STORMWATER MANAGEMENT REPORT

Prepared for:

Elite Properties at Long Hill, LLC

Proposed Residential Development
Block 10801, Lot 3
621 Valley Road (C.R. 512)
Township of Long Hill
Morris County, NJ

Prepared by:

245 Main Street, Suite 110
Chester, NJ 07930
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NJ Professional Engineer License #36618

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DEC# 0555-99-010

TABLE OF CONTENTS

APPENDIX

I. INTRODUCTION

The intent of this study is to analyze the stormwater drainage conditions that will occur as a result of the proposed multi-family residential building, parking facilities, and associated site improvements for the site located at 621 Valley Road in the Township of Long Hill, Morris County, New Jersey and specifically identified as Block 10801, Lot 3 on the Township of Long Hill Tax Maps. The site is currently undeveloped and consists of primarily wooded areas.

Under proposed conditions, the site will be developed to contain one (1) apartment building with surface level parking and associated driveway, as shown on the accompanying engineering drawings. The southern and central portions of the lot, approximately 3.3 acres, is to remain undisturbed.

II. EXISTING DRAINAGE CONDITIONS

The overall subject site consists of 5.07 acres and is currently undeveloped, consisting of primarily wooded areas, as well as wetlands located on the eastern and western sides of the property near the Valley Road frontage.

Based on the Morris County Soil Survey, the soil types native to the site include:

SOIL TYPE (SYMBOL)	SOIL TYPE (NAME)	HYDROLOGIC SOIL GROUP
WhpB	Whippany silt loam, 3 to 8 percent slopes	C
BhdAt	Biddeford silt loam, 0 to 2 percent slopes	D

The site has been evaluated using the TR-55 'Urban Hydrology for Small Watersheds' standards and with the following existing drainage sub-watershed areas as depicted on the Existing Drainage Area Map:

EXISTING DRAINAGE AREA 1:

This study area includes the southern portion of the subject property, consisting primarily of undisturbed wooded areas. The stormwater runoff generated from this area flows in a southerly direction towards the Passaic River, to be identified as Point of Analysis 1 (POA #1). The Runoff Curve Numbers, included within the Appendix of this Report, were chosen to best reflect the existing site conditions as outlined in the USDA's "Urban Hydrology for Small Watersheds: TR-55," including the hydrologic soil groups C and D. Furthermore, this drainage area includes a subarea identified as EX-DA-1A described below:

EX DA-1A: This subarea contains the portion of Drainage Area 1 to remain undisturbed under proposed conditions and consists primarily of wooded areas. This subarea only includes areas to remain undisturbed, and is therefore exempt from the reduction criteria set forth by the Township of Long Hill and NJAC 7:8.

EXISTING DRAINAGE AREA 2:

This area includes the eastern majority of the parcel consisting primarily wooded areas, and contains soils belonging to hydrologic group C. The stormwater runoff generated from this area flows in a northeasterly direction towards the existing stormwater conveyance system within the Valley Road right-of-way, identified as Point of Analysis 2 (POA #2). Runoff Curve Numbers, included within the Appendix of this Report, were chosen to best reflect the existing site conditions as outlined in the USDA's "Urban Hydrology for Small Watersheds: TR-55." This drainage area includes a subarea identified as EX-DA-2A described below.

EX DA-2A: This subarea consists of the eastern and western portions of Existing Drainage Area 2, which is comprised of primarily wooded and wetlands areas connected by an existing culvert. This subarea contains areas to remain undisturbed, and is therefore exempt from the reduction criteria set forth by the Township of Long Hill and NJAC 7:8.

III. PROPOSED DRAINAGE CONDITIONS

Under proposed conditions, the site will be developed with a multifamily residential building, surface level parking and associated site improvements including stormwater management facilities to mitigate the increased stormwater runoff resulting from the additional impervious area and provide water quality measures. The proposed site improvements will result in an overall increase in impervious coverage of approximately 56,000 SF (1.29 acres). The proposed design serves to match the existing drainage patterns to the maximum extent practical. The site has been evaluated using the TR-55 'Urban Hydrology for Small Watersheds' standards and with the following proposed drainage sub-watershed areas as depicted on the Proposed Drainage Area Map:

DRAINAGE AREA 1A:

This area includes the southern majority of the subject site, consisting of a wooded area which is to remain undisturbed. Soils within this study area belong to hydrologic group D. The stormwater generated from this area flows in a southerly direction towards the Passaic River and contributes to POA #1. This area is to remain undisturbed under proposed conditions and is therefore exempt from the reduction criteria set forth by the Township of Long Hill and NJAC 7:8. A time of concentration of 15 minutes has been calculated and utilized for this drainage area.

DRAINAGE AREA 1B:

This area includes a portion of the open space located to the south of the proposed building. The stormwater runoff generated from this area flows in a southerly direction towards the Passaic River and contributes to Point of Analysis 1 (POA #1). Soils within this area primarily belong to hydrologic soil group C. The Runoff Curve Numbers, included within the Appendix of this Report, were chosen to best reflect the proposed site conditions as outlined in the USDA's "Urban Hydrology for Small Watersheds: TR-55." A time of concentration of 15 minutes has been calculated and utilized for this drainage area.

DRAINAGE AREA 2:

This study area consists of the proposed building roof area, southern portion of the driveway, and portions of the open space areas throughout the parking area. Stormwater runoff generated from this area is collected by proposed on-site inlets and is conveyed to a proposed underground basin (Basin A) located beneath the parking garage. Runoff within this area is conveyed through either the Contech Stormfilter water quality unit or the proposed rain garden before entering the underground basin. Ultimately, this runoff is discharged at a controlled rate to the south of the building, contributing to POA #1. Soils from this area belong to hydrologic soil group C, and the Runoff Curve Numbers, included within the Appendix of this Report, were chosen to best reflect the proposed site conditions as outlined in the USDA's "Urban Hydrology for Small Watersheds: TR-55." A time of concentration of 10 minutes has been utilized for this analysis.

DRAINAGE AREA 3:

This study area includes the northern parking area and northern portion of the driveway. Runoff generated from this area flows in a northerly direction towards proposed on-site inlets and is directed towards the aboveground basin (Basin B) located along the Passaic Valley Road frontage. Runoff is detained, treated, and released at a controlled rate to the existing stormwater conveyance system located within the Valley Road right-of-way, contributing to POA #1. Soils within this study area belong to hydrological group C, and a time of concentration of 10 minutes was utilized for this analysis. The Runoff Curve Numbers, included within the Appendix of this Report, were chosen to best reflect the proposed site conditions as outlined in the USDA's "Urban Hydrology for Small Watersheds: TR-55."

DRAINAGE AREA 4A:

This study area includes the areas to the north of the proposed building on either side of the driveway, consisting primarily of wooded area and wetlands. Stormwater runoff generated from this area flows offsite in a northeasterly direction towards the existing conveyance system within the Valley Road right-of-way and contributes to POA #2. A time of concentration of 31.6 minutes has been calculated and used for this analysis. These areas are to remain undisturbed under proposed conditions and are therefore exempt from the reduction criteria set forth by the Township of Long Hill and NJAC 7:8.

DRAINAGE AREA 4B:

This study area consists of open space areas located along the proposed retaining walls and building, within the limits of disturbance. Runoff generated by this area flows undetained towards the wooded areas described in Drainage Area 4A. These areas are within the limits of disturbance and are therefore subject to the reduction criteria set forth by the Township of Long Hill and NJAC 7:8. The Runoff Curve Numbers, included within the Appendix of this Report, were chosen to best reflect the existing site conditions as outlined in the USDA's "Urban Hydrology for Small Watersheds: TR-55," and a time of concentration of 31.6 minutes has been calculated and utilized for this drainage area. This area is to remain undisturbed under proposed conditions and is therefore exempt from the reduction criteria set forth by the Township of Long Hill and NJAC 7:8.

IV. DESIGN METHODOLOGY

The primary design constraints for this project are based on requirements established in the Township of Long Hill Land Development Ordinance, New Jersey Soil Erosion and Sediment Control Standards, and NJAC 7:8. More specifically, the stormwater management design will serve to maintain existing drainage patterns to the maximum extent practical and reduce proposed runoff rates when compared to pre-development runoff rates for disturbed areas. The proposed project will disturb over 1 acre of land and impervious surface coverage will be increased by more than ¼ acre when compared to existing conditions. As a result, the project meets the definition of a "major development" as defined NJAC 7:8. Furthermore, the project has been designed to meet water quality standards, as well as the allowable post-development peak flow rates for the disturbed area of 50%, 75% and 80% for the 2-, 10- and 100- year storms set forth by the Township of Long Hill and NJAC 7:8.

In order to prepare the stormwater calculations for the project, extensive initial investigation of the property and topographic survey was performed. Control Point Associates, Inc. was contracted to prepare a Boundary and Topographic of the existing site. Based on a review of the existing site conditions and the Survey, the Drainage Area Maps for the existing and proposed site conditions as defined within this report were established. The grading plan within the accompanying engineering drawings was developed for the proposed site improvements with consideration to the existing drainage patterns.

The 2-, 10- and 100-year quantity design storms are based upon the New Jersey 24 Hour Rainfall Frequency Data for Morris County as published by the NOAA Atlas 14 Type D rainfall distribution. Curve number calculations have been included within the Appendix and are based upon HSG C and D. Pervious and impervious areas were modeled separately as suggested in the NJDEP Stormwater Management Best Management Practices (BMP) Manual.

The Township of Long Hill and NJDEP flow reduction requirements are as follows:

2-year:	50% reduction (50% of Existing)
10-year:	25% reduction (75% of Existing)
100-year:	20% reduction (80% of Existing)

V. DETENTION BASIN A

The stormwater runoff generated by DA2 is collected by various proposed inlets and conveyed to the underground detention basin located beneath the western portion of the proposed building. The runoff is detained and released at a controlled rate through the use of an internal outlet control structure, and discharges to the south towards the Passaic River, specifically POA #1. Associated calculations are included in the Appendix of this report and details have been provided on the accompanying engineering drawings.

The basin consists of Cupolex reinforced concrete slab, walls and foundation, with polypropylene plastic forms, approximately 48" in height. The system provides approximately 14,750 cubic feet of storage and has been designed in accordance with the New Jersey Stormwater Best Management Practices Manual (BMP). The basin includes a built-in outlet control structure and is water tight, as shown on the accompanying drawings.

VI. DETENTION BASIN B

The stormwater runoff generated by DA3 is collected and conveyed to the proposed aboveground detention basin, Basin B, located in the northwestern corner of the subject property. The basin has been designed to accommodate the 100-year design storm, providing a maximum storage of approximately 3,300 cubic feet, and includes a sand filter to provide water quality treatment, designed in accordance with the New Jersey Stormwater Best Management Practices Manual (BMP). The runoff is detained and released at a controlled rate through the use of an outlet control structure and discharges into the existing conveyance system within the Valley Road right-of-way. Associated calculations are included in the Appendix of this report and details have been provided on the accompanying engineering drawings.

VII. WATER QUANTITY

As required by the Township of Long Hill and NJAC 7:8, the runoff from the area of disturbance must meet the 50%, 75% and 80% reductions for the 2-, 10-, and 100-year storms. The three aforementioned points of analysis have been used to analyze and ensure reduction of peak flows discharging to each point. As such, the required reduction factors were applied to the peak discharge rates of the areas falling within the limits of

disturbance of the entire site, and allowable runoff rates were then calculated. The following demonstrates the results of these calculations:

NJDEP Flow Reductions - POA 1 (CFS)					
Design Storm	Existing Total	Within LOD	Outside of LOD	Allowable	Proposed
2-Year	2.81	0.60 x (0.50) = 0.30	2.21	2.51	2.48
10-Year	5.71	1.37 x (0.75) = 1.03	4.34	5.37	4.73
100-Year	11.45	2.97 x (0.80) = 2.38	8.48	10.86	10.00

NJDEP Flow Reductions - POA 2 (CFS)					
Design Storm	Existing Total	Within LOD	Outside of LOD	Allowable	Proposed
2-Year	1.66	0.80 x (0.50) = 0.40	0.86	1.26	1.13
10-Year	3.81	1.84 x (0.75) = 1.38	1.97	3.35	2.67
100-Year	8.30	4.02 x (0.80) = 3.22	4.29	7.51	5.69

As indicated above, the peak flows for each point of analysis have been reduced when compared to existing conditions. Additionally, the proposed runoff rates for the overall site meet the allowable runoff rates per the required reduction factors, thus meeting the requirements set forth in the Township ordinance and N.J.A.C. 7:8.

VIII. WATER QUALITY

The development proposes more than one-quarter (1/4) acre of impervious coverage and is therefore required to meet the 80% TSS removal rate requirement set forth by the Township of Long Hill and NJAC 7:8. The proposed roof area is considered 'clean' runoff in accordance with the NJDEP BMP Manual; therefore, treatment of runoff generated by same prior to discharge to the underground basins and existing inlets is not required. Drainage areas DA-1A and DA4 are undisturbed areas, and DA-4B does not contain proposed impervious coverage, therefore, runoff generated from these areas is exempt from the water quality requirements.

As shown on the Inlet Area Map, a portion of the runoff generated by the proposed driveway will be collected by Inlet 113. This runoff is conveyed through a Contech Stormfilter Water Quality Unit, an approved NJDEP Stormwater Manufactured Treatment Device designed to provide a TSS removal rate of 80%. The Water Quality Unit is designed to treat the runoff volume generated by the water quality design storm and to allow

larger storm events to bypass. Details associated with this device are included in the attached engineering drawings.

Runoff generated within Inlet Area 114 flows towards the proposed rain garden to the north of the proposed building. The raingarden has been designed to provide 80% TSS removal in accordance with the New Jersey BMP manual to accommodate the volume generated by this area. Treated runoff will be conveyed to the proposed conveyance system via an underdrain and overflow is collected by the proposed inlet 114. This treated runoff is conveyed to the proposed detention basin, Basin A and ultimately discharged to the south towards the Passaic River.

IX. GROUNDWATER RECHARGE

As mentioned above, the project is considered a "major development" under the guidelines set forth by the Township of Long Hill and NJAC 7:8, and is therefore subject to groundwater recharge requirements set forth in same. However, upon field testing conducted by Dynamic Earth, LLC, there is a presence of rock throughout the site that presents unsuitable conditions for groundwater recharge under existing conditions. As such, the proposed underground basins do not allow for infiltration, and meeting the groundwater recharge requirements set forth by the Township and NJAC 7:8 is not feasible. A waiver from providing groundwater recharge BMP's on the developed site is warranted and justified.

X. CONCLUSION

The proposed development has been designed with provisions for the safe and efficient control of stormwater runoff in a manner that will not adversely impact the existing drainage patterns, adjacent roadways, or adjacent parcels.

The stormwater management design reduces peak flow rates for the proposed development area and meets the minimum peak flow reduction for the 2, 10 and 100-year storm frequencies and/or reduces runoff to be under the curve of the existing hydrographs at all times as required by the Township of Long Hill and NJAC 7:8.

The water quality TSS removal requirements set forth by the Township of Long Hill and NJAC 7:8 have been satisfied by use of an NJDEP approved manufactured treatment device, to achieve the 80% TSS required removal rate for the development Ordinance and NJAC 7:8.

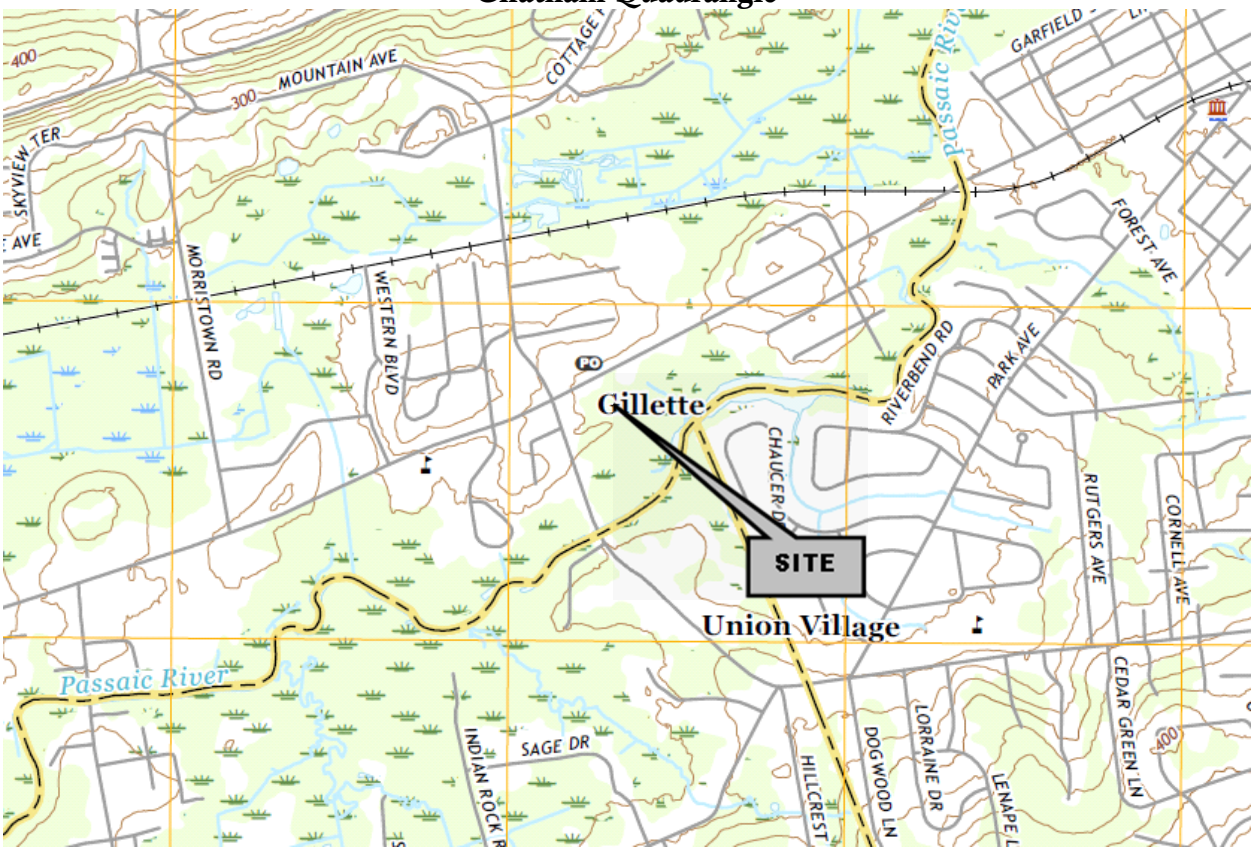
APPENDIX

USGS MAP

DYNAMIC
ENGINEERING EARTH SURVEY TRAFFIC

USGS Map

Chatham Quadrangle



245 Main Street, Suite 110, Chester, NJ 07930 T. 908-879-9229

1904 Main Street, Lake Como, NJ 07719 T. 732-974-0198
8 Robbins Street, Suite 102, Toms River, NJ 08753 T. 732-974-0198
826 Newtown Yardley Rd., Suite 201, Newtown, PA 18940 T. 267-685-0276

100 NE 5th Avenue, Suite B2, Delray Beach, FL 33483 T. 561-291-8570
14521 Old Katy Road, Suite 270, Houston, TX 77079 T. 281-789-6400
714 S. Greenville Avenue, Suite 100, Allen, TX 75002 T. 972-534-2100

CONDUIT OUTLET PROTECTION CALCULATIONS

DYNAMIC ENGINEERING

245 Main Street, Suite 110, Chester, NJ 07930
(908) 879-9229

Date: 7/7/2020
Project: Elite Long Hill
Project No: 0555-99-010

Calculated By: DRL
Checked By: WB

Conduit Outlet Protection Calculations

Rip Rap Pad # 501

Design Parameters:

Design Storm Flow for 25 Year, Q	1.19	cfs
Vertical Dimension of Outlet Pipe, D_o	15	in
Horizontal Dimension of Outlet Pipe, W_o	15	in
Tailwater Depth, TW [1]	0.25	ft

Apron Dimension Calculations:

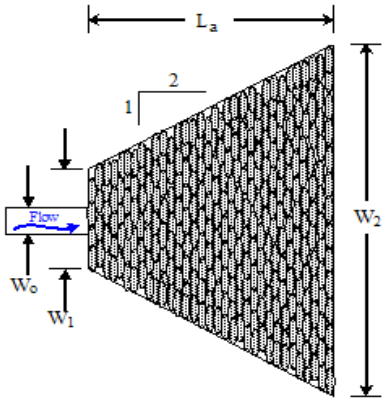
Unit Dicharge, $q = Q/D_o$ = 0.95 cfs per foot

- **Case I: $TW < 1/2\ D_o$**

Apron Length, $L_a = \frac{1.8q}{D_o^{1/2}} + 7D_o$ = 10.28 ft or **L_a = 11 ft**

Width, $W_1 = 3W_o$ = 3.75 ft or **W_1 = 4 ft**

Width, $W_2 = 3W_o + L_a$ = 14.03 ft or **W_2 = 15 ft**

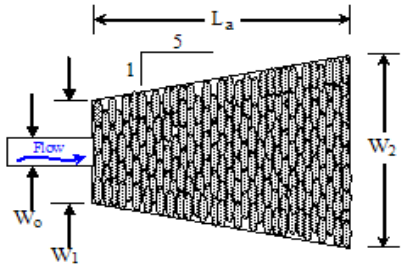


- **Case II: $TW \geq 1/2\ D_o$**

Apron Length, $L_a = \frac{3q}{D_o^{1/2}}$ = **L_a =**

Width, $W_1 = 3W_o$ = **W_1 =**

Width, $W_2 = 3W_o + 0.4L_a$ = **W_2 =**



Rip Rap Stone Size Calculations:

Median Stone, $d_{50} = \frac{0.02q^{1.33}}{TW}$ = 0.90 in **d_{50} = 6 in**

Notes:

1. Where there is a well-defined channel downstream of the apron, the bottom width of the apron shall be at least equal to the bottom width of the channel and the structural lining shall extend at least one foot above the tailwater elevation, but no lower than two-thirds of the vertical conduit dimension above the conduit invert.
2. The side slopes shall be 2:1 or flatter.
3. The bottom grade shall be 0.0% (level).
4. There shall be no overfall at the end of the apron or at the end of the culvert.
5. Fifty (50) percent by weight of the rip-rap mixture shall be smaller than the median size stone designated as d_{50}. The largest stone size in the mixture shall be 1.5 times the d_{50} size. The rip-rap shall be reasonably well graded.
6. The thickness of the rip-rap apron may be two (2) times the median stone diameter provided that the apron is constructed on a bedding of four (4) inches of 3/4 inch clean stone on approved filter fabric material.
7. Rip-rap and filter fabric shall meet the standards of the governing Soil Conservation District as well as the requirements of the local municipality.
8. No bends or curves at the intersection of the conduit and apron will be permitted.

Footnote:

1. Tailwater depth shall be the 2-year storm if discharging into a detention basin. For areas where tailwater cannot be computed, use $TW = 0.2D_o$.
2. For multiple pipes, increase rip-rap sizes by 25% when pipe spacing is greater than or equal to $1/4W_o$.

DYNAMIC ENGINEERING

245 Main Street, Suite 110, Chester, NJ 07930
(908) 879-9229

Date: 7/7/2020
Project: Elite Long Hill
Project No: 0555-99-010

Calculated By: DRL
Checked By: WB

Conduit Outlet Protection Calculations

Rip Rap Pad # 211

Design Parameters:

Design Storm Flow for 25 Year, Q	0.51	cfs
Vertical Dimension of Outlet Pipe, D_o	15	in
Horizontal Dimension of Outlet Pipe, W_o	15	in
Tailwater Depth, TW [1]	0.25	ft

Apron Dimension Calculations:

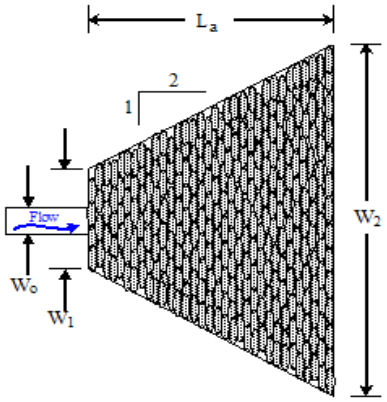
Unit Dicharge, $q = Q/D_o$ = 0.41 cfs per foot

- **Case I: $TW < 1/2\ D_o$**

Apron Length, $L_a = \frac{1.8q}{D_o^{1/2}} + 7D_o$ = 9.41 ft or **L_a = 10 ft**

Width, $W_1 = 3W_o$ = 3.75 ft or **W_1 = 4 ft**

Width, $W_2 = 3W_o + L_a$ = 13.16 ft or **W_2 = 14 ft**

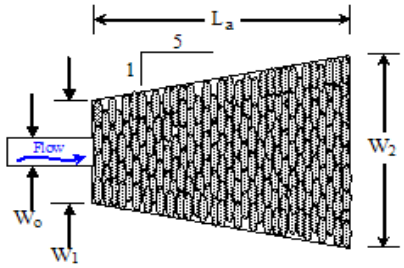


- **Case II: $TW \geq 1/2\ D_o$**

Apron Length, $L_a = \frac{3q}{D_o^{1/2}}$ = **L_a =**

Width, $W_1 = 3W_o$ = **W_1 =**

Width, $W_2 = 3W_o + 0.4L_a$ = **W_2 =**



Rip Rap Stone Size Calculations:

Median Stone, $d_{50} = \frac{0.02q^{1.33}}{TW}$ = 0.29 in **d_{50} = 6 in**

Notes:

1. Where there is a well-defined channel downstream of the apron, the bottom width of the apron shall be at least equal to the bottom width of the channel and the structural lining shall extend at least one foot above the tailwater elevation, but no lower than two-thirds of the vertical conduit dimension above the conduit invert.
2. The side slopes shall be 2:1 or flatter.
3. The bottom grade shall be 0.0% (level).
4. There shall be no overfall at the end of the apron or at the end of the culvert.
5. Fifty (50) percent by weight of the rip-rap mixture shall be smaller than the median size stone designated as d_{50}. The largest stone size in the mixture shall be 1.5 times the d_{50} size. The rip-rap shall be reasonably well graded.
6. The thickness of the rip-rap apron may be two (2) times the median stone diameter provided that the apron is constructed on a bedding of four (4) inches of 3/4 inch clean stone on approved filter fabric material.
7. Rip-rap and filter fabric shall meet the standards of the governing Soil Conservation District as well as the requirements of the local municipality.
8. No bends or curves at the intersection of the conduit and apron will be permitted.

Footnote:

1. Tailwater depth shall be the 2-year storm if discharging into a detention basin. For areas where tailwater cannot be computed, use $TW = 0.2D_o$.
2. For multiple pipes, increase rip-rap sizes by 25% when pipe spacing is greater than or equal to $1/4W_o$.

DYNAMIC ENGINEERING

245 Main Street, Suite 110, Chester, NJ 07930
(908) 879-9229

Date: 7/7/2020
Project: Elite Long Hill
Project No: 0555-99-010

Calculated By: DRL
Checked By: WB

Conduit Outlet Protection Calculations

Rip Rap Pad # 221

Design Parameters:

Design Storm Flow for 25 Year, Q	0.47	cfs
Vertical Dimension of Outlet Pipe, D_o	15	in
Horizontal Dimension of Outlet Pipe, W_o	15	in
Tailwater Depth, TW [1]	0.25	ft

Apron Dimension Calculations:

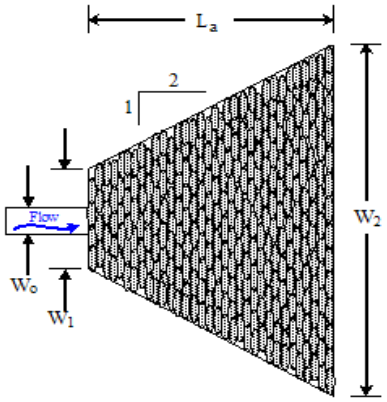
Unit Dicharge, $q = Q/D_o$ = 0.38 cfs per foot

- **Case I: $TW < 1/2\ D_o$**

Apron Length, $L_a = \frac{1.8q}{D_o^{1/2}} + 7D_o$ = 9.36 ft or **L_a = 10 ft**

Width, $W_1 = 3W_o$ = 3.75 ft or **W_1 = 4 ft**

Width, $W_2 = 3W_o + L_a$ = 13.11 ft or **W_2 = 14 ft**

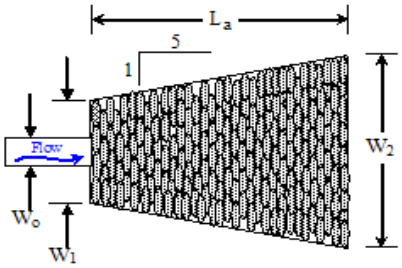


- **Case II: $TW \geq 1/2\ D_o$**

Apron Length, $L_a = \frac{3q}{D_o^{1/2}}$ = **L_a =**

Width, $W_1 = 3W_o$ = **W_1 =**

Width, $W_2 = 3W_o + 0.4L_a$ = **W_2 =**



Rip Rap Stone Size Calculations:

Median Stone, $d_{50} = \frac{0.02q^{1.33}}{TW}$ = 0.26 in **d_{50} = 6 in**

Notes:

1. Where there is a well-defined channel downstream of the apron, the bottom width of the apron shall be at least equal to the bottom width of the channel and the structural lining shall extend at least one foot above the tailwater elevation, but no lower than two-thirds of the vertical conduit dimension above the conduit invert.
2. The side slopes shall be 2:1 or flatter.
3. The bottom grade shall be 0.0% (level).
4. There shall be no overfall at the end of the apron or at the end of the culvert.
5. Fifty (50) percent by weight of the rip-rap mixture shall be smaller than the median size stone designated as d_{50}. The largest stone size in the mixture shall be 1.5 times the d_{50} size. The rip-rap shall be reasonably well graded.
6. The thickness of the rip-rap apron may be two (2) times the median stone diameter provided that the apron is constructed on a bedding of four (4) inches of 3/4 inch clean stone on approved filter fabric material.
7. Rip-rap and filter fabric shall meet the standards of the governing Soil Conservation District as well as the requirements of the local municipality.
8. No bends or curves at the intersection of the conduit and apron will be permitted.

Footnote:

1. Tailwater depth shall be the 2-year storm if discharging into a detention basin. For areas where tailwater cannot be computed, use $TW = 0.2D_o$.
2. For multiple pipes, increase rip-rap sizes by 25% when pipe spacing is greater than or equal to $1/4W_o$.

SOIL SURVEY


74° 27' 56" W
74° 27' 45" W
545170
545210
545250
545290
545330
545370
545410
40° 40' 29" N
40° 40' 18" N
4502800
4502760
4502720
4502680
4502640
4502600
4502560
4502520
4502480
Valley
WhpB
BhdAt
PbpAt
Soil Map may not be valid at this scale.
Map Scale: 1:1,630 if printed on A portrait (8.5" x 11") sheet.
N
Meters
0 20 40 80 120
Feet
0 50 100 200 300
Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N 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 1:24,000.

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

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

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

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

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

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

Soil Survey Area: Morris County, New Jersey
Survey Area Data: Version 14, Sep 16, 2019

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

Date(s) aerial images were photographed: Jul 26, 2019—Jul 31, 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
BhdAt	Biddeford silt loam, 0 to 2 percent slopes, frequently flooded	1.7	31.6%
PbpAt	Parsippany silt loam, 0 to 3 percent slopes, frequently flooded	0.7	13.4%
WhpB	Whippany silt loam, 3 to 8 percent slopes	3.0	55.0%
Totals for Area of Interest		**5.4**	**100.0%**

RUNOFF CURVE NUMBER (CN) CALCULATIONS

DYNAMIC ENGINEERING

EXISTING DRAINAGE AREA SUMMARY AND AVERAGE CURVE NUMBER(CN) CALCULATIONS

Project:	Elite	Computed By:	DRL
Job #:	0555-99-010	Checked By:	WB
Location:	Township of Long Hill	Date:	6/25/2020

Drainage Area	Impervious Area (acre)	Impervious Area (sf)	Curve Number (CN) Used	HSG C - Wooded Area (acre)	HSG C - Wooded Area (sf)	Curve Number (CN) Used	HSG D - Wooded Area (acre)	HSG D - Wooded Area (sf)	Curve Number (CN) Used	Avg. Perv. Curve Number	Total Pervious Area (acres)	Total Area (acres)	TC (Min.)
EX-DA-1	0.00	-	98	0.65	28,383	70	0.00	-	77	70	0.65	0.65	13
EX-DA1 UNDIST	0.00	-	98	0.00	-	70	1.60	69,487	77	77	1.60	1.60	13
EX-DA2	0.00	-	98	1.36	59,109	70	0.00	-	77	70	1.36	1.36	20
EX-DA2 UNDIST	0.00	-	98	1.45	63,010	70	0.00	-	77	70	1.45	1.45	20
Total	**0.00**	**0.00**		**3.46**	**150502.00**		**1.60**	**69487.00**			**5.05**	**5.05**	

Per County Soil Survey - Morris	WhpB	HSG	C	Soil	Whippany silt loam
Per County Soil Survey - Morris	BhdAt	HSG	D	Soil	Biddeford silt loam

Description	Runoff Curve Number (CN) (HSG D)	Runoff Curve Number (CN) (HSG D)
Impervious Surface	98	98
Brush (good)	65	73
Woods (good)	70	77

DYNAMIC ENGINEERING

Proposed Drainage Area Summary and Average Curve Number(CN) Calculations

Project:	Elite	Computed By:	DRL
Job #:	0555-99-010	Checked By:	WB
Location:	Township of Long Hill	Date:	6/24/2020

Drainage Area	Impervious Area (acre)	Impervious Area (sf)	Curve Number (CN) Used	HSG C - Wooded Area (acre)	HSG C - Wooded Area (sf)	Curve Number (CN) Used	HSG C - Open Space (acre)	HSG C - Open Space (sf)	Curve Number (CN) Used	HSG D - Wooded Area (acre)	HSG D - Wooded Area (sf)	Curve Number (CN) Used	HSG D - Open Space (acre)	HSG D - Open Space(sf)	Curve Number (CN) Used	Avg. Perv. Curve Number	Total Pervious Area (acres)	Total Area (acres)	TC (Min.)
DA-1B	0.00	-	98	0.00	-	70	0.26	11,470	74	0.00	-	77	0.00	-	80	74	0.26	0.26	15
DA-1A	0.00	-	98	0.00	-	70	0.00	-	74	1.60	69,487	77	0.00	-	80	77	1.60	1.60	15
DA2-Roof	0.67	29,161	98	0.00	-	70	0.00	-	74	0.00	-	77	0.00	-	80	N/A	0.00	0.67	10
DA-2	0.41	17,813	99	0.00	-	70	0.02	785	74	0.00	-	77	0.00	-	80	74	0.02	0.43	10
DA-3 (detained)	0.24	10,408	100	0.00	-	70	0.12	5,031	74	0.00	-	77	0.00	-	80	74	0.12	0.35	10
DA-4 (undetained)	0.00	-	98	1.45	63,137	70	0.29	12,546	74	0.00	-	77	0.00	-	80	71	1.74	1.74	32
Total	**1.32**	**57382.00**		**1.45**	**63137.00**					**1.60**	**69487.00**						**3.73**	**5.05**	

Per County Soil Survey - Morris	WhpB	HSG	C	Soil	Whippany silt loam
Per County Soil Survey - Morris	BhdAt	HSG	D	Soil	Biddeford silt loam

Description	Runoff Curve Number (CN) (HSG C)	Runoff Curve Number (CN) (HSG D)
Impervious Surface	98	98
Open Space	74	80
Woods (good)	70	77

PIPE SIZING CALCULATIONS

DYNAMIC ENGINEERING

Stormwater Collection System Calculations

Project: Elite Properties
Job #: 0555-99-010
Location: Long Hill, NJ
Design Storm: 25

Computed By: DRL
Checked By: WB
Date: 6/30/2020
Revised:

NOTES:
1) Design method used is Rational Method
2) Refer to Weighted Runoff Coefficient table for calculation of incremental areas and C values

PIPE SECTION		SUBCATCHMENT AREA	INCREMENTAL		CUMULATIVE	TIME OF CONCENTRATION			I	PEAK RUNOFF		PIPING INPUT			PIPING DATA			
FROM	TO	Area (Acres)	"C"	A x C Ac	A x C (acres)	Tc to Inlet (min)	Tc in Pipe (min.)	Final Tc (min)	(In/Hr)	Q to Inlet (CFS)	Q cum. for Pipe (CFS)	Dia. (In)	Length (Ft)	Man. "n"	Slope (ft/ft)	Pipe Capacity (cfs)	Full Pipe Velocity (fps)	Actual Pipe Velocity (fps)
113	112	0.10	0.95	0.10	0.10	0.23	10.00	10.00	6.80	0.68	0.68	15.00	56.00	0.01	0.005	4.95	4.04	0.55
112	BASIN A	0.26	0.95	0.25	0.35	0.27	10.00	10.23	6.80	1.70	2.38	15.00	65.00	0.01	0.005	4.95	4.04	1.94
0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.00	0.00
212	BASIN B	0.10	0.95	0.10	0.10	0.08	10.00	10.00	6.80	0.68	0.68	15.00	20.00	0.01	0.005	4.95	4.04	0.55
0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.00	0.00
222	BASIN B	0.09	0.95	0.09	0.09	0.02	10.00	10.00	6.80	0.61	0.61	15.00	4.00	0.01	0.005	4.95	4.04	0.50

TIME OF CONCENTRATION (Tc) CALCULATIONS

DYNAMIC ENGINEERING

1904 Main Street, Lake Como, NJ 07719
(732) 974-0198

Date: 6/25/2020
Project: Elite - Long Hill
Project No: 0555-99-010

Calculated By: DRL
Checked By: WB

Worksheet 3: Time of Concentration (T_c) Calculations

Land Condition: Existing
Drainage Area: EX-DA1

• Sheet Flow:

1.	Surface Description		Woods, Light Underbrush						
2.	Manning's Roughness Coefficient, n		0.4						
3.	Flow Length, L { total $L \le 100$ ft }		100.0 ft						
4.	Two-Year 24-hour Rainfall, p_2 for . . .	Warren County	3.34 in			3.34 in			
5.	Land Slope, s (ft/ft)		0.085 ft/ft						
6.	Travel Time, $T_t = \frac{0.007\,(n\,L)^{0.8}}{p_2^{0.5}\,s^{0.4}}$		0.196 hr	+	0.000 hr	+	0.000 hr	=	0.196 hr

• Shallow Concentrated Flow:

7.	Surface Description		Unpaved						
8.	Flow Length, L		204.0 ft						
9.	Watercourse Slope, s		0.036 ft/ft						
10.	Average velocity, V { see Figure 3.1)		3.06 ft/s						
11.	Travel Time, $T_t = \frac{L}{3600\,V}$		0.019 hr	+	0.000 hr	+	0.000 hr	=	0.019 hr

• Channel Flow:

12.	Pipe Diameter, D								
13.	Cross-Sectional Flow Area, A								
14.	Wetted Perimeter, p_w								
15.	Hydraulic Radius, $r = A / p_w$								
16.	Channel Slope, s								
17.	Pipe Material								
18.	Manning's Roughness Coefficient, n								
19.	Velocity, $V = \frac{1.49\,r^{2/3}\,s^{1/2}}{n}$								
20.	Flow Length, L		170.0		175.0				
21.	Travel Time, $T_t = \frac{L}{3600\,V}$		0.000 hr	+	0.000 hr	+	0.000 hr	=	0.000 hr
22.	Watershed or subarea Time of Concentration, T_c { add T_t in steps 6, 11 and 21 }								0.215 hr
									12.9 min

DYNAMIC ENGINEERING

1904 Main Street, Lake Como, NJ 07719
(732) 974-0198

Date: 6/25/2020
Project: Elite - Long Hill
Project No: 0555-99-010

Calculated By: DRL
Checked By: WB

Worksheet 3: Time of Concentration (T_c) Calculations

Land Condition: Existing
Drainage Area: EX-DA-2

- ***Sheet Flow*:**

		AB				
1.	Surface Description	Woods, Light Underbrush				
2.	Manning's Roughness Coefficient, n	0.4				
3.	Flow Length, L { *total* $L \le 100$ *ft* }	100.0 ft				
4.	Two-Year 24-hour Rainfall, p_2 for . . Warren County	3.38 in				
5.	Land Slope, s *(ft/ft)*	0.040 ft/ft				
6.	Travel Time, $T_t = \frac{0.007\,(n\,L)^{0.8}}{p_2^{0.5}\,s^{0.4}}$	0.264 hr	+ 0.000 hr	+ 0.000 hr	=	0.264 hr

- ***Shallow Concentrated Flow*:**

		BC				
7.	Surface Description	Unpaved				
8.	Flow Length, L	437.0 ft				
9.	Watercourse Slope, s	0.010 ft/ft				
10.	Average velocity, V { *see Figure 3.1)*	1.61 ft/s				
11.	Travel Time, $T_t = \frac{L}{3600\,V}$	0.075 hr	+ 0.000 hr	+ 0.000 hr	=	0.075 hr

- ***Channel Flow*:**

12.	Pipe Diameter, D					
13.	Cross-Sectional Flow Area, A					
14.	Wetted Perimeter, p_w					
15.	Hydraulic Radius, $r = A / p_w$					
16.	Channel Slope, s					
17.	Pipe Material					
18.	Manning's Roughness Coefficient, n					
19.	Velocity, $V = \frac{1.49\,r^{2/3}\,s^{1/2}}{n}$					
20.	Flow Length, L					
21.	Travel Time, $T_t = \frac{L}{3600\,V}$	0.000 hr	+ 0.000 hr	+ 0.000 hr	=	0.000 hr
22.	Watershed or subarea Time of Concentration, T_c { *add* T_t *in steps 6, 11 and 21* }					0.339 hr
						20.3 min

DYNAMIC ENGINEERING

1904 Main Street, Lake Como, NJ 07719
(732) 974-0198

Date: 6/25/2020
Project: Elite - Long Hill
Project No: 0555-99-010

Calculated By: DRL
Checked By: WB

Worksheet 3: Time of Concentration (T_c) Calculations

Land Condition: Existing
Drainage Area: EX-DA-2 Undist

• Sheet Flow:

		AB				
1.	Surface Description	Woods, Light Underbrush				
2.	Manning's Roughness Coefficient, n	0.4				
3.	Flow Length, L { *total* $L \le 100$ *ft* }	100.0 ft				
4.	Two-Year 24-hour Rainfall, p_2 for . . Warren County	3.38 in				
5.	Land Slope, s *(ft/ft)*	0.010 ft/ft				
6.	Travel Time, $T_t = \frac{0.007\,(n\,L)^{0.8}}{p_2^{0.5}\,s^{0.4}}$	0.460 hr	+ 0.000 hr	+ 0.000 hr	=	0.460 hr

• Shallow Concentrated Flow:

		BC				
7.	Surface Description	Unpaved				
8.	Flow Length, L	393.0 ft				
9.	Watercourse Slope, s	0.010 ft/ft				
10.	Average velocity, V { *see Figure 3.1)*	1.61 ft/s				
11.	Travel Time, $T_t = \frac{L}{3600\,V}$	0.068 hr	+ 0.000 hr	+ 0.000 hr	=	0.068 hr

• Channel Flow:

12.	Pipe Diameter, D					
13.	Cross-Sectional Flow Area, A					
14.	Wetted Perimeter, p_w					
15.	Hydraulic Radius, $r = A / p_w$					
16.	Channel Slope, s					
17.	Pipe Material					
18.	Manning's Roughness Coefficient, n					
19.	Velocity, $V = \frac{1.49\,r^{2/3}\,s^{1/2}}{n}$					
20.	Flow Length, L					
21.	Travel Time, $T_t = \frac{L}{3600\,V}$	0.000 hr	+ 0.000 hr	+ 0.000 hr	=	0.000 hr
22.	Watershed or subarea Time of Concentration, T_c { *add* T_t *in steps 6, 11 and 21* }					0.527 hr
						31.6 min

DYNAMIC ENGINEERING

1904 Main Street, Lake Como, NJ 07719
(732) 974-0198

Date: 4/3/2020
Project: Elite - Long Hill
Project No: 0555-99-010

Calculated By: DRL
Checked By: WB

Worksheet 3: Time of Concentration (T_c) Calculations

Land Condition: Proposed
Drainage Area: DA-1

• Sheet Flow:

	AB	BC			
1. Surface Description	Short Grass, Prairie	Woods, Light Underbrush			
2. Manning's Roughness Coefficient, n	0.15	0.4			
3. Flow Length, L { total $L \le 100$ ft }	15.0 ft	85.0 ft			
4. Two-Year 24-hour Rainfall, p_2 for Warren County	3.38 in	3.38 in			
5. Land Slope, s (ft/ft)	0.200 ft/ft	0.047 ft/ft			
6. Travel Time, $T_t = \frac{0.007\,(n\,L)^{0.8}}{p_2^{0.5}\,s^{0.4}}$	0.014 hr	+ 0.217 hr	+ 0.000 hr	=	0.231 hr

• Shallow Concentrated Flow:

	CD				
7. Surface Description	Unpaved				
8. Flow Length, L	165.0 ft				
9. Watercourse Slope, s	0.024 ft/ft				
10. Average velocity, V { see Figure 3.1)	2.50 ft/s				
11. Travel Time, $T_t = \frac{L}{3600\,V}$	0.018 hr	+ 0.000 hr	+ 0.000 hr	=	0.018 hr

• Channel Flow:

12. Pipe Diameter, D					
13. Cross-Sectional Flow Area, A					
14. Wetted Perimeter, p_w					
15. Hydraulic Radius, $r = A / p_w$					
16. Channel Slope, s					
17. Pipe Material					
18. Manning's Roughness Coefficient, n					
19. Velocity, $V = \frac{1.49\,r^{2/3}\,s^{1/2}}{n}$					
20. Flow Length, L					
21. Travel Time, $T_t = \frac{L}{3600\,V}$	0.000 hr	+ 0.000 hr	+ 0.000 hr	=	0.000 hr
22. Watershed or subarea Time of Concentration, T_c { add T_t in steps 6, 11 and 21 }					0.249 hr
					15.0 min

HYDROGRAPH SUMMARY REPORTS – EXISTING & PROPOSED CONDITIONS 2-YR, 10-YR, & 100-YR

Hydrograph by Return Period

Project Name:

Hydrology Studio v 3.0.0.16

08-06-2020

Hyd. No.	Hydrograph Type	Hydrograph Name	Peak Outflow (cfs)							
			1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr
1	NRCS Runoff	EX-DA1		0.606			1.368	1.932		2.970
2	NRCS Runoff	EX-DA1 UNDIST.		2.213			4.338	5.824		8.478
3	Junction	EXIST. POA-1		2.813			5.706	7.756		11.45
5	NRCS Runoff	EX-DA2		0.804			1.843	2.607		4.019
6	NRCS Runoff	EX-DA2 UNDIST.		0.857			1.965	2.780		4.285
7	Junction	EXIST. POA-2		1.660			3.807	5.387		8.303
12	NRCS Runoff	DA-1B		0.281			0.585	0.802		1.193
13	NRCS Runoff	DA-1A		1.956			3.836	5.151		7.501
14	Junction	DA-1		2.238			4.421	5.953		8.694
16	NRCS Runoff	DA-2 Imperv.		3.017			4.492	5.470		7.180
17	NRCS Runoff	DA-2 Perv.		0.024			0.049	0.067		0.100
18	Junction	DA-2 - BASIN A		3.041			4.541	5.537		7.280
19	Pond Route	BASIN A		0.345			0.986	1.289		1.738
21	Junction	POA-1		2.509			4.972	6.897		10.09
24	NRCS Runoff	DA-3 Imperv.		0.670			0.998	1.215		1.596
25	NRCS Runoff	DA-3 Perv.		0.142			0.294	0.403		0.600
26	Junction	BASIN B		0.812			1.292	1.618		2.195
27	Pond Route	BASIN B		0.222			0.630	0.893		1.326
29	NRCS Runoff	DA-4		0.916			2.046	2.872		4.388
31	Junction	POA-2		1.129			2.668	3.746		5.687
33	NRCS Runoff	222		0.251			0.374	0.456		0.598
35	NRCS Runoff	211		0.279			0.416	0.506		0.665

Hydrograph 2-yr Summary

Project Name:

Hydrology Studio v 3.0.0.16

08-06-2020

Hyd. No.	Hydrograph Type	Hydrograph Name	Peak Flow (cfs)	Time to Peak (hrs)	Hydrograph Volume (cuft)	Inflow Hyd(s)	Maximum Elevation (ft)	Maximum Storage (cuft)
1	NRCS Runoff	EX-DA1	0.606	12.20	2,513	---		
2	NRCS Runoff	EX-DA1 UNDIST.	2.213	12.17	8,746	---		
3	Junction	EXIST. POA-1	2.813	12.17	11,260	1, 2		
5	NRCS Runoff	EX-DA2	0.804	12.40	5,163	---		
6	NRCS Runoff	EX-DA2 UNDIST.	0.857	12.40	5,505	---		
7	Junction	EXIST. POA-2	1.660	12.40	10,667	5, 6		
12	NRCS Runoff	DA-1B	0.281	12.20	1,211	---		
13	NRCS Runoff	DA-1A	1.956	12.20	8,269	---		
14	Junction	DA-1	2.238	12.20	9,481	12, 13		
16	NRCS Runoff	DA-2 Imperv.	3.017	12.17	13,367	---		
17	NRCS Runoff	DA-2 Perv.	0.024	12.20	94.9	---		
18	Junction	DA-2 - BASIN A	3.041	12.17	13,462	16, 17		
19	Pond Route	BASIN A	0.345	13.17	13,439	18	215.09	5,925
21	Junction	POA-1	2.509	12.20	22,920	14, 19		
24	NRCS Runoff	DA-3 Imperv.	0.670	12.17	2,971	---		
25	NRCS Runoff	DA-3 Perv.	0.142	12.20	569	---		
26	Junction	BASIN B	0.812	12.17	3,540	24, 25		
27	Pond Route	BASIN B	0.222	12.53	2,537	26	217.35	1,863
29	NRCS Runoff	DA-4	0.916	12.40	5,805	---		
31	Junction	POA-2	1.129	12.40	8,342	27, 29		
33	NRCS Runoff	222	0.251	12.17	1,114	---		
35	NRCS Runoff	211	0.279	12.17	1,238	---		

Hydrograph Report

Project Name:

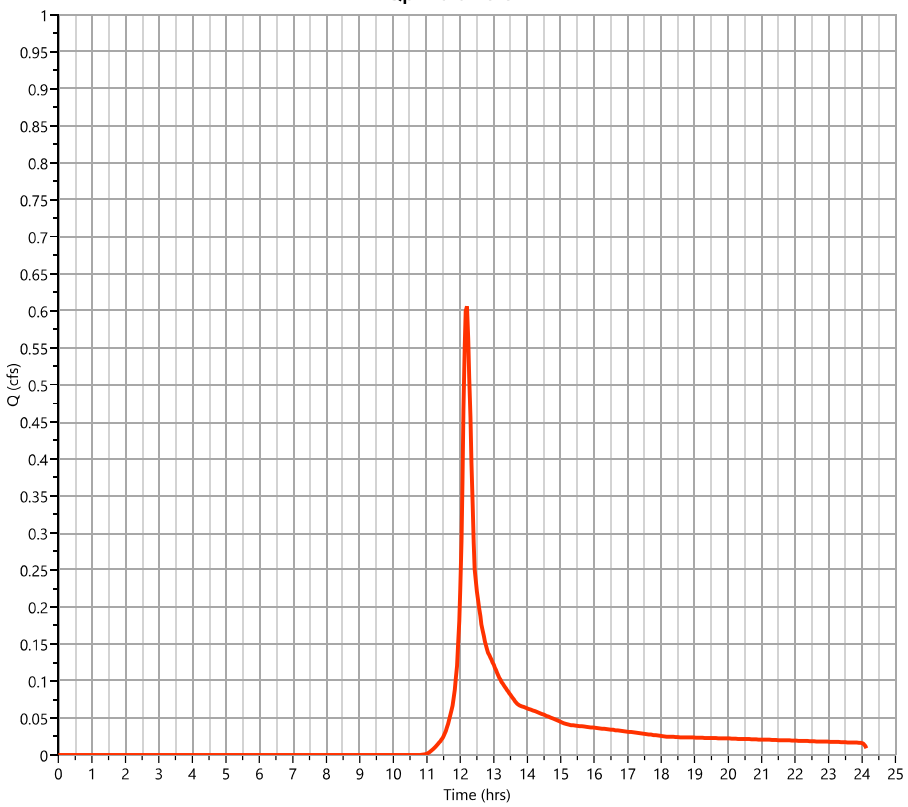
Hydrology Studio v 3.0.0.16

08-06-2020

EX-DA1

Hyd. No. 1

Hydrograph Type	= NRCS Runoff	Peak Flow	= 0.606 cfs
Storm Frequency	= 2-yr	Time to Peak	= 12.20 hrs
Time Interval	= 2 min	Runoff Volume	= 2,513 cuft
Drainage Area	= 0.65 ac	Curve Number	= 70
Tc Method	= User	Time of Conc. (Tc)	= 12.9 min
Total Rainfall	= 3.54 in	Design Storm	= NOAA-D
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

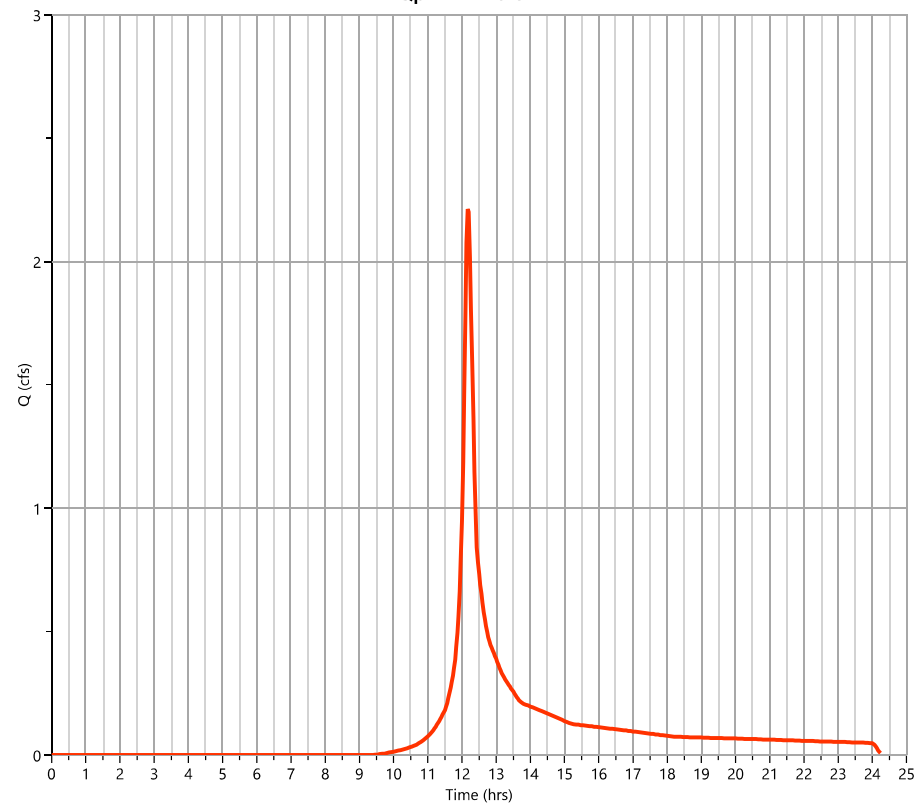
Hydrology Studio v 3.0.0.16

08-06-2020

EX-DA1 UNDIST.

Hyd. No. 2

Hydrograph Type	= NRCS Runoff	Peak Flow	= 2.213 cfs
Storm Frequency	= 2-yr	Time to Peak	= 12.17 hrs
Time Interval	= 2 min	Runoff Volume	= 8,746 cuft
Drainage Area	= 1.6 ac	Curve Number	= 77
Tc Method	= User	Time of Conc. (Tc)	= 12.9 min
Total Rainfall	= 3.54 in	Design Storm	= NOAA-D
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

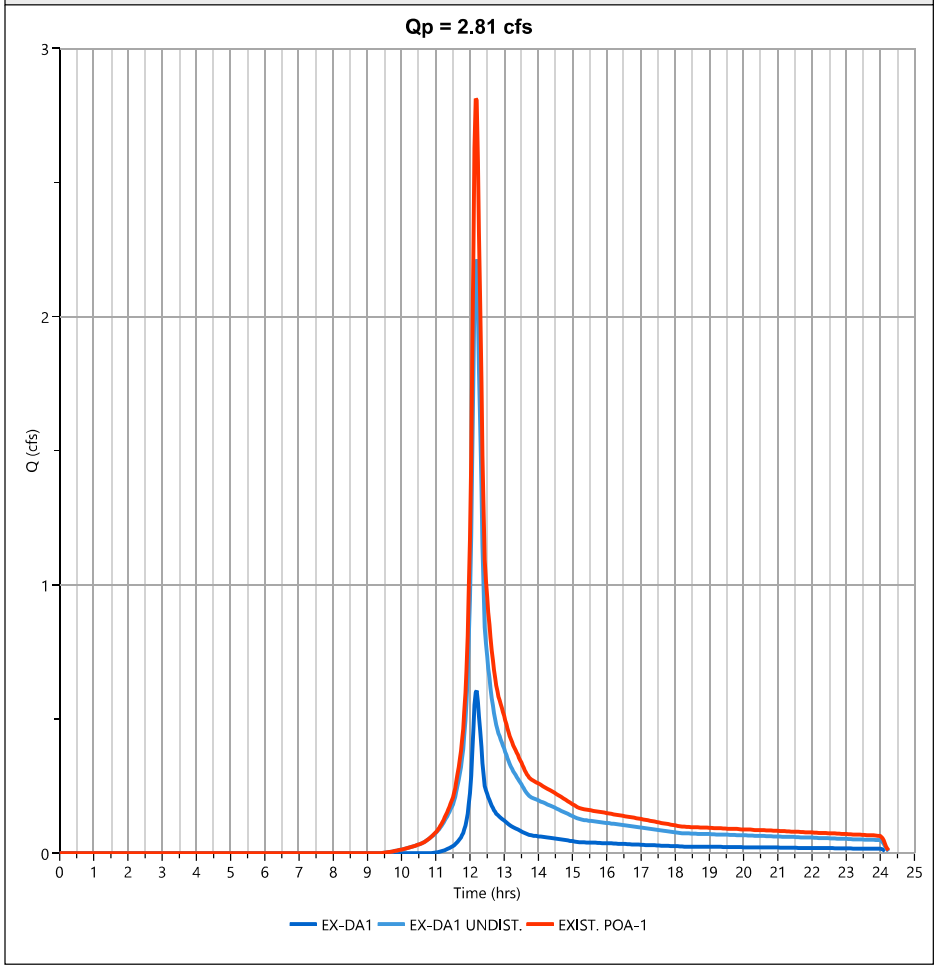
Hydrology Studio v 3.0.0.16

08-06-2020

EXIST. POA-1

Hyd. No. 3

Hydrograph Type	= Junction	Peak Flow	= 2.813 cfs
Storm Frequency	= 2-yr	Time to Peak	= 12.17 hrs
Time Interval	= 2 min	Hydrograph Volume	= 11,260 cuft
Inflow Hydrographs	= 1, 2	Total Contrib. Area	= 2.25 ac



Hydrograph Report

Project Name:

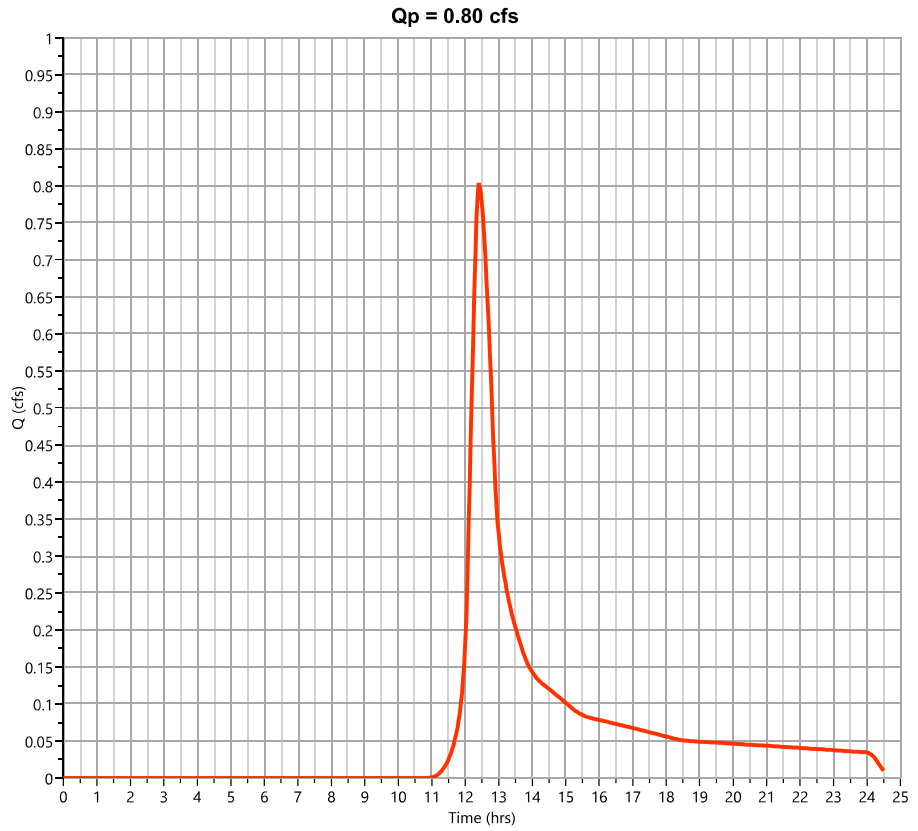
Hydrology Studio v 3.0.0.16

08-06-2020

EX-DA2

Hyd. No. 5

Hydrograph Type	= NRCS Runoff	Peak Flow	= 0.804 cfs
Storm Frequency	= 2-yr	Time to Peak	= 12.40 hrs
Time Interval	= 2 min	Runoff Volume	= 5,163 cuft
Drainage Area	= 1.36 ac	Curve Number	= 70
Tc Method	= User	Time of Conc. (Tc)	= 31.6 min
Total Rainfall	= 3.54 in	Design Storm	= NOAA-D
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

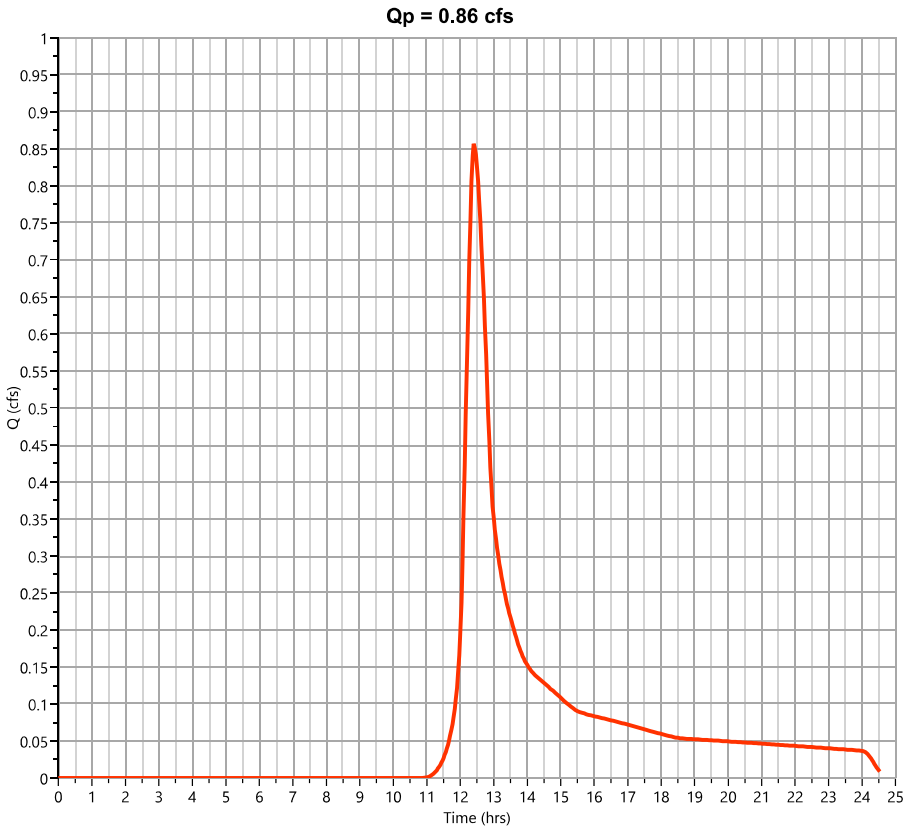
Hydrology Studio v 3.0.0.16

08-06-2020

EX-DA2 UNDIST.

Hyd. No. 6

Hydrograph Type	= NRCS Runoff	Peak Flow	= 0.857 cfs
Storm Frequency	= 2-yr	Time to Peak	= 12.40 hrs
Time Interval	= 2 min	Runoff Volume	= 5,505 cuft
Drainage Area	= 1.45 ac	Curve Number	= 70
Tc Method	= User	Time of Conc. (Tc)	= 31.6 min
Total Rainfall	= 3.54 in	Design Storm	= NOAA-D
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

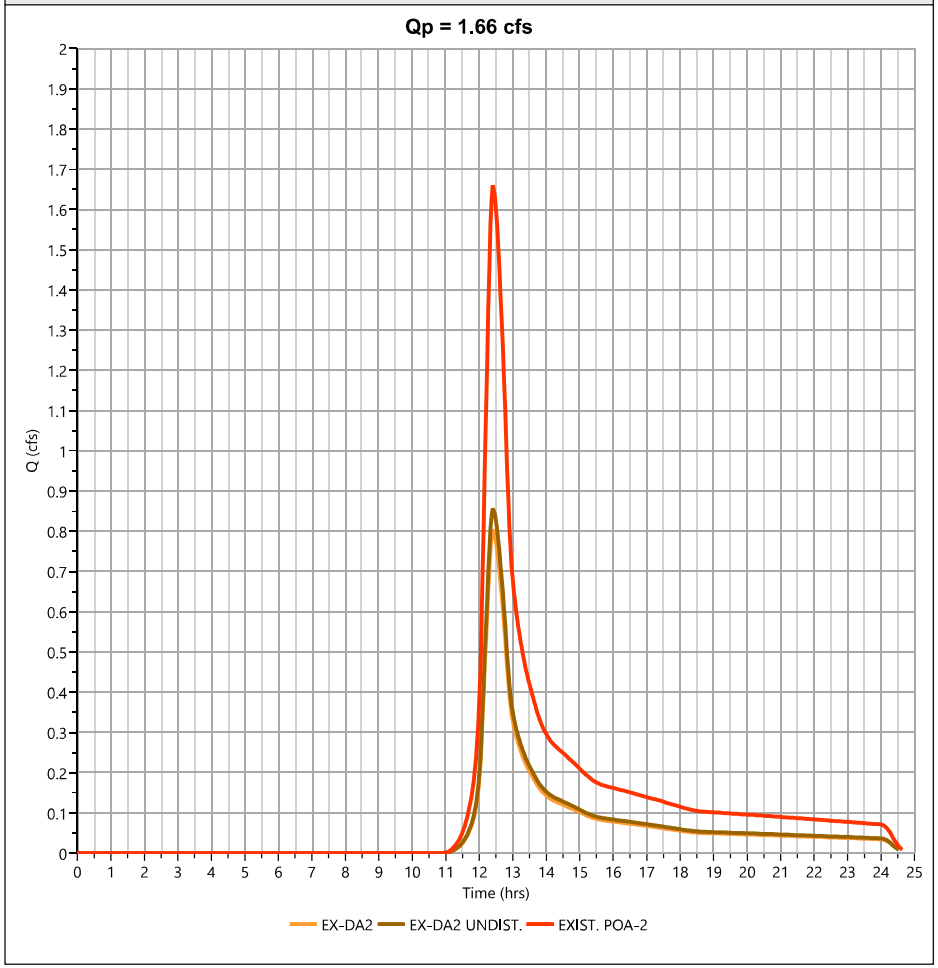
Hydrology Studio v 3.0.0.16

08-06-2020

EXIST. POA-2

Hyd. No. 7

Hydrograph Type	= Junction	Peak Flow	= 1.660 cfs
Storm Frequency	= 2-yr	Time to Peak	= 12.40 hrs
Time Interval	= 2 min	Hydrograph Volume	= 10,667 cuft
Inflow Hydrographs	= 5, 6	Total Contrib. Area	= 2.81 ac



Hydrograph Report

Project Name:

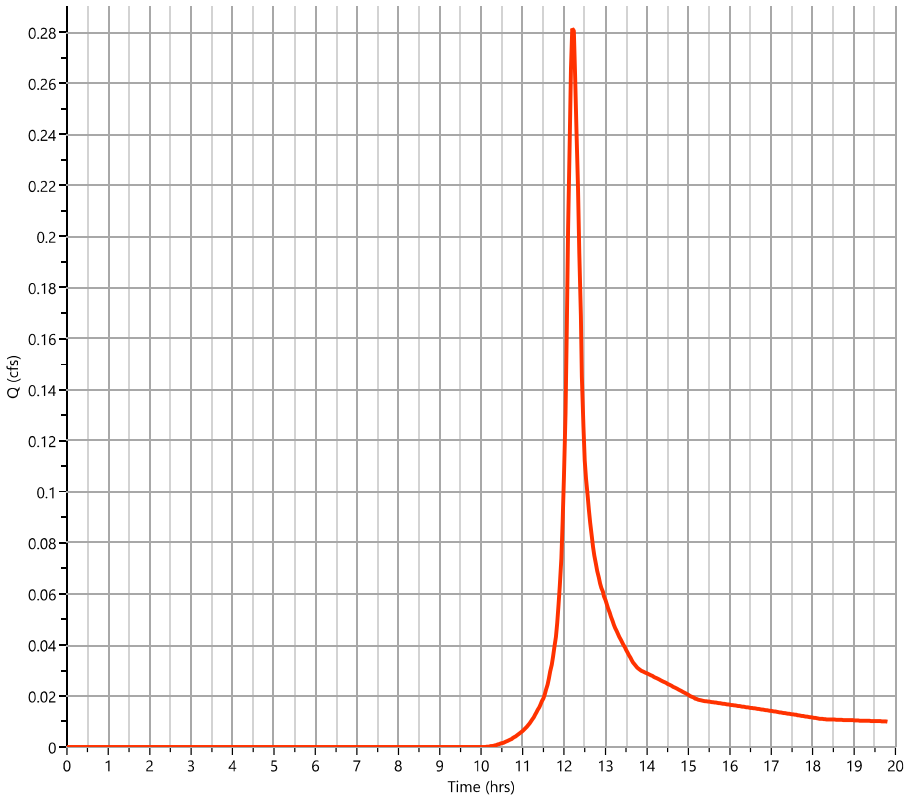
Hydrology Studio v 3.0.0.16

08-06-2020

DA-1B

Hyd. No. 12

Hydrograph Type	= NRCS Runoff	Peak Flow	= 0.281 cfs
Storm Frequency	= 2-yr	Time to Peak	= 12.20 hrs
Time Interval	= 2 min	Runoff Volume	= 1,211 cuft
Drainage Area	= 0.27 ac	Curve Number	= 74
Tc Method	= User	Time of Conc. (Tc)	= 15.0 min
Total Rainfall	= 3.54 in	Design Storm	= NOAA-D
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

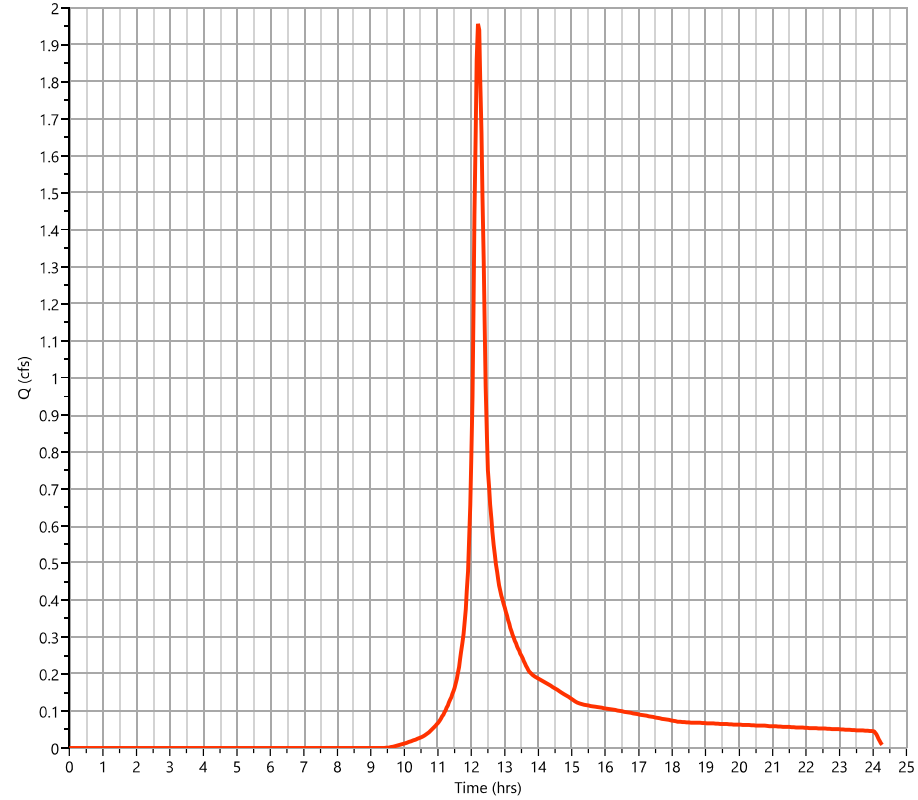
Hydrology Studio v 3.0.0.16

08-06-2020

DA-1A

Hyd. No. 13

Hydrograph Type	= NRCS Runoff	Peak Flow	= 1.956 cfs
Storm Frequency	= 2-yr	Time to Peak	= 12.20 hrs
Time Interval	= 2 min	Runoff Volume	= 8,269 cuft
Drainage Area	= 1.6 ac	Curve Number	= 77
Tc Method	= User	Time of Conc. (Tc)	= 15.0 min
Total Rainfall	= 3.54 in	Design Storm	= NOAA-D
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

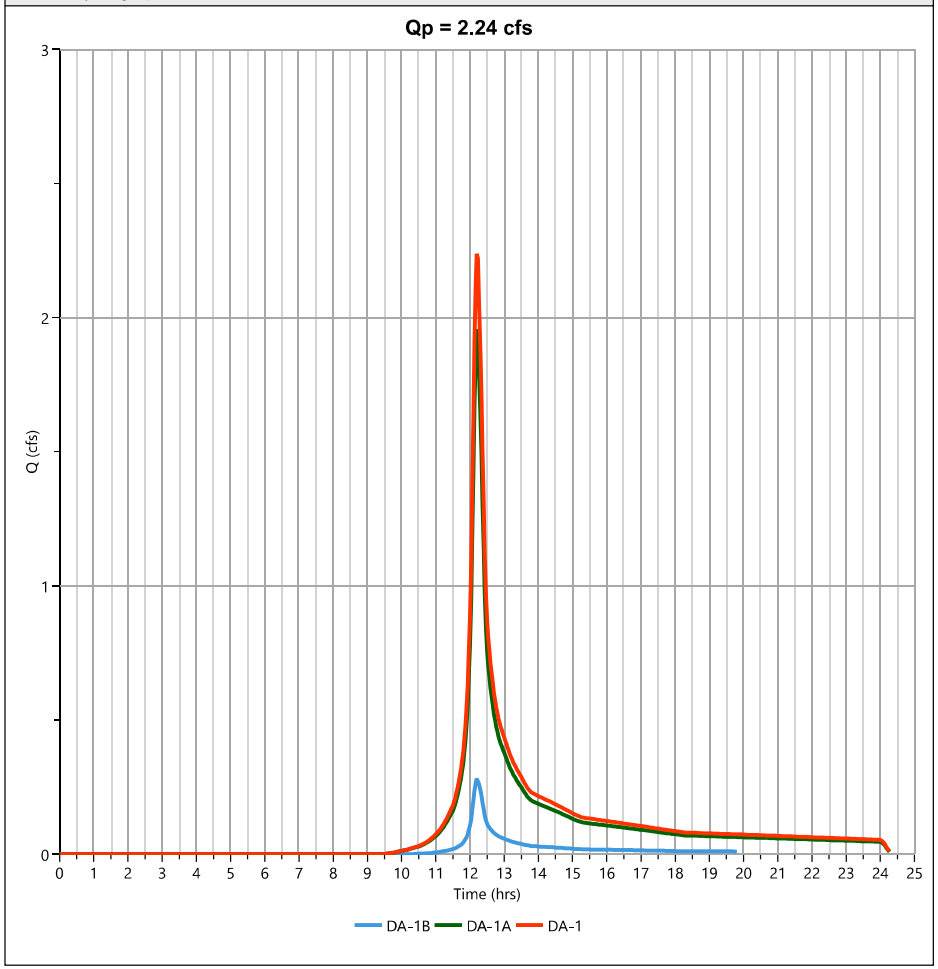
Hydrology Studio v 3.0.0.16

08-06-2020

DA-1

Hyd. No. 14

Hydrograph Type	= Junction	Peak Flow	= 2.238 cfs
Storm Frequency	= 2-yr	Time to Peak	= 12.20 hrs
Time Interval	= 2 min	Hydrograph Volume	= 9,481 cuft
Inflow Hydrographs	= 12, 13	Total Contrib. Area	= 1.87 ac



Hydrograph Report

Project Name:

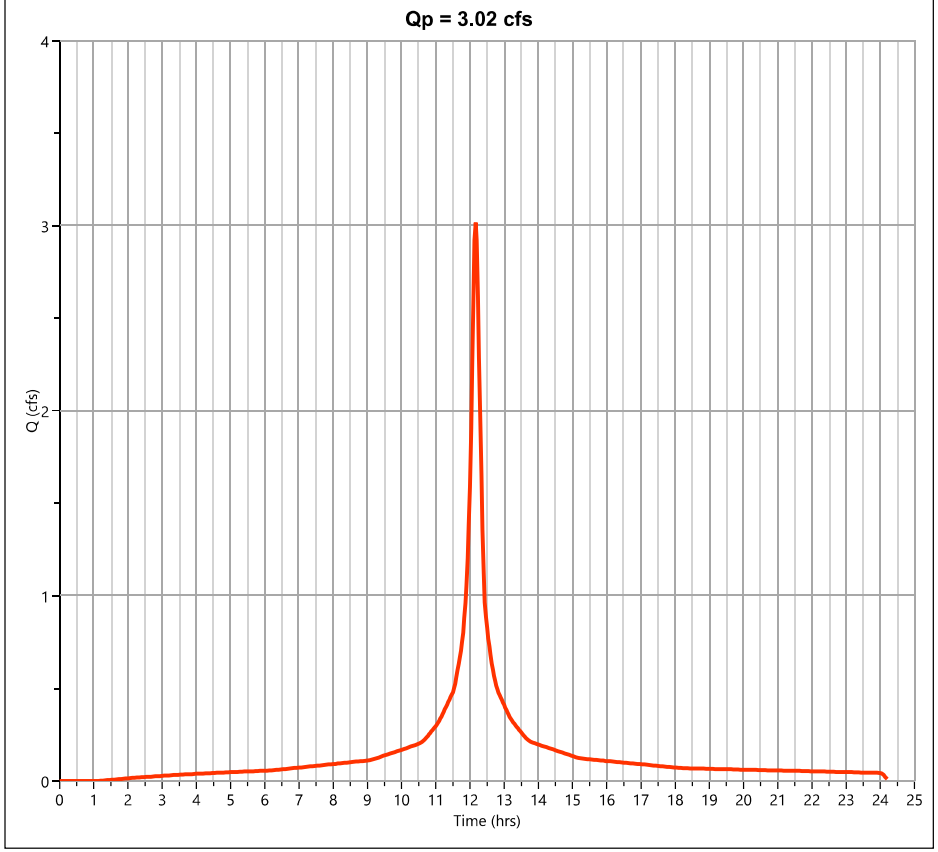
Hydrology Studio v 3.0.0.16

08-06-2020

DA-2 Imperv.

Hyd. No. 16

Hydrograph Type	= NRCS Runoff	Peak Flow	= 3.017 cfs
Storm Frequency	= 2-yr	Time to Peak	= 12.17 hrs
Time Interval	= 2 min	Runoff Volume	= 13,367 cuft
Drainage Area	= 1.08 ac	Curve Number	= 98
Tc Method	= User	Time of Conc. (Tc)	= 10.0 min
Total Rainfall	= 3.54 in	Design Storm	= NOAA-D
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

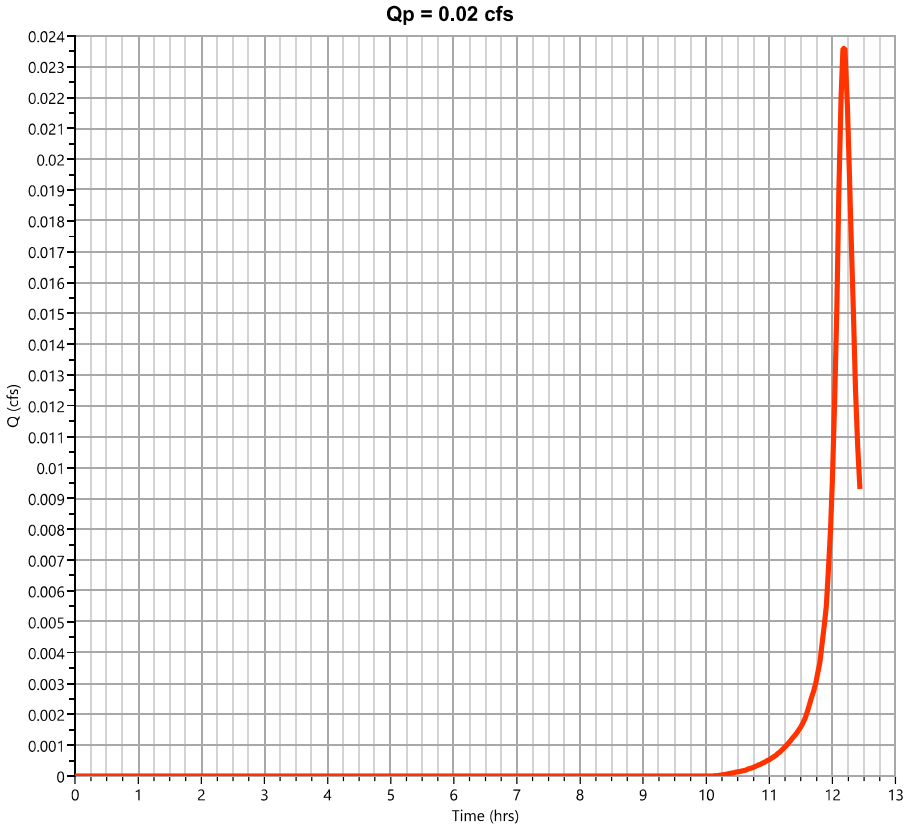
Hydrology Studio v 3.0.0.16

08-06-2020

DA-2 Perv.

Hyd. No. 17

Hydrograph Type	= NRCS Runoff	Peak Flow	= 0.024 cfs
Storm Frequency	= 2-yr	Time to Peak	= 12.20 hrs
Time Interval	= 2 min	Runoff Volume	= 94.9 cuft
Drainage Area	= 0.02 ac	Curve Number	= 74
Tc Method	= User	Time of Conc. (Tc)	= 10.0 min
Total Rainfall	= 3.54 in	Design Storm	= NOAA-D
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

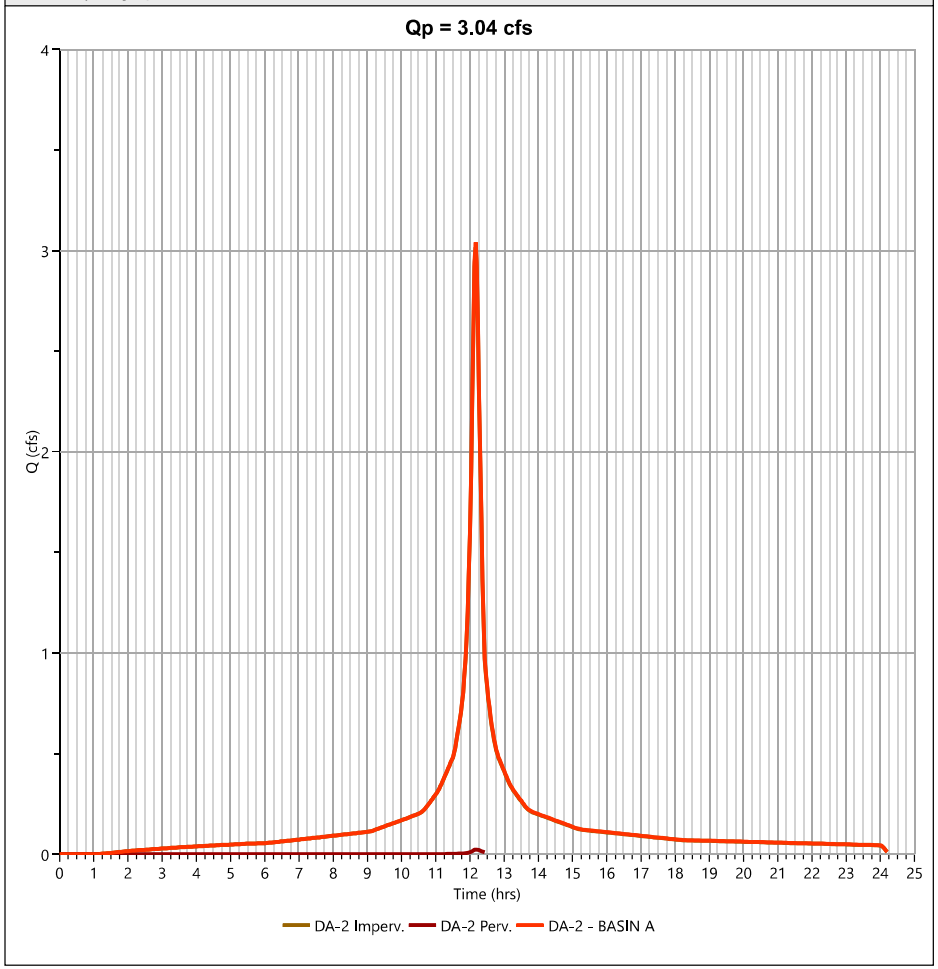
Hydrology Studio v 3.0.0.16

08-06-2020

DA-2 - BASIN A

Hyd. No. 18

Hydrograph Type	= Junction	Peak Flow	= 3.041 cfs
Storm Frequency	= 2-yr	Time to Peak	= 12.17 hrs
Time Interval	= 2 min	Hydrograph Volume	= 13,462 cuft
Inflow Hydrographs	= 16, 17	Total Contrib. Area	= 1.1 ac



Hydrograph Report

Project Name:

Hydrology Studio v 3.0.0.16

08-06-2020

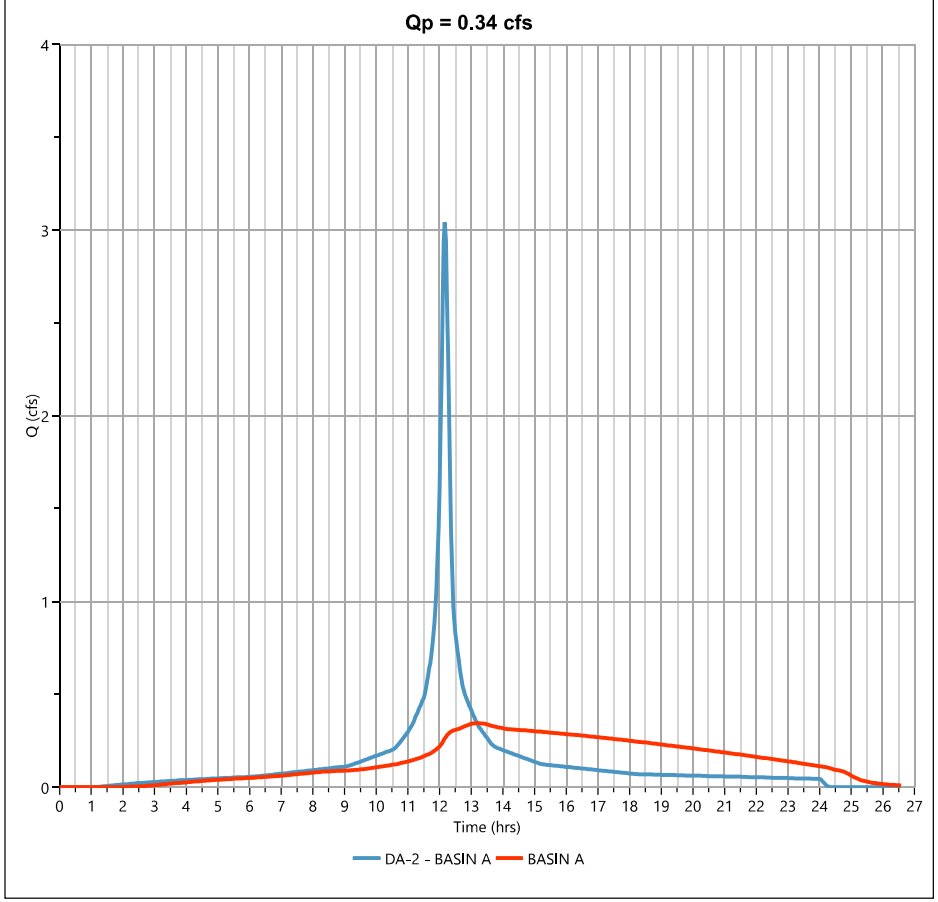
BASIN A

Hyd. No. 19

Hydrograph Type	= Pond Route	Peak Flow	= 0.345 cfs
Storm Frequency	= 2-yr	Time to Peak	= 13.17 hrs
Time Interval	= 2 min	Hydrograph Volume	= 13,439 cuft
Inflow Hydrograph	= 18 - DA-2 - BASIN A	Max. Elevation	= 215.09 ft
Pond Name	= BASIN A (Underground)	Max. Storage	= 5,925 cuft

Pond Routing by Storage Indication Method

Center of mass detention time = 3.20 hrs



Pond Report

Project Name:

Hydrology Studio v 3.0.0.16

08-06-2020

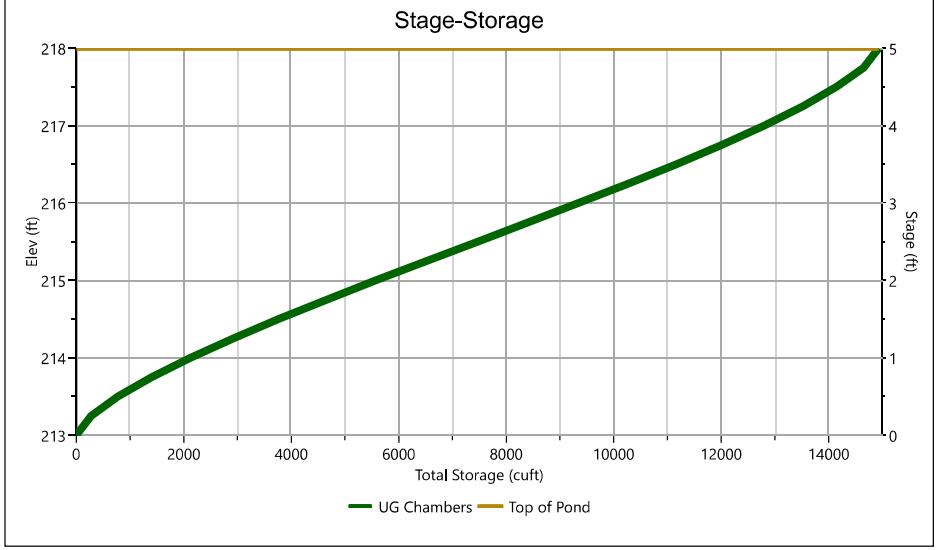
BASIN A (Underground)

Stage-Storage

Underground Chambers	
Description	**Input**
Invert Elev Down, ft	213.00
Chamber Rise, ft	5.00
Chamber Shape	Circular
Chamber Span, ft	5.00
Barrel Length, ft	760.00
No. Barrels	1
Barrel Slope, %	0.00
Headers, y/n	No
Stone Encasement, y/n	No
Encasement Bottom Elevation, ft	213.00
Encasement Width per Chamber, ft	0.00
Encasement Depth, ft	0.00
Encasement Voids, %	100.00

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour Area (sqft)	Incr. Storage (cuft)	Total Storage (cuft)
0.00	213.00	n/a	0.000	0.000
0.25	213.25	n/a	280	280
0.50	213.50	n/a	499	778
0.75	213.75	n/a	626	1,404
1.00	214.00	n/a	722	2,126
1.25	214.25	n/a	794	2,920
1.50	214.50	n/a	848	3,768
1.75	214.75	n/a	891	4,659
2.00	215.00	n/a	917	5,576
2.25	215.25	n/a	942	6,518
2.50	215.50	n/a	947	7,465
2.75	215.75	n/a	947	8,412
3.00	216.00	n/a	942	9,354
3.25	216.25	n/a	917	10,270
3.50	216.50	n/a	891	11,161
3.75	216.75	n/a	847	12,008
4.00	217.00	n/a	793	12,802
4.25	217.25	n/a	721	13,523
4.50	217.50	n/a	627	14,150
4.75	217.75	n/a	497	14,647
5.00	218.00	n/a	278	14,926



Pond Report

Project Name:

Hydrology Studio v 3.0.0.16

08-06-2020

BASIN A (Underground)

Stage-Discharge

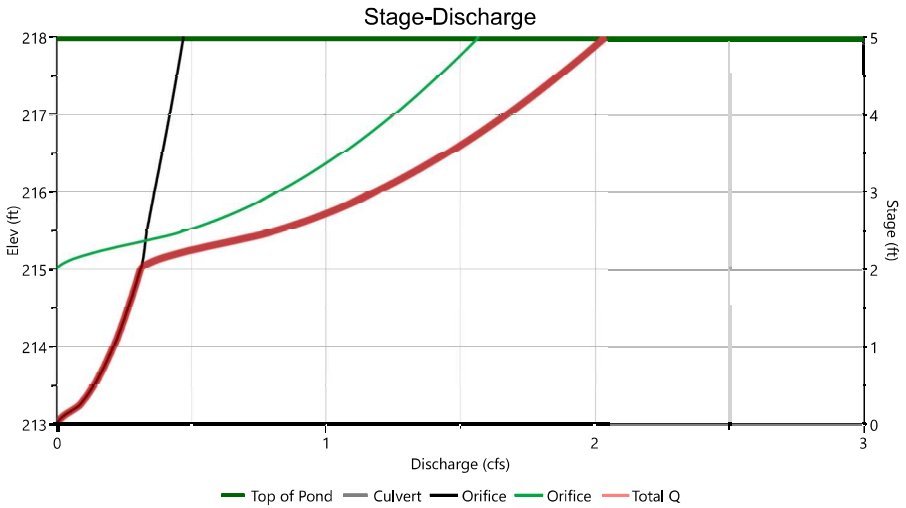
Culvert / Orifices	Culvert	Orifices		
		1*	2*	3
Rise, in	15	3	6	
Span, in	15	3	6	
No. Barrels	1	1	1	
Invert Elevation, ft	213.00	213.00	215.00	
Orifice Coefficient, Co	0.60	0.60	0.60	
Length, ft	20			
Barrel Slope, %	.5			
N-Value, n	0.013			

Weirs	Riser*	Weirs		
		1	2	3
Shape / Type				
Crest Elevation, ft				
Crest Length, ft				
Angle, deg				
Weir Coefficient, Cw				

Perforated Riser	
Hole Diameter, in	
No. holes	
Invert Elevation, ft	
Height, ft	
Orifice Coefficient, Co	

Ancillary	
Exfiltration, in/hr	

*Routes through Culvert.



Pond Report

Project Name:

Hydrology Studio v 3.0.0.16

08-06-2020

BASIN A (Underground)

Stage-Storage-Discharge Summary

Stage (ft)	Elev. (ft)	Storage (cuft)	Culvert (cfs)	Orifices, cfs			Riser (cfs)	Weirs, cfs			Pf Riser (cfs)	Exfil (cfs)	User (cfs)	Total (cfs)
				1	2	3		1	2	3				
0.00	213.00	0.000	0.000	0.000	0.000									0.000
0.25	213.25	280	0.083 ic	0.083	0.000									0.083
0.50	213.50	778	0.136 oc	0.136	0.000									0.136
0.75	213.75	1,404	0.177 oc	0.177	0.000									0.177
1.00	214.00	2,126	0.210 oc	0.210	0.000									0.210
1.25	214.25	2,920	0.239 oc	0.239	0.000									0.239
1.50	214.50	3,768	0.265 oc	0.265	0.000									0.265
1.75	214.75	4,659	0.289 oc	0.289	0.000									0.289
2.00	215.00	5,576	0.311 oc	0.311	0.000									0.311
2.25	215.25	6,518	0.492 oc	0.325	0.167									0.492
2.50	215.50	7,465	0.807 oc	0.334	0.473									0.807
2.75	215.75	8,412	1.016 oc	0.348	0.668									1.016
3.00	216.00	9,354	1.181 oc	0.363	0.819									1.181
3.25	216.25	10,270	1.322 oc	0.377	0.945									1.322
3.50	216.50	11,161	1.448 oc	0.391	1.057									1.448
3.75	216.75	12,008	1.563 oc	0.405	1.158									1.563
4.00	217.00	12,802	1.670 oc	0.419	1.251									1.670
4.25	217.25	13,523	1.769 oc	0.433	1.337									1.769
4.50	217.50	14,150	1.864 oc	0.446	1.418									1.864
4.75	217.75	14,647	1.953 oc	0.458	1.495									1.953
5.00	218.00	14,926	2.038 oc	0.470	1.568									2.038

Suffix key: ic = inlet control, oc = outlet control, s = submerged weir

Pond Report

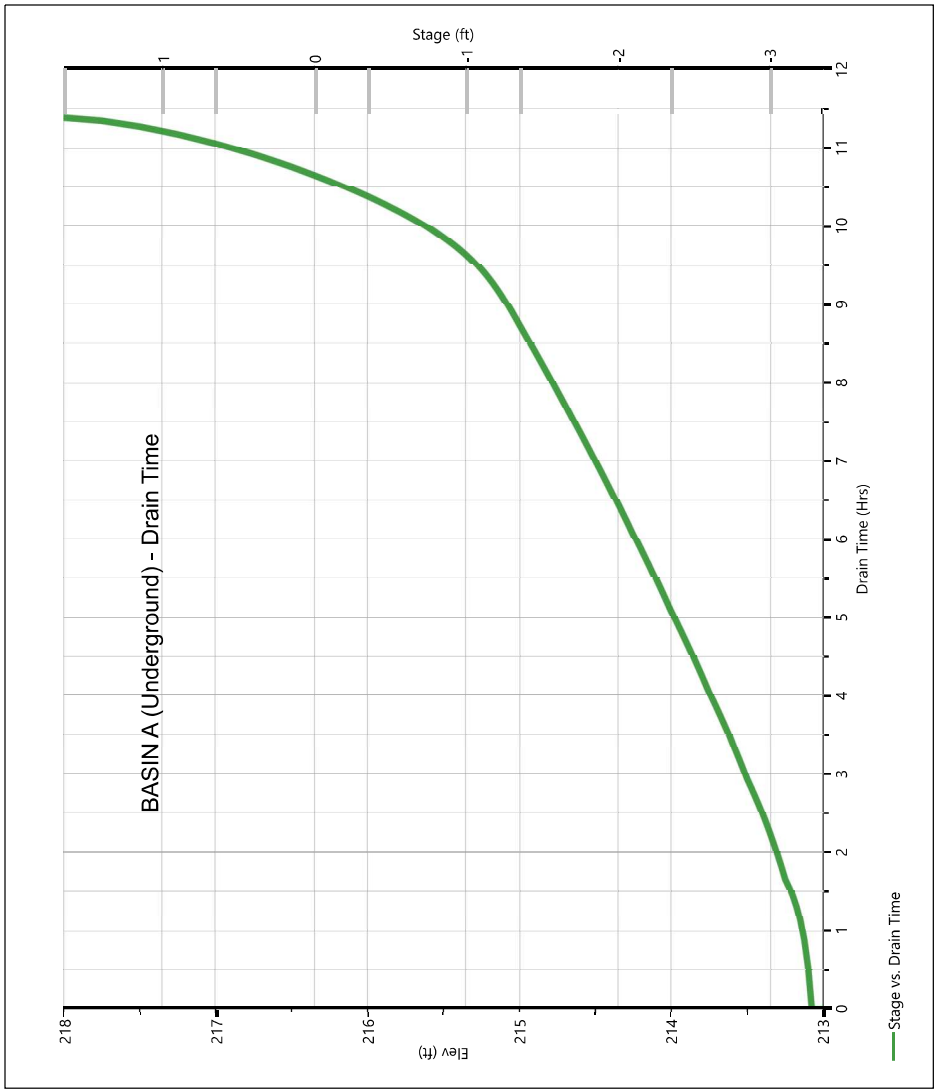
Project Name:

Hydrology Studio v 3.0.0.16

08-06-2020

BASIN A (Underground)

Pond Drawdown



Hydrograph Report

Project Name:

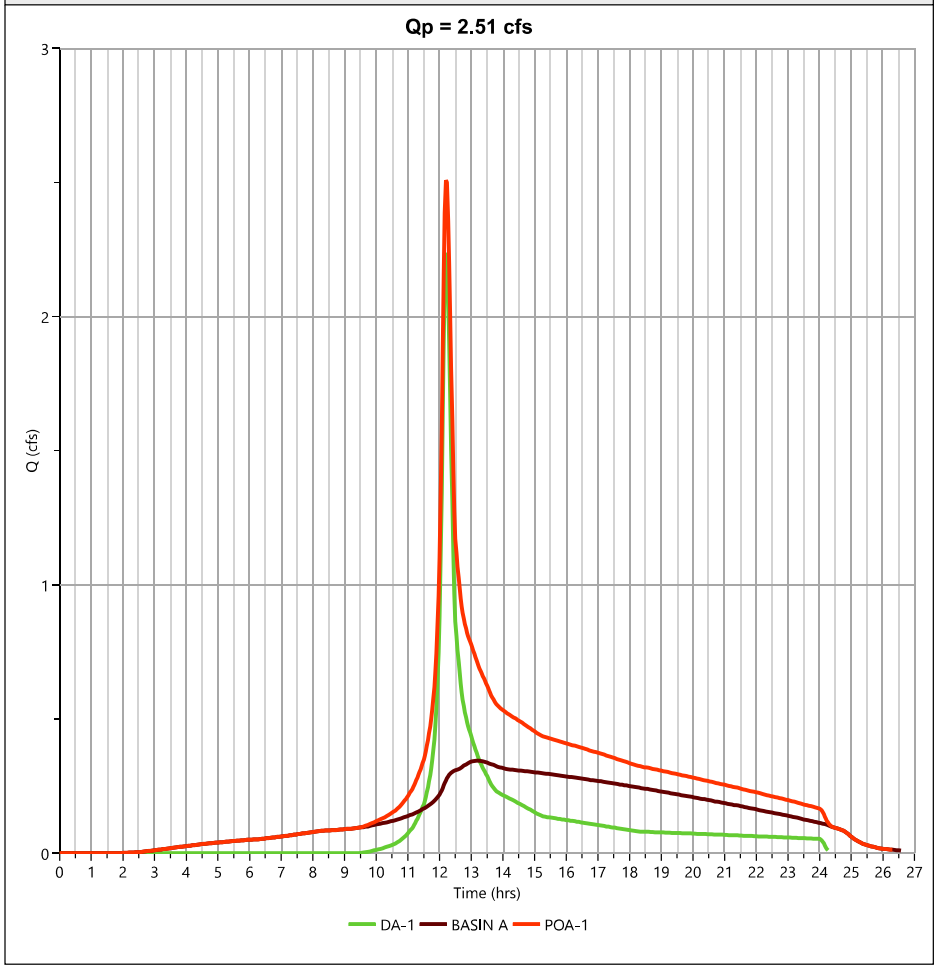
Hydrology Studio v 3.0.0.16

08-06-2020

POA-1

Hyd. No. 21

Hydrograph Type	= Junction	Peak Flow	= 2.509 cfs
Storm Frequency	= 2-yr	Time to Peak	= 12.20 hrs
Time Interval	= 2 min	Hydrograph Volume	= 22,920 cuft
Inflow Hydrographs	= 14, 19	Total Contrib. Area	= 1.87 ac



Hydrograph Report

Project Name:

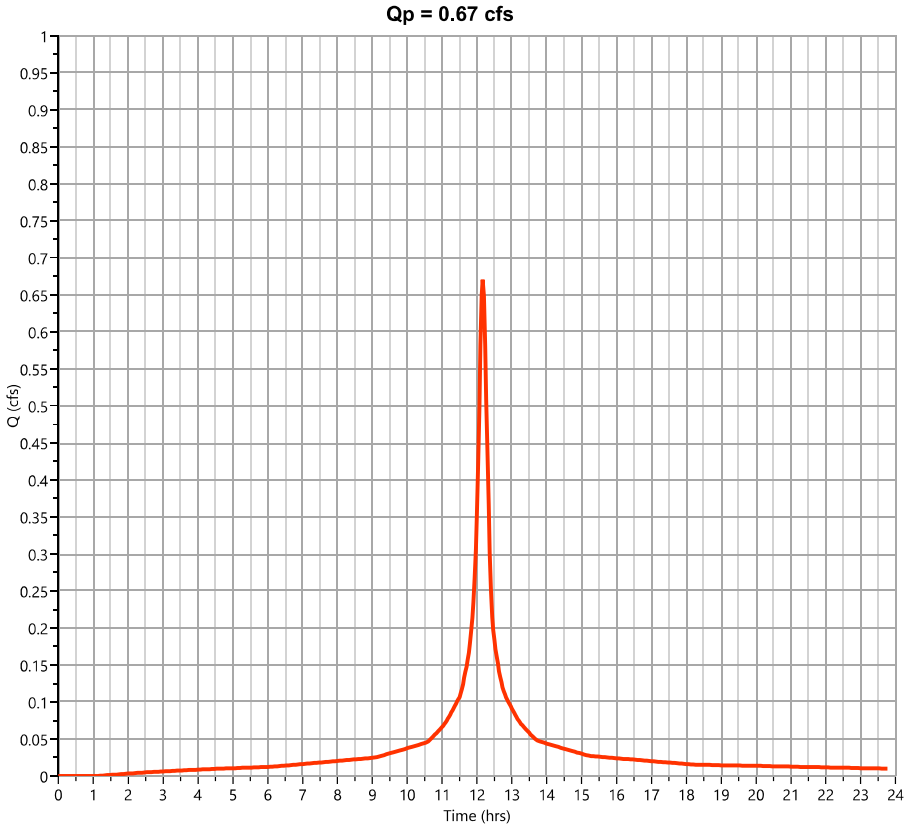
Hydrology Studio v 3.0.0.16

08-06-2020

DA-3 Imperv.

Hyd. No. 24

Hydrograph Type	= NRCS Runoff	Peak Flow	= 0.670 cfs
Storm Frequency	= 2-yr	Time to Peak	= 12.17 hrs
Time Interval	= 2 min	Runoff Volume	= 2,971 cuft
Drainage Area	= 0.24 ac	Curve Number	= 98
Tc Method	= User	Time of Conc. (Tc)	= 10.0 min
Total Rainfall	= 3.54 in	Design Storm	= NOAA-D
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

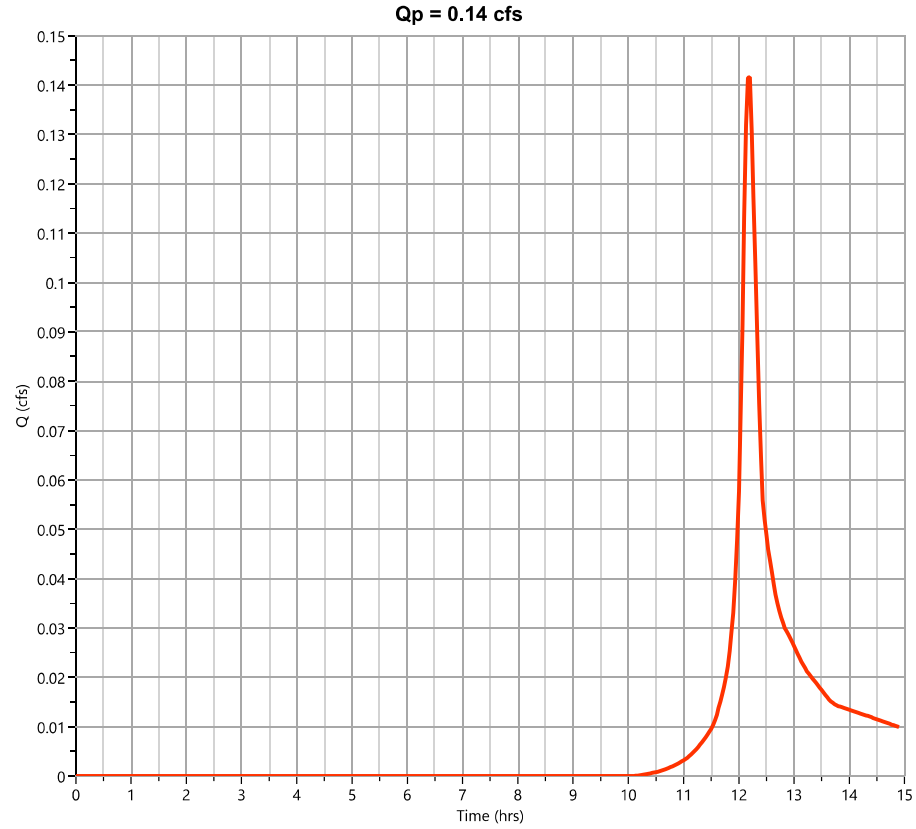
Hydrology Studio v 3.0.0.16

08-06-2020

DA-3 Perv.

Hyd. No. 25

Hydrograph Type	= NRCS Runoff	Peak Flow	= 0.142 cfs
Storm Frequency	= 2-yr	Time to Peak	= 12.20 hrs
Time Interval	= 2 min	Runoff Volume	= 569 cuft
Drainage Area	= 0.12 ac	Curve Number	= 74
Tc Method	= User	Time of Conc. (Tc)	= 10.0 min
Total Rainfall	= 3.54 in	Design Storm	= NOAA-D
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

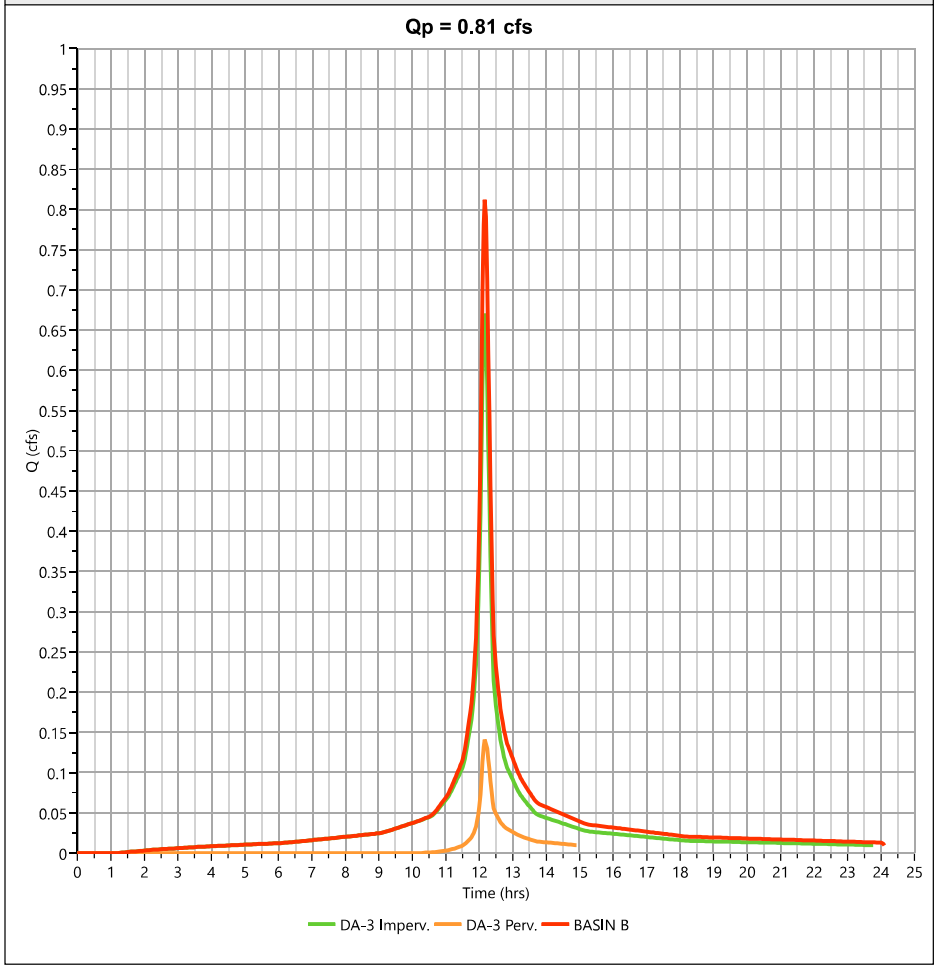
Hydrology Studio v 3.0.0.16

08-06-2020

BASIN B

Hyd. No. 26

Hydrograph Type	= Junction	Peak Flow	= 0.812 cfs
Storm Frequency	= 2-yr	Time to Peak	= 12.17 hrs
Time Interval	= 2 min	Hydrograph Volume	= 3,540 cuft
Inflow Hydrographs	= 24, 25	Total Contrib. Area	= 0.36 ac



Hydrograph Report

Project Name:

Hydrology Studio v 3.0.0.16

08-06-2020

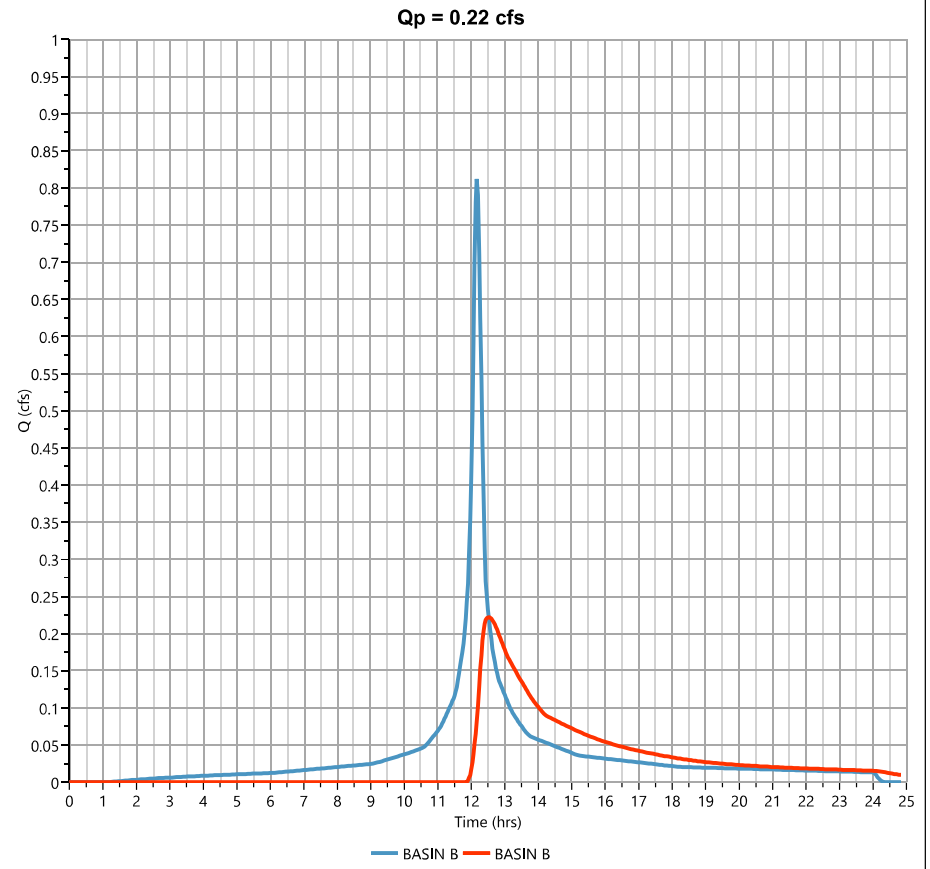
BASIN B

Hyd. No. 27

Hydrograph Type	= Pond Route	Peak Flow	= 0.222 cfs
Storm Frequency	= 2-yr	Time to Peak	= 12.53 hrs
Time Interval	= 2 min	Hydrograph Volume	= 2,537 cuft
Inflow Hydrograph	= 26 - BASIN B	Max. Elevation	= 217.35 ft
Pond Name	= BASIN B (Aboveground)	Max. Storage	= 1,863 cuft

Pond Routing by Storage Indication Method

Center of mass detention time = 2.92 hrs



Pond Report

Project Name:

Hydrology Studio v 3.0.0.16

08-06-2020

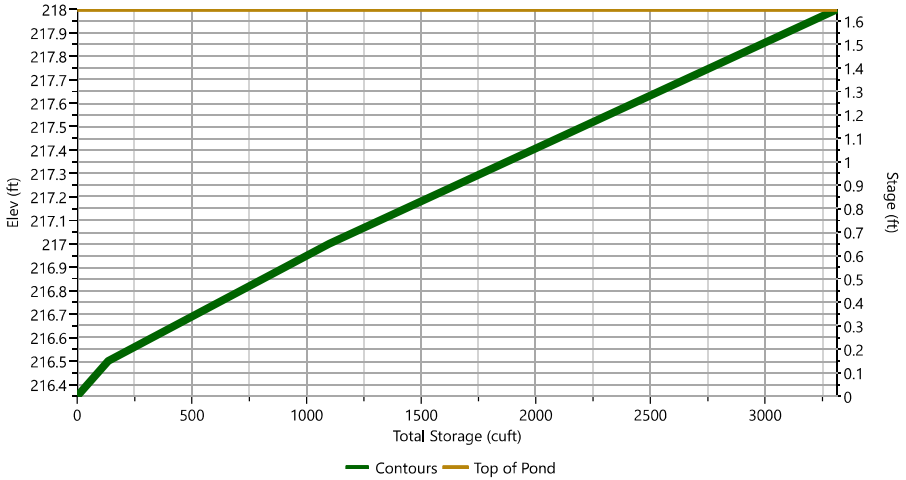
BASIN B (Aboveground)

Stage-Storage

User Defined Contours	
Description	**Input**
Bottom Elevation, ft	216.35
Voids (%)	100.00
Volume Calc	None

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour Area (sqft)	Incr. Storage (cuft)	Total Storage (cuft)
0.00	216.35	1	0.000	0.000
0.15	216.50	1,800	135	135
0.65	217.00	2,052	963	1,098
1.65	218.00	2,381	2,217	3,315



Pond Report

Project Name:

Hydrology Studio v 3.0.0.16

08-06-2020

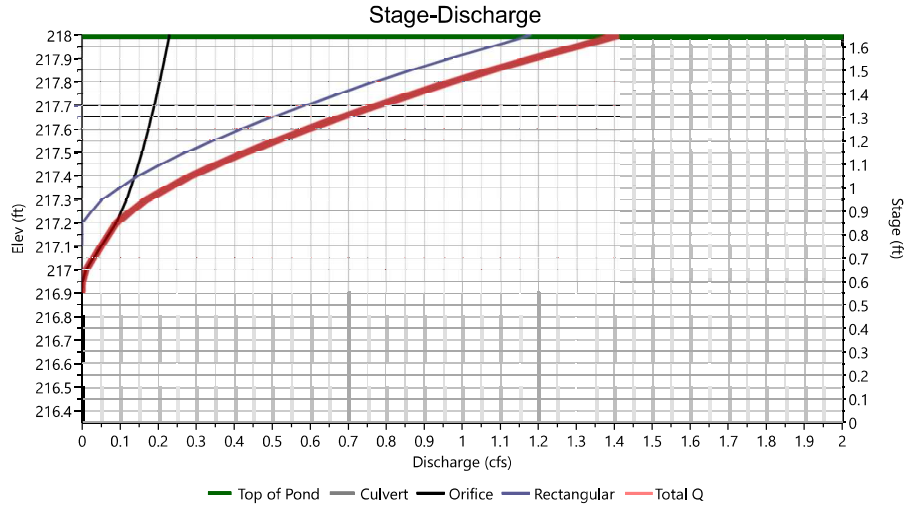
BASIN B (Aboveground)

Stage-Discharge

Culvert / Orifices	Culvert	Orifices			Perforated Riser	
		1*	2	3		
Rise, in	15	3			Hole Diameter, in	
Span, in	15	3			No. holes	
No. Barrels	1	1			Invert Elevation, ft	
Invert Elevation, ft	214.35	216.93			Height, ft	
Orifice Coefficient, Co	0.60	0.60			Orifice Coefficient, Co	
Length, ft	18					
Barrel Slope, %	.5					
N-Value, n	0.013					

Weirs	Riser*	Weirs			Ancillary	
		1*	2	3		
Shape / Type		Rectangular			Exfiltration, in/hr	
Crest Elevation, ft		217.2				
Crest Length, ft		.5				
Angle, deg						
Weir Coefficient, Cw		3.3				

*Routes through Culvert.



Pond Report

Project Name:

Hydrology Studio v 3.0.0.16

08-06-2020

BASIN B (Aboveground)

Stage-Storage-Discharge Summary

Stage (ft)	Elev. (ft)	Storage (cuft)	Culvert (cfs)	Orifices, cfs			Riser (cfs)	Weirs, cfs			Pf Riser (cfs)	Exfil (cfs)	User (cfs)	Total (cfs)
				1	2	3		1	2	3				
0.00	216.35	0.000	0.000	0.000				0.000						0.000
0.15	216.50	135	0.000 oc	0.000				0.000						0.000
0.65	217.00	1,098	0.010 oc	0.010				0.000						0.010
1.65	218.00	3,315	1.410 oc	0.230				1.181						1.410

Suffix key: ic = inlet control, oc = outlet control, s = submerged weir

Pond Report

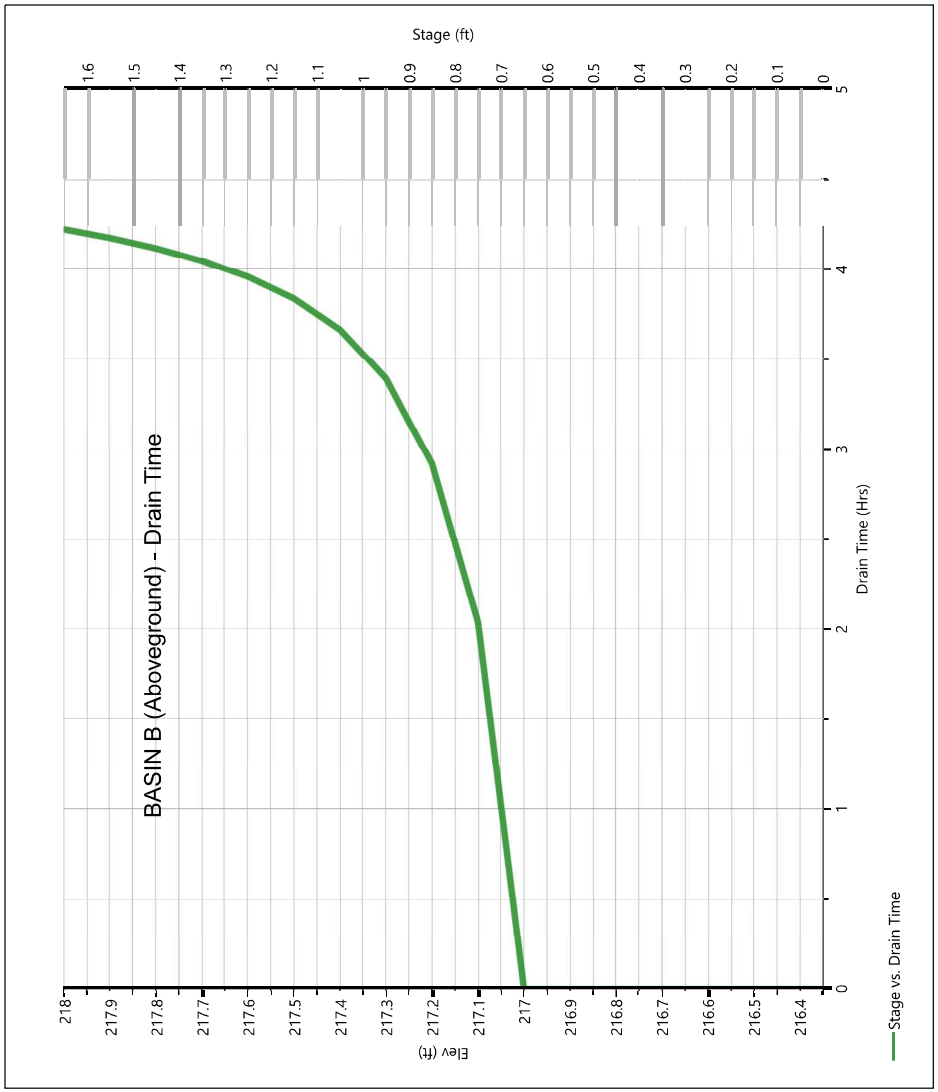
Project Name:

Hydrology Studio v 3.0.0.16

08-06-2020

BASIN B (Aboveground)

Pond Drawdown



Hydrograph Report

Project Name:

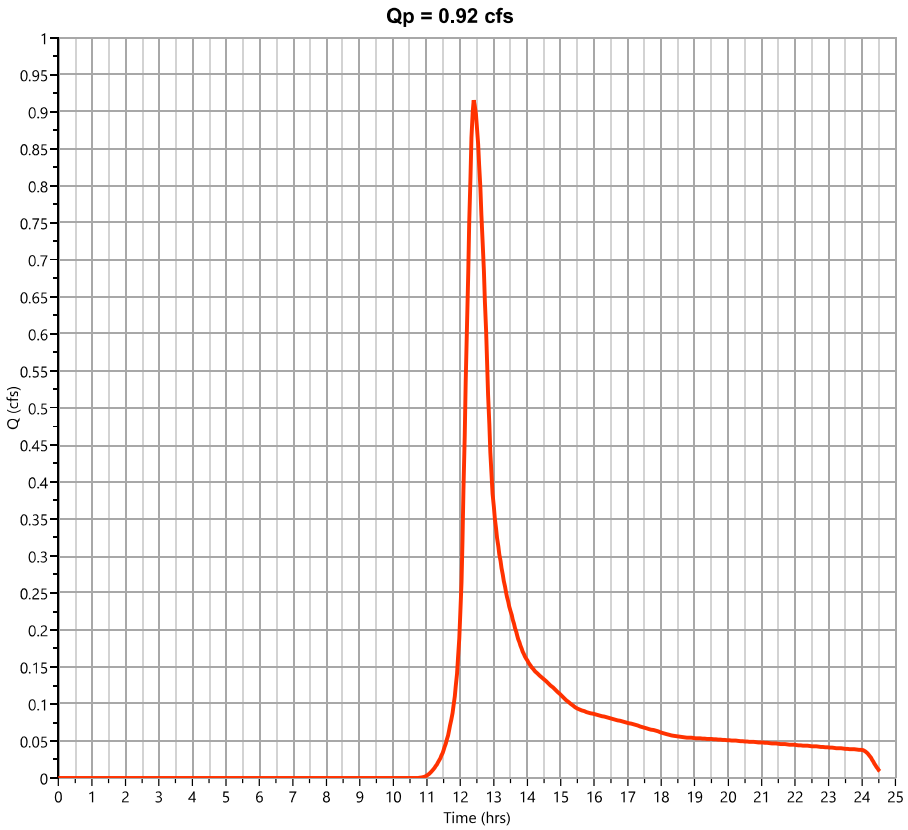
Hydrology Studio v 3.0.0.16

08-06-2020

DA-4

Hyd. No. 29

Hydrograph Type	= NRCS Runoff	Peak Flow	= 0.916 cfs
Storm Frequency	= 2-yr	Time to Peak	= 12.40 hrs
Time Interval	= 2 min	Runoff Volume	= 5,805 cuft
Drainage Area	= 1.45 ac	Curve Number	= 71
Tc Method	= User	Time of Conc. (Tc)	= 31.6 min
Total Rainfall	= 3.54 in	Design Storm	= NOAA-D
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

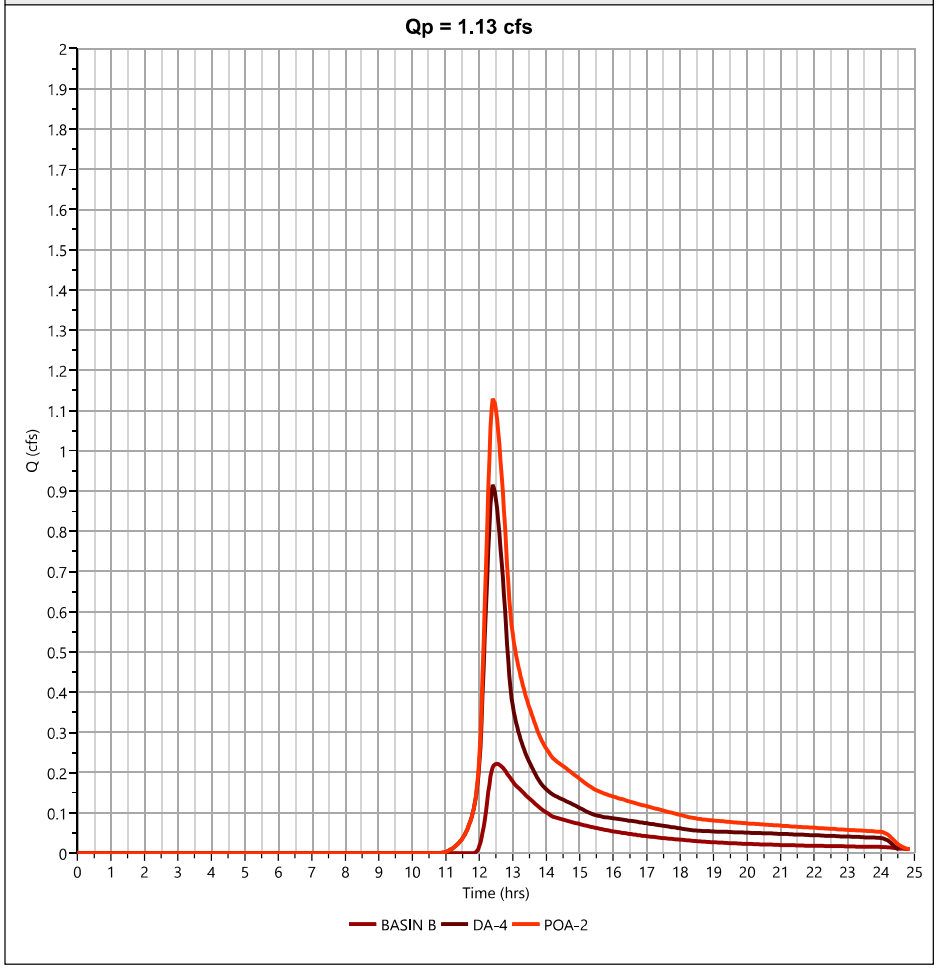
Hydrology Studio v 3.0.0.16

08-06-2020

POA-2

Hyd. No. 31

Hydrograph Type	= Junction	Peak Flow	= 1.129 cfs
Storm Frequency	= 2-yr	Time to Peak	= 12.40 hrs
Time Interval	= 2 min	Hydrograph Volume	= 8,342 cuft
Inflow Hydrographs	= 27, 29	Total Contrib. Area	= 1.45 ac



Hydrograph Report

Project Name:

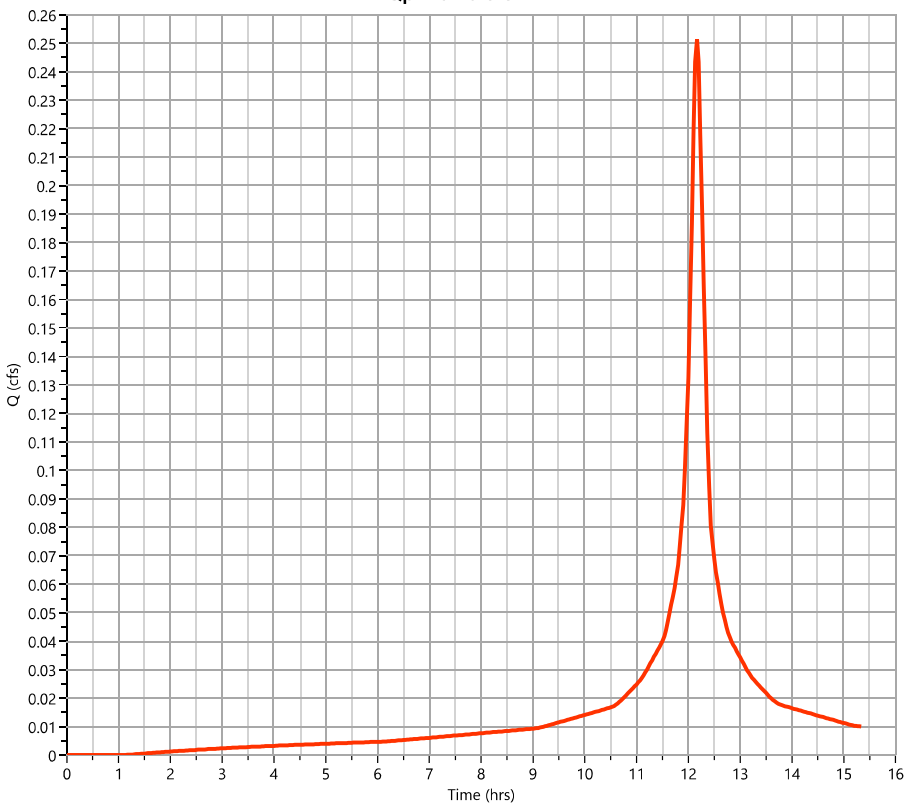
Hydrology Studio v 3.0.0.16

08-06-2020

222

Hyd. No. 33

Hydrograph Type	= NRCS Runoff	Peak Flow	= 0.251 cfs
Storm Frequency	= 2-yr	Time to Peak	= 12.17 hrs
Time Interval	= 2 min	Runoff Volume	= 1,114 cuft
Drainage Area	= 0.09 ac	Curve Number	= 98
Tc Method	= User	Time of Conc. (Tc)	= 10.0 min
Total Rainfall	= 3.54 in	Design Storm	= NOAA-D
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

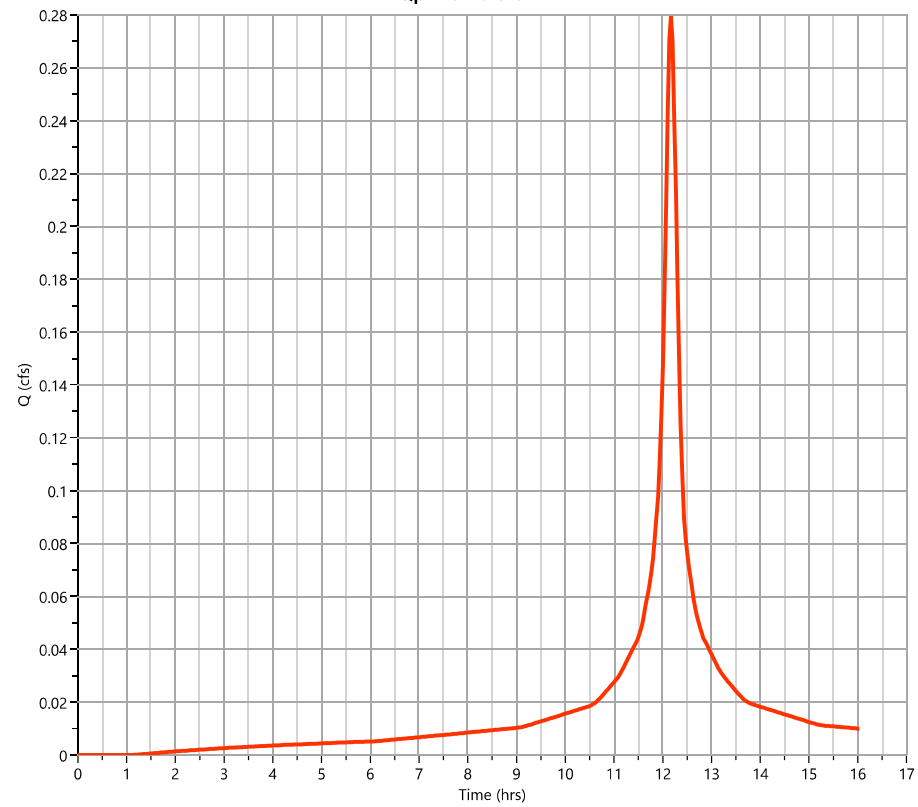
Hydrology Studio v 3.0.0.16

08-06-2020

211

Hyd. No. 35

Hydrograph Type	= NRCS Runoff	Peak Flow	= 0.279 cfs
Storm Frequency	= 2-yr	Time to Peak	= 12.17 hrs
Time Interval	= 2 min	Runoff Volume	= 1,238 cuft
Drainage Area	= 0.1 ac	Curve Number	= 98
Tc Method	= User	Time of Conc. (Tc)	= 10.0 min
Total Rainfall	= 3.54 in	Design Storm	= NOAA-D
Storm Duration	= 24 hrs	Shape Factor	= 484



Design Storm Report

Custom Storm filename:

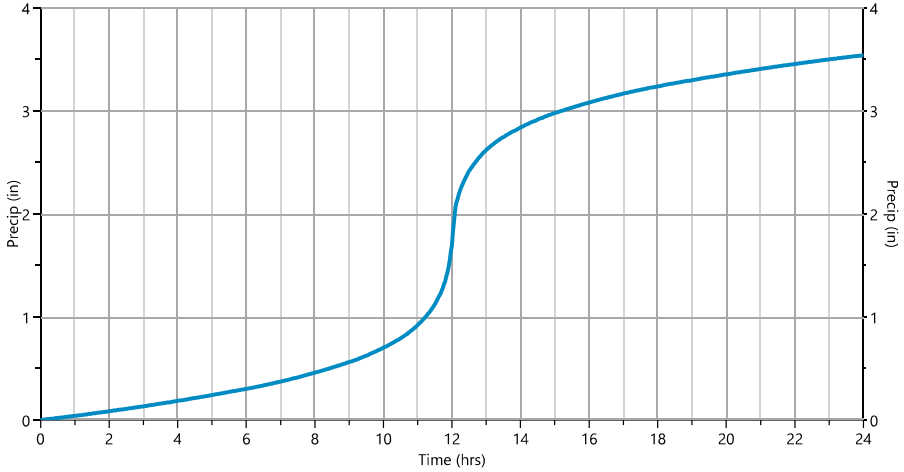
Hydrology Studio v 3.0.0.16

08-06-2020

Storm Distribution: Custom - NOAA-D

Storm Duration	Total Rainfall Volume (in)								
	1-yr	✔ 2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr	
24 hrs	0.00	3.54	0.00	0.00	5.24	6.37	0.00	8.35	

Incremental Rainfall Distribution, 2-yr									
Time (hrs)	Precip (in)	Time (hrs)	Precip (in)	Time (hrs)	Precip (in)	Time (hrs)	Precip (in)	Time (hrs)	Precip (in)
11.10	0.011068	11.47	0.015859	11.83	0.042787	12.20	0.042787	12.57	0.015859
11.13	0.012260	11.50	0.015860	11.87	0.042786	12.23	0.030833	12.60	0.015859
11.17	0.012260	11.53	0.021358	11.90	0.042787	12.27	0.030833	12.63	0.014668
11.20	0.012261	11.57	0.021357	11.93	0.073809	12.30	0.030833	12.67	0.014668
11.23	0.013464	11.60	0.021358	11.97	0.073809	12.33	0.022479	12.70	0.014668
11.27	0.013464	11.63	0.022479	12.00	0.073809	12.37	0.022479	12.73	0.013464
11.30	0.013464	11.67	0.022479	12.03	0.123157	12.40	0.022479	12.77	0.013463
11.33	0.014667	11.70	0.022479	12.07	0.123157	12.43	0.021358	12.80	0.013464
11.37	0.014668	11.73	0.030833	**12.10**	**0.123157**	12.47	0.021358	12.83	0.012260
11.40	0.014667	11.77	0.030833	12.13	0.042787	12.50	0.021358	12.87	0.012260
11.43	0.015859	11.80	0.030834	12.17	0.042786	12.53	0.015859	12.90	0.012260



Hydrograph 10-yr Summary

Project Name:

Hydrology Studio v 3.0.0.16

08-06-2020

Hyd. No.	Hydrograph Type	Hydrograph Name	Peak Flow (cfs)	Time to Peak (hrs)	Hydrograph Volume (cuft)	Inflow Hyd(s)	Maximum Elevation (ft)	Maximum Storage (cuft)
1	NRCS Runoff	EX-DA1	1.368	12.17	5,392	---		
2	NRCS Runoff	EX-DA1 UNDIST.	4.338	12.17	16,920	---		
3	Junction	EXIST. POA-1	5.706	12.17	22,312	1, 2		
5	NRCS Runoff	EX-DA2	1.843	12.40	11,077	---		
6	NRCS Runoff	EX-DA2 UNDIST.	1.965	12.40	11,810	---		
7	Junction	EXIST. POA-2	3.807	12.40	22,886	5, 6		
12	NRCS Runoff	DA-1B	0.585	12.20	2,444	---		
13	NRCS Runoff	DA-1A	3.836	12.20	15,997	---		
14	Junction	DA-1	4.421	12.20	18,441	12, 13		
16	NRCS Runoff	DA-2 Imperv.	4.492	12.17	20,226	---		
17	NRCS Runoff	DA-2 Perv.	0.049	12.17	191	---		
18	Junction	DA-2 - BASIN A	4.541	12.17	20,417	16, 17		
19	Pond Route	BASIN A	0.986	12.63	20,395	18	215.71	8,258
21	Junction	POA-1	4.972	12.23	38,836	14, 19		
24	NRCS Runoff	DA-3 Imperv.	0.998	12.17	4,495	---		
25	NRCS Runoff	DA-3 Perv.	0.294	12.17	1,149	---		
26	Junction	BASIN B	1.292	12.17	5,643	24, 25		
27	Pond Route	BASIN B	0.630	12.37	4,641	26	217.62	2,474
29	NRCS Runoff	DA-4	2.046	12.40	12,255	---		
31	Junction	POA-2	2.668	12.40	16,896	27, 29		
33	NRCS Runoff	222	0.374	12.17	1,685	---		
35	NRCS Runoff	211	0.416	12.17	1,873	---		

Hydrograph Report

Project Name:

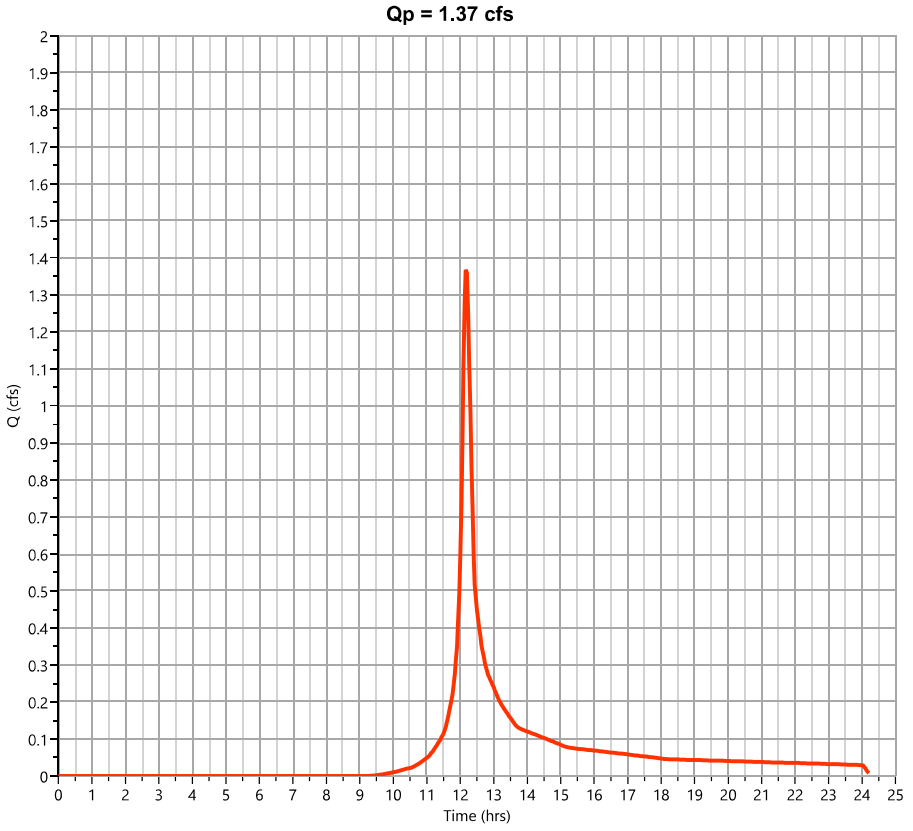
Hydrology Studio v 3.0.0.16

08-06-2020

EX-DA1

Hyd. No. 1

Hydrograph Type	= NRCS Runoff	Peak Flow	= 1.368 cfs
Storm Frequency	= 10-yr	Time to Peak	= 12.17 hrs
Time Interval	= 2 min	Runoff Volume	= 5,392 cuft
Drainage Area	= 0.65 ac	Curve Number	= 70
Tc Method	= User	Time of Conc. (Tc)	= 12.9 min
Total Rainfall	= 5.24 in	Design Storm	= NOAA-D
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

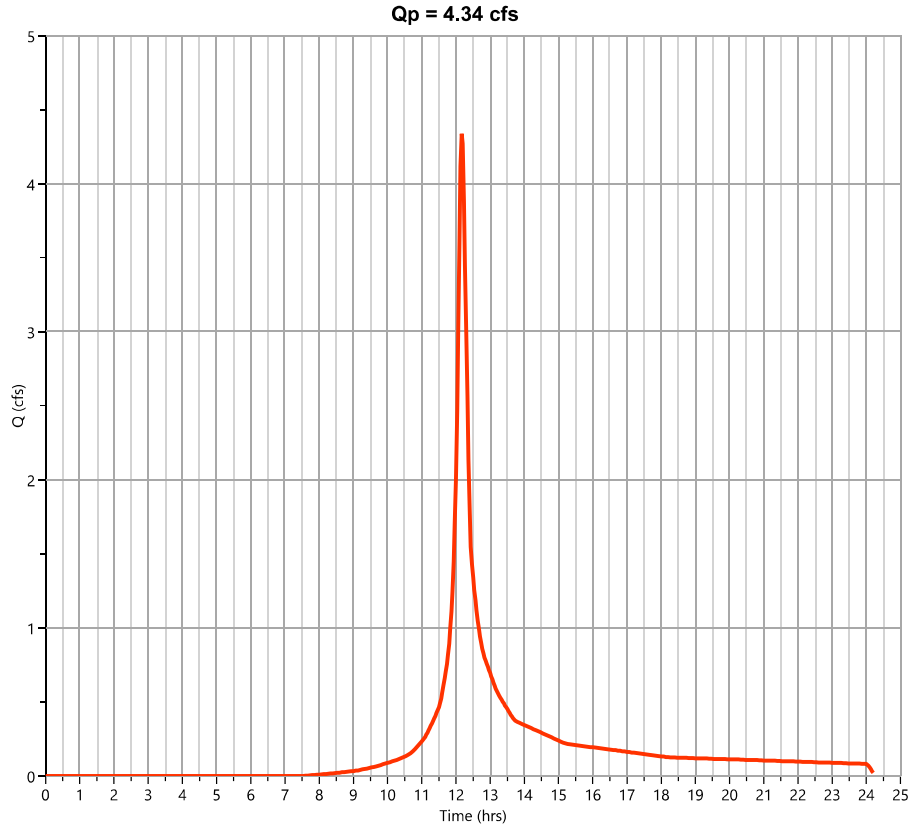
Hydrology Studio v 3.0.0.16

08-06-2020

EX-DA1 UNDIST.

Hyd. No. 2

Hydrograph Type	= NRCS Runoff	Peak Flow	= 4.338 cfs
Storm Frequency	= 10-yr	Time to Peak	= 12.17 hrs
Time Interval	= 2 min	Runoff Volume	= 16,920 cuft
Drainage Area	= 1.6 ac	Curve Number	= 77
Tc Method	= User	Time of Conc. (Tc)	= 12.9 min
Total Rainfall	= 5.24 in	Design Storm	= NOAA-D
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

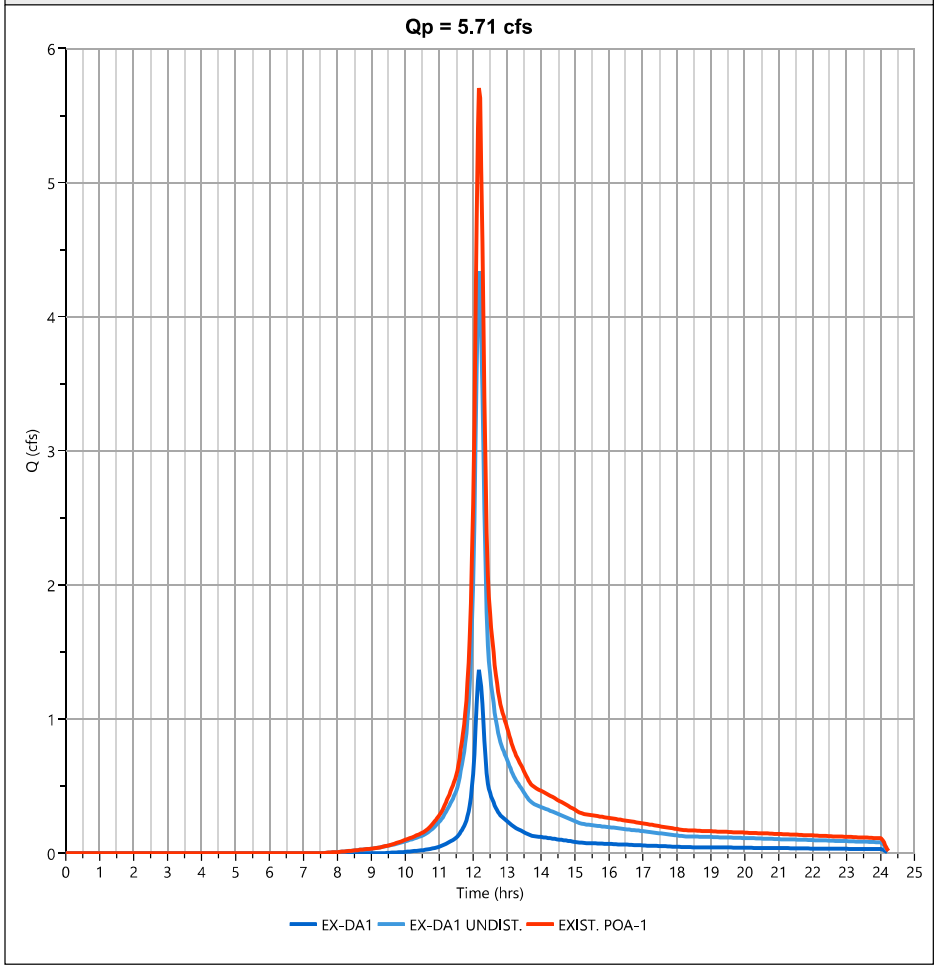
Hydrology Studio v 3.0.0.16

08-06-2020

EXIST. POA-1

Hyd. No. 3

Hydrograph Type	= Junction	Peak Flow	= 5.706 cfs
Storm Frequency	= 10-yr	Time to Peak	= 12.17 hrs
Time Interval	= 2 min	Hydrograph Volume	= 22,312 cuft
Inflow Hydrographs	= 1, 2	Total Contrib. Area	= 2.25 ac



Hydrograph Report

Project Name:

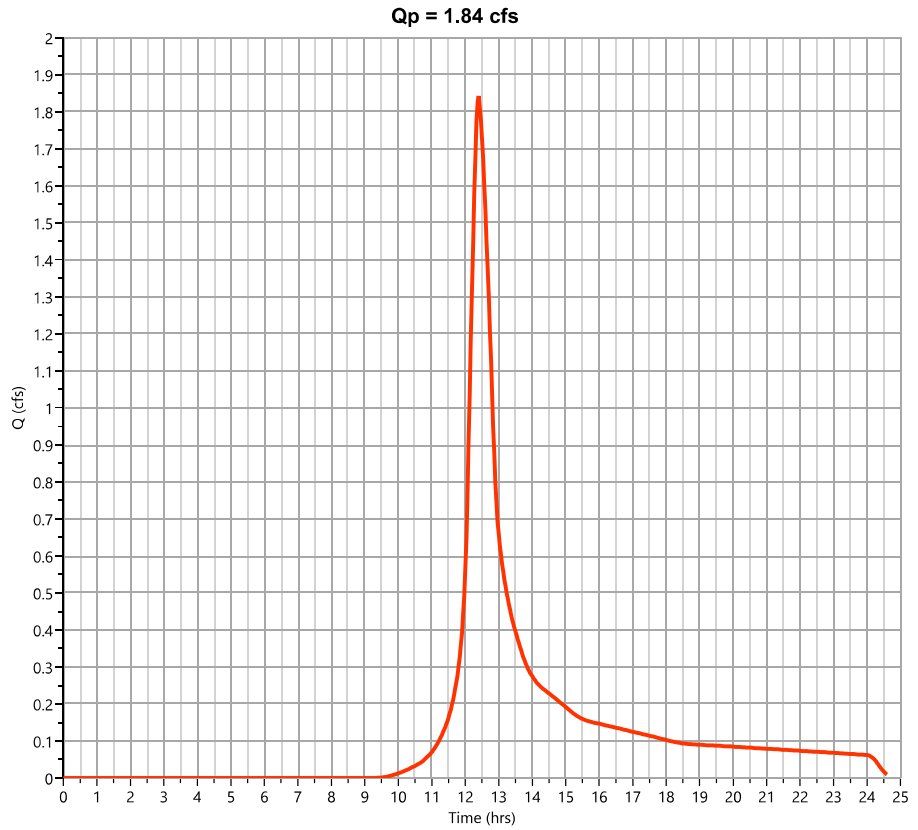
Hydrology Studio v 3.0.0.16

08-06-2020

EX-DA2

Hyd. No. 5

Hydrograph Type	= NRCS Runoff	Peak Flow	= 1.843 cfs
Storm Frequency	= 10-yr	Time to Peak	= 12.40 hrs
Time Interval	= 2 min	Runoff Volume	= 11,077 cuft
Drainage Area	= 1.36 ac	Curve Number	= 70
Tc Method	= User	Time of Conc. (Tc)	= 31.6 min
Total Rainfall	= 5.24 in	Design Storm	= NOAA-D
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

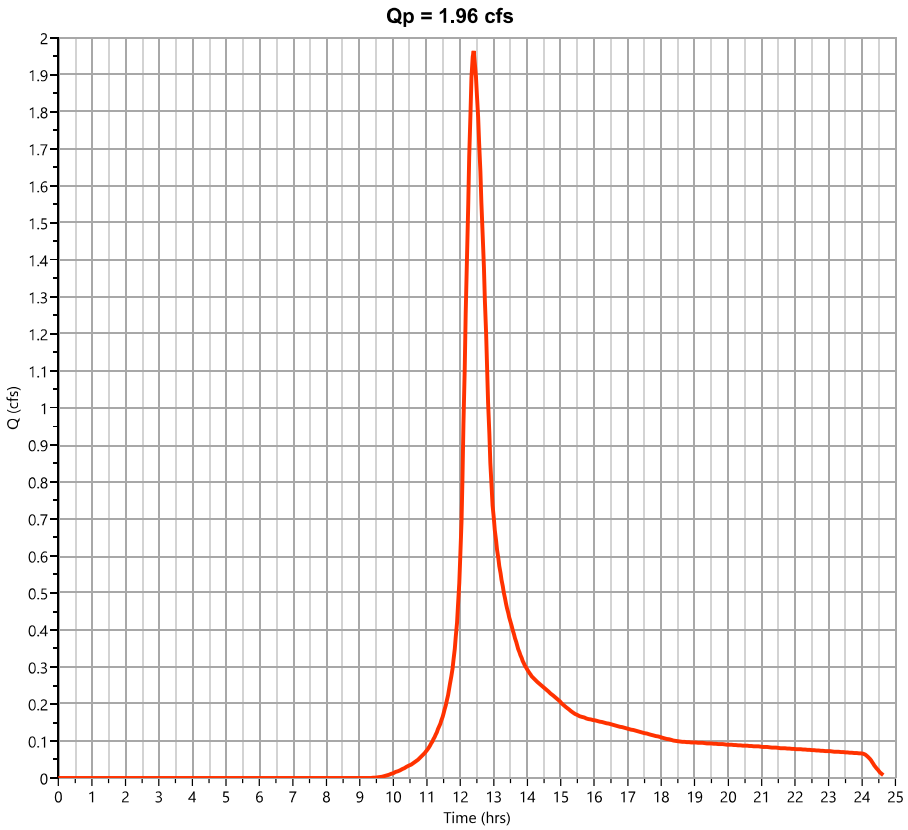
Hydrology Studio v 3.0.0.16

08-06-2020

EX-DA2 UNDIST.

Hyd. No. 6

Hydrograph Type	= NRCS Runoff	Peak Flow	= 1.965 cfs
Storm Frequency	= 10-yr	Time to Peak	= 12.40 hrs
Time Interval	= 2 min	Runoff Volume	= 11,810 cuft
Drainage Area	= 1.45 ac	Curve Number	= 70
Tc Method	= User	Time of Conc. (Tc)	= 31.6 min
Total Rainfall	= 5.24 in	Design Storm	= NOAA-D
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

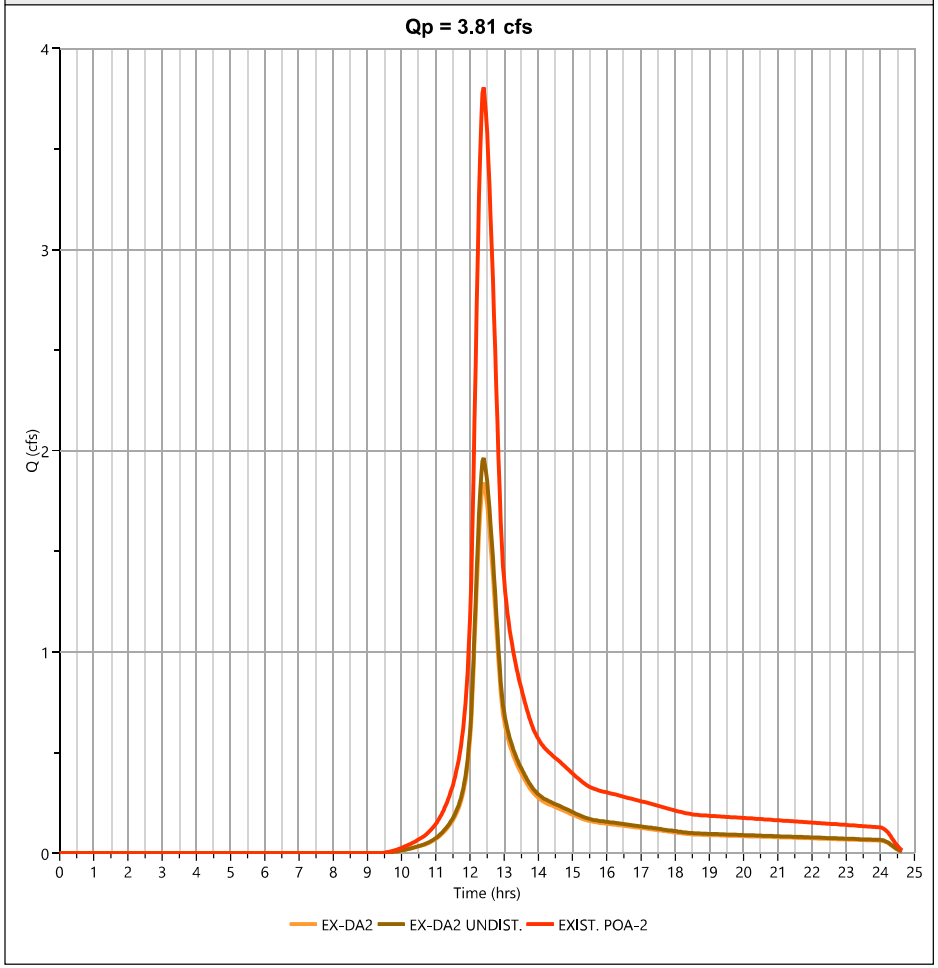
Hydrology Studio v 3.0.0.16

08-06-2020

EXIST. POA-2

Hyd. No. 7

Hydrograph Type	= Junction	Peak Flow	= 3.807 cfs
Storm Frequency	= 10-yr	Time to Peak	= 12.40 hrs
Time Interval	= 2 min	Hydrograph Volume	= 22,886 cuft
Inflow Hydrographs	= 5, 6	Total Contrib. Area	= 2.81 ac



Hydrograph Report

Project Name:

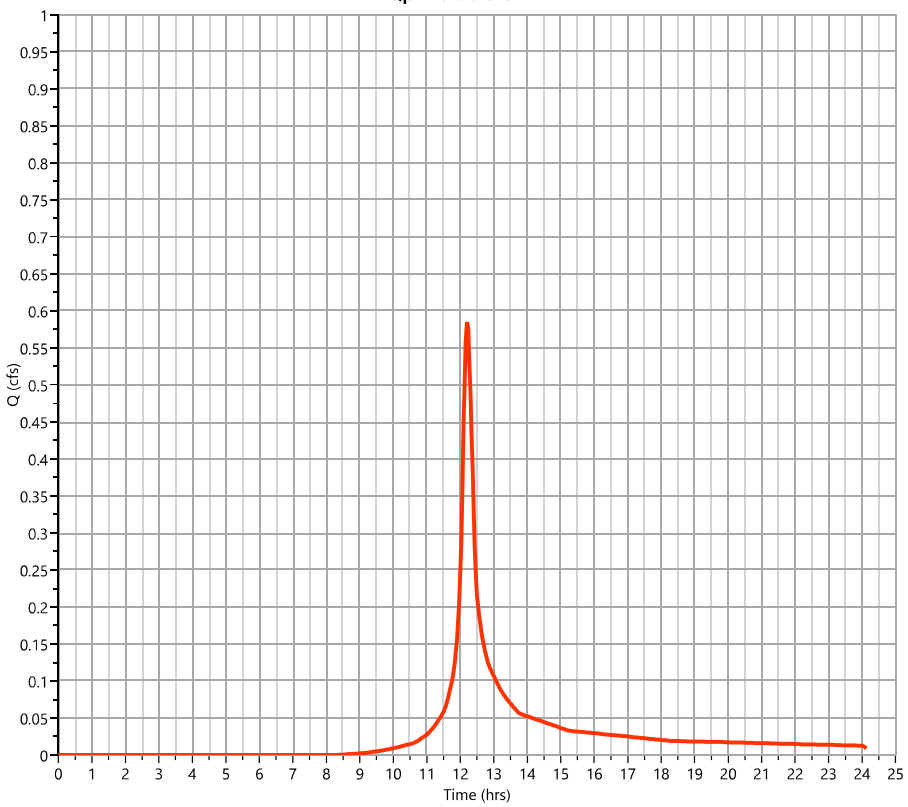
Hydrology Studio v 3.0.0.16

08-06-2020

DA-1B

Hyd. No. 12

Hydrograph Type	= NRCS Runoff	Peak Flow	= 0.585 cfs
Storm Frequency	= 10-yr	Time to Peak	= 12.20 hrs
Time Interval	= 2 min	Runoff Volume	= 2,444 cuft
Drainage Area	= 0.27 ac	Curve Number	= 74
Tc Method	= User	Time of Conc. (Tc)	= 15.0 min
Total Rainfall	= 5.24 in	Design Storm	= NOAA-D
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

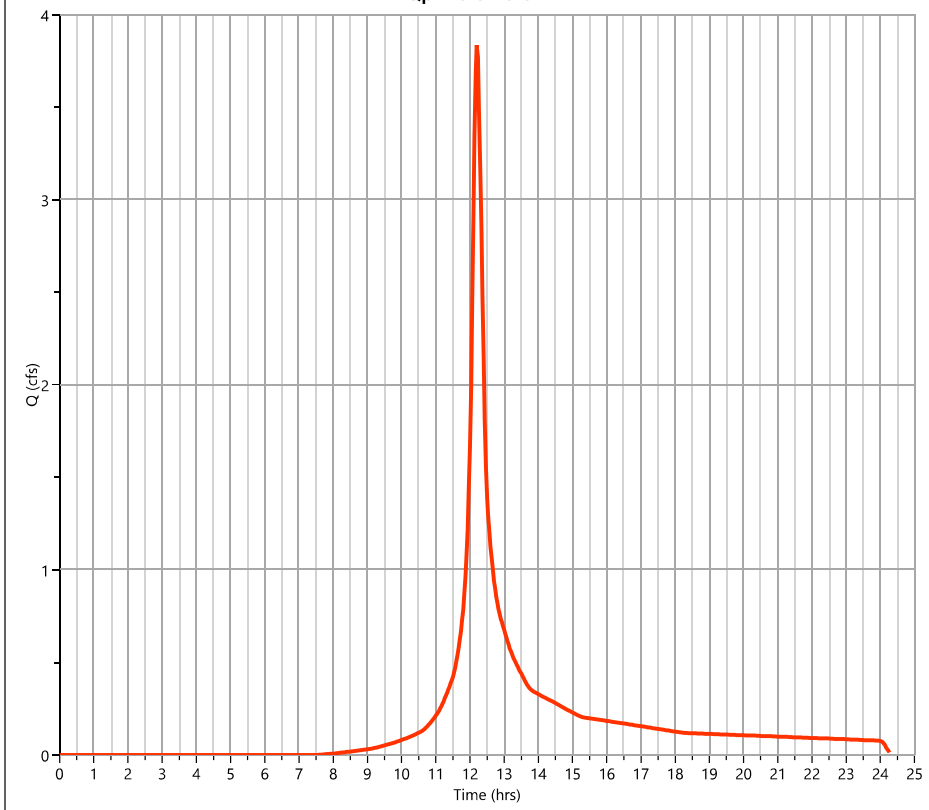
Hydrology Studio v 3.0.0.16

08-06-2020

DA-1A

Hyd. No. 13

Hydrograph Type	= NRCS Runoff	Peak Flow	= 3.836 cfs
Storm Frequency	= 10-yr	Time to Peak	= 12.20 hrs
Time Interval	= 2 min	Runoff Volume	= 15,997 cuft
Drainage Area	= 1.6 ac	Curve Number	= 77
Tc Method	= User	Time of Conc. (Tc)	= 15.0 min
Total Rainfall	= 5.24 in	Design Storm	= NOAA-D
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

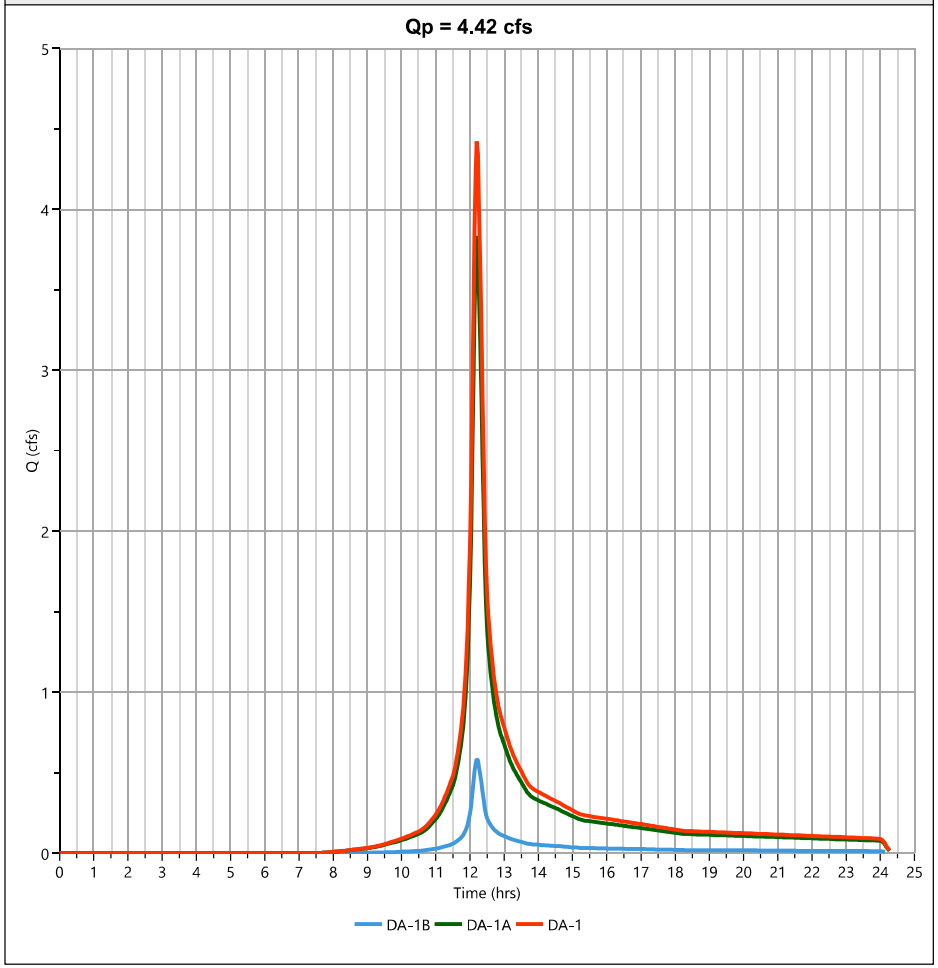
Hydrology Studio v 3.0.0.16

08-06-2020

DA-1

Hyd. No. 14

Hydrograph Type	= Junction	Peak Flow	= 4.421 cfs
Storm Frequency	= 10-yr	Time to Peak	= 12.20 hrs
Time Interval	= 2 min	Hydrograph Volume	= 18,441 cuft
Inflow Hydrographs	= 12, 13	Total Contrib. Area	= 1.87 ac



Hydrograph Report

Project Name:

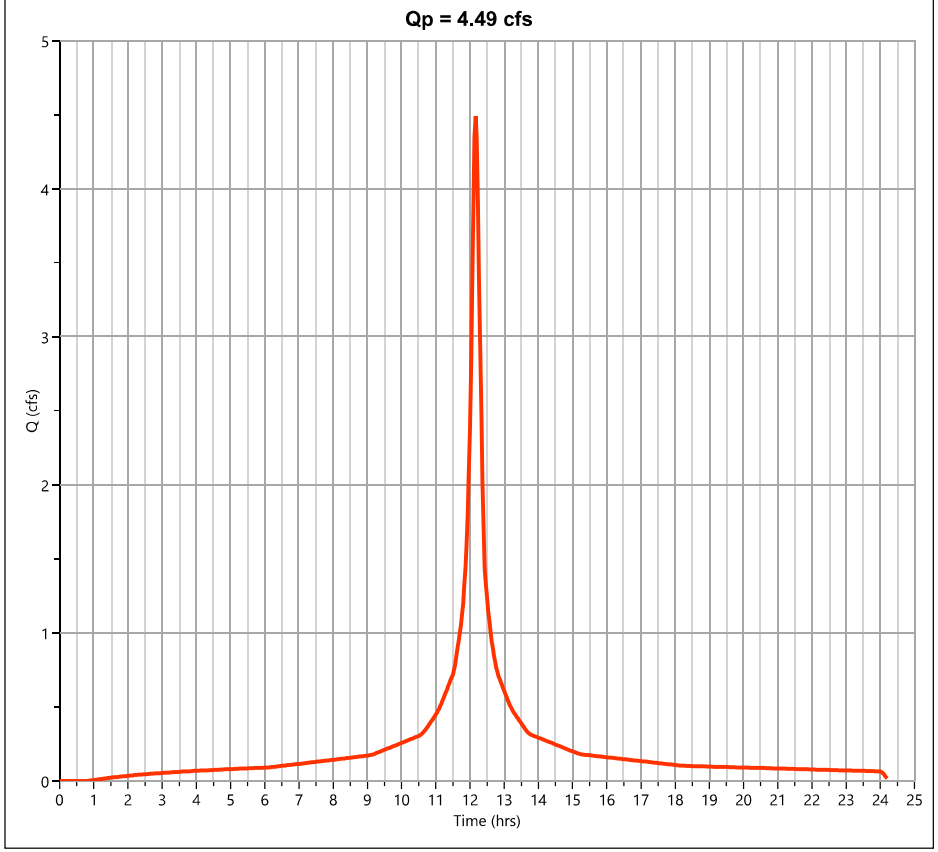
Hydrology Studio v 3.0.0.16

08-06-2020

DA-2 Imperv.

Hyd. No. 16

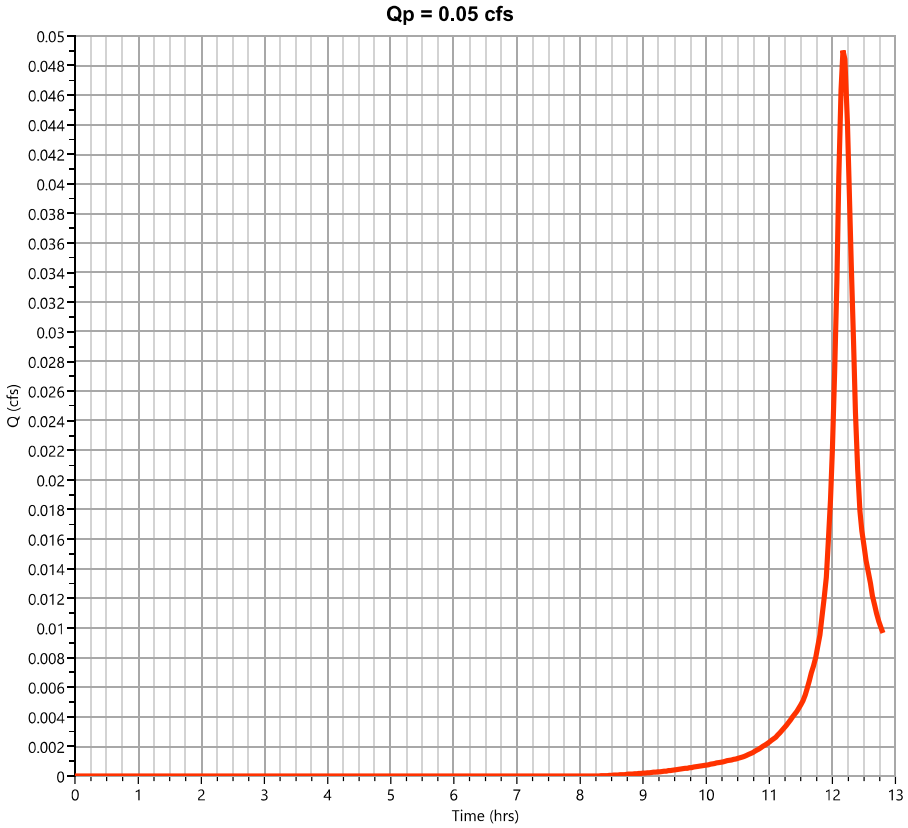
Hydrograph Type	= NRCS Runoff	Peak Flow	= 4.492 cfs
Storm Frequency	= 10-yr	Time to Peak	= 12.17 hrs
Time Interval	= 2 min	Runoff Volume	= 20,226 cuft
Drainage Area	= 1.08 ac	Curve Number	= 98
Tc Method	= User	Time of Conc. (Tc)	= 10.0 min
Total Rainfall	= 5.24 in	Design Storm	= NOAA-D
Storm Duration	= 24 hrs	Shape Factor	= 484



DA-2 Perv.

Hyd. No. 17

Hydrograph Type	= NRCS Runoff	Peak Flow	= 0.049 cfs
Storm Frequency	= 10-yr	Time to Peak	= 12.17 hrs
Time Interval	= 2 min	Runoff Volume	= 191 cuft
Drainage Area	= 0.02 ac	Curve Number	= 74
Tc Method	= User	Time of Conc. (Tc)	= 10.0 min
Total Rainfall	= 5.24 in	Design Storm	= NOAA-D
Storm Duration	= 24 hrs	Shape Factor	= 484

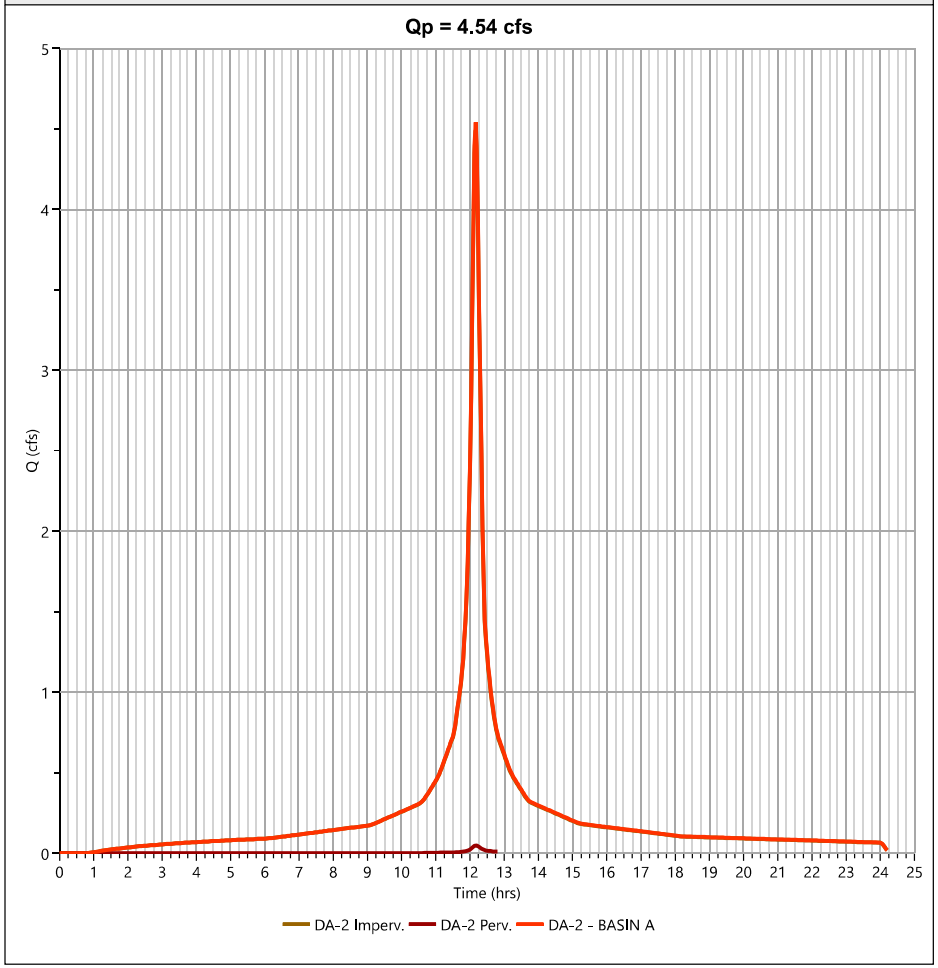


Hydrograph Report
Project Name:
Hydrology Studio v 3.0.0.16
08-06-2020

DA-2 - BASIN A

Hyd. No. 18

Hydrograph Type	= Junction	Peak Flow	= 4.541 cfs
Storm Frequency	= 10-yr	Time to Peak	= 12.17 hrs
Time Interval	= 2 min	Hydrograph Volume	= 20,417 cuft
Inflow Hydrographs	= 16, 17	Total Contrib. Area	= 1.1 ac



Hydrograph Report

Project Name:

Hydrology Studio v 3.0.0.16

08-06-2020

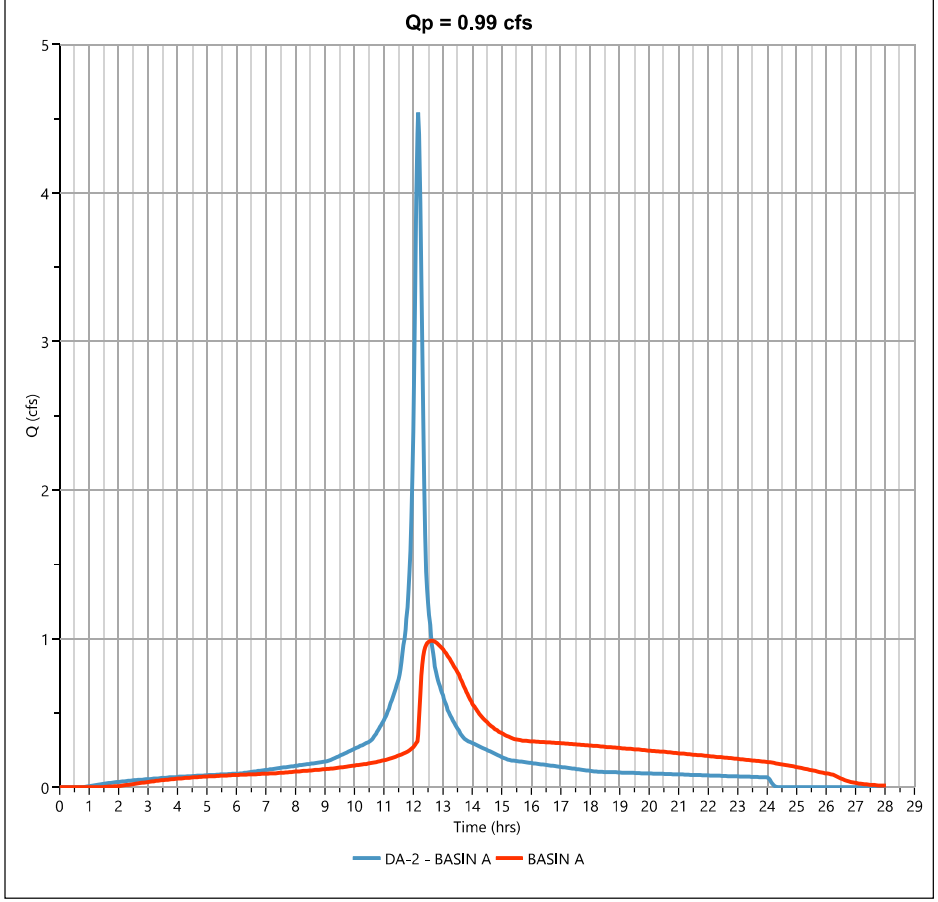
BASIN A

Hyd. No. 19

Hydrograph Type	= Pond Route	Peak Flow	= 0.986 cfs
Storm Frequency	= 10-yr	Time to Peak	= 12.63 hrs
Time Interval	= 2 min	Hydrograph Volume	= 20,395 cuft
Inflow Hydrograph	= 18 - DA-2 - BASIN A	Max. Elevation	= 215.71 ft
Pond Name	= BASIN A (Underground)	Max. Storage	= 8,258 cuft

Pond Routing by Storage Indication Method

Center of mass detention time = 2.95 hrs



Hydrograph Report

Project Name:

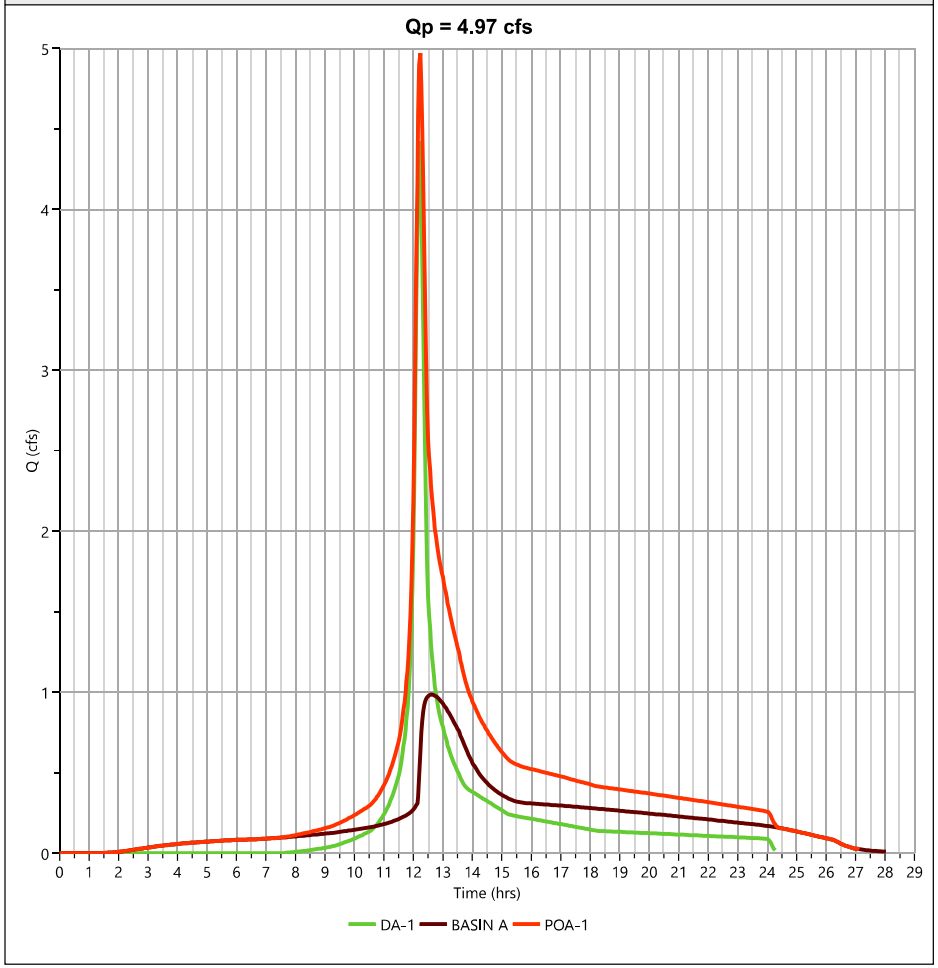
Hydrology Studio v 3.0.0.16

08-06-2020

POA-1

Hyd. No. 21

Hydrograph Type	= Junction	Peak Flow	= 4.972 cfs
Storm Frequency	= 10-yr	Time to Peak	= 12.23 hrs
Time Interval	= 2 min	Hydrograph Volume	= 38,836 cuft
Inflow Hydrographs	= 14, 19	Total Contrib. Area	= 1.87 ac



Hydrograph Report

Project Name:

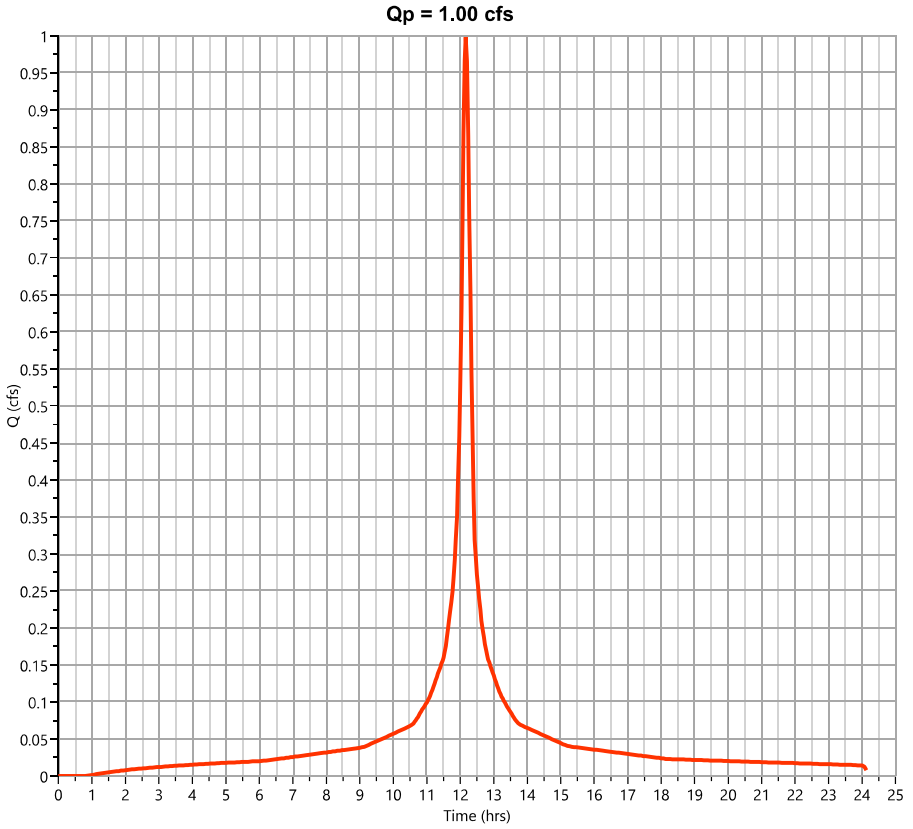
Hydrology Studio v 3.0.0.16

08-06-2020

DA-3 Imperv.

Hyd. No. 24

Hydrograph Type	= NRCS Runoff	Peak Flow	= 0.998 cfs
Storm Frequency	= 10-yr	Time to Peak	= 12.17 hrs
Time Interval	= 2 min	Runoff Volume	= 4,495 cuft
Drainage Area	= 0.24 ac	Curve Number	= 98
Tc Method	= User	Time of Conc. (Tc)	= 10.0 min
Total Rainfall	= 5.24 in	Design Storm	= NOAA-D
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

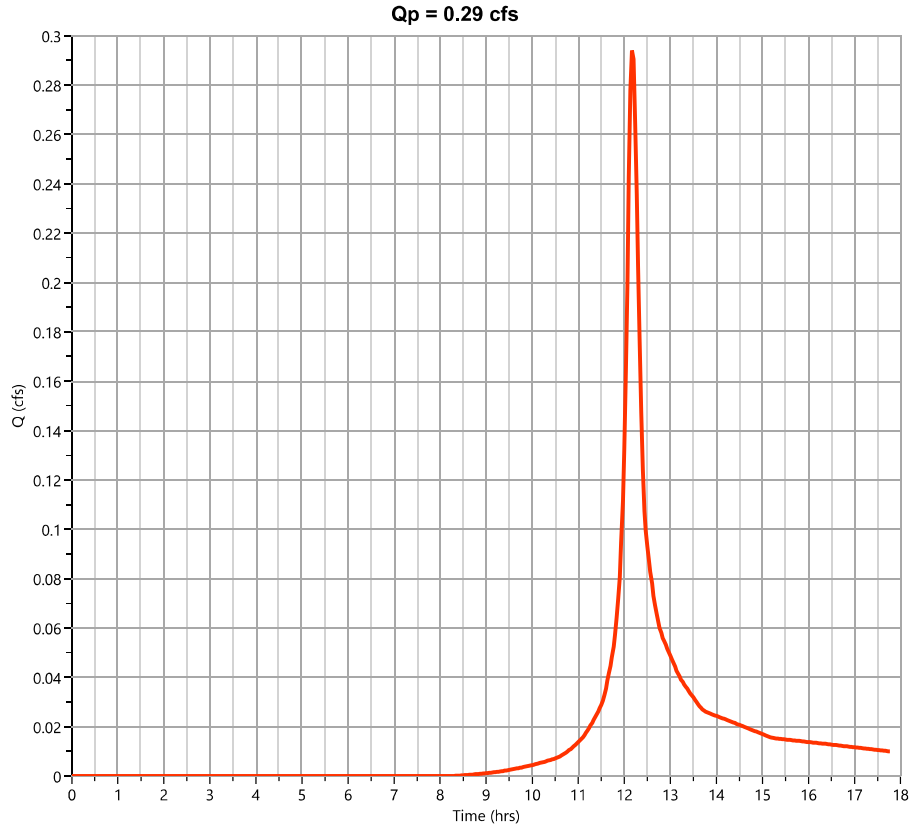
Hydrology Studio v 3.0.0.16

08-06-2020

DA-3 Perv.

Hyd. No. 25

Hydrograph Type	= NRCS Runoff	Peak Flow	= 0.294 cfs
Storm Frequency	= 10-yr	Time to Peak	= 12.17 hrs
Time Interval	= 2 min	Runoff Volume	= 1,149 cuft
Drainage Area	= 0.12 ac	Curve Number	= 74
Tc Method	= User	Time of Conc. (Tc)	= 10.0 min
Total Rainfall	= 5.24 in	Design Storm	= NOAA-D
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

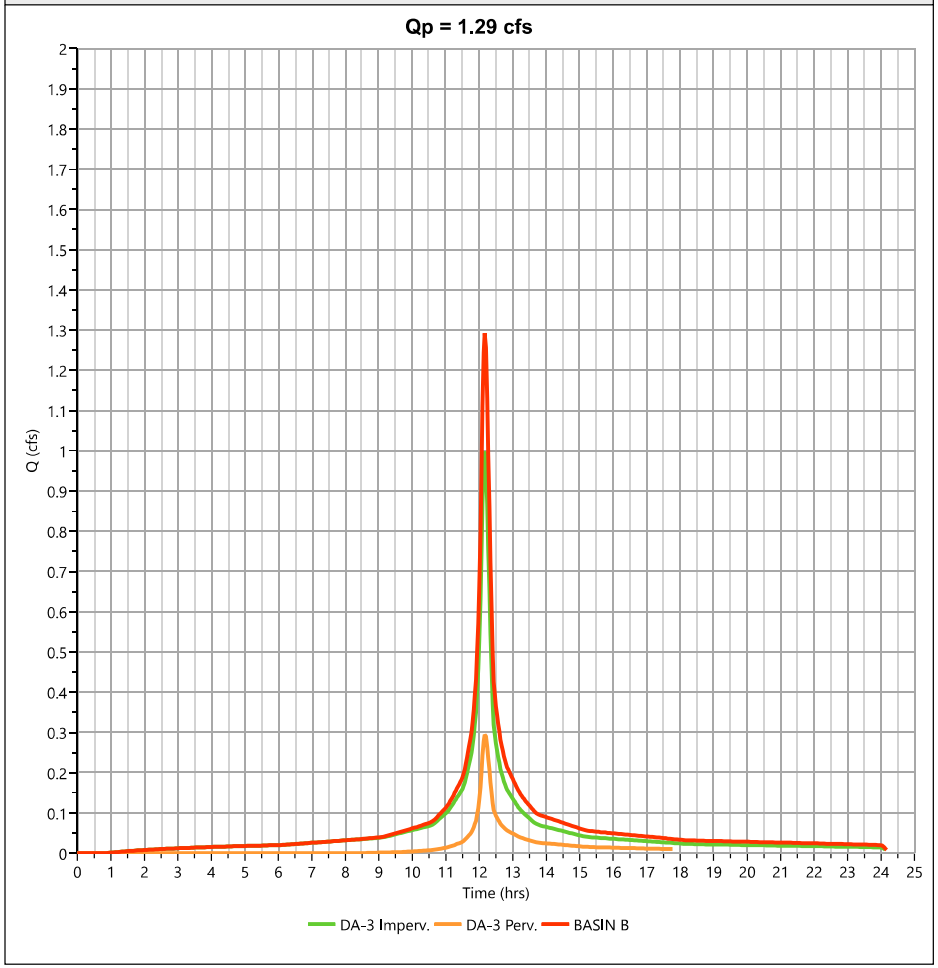
Hydrology Studio v 3.0.0.16

08-06-2020

BASIN B

Hyd. No. 26

Hydrograph Type	= Junction	Peak Flow	= 1.292 cfs
Storm Frequency	= 10-yr	Time to Peak	= 12.17 hrs
Time Interval	= 2 min	Hydrograph Volume	= 5,643 cuft
Inflow Hydrographs	= 24, 25	Total Contrib. Area	= 0.36 ac



Hydrograph Report

Project Name:

Hydrology Studio v 3.0.0.16

08-06-2020

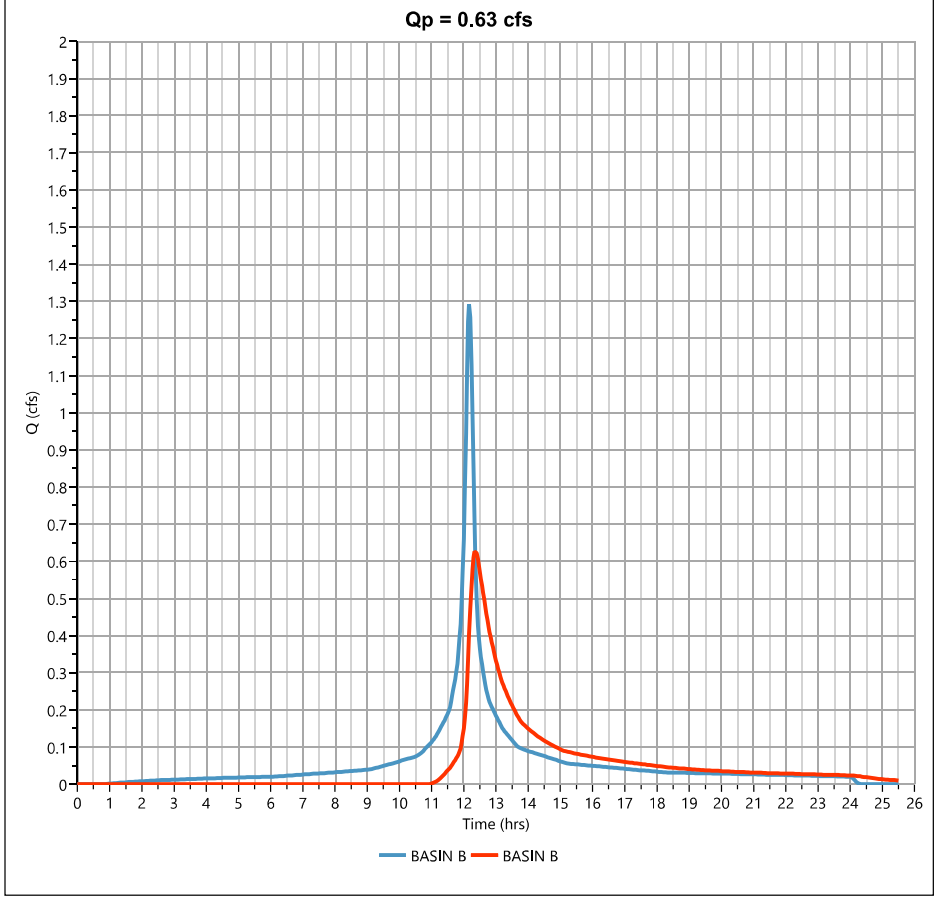
BASIN B

Hyd. No. 27

Hydrograph Type	= Pond Route	Peak Flow	= 0.630 cfs
Storm Frequency	= 10-yr	Time to Peak	= 12.37 hrs
Time Interval	= 2 min	Hydrograph Volume	= 4,641 cuft
Inflow Hydrograph	= 26 - BASIN B	Max. Elevation	= 217.62 ft
Pond Name	= BASIN B (Aboveground)	Max. Storage	= 2,474 cuft

Pond Routing by Storage Indication Method

Center of mass detention time = 2.18 hrs



Hydrograph Report

Project Name:

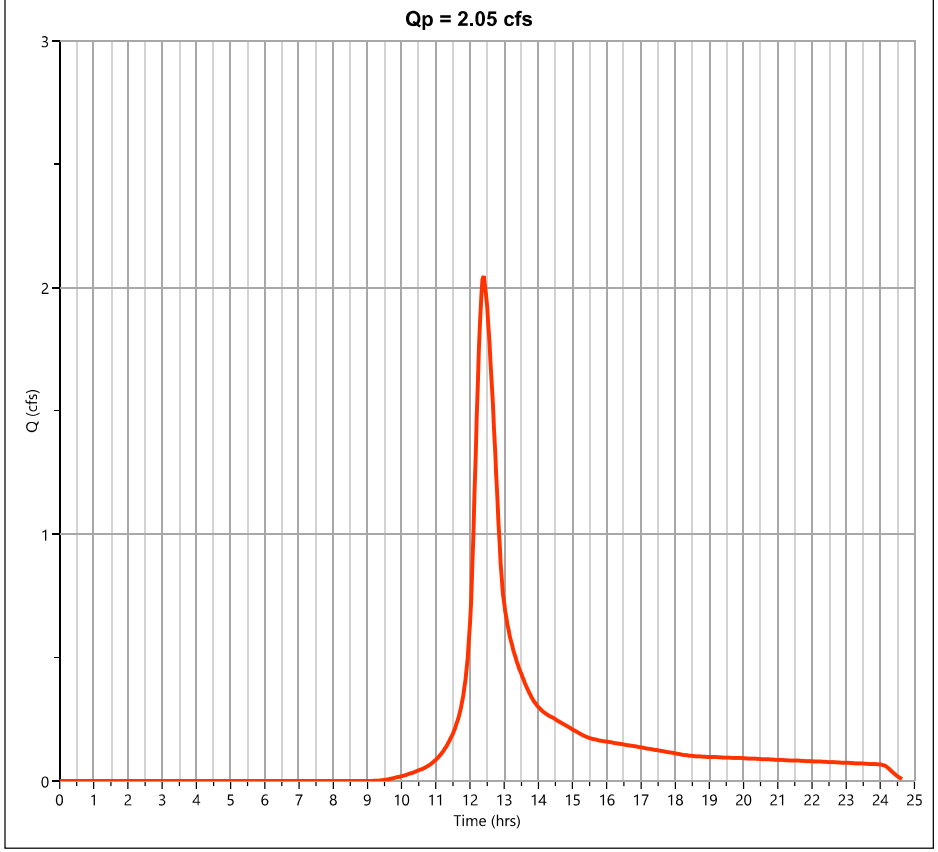
Hydrology Studio v 3.0.0.16

08-06-2020

DA-4

Hyd. No. 29

Hydrograph Type	= NRCS Runoff	Peak Flow	= 2.046 cfs
Storm Frequency	= 10-yr	Time to Peak	= 12.40 hrs
Time Interval	= 2 min	Runoff Volume	= 12,255 cuft
Drainage Area	= 1.45 ac	Curve Number	= 71
Tc Method	= User	Time of Conc. (Tc)	= 31.6 min
Total Rainfall	= 5.24 in	Design Storm	= NOAA-D
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

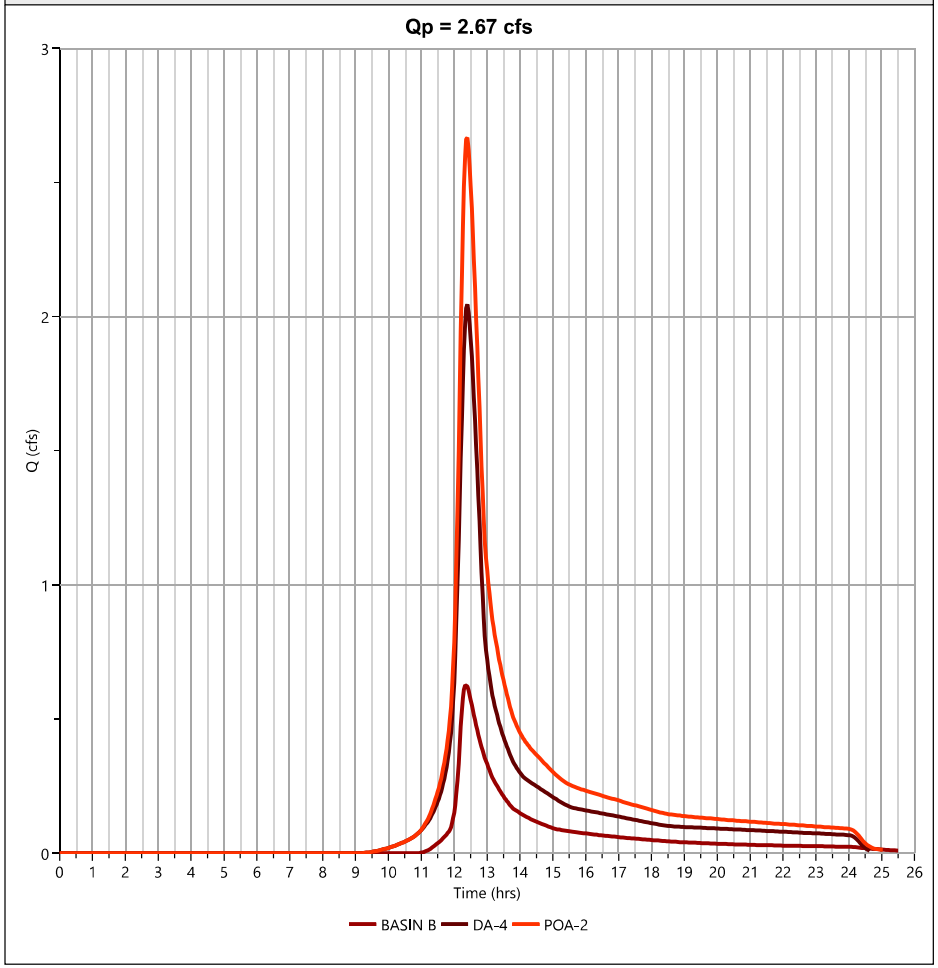
Hydrology Studio v 3.0.0.16

08-06-2020

POA-2

Hyd. No. 31

Hydrograph Type	= Junction	Peak Flow	= 2.668 cfs
Storm Frequency	= 10-yr	Time to Peak	= 12.40 hrs
Time Interval	= 2 min	Hydrograph Volume	= 16,896 cuft
Inflow Hydrographs	= 27, 29	Total Contrib. Area	= 1.45 ac



Hydrograph Report

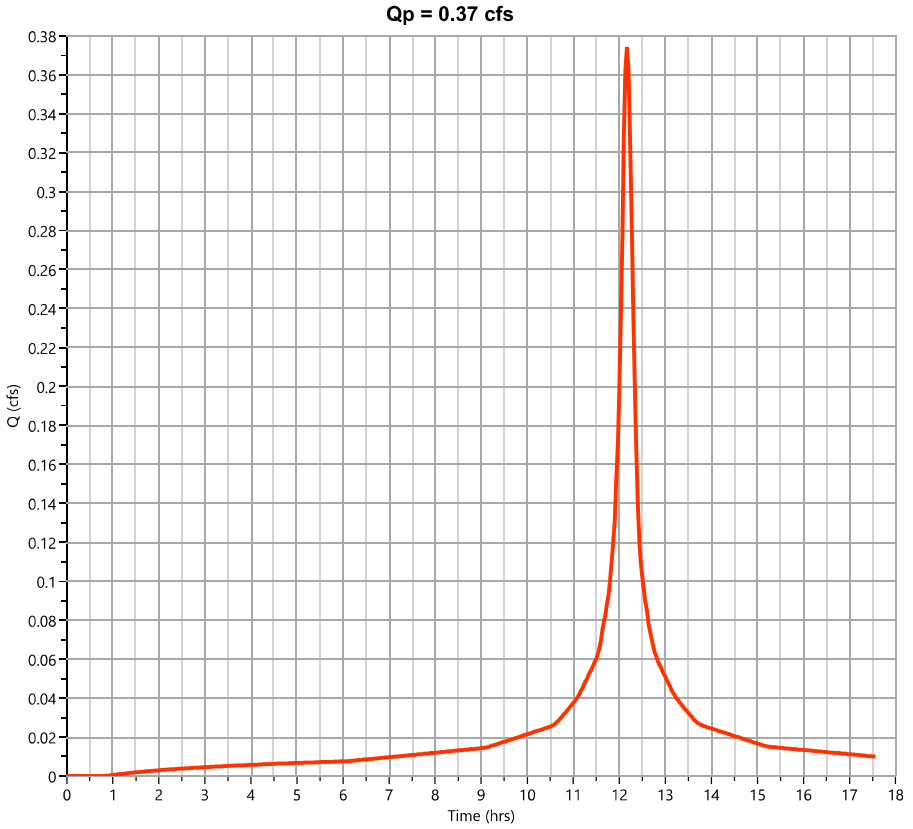
Project Name:

Hydrology Studio v 3.0.0.16

08-06-2020

222 **Hyd. No. 33**

Hydrograph Type	= NRCS Runoff	Peak Flow	= 0.374 cfs
Storm Frequency	= 10-yr	Time to Peak	= 12.17 hrs
Time Interval	= 2 min	Runoff Volume	= 1,685 cuft
Drainage Area	= 0.09 ac	Curve Number	= 98
Tc Method	= User	Time of Conc. (Tc)	= 10.0 min
Total Rainfall	= 5.24 in	Design Storm	= NOAA-D
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

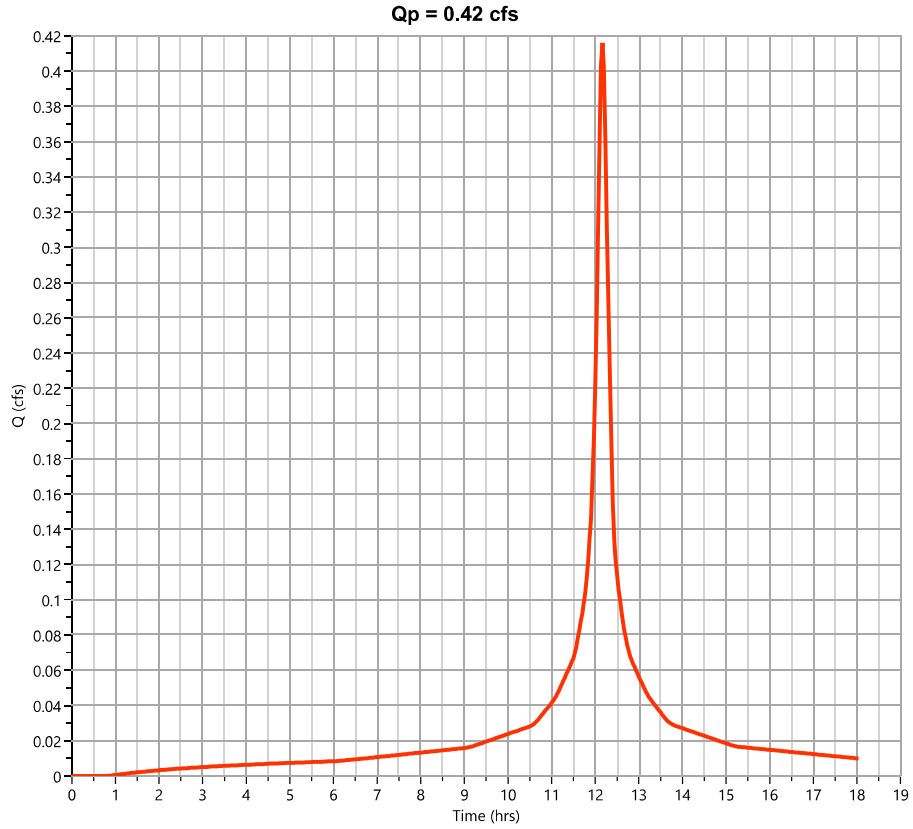
Project Name:

Hydrology Studio v 3.0.0.16

08-06-2020

211 **Hyd. No. 35**

Hydrograph Type	= NRCS Runoff	Peak Flow	= 0.416 cfs
Storm Frequency	= 10-yr	Time to Peak	= 12.17 hrs
Time Interval	= 2 min	Runoff Volume	= 1,873 cuft
Drainage Area	= 0.1 ac	Curve Number	= 98
Tc Method	= User	Time of Conc. (Tc)	= 10.0 min
Total Rainfall	= 5.24 in	Design Storm	= NOAA-D
Storm Duration	= 24 hrs	Shape Factor	= 484



Design Storm Report

Custom Storm filename:

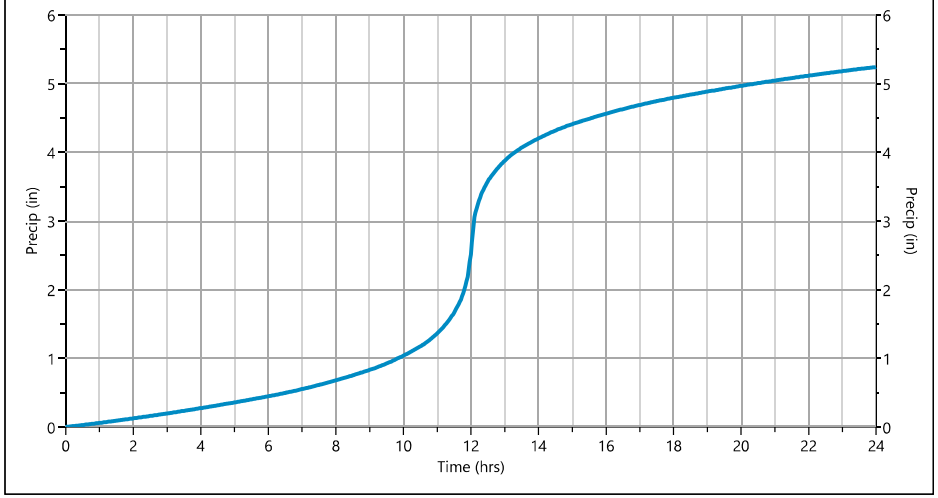
Hydrology Studio v 3.0.0.16

08-06-2020

Storm Distribution: Custom - NOAA-D

Storm Duration	Total Rainfall Volume (in)								
	1-yr	2-yr	3-yr	5-yr	✔ 10-yr	25-yr	50-yr	100-yr	
24 hrs	0.00	3.54	0.00	0.00	5.24	6.37	0.00	8.35	

Incremental Rainfall Distribution, 10-yr									
Time (hrs)	Precip (in)	Time (hrs)	Precip (in)	Time (hrs)	Precip (in)	Time (hrs)	Precip (in)	Time (hrs)	Precip (in)
11.10	0.016384	11.47	0.023475	11.83	0.063334	12.20	0.063334	12.57	0.023475
11.13	0.018148	11.50	0.023476	11.87	0.063333	12.23	0.045640	12.60	0.023475
11.17	0.018148	11.53	0.031615	11.90	0.063334	12.27	0.045640	12.63	0.021711
11.20	0.018148	11.57	0.031614	11.93	0.109254	12.30	0.045640	12.67	0.021711
11.23	0.019930	11.60	0.031615	11.97	0.109254	12.33	0.033274	12.70	0.021711
11.27	0.019929	11.63	0.033274	12.00	0.109253	12.37	0.033274	12.73	0.019930
11.30	0.019930	11.67	0.033274	12.03	0.182300	12.40	0.033274	12.77	0.019929
11.33	0.021711	11.70	0.033274	12.07	0.182300	12.43	0.031615	12.80	0.019929
11.37	0.021711	11.73	0.045641	**12.10**	**0.182300**	12.47	0.031614	12.83	0.018148
11.40	0.021711	11.77	0.045640	12.13	0.063334	12.50	0.031615	12.87	0.018148
11.43	0.023475	11.80	0.045642	12.17	0.063333	12.53	0.023475	12.90	0.018148



Hydrograph 25-yr Summary

Project Name:

Hydrology Studio v 3.0.0.16

08-06-2020

Hyd. No.	Hydrograph Type	Hydrograph Name	Peak Flow (cfs)	Time to Peak (hrs)	Hydrograph Volume (cuft)	Inflow Hyd(s)	Maximum Elevation (ft)	Maximum Storage (cuft)
1	NRCS Runoff	EX-DA1	1.932	12.17	7,547	---		
2	NRCS Runoff	EX-DA1 UNDIST.	5.824	12.17	22,785	---		
3	Junction	EXIST. POA-1	7.756	12.17	30,332	1, 2		
5	NRCS Runoff	EX-DA2	2.607	12.40	15,504	---		
6	NRCS Runoff	EX-DA2 UNDIST.	2.780	12.40	16,530	---		
7	Junction	EXIST. POA-2	5.387	12.40	32,033	5, 6		
12	NRCS Runoff	DA-1B	0.802	12.20	3,343	---		
13	NRCS Runoff	DA-1A	5.151	12.20	21,542	---		
14	Junction	DA-1	5.953	12.20	24,885	12, 13		
16	NRCS Runoff	DA-2 Imperv.	5.470	12.17	24,789	---		
17	NRCS Runoff	DA-2 Perv.	0.067	12.17	262	---		
18	Junction	DA-2 - BASIN A	5.537	12.17	25,051	16, 17		
19	Pond Route	BASIN A	1.289	12.60	25,028	18	216.19	10,041
21	Junction	POA-1	6.897	12.20	49,913	14, 19		
24	NRCS Runoff	DA-3 Imperv.	1.215	12.17	5,509	---		
25	NRCS Runoff	DA-3 Perv.	0.403	12.17	1,572	---		
26	Junction	BASIN B	1.618	12.17	7,080	24, 25		
27	Pond Route	BASIN B	0.893	12.33	6,078	26	217.76	2,784
29	NRCS Runoff	DA-4	2.872	12.40	17,052	---		
31	Junction	POA-2	3.746	12.37	23,129	27, 29		
33	NRCS Runoff	222	0.456	12.17	2,066	---		
35	NRCS Runoff	211	0.506	12.17	2,295	---		

Hydrograph Report

Project Name:

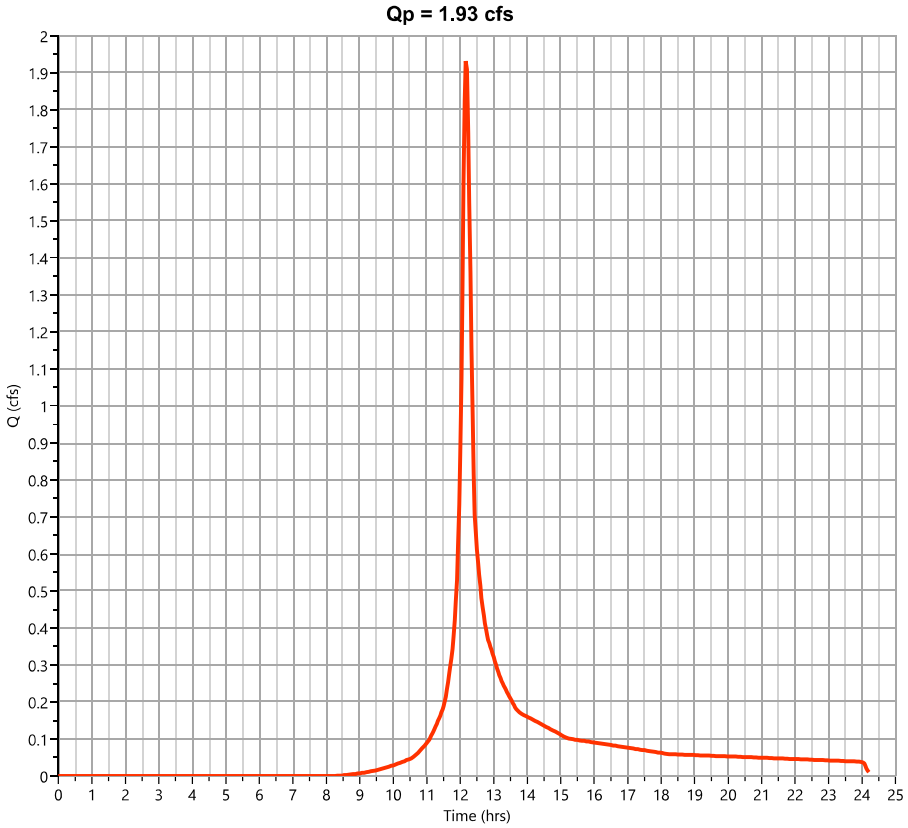
Hydrology Studio v 3.0.0.16

08-06-2020

EX-DA1

Hyd. No. 1

Hydrograph Type	= NRCS Runoff	Peak Flow	= 1.932 cfs
Storm Frequency	= 25-yr	Time to Peak	= 12.17 hrs
Time Interval	= 2 min	Runoff Volume	= 7,547 cuft
Drainage Area	= 0.65 ac	Curve Number	= 70
Tc Method	= User	Time of Conc. (Tc)	= 12.9 min
Total Rainfall	= 6.37 in	Design Storm	= NOAA-D
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

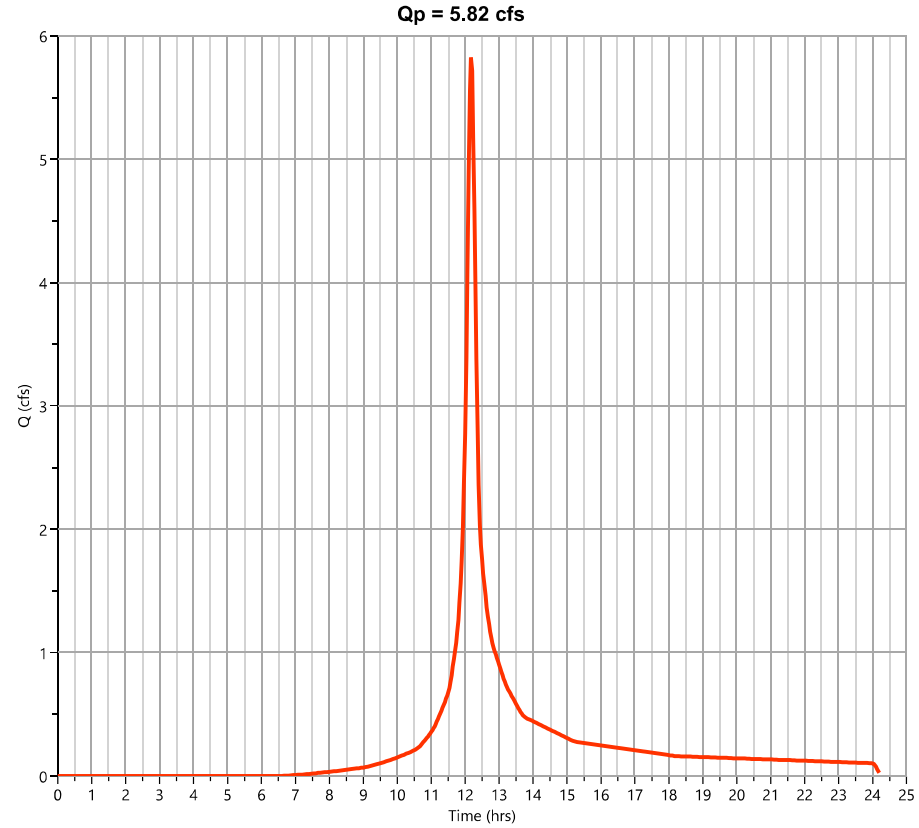
Hydrology Studio v 3.0.0.16

08-06-2020

EX-DA1 UNDIST.

Hyd. No. 2

Hydrograph Type	= NRCS Runoff	Peak Flow	= 5.824 cfs
Storm Frequency	= 25-yr	Time to Peak	= 12.17 hrs
Time Interval	= 2 min	Runoff Volume	= 22,785 cuft
Drainage Area	= 1.6 ac	Curve Number	= 77
Tc Method	= User	Time of Conc. (Tc)	= 12.9 min
Total Rainfall	= 6.37 in	Design Storm	= NOAA-D
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

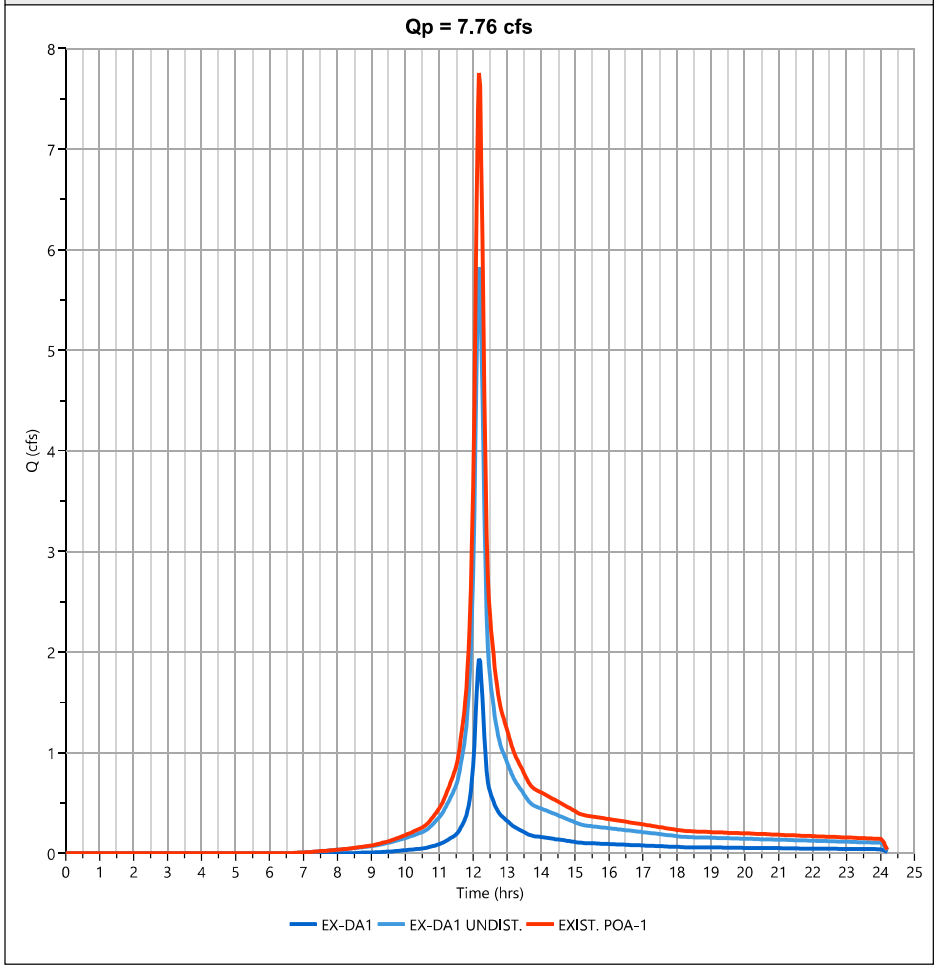
Hydrology Studio v 3.0.0.16

08-06-2020

EXIST. POA-1

Hyd. No. 3

Hydrograph Type	= Junction	Peak Flow	= 7.756 cfs
Storm Frequency	= 25-yr	Time to Peak	= 12.17 hrs
Time Interval	= 2 min	Hydrograph Volume	= 30,332 cuft
Inflow Hydrographs	= 1, 2	Total Contrib. Area	= 2.25 ac



Hydrograph Report

Project Name:

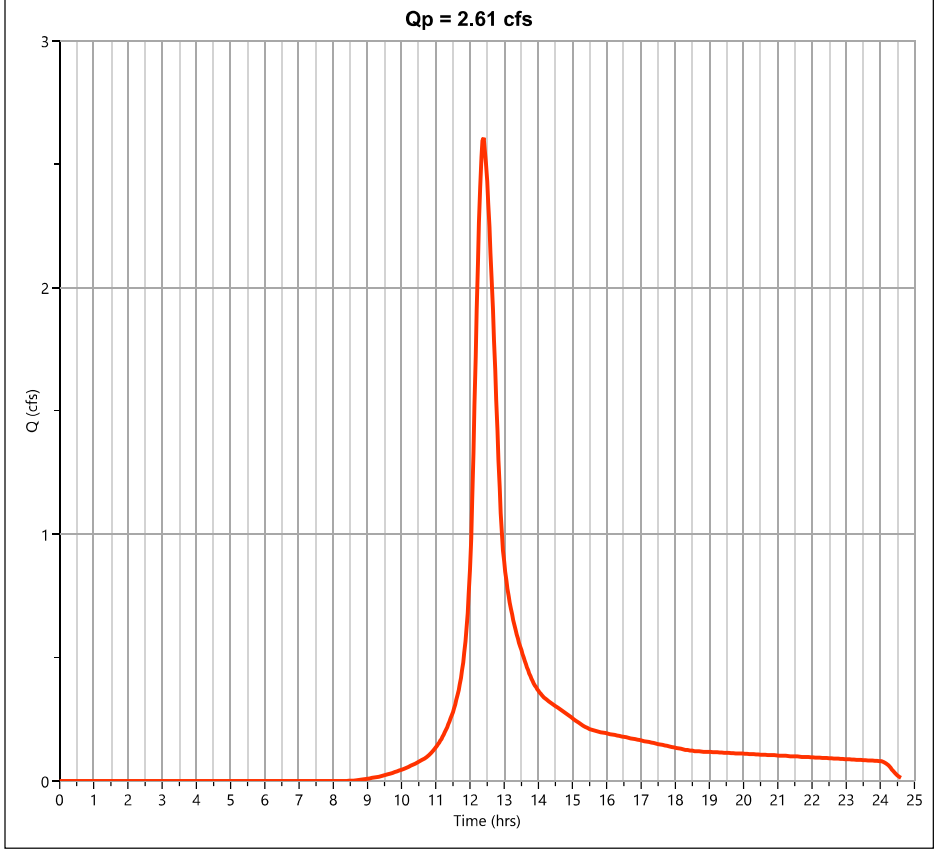
Hydrology Studio v 3.0.0.16

08-06-2020

EX-DA2

Hyd. No. 5

Hydrograph Type	= NRCS Runoff	Peak Flow	= 2.607 cfs
Storm Frequency	= 25-yr	Time to Peak	= 12.40 hrs
Time Interval	= 2 min	Runoff Volume	= 15,504 cuft
Drainage Area	= 1.36 ac	Curve Number	= 70
Tc Method	= User	Time of Conc. (Tc)	= 31.6 min
Total Rainfall	= 6.37 in	Design Storm	= NOAA-D
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

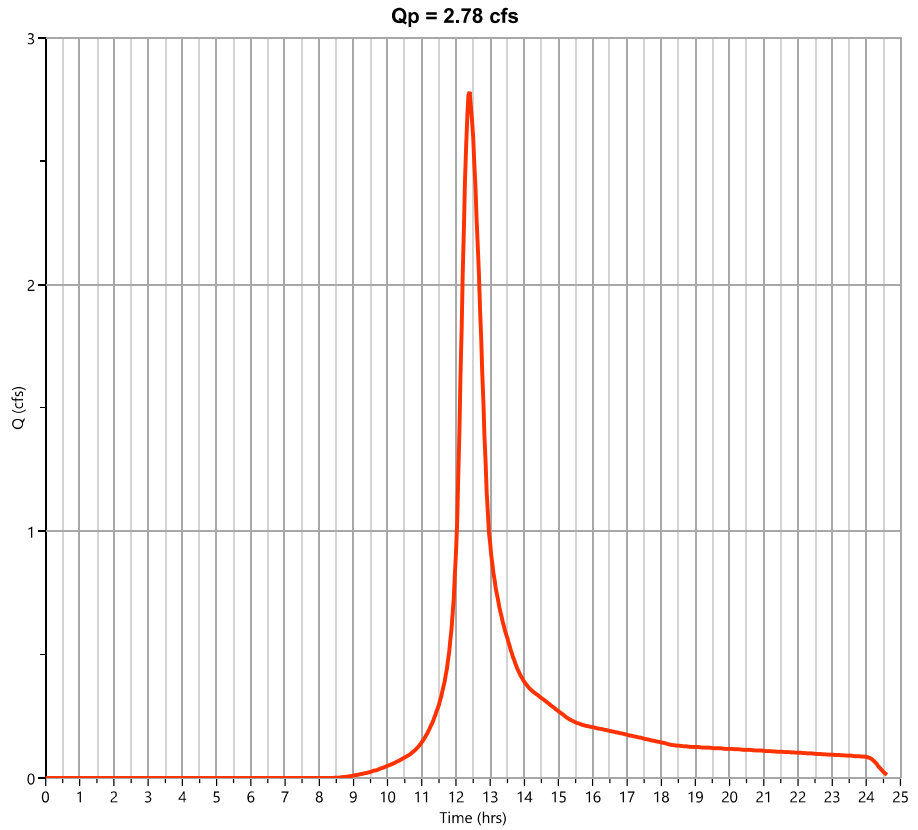
Hydrology Studio v 3.0.0.16

08-06-2020

EX-DA2 UNDIST.

Hyd. No. 6

Hydrograph Type	= NRCS Runoff	Peak Flow	= 2.780 cfs
Storm Frequency	= 25-yr	Time to Peak	= 12.40 hrs
Time Interval	= 2 min	Runoff Volume	= 16,530 cuft
Drainage Area	= 1.45 ac	Curve Number	= 70
Tc Method	= User	Time of Conc. (Tc)	= 31.6 min
Total Rainfall	= 6.37 in	Design Storm	= NOAA-D
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

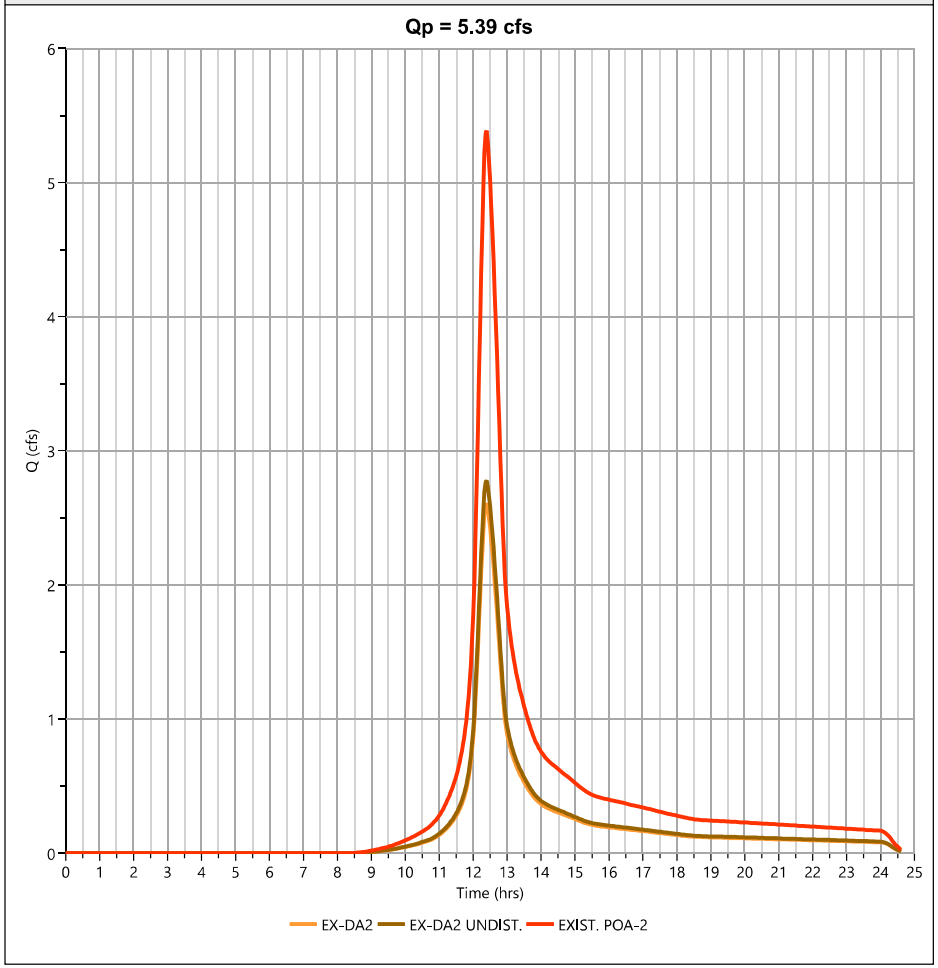
Hydrology Studio v 3.0.0.16

08-06-2020

EXIST. POA-2

Hyd. No. 7

Hydrograph Type	= Junction	Peak Flow	= 5.387 cfs
Storm Frequency	= 25-yr	Time to Peak	= 12.40 hrs
Time Interval	= 2 min	Hydrograph Volume	= 32,033 cuft
Inflow Hydrographs	= 5, 6	Total Contrib. Area	= 2.81 ac



Hydrograph Report

Project Name:

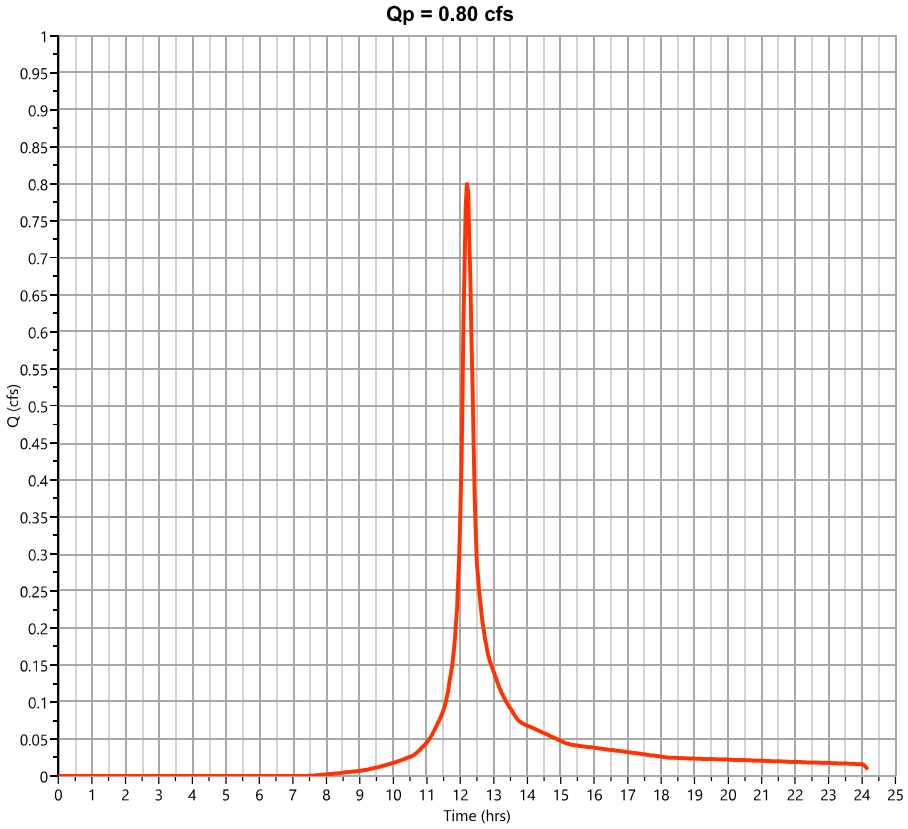
Hydrology Studio v 3.0.0.16

08-06-2020

DA-1B

Hyd. No. 12

Hydrograph Type	= NRCS Runoff	Peak Flow	= 0.802 cfs
Storm Frequency	= 25-yr	Time to Peak	= 12.20 hrs
Time Interval	= 2 min	Runoff Volume	= 3,343 cuft
Drainage Area	= 0.27 ac	Curve Number	= 74
Tc Method	= User	Time of Conc. (Tc)	= 15.0 min
Total Rainfall	= 6.37 in	Design Storm	= NOAA-D
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

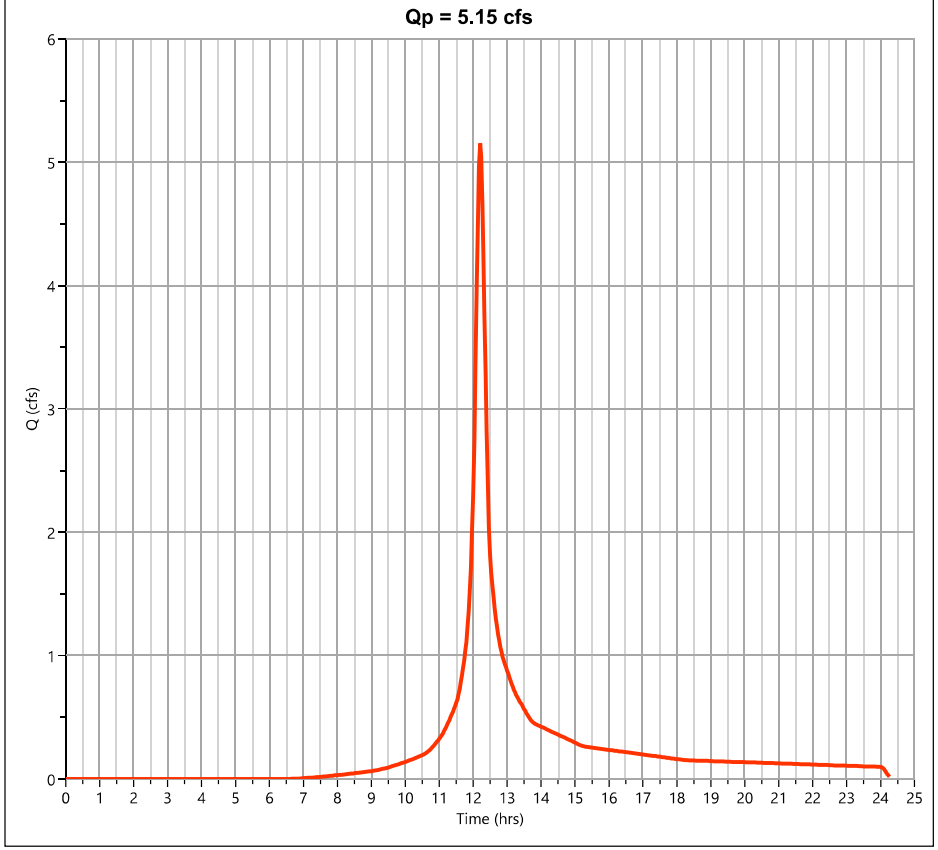
Hydrology Studio v 3.0.0.16

08-06-2020

DA-1A

Hyd. No. 13

Hydrograph Type	= NRCS Runoff	Peak Flow	= 5.151 cfs
Storm Frequency	= 25-yr	Time to Peak	= 12.20 hrs
Time Interval	= 2 min	Runoff Volume	= 21,542 cuft
Drainage Area	= 1.6 ac	Curve Number	= 77
Tc Method	= User	Time of Conc. (Tc)	= 15.0 min
Total Rainfall	= 6.37 in	Design Storm	= NOAA-D
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

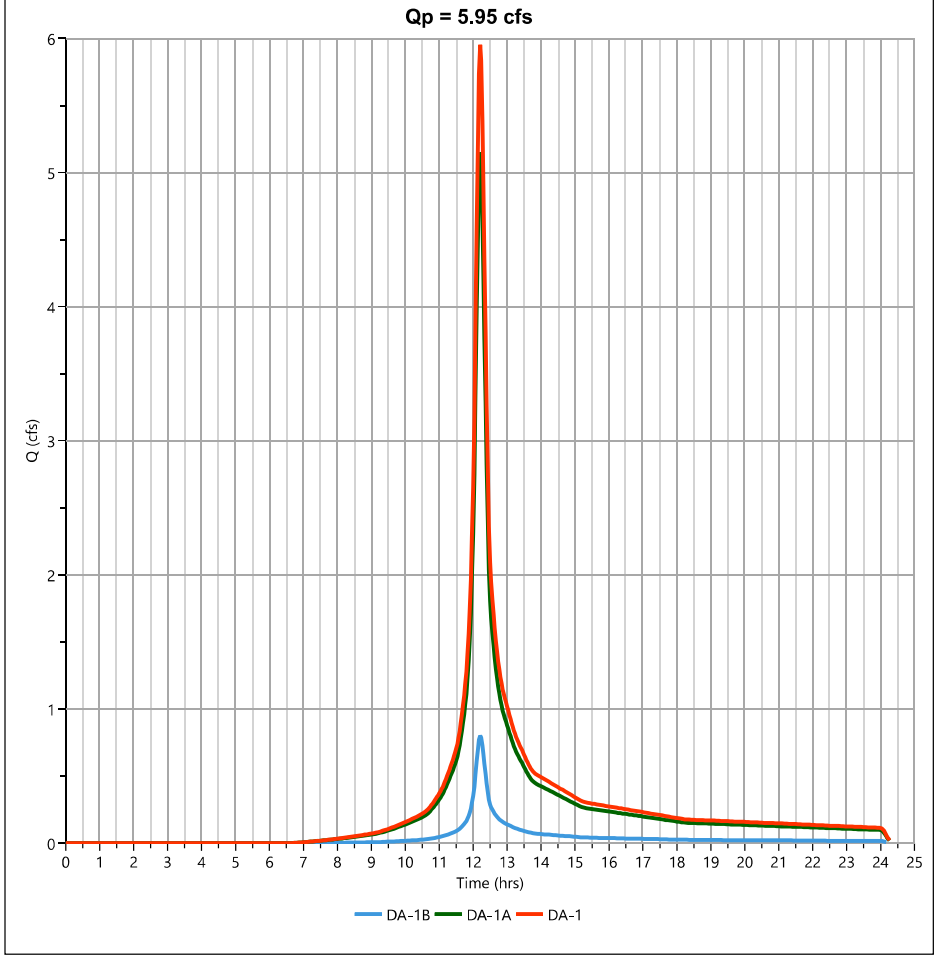
Hydrology Studio v 3.0.0.16

08-06-2020

DA-1

Hyd. No. 14

Hydrograph Type	= Junction	Peak Flow	= 5.953 cfs
Storm Frequency	= 25-yr	Time to Peak	= 12.20 hrs
Time Interval	= 2 min	Hydrograph Volume	= 24,885 cuft
Inflow Hydrographs	= 12, 13	Total Contrib. Area	= 1.87 ac



Hydrograph Report

Project Name:

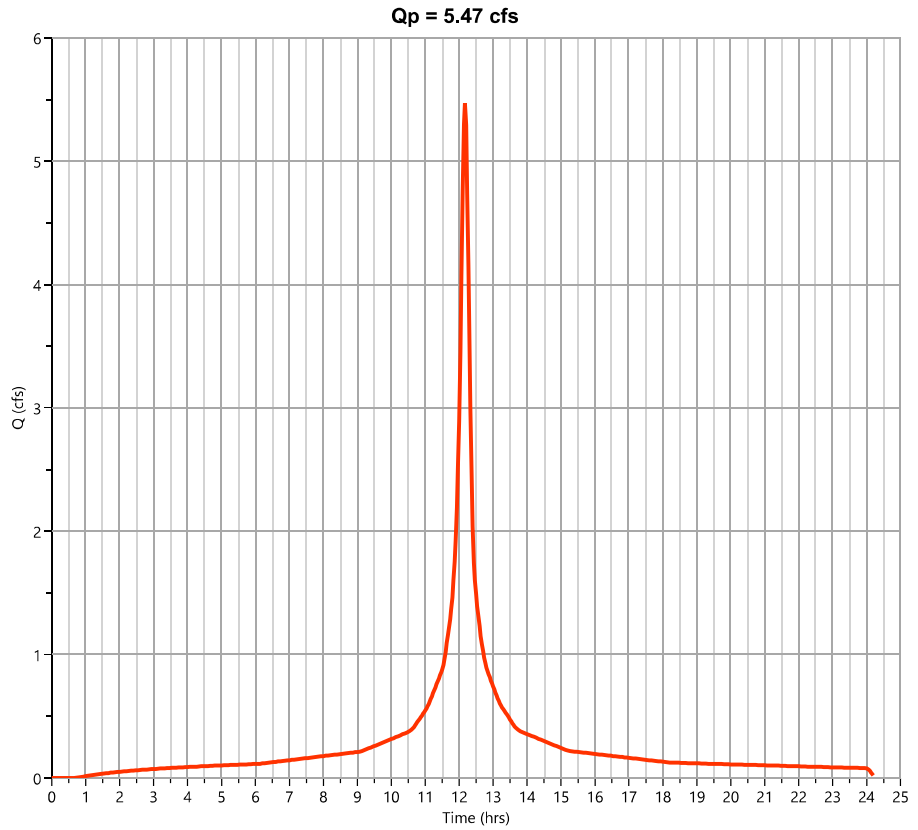
Hydrology Studio v 3.0.0.16

08-06-2020

DA-2 Imperv.

Hyd. No. 16

Hydrograph Type	= NRCS Runoff	Peak Flow	= 5.470 cfs
Storm Frequency	= 25-yr	Time to Peak	= 12.17 hrs
Time Interval	= 2 min	Runoff Volume	= 24,789 cuft
Drainage Area	= 1.08 ac	Curve Number	= 98
Tc Method	= User	Time of Conc. (Tc)	= 10.0 min
Total Rainfall	= 6.37 in	Design Storm	= NOAA-D
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

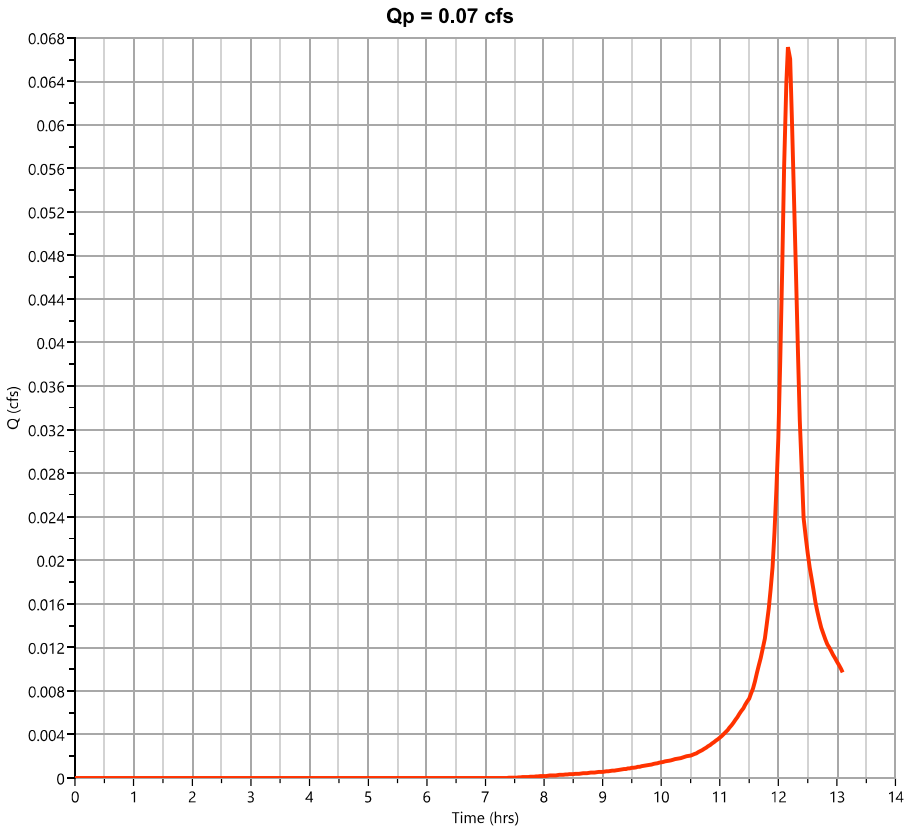
Hydrology Studio v 3.0.0.16

08-06-2020

DA-2 Perv.

Hyd. No. 17

Hydrograph Type	= NRCS Runoff	Peak Flow	= 0.067 cfs
Storm Frequency	= 25-yr	Time to Peak	= 12.17 hrs
Time Interval	= 2 min	Runoff Volume	= 262 cuft
Drainage Area	= 0.02 ac	Curve Number	= 74
Tc Method	= User	Time of Conc. (Tc)	= 10.0 min
Total Rainfall	= 6.37 in	Design Storm	= NOAA-D
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

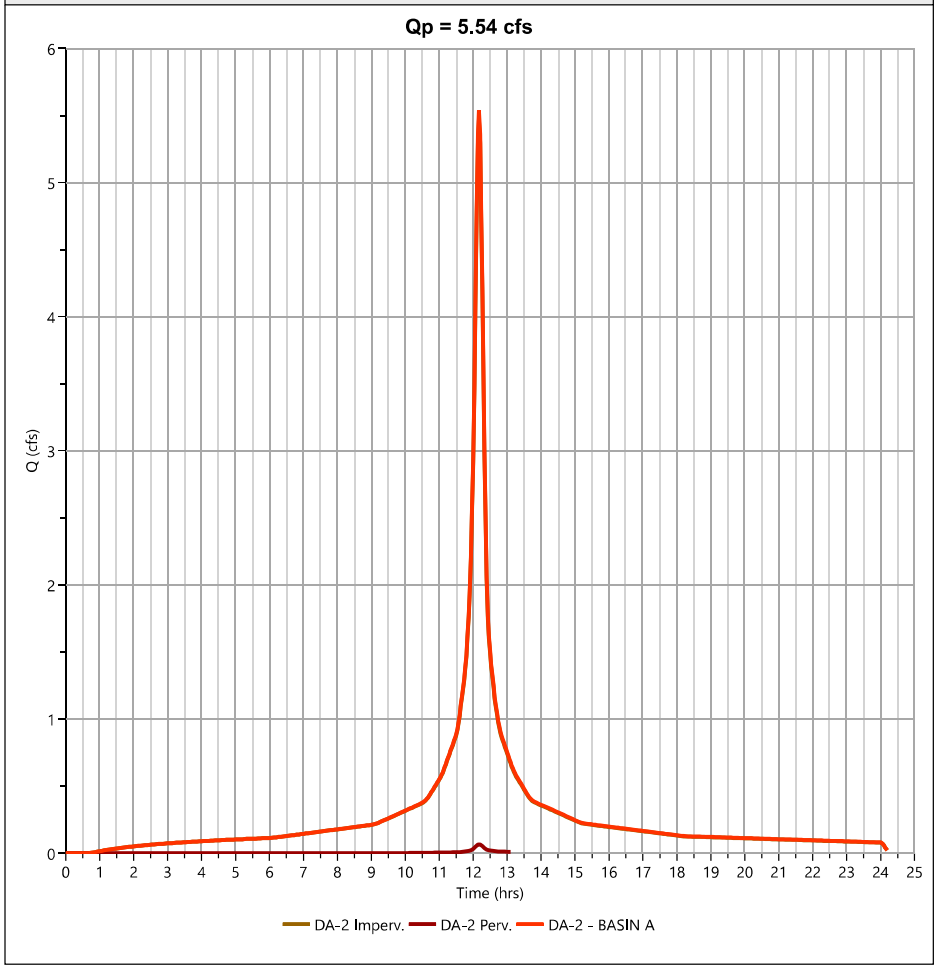
Hydrology Studio v 3.0.0.16

08-06-2020

DA-2 - BASIN A

Hyd. No. 18

Hydrograph Type	= Junction	Peak Flow	= 5.537 cfs
Storm Frequency	= 25-yr	Time to Peak	= 12.17 hrs
Time Interval	= 2 min	Hydrograph Volume	= 25,051 cuft
Inflow Hydrographs	= 16, 17	Total Contrib. Area	= 1.1 ac



Hydrograph Report

Project Name:

Hydrology Studio v 3.0.0.16

08-06-2020

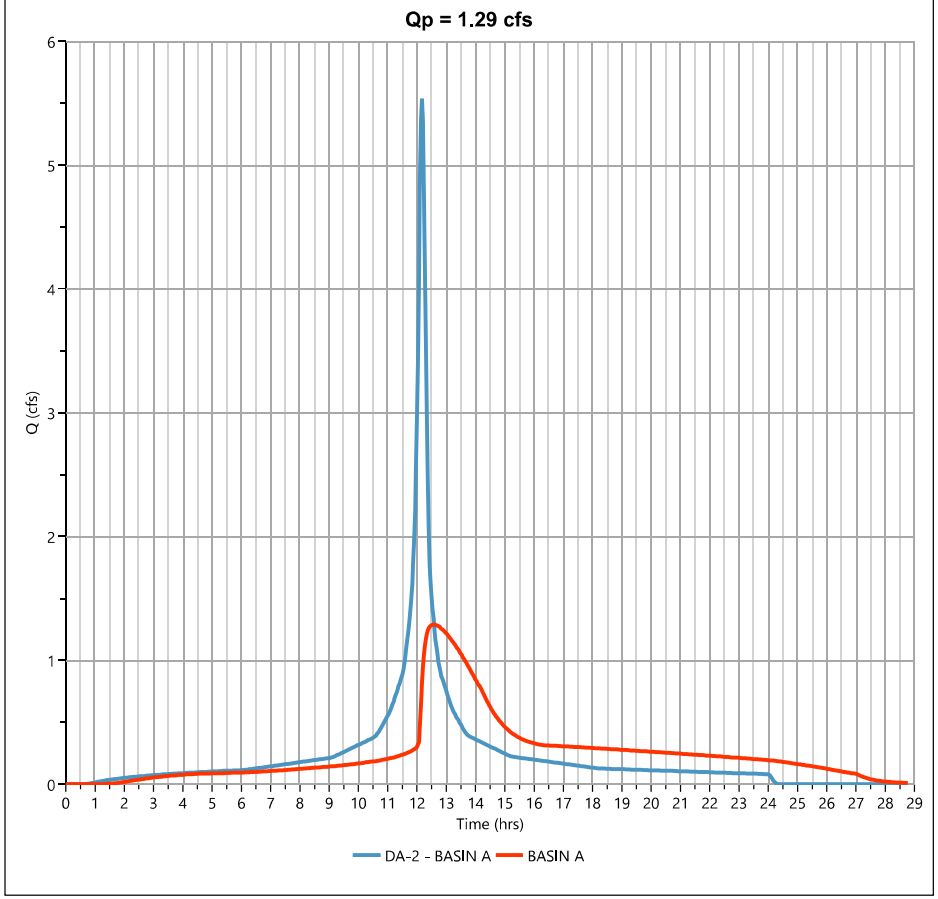
BASIN A

Hyd. No. 19

Hydrograph Type	= Pond Route	Peak Flow	= 1.289 cfs
Storm Frequency	= 25-yr	Time to Peak	= 12.60 hrs
Time Interval	= 2 min	Hydrograph Volume	= 25,028 cuft
Inflow Hydrograph	= 18 - DA-2 - BASIN A	Max. Elevation	= 216.19 ft
Pond Name	= BASIN A (Underground)	Max. Storage	= 10,041 cuft

Pond Routing by Storage Indication Method

Center of mass detention time = 2.84 hrs



Hydrograph Report

Project Name:

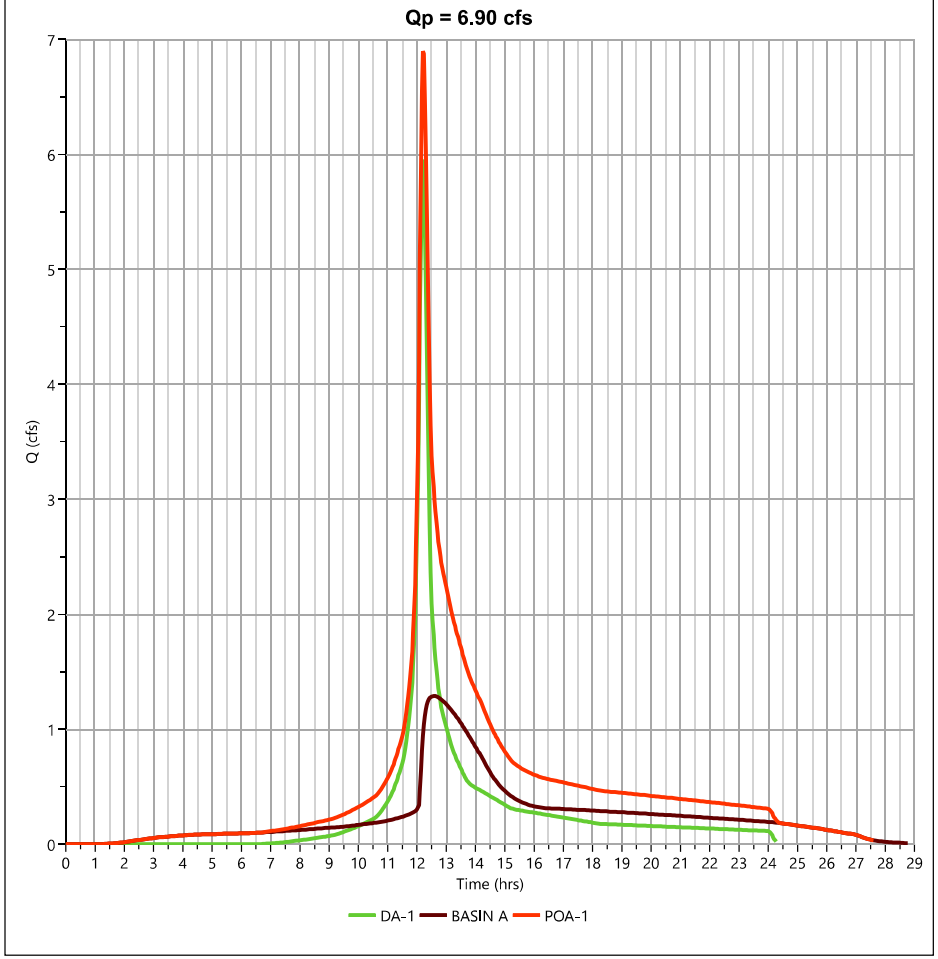
Hydrology Studio v 3.0.0.16

08-06-2020

POA-1

Hyd. No. 21

Hydrograph Type	= Junction	Peak Flow	= 6.897 cfs
Storm Frequency	= 25-yr	Time to Peak	= 12.20 hrs
Time Interval	= 2 min	Hydrograph Volume	= 49,913 cuft
Inflow Hydrographs	= 14, 19	Total Contrib. Area	= 1.87 ac



Hydrograph Report

Project Name:

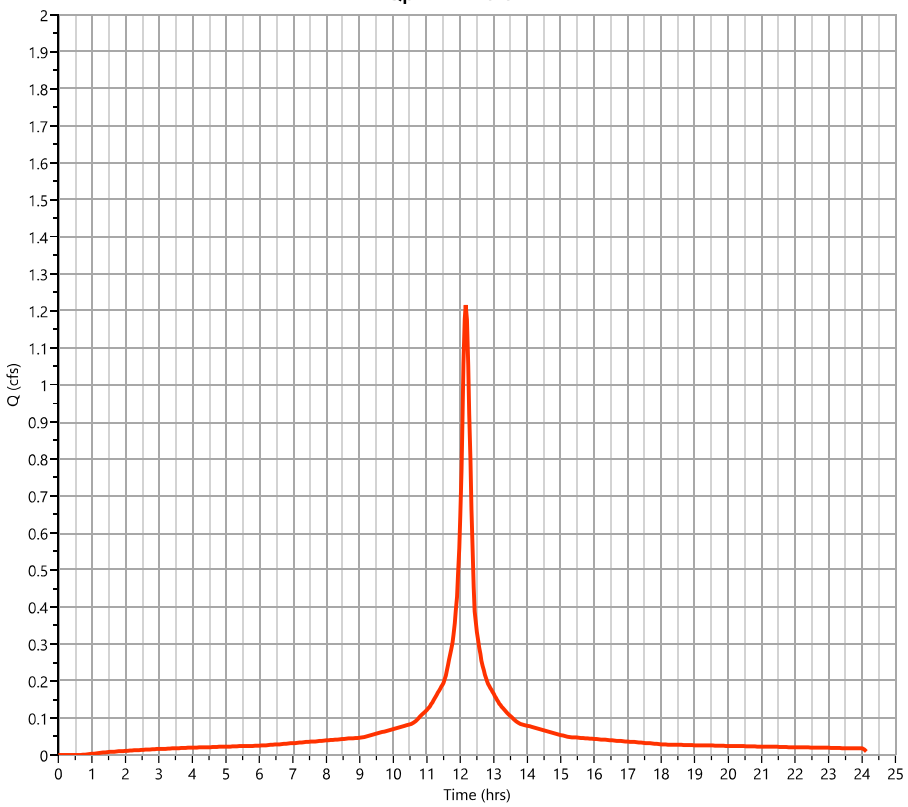
Hydrology Studio v 3.0.0.16

08-06-2020

DA-3 Imperv.

Hyd. No. 24

Hydrograph Type	= NRCS Runoff	Peak Flow	= 1.215 cfs
Storm Frequency	= 25-yr	Time to Peak	= 12.17 hrs
Time Interval	= 2 min	Runoff Volume	= 5,509 cuft
Drainage Area	= 0.24 ac	Curve Number	= 98
Tc Method	= User	Time of Conc. (Tc)	= 10.0 min
Total Rainfall	= 6.37 in	Design Storm	= NOAA-D
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

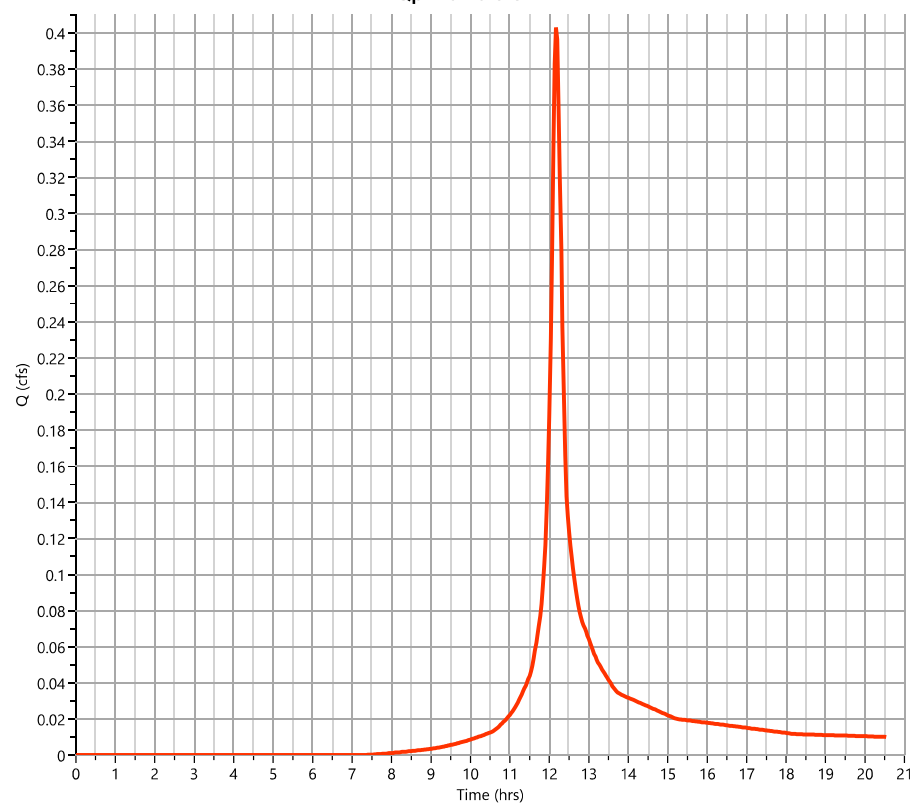
Hydrology Studio v 3.0.0.16

08-06-2020

DA-3 Perv.

Hyd. No. 25

Hydrograph Type	= NRCS Runoff	Peak Flow	= 0.403 cfs
Storm Frequency	= 25-yr	Time to Peak	= 12.17 hrs
Time Interval	= 2 min	Runoff Volume	= 1,572 cuft
Drainage Area	= 0.12 ac	Curve Number	= 74
Tc Method	= User	Time of Conc. (Tc)	= 10.0 min
Total Rainfall	= 6.37 in	Design Storm	= NOAA-D
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

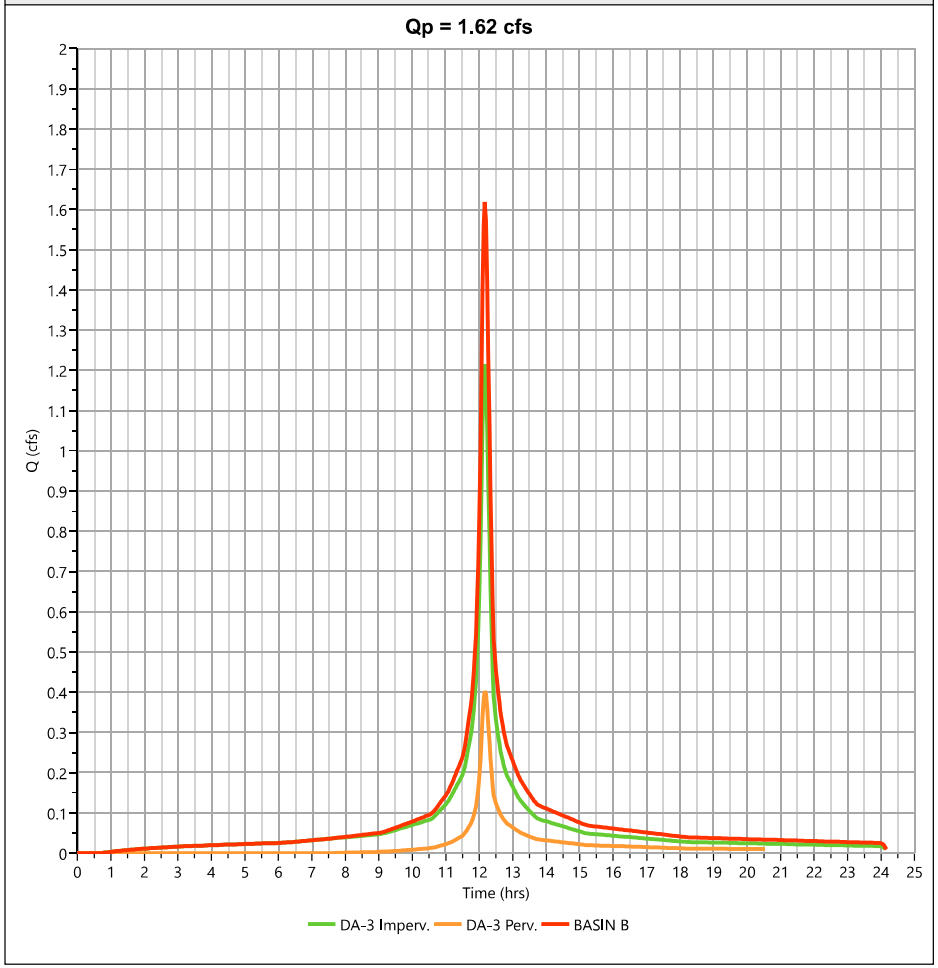
Hydrology Studio v 3.0.0.16

08-06-2020

BASIN B

Hyd. No. 26

Hydrograph Type	= Junction	Peak Flow	= 1.618 cfs
Storm Frequency	= 25-yr	Time to Peak	= 12.17 hrs
Time Interval	= 2 min	Hydrograph Volume	= 7,080 cuft
Inflow Hydrographs	= 24, 25	Total Contrib. Area	= 0.36 ac



Hydrograph Report

Project Name:

Hydrology Studio v 3.0.0.16

08-06-2020

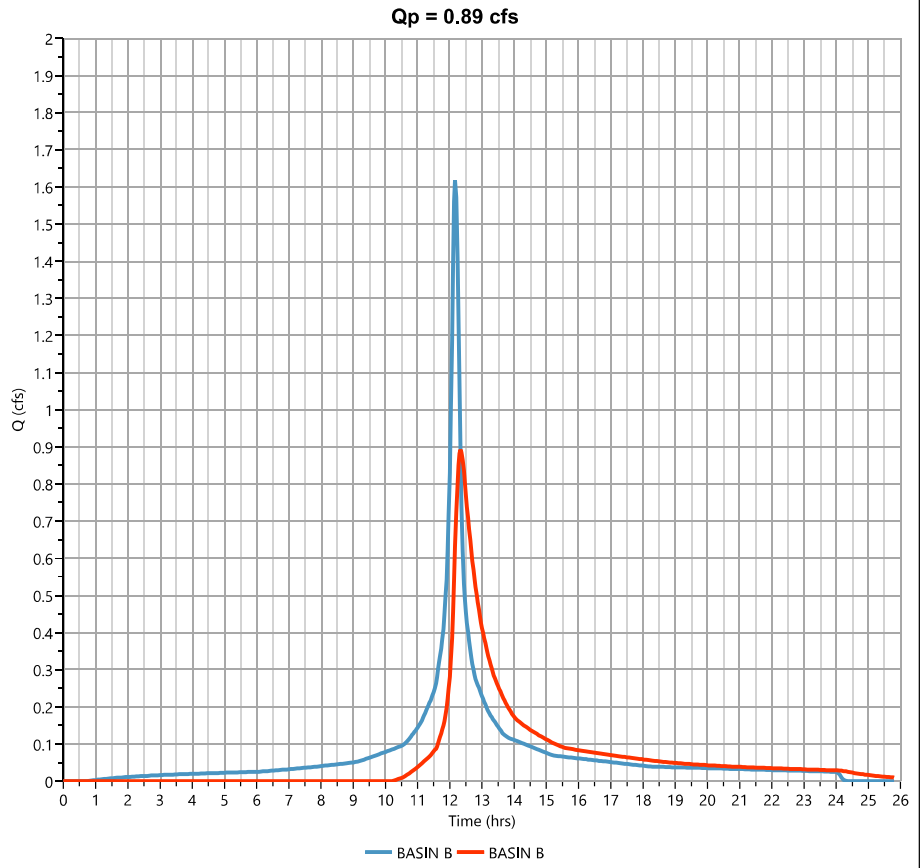
BASIN B

Hyd. No. 27

Hydrograph Type	= Pond Route	Peak Flow	= 0.893 cfs
Storm Frequency	= 25-yr	Time to Peak	= 12.33 hrs
Time Interval	= 2 min	Hydrograph Volume	= 6,078 cuft
Inflow Hydrograph	= 26 - BASIN B	Max. Elevation	= 217.76 ft
Pond Name	= BASIN B (Aboveground)	Max. Storage	= 2,784 cuft

Pond Routing by Storage Indication Method

Center of mass detention time = 1.93 hrs



Hydrograph Report

Project Name:

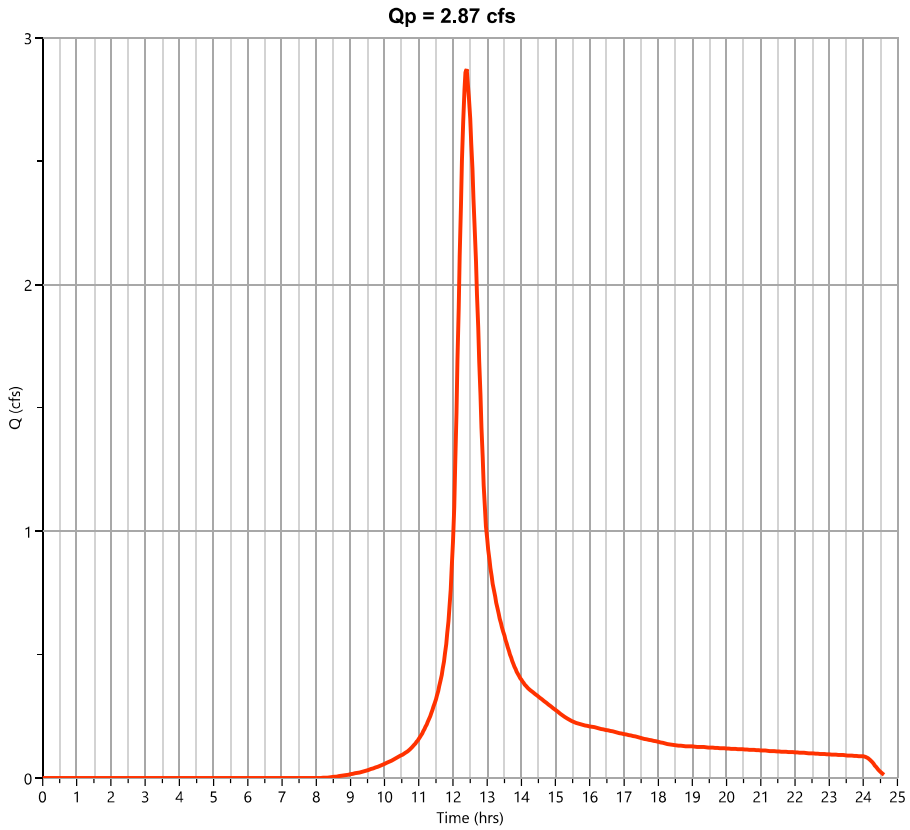
Hydrology Studio v 3.0.0.16

08-06-2020

DA-4

Hyd. No. 29

Hydrograph Type	= NRCS Runoff	Peak Flow	= 2.872 cfs
Storm Frequency	= 25-yr	Time to Peak	= 12.40 hrs
Time Interval	= 2 min	Runoff Volume	= 17,052 cuft
Drainage Area	= 1.45 ac	Curve Number	= 71
Tc Method	= User	Time of Conc. (Tc)	= 31.6 min
Total Rainfall	= 6.37 in	Design Storm	= NOAA-D
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

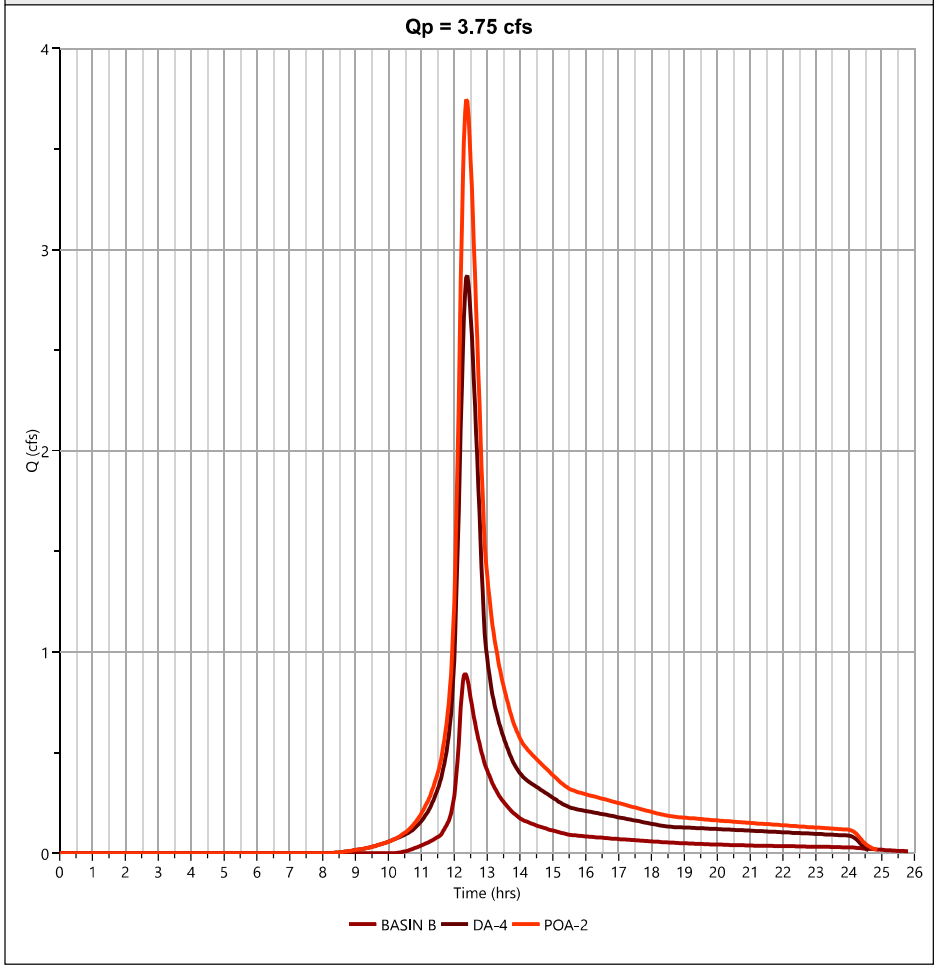
Hydrology Studio v 3.0.0.16

08-06-2020

POA-2

Hyd. No. 31

Hydrograph Type	= Junction	Peak Flow	= 3.746 cfs
Storm Frequency	= 25-yr	Time to Peak	= 12.37 hrs
Time Interval	= 2 min	Hydrograph Volume	= 23,129 cuft
Inflow Hydrographs	= 27, 29	Total Contrib. Area	= 1.45 ac



Hydrograph Report

Project Name:

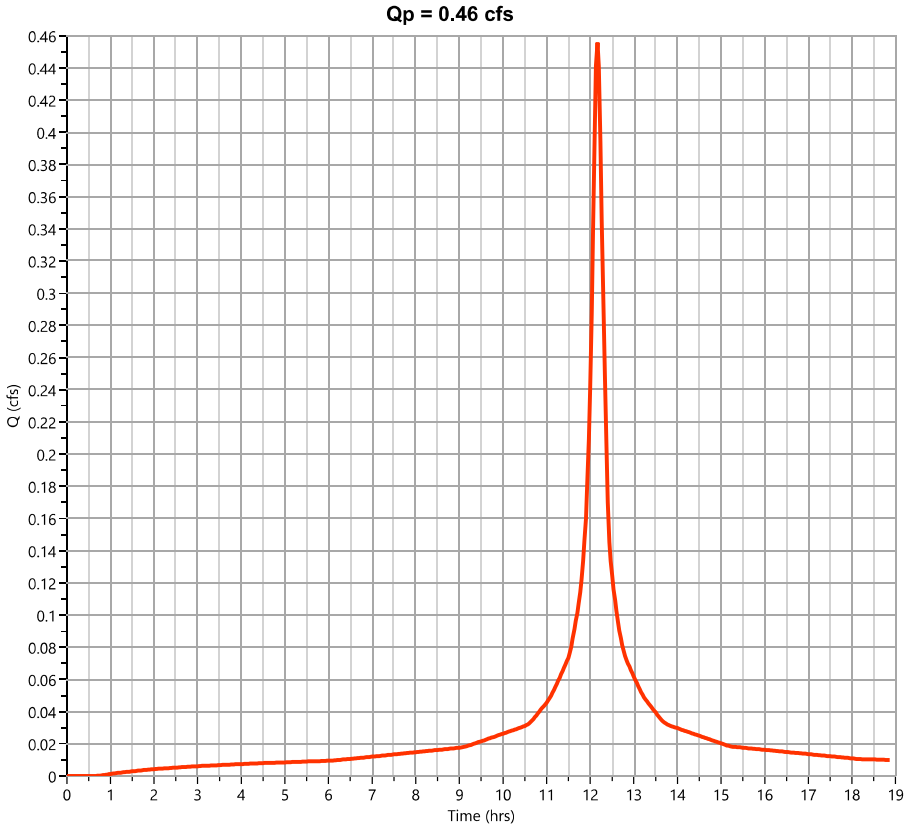
Hydrology Studio v 3.0.0.16

08-06-2020

222

Hyd. No. 33

Hydrograph Type	= NRCS Runoff	Peak Flow	= 0.456 cfs
Storm Frequency	= 25-yr	Time to Peak	= 12.17 hrs
Time Interval	= 2 min	Runoff Volume	= 2,066 cuft
Drainage Area	= 0.09 ac	Curve Number	= 98
Tc Method	= User	Time of Conc. (Tc)	= 10.0 min
Total Rainfall	= 6.37 in	Design Storm	= NOAA-D
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

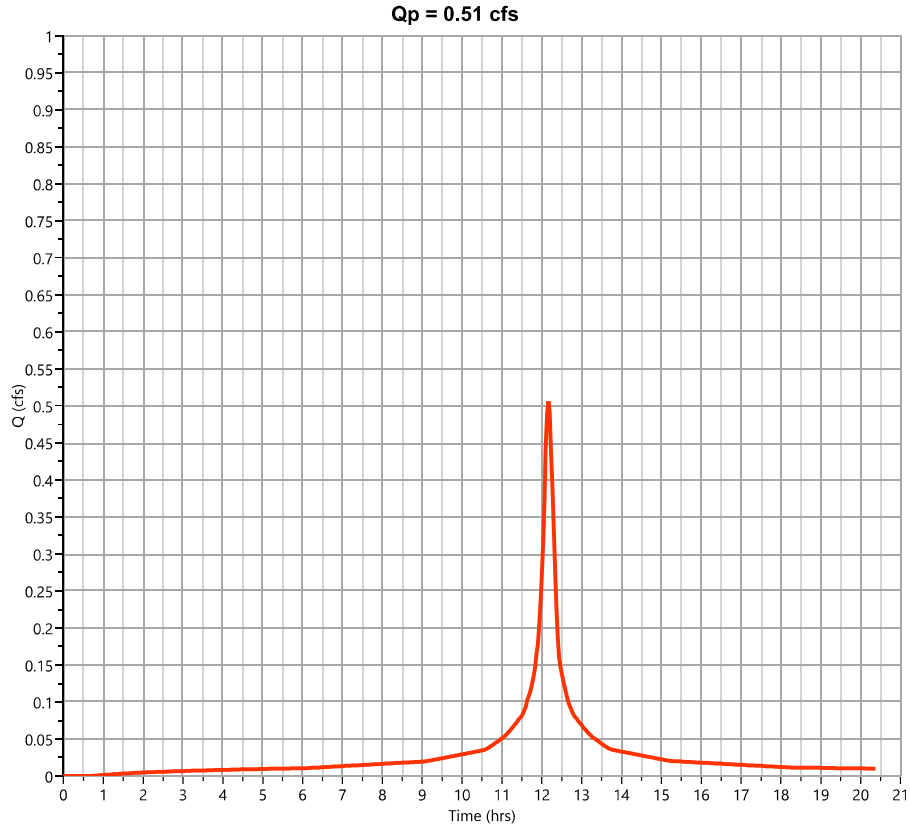
Hydrology Studio v 3.0.0.16

08-06-2020

211

Hyd. No. 35

Hydrograph Type	= NRCS Runoff	Peak Flow	= 0.506 cfs
Storm Frequency	= 25-yr	Time to Peak	= 12.17 hrs
Time Interval	= 2 min	Runoff Volume	= 2,295 cuft
Drainage Area	= 0.1 ac	Curve Number	= 98
Tc Method	= User	Time of Conc. (Tc)	= 10.0 min
Total Rainfall	= 6.37 in	Design Storm	= NOAA-D
Storm Duration	= 24 hrs	Shape Factor	= 484



Design Storm Report

Custom Storm filename:

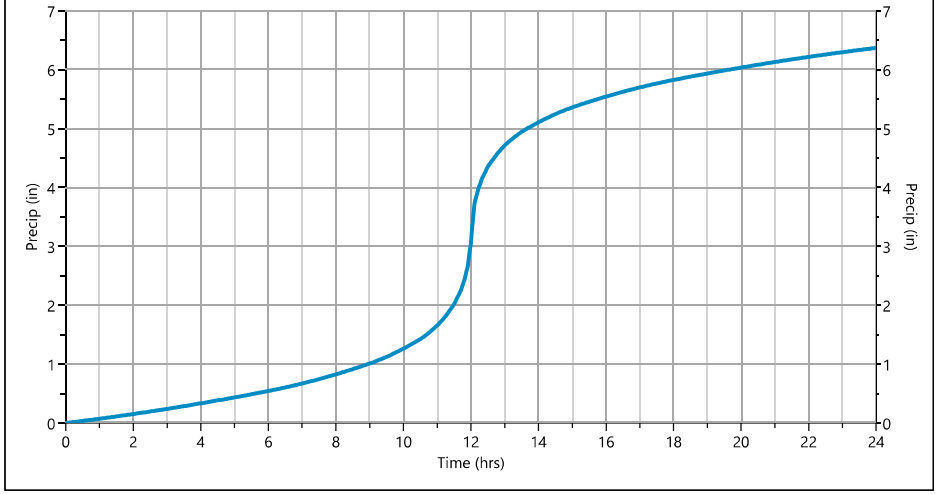
Hydrology Studio v 3.0.0.16

08-06-2020

Storm Distribution: Custom - NOAA-D

Storm Duration	Total Rainfall Volume (in)								
	1-yr	2-yr	3-yr	5-yr	10-yr	✔ 25-yr	50-yr	100-yr	
24 hrs	0.00	3.54	0.00	0.00	5.24	6.37	0.00	8.35	

Incremental Rainfall Distribution, 25-yr									
Time (hrs)	Precip (in)	Time (hrs)	Precip (in)	Time (hrs)	Precip (in)	Time (hrs)	Precip (in)	Time (hrs)	Precip (in)
11.10	0.019917	11.47	0.028538	11.83	0.076992	12.20	0.076992	12.57	0.028537
11.13	0.022061	11.50	0.028539	11.87	0.076990	12.23	0.055482	12.60	0.028538
11.17	0.022062	11.53	0.038432	11.90	0.076992	12.27	0.055483	12.63	0.026393
11.20	0.022062	11.57	0.038431	11.93	0.132814	12.30	0.055482	12.67	0.026393
11.23	0.024227	11.60	0.038432	11.97	0.132815	12.33	0.040450	12.70	0.026393
11.27	0.024227	11.63	0.040449	12.00	0.132814	12.37	0.040450	12.73	0.024228
11.30	0.024227	11.67	0.040450	12.03	0.221613	12.40	0.040450	12.77	0.024226
11.33	0.026393	11.70	0.040449	12.07	0.221613	12.43	0.038433	12.80	0.024227
11.37	0.026393	11.73	0.055483	**12.10**	**0.221613**	12.47	0.038431	12.83	0.022062
11.40	0.026393	11.77	0.055483	12.13	0.076992	12.50	0.038433	12.87	0.022061
11.43	0.028538	11.80	0.055485	12.17	0.076990	12.53	0.028537	12.90	0.022061



Hydrograph 100-yr Summary

Project Name:

Hydrology Studio v 3.0.0.16

08-06-2020

Hyd. No.	Hydrograph Type	Hydrograph Name	Peak Flow (cfs)	Time to Peak (hrs)	Hydrograph Volume (cuft)	Inflow Hyd(s)	Maximum Elevation (ft)	Maximum Storage (cuft)
1	NRCS Runoff	EX-DA1	2.970	12.17	11,598	---		
2	NRCS Runoff	EX-DA1 UNDIST.	8.478	12.17	33,519	---		
3	Junction	EXIST. POA-1	11.45	12.17	45,118	1, 2		
5	NRCS Runoff	EX-DA2	4.019	12.40	23,826	---		
6	NRCS Runoff	EX-DA2 UNDIST.	4.285	12.40	25,402	---		
7	Junction	EXIST. POA-2	8.303	12.40	49,228	5, 6		
12	NRCS Runoff	DA-1B	1.193	12.20	5,007	---		
13	NRCS Runoff	DA-1A	7.501	12.20	31,691	---		
14	Junction	DA-1	8.694	12.20	36,698	12, 13		
16	NRCS Runoff	DA-2 Imperv.	7.180	12.17	32,788	---		
17	NRCS Runoff	DA-2 Perv.	0.100	12.17	392	---		
18	Junction	DA-2 - BASIN A	7.280	12.17	33,180	16, 17		
19	Pond Route	BASIN A	1.738	12.57	33,157	18	217.17	13,292
21	Junction	POA-1	10.09	12.20	69,856	14, 19		
24	NRCS Runoff	DA-3 Imperv.	1.596	12.17	7,286	---		
25	NRCS Runoff	DA-3 Perv.	0.600	12.17	2,354	---		
26	Junction	BASIN B	2.195	12.17	9,640	24, 25		
27	Pond Route	BASIN B	1.326	12.33	8,637	26	217.97	3,232
29	NRCS Runoff	DA-4	4.388	12.40	26,032	---		
31	Junction	POA-2	5.687	12.37	34,669	27, 29		
33	NRCS Runoff	222	0.598	12.17	2,732	---		
35	NRCS Runoff	211	0.665	12.17	3,036	---		

Hydrograph Report

Project Name:

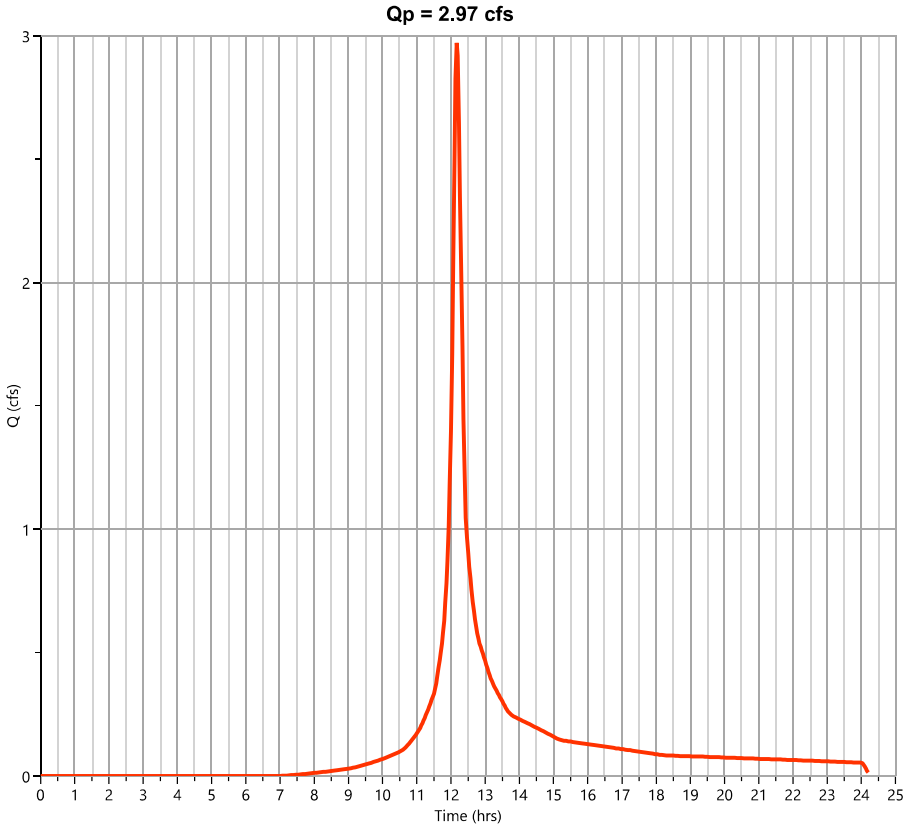
Hydrology Studio v 3.0.0.16

08-06-2020

EX-DA1

Hyd. No. 1

Hydrograph Type	= NRCS Runoff	Peak Flow	= 2.970 cfs
Storm Frequency	= 100-yr	Time to Peak	= 12.17 hrs
Time Interval	= 2 min	Runoff Volume	= 11,598 cuft
Drainage Area	= 0.65 ac	Curve Number	= 70
Tc Method	= User	Time of Conc. (Tc)	= 12.9 min
Total Rainfall	= 8.35 in	Design Storm	= NOAA-D
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

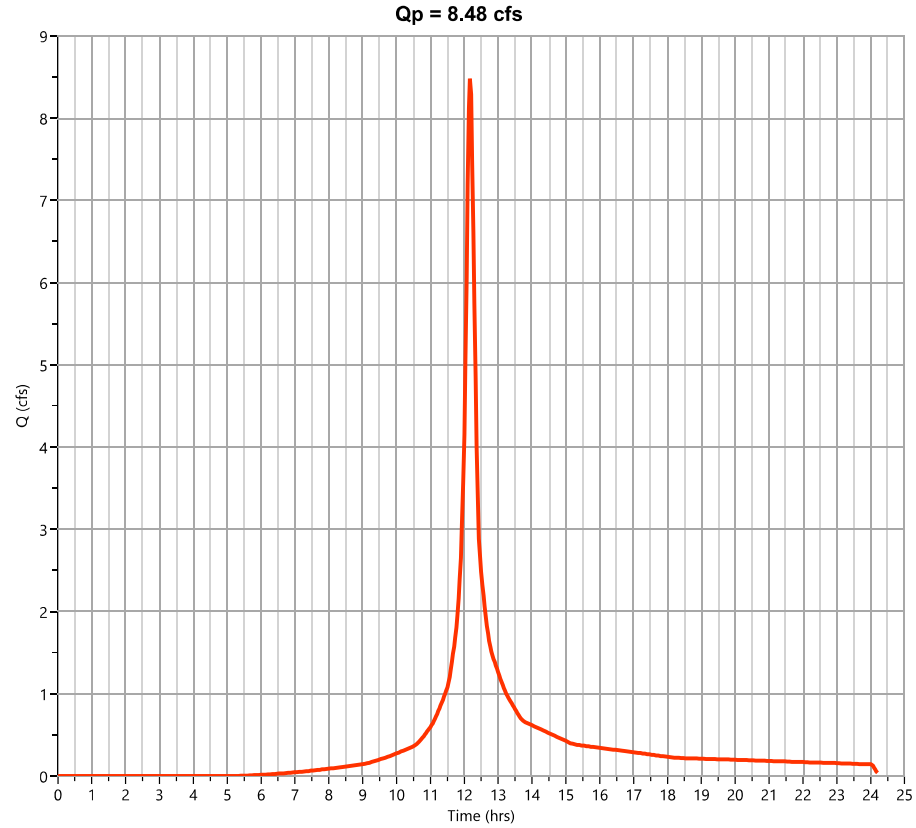
Hydrology Studio v 3.0.0.16

08-06-2020

EX-DA1 UNDIST.

Hyd. No. 2

Hydrograph Type	= NRCS Runoff	Peak Flow	= 8.478 cfs
Storm Frequency	= 100-yr	Time to Peak	= 12.17 hrs
Time Interval	= 2 min	Runoff Volume	= 33,519 cuft
Drainage Area	= 1.6 ac	Curve Number	= 77
Tc Method	= User	Time of Conc. (Tc)	= 12.9 min
Total Rainfall	= 8.35 in	Design Storm	= NOAA-D
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

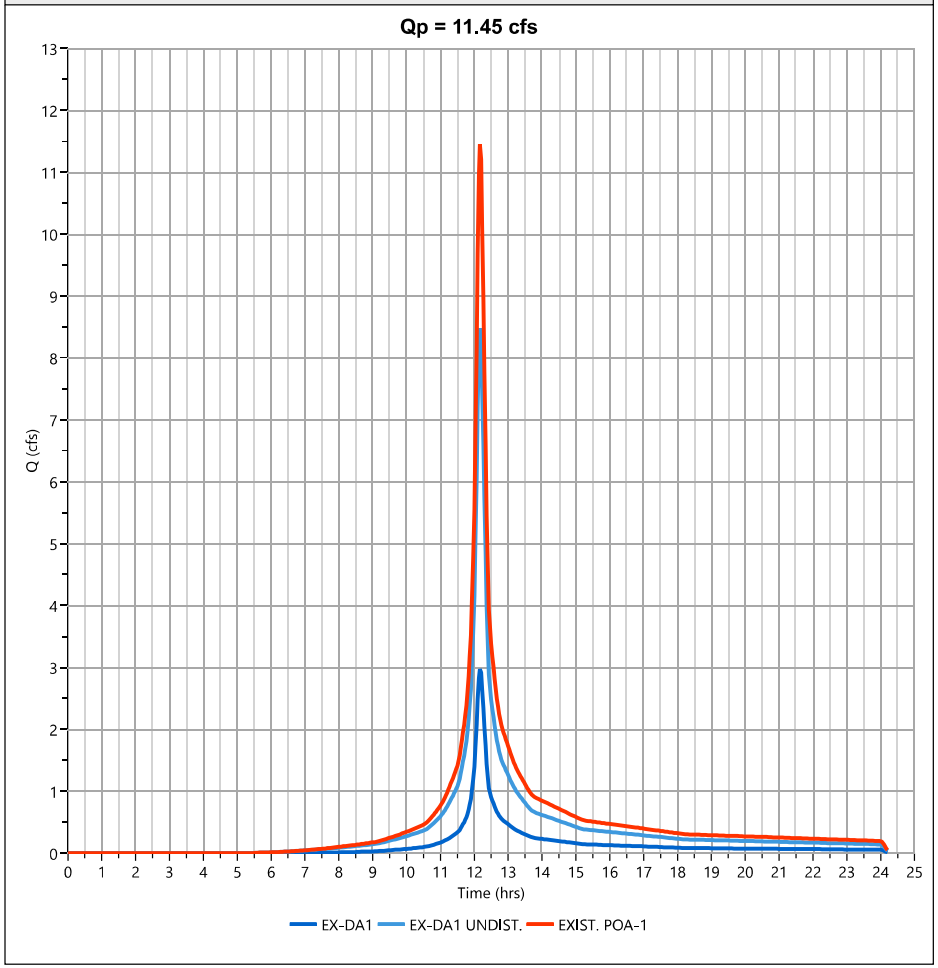
Hydrology Studio v 3.0.0.16

08-06-2020

EXIST. POA-1

Hyd. No. 3

Hydrograph Type	= Junction	Peak Flow	= 11.45 cfs
Storm Frequency	= 100-yr	Time to Peak	= 12.17 hrs
Time Interval	= 2 min	Hydrograph Volume	= 45,118 cuft
Inflow Hydrographs	= 1, 2	Total Contrib. Area	= 2.25 ac



Hydrograph Report

Project Name:

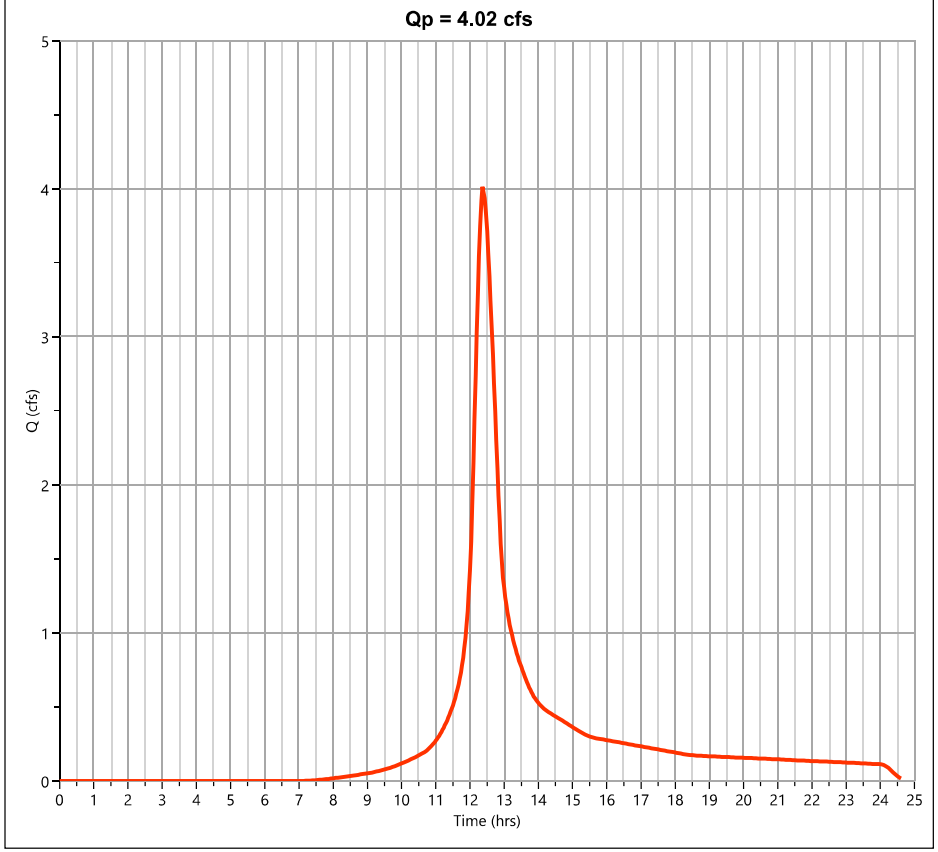
Hydrology Studio v 3.0.0.16

08-06-2020

EX-DA2

Hyd. No. 5

Hydrograph Type	= NRCS Runoff	Peak Flow	= 4.019 cfs
Storm Frequency	= 100-yr	Time to Peak	= 12.40 hrs
Time Interval	= 2 min	Runoff Volume	= 23,826 cuft
Drainage Area	= 1.36 ac	Curve Number	= 70
Tc Method	= User	Time of Conc. (Tc)	= 31.6 min
Total Rainfall	= 8.35 in	Design Storm	= NOAA-D
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

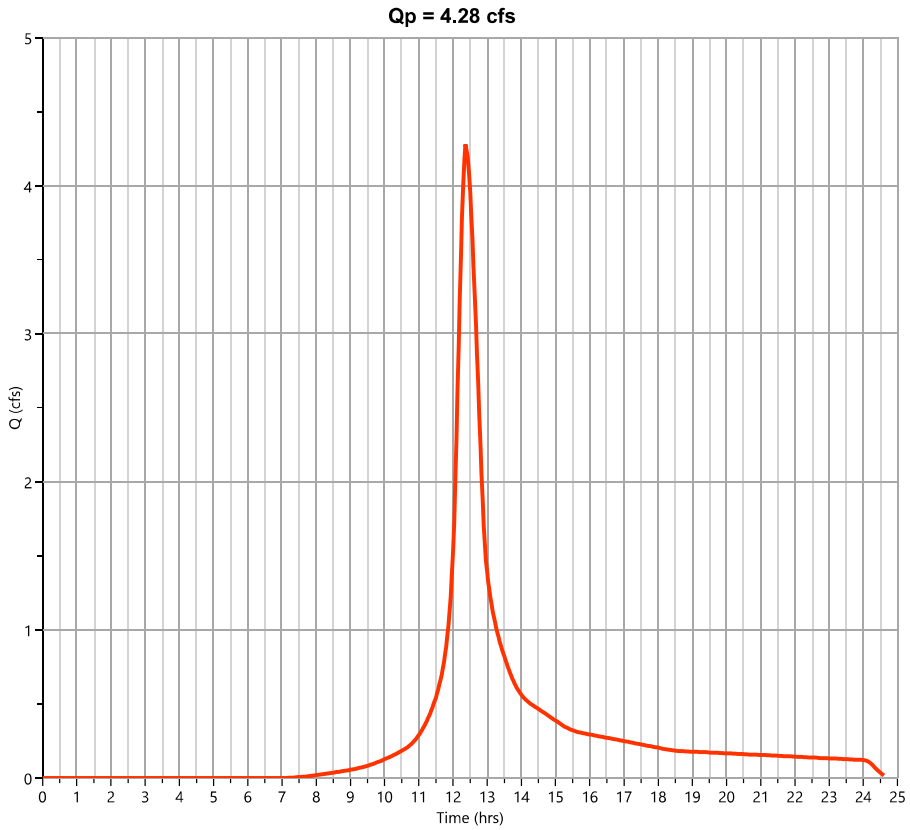
Hydrology Studio v 3.0.0.16

08-06-2020

EX-DA2 UNDIST.

Hyd. No. 6

Hydrograph Type	= NRCS Runoff	Peak Flow	= 4.285 cfs
Storm Frequency	= 100-yr	Time to Peak	= 12.40 hrs
Time Interval	= 2 min	Runoff Volume	= 25,402 cuft
Drainage Area	= 1.45 ac	Curve Number	= 70
Tc Method	= User	Time of Conc. (Tc)	= 31.6 min
Total Rainfall	= 8.35 in	Design Storm	= NOAA-D
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

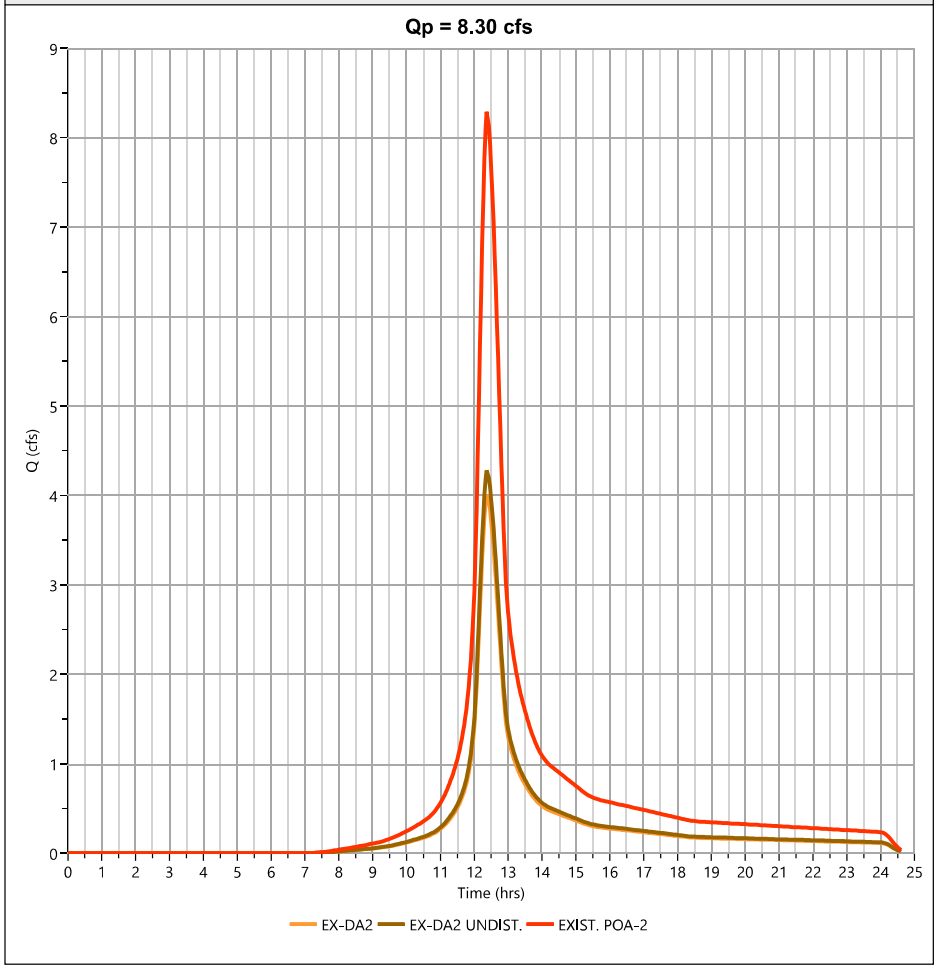
Hydrology Studio v 3.0.0.16

08-06-2020

EXIST. POA-2

Hyd. No. 7

Hydrograph Type	= Junction	Peak Flow	= 8.303 cfs
Storm Frequency	= 100-yr	Time to Peak	= 12.40 hrs
Time Interval	= 2 min	Hydrograph Volume	= 49,228 cuft
Inflow Hydrographs	= 5, 6	Total Contrib. Area	= 2.81 ac



Hydrograph Report

Project Name:

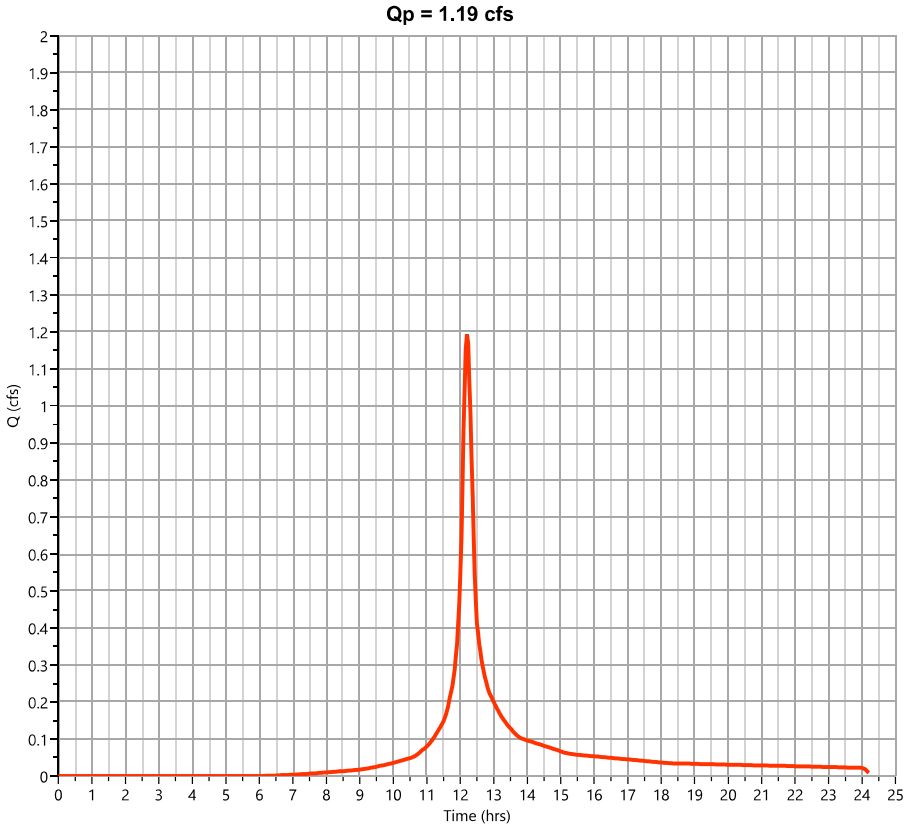
Hydrology Studio v 3.0.0.16

08-06-2020

DA-1B

Hyd. No. 12

Hydrograph Type	= NRCS Runoff	Peak Flow	= 1.193 cfs
Storm Frequency	= 100-yr	Time to Peak	= 12.20 hrs
Time Interval	= 2 min	Runoff Volume	= 5,007 cuft
Drainage Area	= 0.27 ac	Curve Number	= 74
Tc Method	= User	Time of Conc. (Tc)	= 15.0 min
Total Rainfall	= 8.35 in	Design Storm	= NOAA-D
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

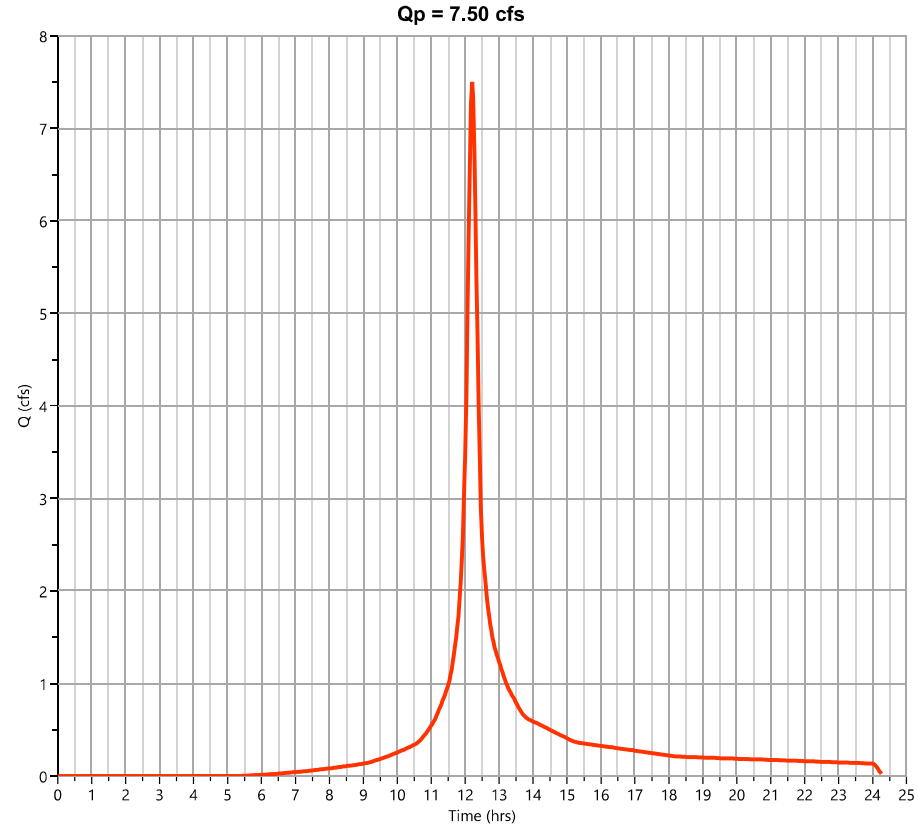
Hydrology Studio v 3.0.0.16

08-06-2020

DA-1A

Hyd. No. 13

Hydrograph Type	= NRCS Runoff	Peak Flow	= 7.501 cfs
Storm Frequency	= 100-yr	Time to Peak	= 12.20 hrs
Time Interval	= 2 min	Runoff Volume	= 31,691 cuft
Drainage Area	= 1.6 ac	Curve Number	= 77
Tc Method	= User	Time of Conc. (Tc)	= 15.0 min
Total Rainfall	= 8.35 in	Design Storm	= NOAA-D
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

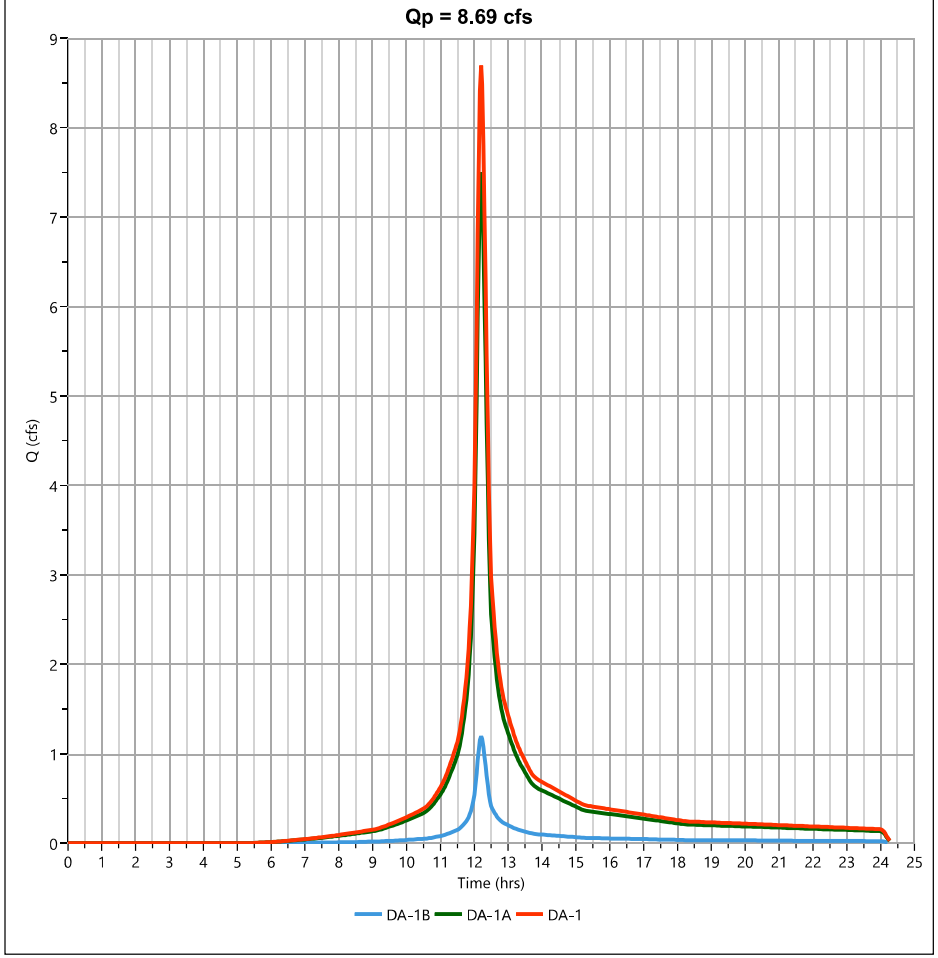
Hydrology Studio v 3.0.0.16

08-06-2020

DA-1

Hyd. No. 14

Hydrograph Type	= Junction	Peak Flow	= 8.694 cfs
Storm Frequency	= 100-yr	Time to Peak	= 12.20 hrs
Time Interval	= 2 min	Hydrograph Volume	= 36,698 cuft
Inflow Hydrographs	= 12, 13	Total Contrib. Area	= 1.87 ac



Hydrograph Report

Project Name:

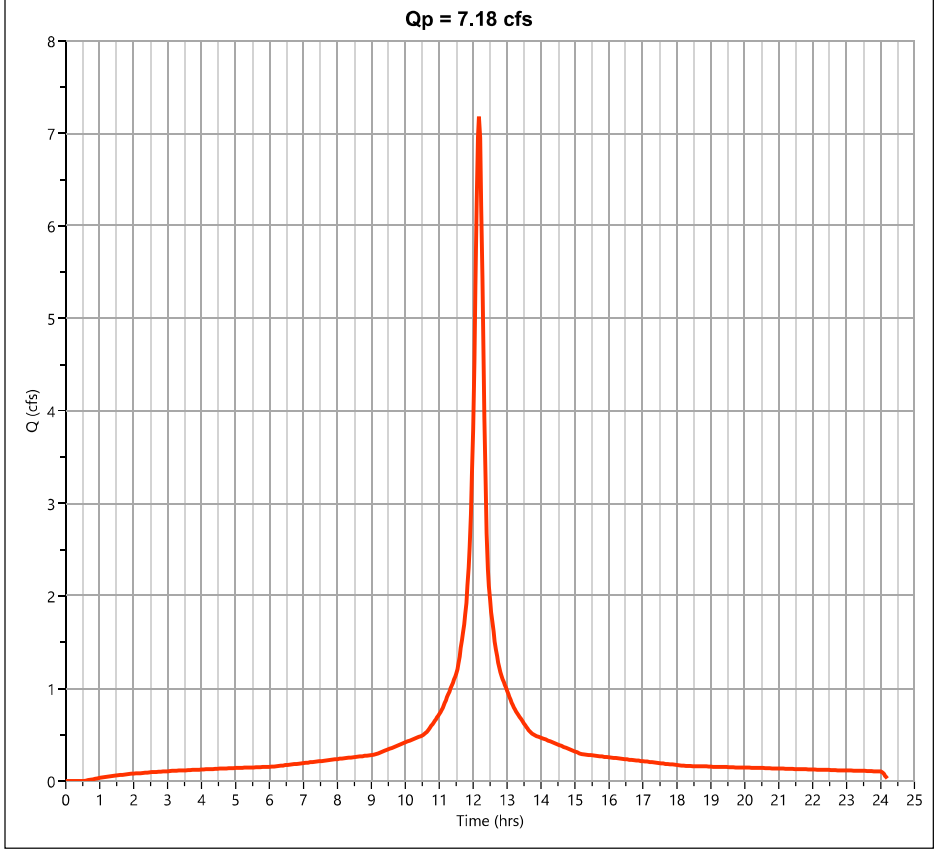
Hydrology Studio v 3.0.0.16

08-06-2020

DA-2 Imperv.

Hyd. No. 16

Hydrograph Type	= NRCS Runoff	Peak Flow	= 7.180 cfs
Storm Frequency	= 100-yr	Time to Peak	= 12.17 hrs
Time Interval	= 2 min	Runoff Volume	= 32,788 cuft
Drainage Area	= 1.08 ac	Curve Number	= 98
Tc Method	= User	Time of Conc. (Tc)	= 10.0 min
Total Rainfall	= 8.35 in	Design Storm	= NOAA-D
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

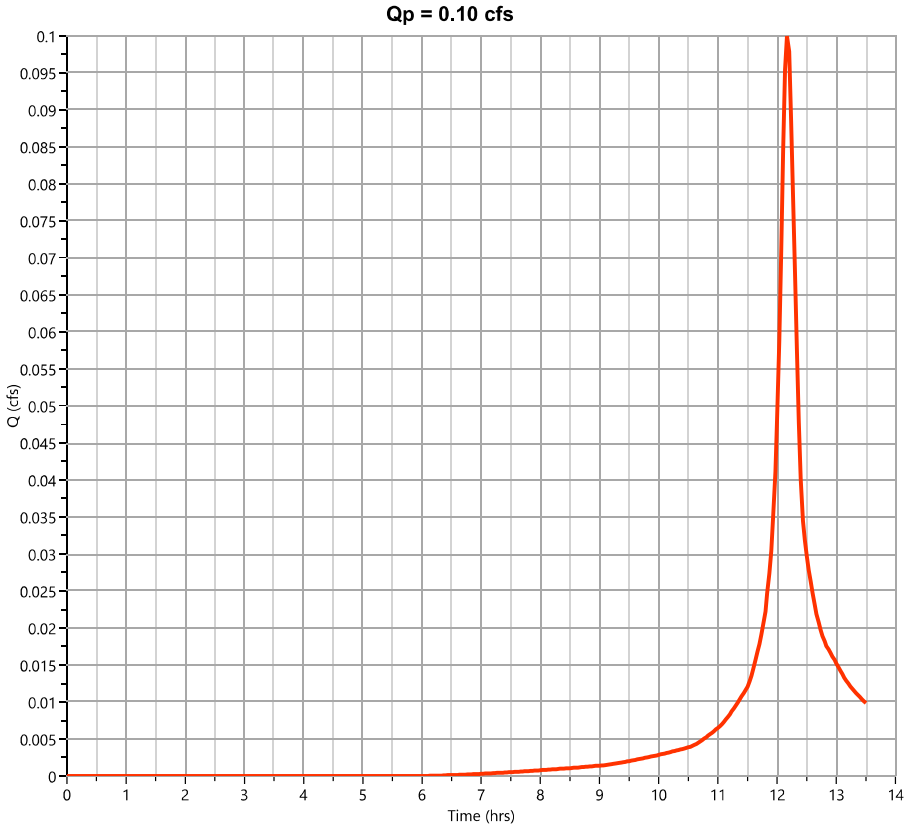
Hydrology Studio v 3.0.0.16

08-06-2020

DA-2 Perv.

Hyd. No. 17

Hydrograph Type	= NRCS Runoff	Peak Flow	= 0.100 cfs
Storm Frequency	= 100-yr	Time to Peak	= 12.17 hrs
Time Interval	= 2 min	Runoff Volume	= 392 cuft
Drainage Area	= 0.02 ac	Curve Number	= 74
Tc Method	= User	Time of Conc. (Tc)	= 10.0 min
Total Rainfall	= 8.35 in	Design Storm	= NOAA-D
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

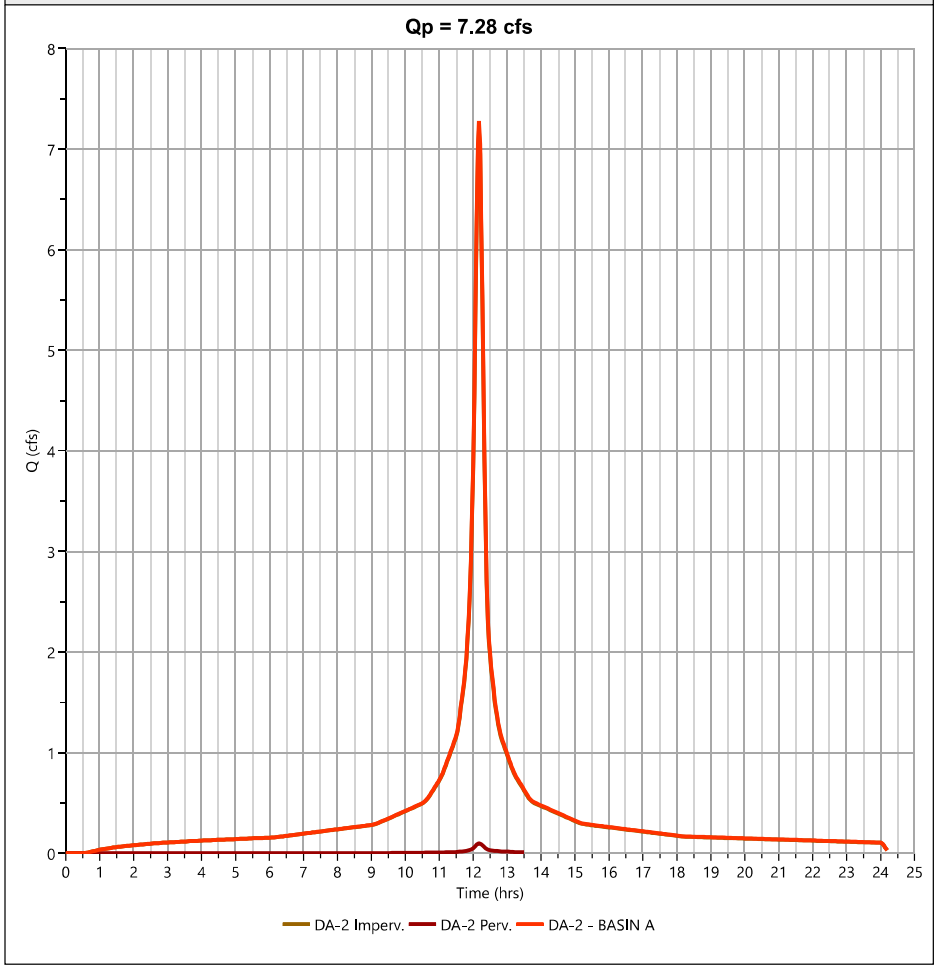
Hydrology Studio v 3.0.0.16

08-06-2020

DA-2 - BASIN A

Hyd. No. 18

Hydrograph Type	= Junction	Peak Flow	= 7.280 cfs
Storm Frequency	= 100-yr	Time to Peak	= 12.17 hrs
Time Interval	= 2 min	Hydrograph Volume	= 33,180 cuft
Inflow Hydrographs	= 16, 17	Total Contrib. Area	= 1.1 ac



Hydrograph Report

Project Name:

Hydrology Studio v 3.0.0.16

08-06-2020

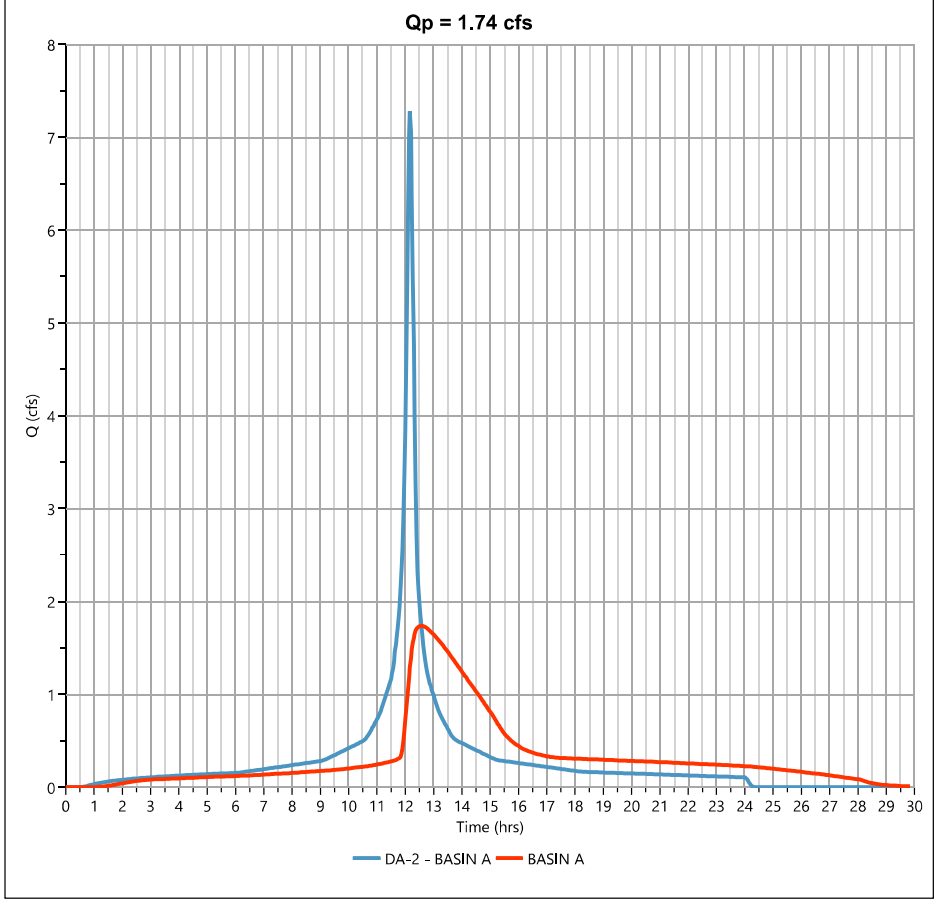
BASIN A

Hyd. No. 19

Hydrograph Type	= Pond Route	Peak Flow	= 1.738 cfs
Storm Frequency	= 100-yr	Time to Peak	= 12.57 hrs
Time Interval	= 2 min	Hydrograph Volume	= 33,157 cuft
Inflow Hydrograph	= 18 - DA-2 - BASIN A	Max. Elevation	= 217.17 ft
Pond Name	= BASIN A (Underground)	Max. Storage	= 13,292 cuft

Pond Routing by Storage Indication Method

Center of mass detention time = 2.75 hrs



Hydrograph Report

Project Name:

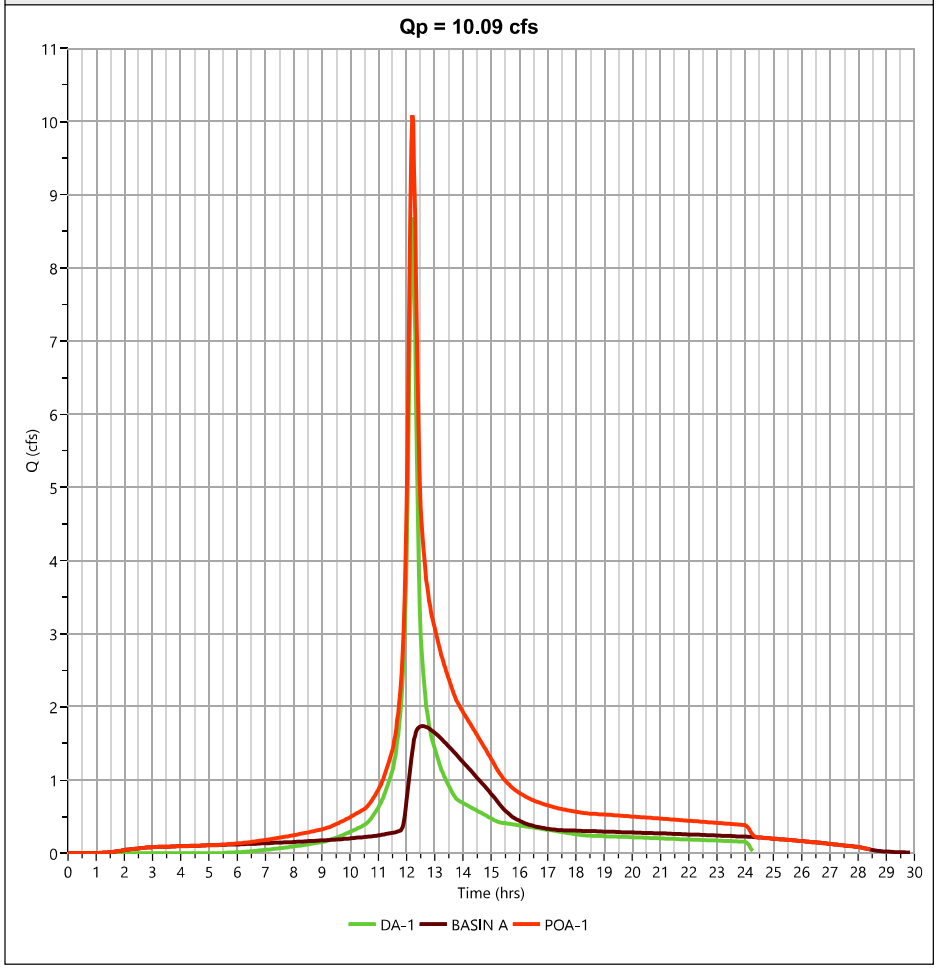
Hydrology Studio v 3.0.0.16

08-06-2020

POA-1

Hyd. No. 21

Hydrograph Type	= Junction	Peak Flow	= 10.09 cfs
Storm Frequency	= 100-yr	Time to Peak	= 12.20 hrs
Time Interval	= 2 min	Hydrograph Volume	= 69,856 cuft
Inflow Hydrographs	= 14, 19	Total Contrib. Area	= 1.87 ac



Hydrograph Report

Project Name:

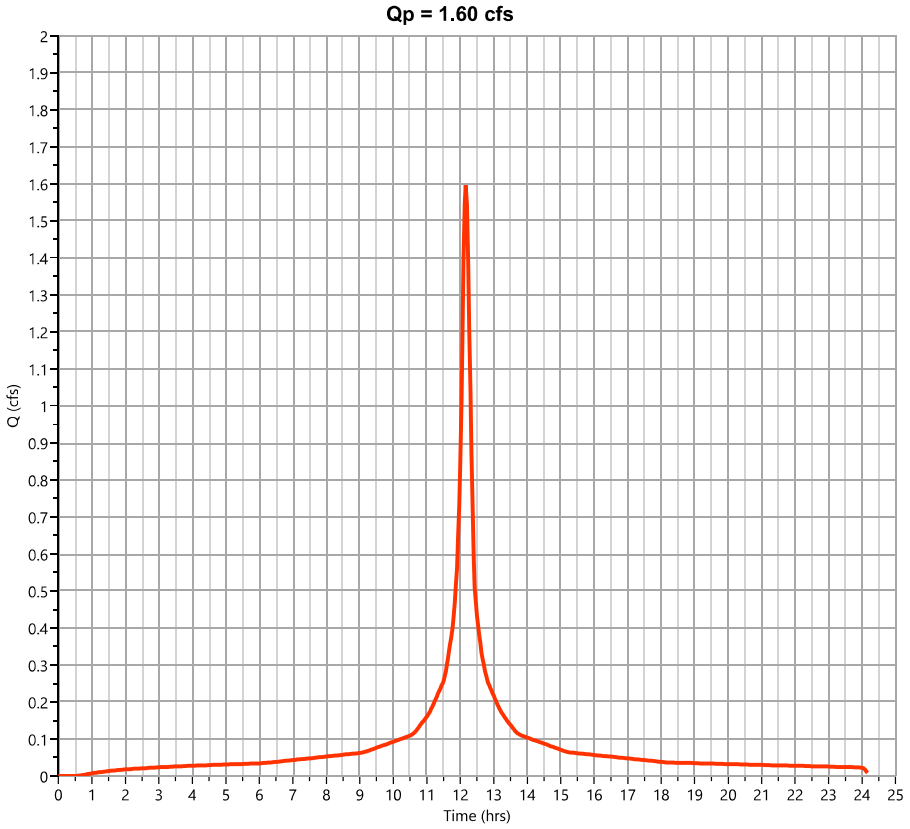
Hydrology Studio v 3.0.0.16

08-06-2020

DA-3 Imperv.

Hyd. No. 24

Hydrograph Type	= NRCS Runoff	Peak Flow	= 1.596 cfs
Storm Frequency	= 100-yr	Time to Peak	= 12.17 hrs
Time Interval	= 2 min	Runoff Volume	= 7,286 cuft
Drainage Area	= 0.24 ac	Curve Number	= 98
Tc Method	= User	Time of Conc. (Tc)	= 10.0 min
Total Rainfall	= 8.35 in	Design Storm	= NOAA-D
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

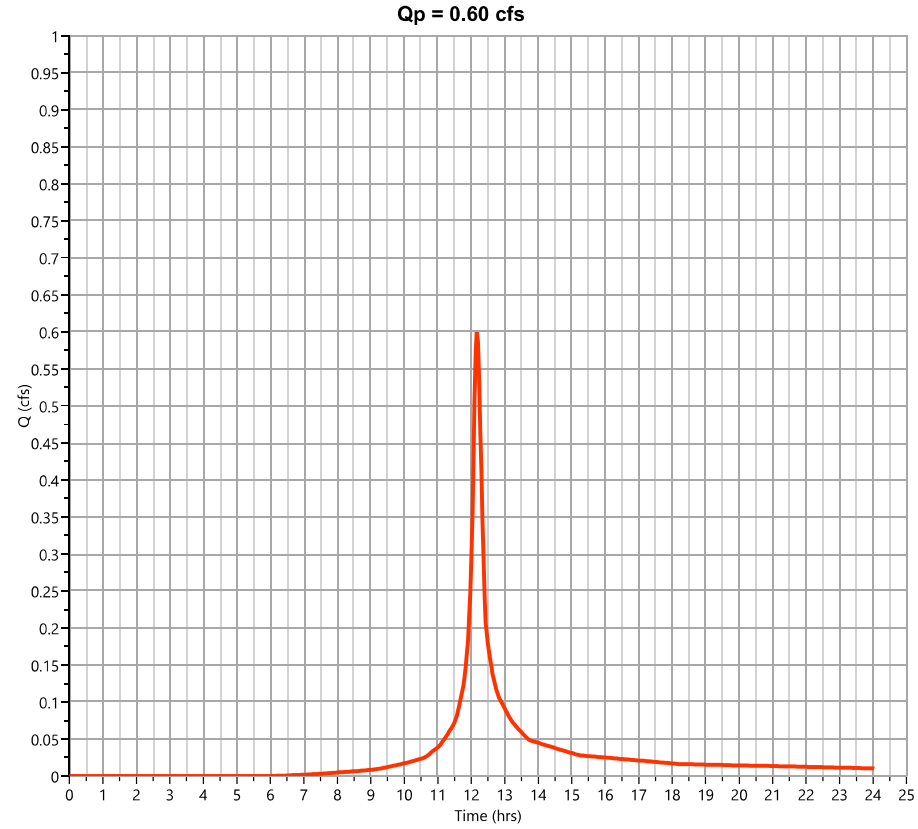
Hydrology Studio v 3.0.0.16

08-06-2020

DA-3 Perv.

Hyd. No. 25

Hydrograph Type	= NRCS Runoff	Peak Flow	= 0.600 cfs
Storm Frequency	= 100-yr	Time to Peak	= 12.17 hrs
Time Interval	= 2 min	Runoff Volume	= 2,354 cuft
Drainage Area	= 0.12 ac	Curve Number	= 74
Tc Method	= User	Time of Conc. (Tc)	= 10.0 min
Total Rainfall	= 8.35 in	Design Storm	= NOAA-D
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

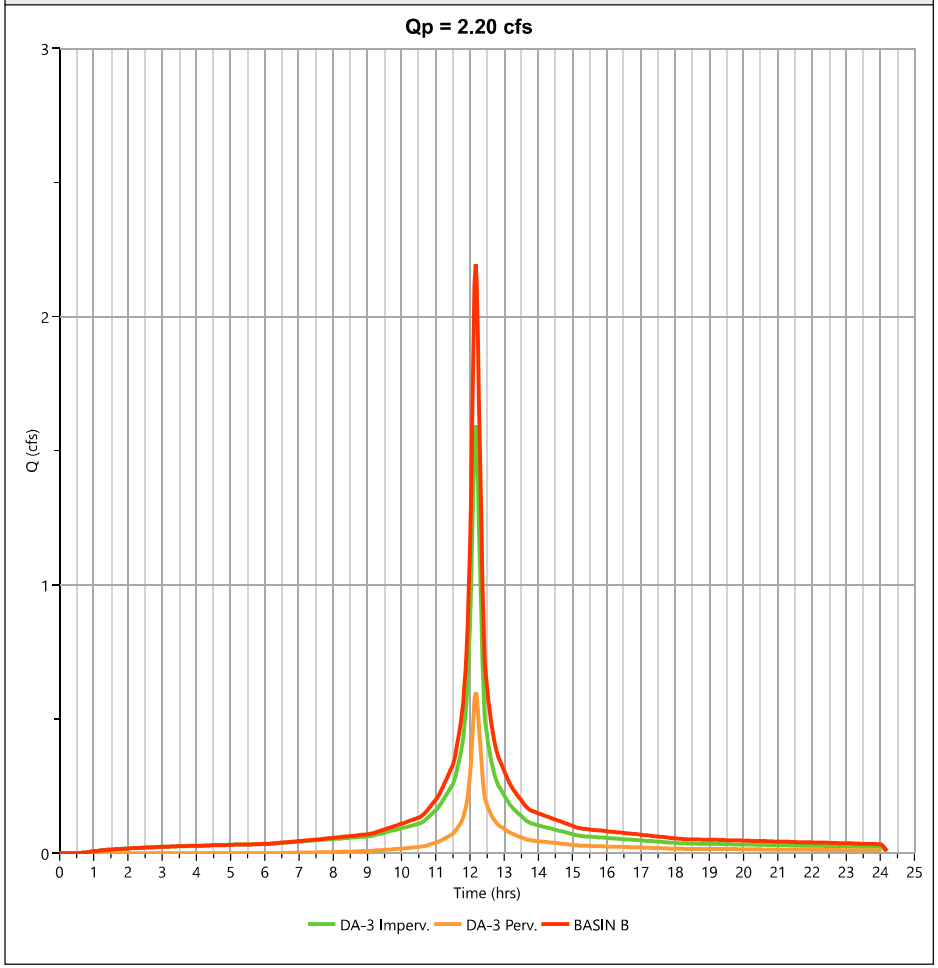
Hydrology Studio v 3.0.0.16

08-06-2020

BASIN B

Hyd. No. 26

Hydrograph Type	= Junction	Peak Flow	= 2.195 cfs
Storm Frequency	= 100-yr	Time to Peak	= 12.17 hrs
Time Interval	= 2 min	Hydrograph Volume	= 9,640 cuft
Inflow Hydrographs	= 24, 25	Total Contrib. Area	= 0.36 ac



Hydrograph Report

Project Name:

Hydrology Studio v 3.0.0.16

08-06-2020

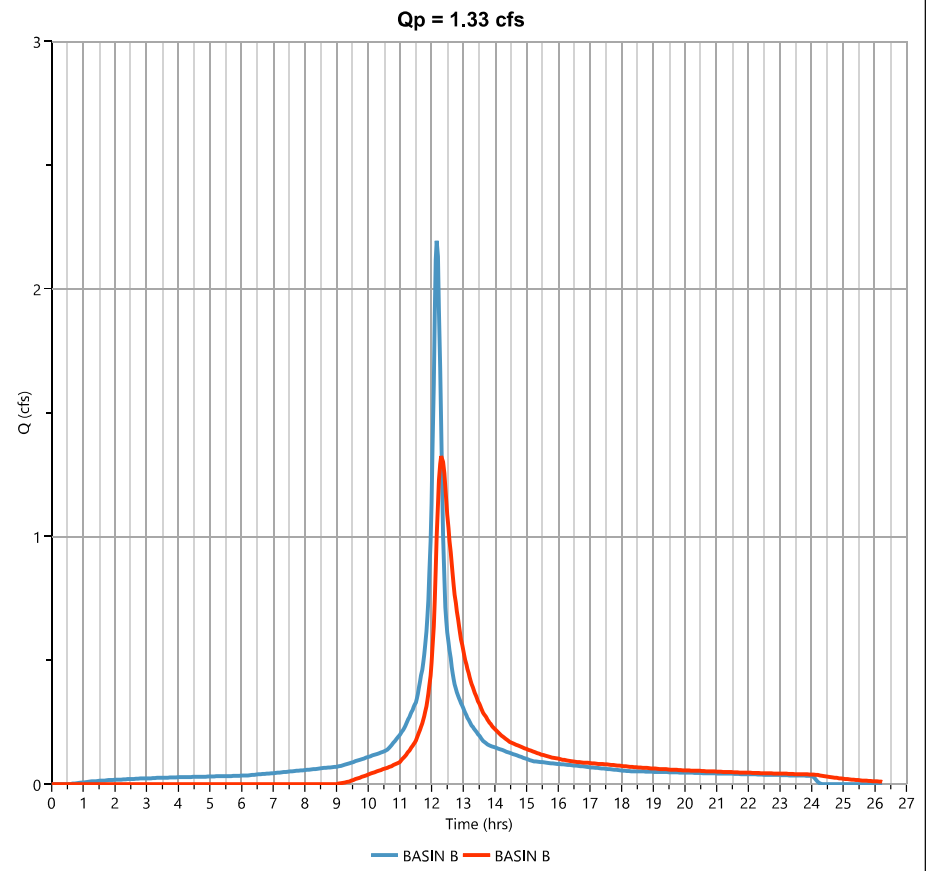
BASIN B

Hyd. No. 27

Hydrograph Type	= Pond Route	Peak Flow	= 1.326 cfs
Storm Frequency	= 100-yr	Time to Peak	= 12.33 hrs
Time Interval	= 2 min	Hydrograph Volume	= 8,637 cuft
Inflow Hydrograph	= 26 - BASIN B	Max. Elevation	= 217.97 ft
Pond Name	= BASIN B (Aboveground)	Max. Storage	= 3,232 cuft

Pond Routing by Storage Indication Method

Center of mass detention time = 1.67 hrs



Hydrograph Report

Project Name:

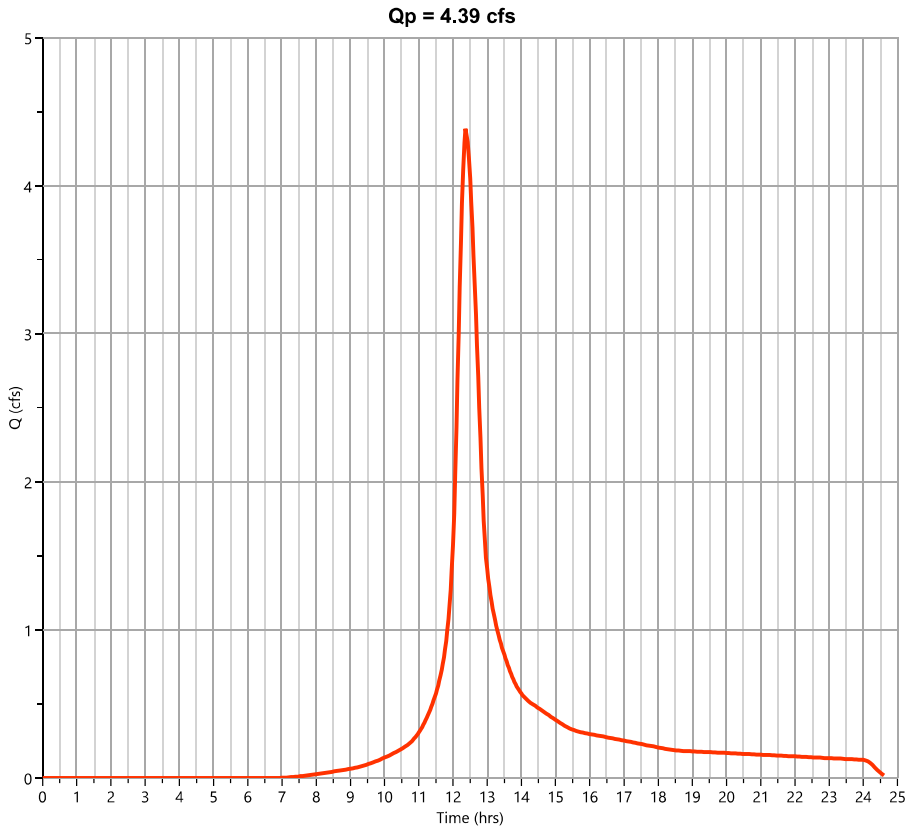
Hydrology Studio v 3.0.0.16

08-06-2020

DA-4

Hyd. No. 29

Hydrograph Type	= NRCS Runoff	Peak Flow	= 4.388 cfs
Storm Frequency	= 100-yr	Time to Peak	= 12.40 hrs
Time Interval	= 2 min	Runoff Volume	= 26,032 cuft
Drainage Area	= 1.45 ac	Curve Number	= 71
Tc Method	= User	Time of Conc. (Tc)	= 31.6 min
Total Rainfall	= 8.35 in	Design Storm	= NOAA-D
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

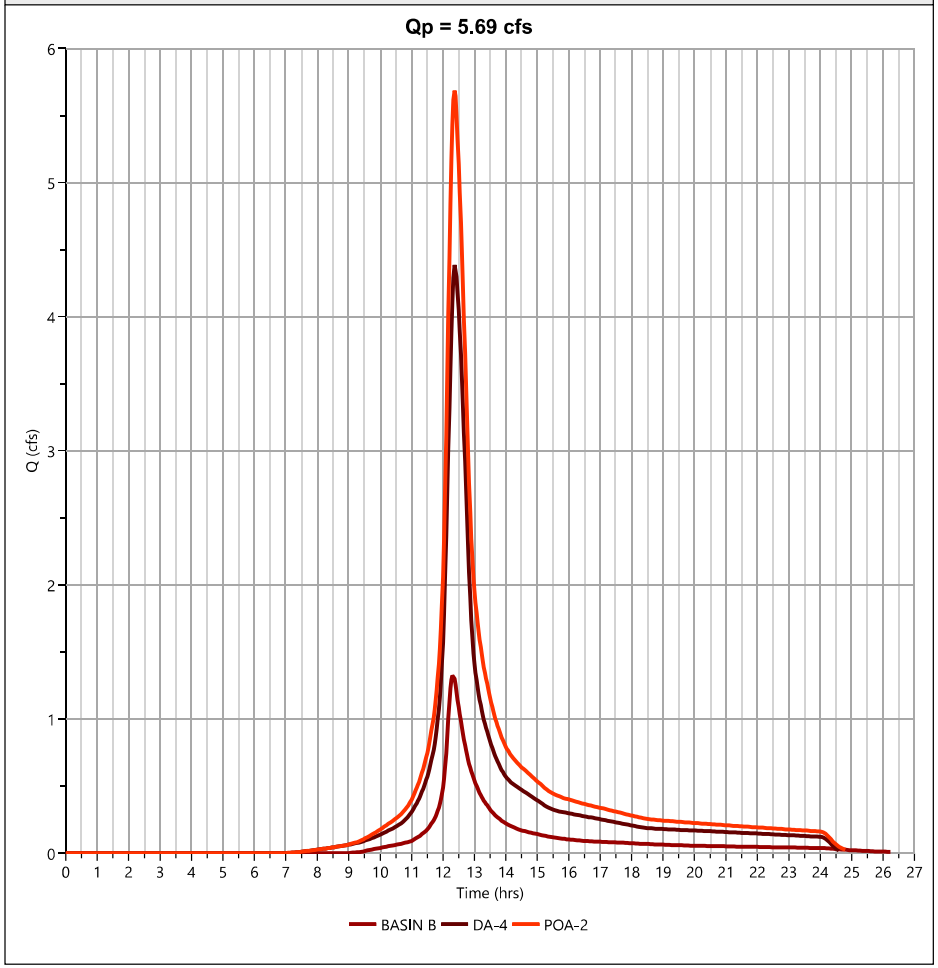
Hydrology Studio v 3.0.0.16

08-06-2020

POA-2

Hyd. No. 31

Hydrograph Type	= Junction	Peak Flow	= 5.687 cfs
Storm Frequency	= 100-yr	Time to Peak	= 12.37 hrs
Time Interval	= 2 min	Hydrograph Volume	= 34,669 cuft
Inflow Hydrographs	= 27, 29	Total Contrib. Area	= 1.45 ac



Hydrograph Report

Project Name:

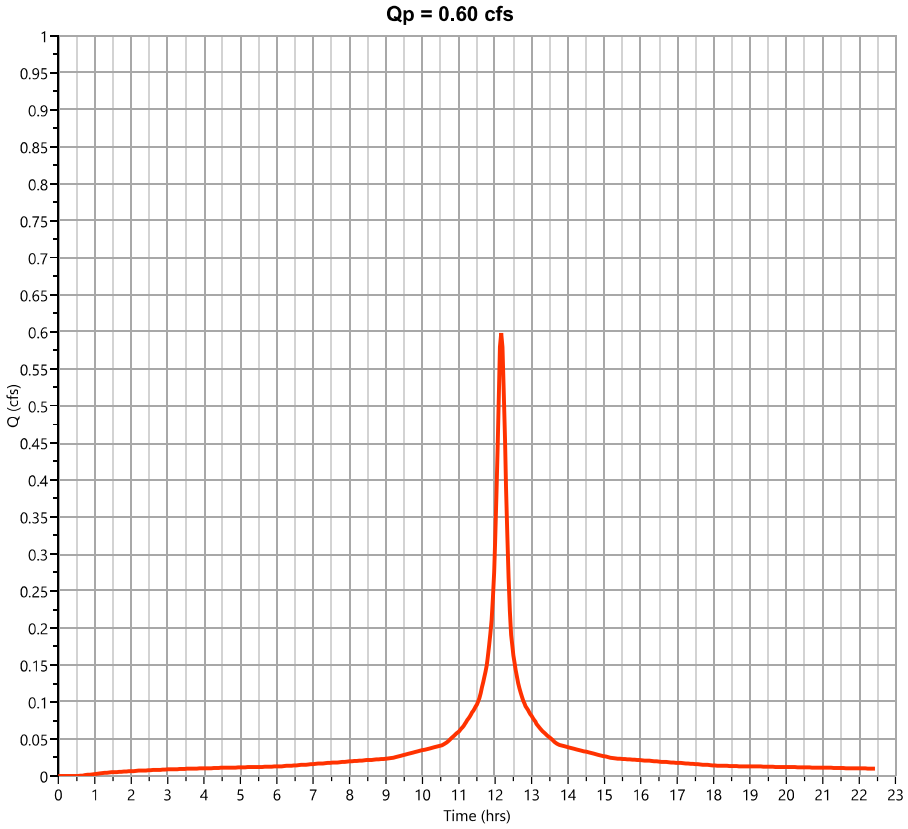
Hydrology Studio v 3.0.0.16

08-06-2020

222

Hyd. No. 33

Hydrograph Type	= NRCS Runoff	Peak Flow	= 0.598 cfs
Storm Frequency	= 100-yr	Time to Peak	= 12.17 hrs
Time Interval	= 2 min	Runoff Volume	= 2,732 cuft
Drainage Area	= 0.09 ac	Curve Number	= 98
Tc Method	= User	Time of Conc. (Tc)	= 10.0 min
Total Rainfall	= 8.35 in	Design Storm	= NOAA-D
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

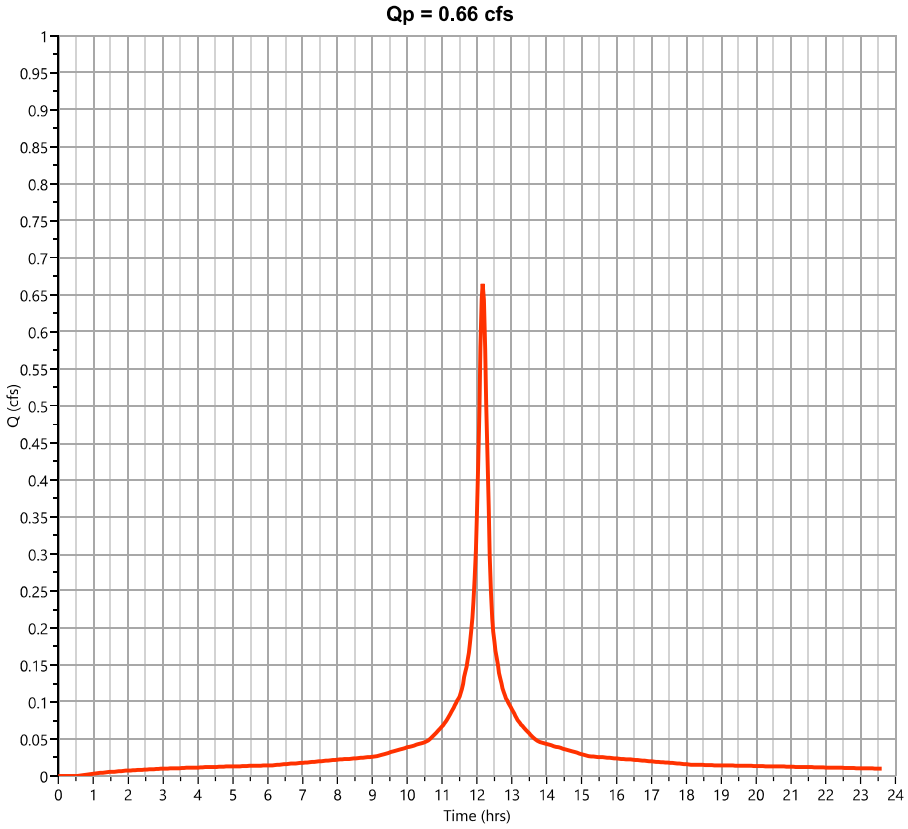
Hydrology Studio v 3.0.0.16

08-06-2020

211

Hyd. No. 35

Hydrograph Type	= NRCS Runoff	Peak Flow	= 0.665 cfs
Storm Frequency	= 100-yr	Time to Peak	= 12.17 hrs
Time Interval	= 2 min	Runoff Volume	= 3,036 cuft
Drainage Area	= 0.1 ac	Curve Number	= 98
Tc Method	= User	Time of Conc. (Tc)	= 10.0 min
Total Rainfall	= 8.35 in	Design Storm	= NOAA-D
Storm Duration	= 24 hrs	Shape Factor	= 484



Design Storm Report

Custom Storm filename:

Hydrology Studio v 3.0.0.16

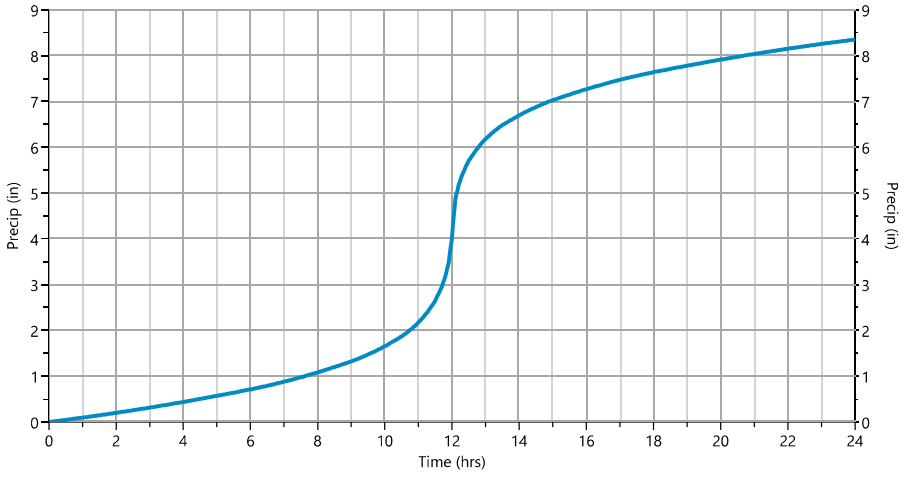
08-06-2020

Storm Distribution: Custom - NOAA-D

Storm Duration	Total Rainfall Volume (in)								
	1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	✔ 100-yr	
24 hrs	0.00	3.54	0.00	0.00	5.24	6.37	0.00	8.35	

Incremental Rainfall Distribution, 100-yr

Time (hrs)	Precip (in)	Time (hrs)	Precip (in)	Time (hrs)	Precip (in)	Time (hrs)	Precip (in)	Time (hrs)	Precip (in)
11.10	0.026107	11.47	0.037408	11.83	0.100924	12.20	0.100924	12.57	0.037408
11.13	0.028919	11.50	0.037409	11.87	0.100921	12.23	0.072728	12.60	0.037408
11.17	0.028919	11.53	0.050378	11.90	0.100924	12.27	0.072729	12.63	0.034597
11.20	0.028919	11.57	0.050377	11.93	0.174097	12.30	0.072728	12.67	0.034597
11.23	0.031758	11.60	0.050378	11.97	0.174098	12.33	0.053023	12.70	0.034597
11.27	0.031757	11.63	0.053022	12.00	0.174096	12.37	0.053023	12.73	0.031758
11.30	0.031758	11.67	0.053023	12.03	0.290497	12.40	0.053023	12.77	0.031757
11.33	0.034596	11.70	0.053022	12.07	0.290498	12.43	0.050379	12.80	0.031758
11.37	0.034597	11.73	0.072729	**12.10**	**0.290497**	12.47	0.050377	12.83	0.028919
11.40	0.034597	11.77	0.072729	12.13	0.100924	12.50	0.050379	12.87	0.028919
11.43	0.037408	11.80	0.072731	12.17	0.100921	12.53	0.037407	12.90	0.028918



IDF Report

IDF filename: TRENTON.idf

Hydrology Studio v 3.0.0.16

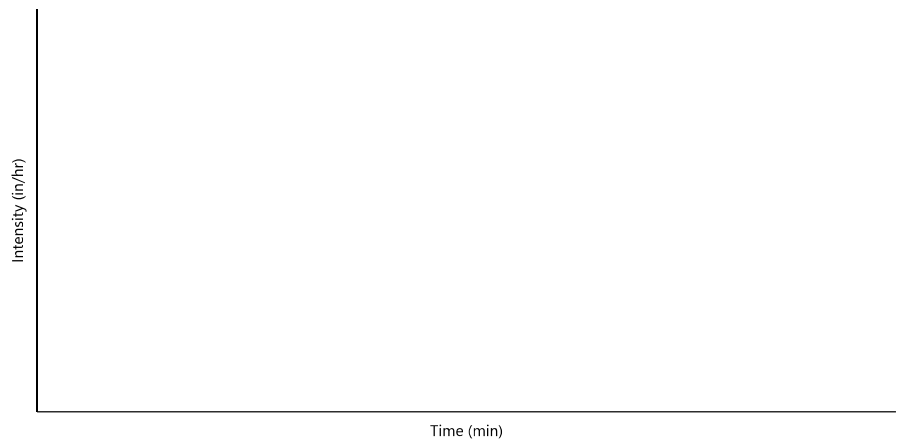
08-06-2020

Equation Coefficients	Intensity = B / (Tc + D)^E (in/hr)								
	1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr	
B	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
D	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
E	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	

Minimum Tc = 5 minutes

Tc (min)	Intensity Values (in/hr)								
	1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr	
Cf	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
5	0	0	0	0	0	0	0	0	
10	0	0	0	0	0	0	0	0	
15	0	0	0	0	0	0	0	0	
20	0	0	0	0	0	0	0	0	
25	0	0	0	0	0	0	0	0	
30	0	0	0	0	0	0	0	0	
35	0	0	0	0	0	0	0	0	
40	0	0	0	0	0	0	0	0	
45	0	0	0	0	0	0	0	0	
50	0	0	0	0	0	0	0	0	
55	0	0	0	0	0	0	0	0	
60	0	0	0	0	0	0	0	0	

Cf = Correction Factor applied to Rational Method runoff coefficient.



Precipitation Report

Precipitation filename: Hunterdon County.pcp

Hydrology Studio v 3.0.0.16 (Rainfall totals in Inches)

08-06-2020

	Active	1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr
Active			✔			✔	✔		✔
SCS Storms	**> SCS Dimensionless Storms**								
SCS 6hr		0	0	0	0	0	0	0	0
Type I, 24-hr		0	0	0	0	0	0	0	0
Type IA, 24-hr		0	0	0	0	0	0	0	0
Type II, 24-hr		0	0	0	0	0	0	0	0
Type II FL, 24-hr		0	0	0	0	0	0	0	0
Type III, 24-hr		2.80	3.38	0	4.26	5.00	6.09	7.02	8.03
Synthetic Storms	**> IDF-Based Synthetic Storms**								
1-hr		0	0	0	0	0	0	0	0
2-hr		0	0	0	0	0	0	0	0
3-hr		0	0	0	0	0	0	0	0
6-hr		0	0	0	0	0	0	0	0
12-hr		0	0	0	0	0	0	0	0
24-hr		0	0	0	0	0	0	0	0
Huff Distribution	**> 1st Quartile (0 to 6 hrs)**								
1-hr		0.76	0.98	0	1.33	1.61	2.01	2.34	2.69
2-hr		0.89	1.14	0	1.50	1.80	2.24	2.60	2.99
3-hr		0.98	1.24	0	1.59	1.90	2.33	2.68	3.07
6-hr		1.20	1.50	0	1.86	2.18	2.64	3.01	3.41
Huff Distribution	**> 2nd Quartile (>6 to 12 hrs)**								
8-hr		0	0	0	0	0	0	0	0
12-hr		0	0	0	0	0	0	0	0
Huff Distribution	**> 3rd Quartile (>12 to 24 hrs)**								
18-hr		0	0	0	0	0	0	0	0
24-hr		0	0	0	0	0	0	0	0
Custom Storms	**> Custom Storm Distributions**								
My Custom Storm 1		1.25	0	0	0	0	0	0	0
My Custom Storm 2		0	0	0	0	0	0	0	0
My Custom Storm 3		0	0	0	0	0	0	0	0
My Custom Storm 4		0	0	0	0	0	0	0	0
My Custom Storm 5		0	0	0	0	0	0	0	0
My Custom Storm 6		0	0	0	0	0	0	0	0
My Custom Storm 7		0	0	0	0	0	0	0	0
My Custom Storm 8		0	0	0	0	0	0	0	0
My Custom Storm 9		0	0	0	0	0	0	0	0
My Custom Storm 10		0	0	0	0	0	0	0	0

Precipitation Report Cont'd

Precipitation filename: Hunterdon County.pcp

Rainfall totals in Inches

08-06-2020

	Active	1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr
Active			✔			✔	✔		✔
Huff Indiana	**> Indianapolis**								
30-min		0	0	0	0	0	0	0	0
1-hr		0	0	0	0	0	0	0	0
2-hr		0	0	0	0	0	0	0	0
3-hr		0	0	0	0	0	0	0	0
6-hr		0	0	0	0	0	0	0	0
12-hr		0	0	0	0	0	0	0	0
24-hr		0	0	0	0	0	0	0	0
Huff Indiana	**> Evansville**								
30-min		0	0	0	0	0	0	0	0
1-hr		0	0	0	0	0	0	0	0
2-hr		0	0	0	0	0	0	0	0
3-hr		0	0	0	0	0	0	0	0
6-hr		0	0	0	0	0	0	0	0
12-hr		0	0	0	0	0	0	0	0
24-hr		0	0	0	0	0	0	0	0
Huff Indiana	**> Fort Wayne**								
30-min		0	0	0	0	0	0	0	0
1-hr		0	0	0	0	0	0	0	0
2-hr		0	0	0	0	0	0	0	0
3-hr		0	0	0	0	0	0	0	0
6-hr		0	0	0	0	0	0	0	0
12-hr		0	0	0	0	0	0	0	0
24-hr		0	0	0	0	0	0	0	0
Huff Indiana	**> South Bend**								
30-min		0	0	0	0	0	0	0	0
1-hr		0	0	0	0	0	0	0	0
2-hr		0	0	0	0	0	0	0	0
3-hr		0	0	0	0	0	0	0	0
6-hr		0	0	0	0	0	0	0	0
12-hr		0	0	0	0	0	0	0	0
24-hr		0	0	0	0	0	0	0	0

Precipitation Report Cont'd

Precipitation filename: Hunterdon County.pcp

Rainfall totals in Inches

08-06-2020

	Active	1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr
Active			✔			✔	✔		✔
NRCS Storms	**> NRCS Dimensionless Storms**								
NRCS MSE1, 24-hr		0	0	0	0	0	0	0	0
NRCS MSE2, 24-hr		0	0	0	0	0	0	0	0
NRCS MSE3, 24-hr		0	0	0	0	0	0	0	0
NRCS MSE4, 24-hr		0	0	0	0	0	0	0	0
NRCS MSE5, 24-hr		0	0	0	0	0	0	0	0
NRCS MSE6, 24-hr		0	0	0	0	0	0	0	0
NOAA-A, 24-hr		0	0	0	0	0	0	0	0
NOAA-B, 24-hr		0	0	0	0	0	0	0	0
NOAA-C, 24-hr		0	0	0	0	0	0	0	0
NOAA-D, 24-hr	✔	0	3.54	0	0	5.24	6.37	0	8.35
NRCC-A, 24-hr		0	0	0	0	0	0	0	0
NRCC-B, 24-hr		0	0	0	0	0	0	0	0
NRCC-C, 24-hr		0	0	0	0	0	0	0	0
NRCC-D, 24-hr		0	0	0	0	0	0	0	0
CA-1, 24-hr		0	0	0	0	0	0	0	0
CA-2, 24-hr		0	0	0	0	0	0	0	0
CA-3, 24-hr		0	0	0	0	0	0	0	0
CA-4, 24-hr		0	0	0	0	0	0	0	0
CA-5, 24-hr		0	0	0	0	0	0	0	0
CA-6, 24-hr		0	0	0	0	0	0	0	0

HYDROGRAPH SUMMARY REPORTS –WATER QUALITY DESIGN STORM

Hydrograph 1-yr Summary

Project Name:

Hydrology Studio v 3.0.0.16

08-06-2020

Hyd. No.	Hydrograph Type	Hydrograph Name	Peak Flow (cfs)	Time to Peak (min)	Hydrograph Volume (cuft)	Inflow Hyd(s)	Maximum Elevation (ft)	Maximum Storage (cuft)
1	NRCS Runoff	DA-3 Imperv.	0.593	68	929	---		
2	NRCS Runoff	DA-3 Perv.	0.015	78	33.0	---		
3	Junction	BASIN B	0.602	70	963	1, 2		
4	Pond Route	BASIN B	0.000	0	0.000	3	216.93	963
6	NRCS Runoff	DA-4	0.074	108	221	---		
8	Junction	POA-2	0.074	108	221	4, 6		
11	NRCS Runoff	IA 113	0.247	68	387	---		

IDF Report

IDF filename: TRENTON.idf

Hydrology Studio v 3.0.0.16

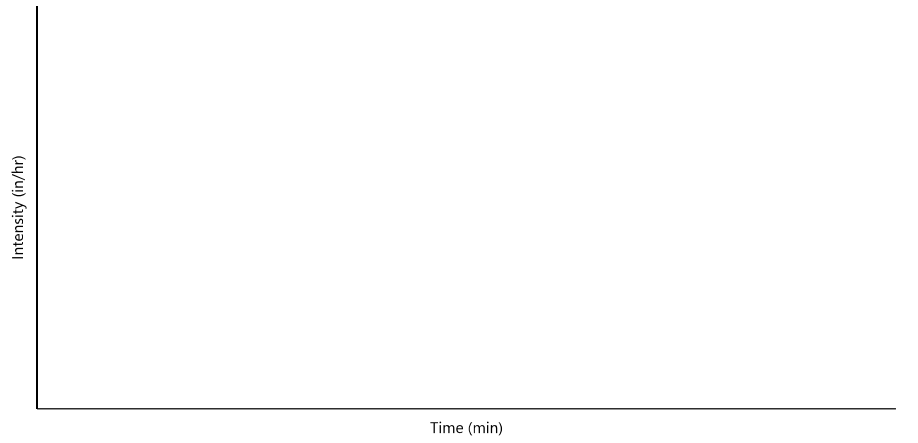
08-06-2020

Equation Coefficients	Intensity = B / (Tc + D)^E (in/hr)								
	1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr	
B	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
D	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
E	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	

Minimum Tc = 5 minutes

Tc (min)	Intensity Values (in/hr)								
	1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr	
Cf	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
5	0	0	0	0	0	0	0	0	
10	0	0	0	0	0	0	0	0	
15	0	0	0	0	0	0	0	0	
20	0	0	0	0	0	0	0	0	
25	0	0	0	0	0	0	0	0	
30	0	0	0	0	0	0	0	0	
35	0	0	0	0	0	0	0	0	
40	0	0	0	0	0	0	0	0	
45	0	0	0	0	0	0	0	0	
50	0	0	0	0	0	0	0	0	
55	0	0	0	0	0	0	0	0	
60	0	0	0	0	0	0	0	0	

Cf = Correction Factor applied to Rational Method runoff coefficient.



Precipitation Report

Precipitation filename: Hunterdon County.pcp

Hydrology Studio v 3.0.0.16 (Rainfall totals in Inches)

08-06-2020

	Active	1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr
Active		✔							
SCS Storms	**> SCS Dimensionless Storms**								
SCS 6hr		0	0	0	0	0	0	0	0
Type I, 24-hr		0	0	0	0	0	0	0	0
Type IA, 24-hr		0	0	0	0	0	0	0	0
Type II, 24-hr		0	0	0	0	0	0	0	0
Type II FL, 24-hr		0	0	0	0	0	0	0	0
Type III, 24-hr		2.80	3.38	0	4.26	5.00	6.09	7.02	8.03
Synthetic Storms	**> IDF-Based Synthetic Storms**								
1-hr		0	0	0	0	0	0	0	0
2-hr		0	0	0	0	0	0	0	0
3-hr		0	0	0	0	0	0	0	0
6-hr		0	0	0	0	0	0	0	0
12-hr		0	0	0	0	0	0	0	0
24-hr		0	0	0	0	0	0	0	0
Huff Distribution	**> 1st Quartile (0 to 6 hrs)**								
1-hr		0.76	0.98	0	1.33	1.61	2.01	2.34	2.69
2-hr		0.89	1.14	0	1.50	1.80	2.24	2.60	2.99
3-hr		0.98	1.24	0	1.59	1.90	2.33	2.68	3.07
6-hr		1.20	1.50	0	1.86	2.18	2.64	3.01	3.41
Huff Distribution	**> 2nd Quartile (>6 to 12 hrs)**								
8-hr		0	0	0	0	0	0	0	0
12-hr		0	0	0	0	0	0	0	0
Huff Distribution	**> 3rd Quartile (>12 to 24 hrs)**								
18-hr		0	0	0	0	0	0	0	0
24-hr		0	0	0	0	0	0	0	0
Custom Storms	**> Custom Storm Distributions**								
My Custom Storm 1		1.25	0	0	0	0	0	0	0
My Custom Storm 2		0	0	0	0	0	0	0	0
My Custom Storm 3		0	0	0	0	0	0	0	0
My Custom Storm 4		0	0	0	0	0	0	0	0
My Custom Storm 5		0	0	0	0	0	0	0	0
My Custom Storm 6		0	0	0	0	0	0	0	0
My Custom Storm 7		0	0	0	0	0	0	0	0
My Custom Storm 8		0	0	0	0	0	0	0	0
My Custom Storm 9		0	0	0	0	0	0	0	0
My Custom Storm 10		0	0	0	0	0	0	0	0

Precipitation Report Cont'd

Precipitation filename: Hunterdon County.pcp

Rainfall totals in Inches

08-06-2020

	Active	1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr
Active		✔							
Huff Indiana	**> Indianapolis**								
30-min		0	0	0	0	0	0	0	0
1-hr		0	0	0	0	0	0	0	0
2-hr		0	0	0	0	0	0	0	0
3-hr		0	0	0	0	0	0	0	0
6-hr		0	0	0	0	0	0	0	0
12-hr		0	0	0	0	0	0	0	0
24-hr		0	0	0	0	0	0	0	0
Huff Indiana	**> Evansville**								
30-min		0	0	0	0	0	0	0	0
1-hr		0	0	0	0	0	0	0	0
2-hr		0	0	0	0	0	0	0	0
3-hr		0	0	0	0	0	0	0	0
6-hr		0	0	0	0	0	0	0	0
12-hr		0	0	0	0	0	0	0	0
24-hr		0	0	0	0	0	0	0	0
Huff Indiana	**> Fort Wayne**								
30-min		0	0	0	0	0	0	0	0
1-hr		0	0	0	0	0	0	0	0
2-hr		0	0	0	0	0	0	0	0
3-hr		0	0	0	0	0	0	0	0
6-hr		0	0	0	0	0	0	0	0
12-hr		0	0	0	0	0	0	0	0
24-hr		0	0	0	0	0	0	0	0
Huff Indiana	**> South Bend**								
30-min		0	0	0	0	0	0	0	0
1-hr		0	0	0	0	0	0	0	0
2-hr		0	0	0	0	0	0	0	0
3-hr		0	0	0	0	0	0	0	0
6-hr		0	0	0	0	0	0	0	0
12-hr		0	0	0	0	0	0	0	0
24-hr		0	0	0	0	0	0	0	0

Precipitation Report Cont'd

Precipitation filename: Hunterdon County.pcp

Rainfall totals in Inches

08-06-2020

	Active	1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr
Active		✔							
NRCS Storms	**> NRCS Dimensionless Storms**								
NRCS MSE1, 24-hr		0	0	0	0	0	0	0	0
NRCS MSE2, 24-hr		0	0	0	0	0	0	0	0
NRCS MSE3, 24-hr		0	0	0	0	0	0	0	0
NRCS MSE4, 24-hr		0	0	0	0	0	0	0	0
NRCS MSE5, 24-hr		0	0	0	0	0	0	0	0
NRCS MSE6, 24-hr		0	0	0	0	0	0	0	0
NOAA-A, 24-hr		0	0	0	0	0	0	0	0
NOAA-B, 24-hr		0	0	0	0	0	0	0	0
NOAA-C, 24-hr		0	0	0	0	0	0	0	0
NOAA-D, 24-hr		0	3.54	0	0	5.24	0	0	8.35
NRCC-A, 24-hr		0	0	0	0	0	0	0	0
NRCC-B, 24-hr		0	0	0	0	0	0	0	0
NRCC-C, 24-hr		0	0	0	0	0	0	0	0
NRCC-D, 24-hr		0	0	0	0	0	0	0	0
CA-1, 24-hr		0	0	0	0	0	0	0	0
CA-2, 24-hr		0	0	0	0	0	0	0	0
CA-3, 24-hr		0	0	0	0	0	0	0	0
CA-4, 24-hr		0	0	0	0	0	0	0	0
CA-5, 24-hr		0	0	0	0	0	0	0	0
CA-6, 24-hr		0	0	0	0	0	0	0	0

DRAINAGE AREA MAPS

THIS PLAN TO BE UTILIZED FOR STORMWATER/DRAINAGE ANALYSIS PURPOSES ONLY

STUDY AREA EX-DA-2A

STUDY AREA EX-DA2

STUDY AREA EX-DA-1A

STUDY AREA EX-DA1

SOIL TYPE C

SOIL TYPE D

POA-1

POA-2

R-3 ZONE

C ZONE

R-MF4 ZONE

B-120 ZONE

O ZONE

R-MF ZONE

BLOCK 10801 LOT 3
LANDS OF
617-621 VALLEY ROAD, LLC
D.B. 22216, PG. 692

BLOCK 10801 LOT 2

BLOCK 10801 LOT 1.02

BLOCK 10801 LOT 1

BLOCK 10801 LOT 1.03

PASSAIC VALLEY ROAD
(VARIABLE WIDTH R.O.W.)
(MORRIS COUNTY ROUTE 512)
(A.K.A. VALLEY ROAD)

MOUNTAIN AVENUE
(A.K.A. MORRIS COUNTY ROUTE 638)
(VARIABLE WIDTH R.O.W.)

783.12'

772.28'

214.56'

263.02'

R=30.00'
L=42.37'

S10°28'00"E (DEED)
S18°24'09"E

S72°53'30"W 595.49' (DEED)

N17°39'54"W
N09°43'45"W (DEED)

N70°00'00"E (DEED)

N62°31'51"E

FLOOD HAZARD ZONE LINE

ZONE AE

ZONE X

150' BUFFER

50' BUFFER

50' RIPARIAN

WETLANDS

WETLANDS LINE (TYP)

WOODED AREA

EDGE OF WOODS

EDGE OF PAVEMENT

ASPHALT DRIVE

GRAVEL DRIVE (TO BE REMOVED)

GRAVEL DRIVE

3' PLASTIC FENCE

6' HIGH WIRE FENCE

GRAVEL AREA

GRASS AREA

SHED

FRAME SHED

FRAME BUILDING 2 STORY

CONC. WALK

WATER METER

MH BELL

MH SAN

TBM-A

TBM-B

IRON PIPE FOUND

IRON BAR FOUND

IRON BAR W/ CAP FOUND

0.4' 0.5' IRON BAR FOUND

20' WIDE SANITARY SEWER EASEMENT PER TAX MAP

P.O.B. IRON PIPE FOUND D.B. 22216, PG. 692

GRAPHIC SCALE
-30 0 15 30 60 120
(IN FEET)
1 INCH = 30 FT.

THIS PLAN SET IS FOR PERMITTING PURPOSES ONLY AND MAY NOT BE USED FOR CONSTRUCTION

PROJECT: ELITE PROPERTIES
PROPOSED RESIDENTIAL DEVELOPMENT
BLOCK 10801 LOT 3 (C.R. 512)
617-621 VALLEY ROAD
TOWNSHIP OF LONG HILL MORRIS COUNTY, NEW JERSEY

DRAWN BY: AJW
DESIGNED BY: WB
CHECKED BY: JGJ
CHECKED BY: —

REV.	DATE	COMMENTS	BY

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JOSEPH G. JAWORSKI
PROFESSIONAL ENGINEER
NEW JERSEY LICENSE No. 36618

BRETT W. SKAPINETZ
PROFESSIONAL ENGINEER
NEW JERSEY LICENSE No. 41985

TITLE: EXISTNG DRAINAGE AREA MAP

SCALE: (H) 1"=30' (V)
DATE: 08/07/2020
PROJECT No: 0555-99-010

SHEET No: 1 OF 3
Rev. #: 0

Plotted: 08/07/20 - 10:55 AM, By: dwright
File: \\decpc-local\shcdolders\data\DECPC PROJECTS\0555 Elite Properties\99-010 Long Hill\Dwg\DA Maps\05559901 0EDAM0.dwg, ----> 01 EXISTING DRAINAGE AREA MAP

THIS PLAN TO BE UTILIZED FOR STORMWATER/DRAINAGE ANALYSIS PURPOSES ONLY

POA-2 | R-3 ZONE | R-MF4 ZONE | B-120 ZONE | POA-1 | C ZONE | R-MF4 ZONE | O ZONE | R-MF ZONE

STUDY AREA DA-4A | STUDY AREA DA-4B | STUDY AREA DA-2 | STUDY AREA DA-1B | STUDY AREA DA-1A

SOIL TYPE C | SOIL TYPE D

BLOCK 10801 LOT 3
LANDS OF
617-621 VALLEY ROAD, LLC
D.B. 22216, PG. 692

PROPOSED 3 STORY RESIDENTIAL BUILDING OVER PARKING GARAGE
29,445 SF FOOTPRINT 62 UNITS

PROP. BASIN "B"

PASSAIC VALLEY ROAD
(VARIABLE R.O.W.)
(A.K.A. MORRIS COUNTY ROUTE 512)
(A.K.A. VALLEY ROAD)

MOUNTAIN AVENUE
(A.K.A. MORRIS COUNTY ROUTE 638)
(VARIABLE WIDTH R.O.W.)

BLOCK 10801 LOT 2 | BLOCK 10801 LOT 1.02 | BLOCK 10801 LOT 1 | BLOCK 10801 LOT 1.03

20' WIDE SANITARY SEWER EASEMENT PER TAX MAP

GRAPHIC SCALE
-30 0 15 30 60 120
(IN FEET)
1 INCH = 30 FT.

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BY	COMMENTS	DATE	REV.

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DRAWN BY: AJW | DESIGNED BY: WB | CHECKED BY: JGJ | CHECKED BY: -

PROJECT: ELITE PROPERTIES
PROPOSED RESIDENTIAL DEVELOPMENT
BLOCK 10801 LOT 3
617-621 VALLEY ROAD (C.R. 512)
TOWNSHIP OF LONG HILL MORRIS COUNTY, NEW JERSEY

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BRETT W. SKAPINETZ
PROFESSIONAL ENGINEER
NEW JERSEY LICENSE No. 41985

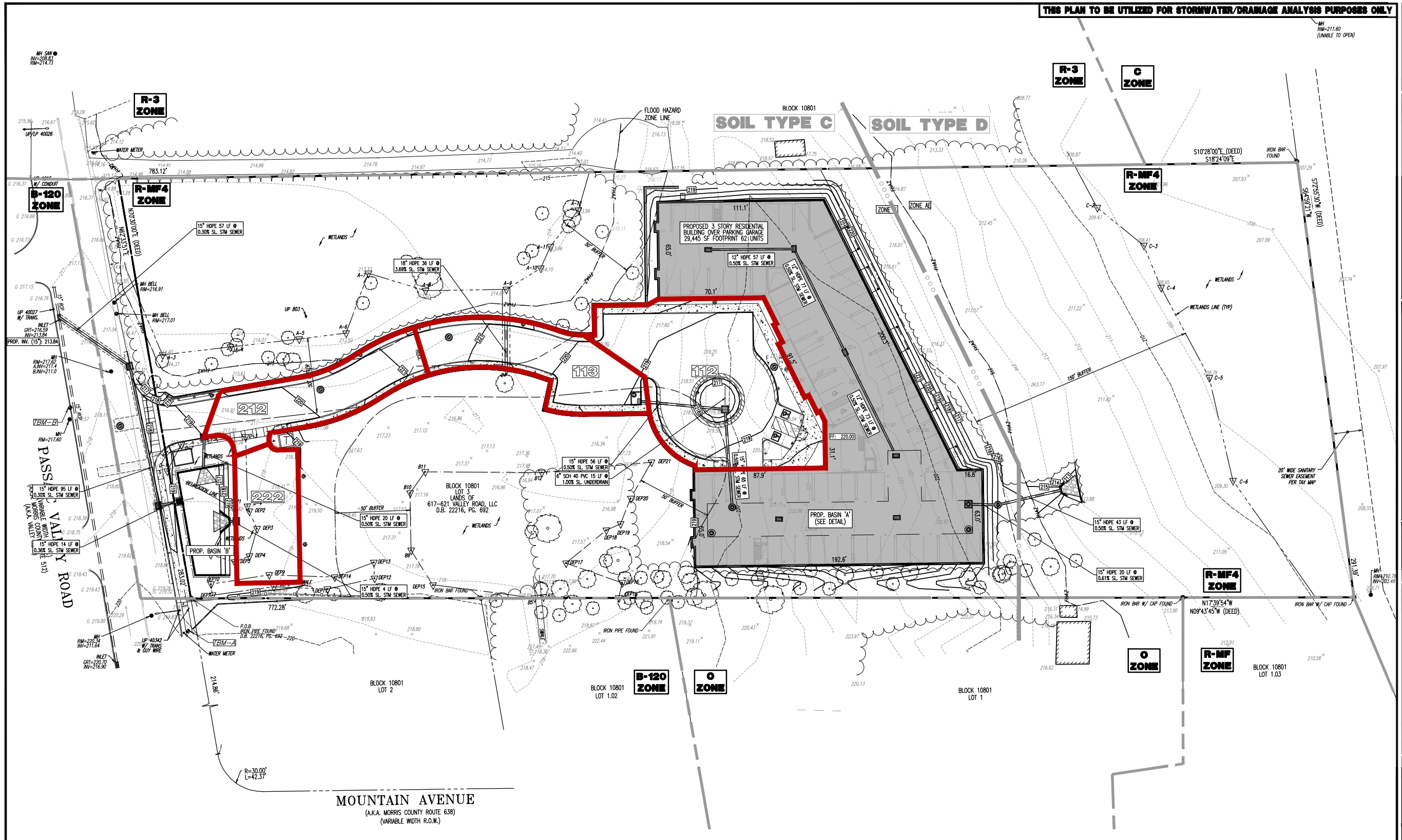
TITLE: PROPOSED DRAINAGE AREA MAP

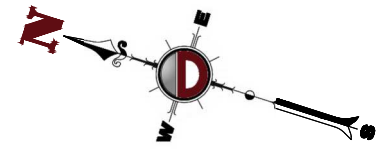
SCALE: (H) 1"=30' (V) | DATE: 08/07/2020
PROJECT No: 0555-99-010

SHEET No: 2 OF 3 | Rev. #: 0

Plotted: 08/07/20 - 10:55 AM, By: dwright
File: \\despc.local\dec\folders\data\DEC\PC PROJECTS\0555 Elite Properties\99-010 Long Hill\Dwg\DA Maps\0555599010PDAM0.dwg, ----> 02 PROPOSED DRAINAGE AREA MAP

THIS PLAN TO BE UTILIZED FOR STORMWATER/DRAINAGE ANALYSIS PURPOSES ONLY





BY	COMMENTS	DATE	REV.

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DRAWN BY: AJW | DESIGNED BY: WB | CHECKED BY: JGJ | CHECKED BY: _

PROJECT: ELITE PROPERTIES
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NEW JERSEY LICENSE No. 41985

TITLE: INLET AREA MAP

SCALE: (H) 1"=30' (V) | DATE: 08/07/2020
PROJECT No: 0555-99-010

SHEET No: 3 OF 3 | Rev. #: 0

Plotted: 08/07/20 - 10:55 AM, By: aiwright
File: \\dcepc-local\dcfolders\data\DECPC PROJECTS\0555 Elite Properties\99-010 Long Hill\Dwg\DA Maps\05559901DAMO.dwg, ---> 03 INLET AREA MAP