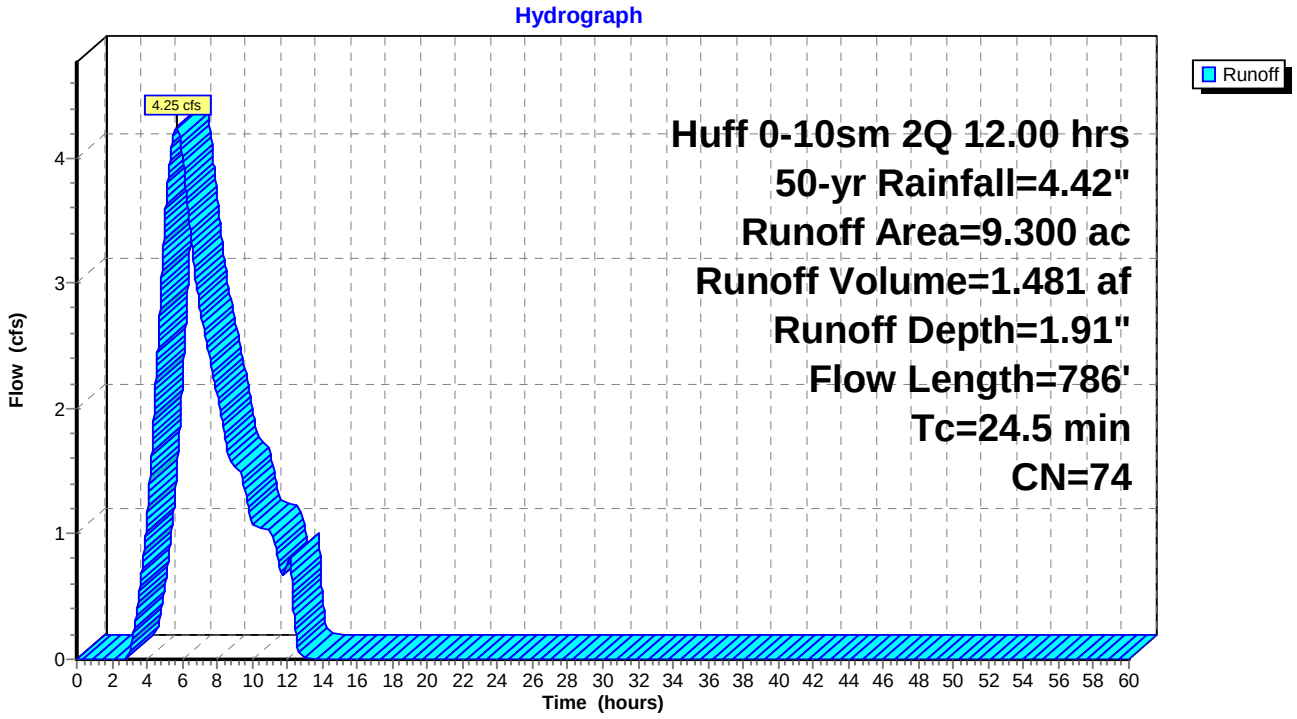
Runoff = 4.25 cfs @ 5.69 hrs, Volume= 1.481 af, Depth= 1.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Huff 0-10sm 2Q 12.00 hrs 50-yr Rainfall=4.42"

	Area (ac)	CN	Description
*	9.300	74	
	9.300		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.7	100	0.0200	0.16		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.70"
13.8	686	0.0140	0.83		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
24.5	786	Total			

Subcatchment 1S: Existing 01



Summary for Subcatchment 2S: Subarea 01 Impervious

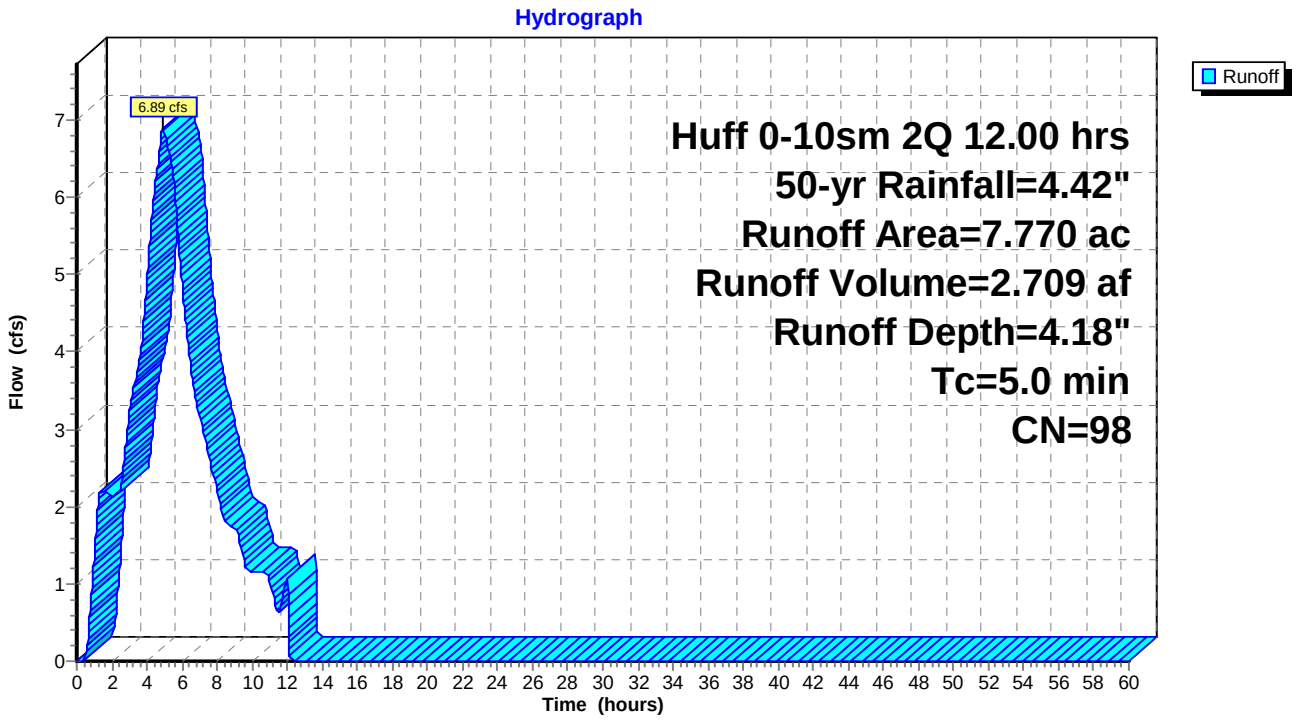
Runoff = 6.89 cfs @ 4.89 hrs, Volume= 2.709 af, Depth= 4.18"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Huff 0-10sm 2Q 12.00 hrs 50-yr Rainfall=4.42"

	Area (ac)	CN	Description
*	7.770	98	
	7.770		100.00% Impervious Area

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

Subcatchment 2S: Subarea 01 Impervious



Summary for Subcatchment 5S: Subarea 01 Pervious

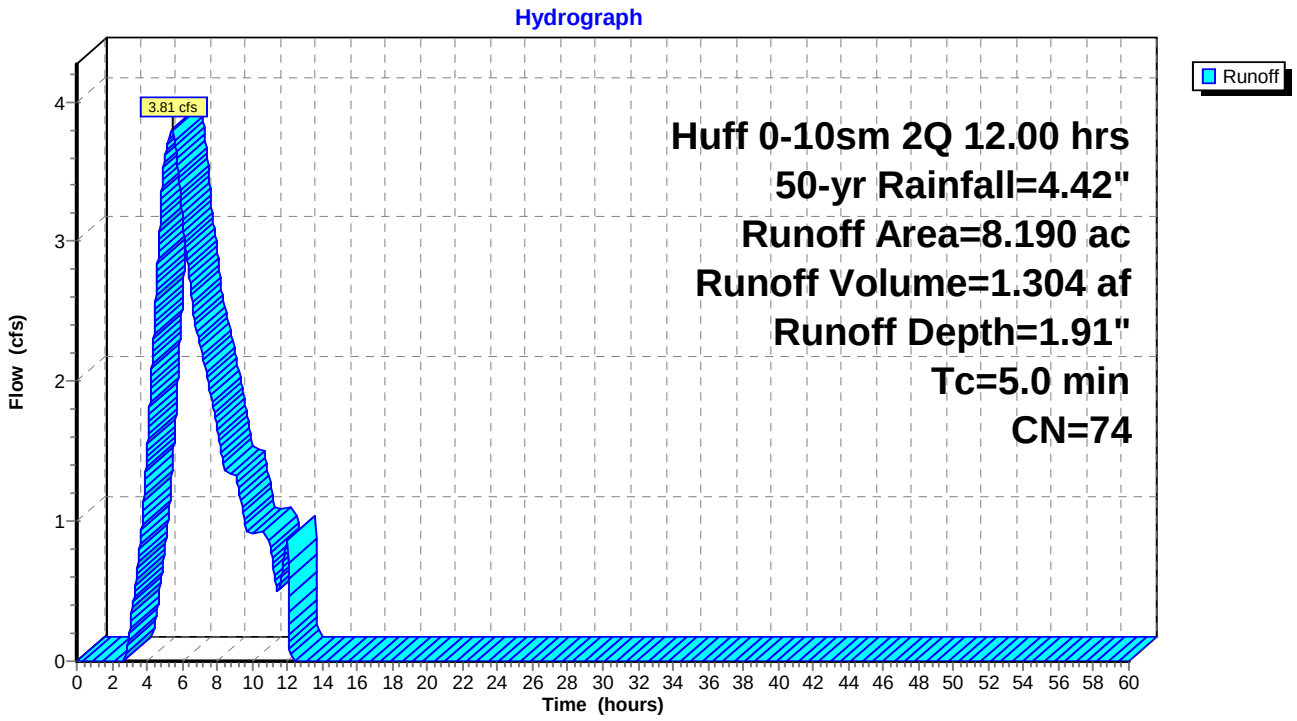
Runoff = 3.81 cfs @ 5.45 hrs, Volume= 1.304 af, Depth= 1.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Huff 0-10sm 2Q 12.00 hrs 50-yr Rainfall=4.42"

	Area (ac)	CN	Description
*	8.190	74	
	8.190		100.00% Pervious Area

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

Subcatchment 5S: Subarea 01 Pervious



Summary for Subcatchment 6S: Offsite 02 Impervious

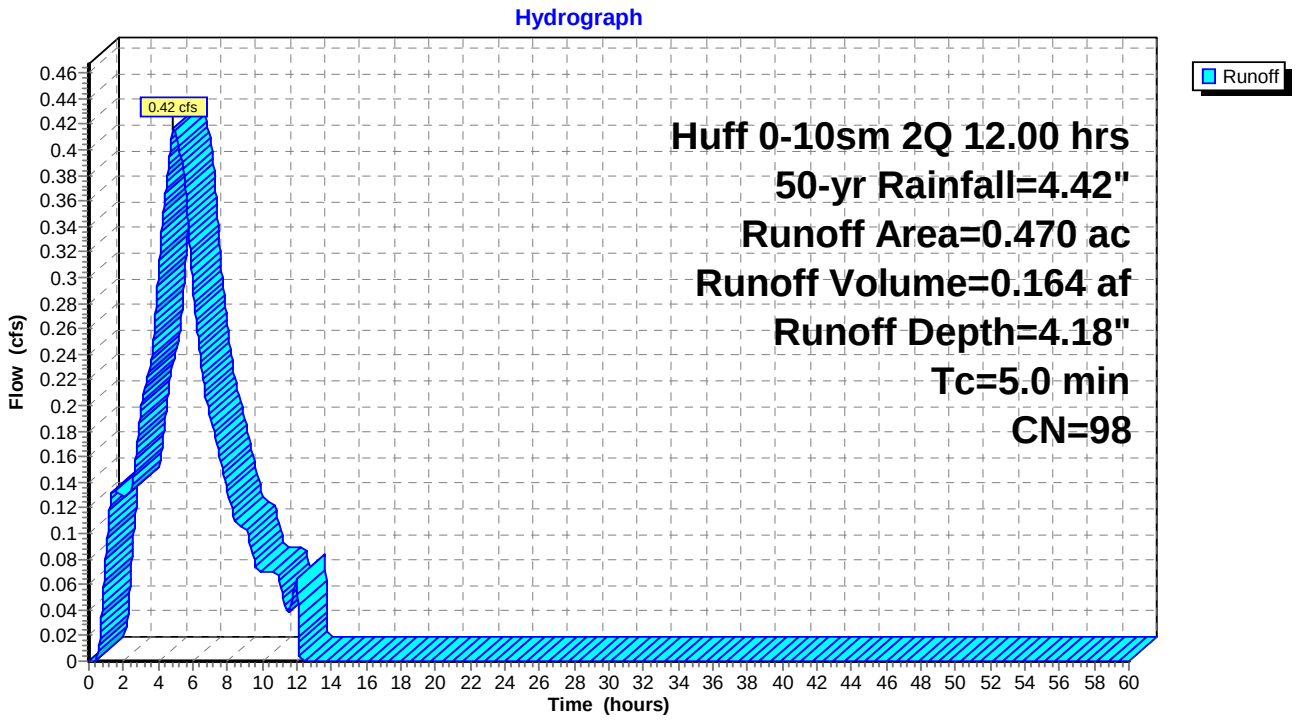
Runoff = 0.42 cfs @ 4.89 hrs, Volume= 0.164 af, Depth= 4.18"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Huff 0-10sm 2Q 12.00 hrs 50-yr Rainfall=4.42"

	Area (ac)	CN	Description
*	0.470	98	
	0.470		100.00% Impervious Area

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

Subcatchment 6S: Offsite 02 Impervious



Summary for Subcatchment 7S: Offsite 02 Pervious

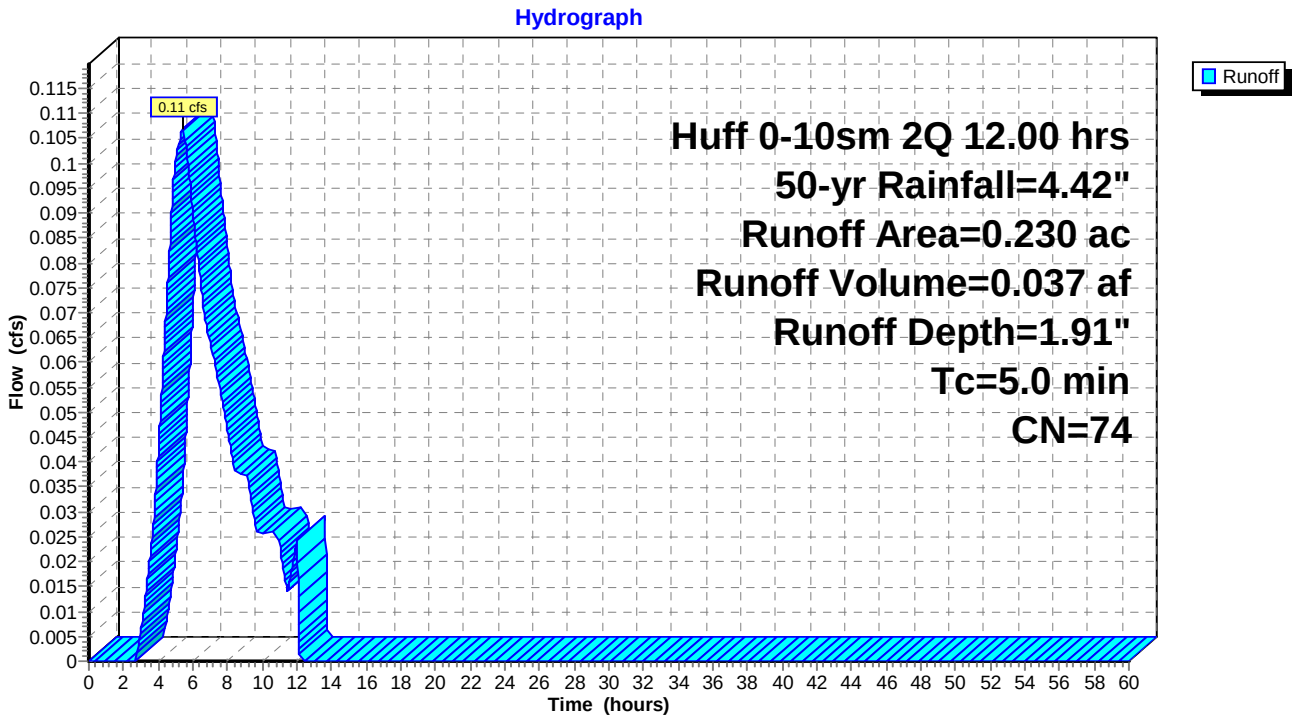
Runoff = 0.11 cfs @ 5.45 hrs, Volume= 0.037 af, Depth= 1.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Huff 0-10sm 2Q 12.00 hrs 50-yr Rainfall=4.42"

	Area (ac)	CN	Description
*	0.230	74	
	0.230		100.00% Pervious Area

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

Subcatchment 7S: Offsite 02 Pervious



Summary for Subcatchment 8S: Offsite 01 Pervious

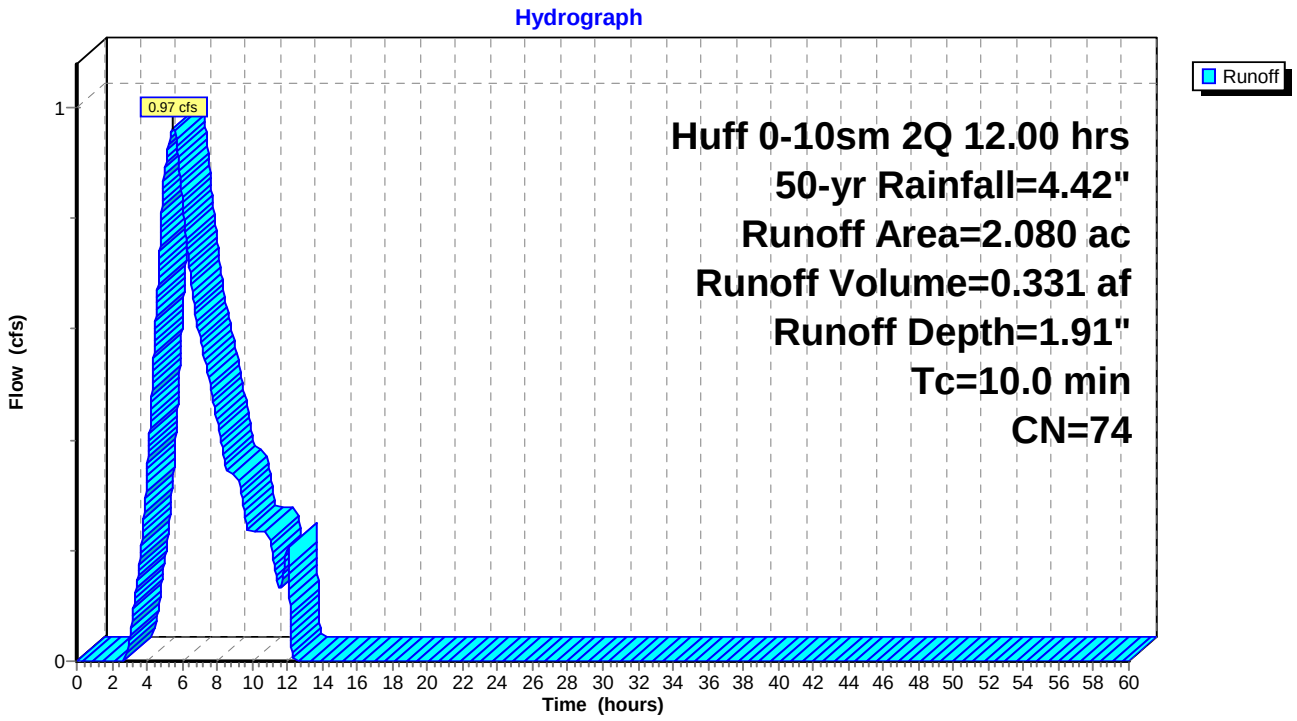
Runoff = 0.97 cfs @ 5.50 hrs, Volume= 0.331 af, Depth= 1.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Huff 0-10sm 2Q 12.00 hrs 50-yr Rainfall=4.42"

	Area (ac)	CN	Description
*	2.080	74	
	2.080		100.00% Pervious Area

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

Subcatchment 8S: Offsite 01 Pervious



Summary for Pond 3P: Wet Basin 01

Inflow Area = 18.740 ac, 43.97% Impervious, Inflow Depth = 2.91" for 50-yr event
Inflow = 11.79 cfs @ 5.06 hrs, Volume= 4.545 af
Outflow = 1.33 cfs @ 12.07 hrs, Volume= 4.195 af, Atten= 89%, Lag= 420.7 min
Primary = 1.33 cfs @ 12.07 hrs, Volume= 4.195 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 733.50' @ 12.07 hrs Surf.Area= 1.269 ac Storage= 3.701 af

Plug-Flow detention time= 1,261.6 min calculated for 4.194 af (92% of inflow)
Center-of-Mass det. time= 1,236.9 min (1,596.2 - 359.3)

Volume	Invert	Avail.Storage	Storage Description
#1	730.25'	4.675 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

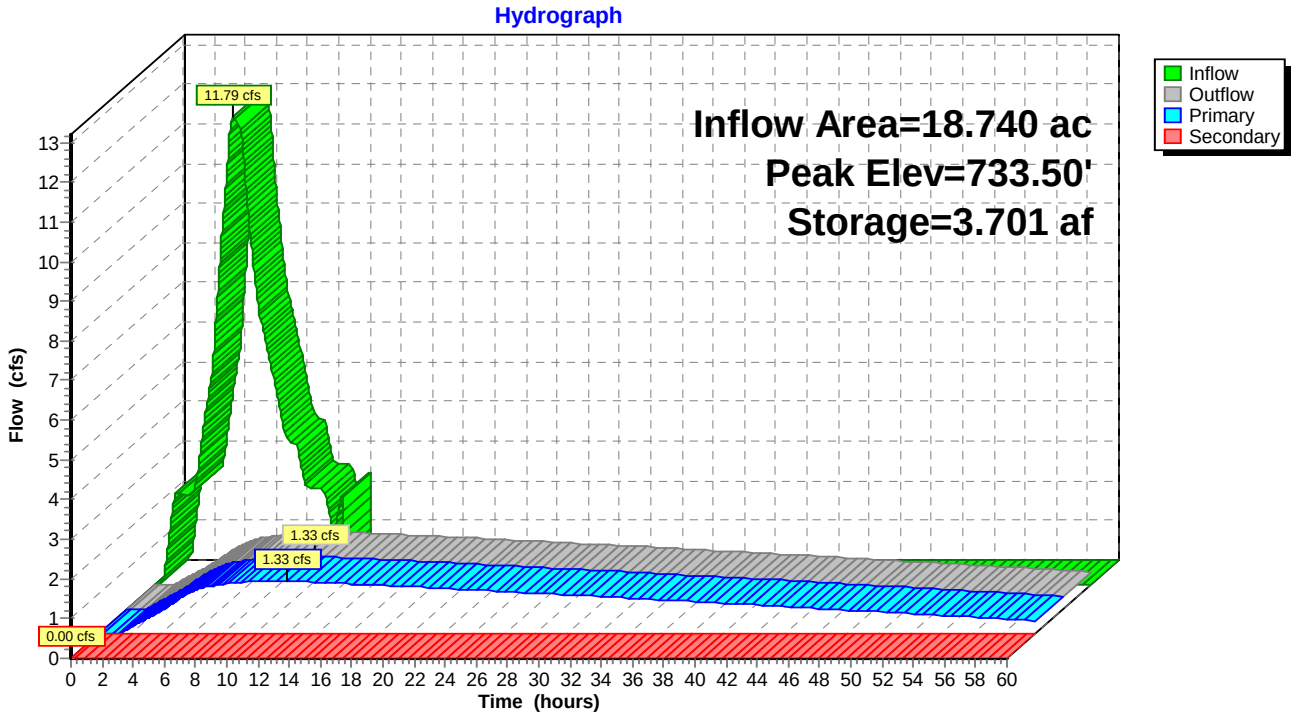
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
730.25	1.012	0.000	0.000
731.25	1.088	1.050	1.050
732.25	1.167	1.128	2.177
733.25	1.248	1.208	3.385
734.25	1.332	1.290	4.675

Device	Routing	Invert	Outlet Devices
#1	Primary	730.25'	**3.8" Vert. Orifice/Grate X 2.00** C= 0.600
#2	Primary	733.55'	**2.0" x 24.0" Horiz. Orifice/Grate X 8.00** C= 0.600 in 27.5" x 27.5" Grate (51% open area) Limited to weir flow at low heads
#3	Secondary	733.75'	**20.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=1.33 cfs @ 12.07 hrs HW=733.50' (Free Discharge)
└─**1=Orifice/Grate** (Orifice Controls 1.33 cfs @ 8.47 fps)
└─**2=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=730.25' (Free Discharge)
└─**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 3P: Wet Basin 01



Summary for Subcatchment 1S: Existing 01

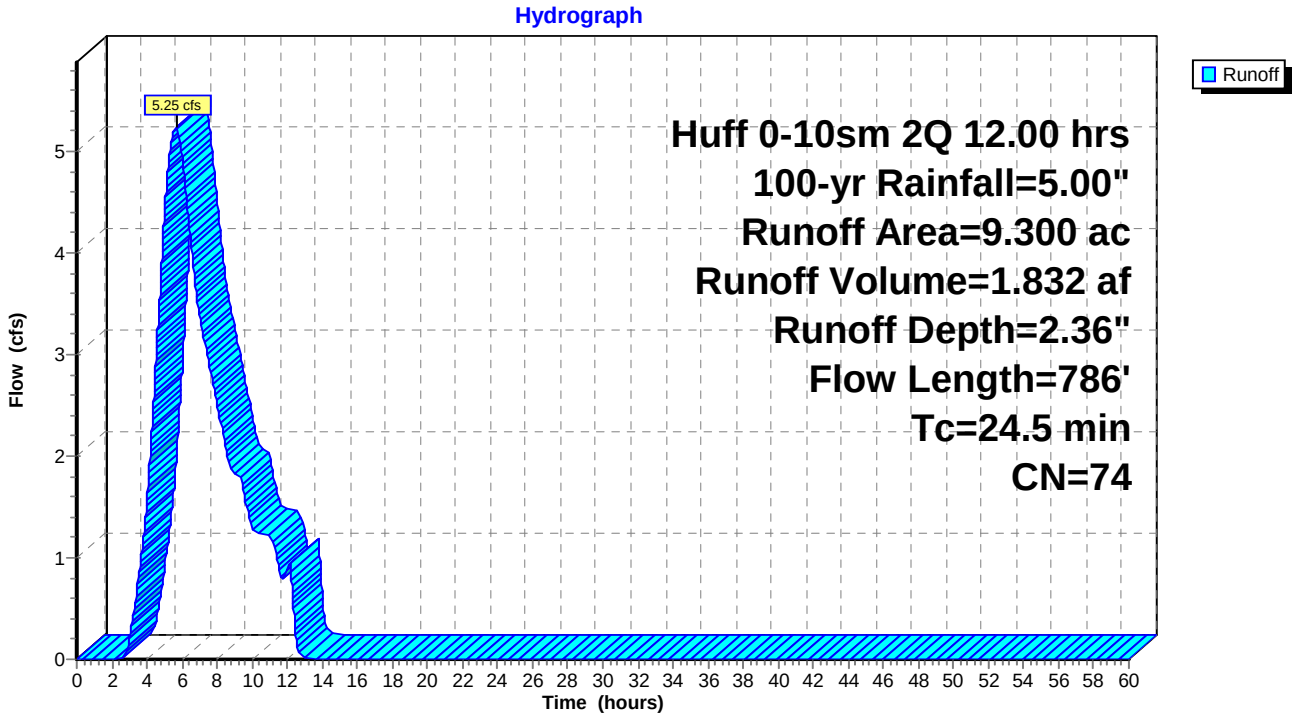
Runoff = 5.25 cfs @ 5.69 hrs, Volume= 1.832 af, Depth= 2.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Huff 0-10sm 2Q 12.00 hrs 100-yr Rainfall=5.00"

	Area (ac)	CN	Description
*	9.300	74	
	9.300		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.7	100	0.0200	0.16		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.70"
13.8	686	0.0140	0.83		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
24.5	786	Total			

Subcatchment 1S: Existing 01



Summary for Subcatchment 2S: Subarea 01 Impervious

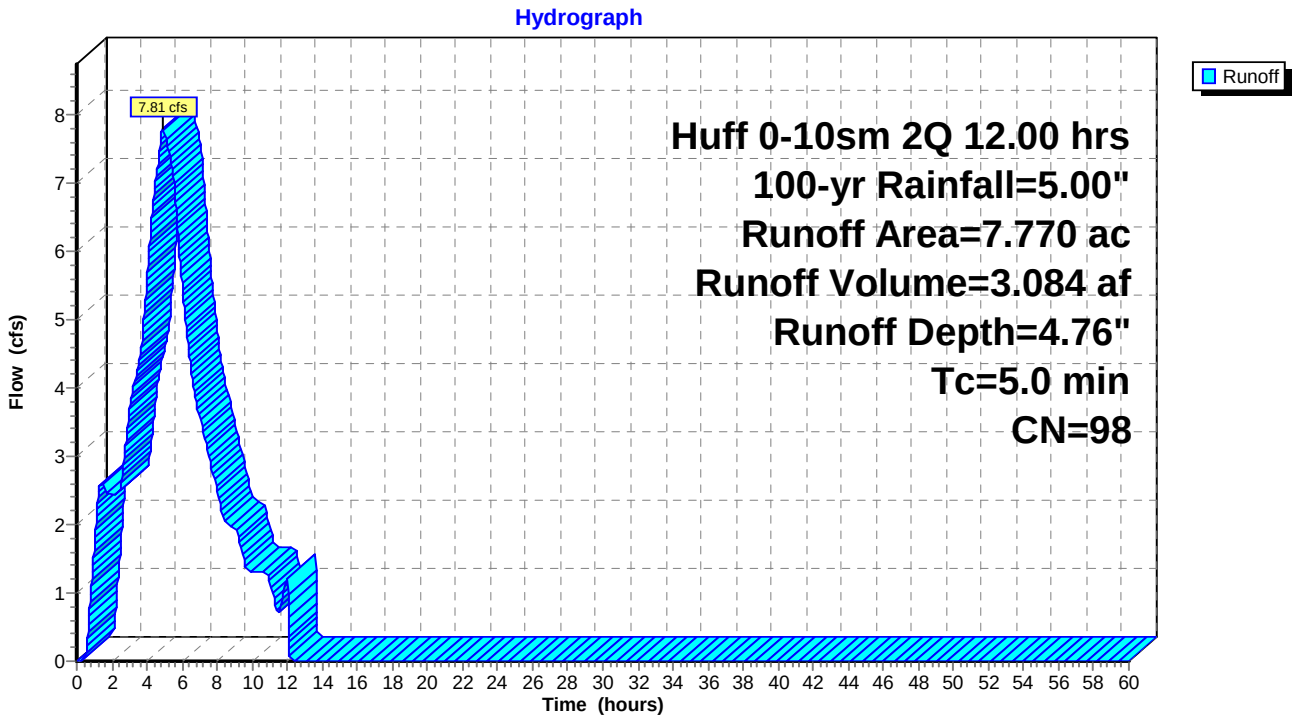
Runoff = 7.81 cfs @ 4.89 hrs, Volume= 3.084 af, Depth= 4.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Huff 0-10sm 2Q 12.00 hrs 100-yr Rainfall=5.00"

	Area (ac)	CN	Description
*	7.770	98	
	7.770		100.00% Impervious Area

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

Subcatchment 2S: Subarea 01 Impervious



Summary for Subcatchment 5S: Subarea 01 Pervious

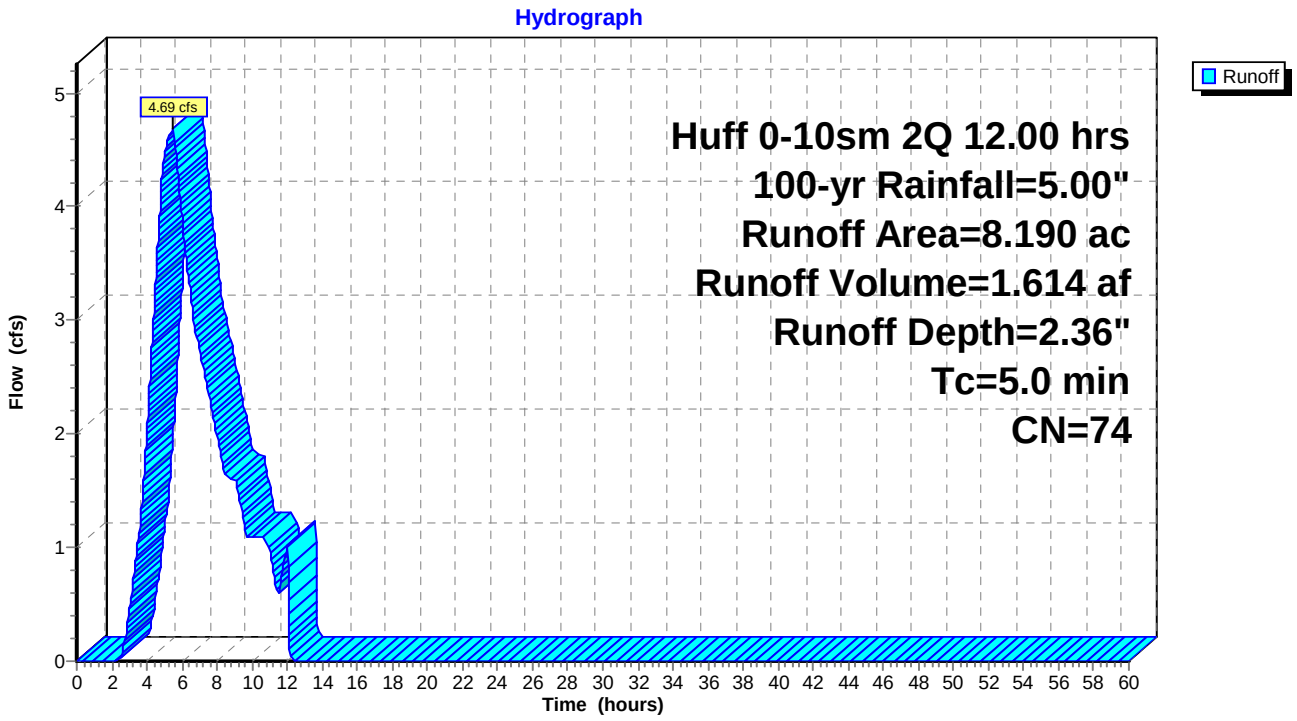
Runoff = 4.69 cfs @ 5.45 hrs, Volume= 1.614 af, Depth= 2.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Huff 0-10sm 2Q 12.00 hrs 100-yr Rainfall=5.00"

	Area (ac)	CN	Description
*	8.190	74	
	8.190		100.00% Pervious Area

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

Subcatchment 5S: Subarea 01 Pervious



Summary for Subcatchment 6S: Offsite 02 Impervious

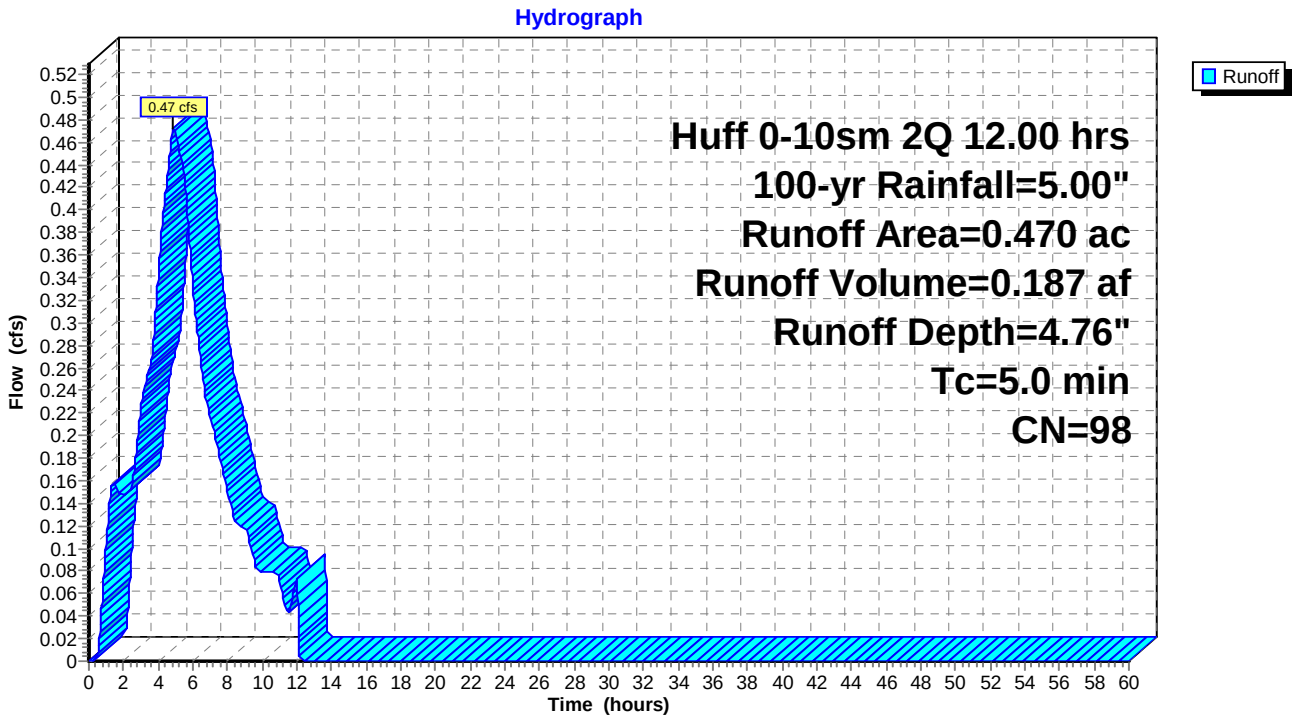
Runoff = 0.47 cfs @ 4.89 hrs, Volume= 0.187 af, Depth= 4.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Huff 0-10sm 2Q 12.00 hrs 100-yr Rainfall=5.00"

	Area (ac)	CN	Description
*	0.470	98	
	0.470		100.00% Impervious Area

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

Subcatchment 6S: Offsite 02 Impervious



Summary for Subcatchment 7S: Offsite 02 Pervious

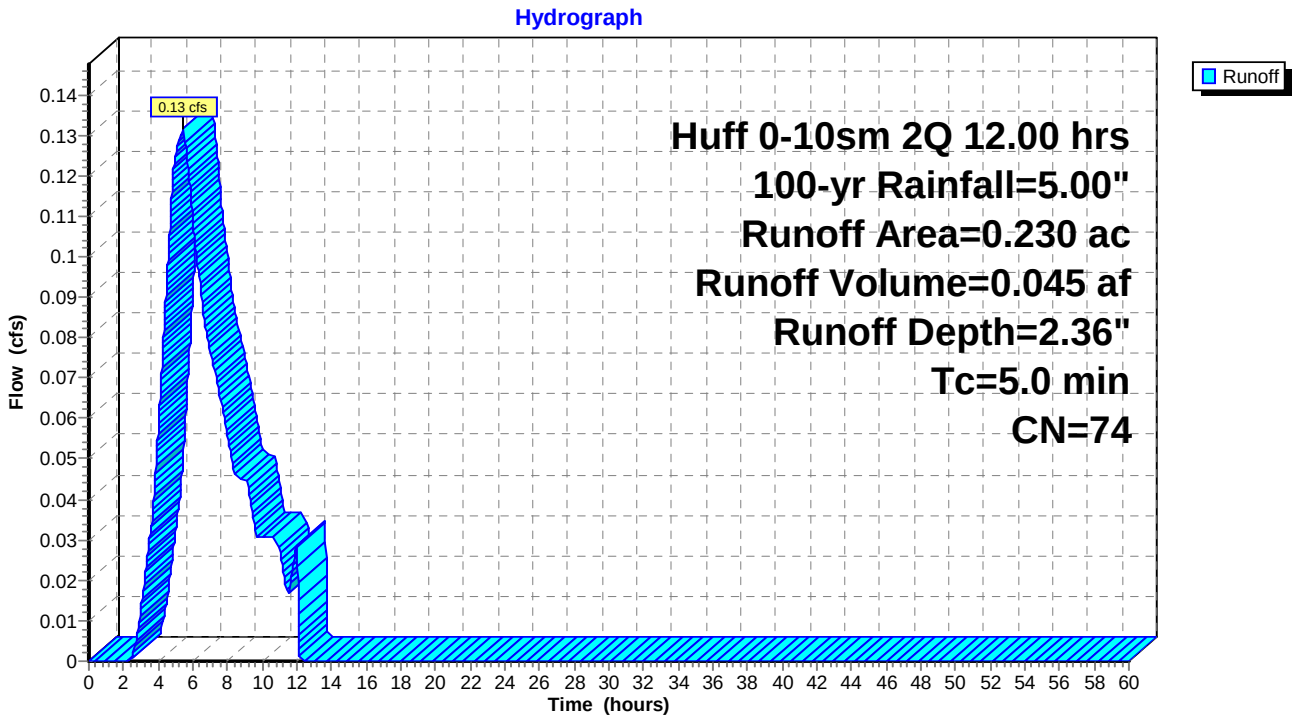
Runoff = 0.13 cfs @ 5.45 hrs, Volume= 0.045 af, Depth= 2.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Huff 0-10sm 2Q 12.00 hrs 100-yr Rainfall=5.00"

	Area (ac)	CN	Description
*	0.230	74	
	0.230		100.00% Pervious Area

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

Subcatchment 7S: Offsite 02 Pervious



Summary for Subcatchment 8S: Offsite 01 Pervious

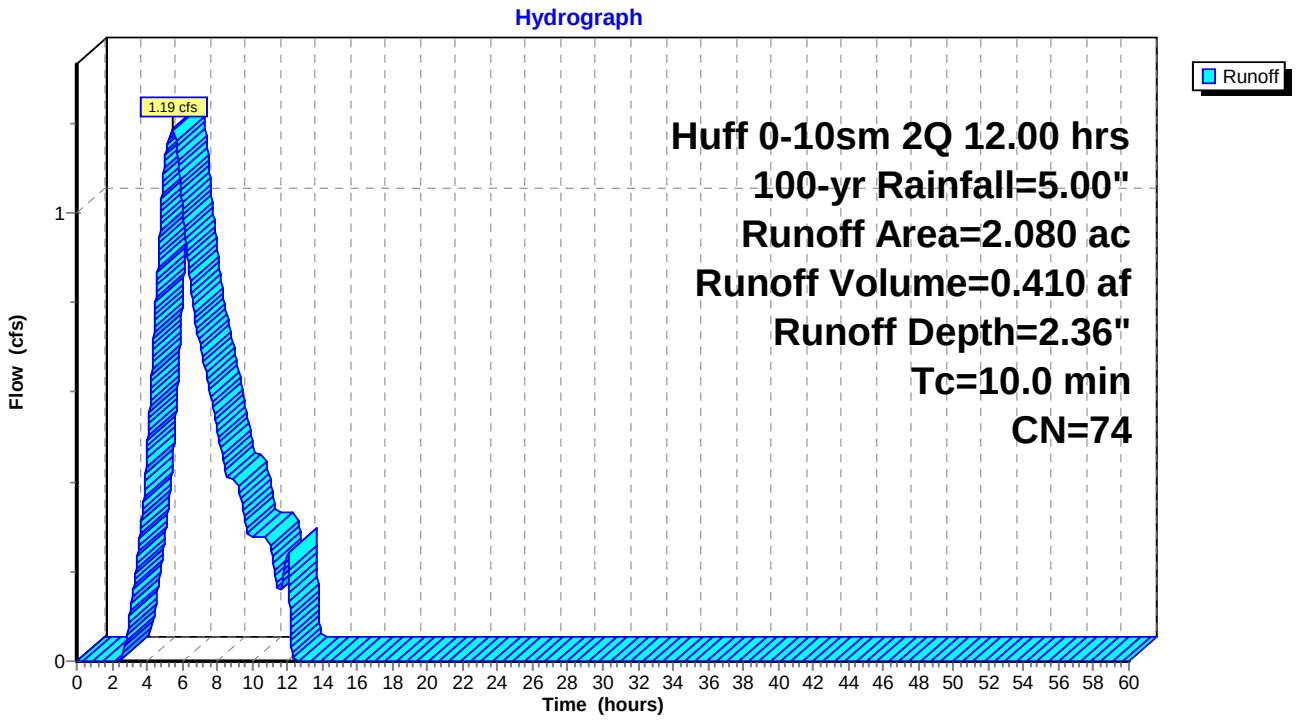
Runoff = 1.19 cfs @ 5.50 hrs, Volume= 0.410 af, Depth= 2.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Huff 0-10sm 2Q 12.00 hrs 100-yr Rainfall=5.00"

	Area (ac)	CN	Description
*	2.080	74	
	2.080		100.00% Pervious Area

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

Subcatchment 8S: Offsite 01 Pervious



Summary for Pond 3P: Wet Basin 01

Inflow Area = 18.740 ac, 43.97% Impervious, Inflow Depth = 3.42" for 100-yr event
Inflow = 13.90 cfs @ 5.03 hrs, Volume= 5.339 af
Outflow = 3.58 cfs @ 9.34 hrs, Volume= 4.947 af, Atten= 74%, Lag= 258.4 min
Primary = 3.58 cfs @ 9.34 hrs, Volume= 4.947 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 733.72' @ 9.34 hrs Surf.Area= 1.288 ac Storage= 3.987 af

Plug-Flow detention time= 1,148.3 min calculated for 4.947 af (93% of inflow)
Center-of-Mass det. time= 1,124.6 min (1,482.4 - 357.8)

Volume	Invert	Avail.Storage	Storage Description
#1	730.25'	4.675 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

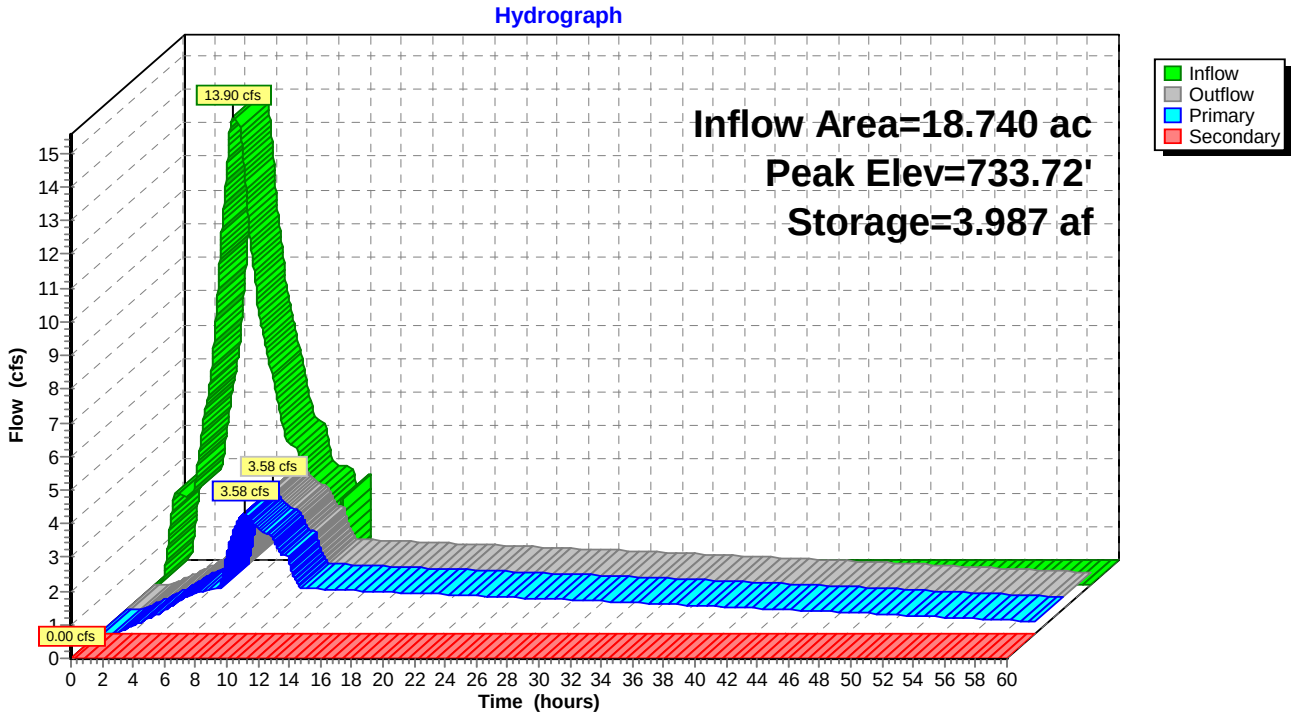
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
730.25	1.012	0.000	0.000
731.25	1.088	1.050	1.050
732.25	1.167	1.128	2.177
733.25	1.248	1.208	3.385
734.25	1.332	1.290	4.675

Device	Routing	Invert	Outlet Devices
#1	Primary	730.25'	**3.8" Vert. Orifice/Grate X 2.00** C= 0.600
#2	Primary	733.55'	**2.0" x 24.0" Horiz. Orifice/Grate X 8.00** C= 0.600 in 27.5" x 27.5" Grate (51% open area) Limited to weir flow at low heads
#3	Secondary	733.75'	**20.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=3.58 cfs @ 9.34 hrs HW=733.72' (Free Discharge)
└─**1=Orifice/Grate** (Orifice Controls 1.38 cfs @ 8.77 fps)
└─**2=Orifice/Grate** (Weir Controls 2.19 cfs @ 1.37 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=730.25' (Free Discharge)
└─**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 3P: Wet Basin 01



Summary for Subcatchment 1S: Existing 01

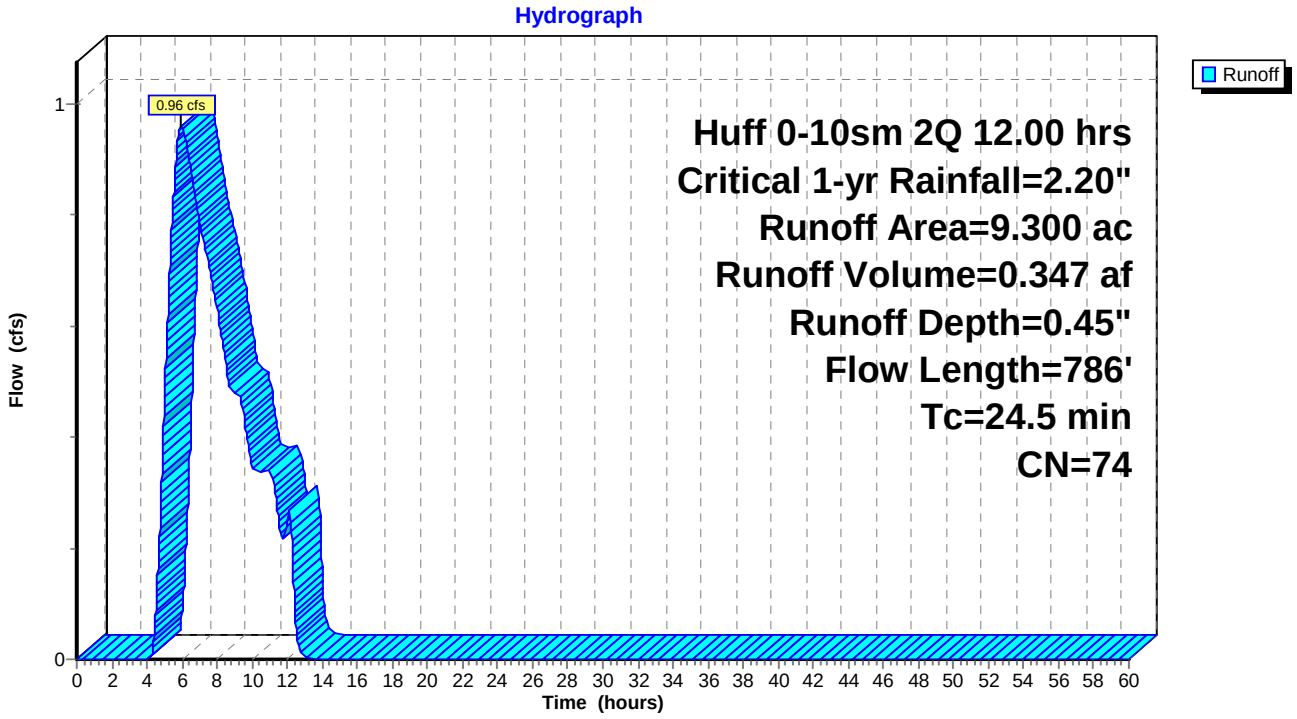
Runoff = 0.96 cfs @ 5.96 hrs, Volume= 0.347 af, Depth= 0.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Huff 0-10sm 2Q 12.00 hrs Critical 1-yr Rainfall=2.20"

	Area (ac)	CN	Description
*	9.300	74	
	9.300		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.7	100	0.0200	0.16		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.70"
13.8	686	0.0140	0.83		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
24.5	786	Total			

Subcatchment 1S: Existing 01



Summary for Subcatchment 2S: Subarea 01 Impervious

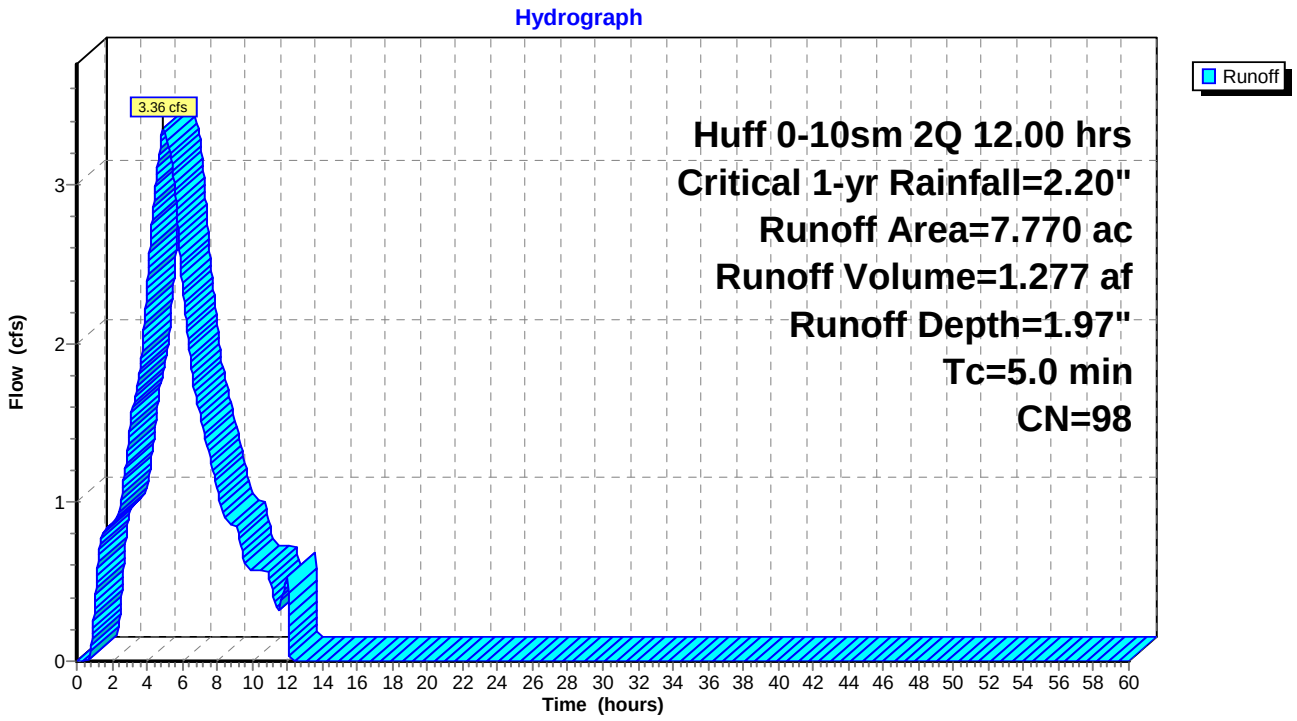
Runoff = 3.36 cfs @ 4.89 hrs, Volume= 1.277 af, Depth= 1.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Huff 0-10sm 2Q 12.00 hrs Critical 1-yr Rainfall=2.20"

	Area (ac)	CN	Description
*	7.770	98	
	7.770		100.00% Impervious Area

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

Subcatchment 2S: Subarea 01 Impervious



Summary for Subcatchment 5S: Subarea 01 Pervious

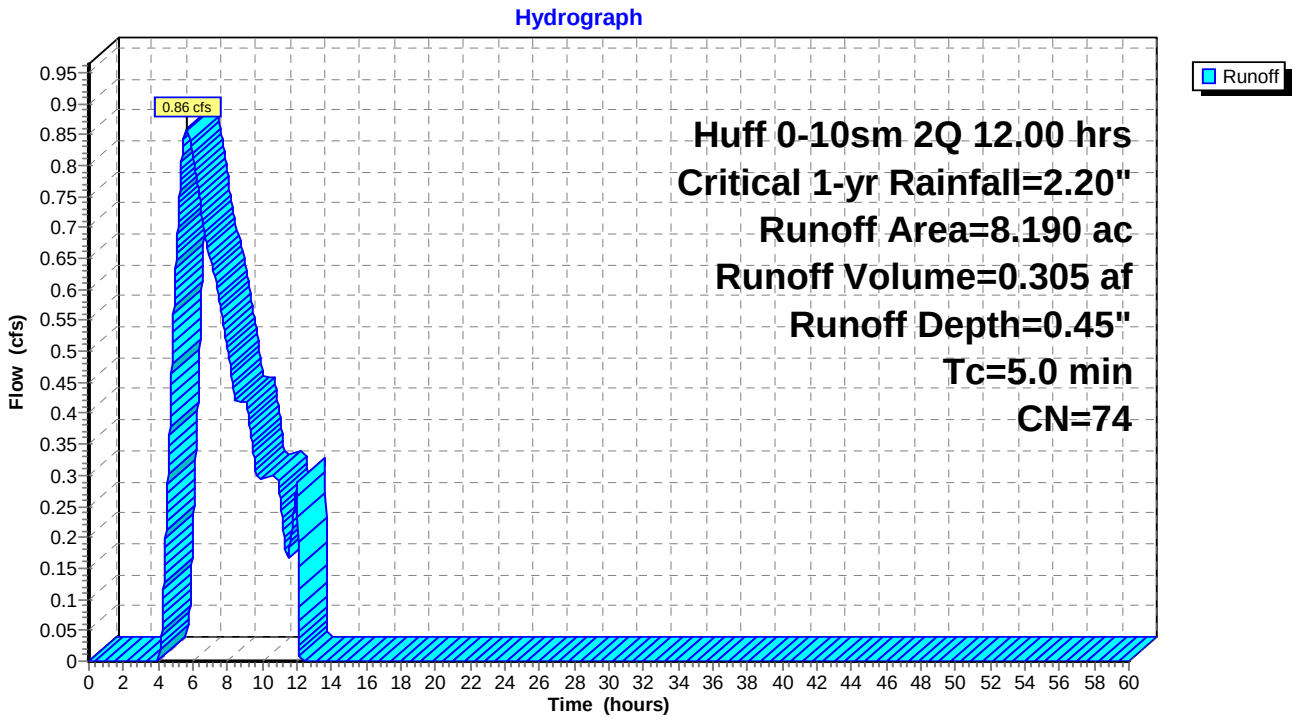
Runoff = 0.86 cfs @ 5.63 hrs, Volume= 0.305 af, Depth= 0.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Huff 0-10sm 2Q 12.00 hrs Critical 1-yr Rainfall=2.20"

	Area (ac)	CN	Description
*	8.190	74	
	8.190		100.00% Pervious Area

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

Subcatchment 5S: Subarea 01 Pervious



Summary for Subcatchment 6S: Offsite 02 Impervious

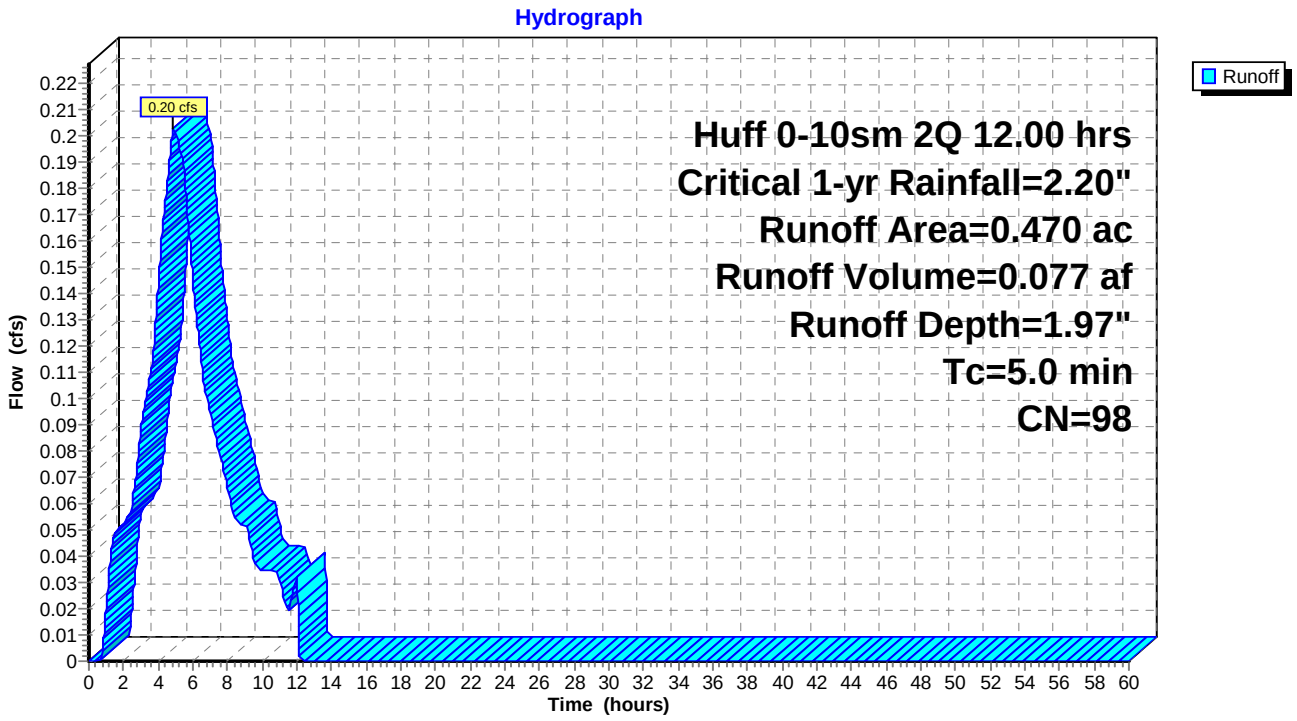
Runoff = 0.20 cfs @ 4.89 hrs, Volume= 0.077 af, Depth= 1.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Huff 0-10sm 2Q 12.00 hrs Critical 1-yr Rainfall=2.20"

	Area (ac)	CN	Description
*	0.470	98	
	0.470		100.00% Impervious Area

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

Subcatchment 6S: Offsite 02 Impervious



Summary for Subcatchment 7S: Offsite 02 Pervious

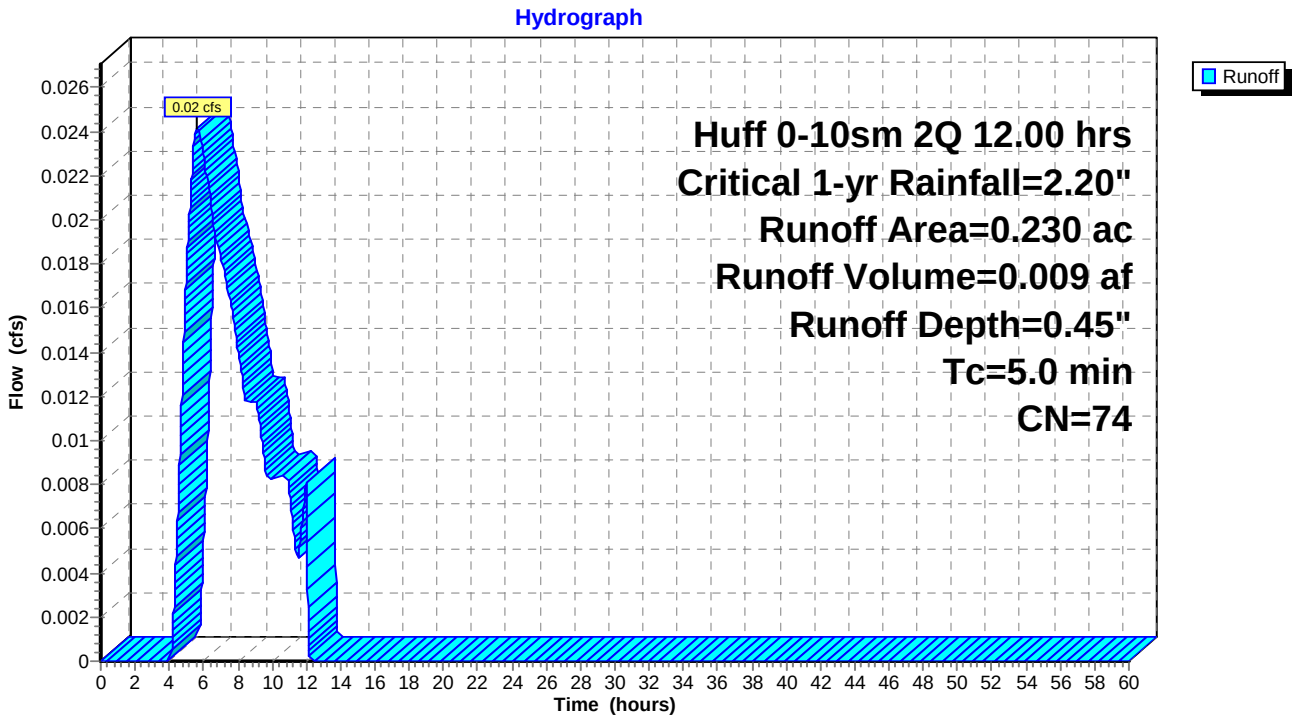
Runoff = 0.02 cfs @ 5.63 hrs, Volume= 0.009 af, Depth= 0.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Huff 0-10sm 2Q 12.00 hrs Critical 1-yr Rainfall=2.20"

	Area (ac)	CN	Description
*	0.230	74	
	0.230		100.00% Pervious Area

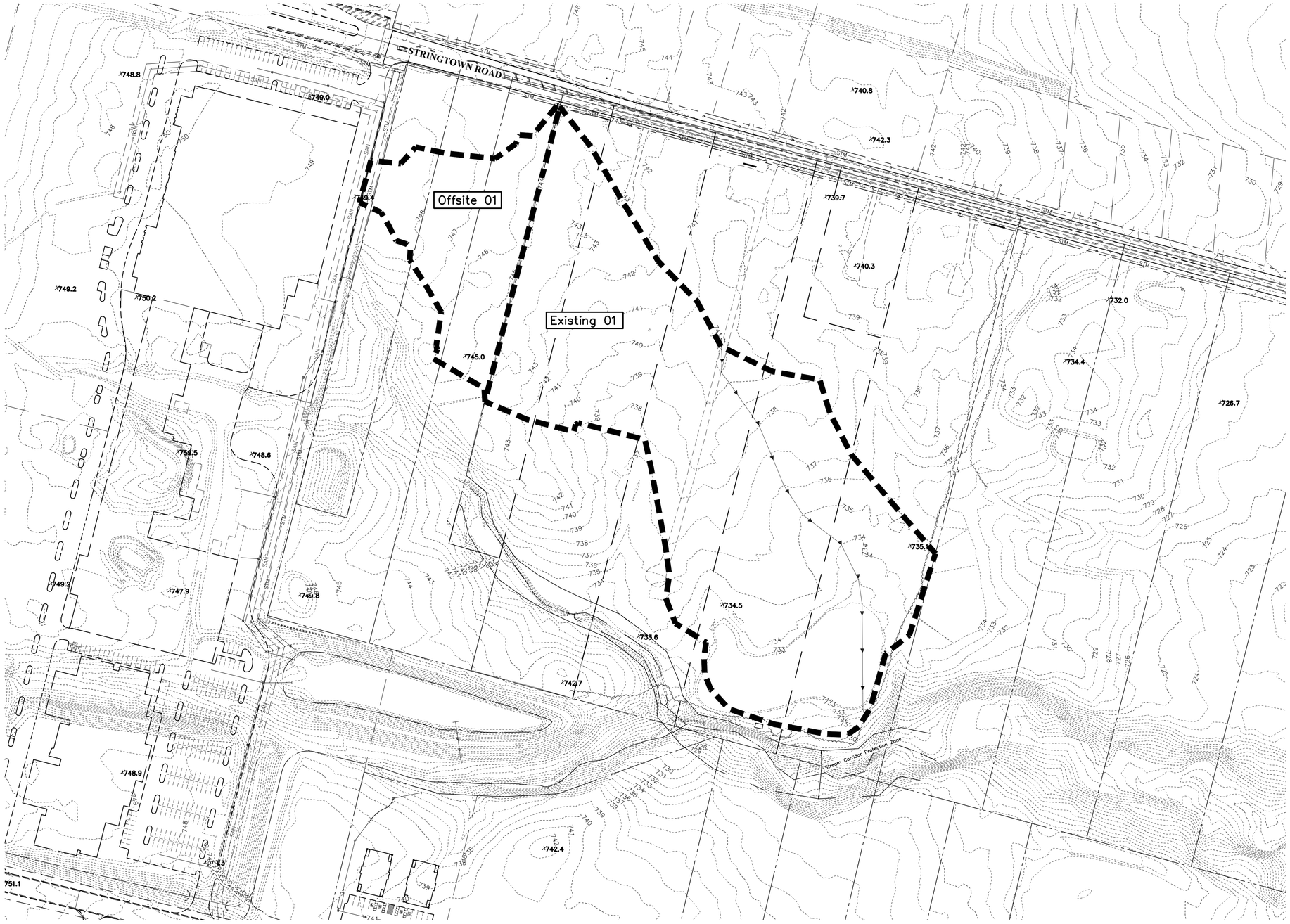
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

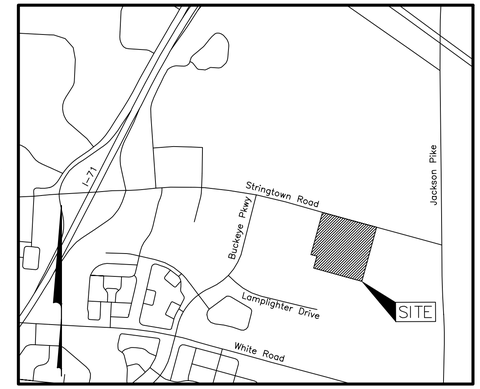
Subcatchment 7S: Offsite 02 Pervious



APPENDIX D:

Exhibits





LOCATION MAP
Not to Scale

Pre-developed Condition

Existing 01
Tributary Area= 9.30 acres
RCN= 74
TC= 24.50 minutes

Offsite 01
Tributary Area= 2.08 acres
RCN= 74
TC= 10.0 minutes

LEGEND

Tributary Boundary

Time of Concentration

Soil Classification

Crosby Silt Loam	Type 'C' Soils
Celina Silt Loam	Type 'C' Soils
Miamian Silty Clay Loam	Type 'C' Soils

GRAPHIC SCALE
0 50 100 200
1 inch = 100 feet

REVISIONS

MARK	DATE	DESCRIPTION

CANNON DESIGN

GROVE CITY, FRANKLIN COUNTY
STORMWATER MANAGEMENT PLAN
FOR
GROVE CITY SURGICAL HOSPITAL
STRINGTOWN ROAD
PRE-DEVELOPED CONDITIONS EXHIBIT

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

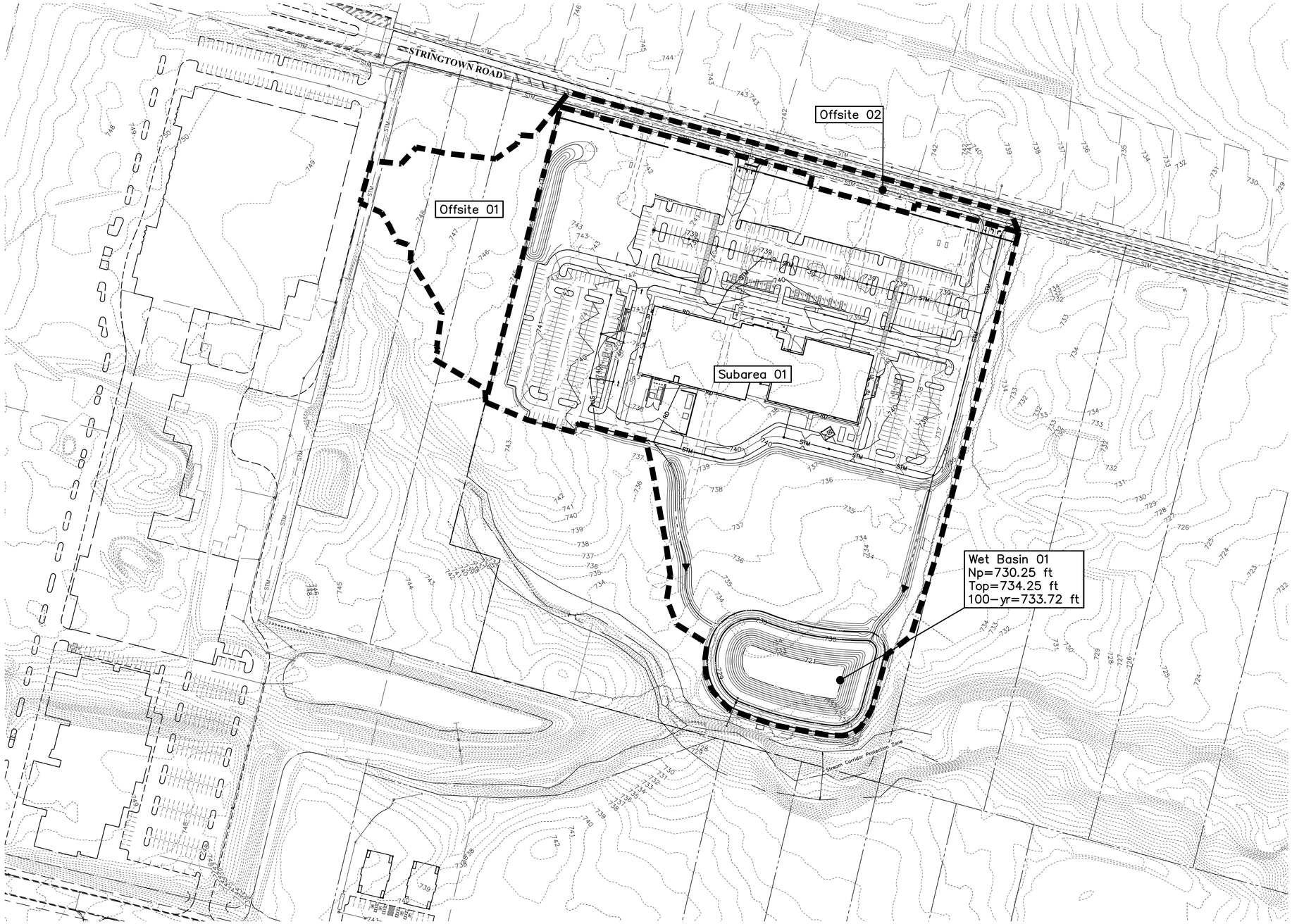
DATE
August 2016

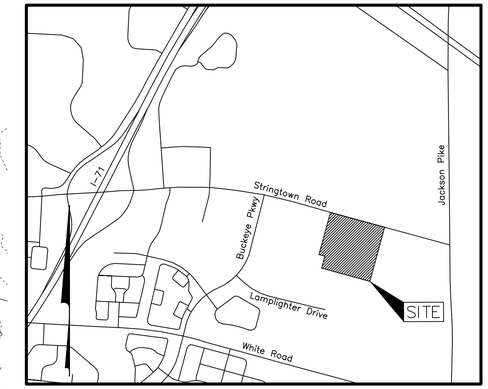
SCALE
1" = 100'

JOB NO.
2016-0707

SHEET
1/2

\\cmhdata01\project01\20160707\Reports\stormwater\dwg\Pre-developed Conditions.dwg, Last Saved By: fsantibanez, 8/30/2016 10:16 AM Last Printed By: Santibanez, Felipe, 8/31/2016 8:31 AM (No Xref's)





LOCATION MAP
Not to Scale

Proposed Condition

Subarea 01 Impervious
Tributary Area= 7.77 acres
RCN= 98
TC= 5.0 minutes

Subarea 01 Pervious
Tributary Area= 8.19 acres
RCN= 74
TC= 5.0 minutes

Offsite 01
Tributary Area= 2.08 acres
RCN= 74
TC= 10.0 minutes

Offsite 02 Impervious
Tributary Area= 0.47 acres
RCN= 98
TC= 5.0 minutes

Offsite 02 Pervious
Tributary Area= 0.23 acres
RCN= 74
TC= 5.0 minutes

LEGEND

Tributary Boundary

Soil Classification

Crosby Silt Loam	Type 'C' Soils
Celina Silt Loam	Type 'C' Soils
Miamian Silty Clay Loam	Type 'C' Soils

GRAPHIC SCALE
0 50 100 200
1 inch = 100 feet

REVISIONS

MARK	DATE	DESCRIPTION

CANNON DESIGN

GROVE CITY, FRANKLIN COUNTY
STORMWATER MANAGEMENT PLAN
FOR
GROVE CITY SURGICAL HOSPITAL
STRINGTOWN ROAD
POST-DEVELOPED CONDITIONS EXHIBIT

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
August 2016

SCALE
1" = 100'

JOB NO.
2016-0707

SHEET
2/2

A:\2016\0707\Reports\Hydrologic\Hydro\Proposed_Conditions.dwg Last Saved By: SmithJonathan B.A\0/2016 10:16 AM Last Printed By: SmithJonathan B.A\31/2016 8:29 AM (No Xrefs)

EMH&T
Engineers, Surveyors, Planners, Scientists

STORM SEWER COMPUTATION SHEET

SHT 1

Project: **OhioHealth - Grove City Surgical Hospital**
Job No.: **2016-0707**
Intensity Reference: Columbus

Date: 8/31/16
By: KSM
Checked:

Revised:
Revised:

2 Yr Design Storm n= **0.012**

Struc.	Struc. Index	Sta.	Drainage Area Trib	Drainage Area Cumul.	Drainage Area C	Drainage Area Cumul CA	Time Delta t Min.	Time Sum t Min.	Intensity in/hr	Des Q CFS	Length ft.	Dia. In	Slope%	Vel	Cap. Flowing Full	Status	In	Out	TC	Remarks	5 YEAR HYDRAULIC GRADE LINE: 5 Yr Rainfall Intensity	Discharge Q	Slope %	Minor Losses	5 Yr HGL w/o minor losses
14		9+69.94	0.21	0.91	0.80		10.00	10.00	3.91	2.84							735.03		738.95						
			0.70		0.80	0.73					68.00	15	0.32%	3.2	4.0	OK				2.48 ft. cover	4.74	3.45	0.2423	-	#DIV/0!
																				3.92 ft. depth					#DIV/0!
13		9+01.94	0.36	1.27	0.80		0.35	10.35	3.85	3.91							734.71	734.81	738.85	0.10 DROP					
			0.00		0.80	1.02					55.00	15	0.32%	3.2	4.0	OK				2.60 ft. cover	4.67	4.75	0.4579	-	#DIV/0!
																				4.14 ft. depth					#DIV/0!
12		8+46.94	0.18	1.45	0.80		0.28	10.63	3.80	4.41							734.43	734.53	739.05	0.10 DROP					
			0.00		0.80	1.16					23.00	18	0.25%	3.2	5.7	OK				2.91 ft. cover	4.62	5.36	0.2204	-	#DIV/0!
																				4.62 ft. depth					#DIV/0!
11		8+23.94	0.00	1.45	0.80		0.12	10.75	3.78	4.39							734.27	734.37	739.05	0.10 DROP					
			0.00		0.80	1.16					64.00	18	0.25%	3.2	5.7	OK				2.97 ft. cover	4.59	5.33	0.2182	-	#DIV/0!
																				4.78 ft. depth					#DIV/0!
10		7+59.94	0.43	2.75	0.80		0.33	11.08	3.73	8.21							734.01	734.11	738.80	0.10 DROP					
			0.87		0.80	2.20					103.00	24	0.17%	3.2	10.1	OK				2.54 ft. cover	4.53	9.97	0.1646	-	#DIV/0!
																				4.79 ft. depth					#DIV/0!
9		6+56.94	0.41	3.16	0.80		0.53	11.62	3.65	9.23							733.73	733.83	738.80	0.10 DROP					
			0.00		0.80	2.53					99.00	24	0.17%	3.2	10.1	OK				2.72 ft. cover	4.44	11.21	0.2082	-	#DIV/0!
																				5.07 ft. depth					#DIV/0!
8		5+57.94	0.32	3.48	0.80		0.51	12.13	3.58	9.95							733.46	733.56	738.80	0.10 DROP					
			0.00		0.80	2.78					68.50	24	0.17%	3.2	10.1	OK				2.99 ft. cover	4.35	12.10	0.2425	-	#DIV/0!
																				5.34 ft. depth					#DIV/0!
7		4+89.44	0.34	4.50	0.80		0.35	12.48	3.53	12.69							733.24	733.34	738.75	0.10 DROP					
			0.68		0.80	3.60					90.00	30	0.13%	3.3	16.1	OK				2.72 ft. cover	4.29	15.44	0.1200	-	#DIV/0!
																				5.51 ft. depth					#DIV/0!
6		3+99.44	0.26	4.76	0.80		0.46	12.94	3.46	13.19							733.02	733.12	738.70	0.10 DROP					
			0.00		0.80	3.81					62.00	30	0.13%	3.3	16.1	OK				2.79 ft. cover	4.21	16.05	0.1297	-	#DIV/0!
																				5.68 ft. depth					#DIV/0!
5		3+37.44	0.09	4.99	0.80		0.32	13.25	3.42	13.66							732.84	732.94	738.60	0.10 DROP					
			0.14		0.80	3.99					87.00	30	0.13%	3.3	16.1	OK				2.87 ft. cover	4.17	16.63	0.1393	-	#DIV/0!
																				5.76 ft. depth					#DIV/0!
4		2+50.44	0.16	5.15	0.80		0.44	13.70	3.37	13.87							732.63	732.73	738.30	0.10 DROP					
			0.00		0.80	4.12					72.00	30	0.13%	3.3	16.1	OK				2.78 ft. cover	4.10	16.88	0.1436	-	#DIV/0!
																				5.67 ft. depth					#DIV/0!
3		1+78.44	0.34	5.49	0.80		0.37	14.06	3.32	14.59							732.44	732.54	738.30	0.10 DROP					
			0.00		0.80	4.39					81.00	30	0.13%	3.3	16.1	OK				2.97 ft. cover	4.04	17.76	0.1590	-	#DIV/0!
																				5.86 ft. depth					#DIV/0!
2		0+97.44	0.31	5.80	0.80		0.41	14.48	3.27	15.18							732.23	732.33	738.30	0.10 DROP					
			0.00		0.80	4.64					77.44	30	0.13%	3.3	16.1	OK				3.18 ft. cover	3.99	18.50	0.1724	-	#DIV/0!
																				6.07 ft. depth					#DIV/0!
1		0+20.00	0.18	6.61	0.80		0.39	14.87	3.23	17.06							732.03	732.13	738.25	0.10 DROP					
			0.63		0.80	5.29					20.00	30	0.15%	3.5	17.3	OK				3.33 ft. cover	3.93	20.80	0.2179	-	#DIV/0!
																				6.22 ft. depth					#DIV/0!
EW1		0+00.00	0.00	6.61	0.80		0.09	14.97	3.22	17.00								732.00	738.67	0.10 DROP					
			0.00		0.80	5.29														3.88 ft. cover	3.92	20.73	#DIV/0!	-	#DIV/0!
																				738.67 ft. depth					#DIV/0!

EMH&T
Engineers, Surveyors, Planners, Scientists

STORM SEWER COMPUTATION SHEET

SHT 2

2 Yr Design Storm n= 0.012

Project: **OhioHealth - Grove City Surgical Hospital**
Job No.: **2016-0707**
Intensity Reference: Columbus

Date: 8/31/16
By: KSM
Checked:

Revised:
Revised:

Struc.	Struc. Index	Sta.	Drainage Area Trib	Drainage Area Cumul.	Drainage Area C	Drainage Area Cumul CA	Time Delta t Min.	Time Sum t Min.	Intensity in/hr	Des Q CFS	Length ft.	Dia. In	Slope%	Vel	Cap. Flowing Full	Status	In	Out	TC	Remarks	5 YEAR HYDRAULIC GRADE LINE: 5 Yr Rainfall Intensity	Discharge Q	Slope %	Minor Losses	5 Yr HGL w/o minor losses
18		2+83.82	0.18	0.18	0.80		10.00	10.00	3.91	0.56							735.63		739.20						
			0.00		0.80	0.14					60.00	12	0.40%	3.1	2.4	OK				2.40 ft. cover	4.74	0.68	0.0312	-	#VALUE!
																				3.57 ft. depth					#VALUE!
17		2+23.82	0.00	0.18	0.80		0.32	10.32	3.85	0.55							735.29	735.39	739.20	0.10 DROP					
			0.00		0.80	0.14					72.00	12	0.40%	3.1	2.4	OK				2.64 ft. cover	4.68	0.67	0.0303	-	#VALUE!
																				3.91 ft. depth					#VALUE!
16		1+51.82	0.20	0.38	0.80		0.39	10.71	3.79	1.15							734.90	735.00	739.20	0.10 DROP					
			0.00		0.80	0.30					62.50	12	0.40%	3.1	2.4	OK				3.03 ft. cover	4.60	1.40	0.1308	-	#VALUE!
																				4.30 ft. depth					#VALUE!
15		0+89.32	0.49	0.87	0.80		0.33	11.04	3.74	2.60							734.40	734.65	739.30	0.25 DROP					
			0.00		0.80	0.70					89.32	15	0.32%	3.2	4.0	OK				3.46 ft. cover	4.54	3.16	0.2028	-	#VALUE!
																				4.90 ft. depth					#VALUE!
10		0+00.00	0.00	0.87	0.80		0.46	11.50	3.67	2.55							734.01	734.11	738.80	0.10 DROP					
			0.00		0.80	0.70														3.25 ft. cover	4.46	3.10	#DIV/0!	-	#VALUE!
																				4.79 ft. depth					#VALUE!

EMH&T
Engineers, Surveyors, Planners, Scientists

STORM SEWER COMPUTATION SHEET

SHT 3

Project: **OhioHealth - Grove City Surgical Hospital**
Job No.: **2016-0707**
Intensity Reference: Columbus

Date: 8/31/16
By: KSM
Checked:

Revised:
Revised:

2 Yr Design Storm n= **0.012**

Struc.	Struc. Index	Sta.	Drainage Area Trib	Drainage Area Cumul.	Drainage Area C	Drainage Area Cumul CA	Time Delta t Min.	Time Sum t Min.	Intensity in/hr	Des Q CFS	Length ft.	Dia. In	Slope%	Vel	Cap. Flowing Full	Status	In	Out	TC	Remarks	5 YEAR HYDRAULIC GRADE LINE: 5 Yr Rainfall Intensity	Discharge Q	Slope %	Minor Losses	5 Yr HGL w/o minor losses
21		2+02.51	0.35	0.35	0.80		10.00	10.00	3.91	1.09							736.25		739.30						
			0.00		0.80	0.28					60.00	12	0.40%	3.1	2.4	OK				1.88 ft. cover	4.74	1.33	0.1178	-	#VALUE!
																				3.05 ft. depth					#VALUE!
20		1+42.51	0.21	0.56	0.80		0.32	10.32	3.85	1.73							735.91	736.01	739.20	0.10 DROP					
			0.00		0.80	0.45					67.39	12	0.40%	3.1	2.4	OK				2.02 ft. cover	4.68	2.10	0.2934	-	#VALUE!
																				3.29 ft. depth					#VALUE!
19		0+75.12	0.12	0.68	0.80		0.36	10.68	3.79	2.06							733.64	735.64	739.20	2.00 DROP					
			0.00		0.80	0.54					75.12	12	0.40%	3.1	2.4	OK				2.39 ft. cover	4.61	2.51	0.4196	-	#VALUE!
																				5.56 ft. depth					#VALUE!
7		0+00.00	0.00	0.68	0.80		0.40	11.08	3.73	2.03							733.24	733.34	738.75	0.10 DROP					
			0.00		0.80	0.54														4.24 ft. cover	4.53	2.47	#DIV/0!	-	#VALUE!
																				5.51 ft. depth					#VALUE!

EMH&T
Engineers, Surveyors, Planners, Scientists

STORM SEWER COMPUTATION SHEET

SHT 4

2 Yr Design Storm n= 0.012

Project: **OhioHealth - Grove City Surgical Hospital**
Job No.: **2016-0707**
Intensity Reference: Columbus

Date: 8/31/16
By: KSM
Checked:

Revised:
Revised:

Struc.	Struc. Index	Sta.	Drainage Area Trib	Drainage Area Cumul.	Drainage Area C	Drainage Area Cumul CA	Time Delta t Min.	Time Sum t Min.	Intensity in/hr	Des Q CFS	Length ft.	Dia. In	Slope%	Vel	Cap. Flowing Full	Status	In	Out	TC	Remarks	5 YEAR HYDRAULIC GRADE LINE: 5 Yr Rainfall Intensity	Discharge Q	Slope %	Minor Losses	5 Yr HGL w/o minor losses
23		1+48.97	0.06	0.06	0.80		10.00	10.00	3.91	0.19							736.04		738.71						
			0.00		0.80	0.05					49.88	12	0.40%	3.1	2.4	OK				1.50 ft. cover	4.74	0.23	0.0035	-	#VALUE!
																				2.67 ft. depth					#VALUE!
22		0+99.09	0.08	0.14	0.80		0.27	10.27	3.86	0.43							733.34	735.84	738.70	2.50 DROP					
			0.00		0.80	0.11					99.09	12	0.40%	3.1	2.4	OK				1.69 ft. cover	4.69	0.53	0.0184	-	#VALUE!
																				5.36 ft. depth					#VALUE!
5		0+00.00	0.00	0.14	0.80		0.53	10.80	3.78	0.42							732.84	732.94	738.60	0.10 DROP					
			0.00		0.80	0.11														4.49 ft. cover	4.59	0.51	#DIV/0!	-	#VALUE!
																				5.76 ft. depth					#VALUE!

EMH&T
Engineers, Surveyors, Planners, Scientists

STORM SEWER COMPUTATION SHEET

SHT 5

Project: **OhioHealth - Grove City Surgical Hospital**
Job No.: **2016-0707**
Intensity Reference: Columbus

Date: 8/31/16
By: KSM
Checked:

Revised:
Revised:

2 Yr Design Storm n= **0.012**

Struc.	Struc. Index	Sta.	Drainage Area Trib	Drainage Area Cumul.	Drainage Area C	Drainage Area Cumul CA	Time Delta t Min.	Time Sum t Min.	Intensity in/hr	Des Q CFS	Length ft.	Dia. In	Slope%	Vel	Cap. Flowing Full	Status	In	Out	TC	Remarks	5 YEAR HYDRAULIC GRADE LINE: 5 Yr Rainfall Intensity	Discharge Q	Slope %	Minor Losses	5 Yr HGL w/o minor losses
25		2+89.00	0.34	0.34	0.80		10.00	10.00	3.91	1.06							737.79		739.55						
			0.00		0.80	0.27					87.46	12	0.40%	3.1	2.4	OK				0.59 ft. cover	4.74	1.29	0.1112	-	#VALUE!
																				1.76 ft. depth					#VALUE!
24		2+01.54	0.29	0.63	0.80		0.47	10.47	3.83	1.93							732.94	737.44	739.45	4.50 DROP					
			0.00		0.80	0.50					201.54	12	0.40%	3.1	2.4	OK				0.84 ft. cover	4.65	2.34	0.3667	-	#VALUE!
																				6.51 ft. depth					#VALUE!
1		0+00.00	0.00	0.63	0.80		1.08	11.55	3.66	1.84							732.03	732.13	738.25	0.10 DROP					
			0.00		0.80	0.50														4.95 ft. cover	4.45	2.24	#DIV/0!	-	#VALUE!
																				6.22 ft. depth					#VALUE!

EMH&T
Engineers, Surveyors, Planners, Scientists

STORM SEWER COMPUTATION SHEET

SHT 10

Project: **OhioHealth - Grove City Surgical Hospital**
Job No.: **2016-0707**
Intensity Reference: Columbus

Date: 8/31/16
By: KSM
Checked:

Revised:
Revised:

2 Yr Design Storm n= **0.012**

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	5 YEAR HYDRAULIC GRADE LINE: 5 Yr Rainfall Intensity	Discharge Q	Slope %	Minor Losses	5 Yr HGL w/o minor losses
EP		4+84.15	3.10	3.10	0.80		12.19	12.19	3.57	8.85							733.73		738.00						
			0.00		0.80	2.48					20.00	18	0.65%	5.2	9.2	OK				2.56 ft. cover	4.34	10.76	0.8885	-	735.54
																				4.27 ft. depth					ok
37		4+64.15	0.21	3.31	0.80		0.06	12.25	3.56	9.42							733.50	733.60	739.60	0.10 DROP					
			0.00		0.80	2.65					181.00	18	0.70%	5.4	9.5	OK				4.29 ft. cover	4.33	11.46	1.0079	-	735.36
																				6.10 ft. depth					ok
36		2+83.15	0.25	3.56	0.80		0.56	12.81	3.48	9.91							732.13	732.23	738.95	0.10 DROP					
			0.00		0.80	2.85					96.15	18	0.80%	5.8	10.2	OK				5.01 ft. cover	4.23	12.06	1.1172	-	733.53
																				6.82 ft. depth					ok
35		1+87.00	0.00	3.56	0.80		0.28	13.09	3.44	9.81							731.26	731.36	738.85	0.10 DROP					
			0.00		0.80	2.85					108.00	18	0.80%	5.8	10.2	OK				5.78 ft. cover	4.19	11.94	1.0943	-	732.46
																				7.59 ft. depth					ok
34		0+79.00	2.49	6.05	0.80		0.31	13.40	3.40	16.48							728.65	730.40	738.75	1.75 DROP					
			0.00		0.80	4.84					79.00	24	0.50%	5.5	17.4	OK				6.64 ft. cover	4.14	20.05	0.6659	-	730.25
																				10.10 ft. depth					ok
EW3		0+00.00	0.00	6.05	0.80		0.24	13.64	3.37	16.33							728.25	728.25	728.25	0.10 DROP					
			0.00		0.80	4.84					0.01	24	0.50%	5.5	17.4	OK				-2.25 ft. cover					
																				0.00 ft. depth					

EMH&T
Engineers, Surveyors, Planners, Scientists

STORM SEWER COMPUTATION SHEET

SHT 6

Project: **OhioHealth - Grove City Surgical Hospital**
Job No.: **2016-0707**
Intensity Reference: Columbus

Date: 8/31/16
By: KSM
Checked:

Revised:
Revised:

2 Yr Design Storm n= **0.012**

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	5 YEAR HYDRAULIC GRADE LINE: 5 Yr Rainfall Intensity	Discharge Q	Slope %	Minor Losses	5 Yr HGL w/o minor losses
30		4+17.87	0.27	0.27	0.80		10.00	10.00	3.91	0.84							735.44		739.45						
			0.00		0.80	0.22					75.00	12	0.40%	3.1	2.4	OK				2.84 ft. cover	4.74	1.02	0.0701	-	736.65
																				4.01 ft. depth					ok
29		3+42.87	0.29	0.74	0.80		0.40	10.40	3.84	2.27							735.04	735.14	739.45	0.10 DROP					
			0.18		0.80	0.59					85.50	12	0.40%	3.1	2.4	OK				3.14 ft. cover	4.66	2.76	0.5088	-	736.59
																				4.41 ft. depth					ok
28		2+57.37	0.40	1.22	0.80		0.46	10.86	3.77	3.68							734.60	734.70	739.45	0.10 DROP					
			0.08		0.80	0.98					92.44	15	0.32%	3.2	4.0	OK				3.41 ft. cover	4.57	4.46	0.4048	-	736.16
																				4.85 ft. depth					ok
27		1+64.93	0.11	1.81	0.80		0.48	11.33	3.69	5.35							734.20	734.30	739.35	0.10 DROP					
			0.48		0.80	1.45					112.24	18	0.25%	3.2	5.7	OK				3.44 ft. cover	4.49	6.50	0.3240	-	735.78
																				5.15 ft. depth					ok
26		0+52.69	0.74	3.10	0.80		0.58	11.91	3.61	8.94							733.82	733.92	739.35	0.10 DROP					
			0.55		0.80	2.48					52.69	24	0.17%	3.2	10.1	OK				3.28 ft. cover	4.38	10.87	0.1957	-	735.42
																				5.53 ft. depth					ok
EW2		0+00.00	0.00	3.10	0.80		0.27	12.19	3.57	8.85								733.73	738.00	0.10 DROP					
			0.00		0.80	2.48														2.02 ft. cover					
																				738.00 ft. depth					

EMH&T
Engineers, Surveyors, Planners, Scientists

STORM SEWER COMPUTATION SHEET

SHT 7

2 Yr Design Storm n= 0.012

Project: **OhioHealth - Grove City Surgical Hospital**
Job No.: **2016-0707**
Intensity Reference: Columbus

Date: 8/31/16
By: KSM
Checked:

Revised:
Revised:

Struc.	Struc. Index	Sta.	Drainage Area Trib	Drainage Area Cumul.	Drainage Area C	Drainage Area Cumul CA	Time Delta t Min.	Time Sum t Min.	Intensity in/hr	Des Q CFS	Length ft.	Dia. In	Slope%	Vel	Cap. Flowing Full	Status	In	Out	TC	Remarks	5 YEAR HYDRAULIC GRADE LINE: 5 Yr Rainfall Intensity	Discharge Q	Slope %	Minor Losses	5 Yr HGL w/o minor losses
31		0+44.42	0.18	0.18	0.80		10.00	10.00	3.91	0.56							735.32		740.44						
			0.00		0.80	0.14					44.42	12	0.40%	3.1	2.4	OK				3.95 ft. cover	4.74	0.68	0.0312	-	#VALUE!
																				5.12 ft. depth					#VALUE!
29		0+00.00	0.00	0.18	0.80		0.24	10.24	3.87	0.56							735.04	735.14	739.45	0.10 DROP					
			0.00		0.80	0.14														3.14 ft. cover	4.70	0.68	#DIV/0!	-	#VALUE!
																				4.41 ft. depth					#VALUE!

EMH&T
Engineers, Surveyors, Planners, Scientists

STORM SEWER COMPUTATION SHEET

SHT 8

Project: **OhioHealth - Grove City Surgical Hospital**
Job No.: **2016-0707**
Intensity Reference: Columbus

Date: 8/31/16
By: KSM
Checked:

Revised:
Revised:

2 Yr Design Storm n= **0.012**

Struc.	Struc. Index	Sta.	Drainage Area Trib	Drainage Area Cumul.	Drainage Area C	Drainage Area Cumul CA	Time Delta t Min.	Time Sum t Min.	Intensity in/hr	Des Q CFS	Length ft.	Dia. In	Slope%	Vel	Cap. Flowing Full	Status	In	Out	TC	Remarks	5 YEAR HYDRAULIC GRADE LINE: 5 Yr Rainfall Intensity	Discharge Q	Slope %	Minor Losses	5 Yr HGL w/o minor losses
32		0+44.29	0.08	0.08	0.80		10.00	10.00	3.91	0.25							734.88		740.04						
			0.00		0.80	0.06					44.29	12	0.40%	3.1	2.4	OK				3.99 ft. cover	4.74	0.30	0.0062	-	#VALUE!
																				5.16 ft. depth					#VALUE!
28		0+00.00	0.00	0.08	0.80		0.24	10.24	3.87	0.25							734.60	734.70	739.45	0.10 DROP					
			0.00		0.80	0.06														3.58 ft. cover	4.70	0.30	#DIV/0!	-	#VALUE!
																				4.85 ft. depth					#VALUE!

EMH&T
Engineers, Surveyors, Planners, Scientists

STORM SEWER COMPUTATION SHEET

SHT 9

2 Yr Design Storm n= 0.012

Project: **OhioHealth - Grove City Surgical Hospital**
Job No.: **2016-0707**
Intensity Reference: Columbus

Date: 8/31/16
By: KSM
Checked:

Revised:
Revised:

Struc.	Struc. Index	Sta.	Drainage Area Trib	Drainage Area Cumul.	Drainage Area C	Drainage Area Cumul CA	Time Delta t Min.	Time Sum t Min.	Intensity in/hr	Des Q CFS	Length ft.	Dia. In	Slope%	Vel	Cap. Flowing Full	Status	In	Out	TC	Remarks	5 YEAR HYDRAULIC GRADE LINE: 5 Yr Rainfall Intensity	Discharge Q	Slope %	Minor Losses	5 Yr HGL w/o minor losses
33		1+35.93	0.55	0.55	0.80		10.00	10.00	3.91	1.72							735.86		739.55						
			0.00		0.80	0.44					135.93	12	0.40%	3.1	2.4	OK				2.52 ft. cover	4.74	2.09	0.2910	-	#VALUE!
																				3.69 ft. depth					#VALUE!
26		0+00.00	0.00	0.55	0.80		0.73	10.73	3.79	1.67							733.82	735.32	739.35	1.50 DROP					
			0.00		0.80	0.44														2.86 ft. cover	4.60	2.02	#DIV/0!	-	#VALUE!
																				5.53 ft. depth					#VALUE!