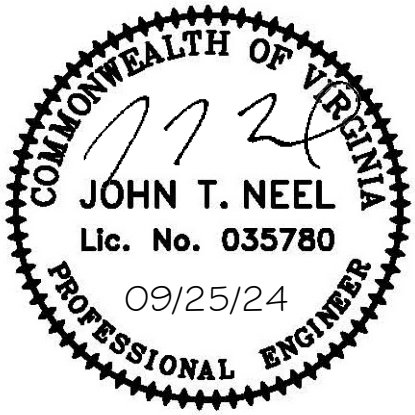
801 N. MAIN STREET

FLOOD PLAIN AND STORMWATER CONCEPT NARRATIVE

Located in:

Blacksburg, Virginia



Project Number: 3644.0

Date: September 3, 2024
Revised: September 25, 2024

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801 N. Main Street

STORMWATER CONCEPT NARRATIVE

INTRODUCTION

The following Stormwater Management Concept Plan has been developed to meet the requirements of Section 18-606, Stormwater Management Concept Plan, of the Code of the Town of Blacksburg, Virginia. The concept plan addressed items (1) through (8) of Section 18-606.

PROJECT DESCRIPTION

The project site is for a multi-story apartment complex to be located at 801 North Main Street in the Town of Blacksburg, Virginia, and is bounded to the east by North Main Street and bounded on the west by Kabrich Street. To the north the site is bounded by both Winston Avenue and Progress Street. An adjacent townhome area of the proposed project will run along Winston Street and be bounded by the neighboring residential properties to the north. The site includes eleven parcels totaling 2.75 acres and the project will include the construction of an apartment complex and the adjoining townhomes with parking. The project will include a design for maintaining the existing stormwater conditions and improving the infrastructure.

EXISTING SITE CONDITIONS

The existing site is primarily a developed, urban area consisting of building facilities and parking lots with slopes averaging from 1 to 30 percent. However, there are residential lots north of Winston Street which comprise of single-family dwellings and lawns.

Stormwater on the site flows under the intersection of Progress Street and Main Street through a stormwater network that outlets at Kabrich Street. This stormwater network that carries the upper drainage area under the site, consists of 5ft x 4ft triple box culverts that are reduced to twin 72in x 44in corrugated arch pipes, and eventually reduced further to a single 72in x 44in corrugated arch pipe. Therefore, many storm events surcharge the system and flow overland through the existing buildings until reaching Kabrich Street. Based on a Storm and Sanitary Sewer Model (SSA) the 10-year flow surcharges the existing underground system and produces up to 379.33 CFS of flow throughout parts of Winston Street and between the adjacent building facilities. This flow then merges back at the outfall of Kabrich to be contained within the existing stream. The 2-year storm does not surcharge in the upper sections of the system or Winston Street but will cause sections of Kabrich Street to surcharge near the stream outfall.

All flow continues downstream to eventually connect to the rest of Stroubles Creek watershed that flows into the New River.

ADJACENT AREAS

There should be no negative effects on any adjacent properties if Erosion and Sediment Control Measures are maintained until permanent stabilization is established.

OFFSITE AREAS

Any offsite areas will have their own separate plans.

SOILS

The USDA soils map shows the project area is within Udorthents and Urban Land soil type. A soils map and soils description are included in the appendices.

CRITICAL AREAS

The critical area of this site is the existing stream flows through the site and therefore will need to be maintained throughout construction. Therefore, the contractor needs to maintain flow for the upper drainage area until the new proposed storm network has been installed.

STORMWATER RUNOFF CONSIDERATIONS

Stormwater on the site is contained for the most part in the underground storm network that starts at the intersection of Progress Street and Main Street and outfalls at Kabrich Street. However, due to the size of the facility to be constructed, the stormwater will need to flow through the structure to ensure that there is no increase in water surface elevations or an increase in downstream capacity.

As the site is developed, the intent is to open the existing pipe network and provide a larger open channel through the majority of the site and through the building. The only constriction will be the Kabrich Street culvert. This will be limited to a similar sized structure to allow flow to back up into the open channel and limit downstream impacts. For higher storm events, the flow will top Kabrich Street and flow over the street and continue downstream. The main purpose of the proposed design is to reduce the overland flow through Winston Street and to maintain a pre-condition release rate of flow downstream. An increase release rate for lower storm events could cause damage to downstream areas that already have erosion issues.

Stormwater Quality

In order to meet the phosphorus removal requirements of the Virginia Runoff Removal Method, nutrient credits will be utilized for the total site development. Water quality

calculations have been provided in the appendices, which demonstrate how the following values were determined:

Target Phosphorus Removal Amount	1.99 lb/yr
Nutrient Credits to be purchased	1.99 lb/yr

Channel Protection

In order to comply with Channel Protection requirements from 9VAC25-875-600-B, section 4a was utilized as the site currently drains to the limits of analysis. This subsection requires stormwater conveyance systems to be analyzed for compliance with channel protection criteria to a point where, based on the land area, the site's contributing drainage area is less than or equal to 1.0% of the total watershed area. A drainage map has been included showing the one percent point and the site's area.

Flood Protection

In order to comply with Flood Protection requirements from 9VAC25-875-600-C, section 3a was utilized for the drainage area. This subsection requires stormwater conveyance systems to be analyzed for compliance with flood protection criteria to a point where, based on the land area, the site's contributing drainage area is less than or equal to 1.0% of the total watershed area draining to a point of analysis in the downstream stormwater conveyance channel. A drainage map has been included showing the one percent point and the site's area.

Even though the site area is less than 1% of its total drainage area, the existing flooding issues need to be addressed. Therefore, the open channel design for the area between the main apartment facility and the Speedway will allow for all lower storm events to be directed to the main channel and through the building facility. During higher storm events, the channel will help reduce the overland flow down Winston and help with flood conditions. A Storm and Sanitary Sewer Model has been created for both the pre and post conditions to show the overall routing of the existing and proposed stormwater networks. Note that a small 18" x 5ft walkway will be located in the corner of the open channel. The overall open channel section of the model was reduced to consider the loss of volume. Below is a summary of the discharge point at the Kabrich Street outfall downstream of the site. The SSA model has flows located on the existing and proposed maps in the appendices.

Peak Flowrate Summary

Study Point	**Pre-Development**			**Post-Development**		
	1-Year	**2-Year**	**10-Year**	**1-Year**	**2-Year**	**10-Year**
	Runoff (cfs)	*Runoff (cfs)*	*Runoff (cfs)*	*Runoff (cfs)*	*Runoff (cfs)*	*Runoff (cfs)*
Kabrich Outfall	246.50	349.18	641.05	246.50	349.18	641.05

STORMWATER OPEN CHANNEL MAINTENANCE CONSIDERATIONS

The proposed open channel will be accessed from the original alleyway behind the Speedway. The alley will provide a ramp down to the open channel instead which will make visual inspections and maintenance operations significantly easier.

STORMWATER RESULTS AND CONCLUSIONS

Based on the Storm and Sanitary Sewer Analysis (SSA) models for both pre and post conditions, there are a few areas to note changes. The focus of the model was to check the flood existing conditions around the site along Winston Street, the intersection at Progress and Main Streets, Kabrich Street, and to determine if there may be impacts to the downstream areas along Webb Street. The models set out to show the existing conditions and the proposed site impacts. In addition to the SSA model, Hydroflow was used to generate cross sections with field survey data at specific points of interest such as Kabrich Street, Winston Street and the intersection of Progress and Main Streets. For downstream conditions, the model only used the junction nodes for elevation determination. Overall, the model is designed to show conveyance through the pipe network and then use a weir conduit to convey overland flow from one junction to another. This is used to determine the maximum flooding condition at each point along the system from the intersection of Progress and Main Streets to the downstream culvert at Orchard Street. A map of pre and post conditions show the culvert systems and the junction node locations in the appendices.

The existing arch pipes throughout the site will need to be removed from the outfall of the triple box culverts under Progress and Main Streets. This includes the removal of the section under Kabrich Street. The area from the outfall of the box culverts will have a new 14ft wide open concrete channel to convey flow to a 23ft wide building pass through area that will take the flow to Kabrich Street. A new 5ft x 4ft box culvert will be installed as a constrictor to allow stormwater flow to back up into the open channel area and maintain downstream conditions.

Kabrich Street

The existing model shows significant flooding for all the storm events in the Kabrich Street area. The existing underground pipes cannot carry the 2-year storm event or the 10-year due to limited capacity. This leads to flooding for the lower storm events in addition to the larger 100- and 500-year events. Since releasing more flow would impact the downstream conditions, a proposed 5ft x 4ft box culvert under Kabrich would be installed to convey the flow. This new culvert would not increase or decrease the flooding conditions due to the limited capacity similar to the original arch pipe. In fact, there will be no general change in the flow conditions and this will not correct the existing flood issues. This is to maintain the constriction so that the downstream conditions do not worsen or cause impacts to Webb Street.

In order to improve the condition at Kabrich Street, more water will need to be released to lower the flood elevation, or downstream improvements will need to be made to allow for increased flow.

Progress and Main Street

The existing model shows some flooding during the 10-year storm event due to back up in the existing system. However, the improvements of the 14ft open channel and 23ft wide area through the proposed building allow more flow to be conveyed between the apartment complex and the Speedway. This allows the 10-year flood condition to be removed from the intersection completely. In addition, the 100-year and 500-year are also reduced since much of the flow is carried by the proposed open channel and building pass through.

Winston Street

The existing model shows flooding during the 10-year storm event due to the surcharging of the existing system throughout the site area. Much of the flow travels through the existing buildings and down the street. The proposed improvements of the open channel and apartment building pass through removes the 10-year storm event from the street and reduces the 100-year and 500-year storm events significantly in volume of flow. Even though the cross-section size is reduced by the apartment building and new townhomes across the street, the elevations still decrease due to the reduced flow along Winston Street.

Downstream and Webb Street

Based on the pre and post conditions, the proposed box culvert at Kabrich Street maintains the restriction and backs up water into the proposed open channel/building pass through. This keeps the overall downstream flow characteristics the same. There are some small drops in elevation and slight increase in velocity, but neither are significant enough to make any major changes. In order to improve the Kabrich Street condition, Webb Street will need to be improved to allow more flow downstream. For example, the Meadow Street culvert is undersized for upstream flow conditions and overtops during the 10-year storm event.

Below is a summary of the depths at different cross sections. Note that the flow numbers were pulled from the SSA model and then imported into a Hydroflow Express cross section based on field survey data. The flows were then run to estimate the changes in depth based on the model data. Cross sectional data can be found in the appendices.

Cross Sectional Depth of Adjacent Streets (Overland Flow in Feet)			
	Progress Cross Section	**Winston Street**	**Kabrich Street**
Existing 2 Year	0.00	0.00	0.48
Proposed 2 Year	0.00	0.00	0.49
Existing 10 Year	0.85	0.73	0.77
Proposed 10 Year	0.00	0.00	0.76
Existing 100 Year	1.19	1.14	1.00
Proposed 100 year	1.10	0.78	1.01
Existing 500 Year	1.37	1.34	1.11
Proposed 500 Year	1.32	1.18	1.12

Note that modeling software has a margin of error of 0.01ft. Also, note that even though there is no 10-year flow at Winston Street or Progress Street, flow will still be on the street but captured by the existing inlet systems. The 0.00 flows demonstrates that there will be no overtopping or surcharging from the system from upstream sources. This assumes that the existing inlets can convey the 10-year flow.

Summary

In summary, the changes to the post flood conditions are more pronounced with the removal of the upstream 10-year event and a decrease in the larger storm events at Winston Street. The open channel/building pass through allows for increased capacity in the system which can convey the flow from the upper drainage areas more effectively as well as provide some storage. Though the triple box culverts are a limiting factor, the flood condition at the intersection of Progress and Main Streets are still improved. However, the box culvert restriction at Kabrich Street only maintains the downstream conditions and does not improve any of the existing flood conditions at Kabrich Street. Overall, the proposed open channel/building pass through improvements will be a significant increase in capacity and help reduce flood conditions in certain areas as well as improve the existing stormwater system.

801 N. Main Street

MAPS

- Drainage Map
- Pre & Post SSA Node Map with 100 Year Flood
- Site Map (Pre and Post)
- Site Map with Open Channel and Kabrich Box Culvert
- Building Sheets with Channel Dimensions

X:\Drawings\3644\ENGINEERING\Design\Calcs\SWM\FloodStudy\3644_Sheet.dwg
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801 NORTH MAIN STREET

TOWN OF BLACKSBURG, VIRGINIA

REVISIONS

NO.	COMMENTS	DATE

PROJECT TEAM

PIC	JOHN T. NEEL, PE
PM	TIMOTHY D. GUTHRIE, PE
DESIGN	TIMOTHY D. GUTHRIE, PE

ISSUE DATE

07/12/2024

FDS JOB NO.

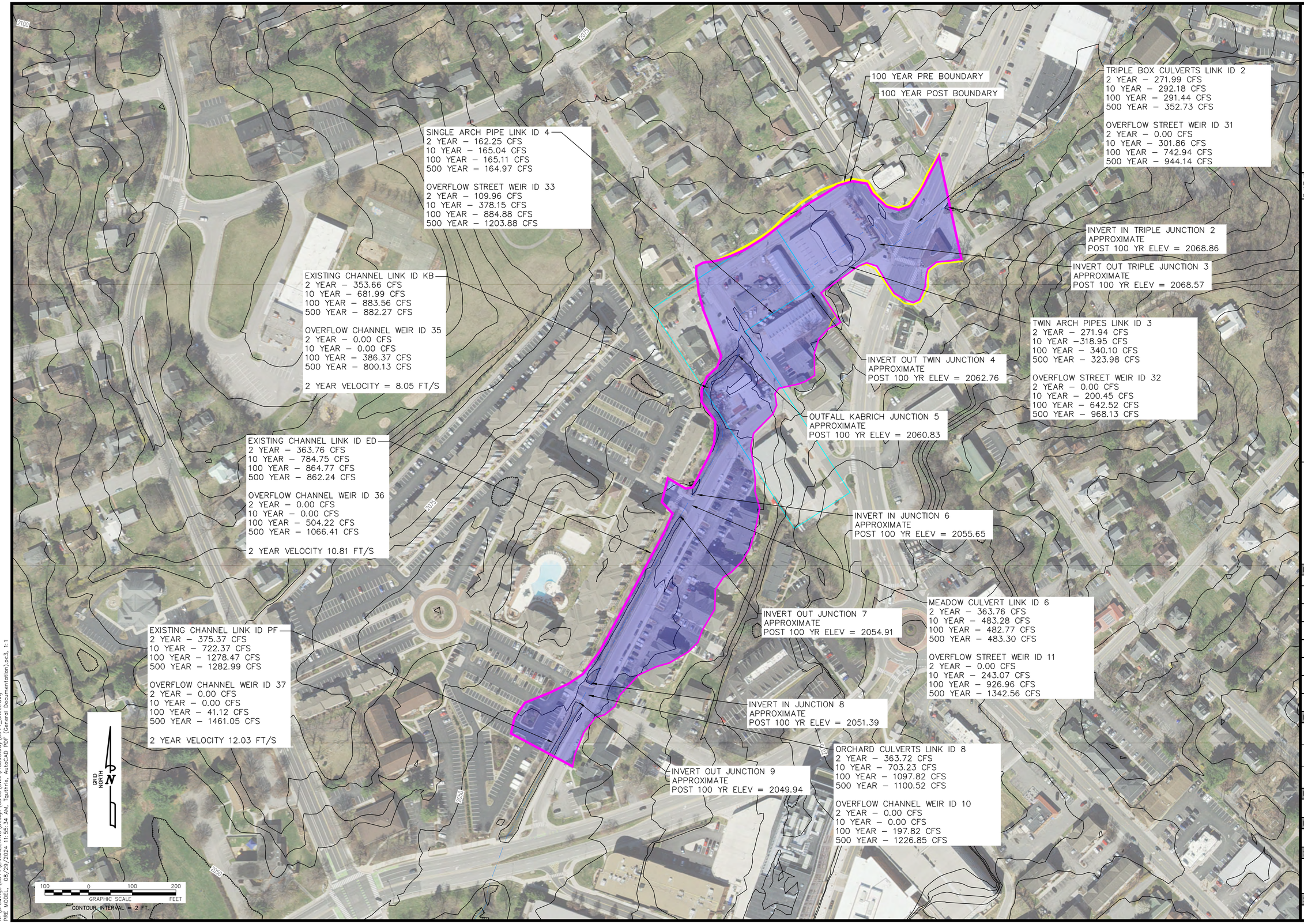
3644

SHEET TITLE

DRAINAGE MAP

SHEET NUMBER

2 OF 2



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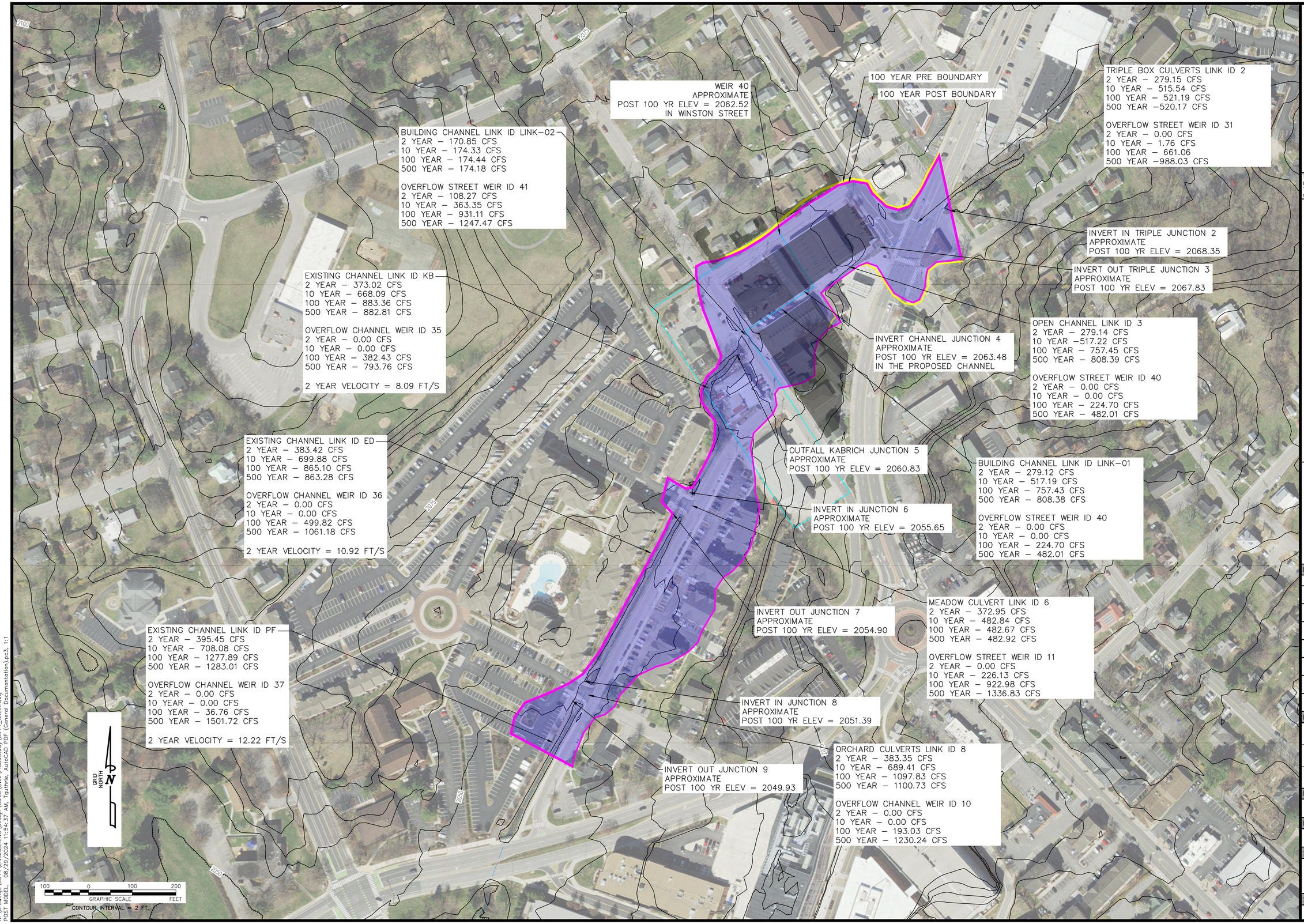
FDS JOB NO.: 3644

SHEET TITLE: MAX FLOW PRE CONDITIONS

SHEET NUMBER: 1 OF 2



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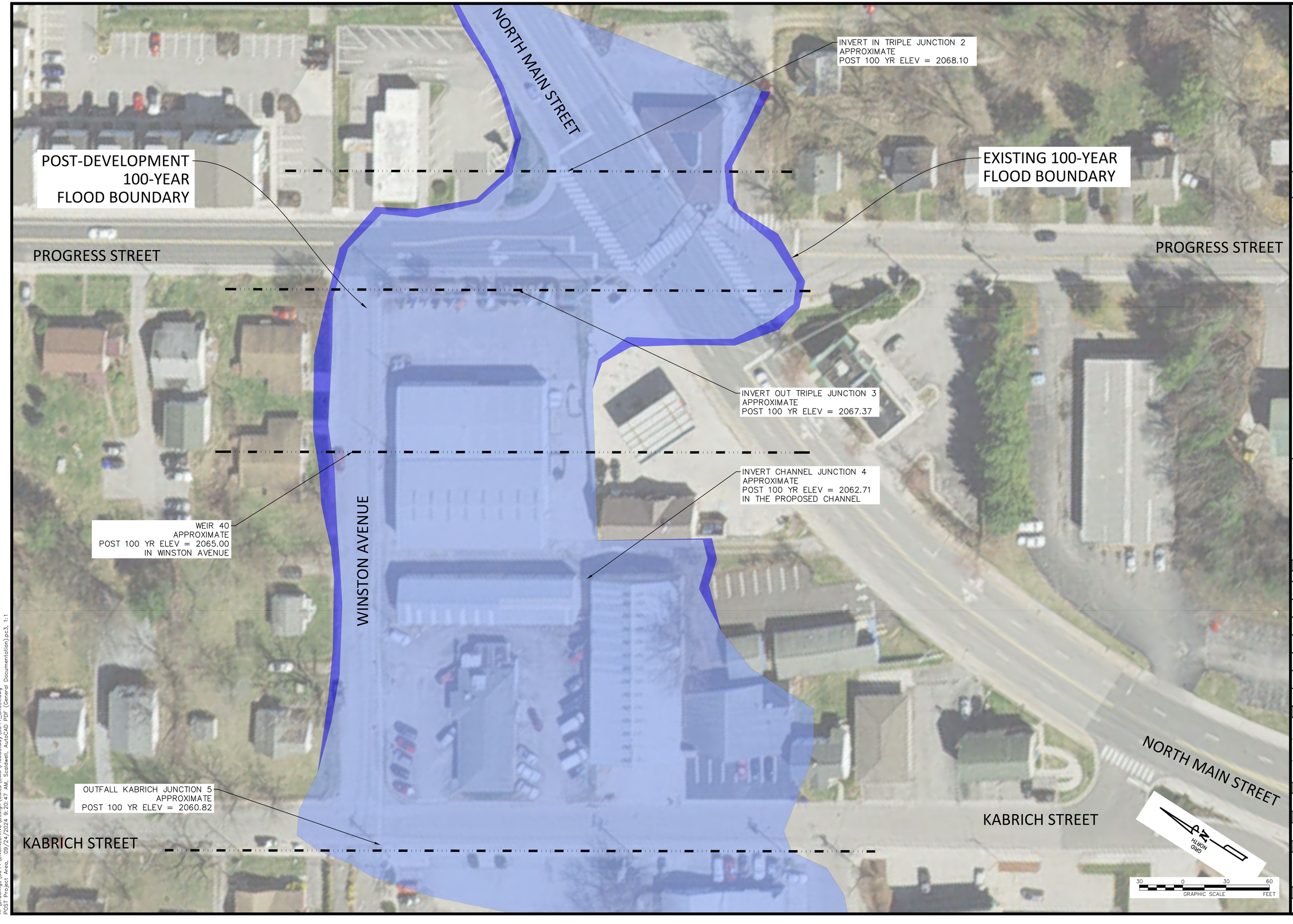
FDS JOB NO.: 3644

SHEET TITLE: MAX FLOW POST CONDITIONS

SHEET NUMBER: 2 OF 2



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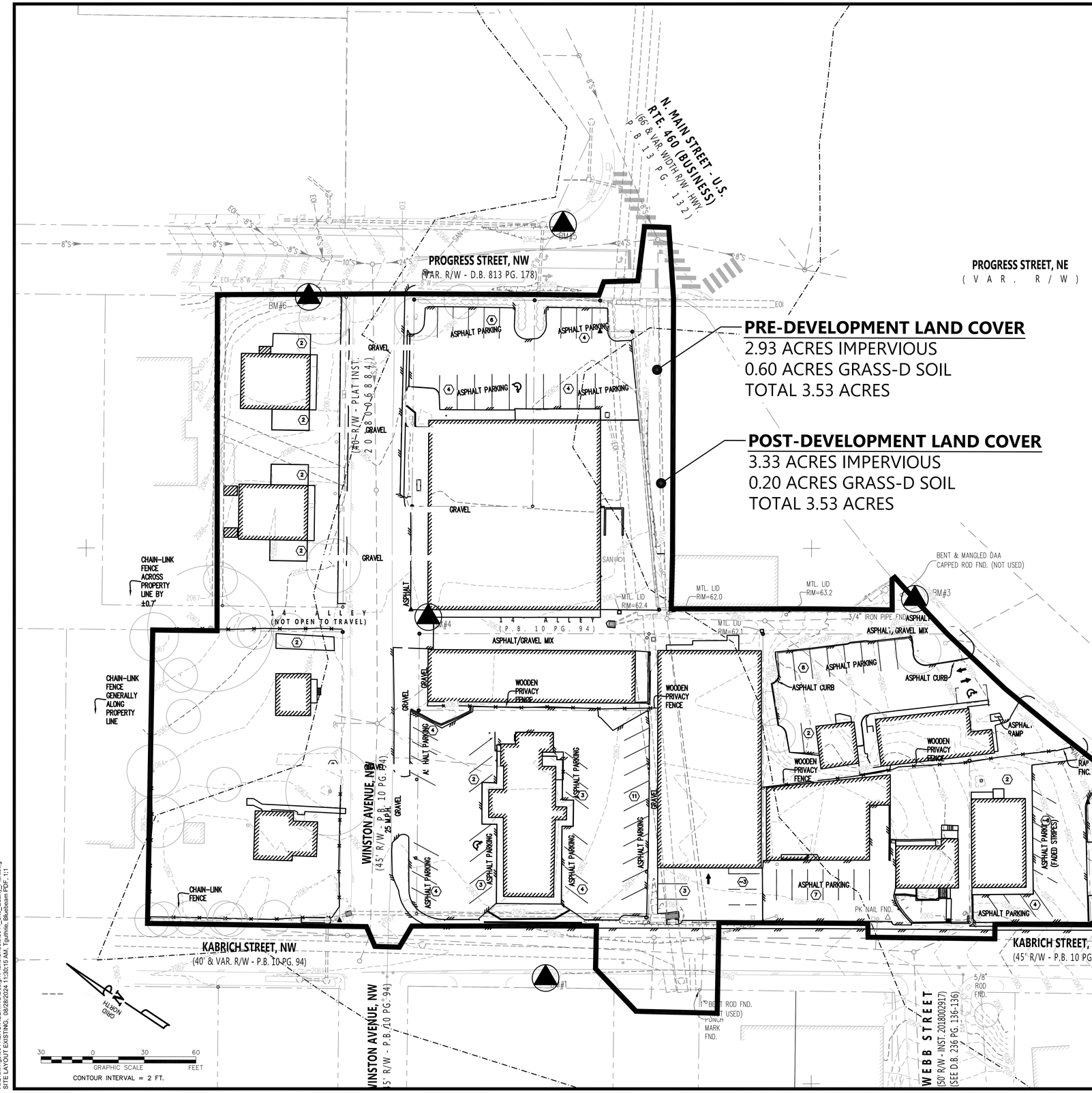
ISSUE DATE: 09/25/2024

FDS JOB NO.: 3644

SHEET TITLE: 100 YR FLOOD BOUNDARIES

SHEET NUMBER: 1 OF 1



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BLACKSBURG, VIRGINIA

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REVISIONS

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ISSUE DATE
08/29/2024

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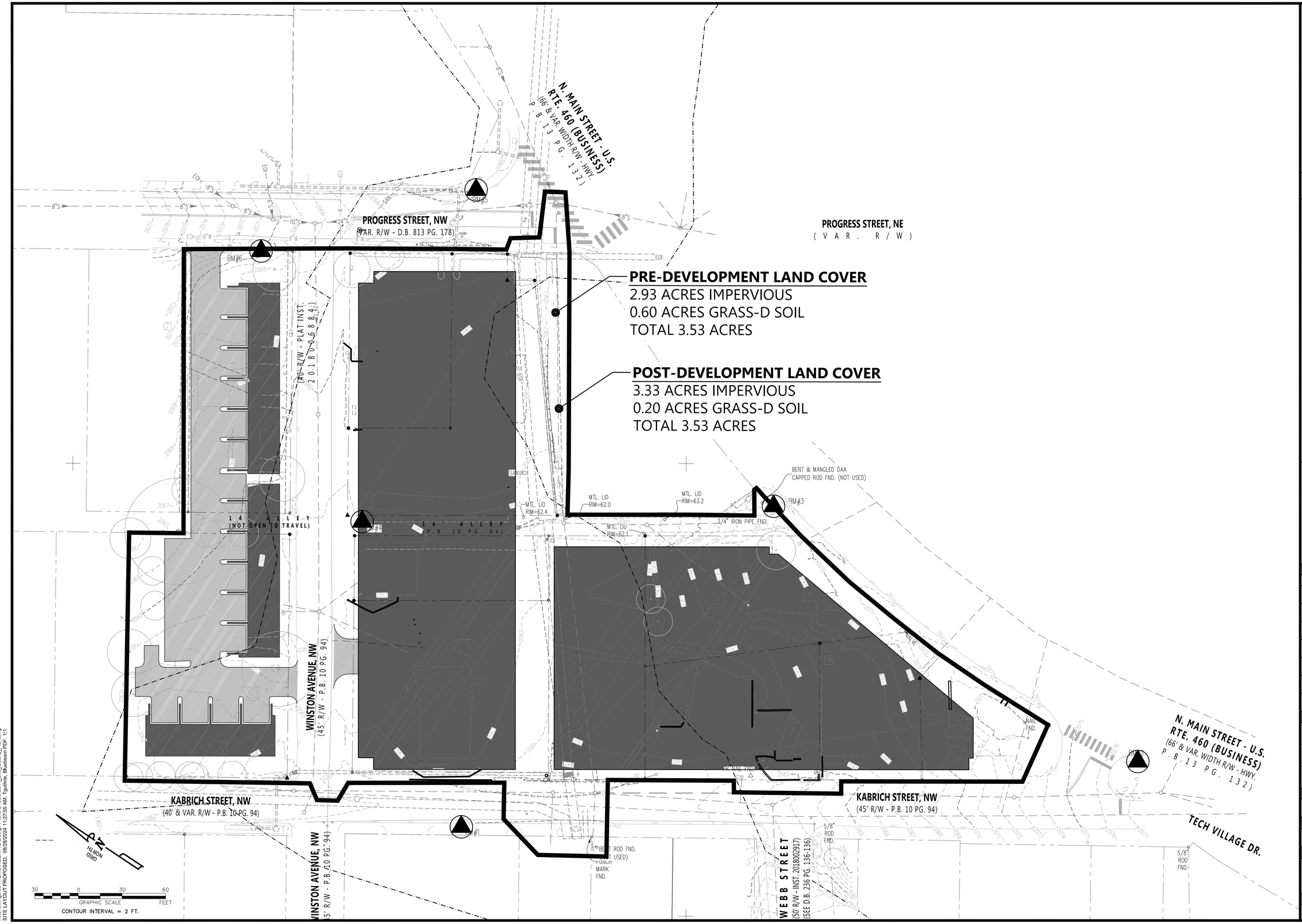
3644

SHEET TITLE
PRE SITE MAP

SHEET NUMBER
1 OF 2



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BLACKSBURG, VIRGINIA

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DESIGN	SEC

ISSUE DATE
08/29/2024

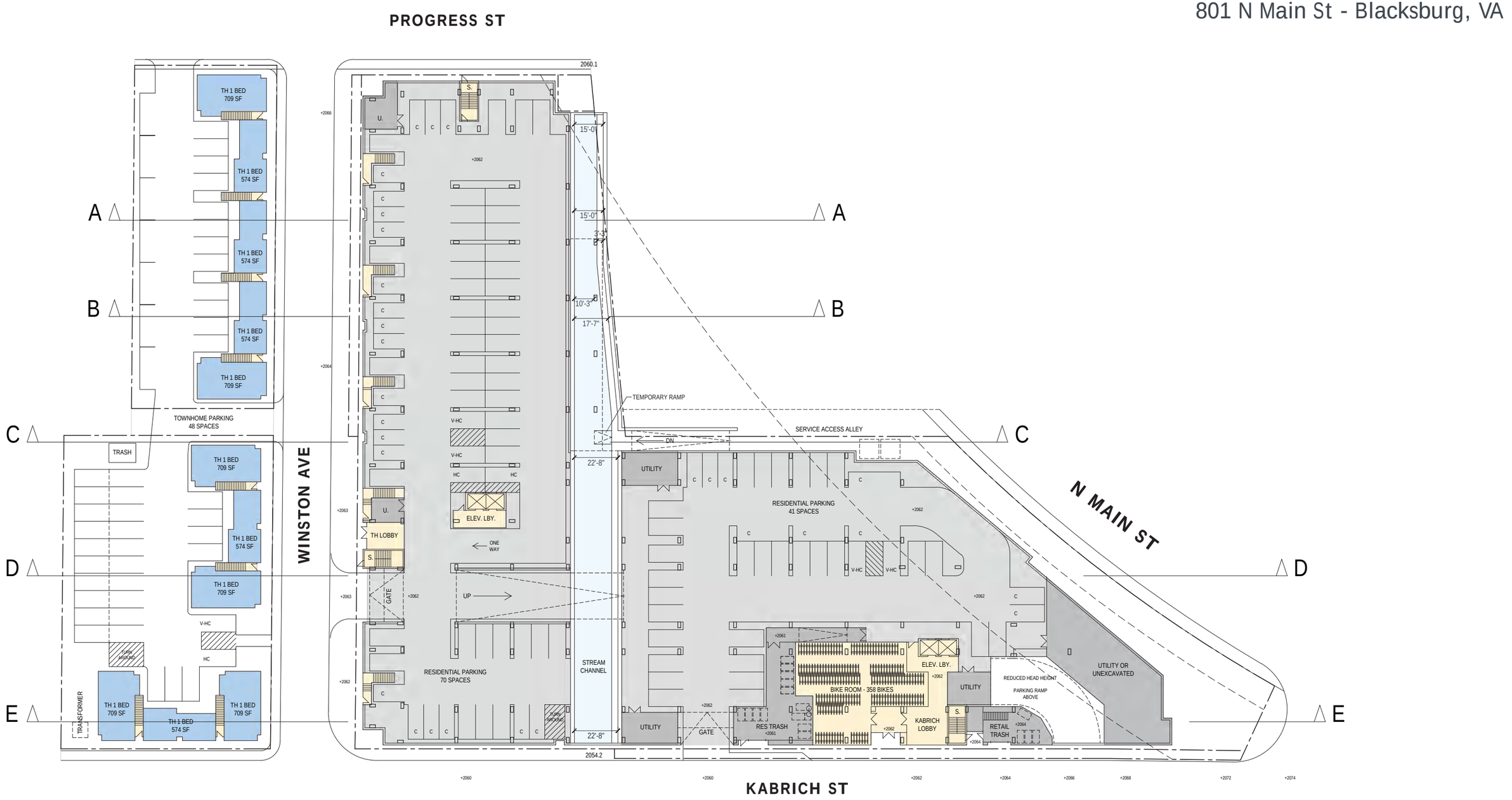
FDS JOB NO.
3644

SHEET TITLE
POST SITE MAP

SHEET NUMBER
2 OF 2

Conceptual Stream Dimensions Exhibit

801 N Main St - Blacksburg, VA



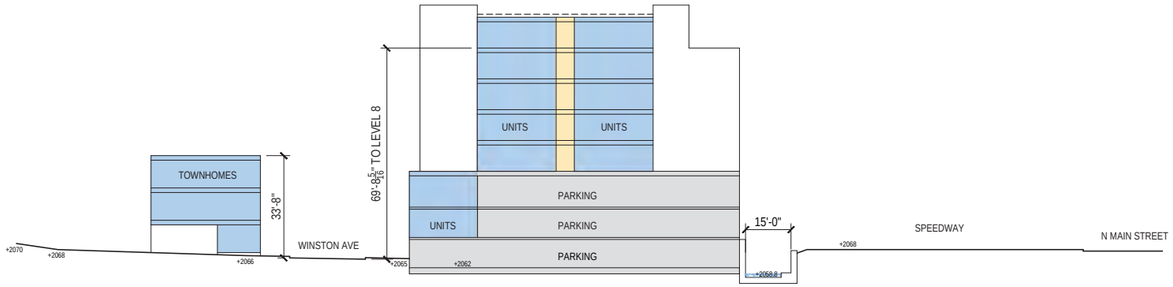
LEVEL 1

N

0’ 25’ 50’ 100’

Conceptual Building Sections

801 N Main St - Blacksburg, VA



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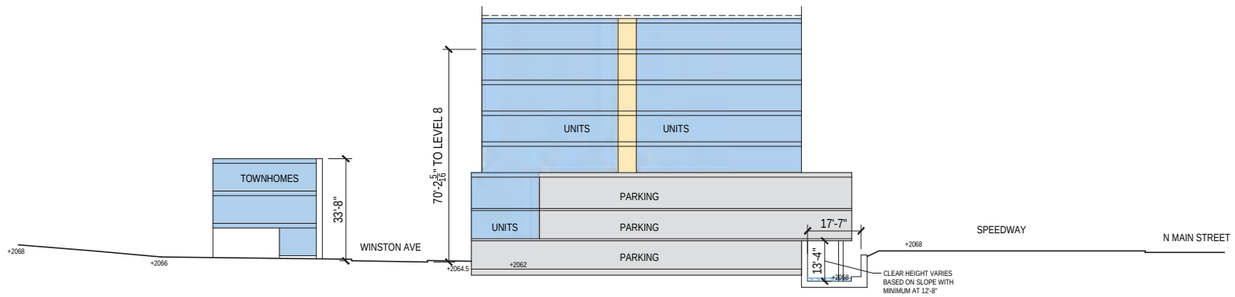

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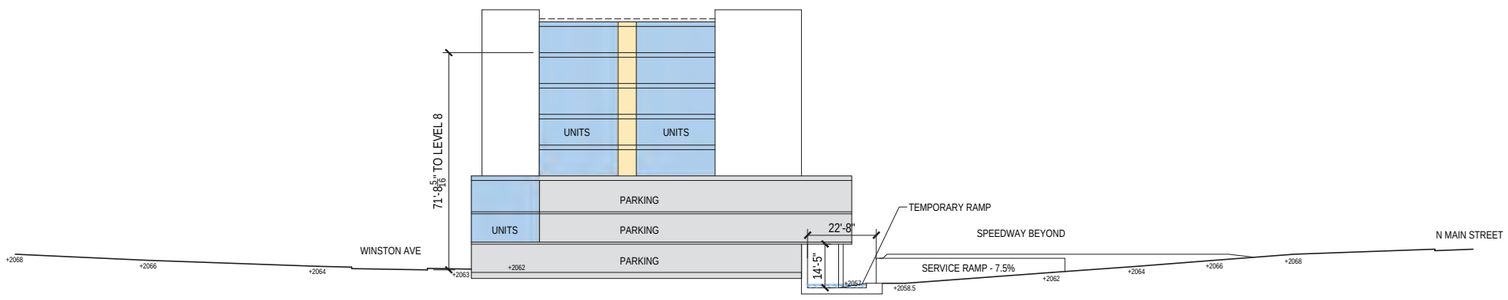
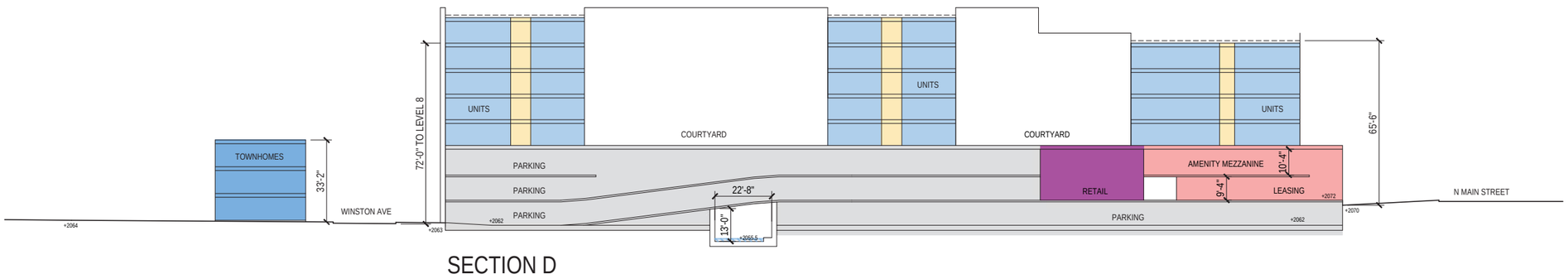


SECTION C

Conceptual Building Sections

801 N Main St - Blacksburg, VA



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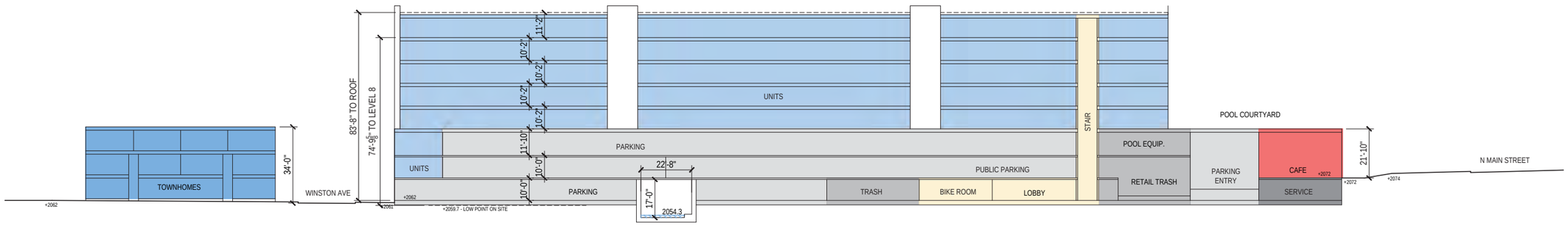

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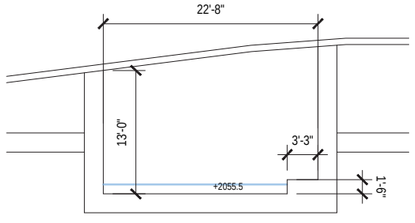


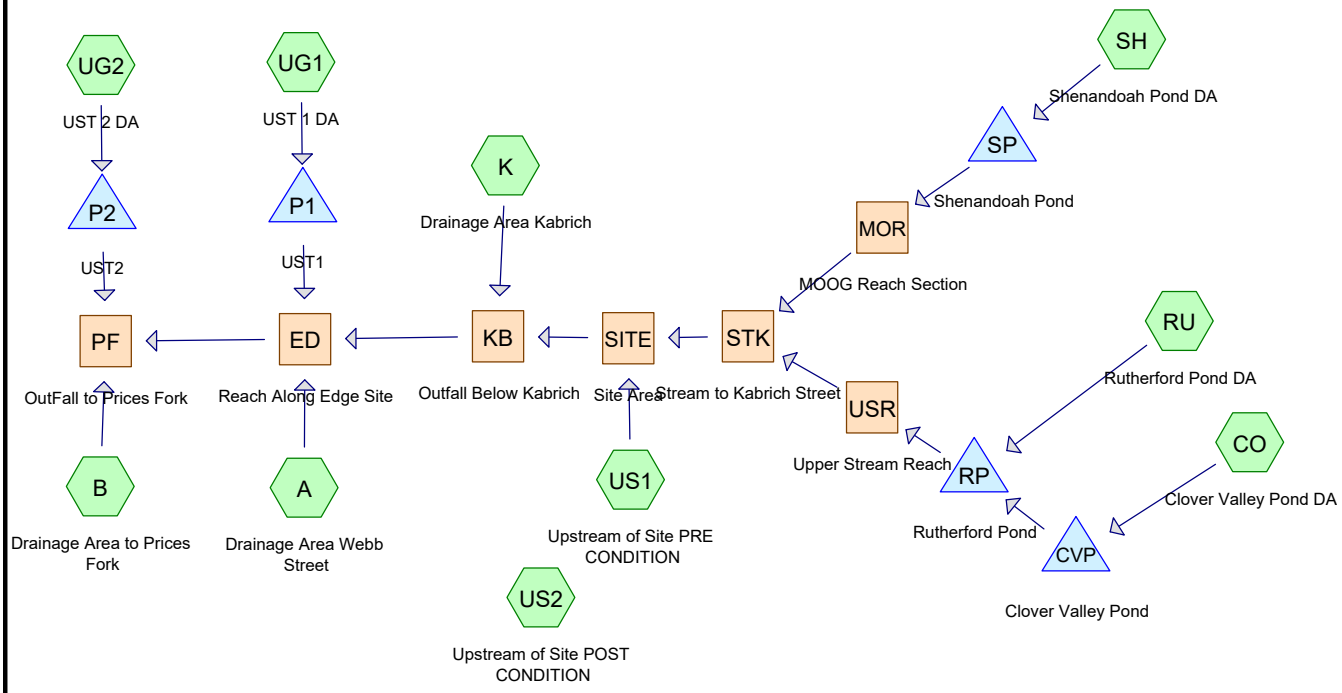
ENLARGED CHANNEL AT SECTION D

0’ 25’ 50’ 100’

801 N. Main Street

STORMWATER QUANTITY CALCULATIONS

- HydroCAD Model
- SSA Model (Pre and Post)
- Winston Weir Check (Pre and Post)



Subcat Reach Pond Link

Routing Diagram for 3644_Flood_Study_HydroCAD - BZ BASE
Prepared by Foresight Design Services, Printed 8/28/2024
HydroCAD® 10.20-3c s/n 08978 © 2023 HydroCAD Software Solutions LLC

Project Notes

Copied 10 events from PF_Depth_Blacksburg_PDS 24-hr S1 storm

Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	1-yr	PF_Depth_Blacksburg_PDS 24-hr S1	1-yr	Default	24.00	1	2.28	2
2	2-yr	PF_Depth_Blacksburg_PDS 24-hr S1	2-yr	Default	24.00	1	2.76	2
3	10-yr	PF_Depth_Blacksburg_PDS 24-hr S1	10-yr	Default	24.00	1	4.10	2
4	100-yr	PF_Depth_Blacksburg_PDS 24-hr S1	100-yr	Default	24.00	1	6.50	2
5	500-yr	PF_Depth_Blacksburg_PDS 24-hr S1	500-yr	Default	24.00	1	8.60	2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.306	68	1 acre lots, 20% imp, HSG B (CO, SH)
0.507	79	1 acre lots, 20% imp, HSG C (CO)
5.055	70	1/2 acre lots, 25% imp, HSG B (CO, RU, SH)
10.821	80	1/2 acre lots, 25% imp, HSG C (CO, RU, SH)
26.456	72	1/3 acre lots, 30% imp, HSG B (CO, US1, US2)
108.541	81	1/3 acre lots, 30% imp, HSG C (CO, US1, US2)
12.800	86	1/3 acre lots, 30% imp, HSG D (US1, US2)
18.635	85	1/8 acre lots, 65% imp, HSG B (CO, RU, SH, US1, US2)
106.012	90	1/8 acre lots, 65% imp, HSG C (CO, RU, SH, US1, US2)
42.275	61	>75% Grass cover, Good, HSG B (K, RU, SH, US1, US2)
136.569	74	>75% Grass cover, Good, HSG C (A, CO, K, RU, SH, UG1, UG2, US1, US2)
4.680	80	>75% Grass cover, Good, HSG D (A, B)
44.800	98	Paved parking, HSG B (K)
19.432	98	Paved parking, HSG C (CO, UG2, US1, US2)
7.529	89	Paved roads w/open ditches, 50% imp, HSG B (CO, SH, US1, US2)
37.624	92	Paved roads w/open ditches, 50% imp, HSG C (CO, SH, US1, US2)
0.800	80	SITE AREA GERASS (US1, US2)
6.260	98	SITE AREA IMPERVIOUS (US1, US2)
11.090	98	Unconnected pavement, HSG C (A, B)
11.623	92	Urban commercial, 85% imp, HSG B (CO, RU, SH)
59.213	94	Urban commercial, 85% imp, HSG C (CO, RU, SH, US1, US2)
11.740	95	Urban commercial, 85% imp, HSG D (US1, US2)
16.483	88	Urban industrial, 72% imp, HSG B (SH, US1, US2)
17.040	91	Urban industrial, 72% imp, HSG C (US1, US2)
2.460	98	Water Surface, 0% imp, HSG C (UG1)
12.480	55	Woods, Good, HSG B (US1, US2)
5.500	70	Woods, Good, HSG C (CO, US1, US2)
736.731	**83**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
185.642	HSG B	CO, K, RU, SH, US1, US2
514.809	HSG C	A, B, CO, K, RU, SH, UG1, UG2, US1, US2
29.220	HSG D	A, B, US1, US2
7.060	Other	US1, US2
736.731		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatch Numbers
0.000	0.306	0.507	0.000	0.000	0.813	1 acre lots, 20% imp	
0.000	5.055	10.821	0.000	0.000	15.876	1/2 acre lots, 25% imp	
0.000	26.456	108.541	12.800	0.000	147.797	1/3 acre lots, 30% imp	
0.000	18.635	106.012	0.000	0.000	124.647	1/8 acre lots, 65% imp	
0.000	42.275	136.569	4.680	0.000	183.524	>75% Grass cover, Good	
0.000	44.800	19.432	0.000	0.000	64.232	Paved parking	
0.000	7.529	37.624	0.000	0.000	45.153	Paved roads w/open ditches, 50% imp	
0.000	0.000	0.000	0.000	0.800	0.800	SITE AREA GERASS	
0.000	0.000	0.000	0.000	6.260	6.260	SITE AREA IMPERVIOUS	
0.000	0.000	11.090	0.000	0.000	11.090	Unconnected pavement	
0.000	11.623	59.213	11.740	0.000	82.576	Urban commercial, 85% imp	
0.000	16.483	17.040	0.000	0.000	33.523	Urban industrial, 72% imp	
0.000	0.000	2.460	0.000	0.000	2.460	Water Surface, 0% imp	
0.000	12.480	5.500	0.000	0.000	17.980	Woods, Good	
0.000	**185.642**	**514.809**	**29.220**	**7.060**	**736.731**	**TOTAL AREA**	

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Width (inches)	Diam/Height (inches)	Inside-Fill (inches)	Node Name
1	K	0.00	0.00	1,152.0	0.0300	0.013	0.0	24.0	0.0	
2	K	0.00	0.00	843.0	0.0200	0.024	0.0	36.0	0.0	
3	CVP	2,154.50	2,153.50	50.0	0.0200	0.013	0.0	30.0	0.0	
4	CVP	2,155.00	2,154.50	3.0	0.1667	0.013	0.0	18.0	0.0	
5	CVP	2,156.77	2,156.27	3.0	0.1667	0.013	0.0	30.0	0.0	
6	P1	2,050.75	2,049.25	42.4	0.0354	0.011	0.0	18.0	0.0	
7	P2	2,044.25	2,043.83	35.1	0.0120	0.011	0.0	30.0	0.0	
8	RP	2,134.82	2,134.00	82.0	0.0100	0.013	0.0	54.0	0.0	
9	RP	2,135.00	2,134.82	3.0	0.0600	0.013	0.0	18.0	0.0	
10	SP	2,117.00	2,116.51	75.0	0.0065	0.024	0.0	36.0	0.0	

Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentA: Drainage Area Webb Runoff Area=6.360 ac 61.95% Impervious Runoff Depth=1.34"
Flow Length=1,277' Tc=18.5 min CN=90 Runoff=7.80 cfs 0.708 af

SubcatchmentB: Drainage Area to Prices Runoff Area=10.800 ac 66.20% Impervious Runoff Depth=1.49"
Flow Length=630' Tc=12.5 min CN=92 Runoff=17.71 cfs 1.342 af

SubcatchmentCO: Clover Valley Pond DA Runoff Area=44.421 ac 44.76% Impervious Runoff Depth=0.95"
Flow Length=2,092' Tc=17.5 min CN=84 Runoff=38.68 cfs 3.510 af

SubcatchmentK: Drainage Area Kabrich Runoff Area=93.790 ac 47.77% Impervious Runoff Depth=1.01"
Flow Length=3,788' Tc=18.2 min CN=85 Runoff=85.53 cfs 7.862 af

SubcatchmentRU: Rutherford Pond DA Runoff Area=7.747 ac 55.63% Impervious Runoff Depth=1.13"
Flow Length=741' Tc=12.4 min CN=87 Runoff=9.56 cfs 0.729 af

SubcatchmentSH: Shenandoah Pond DA Runoff Area=69.353 ac 59.71% Impervious Runoff Depth=1.07"
Flow Length=2,630' Tc=23.5 min CN=86 Runoff=59.79 cfs 6.162 af

SubcatchmentUG1: UST 1 DA Runoff Area=3.050 ac 0.00% Impervious Runoff Depth=1.57"
Tc=5.0 min CN=93 Runoff=7.35 cfs 0.400 af

SubcatchmentUG2: UST 2 DA Runoff Area=11.650 ac 51.33% Impervious Runoff Depth=1.07"
Flow Length=480' Tc=17.2 min CN=86 Runoff=11.63 cfs 1.035 af

SubcatchmentUS1: Upstream of Site Runoff Area=244.780 ac 40.87% Impervious Runoff Depth=0.84"
Flow Length=5,941' Tc=28.6 min CN=82 Runoff=145.28 cfs 17.129 af

SubcatchmentUS2: Upstream of Site Runoff Area=244.780 ac 41.04% Impervious Runoff Depth=0.84"
Flow Length=5,941' Tc=28.6 min CN=82 Runoff=145.28 cfs 17.129 af

Reach ED: Reach Along Edge Site Inflow=252.74 cfs 36.498 af
Outflow=252.74 cfs 36.498 af

Reach KB: Outfall Below Kabrich Inflow=246.50 cfs 35.392 af
Outflow=246.50 cfs 35.392 af

Reach MOR: MOOG Reach Section Avg. Flow Depth=1.28' Max Vel=7.71 fps Inflow=45.05 cfs 6.162 af
n=0.024 L=1,020.0' S=0.0225 '/' Capacity=3,267.06 cfs Outflow=44.97 cfs 6.162 af

Reach PF: OutFall to Prices Fork Inflow=264.20 cfs 38.874 af
Outflow=264.20 cfs 38.874 af

Reach SITE: Site Area Inflow=186.32 cfs 27.530 af
Outflow=186.32 cfs 27.530 af

Reach STK: Stream to Kabrich Street Avg. Flow Depth=1.63' Max Vel=6.51 fps Inflow=68.12 cfs 10.401 af
n=0.024 L=2,424.0' S=0.0111 '/' Capacity=795.50 cfs Outflow=66.67 cfs 10.401 af

Reach USR: Upper Stream Reach Avg. Flow Depth=0.65' Max Vel=5.97 fps Inflow=25.71 cfs 4.239 af
n=0.024 L=1,864.0' S=0.0223 '/' Capacity=3,988.84 cfs Outflow=24.55 cfs 4.239 af

Pond CVP: Clover Valley Pond Peak Elev=2,158.80' Storage=0.164 af Inflow=38.68 cfs 3.510 af
Outflow=35.31 cfs 3.510 af

Pond P1: UST1 Peak Elev=2,052.90' Storage=0.215 af Inflow=7.35 cfs 0.400 af
Outflow=0.80 cfs 0.398 af

Pond P2: UST2 Peak Elev=2,046.05' Storage=0.368 af Inflow=11.63 cfs 1.035 af
Outflow=3.50 cfs 1.035 af

Pond RP: Rutherford Pond Peak Elev=2,140.72' Storage=36,606 cf Inflow=41.80 cfs 4.239 af
Outflow=25.71 cfs 4.239 af

Pond SP: Shenandoah Pond Peak Elev=2,121.63' Storage=20,744 cf Inflow=59.79 cfs 6.162 af
Outflow=45.05 cfs 6.162 af

Total Runoff Area = 736.731 ac Runoff Volume = 56.006 af Average Runoff Depth = 0.91"
55.48% Pervious = 408.755 ac 44.52% Impervious = 327.976 ac

Summary for Subcatchment A: Drainage Area Webb Street

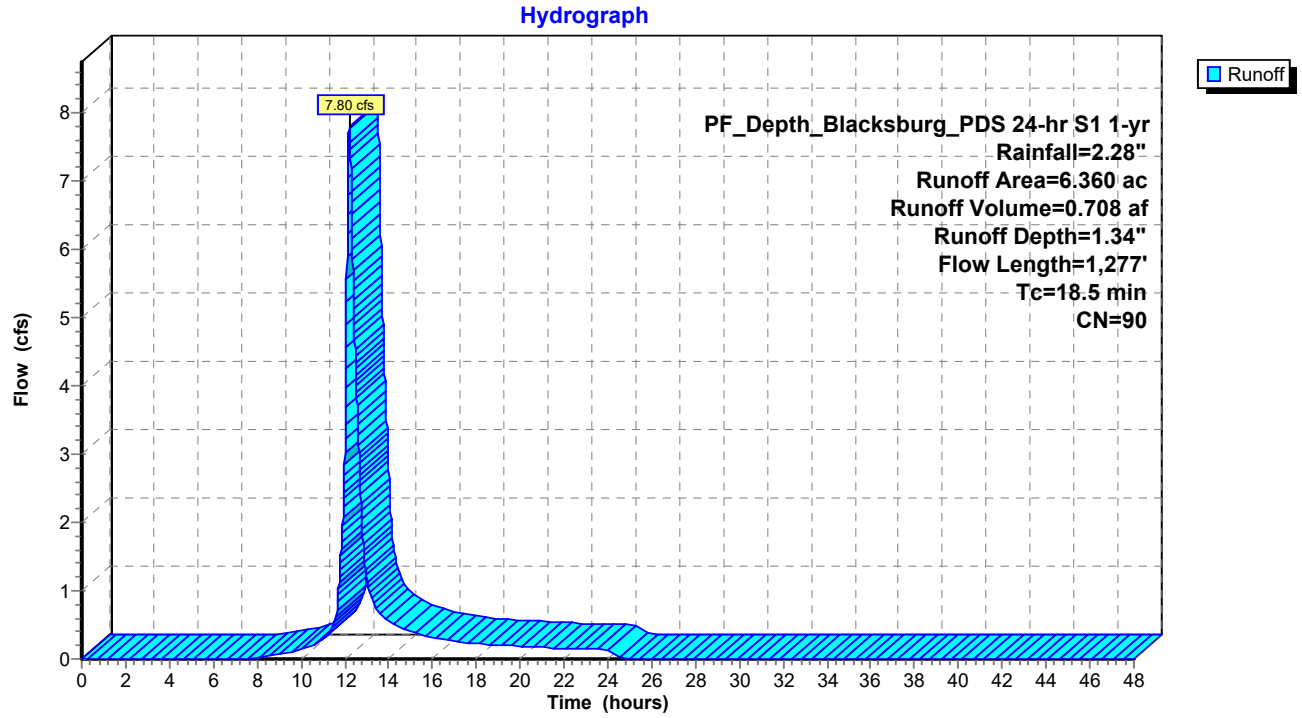
Runoff = 7.80 cfs @ 12.21 hrs, Volume= 0.708 af, Depth= 1.34"
Routed to Reach ED : Reach Along Edge Site

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
PF_Depth_Blacksburg_PDS 24-hr S1 1-yr Rainfall=2.28"

Area (ac)	CN	Description
1.390	74	>75% Grass cover, Good, HSG C
1.030	80	>75% Grass cover, Good, HSG D
3.940	98	Unconnected pavement, HSG C
6.360	90	Weighted Average
2.420		38.05% Pervious Area
3.940		61.95% Impervious Area
3.940		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.4	100	0.0200	0.11		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.76"
2.2	424	0.0400	3.22		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.9	753	0.0200	13.90	166.80	**Channel Flow,** Area= 12.0 sf Perim= 6.0' r= 2.00' n= 0.024
18.5	1,277	Total			

Subcatchment A: Drainage Area Webb Street



Summary for Subcatchment B: Drainage Area to Prices Fork

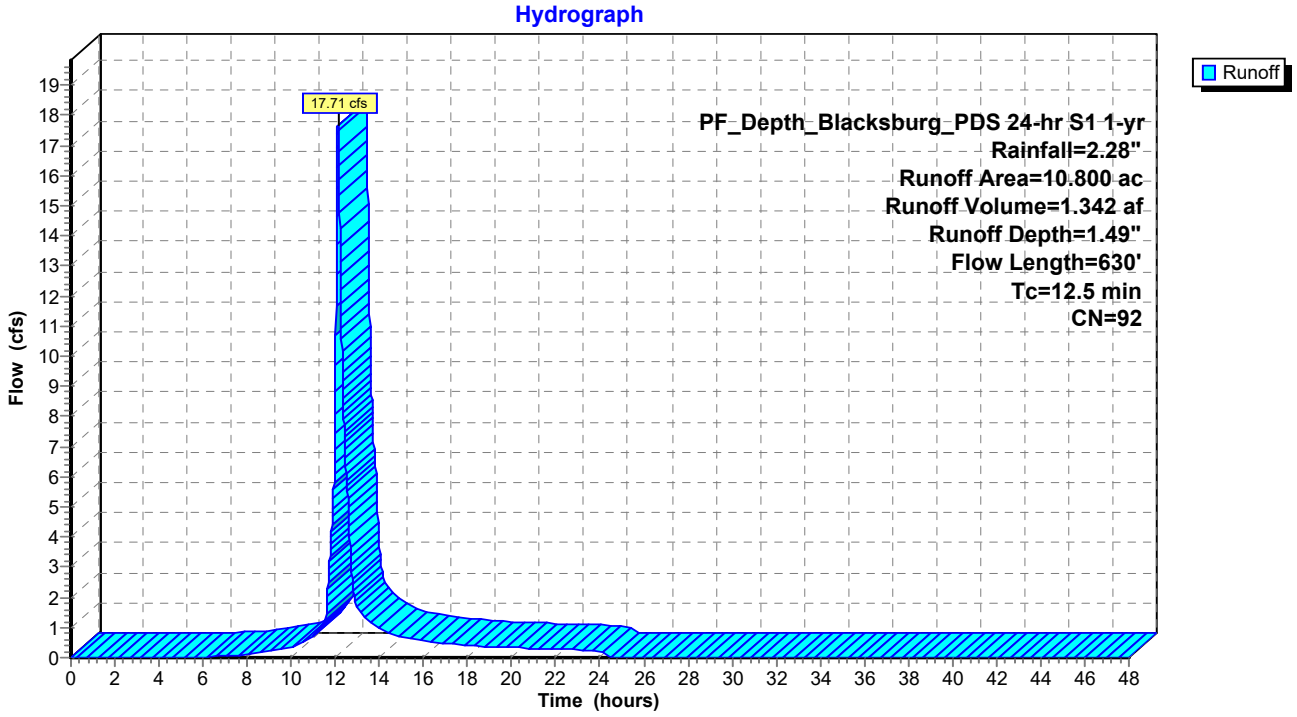
Runoff = 17.71 cfs @ 12.12 hrs, Volume= 1.342 af, Depth= 1.49"
Routed to Reach PF : OutFall to Prices Fork

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
PF_Depth_Blacksburg_PDS 24-hr S1 1-yr Rainfall=2.28"

Area (ac)	CN	Description
3.650	80	>75% Grass cover, Good, HSG D
7.150	98	Unconnected pavement, HSG C
10.800	92	Weighted Average
3.650		33.80% Pervious Area
7.150		66.20% Impervious Area
7.150		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.7	100	0.0500	0.16		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.76"
0.4	80	0.0500	3.60		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
1.4	450	0.0200	5.52	33.10	**Channel Flow,** Area= 6.0 sf Perim= 12.0' r= 0.50' n= 0.024
12.5	630	Total			

Subcatchment B: Drainage Area to Prices Fork



Summary for Subcatchment CO: Clover Valley Pond DA

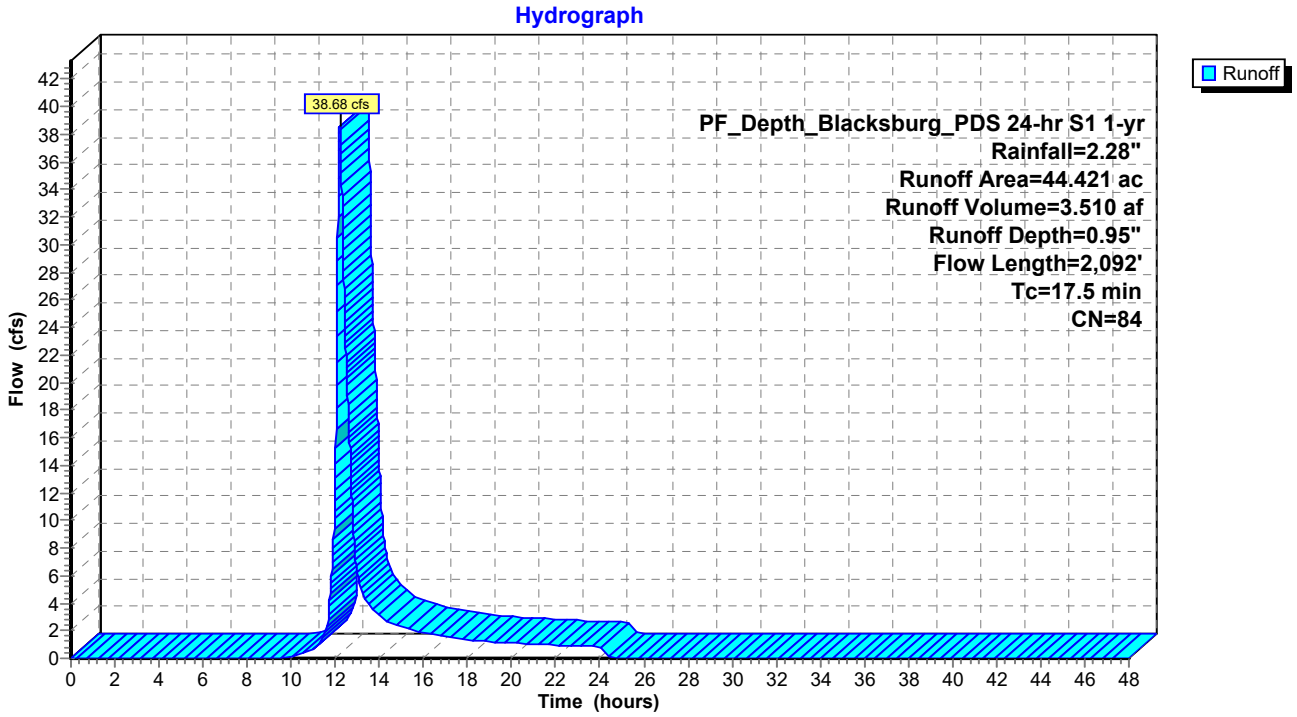
Runoff = 38.68 cfs @ 12.21 hrs, Volume= 3.510 af, Depth= 0.95"
Routed to Pond CVP : Clover Valley Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
PF_Depth_Blacksburg_PDS 24-hr S1 1-yr Rainfall=2.28"

Area (ac)	CN	Description
1.300	70	Woods, Good, HSG C
2.576	74	>75% Grass cover, Good, HSG C
0.198	68	1 acre lots, 20% imp, HSG B
0.507	79	1 acre lots, 20% imp, HSG C
4.150	70	1/2 acre lots, 25% imp, HSG B
10.489	80	1/2 acre lots, 25% imp, HSG C
1.456	72	1/3 acre lots, 30% imp, HSG B
2.101	81	1/3 acre lots, 30% imp, HSG C
1.438	85	1/8 acre lots, 65% imp, HSG B
8.011	90	1/8 acre lots, 65% imp, HSG C
1.487	92	Urban commercial, 85% imp, HSG B
6.136	94	Urban commercial, 85% imp, HSG C
0.610	89	Paved roads w/open ditches, 50% imp, HSG B
0.212	98	Paved parking, HSG C
3.750	92	Paved roads w/open ditches, 50% imp, HSG C
44.421	84	Weighted Average
24.540		55.24% Pervious Area
19.881		44.76% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	150	0.1400	0.26		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.76"
7.7	1,942	0.0690	4.23		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
17.5	2,092	Total			

Subcatchment CO: Clover Valley Pond DA



Summary for Subcatchment K: Drainage Area Kabrich

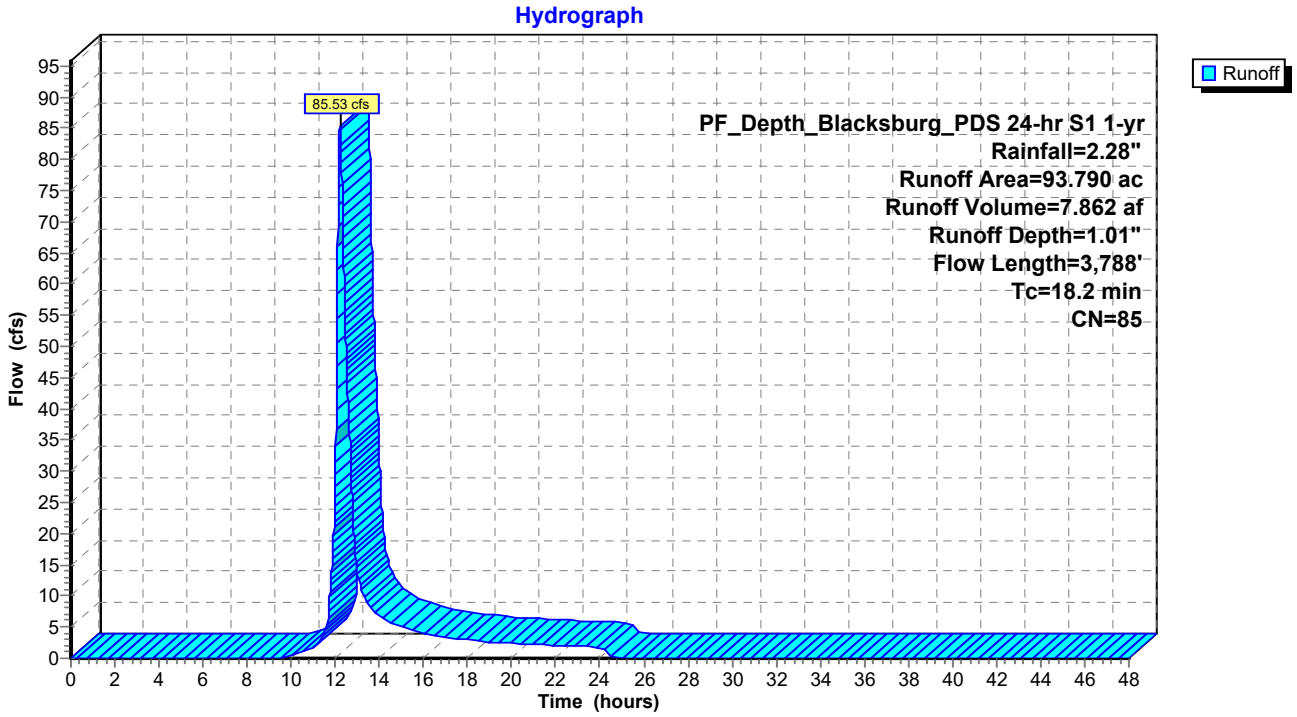
Runoff = 85.53 cfs @ 12.21 hrs, Volume= 7.862 af, Depth= 1.01"
Routed to Reach KB : Outfall Below Kabrich

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
PF_Depth_Blacksburg_PDS 24-hr S1 1-yr Rainfall=2.28"

Area (ac)	CN	Description
3.400	61	>75% Grass cover, Good, HSG B
45.590	74	>75% Grass cover, Good, HSG C
44.800	98	Paved parking, HSG B
93.790	85	Weighted Average
48.990		52.23% Pervious Area
44.800		47.77% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.7	100	0.0500	0.16		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.76"
2.6	322	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.5	1,152	0.0300	12.47	39.18	**Pipe Channel,** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.013
1.5	1,371	0.0240	15.23	182.72	**Channel Flow,** Area= 12.0 sf Perim= 6.0' r= 2.00' n= 0.024
1.9	843	0.0200	7.23	51.09	**Pipe Channel,** 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.024
18.2	3,788	Total			

Subcatchment K: Drainage Area Kabrich



Summary for Subcatchment RU: Rutherford Pond DA

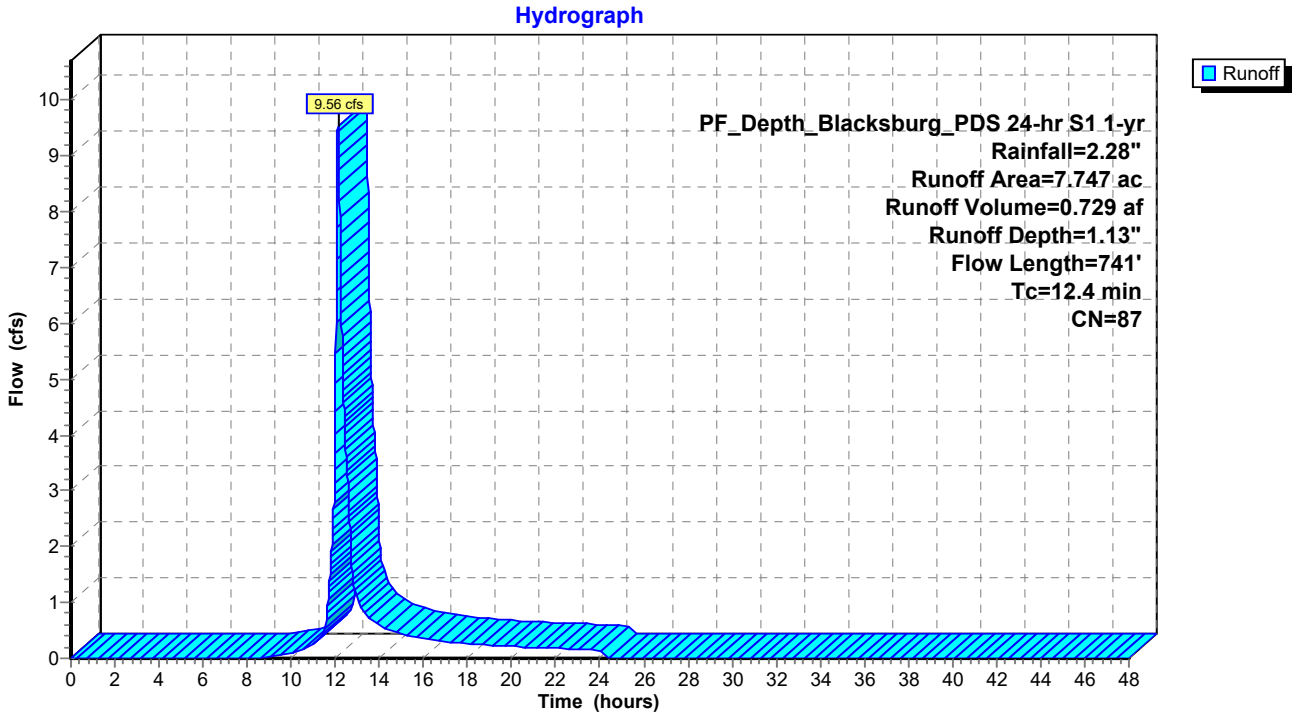
Runoff = 9.56 cfs @ 12.13 hrs, Volume= 0.729 af, Depth= 1.13"
Routed to Pond RP : Rutherford Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
PF_Depth_Blacksburg_PDS 24-hr S1 1-yr Rainfall=2.28"

Area (ac)	CN	Description
0.105	61	>75% Grass cover, Good, HSG B
0.939	74	>75% Grass cover, Good, HSG C
0.132	70	1/2 acre lots, 25% imp, HSG B
0.278	80	1/2 acre lots, 25% imp, HSG C
0.393	85	1/8 acre lots, 65% imp, HSG B
5.318	90	1/8 acre lots, 65% imp, HSG C
0.195	92	Urban commercial, 85% imp, HSG B
0.387	94	Urban commercial, 85% imp, HSG C
7.747	87	Weighted Average
3.438		44.37% Pervious Area
4.309		55.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.6	150	0.1130	0.24		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.76"
1.8	591	0.0745	5.54		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
12.4	741	Total			

Subcatchment RU: Rutherford Pond DA



Summary for Subcatchment SH: Shenandoah Pond DA

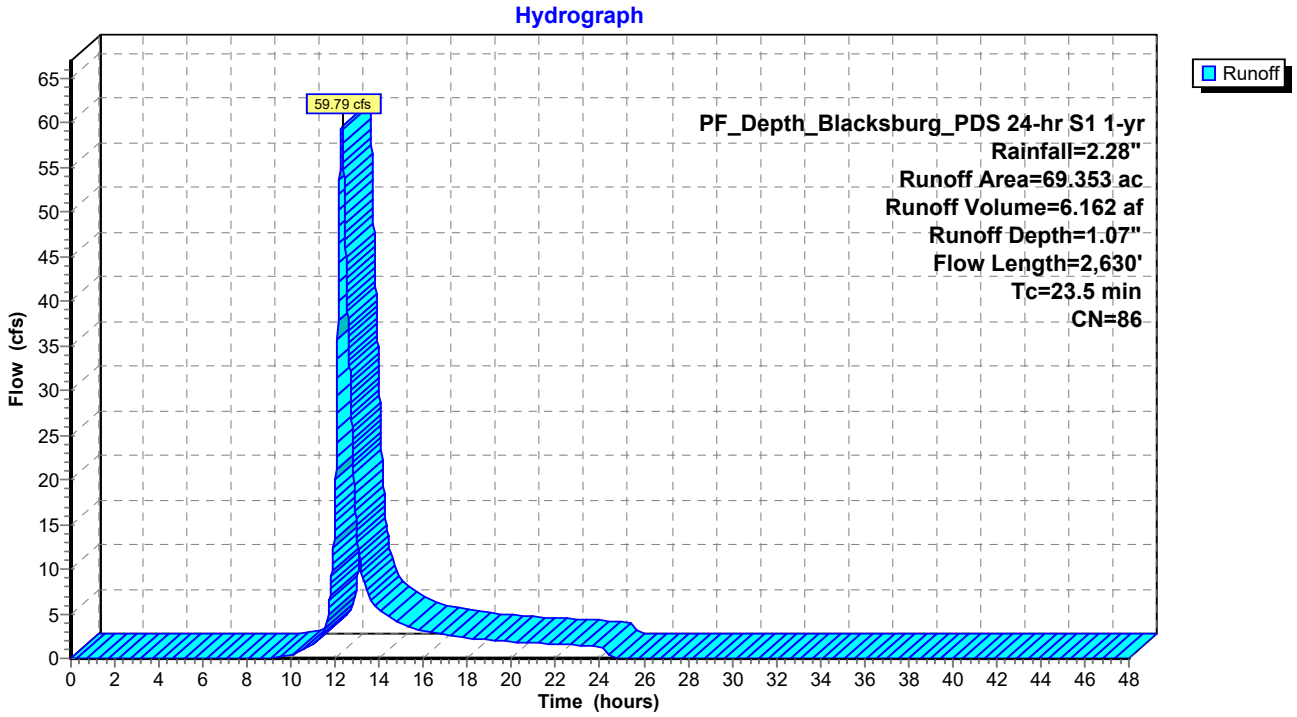
Runoff = 59.79 cfs @ 12.30 hrs, Volume= 6.162 af, Depth= 1.07"
Routed to Pond SP : Shenandoah Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
PF_Depth_Blacksburg_PDS 24-hr S1 1-yr Rainfall=2.28"

Area (ac)	CN	Description
7.130	61	>75% Grass cover, Good, HSG B
0.534	74	>75% Grass cover, Good, HSG C
0.108	68	1 acre lots, 20% imp, HSG B
0.773	70	1/2 acre lots, 25% imp, HSG B
0.054	80	1/2 acre lots, 25% imp, HSG C
14.304	85	1/8 acre lots, 65% imp, HSG B
20.223	90	1/8 acre lots, 65% imp, HSG C
8.803	88	Urban industrial, 72% imp, HSG B
9.941	92	Urban commercial, 85% imp, HSG B
0.610	94	Urban commercial, 85% imp, HSG C
4.119	89	Paved roads w/open ditches, 50% imp, HSG B
2.754	92	Paved roads w/open ditches, 50% imp, HSG C
69.353	86	Weighted Average
27.939		40.29% Pervious Area
41.414		59.71% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.8	150	0.0867	0.21		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.76"
2.4	647	0.0773	4.48		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
9.3	1,833	0.0262	3.29		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
23.5	2,630	Total			

Subcatchment SH: Shenandoah Pond DA



Summary for Subcatchment UG1: UST 1 DA

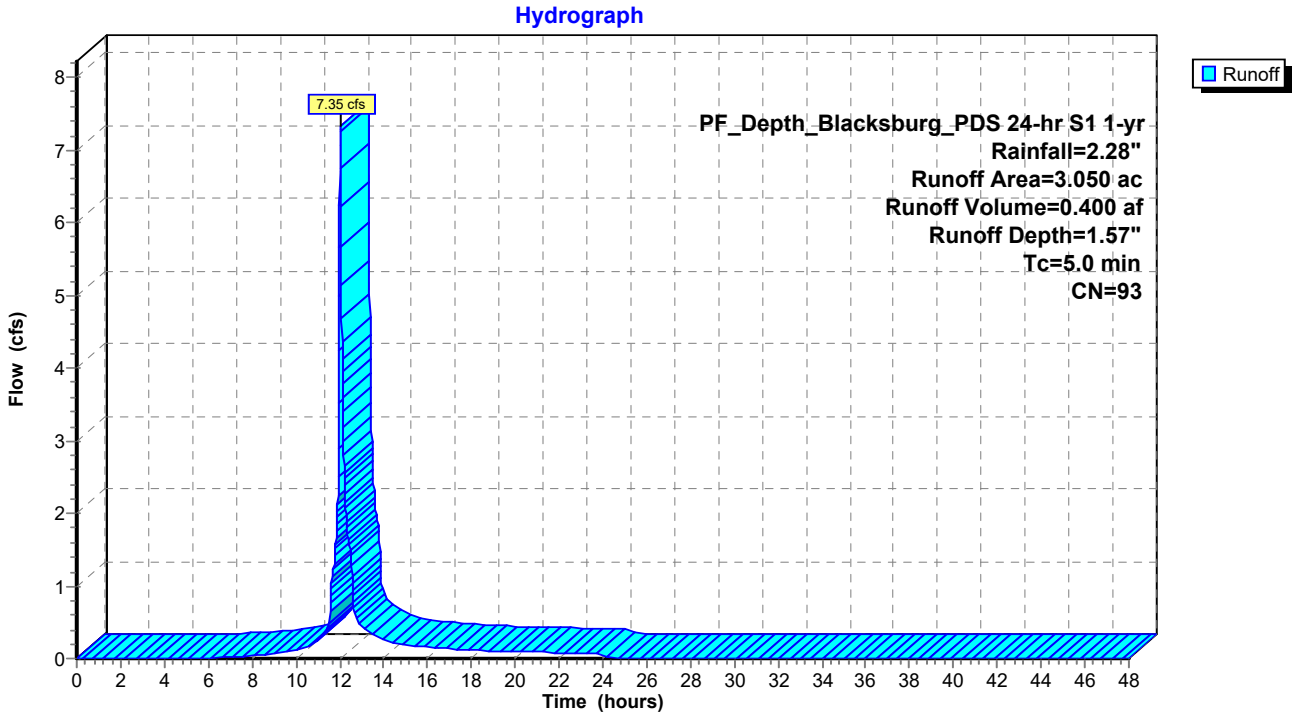
Runoff = 7.35 cfs @ 12.03 hrs, Volume= 0.400 af, Depth= 1.57"
Routed to Pond P1 : UST1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
PF_Depth_Blacksburg_PDS 24-hr S1 1-yr Rainfall=2.28"

Area (ac)	CN	Description
0.590	74	>75% Grass cover, Good, HSG C
2.460	98	Water Surface, 0% imp, HSG C
3.050	93	Weighted Average
3.050		100.00% Pervious Area

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

Subcatchment UG1: UST 1 DA



Summary for Subcatchment UG2: UST 2 DA

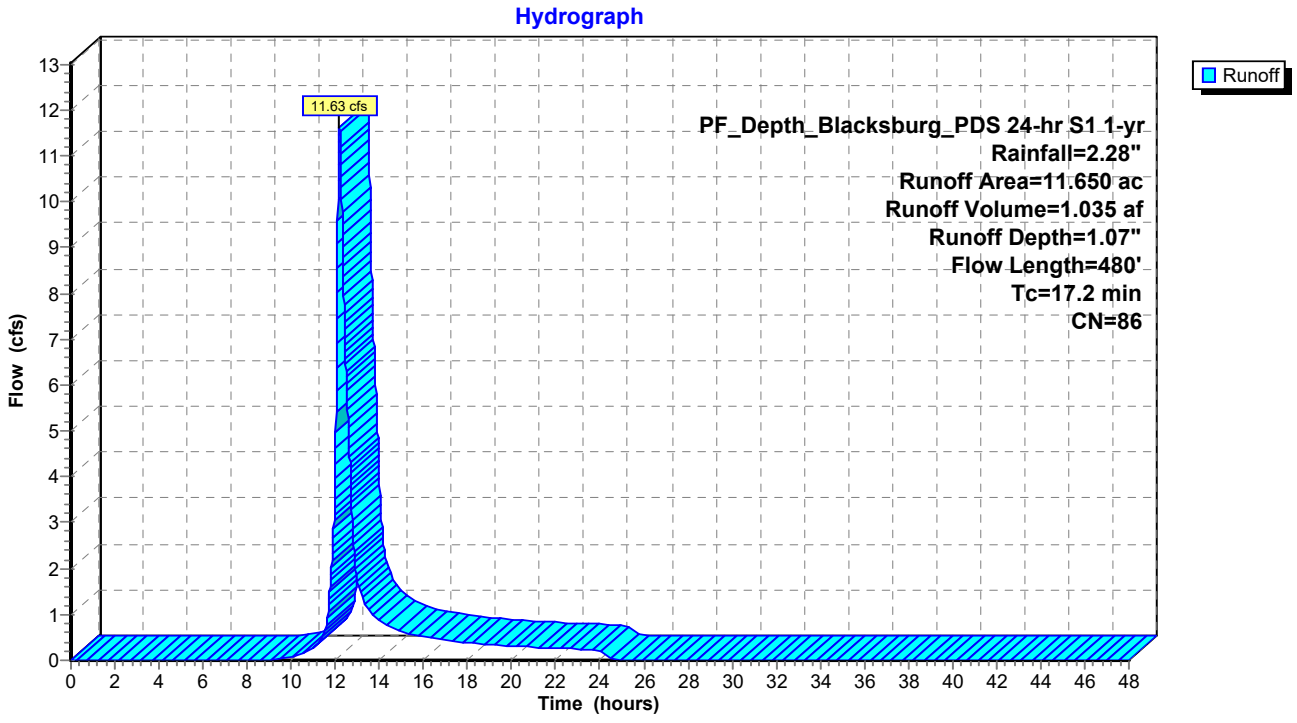
Runoff = 11.63 cfs @ 12.20 hrs, Volume= 1.035 af, Depth= 1.07"
Routed to Pond P2 : UST2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
PF_Depth_Blacksburg_PDS 24-hr S1 1-yr Rainfall=2.28"

Area (ac)	CN	Description
5.670	74	>75% Grass cover, Good, HSG C
5.980	98	Paved parking, HSG C
11.650	86	Weighted Average
5.670		48.67% Pervious Area
5.980		51.33% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.1	150	0.0400	0.16		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.76"
1.1	330	0.0910	4.86		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
17.2	480	Total			

Subcatchment UG2: UST 2 DA



Summary for Subcatchment US1: Upstream of Site PRE CONDITION

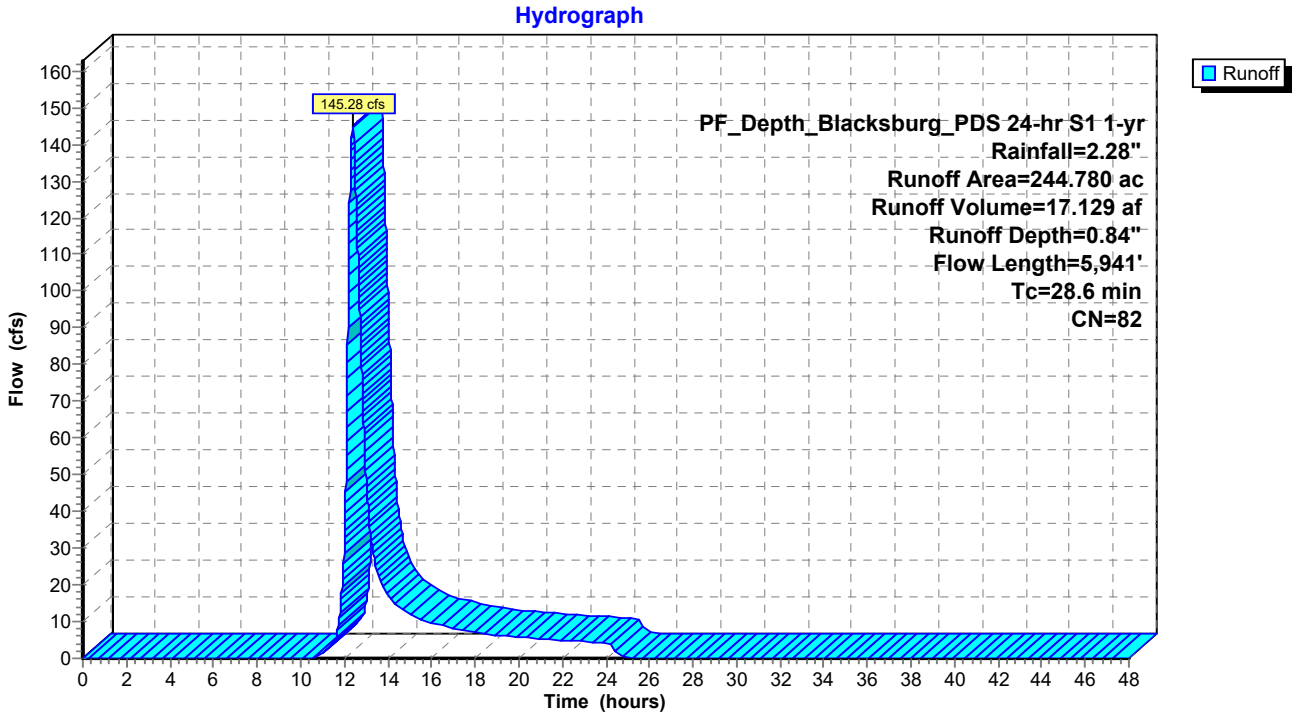
Runoff = 145.28 cfs @ 12.37 hrs, Volume= 17.129 af, Depth= 0.84"
Routed to Reach SITE : Site Area

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
PF_Depth_Blacksburg_PDS 24-hr S1 1-yr Rainfall=2.28"

	Area (ac)	CN	Description
	6.240	55	Woods, Good, HSG B
	2.100	70	Woods, Good, HSG C
	15.820	61	>75% Grass cover, Good, HSG B
	39.640	74	>75% Grass cover, Good, HSG C
	26.040	94	Urban commercial, 85% imp, HSG C
	5.870	95	Urban commercial, 85% imp, HSG D
	3.840	88	Urban industrial, 72% imp, HSG B
	8.520	91	Urban industrial, 72% imp, HSG C
	1.400	89	Paved roads w/open ditches, 50% imp, HSG B
	15.560	92	Paved roads w/open ditches, 50% imp, HSG C
	1.250	85	1/8 acre lots, 65% imp, HSG B
	36.230	90	1/8 acre lots, 65% imp, HSG C
	12.500	72	1/3 acre lots, 30% imp, HSG B
	53.220	81	1/3 acre lots, 30% imp, HSG C
	6.400	86	1/3 acre lots, 30% imp, HSG D
	6.620	98	Paved parking, HSG C
*	2.930	98	SITE AREA IMPERVIOUS
*	0.600	80	SITE AREA GERASS
	244.780	82	Weighted Average
	144.729		59.13% Pervious Area
	100.051		40.87% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.8	100	0.0800	0.19		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.76"
7.7	1,832	0.0600	3.94		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
12.1	4,009	0.0200	5.52	33.10	**Channel Flow,** Area= 6.0 sf Perim= 12.0' r= 0.50' n= 0.024
28.6	5,941	Total			

Subcatchment US1: Upstream of Site PRE CONDITION



Summary for Subcatchment US2: Upstream of Site POST CONDITION

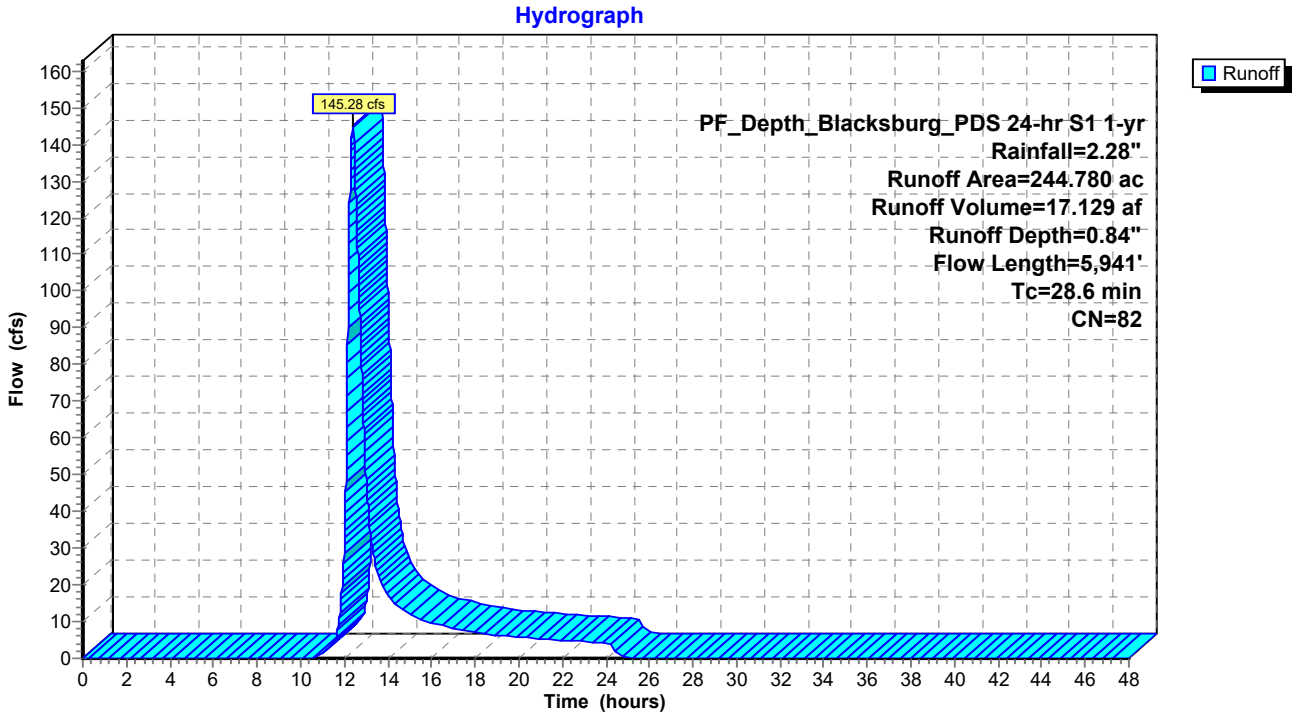
Runoff = 145.28 cfs @ 12.37 hrs, Volume= 17.129 af, Depth= 0.84"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
PF_Depth_Blacksburg_PDS 24-hr S1 1-yr Rainfall=2.28"

	Area (ac)	CN	Description
	6.240	55	Woods, Good, HSG B
	2.100	70	Woods, Good, HSG C
	15.820	61	>75% Grass cover, Good, HSG B
	39.640	74	>75% Grass cover, Good, HSG C
	26.040	94	Urban commercial, 85% imp, HSG C
	5.870	95	Urban commercial, 85% imp, HSG D
	3.840	88	Urban industrial, 72% imp, HSG B
	8.520	91	Urban industrial, 72% imp, HSG C
	1.400	89	Paved roads w/open ditches, 50% imp, HSG B
	15.560	92	Paved roads w/open ditches, 50% imp, HSG C
	1.250	85	1/8 acre lots, 65% imp, HSG B
	36.230	90	1/8 acre lots, 65% imp, HSG C
	12.500	72	1/3 acre lots, 30% imp, HSG B
	53.220	81	1/3 acre lots, 30% imp, HSG C
	6.400	86	1/3 acre lots, 30% imp, HSG D
	6.620	98	Paved parking, HSG C
*	3.330	98	SITE AREA IMPERVIOUS
*	0.200	80	SITE AREA GERASS
	244.780	82	Weighted Average
	144.329		58.96% Pervious Area
	100.451		41.04% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.8	100	0.0800	0.19		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.76"
7.7	1,832	0.0600	3.94		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
12.1	4,009	0.0200	5.52	33.10	**Channel Flow,** Area= 6.0 sf Perim= 12.0' r= 0.50' n= 0.024
28.6	5,941	Total			

Subcatchment US2: Upstream of Site POST CONDITION

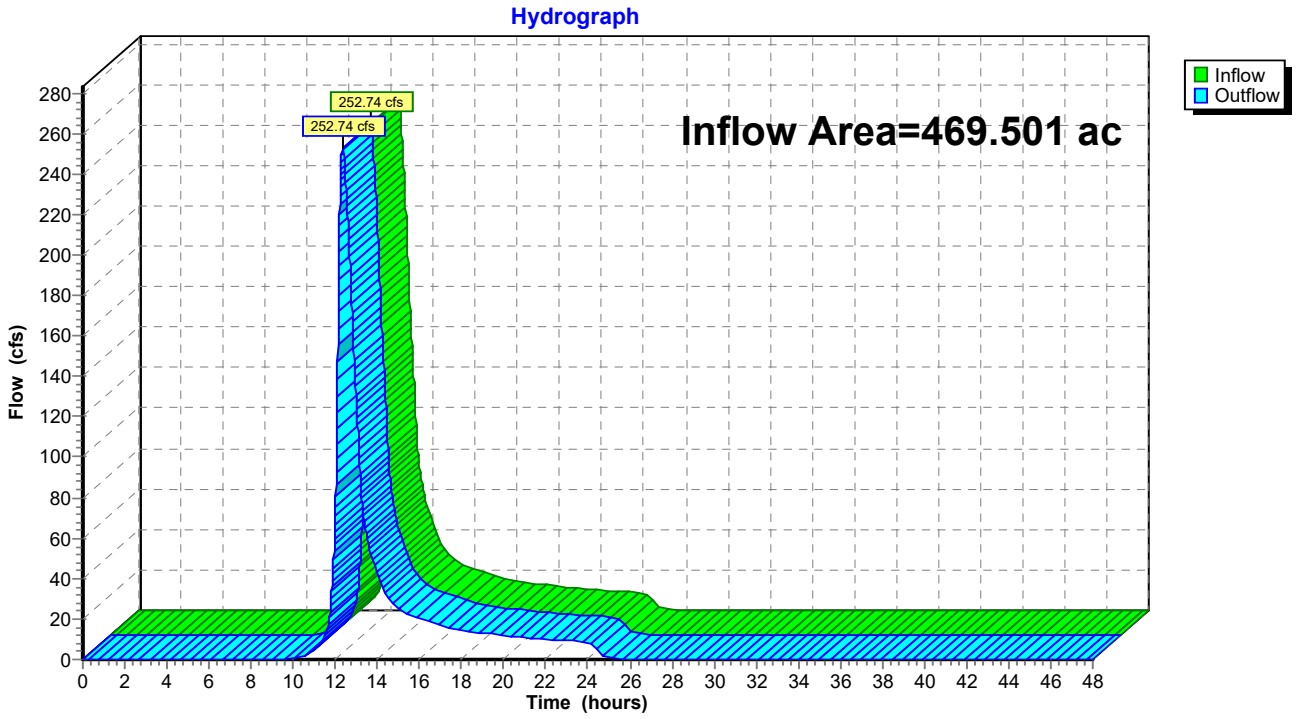


Summary for Reach ED: Reach Along Edge Site

Inflow Area = 469.501 ac, 45.66% Impervious, Inflow Depth = 0.93" for 1-yr event
Inflow = 252.74 cfs @ 12.36 hrs, Volume= 36.498 af
Outflow = 252.74 cfs @ 12.36 hrs, Volume= 36.498 af, Atten= 0%, Lag= 0.0 min
Routed to Reach PF : OutFall to Prices Fork

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Reach ED: Reach Along Edge Site

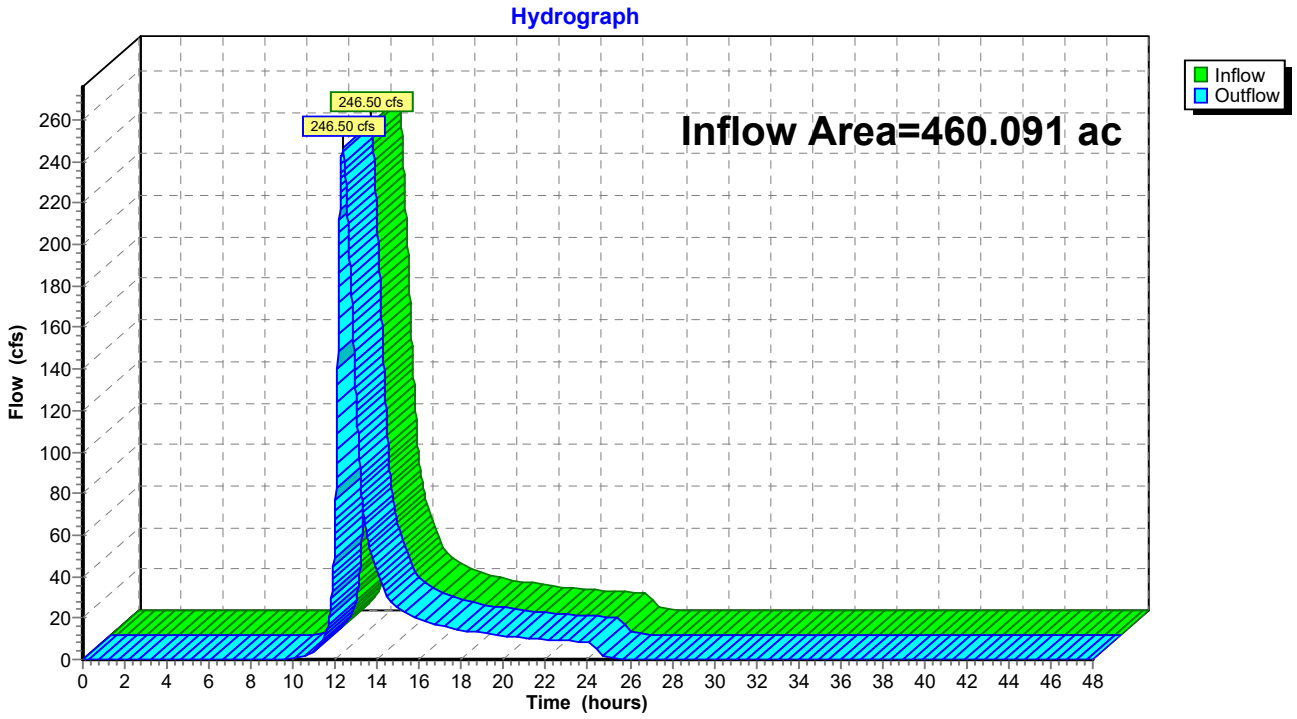


Summary for Reach KB: Outfall Below Kabrich

Inflow Area = 460.091 ac, 45.74% Impervious, Inflow Depth = 0.92" for 1-yr event
Inflow = 246.50 cfs @ 12.36 hrs, Volume= 35.392 af
Outflow = 246.50 cfs @ 12.36 hrs, Volume= 35.392 af, Atten= 0%, Lag= 0.0 min
Routed to Reach ED : Reach Along Edge Site

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Reach KB: Outfall Below Kabrich



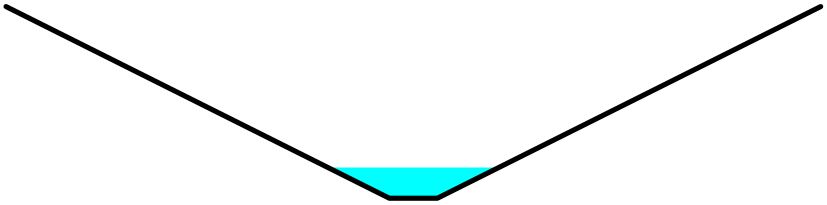
Summary for Reach MOR: MOOG Reach Section

Inflow Area = 69.353 ac, 59.71% Impervious, Inflow Depth = 1.07" for 1-yr event
Inflow = 45.05 cfs @ 12.48 hrs, Volume= 6.162 af
Outflow = 44.97 cfs @ 12.55 hrs, Volume= 6.162 af, Atten= 0%, Lag= 4.0 min
Routed to Reach STK : Stream to Kabrich Street

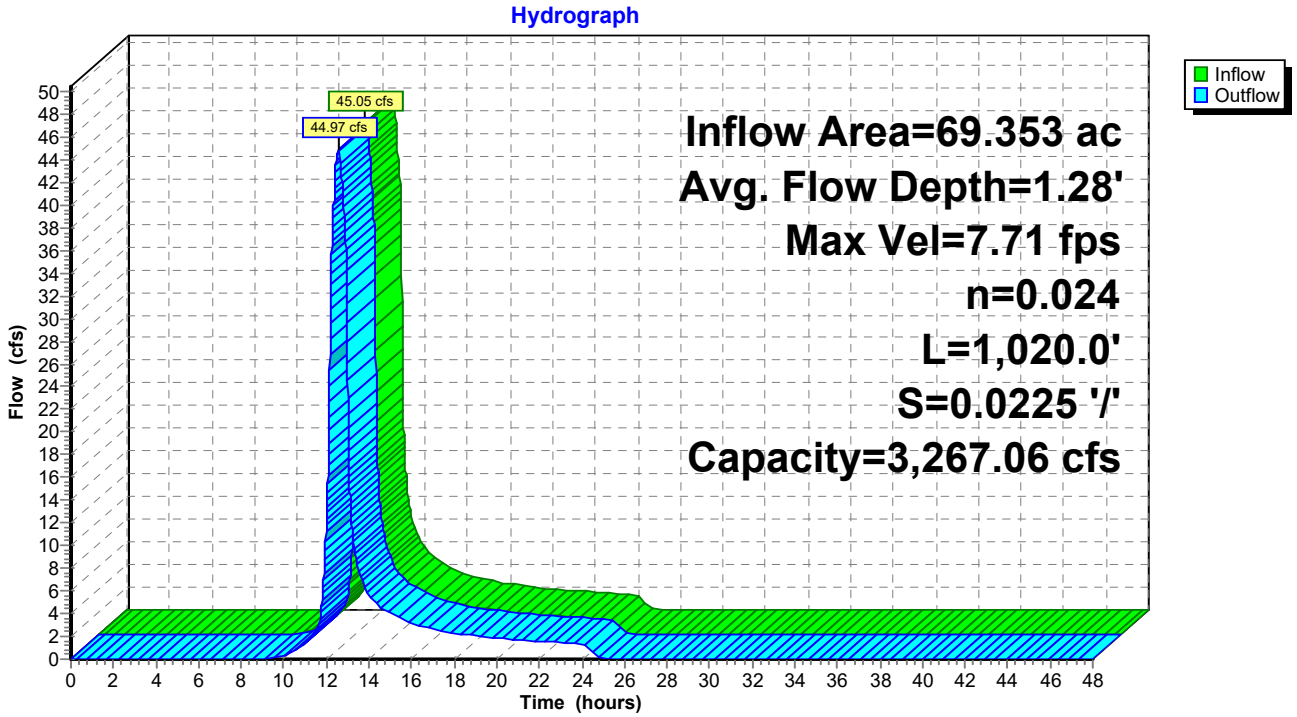
Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 7.71 fps, Min. Travel Time= 2.2 min
Avg. Velocity = 3.34 fps, Avg. Travel Time= 5.1 min

Peak Storage= 5,949 cf @ 12.51 hrs
Average Depth at Peak Storage= 1.28' , Surface Width= 7.12'
Bank-Full Depth= 8.00' Flow Area= 144.0 sf, Capacity= 3,267.06 cfs

2.00' x 8.00' deep channel, n= 0.024
Side Slope Z-value= 2.0 '/' Top Width= 34.00'
Length= 1,020.0' Slope= 0.0225 '/'
Inlet Invert= 2,115.00', Outlet Invert= 2,092.00'



Reach MOR: MOOG Reach Section

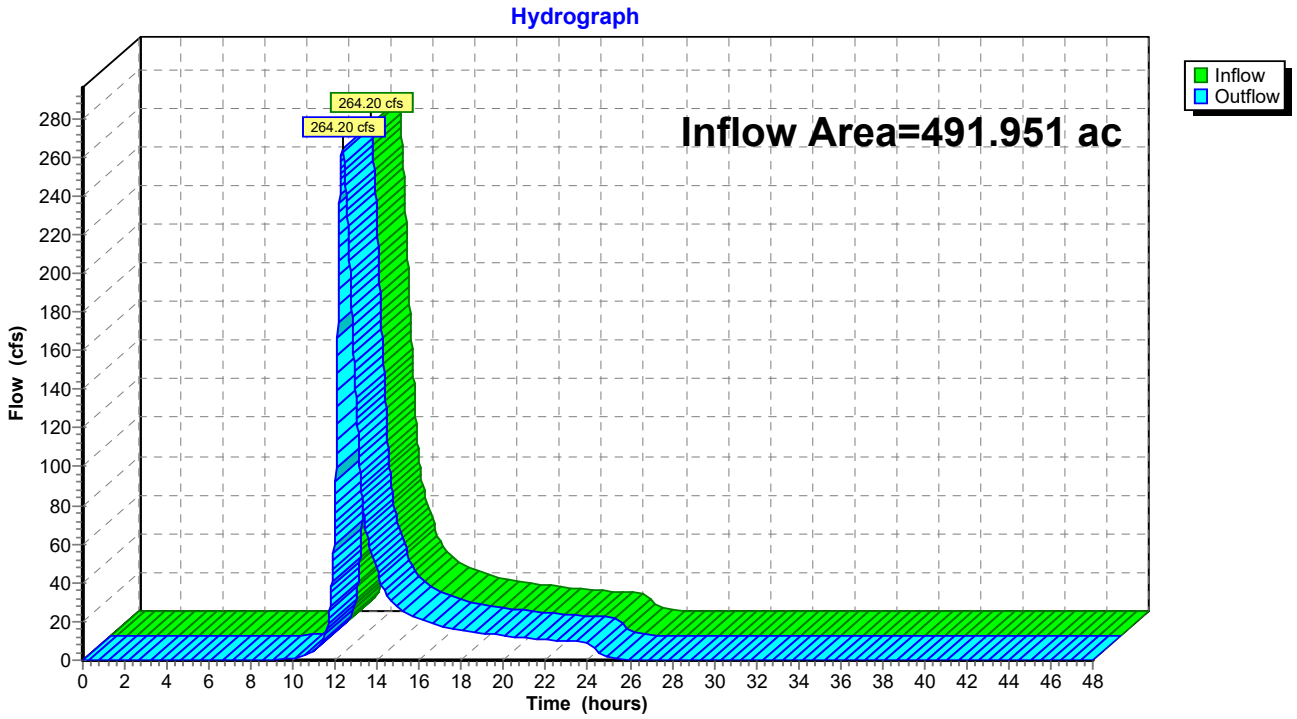


Summary for Reach PF: OutFall to Prices Fork

Inflow Area = 491.951 ac, 46.25% Impervious, Inflow Depth = 0.95" for 1-yr event
Inflow = 264.20 cfs @ 12.36 hrs, Volume= 38.874 af
Outflow = 264.20 cfs @ 12.36 hrs, Volume= 38.874 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Reach PF: OutFall to Prices Fork

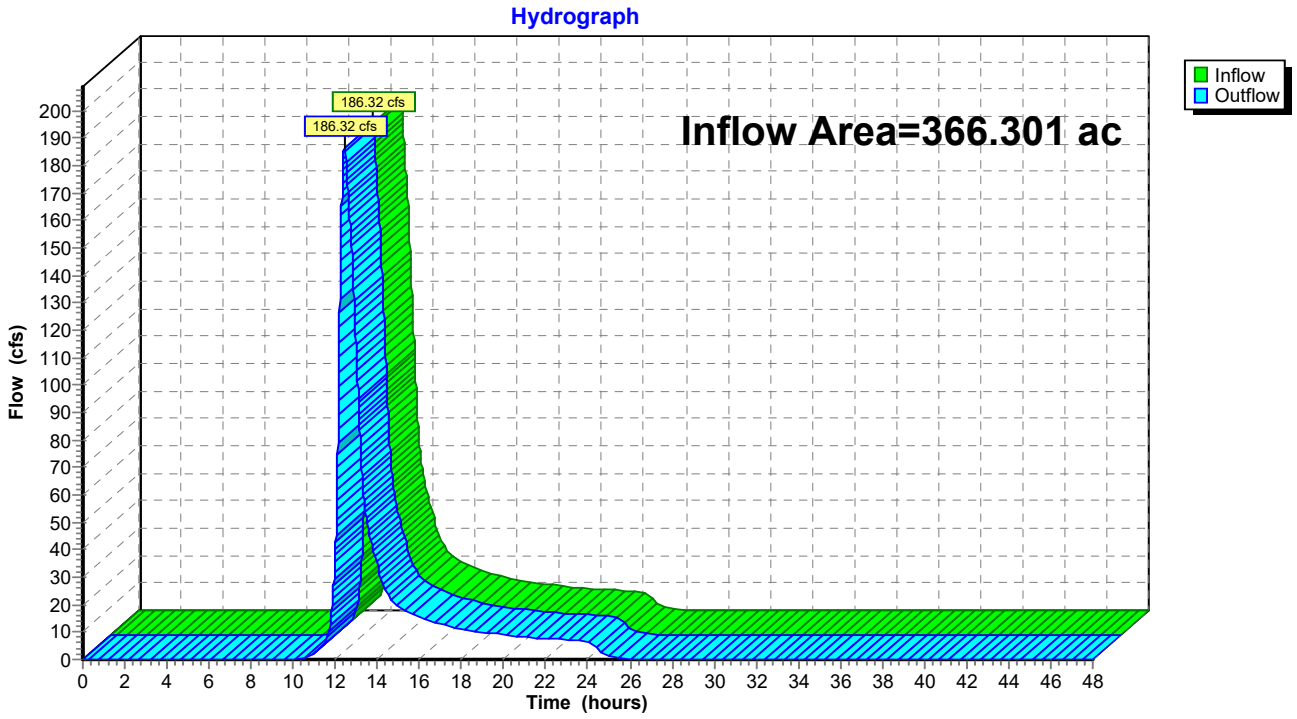


Summary for Reach SITE: Site Area

Inflow Area = 366.301 ac, 45.22% Impervious, Inflow Depth = 0.90" for 1-yr event
Inflow = 186.32 cfs @ 12.43 hrs, Volume= 27.530 af
Outflow = 186.32 cfs @ 12.43 hrs, Volume= 27.530 af, Atten= 0%, Lag= 0.0 min
Routed to Reach KB : Outfall Below Kabrich

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Reach SITE: Site Area



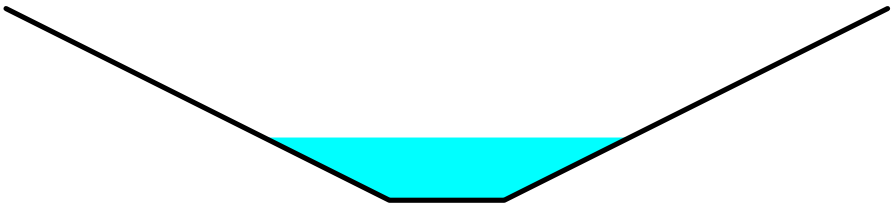
Summary for Reach STK: Stream to Kabrich Street

Inflow Area = 121.521 ac, 53.99% Impervious, Inflow Depth = 1.03" for 1-yr event
Inflow = 68.12 cfs @ 12.67 hrs, Volume= 10.401 af
Outflow = 66.67 cfs @ 12.83 hrs, Volume= 10.401 af, Atten= 2%, Lag= 10.1 min
Routed to Reach SITE : Site Area

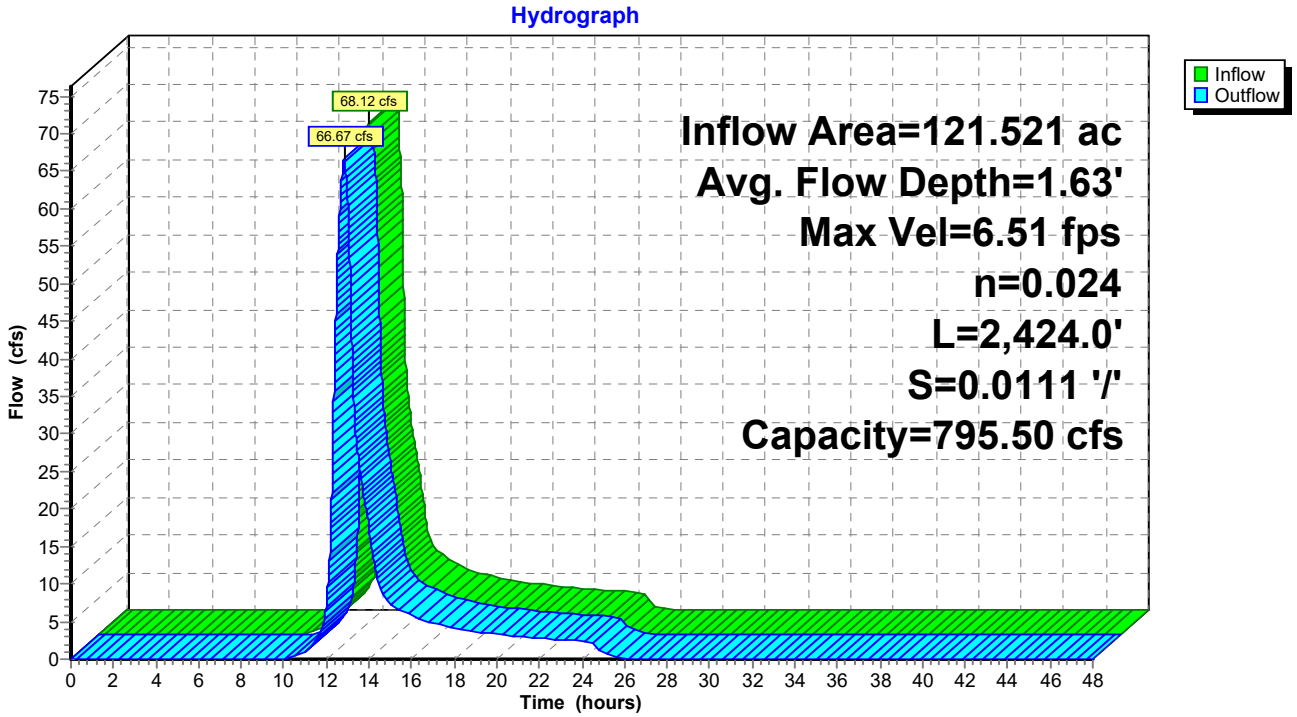
Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 6.51 fps, Min. Travel Time= 6.2 min
Avg. Velocity = 2.30 fps, Avg. Travel Time= 17.6 min

Peak Storage= 24,834 cf @ 12.73 hrs
Average Depth at Peak Storage= 1.63' , Surface Width= 9.54'
Bank-Full Depth= 5.00' Flow Area= 65.0 sf, Capacity= 795.50 cfs

3.00' x 5.00' deep channel, n= 0.024
Side Slope Z-value= 2.0 '/' Top Width= 23.00'
Length= 2,424.0' Slope= 0.0111 '/'
Inlet Invert= 2,092.00', Outlet Invert= 2,065.00'



Reach STK: Stream to Kabrich Street



Summary for Reach USR: Upper Stream Reach

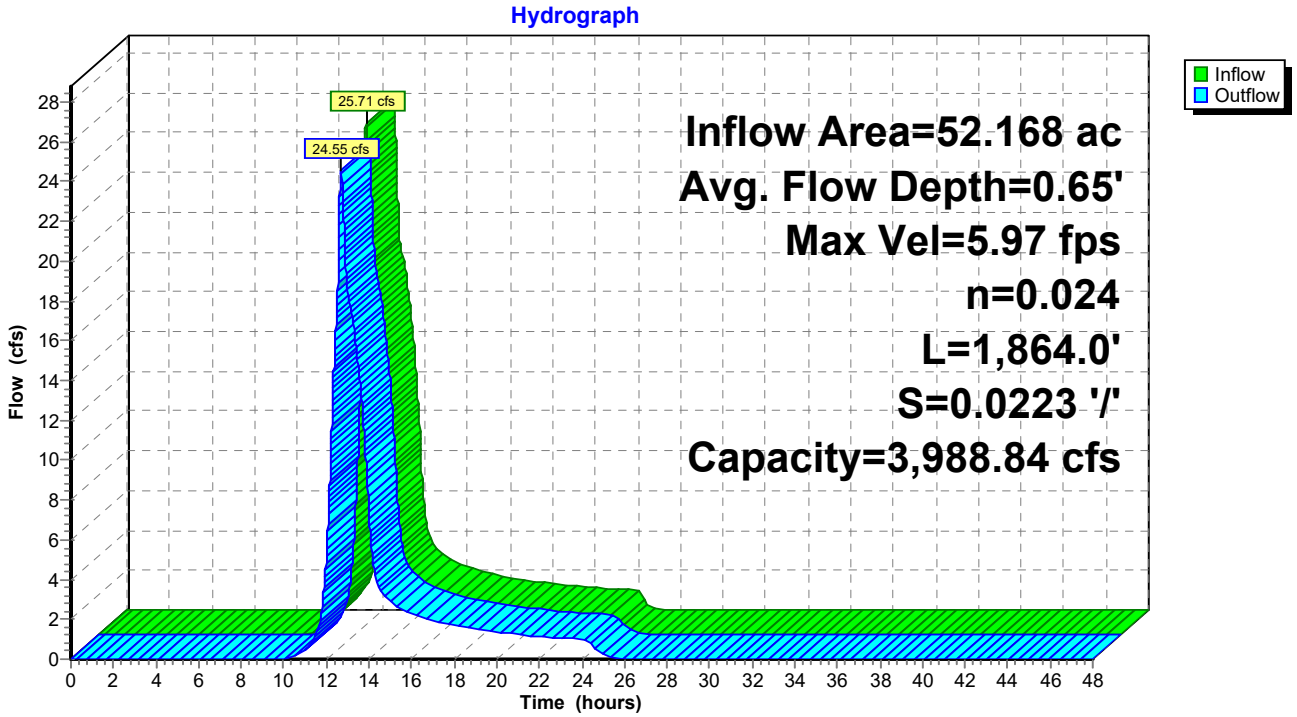
Inflow Area = 52.168 ac, 46.37% Impervious, Inflow Depth = 0.98" for 1-yr event
Inflow = 25.71 cfs @ 12.54 hrs, Volume= 4.239 af
Outflow = 24.55 cfs @ 12.70 hrs, Volume= 4.239 af, Atten= 4%, Lag= 9.1 min
Routed to Reach STK : Stream to Kabrich Street

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 5.97 fps, Min. Travel Time= 5.2 min
Avg. Velocity = 2.37 fps, Avg. Travel Time= 13.1 min

Peak Storage= 7,663 cf @ 12.61 hrs
Average Depth at Peak Storage= 0.65' , Surface Width= 7.61'
Bank-Full Depth= 8.00' Flow Area= 168.0 sf, Capacity= 3,988.84 cfs

5.00' x 8.00' deep channel, n= 0.024
Side Slope Z-value= 2.0 '/' Top Width= 37.00'
Length= 1,864.0' Slope= 0.0223 '/'
Inlet Invert= 2,133.50', Outlet Invert= 2,092.00'

Reach USR: Upper Stream Reach



Summary for Pond CVP: Clover Valley Pond

Inflow Area = 44.421 ac, 44.76% Impervious, Inflow Depth = 0.95" for 1-yr event
Inflow = 38.68 cfs @ 12.21 hrs, Volume= 3.510 af
Outflow = 35.31 cfs @ 12.28 hrs, Volume= 3.510 af, Atten= 9%, Lag= 4.3 min
Primary = 35.31 cfs @ 12.28 hrs, Volume= 3.510 af
Routed to Pond RP : Rutherford Pond

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 2,158.80' @ 12.28 hrs Surf.Area= 0.123 ac Storage= 0.164 af

Plug-Flow detention time= 1.5 min calculated for 3.509 af (100% of inflow)
Center-of-Mass det. time= 1.5 min (861.5 - 860.0)

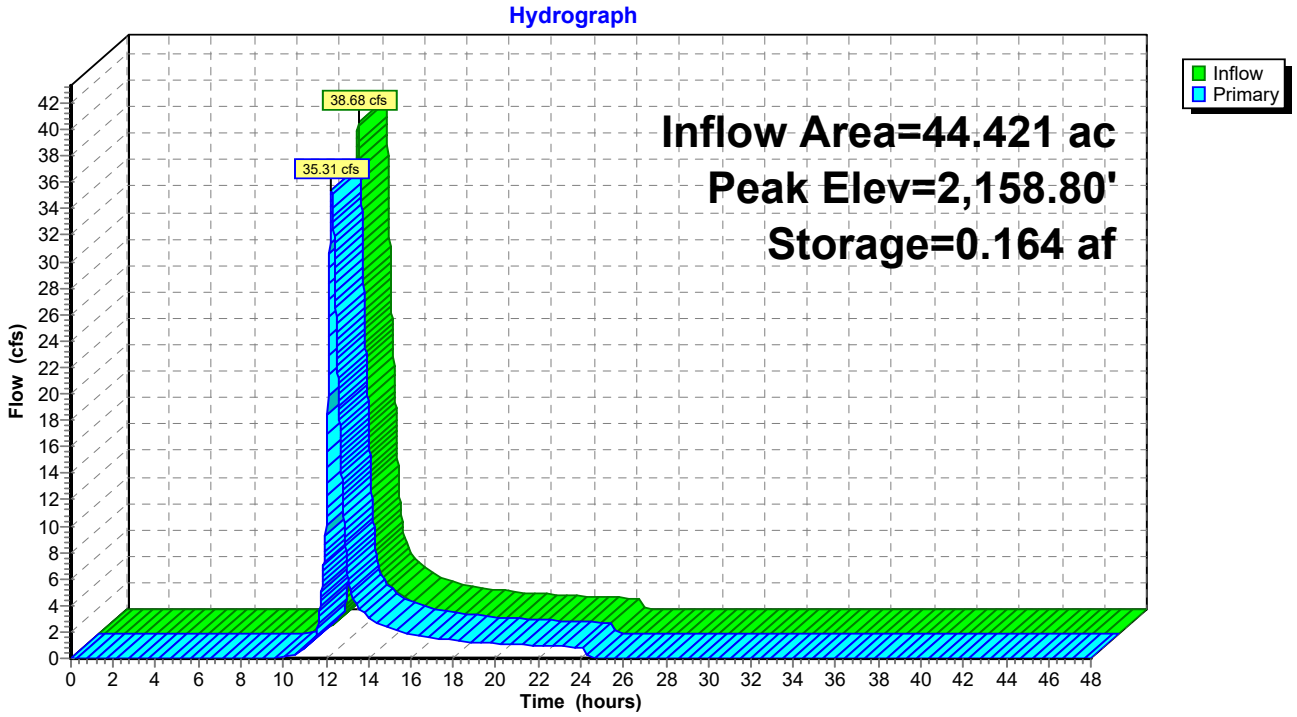
Volume	Invert	Avail.Storage	Storage Description
#1	2,155.00'	0.837 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
2,155.00	0.000	0.000	0.000
2,156.00	0.003	0.002	0.002
2,158.00	0.079	0.082	0.083
2,160.00	0.188	0.267	0.351
2,162.00	0.299	0.487	0.837

Device	Routing	Invert	Outlet Devices
#1	Primary	2,154.50'	**30.0" Round Culvert** L= 50.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,154.50' / 2,153.50' S= 0.0200 '/' Cc= 0.900 n= 0.013, Flow Area= 4.91 sf
#2	Device 1	2,155.00'	**18.0" Round Culvert** L= 3.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,155.00' / 2,154.50' S= 0.1667 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#3	Device 1	2,156.77'	**30.0" Round Culvert** L= 3.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,156.77' / 2,156.27' S= 0.1667 '/' Cc= 0.900 n= 0.013, Flow Area= 4.91 sf
#4	Device 1	2,160.25'	**84.0" x 48.0" Horiz. Orifice/Grate X 3.00** C= 0.600 Limited to weir flow at low heads
#5	Primary	2,161.50'	**40.0' long x 20.0' 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) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=35.31 cfs @ 12.28 hrs HW=2,158.80' (Free Discharge)
- **1=Culvert** (Passes 35.31 cfs of 41.29 cfs potential flow)
  - **2=Culvert** (Inlet Controls 14.86 cfs @ 8.41 fps)
  - **3=Culvert** (Barrel Controls 20.44 cfs @ 6.53 fps)
  - **4=Orifice/Grate** (Controls 0.00 cfs)
- **5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond CVP: Clover Valley Pond



Summary for Pond P1: UST1

Inflow Area = 3.050 ac, 0.00% Impervious, Inflow Depth = 1.57" for 1-yr event
Inflow = 7.35 cfs @ 12.03 hrs, Volume= 0.400 af
Outflow = 0.80 cfs @ 12.60 hrs, Volume= 0.398 af, Atten= 89%, Lag= 34.4 min
Primary = 0.80 cfs @ 12.60 hrs, Volume= 0.398 af
Routed to Reach ED : Reach Along Edge Site

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 2,052.90' @ 12.60 hrs Surf.Area= 0.100 ac Storage= 0.215 af

Plug-Flow detention time= 325.8 min calculated for 0.398 af (99% of inflow)
Center-of-Mass det. time= 322.5 min (1,128.8 - 806.3)

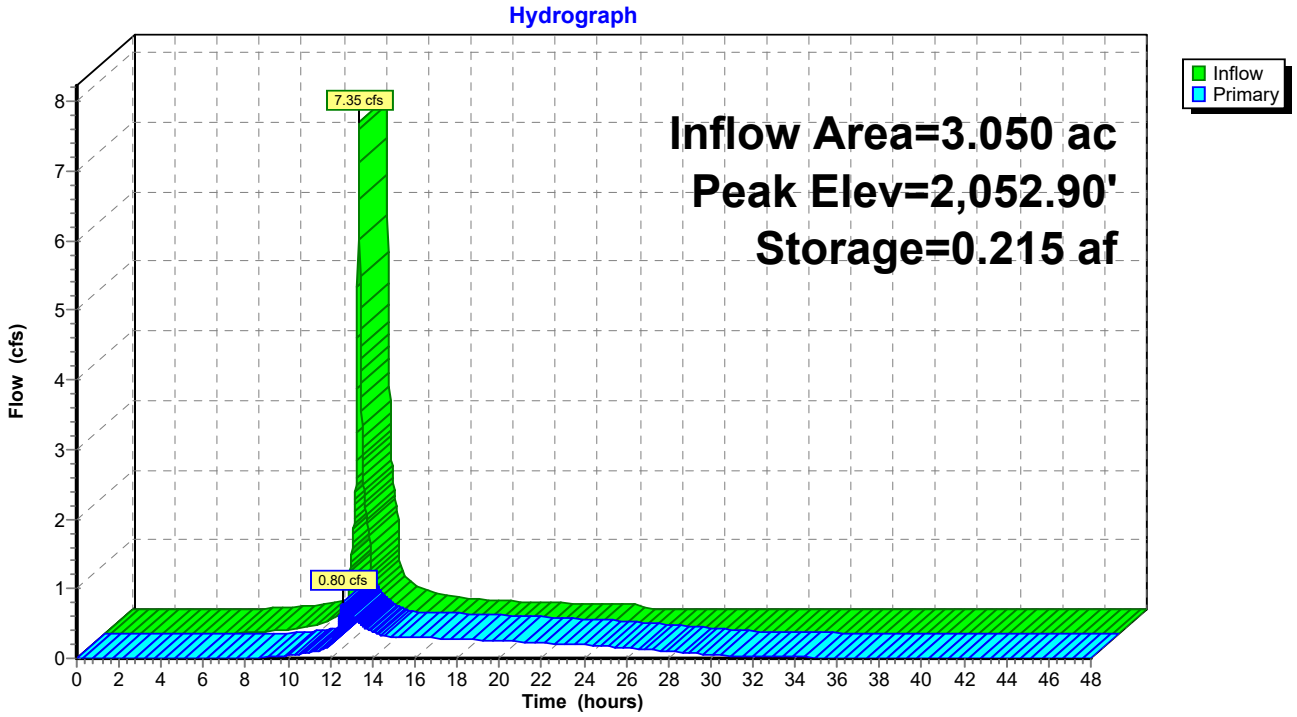
Volume	Invert	Avail.Storage	Storage Description
#1	2,050.75'	0.459 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
2,050.75	0.100	0.000	0.000
2,051.75	0.100	0.100	0.100
2,052.75	0.100	0.100	0.200
2,053.75	0.100	0.100	0.300
2,054.75	0.100	0.100	0.400
2,055.45	0.070	0.059	0.459

Device	Routing	Invert	Outlet Devices
#1	Primary	2,050.75'	**18.0" Round Culvert** L= 42.4' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,050.75' / 2,049.25' S= 0.0354 '/' Cc= 0.900 n= 0.011, Flow Area= 1.77 sf
#2	Device 1	2,050.75'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	2,052.65'	**14.0" W x 5.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	2,054.65'	**6.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=0.80 cfs @ 12.60 hrs HW=2,052.90' (Free Discharge)
└**1=Culvert** (Passes 0.80 cfs of 10.06 cfs potential flow)
├**2=Orifice/Grate** (Orifice Controls 0.34 cfs @ 6.85 fps)
├**3=Orifice/Grate** (Orifice Controls 0.46 cfs @ 1.60 fps)
└**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond P1: UST1


Hydrograph
Inflow
Primary
Inflow Area=3.050 ac
Peak Elev=2,052.90'
Storage=0.215 af
7.35 cfs
0.80 cfs
Flow (cfs)
Time (hours)
0 1 2 3 4 5 6 7 8
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48

Summary for Pond P2: UST2

Inflow Area = 11.650 ac, 51.33% Impervious, Inflow Depth = 1.07" for 1-yr event
Inflow = 11.63 cfs @ 12.20 hrs, Volume= 1.035 af
Outflow = 3.50 cfs @ 12.73 hrs, Volume= 1.035 af, Atten= 70%, Lag= 31.7 min
Primary = 3.50 cfs @ 12.73 hrs, Volume= 1.035 af
Routed to Reach PF : OutFall to Prices Fork

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 2,046.05' @ 12.73 hrs Surf.Area= 0.204 ac Storage= 0.368 af

Plug-Flow detention time= 78.9 min calculated for 1.035 af (100% of inflow)
Center-of-Mass det. time= 78.5 min (930.1 - 851.6)

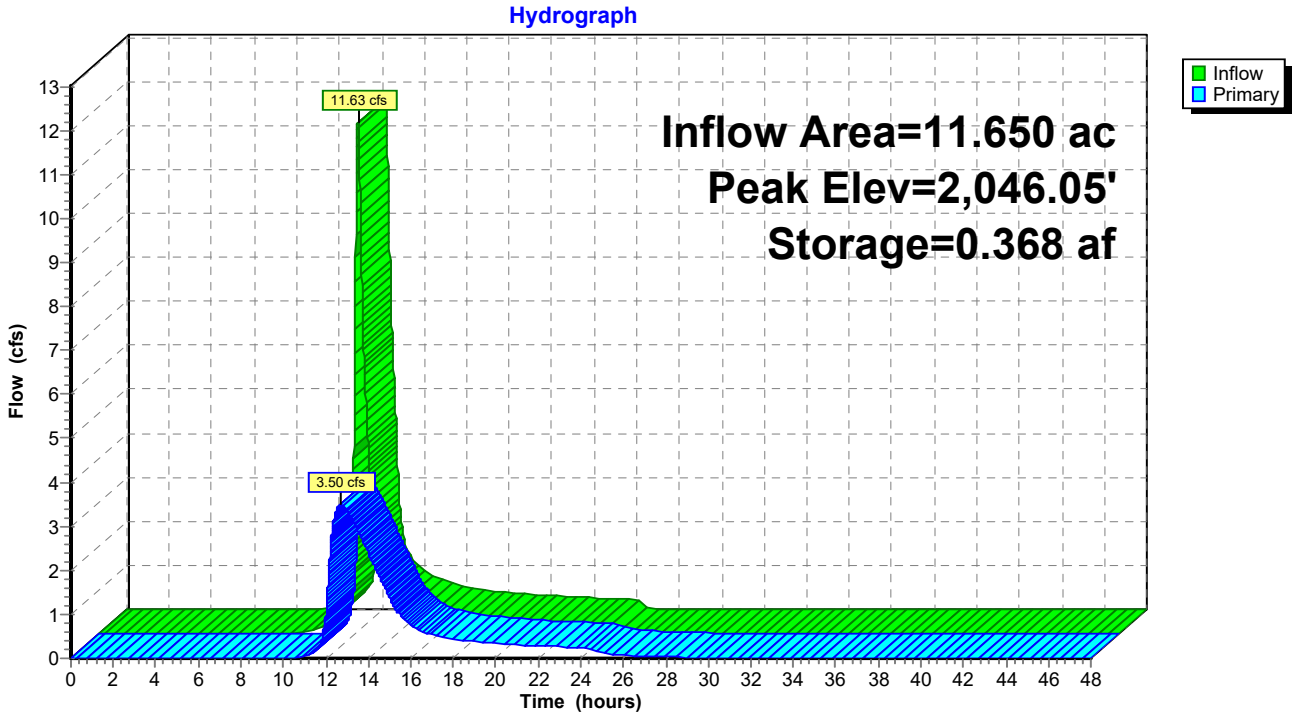
Volume	Invert	Avail.Storage	Storage Description
#1	2,044.25'	1.020 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
2,044.25	0.204	0.000	0.000
2,045.25	0.204	0.204	0.204
2,046.25	0.204	0.204	0.408
2,047.25	0.204	0.204	0.612
2,048.25	0.204	0.204	0.816
2,049.25	0.204	0.204	1.020

Device	Routing	Invert	Outlet Devices
#1	Primary	2,044.25'	**30.0" Round Culvert** L= 35.1' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,044.25' / 2,043.83' S= 0.0120 '/' Cc= 0.900 n= 0.011, Flow Area= 4.91 sf
#2	Device 1	2,044.25'	**14.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	2,047.00'	**16.0" W x 8.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	2,048.80'	**6.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=3.50 cfs @ 12.73 hrs HW=2,046.05' (Free Discharge)
└**1=Culvert** (Passes 3.50 cfs of 15.47 cfs potential flow)
  ├**2=Orifice/Grate** (Orifice Controls 3.50 cfs @ 5.99 fps)
  ├**3=Orifice/Grate** (Controls 0.00 cfs)
  └**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond P2: UST2


Hydrograph
Inflow
Primary
11.63 cfs
3.50 cfs
Inflow Area=11.650 ac
Peak Elev=2,046.05'
Storage=0.368 af
Flow (cfs)
Time (hours)
0 1 2 3 4 5 6 7 8 9 10 11 12 13
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48

Summary for Pond RP: Rutherford Pond

Inflow Area = 52.168 ac, 46.37% Impervious, Inflow Depth = 0.98" for 1-yr event
Inflow = 41.80 cfs @ 12.25 hrs, Volume= 4.239 af
Outflow = 25.71 cfs @ 12.54 hrs, Volume= 4.239 af, Atten= 38%, Lag= 17.5 min
Primary = 25.71 cfs @ 12.54 hrs, Volume= 4.239 af
Routed to Reach USR : Upper Stream Reach

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 2,140.72' @ 12.54 hrs Storage= 36,606 cf

Plug-Flow detention time= 16.1 min calculated for 4.238 af (100% of inflow)
Center-of-Mass det. time= 16.2 min (874.5 - 858.3)

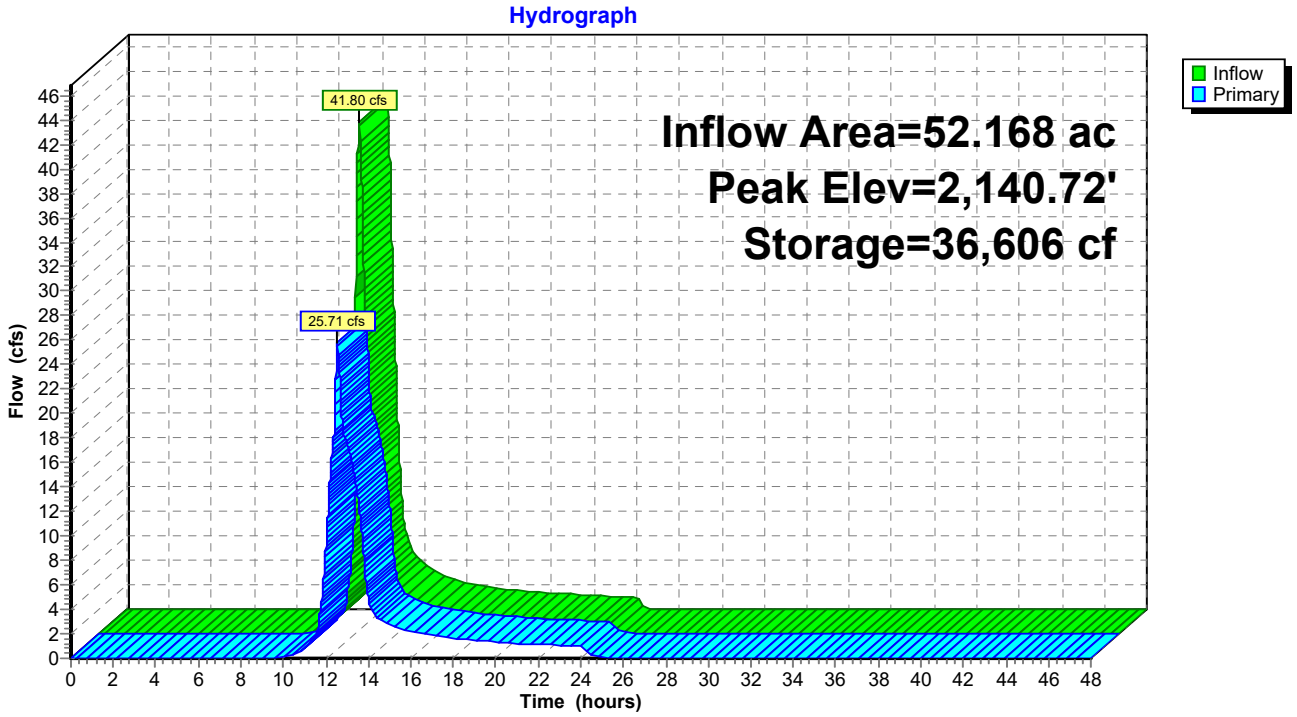
Volume	Invert	Avail.Storage	Storage Description
#1	2,135.00'	74,503 cf	**Custom Stage Data** Listed below

Elevation (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,135.00	0	0
2,136.00	1,366	1,366
2,137.00	3,129	4,495
2,138.00	5,175	9,670
2,139.00	7,760	17,430
2,140.00	10,340	27,770
2,141.00	12,305	40,075
2,142.00	13,925	54,000
2,143.00	20,503	74,503

Device	Routing	Invert	Outlet Devices
#1	Primary	2,134.82'	**54.0" Round Culvert** L= 82.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,134.82' / 2,134.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 15.90 sf
#2	Device 1	2,135.00'	**18.0" Round Culvert** L= 3.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,135.00' / 2,134.82' S= 0.0600 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#3	Device 1	2,140.50'	**72.0" x 48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Primary	2,142.50'	**60.0' long x 30.0' 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) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=25.62 cfs @ 12.54 hrs HW=2,140.72' (Free Discharge)
- **1=Culvert** (Passes 25.62 cfs of 143.15 cfs potential flow)
  - **2=Culvert** (Inlet Controls 18.96 cfs @ 10.73 fps)
  - **3=Orifice/Grate** (Weir Controls 6.65 cfs @ 1.53 fps)
- **4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond RP: Rutherford Pond



Summary for Pond SP: Shenandoah Pond

Inflow Area = 69.353 ac, 59.71% Impervious, Inflow Depth = 1.07" for 1-yr event
Inflow = 59.79 cfs @ 12.30 hrs, Volume= 6.162 af
Outflow = 45.05 cfs @ 12.48 hrs, Volume= 6.162 af, Atten= 25%, Lag= 11.1 min
Primary = 45.05 cfs @ 12.48 hrs, Volume= 6.162 af
Routed to Reach MOR : MOOG Reach Section

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 2,121.63' @ 12.48 hrs Surf.Area= 17,989 sf Storage= 20,744 cf

Plug-Flow detention time= 3.6 min calculated for 6.162 af (100% of inflow)
Center-of-Mass det. time= 3.6 min (861.0 - 857.4)

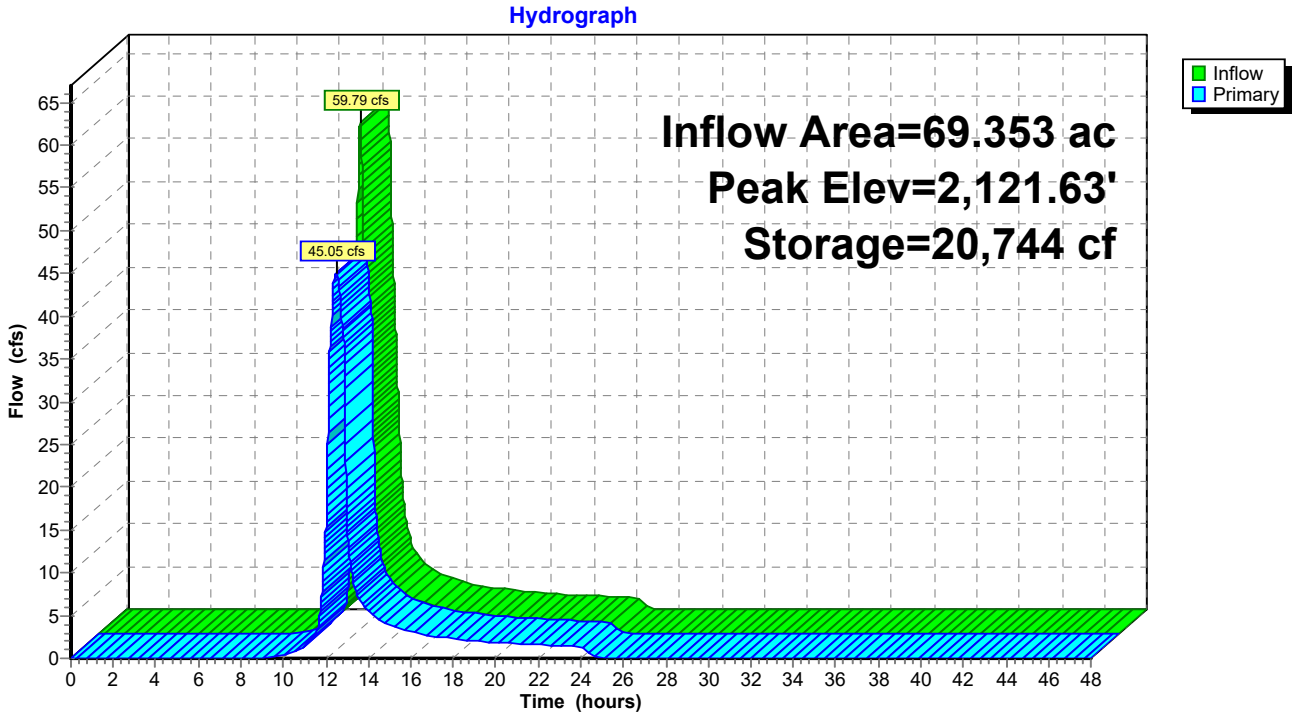
Volume	Invert	Avail.Storage	Storage Description
#1	2,117.00'	117,739 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,117.00	0	0	0
2,118.00	955	478	478
2,120.00	2,580	3,535	4,013
2,122.00	21,522	24,102	28,115
2,124.00	32,858	54,380	82,495
2,125.00	37,630	35,244	117,739

Device	Routing	Invert	Outlet Devices
#1	Primary	2,117.00'	**36.0" Round Culvert** L= 75.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,117.00' / 2,116.51' S= 0.0065 '/' Cc= 0.900 n= 0.024, Flow Area= 7.07 sf
#2	Primary	2,123.00'	**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=45.05 cfs @ 12.48 hrs HW=2,121.63' (Free Discharge)
1=Culvert (Barrel Controls 45.05 cfs @ 6.37 fps)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond SP: Shenandoah Pond



Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentA: Drainage Area Webb Runoff Area=6.360 ac 61.95% Impervious Runoff Depth=1.77"
Flow Length=1,277' Tc=18.5 min CN=90 Runoff=10.25 cfs 0.935 af

SubcatchmentB: Drainage Area to Prices Runoff Area=10.800 ac 66.20% Impervious Runoff Depth=1.94"
Flow Length=630' Tc=12.5 min CN=92 Runoff=22.70 cfs 1.742 af

SubcatchmentCO: Clover Valley Pond DA Runoff Area=44.421 ac 44.76% Impervious Runoff Depth=1.32"
Flow Length=2,092' Tc=17.5 min CN=84 Runoff=54.57 cfs 4.891 af

SubcatchmentK: Drainage Area Kabrich Runoff Area=93.790 ac 47.77% Impervious Runoff Depth=1.39"
Flow Length=3,788' Tc=18.2 min CN=85 Runoff=119.17 cfs 10.855 af

SubcatchmentRU: Rutherford Pond DA Runoff Area=7.747 ac 55.63% Impervious Runoff Depth=1.53"
Flow Length=741' Tc=12.4 min CN=87 Runoff=12.96 cfs 0.989 af

SubcatchmentSH: Shenandoah Pond DA Runoff Area=69.353 ac 59.71% Impervious Runoff Depth=1.46"
Flow Length=2,630' Tc=23.5 min CN=86 Runoff=82.30 cfs 8.431 af

SubcatchmentUG1: UST 1 DA Runoff Area=3.050 ac 0.00% Impervious Runoff Depth=2.03"
Tc=5.0 min CN=93 Runoff=9.26 cfs 0.515 af

SubcatchmentUG2: UST 2 DA Runoff Area=11.650 ac 51.33% Impervious Runoff Depth=1.46"
Flow Length=480' Tc=17.2 min CN=86 Runoff=16.00 cfs 1.416 af

SubcatchmentUS1: Upstream of Site Runoff Area=244.780 ac 40.87% Impervious Runoff Depth=1.19"
Flow Length=5,941' Tc=28.6 min CN=82 Runoff=211.56 cfs 24.332 af

SubcatchmentUS2: Upstream of Site Runoff Area=244.780 ac 41.04% Impervious Runoff Depth=1.19"
Flow Length=5,941' Tc=28.6 min CN=82 Runoff=211.56 cfs 24.332 af

Reach ED: Reach Along Edge Site Inflow=359.12 cfs 50.945 af
Outflow=359.12 cfs 50.945 af

Reach KB: Outfall Below Kabrich Inflow=349.18 cfs 49.498 af
Outflow=349.18 cfs 49.498 af

Reach MOR: MOOG Reach Section Avg. Flow Depth=1.40' Max Vel=8.10 fps Inflow=54.29 cfs 8.431 af
n=0.024 L=1,020.0' S=0.0225 '/' Capacity=3,267.06 cfs Outflow=54.24 cfs 8.431 af

Reach PF: OutFall to Prices Fork Inflow=375.34 cfs 54.103 af
Outflow=375.34 cfs 54.103 af

Reach SITE: Site Area Inflow=260.69 cfs 38.643 af
Outflow=260.69 cfs 38.643 af

Reach STK: Stream to Kabrich Street Avg. Flow Depth=1.96' Max Vel=7.18 fps Inflow=100.78 cfs 14.311 af
n=0.024 L=2,424.0' S=0.0111 '/' Capacity=795.50 cfs Outflow=97.38 cfs 14.311 af

Reach USR: Upper Stream Reach Avg. Flow Depth=0.93' Max Vel=7.28 fps Inflow=48.95 cfs 5.879 af
n=0.024 L=1,864.0' S=0.0223 '/' Capacity=3,988.84 cfs Outflow=46.72 cfs 5.879 af

Pond CVP: Clover Valley Pond Peak Elev=2,159.63' Storage=0.285 af Inflow=54.57 cfs 4.891 af
Outflow=46.57 cfs 4.891 af

Pond P1: UST1 Peak Elev=2,053.22' Storage=0.247 af Inflow=9.26 cfs 0.515 af
Outflow=1.74 cfs 0.512 af

Pond P2: UST2 Peak Elev=2,046.87' Storage=0.534 af Inflow=16.00 cfs 1.416 af
Outflow=4.32 cfs 1.416 af

Pond RP: Rutherford Pond Peak Elev=2,141.09' Storage=41,263 cf Inflow=55.04 cfs 5.879 af
Outflow=48.95 cfs 5.879 af

Pond SP: Shenandoah Pond Peak Elev=2,122.58' Storage=41,632 cf Inflow=82.30 cfs 8.431 af
Outflow=54.29 cfs 8.431 af

Total Runoff Area = 736.731 ac Runoff Volume = 78.438 af Average Runoff Depth = 1.28"
55.48% Pervious = 408.755 ac 44.52% Impervious = 327.976 ac

Summary for Subcatchment A: Drainage Area Webb Street

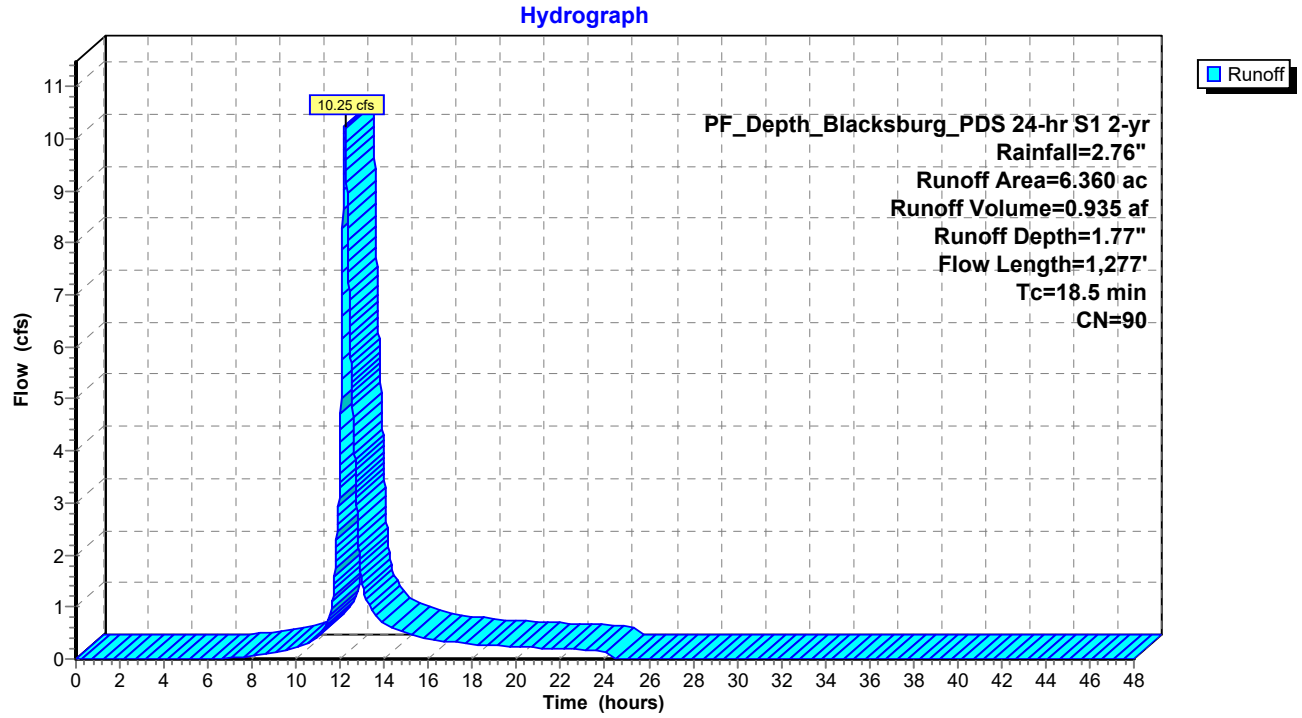
Runoff = 10.25 cfs @ 12.21 hrs, Volume= 0.935 af, Depth= 1.77"
Routed to Reach ED : Reach Along Edge Site

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
PF_Depth_Blacksburg_PDS 24-hr S1 2-yr Rainfall=2.76"

Area (ac)	CN	Description
1.390	74	>75% Grass cover, Good, HSG C
1.030	80	>75% Grass cover, Good, HSG D
3.940	98	Unconnected pavement, HSG C
6.360	90	Weighted Average
2.420		38.05% Pervious Area
3.940		61.95% Impervious Area
3.940		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.4	100	0.0200	0.11		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.76"
2.2	424	0.0400	3.22		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.9	753	0.0200	13.90	166.80	**Channel Flow,** Area= 12.0 sf Perim= 6.0' r= 2.00' n= 0.024
18.5	1,277	Total			

Subcatchment A: Drainage Area Webb Street



Summary for Subcatchment B: Drainage Area to Prices Fork

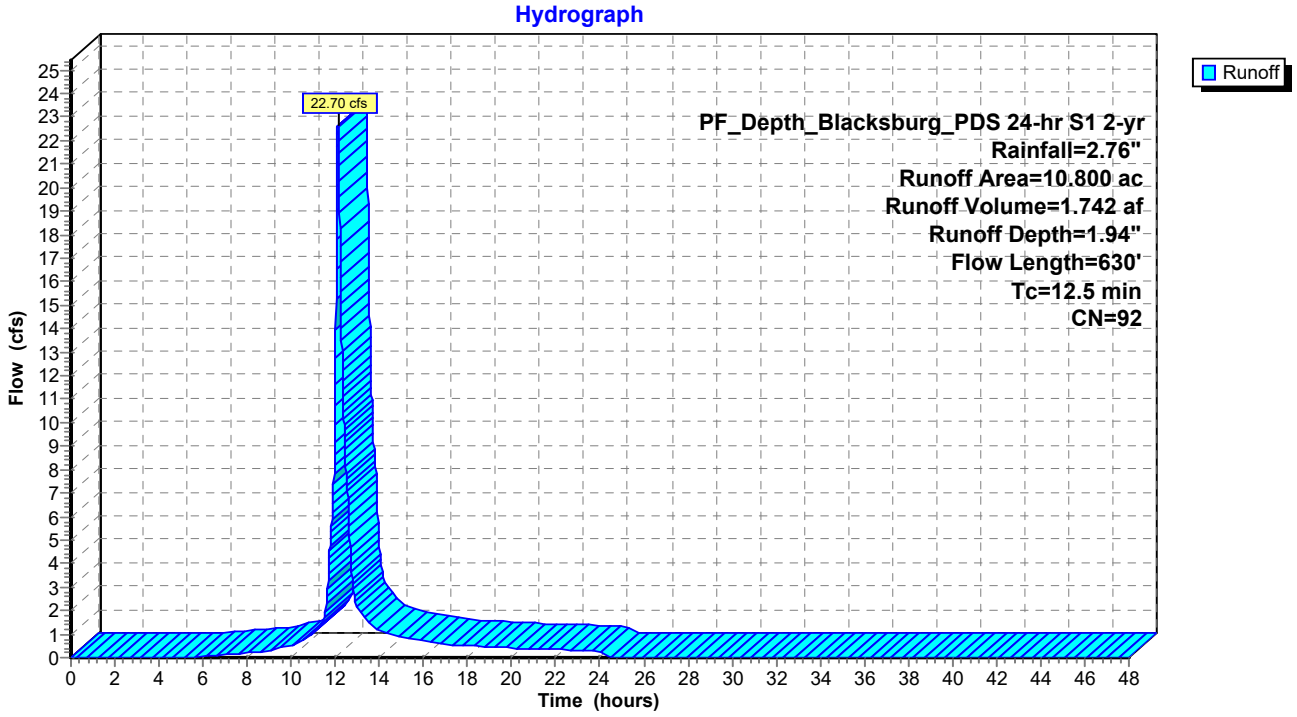
Runoff = 22.70 cfs @ 12.12 hrs, Volume= 1.742 af, Depth= 1.94"
Routed to Reach PF : OutFall to Prices Fork

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
PF_Depth_Blacksburg_PDS 24-hr S1 2-yr Rainfall=2.76"

Area (ac)	CN	Description
3.650	80	>75% Grass cover, Good, HSG D
7.150	98	Unconnected pavement, HSG C
10.800	92	Weighted Average
3.650		33.80% Pervious Area
7.150		66.20% Impervious Area
7.150		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.7	100	0.0500	0.16		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.76"
0.4	80	0.0500	3.60		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
1.4	450	0.0200	5.52	33.10	**Channel Flow,** Area= 6.0 sf Perim= 12.0' r= 0.50' n= 0.024
12.5	630	Total			

Subcatchment B: Drainage Area to Prices Fork



Summary for Subcatchment CO: Clover Valley Pond DA

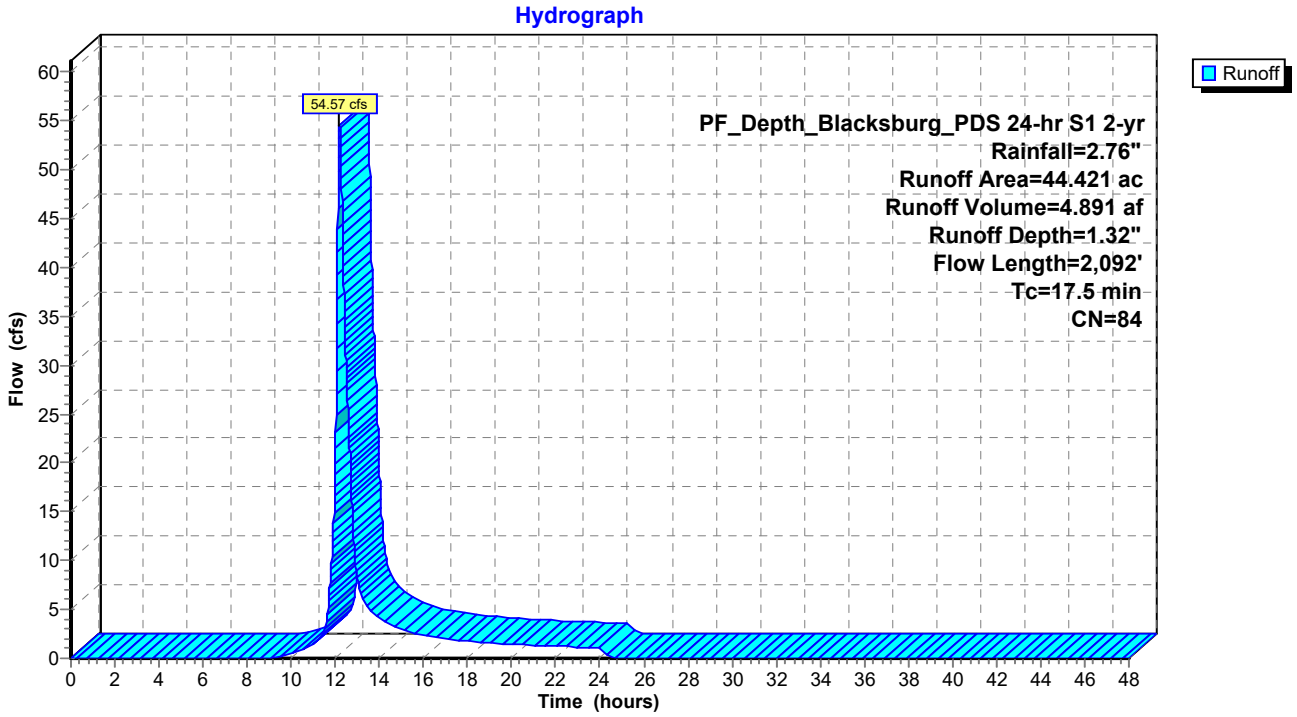
Runoff = 54.57 cfs @ 12.20 hrs, Volume= 4.891 af, Depth= 1.32"
Routed to Pond CVP : Clover Valley Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
PF_Depth_Blacksburg_PDS 24-hr S1 2-yr Rainfall=2.76"

Area (ac)	CN	Description
1.300	70	Woods, Good, HSG C
2.576	74	>75% Grass cover, Good, HSG C
0.198	68	1 acre lots, 20% imp, HSG B
0.507	79	1 acre lots, 20% imp, HSG C
4.150	70	1/2 acre lots, 25% imp, HSG B
10.489	80	1/2 acre lots, 25% imp, HSG C
1.456	72	1/3 acre lots, 30% imp, HSG B
2.101	81	1/3 acre lots, 30% imp, HSG C
1.438	85	1/8 acre lots, 65% imp, HSG B
8.011	90	1/8 acre lots, 65% imp, HSG C
1.487	92	Urban commercial, 85% imp, HSG B
6.136	94	Urban commercial, 85% imp, HSG C
0.610	89	Paved roads w/open ditches, 50% imp, HSG B
0.212	98	Paved parking, HSG C
3.750	92	Paved roads w/open ditches, 50% imp, HSG C
44.421	84	Weighted Average
24.540		55.24% Pervious Area
19.881		44.76% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	150	0.1400	0.26		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.76"
7.7	1,942	0.0690	4.23		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
17.5	2,092	Total			

Subcatchment CO: Clover Valley Pond DA



Summary for Subcatchment K: Drainage Area Kabrich

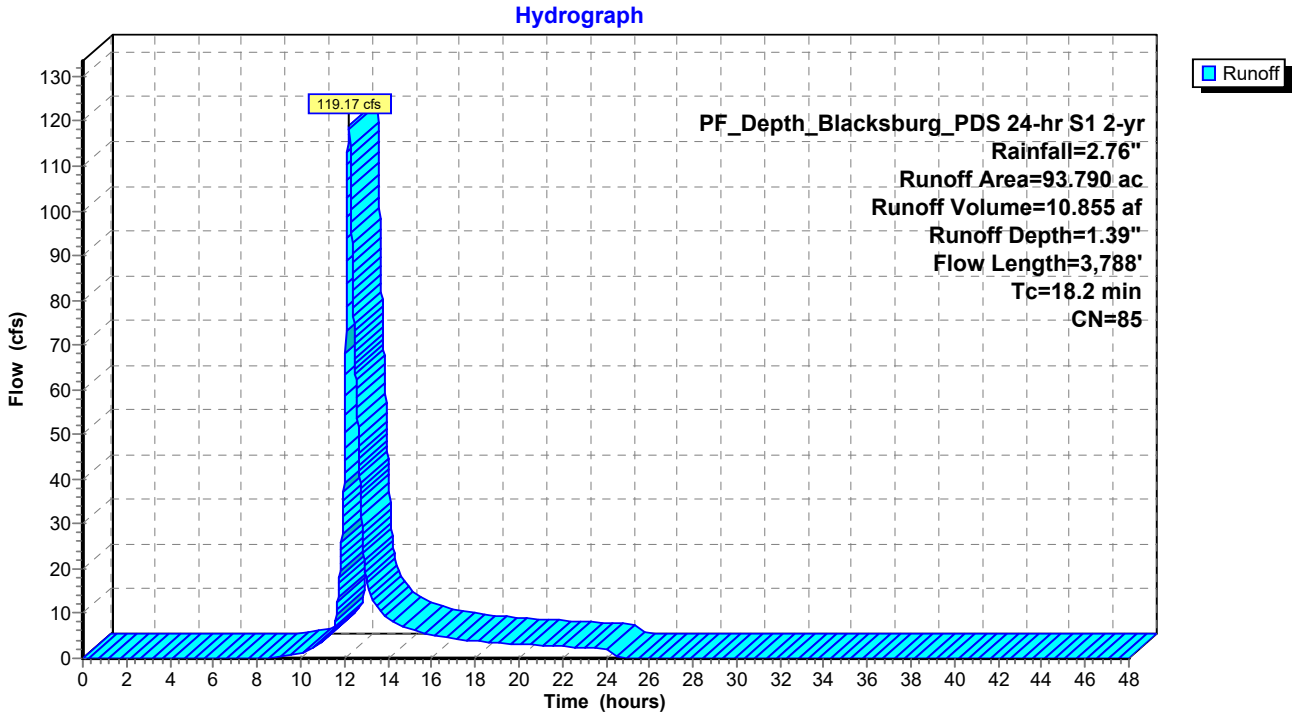
Runoff = 119.17 cfs @ 12.21 hrs, Volume= 10.855 af, Depth= 1.39"
Routed to Reach KB : Outfall Below Kabrich

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
PF_Depth_Blacksburg_PDS 24-hr S1 2-yr Rainfall=2.76"

Area (ac)	CN	Description
3.400	61	>75% Grass cover, Good, HSG B
45.590	74	>75% Grass cover, Good, HSG C
44.800	98	Paved parking, HSG B
93.790	85	Weighted Average
48.990		52.23% Pervious Area
44.800		47.77% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.7	100	0.0500	0.16		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.76"
2.6	322	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.5	1,152	0.0300	12.47	39.18	**Pipe Channel,** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.013
1.5	1,371	0.0240	15.23	182.72	**Channel Flow,** Area= 12.0 sf Perim= 6.0' r= 2.00' n= 0.024
1.9	843	0.0200	7.23	51.09	**Pipe Channel,** 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.024
18.2	3,788	Total			

Subcatchment K: Drainage Area Kabrich



Summary for Subcatchment RU: Rutherford Pond DA

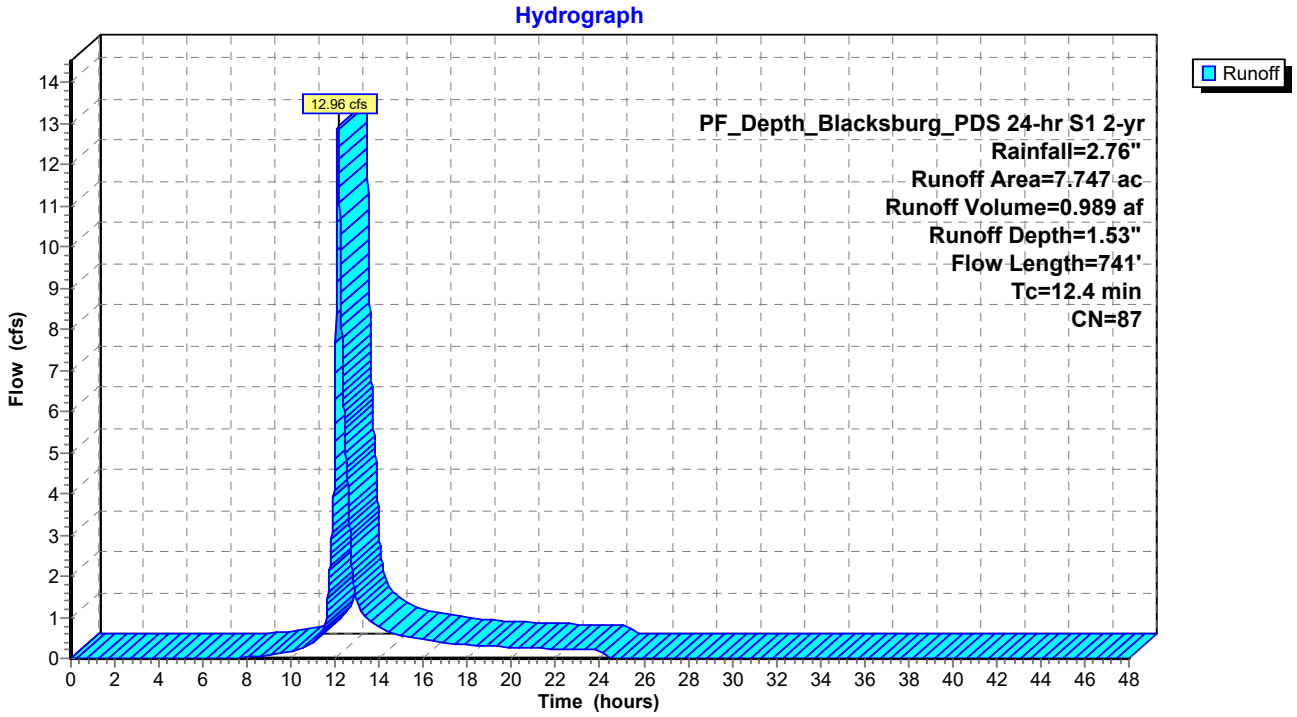
Runoff = 12.96 cfs @ 12.13 hrs, Volume= 0.989 af, Depth= 1.53"
Routed to Pond RP : Rutherford Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
PF_Depth_Blacksburg_PDS 24-hr S1 2-yr Rainfall=2.76"

Area (ac)	CN	Description
0.105	61	>75% Grass cover, Good, HSG B
0.939	74	>75% Grass cover, Good, HSG C
0.132	70	1/2 acre lots, 25% imp, HSG B
0.278	80	1/2 acre lots, 25% imp, HSG C
0.393	85	1/8 acre lots, 65% imp, HSG B
5.318	90	1/8 acre lots, 65% imp, HSG C
0.195	92	Urban commercial, 85% imp, HSG B
0.387	94	Urban commercial, 85% imp, HSG C
7.747	87	Weighted Average
3.438		44.37% Pervious Area
4.309		55.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.6	150	0.1130	0.24		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.76"
1.8	591	0.0745	5.54		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
12.4	741	Total			

Subcatchment RU: Rutherford Pond DA



Summary for Subcatchment SH: Shenandoah Pond DA

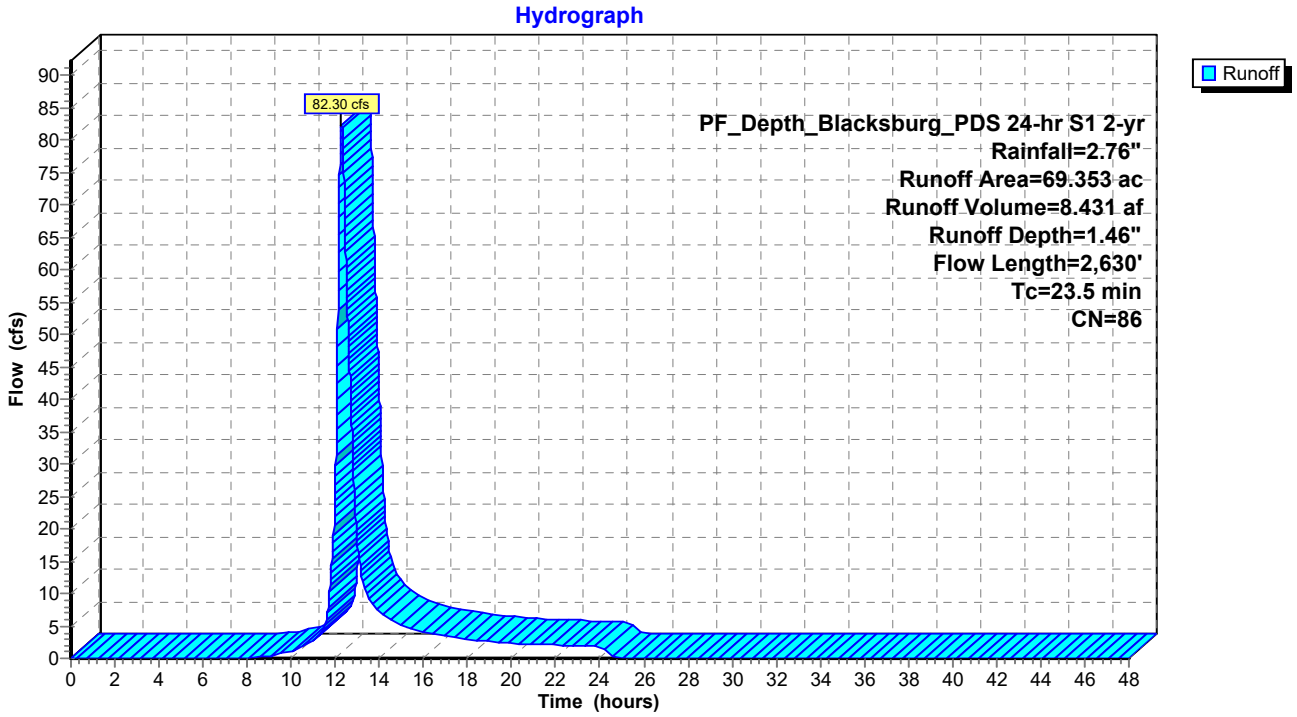
Runoff = 82.30 cfs @ 12.29 hrs, Volume= 8.431 af, Depth= 1.46"
Routed to Pond SP : Shenandoah Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
PF_Depth_Blacksburg_PDS 24-hr S1 2-yr Rainfall=2.76"

Area (ac)	CN	Description
7.130	61	>75% Grass cover, Good, HSG B
0.534	74	>75% Grass cover, Good, HSG C
0.108	68	1 acre lots, 20% imp, HSG B
0.773	70	1/2 acre lots, 25% imp, HSG B
0.054	80	1/2 acre lots, 25% imp, HSG C
14.304	85	1/8 acre lots, 65% imp, HSG B
20.223	90	1/8 acre lots, 65% imp, HSG C
8.803	88	Urban industrial, 72% imp, HSG B
9.941	92	Urban commercial, 85% imp, HSG B
0.610	94	Urban commercial, 85% imp, HSG C
4.119	89	Paved roads w/open ditches, 50% imp, HSG B
2.754	92	Paved roads w/open ditches, 50% imp, HSG C
69.353	86	Weighted Average
27.939		40.29% Pervious Area
41.414		59.71% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.8	150	0.0867	0.21		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.76"
2.4	647	0.0773	4.48		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
9.3	1,833	0.0262	3.29		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
23.5	2,630	Total			

Subcatchment SH: Shenandoah Pond DA



Summary for Subcatchment UG1: UST 1 DA

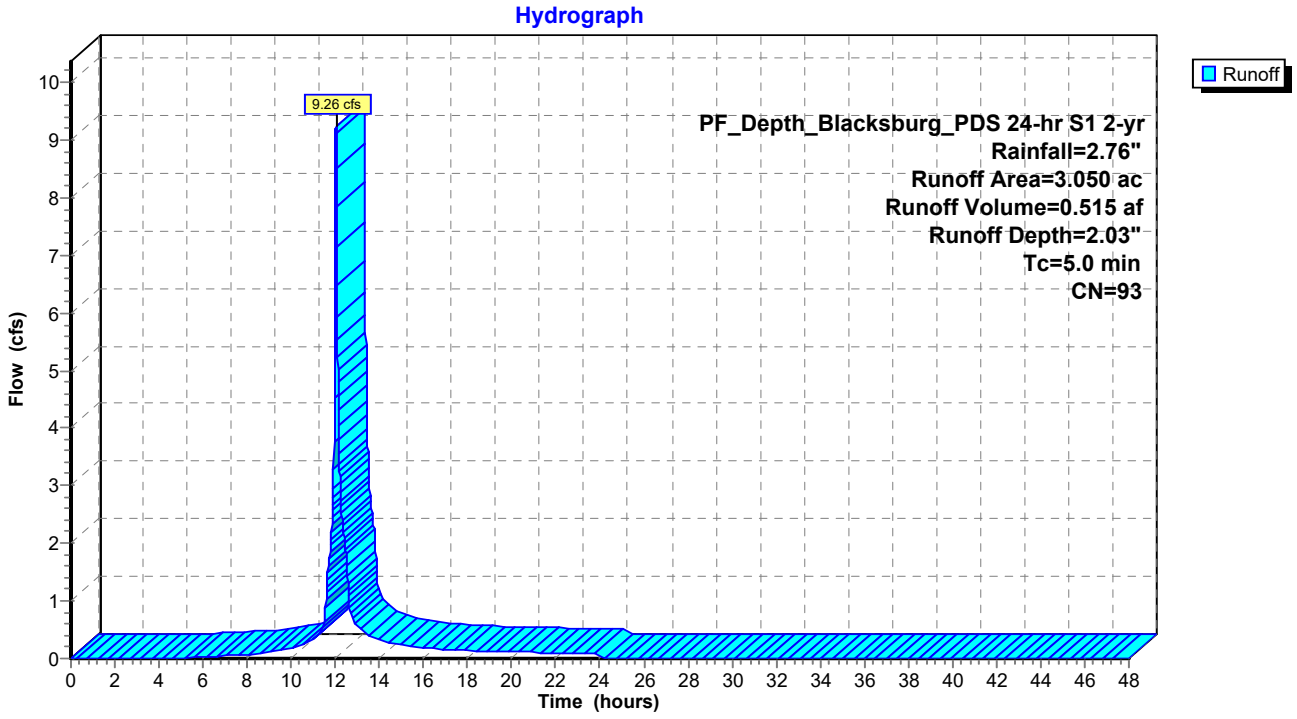
Runoff = 9.26 cfs @ 12.03 hrs, Volume= 0.515 af, Depth= 2.03"
Routed to Pond P1 : UST1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
PF_Depth_Blacksburg_PDS 24-hr S1 2-yr Rainfall=2.76"

Area (ac)	CN	Description
0.590	74	>75% Grass cover, Good, HSG C
2.460	98	Water Surface, 0% imp, HSG C
3.050	93	Weighted Average
3.050		100.00% Pervious Area

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

Subcatchment UG1: UST 1 DA



Summary for Subcatchment UG2: UST 2 DA

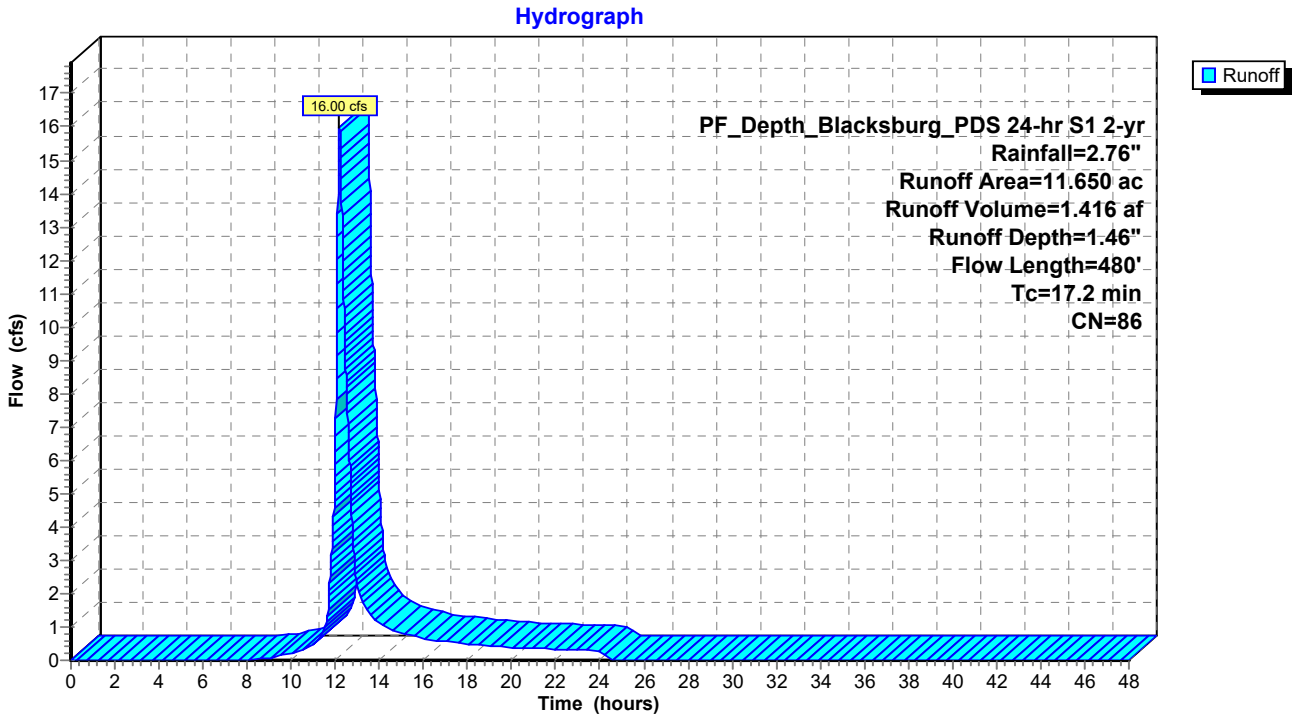
Runoff = 16.00 cfs @ 12.19 hrs, Volume= 1.416 af, Depth= 1.46"
Routed to Pond P2 : UST2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
PF_Depth_Blacksburg_PDS 24-hr S1 2-yr Rainfall=2.76"

Area (ac)	CN	Description
5.670	74	>75% Grass cover, Good, HSG C
5.980	98	Paved parking, HSG C
11.650	86	Weighted Average
5.670		48.67% Pervious Area
5.980		51.33% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.1	150	0.0400	0.16		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.76"
1.1	330	0.0910	4.86		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
17.2	480	Total			

Subcatchment UG2: UST 2 DA



Summary for Subcatchment US1: Upstream of Site PRE CONDITION

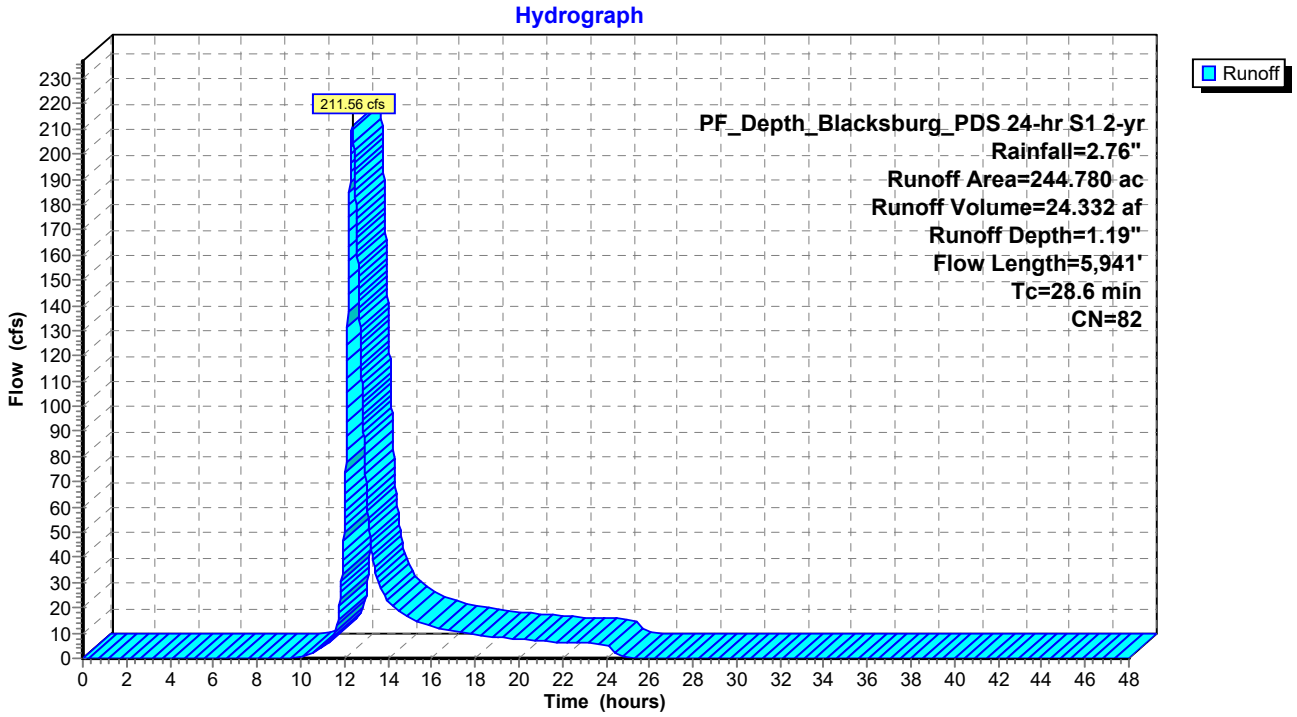
Runoff = 211.56 cfs @ 12.36 hrs, Volume= 24.332 af, Depth= 1.19"
Routed to Reach SITE : Site Area

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
PF_Depth_Blacksburg_PDS 24-hr S1 2-yr Rainfall=2.76"

	Area (ac)	CN	Description
	6.240	55	Woods, Good, HSG B
	2.100	70	Woods, Good, HSG C
	15.820	61	>75% Grass cover, Good, HSG B
	39.640	74	>75% Grass cover, Good, HSG C
	26.040	94	Urban commercial, 85% imp, HSG C
	5.870	95	Urban commercial, 85% imp, HSG D
	3.840	88	Urban industrial, 72% imp, HSG B
	8.520	91	Urban industrial, 72% imp, HSG C
	1.400	89	Paved roads w/open ditches, 50% imp, HSG B
	15.560	92	Paved roads w/open ditches, 50% imp, HSG C
	1.250	85	1/8 acre lots, 65% imp, HSG B
	36.230	90	1/8 acre lots, 65% imp, HSG C
	12.500	72	1/3 acre lots, 30% imp, HSG B
	53.220	81	1/3 acre lots, 30% imp, HSG C
	6.400	86	1/3 acre lots, 30% imp, HSG D
	6.620	98	Paved parking, HSG C
*	2.930	98	SITE AREA IMPERVIOUS
*	0.600	80	SITE AREA GERASS
	244.780	82	Weighted Average
	144.729		59.13% Pervious Area
	100.051		40.87% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.8	100	0.0800	0.19		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.76"
7.7	1,832	0.0600	3.94		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
12.1	4,009	0.0200	5.52	33.10	**Channel Flow,** Area= 6.0 sf Perim= 12.0' r= 0.50' n= 0.024
28.6	5,941	Total			

Subcatchment US1: Upstream of Site PRE CONDITION



Summary for Subcatchment US2: Upstream of Site POST CONDITION

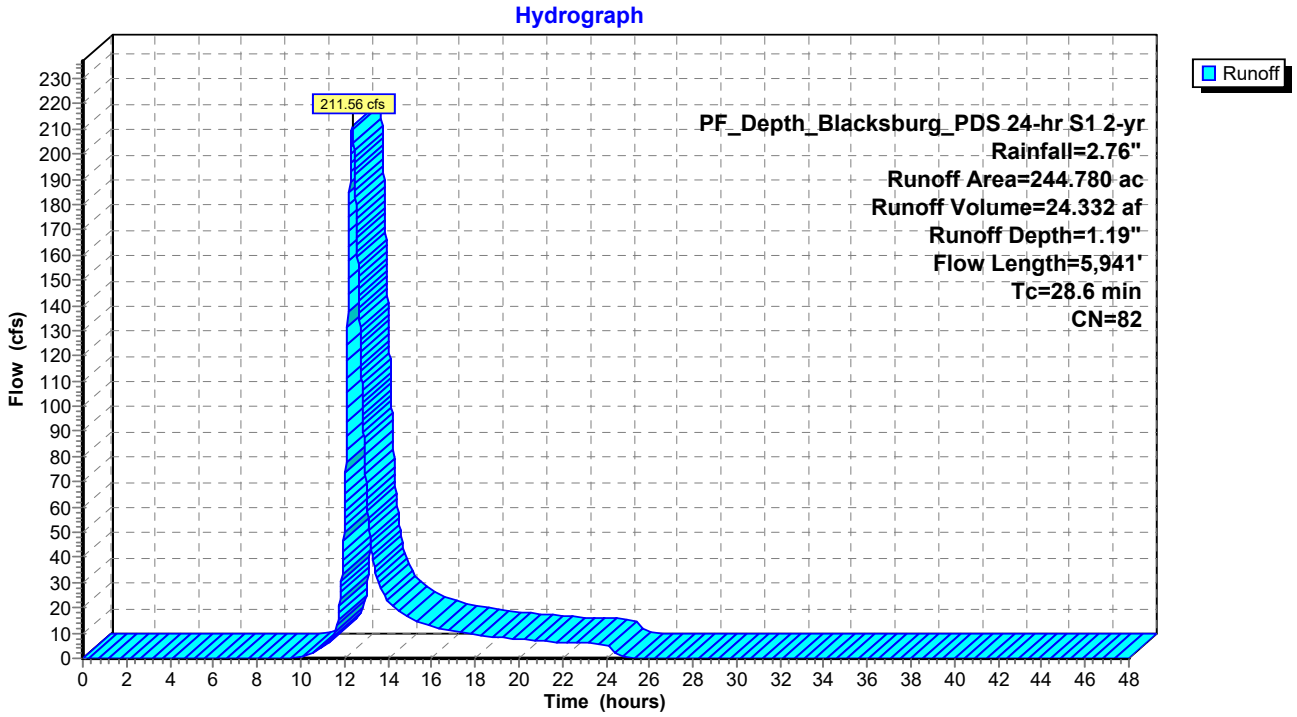
Runoff = 211.56 cfs @ 12.36 hrs, Volume= 24.332 af, Depth= 1.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
PF_Depth_Blacksburg_PDS 24-hr S1 2-yr Rainfall=2.76"

	Area (ac)	CN	Description
	6.240	55	Woods, Good, HSG B
	2.100	70	Woods, Good, HSG C
	15.820	61	>75% Grass cover, Good, HSG B
	39.640	74	>75% Grass cover, Good, HSG C
	26.040	94	Urban commercial, 85% imp, HSG C
	5.870	95	Urban commercial, 85% imp, HSG D
	3.840	88	Urban industrial, 72% imp, HSG B
	8.520	91	Urban industrial, 72% imp, HSG C
	1.400	89	Paved roads w/open ditches, 50% imp, HSG B
	15.560	92	Paved roads w/open ditches, 50% imp, HSG C
	1.250	85	1/8 acre lots, 65% imp, HSG B
	36.230	90	1/8 acre lots, 65% imp, HSG C
	12.500	72	1/3 acre lots, 30% imp, HSG B
	53.220	81	1/3 acre lots, 30% imp, HSG C
	6.400	86	1/3 acre lots, 30% imp, HSG D
	6.620	98	Paved parking, HSG C
*	3.330	98	SITE AREA IMPERVIOUS
*	0.200	80	SITE AREA GERASS
	244.780	82	Weighted Average
	144.329		58.96% Pervious Area
	100.451		41.04% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.8	100	0.0800	0.19		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.76"
7.7	1,832	0.0600	3.94		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
12.1	4,009	0.0200	5.52	33.10	**Channel Flow,** Area= 6.0 sf Perim= 12.0' r= 0.50' n= 0.024
28.6	5,941	Total			

Subcatchment US2: Upstream of Site POST CONDITION

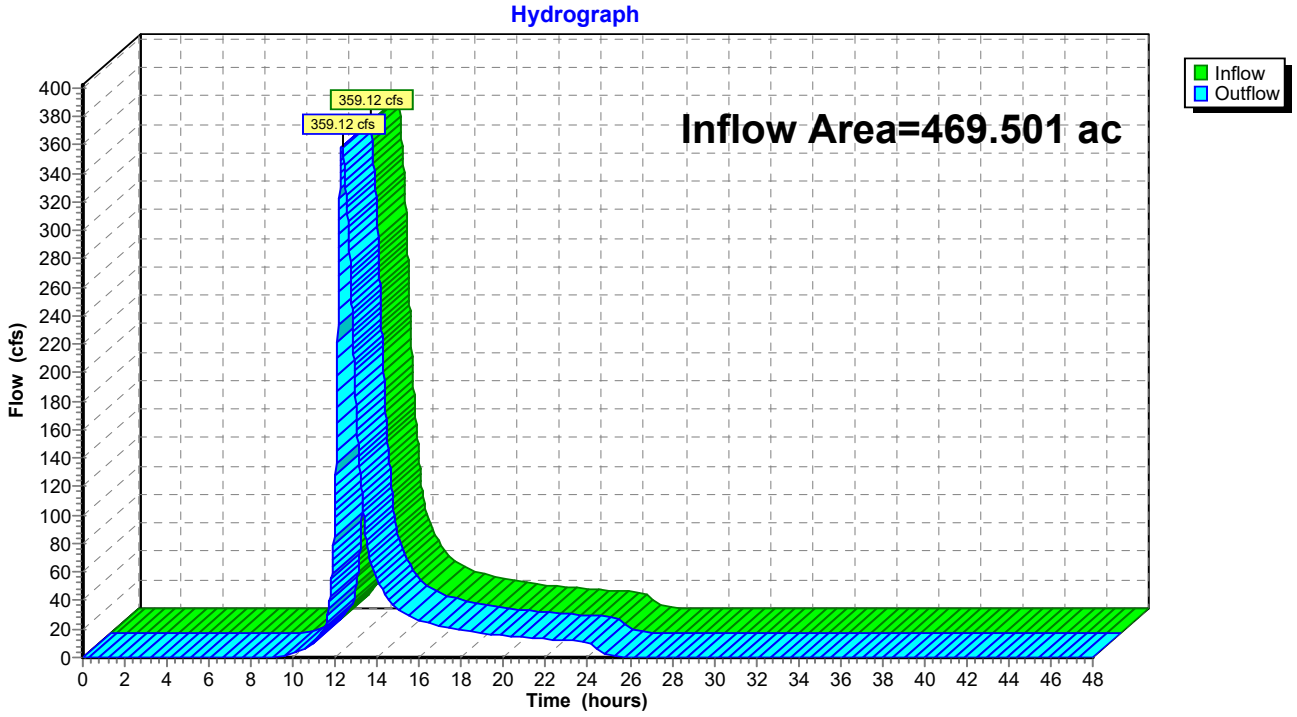


Summary for Reach ED: Reach Along Edge Site

Inflow Area = 469.501 ac, 45.66% Impervious, Inflow Depth = 1.30" for 2-yr event
Inflow = 359.12 cfs @ 12.32 hrs, Volume= 50.945 af
Outflow = 359.12 cfs @ 12.32 hrs, Volume= 50.945 af, Atten= 0%, Lag= 0.0 min
Routed to Reach PF : OutFall to Prices Fork

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Reach ED: Reach Along Edge Site

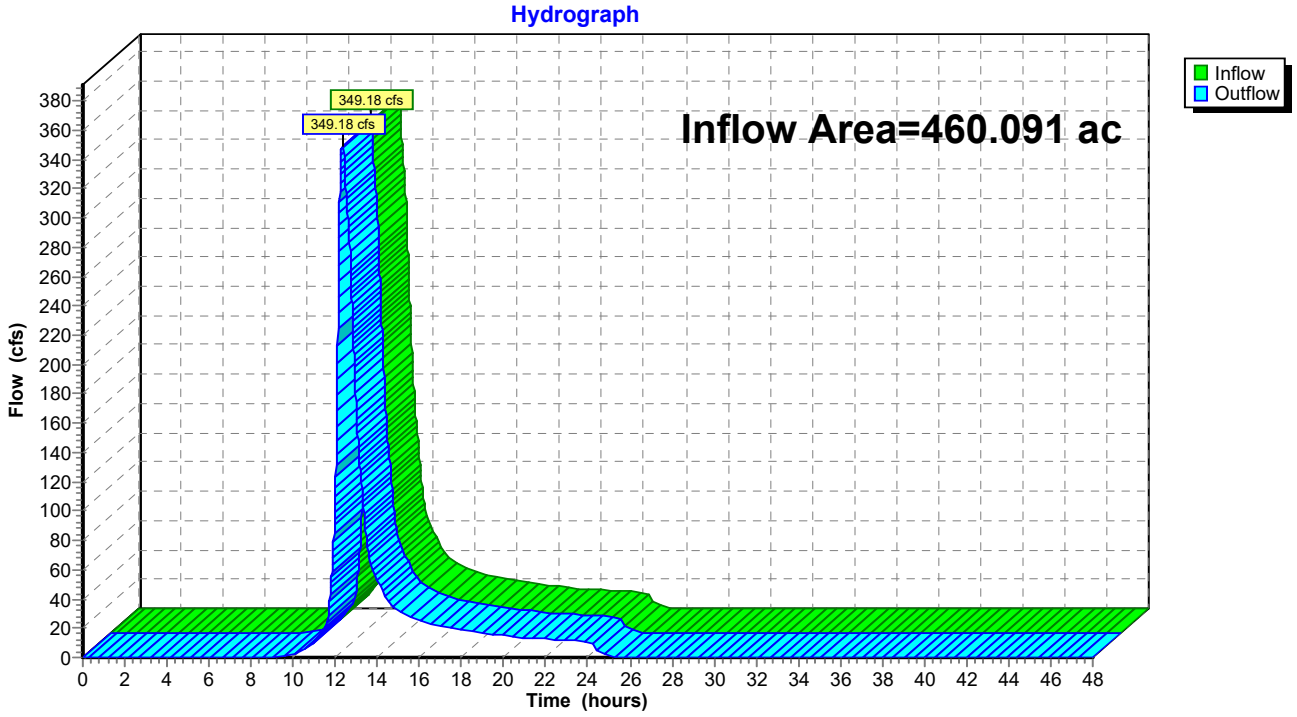


Summary for Reach KB: Outfall Below Kabrich

Inflow Area = 460.091 ac, 45.74% Impervious, Inflow Depth = 1.29" for 2-yr event
Inflow = 349.18 cfs @ 12.33 hrs, Volume= 49.498 af
Outflow = 349.18 cfs @ 12.33 hrs, Volume= 49.498 af, Atten= 0%, Lag= 0.0 min
Routed to Reach ED : Reach Along Edge Site

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Reach KB: Outfall Below Kabrich



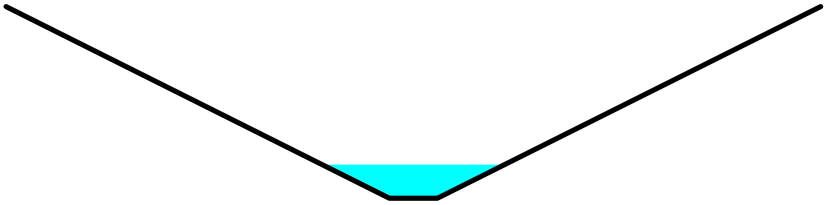
Summary for Reach MOR: MOOG Reach Section

Inflow Area = 69.353 ac, 59.71% Impervious, Inflow Depth = 1.46" for 2-yr event
Inflow = 54.29 cfs @ 12.54 hrs, Volume= 8.431 af
Outflow = 54.24 cfs @ 12.61 hrs, Volume= 8.431 af, Atten= 0%, Lag= 3.7 min
Routed to Reach STK : Stream to Kabrich Street

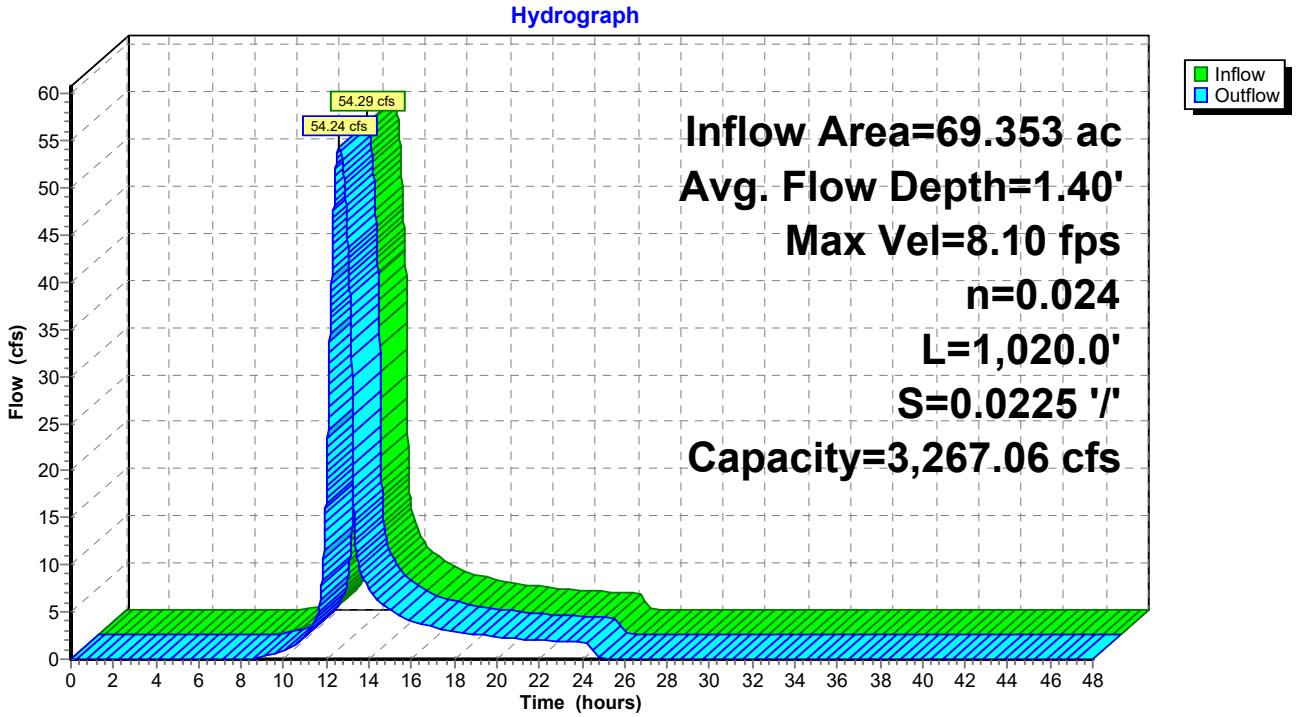
Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 8.10 fps, Min. Travel Time= 2.1 min
Avg. Velocity = 3.56 fps, Avg. Travel Time= 4.8 min

Peak Storage= 6,833 cf @ 12.57 hrs
Average Depth at Peak Storage= 1.40' , Surface Width= 7.59'
Bank-Full Depth= 8.00' Flow Area= 144.0 sf, Capacity= 3,267.06 cfs

2.00' x 8.00' deep channel, n= 0.024
Side Slope Z-value= 2.0 '/' Top Width= 34.00'
Length= 1,020.0' Slope= 0.0225 '/'
Inlet Invert= 2,115.00', Outlet Invert= 2,092.00'



Reach MOR: MOOG Reach Section

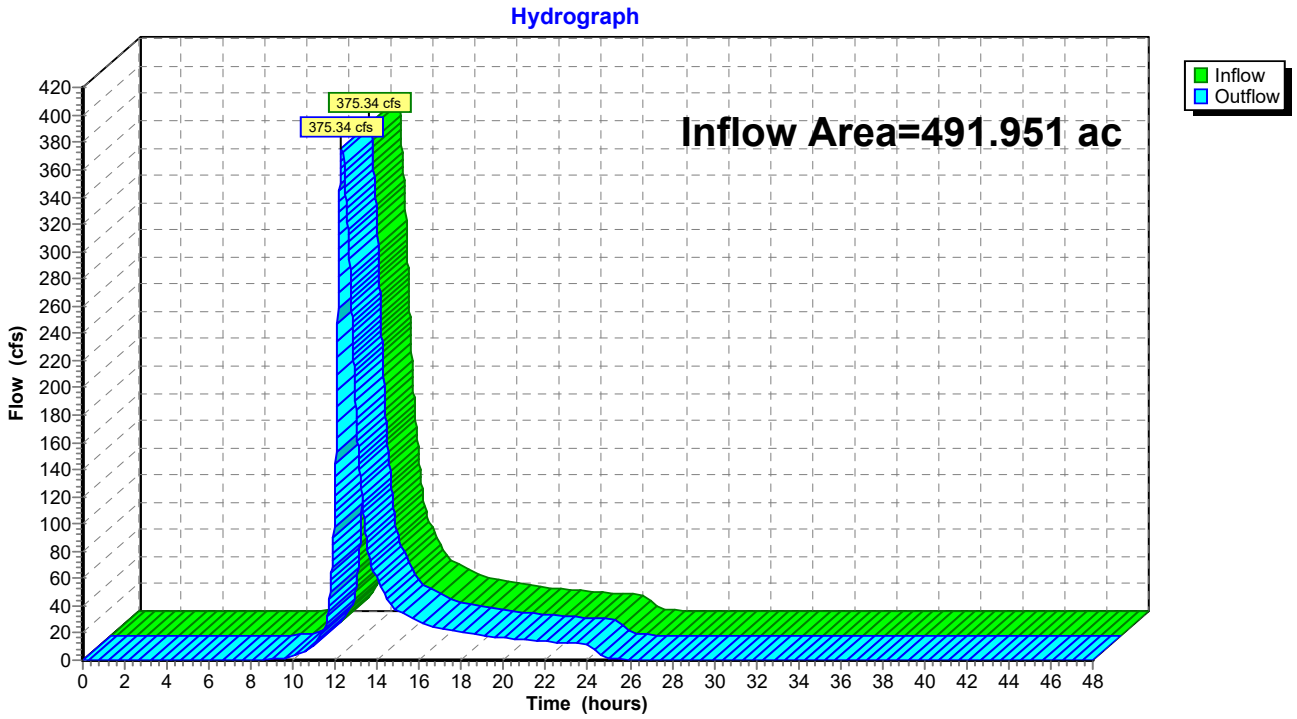


Summary for Reach PF: OutFall to Prices Fork

Inflow Area = 491.951 ac, 46.25% Impervious, Inflow Depth = 1.32" for 2-yr event
Inflow = 375.34 cfs @ 12.30 hrs, Volume= 54.103 af
Outflow = 375.34 cfs @ 12.30 hrs, Volume= 54.103 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Reach PF: OutFall to Prices Fork

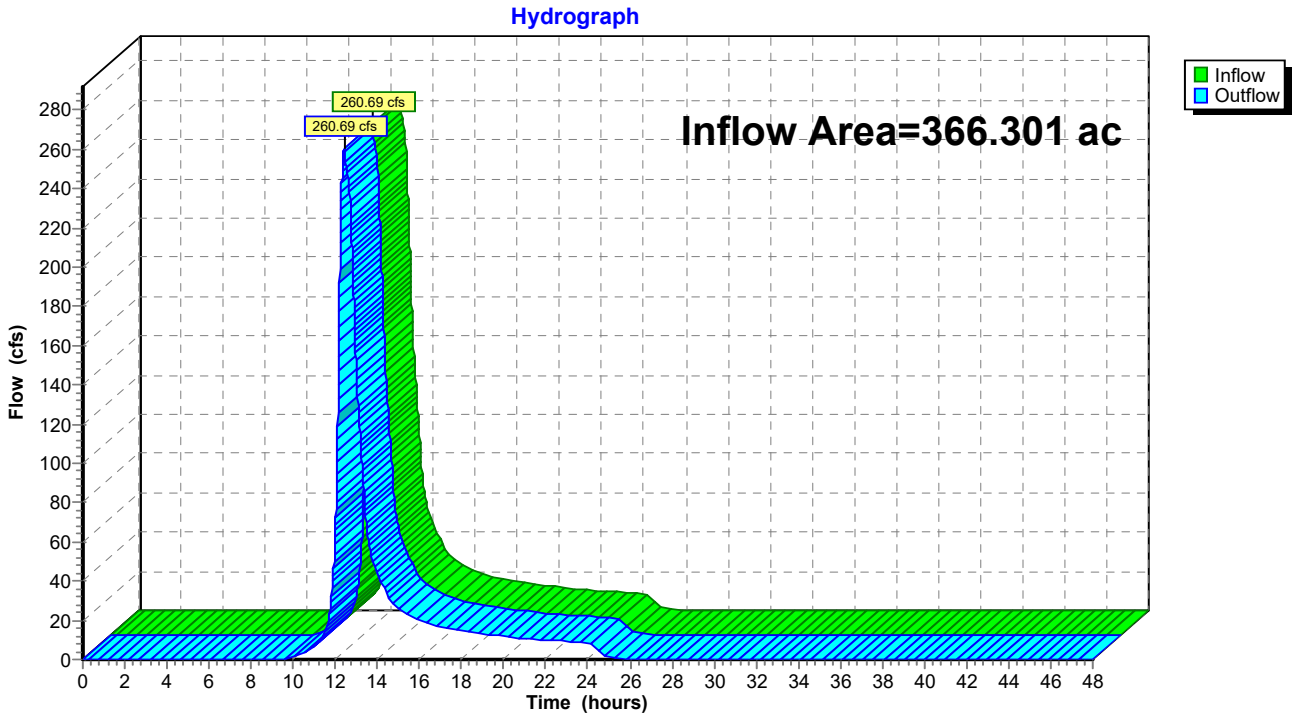


Summary for Reach SITE: Site Area

Inflow Area = 366.301 ac, 45.22% Impervious, Inflow Depth = 1.27" for 2-yr event
Inflow = 260.69 cfs @ 12.42 hrs, Volume= 38.643 af
Outflow = 260.69 cfs @ 12.42 hrs, Volume= 38.643 af, Atten= 0%, Lag= 0.0 min
Routed to Reach KB : Outfall Below Kabrich

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Reach SITE: Site Area



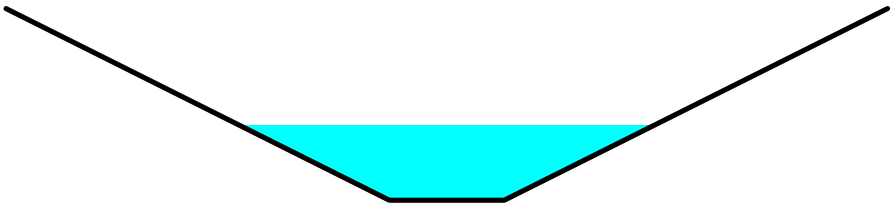
Summary for Reach STK: Stream to Kabrich Street

Inflow Area = 121.521 ac, 53.99% Impervious, Inflow Depth = 1.41" for 2-yr event
Inflow = 100.78 cfs @ 12.56 hrs, Volume= 14.311 af
Outflow = 97.38 cfs @ 12.74 hrs, Volume= 14.311 af, Atten= 3%, Lag= 10.6 min
Routed to Reach SITE : Site Area

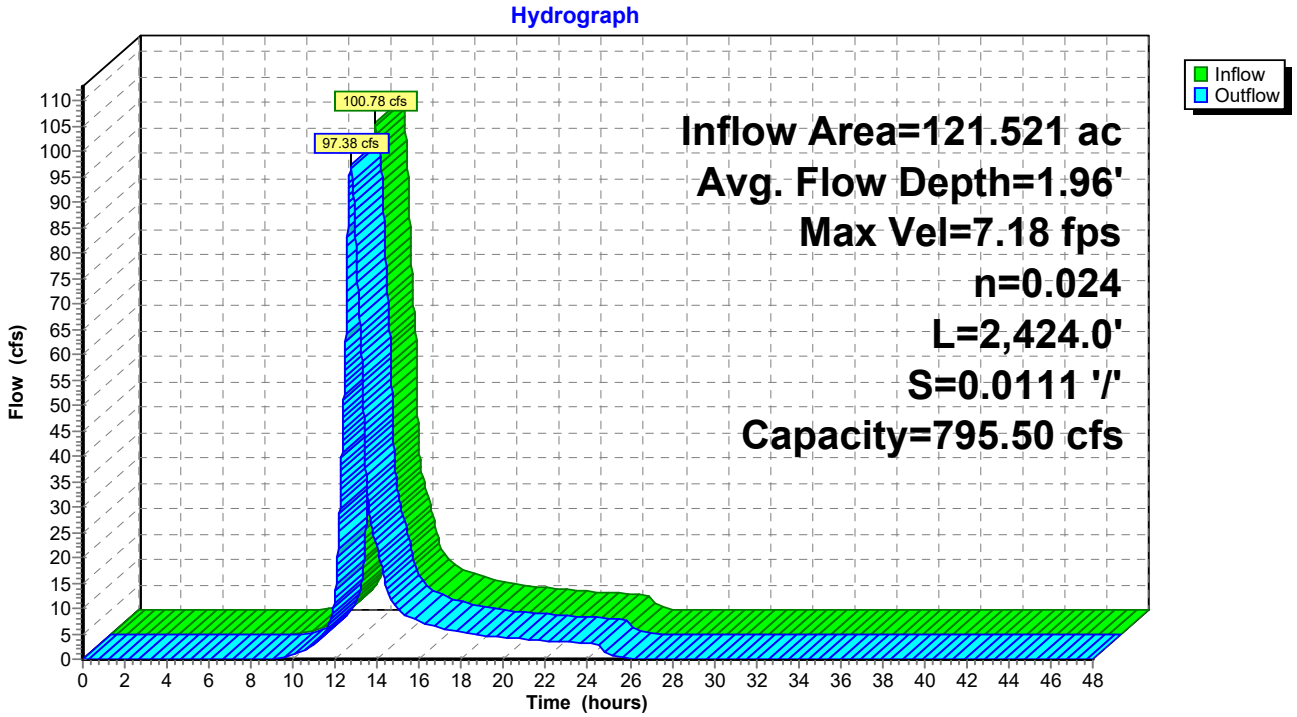
Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 7.18 fps, Min. Travel Time= 5.6 min
Avg. Velocity = 2.46 fps, Avg. Travel Time= 16.4 min

Peak Storage= 32,863 cf @ 12.64 hrs
Average Depth at Peak Storage= 1.96' , Surface Width= 10.84'
Bank-Full Depth= 5.00' Flow Area= 65.0 sf, Capacity= 795.50 cfs

3.00' x 5.00' deep channel, n= 0.024
Side Slope Z-value= 2.0 '/' Top Width= 23.00'
Length= 2,424.0' Slope= 0.0111 '/'
Inlet Invert= 2,092.00', Outlet Invert= 2,065.00'



Reach STK: Stream to Kabrich Street



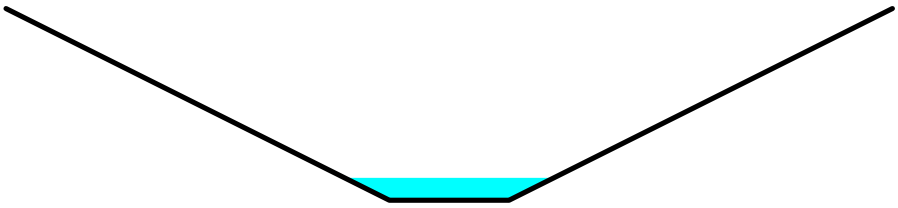
Summary for Reach USR: Upper Stream Reach

Inflow Area = 52.168 ac, 46.37% Impervious, Inflow Depth = 1.35" for 2-yr event
Inflow = 48.95 cfs @ 12.41 hrs, Volume= 5.879 af
Outflow = 46.72 cfs @ 12.55 hrs, Volume= 5.879 af, Atten= 5%, Lag= 8.4 min
Routed to Reach STK : Stream to Kabrich Street

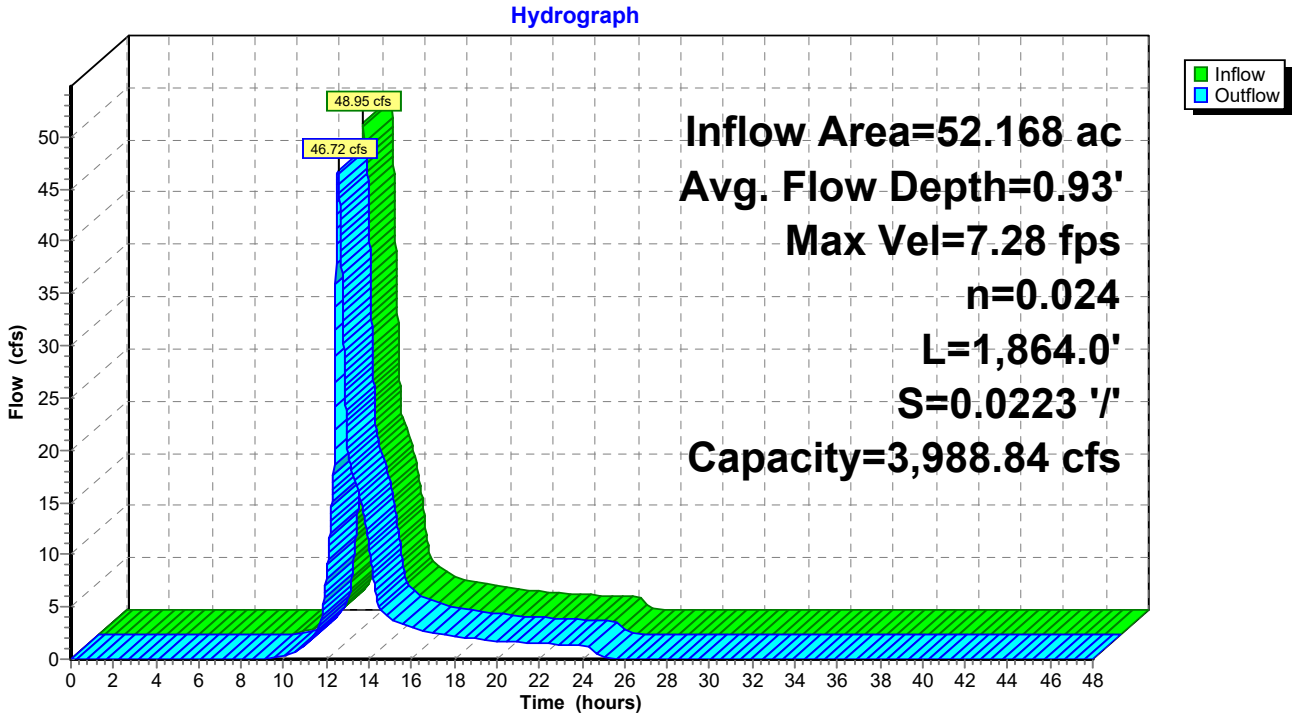
Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 7.28 fps, Min. Travel Time= 4.3 min
Avg. Velocity = 2.52 fps, Avg. Travel Time= 12.3 min

Peak Storage= 11,961 cf @ 12.48 hrs
Average Depth at Peak Storage= 0.93' , Surface Width= 8.74'
Bank-Full Depth= 8.00' Flow Area= 168.0 sf, Capacity= 3,988.84 cfs

5.00' x 8.00' deep channel, n= 0.024
Side Slope Z-value= 2.0 '/' Top Width= 37.00'
Length= 1,864.0' Slope= 0.0223 '/'
Inlet Invert= 2,133.50', Outlet Invert= 2,092.00'



Reach USR: Upper Stream Reach



Summary for Pond CVP: Clover Valley Pond

Inflow Area = 44.421 ac, 44.76% Impervious, Inflow Depth = 1.32" for 2-yr event
Inflow = 54.57 cfs @ 12.20 hrs, Volume= 4.891 af
Outflow = 46.57 cfs @ 12.30 hrs, Volume= 4.891 af, Atten= 15%, Lag= 6.0 min
Primary = 46.57 cfs @ 12.30 hrs, Volume= 4.891 af
Routed to Pond RP : Rutherford Pond

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 2,159.63' @ 12.30 hrs Surf.Area= 0.168 ac Storage= 0.285 af

Plug-Flow detention time= 1.9 min calculated for 4.890 af (100% of inflow)
Center-of-Mass det. time= 1.9 min (851.5 - 849.6)

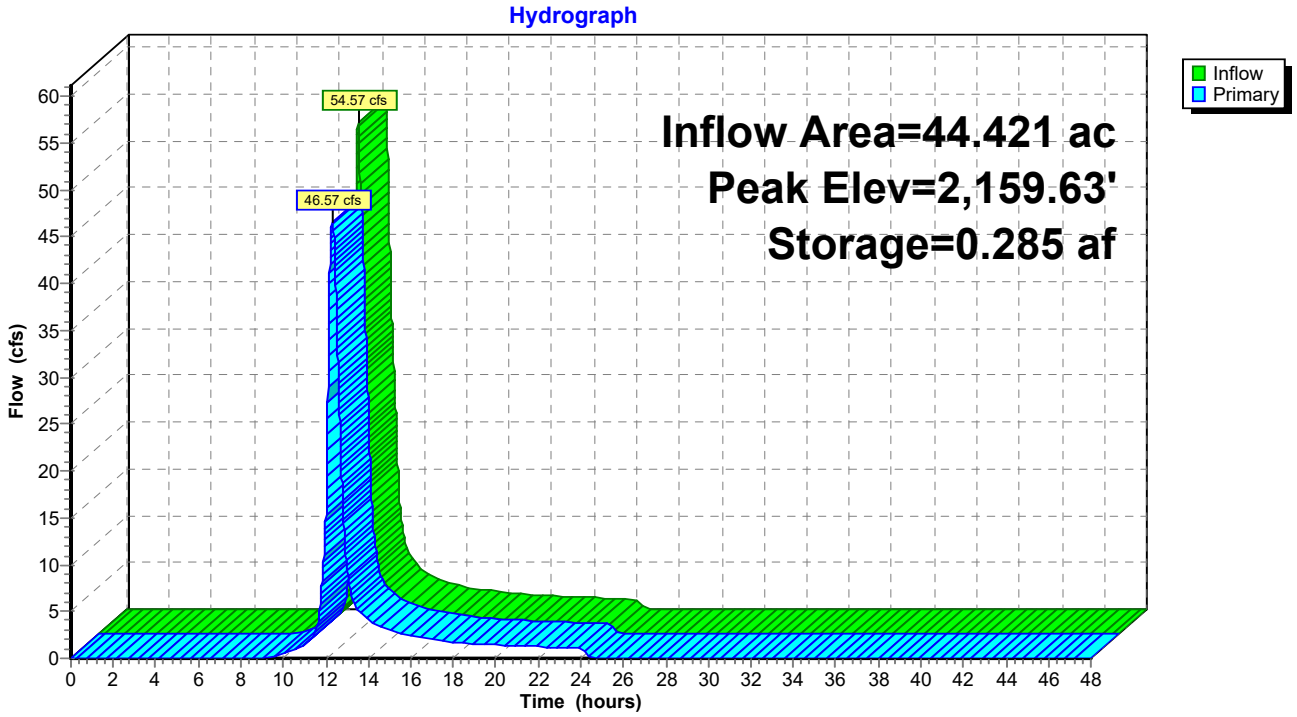
Volume	Invert	Avail.Storage	Storage Description
#1	2,155.00'	0.837 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
2,155.00	0.000	0.000	0.000
2,156.00	0.003	0.002	0.002
2,158.00	0.079	0.082	0.083
2,160.00	0.188	0.267	0.351
2,162.00	0.299	0.487	0.837

Device	Routing	Invert	Outlet Devices
#1	Primary	2,154.50'	**30.0" Round Culvert** L= 50.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,154.50' / 2,153.50' S= 0.0200 '/' Cc= 0.900 n= 0.013, Flow Area= 4.91 sf
#2	Device 1	2,155.00'	**18.0" Round Culvert** L= 3.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,155.00' / 2,154.50' S= 0.1667 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#3	Device 1	2,156.77'	**30.0" Round Culvert** L= 3.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,156.77' / 2,156.27' S= 0.1667 '/' Cc= 0.900 n= 0.013, Flow Area= 4.91 sf
#4	Device 1	2,160.25'	**84.0" x 48.0" Horiz. Orifice/Grate X 3.00** C= 0.600 Limited to weir flow at low heads
#5	Primary	2,161.50'	**40.0' long x 20.0' 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) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=46.57 cfs @ 12.30 hrs HW=2,159.63' (Free Discharge)
- **1=Culvert** (Inlet Controls 46.57 cfs @ 9.49 fps)
  - **2=Culvert** (Passes < 16.77 cfs potential flow)
  - **3=Culvert** (Passes < 30.01 cfs potential flow)
  - **4=Orifice/Grate** (Controls 0.00 cfs)
- **5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond CVP: Clover Valley Pond



Summary for Pond P1: UST1

Inflow Area = 3.050 ac, 0.00% Impervious, Inflow Depth = 2.03" for 2-yr event
Inflow = 9.26 cfs @ 12.03 hrs, Volume= 0.515 af
Outflow = 1.74 cfs @ 12.53 hrs, Volume= 0.512 af, Atten= 81%, Lag= 30.3 min
Primary = 1.74 cfs @ 12.53 hrs, Volume= 0.512 af
Routed to Reach ED : Reach Along Edge Site

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 2,053.22' @ 12.53 hrs Surf.Area= 0.100 ac Storage= 0.247 af

Plug-Flow detention time= 283.0 min calculated for 0.512 af (100% of inflow)
Center-of-Mass det. time= 280.1 min (1,078.7 - 798.6)

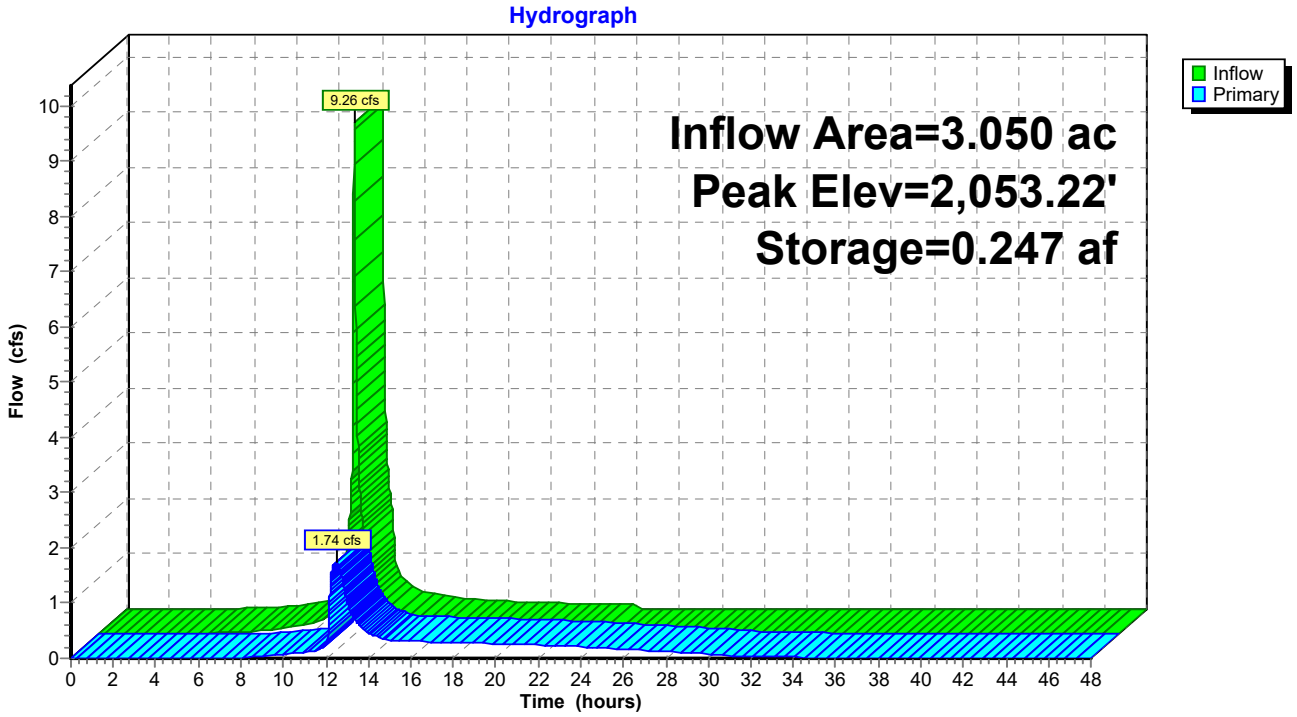
Volume	Invert	Avail.Storage	Storage Description
#1	2,050.75'	0.459 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
2,050.75	0.100	0.000	0.000
2,051.75	0.100	0.100	0.100
2,052.75	0.100	0.100	0.200
2,053.75	0.100	0.100	0.300
2,054.75	0.100	0.100	0.400
2,055.45	0.070	0.059	0.459

Device	Routing	Invert	Outlet Devices
#1	Primary	2,050.75'	**18.0" Round Culvert** L= 42.4' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,050.75' / 2,049.25' S= 0.0354 '/' Cc= 0.900 n= 0.011, Flow Area= 1.77 sf
#2	Device 1	2,050.75'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	2,052.65'	**14.0" W x 5.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	2,054.65'	**6.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=1.74 cfs @ 12.53 hrs HW=2,053.22' (Free Discharge)
└**1=Culvert** (Passes 1.74 cfs of 11.15 cfs potential flow)
├**2=Orifice/Grate** (Orifice Controls 0.36 cfs @ 7.37 fps)
├**3=Orifice/Grate** (Orifice Controls 1.38 cfs @ 2.84 fps)
└**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond P1: UST1


Hydrograph
Inflow
Primary
9.26 cfs
1.74 cfs
Inflow Area=3.050 ac
Peak Elev=2,053.22'
Storage=0.247 af
Flow (cfs)
Time (hours)
0 1 2 3 4 5 6 7 8 9 10
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48

Summary for Pond P2: UST2

Inflow Area = 11.650 ac, 51.33% Impervious, Inflow Depth = 1.46" for 2-yr event
Inflow = 16.00 cfs @ 12.19 hrs, Volume= 1.416 af
Outflow = 4.32 cfs @ 12.75 hrs, Volume= 1.416 af, Atten= 73%, Lag= 33.4 min
Primary = 4.32 cfs @ 12.75 hrs, Volume= 1.416 af
Routed to Reach PF : OutFall to Prices Fork

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 2,046.87' @ 12.75 hrs Surf.Area= 0.204 ac Storage= 0.534 af

Plug-Flow detention time= 80.2 min calculated for 1.415 af (100% of inflow)
Center-of-Mass det. time= 80.1 min (922.0 - 841.8)

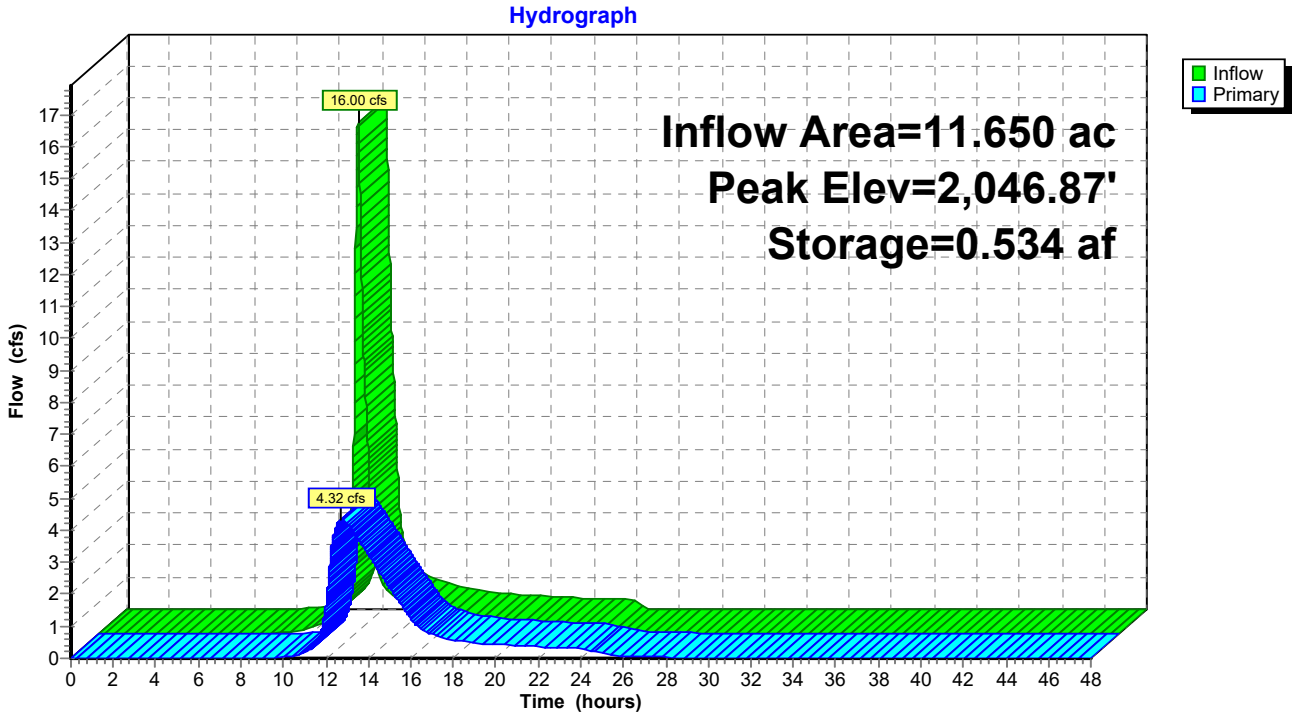
Volume	Invert	Avail.Storage	Storage Description
#1	2,044.25'	1.020 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
2,044.25	0.204	0.000	0.000
2,045.25	0.204	0.204	0.204
2,046.25	0.204	0.204	0.408
2,047.25	0.204	0.204	0.612
2,048.25	0.204	0.204	0.816
2,049.25	0.204	0.204	1.020

Device	Routing	Invert	Outlet Devices
#1	Primary	2,044.25'	**30.0" Round Culvert** L= 35.1' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,044.25' / 2,043.83' S= 0.0120 '/' Cc= 0.900 n= 0.011, Flow Area= 4.91 sf
#2	Device 1	2,044.25'	**14.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	2,047.00'	**16.0" W x 8.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	2,048.80'	**6.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=4.32 cfs @ 12.75 hrs HW=2,046.87' (Free Discharge)
└**1=Culvert** (Passes 4.32 cfs of 26.54 cfs potential flow)
  ├**2=Orifice/Grate** (Orifice Controls 4.32 cfs @ 7.40 fps)
  ├**3=Orifice/Grate** (Controls 0.00 cfs)
  └**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond P2: UST2


Hydrograph
Inflow
Primary
16.00 cfs
4.32 cfs
Inflow Area=11.650 ac
Peak Elev=2,046.87'
Storage=0.534 af
Flow (cfs)
Time (hours)
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48

Summary for Pond RP: Rutherford Pond

Inflow Area = 52.168 ac, 46.37% Impervious, Inflow Depth = 1.35" for 2-yr event
Inflow = 55.04 cfs @ 12.25 hrs, Volume= 5.879 af
Outflow = 48.95 cfs @ 12.41 hrs, Volume= 5.879 af, Atten= 11%, Lag= 9.8 min
Primary = 48.95 cfs @ 12.41 hrs, Volume= 5.879 af
Routed to Reach USR : Upper Stream Reach

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 2,141.09' @ 12.41 hrs Storage= 41,263 cf

Plug-Flow detention time= 14.7 min calculated for 5.878 af (100% of inflow)
Center-of-Mass det. time= 14.7 min (863.2 - 848.5)

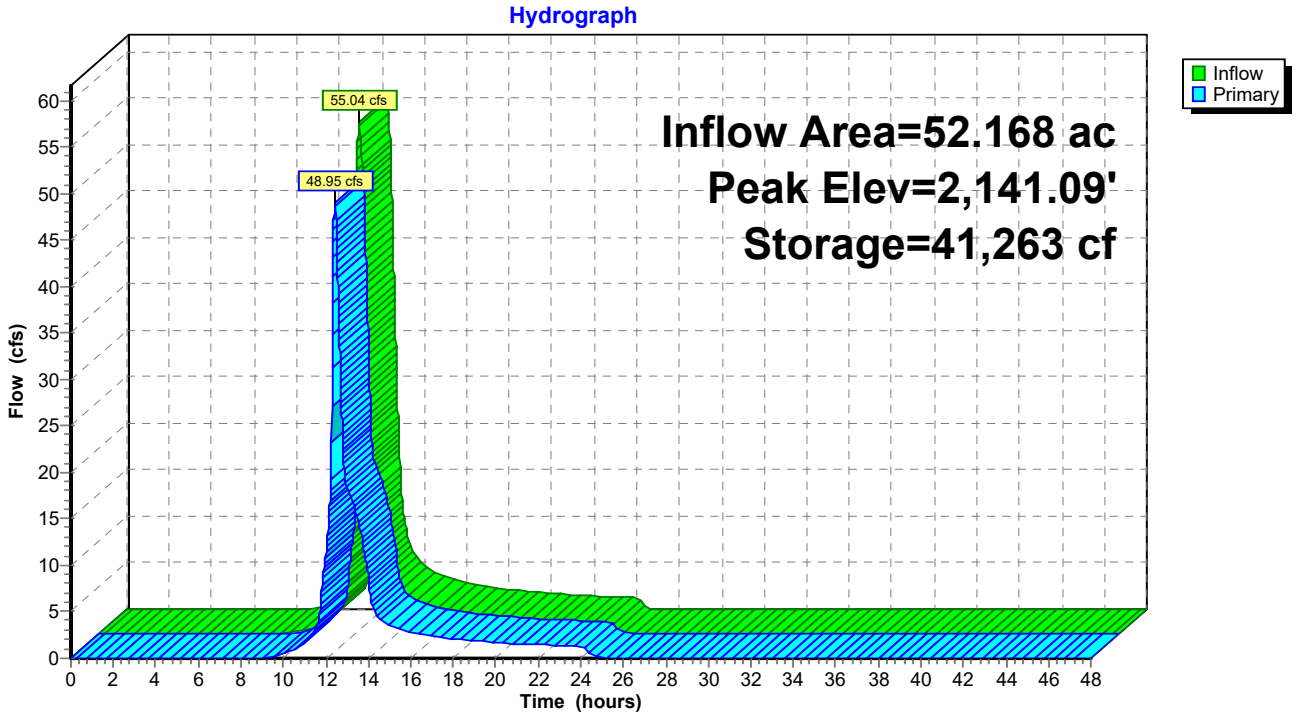
Volume	Invert	Avail.Storage	Storage Description
#1	2,135.00'	74,503 cf	**Custom Stage Data** Listed below

Elevation (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,135.00	0	0
2,136.00	1,366	1,366
2,137.00	3,129	4,495
2,138.00	5,175	9,670
2,139.00	7,760	17,430
2,140.00	10,340	27,770
2,141.00	12,305	40,075
2,142.00	13,925	54,000
2,143.00	20,503	74,503

Device	Routing	Invert	Outlet Devices
#1	Primary	2,134.82'	**54.0" Round Culvert** L= 82.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,134.82' / 2,134.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 15.90 sf
#2	Device 1	2,135.00'	**18.0" Round Culvert** L= 3.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,135.00' / 2,134.82' S= 0.0600 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#3	Device 1	2,140.50'	**72.0" x 48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Primary	2,142.50'	**60.0' long x 30.0' 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) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=48.92 cfs @ 12.41 hrs HW=2,141.09' (Free Discharge)
- **1=Culvert** (Passes 48.92 cfs of 151.01 cfs potential flow)
  - **2=Culvert** (Inlet Controls 19.65 cfs @ 11.12 fps)
  - **3=Orifice/Grate** (Weir Controls 29.27 cfs @ 2.50 fps)
- **4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond RP: Rutherford Pond



Summary for Pond SP: Shenandoah Pond

Inflow Area = 69.353 ac, 59.71% Impervious, Inflow Depth = 1.46" for 2-yr event
Inflow = 82.30 cfs @ 12.29 hrs, Volume= 8.431 af
Outflow = 54.29 cfs @ 12.54 hrs, Volume= 8.431 af, Atten= 34%, Lag= 15.2 min
Primary = 54.29 cfs @ 12.54 hrs, Volume= 8.431 af
Routed to Reach MOR : MOOG Reach Section

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 2,122.58' @ 12.54 hrs Surf.Area= 24,828 sf Storage= 41,632 cf

Plug-Flow detention time= 5.6 min calculated for 8.430 af (100% of inflow)
Center-of-Mass det. time= 5.6 min (853.3 - 847.7)

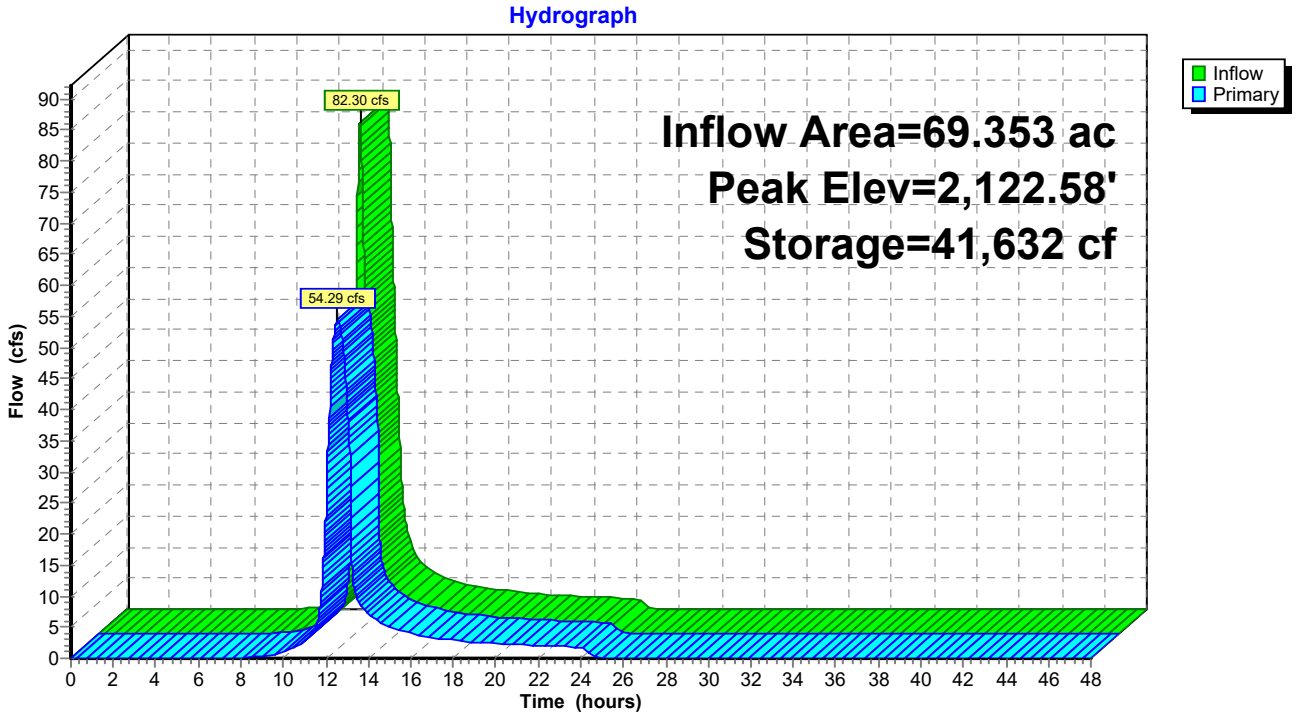
Volume	Invert	Avail.Storage	Storage Description
#1	2,117.00'	117,739 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,117.00	0	0	0
2,118.00	955	478	478
2,120.00	2,580	3,535	4,013
2,122.00	21,522	24,102	28,115
2,124.00	32,858	54,380	82,495
2,125.00	37,630	35,244	117,739

Device	Routing	Invert	Outlet Devices
#1	Primary	2,117.00'	**36.0" Round Culvert** L= 75.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,117.00' / 2,116.51' S= 0.0065 '/' Cc= 0.900 n= 0.024, Flow Area= 7.07 sf
#2	Primary	2,123.00'	**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=54.28 cfs @ 12.54 hrs HW=2,122.58' (Free Discharge)
1=Culvert (Barrel Controls 54.28 cfs @ 7.68 fps)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond SP: Shenandoah Pond



Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentA: Drainage Area Webb Runoff Area=6.360 ac 61.95% Impervious Runoff Depth=3.01"
Flow Length=1,277' Tc=18.5 min CN=90 Runoff=16.37 cfs 1.597 af

SubcatchmentB: Drainage Area to Prices Runoff Area=10.800 ac 66.20% Impervious Runoff Depth=3.21"
Flow Length=630' Tc=12.5 min CN=92 Runoff=34.59 cfs 2.893 af

SubcatchmentCO: Clover Valley Pond DA Runoff Area=44.421 ac 44.76% Impervious Runoff Depth=2.46"
Flow Length=2,092' Tc=17.5 min CN=84 Runoff=97.22 cfs 9.104 af

SubcatchmentK: Drainage Area Kabrich Runoff Area=93.790 ac 47.77% Impervious Runoff Depth=2.55"
Flow Length=3,788' Tc=18.2 min CN=85 Runoff=208.51 cfs 19.910 af

SubcatchmentRU: Rutherford Pond DA Runoff Area=7.747 ac 55.63% Impervious Runoff Depth=2.73"
Flow Length=741' Tc=12.4 min CN=87 Runoff=21.56 cfs 1.762 af

SubcatchmentSH: Shenandoah Pond DA Runoff Area=69.353 ac 59.71% Impervious Runoff Depth=2.64"
Flow Length=2,630' Tc=23.5 min CN=86 Runoff=142.29 cfs 15.241 af

SubcatchmentUG1: UST 1 DA Runoff Area=3.050 ac 0.00% Impervious Runoff Depth=3.32"
Tc=5.0 min CN=93 Runoff=13.56 cfs 0.843 af

SubcatchmentUG2: UST 2 DA Runoff Area=11.650 ac 51.33% Impervious Runoff Depth=2.64"
Flow Length=480' Tc=17.2 min CN=86 Runoff=27.41 cfs 2.560 af

SubcatchmentUS1: Upstream of Site Runoff Area=244.780 ac 40.87% Impervious Runoff Depth=2.29"
Flow Length=5,941' Tc=28.6 min CN=82 Runoff=398.43 cfs 46.685 af

SubcatchmentUS2: Upstream of Site Runoff Area=244.780 ac 41.04% Impervious Runoff Depth=2.29"
Flow Length=5,941' Tc=28.6 min CN=82 Runoff=398.43 cfs 46.685 af

Reach ED: Reach Along Edge Site Inflow=656.70 cfs 95.139 af
Outflow=656.70 cfs 95.139 af

Reach KB: Outfall Below Kabrich Inflow=641.05 cfs 92.701 af
Outflow=641.05 cfs 92.701 af

Reach MOR: MOOG Reach Section Avg. Flow Depth=1.97' Max Vel=9.81 fps Inflow=115.65 cfs 15.241 af
n=0.024 L=1,020.0' S=0.0225 '/' Capacity=3,267.06 cfs Outflow=115.07 cfs 15.241 af

Reach PF: OutFall to Prices Fork Inflow=682.89 cfs 100.591 af
Outflow=682.89 cfs 100.591 af

Reach SITE: Site Area Inflow=514.56 cfs 72.792 af
Outflow=514.56 cfs 72.792 af

Reach STK: Stream to Kabrich Street Avg. Flow Depth=2.70' Max Vel=8.57 fps Inflow=202.54 cfs 26.106 af
n=0.024 L=2,424.0' S=0.0111 '/' Capacity=795.50 cfs Outflow=193.82 cfs 26.106 af

Reach USR: Upper Stream Reach Avg. Flow Depth=1.32' Max Vel=8.79 fps Inflow=92.60 cfs 10.866 af
n=0.024 L=1,864.0' S=0.0223 '/' Capacity=3,988.84 cfs Outflow=89.08 cfs 10.866 af

Pond CVP: Clover Valley Pond Peak Elev=2,161.88' Storage=0.801 af Inflow=97.22 cfs 9.104 af
Outflow=83.48 cfs 9.104 af

Pond P1: UST1 Peak Elev=2,054.37' Storage=0.362 af Inflow=13.56 cfs 0.843 af
Outflow=3.32 cfs 0.840 af

Pond P2: UST2 Peak Elev=2,048.61' Storage=0.888 af Inflow=27.41 cfs 2.560 af
Outflow=10.50 cfs 2.559 af

Pond RP: Rutherford Pond Peak Elev=2,141.57' Storage=47,969 cf Inflow=96.86 cfs 10.866 af
Outflow=92.60 cfs 10.866 af

Pond SP: Shenandoah Pond Peak Elev=2,123.96' Storage=81,134 cf Inflow=142.29 cfs 15.241 af
Outflow=115.65 cfs 15.241 af

Total Runoff Area = 736.731 ac Runoff Volume = 147.280 af Average Runoff Depth = 2.40"
55.48% Pervious = 408.755 ac 44.52% Impervious = 327.976 ac

Summary for Subcatchment A: Drainage Area Webb Street

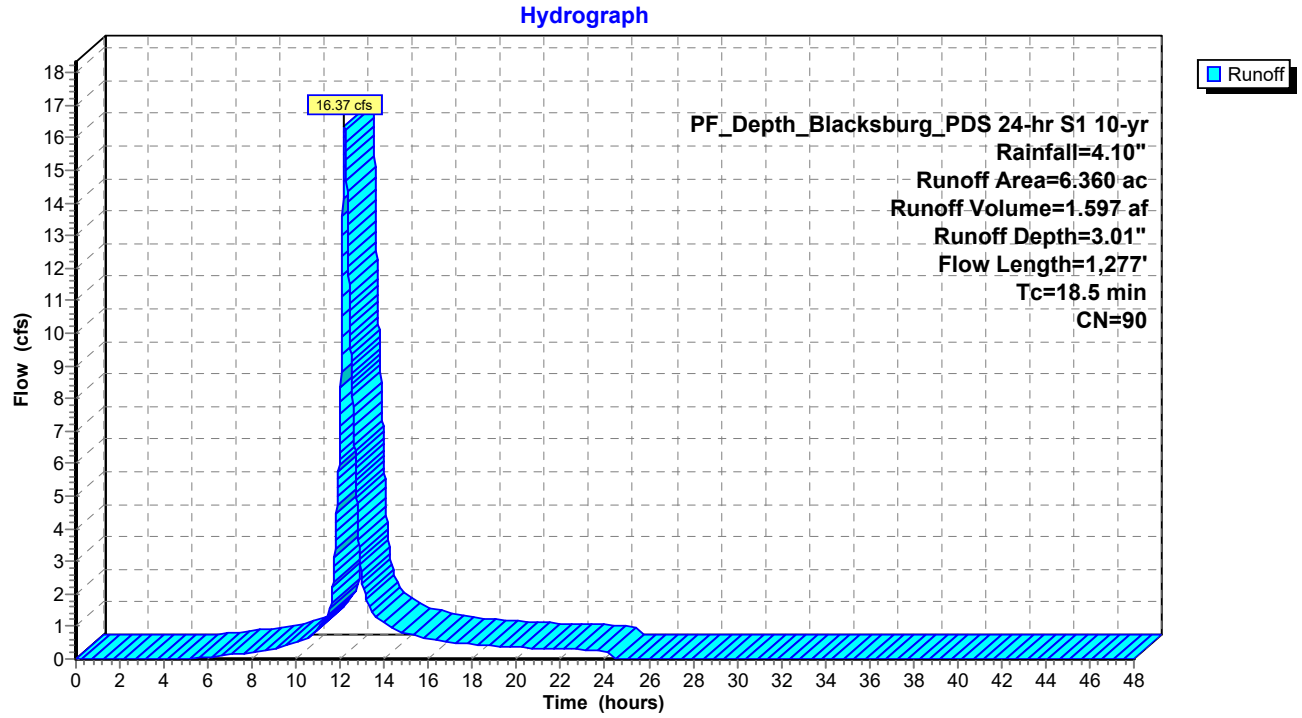
Runoff = 16.37 cfs @ 12.20 hrs, Volume= 1.597 af, Depth= 3.01"
Routed to Reach ED : Reach Along Edge Site

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
PF_Depth_Blacksburg_PDS 24-hr S1 10-yr Rainfall=4.10"

Area (ac)	CN	Description
1.390	74	>75% Grass cover, Good, HSG C
1.030	80	>75% Grass cover, Good, HSG D
3.940	98	Unconnected pavement, HSG C
6.360	90	Weighted Average
2.420		38.05% Pervious Area
3.940		61.95% Impervious Area
3.940		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.4	100	0.0200	0.11		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.76"
2.2	424	0.0400	3.22		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.9	753	0.0200	13.90	166.80	**Channel Flow,** Area= 12.0 sf Perim= 6.0' r= 2.00' n= 0.024
18.5	1,277	Total			

Subcatchment A: Drainage Area Webb Street



Summary for Subcatchment B: Drainage Area to Prices Fork

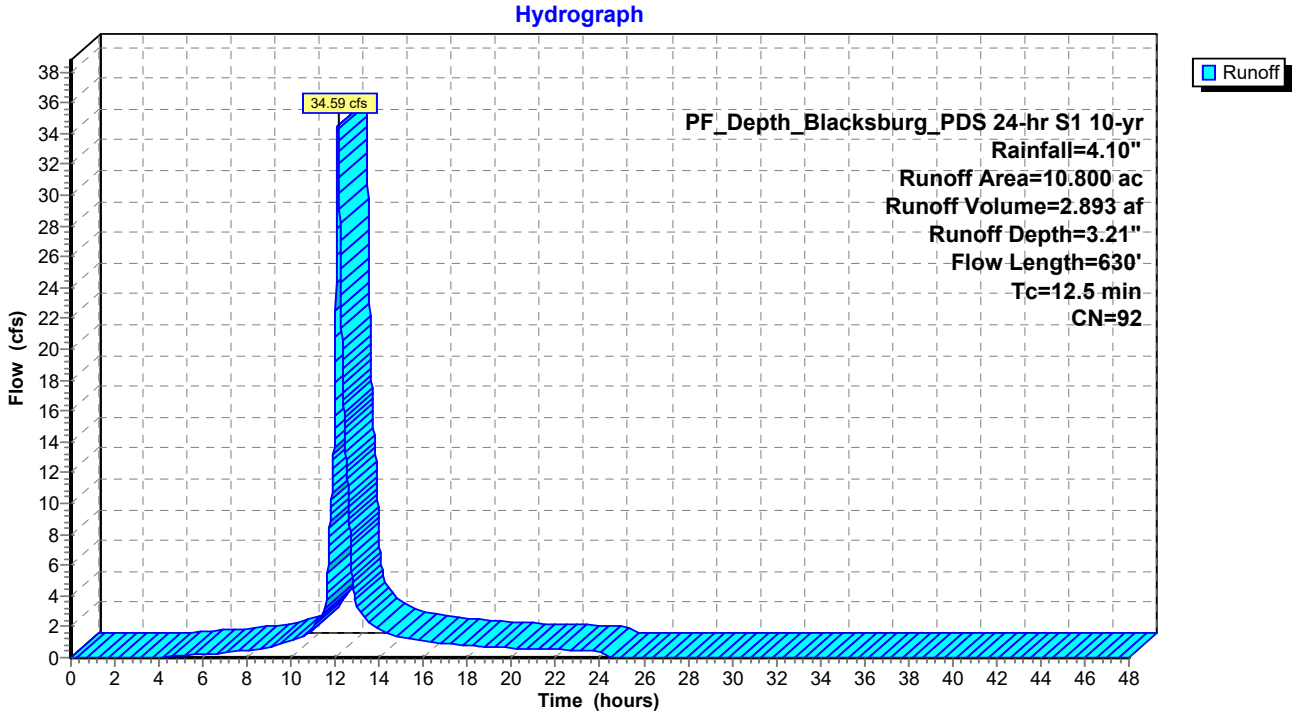
Runoff = 34.59 cfs @ 12.12 hrs, Volume= 2.893 af, Depth= 3.21"
Routed to Reach PF : OutFall to Prices Fork

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
PF_Depth_Blacksburg_PDS 24-hr S1 10-yr Rainfall=4.10"

Area (ac)	CN	Description
3.650	80	>75% Grass cover, Good, HSG D
7.150	98	Unconnected pavement, HSG C
10.800	92	Weighted Average
3.650		33.80% Pervious Area
7.150		66.20% Impervious Area
7.150		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.7	100	0.0500	0.16		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.76"
0.4	80	0.0500	3.60		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
1.4	450	0.0200	5.52	33.10	**Channel Flow,** Area= 6.0 sf Perim= 12.0' r= 0.50' n= 0.024
12.5	630	Total			

Subcatchment B: Drainage Area to Prices Fork



Summary for Subcatchment CO: Clover Valley Pond DA

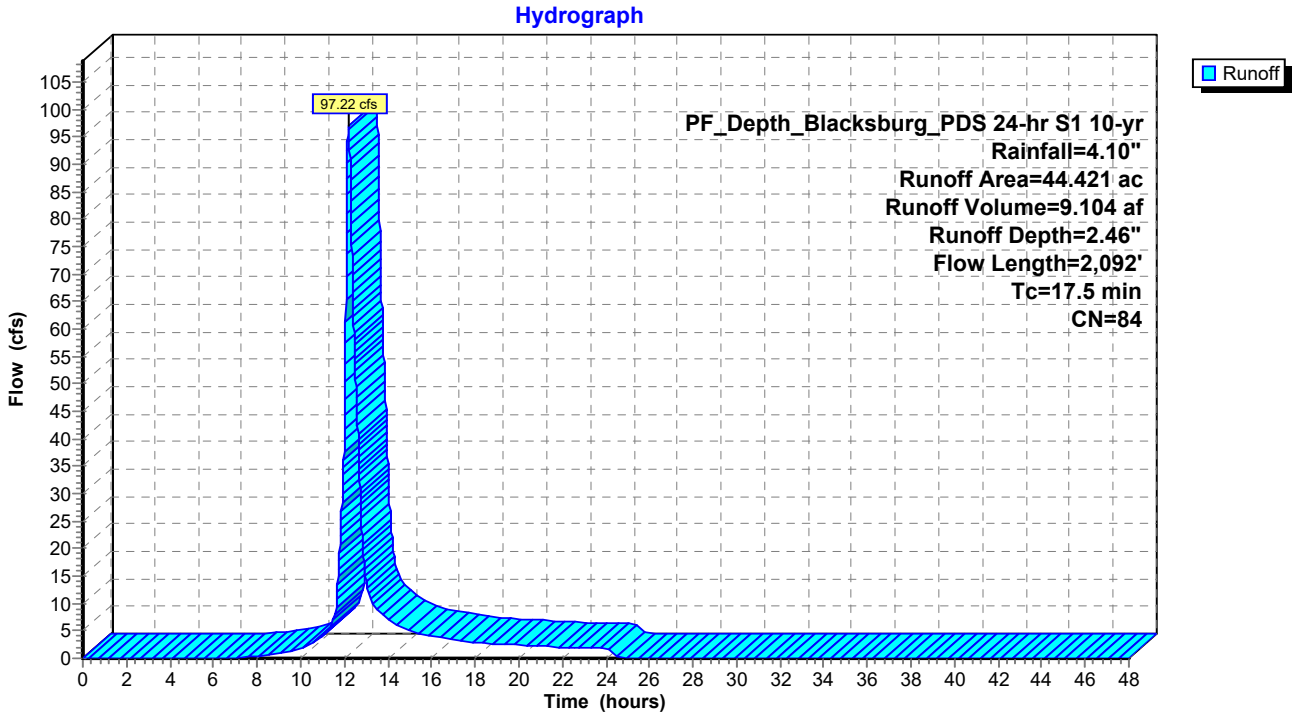
Runoff = 97.22 cfs @ 12.20 hrs, Volume= 9.104 af, Depth= 2.46"
Routed to Pond CVP : Clover Valley Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
PF_Depth_Blacksburg_PDS 24-hr S1 10-yr Rainfall=4.10"

Area (ac)	CN	Description
1.300	70	Woods, Good, HSG C
2.576	74	>75% Grass cover, Good, HSG C
0.198	68	1 acre lots, 20% imp, HSG B
0.507	79	1 acre lots, 20% imp, HSG C
4.150	70	1/2 acre lots, 25% imp, HSG B
10.489	80	1/2 acre lots, 25% imp, HSG C
1.456	72	1/3 acre lots, 30% imp, HSG B
2.101	81	1/3 acre lots, 30% imp, HSG C
1.438	85	1/8 acre lots, 65% imp, HSG B
8.011	90	1/8 acre lots, 65% imp, HSG C
1.487	92	Urban commercial, 85% imp, HSG B
6.136	94	Urban commercial, 85% imp, HSG C
0.610	89	Paved roads w/open ditches, 50% imp, HSG B
0.212	98	Paved parking, HSG C
3.750	92	Paved roads w/open ditches, 50% imp, HSG C
44.421	84	Weighted Average
24.540		55.24% Pervious Area
19.881		44.76% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	150	0.1400	0.26		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.76"
7.7	1,942	0.0690	4.23		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
17.5	2,092	Total			

Subcatchment CO: Clover Valley Pond DA



Summary for Subcatchment K: Drainage Area Kabrich

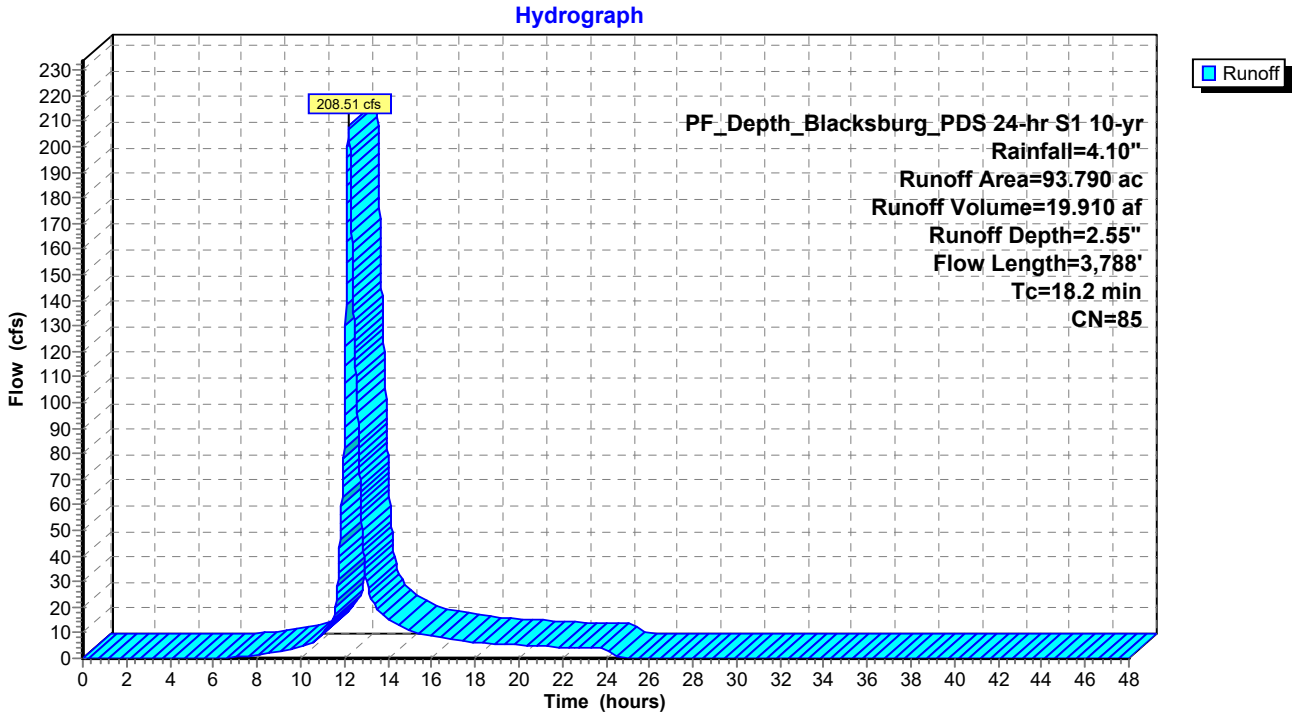
Runoff = 208.51 cfs @ 12.20 hrs, Volume= 19.910 af, Depth= 2.55"
Routed to Reach KB : Outfall Below Kabrich

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
PF_Depth_Blacksburg_PDS 24-hr S1 10-yr Rainfall=4.10"

Area (ac)	CN	Description
3.400	61	>75% Grass cover, Good, HSG B
45.590	74	>75% Grass cover, Good, HSG C
44.800	98	Paved parking, HSG B
93.790	85	Weighted Average
48.990		52.23% Pervious Area
44.800		47.77% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.7	100	0.0500	0.16		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.76"
2.6	322	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.5	1,152	0.0300	12.47	39.18	**Pipe Channel,** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.013
1.5	1,371	0.0240	15.23	182.72	**Channel Flow,** Area= 12.0 sf Perim= 6.0' r= 2.00' n= 0.024
1.9	843	0.0200	7.23	51.09	**Pipe Channel,** 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.024
18.2	3,788	Total			

Subcatchment K: Drainage Area Kabrich



Summary for Subcatchment RU: Rutherford Pond DA

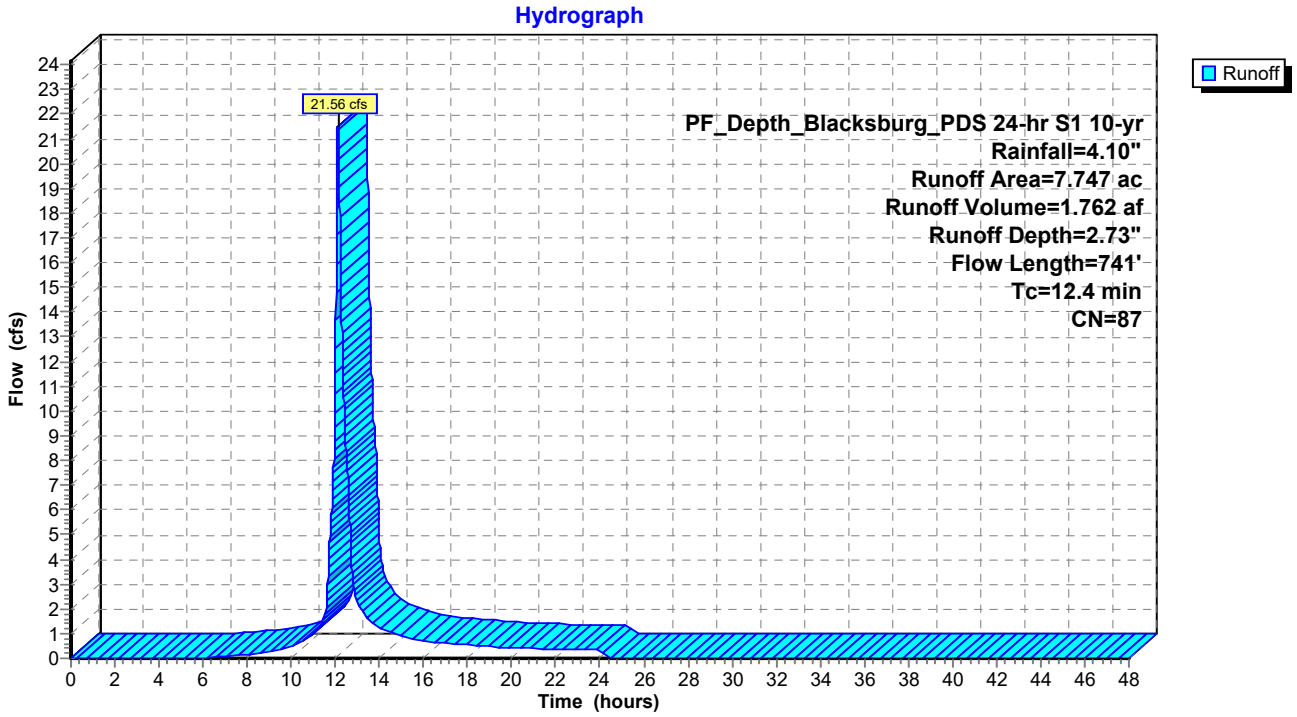
Runoff = 21.56 cfs @ 12.12 hrs, Volume= 1.762 af, Depth= 2.73"
Routed to Pond RP : Rutherford Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
PF_Depth_Blacksburg_PDS 24-hr S1 10-yr Rainfall=4.10"

Area (ac)	CN	Description
0.105	61	>75% Grass cover, Good, HSG B
0.939	74	>75% Grass cover, Good, HSG C
0.132	70	1/2 acre lots, 25% imp, HSG B
0.278	80	1/2 acre lots, 25% imp, HSG C
0.393	85	1/8 acre lots, 65% imp, HSG B
5.318	90	1/8 acre lots, 65% imp, HSG C
0.195	92	Urban commercial, 85% imp, HSG B
0.387	94	Urban commercial, 85% imp, HSG C
7.747	87	Weighted Average
3.438		44.37% Pervious Area
4.309		55.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.6	150	0.1130	0.24		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.76"
1.8	591	0.0745	5.54		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
12.4	741	Total			

Subcatchment RU: Rutherford Pond DA



Summary for Subcatchment SH: Shenandoah Pond DA

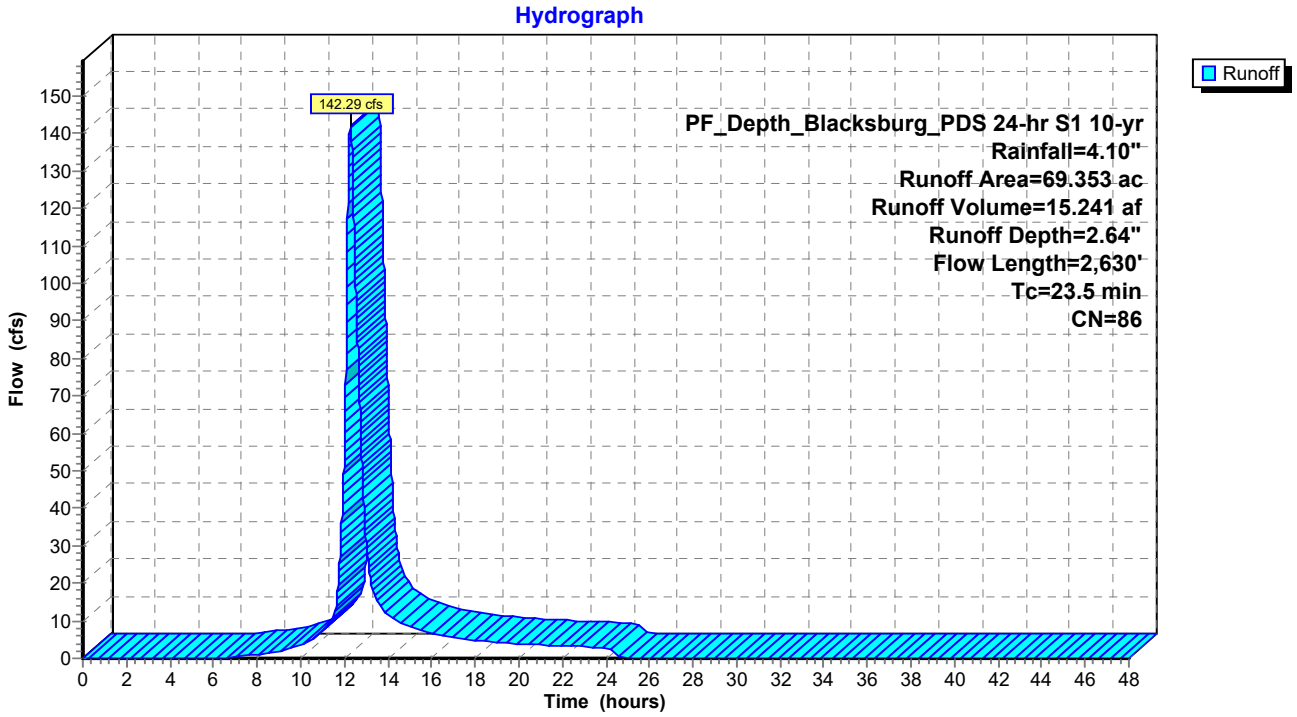
Runoff = 142.29 cfs @ 12.28 hrs, Volume= 15.241 af, Depth= 2.64"
Routed to Pond SP : Shenandoah Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
PF_Depth_Blacksburg_PDS 24-hr S1 10-yr Rainfall=4.10"

Area (ac)	CN	Description
7.130	61	>75% Grass cover, Good, HSG B
0.534	74	>75% Grass cover, Good, HSG C
0.108	68	1 acre lots, 20% imp, HSG B
0.773	70	1/2 acre lots, 25% imp, HSG B
0.054	80	1/2 acre lots, 25% imp, HSG C
14.304	85	1/8 acre lots, 65% imp, HSG B
20.223	90	1/8 acre lots, 65% imp, HSG C
8.803	88	Urban industrial, 72% imp, HSG B
9.941	92	Urban commercial, 85% imp, HSG B
0.610	94	Urban commercial, 85% imp, HSG C
4.119	89	Paved roads w/open ditches, 50% imp, HSG B
2.754	92	Paved roads w/open ditches, 50% imp, HSG C
69.353	86	Weighted Average
27.939		40.29% Pervious Area
41.414		59.71% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.8	150	0.0867	0.21		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.76"
2.4	647	0.0773	4.48		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
9.3	1,833	0.0262	3.29		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
23.5	2,630	Total			

Subcatchment SH: Shenandoah Pond DA



Summary for Subcatchment UG1: UST 1 DA

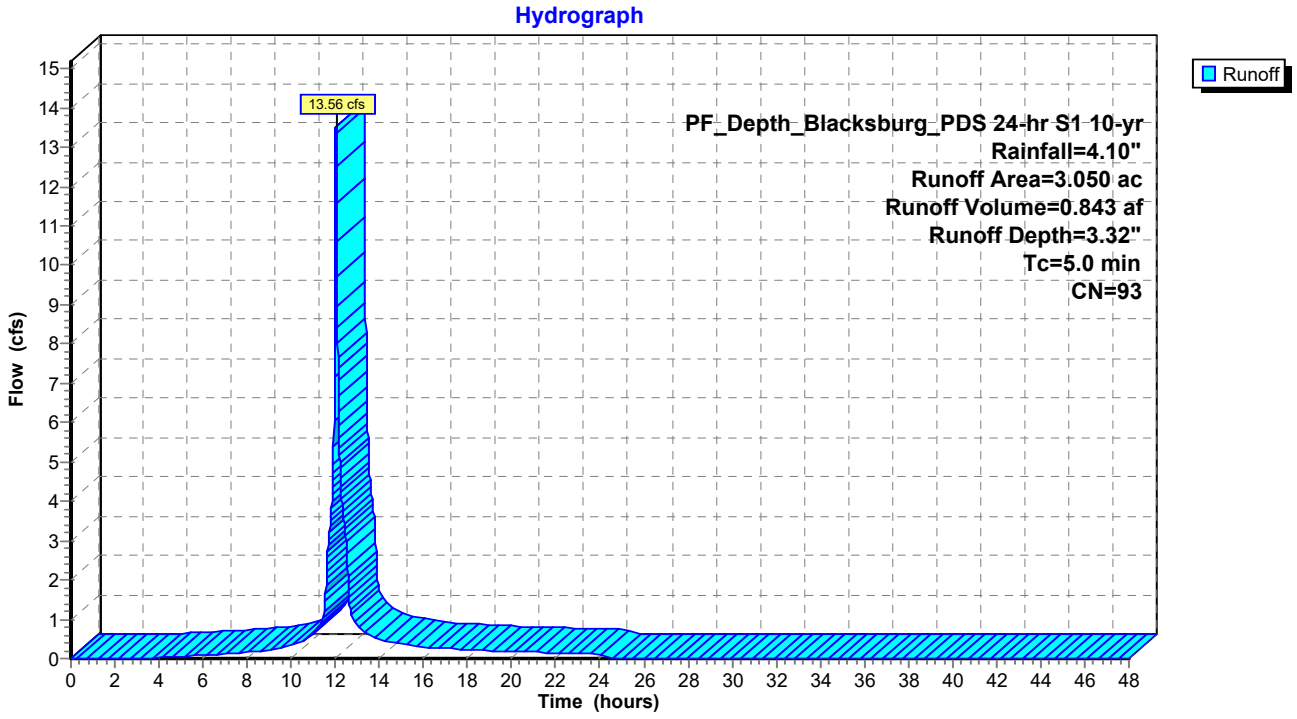
Runoff = 13.56 cfs @ 12.03 hrs, Volume= 0.843 af, Depth= 3.32"
Routed to Pond P1 : UST1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
PF_Depth_Blacksburg_PDS 24-hr S1 10-yr Rainfall=4.10"

Area (ac)	CN	Description
0.590	74	>75% Grass cover, Good, HSG C
2.460	98	Water Surface, 0% imp, HSG C
3.050	93	Weighted Average
3.050		100.00% Pervious Area

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

Subcatchment UG1: UST 1 DA



Summary for Subcatchment UG2: UST 2 DA

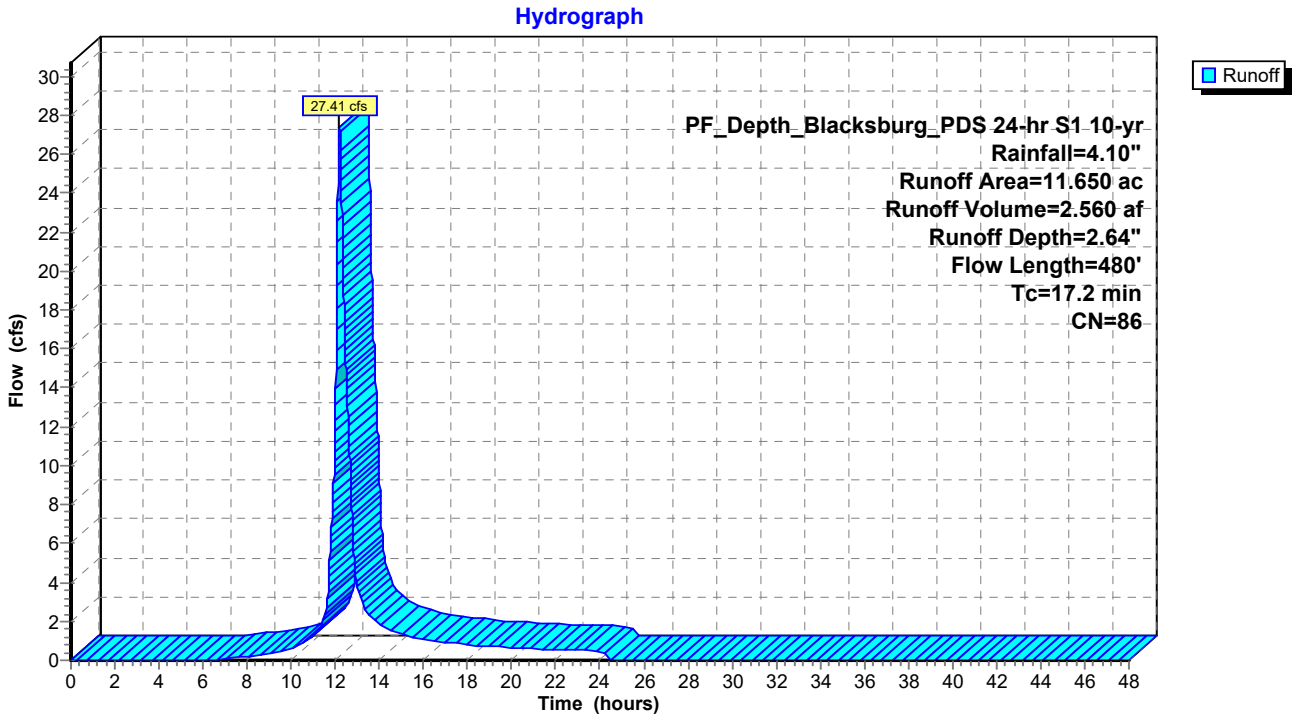
Runoff = 27.41 cfs @ 12.19 hrs, Volume= 2.560 af, Depth= 2.64"
Routed to Pond P2 : UST2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
PF_Depth_Blacksburg_PDS 24-hr S1 10-yr Rainfall=4.10"

Area (ac)	CN	Description
5.670	74	>75% Grass cover, Good, HSG C
5.980	98	Paved parking, HSG C
11.650	86	Weighted Average
5.670		48.67% Pervious Area
5.980		51.33% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.1	150	0.0400	0.16		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.76"
1.1	330	0.0910	4.86		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
17.2	480	Total			

Subcatchment UG2: UST 2 DA



Summary for Subcatchment US1: Upstream of Site PRE CONDITION

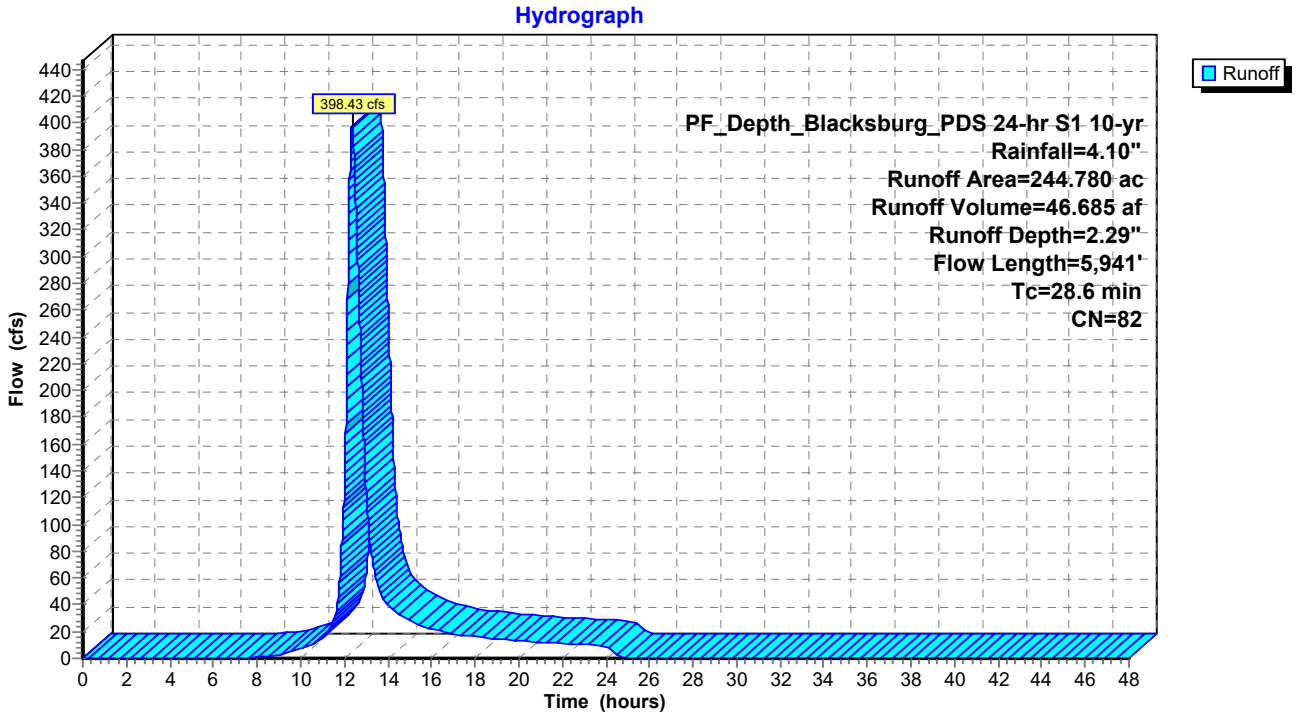
Runoff = 398.43 cfs @ 12.36 hrs, Volume= 46.685 af, Depth= 2.29"
Routed to Reach SITE : Site Area

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
PF_Depth_Blacksburg_PDS 24-hr S1 10-yr Rainfall=4.10"

	Area (ac)	CN	Description
	6.240	55	Woods, Good, HSG B
	2.100	70	Woods, Good, HSG C
	15.820	61	>75% Grass cover, Good, HSG B
	39.640	74	>75% Grass cover, Good, HSG C
	26.040	94	Urban commercial, 85% imp, HSG C
	5.870	95	Urban commercial, 85% imp, HSG D
	3.840	88	Urban industrial, 72% imp, HSG B
	8.520	91	Urban industrial, 72% imp, HSG C
	1.400	89	Paved roads w/open ditches, 50% imp, HSG B
	15.560	92	Paved roads w/open ditches, 50% imp, HSG C
	1.250	85	1/8 acre lots, 65% imp, HSG B
	36.230	90	1/8 acre lots, 65% imp, HSG C
	12.500	72	1/3 acre lots, 30% imp, HSG B
	53.220	81	1/3 acre lots, 30% imp, HSG C
	6.400	86	1/3 acre lots, 30% imp, HSG D
	6.620	98	Paved parking, HSG C
*	2.930	98	SITE AREA IMPERVIOUS
*	0.600	80	SITE AREA GERASS
	244.780	82	Weighted Average
	144.729		59.13% Pervious Area
	100.051		40.87% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.8	100	0.0800	0.19		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.76"
7.7	1,832	0.0600	3.94		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
12.1	4,009	0.0200	5.52	33.10	**Channel Flow,** Area= 6.0 sf Perim= 12.0' r= 0.50' n= 0.024
28.6	5,941	Total			

Subcatchment US1: Upstream of Site PRE CONDITION



Summary for Subcatchment US2: Upstream of Site POST CONDITION

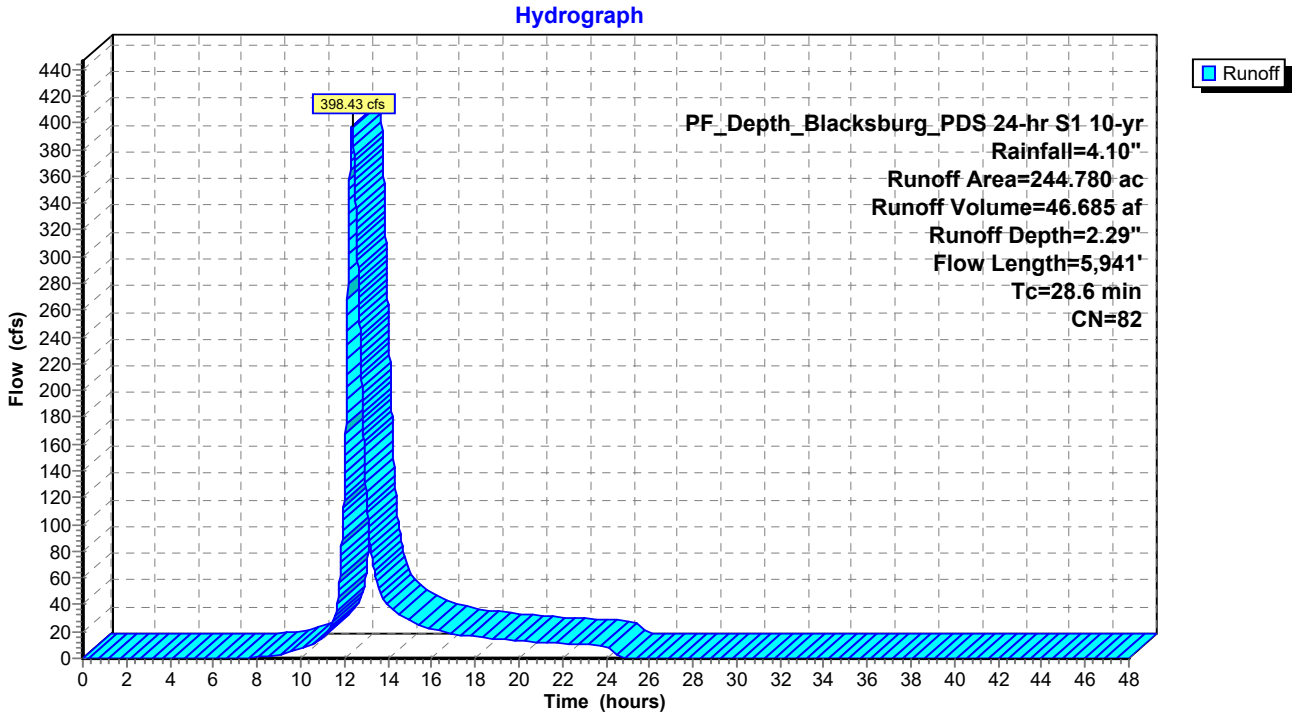
Runoff = 398.43 cfs @ 12.36 hrs, Volume= 46.685 af, Depth= 2.29"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
PF_Depth_Blacksburg_PDS 24-hr S1 10-yr Rainfall=4.10"

	Area (ac)	CN	Description
	6.240	55	Woods, Good, HSG B
	2.100	70	Woods, Good, HSG C
	15.820	61	>75% Grass cover, Good, HSG B
	39.640	74	>75% Grass cover, Good, HSG C
	26.040	94	Urban commercial, 85% imp, HSG C
	5.870	95	Urban commercial, 85% imp, HSG D
	3.840	88	Urban industrial, 72% imp, HSG B
	8.520	91	Urban industrial, 72% imp, HSG C
	1.400	89	Paved roads w/open ditches, 50% imp, HSG B
	15.560	92	Paved roads w/open ditches, 50% imp, HSG C
	1.250	85	1/8 acre lots, 65% imp, HSG B
	36.230	90	1/8 acre lots, 65% imp, HSG C
	12.500	72	1/3 acre lots, 30% imp, HSG B
	53.220	81	1/3 acre lots, 30% imp, HSG C
	6.400	86	1/3 acre lots, 30% imp, HSG D
	6.620	98	Paved parking, HSG C
*	3.330	98	SITE AREA IMPERVIOUS
*	0.200	80	SITE AREA GERASS
	244.780	82	Weighted Average
	144.329		58.96% Pervious Area
	100.451		41.04% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.8	100	0.0800	0.19		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.76"
7.7	1,832	0.0600	3.94		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
12.1	4,009	0.0200	5.52	33.10	**Channel Flow,** Area= 6.0 sf Perim= 12.0' r= 0.50' n= 0.024
28.6	5,941	Total			

Subcatchment US2: Upstream of Site POST CONDITION

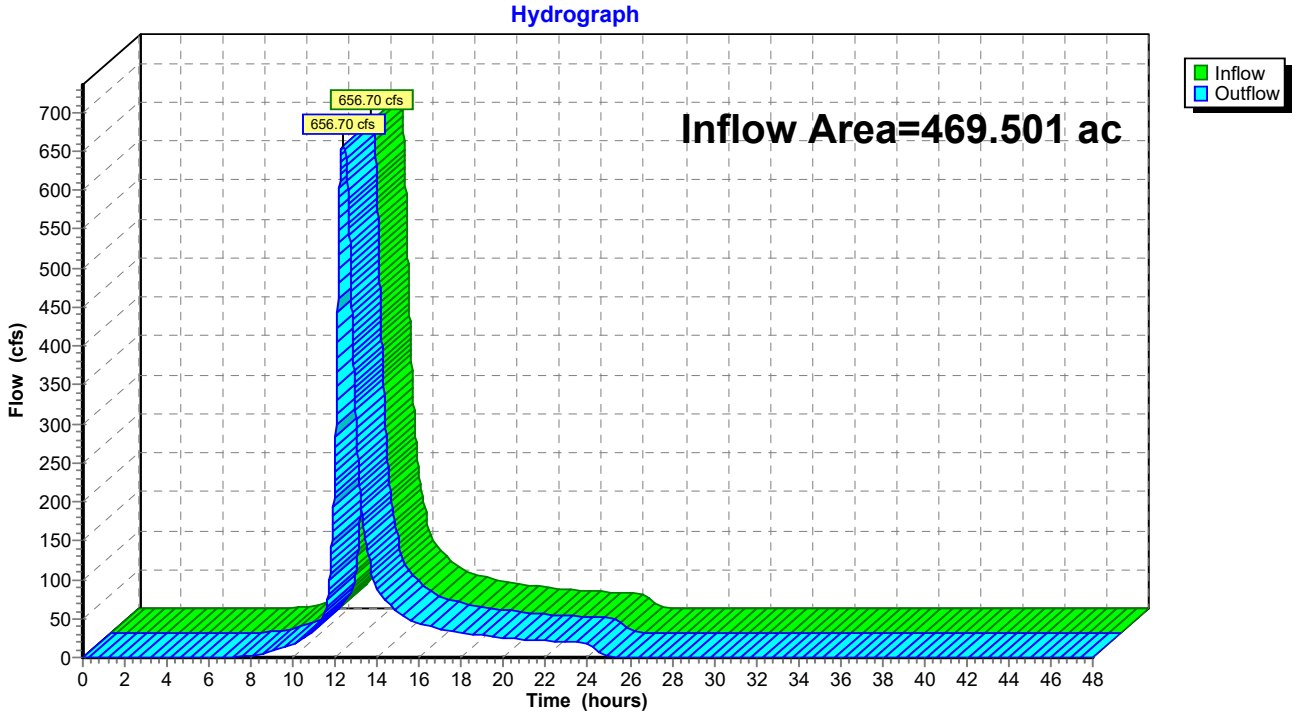


Summary for Reach ED: Reach Along Edge Site

Inflow Area = 469.501 ac, 45.66% Impervious, Inflow Depth = 2.43" for 10-yr event
Inflow = 656.70 cfs @ 12.36 hrs, Volume= 95.139 af
Outflow = 656.70 cfs @ 12.36 hrs, Volume= 95.139 af, Atten= 0%, Lag= 0.0 min
Routed to Reach PF : OutFall to Prices Fork

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Reach ED: Reach Along Edge Site

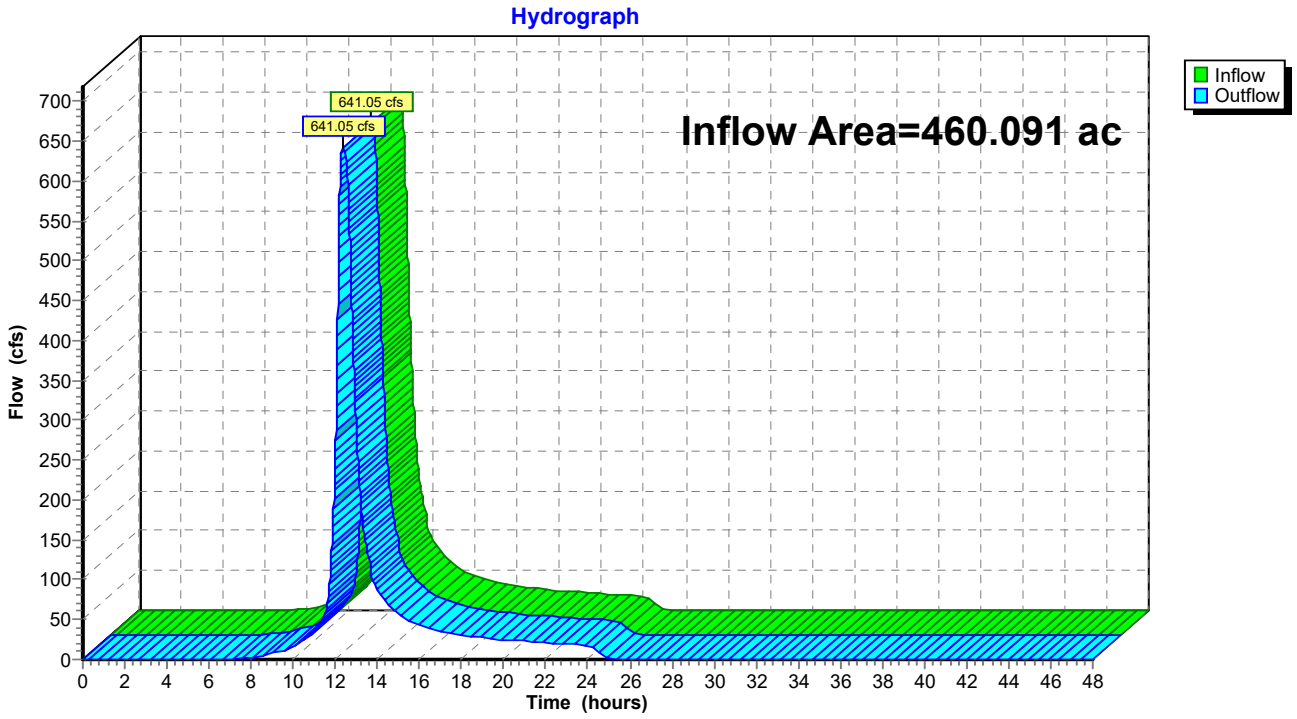


Summary for Reach KB: Outfall Below Kabrich

Inflow Area = 460.091 ac, 45.74% Impervious, Inflow Depth = 2.42" for 10-yr event
Inflow = 641.05 cfs @ 12.36 hrs, Volume= 92.701 af
Outflow = 641.05 cfs @ 12.36 hrs, Volume= 92.701 af, Atten= 0%, Lag= 0.0 min
Routed to Reach ED : Reach Along Edge Site

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Reach KB: Outfall Below Kabrich



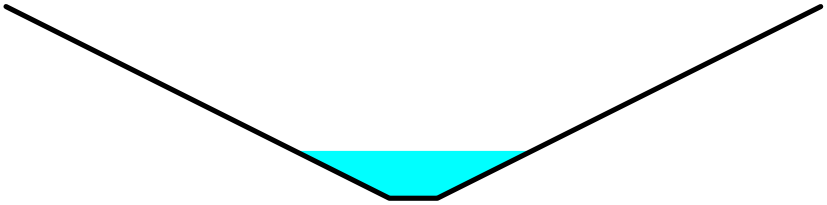
Summary for Reach MOR: MOOG Reach Section

Inflow Area = 69.353 ac, 59.71% Impervious, Inflow Depth = 2.64" for 10-yr event
Inflow = 115.65 cfs @ 12.44 hrs, Volume= 15.241 af
Outflow = 115.07 cfs @ 12.49 hrs, Volume= 15.241 af, Atten= 1%, Lag= 3.2 min
Routed to Reach STK : Stream to Kabrich Street

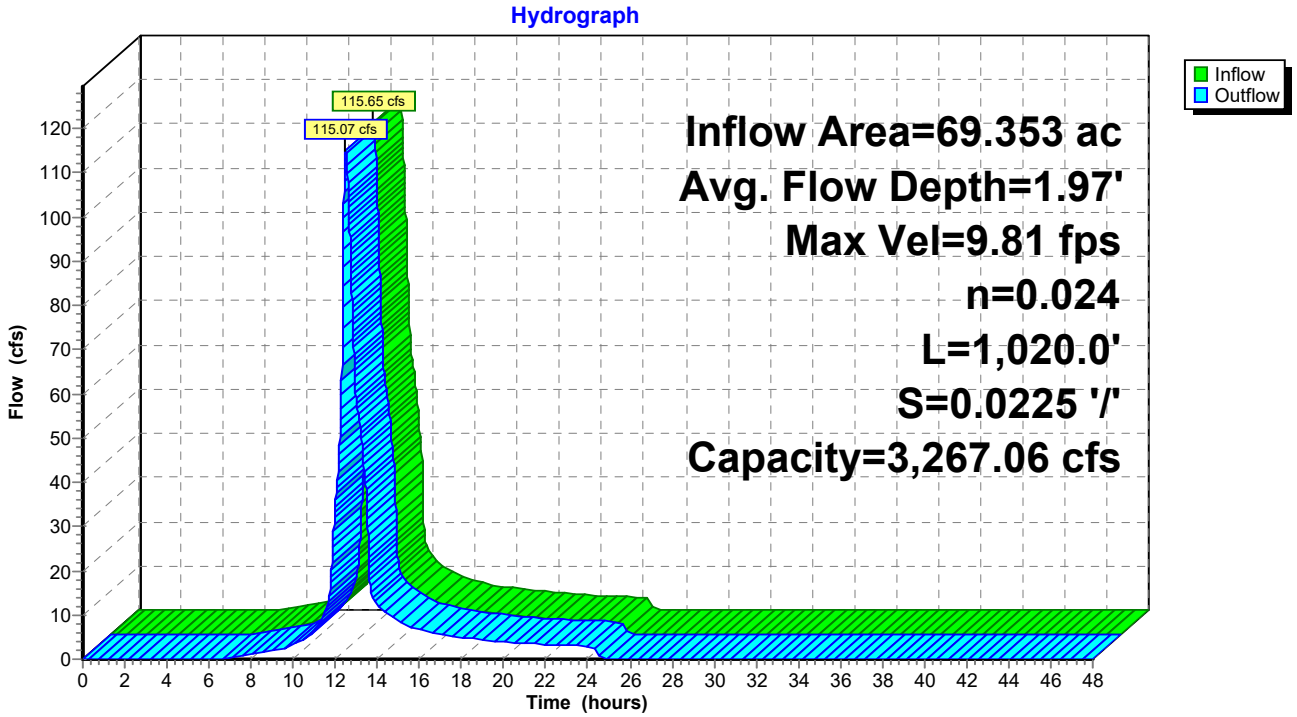
Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 9.81 fps, Min. Travel Time= 1.7 min
Avg. Velocity = 4.05 fps, Avg. Travel Time= 4.2 min

Peak Storage= 11,963 cf @ 12.46 hrs
Average Depth at Peak Storage= 1.97' , Surface Width= 9.89'
Bank-Full Depth= 8.00' Flow Area= 144.0 sf, Capacity= 3,267.06 cfs

2.00' x 8.00' deep channel, n= 0.024
Side Slope Z-value= 2.0 '/' Top Width= 34.00'
Length= 1,020.0' Slope= 0.0225 '/'
Inlet Invert= 2,115.00', Outlet Invert= 2,092.00'



Reach MOR: MOOG Reach Section

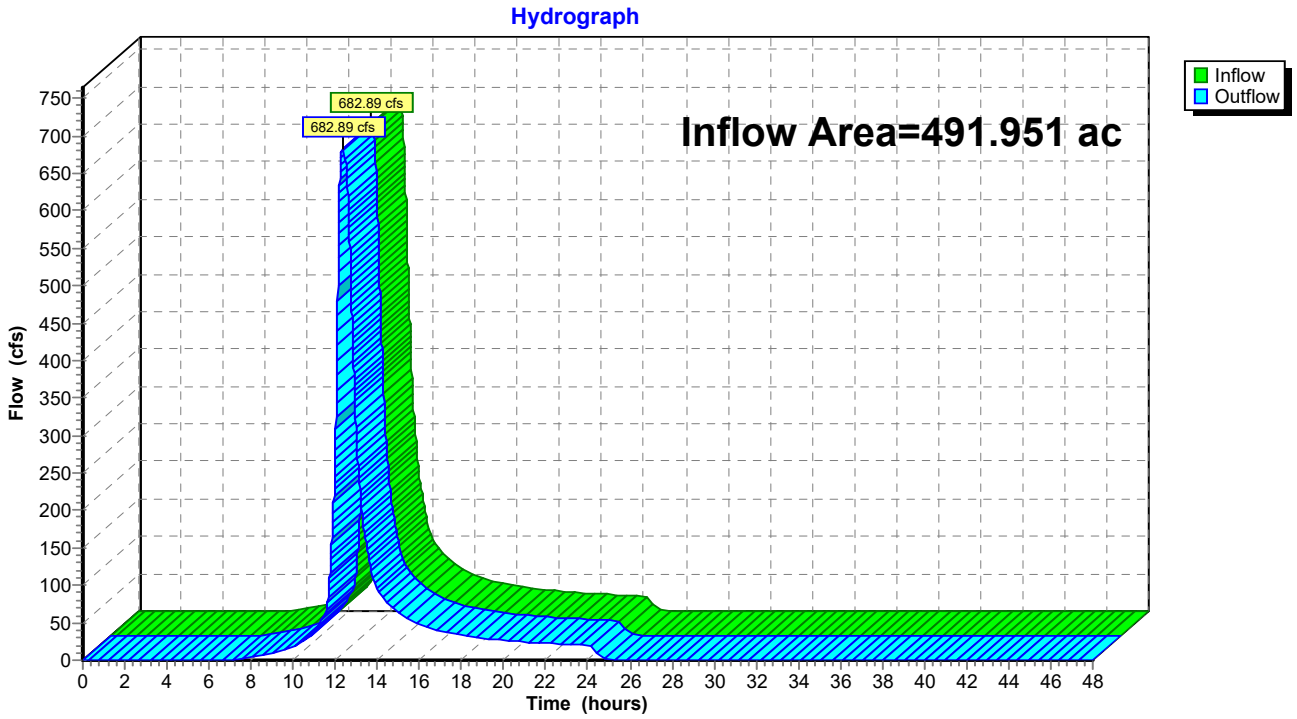


Summary for Reach PF: OutFall to Prices Fork

Inflow Area = 491.951 ac, 46.25% Impervious, Inflow Depth = 2.45" for 10-yr event
Inflow = 682.89 cfs @ 12.36 hrs, Volume= 100.591 af
Outflow = 682.89 cfs @ 12.36 hrs, Volume= 100.591 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Reach PF: OutFall to Prices Fork

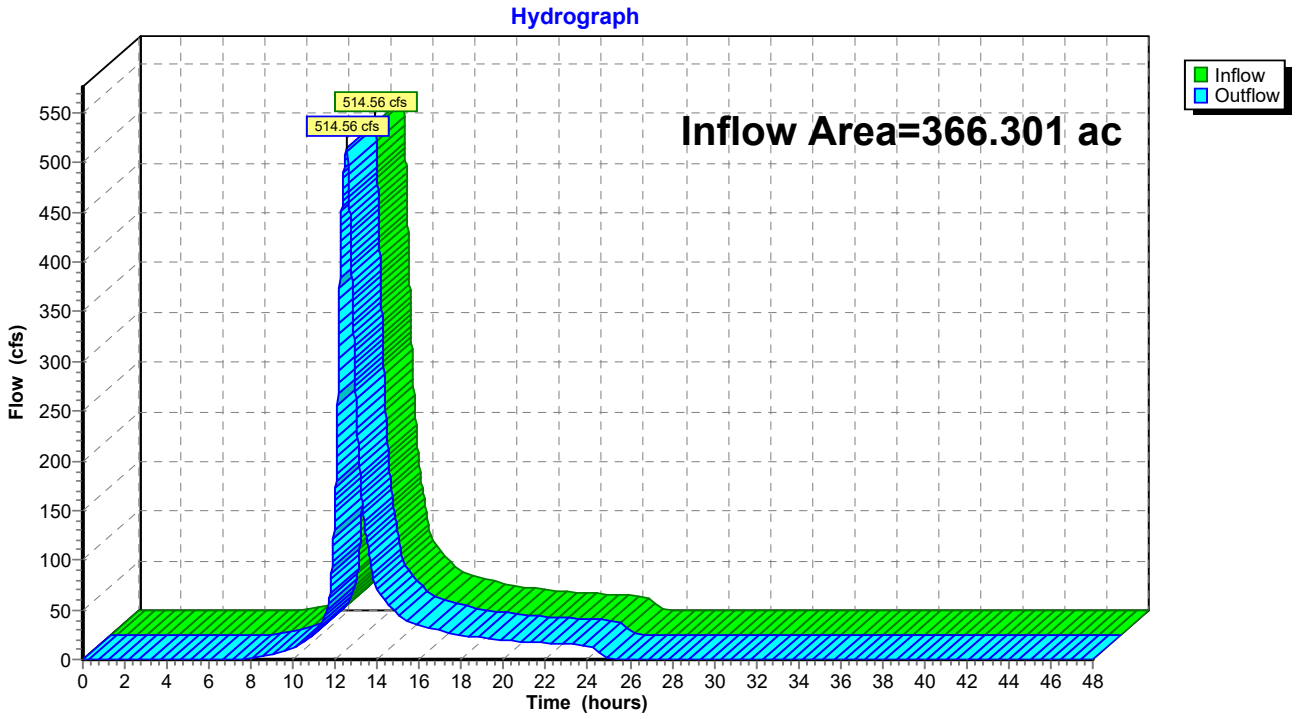


Summary for Reach SITE: Site Area

Inflow Area = 366.301 ac, 45.22% Impervious, Inflow Depth = 2.38" for 10-yr event
Inflow = 514.56 cfs @ 12.50 hrs, Volume= 72.792 af
Outflow = 514.56 cfs @ 12.50 hrs, Volume= 72.792 af, Atten= 0%, Lag= 0.0 min
Routed to Reach KB : Outfall Below Kabrich

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Reach SITE: Site Area



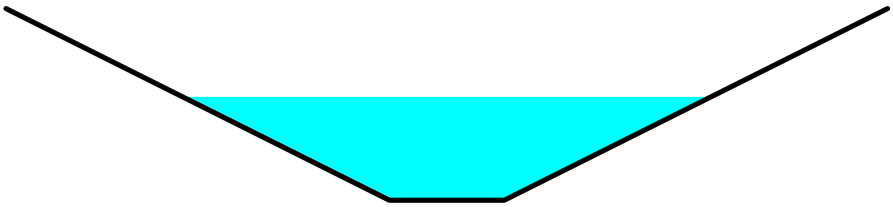
Summary for Reach STK: Stream to Kabrich Street

Inflow Area = 121.521 ac, 53.99% Impervious, Inflow Depth = 2.58" for 10-yr event
Inflow = 202.54 cfs @ 12.47 hrs, Volume= 26.106 af
Outflow = 193.82 cfs @ 12.62 hrs, Volume= 26.106 af, Atten= 4%, Lag= 9.0 min
Routed to Reach SITE : Site Area

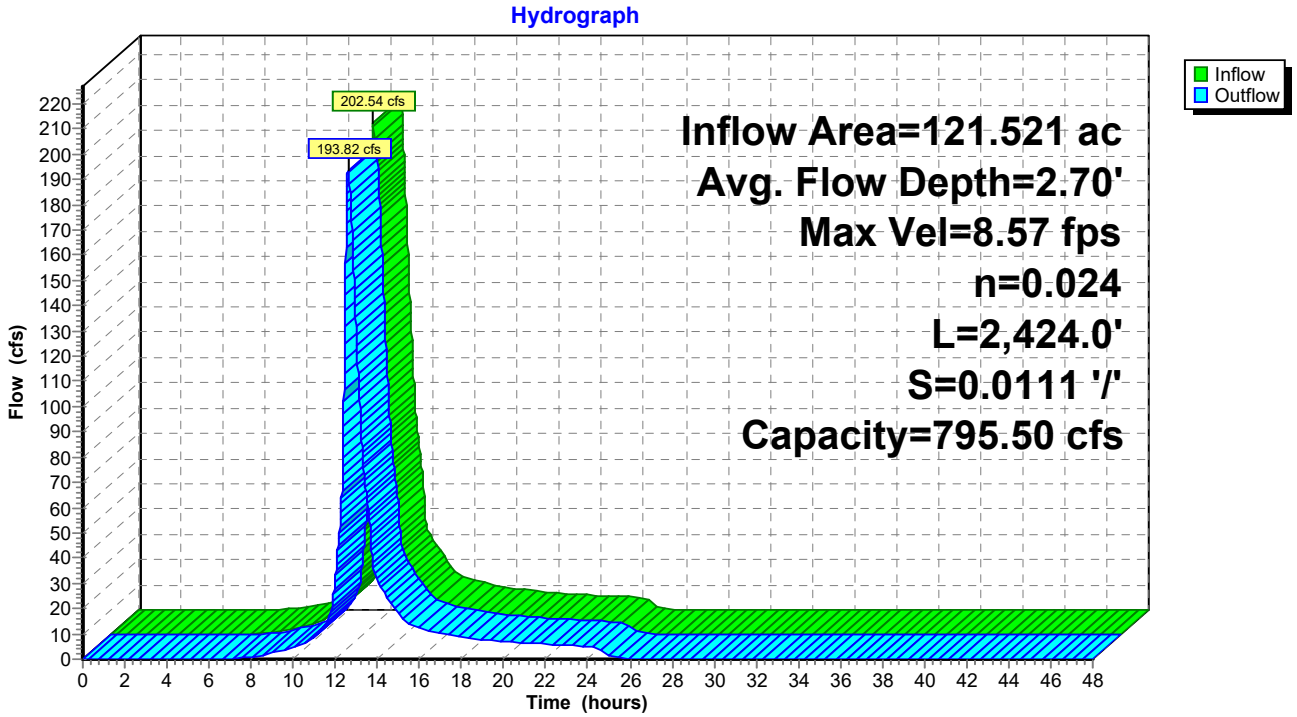
Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 8.57 fps, Min. Travel Time= 4.7 min
Avg. Velocity = 2.84 fps, Avg. Travel Time= 14.2 min

Peak Storage= 54,818 cf @ 12.54 hrs
Average Depth at Peak Storage= 2.70' , Surface Width= 13.78'
Bank-Full Depth= 5.00' Flow Area= 65.0 sf, Capacity= 795.50 cfs

3.00' x 5.00' deep channel, n= 0.024
Side Slope Z-value= 2.0 '/' Top Width= 23.00'
Length= 2,424.0' Slope= 0.0111 '/'
Inlet Invert= 2,092.00', Outlet Invert= 2,065.00'



Reach STK: Stream to Kabrich Street



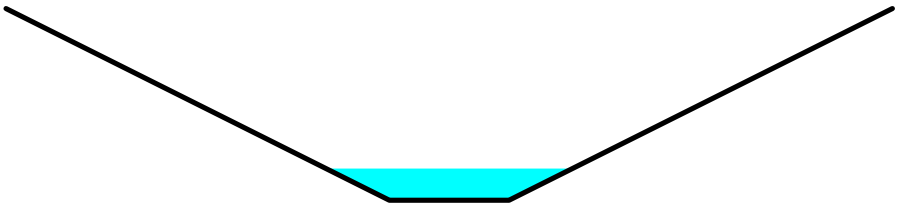
Summary for Reach USR: Upper Stream Reach

Inflow Area = 52.168 ac, 46.37% Impervious, Inflow Depth = 2.50" for 10-yr event
Inflow = 92.60 cfs @ 12.33 hrs, Volume= 10.866 af
Outflow = 89.08 cfs @ 12.44 hrs, Volume= 10.866 af, Atten= 4%, Lag= 6.4 min
Routed to Reach STK : Stream to Kabrich Street

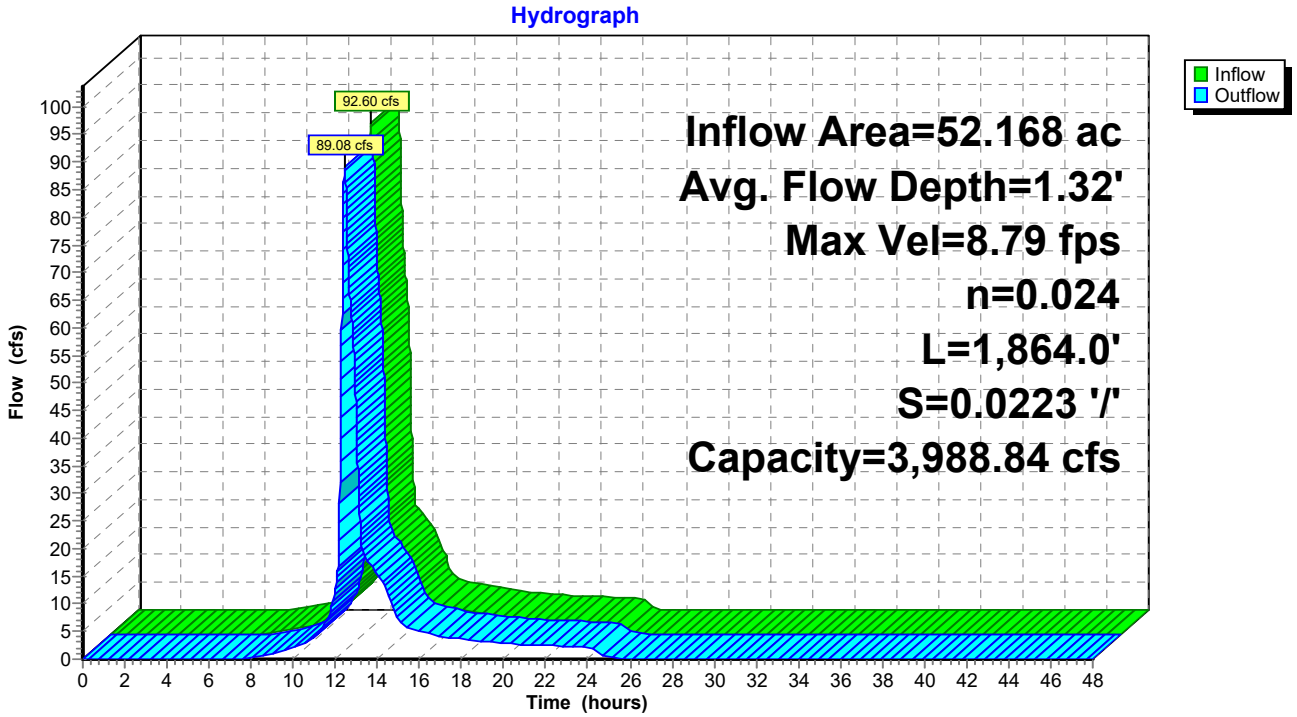
Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 8.79 fps, Min. Travel Time= 3.5 min
Avg. Velocity = 2.88 fps, Avg. Travel Time= 10.8 min

Peak Storage= 18,890 cf @ 12.38 hrs
Average Depth at Peak Storage= 1.32' , Surface Width= 10.30'
Bank-Full Depth= 8.00' Flow Area= 168.0 sf, Capacity= 3,988.84 cfs

5.00' x 8.00' deep channel, n= 0.024
Side Slope Z-value= 2.0 '/' Top Width= 37.00'
Length= 1,864.0' Slope= 0.0223 '/'
Inlet Invert= 2,133.50', Outlet Invert= 2,092.00'



Reach USR: Upper Stream Reach



Summary for Pond CVP: Clover Valley Pond

Inflow Area = 44.421 ac, 44.76% Impervious, Inflow Depth = 2.46" for 10-yr event
Inflow = 97.22 cfs @ 12.20 hrs, Volume= 9.104 af
Outflow = 83.48 cfs @ 12.30 hrs, Volume= 9.104 af, Atten= 14%, Lag= 6.2 min
Primary = 83.48 cfs @ 12.30 hrs, Volume= 9.104 af
Routed to Pond RP : Rutherford Pond

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 2,161.88' @ 12.30 hrs Surf.Area= 0.292 ac Storage= 0.801 af

Plug-Flow detention time= 3.7 min calculated for 9.102 af (100% of inflow)
Center-of-Mass det. time= 3.7 min (836.0 - 832.3)

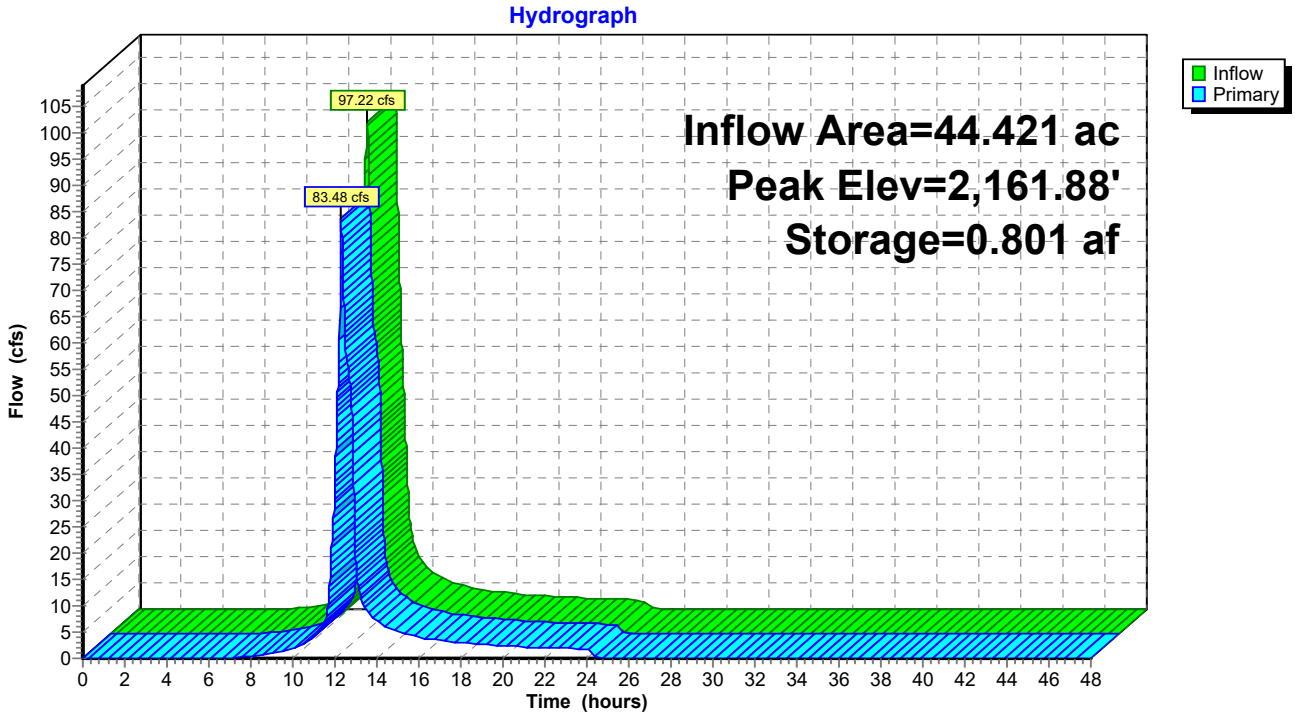
Volume	Invert	Avail.Storage	Storage Description
#1	2,155.00'	0.837 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
2,155.00	0.000	0.000	0.000
2,156.00	0.003	0.002	0.002
2,158.00	0.079	0.082	0.083
2,160.00	0.188	0.267	0.351
2,162.00	0.299	0.487	0.837

Device	Routing	Invert	Outlet Devices
#1	Primary	2,154.50'	**30.0" Round Culvert** L= 50.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,154.50' / 2,153.50' S= 0.0200 '/' Cc= 0.900 n= 0.013, Flow Area= 4.91 sf
#2	Device 1	2,155.00'	**18.0" Round Culvert** L= 3.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,155.00' / 2,154.50' S= 0.1667 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#3	Device 1	2,156.77'	**30.0" Round Culvert** L= 3.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,156.77' / 2,156.27' S= 0.1667 '/' Cc= 0.900 n= 0.013, Flow Area= 4.91 sf
#4	Device 1	2,160.25'	**84.0" x 48.0" Horiz. Orifice/Grate X 3.00** C= 0.600 Limited to weir flow at low heads
#5	Primary	2,161.50'	**40.0' long x 20.0' 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) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=83.41 cfs @ 12.30 hrs HW=2,161.88' (Free Discharge)
- **1=Culvert** (Inlet Controls 58.50 cfs @ 11.92 fps)
  - **2=Culvert** (Passes < 21.06 cfs potential flow)
  - **3=Culvert** (Passes < 46.41 cfs potential flow)
  - **4=Orifice/Grate** (Passes < 447.60 cfs potential flow)
- **5=Broad-Crested Rectangular Weir** (Weir Controls 24.91 cfs @ 1.65 fps)

Pond CVP: Clover Valley Pond



Summary for Pond P1: UST1

Inflow Area = 3.050 ac, 0.00% Impervious, Inflow Depth = 3.32" for 10-yr event
Inflow = 13.56 cfs @ 12.03 hrs, Volume= 0.843 af
Outflow = 3.32 cfs @ 12.42 hrs, Volume= 0.840 af, Atten= 76%, Lag= 23.6 min
Primary = 3.32 cfs @ 12.42 hrs, Volume= 0.840 af
Routed to Reach ED : Reach Along Edge Site

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 2,054.37' @ 12.42 hrs Surf.Area= 0.100 ac Storage= 0.362 af

Plug-Flow detention time= 223.0 min calculated for 0.840 af (100% of inflow)
Center-of-Mass det. time= 221.1 min (1,006.2 - 785.1)

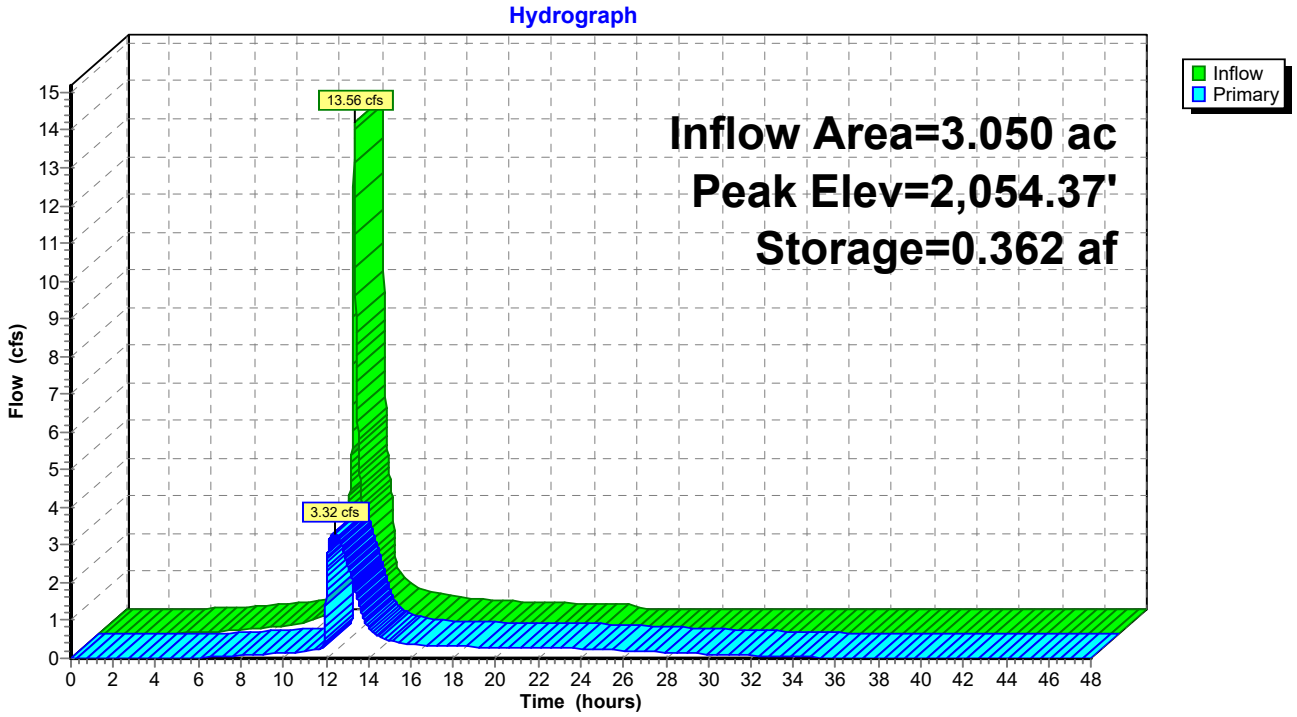
Volume	Invert	Avail.Storage	Storage Description
#1	2,050.75'	0.459 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
2,050.75	0.100	0.000	0.000
2,051.75	0.100	0.100	0.100
2,052.75	0.100	0.100	0.200
2,053.75	0.100	0.100	0.300
2,054.75	0.100	0.100	0.400
2,055.45	0.070	0.059	0.459

Device	Routing	Invert	Outlet Devices
#1	Primary	2,050.75'	**18.0" Round Culvert** L= 42.4' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,050.75' / 2,049.25' S= 0.0354 '/' Cc= 0.900 n= 0.011, Flow Area= 1.77 sf
#2	Device 1	2,050.75'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	2,052.65'	**14.0" W x 5.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	2,054.65'	**6.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=3.32 cfs @ 12.42 hrs HW=2,054.37' (Free Discharge)
└**1=Culvert** (Passes 3.32 cfs of 14.42 cfs potential flow)
  ├**2=Orifice/Grate** (Orifice Controls 0.44 cfs @ 9.00 fps)
  ├**3=Orifice/Grate** (Orifice Controls 2.88 cfs @ 5.92 fps)
  └**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond P1: UST1


Hydrograph
Inflow
Primary
13.56 cfs
3.32 cfs
Inflow Area=3.050 ac
Peak Elev=2,054.37'
Storage=0.362 af
Flow (cfs)
Time (hours)
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48

Summary for Pond P2: UST2

Inflow Area = 11.650 ac, 51.33% Impervious, Inflow Depth = 2.64" for 10-yr event
Inflow = 27.41 cfs @ 12.19 hrs, Volume= 2.560 af
Outflow = 10.50 cfs @ 12.65 hrs, Volume= 2.559 af, Atten= 62%, Lag= 27.8 min
Primary = 10.50 cfs @ 12.65 hrs, Volume= 2.559 af
Routed to Reach PF : OutFall to Prices Fork

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 2,048.61' @ 12.65 hrs Surf.Area= 0.204 ac Storage= 0.888 af

Plug-Flow detention time= 72.7 min calculated for 2.559 af (100% of inflow)
Center-of-Mass det. time= 72.5 min (897.8 - 825.3)

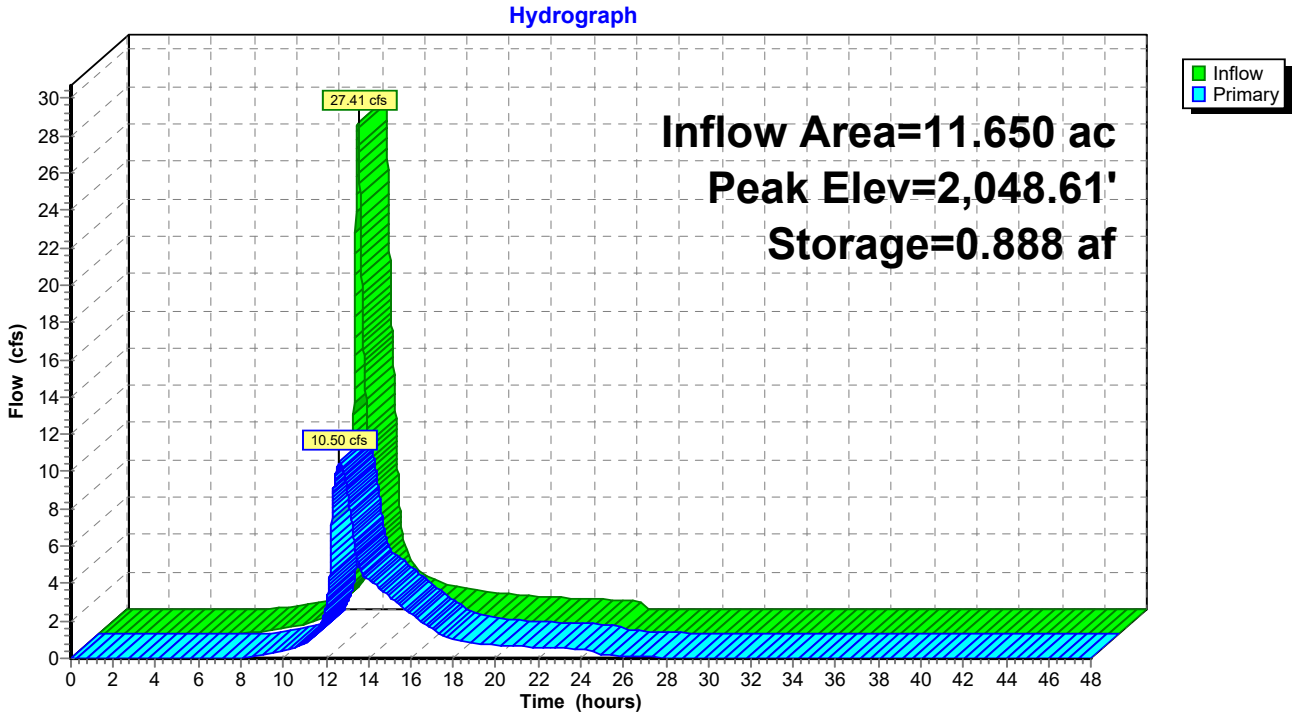
Volume	Invert	Avail.Storage	Storage Description
#1	2,044.25'	1.020 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
2,044.25	0.204	0.000	0.000
2,045.25	0.204	0.204	0.204
2,046.25	0.204	0.204	0.408
2,047.25	0.204	0.204	0.612
2,048.25	0.204	0.204	0.816
2,049.25	0.204	0.204	1.020

Device	Routing	Invert	Outlet Devices
#1	Primary	2,044.25'	**30.0" Round Culvert** L= 35.1' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,044.25' / 2,043.83' S= 0.0120 '/' Cc= 0.900 n= 0.011, Flow Area= 4.91 sf
#2	Device 1	2,044.25'	**14.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	2,047.00'	**16.0" W x 8.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	2,048.80'	**6.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=10.50 cfs @ 12.65 hrs HW=2,048.60' (Free Discharge)
└**1=Culvert** (Passes 10.50 cfs of 41.65 cfs potential flow)
├**2=Orifice/Grate** (Orifice Controls 5.69 cfs @ 9.75 fps)
├**3=Orifice/Grate** (Orifice Controls 4.81 cfs @ 5.41 fps)
└**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond P2: UST2


Hydrograph
Inflow
Primary
27.41 cfs
10.50 cfs
Inflow Area=11.650 ac
Peak Elev=2,048.61'
Storage=0.888 af
Flow (cfs)
Time (hours)
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48

Summary for Pond RP: Rutherford Pond

Inflow Area = 52.168 ac, 46.37% Impervious, Inflow Depth = 2.50" for 10-yr event
Inflow = 96.86 cfs @ 12.29 hrs, Volume= 10.866 af
Outflow = 92.60 cfs @ 12.33 hrs, Volume= 10.866 af, Atten= 4%, Lag= 2.5 min
Primary = 92.60 cfs @ 12.33 hrs, Volume= 10.866 af
Routed to Reach USR : Upper Stream Reach

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 2,141.57' @ 12.33 hrs Storage= 47,969 cf

Plug-Flow detention time= 12.3 min calculated for 10.866 af (100% of inflow)
Center-of-Mass det. time= 12.2 min (845.2 - 833.0)

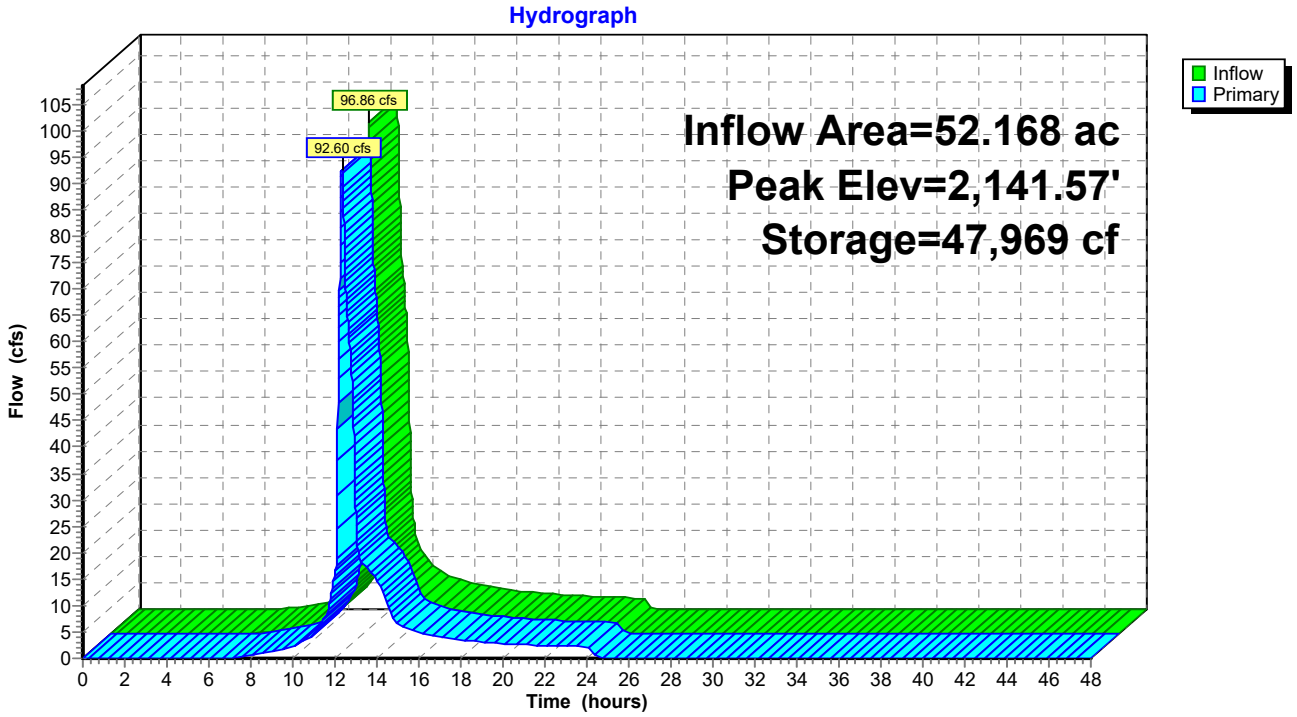
Volume	Invert	Avail.Storage	Storage Description
#1	2,135.00'	74,503 cf	**Custom Stage Data** Listed below

Elevation (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,135.00	0	0
2,136.00	1,366	1,366
2,137.00	3,129	4,495
2,138.00	5,175	9,670
2,139.00	7,760	17,430
2,140.00	10,340	27,770
2,141.00	12,305	40,075
2,142.00	13,925	54,000
2,143.00	20,503	74,503

Device	Routing	Invert	Outlet Devices
#1	Primary	2,134.82'	**54.0" Round Culvert** L= 82.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,134.82' / 2,134.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 15.90 sf
#2	Device 1	2,135.00'	**18.0" Round Culvert** L= 3.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,135.00' / 2,134.82' S= 0.0600 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#3	Device 1	2,140.50'	**72.0" x 48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Primary	2,142.50'	**60.0' long x 30.0' 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) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=92.53 cfs @ 12.33 hrs HW=2,141.57' (Free Discharge)
- **1=Culvert** (Passes 92.53 cfs of 162.38 cfs potential flow)
  - **2=Culvert** (Inlet Controls 20.52 cfs @ 11.61 fps)
  - **3=Orifice/Grate** (Weir Controls 72.01 cfs @ 3.38 fps)
- **4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond RP: Rutherford Pond



Summary for Pond SP: Shenandoah Pond

Inflow Area = 69.353 ac, 59.71% Impervious, Inflow Depth = 2.64" for 10-yr event
Inflow = 142.29 cfs @ 12.28 hrs, Volume= 15.241 af
Outflow = 115.65 cfs @ 12.44 hrs, Volume= 15.241 af, Atten= 19%, Lag= 9.3 min
Primary = 115.65 cfs @ 12.44 hrs, Volume= 15.241 af
Routed to Reach MOR : MOOG Reach Section

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 2,123.96' @ 12.44 hrs Surf.Area= 32,623 sf Storage= 81,134 cf

Plug-Flow detention time= 7.3 min calculated for 15.237 af (100% of inflow)
Center-of-Mass det. time= 7.3 min (838.5 - 831.2)

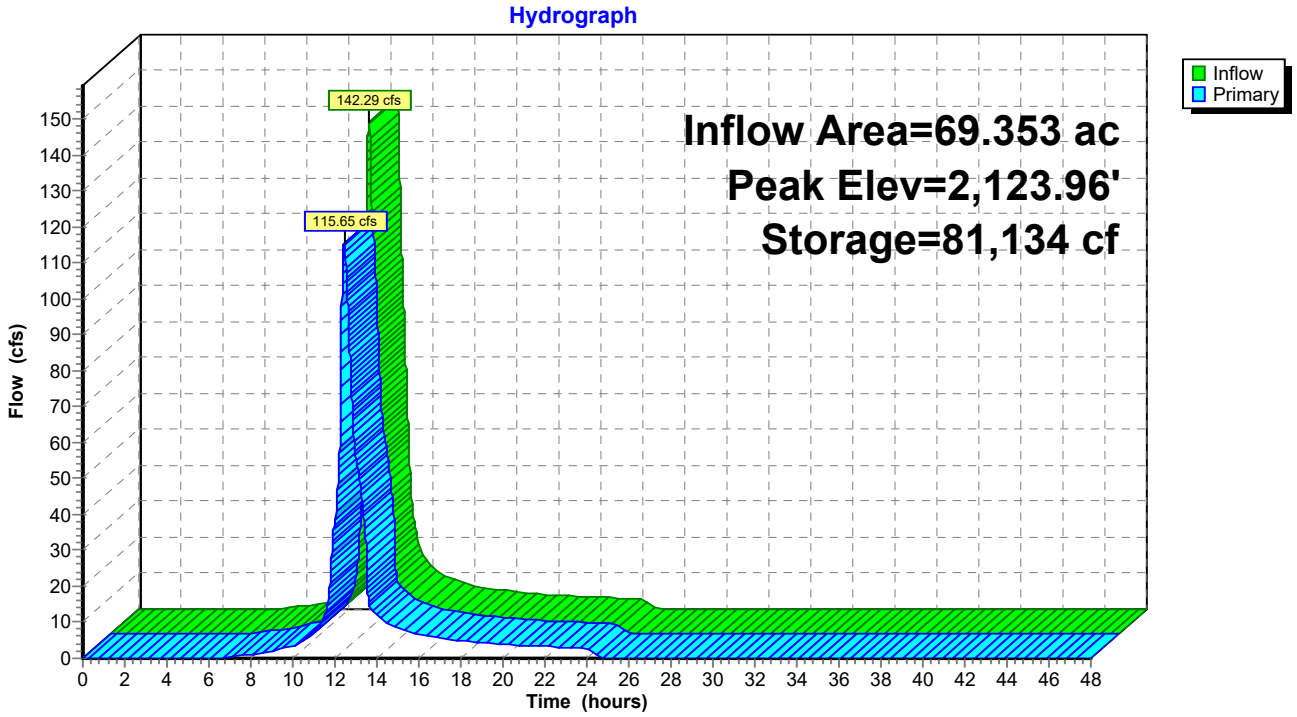
Volume	Invert	Avail.Storage	Storage Description
#1	2,117.00'	117,739 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,117.00	0	0	0
2,118.00	955	478	478
2,120.00	2,580	3,535	4,013
2,122.00	21,522	24,102	28,115
2,124.00	32,858	54,380	82,495
2,125.00	37,630	35,244	117,739

Device	Routing	Invert	Outlet Devices
#1	Primary	2,117.00'	**36.0" Round Culvert** L= 75.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,117.00' / 2,116.51' S= 0.0065 '/' Cc= 0.900 n= 0.024, Flow Area= 7.07 sf
#2	Primary	2,123.00'	**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=115.63 cfs @ 12.44 hrs HW=2,123.96' (Free Discharge)
1=Culvert (Barrel Controls 65.31 cfs @ 9.24 fps)
2=Broad-Crested Rectangular Weir (Weir Controls 50.32 cfs @ 2.63 fps)

Pond SP: Shenandoah Pond



Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentA: Drainage Area Webb Runoff Area=6.360 ac 61.95% Impervious Runoff Depth=5.33"
Flow Length=1,277' Tc=18.5 min CN=90 Runoff=24.66 cfs 2.827 af

SubcatchmentB: Drainage Area to Prices Runoff Area=10.800 ac 66.20% Impervious Runoff Depth=5.56"
Flow Length=630' Tc=12.5 min CN=92 Runoff=50.01 cfs 5.005 af

SubcatchmentCO: Clover Valley Pond DA Runoff Area=44.421 ac 44.76% Impervious Runoff Depth=4.67"
Flow Length=2,092' Tc=17.5 min CN=84 Runoff=159.09 cfs 17.274 af

SubcatchmentK: Drainage Area Kabrich Runoff Area=93.790 ac 47.77% Impervious Runoff Depth=4.78"
Flow Length=3,788' Tc=18.2 min CN=85 Runoff=336.52 cfs 37.328 af

SubcatchmentRU: Rutherford Pond DA Runoff Area=7.747 ac 55.63% Impervious Runoff Depth=5.00"
Flow Length=741' Tc=12.4 min CN=87 Runoff=33.31 cfs 3.226 af

SubcatchmentSH: Shenandoah Pond DA Runoff Area=69.353 ac 59.71% Impervious Runoff Depth=4.89"
Flow Length=2,630' Tc=23.5 min CN=86 Runoff=228.58 cfs 28.239 af

SubcatchmentUG1: UST 1 DA Runoff Area=3.050 ac 0.00% Impervious Runoff Depth=5.68"
Tc=5.0 min CN=93 Runoff=18.85 cfs 1.443 af

SubcatchmentUG2: UST 2 DA Runoff Area=11.650 ac 51.33% Impervious Runoff Depth=4.89"
Flow Length=480' Tc=17.2 min CN=86 Runoff=43.51 cfs 4.744 af

SubcatchmentUS1: Upstream of Site Runoff Area=244.780 ac 40.87% Impervious Runoff Depth=4.45"
Flow Length=5,941' Tc=28.6 min CN=82 Runoff=684.57 cfs 90.762 af

SubcatchmentUS2: Upstream of Site Runoff Area=244.780 ac 41.04% Impervious Runoff Depth=4.45"
Flow Length=5,941' Tc=28.6 min CN=82 Runoff=684.57 cfs 90.762 af

Reach ED: Reach Along Edge Site Inflow=1,251.02 cfs 181.096 af
Outflow=1,251.02 cfs 181.096 af

Reach KB: Outfall Below Kabrich Inflow=1,227.32 cfs 176.830 af
Outflow=1,227.32 cfs 176.830 af

Reach MOR: MOOG Reach Section Avg. Flow Depth=2.56' Max Vel=11.40 fps Inflow=209.02 cfs 28.239 af
n=0.024 L=1,020.0' S=0.0225 '/' Capacity=3,267.06 cfs Outflow=208.27 cfs 28.239 af

Reach PF: OutFall to Prices Fork Inflow=1,313.99 cfs 190.844 af
Outflow=1,313.99 cfs 190.844 af

Reach SITE: Site Area Inflow=998.78 cfs 139.501 af
Outflow=998.78 cfs 139.501 af

Reach STK: Stream to Kabrich Avg. Flow Depth=3.57' Max Vel=10.05 fps Inflow=375.34 cfs 48.739 af
n=0.024 L=2,424.0' S=0.0111 '/' Capacity=795.50 cfs Outflow=363.26 cfs 48.739 af

Reach USR: Upper Stream Reach Avg. Flow Depth=1.88' Max Vel=10.59 fps Inflow=175.86 cfs 20.500 af
n=0.024 L=1,864.0' S=0.0223 '/' Capacity=3,988.84 cfs Outflow=173.90 cfs 20.500 af

Pond CVP: Clover Valley Pond Peak Elev=2,162.65' Storage=0.837 af Inflow=159.09 cfs 17.274 af
Outflow=192.02 cfs 17.274 af

Pond P1: UST1 Peak Elev=2,055.26' Storage=0.445 af Inflow=18.85 cfs 1.443 af
Outflow=12.86 cfs 1.439 af

Pond P2: UST2 Peak Elev=2,050.36' Storage=1.020 af Inflow=43.51 cfs 4.744 af
Outflow=52.12 cfs 4.743 af

Pond RP: Rutherford Pond Peak Elev=2,142.34' Storage=61,053 cf Inflow=221.73 cfs 20.500 af
Outflow=175.86 cfs 20.500 af

Pond SP: Shenandoah Pond Peak Elev=2,124.89' Storage=113,623 cf Inflow=228.58 cfs 28.239 af
Outflow=209.02 cfs 28.239 af

Total Runoff Area = 736.731 ac Runoff Volume = 281.611 af Average Runoff Depth = 4.59"
55.48% Pervious = 408.755 ac 44.52% Impervious = 327.976 ac

Summary for Subcatchment A: Drainage Area Webb Street

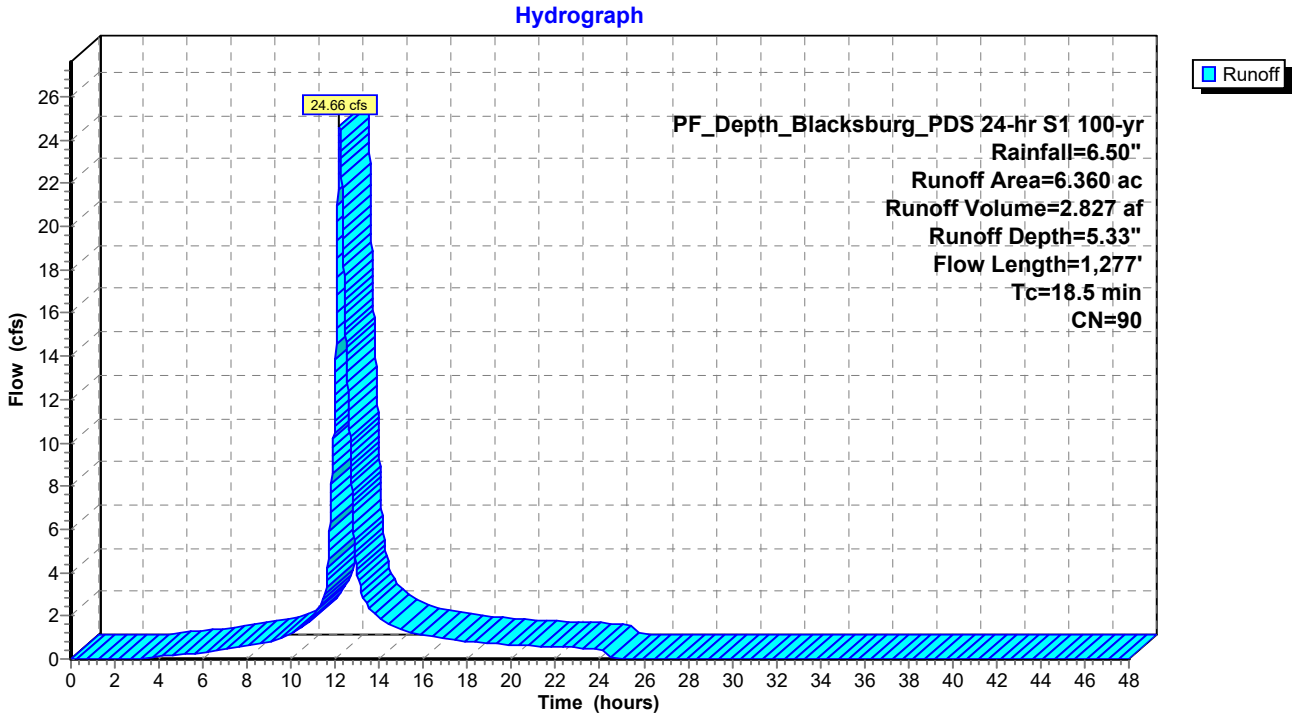
Runoff = 24.66 cfs @ 12.20 hrs, Volume= 2.827 af, Depth= 5.33"
Routed to Reach ED : Reach Along Edge Site

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
PF_Depth_Blacksburg_PDS 24-hr S1 100-yr Rainfall=6.50"

Area (ac)	CN	Description
1.390	74	>75% Grass cover, Good, HSG C
1.030	80	>75% Grass cover, Good, HSG D
3.940	98	Unconnected pavement, HSG C
6.360	90	Weighted Average
2.420		38.05% Pervious Area
3.940		61.95% Impervious Area
3.940		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.4	100	0.0200	0.11		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.76"
2.2	424	0.0400	3.22		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.9	753	0.0200	13.90	166.80	**Channel Flow,** Area= 12.0 sf Perim= 6.0' r= 2.00' n= 0.024
18.5	1,277	Total			

Subcatchment A: Drainage Area Webb Street



Summary for Subcatchment B: Drainage Area to Prices Fork

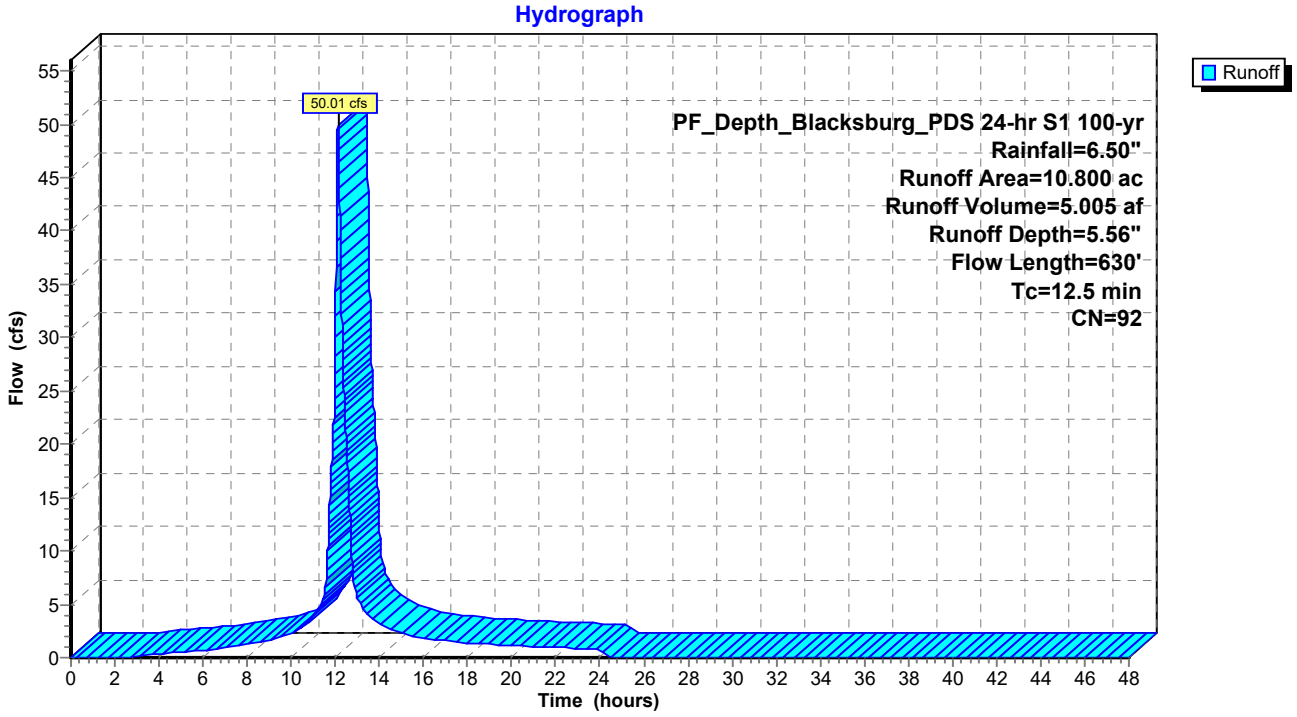
Runoff = 50.01 cfs @ 12.12 hrs, Volume= 5.005 af, Depth= 5.56"
Routed to Reach PF : OutFall to Prices Fork

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
PF_Depth_Blacksburg_PDS 24-hr S1 100-yr Rainfall=6.50"

Area (ac)	CN	Description
3.650	80	>75% Grass cover, Good, HSG D
7.150	98	Unconnected pavement, HSG C
10.800	92	Weighted Average
3.650		33.80% Pervious Area
7.150		66.20% Impervious Area
7.150		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.7	100	0.0500	0.16		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.76"
0.4	80	0.0500	3.60		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
1.4	450	0.0200	5.52	33.10	**Channel Flow,** Area= 6.0 sf Perim= 12.0' r= 0.50' n= 0.024
12.5	630	Total			

Subcatchment B: Drainage Area to Prices Fork



Summary for Subcatchment CO: Clover Valley Pond DA

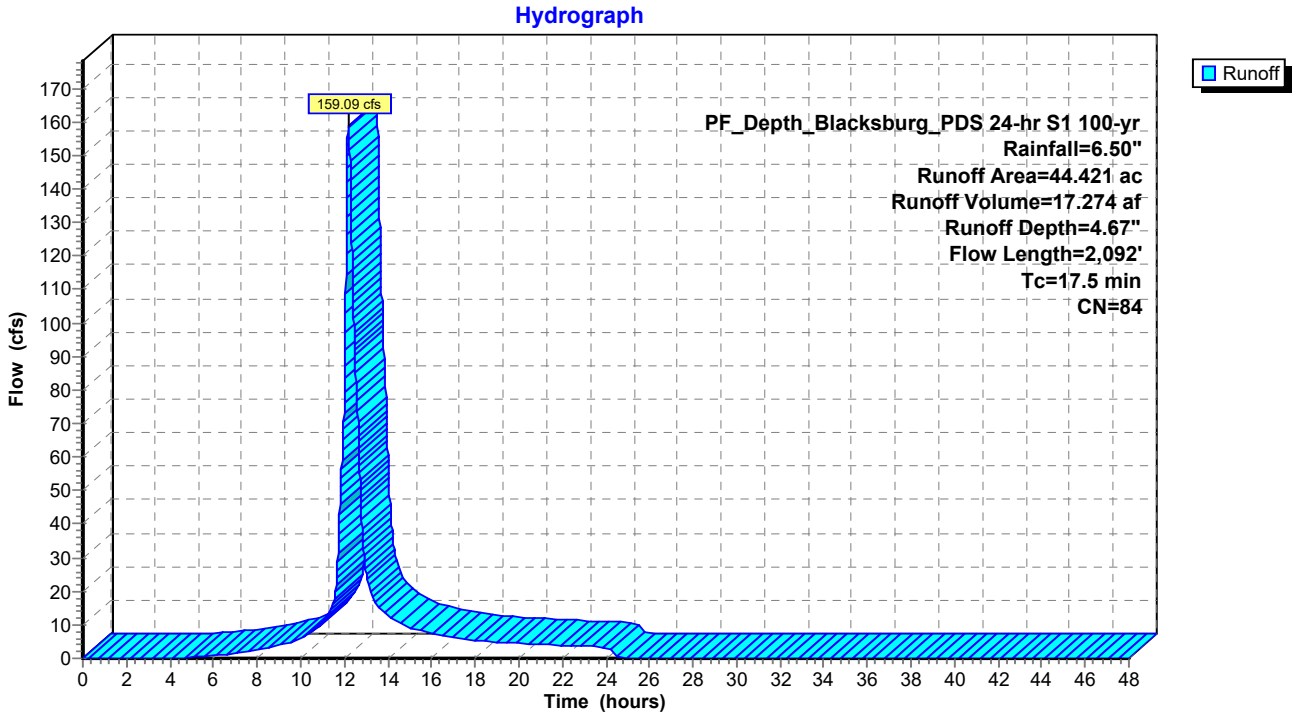
Runoff = 159.09 cfs @ 12.19 hrs, Volume= 17.274 af, Depth= 4.67"
Routed to Pond CVP : Clover Valley Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
PF_Depth_Blacksburg_PDS 24-hr S1 100-yr Rainfall=6.50"

Area (ac)	CN	Description
1.300	70	Woods, Good, HSG C
2.576	74	>75% Grass cover, Good, HSG C
0.198	68	1 acre lots, 20% imp, HSG B
0.507	79	1 acre lots, 20% imp, HSG C
4.150	70	1/2 acre lots, 25% imp, HSG B
10.489	80	1/2 acre lots, 25% imp, HSG C
1.456	72	1/3 acre lots, 30% imp, HSG B
2.101	81	1/3 acre lots, 30% imp, HSG C
1.438	85	1/8 acre lots, 65% imp, HSG B
8.011	90	1/8 acre lots, 65% imp, HSG C
1.487	92	Urban commercial, 85% imp, HSG B
6.136	94	Urban commercial, 85% imp, HSG C
0.610	89	Paved roads w/open ditches, 50% imp, HSG B
0.212	98	Paved parking, HSG C
3.750	92	Paved roads w/open ditches, 50% imp, HSG C
44.421	84	Weighted Average
24.540		55.24% Pervious Area
19.881		44.76% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	150	0.1400	0.26		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.76"
7.7	1,942	0.0690	4.23		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
17.5	2,092	Total			

Subcatchment CO: Clover Valley Pond DA



Summary for Subcatchment K: Drainage Area Kabrich

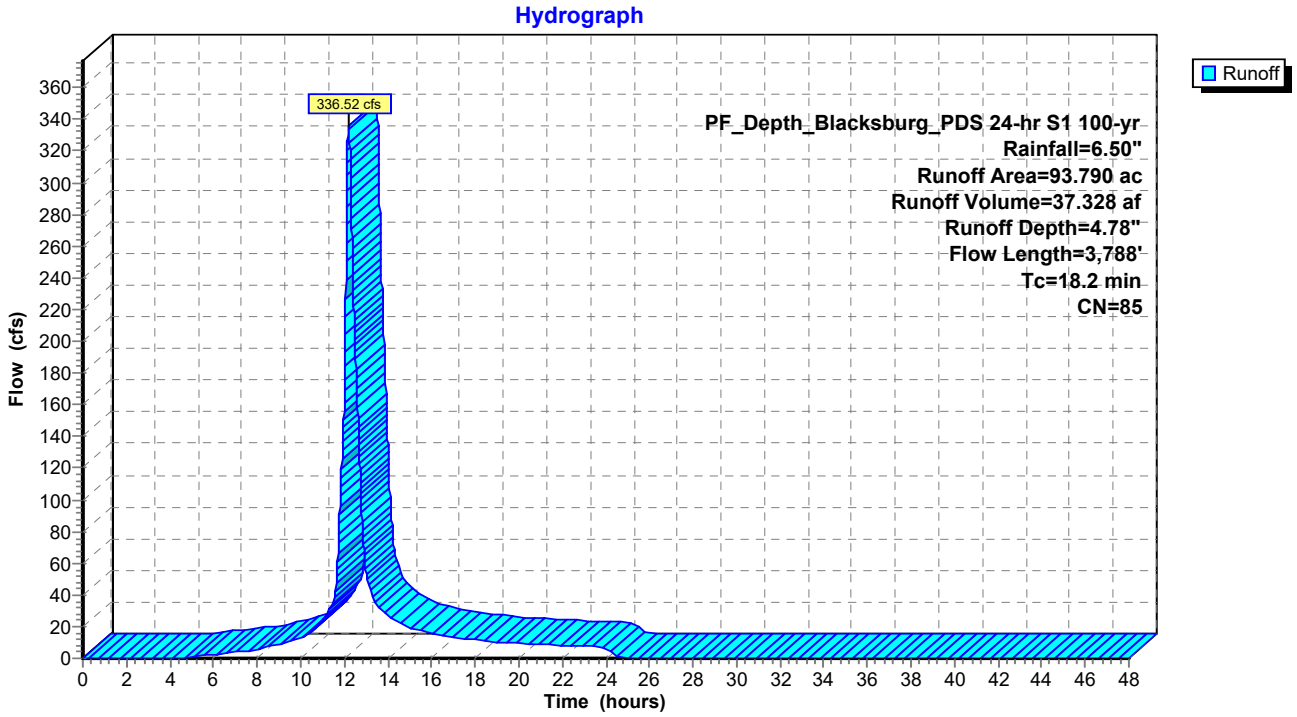
Runoff = 336.52 cfs @ 12.20 hrs, Volume= 37.328 af, Depth= 4.78"
Routed to Reach KB : Outfall Below Kabrich

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
PF_Depth_Blacksburg_PDS 24-hr S1 100-yr Rainfall=6.50"

Area (ac)	CN	Description
3.400	61	>75% Grass cover, Good, HSG B
45.590	74	>75% Grass cover, Good, HSG C
44.800	98	Paved parking, HSG B
93.790	85	Weighted Average
48.990		52.23% Pervious Area
44.800		47.77% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.7	100	0.0500	0.16		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.76"
2.6	322	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.5	1,152	0.0300	12.47	39.18	**Pipe Channel,** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.013
1.5	1,371	0.0240	15.23	182.72	**Channel Flow,** Area= 12.0 sf Perim= 6.0' r= 2.00' n= 0.024
1.9	843	0.0200	7.23	51.09	**Pipe Channel,** 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.024
18.2	3,788	Total			

Subcatchment K: Drainage Area Kabrich



Summary for Subcatchment RU: Rutherford Pond DA

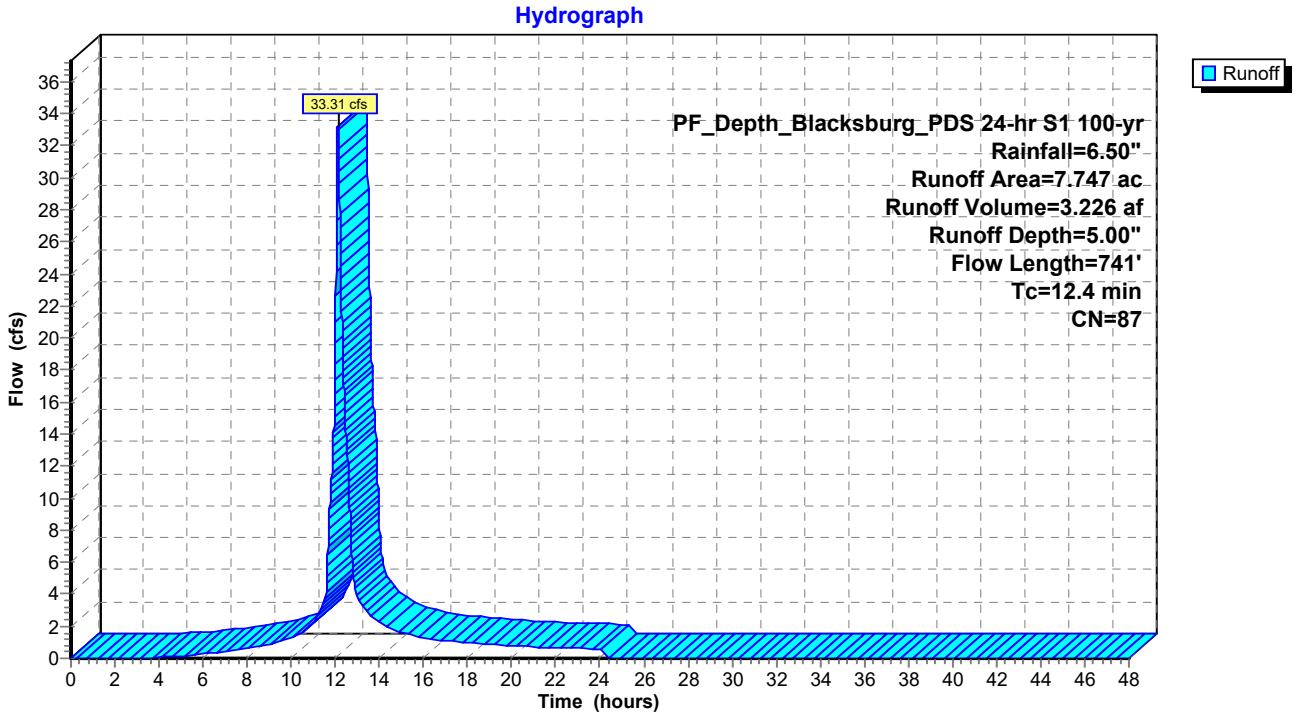
Runoff = 33.31 cfs @ 12.12 hrs, Volume= 3.226 af, Depth= 5.00"
Routed to Pond RP : Rutherford Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
PF_Depth_Blacksburg_PDS 24-hr S1 100-yr Rainfall=6.50"

Area (ac)	CN	Description
0.105	61	>75% Grass cover, Good, HSG B
0.939	74	>75% Grass cover, Good, HSG C
0.132	70	1/2 acre lots, 25% imp, HSG B
0.278	80	1/2 acre lots, 25% imp, HSG C
0.393	85	1/8 acre lots, 65% imp, HSG B
5.318	90	1/8 acre lots, 65% imp, HSG C
0.195	92	Urban commercial, 85% imp, HSG B
0.387	94	Urban commercial, 85% imp, HSG C
7.747	87	Weighted Average
3.438		44.37% Pervious Area
4.309		55.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.6	150	0.1130	0.24		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.76"
1.8	591	0.0745	5.54		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
12.4	741	Total			

Subcatchment RU: Rutherford Pond DA



Summary for Subcatchment SH: Shenandoah Pond DA

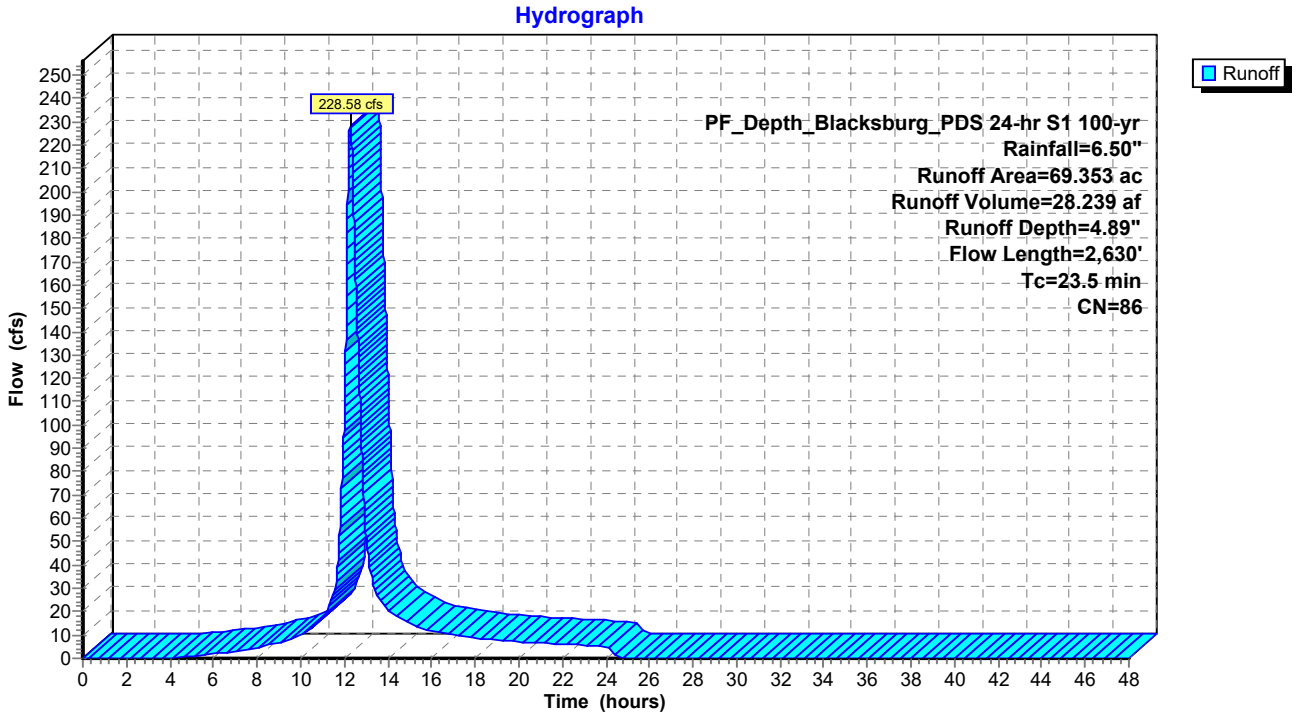
Runoff = 228.58 cfs @ 12.27 hrs, Volume= 28.239 af, Depth= 4.89"
Routed to Pond SP : Shenandoah Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
PF_Depth_Blacksburg_PDS 24-hr S1 100-yr Rainfall=6.50"

Area (ac)	CN	Description
7.130	61	>75% Grass cover, Good, HSG B
0.534	74	>75% Grass cover, Good, HSG C
0.108	68	1 acre lots, 20% imp, HSG B
0.773	70	1/2 acre lots, 25% imp, HSG B
0.054	80	1/2 acre lots, 25% imp, HSG C
14.304	85	1/8 acre lots, 65% imp, HSG B
20.223	90	1/8 acre lots, 65% imp, HSG C
8.803	88	Urban industrial, 72% imp, HSG B
9.941	92	Urban commercial, 85% imp, HSG B
0.610	94	Urban commercial, 85% imp, HSG C
4.119	89	Paved roads w/open ditches, 50% imp, HSG B
2.754	92	Paved roads w/open ditches, 50% imp, HSG C
69.353	86	Weighted Average
27.939		40.29% Pervious Area
41.414		59.71% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.8	150	0.0867	0.21		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.76"
2.4	647	0.0773	4.48		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
9.3	1,833	0.0262	3.29		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
23.5	2,630	Total			

Subcatchment SH: Shenandoah Pond DA



Summary for Subcatchment UG1: UST 1 DA

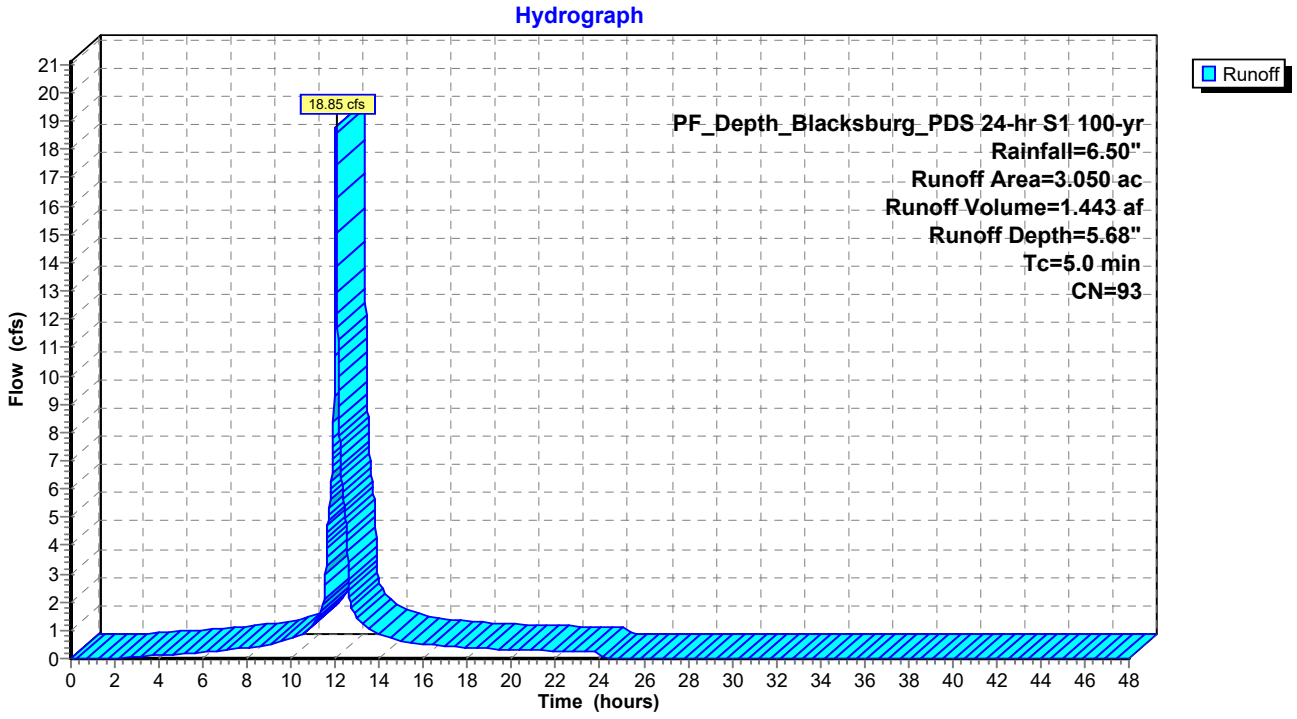
Runoff = 18.85 cfs @ 12.03 hrs, Volume= 1.443 af, Depth= 5.68"
Routed to Pond P1 : UST1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
PF_Depth_Blacksburg_PDS 24-hr S1 100-yr Rainfall=6.50"

Area (ac)	CN	Description
0.590	74	>75% Grass cover, Good, HSG C
2.460	98	Water Surface, 0% imp, HSG C
3.050	93	Weighted Average
3.050		100.00% Pervious Area

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

Subcatchment UG1: UST 1 DA



Summary for Subcatchment UG2: UST 2 DA

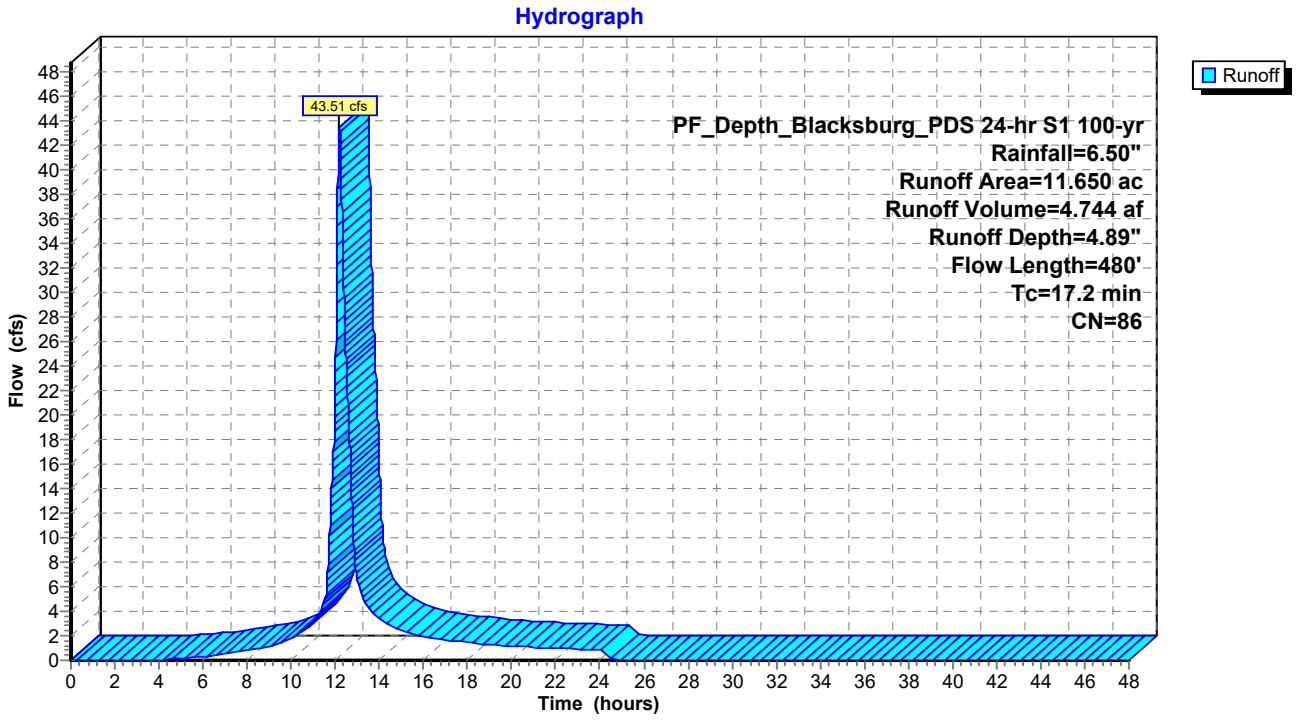
Runoff = 43.51 cfs @ 12.18 hrs, Volume= 4.744 af, Depth= 4.89"
Routed to Pond P2 : UST2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
PF_Depth_Blacksburg_PDS 24-hr S1 100-yr Rainfall=6.50"

Area (ac)	CN	Description
5.670	74	>75% Grass cover, Good, HSG C
5.980	98	Paved parking, HSG C
11.650	86	Weighted Average
5.670		48.67% Pervious Area
5.980		51.33% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.1	150	0.0400	0.16		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.76"
1.1	330	0.0910	4.86		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
17.2	480	Total			

Subcatchment UG2: UST 2 DA



Summary for Subcatchment US1: Upstream of Site PRE CONDITION

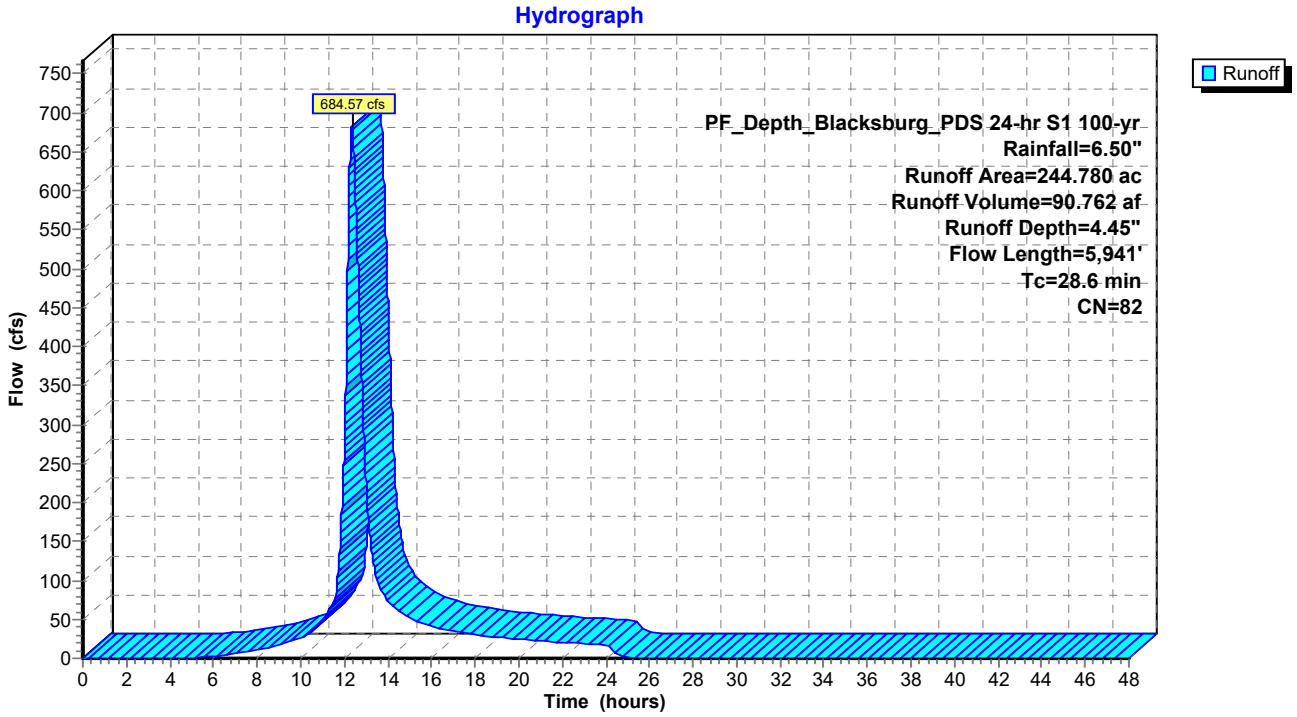
Runoff = 684.57 cfs @ 12.36 hrs, Volume= 90.762 af, Depth= 4.45"
Routed to Reach SITE : Site Area

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
PF_Depth_Blacksburg_PDS 24-hr S1 100-yr Rainfall=6.50"

	Area (ac)	CN	Description
	6.240	55	Woods, Good, HSG B
	2.100	70	Woods, Good, HSG C
	15.820	61	>75% Grass cover, Good, HSG B
	39.640	74	>75% Grass cover, Good, HSG C
	26.040	94	Urban commercial, 85% imp, HSG C
	5.870	95	Urban commercial, 85% imp, HSG D
	3.840	88	Urban industrial, 72% imp, HSG B
	8.520	91	Urban industrial, 72% imp, HSG C
	1.400	89	Paved roads w/open ditches, 50% imp, HSG B
	15.560	92	Paved roads w/open ditches, 50% imp, HSG C
	1.250	85	1/8 acre lots, 65% imp, HSG B
	36.230	90	1/8 acre lots, 65% imp, HSG C
	12.500	72	1/3 acre lots, 30% imp, HSG B
	53.220	81	1/3 acre lots, 30% imp, HSG C
	6.400	86	1/3 acre lots, 30% imp, HSG D
	6.620	98	Paved parking, HSG C
*	2.930	98	SITE AREA IMPERVIOUS
*	0.600	80	SITE AREA GERASS
	244.780	82	Weighted Average
	144.729		59.13% Pervious Area
	100.051		40.87% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.8	100	0.0800	0.19		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.76"
7.7	1,832	0.0600	3.94		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
12.1	4,009	0.0200	5.52	33.10	**Channel Flow,** Area= 6.0 sf Perim= 12.0' r= 0.50' n= 0.024
28.6	5,941	Total			

Subcatchment US1: Upstream of Site PRE CONDITION



Summary for Subcatchment US2: Upstream of Site POST CONDITION

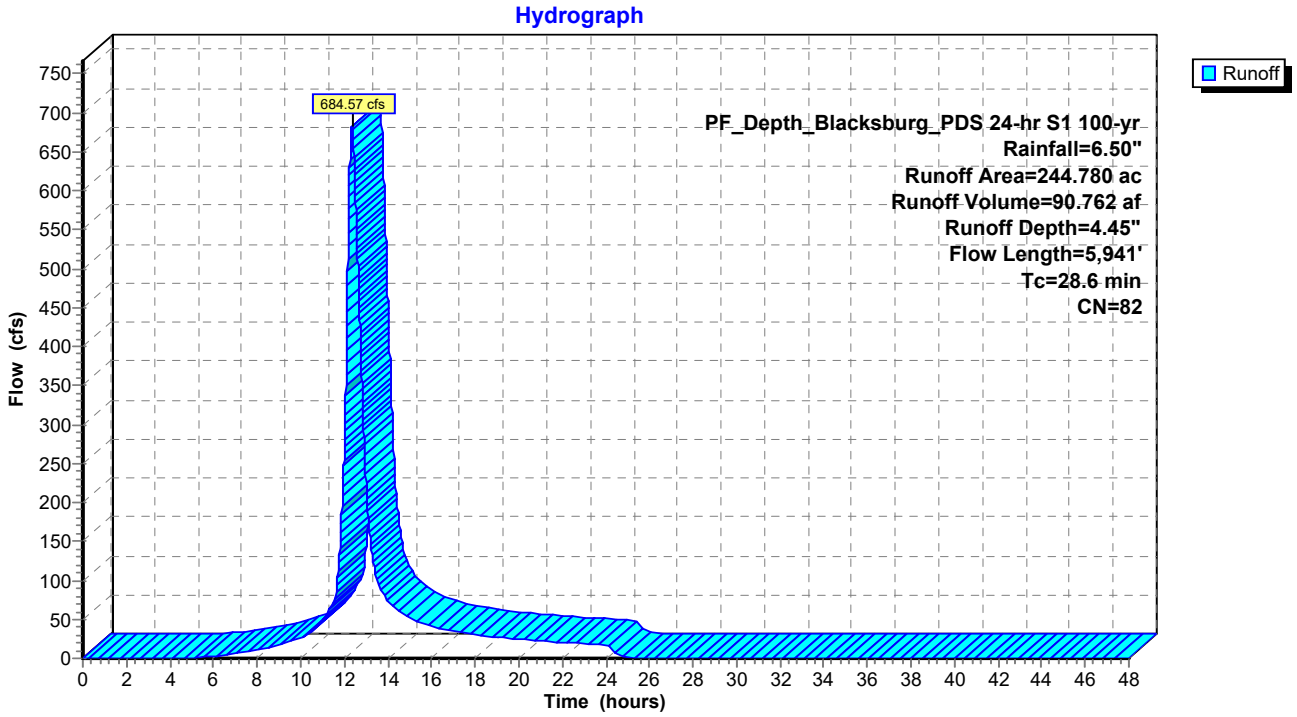
Runoff = 684.57 cfs @ 12.36 hrs, Volume= 90.762 af, Depth= 4.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
PF_Depth_Blacksburg_PDS 24-hr S1 100-yr Rainfall=6.50"

	Area (ac)	CN	Description
	6.240	55	Woods, Good, HSG B
	2.100	70	Woods, Good, HSG C
	15.820	61	>75% Grass cover, Good, HSG B
	39.640	74	>75% Grass cover, Good, HSG C
	26.040	94	Urban commercial, 85% imp, HSG C
	5.870	95	Urban commercial, 85% imp, HSG D
	3.840	88	Urban industrial, 72% imp, HSG B
	8.520	91	Urban industrial, 72% imp, HSG C
	1.400	89	Paved roads w/open ditches, 50% imp, HSG B
	15.560	92	Paved roads w/open ditches, 50% imp, HSG C
	1.250	85	1/8 acre lots, 65% imp, HSG B
	36.230	90	1/8 acre lots, 65% imp, HSG C
	12.500	72	1/3 acre lots, 30% imp, HSG B
	53.220	81	1/3 acre lots, 30% imp, HSG C
	6.400	86	1/3 acre lots, 30% imp, HSG D
	6.620	98	Paved parking, HSG C
*	3.330	98	SITE AREA IMPERVIOUS
*	0.200	80	SITE AREA GERASS
	244.780	82	Weighted Average
	144.329		58.96% Pervious Area
	100.451		41.04% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.8	100	0.0800	0.19		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.76"
7.7	1,832	0.0600	3.94		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
12.1	4,009	0.0200	5.52	33.10	**Channel Flow,** Area= 6.0 sf Perim= 12.0' r= 0.50' n= 0.024
28.6	5,941	Total			

Subcatchment US2: Upstream of Site POST CONDITION

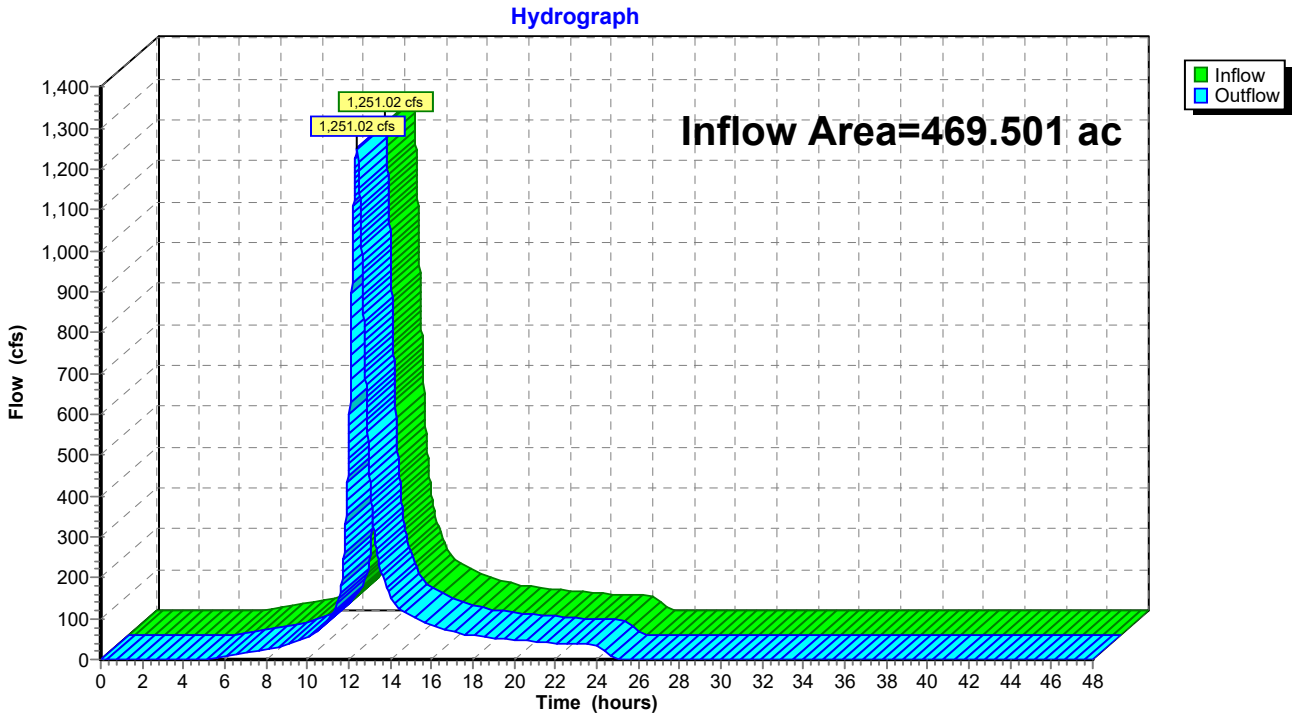


Summary for Reach ED: Reach Along Edge Site

Inflow Area = 469.501 ac, 45.66% Impervious, Inflow Depth = 4.63" for 100-yr event
Inflow = 1,251.02 cfs @ 12.39 hrs, Volume= 181.096 af
Outflow = 1,251.02 cfs @ 12.39 hrs, Volume= 181.096 af, Atten= 0%, Lag= 0.0 min
Routed to Reach PF : OutFall to Prices Fork

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Reach ED: Reach Along Edge Site

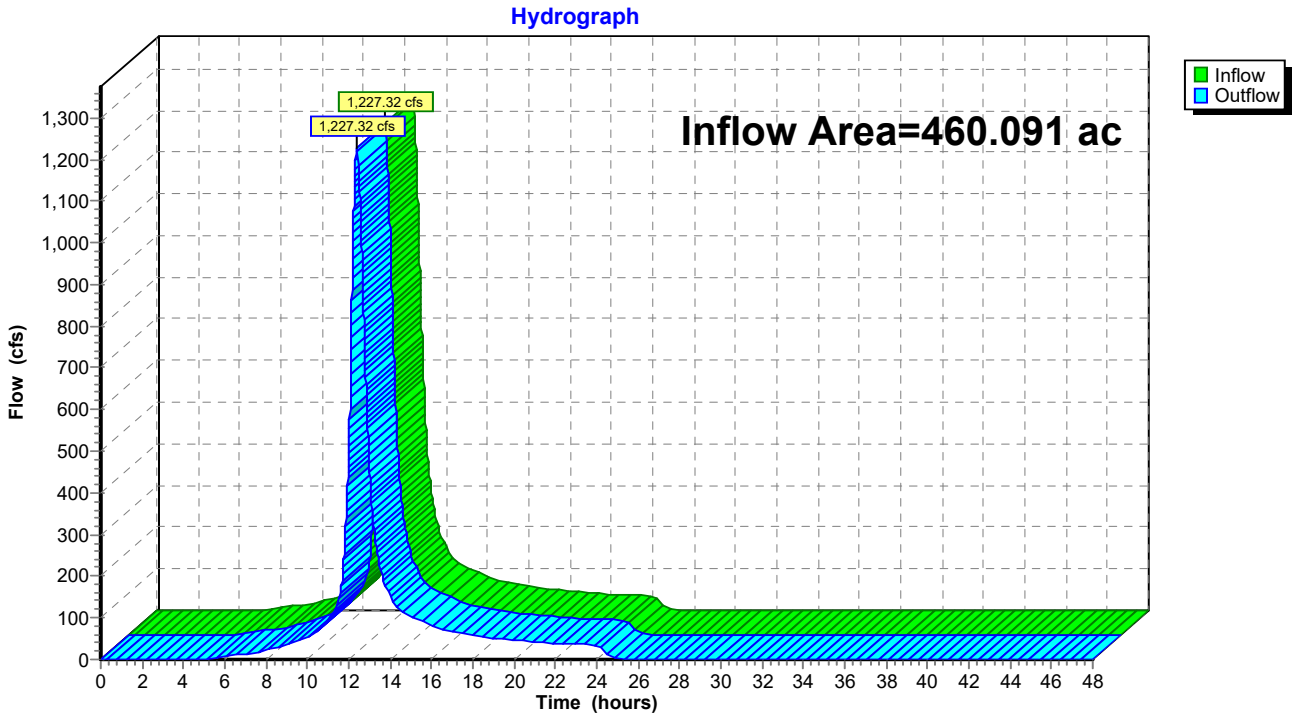


Summary for Reach KB: Outfall Below Kabrich

Inflow Area = 460.091 ac, 45.74% Impervious, Inflow Depth = 4.61" for 100-yr event
Inflow = 1,227.32 cfs @ 12.40 hrs, Volume= 176.830 af
Outflow = 1,227.32 cfs @ 12.40 hrs, Volume= 176.830 af, Atten= 0%, Lag= 0.0 min
Routed to Reach ED : Reach Along Edge Site

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Reach KB: Outfall Below Kabrich



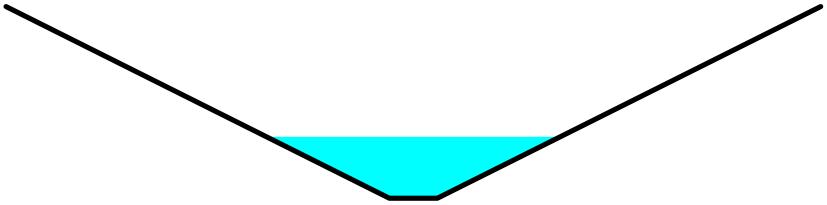
Summary for Reach MOR: MOOG Reach Section

Inflow Area = 69.353 ac, 59.71% Impervious, Inflow Depth = 4.89" for 100-yr event
Inflow = 209.02 cfs @ 12.38 hrs, Volume= 28.239 af
Outflow = 208.27 cfs @ 12.42 hrs, Volume= 28.239 af, Atten= 0%, Lag= 2.7 min
Routed to Reach STK : Stream to Kabrich Street

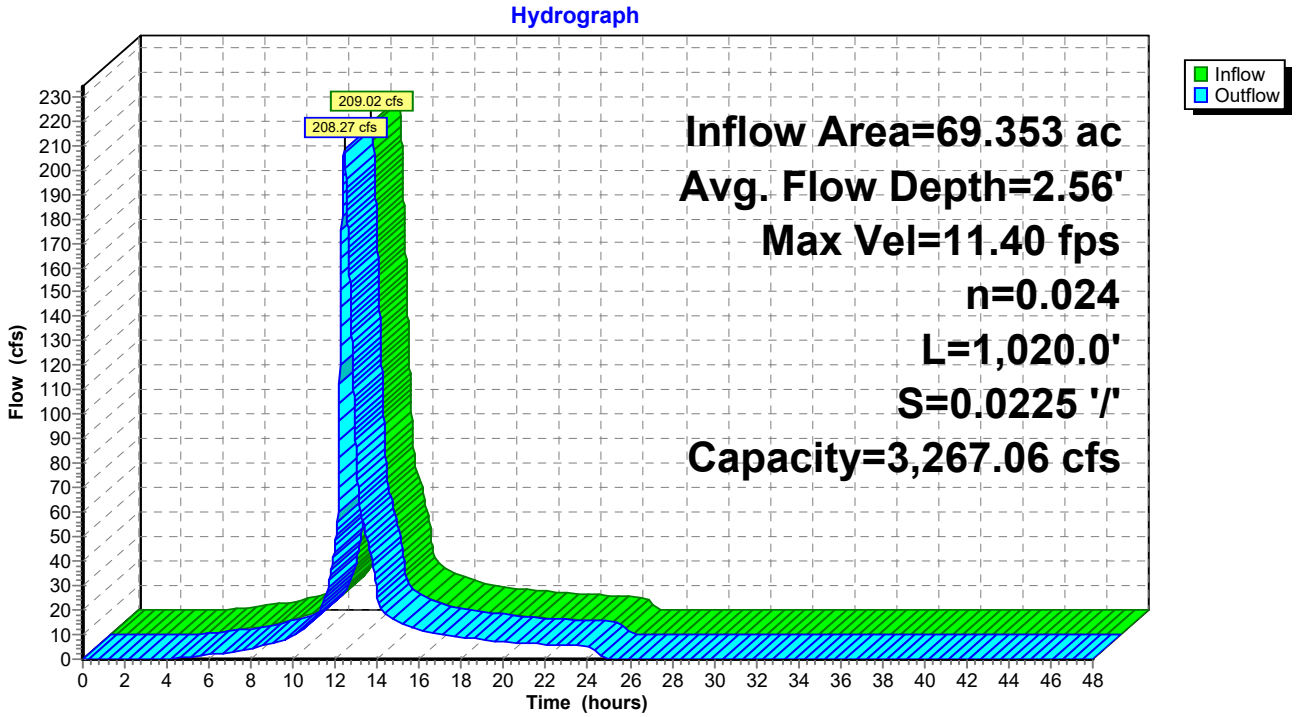
Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 11.40 fps, Min. Travel Time= 1.5 min
Avg. Velocity = 4.73 fps, Avg. Travel Time= 3.6 min

Peak Storage= 18,643 cf @ 12.40 hrs
Average Depth at Peak Storage= 2.56' , Surface Width= 12.26'
Bank-Full Depth= 8.00' Flow Area= 144.0 sf, Capacity= 3,267.06 cfs

2.00' x 8.00' deep channel, n= 0.024
Side Slope Z-value= 2.0 '/' Top Width= 34.00'
Length= 1,020.0' Slope= 0.0225 '/'
Inlet Invert= 2,115.00', Outlet Invert= 2,092.00'



Reach MOR: MOOG Reach Section

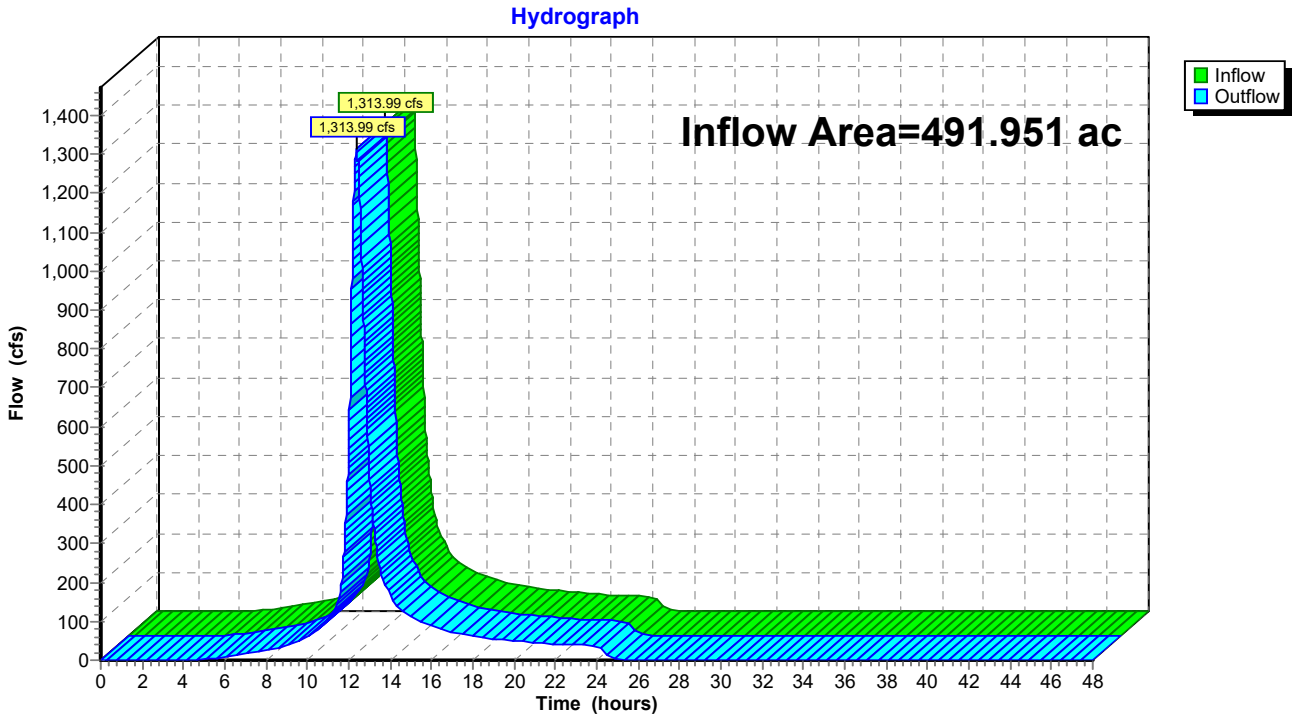


Summary for Reach PF: OutFall to Prices Fork

Inflow Area = 491.951 ac, 46.25% Impervious, Inflow Depth = 4.66" for 100-yr event
Inflow = 1,313.99 cfs @ 12.38 hrs, Volume= 190.844 af
Outflow = 1,313.99 cfs @ 12.38 hrs, Volume= 190.844 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Reach PF: OutFall to Prices Fork

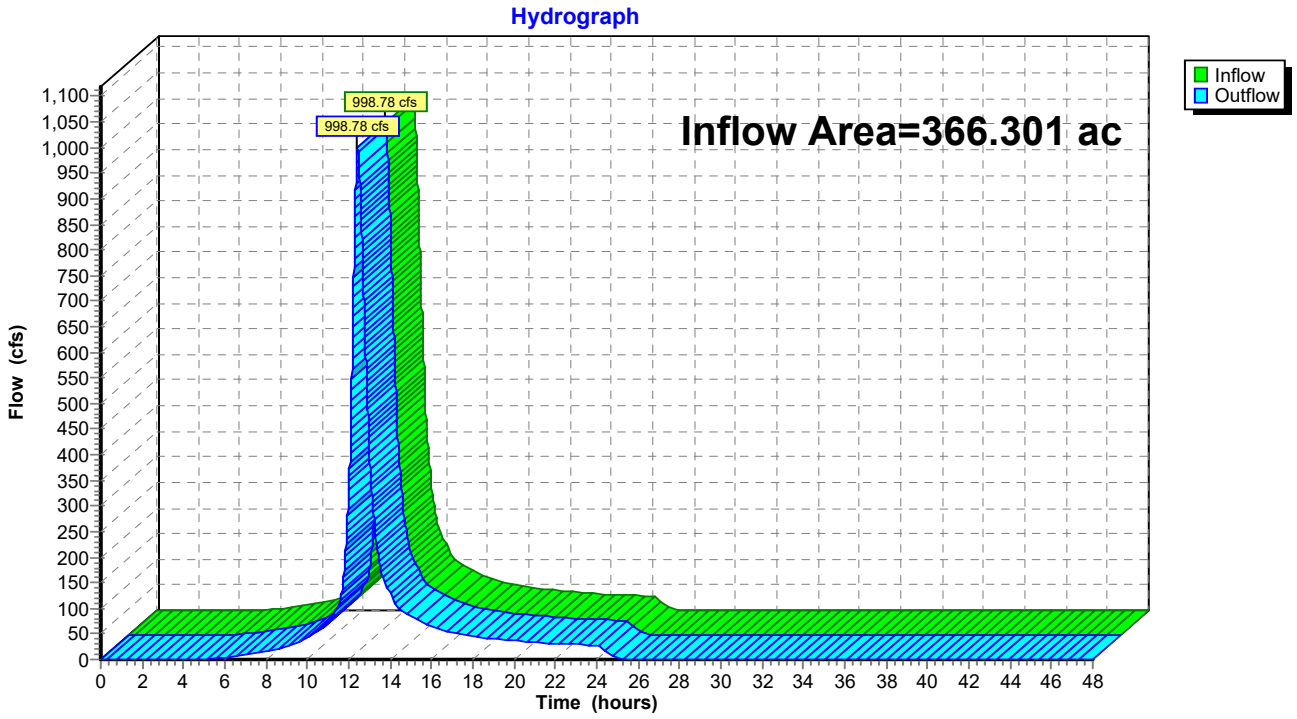


Summary for Reach SITE: Site Area

Inflow Area = 366.301 ac, 45.22% Impervious, Inflow Depth = 4.57" for 100-yr event
Inflow = 998.78 cfs @ 12.43 hrs, Volume= 139.501 af
Outflow = 998.78 cfs @ 12.43 hrs, Volume= 139.501 af, Atten= 0%, Lag= 0.0 min
Routed to Reach KB : Outfall Below Kabrich

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Reach SITE: Site Area



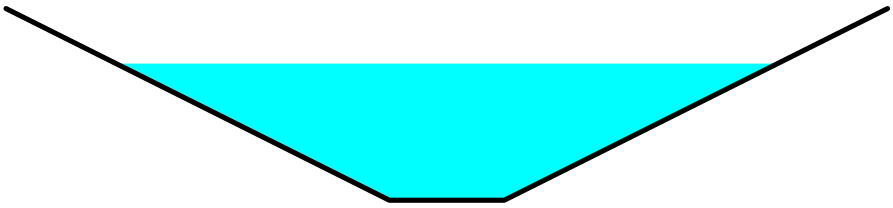
Summary for Reach STK: Stream to Kabrich Street

Inflow Area = 121.521 ac, 53.99% Impervious, Inflow Depth = 4.81" for 100-yr event
Inflow = 375.34 cfs @ 12.38 hrs, Volume= 48.739 af
Outflow = 363.26 cfs @ 12.50 hrs, Volume= 48.739 af, Atten= 3%, Lag= 7.4 min
Routed to Reach SITE : Site Area

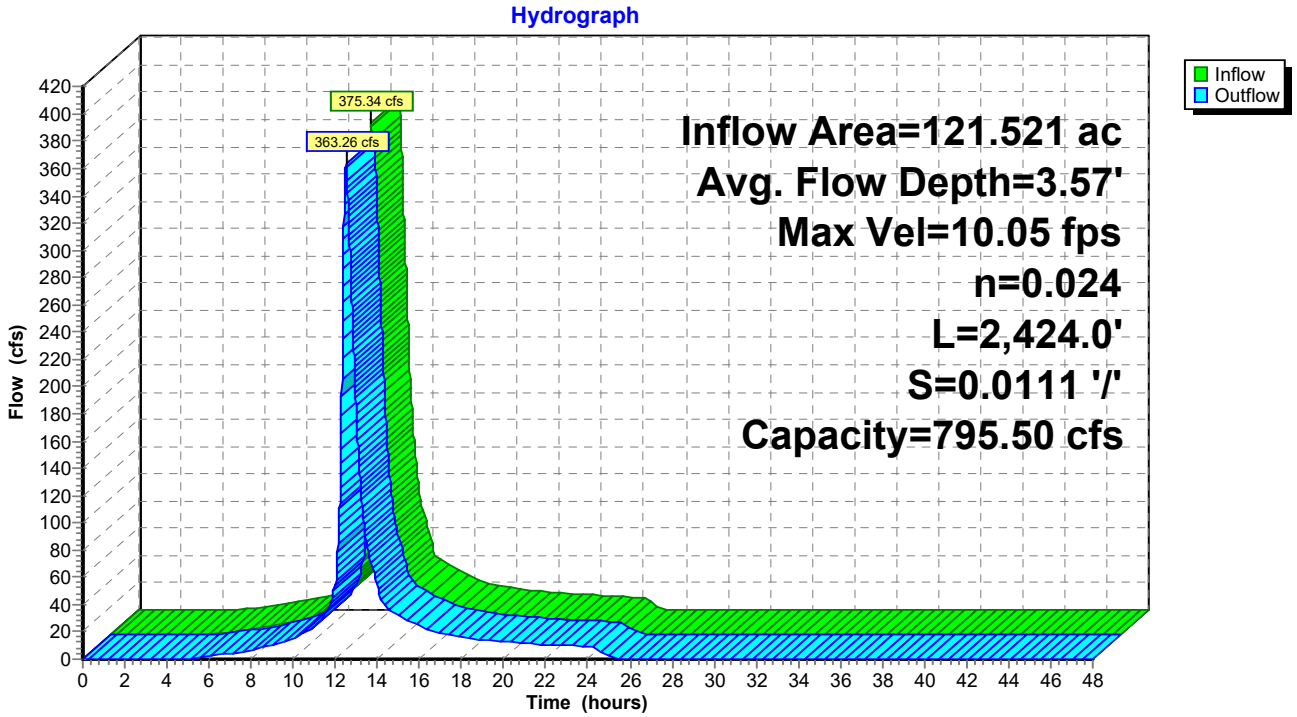
Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 10.05 fps, Min. Travel Time= 4.0 min
Avg. Velocity = 3.37 fps, Avg. Travel Time= 12.0 min

Peak Storage= 87,629 cf @ 12.43 hrs
Average Depth at Peak Storage= 3.57' , Surface Width= 17.27'
Bank-Full Depth= 5.00' Flow Area= 65.0 sf, Capacity= 795.50 cfs

3.00' x 5.00' deep channel, n= 0.024
Side Slope Z-value= 2.0 '/' Top Width= 23.00'
Length= 2,424.0' Slope= 0.0111 '/'
Inlet Invert= 2,092.00', Outlet Invert= 2,065.00'



Reach STK: Stream to Kabrich Street



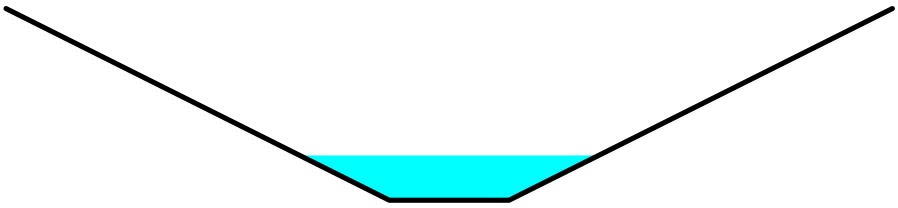
Summary for Reach USR: Upper Stream Reach

Inflow Area = 52.168 ac, 46.37% Impervious, Inflow Depth = 4.72" for 100-yr event
Inflow = 175.86 cfs @ 12.25 hrs, Volume= 20.500 af
Outflow = 173.90 cfs @ 12.35 hrs, Volume= 20.500 af, Atten= 1%, Lag= 5.8 min
Routed to Reach STK : Stream to Kabrich Street

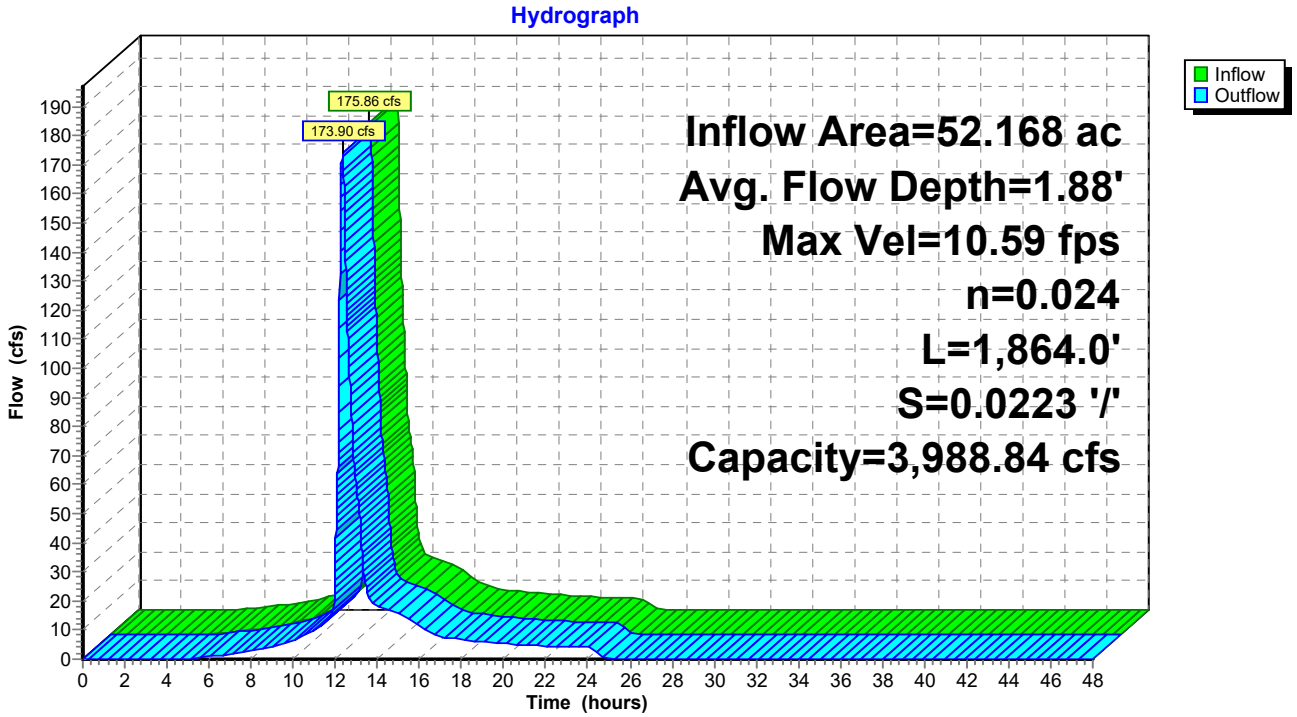
Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 10.59 fps, Min. Travel Time= 2.9 min
Avg. Velocity = 3.41 fps, Avg. Travel Time= 9.1 min

Peak Storage= 30,619 cf @ 12.30 hrs
Average Depth at Peak Storage= 1.88' , Surface Width= 12.51'
Bank-Full Depth= 8.00' Flow Area= 168.0 sf, Capacity= 3,988.84 cfs

5.00' x 8.00' deep channel, n= 0.024
Side Slope Z-value= 2.0 '/' Top Width= 37.00'
Length= 1,864.0' Slope= 0.0223 '/'
Inlet Invert= 2,133.50', Outlet Invert= 2,092.00'



Reach USR: Upper Stream Reach



Summary for Pond CVP: Clover Valley Pond

Inflow Area = 44.421 ac, 44.76% Impervious, Inflow Depth = 4.67" for 100-yr event
Inflow = 159.09 cfs @ 12.19 hrs, Volume= 17.274 af
Outflow = 192.02 cfs @ 12.20 hrs, Volume= 17.274 af, Atten= 0%, Lag= 0.4 min
Primary = 192.02 cfs @ 12.20 hrs, Volume= 17.274 af
Routed to Pond RP : Rutherford Pond

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 2,162.65' @ 12.20 hrs Surf.Area= 0.299 ac Storage= 0.837 af

Plug-Flow detention time= 3.4 min calculated for 17.270 af (100% of inflow)
Center-of-Mass det. time= 3.4 min (821.5 - 818.1)

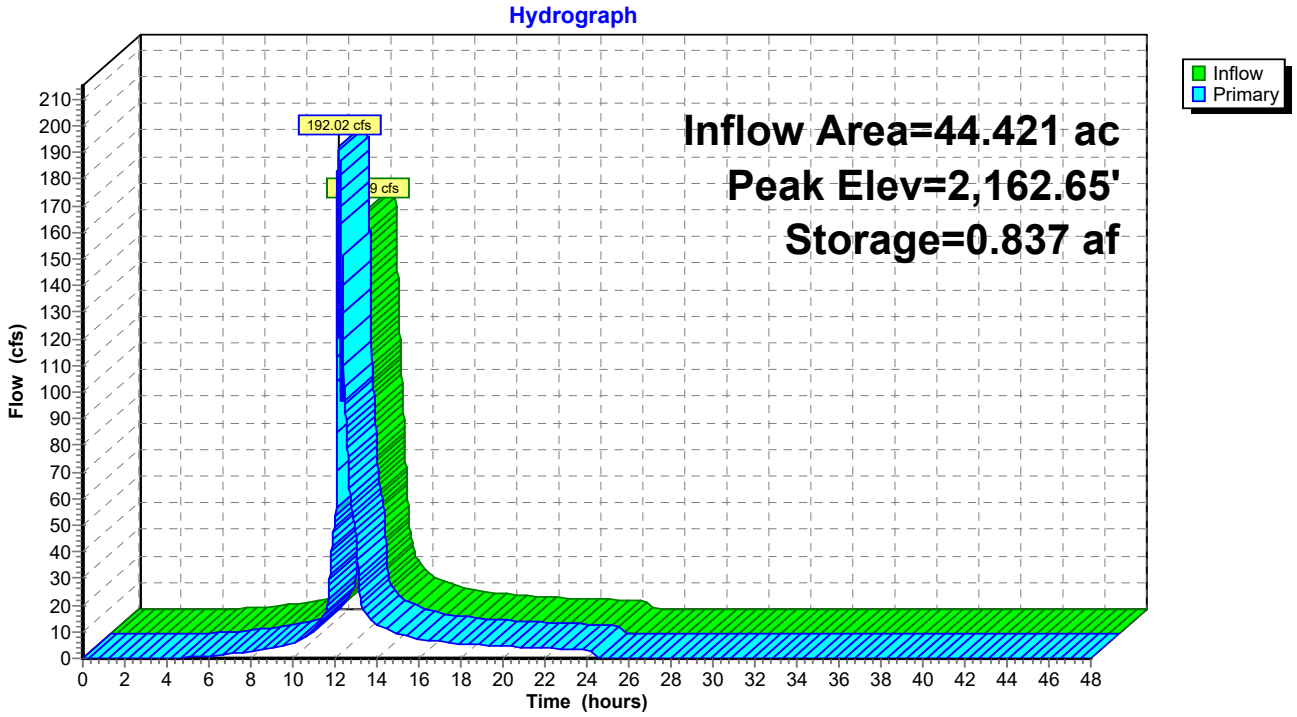
Volume	Invert	Avail.Storage	Storage Description
#1	2,155.00'	0.837 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
2,155.00	0.000	0.000	0.000
2,156.00	0.003	0.002	0.002
2,158.00	0.079	0.082	0.083
2,160.00	0.188	0.267	0.351
2,162.00	0.299	0.487	0.837

Device	Routing	Invert	Outlet Devices
#1	Primary	2,154.50'	**30.0" Round Culvert** L= 50.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,154.50' / 2,153.50' S= 0.0200 '/' Cc= 0.900 n= 0.013, Flow Area= 4.91 sf
#2	Device 1	2,155.00'	**18.0" Round Culvert** L= 3.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,155.00' / 2,154.50' S= 0.1667 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#3	Device 1	2,156.77'	**30.0" Round Culvert** L= 3.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,156.77' / 2,156.27' S= 0.1667 '/' Cc= 0.900 n= 0.013, Flow Area= 4.91 sf
#4	Device 1	2,160.25'	**84.0" x 48.0" Horiz. Orifice/Grate X 3.00** C= 0.600 Limited to weir flow at low heads
#5	Primary	2,161.50'	**40.0' long x 20.0' 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) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=191.78 cfs @ 12.20 hrs HW=2,162.65' (Free Discharge)
- **1=Culvert** (Inlet Controls 62.07 cfs @ 12.65 fps)
  - **2=Culvert** (Passes < 22.35 cfs potential flow)
  - **3=Culvert** (Passes < 50.84 cfs potential flow)
  - **4=Orifice/Grate** (Passes < 626.28 cfs potential flow)
- **5=Broad-Crested Rectangular Weir** (Weir Controls 129.71 cfs @ 2.83 fps)

Pond CVP: Clover Valley Pond



Summary for Pond P1: UST1

Inflow Area = 3.050 ac, 0.00% Impervious, Inflow Depth = 5.68" for 100-yr event
Inflow = 18.85 cfs @ 12.03 hrs, Volume= 1.443 af
Outflow = 12.86 cfs @ 12.09 hrs, Volume= 1.439 af, Atten= 32%, Lag= 4.0 min
Primary = 12.86 cfs @ 12.09 hrs, Volume= 1.439 af
Routed to Reach ED : Reach Along Edge Site

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 2,055.26' @ 12.09 hrs Surf.Area= 0.078 ac Storage= 0.445 af

Plug-Flow detention time= 174.9 min calculated for 1.439 af (100% of inflow)
Center-of-Mass det. time= 173.6 min (946.4 - 772.8)

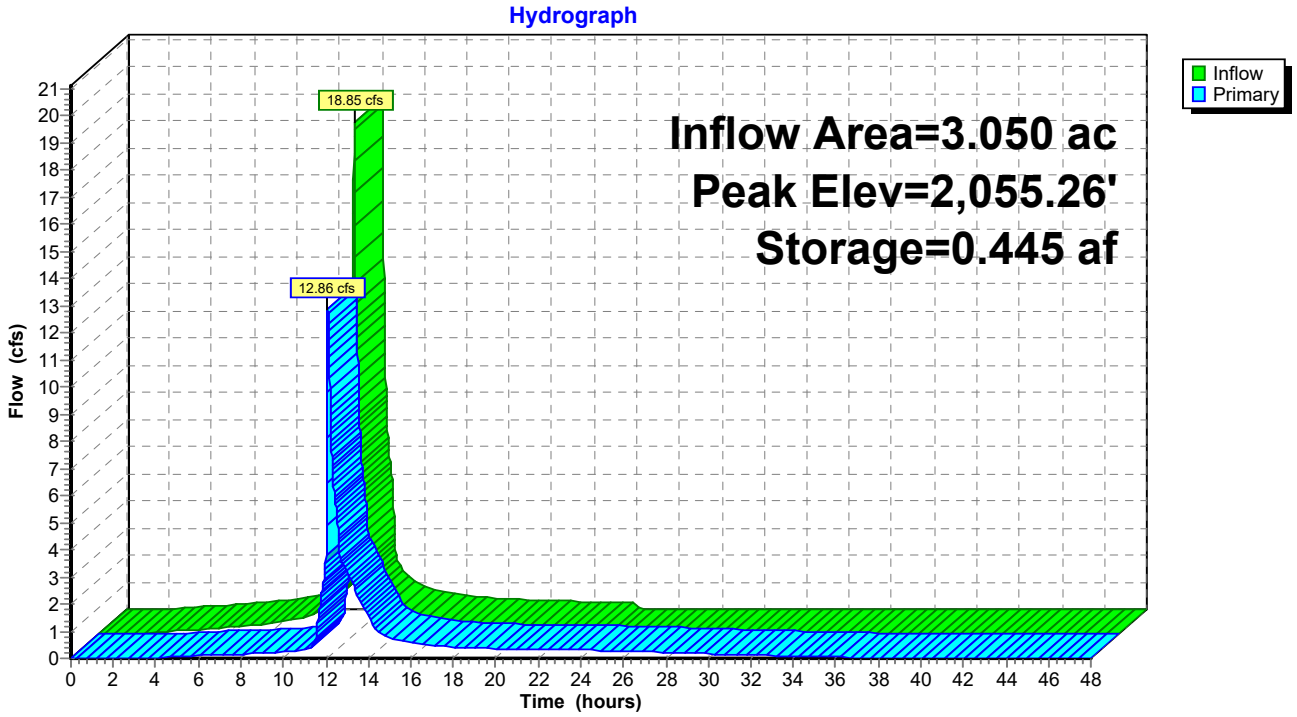
Volume	Invert	Avail.Storage	Storage Description
#1	2,050.75'	0.459 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
2,050.75	0.100	0.000	0.000
2,051.75	0.100	0.100	0.100
2,052.75	0.100	0.100	0.200
2,053.75	0.100	0.100	0.300
2,054.75	0.100	0.100	0.400
2,055.45	0.070	0.059	0.459

Device	Routing	Invert	Outlet Devices
#1	Primary	2,050.75'	**18.0" Round Culvert** L= 42.4' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,050.75' / 2,049.25' S= 0.0354 '/' Cc= 0.900 n= 0.011, Flow Area= 1.77 sf
#2	Device 1	2,050.75'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	2,052.65'	**14.0" W x 5.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	2,054.65'	**6.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=12.83 cfs @ 12.09 hrs HW=2,055.26' (Free Discharge)
└**1=Culvert** (Passes 12.83 cfs of 16.49 cfs potential flow)
  ├**2=Orifice/Grate** (Orifice Controls 0.49 cfs @ 10.08 fps)
  ├**3=Orifice/Grate** (Orifice Controls 3.62 cfs @ 7.45 fps)
  └**4=Broad-Crested Rectangular Weir** (Weir Controls 8.71 cfs @ 2.40 fps)

Pond P1: UST1


Hydrograph
Inflow
Primary
18.85 cfs
12.86 cfs
Inflow Area=3.050 ac
Peak Elev=2,055.26'
Storage=0.445 af
Flow (cfs)
Time (hours)
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48

Summary for Pond P2: UST2

Inflow Area = 11.650 ac, 51.33% Impervious, Inflow Depth = 4.89" for 100-yr event
Inflow = 43.51 cfs @ 12.18 hrs, Volume= 4.744 af
Outflow = 52.12 cfs @ 12.22 hrs, Volume= 4.743 af, Atten= 0%, Lag= 2.1 min
Primary = 52.12 cfs @ 12.22 hrs, Volume= 4.743 af
Routed to Reach PF : OutFall to Prices Fork

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 2,050.36' @ 12.22 hrs Surf.Area= 0.204 ac Storage= 1.020 af

Plug-Flow detention time= 58.7 min calculated for 4.742 af (100% of inflow)
Center-of-Mass det. time= 58.9 min (870.3 - 811.4)

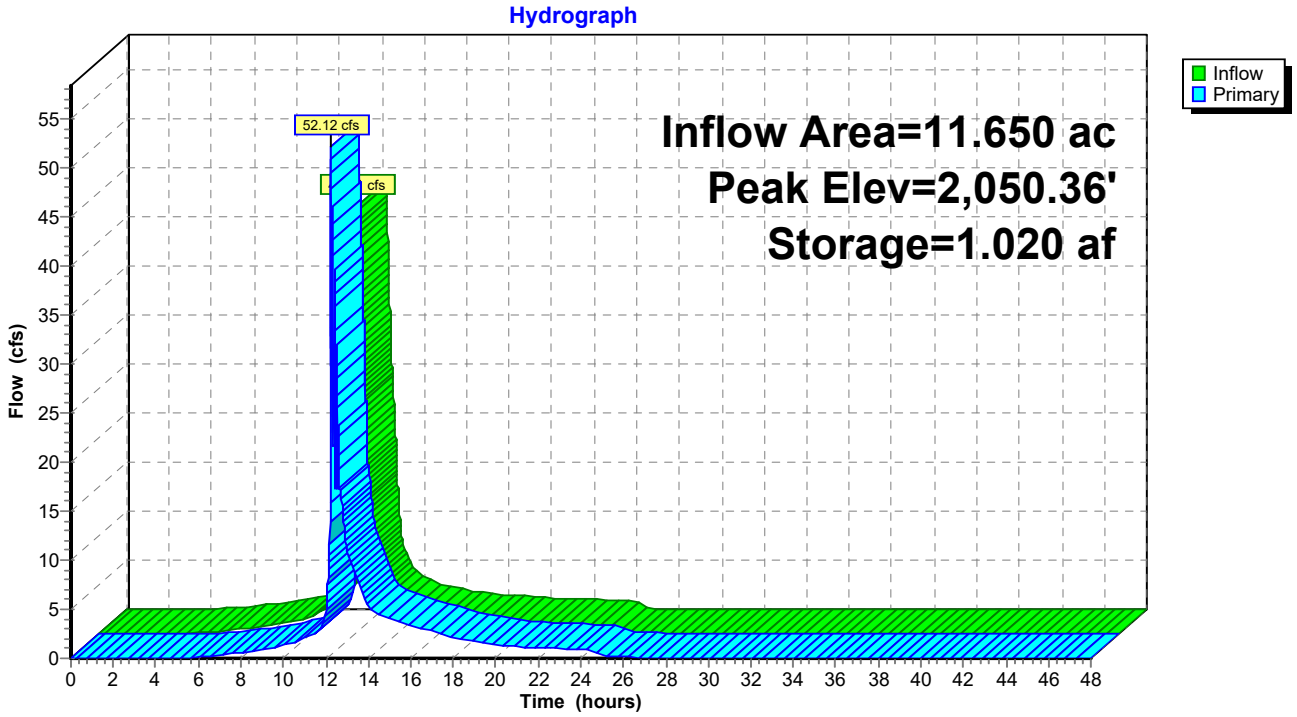
Volume	Invert	Avail.Storage	Storage Description
#1	2,044.25'	1.020 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
2,044.25	0.204	0.000	0.000
2,045.25	0.204	0.204	0.204
2,046.25	0.204	0.204	0.408
2,047.25	0.204	0.204	0.612
2,048.25	0.204	0.204	0.816
2,049.25	0.204	0.204	1.020

Device	Routing	Invert	Outlet Devices
#1	Primary	2,044.25'	**30.0" Round Culvert** L= 35.1' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,044.25' / 2,043.83' S= 0.0120 '/' Cc= 0.900 n= 0.011, Flow Area= 4.91 sf
#2	Device 1	2,044.25'	**14.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	2,047.00'	**16.0" W x 8.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	2,048.80'	**6.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=52.12 cfs @ 12.22 hrs HW=2,050.36' (Free Discharge)
└**1=Culvert** (Inlet Controls 52.12 cfs @ 10.62 fps)
├**2=Orifice/Grate** (Passes < 6.80 cfs potential flow)
├**3=Orifice/Grate** (Passes < 7.45 cfs potential flow)
└**4=Broad-Crested Rectangular Weir** (Passes < 38.90 cfs potential flow)

Pond P2: UST2


Hydrograph
Inflow Area=11.650 ac
Peak Elev=2,050.36'
Storage=1.020 af
52.12 cfs
cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0
5
10
15
20
25
30
35
40
45
50
55
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48

Summary for Pond RP: Rutherford Pond

Inflow Area = 52.168 ac, 46.37% Impervious, Inflow Depth = 4.72" for 100-yr event
Inflow = 221.73 cfs @ 12.18 hrs, Volume= 20.500 af
Outflow = 175.86 cfs @ 12.25 hrs, Volume= 20.500 af, Atten= 21%, Lag= 4.2 min
Primary = 175.86 cfs @ 12.25 hrs, Volume= 20.500 af
Routed to Reach USR : Upper Stream Reach

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 2,142.34' @ 12.25 hrs Storage= 61,053 cf

Plug-Flow detention time= 11.3 min calculated for 20.496 af (100% of inflow)
Center-of-Mass det. time= 11.3 min (829.9 - 818.7)

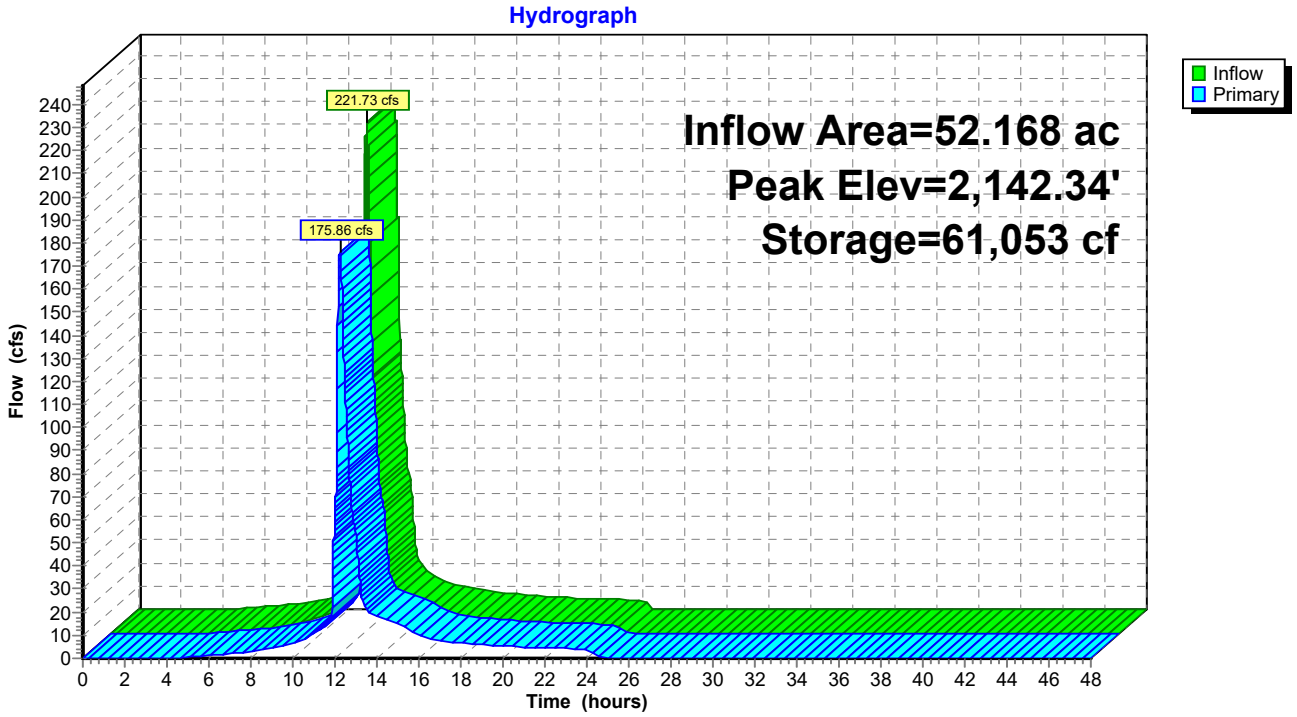
Volume	Invert	Avail.Storage	Storage Description
#1	2,135.00'	74,503 cf	**Custom Stage Data** Listed below

Elevation (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,135.00	0	0
2,136.00	1,366	1,366
2,137.00	3,129	4,495
2,138.00	5,175	9,670
2,139.00	7,760	17,430
2,140.00	10,340	27,770
2,141.00	12,305	40,075
2,142.00	13,925	54,000
2,143.00	20,503	74,503

Device	Routing	Invert	Outlet Devices
#1	Primary	2,134.82'	**54.0" Round Culvert** L= 82.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,134.82' / 2,134.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 15.90 sf
#2	Device 1	2,135.00'	**18.0" Round Culvert** L= 3.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,135.00' / 2,134.82' S= 0.0600 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#3	Device 1	2,140.50'	**72.0" x 48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Primary	2,142.50'	**60.0' long x 30.0' 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) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=175.86 cfs @ 12.25 hrs HW=2,142.34' (Free Discharge)
- **1=Culvert** (Inlet Controls 175.86 cfs @ 11.06 fps)
  - **2=Culvert** (Passes < 21.85 cfs potential flow)
  - **3=Orifice/Grate** (Passes < 156.92 cfs potential flow)
- **4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond RP: Rutherford Pond



Summary for Pond SP: Shenandoah Pond

Inflow Area = 69.353 ac, 59.71% Impervious, Inflow Depth = 4.89" for 100-yr event
Inflow = 228.58 cfs @ 12.27 hrs, Volume= 28.239 af
Outflow = 209.02 cfs @ 12.38 hrs, Volume= 28.239 af, Atten= 9%, Lag= 6.1 min
Primary = 209.02 cfs @ 12.38 hrs, Volume= 28.239 af
Routed to Reach MOR : MOOG Reach Section

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 2,124.89' @ 12.38 hrs Surf.Area= 37,104 sf Storage= 113,623 cf

Plug-Flow detention time= 6.7 min calculated for 28.239 af (100% of inflow)
Center-of-Mass det. time= 6.7 min (824.0 - 817.2)

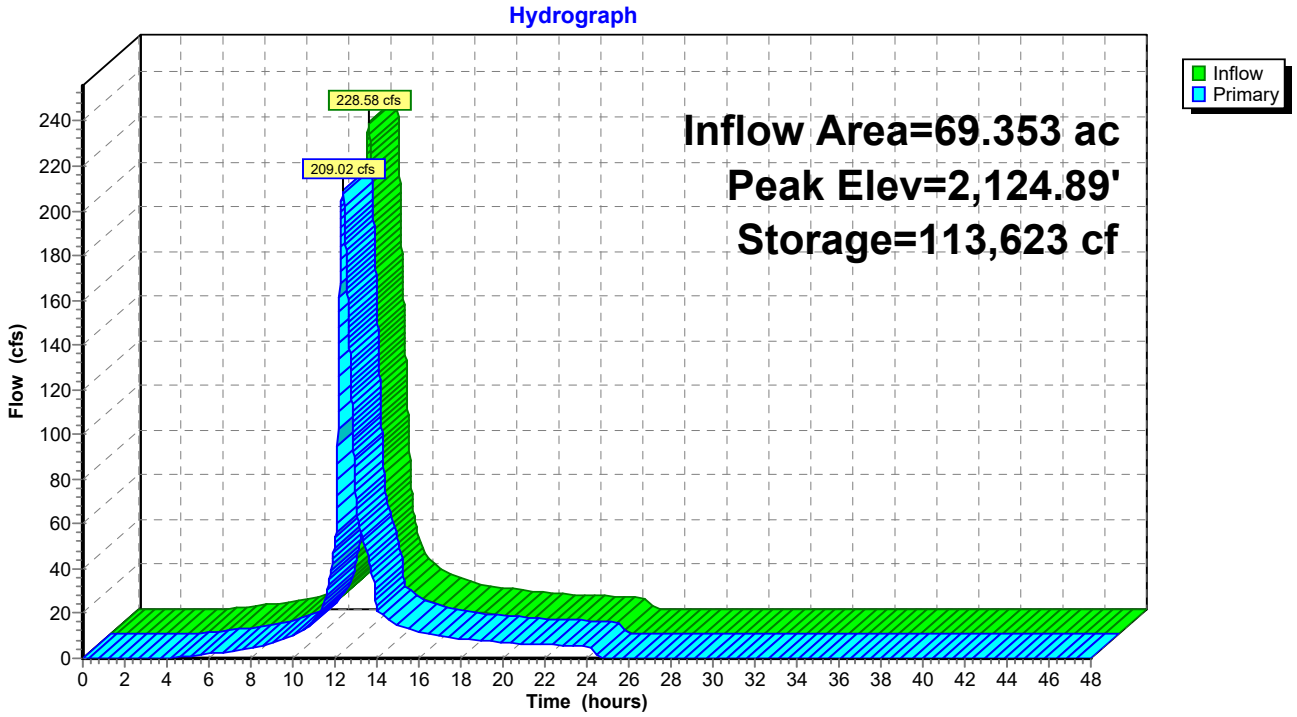
Volume	Invert	Avail.Storage	Storage Description
#1	2,117.00'	117,739 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,117.00	0	0	0
2,118.00	955	478	478
2,120.00	2,580	3,535	4,013
2,122.00	21,522	24,102	28,115
2,124.00	32,858	54,380	82,495
2,125.00	37,630	35,244	117,739

Device	Routing	Invert	Outlet Devices
#1	Primary	2,117.00'	**36.0" Round Culvert** L= 75.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,117.00' / 2,116.51' S= 0.0065 '/' Cc= 0.900 n= 0.024, Flow Area= 7.07 sf
#2	Primary	2,123.00'	**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=208.96 cfs @ 12.38 hrs HW=2,124.89' (Free Discharge)
1=Culvert (Barrel Controls 71.82 cfs @ 10.16 fps)
2=Broad-Crested Rectangular Weir (Weir Controls 137.14 cfs @ 3.63 fps)

Pond SP: Shenandoah Pond



Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentA: Drainage Area Webb Runoff Area=6.360 ac 61.95% Impervious Runoff Depth=7.40"
Flow Length=1,277' Tc=18.5 min CN=90 Runoff=29.91 cfs 3.920 af

SubcatchmentB: Drainage Area to Prices Runoff Area=10.800 ac 66.20% Impervious Runoff Depth=7.64"
Flow Length=630' Tc=12.5 min CN=92 Runoff=59.47 cfs 6.874 af

SubcatchmentCO: Clover Valley Pond DA Runoff Area=44.421 ac 44.76% Impervious Runoff Depth=6.67"
Flow Length=2,092' Tc=17.5 min CN=84 Runoff=199.41 cfs 24.701 af

SubcatchmentK: Drainage Area Kabrich Runoff Area=93.790 ac 47.77% Impervious Runoff Depth=6.79"
Flow Length=3,788' Tc=18.2 min CN=85 Runoff=419.72 cfs 53.096 af

SubcatchmentRU: Rutherford Pond DA Runoff Area=7.747 ac 55.63% Impervious Runoff Depth=7.03"
Flow Length=741' Tc=12.4 min CN=87 Runoff=40.64 cfs 4.542 af

SubcatchmentSH: Shenandoah Pond DA Runoff Area=69.353 ac 59.71% Impervious Runoff Depth=6.91"
Flow Length=2,630' Tc=23.5 min CN=86 Runoff=285.32 cfs 39.960 af

SubcatchmentUG1: UST 1 DA Runoff Area=3.050 ac 0.00% Impervious Runoff Depth=7.76"
Tc=5.0 min CN=93 Runoff=21.92 cfs 1.972 af

SubcatchmentUG2: UST 2 DA Runoff Area=11.650 ac 51.33% Impervious Runoff Depth=6.91"
Flow Length=480' Tc=17.2 min CN=86 Runoff=53.86 cfs 6.712 af

SubcatchmentUS1: Upstream of Site Runoff Area=244.780 ac 40.87% Impervious Runoff Depth=6.43"
Flow Length=5,941' Tc=28.6 min CN=82 Runoff=880.76 cfs 131.185 af

SubcatchmentUS2: Upstream of Site Runoff Area=244.780 ac 41.04% Impervious Runoff Depth=6.43"
Flow Length=5,941' Tc=28.6 min CN=82 Runoff=880.76 cfs 131.185 af

Reach ED: Reach Along Edge Site Inflow=1,671.73 cfs 259.372 af
Outflow=1,671.73 cfs 259.372 af

Reach KB: Outfall Below Kabrich Inflow=1,641.65 cfs 253.482 af
Outflow=1,641.65 cfs 253.482 af

Reach MOR: MOOG Reach Section Avg. Flow Depth=2.93' Max Vel=12.32 fps Inflow=295.34 cfs 39.960 af
n=0.024 L=1,020.0' S=0.0225 '/' Capacity=3,267.06 cfs Outflow=283.70 cfs 39.960 af

Reach PF: OutFall to Prices Fork Inflow=1,763.66 cfs 272.959 af
Outflow=1,763.66 cfs 272.959 af

Reach SITE: Site Area Inflow=1,336.65 cfs 200.386 af
Outflow=1,336.65 cfs 200.386 af

Reach STK: Stream to Kabrich Avg. Flow Depth=4.04' Max Vel=10.81 fps Inflow=505.40 cfs 69.202 af
n=0.024 L=2,424.0' S=0.0111 '/' Capacity=795.50 cfs Outflow=484.34 cfs 69.202 af

Reach USR: Upper Stream Reach Avg. Flow Depth=2.12' Max Vel=11.31 fps Inflow=227.35 cfs 29.242 af
n=0.024 L=1,864.0' S=0.0223 '/' Capacity=3,988.84 cfs Outflow=221.96 cfs 29.242 af

Pond CVP: Clover Valley Pond Peak Elev=2,162.72' Storage=0.837 af Inflow=199.41 cfs 24.701 af
Outflow=205.43 cfs 24.701 af

Pond P1: UST1 Peak Elev=2,060.92' Storage=0.459 af Inflow=21.92 cfs 1.972 af
Outflow=26.12 cfs 1.970 af

Pond P2: UST2 Peak Elev=2,057.28' Storage=1.020 af Inflow=53.86 cfs 6.712 af
Outflow=81.11 cfs 6.712 af

Pond RP: Rutherford Pond Peak Elev=2,142.91' Storage=72,621 cf Inflow=242.06 cfs 29.242 af
Outflow=227.35 cfs 29.242 af

Pond SP: Shenandoah Pond Peak Elev=2,125.58' Storage=117,739 cf Inflow=285.32 cfs 39.960 af
Outflow=295.34 cfs 39.960 af

Total Runoff Area = 736.731 ac Runoff Volume = 404.146 af Average Runoff Depth = 6.58"
55.48% Pervious = 408.755 ac 44.52% Impervious = 327.976 ac

Summary for Subcatchment A: Drainage Area Webb Street

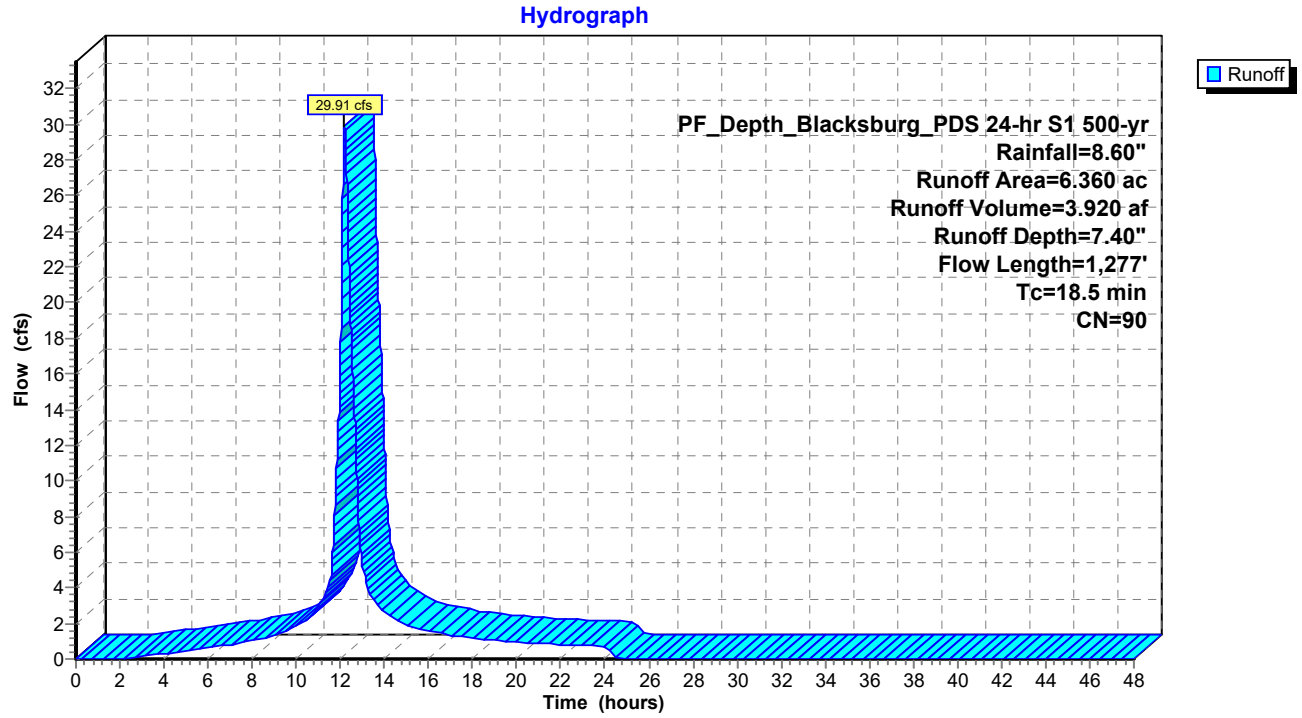
Runoff = 29.91 cfs @ 12.20 hrs, Volume= 3.920 af, Depth= 7.40"
Routed to Reach ED : Reach Along Edge Site

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
PF_Depth_Blacksburg_PDS 24-hr S1 500-yr Rainfall=8.60"

Area (ac)	CN	Description
1.390	74	>75% Grass cover, Good, HSG C
1.030	80	>75% Grass cover, Good, HSG D
3.940	98	Unconnected pavement, HSG C
6.360	90	Weighted Average
2.420		38.05% Pervious Area
3.940		61.95% Impervious Area
3.940		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.4	100	0.0200	0.11		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.76"
2.2	424	0.0400	3.22		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.9	753	0.0200	13.90	166.80	**Channel Flow,** Area= 12.0 sf Perim= 6.0' r= 2.00' n= 0.024
18.5	1,277	Total			

Subcatchment A: Drainage Area Webb Street



Summary for Subcatchment B: Drainage Area to Prices Fork

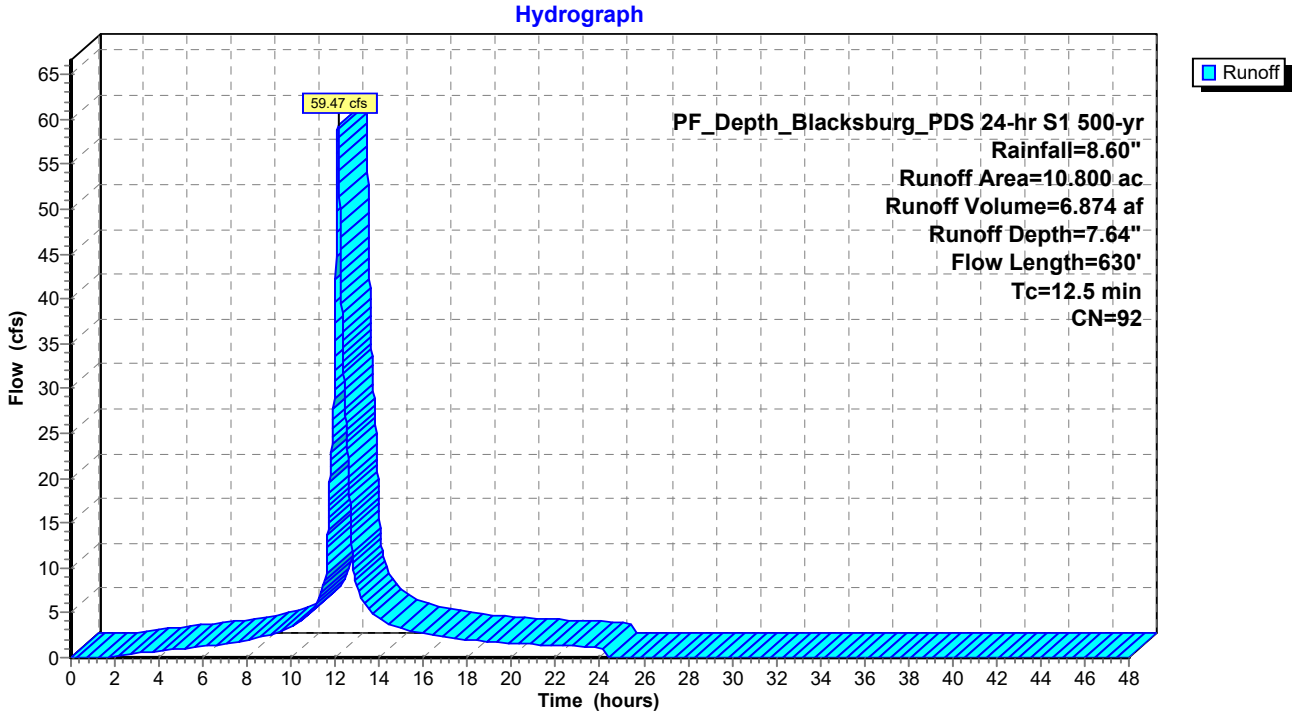
Runoff = 59.47 cfs @ 12.12 hrs, Volume= 6.874 af, Depth= 7.64"
Routed to Reach PF : OutFall to Prices Fork

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
PF_Depth_Blacksburg_PDS 24-hr S1 500-yr Rainfall=8.60"

Area (ac)	CN	Description
3.650	80	>75% Grass cover, Good, HSG D
7.150	98	Unconnected pavement, HSG C
10.800	92	Weighted Average
3.650		33.80% Pervious Area
7.150		66.20% Impervious Area
7.150		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.7	100	0.0500	0.16		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.76"
0.4	80	0.0500	3.60		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
1.4	450	0.0200	5.52	33.10	**Channel Flow,** Area= 6.0 sf Perim= 12.0' r= 0.50' n= 0.024
12.5	630	Total			

Subcatchment B: Drainage Area to Prices Fork



Summary for Subcatchment CO: Clover Valley Pond DA

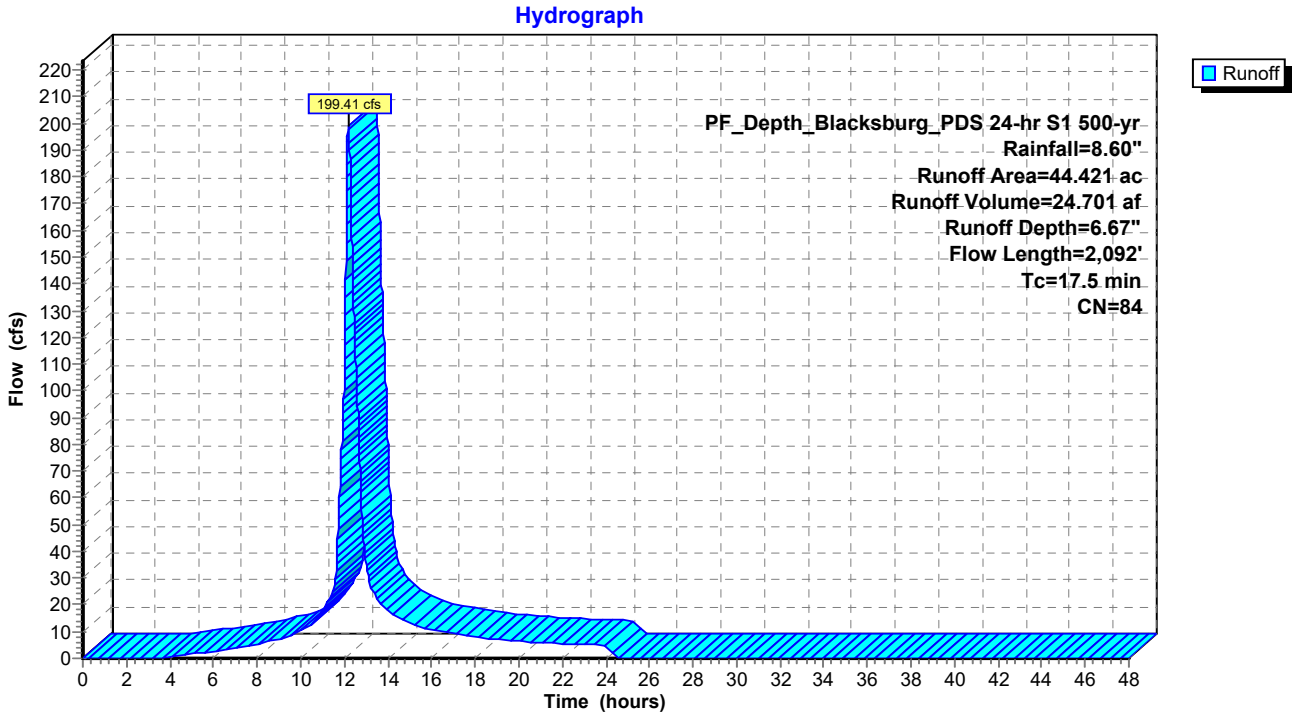
Runoff = 199.41 cfs @ 12.19 hrs, Volume= 24.701 af, Depth= 6.67"
Routed to Pond CVP : Clover Valley Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
PF_Depth_Blacksburg_PDS 24-hr S1 500-yr Rainfall=8.60"

Area (ac)	CN	Description
1.300	70	Woods, Good, HSG C
2.576	74	>75% Grass cover, Good, HSG C
0.198	68	1 acre lots, 20% imp, HSG B
0.507	79	1 acre lots, 20% imp, HSG C
4.150	70	1/2 acre lots, 25% imp, HSG B
10.489	80	1/2 acre lots, 25% imp, HSG C
1.456	72	1/3 acre lots, 30% imp, HSG B
2.101	81	1/3 acre lots, 30% imp, HSG C
1.438	85	1/8 acre lots, 65% imp, HSG B
8.011	90	1/8 acre lots, 65% imp, HSG C
1.487	92	Urban commercial, 85% imp, HSG B
6.136	94	Urban commercial, 85% imp, HSG C
0.610	89	Paved roads w/open ditches, 50% imp, HSG B
0.212	98	Paved parking, HSG C
3.750	92	Paved roads w/open ditches, 50% imp, HSG C
44.421	84	Weighted Average
24.540		55.24% Pervious Area
19.881		44.76% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	150	0.1400	0.26		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.76"
7.7	1,942	0.0690	4.23		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
17.5	2,092	Total			

Subcatchment CO: Clover Valley Pond DA



Summary for Subcatchment K: Drainage Area Kabrich

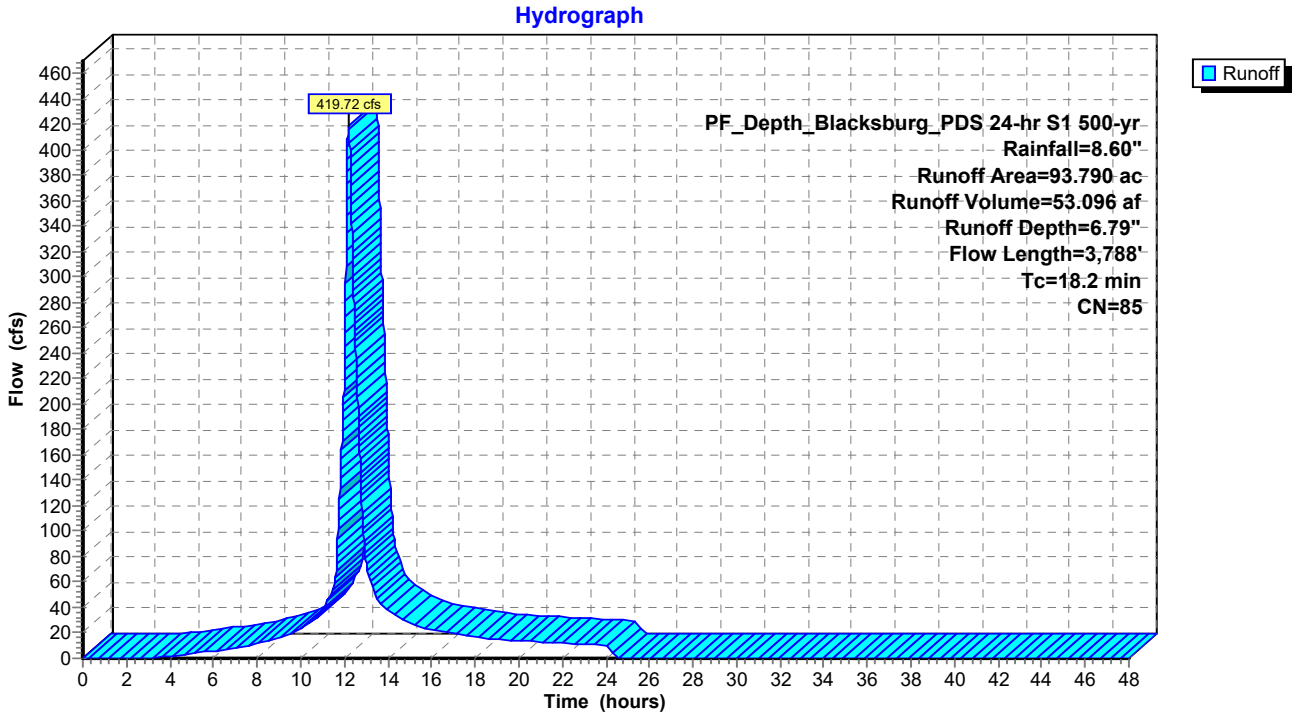
Runoff = 419.72 cfs @ 12.20 hrs, Volume= 53.096 af, Depth= 6.79"
Routed to Reach KB : Outfall Below Kabrich

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
PF_Depth_Blacksburg_PDS 24-hr S1 500-yr Rainfall=8.60"

Area (ac)	CN	Description
3.400	61	>75% Grass cover, Good, HSG B
45.590	74	>75% Grass cover, Good, HSG C
44.800	98	Paved parking, HSG B
93.790	85	Weighted Average
48.990		52.23% Pervious Area
44.800		47.77% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.7	100	0.0500	0.16		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.76"
2.6	322	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.5	1,152	0.0300	12.47	39.18	**Pipe Channel,** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.013
1.5	1,371	0.0240	15.23	182.72	**Channel Flow,** Area= 12.0 sf Perim= 6.0' r= 2.00' n= 0.024
1.9	843	0.0200	7.23	51.09	**Pipe Channel,** 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.024
18.2	3,788	Total			

Subcatchment K: Drainage Area Kabrich



Summary for Subcatchment RU: Rutherford Pond DA

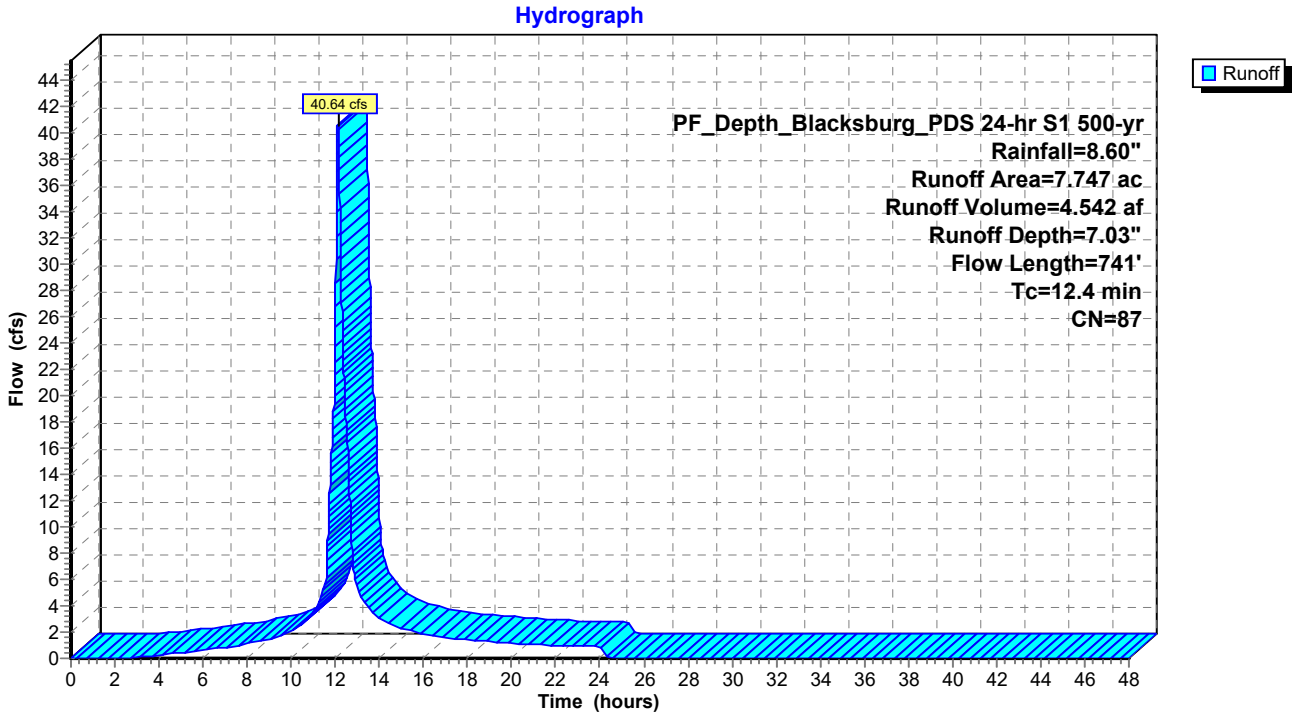
Runoff = 40.64 cfs @ 12.12 hrs, Volume= 4.542 af, Depth= 7.03"
Routed to Pond RP : Rutherford Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
PF_Depth_Blacksburg_PDS 24-hr S1 500-yr Rainfall=8.60"

Area (ac)	CN	Description
0.105	61	>75% Grass cover, Good, HSG B
0.939	74	>75% Grass cover, Good, HSG C
0.132	70	1/2 acre lots, 25% imp, HSG B
0.278	80	1/2 acre lots, 25% imp, HSG C
0.393	85	1/8 acre lots, 65% imp, HSG B
5.318	90	1/8 acre lots, 65% imp, HSG C
0.195	92	Urban commercial, 85% imp, HSG B
0.387	94	Urban commercial, 85% imp, HSG C
7.747	87	Weighted Average
3.438		44.37% Pervious Area
4.309		55.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.6	150	0.1130	0.24		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.76"
1.8	591	0.0745	5.54		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
12.4	741	Total			

Subcatchment RU: Rutherford Pond DA



Summary for Subcatchment SH: Shenandoah Pond DA

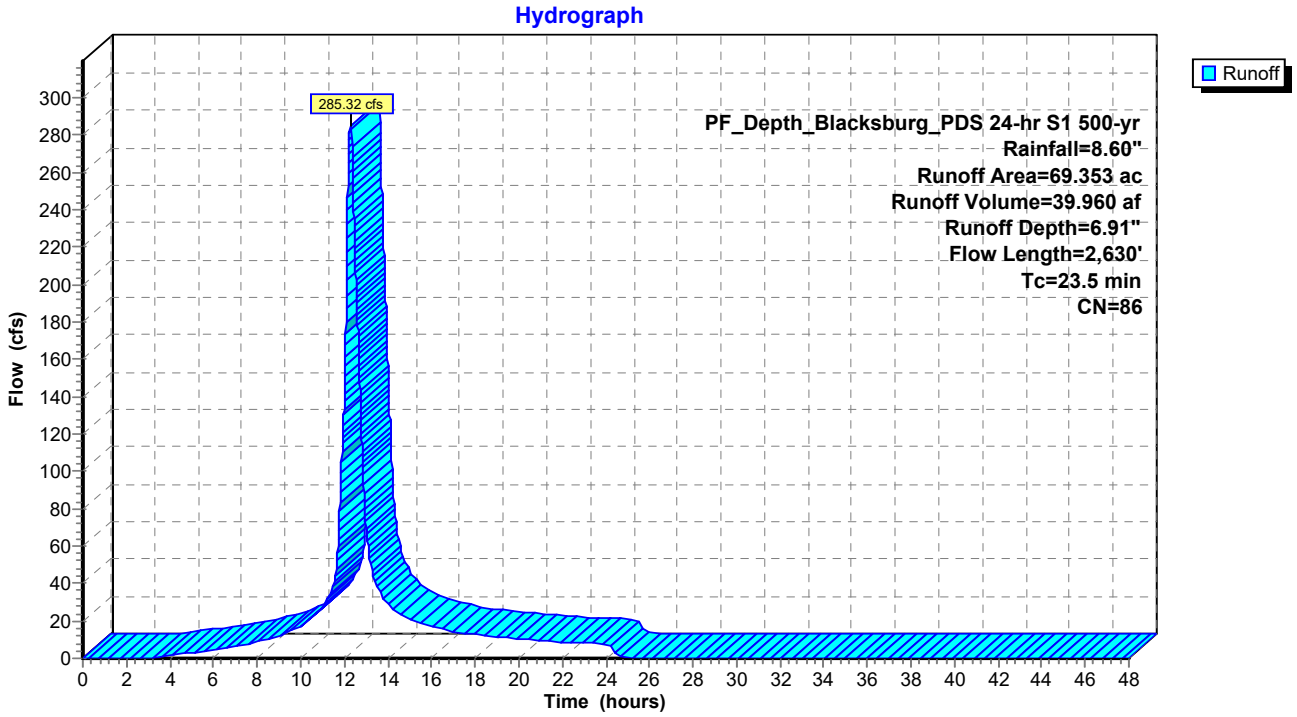
Runoff = 285.32 cfs @ 12.27 hrs, Volume= 39.960 af, Depth= 6.91"
Routed to Pond SP : Shenandoah Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
PF_Depth_Blacksburg_PDS 24-hr S1 500-yr Rainfall=8.60"

Area (ac)	CN	Description
7.130	61	>75% Grass cover, Good, HSG B
0.534	74	>75% Grass cover, Good, HSG C
0.108	68	1 acre lots, 20% imp, HSG B
0.773	70	1/2 acre lots, 25% imp, HSG B
0.054	80	1/2 acre lots, 25% imp, HSG C
14.304	85	1/8 acre lots, 65% imp, HSG B
20.223	90	1/8 acre lots, 65% imp, HSG C
8.803	88	Urban industrial, 72% imp, HSG B
9.941	92	Urban commercial, 85% imp, HSG B
0.610	94	Urban commercial, 85% imp, HSG C
4.119	89	Paved roads w/open ditches, 50% imp, HSG B
2.754	92	Paved roads w/open ditches, 50% imp, HSG C
69.353	86	Weighted Average
27.939		40.29% Pervious Area
41.414		59.71% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.8	150	0.0867	0.21		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.76"
2.4	647	0.0773	4.48		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
9.3	1,833	0.0262	3.29		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
23.5	2,630	Total			

Subcatchment SH: Shenandoah Pond DA



Summary for Subcatchment UG1: UST 1 DA

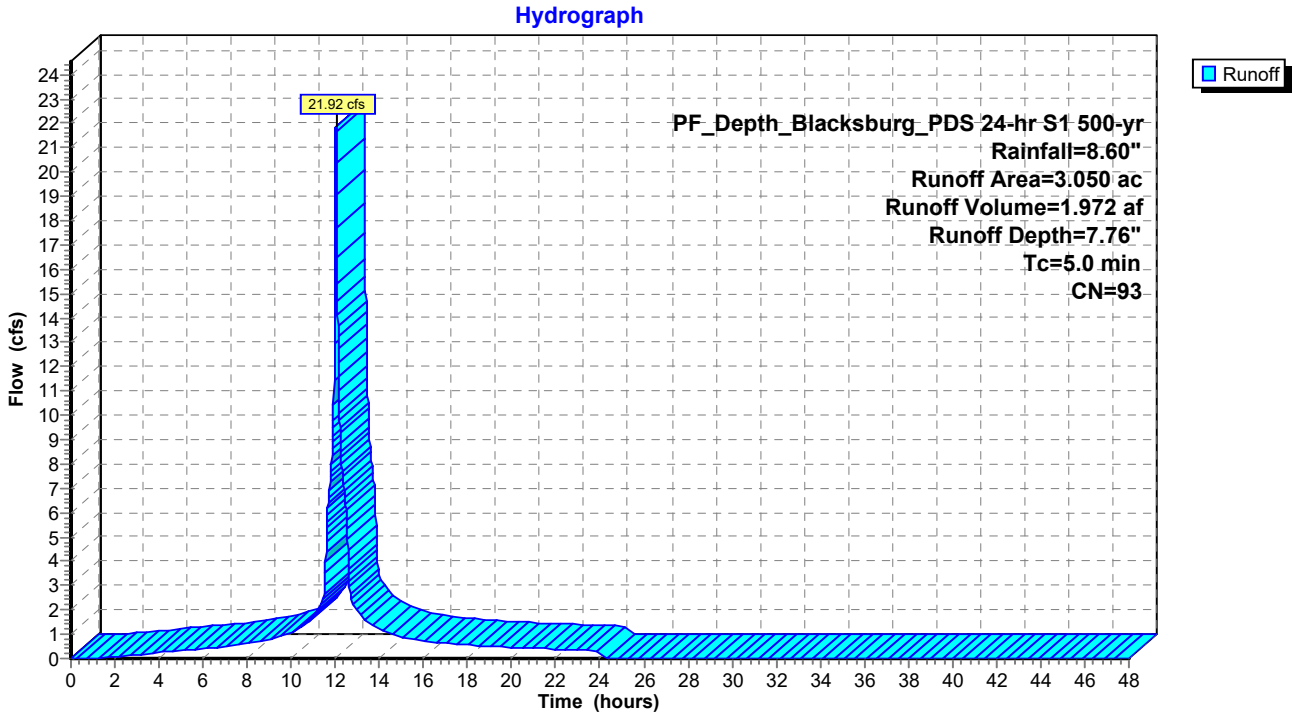
Runoff = 21.92 cfs @ 12.03 hrs, Volume= 1.972 af, Depth= 7.76"
Routed to Pond P1 : UST1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
PF_Depth_Blacksburg_PDS 24-hr S1 500-yr Rainfall=8.60"

Area (ac)	CN	Description
0.590	74	>75% Grass cover, Good, HSG C
2.460	98	Water Surface, 0% imp, HSG C
3.050	93	Weighted Average
3.050		100.00% Pervious Area

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

Subcatchment UG1: UST 1 DA



Summary for Subcatchment UG2: UST 2 DA

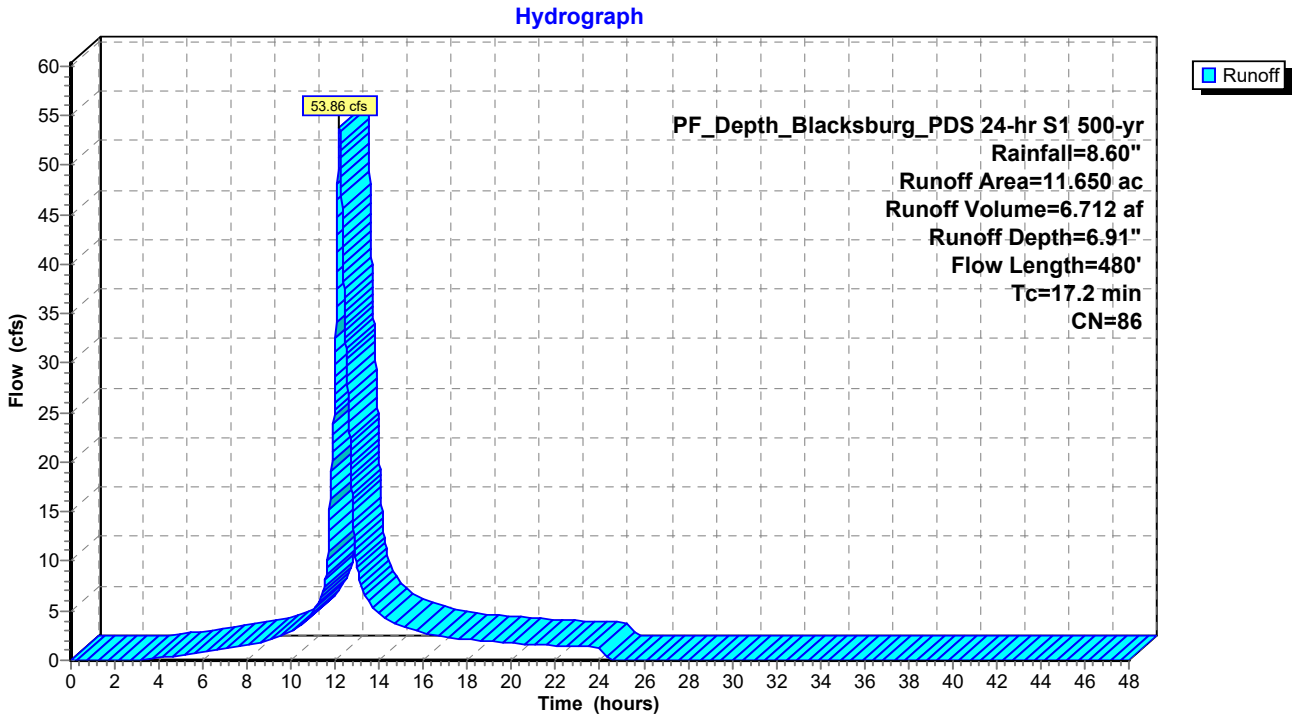
Runoff = 53.86 cfs @ 12.18 hrs, Volume= 6.712 af, Depth= 6.91"
Routed to Pond P2 : UST2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
PF_Depth_Blacksburg_PDS 24-hr S1 500-yr Rainfall=8.60"

Area (ac)	CN	Description
5.670	74	>75% Grass cover, Good, HSG C
5.980	98	Paved parking, HSG C
11.650	86	Weighted Average
5.670		48.67% Pervious Area
5.980		51.33% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.1	150	0.0400	0.16		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.76"
1.1	330	0.0910	4.86		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
17.2	480	Total			

Subcatchment UG2: UST 2 DA



Summary for Subcatchment US1: Upstream of Site PRE CONDITION

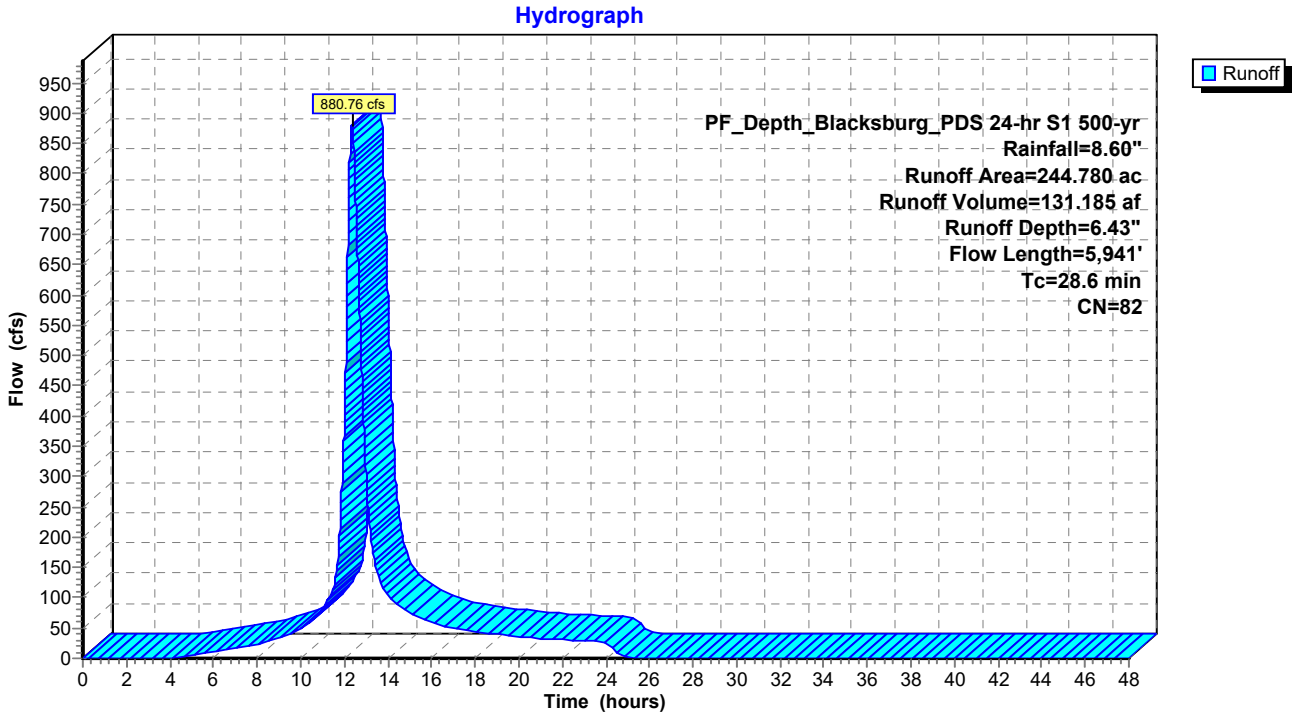
Runoff = 880.76 cfs @ 12.36 hrs, Volume= 131.185 af, Depth= 6.43"
Routed to Reach SITE : Site Area

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
PF_Depth_Blacksburg_PDS 24-hr S1 500-yr Rainfall=8.60"

	Area (ac)	CN	Description
	6.240	55	Woods, Good, HSG B
	2.100	70	Woods, Good, HSG C
	15.820	61	>75% Grass cover, Good, HSG B
	39.640	74	>75% Grass cover, Good, HSG C
	26.040	94	Urban commercial, 85% imp, HSG C
	5.870	95	Urban commercial, 85% imp, HSG D
	3.840	88	Urban industrial, 72% imp, HSG B
	8.520	91	Urban industrial, 72% imp, HSG C
	1.400	89	Paved roads w/open ditches, 50% imp, HSG B
	15.560	92	Paved roads w/open ditches, 50% imp, HSG C
	1.250	85	1/8 acre lots, 65% imp, HSG B
	36.230	90	1/8 acre lots, 65% imp, HSG C
	12.500	72	1/3 acre lots, 30% imp, HSG B
	53.220	81	1/3 acre lots, 30% imp, HSG C
	6.400	86	1/3 acre lots, 30% imp, HSG D
	6.620	98	Paved parking, HSG C
*	2.930	98	SITE AREA IMPERVIOUS
*	0.600	80	SITE AREA GERASS
	244.780	82	Weighted Average
	144.729		59.13% Pervious Area
	100.051		40.87% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.8	100	0.0800	0.19		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.76"
7.7	1,832	0.0600	3.94		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
12.1	4,009	0.0200	5.52	33.10	**Channel Flow,** Area= 6.0 sf Perim= 12.0' r= 0.50' n= 0.024
28.6	5,941	Total			

Subcatchment US1: Upstream of Site PRE CONDITION



Summary for Subcatchment US2: Upstream of Site POST CONDITION

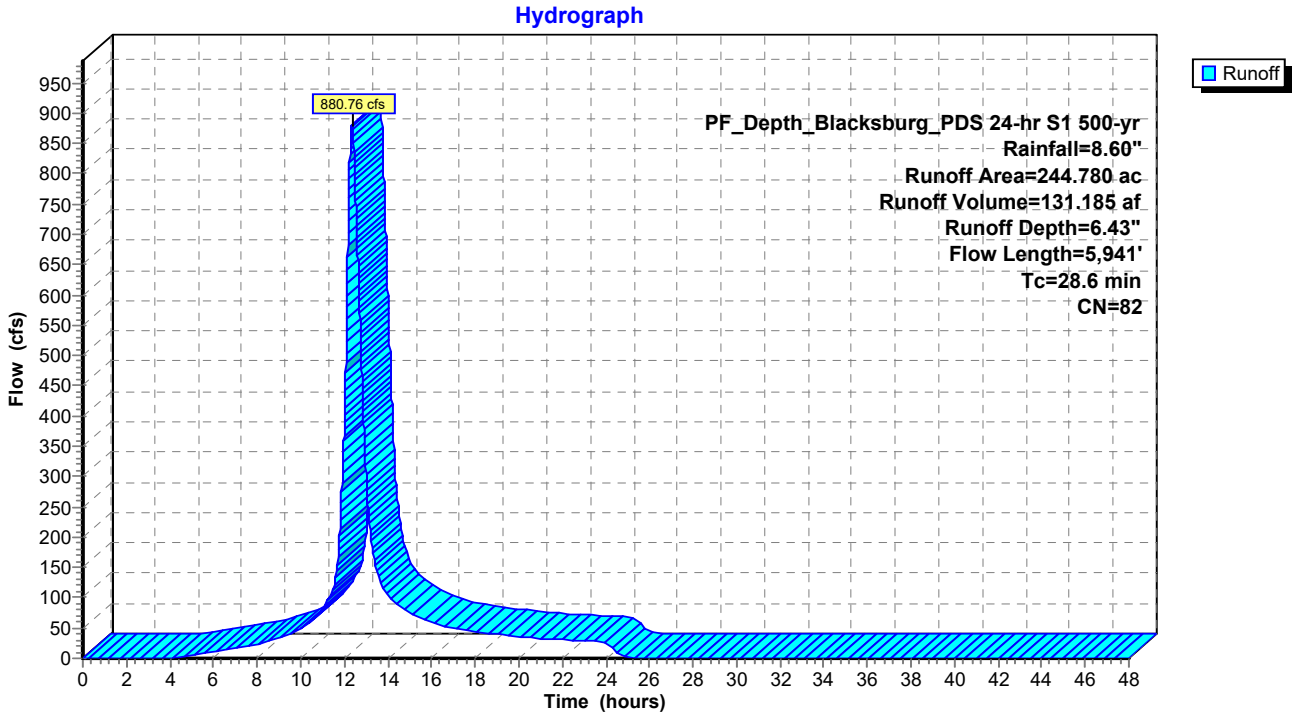
Runoff = 880.76 cfs @ 12.36 hrs, Volume= 131.185 af, Depth= 6.43"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
PF_Depth_Blacksburg_PDS 24-hr S1 500-yr Rainfall=8.60"

	Area (ac)	CN	Description
	6.240	55	Woods, Good, HSG B
	2.100	70	Woods, Good, HSG C
	15.820	61	>75% Grass cover, Good, HSG B
	39.640	74	>75% Grass cover, Good, HSG C
	26.040	94	Urban commercial, 85% imp, HSG C
	5.870	95	Urban commercial, 85% imp, HSG D
	3.840	88	Urban industrial, 72% imp, HSG B
	8.520	91	Urban industrial, 72% imp, HSG C
	1.400	89	Paved roads w/open ditches, 50% imp, HSG B
	15.560	92	Paved roads w/open ditches, 50% imp, HSG C
	1.250	85	1/8 acre lots, 65% imp, HSG B
	36.230	90	1/8 acre lots, 65% imp, HSG C
	12.500	72	1/3 acre lots, 30% imp, HSG B
	53.220	81	1/3 acre lots, 30% imp, HSG C
	6.400	86	1/3 acre lots, 30% imp, HSG D
	6.620	98	Paved parking, HSG C
*	3.330	98	SITE AREA IMPERVIOUS
*	0.200	80	SITE AREA GERASS
	244.780	82	Weighted Average
	144.329		58.96% Pervious Area
	100.451		41.04% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.8	100	0.0800	0.19		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.76"
7.7	1,832	0.0600	3.94		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
12.1	4,009	0.0200	5.52	33.10	**Channel Flow,** Area= 6.0 sf Perim= 12.0' r= 0.50' n= 0.024
28.6	5,941	Total			

Subcatchment US2: Upstream of Site POST CONDITION

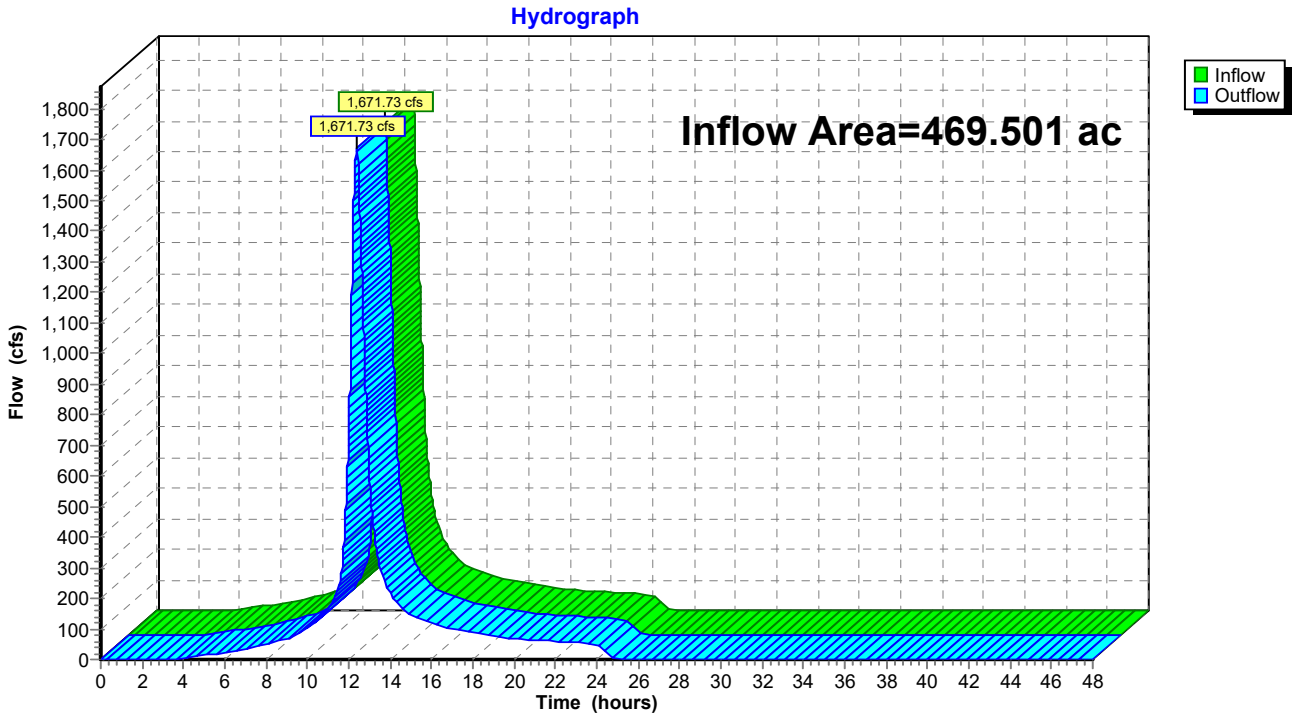


Summary for Reach ED: Reach Along Edge Site

Inflow Area = 469.501 ac, 45.66% Impervious, Inflow Depth = 6.63" for 500-yr event
Inflow = 1,671.73 cfs @ 12.38 hrs, Volume= 259.372 af
Outflow = 1,671.73 cfs @ 12.38 hrs, Volume= 259.372 af, Atten= 0%, Lag= 0.0 min
Routed to Reach PF : OutFall to Prices Fork

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Reach ED: Reach Along Edge Site

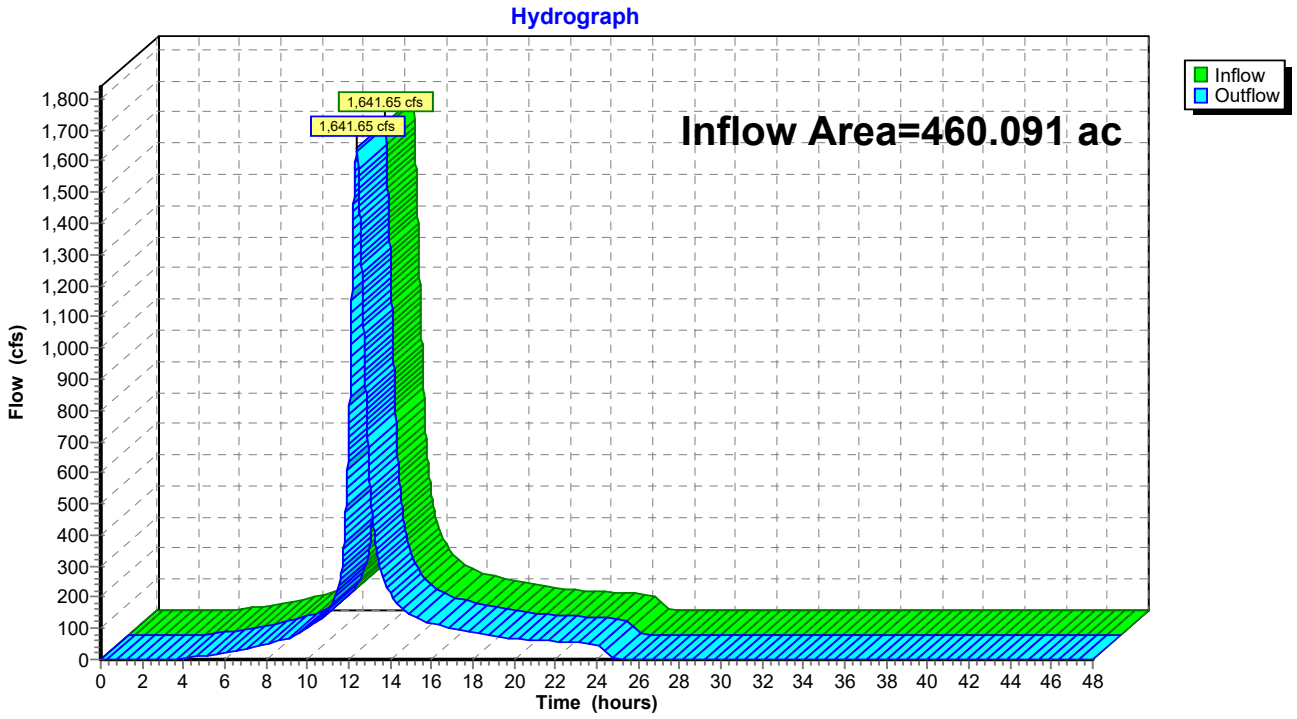


Summary for Reach KB: Outfall Below Kabrich

Inflow Area = 460.091 ac, 45.74% Impervious, Inflow Depth = 6.61" for 500-yr event
Inflow = 1,641.65 cfs @ 12.38 hrs, Volume= 253.482 af
Outflow = 1,641.65 cfs @ 12.38 hrs, Volume= 253.482 af, Atten= 0%, Lag= 0.0 min
Routed to Reach ED : Reach Along Edge Site

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Reach KB: Outfall Below Kabrich



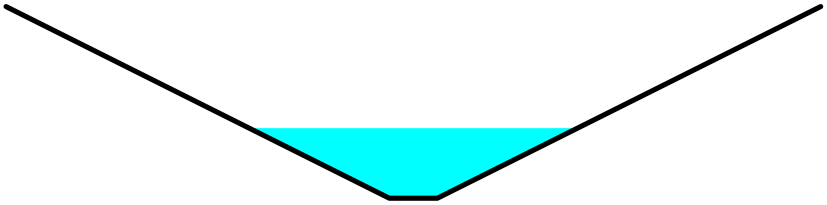
Summary for Reach MOR: MOOG Reach Section

Inflow Area = 69.353 ac, 59.71% Impervious, Inflow Depth = 6.91" for 500-yr event
Inflow = 295.34 cfs @ 12.27 hrs, Volume= 39.960 af
Outflow = 283.70 cfs @ 12.32 hrs, Volume= 39.960 af, Atten= 4%, Lag= 3.3 min
Routed to Reach STK : Stream to Kabrich Street

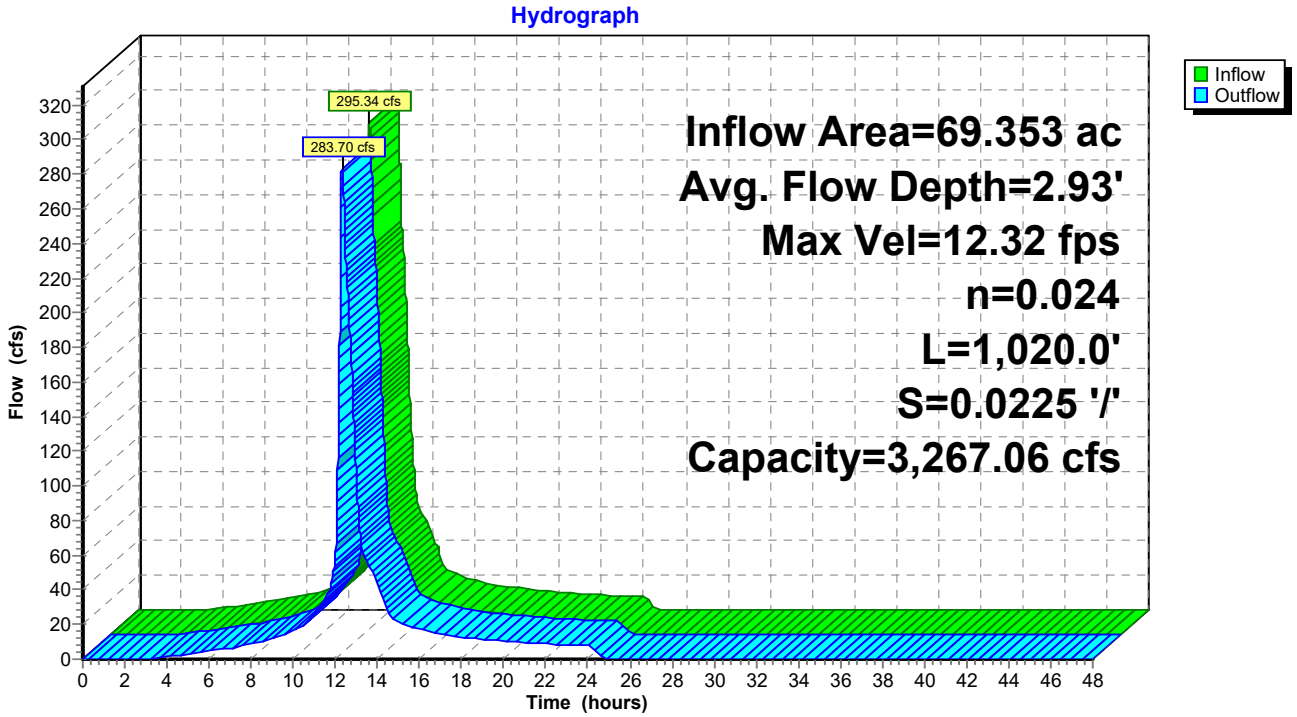
Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 12.32 fps, Min. Travel Time= 1.4 min
Avg. Velocity = 5.23 fps, Avg. Travel Time= 3.3 min

Peak Storage= 23,496 cf @ 12.30 hrs
Average Depth at Peak Storage= 2.93' , Surface Width= 13.72'
Bank-Full Depth= 8.00' Flow Area= 144.0 sf, Capacity= 3,267.06 cfs

2.00' x 8.00' deep channel, n= 0.024
Side Slope Z-value= 2.0 '/' Top Width= 34.00'
Length= 1,020.0' Slope= 0.0225 '/'
Inlet Invert= 2,115.00', Outlet Invert= 2,092.00'



Reach MOR: MOOG Reach Section

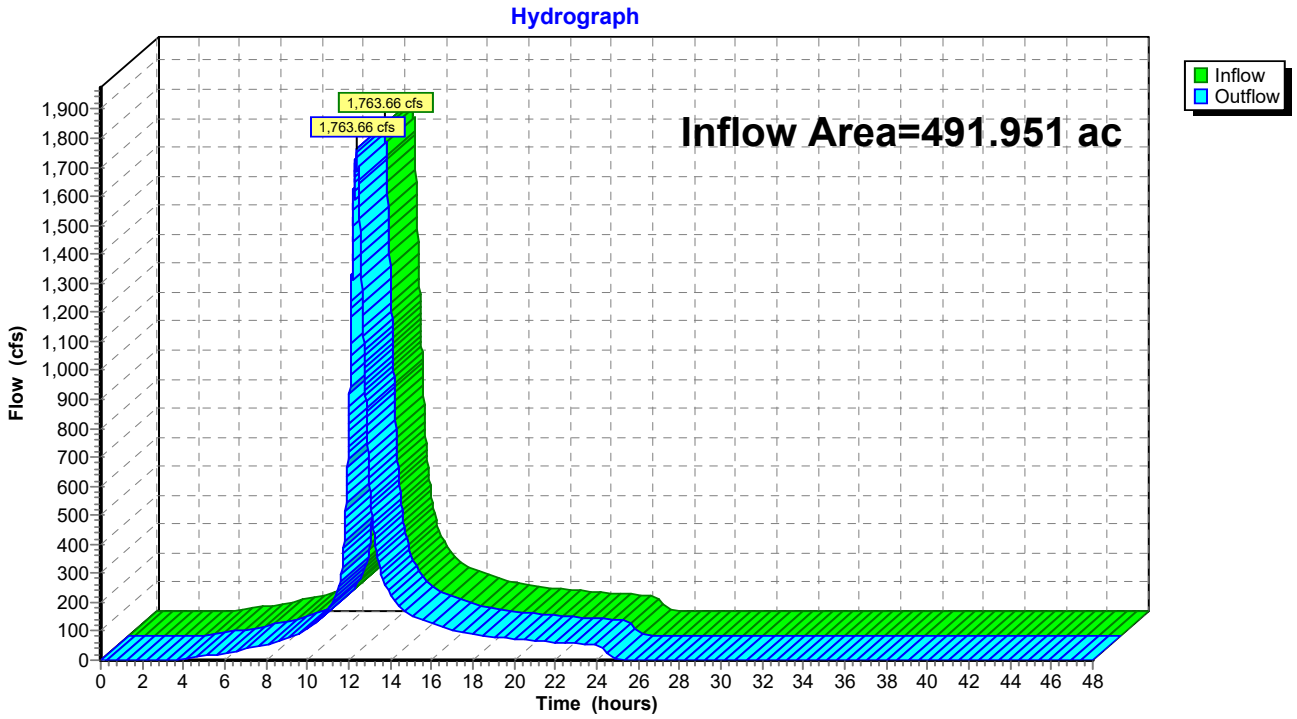


Summary for Reach PF: OutFall to Prices Fork

Inflow Area = 491.951 ac, 46.25% Impervious, Inflow Depth = 6.66" for 500-yr event
Inflow = 1,763.66 cfs @ 12.36 hrs, Volume= 272.959 af
Outflow = 1,763.66 cfs @ 12.36 hrs, Volume= 272.959 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Reach PF: OutFall to Prices Fork

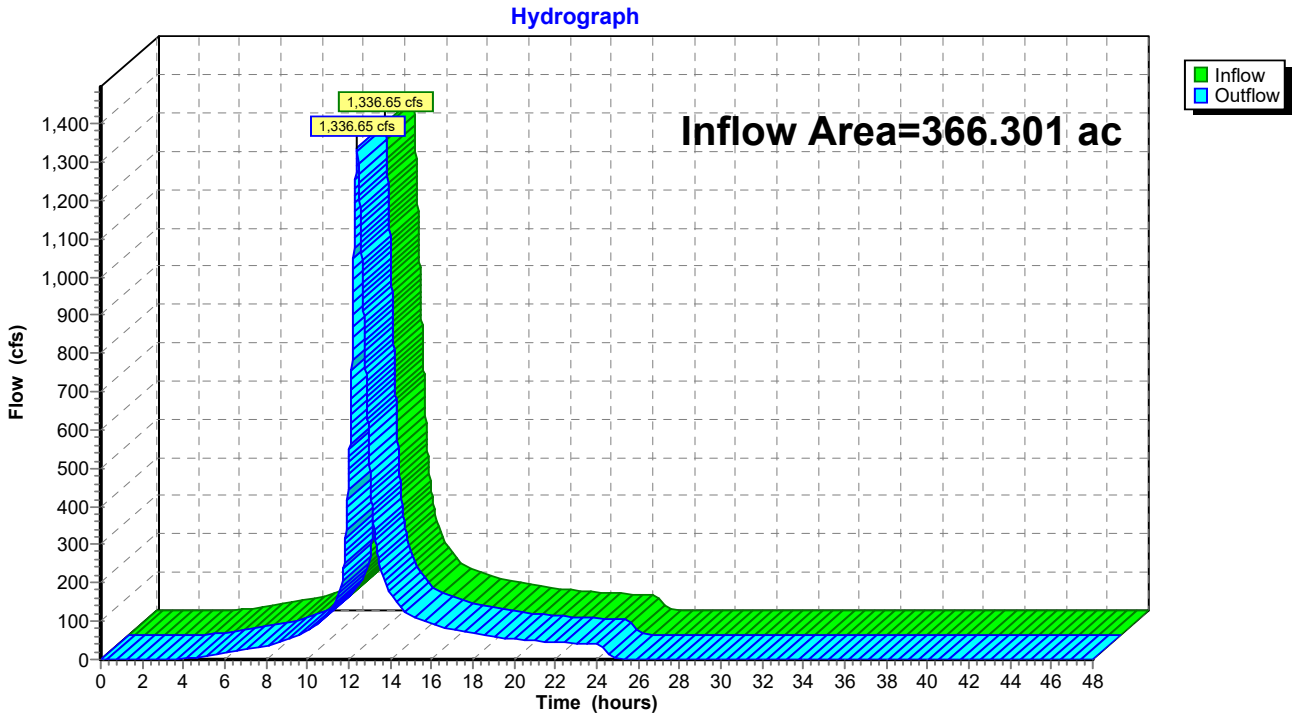


Summary for Reach SITE: Site Area

Inflow Area = 366.301 ac, 45.22% Impervious, Inflow Depth = 6.56" for 500-yr event
Inflow = 1,336.65 cfs @ 12.41 hrs, Volume= 200.386 af
Outflow = 1,336.65 cfs @ 12.41 hrs, Volume= 200.386 af, Atten= 0%, Lag= 0.0 min
Routed to Reach KB : Outfall Below Kabrich

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Reach SITE: Site Area



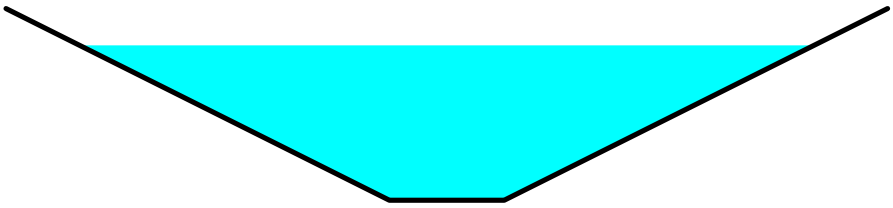
Summary for Reach STK: Stream to Kabrich Street

Inflow Area = 121.521 ac, 53.99% Impervious, Inflow Depth = 6.83" for 500-yr event
Inflow = 505.40 cfs @ 12.32 hrs, Volume= 69.202 af
Outflow = 484.34 cfs @ 12.44 hrs, Volume= 69.202 af, Atten= 4%, Lag= 7.3 min
Routed to Reach SITE : Site Area

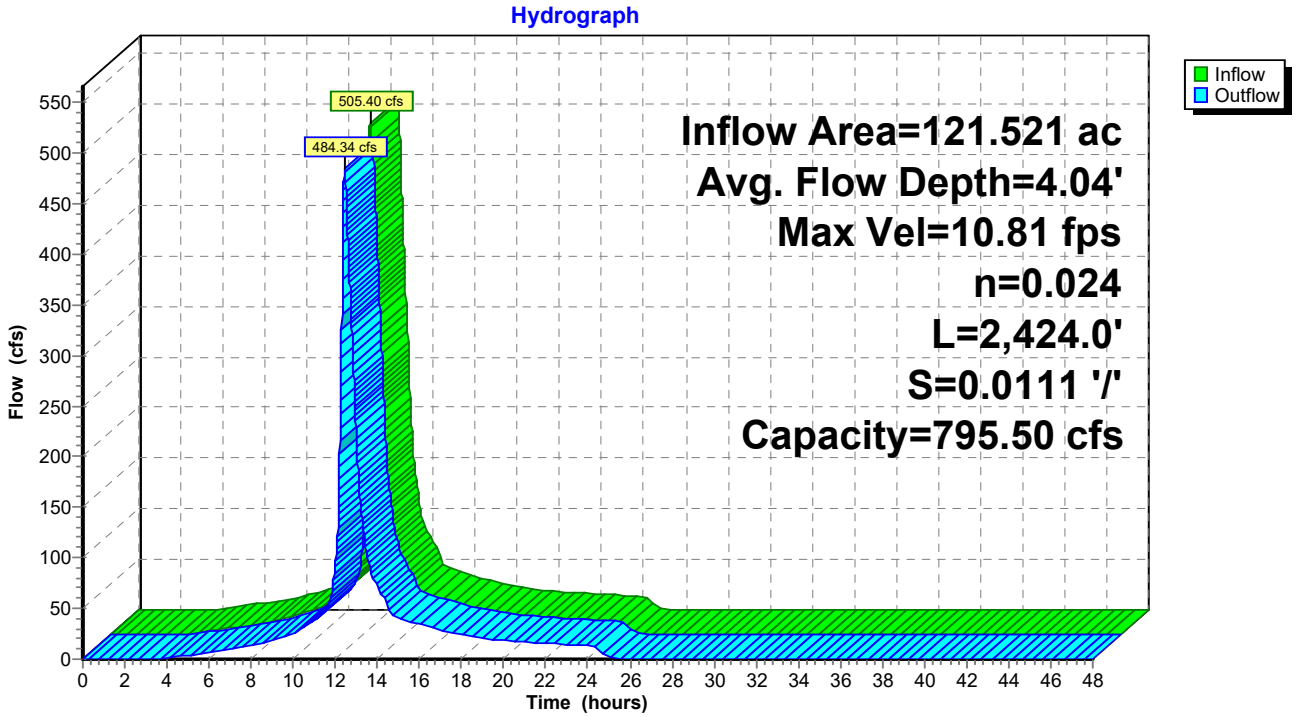
Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 10.81 fps, Min. Travel Time= 3.7 min
Avg. Velocity = 3.75 fps, Avg. Travel Time= 10.8 min

Peak Storage= 108,672 cf @ 12.38 hrs
Average Depth at Peak Storage= 4.04' , Surface Width= 19.17'
Bank-Full Depth= 5.00' Flow Area= 65.0 sf, Capacity= 795.50 cfs

3.00' x 5.00' deep channel, n= 0.024
Side Slope Z-value= 2.0 '/' Top Width= 23.00'
Length= 2,424.0' Slope= 0.0111 '/'
Inlet Invert= 2,092.00', Outlet Invert= 2,065.00'



Reach STK: Stream to Kabrich Street



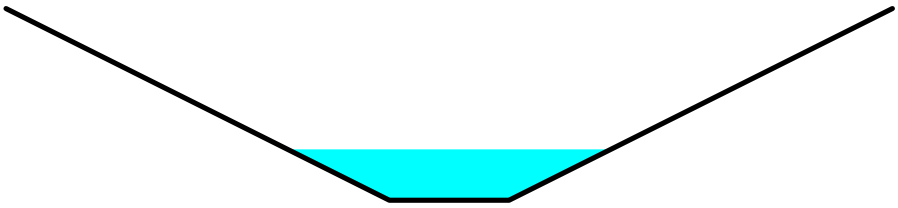
Summary for Reach USR: Upper Stream Reach

Inflow Area = 52.168 ac, 46.37% Impervious, Inflow Depth = 6.73" for 500-yr event
Inflow = 227.35 cfs @ 12.23 hrs, Volume= 29.242 af
Outflow = 221.96 cfs @ 12.31 hrs, Volume= 29.242 af, Atten= 2%, Lag= 4.9 min
Routed to Reach STK : Stream to Kabrich Street

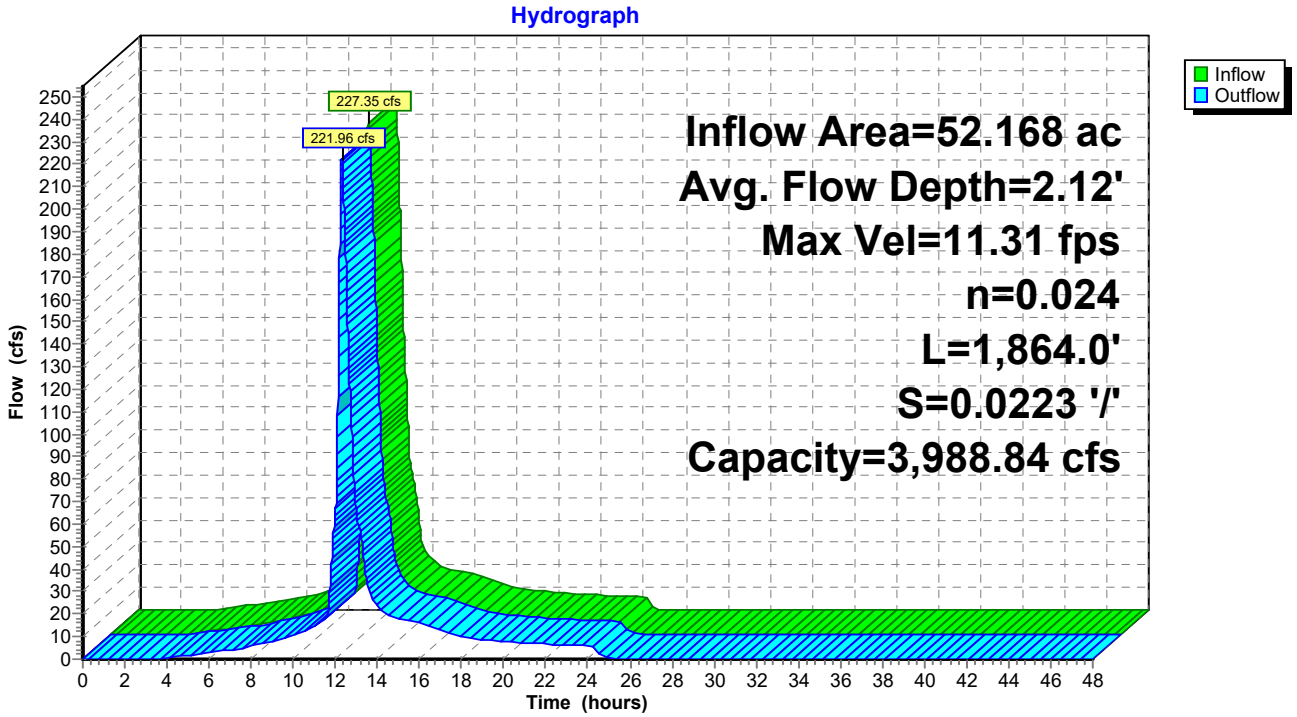
Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 11.31 fps, Min. Travel Time= 2.7 min
Avg. Velocity = 3.81 fps, Avg. Travel Time= 8.1 min

Peak Storage= 36,593 cf @ 12.27 hrs
Average Depth at Peak Storage= 2.12' , Surface Width= 13.49'
Bank-Full Depth= 8.00' Flow Area= 168.0 sf, Capacity= 3,988.84 cfs

5.00' x 8.00' deep channel, n= 0.024
Side Slope Z-value= 2.0 '/' Top Width= 37.00'
Length= 1,864.0' Slope= 0.0223 '/'
Inlet Invert= 2,133.50', Outlet Invert= 2,092.00'



Reach USR: Upper Stream Reach



Summary for Pond CVP: Clover Valley Pond

Inflow Area = 44.421 ac, 44.76% Impervious, Inflow Depth = 6.67" for 500-yr event
Inflow = 199.41 cfs @ 12.19 hrs, Volume= 24.701 af
Outflow = 205.43 cfs @ 12.20 hrs, Volume= 24.701 af, Atten= 0%, Lag= 0.4 min
Primary = 205.43 cfs @ 12.20 hrs, Volume= 24.701 af
Routed to Pond RP : Rutherford Pond

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 2,162.72' @ 12.20 hrs Surf.Area= 0.299 ac Storage= 0.837 af

Plug-Flow detention time= 3.2 min calculated for 24.695 af (100% of inflow)
Center-of-Mass det. time= 3.2 min (813.3 - 810.1)

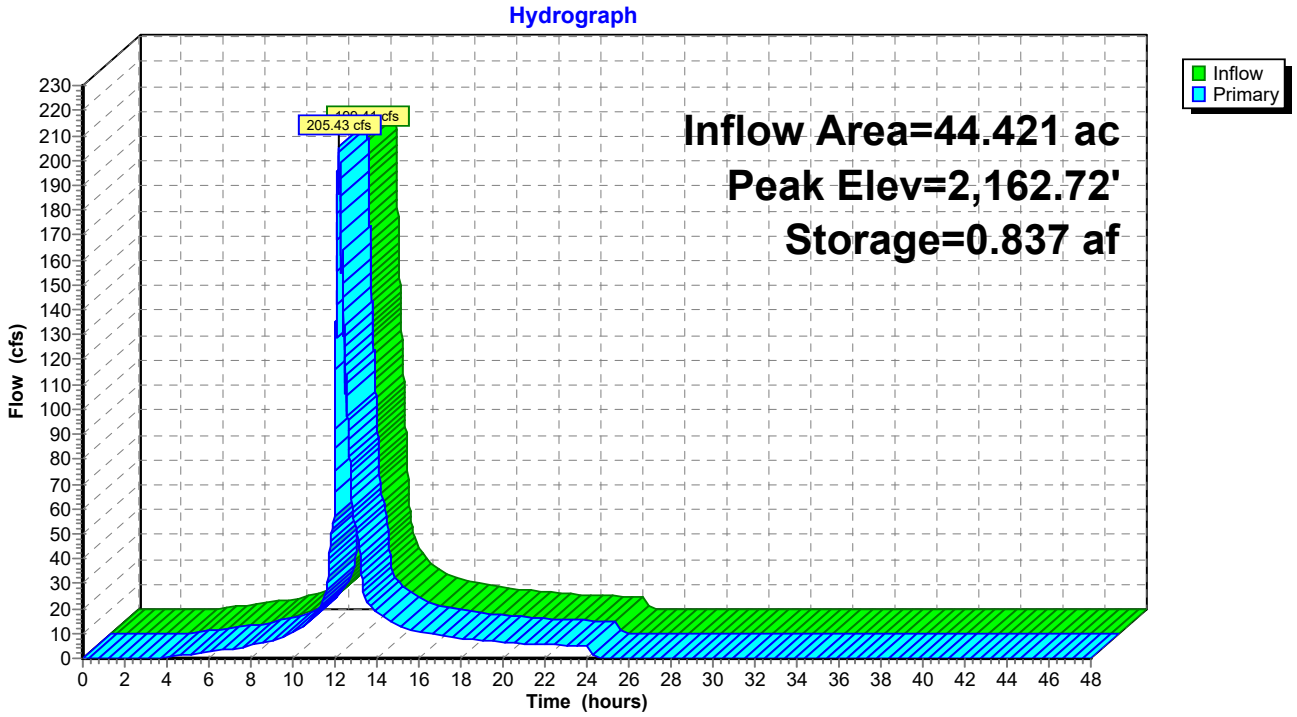
Volume	Invert	Avail.Storage	Storage Description
#1	2,155.00'	0.837 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
2,155.00	0.000	0.000	0.000
2,156.00	0.003	0.002	0.002
2,158.00	0.079	0.082	0.083
2,160.00	0.188	0.267	0.351
2,162.00	0.299	0.487	0.837

Device	Routing	Invert	Outlet Devices
#1	Primary	2,154.50'	**30.0" Round Culvert** L= 50.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,154.50' / 2,153.50' S= 0.0200 '/' Cc= 0.900 n= 0.013, Flow Area= 4.91 sf
#2	Device 1	2,155.00'	**18.0" Round Culvert** L= 3.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,155.00' / 2,154.50' S= 0.1667 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#3	Device 1	2,156.77'	**30.0" Round Culvert** L= 3.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,156.77' / 2,156.27' S= 0.1667 '/' Cc= 0.900 n= 0.013, Flow Area= 4.91 sf
#4	Device 1	2,160.25'	**84.0" x 48.0" Horiz. Orifice/Grate X 3.00** C= 0.600 Limited to weir flow at low heads
#5	Primary	2,161.50'	**40.0' long x 20.0' 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) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=205.15 cfs @ 12.20 hrs HW=2,162.72' (Free Discharge)
- **1=Culvert** (Inlet Controls 62.41 cfs @ 12.71 fps)
  - **2=Culvert** (Passes < 22.47 cfs potential flow)
  - **3=Culvert** (Passes < 51.25 cfs potential flow)
  - **4=Orifice/Grate** (Passes < 635.98 cfs potential flow)
- **5=Broad-Crested Rectangular Weir** (Weir Controls 142.74 cfs @ 2.92 fps)

Pond CVP: Clover Valley Pond



Summary for Pond P1: UST1

Inflow Area = 3.050 ac, 0.00% Impervious, Inflow Depth = 7.76" for 500-yr event
Inflow = 21.92 cfs @ 12.03 hrs, Volume= 1.972 af
Outflow = 26.12 cfs @ 12.04 hrs, Volume= 1.970 af, Atten= 0%, Lag= 0.8 min
Primary = 26.12 cfs @ 12.04 hrs, Volume= 1.970 af
Routed to Reach ED : Reach Along Edge Site

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 2,060.92' @ 12.04 hrs Surf.Area= 0.070 ac Storage= 0.459 af

Plug-Flow detention time= 148.0 min calculated for 1.969 af (100% of inflow)
Center-of-Mass det. time= 147.5 min (913.5 - 766.0)

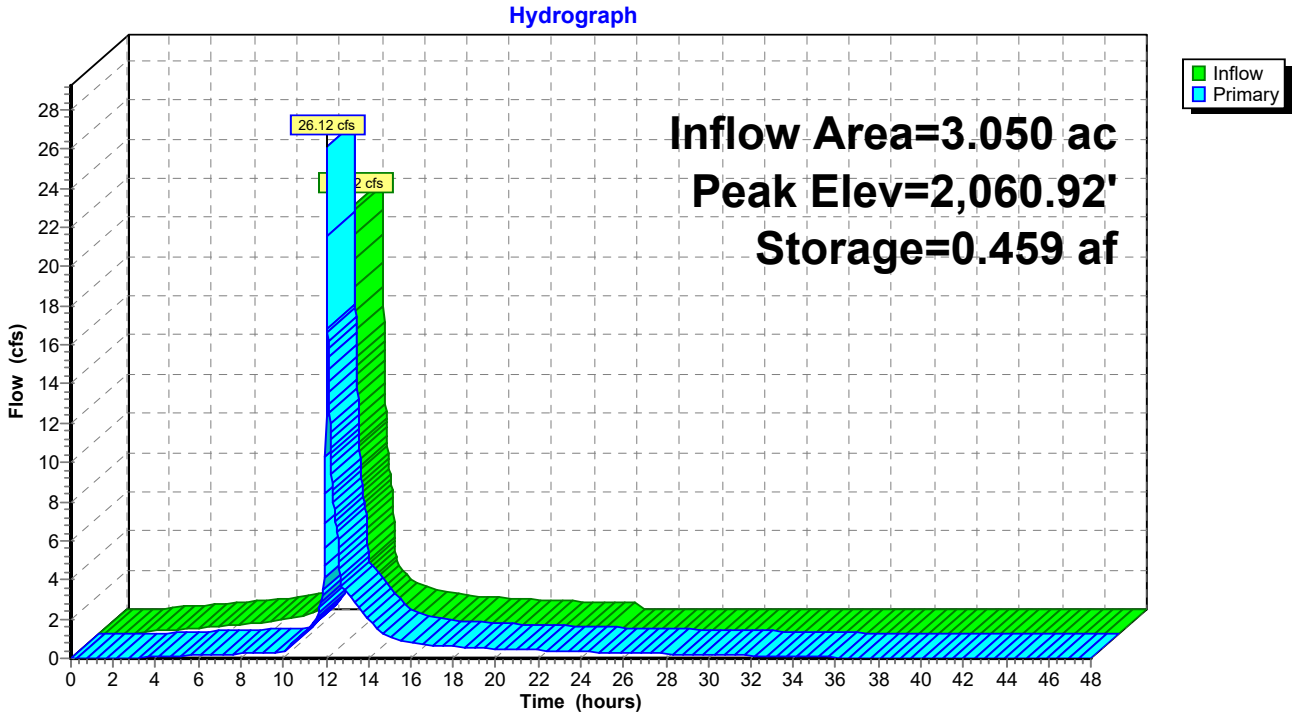
Volume	Invert	Avail.Storage	Storage Description
#1	2,050.75'	0.459 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
2,050.75	0.100	0.000	0.000
2,051.75	0.100	0.100	0.100
2,052.75	0.100	0.100	0.200
2,053.75	0.100	0.100	0.300
2,054.75	0.100	0.100	0.400
2,055.45	0.070	0.059	0.459

Device	Routing	Invert	Outlet Devices
#1	Primary	2,050.75'	**18.0" Round Culvert** L= 42.4' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,050.75' / 2,049.25' S= 0.0354 '/' Cc= 0.900 n= 0.011, Flow Area= 1.77 sf
#2	Device 1	2,050.75'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	2,052.65'	**14.0" W x 5.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	2,054.65'	**6.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=26.10 cfs @ 12.04 hrs HW=2,060.91' (Free Discharge)
└**1=Culvert** (Inlet Controls 26.10 cfs @ 14.77 fps)
├**2=Orifice/Grate** (Passes < 0.75 cfs potential flow)
├**3=Orifice/Grate** (Passes < 6.64 cfs potential flow)
└**4=Broad-Crested Rectangular Weir** (Passes < 312.04 cfs potential flow)

Pond P1: UST1


Hydrograph
Inflow
Primary
Inflow Area=3.050 ac
Peak Elev=2,060.92'
Storage=0.459 af
26.12 cfs
Flow (cfs)
Time (hours)

Summary for Pond P2: UST2

Inflow Area = 11.650 ac, 51.33% Impervious, Inflow Depth = 6.91" for 500-yr event
Inflow = 53.86 cfs @ 12.18 hrs, Volume= 6.712 af
Outflow = 81.11 cfs @ 12.18 hrs, Volume= 6.712 af, Atten= 0%, Lag= 0.0 min
Primary = 81.11 cfs @ 12.18 hrs, Volume= 6.712 af
Routed to Reach PF : OutFall to Prices Fork

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 2,057.28' @ 12.18 hrs Surf.Area= 0.204 ac Storage= 1.020 af

Plug-Flow detention time= 54.2 min calculated for 6.712 af (100% of inflow)
Center-of-Mass det. time= 54.2 min (857.6 - 803.4)

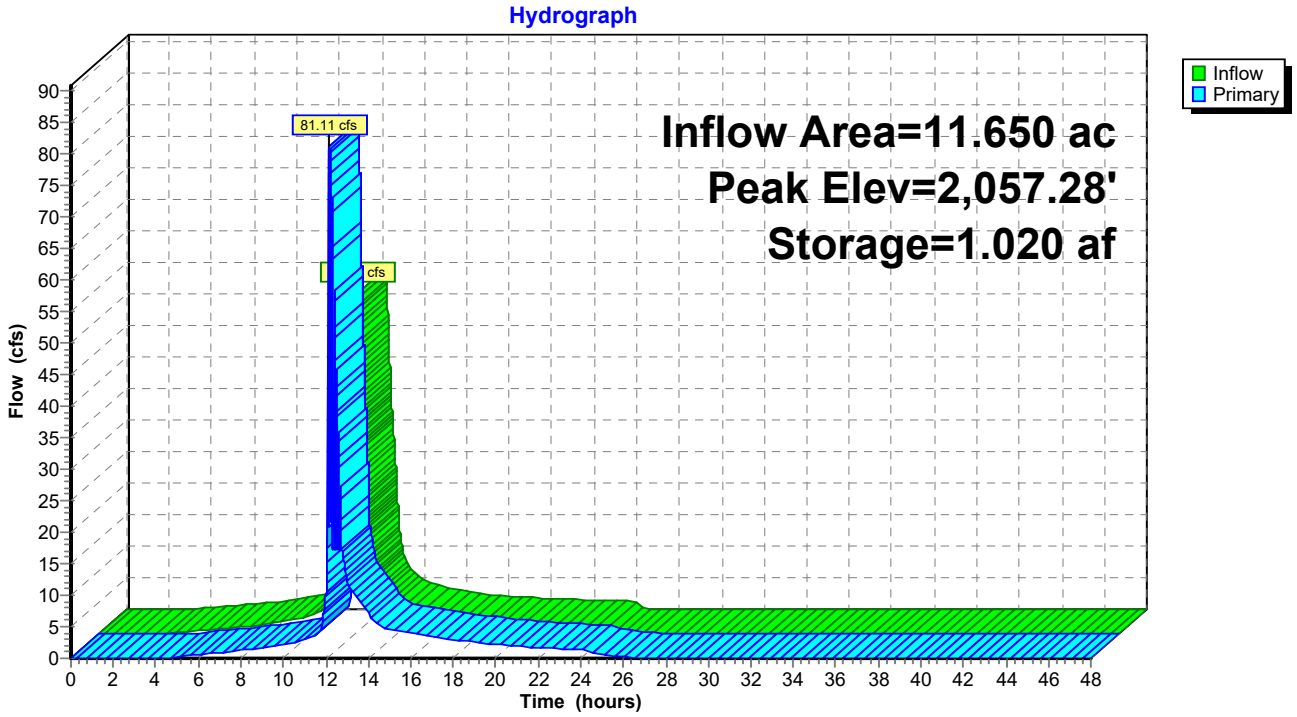
Volume	Invert	Avail.Storage	Storage Description
#1	2,044.25'	1.020 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
2,044.25	0.204	0.000	0.000
2,045.25	0.204	0.204	0.204
2,046.25	0.204	0.204	0.408
2,047.25	0.204	0.204	0.612
2,048.25	0.204	0.204	0.816
2,049.25	0.204	0.204	1.020

Device	Routing	Invert	Outlet Devices
#1	Primary	2,044.25'	**30.0" Round Culvert** L= 35.1' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,044.25' / 2,043.83' S= 0.0120 '/' Cc= 0.900 n= 0.011, Flow Area= 4.91 sf
#2	Device 1	2,044.25'	**14.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	2,047.00'	**16.0" W x 8.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	2,048.80'	**6.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=81.09 cfs @ 12.18 hrs HW=2,057.27' (Free Discharge)
└**1=Culvert** (Inlet Controls 81.09 cfs @ 16.52 fps)
├**2=Orifice/Grate** (Passes < 10.04 cfs potential flow)
├**3=Orifice/Grate** (Passes < 13.49 cfs potential flow)
└**4=Broad-Crested Rectangular Weir** (Passes < 491.09 cfs potential flow)

Pond P2: UST2


Hydrograph
Inflow
Primary
Inflow Area=11.650 ac
Peak Elev=2,057.28'
Storage=1.020 af
81.11 cfs
cfs
Flow (cfs)
Time (hours)
0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48

Summary for Pond RP: Rutherford Pond

Inflow Area = 52.168 ac, 46.37% Impervious, Inflow Depth = 6.73" for 500-yr event
Inflow = 242.06 cfs @ 12.18 hrs, Volume= 29.242 af
Outflow = 227.35 cfs @ 12.23 hrs, Volume= 29.242 af, Atten= 6%, Lag= 3.1 min
Primary = 227.35 cfs @ 12.23 hrs, Volume= 29.242 af
Routed to Reach USR : Upper Stream Reach

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 2,142.91' @ 12.23 hrs Storage= 72,621 cf

Plug-Flow detention time= 11.9 min calculated for 29.242 af (100% of inflow)
Center-of-Mass det. time= 11.8 min (822.4 - 810.6)

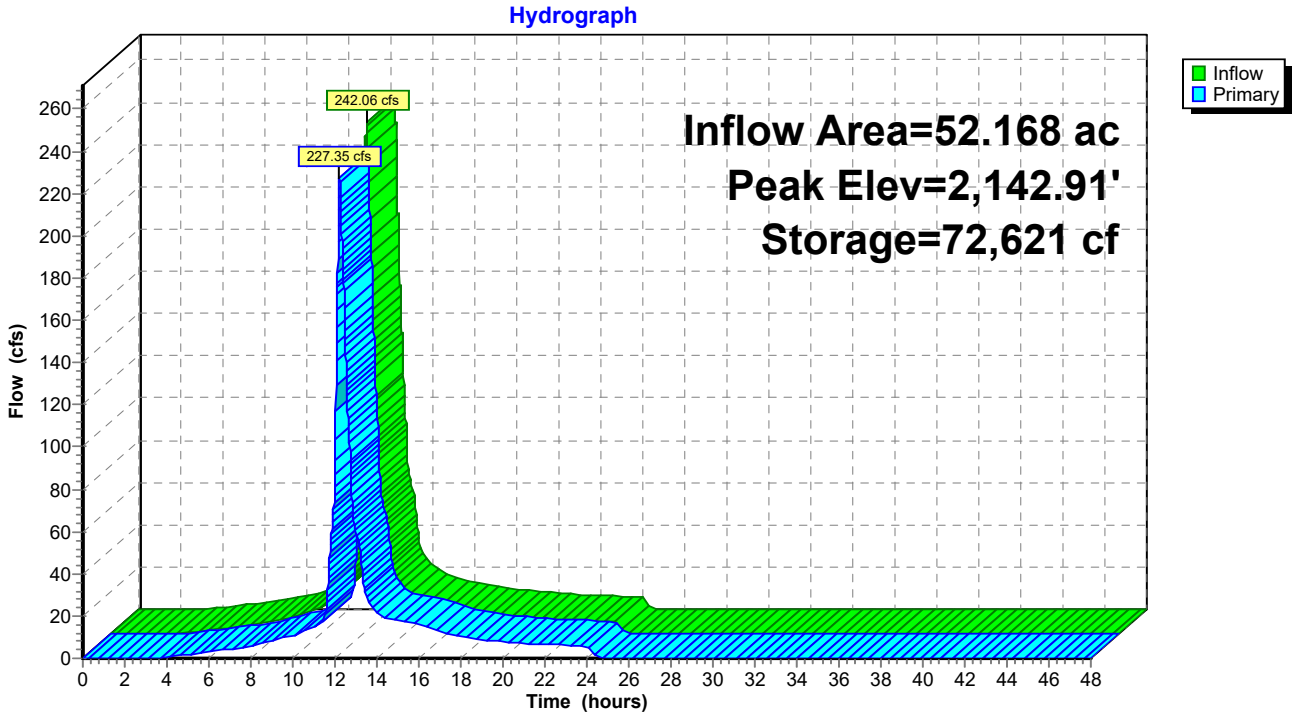
Volume	Invert	Avail.Storage	Storage Description
#1	2,135.00'	74,503 cf	**Custom Stage Data** Listed below

Elevation (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,135.00	0	0
2,136.00	1,366	1,366
2,137.00	3,129	4,495
2,138.00	5,175	9,670
2,139.00	7,760	17,430
2,140.00	10,340	27,770
2,141.00	12,305	40,075
2,142.00	13,925	54,000
2,143.00	20,503	74,503

Device	Routing	Invert	Outlet Devices
#1	Primary	2,134.82'	**54.0" Round Culvert** L= 82.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,134.82' / 2,134.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 15.90 sf
#2	Device 1	2,135.00'	**18.0" Round Culvert** L= 3.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,135.00' / 2,134.82' S= 0.0600 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#3	Device 1	2,140.50'	**72.0" x 48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Primary	2,142.50'	**60.0' long x 30.0' 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) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=227.23 cfs @ 12.23 hrs HW=2,142.91' (Free Discharge)
- **1=Culvert** (Inlet Controls 185.03 cfs @ 11.63 fps)
  - **2=Culvert** (Passes < 22.76 cfs potential flow)
  - **3=Orifice/Grate** (Passes < 179.32 cfs potential flow)
- **4=Broad-Crested Rectangular Weir** (Weir Controls 42.20 cfs @ 1.72 fps)

Pond RP: Rutherford Pond



Summary for Pond SP: Shenandoah Pond

Inflow Area = 69.353 ac, 59.71% Impervious, Inflow Depth = 6.91" for 500-yr event
Inflow = 285.32 cfs @ 12.27 hrs, Volume= 39.960 af
Outflow = 295.34 cfs @ 12.27 hrs, Volume= 39.960 af, Atten= 0%, Lag= 0.0 min
Primary = 295.34 cfs @ 12.27 hrs, Volume= 39.960 af
Routed to Reach MOR : MOOG Reach Section

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 2,125.58' @ 12.27 hrs Surf.Area= 37,630 sf Storage= 117,739 cf

Plug-Flow detention time= 6.3 min calculated for 39.951 af (100% of inflow)
Center-of-Mass det. time= 6.3 min (815.6 - 809.3)

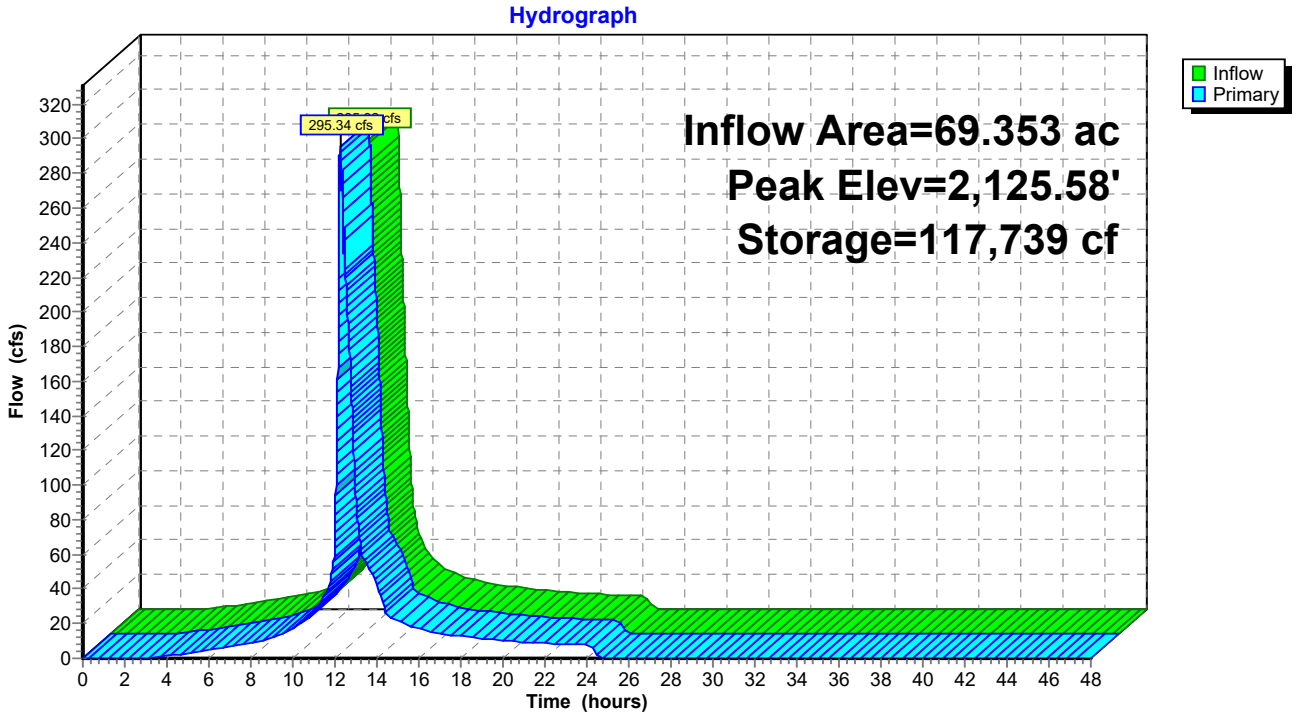
Volume	Invert	Avail.Storage	Storage Description
#1	2,117.00'	117,739 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,117.00	0	0	0
2,118.00	955	478	478
2,120.00	2,580	3,535	4,013
2,122.00	21,522	24,102	28,115
2,124.00	32,858	54,380	82,495
2,125.00	37,630	35,244	117,739

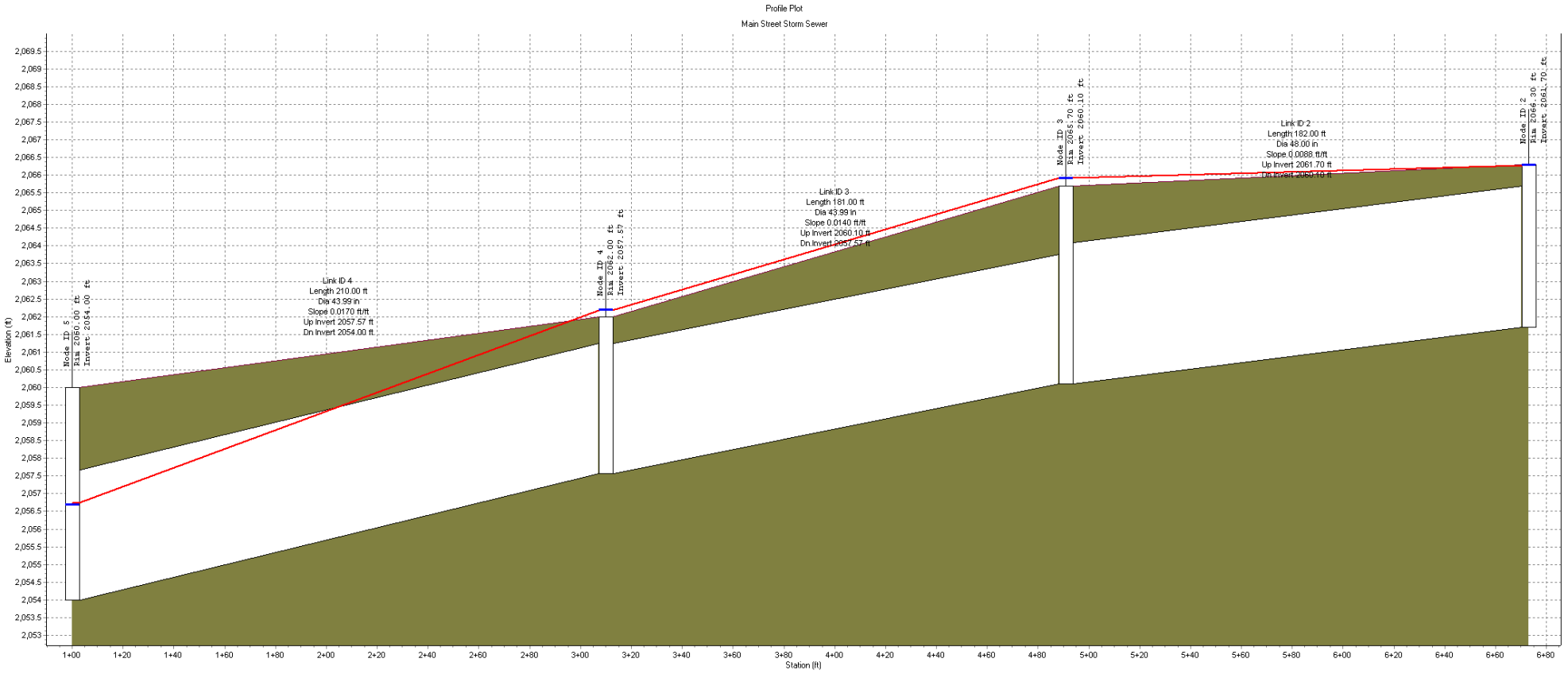
Device	Routing	Invert	Outlet Devices
#1	Primary	2,117.00'	**36.0" Round Culvert** L= 75.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,117.00' / 2,116.51' S= 0.0065 '/' Cc= 0.900 n= 0.024, Flow Area= 7.07 sf
#2	Primary	2,123.00'	**20.0' long x 10.0' breadth Broad-Crested Rectangular 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=295.24 cfs @ 12.27 hrs HW=2,125.58' (Free Discharge)
1=Culvert (Barrel Controls 76.30 cfs @ 10.79 fps)
2=Broad-Crested Rectangular Weir (Weir Controls 218.94 cfs @ 4.24 fps)

Pond SP: Shenandoah Pond



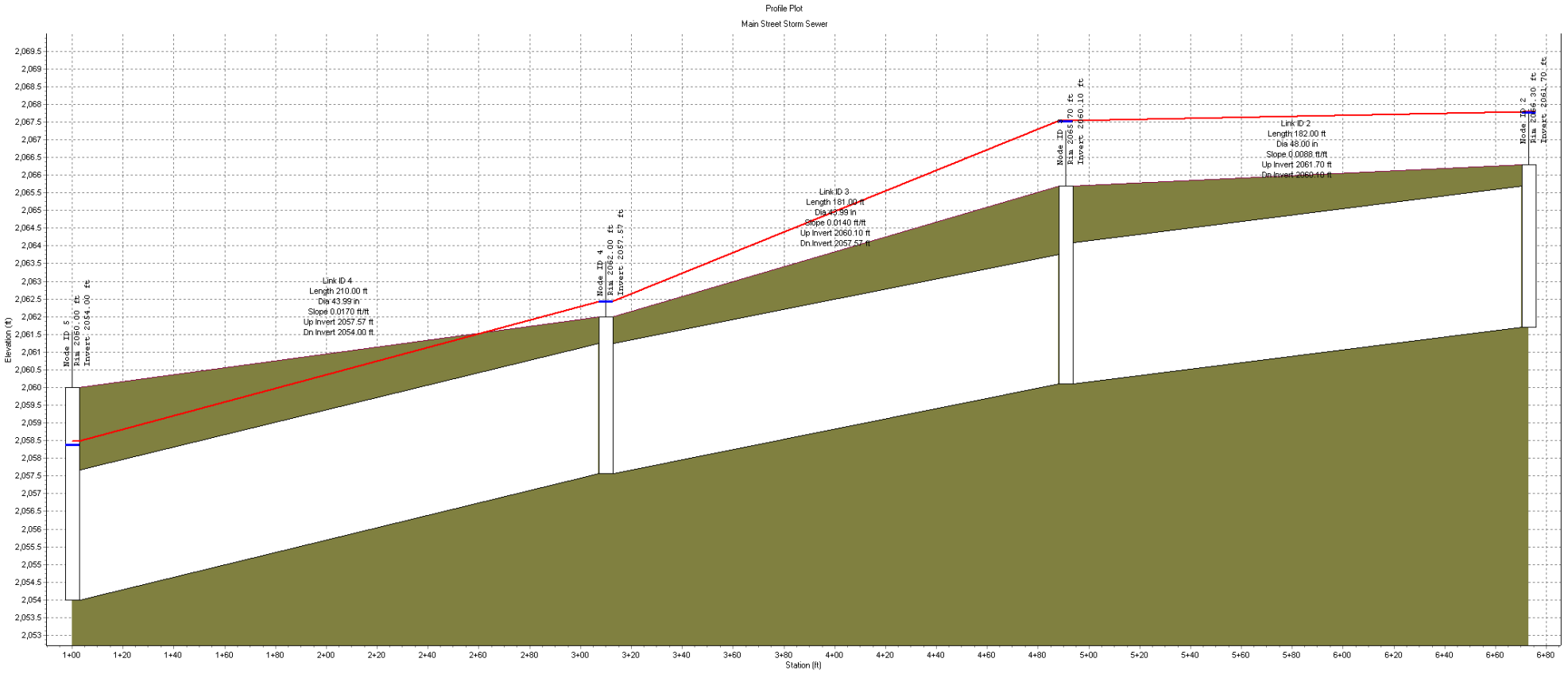
EXISTING 2 YEAR PROFILE



Node ID:	5	4	3	2
Rim (ft):	2060.00	2062.00	2065.70	2066.30
Invert (ft):	2054.00	2057.57	2060.10	2061.70
Min Pipe Cover (ft):	0.00	0.00	0.00	0.00
Max HGL (ft):	2056.73	2062.19	2065.91	2066.28

Link ID:	4	3	2
Length (ft):	210.00	181.00	182.00
Dia (in):	43.99	43.99	48.00
Slope (ft/ft):	0.0170	0.0140	0.0088
Up Invert (ft):	2057.57	2060.10	2061.70
Dn Invert (ft):	2054.00	2057.57	2060.10
Max Q (cfs):	162.25	271.94	271.99
Max Vel (ft/s):	11.24	7.85	6.51
Max Depth (ft):	3.18	3.67	4.00

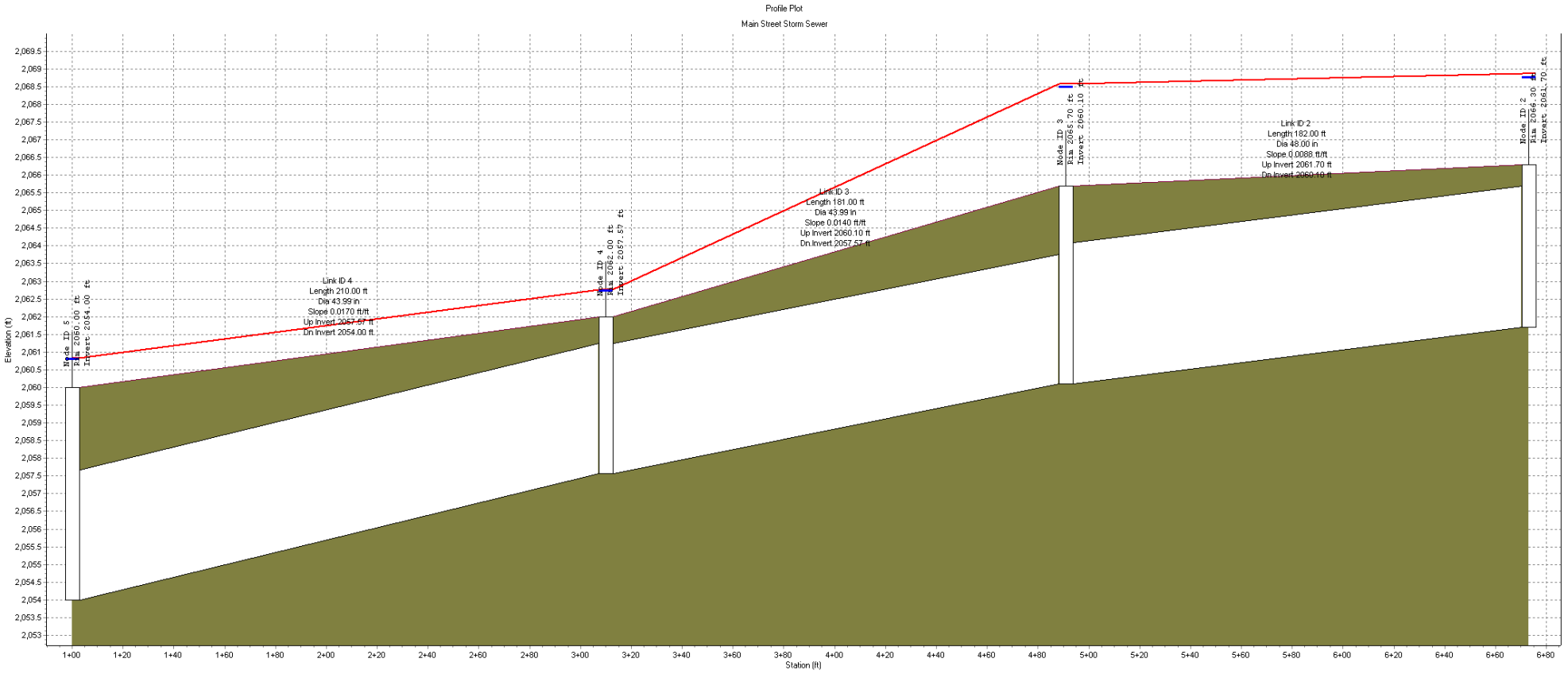
EXISTING 10 YEAR PROFILE



Node ID:	5	4	3	2
Rim (ft):	2060.00	2062.00	2065.70	2066.30
Invert (ft):	2054.00	2057.57	2060.10	2061.70
Min Pipe Cover (ft):	0.00	0.00	0.00	0.00
Max HGL (ft):	2058.49	2062.43	2067.54	2067.78

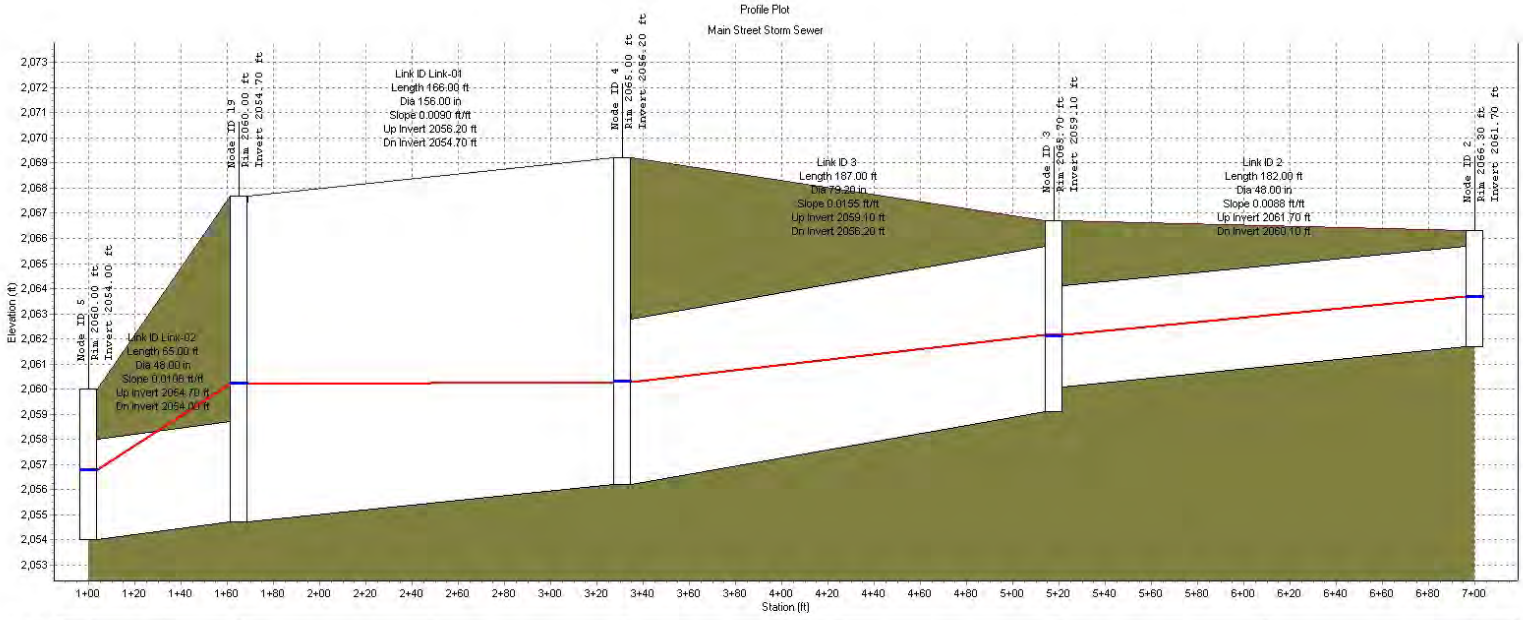
Link ID:	4	3	2
Length (ft):	210.00	181.00	182.00
Dia (in):	43.99	43.99	48.00
Slope (ft/ft):	0.0170	0.0140	0.0088
Up Invert (ft):	2057.57	2060.10	2061.70
Dn Invert (ft):	2054.00	2057.57	2060.10
Max Q (cfs):	165.04	318.95	292.18
Max Vel (ft/s):	11.22	9.20	6.48
Max Depth (ft):	3.67	3.67	4.00

EXISTING 100 YEAR PROFILE



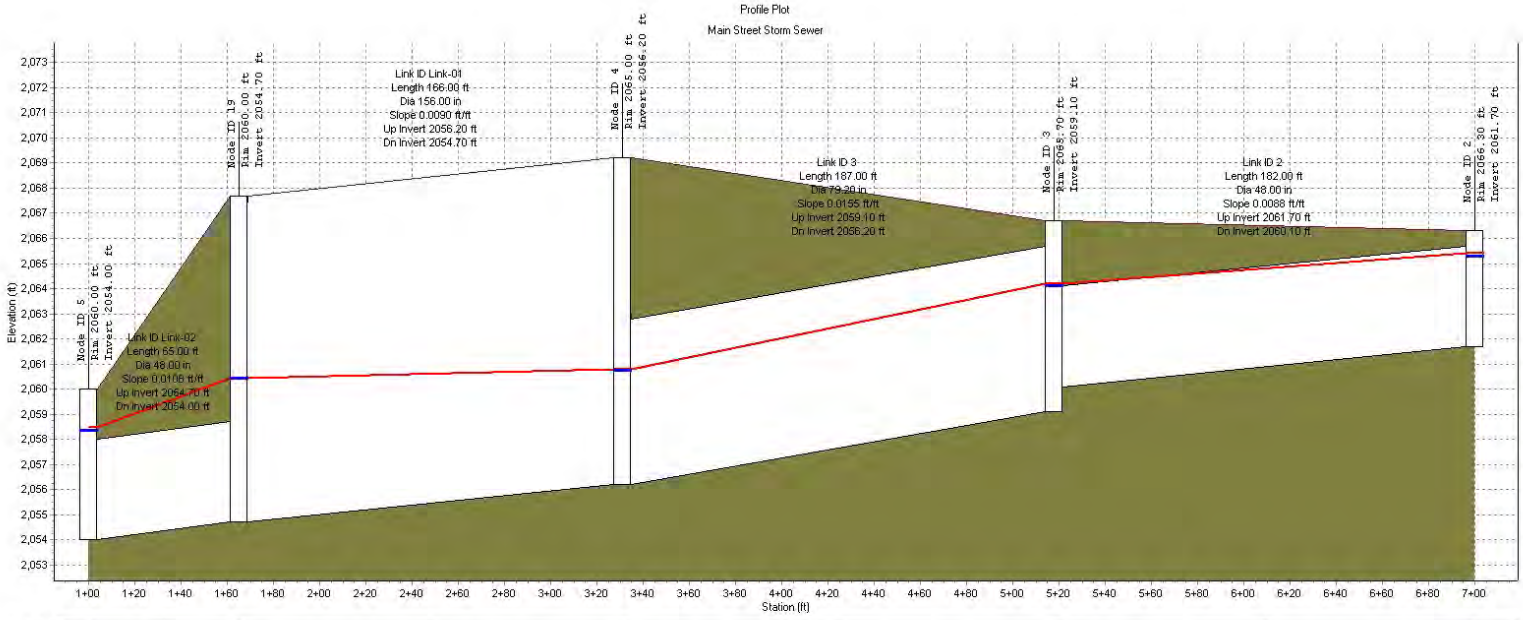
Node ID:	5	4	3	2
Rim (ft):	2060.00	2062.00	2065.70	2066.30
Invert (ft):	2054.00	2057.57	2060.10	2061.70
Min Pipe Cover (ft):	0.00	0.00	0.00	0.00
Max HGL (ft):	2060.83	2062.76	2068.57	2068.86

Link ID:	4	3	2
Length (ft):	210.00	181.00	182.00
Dia (in):	43.99	43.99	48.00
Slope (ft/ft):	0.0170	0.0140	0.0088
Up Invert (ft):	2057.57	2060.10	2061.70
Dn Invert (ft):	2054.00	2057.57	2060.10
Max Q (cfs):	165.11	340.10	291.44
Max Vel (ft/s):	11.06	9.81	6.45
Max Depth (ft):	3.67	3.67	4.00



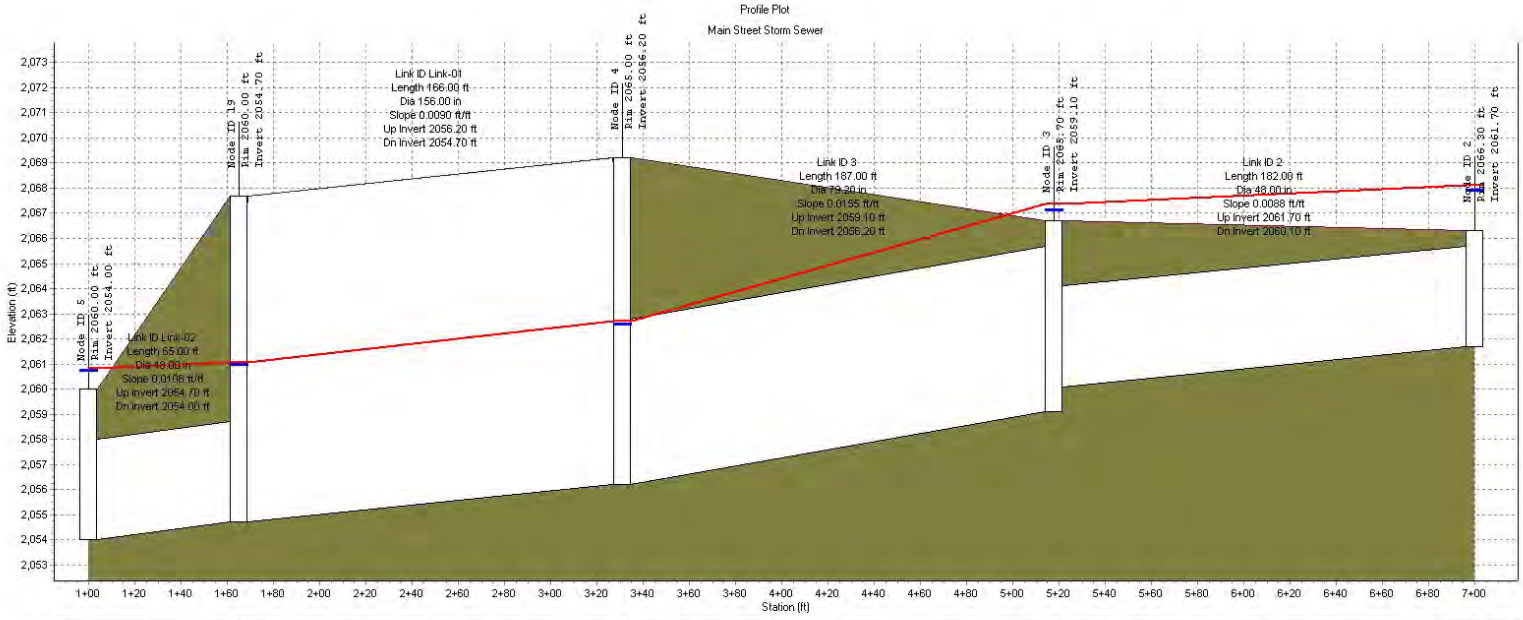
Node ID:	5	19	4	3	2
Rim (ft):	2060.00	2060.00	2065.00	2065.70	2066.30
Invert (ft):	2054.00	2054.70	2056.20	2059.10	2061.70
Min Pipe Cover (ft):	0.00	0.00	0.00	0.00	0.00
Max HGL (ft):	2056.80	2060.20	2060.28	2062.16	2063.70

Link ID:	Link-02	Link-01	3	2
Length (ft):	65.00	166.00	187.00	182.00
Dia (in):	48.00	156.00	79.20	48.00
Slope (ft/ft):	0.0108	0.0090	0.0155	0.0088
Up Invert (ft):	2054.70	2056.20	2059.10	2061.70
Dn Invert (ft):	2054.00	2054.70	2056.20	2060.10
Max Q (cfs):	158.71	279.19	279.18	279.18
Max Vel (ft/s):	10.61	2.99	6.51	10.06
Max Depth (ft):	3.38	4.79	3.54	1.98



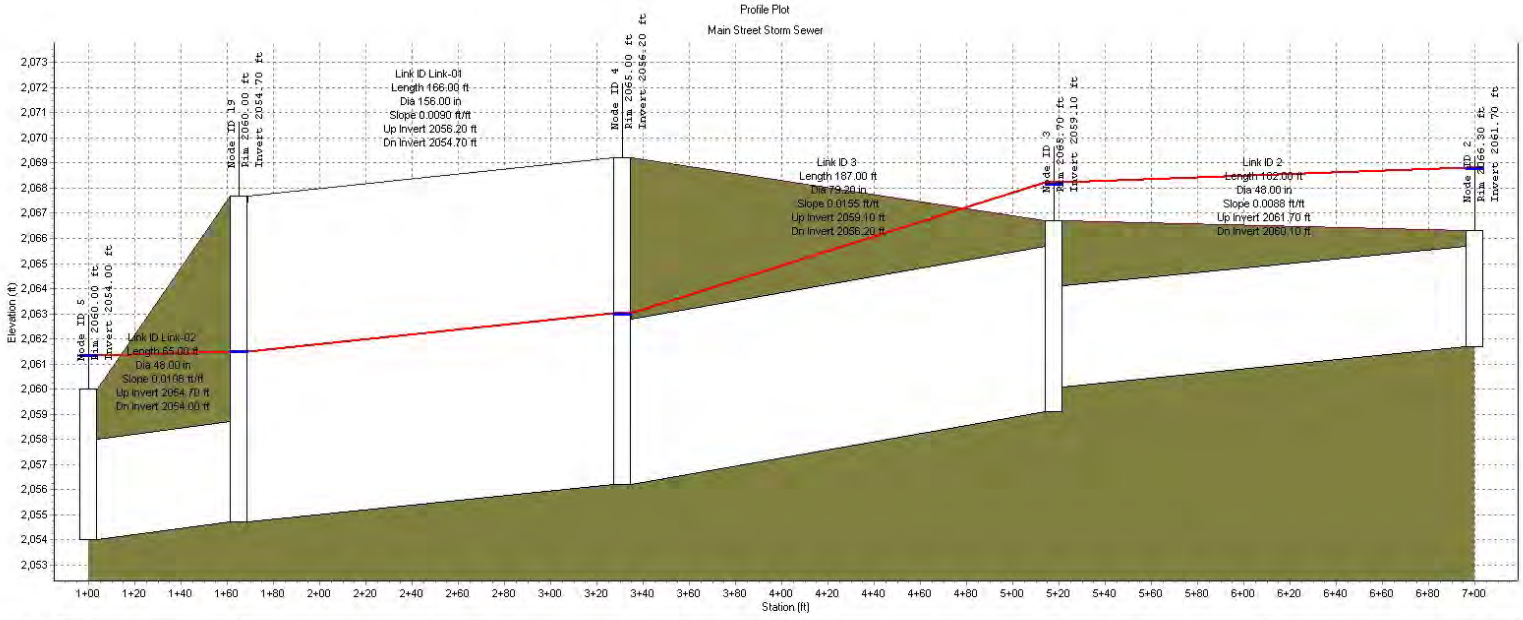
Node ID:	5	19	4	3	2
Rim (ft):	2060.00	2060.00	2065.00	2065.70	2066.30
Invert (ft):	2054.00	2054.70	2056.20	2059.10	2061.70
Min Pipe Cover (ft):	0.00	0.00	0.00	0.00	0.00
Max HGL (ft):	2058.49	2060.42	2060.80	2064.19	2065.40

Link ID:	Link-02	Link-01	3	2
Length (ft):	65.00	166.00	187.00	182.00
Dia (in):	48.00	156.00	79.20	48.00
Slope (ft/ft):	0.0108	0.0090	0.0155	0.0088
Up Invert (ft):	2054.70	2056.20	2059.10	2061.70
Dn Invert (ft):	2054.00	2054.70	2056.20	2060.10
Max Q (cfs):	164.86	520.23	520.25	520.27
Max Vel (ft/s):	10.61	5.17	8.95	10.07
Max Depth (ft):	4.00	5.12	4.76	3.77



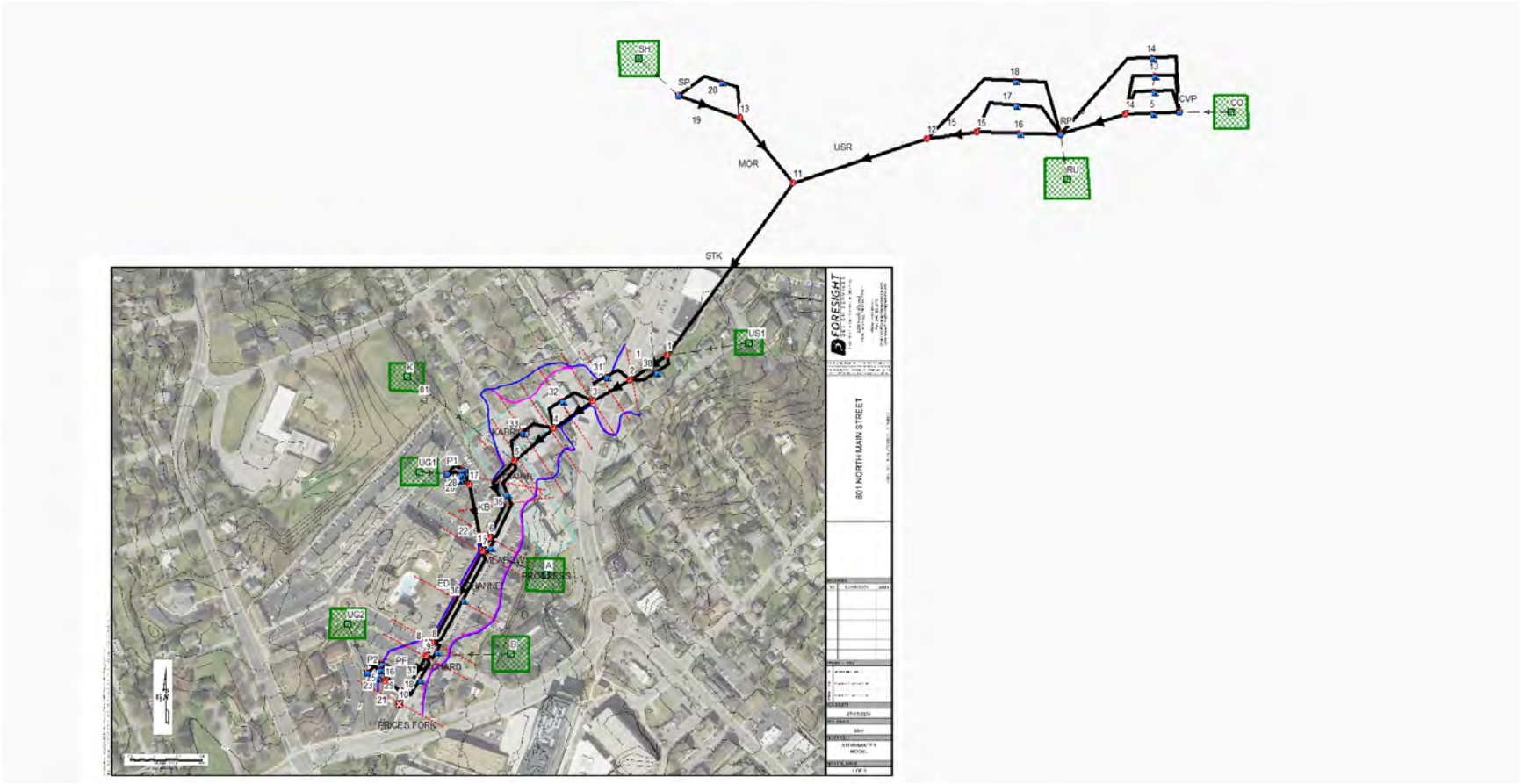
Node ID:	5	19	4	3	2
Rim (ft):	2060.00	2060.00	2065.00	2065.70	2066.30
Invert (ft):	2054.00	2054.70	2056.20	2059.10	2061.70
Min Pipe Cover (ft):	0.00	0.00	0.00	0.00	0.00
Max HGL (ft):	2060.82	2061.05	2062.71	2067.37	2068.10

Link ID:	Link-02	Link-01	3	2
Length (ft):	65.00	166.00	187.00	182.00
Dia (in):	48.00	156.00	79.20	48.00
Slope (ft/ft):	0.0108	0.0090	0.0155	0.0088
Up Invert (ft):	2054.70	2056.20	2059.10	2061.70
Dn Invert (ft):	2054.00	2054.70	2056.20	2060.10
Max Q (cfs):	165.26	876.17	876.19	614.76
Max Vel (ft/s):	10.51	7.00	11.14	10.25
Max Depth (ft):	4.00	6.31	6.49	4.00



Node ID:	5	19	4	3	2
Rim (ft):	2060.00	2060.00	2065.00	2065.70	2066.30
Invert (ft):	2054.00	2054.70	2056.20	2059.10	2061.70
Min Pipe Cover (ft):	0.00	0.00	0.00	0.00	0.00
Max HGL (ft):	2061.34	2061.51	2063.01	2068.25	2068.84

Link ID:	Link-02	Link-01	3	2
Length (ft):	65.00	166.00	187.00	182.00
Dia (in):	48.00	156.00	79.20	48.00
Slope (ft/ft):	0.0108	0.0090	0.0155	0.0088
Up Invert (ft):	2054.70	2056.20	2059.10	2061.70
Dn Invert (ft):	2054.00	2054.70	2056.20	2060.10
Max Q (cfs):	165.20	936.89	936.90	613.46
Max Vel (ft/s):	10.47	7.08	11.83	10.22
Max Depth (ft):	4.00	6.77	6.60	4.00



Autodesk Storm and Sanitary Analysis

Project Description

File Name ..... ExistingKabrichModel.SPF

Project Options

Flow Units ..... CFS
Elevation Type ..... Elevation
Hydrology Method ..... SCS TR-20
Time of Concentration (TOC) Method ..... User-Defined
Link Routing Method ..... Hydrodynamic
Enable Overflow Ponding at Nodes ..... YES
Skip Steady State Analysis Time Periods ..... NO

Number of Elements

	Qty
Rain Gages	1
Subbasins	9
Nodes	23
Junctions	17
Outfalls	1
Flow Diversions	0
Inlets	0
Storage Nodes	5
Links	41
Channels	8
Pipes	10
Pumps	0
Orifices	9
Weirs	14
Outlets	0
Pollutants	0
Land Uses	0

Rainfall Details

SN	Rain Gage ID	Data Source	Data Source ID	Rainfall Type	Rain Units	State	County	Return Period (years)	Rainfall Depth (inches)	Rainfall Distribution
1	1	Time Series	2Year	Cumulative	inches				0.00	

Subbasin Summary

SN	Subbasin ID	Area (ac)	Peak Rate Factor	Weighted Curve Number	Total Rainfall (in)	Total Runoff (in)	Total Runoff Volume (ac-in)	Peak Runoff (cfs)	Time of Concentration (days hh:mm:ss)
1	A	6.36	484.00	90.00	2.76	1.76	11.20	10.54	0 00:18:30
2	B	10.80	484.00	92.00	2.76	1.93	20.87	23.28	0 00:12:30
3	CO	44.42	484.00	84.00	2.76	1.32	58.55	55.88	0 00:17:30
4	K	93.79	484.00	85.00	2.76	1.39	129.99	122.48	0 00:18:12
5	RU	7.74	484.00	87.00	2.76	1.53	11.83	13.30	0 00:12:24
6	SH	69.35	484.00	86.00	2.76	1.46	100.97	84.59	0 00:23:30
7	UG1	3.05	484.00	93.00	2.76	2.02	6.16	9.38	0 00:05:00
8	UG2	11.65	484.00	86.00	2.76	1.46	16.95	16.46	0 00:17:12
9	US1	244.78	484.00	82.00	2.76	1.19	291.29	217.07	0 00:28:36

Node Summary

SN	Element ID	Element Type	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Initial Water Elevation (ft)	Surcharge Elevation (ft)	Ponded Area (ft^2)	Peak Inflow (cfs)	Max HGL Elevation Attained (ft)	Max Surcharge Depth Attained (ft)	Min Freeboard Attained (ft)	Time of Peak Flooding Occurrence (days hh:mm)	Total Flooded Volume (ac-in)	Total Time Flooded (min)
1	1	Junction	2062.60	2068.60	2062.60	2068.60	0.00	282.39	2066.46	0.00	7.14	0 00:00	0.00	0.00
2	2	Junction	2061.70	2066.30	2061.70	2066.30	0.00	272.34	2066.28	0.00	6.42	0 00:00	0.00	0.00
3	3	Junction	2060.10	2065.70	2060.10	2065.70	0.00	271.99	2065.91	0.00	5.75	0 00:00	0.00	0.00
4	4	Junction	2057.57	2062.00	2057.57	2062.00	0.00	271.94	2062.19	0.00	6.94	0 00:00	0.00	0.00
5	5	Junction	2054.00	2060.00	2054.00	2060.00	0.00	353.67	2056.73	0.00	8.27	0 00:00	0.00	0.00
6	6	Junction	2048.88	2053.88	2048.88	2053.88	0.00	353.66	2052.76	0.00	7.12	0 00:00	0.00	0.00
7	7	Junction	2048.60	2053.60	2048.60	2053.60	0.00	364.16	2051.77	0.00	6.83	0 00:00	0.00	0.00
8	8	Junction	2045.83	2050.83	2045.83	2050.83	0.00	363.76	2047.98	0.00	7.85	0 00:00	0.00	0.00
9	9	Junction	2044.80	2049.80	2044.80	2049.80	0.00	375.38	2047.53	0.00	7.27	0 00:00	0.00	0.00
10	11	Junction	2092.00	2098.00	2092.00	2098.00	0.00	104.46	2093.96	0.00	6.04	0 00:00	0.00	0.00
11	12	Junction	2133.50	2139.50	2133.50	2139.50	0.00	39.13	2134.34	0.00	8.66	0 00:00	0.00	0.00
12	13	Junction	2116.51	2125.00	2116.51	2125.00	0.00	67.13	2118.03	0.00	6.97	0 00:00	0.00	0.00
13	14	Junction	2154.50	2154.50	2154.50	2154.50	0.00	43.45	2155.22	0.00	3.55	0 00:00	0.00	0.00
14	15	Junction	2134.00	2142.00	2134.00	2142.00	0.00	39.13	2135.35	0.00	11.15	0 00:00	0.00	0.00
15	16	Junction	2044.25	2044.25	2044.25	2044.25	0.00	4.46	2046.10	0.00	4.70	0 00:00	0.00	0.00
16	17	Junction	2050.75	2050.75	2050.75	2050.75	0.00	3.11	2052.12	0.00	4.53	0 00:00	0.00	0.00
17	18	Junction	2043.83	2047.83	2043.83	2047.83	0.00	377.54	2046.10	0.00	7.73	0 00:00	0.00	0.00
18	10	Outfall	2041.91					377.53	2044.18					
19	CVP	Storage Node	2155.00	2162.00	2155.00		7.00	48.31	2159.14				0.00	0.00
20	P1	Storage Node	2050.75	2055.75	2050.75		5.00	9.10	2053.45				0.00	0.00
21	P2	Storage Node	2044.25	2049.25	2044.25		5.00	13.91	2047.23				0.00	0.00
22	RP	Storage Node	2137.00	2145.00	2137.00		8.00	51.01	2143.59				0.00	0.00
23	SP	Storage Node	2117.00	2125.00	2117.00		8.00	84.28	2121.23				0.00	0.00

Link Summary

SN	Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length	Inlet Invert Elevation	Outlet Invert Elevation	Average Slope	Diameter or Height	Manning's Roughness	Peak Flow	Design Flow Capacity	Peak Flow/ Design Flow Ratio	Peak Flow Velocity	Peak Flow Depth	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged	Reported Condition
					(ft)	(ft)	(ft)	(%)	(in)		(cfs)	(cfs)		(ft/sec)	(ft)		(min)	
1	2	Pipe	2	3	182.00	2061.70	2060.10	0.8800			271.99	896.81	0.30	6.51	4.00	1.00	22.00	SURCHARGED
2	3	Pipe	3	4	181.00	2060.10	2057.57	1.4000			271.94	269.80	1.01	7.85	3.67	1.00	39.00	SURCHARGED
3	4	Pipe	4	5	210.00	2057.57	2054.00	1.7000			162.25	148.77	1.09	11.24	3.18	0.87	0.00	> CAPACITY
4	6	Pipe	6	7	50.00	2048.88	2048.60	0.5600			353.74	291.43	1.21	8.37	3.43	0.88	0.00	> CAPACITY
5	8	Pipe	8	9	50.00	2045.83	2044.80	2.0600			363.72	1979.07	0.18	7.46	2.33	0.54	0.00	Calculated
6	9	Pipe	14	RP	50.00	2154.50	2137.00	35.0000			43.45	242.66	0.18	13.02	1.60	0.64	0.00	Calculated
7	15	Pipe	15	12	82.00	2134.00	2133.50	0.6100			39.13	199.62	0.20	13.14	1.10	0.24	0.00	Calculated
8	19	Pipe	SP	13	75.00	2117.00	2116.51	0.6500			67.13	29.20	2.30	11.75	2.25	0.75	0.00	> CAPACITY
9	21	Pipe	16	18	35.10	2044.25	2043.83	1.2000			6.13	53.03	0.12	3.97	1.97	0.82	0.00	Calculated
10	22	Pipe	17	7	42.40	2050.75	2048.60	5.0700			4.82	27.95	0.17	4.44	1.20	0.96	0.00	Calculated
11	1	Channel	1	2	131.00	2062.60	2061.70	0.6900			272.34	964.35	0.28	12.14	4.22	0.70	0.00	
12	29	Channel	18	10	154.40	2043.83	2041.91	1.2400			377.53	1476.05	0.26	10.24	2.18	0.45	0.00	
13	ED	Channel	7	8	440.35	2048.60	2045.83	0.6300			363.76	784.15	0.46	10.81	2.56	0.53	0.00	
14	KB	Channel	5	6	392.20	2054.00	2048.88	1.3100			353.66	1129.64	0.31	8.05	3.23	0.66	0.00	
15	MOR	Channel	13	11	1020.00	2116.51	2092.00	2.4000			67.10	3372.60	0.02	7.92	1.72	0.22	0.00	
16	PF	Channel	9	18	78.10	2044.80	2043.83	1.2400			375.37	1101.84	0.34	12.03	2.40	0.50	0.00	
17	STK	Channel	11	1	2424.00	2092.00	2062.60	1.2100			101.51	830.10	0.12	4.23	2.90	0.58	0.00	
18	USR	Channel	12	11	1864.00	2133.50	2092.00	2.2300			38.81	3988.84	0.01	3.57	1.39	0.17	0.00	
19	5	Orifice	CVP	14		2155.00	2154.50				16.98							
20	7	Orifice	CVP	14		2155.00	2154.50				26.47							
21	13	Orifice	CVP	14		2155.00	2154.50				0.00							
22	16	Orifice	RP	15		2137.00	2134.00				22.28							
23	17	Orifice	RP	15		2137.00	2134.00				16.85							
24	23	Orifice	P2	16		2044.25	2044.25				4.46							
25	24	Orifice	P2	16		2044.25	2044.25				0.53							
26	26	Orifice	P1	17		2050.75	2050.75				0.39							
27	27	Orifice	P1	17		2050.75	2050.75				1.95							
28	10	Weir	8	9		2045.83	2044.80				0.00							
29	11	Weir	6	7		2048.88	2048.60				0.00							
30	14	Weir	CVP	RP		2155.00	2137.00				0.00							
31	18	Weir	RP	12		2137.00	2133.50				0.00							
32	20	Weir	SP	13		2117.00	2116.51				0.00							
33	25	Weir	P2	16		2044.25	2044.25				0.00							
34	28	Weir	P1	17		2050.75	2050.75				0.00							
35	31	Weir	2	3		2061.70	2060.10				0.00							
36	32	Weir	3	4		2060.10	2057.57				0.00							
37	33	Weir	4	5		2057.57	2054.00				109.96							
38	35	Weir	5	6		2054.00	2048.88				0.00							
39	36	Weir	7	8		2048.60	2045.83				0.00							
40	37	Weir	9	18		2044.80	2043.83				0.00							
41	38	Weir	1	2		2062.60	2061.70				0.00							

Subbasin Hydrology

Subbasin : A

Input Data

Area (ac) 6.36
Peak Rate Factor 484
Weighted Curve Number 90
Rain Gage ID 1

Composite Curve Number

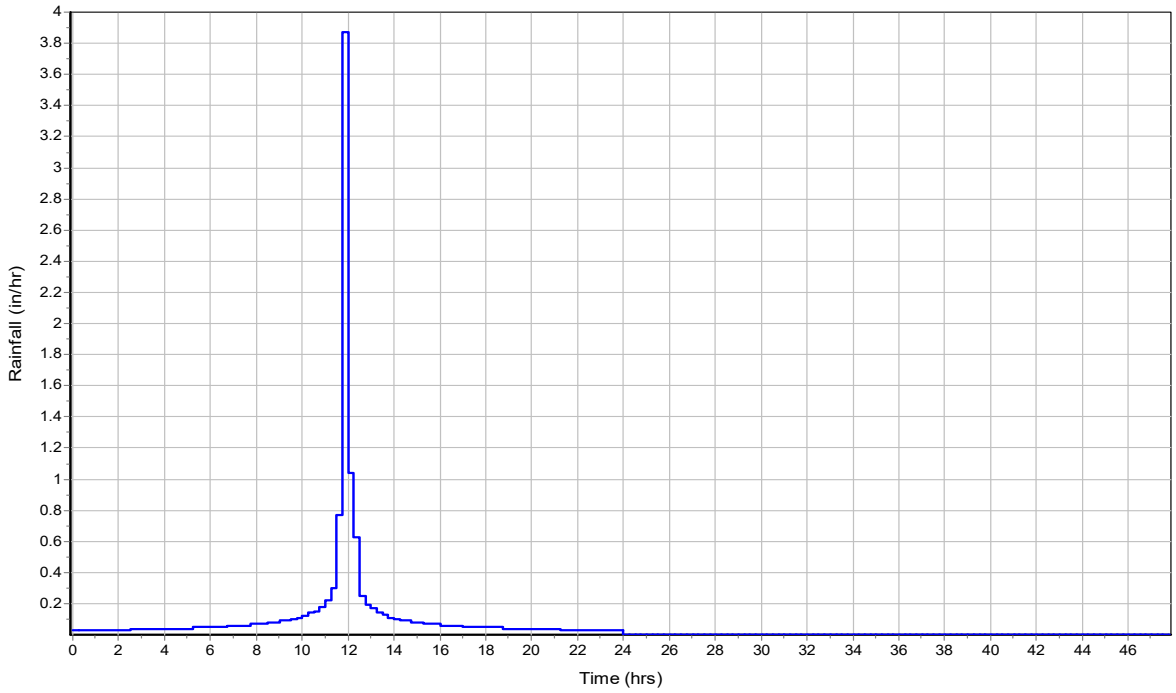
32 Soil/Surface Description	Area (acres)	Soil Group	Curve Number
-	6.36	-	90
Composite Area & Weighted CN	6.36		90

Subbasin Runoff Results

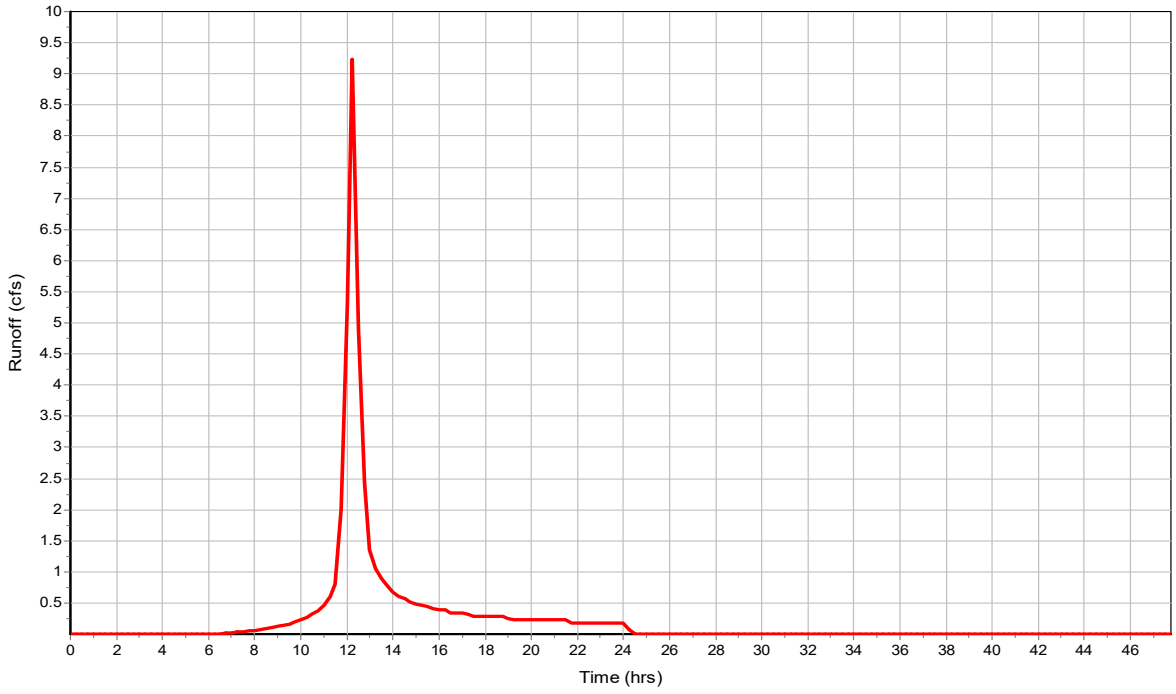
Total Rainfall (in) 2.76
Total Runoff (in) 1.76
Peak Runoff (cfs) 10.54
Weighted Curve Number 90
Time of Concentration (days hh:mm:ss) 0 00:18:30

Subbasin : A

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : B

Input Data

Area (ac) 10.8
Peak Rate Factor 484
Weighted Curve Number 92
Rain Gage ID 1

Composite Curve Number

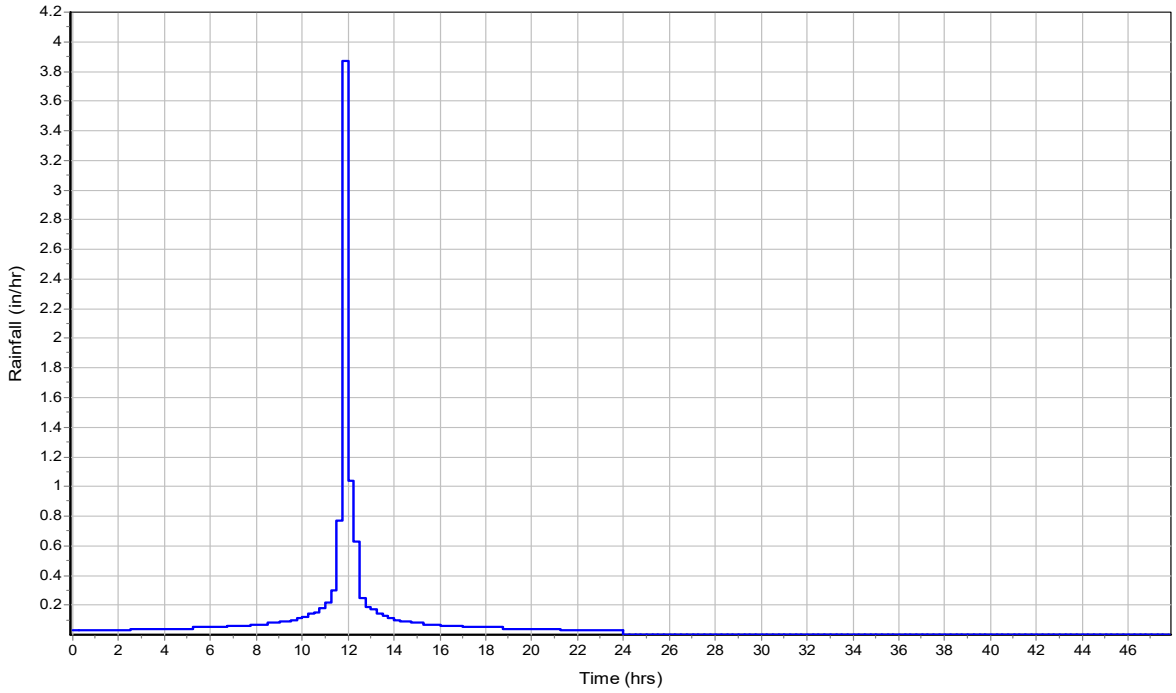
32 Soil/Surface Description	Area (acres)	Soil Group	Curve Number
-	10.8	-	92
Composite Area & Weighted CN	10.8		92

Subbasin Runoff Results

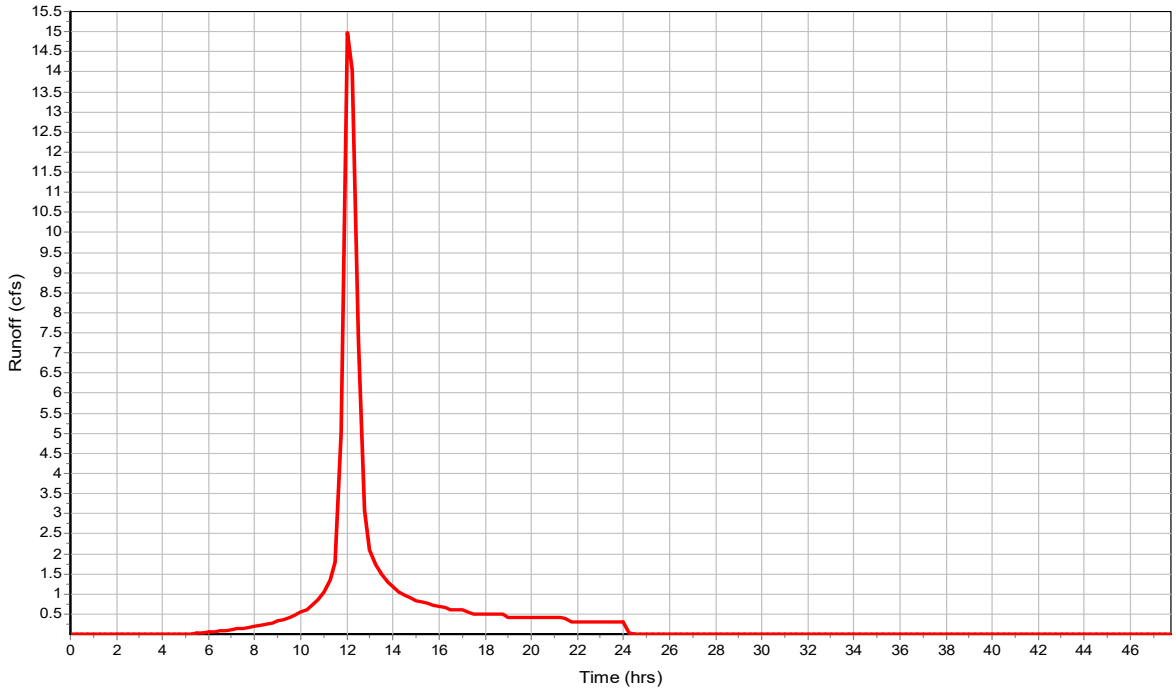
Total Rainfall (in) 2.76
Total Runoff (in) 1.93
Peak Runoff (cfs) 23.28
Weighted Curve Number 92
Time of Concentration (days hh:mm:ss) 0 00:12:30

Subbasin : B

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : CO

Input Data

Area (ac)	44.42
Peak Rate Factor	484
Weighted Curve Number	84
Rain Gage ID	1

Composite Curve Number

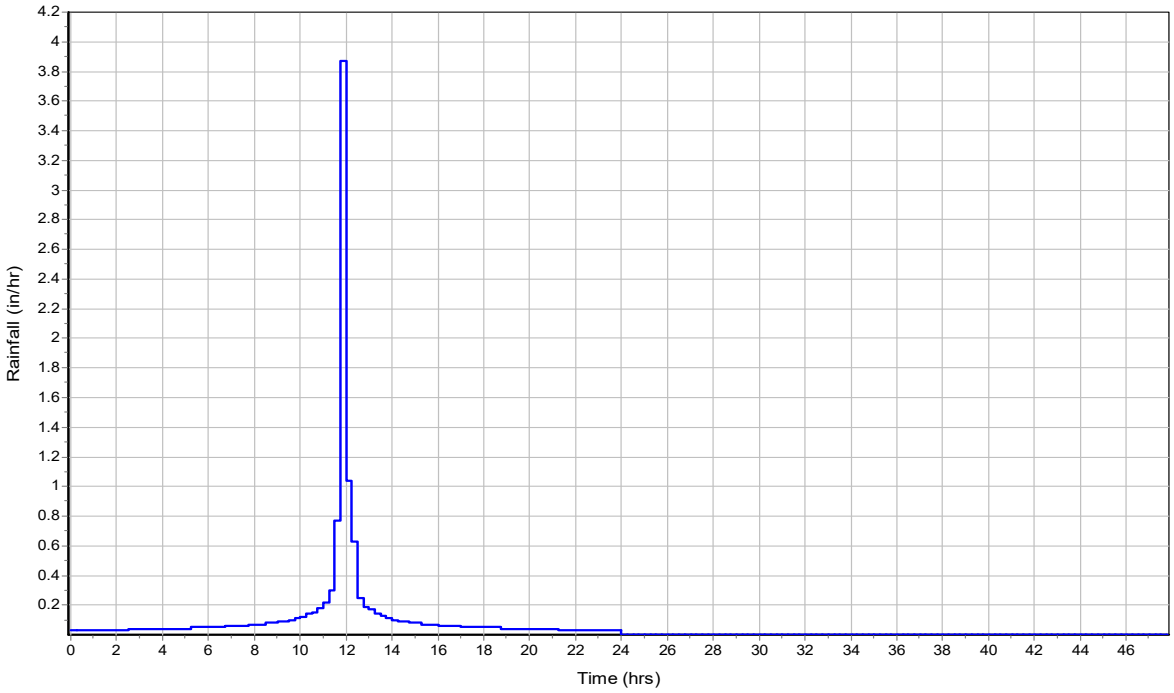
32 Soil/Surface Description	Area (acres)	Soil Group	Curve Number
-	44.42	-	84
Composite Area & Weighted CN	44.42		84

Subbasin Runoff Results

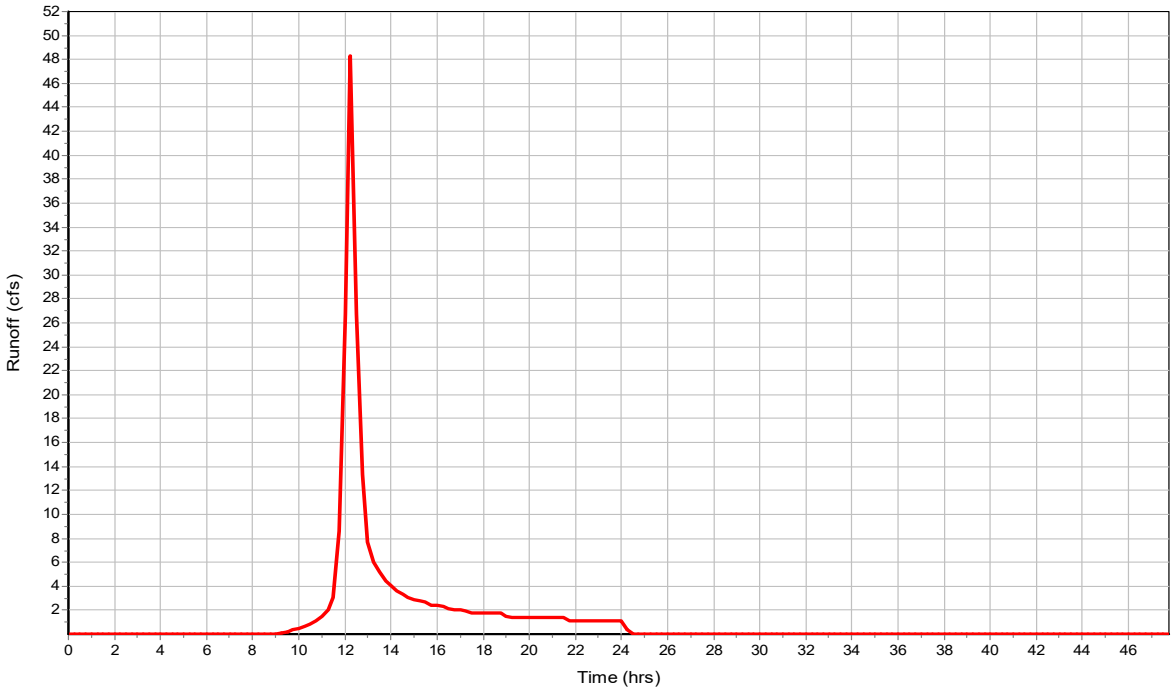
Total Rainfall (in)	2.76
Total Runoff (in)	1.32
Peak Runoff (cfs)	55.88
Weighted Curve Number	84
Time of Concentration (days hh:mm:ss)	0 00:17:30

Subbasin : CO

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : K

Input Data

Area (ac)	93.79
Peak Rate Factor	484
Weighted Curve Number	85
Rain Gage ID	1

Composite Curve Number

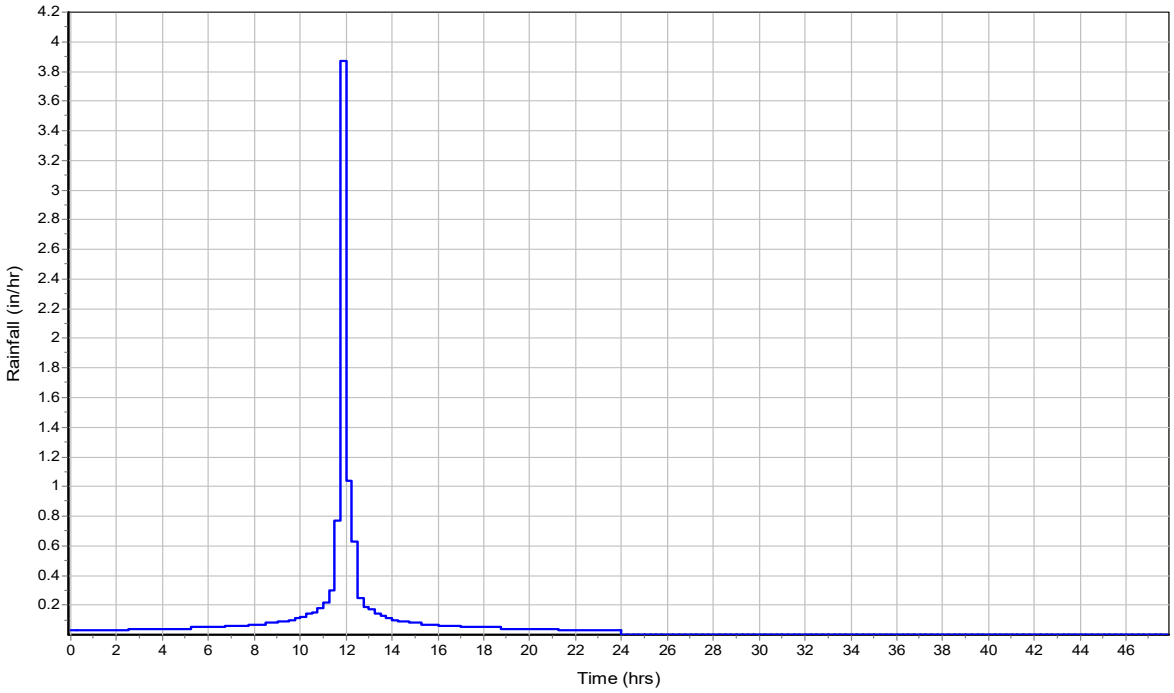
32 Soil/Surface Description	Area (acres)	Soil Group	Curve Number
-	93.79	-	85
Composite Area & Weighted CN	93.79		85

Subbasin Runoff Results

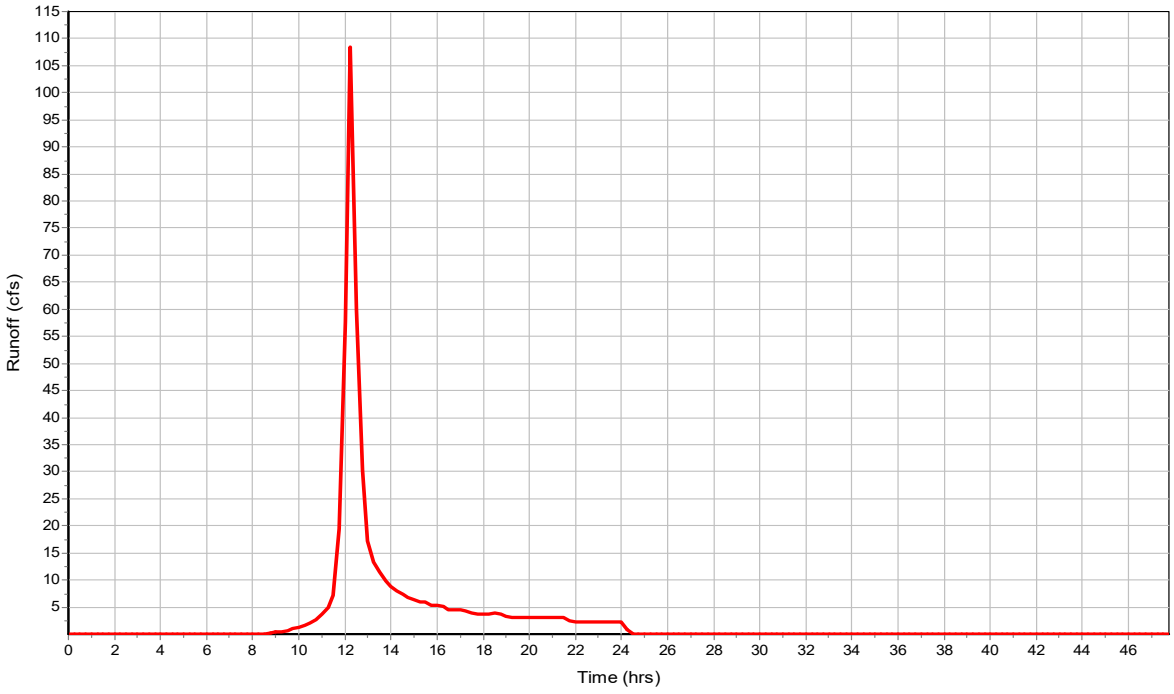
Total Rainfall (in)	2.76
Total Runoff (in)	1.39
Peak Runoff (cfs)	122.48
Weighted Curve Number	85
Time of Concentration (days hh:mm:ss)	0 00:18:12

Subbasin : K

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : RU

Input Data

Area (ac)	7.74
Peak Rate Factor	484
Weighted Curve Number	87
Rain Gage ID	1

Composite Curve Number

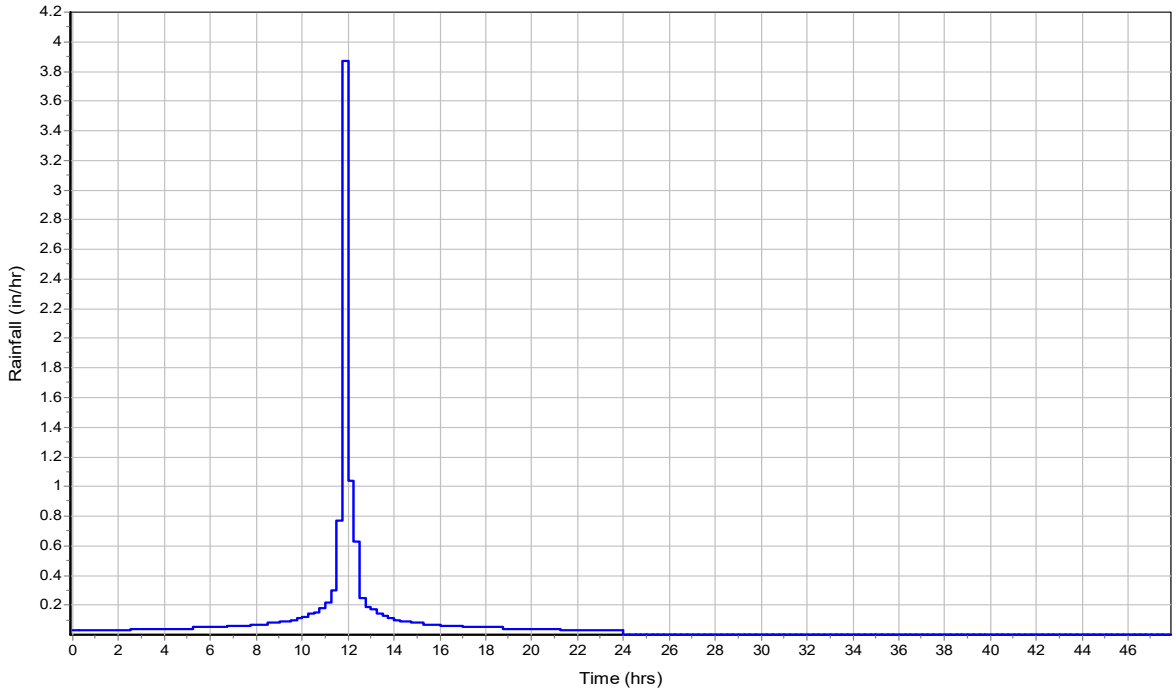
32 Soil/Surface Description	Area (acres)	Soil Group	Curve Number
-	7.74	-	87
Composite Area & Weighted CN	7.74		87

Subbasin Runoff Results

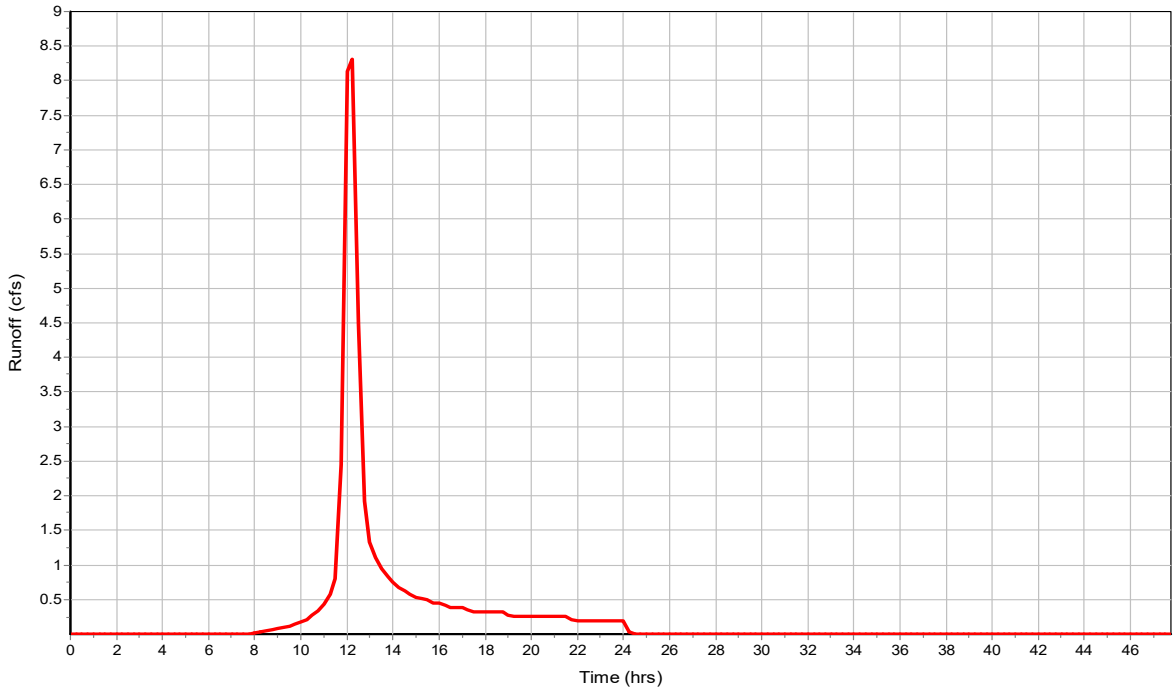
Total Rainfall (in)	2.76
Total Runoff (in)	1.53
Peak Runoff (cfs)	13.3
Weighted Curve Number	87
Time of Concentration (days hh:mm:ss)	0 00:12:24

Subbasin : RU

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : SH

Input Data

Area (ac)	69.35
Peak Rate Factor	484
Weighted Curve Number	86
Rain Gage ID	1

Composite Curve Number

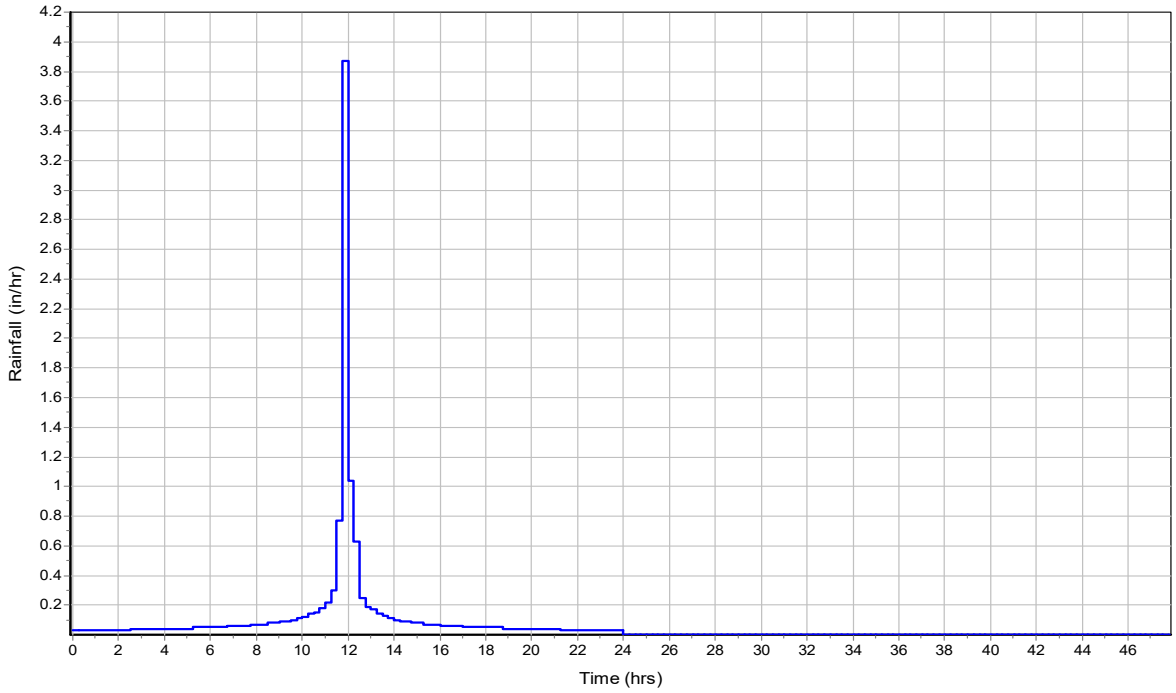
32 Soil/Surface Description	Area (acres)	Soil Group	Curve Number
-	69.35	-	86
Composite Area & Weighted CN	69.35		86

Subbasin Runoff Results

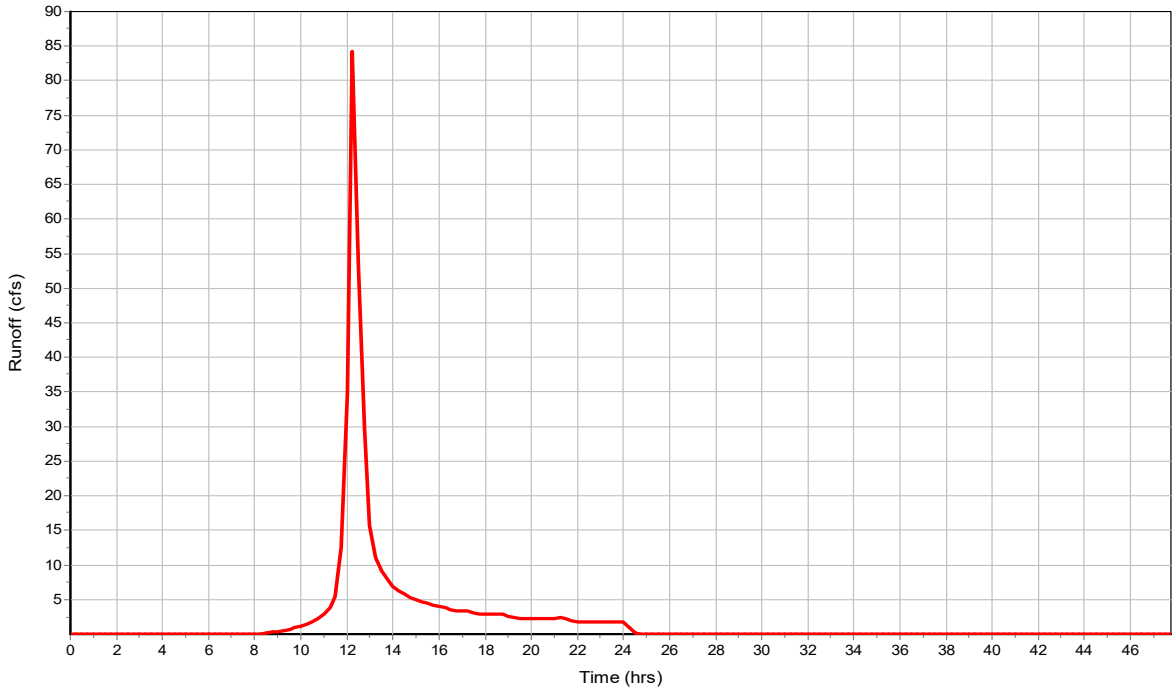
Total Rainfall (in)	2.76
Total Runoff (in)	1.46
Peak Runoff (cfs)	84.59
Weighted Curve Number	86
Time of Concentration (days hh:mm:ss)	0 00:23:30

Subbasin : SH

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : UG1

Input Data

Area (ac) 3.05
Peak Rate Factor 484
Weighted Curve Number 93
Rain Gage ID 1

Composite Curve Number

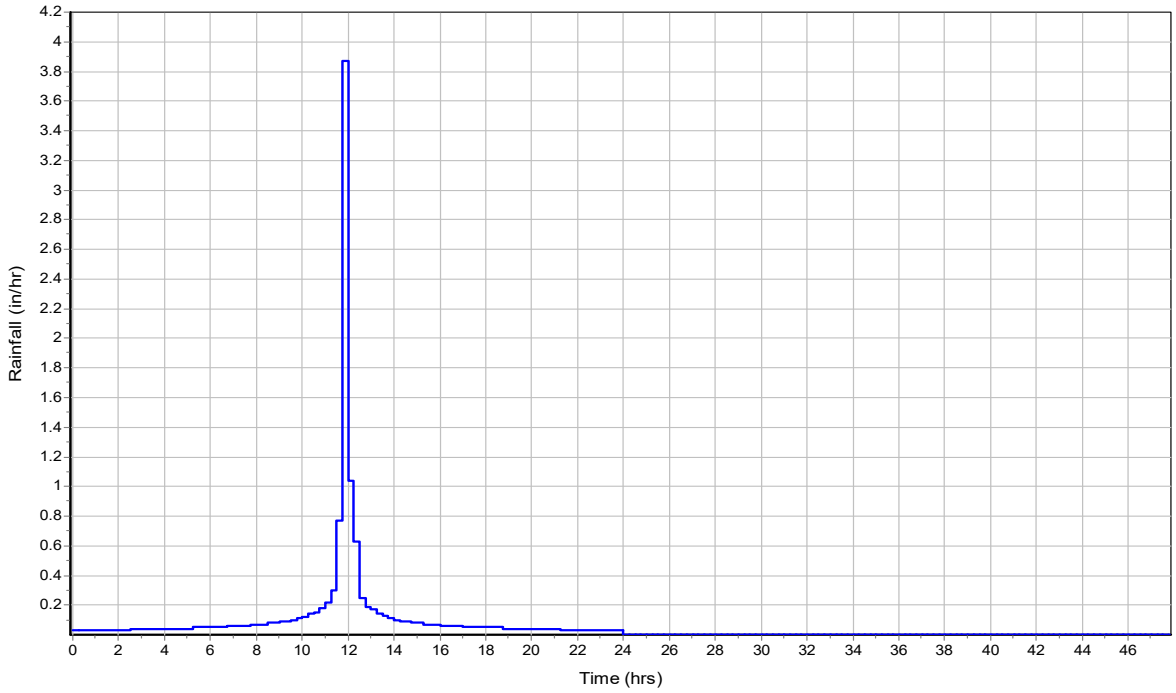
32	Area	Soil	Curve
Soil/Surface Description	(acres)	Group	Number
-	3.05	-	93
Composite Area & Weighted CN	3.05		93

Subbasin Runoff Results

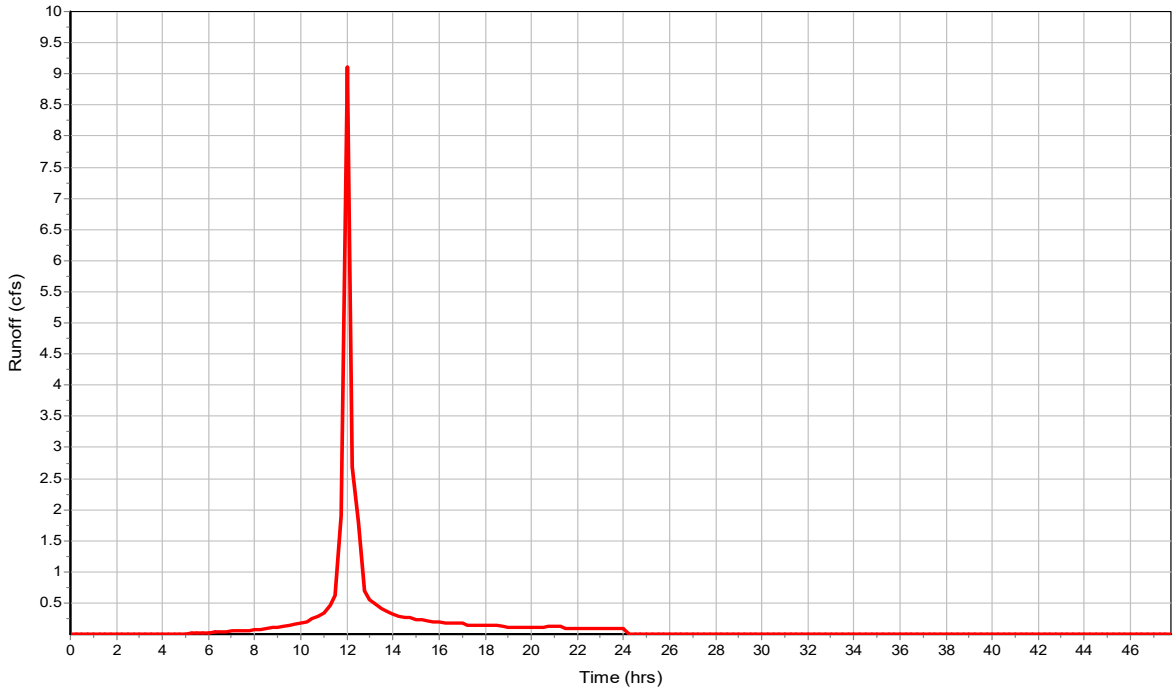
Total Rainfall (in) 2.76
Total Runoff (in) 2.02
Peak Runoff (cfs) 9.38
Weighted Curve Number 93
Time of Concentration (days hh:mm:ss) 0 00:05:00

Subbasin : UG1

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : UG2

Input Data

Area (ac)	11.65
Peak Rate Factor	484
Weighted Curve Number	86
Rain Gage ID	1

Composite Curve Number

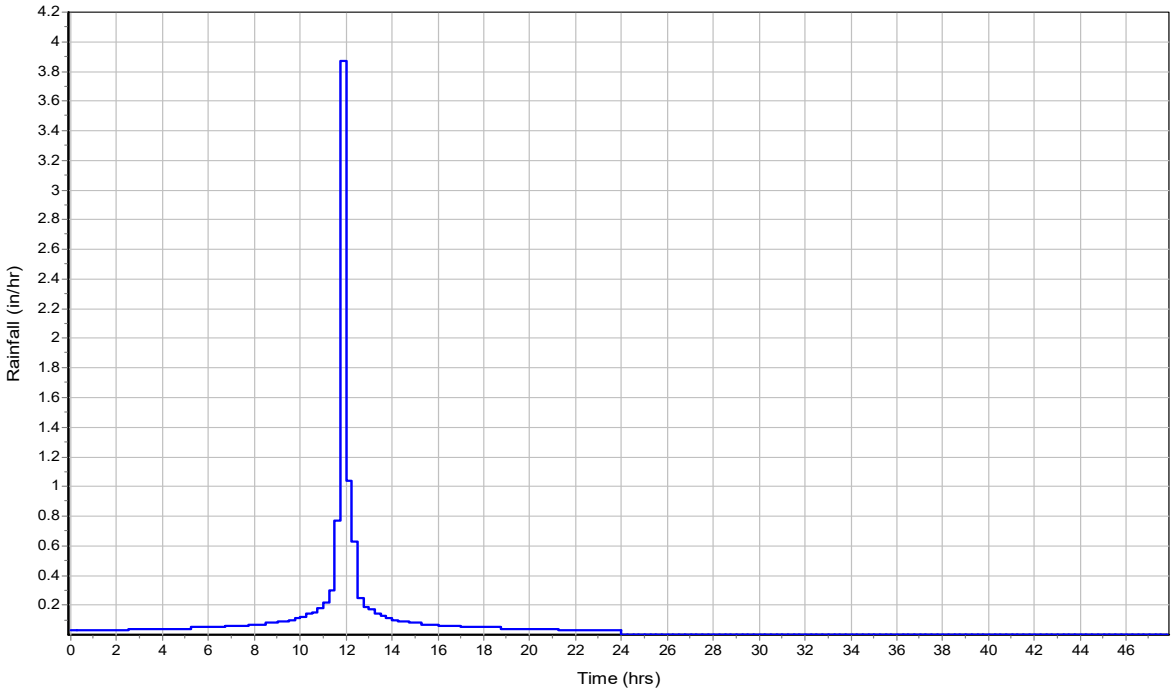
32 Soil/Surface Description	Area (acres)	Soil Group	Curve Number
-	11.65	-	86
Composite Area & Weighted CN	11.65		86

Subbasin Runoff Results

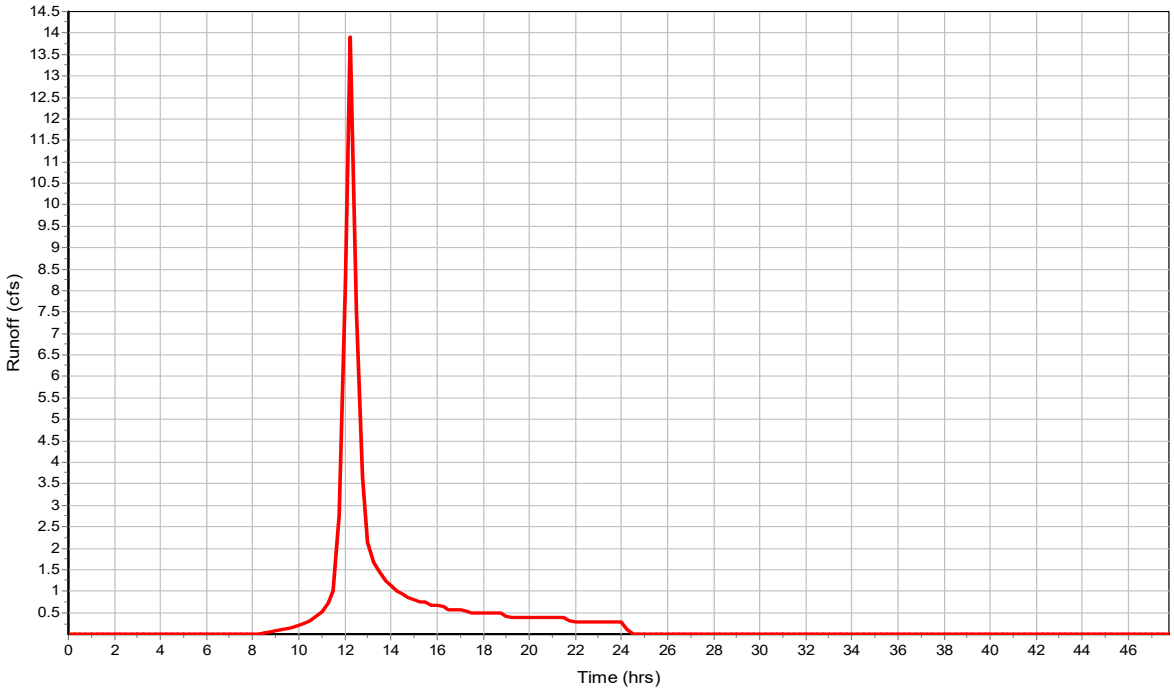
Total Rainfall (in)	2.76
Total Runoff (in)	1.46
Peak Runoff (cfs)	16.46
Weighted Curve Number	86
Time of Concentration (days hh:mm:ss)	0 00:17:12

Subbasin : UG2

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : US1

Input Data

Area (ac) 244.78
Peak Rate Factor 484
Weighted Curve Number 82
Rain Gage ID 1

Composite Curve Number

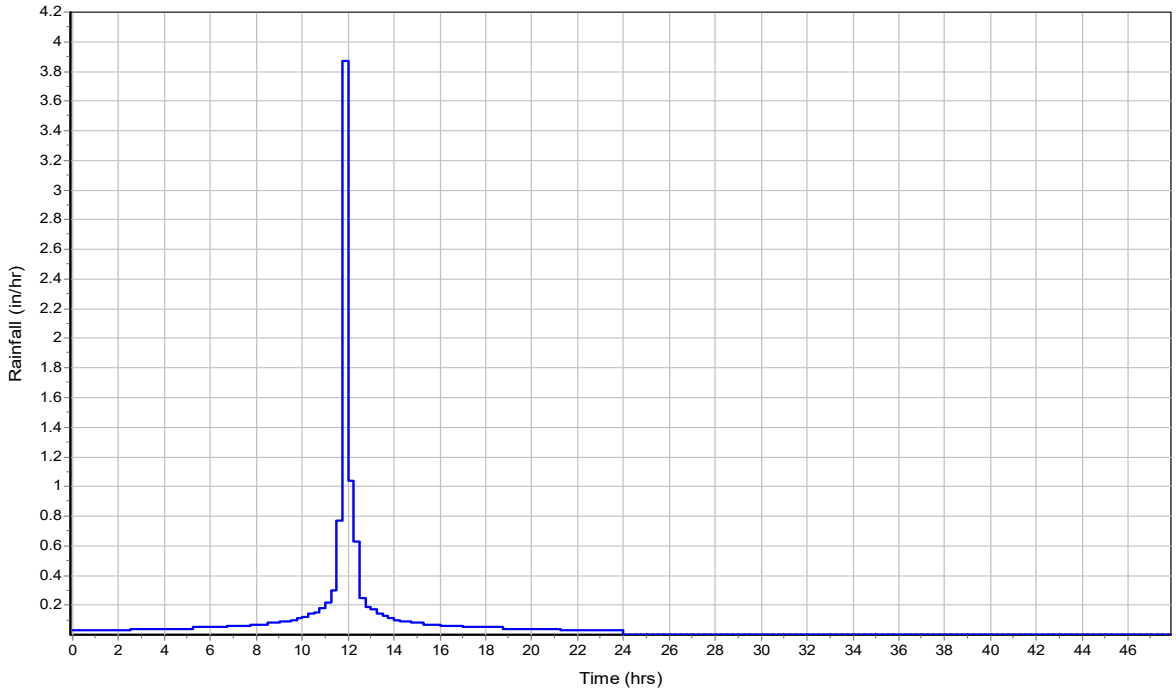
32 Soil/Surface Description	Area (acres)	Soil Group	Curve Number
-	244.78	-	82
Composite Area & Weighted CN	244.78		82

Subbasin Runoff Results

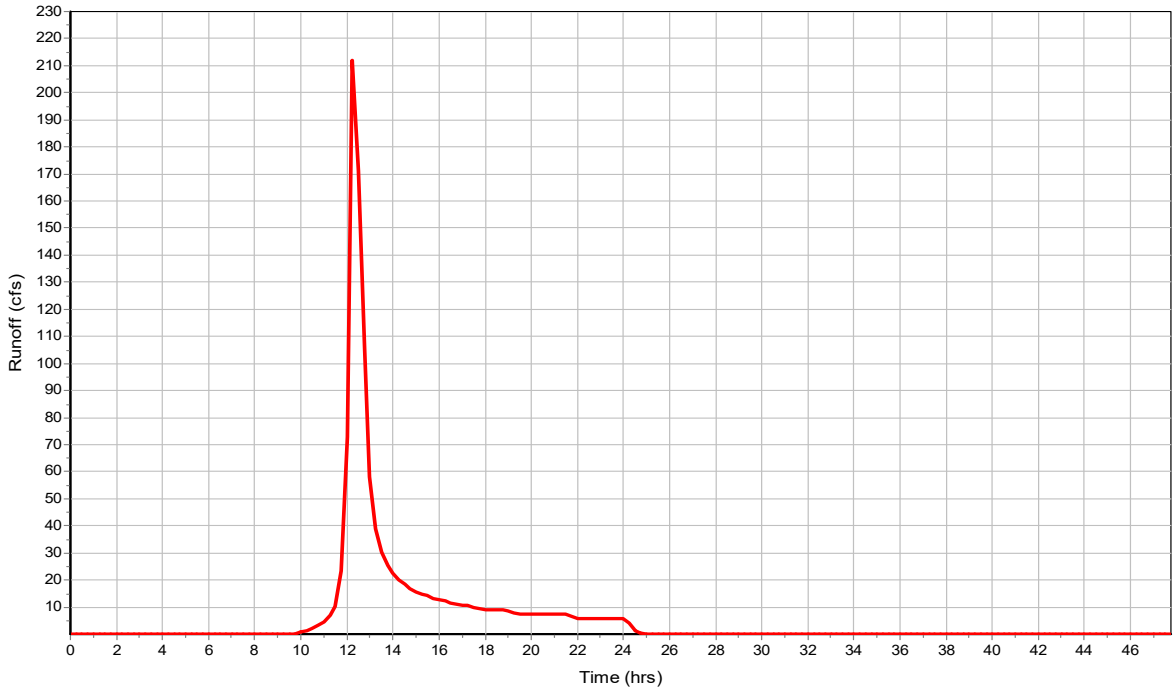
Total Rainfall (in) 2.76
Total Runoff (in) 1.19
Peak Runoff (cfs) 217.07
Weighted Curve Number 82
Time of Concentration (days hh:mm:ss) 0 00:28:36

Subbasin : US1

Rainfall Intensity Graph



Runoff Hydrograph



Junction Input

SN	Element ID	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Ground/Rim (Max) Offset (ft)	Initial Water Elevation (ft)	Initial Water Depth (ft)	Surcharge Elevation (ft)	Surcharge Depth (ft)	Ponded Area (ft^2)	Minimum Pipe Cover (in)
1	1	2062.60	2068.60	6.00	2062.60	0.00	2068.60	0.00	0.00	
2	2	2061.70	2066.30	4.60	2061.70	0.00	2066.30	0.00	0.00	
3	3	2060.10	2065.70	5.60	2060.10	0.00	2065.70	0.00	0.00	
4	4	2057.57	2062.00	4.43	2057.57	0.00	2062.00	0.00	0.00	
5	5	2054.00	2060.00	6.00	2054.00	0.00	2060.00	0.00	0.00	
6	6	2048.88	2053.88	5.00	2048.88	0.00	2053.88	0.00	0.00	
7	7	2048.60	2053.60	5.00	2048.60	0.00	2053.60	0.00	0.00	
8	8	2045.83	2050.83	5.00	2045.83	0.00	2050.83	0.00	0.00	
9	9	2044.80	2049.80	5.00	2044.80	0.00	2049.80	0.00	0.00	
10	11	2092.00	2098.00	6.00	2092.00	0.00	2098.00	0.00	0.00	
11	12	2133.50	2139.50	6.00	2133.50	0.00	2139.50	0.00	0.00	
12	13	2116.51	2125.00	8.49	2116.51	0.00	2125.00	0.00	0.00	
13	14	2154.50	2154.50	0.00	2154.50	0.00	2154.50	0.00	0.00	
14	15	2134.00	2142.00	8.00	2134.00	0.00	2142.00	0.00	0.00	
15	16	2044.25	2044.25	0.00	2044.25	0.00	2044.25	0.00	0.00	
16	17	2050.75	2050.75	0.00	2050.75	0.00	2050.75	0.00	0.00	
17	18	2043.83	2047.83	4.00	2043.83	0.00	2047.83	0.00	0.00	

Junction Results

SN	Element ID	Peak Inflow (cfs)	Peak Lateral Inflow (cfs)	Max HGL Elevation Attained (ft)	Max HGL Depth Attained (ft)	Max Surcharge Depth Attained (ft)	Min Freeboard Attained (ft)	Average HGL Elevation Attained (ft)	Average HGL Depth Attained (ft)	Time of Max HGL Occurrence (days hh:mm)	Time of Peak Flooding Occurrence (days hh:mm)	Total Flooded Volume (ac-in)	Total Time Flooded (min)
1	1	282.39	211.89	2066.46	3.86	0.00	7.14	2062.94	0.34	0 12:44	0 00:00	0.00	0.00
2	2	272.34	0.00	2066.28	4.58	0.00	6.42	2061.83	0.13	0 12:44	0 00:00	0.00	0.00
3	3	271.99	0.00	2065.91	5.81	0.00	5.75	2060.34	0.24	0 12:44	0 00:00	0.00	0.00
4	4	271.94	0.00	2062.19	4.62	0.00	6.94	2057.89	0.32	0 12:45	0 00:00	0.00	0.00
5	5	353.67	108.47	2056.73	2.73	0.00	8.27	2054.19	0.19	0 12:34	0 00:00	0.00	0.00
6	6	353.66	0.00	2052.76	3.88	0.00	7.12	2049.13	0.25	0 12:35	0 00:00	0.00	0.00
7	7	364.16	9.24	2051.77	3.17	0.00	6.83	2048.86	0.26	0 12:34	0 00:00	0.00	0.00
8	8	363.76	0.00	2047.98	2.15	0.00	7.85	2045.93	0.10	0 12:35	0 00:00	0.00	0.00
9	9	375.38	14.97	2047.53	2.73	0.00	7.27	2045.01	0.21	0 12:35	0 00:00	0.00	0.00
10	11	104.46	0.00	2093.96	1.96	0.00	6.04	2092.17	0.17	0 12:48	0 00:00	0.00	0.00
11	12	39.13	0.00	2134.34	0.84	0.00	8.66	2133.57	0.07	0 12:46	0 00:00	0.00	0.00
12	13	67.13	0.00	2118.03	1.52	0.00	6.97	2116.63	0.12	0 12:39	0 00:00	0.00	0.00
13	14	43.45	0.00	2155.22	0.72	0.00	3.55	2154.56	0.06	0 12:33	0 00:00	0.00	0.00
14	15	39.13	0.00	2135.35	1.35	0.00	11.15	2134.13	0.13	0 12:44	0 00:00	0.00	0.00
15	16	4.46	0.00	2046.10	1.85	0.00	4.70	2044.36	0.11	0 12:35	0 00:00	0.00	0.00
16	17	3.11	0.00	2052.12	1.37	0.00	4.53	2050.81	0.06	0 12:30	0 00:00	0.00	0.00
17	18	377.54	0.00	2046.10	2.27	0.00	7.73	2044.00	0.17	0 12:35	0 00:00	0.00	0.00

Channel Input

SN	Element ID	Length (ft)	Inlet Invert Elevation (ft)	Inlet Invert Offset (ft)	Outlet Invert Elevation (ft)	Outlet Invert Offset (ft)	Total Drop (ft)	Average Slope (%)	Shape	Height (ft)	Width (ft)	Manning's Roughness	Entrance Losses	Exit/Bend Losses	Additional Losses	Initial Flow (cfs)	Flap Gate
1	1	131.00	2062.60	0.00	2061.70	0.00	0.90	0.6900	Trapezoidal	6.000	27.000	0.0240	0.0000	0.0000	0.0000	0.00	No
2	29	154.40	2043.83	0.00	2041.91	0.00	1.92	1.2400	Trapezoidal	5.000	24.000	0.0240	0.0000	0.0000	0.0000	0.00	No
3	ED	440.35	2048.60	0.00	2045.83	0.00	2.77	0.6300	Trapezoidal	5.000	20.000	0.0240	0.0000	0.0000	0.0000	0.00	No
4	KB	392.20	2054.00	0.00	2048.88	0.00	5.12	1.3100	Trapezoidal	5.000	20.000	0.0240	0.0000	0.0000	1.0000	0.00	No
5	MOR	1020.00	2116.51	0.00	2092.00	0.00	24.51	2.4000	Trapezoidal	8.000	34.000	0.0240	0.0000	0.0000	0.0000	0.00	No
6	PF	78.10	2044.80	0.00	2043.83	0.00	0.97	1.2400	Trapezoidal	5.000	20.000	0.0240	0.0000	0.0000	0.0000	0.00	No
7	STK	2424.00	2092.00	0.00	2062.60	0.00	29.40	1.2100	Trapezoidal	5.000	23.000	0.0240	0.0000	0.0000	0.0000	0.00	No
8	USR	1864.00	2133.50	0.00	2092.00	0.00	41.50	2.2300	Trapezoidal	8.000	37.000	0.0240	0.0000	0.0000	0.0000	0.00	No

Channel Results

SN	Element ID	Peak Flow	Time of Peak Flow Occurrence	Design Flow Capacity	Peak Flow/ Design Flow Ratio	Peak Flow Velocity	Travel Time	Peak Flow Depth	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged	Froude Number	Reported Condition
		(cfs)	(days hh:mm)	(cfs)		(ft/sec)	(min)	(ft)		(min)		
1	1	272.34	0 12:42	964.35	0.28	12.14	0.18	4.22	0.70	0.00		
2	29	377.53	0 12:35	1476.05	0.26	10.24	0.25	2.18	0.45	0.00		
3	ED	363.76	0 12:35	784.15	0.46	10.81	0.68	2.56	0.53	0.00		
4	KB	353.66	0 12:34	1129.64	0.31	8.05	0.81	3.23	0.66	0.00		
5	MOR	67.10	0 12:39	3372.60	0.02	7.92	2.15	1.72	0.22	0.00		
6	PF	375.37	0 12:35	1101.84	0.34	12.03	0.11	2.40	0.50	0.00		
7	STK	101.51	0 12:48	830.10	0.12	4.23	9.55	2.90	0.58	0.00		
8	USR	38.81	0 12:46	3988.84	0.01	3.57	8.70	1.39	0.17	0.00		

Pipe Input

SN	Element ID	Length (ft)	Inlet Invert Elevation (ft)	Inlet Invert Offset (ft)	Outlet Invert Elevation (ft)	Outlet Invert Offset (ft)	Total Drop (ft)	Average Slope (%)	Pipe Shape	Pipe Diameter or Height (in)	Pipe Width (in)	Manning's Roughness	Entrance Losses	Exit/Bend Losses	Additional Losses	Initial Flow (cfs)	Flap Gate	No. of Barrels
1	2	182.00	2061.70	0.00	2060.10	0.00	1.60	0.8800	Rectangular									
2	3	181.00	2060.10	0.00	2057.57	0.00	2.53	1.4000	Arch									
3	4	210.00	2057.57	0.00	2054.00	0.00	3.57	1.7000	Arch									
4	6	50.00	2048.88	0.00	2048.60	0.00	0.28	0.5600	Rectangular									
5	8	50.00	2045.83	0.00	2044.80	0.00	1.03	2.0600	Rectangular									
6	9	50.00	2154.50	0.00	2137.00	0.00	17.50	35.0000	CIRCULAR									
7	15	82.00	2134.00	0.00	2133.50	0.00	0.50	0.6100	CIRCULAR									
8	19	75.00	2117.00	0.00	2116.51	0.00	0.49	0.6500	CIRCULAR									
9	21	35.10	2044.25	0.00	2043.83	0.00	0.42	1.2000	CIRCULAR									
10	22	42.40	2050.75	0.00	2048.60	0.00	2.15	5.0700	CIRCULAR									

Pipe Results

SN	Element ID	Peak Flow (cfs)	Time of Peak Flow Occurrence (days hh:mm)	Design Flow Capacity (cfs)	Peak Flow/ Design Flow Ratio	Peak Flow Velocity (ft/sec)	Travel Time (min)	Peak Flow Depth (ft)	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged (min)	Froude Number	Reported Condition
1	2	271.99	0 12:43	896.81	0.30	6.51	0.47	4.00	1.00	22.00		SURCHARGED
2	3	271.94	0 12:44	269.80	1.01	7.85	0.38	3.67	1.00	39.00		SURCHARGED
3	4	162.25	0 12:36	148.77	1.09	11.24	0.31	3.18	0.87	0.00		> CAPACITY
4	6	353.74	0 12:35	291.43	1.21	8.37	0.10	3.43	0.88	0.00		> CAPACITY
5	8	363.72	0 12:35	1979.07	0.18	7.46	0.11	2.33	0.54	0.00		Calculated
6	9	43.45	0 12:33	242.66	0.18	13.02	0.06	1.60	0.64	0.00		Calculated
7	15	39.13	0 12:44	199.62	0.20	13.14	0.10	1.10	0.24	0.00		Calculated
8	19	67.13	0 12:38	29.20	2.30	11.75	0.11	2.25	0.75	0.00		> CAPACITY
9	21	6.13	0 13:19	53.03	0.12	3.97	0.15	1.97	0.82	0.00		Calculated
10	22	4.82	0 12:29	27.95	0.17	4.44	0.16	1.20	0.96	0.00		Calculated

Storage Nodes

Storage Node : CVP

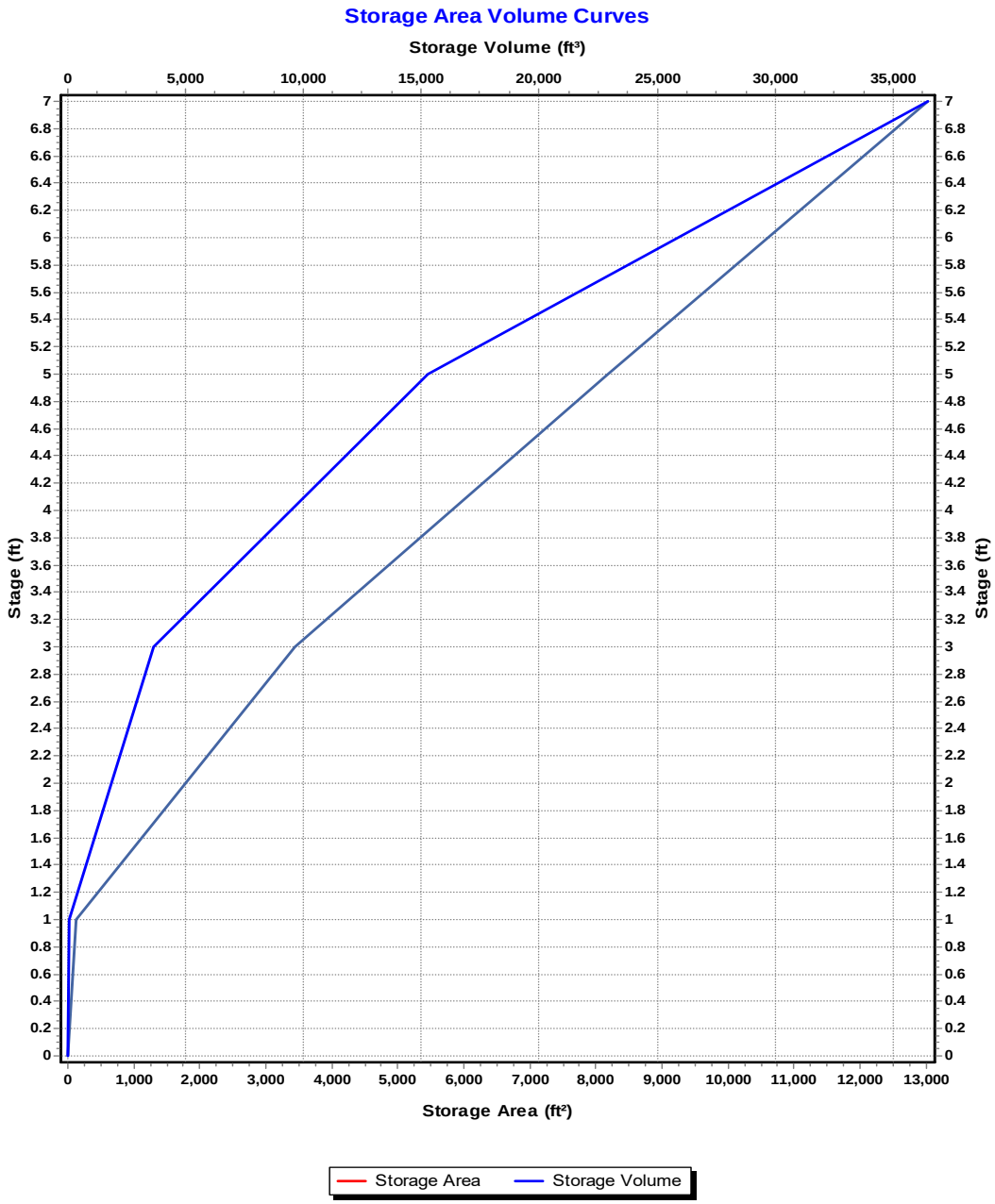
Input Data

Invert Elevation (ft) 2155.00
Max (Rim) Elevation (ft) 2162.00
Max (Rim) Offset (ft) 7.00
Initial Water Elevation (ft) 2155.00
Initial Water Depth (ft) 0.00
Ponded Area (ft^2) 7.00
Evaporation Loss 0.00

Storage Area Volume Curves

Storage Curve : CVP1

Stage (ft)	Storage Area (ft^2)	Storage Volume (ft^3)
0	0	0
1	131	65.5
3	3441	3637.5
5	8189	15267.5
7	13024	36480.5


Storage Area Volume Curves
Storage Volume (ft³)
0
5,000
10,000
15,000
20,000
25,000
30,000
35,000
Stage (ft)
0
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
1.8
2
2.2
2.4
2.6
2.8
3
3.2
3.4
3.6
3.8
4
4.2
4.4
4.6
4.8
5
5.2
5.4
5.6
5.8
6
6.2
6.4
6.6
6.8
7
0
1,000
2,000
3,000
4,000
5,000
6,000
7,000
8,000
9,000
10,000
11,000
12,000
13,000
Storage Area (ft²)
Storage Area
Storage Volume

Storage Node : CVP (continued)

Outflow Weirs

SN	Element ID	Weir Type	Flap Gate	Crest Elevation (ft)	Crest Offset (ft)	Length (ft)	Weir Total Height (ft)	Discharge Coefficient
1	14	Trapezoidal	No	2161.50	6.50	40.00	2.00	3.33

Outflow Orifices

SN	Element ID	Orifice Type	Orifice Shape	Flap Gate	Circular Orifice Diameter (in)	Rectangular Orifice Height (in)	Rectangular Orifice Width (in)	Orifice Invert Elevation (ft)	Orifice Coefficient
1	5	Side	CIRCULAR	No					
2	7	Side	CIRCULAR	No					
3	13	Bottom	Rectangular	No					

Output Summary Results

Peak Inflow (cfs)	48.31
Peak Lateral Inflow (cfs)	48.31
Peak Outflow (cfs)	43.45
Peak Exfiltration Flow Rate (cfm)	0
Max HGL Elevation Attained (ft)	2159.14
Max HGL Depth Attained (ft)	4.14
Average HGL Elevation Attained (ft)	2155.24
Average HGL Depth Attained (ft)	0.24
Time of Max HGL Occurrence (days hh:mm)	0 12:33
Total Exfiltration Volume (1000-ft^3)	0
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0

Storage Node : P1

Input Data

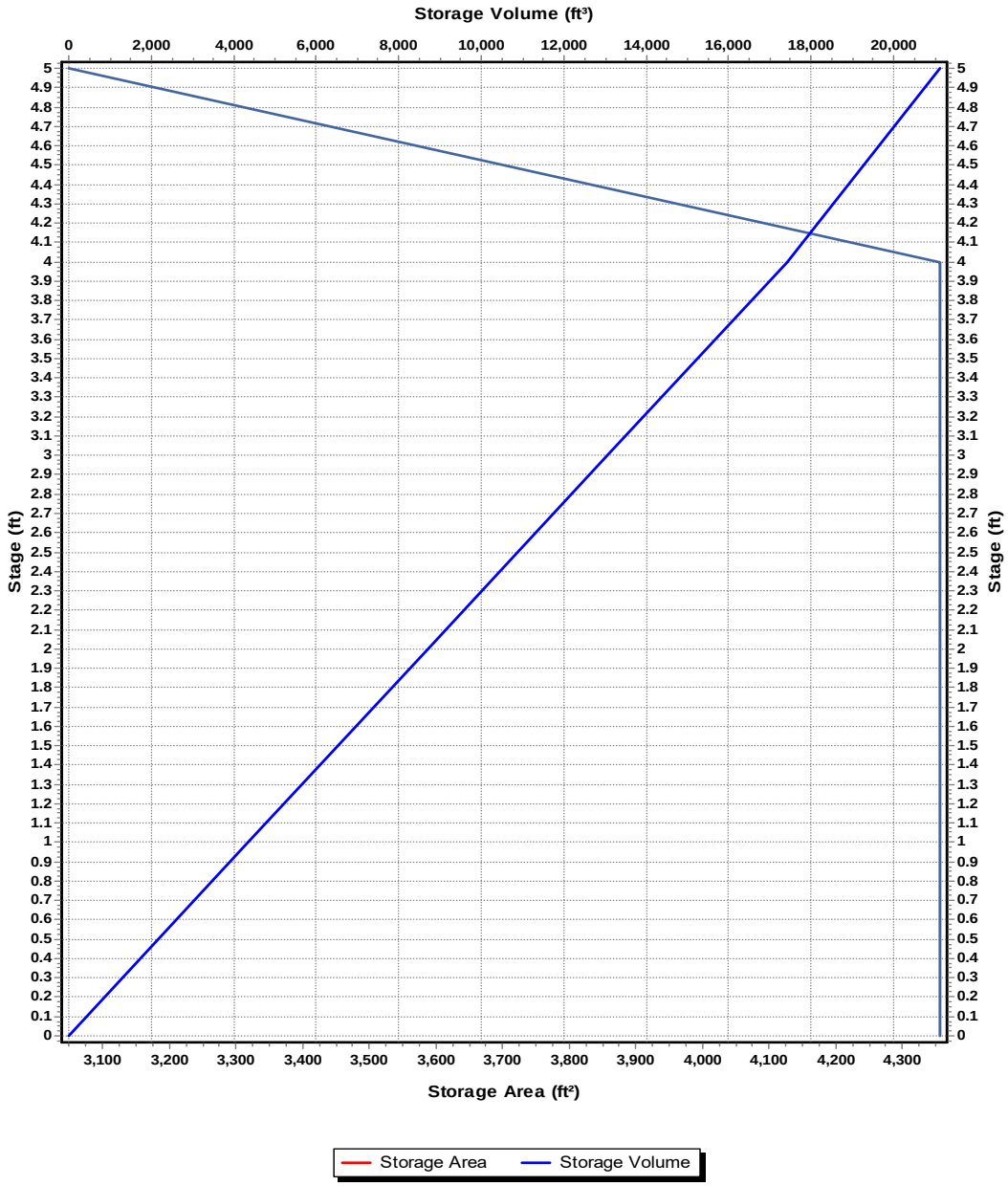
Invert Elevation (ft) 2050.75
Max (Rim) Elevation (ft) 2055.75
Max (Rim) Offset (ft) 5.00
Initial Water Elevation (ft) 2050.75
Initial Water Depth (ft) 0.00
Ponded Area (ft^2) 5.00
Evaporation Loss 0.00

Storage Area Volume Curves

Storage Curve : P1

Stage (ft)	Storage Area (ft^2)	Storage Volume (ft^3)
0	4356	0
1	4356	4356
2	4356	8712
3	4356	13068
4	4356	17424
5	3049	21126.5

Storage Area Volume Curves



Storage Node : P1 (continued)

Outflow Weirs

SN	Element ID	Weir Type	Flap Gate	Crest Elevation (ft)	Crest Offset (ft)	Length (ft)	Weir Total Height (ft)	Discharge Coefficient
1	28	Transverse	No	2054.65	3.90	6.00	2.00	3.33

Outflow Orifices

SN	Element ID	Orifice Type	Orifice Shape	Flap Gate	Circular Orifice Diameter (in)	Rectangular Orifice Height (in)	Rectangular Orifice Width (in)	Orifice Invert Elevation (ft)	Orifice Coefficient
1	26	Side	CIRCULAR	No					
2	27	Side	Rectangular	No					

Output Summary Results

Peak Inflow (cfs)	9.1
Peak Lateral Inflow (cfs)	9.1
Peak Outflow (cfs)	2.29
Peak Exfiltration Flow Rate (cfm)	0
Max HGL Elevation Attained (ft)	2053.45
Max HGL Depth Attained (ft)	2.7
Average HGL Elevation Attained (ft)	2051.24
Average HGL Depth Attained (ft)	0.49
Time of Max HGL Occurrence (days hh:mm)	0 12:36
Total Exfiltration Volume (1000-ft^3)	0
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0

Storage Node : P2

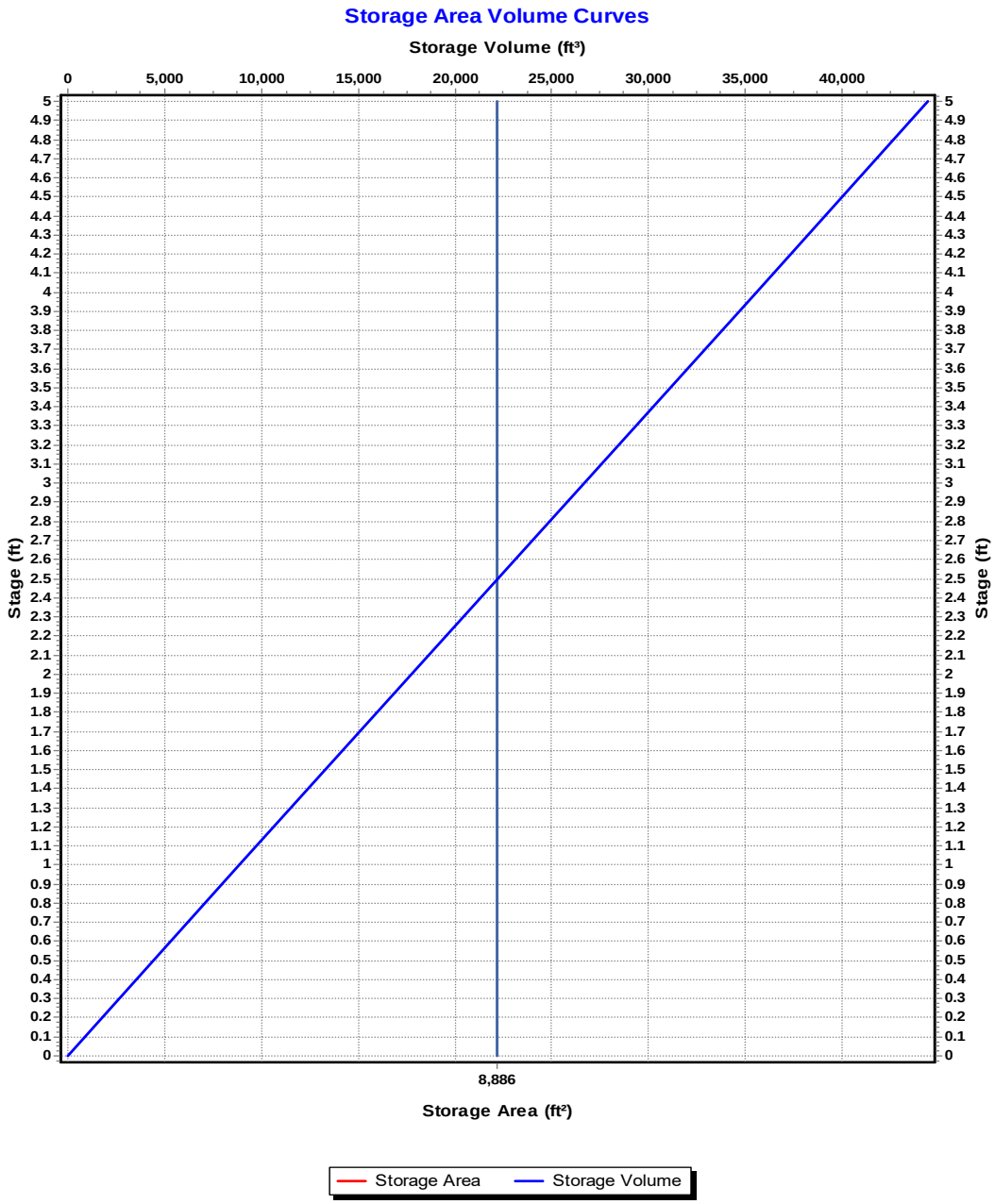
Input Data

Invert Elevation (ft) 2044.25
Max (Rim) Elevation (ft) 2049.25
Max (Rim) Offset (ft) 5.00
Initial Water Elevation (ft) 2044.25
Initial Water Depth (ft) 0.00
Ponded Area (ft^2) 5.00
Evaporation Loss 0.00

Storage Area Volume Curves

Storage Curve : P2

Stage (ft)	Storage Area (ft^2)	Storage Volume (ft^3)
0	8886	0
1	8886	8886
2	8886	17772
3	8886	26658
4	8886	35544
5	8886	44430


Storage Area Volume Curves
Storage Volume (ft³)
0
5,000
10,000
15,000
20,000
25,000
30,000
35,000
40,000
Stage (ft)
Stage (ft)
8,886
Storage Area (ft²)
Storage Area
Storage Volume

Storage Node : P2 (continued)

Outflow Weirs

SN	Element ID	Weir Type	Flap Gate	Crest Elevation (ft)	Crest Offset (ft)	Length (ft)	Weir Total Height (ft)	Discharge Coefficient
1	25	Transverse	No	2048.80	4.55	6.00	2.00	3.33

Outflow Orifices

SN	Element ID	Orifice Type	Orifice Shape	Flap Gate	Circular Orifice Diameter (in)	Rectangular Orifice Height (in)	Rectangular Orifice Width (in)	Orifice Invert Elevation (ft)	Orifice Coefficient
1	23	Side	Rectangular	No					
2	24	Side	Rectangular	No					

Output Summary Results

Peak Inflow (cfs)	13.91
Peak Lateral Inflow (cfs)	13.91
Peak Outflow (cfs)	4.46
Peak Exfiltration Flow Rate (cfm)	0
Max HGL Elevation Attained (ft)	2047.23
Max HGL Depth Attained (ft)	2.98
Average HGL Elevation Attained (ft)	2044.47
Average HGL Depth Attained (ft)	0.22
Time of Max HGL Occurrence (days hh:mm)	0 12:58
Total Exfiltration Volume (1000-ft^3)	0
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0

Storage Node : RP

Input Data

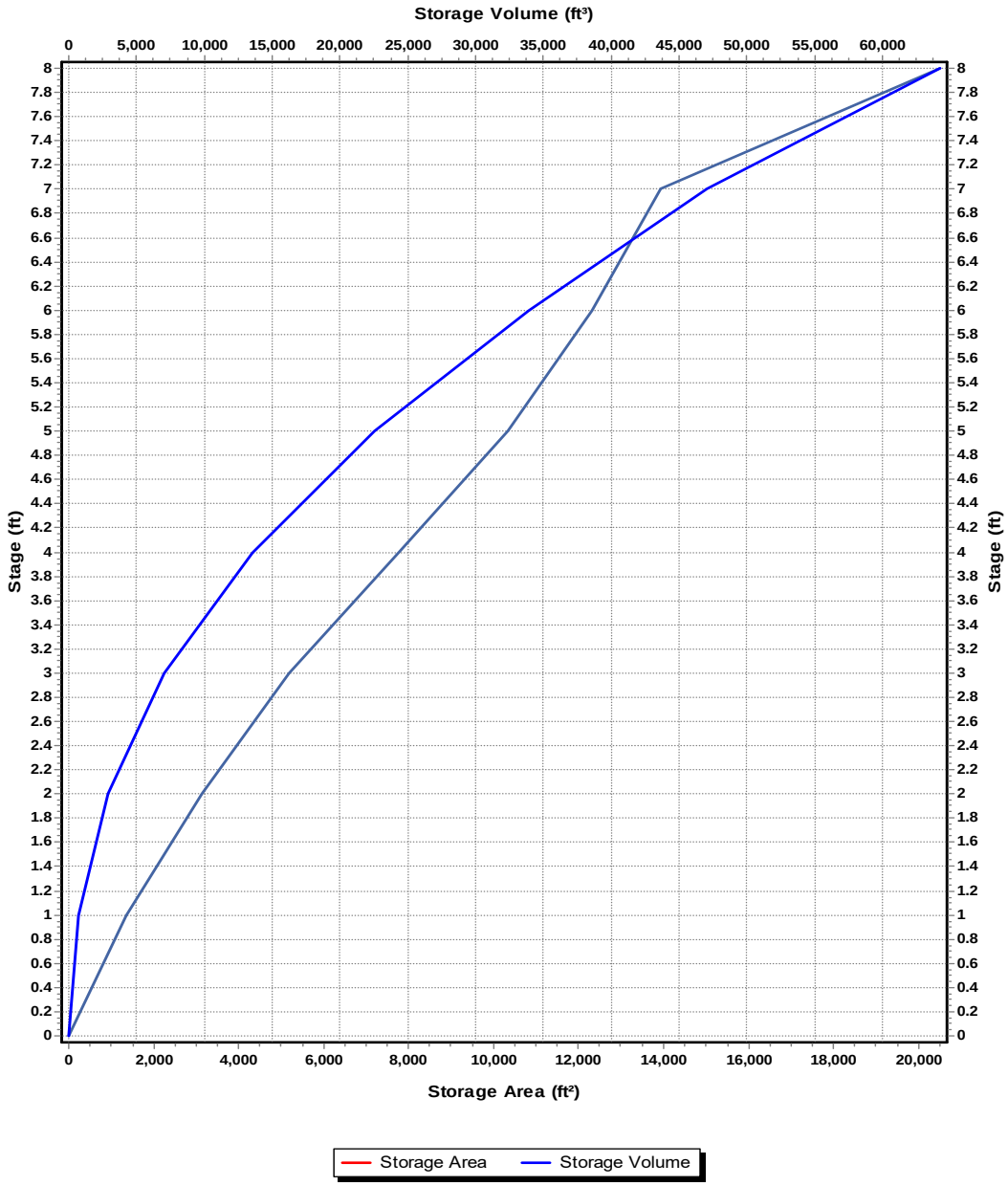
Invert Elevation (ft) 2137.00
Max (Rim) Elevation (ft) 2145.00
Max (Rim) Offset (ft) 8.00
Initial Water Elevation (ft) 2137.00
Initial Water Depth (ft) 0.00
Ponded Area (ft^2) 8.00
Evaporation Loss 0.00

Storage Area Volume Curves

Storage Curve : RP1

Stage (ft)	Storage Area (ft^2)	Storage Volume (ft^3)
0	0	0
1	1366	683
2	3129	2930.5
3	5175	7082.5
4	7760	13550
5	10340	22600
6	12305	33922.5
7	13925	47037.5
8	20503	64251.5

Storage Area Volume Curves



Storage Node : RP (continued)

Outflow Weirs

SN	Element ID	Weir Type	Flap Gate	Crest Elevation (ft)	Crest Offset (ft)	Length (ft)	Weir Total Height (ft)	Discharge Coefficient
1	18	Trapezoidal	No	2144.50	7.50	60.00	2.00	3.33

Outflow Orifices

SN	Element ID	Orifice Type	Orifice Shape	Flap Gate	Circular Orifice Diameter (in)	Rectangular Orifice Height (in)	Rectangular Orifice Width (in)	Orifice Invert Elevation (ft)	Orifice Coefficient
1	16	Side	CIRCULAR	No					
2	17	Side	Rectangular	No					

Output Summary Results

Peak Inflow (cfs)	51.01
Peak Lateral Inflow (cfs)	8.31
Peak Outflow (cfs)	39.13
Peak Exfiltration Flow Rate (cfm)	0
Max HGL Elevation Attained (ft)	2143.59
Max HGL Depth Attained (ft)	6.59
Average HGL Elevation Attained (ft)	2137.36
Average HGL Depth Attained (ft)	0.36
Time of Max HGL Occurrence (days hh:mm)	0 12:44
Total Exfiltration Volume (1000-ft^3)	0
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0

Storage Node : SP

Input Data

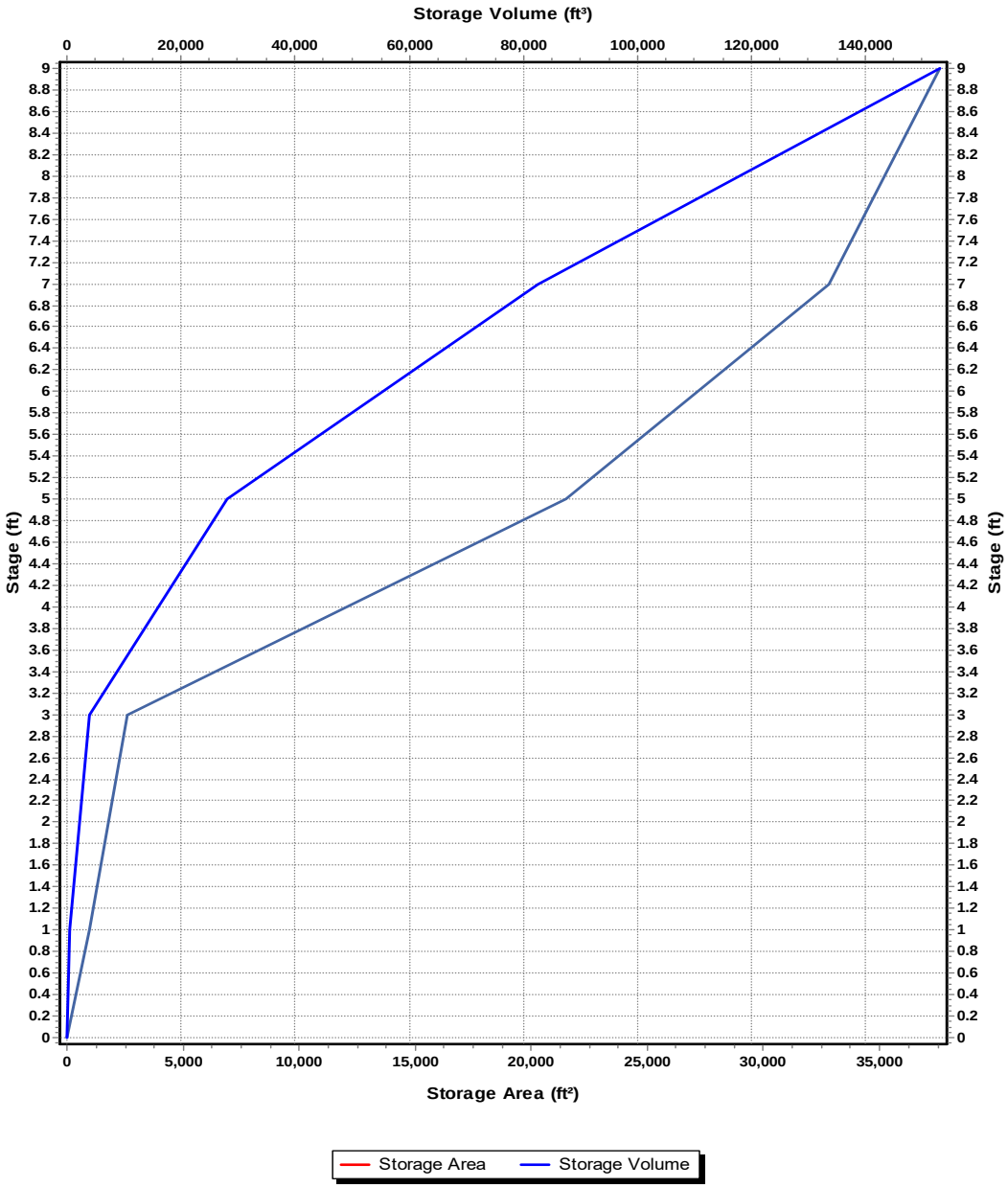
Invert Elevation (ft)	2117.00
Max (Rim) Elevation (ft)	2125.00
Max (Rim) Offset (ft)	8.00
Initial Water Elevation (ft)	2117.00
Initial Water Depth (ft)	0.00
Ponded Area (ft^2)	8.00
Evaporation Loss	0.00

Storage Area Volume Curves

Storage Curve : SP1

Stage (ft)	Storage Area (ft^2)	Storage Volume (ft^3)
0	0	0
1	955	477.5
3	2580	4012.5
5	21522	28114.5
7	32858	82494.5
9	37630	152982.5

Storage Area Volume Curves



Storage Node : SP (continued)

Outflow Weirs

SN	Element ID	Weir Type	Flap Gate	Crest Elevation (ft)	Crest Offset (ft)	Length (ft)	Weir Total Height (ft)	Discharge Coefficient
1	20	Trapezoidal	No	2123.00	6.00	20.00	2.00	3.33

Output Summary Results

Peak Inflow (cfs)	84.28
Peak Lateral Inflow (cfs)	84.28
Peak Outflow (cfs)	67.13
Peak Exfiltration Flow Rate (cfm)	0
Max HGL Elevation Attained (ft)	2121.23
Max HGL Depth Attained (ft)	4.23
Average HGL Elevation Attained (ft)	2117.26
Average HGL Depth Attained (ft)	0.26
Time of Max HGL Occurrence (days hh:mm)	0 12:38
Total Exfiltration Volume (1000-ft^3)	0
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0

Project Description

File Name ..... ProposedKabrichModel.SPF

Project Options

Flow Units ..... CFS
Elevation Type ..... Elevation
Hydrology Method ..... SCS TR-20
Time of Concentration (TOC) Method ..... User-Defined
Link Routing Method ..... Hydrodynamic
Enable Overflow Ponding at Nodes ..... YES
Skip Steady State Analysis Time Periods ..... NO

Number of Elements

	Qty
Rain Gages	1
Subbasins	9
Nodes	24
Junctions	18
Outfalls	1
Flow Diversions	0
Inlets	0
Storage Nodes	5
Links	42
Channels	9
Pipes	10
Pumps	0
Orifices	9
Weirs	14
Outlets	0
Pollutants	0
Land Uses	0

Rainfall Details

SN	Rain Gage ID	Data Source	Data Source ID	Rainfall Type	Rain Units	State	County	Return Period (years)	Rainfall Depth (inches)	Rainfall Distribution
1	1	Time Series	2Year	Cumulative	inches				0.00	

Subbasin Summary

SN	Subbasin ID	Area (ac)	Peak Rate Factor	Weighted Curve Number	Total Rainfall (in)	Total Runoff (in)	Total Runoff Volume (ac-in)	Peak Runoff (cfs)	Time of Concentration (days hh:mm:ss)
1	A	6.36	484.00	90.00	2.76	1.76	11.20	10.54	0 00:18:30
2	B	10.80	484.00	92.00	2.76	1.93	20.87	23.28	0 00:12:30
3	CO	44.42	484.00	84.00	2.76	1.32	58.55	55.88	0 00:17:30
4	K	93.79	484.00	85.00	2.76	1.39	129.99	122.48	0 00:18:12
5	RU	7.74	484.00	87.00	2.76	1.53	11.83	13.30	0 00:12:24
6	SH	69.35	484.00	86.00	2.76	1.46	100.97	84.59	0 00:23:30
7	UG1	3.05	484.00	93.00	2.76	2.02	6.16	9.38	0 00:05:00
8	UG2	11.65	484.00	86.00	2.76	1.46	16.95	16.46	0 00:17:12
9	US1	244.78	484.00	82.00	2.76	1.19	291.29	217.07	0 00:28:36

Node Summary

SN	Element ID	Element Type	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Initial Water Elevation (ft)	Surcharge Elevation (ft)	Ponded Area (ft^2)	Peak Inflow (cfs)	Max HGL Elevation Attained (ft)	Max Surcharge Depth Attained (ft)	Min Freeboard Attained (ft)	Time of Peak Flooding Occurrence (days hh:mm)	Total Flooded Volume (ac-in)	Total Time Flooded (min)
1	1	Junction	2062.60	2068.60	2062.60	2068.60	0.00	282.39	2066.11	0.00	7.49	0 00:00	0.00	0.00
2	2	Junction	2061.70	2066.30	2061.70	2066.30	0.00	283.46	2063.70	0.00	9.00	0 00:00	0.00	0.00
3	3	Junction	2059.10	2065.70	2059.10	2065.70	0.00	279.18	2062.16	0.00	10.50	0 00:00	0.00	0.00
4	4	Junction	2056.20	2065.00	2056.20	2065.00	0.00	279.18	2060.28	0.00	8.92	0 00:00	0.00	0.00
5	5	Junction	2054.00	2060.00	2054.00	2060.00	0.00	374.85	2056.80	0.00	8.20	0 00:00	0.00	0.00
6	6	Junction	2048.88	2053.88	2048.88	2053.88	0.00	374.96	2053.02	0.00	6.86	0 00:00	0.00	0.00
7	7	Junction	2048.60	2053.60	2048.60	2053.60	0.00	385.53	2051.87	0.00	6.73	0 00:00	0.00	0.00
8	8	Junction	2045.83	2050.83	2045.83	2050.83	0.00	385.50	2048.09	0.00	7.74	0 00:00	0.00	0.00
9	9	Junction	2044.80	2049.80	2044.80	2049.80	0.00	397.81	2047.62	0.00	7.18	0 00:00	0.00	0.00
10	11	Junction	2092.00	2098.00	2092.00	2098.00	0.00	104.46	2093.96	0.00	6.04	0 00:00	0.00	0.00
11	12	Junction	2133.50	2139.50	2133.50	2139.50	0.00	39.13	2134.34	0.00	8.66	0 00:00	0.00	0.00
12	13	Junction	2116.51	2125.00	2116.51	2125.00	0.00	67.13	2118.03	0.00	6.97	0 00:00	0.00	0.00
13	14	Junction	2154.50	2154.50	2154.50	2154.50	0.00	43.45	2155.22	0.00	3.55	0 00:00	0.00	0.00
14	15	Junction	2134.00	2142.00	2134.00	2142.00	0.00	39.13	2135.35	0.00	11.15	0 00:00	0.00	0.00
15	16	Junction	2044.25	2044.25	2044.25	2044.25	0.00	4.46	2046.17	0.00	4.63	0 00:00	0.00	0.00
16	17	Junction	2050.75	2050.75	2050.75	2050.75	0.00	2.28	2051.90	0.00	4.75	0 00:00	0.00	0.00
17	18	Junction	2043.83	2047.83	2043.83	2047.83	0.00	399.48	2046.17	0.00	7.66	0 00:00	0.00	0.00
18	19	Junction	2054.70	2060.00	2054.70	2060.00	0.00	279.19	2060.20	0.00	8.06	0 00:00	0.00	0.00
19	10	Outfall	2041.91					399.51	2044.25					
20	CVP	Storage Node	2155.00	2162.00	2155.00		7.00	48.31	2159.14				0.00	0.00
21	P1	Storage Node	2050.75	2055.75	2050.75		5.00	9.10	2053.45				0.00	0.00
22	P2	Storage Node	2044.25	2049.25	2044.25		5.00	13.91	2047.22				0.00	0.00
23	RP	Storage Node	2137.00	2145.00	2137.00		8.00	51.01	2143.59				0.00	0.00
24	SP	Storage Node	2117.00	2125.00	2117.00		8.00	84.28	2121.23				0.00	0.00

Link Summary

SN	Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length	Inlet Invert Elevation	Outlet Invert Elevation	Average Slope	Diameter or Height	Manning's Roughness	Peak Flow	Design Flow Capacity	Peak Flow/ Design Flow Ratio	Peak Flow Velocity	Peak Flow Depth	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged	Reported Condition
					(ft)	(ft)	(ft)	(%)	(in)		(cfs)	(cfs)		(ft/sec)	(ft)		(min)	
1	2	Pipe	2	3	182.00	2061.70	2060.10	0.8800			279.18	896.81	0.31	10.06	1.98	0.51	0.00	Calculated
2	6	Pipe	6	7	50.00	2048.88	2048.60	0.5600			374.90	291.43	1.29	8.60	3.51	0.91	0.00	> CAPACITY
3	8	Pipe	8	9	50.00	2045.83	2044.80	2.0600			385.47	1979.07	0.19	7.59	2.39	0.56	0.00	Calculated
4	9	Pipe	14	RP	50.00	2154.50	2137.00	35.0000			43.45	242.66	0.18	13.02	1.60	0.64	0.00	Calculated
5	15	Pipe	15	12	82.00	2134.00	2133.50	0.6100			39.13	199.62	0.20	13.14	1.10	0.24	0.00	Calculated
6	19	Pipe	SP	13	75.00	2117.00	2116.51	0.6500			67.13	29.20	2.30	11.75	2.25	0.75	0.00	> CAPACITY
7	21	Pipe	16	18	35.10	2044.25	2043.83	1.2000			7.07	53.03	0.13	3.95	2.01	0.85	0.00	Calculated
8	22	Pipe	17	7	42.40	2050.75	2048.60	5.0700			3.20	27.95	0.11	4.39	1.21	0.88	0.00	Calculated
9	Link-01	Pipe	4	19	166.00	2056.20	2054.70	0.9000			279.19	6824.77	0.04	2.99	4.79	0.37	0.00	Calculated
10	Link-02	Pipe	19	5	65.00	2054.70	2054.00	1.0800			158.71	254.51	0.62	10.61	3.38	0.85	0.00	Calculated
11	1	Channel	1	2	131.00	2062.60	2061.70	0.6900			283.46	964.35	0.29	12.41	2.72	0.46	0.00	
12	3	Channel	3	4	187.00	2059.10	2056.20	1.5500			279.18	982.70	0.28	6.51	3.54	0.54	0.00	
13	29	Channel	18	10	154.40	2043.83	2041.91	1.2400			399.51	1476.05	0.27	10.43	2.22	0.47	0.00	
14	ED	Channel	7	8	440.35	2048.60	2045.83	0.6300			385.50	784.15	0.49	10.93	2.62	0.55	0.00	
15	KB	Channel	5	6	392.20	2054.00	2048.88	1.3100			374.96	1129.64	0.33	8.10	3.31	0.69	0.00	
16	MOR	Channel	13	11	1020.00	2116.51	2092.00	2.4000			67.10	3372.60	0.02	7.92	1.72	0.22	0.00	
17	PF	Channel	9	18	78.10	2044.80	2043.83	1.2400			397.81	1101.84	0.36	12.24	2.45	0.52	0.00	
18	STK	Channel	11	1	2424.00	2092.00	2062.60	1.2100			101.58	830.10	0.12	4.58	2.71	0.54	0.00	
19	USR	Channel	12	11	1864.00	2133.50	2092.00	2.2300			38.81	3988.84	0.01	3.57	1.39	0.17	0.00	
20	5	Orifice	CVP	14		2155.00	2154.50				16.98							
21	7	Orifice	CVP	14		2155.00	2154.50				26.47							
22	13	Orifice	CVP	14		2155.00	2154.50				0.00							
23	16	Orifice	RP	15		2137.00	2134.00				22.28							
24	17	Orifice	RP	15		2137.00	2134.00				16.85							
25	23	Orifice	P2	16		2044.25	2044.25				4.46							
26	24	Orifice	P2	16		2044.25	2044.25				0.51							
27	26	Orifice	P1	17		2050.75	2050.75				0.39							
28	27	Orifice	P1	17		2050.75	2050.75				1.95							
29	10	Weir	8	9		2045.83	2044.80				0.00							
30	11	Weir	6	7		2048.88	2048.60				0.00							
31	14	Weir	CVP	RP		2155.00	2137.00				0.00							
32	18	Weir	RP	12		2137.00	2133.50				0.00							
33	20	Weir	SP	13		2117.00	2116.51				0.00							
34	25	Weir	P2	16		2044.25	2044.25				0.00							
35	28	Weir	P1	17		2050.75	2050.75				0.00							
36	31	Weir	2	3		2061.70	2059.10				0.00							
37	35	Weir	5	6		2054.00	2048.88				0.00							
38	36	Weir	7	8		2048.60	2045.83				0.00							
39	37	Weir	9	18		2044.80	2043.83				0.00							
40	38	Weir	1	2		2062.60	2061.70				0.00							
41	40	Weir	3	19		2059.10	2054.70				0.00							
42	41	Weir	19	5		2054.70	2054.00				120.48							

Subbasin Hydrology

Subbasin : A

Input Data

Area (ac)	6.36
Peak Rate Factor	484
Weighted Curve Number	90
Rain Gage ID	1

Composite Curve Number

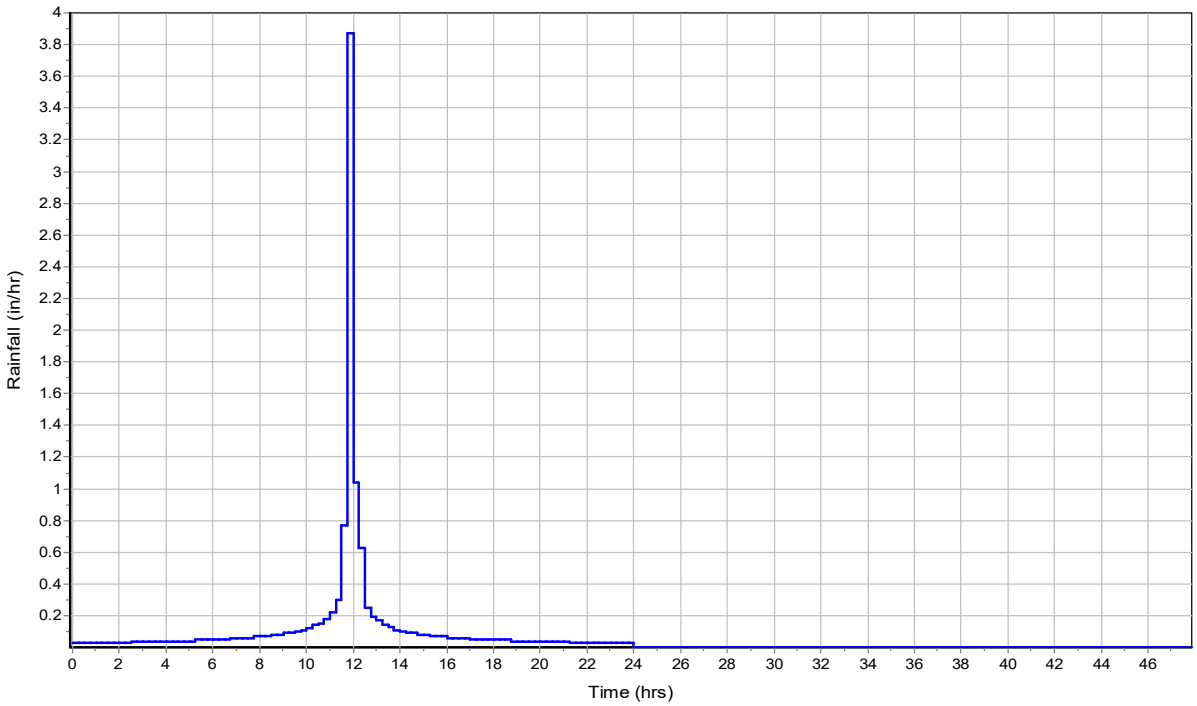
32 Soil/Surface Description	Area (acres)	Soil Group	Curve Number
-	6.36	-	90
Composite Area & Weighted CN	6.36		90

Subbasin Runoff Results

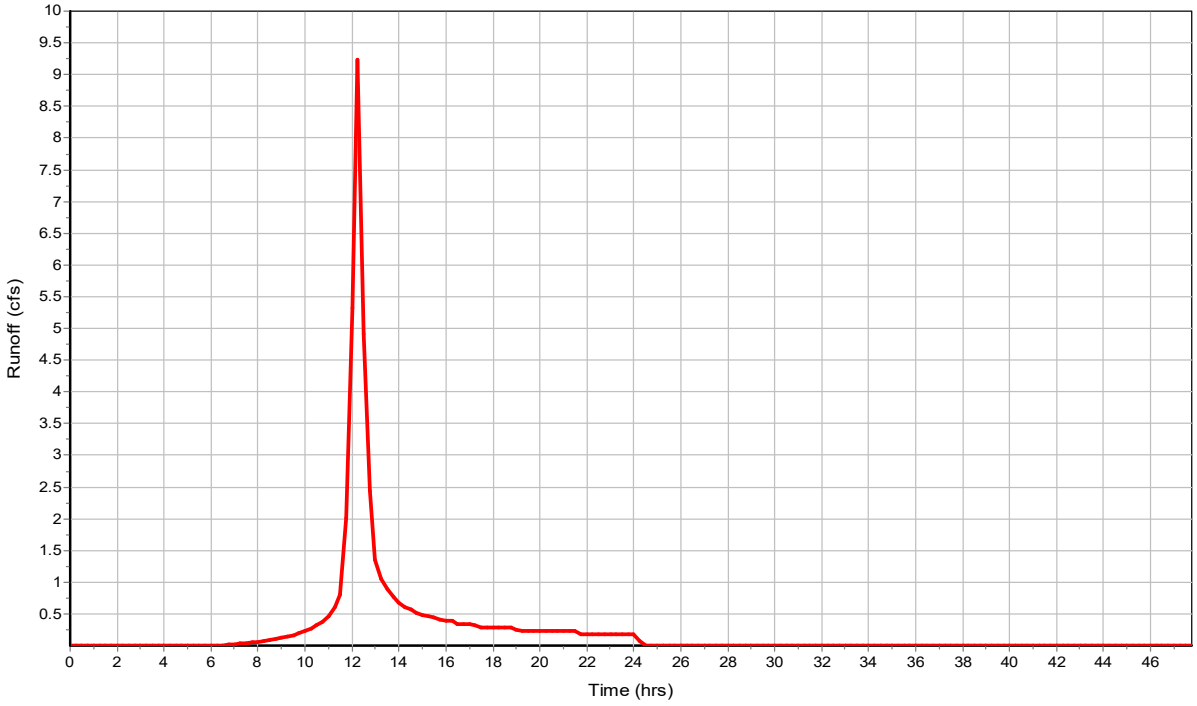
Total Rainfall (in)	2.76
Total Runoff (in)	1.76
Peak Runoff (cfs)	10.54
Weighted Curve Number	90
Time of Concentration (days hh:mm:ss)	0 00:18:30

Subbasin : A

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : B

Input Data

Area (ac)	10.8
Peak Rate Factor	484
Weighted Curve Number	92
Rain Gage ID	1

Composite Curve Number

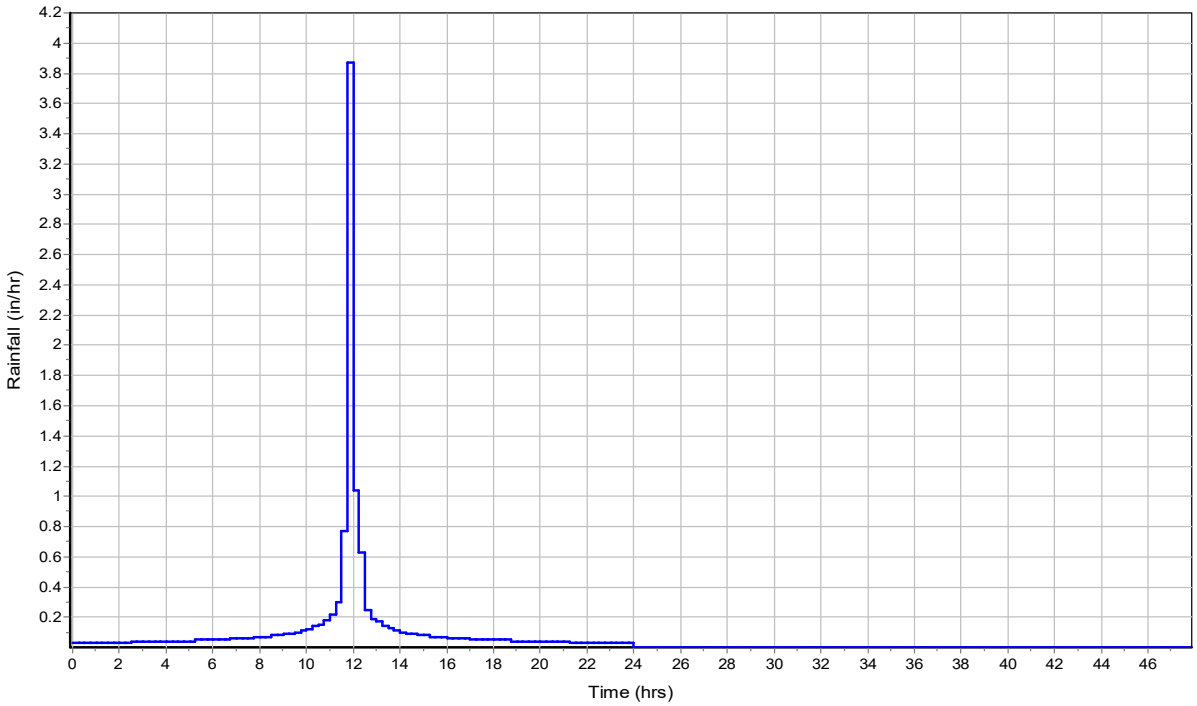
32 Soil/Surface Description	Area (acres)	Soil Group	Curve Number
-	10.8	-	92
Composite Area & Weighted CN	10.8		92

Subbasin Runoff Results

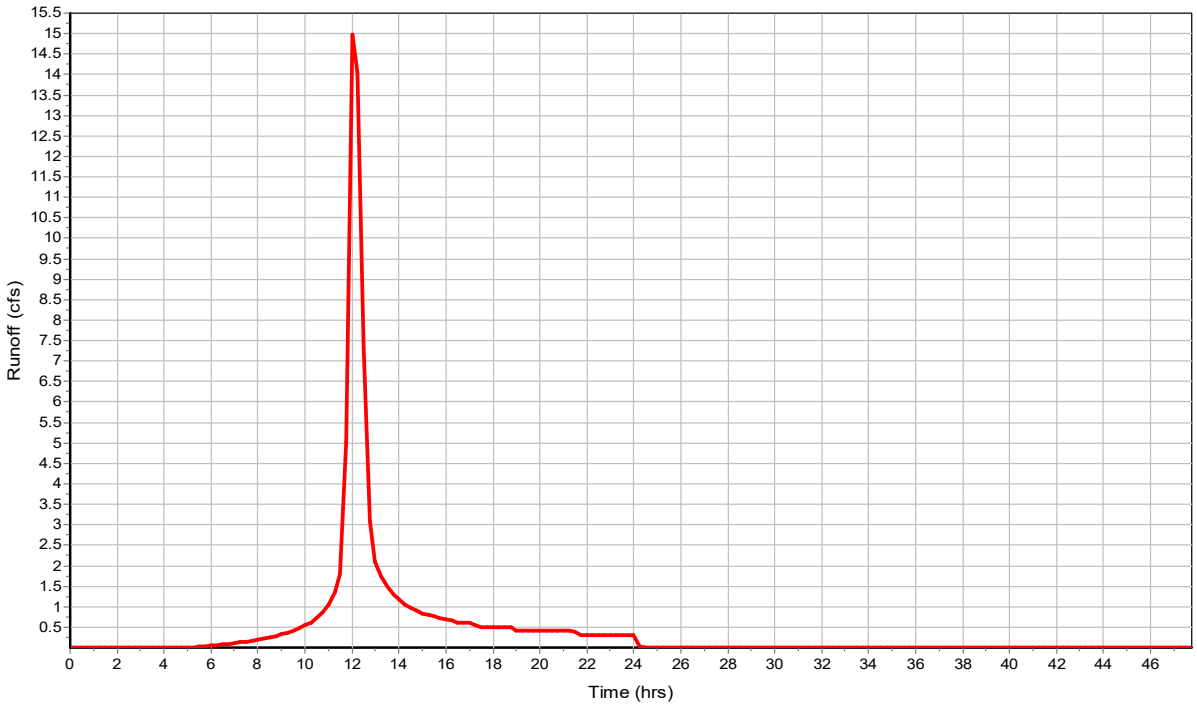
Total Rainfall (in)	2.76
Total Runoff (in)	1.93
Peak Runoff (cfs)	23.28
Weighted Curve Number	92
Time of Concentration (days hh:mm:ss)	0 00:12:30

Subbasin : B

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : CO

Input Data

Area (ac) 44.42
Peak Rate Factor 484
Weighted Curve Number 84
Rain Gage ID 1

Composite Curve Number

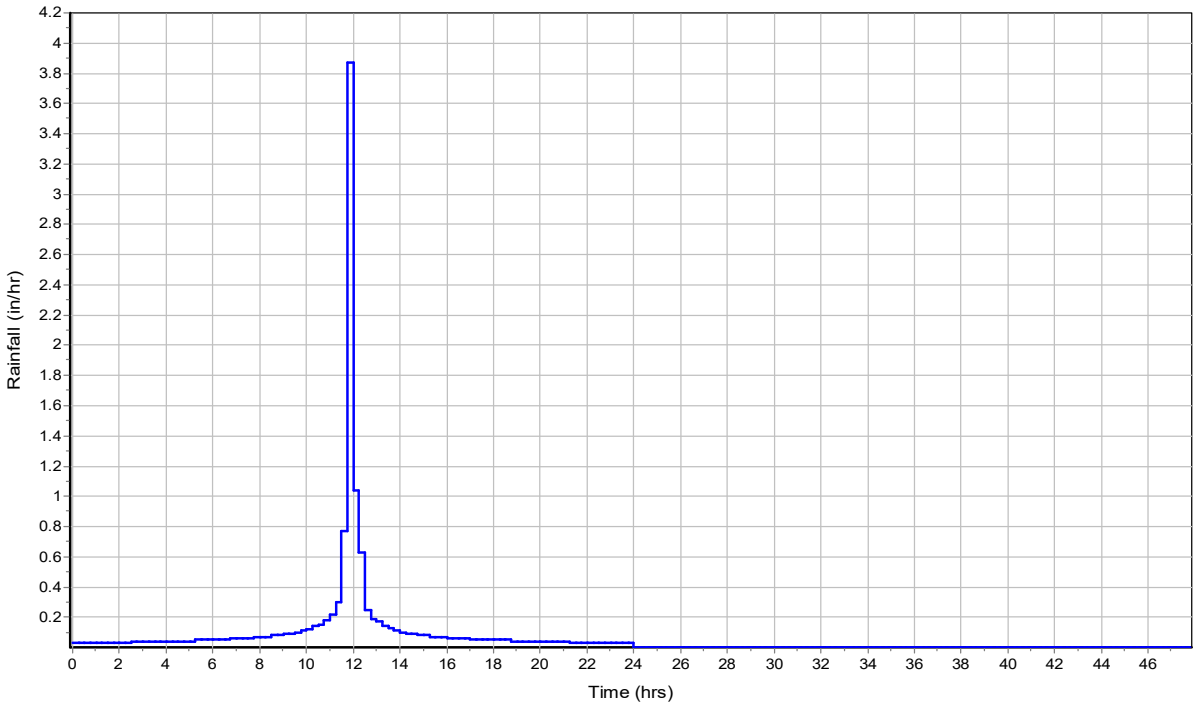
32 Soil/Surface Description	Area (acres)	Soil Group	Curve Number
-	44.42	-	84
Composite Area & Weighted CN	44.42		84

Subbasin Runoff Results

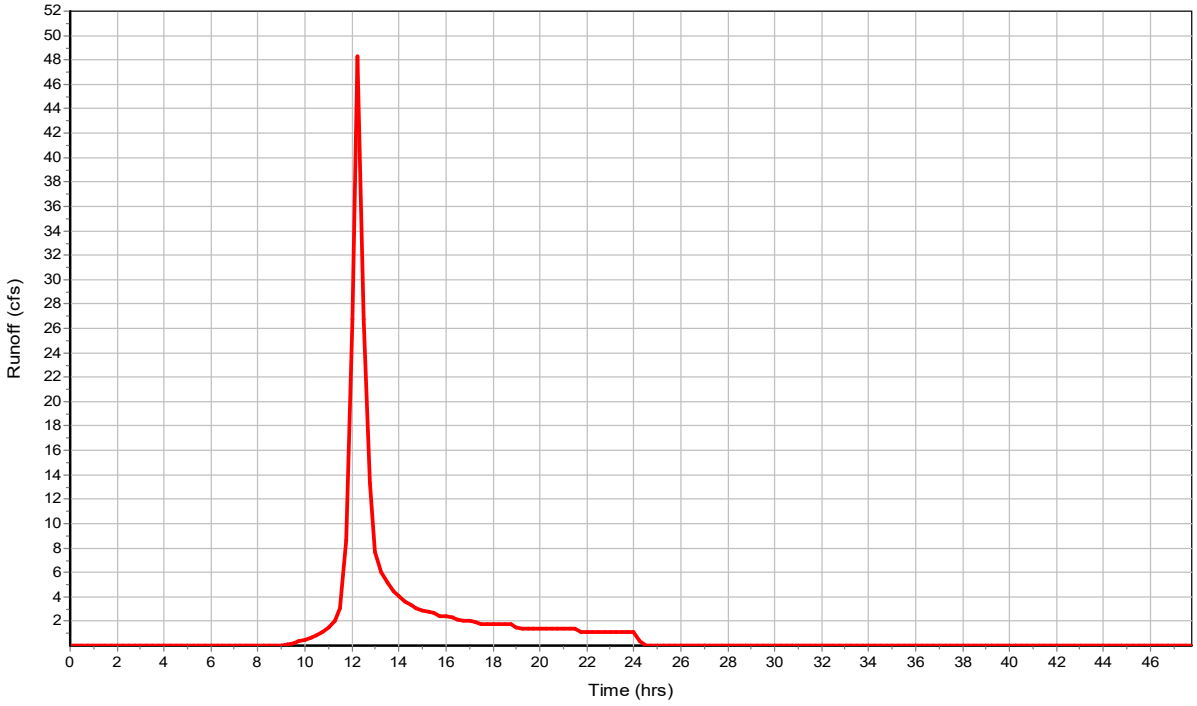
Total Rainfall (in) 2.76
Total Runoff (in) 1.32
Peak Runoff (cfs) 55.88
Weighted Curve Number 84
Time of Concentration (days hh:mm:ss) 0 00:17:30

Subbasin : CO

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : K

Input Data

Area (ac)	93.79
Peak Rate Factor	484
Weighted Curve Number	85
Rain Gage ID	1

Composite Curve Number

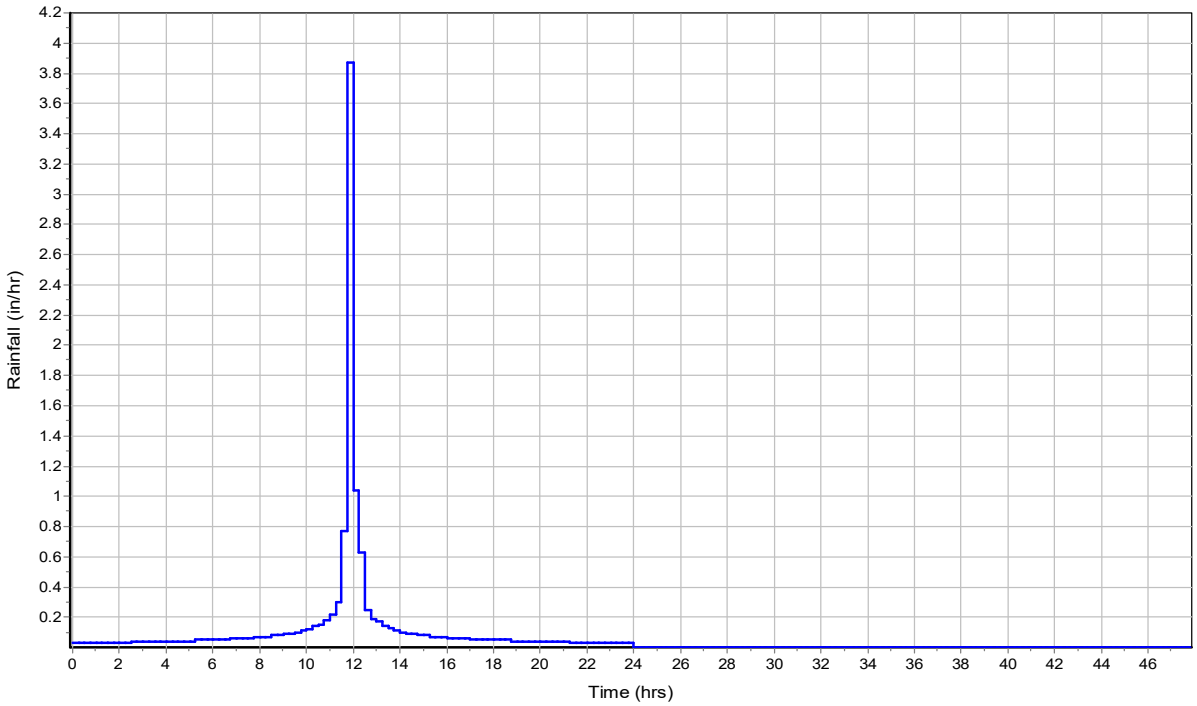
32 Soil/Surface Description	Area (acres)	Soil Group	Curve Number
-	93.79	-	85
Composite Area & Weighted CN	93.79		85

Subbasin Runoff Results

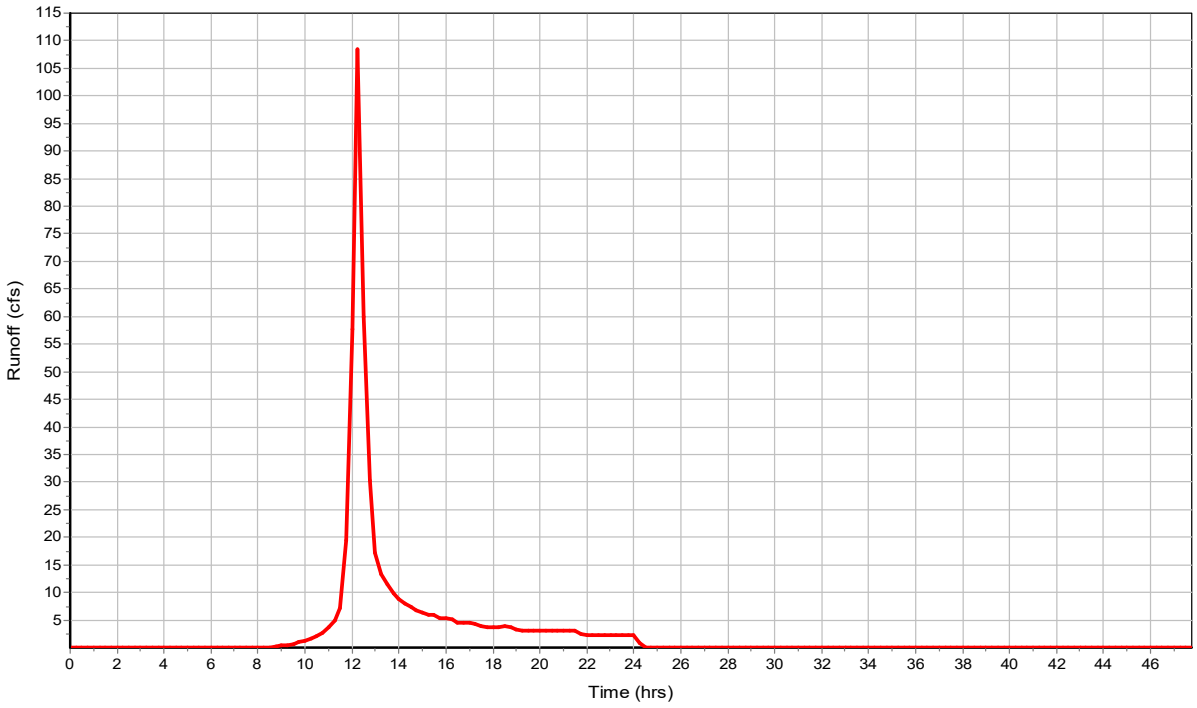
Total Rainfall (in)	2.76
Total Runoff (in)	1.39
Peak Runoff (cfs)	122.48
Weighted Curve Number	85
Time of Concentration (days hh:mm:ss)	0 00:18:12

Subbasin : K

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : RU

Input Data

Area (ac)	7.74
Peak Rate Factor	484
Weighted Curve Number	87
Rain Gage ID	1

Composite Curve Number

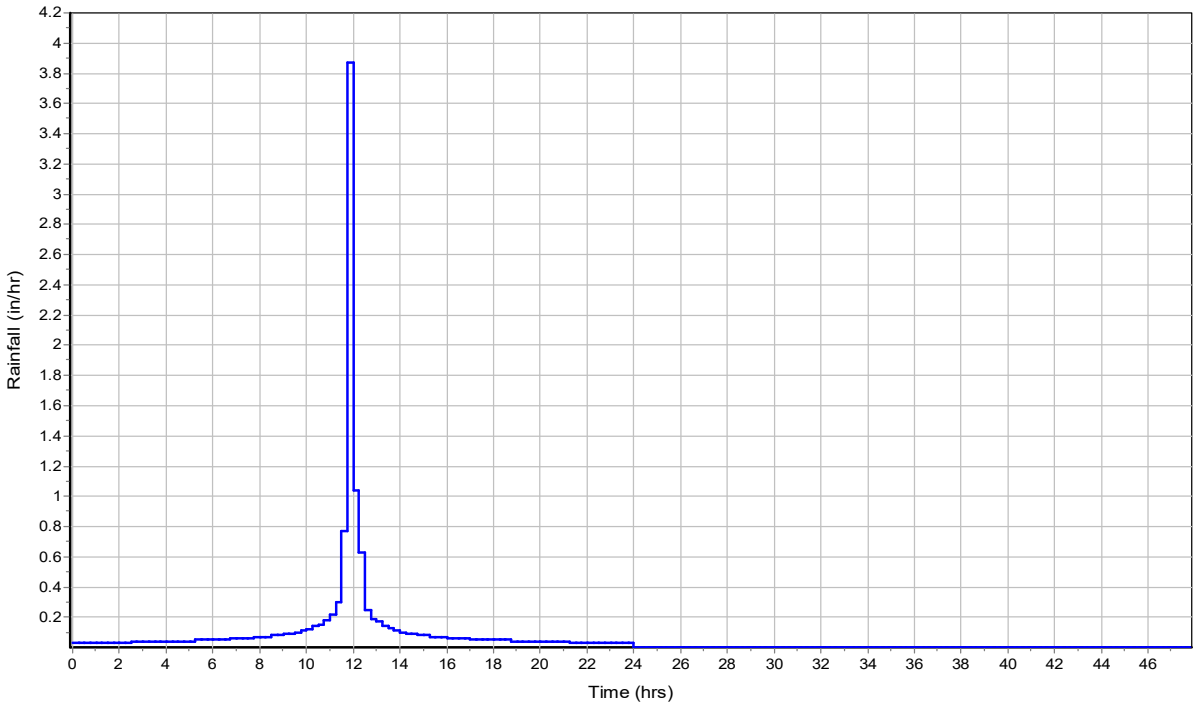
32 Soil/Surface Description	Area (acres)	Soil Group	Curve Number
-	7.74	-	87
Composite Area & Weighted CN	7.74		87

Subbasin Runoff Results

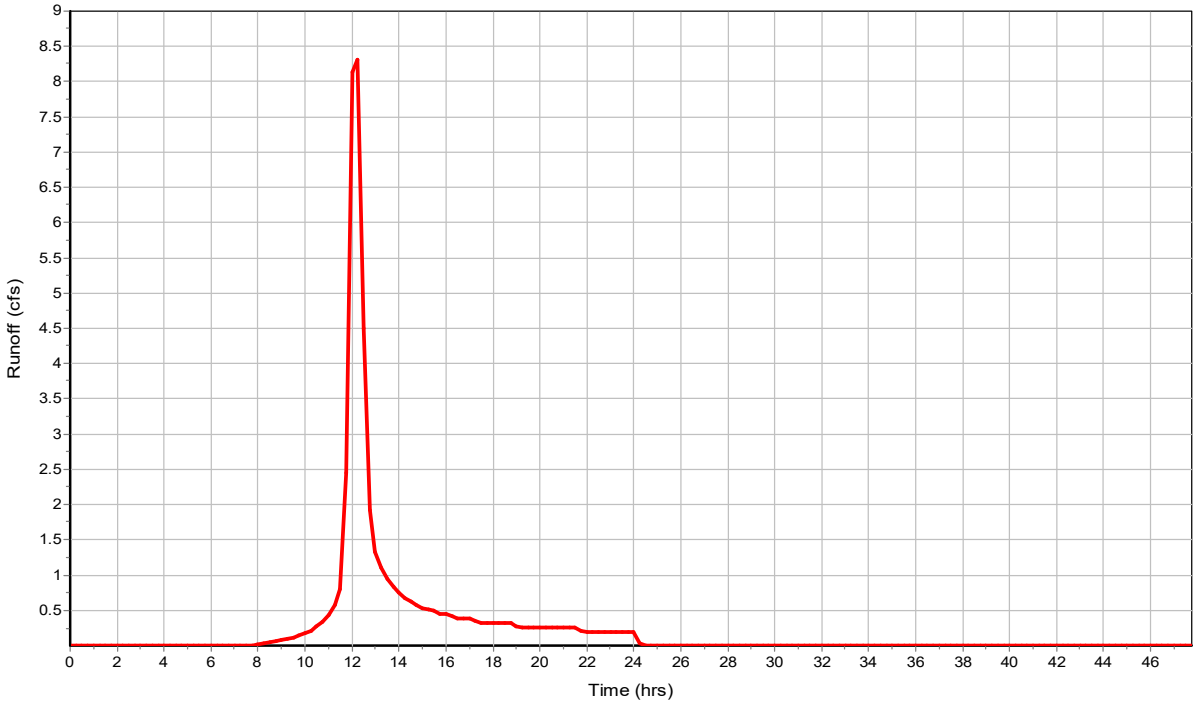
Total Rainfall (in)	2.76
Total Runoff (in)	1.53
Peak Runoff (cfs)	13.3
Weighted Curve Number	87
Time of Concentration (days hh:mm:ss)	0 00:12:24

Subbasin : RU

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : SH

Input Data

Area (ac)	69.35
Peak Rate Factor	484
Weighted Curve Number	86
Rain Gage ID	1

Composite Curve Number

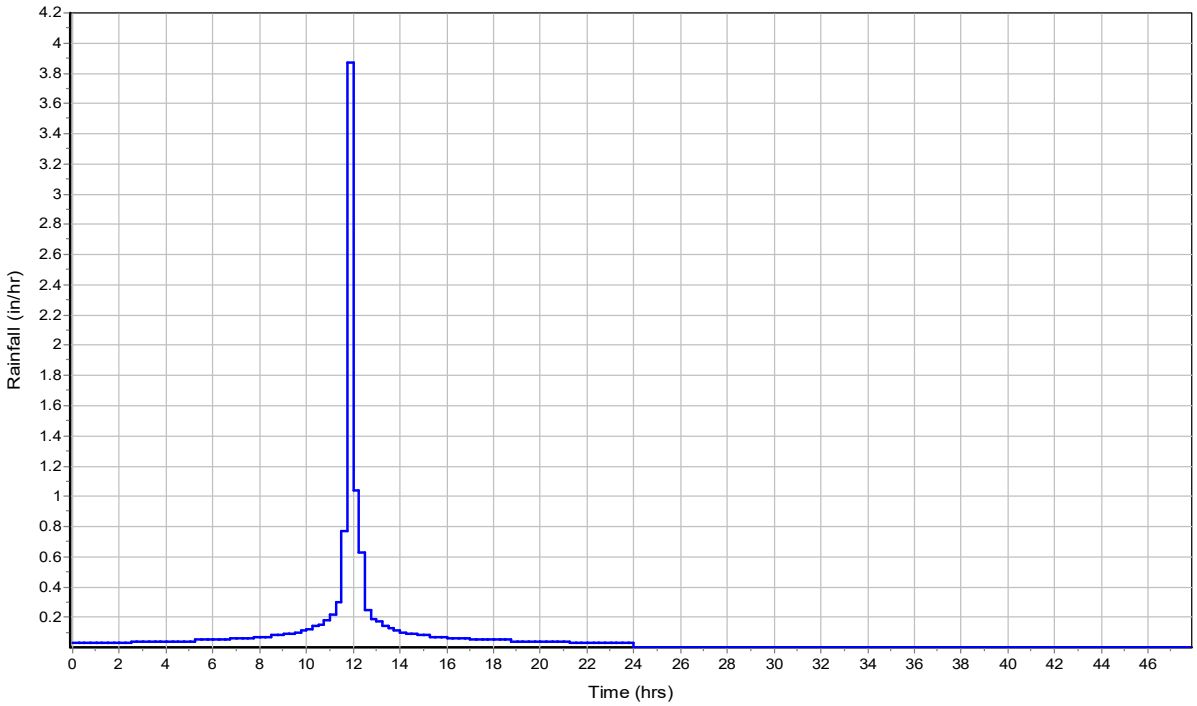
32 Soil/Surface Description	Area (acres)	Soil Group	Curve Number
-	69.35	-	86
Composite Area & Weighted CN	69.35		86

Subbasin Runoff Results

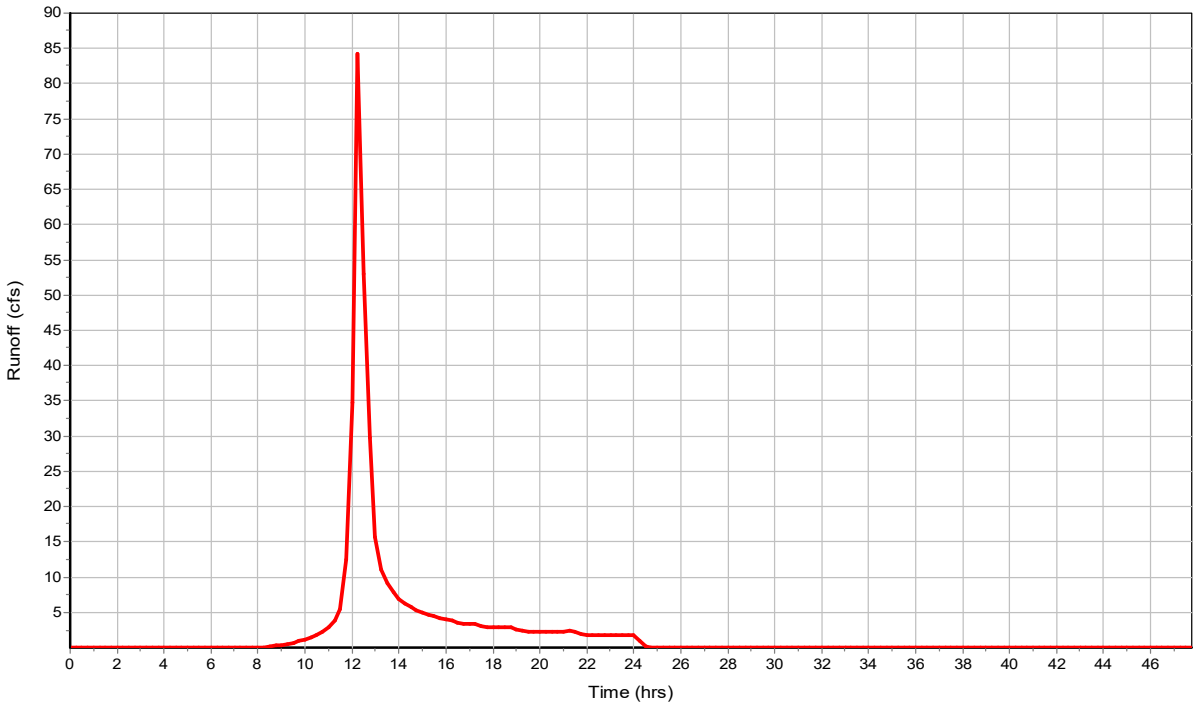
Total Rainfall (in)	2.76
Total Runoff (in)	1.46
Peak Runoff (cfs)	84.59
Weighted Curve Number	86
Time of Concentration (days hh:mm:ss)	0 00:23:30

Subbasin : SH

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : UG1

Input Data

Area (ac)	3.05
Peak Rate Factor	484
Weighted Curve Number	93
Rain Gage ID	1

Composite Curve Number

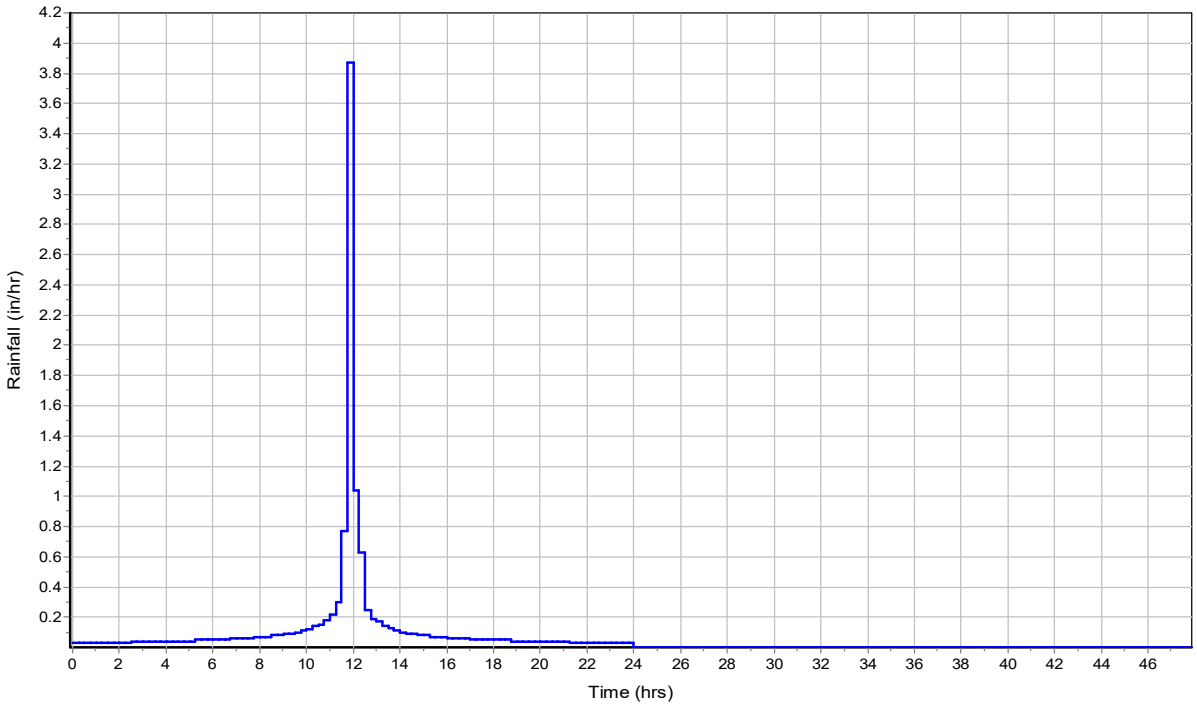
32 Soil/Surface Description	Area (acres)	Soil Group	Curve Number
-	3.05	-	93
Composite Area & Weighted CN	3.05		93

Subbasin Runoff Results

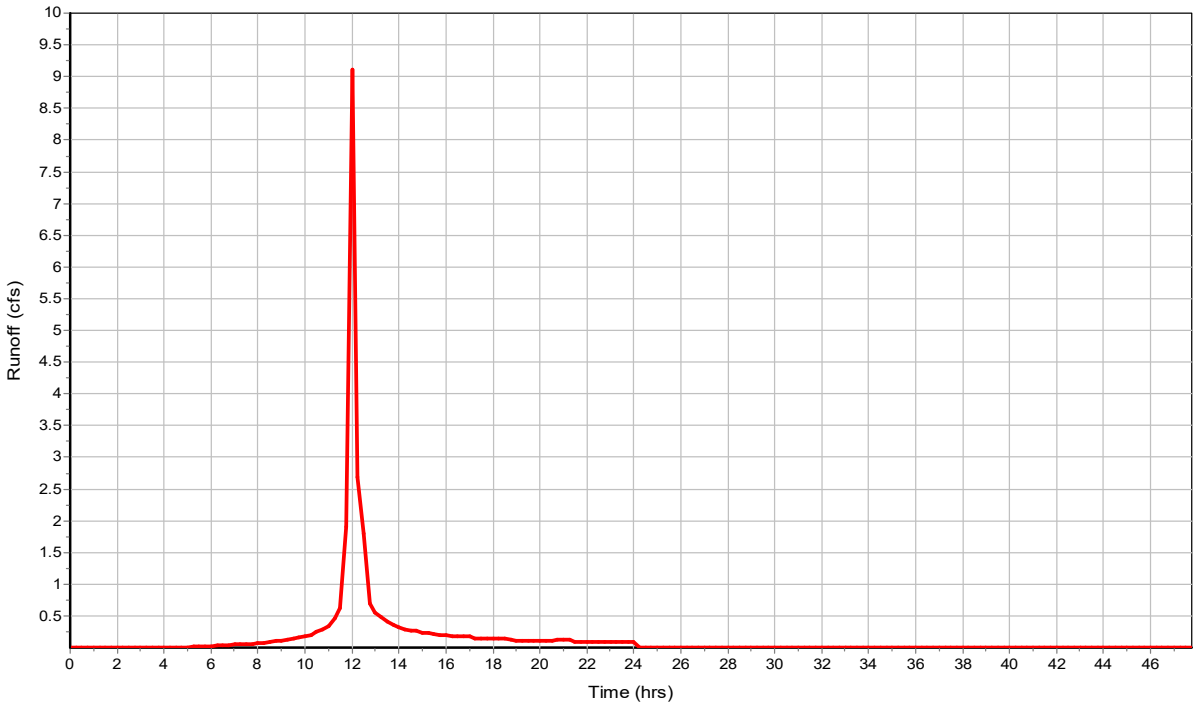
Total Rainfall (in)	2.76
Total Runoff (in)	2.02
Peak Runoff (cfs)	9.38
Weighted Curve Number	93
Time of Concentration (days hh:mm:ss)	0 00:05:00

Subbasin : UG1

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : UG2

Input Data

Area (ac) 11.65
Peak Rate Factor 484
Weighted Curve Number 86
Rain Gage ID 1

Composite Curve Number

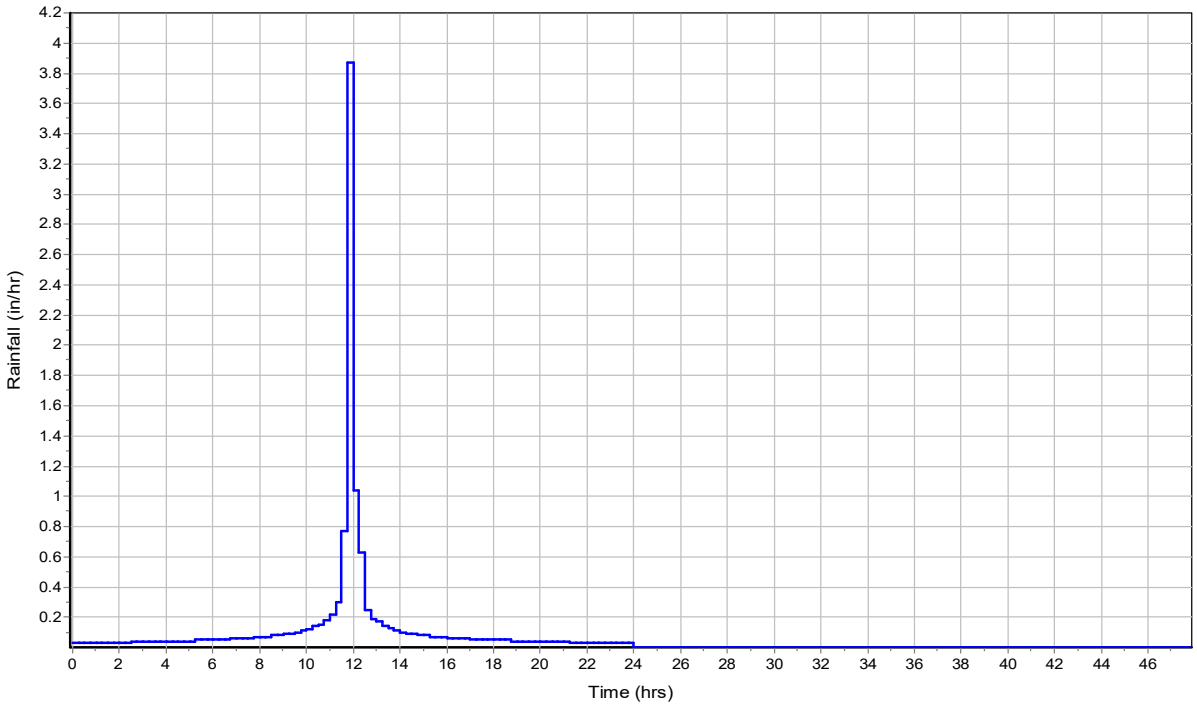
32 Soil/Surface Description	Area (acres)	Soil Group	Curve Number
-	11.65	-	86
Composite Area & Weighted CN	11.65		86

Subbasin Runoff Results

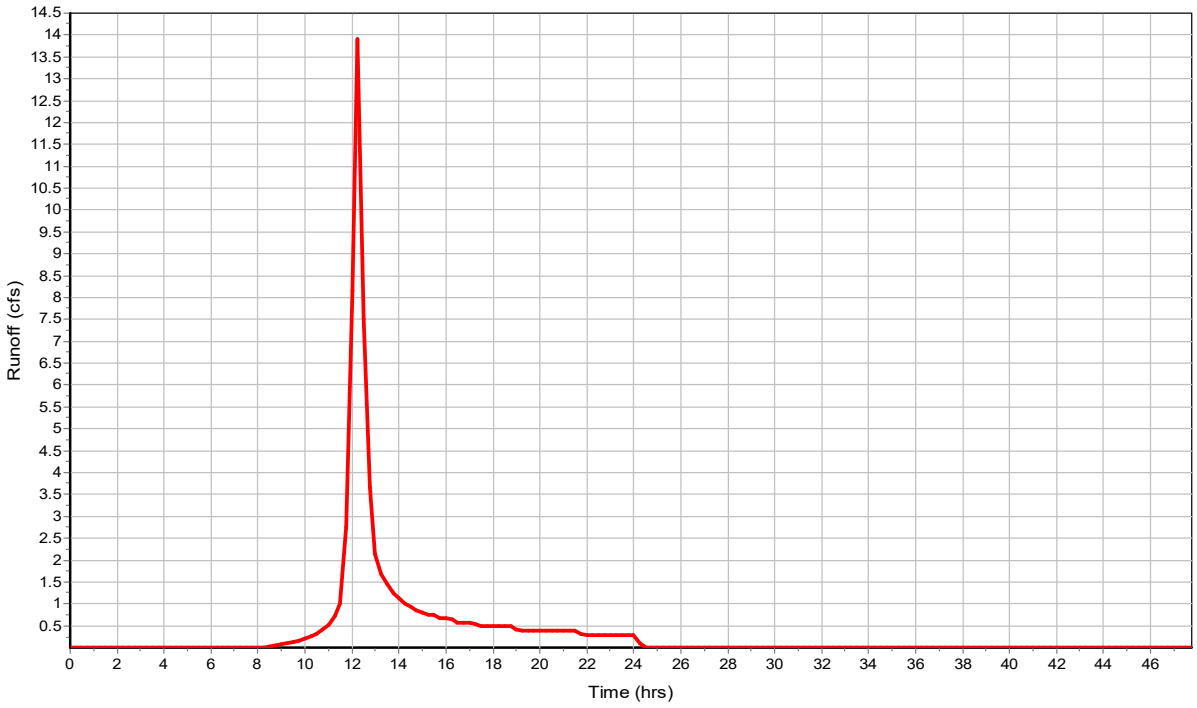
Total Rainfall (in) 2.76
Total Runoff (in) 1.46
Peak Runoff (cfs) 16.46
Weighted Curve Number 86
Time of Concentration (days hh:mm:ss) 0 00:17:12

Subbasin : UG2

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : US1

Input Data

Area (ac)	244.78
Peak Rate Factor	484
Weighted Curve Number	82
Rain Gage ID	1

Composite Curve Number

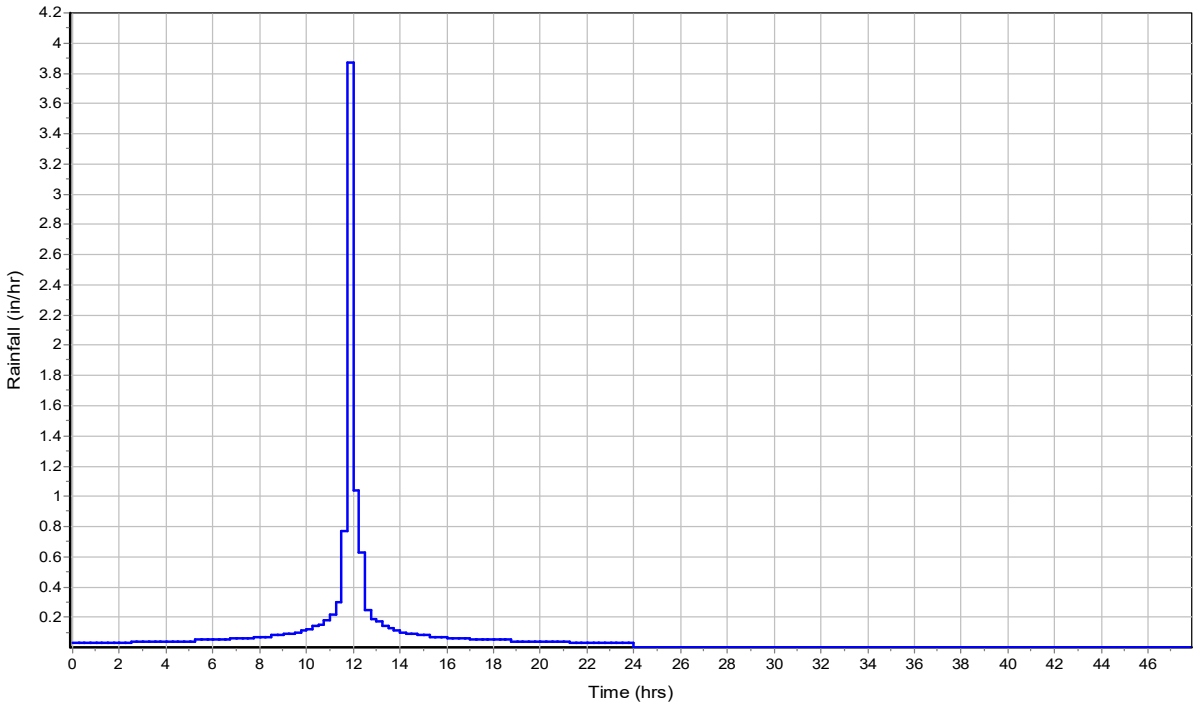
32 Soil/Surface Description	Area (acres)	Soil Group	Curve Number
-	244.78	-	82
Composite Area & Weighted CN	244.78		82

Subbasin Runoff Results

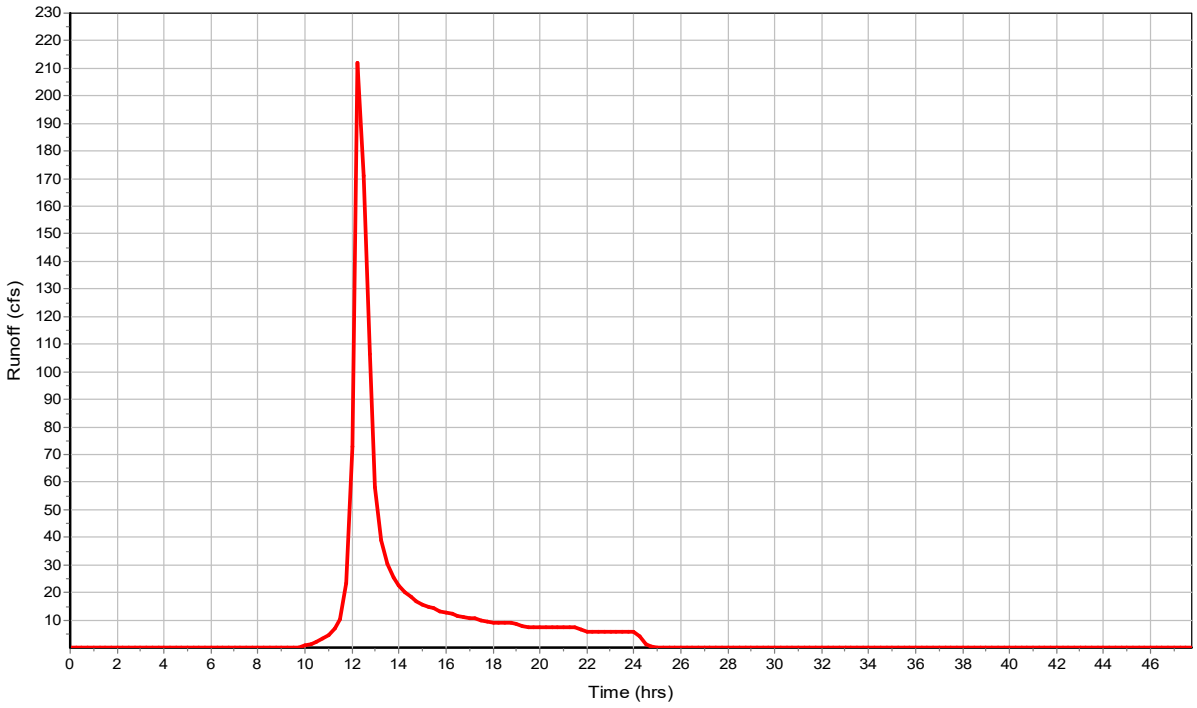
Total Rainfall (in)	2.76
Total Runoff (in)	1.19
Peak Runoff (cfs)	217.07
Weighted Curve Number	82
Time of Concentration (days hh:mm:ss)	0 00:28:36

Subbasin : US1

Rainfall Intensity Graph



Runoff Hydrograph



Junction Input

SN	Element ID	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Ground/Rim (Max) Offset (ft)	Initial Water Elevation (ft)	Initial Water Depth (ft)	Surcharge Elevation (ft)	Surcharge Depth (ft)	Ponded Area (ft^2)	Minimum Pipe Cover (in)
1	1	2062.60	2068.60	6.00	2062.60	0.00	2068.60	0.00	0.00	
2	2	2061.70	2066.30	4.60	2061.70	0.00	2066.30	0.00	0.00	
3	3	2059.10	2065.70	6.60	2059.10	0.00	2065.70	0.00	0.00	
4	4	2056.20	2065.00	8.80	2056.20	0.00	2065.00	0.00	0.00	
5	5	2054.00	2060.00	6.00	2054.00	0.00	2060.00	0.00	0.00	
6	6	2048.88	2053.88	5.00	2048.88	0.00	2053.88	0.00	0.00	
7	7	2048.60	2053.60	5.00	2048.60	0.00	2053.60	0.00	0.00	
8	8	2045.83	2050.83	5.00	2045.83	0.00	2050.83	0.00	0.00	
9	9	2044.80	2049.80	5.00	2044.80	0.00	2049.80	0.00	0.00	
10	11	2092.00	2098.00	6.00	2092.00	0.00	2098.00	0.00	0.00	
11	12	2133.50	2139.50	6.00	2133.50	0.00	2139.50	0.00	0.00	
12	13	2116.51	2125.00	8.49	2116.51	0.00	2125.00	0.00	0.00	
13	14	2154.50	2154.50	0.00	2154.50	0.00	2154.50	0.00	0.00	
14	15	2134.00	2142.00	8.00	2134.00	0.00	2142.00	0.00	0.00	
15	16	2044.25	2044.25	0.00	2044.25	0.00	2044.25	0.00	0.00	
16	17	2050.75	2050.75	0.00	2050.75	0.00	2050.75	0.00	0.00	
17	18	2043.83	2047.83	4.00	2043.83	0.00	2047.83	0.00	0.00	
18	19	2054.70	2060.00	5.30	2054.70	0.00	2060.00	0.00	0.00	

Junction Results

SN	Element ID	Peak Inflow (cfs)	Peak Lateral Inflow (cfs)	Max HGL Elevation Attained (ft)	Max HGL Depth Attained (ft)	Max Surcharge Depth Attained (ft)	Min Freeboard Attained (ft)	Average HGL Elevation Attained (ft)	Average HGL Depth Attained (ft)	Time of Max HGL Occurrence (days hh:mm)	Time of Peak Flooding Occurrence (days hh:mm)	Total Flooded Volume (ac-in)	Total Time Flooded (min)
1	1	282.39	211.88	2066.11	3.51	0.00	7.49	2062.93	0.33	0 12:35	0 00:00	0.00	0.00
2	2	283.46	0.00	2063.70	2.00	0.00	9.00	2061.80	0.10	0 12:35	0 00:00	0.00	0.00
3	3	279.18	0.00	2062.16	3.06	0.00	10.50	2059.28	0.18	0 12:36	0 00:00	0.00	0.00
4	4	279.18	0.00	2060.28	4.08	0.00	8.92	2056.42	0.22	0 12:35	0 00:00	0.00	0.00
5	5	374.85	108.46	2056.80	2.80	0.00	8.20	2054.19	0.19	0 12:31	0 00:00	0.00	0.00
6	6	374.96	0.00	2053.02	4.14	0.00	6.86	2049.14	0.26	0 12:33	0 00:00	0.00	0.00
7	7	385.53	9.24	2051.87	3.27	0.00	6.73	2048.86	0.26	0 12:33	0 00:00	0.00	0.00
8	8	385.50	0.00	2048.09	2.26	0.00	7.74	2045.93	0.10	0 12:33	0 00:00	0.00	0.00
9	9	397.81	14.97	2047.62	2.82	0.00	7.18	2045.01	0.21	0 12:33	0 00:00	0.00	0.00
10	11	104.46	0.00	2093.96	1.96	0.00	6.04	2092.17	0.17	0 12:48	0 00:00	0.00	0.00
11	12	39.13	0.00	2134.34	0.84	0.00	8.66	2133.57	0.07	0 12:46	0 00:00	0.00	0.00
12	13	67.13	0.00	2118.03	1.52	0.00	6.97	2116.63	0.12	0 12:39	0 00:00	0.00	0.00
13	14	43.45	0.00	2155.22	0.72	0.00	3.55	2154.56	0.06	0 12:33	0 00:00	0.00	0.00
14	15	39.13	0.00	2135.35	1.35	0.00	11.15	2134.13	0.13	0 12:44	0 00:00	0.00	0.00
15	16	4.46	0.00	2046.17	1.92	0.00	4.63	2044.36	0.11	0 12:33	0 00:00	0.00	0.00
16	17	2.28	0.00	2051.90	1.15	0.00	4.75	2050.81	0.06	0 12:32	0 00:00	0.00	0.00
17	18	399.48	0.00	2046.17	2.34	0.00	7.66	2044.00	0.17	0 12:33	0 00:00	0.00	0.00
18	19	279.19	0.00	2060.20	5.50	0.00	8.06	2055.14	0.44	0 12:36	0 00:00	0.00	0.00

Channel Input

SN	Element ID	Length (ft)	Inlet Invert Elevation (ft)	Inlet Invert Offset (ft)	Outlet Invert Elevation (ft)	Outlet Invert Offset (ft)	Total Drop (ft)	Average Slope (%)	Shape	Height (ft)	Width (ft)	Manning's Roughness	Entrance Losses	Exit/Bend Losses	Additional Losses	Initial Flow (cfs)	Flap Gate
1	1	131.00	2062.60	0.00	2061.70	0.00	0.90	0.6900	Trapezoidal	6.000	27.000	0.0240	0.0000	0.0000	0.0000	0.00	No
2	3	187.00	2059.10	0.00	2056.20	0.00	2.90	1.5500	Rectangular	6.600	12.000	0.0320	0.7000	0.5000	0.0000	0.00	No
3	29	154.40	2043.83	0.00	2041.91	0.00	1.92	1.2400	Trapezoidal	5.000	24.000	0.0240	0.0000	0.0000	0.0000	0.00	No
4	ED	440.35	2048.60	0.00	2045.83	0.00	2.77	0.6300	Trapezoidal	5.000	20.000	0.0240	0.0000	0.0000	0.0000	0.00	No
5	KB	392.20	2054.00	0.00	2048.88	0.00	5.12	1.3100	Trapezoidal	5.000	20.000	0.0240	0.0000	0.0000	1.0000	0.00	No
6	MOR	1020.00	2116.51	0.00	2092.00	0.00	24.51	2.4000	Trapezoidal	8.000	34.000	0.0240	0.0000	0.0000	0.0000	0.00	No
7	PF	78.10	2044.80	0.00	2043.83	0.00	0.97	1.2400	Trapezoidal	5.000	20.000	0.0240	0.0000	0.0000	0.0000	0.00	No
8	STK	2424.00	2092.00	0.00	2062.60	0.00	29.40	1.2100	Trapezoidal	5.000	23.000	0.0240	0.0000	0.0000	0.0000	0.00	No
9	USR	1864.00	2133.50	0.00	2092.00	0.00	41.50	2.2300	Trapezoidal	8.000	37.000	0.0240	0.0000	0.0000	0.0000	0.00	No

Channel Results

SN	Element ID	Peak Flow	Time of Peak Flow Occurrence	Design Flow Capacity	Peak Flow/ Design Flow Ratio	Peak Flow Velocity	Travel Time	Peak Flow Depth	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged	Froude Number	Reported Condition
		(cfs)	(days hh:mm)	(cfs)		(ft/sec)	(min)	(ft)		(min)		
1	1	283.46	0 12:35	964.35	0.29	12.41	0.18	2.72	0.46	0.00		
2	3	279.18	0 12:36	982.70	0.28	6.51	0.48	3.54	0.54	0.00		
3	29	399.51	0 12:33	1476.05	0.27	10.43	0.25	2.22	0.47	0.00		
4	ED	385.50	0 12:33	784.15	0.49	10.93	0.67	2.62	0.55	0.00		
5	KB	374.96	0 12:32	1129.64	0.33	8.10	0.81	3.31	0.69	0.00		
6	MOR	67.10	0 12:39	3372.60	0.02	7.92	2.15	1.72	0.22	0.00		
7	PF	397.81	0 12:33	1101.84	0.36	12.24	0.11	2.45	0.52	0.00		
8	STK	101.58	0 12:48	830.10	0.12	4.58	8.82	2.71	0.54	0.00		
9	USR	38.81	0 12:46	3988.84	0.01	3.57	8.70	1.39	0.17	0.00		

Pipe Input

SN	Element ID	Length (ft)	Inlet Invert Elevation (ft)	Inlet Invert Offset (ft)	Outlet Invert Elevation (ft)	Outlet Invert Offset (ft)	Total Drop (ft)	Average Slope (%)	Pipe Shape	Pipe Diameter or Height (in)	Pipe Width (in)	Manning's Roughness	Entrance Losses	Exit/Bend Losses	Additional Losses	Initial Flow (cfs)	Flap Gate	No. of Barrels
1	2	182.00	2061.70	0.00	2060.10	1.00	1.60	0.8800	Rectangular									
2	6	50.00	2048.88	0.00	2048.60	0.00	0.28	0.5600	Rectangular									
3	8	50.00	2045.83	0.00	2044.80	0.00	1.03	2.0600	Rectangular									
4	9	50.00	2154.50	0.00	2137.00	0.00	17.50	35.0000	CIRCULAR									
5	15	82.00	2134.00	0.00	2133.50	0.00	0.50	0.6100	CIRCULAR									
6	19	75.00	2117.00	0.00	2116.51	0.00	0.49	0.6500	CIRCULAR									
7	21	35.10	2044.25	0.00	2043.83	0.00	0.42	1.2000	CIRCULAR									
8	22	42.40	2050.75	0.00	2048.60	0.00	2.15	5.0700	CIRCULAR									
9	Link-01	166.00	2056.20	0.00	2054.70	0.00	1.50	0.9000	Rectangular									
10	Link-02	65.00	2054.70	0.00	2054.00	0.00	0.70	1.0800	Rectangular									

Pipe Results

SN	Element ID	Peak Flow	Time of Peak Flow Occurrence	Design Flow Capacity	Peak Flow/ Design Flow Ratio	Peak Flow Velocity	Travel Time	Peak Flow Depth	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged	Froude Number	Reported Condition
		(cfs)	(days hh:mm)	(cfs)		(ft/sec)	(min)	(ft)		(min)		
1	2	279.18	0 12:36	896.81	0.31	10.06	0.30	1.98	0.51	0.00		Calculated
2	6	374.90	0 12:33	291.43	1.29	8.60	0.10	3.51	0.91	0.00		> CAPACITY
3	8	385.47	0 12:33	1979.07	0.19	7.59	0.11	2.39	0.56	0.00		Calculated
4	9	43.45	0 12:33	242.66	0.18	13.02	0.06	1.60	0.64	0.00		Calculated
5	15	39.13	0 12:44	199.62	0.20	13.14	0.10	1.10	0.24	0.00		Calculated
6	19	67.13	0 12:38	29.20	2.30	11.75	0.11	2.25	0.75	0.00		> CAPACITY
7	21	7.07	0 13:19	53.03	0.13	3.95	0.15	2.01	0.85	0.00		Calculated
8	22	3.20	0 12:27	27.95	0.11	4.39	0.16	1.21	0.88	0.00		Calculated
9	Link-01	279.19	0 12:36	6824.77	0.04	2.99	0.93	4.79	0.37	0.00		Calculated
10	Link-02	158.71	0 12:36	254.51	0.62	10.61	0.10	3.38	0.85	0.00		Calculated

Storage Nodes

Storage Node : CVP

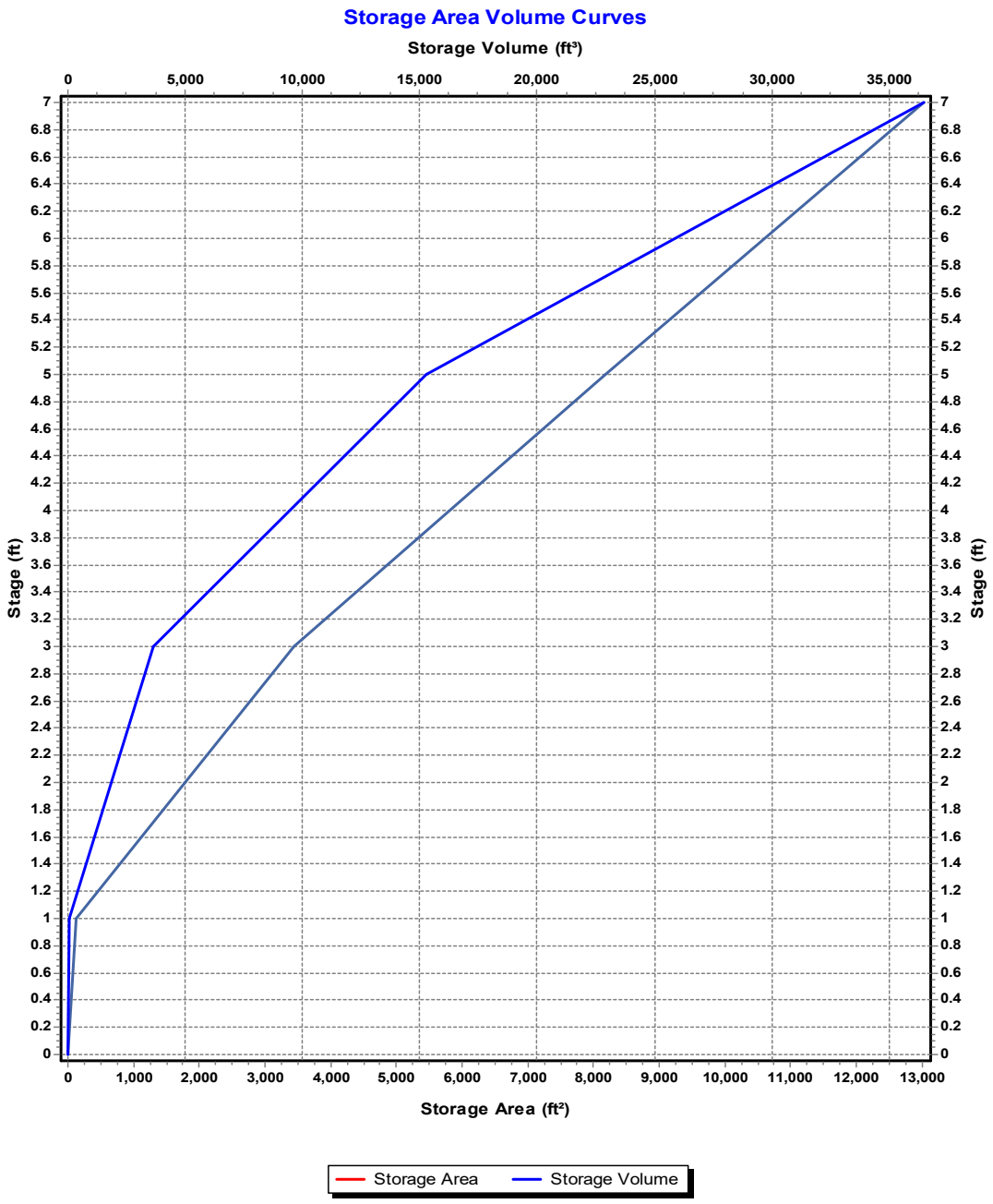
Input Data

Invert Elevation (ft)	2155.00
Max (Rim) Elevation (ft)	2162.00
Max (Rim) Offset (ft)	7.00
Initial Water Elevation (ft)	2155.00
Initial Water Depth (ft)	0.00
Ponded Area (ft^2)	7.00
Evaporation Loss	0.00

Storage Area Volume Curves

Storage Curve : CVP1

Stage (ft)	Storage Area (ft^2)	Storage Volume (ft^3)
0	0	0
1	131	65.5
3	3441	3637.5
5	8189	15267.5
7	13024	36480.5


Storage Area Volume Curves
Storage Volume (ft³)
0
5,000
10,000
15,000
20,000
25,000
30,000
35,000
Stage (ft)
0
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
1.8
2
2.2
2.4
2.6
2.8
3
3.2
3.4
3.6
3.8
4
4.2
4.4
4.6
4.8
5
5.2
5.4
5.6
5.8
6
6.2
6.4
6.6
6.8
7
Storage Area (ft²)
0
1,000
2,000
3,000
4,000
5,000
6,000
7,000
8,000
9,000
10,000
11,000
12,000
13,000
Storage Area
Storage Volume

Storage Node : CVP (continued)

Outflow Weirs

SN	Element ID	Weir Type	Flap Gate	Crest Elevation (ft)	Crest Offset (ft)	Length (ft)	Weir Total Height (ft)	Discharge Coefficient
1	14	Trapezoidal	No	2161.50	6.50	40.00	2.00	3.33

Outflow Orifices

SN	Element ID	Orifice Type	Orifice Shape	Flap Gate	Circular Orifice Diameter (in)	Rectangular Orifice Height (in)	Rectangular Orifice Width (in)	Orifice Invert Elevation (ft)	Orifice Coefficient
1	5	Side	CIRCULAR	No					
2	7	Side	CIRCULAR	No					
3	13	Bottom	Rectangular	No					

Output Summary Results

Peak Inflow (cfs)	48.31
Peak Lateral Inflow (cfs)	48.31
Peak Outflow (cfs)	43.45
Peak Exfiltration Flow Rate (cfm)	0
Max HGL Elevation Attained (ft)	2159.14
Max HGL Depth Attained (ft)	4.14
Average HGL Elevation Attained (ft)	2155.24
Average HGL Depth Attained (ft)	0.24
Time of Max HGL Occurrence (days hh:mm)	0 12:33
Total Exfiltration Volume (1000-ft^3)	0
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0

Storage Node : P1

Input Data

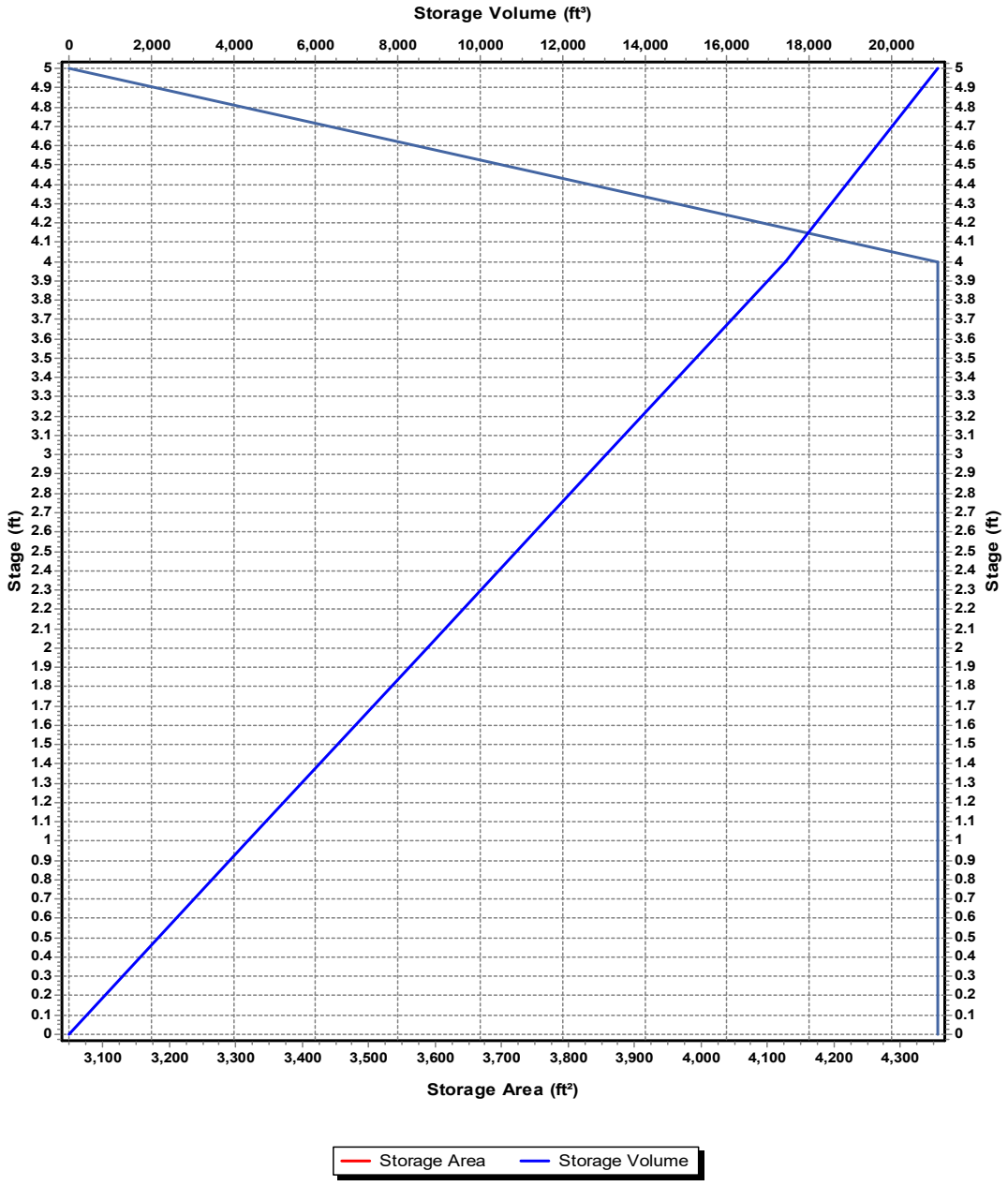
Invert Elevation (ft)	2050.75
Max (Rim) Elevation (ft)	2055.75
Max (Rim) Offset (ft)	5.00
Initial Water Elevation (ft)	2050.75
Initial Water Depth (ft)	0.00
Ponded Area (ft^2)	5.00
Evaporation Loss	0.00

Storage Area Volume Curves

Storage Curve : P1

Stage (ft)	Storage Area (ft^2)	Storage Volume (ft^3)
0	4356	0
1	4356	4356
2	4356	8712
3	4356	13068
4	4356	17424
5	3049	21126.5

Storage Area Volume Curves



Storage Node : P1 (continued)

Outflow Weirs

SN	Element ID	Weir Type	Flap Gate	Crest Elevation (ft)	Crest Offset (ft)	Length (ft)	Weir Total Height (ft)	Discharge Coefficient
1	28	Transverse	No	2054.65	3.90	6.00	2.00	3.33

Outflow Orifices

SN	Element ID	Orifice Type	Orifice Shape	Flap Gate	Circular Orifice Diameter (in)	Rectangular Orifice Height (in)	Rectangular Orifice Width (in)	Orifice Invert Elevation (ft)	Orifice Coefficient
1	26	Side	CIRCULAR	No					
2	27	Side	Rectangular	No					

Output Summary Results

Peak Inflow (cfs)	9.1
Peak Lateral Inflow (cfs)	9.1
Peak Outflow (cfs)	2.28
Peak Exfiltration Flow Rate (cfm)	0
Max HGL Elevation Attained (ft)	2053.45
Max HGL Depth Attained (ft)	2.7
Average HGL Elevation Attained (ft)	2051.24
Average HGL Depth Attained (ft)	0.49
Time of Max HGL Occurrence (days hh:mm)	0 12:36
Total Exfiltration Volume (1000-ft^3)	0
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0

Storage Node : P2

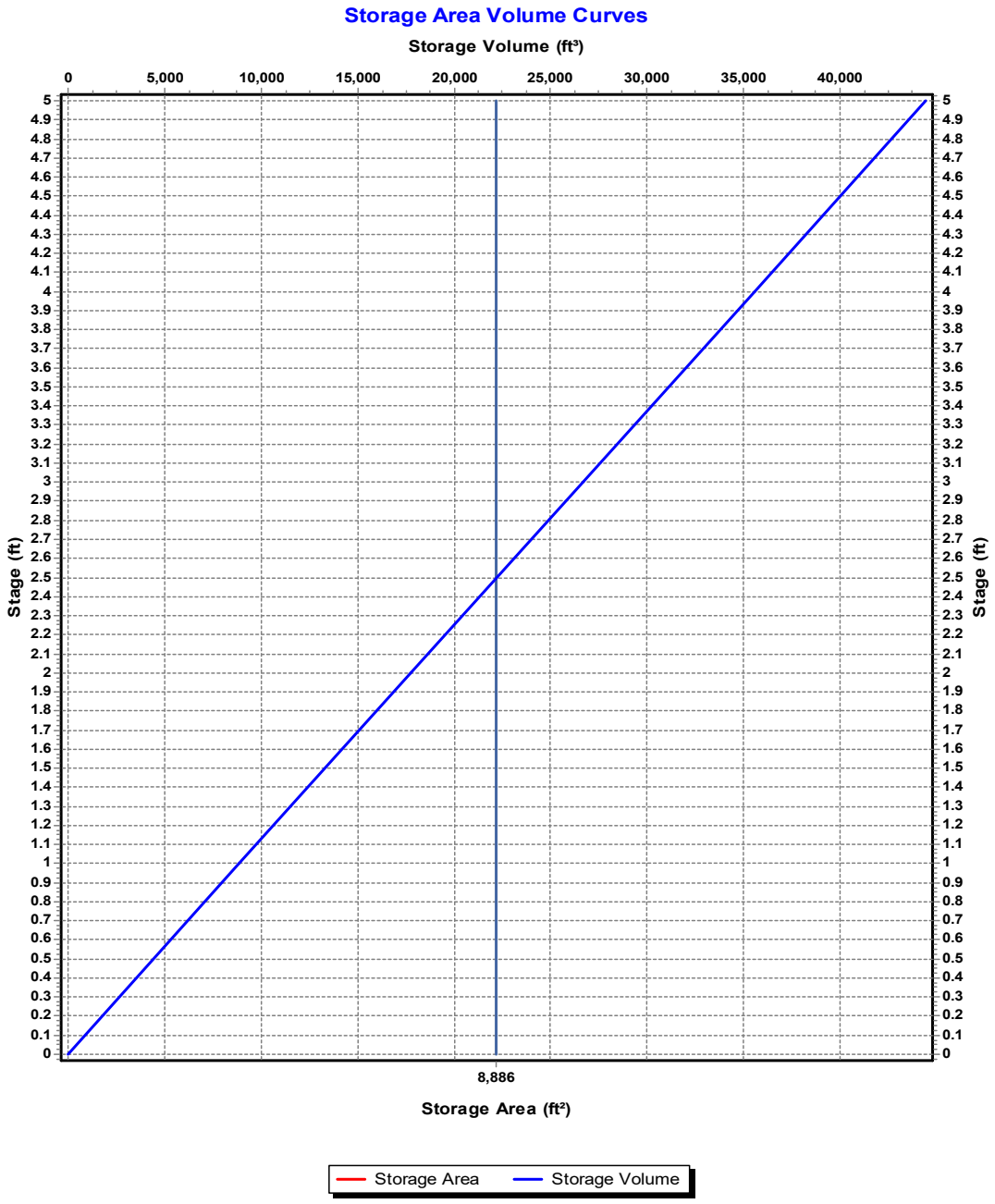
Input Data

Invert Elevation (ft)	2044.25
Max (Rim) Elevation (ft)	2049.25
Max (Rim) Offset (ft)	5.00
Initial Water Elevation (ft)	2044.25
Initial Water Depth (ft)	0.00
Ponded Area (ft^2)	5.00
Evaporation Loss	0.00

Storage Area Volume Curves

Storage Curve : P2

Stage (ft)	Storage Area (ft^2)	Storage Volume (ft^3)
0	8886	0
1	8886	8886
2	8886	17772
3	8886	26658
4	8886	35544
5	8886	44430


Storage Area Volume Curves
Storage Volume (ft³)
0
5,000
10,000
15,000
20,000
25,000
30,000
35,000
40,000
Stage (ft)
Stage (ft)
8,886
Storage Area (ft²)
Storage Area
Storage Volume

Storage Node : P2 (continued)

Outflow Weirs

SN	Element ID	Weir Type	Flap Gate	Crest Elevation (ft)	Crest Offset (ft)	Length (ft)	Weir Total Height (ft)	Discharge Coefficient
1	25	Transverse	No	2048.80	4.55	6.00	2.00	3.33

Outflow Orifices

SN	Element ID	Orifice Type	Orifice Shape	Flap Gate	Circular Orifice Diameter (in)	Rectangular Orifice Height (in)	Rectangular Orifice Width (in)	Orifice Invert Elevation (ft)	Orifice Coefficient
1	23	Side	Rectangular	No					
2	24	Side	Rectangular	No					

Output Summary Results

Peak Inflow (cfs)	13.91
Peak Lateral Inflow (cfs)	13.91
Peak Outflow (cfs)	4.46
Peak Exfiltration Flow Rate (cfm)	0
Max HGL Elevation Attained (ft)	2047.22
Max HGL Depth Attained (ft)	2.97
Average HGL Elevation Attained (ft)	2044.47
Average HGL Depth Attained (ft)	0.22
Time of Max HGL Occurrence (days hh:mm)	0 12:57
Total Exfiltration Volume (1000-ft³)	0
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0

Storage Node : RP

Input Data

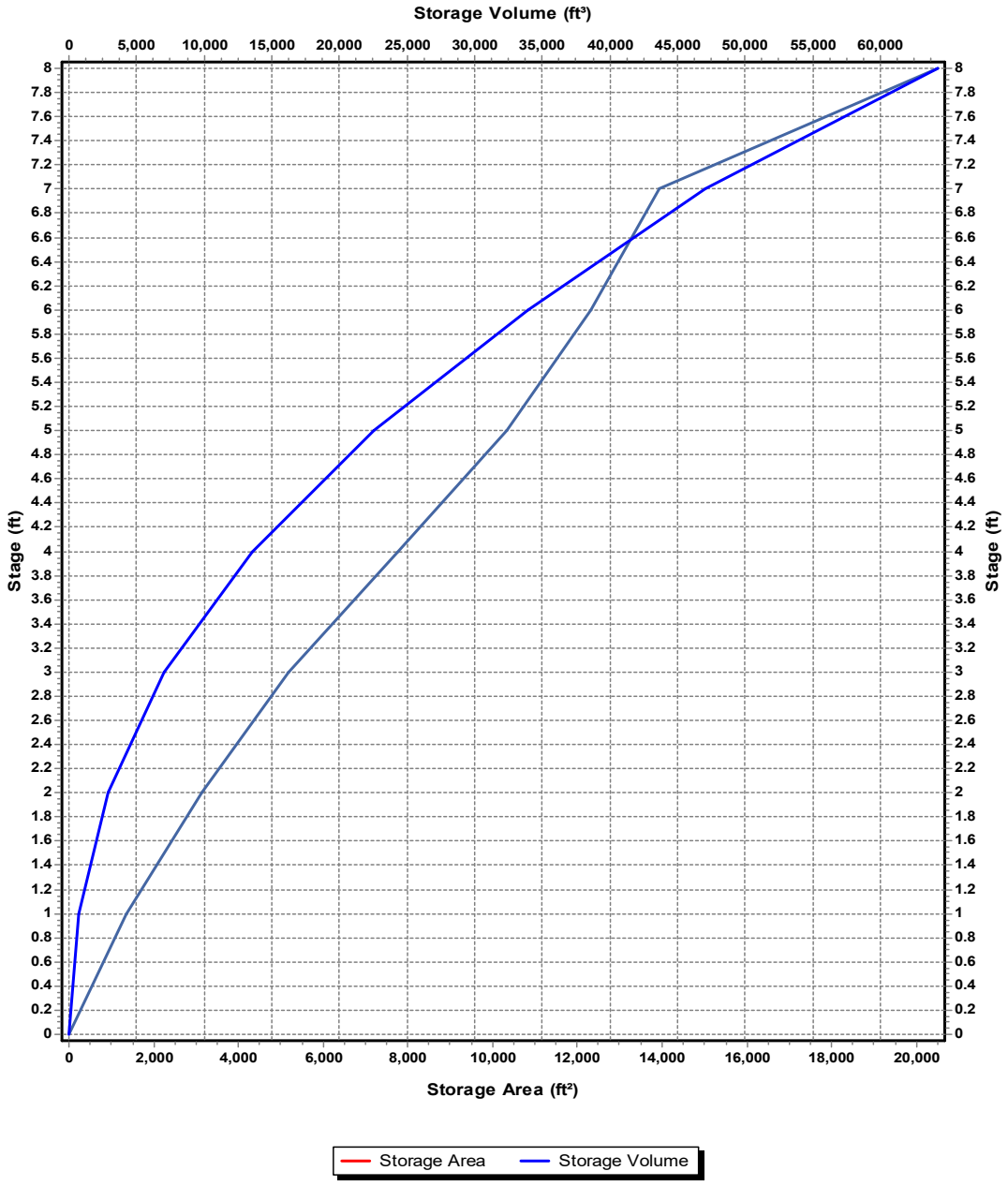
Invert Elevation (ft)	2137.00
Max (Rim) Elevation (ft)	2145.00
Max (Rim) Offset (ft)	8.00
Initial Water Elevation (ft)	2137.00
Initial Water Depth (ft)	0.00
Ponded Area (ft^2)	8.00
Evaporation Loss	0.00

Storage Area Volume Curves

Storage Curve : RP1

Stage (ft)	Storage Area (ft^2)	Storage Volume (ft^3)
0	0	0
1	1366	683
2	3129	2930.5
3	5175	7082.5
4	7760	13550
5	10340	22600
6	12305	33922.5
7	13925	47037.5
8	20503	64251.5

Storage Area Volume Curves



Storage Node : RP (continued)

Outflow Weirs

SN	Element ID	Weir Type	Flap Gate	Crest Elevation (ft)	Crest Offset (ft)	Length (ft)	Weir Total Height (ft)	Discharge Coefficient
1	18	Trapezoidal	No	2144.50	7.50	60.00	2.00	3.33

Outflow Orifices

SN	Element ID	Orifice Type	Orifice Shape	Flap Gate	Circular Orifice Diameter (in)	Rectangular Orifice Height (in)	Rectangular Orifice Width (in)	Orifice Invert Elevation (ft)	Orifice Coefficient
1	16	Side	CIRCULAR	No					
2	17	Side	Rectangular	No					

Output Summary Results

Peak Inflow (cfs)	51.01
Peak Lateral Inflow (cfs)	8.31
Peak Outflow (cfs)	39.13
Peak Exfiltration Flow Rate (cfm)	0
Max HGL Elevation Attained (ft)	2143.59
Max HGL Depth Attained (ft)	6.59
Average HGL Elevation Attained (ft)	2137.36
Average HGL Depth Attained (ft)	0.36
Time of Max HGL Occurrence (days hh:mm)	0 12:44
Total Exfiltration Volume (1000-ft^3)	0
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0

Storage Node : SP

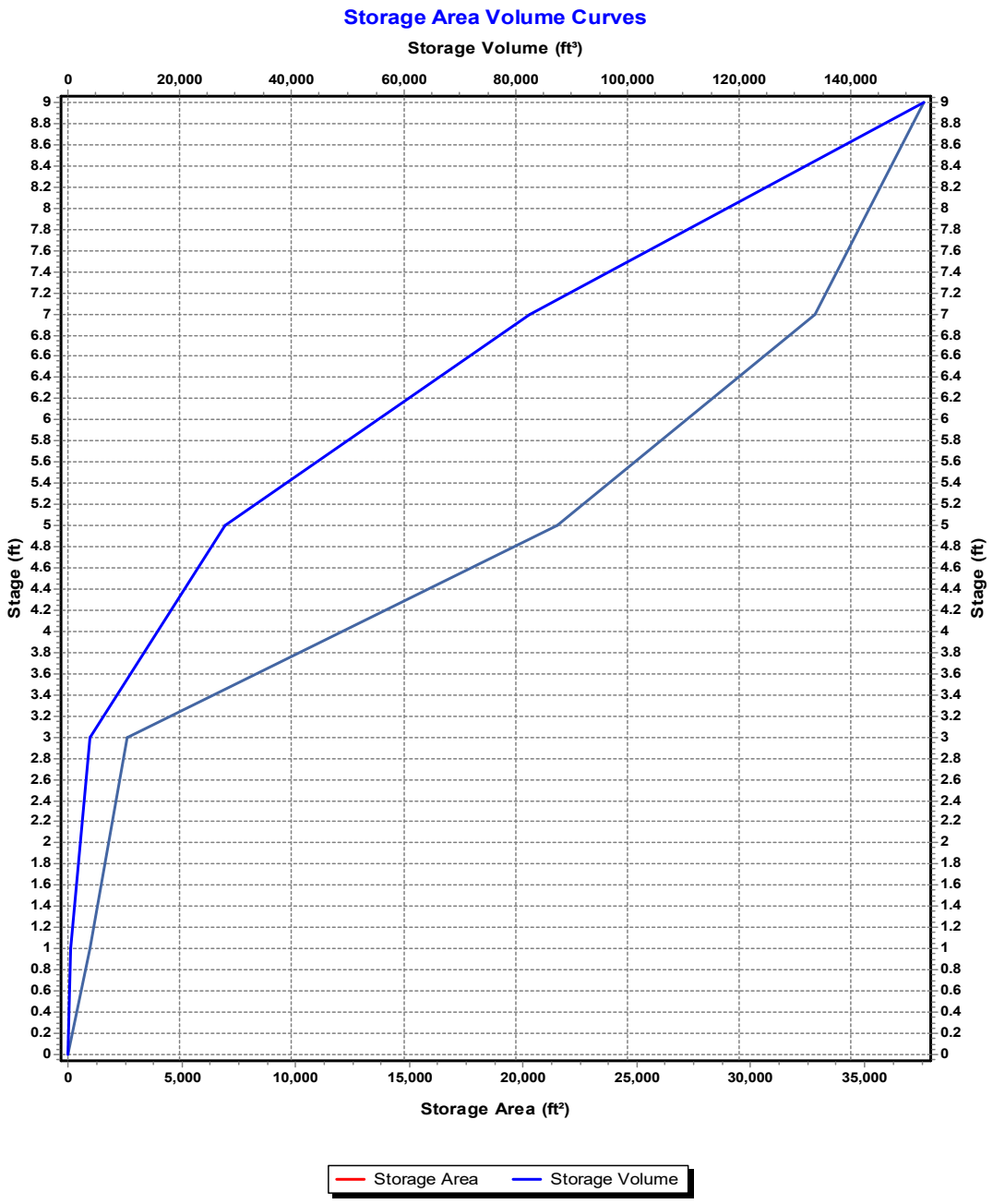
Input Data

Invert Elevation (ft)	2117.00
Max (Rim) Elevation (ft)	2125.00
Max (Rim) Offset (ft)	8.00
Initial Water Elevation (ft)	2117.00
Initial Water Depth (ft)	0.00
Ponded Area (ft^2)	8.00
Evaporation Loss	0.00

Storage Area Volume Curves

Storage Curve : SP1

Stage (ft)	Storage Area (ft^2)	Storage Volume (ft^3)
0	0	0
1	955	477.5
3	2580	4012.5
5	21522	28114.5
7	32858	82494.5
9	37630	152982.5


Storage Area Volume Curves
Storage Volume (ft³)
0
20,000
40,000
60,000
80,000
100,000
120,000
140,000
Stage (ft)
0
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
1.8
2
2.2
2.4
2.6
2.8
3
3.2
3.4
3.6
3.8
4
4.2
4.4
4.6
4.8
5
5.2
5.4
5.6
5.8
6
6.2
6.4
6.6
6.8
7
7.2
7.4
7.6
7.8
8
8.2
8.4
8.6
8.8
9
0
5,000
10,000
15,000
20,000
25,000
30,000
35,000
Storage Area (ft²)
Storage Area
Storage Volume

Storage Node : SP (continued)

Outflow Weirs

SN	Element ID	Weir Type	Flap Gate	Crest Elevation (ft)	Crest Offset (ft)	Length (ft)	Weir Total Height (ft)	Discharge Coefficient
1	20	Trapezoidal	No	2123.00	6.00	20.00	2.00	3.33

Output Summary Results

Peak Inflow (cfs)	84.28
Peak Lateral Inflow (cfs)	84.28
Peak Outflow (cfs)	67.13
Peak Exfiltration Flow Rate (cfm)	0
Max HGL Elevation Attained (ft)	2121.23
Max HGL Depth Attained (ft)	4.23
Average HGL Elevation Attained (ft)	2117.26
Average HGL Depth Attained (ft)	0.26
Time of Max HGL Occurrence (days hh:mm)	0 12:38
Total Exfiltration Volume (1000-ft^3)	0
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0

Project Description

File Name ..... ExistingKabrichModel.SPF

Project Options

Flow Units ..... CFS
Elevation Type ..... Elevation
Hydrology Method ..... SCS TR-20
Time of Concentration (TOC) Method ..... User-Defined
Link Routing Method ..... Hydrodynamic
Enable Overflow Ponding at Nodes ..... YES
Skip Steady State Analysis Time Periods ..... NO

Number of Elements

	Qty
Rain Gages	1
Subbasins	9
Nodes	23
Junctions	17
Outfalls	1
Flow Diversions	0
Inlets	0
Storage Nodes	5
Links	41
Channels	8
Pipes	10
Pumps	0
Orifices	9
Weirs	14
Outlets	0
Pollutants	0
Land Uses	0

Rainfall Details

SN	Rain Gage ID	Data Source	Data Source ID	Rainfall Type	Rain Units	State	County	Return Period (years)	Rainfall Depth (inches)	Rainfall Distribution
1	1	Time Series	10Year	Cumulative	inches				0.00	

Subbasin Summary

SN	Subbasin ID	Area (ac)	Peak Rate Factor	Weighted Curve Number	Total Rainfall (in)	Total Runoff (in)	Total Runoff Volume (ac-in)	Peak Runoff (cfs)	Time of Concentration (days hh:mm:ss)
1	A	6.36	484.00	90.00	4.10	3.02	19.18	16.83	0 00:18:30
2	B	10.80	484.00	92.00	4.10	3.22	34.72	35.42	0 00:12:30
3	CO	44.42	484.00	84.00	4.10	2.46	109.27	99.40	0 00:17:30
4	K	93.79	484.00	85.00	4.10	2.55	238.98	213.90	0 00:18:12
5	RU	7.74	484.00	87.00	4.10	2.73	21.12	22.05	0 00:12:24
6	SH	69.35	484.00	86.00	4.10	2.64	182.95	146.23	0 00:23:30
7	UG1	3.05	484.00	93.00	4.10	3.32	10.12	13.71	0 00:05:00
8	UG2	11.65	484.00	86.00	4.10	2.64	30.73	28.13	0 00:17:12
9	US1	244.78	484.00	82.00	4.10	2.29	560.55	409.09	0 00:28:36

Node Summary

SN	Element ID	Element Type	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Initial Water Elevation (ft)	Surcharge Elevation (ft)	Ponded Area (ft^2)	Peak Inflow (cfs)	Max HGL Elevation Attained (ft)	Max Surcharge Depth Attained (ft)	Min Freeboard Attained (ft)	Time of Peak Flooding Occurrence (days hh:mm)	Total Flooded Volume (ac-in)	Total Time Flooded (min)
1	1	Junction	2062.60	2068.60	2062.60	2068.60	0.00	520.56	2067.94	0.00	5.66	0 00:00	0.00	0.00
2	2	Junction	2061.70	2066.30	2061.70	2066.30	0.00	519.40	2067.78	0.00	4.92	0 00:00	0.00	0.00
3	3	Junction	2060.10	2065.70	2060.10	2065.70	0.00	519.39	2067.54	0.00	4.12	0 00:00	0.00	0.00
4	4	Junction	2057.57	2062.00	2057.57	2062.00	0.00	519.39	2062.43	0.00	6.70	0 00:00	0.00	0.00
5	5	Junction	2054.00	2060.00	2054.00	2060.00	0.00	681.97	2058.49	0.00	6.51	0 00:00	0.00	0.00
6	6	Junction	2048.88	2053.88	2048.88	2053.88	0.00	681.99	2054.50	0.00	5.38	0 00:00	0.00	0.00
7	7	Junction	2048.60	2053.60	2048.60	2053.60	0.00	700.54	2053.23	0.00	5.37	0 00:00	0.00	0.00
8	8	Junction	2045.83	2050.83	2045.83	2050.83	0.00	713.86	2049.49	0.00	6.34	0 00:00	0.00	0.00
9	9	Junction	2044.80	2049.80	2044.80	2049.80	0.00	722.68	2048.76	0.00	6.04	0 00:00	0.00	0.00
10	11	Junction	2092.00	2098.00	2092.00	2098.00	0.00	183.67	2094.53	0.00	5.47	0 00:00	0.00	0.00
11	12	Junction	2133.50	2139.50	2133.50	2139.50	0.00	89.68	2134.82	0.00	8.18	0 00:00	0.00	0.00
12	13	Junction	2116.51	2125.00	2116.51	2125.00	0.00	103.18	2118.36	0.00	6.64	0 00:00	0.00	0.00
13	14	Junction	2154.50	2154.50	2154.50	2154.50	0.00	83.76	2155.51	0.00	3.26	0 00:00	0.00	0.00
14	15	Junction	2134.00	2142.00	2134.00	2142.00	0.00	72.31	2135.87	0.00	10.63	0 00:00	0.00	0.00
15	16	Junction	2044.25	2044.25	2044.25	2044.25	0.00	10.80	2047.21	0.00	3.59	0 00:00	0.00	0.00
16	17	Junction	2050.75	2050.75	2050.75	2050.75	0.00	4.21	2053.28	0.00	3.37	0 00:00	0.00	0.00
17	18	Junction	2043.83	2047.83	2043.83	2047.83	0.00	729.50	2047.17	0.00	6.66	0 00:00	0.00	0.00
18	10	Outfall	2041.91					730.32	2045.25					
19	CVP	Storage Node	2155.00	2162.00	2155.00		7.00	85.84	2160.52				0.00	0.00
20	P1	Storage Node	2050.75	2055.75	2050.75		5.00	13.40	2054.75				0.00	0.00
21	P2	Storage Node	2044.25	2049.25	2044.25		5.00	23.85	2048.90				0.00	0.00
22	RP	Storage Node	2137.00	2145.00	2137.00		8.00	97.50	2144.70				0.00	0.00
23	SP	Storage Node	2117.00	2125.00	2117.00		8.00	145.21	2123.39				0.00	0.00

Link Summary

SN	Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length	Inlet Invert Elevation	Outlet Invert Elevation	Average Slope	Diameter or Height	Manning's Roughness	Peak Flow	Design Flow Capacity	Peak Flow/ Design Flow Ratio	Peak Flow Velocity	Peak Flow Depth	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged	Reported Condition
					(ft)	(ft)	(ft)	(%)	(in)		(cfs)	(cfs)		(ft/sec)	(ft)		(min)	
1	2	Pipe	2	3	182.00	2061.70	2060.10	0.8800			292.18	896.81	0.33	6.48	4.00	1.00	57.00	SURCHARGED
2	3	Pipe	3	4	181.00	2060.10	2057.57	1.4000			318.95	269.80	1.18	9.20	3.67	1.00	71.00	SURCHARGED
3	4	Pipe	4	5	210.00	2057.57	2054.00	1.7000			165.04	148.77	1.11	11.22	3.67	1.00	25.00	SURCHARGED
4	6	Pipe	6	7	50.00	2048.88	2048.60	0.5600			483.28	291.43	1.66	10.37	4.00	1.00	25.00	SURCHARGED
5	8	Pipe	8	9	50.00	2045.83	2044.80	2.0600			703.23	1979.07	0.36	9.24	3.63	0.85	0.00	Calculated
6	9	Pipe	14	RP	50.00	2154.50	2137.00	35.0000			83.76	242.66	0.35	22.73	1.75	0.70	0.00	Calculated
7	15	Pipe	15	12	82.00	2134.00	2133.50	0.6100			72.31	199.62	0.36	15.26	1.49	0.35	0.00	Calculated
8	19	Pipe	SP	13	75.00	2117.00	2116.51	0.6500			87.05	29.20	2.98	14.29	2.42	0.81	0.00	> CAPACITY
9	21	Pipe	16	18	35.10	2044.25	2043.83	1.2000			11.33	53.03	0.21	3.56	2.50	1.00	25.00	SURCHARGED
10	22	Pipe	17	7	42.40	2050.75	2048.60	5.0700			5.07	27.95	0.18	5.02	1.50	1.00	34.00	SURCHARGED
11	1	Channel	1	2	131.00	2062.60	2061.70	0.6900			519.40	964.35	0.54	12.13	5.64	0.94	0.00	
12	29	Channel	18	10	154.40	2043.83	2041.91	1.2400			730.32	1476.05	0.49	12.61	3.19	0.67	0.00	
13	ED	Channel	7	8	440.35	2048.60	2045.83	0.6300			713.86	784.15	0.91	12.24	3.93	0.83	0.00	
14	KB	Channel	5	6	392.20	2054.00	2048.88	1.3100			681.99	1129.64	0.60	9.75	4.68	0.95	0.00	
15	MOR	Channel	13	11	1020.00	2116.51	2092.00	2.4000			103.05	3372.60	0.03	7.83	2.19	0.27	0.00	
16	PF	Channel	9	18	78.10	2044.80	2043.83	1.2400			722.37	1101.84	0.66	14.51	3.50	0.73	0.00	
17	STK	Channel	11	1	2424.00	2092.00	2062.60	1.2100			176.33	830.10	0.21	4.64	3.77	0.75	0.00	
18	USR	Channel	12	11	1864.00	2133.50	2092.00	2.2300			87.89	3988.84	0.02	5.57	1.86	0.24	0.00	
19	5	Orifice	CVP	14		2155.00	2154.50				20.13							
20	7	Orifice	CVP	14		2155.00	2154.50				40.48							
21	13	Orifice	CVP	14		2155.00	2154.50				23.15							
22	16	Orifice	RP	15		2137.00	2134.00				24.29							
23	17	Orifice	RP	15		2137.00	2134.00				48.02							
24	23	Orifice	P2	16		2044.25	2044.25				4.81							
25	24	Orifice	P2	16		2044.25	2044.25				5.78							
26	26	Orifice	P1	17		2050.75	2050.75				0.42							
27	27	Orifice	P1	17		2050.75	2050.75				3.46							
28	10	Weir	8	9		2045.83	2044.80				0.00							
29	11	Weir	6	7		2048.88	2048.60				243.07							
30	14	Weir	CVP	RP		2155.00	2137.00				0.00							
31	18	Weir	RP	12		2137.00	2133.50				17.36							
32	20	Weir	SP	13		2117.00	2116.51				16.13							
33	25	Weir	P2	16		2044.25	2044.25				0.59							
34	28	Weir	P1	17		2050.75	2050.75				0.59							
35	31	Weir	2	3		2061.70	2060.10				301.86							
36	32	Weir	3	4		2060.10	2057.57				200.45							
37	33	Weir	4	5		2057.57	2054.00				378.15							
38	35	Weir	5	6		2054.00	2048.88				0.00							
39	36	Weir	7	8		2048.60	2045.83				0.00							
40	37	Weir	9	18		2044.80	2043.83				0.00							
41	38	Weir	1	2		2062.60	2061.70				0.00							

Subbasin Hydrology

Subbasin : A

Input Data

Area (ac) 6.36
Peak Rate Factor 484
Weighted Curve Number 90
Rain Gage ID 1

Composite Curve Number

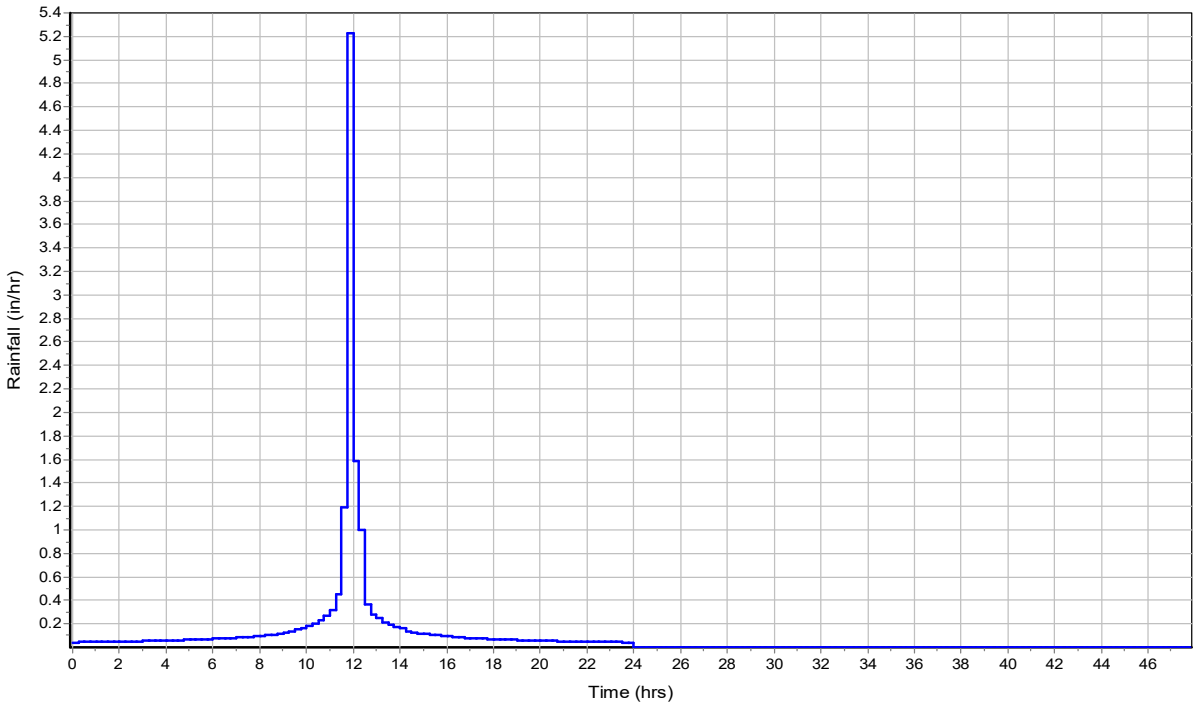
32 Soil/Surface Description	Area (acres)	Soil Group	Curve Number
-	6.36	-	90
Composite Area & Weighted CN	6.36		90

Subbasin Runoff Results

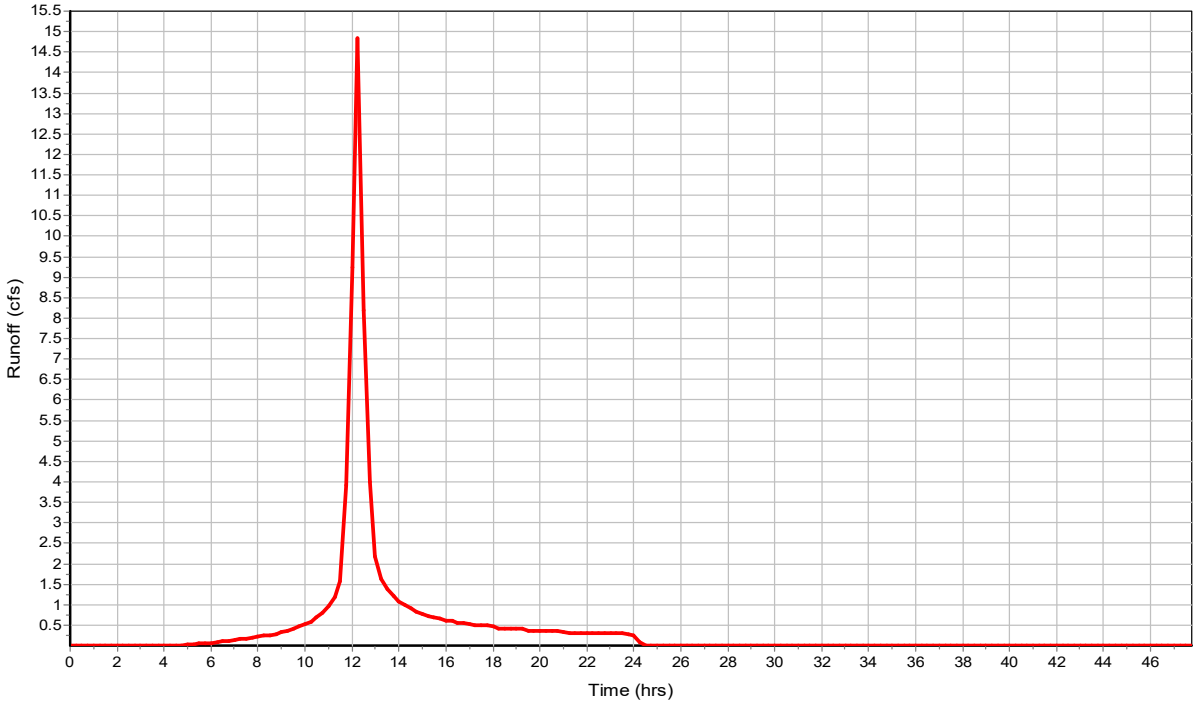
Total Rainfall (in) 4.1
Total Runoff (in) 3.02
Peak Runoff (cfs) 16.83
Weighted Curve Number 90
Time of Concentration (days hh:mm:ss) 0 00:18:30

Subbasin : A

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : B

Input Data

Area (ac) 10.8
Peak Rate Factor 484
Weighted Curve Number 92
Rain Gage ID 1

Composite Curve Number

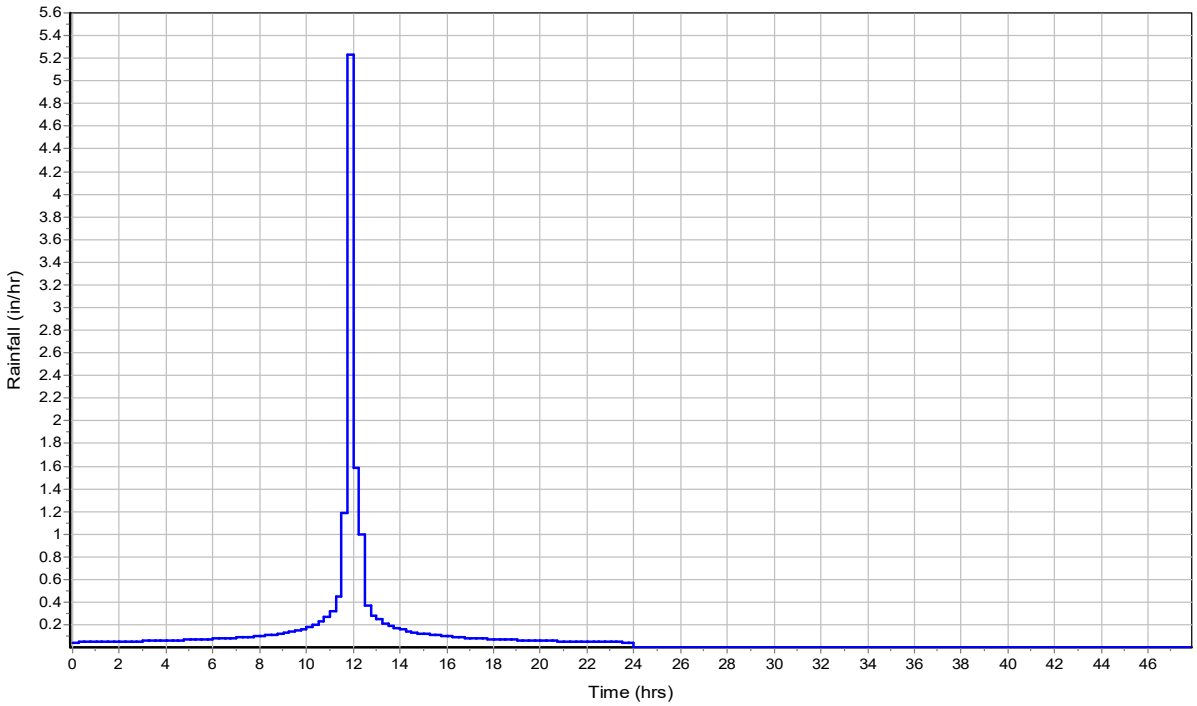
32 Soil/Surface Description	Area (acres)	Soil Group	Curve Number
-	10.8	-	92
Composite Area & Weighted CN	10.8		92

Subbasin Runoff Results

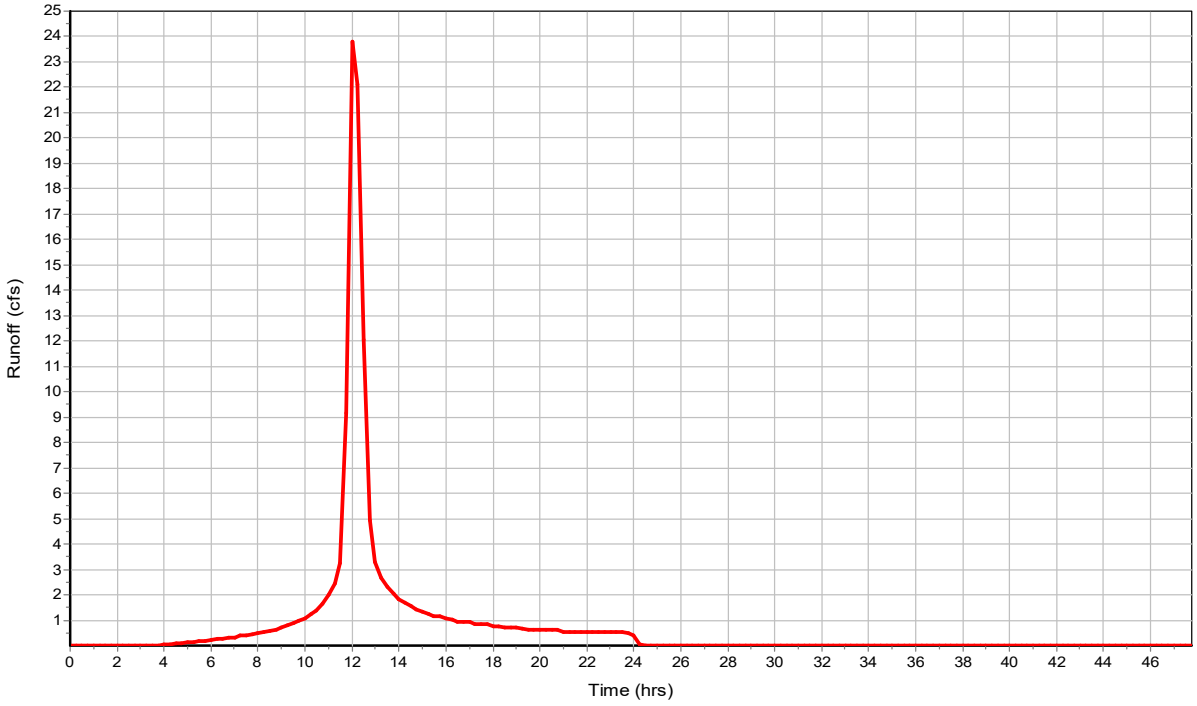
Total Rainfall (in) 4.1
Total Runoff (in) 3.22
Peak Runoff (cfs) 35.42
Weighted Curve Number 92
Time of Concentration (days hh:mm:ss) 0 00:12:30

Subbasin : B

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : CO

Input Data

Area (ac)	44.42
Peak Rate Factor	484
Weighted Curve Number	84
Rain Gage ID	1

Composite Curve Number

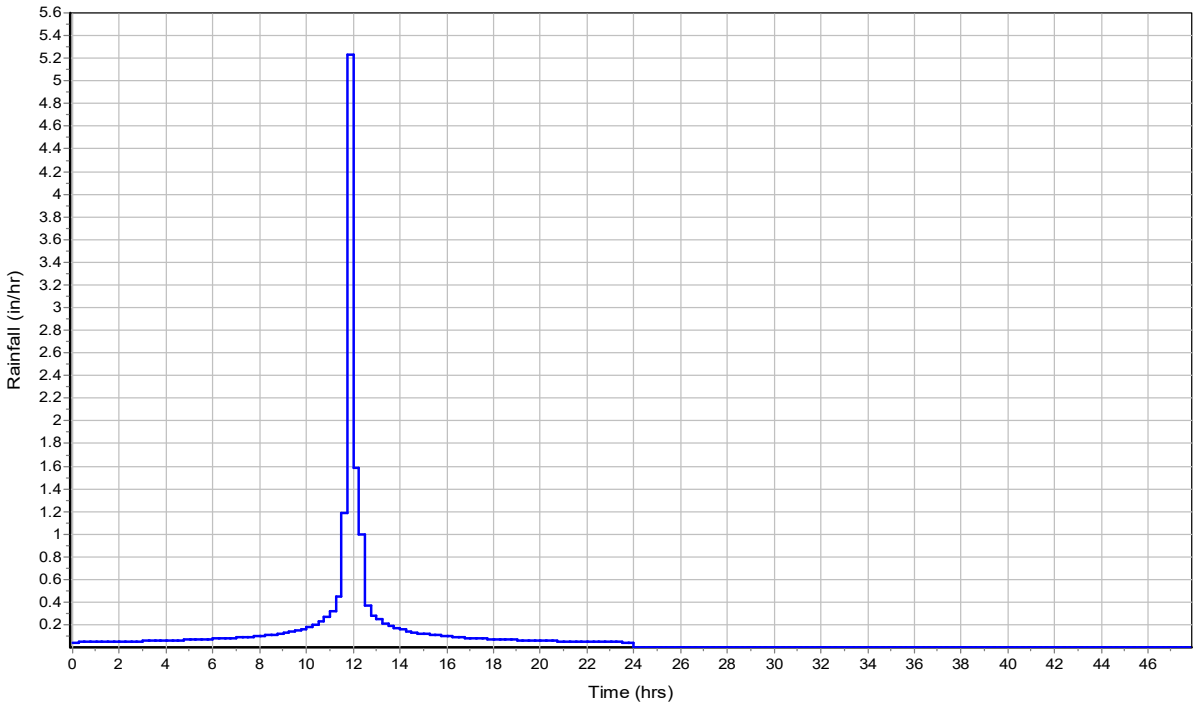
32 Soil/Surface Description	Area (acres)	Soil Group	Curve Number
-	44.42	-	84
Composite Area & Weighted CN	44.42		84

Subbasin Runoff Results

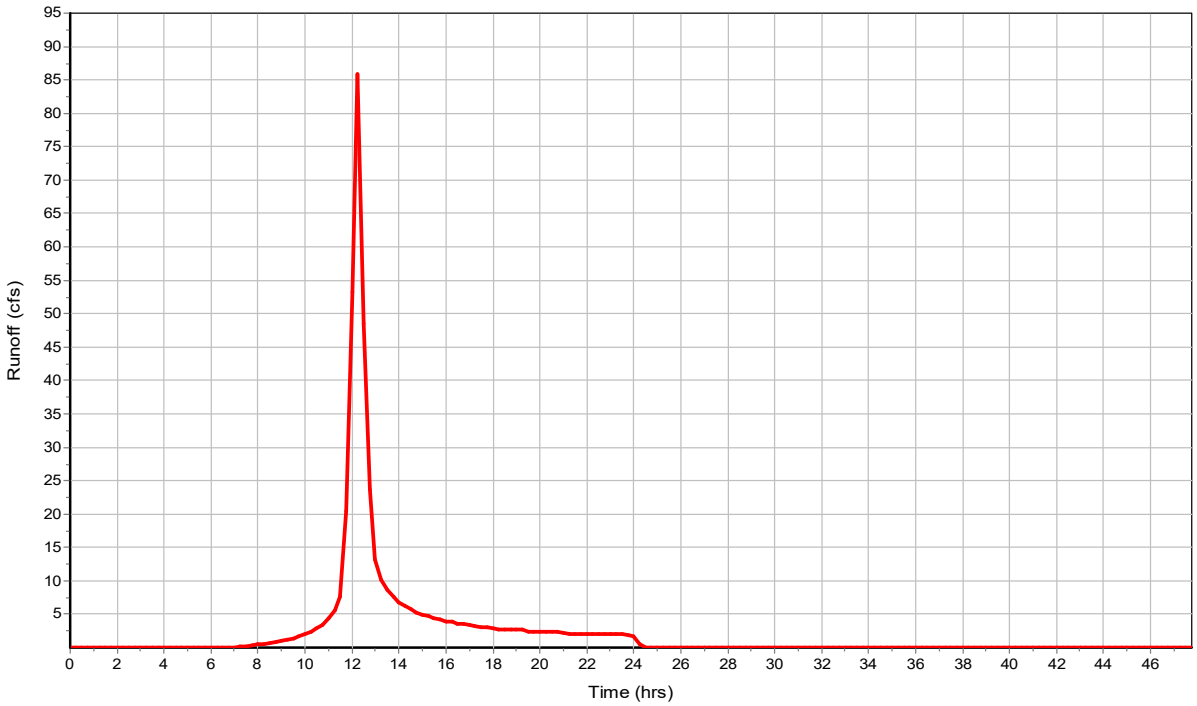
Total Rainfall (in)	4.1
Total Runoff (in)	2.46
Peak Runoff (cfs)	99.4
Weighted Curve Number	84
Time of Concentration (days hh:mm:ss)	0 00:17:30

Subbasin : CO

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : K

Input Data

Area (ac)	93.79
Peak Rate Factor	484
Weighted Curve Number	85
Rain Gage ID	1

Composite Curve Number

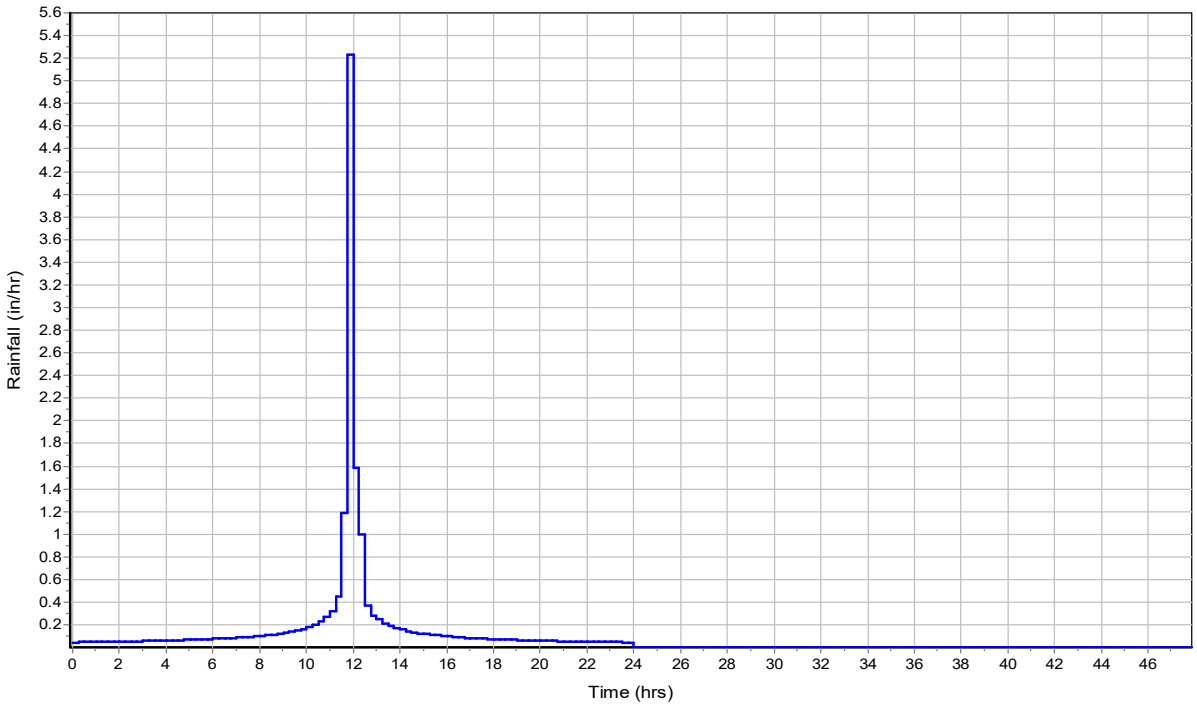
32 Soil/Surface Description	Area (acres)	Soil Group	Curve Number
-	93.79	-	85
Composite Area & Weighted CN	93.79		85

Subbasin Runoff Results

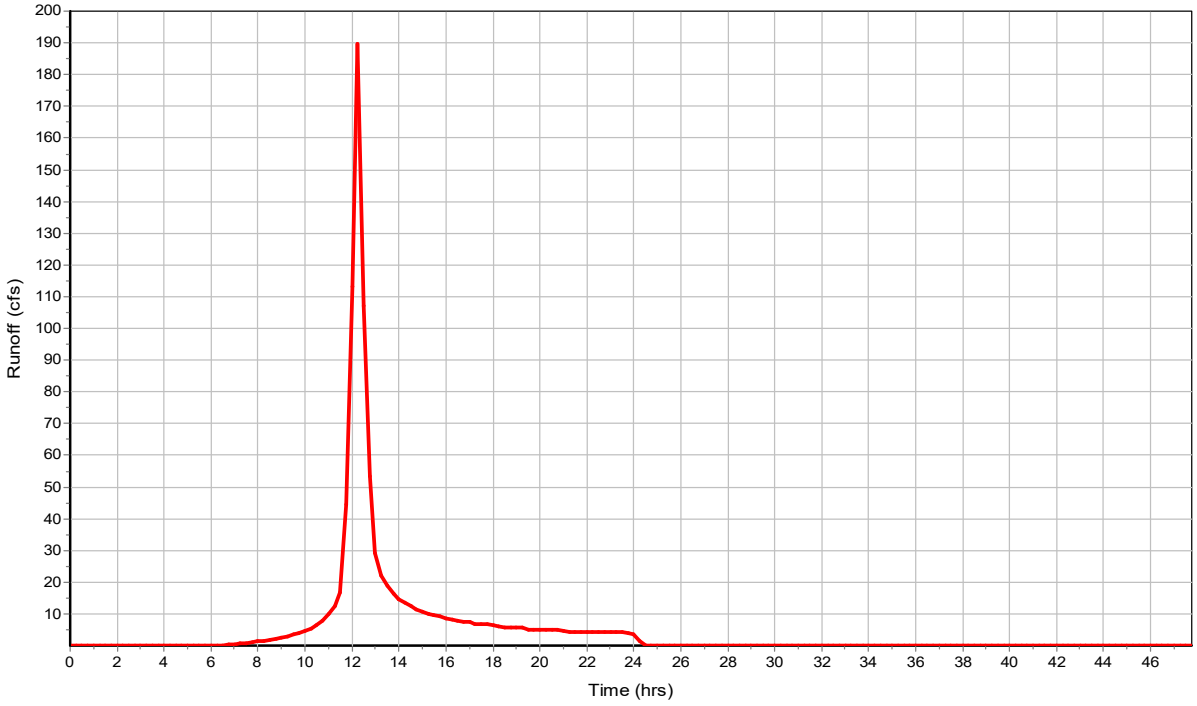
Total Rainfall (in)	4.1
Total Runoff (in)	2.55
Peak Runoff (cfs)	213.9
Weighted Curve Number	85
Time of Concentration (days hh:mm:ss)	0 00:18:12

Subbasin : K

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : RU

Input Data

Area (ac) 7.74
Peak Rate Factor 484
Weighted Curve Number 87
Rain Gage ID 1

Composite Curve Number

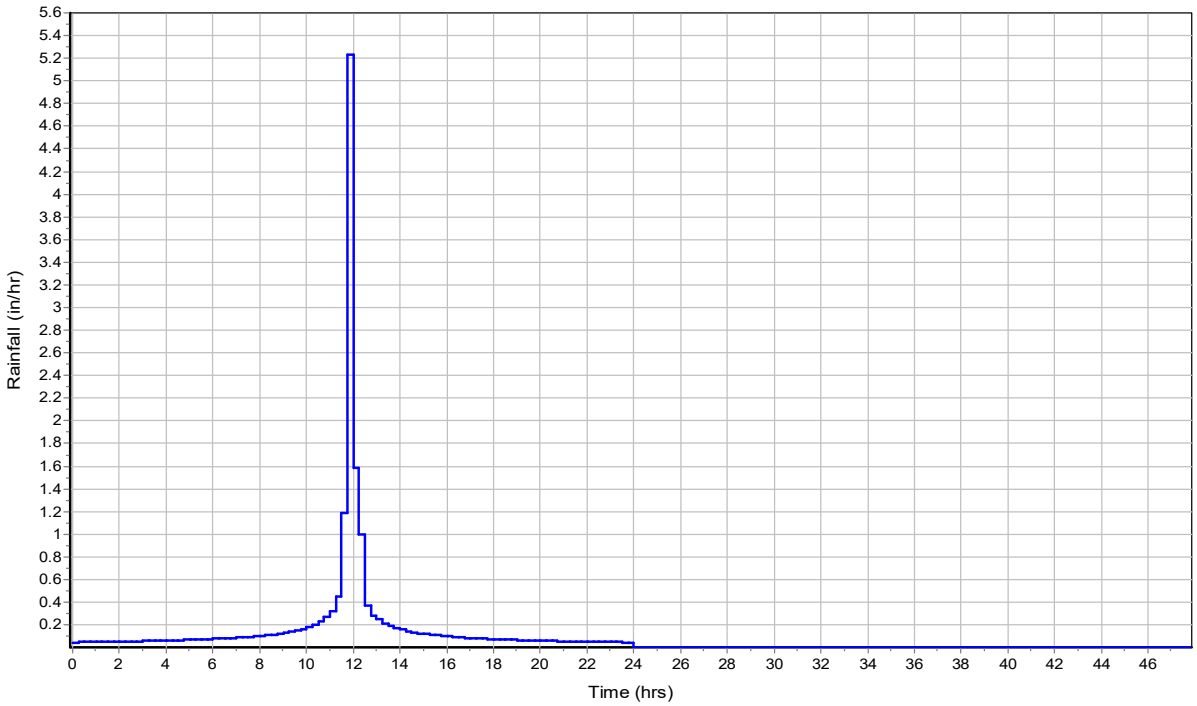
32 Soil/Surface Description	Area (acres)	Soil Group	Curve Number
-	7.74	-	87
Composite Area & Weighted CN	7.74		87

Subbasin Runoff Results

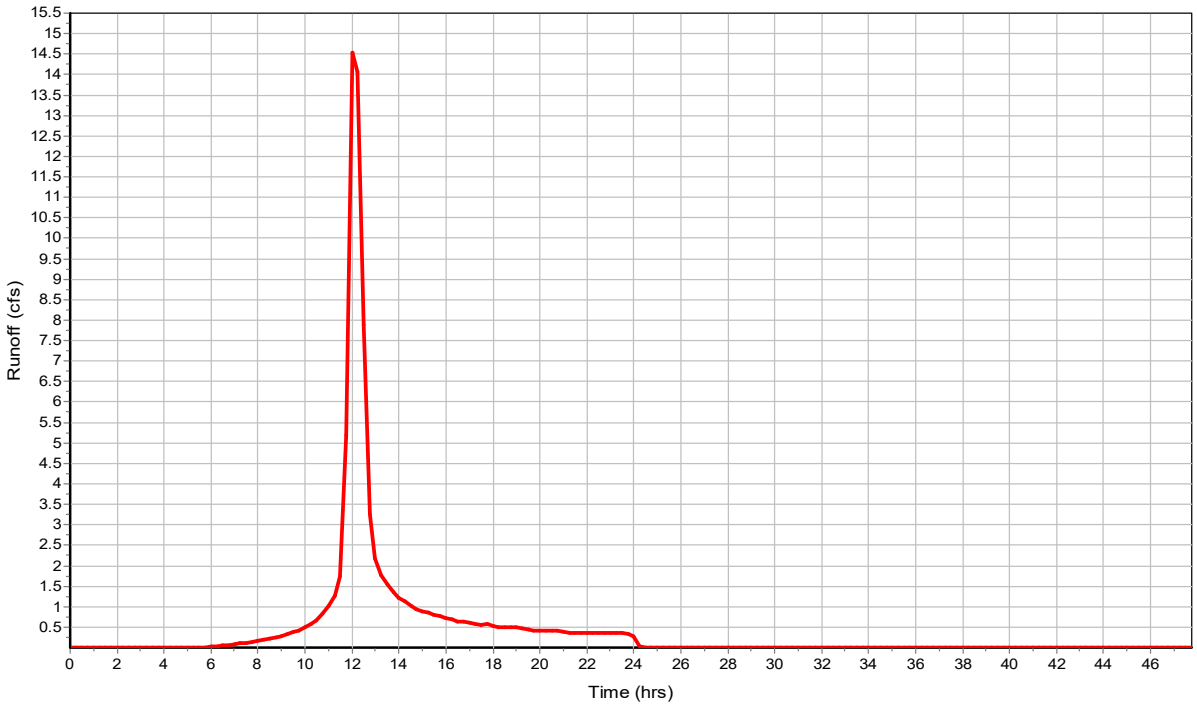
Total Rainfall (in) 4.1
Total Runoff (in) 2.73
Peak Runoff (cfs) 22.05
Weighted Curve Number 87
Time of Concentration (days hh:mm:ss) 0 00:12:24

Subbasin : RU

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : SH

Input Data

Area (ac)	69.35
Peak Rate Factor	484
Weighted Curve Number	86
Rain Gage ID	1

Composite Curve Number

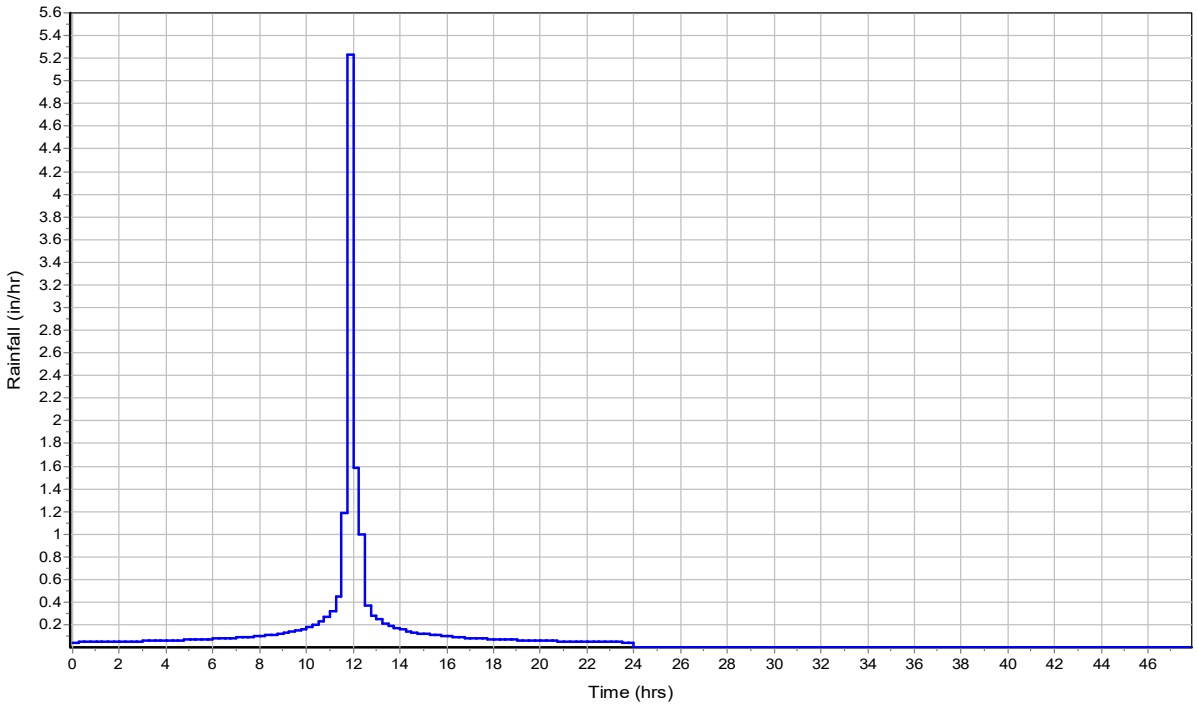
32 Soil/Surface Description	Area (acres)	Soil Group	Curve Number
-	69.35	-	86
Composite Area & Weighted CN	69.35		86

Subbasin Runoff Results

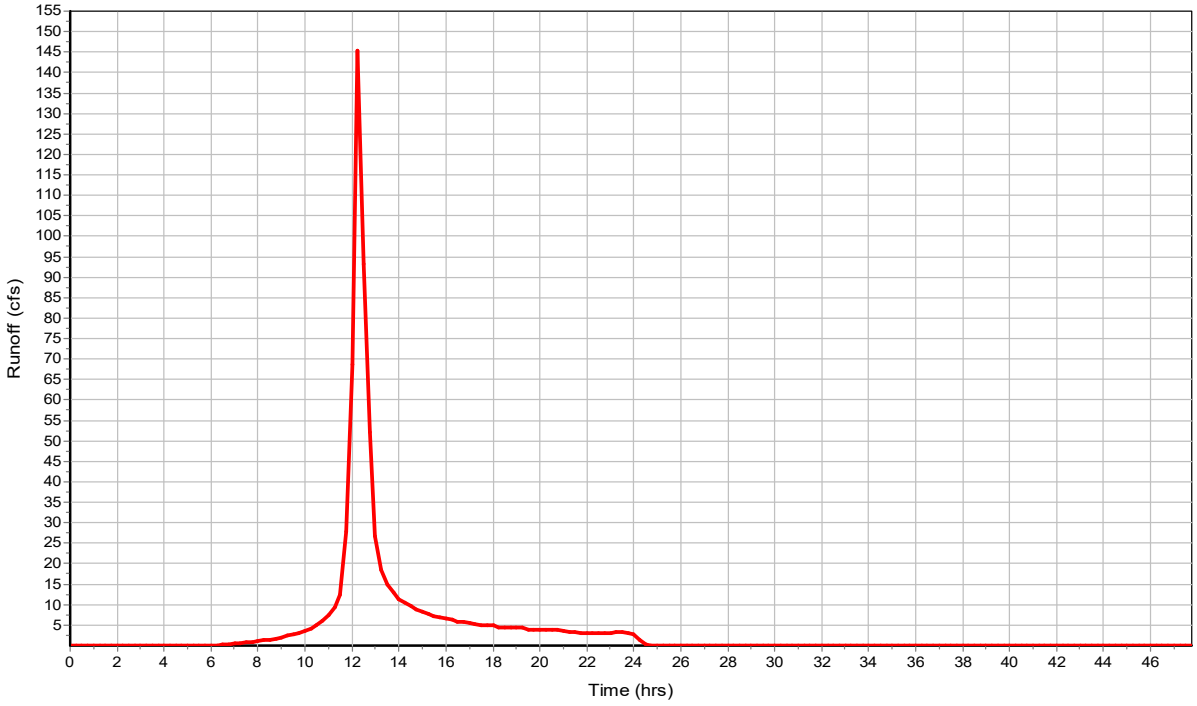
Total Rainfall (in)	4.1
Total Runoff (in)	2.64
Peak Runoff (cfs)	146.23
Weighted Curve Number	86
Time of Concentration (days hh:mm:ss)	0 00:23:30

Subbasin : SH

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : UG1

Input Data

Area (ac) 3.05
Peak Rate Factor 484
Weighted Curve Number 93
Rain Gage ID 1

Composite Curve Number

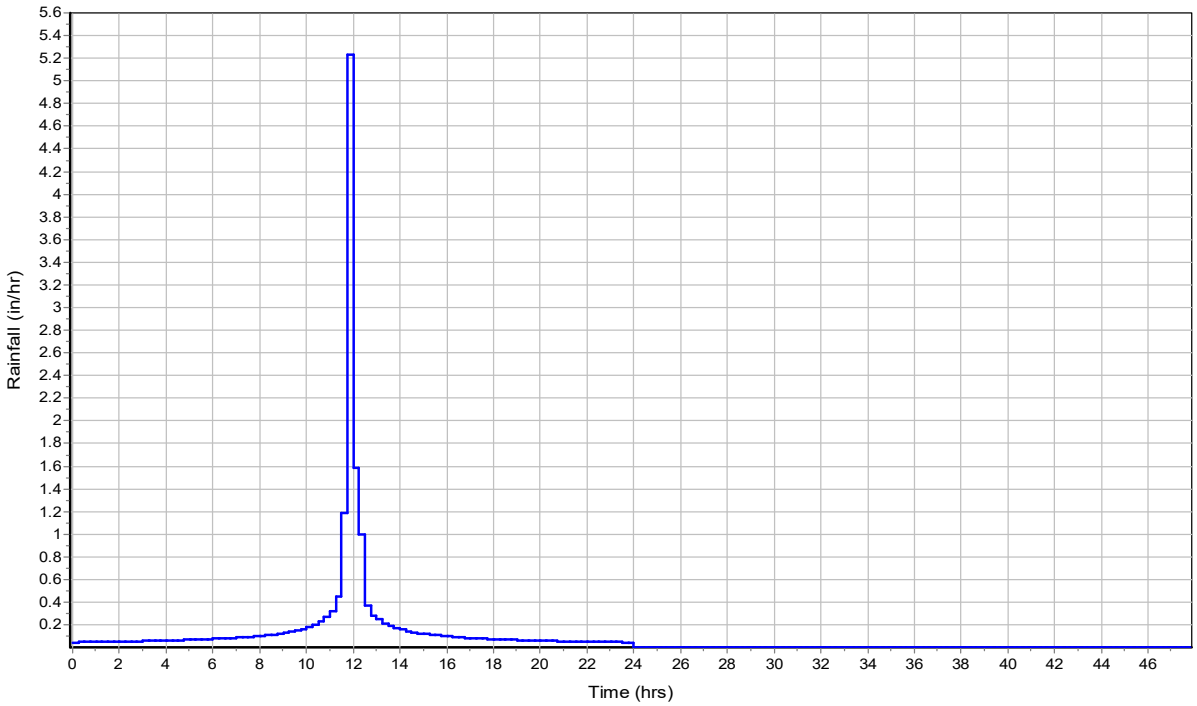
32 Soil/Surface Description	Area (acres)	Soil Group	Curve Number
-	3.05	-	93
Composite Area & Weighted CN	3.05		93

Subbasin Runoff Results

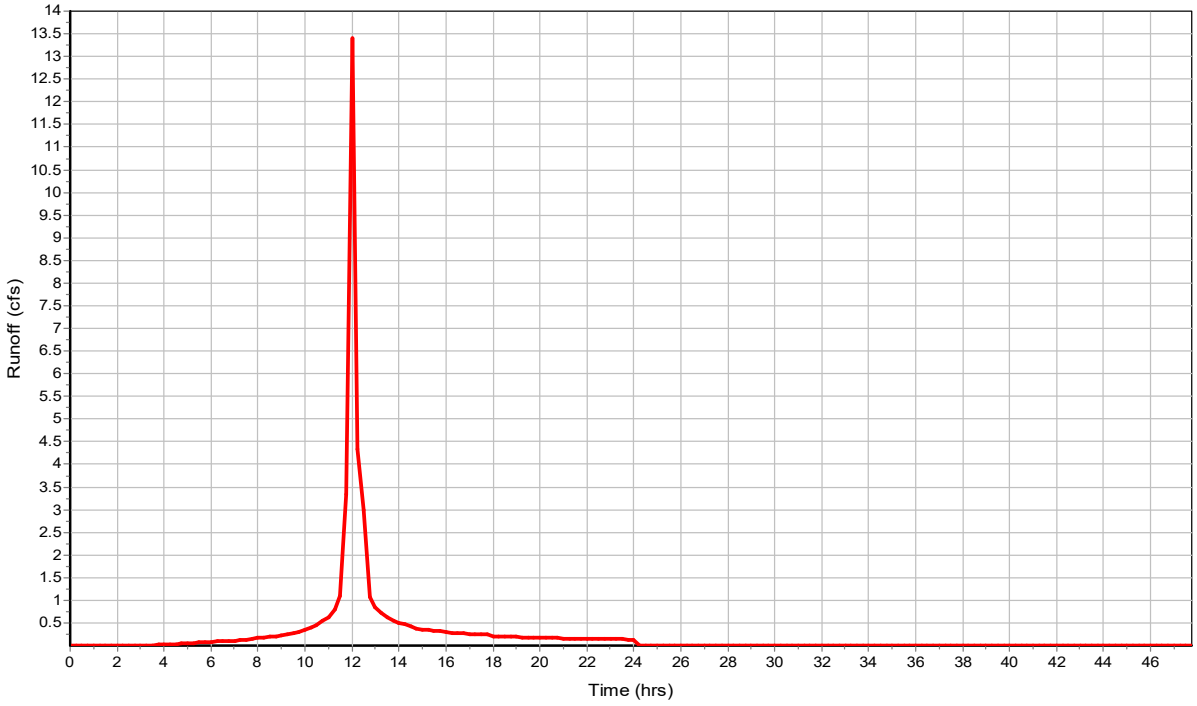
Total Rainfall (in) 4.1
Total Runoff (in) 3.32
Peak Runoff (cfs) 13.71
Weighted Curve Number 93
Time of Concentration (days hh:mm:ss) 0 00:05:00

Subbasin : UG1

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : UG2

Input Data

Area (ac) 11.65
Peak Rate Factor 484
Weighted Curve Number 86
Rain Gage ID 1

Composite Curve Number

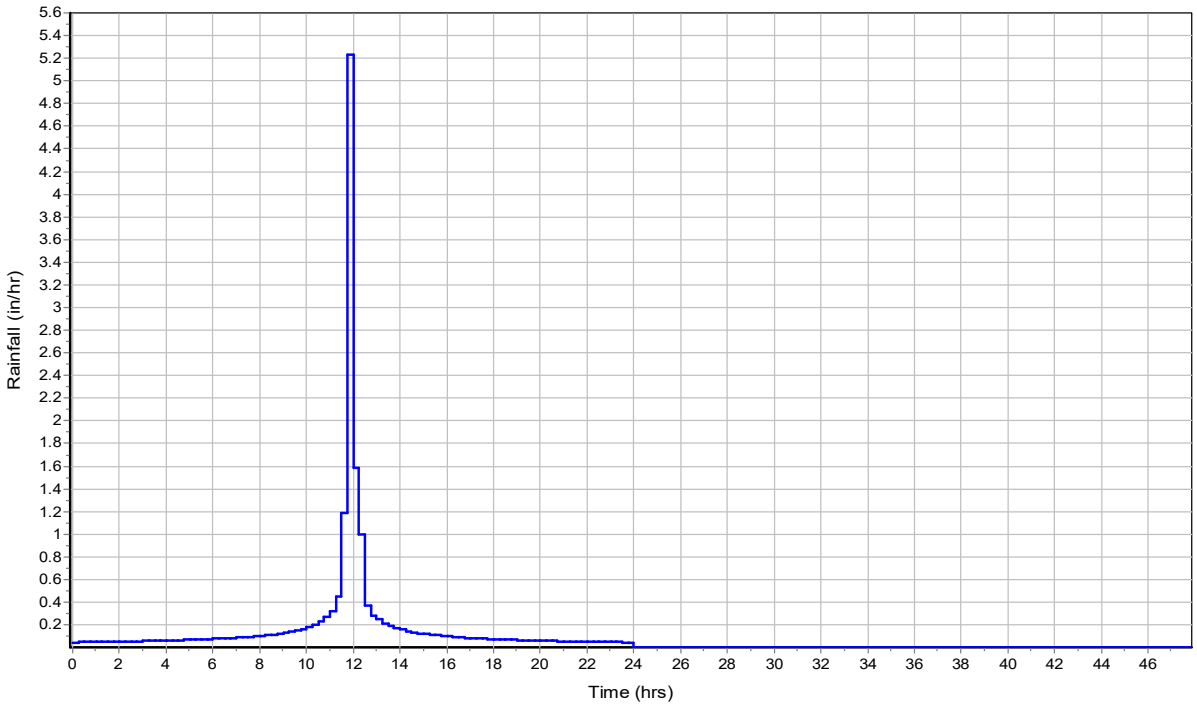
32 Soil/Surface Description	Area (acres)	Soil Group	Curve Number
-	11.65	-	86
Composite Area & Weighted CN	11.65		86

Subbasin Runoff Results

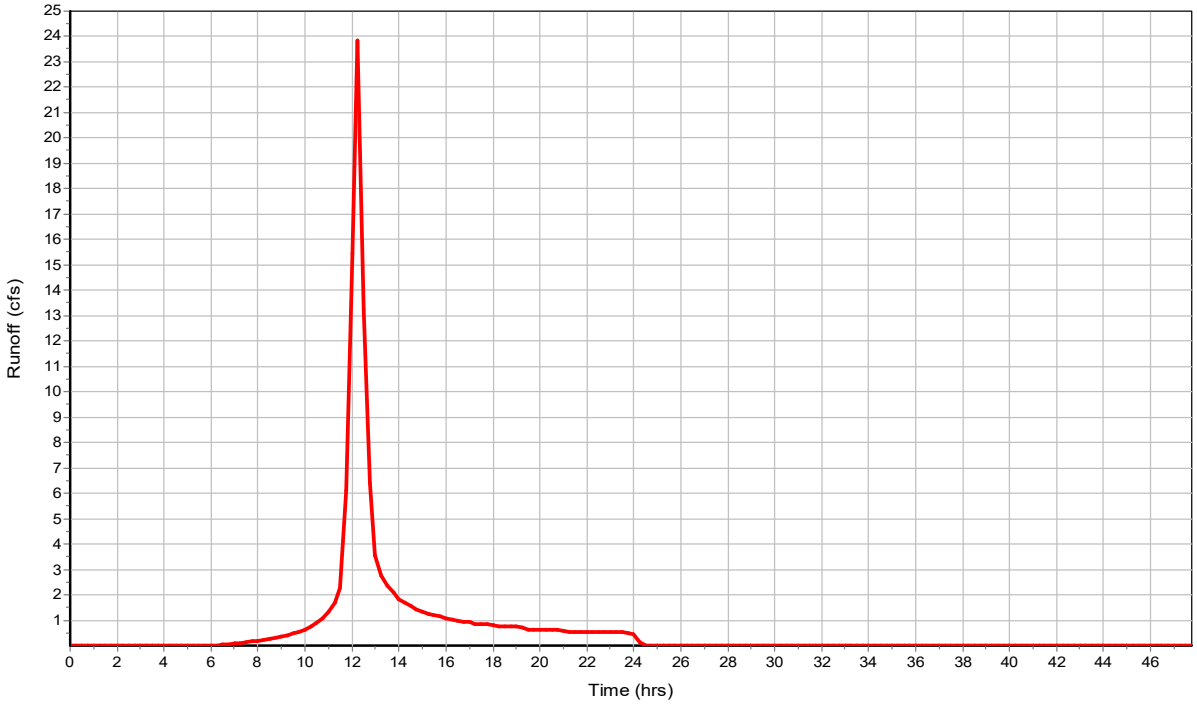
Total Rainfall (in) 4.1
Total Runoff (in) 2.64
Peak Runoff (cfs) 28.13
Weighted Curve Number 86
Time of Concentration (days hh:mm:ss) 0 00:17:12

Subbasin : UG2

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : US1

Input Data

Area (ac)	244.78
Peak Rate Factor	484
Weighted Curve Number	82
Rain Gage ID	1

Composite Curve Number

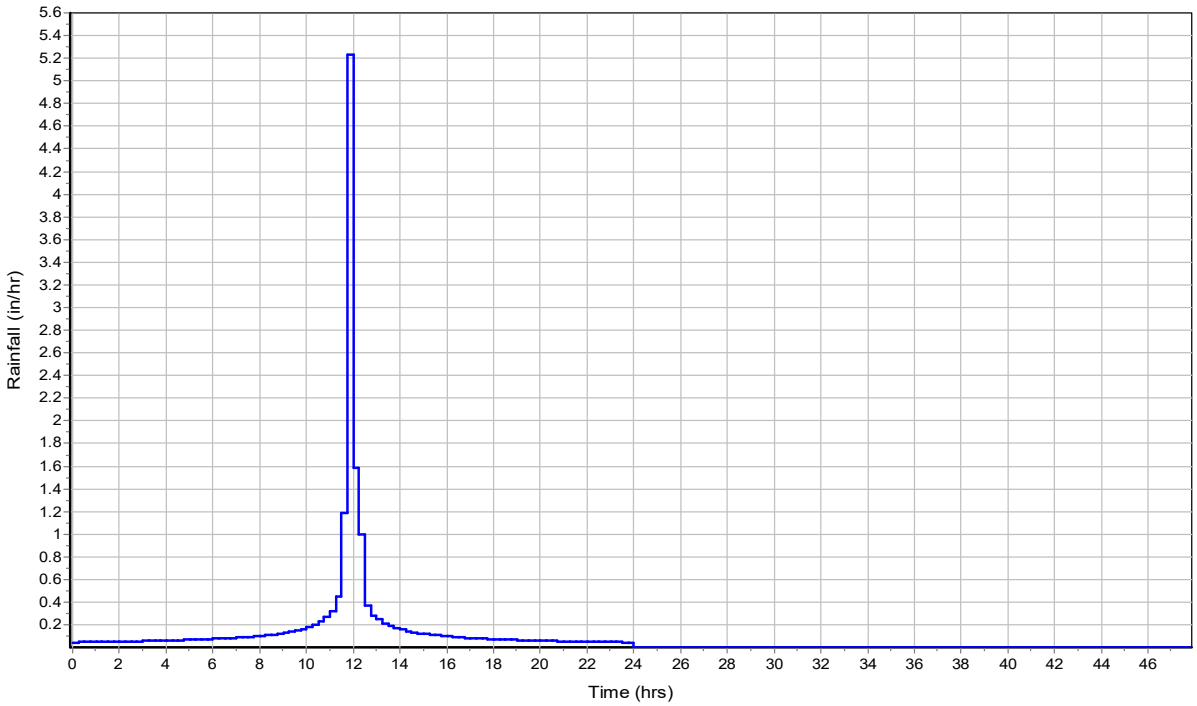
32 Soil/Surface Description	Area (acres)	Soil Group	Curve Number
-	244.78	-	82
Composite Area & Weighted CN	244.78		82

Subbasin Runoff Results

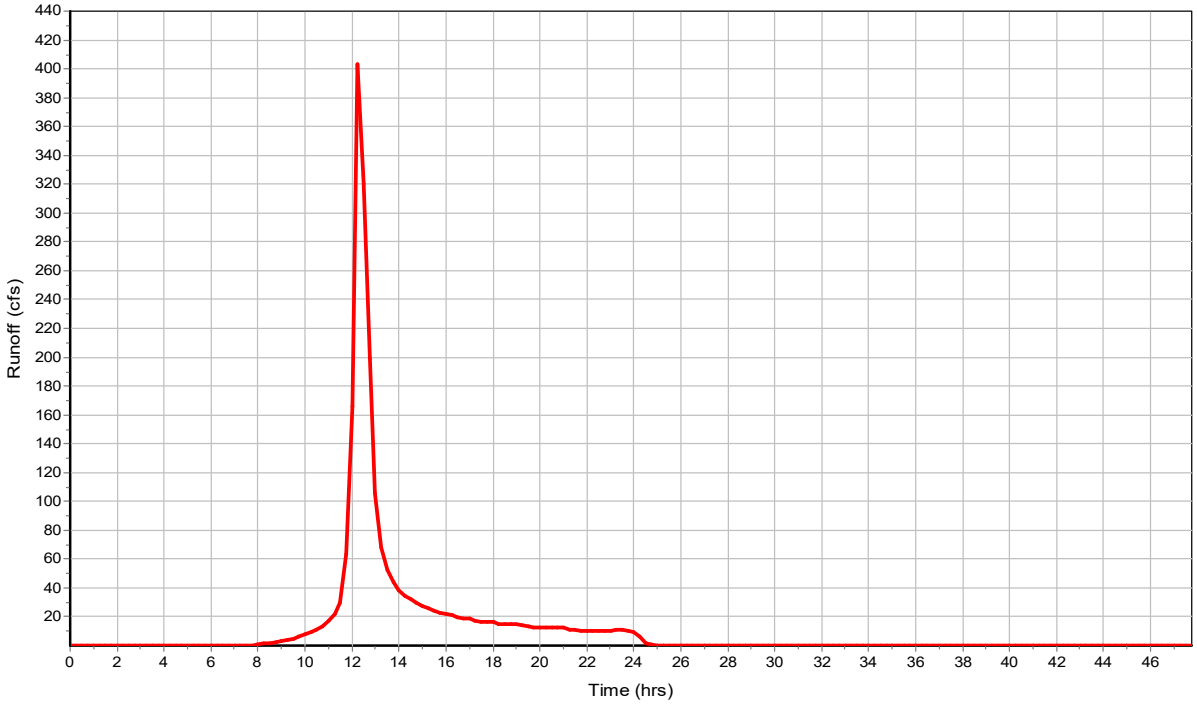
Total Rainfall (in)	4.1
Total Runoff (in)	2.29
Peak Runoff (cfs)	409.09
Weighted Curve Number	82
Time of Concentration (days hh:mm:ss)	0 00:28:36

Subbasin : US1

Rainfall Intensity Graph



Runoff Hydrograph



Junction Input

SN	Element ID	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Ground/Rim (Max) Offset (ft)	Initial Water Elevation (ft)	Initial Water Depth (ft)	Surcharge Elevation (ft)	Surcharge Depth (ft)	Ponded Area (ft^2)	Minimum Pipe Cover (in)
1	1	2062.60	2068.60	6.00	2062.60	0.00	2068.60	0.00	0.00	
2	2	2061.70	2066.30	4.60	2061.70	0.00	2066.30	0.00	0.00	
3	3	2060.10	2065.70	5.60	2060.10	0.00	2065.70	0.00	0.00	
4	4	2057.57	2062.00	4.43	2057.57	0.00	2062.00	0.00	0.00	
5	5	2054.00	2060.00	6.00	2054.00	0.00	2060.00	0.00	0.00	
6	6	2048.88	2053.88	5.00	2048.88	0.00	2053.88	0.00	0.00	
7	7	2048.60	2053.60	5.00	2048.60	0.00	2053.60	0.00	0.00	
8	8	2045.83	2050.83	5.00	2045.83	0.00	2050.83	0.00	0.00	
9	9	2044.80	2049.80	5.00	2044.80	0.00	2049.80	0.00	0.00	
10	11	2092.00	2098.00	6.00	2092.00	0.00	2098.00	0.00	0.00	
11	12	2133.50	2139.50	6.00	2133.50	0.00	2139.50	0.00	0.00	
12	13	2116.51	2125.00	8.49	2116.51	0.00	2125.00	0.00	0.00	
13	14	2154.50	2154.50	0.00	2154.50	0.00	2154.50	0.00	0.00	
14	15	2134.00	2142.00	8.00	2134.00	0.00	2142.00	0.00	0.00	
15	16	2044.25	2044.25	0.00	2044.25	0.00	2044.25	0.00	0.00	
16	17	2050.75	2050.75	0.00	2050.75	0.00	2050.75	0.00	0.00	
17	18	2043.83	2047.83	4.00	2043.83	0.00	2047.83	0.00	0.00	

Junction Results

SN	Element ID	Peak Inflow (cfs)	Peak Lateral Inflow (cfs)	Max HGL Elevation Attained (ft)	Max HGL Depth Attained (ft)	Max Surcharge Depth Attained (ft)	Min Freeboard Attained (ft)	Average HGL Elevation Attained (ft)	Average HGL Depth Attained (ft)	Time of Max HGL Occurrence (days hh:mm)	Time of Peak Flooding Occurrence (days hh:mm)	Total Flooded Volume (ac-in)	Total Time Flooded (min)
1	1	520.56	402.87	2067.94	5.34	0.00	5.66	2063.08	0.48	0 12:38	0 00:00	0.00	0.00
2	2	519.40	0.00	2067.78	6.08	0.00	4.92	2061.93	0.23	0 12:39	0 00:00	0.00	0.00
3	3	519.39	0.00	2067.54	7.44	0.00	4.12	2060.48	0.38	0 12:39	0 00:00	0.00	0.00
4	4	519.39	0.00	2062.43	4.86	0.00	6.70	2058.02	0.45	0 12:38	0 00:00	0.00	0.00
5	5	681.97	189.58	2058.49	4.49	0.00	6.51	2054.29	0.29	0 12:32	0 00:00	0.00	0.00
6	6	681.99	0.00	2054.50	5.62	0.00	5.38	2049.27	0.39	0 12:33	0 00:00	0.00	0.00
7	7	700.54	14.83	2053.23	4.63	0.00	5.37	2048.98	0.38	0 12:33	0 00:00	0.00	0.00
8	8	713.86	0.00	2049.49	3.66	0.00	6.34	2045.99	0.16	0 12:33	0 00:00	0.00	0.00
9	9	722.68	23.78	2048.76	3.96	0.00	6.04	2045.10	0.30	0 12:34	0 00:00	0.00	0.00
10	11	183.67	0.00	2094.53	2.53	0.00	5.47	2092.24	0.24	0 12:44	0 00:00	0.00	0.00
11	12	89.68	0.00	2134.82	1.32	0.00	8.18	2133.60	0.10	0 12:36	0 00:00	0.00	0.00
12	13	103.18	0.00	2118.36	1.85	0.00	6.64	2116.69	0.18	0 12:42	0 00:00	0.00	0.00
13	14	83.76	0.00	2155.51	1.01	0.00	3.26	2154.58	0.08	0 12:30	0 00:00	0.00	0.00
14	15	72.31	0.00	2135.87	1.87	0.00	10.63	2134.18	0.18	0 12:34	0 00:00	0.00	0.00
15	16	10.80	0.00	2047.21	2.96	0.00	3.59	2044.41	0.16	0 12:33	0 00:00	0.00	0.00
16	17	4.21	0.00	2053.28	2.53	0.00	3.37	2050.85	0.10	0 12:32	0 00:00	0.00	0.00
17	18	729.50	0.00	2047.17	3.34	0.00	6.66	2044.08	0.25	0 12:32	0 00:00	0.00	0.00

Channel Input

SN	Element ID	Length (ft)	Inlet Invert Elevation (ft)	Inlet Invert Offset (ft)	Outlet Invert Elevation (ft)	Outlet Invert Offset (ft)	Total Drop (ft)	Average Slope (%)	Shape	Height (ft)	Width (ft)	Manning's Roughness	Entrance Losses	Exit/Bend Losses	Additional Losses	Initial Flow (cfs)	Flap Gate
1	1	131.00	2062.60	0.00	2061.70	0.00	0.90	0.6900	Trapezoidal	6.000	27.000	0.0240	0.0000	0.0000	0.0000	0.00	No
2	29	154.40	2043.83	0.00	2041.91	0.00	1.92	1.2400	Trapezoidal	5.000	24.000	0.0240	0.0000	0.0000	0.0000	0.00	No
3	ED	440.35	2048.60	0.00	2045.83	0.00	2.77	0.6300	Trapezoidal	5.000	20.000	0.0240	0.0000	0.0000	0.0000	0.00	No
4	KB	392.20	2054.00	0.00	2048.88	0.00	5.12	1.3100	Trapezoidal	5.000	20.000	0.0240	0.0000	0.0000	1.0000	0.00	No
5	MOR	1020.00	2116.51	0.00	2092.00	0.00	24.51	2.4000	Trapezoidal	8.000	34.000	0.0240	0.0000	0.0000	0.0000	0.00	No
6	PF	78.10	2044.80	0.00	2043.83	0.00	0.97	1.2400	Trapezoidal	5.000	20.000	0.0240	0.0000	0.0000	0.0000	0.00	No
7	STK	2424.00	2092.00	0.00	2062.60	0.00	29.40	1.2100	Trapezoidal	5.000	23.000	0.0240	0.0000	0.0000	0.0000	0.00	No
8	USR	1864.00	2133.50	0.00	2092.00	0.00	41.50	2.2300	Trapezoidal	8.000	37.000	0.0240	0.0000	0.0000	0.0000	0.00	No

Channel Results

SN	Element ID	Peak Flow (cfs)	Time of Peak Flow Occurrence (days hh:mm)	Design Flow Capacity (cfs)	Peak Flow/ Design Flow Ratio	Peak Flow Velocity (ft/sec)	Travel Time (min)	Peak Flow Depth (ft)	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged (min)	Froude Number	Reported Condition
1	1	519.40	0 12:39	964.35	0.54	12.13	0.18	5.64	0.94	0.00		
2	29	730.32	0 12:34	1476.05	0.49	12.61	0.20	3.19	0.67	0.00		
3	ED	713.86	0 12:33	784.15	0.91	12.24	0.60	3.93	0.83	0.00		
4	KB	681.99	0 12:32	1129.64	0.60	9.75	0.67	4.68	0.95	0.00		
5	MOR	103.05	0 12:42	3372.60	0.03	7.83	2.17	2.19	0.27	0.00		
6	PF	722.37	0 12:34	1101.84	0.66	14.51	0.09	3.50	0.73	0.00		
7	STK	176.33	0 12:44	830.10	0.21	4.64	8.71	3.77	0.75	0.00		
8	USR	87.89	0 12:36	3988.84	0.02	5.57	5.58	1.86	0.24	0.00		

Pipe Input

SN	Element ID	Length (ft)	Inlet Invert Elevation (ft)	Inlet Invert Offset (ft)	Outlet Invert Elevation (ft)	Outlet Invert Offset (ft)	Total Drop (ft)	Average Slope (%)	Pipe Shape	Pipe Diameter or Height (in)	Pipe Width (in)	Manning's Roughness	Entrance Losses	Exit/Bend Losses	Additional Losses	Initial Flow (cfs)	Flap Gate	No. of Barrels
1	2	182.00	2061.70	0.00	2060.10	0.00	1.60	0.8800	Rectangular									
2	3	181.00	2060.10	0.00	2057.57	0.00	2.53	1.4000	Arch									
3	4	210.00	2057.57	0.00	2054.00	0.00	3.57	1.7000	Arch									
4	6	50.00	2048.88	0.00	2048.60	0.00	0.28	0.5600	Rectangular									
5	8	50.00	2045.83	0.00	2044.80	0.00	1.03	2.0600	Rectangular									
6	9	50.00	2154.50	0.00	2137.00	0.00	17.50	35.0000	CIRCULAR									
7	15	82.00	2134.00	0.00	2133.50	0.00	0.50	0.6100	CIRCULAR									
8	19	75.00	2117.00	0.00	2116.51	0.00	0.49	0.6500	CIRCULAR									
9	21	35.10	2044.25	0.00	2043.83	0.00	0.42	1.2000	CIRCULAR									
10	22	42.40	2050.75	0.00	2048.60	0.00	2.15	5.0700	CIRCULAR									

Pipe Results

SN	Element ID	Peak Flow (cfs)	Time of Peak Flow Occurrence (days hh:mm)	Design Flow Capacity (cfs)	Peak Flow/ Design Flow Ratio	Peak Flow Velocity (ft/sec)	Travel Time (min)	Peak Flow Depth (ft)	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged (min)	Froude Number	Reported Condition
1	2	292.18	0 12:23	896.81	0.33	6.48	0.47	4.00	1.00	57.00		SURCHARGED
2	3	318.95	0 12:39	269.80	1.18	9.20	0.33	3.67	1.00	71.00		SURCHARGED
3	4	165.04	0 12:58	148.77	1.11	11.22	0.31	3.67	1.00	25.00		SURCHARGED
4	6	483.28	0 12:25	291.43	1.66	10.37	0.08	4.00	1.00	25.00		SURCHARGED
5	8	703.23	0 12:33	1979.07	0.36	9.24	0.09	3.63	0.85	0.00		Calculated
6	9	83.76	0 12:30	242.66	0.35	22.73	0.04	1.75	0.70	0.00		Calculated
7	15	72.31	0 12:34	199.62	0.36	15.26	0.09	1.49	0.35	0.00		Calculated
8	19	87.05	0 12:42	29.20	2.98	14.29	0.09	2.42	0.81	0.00		> CAPACITY
9	21	11.33	0 12:51	53.03	0.21	3.56	0.16	2.50	1.00	25.00		SURCHARGED
10	22	5.07	0 12:16	27.95	0.18	5.02	0.14	1.50	1.00	34.00		SURCHARGED

Storage Nodes

Storage Node : CVP

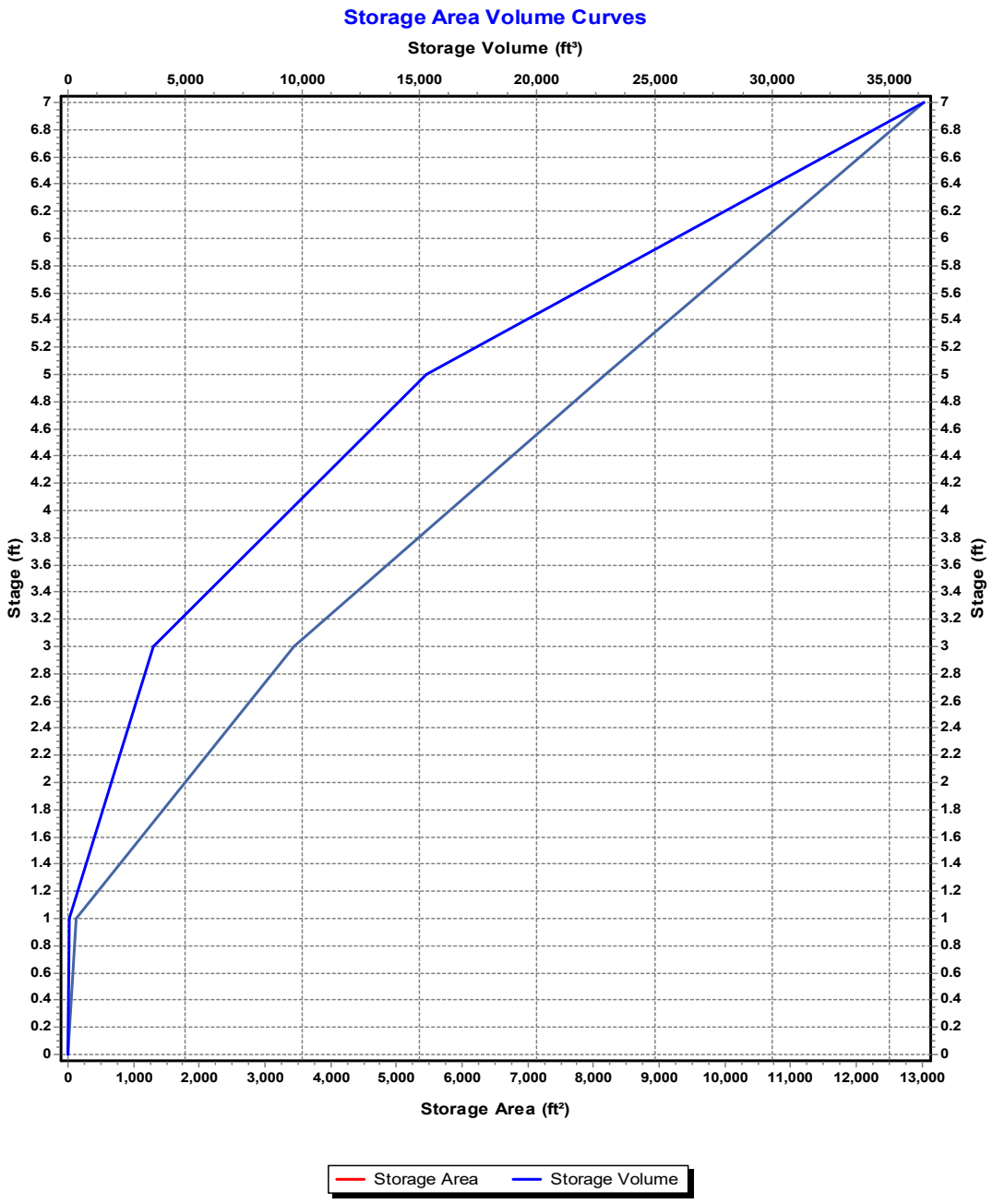
Input Data

Invert Elevation (ft)	2155.00
Max (Rim) Elevation (ft)	2162.00
Max (Rim) Offset (ft)	7.00
Initial Water Elevation (ft)	2155.00
Initial Water Depth (ft)	0.00
Ponded Area (ft^2)	7.00
Evaporation Loss	0.00

Storage Area Volume Curves

Storage Curve : CVP1

Stage (ft)	Storage Area (ft^2)	Storage Volume (ft^3)
0	0	0
1	131	65.5
3	3441	3637.5
5	8189	15267.5
7	13024	36480.5


Storage Area Volume Curves
Storage Volume (ft³)
0
5,000
10,000
15,000
20,000
25,000
30,000
35,000
Stage (ft)
0
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
1.8
2
2.2
2.4
2.6
2.8
3
3.2
3.4
3.6
3.8
4
4.2
4.4
4.6
4.8
5
5.2
5.4
5.6
5.8
6
6.2
6.4
6.6
6.8
7
Storage Area (ft²)
0
1,000
2,000
3,000
4,000
5,000
6,000
7,000
8,000
9,000
10,000
11,000
12,000
13,000
Storage Area
Storage Volume

Storage Node : CVP (continued)

Outflow Weirs

SN	Element ID	Weir Type	Flap Gate	Crest Elevation (ft)	Crest Offset (ft)	Length (ft)	Weir Total Height (ft)	Discharge Coefficient
1	14	Trapezoidal	No	2161.50	6.50	40.00	2.00	3.33

Outflow Orifices

SN	Element ID	Orifice Type	Orifice Shape	Flap Gate	Circular Orifice Diameter (in)	Rectangular Orifice Height (in)	Rectangular Orifice Width (in)	Orifice Invert Elevation (ft)	Orifice Coefficient
1	5	Side	CIRCULAR	No					
2	7	Side	CIRCULAR	No					
3	13	Bottom	Rectangular	No					

Output Summary Results

Peak Inflow (cfs)	85.84
Peak Lateral Inflow (cfs)	85.84
Peak Outflow (cfs)	83.76
Peak Exfiltration Flow Rate (cfm)	0
Max HGL Elevation Attained (ft)	2160.52
Max HGL Depth Attained (ft)	5.52
Average HGL Elevation Attained (ft)	2155.37
Average HGL Depth Attained (ft)	0.37
Time of Max HGL Occurrence (days hh:mm)	0 12:30
Total Exfiltration Volume (1000-ft^3)	0
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0

Storage Node : P1

Input Data

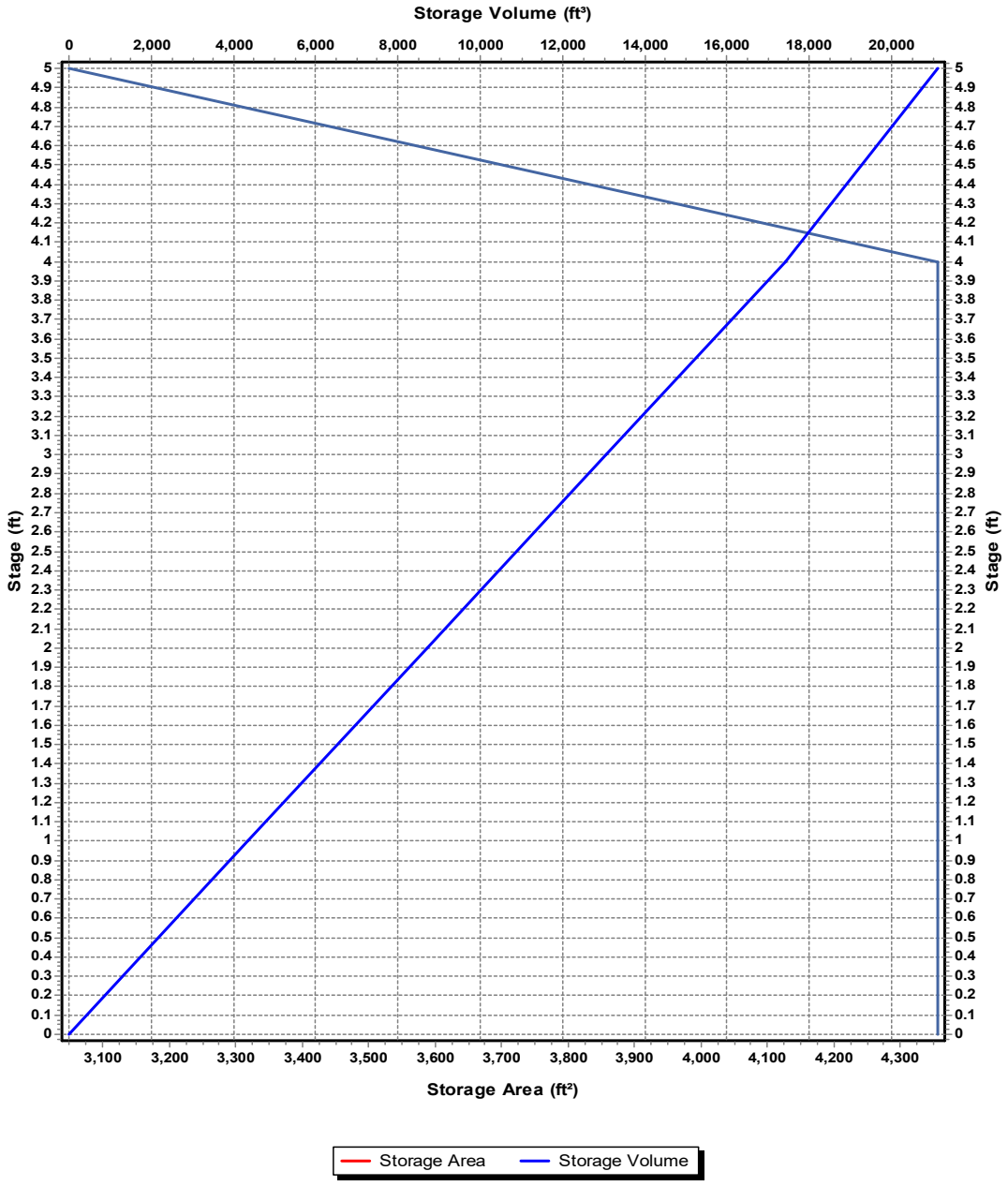
Invert Elevation (ft)	2050.75
Max (Rim) Elevation (ft)	2055.75
Max (Rim) Offset (ft)	5.00
Initial Water Elevation (ft)	2050.75
Initial Water Depth (ft)	0.00
Ponded Area (ft^2)	5.00
Evaporation Loss	0.00

Storage Area Volume Curves

Storage Curve : P1

Stage (ft)	Storage Area (ft^2)	Storage Volume (ft^3)
0	4356	0
1	4356	4356
2	4356	8712
3	4356	13068
4	4356	17424
5	3049	21126.5

Storage Area Volume Curves



Storage Node : P1 (continued)

Outflow Weirs

SN	Element ID	Weir Type	Flap Gate	Crest Elevation (ft)	Crest Offset (ft)	Length (ft)	Weir Total Height (ft)	Discharge Coefficient
1	28	Transverse	No	2054.65	3.90	6.00	2.00	3.33

Outflow Orifices

SN	Element ID	Orifice Type	Orifice Shape	Flap Gate	Circular Orifice Diameter (in)	Rectangular Orifice Height (in)	Rectangular Orifice Width (in)	Orifice Invert Elevation (ft)	Orifice Coefficient
1	26	Side	CIRCULAR	No					
2	27	Side	Rectangular	No					

Output Summary Results

Peak Inflow (cfs)	13.4
Peak Lateral Inflow (cfs)	13.4
Peak Outflow (cfs)	4.21
Peak Exfiltration Flow Rate (cfm)	0
Max HGL Elevation Attained (ft)	2054.75
Max HGL Depth Attained (ft)	4
Average HGL Elevation Attained (ft)	2051.39
Average HGL Depth Attained (ft)	0.64
Time of Max HGL Occurrence (days hh:mm)	0 12:33
Total Exfiltration Volume (1000-ft^3)	0
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0

Storage Node : P2

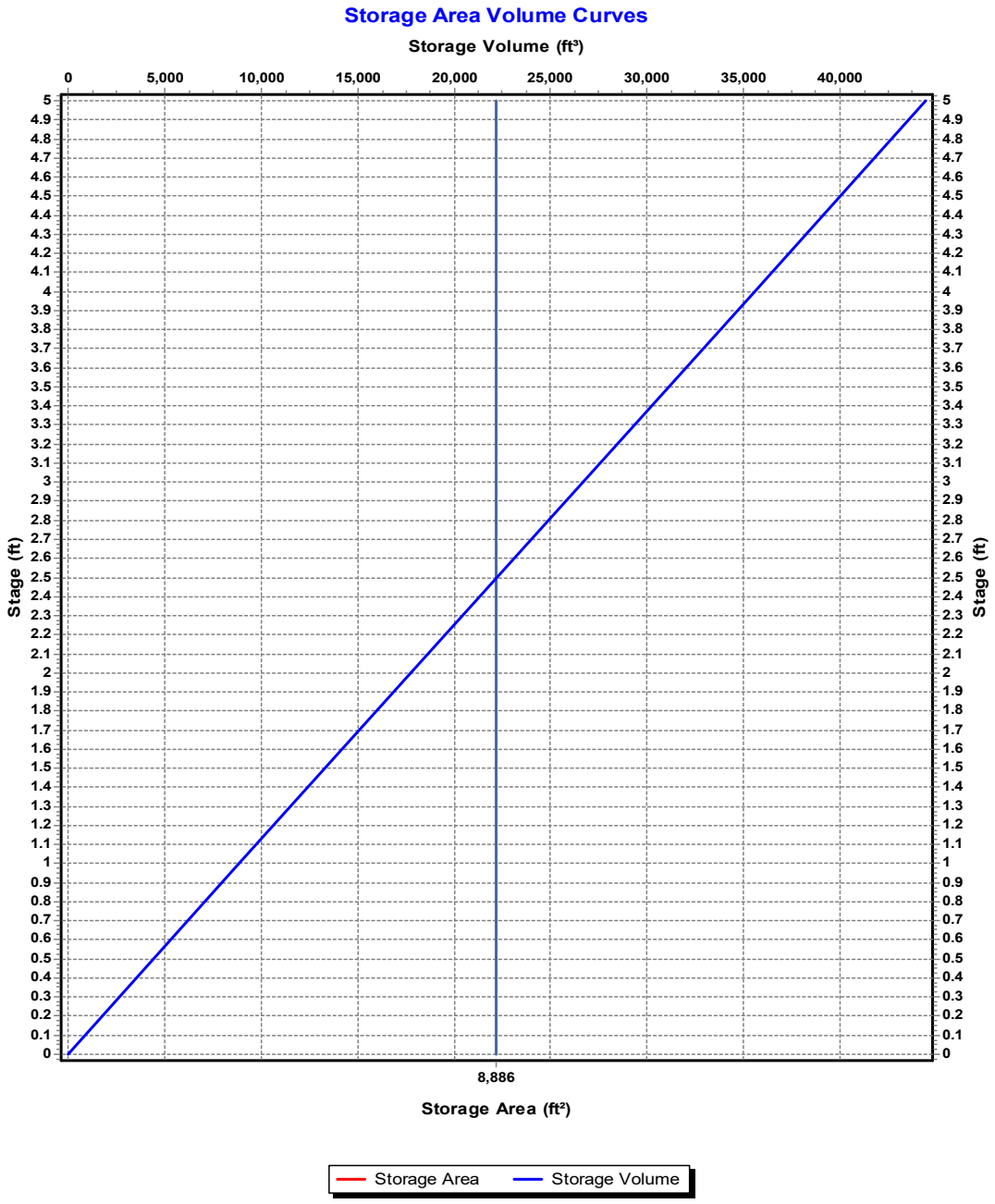
Input Data

Invert Elevation (ft)	2044.25
Max (Rim) Elevation (ft)	2049.25
Max (Rim) Offset (ft)	5.00
Initial Water Elevation (ft)	2044.25
Initial Water Depth (ft)	0.00
Ponded Area (ft^2)	5.00
Evaporation Loss	0.00

Storage Area Volume Curves

Storage Curve : P2

Stage (ft)	Storage Area (ft^2)	Storage Volume (ft^3)
0	8886	0
1	8886	8886
2	8886	17772
3	8886	26658
4	8886	35544
5	8886	44430


Storage Area Volume Curves
Storage Volume (ft³)
0
5,000
10,000
15,000
20,000
25,000
30,000
35,000
40,000
Stage (ft)
Stage (ft)
8,886
Storage Area (ft²)
Storage Area
Storage Volume

Storage Node : P2 (continued)

Outflow Weirs

SN	Element ID	Weir Type	Flap Gate	Crest Elevation (ft)	Crest Offset (ft)	Length (ft)	Weir Total Height (ft)	Discharge Coefficient
1	25	Transverse	No	2048.80	4.55	6.00	2.00	3.33

Outflow Orifices

SN	Element ID	Orifice Type	Orifice Shape	Flap Gate	Circular Orifice Diameter (in)	Rectangular Orifice Height (in)	Rectangular Orifice Width (in)	Orifice Invert Elevation (ft)	Orifice Coefficient
1	23	Side	Rectangular	No					
2	24	Side	Rectangular	No					

Output Summary Results

Peak Inflow (cfs)	23.85
Peak Lateral Inflow (cfs)	23.85
Peak Outflow (cfs)	10.8
Peak Exfiltration Flow Rate (cfm)	0
Max HGL Elevation Attained (ft)	2048.9
Max HGL Depth Attained (ft)	4.65
Average HGL Elevation Attained (ft)	2044.58
Average HGL Depth Attained (ft)	0.33
Time of Max HGL Occurrence (days hh:mm)	0 12:50
Total Exfiltration Volume (1000-ft³)	0
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0

Storage Node : RP

Input Data

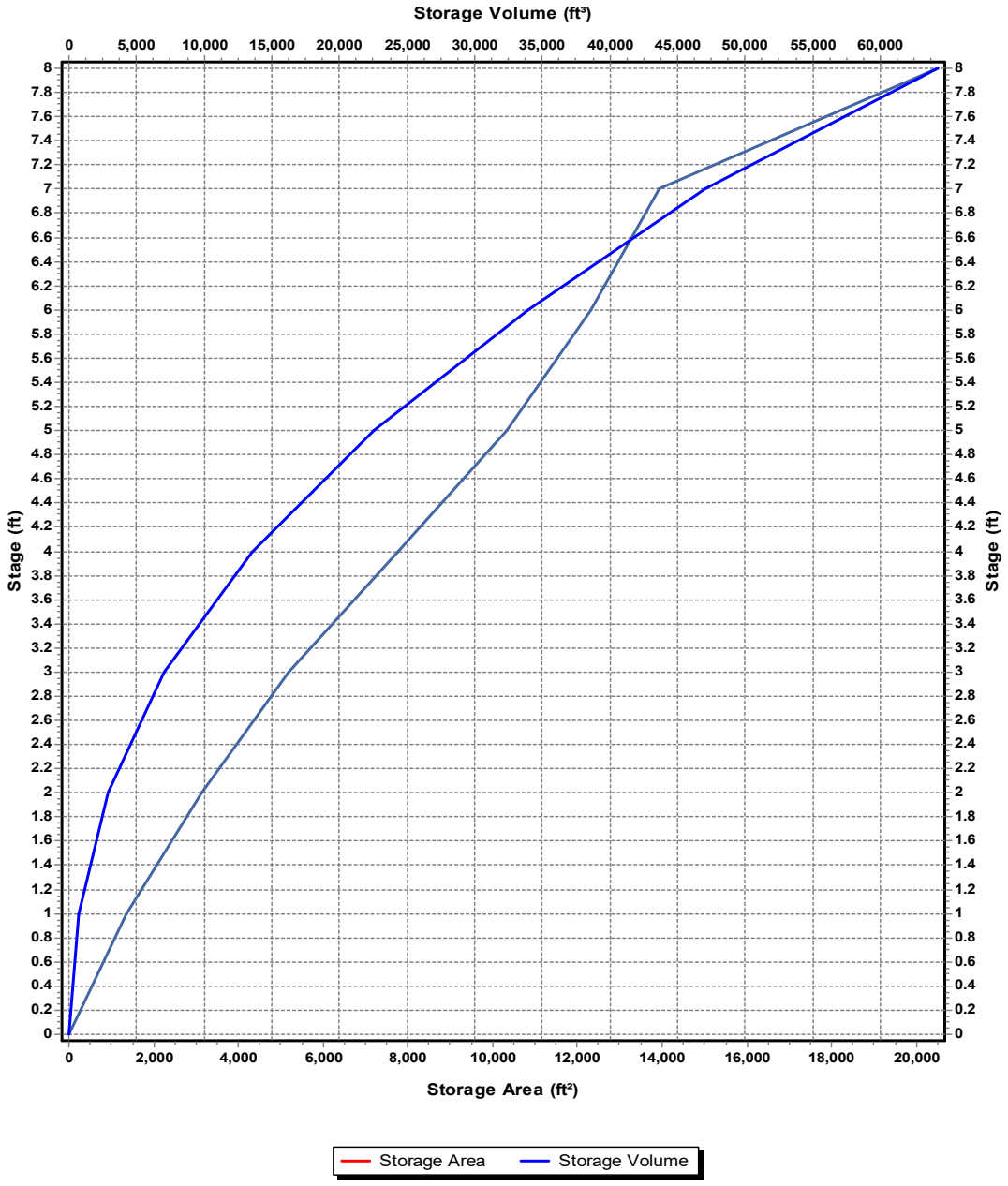
Invert Elevation (ft)	2137.00
Max (Rim) Elevation (ft)	2145.00
Max (Rim) Offset (ft)	8.00
Initial Water Elevation (ft)	2137.00
Initial Water Depth (ft)	0.00
Ponded Area (ft^2)	8.00
Evaporation Loss	0.00

Storage Area Volume Curves

Storage Curve : RP1

Stage (ft)	Storage Area (ft^2)	Storage Volume (ft^3)
0	0	0
1	1366	683
2	3129	2930.5
3	5175	7082.5
4	7760	13550
5	10340	22600
6	12305	33922.5
7	13925	47037.5
8	20503	64251.5

Storage Area Volume Curves



Storage Node : RP (continued)

Outflow Weirs

SN	Element ID	Weir Type	Flap Gate	Crest Elevation (ft)	Crest Offset (ft)	Length (ft)	Weir Total Height (ft)	Discharge Coefficient
1	18	Trapezoidal	No	2144.50	7.50	60.00	2.00	3.33

Outflow Orifices

SN	Element ID	Orifice Type	Orifice Shape	Flap Gate	Circular Orifice Diameter (in)	Rectangular Orifice Height (in)	Rectangular Orifice Width (in)	Orifice Invert Elevation (ft)	Orifice Coefficient
1	16	Side	CIRCULAR	No					
2	17	Side	Rectangular	No					

Output Summary Results

Peak Inflow (cfs)	97.5
Peak Lateral Inflow (cfs)	14.52
Peak Outflow (cfs)	89.68
Peak Exfiltration Flow Rate (cfm)	0
Max HGL Elevation Attained (ft)	2144.7
Max HGL Depth Attained (ft)	7.7
Average HGL Elevation Attained (ft)	2137.53
Average HGL Depth Attained (ft)	0.53
Time of Max HGL Occurrence (days hh:mm)	0 12:34
Total Exfiltration Volume (1000-ft^3)	0
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0

Storage Node : SP

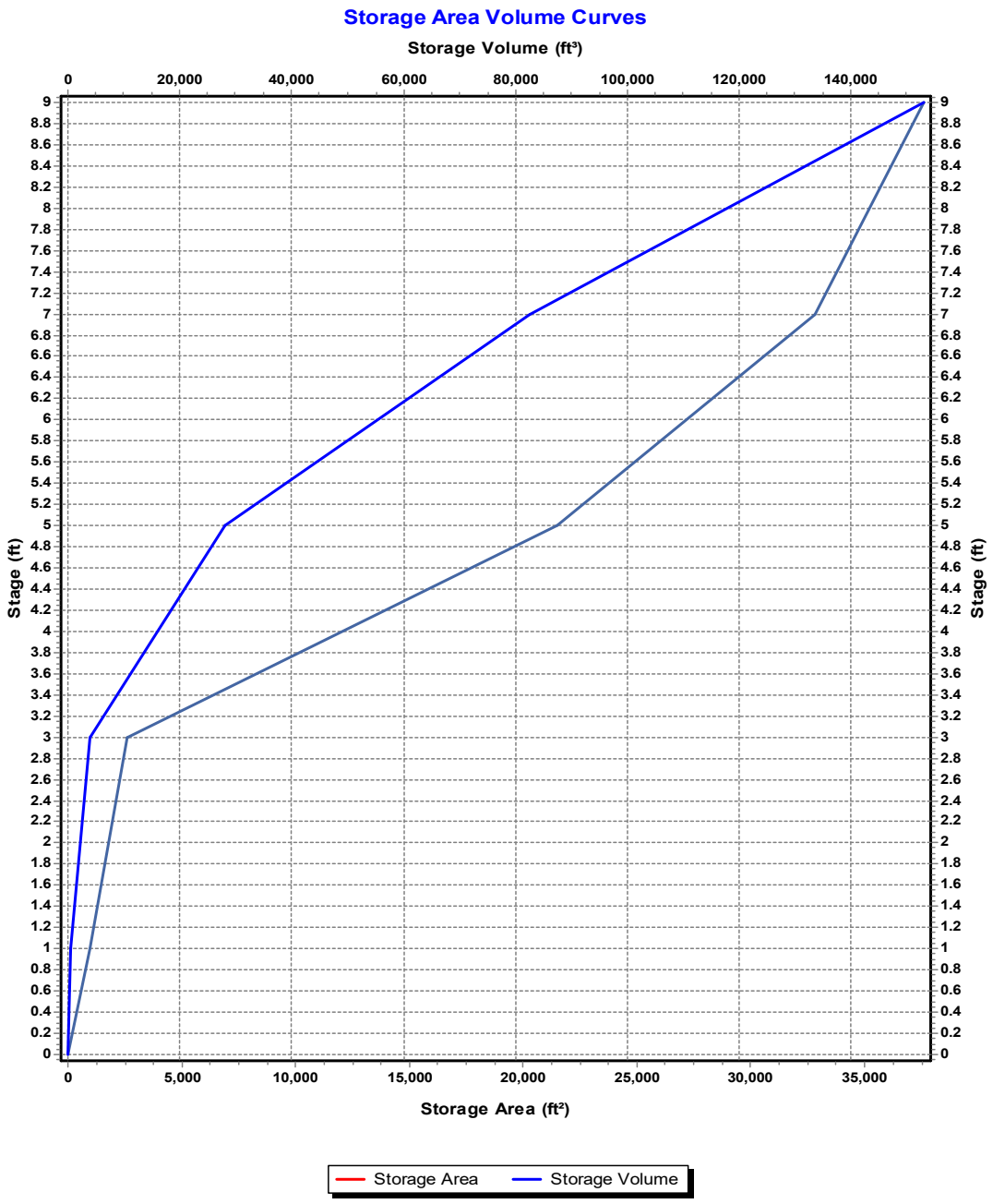
Input Data

Invert Elevation (ft)	2117.00
Max (Rim) Elevation (ft)	2125.00
Max (Rim) Offset (ft)	8.00
Initial Water Elevation (ft)	2117.00
Initial Water Depth (ft)	0.00
Ponded Area (ft^2)	8.00
Evaporation Loss	0.00

Storage Area Volume Curves

Storage Curve : SP1

Stage (ft)	Storage Area (ft^2)	Storage Volume (ft^3)
0	0	0
1	955	477.5
3	2580	4012.5
5	21522	28114.5
7	32858	82494.5
9	37630	152982.5


Storage Area Volume Curves
Storage Volume (ft³)
0
20,000
40,000
60,000
80,000
100,000
120,000
140,000
Stage (ft)
0
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
1.8
2
2.2
2.4
2.6
2.8
3
3.2
3.4
3.6
3.8
4
4.2
4.4
4.6
4.8
5
5.2
5.4
5.6
5.8
6
6.2
6.4
6.6
6.8
7
7.2
7.4
7.6
7.8
8
8.2
8.4
8.6
8.8
9
0
5,000
10,000
15,000
20,000
25,000
30,000
35,000
Storage Area (ft²)
Storage Area
Storage Volume

Storage Node : SP (continued)

Outflow Weirs

SN	Element ID	Weir Type	Flap Gate	Crest Elevation (ft)	Crest Offset (ft)	Length (ft)	Weir Total Height (ft)	Discharge Coefficient
1	20	Trapezoidal	No	2123.00	6.00	20.00	2.00	3.33

Output Summary Results

Peak Inflow (cfs)	145.21
Peak Lateral Inflow (cfs)	145.21
Peak Outflow (cfs)	103.18
Peak Exfiltration Flow Rate (cfm)	0
Max HGL Elevation Attained (ft)	2123.39
Max HGL Depth Attained (ft)	6.39
Average HGL Elevation Attained (ft)	2117.4
Average HGL Depth Attained (ft)	0.4
Time of Max HGL Occurrence (days hh:mm)	0 12:42
Total Exfiltration Volume (1000-ft^3)	0
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0

Project Description

File Name ..... ProposedKabrichModel.SPF

Project Options

Flow Units ..... CFS
Elevation Type ..... Elevation
Hydrology Method ..... SCS TR-20
Time of Concentration (TOC) Method ..... User-Defined
Link Routing Method ..... Hydrodynamic
Enable Overflow Ponding at Nodes ..... YES
Skip Steady State Analysis Time Periods ..... NO

Number of Elements

	Qty
Rain Gages	1
Subbasins	9
Nodes	24
Junctions	18
Outfalls	1
Flow Diversions	0
Inlets	0
Storage Nodes	5
Links	42
Channels	9
Pipes	10
Pumps	0
Orifices	9
Weirs	14
Outlets	0
Pollutants	0
Land Uses	0

Rainfall Details

SN	Rain Gage ID	Data Source	Data Source ID	Rainfall Type	Rain Units	State	County	Return Period (years)	Rainfall Depth (inches)	Rainfall Distribution
1	1	Time Series	10Year	Cumulative	inches				0.00	

Subbasin Summary

SN	Subbasin ID	Area (ac)	Peak Rate Factor	Weighted Curve Number	Total Rainfall (in)	Total Runoff (in)	Total Runoff Volume (ac-in)	Peak Runoff (cfs)	Time of Concentration (days hh:mm:ss)
1	A	6.36	484.00	90.00	4.10	3.02	19.18	16.83	0 00:18:30
2	B	10.80	484.00	92.00	4.10	3.22	34.72	35.42	0 00:12:30
3	CO	44.42	484.00	84.00	4.10	2.46	109.27	99.40	0 00:17:30
4	K	93.79	484.00	85.00	4.10	2.55	238.98	213.90	0 00:18:12
5	RU	7.74	484.00	87.00	4.10	2.73	21.12	22.05	0 00:12:24
6	SH	69.35	484.00	86.00	4.10	2.64	182.95	146.23	0 00:23:30
7	UG1	3.05	484.00	93.00	4.10	3.32	10.12	13.71	0 00:05:00
8	UG2	11.65	484.00	86.00	4.10	2.64	30.73	28.13	0 00:17:12
9	US1	244.78	484.00	82.00	4.10	2.29	560.55	409.09	0 00:28:36

Node Summary

SN	Element ID	Element Type	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Initial Water Elevation (ft)	Surcharge Elevation (ft)	Ponded Area (ft^2)	Peak Inflow (cfs)	Max HGL Elevation Attained (ft)	Max Surcharge Depth Attained (ft)	Min Freeboard Attained (ft)	Time of Peak Flooding Occurrence (days hh:mm)	Total Flooded Volume (ac-in)	Total Time Flooded (min)
1	1	Junction	2062.60	2068.60	2062.60	2068.60	0.00	520.95	2067.23	0.00	6.37	0 00:00	0.00	0.00
2	2	Junction	2061.70	2066.30	2061.70	2066.30	0.00	520.34	2065.40	0.00	7.30	0 00:00	0.00	0.00
3	3	Junction	2059.10	2065.70	2059.10	2065.70	0.00	520.27	2064.19	0.00	8.47	0 00:00	0.00	0.00
4	4	Junction	2056.20	2065.00	2056.20	2065.00	0.00	520.25	2060.80	0.00	8.40	0 00:00	0.00	0.00
5	5	Junction	2054.00	2060.00	2054.00	2060.00	0.00	682.05	2058.49	0.00	6.51	0 00:00	0.00	0.00
6	6	Junction	2048.88	2053.88	2048.88	2053.88	0.00	682.09	2054.51	0.00	5.37	0 00:00	0.00	0.00
7	7	Junction	2048.60	2053.60	2048.60	2053.60	0.00	700.57	2053.23	0.00	5.37	0 00:00	0.00	0.00
8	8	Junction	2045.83	2050.83	2045.83	2050.83	0.00	714.95	2049.49	0.00	6.34	0 00:00	0.00	0.00
9	9	Junction	2044.80	2049.80	2044.80	2049.80	0.00	723.18	2048.76	0.00	6.04	0 00:00	0.00	0.00
10	11	Junction	2092.00	2098.00	2092.00	2098.00	0.00	183.67	2094.53	0.00	5.47	0 00:00	0.00	0.00
11	12	Junction	2133.50	2139.50	2133.50	2139.50	0.00	89.68	2134.82	0.00	8.18	0 00:00	0.00	0.00
12	13	Junction	2116.51	2125.00	2116.51	2125.00	0.00	103.18	2118.36	0.00	6.64	0 00:00	0.00	0.00
13	14	Junction	2154.50	2154.50	2154.50	2154.50	0.00	83.76	2155.51	0.00	3.26	0 00:00	0.00	0.00
14	15	Junction	2134.00	2142.00	2134.00	2142.00	0.00	72.31	2135.87	0.00	10.63	0 00:00	0.00	0.00
15	16	Junction	2044.25	2044.25	2044.25	2044.25	0.00	10.80	2047.20	0.00	3.60	0 00:00	0.00	0.00
16	17	Junction	2050.75	2050.75	2050.75	2050.75	0.00	4.20	2053.28	0.00	3.37	0 00:00	0.00	0.00
17	18	Junction	2043.83	2047.83	2043.83	2047.83	0.00	730.13	2047.18	0.00	6.65	0 00:00	0.00	0.00
18	19	Junction	2054.70	2060.00	2054.70	2060.00	0.00	520.23	2060.42	0.00	7.84	0 00:00	0.00	0.00
19	10	Outfall	2041.91					730.29	2045.25					
20	CVP	Storage Node	2155.00	2162.00	2155.00		7.00	85.85	2160.52				0.00	0.00
21	P1	Storage Node	2050.75	2055.75	2050.75		5.00	13.40	2054.75				0.00	0.00
22	P2	Storage Node	2044.25	2049.25	2044.25		5.00	23.85	2048.90				0.00	0.00
23	RP	Storage Node	2137.00	2145.00	2137.00		8.00	97.50	2144.70				0.00	0.00
24	SP	Storage Node	2117.00	2125.00	2117.00		8.00	145.22	2123.39				0.00	0.00

Link Summary

SN	Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length	Inlet Invert Elevation	Outlet Invert Elevation	Average Slope	Diameter or Height	Manning's Roughness	Peak Flow	Design Flow Capacity	Peak Flow/ Design Flow Ratio	Peak Flow Velocity	Peak Flow Depth	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged	Reported Condition
					(ft)	(ft)	(ft)	(%)	(in)		(cfs)	(cfs)		(ft/sec)	(ft)		(min)	
1	2	Pipe	2	3	182.00	2061.70	2060.10	0.8800			520.27	896.81	0.58	10.07	3.77	0.96	0.00	Calculated
2	6	Pipe	6	7	50.00	2048.88	2048.60	0.5600			483.15	291.43	1.66	10.38	4.00	1.00	26.00	SURCHARGED
3	8	Pipe	8	9	50.00	2045.83	2044.80	2.0600			703.75	1979.07	0.36	9.24	3.63	0.85	0.00	Calculated
4	9	Pipe	14	RP	50.00	2154.50	2137.00	35.0000			83.76	242.66	0.35	22.73	1.75	0.70	0.00	Calculated
5	15	Pipe	15	12	82.00	2134.00	2133.50	0.6100			72.31	199.62	0.36	15.26	1.49	0.35	0.00	Calculated
6	19	Pipe	SP	13	75.00	2117.00	2116.51	0.6500			87.05	29.20	2.98	14.29	2.42	0.81	0.00	> CAPACITY
7	21	Pipe	16	18	35.10	2044.25	2043.83	1.2000			11.41	53.03	0.22	3.55	2.50	1.00	26.00	SURCHARGED
8	22	Pipe	17	7	42.40	2050.75	2048.60	5.0700			5.13	27.95	0.18	4.98	1.50	1.00	36.00	SURCHARGED
9	Link-01	Pipe	4	19	166.00	2056.20	2054.70	0.9000			520.23	6824.77	0.08	5.17	5.12	0.40	0.00	Calculated
10	Link-02	Pipe	19	5	65.00	2054.70	2054.00	1.0800			164.86	254.51	0.65	10.61	4.00	1.00	20.00	SURCHARGED
11	1	Channel	1	2	131.00	2062.60	2061.70	0.6900			520.34	964.35	0.54	12.41	4.06	0.69	0.00	
12	3	Channel	3	4	187.00	2059.10	2056.20	1.5500			520.25	982.70	0.53	8.95	4.76	0.73	0.00	
13	29	Channel	18	10	154.40	2043.83	2041.91	1.2400			730.29	1476.05	0.49	12.61	3.19	0.67	0.00	
14	ED	Channel	7	8	440.35	2048.60	2045.83	0.6300			714.95	784.15	0.91	12.24	3.92	0.83	0.00	
15	KB	Channel	5	6	392.20	2054.00	2048.88	1.3100			682.09	1129.64	0.60	9.75	4.67	0.95	0.00	
16	MOR	Channel	13	11	1020.00	2116.51	2092.00	2.4000			103.05	3372.60	0.03	7.83	2.19	0.27	0.00	
17	PF	Channel	9	18	78.10	2044.80	2043.83	1.2400			722.80	1101.84	0.66	14.51	3.50	0.73	0.00	
18	STK	Channel	11	1	2424.00	2092.00	2062.60	1.2100			176.49	830.10	0.21	5.08	3.55	0.71	0.00	
19	USR	Channel	12	11	1864.00	2133.50	2092.00	2.2300			87.89	3988.84	0.02	5.56	1.86	0.24	0.00	
20	5	Orifice	CVP	14		2155.00	2154.50				20.13							
21	7	Orifice	CVP	14		2155.00	2154.50				40.48							
22	13	Orifice	CVP	14		2155.00	2154.50				23.15							
23	16	Orifice	RP	15		2137.00	2134.00				24.29							
24	17	Orifice	RP	15		2137.00	2134.00				48.02							
25	23	Orifice	P2	16		2044.25	2044.25				4.87							
26	24	Orifice	P2	16		2044.25	2044.25				5.79							
27	26	Orifice	P1	17		2050.75	2050.75				0.43							
28	27	Orifice	P1	17		2050.75	2050.75				3.46							
29	10	Weir	8	9		2045.83	2044.80				0.00							
30	11	Weir	6	7		2048.88	2048.60				243.91							
31	14	Weir	CVP	RP		2155.00	2137.00				0.00							
32	18	Weir	RP	12		2137.00	2133.50				17.36							
33	20	Weir	SP	13		2117.00	2116.51				16.13							
34	25	Weir	P2	16		2044.25	2044.25				0.61							
35	28	Weir	P1	17		2050.75	2050.75				0.59							
36	31	Weir	2	3		2061.70	2059.10				0.00							
37	35	Weir	5	6		2054.00	2048.88				0.00							
38	36	Weir	7	8		2048.60	2045.83				0.00							
39	37	Weir	9	18		2044.80	2043.83				0.00							
40	38	Weir	1	2		2062.60	2061.70				0.00							
41	40	Weir	3	19		2059.10	2054.70				0.00							
42	41	Weir	19	5		2054.70	2054.00				368.83							

Subbasin Hydrology

Subbasin : A

Input Data

Area (ac) 6.36
Peak Rate Factor 484
Weighted Curve Number 90
Rain Gage ID 1

Composite Curve Number

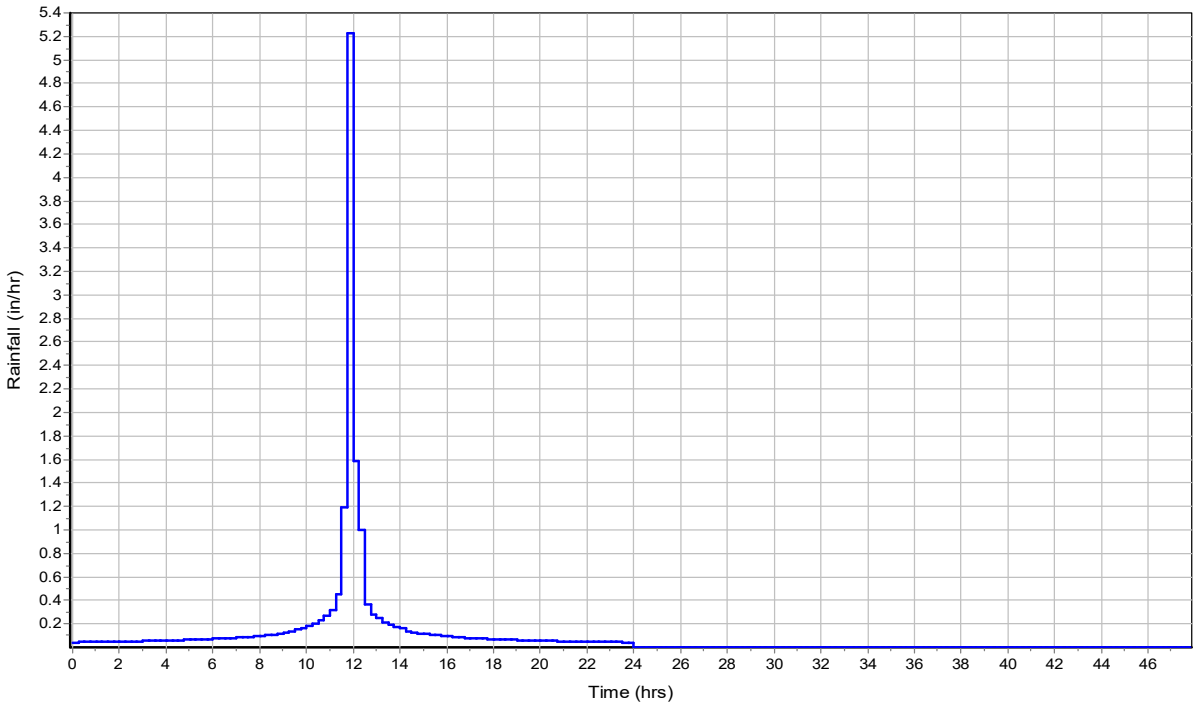
32 Soil/Surface Description	Area (acres)	Soil Group	Curve Number
-	6.36	-	90
Composite Area & Weighted CN	6.36		90

Subbasin Runoff Results

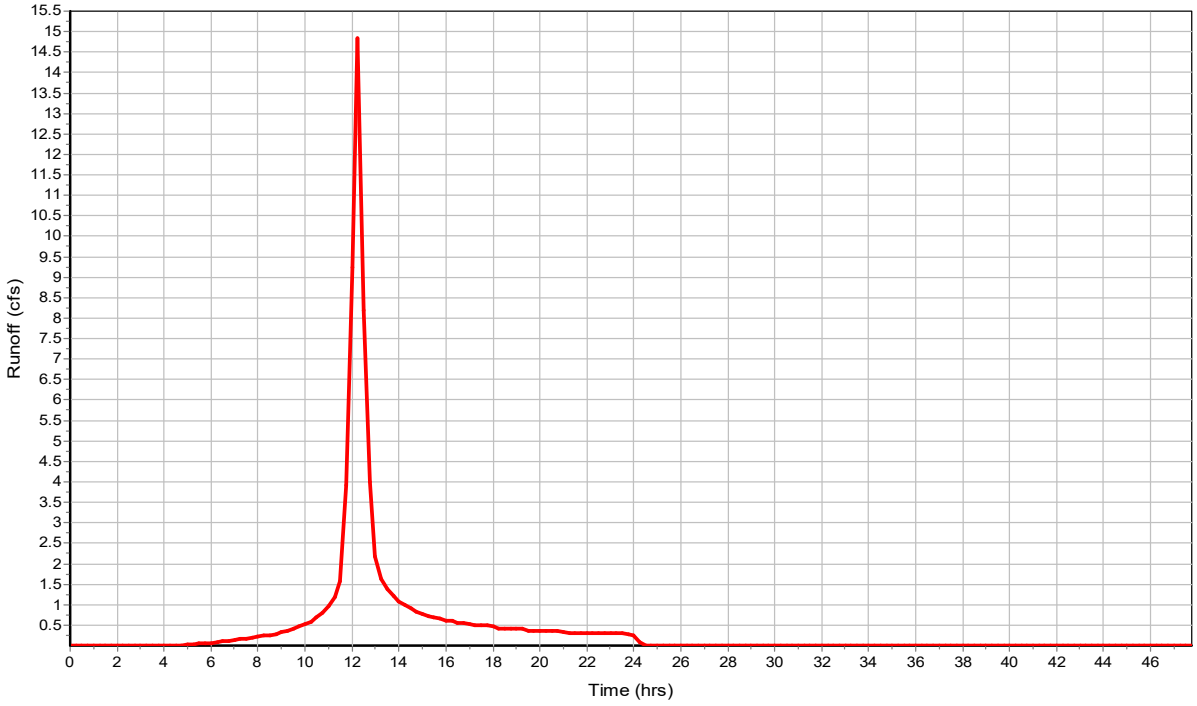
Total Rainfall (in) 4.1
Total Runoff (in) 3.02
Peak Runoff (cfs) 16.83
Weighted Curve Number 90
Time of Concentration (days hh:mm:ss) 0 00:18:30

Subbasin : A

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : B

Input Data

Area (ac) 10.8
Peak Rate Factor 484
Weighted Curve Number 92
Rain Gage ID 1

Composite Curve Number

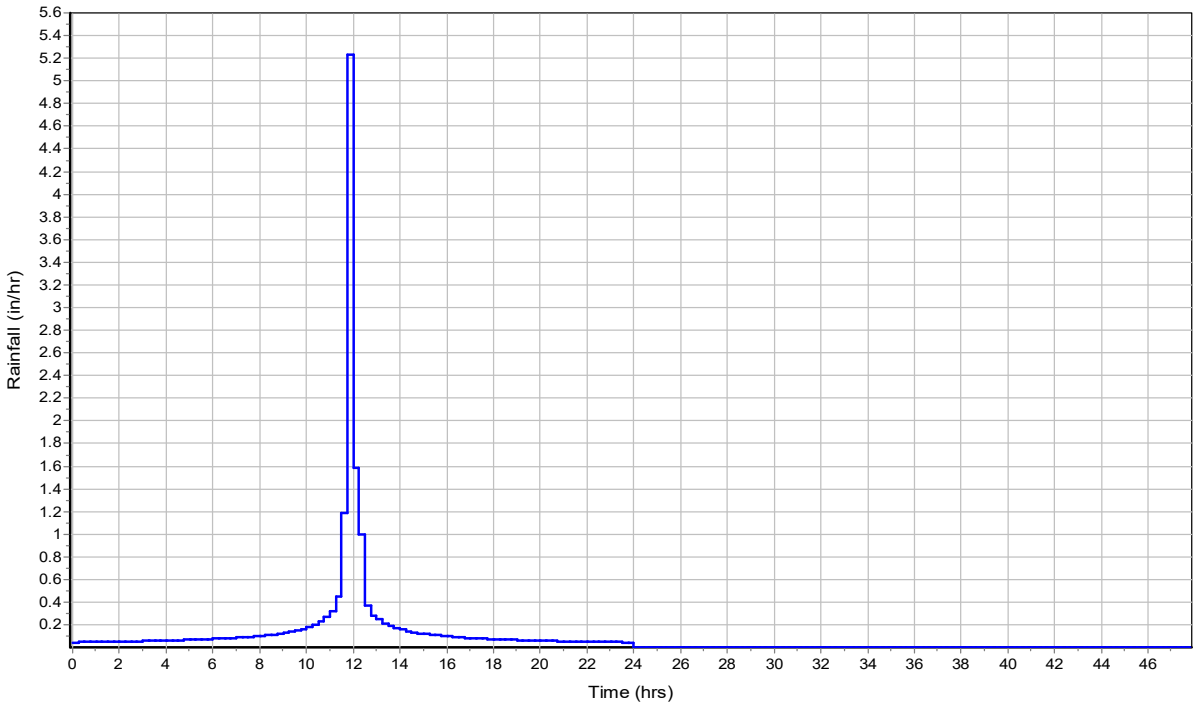
32 Soil/Surface Description	Area (acres)	Soil Group	Curve Number
-	10.8	-	92
Composite Area & Weighted CN	10.8		92

Subbasin Runoff Results

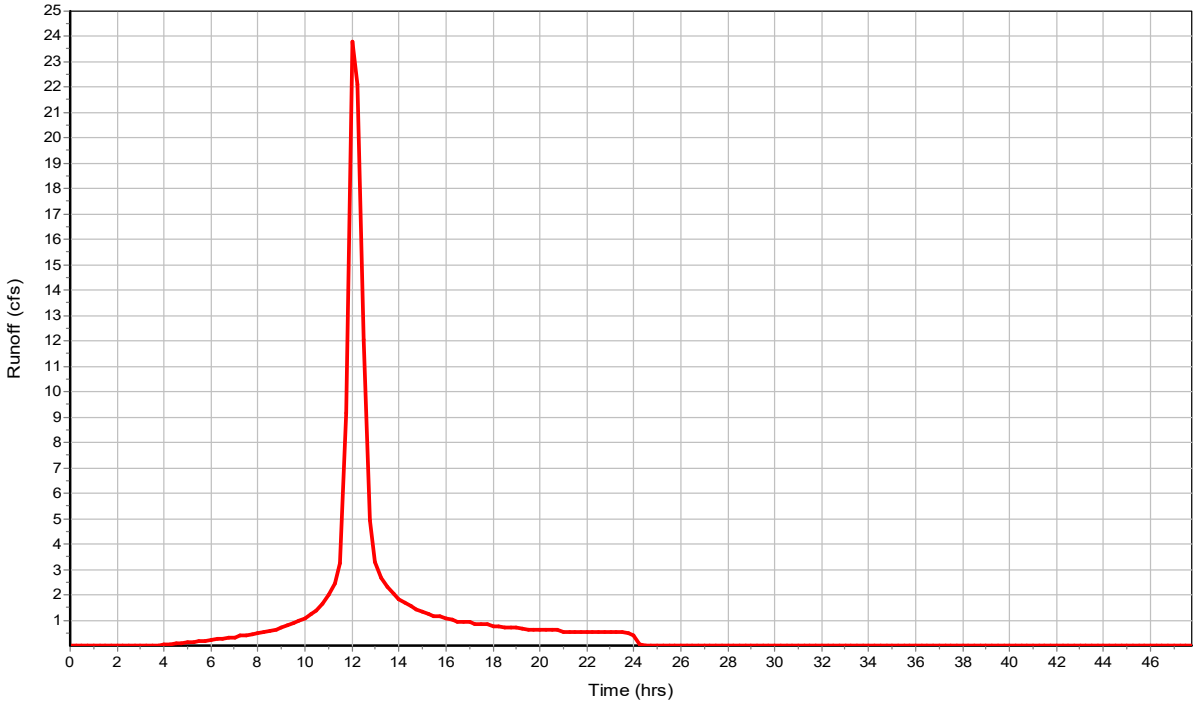
Total Rainfall (in) 4.1
Total Runoff (in) 3.22
Peak Runoff (cfs) 35.42
Weighted Curve Number 92
Time of Concentration (days hh:mm:ss) 0 00:12:30

Subbasin : B

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : CO

Input Data

Area (ac)	44.42
Peak Rate Factor	484
Weighted Curve Number	84
Rain Gage ID	1

Composite Curve Number

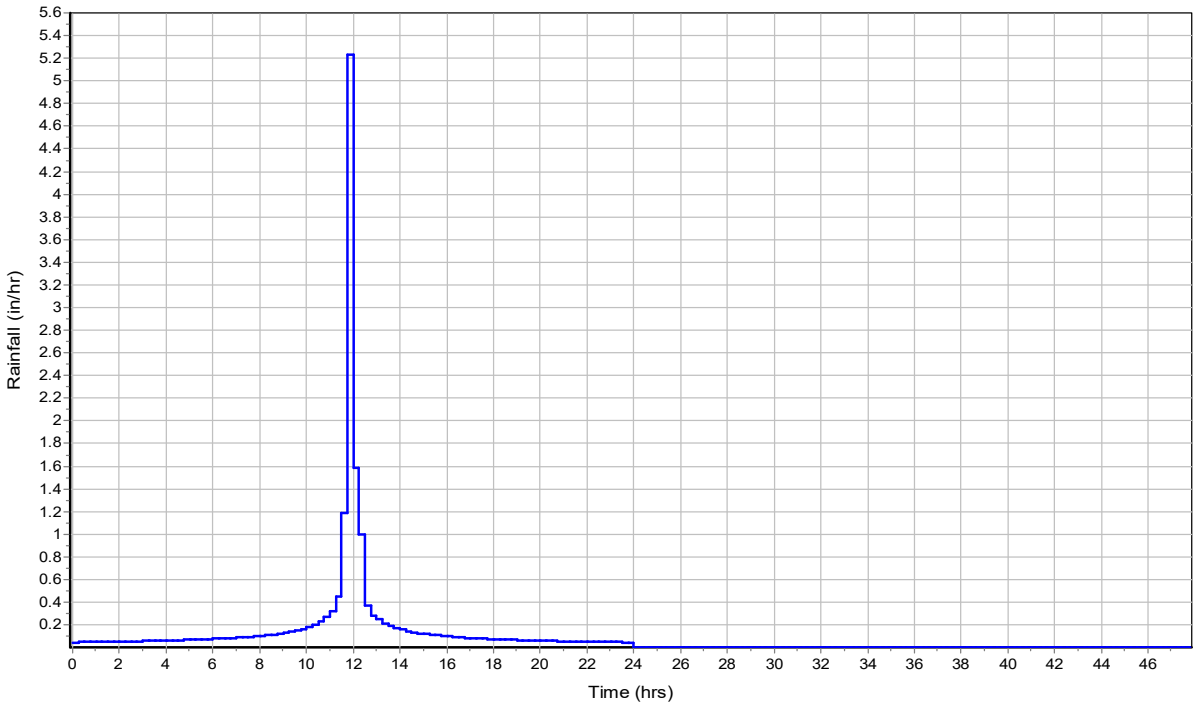
32 Soil/Surface Description	Area (acres)	Soil Group	Curve Number
-	44.42	-	84
Composite Area & Weighted CN	44.42		84

Subbasin Runoff Results

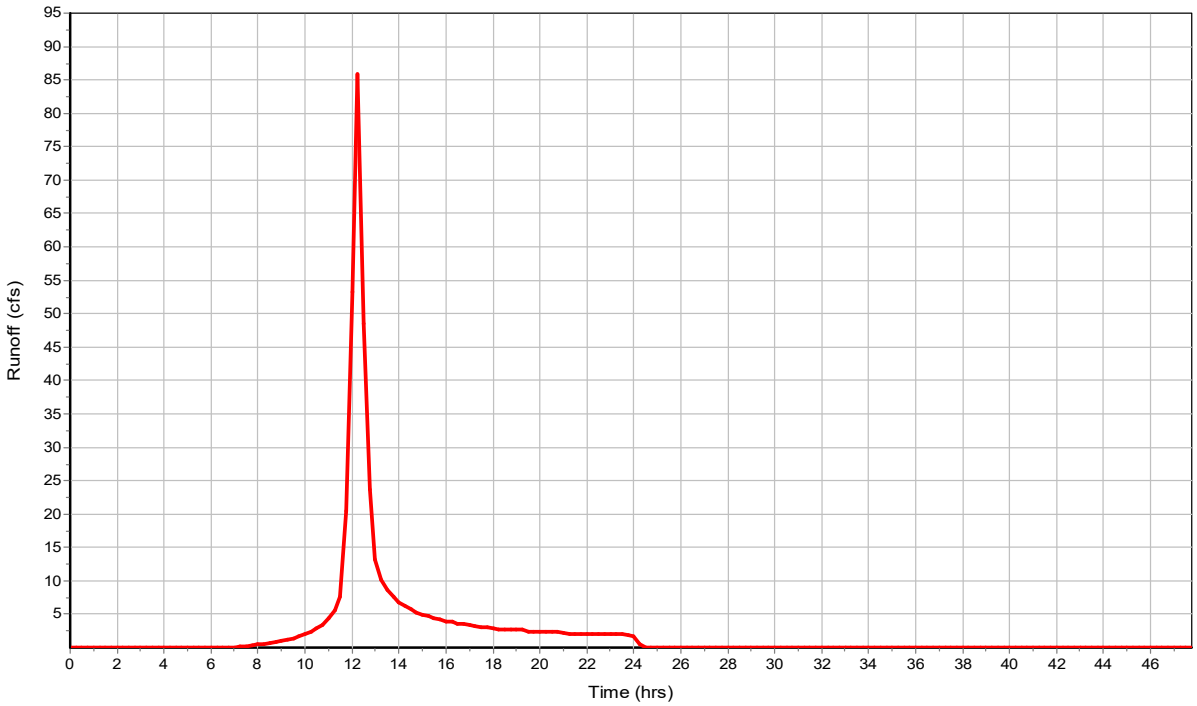
Total Rainfall (in)	4.1
Total Runoff (in)	2.46
Peak Runoff (cfs)	99.4
Weighted Curve Number	84
Time of Concentration (days hh:mm:ss)	0 00:17:30

Subbasin : CO

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : K

Input Data

Area (ac)	93.79
Peak Rate Factor	484
Weighted Curve Number	85
Rain Gage ID	1

Composite Curve Number

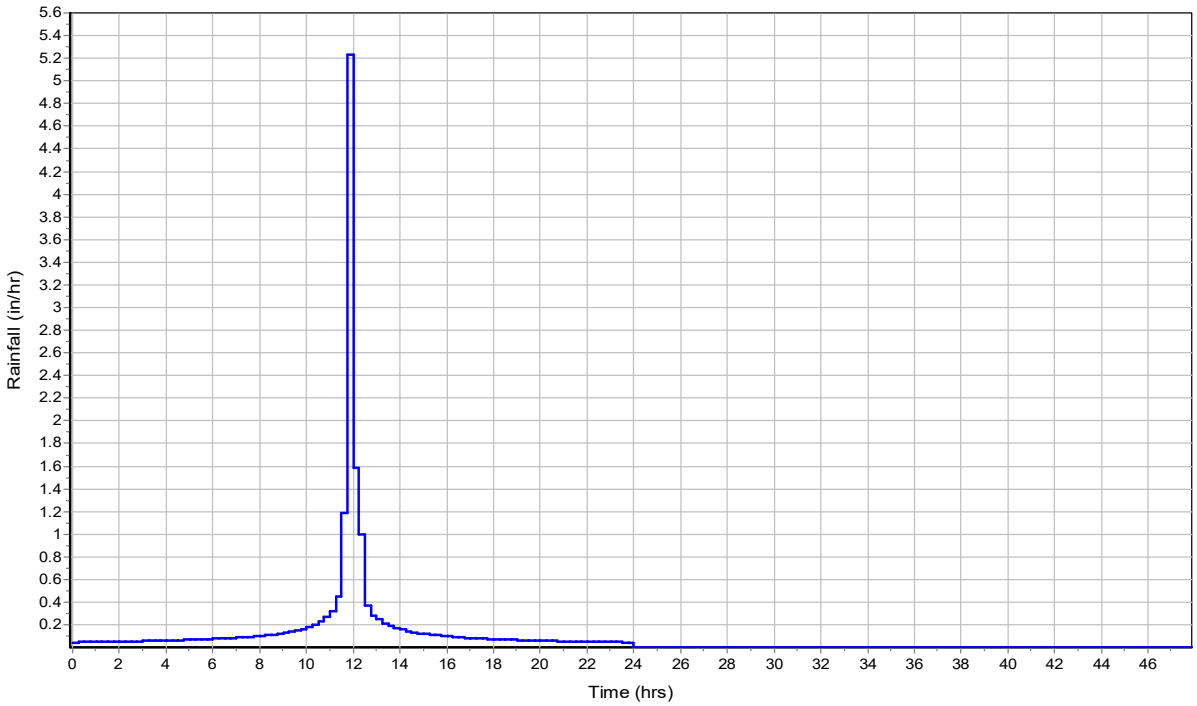
32 Soil/Surface Description	Area (acres)	Soil Group	Curve Number
-	93.79	-	85
Composite Area & Weighted CN	93.79		85

Subbasin Runoff Results

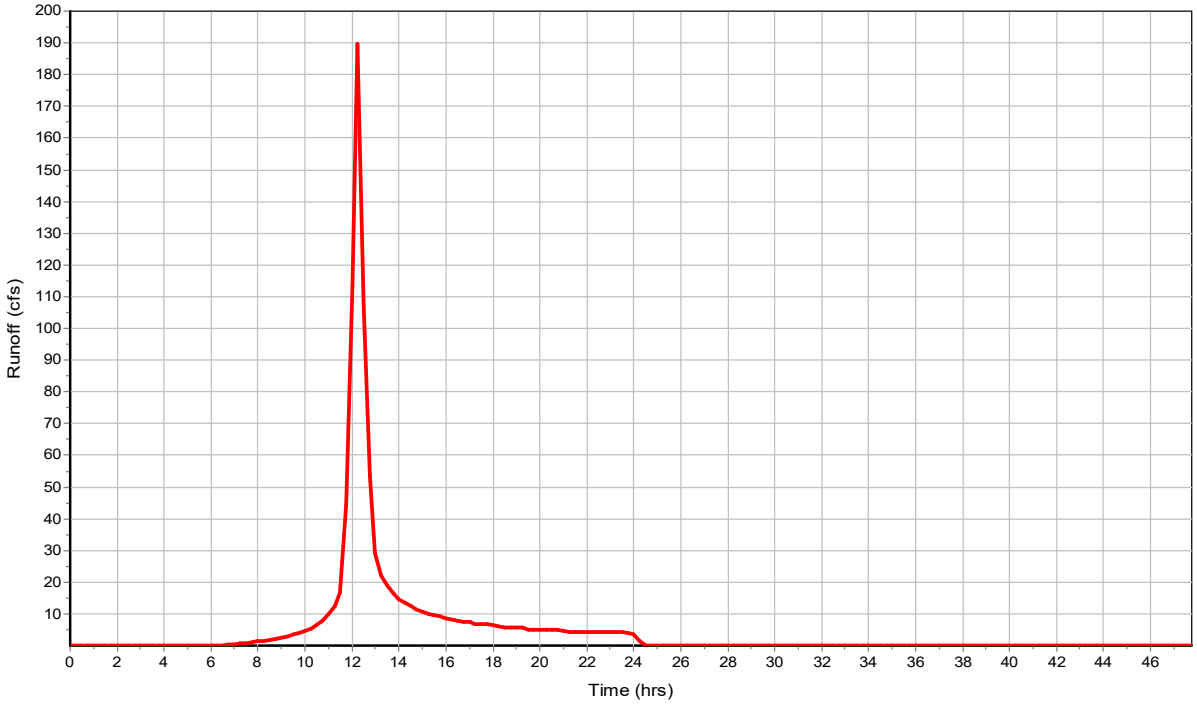
Total Rainfall (in)	4.1
Total Runoff (in)	2.55
Peak Runoff (cfs)	213.9
Weighted Curve Number	85
Time of Concentration (days hh:mm:ss)	0 00:18:12

Subbasin : K

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : RU

Input Data

Area (ac) 7.74
Peak Rate Factor 484
Weighted Curve Number 87
Rain Gage ID 1

Composite Curve Number

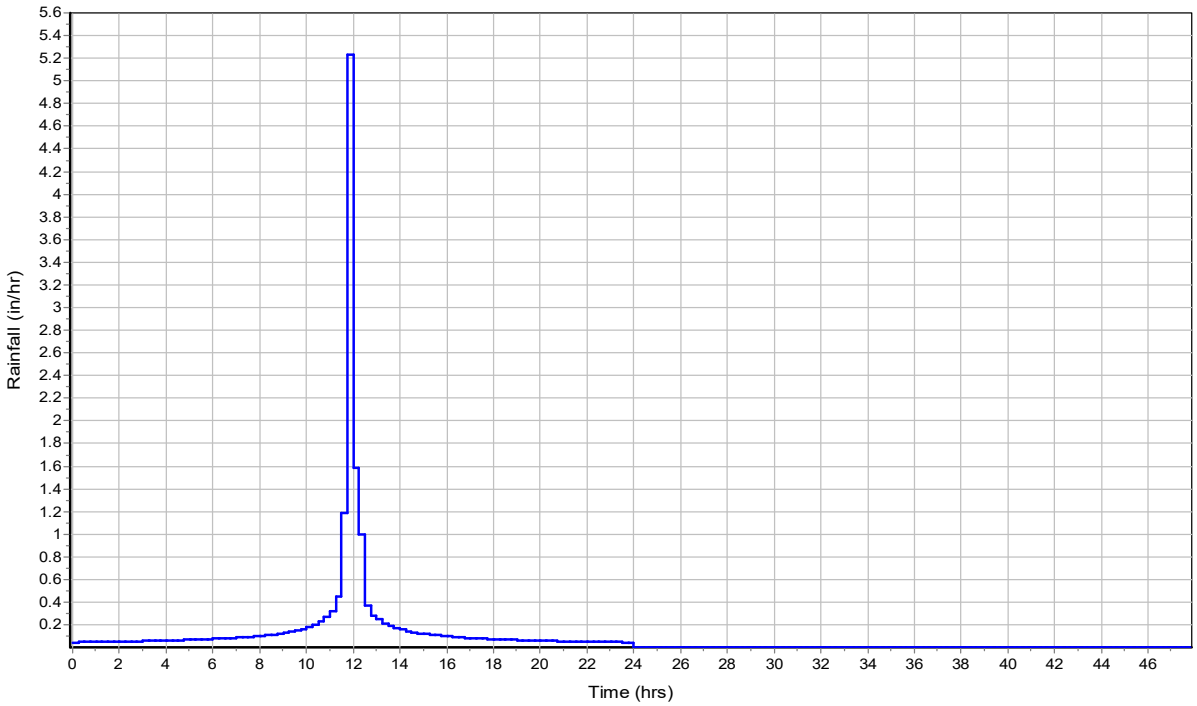
32 Soil/Surface Description	Area (acres)	Soil Group	Curve Number
-	7.74	-	87
Composite Area & Weighted CN	7.74		87

Subbasin Runoff Results

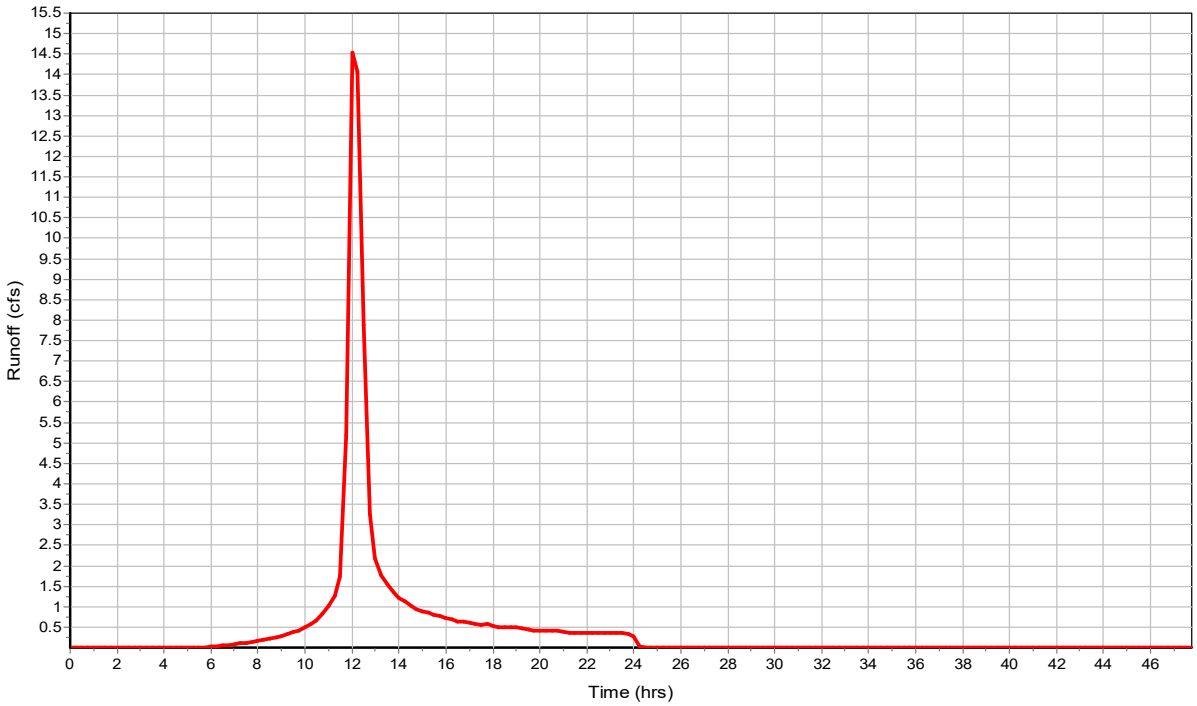
Total Rainfall (in) 4.1
Total Runoff (in) 2.73
Peak Runoff (cfs) 22.05
Weighted Curve Number 87
Time of Concentration (days hh:mm:ss) 0 00:12:24

Subbasin : RU

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : SH

Input Data

Area (ac)	69.35
Peak Rate Factor	484
Weighted Curve Number	86
Rain Gage ID	1

Composite Curve Number

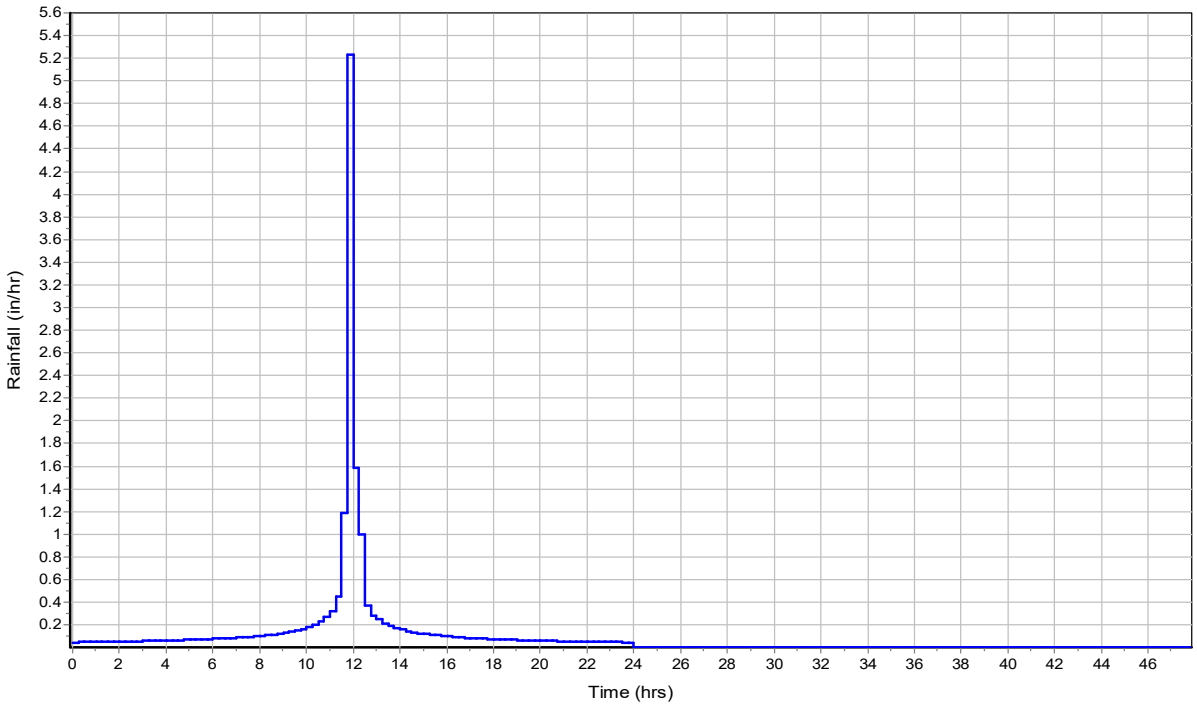
32 Soil/Surface Description	Area (acres)	Soil Group	Curve Number
-	69.35	-	86
Composite Area & Weighted CN	69.35		86

Subbasin Runoff Results

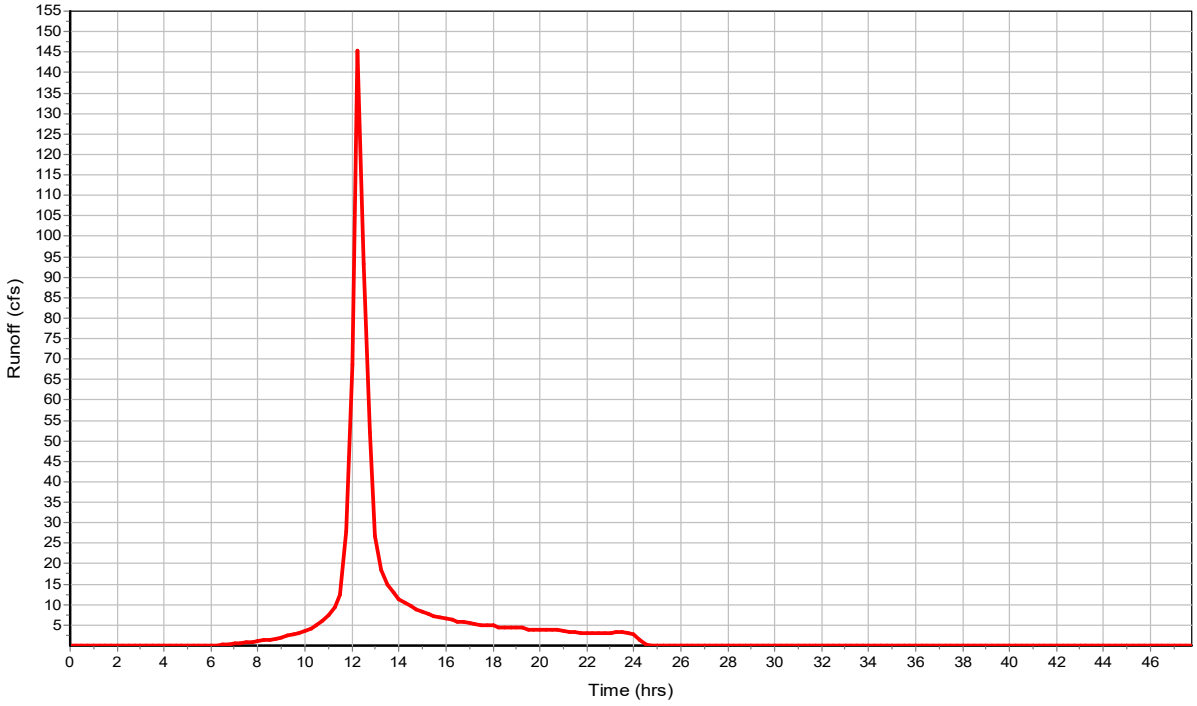
Total Rainfall (in)	4.1
Total Runoff (in)	2.64
Peak Runoff (cfs)	146.23
Weighted Curve Number	86
Time of Concentration (days hh:mm:ss)	0 00:23:30

Subbasin : SH

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : UG1

Input Data

Area (ac) 3.05
Peak Rate Factor 484
Weighted Curve Number 93
Rain Gage ID 1

Composite Curve Number

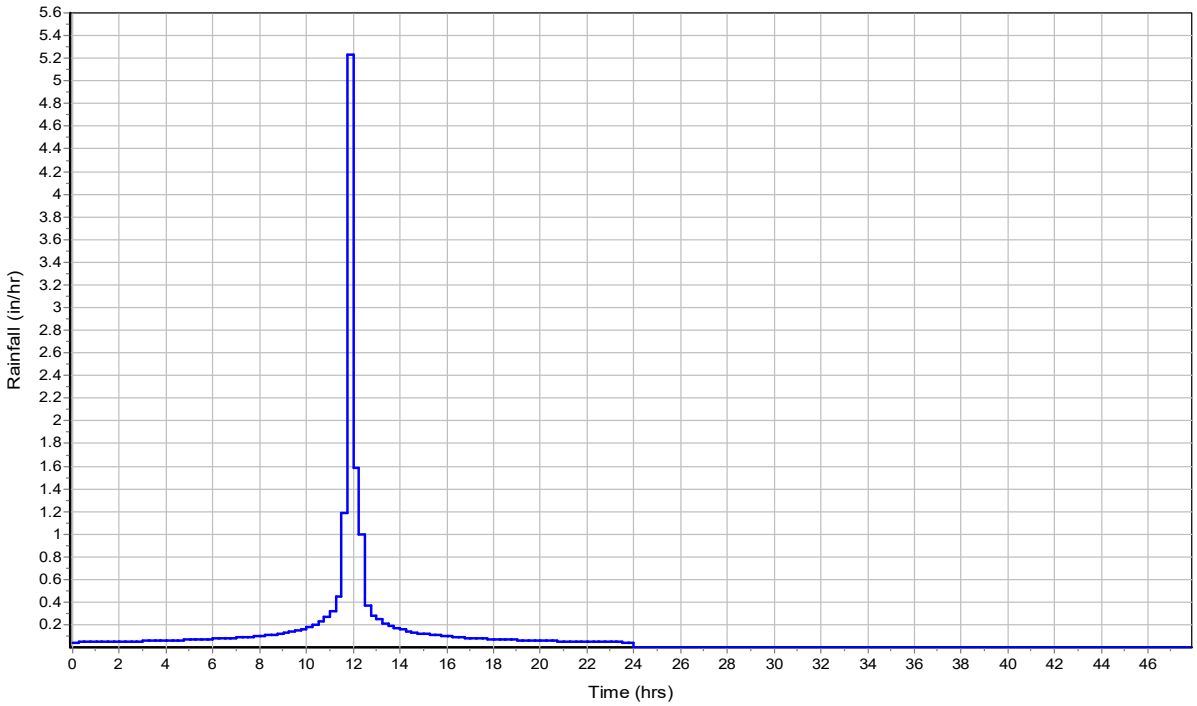
32 Soil/Surface Description	Area (acres)	Soil Group	Curve Number
-	3.05	-	93
Composite Area & Weighted CN	3.05		93

Subbasin Runoff Results

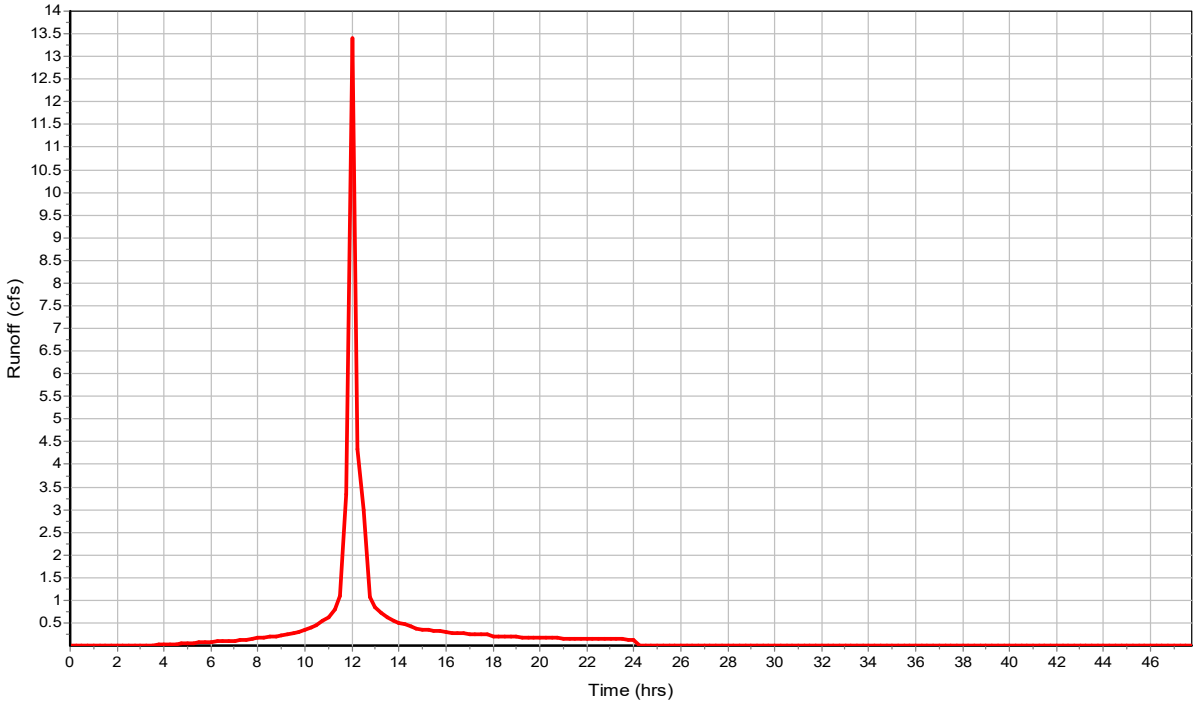
Total Rainfall (in) 4.1
Total Runoff (in) 3.32
Peak Runoff (cfs) 13.71
Weighted Curve Number 93
Time of Concentration (days hh:mm:ss) 0 00:05:00

Subbasin : UG1

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : UG2

Input Data

Area (ac) 11.65
Peak Rate Factor 484
Weighted Curve Number 86
Rain Gage ID 1

Composite Curve Number

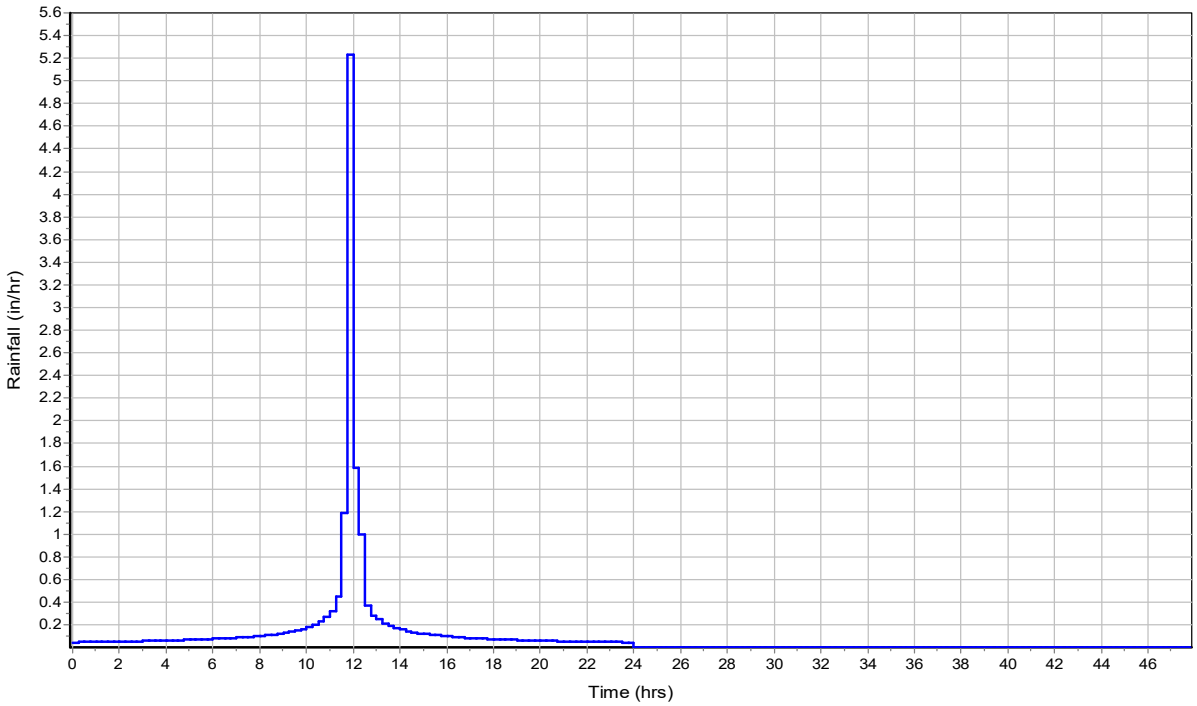
32 Soil/Surface Description	Area (acres)	Soil Group	Curve Number
-	11.65	-	86
Composite Area & Weighted CN	11.65		86

Subbasin Runoff Results

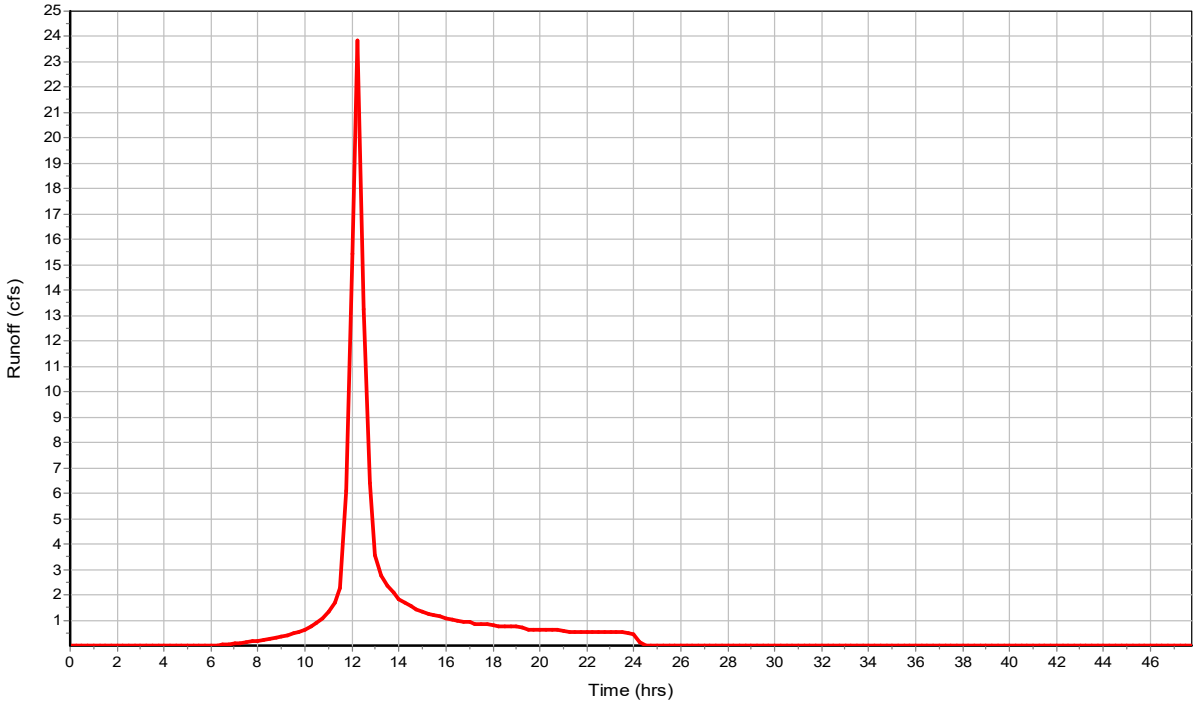
Total Rainfall (in) 4.1
Total Runoff (in) 2.64
Peak Runoff (cfs) 28.13
Weighted Curve Number 86
Time of Concentration (days hh:mm:ss) 0 00:17:12

Subbasin : UG2

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : US1

Input Data

Area (ac)	244.78
Peak Rate Factor	484
Weighted Curve Number	82
Rain Gage ID	1

Composite Curve Number

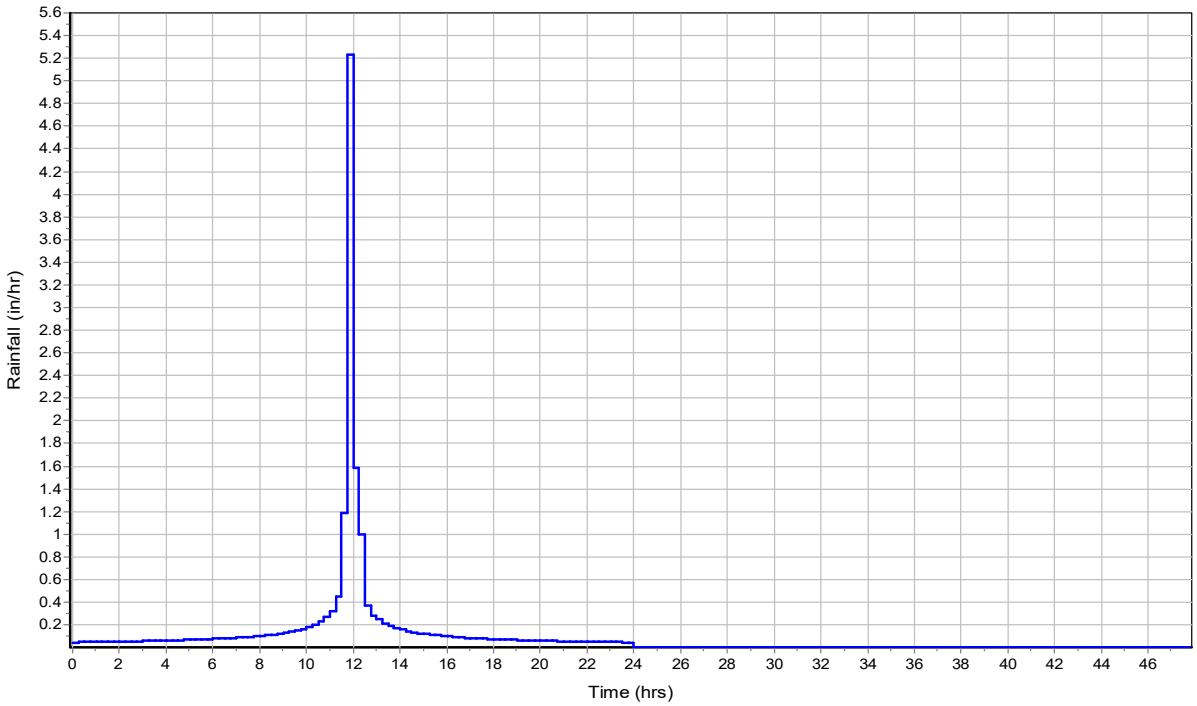
32 Soil/Surface Description	Area (acres)	Soil Group	Curve Number
-	244.78	-	82
Composite Area & Weighted CN	244.78		82

Subbasin Runoff Results

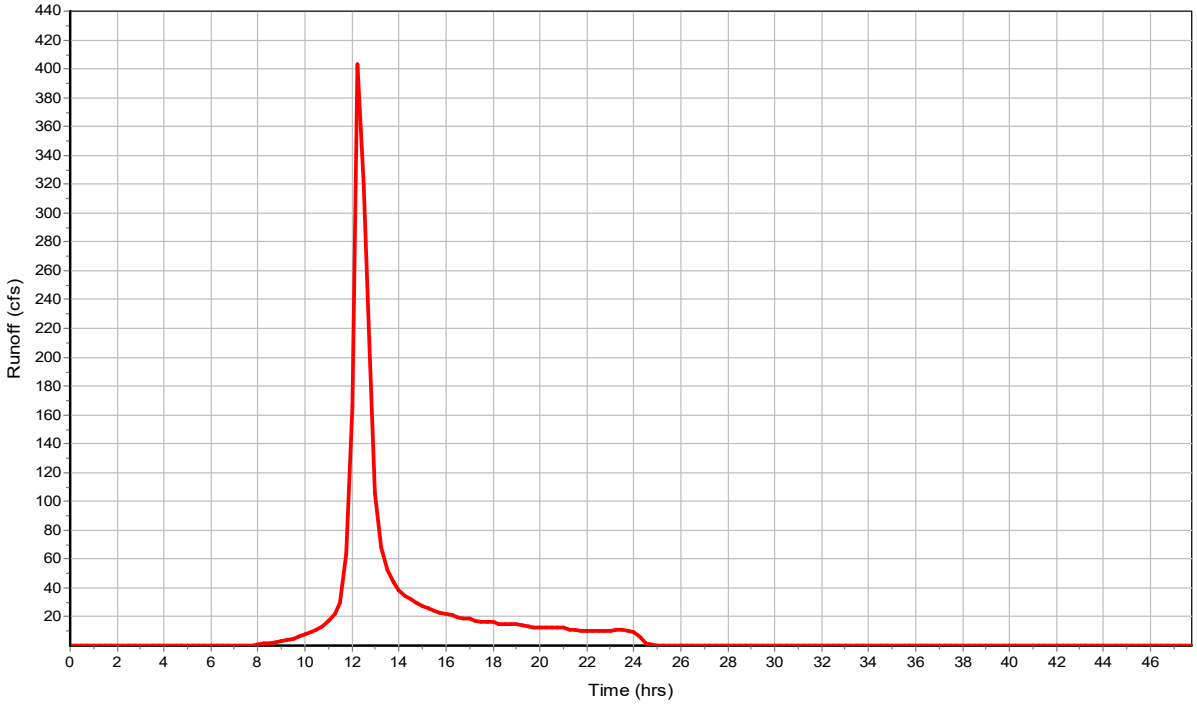
Total Rainfall (in)	4.1
Total Runoff (in)	2.29
Peak Runoff (cfs)	409.09
Weighted Curve Number	82
Time of Concentration (days hh:mm:ss)	0 00:28:36

Subbasin : US1

Rainfall Intensity Graph



Runoff Hydrograph



Junction Input

SN	Element ID	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Ground/Rim (Max) Offset (ft)	Initial Water Elevation (ft)	Initial Water Depth (ft)	Surcharge Elevation (ft)	Surcharge Depth (ft)	Ponded Area (ft^2)	Minimum Pipe Cover (in)
1	1	2062.60	2068.60	6.00	2062.60	0.00	2068.60	0.00	0.00	
2	2	2061.70	2066.30	4.60	2061.70	0.00	2066.30	0.00	0.00	
3	3	2059.10	2065.70	6.60	2059.10	0.00	2065.70	0.00	0.00	
4	4	2056.20	2065.00	8.80	2056.20	0.00	2065.00	0.00	0.00	
5	5	2054.00	2060.00	6.00	2054.00	0.00	2060.00	0.00	0.00	
6	6	2048.88	2053.88	5.00	2048.88	0.00	2053.88	0.00	0.00	
7	7	2048.60	2053.60	5.00	2048.60	0.00	2053.60	0.00	0.00	
8	8	2045.83	2050.83	5.00	2045.83	0.00	2050.83	0.00	0.00	
9	9	2044.80	2049.80	5.00	2044.80	0.00	2049.80	0.00	0.00	
10	11	2092.00	2098.00	6.00	2092.00	0.00	2098.00	0.00	0.00	
11	12	2133.50	2139.50	6.00	2133.50	0.00	2139.50	0.00	0.00	
12	13	2116.51	2125.00	8.49	2116.51	0.00	2125.00	0.00	0.00	
13	14	2154.50	2154.50	0.00	2154.50	0.00	2154.50	0.00	0.00	
14	15	2134.00	2142.00	8.00	2134.00	0.00	2142.00	0.00	0.00	
15	16	2044.25	2044.25	0.00	2044.25	0.00	2044.25	0.00	0.00	
16	17	2050.75	2050.75	0.00	2050.75	0.00	2050.75	0.00	0.00	
17	18	2043.83	2047.83	4.00	2043.83	0.00	2047.83	0.00	0.00	
18	19	2054.70	2060.00	5.30	2054.70	0.00	2060.00	0.00	0.00	

Junction Results

SN	Element ID	Peak Inflow (cfs)	Peak Lateral Inflow (cfs)	Max HGL Elevation Attained (ft)	Max HGL Depth Attained (ft)	Max Surcharge Depth Attained (ft)	Min Freeboard Attained (ft)	Average HGL Elevation Attained (ft)	Average HGL Depth Attained (ft)	Time of Max HGL Occurrence (days hh:mm)	Time of Peak Flooding Occurrence (days hh:mm)	Total Flooded Volume (ac-in)	Total Time Flooded (min)
1	1	520.95	402.89	2067.23	4.63	0.00	6.37	2063.07	0.47	0 12:38	0 00:00	0.00	0.00
2	2	520.34	0.00	2065.40	3.70	0.00	7.30	2061.87	0.17	0 12:38	0 00:00	0.00	0.00
3	3	520.27	0.00	2064.19	5.09	0.00	8.47	2059.39	0.29	0 12:39	0 00:00	0.00	0.00
4	4	520.25	0.00	2060.80	4.60	0.00	8.40	2056.53	0.33	0 12:39	0 00:00	0.00	0.00
5	5	682.05	189.60	2058.49	4.49	0.00	6.51	2054.29	0.29	0 12:32	0 00:00	0.00	0.00
6	6	682.09	0.00	2054.51	5.63	0.00	5.37	2049.28	0.40	0 12:33	0 00:00	0.00	0.00
7	7	700.57	14.83	2053.23	4.63	0.00	5.37	2048.98	0.38	0 12:33	0 00:00	0.00	0.00
8	8	714.95	0.00	2049.49	3.66	0.00	6.34	2045.99	0.16	0 12:33	0 00:00	0.00	0.00
9	9	723.18	23.78	2048.76	3.96	0.00	6.04	2045.10	0.30	0 12:34	0 00:00	0.00	0.00
10	11	183.67	0.00	2094.53	2.53	0.00	5.47	2092.24	0.24	0 12:44	0 00:00	0.00	0.00
11	12	89.68	0.00	2134.82	1.32	0.00	8.18	2133.60	0.10	0 12:36	0 00:00	0.00	0.00
12	13	103.18	0.00	2118.36	1.85	0.00	6.64	2116.69	0.18	0 12:42	0 00:00	0.00	0.00
13	14	83.76	0.00	2155.51	1.01	0.00	3.26	2154.58	0.08	0 12:30	0 00:00	0.00	0.00
14	15	72.31	0.00	2135.87	1.87	0.00	10.63	2134.18	0.18	0 12:34	0 00:00	0.00	0.00
15	16	10.80	0.00	2047.20	2.95	0.00	3.60	2044.41	0.16	0 12:35	0 00:00	0.00	0.00
16	17	4.20	0.00	2053.28	2.53	0.00	3.37	2050.85	0.10	0 12:33	0 00:00	0.00	0.00
17	18	730.13	0.00	2047.18	3.35	0.00	6.65	2044.08	0.25	0 12:34	0 00:00	0.00	0.00
18	19	520.23	0.00	2060.42	5.72	0.00	7.84	2055.34	0.64	0 12:37	0 00:00	0.00	0.00

Channel Input

SN	Element ID	Length (ft)	Inlet Invert Elevation (ft)	Inlet Invert Offset (ft)	Outlet Invert Elevation (ft)	Outlet Invert Offset (ft)	Total Drop (ft)	Average Slope (%)	Shape	Height (ft)	Width (ft)	Manning's Roughness	Entrance Losses	Exit/Bend Losses	Additional Losses	Initial Flow (cfs)	Flap Gate
1	1	131.00	2062.60	0.00	2061.70	0.00	0.90	0.6900	Trapezoidal	6.000	27.000	0.0240	0.0000	0.0000	0.0000	0.00	No
2	3	187.00	2059.10	0.00	2056.20	0.00	2.90	1.5500	Rectangular	6.600	12.000	0.0320	0.7000	0.5000	0.0000	0.00	No
3	29	154.40	2043.83	0.00	2041.91	0.00	1.92	1.2400	Trapezoidal	5.000	24.000	0.0240	0.0000	0.0000	0.0000	0.00	No
4	ED	440.35	2048.60	0.00	2045.83	0.00	2.77	0.6300	Trapezoidal	5.000	20.000	0.0240	0.0000	0.0000	0.0000	0.00	No
5	KB	392.20	2054.00	0.00	2048.88	0.00	5.12	1.3100	Trapezoidal	5.000	20.000	0.0240	0.0000	0.0000	1.0000	0.00	No
6	MOR	1020.00	2116.51	0.00	2092.00	0.00	24.51	2.4000	Trapezoidal	8.000	34.000	0.0240	0.0000	0.0000	0.0000	0.00	No
7	PF	78.10	2044.80	0.00	2043.83	0.00	0.97	1.2400	Trapezoidal	5.000	20.000	0.0240	0.0000	0.0000	0.0000	0.00	No
8	STK	2424.00	2092.00	0.00	2062.60	0.00	29.40	1.2100	Trapezoidal	5.000	23.000	0.0240	0.0000	0.0000	0.0000	0.00	No
9	USR	1864.00	2133.50	0.00	2092.00	0.00	41.50	2.2300	Trapezoidal	8.000	37.000	0.0240	0.0000	0.0000	0.0000	0.00	No

Channel Results

SN	Element ID	Peak Flow	Time of Peak Flow Occurrence	Design Flow Capacity	Peak Flow/ Design Flow Ratio	Peak Flow Velocity	Travel Time	Peak Flow Depth	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged	Froude Number	Reported Condition
		(cfs)	(days hh:mm)	(cfs)		(ft/sec)	(min)	(ft)		(min)		
1	1	520.34	0 12:38	964.35	0.54	12.41	0.18	4.06	0.69	0.00		
2	3	520.25	0 12:39	982.70	0.53	8.95	0.35	4.76	0.73	0.00		
3	29	730.29	0 12:34	1476.05	0.49	12.61	0.20	3.19	0.67	0.00		
4	ED	714.95	0 12:33	784.15	0.91	12.24	0.60	3.92	0.83	0.00		
5	KB	682.09	0 12:32	1129.64	0.60	9.75	0.67	4.67	0.95	0.00		
6	MOR	103.05	0 12:42	3372.60	0.03	7.83	2.17	2.19	0.27	0.00		
7	PF	722.80	0 12:34	1101.84	0.66	14.51	0.09	3.50	0.73	0.00		
8	STK	176.49	0 12:44	830.10	0.21	5.08	7.95	3.55	0.71	0.00		
9	USR	87.89	0 12:36	3988.84	0.02	5.56	5.59	1.86	0.24	0.00		

Pipe Input

SN	Element ID	Length (ft)	Inlet Invert Elevation (ft)	Inlet Invert Offset (ft)	Outlet Invert Elevation (ft)	Outlet Invert Offset (ft)	Total Drop (ft)	Average Slope (%)	Pipe Shape	Pipe Diameter or Height (in)	Pipe Width (in)	Manning's Roughness	Entrance Losses	Exit/Bend Losses	Additional Losses	Initial Flow (cfs)	Flap Gate	No. of Barrels
1	2	182.00	2061.70	0.00	2060.10	1.00	1.60	0.8800	Rectangular									
2	6	50.00	2048.88	0.00	2048.60	0.00	0.28	0.5600	Rectangular									
3	8	50.00	2045.83	0.00	2044.80	0.00	1.03	2.0600	Rectangular									
4	9	50.00	2154.50	0.00	2137.00	0.00	17.50	35.0000	CIRCULAR									
5	15	82.00	2134.00	0.00	2133.50	0.00	0.50	0.6100	CIRCULAR									
6	19	75.00	2117.00	0.00	2116.51	0.00	0.49	0.6500	CIRCULAR									
7	21	35.10	2044.25	0.00	2043.83	0.00	0.42	1.2000	CIRCULAR									
8	22	42.40	2050.75	0.00	2048.60	0.00	2.15	5.0700	CIRCULAR									
9	Link-01	166.00	2056.20	0.00	2054.70	0.00	1.50	0.9000	Rectangular									
10	Link-02	65.00	2054.70	0.00	2054.00	0.00	0.70	1.0800	Rectangular									

Pipe Results

SN	Element ID	Peak Flow (cfs)	Time of Peak Flow Occurrence (days hh:mm)	Design Flow Capacity (cfs)	Peak Flow/ Design Flow Ratio	Peak Flow Velocity (ft/sec)	Travel Time (min)	Peak Flow Depth (ft)	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged (min)	Froude Number	Reported Condition
1	2	520.27	0 12:38	896.81	0.58	10.07	0.30	3.77	0.96	0.00		Calculated
2	6	483.15	0 12:56	291.43	1.66	10.38	0.08	4.00	1.00	26.00		SURCHARGED
3	8	703.75	0 12:33	1979.07	0.36	9.24	0.09	3.63	0.85	0.00		Calculated
4	9	83.76	0 12:30	242.66	0.35	22.73	0.04	1.75	0.70	0.00		Calculated
5	15	72.31	0 12:34	199.62	0.36	15.26	0.09	1.49	0.35	0.00		Calculated
6	19	87.05	0 12:42	29.20	2.98	14.29	0.09	2.42	0.81	0.00		> CAPACITY
7	21	11.41	0 12:51	53.03	0.22	3.55	0.16	2.50	1.00	26.00		SURCHARGED
8	22	5.13	0 12:16	27.95	0.18	4.98	0.14	1.50	1.00	36.00		SURCHARGED
9	Link-01	520.23	0 12:39	6824.77	0.08	5.17	0.54	5.12	0.40	0.00		Calculated
10	Link-02	164.86	0 12:48	254.51	0.65	10.61	0.10	4.00	1.00	20.00		SURCHARGED

Storage Nodes

Storage Node : CVP

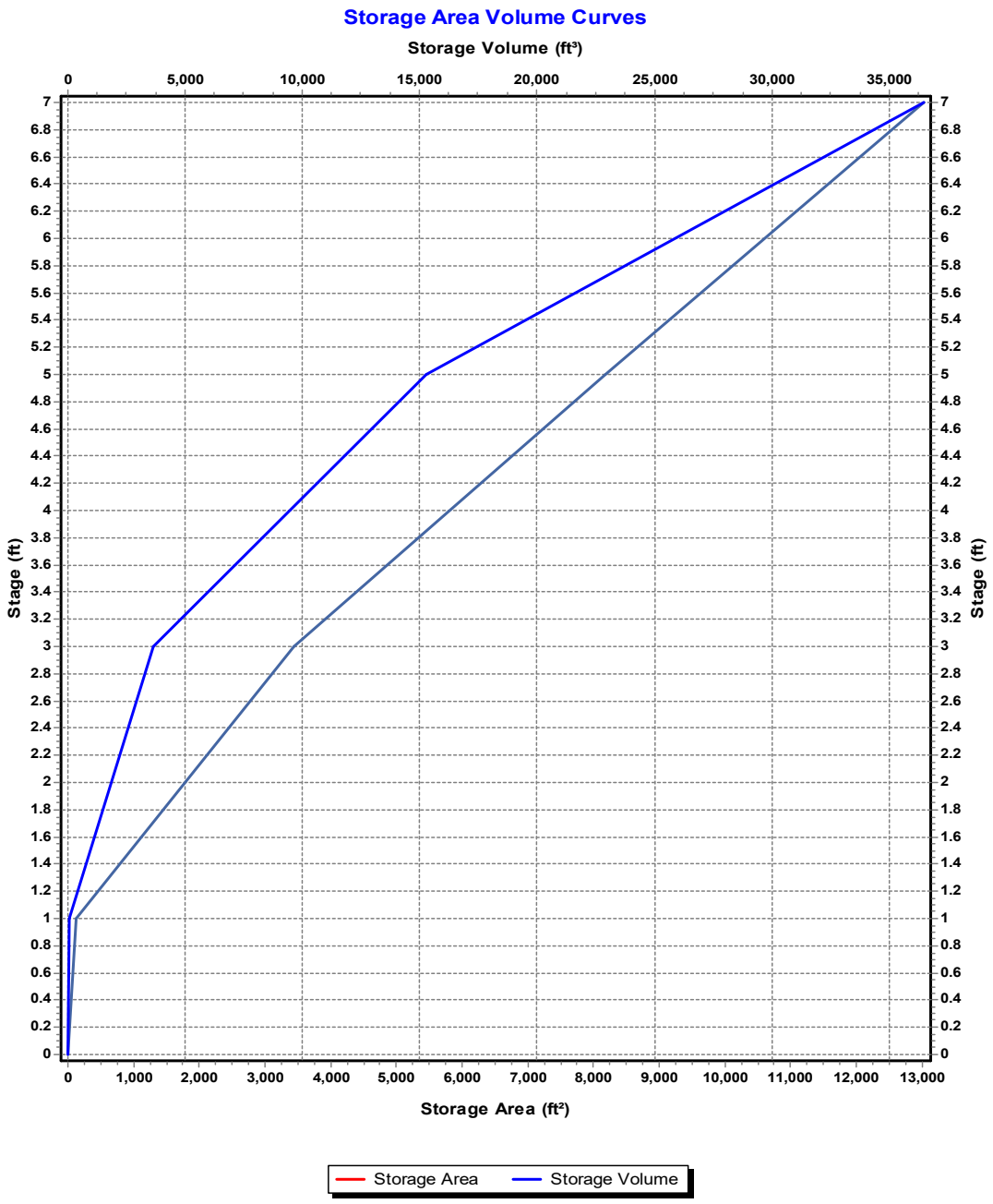
Input Data

Invert Elevation (ft)	2155.00
Max (Rim) Elevation (ft)	2162.00
Max (Rim) Offset (ft)	7.00
Initial Water Elevation (ft)	2155.00
Initial Water Depth (ft)	0.00
Ponded Area (ft^2)	7.00
Evaporation Loss	0.00

Storage Area Volume Curves

Storage Curve : CVP1

Stage (ft)	Storage Area (ft^2)	Storage Volume (ft^3)
0	0	0
1	131	65.5
3	3441	3637.5
5	8189	15267.5
7	13024	36480.5


Storage Area Volume Curves
Storage Volume (ft³)
0
5,000
10,000
15,000
20,000
25,000
30,000
35,000
Stage (ft)
0
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
1.8
2
2.2
2.4
2.6
2.8
3
3.2
3.4
3.6
3.8
4
4.2
4.4
4.6
4.8
5
5.2
5.4
5.6
5.8
6
6.2
6.4
6.6
6.8
7
Storage Area (ft²)
0
1,000
2,000
3,000
4,000
5,000
6,000
7,000
8,000
9,000
10,000
11,000
12,000
13,000
Storage Area
Storage Volume

Storage Node : CVP (continued)

Outflow Weirs

SN	Element ID	Weir Type	Flap Gate	Crest Elevation (ft)	Crest Offset (ft)	Length (ft)	Weir Total Height (ft)	Discharge Coefficient
1	14	Trapezoidal	No	2161.50	6.50	40.00	2.00	3.33

Outflow Orifices

SN	Element ID	Orifice Type	Orifice Shape	Flap Gate	Circular Orifice Diameter (in)	Rectangular Orifice Height (in)	Rectangular Orifice Width (in)	Orifice Invert Elevation (ft)	Orifice Coefficient
1	5	Side	CIRCULAR	No					
2	7	Side	CIRCULAR	No					
3	13	Bottom	Rectangular	No					

Output Summary Results

Peak Inflow (cfs)	85.85
Peak Lateral Inflow (cfs)	85.85
Peak Outflow (cfs)	83.76
Peak Exfiltration Flow Rate (cfm)	0
Max HGL Elevation Attained (ft)	2160.52
Max HGL Depth Attained (ft)	5.52
Average HGL Elevation Attained (ft)	2155.37
Average HGL Depth Attained (ft)	0.37
Time of Max HGL Occurrence (days hh:mm)	0 12:30
Total Exfiltration Volume (1000-ft^3)	0
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0

Storage Node : P1

Input Data

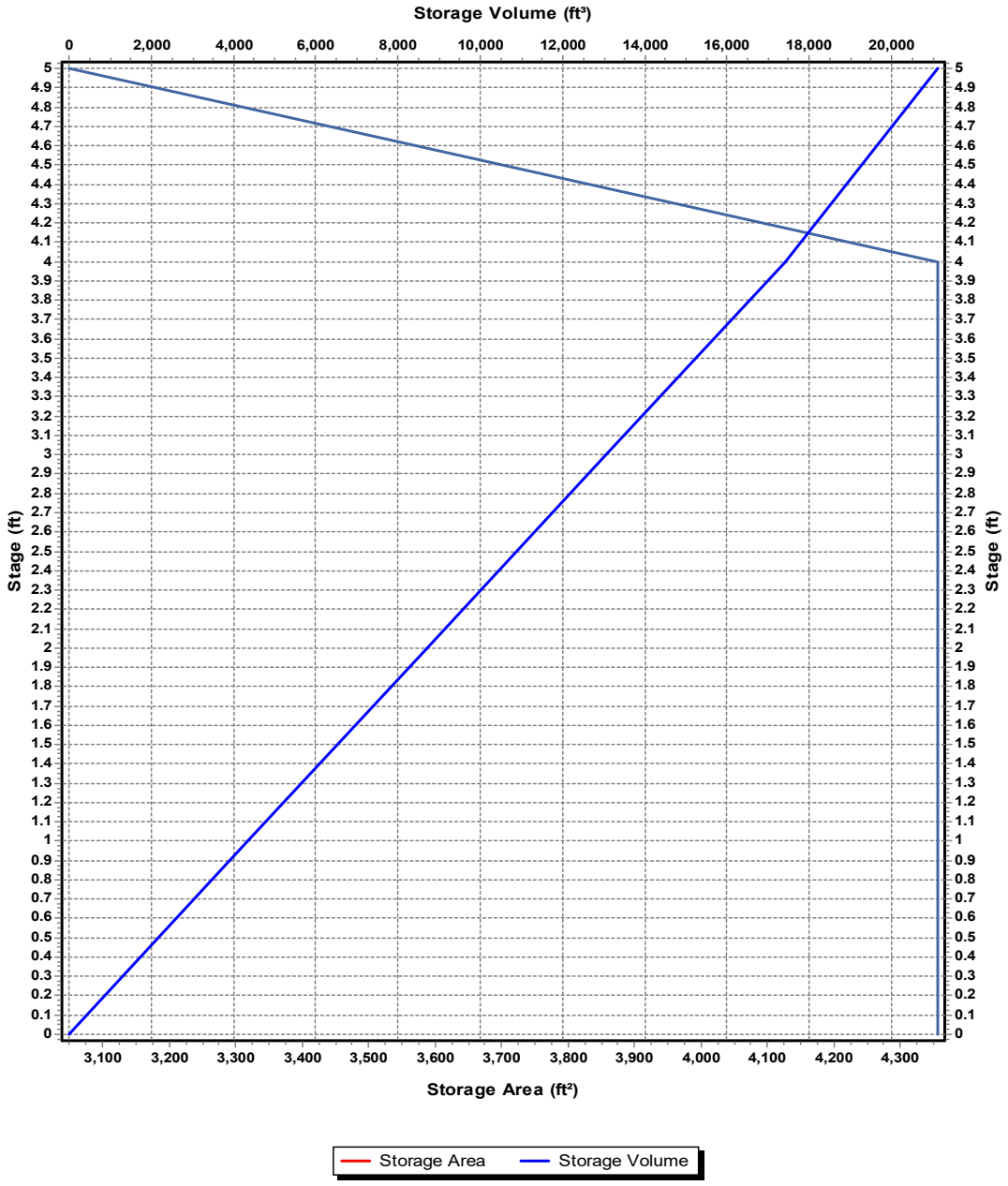
Invert Elevation (ft)	2050.75
Max (Rim) Elevation (ft)	2055.75
Max (Rim) Offset (ft)	5.00
Initial Water Elevation (ft)	2050.75
Initial Water Depth (ft)	0.00
Ponded Area (ft^2)	5.00
Evaporation Loss	0.00

Storage Area Volume Curves

Storage Curve : P1

Stage (ft)	Storage Area (ft^2)	Storage Volume (ft^3)
0	4356	0
1	4356	4356
2	4356	8712
3	4356	13068
4	4356	17424
5	3049	21126.5

Storage Area Volume Curves



Storage Node : P1 (continued)

Outflow Weirs

SN	Element ID	Weir Type	Flap Gate	Crest Elevation (ft)	Crest Offset (ft)	Length (ft)	Weir Total Height (ft)	Discharge Coefficient
1	28	Transverse	No	2054.65	3.90	6.00	2.00	3.33

Outflow Orifices

SN	Element ID	Orifice Type	Orifice Shape	Flap Gate	Circular Orifice Diameter (in)	Rectangular Orifice Height (in)	Rectangular Orifice Width (in)	Orifice Invert Elevation (ft)	Orifice Coefficient
1	26	Side	CIRCULAR	No					
2	27	Side	Rectangular	No					

Output Summary Results

Peak Inflow (cfs)	13.4
Peak Lateral Inflow (cfs)	13.4
Peak Outflow (cfs)	4.2
Peak Exfiltration Flow Rate (cfm)	0
Max HGL Elevation Attained (ft)	2054.75
Max HGL Depth Attained (ft)	4
Average HGL Elevation Attained (ft)	2051.39
Average HGL Depth Attained (ft)	0.64
Time of Max HGL Occurrence (days hh:mm)	0 12:33
Total Exfiltration Volume (1000-ft^3)	0
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0

Storage Node : P2

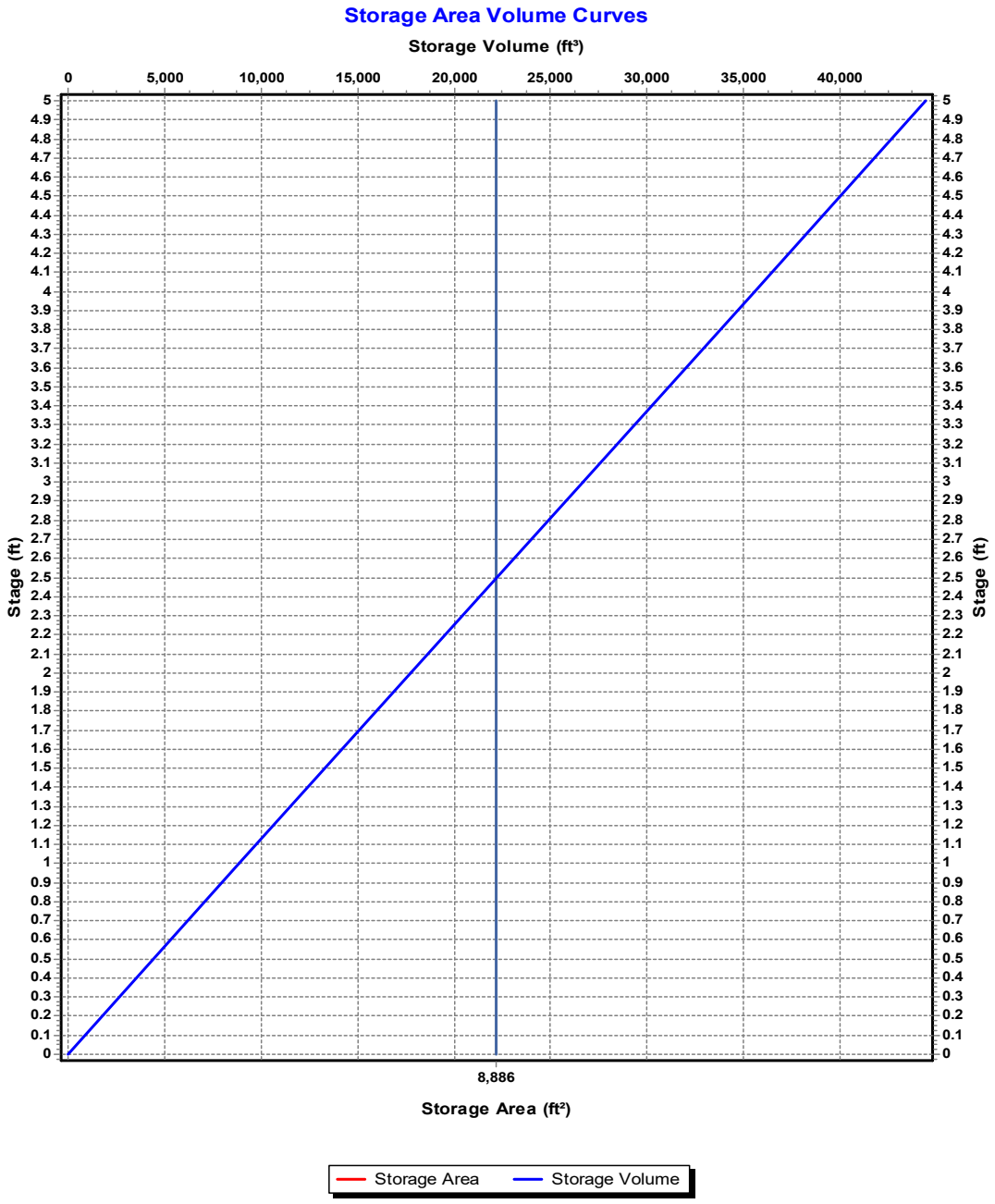
Input Data

Invert Elevation (ft)	2044.25
Max (Rim) Elevation (ft)	2049.25
Max (Rim) Offset (ft)	5.00
Initial Water Elevation (ft)	2044.25
Initial Water Depth (ft)	0.00
Ponded Area (ft^2)	5.00
Evaporation Loss	0.00

Storage Area Volume Curves

Storage Curve : P2

Stage (ft)	Storage Area (ft^2)	Storage Volume (ft^3)
0	8886	0
1	8886	8886
2	8886	17772
3	8886	26658
4	8886	35544
5	8886	44430


Storage Area Volume Curves
Storage Volume (ft³)
0
5,000
10,000
15,000
20,000
25,000
30,000
35,000
40,000
Stage (ft)
Stage (ft)
8,886
Storage Area (ft²)
Storage Area
Storage Volume

Storage Node : P2 (continued)

Outflow Weirs

SN	Element ID	Weir Type	Flap Gate	Crest Elevation (ft)	Crest Offset (ft)	Length (ft)	Weir Total Height (ft)	Discharge Coefficient
1	25	Transverse	No	2048.80	4.55	6.00	2.00	3.33

Outflow Orifices

SN	Element ID	Orifice Type	Orifice Shape	Flap Gate	Circular Orifice Diameter (in)	Rectangular Orifice Height (in)	Rectangular Orifice Width (in)	Orifice Invert Elevation (ft)	Orifice Coefficient
1	23	Side	Rectangular	No					
2	24	Side	Rectangular	No					

Output Summary Results

Peak Inflow (cfs)	23.85
Peak Lateral Inflow (cfs)	23.85
Peak Outflow (cfs)	10.8
Peak Exfiltration Flow Rate (cfm)	0
Max HGL Elevation Attained (ft)	2048.9
Max HGL Depth Attained (ft)	4.65
Average HGL Elevation Attained (ft)	2044.58
Average HGL Depth Attained (ft)	0.33
Time of Max HGL Occurrence (days hh:mm)	0 12:50
Total Exfiltration Volume (1000-ft³)	0
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0

Storage Node : RP

Input Data

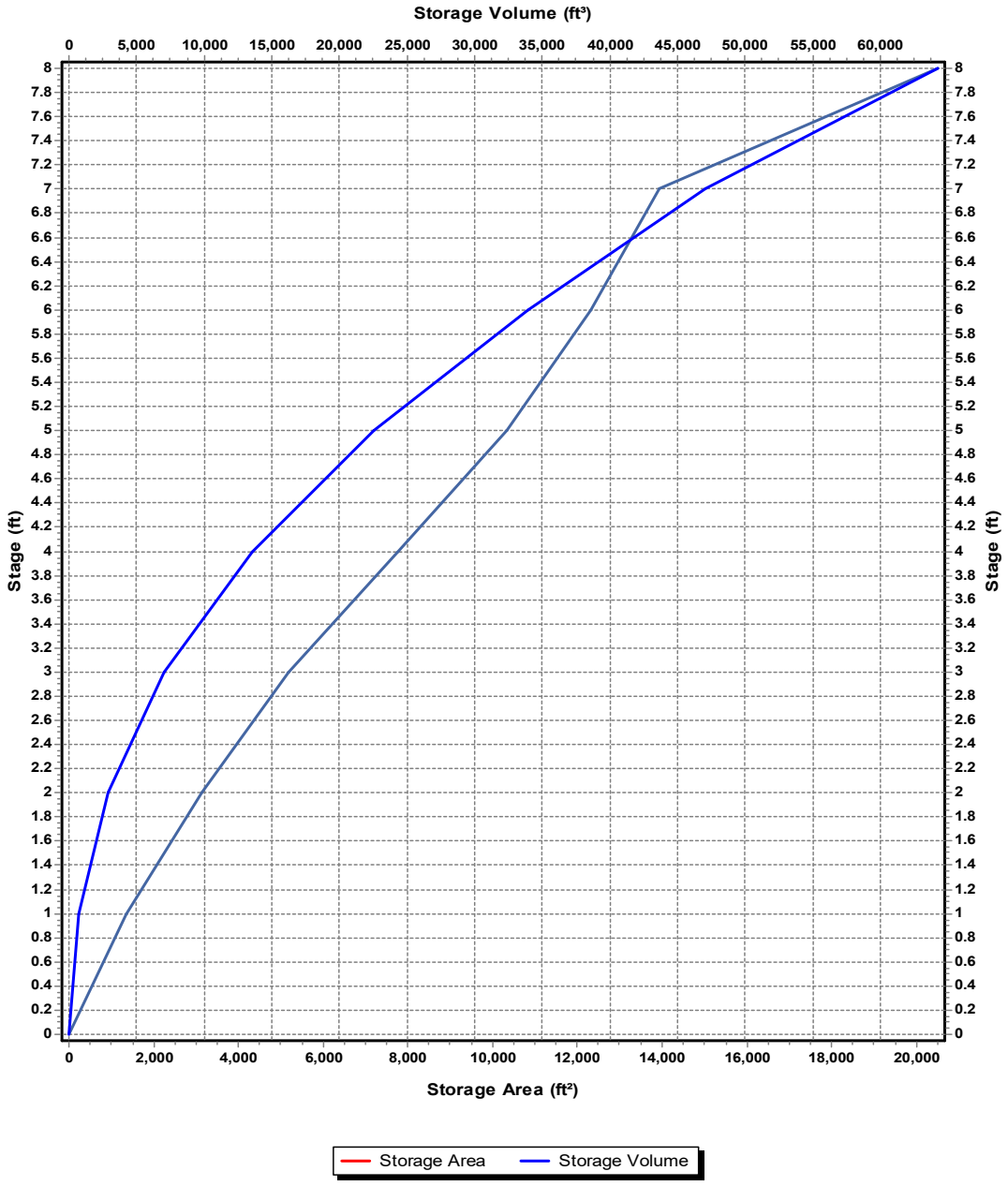
Invert Elevation (ft)	2137.00
Max (Rim) Elevation (ft)	2145.00
Max (Rim) Offset (ft)	8.00
Initial Water Elevation (ft)	2137.00
Initial Water Depth (ft)	0.00
Ponded Area (ft^2)	8.00
Evaporation Loss	0.00

Storage Area Volume Curves

Storage Curve : RP1

Stage (ft)	Storage Area (ft^2)	Storage Volume (ft^3)
0	0	0
1	1366	683
2	3129	2930.5
3	5175	7082.5
4	7760	13550
5	10340	22600
6	12305	33922.5
7	13925	47037.5
8	20503	64251.5

Storage Area Volume Curves



Storage Node : RP (continued)

Outflow Weirs

SN	Element ID	Weir Type	Flap Gate	Crest Elevation (ft)	Crest Offset (ft)	Length (ft)	Weir Total Height (ft)	Discharge Coefficient
1	18	Trapezoidal	No	2144.50	7.50	60.00	2.00	3.33

Outflow Orifices

SN	Element ID	Orifice Type	Orifice Shape	Flap Gate	Circular Orifice Diameter (in)	Rectangular Orifice Height (in)	Rectangular Orifice Width (in)	Orifice Invert Elevation (ft)	Orifice Coefficient
1	16	Side	CIRCULAR	No					
2	17	Side	Rectangular	No					

Output Summary Results

Peak Inflow (cfs)	97.5
Peak Lateral Inflow (cfs)	14.52
Peak Outflow (cfs)	89.68
Peak Exfiltration Flow Rate (cfm)	0
Max HGL Elevation Attained (ft)	2144.7
Max HGL Depth Attained (ft)	7.7
Average HGL Elevation Attained (ft)	2137.53
Average HGL Depth Attained (ft)	0.53
Time of Max HGL Occurrence (days hh:mm)	0 12:34
Total Exfiltration Volume (1000-ft^3)	0
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0

Storage Node : SP

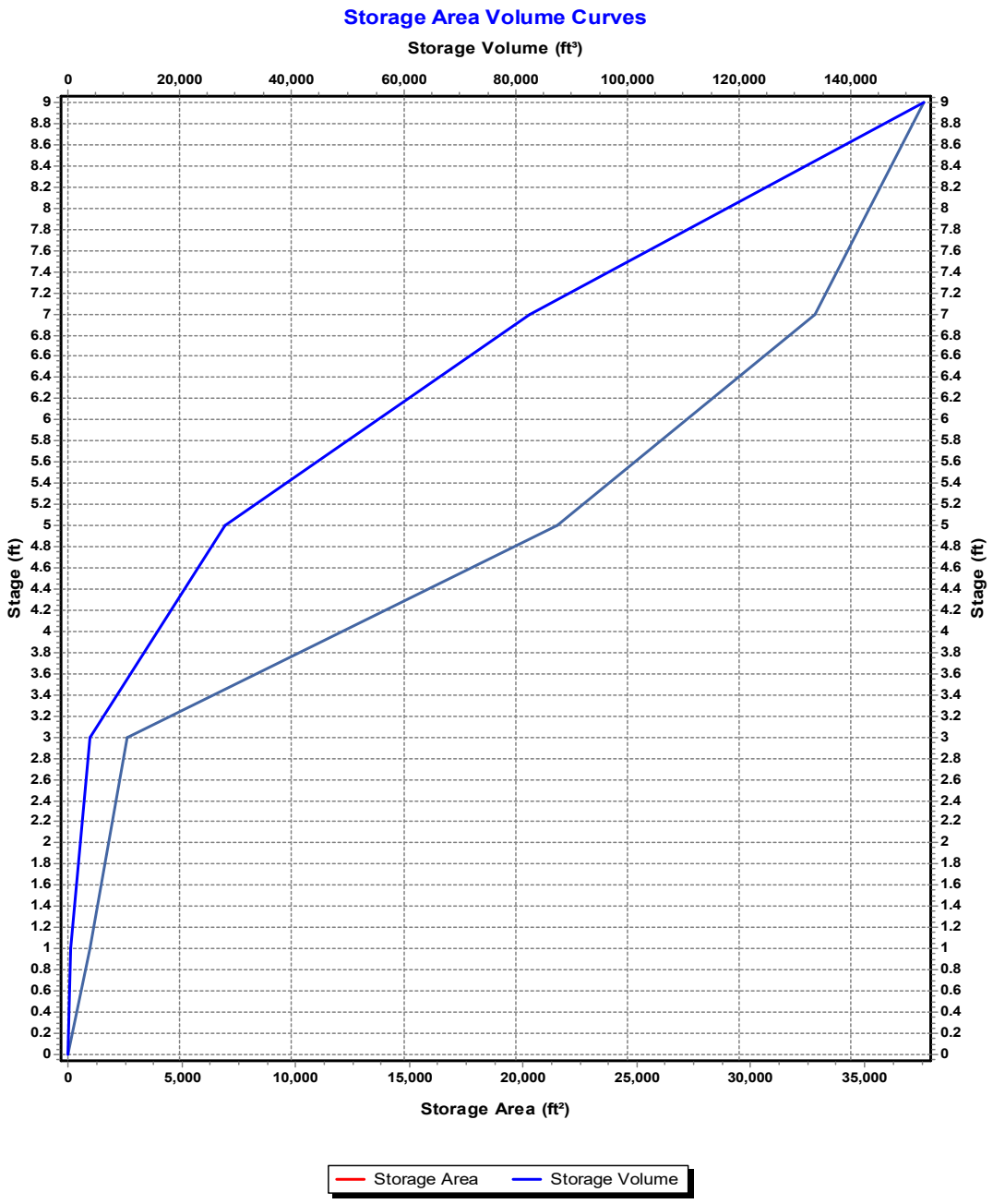
Input Data

Invert Elevation (ft)	2117.00
Max (Rim) Elevation (ft)	2125.00
Max (Rim) Offset (ft)	8.00
Initial Water Elevation (ft)	2117.00
Initial Water Depth (ft)	0.00
Ponded Area (ft^2)	8.00
Evaporation Loss	0.00

Storage Area Volume Curves

Storage Curve : SP1

Stage (ft)	Storage Area (ft^2)	Storage Volume (ft^3)
0	0	0
1	955	477.5
3	2580	4012.5
5	21522	28114.5
7	32858	82494.5
9	37630	152982.5


Storage Area Volume Curves
Storage Volume (ft³)
0
20,000
40,000
60,000
80,000
100,000
120,000
140,000
Stage (ft)
0
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
1.8
2
2.2
2.4
2.6
2.8
3
3.2
3.4
3.6
3.8
4
4.2
4.4
4.6
4.8
5
5.2
5.4
5.6
5.8
6
6.2
6.4
6.6
6.8
7
7.2
7.4
7.6
7.8
8
8.2
8.4
8.6
8.8
9
0
5,000
10,000
15,000
20,000
25,000
30,000
35,000
Storage Area (ft²)
Storage Area
Storage Volume

Storage Node : SP (continued)

Outflow Weirs

SN	Element ID	Weir Type	Flap Gate	Crest Elevation (ft)	Crest Offset (ft)	Length (ft)	Weir Total Height (ft)	Discharge Coefficient
1	20	Trapezoidal	No	2123.00	6.00	20.00	2.00	3.33

Output Summary Results

Peak Inflow (cfs)	145.22
Peak Lateral Inflow (cfs)	145.22
Peak Outflow (cfs)	103.18
Peak Exfiltration Flow Rate (cfm)	0
Max HGL Elevation Attained (ft)	2123.39
Max HGL Depth Attained (ft)	6.39
Average HGL Elevation Attained (ft)	2117.4
Average HGL Depth Attained (ft)	0.4
Time of Max HGL Occurrence (days hh:mm)	0 12:42
Total Exfiltration Volume (1000-ft^3)	0
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0

Project Description

File Name ..... ExistingKabrichModel.SPF

Project Options

Flow Units ..... CFS
Elevation Type ..... Elevation
Hydrology Method ..... SCS TR-20
Time of Concentration (TOC) Method ..... User-Defined
Link Routing Method ..... Hydrodynamic
Enable Overflow Ponding at Nodes ..... YES
Skip Steady State Analysis Time Periods ..... NO

Number of Elements

	Qty
Rain Gages	1
Subbasins	9
Nodes	23
Junctions	17
Outfalls	1
Flow Diversions	0
Inlets	0
Storage Nodes	5
Links	41
Channels	8
Pipes	10
Pumps	0
Orifices	9
Weirs	14
Outlets	0
Pollutants	0
Land Uses	0

Rainfall Details

SN	Rain Gage ID	Data Source	Data Source ID	Rainfall Type	Rain Units	State	County	Return Period (years)	Rainfall Depth (inches)	Rainfall Distribution
1	1	Time Series	100Year	Cumulative	inches				0.00	

Subbasin Summary

SN	Subbasin ID	Area (ac)	Peak Rate Factor	Weighted Curve Number	Total Rainfall (in)	Total Runoff (in)	Total Runoff Volume (ac-in)	Peak Runoff (cfs)	Time of Concentration (days hh:mm:ss)
1	A	6.36	484.00	90.00	6.50	5.33	33.92	25.26	0 00:18:30
2	B	10.80	484.00	92.00	6.50	5.56	60.06	51.03	0 00:12:30
3	CO	44.42	484.00	84.00	6.50	4.67	207.22	162.24	0 00:17:30
4	K	93.79	484.00	85.00	6.50	4.78	447.85	344.04	0 00:18:12
5	RU	7.74	484.00	87.00	6.50	5.00	38.67	34.03	0 00:12:24
6	SH	69.35	484.00	86.00	6.50	4.89	338.77	234.05	0 00:23:30
7	UG1	3.05	484.00	93.00	6.50	5.68	17.31	19.04	0 00:05:00
8	UG2	11.65	484.00	86.00	6.50	4.89	56.91	44.49	0 00:17:12
9	US1	244.78	484.00	82.00	6.50	4.45	1089.03	701.29	0 00:28:36

Node Summary

SN	Element ID	Element Type	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Initial Water Elevation (ft)	Surcharge Elevation (ft)	Ponded Area (ft^2)	Peak Inflow (cfs)	Max HGL Elevation Attained (ft)	Max Surcharge Depth Attained (ft)	Min Freeboard Attained (ft)	Time of Peak Flooding Occurrence (days hh:mm)	Total Flooded Volume (ac-in)	Total Time Flooded (min)
1	1	Junction	2062.60	2068.60	2062.60	2068.60	0.00	983.85	2069.21	0.00	4.39	0 00:00	0.00	0.00
2	2	Junction	2061.70	2066.30	2061.70	2066.30	0.00	982.65	2068.86	0.00	3.84	0 00:00	0.00	0.00
3	3	Junction	2060.10	2065.70	2060.10	2065.70	0.00	982.63	2068.57	0.00	3.09	0 00:00	0.00	0.00
4	4	Junction	2057.57	2062.00	2057.57	2062.00	0.00	982.62	2062.76	0.00	6.37	0 00:00	0.00	0.00
5	5	Junction	2054.00	2060.00	2054.00	2060.00	0.00	1260.97	2060.83	0.00	4.17	0 00:00	0.00	0.00
6	6	Junction	2048.88	2053.88	2048.88	2053.88	0.00	1260.92	2055.65	0.00	4.23	0 00:00	0.00	0.00
7	7	Junction	2048.60	2053.60	2048.60	2053.60	0.00	1288.42	2054.91	0.00	3.69	0 00:00	0.00	0.00
8	8	Junction	2045.83	2050.83	2045.83	2050.83	0.00	1288.37	2051.39	0.00	4.44	0 00:00	0.00	0.00
9	9	Junction	2044.80	2049.80	2044.80	2049.80	0.00	1319.37	2049.94	0.00	4.86	0 00:00	0.00	0.00
10	11	Junction	2092.00	2098.00	2092.00	2098.00	0.00	357.06	2095.42	0.00	4.58	0 00:00	0.00	0.00
11	12	Junction	2133.50	2139.50	2133.50	2139.50	0.00	162.09	2135.29	0.00	7.71	0 00:00	0.00	0.00
12	13	Junction	2116.51	2125.00	2116.51	2125.00	0.00	204.98	2119.02	0.00	5.98	0 00:00	0.00	0.00
13	14	Junction	2154.50	2154.50	2154.50	2154.50	0.00	138.50	2155.90	0.00	2.87	0 00:00	0.00	0.00
14	15	Junction	2134.00	2142.00	2134.00	2142.00	0.00	84.39	2136.04	0.00	10.46	0 00:00	0.00	0.00
15	16	Junction	2044.25	2044.25	2044.25	2044.25	0.00	37.87	2048.79	0.00	2.01	0 00:00	0.00	0.00
16	17	Junction	2050.75	2050.75	2050.75	2050.75	0.00	14.84	2055.03	0.00	1.62	0 00:00	0.00	0.00
17	18	Junction	2043.83	2047.83	2043.83	2047.83	0.00	1354.89	2048.59	0.00	5.24	0 00:00	0.00	0.00
18	10	Outfall	2041.91					1354.98	2046.67					
19	CVP	Storage Node	2155.00	2162.00	2155.00		7.00	140.35	2160.84				0.00	0.00
20	P1	Storage Node	2050.75	2055.75	2050.75		5.00	18.61	2055.35				0.00	0.00
21	P2	Storage Node	2044.25	2049.25	2044.25		5.00	37.87	2050.08				0.00	13.00
22	RP	Storage Node	2137.00	2145.00	2137.00		8.00	160.54	2145.03				0.00	2.00
23	SP	Storage Node	2117.00	2125.00	2117.00		8.00	231.97	2124.40				0.00	0.00

Link Summary

SN	Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length	Inlet Invert Elevation	Outlet Invert Elevation	Average Slope	Diameter or Height	Manning's Roughness	Peak Flow	Design Flow Capacity	Peak Flow/ Design Flow Ratio	Peak Flow Velocity	Peak Flow Depth	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged	Reported Condition
					(ft)	(ft)	(ft)	(%)	(in)		(cfs)	(cfs)		(ft/sec)	(ft)		(min)	
1	2	Pipe	2	3	182.00	2061.70	2060.10	0.8800			291.44	896.81	0.32	6.45	4.00	1.00	87.00	SURCHARGED
2	3	Pipe	3	4	181.00	2060.10	2057.57	1.4000			340.10	269.80	1.26	9.81	3.67	1.00	103.00	SURCHARGED
3	4	Pipe	4	5	210.00	2057.57	2054.00	1.7000			165.11	148.77	1.11	11.06	3.67	1.00	54.00	SURCHARGED
4	6	Pipe	6	7	50.00	2048.88	2048.60	0.5600			482.77	291.43	1.66	10.36	4.00	1.00	54.00	SURCHARGED
5	8	Pipe	8	9	50.00	2045.83	2044.80	2.0600			1097.82	1979.07	0.55	12.20	4.50	1.00	29.00	SURCHARGED
6	9	Pipe	14	RP	50.00	2154.50	2137.00	35.0000			138.51	242.66	0.57	33.75	1.95	0.78	0.00	Calculated
7	15	Pipe	15	12	82.00	2134.00	2133.50	0.6100			84.15	199.62	0.42	15.48	1.90	0.42	0.00	Calculated
8	19	Pipe	SP	13	75.00	2117.00	2116.51	0.6500			94.87	29.20	3.25	14.38	2.68	0.92	0.00	> CAPACITY
9	21	Pipe	16	18	35.10	2044.25	2043.83	1.2000			42.95	53.03	0.81	8.75	2.50	1.00	54.00	SURCHARGED
10	22	Pipe	17	7	42.40	2050.75	2048.60	5.0700			14.62	27.95	0.52	8.27	1.50	1.00	62.00	SURCHARGED
11	1	Channel	1	2	131.00	2062.60	2061.70	0.6900			682.00	964.35	0.71	12.16	6.00	1.00	32.00	
12	29	Channel	18	10	154.40	2043.83	2041.91	1.2400			1354.98	1476.05	0.92	15.16	4.68	0.95	0.00	
13	ED	Channel	7	8	440.35	2048.60	2045.83	0.6300			864.77	784.15	1.10	12.60	5.00	1.00	23.00	
14	KB	Channel	5	6	392.20	2054.00	2048.88	1.3100			883.56	1129.64	0.78	11.78	5.00	1.00	35.00	
15	MOR	Channel	13	11	1020.00	2116.51	2092.00	2.4000			204.76	3372.60	0.06	8.87	2.82	0.37	0.00	
16	PF	Channel	9	18	78.10	2044.80	2043.83	1.2400			1278.47	1101.84	1.16	17.70	4.84	0.98	0.00	
17	STK	Channel	11	1	2424.00	2092.00	2062.60	1.2100			344.13	830.10	0.41	7.16	4.14	0.84	0.00	
18	USR	Channel	12	11	1864.00	2133.50	2092.00	2.2300			158.18	3988.84	0.04	6.83	2.43	0.32	0.00	
19	5	Orifice	CVP	14		2155.00	2154.50				20.60							
20	7	Orifice	CVP	14		2155.00	2154.50				42.99							
21	13	Orifice	CVP	14		2155.00	2154.50				75.02							
22	16	Orifice	RP	15		2137.00	2134.00				24.88							
23	17	Orifice	RP	15		2137.00	2134.00				59.51							
24	23	Orifice	P2	16		2044.25	2044.25				4.83							
25	24	Orifice	P2	16		2044.25	2044.25				6.65							
26	26	Orifice	P1	17		2050.75	2050.75				0.42							
27	27	Orifice	P1	17		2050.75	2050.75				3.73							
28	10	Weir	8	9		2045.83	2044.80				197.82							
29	11	Weir	6	7		2048.88	2048.60				926.96							
30	14	Weir	CVP	RP		2155.00	2137.00				0.00							
31	18	Weir	RP	12		2137.00	2133.50				77.98							
32	20	Weir	SP	13		2117.00	2116.51				110.12							
33	25	Weir	P2	16		2044.25	2044.25				28.99							
34	28	Weir	P1	17		2050.75	2050.75				11.62							
35	31	Weir	2	3		2061.70	2060.10				742.94							
36	32	Weir	3	4		2060.10	2057.57				642.52							
37	33	Weir	4	5		2057.57	2054.00				884.88							
38	35	Weir	5	6		2054.00	2048.88				386.37							
39	36	Weir	7	8		2048.60	2045.83				504.22							
40	37	Weir	9	18		2044.80	2043.83				41.12							
41	38	Weir	1	2		2062.60	2061.70				376.33							

Subbasin Hydrology

Subbasin : A

Input Data

Area (ac) 6.36
Peak Rate Factor 484
Weighted Curve Number 90
Rain Gage ID 1

Composite Curve Number

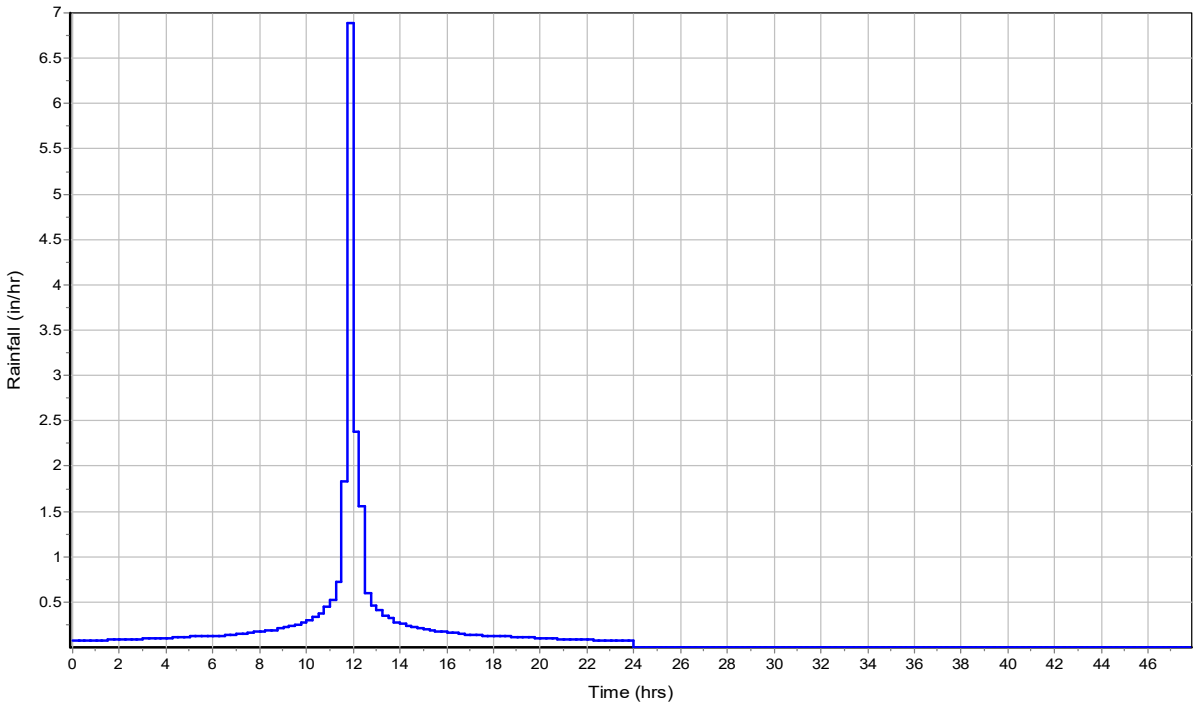
32 Soil/Surface Description	Area (acres)	Soil Group	Curve Number
-	6.36	-	90
Composite Area & Weighted CN	6.36		90

Subbasin Runoff Results

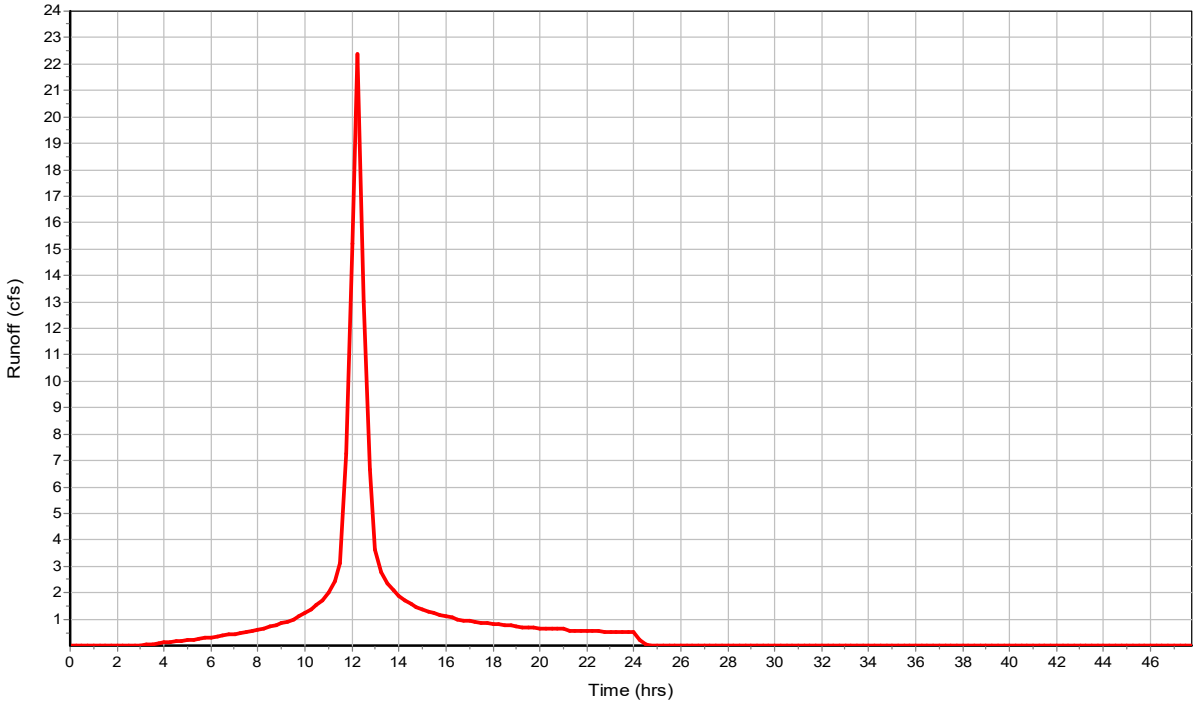
Total Rainfall (in) 6.5
Total Runoff (in) 5.33
Peak Runoff (cfs) 25.26
Weighted Curve Number 90
Time of Concentration (days hh:mm:ss) 0 00:18:30

Subbasin : A

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : B

Input Data

Area (ac) 10.8
Peak Rate Factor 484
Weighted Curve Number 92
Rain Gage ID 1

Composite Curve Number

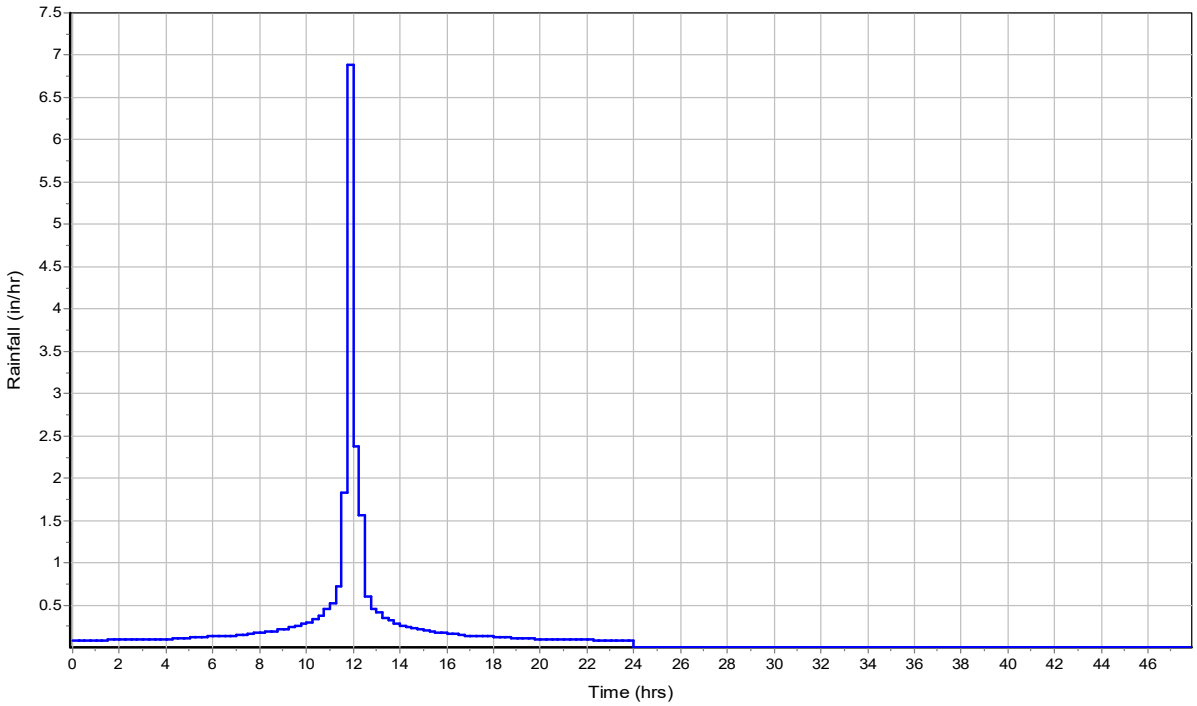
32 Soil/Surface Description	Area (acres)	Soil Group	Curve Number
-	10.8	-	92
Composite Area & Weighted CN	10.8		92

Subbasin Runoff Results

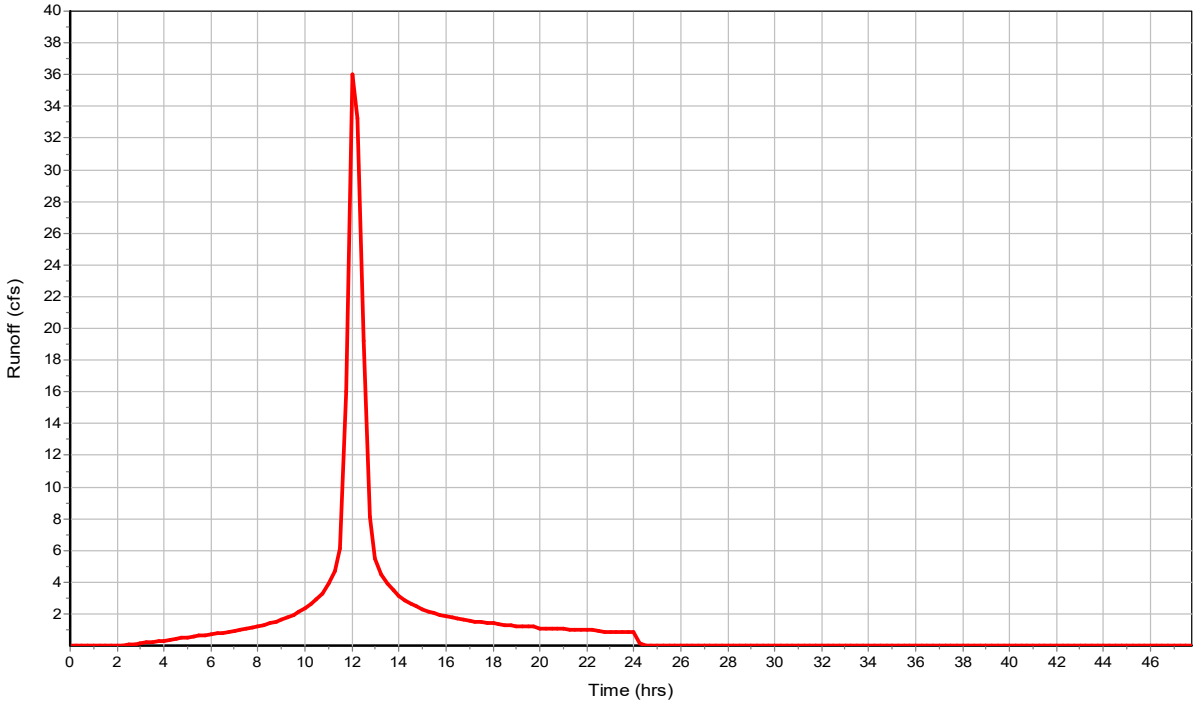
Total Rainfall (in) 6.5
Total Runoff (in) 5.56
Peak Runoff (cfs) 51.03
Weighted Curve Number 92
Time of Concentration (days hh:mm:ss) 0 00:12:30

Subbasin : B

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : CO

Input Data

Area (ac) 44.42
Peak Rate Factor 484
Weighted Curve Number 84
Rain Gage ID 1

Composite Curve Number

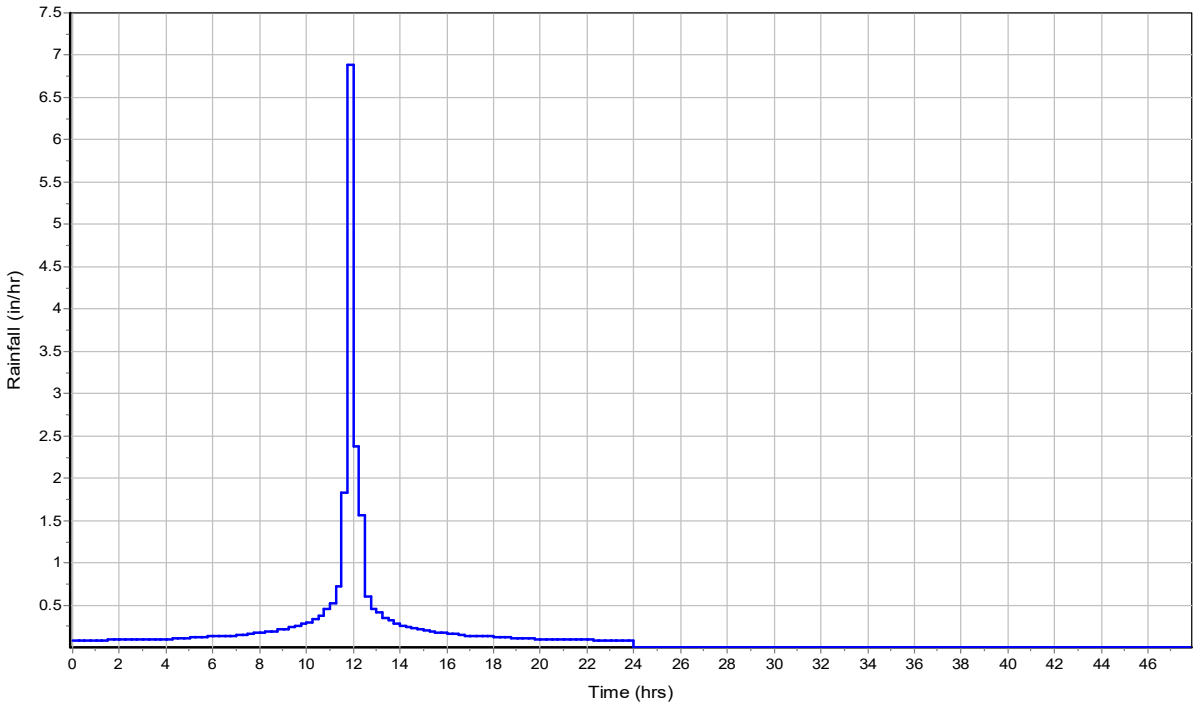
32 Soil/Surface Description	Area (acres)	Soil Group	Curve Number
-	44.42	-	84
Composite Area & Weighted CN	44.42		84

Subbasin Runoff Results

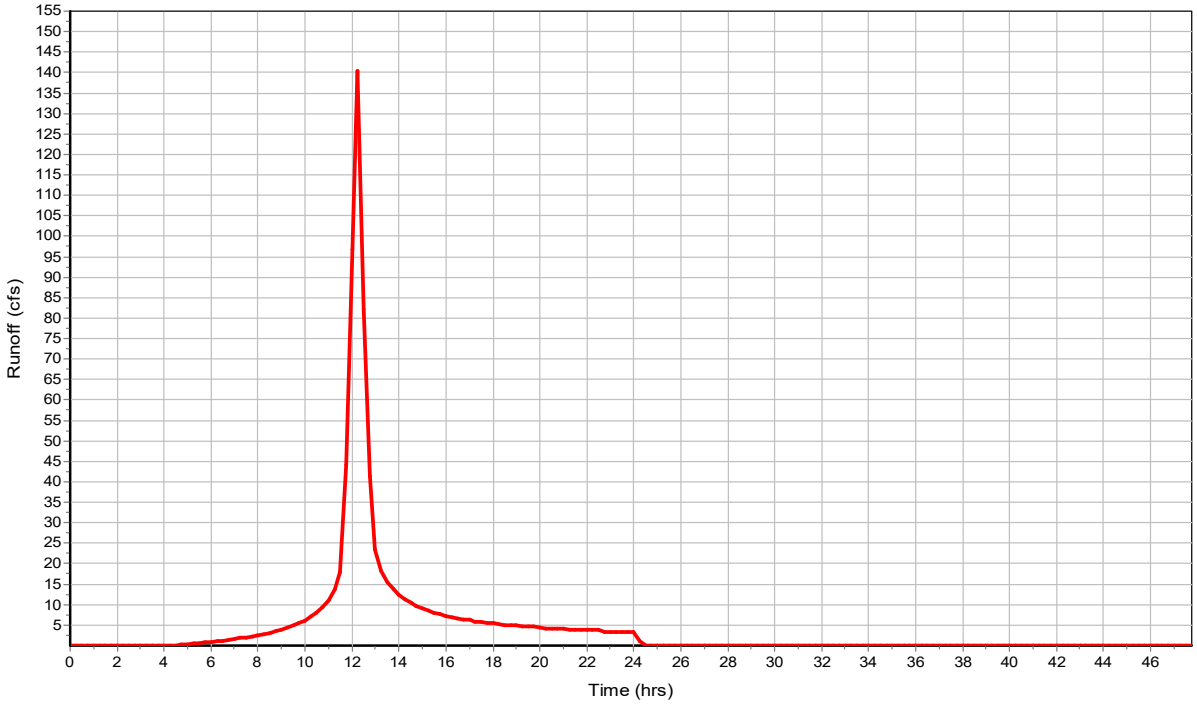
Total Rainfall (in) 6.5
Total Runoff (in) 4.67
Peak Runoff (cfs) 162.24
Weighted Curve Number 84
Time of Concentration (days hh:mm:ss) 0 00:17:30

Subbasin : CO

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : K

Input Data

Area (ac)	93.79
Peak Rate Factor	484
Weighted Curve Number	85
Rain Gage ID	1

Composite Curve Number

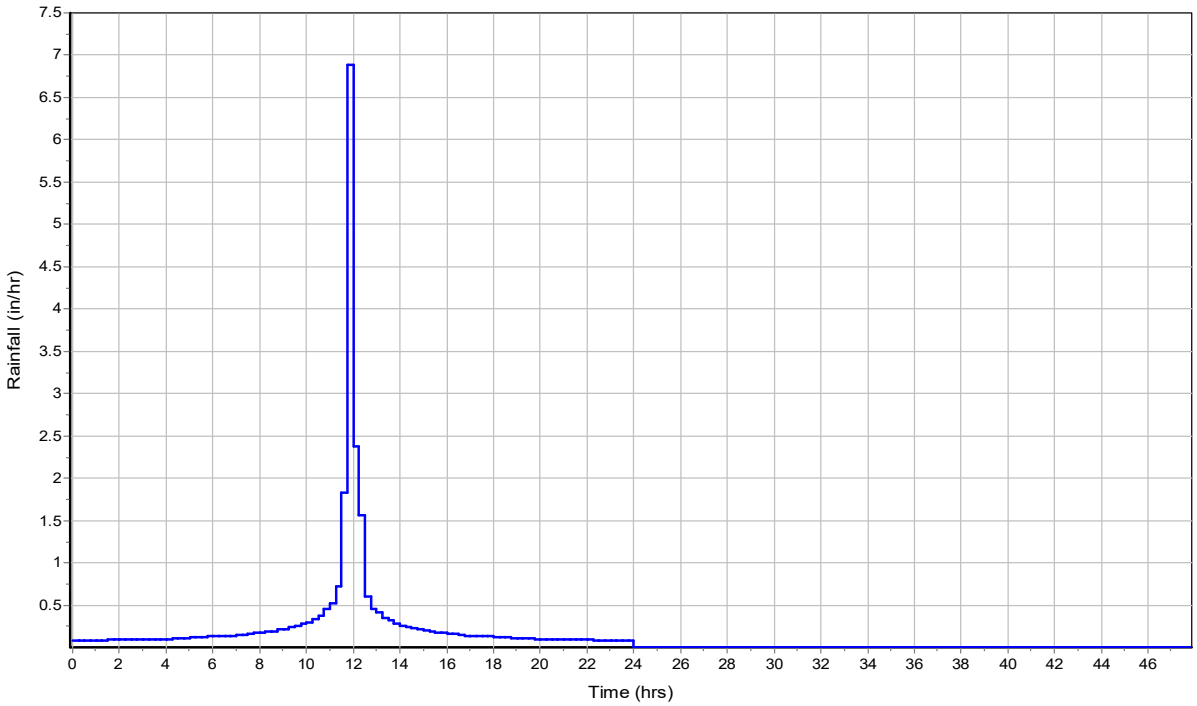
32 Soil/Surface Description	Area (acres)	Soil Group	Curve Number
-	93.79	-	85
Composite Area & Weighted CN	93.79		85

Subbasin Runoff Results

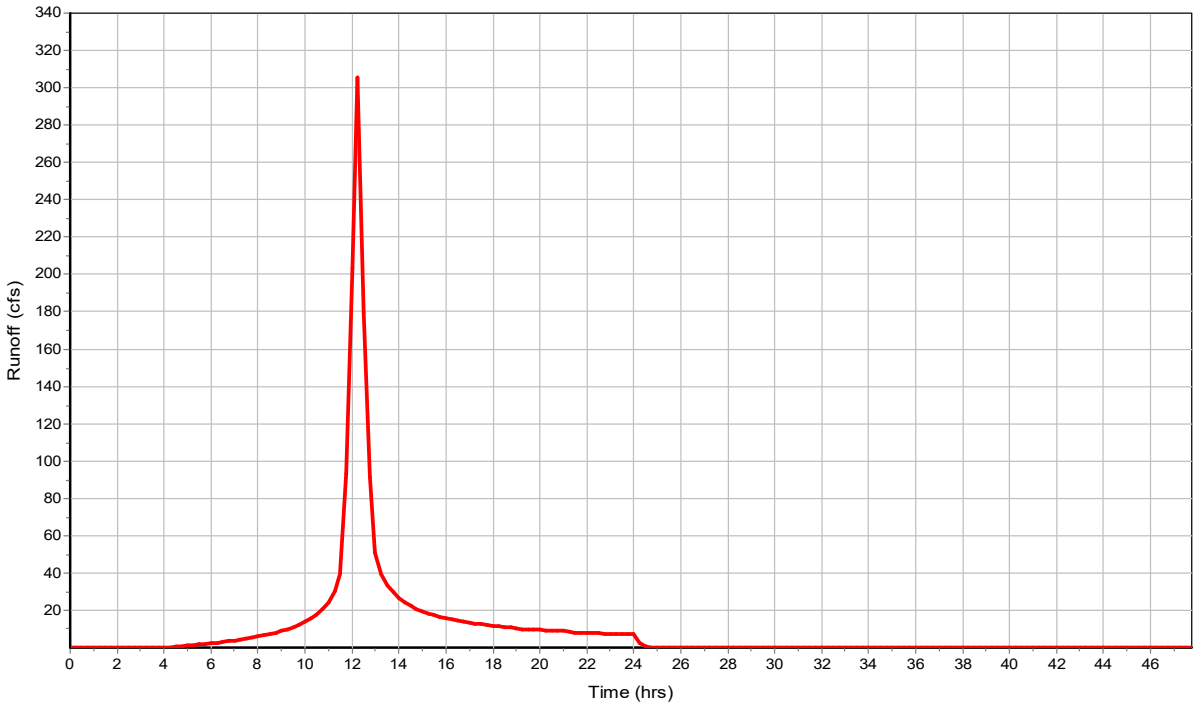
Total Rainfall (in)	6.5
Total Runoff (in)	4.78
Peak Runoff (cfs)	344.04
Weighted Curve Number	85
Time of Concentration (days hh:mm:ss)	0 00:18:12

Subbasin : K

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : RU

Input Data

Area (ac)	7.74
Peak Rate Factor	484
Weighted Curve Number	87
Rain Gage ID	1

Composite Curve Number

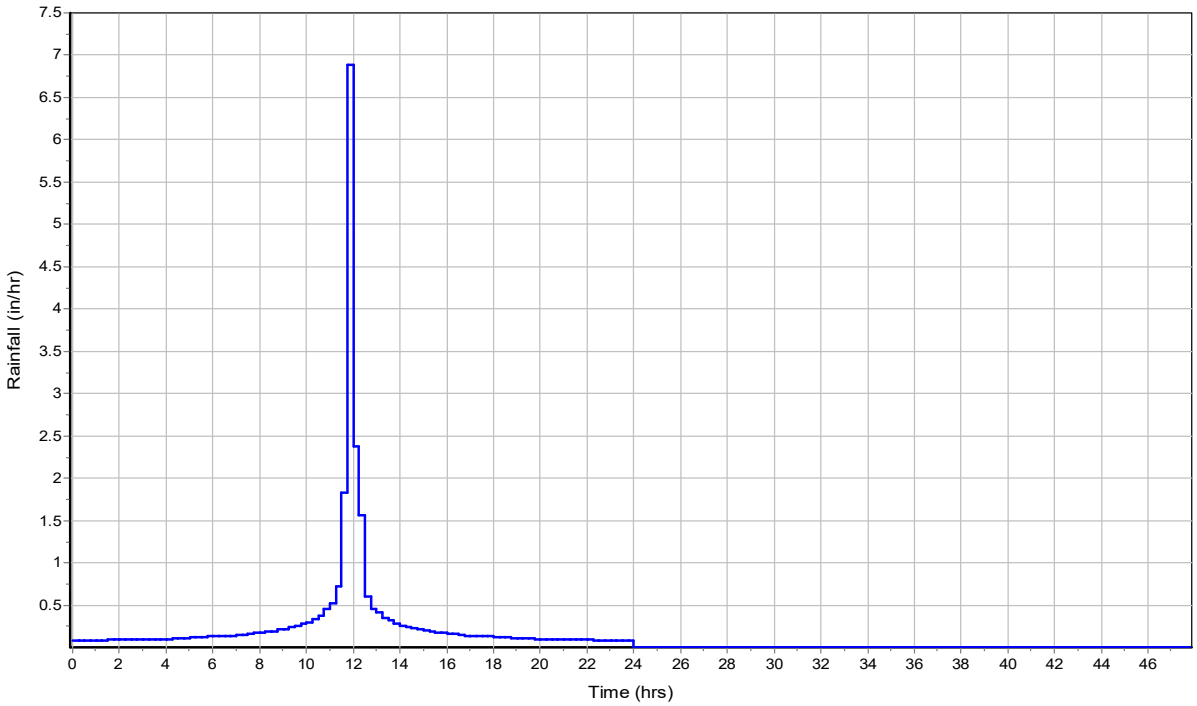
32 Soil/Surface Description	Area (acres)	Soil Group	Curve Number
-	7.74	-	87
Composite Area & Weighted CN	7.74		87

Subbasin Runoff Results

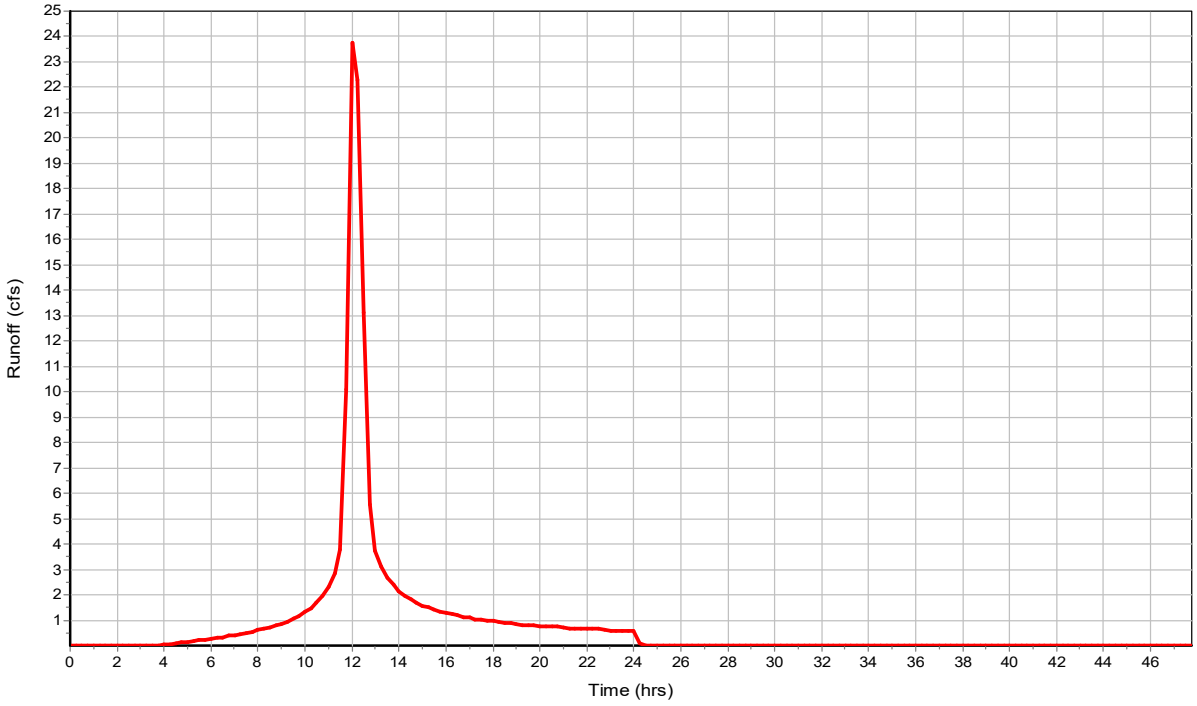
Total Rainfall (in)	6.5
Total Runoff (in)	5
Peak Runoff (cfs)	34.03
Weighted Curve Number	87
Time of Concentration (days hh:mm:ss)	0 00:12:24

Subbasin : RU

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : SH

Input Data

Area (ac)	69.35
Peak Rate Factor	484
Weighted Curve Number	86
Rain Gage ID	1

Composite Curve Number

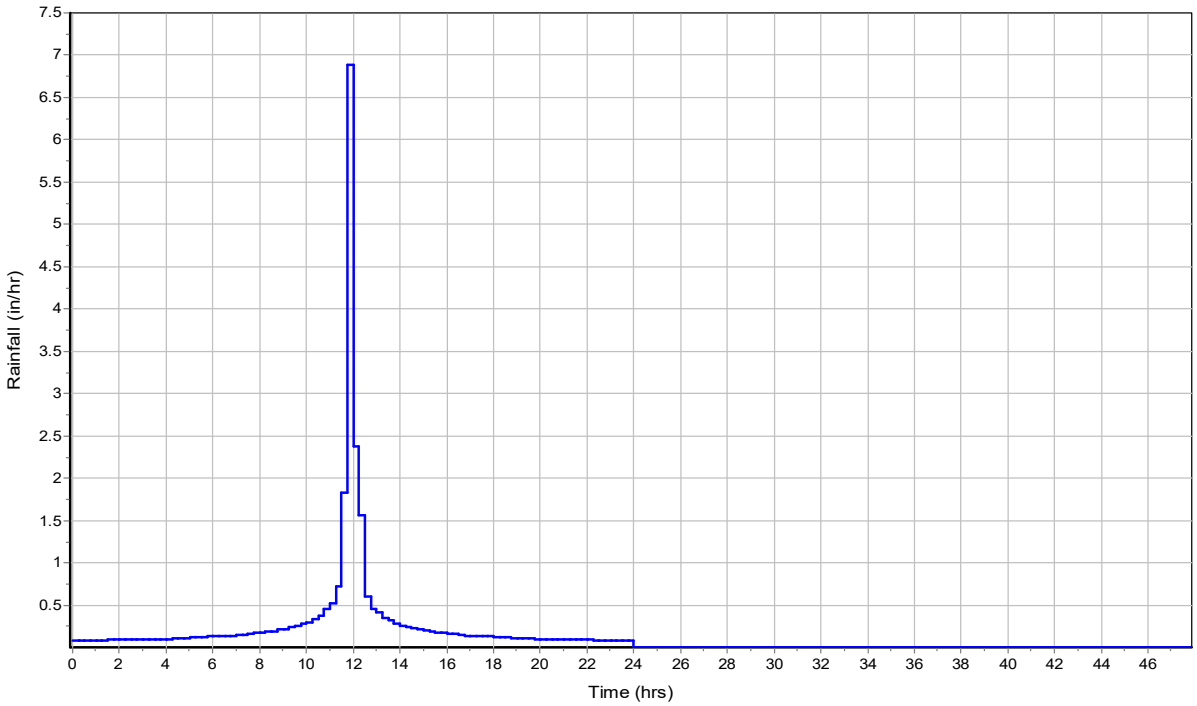
32 Soil/Surface Description	Area (acres)	Soil Group	Curve Number
-	69.35	-	86
Composite Area & Weighted CN	69.35		86

Subbasin Runoff Results

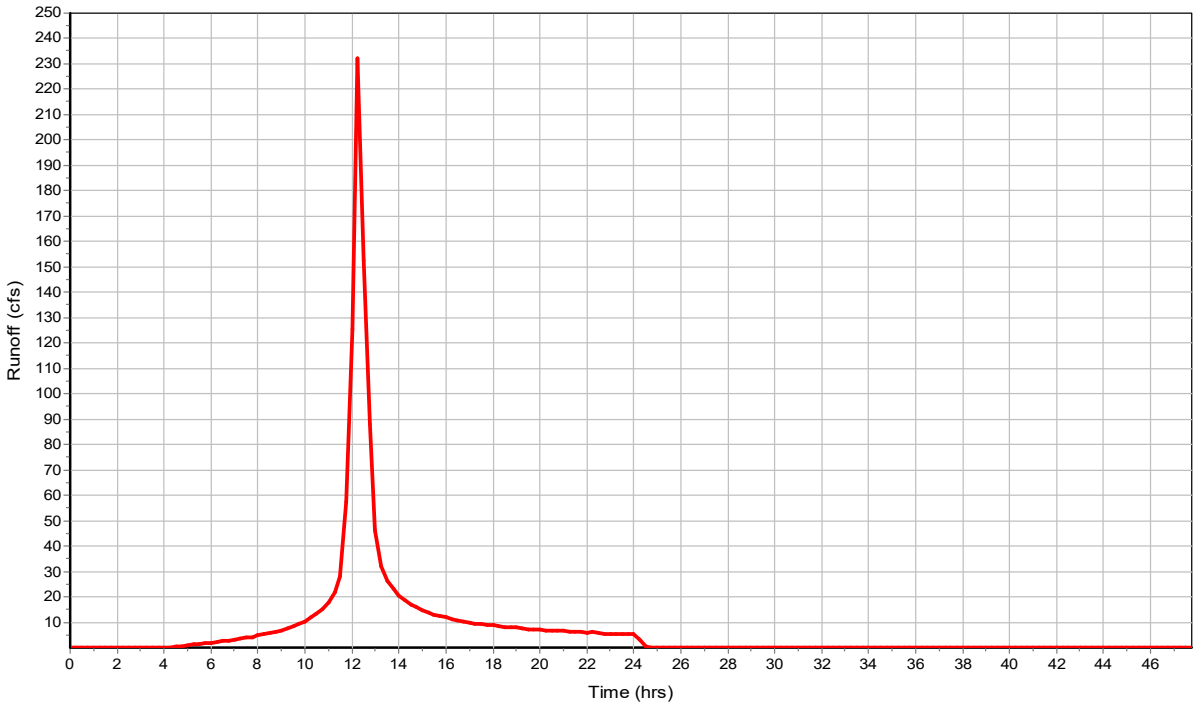
Total Rainfall (in)	6.5
Total Runoff (in)	4.89
Peak Runoff (cfs)	234.05
Weighted Curve Number	86
Time of Concentration (days hh:mm:ss)	0 00:23:30

Subbasin : SH

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : UG1

Input Data

Area (ac) 3.05
Peak Rate Factor 484
Weighted Curve Number 93
Rain Gage ID 1

Composite Curve Number

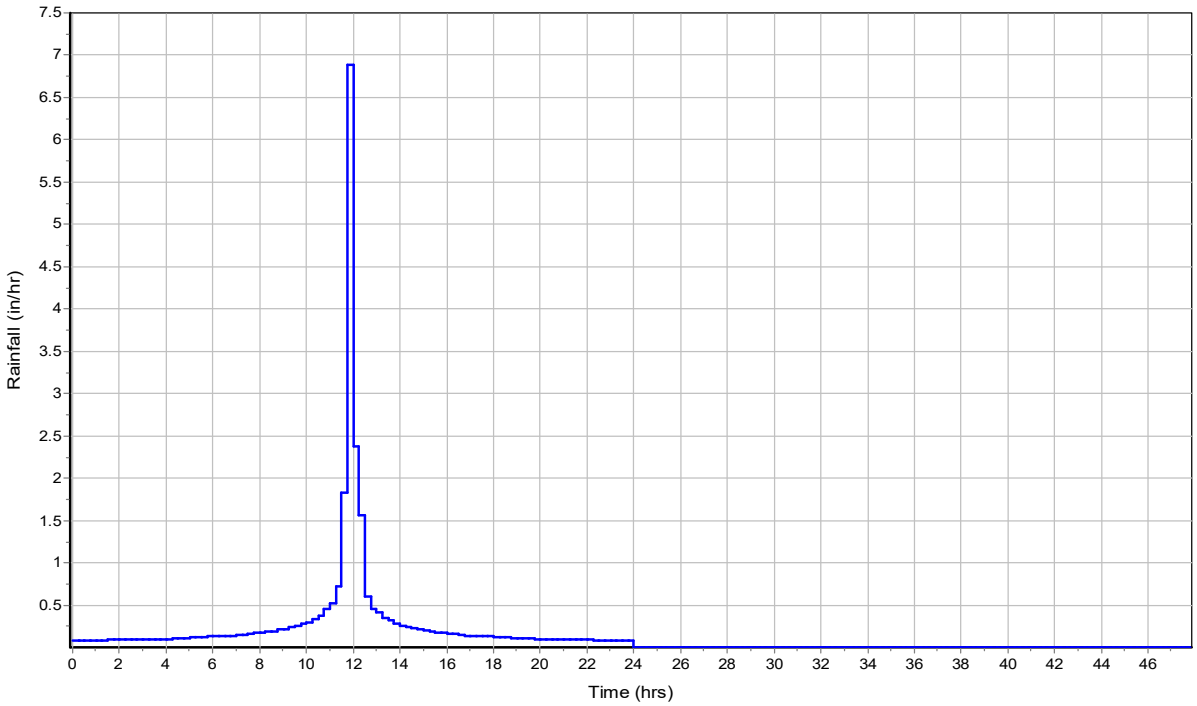
32 Soil/Surface Description	Area (acres)	Soil Group	Curve Number
-	3.05	-	93
Composite Area & Weighted CN	3.05		93

Subbasin Runoff Results

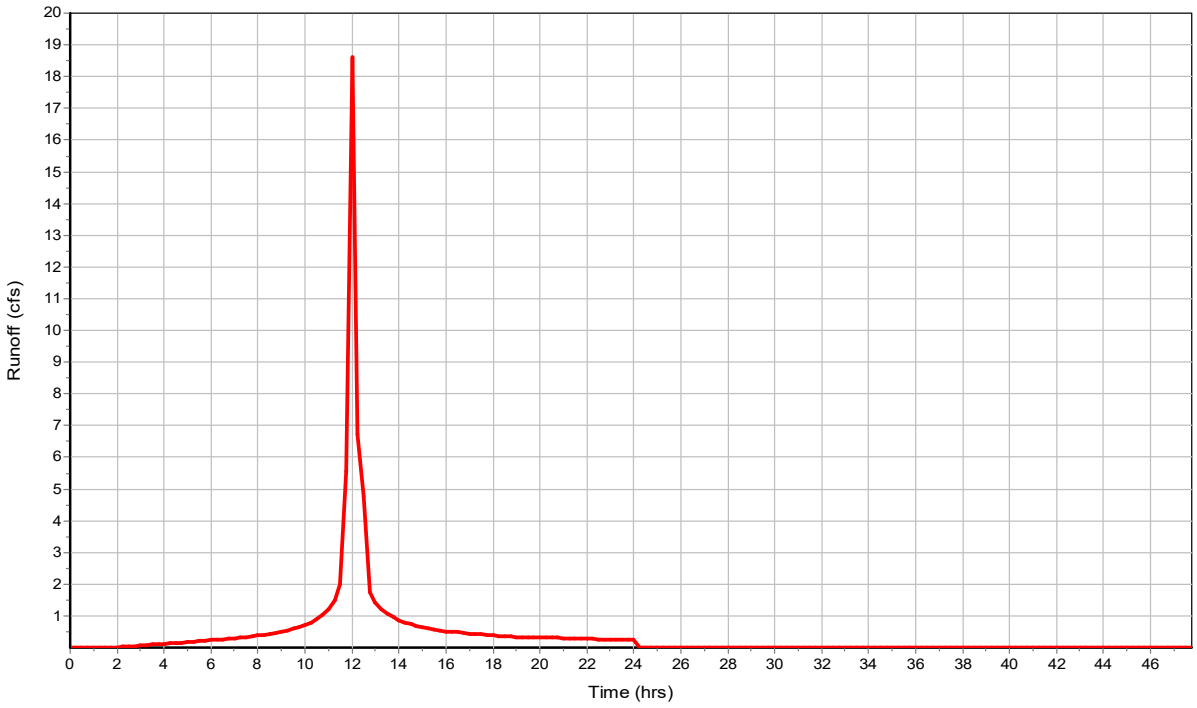
Total Rainfall (in) 6.5
Total Runoff (in) 5.68
Peak Runoff (cfs) 19.04
Weighted Curve Number 93
Time of Concentration (days hh:mm:ss) 0 00:05:00

Subbasin : UG1

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : UG2

Input Data

Area (ac)	11.65
Peak Rate Factor	484
Weighted Curve Number	86
Rain Gage ID	1

Composite Curve Number

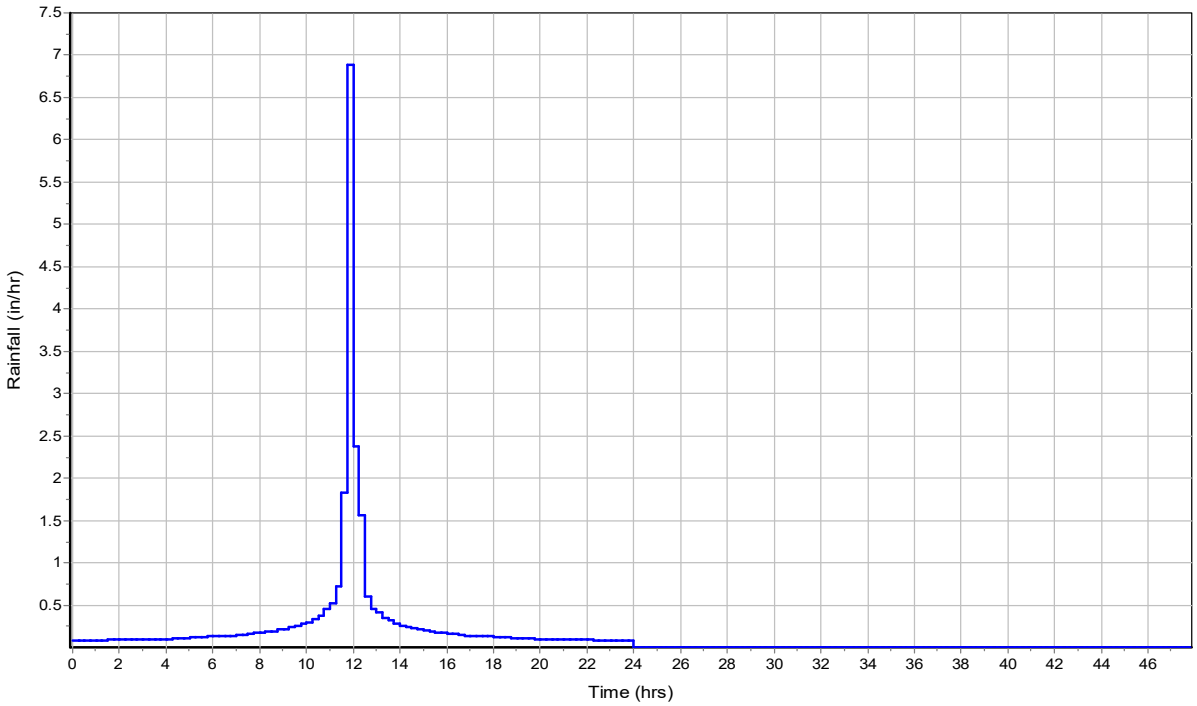
32 Soil/Surface Description	Area (acres)	Soil Group	Curve Number
-	11.65	-	86
Composite Area & Weighted CN	11.65		86

Subbasin Runoff Results

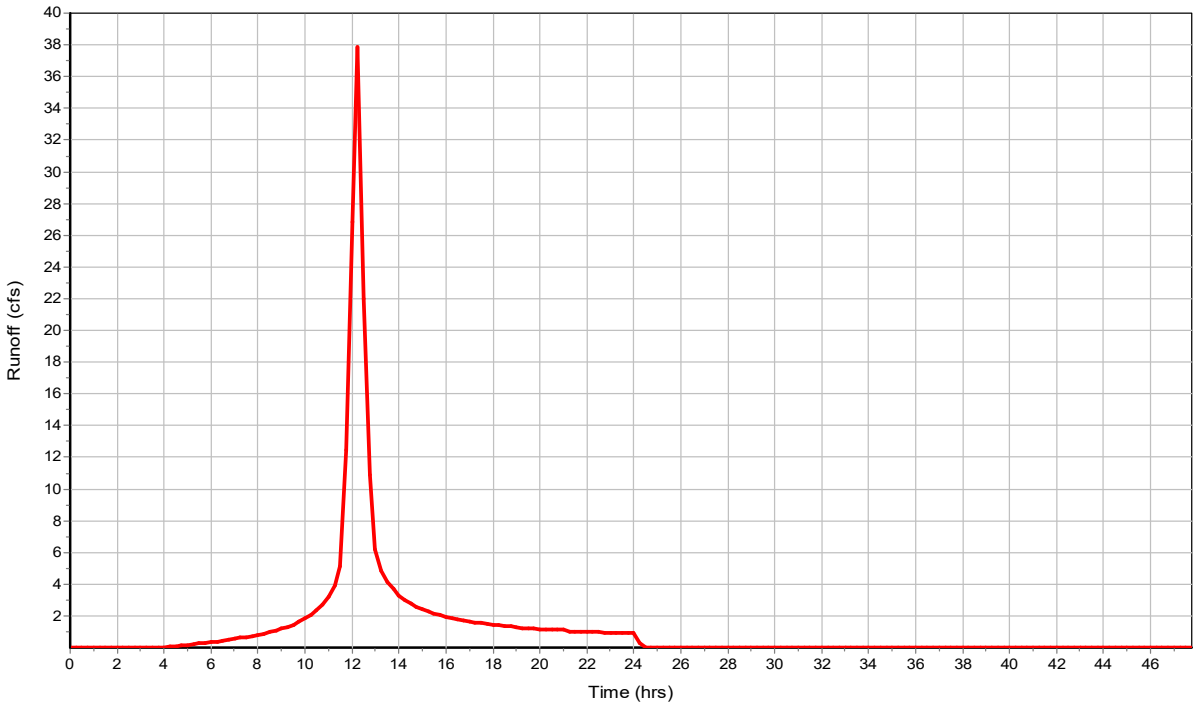
Total Rainfall (in)	6.5
Total Runoff (in)	4.89
Peak Runoff (cfs)	44.49
Weighted Curve Number	86
Time of Concentration (days hh:mm:ss)	0 00:17:12

Subbasin : UG2

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : US1

Input Data

Area (ac)	244.78
Peak Rate Factor	484
Weighted Curve Number	82
Rain Gage ID	1

Composite Curve Number

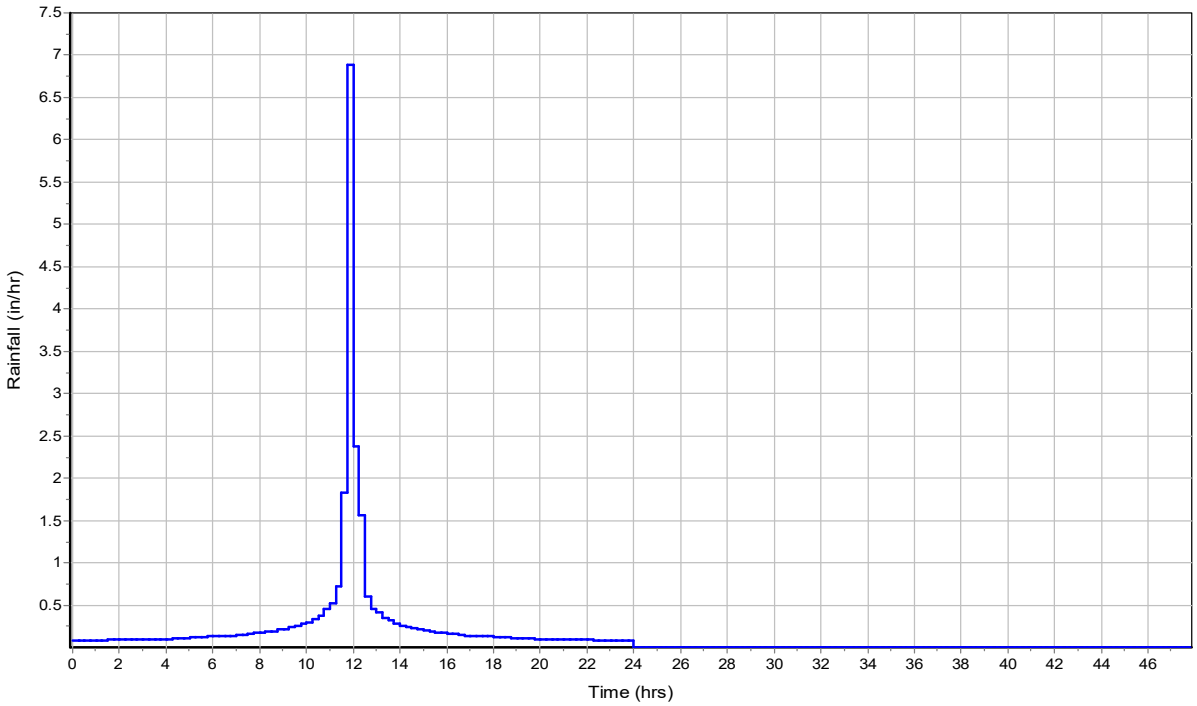
32 Soil/Surface Description	Area (acres)	Soil Group	Curve Number
-	244.78	-	82
Composite Area & Weighted CN	244.78		82

Subbasin Runoff Results

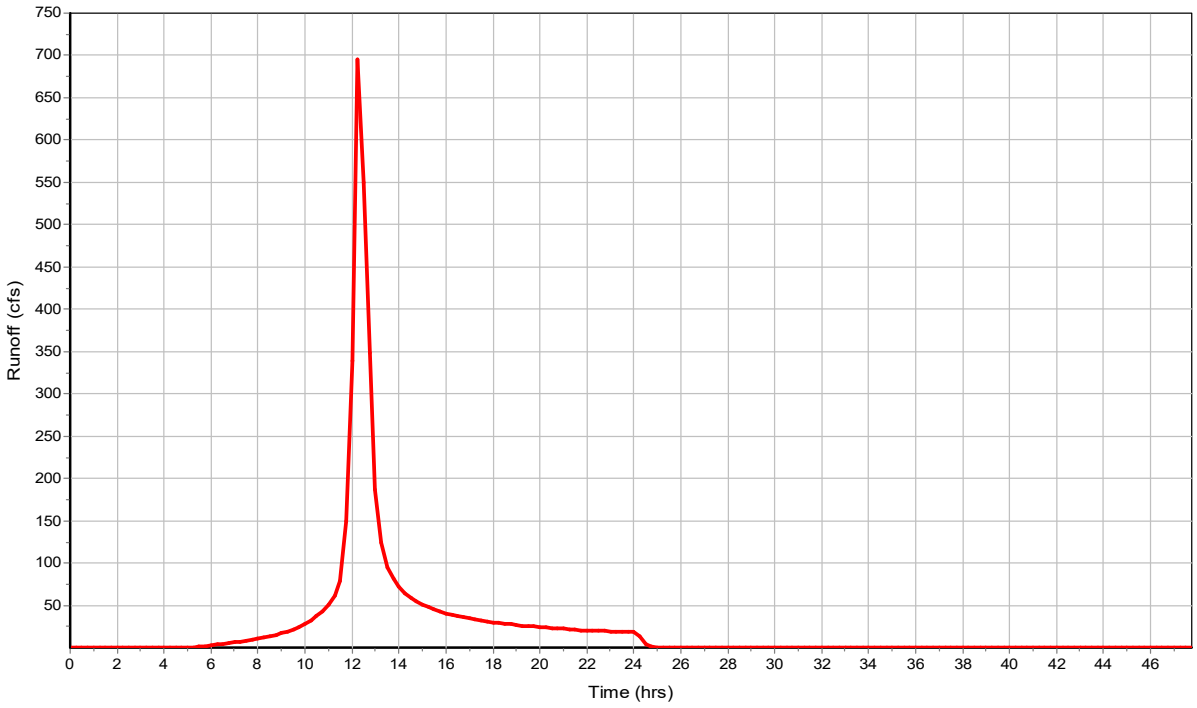
Total Rainfall (in)	6.5
Total Runoff (in)	4.45
Peak Runoff (cfs)	701.29
Weighted Curve Number	82
Time of Concentration (days hh:mm:ss)	0 00:28:36

Subbasin : US1

Rainfall Intensity Graph



Runoff Hydrograph



Junction Input

SN	Element ID	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Ground/Rim (Max) Offset (ft)	Initial Water Elevation (ft)	Initial Water Depth (ft)	Surcharge Elevation (ft)	Surcharge Depth (ft)	Ponded Area (ft^2)	Minimum Pipe Cover (in)
1	1	2062.60	2068.60	6.00	2062.60	0.00	2068.60	0.00	0.00	
2	2	2061.70	2066.30	4.60	2061.70	0.00	2066.30	0.00	0.00	
3	3	2060.10	2065.70	5.60	2060.10	0.00	2065.70	0.00	0.00	
4	4	2057.57	2062.00	4.43	2057.57	0.00	2062.00	0.00	0.00	
5	5	2054.00	2060.00	6.00	2054.00	0.00	2060.00	0.00	0.00	
6	6	2048.88	2053.88	5.00	2048.88	0.00	2053.88	0.00	0.00	
7	7	2048.60	2053.60	5.00	2048.60	0.00	2053.60	0.00	0.00	
8	8	2045.83	2050.83	5.00	2045.83	0.00	2050.83	0.00	0.00	
9	9	2044.80	2049.80	5.00	2044.80	0.00	2049.80	0.00	0.00	
10	11	2092.00	2098.00	6.00	2092.00	0.00	2098.00	0.00	0.00	
11	12	2133.50	2139.50	6.00	2133.50	0.00	2139.50	0.00	0.00	
12	13	2116.51	2125.00	8.49	2116.51	0.00	2125.00	0.00	0.00	
13	14	2154.50	2154.50	0.00	2154.50	0.00	2154.50	0.00	0.00	
14	15	2134.00	2142.00	8.00	2134.00	0.00	2142.00	0.00	0.00	
15	16	2044.25	2044.25	0.00	2044.25	0.00	2044.25	0.00	0.00	
16	17	2050.75	2050.75	0.00	2050.75	0.00	2050.75	0.00	0.00	
17	18	2043.83	2047.83	4.00	2043.83	0.00	2047.83	0.00	0.00	

Junction Results

SN	Element ID	Peak Inflow (cfs)	Peak Lateral Inflow (cfs)	Max HGL Elevation Attained (ft)	Max HGL Depth Attained (ft)	Max Surcharge Depth Attained (ft)	Min Freeboard Attained (ft)	Average HGL Elevation Attained (ft)	Average HGL Depth Attained (ft)	Time of Max HGL Occurrence (days hh:mm)	Time of Peak Flooding Occurrence (days hh:mm)	Total Flooded Volume (ac-in)	Total Time Flooded (min)
1	1	983.85	694.82	2069.21	6.61	0.00	4.39	2063.30	0.70	0 12:34	0 00:00	0.00	0.00
2	2	982.65	0.00	2068.86	7.16	0.00	3.84	2062.07	0.37	0 12:34	0 00:00	0.00	0.00
3	3	982.63	0.00	2068.57	8.47	0.00	3.09	2060.67	0.57	0 12:34	0 00:00	0.00	0.00
4	4	982.62	0.00	2062.76	5.19	0.00	6.37	2058.23	0.66	0 12:34	0 00:00	0.00	0.00
5	5	1260.97	305.68	2060.83	6.83	0.00	4.17	2054.47	0.47	0 12:32	0 00:00	0.00	0.00
6	6	1260.92	0.00	2055.65	6.77	0.00	4.23	2049.50	0.62	0 12:32	0 00:00	0.00	0.00
7	7	1288.42	22.38	2054.91	6.31	0.00	3.69	2049.18	0.58	0 12:32	0 00:00	0.00	0.00
8	8	1288.37	0.00	2051.39	5.56	0.00	4.44	2046.11	0.28	0 12:32	0 00:00	0.00	0.00
9	9	1319.37	36.00	2049.94	5.14	0.00	4.86	2045.27	0.47	0 12:32	0 00:00	0.00	0.00
10	11	357.06	0.00	2095.42	3.42	0.00	4.58	2092.36	0.36	0 12:37	0 00:00	0.00	0.00
11	12	162.09	0.00	2135.29	1.79	0.00	7.71	2133.65	0.15	0 12:31	0 00:00	0.00	0.00
12	13	204.98	0.00	2119.02	2.51	0.00	5.98	2116.78	0.27	0 12:35	0 00:00	0.00	0.00
13	14	138.50	0.00	2155.90	1.40	0.00	2.87	2154.62	0.12	0 12:30	0 00:00	0.00	0.00
14	15	84.39	0.00	2136.04	2.04	0.00	10.46	2134.26	0.26	0 12:30	0 00:00	0.00	0.00
15	16	37.87	0.00	2048.79	4.54	0.00	2.01	2044.50	0.25	0 12:31	0 00:00	0.00	0.00
16	17	14.84	0.00	2055.03	4.28	0.00	1.62	2050.90	0.15	0 12:32	0 00:00	0.00	0.00
17	18	1354.89	0.00	2048.59	4.76	0.00	5.24	2044.22	0.39	0 12:32	0 00:00	0.00	0.00

Channel Input

SN	Element ID	Length (ft)	Inlet Invert Elevation (ft)	Inlet Invert Offset (ft)	Outlet Invert Elevation (ft)	Outlet Invert Offset (ft)	Total Drop (ft)	Average Slope (%)	Shape	Height (ft)	Width (ft)	Manning's Roughness	Entrance Losses	Exit/Bend Losses	Additional Losses	Initial Flow (cfs)	Flap Gate
1	1	131.00	2062.60	0.00	2061.70	0.00	0.90	0.6900	Trapezoidal	6.000	27.000	0.0240	0.0000	0.0000	0.0000	0.00	No
2	29	154.40	2043.83	0.00	2041.91	0.00	1.92	1.2400	Trapezoidal	5.000	24.000	0.0240	0.0000	0.0000	0.0000	0.00	No
3	ED	440.35	2048.60	0.00	2045.83	0.00	2.77	0.6300	Trapezoidal	5.000	20.000	0.0240	0.0000	0.0000	0.0000	0.00	No
4	KB	392.20	2054.00	0.00	2048.88	0.00	5.12	1.3100	Trapezoidal	5.000	20.000	0.0240	0.0000	0.0000	1.0000	0.00	No
5	MOR	1020.00	2116.51	0.00	2092.00	0.00	24.51	2.4000	Trapezoidal	8.000	34.000	0.0240	0.0000	0.0000	0.0000	0.00	No
6	PF	78.10	2044.80	0.00	2043.83	0.00	0.97	1.2400	Trapezoidal	5.000	20.000	0.0240	0.0000	0.0000	0.0000	0.00	No
7	STK	2424.00	2092.00	0.00	2062.60	0.00	29.40	1.2100	Trapezoidal	5.000	23.000	0.0240	0.0000	0.0000	0.0000	0.00	No
8	USR	1864.00	2133.50	0.00	2092.00	0.00	41.50	2.2300	Trapezoidal	8.000	37.000	0.0240	0.0000	0.0000	0.0000	0.00	No

Channel Results

SN	Element ID	Peak Flow	Time of Peak Flow Occurrence	Design Flow Capacity	Peak Flow/ Design Flow Ratio	Peak Flow Velocity	Travel Time	Peak Flow Depth	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged	Froude Number	Reported Condition
		(cfs)	(days hh:mm)	(cfs)		(ft/sec)	(min)	(ft)		(min)		
1	1	682.00	0 12:24	964.35	0.71	12.16	0.18	6.00	1.00	32.00		
2	29	1354.98	0 12:32	1476.05	0.92	15.16	0.17	4.68	0.95	0.00		
3	ED	864.77	0 12:25	784.15	1.10	12.60	0.58	5.00	1.00	23.00		
4	KB	883.56	0 12:25	1129.64	0.78	11.78	0.55	5.00	1.00	35.00		
5	MOR	204.76	0 12:35	3372.60	0.06	8.87	1.92	2.82	0.37	0.00		
6	PF	1278.47	0 12:32	1101.84	1.16	17.70	0.07	4.84	0.98	0.00		
7	STK	344.13	0 12:37	830.10	0.41	7.16	5.64	4.14	0.84	0.00		
8	USR	158.18	0 12:31	3988.84	0.04	6.83	4.55	2.43	0.32	0.00		

Pipe Input

SN	Element ID	Length (ft)	Inlet Invert Elevation (ft)	Inlet Invert Offset (ft)	Outlet Invert Elevation (ft)	Outlet Invert Offset (ft)	Total Drop (ft)	Average Slope (%)	Pipe Shape	Pipe Diameter or Height (in)	Pipe Width (in)	Manning's Roughness	Entrance Losses	Exit/Bend Losses	Additional Losses	Initial Flow (cfs)	Flap Gate	No. of Barrels
1	2	182.00	2061.70	0.00	2060.10	0.00	1.60	0.8800	Rectangular									
2	3	181.00	2060.10	0.00	2057.57	0.00	2.53	1.4000	Arch									
3	4	210.00	2057.57	0.00	2054.00	0.00	3.57	1.7000	Arch									
4	6	50.00	2048.88	0.00	2048.60	0.00	0.28	0.5600	Rectangular									
5	8	50.00	2045.83	0.00	2044.80	0.00	1.03	2.0600	Rectangular									
6	9	50.00	2154.50	0.00	2137.00	0.00	17.50	35.0000	CIRCULAR									
7	15	82.00	2134.00	0.00	2133.50	0.00	0.50	0.6100	CIRCULAR									
8	19	75.00	2117.00	0.00	2116.51	0.00	0.49	0.6500	CIRCULAR									
9	21	35.10	2044.25	0.00	2043.83	0.00	0.42	1.2000	CIRCULAR									
10	22	42.40	2050.75	0.00	2048.60	0.00	2.15	5.0700	CIRCULAR									

Pipe Results

SN	Element ID	Peak Flow (cfs)	Time of Peak Flow Occurrence (days hh:mm)	Design Flow Capacity (cfs)	Peak Flow/ Design Flow Ratio	Peak Flow Velocity (ft/sec)	Travel Time (min)	Peak Flow Depth (ft)	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged (min)	Froude Number	Reported Condition
1	2	291.44	0 12:10	896.81	0.32	6.45	0.47	4.00	1.00	87.00		SURCHARGED
2	3	340.10	0 12:34	269.80	1.26	9.81	0.31	3.67	1.00	103.00		SURCHARGED
3	4	165.11	0 13:12	148.77	1.11	11.06	0.32	3.67	1.00	54.00		SURCHARGED
4	6	482.77	0 13:10	291.43	1.66	10.36	0.08	4.00	1.00	54.00		SURCHARGED
5	8	1097.82	0 12:38	1979.07	0.55	12.20	0.07	4.50	1.00	29.00		SURCHARGED
6	9	138.51	0 12:30	242.66	0.57	33.75	0.02	1.95	0.78	0.00		Calculated
7	15	84.15	0 12:30	199.62	0.42	15.48	0.09	1.90	0.42	0.00		Calculated
8	19	94.87	0 12:34	29.20	3.25	14.38	0.09	2.68	0.92	0.00		> CAPACITY
9	21	42.95	0 12:24	53.03	0.81	8.75	0.07	2.50	1.00	54.00		SURCHARGED
10	22	14.62	0 12:21	27.95	0.52	8.27	0.09	1.50	1.00	62.00		SURCHARGED

Storage Nodes

Storage Node : CVP

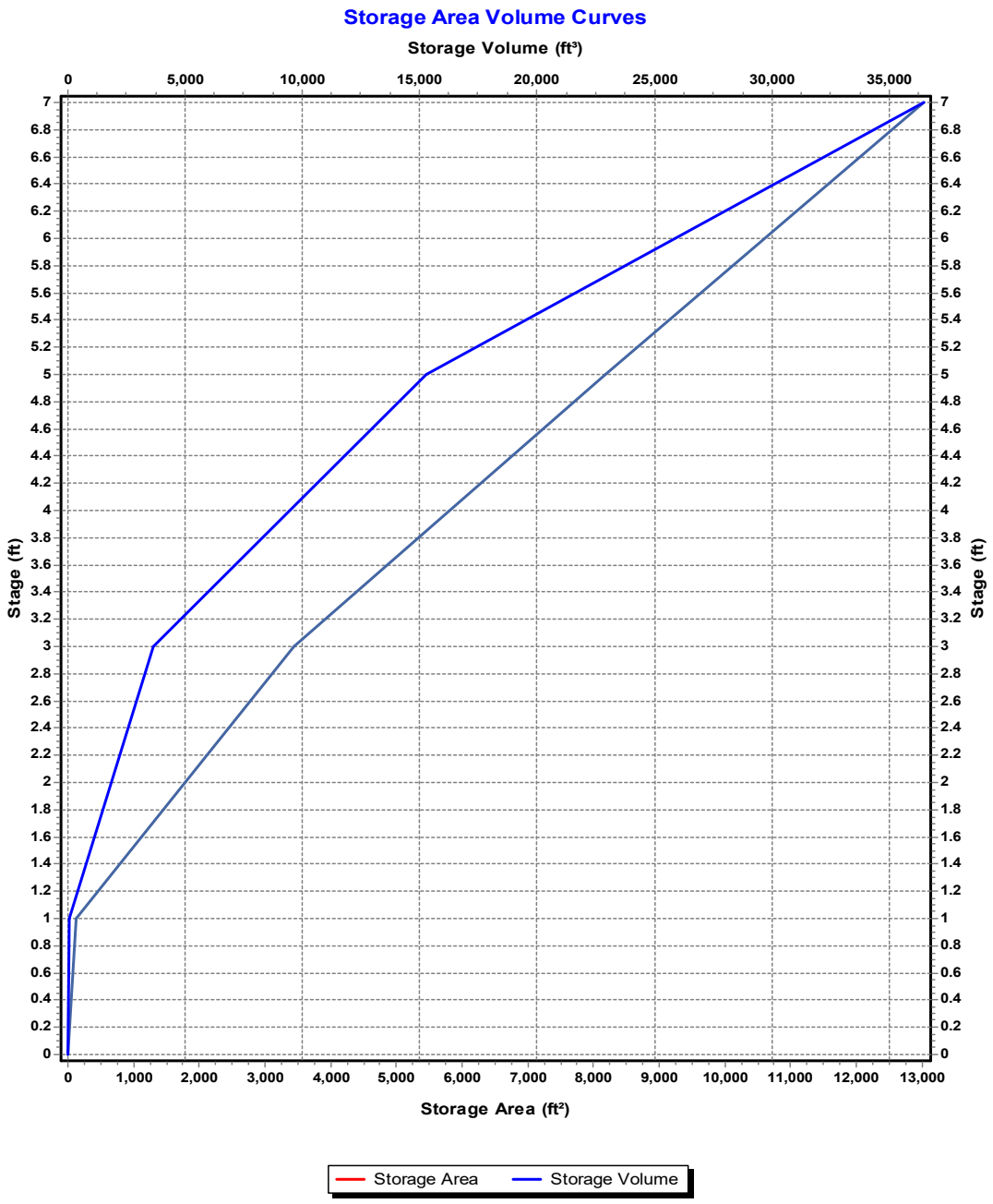
Input Data

Invert Elevation (ft)	2155.00
Max (Rim) Elevation (ft)	2162.00
Max (Rim) Offset (ft)	7.00
Initial Water Elevation (ft)	2155.00
Initial Water Depth (ft)	0.00
Ponded Area (ft^2)	7.00
Evaporation Loss	0.00

Storage Area Volume Curves

Storage Curve : CVP1

Stage (ft)	Storage Area (ft^2)	Storage Volume (ft^3)
0	0	0
1	131	65.5
3	3441	3637.5
5	8189	15267.5
7	13024	36480.5


Storage Area Volume Curves
Storage Volume (ft³)
0
5,000
10,000
15,000
20,000
25,000
30,000
35,000
Stage (ft)
0
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
1.8
2
2.2
2.4
2.6
2.8
3
3.2
3.4
3.6
3.8
4
4.2
4.4
4.6
4.8
5
5.2
5.4
5.6
5.8
6
6.2
6.4
6.6
6.8
7
Storage Area (ft²)
0
1,000
2,000
3,000
4,000
5,000
6,000
7,000
8,000
9,000
10,000
11,000
12,000
13,000
Storage Area
Storage Volume

Storage Node : CVP (continued)

Outflow Weirs

SN	Element ID	Weir Type	Flap Gate	Crest Elevation (ft)	Crest Offset (ft)	Length (ft)	Weir Total Height (ft)	Discharge Coefficient
1	14	Trapezoidal	No	2161.50	6.50	40.00	2.00	3.33

Outflow Orifices

SN	Element ID	Orifice Type	Orifice Shape	Flap Gate	Circular Orifice Diameter (in)	Rectangular Orifice Height (in)	Rectangular Orifice Width (in)	Orifice Invert Elevation (ft)	Orifice Coefficient
1	5	Side	CIRCULAR	No					
2	7	Side	CIRCULAR	No					
3	13	Bottom	Rectangular	No					

Output Summary Results

Peak Inflow (cfs)	140.35
Peak Lateral Inflow (cfs)	140.35
Peak Outflow (cfs)	138.5
Peak Exfiltration Flow Rate (cfm)	0
Max HGL Elevation Attained (ft)	2160.84
Max HGL Depth Attained (ft)	5.84
Average HGL Elevation Attained (ft)	2155.58
Average HGL Depth Attained (ft)	0.58
Time of Max HGL Occurrence (days hh:mm)	0 12:30
Total Exfiltration Volume (1000-ft^3)	0
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0

Storage Node : P1

Input Data

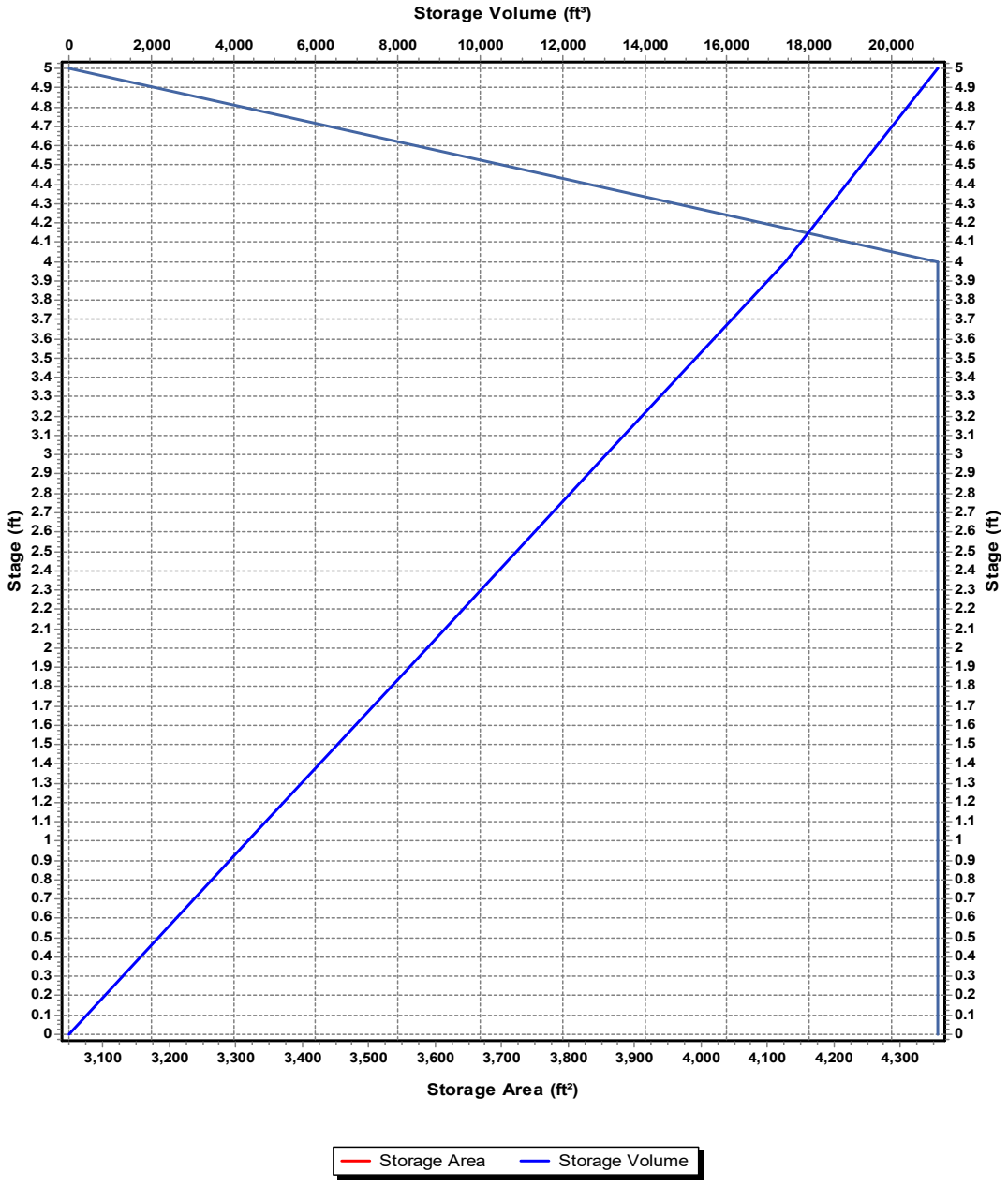
Invert Elevation (ft)	2050.75
Max (Rim) Elevation (ft)	2055.75
Max (Rim) Offset (ft)	5.00
Initial Water Elevation (ft)	2050.75
Initial Water Depth (ft)	0.00
Ponded Area (ft^2)	5.00
Evaporation Loss	0.00

Storage Area Volume Curves

Storage Curve : P1

Stage (ft)	Storage Area (ft^2)	Storage Volume (ft^3)
0	4356	0
1	4356	4356
2	4356	8712
3	4356	13068
4	4356	17424
5	3049	21126.5

Storage Area Volume Curves



Storage Node : P1 (continued)

Outflow Weirs

SN	Element ID	Weir Type	Flap Gate	Crest Elevation (ft)	Crest Offset (ft)	Length (ft)	Weir Total Height (ft)	Discharge Coefficient
1	28	Transverse	No	2054.65	3.90	6.00	2.00	3.33

Outflow Orifices

SN	Element ID	Orifice Type	Orifice Shape	Flap Gate	Circular Orifice Diameter (in)	Rectangular Orifice Height (in)	Rectangular Orifice Width (in)	Orifice Invert Elevation (ft)	Orifice Coefficient
1	26	Side	CIRCULAR	No					
2	27	Side	Rectangular	No					

Output Summary Results

Peak Inflow (cfs)	18.61
Peak Lateral Inflow (cfs)	18.61
Peak Outflow (cfs)	14.84
Peak Exfiltration Flow Rate (cfm)	0
Max HGL Elevation Attained (ft)	2055.35
Max HGL Depth Attained (ft)	4.6
Average HGL Elevation Attained (ft)	2051.62
Average HGL Depth Attained (ft)	0.87
Time of Max HGL Occurrence (days hh:mm)	0 12:19
Total Exfiltration Volume (1000-ft³)	0
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0

Storage Node : P2

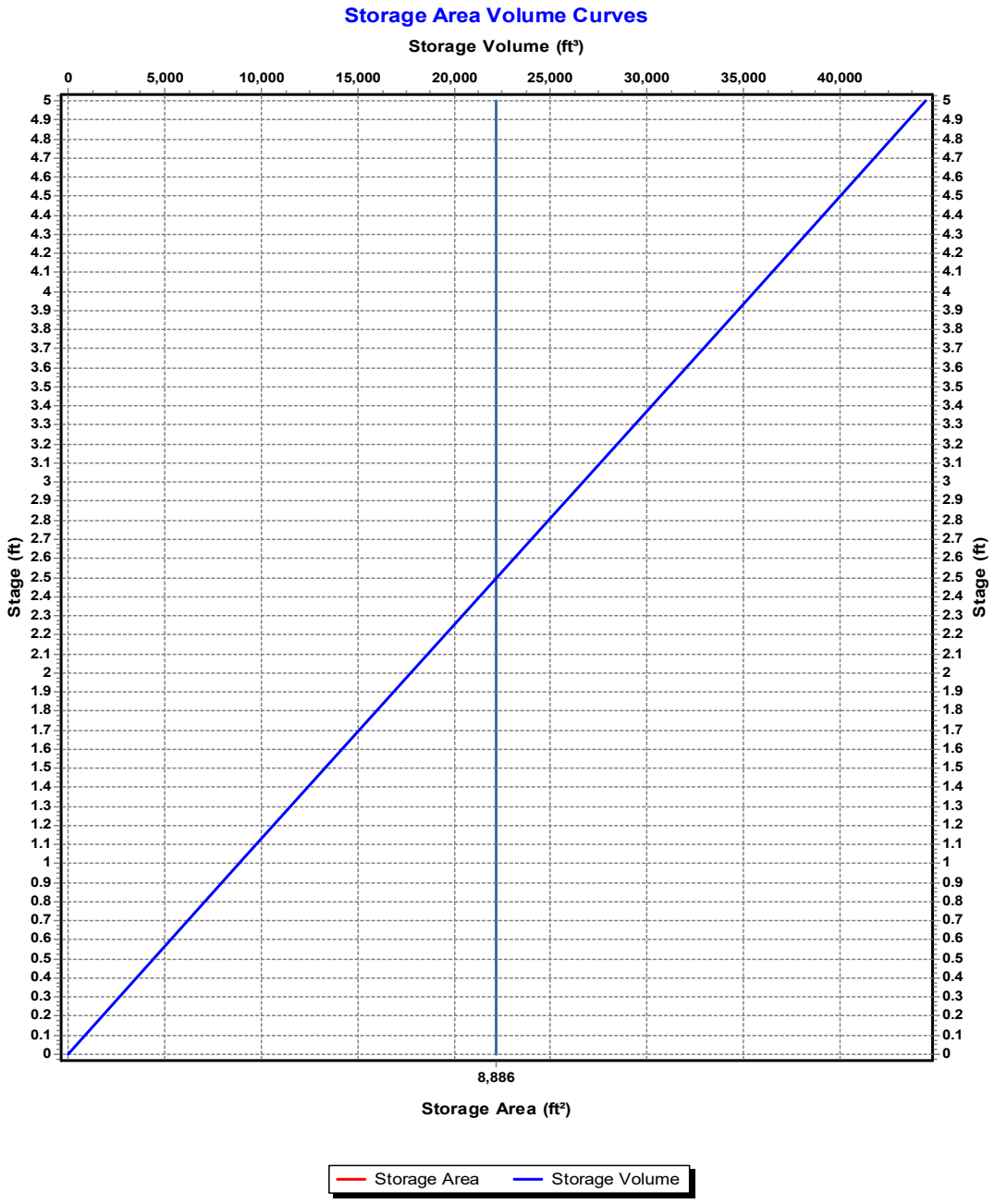
Input Data

Invert Elevation (ft)	2044.25
Max (Rim) Elevation (ft)	2049.25
Max (Rim) Offset (ft)	5.00
Initial Water Elevation (ft)	2044.25
Initial Water Depth (ft)	0.00
Ponded Area (ft^2)	5.00
Evaporation Loss	0.00

Storage Area Volume Curves

Storage Curve : P2

Stage (ft)	Storage Area (ft^2)	Storage Volume (ft^3)
0	8886	0
1	8886	8886
2	8886	17772
3	8886	26658
4	8886	35544
5	8886	44430


Storage Area Volume Curves
Storage Volume (ft³)
0
5,000
10,000
15,000
20,000
25,000
30,000
35,000
40,000
Stage (ft)
Stage (ft)
8,886
Storage Area (ft²)
Storage Area
Storage Volume

Storage Node : P2 (continued)

Outflow Weirs

SN	Element ID	Weir Type	Flap Gate	Crest Elevation (ft)	Crest Offset (ft)	Length (ft)	Weir Total Height (ft)	Discharge Coefficient
1	25	Transverse	No	2048.80	4.55	6.00	2.00	3.33

Outflow Orifices

SN	Element ID	Orifice Type	Orifice Shape	Flap Gate	Circular Orifice Diameter (in)	Rectangular Orifice Height (in)	Rectangular Orifice Width (in)	Orifice Invert Elevation (ft)	Orifice Coefficient
1	23	Side	Rectangular	No					
2	24	Side	Rectangular	No					

Output Summary Results

Peak Inflow (cfs)	37.87
Peak Lateral Inflow (cfs)	37.87
Peak Outflow (cfs)	37.87
Peak Exfiltration Flow Rate (cfm)	0
Max HGL Elevation Attained (ft)	2050.08
Max HGL Depth Attained (ft)	5.83
Average HGL Elevation Attained (ft)	2044.75
Average HGL Depth Attained (ft)	0.5
Time of Max HGL Occurrence (days hh:mm)	0 12:30
Total Exfiltration Volume (1000-ft³)	0
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	13
Total Retention Time (sec)	0

Storage Node : RP

Input Data

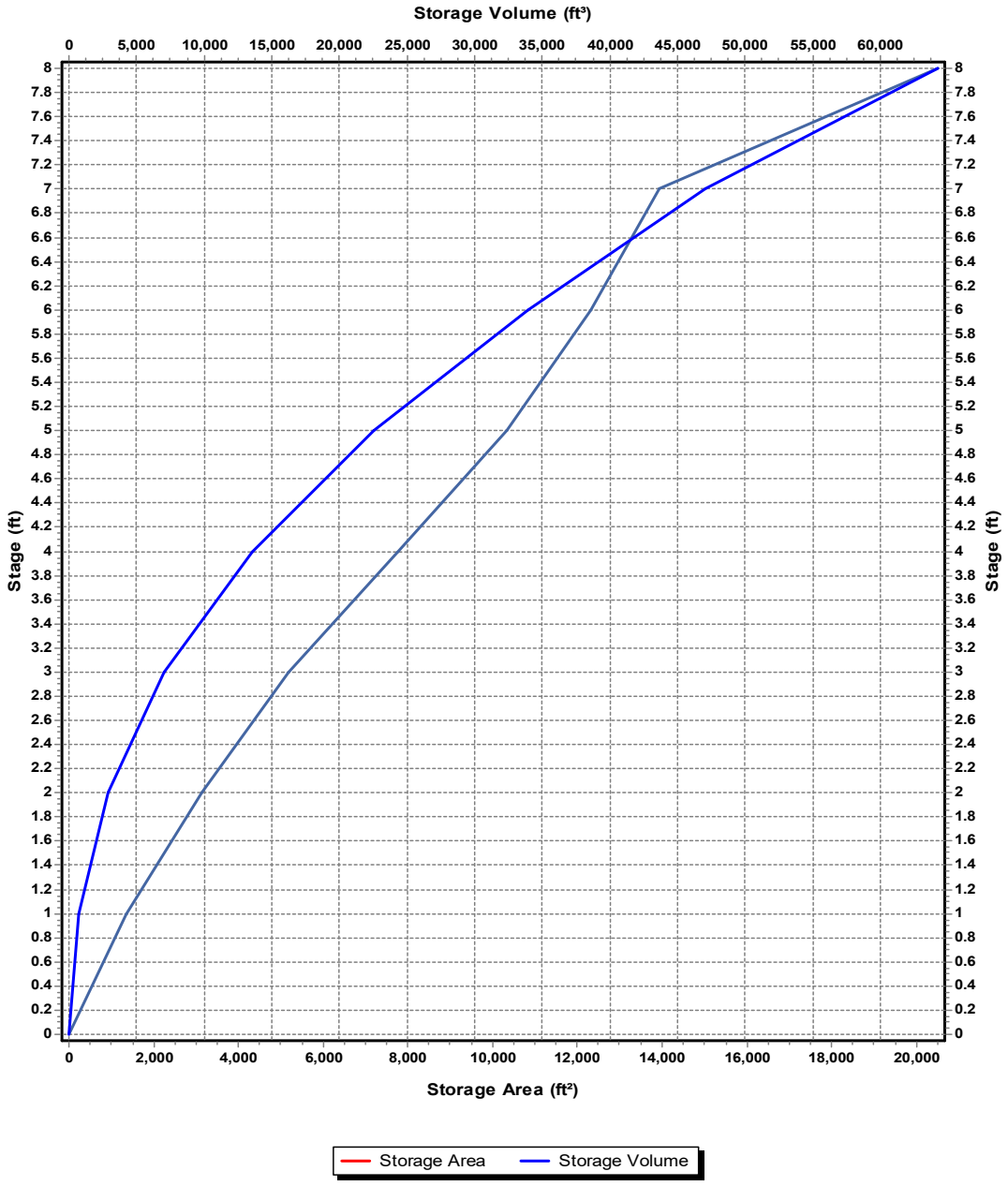
Invert Elevation (ft)	2137.00
Max (Rim) Elevation (ft)	2145.00
Max (Rim) Offset (ft)	8.00
Initial Water Elevation (ft)	2137.00
Initial Water Depth (ft)	0.00
Ponded Area (ft^2)	8.00
Evaporation Loss	0.00

Storage Area Volume Curves

Storage Curve : RP1

Stage (ft)	Storage Area (ft^2)	Storage Volume (ft^3)
0	0	0
1	1366	683
2	3129	2930.5
3	5175	7082.5
4	7760	13550
5	10340	22600
6	12305	33922.5
7	13925	47037.5
8	20503	64251.5

Storage Area Volume Curves



Storage Node : RP (continued)

Outflow Weirs

SN	Element ID	Weir Type	Flap Gate	Crest Elevation (ft)	Crest Offset (ft)	Length (ft)	Weir Total Height (ft)	Discharge Coefficient
1	18	Trapezoidal	No	2144.50	7.50	60.00	2.00	3.33

Outflow Orifices

SN	Element ID	Orifice Type	Orifice Shape	Flap Gate	Circular Orifice Diameter (in)	Rectangular Orifice Height (in)	Rectangular Orifice Width (in)	Orifice Invert Elevation (ft)	Orifice Coefficient
1	16	Side	CIRCULAR	No					
2	17	Side	Rectangular	No					

Output Summary Results

Peak Inflow (cfs)	160.54
Peak Lateral Inflow (cfs)	23.77
Peak Outflow (cfs)	162.38
Peak Exfiltration Flow Rate (cfm)	0
Max HGL Elevation Attained (ft)	2145.03
Max HGL Depth Attained (ft)	8.03
Average HGL Elevation Attained (ft)	2137.82
Average HGL Depth Attained (ft)	0.82
Time of Max HGL Occurrence (days hh:mm)	0 12:29
Total Exfiltration Volume (1000-ft^3)	0
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	2
Total Retention Time (sec)	0

Storage Node : SP

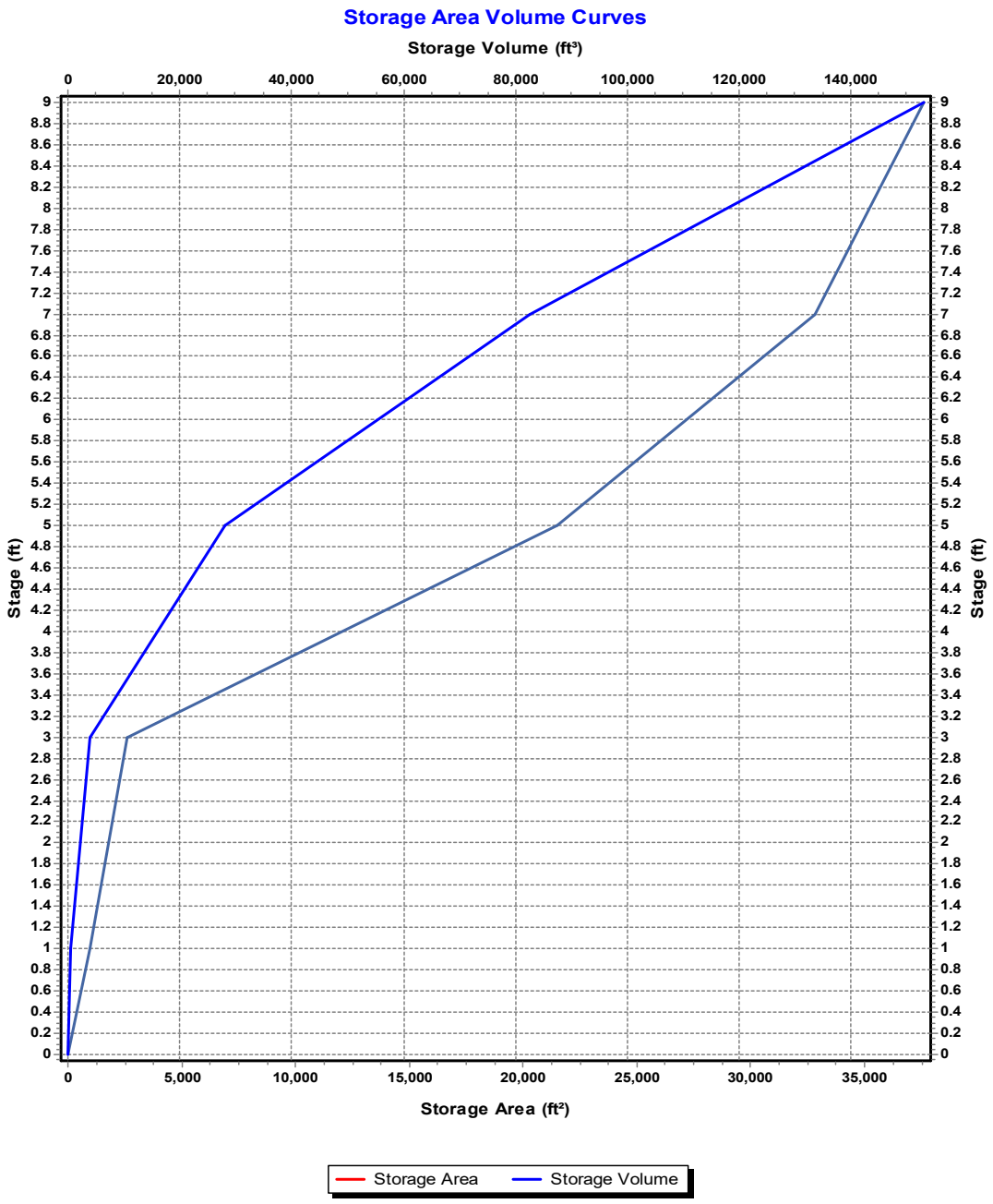
Input Data

Invert Elevation (ft)	2117.00
Max (Rim) Elevation (ft)	2125.00
Max (Rim) Offset (ft)	8.00
Initial Water Elevation (ft)	2117.00
Initial Water Depth (ft)	0.00
Ponded Area (ft^2)	8.00
Evaporation Loss	0.00

Storage Area Volume Curves

Storage Curve : SP1

Stage (ft)	Storage Area (ft^2)	Storage Volume (ft^3)
0	0	0
1	955	477.5
3	2580	4012.5
5	21522	28114.5
7	32858	82494.5
9	37630	152982.5


Storage Area Volume Curves
Storage Volume (ft³)
0
20,000
40,000
60,000
80,000
100,000
120,000
140,000
Stage (ft)
0
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
1.8
2
2.2
2.4
2.6
2.8
3
3.2
3.4
3.6
3.8
4
4.2
4.4
4.6
4.8
5
5.2
5.4
5.6
5.8
6
6.2
6.4
6.6
6.8
7
7.2
7.4
7.6
7.8
8
8.2
8.4
8.6
8.8
9
0
5,000
10,000
15,000
20,000
25,000
30,000
35,000
Storage Area (ft²)
Storage Area
Storage Volume

Storage Node : SP (continued)

Outflow Weirs

SN	Element ID	Weir Type	Flap Gate	Crest Elevation (ft)	Crest Offset (ft)	Length (ft)	Weir Total Height (ft)	Discharge Coefficient
1	20	Trapezoidal	No	2123.00	6.00	20.00	2.00	3.33

Output Summary Results

Peak Inflow (cfs)	231.97
Peak Lateral Inflow (cfs)	231.97
Peak Outflow (cfs)	204.98
Peak Exfiltration Flow Rate (cfm)	0
Max HGL Elevation Attained (ft)	2124.4
Max HGL Depth Attained (ft)	7.4
Average HGL Elevation Attained (ft)	2117.58
Average HGL Depth Attained (ft)	0.58
Time of Max HGL Occurrence (days hh:mm)	0 12:35
Total Exfiltration Volume (1000-ft^3)	0
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0

Project Description

File Name ..... ProposedKabrichModel.SPF

Project Options

Flow Units ..... CFS
Elevation Type ..... Elevation
Hydrology Method ..... SCS TR-20
Time of Concentration (TOC) Method ..... User-Defined
Link Routing Method ..... Hydrodynamic
Enable Overflow Ponding at Nodes ..... YES
Skip Steady State Analysis Time Periods ..... NO

Number of Elements

	Qty
Rain Gages	1
Subbasins	9
Nodes	24
Junctions	18
Outfalls	1
Flow Diversions	0
Inlets	0
Storage Nodes	5
Links	42
Channels	9
Pipes	10
Pumps	0
Orifices	9
Weirs	14
Outlets	0
Pollutants	0
Land Uses	0

Rainfall Details

SN	Rain Gage ID	Data Source	Data Source ID	Rainfall Type	Rain Units	State	County	Return Period (years)	Rainfall Depth (inches)	Rainfall Distribution
1	1	Time Series	100Year	Cumulative	inches				0.00	

Subbasin Summary

SN	Subbasin ID	Area (ac)	Peak Rate Factor	Weighted Curve Number	Total Rainfall (in)	Total Runoff (in)	Total Runoff Volume (ac-in)	Peak Runoff (cfs)	Time of Concentration (days hh:mm:ss)
1	A	6.36	484.00	90.00	6.50	5.33	33.92	25.26	0 00:18:30
2	B	10.80	484.00	92.00	6.50	5.56	60.06	51.03	0 00:12:30
3	CO	44.42	484.00	84.00	6.50	4.67	207.22	162.24	0 00:17:30
4	K	93.79	484.00	85.00	6.50	4.78	447.85	344.04	0 00:18:12
5	RU	7.74	484.00	87.00	6.50	5.00	38.67	34.03	0 00:12:24
6	SH	69.35	484.00	86.00	6.50	4.89	338.77	234.05	0 00:23:30
7	UG1	3.05	484.00	93.00	6.50	5.68	17.31	19.04	0 00:05:00
8	UG2	11.65	484.00	86.00	6.50	4.89	56.91	44.49	0 00:17:12
9	US1	244.78	484.00	82.00	6.50	4.45	1089.03	701.29	0 00:28:36

Node Summary

SN	Element ID	Element Type	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Initial Water Elevation (ft)	Surcharge Elevation (ft)	Ponded Area (ft^2)	Peak Inflow (cfs)	Max HGL Elevation Attained (ft)	Max Surcharge Depth Attained (ft)	Min Freeboard Attained (ft)	Time of Peak Flooding Occurrence (days hh:mm)	Total Flooded Volume (ac-in)	Total Time Flooded (min)
1	1	Junction	2062.60	2068.60	2062.60	2068.60	0.00	983.87	2068.84	0.00	4.76	0 00:00	0.00	0.00
2	2	Junction	2061.70	2066.30	2061.70	2066.30	0.00	981.59	2068.10	0.00	4.60	0 00:00	0.00	0.00
3	3	Junction	2059.10	2065.70	2059.10	2065.70	0.00	981.53	2067.37	0.00	5.29	0 00:00	0.00	0.00
4	4	Junction	2056.20	2065.00	2056.20	2065.00	0.00	876.19	2062.71	0.00	6.49	0 00:00	0.00	0.00
5	5	Junction	2054.00	2060.00	2054.00	2060.00	0.00	1253.51	2060.82	0.00	4.18	0 00:00	0.00	0.00
6	6	Junction	2048.88	2053.88	2048.88	2053.88	0.00	1253.46	2055.64	0.00	4.24	0 00:00	0.00	0.00
7	7	Junction	2048.60	2053.60	2048.60	2053.60	0.00	1280.03	2054.90	0.00	3.70	0 00:00	0.00	0.00
8	8	Junction	2045.83	2050.83	2045.83	2050.83	0.00	1279.98	2051.38	0.00	4.45	0 00:00	0.00	0.00
9	9	Junction	2044.80	2049.80	2044.80	2049.80	0.00	1310.03	2049.92	0.00	4.88	0 00:00	0.00	0.00
10	11	Junction	2092.00	2098.00	2092.00	2098.00	0.00	357.05	2095.42	0.00	4.58	0 00:00	0.00	0.00
11	12	Junction	2133.50	2139.50	2133.50	2139.50	0.00	162.14	2135.29	0.00	7.71	0 00:00	0.00	0.00
12	13	Junction	2116.51	2125.00	2116.51	2125.00	0.00	204.98	2119.02	0.00	5.98	0 00:00	0.00	0.00
13	14	Junction	2154.50	2154.50	2154.50	2154.50	0.00	138.50	2155.90	0.00	2.87	0 00:00	0.00	0.00
14	15	Junction	2134.00	2142.00	2134.00	2142.00	0.00	84.40	2136.04	0.00	10.46	0 00:00	0.00	0.00
15	16	Junction	2044.25	2044.25	2044.25	2044.25	0.00	37.87	2048.75	0.00	2.05	0 00:00	0.00	0.00
16	17	Junction	2050.75	2050.75	2050.75	2050.75	0.00	14.89	2055.00	0.00	1.65	0 00:00	0.00	0.00
17	18	Junction	2043.83	2047.83	2043.83	2047.83	0.00	1344.48	2048.57	0.00	5.26	0 00:00	0.00	0.00
18	19	Junction	2054.70	2060.00	2054.70	2060.00	0.00	981.47	2061.05	0.00	7.21	0 00:00	0.00	0.00
19	10	Outfall	2041.91					1344.58	2046.65					
20	CVP	Storage Node	2155.00	2162.00	2155.00		7.00	140.37	2160.84				0.00	0.00
21	P1	Storage Node	2050.75	2055.75	2050.75		5.00	18.61	2055.35				0.00	0.00
22	P2	Storage Node	2044.25	2049.25	2044.25		5.00	37.87	2050.07				0.00	18.00
23	RP	Storage Node	2137.00	2145.00	2137.00		8.00	160.54	2145.03				0.00	2.00
24	SP	Storage Node	2117.00	2125.00	2117.00		8.00	232.01	2124.40				0.00	0.00

Link Summary

SN	Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length	Inlet Invert Elevation	Outlet Invert Elevation	Average Slope	Diameter or Height	Manning's Roughness	Peak Flow	Design Flow Capacity	Peak Flow/ Design Flow Ratio	Peak Flow Velocity	Peak Flow Depth	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged	Reported Condition
					(ft)	(ft)	(ft)	(%)	(in)		(cfs)	(cfs)		(ft/sec)	(ft)		(min)	
1	2	Pipe	2	3	182.00	2061.70	2060.10	0.8800			614.76	896.81	0.69	10.25	4.00	1.00	44.00	SURCHARGED
2	6	Pipe	6	7	50.00	2048.88	2048.60	0.5600			482.75	291.43	1.66	10.35	4.00	1.00	55.00	SURCHARGED
3	8	Pipe	8	9	50.00	2045.83	2044.80	2.0600			1097.88	1979.07	0.55	12.20	4.50	1.00	29.00	SURCHARGED
4	9	Pipe	14	RP	50.00	2154.50	2137.00	35.0000			138.51	242.66	0.57	33.75	1.95	0.78	0.00	Calculated
5	15	Pipe	15	12	82.00	2134.00	2133.50	0.6100			84.15	199.62	0.42	15.48	1.90	0.42	0.00	Calculated
6	19	Pipe	SP	13	75.00	2117.00	2116.51	0.6500			94.87	29.20	3.25	14.38	2.68	0.92	0.00	> CAPACITY
7	21	Pipe	16	18	35.10	2044.25	2043.83	1.2000			41.90	53.03	0.79	8.54	2.50	1.00	56.00	SURCHARGED
8	22	Pipe	17	7	42.40	2050.75	2048.60	5.0700			14.59	27.95	0.52	8.26	1.50	1.00	64.00	SURCHARGED
9	Link-01	Pipe	4	19	166.00	2056.20	2054.70	0.9000			876.17	6824.77	0.13	7.00	6.31	0.49	0.00	Calculated
10	Link-02	Pipe	19	5	65.00	2054.70	2054.00	1.0800			165.26	254.51	0.65	10.51	4.00	1.00	51.00	SURCHARGED
11	1	Channel	1	2	131.00	2062.60	2061.70	0.6900			898.79	964.35	0.93	12.41	6.00	1.00	16.00	
12	3	Channel	3	4	187.00	2059.10	2056.20	1.5500			876.19	982.70	0.89	11.14	6.49	0.99	0.00	
13	29	Channel	18	10	154.40	2043.83	2041.91	1.2400			1344.58	1476.05	0.91	15.13	4.60	0.95	0.00	
14	ED	Channel	7	8	440.35	2048.60	2045.83	0.6300			863.80	784.15	1.10	12.60	5.00	1.00	23.00	
15	KB	Channel	5	6	392.20	2054.00	2048.88	1.3100			882.96	1129.64	0.78	11.77	5.00	1.00	36.00	
16	MOR	Channel	13	11	1020.00	2116.51	2092.00	2.4000			204.76	3372.60	0.06	8.87	2.82	0.37	0.00	
17	PF	Channel	9	18	78.10	2044.80	2043.83	1.2400			1277.27	1101.84	1.16	17.70	4.80	0.97	0.00	
18	STK	Channel	11	1	2424.00	2092.00	2062.60	1.2100			344.14	830.10	0.41	7.16	4.14	0.84	0.00	
19	USR	Channel	12	11	1864.00	2133.50	2092.00	2.2300			158.17	3988.84	0.04	6.83	2.43	0.32	0.00	
20	5	Orifice	CVP	14		2155.00	2154.50				20.60							
21	7	Orifice	CVP	14		2155.00	2154.50				42.99							
22	13	Orifice	CVP	14		2155.00	2154.50				75.02							
23	16	Orifice	RP	15		2137.00	2134.00				24.88							
24	17	Orifice	RP	15		2137.00	2134.00				59.52							
25	23	Orifice	P2	16		2044.25	2044.25				4.88							
26	24	Orifice	P2	16		2044.25	2044.25				6.73							
27	26	Orifice	P1	17		2050.75	2050.75				0.43							
28	27	Orifice	P1	17		2050.75	2050.75				3.66							
29	10	Weir	8	9		2045.83	2044.80				188.69							
30	11	Weir	6	7		2048.88	2048.60				919.23							
31	14	Weir	CVP	RP		2155.00	2137.00				0.00							
32	18	Weir	RP	12		2137.00	2133.50				78.04							
33	20	Weir	SP	13		2117.00	2116.51				110.12							
34	25	Weir	P2	16		2044.25	2044.25				28.70							
35	28	Weir	P1	17		2050.75	2050.75				11.62							
36	31	Weir	2	3		2061.70	2059.10				600.62							
37	35	Weir	5	6		2054.00	2048.88				378.70							
38	36	Weir	7	8		2048.60	2045.83				495.82							
39	37	Weir	9	18		2044.80	2043.83				32.95							
40	38	Weir	1	2		2062.60	2061.70				103.66							
41	40	Weir	3	19		2059.10	2054.70				105.32							
42	41	Weir	19	5		2054.70	2054.00				930.30							

Subbasin Hydrology

Subbasin : A

Input Data

Area (ac) 6.36
Peak Rate Factor 484
Weighted Curve Number 90
Rain Gage ID 1

Composite Curve Number

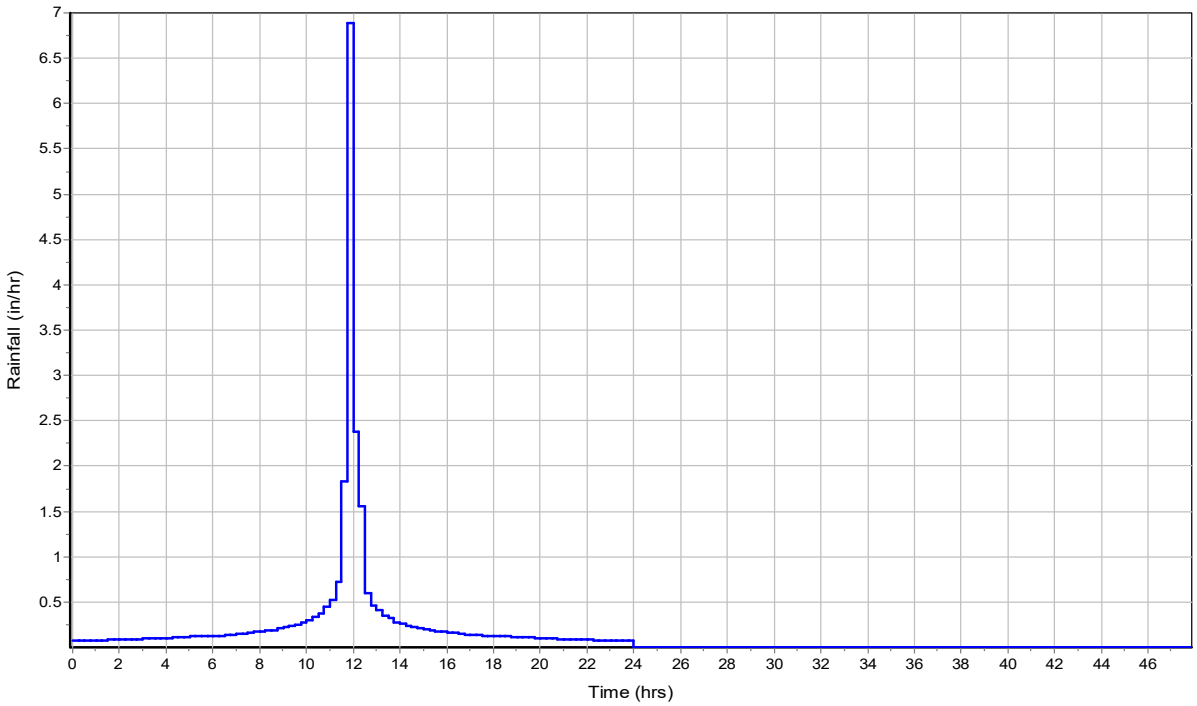
32 Soil/Surface Description	Area (acres)	Soil Group	Curve Number
-	6.36	-	90
Composite Area & Weighted CN	6.36		90

Subbasin Runoff Results

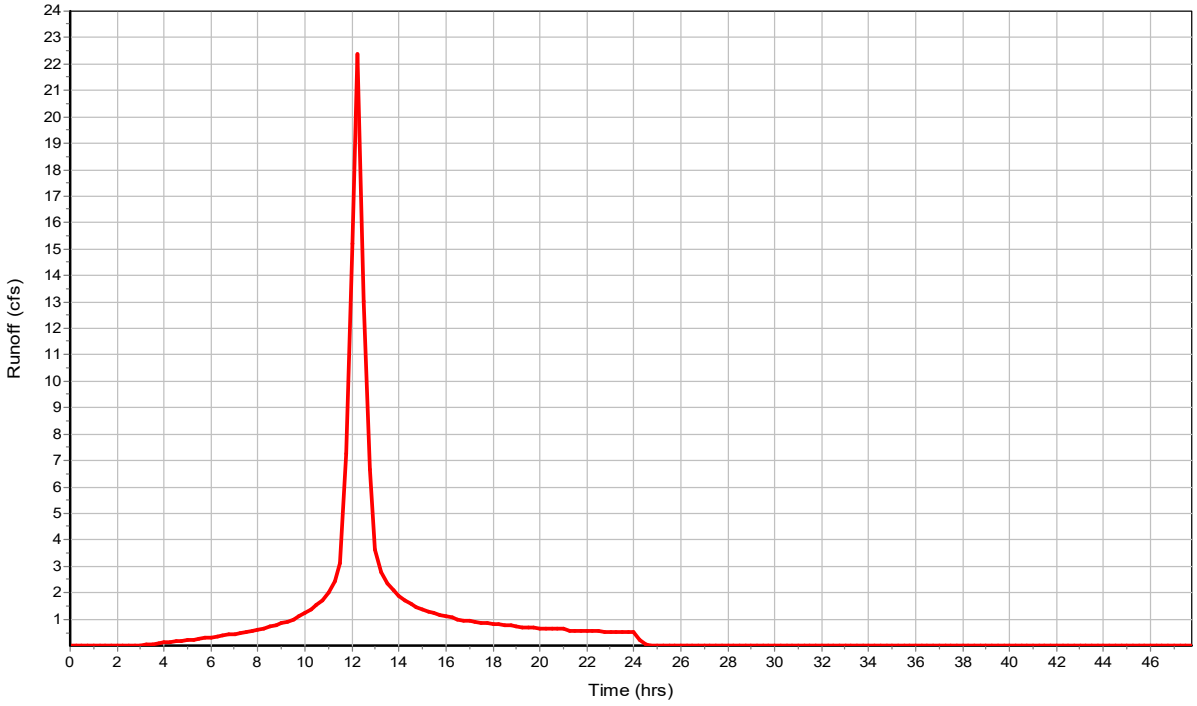
Total Rainfall (in) 6.5
Total Runoff (in) 5.33
Peak Runoff (cfs) 25.26
Weighted Curve Number 90
Time of Concentration (days hh:mm:ss) 0 00:18:30

Subbasin : A

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : B

Input Data

Area (ac) 10.8
Peak Rate Factor 484
Weighted Curve Number 92
Rain Gage ID 1

Composite Curve Number

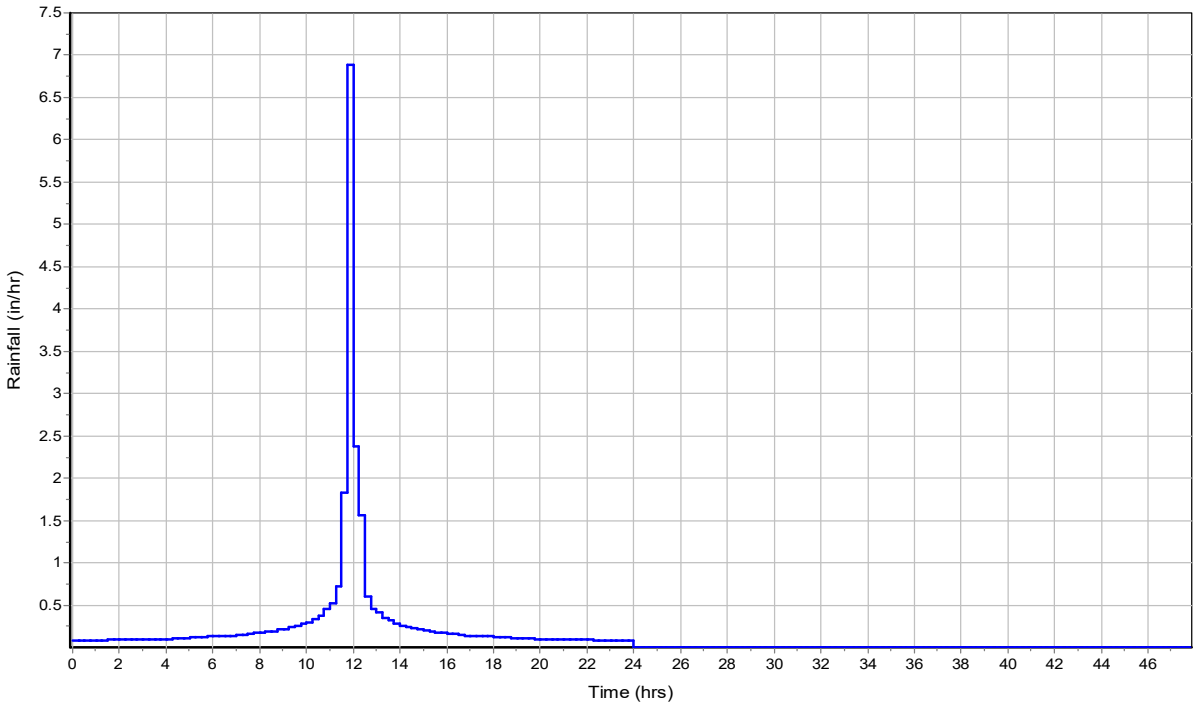
32 Soil/Surface Description	Area (acres)	Soil Group	Curve Number
-	10.8	-	92
Composite Area & Weighted CN	10.8		92

Subbasin Runoff Results

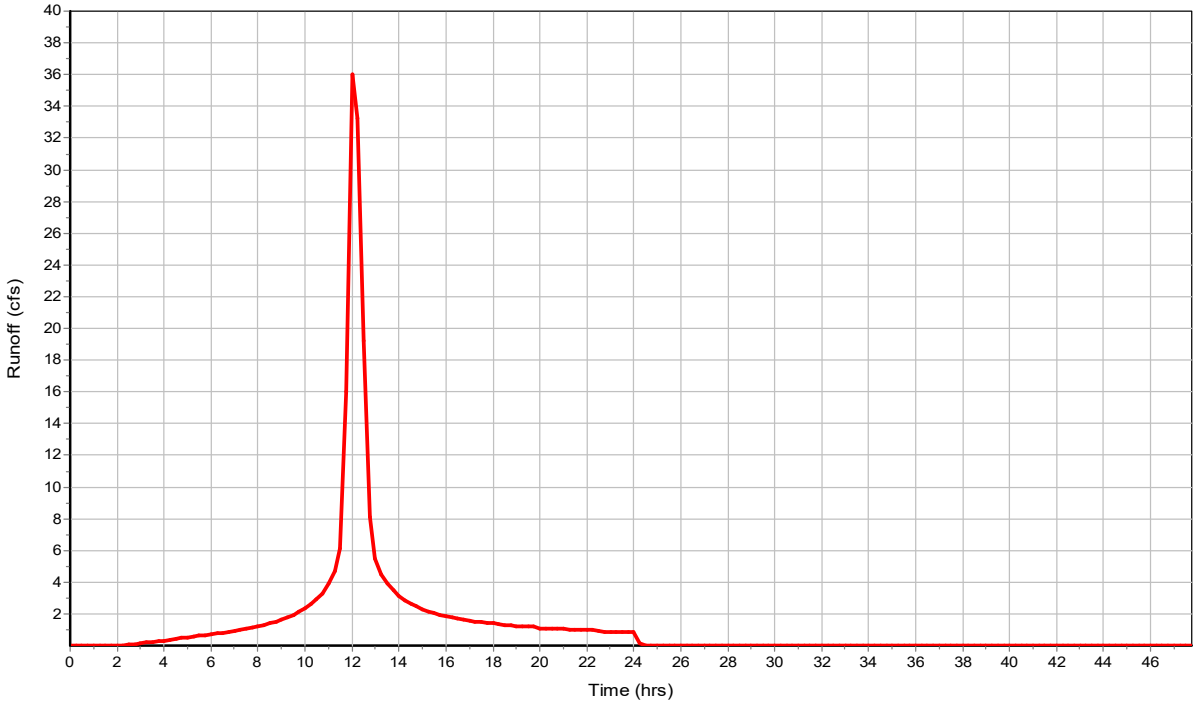
Total Rainfall (in) 6.5
Total Runoff (in) 5.56
Peak Runoff (cfs) 51.03
Weighted Curve Number 92
Time of Concentration (days hh:mm:ss) 0 00:12:30

Subbasin : B

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : CO

Input Data

Area (ac) 44.42
Peak Rate Factor 484
Weighted Curve Number 84
Rain Gage ID 1

Composite Curve Number

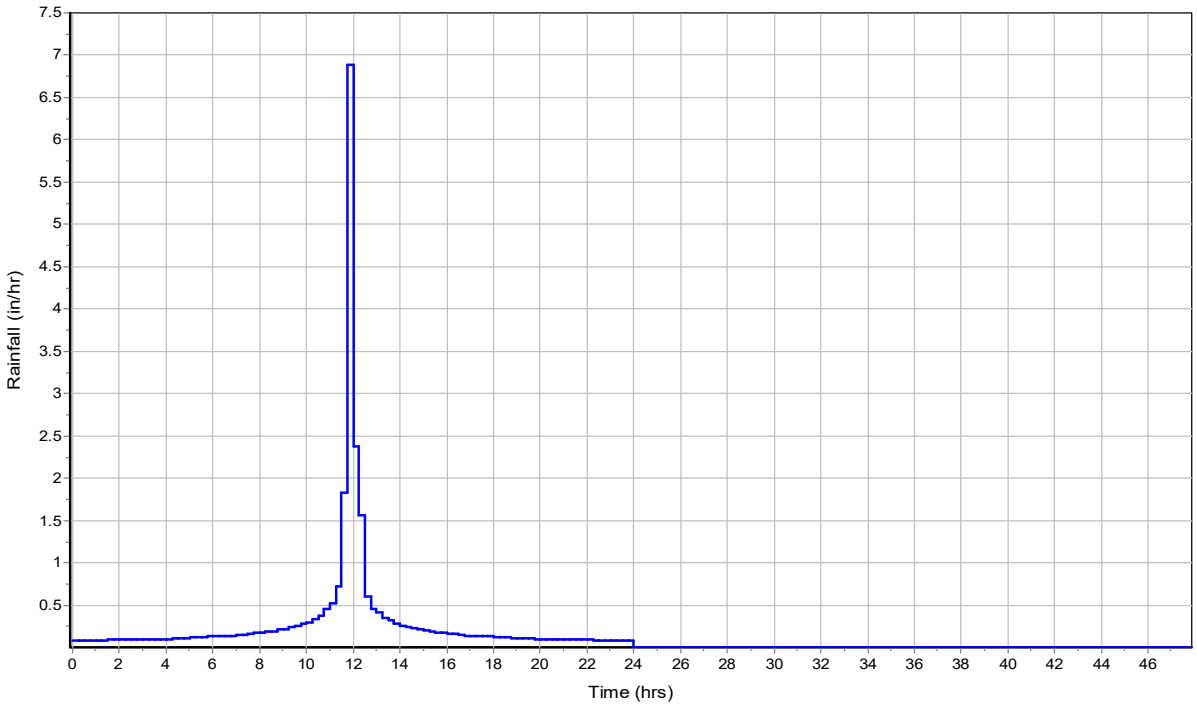
32 Soil/Surface Description	Area (acres)	Soil Group	Curve Number
-	44.42	-	84
Composite Area & Weighted CN	44.42		84

Subbasin Runoff Results

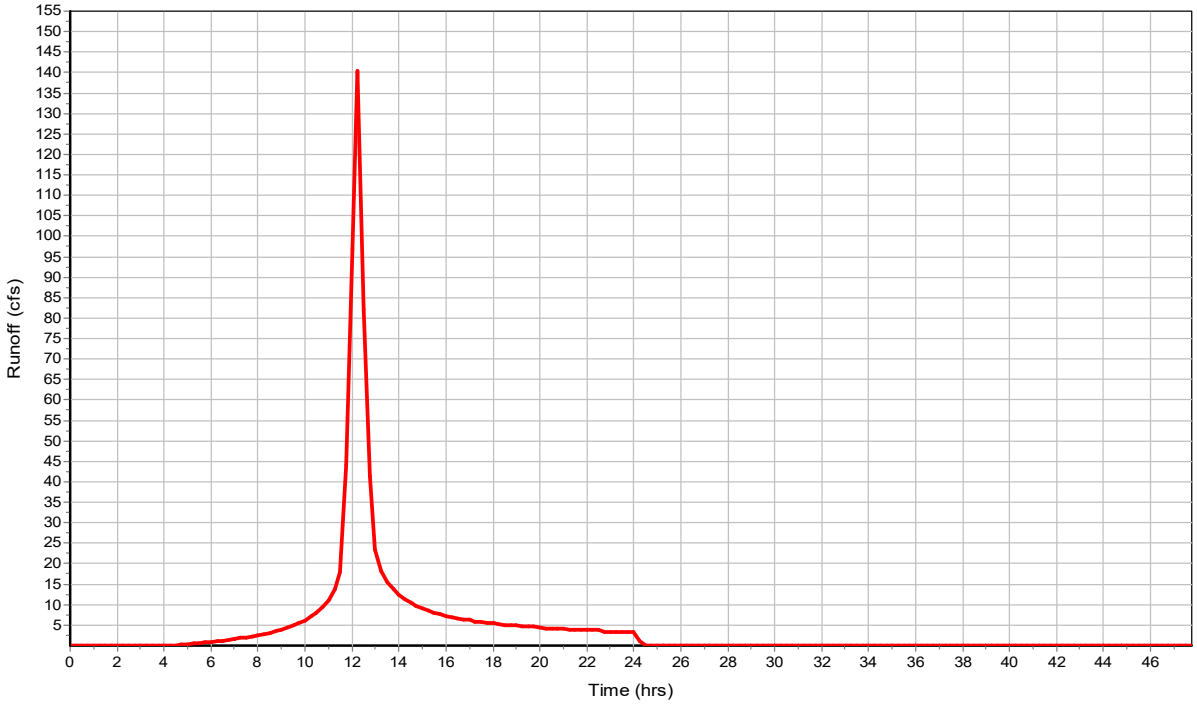
Total Rainfall (in) 6.5
Total Runoff (in) 4.67
Peak Runoff (cfs) 162.24
Weighted Curve Number 84
Time of Concentration (days hh:mm:ss) 0 00:17:30

Subbasin : CO

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : K

Input Data

Area (ac)	93.79
Peak Rate Factor	484
Weighted Curve Number	85
Rain Gage ID	1

Composite Curve Number

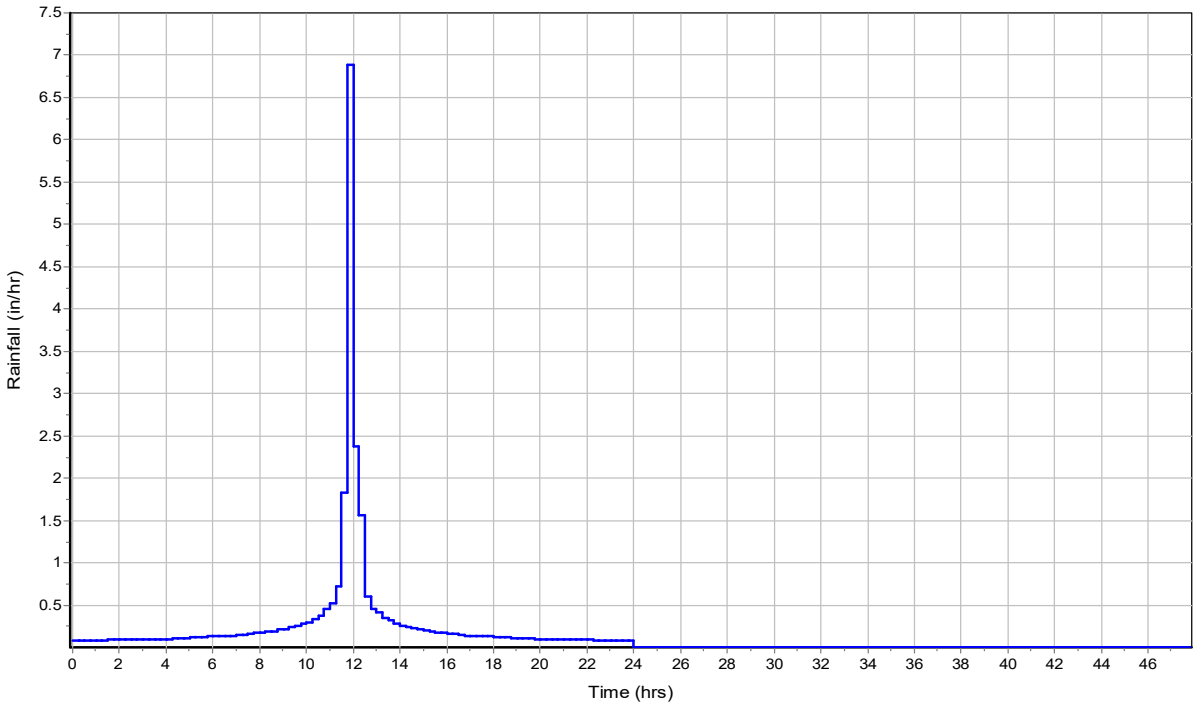
32 Soil/Surface Description	Area (acres)	Soil Group	Curve Number
-	93.79	-	85
Composite Area & Weighted CN	93.79		85

Subbasin Runoff Results

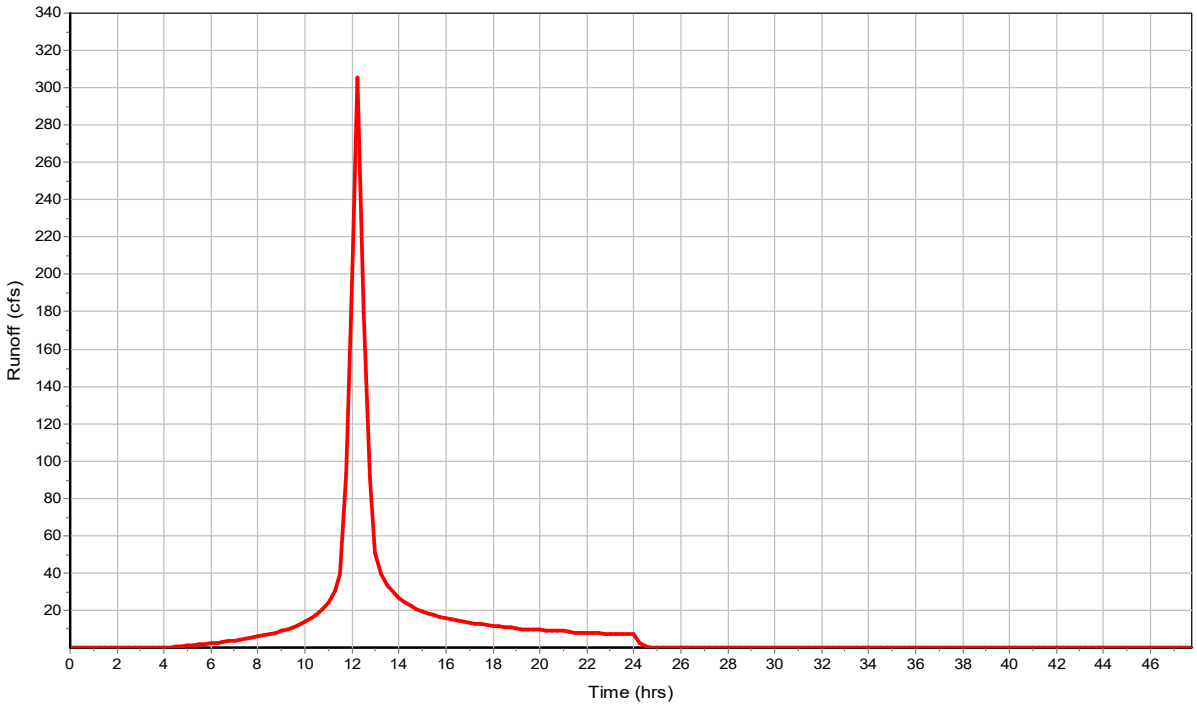
Total Rainfall (in)	6.5
Total Runoff (in)	4.78
Peak Runoff (cfs)	344.04
Weighted Curve Number	85
Time of Concentration (days hh:mm:ss)	0 00:18:12

Subbasin : K

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : RU

Input Data

Area (ac)	7.74
Peak Rate Factor	484
Weighted Curve Number	87
Rain Gage ID	1

Composite Curve Number

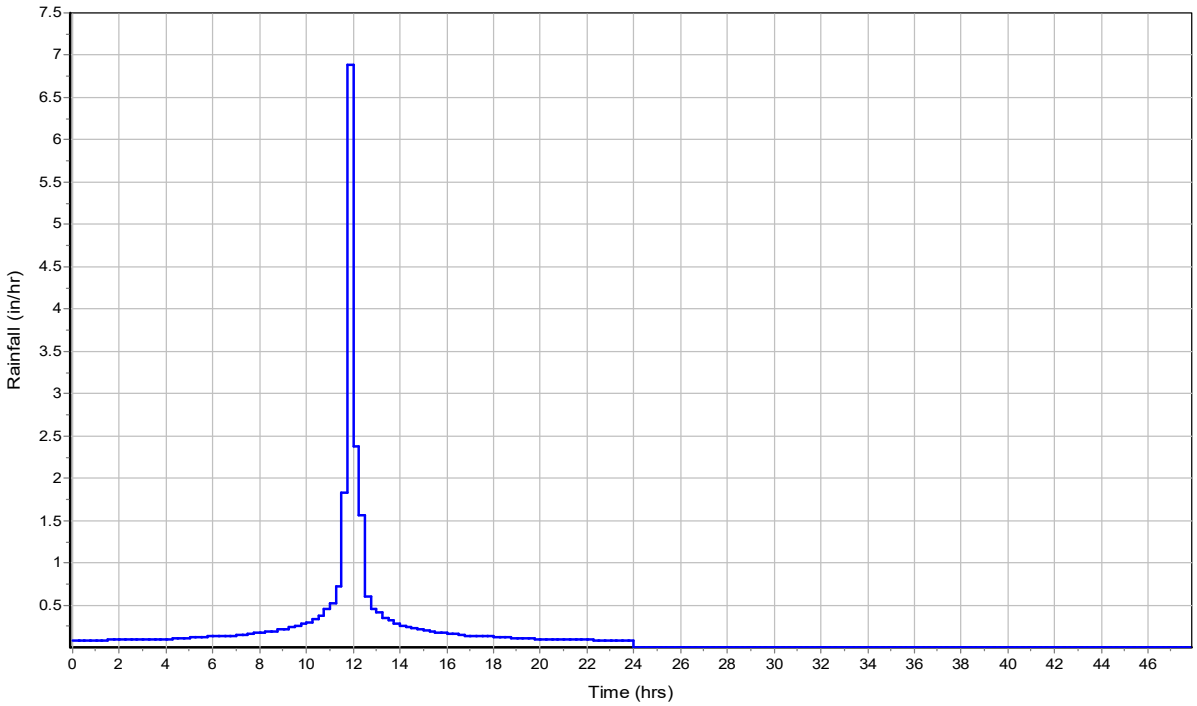
32 Soil/Surface Description	Area (acres)	Soil Group	Curve Number
-	7.74	-	87
Composite Area & Weighted CN	7.74		87

Subbasin Runoff Results

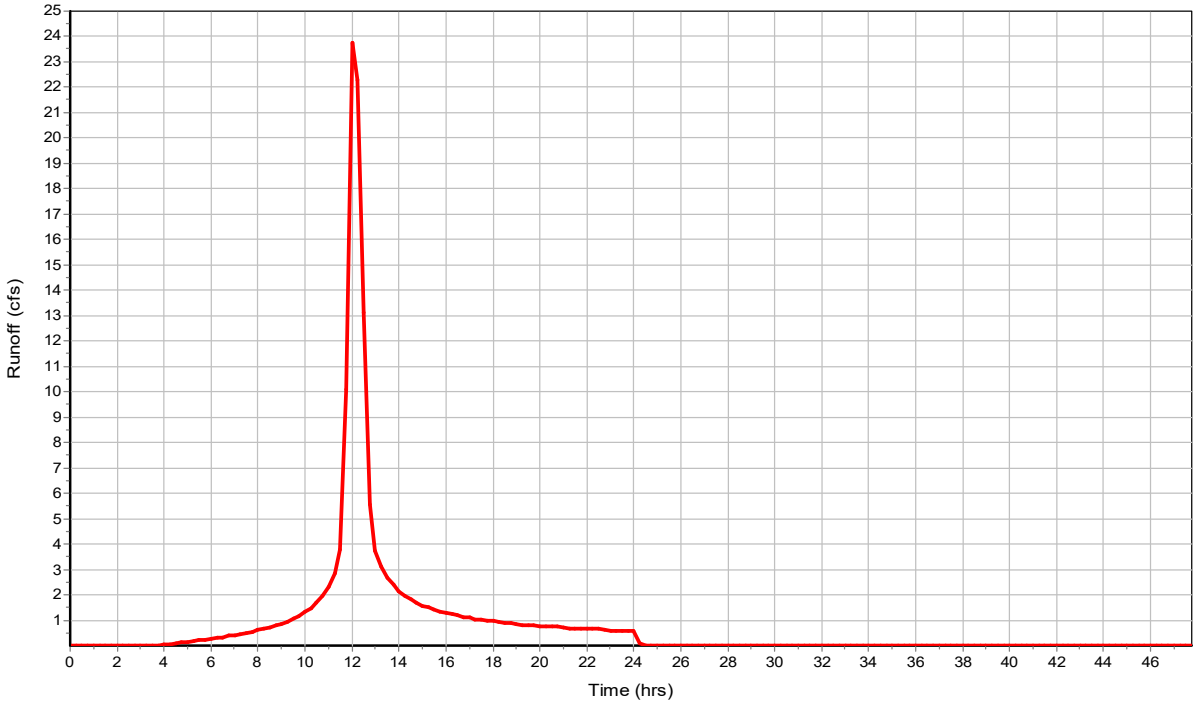
Total Rainfall (in)	6.5
Total Runoff (in)	5
Peak Runoff (cfs)	34.03
Weighted Curve Number	87
Time of Concentration (days hh:mm:ss)	0 00:12:24

Subbasin : RU

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : SH

Input Data

Area (ac)	69.35
Peak Rate Factor	484
Weighted Curve Number	86
Rain Gage ID	1

Composite Curve Number

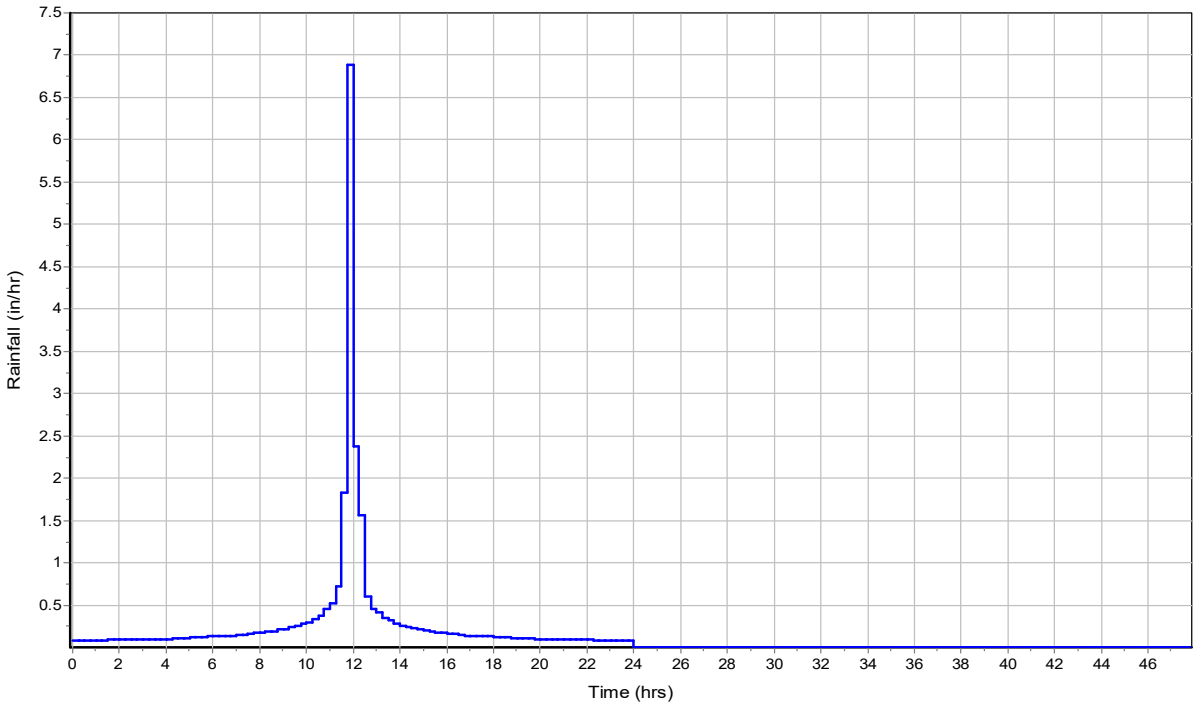
32 Soil/Surface Description	Area (acres)	Soil Group	Curve Number
-	69.35	-	86
Composite Area & Weighted CN	69.35		86

Subbasin Runoff Results

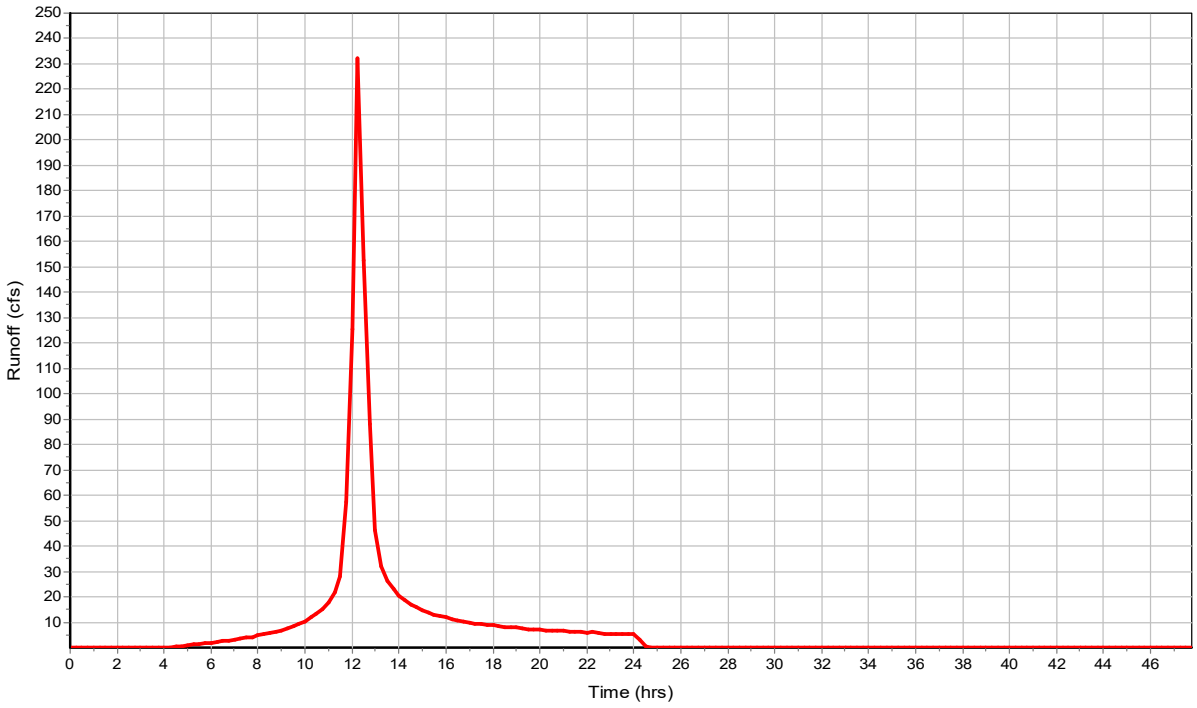
Total Rainfall (in)	6.5
Total Runoff (in)	4.89
Peak Runoff (cfs)	234.05
Weighted Curve Number	86
Time of Concentration (days hh:mm:ss)	0 00:23:30

Subbasin : SH

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : UG1

Input Data

Area (ac) 3.05
Peak Rate Factor 484
Weighted Curve Number 93
Rain Gage ID 1

Composite Curve Number

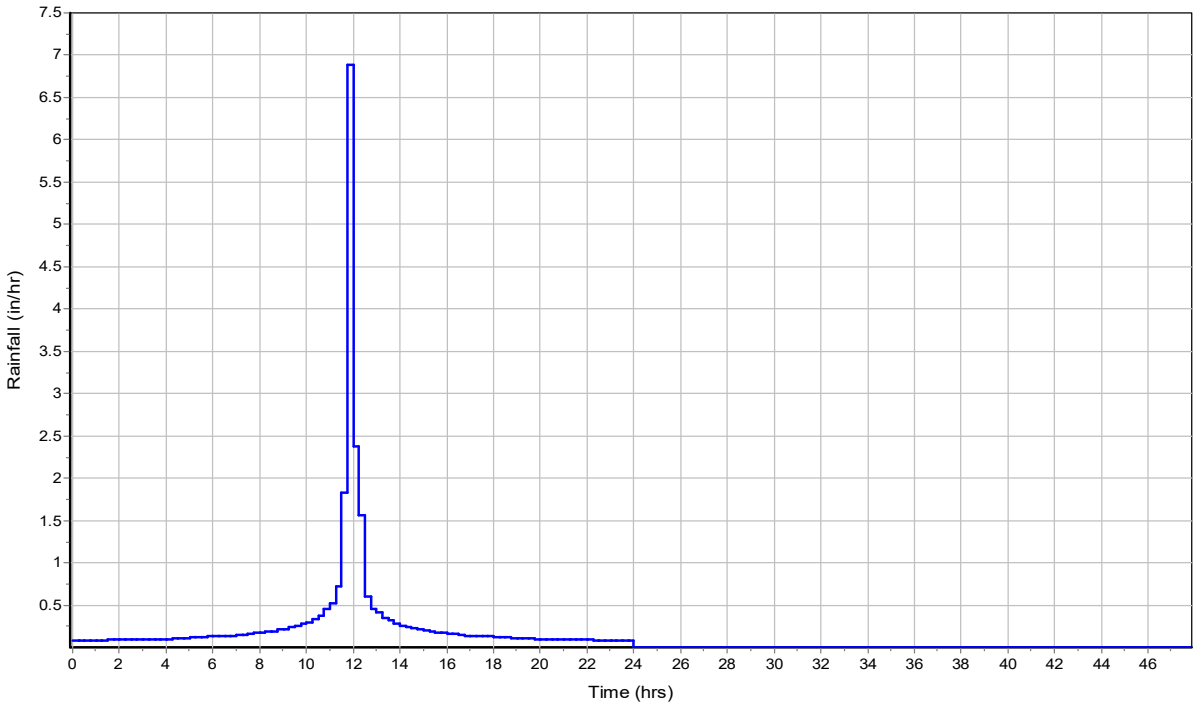
32 Soil/Surface Description	Area (acres)	Soil Group	Curve Number
-	3.05	-	93
Composite Area & Weighted CN	3.05		93

Subbasin Runoff Results

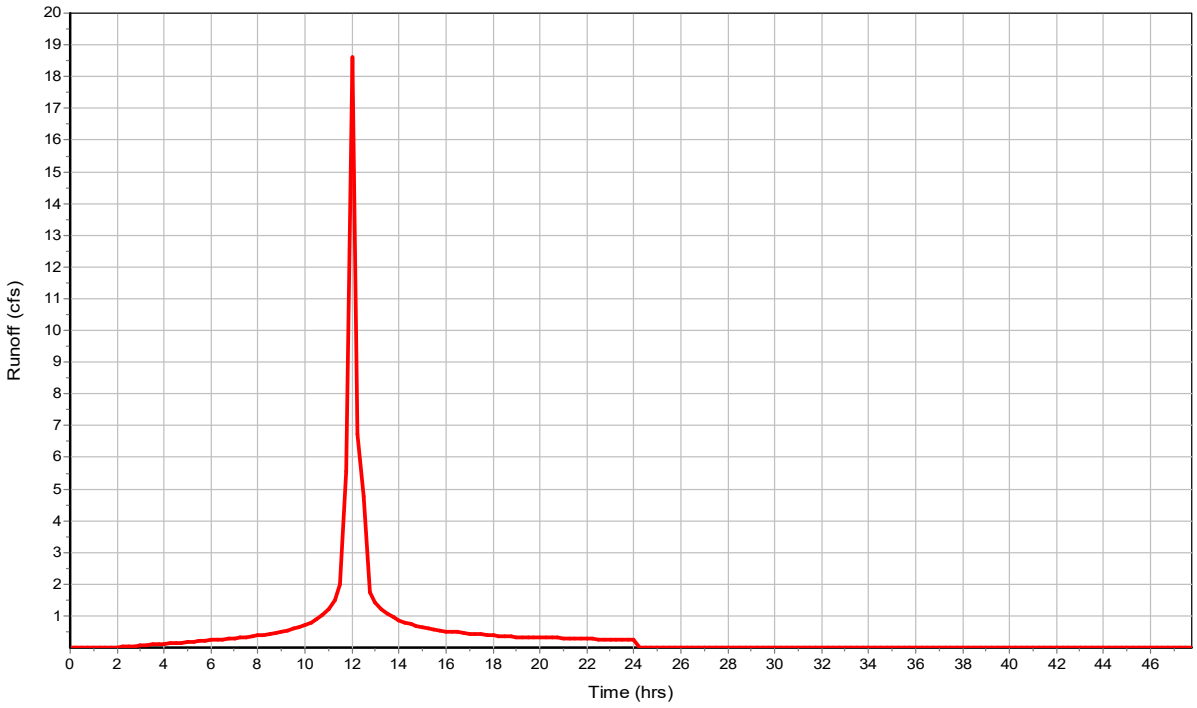
Total Rainfall (in) 6.5
Total Runoff (in) 5.68
Peak Runoff (cfs) 19.04
Weighted Curve Number 93
Time of Concentration (days hh:mm:ss) 0 00:05:00

Subbasin : UG1

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : UG2

Input Data

Area (ac)	11.65
Peak Rate Factor	484
Weighted Curve Number	86
Rain Gage ID	1

Composite Curve Number

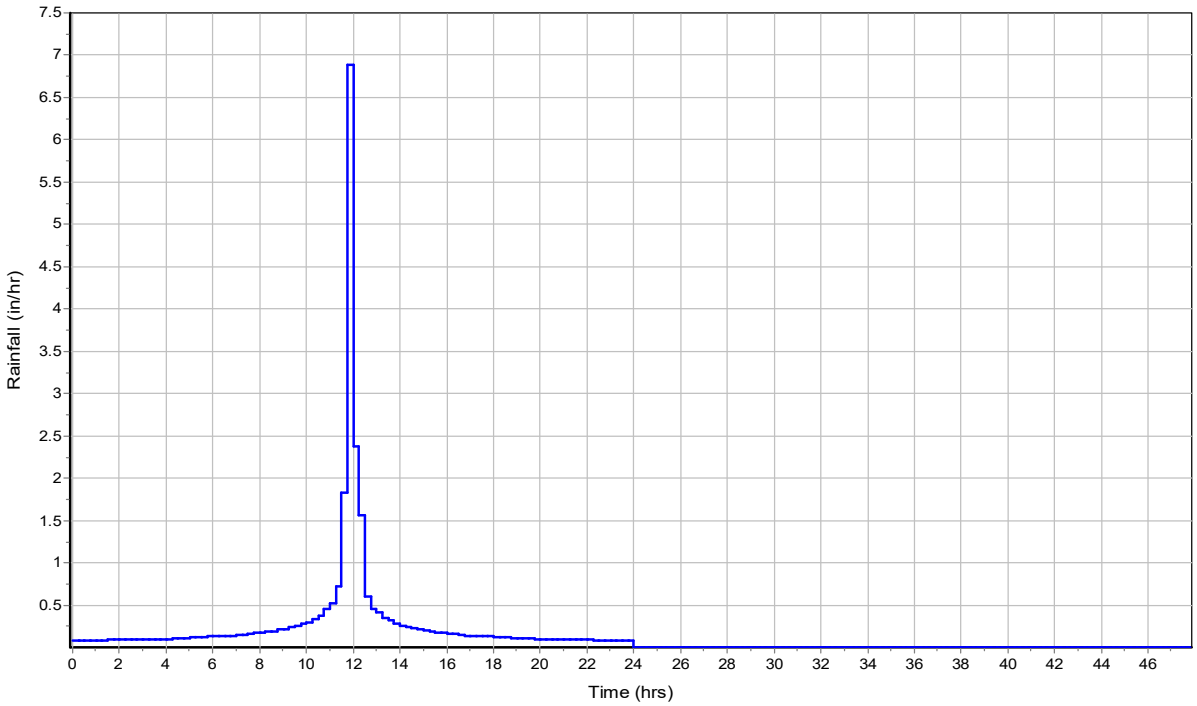
32 Soil/Surface Description	Area (acres)	Soil Group	Curve Number
-	11.65	-	86
Composite Area & Weighted CN	11.65		86

Subbasin Runoff Results

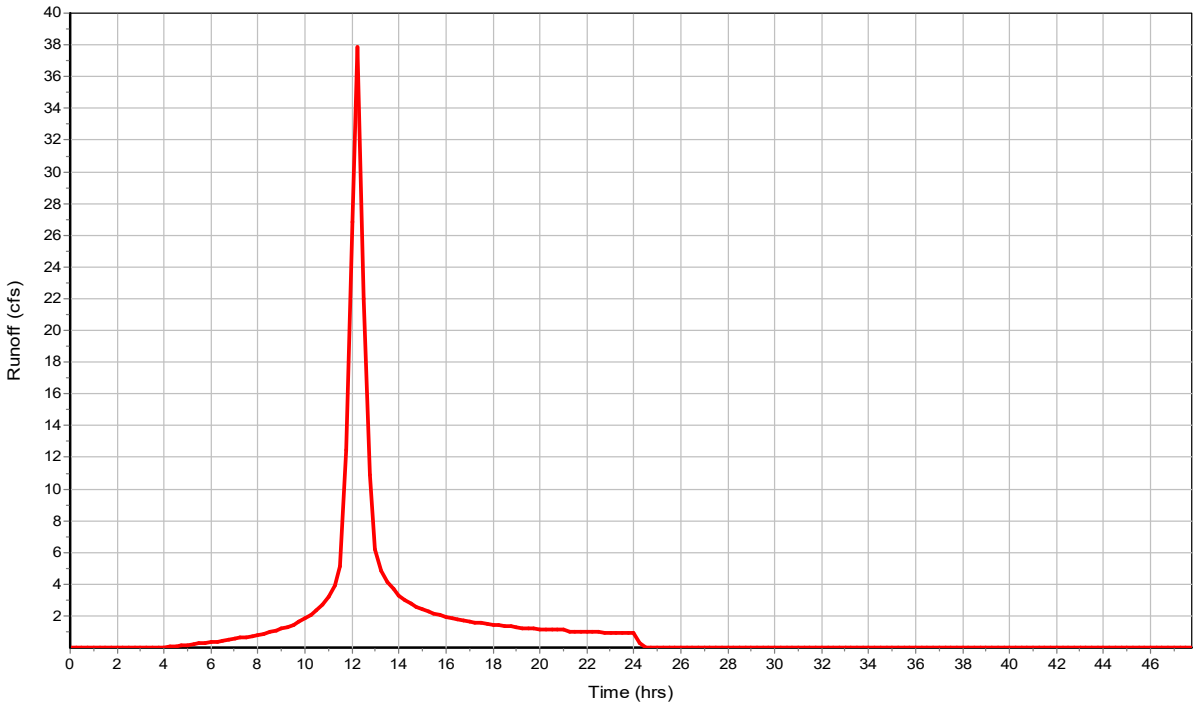
Total Rainfall (in)	6.5
Total Runoff (in)	4.89
Peak Runoff (cfs)	44.49
Weighted Curve Number	86
Time of Concentration (days hh:mm:ss)	0 00:17:12

Subbasin : UG2

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : US1

Input Data

Area (ac)	244.78
Peak Rate Factor	484
Weighted Curve Number	82
Rain Gage ID	1

Composite Curve Number

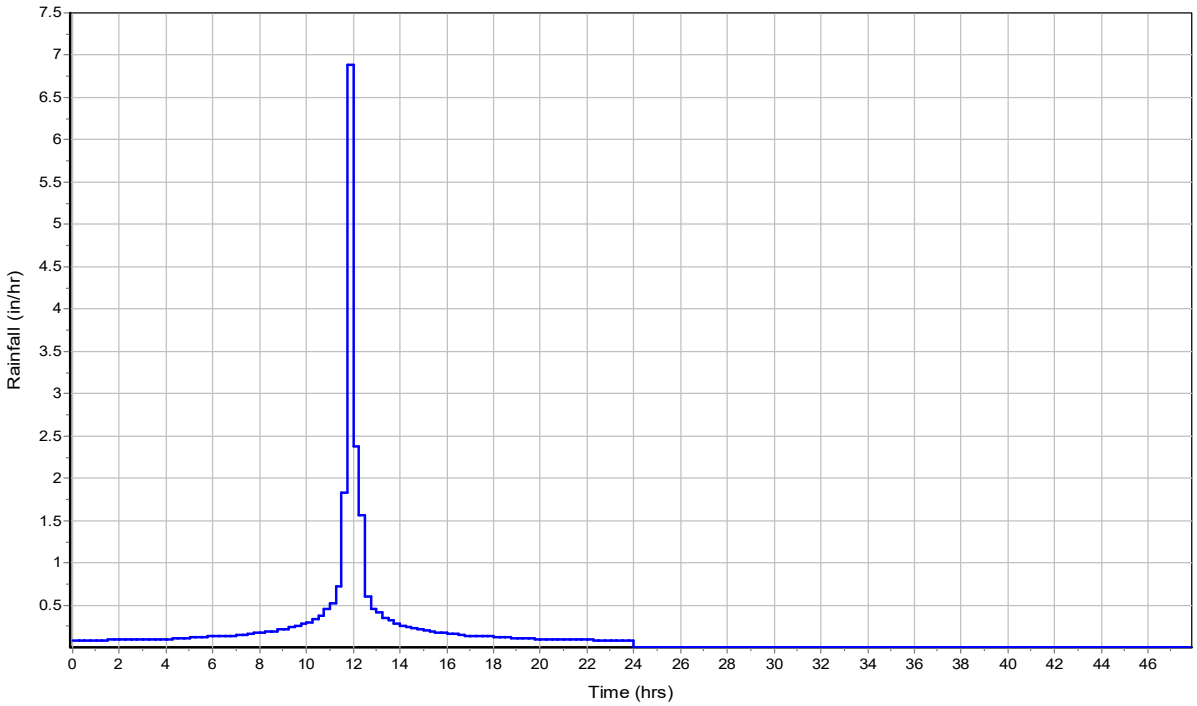
32 Soil/Surface Description	Area (acres)	Soil Group	Curve Number
-	244.78	-	82
Composite Area & Weighted CN	244.78		82

Subbasin Runoff Results

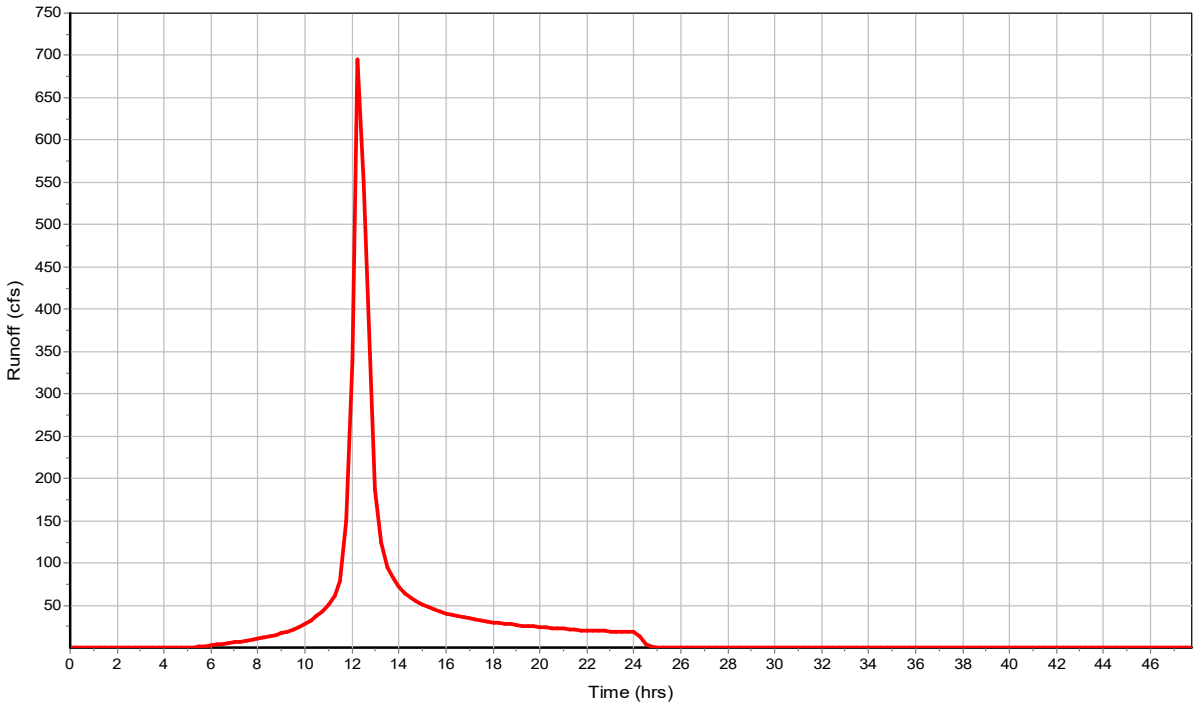
Total Rainfall (in)	6.5
Total Runoff (in)	4.45
Peak Runoff (cfs)	701.29
Weighted Curve Number	82
Time of Concentration (days hh:mm:ss)	0 00:28:36

Subbasin : US1

Rainfall Intensity Graph



Runoff Hydrograph



Junction Input

SN	Element ID	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Ground/Rim (Max) Offset (ft)	Initial Water Elevation (ft)	Initial Water Depth (ft)	Surcharge Elevation (ft)	Surcharge Depth (ft)	Ponded Area (ft^2)	Minimum Pipe Cover (in)
1	1	2062.60	2068.60	6.00	2062.60	0.00	2068.60	0.00	0.00	
2	2	2061.70	2066.30	4.60	2061.70	0.00	2066.30	0.00	0.00	
3	3	2059.10	2065.70	6.60	2059.10	0.00	2065.70	0.00	0.00	
4	4	2056.20	2065.00	8.80	2056.20	0.00	2065.00	0.00	0.00	
5	5	2054.00	2060.00	6.00	2054.00	0.00	2060.00	0.00	0.00	
6	6	2048.88	2053.88	5.00	2048.88	0.00	2053.88	0.00	0.00	
7	7	2048.60	2053.60	5.00	2048.60	0.00	2053.60	0.00	0.00	
8	8	2045.83	2050.83	5.00	2045.83	0.00	2050.83	0.00	0.00	
9	9	2044.80	2049.80	5.00	2044.80	0.00	2049.80	0.00	0.00	
10	11	2092.00	2098.00	6.00	2092.00	0.00	2098.00	0.00	0.00	
11	12	2133.50	2139.50	6.00	2133.50	0.00	2139.50	0.00	0.00	
12	13	2116.51	2125.00	8.49	2116.51	0.00	2125.00	0.00	0.00	
13	14	2154.50	2154.50	0.00	2154.50	0.00	2154.50	0.00	0.00	
14	15	2134.00	2142.00	8.00	2134.00	0.00	2142.00	0.00	0.00	
15	16	2044.25	2044.25	0.00	2044.25	0.00	2044.25	0.00	0.00	
16	17	2050.75	2050.75	0.00	2050.75	0.00	2050.75	0.00	0.00	
17	18	2043.83	2047.83	4.00	2043.83	0.00	2047.83	0.00	0.00	
18	19	2054.70	2060.00	5.30	2054.70	0.00	2060.00	0.00	0.00	

Junction Results

SN	Element ID	Peak Inflow (cfs)	Peak Lateral Inflow (cfs)	Max HGL Elevation Attained (ft)	Max HGL Depth Attained (ft)	Max Surcharge Depth Attained (ft)	Min Freeboard Attained (ft)	Average HGL Elevation Attained (ft)	Average HGL Depth Attained (ft)	Time of Max HGL Occurrence (days hh:mm)	Time of Peak Flooding Occurrence (days hh:mm)	Total Flooded Volume (ac-in)	Total Time Flooded (min)
1	1	983.87	694.89	2068.84	6.24	0.00	4.76	2063.28	0.68	0 12:35	0 00:00	0.00	0.00
2	2	981.59	0.00	2068.10	6.40	0.00	4.60	2062.01	0.31	0 12:35	0 00:00	0.00	0.00
3	3	981.53	0.00	2067.37	8.27	0.00	5.29	2059.57	0.47	0 12:35	0 00:00	0.00	0.00
4	4	876.19	0.00	2062.71	6.51	0.00	6.49	2056.75	0.55	0 12:35	0 00:00	0.00	0.00
5	5	1253.51	305.72	2060.82	6.82	0.00	4.18	2054.47	0.47	0 12:33	0 00:00	0.00	0.00
6	6	1253.46	0.00	2055.64	6.76	0.00	4.24	2049.50	0.62	0 12:33	0 00:00	0.00	0.00
7	7	1280.03	22.39	2054.90	6.30	0.00	3.70	2049.18	0.58	0 12:33	0 00:00	0.00	0.00
8	8	1279.98	0.00	2051.38	5.55	0.00	4.45	2046.11	0.28	0 12:33	0 00:00	0.00	0.00
9	9	1310.03	36.00	2049.92	5.12	0.00	4.88	2045.27	0.47	0 12:33	0 00:00	0.00	0.00
10	11	357.05	0.00	2095.42	3.42	0.00	4.58	2092.36	0.36	0 12:37	0 00:00	0.00	0.00
11	12	162.14	0.00	2135.29	1.79	0.00	7.71	2133.65	0.15	0 12:31	0 00:00	0.00	0.00
12	13	204.98	0.00	2119.02	2.51	0.00	5.98	2116.78	0.27	0 12:35	0 00:00	0.00	0.00
13	14	138.50	0.00	2155.90	1.40	0.00	2.87	2154.62	0.12	0 12:30	0 00:00	0.00	0.00
14	15	84.40	0.00	2136.04	2.04	0.00	10.46	2134.26	0.26	0 12:30	0 00:00	0.00	0.00
15	16	37.87	0.00	2048.75	4.50	0.00	2.05	2044.50	0.25	0 12:32	0 00:00	0.00	0.00
16	17	14.89	0.00	2055.00	4.25	0.00	1.65	2050.90	0.15	0 12:33	0 00:00	0.00	0.00
17	18	1344.48	0.00	2048.57	4.74	0.00	5.26	2044.22	0.39	0 12:33	0 00:00	0.00	0.00
18	19	981.47	0.00	2061.05	6.35	0.00	7.21	2055.69	0.99	0 12:33	0 00:00	0.00	0.00

Channel Input

SN	Element ID	Length (ft)	Inlet Invert Elevation (ft)	Inlet Invert Offset (ft)	Outlet Invert Elevation (ft)	Outlet Invert Offset (ft)	Total Drop (ft)	Average Slope (%)	Shape	Height (ft)	Width (ft)	Manning's Roughness	Entrance Losses	Exit/Bend Losses	Additional Losses	Initial Flow (cfs)	Flap Gate
1	1	131.00	2062.60	0.00	2061.70	0.00	0.90	0.6900	Trapezoidal	6.000	27.000	0.0240	0.0000	0.0000	0.0000	0.00	No
2	3	187.00	2059.10	0.00	2056.20	0.00	2.90	1.5500	Rectangular	6.600	12.000	0.0320	0.7000	0.5000	0.0000	0.00	No
3	29	154.40	2043.83	0.00	2041.91	0.00	1.92	1.2400	Trapezoidal	5.000	24.000	0.0240	0.0000	0.0000	0.0000	0.00	No
4	ED	440.35	2048.60	0.00	2045.83	0.00	2.77	0.6300	Trapezoidal	5.000	20.000	0.0240	0.0000	0.0000	0.0000	0.00	No
5	KB	392.20	2054.00	0.00	2048.88	0.00	5.12	1.3100	Trapezoidal	5.000	20.000	0.0240	0.0000	0.0000	1.0000	0.00	No
6	MOR	1020.00	2116.51	0.00	2092.00	0.00	24.51	2.4000	Trapezoidal	8.000	34.000	0.0240	0.0000	0.0000	0.0000	0.00	No
7	PF	78.10	2044.80	0.00	2043.83	0.00	0.97	1.2400	Trapezoidal	5.000	20.000	0.0240	0.0000	0.0000	0.0000	0.00	No
8	STK	2424.00	2092.00	0.00	2062.60	0.00	29.40	1.2100	Trapezoidal	5.000	23.000	0.0240	0.0000	0.0000	0.0000	0.00	No
9	USR	1864.00	2133.50	0.00	2092.00	0.00	41.50	2.2300	Trapezoidal	8.000	37.000	0.0240	0.0000	0.0000	0.0000	0.00	No

Channel Results

SN	Element ID	Peak Flow	Time of Peak Flow Occurrence	Design Flow Capacity	Peak Flow/ Design Flow Ratio	Peak Flow Velocity	Travel Time	Peak Flow Depth	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged	Froude Number	Reported Condition
		(cfs)	(days hh:mm)	(cfs)		(ft/sec)	(min)	(ft)		(min)		
1	1	898.79	0 12:30	964.35	0.93	12.41	0.18	6.00	1.00	16.00		
2	3	876.19	0 12:35	982.70	0.89	11.14	0.28	6.49	0.99	0.00		
3	29	1344.58	0 12:33	1476.05	0.91	15.13	0.17	4.60	0.95	0.00		
4	ED	863.80	0 12:24	784.15	1.10	12.60	0.58	5.00	1.00	23.00		
5	KB	882.96	0 12:26	1129.64	0.78	11.77	0.56	5.00	1.00	36.00		
6	MOR	204.76	0 12:35	3372.60	0.06	8.87	1.92	2.82	0.37	0.00		
7	PF	1277.27	0 12:33	1101.84	1.16	17.70	0.07	4.80	0.97	0.00		
8	STK	344.14	0 12:37	830.10	0.41	7.16	5.64	4.14	0.84	0.00		
9	USR	158.17	0 12:31	3988.84	0.04	6.83	4.55	2.43	0.32	0.00		

Pipe Input

SN	Element ID	Length (ft)	Inlet Invert Elevation (ft)	Inlet Invert Offset (ft)	Outlet Invert Elevation (ft)	Outlet Invert Offset (ft)	Total Drop (ft)	Average Slope (%)	Pipe Shape	Pipe Diameter or Height (in)	Pipe Width (in)	Manning's Roughness	Entrance Losses	Exit/Bend Losses	Additional Losses	Initial Flow (cfs)	Flap Gate	No. of Barrels
1	2	182.00	2061.70	0.00	2060.10	1.00	1.60	0.8800	Rectangular									
2	6	50.00	2048.88	0.00	2048.60	0.00	0.28	0.5600	Rectangular									
3	8	50.00	2045.83	0.00	2044.80	0.00	1.03	2.0600	Rectangular									
4	9	50.00	2154.50	0.00	2137.00	0.00	17.50	35.0000	CIRCULAR									
5	15	82.00	2134.00	0.00	2133.50	0.00	0.50	0.6100	CIRCULAR									
6	19	75.00	2117.00	0.00	2116.51	0.00	0.49	0.6500	CIRCULAR									
7	21	35.10	2044.25	0.00	2043.83	0.00	0.42	1.2000	CIRCULAR									
8	22	42.40	2050.75	0.00	2048.60	0.00	2.15	5.0700	CIRCULAR									
9	Link-01	166.00	2056.20	0.00	2054.70	0.00	1.50	0.9000	Rectangular									
10	Link-02	65.00	2054.70	0.00	2054.00	0.00	0.70	1.0800	Rectangular									

Pipe Results

SN	Element ID	Peak Flow (cfs)	Time of Peak Flow Occurrence (days hh:mm)	Design Flow Capacity (cfs)	Peak Flow/ Design Flow Ratio	Peak Flow Velocity (ft/sec)	Travel Time (min)	Peak Flow Depth (ft)	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged (min)	Froude Number	Reported Condition
1	2	614.76	0 12:22	896.81	0.69	10.25	0.30	4.00	1.00	44.00		SURCHARGED
2	6	482.75	0 13:11	291.43	1.66	10.35	0.08	4.00	1.00	55.00		SURCHARGED
3	8	1097.88	0 12:38	1979.07	0.55	12.20	0.07	4.50	1.00	29.00		SURCHARGED
4	9	138.51	0 12:30	242.66	0.57	33.75	0.02	1.95	0.78	0.00		Calculated
5	15	84.15	0 12:30	199.62	0.42	15.48	0.09	1.90	0.42	0.00		Calculated
6	19	94.87	0 12:34	29.20	3.25	14.38	0.09	2.68	0.92	0.00		> CAPACITY
7	21	41.90	0 12:24	53.03	0.79	8.54	0.07	2.50	1.00	56.00		SURCHARGED
8	22	14.59	0 12:19	27.95	0.52	8.26	0.09	1.50	1.00	64.00		SURCHARGED
9	Link-01	876.17	0 12:35	6824.77	0.13	7.00	0.40	6.31	0.49	0.00		Calculated
10	Link-02	165.26	0 13:05	254.51	0.65	10.51	0.10	4.00	1.00	51.00		SURCHARGED

Storage Nodes

Storage Node : CVP

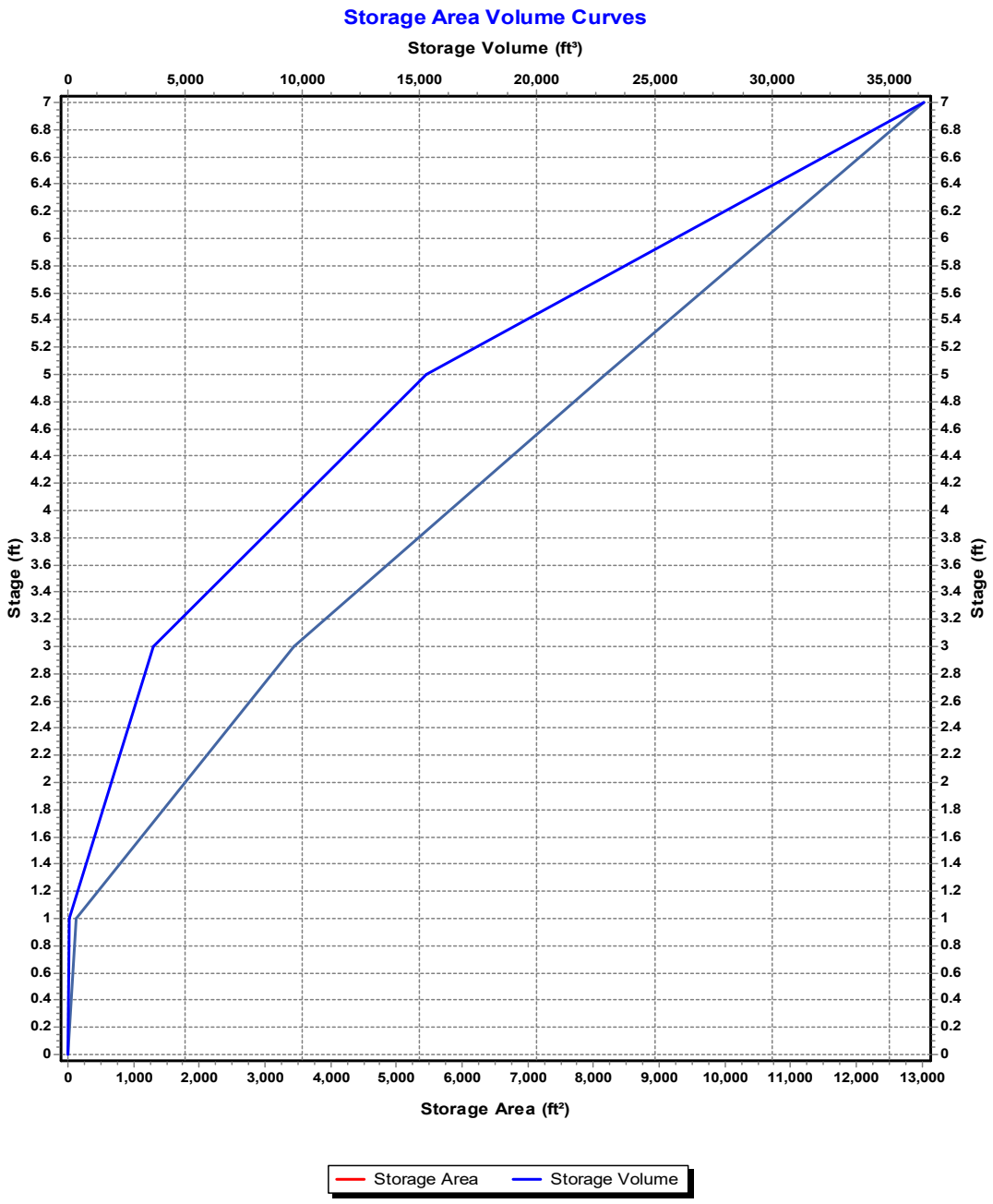
Input Data

Invert Elevation (ft)	2155.00
Max (Rim) Elevation (ft)	2162.00
Max (Rim) Offset (ft)	7.00
Initial Water Elevation (ft)	2155.00
Initial Water Depth (ft)	0.00
Ponded Area (ft^2)	7.00
Evaporation Loss	0.00

Storage Area Volume Curves

Storage Curve : CVP1

Stage (ft)	Storage Area (ft^2)	Storage Volume (ft^3)
0	0	0
1	131	65.5
3	3441	3637.5
5	8189	15267.5
7	13024	36480.5


Storage Area Volume Curves
Storage Volume (ft³)
0
5,000
10,000
15,000
20,000
25,000
30,000
35,000
Stage (ft)
0
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
1.8
2
2.2
2.4
2.6
2.8
3
3.2
3.4
3.6
3.8
4
4.2
4.4
4.6
4.8
5
5.2
5.4
5.6
5.8
6
6.2
6.4
6.6
6.8
7
Storage Area (ft²)
0
1,000
2,000
3,000
4,000
5,000
6,000
7,000
8,000
9,000
10,000
11,000
12,000
13,000
Storage Area
Storage Volume

Storage Node : CVP (continued)

Outflow Weirs

SN	Element ID	Weir Type	Flap Gate	Crest Elevation (ft)	Crest Offset (ft)	Length (ft)	Weir Total Height (ft)	Discharge Coefficient
1	14	Trapezoidal	No	2161.50	6.50	40.00	2.00	3.33

Outflow Orifices

SN	Element ID	Orifice Type	Orifice Shape	Flap Gate	Circular Orifice Diameter (in)	Rectangular Orifice Height (in)	Rectangular Orifice Width (in)	Orifice Invert Elevation (ft)	Orifice Coefficient
1	5	Side	CIRCULAR	No					
2	7	Side	CIRCULAR	No					
3	13	Bottom	Rectangular	No					

Output Summary Results

Peak Inflow (cfs)	140.37
Peak Lateral Inflow (cfs)	140.37
Peak Outflow (cfs)	138.5
Peak Exfiltration Flow Rate (cfm)	0
Max HGL Elevation Attained (ft)	2160.84
Max HGL Depth Attained (ft)	5.84
Average HGL Elevation Attained (ft)	2155.58
Average HGL Depth Attained (ft)	0.58
Time of Max HGL Occurrence (days hh:mm)	0 12:30
Total Exfiltration Volume (1000-ft^3)	0
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0

Storage Node : P1

Input Data

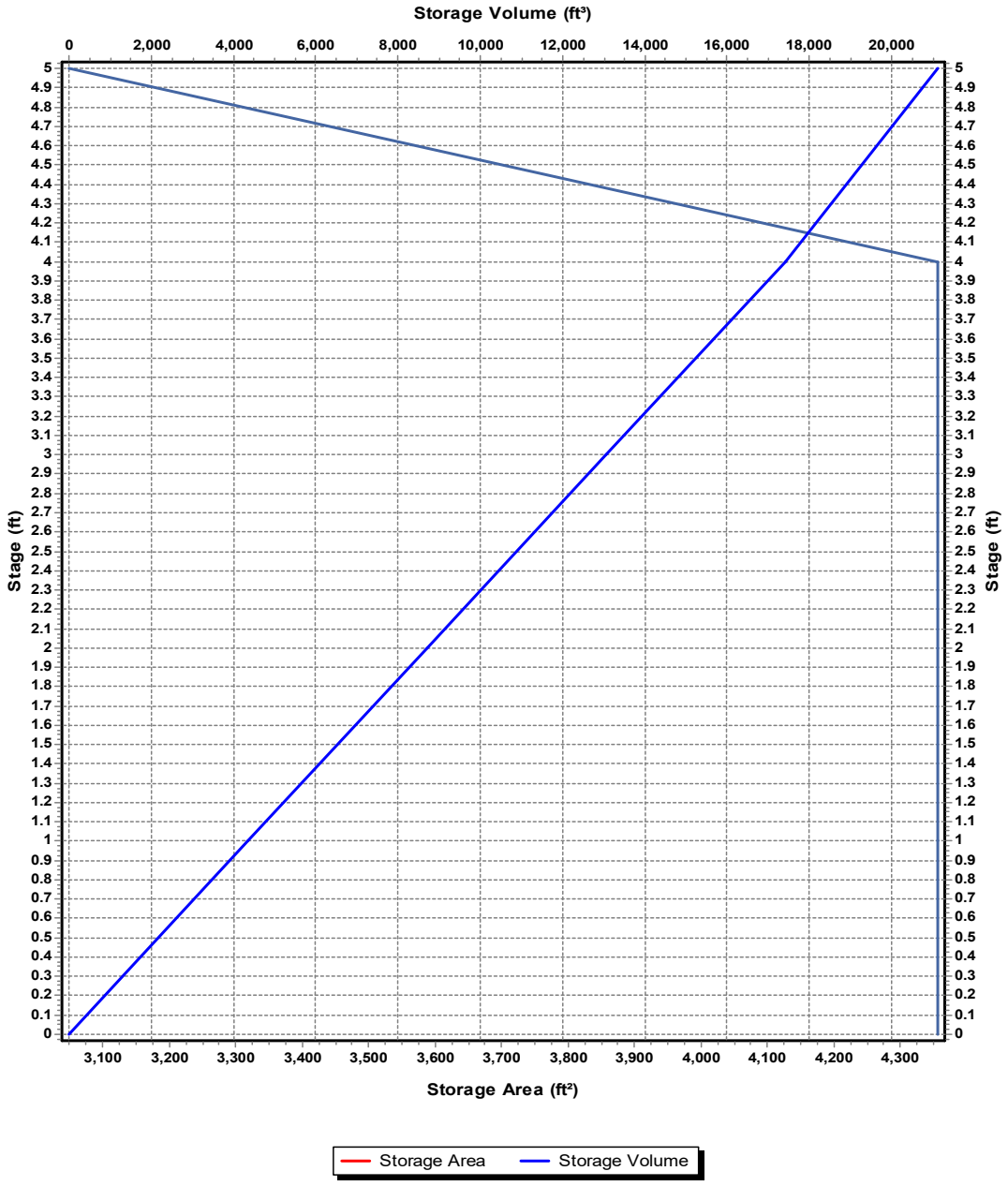
Invert Elevation (ft)	2050.75
Max (Rim) Elevation (ft)	2055.75
Max (Rim) Offset (ft)	5.00
Initial Water Elevation (ft)	2050.75
Initial Water Depth (ft)	0.00
Ponded Area (ft^2)	5.00
Evaporation Loss	0.00

Storage Area Volume Curves

Storage Curve : P1

Stage (ft)	Storage Area (ft^2)	Storage Volume (ft^3)
0	4356	0
1	4356	4356
2	4356	8712
3	4356	13068
4	4356	17424
5	3049	21126.5

Storage Area Volume Curves



Storage Node : P1 (continued)

Outflow Weirs

SN	Element ID	Weir Type	Flap Gate	Crest Elevation (ft)	Crest Offset (ft)	Length (ft)	Weir Total Height (ft)	Discharge Coefficient
1	28	Transverse	No	2054.65	3.90	6.00	2.00	3.33

Outflow Orifices

SN	Element ID	Orifice Type	Orifice Shape	Flap Gate	Circular Orifice Diameter (in)	Rectangular Orifice Height (in)	Rectangular Orifice Width (in)	Orifice Invert Elevation (ft)	Orifice Coefficient
1	26	Side	CIRCULAR	No					
2	27	Side	Rectangular	No					

Output Summary Results

Peak Inflow (cfs)	18.61
Peak Lateral Inflow (cfs)	18.61
Peak Outflow (cfs)	14.89
Peak Exfiltration Flow Rate (cfm)	0
Max HGL Elevation Attained (ft)	2055.35
Max HGL Depth Attained (ft)	4.6
Average HGL Elevation Attained (ft)	2051.62
Average HGL Depth Attained (ft)	0.87
Time of Max HGL Occurrence (days hh:mm)	0 12:19
Total Exfiltration Volume (1000-ft³)	0
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0

Storage Node : P2

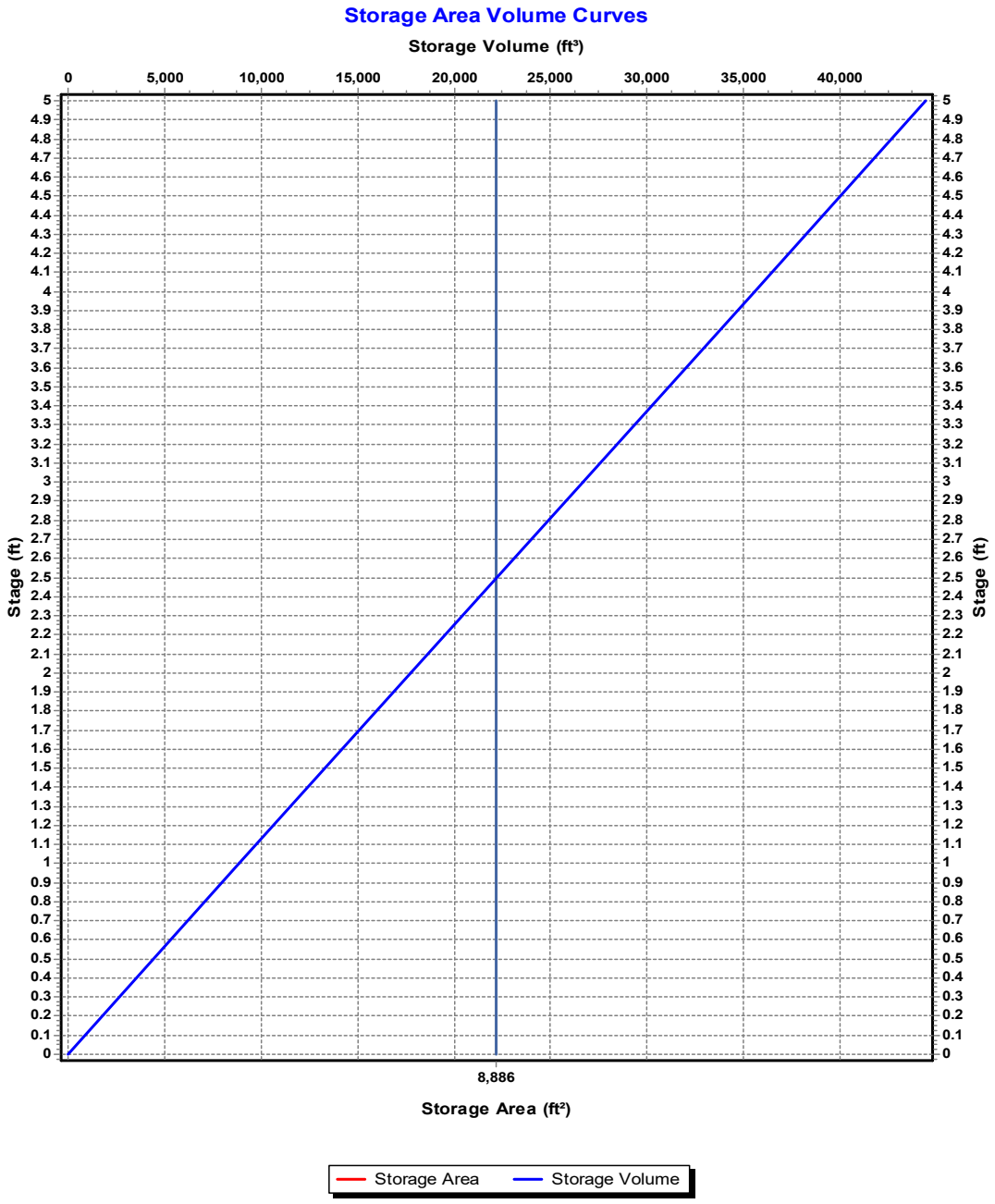
Input Data

Invert Elevation (ft)	2044.25
Max (Rim) Elevation (ft)	2049.25
Max (Rim) Offset (ft)	5.00
Initial Water Elevation (ft)	2044.25
Initial Water Depth (ft)	0.00
Ponded Area (ft^2)	5.00
Evaporation Loss	0.00

Storage Area Volume Curves

Storage Curve : P2

Stage (ft)	Storage Area (ft^2)	Storage Volume (ft^3)
0	8886	0
1	8886	8886
2	8886	17772
3	8886	26658
4	8886	35544
5	8886	44430


Storage Area Volume Curves
Storage Volume (ft³)
0
5,000
10,000
15,000
20,000
25,000
30,000
35,000
40,000
Stage (ft)
Stage (ft)
8,886
Storage Area (ft²)
Storage Area
Storage Volume

Storage Node : P2 (continued)

Outflow Weirs

SN	Element ID	Weir Type	Flap Gate	Crest Elevation (ft)	Crest Offset (ft)	Length (ft)	Weir Total Height (ft)	Discharge Coefficient
1	25	Transverse	No	2048.80	4.55	6.00	2.00	3.33

Outflow Orifices

SN	Element ID	Orifice Type	Orifice Shape	Flap Gate	Circular Orifice Diameter (in)	Rectangular Orifice Height (in)	Rectangular Orifice Width (in)	Orifice Invert Elevation (ft)	Orifice Coefficient
1	23	Side	Rectangular	No					
2	24	Side	Rectangular	No					

Output Summary Results

Peak Inflow (cfs)	37.87
Peak Lateral Inflow (cfs)	37.87
Peak Outflow (cfs)	37.87
Peak Exfiltration Flow Rate (cfm)	0
Max HGL Elevation Attained (ft)	2050.07
Max HGL Depth Attained (ft)	5.82
Average HGL Elevation Attained (ft)	2044.75
Average HGL Depth Attained (ft)	0.5
Time of Max HGL Occurrence (days hh:mm)	0 12:30
Total Exfiltration Volume (1000-ft^3)	0
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	18
Total Retention Time (sec)	0

Storage Node : RP

Input Data

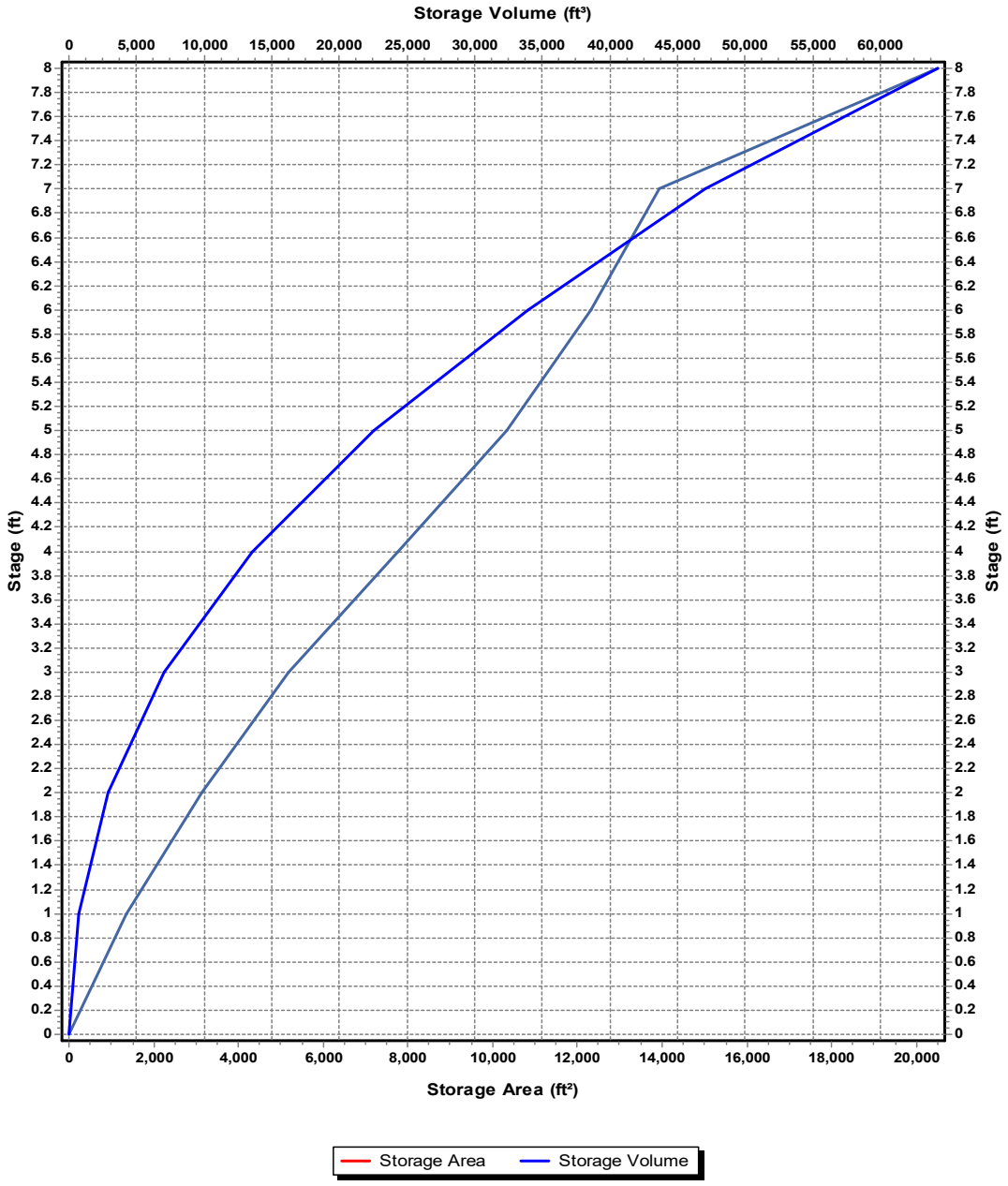
Invert Elevation (ft)	2137.00
Max (Rim) Elevation (ft)	2145.00
Max (Rim) Offset (ft)	8.00
Initial Water Elevation (ft)	2137.00
Initial Water Depth (ft)	0.00
Ponded Area (ft^2)	8.00
Evaporation Loss	0.00

Storage Area Volume Curves

Storage Curve : RP1

Stage (ft)	Storage Area (ft^2)	Storage Volume (ft^3)
0	0	0
1	1366	683
2	3129	2930.5
3	5175	7082.5
4	7760	13550
5	10340	22600
6	12305	33922.5
7	13925	47037.5
8	20503	64251.5

Storage Area Volume Curves



Storage Node : RP (continued)

Outflow Weirs

SN	Element ID	Weir Type	Flap Gate	Crest Elevation (ft)	Crest Offset (ft)	Length (ft)	Weir Total Height (ft)	Discharge Coefficient
1	18	Trapezoidal	No	2144.50	7.50	60.00	2.00	3.33

Outflow Orifices

SN	Element ID	Orifice Type	Orifice Shape	Flap Gate	Circular Orifice Diameter (in)	Rectangular Orifice Height (in)	Rectangular Orifice Width (in)	Orifice Invert Elevation (ft)	Orifice Coefficient
1	16	Side	CIRCULAR	No					
2	17	Side	Rectangular	No					

Output Summary Results

Peak Inflow (cfs)	160.54
Peak Lateral Inflow (cfs)	23.77
Peak Outflow (cfs)	162.44
Peak Exfiltration Flow Rate (cfm)	0
Max HGL Elevation Attained (ft)	2145.03
Max HGL Depth Attained (ft)	8.03
Average HGL Elevation Attained (ft)	2137.82
Average HGL Depth Attained (ft)	0.82
Time of Max HGL Occurrence (days hh:mm)	0 12:29
Total Exfiltration Volume (1000-ft^3)	0
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	2
Total Retention Time (sec)	0

Storage Node : SP

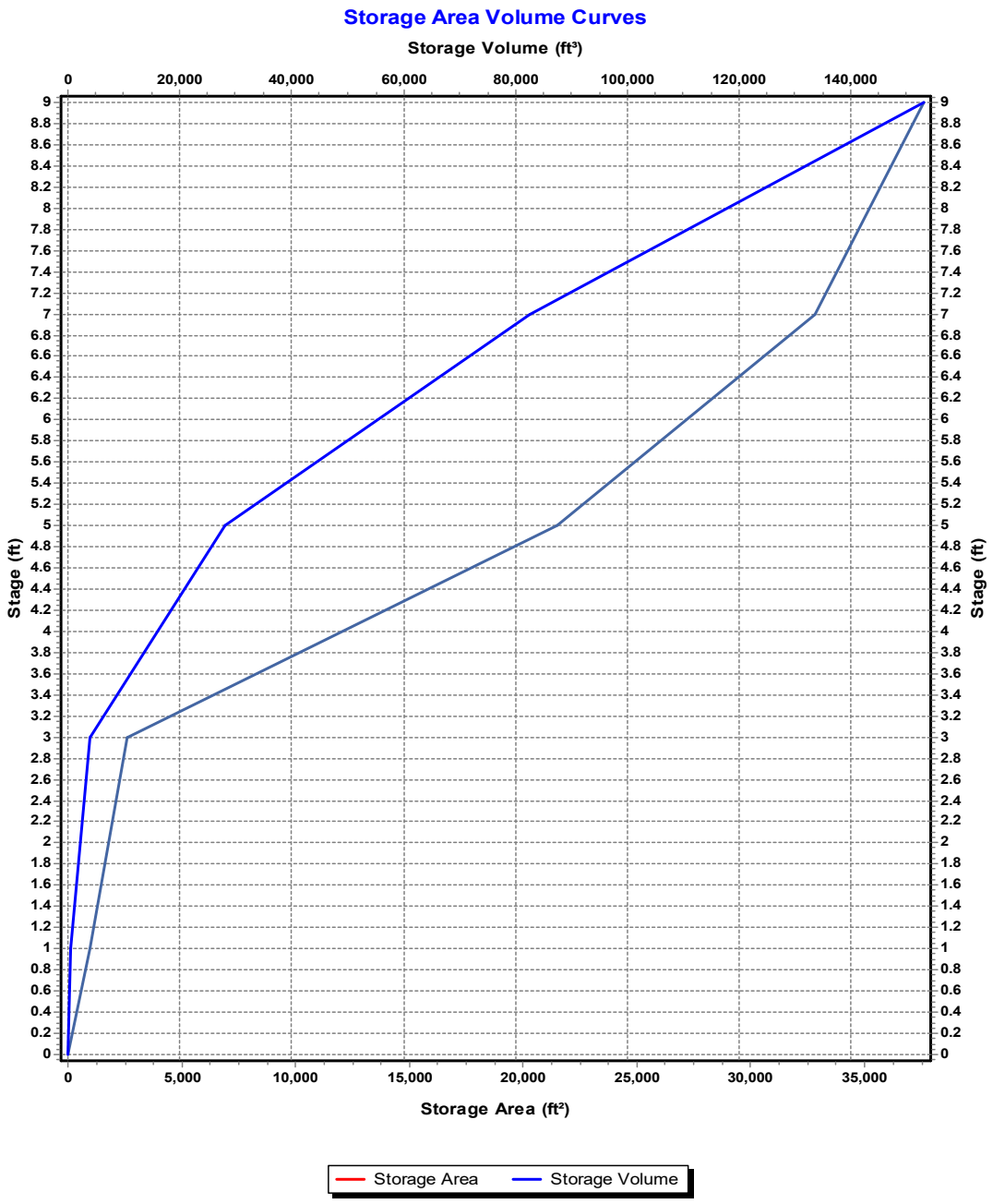
Input Data

Invert Elevation (ft)	2117.00
Max (Rim) Elevation (ft)	2125.00
Max (Rim) Offset (ft)	8.00
Initial Water Elevation (ft)	2117.00
Initial Water Depth (ft)	0.00
Ponded Area (ft^2)	8.00
Evaporation Loss	0.00

Storage Area Volume Curves

Storage Curve : SP1

Stage (ft)	Storage Area (ft^2)	Storage Volume (ft^3)
0	0	0
1	955	477.5
3	2580	4012.5
5	21522	28114.5
7	32858	82494.5
9	37630	152982.5


Storage Area Volume Curves
Storage Volume (ft³)
0
20,000
40,000
60,000
80,000
100,000
120,000
140,000
Stage (ft)
0
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
1.8
2
2.2
2.4
2.6
2.8
3
3.2
3.4
3.6
3.8
4
4.2
4.4
4.6
4.8
5
5.2
5.4
5.6
5.8
6
6.2
6.4
6.6
6.8
7
7.2
7.4
7.6
7.8
8
8.2
8.4
8.6
8.8
9
0
5,000
10,000
15,000
20,000
25,000
30,000
35,000
Storage Area (ft²)
Storage Area
Storage Volume

Storage Node : SP (continued)

Outflow Weirs

SN	Element ID	Weir Type	Flap Gate	Crest Elevation (ft)	Crest Offset (ft)	Length (ft)	Weir Total Height (ft)	Discharge Coefficient
1	20	Trapezoidal	No	2123.00	6.00	20.00	2.00	3.33

Output Summary Results

Peak Inflow (cfs)	232.01
Peak Lateral Inflow (cfs)	232.01
Peak Outflow (cfs)	204.98
Peak Exfiltration Flow Rate (cfm)	0
Max HGL Elevation Attained (ft)	2124.4
Max HGL Depth Attained (ft)	7.4
Average HGL Elevation Attained (ft)	2117.58
Average HGL Depth Attained (ft)	0.58
Time of Max HGL Occurrence (days hh:mm)	0 12:35
Total Exfiltration Volume (1000-ft^3)	0
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0

Project Description

File Name ..... ExistingKabrichModel.SPF

Project Options

Flow Units ..... CFS
Elevation Type ..... Elevation
Hydrology Method ..... SCS TR-20
Time of Concentration (TOC) Method ..... User-Defined
Link Routing Method ..... Hydrodynamic
Enable Overflow Ponding at Nodes ..... YES
Skip Steady State Analysis Time Periods ..... NO

Number of Elements

	Qty
Rain Gages	1
Subbasins	9
Nodes	23
Junctions	17
Outfalls	1
Flow Diversions	0
Inlets	0
Storage Nodes	5
Links	41
Channels	8
Pipes	10
Pumps	0
Orifices	9
Weirs	14
Outlets	0
Pollutants	0
Land Uses	0

Rainfall Details

SN	Rain Gage ID	Data Source	Data Source ID	Rainfall Type	Rain Units	State	County	Return Period (years)	Rainfall Depth (inches)	Rainfall Distribution
1	1	Time Series	500Year	Cumulative	inches				0.00	

Subbasin Summary

SN	Subbasin ID	Area (ac)	Peak Rate Factor	Weighted Curve Number	Total Rainfall (in)	Total Runoff (in)	Total Runoff Volume (ac-in)	Peak Runoff (cfs)	Time of Concentration (days hh:mm:ss)
1	A	6.36	484.00	90.00	8.60	7.40	47.04	30.58	0 00:18:30
2	B	10.80	484.00	92.00	8.60	7.64	82.48	60.67	0 00:12:30
3	CO	44.42	484.00	84.00	8.60	6.67	296.37	203.15	0 00:17:30
4	K	93.79	484.00	85.00	8.60	6.79	637.02	428.55	0 00:18:12
5	RU	7.74	484.00	87.00	8.60	7.03	54.44	41.43	0 00:12:24
6	SH	69.35	484.00	86.00	8.60	6.91	479.42	291.49	0 00:23:30
7	UG1	3.05	484.00	93.00	8.60	7.76	23.66	22.14	0 00:05:00
8	UG2	11.65	484.00	86.00	8.60	6.91	80.54	55.04	0 00:17:12
9	US1	244.78	484.00	82.00	8.60	6.43	1573.94	900.34	0 00:28:36

Node Summary

SN	Element ID	Element Type	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Initial Water Elevation (ft)	Surcharge Elevation (ft)	Ponded Area (ft²)	Peak Inflow (cfs)	Max HGL Elevation Attained (ft)	Max Surcharge Depth Attained (ft)	Min Freeboard Attained (ft)	Time of Peak Flooding Occurrence (days hh:mm)	Total Flooded Volume (ac-in)	Total Time Flooded (min)
1	1	Junction	2062.60	2068.60	2062.60	2068.60	0.00	1293.71	2069.74	0.00	3.86	0 00:00	0.00	0.00
2	2	Junction	2061.70	2066.30	2061.70	2066.30	0.00	1291.51	2069.44	0.00	3.26	0 00:00	0.00	0.00
3	3	Junction	2060.10	2065.70	2060.10	2065.70	0.00	1291.49	2069.12	0.00	2.54	0 00:00	0.00	0.00
4	4	Junction	2057.57	2062.00	2057.57	2062.00	0.00	1291.49	2062.93	0.00	6.20	0 00:00	0.00	0.00
5	5	Junction	2054.00	2060.00	2054.00	2060.00	0.00	1653.05	2061.35	0.00	3.65	0 00:00	0.00	0.00
6	6	Junction	2048.88	2053.88	2048.88	2053.88	0.00	1652.55	2056.45	0.00	3.43	0 00:00	0.00	0.00
7	7	Junction	2048.60	2053.60	2048.60	2053.60	0.00	1680.98	2055.83	0.00	2.77	0 00:00	0.00	0.00
8	8	Junction	2045.83	2050.83	2045.83	2050.83	0.00	1679.08	2054.15	0.00	1.68	0 00:00	0.00	0.00
9	9	Junction	2044.80	2049.80	2044.80	2049.80	0.00	1717.81	2053.90	0.00	0.90	0 00:00	0.00	0.00
10	11	Junction	2092.00	2098.00	2092.00	2098.00	0.00	460.17	2095.83	0.00	4.17	0 00:00	0.00	0.00
11	12	Junction	2133.50	2139.50	2133.50	2139.50	0.00	204.23	2135.52	0.00	7.48	0 00:00	0.00	0.00
12	13	Junction	2116.51	2125.00	2116.51	2125.00	0.00	265.46	2119.32	0.00	5.68	0 00:00	0.00	0.00
13	14	Junction	2154.50	2154.50	2154.50	2154.50	0.00	174.79	2156.22	0.00	2.55	0 00:00	0.00	0.00
14	15	Junction	2134.00	2142.00	2134.00	2142.00	0.00	90.21	2136.12	0.00	10.38	0 00:00	0.00	0.00
15	16	Junction	2044.25	2044.25	2044.25	2044.25	0.00	186.91	2050.80	0.00	0.00	0 12:32	43.17	18.00
16	17	Junction	2050.75	2050.75	2050.75	2050.75	0.00	18.83	2056.04	0.00	0.61	0 00:00	0.00	0.00
17	18	Junction	2043.83	2047.83	2043.83	2047.83	0.00	1749.91	2053.83	0.00	0.00	0 12:33	4.65	5.00
18	10	Outfall	2041.91					1523.56	2046.91					
19	CVP	Storage Node	2155.00	2162.00	2155.00		7.00	176.72	2161.01				0.00	0.00
20	P1	Storage Node	2050.75	2055.75	2050.75		5.00	21.66	2056.15				0.01	8.00
21	P2	Storage Node	2044.25	2049.25	2044.25		5.00	47.27	2051.34				0.01	38.00
22	RP	Storage Node	2137.00	2145.00	2137.00		8.00	202.38	2145.18				0.02	23.00
23	SP	Storage Node	2117.00	2125.00	2117.00		8.00	289.11	2124.85				0.00	0.00

Link Summary

SN	Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length	Inlet Invert Elevation	Outlet Invert Elevation	Average Slope	Diameter or Height	Manning's Roughness	Peak Design Flow	Peak Flow Capacity	Peak Flow/ Design Flow Ratio	Peak Flow Velocity	Peak Flow Depth	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged	Reported Condition
					(ft)	(ft)	(ft)	(%)	(in)		(cfs)	(cfs)		(ft/sec)	(ft)		(min)	
1	2	Pipe	2	3	182.00	2061.70	2060.10	0.8800			291.19	896.81	0.32	6.40	4.00	1.00	110.00	SURCHARGED
2	3	Pipe	3	4	181.00	2060.10	2057.57	1.4000			350.90	269.80	1.30	10.12	3.67	1.00	135.00	SURCHARGED
3	4	Pipe	4	5	210.00	2057.57	2054.00	1.7000			164.97	148.77	1.11	11.00	3.67	1.00	69.00	SURCHARGED
4	6	Pipe	6	7	50.00	2048.88	2048.60	0.5600			483.46	291.43	1.66	10.40	4.00	1.00	69.00	SURCHARGED
5	8	Pipe	8	9	50.00	2045.83	2044.80	2.0600			1100.60	1979.07	0.56	12.23	4.50	1.00	44.00	SURCHARGED
6	9	Pipe	14	RP	50.00	2154.50	2137.00	35.0000			174.80	242.66	0.72	39.55	2.11	0.84	0.00	Calculated
7	15	Pipe	15	12	82.00	2134.00	2133.50	0.6100			89.94	199.62	0.45	15.36	2.06	0.46	0.00	Calculated
8	19	Pipe	SP	13	75.00	2117.00	2116.51	0.6500			98.13	29.20	3.36	14.37	2.86	0.97	0.00	> CAPACITY
9	21	Pipe	16	18	35.10	2044.25	2043.83	1.2000			142.42	53.03	2.69	29.01	2.50	1.00	69.00	SURCHARGED
10	22	Pipe	17	7	42.40	2050.75	2048.60	5.0700			18.50	27.95	0.66	10.47	1.50	1.00	77.00	SURCHARGED
11	1	Channel	1	2	131.00	2062.60	2061.70	0.6900			682.46	964.35	0.71	12.17	6.00	1.00	46.00	
12	29	Channel	18	10	154.40	2043.83	2041.91	1.2400			1523.56	1476.05	1.03	16.04	5.00	1.00	20.00	
13	ED	Channel	7	8	440.35	2048.60	2045.83	0.6300			863.00	784.15	1.10	12.60	5.00	1.00	39.00	
14	KB	Channel	5	6	392.20	2054.00	2048.88	1.3100			883.04	1129.64	0.78	11.77	5.00	1.00	50.00	
15	MOR	Channel	13	11	1020.00	2116.51	2092.00	2.4000			265.19	3372.60	0.08	9.33	3.18	0.41	0.00	
16	PF	Channel	9	18	78.10	2044.80	2043.83	1.2400			1283.04	1101.84	1.16	17.75	5.00	1.00	21.00	
17	STK	Channel	11	1	2424.00	2092.00	2062.60	1.2100			445.96	830.10	0.54	8.54	4.32	0.88	0.00	
18	USR	Channel	12	11	1864.00	2133.50	2092.00	2.2300			200.47	3988.84	0.05	7.27	2.82	0.36	0.00	
19	5	Orifice	CVP	14		2155.00	2154.50				20.60							
20	7	Orifice	CVP	14		2155.00	2154.50				44.28							
21	13	Orifice	CVP	14		2155.00	2154.50				110.33							
22	16	Orifice	RP	15		2137.00	2134.00				25.14							
23	17	Orifice	RP	15		2137.00	2134.00				65.07							
24	23	Orifice	P2	16		2044.25	2044.25				4.81							
25	24	Orifice	P2	16		2044.25	2044.25				6.87							
26	26	Orifice	P1	17		2050.75	2050.75				0.41							
27	27	Orifice	P1	17		2050.75	2050.75				3.39							
28	10	Weir	8	9		2045.83	2044.80				1221.28							
29	11	Weir	6	7		2048.88	2048.60				1340.28							
30	14	Weir	CVP	RP		2155.00	2137.00				0.00							
31	18	Weir	RP	12		2137.00	2133.50				114.34							
32	20	Weir	SP	13		2117.00	2116.51				167.34							
33	25	Weir	P2	16		2044.25	2044.25				41.62							
34	28	Weir	P1	17		2050.75	2050.75				16.43							
35	31	Weir	2	3		2061.70	2060.10				1037.83							
36	32	Weir	3	4		2060.10	2057.57				940.59							
37	33	Weir	4	5		2057.57	2054.00				1203.18							
38	35	Weir	5	6		2054.00	2048.88				797.63							
39	36	Weir	7	8		2048.60	2045.83				1064.14							
40	37	Weir	9	18		2044.80	2043.83				1438.45							
41	38	Weir	1	2		2062.60	2061.70				736.47							

Subbasin Hydrology

Subbasin : A

Input Data

Area (ac) 6.36
Peak Rate Factor 484
Weighted Curve Number 90
Rain Gage ID 1

Composite Curve Number

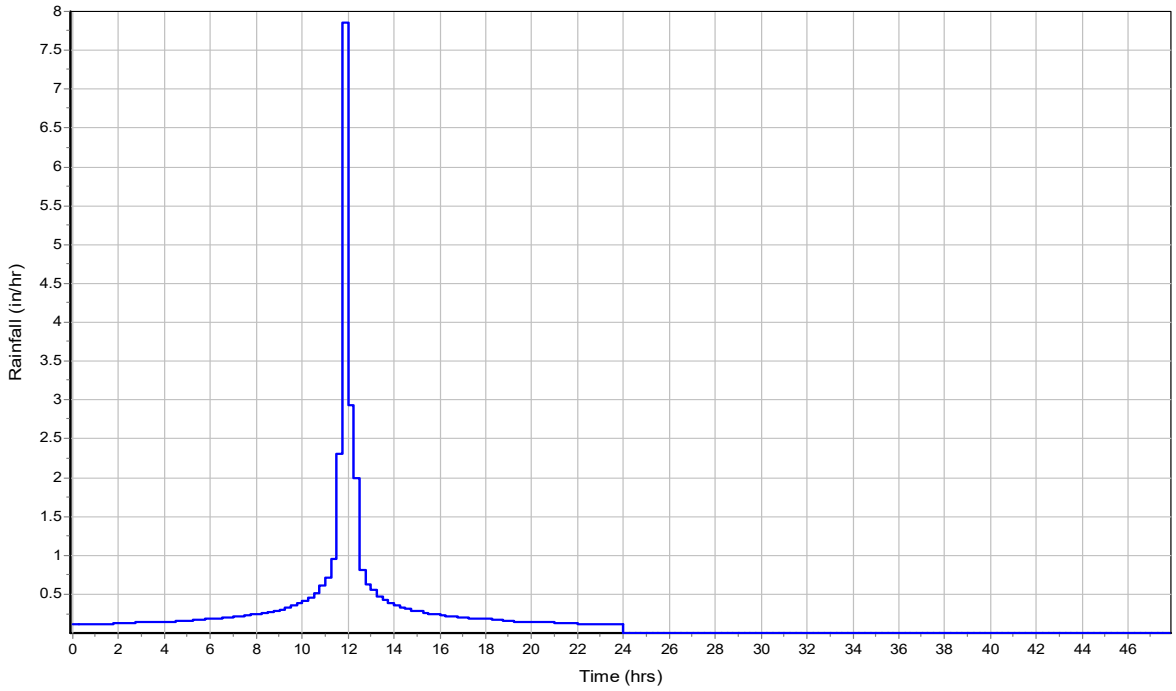
32 Soil/Surface Description	Area (acres)	Soil Group	Curve Number
-	6.36	-	90
Composite Area & Weighted CN	6.36		90

Subbasin Runoff Results

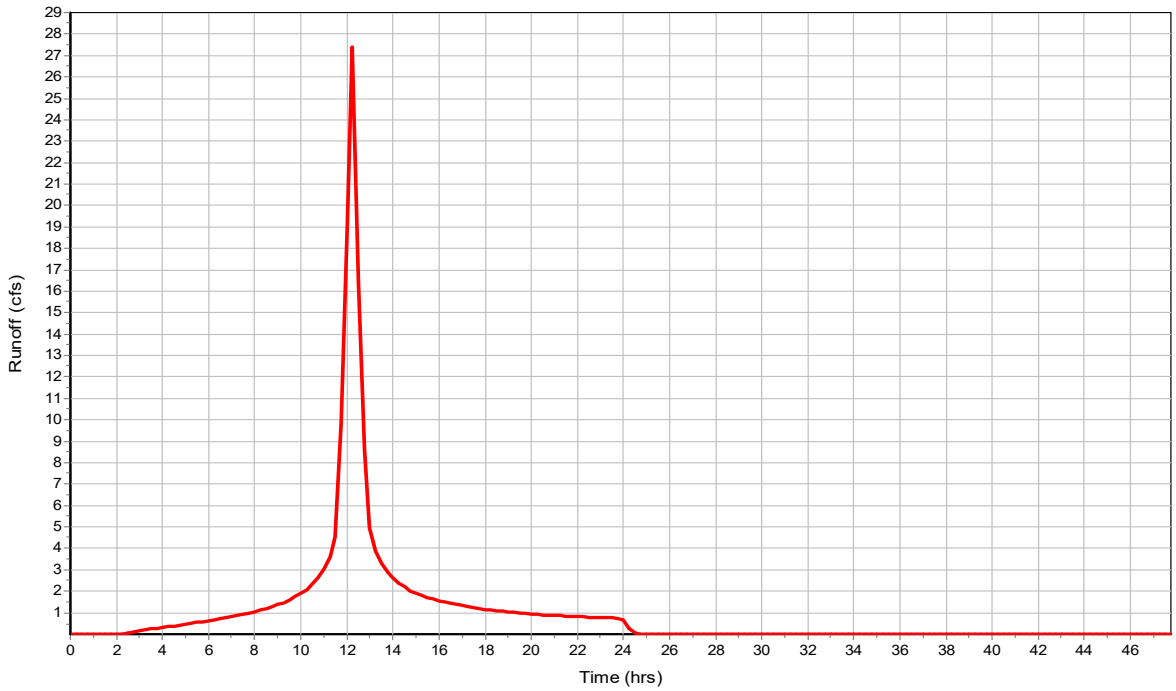
Total Rainfall (in) 8.6
Total Runoff (in) 7.4
Peak Runoff (cfs) 30.58
Weighted Curve Number 90
Time of Concentration (days hh:mm:ss) ... 0 00:18:30

Subbasin : A

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : B

Input Data

Area (ac)	10.8
Peak Rate Factor	484
Weighted Curve Number	92
Rain Gage ID	1

Composite Curve Number

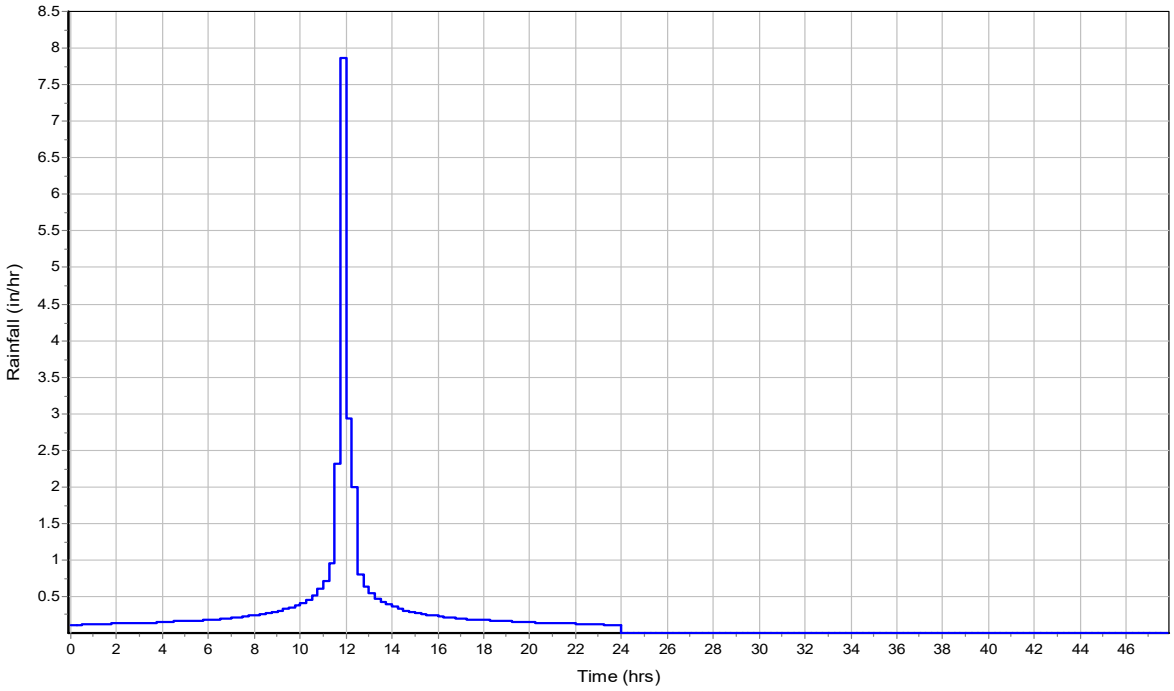
32 Soil/Surface Description	Area (acres)	Soil Group	Curve Number
-	10.8	-	92
Composite Area & Weighted CN	10.8		92

Subbasin Runoff Results

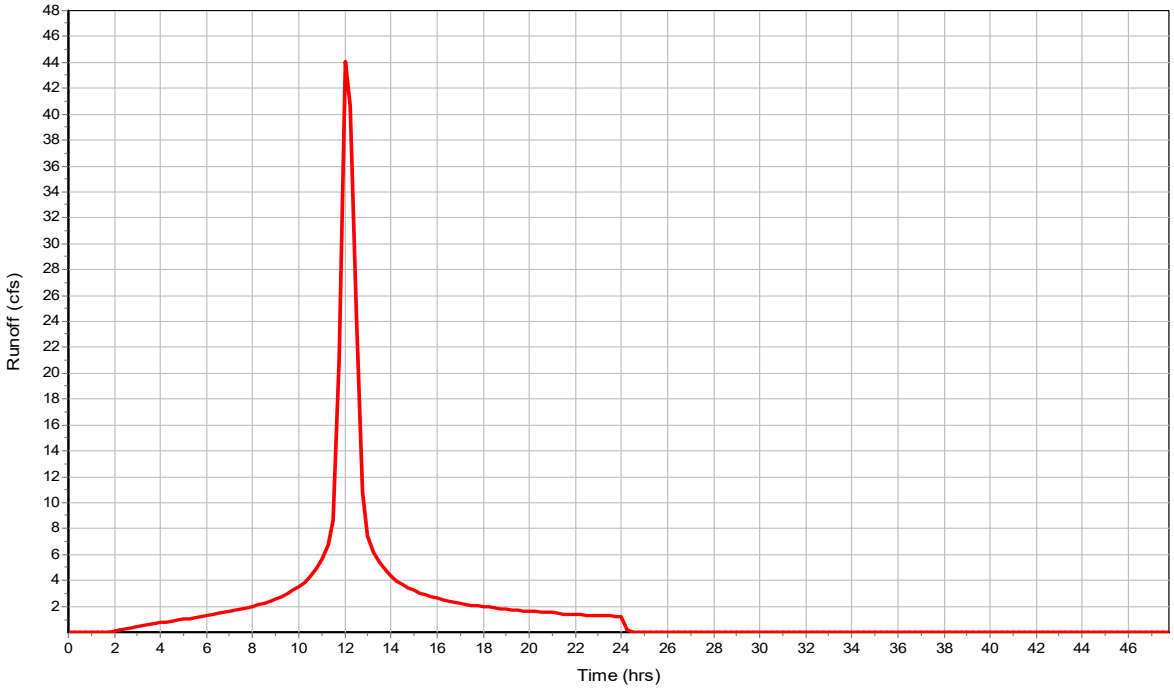
Total Rainfall (in)	8.6
Total Runoff (in)	7.64
Peak Runoff (cfs)	60.67
Weighted Curve Number	92
Time of Concentration (days hh:mm:ss)	0 00:12:30

Subbasin : B

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : CO

Input Data

Area (ac)	44.42
Peak Rate Factor	484
Weighted Curve Number	84
Rain Gage ID	1

Composite Curve Number

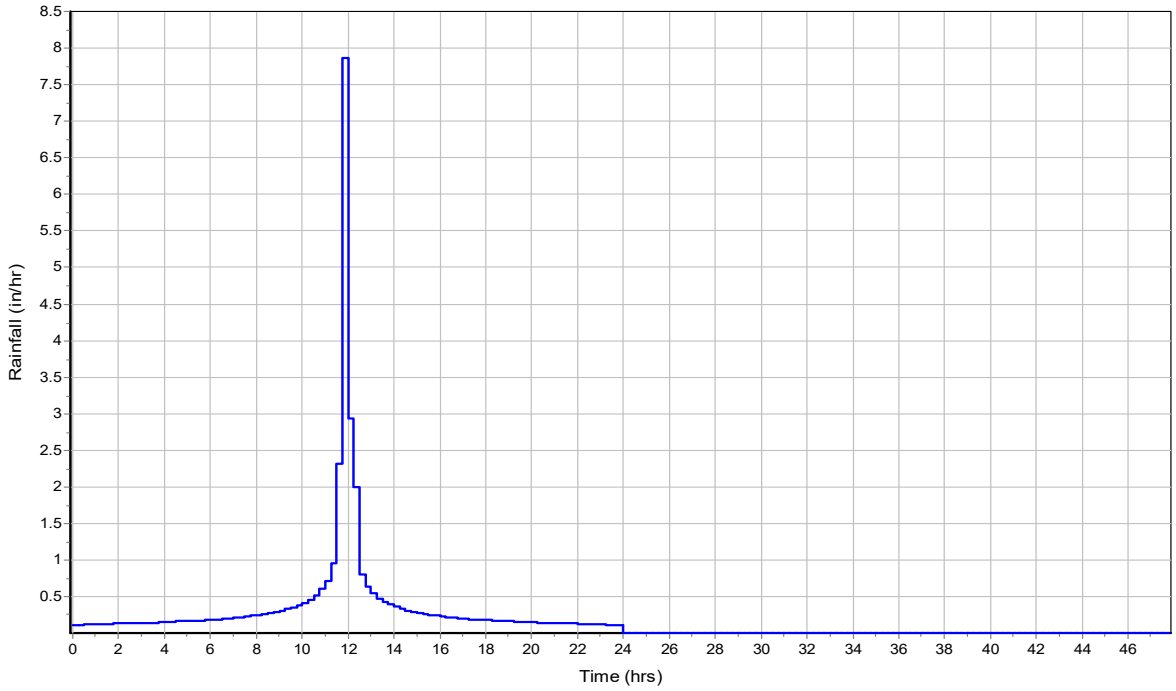
32 Soil/Surface Description	Area (acres)	Soil Group	Curve Number
-	44.42	-	84
Composite Area & Weighted CN	44.42		84

Subbasin Runoff Results

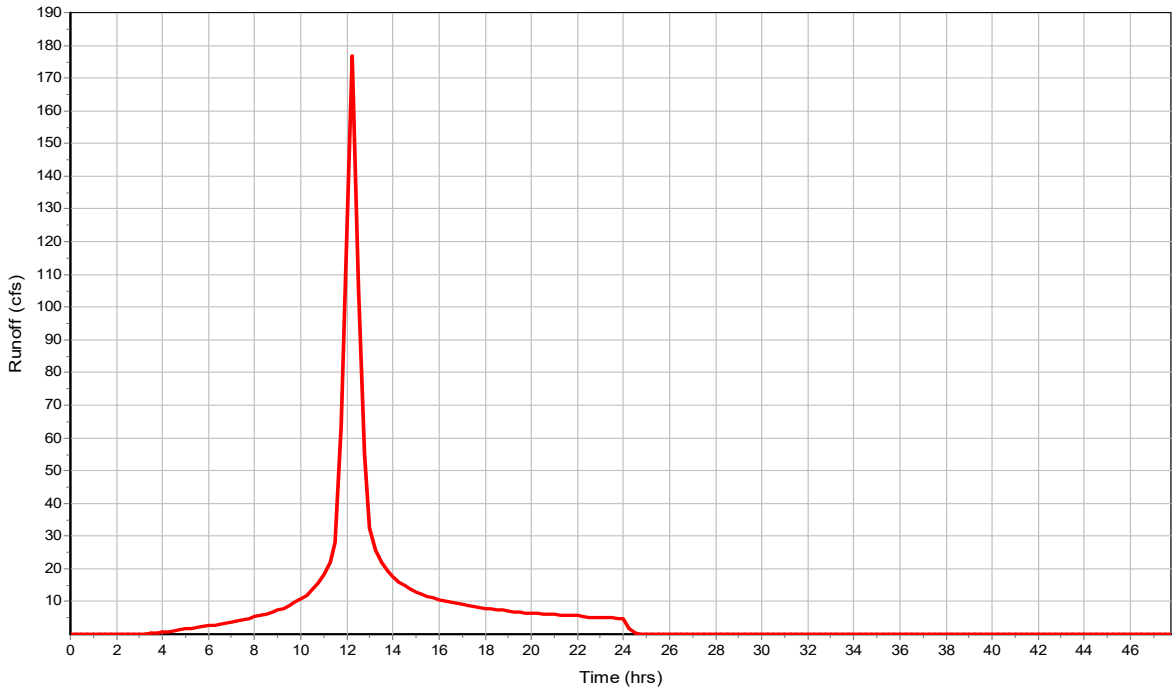
Total Rainfall (in)	8.6
Total Runoff (in)	6.67
Peak Runoff (cfs)	203.15
Weighted Curve Number	84
Time of Concentration (days hh:mm:ss)	0 00:17:30

Subbasin : CO

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : K

Input Data

Area (ac)	93.79
Peak Rate Factor	484
Weighted Curve Number	85
Rain Gage ID	1

Composite Curve Number

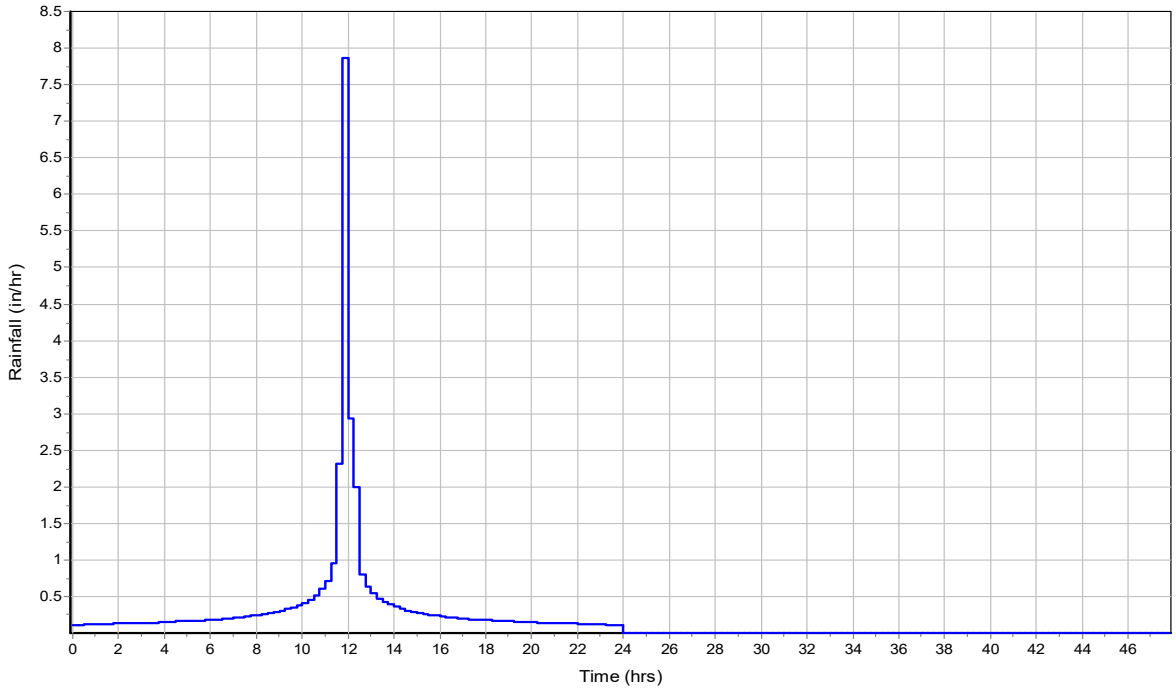
32 Soil/Surface Description	Area (acres)	Soil Group	Curve Number
-	93.79	-	85
Composite Area & Weighted CN	93.79		85

Subbasin Runoff Results

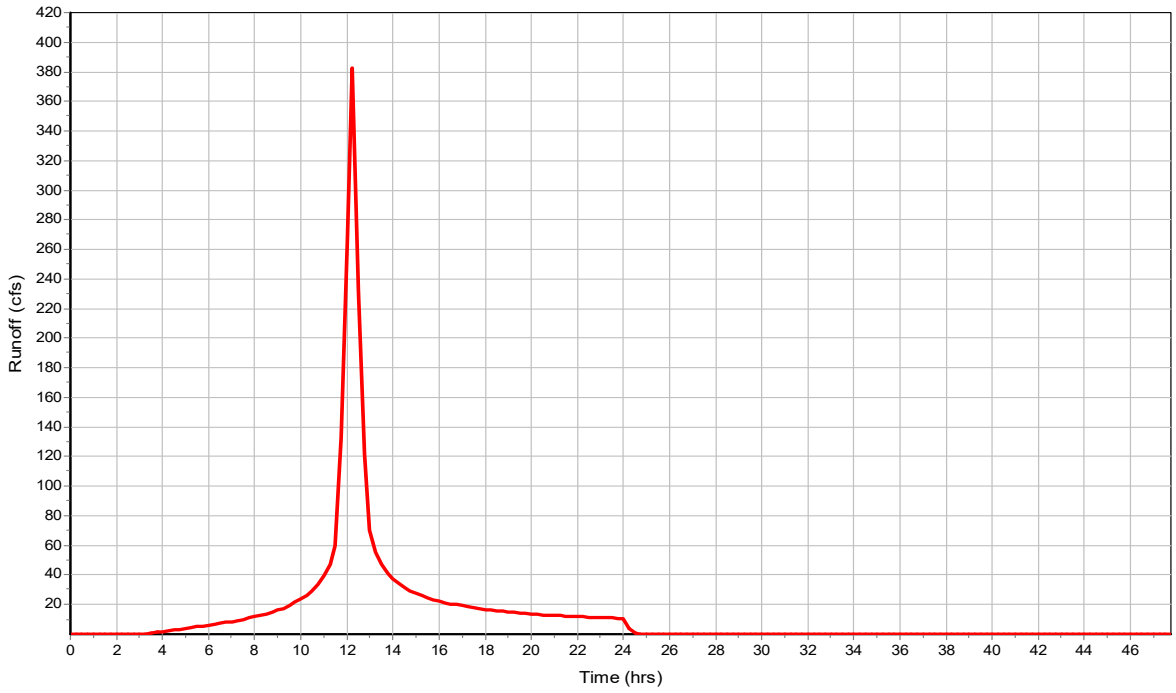
Total Rainfall (in)	8.6
Total Runoff (in)	6.79
Peak Runoff (cfs)	428.55
Weighted Curve Number	85
Time of Concentration (days hh:mm:ss)	0 00:18:12

Subbasin : K

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : RU

Input Data

Area (ac)	7.74
Peak Rate Factor	484
Weighted Curve Number	87
Rain Gage ID	1

Composite Curve Number

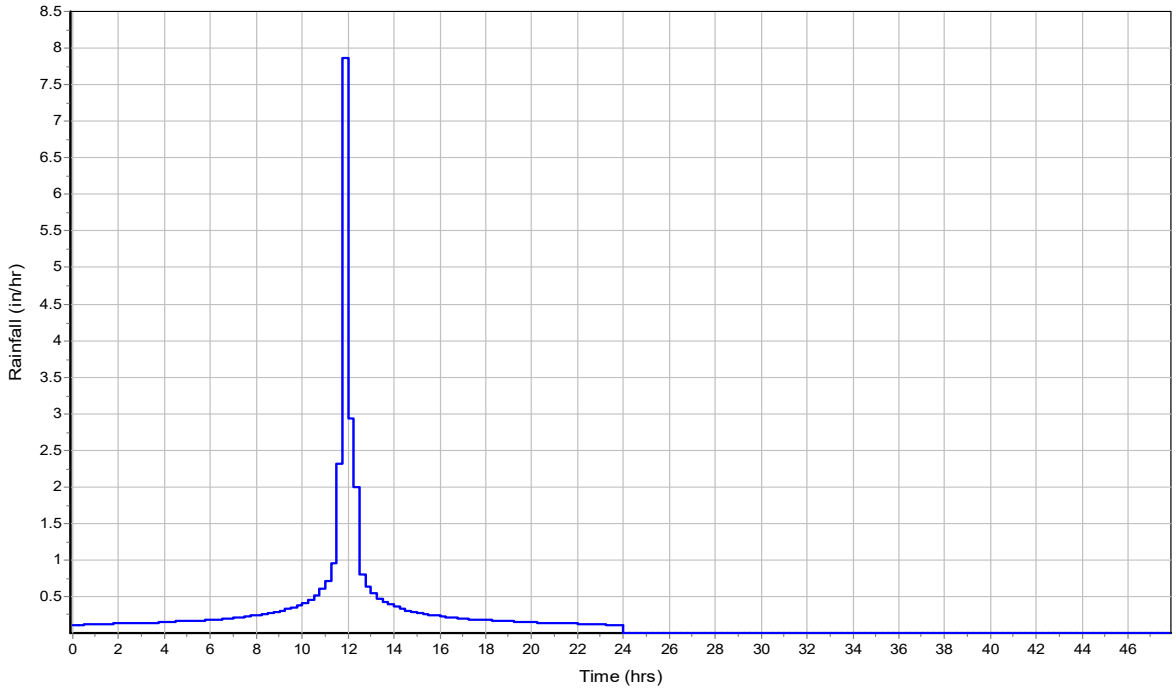
32 Soil/Surface Description	Area (acres)	Soil Group	Curve Number
-	7.74	-	87
Composite Area & Weighted CN	7.74		87

Subbasin Runoff Results

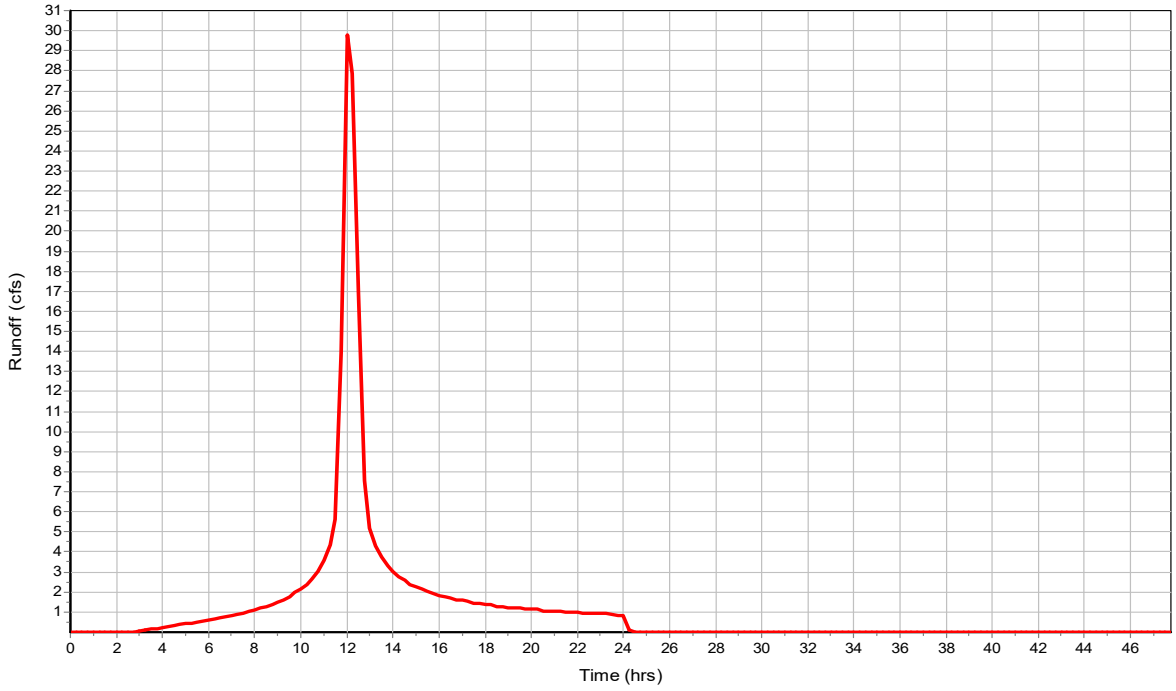
Total Rainfall (in)	8.6
Total Runoff (in)	7.03
Peak Runoff (cfs)	41.43
Weighted Curve Number	87
Time of Concentration (days hh:mm:ss)	0 00:12:24

Subbasin : RU

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : SH

Input Data

Area (ac)	69.35
Peak Rate Factor	484
Weighted Curve Number	86
Rain Gage ID	1

Composite Curve Number

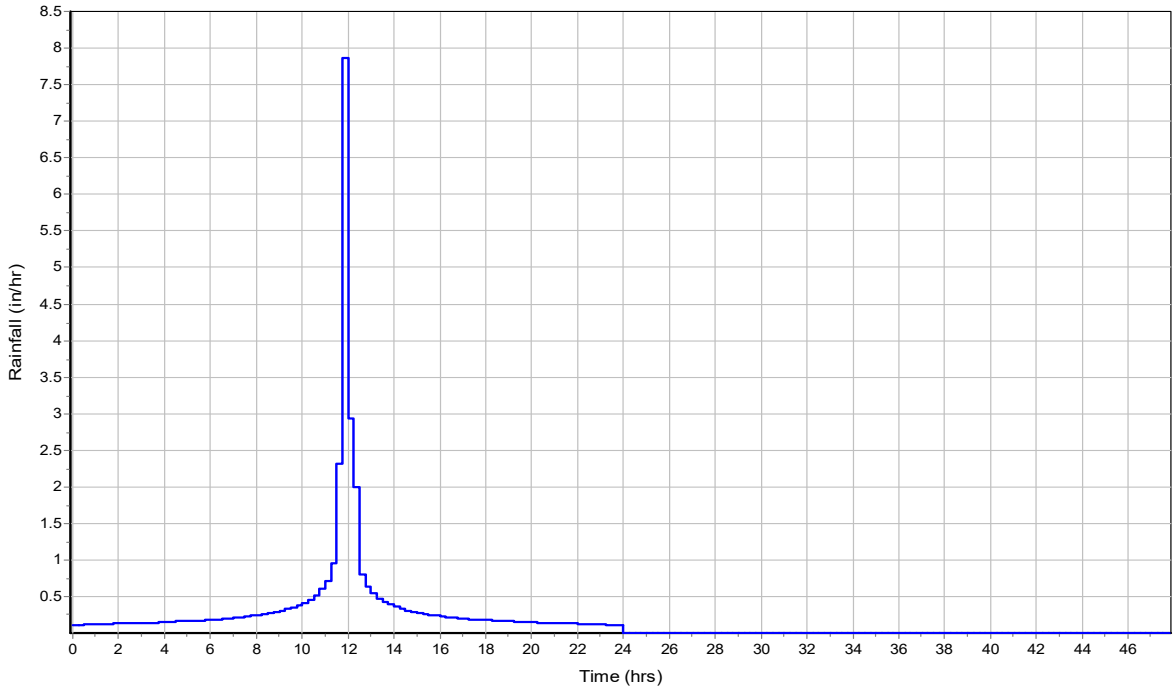
32 Soil/Surface Description	Area (acres)	Soil Group	Curve Number
-	69.35	-	86
Composite Area & Weighted CN	69.35		86

Subbasin Runoff Results

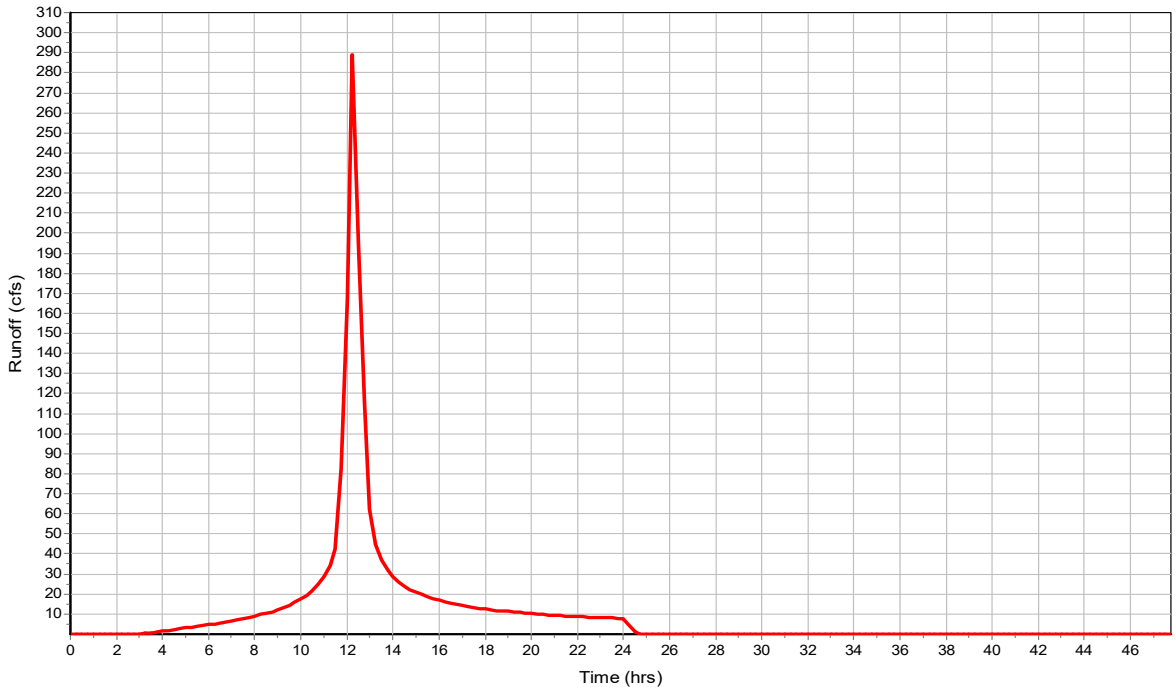
Total Rainfall (in)	8.6
Total Runoff (in)	6.91
Peak Runoff (cfs)	291.49
Weighted Curve Number	86
Time of Concentration (days hh:mm:ss)	0 00:23:30

Subbasin : SH

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : UG1

Input Data

Area (ac)	3.05
Peak Rate Factor	484
Weighted Curve Number	93
Rain Gage ID	1

Composite Curve Number

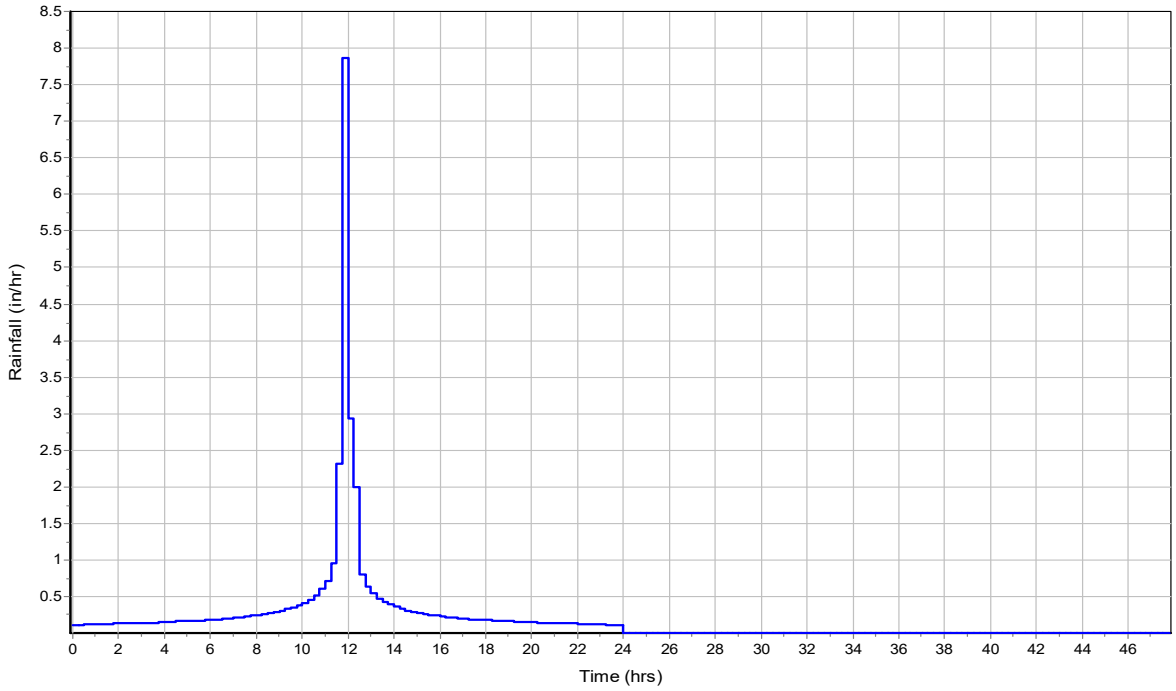
32 Soil/Surface Description	Area (acres)	Soil Group	Curve Number
-	3.05	-	93
Composite Area & Weighted CN	3.05		93

Subbasin Runoff Results

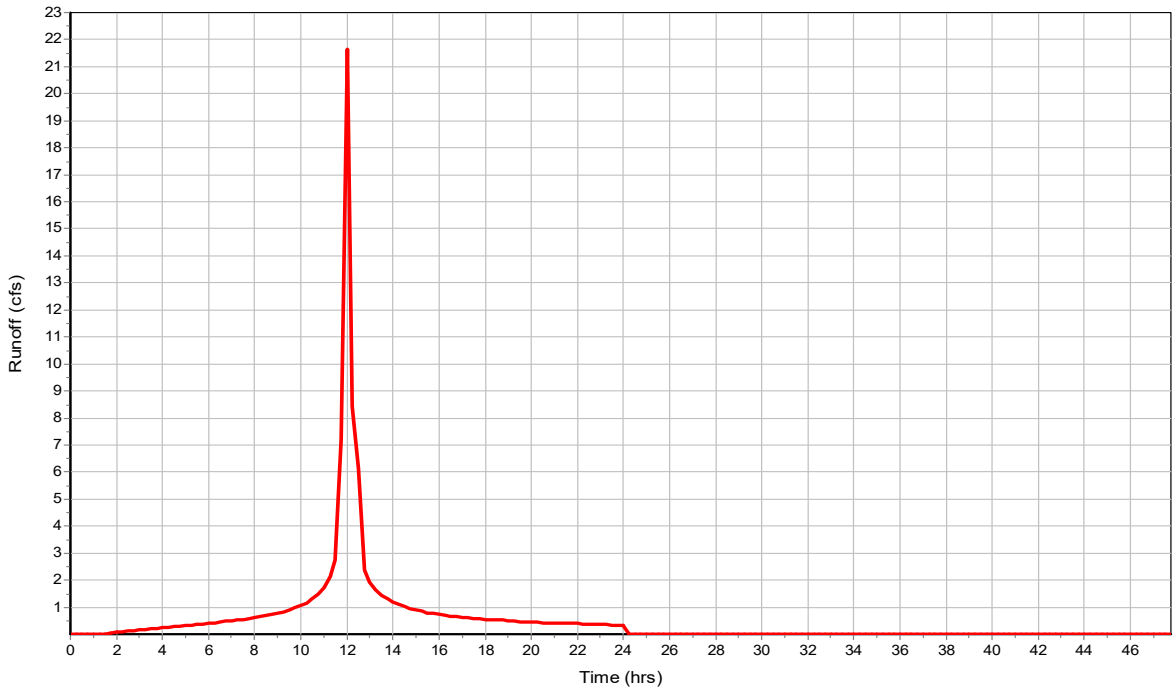
Total Rainfall (in)	8.6
Total Runoff (in)	7.76
Peak Runoff (cfs)	22.14
Weighted Curve Number	93
Time of Concentration (days hh:mm:ss)	0 00:05:00

Subbasin : UG1

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : UG2

Input Data

Area (ac)	11.65
Peak Rate Factor	484
Weighted Curve Number	86
Rain Gage ID	1

Composite Curve Number

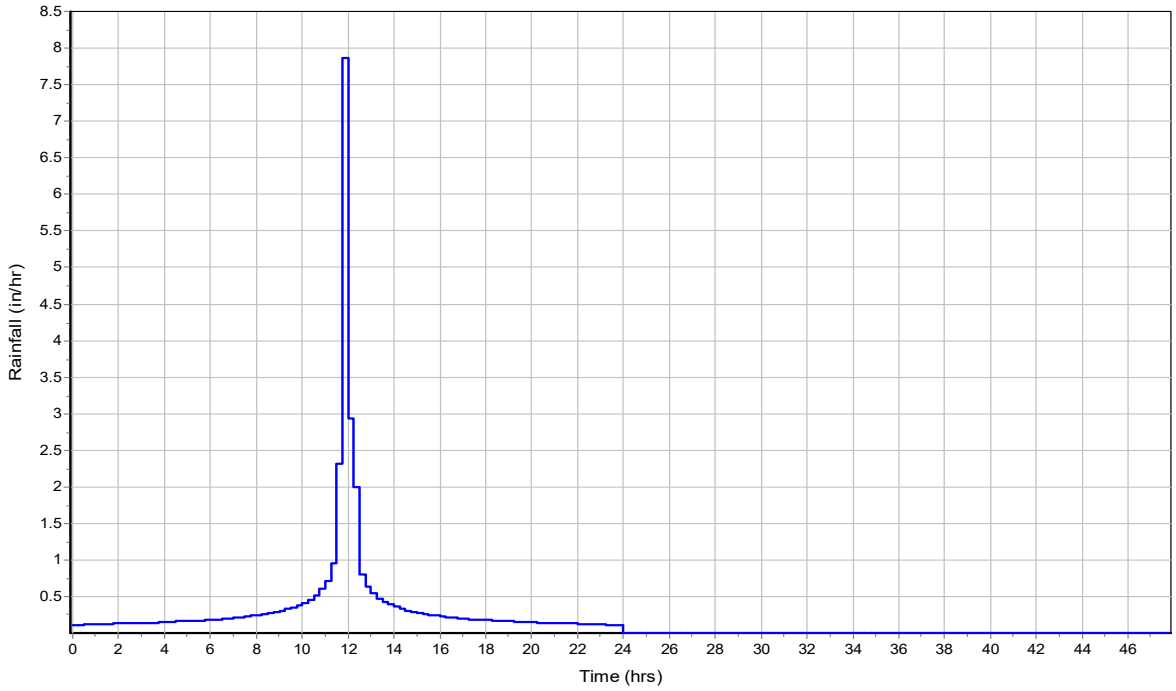
32 Soil/Surface Description	Area (acres)	Soil Group	Curve Number
-	11.65	-	86
Composite Area & Weighted CN	11.65		86

Subbasin Runoff Results

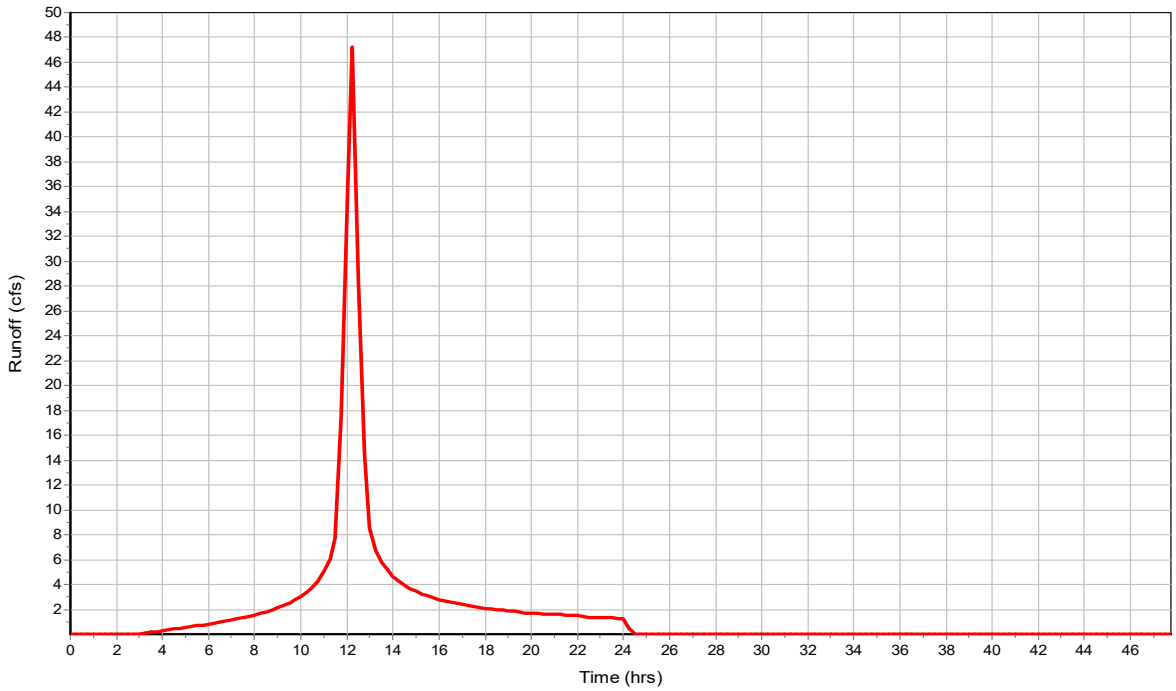
Total Rainfall (in)	8.6
Total Runoff (in)	6.91
Peak Runoff (cfs)	55.04
Weighted Curve Number	86
Time of Concentration (days hh:mm:ss)	0 00:17:12

Subbasin : UG2

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : US1

Input Data

Area (ac)	244.78
Peak Rate Factor	484
Weighted Curve Number	82
Rain Gage ID	1

Composite Curve Number

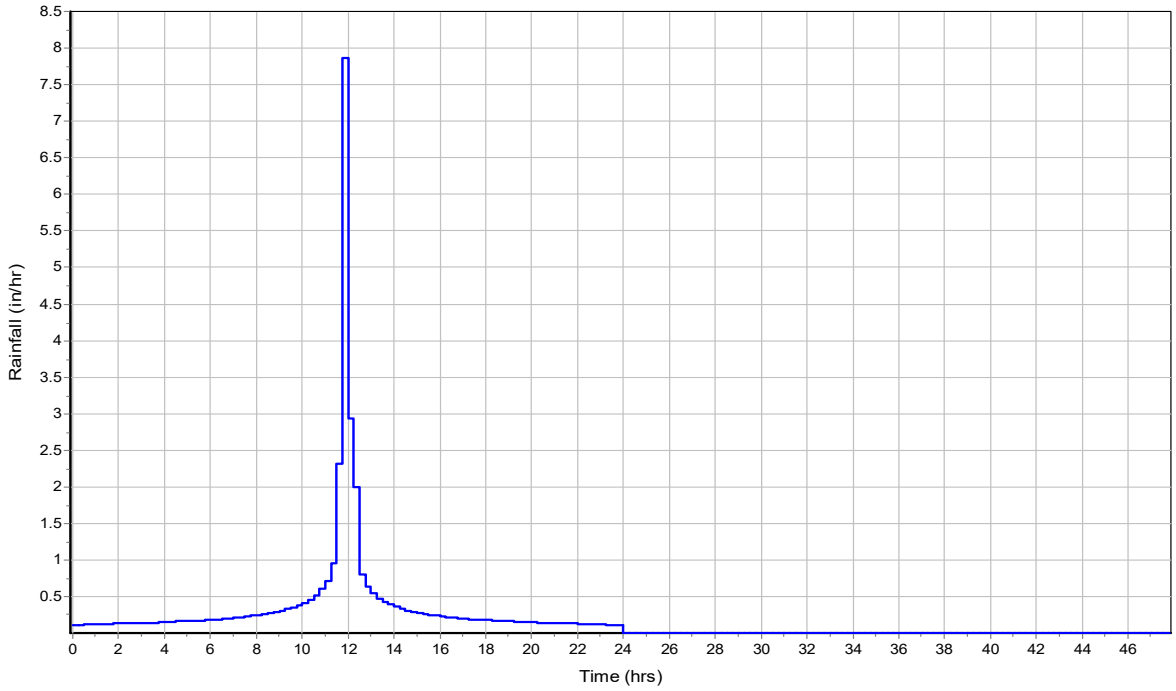
32 Soil/Surface Description	Area (acres)	Soil Group	Curve Number
-	244.78	-	82
Composite Area & Weighted CN	244.78		82

Subbasin Runoff Results

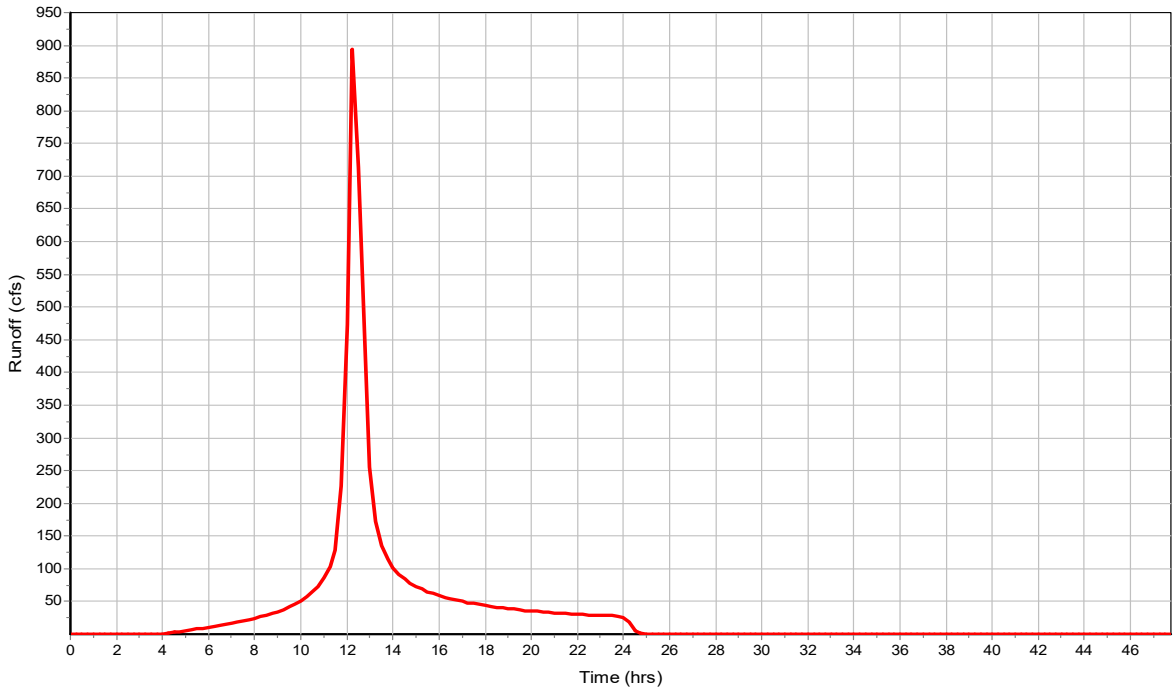
Total Rainfall (in)	8.6
Total Runoff (in)	6.43
Peak Runoff (cfs)	900.34
Weighted Curve Number	82
Time of Concentration (days hh:mm:ss)	0 00:28:36

Subbasin : US1

Rainfall Intensity Graph



Runoff Hydrograph



Junction Input

SN	Element ID	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Ground/Rim (Max) Offset (ft)	Initial Water Elevation (ft)	Initial Water Depth (ft)	Surcharge Elevation (ft)	Surcharge Depth (ft)	Ponded Area (ft²)	Minimum Pipe Cover (in)
1	1	2062.60	2068.60	6.00	2062.60	0.00	2068.60	0.00	0.00	
2	2	2061.70	2066.30	4.60	2061.70	0.00	2066.30	0.00	0.00	
3	3	2060.10	2065.70	5.60	2060.10	0.00	2065.70	0.00	0.00	
4	4	2057.57	2062.00	4.43	2057.57	0.00	2062.00	0.00	0.00	
5	5	2054.00	2060.00	6.00	2054.00	0.00	2060.00	0.00	0.00	
6	6	2048.88	2053.88	5.00	2048.88	0.00	2053.88	0.00	0.00	
7	7	2048.60	2053.60	5.00	2048.60	0.00	2053.60	0.00	0.00	
8	8	2045.83	2050.83	5.00	2045.83	0.00	2050.83	0.00	0.00	
9	9	2044.80	2049.80	5.00	2044.80	0.00	2049.80	0.00	0.00	
10	11	2092.00	2098.00	6.00	2092.00	0.00	2098.00	0.00	0.00	
11	12	2133.50	2139.50	6.00	2133.50	0.00	2139.50	0.00	0.00	
12	13	2116.51	2125.00	8.49	2116.51	0.00	2125.00	0.00	0.00	
13	14	2154.50	2154.50	0.00	2154.50	0.00	2154.50	0.00	0.00	
14	15	2134.00	2142.00	8.00	2134.00	0.00	2142.00	0.00	0.00	
15	16	2044.25	2044.25	0.00	2044.25	0.00	2044.25	0.00	0.00	
16	17	2050.75	2050.75	0.00	2050.75	0.00	2050.75	0.00	0.00	
17	18	2043.83	2047.83	4.00	2043.83	0.00	2047.83	0.00	0.00	

Junction Results

SN	Element ID	Peak Inflow (cfs)	Peak Lateral Inflow (cfs)	Max HGL Elevation Attained (ft)	Max HGL Depth Attained (ft)	Max Surcharge Depth Attained (ft)	Min Freeboard Attained (ft)	Average HGL Elevation Attained (ft)	Average HGL Depth Attained (ft)	Time of Max HGL Occurrence (days hh:mm)	Time of Peak Flooding Occurrence (days hh:mm)	Total Flooded Volume (ac-in)	Total Time Flooded (min)
1	1	1293.71	893.76	2069.74	7.14	0.00	3.86	2063.48	0.88	0 12:33	0 00:00	0.00	0.00
2	2	1291.51	0.00	2069.44	7.74	0.00	3.26	2062.20	0.50	0 12:32	0 00:00	0.00	0.00
3	3	1291.49	0.00	2069.12	9.02	0.00	2.54	2060.85	0.75	0 12:33	0 00:00	0.00	0.00
4	4	1291.49	0.00	2062.93	5.36	0.00	6.20	2058.43	0.86	0 12:32	0 00:00	0.00	0.00
5	5	1653.05	382.43	2061.35	7.35	0.00	3.65	2054.61	0.61	0 12:32	0 00:00	0.00	0.00
6	6	1652.55	0.00	2056.45	7.57	0.00	3.43	2049.69	0.81	0 12:32	0 00:00	0.00	0.00
7	7	1680.98	27.40	2055.83	7.23	0.00	2.77	2049.35	0.75	0 12:33	0 00:00	0.00	0.00
8	8	1679.08	0.00	2054.15	8.32	0.00	1.68	2046.23	0.40	0 12:33	0 00:00	0.00	0.00
9	9	1717.81	44.06	2053.90	9.10	0.00	0.90	2045.43	0.63	0 12:32	0 00:00	0.00	0.00
10	11	460.17	0.00	2095.83	3.83	0.00	4.17	2092.46	0.46	0 12:35	0 00:00	0.00	0.00
11	12	204.23	0.00	2135.52	2.02	0.00	7.48	2133.69	0.19	0 12:31	0 00:00	0.00	0.00
12	13	265.46	0.00	2119.32	2.81	0.00	5.68	2116.85	0.34	0 12:34	0 00:00	0.00	0.00
13	14	174.79	0.00	2156.22	1.72	0.00	2.55	2154.66	0.16	0 12:30	0 00:00	0.00	0.00
14	15	90.21	0.00	2136.12	2.12	0.00	10.38	2134.32	0.32	0 12:30	0 00:00	0.00	0.00
15	16	186.91	0.00	2050.80	6.55	0.00	0.00	2044.60	0.35	0 12:27	0 12:32	43.17	18.00
16	17	18.83	0.00	2056.04	5.29	0.00	0.61	2050.96	0.21	0 12:31	0 00:00	0.00	0.00
17	18	1749.91	0.00	2053.83	10.00	0.00	0.00	2044.37	0.54	0 12:31	0 12:33	4.65	5.00

Channel Input

SN	Element ID	Length (ft)	Inlet Invert Elevation (ft)	Inlet Invert Offset (ft)	Outlet Invert Elevation (ft)	Outlet Invert Offset (ft)	Total Drop (ft)	Average Slope (%)	Shape	Height (ft)	Width (ft)	Manning's Roughness	Entrance Losses	Exit/Bend Losses	Additional Losses	Initial Flow (cfs)	Flap Gate
1	1	131.00	2062.60	0.00	2061.70	0.00	0.90	0.6900	Trapezoidal	6.000	27.000	0.0240	0.0000	0.0000	0.0000	0.00	No
2	29	154.40	2043.83	0.00	2041.91	0.00	1.92	1.2400	Trapezoidal	5.000	24.000	0.0240	0.0000	0.0000	0.0000	0.00	No
3	ED	440.35	2048.60	0.00	2045.83	0.00	2.77	0.6300	Trapezoidal	5.000	20.000	0.0240	0.0000	0.0000	0.0000	0.00	No
4	KB	392.20	2054.00	0.00	2048.88	0.00	5.12	1.3100	Trapezoidal	5.000	20.000	0.0240	0.0000	0.0000	1.0000	0.00	No
5	MOR	1020.00	2116.51	0.00	2092.00	0.00	24.51	2.4000	Trapezoidal	8.000	34.000	0.0240	0.0000	0.0000	0.0000	0.00	No
6	PF	78.10	2044.80	0.00	2043.83	0.00	0.97	1.2400	Trapezoidal	5.000	20.000	0.0240	0.0000	0.0000	0.0000	0.00	No
7	STK	2424.00	2092.00	0.00	2062.60	0.00	29.40	1.2100	Trapezoidal	5.000	23.000	0.0240	0.0000	0.0000	0.0000	0.00	No
8	USR	1864.00	2133.50	0.00	2092.00	0.00	41.50	2.2300	Trapezoidal	8.000	37.000	0.0240	0.0000	0.0000	0.0000	0.00	No

Channel Results

SN	Element ID	Peak Flow	Time of Peak Flow Occurrence	Design Flow Capacity	Peak Flow/ Design Flow Ratio	Peak Flow Velocity	Travel Time	Peak Flow Depth	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged	Froude Number	Reported Condition
		(cfs)	(days hh:mm)	(cfs)		(ft/sec)	(min)	(ft)		(min)		
1	1	682.46	0 12:18	964.35	0.71	12.17	0.18	6.00	1.00	46.00		
2	29	1523.56	0 12:40	1476.05	1.03	16.04	0.16	5.00	1.00	20.00		
3	ED	863.00	0 12:18	784.15	1.10	12.60	0.58	5.00	1.00	39.00		
4	KB	883.04	0 12:18	1129.64	0.78	11.77	0.56	5.00	1.00	50.00		
5	MOR	265.19	0 12:34	3372.60	0.08	9.33	1.82	3.18	0.41	0.00		
6	PF	1283.04	0 12:47	1101.84	1.16	17.75	0.07	5.00	1.00	21.00		
7	STK	445.96	0 12:35	830.10	0.54	8.54	4.73	4.32	0.88	0.00		
8	USR	200.47	0 12:31	3988.84	0.05	7.27	4.27	2.82	0.36	0.00		

Pipe Input

SN	Element ID	Length (ft)	Inlet Invert Elevation (ft)	Inlet Invert Offset (ft)	Outlet Invert Elevation (ft)	Outlet Invert Offset (ft)	Total Drop (ft)	Average Slope (%)	Pipe Shape	Pipe Diameter or Height (in)	Pipe Width (in)	Manning's Roughness	Entrance Losses	Exit/Bend Losses	Additional Losses	Initial Flow (cfs)	Flap Gate	No. of Barrels
1	2	182.00	2061.70	0.00	2060.10	0.00	1.60	0.8800	Rectangular									
2	3	181.00	2060.10	0.00	2057.57	0.00	2.53	1.4000	Arch									
3	4	210.00	2057.57	0.00	2054.00	0.00	3.57	1.7000	Arch									
4	6	50.00	2048.88	0.00	2048.60	0.00	0.28	0.5600	Rectangular									
5	8	50.00	2045.83	0.00	2044.80	0.00	1.03	2.0600	Rectangular									
6	9	50.00	2154.50	0.00	2137.00	0.00	17.50	35.0000	CIRCULAR									
7	15	82.00	2134.00	0.00	2133.50	0.00	0.50	0.6100	CIRCULAR									
8	19	75.00	2117.00	0.00	2116.51	0.00	0.49	0.6500	CIRCULAR									
9	21	35.10	2044.25	0.00	2043.83	0.00	0.42	1.2000	CIRCULAR									
10	22	42.40	2050.75	0.00	2048.60	0.00	2.15	5.0700	CIRCULAR									

Pipe Results

SN	Element ID	Peak Flow	Time of Peak Flow Occurrence	Design Flow Capacity	Peak Flow/ Design Flow Ratio	Peak Flow Velocity	Travel Time	Peak Flow Depth	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged	Froude Number	Reported Condition
		(cfs)	(days hh:mm)	(cfs)		(ft/sec)	(min)	(ft)		(min)		
1	2	291.19	0 12:02	896.81	0.32	6.40	0.47	4.00	1.00	110.00		SURCHARGED
2	3	350.90	0 12:33	269.80	1.30	10.12	0.30	3.67	1.00	135.00		SURCHARGED
3	4	164.97	0 13:21	148.77	1.11	11.00	0.32	3.67	1.00	69.00		SURCHARGED
4	6	483.46	0 12:05	291.43	1.66	10.40	0.08	4.00	1.00	69.00		SURCHARGED
5	8	1100.60	0 12:49	1979.07	0.56	12.23	0.07	4.50	1.00	44.00		SURCHARGED
6	9	174.80	0 12:30	242.66	0.72	39.55	0.02	2.11	0.84	0.00		Calculated
7	15	89.94	0 12:30	199.62	0.45	15.36	0.09	2.06	0.46	0.00		Calculated
8	19	98.13	0 12:34	29.20	3.36	14.37	0.09	2.86	0.97	0.00		> CAPACITY
9	21	142.42	0 12:35	53.03	2.69	29.01	0.02	2.50	1.00	69.00		SURCHARGED
10	22	18.50	0 12:16	27.95	0.66	10.47	0.07	1.50	1.00	77.00		SURCHARGED

Project Description

File Name ..... ProposedKabrichModel.SPF

Project Options

Flow Units ..... CFS
Elevation Type ..... Elevation
Hydrology Method ..... SCS TR-20
Time of Concentration (TOC) Method ..... User-Defined
Link Routing Method ..... Hydrodynamic
Enable Overflow Ponding at Nodes ..... YES
Skip Steady State Analysis Time Periods ..... NO

Number of Elements

	Qty
Rain Gages	1
Subbasins	9
Nodes	24
Junctions	18
Outfalls	1
Flow Diversions	0
Inlets	0
Storage Nodes	5
Links	42
Channels	9
Pipes	10
Pumps	0
Orifices	9
Weirs	14
Outlets	0
Pollutants	0
Land Uses	0

Rainfall Details

SN	Rain Gage ID	Data Source	Data Source ID	Rainfall Type	Rain Units	State	County	Return Period (years)	Rainfall Depth (inches)	Rainfall Distribution
1	1	Time Series	500Year	Cumulative	inches				0.00	

Subbasin Summary

SN	Subbasin ID	Area (ac)	Peak Rate Factor	Weighted Curve Number	Total Rainfall (in)	Total Runoff (in)	Total Runoff Volume (ac-in)	Peak Runoff (cfs)	Time of Concentration (days hh:mm:ss)
1	A	6.36	484.00	90.00	8.60	7.40	47.04	30.58	0 00:18:30
2	B	10.80	484.00	92.00	8.60	7.64	82.48	60.67	0 00:12:30
3	CO	44.42	484.00	84.00	8.60	6.67	296.37	203.15	0 00:17:30
4	K	93.79	484.00	85.00	8.60	6.79	637.02	428.55	0 00:18:12
5	RU	7.74	484.00	87.00	8.60	7.03	54.44	41.43	0 00:12:24
6	SH	69.35	484.00	86.00	8.60	6.91	479.42	291.49	0 00:23:30
7	UG1	3.05	484.00	93.00	8.60	7.76	23.66	22.14	0 00:05:00
8	UG2	11.65	484.00	86.00	8.60	6.91	80.54	55.04	0 00:17:12
9	US1	244.78	484.00	82.00	8.60	6.43	1573.94	900.34	0 00:28:36

Node Summary

SN	Element ID	Element Type	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Initial Water Elevation (ft)	Surcharge Elevation (ft)	Ponded Area (ft^2)	Peak Inflow (cfs)	Max HGL Elevation Attained (ft)	Max Surcharge Depth Attained (ft)	Min Freeboard Attained (ft)	Time of Peak Flooding Occurrence (days hh:mm)	Total Flooded Volume (ac-in)	Total Time Flooded (min)
1	1	Junction	2062.60	2068.60	2062.60	2068.60	0.00	1293.72	2069.36	0.00	4.24	0 00:00	0.00	0.00
2	2	Junction	2061.70	2066.30	2061.70	2066.30	0.00	1290.78	2068.84	0.00	3.86	0 00:00	0.00	0.00
3	3	Junction	2059.10	2065.70	2059.10	2065.70	0.00	1290.71	2068.25	0.00	4.41	0 00:00	0.00	0.00
4	4	Junction	2056.20	2065.00	2056.20	2065.00	0.00	936.90	2063.01	0.00	6.19	0 00:00	0.00	0.00
5	5	Junction	2054.00	2060.00	2054.00	2060.00	0.00	1649.89	2061.34	0.00	3.66	0 00:00	0.00	0.00
6	6	Junction	2048.88	2053.88	2048.88	2053.88	0.00	1649.41	2056.45	0.00	3.43	0 00:00	0.00	0.00
7	7	Junction	2048.60	2053.60	2048.60	2053.60	0.00	1678.21	2055.82	0.00	2.78	0 00:00	0.00	0.00
8	8	Junction	2045.83	2050.83	2045.83	2050.83	0.00	1676.18	2054.14	0.00	1.69	0 00:00	0.00	0.00
9	9	Junction	2044.80	2049.80	2044.80	2049.80	0.00	1717.98	2053.90	0.00	0.90	0 00:00	0.00	0.00
10	11	Junction	2092.00	2098.00	2092.00	2098.00	0.00	460.17	2095.83	0.00	4.17	0 00:00	0.00	0.00
11	12	Junction	2133.50	2139.50	2133.50	2139.50	0.00	204.20	2135.52	0.00	7.48	0 00:00	0.00	0.00
12	13	Junction	2116.51	2125.00	2116.51	2125.00	0.00	265.46	2119.32	0.00	5.68	0 00:00	0.00	0.00
13	14	Junction	2154.50	2154.50	2154.50	2154.50	0.00	174.79	2156.22	0.00	2.55	0 00:00	0.00	0.00
14	15	Junction	2134.00	2142.00	2134.00	2142.00	0.00	90.20	2136.12	0.00	10.38	0 00:00	0.00	0.00
15	16	Junction	2044.25	2044.25	2044.25	2044.25	0.00	186.67	2050.80	0.00	0.00	0 12:32	42.66	17.00
16	17	Junction	2050.75	2050.75	2050.75	2050.75	0.00	18.98	2056.07	0.00	0.58	0 00:00	0.00	0.00
17	18	Junction	2043.83	2047.83	2043.83	2047.83	0.00	1753.63	2053.83	0.00	0.00	0 12:33	4.54	5.00
18	19	Junction	2054.70	2060.00	2054.70	2060.00	0.00	1290.66	2061.51	0.00	6.75	0 00:00	0.00	0.00
19	10	Outfall	2041.91					1521.41	2046.91					
20	CVP	Storage Node	2155.00	2162.00	2155.00		7.00	176.72	2161.01				0.00	0.00
21	P1	Storage Node	2050.75	2055.75	2050.75		5.00	21.66	2056.13				0.02	8.00
22	P2	Storage Node	2044.25	2049.25	2044.25		5.00	47.27	2051.34				0.01	33.00
23	RP	Storage Node	2137.00	2145.00	2137.00		8.00	202.38	2145.18				0.02	23.00
24	SP	Storage Node	2117.00	2125.00	2117.00		8.00	289.11	2124.85				0.00	0.00

Link Summary

SN	Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length	Inlet Invert Elevation	Outlet Invert Elevation	Average Slope	Diameter or Height	Manning's Roughness	Peak Flow	Design Flow Capacity	Peak Flow/ Design Flow Ratio	Peak Flow Velocity	Peak Flow Depth	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged	Reported Condition
					(ft)	(ft)	(ft)	(%)	(in)		(cfs)	(cfs)		(ft/sec)	(ft)		(min)	
1	2	Pipe	2	3	182.00	2061.70	2060.10	0.8800			613.46	896.81	0.68	10.22	4.00	1.00	58.00	SURCHARGED
2	6	Pipe	6	7	50.00	2048.88	2048.60	0.5600			483.16	291.43	1.66	10.40	4.00	1.00	70.00	SURCHARGED
3	8	Pipe	8	9	50.00	2045.83	2044.80	2.0600			1100.70	1979.07	0.56	12.23	4.50	1.00	44.00	SURCHARGED
4	9	Pipe	14	RP	50.00	2154.50	2137.00	35.0000			174.80	242.66	0.72	39.55	2.11	0.84	0.00	Calculated
5	15	Pipe	15	12	82.00	2134.00	2133.50	0.6100			89.94	199.62	0.45	15.36	2.06	0.46	0.00	Calculated
6	19	Pipe	SP	13	75.00	2117.00	2116.51	0.6500			98.13	29.20	3.36	14.38	2.86	0.97	0.00	> CAPACITY
7	21	Pipe	16	18	35.10	2044.25	2043.83	1.2000			142.42	53.03	2.69	29.01	2.50	1.00	70.00	SURCHARGED
8	22	Pipe	17	7	42.40	2050.75	2048.60	5.0700			18.68	27.95	0.67	10.57	1.50	1.00	79.00	SURCHARGED
9	Link-01	Pipe	4	19	166.00	2056.20	2054.70	0.9000			936.89	6824.77	0.14	7.08	6.77	0.52	0.00	Calculated
10	Link-02	Pipe	19	5	65.00	2054.70	2054.00	1.0800			165.20	254.51	0.65	10.47	4.00	1.00	66.00	SURCHARGED
11	1	Channel	1	2	131.00	2062.60	2061.70	0.6900			900.12	964.35	0.93	12.41	6.00	1.00	32.00	
12	3	Channel	3	4	187.00	2059.10	2056.20	1.5500			936.90	982.70	0.95	11.83	6.60	1.00	22.00	
13	29	Channel	18	10	154.40	2043.83	2041.91	1.2400			1521.41	1476.05	1.03	16.02	5.00	1.00	20.00	
14	ED	Channel	7	8	440.35	2048.60	2045.83	0.6300			862.28	784.15	1.10	12.60	5.00	1.00	39.00	
15	KB	Channel	5	6	392.20	2054.00	2048.88	1.3100			882.36	1129.64	0.78	11.76	5.00	1.00	51.00	
16	MOR	Channel	13	11	1020.00	2116.51	2092.00	2.4000			265.19	3372.60	0.08	9.33	3.18	0.41	0.00	
17	PF	Channel	9	18	78.10	2044.80	2043.83	1.2400			1283.15	1101.84	1.16	17.75	5.00	1.00	21.00	
18	STK	Channel	11	1	2424.00	2092.00	2062.60	1.2100			445.96	830.10	0.54	8.54	4.32	0.88	0.00	
19	USR	Channel	12	11	1864.00	2133.50	2092.00	2.2300			200.47	3988.84	0.05	7.26	2.82	0.36	0.00	
20	5	Orifice	CVP	14		2155.00	2154.50				20.60							
21	7	Orifice	CVP	14		2155.00	2154.50				44.28							
22	13	Orifice	CVP	14		2155.00	2154.50				110.33							
23	16	Orifice	RP	15		2137.00	2134.00				25.14							
24	17	Orifice	RP	15		2137.00	2134.00				65.06							
25	23	Orifice	P2	16		2044.25	2044.25				4.84							
26	24	Orifice	P2	16		2044.25	2044.25				6.92							
27	26	Orifice	P1	17		2050.75	2050.75				0.42							
28	27	Orifice	P1	17		2050.75	2050.75				3.37							
29	10	Weir	8	9		2045.83	2044.80				1224.23							
30	11	Weir	6	7		2048.88	2048.60				1337.66							
31	14	Weir	CVP	RP		2155.00	2137.00				0.00							
32	18	Weir	RP	12		2137.00	2133.50				114.30							
33	20	Weir	SP	13		2117.00	2116.51				167.34							
34	25	Weir	P2	16		2044.25	2044.25				41.62							
35	28	Weir	P1	17		2050.75	2050.75				16.55							
36	31	Weir	2	3		2061.70	2059.10				948.38							
37	35	Weir	5	6		2054.00	2048.88				794.64							
38	36	Weir	7	8		2048.60	2045.83				1061.85							
39	37	Weir	9	18		2044.80	2043.83				1459.99							
40	38	Weir	1	2		2062.60	2061.70				551.72							
41	40	Weir	3	19		2059.10	2054.70				353.78							
42	41	Weir	19	5		2054.70	2054.00				1247.77							

Subbasin Hydrology

Subbasin : A

Input Data

Area (ac)	6.36
Peak Rate Factor	484
Weighted Curve Number	90
Rain Gage ID	1

Composite Curve Number

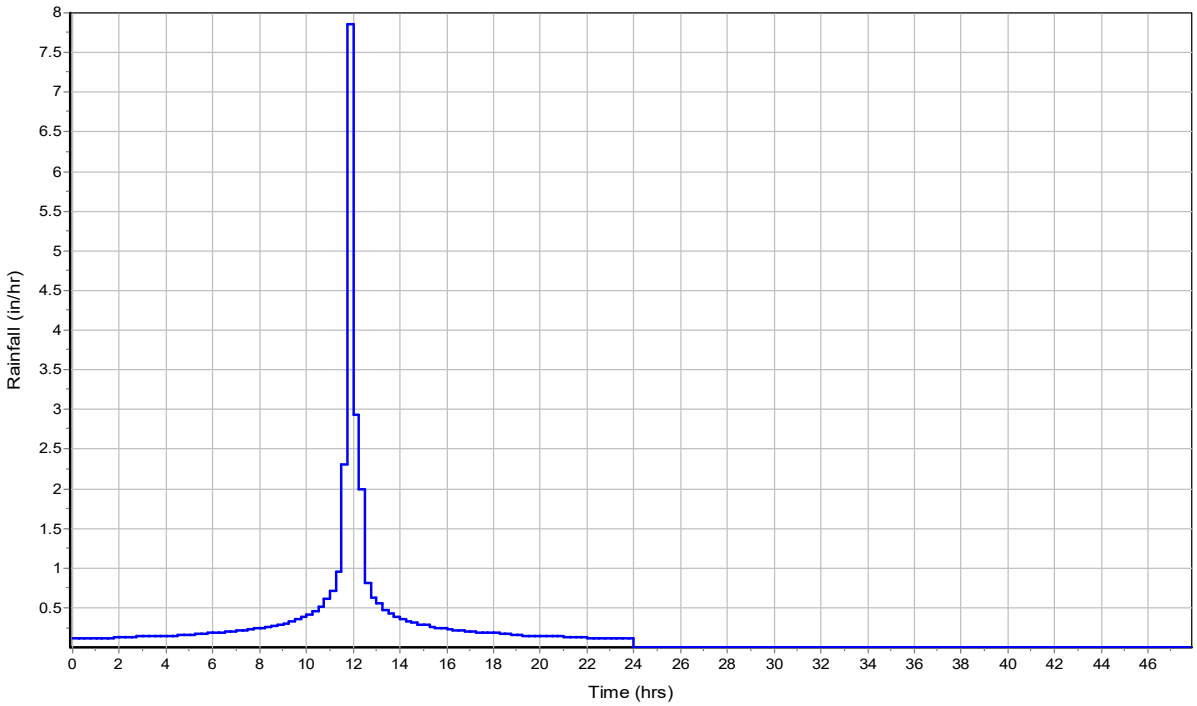
32 Soil/Surface Description	Area (acres)	Soil Group	Curve Number
-	6.36	-	90
Composite Area & Weighted CN	6.36		90

Subbasin Runoff Results

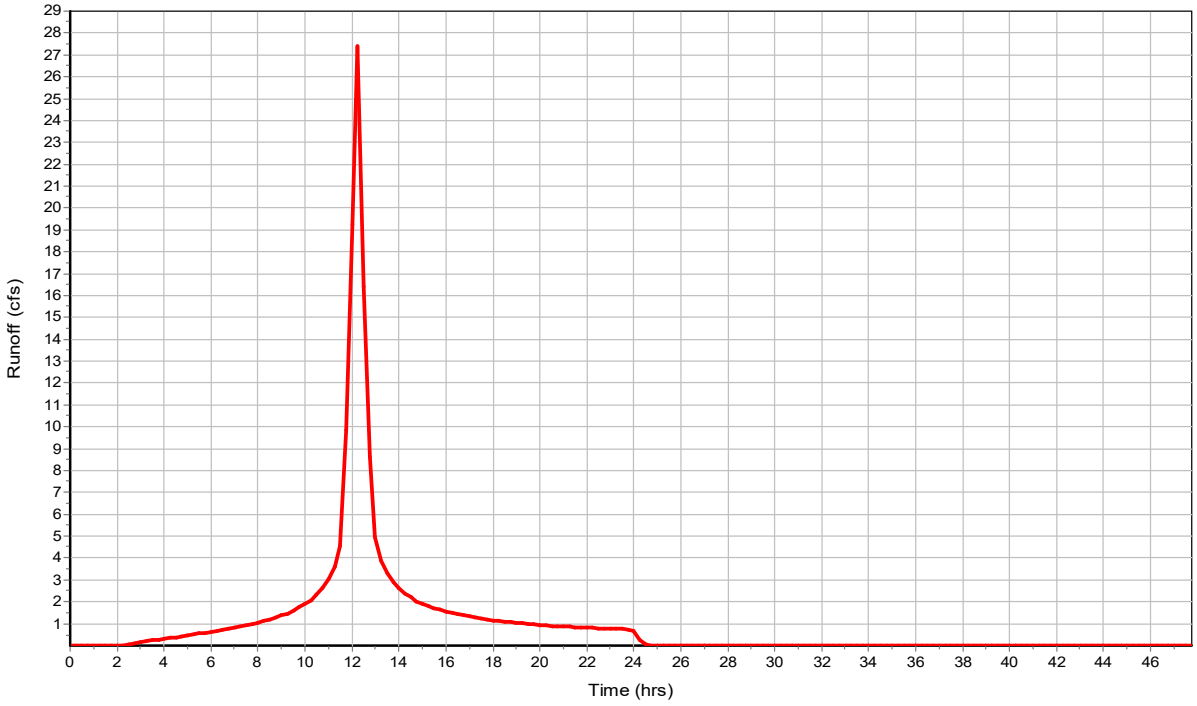
Total Rainfall (in)	8.6
Total Runoff (in)	7.4
Peak Runoff (cfs)	30.58
Weighted Curve Number	90
Time of Concentration (days hh:mm:ss)	0 00:18:30

Subbasin : A

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : B

Input Data

Area (ac)	10.8
Peak Rate Factor	484
Weighted Curve Number	92
Rain Gage ID	1

Composite Curve Number

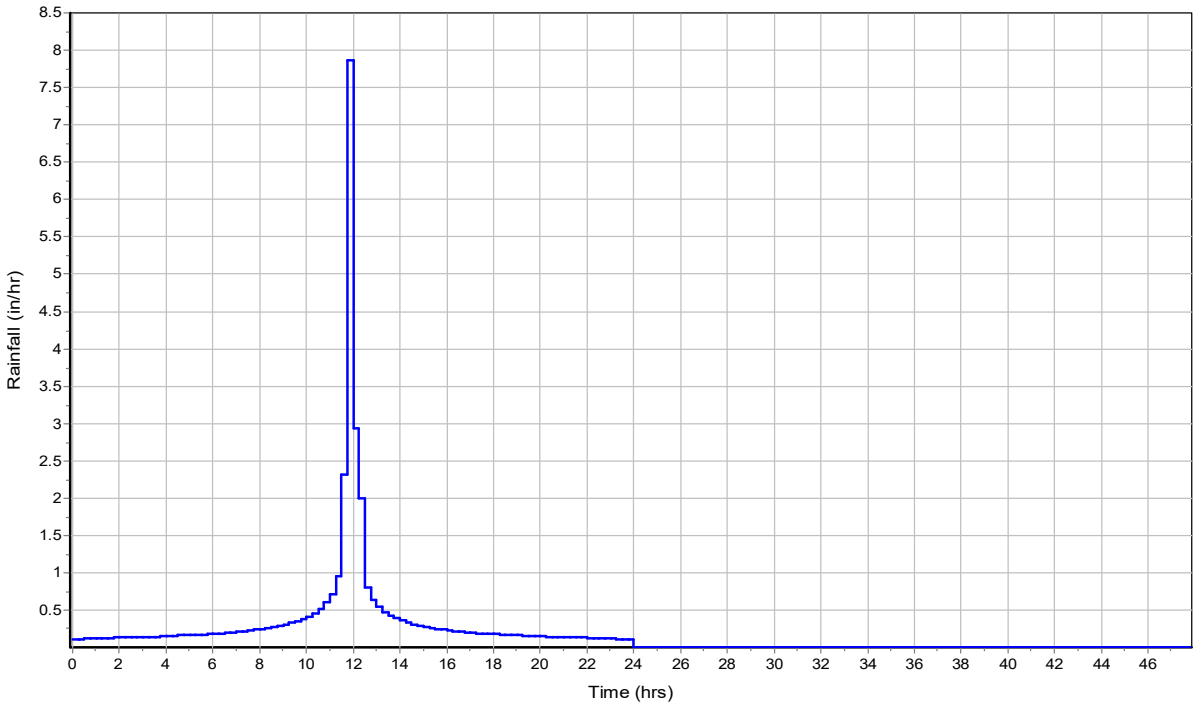
32 Soil/Surface Description	Area (acres)	Soil Group	Curve Number
-	10.8	-	92
Composite Area & Weighted CN	10.8		92

Subbasin Runoff Results

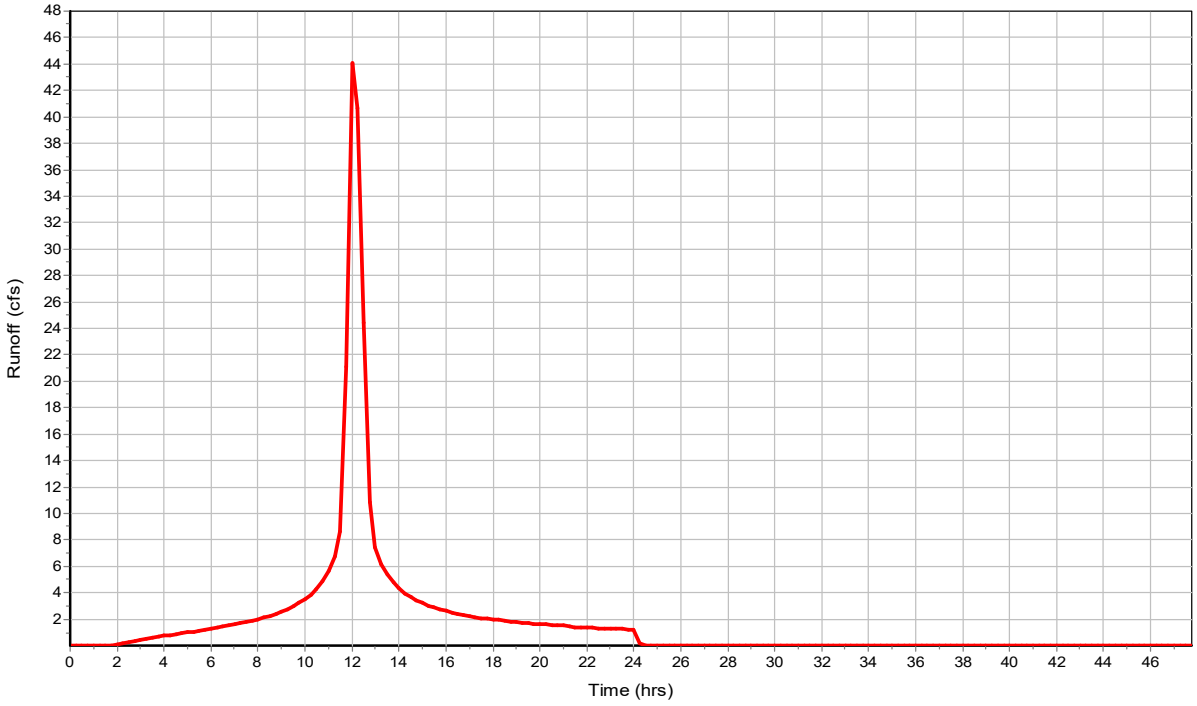
Total Rainfall (in)	8.6
Total Runoff (in)	7.64
Peak Runoff (cfs)	60.67
Weighted Curve Number	92
Time of Concentration (days hh:mm:ss)	0 00:12:30

Subbasin : B

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : CO

Input Data

Area (ac)	44.42
Peak Rate Factor	484
Weighted Curve Number	84
Rain Gage ID	1

Composite Curve Number

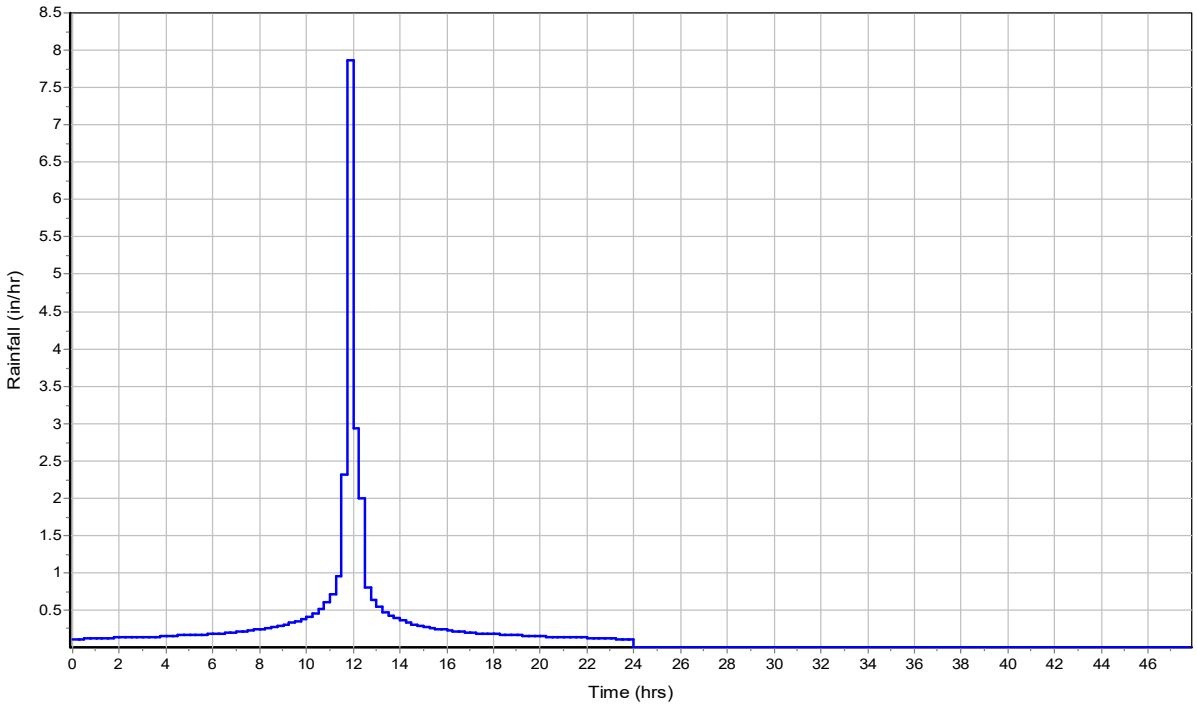
32 Soil/Surface Description	Area (acres)	Soil Group	Curve Number
-	44.42	-	84
Composite Area & Weighted CN	44.42		84

Subbasin Runoff Results

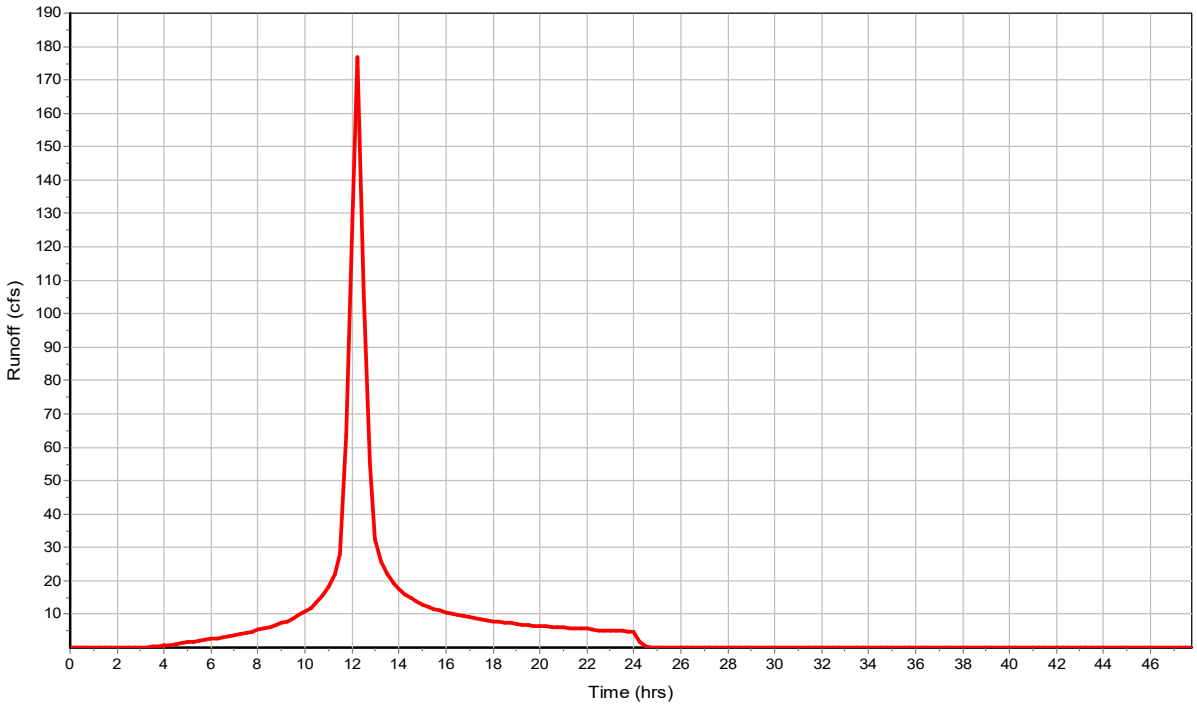
Total Rainfall (in)	8.6
Total Runoff (in)	6.67
Peak Runoff (cfs)	203.15
Weighted Curve Number	84
Time of Concentration (days hh:mm:ss)	0 00:17:30

Subbasin : CO

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : K

Input Data

Area (ac)	93.79
Peak Rate Factor	484
Weighted Curve Number	85
Rain Gage ID	1

Composite Curve Number

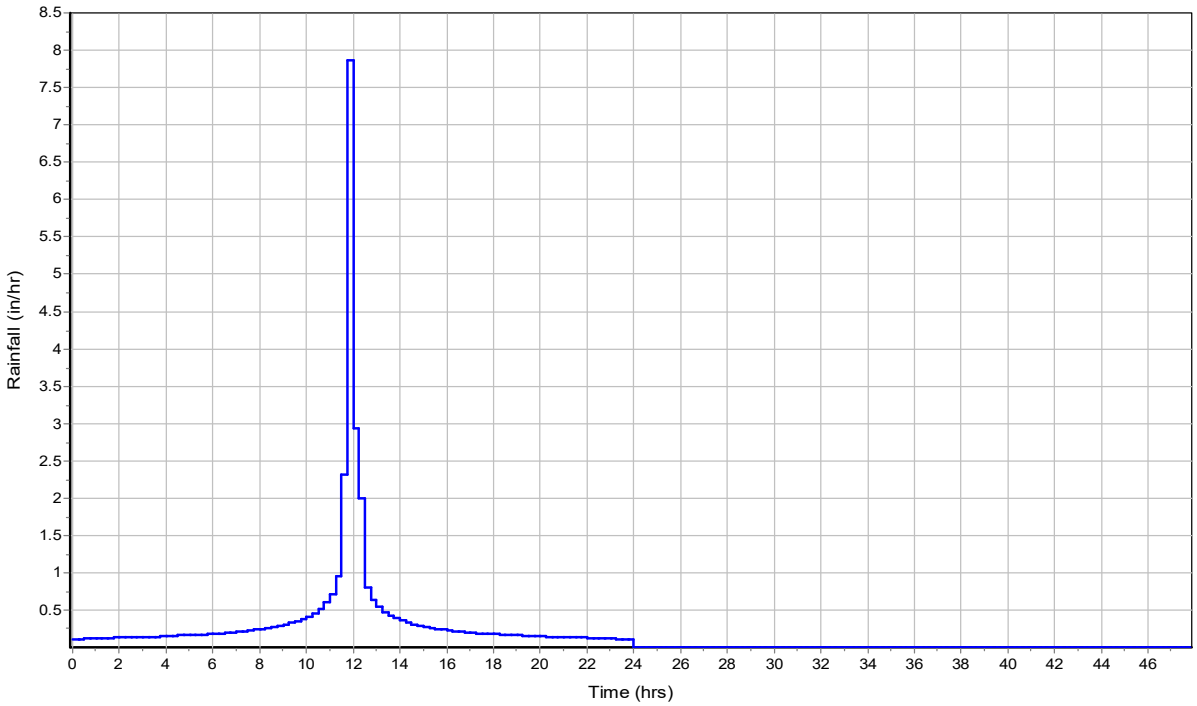
32 Soil/Surface Description	Area (acres)	Soil Group	Curve Number
-	93.79	-	85
Composite Area & Weighted CN	93.79		85

Subbasin Runoff Results

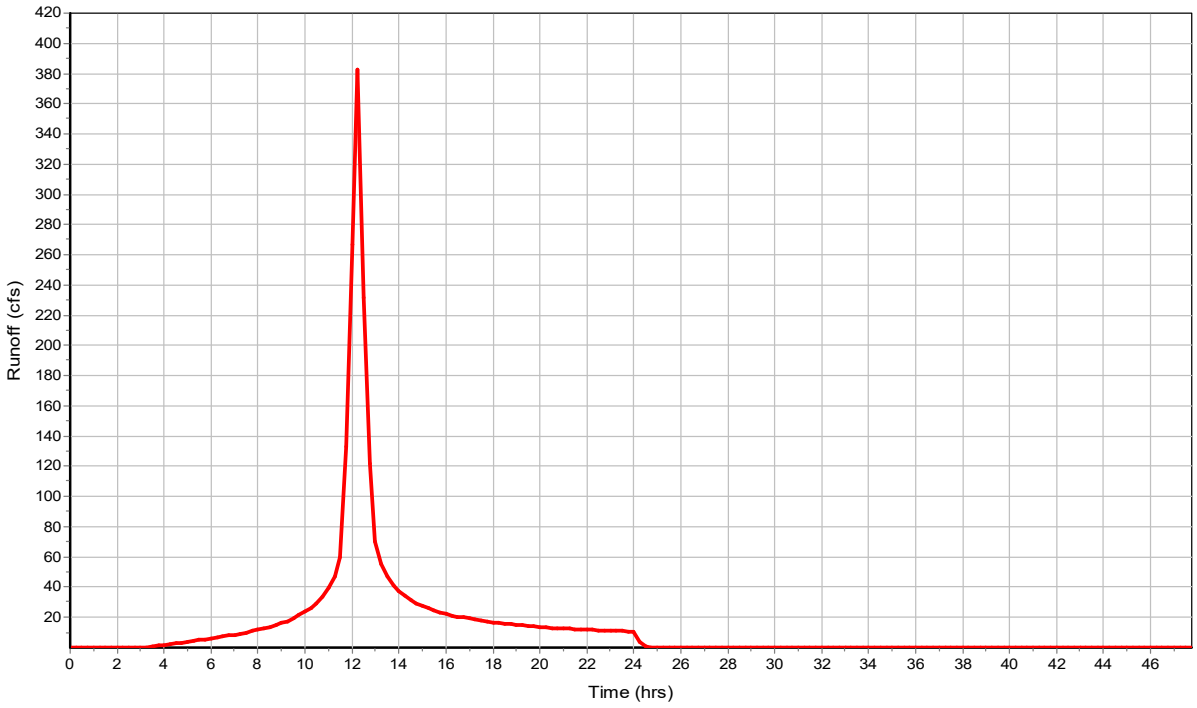
Total Rainfall (in)	8.6
Total Runoff (in)	6.79
Peak Runoff (cfs)	428.55
Weighted Curve Number	85
Time of Concentration (days hh:mm:ss)	0 00:18:12

Subbasin : K

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : RU

Input Data

Area (ac) 7.74
Peak Rate Factor 484
Weighted Curve Number 87
Rain Gage ID 1

Composite Curve Number

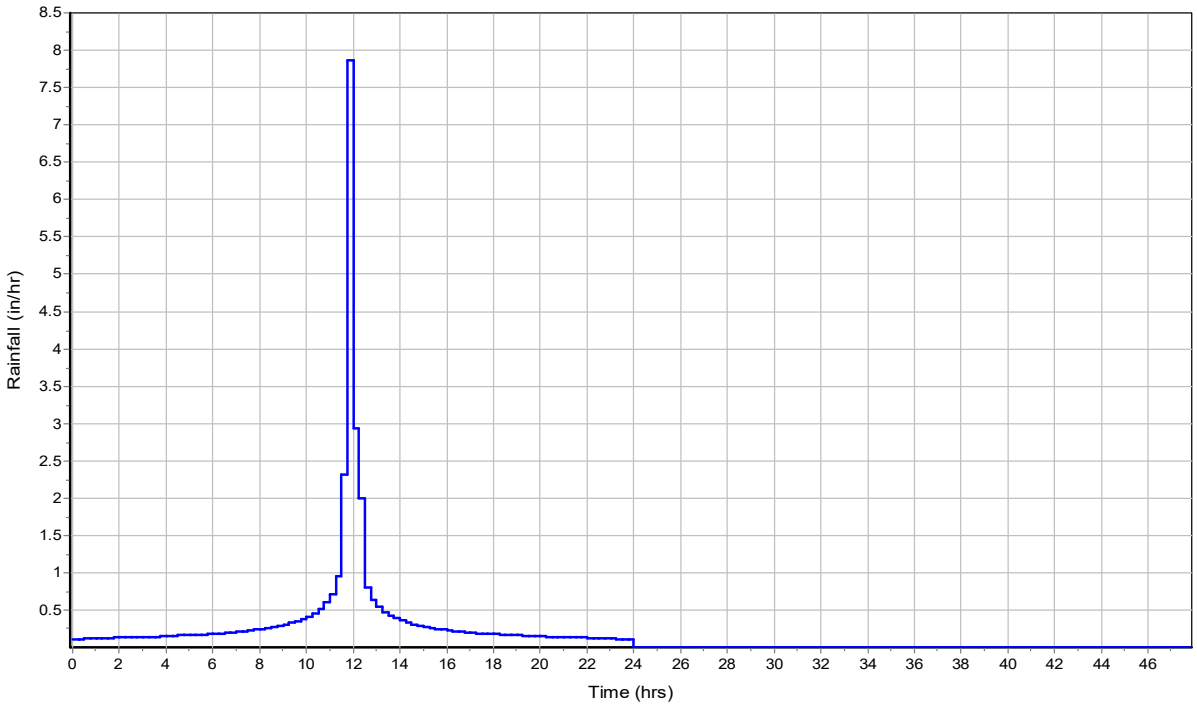
32 Soil/Surface Description	Area (acres)	Soil Group	Curve Number
-	7.74	-	87
Composite Area & Weighted CN	7.74		87

Subbasin Runoff Results

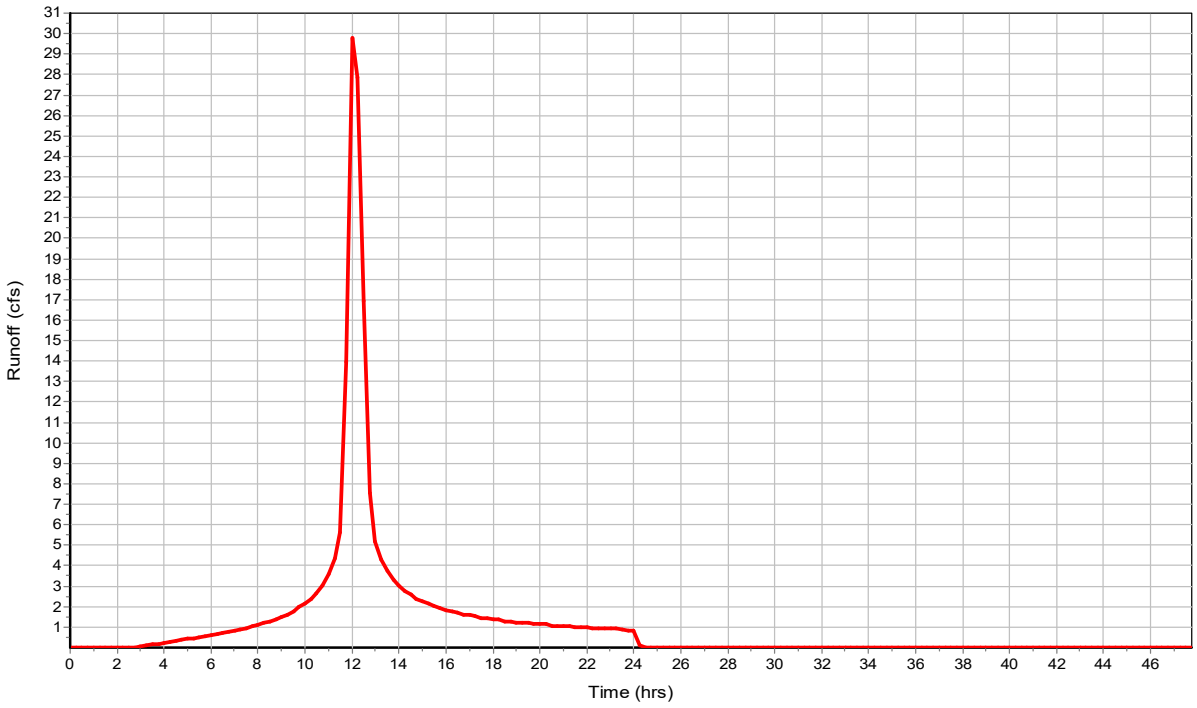
Total Rainfall (in) 8.6
Total Runoff (in) 7.03
Peak Runoff (cfs) 41.43
Weighted Curve Number 87
Time of Concentration (days hh:mm:ss) 0 00:12:24

Subbasin : RU

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : SH

Input Data

Area (ac)	69.35
Peak Rate Factor	484
Weighted Curve Number	86
Rain Gage ID	1

Composite Curve Number

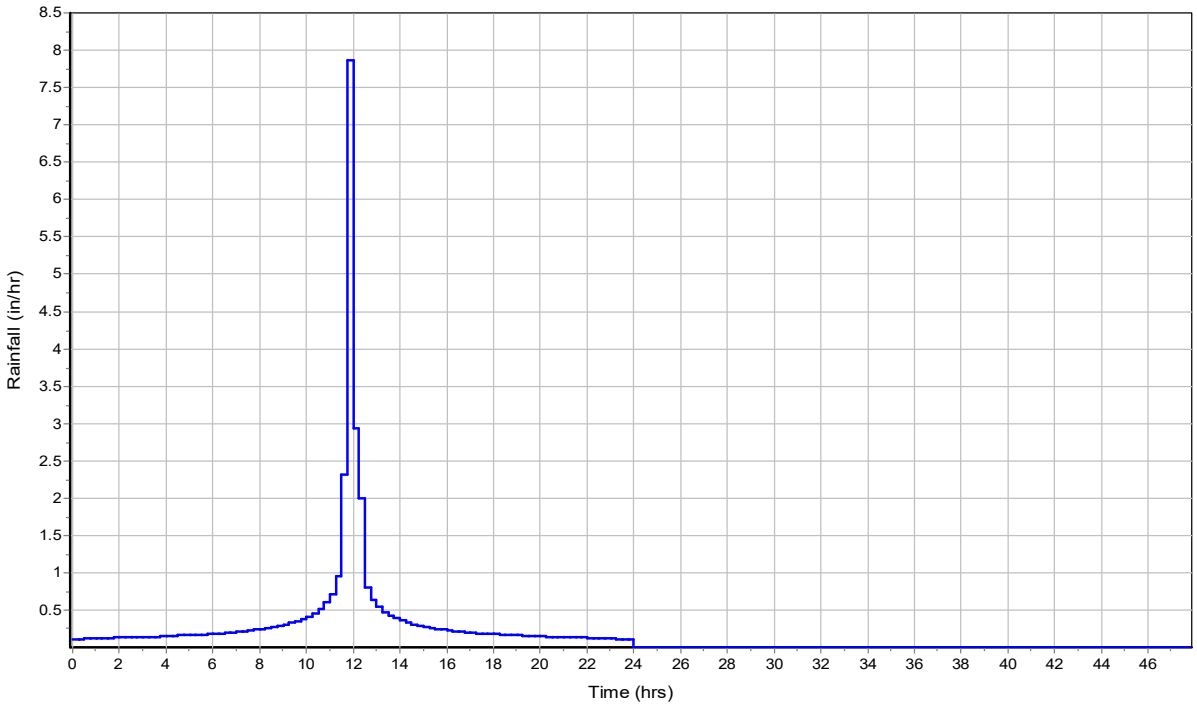
32 Soil/Surface Description	Area (acres)	Soil Group	Curve Number
-	69.35	-	86
Composite Area & Weighted CN	69.35		86

Subbasin Runoff Results

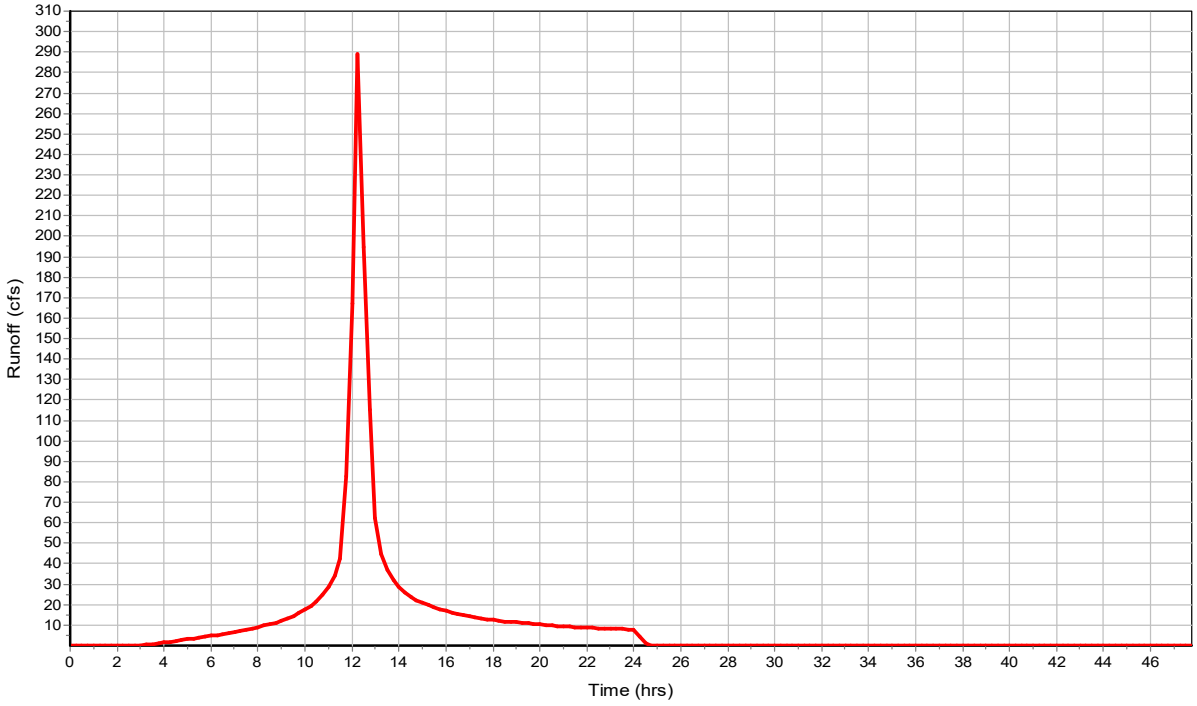
Total Rainfall (in)	8.6
Total Runoff (in)	6.91
Peak Runoff (cfs)	291.49
Weighted Curve Number	86
Time of Concentration (days hh:mm:ss)	0 00:23:30

Subbasin : SH

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : UG1

Input Data

Area (ac) 3.05
Peak Rate Factor 484
Weighted Curve Number 93
Rain Gage ID 1

Composite Curve Number

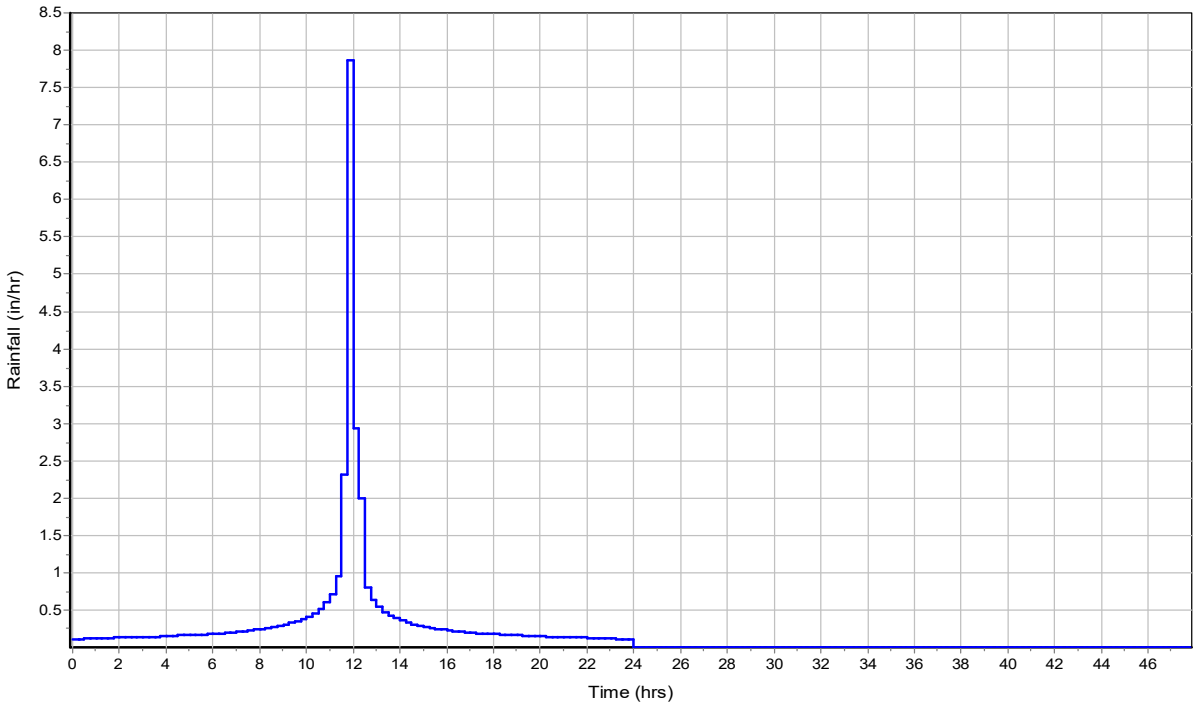
32 Soil/Surface Description	Area (acres)	Soil Group	Curve Number
-	3.05	-	93
Composite Area & Weighted CN	3.05		93

Subbasin Runoff Results

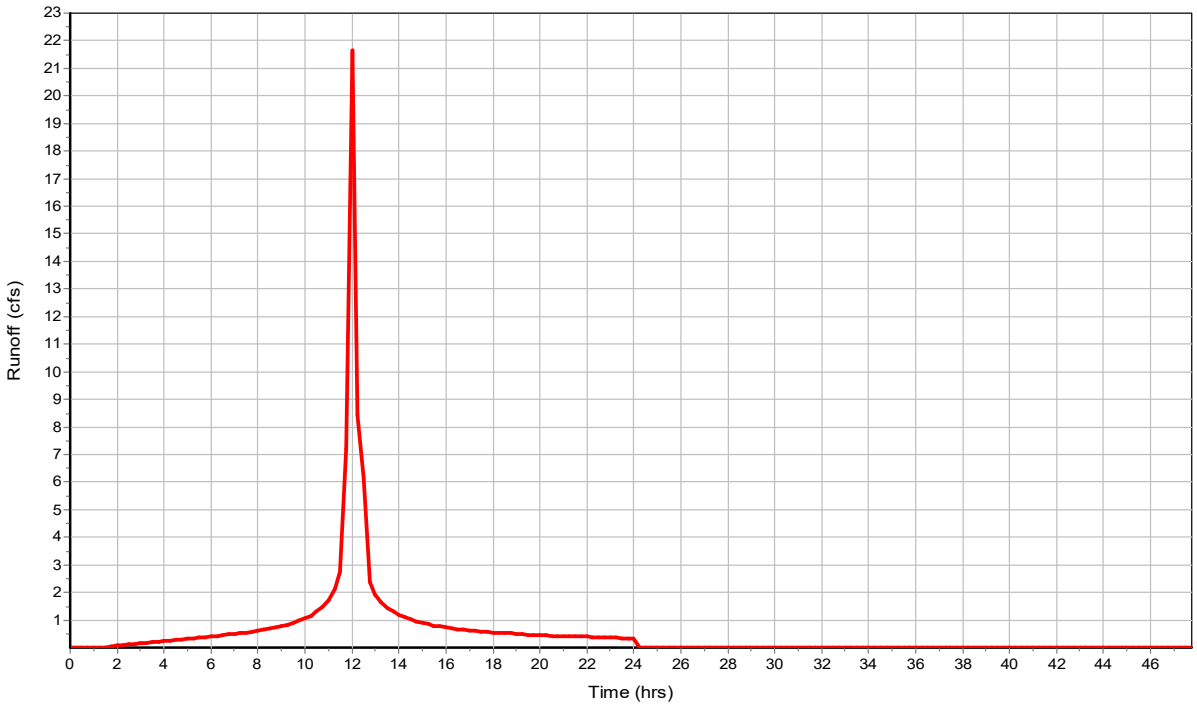
Total Rainfall (in) 8.6
Total Runoff (in) 7.76
Peak Runoff (cfs) 22.14
Weighted Curve Number 93
Time of Concentration (days hh:mm:ss) 0 00:05:00

Subbasin : UG1

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : UG2

Input Data

Area (ac)	11.65
Peak Rate Factor	484
Weighted Curve Number	86
Rain Gage ID	1

Composite Curve Number

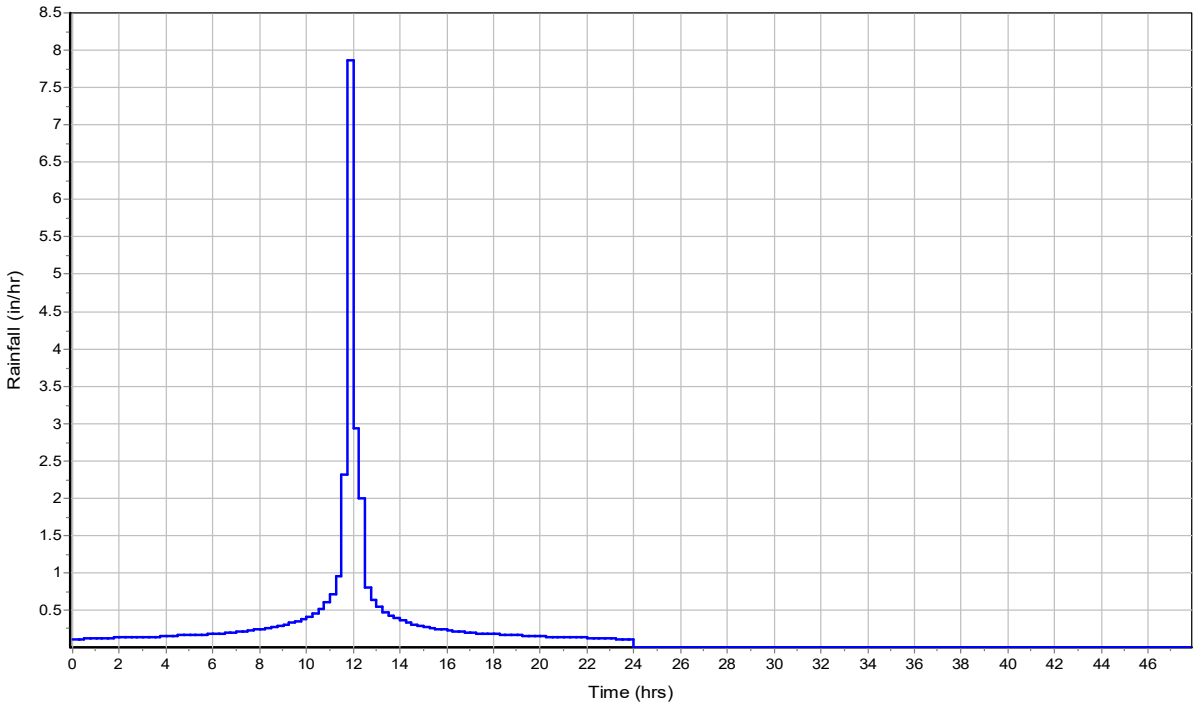
32 Soil/Surface Description	Area (acres)	Soil Group	Curve Number
-	11.65	-	86
Composite Area & Weighted CN	11.65		86

Subbasin Runoff Results

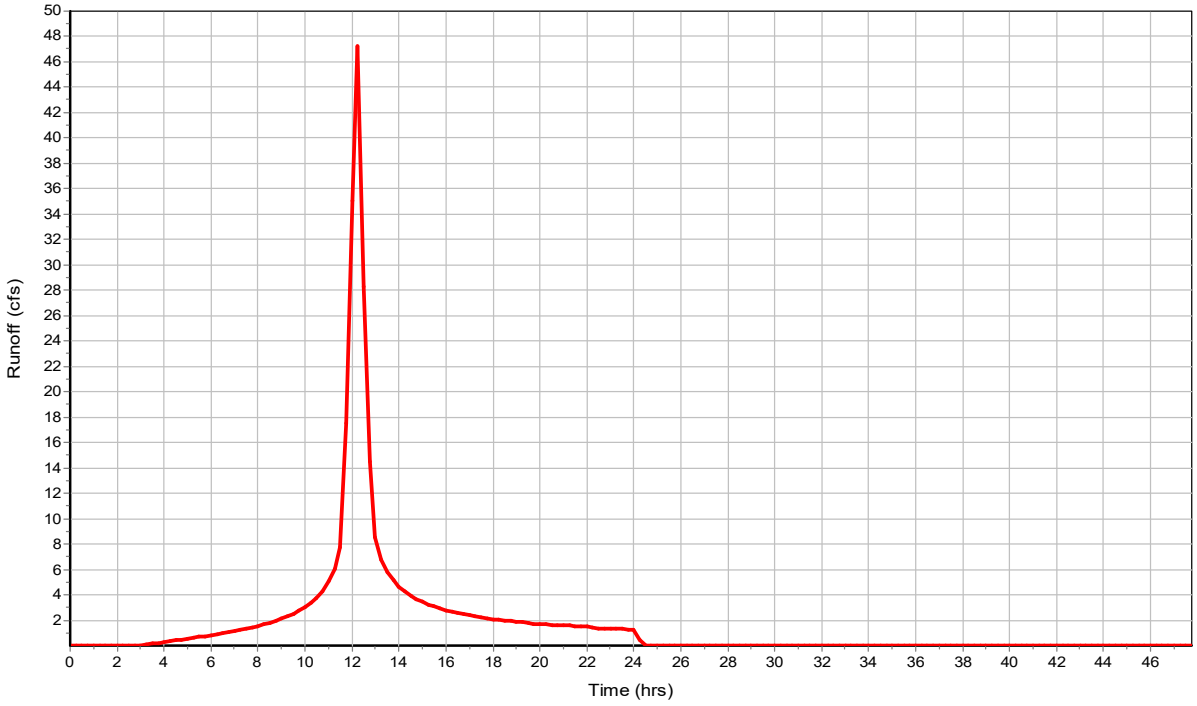
Total Rainfall (in)	8.6
Total Runoff (in)	6.91
Peak Runoff (cfs)	55.04
Weighted Curve Number	86
Time of Concentration (days hh:mm:ss)	0 00:17:12

Subbasin : UG2

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : US1

Input Data

Area (ac)	244.78
Peak Rate Factor	484
Weighted Curve Number	82
Rain Gage ID	1

Composite Curve Number

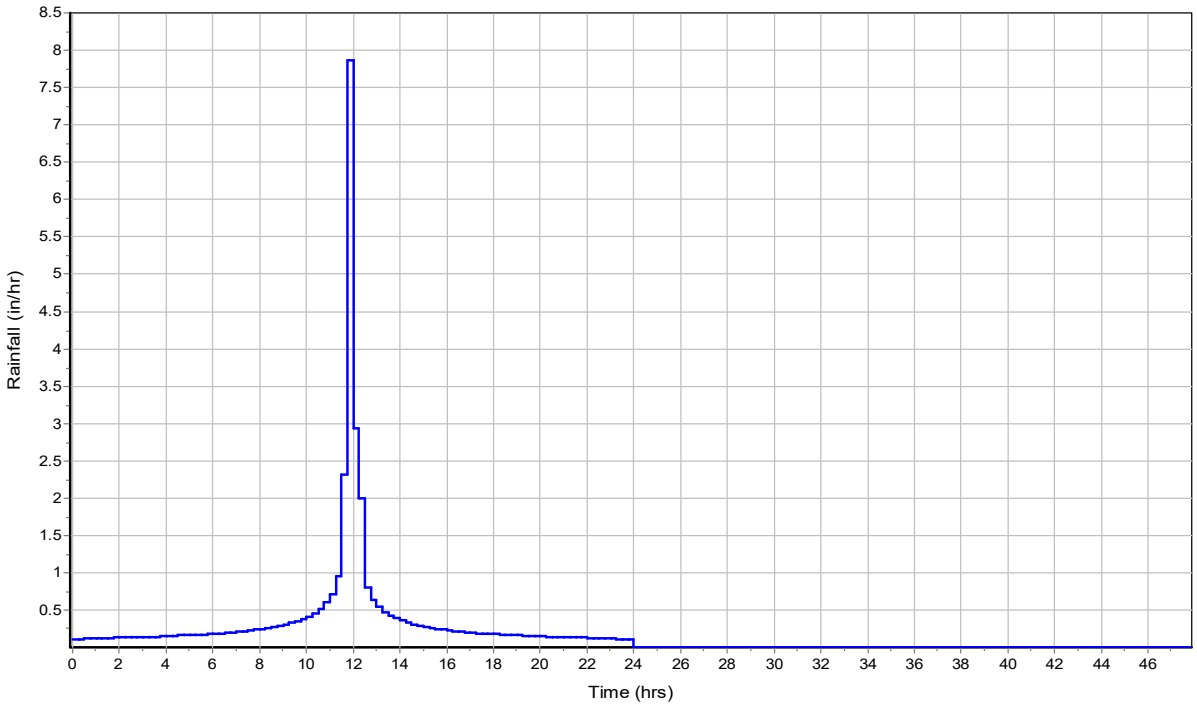
32 Soil/Surface Description	Area (acres)	Soil Group	Curve Number
-	244.78	-	82
Composite Area & Weighted CN	244.78		82

Subbasin Runoff Results

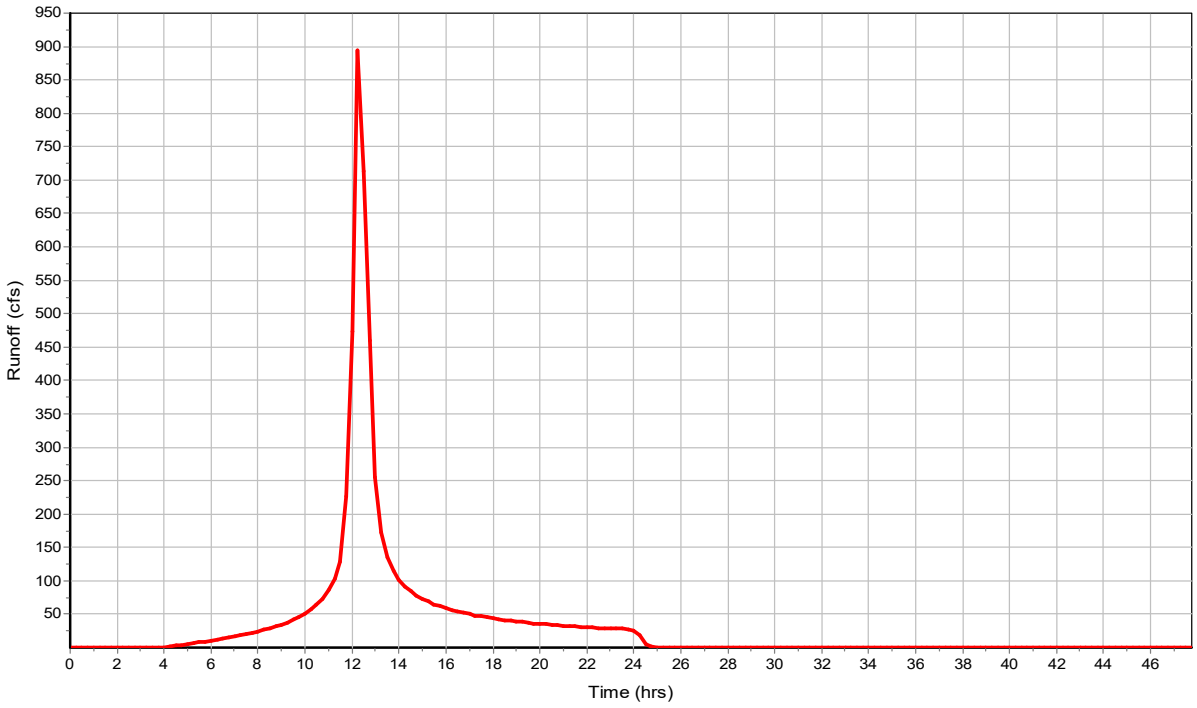
Total Rainfall (in)	8.6
Total Runoff (in)	6.43
Peak Runoff (cfs)	900.34
Weighted Curve Number	82
Time of Concentration (days hh:mm:ss)	0 00:28:36

Subbasin : US1

Rainfall Intensity Graph



Runoff Hydrograph



Junction Input

SN	Element ID	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Ground/Rim (Max) Offset (ft)	Initial Water Elevation (ft)	Initial Water Depth (ft)	Surcharge Elevation (ft)	Surcharge Depth (ft)	Ponded Area (ft^2)	Minimum Pipe Cover (in)
1	1	2062.60	2068.60	6.00	2062.60	0.00	2068.60	0.00	0.00	
2	2	2061.70	2066.30	4.60	2061.70	0.00	2066.30	0.00	0.00	
3	3	2059.10	2065.70	6.60	2059.10	0.00	2065.70	0.00	0.00	
4	4	2056.20	2065.00	8.80	2056.20	0.00	2065.00	0.00	0.00	
5	5	2054.00	2060.00	6.00	2054.00	0.00	2060.00	0.00	0.00	
6	6	2048.88	2053.88	5.00	2048.88	0.00	2053.88	0.00	0.00	
7	7	2048.60	2053.60	5.00	2048.60	0.00	2053.60	0.00	0.00	
8	8	2045.83	2050.83	5.00	2045.83	0.00	2050.83	0.00	0.00	
9	9	2044.80	2049.80	5.00	2044.80	0.00	2049.80	0.00	0.00	
10	11	2092.00	2098.00	6.00	2092.00	0.00	2098.00	0.00	0.00	
11	12	2133.50	2139.50	6.00	2133.50	0.00	2139.50	0.00	0.00	
12	13	2116.51	2125.00	8.49	2116.51	0.00	2125.00	0.00	0.00	
13	14	2154.50	2154.50	0.00	2154.50	0.00	2154.50	0.00	0.00	
14	15	2134.00	2142.00	8.00	2134.00	0.00	2142.00	0.00	0.00	
15	16	2044.25	2044.25	0.00	2044.25	0.00	2044.25	0.00	0.00	
16	17	2050.75	2050.75	0.00	2050.75	0.00	2050.75	0.00	0.00	
17	18	2043.83	2047.83	4.00	2043.83	0.00	2047.83	0.00	0.00	
18	19	2054.70	2060.00	5.30	2054.70	0.00	2060.00	0.00	0.00	

Junction Results

SN	Element ID	Peak Inflow (cfs)	Peak Lateral Inflow (cfs)	Max HGL Elevation Attained (ft)	Max HGL Depth Attained (ft)	Max Surcharge Depth Attained (ft)	Min Freeboard Attained (ft)	Average HGL Elevation Attained (ft)	Average HGL Depth Attained (ft)	Time of Max HGL Occurrence (days hh:mm)	Time of Peak Flooding Occurrence (days hh:mm)	Total Flooded Volume (ac-in)	Total Time Flooded (min)
1	1	1293.72	893.77	2069.36	6.76	0.00	4.24	2063.46	0.86	0 12:33	0 00:00	0.00	0.00
2	2	1290.78	0.00	2068.84	7.14	0.00	3.86	2062.12	0.42	0 12:33	0 00:00	0.00	0.00
3	3	1290.71	0.00	2068.25	9.15	0.00	4.41	2059.73	0.63	0 12:33	0 00:00	0.00	0.00
4	4	936.90	0.00	2063.01	6.81	0.00	6.19	2056.97	0.77	0 12:33	0 00:00	0.00	0.00
5	5	1649.89	382.42	2061.34	7.34	0.00	3.66	2054.61	0.61	0 12:32	0 00:00	0.00	0.00
6	6	1649.41	0.00	2056.45	7.57	0.00	3.43	2049.69	0.81	0 12:33	0 00:00	0.00	0.00
7	7	1678.21	27.40	2055.82	7.22	0.00	2.78	2049.35	0.75	0 12:33	0 00:00	0.00	0.00
8	8	1676.18	0.00	2054.14	8.31	0.00	1.69	2046.23	0.40	0 12:33	0 00:00	0.00	0.00
9	9	1717.98	44.06	2053.90	9.10	0.00	0.90	2045.43	0.63	0 12:33	0 00:00	0.00	0.00
10	11	460.17	0.00	2095.83	3.83	0.00	4.17	2092.46	0.46	0 12:35	0 00:00	0.00	0.00
11	12	204.20	0.00	2135.52	2.02	0.00	7.48	2133.69	0.19	0 12:31	0 00:00	0.00	0.00
12	13	265.46	0.00	2119.32	2.81	0.00	5.68	2116.85	0.34	0 12:34	0 00:00	0.00	0.00
13	14	174.79	0.00	2156.22	1.72	0.00	2.55	2154.66	0.16	0 12:30	0 00:00	0.00	0.00
14	15	90.20	0.00	2136.12	2.12	0.00	10.38	2134.32	0.32	0 12:30	0 00:00	0.00	0.00
15	16	186.67	0.00	2050.80	6.55	0.00	0.00	2044.60	0.35	0 12:27	0 12:32	42.66	17.00
16	17	18.98	0.00	2056.07	5.32	0.00	0.58	2050.96	0.21	0 12:32	0 00:00	0.00	0.00
17	18	1753.63	0.00	2053.83	10.00	0.00	0.00	2044.37	0.54	0 12:32	0 12:33	4.54	5.00
18	19	1290.66	0.00	2061.51	6.81	0.00	6.75	2055.99	1.29	0 12:32	0 00:00	0.00	0.00

Channel Input

SN	Element ID	Length (ft)	Inlet Invert Elevation (ft)	Inlet Invert Offset (ft)	Outlet Invert Elevation (ft)	Outlet Invert Offset (ft)	Total Drop (ft)	Average Slope (%)	Shape	Height (ft)	Width (ft)	Manning's Roughness	Entrance Losses	Exit/Bend Losses	Additional Losses	Initial Flow (cfs)	Flap Gate
1	1	131.00	2062.60	0.00	2061.70	0.00	0.90	0.6900	Trapezoidal	6.000	27.000	0.0240	0.0000	0.0000	0.0000	0.00	No
2	3	187.00	2059.10	0.00	2056.20	0.00	2.90	1.5500	Rectangular	6.600	12.000	0.0320	0.7000	0.5000	0.0000	0.00	No
3	29	154.40	2043.83	0.00	2041.91	0.00	1.92	1.2400	Trapezoidal	5.000	24.000	0.0240	0.0000	0.0000	0.0000	0.00	No
4	ED	440.35	2048.60	0.00	2045.83	0.00	2.77	0.6300	Trapezoidal	5.000	20.000	0.0240	0.0000	0.0000	0.0000	0.00	No
5	KB	392.20	2054.00	0.00	2048.88	0.00	5.12	1.3100	Trapezoidal	5.000	20.000	0.0240	0.0000	0.0000	1.0000	0.00	No
6	MOR	1020.00	2116.51	0.00	2092.00	0.00	24.51	2.4000	Trapezoidal	8.000	34.000	0.0240	0.0000	0.0000	0.0000	0.00	No
7	PF	78.10	2044.80	0.00	2043.83	0.00	0.97	1.2400	Trapezoidal	5.000	20.000	0.0240	0.0000	0.0000	0.0000	0.00	No
8	STK	2424.00	2092.00	0.00	2062.60	0.00	29.40	1.2100	Trapezoidal	5.000	23.000	0.0240	0.0000	0.0000	0.0000	0.00	No
9	USR	1864.00	2133.50	0.00	2092.00	0.00	41.50	2.2300	Trapezoidal	8.000	37.000	0.0240	0.0000	0.0000	0.0000	0.00	No

Channel Results

SN	Element ID	Peak Flow	Time of Peak Flow Occurrence	Design Flow Capacity	Peak Flow/ Design Flow Ratio	Peak Flow Velocity	Travel Time	Peak Flow Depth	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged	Froude Number	Reported Condition
		(cfs)	(days hh:mm)	(cfs)		(ft/sec)	(min)	(ft)		(min)		
1	1	900.12	0 12:23	964.35	0.93	12.41	0.18	6.00	1.00	32.00		
2	3	936.90	0 12:33	982.70	0.95	11.83	0.26	6.60	1.00	22.00		
3	29	1521.41	0 12:40	1476.05	1.03	16.02	0.16	5.00	1.00	20.00		
4	ED	862.28	0 12:18	784.15	1.10	12.60	0.58	5.00	1.00	39.00		
5	KB	882.36	0 12:18	1129.64	0.78	11.76	0.56	5.00	1.00	51.00		
6	MOR	265.19	0 12:34	3372.60	0.08	9.33	1.82	3.18	0.41	0.00		
7	PF	1283.15	0 12:47	1101.84	1.16	17.75	0.07	5.00	1.00	21.00		
8	STK	445.96	0 12:35	830.10	0.54	8.54	4.73	4.32	0.88	0.00		
9	USR	200.47	0 12:31	3988.84	0.05	7.26	4.28	2.82	0.36	0.00		

Pipe Input

SN	Element ID	Length (ft)	Inlet Invert Elevation (ft)	Inlet Invert Offset (ft)	Outlet Invert Elevation (ft)	Outlet Invert Offset (ft)	Total Drop (ft)	Average Slope (%)	Pipe Shape	Pipe Diameter or Height (in)	Pipe Width (in)	Manning's Roughness	Entrance Losses	Exit/Bend Losses	Additional Losses	Initial Flow (cfs)	Flap Gate	No. of Barrels
1	2	182.00	2061.70	0.00	2060.10	1.00	1.60	0.8800	Rectangular									
2	6	50.00	2048.88	0.00	2048.60	0.00	0.28	0.5600	Rectangular									
3	8	50.00	2045.83	0.00	2044.80	0.00	1.03	2.0600	Rectangular									
4	9	50.00	2154.50	0.00	2137.00	0.00	17.50	35.0000	CIRCULAR									
5	15	82.00	2134.00	0.00	2133.50	0.00	0.50	0.6100	CIRCULAR									
6	19	75.00	2117.00	0.00	2116.51	0.00	0.49	0.6500	CIRCULAR									
7	21	35.10	2044.25	0.00	2043.83	0.00	0.42	1.2000	CIRCULAR									
8	22	42.40	2050.75	0.00	2048.60	0.00	2.15	5.0700	CIRCULAR									
9	Link-01	166.00	2056.20	0.00	2054.70	0.00	1.50	0.9000	Rectangular									
10	Link-02	65.00	2054.70	0.00	2054.00	0.00	0.70	1.0800	Rectangular									

Pipe Results

SN	Element ID	Peak Flow (cfs)	Time of Peak Flow Occurrence (days hh:mm)	Design Flow Capacity (cfs)	Peak Flow/ Design Flow Ratio	Peak Flow Velocity (ft/sec)	Travel Time (min)	Peak Flow Depth (ft)	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged (min)	Froude Number	Reported Condition
1	2	613.46	0 12:15	896.81	0.68	10.22	0.30	4.00	1.00	58.00		SURCHARGED
2	6	483.16	0 13:18	291.43	1.66	10.40	0.08	4.00	1.00	70.00		SURCHARGED
3	8	1100.70	0 12:49	1979.07	0.56	12.23	0.07	4.50	1.00	44.00		SURCHARGED
4	9	174.80	0 12:30	242.66	0.72	39.55	0.02	2.11	0.84	0.00		Calculated
5	15	89.94	0 12:30	199.62	0.45	15.36	0.09	2.06	0.46	0.00		Calculated
6	19	98.13	0 12:34	29.20	3.36	14.38	0.09	2.86	0.97	0.00		> CAPACITY
7	21	142.42	0 12:35	53.03	2.69	29.01	0.02	2.50	1.00	70.00		SURCHARGED
8	22	18.68	0 12:16	27.95	0.67	10.57	0.07	1.50	1.00	79.00		SURCHARGED
9	Link-01	936.89	0 12:33	6824.77	0.14	7.08	0.39	6.77	0.52	0.00		Calculated
10	Link-02	165.20	0 13:13	254.51	0.65	10.47	0.10	4.00	1.00	66.00		SURCHARGED

Storage Nodes

Storage Node : CVP

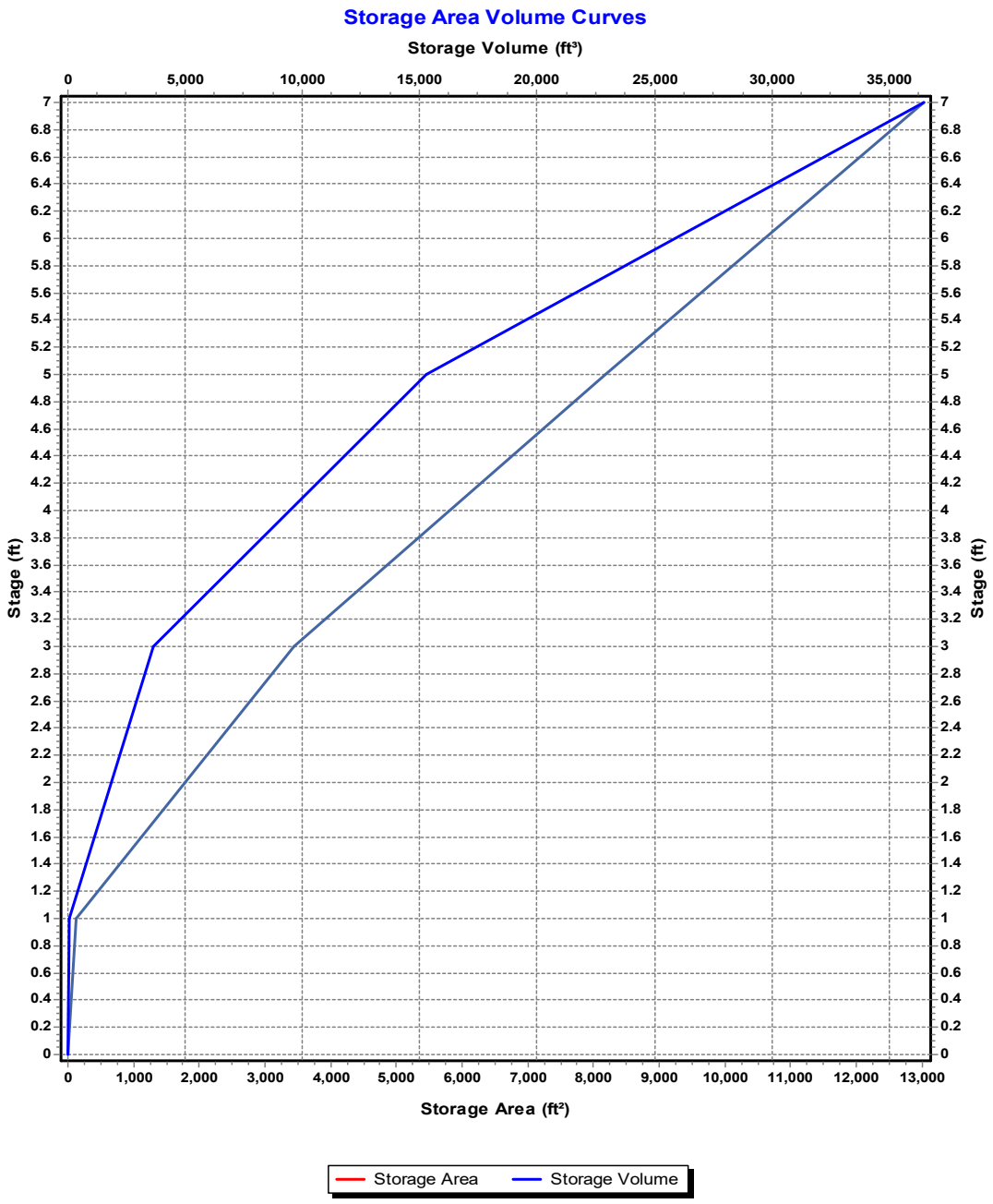
Input Data

Invert Elevation (ft)	2155.00
Max (Rim) Elevation (ft)	2162.00
Max (Rim) Offset (ft)	7.00
Initial Water Elevation (ft)	2155.00
Initial Water Depth (ft)	0.00
Ponded Area (ft^2)	7.00
Evaporation Loss	0.00

Storage Area Volume Curves

Storage Curve : CVP1

Stage (ft)	Storage Area (ft^2)	Storage Volume (ft^3)
0	0	0
1	131	65.5
3	3441	3637.5
5	8189	15267.5
7	13024	36480.5


Storage Area Volume Curves
Storage Volume (ft³)
0
5,000
10,000
15,000
20,000
25,000
30,000
35,000
Stage (ft)
0
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
1.8
2
2.2
2.4
2.6
2.8
3
3.2
3.4
3.6
3.8
4
4.2
4.4
4.6
4.8
5
5.2
5.4
5.6
5.8
6
6.2
6.4
6.6
6.8
7
Storage Area (ft²)
0
1,000
2,000
3,000
4,000
5,000
6,000
7,000
8,000
9,000
10,000
11,000
12,000
13,000
Storage Area
Storage Volume

Storage Node : CVP (continued)

Outflow Weirs

SN	Element ID	Weir Type	Flap Gate	Crest Elevation (ft)	Crest Offset (ft)	Length (ft)	Weir Total Height (ft)	Discharge Coefficient
1	14	Trapezoidal	No	2161.50	6.50	40.00	2.00	3.33

Outflow Orifices

SN	Element ID	Orifice Type	Orifice Shape	Flap Gate	Circular Orifice Diameter (in)	Rectangular Orifice Height (in)	Rectangular Orifice Width (in)	Orifice Invert Elevation (ft)	Orifice Coefficient
1	5	Side	CIRCULAR	No					
2	7	Side	CIRCULAR	No					
3	13	Bottom	Rectangular	No					

Output Summary Results

Peak Inflow (cfs)	176.72
Peak Lateral Inflow (cfs)	176.72
Peak Outflow (cfs)	174.79
Peak Exfiltration Flow Rate (cfm)	0
Max HGL Elevation Attained (ft)	2161.01
Max HGL Depth Attained (ft)	6.01
Average HGL Elevation Attained (ft)	2155.76
Average HGL Depth Attained (ft)	0.76
Time of Max HGL Occurrence (days hh:mm)	0 12:30
Total Exfiltration Volume (1000-ft^3)	0
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0

Storage Node : P1

Input Data

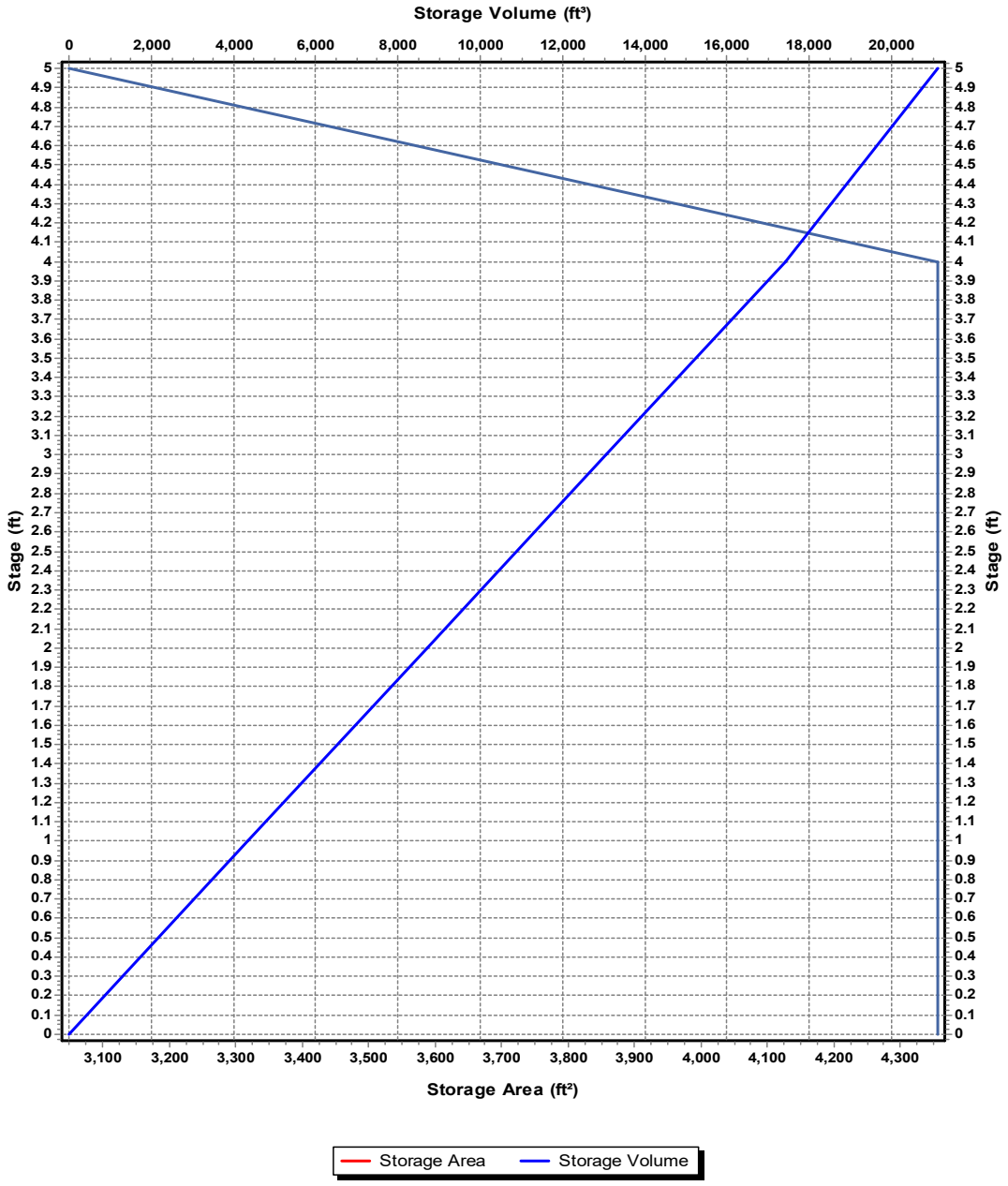
Invert Elevation (ft)	2050.75
Max (Rim) Elevation (ft)	2055.75
Max (Rim) Offset (ft)	5.00
Initial Water Elevation (ft)	2050.75
Initial Water Depth (ft)	0.00
Ponded Area (ft^2)	5.00
Evaporation Loss	0.00

Storage Area Volume Curves

Storage Curve : P1

Stage (ft)	Storage Area (ft^2)	Storage Volume (ft^3)
0	4356	0
1	4356	4356
2	4356	8712
3	4356	13068
4	4356	17424
5	3049	21126.5

Storage Area Volume Curves



Storage Node : P1 (continued)

Outflow Weirs

SN	Element ID	Weir Type	Flap Gate	Crest Elevation (ft)	Crest Offset (ft)	Length (ft)	Weir Total Height (ft)	Discharge Coefficient
1	28	Transverse	No	2054.65	3.90	6.00	2.00	3.33

Outflow Orifices

SN	Element ID	Orifice Type	Orifice Shape	Flap Gate	Circular Orifice Diameter (in)	Rectangular Orifice Height (in)	Rectangular Orifice Width (in)	Orifice Invert Elevation (ft)	Orifice Coefficient
1	26	Side	CIRCULAR	No					
2	27	Side	Rectangular	No					

Output Summary Results

Peak Inflow (cfs)	21.66
Peak Lateral Inflow (cfs)	21.66
Peak Outflow (cfs)	18.98
Peak Exfiltration Flow Rate (cfm)	0
Max HGL Elevation Attained (ft)	2056.13
Max HGL Depth Attained (ft)	5.38
Average HGL Elevation Attained (ft)	2051.77
Average HGL Depth Attained (ft)	1.02
Time of Max HGL Occurrence (days hh:mm)	0 12:33
Total Exfiltration Volume (1000-ft^3)	0
Total Flooded Volume (ac-in)	0.02
Total Time Flooded (min)	8
Total Retention Time (sec)	0

Storage Node : P2

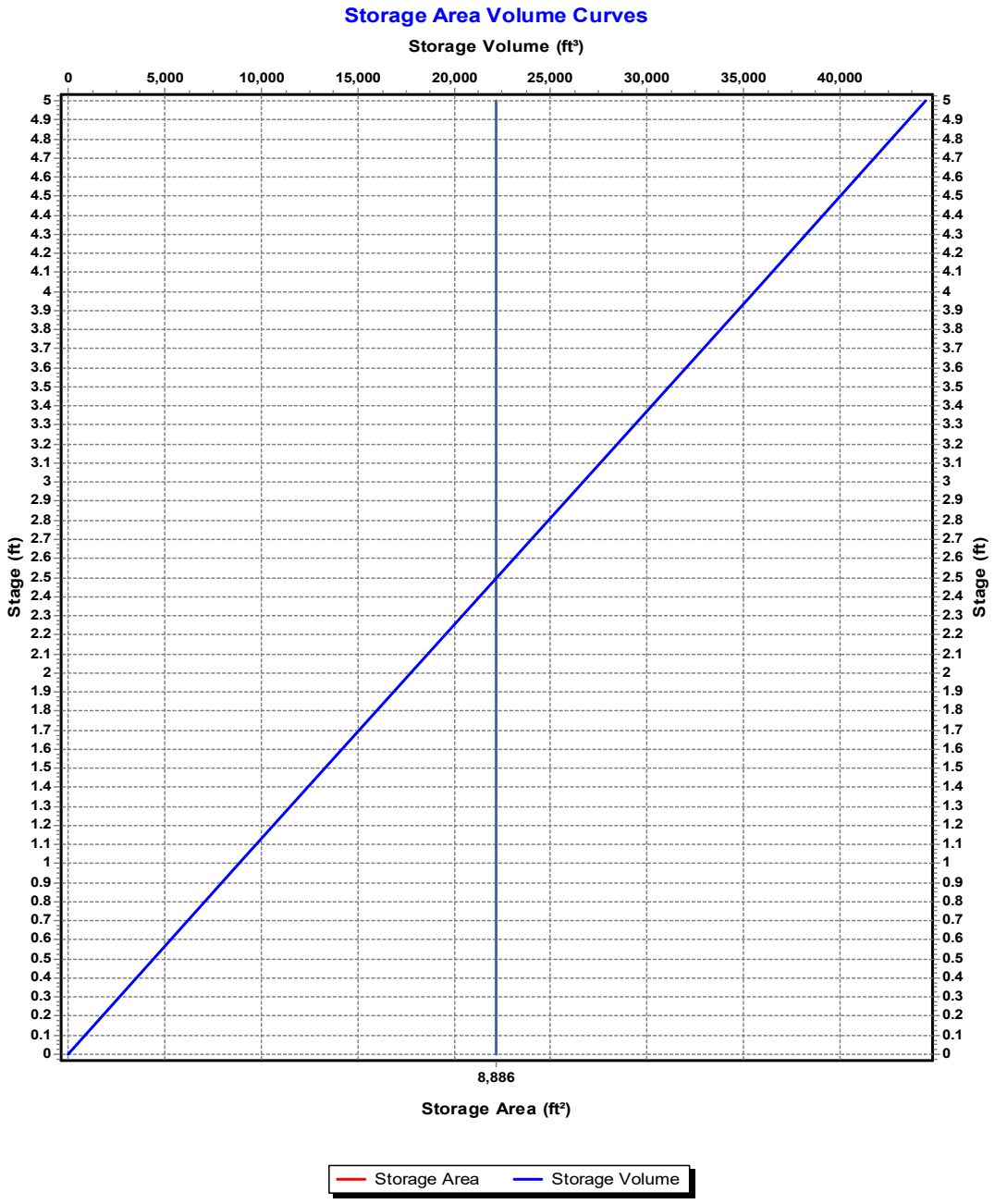
Input Data

Invert Elevation (ft)	2044.25
Max (Rim) Elevation (ft)	2049.25
Max (Rim) Offset (ft)	5.00
Initial Water Elevation (ft)	2044.25
Initial Water Depth (ft)	0.00
Ponded Area (ft^2)	5.00
Evaporation Loss	0.00

Storage Area Volume Curves

Storage Curve : P2

Stage (ft)	Storage Area (ft^2)	Storage Volume (ft^3)
0	8886	0
1	8886	8886
2	8886	17772
3	8886	26658
4	8886	35544
5	8886	44430


Storage Area Volume Curves
Storage Volume (ft³)
0
5,000
10,000
15,000
20,000
25,000
30,000
35,000
40,000
Stage (ft)
Stage (ft)
8,886
Storage Area (ft²)
Storage Area
Storage Volume

Storage Node : P2 (continued)

Outflow Weirs

SN	Element ID	Weir Type	Flap Gate	Crest Elevation (ft)	Crest Offset (ft)	Length (ft)	Weir Total Height (ft)	Discharge Coefficient
1	25	Transverse	No	2048.80	4.55	6.00	2.00	3.33

Outflow Orifices

SN	Element ID	Orifice Type	Orifice Shape	Flap Gate	Circular Orifice Diameter (in)	Rectangular Orifice Height (in)	Rectangular Orifice Width (in)	Orifice Invert Elevation (ft)	Orifice Coefficient
1	23	Side	Rectangular	No					
2	24	Side	Rectangular	No					

Output Summary Results

Peak Inflow (cfs)	47.27
Peak Lateral Inflow (cfs)	47.27
Peak Outflow (cfs)	47.27
Peak Exfiltration Flow Rate (cfm)	0
Max HGL Elevation Attained (ft)	2051.34
Max HGL Depth Attained (ft)	7.09
Average HGL Elevation Attained (ft)	2044.93
Average HGL Depth Attained (ft)	0.68
Time of Max HGL Occurrence (days hh:mm)	0 12:30
Total Exfiltration Volume (1000-ft³)	0
Total Flooded Volume (ac-in)	0.01
Total Time Flooded (min)	33
Total Retention Time (sec)	0

Storage Node : RP

Input Data

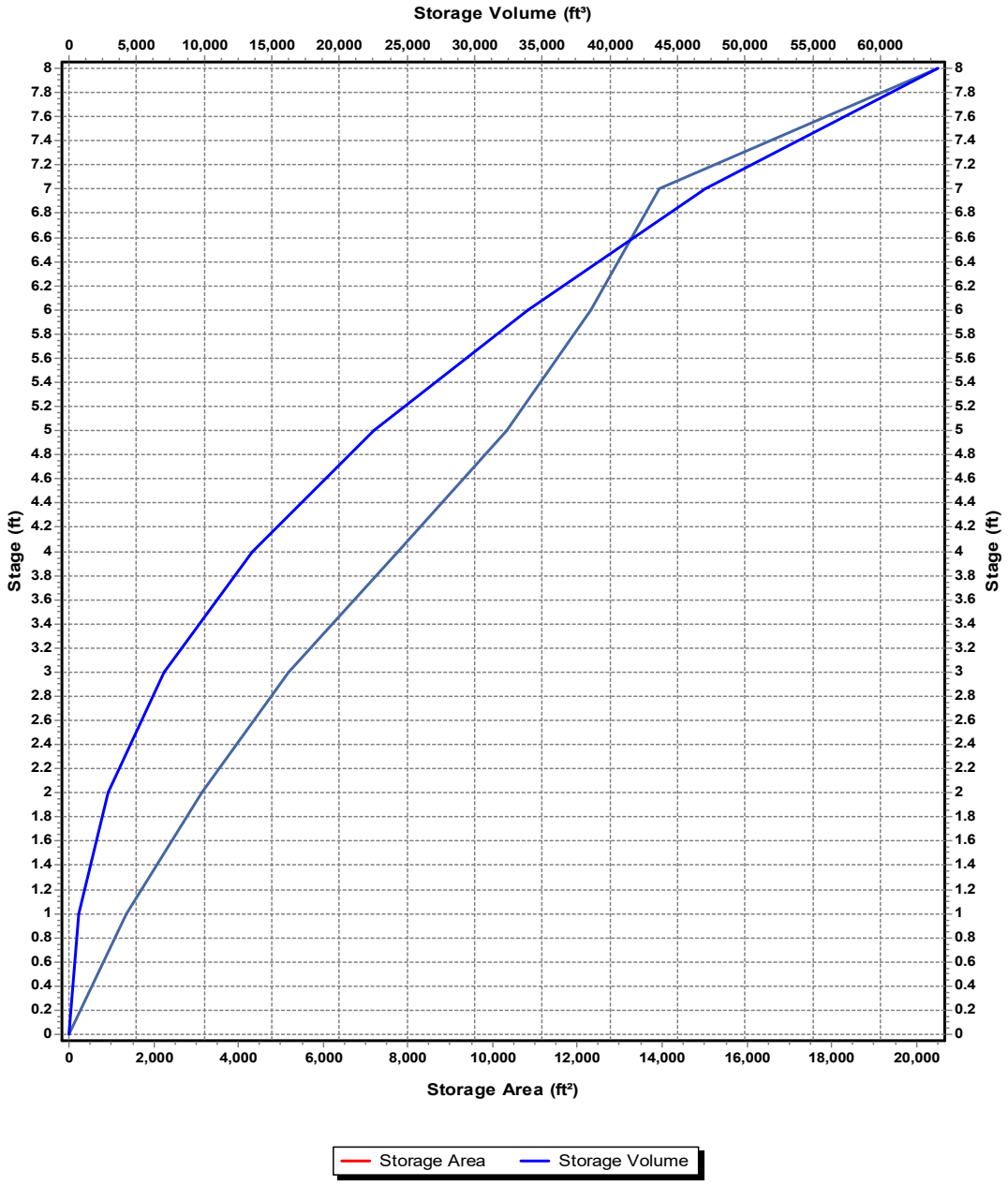
Invert Elevation (ft)	2137.00
Max (Rim) Elevation (ft)	2145.00
Max (Rim) Offset (ft)	8.00
Initial Water Elevation (ft)	2137.00
Initial Water Depth (ft)	0.00
Ponded Area (ft^2)	8.00
Evaporation Loss	0.00

Storage Area Volume Curves

Storage Curve : RP1

Stage (ft)	Storage Area (ft^2)	Storage Volume (ft^3)
0	0	0
1	1366	683
2	3129	2930.5
3	5175	7082.5
4	7760	13550
5	10340	22600
6	12305	33922.5
7	13925	47037.5
8	20503	64251.5

Storage Area Volume Curves



Storage Node : RP (continued)

Outflow Weirs

SN	Element ID	Weir Type	Flap Gate	Crest Elevation (ft)	Crest Offset (ft)	Length (ft)	Weir Total Height (ft)	Discharge Coefficient
1	18	Trapezoidal	No	2144.50	7.50	60.00	2.00	3.33

Outflow Orifices

SN	Element ID	Orifice Type	Orifice Shape	Flap Gate	Circular Orifice Diameter (in)	Rectangular Orifice Height (in)	Rectangular Orifice Width (in)	Orifice Invert Elevation (ft)	Orifice Coefficient
1	16	Side	CIRCULAR	No					
2	17	Side	Rectangular	No					

Output Summary Results

Peak Inflow (cfs)	202.38
Peak Lateral Inflow (cfs)	29.81
Peak Outflow (cfs)	204.51
Peak Exfiltration Flow Rate (cfm)	0
Max HGL Elevation Attained (ft)	2145.18
Max HGL Depth Attained (ft)	8.18
Average HGL Elevation Attained (ft)	2138.12
Average HGL Depth Attained (ft)	1.12
Time of Max HGL Occurrence (days hh:mm)	0 12:30
Total Exfiltration Volume (1000-ft^3)	0
Total Flooded Volume (ac-in)	0.02
Total Time Flooded (min)	23
Total Retention Time (sec)	0

Storage Node : SP

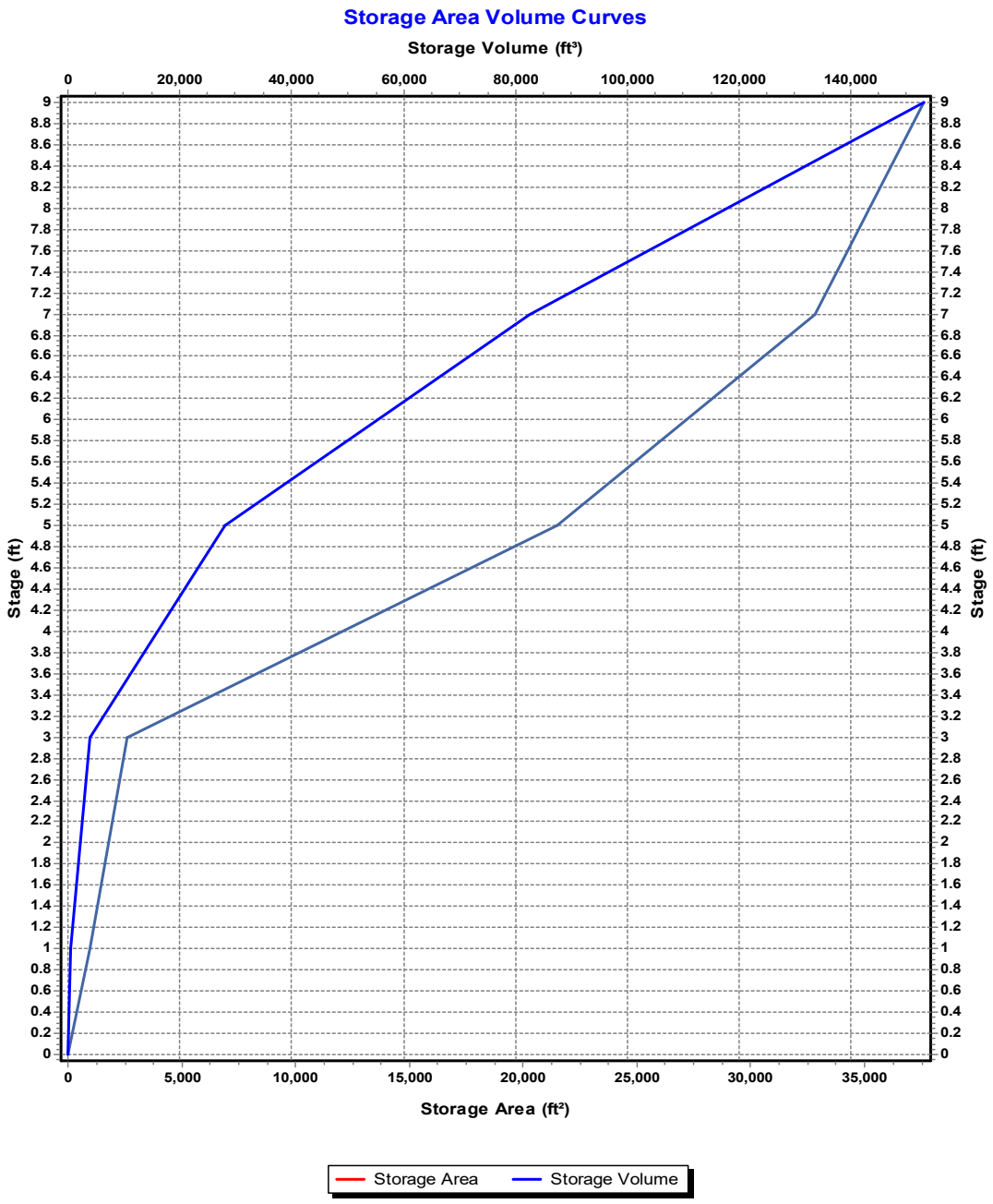
Input Data

Invert Elevation (ft)	2117.00
Max (Rim) Elevation (ft)	2125.00
Max (Rim) Offset (ft)	8.00
Initial Water Elevation (ft)	2117.00
Initial Water Depth (ft)	0.00
Ponded Area (ft^2)	8.00
Evaporation Loss	0.00

Storage Area Volume Curves

Storage Curve : SP1

Stage (ft)	Storage Area (ft^2)	Storage Volume (ft^3)
0	0	0
1	955	477.5
3	2580	4012.5
5	21522	28114.5
7	32858	82494.5
9	37630	152982.5


Storage Area Volume Curves
Storage Volume (ft³)
0
20,000
40,000
60,000
80,000
100,000
120,000
140,000
Stage (ft)
0
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
1.8
2
2.2
2.4
2.6
2.8
3
3.2
3.4
3.6
3.8
4
4.2
4.4
4.6
4.8
5
5.2
5.4
5.6
5.8
6
6.2
6.4
6.6
6.8
7
7.2
7.4
7.6
7.8
8
8.2
8.4
8.6
8.8
9
0
5,000
10,000
15,000
20,000
25,000
30,000
35,000
Storage Area (ft²)
Storage Area
Storage Volume

Storage Node : SP (continued)

Outflow Weirs

SN	Element ID	Weir Type	Flap Gate	Crest Elevation (ft)	Crest Offset (ft)	Length (ft)	Weir Total Height (ft)	Discharge Coefficient
1	20	Trapezoidal	No	2123.00	6.00	20.00	2.00	3.33

Output Summary Results

Peak Inflow (cfs)	289.11
Peak Lateral Inflow (cfs)	289.11
Peak Outflow (cfs)	265.46
Peak Exfiltration Flow Rate (cfm)	0
Max HGL Elevation Attained (ft)	2124.85
Max HGL Depth Attained (ft)	7.85
Average HGL Elevation Attained (ft)	2117.73
Average HGL Depth Attained (ft)	0.73
Time of Max HGL Occurrence (days hh:mm)	0 12:33
Total Exfiltration Volume (1000-ft^3)	0
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0

Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Thursday, Aug 29 2024

Winston Street Pre Conditions

Rectangular

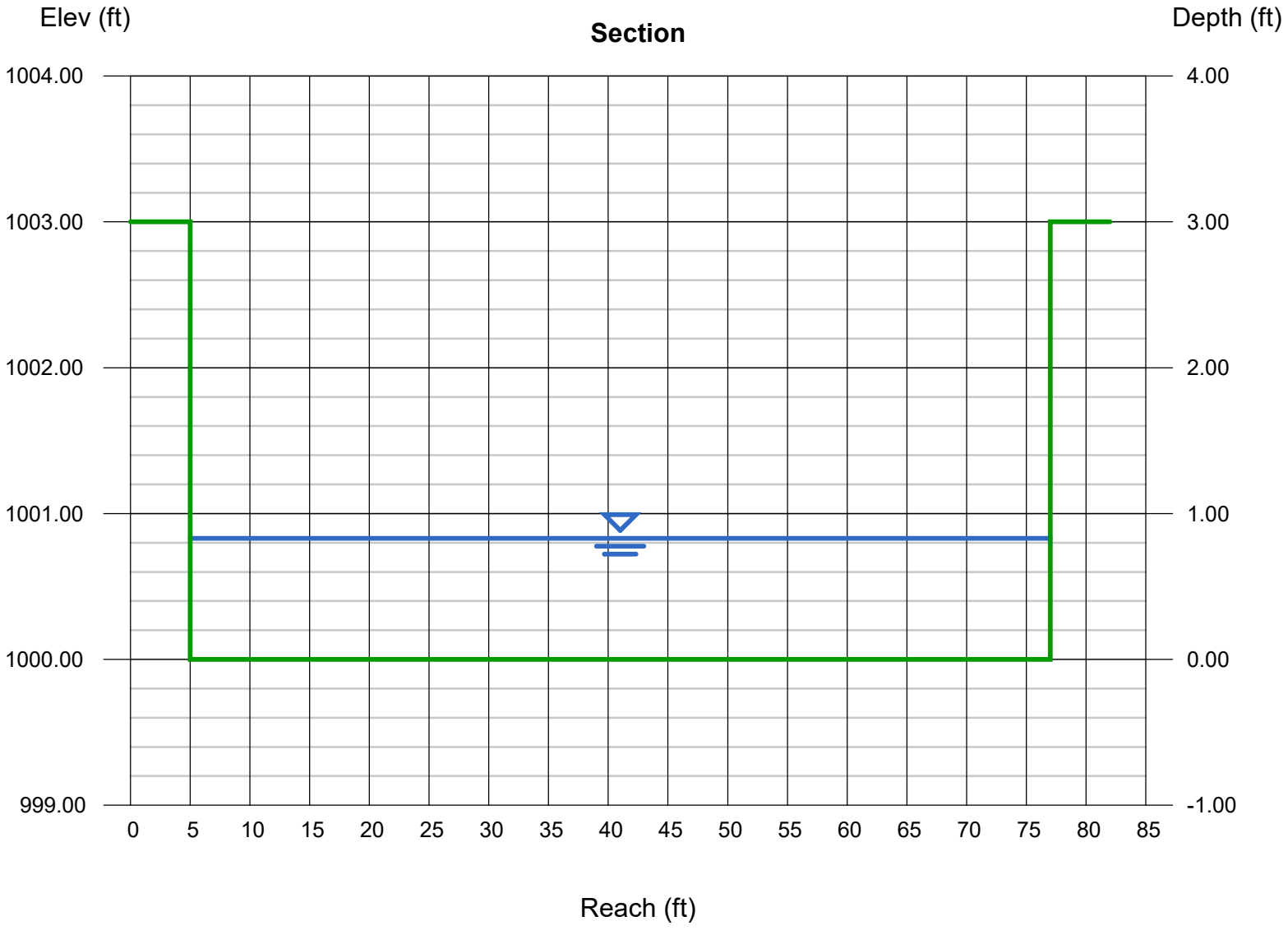
Bottom Width (ft)	= 72.00
Total Depth (ft)	= 3.00
Invert Elev (ft)	= 1000.00
Slope (%)	= 1.20
N-Value	= 0.013

Calculations

Compute by:	Known Q
Known Q (cfs)	= 642.52

Highlighted

Depth (ft)	= 0.83
Q (cfs)	= 642.52
Area (sqft)	= 59.76
Velocity (ft/s)	= 10.75
Wetted Perim (ft)	= 73.66
Crit Depth, Yc (ft)	= 1.36
Top Width (ft)	= 72.00
EGL (ft)	= 2.63



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Thursday, Aug 29 2024

Winston Street Post Conditions

Rectangular

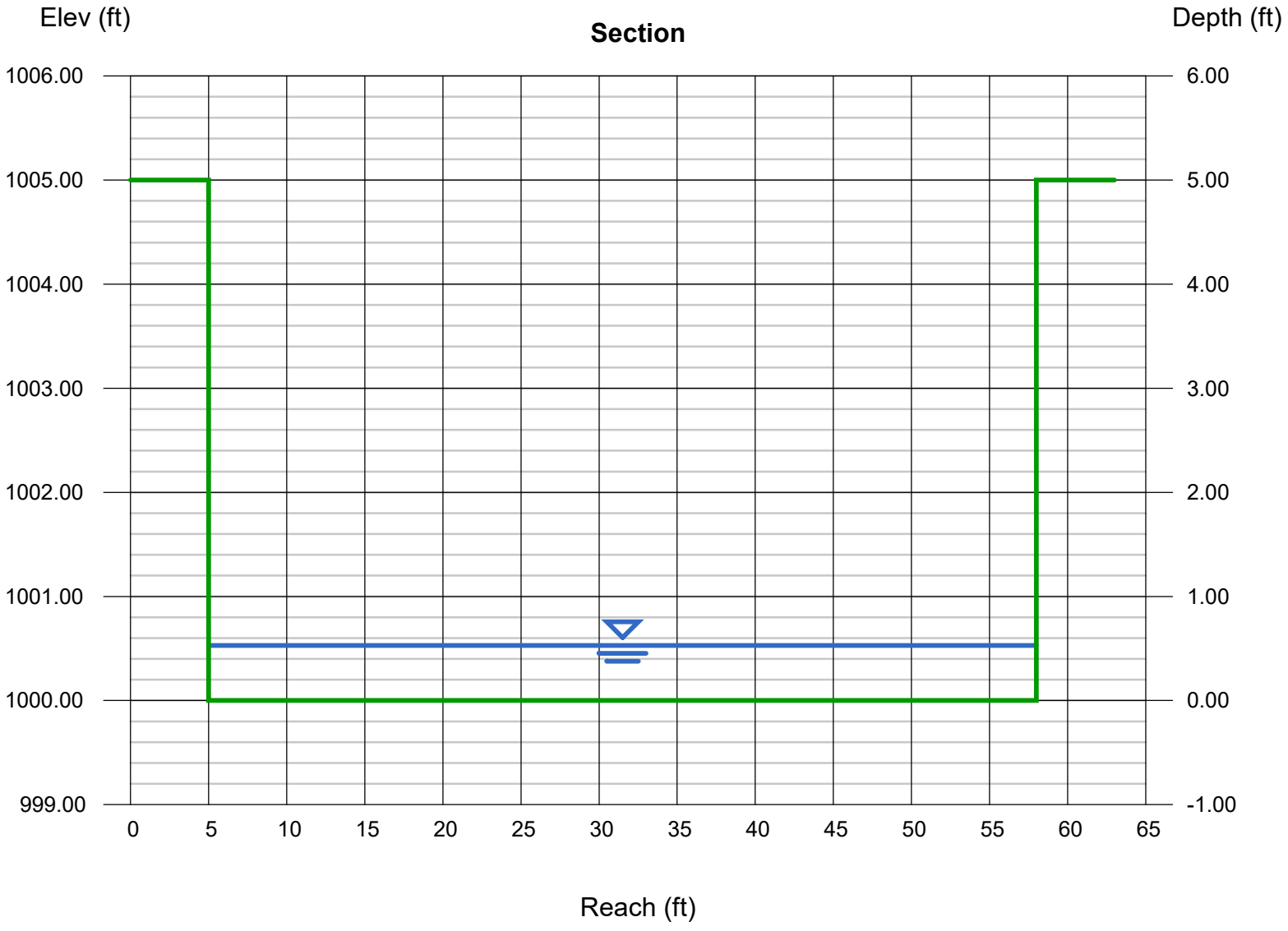
Bottom Width (ft)	= 53.00
Total Depth (ft)	= 5.00
Invert Elev (ft)	= 1000.00
Slope (%)	= 1.20
N-Value	= 0.013

Calculations

Compute by:	Known Q
Known Q (cfs)	= 224.70

Highlighted

Depth (ft)	= 0.53
Q (cfs)	= 224.70
Area (sqft)	= 28.09
Velocity (ft/s)	= 8.00
Wetted Perim (ft)	= 54.06
Crit Depth, Yc (ft)	= 0.83
Top Width (ft)	= 53.00
EGL (ft)	= 1.52



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Monday, Sep 23 2024

Kabrich Street Pre 2 yr

User-defined

Invert Elev (ft)	= 2059.94
Slope (%)	= 1.00
N-Value	= 0.013

Calculations

Compute by:	Known Q
Known Q (cfs)	= 109.96

Highlighted

Depth (ft)	= 0.48
Q (cfs)	= 109.96
Area (sqft)	= 27.07
Velocity (ft/s)	= 4.06
Wetted Perim (ft)	= 117.02
Crit Depth, Yc (ft)	= 0.56
Top Width (ft)	= 117.01
EGL (ft)	= 0.74

(Sta, El, n)-(Sta, El, n)...

(0.00, 2062.61)-(15.30, 2062.37, 0.013)-(27.07, 2062.17, 0.013)-(43.86, 2061.92, 0.013)-(47.34, 2061.92, 0.013)-(58.46, 2061.79, 0.013)-(71.77, 2061.64, 0.013)
-(95.85, 2061.37, 0.013)-(106.90, 2060.94, 0.013)-(112.23, 2061.28, 0.013)-(114.37, 2061.35, 0.013)-(115.33, 2061.21, 0.013)-(115.98, 2060.85, 0.013)-(117.71, 206
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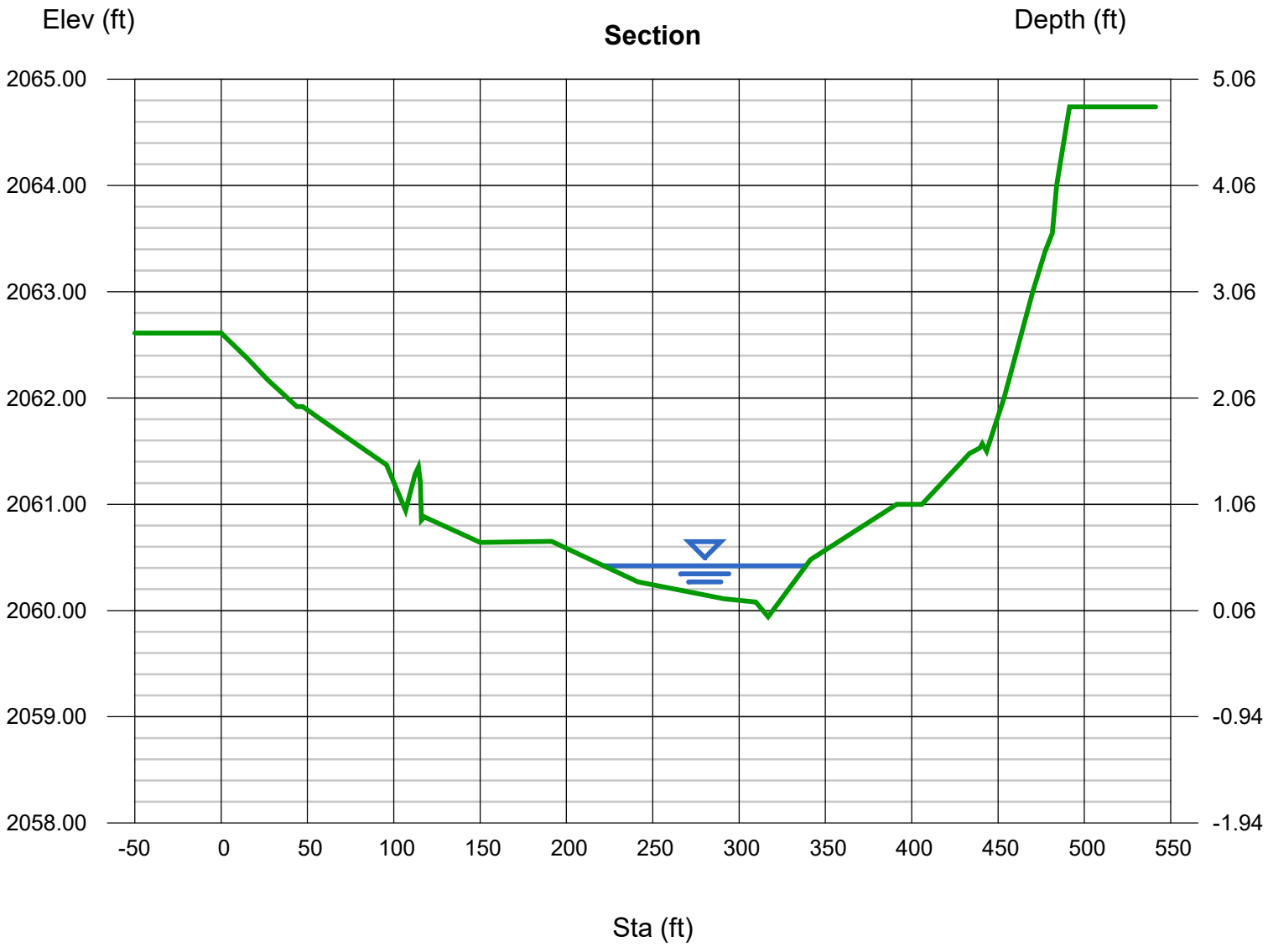

Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Monday, Sep 23 2024

Kabrich Street Post 2 yr

User-defined

Invert Elev (ft)	= 2059.94
Slope (%)	= 1.00
N-Value	= 0.013

Calculations

Compute by:	Known Q
Known Q (cfs)	= 120.48

Highlighted

Depth (ft)	= 0.49
Q (cfs)	= 120.48
Area (sqft)	= 28.25
Velocity (ft/s)	= 4.26
Wetted Perim (ft)	= 118.80
Crit Depth, Yc (ft)	= 0.58
Top Width (ft)	= 118.79
EGL (ft)	= 0.77

(Sta, El, n)-(Sta, El, n)...

(0.00, 2062.61)-(15.30, 2062.37, 0.013)-(27.07, 2062.17, 0.013)-(43.86, 2061.92, 0.013)-(47.34, 2061.92, 0.013)-(58.46, 2061.79, 0.013)-(71.77, 2061.64, 0.013)
-(95.85, 2061.37, 0.013)-(106.90, 2060.94, 0.013)-(112.23, 2061.28, 0.013)-(114.37, 2061.35, 0.013)-(115.33, 2061.21, 0.013)-(115.98, 2060.85, 0.013)-(117.71, 206
-(150.07, 2060.64, 0.013)-(191.37, 2060.65, 0.013)-(241.38, 2060.27, 0.013)-(291.40, 2060.11, 0.013)-(309.75, 2060.08, 0.013)-(316.77, 2059.94, 0.013)-(341.40, 20
-(391.38, 2061.00, 0.013)-(405.85, 2061.00, 0.013)-(433.54, 2061.48, 0.013)-(439.47, 2061.53, 0.013)-(440.82, 2061.57, 0.013)-(443.38, 2061.50, 0.013)-(453.43, 2(
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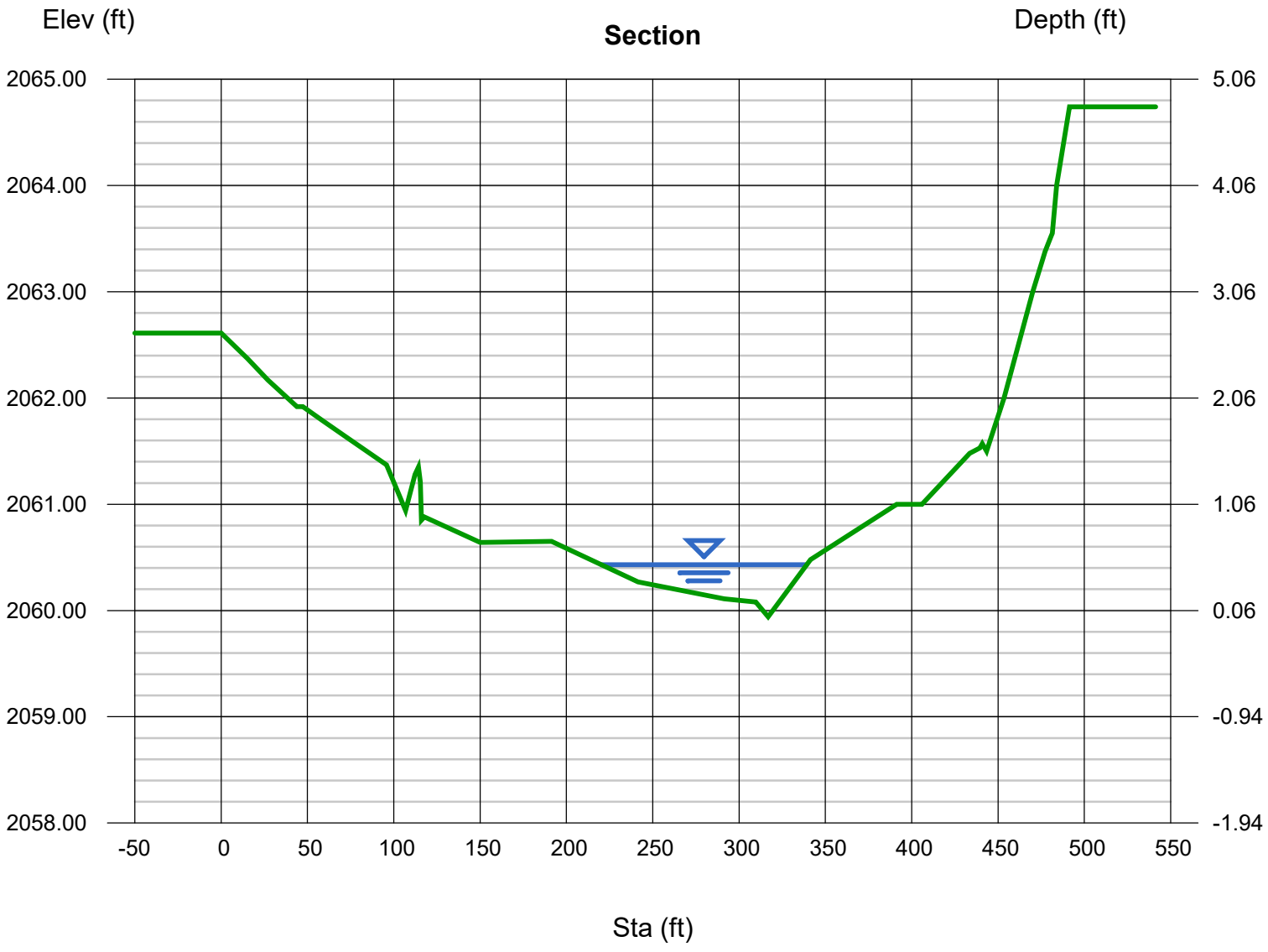

Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Monday, Sep 23 2024

Kabrich Street Pre 10 yr

User-defined

Invert Elev (ft)	= 2059.94
Slope (%)	= 1.00
N-Value	= 0.013

Calculations

Compute by:	Known Q
Known Q (cfs)	= 378.15

Highlighted

Depth (ft)	= 0.77
Q (cfs)	= 378.15
Area (sqft)	= 72.58
Velocity (ft/s)	= 5.21
Wetted Perim (ft)	= 222.89
Crit Depth, Yc (ft)	= 0.91
Top Width (ft)	= 222.88
EGL (ft)	= 1.19

(Sta, El, n)-(Sta, El, n)...

(0.00, 2062.61)-(15.30, 2062.37, 0.013)-(27.07, 2062.17, 0.013)-(43.86, 2061.92, 0.013)-(47.34, 2061.92, 0.013)-(58.46, 2061.79, 0.013)-(71.77, 2061.64, 0.013)
-(95.85, 2061.37, 0.013)-(106.90, 2060.94, 0.013)-(112.23, 2061.28, 0.013)-(114.37, 2061.35, 0.013)-(115.33, 2061.21, 0.013)-(115.98, 2060.85, 0.013)-(117.71, 206
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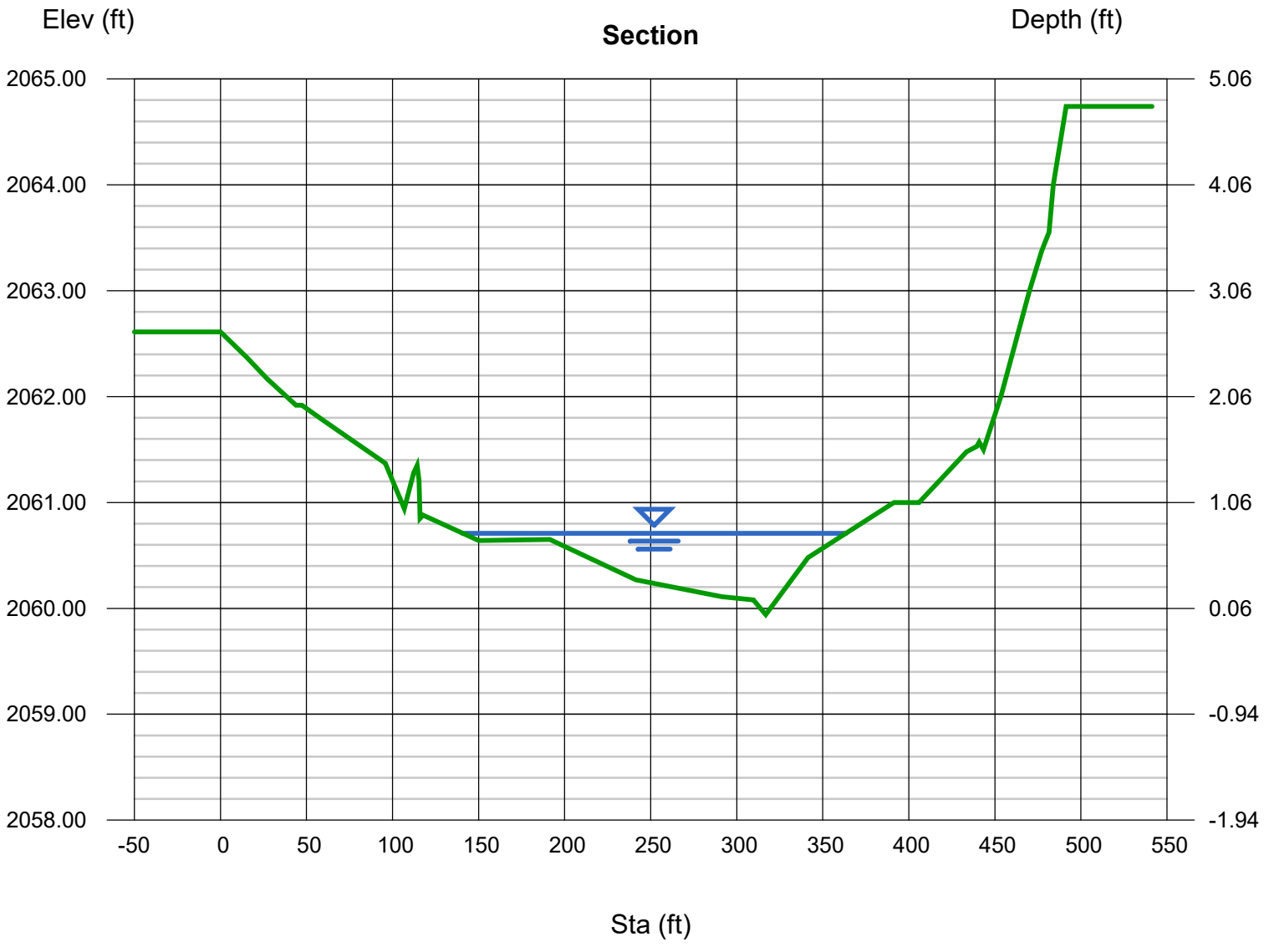

Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Monday, Sep 23 2024

Kabrich Street Post 10 yr

User-defined

Invert Elev (ft)	= 2059.94
Slope (%)	= 1.00
N-Value	= 0.013

Calculations

Compute by:	Known Q
Known Q (cfs)	= 368.83

Highlighted

Depth (ft)	= 0.76
Q (cfs)	= 368.83
Area (sqft)	= 70.36
Velocity (ft/s)	= 5.24
Wetted Perim (ft)	= 220.58
Crit Depth, Yc (ft)	= 0.90
Top Width (ft)	= 220.57
EGL (ft)	= 1.19

(Sta, El, n)-(Sta, El, n)...

(0.00, 2062.61)-(15.30, 2062.37, 0.013)-(27.07, 2062.17, 0.013)-(43.86, 2061.92, 0.013)-(47.34, 2061.92, 0.013)-(58.46, 2061.79, 0.013)-(71.77, 2061.64, 0.013)
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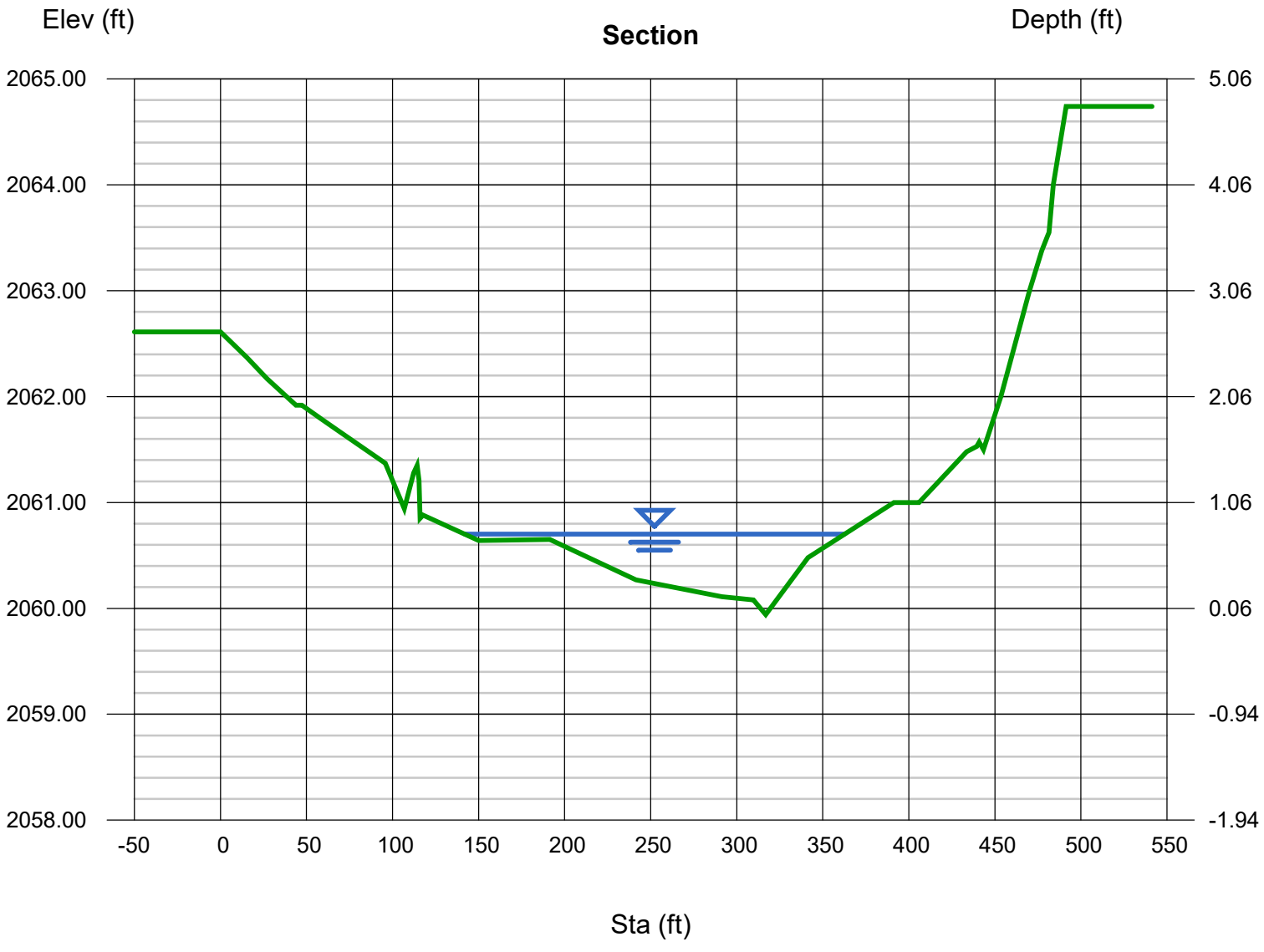

Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Monday, Sep 23 2024

Kabrich Street Pre 100 yr

User-defined

Invert Elev (ft)	= 2059.94
Slope (%)	= 1.00
N-Value	= 0.013

Calculations

Compute by:	Known Q
Known Q (cfs)	= 884.88

Highlighted

Depth (ft)	= 1.00
Q (cfs)	= 884.88
Area (sqft)	= 129.84
Velocity (ft/s)	= 6.82
Wetted Perim (ft)	= 269.83
Crit Depth, Yc (ft)	= 1.23
Top Width (ft)	= 269.79
EGL (ft)	= 1.72

(Sta, El, n)-(Sta, El, n)...

(0.00, 2062.61)-(15.30, 2062.37, 0.013)-(27.07, 2062.17, 0.013)-(43.86, 2061.92, 0.013)-(47.34, 2061.92, 0.013)-(58.46, 2061.79, 0.013)-(71.77, 2061.64, 0.013)
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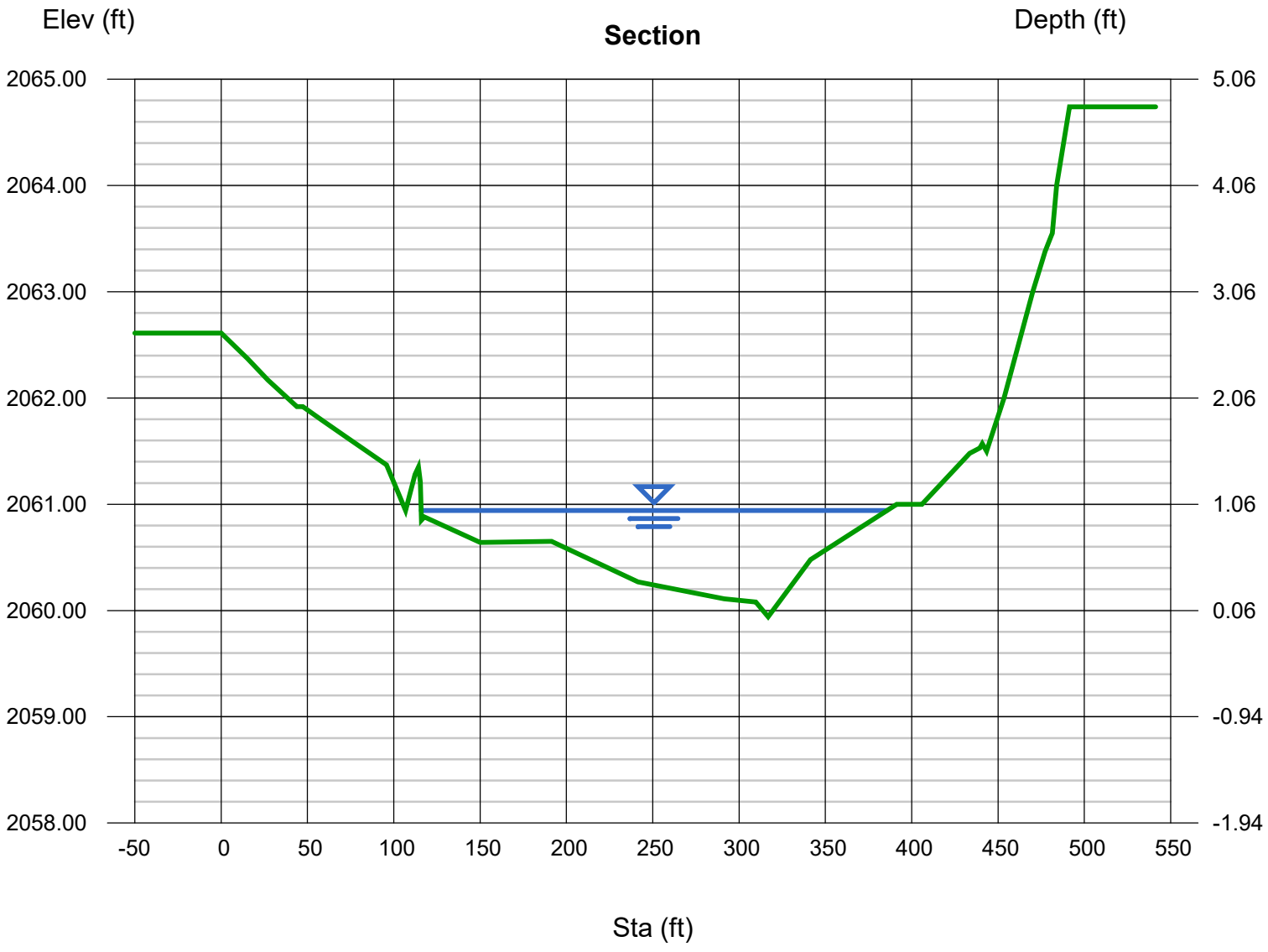

Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Monday, Sep 23 2024

Kabrich Street Post 100 yr

User-defined

Invert Elev (ft)	= 2059.94
Slope (%)	= 1.00
N-Value	= 0.013

Calculations

Compute by:	Known Q
Known Q (cfs)	= 930.31

Highlighted

Depth (ft)	= 1.01
Q (cfs)	= 930.31
Area (sqft)	= 132.55
Velocity (ft/s)	= 7.02
Wetted Perim (ft)	= 271.22
Crit Depth, Yc (ft)	= 1.25
Top Width (ft)	= 271.18
EGL (ft)	= 1.78

(Sta, El, n)-(Sta, El, n)...

(0.00, 2062.61)-(15.30, 2062.37, 0.013)-(27.07, 2062.17, 0.013)-(43.86, 2061.92, 0.013)-(47.34, 2061.92, 0.013)-(58.46, 2061.79, 0.013)-(71.77, 2061.64, 0.013)
-(95.85, 2061.37, 0.013)-(106.90, 2060.94, 0.013)-(112.23, 2061.28, 0.013)-(114.37, 2061.35, 0.013)-(115.33, 2061.21, 0.013)-(115.98, 2060.85, 0.013)-(117.71, 206
-(150.07, 2060.64, 0.013)-(191.37, 2060.65, 0.013)-(241.38, 2060.27, 0.013)-(291.40, 2060.11, 0.013)-(309.75, 2060.08, 0.013)-(316.77, 2059.94, 0.013)-(341.40, 20
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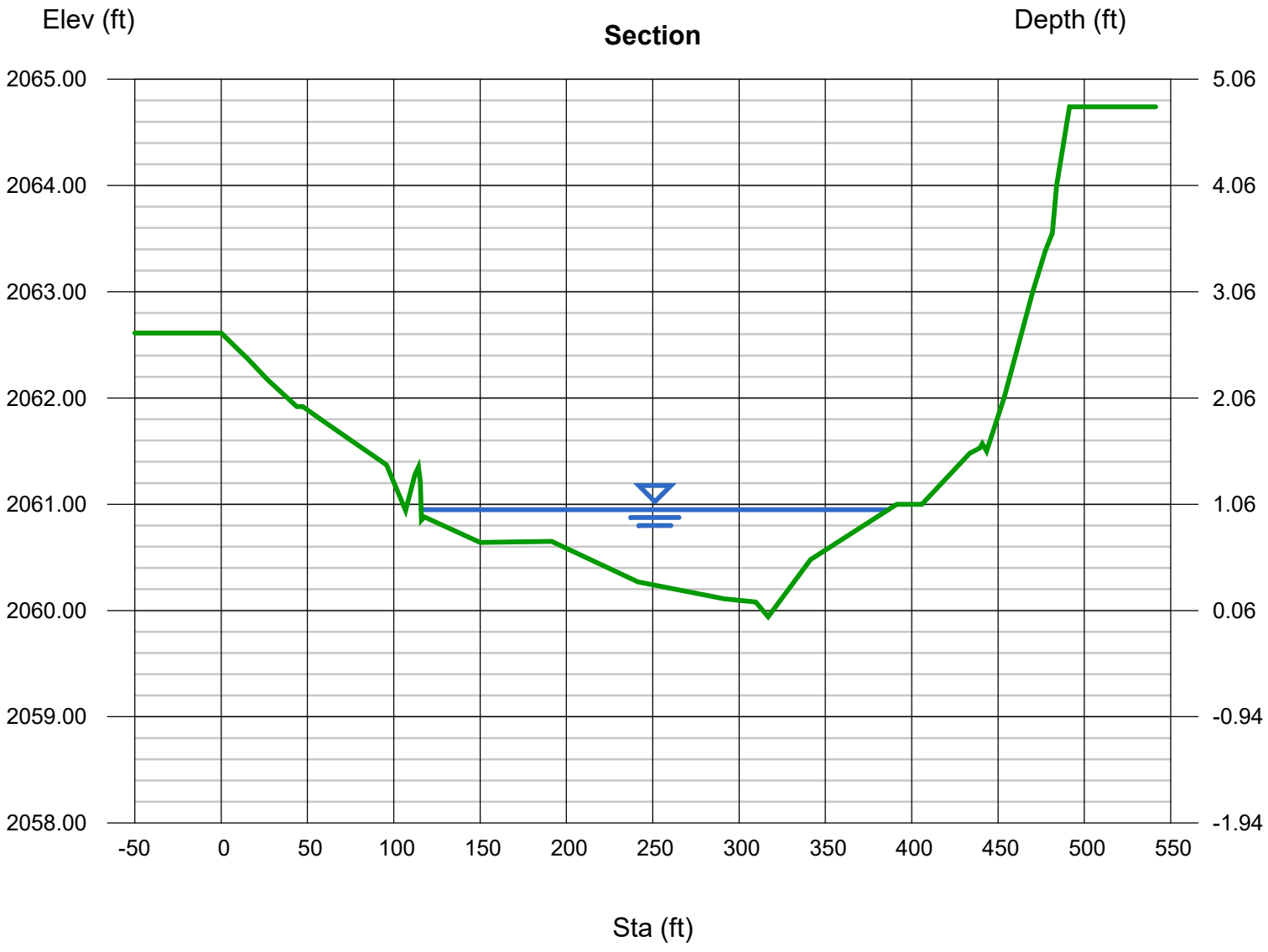


Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Monday, Sep 23 2024

Kabrich Street Pre 500 yr

User-defined

Invert Elev (ft)	= 2059.94
Slope (%)	= 1.00
N-Value	= 0.013

Calculations

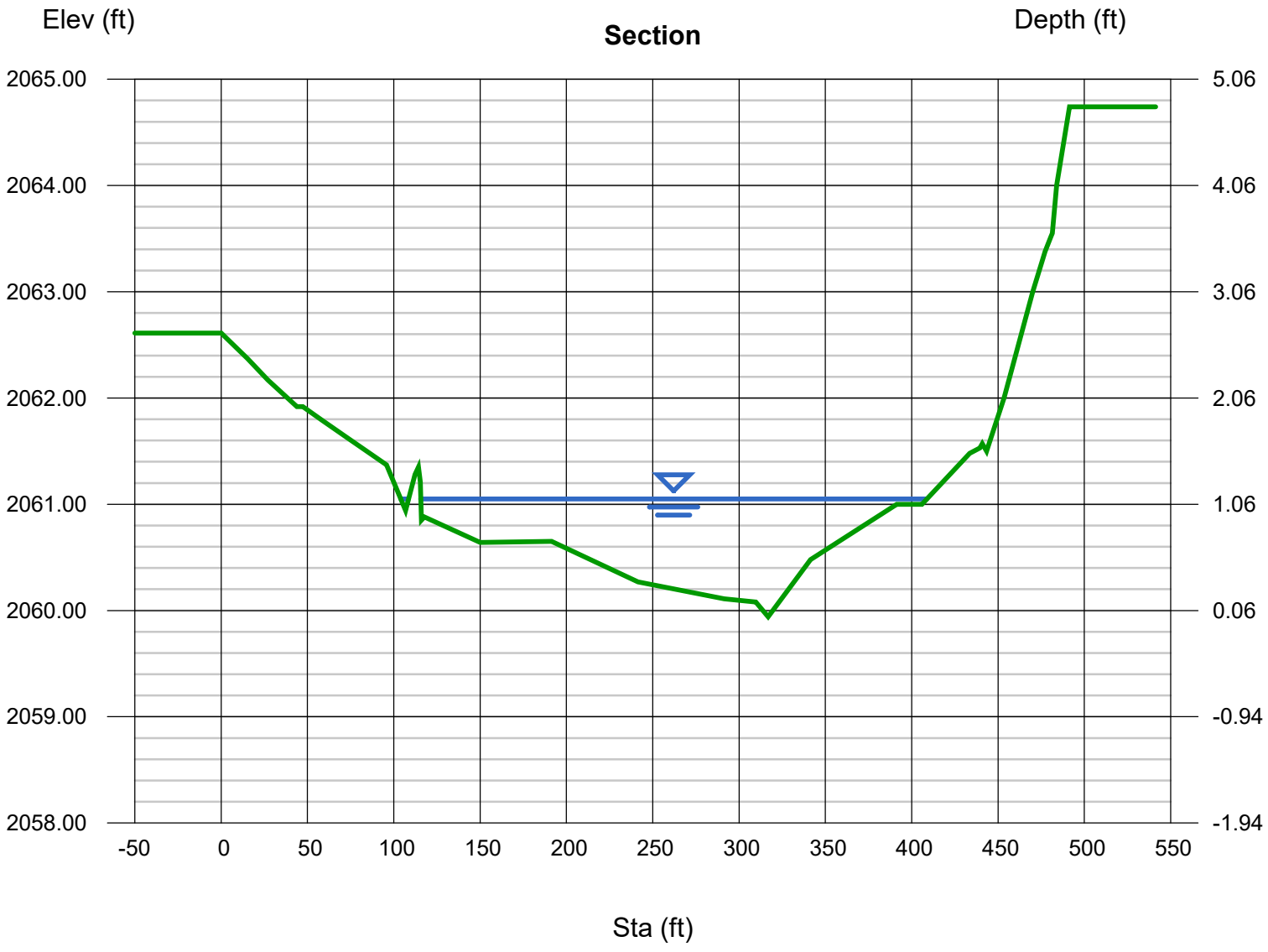
Compute by:	Known Q
Known Q (cfs)	= 1203.18

Highlighted

Depth (ft)	= 1.11
Q (cfs)	= 1,203
Area (sqft)	= 161.07
Velocity (ft/s)	= 7.47
Wetted Perim (ft)	= 297.74
Crit Depth, Yc (ft)	= 1.38
Top Width (ft)	= 297.67
EGL (ft)	= 1.98

(Sta, El, n)-(Sta, El, n)...

(0.00, 2062.61)-(15.30, 2062.37, 0.013)-(27.07, 2062.17, 0.013)-(43.86, 2061.92, 0.013)-(47.34, 2061.92, 0.013)-(58.46, 2061.79, 0.013)-(71.77, 2061.64, 0.013)
-(95.85, 2061.37, 0.013)-(106.90, 2060.94, 0.013)-(112.23, 2061.28, 0.013)-(114.37, 2061.35, 0.013)-(115.33, 2061.21, 0.013)-(115.98, 2060.85, 0.013)-(117.71, 206
-(150.07, 2060.64, 0.013)-(191.37, 2060.65, 0.013)-(241.38, 2060.27, 0.013)-(291.40, 2060.11, 0.013)-(309.75, 2060.08, 0.013)-(316.77, 2059.94, 0.013)-(341.40, 20
-(391.38, 2061.00, 0.013)-(405.85, 2061.00, 0.013)-(433.54, 2061.48, 0.013)-(439.47, 2061.53, 0.013)-(440.82, 2061.57, 0.013)-(443.38, 2061.50, 0.013)-(453.43, 20
-(470.11, 2063.00, 0.013)-(477.24, 2063.38, 0.013)-(480.68, 2063.52, 0.013)-(481.45, 2063.55, 0.013)-(483.90, 2064.00, 0.013)-(491.36, 2064.74, 0.013)



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Monday, Sep 23 2024

Kabrich Street Post 500 yr

User-defined

Invert Elev (ft)	= 2059.94
Slope (%)	= 1.00
N-Value	= 0.013

Calculations

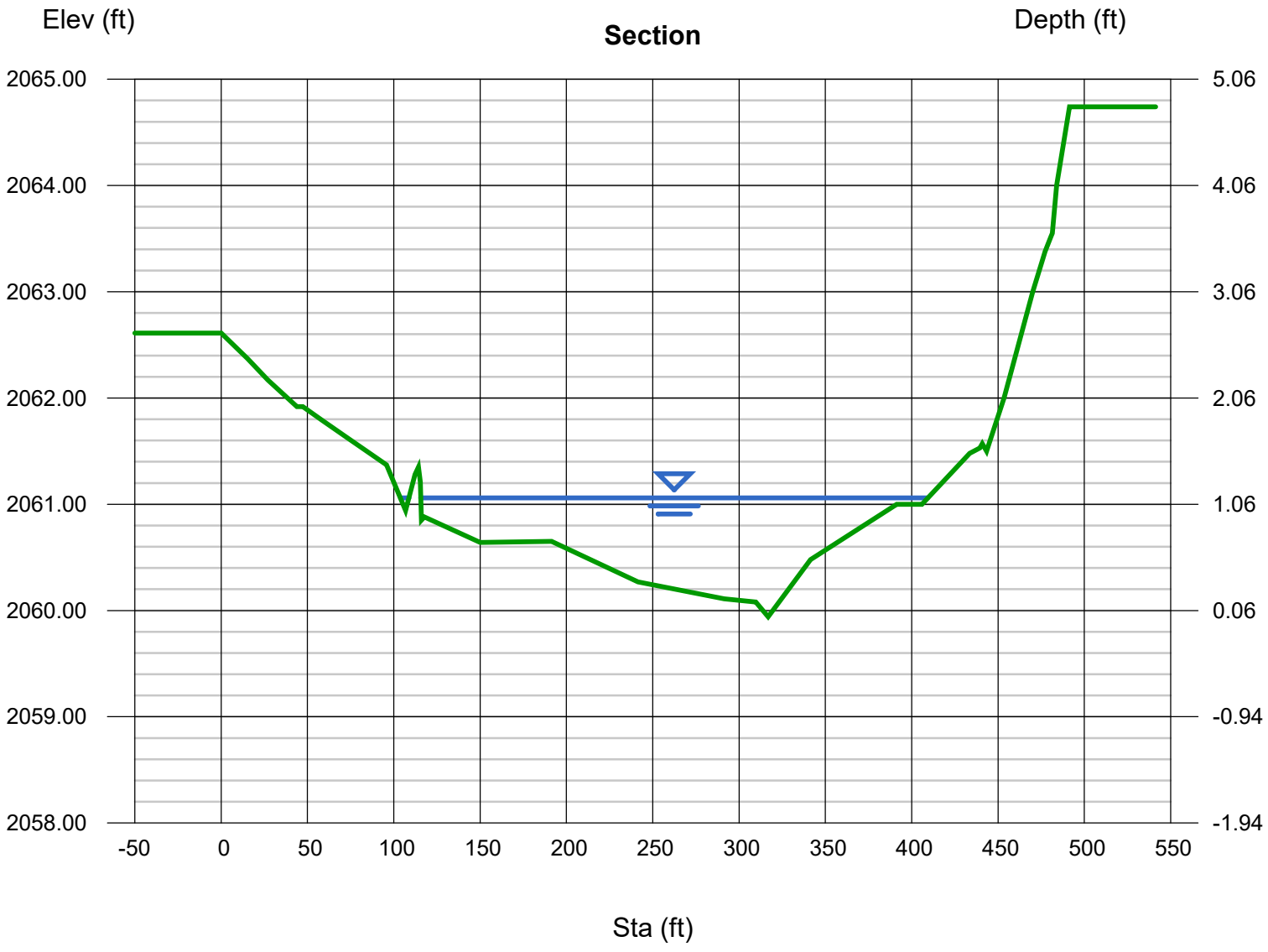
Compute by:	Known Q
Known Q (cfs)	= 1247.77

Highlighted

Depth (ft)	= 1.12
Q (cfs)	= 1,248
Area (sqft)	= 164.05
Velocity (ft/s)	= 7.61
Wetted Perim (ft)	= 298.76
Crit Depth, Yc (ft)	= 1.40
Top Width (ft)	= 298.68
EGL (ft)	= 2.02

(Sta, El, n)-(Sta, El, n)...

(0.00, 2062.61)-(15.30, 2062.37, 0.013)-(27.07, 2062.17, 0.013)-(43.86, 2061.92, 0.013)-(47.34, 2061.92, 0.013)-(58.46, 2061.79, 0.013)-(71.77, 2061.64, 0.013)
-(95.85, 2061.37, 0.013)-(106.90, 2060.94, 0.013)-(112.23, 2061.28, 0.013)-(114.37, 2061.35, 0.013)-(115.33, 2061.21, 0.013)-(115.98, 2060.85, 0.013)-(117.71, 206
-(150.07, 2060.64, 0.013)-(191.37, 2060.65, 0.013)-(241.38, 2060.27, 0.013)-(291.40, 2060.11, 0.013)-(309.75, 2060.08, 0.013)-(316.77, 2059.94, 0.013)-(341.40, 20
-(391.38, 2061.00, 0.013)-(405.85, 2061.00, 0.013)-(433.54, 2061.48, 0.013)-(439.47, 2061.53, 0.013)-(440.82, 2061.57, 0.013)-(443.38, 2061.50, 0.013)-(453.43, 20
-(470.11, 2063.00, 0.013)-(477.24, 2063.38, 0.013)-(480.68, 2063.52, 0.013)-(481.45, 2063.55, 0.013)-(483.90, 2064.00, 0.013)-(491.36, 2064.74, 0.013)



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Monday, Sep 23 2024

Progress Street - Pre 10 year

User-defined

Invert Elev (ft)	= 2065.92
Slope (%)	= 1.00
N-Value	= 0.013

Calculations

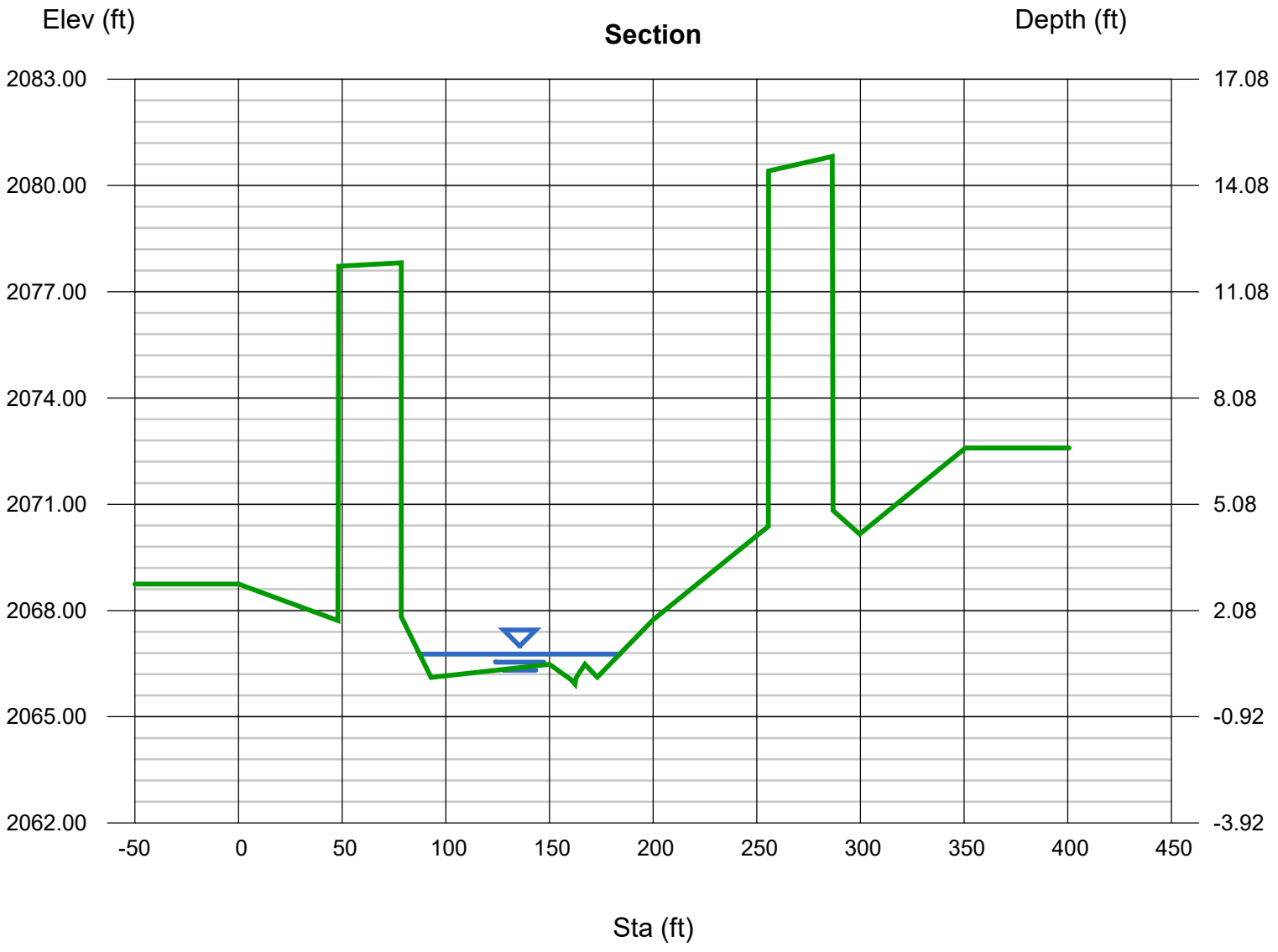
Compute by:	Known Q
Known Q (cfs)	= 301.86

Highlighted

Depth (ft)	= 0.85
Q (cfs)	= 301.86
Area (sqft)	= 44.50
Velocity (ft/s)	= 6.78
Wetted Perim (ft)	= 96.71
Crit Depth, Yc (ft)	= 1.07
Top Width (ft)	= 96.58
EGL (ft)	= 1.57

(Sta, El, n)-(Sta, El, n)...

(0.00, 2068.75)-(47.95, 2067.72, 0.013)-(48.32, 2077.72, 0.013)-(78.45, 2077.82, 0.013)-(78.51, 2067.82, 0.013)-(92.83, 2066.11, 0.013)-(150.02, 2066.48, 0.013)
-(160.39, 2066.05, 0.013)-(162.35, 2065.92, 0.013)-(162.85, 2066.10, 0.013)-(167.11, 2066.48, 0.013)-(173.08, 2066.12, 0.013)-(199.83, 2067.73, 0.013)-(255.61, 20
-(255.71, 2080.41, 0.013)-(286.47, 2080.82, 0.013)-(286.82, 2070.82, 0.013)-(299.68, 2070.16, 0.013)-(350.63, 2072.59, 0.013)



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Monday, Sep 23 2024

Progress Street - Pre 100 year

User-defined

Invert Elev (ft)	= 2065.92
Slope (%)	= 1.00
N-Value	= 0.013

Calculations

Compute by:	Known Q
Known Q (cfs)	= 742.94

Highlighted

Depth (ft)	= 1.19
Q (cfs)	= 742.94
Area (sqft)	= 78.77
Velocity (ft/s)	= 9.43
Wetted Perim (ft)	= 105.23
Crit Depth, Yc (ft)	= 1.62
Top Width (ft)	= 105.07
EGL (ft)	= 2.57

(Sta, El, n)-(Sta, El, n)...

(0.00, 2068.75)-(47.95, 2067.72, 0.013)-(48.32, 2077.72, 0.013)-(78.45, 2077.82, 0.013)-(78.51, 2067.82, 0.013)-(92.83, 2066.11, 0.013)-(150.02, 2066.48, 0.013)
-(160.39, 2066.05, 0.013)-(162.35, 2065.92, 0.013)-(162.85, 2066.10, 0.013)-(167.11, 2066.48, 0.013)-(173.08, 2066.12, 0.013)-(199.83, 2067.73, 0.013)-(255.61, 20
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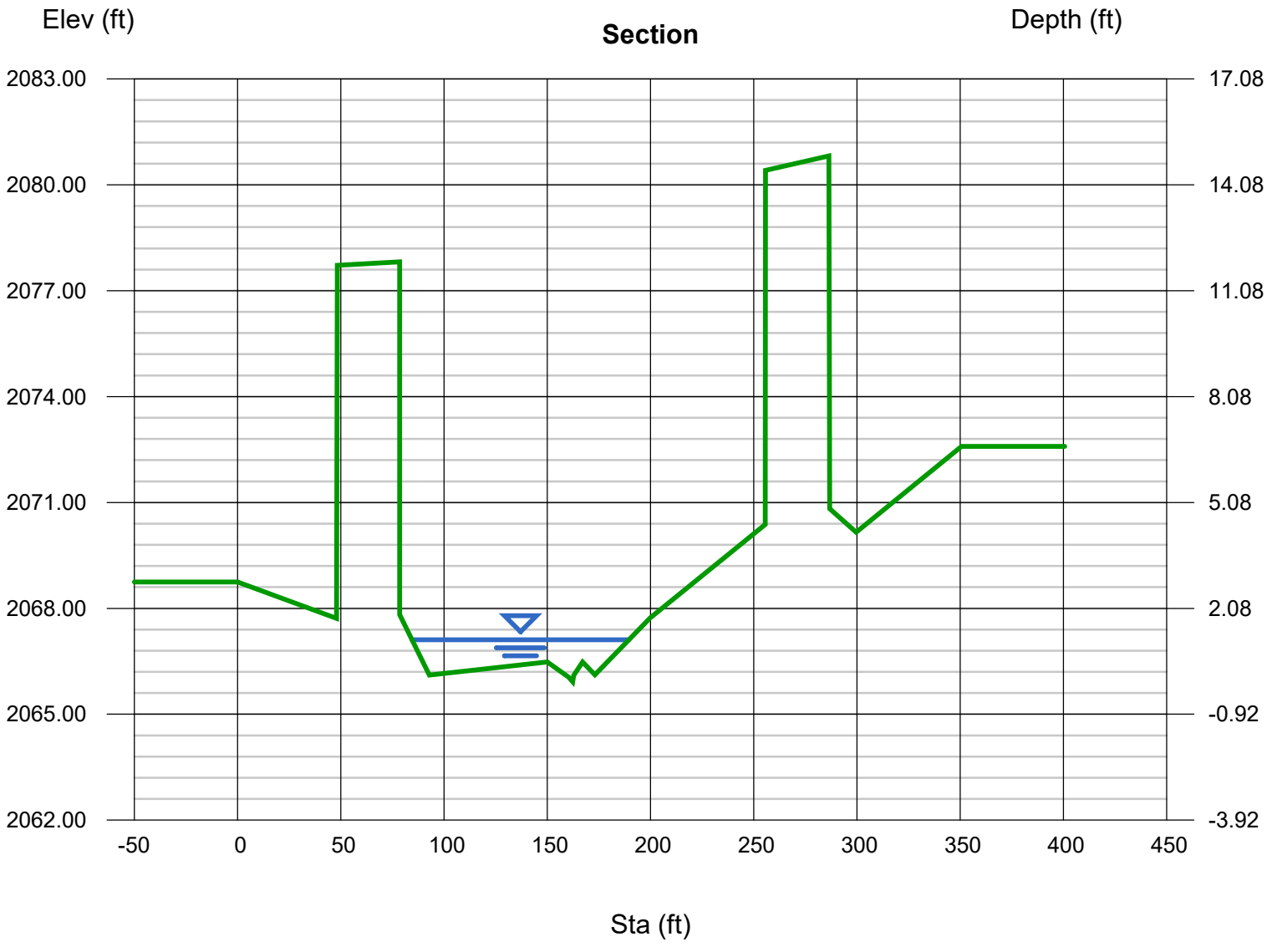

Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Monday, Sep 23 2024

Progress Street - Post 100 year

User-defined

Invert Elev (ft)	= 2065.92
Slope (%)	= 1.00
N-Value	= 0.013

Calculations

Compute by:	Known Q
Known Q (cfs)	= 600.62

Highlighted

Depth (ft)	= 1.10
Q (cfs)	= 600.62
Area (sqft)	= 69.43
Velocity (ft/s)	= 8.65
Wetted Perim (ft)	= 102.98
Crit Depth, Yc (ft)	= 1.46
Top Width (ft)	= 102.82
EGL (ft)	= 2.26

(Sta, El, n)-(Sta, El, n)...

(0.00, 2068.75)-(47.95, 2067.72, 0.013)-(48.32, 2077.72, 0.013)-(78.45, 2077.82, 0.013)-(78.51, 2067.82, 0.013)-(92.83, 2066.11, 0.013)-(150.02, 2066.48, 0.013)
-(160.39, 2066.05, 0.013)-(162.35, 2065.92, 0.013)-(162.85, 2066.10, 0.013)-(167.11, 2066.48, 0.013)-(173.08, 2066.12, 0.013)-(199.83, 2067.73, 0.013)-(255.61, 20
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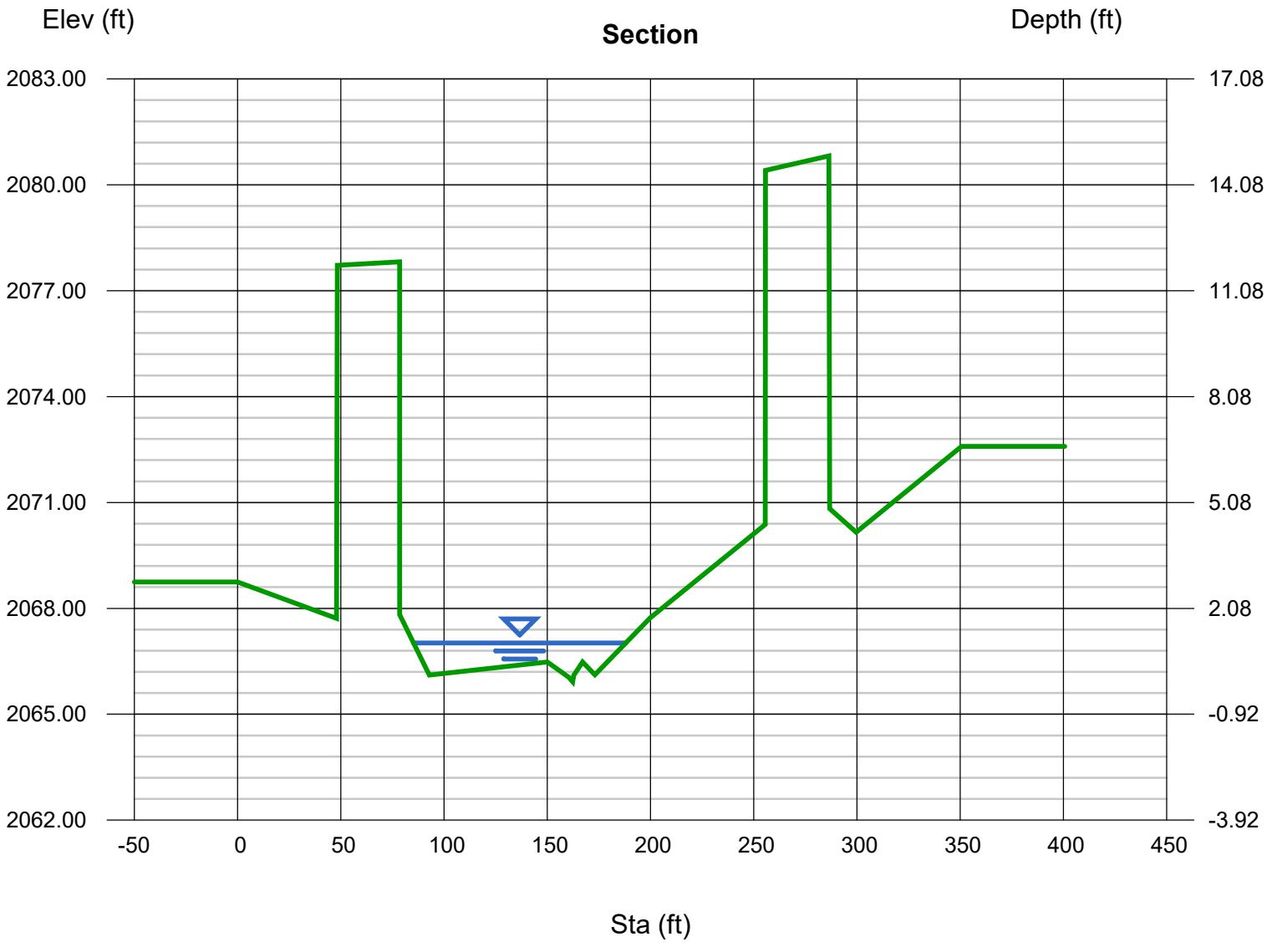

Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Monday, Sep 23 2024

Progress Street - Pre 500 year

User-defined

Invert Elev (ft)	= 2065.92
Slope (%)	= 1.00
N-Value	= 0.013

Calculations

Compute by:	Known Q
Known Q (cfs)	= 1037.83

Highlighted

Depth (ft)	= 1.37
Q (cfs)	= 1,038
Area (sqft)	= 98.10
Velocity (ft/s)	= 10.58
Wetted Perim (ft)	= 109.75
Crit Depth, Yc (ft)	= 1.93
Top Width (ft)	= 109.57
EGL (ft)	= 3.11

(Sta, El, n)-(Sta, El, n)...

(0.00, 2068.75)-(47.95, 2067.72, 0.013)-(48.32, 2077.72, 0.013)-(78.45, 2077.82, 0.013)-(78.51, 2067.82, 0.013)-(92.83, 2066.11, 0.013)-(150.02, 2066.48, 0.013)
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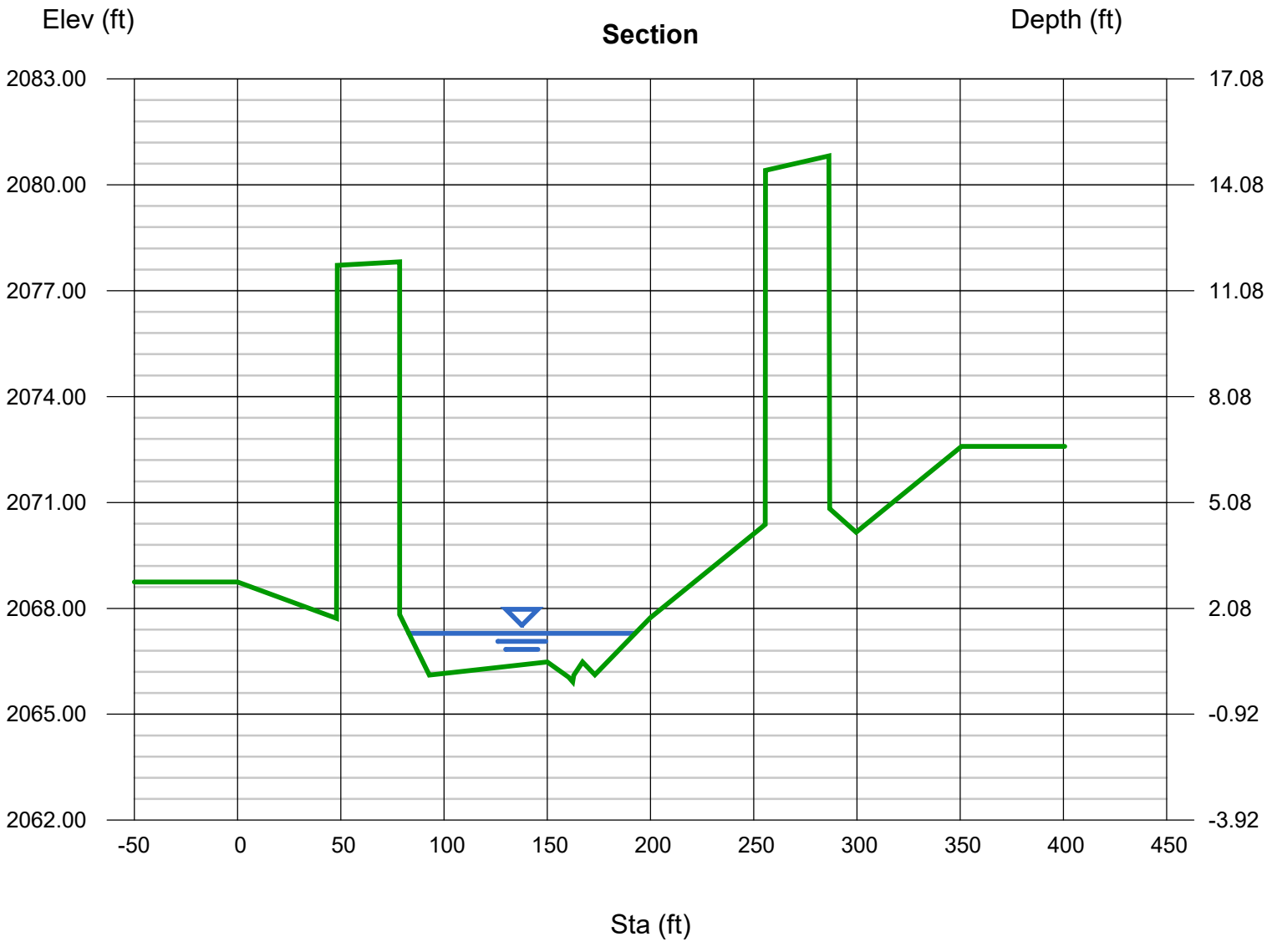

Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Monday, Sep 23 2024

Progress Street - Post 500 year

User-defined

Invert Elev (ft)	= 2065.92
Slope (%)	= 1.00
N-Value	= 0.013

Calculations

Compute by:	Known Q
Known Q (cfs)	= 948.38

Highlighted

Depth (ft)	= 1.32
Q (cfs)	= 948.38
Area (sqft)	= 92.65
Velocity (ft/s)	= 10.24
Wetted Perim (ft)	= 108.49
Crit Depth, Yc (ft)	= 1.83
Top Width (ft)	= 108.32
EGL (ft)	= 2.95

(Sta, El, n)-(Sta, El, n)...

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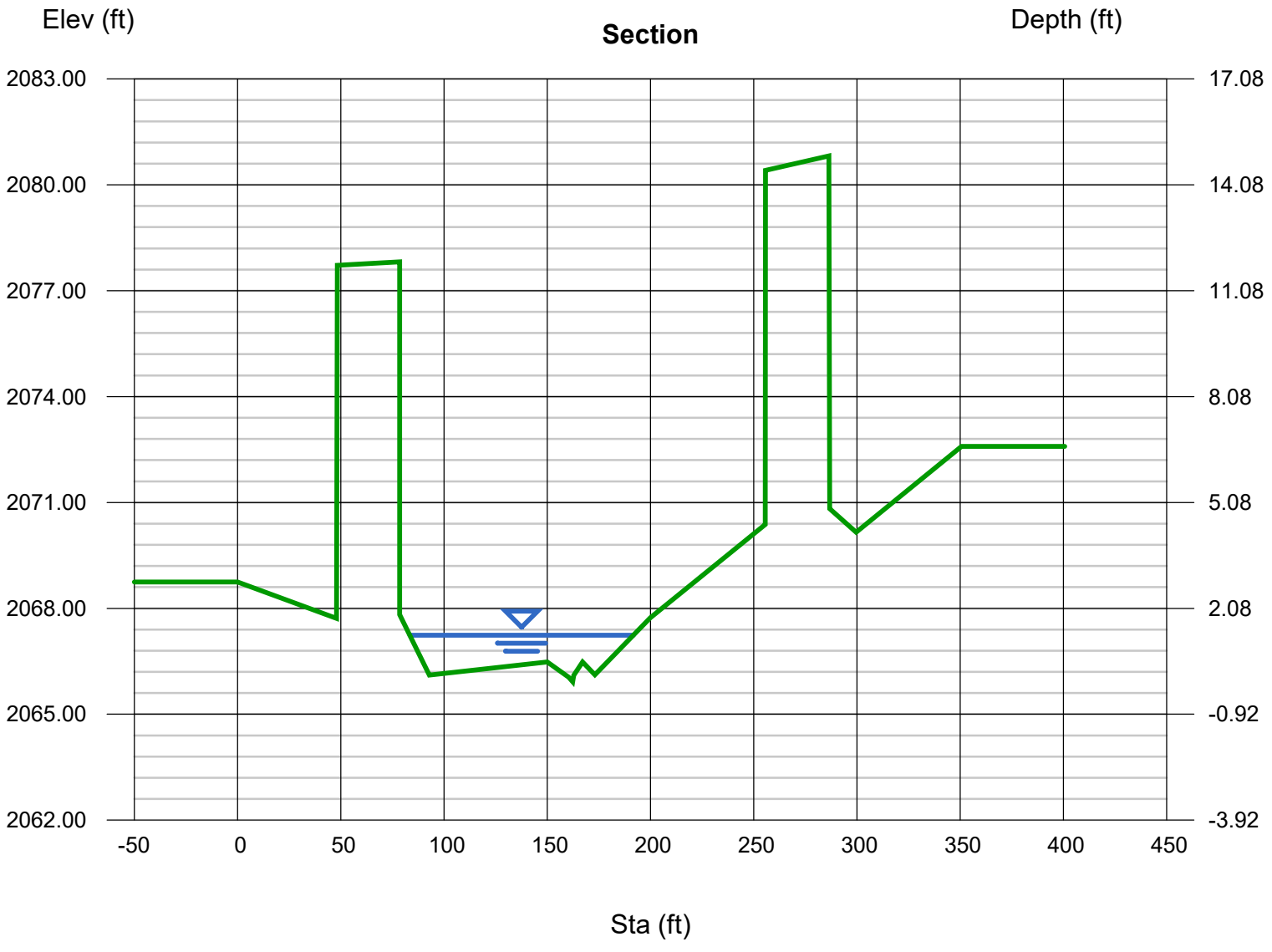
-(255.71, 2080.41, 0.013)-(286.47, 2080.82, 0.013)-(286.82, 2070.82, 0.013)-(299.68, 2070.16, 0.013)-(350.63, 2072.59, 0.013)



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Monday, Sep 23 2024

Winston St Pre 10 Year

User-defined

Invert Elev (ft)	= 2064.31
Slope (%)	= 2.00
N-Value	= 0.013

Calculations

Compute by:	Known Q
Known Q (cfs)	= 200.45

Highlighted

Depth (ft)	= 0.73
Q (cfs)	= 200.45
Area (sqft)	= 24.54
Velocity (ft/s)	= 8.17
Wetted Perim (ft)	= 67.06
Crit Depth, Yc (ft)	= 1.03
Top Width (ft)	= 66.46
EGL (ft)	= 1.77

(Sta, El, n)-(Sta, El, n)...

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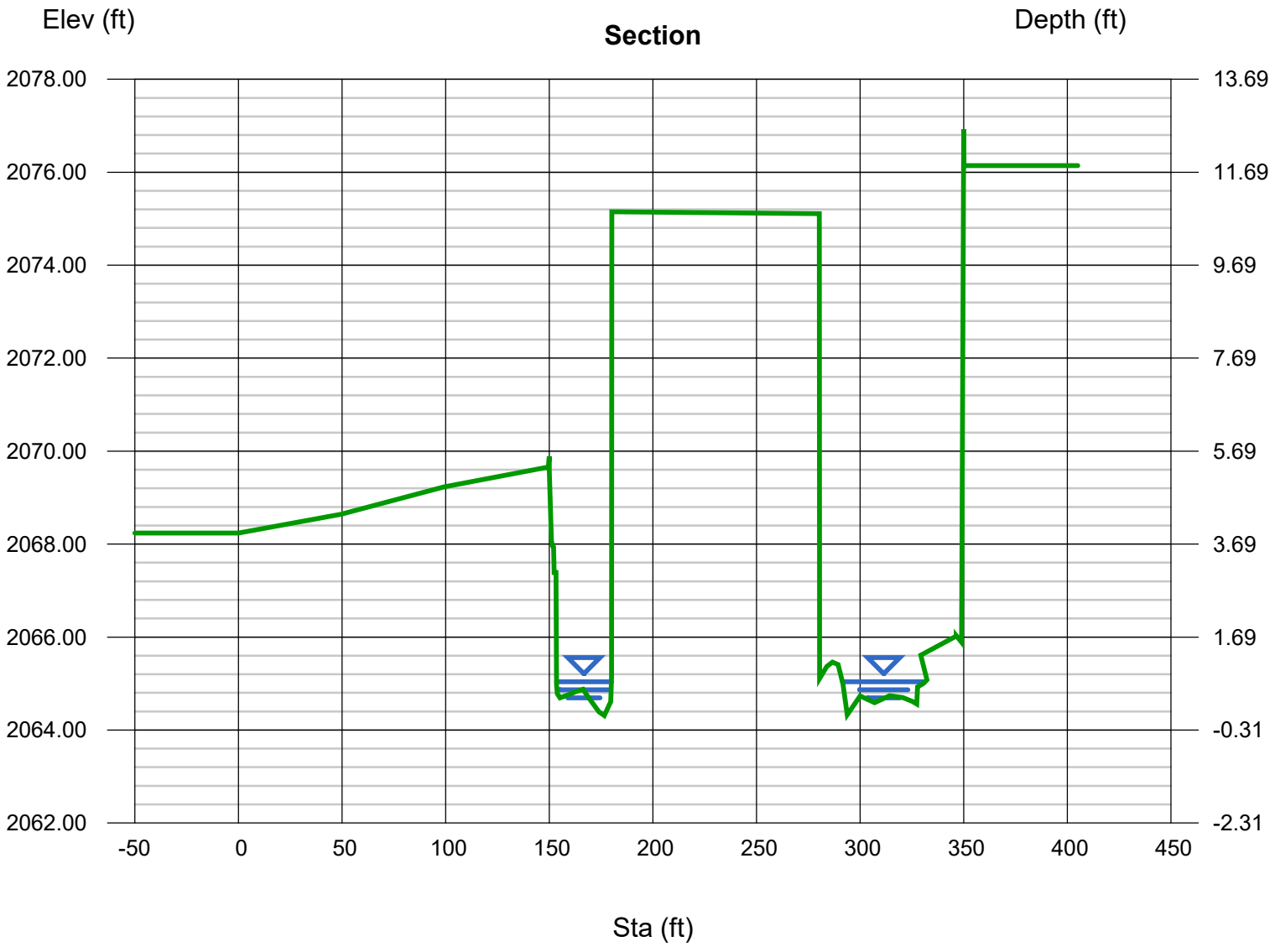

Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Monday, Sep 23 2024

Winston St Pre 100 Year

User-defined

Invert Elev (ft)	= 2064.31
Slope (%)	= 2.00
N-Value	= 0.013

Calculations

Compute by:	Known Q
Known Q (cfs)	= 642.52

Highlighted

Depth (ft)	= 1.14
Q (cfs)	= 642.52
Area (sqft)	= 53.16
Velocity (ft/s)	= 12.09
Wetted Perim (ft)	= 81.62
Crit Depth, Yc (ft)	= 1.79
Top Width (ft)	= 75.65
EGL (ft)	= 3.41

(Sta, El, n)-(Sta, El, n)...

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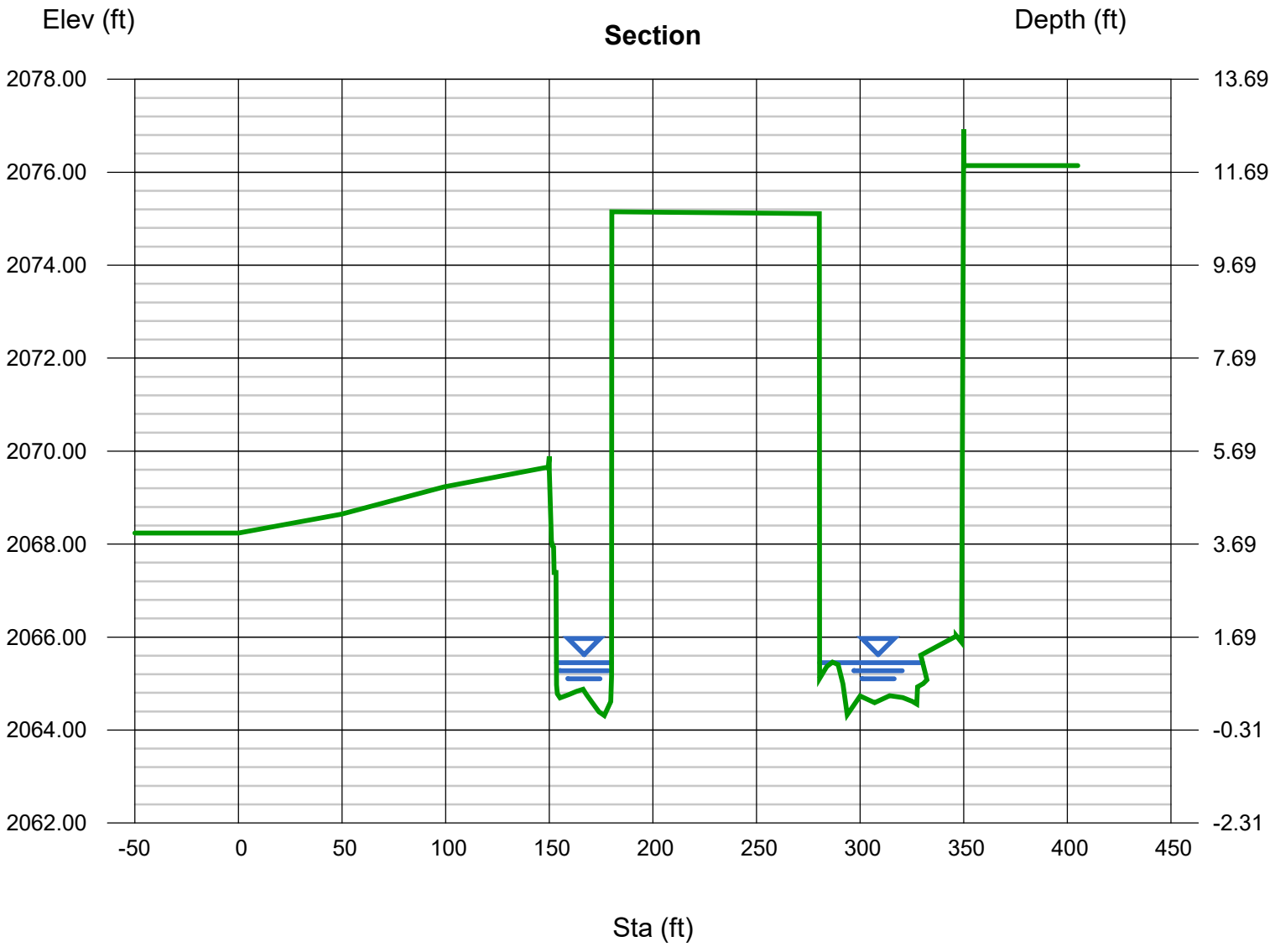

Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Monday, Sep 23 2024

Winston St - Post 100 year

User-defined

Invert Elev (ft)	= 2064.22
Slope (%)	= 2.00
N-Value	= 0.013

Calculations

Compute by:	Known Q
Known Q (cfs)	= 105.32

Highlighted

Depth (ft)	= 0.78
Q (cfs)	= 105.32
Area (sqft)	= 13.57
Velocity (ft/s)	= 7.76
Wetted Perim (ft)	= 39.28
Crit Depth, Yc (ft)	= 1.05
Top Width (ft)	= 38.78
EGL (ft)	= 1.72

(Sta, El, n)-(Sta, El, n)...

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-(15.16, 2064.26, 0.013)-(15.20, 2064.27, 0.013)-(15.35, 2064.28, 0.013)-(15.71, 2064.34, 0.013)-(16.49, 2064.38, 0.013)-(22.12, 2064.61, 0.013)-(24.80, 2064.67, 0
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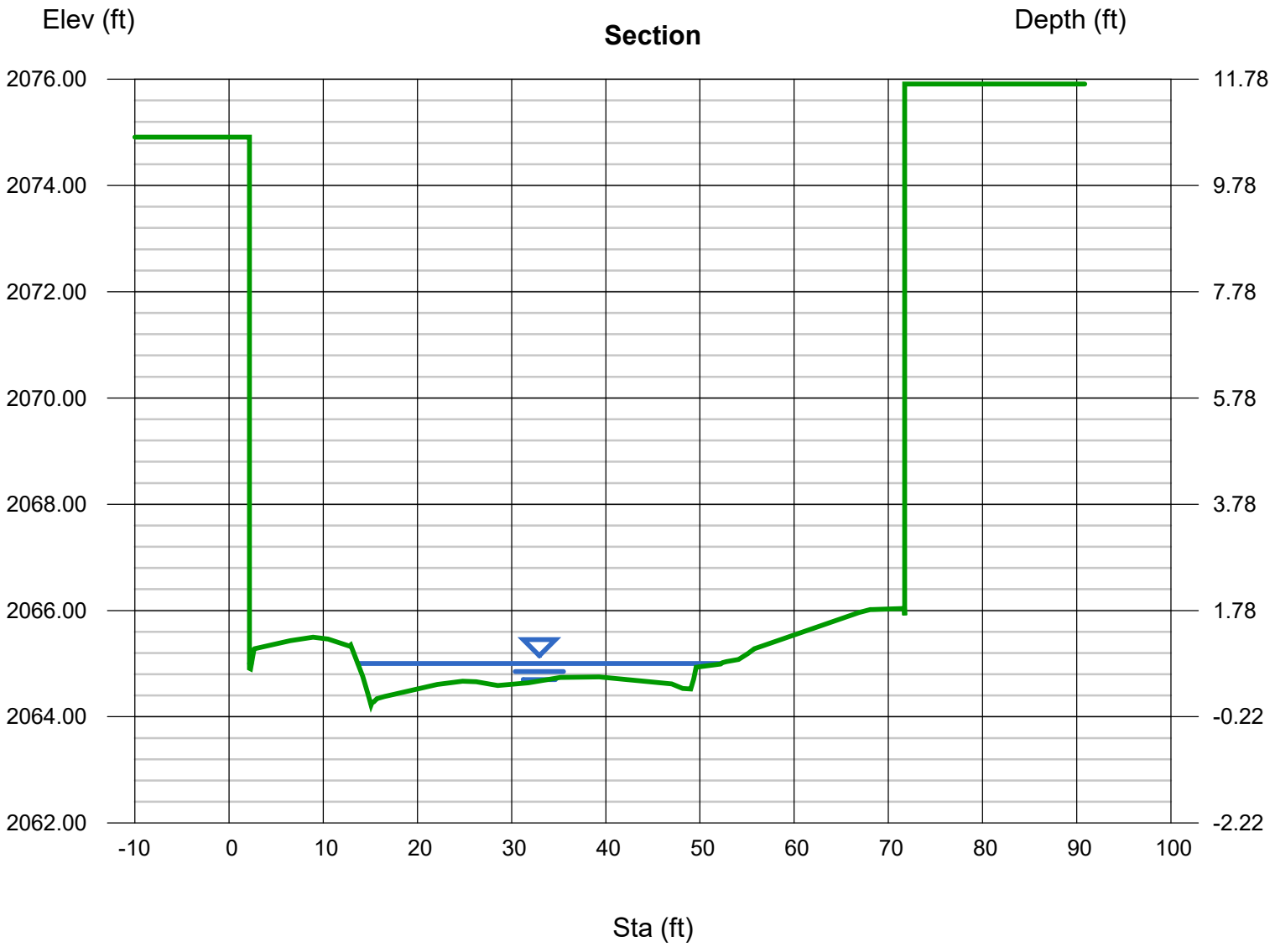

Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Monday, Sep 23 2024

Winston St Pre 500 Year

User-defined

Invert Elev (ft)	= 2064.31
Slope (%)	= 2.00
N-Value	= 0.013

Calculations

Compute by:	Known Q
Known Q (cfs)	= 940.59

Highlighted

Depth (ft)	= 1.34
Q (cfs)	= 940.59
Area (sqft)	= 68.40
Velocity (ft/s)	= 13.75
Wetted Perim (ft)	= 85.64
Crit Depth, Yc (ft)	= 2.11
Top Width (ft)	= 77.25
EGL (ft)	= 4.28

(Sta, El, n)-(Sta, El, n)...

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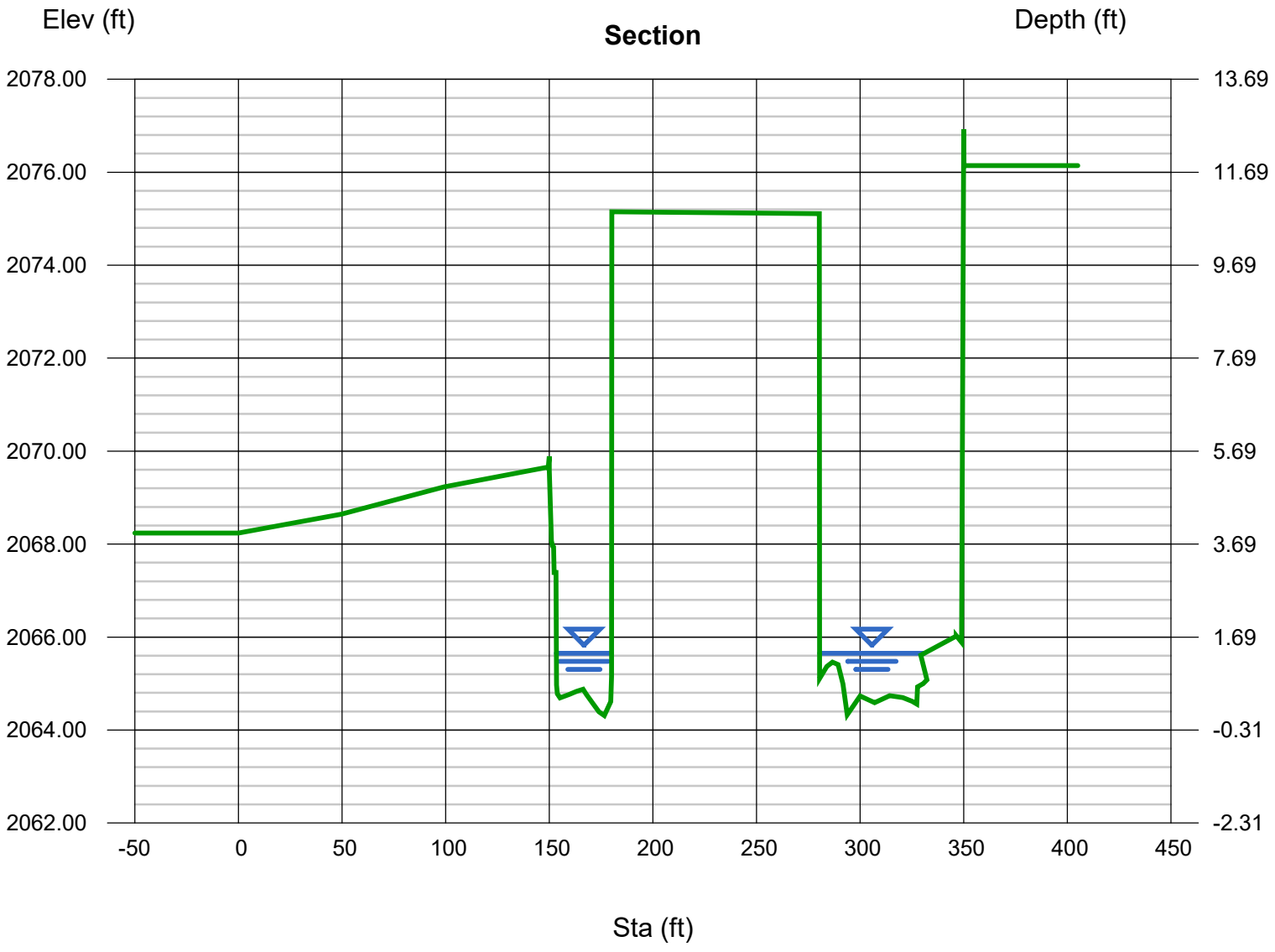

Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Monday, Sep 23 2024

Winston St - Post 500 year

User-defined

Invert Elev (ft)	= 2064.22
Slope (%)	= 2.00
N-Value	= 0.013

Calculations

Compute by:	Known Q
Known Q (cfs)	= 353.78

Highlighted

Depth (ft)	= 1.18
Q (cfs)	= 353.78
Area (sqft)	= 30.71
Velocity (ft/s)	= 11.52
Wetted Perim (ft)	= 50.86
Crit Depth, Yc (ft)	= 1.73
Top Width (ft)	= 49.74
EGL (ft)	= 3.24

(Sta, El, n)-(Sta, El, n)...

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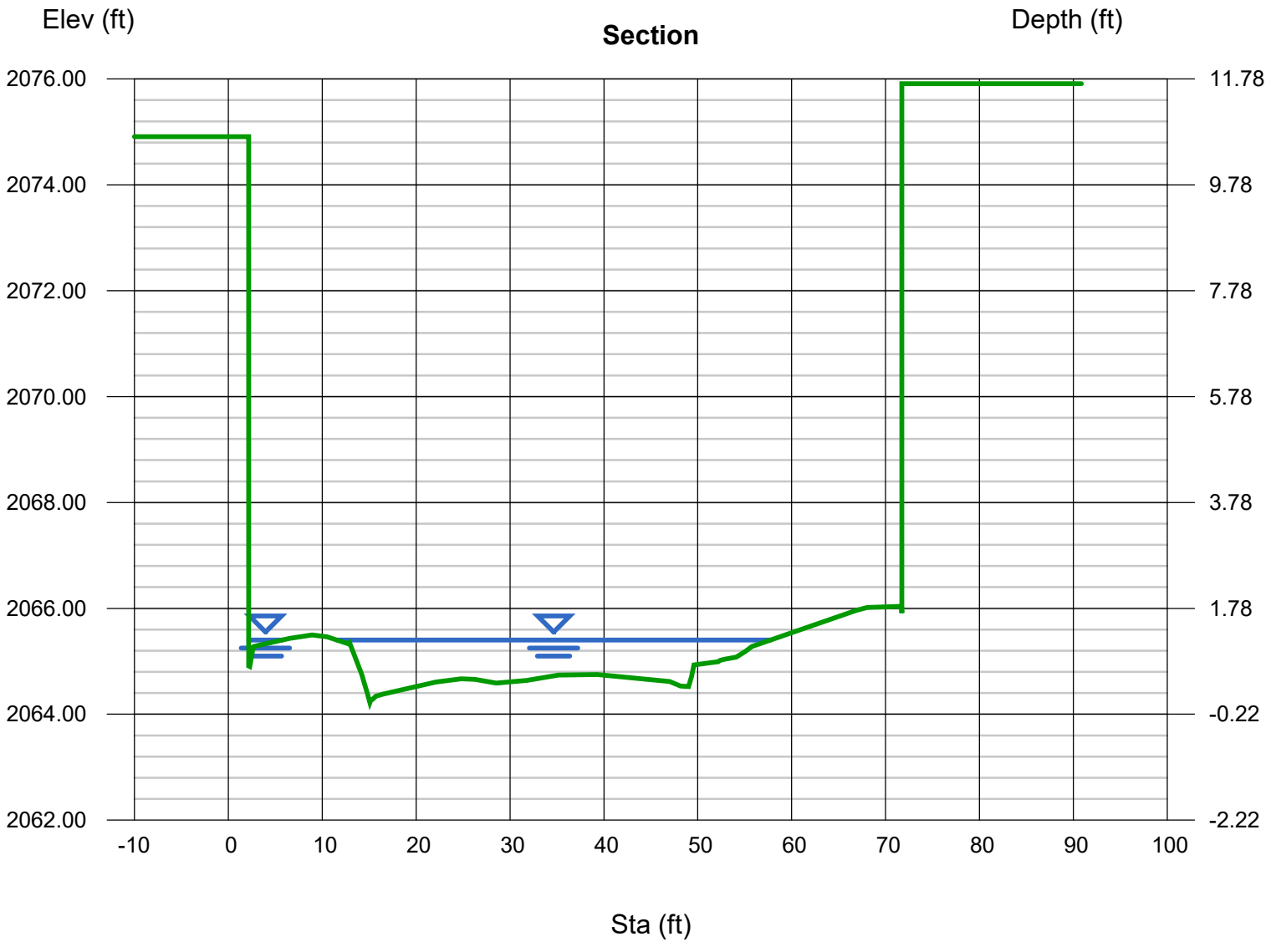


- VRRM Spreadsheet

DEQ Virginia Runoff Reduction Method Re-Development Compliance Spreadsheet - Version 3.0

☐ 2011 BMP Standards and Specifications ☑ 2013 Draft BMP Standards and Specifications

CLEAR ALL (Ctrl+Shift+R)

data input cells | constant values | calculation cells | final results

Project Name: Kabrich Street
Date: 8/18/2024
Linear Development Project? No

Site Information

Post-Development Project (Treatment Volume and Loads)

Enter Total Disturbed Area *(acres)* → 7.75

Check:
BMP Design Specifications List: 2013 Draft Stds & Specs
Maximum reduction required: 20%
Linear project? No
The site's net increase in impervious cover (acres) is: 0.4
Land cover areas entered correctly? ✓
Post-Development TP Load Reduction for Site (lb/yr): 1.99
Total disturbed area entered? ✓

Pre-ReDevelopment Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land					0.00
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed		0.60			0.60
Impervious Cover (acres)		2.93			2.93
					3.53

Post-Development Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land					0.00
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed		0.20			0.20
Impervious Cover (acres)		3.33			3.33
Area Check	OK.	OK.	OK.	OK.	3.53

Constants

		Runoff Coefficients (Rv)	A Soils	B Soils	C Soils	D Soils
Annual Rainfall (inches)	43					
Target Rainfall Event (inches)	1.00	Forest/Open Space	0.02	0.03	0.04	0.05
Total Phosphorus (TP) EMC (mg/L)	0.26	Managed Turf	0.15	0.20	0.22	0.25
Total Nitrogen (TN) EMC (mg/L)	1.86	Impervious Cover	0.95	0.95	0.95	0.95
Target TP Load (lb/acre/yr)	0.41					
Pj (unitless correction factor)	0.90					

LAND COVER SUMMARY -- PRE-REDEVELOPMENT

Land Cover Summary-Pre		
Pre-ReDevelopment	**Listed**	**Adjusted[1]**
Forest/Open Space Cover (acres)	0.00	0.00
Weighted Rv(forest)	0.00	0.00
% Forest	0%	0%
Managed Turf Cover (acres)	0.60	0.20
Weighted Rv(turf)	0.20	0.20
% Managed Turf	17%	6%
Impervious Cover (acres)	2.93	2.93
Rv(impervious)	0.95	0.95
% Impervious	83%	94%
Total Site Area (acres)	**3.53**	**3.13**
Site Rv	**0.82**	**0.90**

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary-Post (Final)	
Post ReDev. & New Impervious	
Forest/Open Space Cover (acres)	0.00
Weighted Rv(forest)	0.00
% Forest	0%
Managed Turf Cover (acres)	0.20
Weighted Rv (turf)	0.20
% Managed Turf	6%
Impervious Cover (acres)	3.33
Rv(impervious)	0.95
% Impervious	94%
Final Site Area (acres)	**3.53**
Final Post Dev Site Rv	**0.91**

Land Cover Summary-Post	
Post-ReDevelopment	
Forest/Open Space Cover (acres)	0.00
Weighted Rv(forest)	0.00
% Forest	0%
Managed Turf Cover (acres)	0.20
Weighted Rv (turf)	0.20
% Managed Turf	6%
ReDev. Impervious Cover (acres)	2.93
Rv(impervious)	0.95
% Impervious	94%
Total ReDev. Site Area (acres)	**3.13**
ReDev Site Rv	**0.90**

Land Cover Summary-Post	
Post-Development New Impervious	
New Impervious Cover (acres)	0.40
Rv(impervious)	0.95

Treatment Volume and Nutrient Load

Pre-ReDevelopment Treatment Volume (acre-ft)	0.2420	0.2353
Pre-ReDevelopment Treatment Volume (cubic feet)	10,540	10,249
Pre-ReDevelopment TP Load (lb/yr)	**6.62**	**6.44**
Pre-ReDevelopment TP Load per acre (lb/acre/yr)	1.88	2.06
Baseline TP Load (lb/yr) (**0.41 lbs/acre/yr** applied to pre-redevelopment area excluding pervious land proposed for new impervious cover)		*1.28*

Final Post-Development Treatment Volume (acre-ft)	0.2670
Final Post-Development Treatment Volume (cubic feet)	11,629
Final Post-Development TP Load (lb/yr)	**7.31**
Final Post-Development TP Load per acre **(lb/acre/yr)**	2.07

Treatment Volume and Nutrient Load

Post-ReDevelopment Treatment Volume (acre-ft)	0.2353
Post-ReDevelopment Treatment Volume (cubic feet)	10,249
Post-ReDevelopment Load (TP) (lb/yr)*	**6.44**
Post-ReDevelopment TP Load per acre **(lb/acre/yr)**	2.06
Max. Reduction Required (Below Pre-ReDevelopment Load)	**20%**
TP Load Reduction Required for Redeveloped Area (lb/yr)	**1.29**

Post-Development Treatment Volume (acre-ft)	0.0317
Post-Development Treatment Volume (cubic feet)	1,379
Post-Development TP Load (lb/yr)	**0.87**
TP Load Reduction Required for New Impervious Area (lb/yr)	**0.70**

[1] *Adjusted Land Cover Summary:*
Pre ReDevelopment land cover minus pervious land cover (forest/open space or managed turf) acreage proposed for new impervious cover.

Adjusted total acreage is consistent with Post-ReDevelopment acreage (minus acreage of new impervious cover).

Column I shows load reduction requriement for new impervious cover (based on new development load limit, 0.41 lbs/acre/year).

Post-Development Requirement for Site Area

		TP Load Reduction Required (lb/yr)	1.99						
	Nitrogen Loads (Informational Purposes Only)								
	Pre-ReDevelopment TN Load (lb/yr)	47.37			Final Post-Development TN Load (Post-ReDevelopment & New Impervious) (lb/yr)	52.27			

APPENDIX

- NRCS Soils Report

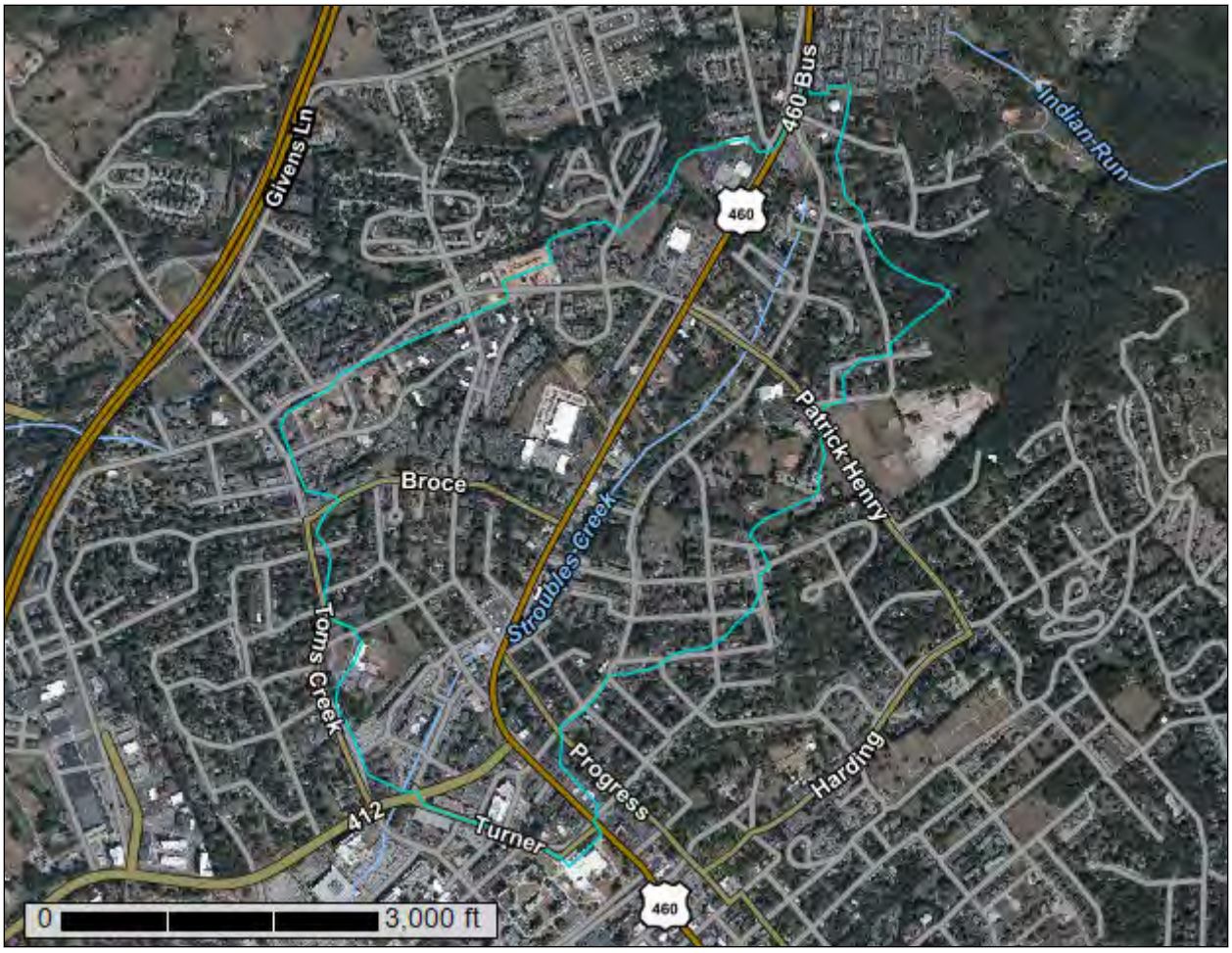
United States Department of Agriculture

NRCS

Natural Resources Conservation Service

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

Custom Soil Resource Report for Montgomery County, Virginia



July 1, 2024

Preface

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

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

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

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

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

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

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Contents

How Soil Surveys Are Made

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

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

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

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

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

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

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

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

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

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

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

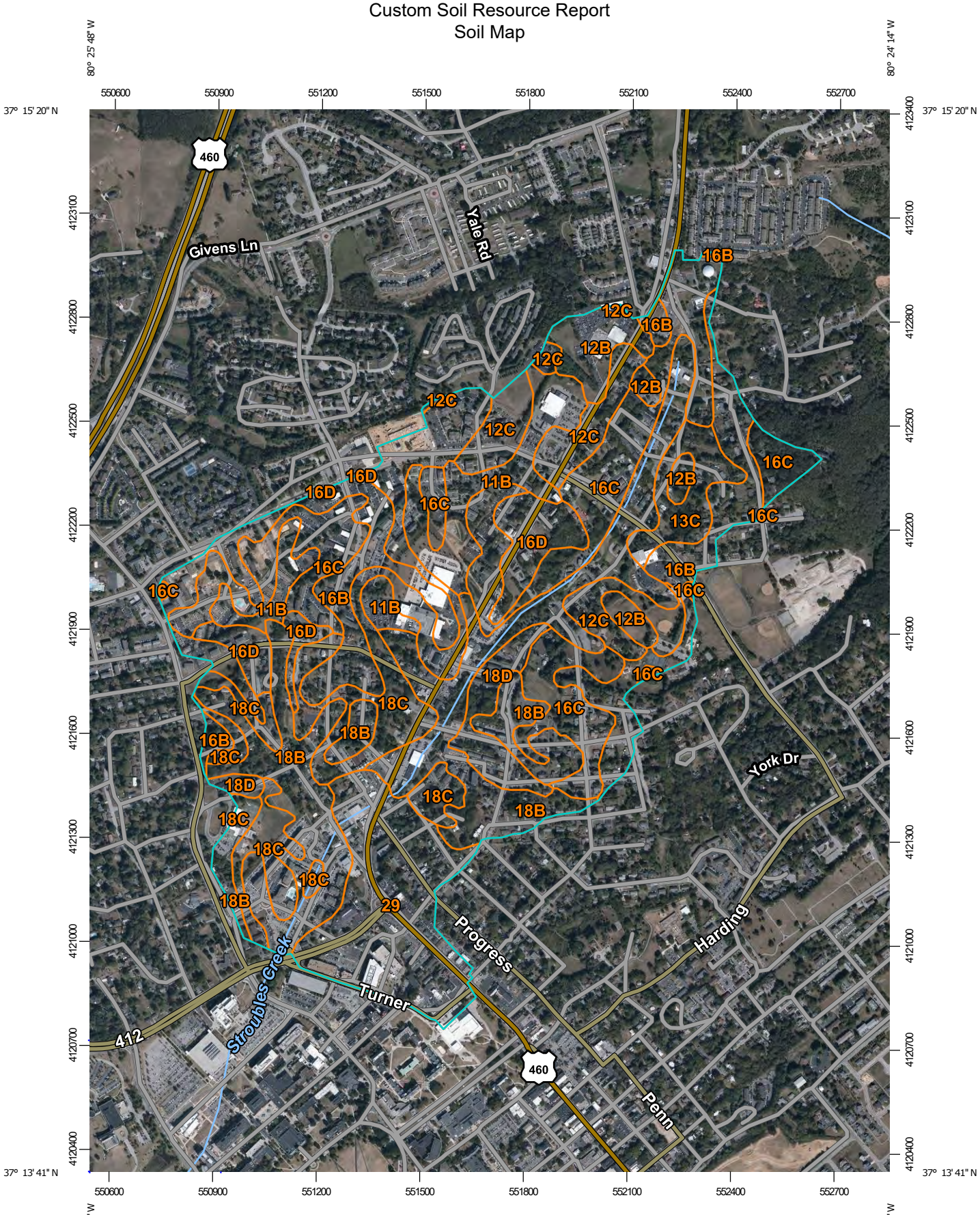
After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

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

Soil Map

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

Custom Soil Resource Report
Soil Map



Map Scale: 1:14,900 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 200 400 800 1200

Feet
0 500 1000 2000 3000

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

MAP LEGEND

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

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

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

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

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

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

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

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

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

Soil Survey Area: Montgomery County, Virginia
Survey Area Data: Version 16, Sep 5, 2023

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

Date(s) aerial images were photographed: Sep 29, 2019—Oct 4, 2019

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

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
11B	Duffield-Ernest complex, 2 to 7 percent slopes	33.4	6.5%
12B	Frederick and Vertrees silt loams, 2 to 7 percent slopes	17.9	3.5%
12C	Frederick and Vertrees silt loams, 7 to 15 percent slopes	30.7	6.0%
13C	Frederick and Vertrees gravelly silt loams, 7 to 15 percent slopes	13.6	2.6%
16B	Groseclose and Poplimento soils, 2 to 7 percent slopes	67.2	13.1%
16C	Groseclose and Poplimento soils, 7 to 15 percent slopes	90.7	17.7%
16D	Groseclose and Poplimento soils, 15 to 25 percent slopes	21.3	4.2%
18B	Groseclose-Urban land complex, 2 to 7 percent slopes	108.0	21.0%
18C	Groseclose-Urban land complex, 7 to 15 percent slopes	63.5	12.4%
18D	Groseclose-Urban land complex, 15 to 25 percent slopes	14.1	2.8%
29	Udorthents and Urban land	53.1	10.3%
Totals for Area of Interest		**513.5**	**100.0%**

Map Unit Descriptions

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

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

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

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

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

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

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

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

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

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

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion

of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

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

Montgomery County, Virginia

11B—Duffield-Ernest complex, 2 to 7 percent slopes

Map Unit Setting

National map unit symbol: kc1q
Elevation: 1,300 to 3,000 feet
Mean annual precipitation: 30 to 45 inches
Mean annual air temperature: 50 to 57 degrees F
Frost-free period: 117 to 185 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Duffield and similar soils: 45 percent
Ernest and similar soils: 35 percent
Minor components: 3 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Duffield

Setting

Landform: Drainageways
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Loamy colluvial, alluvial, eolian sediments underlain by loamy and clayey residuum of limestone and shale

Typical profile

H1 - 0 to 7 inches: silt loam
H2 - 7 to 37 inches: silty clay loam
H3 - 37 to 79 inches: clay

Properties and qualities

Slope: 2 to 7 percent
Depth to restrictive feature: 48 to 99 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 10.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: B
Ecological site: F128XY516WV - Mesic Limestone With Interbedded Sedimentary Uplands
Hydric soil rating: No

Description of Ernest

Setting

Landform: Drainageways
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Interbedded limestone and shale residuum

Typical profile

H1 - 0 to 6 inches: silt loam
H2 - 6 to 26 inches: silty clay loam
H3 - 26 to 50 inches: silty clay loam
H4 - 50 to 79 inches: silty clay loam

Properties and qualities

Slope: 2 to 7 percent
Depth to restrictive feature: 20 to 35 inches to fragipan
Drainage class: Moderately well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.57 in/hr)
Depth to water table: About 18 to 36 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Ecological site: F128XY516WV - Mesic Limestone With Interbedded Sedimentary Uplands
Hydric soil rating: No

Minor Components

Purdy

Percent of map unit: 3 percent
Landform: Depressions, stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: Yes

12B—Frederick and Vertrees silt loams, 2 to 7 percent slopes

Map Unit Setting

National map unit symbol: kc1s
Elevation: 1,700 to 3,000 feet
Mean annual precipitation: 30 to 45 inches
Mean annual air temperature: 50 to 57 degrees F
Frost-free period: 117 to 185 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Frederick and similar soils: 40 percent
Vertrees and similar soils: 35 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Frederick

Setting

Landform: Hills
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Limestone interbedded with siltstone and shale residuum

Typical profile

H1 - 0 to 10 inches: silt loam
H2 - 10 to 22 inches: clay
H3 - 22 to 79 inches: clay

Properties and qualities

Slope: 2 to 7 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 9.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: B
Ecological site: F128XY513WV - Mesic Limestone And Dolomite Uplands
Forage suitability group: Moist, Fertile Soils (G128XB001VA)
Other vegetative classification: Moist, Fertile Soils (G128XB001VA)

Hydric soil rating: No

Description of Vertrees

Setting

Landform: Hills
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Limestone, siltstone, and shale residuum

Typical profile

H1 - 0 to 10 inches: silt loam
H2 - 10 to 25 inches: silty clay
H3 - 25 to 50 inches: clay
H4 - 50 to 79 inches: clay

Properties and qualities

Slope: 2 to 7 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 8.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Ecological site: F128XY513WV - Mesic Limestone And Dolomite Uplands
Forage suitability group: Moist, Fertile Soils (G128XB001VA)
Other vegetative classification: Moist, Fertile Soils (G128XB001VA)
Hydric soil rating: No

12C—Frederick and Vertrees silt loams, 7 to 15 percent slopes

Map Unit Setting

National map unit symbol: kc1t
Elevation: 1,700 to 3,000 feet
Mean annual precipitation: 30 to 45 inches
Mean annual air temperature: 50 to 57 degrees F
Frost-free period: 117 to 185 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Frederick and similar soils: 40 percent

Vertrees and similar soils: 35 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Frederick

Setting

Landform: Hills
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Interfluve, side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Limestone interbedded with siltstone and shale residuum

Typical profile

H1 - 0 to 10 inches: silt loam
H2 - 10 to 22 inches: clay
H3 - 22 to 79 inches: clay

Properties and qualities

Slope: 7 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 9.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Ecological site: F128XY513WV - Mesic Limestone And Dolomite Uplands
Forage suitability group: Moist, Fertile Soils (G128XB001VA)
Other vegetative classification: Moist, Fertile Soils (G128XB001VA)
Hydric soil rating: No

Description of Vertrees

Setting

Landform: Hills
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Interfluve, side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Limestone, siltstone, and shale residuum

Typical profile

H1 - 0 to 10 inches: silt loam
H2 - 10 to 25 inches: silty clay
H3 - 25 to 50 inches: clay
H4 - 50 to 79 inches: clay

Properties and qualities

Slope: 7 to 15 percent
Depth to restrictive feature: More than 80 inches

Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 8.9 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: F128XY513WV - Mesic Limestone And Dolomite Uplands
Forage suitability group: Moist, Fertile Soils (G128XB001VA)
Other vegetative classification: Moist, Fertile Soils (G128XB001VA)
Hydric soil rating: No

13C—Frederick and Vertrees gravelly silt loams, 7 to 15 percent slopes

Map Unit Setting
National map unit symbol: kc1w
Elevation: 1,700 to 3,000 feet
Mean annual precipitation: 30 to 45 inches
Mean annual air temperature: 50 to 57 degrees F
Frost-free period: 117 to 185 days
Farmland classification: Farmland of statewide importance

Map Unit Composition
Frederick and similar soils: 40 percent
Vertrees and similar soils: 35 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Frederick

Setting
Landform: Hills
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Interfluve, side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Limestone interbedded with siltstone and shale residuum

Typical profile
H1 - 0 to 10 inches: gravelly silt loam
H2 - 10 to 22 inches: clay
H3 - 22 to 79 inches: clay

Properties and qualities
Slope: 7 to 15 percent
Depth to restrictive feature: More than 80 inches

Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 8.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Ecological site: F128XY513WV - Mesic Limestone And Dolomite Uplands
Forage suitability group: Moist, Fertile Soils (G128XB001VA)
Other vegetative classification: Moist, Fertile Soils (G128XB001VA)
Hydric soil rating: No

Description of Vertrees

Setting

Landform: Hills
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Interfluve, side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Limestone, siltstone, and shale residuum

Typical profile

H1 - 0 to 10 inches: gravelly silt loam
H2 - 10 to 25 inches: silty clay
H3 - 25 to 50 inches: clay
H4 - 50 to 79 inches: clay

Properties and qualities

Slope: 7 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 8.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: F128XY513WV - Mesic Limestone And Dolomite Uplands
Forage suitability group: Moist, Fertile Soils (G128XB001VA)
Other vegetative classification: Moist, Fertile Soils (G128XB001VA)
Hydric soil rating: No

16B—Groseclose and Poplimento soils, 2 to 7 percent slopes

Map Unit Setting

National map unit symbol: kc22
Elevation: 1,700 to 3,000 feet
Mean annual precipitation: 30 to 45 inches
Mean annual air temperature: 50 to 57 degrees F
Frost-free period: 117 to 185 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Groseclose and similar soils: 45 percent
Poplimento and similar soils: 40 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Groseclose

Setting

Landform: Hills
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Limestone, shale, siltstone, and sandstone residuum

Typical profile

H1 - 0 to 10 inches: loam
H2 - 10 to 28 inches: clay
H3 - 28 to 39 inches: clay
H4 - 39 to 51 inches: clay
H5 - 51 to 79 inches: clay loam

Properties and qualities

Slope: 2 to 7 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 8.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Ecological site: F128XY516WV - Mesic Limestone With Interbedded Sedimentary Uplands

Hydric soil rating: No

Description of Poplimento

Setting

Landform: Hills
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Limestone, shale, siltstone, and sandstone residuum

Typical profile

H1 - 0 to 12 inches: silt loam
H2 - 12 to 35 inches: clay
H3 - 35 to 55 inches: clay
H4 - 55 to 79 inches: channery silty clay loam

Properties and qualities

Slope: 2 to 7 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 7.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Ecological site: F128XY516WV - Mesic Limestone With Interbedded Sedimentary Uplands
Hydric soil rating: No

16C—Groseclose and Poplimento soils, 7 to 15 percent slopes

Map Unit Setting

National map unit symbol: kc23
Elevation: 1,700 to 3,000 feet
Mean annual precipitation: 30 to 45 inches
Mean annual air temperature: 50 to 57 degrees F
Frost-free period: 117 to 185 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Groseclose and similar soils: 45 percent
Poplimento and similar soils: 40 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Groseclose

Setting

Landform: Hills
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Interfluve, side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Limestone, shale, siltstone, and sandstone residuum

Typical profile

H1 - 0 to 10 inches: loam
H2 - 10 to 28 inches: clay
H3 - 28 to 39 inches: clay
H4 - 39 to 51 inches: clay
H5 - 51 to 79 inches: clay loam

Properties and qualities

Slope: 7 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 8.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: F128XY516WV - Mesic Limestone With Interbedded Sedimentary Uplands
Hydric soil rating: No

Description of Poplimento

Setting

Landform: Hills
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Interfluve, side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Limestone, shale, siltstone, and sandstone residuum

Typical profile

H1 - 0 to 12 inches: silt loam
H2 - 12 to 35 inches: clay
H3 - 35 to 55 inches: clay
H4 - 55 to 79 inches: channery silty clay loam

Properties and qualities

Slope: 7 to 15 percent
Depth to restrictive feature: More than 80 inches

Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 7.7 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: F128XY516WV - Mesic Limestone With Interbedded Sedimentary Uplands
Hydric soil rating: No

16D—Groseclose and Poplimento soils, 15 to 25 percent slopes

Map Unit Setting
National map unit symbol: kc24
Elevation: 1,700 to 3,000 feet
Mean annual precipitation: 30 to 45 inches
Mean annual air temperature: 50 to 57 degrees F
Frost-free period: 117 to 185 days
Farmland classification: Farmland of statewide importance

Map Unit Composition
Groseclose and similar soils: 45 percent
Poplimento and similar soils: 40 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Groseclose

Setting
Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Limestone, shale, siltstone, and sandstone residuum

Typical profile
H1 - 0 to 10 inches: loam
H2 - 10 to 28 inches: clay
H3 - 28 to 39 inches: clay
H4 - 39 to 51 inches: clay
H5 - 51 to 79 inches: clay loam

Properties and qualities
Slope: 15 to 25 percent

Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 8.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Ecological site: F128XY516WV - Mesic Limestone With Interbedded Sedimentary Uplands
Hydric soil rating: No

Description of Poplimento

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Limestone, shale, siltstone, and sandstone residuum

Typical profile

H1 - 0 to 12 inches: silt loam
H2 - 12 to 35 inches: clay
H3 - 35 to 55 inches: clay
H4 - 55 to 79 inches: channery silty clay loam

Properties and qualities

Slope: 15 to 25 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 7.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Ecological site: F128XY516WV - Mesic Limestone With Interbedded Sedimentary Uplands
Hydric soil rating: No

18B—Groseclose-Urban land complex, 2 to 7 percent slopes

Map Unit Setting

National map unit symbol: kc27
Elevation: 1,300 to 3,000 feet
Mean annual precipitation: 30 to 45 inches
Mean annual air temperature: 50 to 57 degrees F
Frost-free period: 117 to 185 days
Farmland classification: Not prime farmland

Map Unit Composition

Groseclose and similar soils: 40 percent
Urban land: 30 percent
Minor components: 3 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Groseclose

Setting

Landform: Hills
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Limestone, shale, siltstone, and sandstone residuum

Typical profile

H1 - 0 to 10 inches: loam
H2 - 10 to 28 inches: clay
H3 - 28 to 39 inches: clay
H4 - 39 to 51 inches: clay
H5 - 51 to 79 inches: clay loam

Properties and qualities

Slope: 2 to 7 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 8.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C

Ecological site: F128XY516WV - Mesic Limestone With Interbedded Sedimentary Uplands
Hydric soil rating: No

Description of Urban Land

Setting
Landform: Hills
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Limestone, shale, siltstone, and sandstone residuum

Minor Components

Purdy
Percent of map unit: 3 percent
Landform: Depressions, stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: Yes

18C—Groseclose-Urban land complex, 7 to 15 percent slopes

Map Unit Setting
National map unit symbol: kc28
Elevation: 1,300 to 3,000 feet
Mean annual precipitation: 30 to 45 inches
Mean annual air temperature: 50 to 57 degrees F
Frost-free period: 117 to 185 days
Farmland classification: Not prime farmland

Map Unit Composition
Groseclose and similar soils: 40 percent
Urban land: 30 percent
Minor components: 3 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Groseclose

Setting
Landform: Hills
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Interfluve, side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Limestone, shale, siltstone, and sandstone residuum

Typical profile

H1 - 0 to 10 inches: loam
H2 - 10 to 28 inches: clay
H3 - 28 to 39 inches: clay
H4 - 39 to 51 inches: clay
H5 - 51 to 79 inches: clay loam

Properties and qualities

Slope: 7 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 8.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: F128XY516WV - Mesic Limestone With Interbedded Sedimentary Uplands
Hydric soil rating: No

Description of Urban Land

Setting

Landform: Hills
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Interfluve, side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Limestone, shale, siltstone, and sandstone residuum

Minor Components

Purdy

Percent of map unit: 3 percent
Landform: Depressions, stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: Yes

18D—Groseclose-Urban land complex, 15 to 25 percent slopes

Map Unit Setting

National map unit symbol: kc29
Elevation: 1,300 to 3,000 feet
Mean annual precipitation: 30 to 45 inches
Mean annual air temperature: 50 to 57 degrees F
Frost-free period: 117 to 185 days
Farmland classification: Not prime farmland

Map Unit Composition

Groseclose and similar soils: 40 percent
Urban land: 30 percent
Minor components: 3 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Groseclose

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Limestone, shale, siltstone, and sandstone residuum

Typical profile

H1 - 0 to 10 inches: loam
H2 - 10 to 28 inches: clay
H3 - 28 to 39 inches: clay
H4 - 39 to 51 inches: clay
H5 - 51 to 79 inches: clay loam

Properties and qualities

Slope: 15 to 25 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 8.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C

Ecological site: F128XY516WV - Mesic Limestone With Interbedded Sedimentary Uplands
Hydric soil rating: No

Description of Urban Land

Setting
Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Limestone, shale, siltstone, and sandstone residuum

Minor Components

Purdy
Percent of map unit: 3 percent
Landform: Depressions, stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: Yes

29—Udorthents and Urban land

Map Unit Setting
National map unit symbol: kc2r
Elevation: 1,300 to 3,000 feet
Mean annual precipitation: 30 to 45 inches
Mean annual air temperature: 50 to 57 degrees F
Frost-free period: 117 to 185 days
Farmland classification: Not prime farmland

Map Unit Composition
Udorthents and similar soils: 45 percent
Urban land: 30 percent
Minor components: 3 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Udorthents

Setting
Landform: Hills
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Limestone, shale, sandstone, or granite residuum

Properties and qualities

Slope: 0 to 25 percent
Depth to restrictive feature: More than 80 inches
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None

Description of Urban Land

Setting

Landform: Hills
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Limestone, shale, sandstone, or granite residuum

Minor Components

Purdy

Percent of map unit: 3 percent
Landform: Depressions, stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: Yes

Soil Information for All Uses

Soil Properties and Qualities

The Soil Properties and Qualities section includes various soil properties and qualities displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each property or quality.

Soil Qualities and Features

Soil qualities are behavior and performance attributes that are not directly measured, but are inferred from observations of dynamic conditions and from soil properties. Example soil qualities include natural drainage, and frost action. Soil features are attributes that are not directly part of the soil. Example soil features include slope and depth to restrictive layer. These features can greatly impact the use and management of the soil.

Hydrologic Soil Group (Hydrologic Soils)

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:

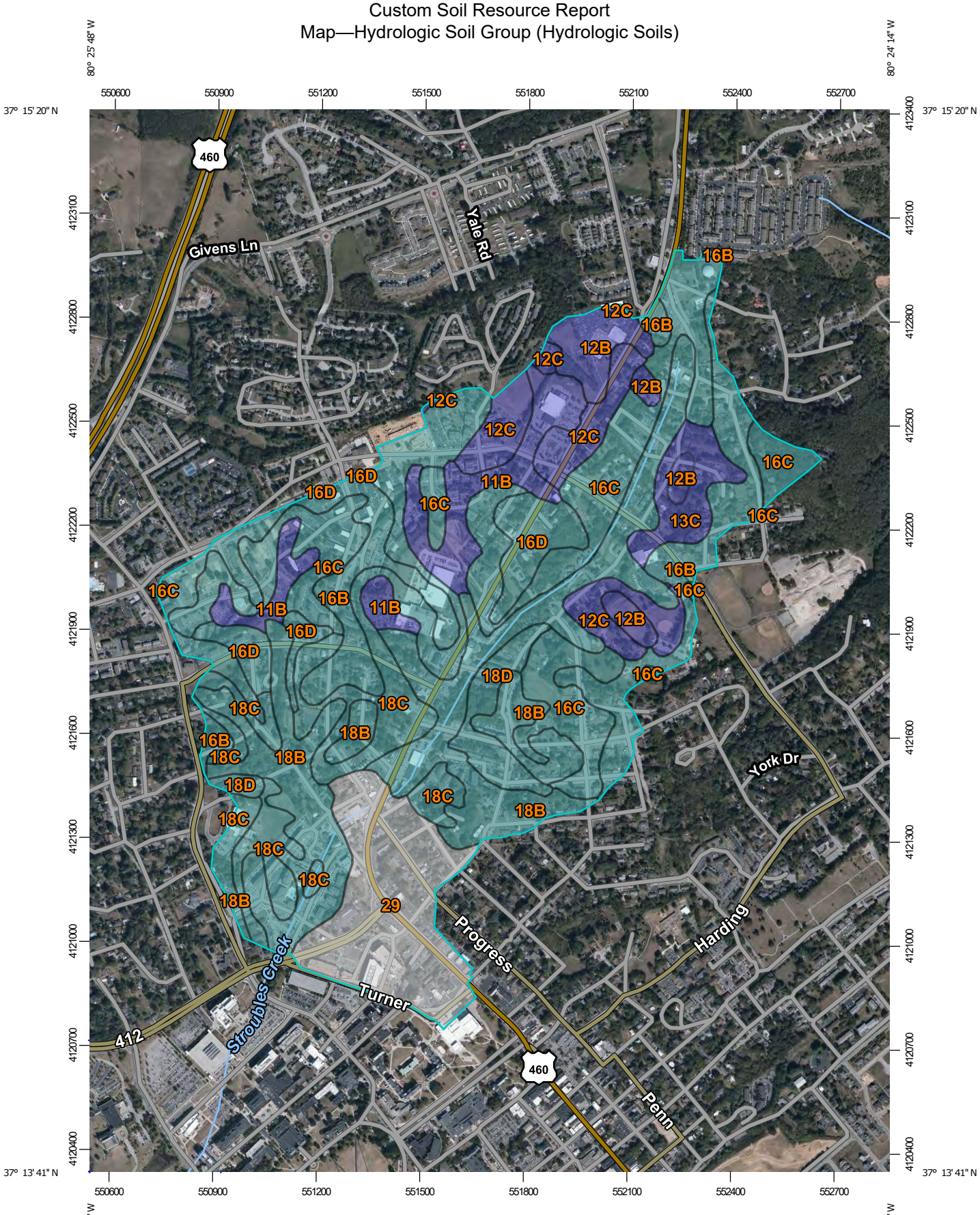
Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

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.


80° 25' 48" W
80° 24' 14" W
37° 15' 20" N
37° 13' 41" N
550600
550900
551200
551500
551800
552100
552400
552700
4123400
4123100
4122800
4122500
4122200
4121900
4121600
4121300
4121000
4120700
4120400
460
Givens Ln
Yale Rd
York Dr
Harding
Progress
Penn
Turner
Stroubles Creek
412
29
16B
12C
12B
16C
16D
11B
13C
18D
18C
18B
Map Scale: 1:14,900 if printed on A portrait (8.5" x 11") sheet.
N
Meters
0
200
400
800
1200
Feet
0
500
1000
2000
3000
Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 17N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Lines

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Points

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

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

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

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

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

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

Soil Survey Area: Montgomery County, Virginia
Survey Area Data: Version 16, Sep 5, 2023

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

Date(s) aerial images were photographed: Sep 29, 2019—Oct 4, 2019

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.

Table—Hydrologic Soil Group (Hydrologic Soils)

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
11B	Duffield-Ernest complex, 2 to 7 percent slopes	B	33.4	6.5%
12B	Frederick and Vertrees silt loams, 2 to 7 percent slopes	B	17.9	3.5%
12C	Frederick and Vertrees silt loams, 7 to 15 percent slopes	B	30.7	6.0%
13C	Frederick and Vertrees gravelly silt loams, 7 to 15 percent slopes	B	13.6	2.6%
16B	Groseclose and Poplimento soils, 2 to 7 percent slopes	C	67.2	13.1%
16C	Groseclose and Poplimento soils, 7 to 15 percent slopes	C	90.7	17.7%
16D	Groseclose and Poplimento soils, 15 to 25 percent slopes	C	21.3	4.2%
18B	Groseclose-Urban land complex, 2 to 7 percent slopes	C	108.0	21.0%
18C	Groseclose-Urban land complex, 7 to 15 percent slopes	C	63.5	12.4%
18D	Groseclose-Urban land complex, 15 to 25 percent slopes	C	14.1	2.8%
29	Udorthents and Urban land		53.1	10.3%
Totals for Area of Interest			**513.5**	**100.0%**

Rating Options—Hydrologic Soil Group (Hydrologic Soils)

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

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