Drainage Report

For

Bryant Pharmacy

Bryant, Saline County, Arkansas

November 13, 2025

Prepared by:

RICHARDSON ENGINEERING, PLLC

325 W. South St.
Benton, AR 72015
501-315-7225

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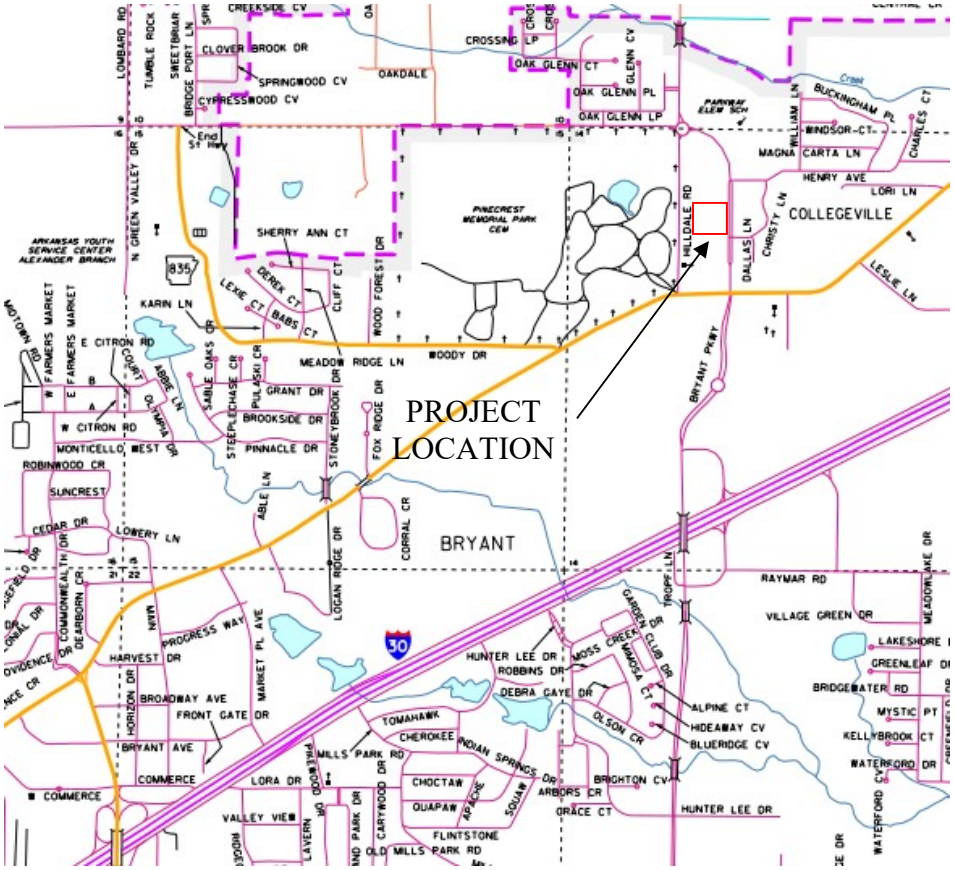
Project Owner Information

Jon Martin
5501 Lombard Road
Alexander, AR 72002

Project Location and Description

The project is located on West side of the Bryant Parkway, part of the Southeast Quater of the Northwest Quarter, Section 14, Township 1-S, Range 14-W, Saline County, Arkansas.



Vicinity Map – N.T.S

This project is a proposed Commercial Development, located in the City of Bryant, Saline County.

Site Drainage

Pre-Development

The pre-developed runoff for the site flows to the East, West, and South. The on-site drainage basins have been broken down into five separate basins that discharge water off-site. Drainage Basins A and B discharge water to the West, Basin C discharges water to the South, and Basins D and E discharge water to the East. The pre-development drainage basin delineation can be found in the appendix of this report.

The pre-development runoff condition is undeveloped/woods.

Post-Development

The site drainage starts on the South side of the project and flows to the North. The drainage is sheet flows across the proposed parking lot and intercepted by the proposed storm sewer system and is discharged into a proposed detention basin on the Northwest corner of the project. There are also some small areas that discharge to the East and South from the site.

The City of Bryant Drainage Manual utilized different C values for each storm event. The C value for the 100-year design storm was utilized for all storm events for the drainage analysis for this site.

The minimum required volume of the detention basin was found by comparing the pre-development rational method hydrograph for the area that the detention pond is being discharged, to the post-development modified rational method hydrograph for the area that the detention basin is receiving using the Hydrology Studio program. The minimum required volume was found to be 5,157 CF for the 100-year storm event. In order to meet the City of Bryants Stormwater Manual detention requirements, the detention pond has to be sized with at least a 25% factory of safety; therefore, the minimum size of the detention pond is 6,447 CF.

The proposed detention basin will utilize an orifice/riser/culvert discharge structure. Post-Development Basin “A” is the drainage basin that discharges water into the proposed detention basin. Post-development drainage basin “A” consists of all of the individual drainage basins for CB-1, CB-2, CB-3, AD-4, the proposed building areas for phase 2 (i.e. roof drains), and the detention pond area. Post-Development Basin B, C, D, and E consist of the grass tie back slopes from the proposed pavement to existing grade and a small portion of the entrance drives that tie down to the existing grade on the Bryant Parkway. These areas are not routed through the detention basin, so they were calculated by themselves. The detention basin and post-development basin “B” will be discharged to the West, post-development basin “C” and “D” will be discharged to the East, and post-development basin “E” will be discharged to the South. A delineation for the drainage basins that were used in Hydrology Studio (for the overall site drainage basins), as well as a delineation of the basins that were used in Storm and Sanitary Analysis (on-site

storm inlets) can be seen in the appendix of this report.

The post-development runoff conditions changed from undeveloped/woods to commercial development.

Runoff Summary's

Pre- Development Drainage Basin Information

Overall Project Site Area: 1.92 Acres

Overall Pre-Development Drainage Basin Study Area: 6.06 Acres

Drainage Basins	Drainage Area (Ac)	C Value	Time of Concentration (min)
Basin A	1.44	0.56	14
Basin B	3.26	0.59	14
Basin C	0.33	0.65	11
Basin D	0.50	0.54	15
Basin E	0.53	0.55	19

Design Storm	Basin A (cfs)	Basin B (cfs)	Basin C (cfs)	Basin D (cfs)	Basin E (cfs)
2-yr	3.11	7.41	0.92	1.01	0.98
10-yr	4.17	9.94	1.24	1.35	1.31
25-yr	4.79	11.43	1.42	1.56	1.51
50-yr	5.24	12.50	1.55	1.70	1.65
100-yr	5.69	13.57	1.69	1.85	1.79

Overall Post-Development Drainage Study Area: 6.02 Acres

Overall Site Post- Development Drainage Basin Information

Drainage Basins	Drainage Area (Ac)	C Value	Time of Concentration (min)
Basin A	1.56	0.85	12
Basin B	3.67	0.60	14
Basin C	0.38	0.72	7
Basin D	0.12	0.75	17
Basin E	0.29	0.63	16

Design Storm	Basin A (cfs)	Basin B (cfs)	Basin C (cfs)	Basin D (cfs)	Basin E (cfs)
2-yr	5.48	8.49	1.44	0.28	0.66
10-yr	7.35	11.38	1.93	0.38	0.89
25-yr	8.44	13.08	2.22	0.44	1.02
50-yr	9.23	14.31	2.42	0.48	1.12
100-yr	10.02	15.53	2.64	0.52	1.21

On-Site Drainage Inlet Basin Information

Drainage Basins	Drainage Area (Ac)	C Value	Time of Concentration (min)
CB-1	0.36	0.85	2.68
CB-2	0.16	0.85	8.50
CB-3	0.30	0.85	10.73
AD-4	0.40	0.85	11.76

Design Storm	CB-1 (cfs)	CB-2 (cfs)	CB-3 (cfs)	AD-4 (cfs)
2-yr	2.32	0.65	1.09	1.40
10-yr	3.03	0.87	1.46	1.86
25-yr	3.48	1.00	1.68	2.14
50-yr	3.83	1.09	1.84	2.34
100-yr	4.16	1.19	1.99	2.54

Site Discharge to the West to Include Detention Basin

Overall Development Area = 1.92 Ac
Pre-Development Drainage Study Area = 4.70
Post-Development Drainage Study Area = 5.23
Existing Condition runoff Coefficient: C = 0.56/0.59
Proposed runoff Coefficient: C = 0.85/0.60
Tc Undeveloped = 14 Minutes (TR55 Method)
Tc Developed = 12/14 Minutes (TR55 Method)
Detention Basin Required Volume: 6,447 CF
Detention Basin Volume: 9,802 CF
Maximum Storage: 4,240 CF
Discharge Structure: Orifice/Riser/Culvert

Design Storm	Pre-Development Flow Rate (cfs)	Post-Development Flow Rate (cfs)	Post-Development w/ Detention Flow Rate (cfs)	Maximum Water Elevation in Pond (ft)
2-yr	10.52	13.42	10.30	421.39
10-yr	14.11	17.99	13.53	422.03
25-yr	16.22	20.68	15.42	422.3
50-yr	17.74	22.62	16.77	422.54
100-yr	19.26	24.56	18.08	422.78

Should both orifices get 100 percent blocked and the water can only be discharged from the pond over the top of the overflow structure, the maximum water elevation in the pond reaches 423.27. The water elevations for the other design storms can be seen in the appendix.

Site Discharge to the East

Pre-Development Drainage Study Area = 0.83
Post-Development Drainage Study Area = 0.50
Existing Condition runoff Coefficient: C = 0.65/0.54
Proposed runoff Coefficient: C = 0.72/0.67
Tc Undeveloped = 11/15 Minutes (TR55 Method)
Tc Developed = 7/17 Minutes (TR55 Method)

Design Storm	Pre-Development Flow Rate (cfs)	Post-Development Flow Rate (cfs)
2-yr	1.73	1.56
10-yr	2.31	2.09
25-yr	2.66	2.40
50-yr	2.91	2.62
100-yr	3.16	2.85

Site Discharge to the South

Pre-Development Drainage Study Area = 0.53
Post-Development Drainage Study Area = 0.29
Existing Condition runoff Coefficient: C = 0.55
Proposed runoff Coefficient: C = 0.63
Tc Undeveloped = 19 Minutes (TR55 Method)
Tc Developed = 16 Minutes (TR55 Method)

Design Storm	Pre-Development Flow Rate (cfs)	Post-Development Flow Rate (cfs)
2-yr	0.98	0.66
10-yr	1.31	0.89
25-yr	1.51	1.02
50-yr	1.65	1.12
100-yr	1.79	1.21

Recommendations/Summary

The proposed drainage improvements include a storm sewer system and a detention basin on the Northwest corner of the project. The proposed detention basin releases the post development runoff at a lower rate than the pre-development condition.

Appendices

Runoff Coefficient Calculations
Time of Concentration Calculation
NRCS Soil Report
Site Drainage Map
Trickle Channel Velocity Calculation
Overflow Wier Blockage Calculation
SSA Design Layout
Storm System Design (SSA)
Pond and Post Development Hydrographs (Hydrology Studio)

Runoff Coefficient Calculations

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PROJECT 025-029 COMPOSITE C CALCULATION DATE 11/13/2025

PRE-DEV * ALL CLAY SOIL

BASIN "A" A= 1.44 Ac

50% - 2-7% C= 0.50

50% - >7% C= 0.62

$$C = \frac{(0.50)(0.72) + (0.62)(0.72)}{1.44} = 0.56$$

BASIN "B" A= 3.26 Ac (142006 SF)

IMPERVIOUS: 2970 SF C= 0.95

PERVIOUS: 30% - 2-7% 41711 SF C= 0.5

70% - >7% 97325 SF C= 0.62

$$C = \frac{(2970)(0.95) + (41711)(0.5) + (97325)(0.62)}{142006}$$

$$= 0.59$$

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PROJECT 025-029 C CALCULATION DATE 11/13/2025

BASIN "C" A = 0.33 AC (14375 SF)

IMPERVIOUS : A = 2025 SF C = 0.95

PERVIOUS : 20% - 2-7% A = 2470 SF C = 0.50
80% - > 7% A = 9880 SF C = 0.62

$$C = \frac{(2025)(0.95) + (2470)(0.50) + (9880)(0.62)}{14375}$$

$$= 0.65$$

BASIN "D" A = .50 AC (21780 SF)

PERVIOUS : A = 19820 SF C = 0.50

IMPERVIOUS : A = 1960 SF C = 0.95

$$C = \frac{(19820)(0.5) + (1960)(0.95)}{21780} = 0.54$$

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PROJECT 025-029 C CALCULATION DATE 11/13/2025

BASIN "C" A = 0.53 ac (23087 SF)

IMPERVIOUS A = 2613 SF C = 0.95

PERVIOUS A = 20474 SF C = 0.50

$$C = \frac{(2613)(0.95) + (20474)(0.50)}{23087}$$

$$= 0.55$$

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PROJECT 025-029 C CALCULATION DATE 11/13/2025

POST - DEVELOPED

BASIN "A" A = 1.56 AC

PERVIOUS: 0.36 AC C = 0.50

IMPERVIOUS: 1.20 AC C = 0.95

$$C = \frac{(0.36)(0.50) + (1.20)(0.95)}{1.56} = 0.85$$

BASIN "B" A = 3.67 AC

IMPERVIOUS: A = 0.144 AC C = 0.95

PERVIOUS: 30% - 2-7% 1.06 AC C = 0.50

70% - >7% 2.466 AC C = 0.62

$$C = \frac{(0.144)(0.95) + (1.06)(0.50) + (2.466)(0.62)}{3.67}$$

$$= 0.60$$

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PROJECT 025-029 C CALCULATION DATE 11/13/2025

BASIN "C" A = 0.38 AC (16553 SF)

IMPERVIOUS: A = 6950 SF C = 0.95

PERVIOUS: 50% - 2-7% 4801.5 SF C = 0.50

50% -> 7% 4801.5 SF C = 0.62

$$C = \frac{(6950)(0.95) + (4801.5)(0.50) + (4801.5)(0.62)}{16553}$$

$$= 0.72$$

BASIN "D" A = 0.12 AC (5227 SF)

PERVIOUS: A = 3267 SF (C = 0.50)

IMPERVIOUS: A = 1960 SF C = 0.95

$$C = \frac{(3267)(0.50) + (1960)(0.95)}{5227} = 0.67$$

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PROJECT 025-029 C CALCULATION DATE 11/13/2025

BASIN "E" A= 0.29 AC (12632 SF)

PERVIOUS: A = 8982 SF C = 0.50

IMPERVIOUS: A = 3650 SF C = 0.95

$$C = \frac{(8982)(0.50) + (3650)(0.95)}{12632}$$

$$= 0.63$$

Time of Concentration

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PROJECT 025-029 T_c CALCULATION DATE 11/13/2025

POST-DEV BASIN "1" T_c

SUB-AD-4 T_c = 11.76 min

PIPE 18 $\frac{L}{V * 60} = \frac{128}{(8.12)(60)} = 0.26$ min

PIPE 14 => $\frac{85}{(10.09)(60)} = 0.14$ min

T_c = 12.16 min

NRCS Soil Report

Map Scale: 1:748 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 10 20 40 60

Feet: 0 35 70 140 210

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 15N 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 1:20,000.

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: Saline County, Arkansas
Survey Area Data: Version 21, Sep 10, 2024

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

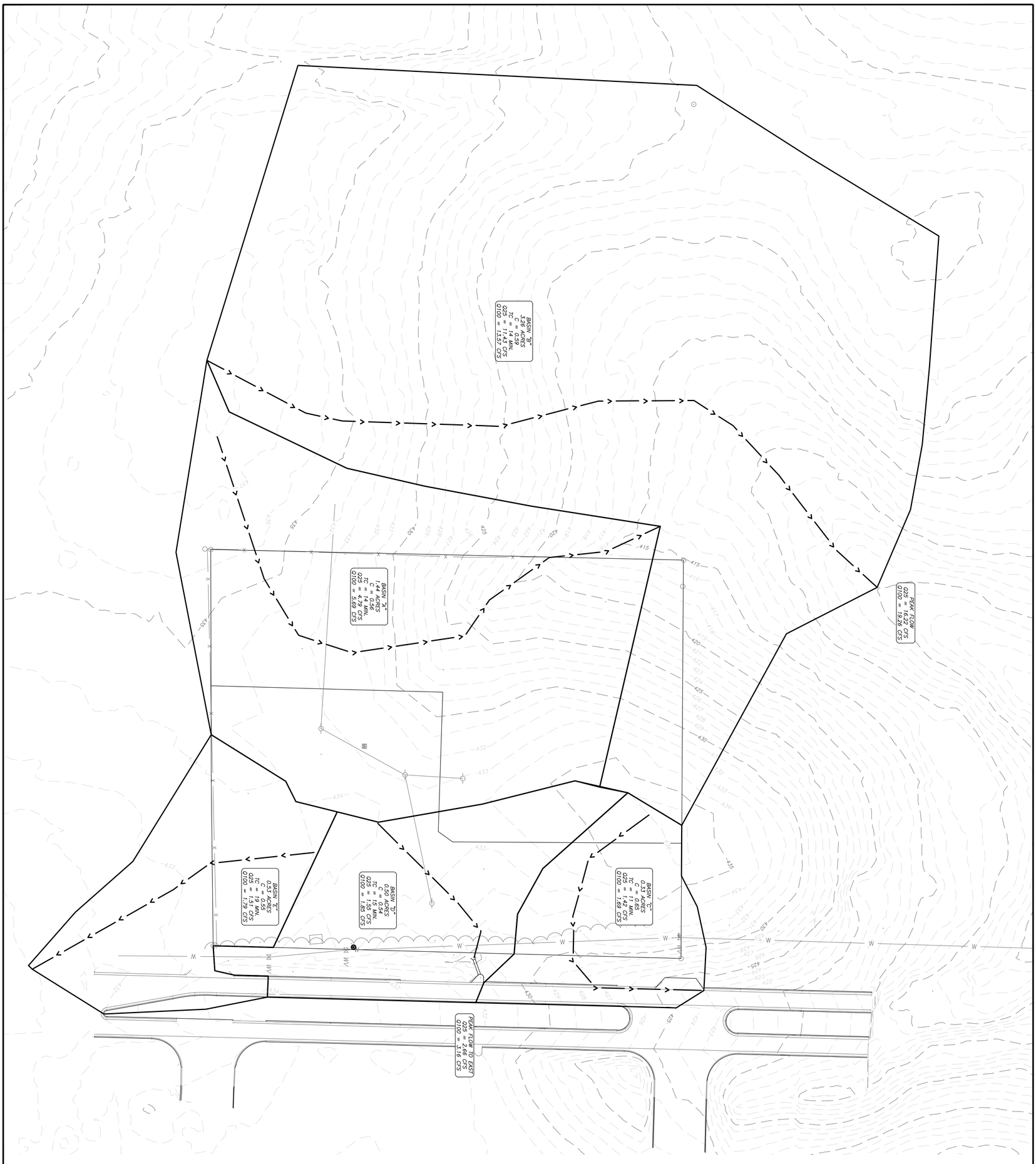
Date(s) aerial images were photographed: May 1, 2022—May 29, 2022

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
29	Tiak silt loam, 3 to 8 percent slopes	2.4	100.0%
Totals for Area of Interest		**2.4**	**100.0%**

Site Drainage Basin Maps



GRAPHIC SCALE

(IN FEET)

1 inch = 30 ft.

PROJECT #: 025-029	
Scale: 1" = 30'	Date: 11/13/2025
Sheet: 1 of 3	

No.	Revisions	Date

Prepared For:

JON MARTIN
5501 LOMBARD ROAD
ALEXANDER, AR 72002

PRE-DEVELOPMENT DRAINAGE BASIN MAP
SHOPPES AT DOGWOOD SPRINGS
RETAIL DEVELOPMENT
BRYANT PARKWAY
BRYANT, ARKANSAS

CERTIFICATE OF AUTHORIZATION
Richardson Engineering, PLLC
No. 2519
ARKANSAS

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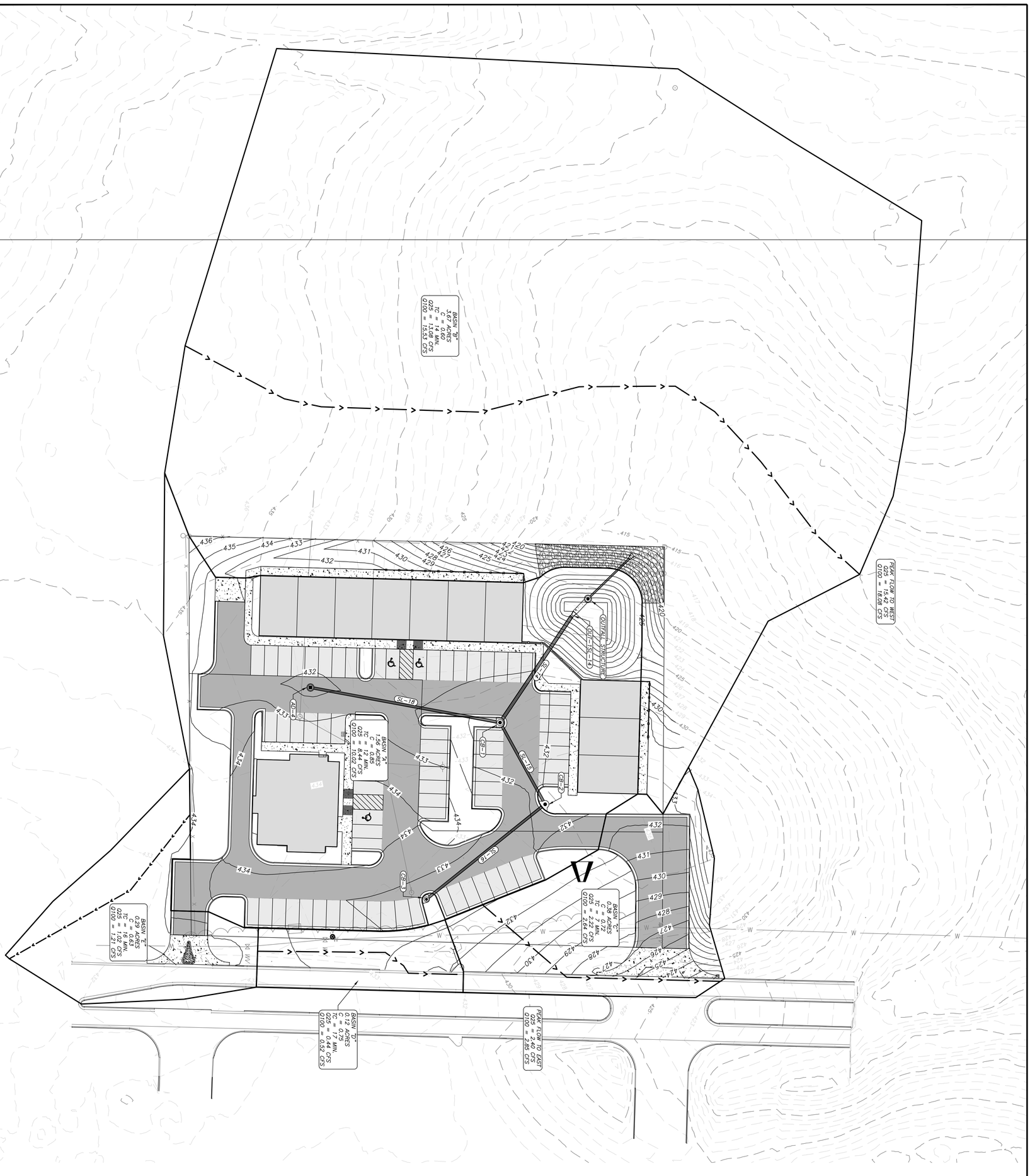

GRAPHIC SCALE
(IN FEET)
1 inch = 30 ft.

PROJECT #: 025-029	No. / Revisions / Date	Prepared For: JON MARTIN, 5501 LOMBARD ROAD, ALEXANDER, AR 72002	POST-DEVELOPMENT DRAINAGE BASIN MAP SHOPPES AT DOGWOOD SPRINGS RETAIL DEVELOPMENT BRYANT PARKWAY BRYANT, ARKANSAS
Scale: 1" = 30'	Date: 11/13/2025		
Sheet: 2 of 3			

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ARKANSAS

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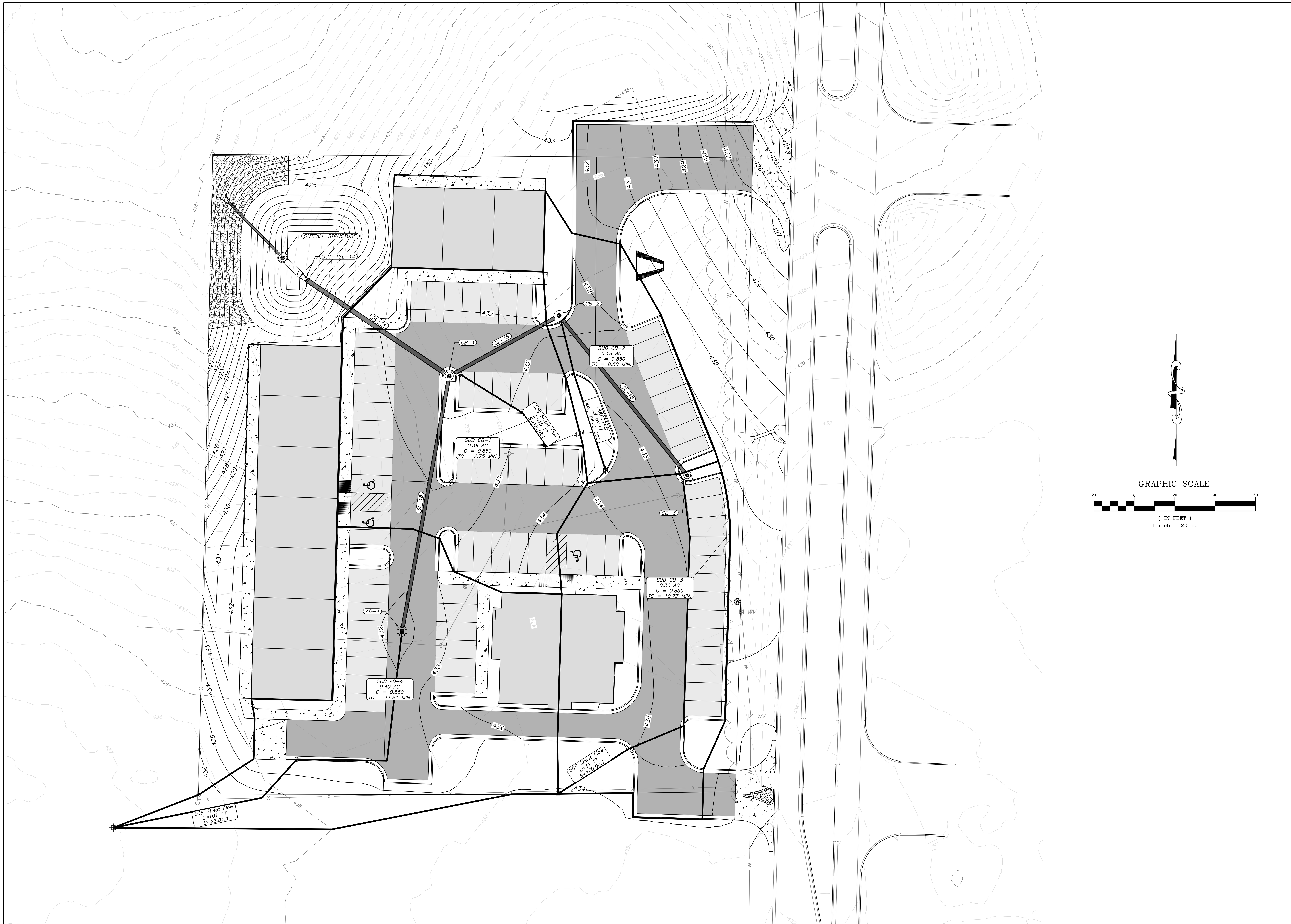

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CERTIFICATE OF AUTHORIZATION — ARKANSAS

POST-DEVELOPMENT DRAINAGE BASIN MAP
SHOPPES AT DOGWOOD SPRINGS
RETAIL DEVELOPMENT
BRYANT PARKWAY
BRYANT, ARKANSAS

Prepared For:
JON MARTIN
5501 LOMBARD ROAD
ALEXANDER, AR 72002

No.	Revisions	Date

PROJECT #: 025-029
Scale: 1" = 20'
Date: 11/13/2025
Sheet: 3 of 3

Trickle Channel Velocity Calculation

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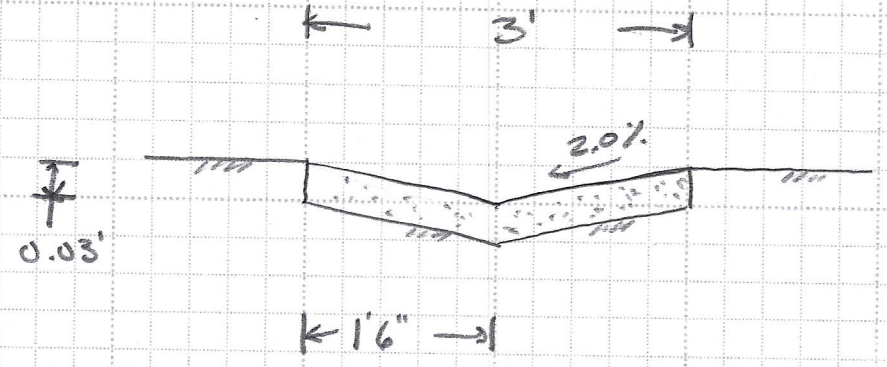
PROJECT 025-029 TRICKLE CHANNEL VELOCITY DATE 11/05/2025



$A = 0.045\ FT^2$ $\quad S = \frac{0.2}{10} = 0.02\ FT/FT$

$W_p = 0.16\ FT$

$$Q = \left(\frac{1.49}{0.013}\right)(0.045)\left(\frac{0.045}{0.16}\right)^{2/3}(0.02)^{1/2}$$

$= 0.313\ CFS$

$$V = \frac{Q}{A} = \frac{0.313}{0.045} = 6.95\ FT/S > 2\ FT/S \checkmark$$

Overflow Wier Blockage Calculation

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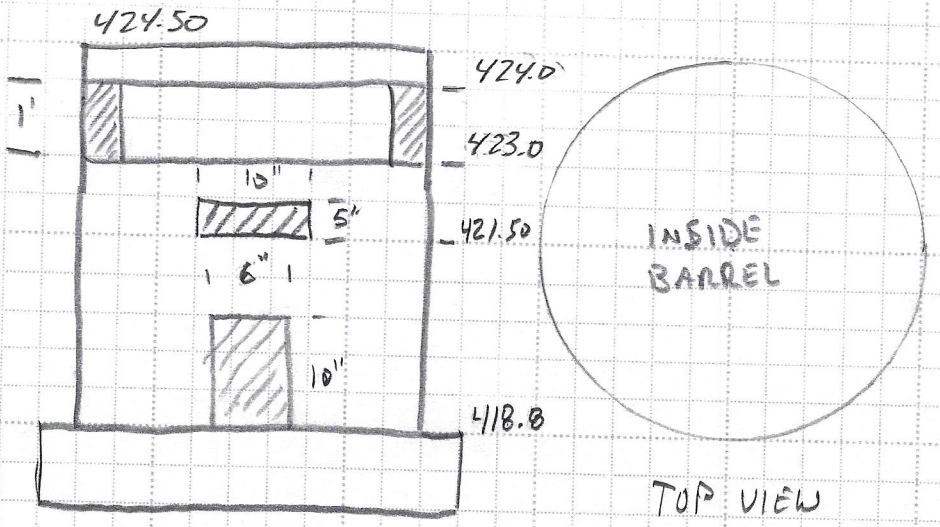
PROJECT 025-029 OVER FLOW RISER WEIR CALCULATION DATE 11/05/2025

RISER IS 4' I.D. ROUND BARREL



TOP VIEW

4'

$Q = C\ L\ H^{3/2}$

$C = 2.6$

$L = 2\pi R = (2)(\pi)(2) = 12.56'$

$H = 1.0'$

$Q = (2.6)(12.56)(1.0)^{3/2} = 32.65$ CFS

∴ ASSUMING THAT 50% OF THE WIER IS BLOCKED

$Q = \frac{32.65}{2} = 16.33$ CFS > Q_{100} into pond = 15.96 CFS ✓

SSA Design Layout

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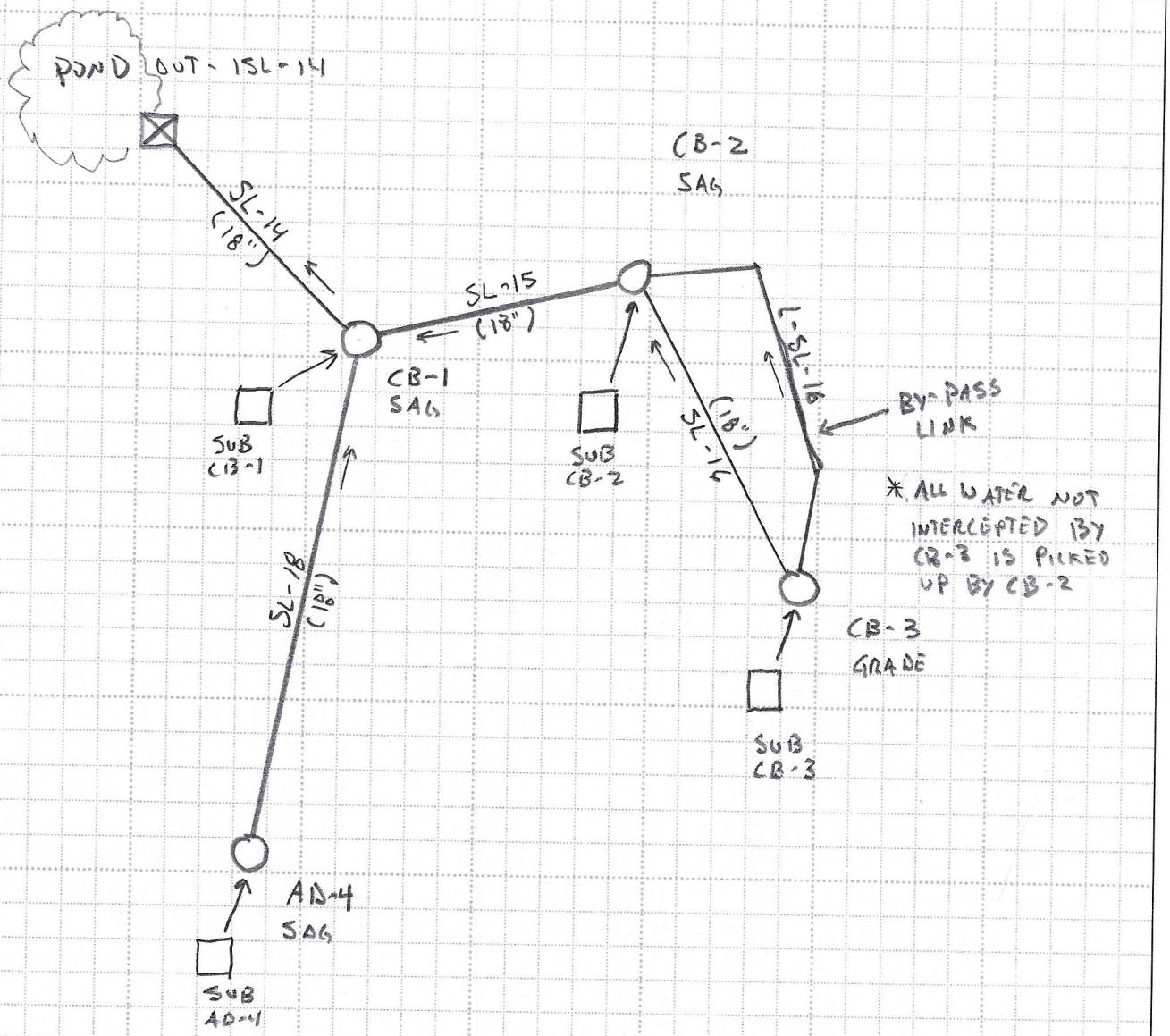
PROJECT 025-029 SSA DESIGN LAYOUT DATE 11/05/2025



Storm System Design (SSA)

2 Year Design Storm

Project Description

File Name	Bryant Pharmacy Drainage Analysis 11-13-25.SPF

Project Options

Flow Units	CFS
Elevation Type	Elevation
Hydrology Method	Rational
Time of Concentration (TOC) Method	SCS TR-55
Link Routing Method	Kinematic Wave
Enable Overflow Ponding at Nodes	YES
Skip Steady State Analysis Time Periods	NO

Analysis Options

Start Analysis On	00:00:00	0:00:00
End Analysis On	00:00:00	0:00:00
Start Reporting On	00:00:00	0:00:00
Antecedent Dry Days	0	days
Runoff (Dry Weather) Time Step	0 01:00:00	days hh:mm:ss
Runoff (Wet Weather) Time Step	0 00:05:00	days hh:mm:ss
Reporting Time Step	0 00:05:00	days hh:mm:ss
Routing Time Step	30	seconds

Number of Elements

	Qty
Rain Gages	0
Subbasins	4
Nodes	5
Junctions	0
Outfalls	1
Flow Diversions	0
Inlets	4
Storage Nodes	0
Links	5
Channels	0
Pipes	5
Pumps	0
Orifices	0
Weirs	0
Outlets	0
Pollutants	0
Land Uses	0

Rainfall Details

Return Period	2 year(s)

Subbasin Summary

SN	Subbasin ID	Area (ac)	Weighted Runoff Coefficient	Total Rainfall (in)	Total Runoff (in)	Total Runoff Volume (ac-in)	Peak Runoff (cfs)	Time of Concentration (days hh:mm:ss)
1	SUB-AD-4	0.40	0.8500	0.81	0.69	0.28	1.40	0 00:11:45
2	Sub-CB-1	0.36	0.8500	0.34	0.29	0.10	2.32	0 00:02:40
3	Sub-CB-2	0.16	0.8500	0.68	0.58	0.09	0.65	0 00:08:30
4	Sub-CB-3	0.30	0.8500	0.76	0.65	0.19	1.09	0 00:10:43

Node Summary

SN	Element ID	Element Type	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Initial Water Elevation (ft)	Surcharge Elevation (ft)	Ponded Area (ft^2)	Peak Inflow (cfs)	Max HGL Elevation Attained (ft)	Max Surcharge Depth Attained (ft)	Min Freeboard Attained (ft)
1	Out-1SL - (14)	Outfall	419.00					2.96	419.38		

Link Summary

SN	Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length	Inlet Invert Elevation	Outlet Invert Elevation	Average Slope	Diameter or Height	Manning's Roughness	Peak Flow	Design Flow Capacity	Peak Flow/ Design Flow Ratio	Peak Flow Velocity	Peak Flow Depth	Peak Flow Depth/ Total Depth Ratio	To Sur
					(ft)	(ft)	(ft)	(%)	(in)		(cfs)	(cfs)		(ft/sec)	(ft)		
1	L-SL - (16)	Pipe	CB-3	CB-2	112.54	433.11	432.25	0.7600			0.00	0.00	0.00	0.00	0.00	0.00	
2	SL - (14)	Pipe	CB-1	Out-1SL - (14)	85.23	422.00	419.00	3.5200			2.96	21.35	0.14	8.53	0.38	0.25	
3	SL - (15)	Pipe	CB-2	CB-1	62.02	426.00	422.00	6.4500			1.57	28.90	0.05	8.74	0.24	0.16	
4	SL - (16)	Pipe	CB-3	CB-2	101.17	429.00	426.00	2.9700			1.08	19.60	0.06	7.03	0.24	0.16	
5	SL - (18)	Pipe	AD-4	CB-1	128.37	427.50	423.00	3.5100			1.39	21.31	0.07	7.05	0.26	0.17	

Inlet Summary

SN	Element ID	Inlet Location	Number of Inlets	Catchbasin Invert Elevation (ft)	Max (Rim) Elevation (ft)	Initial Water Elevation (ft)	Ponded Area (ft^2)	Peak Flow (cfs)	Peak Flow Intercepted by Inlet (cfs)	Peak Flow Bypassing Inlet (cfs)	Inlet Efficiency during Peak Flow (%)	Allowable Spread (ft)	Max Gutter Spread during Peak Flow (ft)	Max Gutter Water Elev. during Peak Flow (ft)
1	AD-4	On Sag	1	427.50	431.80	427.50	10.00	1.40	N/A	N/A	N/A	10.00	7.06	432.11
2	CB-1	On Sag	1	422.00	431.61	422.00	10.00	2.32	N/A	N/A	N/A	10.00	5.35	432.02
3	CB-2	On Sag	1	426.00	432.25	426.00	10.00	0.65	N/A	N/A	N/A	10.00	2.29	432.57
4	CB-3	On Grade	1	429.00	433.11	429.00	N/A	1.09	1.09	0.00	100.00	10.00	5.09	433.25

Subbasin Hydrology

Subbasin : SUB-AD-4

Input Data

Area (ac) 0.4
Weighted Runoff Coefficient 0.85

Time of Concentration

TOC Method : SCS TR-55

Sheet Flow Equation :

Tc = (0.007 * ((n * Lf)^0.8)) / ((P^0.5) * (Sf^0.4))

Where :

Tc = Time of Concentration (hr)
n = Manning's roughness
Lf = Flow Length (ft)
P = 2 yr, 24 hr Rainfall (inches)
Sf = Slope (ft/ft)

Shallow Concentrated Flow Equation :

V = 16.1345 * (Sf^0.5) (unpaved surface)
V = 20.3282 * (Sf^0.5) (paved surface)
V = 15.0 * (Sf^0.5) (grassed waterway surface)
V = 10.0 * (Sf^0.5) (nearly bare & untilled surface)
V = 9.0 * (Sf^0.5) (cultivated straight rows surface)
V = 7.0 * (Sf^0.5) (short grass pasture surface)
V = 5.0 * (Sf^0.5) (woodland surface)
V = 2.5 * (Sf^0.5) (forest w/heavy litter surface)
Tc = (Lf / V) / (3600 sec/hr)

Where:

Tc = Time of Concentration (hr)
Lf = Flow Length (ft)
V = Velocity (ft/sec)
Sf = Slope (ft/ft)

Channel Flow Equation :

V = (1.49 * (R^(2/3)) * (Sf^0.5)) / n
R = Aq / Wp
Tc = (Lf / V) / (3600 sec/hr)

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.3	0	0
Flow Length (ft) :	100	0	0
Slope (%) :	4.2	0	0
2 yr, 24 hr Rainfall (in) :	4.36	0	0
Velocity (ft/sec) :	0.15	0	0
Computed Flow Time (min) :	10.86	0	0

Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	109	0	0
Slope (%) :	1	0	0
Surface Type :	Paved	Unpaved	Unpaved
Velocity (ft/sec) :	2.03	0	0
Computed Flow Time (min) :	0.89	0	0

Total TOC (min) 11.76

Subbasin : Sub-CB-1

Input Data

Area (ac)	0.36
Weighted Runoff Coefficient	0.85

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.3	0	0
Flow Length (ft) :	18.76	0	0
Slope (%) :	5.5	0	0
2 yr, 24 hr Rainfall (in) :	4.6	0	0
Velocity (ft/sec) :	0.13	0	0
Computed Flow Time (min) :	2.49	0	0

Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	36.8	0	0
Slope (%) :	2.5	0	0
Surface Type :	Paved	Paved	Paved
Velocity (ft/sec) :	3.21	0	0
Computed Flow Time (min) :	0.19	0	0

Total TOC (min) 2.68

Subbasin : Sub-CB-2

Input Data

Area (ac) 0.16
Weighted Runoff Coefficient 0.85

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.3	0	0
Flow Length (ft) :	49.44	0	0
Slope (%) :	2	0	0
2 yr, 24 hr Rainfall (in) :	4.36	0	0
Velocity (ft/sec) :	0.1	0	0
Computed Flow Time (min) :	8.32	0	0

Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	26.44	0	0
Slope (%) :	1.5	0	0
Surface Type :	Paved	Paved	Paved
Velocity (ft/sec) :	2.49	0	0
Computed Flow Time (min) :	0.18	0	0

Total TOC (min) 8.50

Subbasin : Sub-CB-3

Input Data

Area (ac) 0.3
Weighted Runoff Coefficient 0.85

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.3	0	0
Flow Length (ft) :	41.23	0	0
Slope (%) :	1	0	0
2 yr, 24 hr Rainfall (in) :	4.36	0	0
Velocity (ft/sec) :	0.07	0	0
Computed Flow Time (min) :	9.49	0	0

Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	150.58	0	0
Slope (%) :	1	0	0
Surface Type :	Paved	Paved	Paved
Velocity (ft/sec) :	2.03	0	0
Computed Flow Time (min) :	1.24	0	0

Total TOC (min) 10.73

Pipe Input

SN	Element ID	Length (ft)	Inlet Invert Elevation (ft)	Inlet Invert Offset (ft)	Outlet Invert Elevation (ft)	Outlet Invert Offset (ft)	Total Drop (ft)	Average Slope (%)	Pipe Shape	Pipe Diameter or Height (in)	Pipe Width (in)	Manning's Roughness	Entr Lc
1	L-SL - (16)	112.54	433.11	4.11	432.25	6.25	0.86	0.7600	Dummy				
2	SL - (14)	85.23	422.00	0.00	419.00	0.00	3.00	3.5200	CIRCULAR				
3	SL - (15)	62.02	426.00	0.00	422.00	0.00	4.00	6.4500	CIRCULAR				
4	SL - (16)	101.17	429.00	0.00	426.00	0.00	3.00	2.9700	CIRCULAR				
5	SL - (18)	128.37	427.50	0.00	423.00	1.00	4.50	3.5100	CIRCULAR				

Pipe Results

SN	Element ID	Peak Flow	Time of Peak Flow Occurrence	Design Flow Capacity	Peak Flow/ Design Flow Ratio	Peak Flow Velocity	Travel Time	Peak Flow Depth	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged	Frou Numb
		(cfs)	(days hh:mm)	(cfs)		(ft/sec)	(min)	(ft)		(min)	
1	L-SL - (16)	0.00	0 00:10	0.00	0.00	0.00		0.00	0.00	0.00	
2	SL - (14)	2.96	0 00:02	21.35	0.14	8.53	0.17	0.38	0.25	0.00	
3	SL - (15)	1.57	0 00:11	28.90	0.05	8.74	0.12	0.24	0.16	0.00	
4	SL - (16)	1.08	0 00:10	19.60	0.06	7.03	0.24	0.24	0.16	0.00	
5	SL - (18)	1.39	0 00:12	21.31	0.07	7.05	0.30	0.26	0.17	0.00	

Inlet Input

SN	Element ID	Inlet Location	Number of Inlets	Catchbasin Invert Elevation (ft)	Max (Rim) Elevation (ft)	Inlet Depth (ft)	Initial Water Elevation (ft)	Initial Water Depth (ft)	Ponded Area (ft^2)	Grate Clogging Factor (%)
1	AD-4	On Sag	1	427.50	431.80	4.30	427.50	0.00	10.00	0.00
2	CB-1	On Sag	1	422.00	431.61	9.61	422.00	0.00	10.00	0.00
3	CB-2	On Sag	1	426.00	432.25	6.25	426.00	0.00	10.00	0.00
4	CB-3	On Grade	1	429.00	433.11	4.11	429.00	0.00	N/A	0.00

Roadway & Gutter Input

SN	Element ID	Roadway Longitudinal Slope (ft/ft)	Roadway Cross Slope (ft/ft)	Roadway Manning's Roughness	Gutter Cross Slope (ft/ft)	Gutter Width (ft)	Gutter Depression (in)	Allowable Spread (ft)
1	AD-4	N/A	0.0300	0.0150	0.0300	1.50		

Inlet Results

SN	Element ID	Peak Flow (cfs)	Peak Lateral Inflow (cfs)	Peak Flow Intercepted by Inlet (cfs)	Peak Flow Bypassing Inlet (cfs)	Inlet Efficiency during Peak Flow (%)	Max Gutter Spread during Peak Flow (ft)	Max Gutter Water Elev. during Peak Flow (ft)	Max Gutter Water Depth during Peak Flow (ft)	Time of Max Depth Occurrence (days hh:mm)	T Floo Volu (ac
1	AD-4	1.40	1.40	N/A	N/A	N/A	7.06	432.11	0.31	0 00:12	0
2	CB-1	2.32	2.32	N/A	N/A	N/A	5.35	432.02	0.41	0 00:12	0
3	CB-2	0.65	0.65	N/A	N/A	N/A	2.29	432.57	0.32	0 00:10	0
4	CB-3	1.09	1.09	1.09	0.00	100.00	5.09	433.25	0.14	0 00:10	0

10 Year Design Storm

Project Description

File Name	Bryant Pharmacy Drainage Analysis 11-13-25.SPF

Project Options

Flow Units	CFS
Elevation Type	Elevation
Hydrology Method	Rational
Time of Concentration (TOC) Method	SCS TR-55
Link Routing Method	Kinematic Wave
Enable Overflow Ponding at Nodes	YES
Skip Steady State Analysis Time Periods	NO

Analysis Options

Start Analysis On	00:00:00	0:00:00
End Analysis On	00:00:00	0:00:00
Start Reporting On	00:00:00	0:00:00
Antecedent Dry Days	0	days
Runoff (Dry Weather) Time Step	0 01:00:00	days hh:mm:ss
Runoff (Wet Weather) Time Step	0 00:05:00	days hh:mm:ss
Reporting Time Step	0 00:05:00	days hh:mm:ss
Routing Time Step	30	seconds

Number of Elements

	Qty
Rain Gages	0
Subbasins	4
Nodes	5
Junctions	0
Outfalls	1
Flow Diversions	0
Inlets	4
Storage Nodes	0
Links	5
Channels	0
Pipes	5
Pumps	0
Orifices	0
Weirs	0
Outlets	0
Pollutants	0
Land Uses	0

Rainfall Details

Return Period	10 year(s)

Subbasin Summary

SN	Subbasin ID	Area (ac)	Weighted Runoff Coefficient	Total Rainfall (in)	Total Runoff (in)	Total Runoff Volume (ac-in)	Peak Runoff (cfs)	Time of Concentration (days hh:mm:ss)
1	SUB-AD-4	0.40	0.8500	1.08	0.92	0.37	1.86	0 00:11:45
2	Sub-CB-1	0.36	0.8500	0.44	0.37	0.13	3.03	0 00:02:40
3	Sub-CB-2	0.16	0.8500	0.91	0.77	0.12	0.87	0 00:08:30
4	Sub-CB-3	0.30	0.8500	1.02	0.86	0.26	1.46	0 00:10:43

Node Summary

SN	Element ID	Element Type	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Initial Water Elevation (ft)	Surcharge Elevation (ft)	Ponded Area (ft^2)	Peak Inflow (cfs)	Max HGL Elevation Attained (ft)	Max Surcharge Depth Attained (ft)	Min Freeboard Attained (ft)
1	Out-1SL - (14)	Outfall	419.00					3.87	419.43		

Link Summary

SN	Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length	Inlet Invert Elevation	Outlet Invert Elevation	Average Slope	Diameter or Height	Manning's Roughness	Peak Flow	Design Flow Capacity	Peak Flow/ Design Flow Ratio	Peak Flow Velocity	Peak Flow Depth	Peak Flow Depth/ Total Depth Ratio	To Sur
					(ft)	(ft)	(ft)	(%)	(in)		(cfs)	(cfs)		(ft/sec)	(ft)		
1	L-SL - (16)	Pipe	CB-3	CB-2	112.54	433.11	432.25	0.7600			0.01	0.00	0.00	0.00	0.00	0.00	
2	SL - (14)	Pipe	CB-1	Out-1SL - (14)	85.23	422.00	419.00	3.5200			3.87	21.35	0.18	9.20	0.43	0.29	
3	SL - (15)	Pipe	CB-2	CB-1	62.02	426.00	422.00	6.4500			2.09	28.90	0.07	9.54	0.27	0.18	
4	SL - (16)	Pipe	CB-3	CB-2	101.17	429.00	426.00	2.9700			1.44	19.60	0.07	7.46	0.27	0.18	
5	SL - (18)	Pipe	AD-4	CB-1	128.37	427.50	423.00	3.5100			1.85	21.31	0.09	7.43	0.30	0.20	

Inlet Summary

SN	Element ID	Inlet Location	Number of Inlets	Catchbasin Invert Elevation (ft)	Max (Rim) Elevation (ft)	Initial Water Elevation (ft)	Ponded Area (ft²)	Peak Flow (cfs)	Peak Flow Intercepted by Inlet (cfs)	Peak Flow Bypassing Inlet (cfs)	Inlet Efficiency during Peak Flow (%)	Allowable Spread (ft)	Max Gutter Spread during Peak Flow (ft)	Max Gutter Water Elev. during Peak Flow (ft)
1	AD-4	On Sag	1	427.50	431.80	427.50	10.00	1.86	N/A	N/A	N/A	10.00	8.34	432.15
2	CB-1	On Sag	1	422.00	431.61	422.00	10.00	3.03	N/A	N/A	N/A	10.00	6.40	432.05
3	CB-2	On Sag	1	426.00	432.25	426.00	10.00	0.87	N/A	N/A	N/A	10.00	2.79	432.59
4	CB-3	On Grade	1	429.00	433.11	429.00	N/A	1.46	1.45	0.01	99.52	10.00	5.64	433.26

Subbasin Hydrology

Subbasin : SUB-AD-4

Input Data

Area (ac) 0.4
Weighted Runoff Coefficient 0.85

Time of Concentration

TOC Method : SCS TR-55

Sheet Flow Equation :

Tc = (0.007 * ((n * Lf)^0.8)) / ((P^0.5) * (Sf^0.4))

Where :

Tc = Time of Concentration (hr)
n = Manning's roughness
Lf = Flow Length (ft)
P = 2 yr, 24 hr Rainfall (inches)
Sf = Slope (ft/ft)

Shallow Concentrated Flow Equation :

V = 16.1345 * (Sf^0.5) (unpaved surface)
V = 20.3282 * (Sf^0.5) (paved surface)
V = 15.0 * (Sf^0.5) (grassed waterway surface)
V = 10.0 * (Sf^0.5) (nearly bare & untilled surface)
V = 9.0 * (Sf^0.5) (cultivated straight rows surface)
V = 7.0 * (Sf^0.5) (short grass pasture surface)
V = 5.0 * (Sf^0.5) (woodland surface)
V = 2.5 * (Sf^0.5) (forest w/heavy litter surface)
Tc = (Lf / V) / (3600 sec/hr)

Where:

Tc = Time of Concentration (hr)
Lf = Flow Length (ft)
V = Velocity (ft/sec)
Sf = Slope (ft/ft)

Channel Flow Equation :

V = (1.49 * (R^(2/3)) * (Sf^0.5)) / n
R = Aq / Wp
Tc = (Lf / V) / (3600 sec/hr)

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.3	0	0
Flow Length (ft) :	100	0	0
Slope (%) :	4.2	0	0
2 yr, 24 hr Rainfall (in) :	4.36	0	0
Velocity (ft/sec) :	0.15	0	0
Computed Flow Time (min) :	10.86	0	0

Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	109	0	0
Slope (%) :	1	0	0
Surface Type :	Paved	Unpaved	Unpaved
Velocity (ft/sec) :	2.03	0	0
Computed Flow Time (min) :	0.89	0	0

Total TOC (min) 11.76

Subbasin : Sub-CB-1

Input Data

Area (ac)	0.36
Weighted Runoff Coefficient	0.85

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.3	0	0
Flow Length (ft) :	18.76	0	0
Slope (%) :	5.5	0	0
2 yr, 24 hr Rainfall (in) :	4.6	0	0
Velocity (ft/sec) :	0.13	0	0
Computed Flow Time (min) :	2.49	0	0

Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	36.8	0	0
Slope (%) :	2.5	0	0
Surface Type :	Paved	Paved	Paved
Velocity (ft/sec) :	3.21	0	0
Computed Flow Time (min) :	0.19	0	0

Total TOC (min) 2.68

Subbasin : Sub-CB-2

Input Data

Area (ac) 0.16
Weighted Runoff Coefficient 0.85

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.3	0	0
Flow Length (ft) :	49.44	0	0
Slope (%) :	2	0	0
2 yr, 24 hr Rainfall (in) :	4.36	0	0
Velocity (ft/sec) :	0.1	0	0
Computed Flow Time (min) :	8.32	0	0

Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	26.44	0	0
Slope (%) :	1.5	0	0
Surface Type :	Paved	Paved	Paved
Velocity (ft/sec) :	2.49	0	0
Computed Flow Time (min) :	0.18	0	0

Total TOC (min) 8.50

Subbasin : Sub-CB-3

Input Data

Area (ac) 0.3
Weighted Runoff Coefficient 0.85

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.3	0	0
Flow Length (ft) :	41.23	0	0
Slope (%) :	1	0	0
2 yr, 24 hr Rainfall (in) :	4.36	0	0
Velocity (ft/sec) :	0.07	0	0
Computed Flow Time (min) :	9.49	0	0

Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	150.58	0	0
Slope (%) :	1	0	0
Surface Type :	Paved	Paved	Paved
Velocity (ft/sec) :	2.03	0	0
Computed Flow Time (min) :	1.24	0	0

Total TOC (min) 10.73

Pipe Input

SN	Element ID	Length (ft)	Inlet Invert Elevation (ft)	Inlet Invert Offset (ft)	Outlet Invert Elevation (ft)	Outlet Invert Offset (ft)	Total Drop (ft)	Average Slope (%)	Pipe Shape	Pipe Diameter or Height (in)	Pipe Width (in)	Manning's Roughness	Entr Lc
1	L-SL - (16)	112.54	433.11	4.11	432.25	6.25	0.86	0.7600	Dummy				
2	SL - (14)	85.23	422.00	0.00	419.00	0.00	3.00	3.5200	CIRCULAR				
3	SL - (15)	62.02	426.00	0.00	422.00	0.00	4.00	6.4500	CIRCULAR				
4	SL - (16)	101.17	429.00	0.00	426.00	0.00	3.00	2.9700	CIRCULAR				
5	SL - (18)	128.37	427.50	0.00	423.00	1.00	4.50	3.5100	CIRCULAR				

Pipe Results

SN	Element ID	Peak Flow	Time of Peak Flow Occurrence	Design Flow Capacity	Peak Flow/ Design Flow Ratio	Peak Flow Velocity	Travel Time	Peak Flow Depth	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged	Frou Numb
		(cfs)	(days hh:mm)	(cfs)		(ft/sec)	(min)	(ft)		(min)	
1	L-SL - (16)	0.01	0 00:10	0.00	0.00	0.00		0.00	0.00	0.00	
2	SL - (14)	3.87	0 00:02	21.35	0.18	9.20	0.15	0.43	0.29	0.00	
3	SL - (15)	2.09	0 00:10	28.90	0.07	9.54	0.11	0.27	0.18	0.00	
4	SL - (16)	1.44	0 00:10	19.60	0.07	7.46	0.23	0.27	0.18	0.00	
5	SL - (18)	1.85	0 00:12	21.31	0.09	7.43	0.29	0.30	0.20	0.00	

Inlet Input

SN	Element ID	Inlet Location	Number of Inlets	Catchbasin Invert Elevation (ft)	Max (Rim) Elevation (ft)	Inlet Depth (ft)	Initial Water Elevation (ft)	Initial Water Depth (ft)	Ponded Area (ft^2)	Grate Clogging Factor (%)
1	AD-4	On Sag	1	427.50	431.80	4.30	427.50	0.00	10.00	0.00
2	CB-1	On Sag	1	422.00	431.61	9.61	422.00	0.00	10.00	0.00
3	CB-2	On Sag	1	426.00	432.25	6.25	426.00	0.00	10.00	0.00
4	CB-3	On Grade	1	429.00	433.11	4.11	429.00	0.00	N/A	0.00

Roadway & Gutter Input

SN	Element ID	Roadway Longitudinal Slope (ft/ft)	Roadway Cross Slope (ft/ft)	Roadway Manning's Roughness	Gutter Cross Slope (ft/ft)	Gutter Width (ft)	Gutter Depression (in)	Allowable Spread (ft)
1	AD-4	N/A	0.0300	0.0150	0.0300	1.50		

Inlet Results

SN	Element ID	Peak Flow (cfs)	Peak Lateral Inflow (cfs)	Peak Flow Intercepted by Inlet (cfs)	Peak Flow Bypassing Inlet (cfs)	Inlet Efficiency during Peak Flow (%)	Max Gutter Spread during Peak Flow (ft)	Max Gutter Water Elev. during Peak Flow (ft)	Max Gutter Water Depth during Peak Flow (ft)	Time of Max Depth Occurrence (days hh:mm)	T Floo Volu (ac
1	AD-4	1.86	1.86	N/A	N/A	N/A	8.34	432.15	0.35	0 00:12	0
2	CB-1	3.03	3.03	N/A	N/A	N/A	6.40	432.05	0.44	0 00:12	0
3	CB-2	0.87	0.87	N/A	N/A	N/A	2.79	432.59	0.33	0 00:10	0
4	CB-3	1.46	1.46	1.45	0.01	99.52	5.64	433.26	0.15	0 00:10	0

25 Year Design Storm

Project Description

File Name	Bryant Pharmacy Drainage Analysis 11-13-25.SPF

Project Options

Flow Units	CFS
Elevation Type	Elevation
Hydrology Method	Rational
Time of Concentration (TOC) Method	SCS TR-55
Link Routing Method	Kinematic Wave
Enable Overflow Ponding at Nodes	YES
Skip Steady State Analysis Time Periods	NO

Analysis Options

Start Analysis On	00:00:00	0:00:00
End Analysis On	00:00:00	0:00:00
Start Reporting On	00:00:00	0:00:00
Antecedent Dry Days	0	days
Runoff (Dry Weather) Time Step	0 01:00:00	days hh:mm:ss
Runoff (Wet Weather) Time Step	0 00:05:00	days hh:mm:ss
Reporting Time Step	0 00:05:00	days hh:mm:ss
Routing Time Step	30	seconds

Number of Elements

	Qty
Rain Gages	0
Subbasins	4
Nodes	5
Junctions	0
Outfalls	1
Flow Diversions	0
Inlets	4
Storage Nodes	0
Links	5
Channels	0
Pipes	5
Pumps	0
Orifices	0
Weirs	0
Outlets	0
Pollutants	0
Land Uses	0

Rainfall Details

Return Period	25 year(s)

Subbasin Summary

SN	Subbasin ID	Area (ac)	Weighted Runoff Coefficient	Total Rainfall (in)	Total Runoff (in)	Total Runoff Volume (ac-in)	Peak Runoff (cfs)	Time of Concentration (days hh:mm:ss)
1	SUB-AD-4	0.40	0.8500	1.24	1.06	0.42	2.14	0 00:11:45
2	Sub-CB-1	0.36	0.8500	0.51	0.43	0.15	3.48	0 00:02:40
3	Sub-CB-2	0.16	0.8500	1.04	0.88	0.14	1.00	0 00:08:30
4	Sub-CB-3	0.30	0.8500	1.17	0.99	0.30	1.68	0 00:10:43

Node Summary

SN	Element ID	Element Type	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Initial Water Elevation (ft)	Surcharge Elevation (ft)	Ponded Area (ft^2)	Peak Inflow (cfs)	Max HGL Elevation Attained (ft)	Max Surcharge Depth Attained (ft)	Min Freeboard Attained (ft)
1	Out-1SL - (14)	Outfall	419.00					4.46	419.47		

Link Summary

SN	Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length	Inlet Invert Elevation	Outlet Invert Elevation	Average Slope	Diameter or Height	Manning's Roughness	Peak Flow	Design Flow Capacity	Peak Flow/ Design Flow Ratio	Peak Flow Velocity	Peak Flow Depth	Peak Flow Depth/ Total Depth Ratio	To Sur
					(ft)	(ft)	(ft)	(%)	(in)		(cfs)	(cfs)		(ft/sec)	(ft)		
1	L-SL - (16)	Pipe	CB-3	CB-2	112.54	433.11	432.25	0.7600			0.05	0.00	0.00	0.00	0.00	0.00	
2	SL - (14)	Pipe	CB-1	Out-1SL - (14)	85.23	422.00	419.00	3.5200			4.46	21.35	0.21	9.59	0.46	0.31	
3	SL - (15)	Pipe	CB-2	CB-1	62.02	426.00	422.00	6.4500			2.41	28.90	0.08	9.93	0.29	0.20	
4	SL - (16)	Pipe	CB-3	CB-2	101.17	429.00	426.00	2.9700			1.62	19.60	0.08	7.68	0.29	0.19	
5	SL - (18)	Pipe	AD-4	CB-1	128.37	427.50	423.00	3.5100			2.13	21.31	0.10	7.74	0.32	0.21	

Inlet Summary

SN	Element ID	Inlet Location	Number of Inlets	Catchbasin Invert Elevation (ft)	Max (Rim) Elevation (ft)	Initial Water Elevation (ft)	Ponded Area (ft^2)	Peak Flow (cfs)	Peak Flow Intercepted by Inlet (cfs)	Peak Flow Bypassing Inlet (cfs)	Inlet Efficiency during Peak Flow (%)	Allowable Spread (ft)	Max Gutter Spread during Peak Flow (ft)	Max Gutter Water Elev. during Peak Flow (ft)
1	AD-4	On Sag	1	427.50	431.80	427.50	10.00	2.14	N/A	N/A	N/A	10.00	9.05	432.17
2	CB-1	On Sag	1	422.00	431.61	422.00	10.00	3.48	N/A	N/A	N/A	10.00	7.02	432.07
3	CB-2	On Sag	1	426.00	432.25	426.00	10.00	1.01	N/A	N/A	N/A	10.00	3.07	432.59
4	CB-3	On Grade	1	429.00	433.11	429.00	N/A	1.68	1.64	0.04	97.79	10.00	5.91	433.27

Subbasin Hydrology

Subbasin : SUB-AD-4

Input Data

Area (ac) 0.4
Weighted Runoff Coefficient 0.85

Time of Concentration

TOC Method : SCS TR-55

Sheet Flow Equation :

Tc = (0.007 * ((n * Lf)^0.8)) / ((P^0.5) * (Sf^0.4))

Where :

Tc = Time of Concentration (hr)
n = Manning's roughness
Lf = Flow Length (ft)
P = 2 yr, 24 hr Rainfall (inches)
Sf = Slope (ft/ft)

Shallow Concentrated Flow Equation :

V = 16.1345 * (Sf^0.5) (unpaved surface)
V = 20.3282 * (Sf^0.5) (paved surface)
V = 15.0 * (Sf^0.5) (grassed waterway surface)
V = 10.0 * (Sf^0.5) (nearly bare & untilled surface)
V = 9.0 * (Sf^0.5) (cultivated straight rows surface)
V = 7.0 * (Sf^0.5) (short grass pasture surface)
V = 5.0 * (Sf^0.5) (woodland surface)
V = 2.5 * (Sf^0.5) (forest w/heavy litter surface)
Tc = (Lf / V) / (3600 sec/hr)

Where:

Tc = Time of Concentration (hr)
Lf = Flow Length (ft)
V = Velocity (ft/sec)
Sf = Slope (ft/ft)

Channel Flow Equation :

V = (1.49 * (R^(2/3)) * (Sf^0.5)) / n
R = Aq / Wp
Tc = (Lf / V) / (3600 sec/hr)

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.3	0	0
Flow Length (ft) :	100	0	0
Slope (%) :	4.2	0	0
2 yr, 24 hr Rainfall (in) :	4.36	0	0
Velocity (ft/sec) :	0.15	0	0
Computed Flow Time (min) :	10.86	0	0

Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	109	0	0
Slope (%) :	1	0	0
Surface Type :	Paved	Unpaved	Unpaved
Velocity (ft/sec) :	2.03	0	0
Computed Flow Time (min) :	0.89	0	0

Total TOC (min) 11.76

Subbasin : Sub-CB-1

Input Data

Area (ac)	0.36
Weighted Runoff Coefficient	0.85

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.3	0	0
Flow Length (ft) :	18.76	0	0
Slope (%) :	5.5	0	0
2 yr, 24 hr Rainfall (in) :	4.6	0	0
Velocity (ft/sec) :	0.13	0	0
Computed Flow Time (min) :	2.49	0	0

Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	36.8	0	0
Slope (%) :	2.5	0	0
Surface Type :	Paved	Paved	Paved
Velocity (ft/sec) :	3.21	0	0
Computed Flow Time (min) :	0.19	0	0

Total TOC (min) 2.68

Subbasin : Sub-CB-2

Input Data

Area (ac) 0.16
Weighted Runoff Coefficient 0.85

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.3	0	0
Flow Length (ft) :	49.44	0	0
Slope (%) :	2	0	0
2 yr, 24 hr Rainfall (in) :	4.36	0	0
Velocity (ft/sec) :	0.1	0	0
Computed Flow Time (min) :	8.32	0	0

Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	26.44	0	0
Slope (%) :	1.5	0	0
Surface Type :	Paved	Paved	Paved
Velocity (ft/sec) :	2.49	0	0
Computed Flow Time (min) :	0.18	0	0

Total TOC (min) 8.50

Subbasin : Sub-CB-3

Input Data

Area (ac) 0.3
Weighted Runoff Coefficient 0.85

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.3	0	0
Flow Length (ft) :	41.23	0	0
Slope (%) :	1	0	0
2 yr, 24 hr Rainfall (in) :	4.36	0	0
Velocity (ft/sec) :	0.07	0	0
Computed Flow Time (min) :	9.49	0	0

Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	150.58	0	0
Slope (%) :	1	0	0
Surface Type :	Paved	Paved	Paved
Velocity (ft/sec) :	2.03	0	0
Computed Flow Time (min) :	1.24	0	0

Total TOC (min) 10.73

Pipe Input

SN	Element ID	Length (ft)	Inlet Invert Elevation (ft)	Inlet Invert Offset (ft)	Outlet Invert Elevation (ft)	Outlet Invert Offset (ft)	Total Drop (ft)	Average Slope (%)	Pipe Shape	Pipe Diameter or Height (in)	Pipe Width (in)	Manning's Roughness	Entr Lc
1	L-SL - (16)	112.54	433.11	4.11	432.25	6.25	0.86	0.7600	Dummy				
2	SL - (14)	85.23	422.00	0.00	419.00	0.00	3.00	3.5200	CIRCULAR				
3	SL - (15)	62.02	426.00	0.00	422.00	0.00	4.00	6.4500	CIRCULAR				
4	SL - (16)	101.17	429.00	0.00	426.00	0.00	3.00	2.9700	CIRCULAR				
5	SL - (18)	128.37	427.50	0.00	423.00	1.00	4.50	3.5100	CIRCULAR				

Pipe Results

SN	Element ID	Peak Flow	Time of Peak Flow Occurrence	Design Flow Capacity	Peak Flow/ Design Flow Ratio	Peak Flow Velocity	Travel Time	Peak Flow Depth	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged	Frou Numb
		(cfs)	(days hh:mm)	(cfs)		(ft/sec)	(min)	(ft)		(min)	
1	L-SL - (16)	0.05	0 00:10	0.00	0.00	0.00		0.00	0.00	0.00	
2	SL - (14)	4.46	0 00:02	21.35	0.21	9.59	0.15	0.46	0.31	0.00	
3	SL - (15)	2.41	0 00:10	28.90	0.08	9.93	0.10	0.29	0.20	0.00	
4	SL - (16)	1.62	0 00:10	19.60	0.08	7.68	0.22	0.29	0.19	0.00	
5	SL - (18)	2.13	0 00:12	21.31	0.10	7.74	0.28	0.32	0.21	0.00	

Inlet Input

SN	Element ID	Inlet Location	Number of Inlets	Catchbasin Invert Elevation (ft)	Max (Rim) Elevation (ft)	Inlet Depth (ft)	Initial Water Elevation (ft)	Initial Water Depth (ft)	Ponded Area (ft^2)	Grate Clogging Factor (%)
1	AD-4	On Sag	1	427.50	431.80	4.30	427.50	0.00	10.00	0.00
2	CB-1	On Sag	1	422.00	431.61	9.61	422.00	0.00	10.00	0.00
3	CB-2	On Sag	1	426.00	432.25	6.25	426.00	0.00	10.00	0.00
4	CB-3	On Grade	1	429.00	433.11	4.11	429.00	0.00	N/A	0.00

Roadway & Gutter Input

SN	Element ID	Roadway Longitudinal Slope (ft/ft)	Roadway Cross Slope (ft/ft)	Roadway Manning's Roughness	Gutter Cross Slope (ft/ft)	Gutter Width (ft)	Gutter Depression (in)	Allowable Spread (ft)
1	AD-4	N/A	0.0300	0.0150	0.0300	1.50		

Inlet Results

SN	Element ID	Peak Flow (cfs)	Peak Lateral Inflow (cfs)	Peak Flow Intercepted by Inlet (cfs)	Peak Flow Bypassing Inlet (cfs)	Inlet Efficiency during Peak Flow (%)	Max Gutter Spread during Peak Flow (ft)	Max Gutter Water Elev. during Peak Flow (ft)	Max Gutter Water Depth during Peak Flow (ft)	Time of Max Depth Occurrence (days hh:mm)	T Floo Volu (ac
1	AD-4	2.14	2.14	N/A	N/A	N/A	9.05	432.17	0.37	0 00:12	0
2	CB-1	3.48	3.48	N/A	N/A	N/A	7.02	432.07	0.46	0 00:12	0
3	CB-2	1.01	1.00	N/A	N/A	N/A	3.07	432.59	0.34	0 00:10	0
4	CB-3	1.68	1.68	1.64	0.04	97.79	5.91	433.27	0.16	0 00:10	0

50 Year Design Storm

Project Description

File Name	Bryant Pharmacy Drainage Analysis 11-13-25.SPF

Project Options

Flow Units	CFS
Elevation Type	Elevation
Hydrology Method	Rational
Time of Concentration (TOC) Method	SCS TR-55
Link Routing Method	Kinematic Wave
Enable Overflow Ponding at Nodes	YES
Skip Steady State Analysis Time Periods	NO

Analysis Options

Start Analysis On	00:00:00	0:00:00
End Analysis On	00:00:00	0:00:00
Start Reporting On	00:00:00	0:00:00
Antecedent Dry Days	0	days
Runoff (Dry Weather) Time Step	0 01:00:00	days hh:mm:ss
Runoff (Wet Weather) Time Step	0 00:05:00	days hh:mm:ss
Reporting Time Step	0 00:05:00	days hh:mm:ss
Routing Time Step	30	seconds

Number of Elements

	Qty
Rain Gages	0
Subbasins	4
Nodes	5
Junctions	0
Outfalls	1
Flow Diversions	0
Inlets	4
Storage Nodes	0
Links	5
Channels	0
Pipes	5
Pumps	0
Orifices	0
Weirs	0
Outlets	0
Pollutants	0
Land Uses	0

Rainfall Details

Return Period	50 year(s)

Subbasin Summary

SN	Subbasin ID	Area (ac)	Weighted Runoff Coefficient	Total Rainfall (in)	Total Runoff (in)	Total Runoff Volume (ac-in)	Peak Runoff (cfs)	Time of Concentration (days hh:mm:ss)
1	SUB-AD-4	0.40	0.8500	1.36	1.16	0.46	2.34	0 00:11:45
2	Sub-CB-1	0.36	0.8500	0.56	0.47	0.17	3.83	0 00:02:40
3	Sub-CB-2	0.16	0.8500	1.14	0.97	0.15	1.09	0 00:08:30
4	Sub-CB-3	0.30	0.8500	1.28	1.09	0.33	1.84	0 00:10:43

Node Summary

SN	Element ID	Element Type	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Initial Water Elevation (ft)	Surcharge Elevation (ft)	Ponded Area (ft^2)	Peak Inflow (cfs)	Max HGL Elevation Attained (ft)	Max Surcharge Depth Attained (ft)	Min Freeboard Attained (ft)
1	Out-1SL - (14)	Outfall	419.00					4.93	419.49		

Link Summary

SN	Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length	Inlet Invert Elevation	Outlet Invert Elevation	Average Slope	Diameter or Height	Manning's Roughness	Peak Flow	Design Flow Capacity	Peak Flow/ Design Flow Ratio	Peak Flow Velocity	Peak Flow Depth	Peak Flow Depth/ Total Depth Ratio	To Sur
					(ft)	(ft)	(ft)	(%)	(in)		(cfs)	(cfs)		(ft/sec)	(ft)		
1	L-SL - (16)	Pipe	CB-3	CB-2	112.54	433.11	432.25	0.7600			0.08	0.00	0.00	0.00	0.00	0.00	
2	SL - (14)	Pipe	CB-1	Out-1SL - (14)	85.23	422.00	419.00	3.5200			4.93	21.35	0.23	9.86	0.49	0.33	
3	SL - (15)	Pipe	CB-2	CB-1	62.02	426.00	422.00	6.4500			2.64	28.90	0.09	10.20	0.31	0.20	
4	SL - (16)	Pipe	CB-3	CB-2	101.17	429.00	426.00	2.9700			1.75	19.60	0.09	7.83	0.30	0.20	
5	SL - (18)	Pipe	AD-4	CB-1	128.37	427.50	423.00	3.5100			2.33	21.31	0.11	7.94	0.33	0.22	

Inlet Summary

SN	Element ID	Inlet Location	Number of Inlets	Catchbasin Invert Elevation (ft)	Max (Rim) Elevation (ft)	Initial Water Elevation (ft)	Ponded Area (ft²)	Peak Flow (cfs)	Peak Flow Intercepted by Inlet (cfs)	Peak Flow Bypassing Inlet (cfs)	Inlet Efficiency during Peak Flow (%)	Allowable Spread (ft)	Max Gutter Spread during Peak Flow (ft)	Max Gutter Water Elev. during Peak Flow (ft)
1	AD-4	On Sag	1	427.50	431.80	427.50	10.00	2.34	N/A	N/A	N/A	10.00	9.56	432.19
2	CB-1	On Sag	1	422.00	431.61	422.00	10.00	3.83	N/A	N/A	N/A	10.00	7.48	432.08
3	CB-2	On Sag	1	426.00	432.25	426.00	10.00	1.10	N/A	N/A	N/A	10.00	3.26	432.60
4	CB-3	On Grade	1	429.00	433.11	429.00	N/A	1.84	1.76	0.07	96.13	10.00	6.13	433.28

Subbasin Hydrology

Subbasin : SUB-AD-4

Input Data

Area (ac) 0.4
Weighted Runoff Coefficient 0.85

Time of Concentration

TOC Method : SCS TR-55

Sheet Flow Equation :

Tc = (0.007 * ((n * Lf)^0.8)) / ((P^0.5) * (Sf^0.4))

Where :

Tc = Time of Concentration (hr)
n = Manning's roughness
Lf = Flow Length (ft)
P = 2 yr, 24 hr Rainfall (inches)
Sf = Slope (ft/ft)

Shallow Concentrated Flow Equation :

V = 16.1345 * (Sf^0.5) (unpaved surface)
V = 20.3282 * (Sf^0.5) (paved surface)
V = 15.0 * (Sf^0.5) (grassed waterway surface)
V = 10.0 * (Sf^0.5) (nearly bare & untilled surface)
V = 9.0 * (Sf^0.5) (cultivated straight rows surface)
V = 7.0 * (Sf^0.5) (short grass pasture surface)
V = 5.0 * (Sf^0.5) (woodland surface)
V = 2.5 * (Sf^0.5) (forest w/heavy litter surface)
Tc = (Lf / V) / (3600 sec/hr)

Where:

Tc = Time of Concentration (hr)
Lf = Flow Length (ft)
V = Velocity (ft/sec)
Sf = Slope (ft/ft)

Channel Flow Equation :

V = (1.49 * (R^(2/3)) * (Sf^0.5)) / n
R = Aq / Wp
Tc = (Lf / V) / (3600 sec/hr)

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.3	0	0
Flow Length (ft) :	100	0	0
Slope (%) :	4.2	0	0
2 yr, 24 hr Rainfall (in) :	4.36	0	0
Velocity (ft/sec) :	0.15	0	0
Computed Flow Time (min) :	10.86	0	0

Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	109	0	0
Slope (%) :	1	0	0
Surface Type :	Paved	Unpaved	Unpaved
Velocity (ft/sec) :	2.03	0	0
Computed Flow Time (min) :	0.89	0	0

Total TOC (min) 11.76

Subbasin : Sub-CB-1

Input Data

Area (ac)	0.36
Weighted Runoff Coefficient	0.85

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.3	0	0
Flow Length (ft) :	18.76	0	0
Slope (%) :	5.5	0	0
2 yr, 24 hr Rainfall (in) :	4.6	0	0
Velocity (ft/sec) :	0.13	0	0
Computed Flow Time (min) :	2.49	0	0

Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	36.8	0	0
Slope (%) :	2.5	0	0
Surface Type :	Paved	Paved	Paved
Velocity (ft/sec) :	3.21	0	0
Computed Flow Time (min) :	0.19	0	0

Total TOC (min) 2.68

Subbasin : Sub-CB-2

Input Data

Area (ac) 0.16
Weighted Runoff Coefficient 0.85

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.3	0	0
Flow Length (ft) :	49.44	0	0
Slope (%) :	2	0	0
2 yr, 24 hr Rainfall (in) :	4.36	0	0
Velocity (ft/sec) :	0.1	0	0
Computed Flow Time (min) :	8.32	0	0

Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	26.44	0	0
Slope (%) :	1.5	0	0
Surface Type :	Paved	Paved	Paved
Velocity (ft/sec) :	2.49	0	0
Computed Flow Time (min) :	0.18	0	0

Total TOC (min) 8.50

Subbasin : Sub-CB-3

Input Data

Area (ac) 0.3
Weighted Runoff Coefficient 0.85

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.3	0	0
Flow Length (ft) :	41.23	0	0
Slope (%) :	1	0	0
2 yr, 24 hr Rainfall (in) :	4.36	0	0
Velocity (ft/sec) :	0.07	0	0
Computed Flow Time (min) :	9.49	0	0

Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	150.58	0	0
Slope (%) :	1	0	0
Surface Type :	Paved	Paved	Paved
Velocity (ft/sec) :	2.03	0	0
Computed Flow Time (min) :	1.24	0	0

Total TOC (min) 10.73

Pipe Input

SN	Element ID	Length (ft)	Inlet Invert Elevation (ft)	Inlet Invert Offset (ft)	Outlet Invert Elevation (ft)	Outlet Invert Offset (ft)	Total Drop (ft)	Average Slope (%)	Pipe Shape	Pipe Diameter or Height (in)	Pipe Width (in)	Manning's Roughness	Entr Lc
1	L-SL - (16)	112.54	433.11	4.11	432.25	6.25	0.86	0.7600	Dummy				
2	SL - (14)	85.23	422.00	0.00	419.00	0.00	3.00	3.5200	CIRCULAR				
3	SL - (15)	62.02	426.00	0.00	422.00	0.00	4.00	6.4500	CIRCULAR				
4	SL - (16)	101.17	429.00	0.00	426.00	0.00	3.00	2.9700	CIRCULAR				
5	SL - (18)	128.37	427.50	0.00	423.00	1.00	4.50	3.5100	CIRCULAR				

Pipe Results

SN	Element ID	Peak Flow	Time of Peak Flow Occurrence	Design Flow Capacity	Peak Flow/ Design Flow Ratio	Peak Flow Velocity	Travel Time	Peak Flow Depth	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged	Frou Numb
		(cfs)	(days hh:mm)	(cfs)		(ft/sec)	(min)	(ft)		(min)	
1	L-SL - (16)	0.08	0 00:10	0.00	0.00	0.00		0.00	0.00	0.00	
2	SL - (14)	4.93	0 00:02	21.35	0.23	9.86	0.14	0.49	0.33	0.00	
3	SL - (15)	2.64	0 00:10	28.90	0.09	10.20	0.10	0.31	0.20	0.00	
4	SL - (16)	1.75	0 00:10	19.60	0.09	7.83	0.22	0.30	0.20	0.00	
5	SL - (18)	2.33	0 00:12	21.31	0.11	7.94	0.27	0.33	0.22	0.00	

Inlet Input

SN	Element ID	Inlet Location	Number of Inlets	Catchbasin Invert Elevation (ft)	Max (Rim) Elevation (ft)	Inlet Depth (ft)	Initial Water Elevation (ft)	Initial Water Depth (ft)	Ponded Area (ft^2)	Grate Clogging Factor (%)
1	AD-4	On Sag	1	427.50	431.80	4.30	427.50	0.00	10.00	0.00
2	CB-1	On Sag	1	422.00	431.61	9.61	422.00	0.00	10.00	0.00
3	CB-2	On Sag	1	426.00	432.25	6.25	426.00	0.00	10.00	0.00
4	CB-3	On Grade	1	429.00	433.11	4.11	429.00	0.00	N/A	0.00

Roadway & Gutter Input

SN	Element ID	Roadway Longitudinal Slope (ft/ft)	Roadway Cross Slope (ft/ft)	Roadway Manning's Roughness	Gutter Cross Slope (ft/ft)	Gutter Width (ft)	Gutter Depression (in)	Allowable Spread (ft)
1	AD-4	N/A	0.0300	0.0150	0.0300	1.50		

Inlet Results

SN	Element ID	Peak Flow (cfs)	Peak Lateral Inflow (cfs)	Peak Flow Intercepted by Inlet (cfs)	Peak Flow Bypassing Inlet (cfs)	Inlet Efficiency during Peak Flow (%)	Max Gutter Spread during Peak Flow (ft)	Max Gutter Water Elev. during Peak Flow (ft)	Max Gutter Water Depth during Peak Flow (ft)	Time of Max Depth Occurrence (days hh:mm)	T Floo Volu (ac
1	AD-4	2.34	2.34	N/A	N/A	N/A	9.56	432.19	0.39	0 00:12	0
2	CB-1	3.83	3.83	N/A	N/A	N/A	7.48	432.08	0.47	0 00:12	0
3	CB-2	1.10	1.09	N/A	N/A	N/A	3.26	432.60	0.35	0 00:10	0
4	CB-3	1.84	1.84	1.76	0.07	96.13	6.13	433.28	0.17	0 00:10	0

100 Year Design Storm

Project Description

File Name	Bryant Pharmacy Drainage Analysis 11-13-25.SPF

Project Options

Flow Units	CFS
Elevation Type	Elevation
Hydrology Method	Rational
Time of Concentration (TOC) Method	SCS TR-55
Link Routing Method	Kinematic Wave
Enable Overflow Ponding at Nodes	YES
Skip Steady State Analysis Time Periods	NO

Analysis Options

Start Analysis On	00:00:00	0:00:00
End Analysis On	00:00:00	0:00:00
Start Reporting On	00:00:00	0:00:00
Antecedent Dry Days	0	days
Runoff (Dry Weather) Time Step	0 01:00:00	days hh:mm:ss
Runoff (Wet Weather) Time Step	0 00:05:00	days hh:mm:ss
Reporting Time Step	0 00:05:00	days hh:mm:ss
Routing Time Step	30	seconds

Number of Elements

	Qty
Rain Gages	0
Subbasins	4
Nodes	5
Junctions	0
Outfalls	1
Flow Diversions	0
Inlets	4
Storage Nodes	0
Links	5
Channels	0
Pipes	5
Pumps	0
Orifices	0
Weirs	0
Outlets	0
Pollutants	0
Land Uses	0

Rainfall Details

Return Period	100 year(s)

Subbasin Summary

SN	Subbasin ID	Area (ac)	Weighted Runoff Coefficient	Total Rainfall (in)	Total Runoff (in)	Total Runoff Volume (ac-in)	Peak Runoff (cfs)	Time of Concentration (days hh:mm:ss)
1	SUB-AD-4	0.40	0.8500	1.48	1.25	0.50	2.54	0 00:11:45
2	Sub-CB-1	0.36	0.8500	0.60	0.51	0.18	4.16	0 00:02:40
3	Sub-CB-2	0.16	0.8500	1.24	1.05	0.17	1.19	0 00:08:30
4	Sub-CB-3	0.30	0.8500	1.39	1.18	0.35	1.99	0 00:10:43

Node Summary

SN	Element ID	Element Type	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Initial Water Elevation (ft)	Surcharge Elevation (ft)	Ponded Area (ft^2)	Peak Inflow (cfs)	Max HGL Elevation Attained (ft)	Max Surcharge Depth Attained (ft)	Min Freeboard Attained (ft)
1	Out-1SL - (14)	Outfall	419.00					5.36	419.51		

Link Summary

SN	Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length	Inlet Invert Elevation	Outlet Invert Elevation	Average Slope	Diameter or Height	Manning's Roughness	Peak Flow	Design Flow Capacity	Peak Flow/ Design Flow Ratio	Peak Flow Velocity	Peak Flow Depth	Peak Flow Depth/ Total Depth Ratio	To Sur
					(ft)	(ft)	(ft)	(%)	(in)		(cfs)	(cfs)		(ft/sec)	(ft)		
1	L-SL - (16)	Pipe	CB-3	CB-2	112.54	433.11	432.25	0.7600			0.11	0.00	0.00	0.00	0.00	0.00	
2	SL - (14)	Pipe	CB-1	Out-1SL - (14)	85.23	422.00	419.00	3.5200			5.36	21.35	0.25	10.09	0.51	0.34	
3	SL - (15)	Pipe	CB-2	CB-1	62.02	426.00	422.00	6.4500			2.86	28.90	0.10	10.44	0.32	0.21	
4	SL - (16)	Pipe	CB-3	CB-2	101.17	429.00	426.00	2.9700			1.87	19.60	0.10	7.98	0.31	0.21	
5	SL - (18)	Pipe	AD-4	CB-1	128.37	427.50	423.00	3.5100			2.53	21.31	0.12	8.12	0.35	0.23	

Inlet Summary

SN	Element ID	Inlet Location	Number of Inlets	Catchbasin Invert Elevation (ft)	Max (Rim) Elevation (ft)	Initial Water Elevation (ft)	Ponded Area (ft^2)	Peak Flow (cfs)	Peak Flow Intercepted by Inlet (cfs)	Peak Flow Bypassing Inlet (cfs)	Inlet Efficiency during Peak Flow (%)	Allowable Spread (ft)	Max Gutter Spread during Peak Flow (ft)	Max Gutter Water Elev. during Peak Flow (ft)
1	AD-4	On Sag	1	427.50	431.80	427.50	10.00	2.54	N/A	N/A	N/A	10.00	10.04	432.20
2	CB-1	On Sag	1	422.00	431.61	422.00	10.00	4.16	N/A	N/A	N/A	10.00	7.90	432.09
3	CB-2	On Sag	1	426.00	432.25	426.00	10.00	1.22	N/A	N/A	N/A	10.00	3.48	432.61
4	CB-3	On Grade	1	429.00	433.11	429.00	N/A	1.99	1.88	0.11	94.42	10.00	6.32	433.28

Subbasin Hydrology

Subbasin : SUB-AD-4

Input Data

Area (ac) 0.4
Weighted Runoff Coefficient 0.85

Time of Concentration

TOC Method : SCS TR-55

Sheet Flow Equation :

Tc = (0.007 * ((n * Lf)^0.8)) / ((P^0.5) * (Sf^0.4))

Where :

Tc = Time of Concentration (hr)
n = Manning's roughness
Lf = Flow Length (ft)
P = 2 yr, 24 hr Rainfall (inches)
Sf = Slope (ft/ft)

Shallow Concentrated Flow Equation :

V = 16.1345 * (Sf^0.5) (unpaved surface)
V = 20.3282 * (Sf^0.5) (paved surface)
V = 15.0 * (Sf^0.5) (grassed waterway surface)
V = 10.0 * (Sf^0.5) (nearly bare & untilled surface)
V = 9.0 * (Sf^0.5) (cultivated straight rows surface)
V = 7.0 * (Sf^0.5) (short grass pasture surface)
V = 5.0 * (Sf^0.5) (woodland surface)
V = 2.5 * (Sf^0.5) (forest w/heavy litter surface)
Tc = (Lf / V) / (3600 sec/hr)

Where:

Tc = Time of Concentration (hr)
Lf = Flow Length (ft)
V = Velocity (ft/sec)
Sf = Slope (ft/ft)

Channel Flow Equation :

V = (1.49 * (R^(2/3)) * (Sf^0.5)) / n
R = Aq / Wp
Tc = (Lf / V) / (3600 sec/hr)

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.3	0	0
Flow Length (ft) :	100	0	0
Slope (%) :	4.2	0	0
2 yr, 24 hr Rainfall (in) :	4.36	0	0
Velocity (ft/sec) :	0.15	0	0
Computed Flow Time (min) :	10.86	0	0

Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	109	0	0
Slope (%) :	1	0	0
Surface Type :	Paved	Unpaved	Unpaved
Velocity (ft/sec) :	2.03	0	0
Computed Flow Time (min) :	0.89	0	0

Total TOC (min) 11.76

Subbasin : Sub-CB-1

Input Data

Area (ac)	0.36
Weighted Runoff Coefficient	0.85

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.3	0	0
Flow Length (ft) :	18.76	0	0
Slope (%) :	5.5	0	0
2 yr, 24 hr Rainfall (in) :	4.6	0	0
Velocity (ft/sec) :	0.13	0	0
Computed Flow Time (min) :	2.49	0	0

Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	36.8	0	0
Slope (%) :	2.5	0	0
Surface Type :	Paved	Paved	Paved
Velocity (ft/sec) :	3.21	0	0
Computed Flow Time (min) :	0.19	0	0

Total TOC (min) 2.68

Subbasin : Sub-CB-2

Input Data

Area (ac) 0.16
Weighted Runoff Coefficient 0.85

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.3	0	0
Flow Length (ft) :	49.44	0	0
Slope (%) :	2	0	0
2 yr, 24 hr Rainfall (in) :	4.36	0	0
Velocity (ft/sec) :	0.1	0	0
Computed Flow Time (min) :	8.32	0	0

Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	26.44	0	0
Slope (%) :	1.5	0	0
Surface Type :	Paved	Paved	Paved
Velocity (ft/sec) :	2.49	0	0
Computed Flow Time (min) :	0.18	0	0

Total TOC (min) 8.50

Subbasin : Sub-CB-3

Input Data

Area (ac) 0.3
Weighted Runoff Coefficient 0.85

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.3	0	0
Flow Length (ft) :	41.23	0	0
Slope (%) :	1	0	0
2 yr, 24 hr Rainfall (in) :	4.36	0	0
Velocity (ft/sec) :	0.07	0	0
Computed Flow Time (min) :	9.49	0	0

Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	150.58	0	0
Slope (%) :	1	0	0
Surface Type :	Paved	Paved	Paved
Velocity (ft/sec) :	2.03	0	0
Computed Flow Time (min) :	1.24	0	0

Total TOC (min) 10.73

Pipe Input

SN	Element ID	Length (ft)	Inlet Invert Elevation (ft)	Inlet Invert Offset (ft)	Outlet Invert Elevation (ft)	Outlet Invert Offset (ft)	Total Drop (ft)	Average Slope (%)	Pipe Shape	Pipe Diameter or Height (in)	Pipe Width (in)	Manning's Roughness	Entr Lc
1	L-SL - (16)	112.54	433.11	4.11	432.25	6.25	0.86	0.7600	Dummy				
2	SL - (14)	85.23	422.00	0.00	419.00	0.00	3.00	3.5200	CIRCULAR				
3	SL - (15)	62.02	426.00	0.00	422.00	0.00	4.00	6.4500	CIRCULAR				
4	SL - (16)	101.17	429.00	0.00	426.00	0.00	3.00	2.9700	CIRCULAR				
5	SL - (18)	128.37	427.50	0.00	423.00	1.00	4.50	3.5100	CIRCULAR				

Pipe Results

SN	Element ID	Peak Flow	Time of Peak Flow Occurrence	Design Flow Capacity	Peak Flow/ Design Flow Ratio	Peak Flow Velocity	Travel Time	Peak Flow Depth	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged	Frou Numb
		(cfs)	(days hh:mm)	(cfs)		(ft/sec)	(min)	(ft)		(min)	
1	L-SL - (16)	0.11	0 00:10	0.00	0.00	0.00		0.00	0.00	0.00	
2	SL - (14)	5.36	0 00:02	21.35	0.25	10.09	0.14	0.51	0.34	0.00	
3	SL - (15)	2.86	0 00:10	28.90	0.10	10.44	0.10	0.32	0.21	0.00	
4	SL - (16)	1.87	0 00:10	19.60	0.10	7.98	0.21	0.31	0.21	0.00	
5	SL - (18)	2.53	0 00:12	21.31	0.12	8.12	0.26	0.35	0.23	0.00	

Inlet Input

SN	Element ID	Inlet Location	Number of Inlets	Catchbasin Invert Elevation (ft)	Max (Rim) Elevation (ft)	Inlet Depth (ft)	Initial Water Elevation (ft)	Initial Water Depth (ft)	Ponded Area (ft^2)	Grate Clogging Factor (%)
1	AD-4	On Sag	1	427.50	431.80	4.30	427.50	0.00	10.00	0.00
2	CB-1	On Sag	1	422.00	431.61	9.61	422.00	0.00	10.00	0.00
3	CB-2	On Sag	1	426.00	432.25	6.25	426.00	0.00	10.00	0.00
4	CB-3	On Grade	1	429.00	433.11	4.11	429.00	0.00	N/A	0.00

Roadway & Gutter Input

SN	Element ID	Roadway Longitudinal Slope (ft/ft)	Roadway Cross Slope (ft/ft)	Roadway Manning's Roughness	Gutter Cross Slope (ft/ft)	Gutter Width (ft)	Gutter Depression (in)	Allowable Spread (ft)
1	AD-4	N/A	0.0300	0.0150	0.0300	1.50		

Inlet Results

SN	Element ID	Peak Flow (cfs)	Peak Lateral Inflow (cfs)	Peak Flow Intercepted by Inlet (cfs)	Peak Flow Bypassing Inlet (cfs)	Inlet Efficiency during Peak Flow (%)	Max Gutter Spread during Peak Flow (ft)	Max Gutter Water Elev. during Peak Flow (ft)	Max Gutter Water Depth during Peak Flow (ft)	Time of Max Depth Occurrence (days hh:mm)	T Floo Volu (ac
1	AD-4	2.54	2.54	N/A	N/A	N/A	10.04	432.20	0.40	0 00:12	0
2	CB-1	4.16	4.16	N/A	N/A	N/A	7.90	432.09	0.49	0 00:12	0
3	CB-2	1.22	1.19	N/A	N/A	N/A	3.48	432.61	0.35	0 00:10	0
4	CB-3	1.99	1.99	1.88	0.11	94.42	6.32	433.28	0.17	0 00:10	0

Pre and Post Development Hydrographs (Hydrology Studio)

Pond No. 1 : Bryant Pharmacy Detention Pond

Pond Designer

Report | Help

Estimate Storage* > Create Pond > Add Outlet Structures

1-Yr | 2-Yr | 3-Yr | 5-Yr | 10-Yr | 25-Yr | 50-Yr | 100-Yr

Post-dev Hyd = 8 - Mod Rational - Post-Dev Basin A

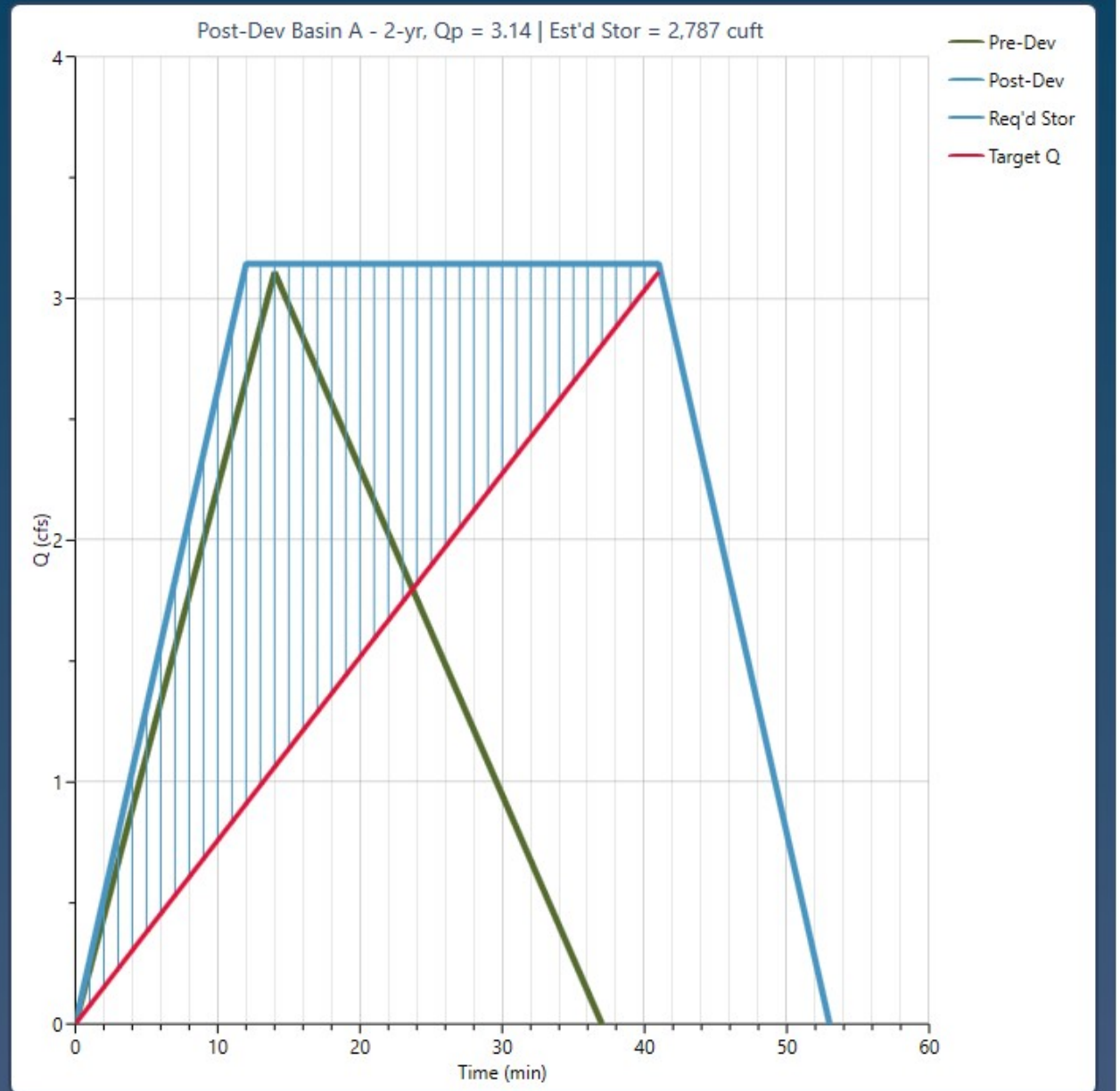
Pre-dev Hyd = 1 - Rational - Pre-Dev Basin "A"

Freq (Yr)	Vol Pre (cuft)	Vol Post (cuft)	Qp Post (cfs)	Q Targ (cfs)	Req Stor (cuft)
1					
2	3,485	7,732	3.14	3.11	2,787
3					
5					
10	4,674	10,404	4.23	4.17	3,773
25	5,372	11,965	4.86	4.79	4,349
50	5,876	13,104	5.33	5.24	4,773
100	6,379	14,204	5.77	5.69	5,157

Clear | Estimate Storage

	Extended Detention Storage (optional)	
Zone	Description	Volume (cuft)
1	WQv	
2	CPv	
3	Custom	
4	Custom	

Clear | Apply



*Estimate Storage Step is Optional

Always skip this step

Create Pond >

Pond No. 1 : Bryant Pharmacy Detention Pond

Pond Designer

Report | Help

Estimate Storage > Create Pond > **Add Outlet Structures**

Culvert	Riser	Orifice	Weir
Exfiltration	User	Perf Riser	Tailwater

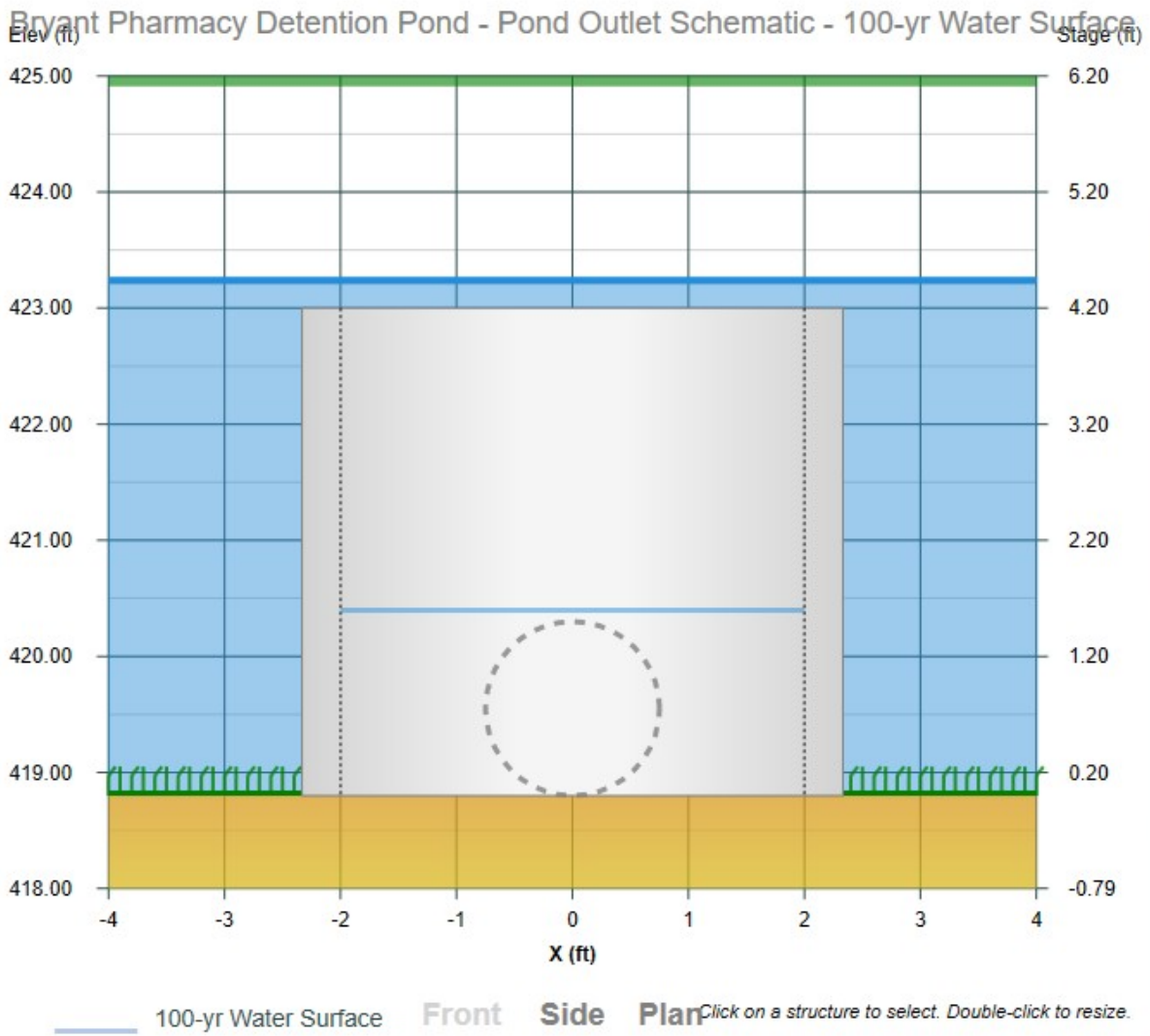
Orifice 2	Input
Outlet Structure =	Orifice 2
Shape =	Rectangular
Rise (in) =	5.00
Span (in) =	10.00
No. Holes =	1
Invert Elev. (ft) =	421.50
Orifice Coeff. (Co) =	0.6
Flows through Culvert =	☑
Active =	☐

Auto | Add/Update

Freq (Yr)	Q Targ (cfs)	Q Act (cfs)	Max Ele (ft)	Max Stor (cuft)
2	3.11	3.14	423.18	5,043
10	4.17	4.23	423.22	5,136
25	4.79	4.86	423.24	5,183
50	5.24	5.33	423.25	5,217
100	5.69	5.77	423.27	5,250

Auto Route | Trial Route

Table | Structure | Plan / Profile | Stage vs. Q | Stage vs. Drain Time | Trial Route | Help | Flow Pati



Numerical Output

X = 5.00 ft Y = 418.43 ft

< Create Pond | Finish

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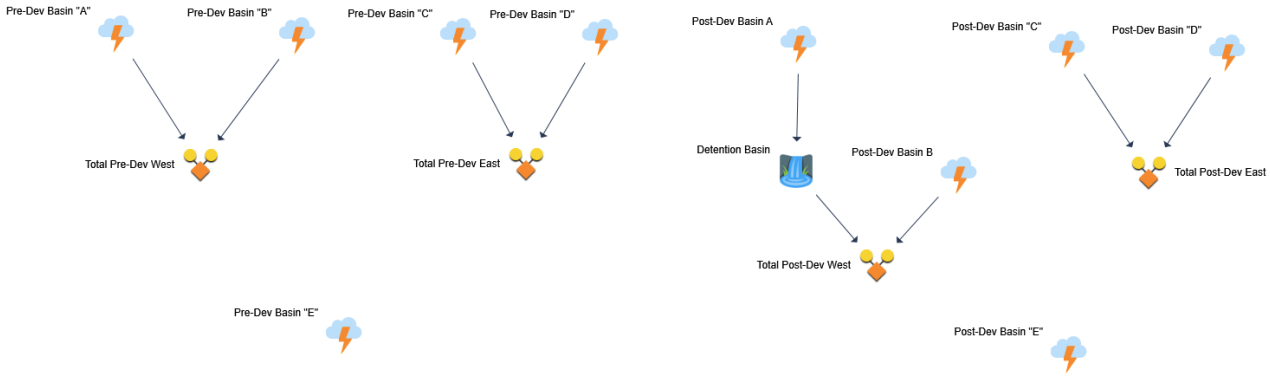
Contents continued...

Basin Model

Hydrology Studio v 3.0.0.39

Project Name: Bryant Pharmacy
File: Detention Calculation 11-13-25 FINAL.hys
11-13-2025



Hydrograph by Return Period

Hydrology Studio v 3.0.0.39

Project Name: Bryant Pharmacy
File: Detention Calculation 11-13-25 FINAL.hys
11-13-2025

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	Rational	Pre-Dev Basin "A"		3.108			4.168	4.791	5.240	5.689
2	Rational	Pre-Dev Basin "B"		7.412			9.942	11.43	12.50	13.57
3	Junction	Total Pre-Dev West		10.52			14.11	16.22	17.74	19.26
4	Rational	Pre-Dev Basin "C"		0.922			1.236	1.420	1.553	1.686
5	Rational	Pre-Dev Basin "D"		1.009			1.353	1.555	1.701	1.847
6	Junction	Total Pre-Dev East		1.726			2.314	2.660	2.909	3.158
7	Rational	Pre-Dev Basin "E"		0.978			1.314	1.510	1.652	1.793
8	Mod Rational	Post-Dev Basin A		3.143			4.229	4.864	5.327	5.774
9	Pond Route	Detention Basin		2.713			3.972	4.449	4.789	5.104
10	Rational	Post-Dev Basin B		8.486			11.38	13.08	14.31	15.53
11	Junction	Total Post-Dev West		10.30			13.53	15.42	16.77	18.08
12	Rational	Post-Dev Basin "C"		1.443			1.931	2.218	2.424	2.635
13	Rational	Post-Dev Basin "D"		0.284			0.381	0.438	0.479	0.520
14	Junction	Total Post-Dev East		1.560			2.088	2.399	2.621	2.849
15	Rational	Post-Dev Basin "E"		0.663			0.889	1.022	1.118	1.214

Hydrograph 2-yr Summary

Hydrology Studio v 3.0.0.39

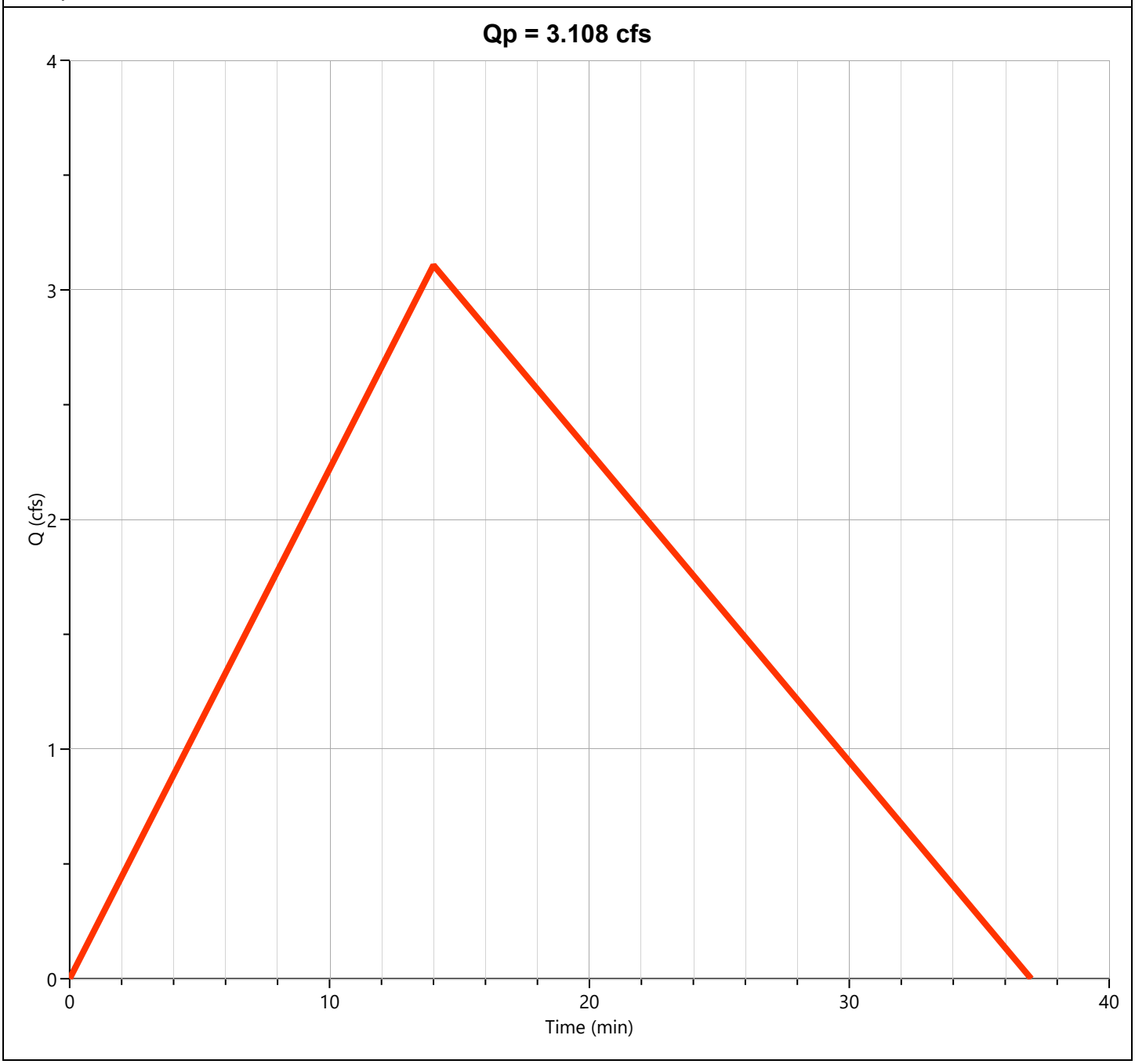
Project Name: Bryant Pharmacy
File: Detention Calculation 11-13-25 FINAL.hys
11-13-2025

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	Rational	Pre-Dev Basin "A"	3.108	0.23	3,485	----		
2	Rational	Pre-Dev Basin "B"	7.412	0.23	8,312	----		
3	Junction	Total Pre-Dev West	10.52	0.23	11,677	1, 2		
4	Rational	Pre-Dev Basin "C"	0.922	0.18	812	----		
5	Rational	Pre-Dev Basin "D"	1.009	0.25	1,212	----		
6	Junction	Total Pre-Dev East	1.726	0.25	2,012	4, 5		
7	Rational	Pre-Dev Basin "E"	0.978	0.32	1,489	----		
8	Mod Rational	Post-Dev Basin A	3.143	0.20	7,732	----		
9	Pond Route	Detention Basin	2.713	0.72	7,730	8	421.39	2,050
10	Rational	Post-Dev Basin B	8.486	0.23	9,516	----		
11	Junction	Total Post-Dev West	10.30	0.23	17,149	9, 10		
12	Rational	Post-Dev Basin "C"	1.443	0.12	809	----		
13	Rational	Post-Dev Basin "D"	0.284	0.28	386	----		
14	Junction	Total Post-Dev East	1.560	0.12	1,162	12, 13		
15	Rational	Post-Dev Basin "E"	0.663	0.27	849	----		

Pre-Dev Basin "A"

Hyd. No. 1

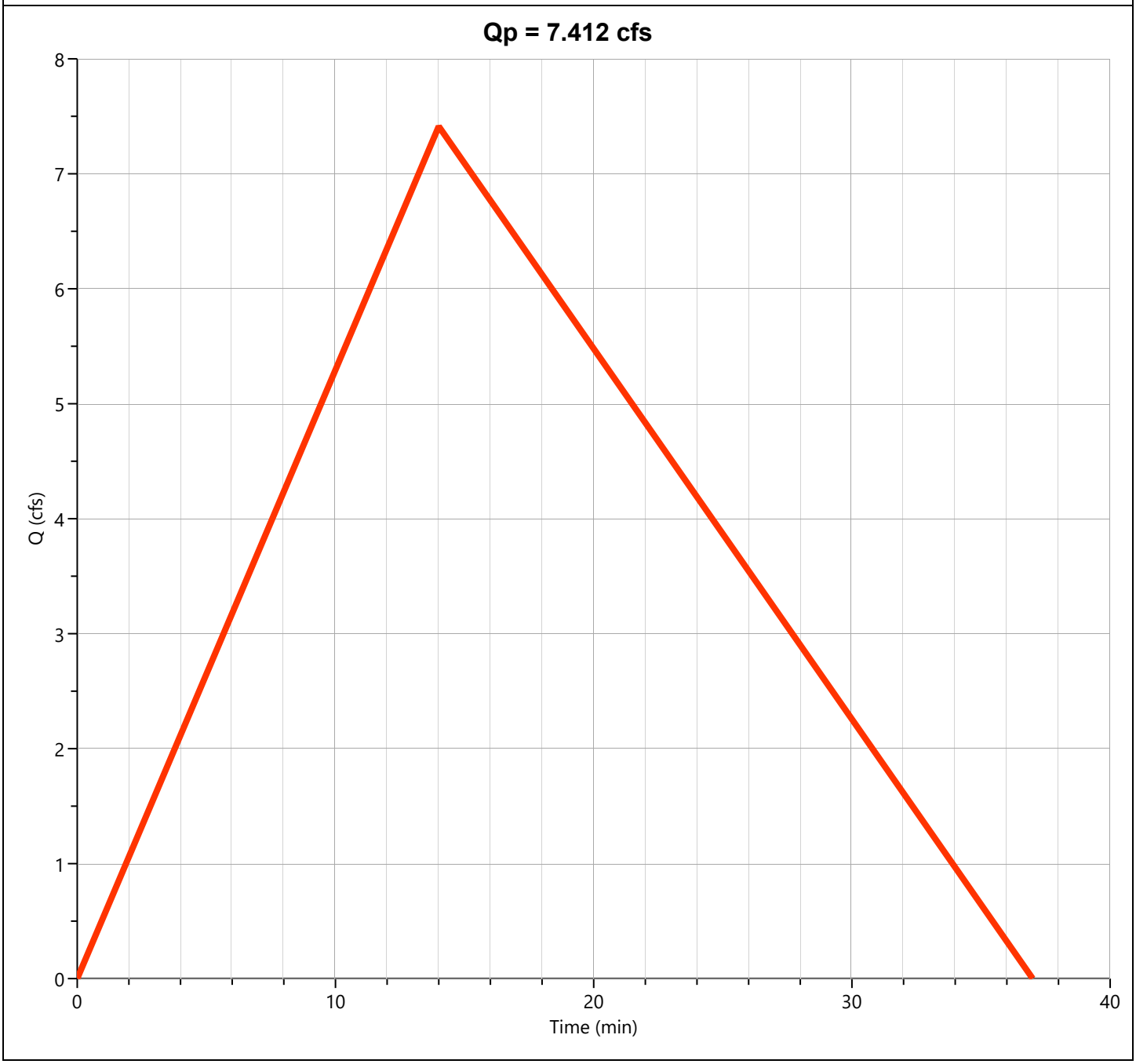
Hydrograph Type	= Rational	Peak Flow	= 3.108 cfs
Storm Frequency	= 2-yr	Time to Peak	= 0.23 hrs
Time Interval	= 1 min	Runoff Volume	= 3,485 cuft
Drainage Area	= 1.44 ac	Runoff Coeff.	= 0.56
Tc Method	= TR55	Time of Conc. (Tc)	= 14.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 3.85 in/hr
Freq. Corr. Factor	= 1.00	Asc/Rec Limb Factors	= 1/1.67



Pre-Dev Basin "B"

Hyd. No. 2

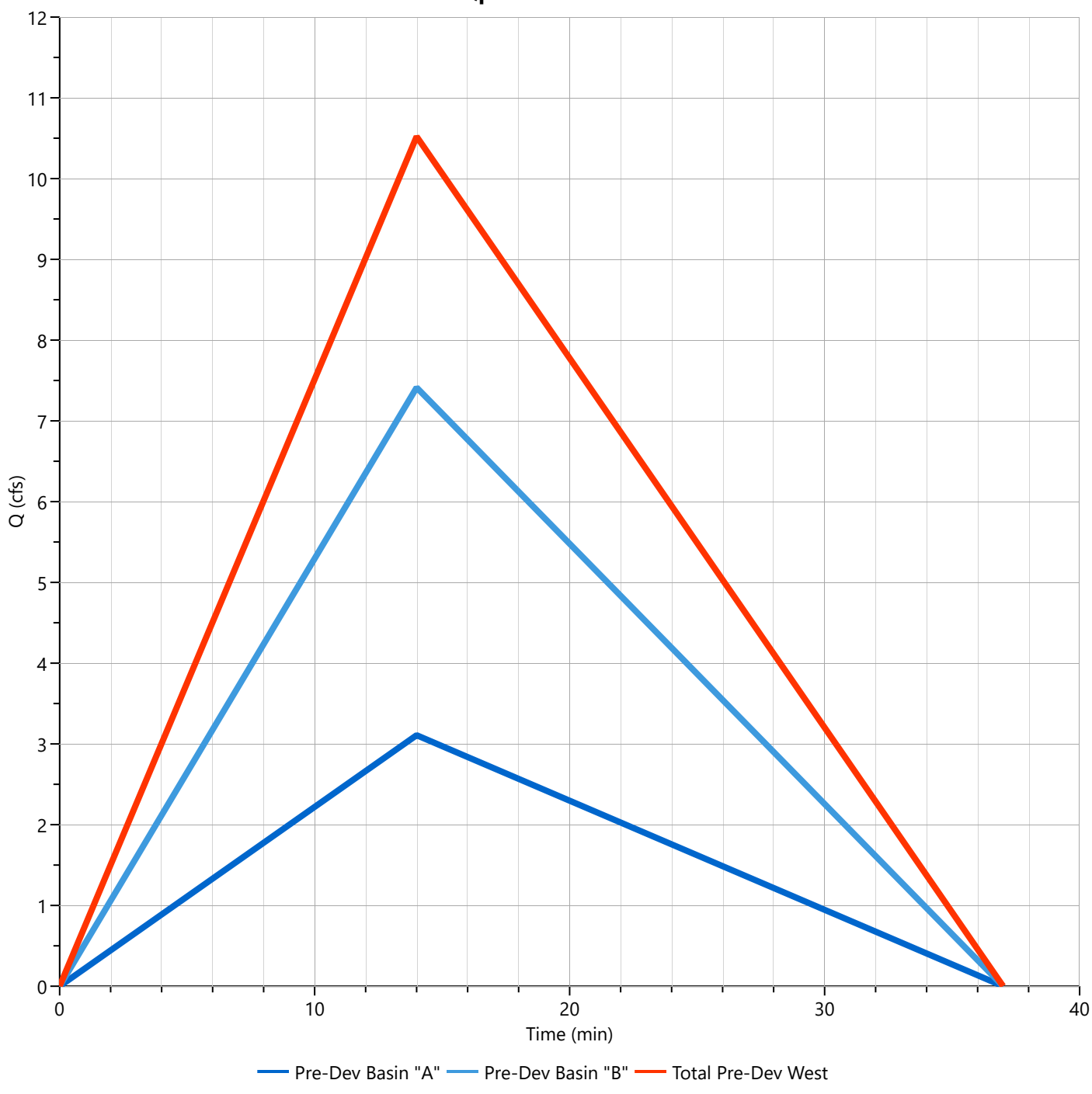
Hydrograph Type	= Rational	Peak Flow	= 7.412 cfs
Storm Frequency	= 2-yr	Time to Peak	= 0.23 hrs
Time Interval	= 1 min	Runoff Volume	= 8,312 cuft
Drainage Area	= 3.26 ac	Runoff Coeff.	= 0.59
Tc Method	= TR55	Time of Conc. (Tc)	= 14.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 3.85 in/hr
Freq. Corr. Factor	= 1.00	Asc/Rec Limb Factors	= 1/1.67



Total Pre-Dev West

Hyd. No. 3

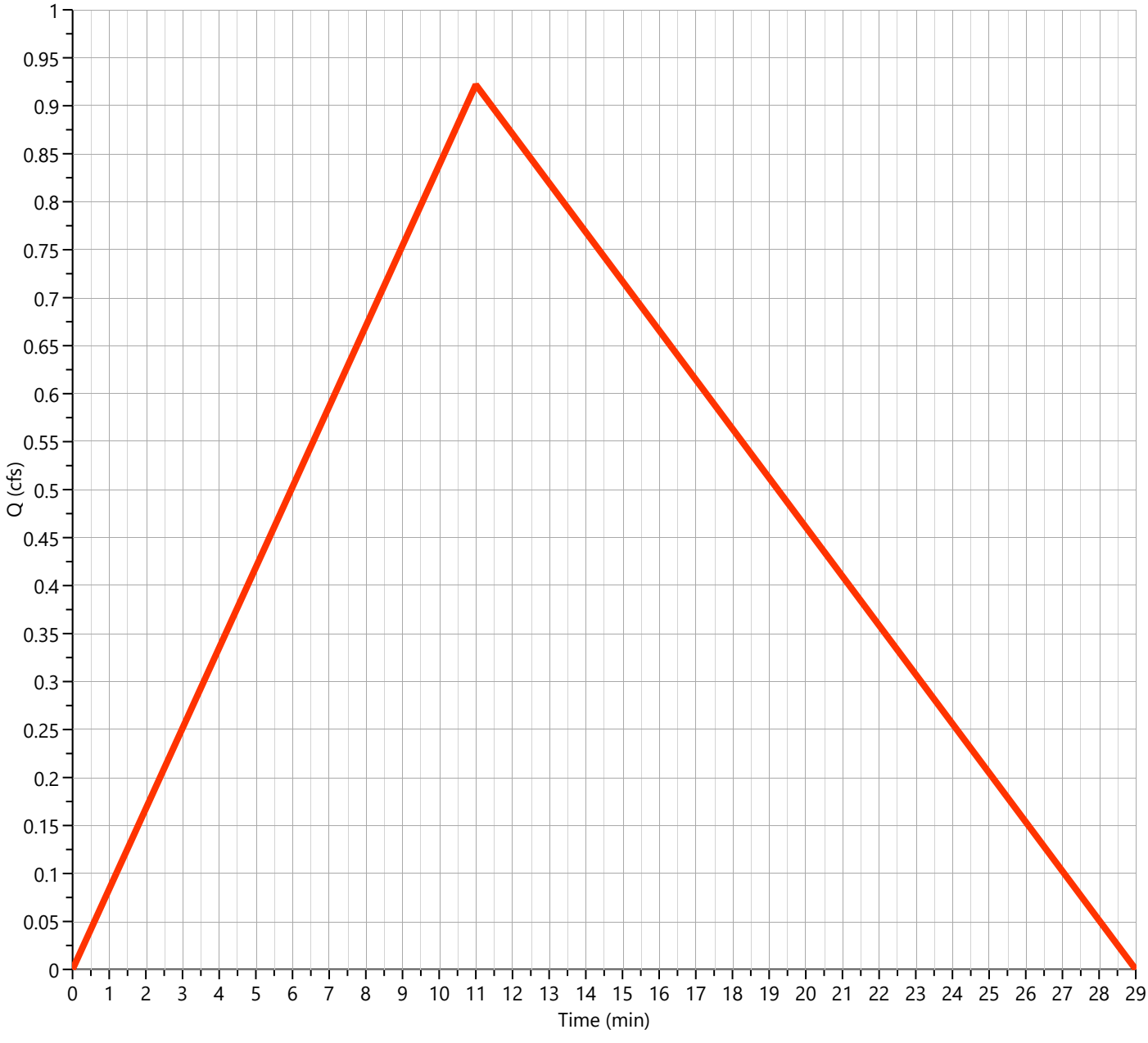
Hydrograph Type	= Junction	Peak Flow	= 10.52 cfs
Storm Frequency	= 2-yr	Time to Peak	= 0.23 hrs
Time Interval	= 1 min	Hydrograph Volume	= 11,677 cuft
Inflow Hydrographs	= 1, 2	Total Contrib. Area	= 4.7 ac



Pre-Dev Basin "C"

Hyd. No. 4

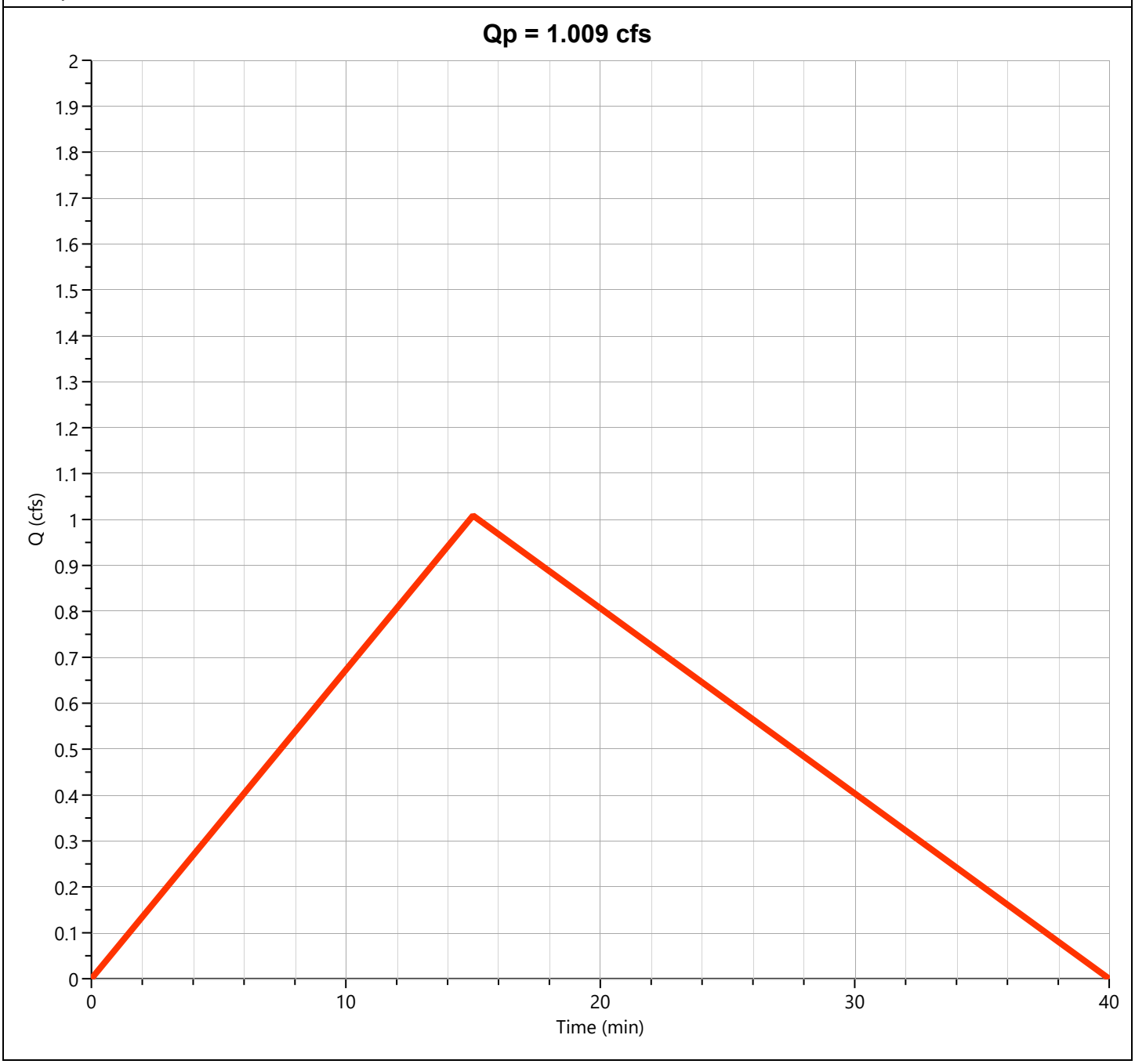
Hydrograph Type	= Rational	Peak Flow	= 0.922 cfs
Storm Frequency	= 2-yr	Time to Peak	= 0.18 hrs
Time Interval	= 1 min	Runoff Volume	= 812 cuft
Drainage Area	= 0.33 ac	Runoff Coeff.	= 0.65
Tc Method	= TR55	Time of Conc. (Tc)	= 11.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 4.30 in/hr
Freq. Corr. Factor	= 1.00	Asc/Rec Limb Factors	= 1/1.67



Pre-Dev Basin "D"

Hyd. No. 5

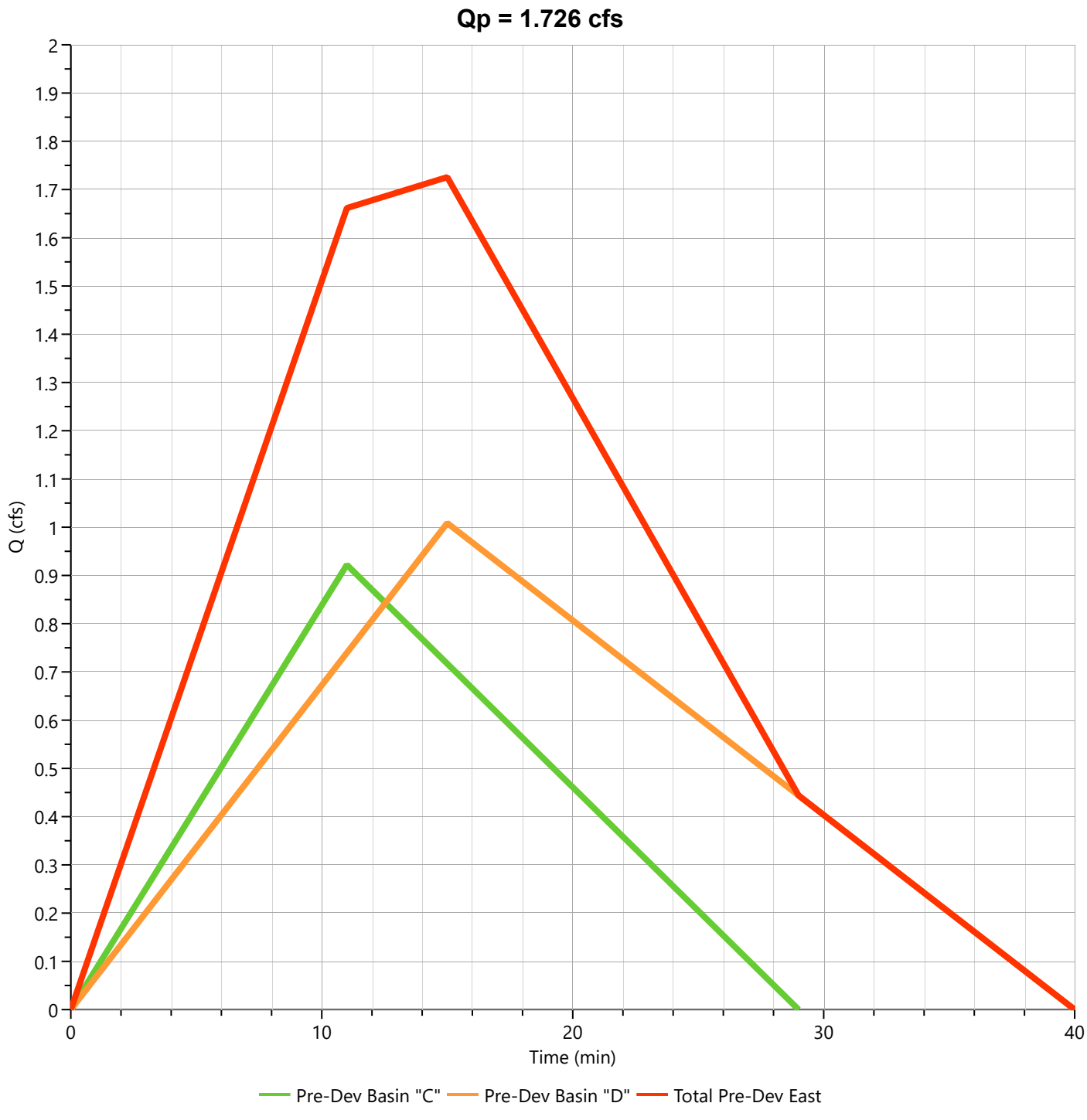
Hydrograph Type	= Rational	Peak Flow	= 1.009 cfs
Storm Frequency	= 2-yr	Time to Peak	= 0.25 hrs
Time Interval	= 1 min	Runoff Volume	= 1,212 cuft
Drainage Area	= 0.5 ac	Runoff Coeff.	= 0.54
Tc Method	= TR55	Time of Conc. (Tc)	= 15.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 3.74 in/hr
Freq. Corr. Factor	= 1.00	Asc/Rec Limb Factors	= 1/1.67



Total Pre-Dev East

Hyd. No. 6

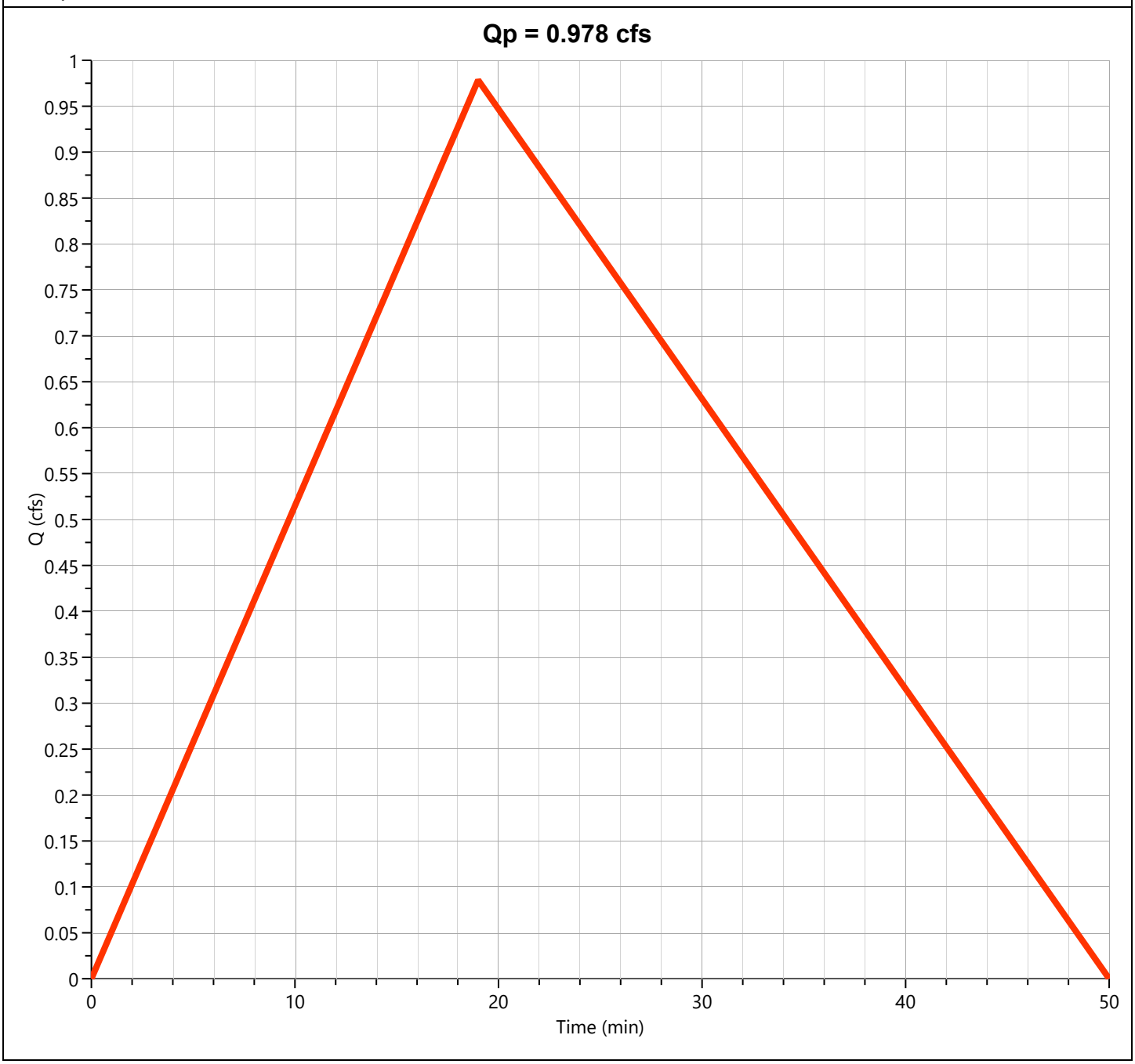
Hydrograph Type	= Junction	Peak Flow	= 1.726 cfs
Storm Frequency	= 2-yr	Time to Peak	= 0.25 hrs
Time Interval	= 1 min	Hydrograph Volume	= 2,012 cuft
Inflow Hydrographs	= 4, 5	Total Contrib. Area	= 0.83 ac



Pre-Dev Basin "E"

Hyd. No. 7

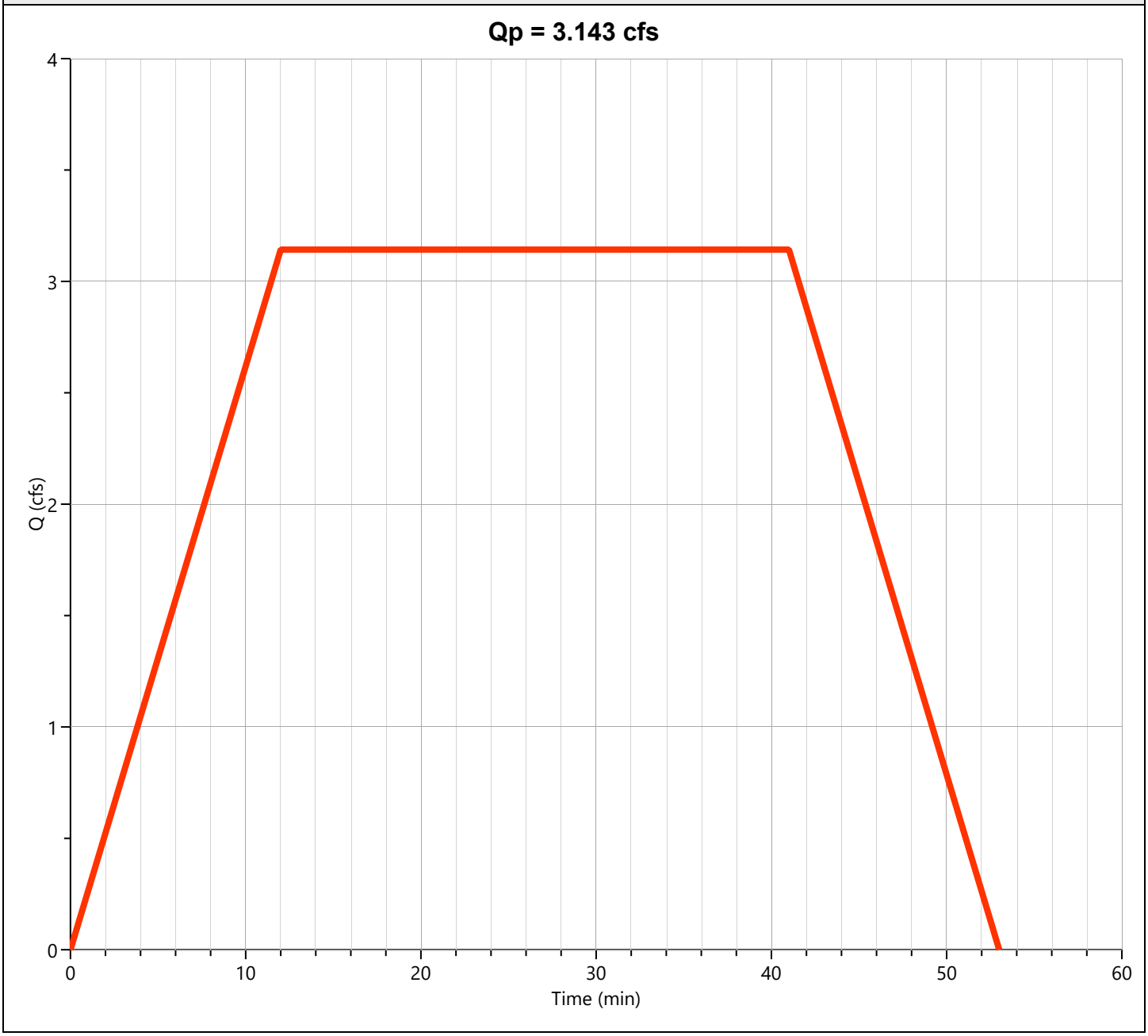
Hydrograph Type	= Rational	Peak Flow	= 0.978 cfs
Storm Frequency	= 2-yr	Time to Peak	= 0.32 hrs
Time Interval	= 1 min	Runoff Volume	= 1,489 cuft
Drainage Area	= 0.53 ac	Runoff Coeff.	= 0.55
Tc Method	= TR55	Time of Conc. (Tc)	= 19.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 3.36 in/hr
Freq. Corr. Factor	= 1.00	Asc/Rec Limb Factors	= 1/1.67



Post-Dev Basin A

Hyd. No. 8

Hydrograph Type	= Mod Rational	Peak Flow	= 3.143 cfs
Storm Frequency	= 2-yr	Time to Peak	= 0.20 hrs
Time Interval	= 1 min	Runoff Volume	= 7,732 cuft
Drainage Area	= 1.56 ac	Runoff Coeff.	= 0.85
Tc Method	= User	Time of Conc. (Tc)	= 12.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 2.37 in/hr
Freq. Corr. Factor	= 1.00	Storm Duration	= 3.42 x Tc
Target Q	= 0.000 cfs	Required Storage	= 0.000 cuft



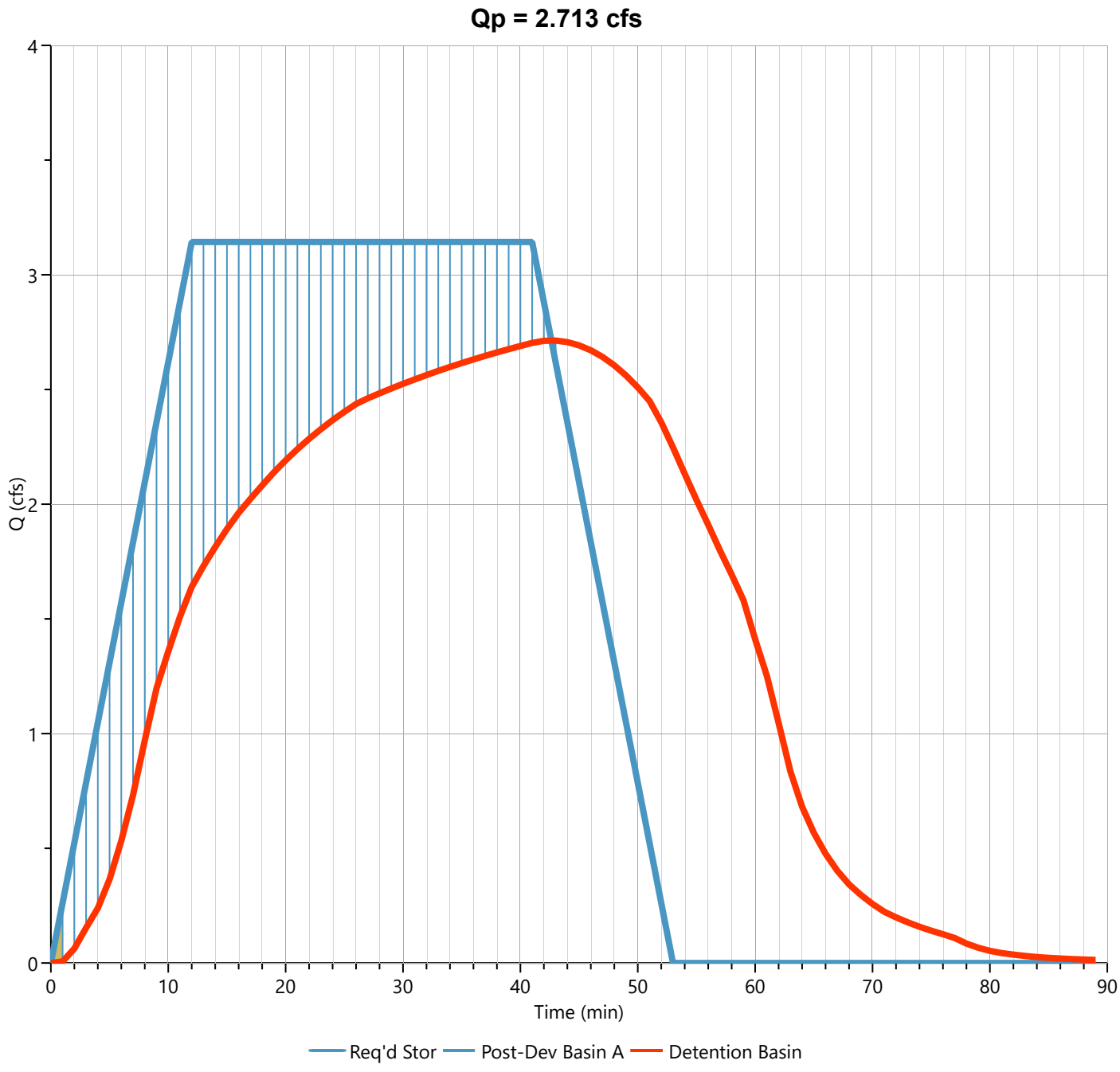
Detention Basin

Hyd. No. 9

Hydrograph Type	= Pond Route	Peak Flow	= 2.713 cfs
Storm Frequency	= 2-yr	Time to Peak	= 0.72 hrs
Time Interval	= 1 min	Hydrograph Volume	= 7,730 cuft
Inflow Hydrograph	= 8 - Post-Dev Basin A	Max. Elevation	= 421.39 ft
Pond Name	= Bryant Pharmacy Detention Pond	Max. Storage	= 2,050 cuft

Pond Routing by Storage Indication Method

Center of mass detention time = 10 min



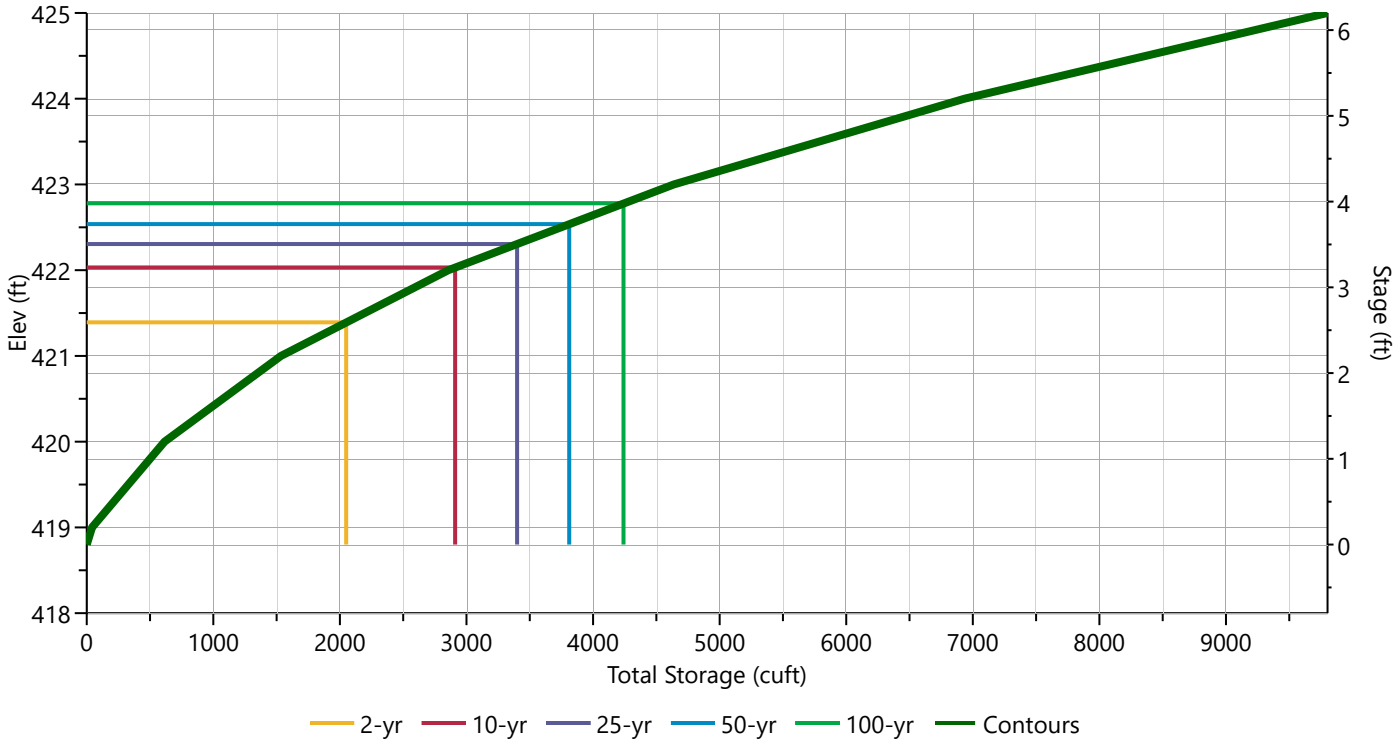
Bryant Pharmacy Detention Pond

Stage-Storage

User Defined Contours	
Description	**Input**
Bottom Elevation, ft	418.80
Voids (%)	100.00
Volume Calc	Ave End Area

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour Area (sqft)	Incr. Storage (cuft)	Total Storage (cuft)
0.00	418.80	4	0.000	0.000
0.20	419.00	414	41.8	41.8
1.20	420.00	732	573	615
2.20	421.00	1,107	920	1,534
3.20	422.00	1,538	1,323	2,857
4.20	423.00	2,025	1,782	4,638
5.20	424.00	2,568	2,297	6,935
6.20	425.00	3,167	2,868	9,802

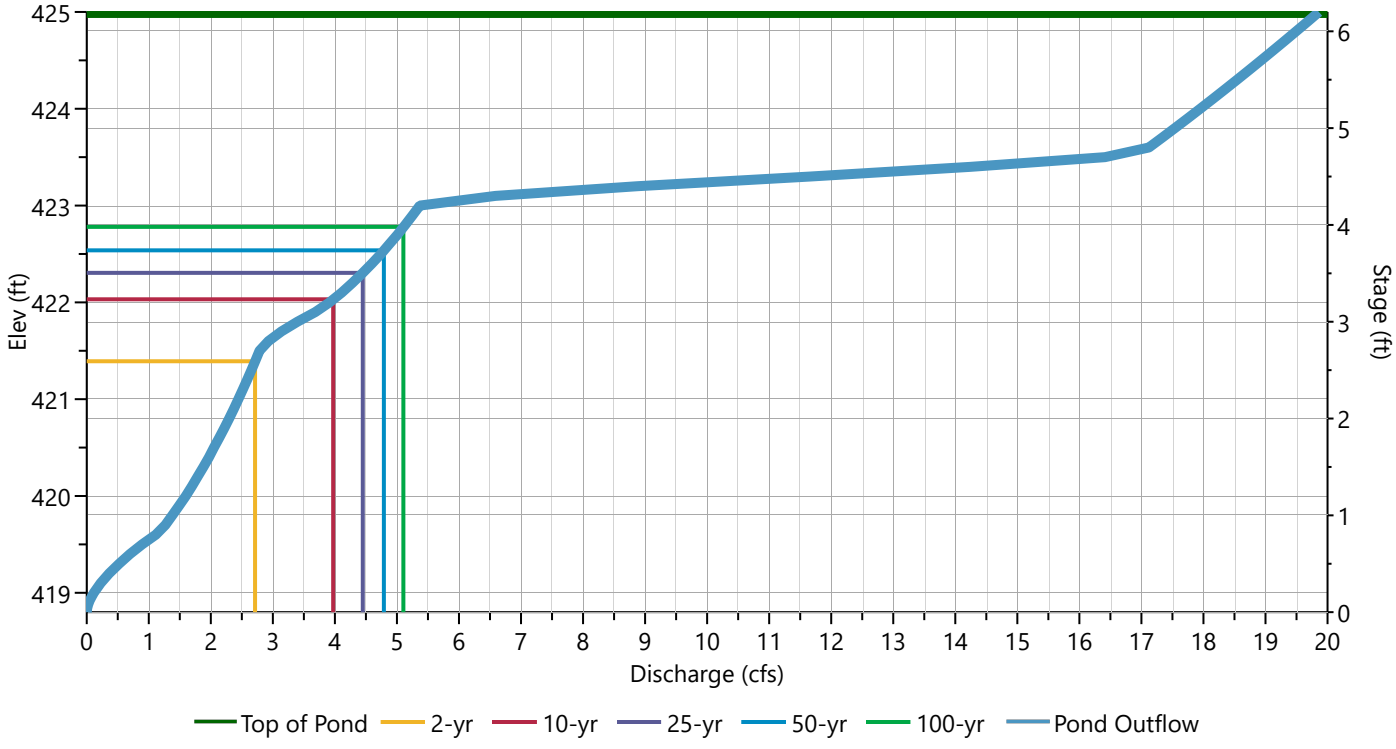


Bryant Pharmacy Detention Pond

Stage-Discharge

Culvert / Orifices	Cir Culvert	Orifice			Orifice Plate	
		1 (m)	2 (m)	3		
Rise, in	18	10	5		Orifice Dia, in	
Span, in	18	6	10		No. Orifices	
No. Barrels	1	1	1		Invert Elevation, ft	
Invert Elevation, ft	418.80	418.80	421.50		Height, ft	
Orifice Coefficient, Co	0.60	0.60	0.60		Orifice Coefficient, Co	
Length, ft	39					
Barrel Slope, %	1					
N-Value, n	0.013					
Weirs	**Riser**	**Weir**			**Ancillary**	
		1	2	3		
Shape / Type	Circular				Exfiltration, in/hr	
Crest Elevation, ft	423					
Crest Length, ft	12.56					
Angle, deg						
Weir Coefficient, Cw	3.3					

m = Flows through Culvert, i = Independent



Bryant Pharmacy Detention Pond

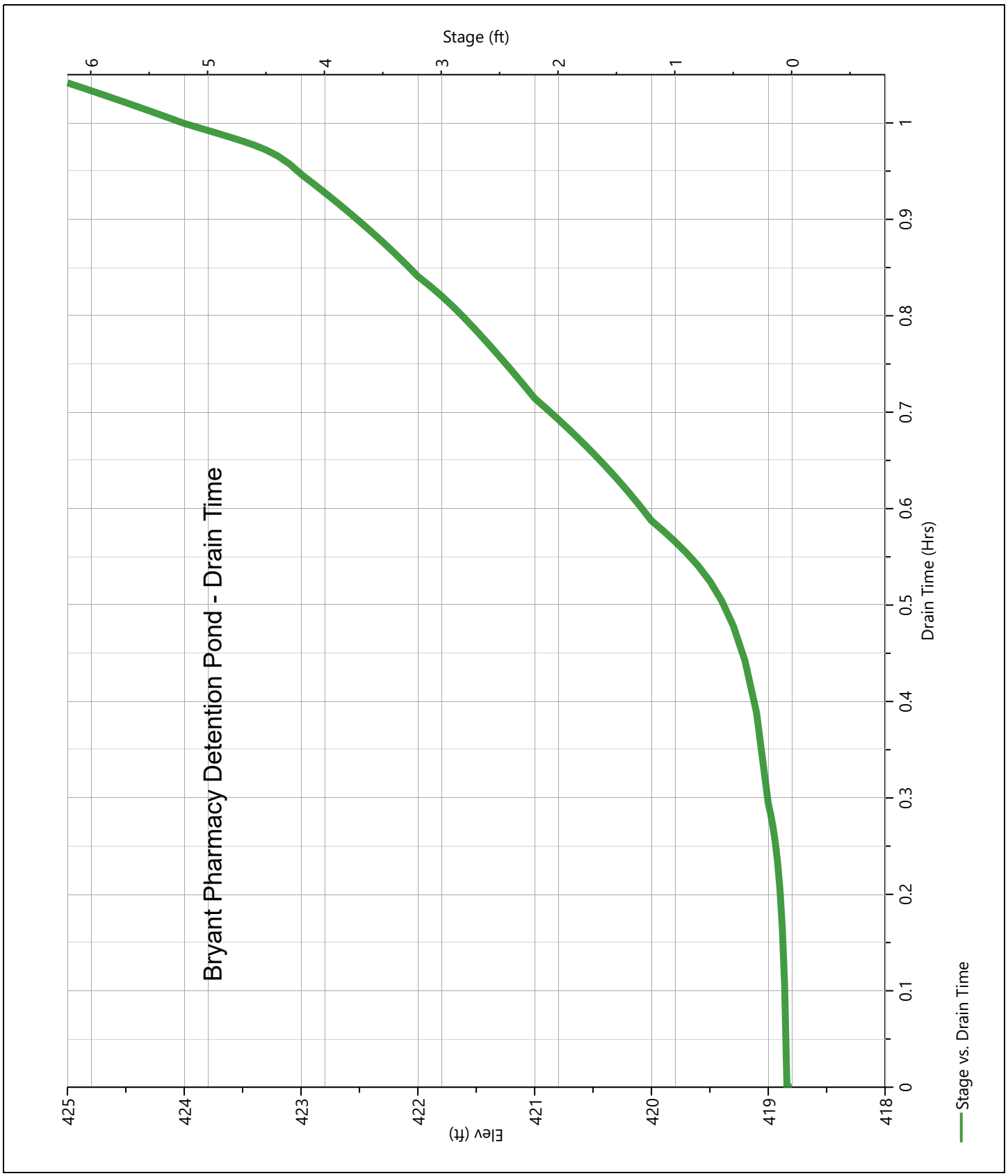
Stage-Storage-Discharge Summary

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	418.80	0.000	0.000	0.000	0.000		0.000							0.000
0.20	419.00	41.8	0.115 ic	0.115	0.000		0.000							0.115
1.20	420.00	615	1.597 ic	1.597	0.000		0.000							1.597
2.20	421.00	1,534	2.444 ic	2.444	0.000		0.000							2.444
3.20	422.00	2,857	3.914 ic	3.011	0.903		0.000							3.914
4.20	423.00	4,638	5.369 oc	3.469	1.900		0.000							5.369
5.20	424.00	6,935	17.95 ic	0.000	0.000		0.000							17.95
6.20	425.00	9,802	19.86 ic	0.000	0.000		0.000							19.86

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

Bryant Pharmacy Detention Pond

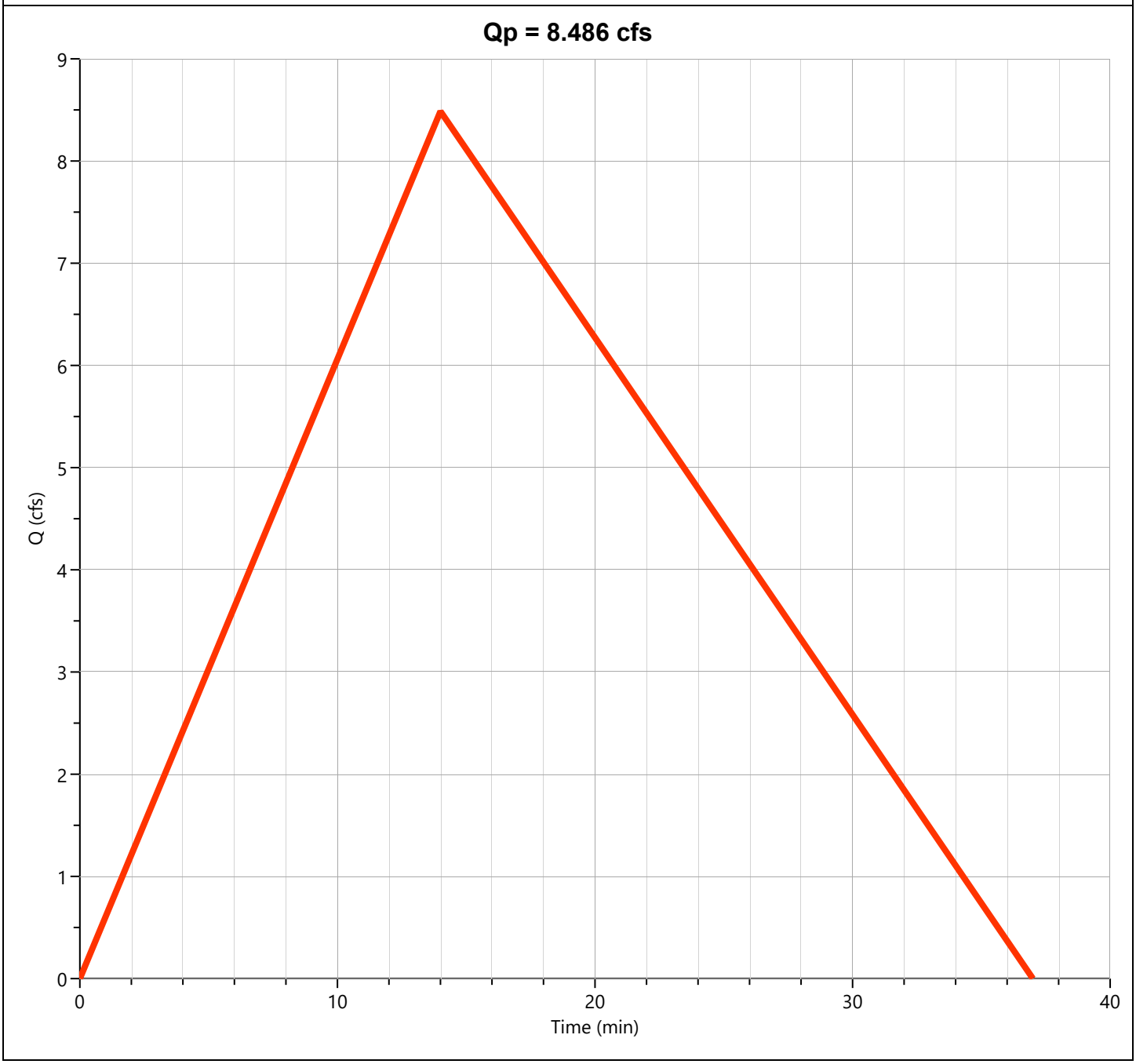
Pond Drawdown



Post-Dev Basin B

Hyd. No. 10

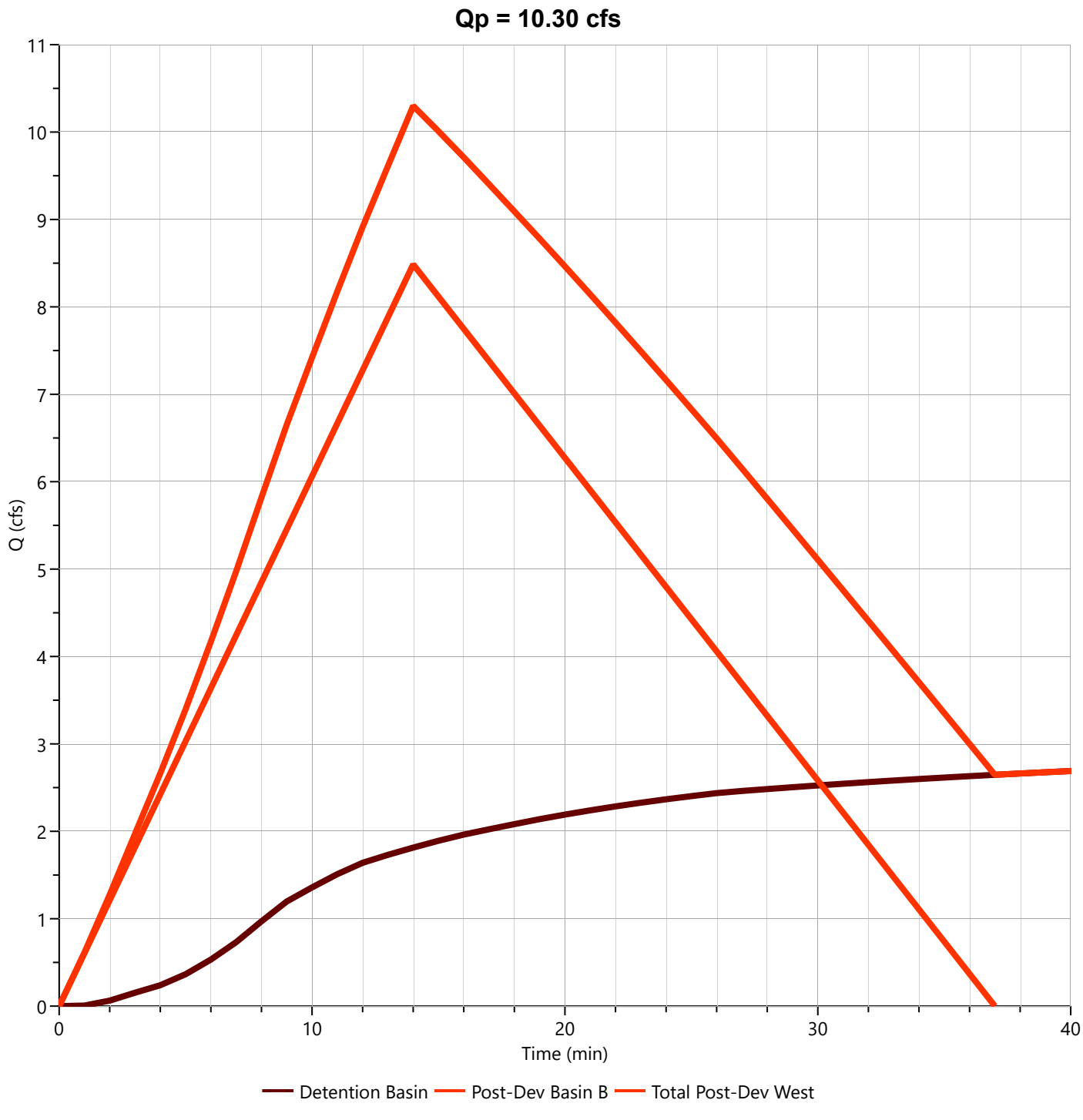
Hydrograph Type	= Rational	Peak Flow	= 8.486 cfs
Storm Frequency	= 2-yr	Time to Peak	= 0.23 hrs
Time Interval	= 1 min	Runoff Volume	= 9,516 cuft
Drainage Area	= 3.67 ac	Runoff Coeff.	= 0.60
Tc Method	= TR55	Time of Conc. (Tc)	= 14.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 3.85 in/hr
Freq. Corr. Factor	= 1.00	Asc/Rec Limb Factors	= 1/1.67



Total Post-Dev West

Hyd. No. 11

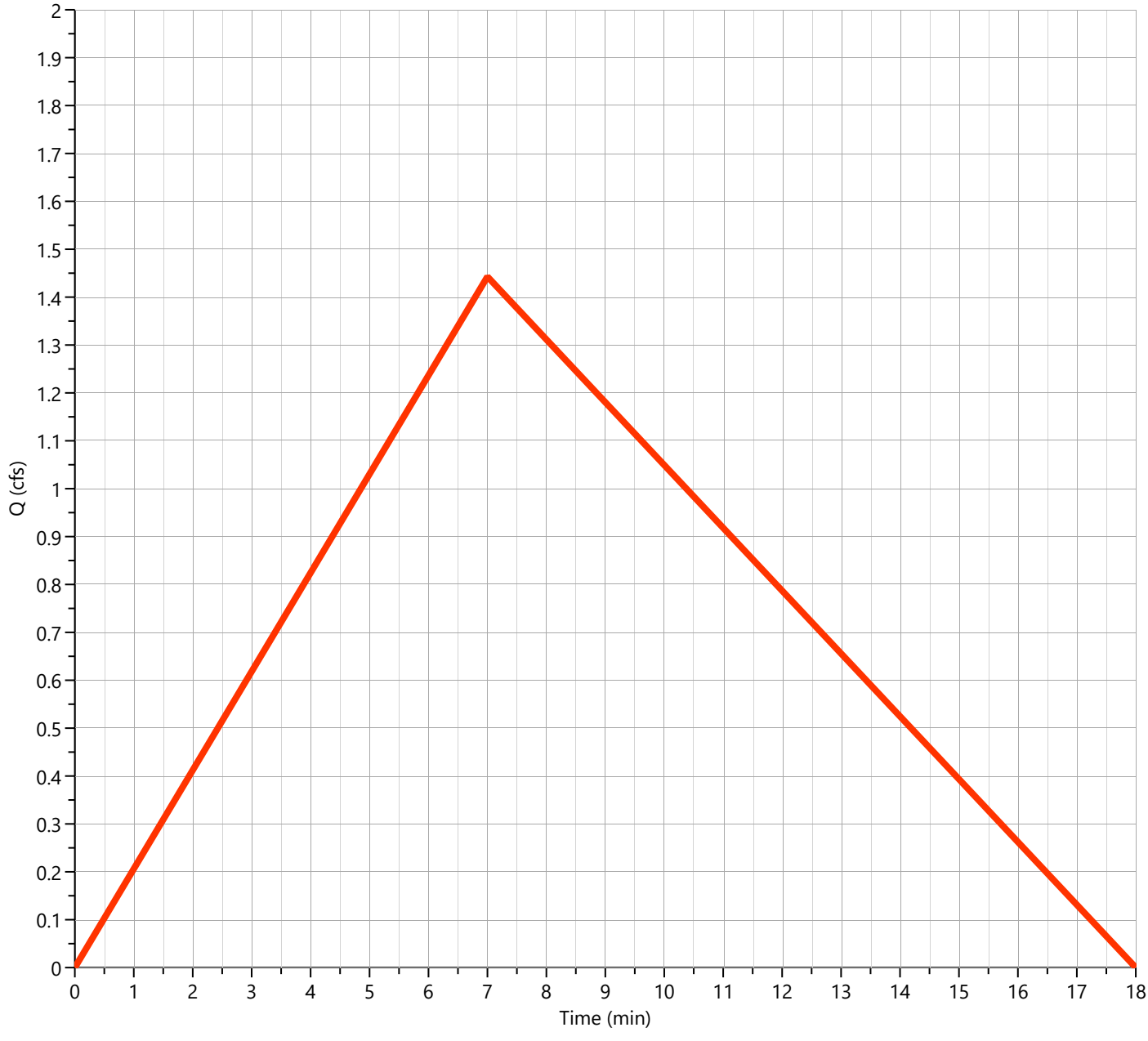
Hydrograph Type	= Junction	Peak Flow	= 10.30 cfs
Storm Frequency	= 2-yr	Time to Peak	= 0.23 hrs
Time Interval	= 1 min	Hydrograph Volume	= 17,149 cuft
Inflow Hydrographs	= 10	Total Contrib. Area	= 3.67 ac



Post-Dev Basin "C"

Hyd. No. 12

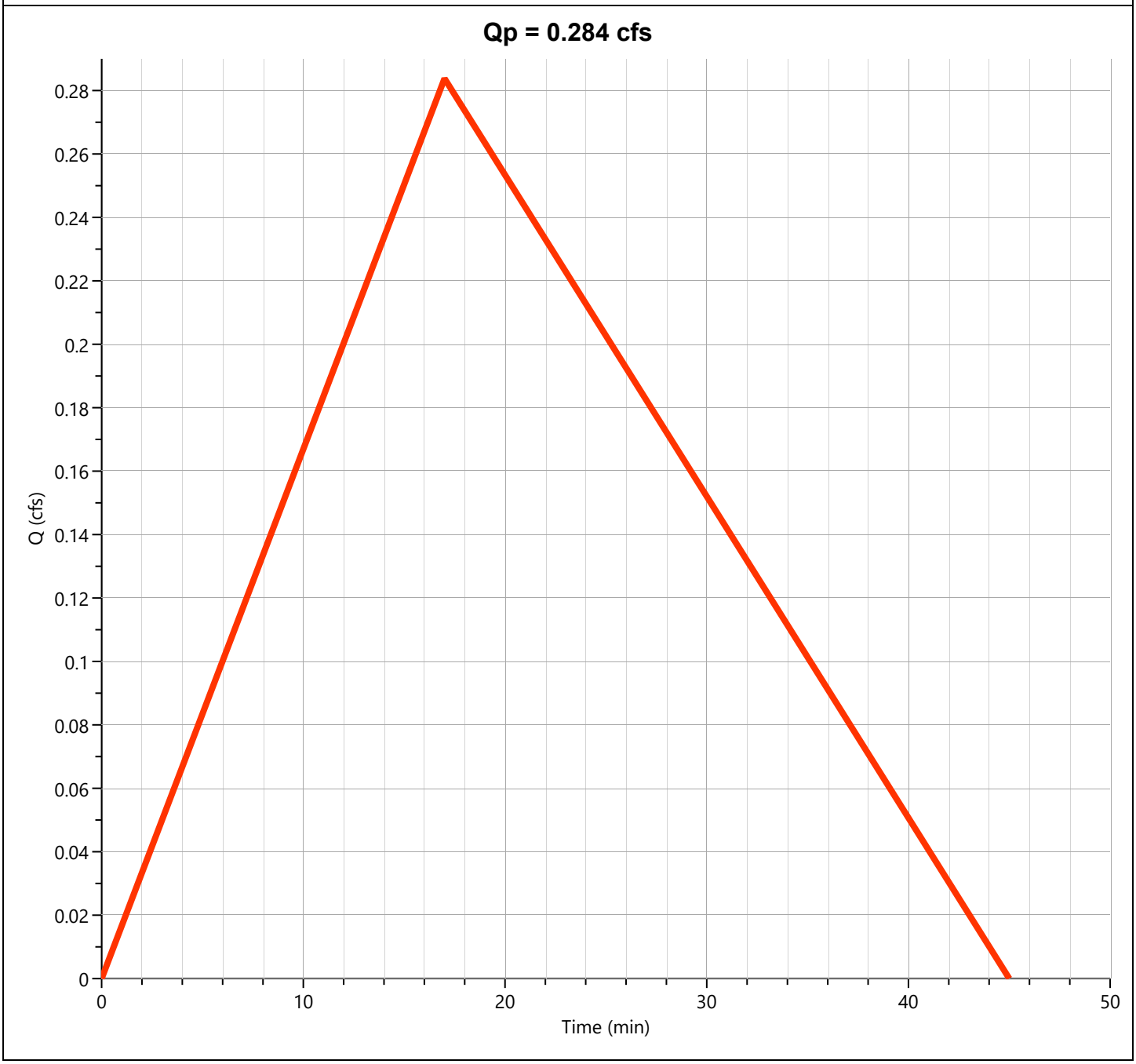
Hydrograph Type	= Rational	Peak Flow	= 1.443 cfs
Storm Frequency	= 2-yr	Time to Peak	= 0.12 hrs
Time Interval	= 1 min	Runoff Volume	= 809 cuft
Drainage Area	= 0.38 ac	Runoff Coeff.	= 0.72
Tc Method	= TR55	Time of Conc. (Tc)	= 7.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 5.27 in/hr
Freq. Corr. Factor	= 1.00	Asc/Rec Limb Factors	= 1/1.67



Post-Dev Basin "D"

Hyd. No. 13

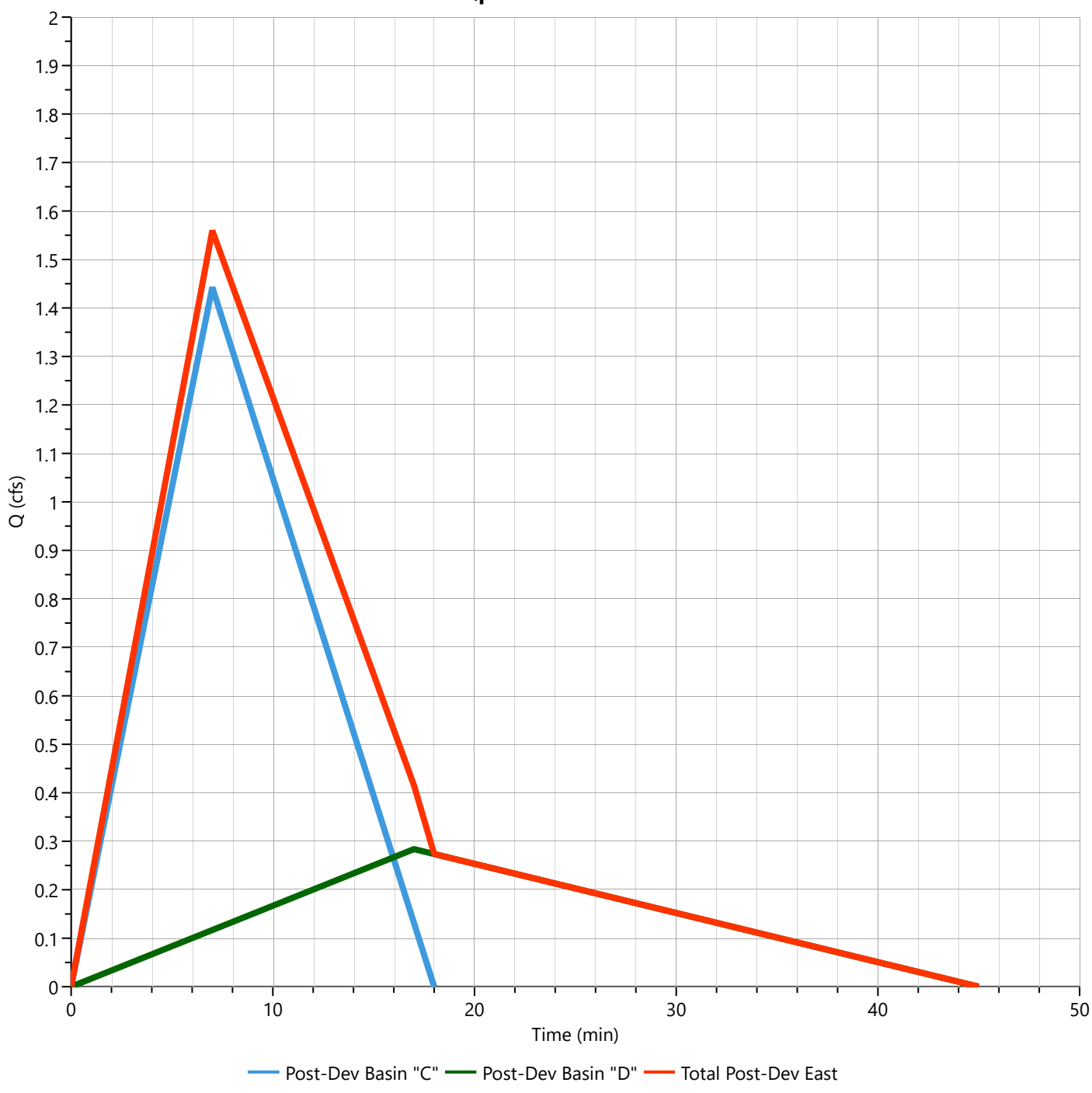
Hydrograph Type	= Rational	Peak Flow	= 0.284 cfs
Storm Frequency	= 2-yr	Time to Peak	= 0.28 hrs
Time Interval	= 1 min	Runoff Volume	= 386 cuft
Drainage Area	= 0.12 ac	Runoff Coeff.	= 0.67
Tc Method	= TR55	Time of Conc. (Tc)	= 17.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 3.53 in/hr
Freq. Corr. Factor	= 1.00	Asc/Rec Limb Factors	= 1/1.67



Total Post-Dev East

Hyd. No. 14

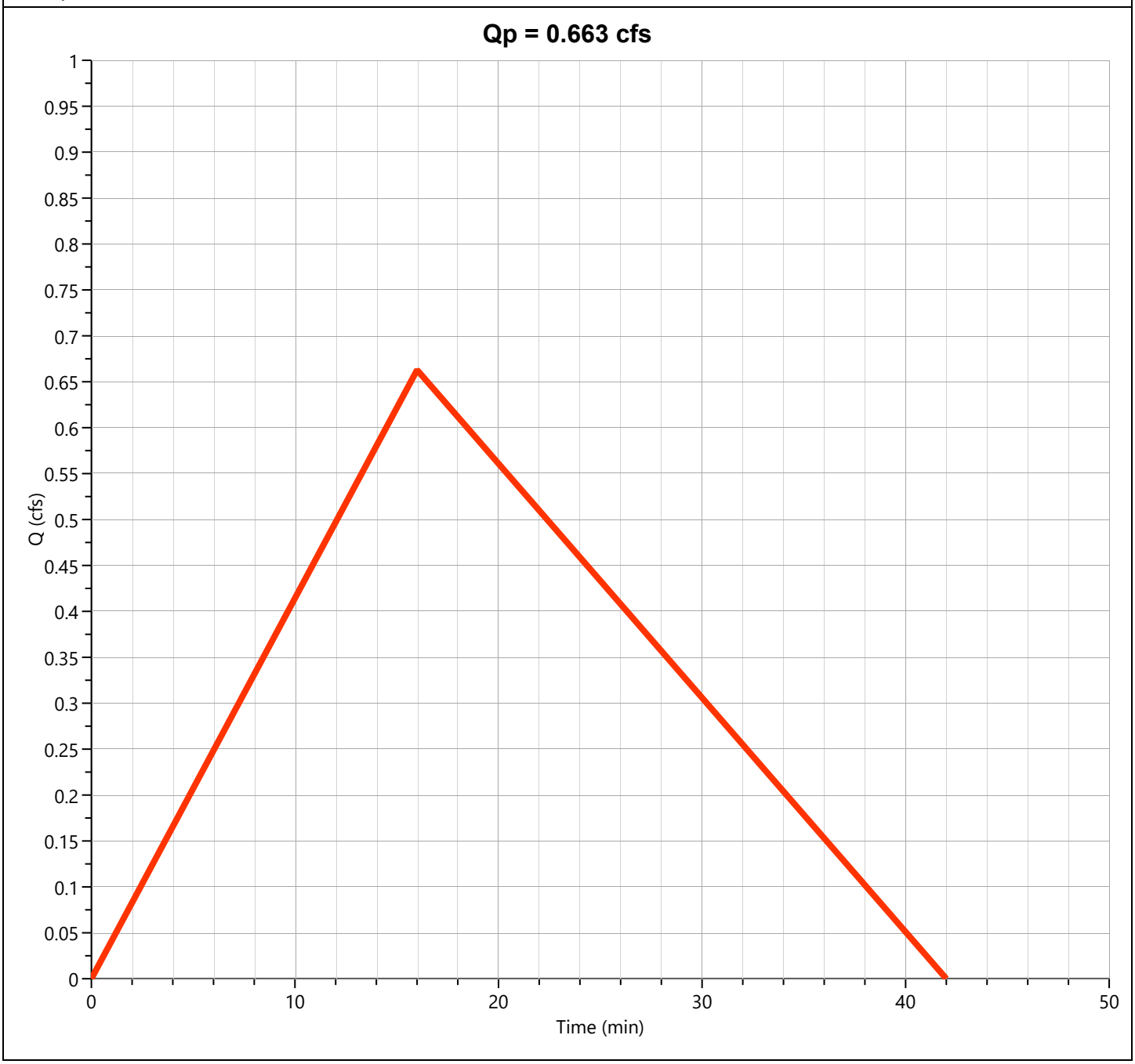
Hydrograph Type	= Junction	Peak Flow	= 1.560 cfs
Storm Frequency	= 2-yr	Time to Peak	= 0.12 hrs
Time Interval	= 1 min	Hydrograph Volume	= 1,162 cuft
Inflow Hydrographs	= 12, 13	Total Contrib. Area	= 0.5 ac



Post-Dev Basin "E"

Hyd. No. 15

Hydrograph Type	= Rational	Peak Flow	= 0.663 cfs
Storm Frequency	= 2-yr	Time to Peak	= 0.27 hrs
Time Interval	= 1 min	Runoff Volume	= 849 cuft
Drainage Area	= 0.29 ac	Runoff Coeff.	= 0.63
Tc Method	= TR55	Time of Conc. (Tc)	= 16.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 3.63 in/hr
Freq. Corr. Factor	= 1.00	Asc/Rec Limb Factors	= 1/1.67



Hydrograph 10-yr Summary

Hydrology Studio v 3.0.0.39

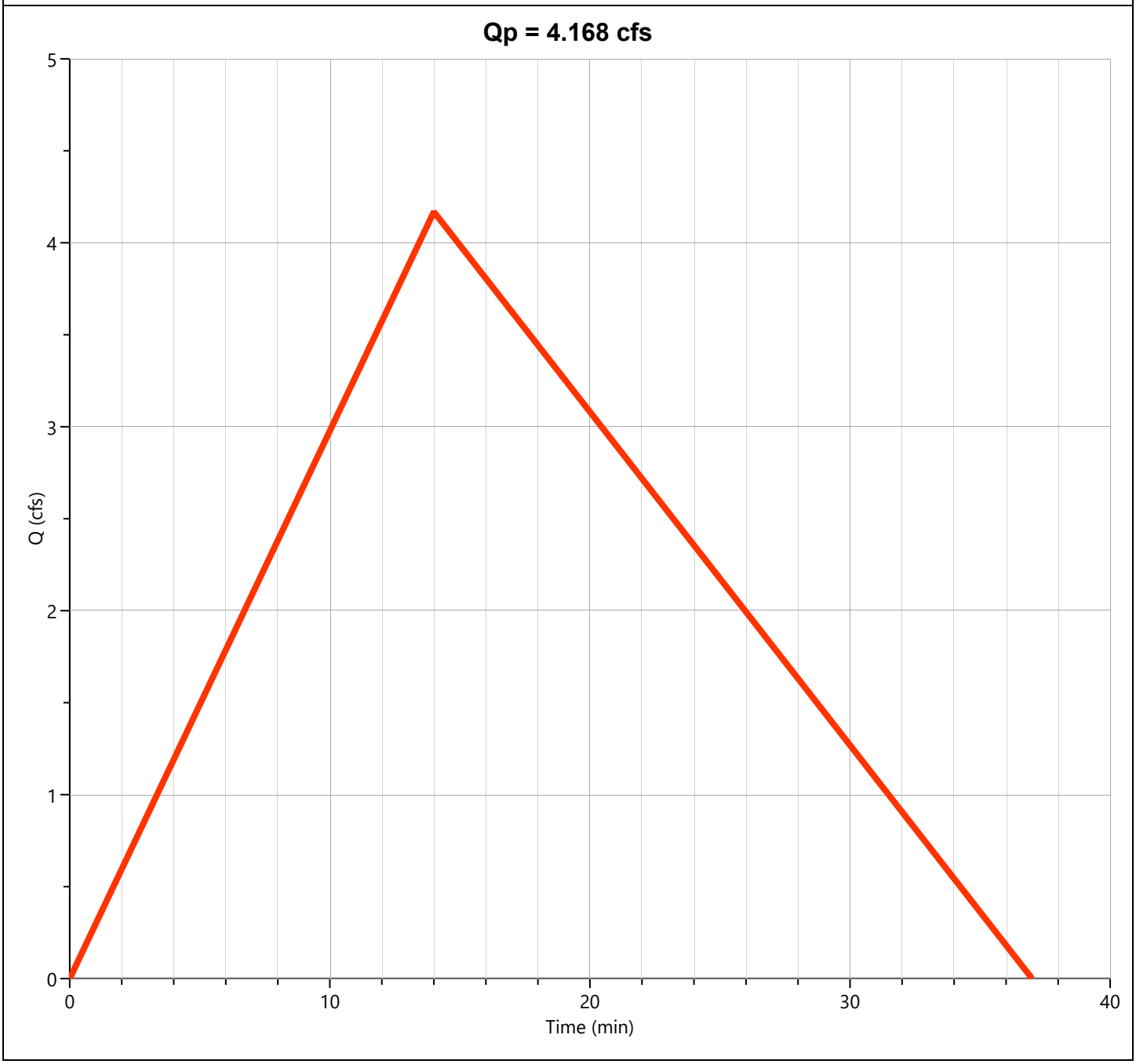
Project Name: Bryant Pharmacy
File: Detention Calculation 11-13-25 FINAL.hys
11-13-2025

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	Rational	Pre-Dev Basin "A"	4.168	0.23	4,674	----		
2	Rational	Pre-Dev Basin "B"	9.942	0.23	11,149	----		
3	Junction	Total Pre-Dev West	14.11	0.23	15,662	1, 2		
4	Rational	Pre-Dev Basin "C"	1.236	0.18	1,089	----		
5	Rational	Pre-Dev Basin "D"	1.353	0.25	1,626	----		
6	Junction	Total Pre-Dev East	2.314	0.25	2,699	4, 5		
7	Rational	Pre-Dev Basin "E"	1.314	0.32	1,999	----		
8	Mod Rational	Post-Dev Basin A	4.229	0.20	10,404	----		
9	Pond Route	Detention Basin	3.972	0.70	10,402	8	422.03	2,910
10	Rational	Post-Dev Basin B	11.38	0.23	12,764	----		
11	Junction	Total Post-Dev West	13.53	0.23	23,036	9, 10		
12	Rational	Post-Dev Basin "C"	1.931	0.12	1,083	----		
13	Rational	Post-Dev Basin "D"	0.381	0.28	519	----		
14	Junction	Total Post-Dev East	2.088	0.12	1,557	12, 13		
15	Rational	Post-Dev Basin "E"	0.889	0.27	1,140	----		

Pre-Dev Basin "A"

Hyd. No. 1

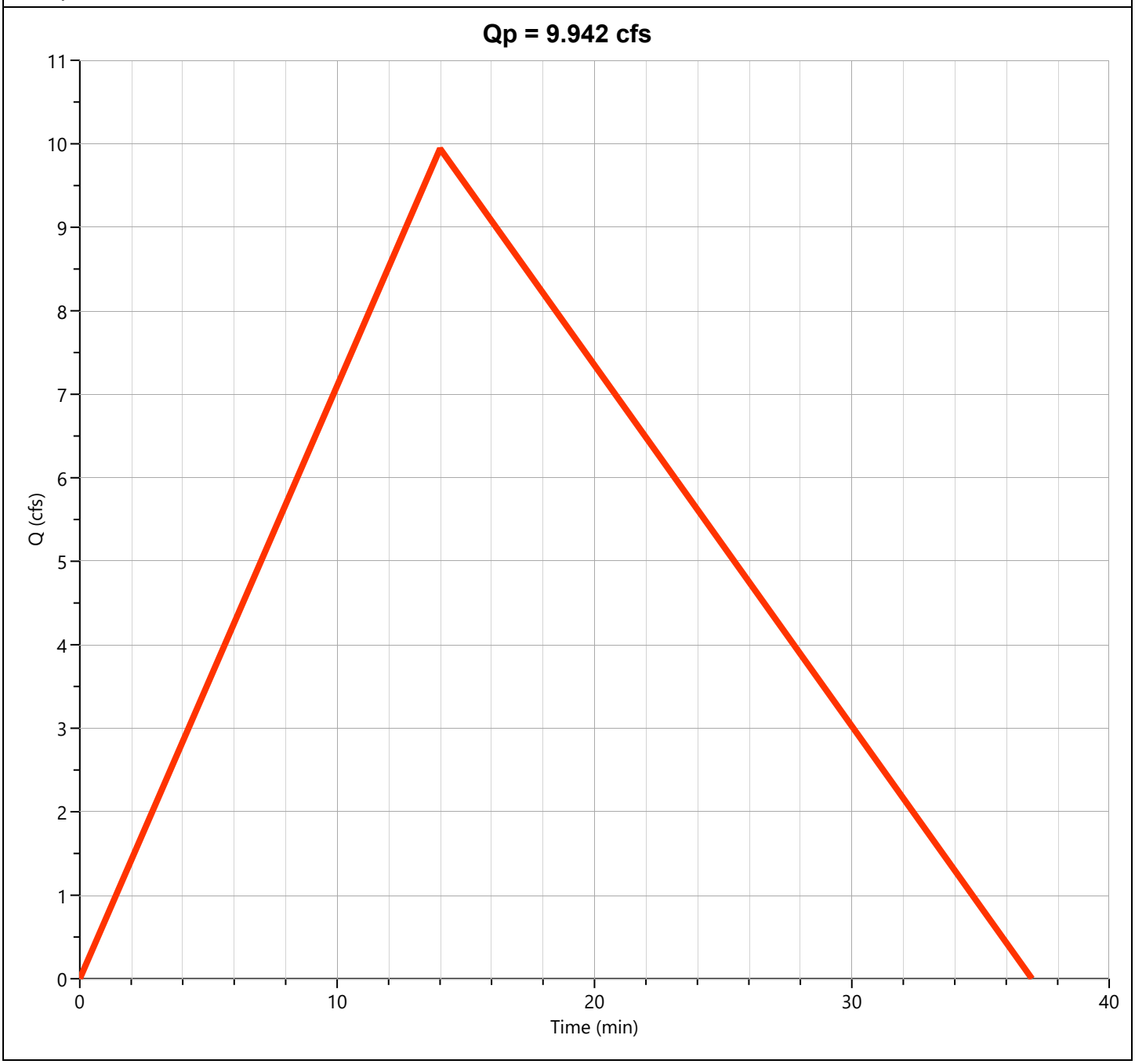
Hydrograph Type	= Rational	Peak Flow	= 4.168 cfs
Storm Frequency	= 10-yr	Time to Peak	= 0.23 hrs
Time Interval	= 1 min	Runoff Volume	= 4,674 cuft
Drainage Area	= 1.44 ac	Runoff Coeff.	= 0.56
Tc Method	= TR55	Time of Conc. (Tc)	= 14.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 5.17 in/hr
Freq. Corr. Factor	= 1.00	Asc/Rec Limb Factors	= 1/1.67



Pre-Dev Basin "B"

Hyd. No. 2

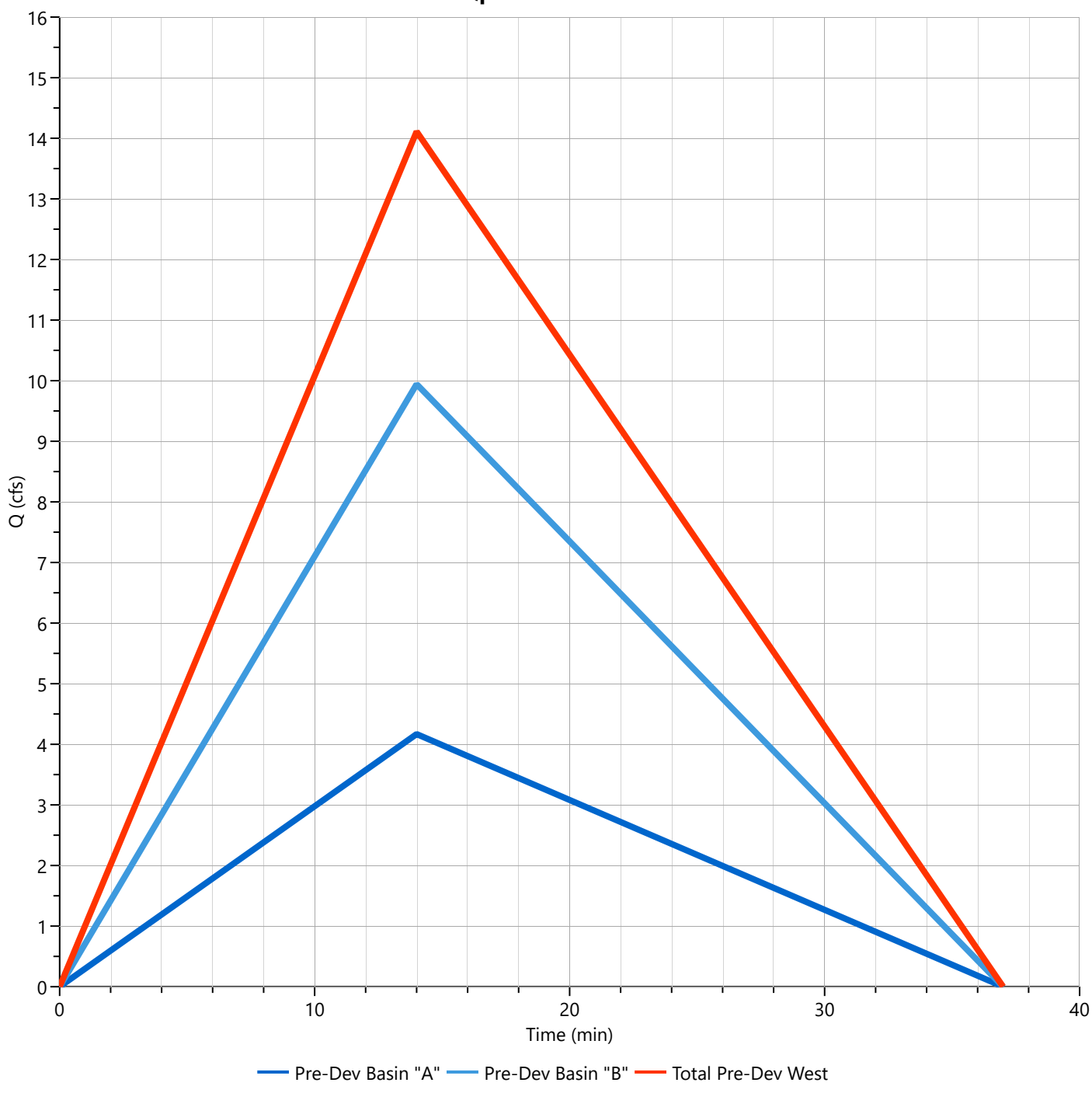
Hydrograph Type	= Rational	Peak Flow	= 9.942 cfs
Storm Frequency	= 10-yr	Time to Peak	= 0.23 hrs
Time Interval	= 1 min	Runoff Volume	= 11,149 cuft
Drainage Area	= 3.26 ac	Runoff Coeff.	= 0.59
Tc Method	= TR55	Time of Conc. (Tc)	= 14.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 5.17 in/hr
Freq. Corr. Factor	= 1.00	Asc/Rec Limb Factors	= 1/1.67



Total Pre-Dev West

Hyd. No. 3

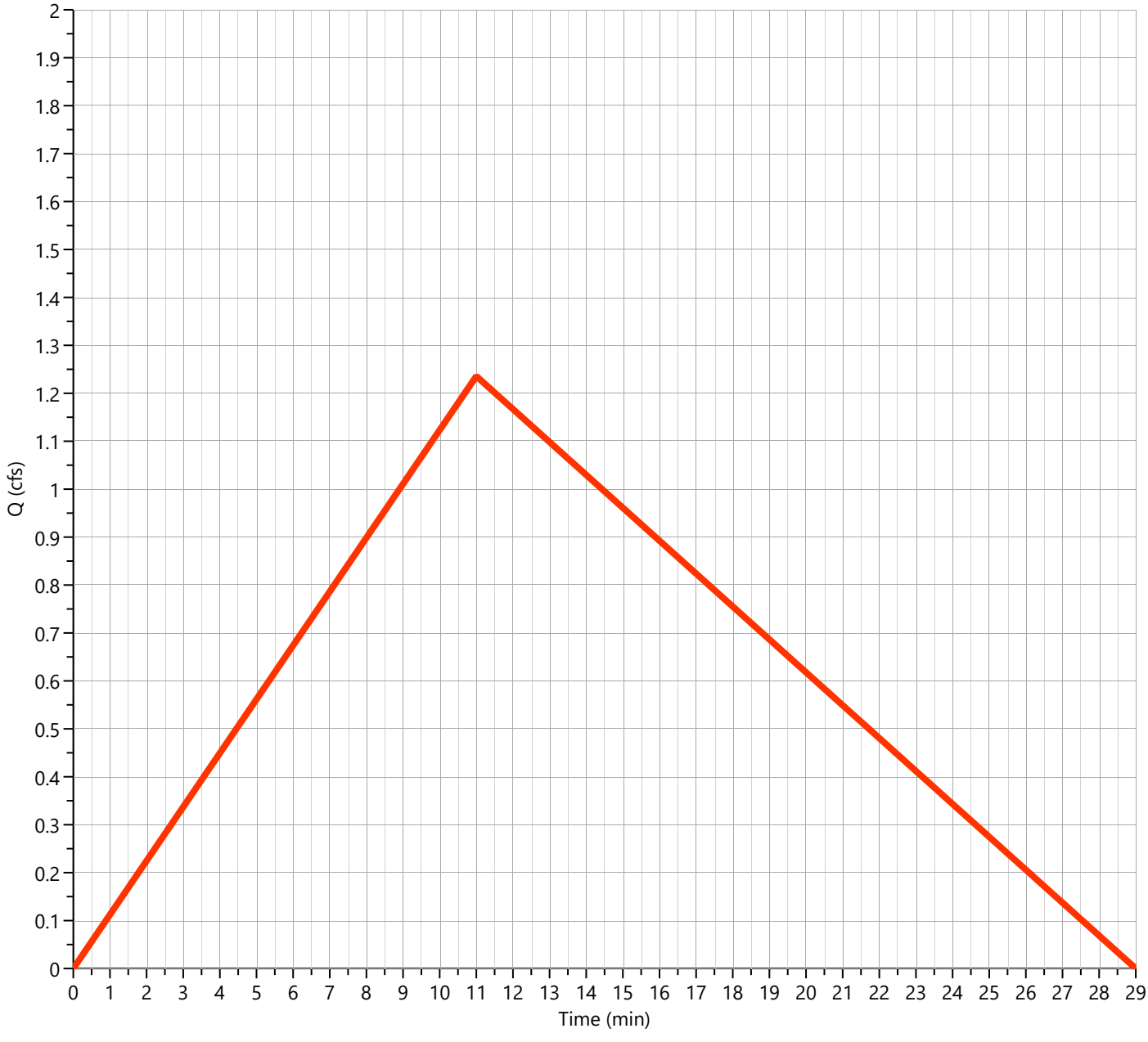
Hydrograph Type	= Junction	Peak Flow	= 14.11 cfs
Storm Frequency	= 10-yr	Time to Peak	= 0.23 hrs
Time Interval	= 1 min	Hydrograph Volume	= 15,662 cuft
Inflow Hydrographs	= 1, 2	Total Contrib. Area	= 4.7 ac



Pre-Dev Basin "C"

Hyd. No. 4

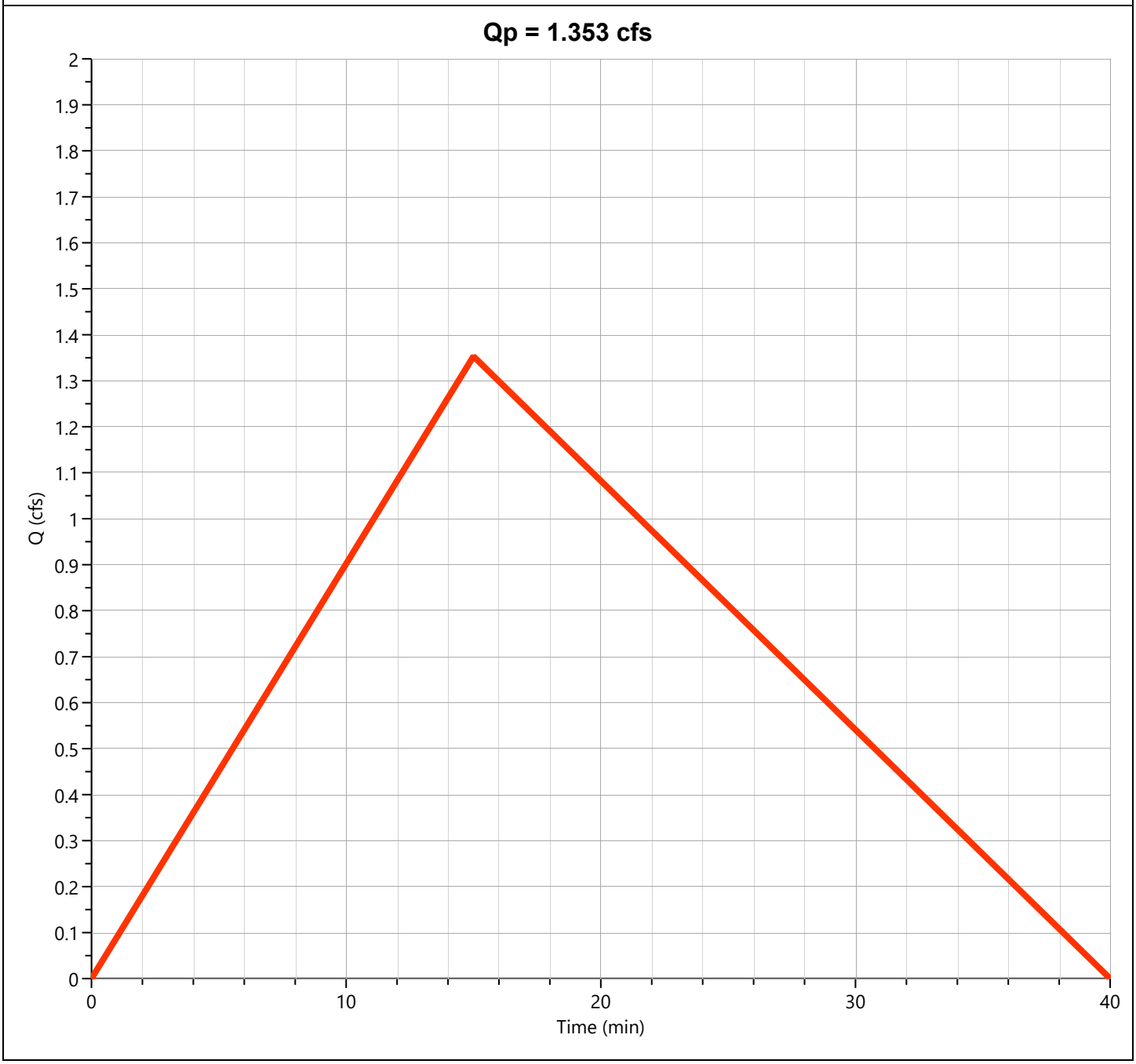
Hydrograph Type	= Rational	Peak Flow	= 1.236 cfs
Storm Frequency	= 10-yr	Time to Peak	= 0.18 hrs
Time Interval	= 1 min	Runoff Volume	= 1,089 cuft
Drainage Area	= 0.33 ac	Runoff Coeff.	= 0.65
Tc Method	= TR55	Time of Conc. (Tc)	= 11.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 5.76 in/hr
Freq. Corr. Factor	= 1.00	Asc/Rec Limb Factors	= 1/1.67



Pre-Dev Basin "D"

Hyd. No. 5

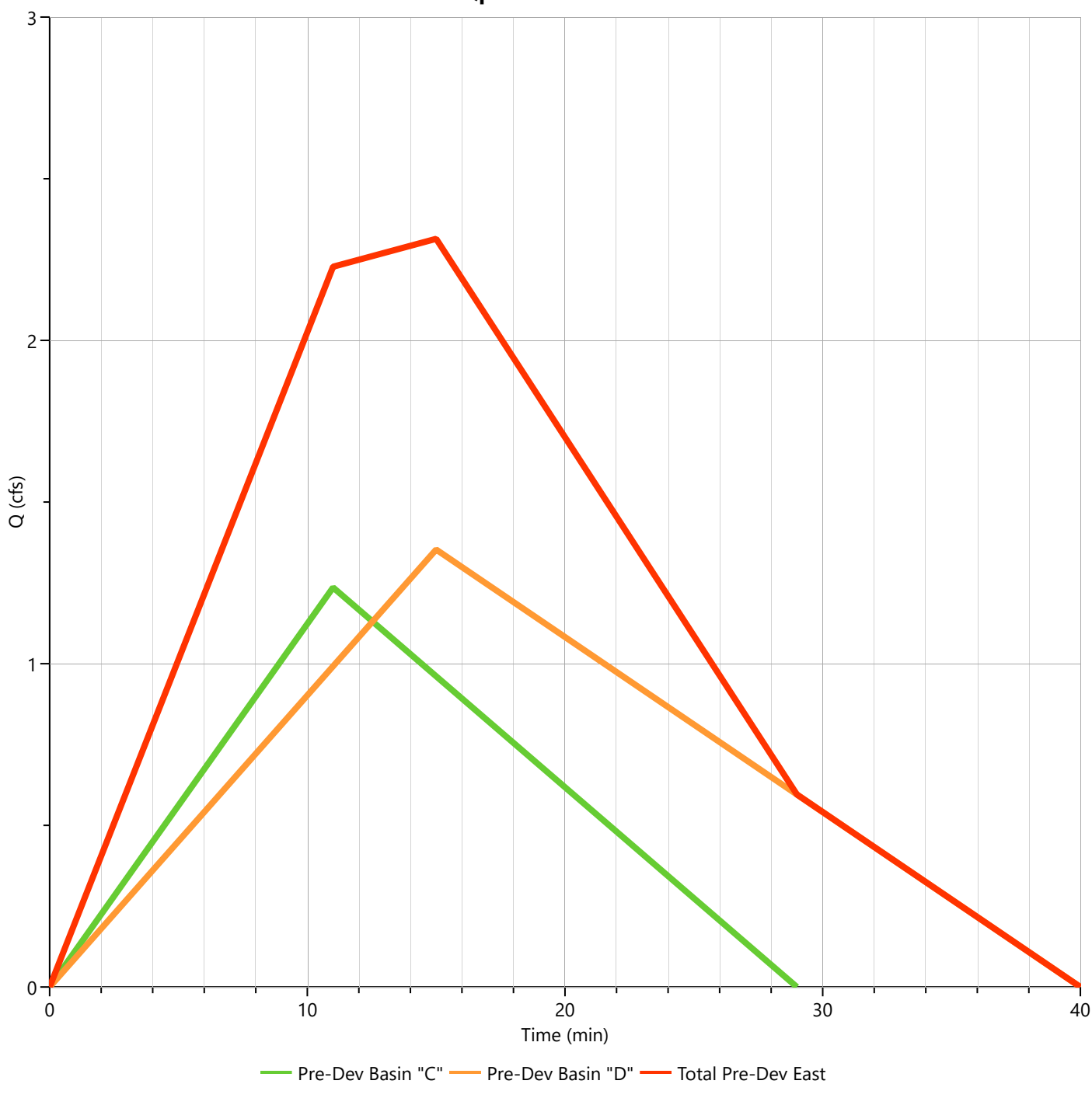
Hydrograph Type	= Rational	Peak Flow	= 1.353 cfs
Storm Frequency	= 10-yr	Time to Peak	= 0.25 hrs
Time Interval	= 1 min	Runoff Volume	= 1,626 cuft
Drainage Area	= 0.5 ac	Runoff Coeff.	= 0.54
Tc Method	= TR55	Time of Conc. (Tc)	= 15.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 5.01 in/hr
Freq. Corr. Factor	= 1.00	Asc/Rec Limb Factors	= 1/1.67



Total Pre-Dev East

Hyd. No. 6

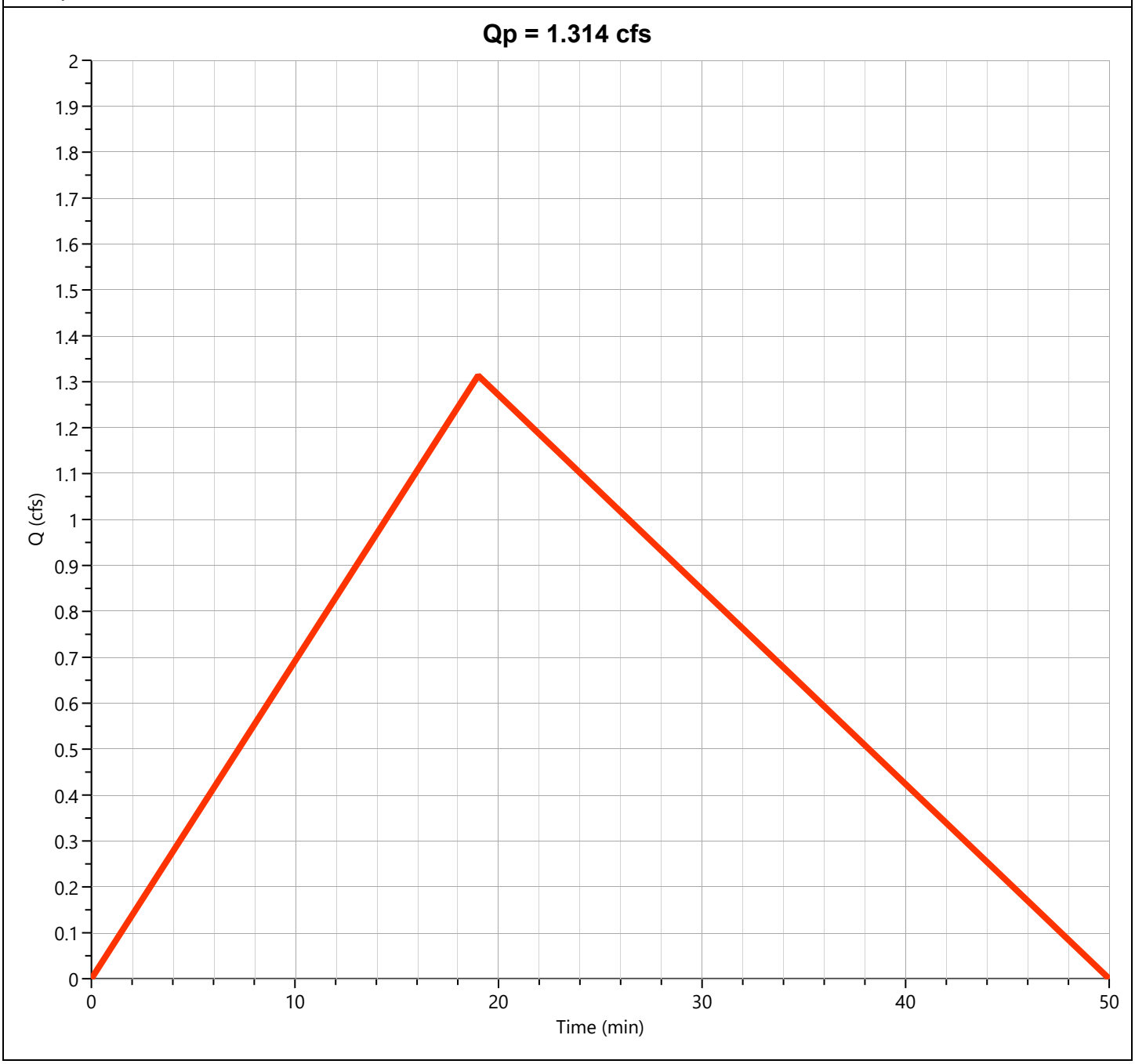
Hydrograph Type	= Junction	Peak Flow	= 2.314 cfs
Storm Frequency	= 10-yr	Time to Peak	= 0.25 hrs
Time Interval	= 1 min	Hydrograph Volume	= 2,699 cuft
Inflow Hydrographs	= 4, 5	Total Contrib. Area	= 0.83 ac



Pre-Dev Basin "E"

Hyd. No. 7

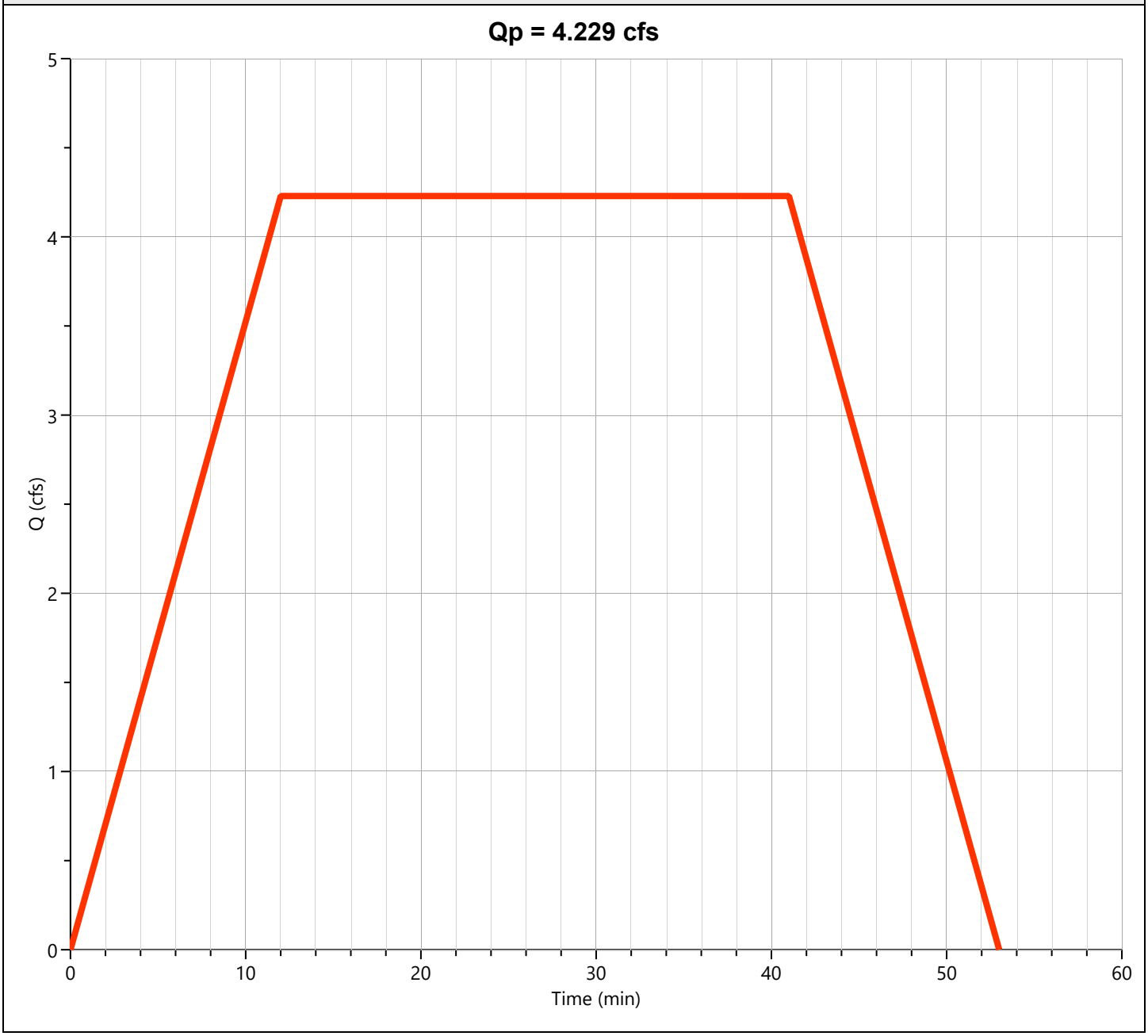
Hydrograph Type	= Rational	Peak Flow	= 1.314 cfs
Storm Frequency	= 10-yr	Time to Peak	= 0.32 hrs
Time Interval	= 1 min	Runoff Volume	= 1,999 cuft
Drainage Area	= 0.53 ac	Runoff Coeff.	= 0.55
Tc Method	= TR55	Time of Conc. (Tc)	= 19.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 4.51 in/hr
Freq. Corr. Factor	= 1.00	Asc/Rec Limb Factors	= 1/1.67



Post-Dev Basin A

Hyd. No. 8

Hydrograph Type	= Mod Rational	Peak Flow	= 4.229 cfs
Storm Frequency	= 10-yr	Time to Peak	= 0.20 hrs
Time Interval	= 1 min	Runoff Volume	= 10,404 cuft
Drainage Area	= 1.56 ac	Runoff Coeff.	= 0.85
Tc Method	= User	Time of Conc. (Tc)	= 12.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 3.19 in/hr
Freq. Corr. Factor	= 1.00	Storm Duration	= 3.42 x Tc
Target Q	= 0.000 cfs	Required Storage	= 0.000 cuft



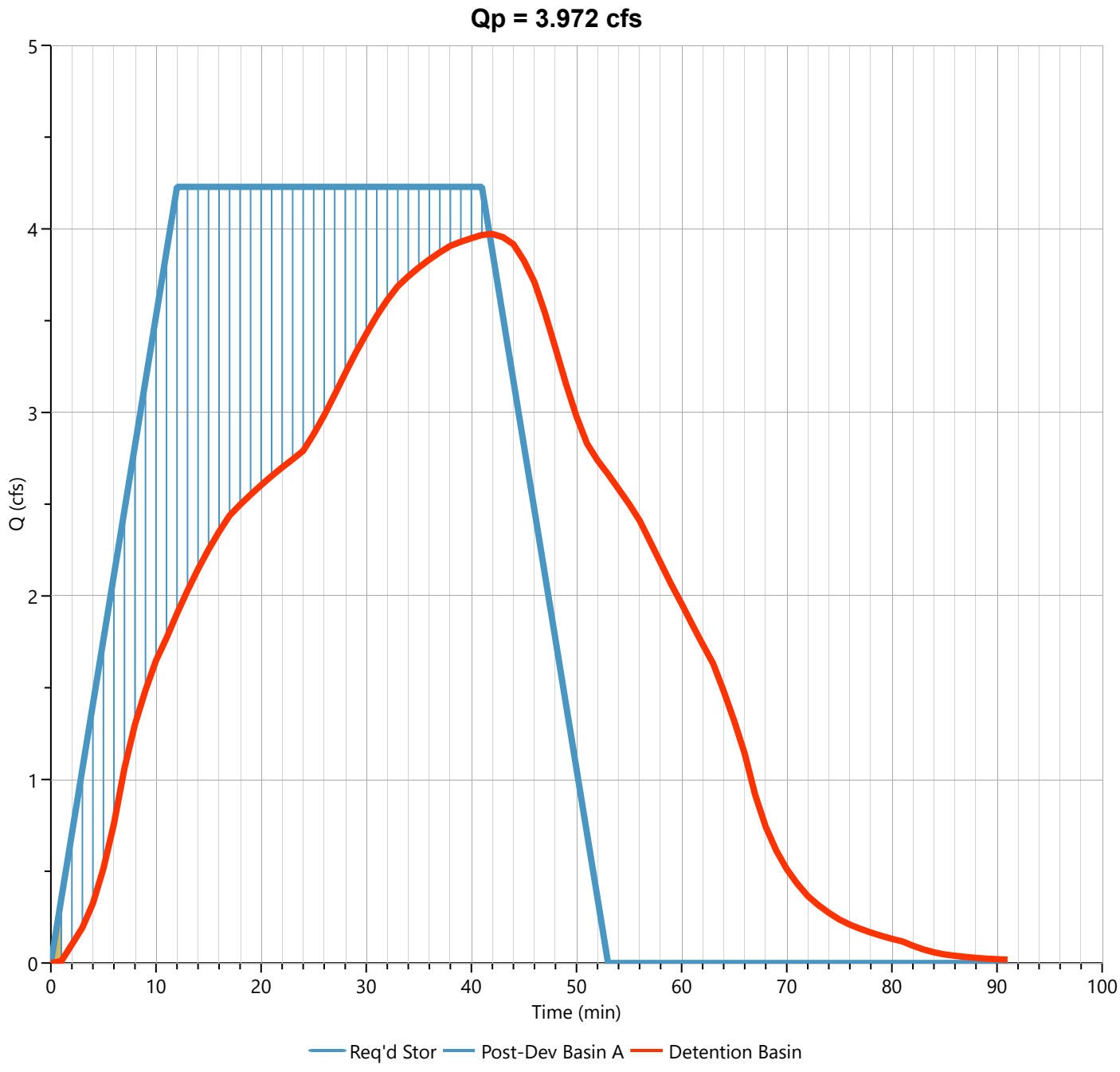
Detention Basin

Hyd. No. 9

Hydrograph Type	= Pond Route	Peak Flow	= 3.972 cfs
Storm Frequency	= 10-yr	Time to Peak	= 0.70 hrs
Time Interval	= 1 min	Hydrograph Volume	= 10,402 cuft
Inflow Hydrograph	= 8 - Post-Dev Basin A	Max. Elevation	= 422.03 ft
Pond Name	= Bryant Pharmacy Detention Pond	Max. Storage	= 2,910 cuft

Pond Routing by Storage Indication Method

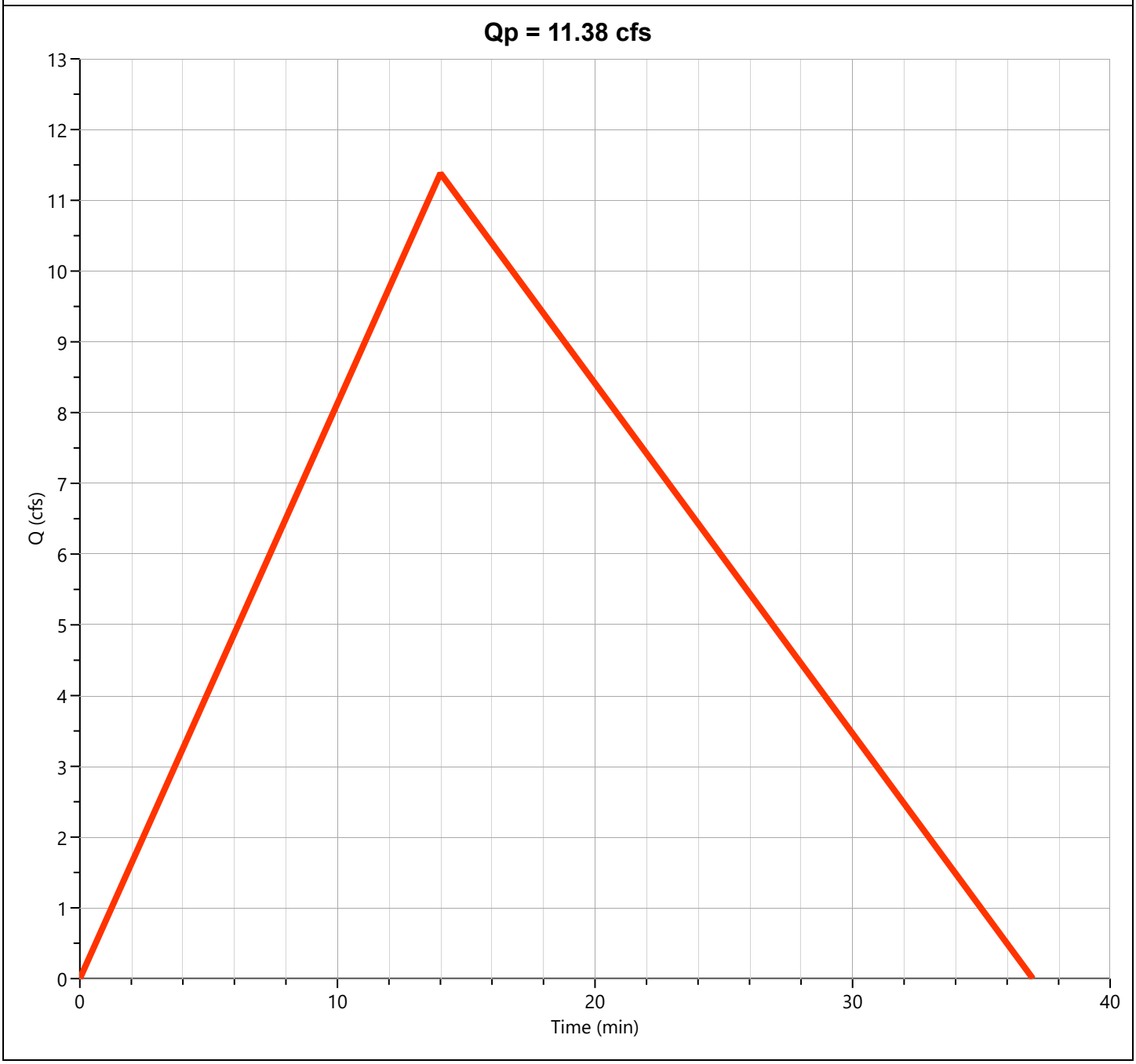
Center of mass detention time = 11 min



Post-Dev Basin B

Hyd. No. 10

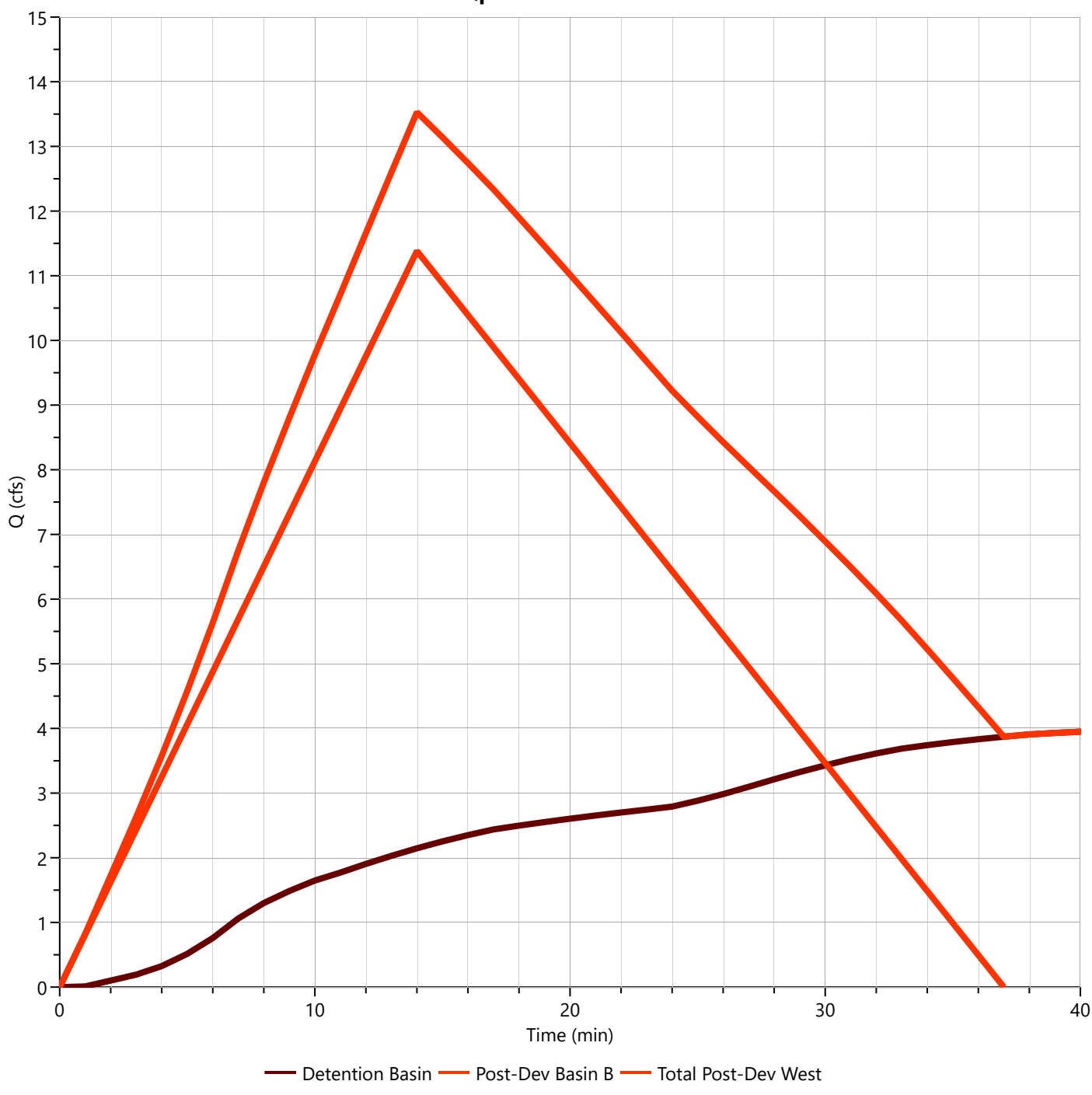
Hydrograph Type	= Rational	Peak Flow	= 11.38 cfs
Storm Frequency	= 10-yr	Time to Peak	= 0.23 hrs
Time Interval	= 1 min	Runoff Volume	= 12,764 cuft
Drainage Area	= 3.67 ac	Runoff Coeff.	= 0.60
Tc Method	= TR55	Time of Conc. (Tc)	= 14.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 5.17 in/hr
Freq. Corr. Factor	= 1.00	Asc/Rec Limb Factors	= 1/1.67



Total Post-Dev West

Hyd. No. 11

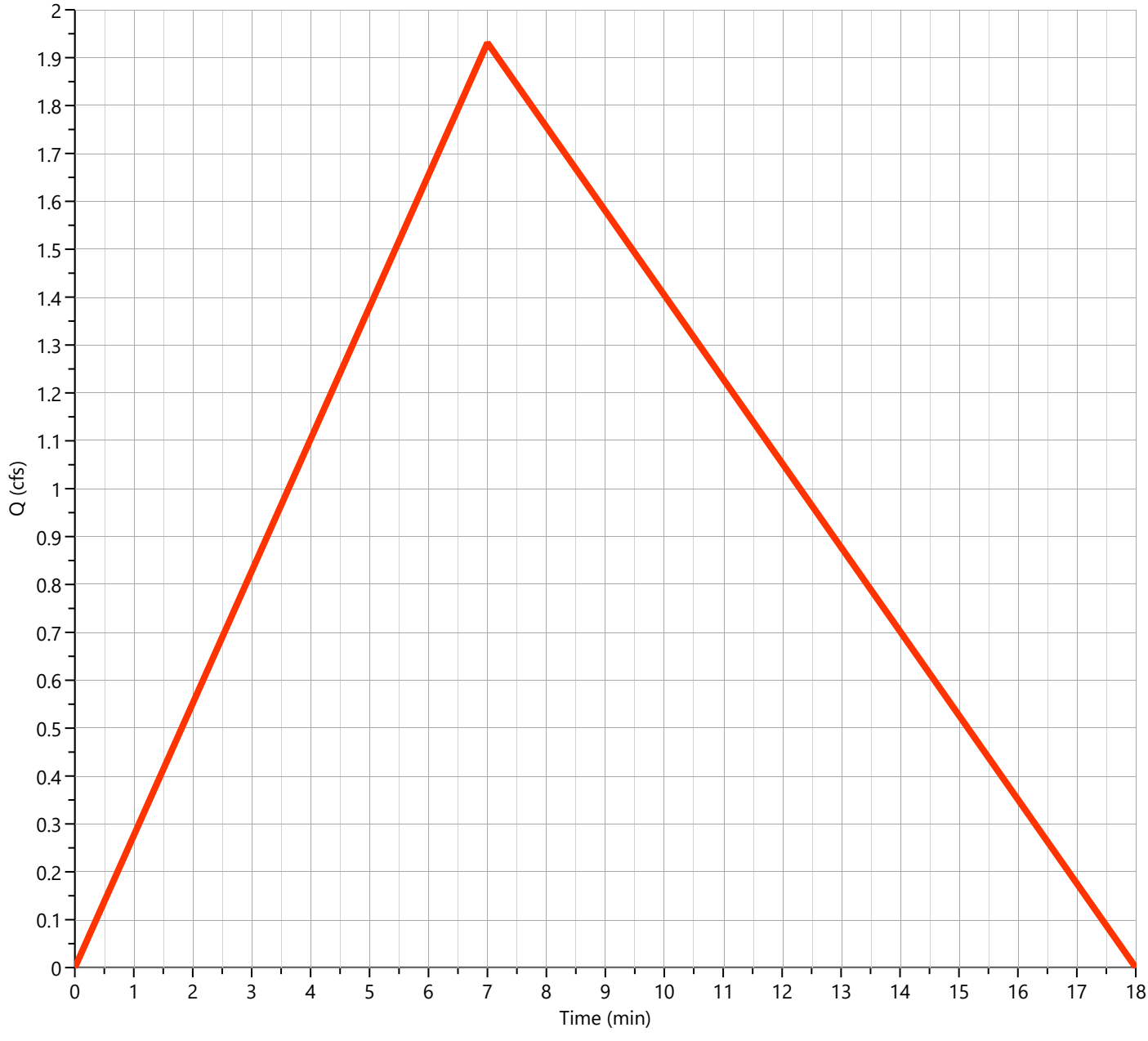
Hydrograph Type	= Junction	Peak Flow	= 13.53 cfs
Storm Frequency	= 10-yr	Time to Peak	= 0.23 hrs
Time Interval	= 1 min	Hydrograph Volume	= 23,036 cuft
Inflow Hydrographs	= 10	Total Contrib. Area	= 3.67 ac



Post-Dev Basin "C"

Hyd. No. 12

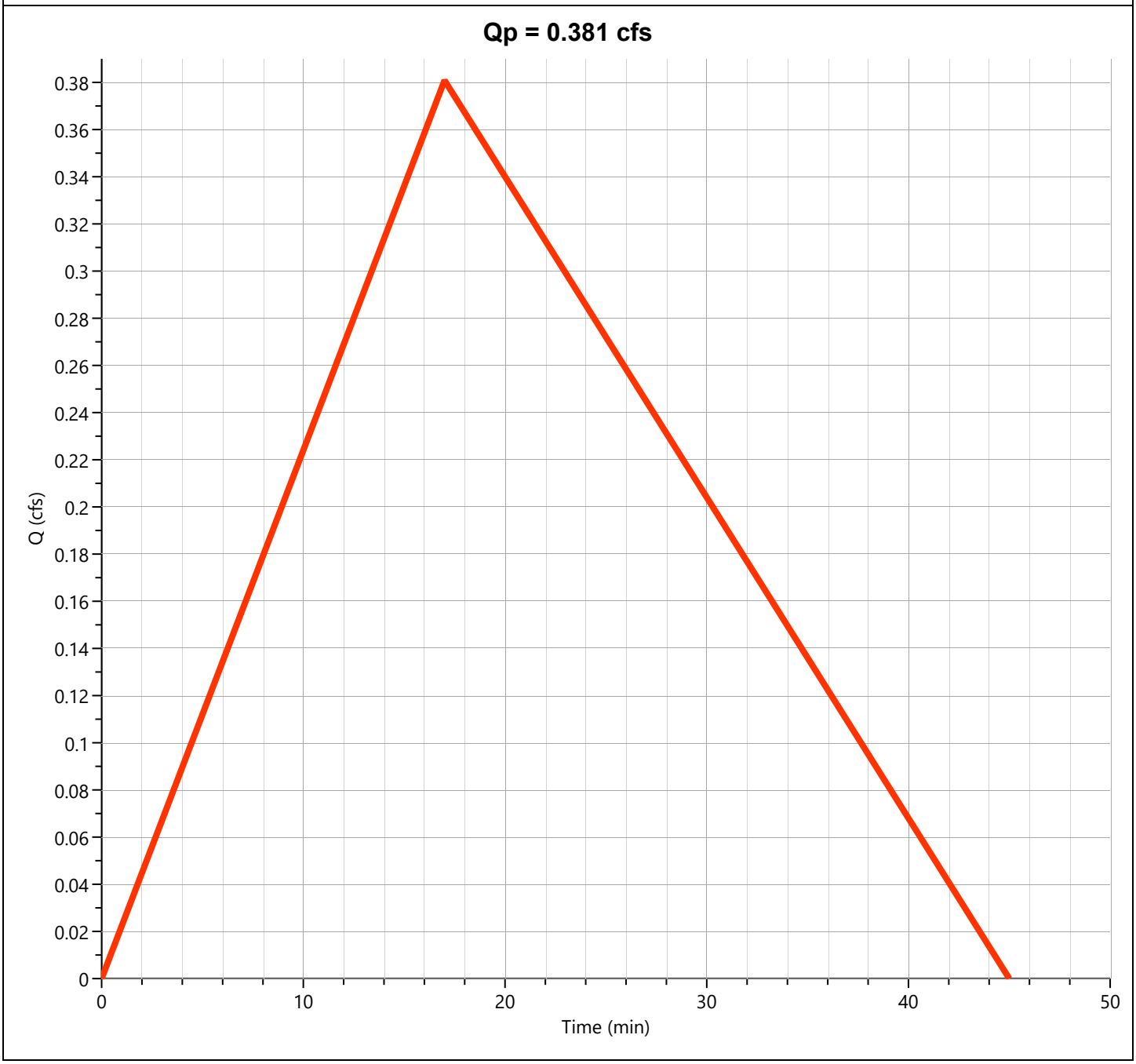
Hydrograph Type	= Rational	Peak Flow	= 1.931 cfs
Storm Frequency	= 10-yr	Time to Peak	= 0.12 hrs
Time Interval	= 1 min	Runoff Volume	= 1,083 cuft
Drainage Area	= 0.38 ac	Runoff Coeff.	= 0.72
Tc Method	= TR55	Time of Conc. (Tc)	= 7.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 7.06 in/hr
Freq. Corr. Factor	= 1.00	Asc/Rec Limb Factors	= 1/1.67



Post-Dev Basin "D"

Hyd. No. 13

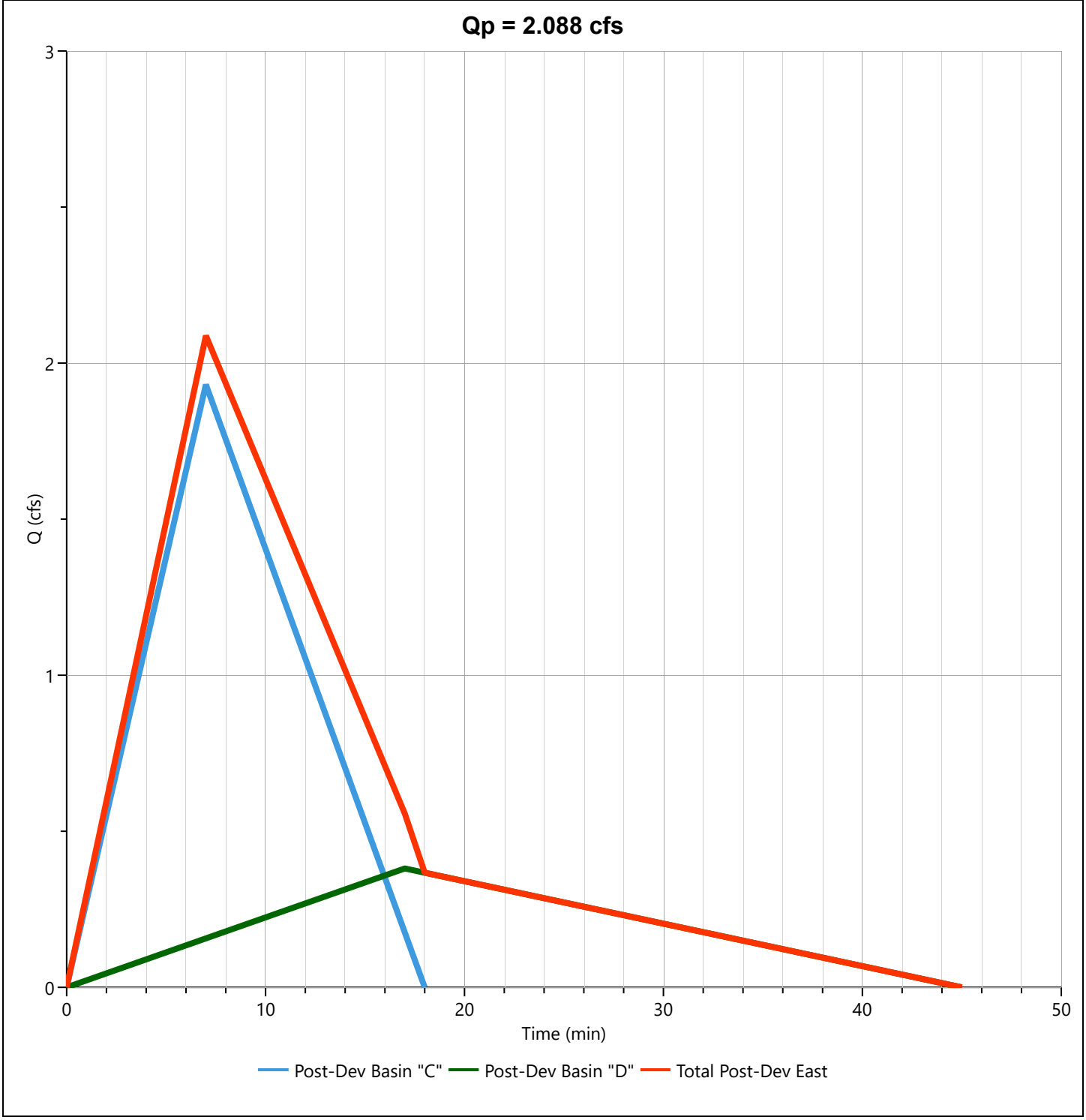
Hydrograph Type	= Rational	Peak Flow	= 0.381 cfs
Storm Frequency	= 10-yr	Time to Peak	= 0.28 hrs
Time Interval	= 1 min	Runoff Volume	= 519 cuft
Drainage Area	= 0.12 ac	Runoff Coeff.	= 0.67
Tc Method	= TR55	Time of Conc. (Tc)	= 17.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 4.74 in/hr
Freq. Corr. Factor	= 1.00	Asc/Rec Limb Factors	= 1/1.67



Total Post-Dev East

Hyd. No. 14

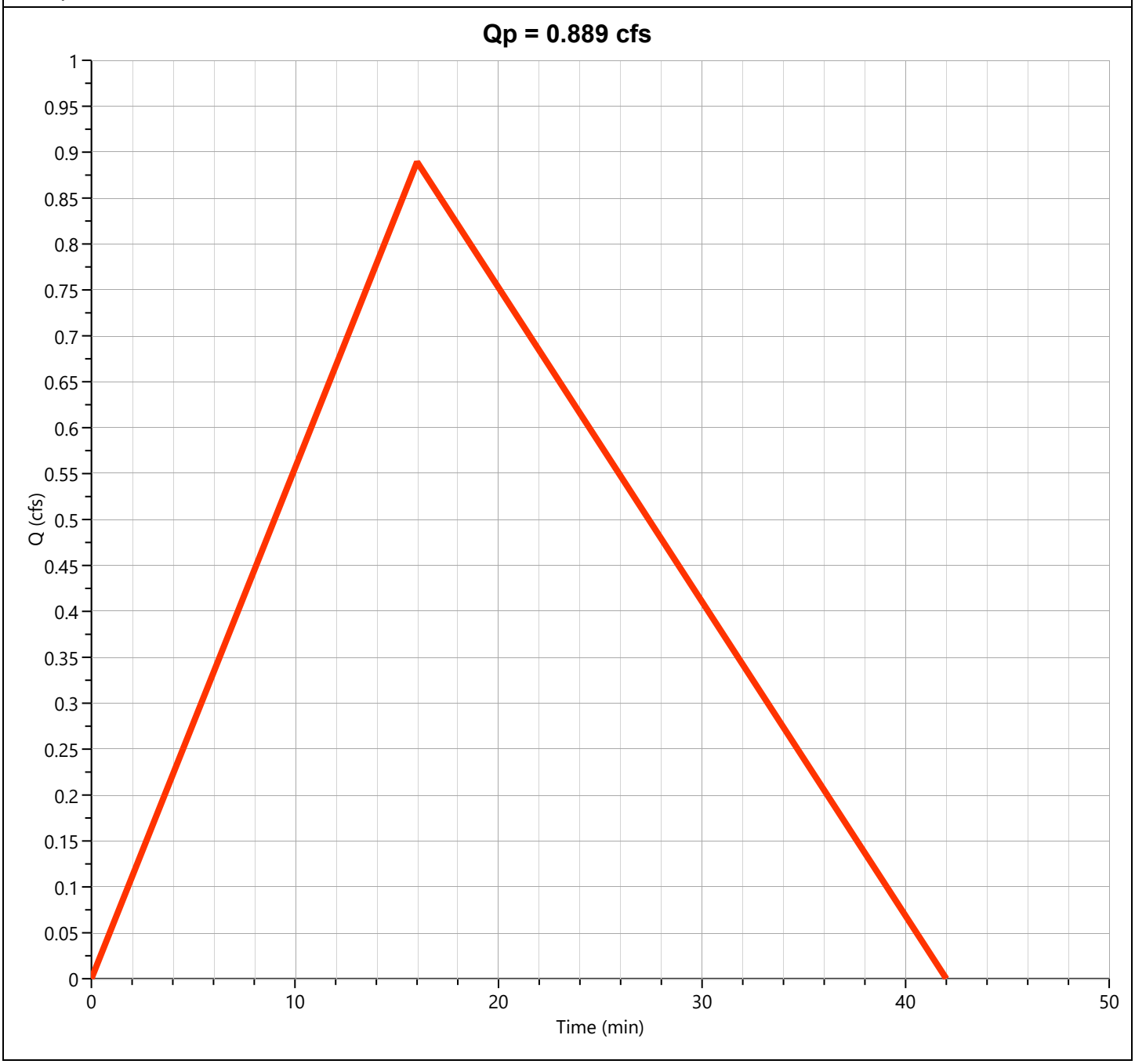
Hydrograph Type	= Junction	Peak Flow	= 2.088 cfs
Storm Frequency	= 10-yr	Time to Peak	= 0.12 hrs
Time Interval	= 1 min	Hydrograph Volume	= 1,557 cuft
Inflow Hydrographs	= 12, 13	Total Contrib. Area	= 0.5 ac



Post-Dev Basin "E"

Hyd. No. 15

Hydrograph Type	= Rational	Peak Flow	= 0.889 cfs
Storm Frequency	= 10-yr	Time to Peak	= 0.27 hrs
Time Interval	= 1 min	Runoff Volume	= 1,140 cuft
Drainage Area	= 0.29 ac	Runoff Coeff.	= 0.63
Tc Method	= TR55	Time of Conc. (Tc)	= 16.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 4.87 in/hr
Freq. Corr. Factor	= 1.00	Asc/Rec Limb Factors	= 1/1.67



Hydrograph 25-yr Summary

Hydrology Studio v 3.0.0.39

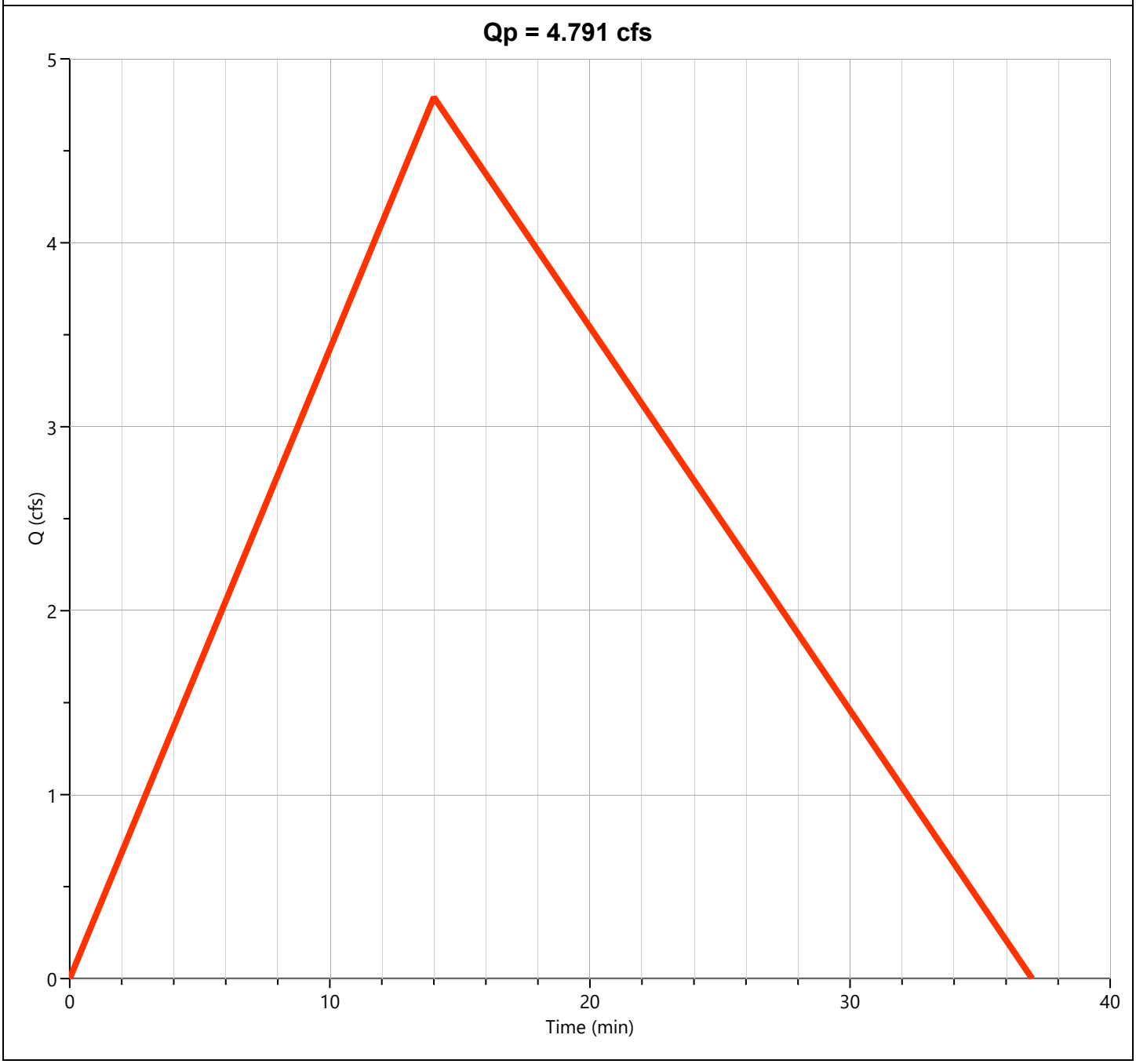
Project Name: Bryant Pharmacy
File: Detention Calculation 11-13-25 FINAL.hys
11-13-2025

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	Rational	Pre-Dev Basin "A"	4.791	0.23	5,372	----		
2	Rational	Pre-Dev Basin "B"	11.43	0.23	12,814	----		
3	Junction	Total Pre-Dev West	16.22	0.23	18,001	1, 2		
4	Rational	Pre-Dev Basin "C"	1.420	0.18	1,251	----		
5	Rational	Pre-Dev Basin "D"	1.555	0.25	1,868	----		
6	Junction	Total Pre-Dev East	2.660	0.25	3,102	4, 5		
7	Rational	Pre-Dev Basin "E"	1.510	0.32	2,298	----		
8	Mod Rational	Post-Dev Basin A	4.864	0.20	11,965	----		
9	Pond Route	Detention Basin	4.449	0.70	11,963	8	422.31	3,400
10	Rational	Post-Dev Basin B	13.08	0.23	14,670	----		
11	Junction	Total Post-Dev West	15.42	0.23	26,484	9, 10		
12	Rational	Post-Dev Basin "C"	2.218	0.12	1,244	----		
13	Rational	Post-Dev Basin "D"	0.438	0.28	596	----		
14	Junction	Total Post-Dev East	2.399	0.12	1,789	12, 13		
15	Rational	Post-Dev Basin "E"	1.022	0.27	1,310	----		

Pre-Dev Basin "A"

Hyd. No. 1

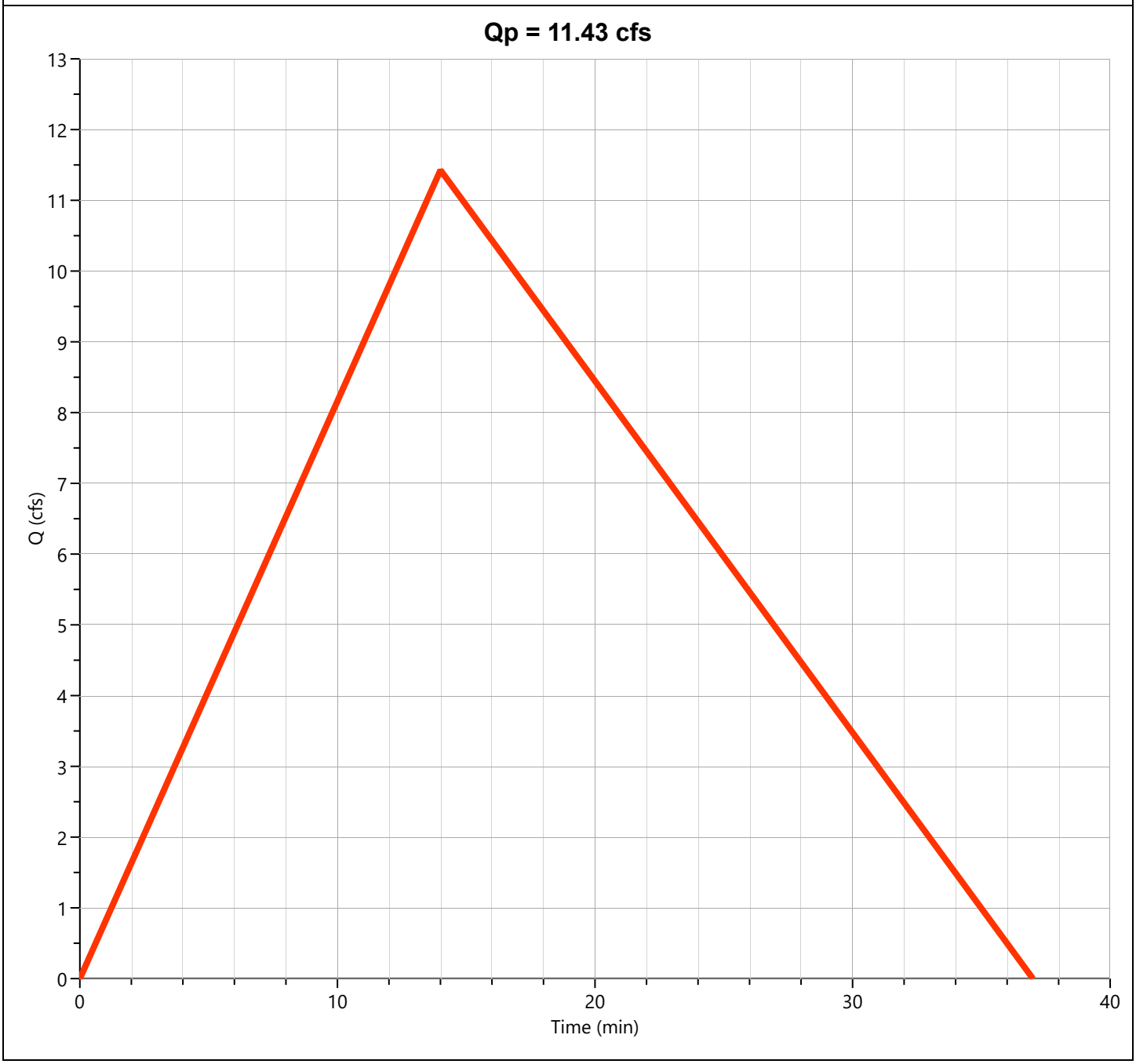
Hydrograph Type	= Rational	Peak Flow	= 4.791 cfs
Storm Frequency	= 25-yr	Time to Peak	= 0.23 hrs
Time Interval	= 1 min	Runoff Volume	= 5,372 cuft
Drainage Area	= 1.44 ac	Runoff Coeff.	= 0.56
Tc Method	= TR55	Time of Conc. (Tc)	= 14.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 5.94 in/hr
Freq. Corr. Factor	= 1.00	Asc/Rec Limb Factors	= 1/1.67



Pre-Dev Basin "B"

Hyd. No. 2

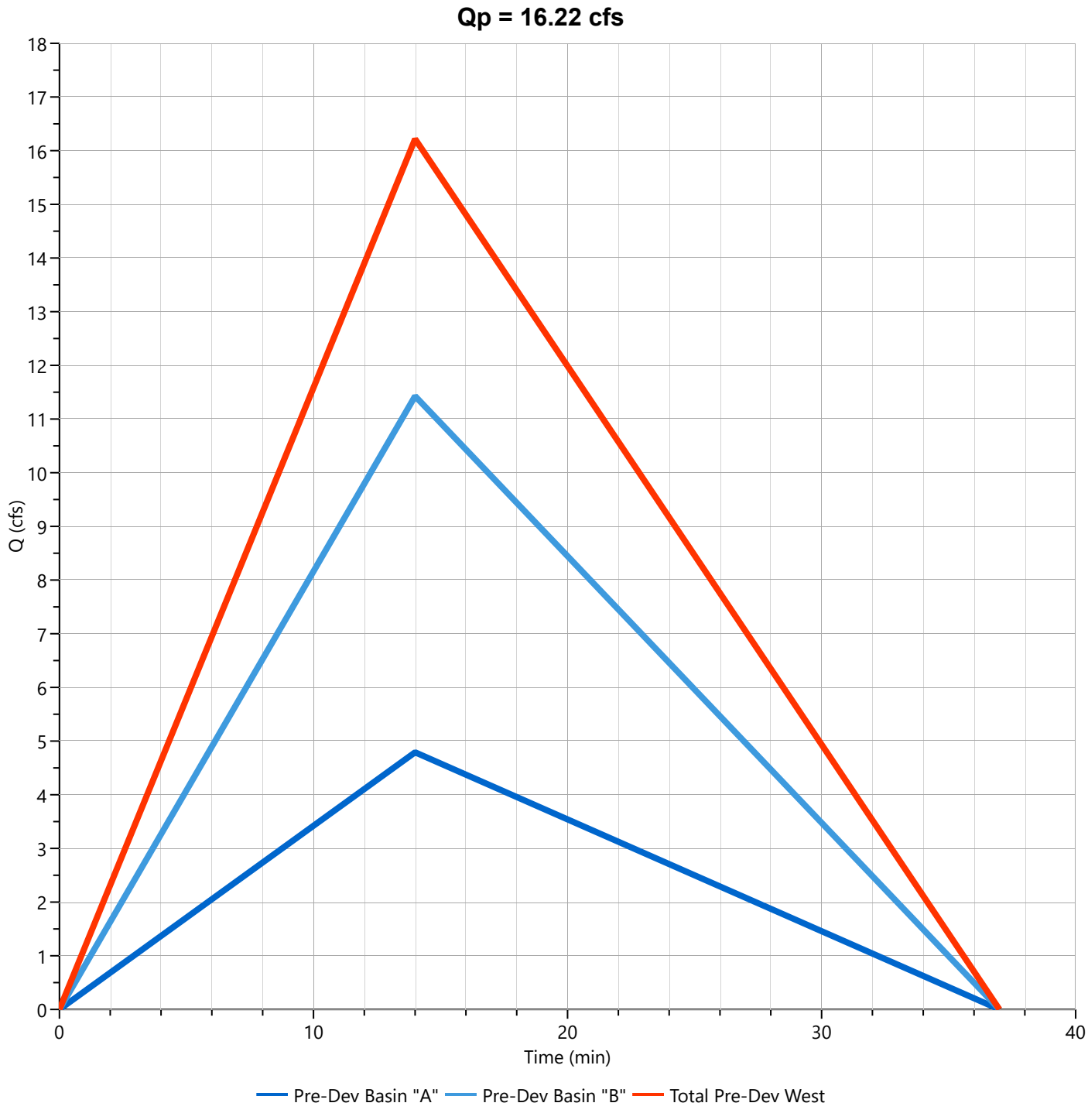
Hydrograph Type	= Rational	Peak Flow	= 11.43 cfs
Storm Frequency	= 25-yr	Time to Peak	= 0.23 hrs
Time Interval	= 1 min	Runoff Volume	= 12,814 cuft
Drainage Area	= 3.26 ac	Runoff Coeff.	= 0.59
Tc Method	= TR55	Time of Conc. (Tc)	= 14.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 5.94 in/hr
Freq. Corr. Factor	= 1.00	Asc/Rec Limb Factors	= 1/1.67



Total Pre-Dev West

Hyd. No. 3

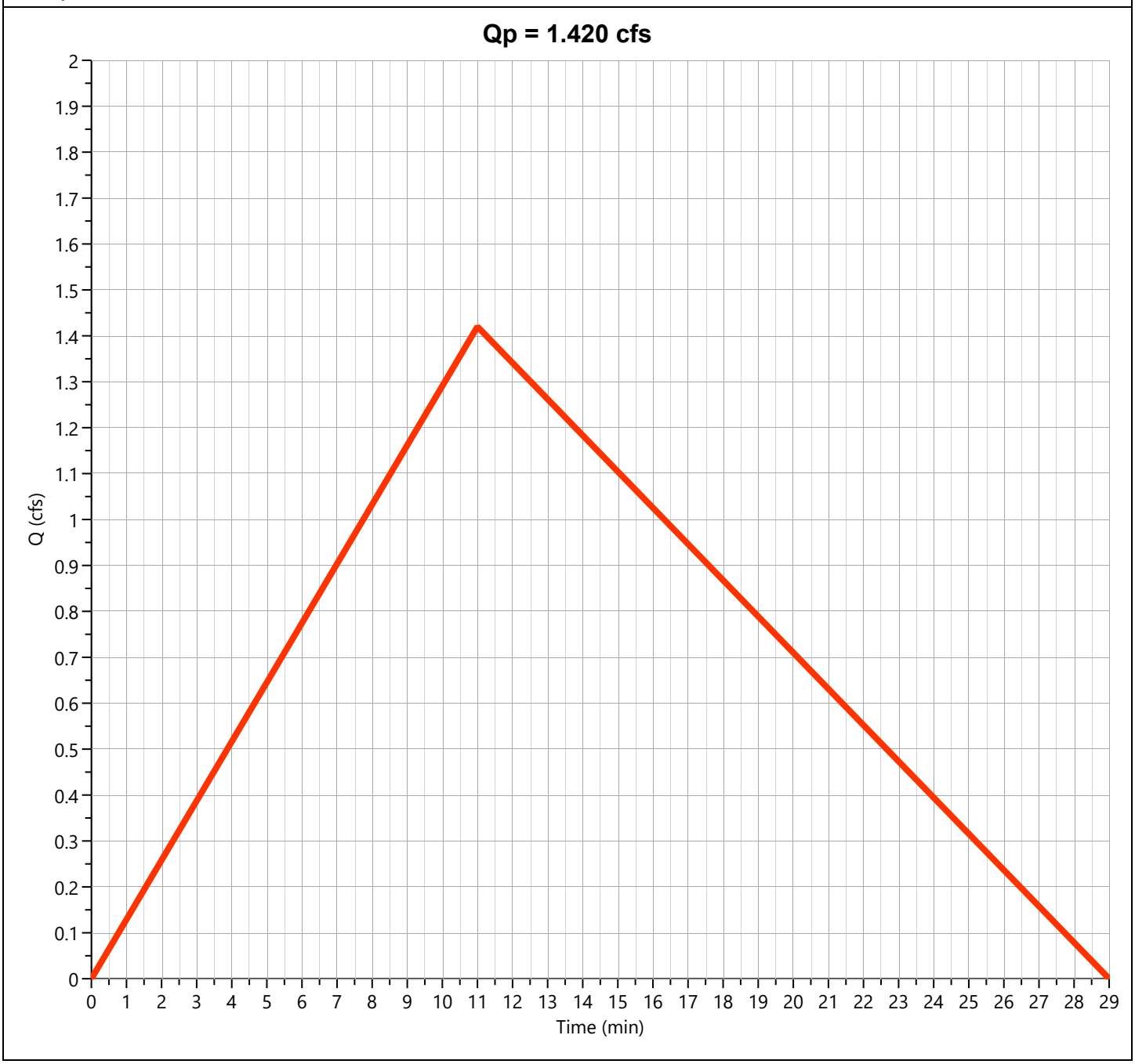
Hydrograph Type	= Junction	Peak Flow	= 16.22 cfs
Storm Frequency	= 25-yr	Time to Peak	= 0.23 hrs
Time Interval	= 1 min	Hydrograph Volume	= 18,001 cuft
Inflow Hydrographs	= 1, 2	Total Contrib. Area	= 4.7 ac



Pre-Dev Basin "C"

Hyd. No. 4

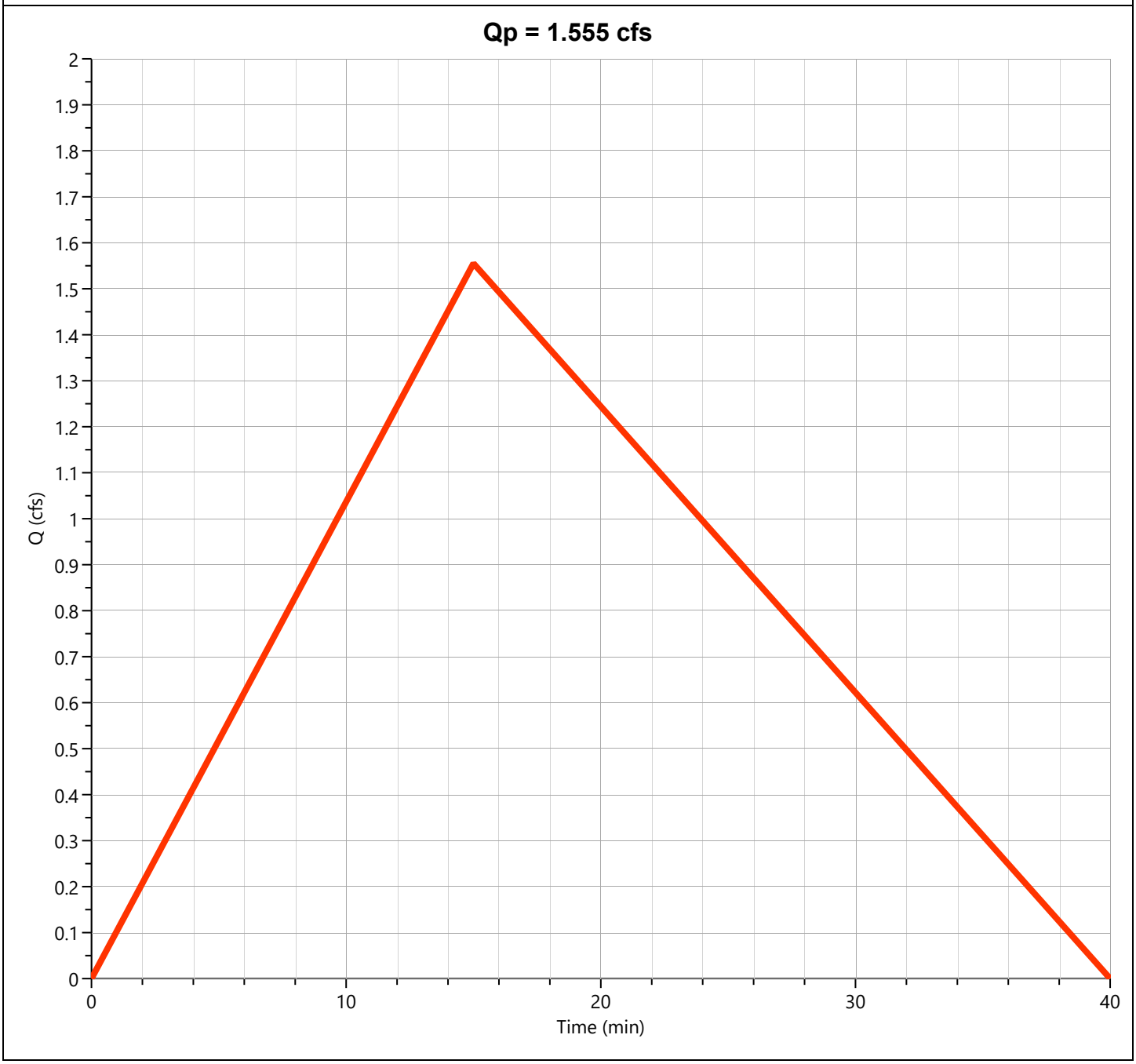
Hydrograph Type	= Rational	Peak Flow	= 1.420 cfs
Storm Frequency	= 25-yr	Time to Peak	= 0.18 hrs
Time Interval	= 1 min	Runoff Volume	= 1,251 cuft
Drainage Area	= 0.33 ac	Runoff Coeff.	= 0.65
Tc Method	= TR55	Time of Conc. (Tc)	= 11.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 6.62 in/hr
Freq. Corr. Factor	= 1.00	Asc/Rec Limb Factors	= 1/1.67



Pre-Dev Basin "D"

Hyd. No. 5

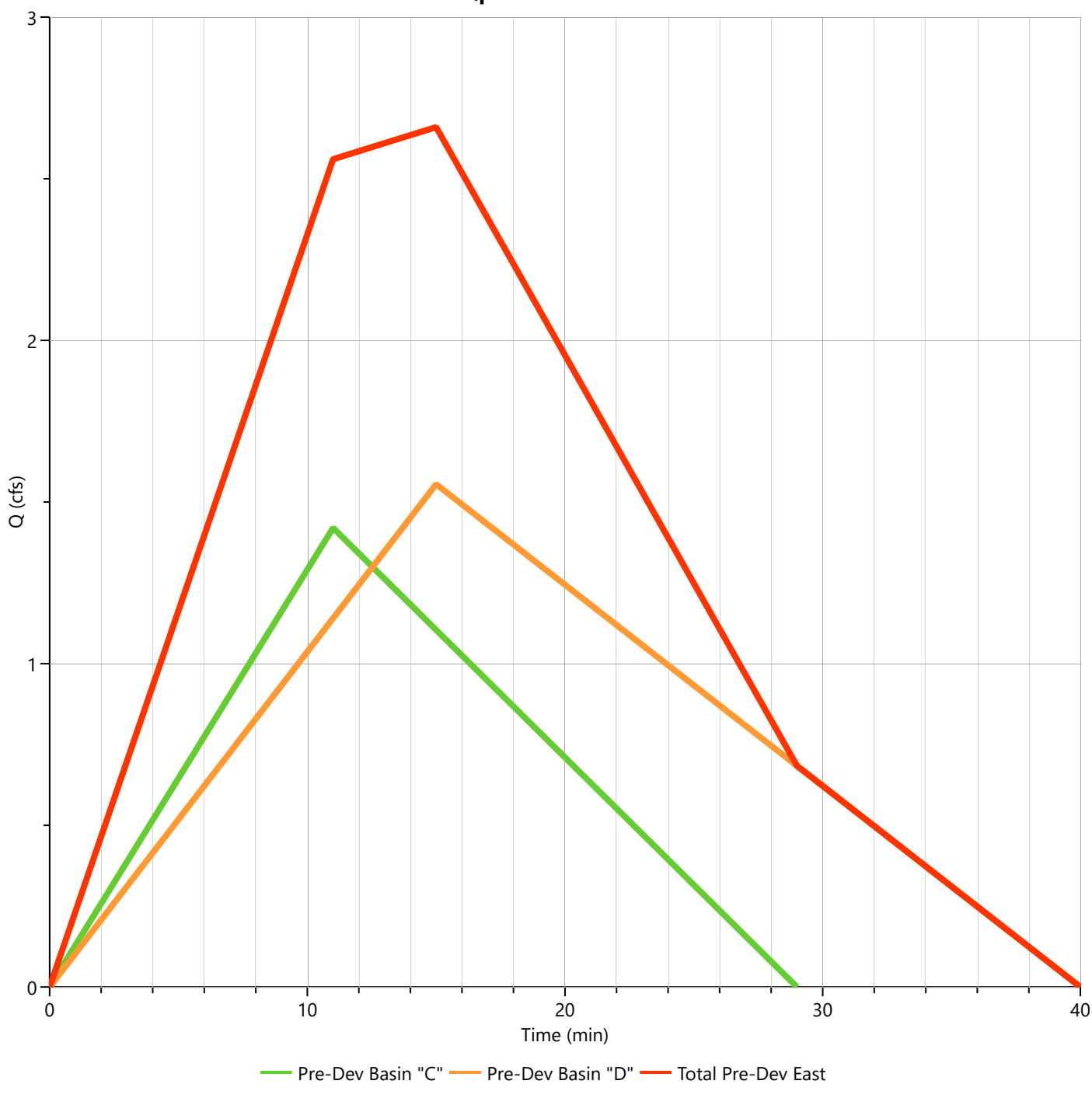
Hydrograph Type	= Rational	Peak Flow	= 1.555 cfs
Storm Frequency	= 25-yr	Time to Peak	= 0.25 hrs
Time Interval	= 1 min	Runoff Volume	= 1,868 cuft
Drainage Area	= 0.5 ac	Runoff Coeff.	= 0.54
Tc Method	= TR55	Time of Conc. (Tc)	= 15.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 5.76 in/hr
Freq. Corr. Factor	= 1.00	Asc/Rec Limb Factors	= 1/1.67



Total Pre-Dev East

Hyd. No. 6

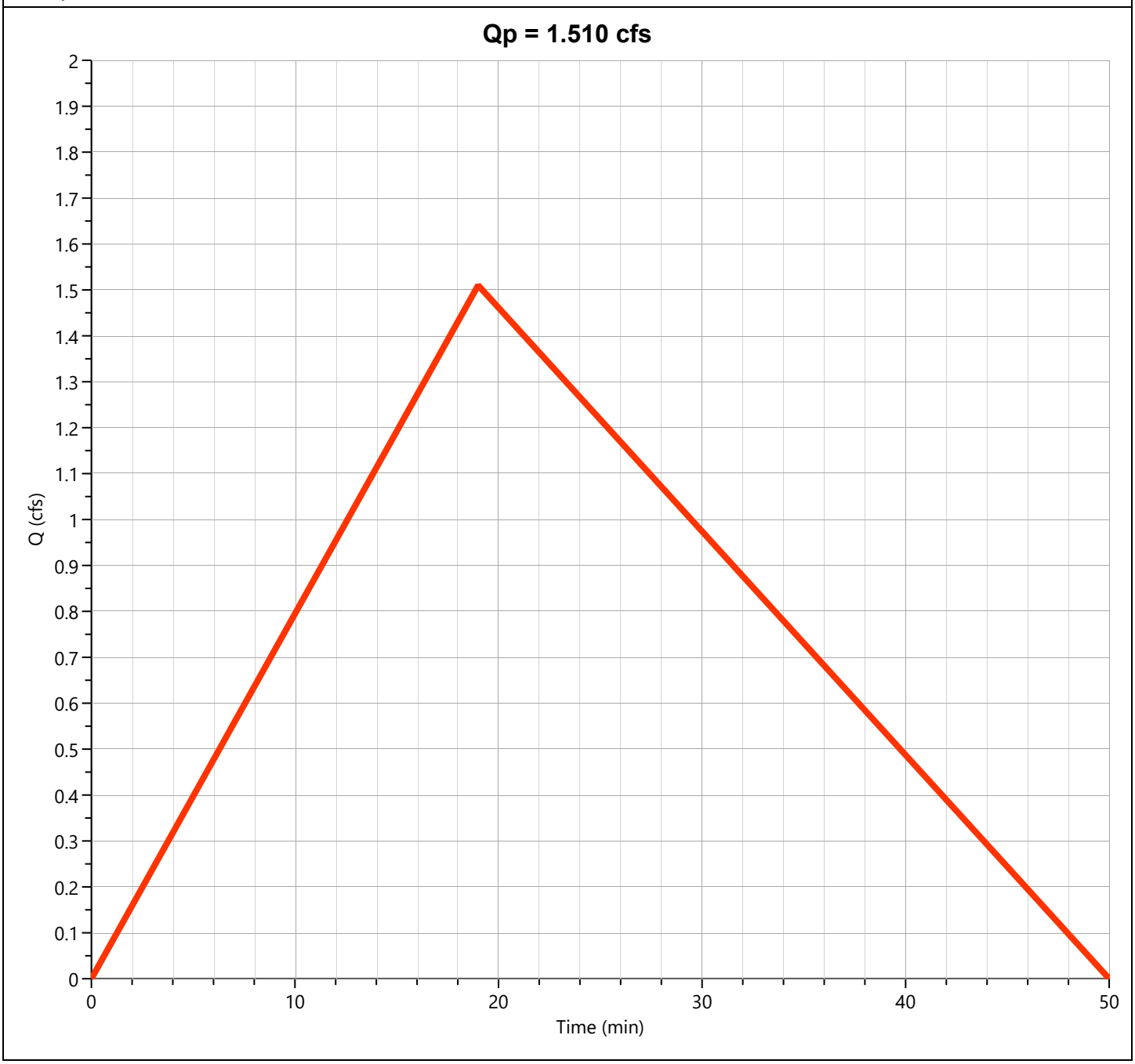
Hydrograph Type	= Junction	Peak Flow	= 2.660 cfs
Storm Frequency	= 25-yr	Time to Peak	= 0.25 hrs
Time Interval	= 1 min	Hydrograph Volume	= 3,102 cuft
Inflow Hydrographs	= 4, 5	Total Contrib. Area	= 0.83 ac



Pre-Dev Basin "E"

Hyd. No. 7

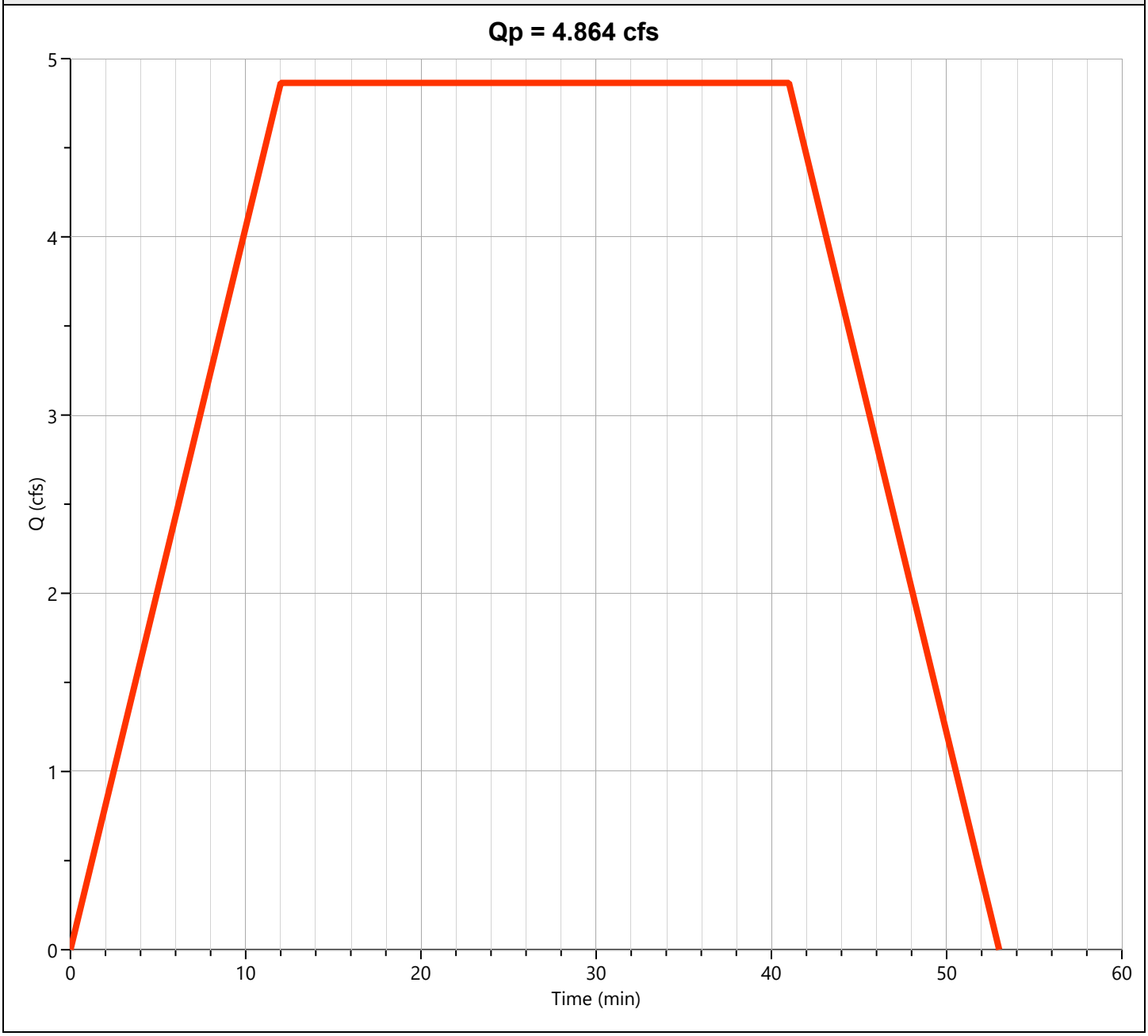
Hydrograph Type	= Rational	Peak Flow	= 1.510 cfs
Storm Frequency	= 25-yr	Time to Peak	= 0.32 hrs
Time Interval	= 1 min	Runoff Volume	= 2,298 cuft
Drainage Area	= 0.53 ac	Runoff Coeff.	= 0.55
Tc Method	= TR55	Time of Conc. (Tc)	= 19.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 5.18 in/hr
Freq. Corr. Factor	= 1.00	Asc/Rec Limb Factors	= 1/1.67



Post-Dev Basin A

Hyd. No. 8

Hydrograph Type	= Mod Rational	Peak Flow	= 4.864 cfs
Storm Frequency	= 25-yr	Time to Peak	= 0.20 hrs
Time Interval	= 1 min	Runoff Volume	= 11,965 cuft
Drainage Area	= 1.56 ac	Runoff Coeff.	= 0.85
Tc Method	= User	Time of Conc. (Tc)	= 12.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 3.67 in/hr
Freq. Corr. Factor	= 1.00	Storm Duration	= 3.42 x Tc
Target Q	= 0.000 cfs	Required Storage	= 0.000 cuft



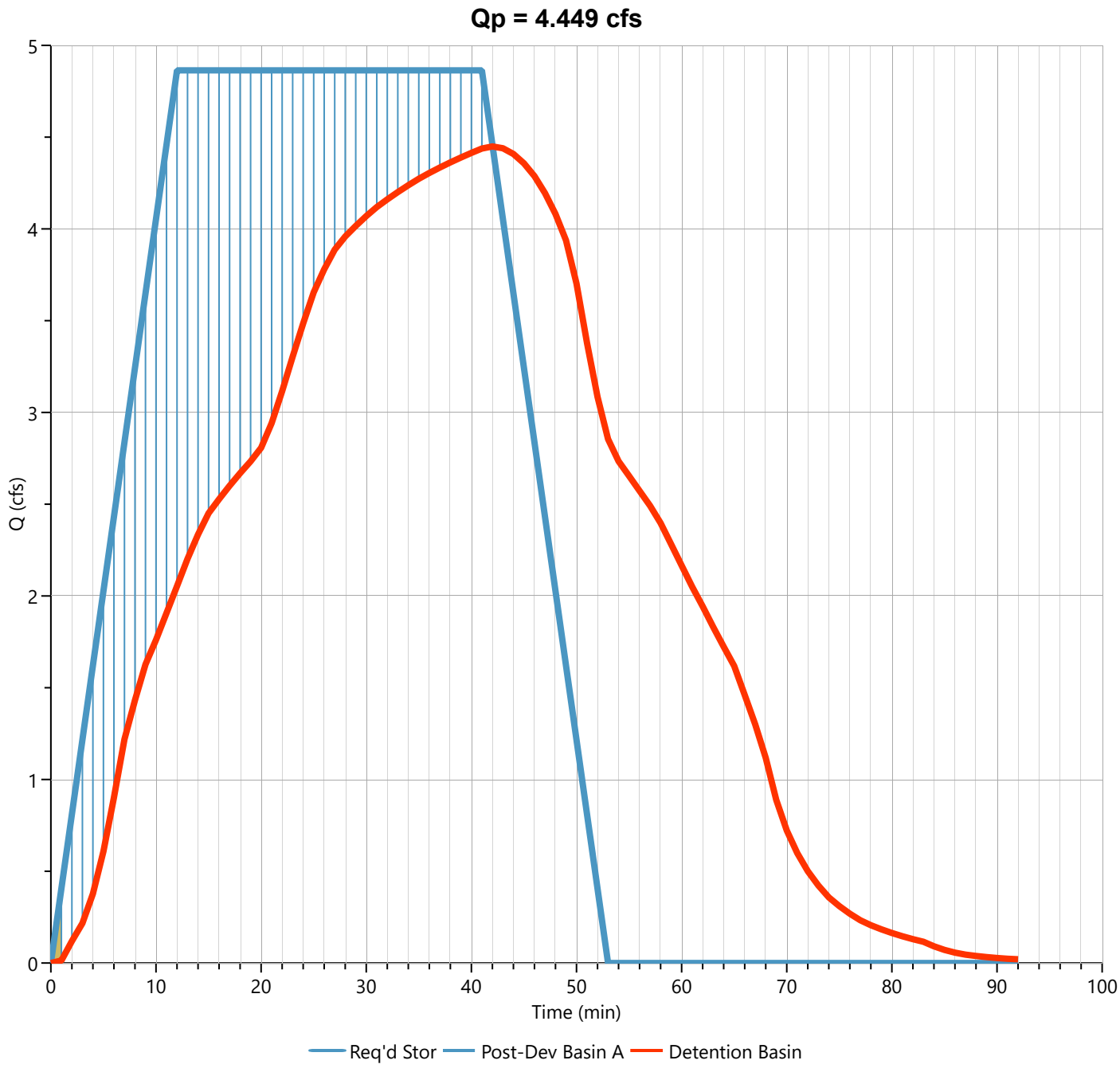
Detention Basin

Hyd. No. 9

Hydrograph Type	= Pond Route	Peak Flow	= 4.449 cfs
Storm Frequency	= 25-yr	Time to Peak	= 0.70 hrs
Time Interval	= 1 min	Hydrograph Volume	= 11,963 cuft
Inflow Hydrograph	= 8 - Post-Dev Basin A	Max. Elevation	= 422.31 ft
Pond Name	= Bryant Pharmacy Detention Pond	Max. Storage	= 3,400 cuft

Pond Routing by Storage Indication Method

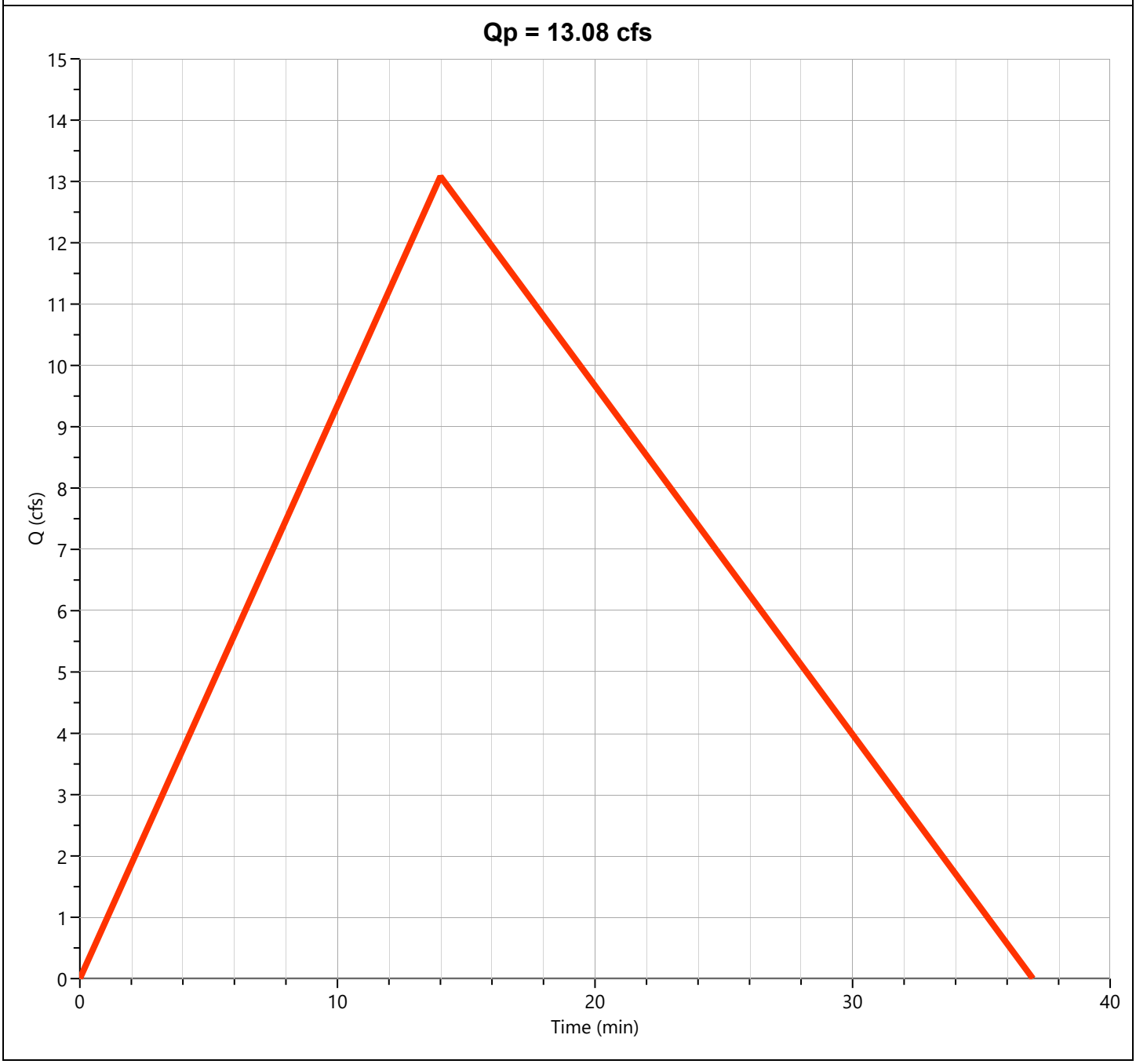
Center of mass detention time = 11 min



Post-Dev Basin B

Hyd. No. 10

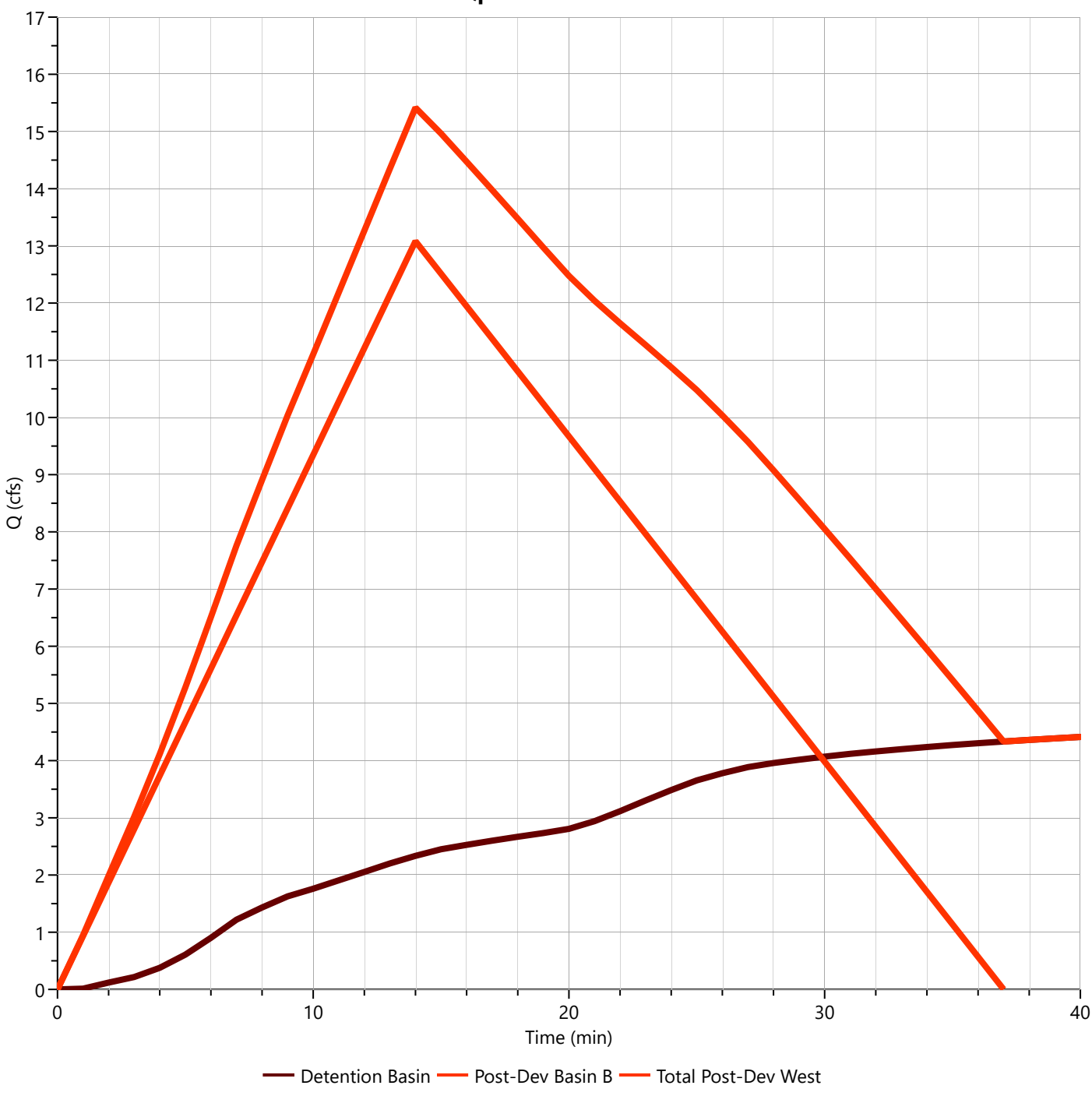
Hydrograph Type	= Rational	Peak Flow	= 13.08 cfs
Storm Frequency	= 25-yr	Time to Peak	= 0.23 hrs
Time Interval	= 1 min	Runoff Volume	= 14,670 cuft
Drainage Area	= 3.67 ac	Runoff Coeff.	= 0.60
Tc Method	= TR55	Time of Conc. (Tc)	= 14.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 5.94 in/hr
Freq. Corr. Factor	= 1.00	Asc/Rec Limb Factors	= 1/1.67



Total Post-Dev West

Hyd. No. 11

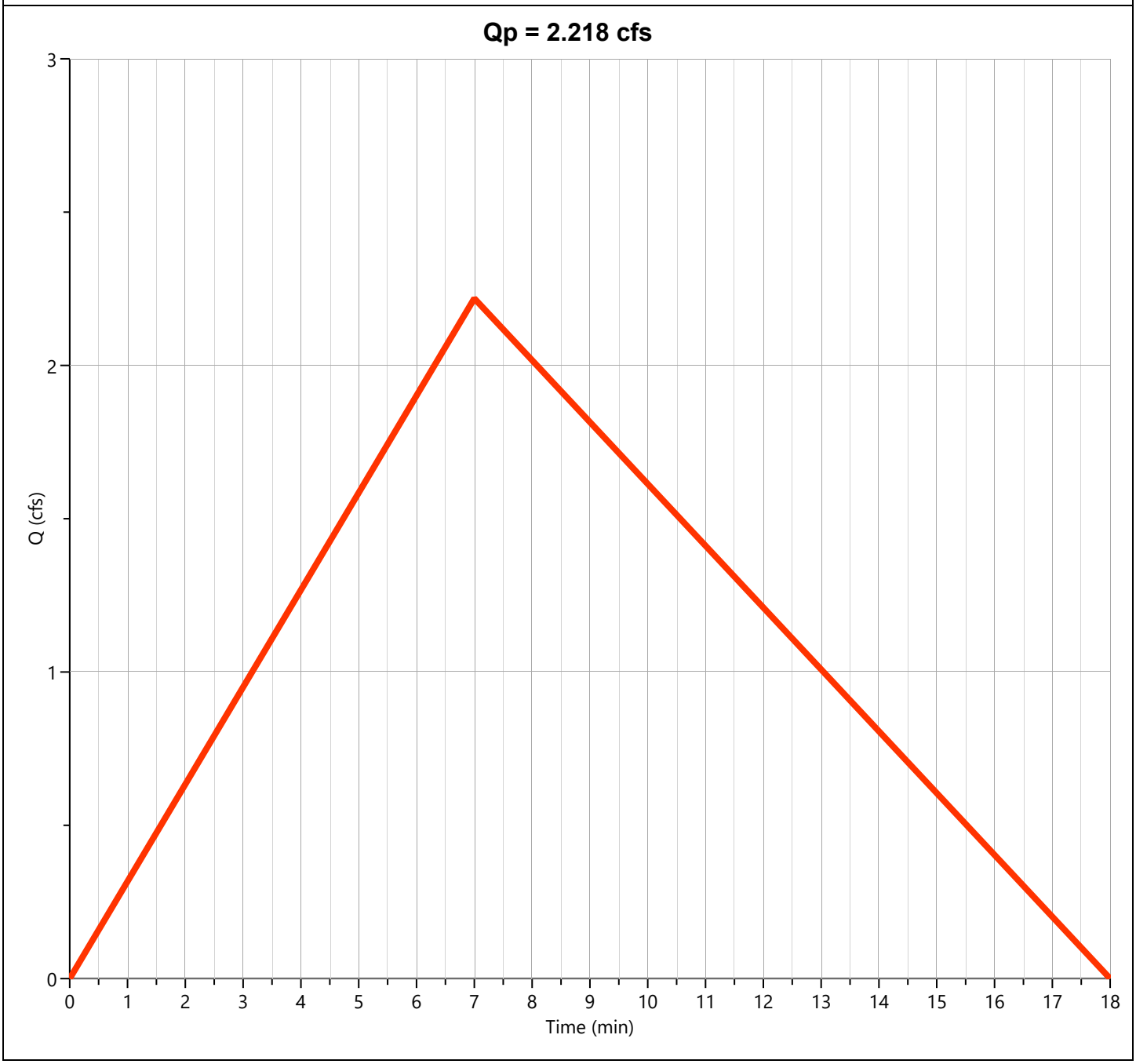
Hydrograph Type	= Junction	Peak Flow	= 15.42 cfs
Storm Frequency	= 25-yr	Time to Peak	= 0.23 hrs
Time Interval	= 1 min	Hydrograph Volume	= 26,484 cuft
Inflow Hydrographs	= 10	Total Contrib. Area	= 3.67 ac



Post-Dev Basin "C"

Hyd. No. 12

Hydrograph Type	= Rational	Peak Flow	= 2.218 cfs
Storm Frequency	= 25-yr	Time to Peak	= 0.12 hrs
Time Interval	= 1 min	Runoff Volume	= 1,244 cuft
Drainage Area	= 0.38 ac	Runoff Coeff.	= 0.72
Tc Method	= TR55	Time of Conc. (Tc)	= 7.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 8.11 in/hr
Freq. Corr. Factor	= 1.00	Asc/Rec Limb Factors	= 1/1.67



Post-Dev Basin "D"

Hyd. No. 13

Hydrograph Type	= Rational	Peak Flow	= 0.438 cfs
Storm Frequency	= 25-yr	Time to Peak	= 0.28 hrs
Time Interval	= 1 min	Runoff Volume	= 596 cuft
Drainage Area	= 0.12 ac	Runoff Coeff.	= 0.67
Tc Method	= TR55	Time of Conc. (Tc)	= 17.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 5.45 in/hr
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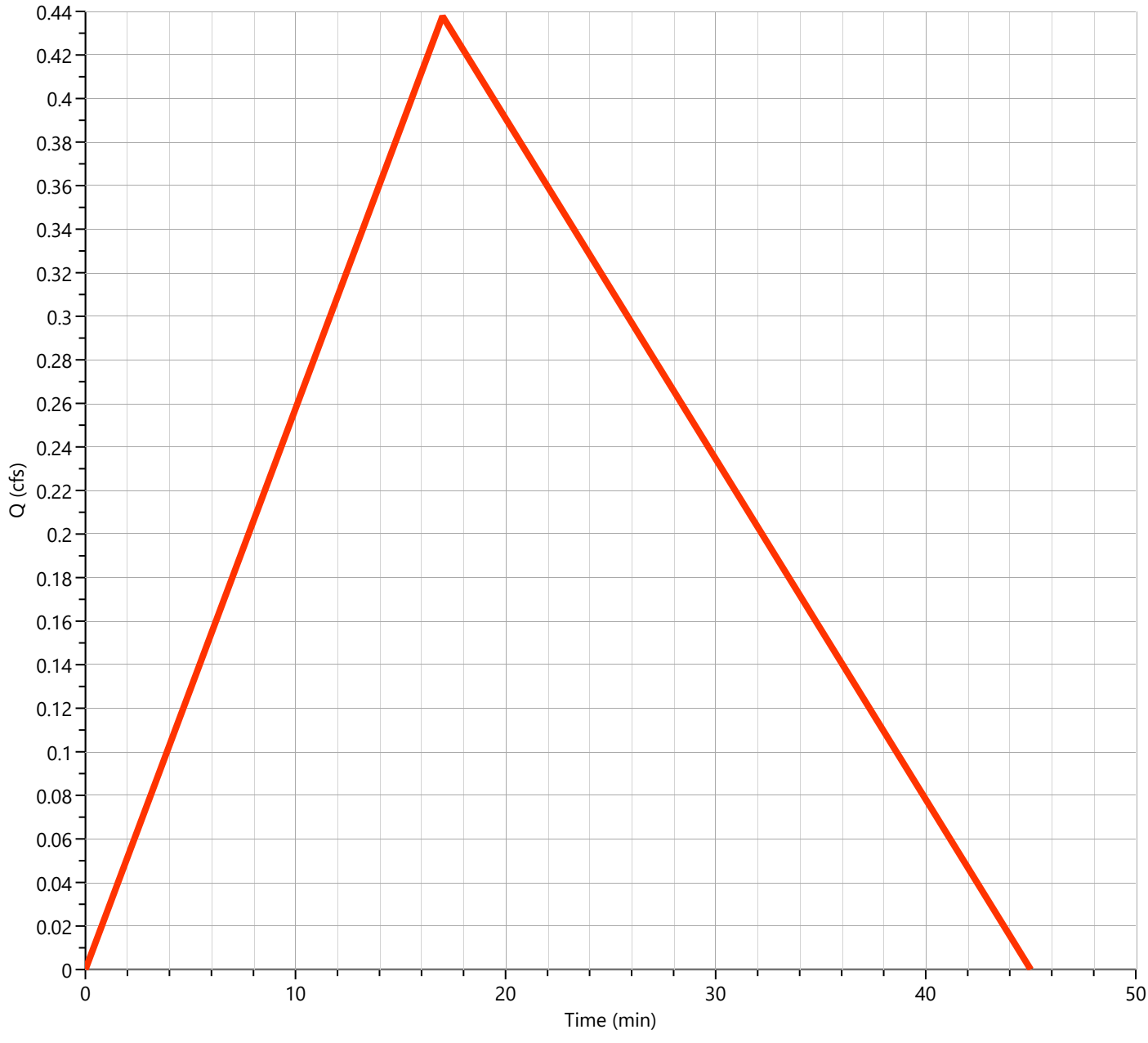
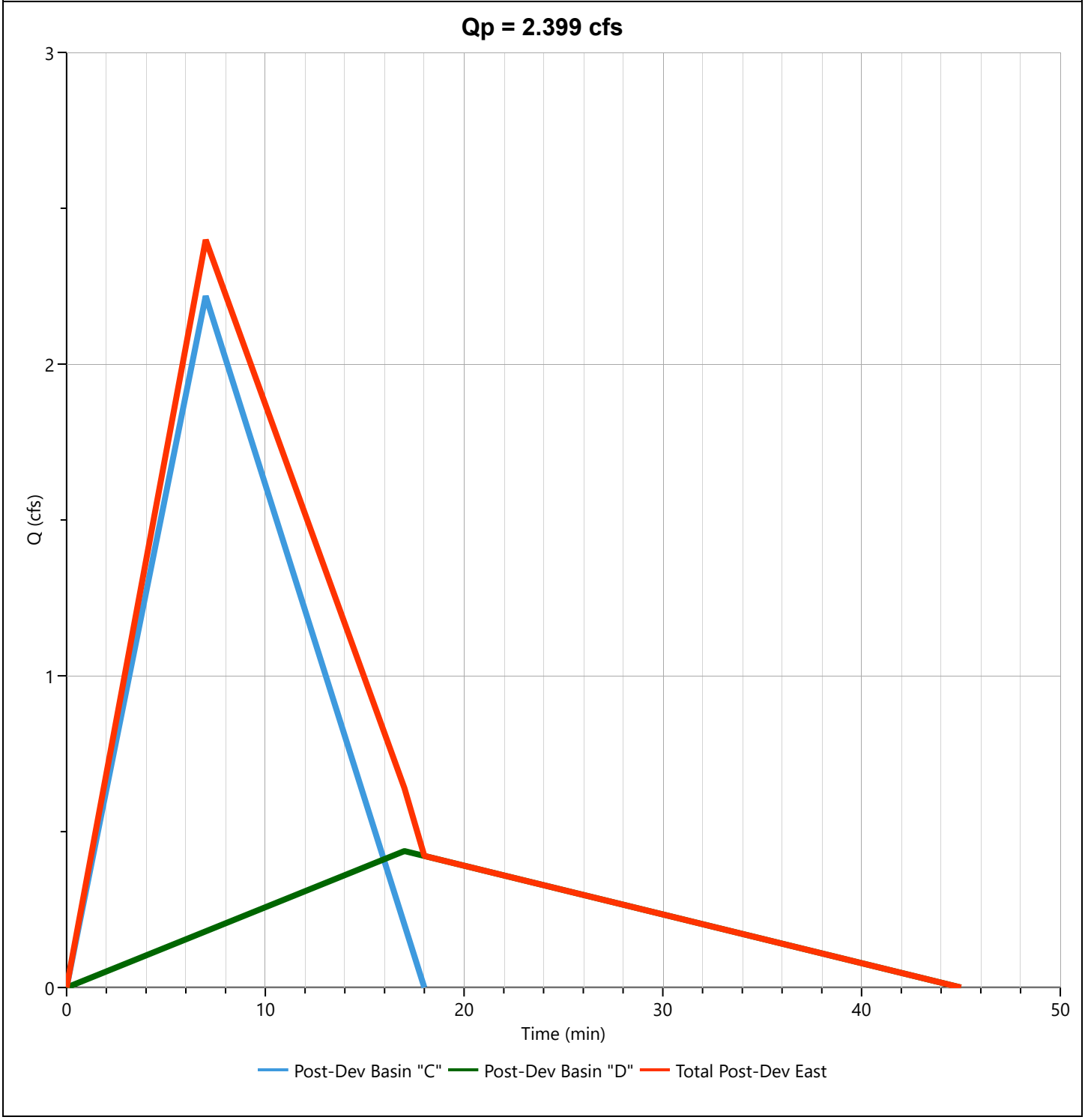


Total Post-Dev East

Hyd. No. 14

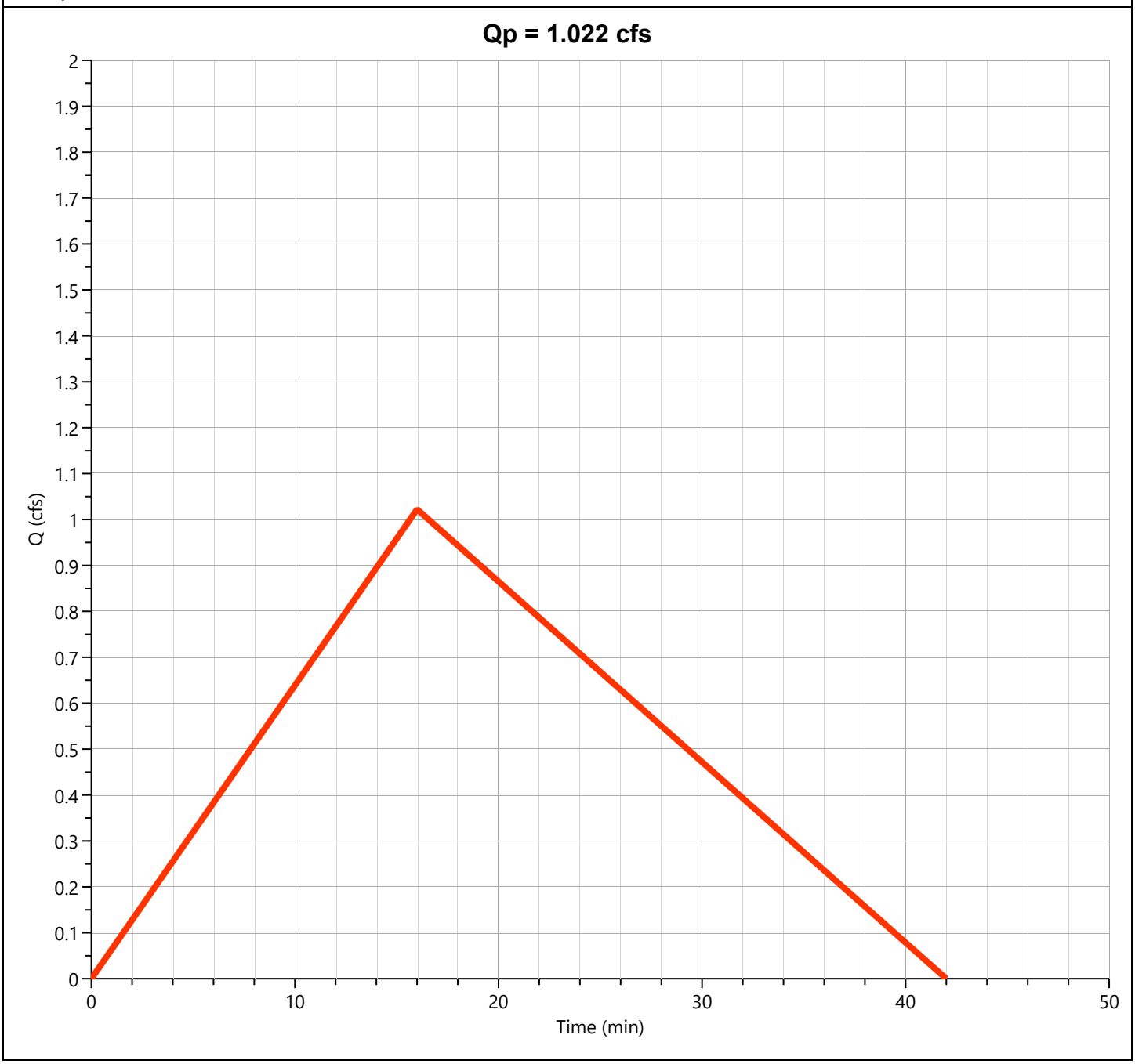
Hydrograph Type	= Junction	Peak Flow	= 2.399 cfs
Storm Frequency	= 25-yr	Time to Peak	= 0.12 hrs
Time Interval	= 1 min	Hydrograph Volume	= 1,789 cuft
Inflow Hydrographs	= 12, 13	Total Contrib. Area	= 0.5 ac



Post-Dev Basin "E"

Hyd. No. 15

Hydrograph Type	= Rational	Peak Flow	= 1.022 cfs
Storm Frequency	= 25-yr	Time to Peak	= 0.27 hrs
Time Interval	= 1 min	Runoff Volume	= 1,310 cuft
Drainage Area	= 0.29 ac	Runoff Coeff.	= 0.63
Tc Method	= TR55	Time of Conc. (Tc)	= 16.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 5.60 in/hr
Freq. Corr. Factor	= 1.00	Asc/Rec Limb Factors	= 1/1.67



Hydrograph 50-yr Summary

Hydrology Studio v 3.0.0.39

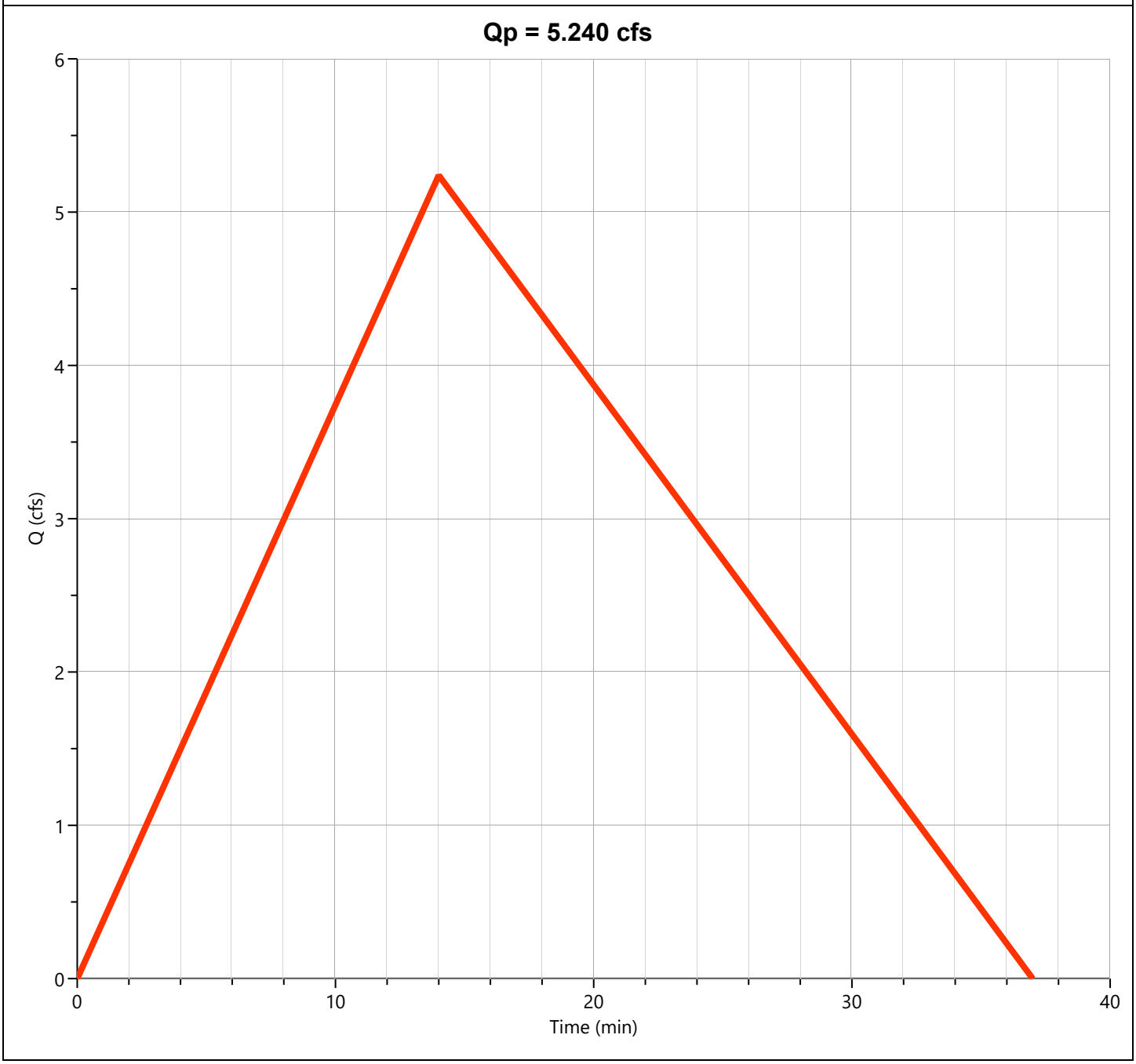
Project Name: Bryant Pharmacy
File: Detention Calculation 11-13-25 FINAL.hys
11-13-2025

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	Rational	Pre-Dev Basin "A"	5.240	0.23	5,876	----		
2	Rational	Pre-Dev Basin "B"	12.50	0.23	14,015	----		
3	Junction	Total Pre-Dev West	17.74	0.23	19,688	1, 2		
4	Rational	Pre-Dev Basin "C"	1.553	0.18	1,368	----		
5	Rational	Pre-Dev Basin "D"	1.701	0.25	2,044	----		
6	Junction	Total Pre-Dev East	2.909	0.25	3,392	4, 5		
7	Rational	Pre-Dev Basin "E"	1.652	0.32	2,514	----		
8	Mod Rational	Post-Dev Basin A	5.327	0.20	13,104	----		
9	Pond Route	Detention Basin	4.789	0.70	13,102	8	422.54	3,812
10	Rational	Post-Dev Basin B	14.31	0.23	16,045	----		
11	Junction	Total Post-Dev West	16.77	0.23	28,984	9, 10		
12	Rational	Post-Dev Basin "C"	2.424	0.12	1,359	----		
13	Rational	Post-Dev Basin "D"	0.479	0.28	652	----		
14	Junction	Total Post-Dev East	2.621	0.12	1,956	12, 13		
15	Rational	Post-Dev Basin "E"	1.118	0.27	1,433	----		

Pre-Dev Basin "A"

Hyd. No. 1

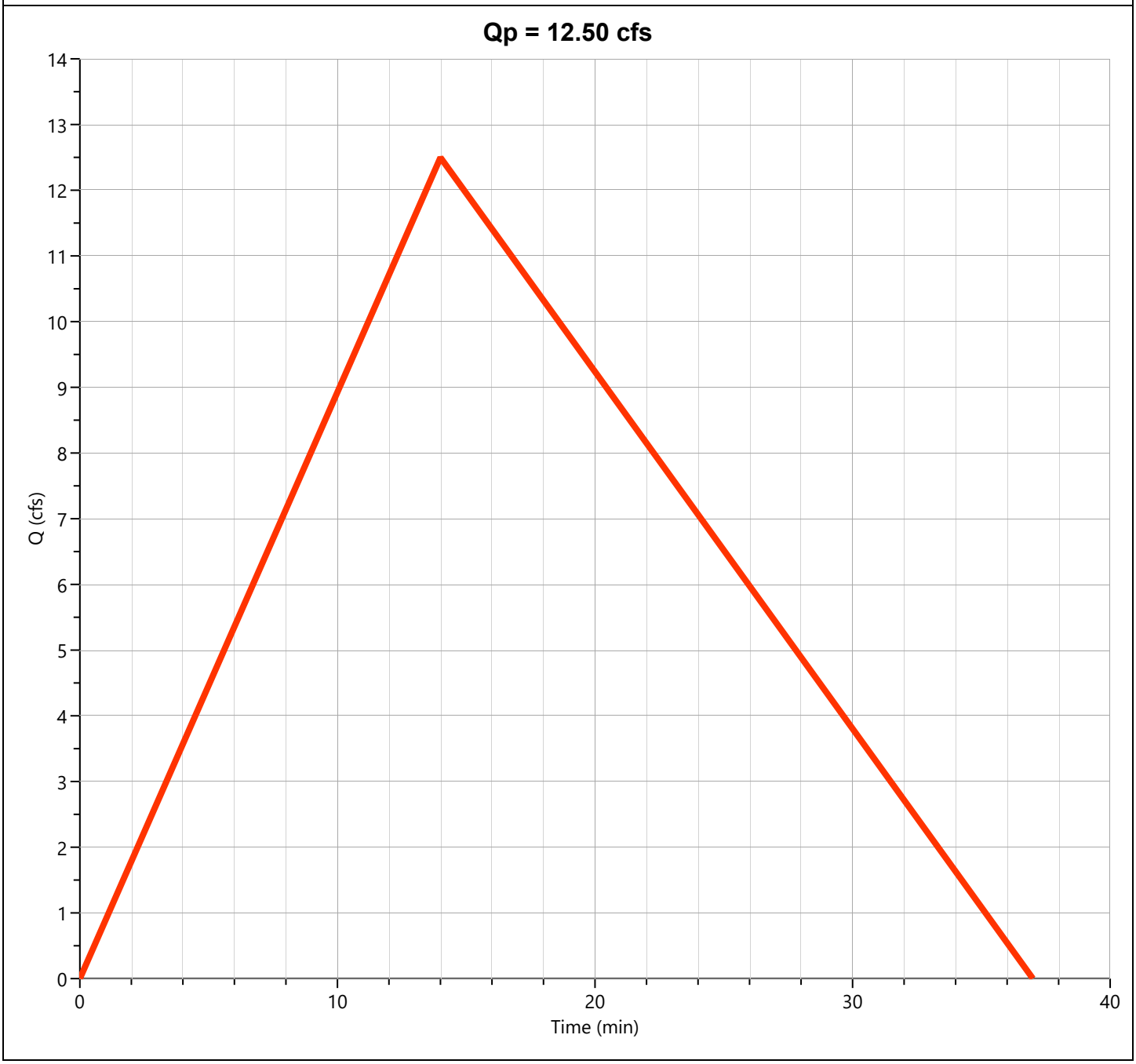
Hydrograph Type	= Rational	Peak Flow	= 5.240 cfs
Storm Frequency	= 50-yr	Time to Peak	= 0.23 hrs
Time Interval	= 1 min	Runoff Volume	= 5,876 cuft
Drainage Area	= 1.44 ac	Runoff Coeff.	= 0.56
Tc Method	= TR55	Time of Conc. (Tc)	= 14.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 6.50 in/hr
Freq. Corr. Factor	= 1.00	Asc/Rec Limb Factors	= 1/1.67



Pre-Dev Basin "B"

Hyd. No. 2

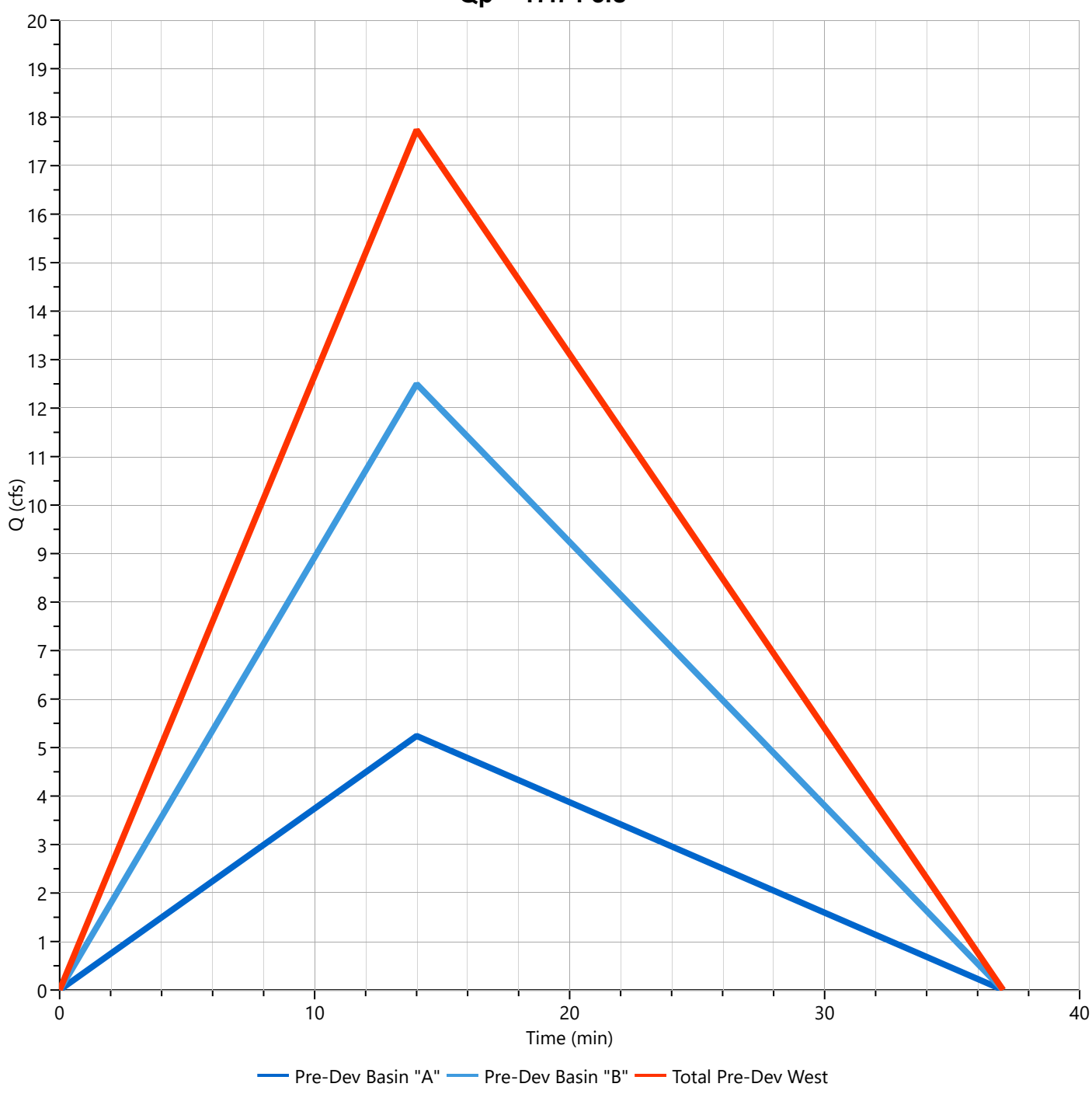
Hydrograph Type	= Rational	Peak Flow	= 12.50 cfs
Storm Frequency	= 50-yr	Time to Peak	= 0.23 hrs
Time Interval	= 1 min	Runoff Volume	= 14,015 cuft
Drainage Area	= 3.26 ac	Runoff Coeff.	= 0.59
Tc Method	= TR55	Time of Conc. (Tc)	= 14.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 6.50 in/hr
Freq. Corr. Factor	= 1.00	Asc/Rec Limb Factors	= 1/1.67



Total Pre-Dev West

Hyd. No. 3

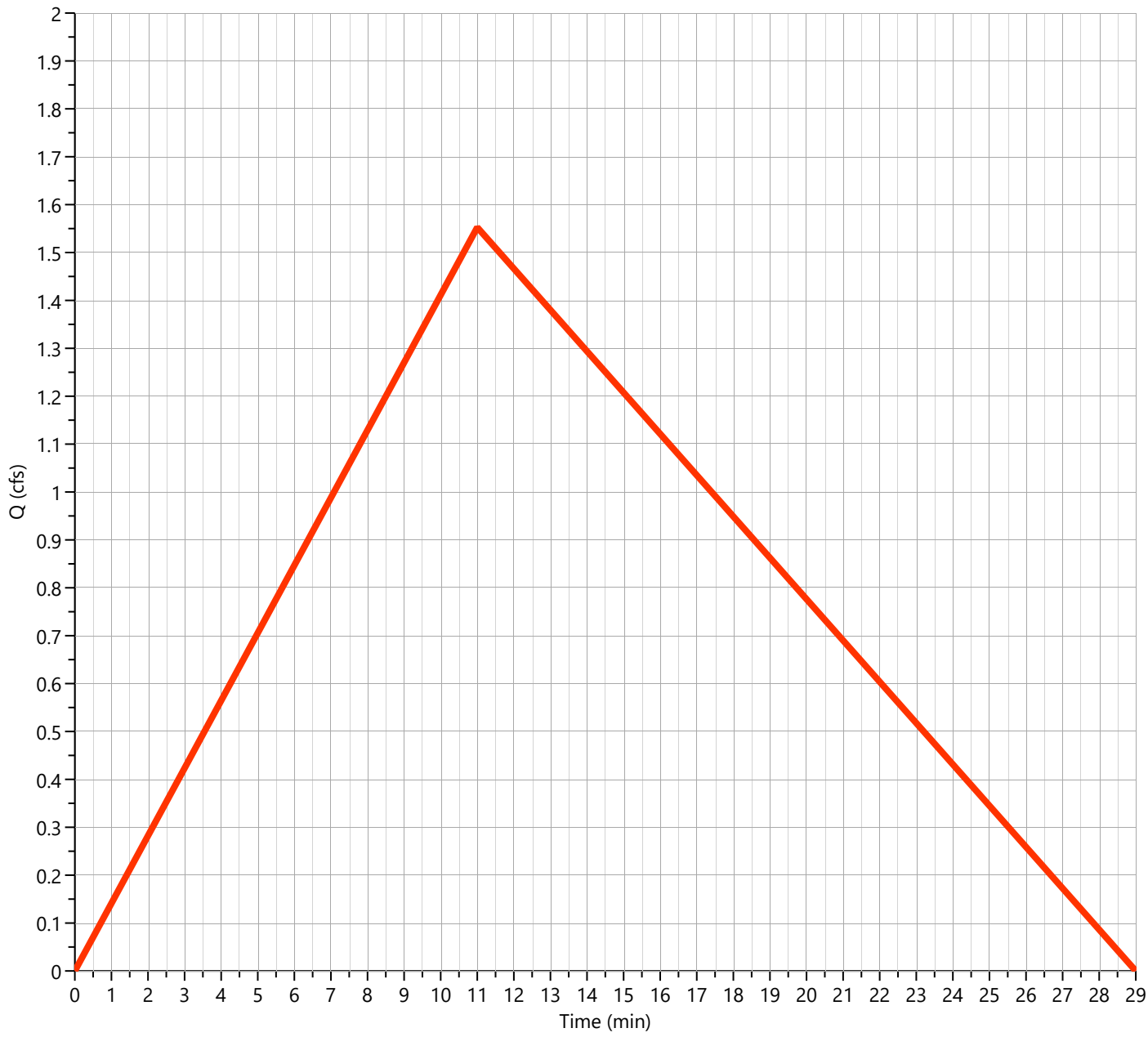
Hydrograph Type	= Junction	Peak Flow	= 17.74 cfs
Storm Frequency	= 50-yr	Time to Peak	= 0.23 hrs
Time Interval	= 1 min	Hydrograph Volume	= 19,688 cuft
Inflow Hydrographs	= 1, 2	Total Contrib. Area	= 4.7 ac



Pre-Dev Basin "C"

Hyd. No. 4

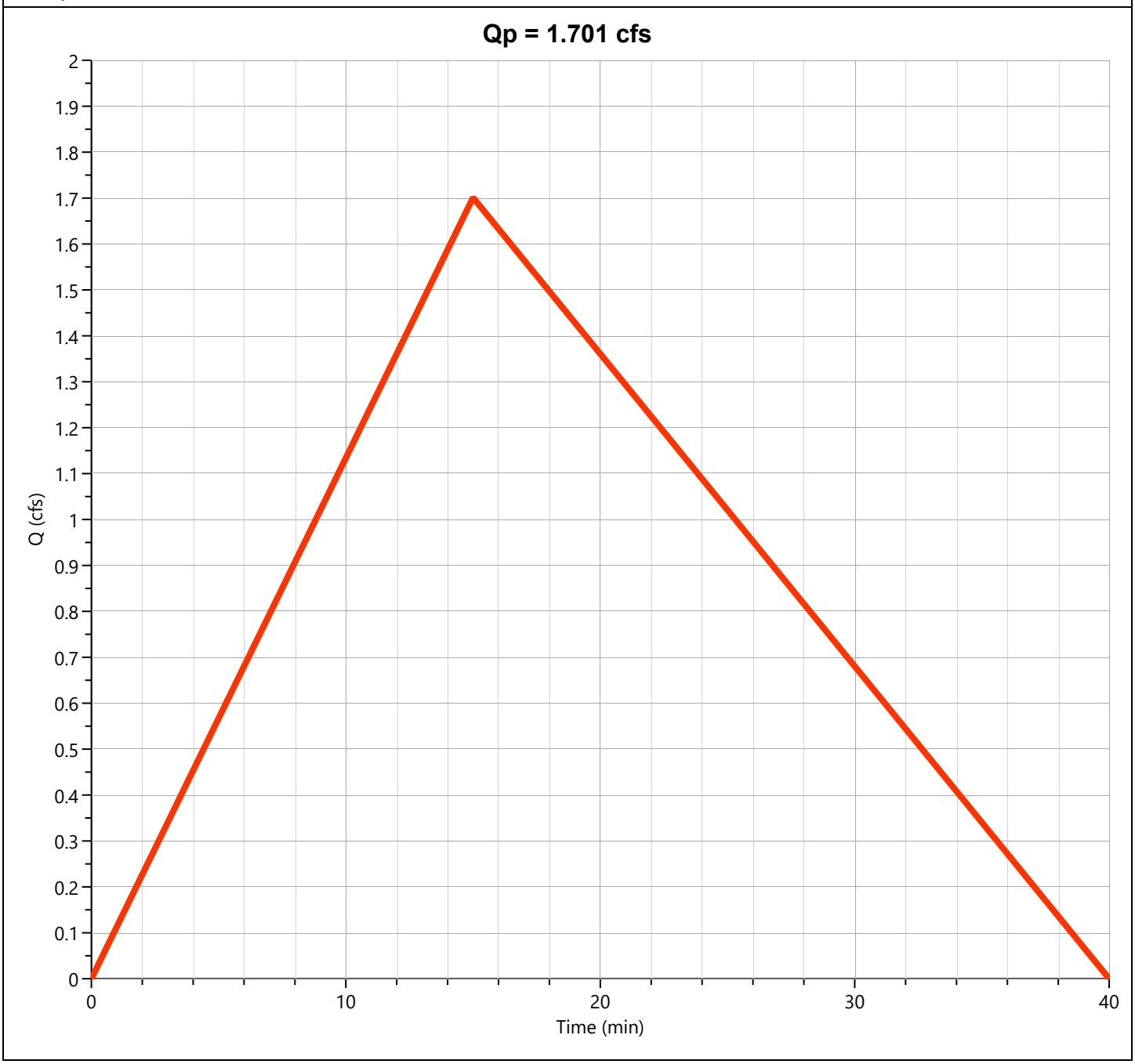
Hydrograph Type	= Rational	Peak Flow	= 1.553 cfs
Storm Frequency	= 50-yr	Time to Peak	= 0.18 hrs
Time Interval	= 1 min	Runoff Volume	= 1,368 cuft
Drainage Area	= 0.33 ac	Runoff Coeff.	= 0.65
Tc Method	= TR55	Time of Conc. (Tc)	= 11.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 7.24 in/hr
Freq. Corr. Factor	= 1.00	Asc/Rec Limb Factors	= 1/1.67



Pre-Dev Basin "D"

Hyd. No. 5

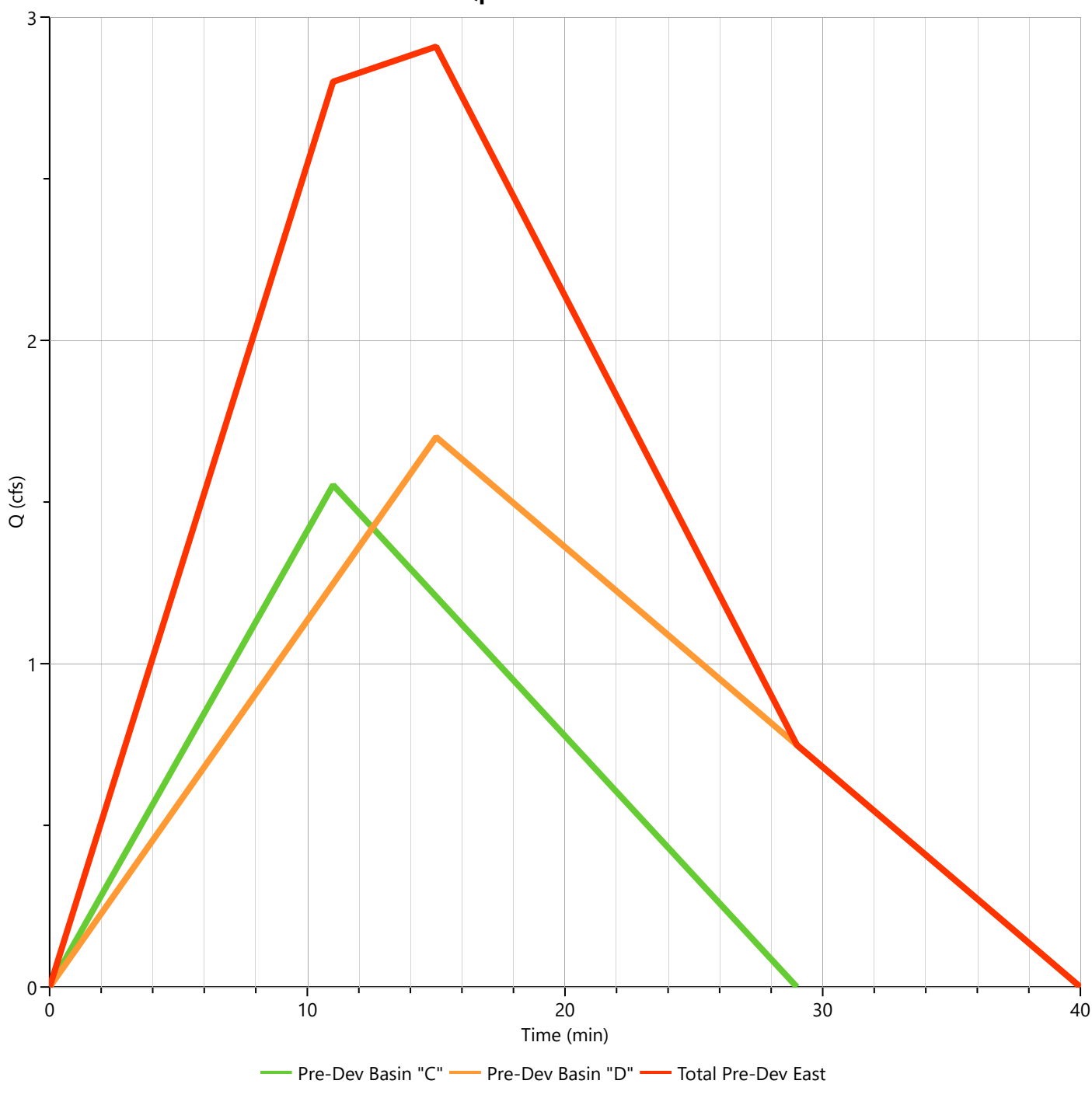
Hydrograph Type	= Rational	Peak Flow	= 1.701 cfs
Storm Frequency	= 50-yr	Time to Peak	= 0.25 hrs
Time Interval	= 1 min	Runoff Volume	= 2,044 cuft
Drainage Area	= 0.5 ac	Runoff Coeff.	= 0.54
Tc Method	= TR55	Time of Conc. (Tc)	= 15.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 6.30 in/hr
Freq. Corr. Factor	= 1.00	Asc/Rec Limb Factors	= 1/1.67



Total Pre-Dev East

Hyd. No. 6

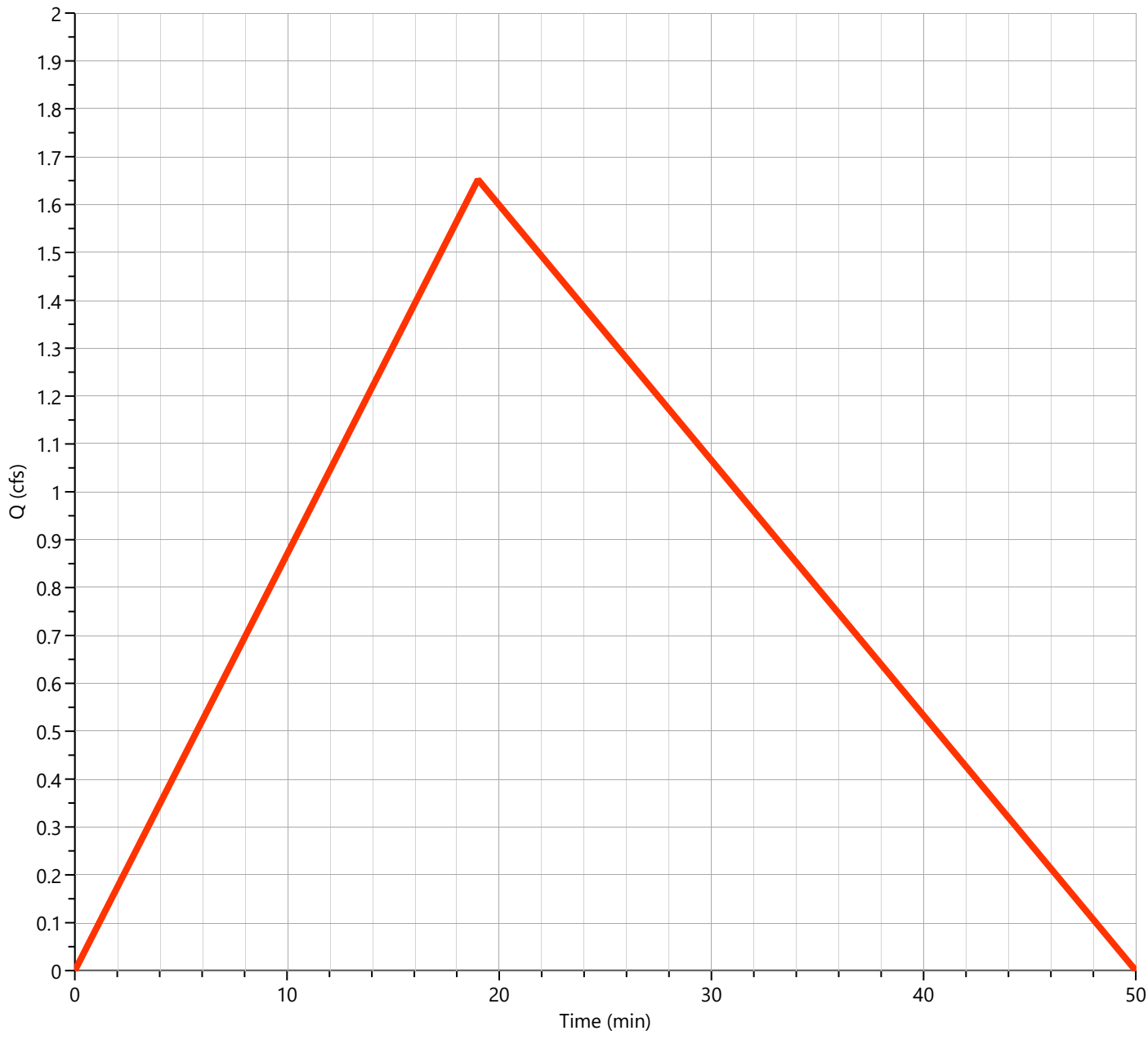
Hydrograph Type	= Junction	Peak Flow	= 2.909 cfs
Storm Frequency	= 50-yr	Time to Peak	= 0.25 hrs
Time Interval	= 1 min	Hydrograph Volume	= 3,392 cuft
Inflow Hydrographs	= 4, 5	Total Contrib. Area	= 0.83 ac



Pre-Dev Basin "E"

Hyd. No. 7

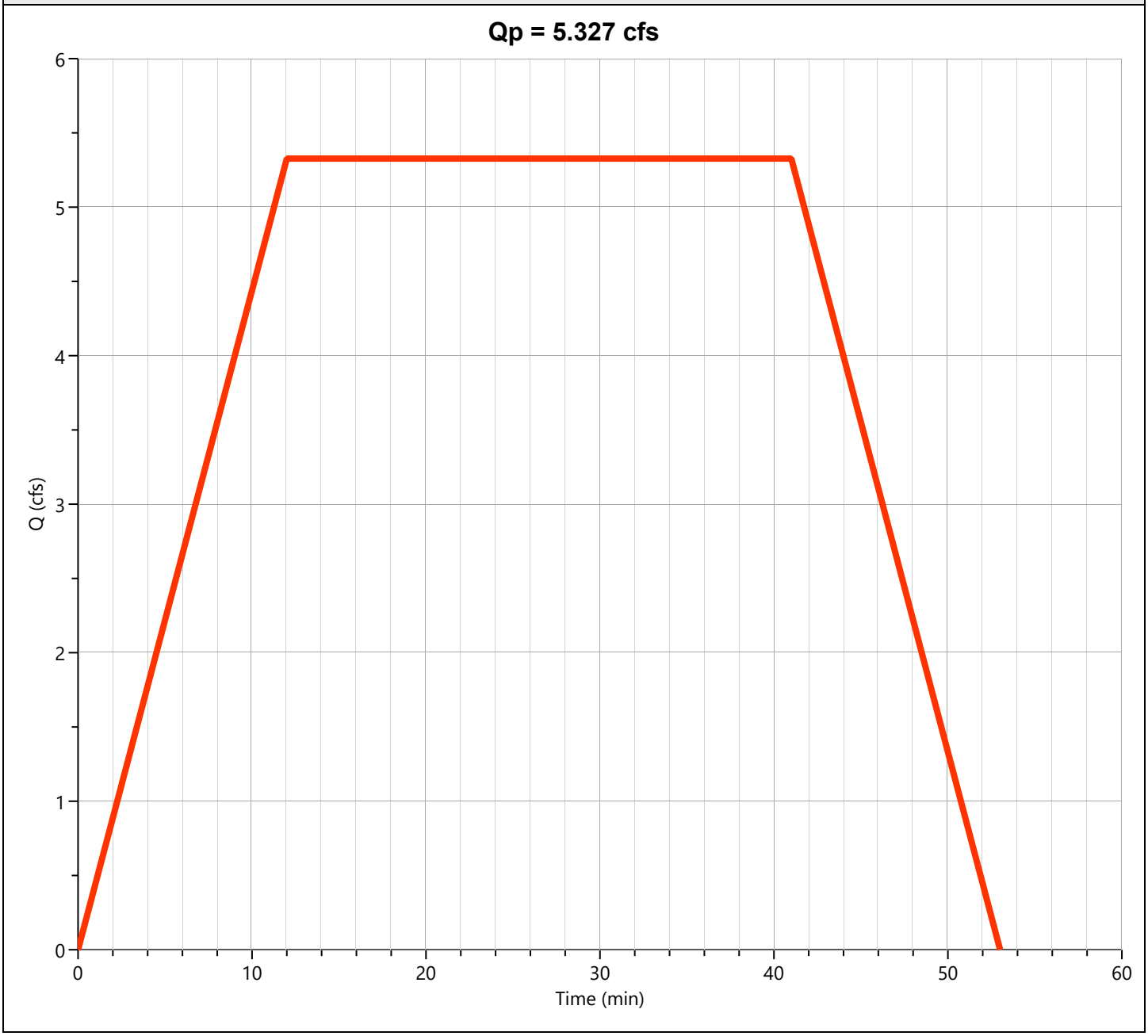
Hydrograph Type	= Rational	Peak Flow	= 1.652 cfs
Storm Frequency	= 50-yr	Time to Peak	= 0.32 hrs
Time Interval	= 1 min	Runoff Volume	= 2,514 cuft
Drainage Area	= 0.53 ac	Runoff Coeff.	= 0.55
Tc Method	= TR55	Time of Conc. (Tc)	= 19.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 5.67 in/hr
Freq. Corr. Factor	= 1.00	Asc/Rec Limb Factors	= 1/1.67



Post-Dev Basin A

Hyd. No. 8

Hydrograph Type	= Mod Rational	Peak Flow	= 5.327 cfs
Storm Frequency	= 50-yr	Time to Peak	= 0.20 hrs
Time Interval	= 1 min	Runoff Volume	= 13,104 cuft
Drainage Area	= 1.56 ac	Runoff Coeff.	= 0.85
Tc Method	= User	Time of Conc. (Tc)	= 12.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 4.02 in/hr
Freq. Corr. Factor	= 1.00	Storm Duration	= 3.42 x Tc
Target Q	= 0.000 cfs	Required Storage	= 0.000 cuft



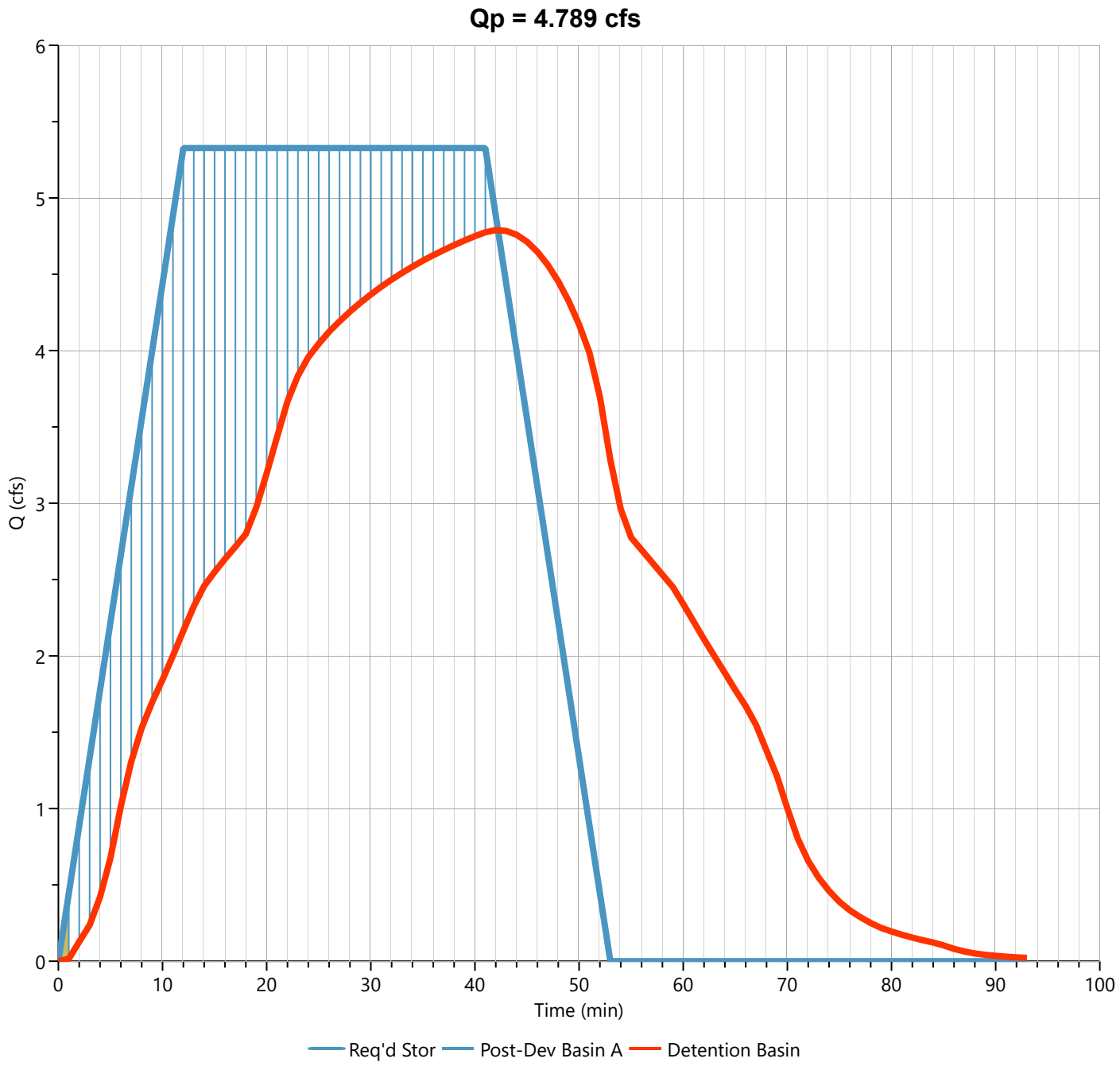
Detention Basin

Hyd. No. 9

Hydrograph Type	= Pond Route	Peak Flow	= 4.789 cfs
Storm Frequency	= 50-yr	Time to Peak	= 0.70 hrs
Time Interval	= 1 min	Hydrograph Volume	= 13,102 cuft
Inflow Hydrograph	= 8 - Post-Dev Basin A	Max. Elevation	= 422.54 ft
Pond Name	= Bryant Pharmacy Detention Pond	Max. Storage	= 3,812 cuft

Pond Routing by Storage Indication Method

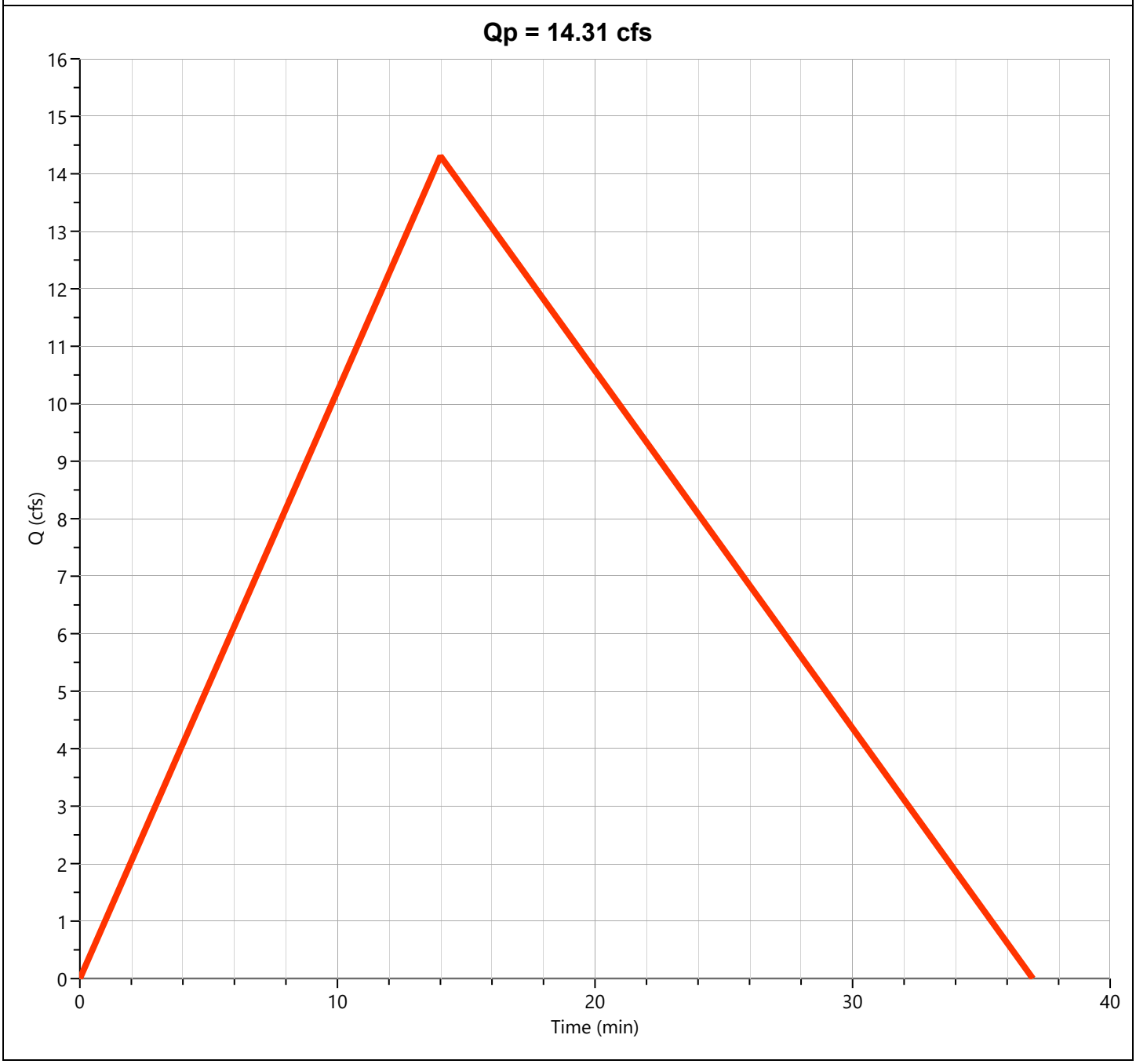
Center of mass detention time = 12 min



Post-Dev Basin B

Hyd. No. 10

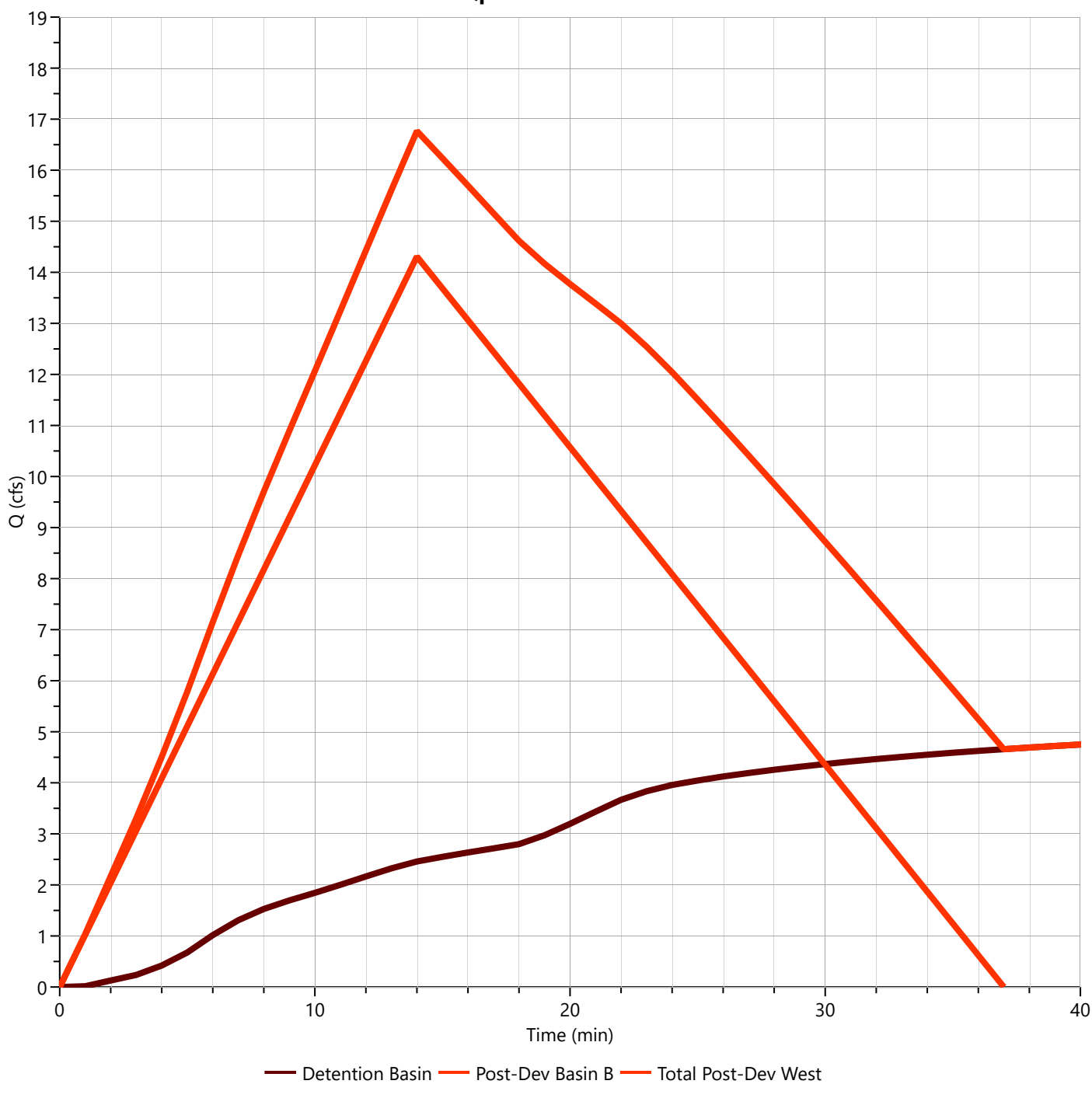
Hydrograph Type	= Rational	Peak Flow	= 14.31 cfs
Storm Frequency	= 50-yr	Time to Peak	= 0.23 hrs
Time Interval	= 1 min	Runoff Volume	= 16,045 cuft
Drainage Area	= 3.67 ac	Runoff Coeff.	= 0.60
Tc Method	= TR55	Time of Conc. (Tc)	= 14.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 6.50 in/hr
Freq. Corr. Factor	= 1.00	Asc/Rec Limb Factors	= 1/1.67



Total Post-Dev West

Hyd. No. 11

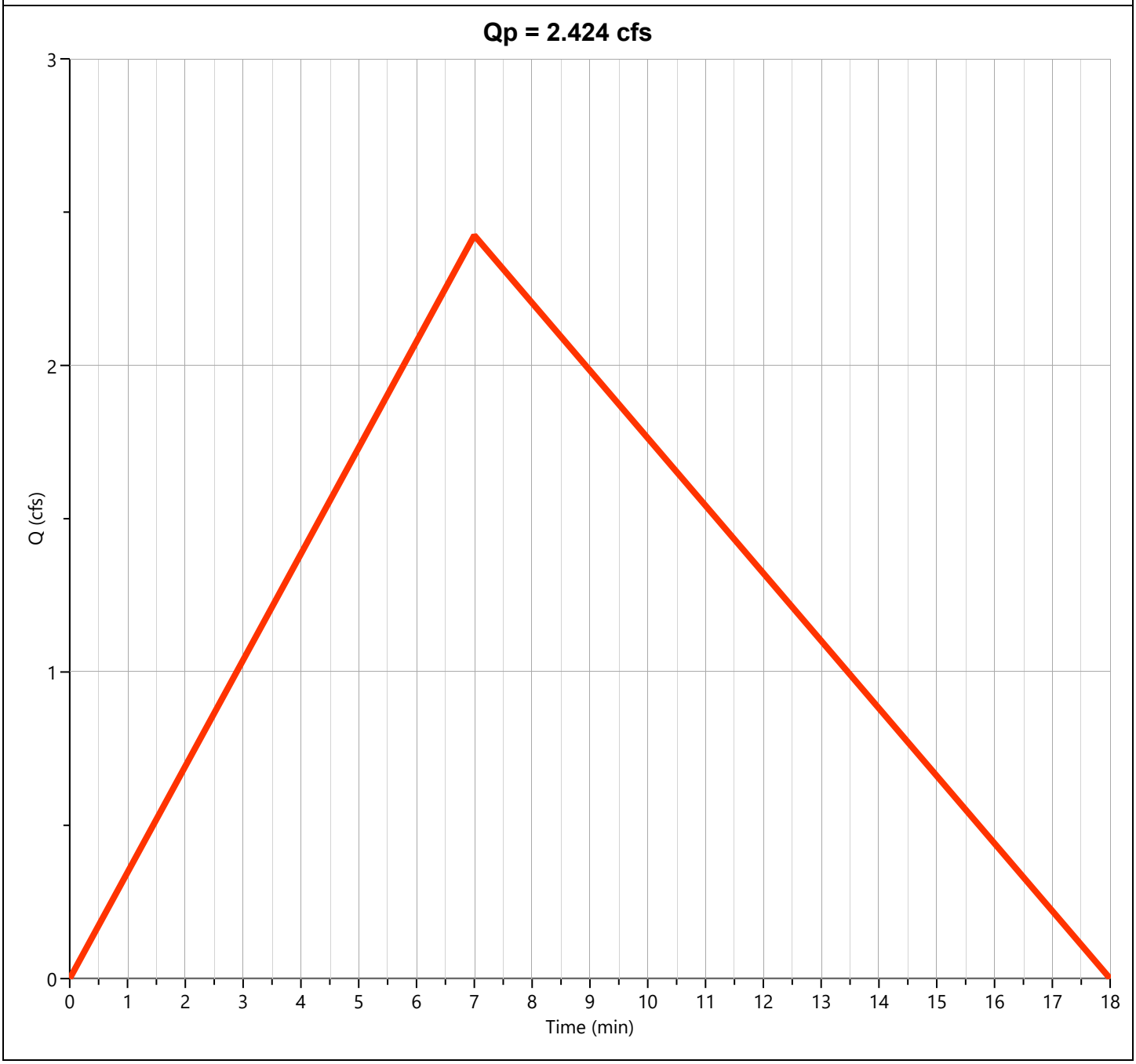
Hydrograph Type	= Junction	Peak Flow	= 16.77 cfs
Storm Frequency	= 50-yr	Time to Peak	= 0.23 hrs
Time Interval	= 1 min	Hydrograph Volume	= 28,984 cuft
Inflow Hydrographs	= 10	Total Contrib. Area	= 3.67 ac



Post-Dev Basin "C"

Hyd. No. 12

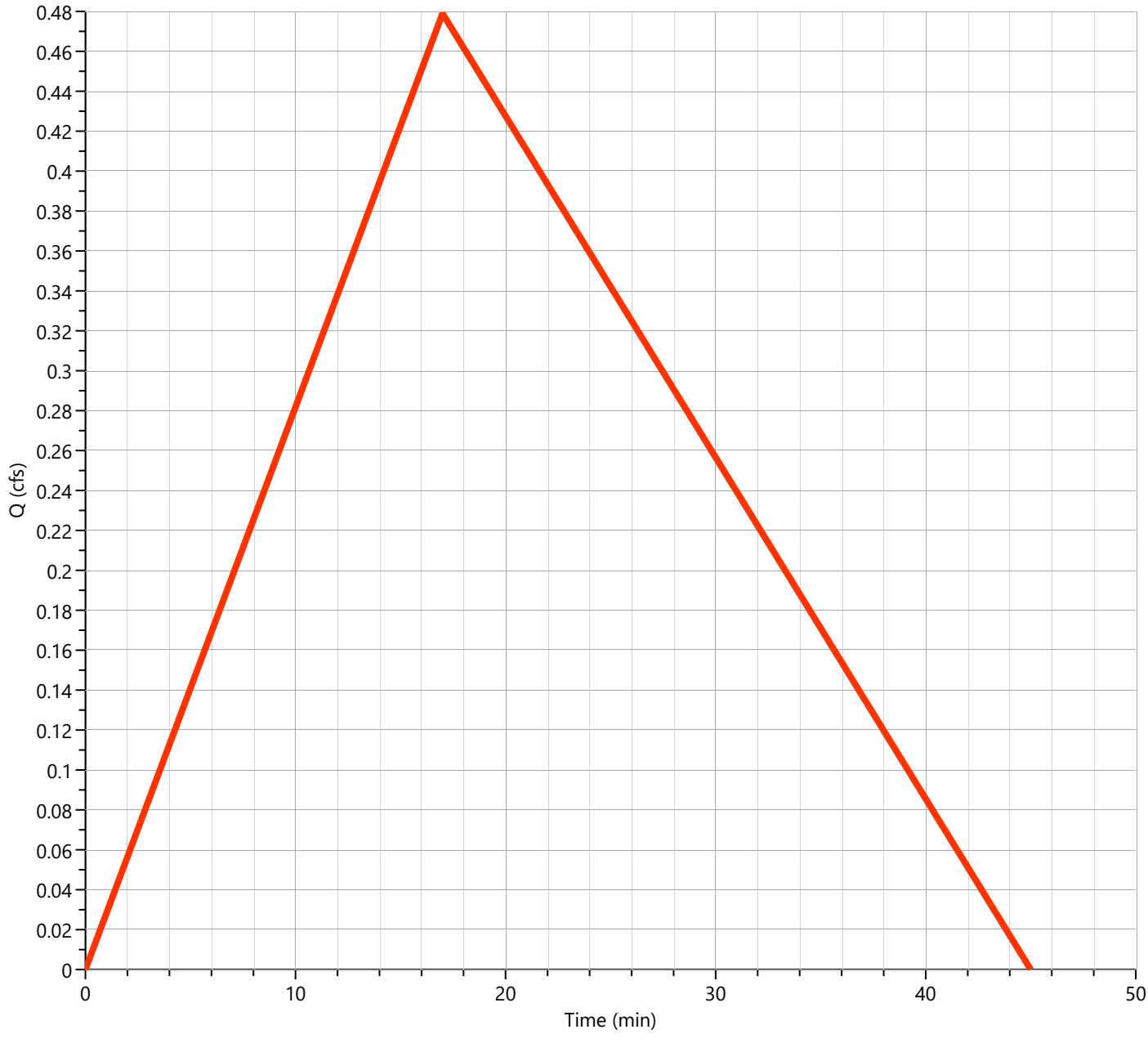
Hydrograph Type	= Rational	Peak Flow	= 2.424 cfs
Storm Frequency	= 50-yr	Time to Peak	= 0.12 hrs
Time Interval	= 1 min	Runoff Volume	= 1,359 cuft
Drainage Area	= 0.38 ac	Runoff Coeff.	= 0.72
Tc Method	= TR55	Time of Conc. (Tc)	= 7.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 8.86 in/hr
Freq. Corr. Factor	= 1.00	Asc/Rec Limb Factors	= 1/1.67



Post-Dev Basin "D"

Hyd. No. 13

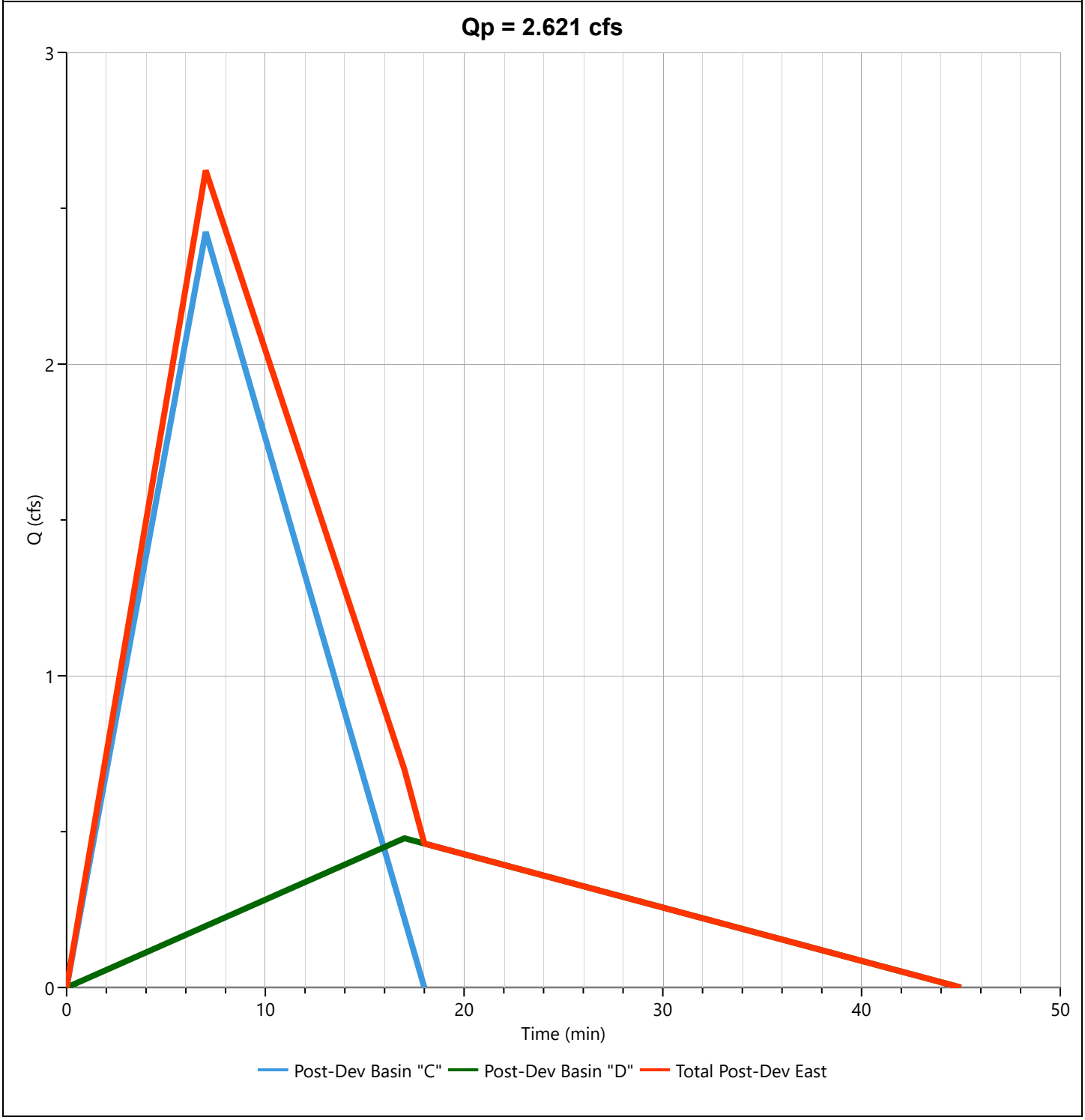
Hydrograph Type	= Rational	Peak Flow	= 0.479 cfs
Storm Frequency	= 50-yr	Time to Peak	= 0.28 hrs
Time Interval	= 1 min	Runoff Volume	= 652 cuft
Drainage Area	= 0.12 ac	Runoff Coeff.	= 0.67
Tc Method	= TR55	Time of Conc. (Tc)	= 17.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 5.96 in/hr
Freq. Corr. Factor	= 1.00	Asc/Rec Limb Factors	= 1/1.67



Total Post-Dev East

Hyd. No. 14

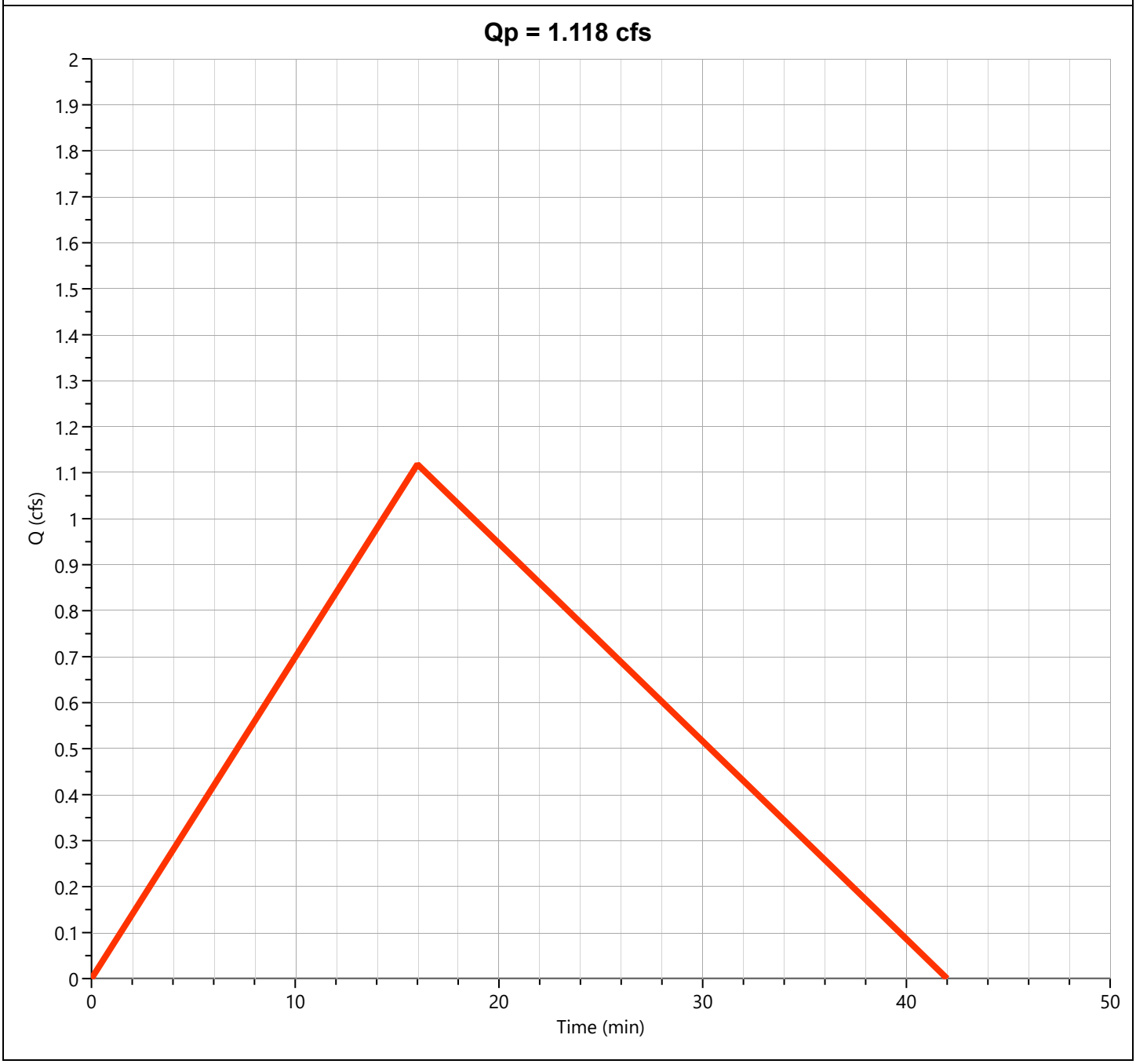
Hydrograph Type	= Junction	Peak Flow	= 2.621 cfs
Storm Frequency	= 50-yr	Time to Peak	= 0.12 hrs
Time Interval	= 1 min	Hydrograph Volume	= 1,956 cuft
Inflow Hydrographs	= 12, 13	Total Contrib. Area	= 0.5 ac



Post-Dev Basin "E"

Hyd. No. 15

Hydrograph Type	= Rational	Peak Flow	= 1.118 cfs
Storm Frequency	= 50-yr	Time to Peak	= 0.27 hrs
Time Interval	= 1 min	Runoff Volume	= 1,433 cuft
Drainage Area	= 0.29 ac	Runoff Coeff.	= 0.63
Tc Method	= TR55	Time of Conc. (Tc)	= 16.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 6.12 in/hr
Freq. Corr. Factor	= 1.00	Asc/Rec Limb Factors	= 1/1.67



Hydrograph 100-yr Summary

Hydrology Studio v 3.0.0.39

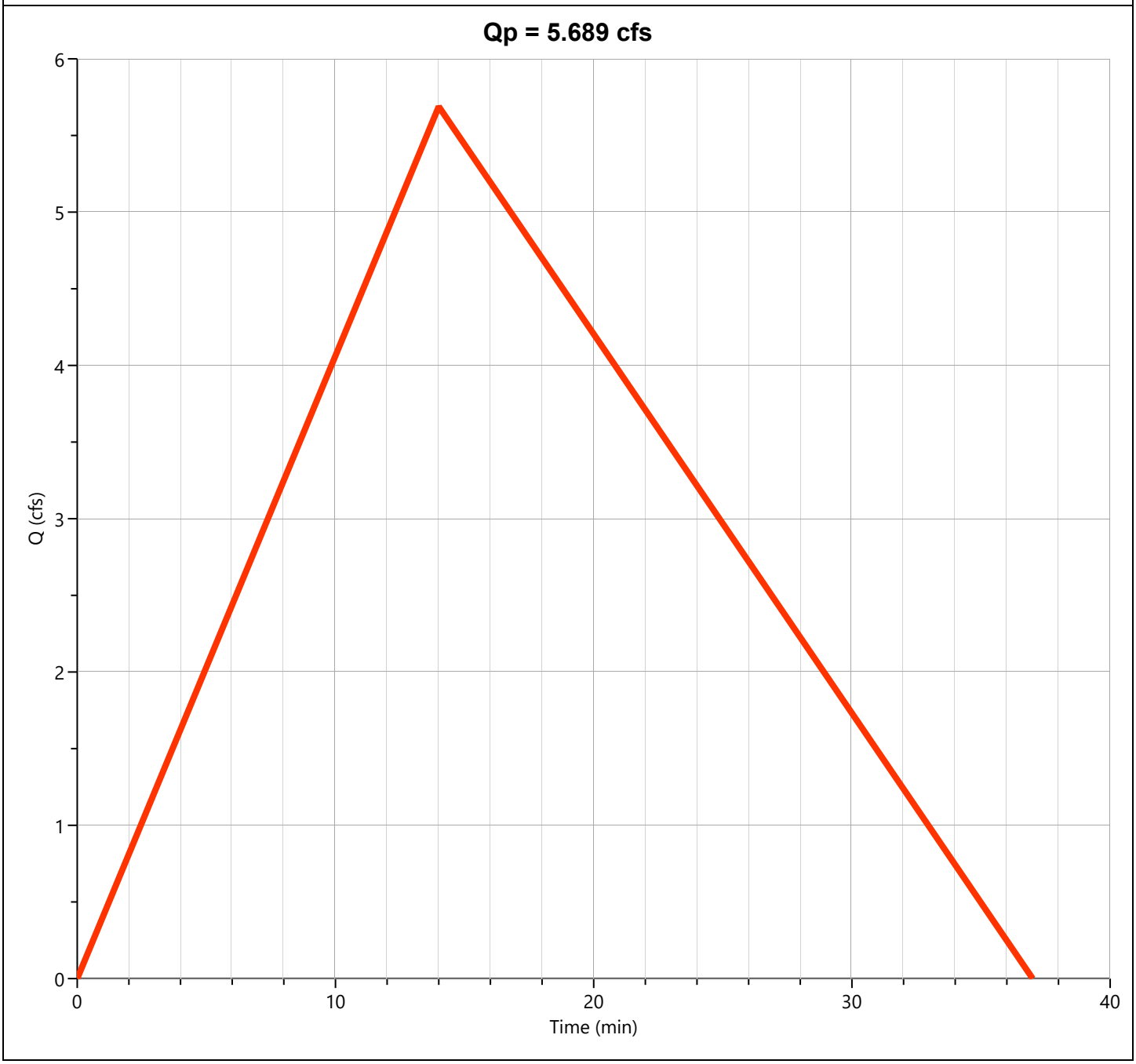
Project Name: Bryant Pharmacy
File: Detention Calculation 11-13-25 FINAL.hys
11-13-2025

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	Rational	Pre-Dev Basin "A"	5.689	0.23	6,379	----		
2	Rational	Pre-Dev Basin "B"	13.57	0.23	15,215	----		
3	Junction	Total Pre-Dev West	19.26	0.23	21,375	1, 2		
4	Rational	Pre-Dev Basin "C"	1.686	0.18	1,486	----		
5	Rational	Pre-Dev Basin "D"	1.847	0.25	2,219	----		
6	Junction	Total Pre-Dev East	3.158	0.25	3,683	4, 5		
7	Rational	Pre-Dev Basin "E"	1.793	0.32	2,729	----		
8	Mod Rational	Post-Dev Basin A	5.774	0.20	14,204	----		
9	Pond Route	Detention Basin	5.104	0.70	14,202	8	422.78	4,240
10	Rational	Post-Dev Basin B	15.53	0.23	17,419	----		
11	Junction	Total Post-Dev West	18.08	0.23	31,444	9, 10		
12	Rational	Post-Dev Basin "C"	2.635	0.12	1,477	----		
13	Rational	Post-Dev Basin "D"	0.520	0.28	708	----		
14	Junction	Total Post-Dev East	2.849	0.12	2,124	12, 13		
15	Rational	Post-Dev Basin "E"	1.214	0.27	1,556	----		

Pre-Dev Basin "A"

Hyd. No. 1

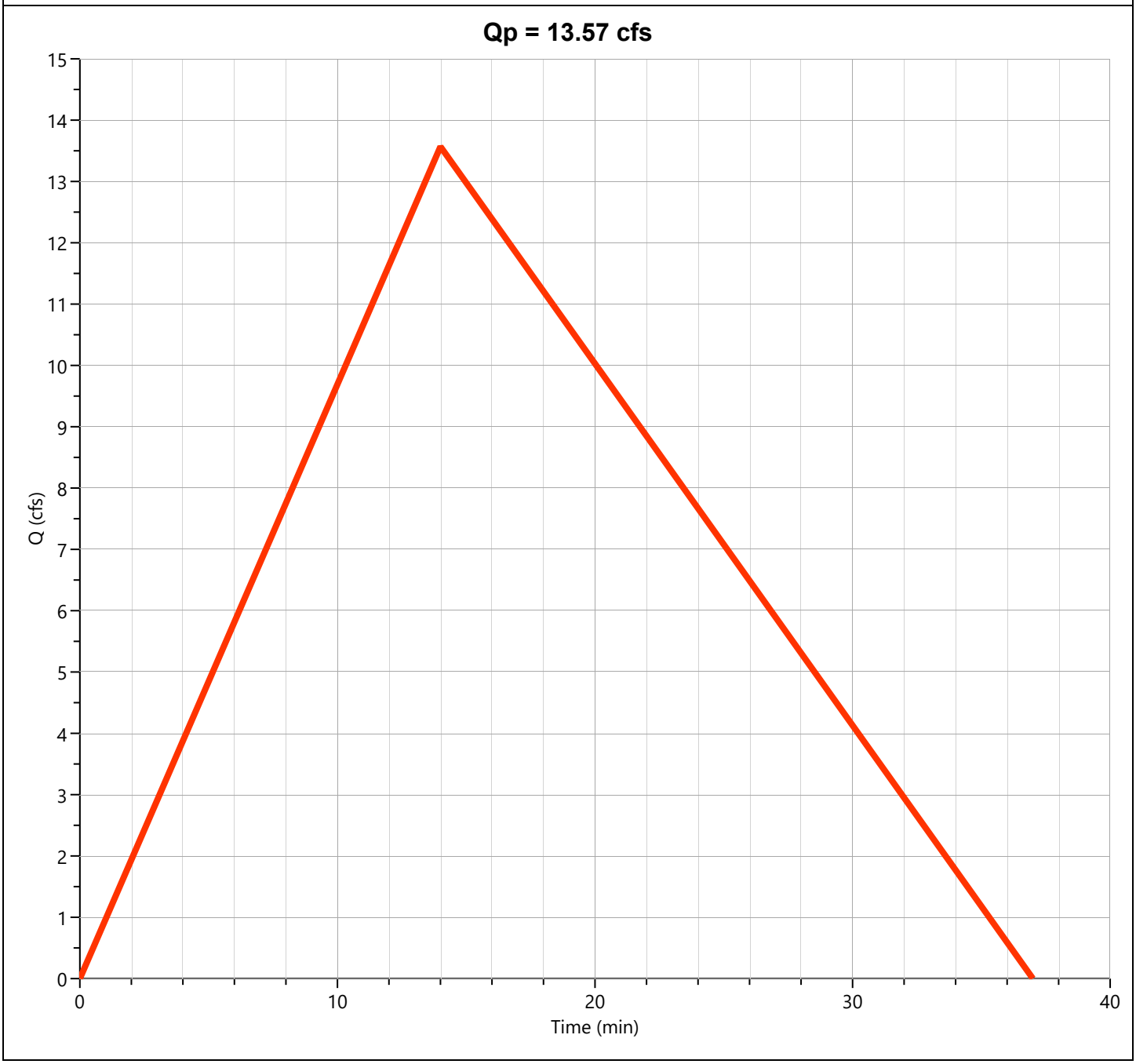
Hydrograph Type	= Rational	Peak Flow	= 5.689 cfs
Storm Frequency	= 100-yr	Time to Peak	= 0.23 hrs
Time Interval	= 1 min	Runoff Volume	= 6,379 cuft
Drainage Area	= 1.44 ac	Runoff Coeff.	= 0.56
Tc Method	= TR55	Time of Conc. (Tc)	= 14.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 7.05 in/hr
Freq. Corr. Factor	= 1.00	Asc/Rec Limb Factors	= 1/1.67



Pre-Dev Basin "B"

Hyd. No. 2

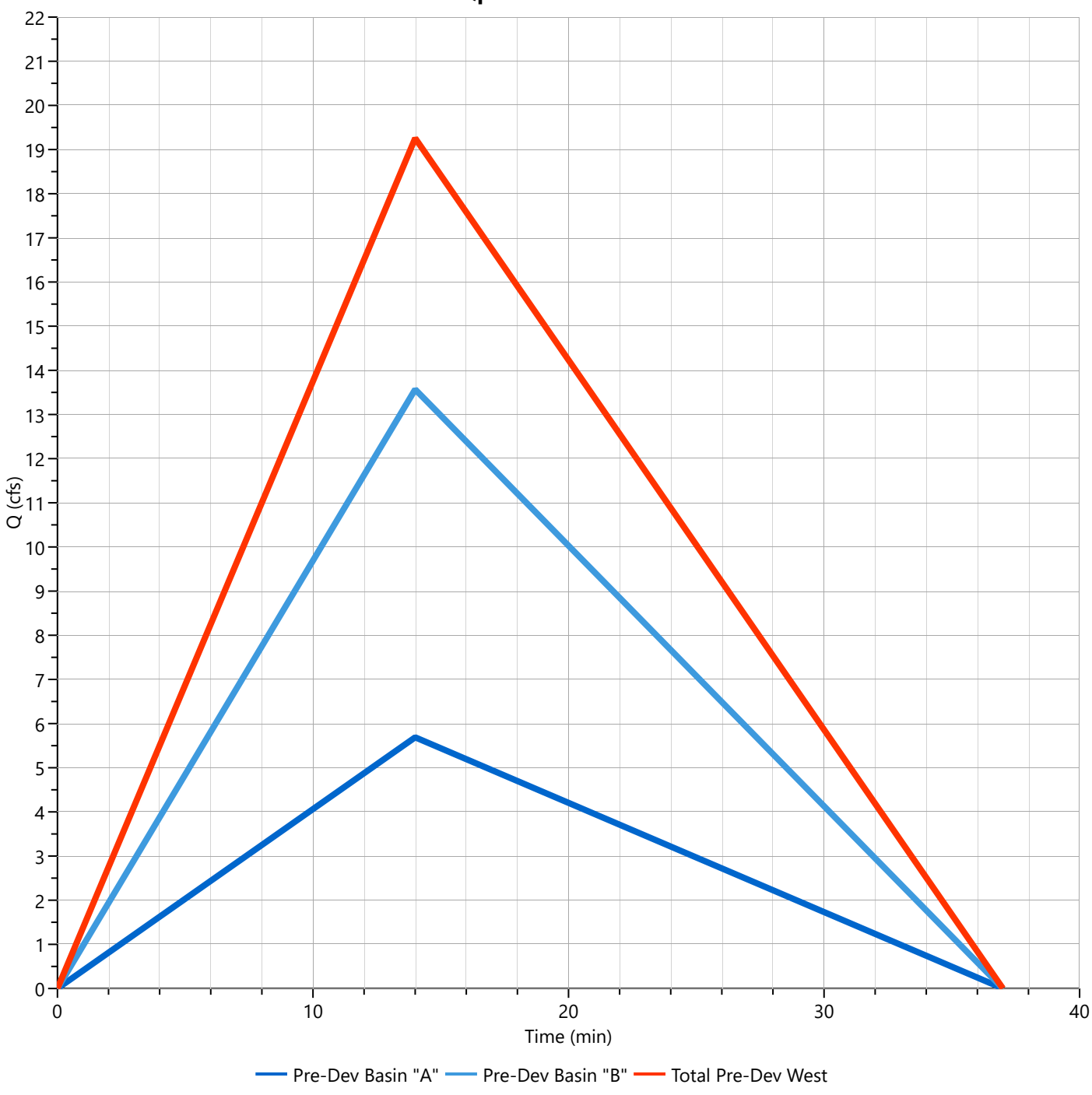
Hydrograph Type	= Rational	Peak Flow	= 13.57 cfs
Storm Frequency	= 100-yr	Time to Peak	= 0.23 hrs
Time Interval	= 1 min	Runoff Volume	= 15,215 cuft
Drainage Area	= 3.26 ac	Runoff Coeff.	= 0.59
Tc Method	= TR55	Time of Conc. (Tc)	= 14.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 7.05 in/hr
Freq. Corr. Factor	= 1.00	Asc/Rec Limb Factors	= 1/1.67



Total Pre-Dev West

Hyd. No. 3

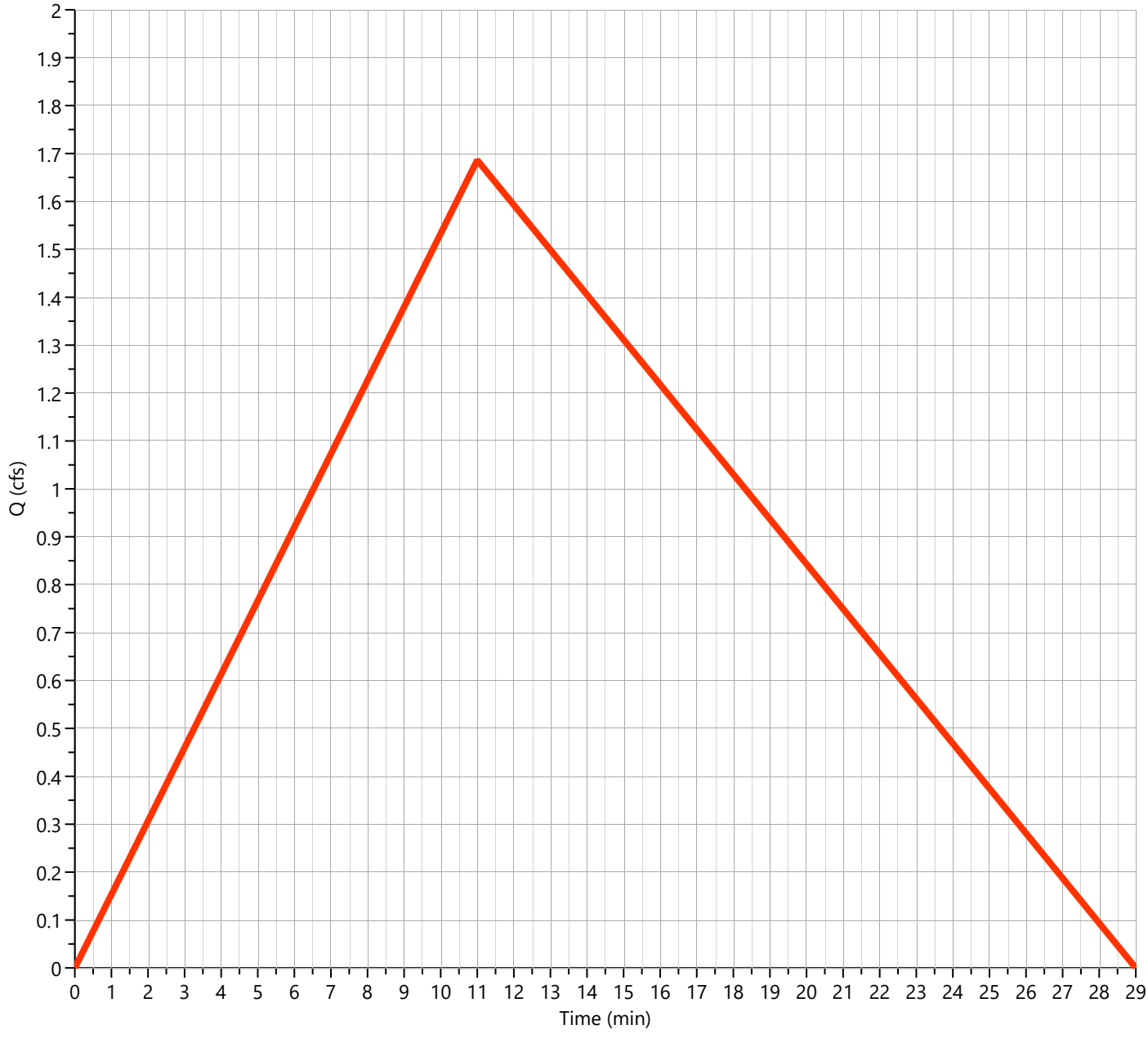
Hydrograph Type	= Junction	Peak Flow	= 19.26 cfs
Storm Frequency	= 100-yr	Time to Peak	= 0.23 hrs
Time Interval	= 1 min	Hydrograph Volume	= 21,375 cuft
Inflow Hydrographs	= 1, 2	Total Contrib. Area	= 4.7 ac



Pre-Dev Basin "C"

Hyd. No. 4

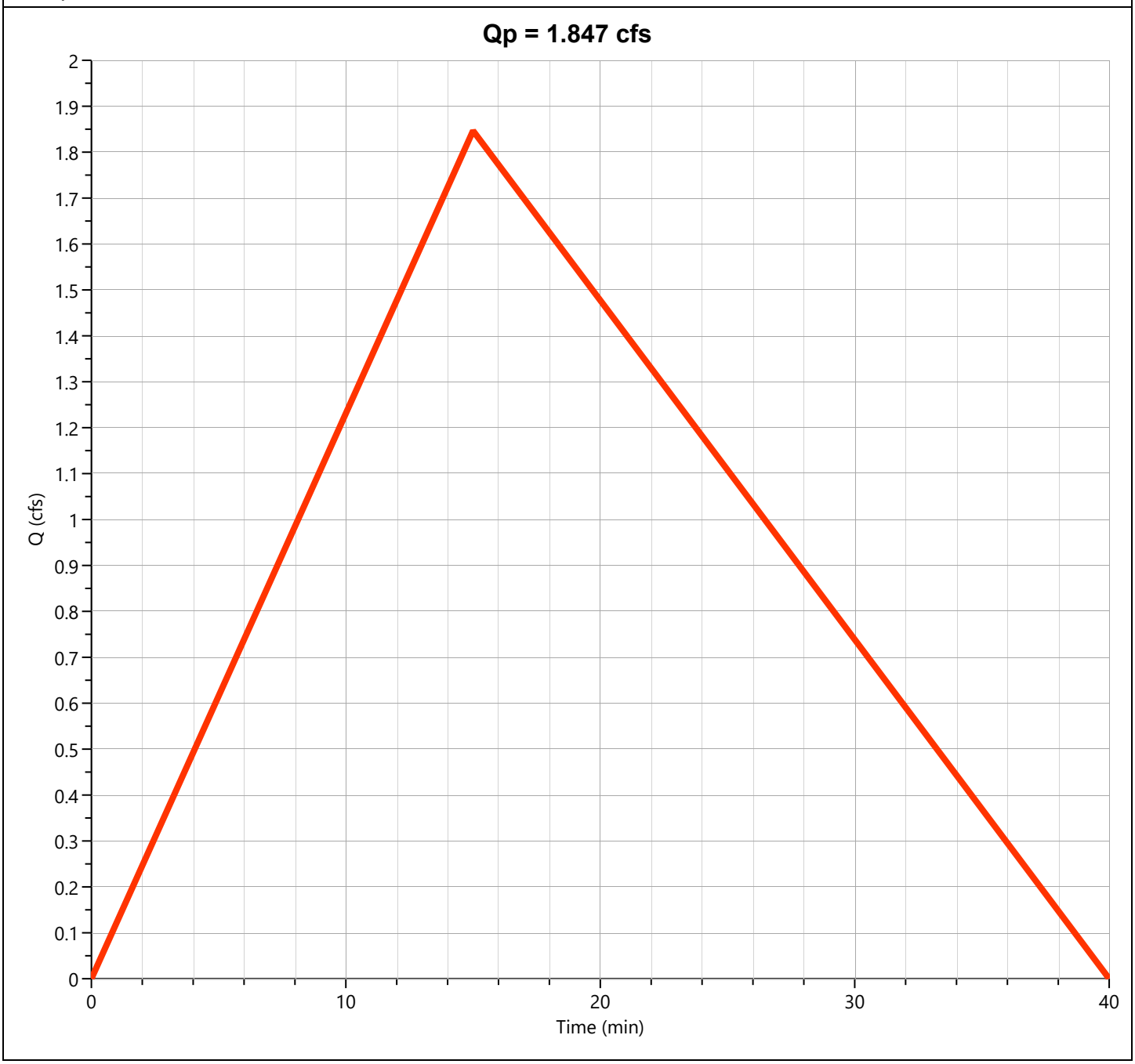
Hydrograph Type	= Rational	Peak Flow	= 1.686 cfs
Storm Frequency	= 100-yr	Time to Peak	= 0.18 hrs
Time Interval	= 1 min	Runoff Volume	= 1,486 cuft
Drainage Area	= 0.33 ac	Runoff Coeff.	= 0.65
Tc Method	= TR55	Time of Conc. (Tc)	= 11.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 7.86 in/hr
Freq. Corr. Factor	= 1.00	Asc/Rec Limb Factors	= 1/1.67



Pre-Dev Basin "D"

Hyd. No. 5

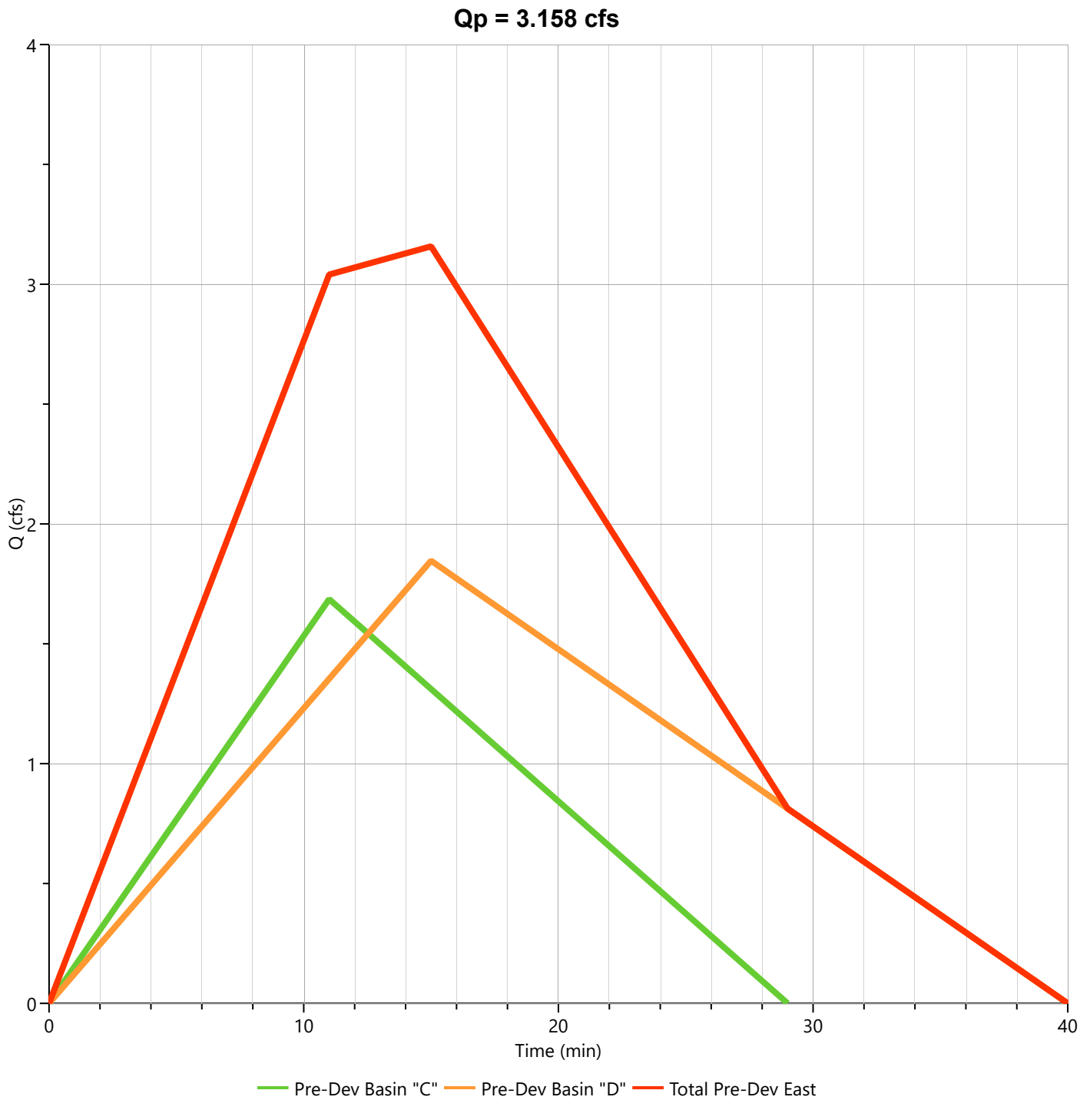
Hydrograph Type	= Rational	Peak Flow	= 1.847 cfs
Storm Frequency	= 100-yr	Time to Peak	= 0.25 hrs
Time Interval	= 1 min	Runoff Volume	= 2,219 cuft
Drainage Area	= 0.5 ac	Runoff Coeff.	= 0.54
Tc Method	= TR55	Time of Conc. (Tc)	= 15.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 6.84 in/hr
Freq. Corr. Factor	= 1.00	Asc/Rec Limb Factors	= 1/1.67



Total Pre-Dev East

Hyd. No. 6

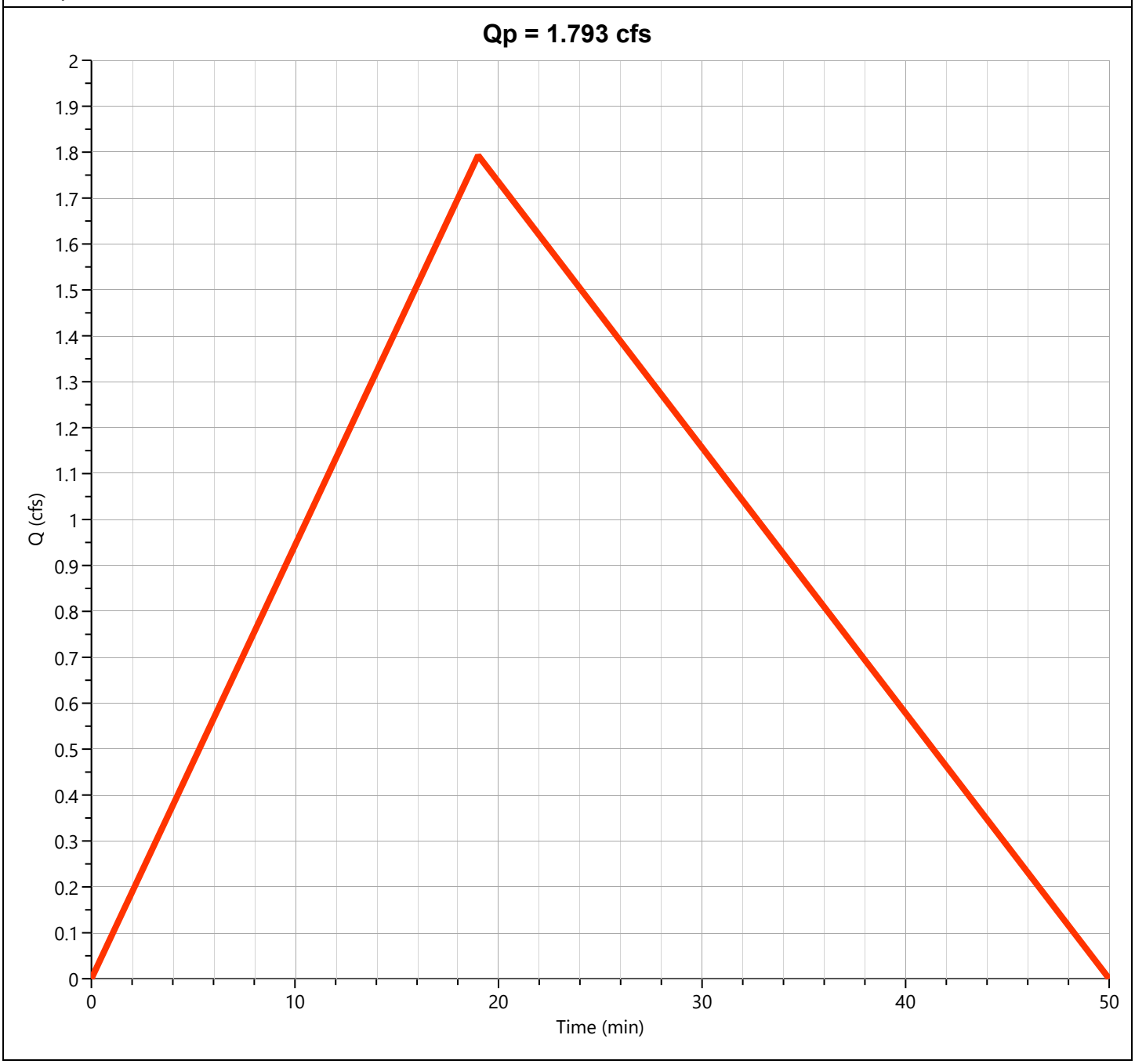
Hydrograph Type	= Junction	Peak Flow	= 3.158 cfs
Storm Frequency	= 100-yr	Time to Peak	= 0.25 hrs
Time Interval	= 1 min	Hydrograph Volume	= 3,683 cuft
Inflow Hydrographs	= 4, 5	Total Contrib. Area	= 0.83 ac



Pre-Dev Basin "E"

Hyd. No. 7

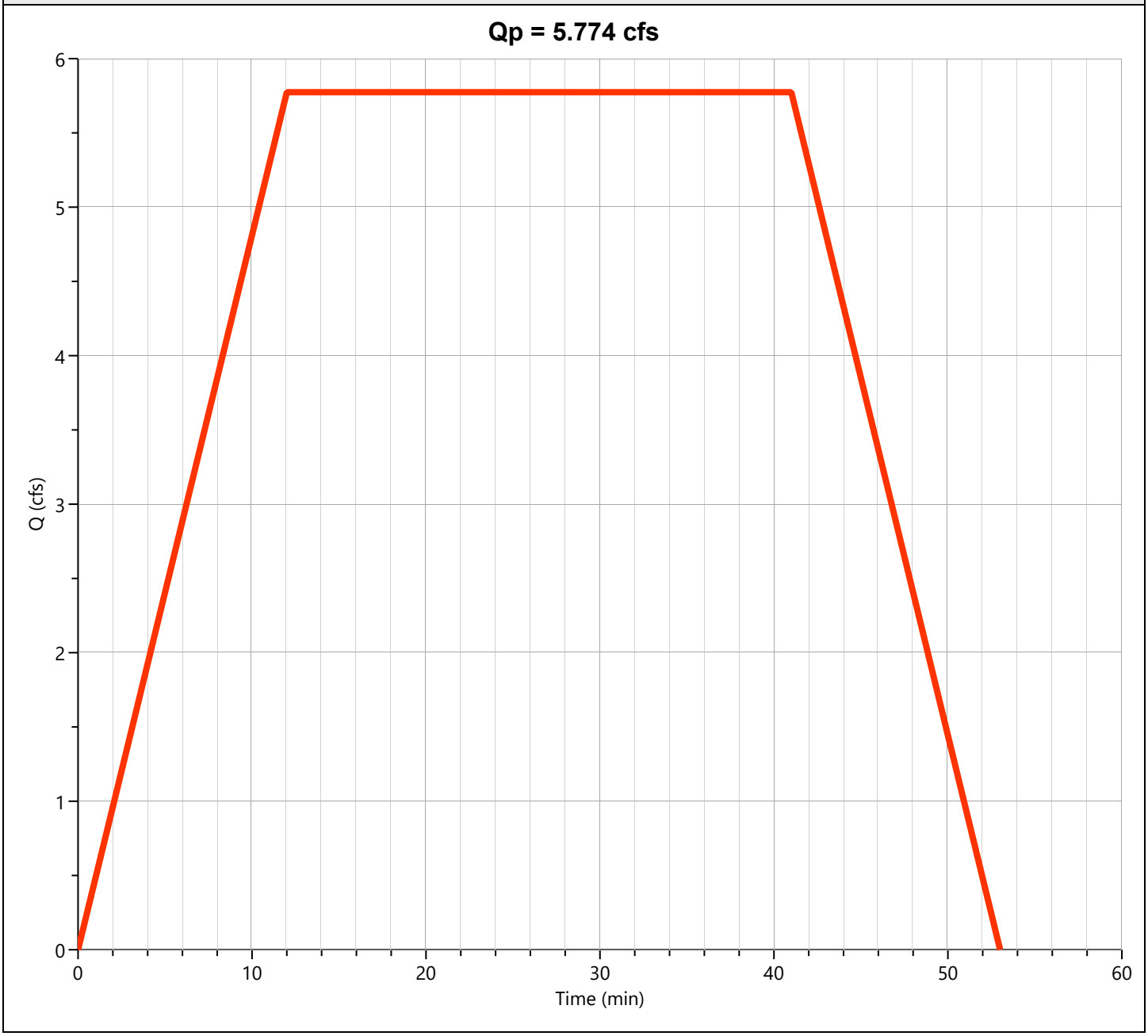
Hydrograph Type	= Rational	Peak Flow	= 1.793 cfs
Storm Frequency	= 100-yr	Time to Peak	= 0.32 hrs
Time Interval	= 1 min	Runoff Volume	= 2,729 cuft
Drainage Area	= 0.53 ac	Runoff Coeff.	= 0.55
Tc Method	= TR55	Time of Conc. (Tc)	= 19.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 6.15 in/hr
Freq. Corr. Factor	= 1.00	Asc/Rec Limb Factors	= 1/1.67



Post-Dev Basin A

Hyd. No. 8

Hydrograph Type	= Mod Rational	Peak Flow	= 5.774 cfs
Storm Frequency	= 100-yr	Time to Peak	= 0.20 hrs
Time Interval	= 1 min	Runoff Volume	= 14,204 cuft
Drainage Area	= 1.56 ac	Runoff Coeff.	= 0.85
Tc Method	= User	Time of Conc. (Tc)	= 12.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 4.35 in/hr
Freq. Corr. Factor	= 1.00	Storm Duration	= 3.42 x Tc
Target Q	= 0.000 cfs	Required Storage	= 0.000 cuft



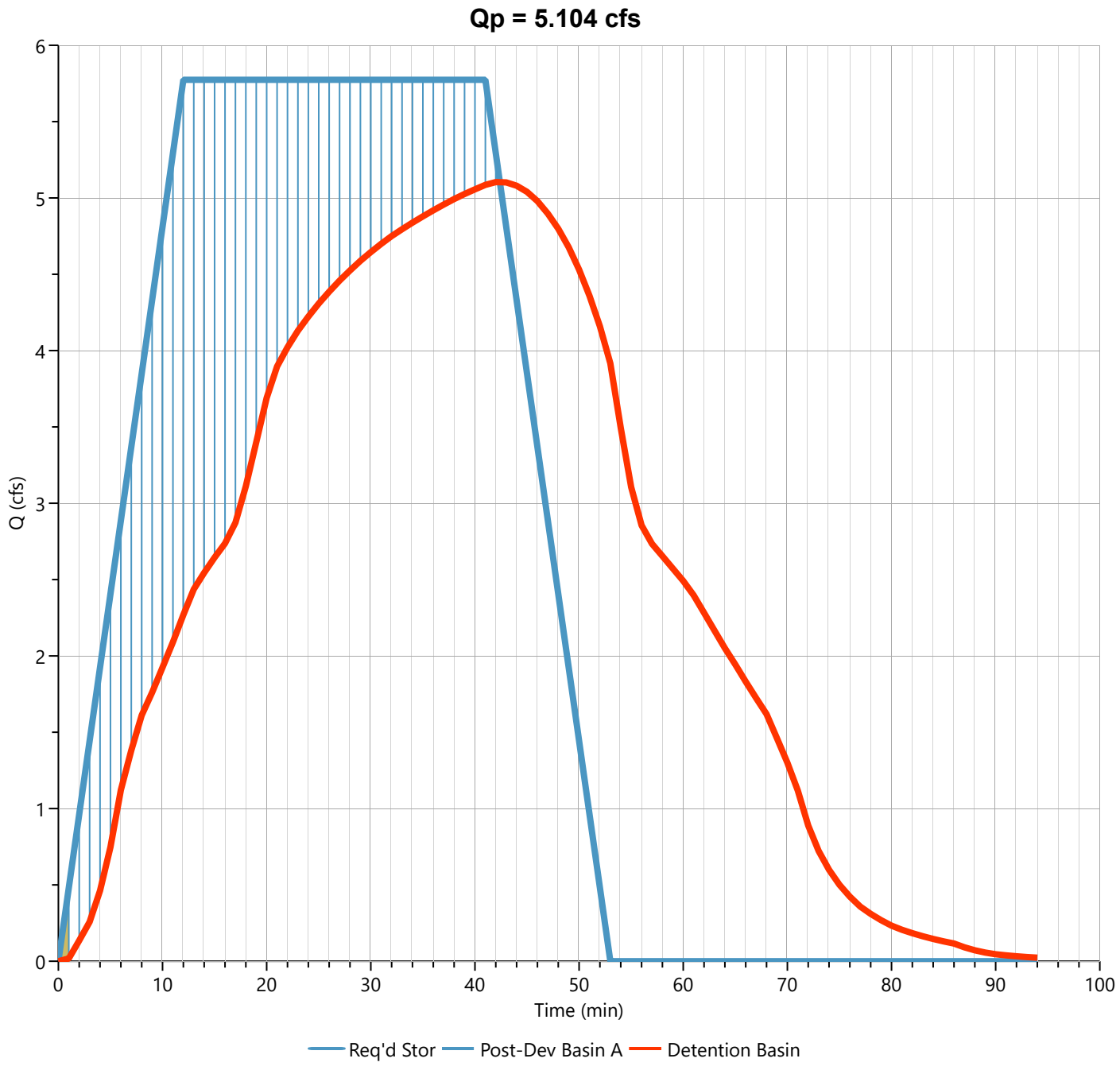
Detention Basin

Hyd. No. 9

Hydrograph Type	= Pond Route	Peak Flow	= 5.104 cfs
Storm Frequency	= 100-yr	Time to Peak	= 0.70 hrs
Time Interval	= 1 min	Hydrograph Volume	= 14,202 cuft
Inflow Hydrograph	= 8 - Post-Dev Basin A	Max. Elevation	= 422.78 ft
Pond Name	= Bryant Pharmacy Detention Pond	Max. Storage	= 4,240 cuft

Pond Routing by Storage Indication Method

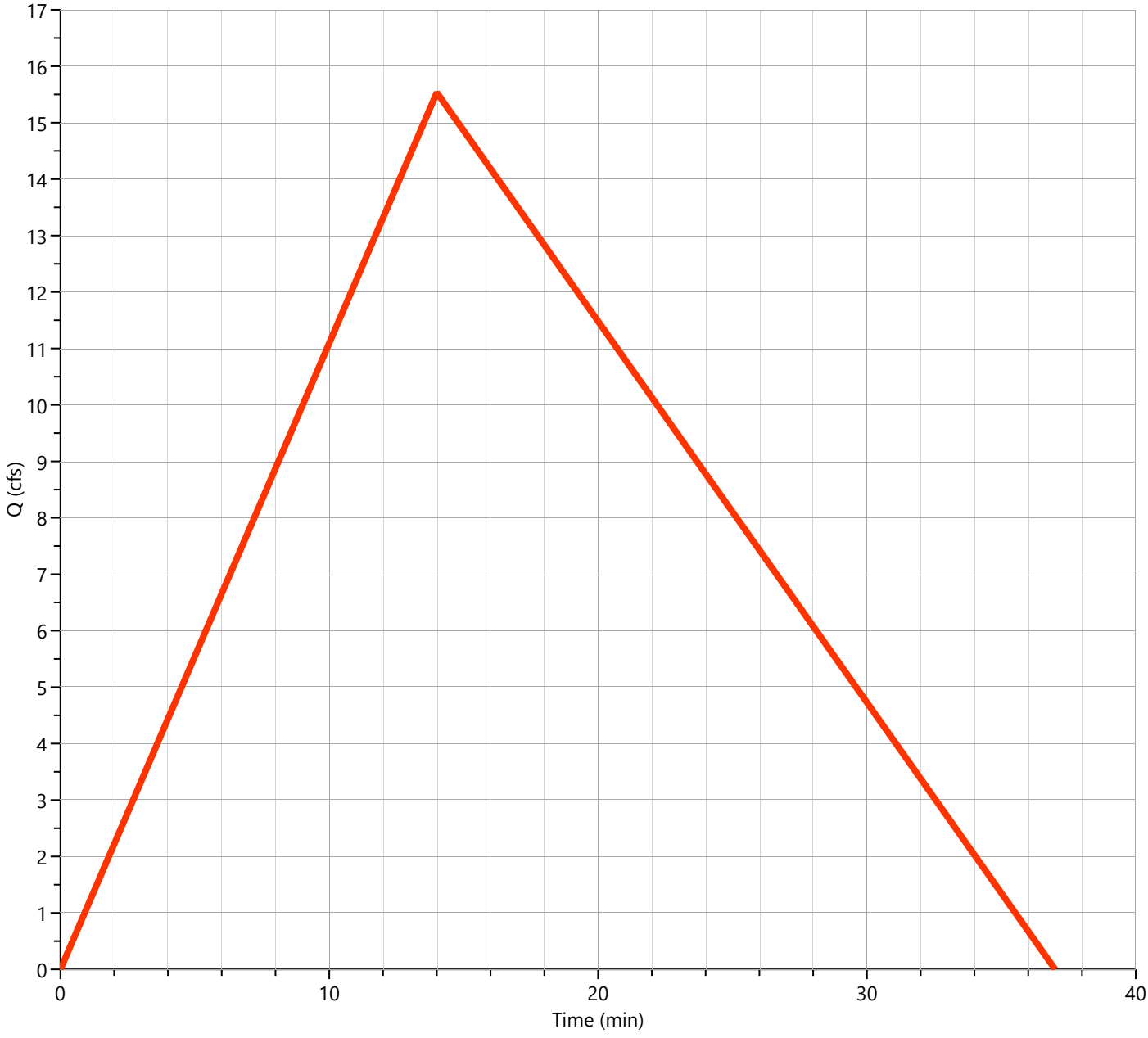
Center of mass detention time = 12 min



Post-Dev Basin B

Hyd. No. 10

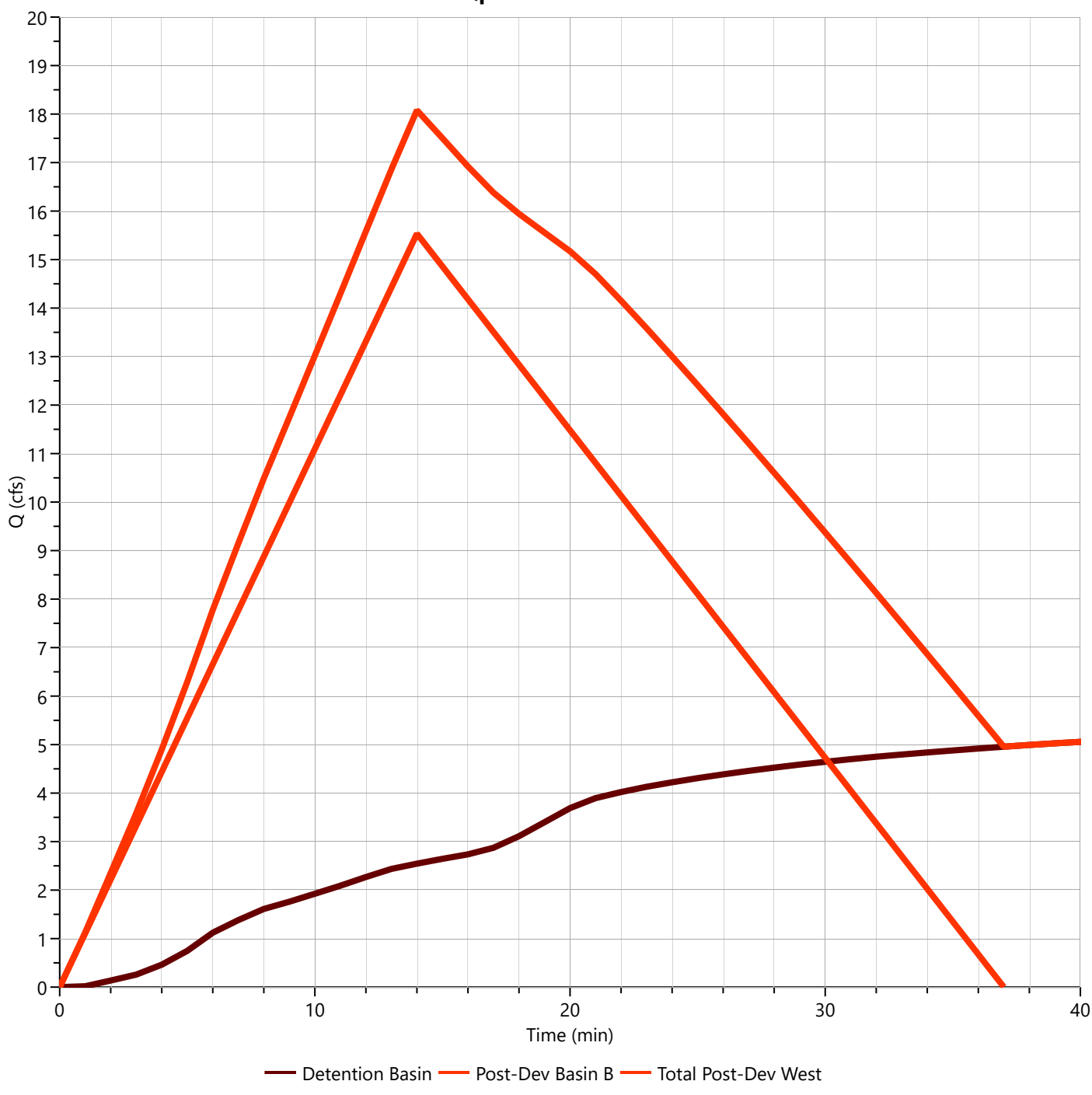
Hydrograph Type	= Rational	Peak Flow	= 15.53 cfs
Storm Frequency	= 100-yr	Time to Peak	= 0.23 hrs
Time Interval	= 1 min	Runoff Volume	= 17,419 cuft
Drainage Area	= 3.67 ac	Runoff Coeff.	= 0.60
Tc Method	= TR55	Time of Conc. (Tc)	= 14.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 7.05 in/hr
Freq. Corr. Factor	= 1.00	Asc/Rec Limb Factors	= 1/1.67



Total Post-Dev West

Hyd. No. 11

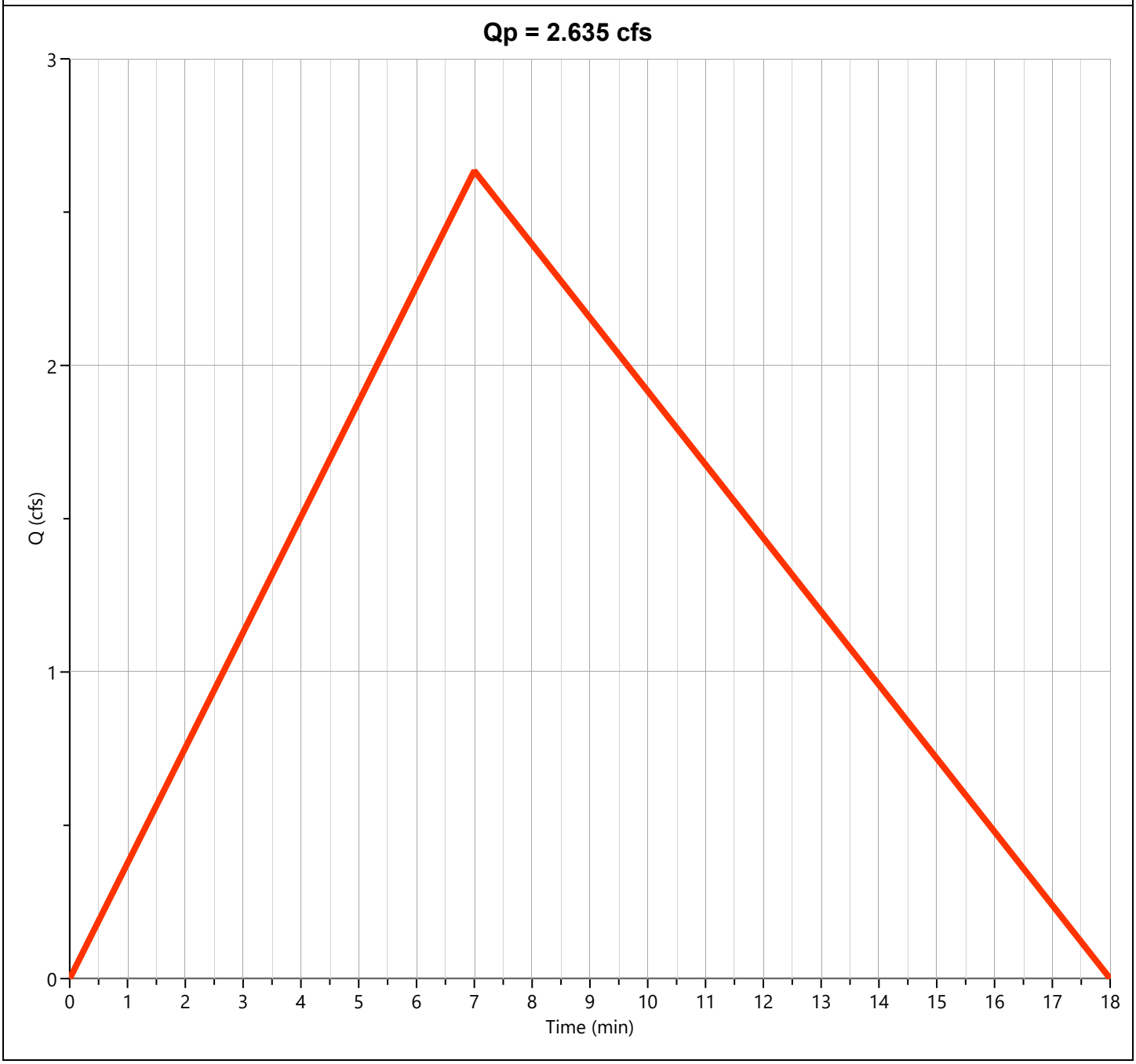
Hydrograph Type	= Junction	Peak Flow	= 18.08 cfs
Storm Frequency	= 100-yr	Time to Peak	= 0.23 hrs
Time Interval	= 1 min	Hydrograph Volume	= 31,444 cuft
Inflow Hydrographs	= 10	Total Contrib. Area	= 3.67 ac



Post-Dev Basin "C"

Hyd. No. 12

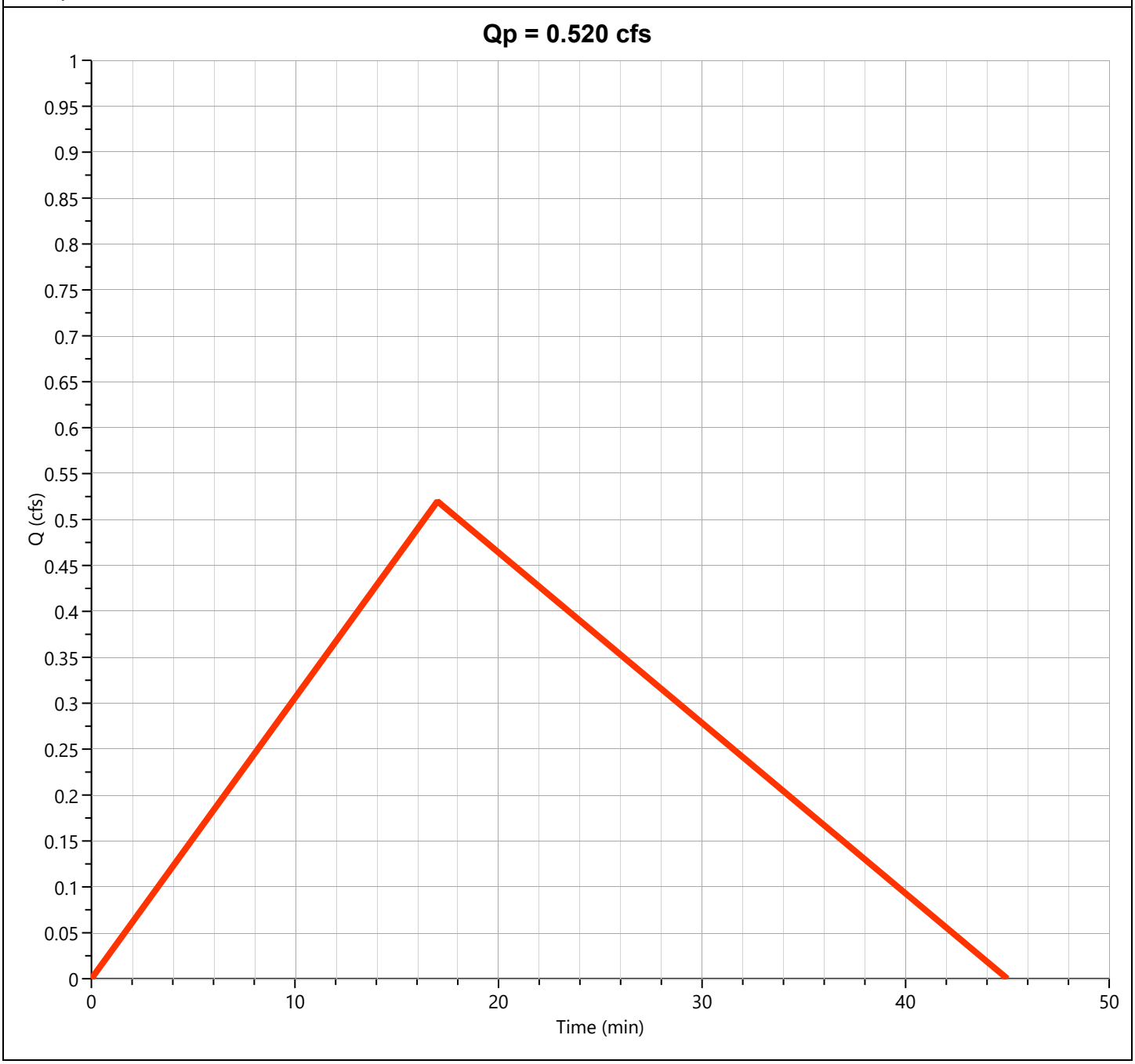
Hydrograph Type	= Rational	Peak Flow	= 2.635 cfs
Storm Frequency	= 100-yr	Time to Peak	= 0.12 hrs
Time Interval	= 1 min	Runoff Volume	= 1,477 cuft
Drainage Area	= 0.38 ac	Runoff Coeff.	= 0.72
Tc Method	= TR55	Time of Conc. (Tc)	= 7.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 9.63 in/hr
Freq. Corr. Factor	= 1.00	Asc/Rec Limb Factors	= 1/1.67



Post-Dev Basin "D"

Hyd. No. 13

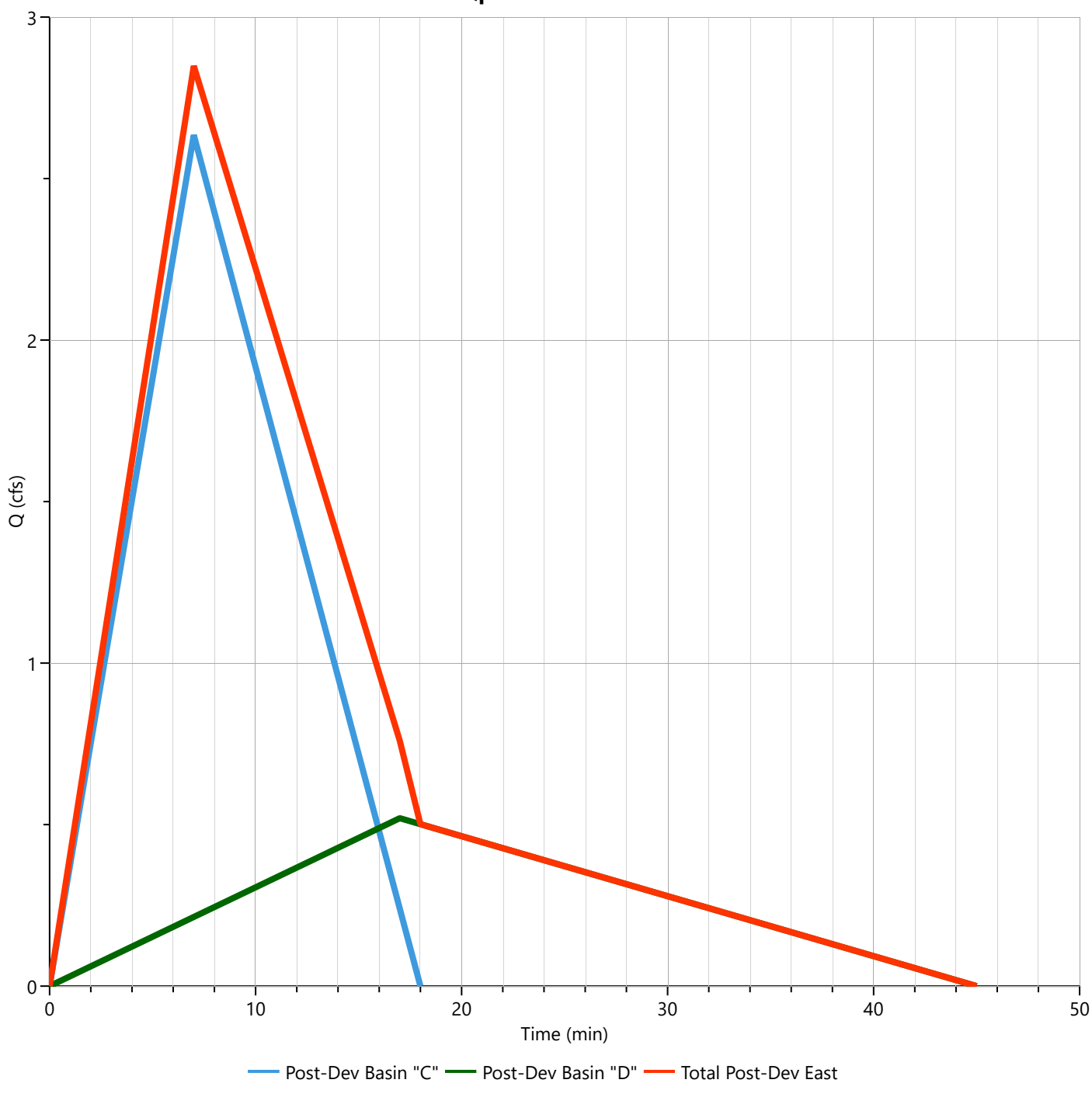
Hydrograph Type	= Rational	Peak Flow	= 0.520 cfs
Storm Frequency	= 100-yr	Time to Peak	= 0.28 hrs
Time Interval	= 1 min	Runoff Volume	= 708 cuft
Drainage Area	= 0.12 ac	Runoff Coeff.	= 0.67
Tc Method	= TR55	Time of Conc. (Tc)	= 17.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 6.47 in/hr
Freq. Corr. Factor	= 1.00	Asc/Rec Limb Factors	= 1/1.67



Total Post-Dev East

Hyd. No. 14

Hydrograph Type	= Junction	Peak Flow	= 2.849 cfs
Storm Frequency	= 100-yr	Time to Peak	= 0.12 hrs
Time Interval	= 1 min	Hydrograph Volume	= 2,124 cuft
Inflow Hydrographs	= 12, 13	Total Contrib. Area	= 0.5 ac



Post-Dev Basin "E"

Hyd. No. 15

Hydrograph Type	= Rational	Peak Flow	= 1.214 cfs
Storm Frequency	= 100-yr	Time to Peak	= 0.27 hrs
Time Interval	= 1 min	Runoff Volume	= 1,556 cuft
Drainage Area	= 0.29 ac	Runoff Coeff.	= 0.63
Tc Method	= TR55	Time of Conc. (Tc)	= 16.0 min
IDF Curve	= City of Bryant IDF Curve.idf	Intensity	= 6.64 in/hr
Freq. Corr. Factor	= 1.00	Asc/Rec Limb Factors	= 1/1.67