

# **Stormwater Impact Analysis Conditional Zoning Permit Submittal**

For the proposed  
**Homestead Road Townhomes**

Conditional Zoning Permit

Chapel Hill, North Carolina

**Prepared By**  
Stewart Inc.



# STEWART

June 24, 2022  
Revised August 26, 2022  
Revised October 7, 2022

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# STORMWATER NARRATIVE

## HOMESTEAD ROAD TOWNHOMES

### CHAPEL HILL, NORTH CAROLINA

#### Project Data

**Project:** Homestead Road Townhomes  
**PIN:** 9870907642  
**Parcel Area:** 15.65 AC  
**Address:** 2217 Homestead Road  
**Case Number:** D2200XX  
**Stormwater Regulatory Basin:** Jordan Lake  
**River Basin:** Cape Fear  
**Existing Impervious Area:** 15,438 SF (0.35 AC)  
**Proposed Impervious Area:** 270,712 SF (6.21 AC)  
**Limits of Disturbance:** 566,437 SF (13.00 AC)  
**Watershed Protection Overlay:** None

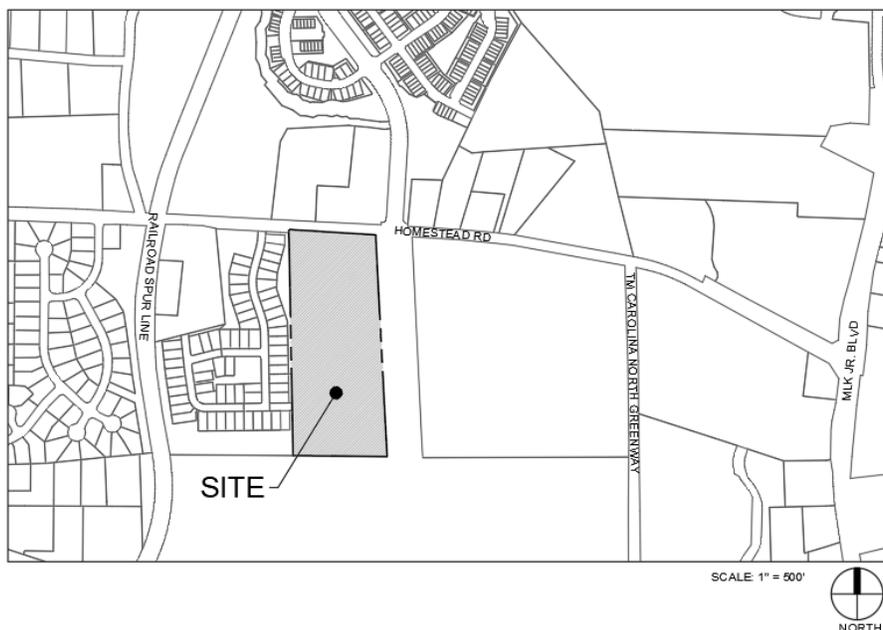
#### Site Development History

There have been no changes in impervious surface since the baseline date of April 23, 1997 and March 17, 2009 for 1, 2, and 10 year peak flow.

#### Project Description

This stormwater analysis will address the various quality and quantity control standards per the Town of Chapel Hill Stormwater Performance Standards for Development and proposed changes in impervious surfaces on the subject property. The project area is 13.44 acres located in the Jordan Lake Basin. The site does not lie in a regulated floodplain and the soils across the site are composed of primarily GeB and GeC soils (Hydrologic Soils Group 'B'). The subject property is currently an existing residential house and driveway. The proposed project is to demolish the existing building to construct new multifamily Townhomes. Please see Figure 1.0 below for the location of the project parcel.

**Figure 1.0** – Vicinity Map for Homestead Road Townhomes



## Quantity Measures

In pre-development conditions, runoff from the site drains into three different directions. Three analysis points were evaluated. One analysis point was observed at the north side of the property; there is an existing stormwater catch basin along Homestead Rd, see sheet SW1.0 of this report. This is the north analysis point for the 1-, 2-, 10-, 25-, and 100-year storms.

The rest of the runoff is directed to the south side of the property. The second analysis point is located at the southwest corner; this will be for the 1-year storm. The third analysis point is located farther downstream that was the closest to include runoff from the entire site; this will be for the 2-, 10-, 25-, and 100-year storms.

In the Jordan Basin, the Town of Chapel Hill requires the 1-year analysis point to be analyzed on March 17, 2009, and the 2 and 10-year to be analyzed on April 23, 1997. However, in Google Earth there is no change in land cover for this parcel between April 23, 1997 and March 17, 2009. There is also no change in land cover between now and 1997 for this parcel. Pre-development conditions for this project were analyzed with current site conditions. Therefore, only the three analysis points were needed to be observed.

Both the north analysis point and south analysis point (1 year) include a mix of woods, roof area and open space. The south analysis point (2/10/25/100 year) has a total of 54.65 acres of runoff area and majority woods. We found a CN value of all three analysis points and time of concentration was calculated using the TR-5 method. Please refer to SW1.1 in Appendix 4 for reference.

In post development conditions, there are two constructed wetlands proposed (one on the north and one on the south) to meet peak flow requirements.

Table 1.0 below summarizes the peak flows from the analysis points determined with Hydraflow Hydrographs. The SCS method was used in Hydraflow to populate the hydrographs. These results show peak flow rates decreasing throughout 1, 2, 10, 25 and 100-year storms.

**Table 1.0 – Pre and Post Peak Flow Rates at Analysis Points**

Sub-Basin #	Pre-Development (cfs)	Post Development – No Detention (cfs)	Post Development – With Detention (cfs)	Basin ID	Post Development – Net Reduction (cfs)
North AP – 1 Year	1.894	16.64	0.998	NORTH	-0.896
North AP – 2 Year	4.145	23.78	1.674	NORTH	-2.471
North AP – 10 Year	13.05	45.51	12.36	NORTH	-0.69
North AP – 25 Year	19.37	59.18	17.08	NORTH	-2.29
North AP – 100 Year	30.34	81.96	28.29	NORTH	-2.05
South AP – 1 Year	0.183	10.38	0.122	SOUTH	-0.06
South AP – 2 Year	10.90	17.37	10.67	SOUTH	-0.23
South AP – 10 Year	50.09	54.84	48.94	SOUTH	-1.15
South AP – 25 Year	81.71	86.29	79.05	SOUTH	-2.66
South AP – 100 Year	138.52	143.68	132.88	SOUTH	-5.64

Table 2.0 below summarizes the 2-year runoff volumes from the analysis points determined with Hydraflow Hydrographs. These results are based on the 2-year storm event.

**Table 2.0 – Pre and Post 2-Year Runoff Volumes at Analysis Points**

Sub-Basin #	Pre-Development Runoff Volume (cf)	Post Development Runoff Volume No Detention (cf)	Post Development Runoff Volume With Detention (cf)
North AP – 2 Year	18,071	48,482	46,757
South AP – 2 Year	74,600	92,477	88,531

## Quality Measures

The site is located within the New Hope River of the Jordan Lake watershed. Per the Town of Chapel Hill Durham Stormwater Performance Standards, 85% of all TSS from new impervious surface must be removed. The Jordan Lake watershed has a baseline date of March 17, 2009 which means any development constructed after this date must meet the current stormwater performance standards.

The 85% TSS requirement was met by proposing two constructed wetlands. The drainage areas going to the wetlands consists of roof from the proposed buildings, driveway, sidewalk and road. The two constructed wetlands will treat an area that is equal to the the post-development additional impervious area.

Please refer to Table 1.0 below for the summary of treated impervious areas.

**Table 1.0 – Impervious Area Treatment Summary within the Project Area**

Area	SF	AC
Total Post Development Impervious	282,274	6.48
Existing Impervious	15,438	0.35
Increased Impervious	266,836	6.13
Treated Impervious	282,274	6.48

## Conclusion

The proposed conditional use permit for Homestead Road Townhomes will utilize two proposed constructed wetlands to meet peak flow and nutrient requirements. These constructed wetlands will provide 85% TSS removal for the increase in impervious surface. They will also be designed per NCDEQ and Town of Chapel Hill requirements to achieve the TSS reduction requirements.

Submitted 7th day of October 2022 by **STEWART**

Prepared by:

Ashley Abbott



Approved by:

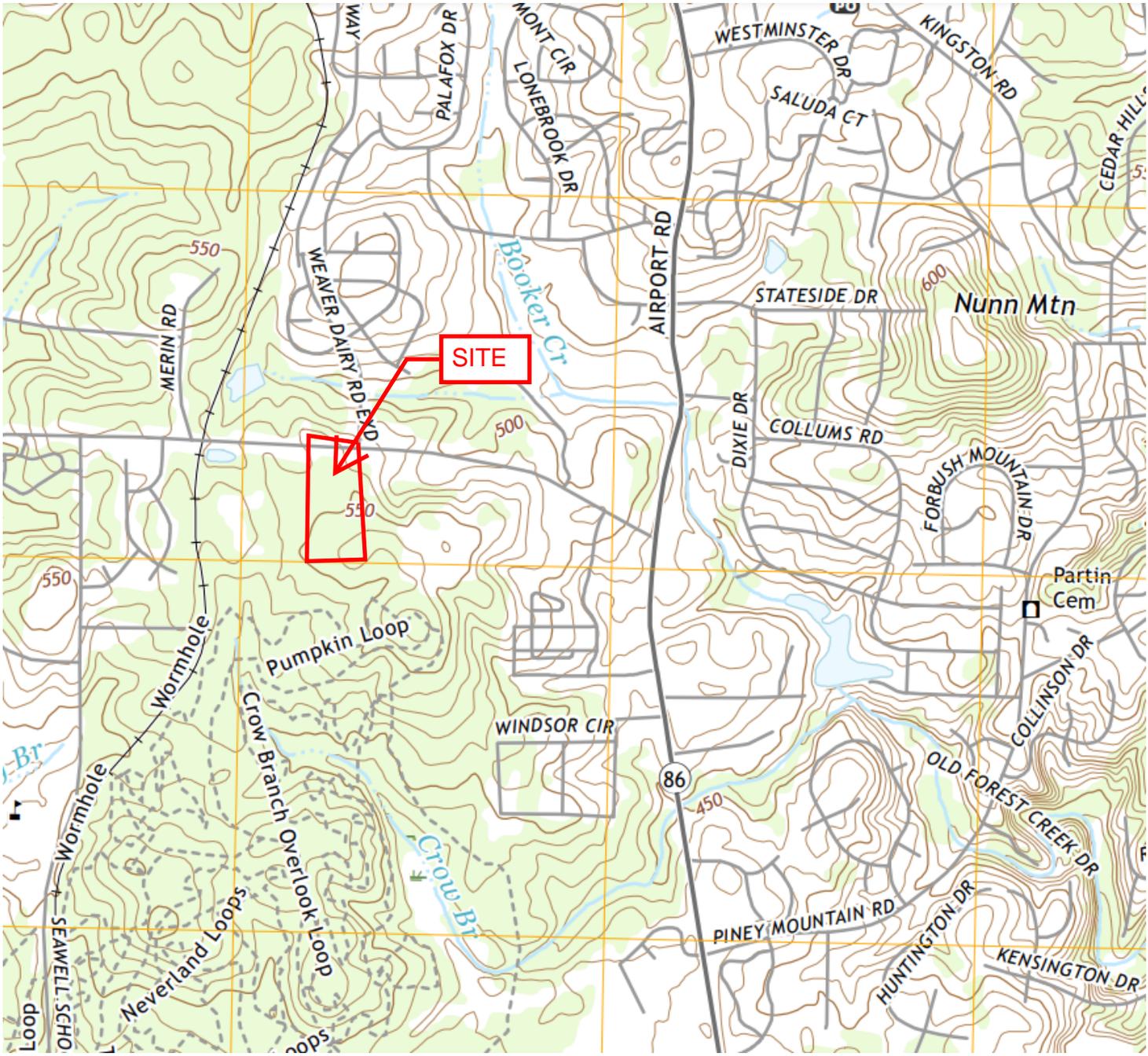
Tim Summerville, PE



## **Appendix 2**

### **Site Information**

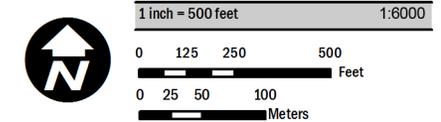
- a. USGS 7.5 Min. Quad Map**
- b. FEMA Map**
- c. USDA Web Soil Survey Map**





	Without Base Flood Elevation (BFE) <i>Zone A, V, A99</i>
	With BFE or Depth <i>Zone AE, AO, AH, VE, AR</i>
	Regulatory Floodway
	0.2% Annual Chance Flood Hazard
	Future Conditions 1% Annual Chance Flood Hazard <i>Zone X</i>
	Areas Determined to be Outside the 0.2% Annual Chance Flood Hazard <i>Zone X</i>
	Jurisdiction Boundary
	FIRM Panel Boundary

North Carolina State Plane Projection Feet (Zone 3200)  
Datum: NAD 1983 (Horizontal), NAVD 1988 (Vertical)



**FEMA National Flood Insurance Program**

**NATIONAL FLOOD INSURANCE PROGRAM**  
FLOOD INSURANCE RATE MAP

Panel(s): 9870,9880,9779,9789

CONTAINS:

<b>COMMUNITY</b>	<b>CID</b>
TOWN OF CHAPEL HILL	370180

Notice to User: The Map Number(s) shown below should be used when placing map orders; the Community Number(s) shown above should be used on insurance applications for the subject community.

SELECTED PANELS:

MAP NUMBER	EFFECTIVE DATE
3710987000K	11/17/2017
3710988000K	11/17/2017
3710977900K	11/17/2017
3710978900J	2/2/2007






# FEMA: National Flood Insurance Program



Panel(s): 9870,9880,9779,9789

**CONTAINS:**

<b>COMMUNITY</b>	<b>CID</b>
TOWN OF CHAPEL HILL	370180

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3710977900K	11/17/2017
3710978900J	2/2/2007

### NOTES TO USERS

This is an official FIRMette of a portion of the effective panels listed in the Title Block shown on Page 1. The information represented on this FIRMette was extracted from the effective digital flood hazard data available at <http://fris.nc.gov/fris>.

Base flood elevation data, floodway, nonencroachment widths, information on certain areas no in the Special Flood Hazard Areas protected by flood control structures, and other pertinent data are available in the Flood Insurance Study (FIS) available at <http://fris.nc.gov/fris>. Users should be aware that flood elevations shown on this FIRMette represent elevations rounded to one tenth of a foot (0.1') and should be utilized in conjunction with data available in the FIS.

### NOTES TO USERS

Base map information and geospatial data used to develop this FIRMette were obtained from various organizations, including the participating local community(ies), state and federal agencies, and/or other sources. The primary base for this FIRM is aerial imagery acquired by the State in 2010. Information and geospatial data supplied by the local community(ies) that met FEMA base map specifications were considered the preferred source for development of the base map.

See geospatial metadata for the associated digital FIRMette for additional information about base map preparation. Base map features shown on this FIRMette, such as corporate limits, are based on the most up-to-date data available at the time of publication. Changes in the corporate limits may have occurred since this map was published. Map users should consult the appropriate community official or website to verify current conditions of jurisdictional boundaries and base map features. This map may contain roads that were not considered in the hydraulic analysis of streams where no new hydraulic model was created during the production of this statewide format FIRM.

Flood elevations on this map are referenced to either or both the North American Vertical Datum of 1988 (NAVD 88) or National Geodetic Datum of 1929 (NGVD 29), and are labeled accordingly. These flood elevations must be compared to structure and ground elevations referenced to the same vertical datum. To obtain current elevation, description, and/or location information for bench marks shown on this map, or for information regarding conversion between NGVD 29 and NAVD 88, please contact the Information Services Branch of the National Geodetic Survey at (301) 713-3242, or visit its website at <http://www.ngs.noaa.gov/>.

### MORE INFORMATION

Letters of Map Amendment (LOMA)	1-877-336-2627 <a href="http://msc.fema.gov/">http://msc.fema.gov/</a>
Letters of Map Revision (LOMR)	919-715-5711 <a href="http://www.ncfloodmaps.com">www.ncfloodmaps.com</a>
Flood Insurance Availability	
North Carolina Division of Emergency Management (NCDEM)	919-715-5711 <a href="http://www.nccrimecontrol.org/nfip">http://www.nccrimecontrol.org/nfip</a>
National Flood Insurance Program (NFIP)	1-877-638-6620 <a href="http://www.fema.gov/business/nfip">http://www.fema.gov/business/nfip</a>
Questions about this FIRMette	1-877-336-2627 <a href="http://fema.gov">http://fema.gov</a>

### LEGEND

#### LEGEND

#### MAP REVISIONS

**There are no map revisions for the selected area.**

Soil Map—Orange County, North Carolina



Map Scale: 1:2,480 if printed on A portrait (8.5" x 11") sheet.



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



Natural Resources Conservation Service

Web Soil Survey National Cooperative Soil Survey

6/20/2022 Page 1 of 3

## 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: Orange County, North Carolina

Survey Area Data: Version 22, Jan 21, 2022

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

Date(s) aerial images were photographed: Oct 9, 2019—Oct 19, 2019

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

## Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
EnC	Enon loam, 6 to 12 percent slopes	0.1	0.3%
GeB	Georgeville silt loam, 2 to 6 percent slopes	10.5	51.7%
GeC	Georgeville silt loam, 6 to 10 percent slopes	9.7	48.0%
<b>Totals for Area of Interest</b>		<b>20.3</b>	<b>100.0%</b>

## **Appendix 3**

### **Peak Flow Analysis**

- a. Constructed Wetland Sizing Calculations**
- b. Composite CN Calculations**
- c. Time of Concentration Calculations**
- d. Hydrographs**



# STEWART

Project: Homestead Rd Townhomes  
 Project No: C22033

Date: 8.25.2022  
 By: SRM

Revision:

## Constructed Wetland Sizing Calculations

Input values in red

Drainage Area: North Wetland

Drainage Area	
Total Drainage Area (sf)	422,357
On-site Drainage Area (sf)	363,197
Off-site Drainage Area (sf)	59,160

Pervious Surface Area	
Managed Pervious Area (sf)	193,234
Off-site Managed Pervious Area (sf)	0
Unmanaged Pervious Area (pasture) (sf)	0
Forest (sf)	0
Off-site Forest (sf)	59,160
Total Pervious Area (sf)	252,394

Impervious Surface Area	
On-site Buildings/Lots (sf)	86,496
On-site Streets (sf)	52,037
On-site Parking (sf)	0
On-site Sidewalks (sf)	31,430
Other On-site (sf)	0
Future (sf)	0
Off-site (sf)	0
Existing BUA* (sf)	0
<b>Total Impervious Area (sf)</b>	<b>169,963</b>

\* = Report only amount of existing BUA that will remain after development. Do not report any existing BUA that is to be removed and which will be replaced by new BUA

Required Surface Area		Required Storage for 1st inch of runoff	
Total Drainage Area =	9.70 ac	Simple Method	
Total Impervious Area =	3.90 ac	Rv = 0.05 + 0.009(I)	
Percent Impervious =	40.24%	I = % impervious = 40%	
Design Rainfall Depth =	1 in	Rv = 0.41 in	
Allowed Ponding Depth =	15 in	Required Volume = 14507 cf	
<b>Required Surface Area =</b>	<b>11606 sf</b>		

Required Surface Area Breakdown					
Required Storage Area =		11606 SF			
Provided Surface Area =		13952 SF			
Wetland Zone Type	% of Total Wetland Surface	Surface Area Required (sf)	Zone Depth	Surface Area Provided (sf)	% of Total
Deep Water (Forebay)	10%	1,161	18-36"	1,396	10.0%
Shallow Water	40%	4,642	3-6"	5,580	40.0%
Shallow Land	40%	4,642	12"	5,580	40.0%
Deep Water (non-Forebay)	10%	1,161	18-36"	1,396	10.0%
		11,606		13,952	



# STEWART

Project: Homestead Rd Town Date: 6.3.2022  
 Project No: C22033 By: SRM

Revision:

## Water Quality Drawdown Calculations

*Input values in red*

**Drainage Area:** North Wetland

<p>Storage Volume Required (Simple Method)</p> <p>Total Drainage Area = 9.70 ac          Total Impervious Area = 3.90 ac          Percent Impervious = 40%</p> <p><math>R_v = 0.05 + 0.009(I)</math>  <math>I = \% \text{ impervious} = 40\%</math>  <math>R_v = 0.41 \text{ in}</math></p> <p>Runoff Vol. Req' = <b>14507 cf</b></p>	<p>Basin Characteristics</p> <p>Wetland Invert = 535.00 ft          Normal Pool Elevation = 536.00 ft          Next available Outlet = <b>537.25 ft</b>          Storage Depth = 1.25 ft          Driving Head (H/3) = 0.42 ft</p>
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Temporary Storage Volume = **17440 cf**  
 Temporary Storage Surface Area = **13952 sf**

<p>Find orifice size for 2-day drawdown time</p> <p>Flow Rate = Volume (cf) / Time (sec)          = 0.1009 cfs</p> <p><math>Q = C_D * A * (2 * g * h)^{(1/2)}</math> (Orifice Equation - solve for A (area))</p> <p>A = 0.03247 ft<sup>2</sup>          4.67602 in<sup>2</sup></p> <p>Orifice Size (2 day) = 2.44 in (dia)</p>
--

<p>Find orifice size for 5-day drawdown time</p> <p>Flow Rate = Volume (cf) / Time (sec)          = 0.0336 cfs</p> <p><math>Q = C_D * A * (2 * g * h)^{(1/2)}</math> (Orifice Equation - solve for A (area))</p> <p>A = 0.01080 ft<sup>2</sup>          1.55586 in<sup>2</sup></p> <p>Orifice Size (5 day) = 1.41 in (dia)</p>
--

Select orifice size between 2 and 5 day size  
**Size selected = 2 " dia**

<p>Actual Drawdown Time</p> <p>Volume = 17440 cf          Pipe Size = 2 "dia          Area = 0.02182 ft<sup>2</sup>          Flow Rate = 0.06781 cfs</p> <p><b>Drawdown Time = 2.98 days</b></p>
--



# STEWART

Project: Homestead Rd Townhomes  
 Project No: C22033

Date: 10.6.2022  
 By: SRM

Revision:

## Constructed Wetland Sizing Calculations

Input values in red

Drainage Area: South Wetland

Drainage Area	
Total Drainage Area (sf)	223,275
On-site Drainage Area (sf)	223,275
Off-site Drainage Area (sf)	0

Impervious Surface Area	
On-site Buildings/Lots (sf)	54,207
On-site Streets (sf)	36,635
On-site Parking (sf)	0
On-site Sidewalks (sf)	21,469
Other On-site (sf)	0
Future (sf)	0
Off-site (sf)	0
Existing BUA* (sf)	0
<b>Total Impervious Area (sf)</b>	<b>112,311</b>

Pervious Surface Area	
Managed Pervious Area (sf)	110,964
Off-site Managed Pervious Area (sf)	0
Unmanaged Pervious Area (pasture) (sf)	0
Forest (sf)	0
Off-site Forest (sf)	0
<b>Total Pervious Area (sf)</b>	<b>110,964</b>

\* = Report only amount of existing BUA that will remain after development. Do not report any existing BUA that is to be removed and which will be replaced by new BUA

Required Surface Area		Required Storage for 1st inch of runoff	
Total Drainage Area =	5.13 ac	Simple Method	
Total Impervious Area =	2.58 ac	Rv = 0.05 + 0.009(I)	
Percent Impervious =	50.30%	I = % impervious = 50%	
Design Rainfall Depth =	1 in	Rv = 0.50 in	
Allowed Ponding Depth =	15 in	<b>Required Volume = 9354 cf</b>	
<b>Required Surface Area =</b>	<b>7483 sf</b>		

Required Surface Area Breakdown					
Required Storage Area =		7483 SF			
Provided Surface Area =		10488 SF			
Wetland Zone Type	% of Total Wetland Surface	Surface Area Required (sf)	Zone Depth	Surface Area Provided (sf)	% of Total
Deep Water (Forebay)	10%	748	18-36"	1,052	10.0%
Shallow Water	40%	2,993	3-6"	4,192	40.0%
Shallow Land	40%	2,993	12"	4,192	40.0%
Deep Water (non-Forebay)	10%	748	18-36"	1,052	10.0%
		7,483		10,488	



# STEWART

Project: Homestead Rd Town Date: 6.3.2022  
 Project No: C22033 By: SRM

Revision:

## Water Quality Drawdown Calculations

*Input values in red*

**Drainage Area: South Wetland**

Storage Volume Required (Simple Method)	Basin Characteristics
Total Drainage Area = 5.13 ac	Wetland Invert = 539.00 ft
Total Impervious Area = 2.58 ac	Normal Pool Elevation = 540.00 ft
Percent Impervious = 50%	Next available Outlet = <b>541.25</b> ft
$R_v = 0.05 + 0.009(I)$	Storage Depth = 1.25 ft
$I = \% \text{ impervious} = 50\%$	Driving Head (H/3) = 0.42 ft
$R_v = 0.50 \text{ in}$	
Runoff Vol. Req' = <b>9354 cf</b>	

Temporary Storage Volume = **13110 cf**  
 Temporary Storage Surface Area = **10488 sf**

Find orifice size for 2-day drawdown time  
 Flow Rate = Volume (cf) / Time (sec)  
 = 0.0759 cfs

$Q = C_D * A * (2 * g * h)^{(1/2)}$  (Orifice Equation - solve for A (area))

A = 0.02441 ft<sup>2</sup>  
 3.51506 in<sup>2</sup>

Orifice Size (2 day) = 2.12 in (dia)

Find orifice size for 5-day drawdown time  
 Flow Rate = Volume (cf) / Time (sec)  
 = 0.0217 cfs

$Q = C_D * A * (2 * g * h)^{(1/2)}$  (Orifice Equation - solve for A (area))

A = 0.00697 ft<sup>2</sup>  
 1.00316 in<sup>2</sup>

Orifice Size (5 day) = 1.13 in (dia)

Select orifice size between 2 and 5 day size  
**Size selected = 1.5 " dia**

Actual Drawdown Time  
 Volume = 13110 cf  
 Pipe Size = 1.5 "dia  
 Area = 0.01227 ft<sup>2</sup>  
 Flow Rate = 0.03814 cfs

**Drawdown Time = 3.98 days**



# STEWART

Project: Homestead Rd Townhomes  
Project No: C22033

Date: 10.6.2022  
By: SM

## Pre Development Composite CN Values - 1 Year Drainage Areas

North AP			
Surface	SCS CN	Area (ac)	Comments
Impervious	98	0.35	assume good condition
Open Space	61	4.45	assume good condition
Wooded	55	4.06	assume good condition
=> Total Area		8.86	ac
<b>=&gt; Composite SCS CN Value</b>		<b>60</b>	

South AP			
Surface	SCS CN	Area (ac)	Comments
Impervious	98	0.00	assume good condition
Open Space	61	0.22	assume good condition
Wooded	55	1.87	assume good condition
=> Total Area		2.09	ac
<b>=&gt; Composite SCS CN Value</b>		<b>56</b>	

## Pre Development Composite CN Values - 2/10/25/100 Year Drainage Areas

North AP			
Surface	SCS CN	Area (ac)	Comments
Impervious	98	0.35	assume good condition
Open Space	61	4.45	assume good condition
Wooded	55	4.06	assume good condition
=> Total Area		8.86	ac
<b>=&gt; Composite SCS CN Value</b>		<b>60</b>	

South AP			
Surface	SCS CN	Area (ac)	Comments
Impervious	98	0.01	assume good condition
Open Space	61	0.00	assume good condition
Wooded	55	54.64	assume good condition
=> Total Area		54.65	ac
<b>=&gt; Composite SCS CN Value</b>		<b>55</b>	

\*Assume Hyrdologic Soil Group B



# STEWART

Project: Homestead Rd Townhomes  
Project No: C22033

Date: 10.6.2022  
By: AA

## Post Development Composite CN Values - 1 Year Drainage Areas

North Pond AP			
Surface	SCS CN	Area (ac)	Comments
Impervious	98	3.90	assume good condition
Open Space	61	5.14	assume good condition
Wooded	55	0.65	assume good condition
=> Total Area		9.70	ac
<b>=&gt; Composite SCS CN Value</b>		<b>75</b>	

North AP Bypass			
Surface	SCS CN	Area (ac)	Comments
Impervious	98	0.18	assume good condition
Open Space	61	1.09	assume good condition
Wooded	55	0.08	assume good condition
=> Total Area		1.35	ac
<b>=&gt; Composite SCS CN Value</b>		<b>65</b>	

South Pond AP			
Surface	SCS CN	Area (ac)	Comments
Impervious	98	2.58	assume good condition
Open Space	61	2.38	assume good condition
Wooded	55	0.16	assume good condition
=> Total Area		5.13	ac
<b>=&gt; Composite SCS CN Value</b>		<b>79</b>	

South AP Bypass			
Surface	SCS CN	Area (ac)	Comments
Impervious	98	0.00	assume good condition
Open Space	61	0.00	assume good condition
Wooded	55	0.14	assume good condition
=> Total Area		0.14	ac
<b>=&gt; Composite SCS CN Value</b>		<b>55</b>	

## Post Development Composite CN Values - 2/10/25/100 Year Drainage Areas

South AP Bypass			
Surface	SCS CN	Area (ac)	Comments
Impervious	98	0.00	assume good condition
Open Space	61	2.10	assume good condition
Wooded	55	45.76	assume good condition
=> Total Area		47.86	ac
<b>=&gt; Composite SCS CN Value</b>		<b>55</b>	

\*Assume Hyrdologic Soil Group B



**STEWART**

**TR 55 Time of Concentration Worksheet**

**Project** Homestead Rd  
**Location** Chapel Hill, NC

**Calculated By**  
**Checked By**

**Date** 6/21/2022  
**Revised**

Pre Development - North Analysis Point											
<b>Sheet Flow</b>											
	Segment ID	1									Subtotal
1	Surface Description	Woods, Light									
2	Mannings Roughness, n	0.4									
3	Flow Length, L in ft (max 300')	75									
4	Two-year 24-hr rainfall, P2 in inches	3.5									
5	Land Slope, s in ft/ft	0.027									
6	Tt = 0.007x(nL)^0.8/(P2^0.5xs^0.4) in hr	0.242									0.242
<b>Shallow Concentrated Flow</b>											
	Segment ID	2	3								
7	Surface description (paved or unpaved)	Unpaved	Unpaved								
8	Flow length, L in ft	320	484								
9	Watercourse slope, s in ft/ft	0.038	0.021								
10	Average velocity, V in ft/s (figure 3-1)	3.1	2.3								
11	Tt=L/3600V in hr	0.029	0.058								0.087
<b>Channel Flow</b>											
	Segment ID	4									
12	Cross Sectional flow area, a in ft^2	109.50									
13	Wetted perimeter, pw in ft	147.03									
14	Hydraulic radius, r=a/pw in ft	0.74									
15	Channel slope, s in ft/ft	0.045									
16	Manning's roughness, n	0.015									
17	V=1.49xr^0.667xs^0.5/n in ft/s	17.40									
18	Flow length, L in ft	264									
19	Tt=L/3600V, in hr	0.004									0.004
20	Watershed total Tc in hours										0.334
21	Watershed total Tc in minutes										20.0



**STEWART**

**TR 55 Time of Concentration Worksheet**

**Project** Homestead Rd  
**Location** Chapel Hill, NC

**Calculated By**  
**Checked By**

**Date** 6/21/2022  
**Revised**

Post Development - North Analysis Point Bypass											
<b>Sheet Flow</b>											
	Segment ID	1									Subtotal
1	Surface Description	Woods, Light									
2	Mannings Roughness, n	0.4									
3	Flow Length, L in ft (max 300')	75									
4	Two-year 24-hr rainfall, P2 in inches	3.5									
5	Land Slope, s in ft/ft	0.120									
6	Tt = 0.007x(nL)^0.8/(P2^0.5xs^0.4) in hr	0.133									0.133
<b>Shallow Concentrated Flow</b>											
	Segment ID	2									
7	Surface description (paved or unpaved)	Unpaved									
8	Flow length, L in ft	213									
9	Watercourse slope, s in ft/ft	0.047									
10	Average velocity, V in ft/s (figure 3-1)	3.5									
11	Tt=L/3600V in hr	0.017									0.017
<b>Channel Flow</b>											
	Segment ID	3									
12	Cross Sectional flow area, a in ft^2	109.50									
13	Wetted perimeter, pw in ft	147.03									
14	Hydraulic radius, r=a/pw in ft	0.74									
15	Channel slope, s in ft/ft	0.009									
16	Manning's roughness, n	0.015									
17	V=1.49xr^0.667xs^0.5/n in ft/s	7.64									
18	Flow length, L in ft	114									
19	Tt=L/3600V, in hr	0.004									0.004
20	Watershed total Tc in hours										0.154
21	Watershed total Tc in minutes										9.2



**STEWART**

**TR 55 Time of Concentration Worksheet**

**Project** Homestead Rd  
**Location** Chapel Hill, NC

**Calculated By**  
**Checked By**

**Date** 6/21/2022  
**Revised**

**Sheet Flow**

Pre Development 1 Year - South Analysis Point											
Segment ID	1										Subtotal
1	Surface Description	Woods, Light									
2	Mannings Roughness, n	0.4									
3	Flow Length, L in ft (max 300')	75									
4	Two-year 24-hr rainfall, P2 in inches	3.5									
5	Land Slope, s in ft/ft	0.027									
6	Tt = 0.007x(nL)^0.8/(P2^0.5xs^0.4) in hr	0.242									0.242

**Shallow Concentrated Flow**

Segment ID	2	3	4								
7	Surface description (paved or unpaved)	Unpaved	Unpaved	Unpaved							
8	Flow length, L in ft	107	271	143							
9	Watercourse slope, s in ft/ft	0.019	0.059	0.028							
10	Average velocity, V in ft/s (figure 3-1)	2.3	4	2.7							
11	Tt=L/3600V in hr	0.013	0.019	0.015							0.046

**Channel Flow**

Segment ID											
12	Cross Sectional flow area, a in ft^2										
13	Wetted perimeter, pw in ft										
14	Hydraulic radius, r=a/pw in ft										
15	Channel slope, s in ft/ft										
16	Manning's roughness, n										
17	V=1.49xr^0.667xs^0.5/n in ft/s										
18	Flow length, L in ft										
19	Tt=L/3600V, in hr										0.000
20	Watershed total Tc in hours										0.289
21	Watershed total Tc in minutes										17.3





# STEWART

## TR 55 Time of Concentration Worksheet

**Project** Homestead Rd  
**Location** Chapel Hill, NC

**Calculated By**  
**Checked By**

**Date** 6/21/2022  
**Revised**

Pre Development 2/10/25/100 Year - South Analysis Point												
<b>Sheet Flow</b>												
	Segment ID	1										Subtotal
1	Surface Description	Open Space										
2	Mannings Roughness, n	0.24										
3	Flow Length, L in ft (max 300')	75										
4	Two-year 24-hr rainfall, P2 in inches	3.5										
5	Land Slope, s in ft/ft	0.027										
6	Tt = 0.007x(nL)^0.8/(P2^0.5xs^0.4) in hr	0.161										0.161
<b>Shallow Concentrated Flow</b>												
	Segment ID	2	3	4	5	6	7					
7	Surface description (paved or unpaved)	Unpaved	Unpaved	Unpaved	Unpaved	Unpaved	Unpaved					
8	Flow length, L in ft	261	499	238	297	426	389					
9	Watercourse slope, s in ft/ft	0.023	0.048	0.021	0.017	0.028	0.051					
10	Average velocity, V in ft/s (figure 3-1)	2.4	3.4	2.3	2.1	2.6	3.4					
11	Tt=L/3600V in hr	0.030	0.041	0.029	0.039	0.046	0.032					0.216
<b>Channel Flow</b>												
	Segment ID											
12	Cross Sectional flow area, a in ft^2											
13	Wetted perimeter, pw in ft											
14	Hydraulic radius, r=a/pw in ft											
15	Channel slope, s in ft/ft											
16	Manning's roughness, n											
17	V=1.49xr^0.667xs^0.5/n in ft/s											
18	Flow length, L in ft											
19	Tt=L/3600V, in hr											0.000
20	Watershed total Tc in hours											0.377
21	Watershed total Tc in minutes											22.6



# STEWART

## TR 55 Time of Concentration Worksheet

**Project** Homestead Rd  
**Location** Chapel Hill, NC

**Calculated By**  
**Checked By**

**Date** 6/21/2022  
**Revised**

### Sheet Flow

Post Development 2/10/25/100 Year - South Analysis Point Bypass											
Segment ID	1										Subtotal
1	Surface Description	Woods, Light									
2	Mannings Roughness, n	0.4									
3	Flow Length, L in ft (max 300')	75									
4	Two-year 24-hr rainfall, P2 in inches	3.5									
5	Land Slope, s in ft/ft	0.080									
6	Tt = 0.007x(nL)^0.8/(P2^0.5xs^0.4) in hr	0.156									0.156

### Shallow Concentrated Flow

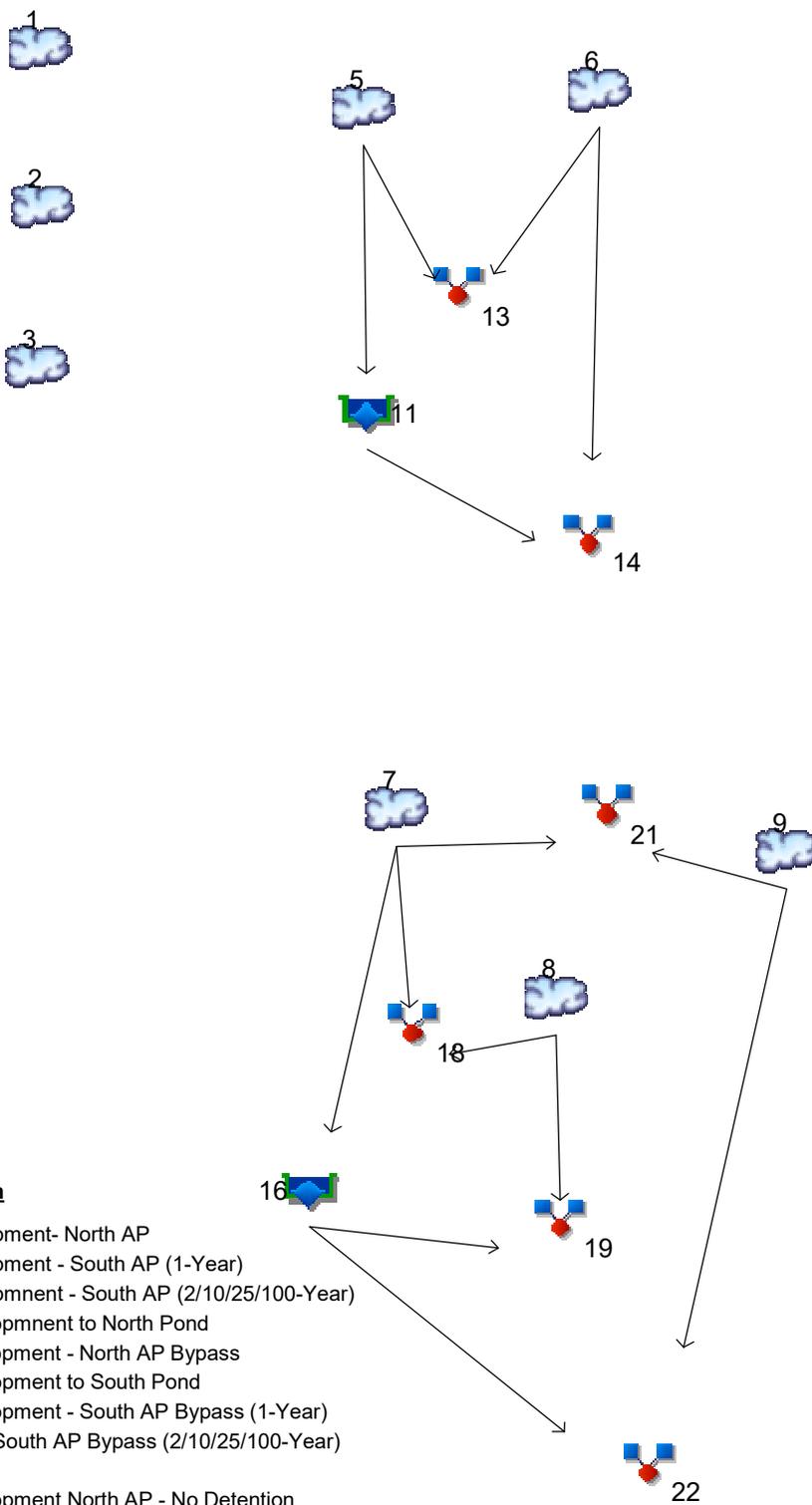
Segment ID	2	3	4	5							
7	Surface description (paved or unpaved)	Unpaved	Unpaved	Unpaved	Unpaved						
8	Flow length, L in ft	281	297	426	389						
9	Watercourse slope, s in ft/ft	0.028	0.017	0.028	0.051						
10	Average velocity, V in ft/s (figure 3-1)	2.6	2.1	2.6	3.4						
11	Tt=L/3600V in hr	0.030	0.039	0.046	0.032						0.147

### Channel Flow

Segment ID											
12	Cross Sectional flow area, a in ft^2										
13	Wetted perimeter, pw in ft										
14	Hydraulic radius, r=a/pw in ft										
15	Channel slope, s in ft/ft										
16	Manning's roughness, n										
17	V=1.49xr^0.667xs^0.5/n in ft/s										
18	Flow length, L in ft										
19	Tt=L/3600V, in hr										0.000
20	Watershed total Tc in hours										0.303
21	Watershed total Tc in minutes										18.2

# Watershed Model Schematic

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4



## Legend

Hyd.	Origin	Description
1	SCS Runoff	Pre Development- North AP
2	SCS Runoff	Pre Development - South AP (1-Year)
3	SCS Runoff	Pre Development - South AP (2/10/25/100-Year)
5	SCS Runoff	Post Development to North Pond
6	SCS Runoff	Post Development - North AP Bypass
7	SCS Runoff	Post Development to South Pond
8	SCS Runoff	Post Development - South AP Bypass (1-Year)
9	SCS Runoff	Post Dev - South AP Bypass (2/10/25/100-Year)
11	Reservoir	North Pond
13	Combine	Post Development North AP - No Detention
14	Combine	Post Development North AP With Detention
16	Reservoir	South Pond
18	Combine	Post Development South AP 1-Year No Detention
19	Combine	Post Development South AP 1-Year With Detention
21	Combine	Post Development South AP 2/10/25/100 Year No Detn
22	Combine	Post Development South AP 2/10/25/100 Year W/ Detn

# Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

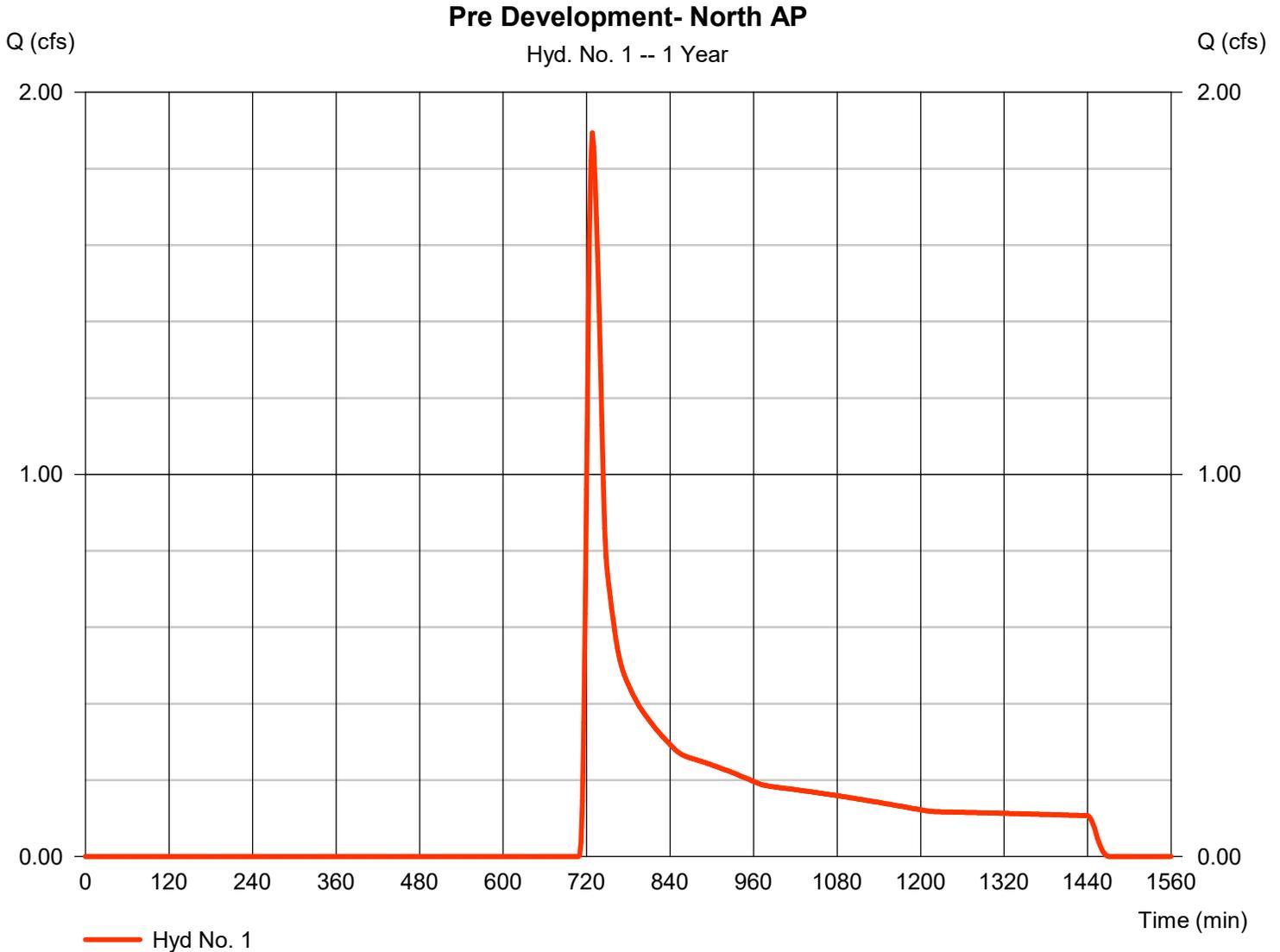
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description	
1	SCS Runoff	1.894	2	728	10,712	-----	-----	-----	Pre Development- North AP	
2	SCS Runoff	0.183	2	730	1,667	-----	-----	-----	Pre Development - South AP (1-Year)	
3	SCS Runoff	3.301	2	738	39,225	-----	-----	-----	Pre Development - South AP (2/10/2	
5	SCS Runoff	15.82	2	718	31,716	-----	-----	-----	Post Development to North Pond	
6	SCS Runoff	0.917	2	720	2,480	-----	-----	-----	Post Development - North AP Bypass	
7	SCS Runoff	10.37	2	718	20,748	-----	-----	-----	Post Development to South Pond	
8	SCS Runoff	0.017	2	720	93	-----	-----	-----	Post Development - South AP Bypass	
9	SCS Runoff	3.062	2	734	33,749	-----	-----	-----	Post Dev - South AP Bypass (2/10/25	
11	Reservoir	0.459	2	922	30,016	5	537.34	20,166	North Pond	
13	Combine	16.64	2	718	34,196	5, 6,	-----	-----	Post Development North AP - No Det	
14	Combine	0.998	2	720	32,496	6, 11,	-----	-----	Post Development North AP With Det	
16	Reservoir	0.121	2	1390	17,374	7	541.43	16,541	South Pond	
18	Combine	10.38	2	718	20,841	7, 8,	-----	-----	Post Development South AP 1-Year	
19	Combine	0.122	2	1388	17,467	8, 16,	-----	-----	Post Development South AP 1-Year	
21	Combine	10.83	2	718	54,497	7, 9,	-----	-----	Post Development South AP 2/10/25/	
22	Combine	3.116	2	734	51,123	9, 16,	-----	-----	Post Development South AP 2/10/25/	
Homestead Rd Peak Flow-CZP.gpw					Return Period: 1 Year			Thursday, 10 / 6 / 2022		

# Hydrograph Report

## Hyd. No. 1

Pre Development- North AP

Hydrograph type	= SCS Runoff	Peak discharge	= 1.894 cfs
Storm frequency	= 1 yrs	Time to peak	= 728 min
Time interval	= 2 min	Hyd. volume	= 10,712 cuft
Drainage area	= 8.860 ac	Curve number	= 60
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 20.00 min
Total precip.	= 3.00 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



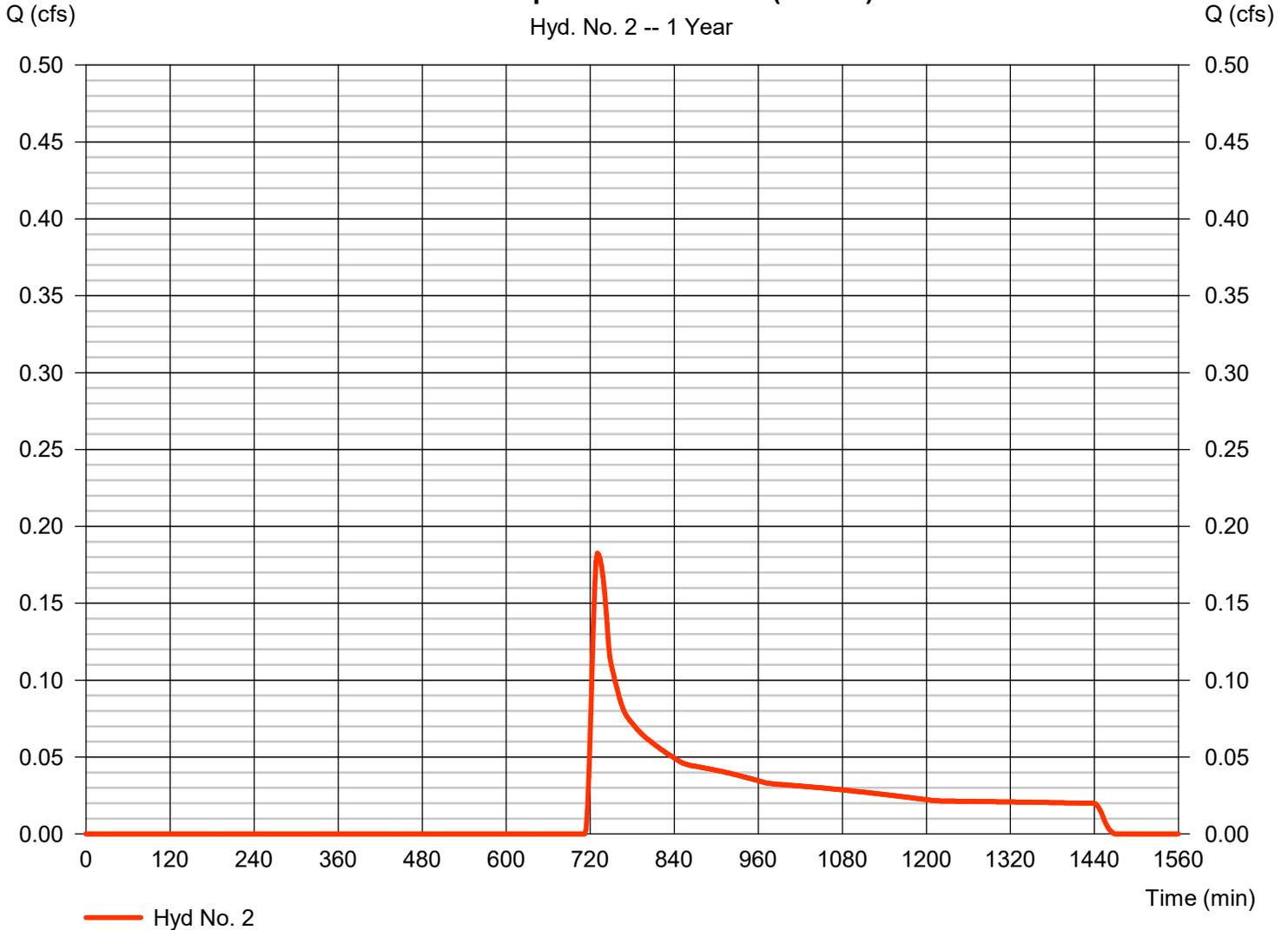
# Hydrograph Report

## Hyd. No. 2

Pre Development - South AP (1-Year)

Hydrograph type	= SCS Runoff	Peak discharge	= 0.183 cfs
Storm frequency	= 1 yrs	Time to peak	= 730 min
Time interval	= 2 min	Hyd. volume	= 1,667 cuft
Drainage area	= 2.090 ac	Curve number	= 56
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 17.30 min
Total precip.	= 3.00 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Pre Development - South AP (1-Year)



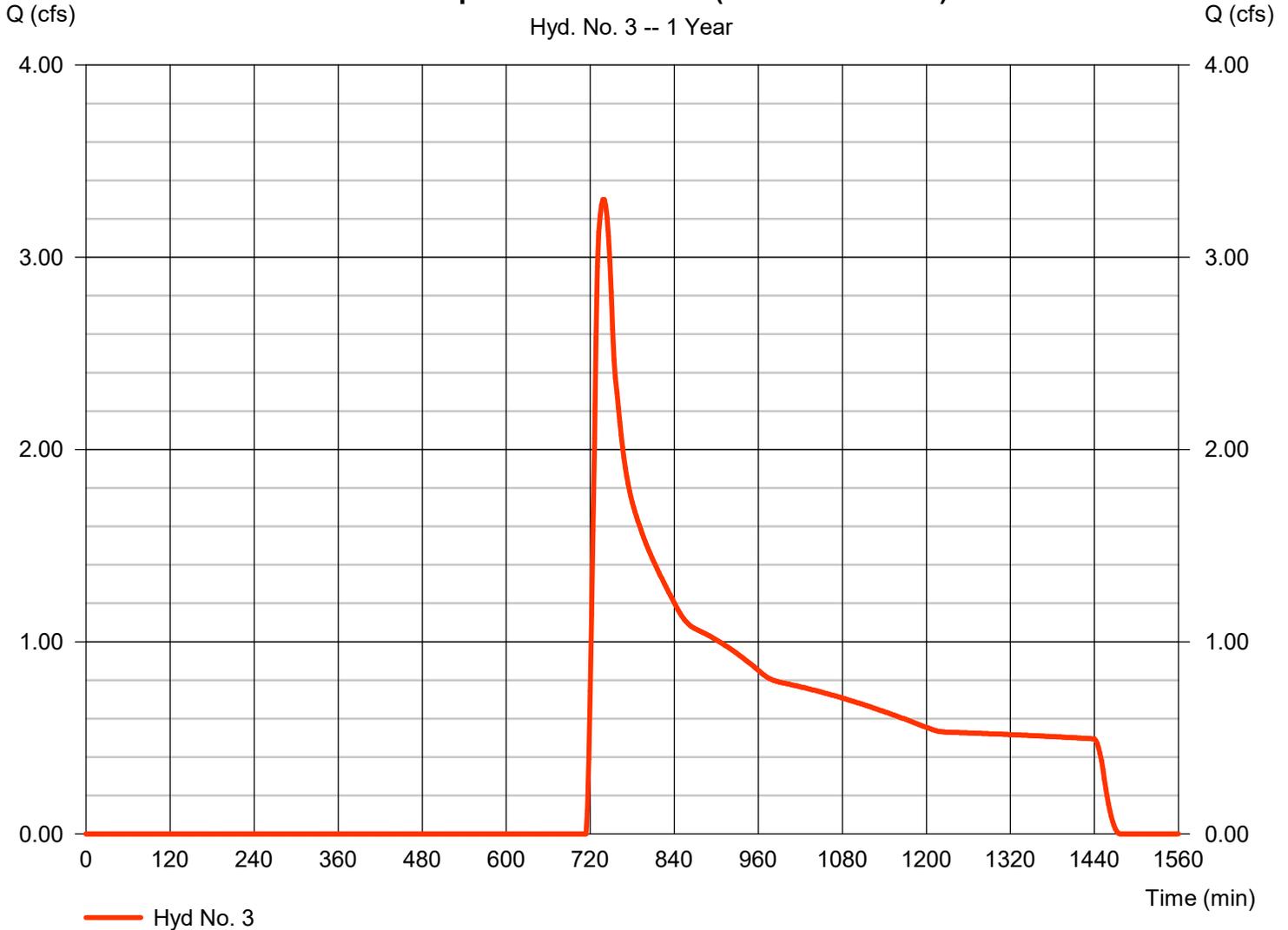
# Hydrograph Report

## Hyd. No. 3

Pre Development - South AP (2/10/25/100-Year)

Hydrograph type	= SCS Runoff	Peak discharge	= 3.301 cfs
Storm frequency	= 1 yrs	Time to peak	= 738 min
Time interval	= 2 min	Hyd. volume	= 39,225 cuft
Drainage area	= 54.650 ac	Curve number	= 55
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 22.60 min
Total precip.	= 3.00 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Pre Development - South AP (2/10/25/100-Year)



# Hydrograph Report

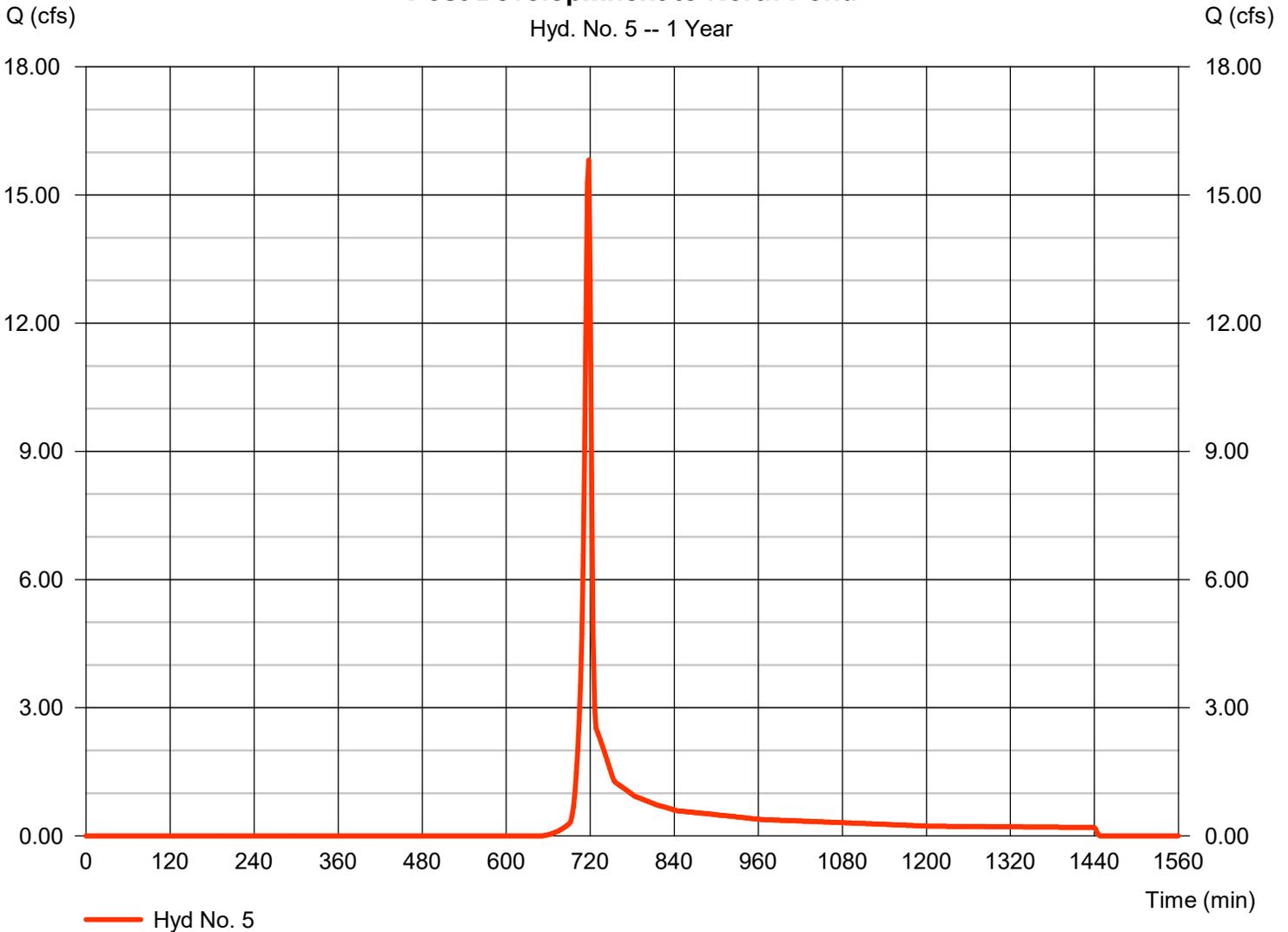
## Hyd. No. 5

Post Development to North Pond

Hydrograph type	= SCS Runoff	Peak discharge	= 15.82 cfs
Storm frequency	= 1 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 31,716 cuft
Drainage area	= 9.700 ac	Curve number	= 75
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 3.00 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Post Development to North Pond

Hyd. No. 5 -- 1 Year



# Hydrograph Report

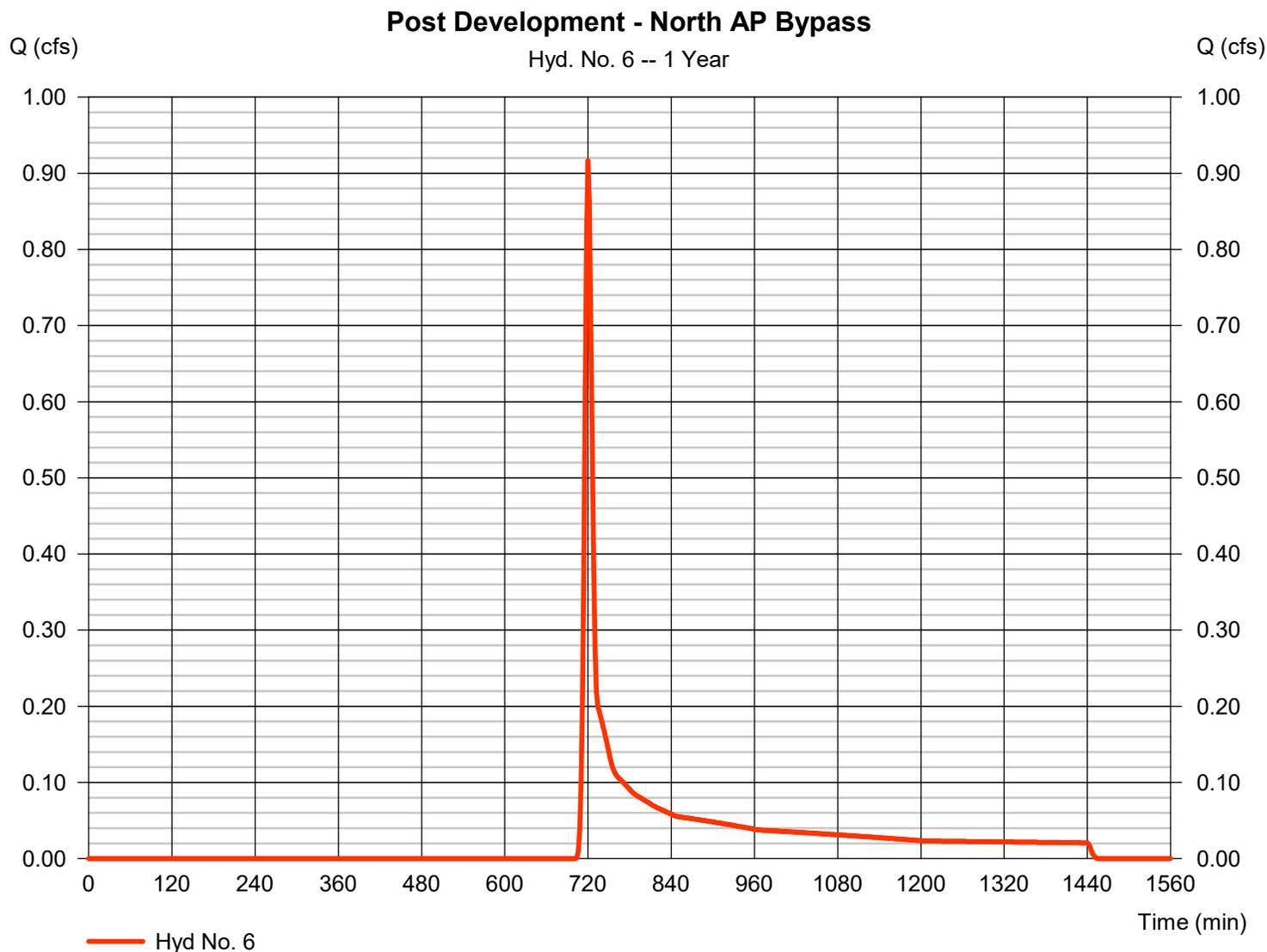
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

Thursday, 10 / 6 / 2022

## Hyd. No. 6

Post Development - North AP Bypass

Hydrograph type	= SCS Runoff	Peak discharge	= 0.917 cfs
Storm frequency	= 1 yrs	Time to peak	= 720 min
Time interval	= 2 min	Hyd. volume	= 2,480 cuft
Drainage area	= 1.350 ac	Curve number	= 65
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 9.20 min
Total precip.	= 3.00 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

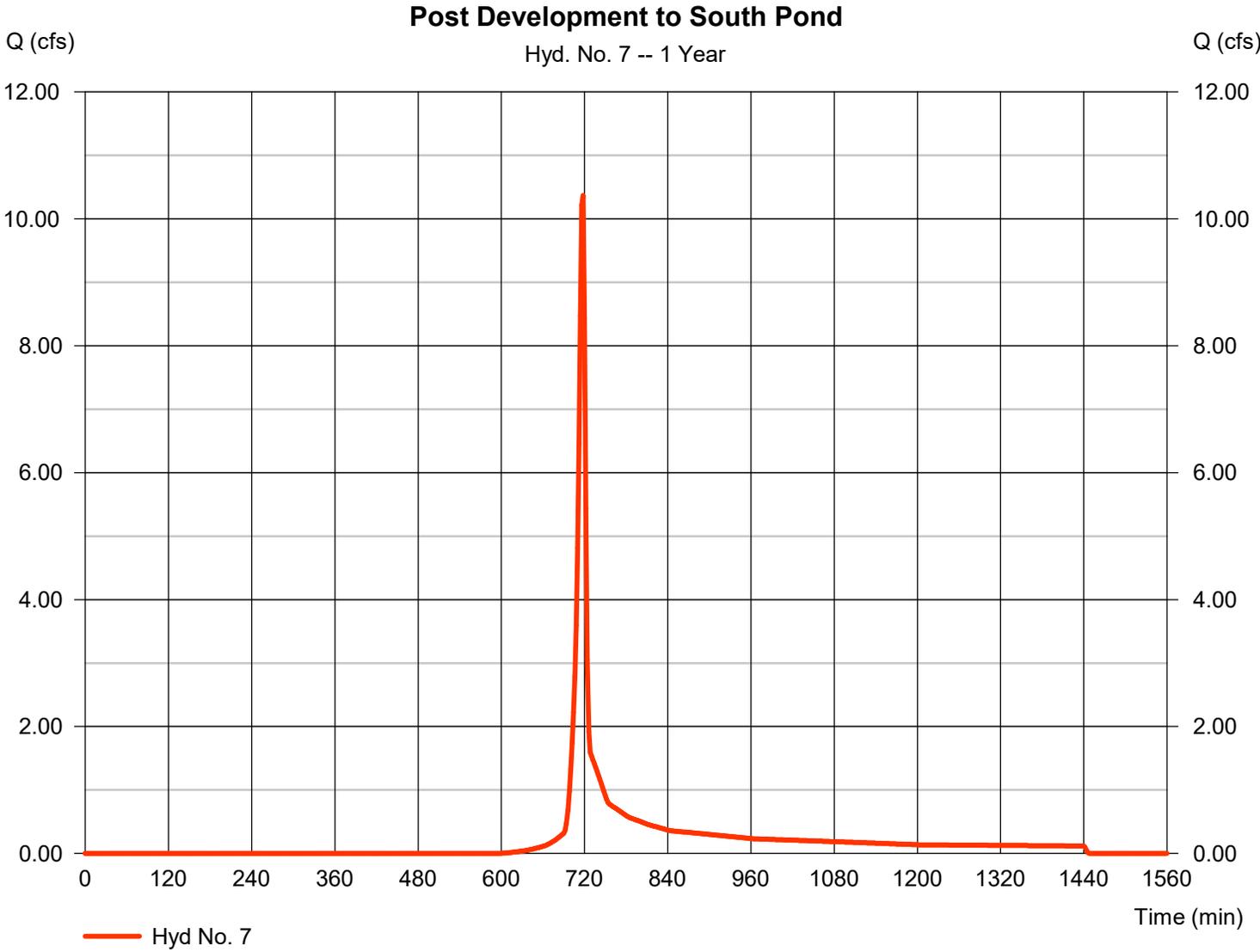


# Hydrograph Report

## Hyd. No. 7

Post Development to South Pond

Hydrograph type	= SCS Runoff	Peak discharge	= 10.37 cfs
Storm frequency	= 1 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 20,748 cuft
Drainage area	= 5.130 ac	Curve number	= 79
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 3.00 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



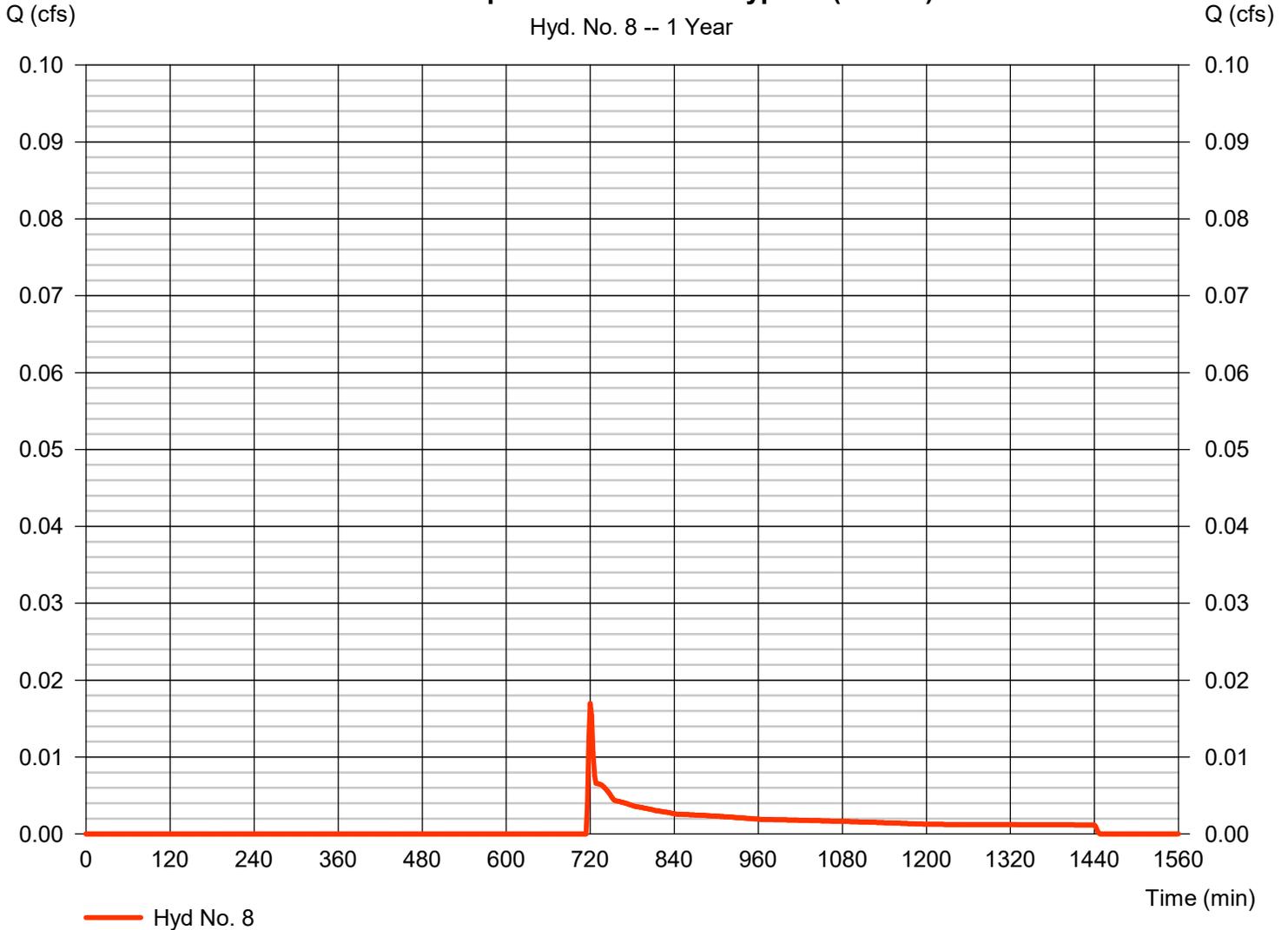
# Hydrograph Report

## Hyd. No. 8

Post Development - South AP Bypass (1-Year)

Hydrograph type	= SCS Runoff	Peak discharge	= 0.017 cfs
Storm frequency	= 1 yrs	Time to peak	= 720 min
Time interval	= 2 min	Hyd. volume	= 93 cuft
Drainage area	= 0.140 ac	Curve number	= 55
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 3.00 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Post Development - South AP Bypass (1-Year)



# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

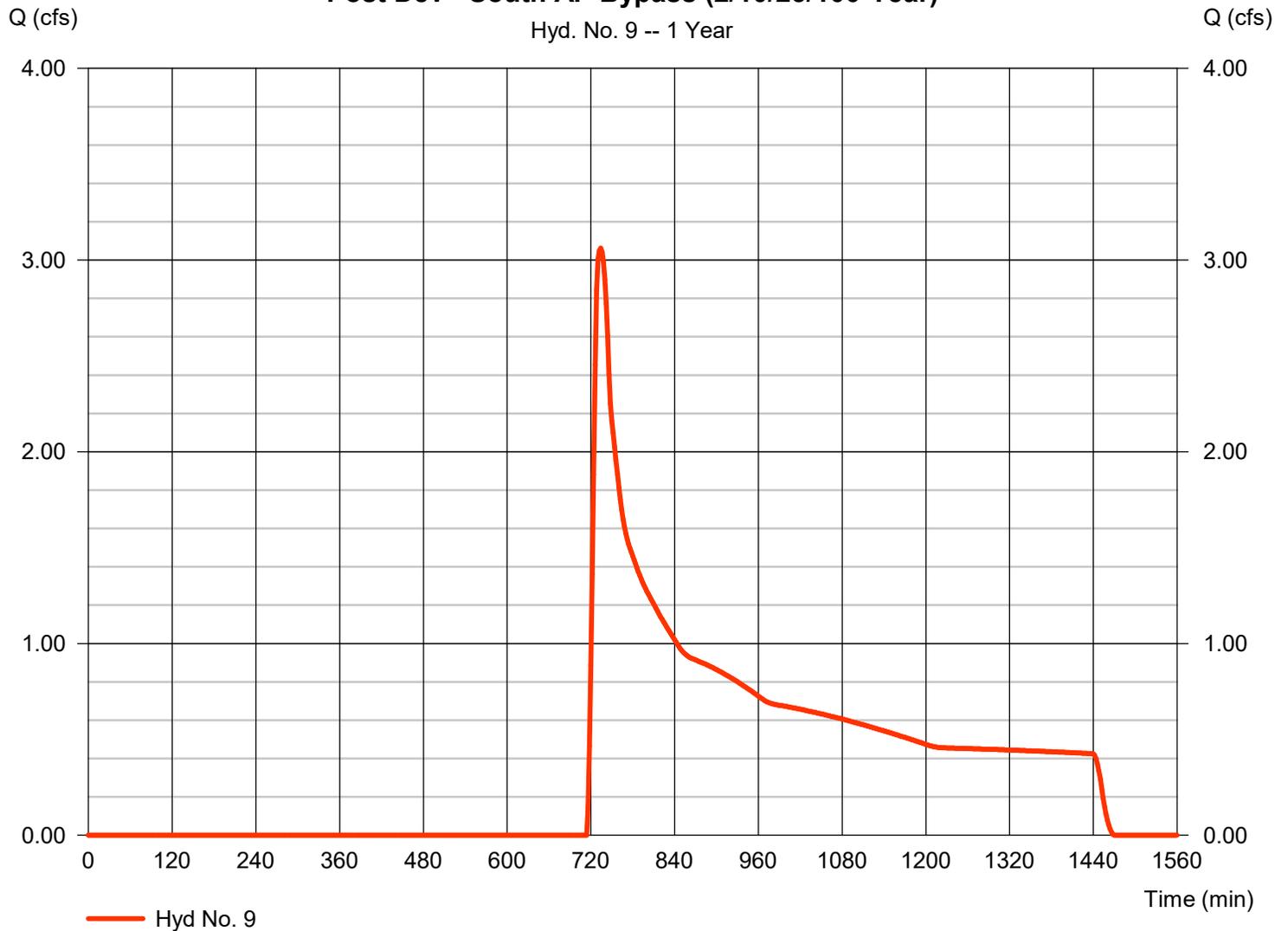
Thursday, 10 / 6 / 2022

## Hyd. No. 9

Post Dev - South AP Bypass (2/10/25/100-Year)

Hydrograph type	= SCS Runoff	Peak discharge	= 3.062 cfs
Storm frequency	= 1 yrs	Time to peak	= 734 min
Time interval	= 2 min	Hyd. volume	= 33,749 cuft
Drainage area	= 47.860 ac	Curve number	= 55
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 18.20 min
Total precip.	= 3.00 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

**Post Dev - South AP Bypass (2/10/25/100-Year)**



# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

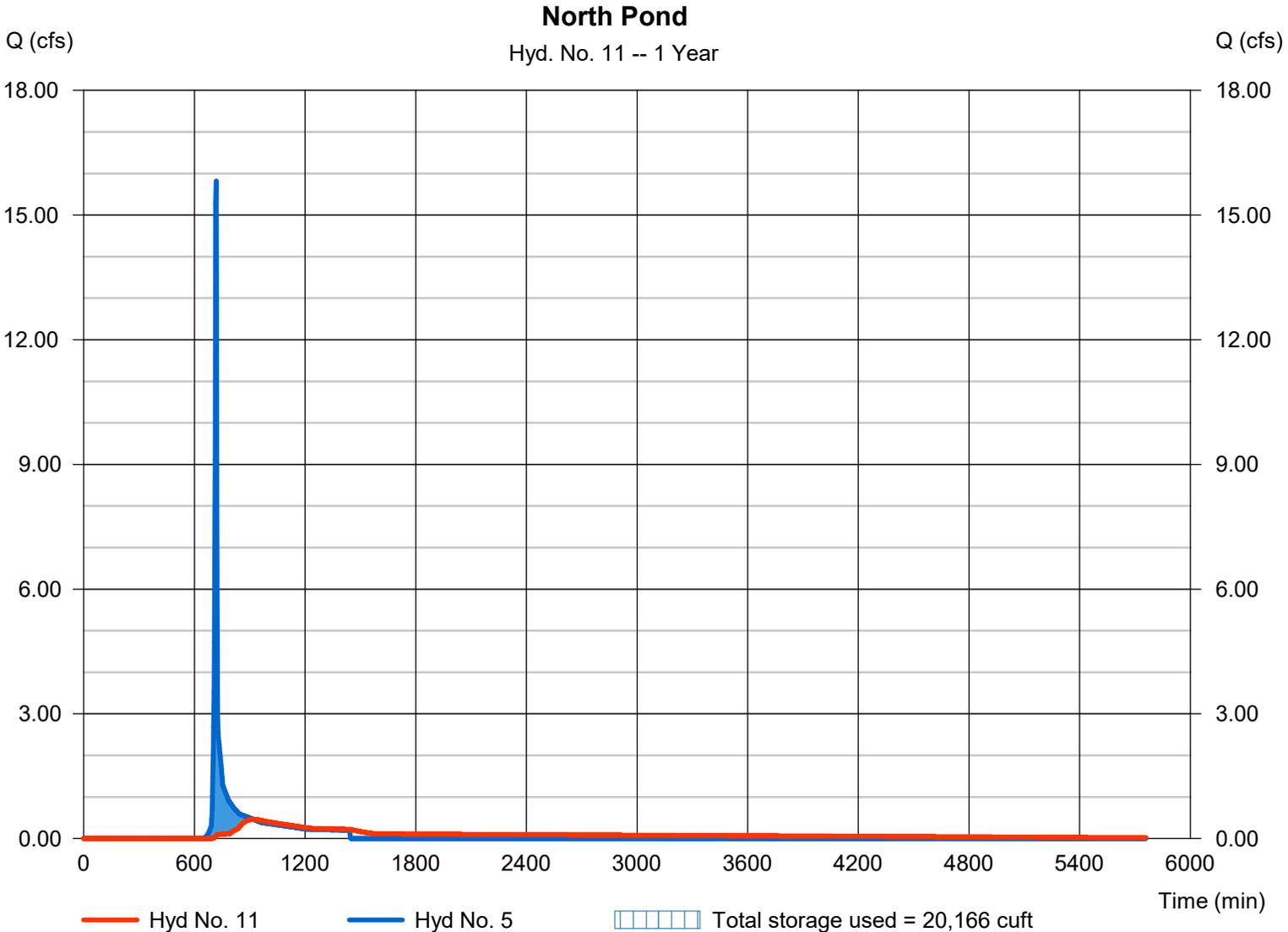
Thursday, 10 / 6 / 2022

## Hyd. No. 11

North Pond

Hydrograph type	= Reservoir	Peak discharge	= 0.459 cfs
Storm frequency	= 1 yrs	Time to peak	= 922 min
Time interval	= 2 min	Hyd. volume	= 30,016 cuft
Inflow hyd. No.	= 5 - Post Development to North Pond	Max. Elevation	= 537.34 ft
Reservoir name	= North Pond	Max. Storage	= 20,166 cuft

Storage Indication method used.



# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

Thursday, 10 / 6 / 2022

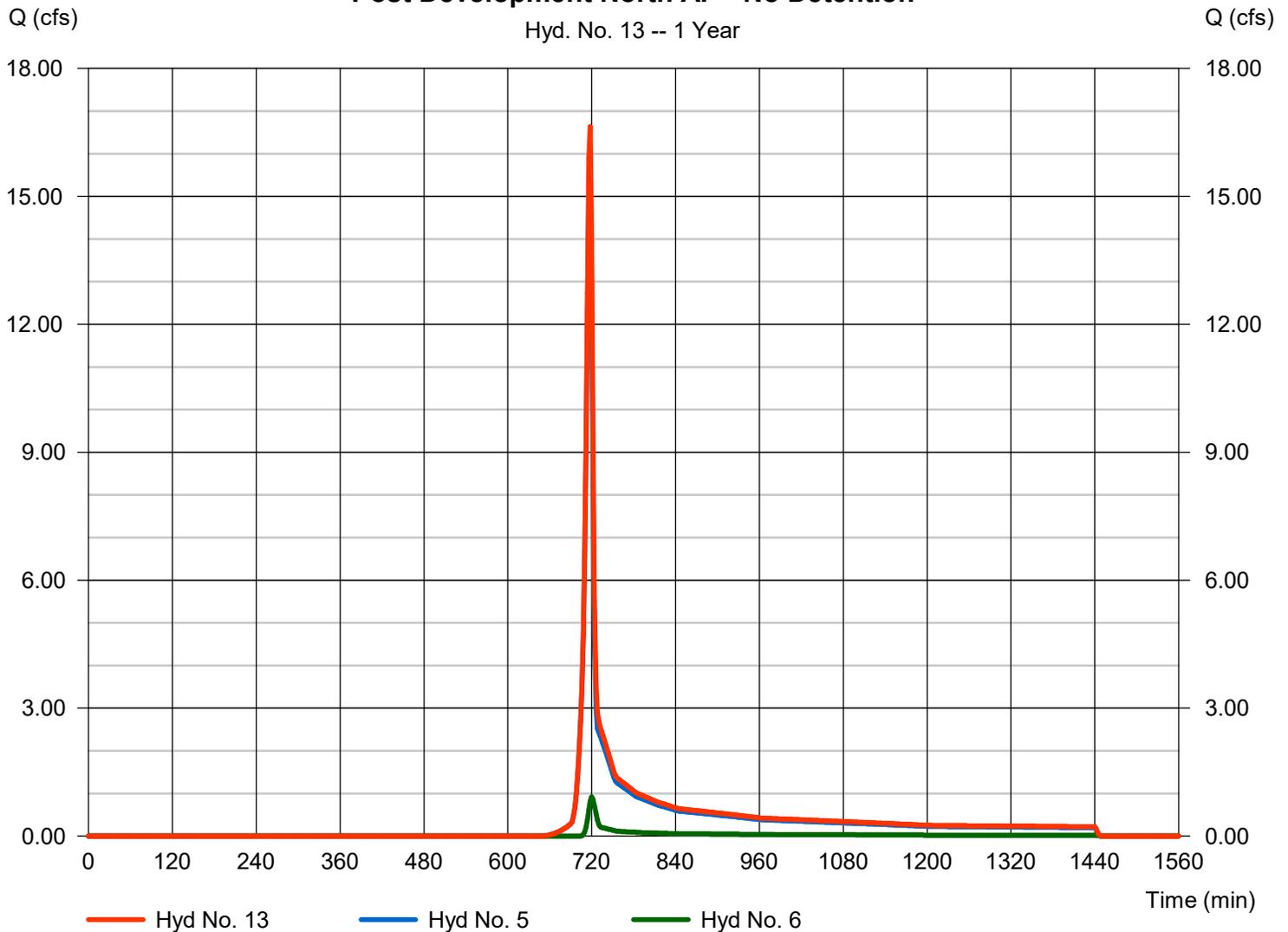
## Hyd. No. 13

Post Development North AP - No Detention

Hydrograph type	= Combine	Peak discharge	= 16.64 cfs
Storm frequency	= 1 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 34,196 cuft
Inflow hyds.	= 5, 6	Contrib. drain. area	= 11.050 ac

### Post Development North AP - No Detention

Hyd. No. 13 -- 1 Year



# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

Thursday, 10 / 6 / 2022

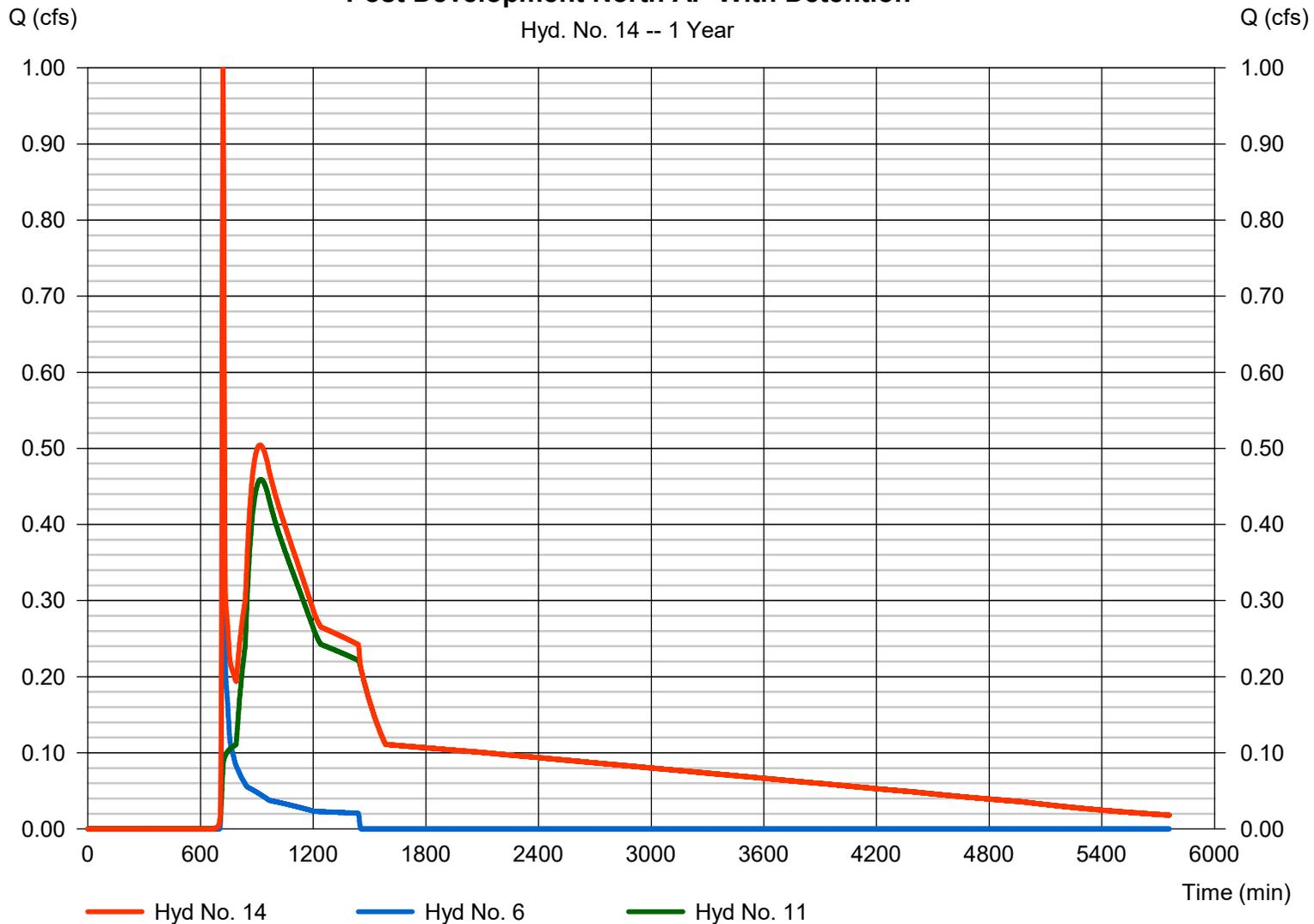
## Hyd. No. 14

Post Development North AP With Detention

Hydrograph type	= Combine	Peak discharge	= 0.998 cfs
Storm frequency	= 1 yrs	Time to peak	= 720 min
Time interval	= 2 min	Hyd. volume	= 32,496 cuft
Inflow hyds.	= 6, 11	Contrib. drain. area	= 1.350 ac

### Post Development North AP With Detention

Hyd. No. 14 -- 1 Year



# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

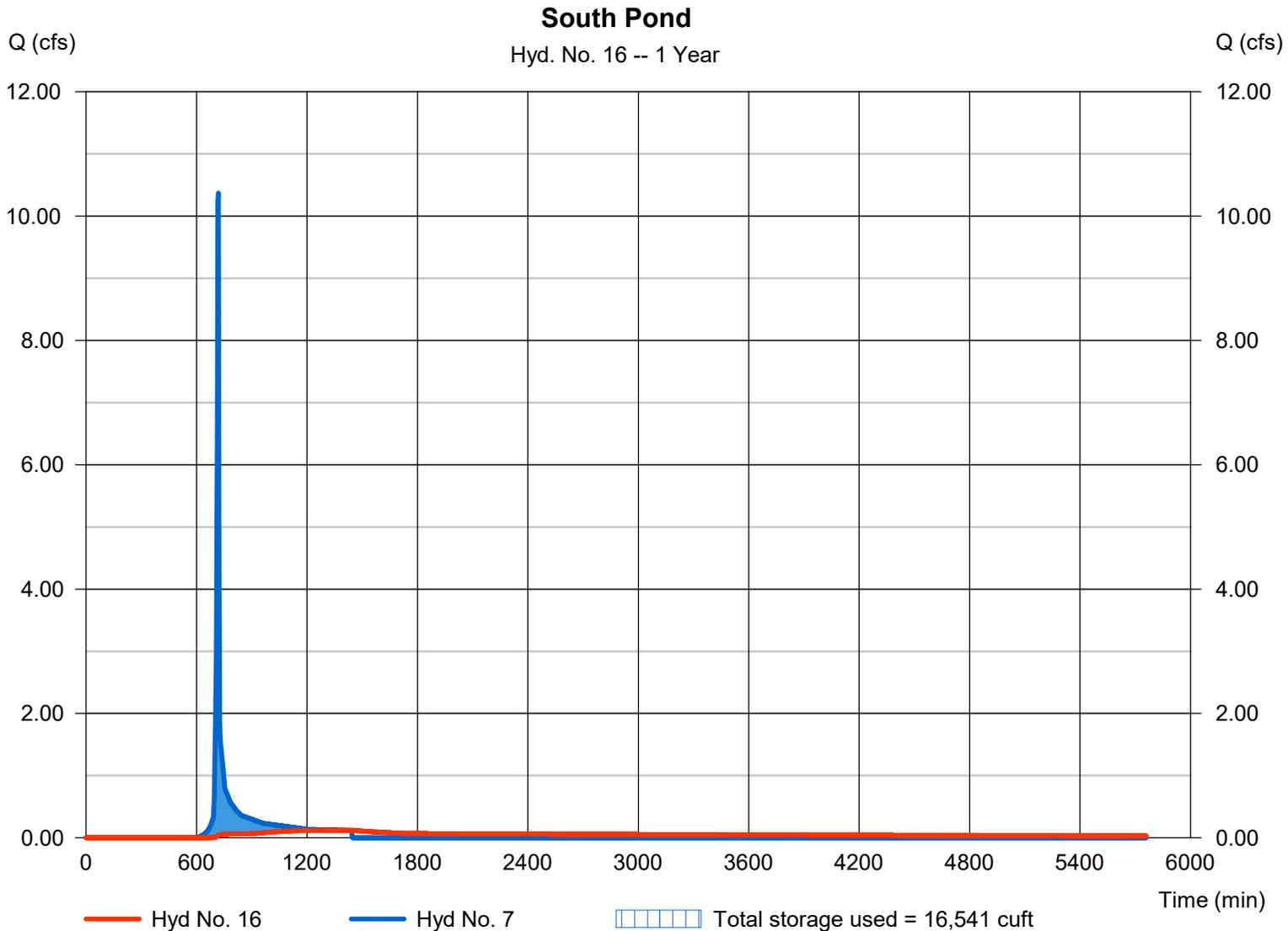
Thursday, 10 / 6 / 2022

## Hyd. No. 16

South Pond

Hydrograph type	= Reservoir	Peak discharge	= 0.121 cfs
Storm frequency	= 1 yrs	Time to peak	= 1390 min
Time interval	= 2 min	Hyd. volume	= 17,374 cuft
Inflow hyd. No.	= 7 - Post Development to South Pond	Max. Elevation	= 541.43 ft
Reservoir name	= South Pond	Max. Storage	= 16,541 cuft

Storage Indication method used.



# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

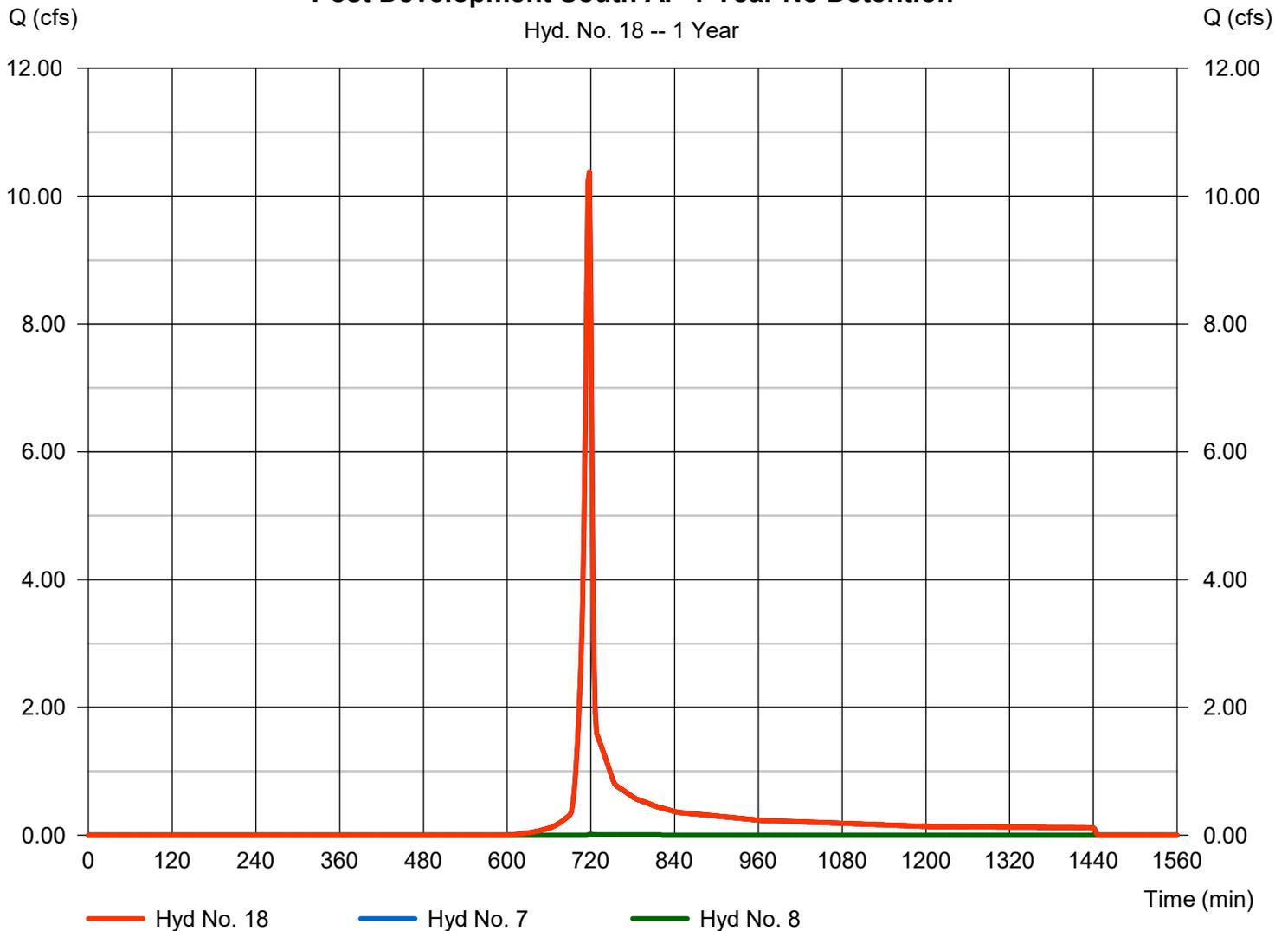
Thursday, 10 / 6 / 2022

## Hyd. No. 18

Post Development South AP 1-Year No Detention

Hydrograph type	= Combine	Peak discharge	= 10.38 cfs
Storm frequency	= 1 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 20,841 cuft
Inflow hyds.	= 7, 8	Contrib. drain. area	= 5.270 ac

### Post Development South AP 1-Year No Detention



# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

Thursday, 10 / 6 / 2022

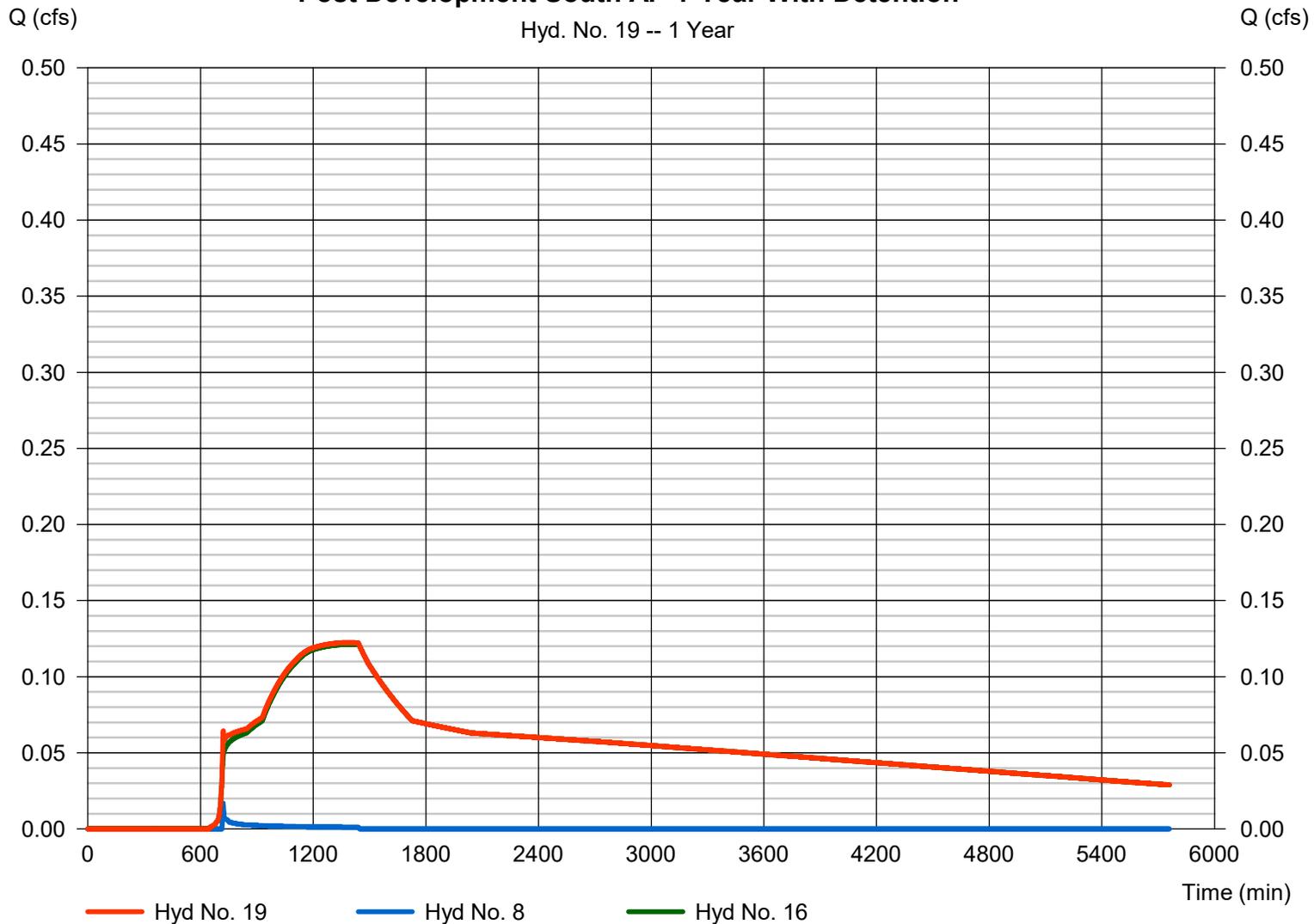
## Hyd. No. 19

Post Development South AP 1-Year With Detention

Hydrograph type	= Combine	Peak discharge	= 0.122 cfs
Storm frequency	= 1 yrs	Time to peak	= 1388 min
Time interval	= 2 min	Hyd. volume	= 17,467 cuft
Inflow hyds.	= 8, 16	Contrib. drain. area	= 0.140 ac

**Post Development South AP 1-Year With Detention**

Hyd. No. 19 -- 1 Year



# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

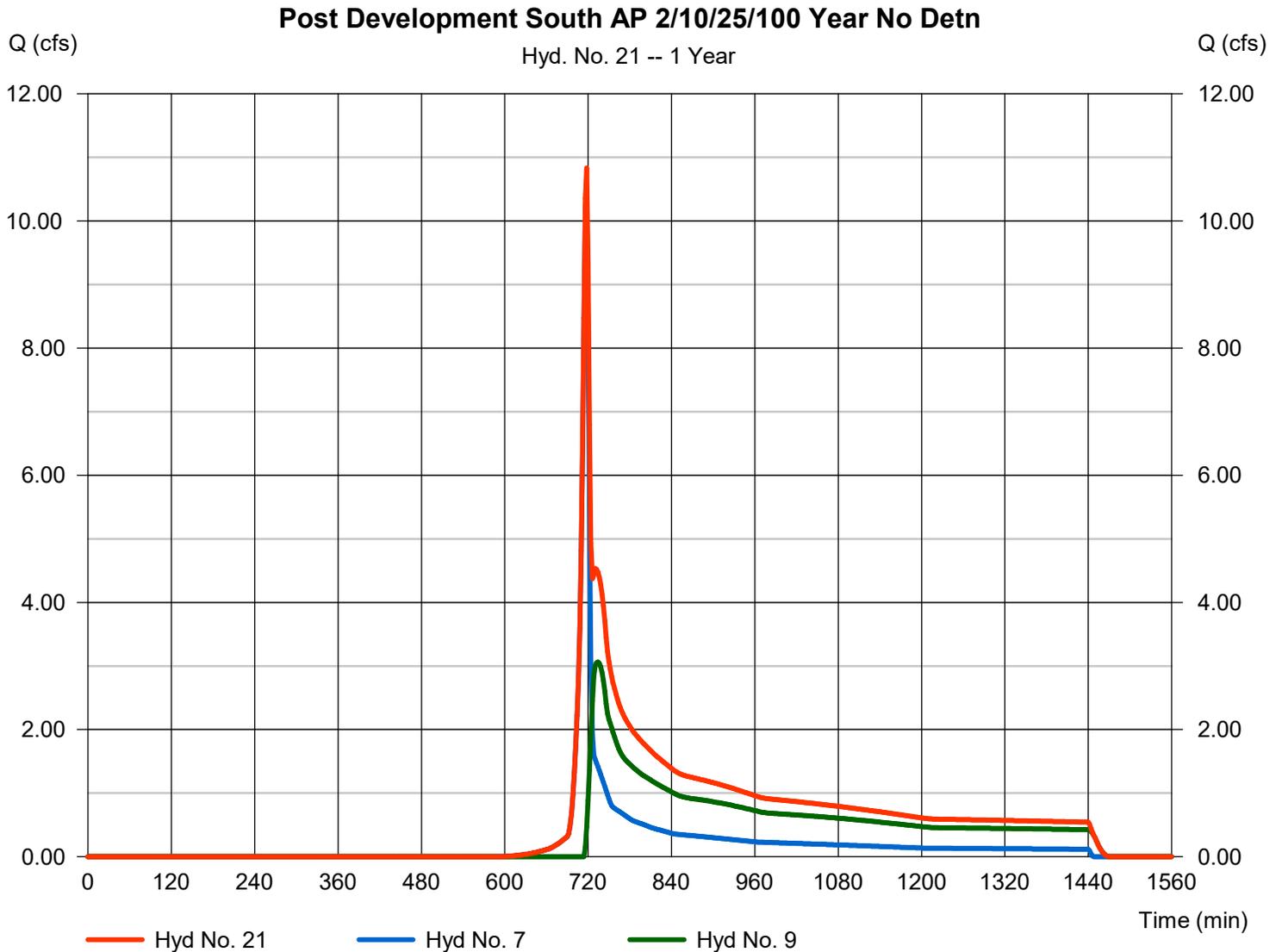
Thursday, 10 / 6 / 2022

## Hyd. No. 21

Post Development South AP 2/10/25/100 Year No Detn

Hydrograph type = Combine  
Storm frequency = 1 yrs  
Time interval = 2 min  
Inflow hyds. = 7, 9

Peak discharge = 10.83 cfs  
Time to peak = 718 min  
Hyd. volume = 54,497 cuft  
Contrib. drain. area = 52.990 ac



# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

Thursday, 10 / 6 / 2022

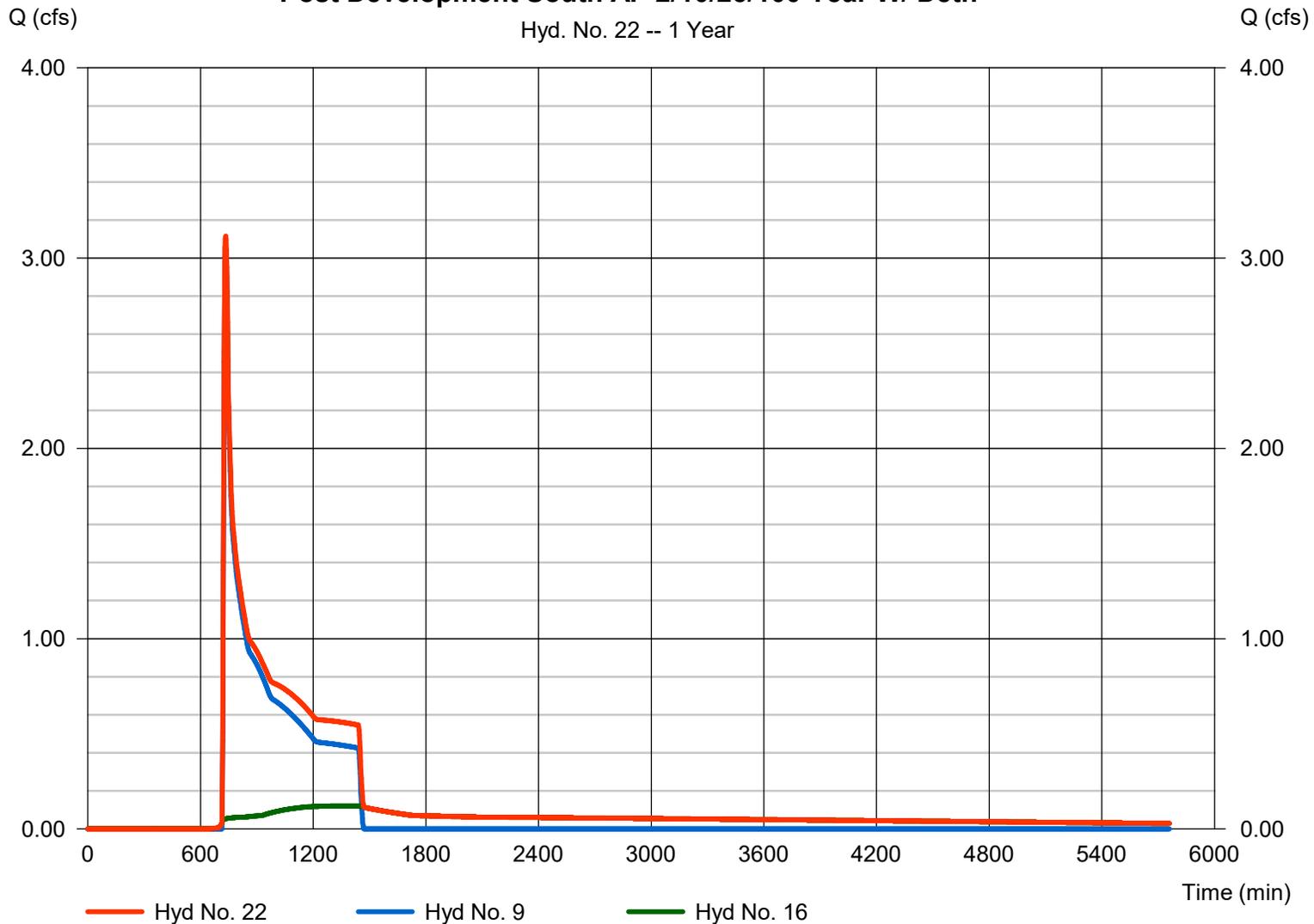
## Hyd. No. 22

Post Development South AP 2/10/25/100 Year W/ Detn

Hydrograph type	= Combine	Peak discharge	= 3.116 cfs
Storm frequency	= 1 yrs	Time to peak	= 734 min
Time interval	= 2 min	Hyd. volume	= 51,123 cuft
Inflow hyds.	= 9, 16	Contrib. drain. area	= 47.860 ac

Post Development South AP 2/10/25/100 Year W/ Detn

Hyd. No. 22 -- 1 Year



# Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

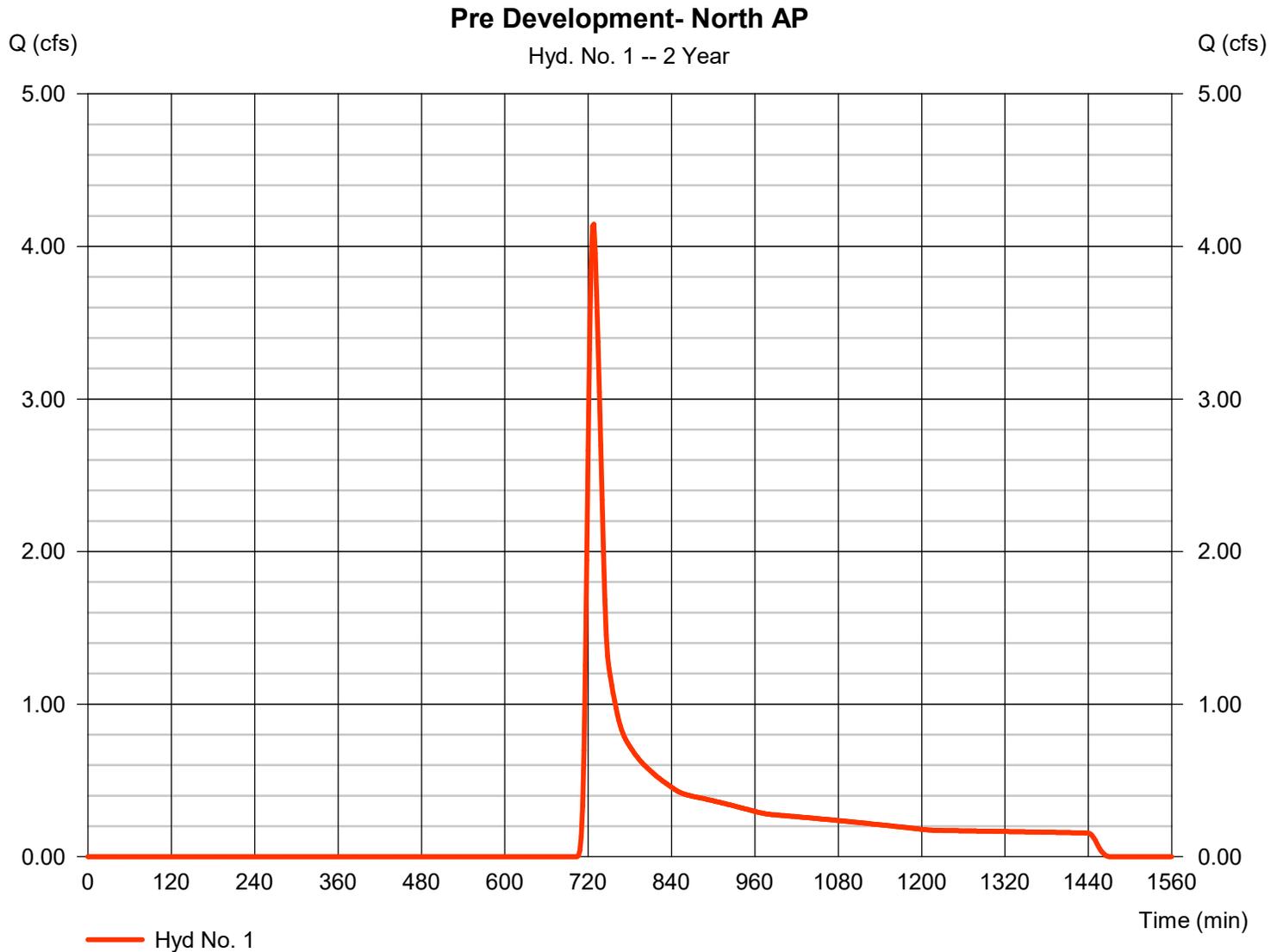
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	4.145	2	728	18,071	-----	-----	-----	Pre Development- North AP
2	SCS Runoff	0.555	2	728	3,074	-----	-----	-----	Pre Development - South AP (1-Year)
3	SCS Runoff	10.90	2	730	74,600	-----	-----	-----	Pre Development - South AP (2/10/2
5	SCS Runoff	22.31	2	718	44,616	-----	-----	-----	Post Development to North Pond
6	SCS Runoff	1.570	2	720	3,866	-----	-----	-----	Post Development - North AP Bypass
7	SCS Runoff	14.06	2	718	28,292	-----	-----	-----	Post Development to South Pond
8	SCS Runoff	0.058	2	718	176	-----	-----	-----	Post Development - South AP Bypass
9	SCS Runoff	10.61	2	728	64,185	-----	-----	-----	Post Dev - South AP Bypass (2/10/25
11	Reservoir	1.430	2	772	42,891	5	537.49	22,505	North Pond
13	Combine	23.78	2	718	48,482	5, 6,	-----	-----	Post Development North AP - No Det
14	Combine	1.674	2	720	46,757	6, 11,	-----	-----	Post Development North AP With Det
16	Reservoir	0.219	2	1118	24,346	7	541.74	20,455	South Pond
18	Combine	14.11	2	718	28,468	7, 8,	-----	-----	Post Development South AP 1-Year
19	Combine	0.221	2	1108	24,522	8, 16,	-----	-----	Post Development South AP 1-Year
21	Combine	17.37	2	718	92,477	7, 9,	-----	-----	Post Development South AP 2/10/25/
22	Combine	10.67	2	728	88,531	9, 16,	-----	-----	Post Development South AP 2/10/25/
Homestead Rd Peak Flow-CZP.gpw					Return Period: 2 Year			Thursday, 10 / 6 / 2022	

# Hydrograph Report

## Hyd. No. 1

Pre Development- North AP

Hydrograph type	= SCS Runoff	Peak discharge	= 4.145 cfs
Storm frequency	= 2 yrs	Time to peak	= 728 min
Time interval	= 2 min	Hyd. volume	= 18,071 cuft
Drainage area	= 8.860 ac	Curve number	= 60
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 20.00 min
Total precip.	= 3.57 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



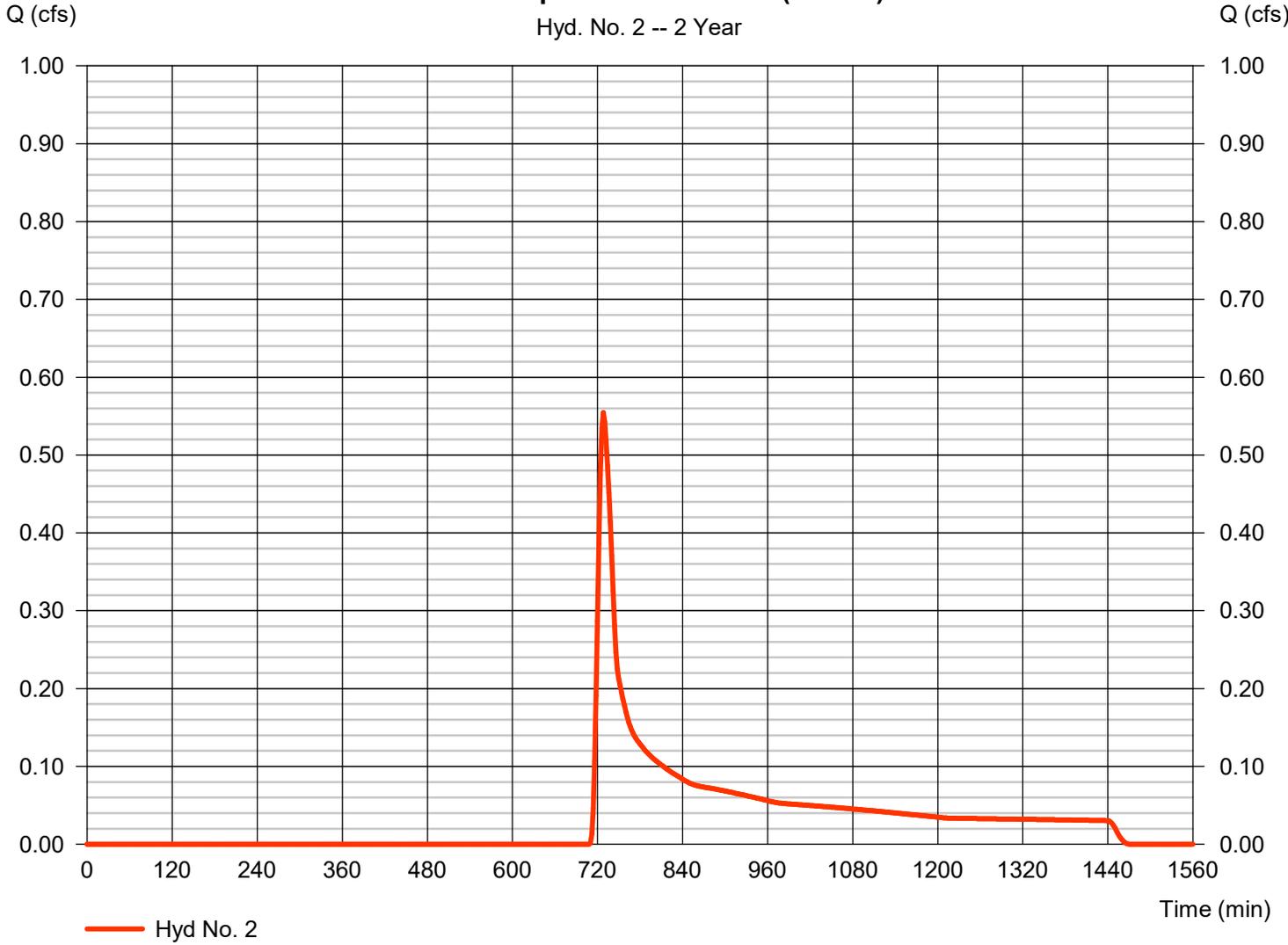
# Hydrograph Report

## Hyd. No. 2

Pre Development - South AP (1-Year)

Hydrograph type	= SCS Runoff	Peak discharge	= 0.555 cfs
Storm frequency	= 2 yrs	Time to peak	= 728 min
Time interval	= 2 min	Hyd. volume	= 3,074 cuft
Drainage area	= 2.090 ac	Curve number	= 56
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 17.30 min
Total precip.	= 3.57 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Pre Development - South AP (1-Year)



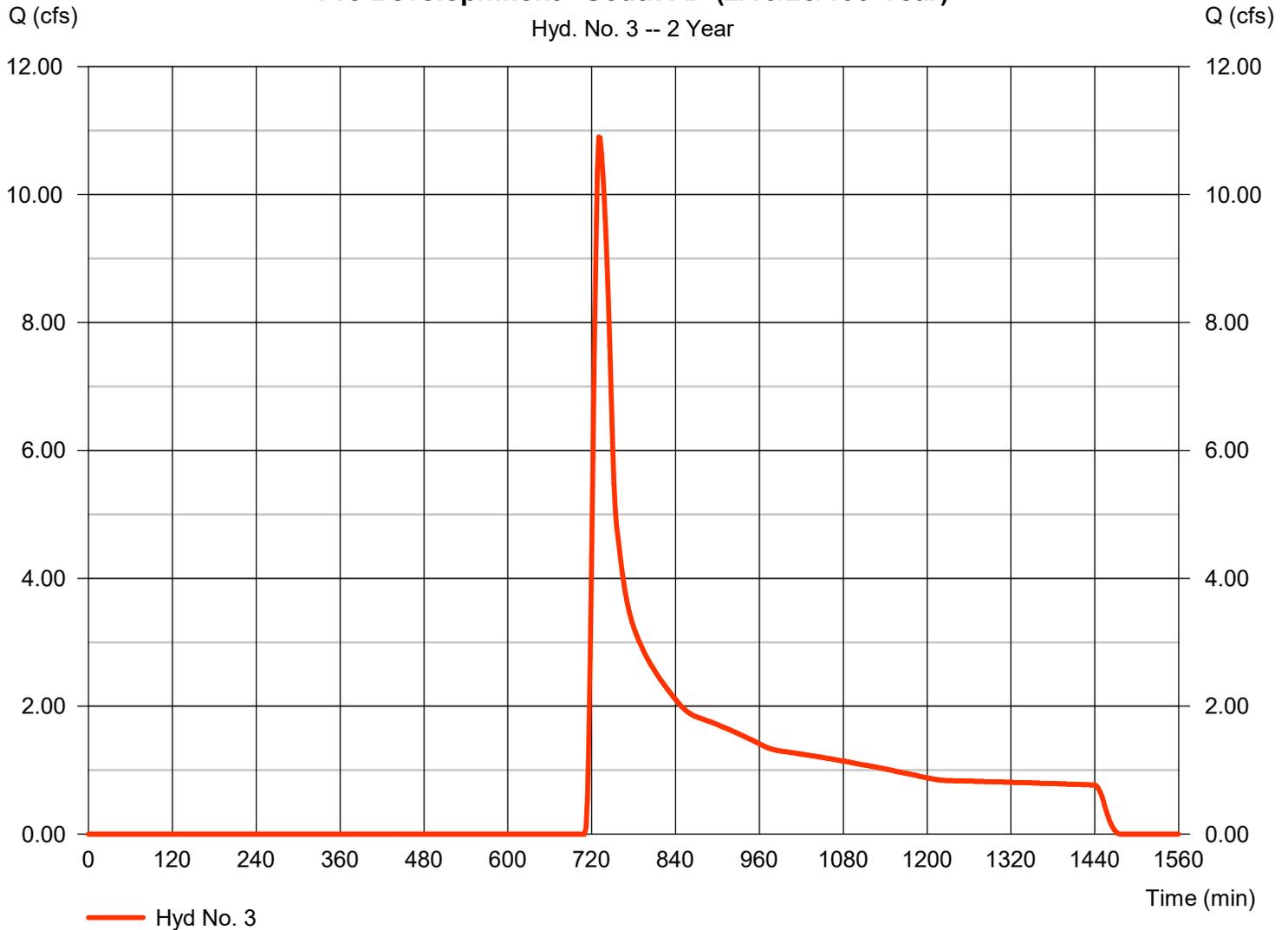
# Hydrograph Report

## Hyd. No. 3

Pre Development - South AP (2/10/25/100-Year)

Hydrograph type	= SCS Runoff	Peak discharge	= 10.90 cfs
Storm frequency	= 2 yrs	Time to peak	= 730 min
Time interval	= 2 min	Hyd. volume	= 74,600 cuft
Drainage area	= 54.650 ac	Curve number	= 55
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 22.60 min
Total precip.	= 3.57 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

**Pre Development - South AP (2/10/25/100-Year)**



# Hydrograph Report

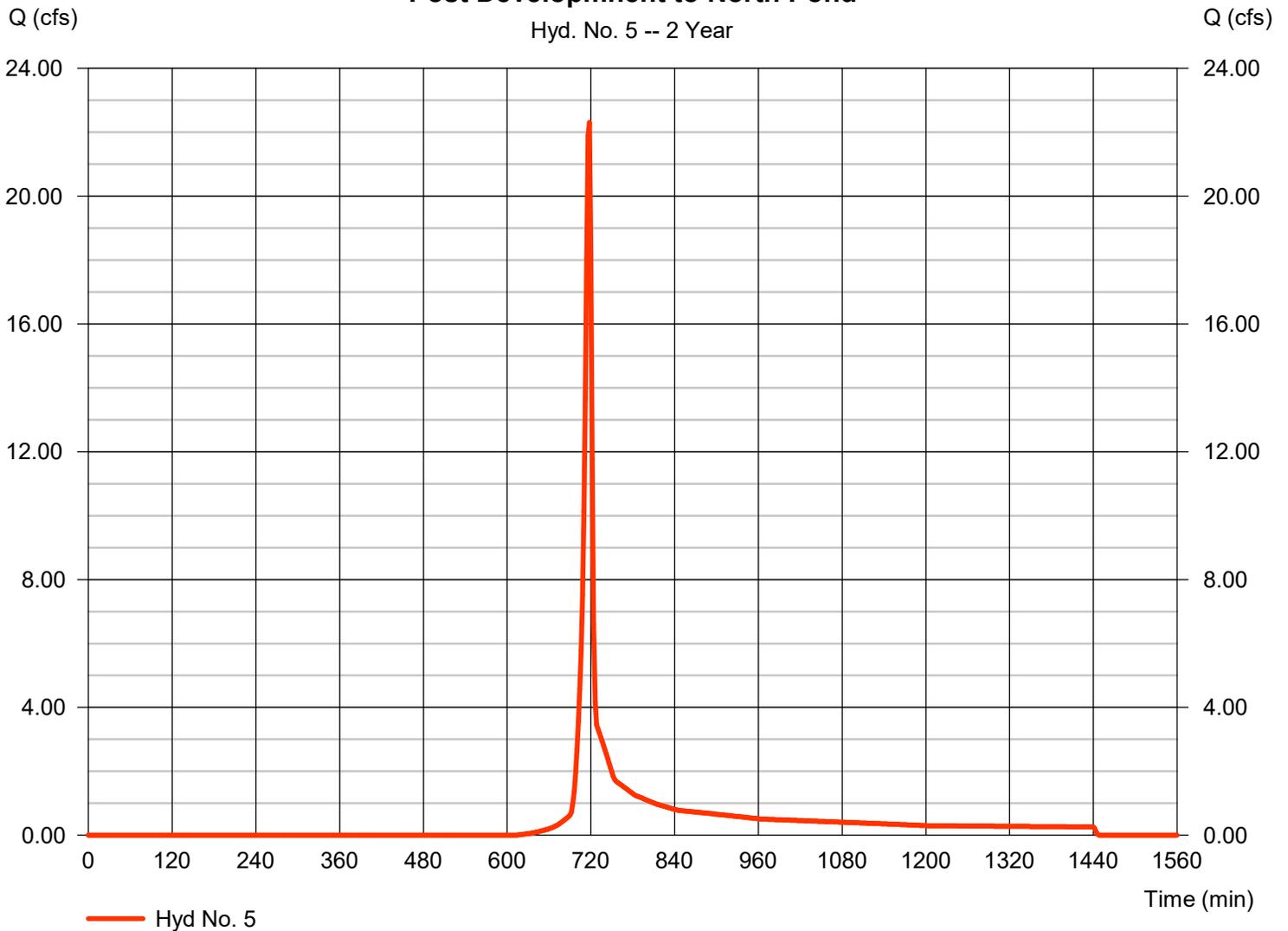
## Hyd. No. 5

Post Development to North Pond

Hydrograph type	= SCS Runoff	Peak discharge	= 22.31 cfs
Storm frequency	= 2 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 44,616 cuft
Drainage area	= 9.700 ac	Curve number	= 75
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 3.57 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Post Development to North Pond

Hyd. No. 5 -- 2 Year



# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

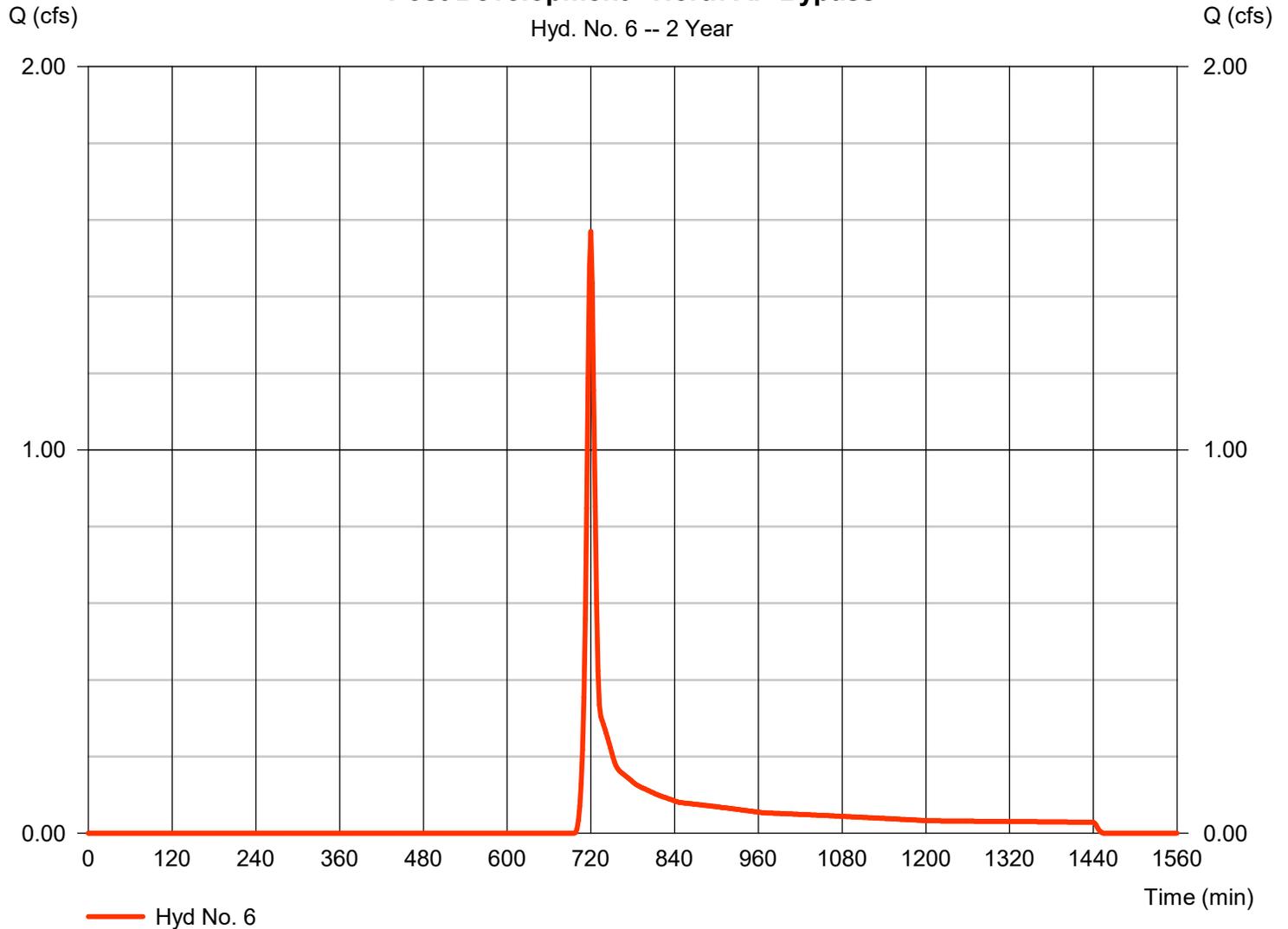
Thursday, 10 / 6 / 2022

## Hyd. No. 6

Post Development - North AP Bypass

Hydrograph type	= SCS Runoff	Peak discharge	= 1.570 cfs
Storm frequency	= 2 yrs	Time to peak	= 720 min
Time interval	= 2 min	Hyd. volume	= 3,866 cuft
Drainage area	= 1.350 ac	Curve number	= 65
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 9.20 min
Total precip.	= 3.57 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

### Post Development - North AP Bypass



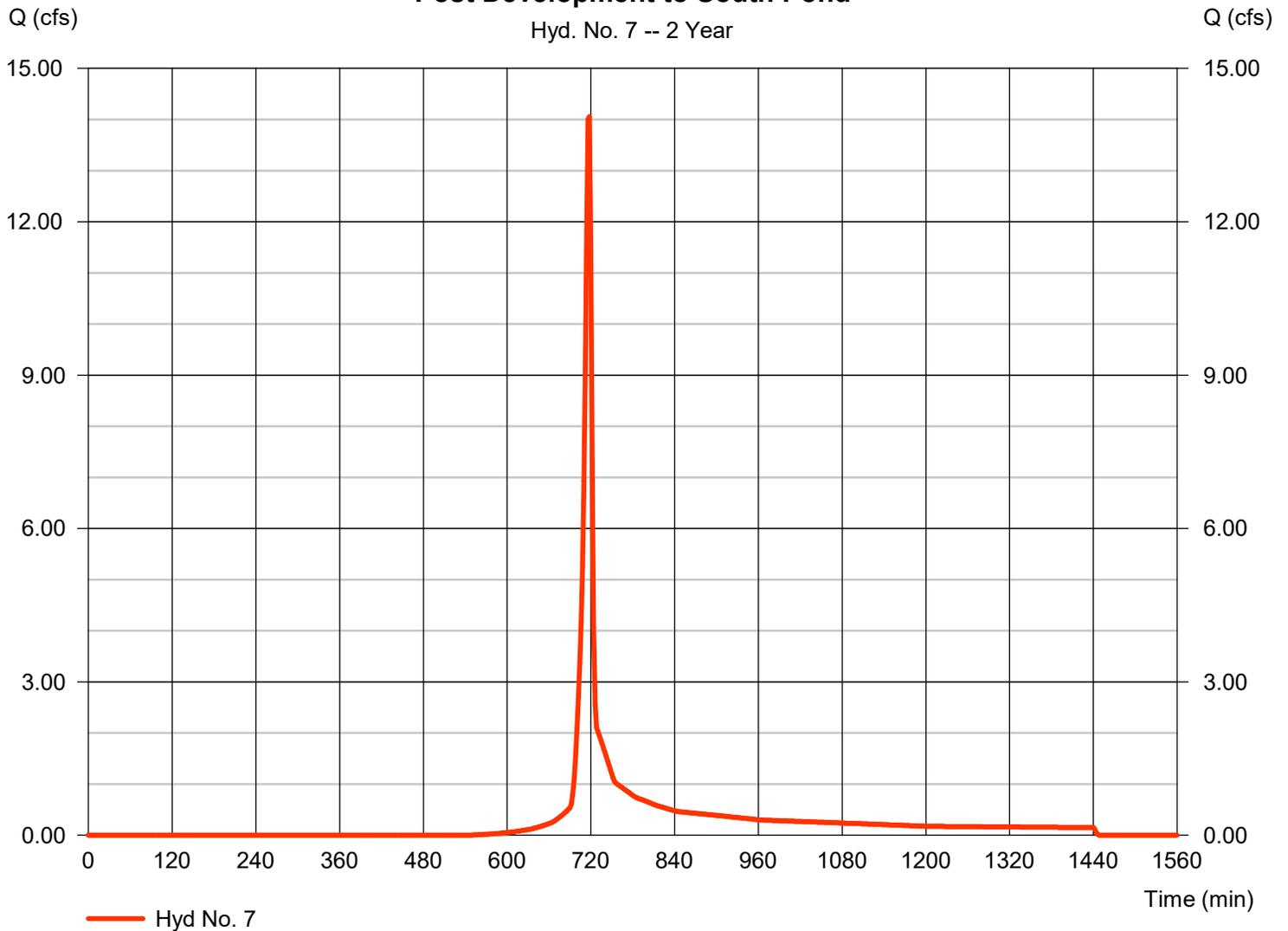
# Hydrograph Report

## Hyd. No. 7

Post Development to South Pond

Hydrograph type	= SCS Runoff	Peak discharge	= 14.06 cfs
Storm frequency	= 2 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 28,292 cuft
Drainage area	= 5.130 ac	Curve number	= 79
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 3.57 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

### Post Development to South Pond



# Hydrograph Report

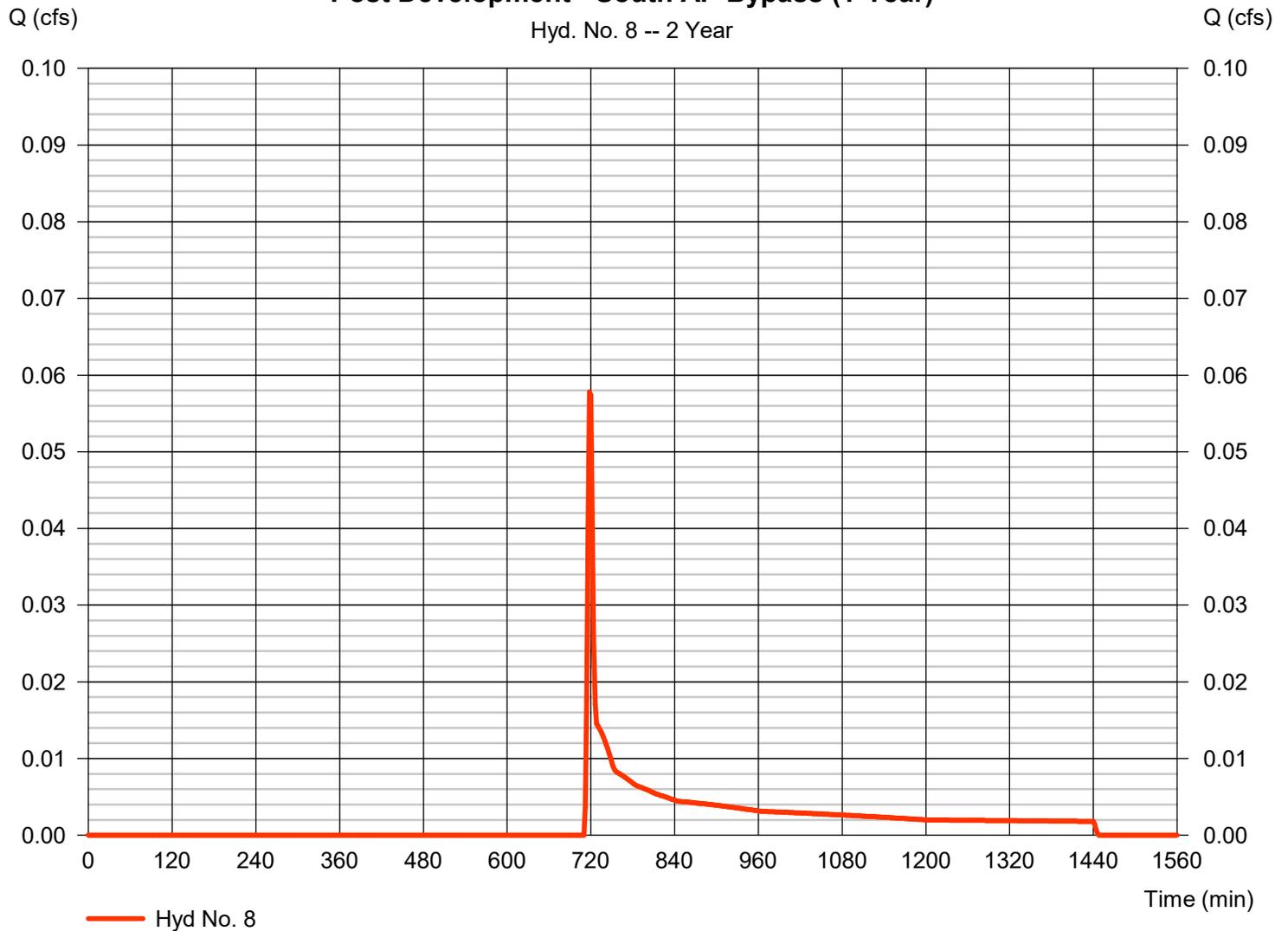
## Hyd. No. 8

Post Development - South AP Bypass (1-Year)

Hydrograph type	= SCS Runoff	Peak discharge	= 0.058 cfs
Storm frequency	= 2 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 176 cuft
Drainage area	= 0.140 ac	Curve number	= 55
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 3.57 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Post Development - South AP Bypass (1-Year)

Hyd. No. 8 -- 2 Year



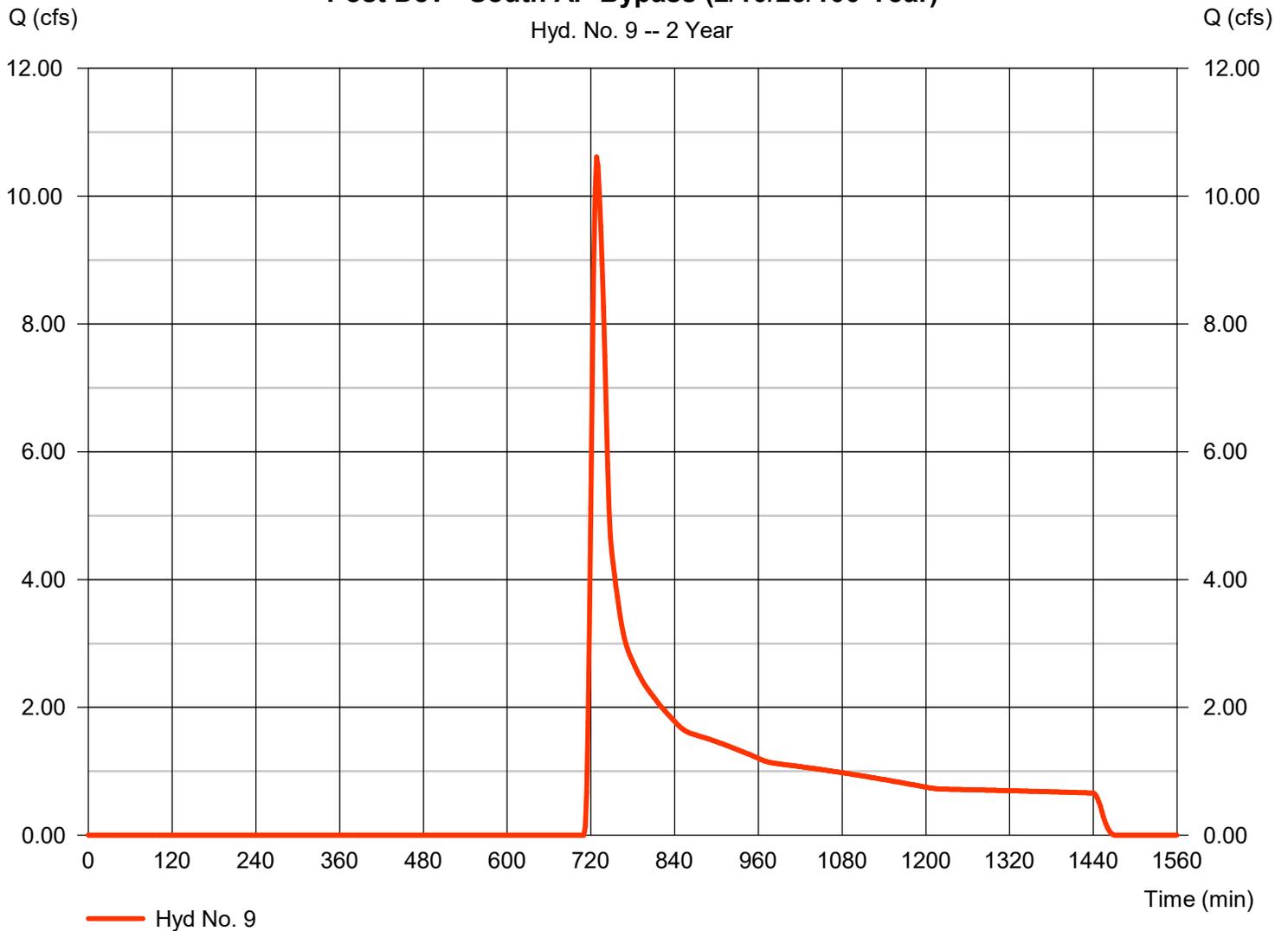
# Hydrograph Report

## Hyd. No. 9

Post Dev - South AP Bypass (2/10/25/100-Year)

Hydrograph type	= SCS Runoff	Peak discharge	= 10.61 cfs
Storm frequency	= 2 yrs	Time to peak	= 728 min
Time interval	= 2 min	Hyd. volume	= 64,185 cuft
Drainage area	= 47.860 ac	Curve number	= 55
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 18.20 min
Total precip.	= 3.57 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Post Dev - South AP Bypass (2/10/25/100-Year)



# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

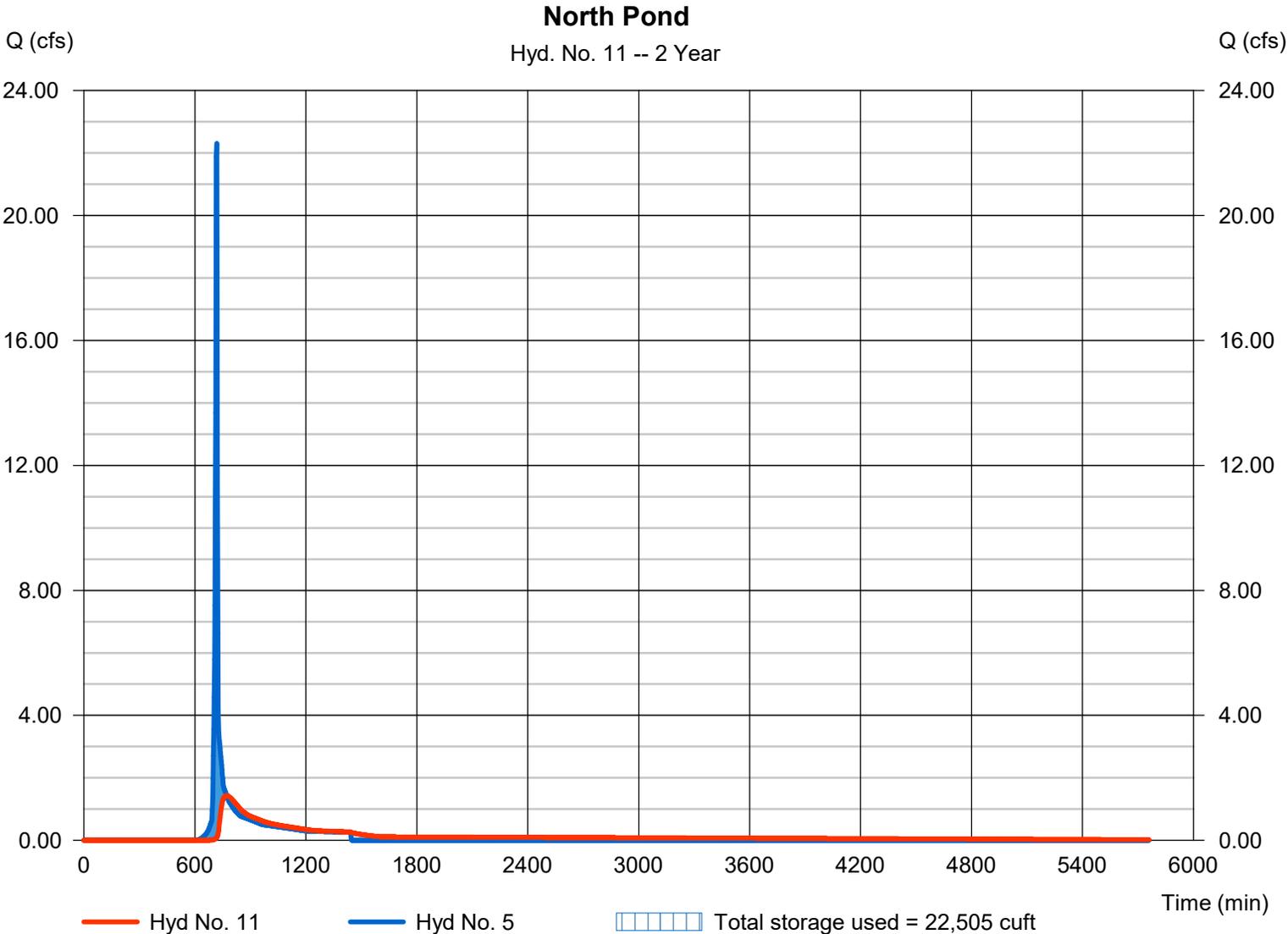
Thursday, 10 / 6 / 2022

## Hyd. No. 11

North Pond

Hydrograph type	= Reservoir	Peak discharge	= 1.430 cfs
Storm frequency	= 2 yrs	Time to peak	= 772 min
Time interval	= 2 min	Hyd. volume	= 42,891 cuft
Inflow hyd. No.	= 5 - Post Development to North Pond	Mean Elevation	= 537.49 ft
Reservoir name	= North Pond	Max. Storage	= 22,505 cuft

Storage Indication method used.



# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

Thursday, 10 / 6 / 2022

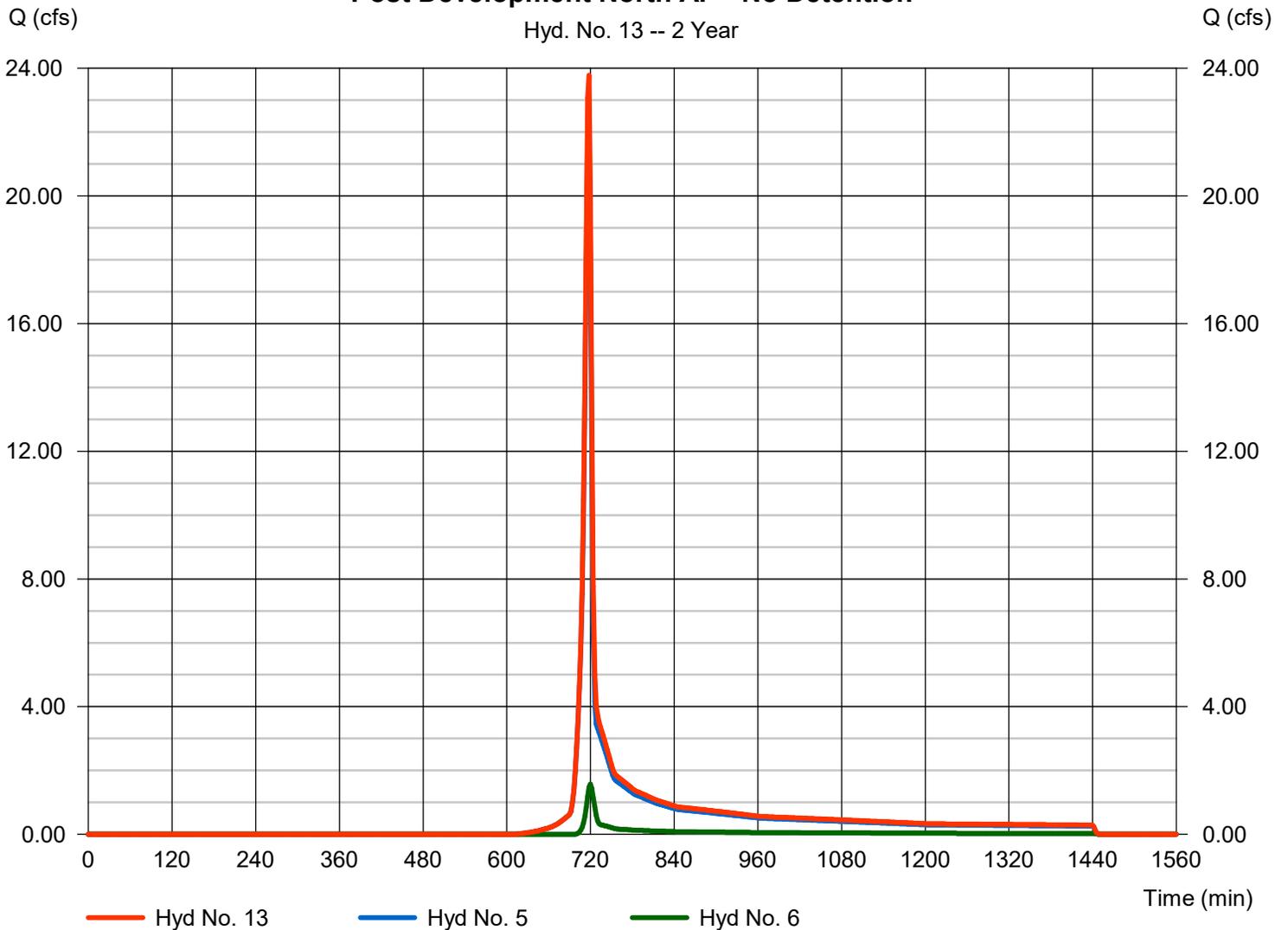
## Hyd. No. 13

Post Development North AP - No Detention

Hydrograph type	= Combine	Peak discharge	= 23.78 cfs
Storm frequency	= 2 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 48,482 cuft
Inflow hyds.	= 5, 6	Contrib. drain. area	= 11.050 ac

### Post Development North AP - No Detention

Hyd. No. 13 -- 2 Year



# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

Thursday, 10 / 6 / 2022

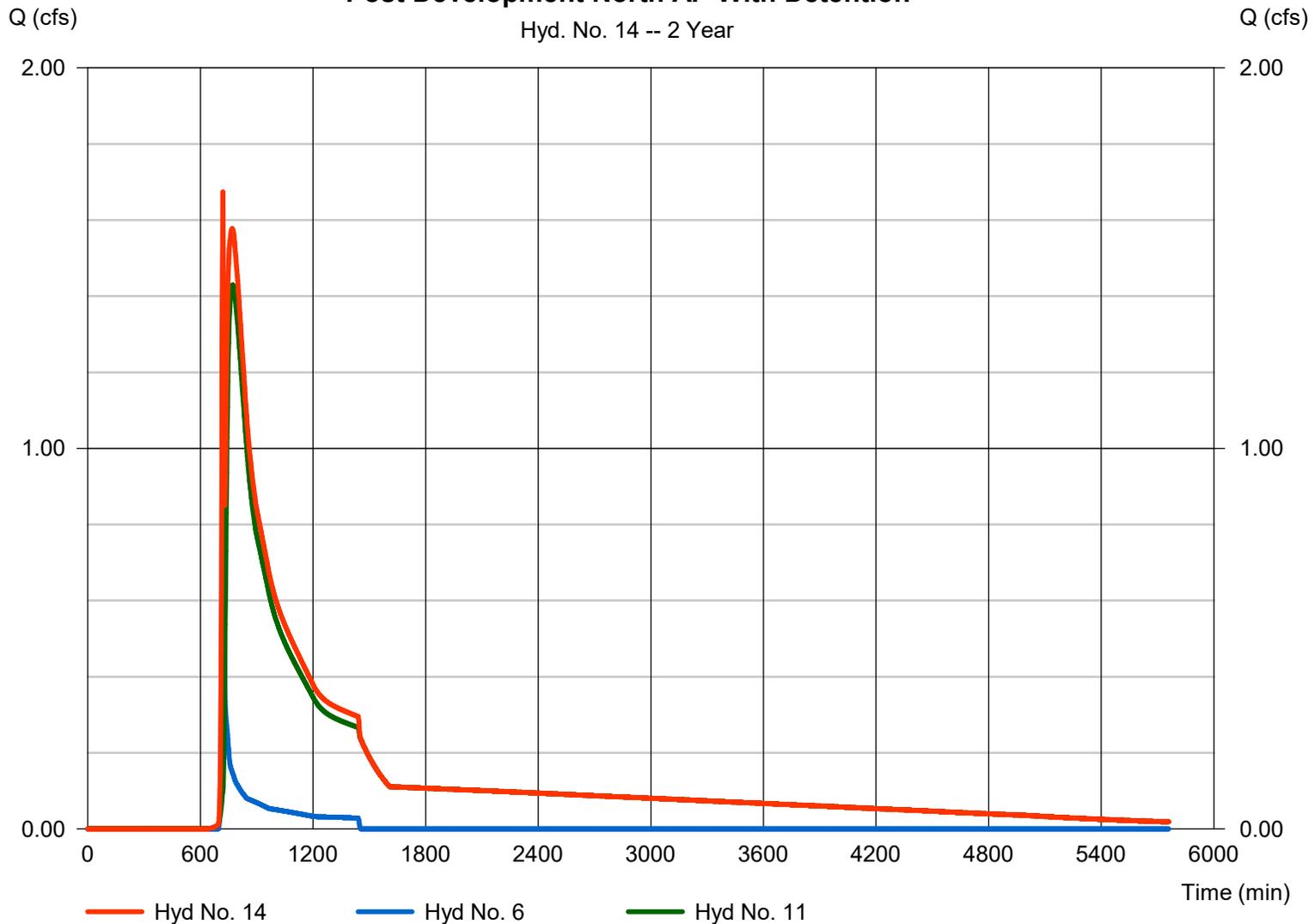
## Hyd. No. 14

Post Development North AP With Detention

Hydrograph type	= Combine	Peak discharge	= 1.674 cfs
Storm frequency	= 2 yrs	Time to peak	= 720 min
Time interval	= 2 min	Hyd. volume	= 46,757 cuft
Inflow hyds.	= 6, 11	Contrib. drain. area	= 1.350 ac

### Post Development North AP With Detention

Hyd. No. 14 -- 2 Year



# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

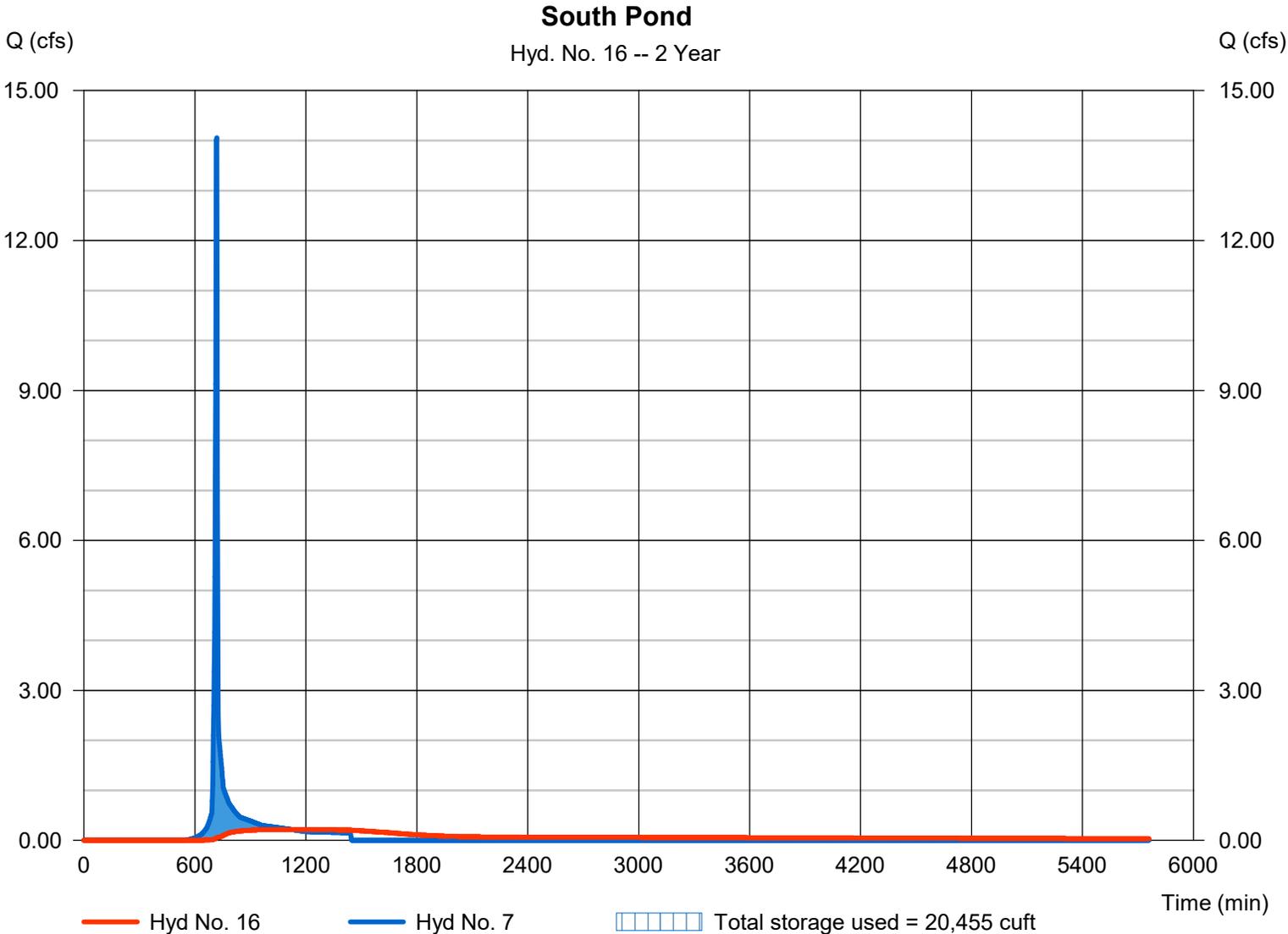
Thursday, 10 / 6 / 2022

## Hyd. No. 16

South Pond

Hydrograph type	= Reservoir	Peak discharge	= 0.219 cfs
Storm frequency	= 2 yrs	Time to peak	= 1118 min
Time interval	= 2 min	Hyd. volume	= 24,346 cuft
Inflow hyd. No.	= 7 - Post Development to South Pond	Peak Elevation	= 541.74 ft
Reservoir name	= South Pond	Max. Storage	= 20,455 cuft

Storage Indication method used.



# Hydrograph Report

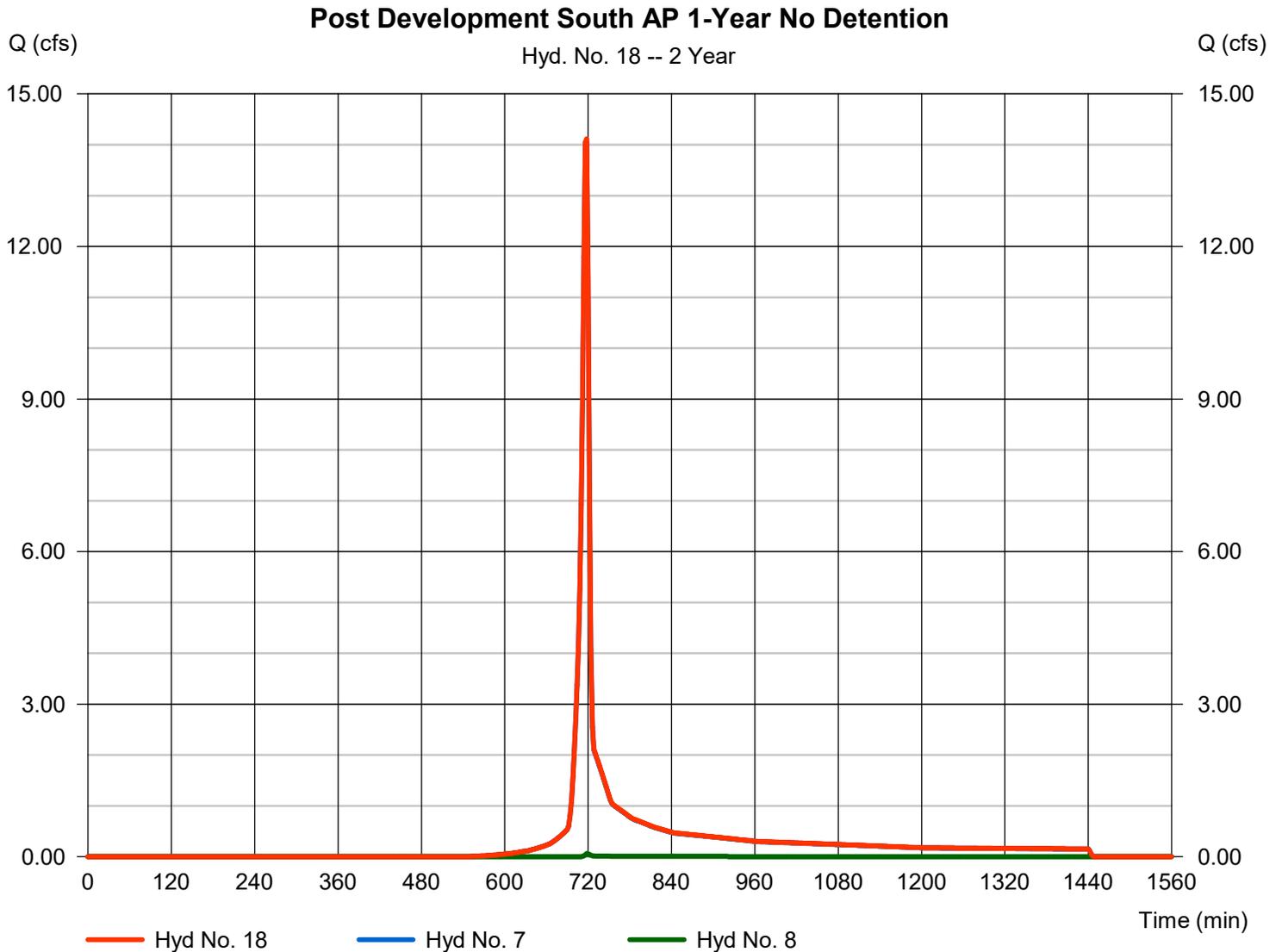
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

Thursday, 10 / 6 / 2022

## Hyd. No. 18

Post Development South AP 1-Year No Detention

Hydrograph type	= Combine	Peak discharge	= 14.11 cfs
Storm frequency	= 2 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 28,468 cuft
Inflow hyds.	= 7, 8	Contrib. drain. area	= 5.270 ac



# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

Thursday, 10 / 6 / 2022

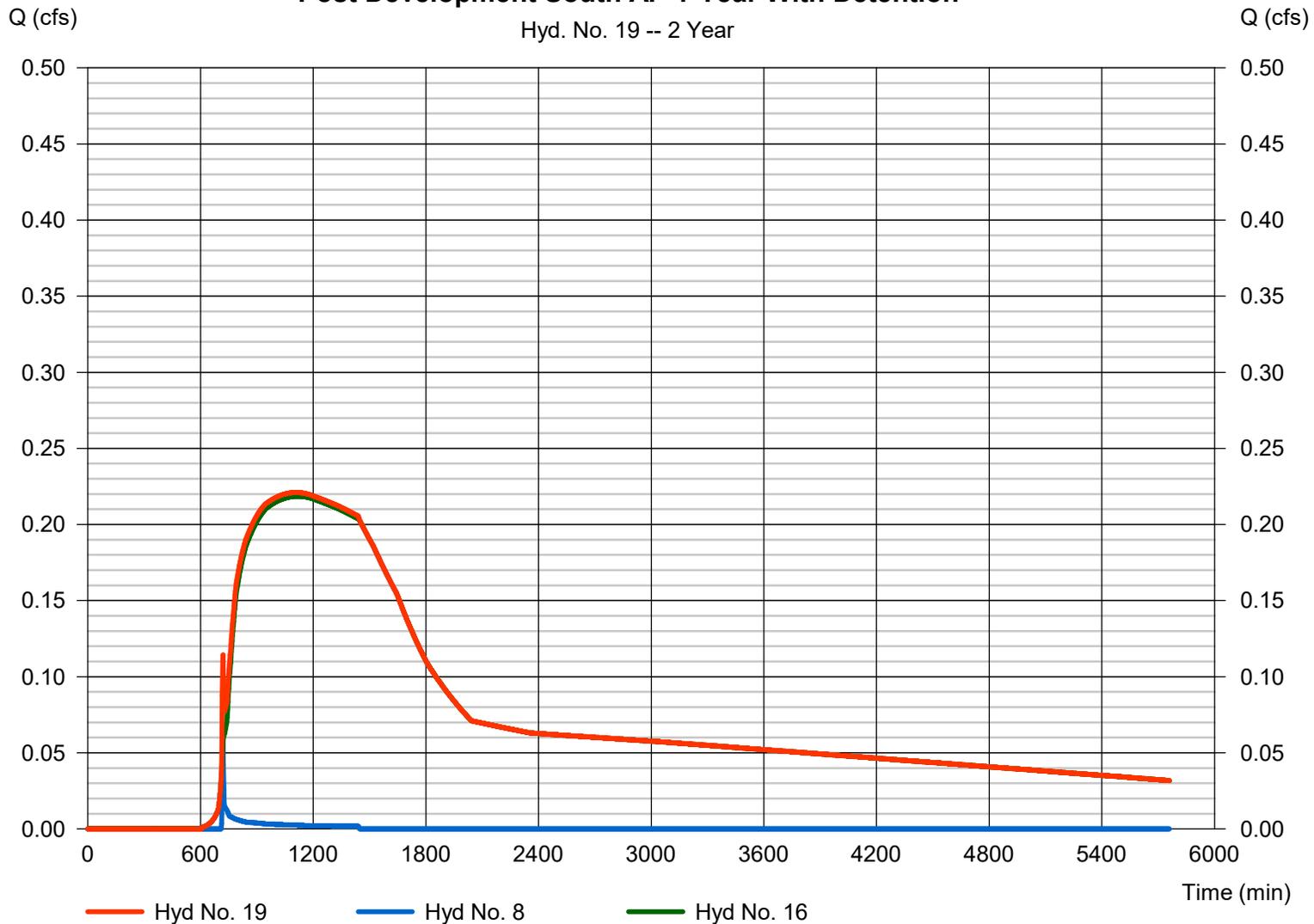
## Hyd. No. 19

Post Development South AP 1-Year With Detention

Hydrograph type	= Combine	Peak discharge	= 0.221 cfs
Storm frequency	= 2 yrs	Time to peak	= 1108 min
Time interval	= 2 min	Hyd. volume	= 24,522 cuft
Inflow hyds.	= 8, 16	Contrib. drain. area	= 0.140 ac

Post Development South AP 1-Year With Detention

Hyd. No. 19 -- 2 Year



# Hydrograph Report

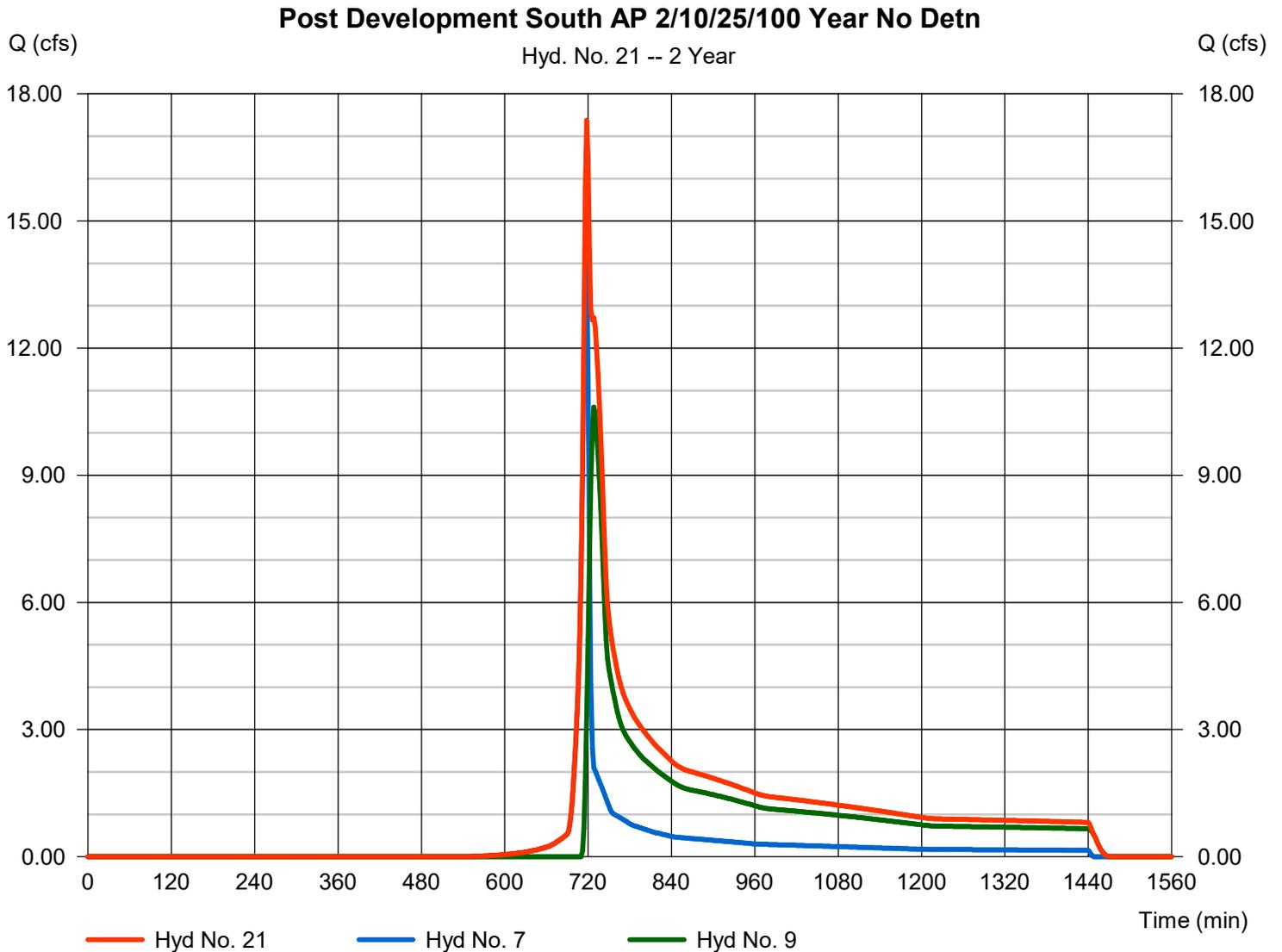
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

Thursday, 10 / 6 / 2022

## Hyd. No. 21

Post Development South AP 2/10/25/100 Year No Detn

Hydrograph type	= Combine	Peak discharge	= 17.37 cfs
Storm frequency	= 2 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 92,477 cuft
Inflow hyds.	= 7, 9	Contrib. drain. area	= 52.990 ac



# Hydrograph Report

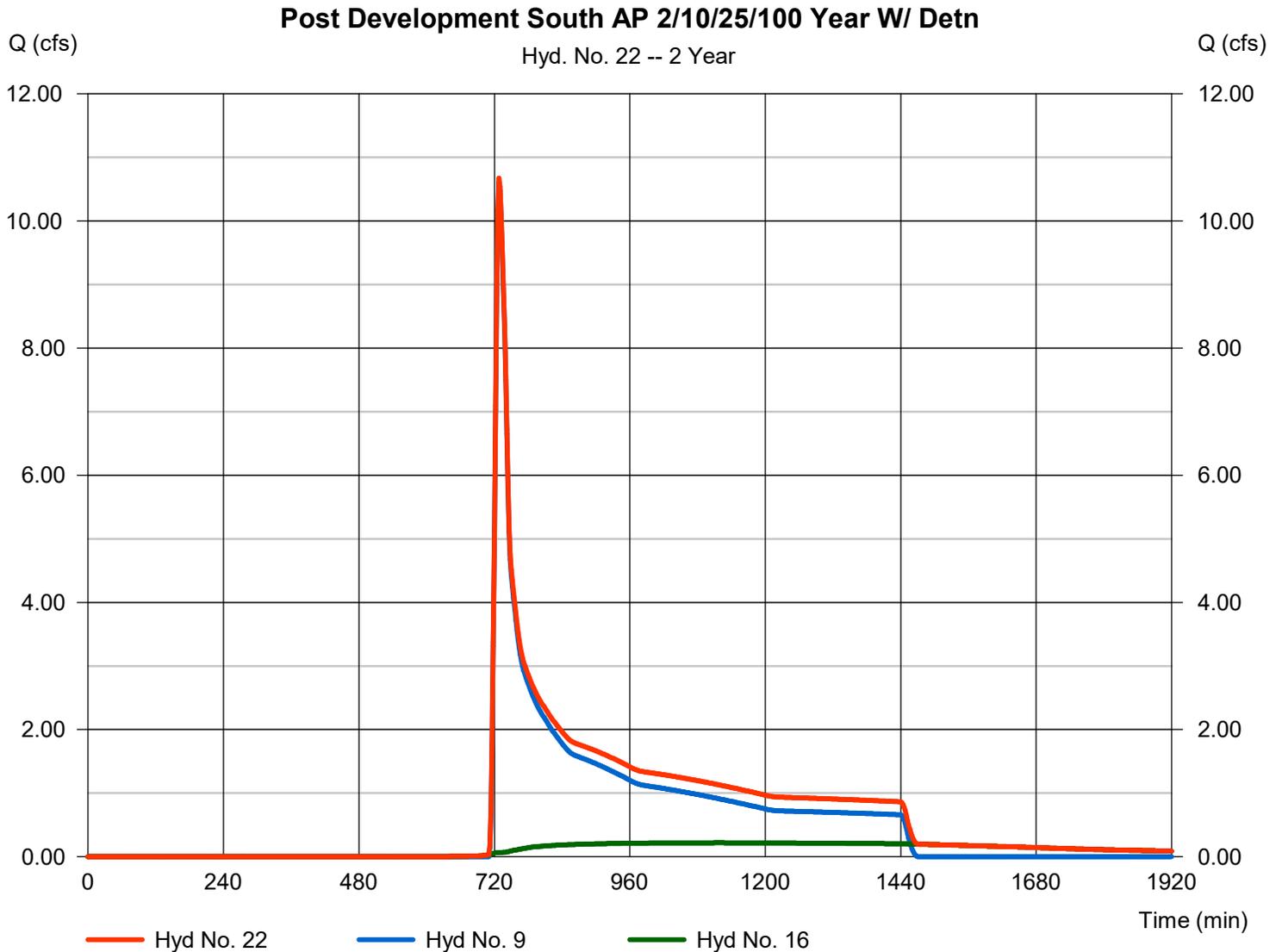
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

Thursday, 10 / 6 / 2022

## Hyd. No. 22

Post Development South AP 2/10/25/100 Year W/ Detn

Hydrograph type	= Combine	Peak discharge	= 10.67 cfs
Storm frequency	= 2 yrs	Time to peak	= 728 min
Time interval	= 2 min	Hyd. volume	= 88,531 cuft
Inflow hyds.	= 9, 16	Contrib. drain. area	= 47.860 ac



# Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description	
1	SCS Runoff	13.05	2	726	44,690	-----	-----	-----	Pre Development- North AP	
2	SCS Runoff	2.311	2	726	8,496	-----	-----	-----	Pre Development - South AP (1-Year)	
3	SCS Runoff	50.09	2	728	213,144	-----	-----	-----	Pre Development - South AP (2/10/2	
5	SCS Runoff	42.03	2	716	84,885	-----	-----	-----	Post Development to North Pond	
6	SCS Runoff	3.728	2	720	8,596	-----	-----	-----	Post Development - North AP Bypass	
7	SCS Runoff	25.19	2	716	51,173	-----	-----	-----	Post Development to South Pond	
8	SCS Runoff	0.237	2	718	503	-----	-----	-----	Post Development - South AP Bypass	
9	SCS Runoff	48.64	2	726	183,387	-----	-----	-----	Post Dev - South AP Bypass (2/10/25	
11	Reservoir	9.387	2	726	83,131	5	538.33	36,610	North Pond	
13	Combine	45.51	2	718	93,481	5, 6,	-----	-----	Post Development North AP - No Det	
14	Combine	12.36	2	722	91,727	6, 11,	-----	-----	Post Development North AP With Det	
16	Reservoir	0.393	2	1070	45,426	7	542.92	36,639	South Pond	
18	Combine	25.41	2	716	51,676	7, 8,	-----	-----	Post Development South AP 1-Year	
19	Combine	0.457	2	720	45,929	8, 16,	-----	-----	Post Development South AP 1-Year	
21	Combine	54.84	2	720	234,560	7, 9,	-----	-----	Post Development South AP 2/10/25/	
22	Combine	48.94	2	726	228,812	9, 16,	-----	-----	Post Development South AP 2/10/25/	
Homestead Rd Peak Flow-CZP.gpw					Return Period: 10 Year			Thursday, 10 / 6 / 2022		

# Hydrograph Report

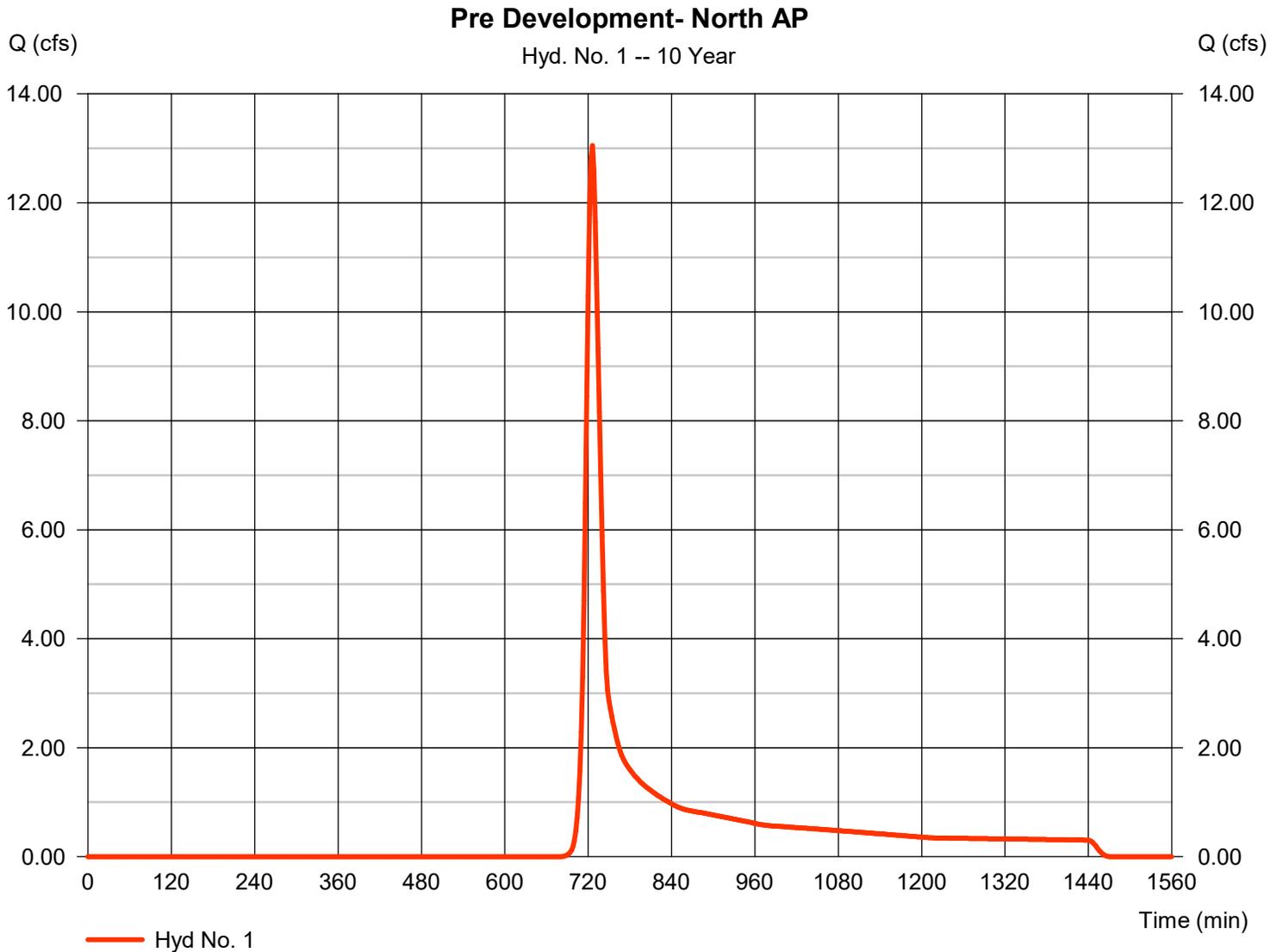
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

Thursday, 10 / 6 / 2022

## Hyd. No. 1

Pre Development- North AP

Hydrograph type	= SCS Runoff	Peak discharge	= 13.05 cfs
Storm frequency	= 10 yrs	Time to peak	= 726 min
Time interval	= 2 min	Hyd. volume	= 44,690 cuft
Drainage area	= 8.860 ac	Curve number	= 60
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 20.00 min
Total precip.	= 5.15 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

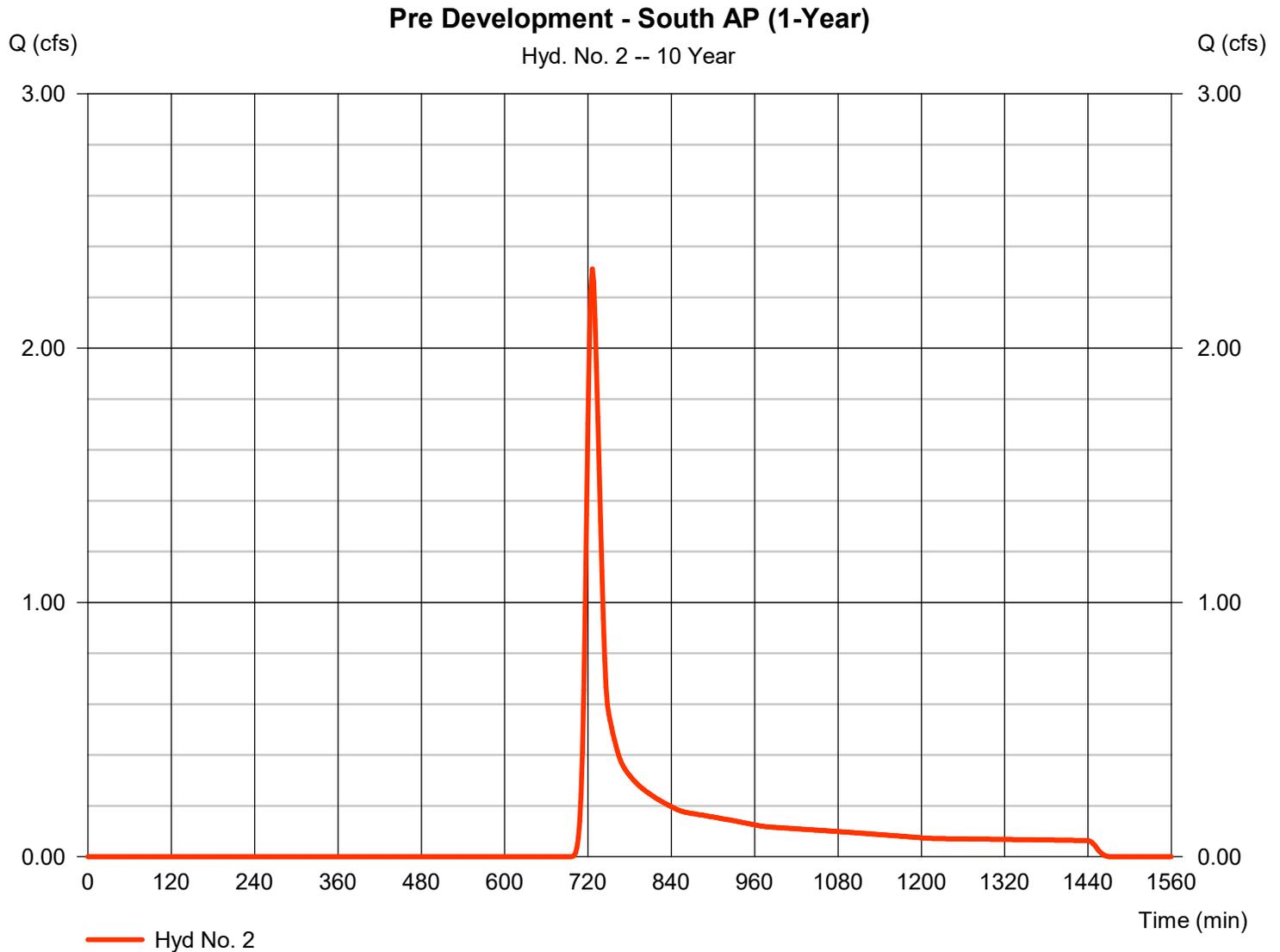


# Hydrograph Report

## Hyd. No. 2

Pre Development - South AP (1-Year)

Hydrograph type	= SCS Runoff	Peak discharge	= 2.311 cfs
Storm frequency	= 10 yrs	Time to peak	= 726 min
Time interval	= 2 min	Hyd. volume	= 8,496 cuft
Drainage area	= 2.090 ac	Curve number	= 56
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 17.30 min
Total precip.	= 5.15 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



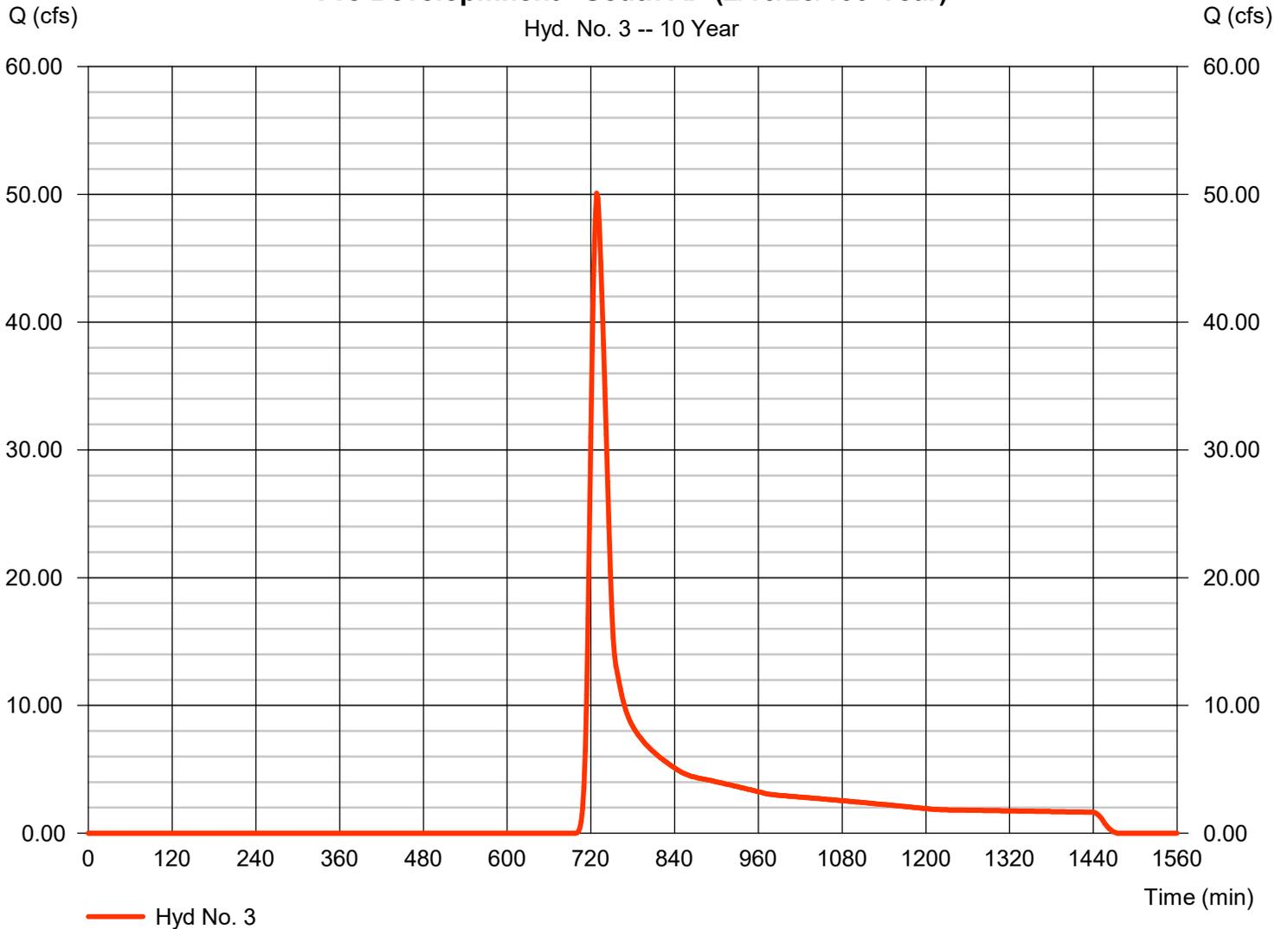
# Hydrograph Report

## Hyd. No. 3

Pre Development - South AP (2/10/25/100-Year)

Hydrograph type	= SCS Runoff	Peak discharge	= 50.09 cfs
Storm frequency	= 10 yrs	Time to peak	= 728 min
Time interval	= 2 min	Hyd. volume	= 213,144 cuft
Drainage area	= 54.650 ac	Curve number	= 55
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 22.60 min
Total precip.	= 5.15 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

**Pre Development - South AP (2/10/25/100-Year)**



# Hydrograph Report

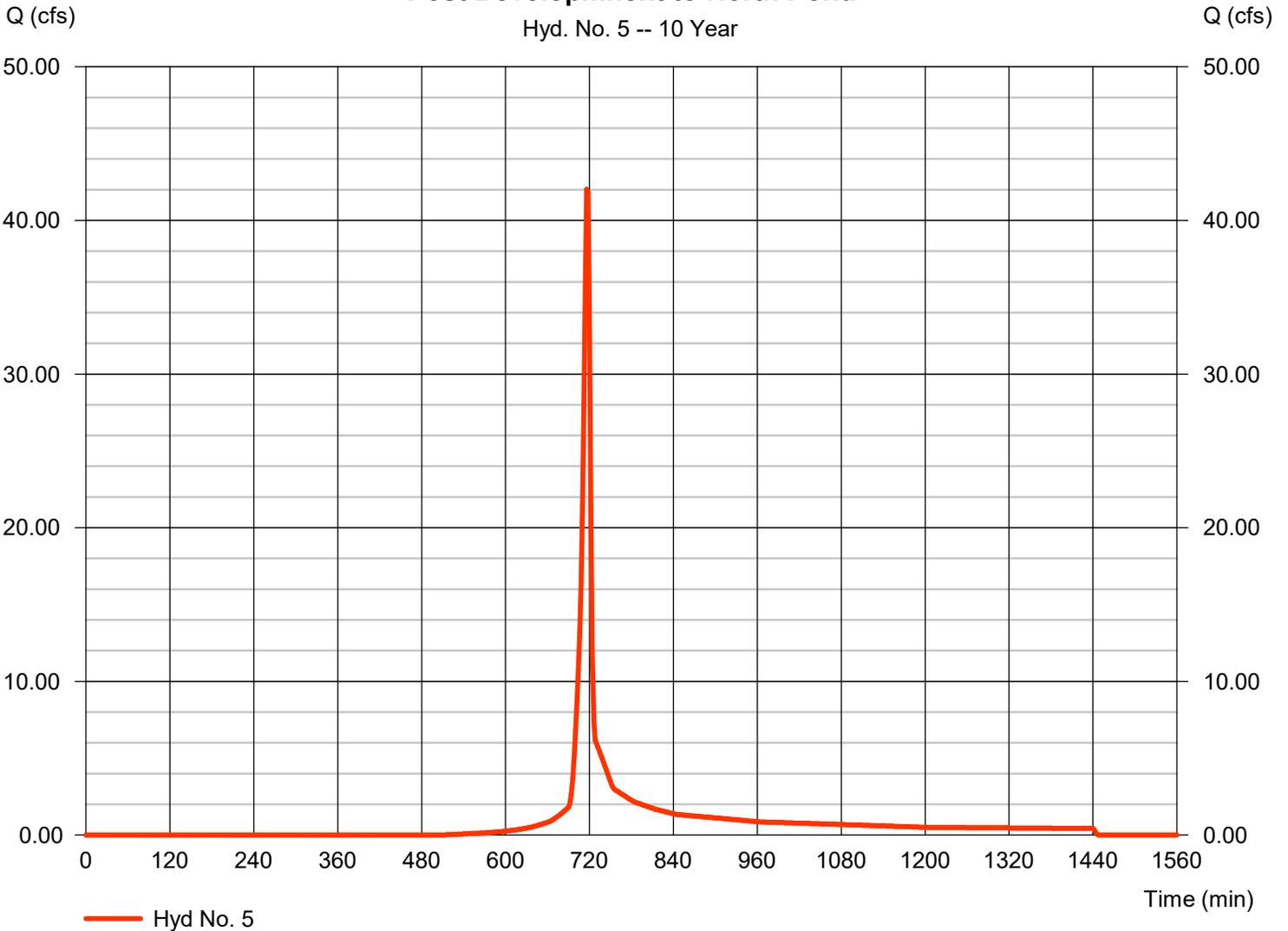
## Hyd. No. 5

Post Development to North Pond

Hydrograph type	= SCS Runoff	Peak discharge	= 42.03 cfs
Storm frequency	= 10 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 84,885 cuft
Drainage area	= 9.700 ac	Curve number	= 75
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 5.15 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Post Development to North Pond

Hyd. No. 5 -- 10 Year



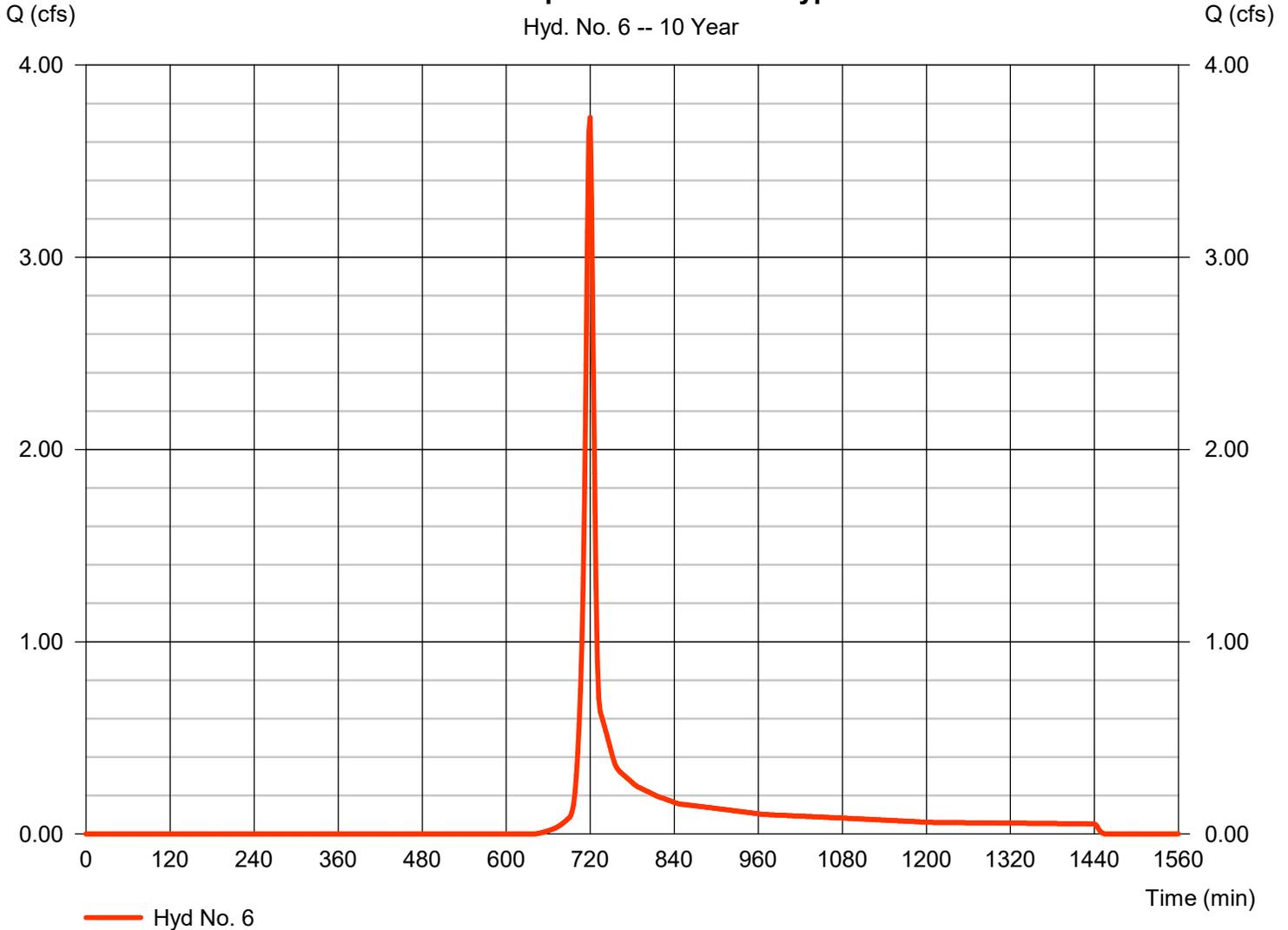
# Hydrograph Report

## Hyd. No. 6

Post Development - North AP Bypass

Hydrograph type	= SCS Runoff	Peak discharge	= 3.728 cfs
Storm frequency	= 10 yrs	Time to peak	= 720 min
Time interval	= 2 min	Hyd. volume	= 8,596 cuft
Drainage area	= 1.350 ac	Curve number	= 65
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 9.20 min
Total precip.	= 5.15 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Post Development - North AP Bypass

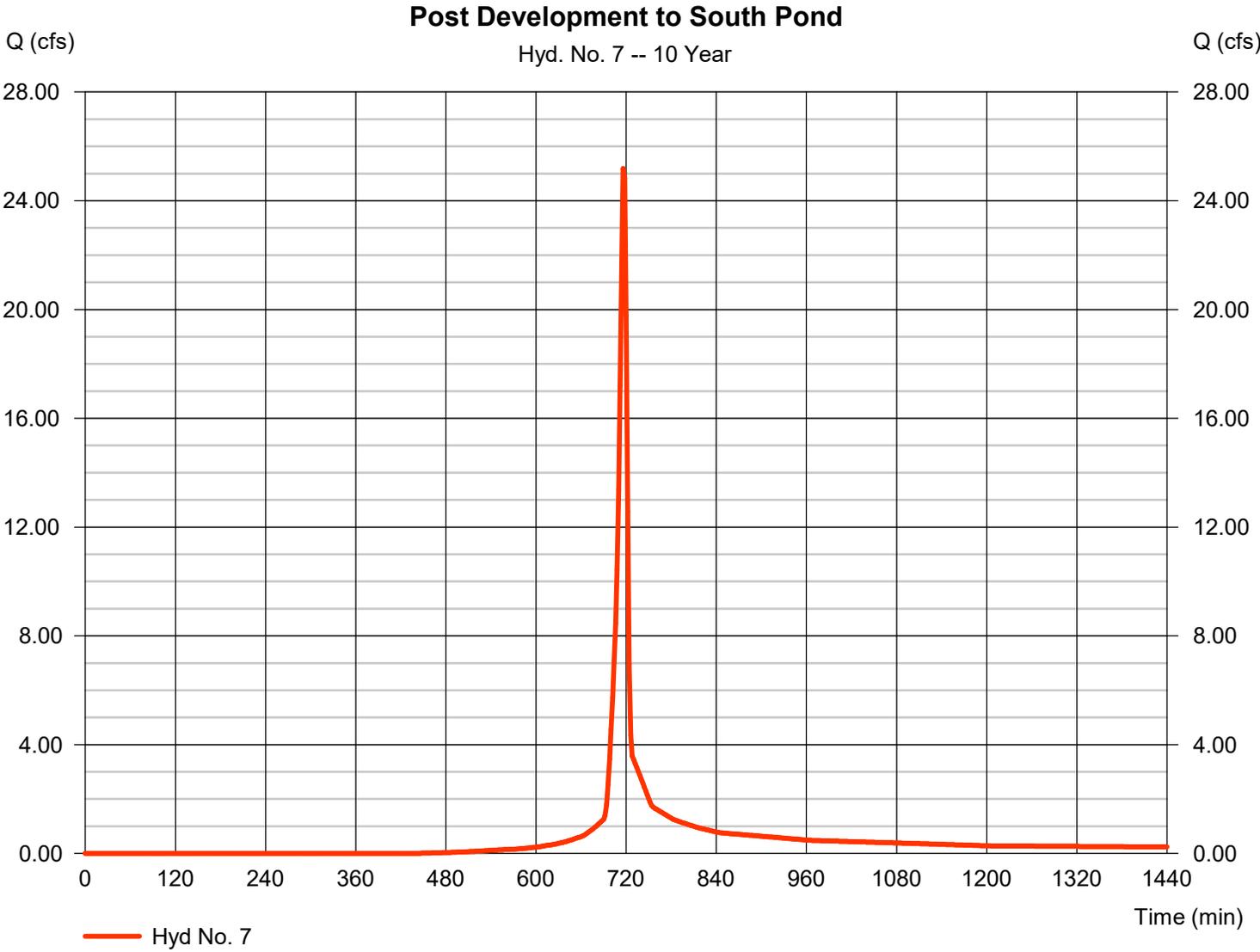


# Hydrograph Report

## Hyd. No. 7

Post Development to South Pond

Hydrograph type	= SCS Runoff	Peak discharge	= 25.19 cfs
Storm frequency	= 10 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 51,173 cuft
Drainage area	= 5.130 ac	Curve number	= 79
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 5.15 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



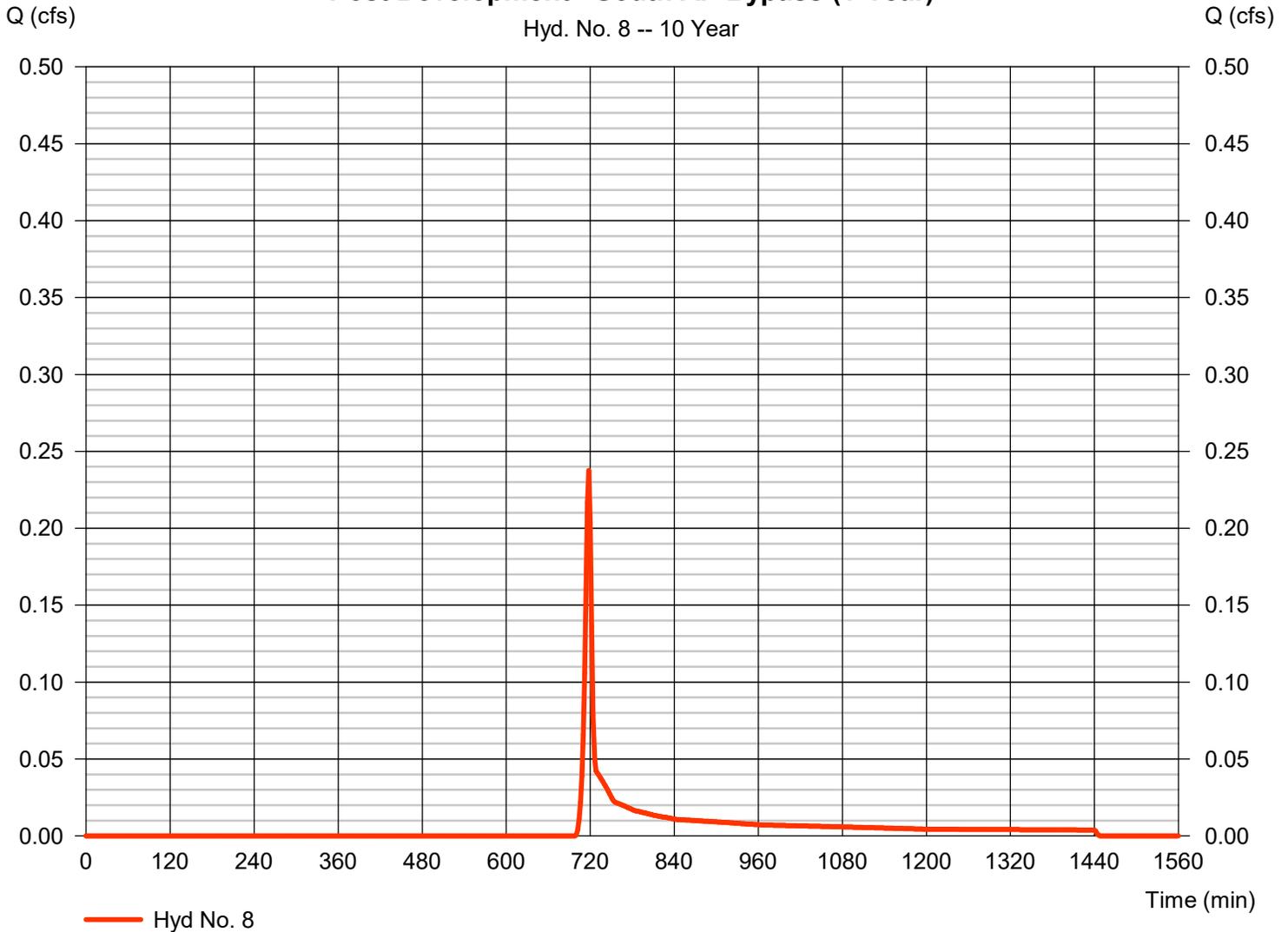
# Hydrograph Report

## Hyd. No. 8

Post Development - South AP Bypass (1-Year)

Hydrograph type	= SCS Runoff	Peak discharge	= 0.237 cfs
Storm frequency	= 10 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 503 cuft
Drainage area	= 0.140 ac	Curve number	= 55
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 5.15 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Post Development - South AP Bypass (1-Year)



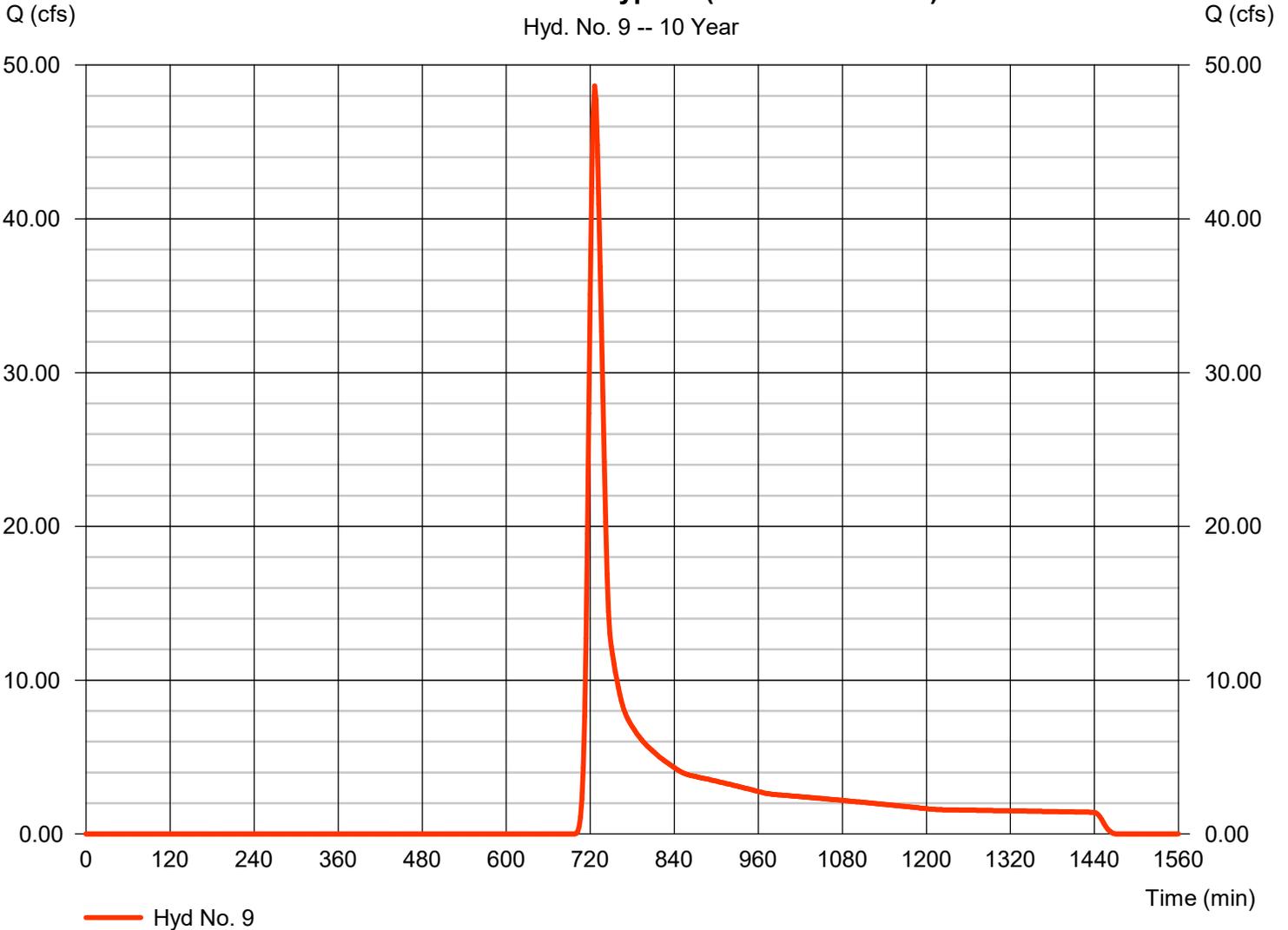
# Hydrograph Report

## Hyd. No. 9

Post Dev - South AP Bypass (2/10/25/100-Year)

Hydrograph type	= SCS Runoff	Peak discharge	= 48.64 cfs
Storm frequency	= 10 yrs	Time to peak	= 726 min
Time interval	= 2 min	Hyd. volume	= 183,387 cuft
Drainage area	= 47.860 ac	Curve number	= 55
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 18.20 min
Total precip.	= 5.15 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Post Dev - South AP Bypass (2/10/25/100-Year)



# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

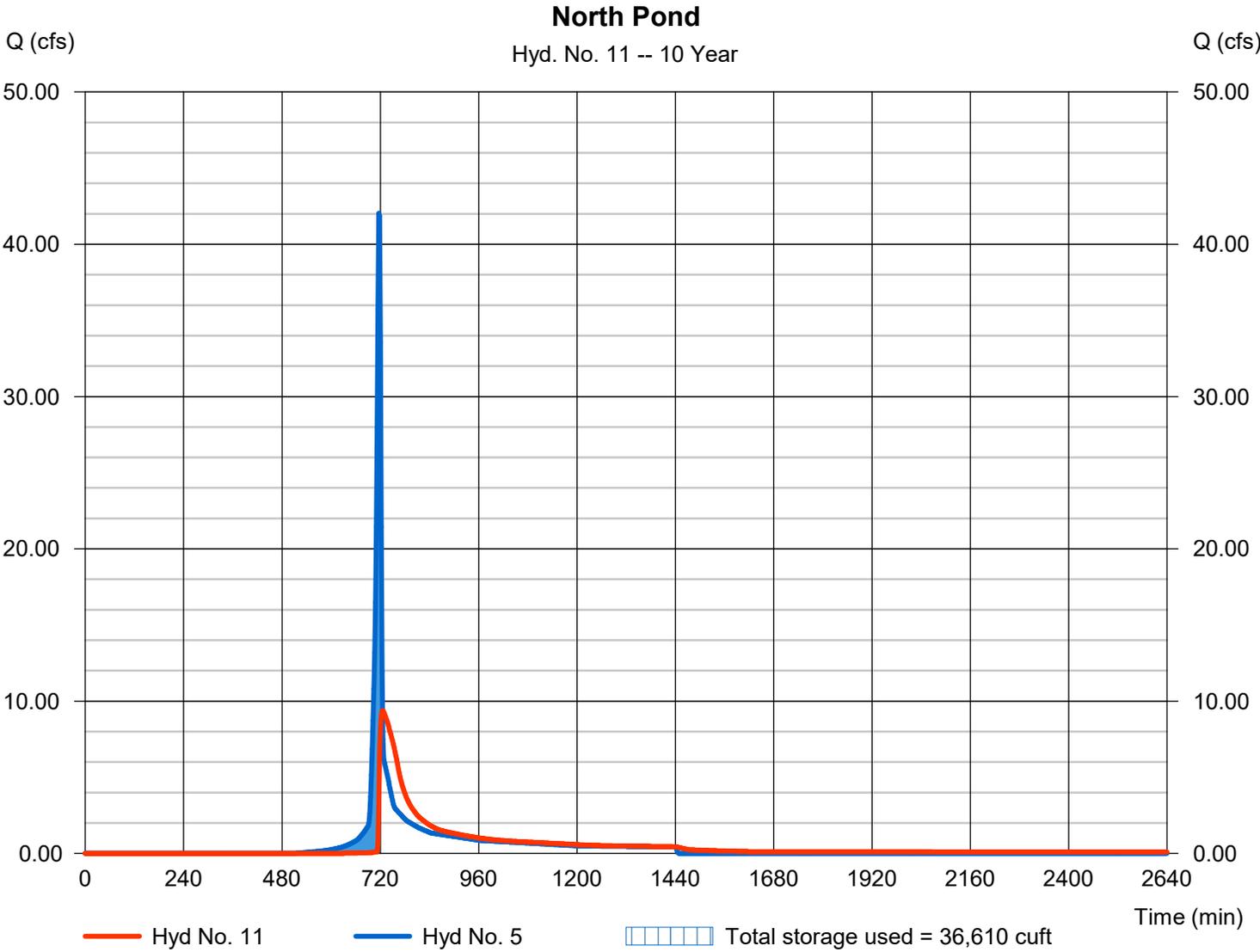
Thursday, 10 / 6 / 2022

## Hyd. No. 11

North Pond

Hydrograph type	= Reservoir	Peak discharge	= 9.387 cfs
Storm frequency	= 10 yrs	Time to peak	= 726 min
Time interval	= 2 min	Hyd. volume	= 83,131 cuft
Inflow hyd. No.	= 5 - Post Development to North Pond	Max. Elevation	= 538.33 ft
Reservoir name	= North Pond	Max. Storage	= 36,610 cuft

Storage Indication method used.



# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

Thursday, 10 / 6 / 2022

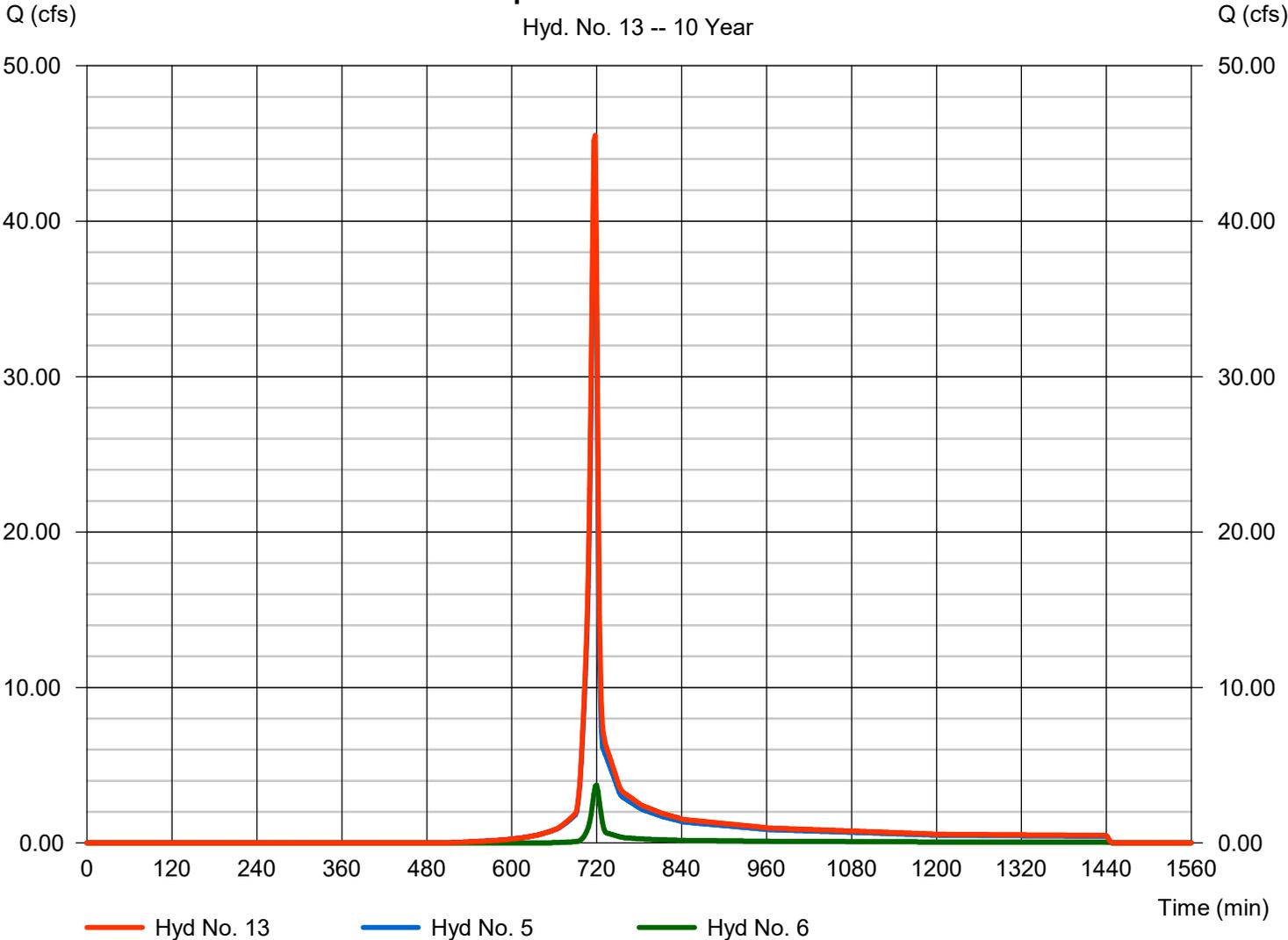
## Hyd. No. 13

Post Development North AP - No Detention

Hydrograph type	= Combine	Peak discharge	= 45.51 cfs
Storm frequency	= 10 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 93,481 cuft
Inflow hyds.	= 5, 6	Contrib. drain. area	= 11.050 ac

### Post Development North AP - No Detention

Hyd. No. 13 -- 10 Year



# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

Thursday, 10 / 6 / 2022

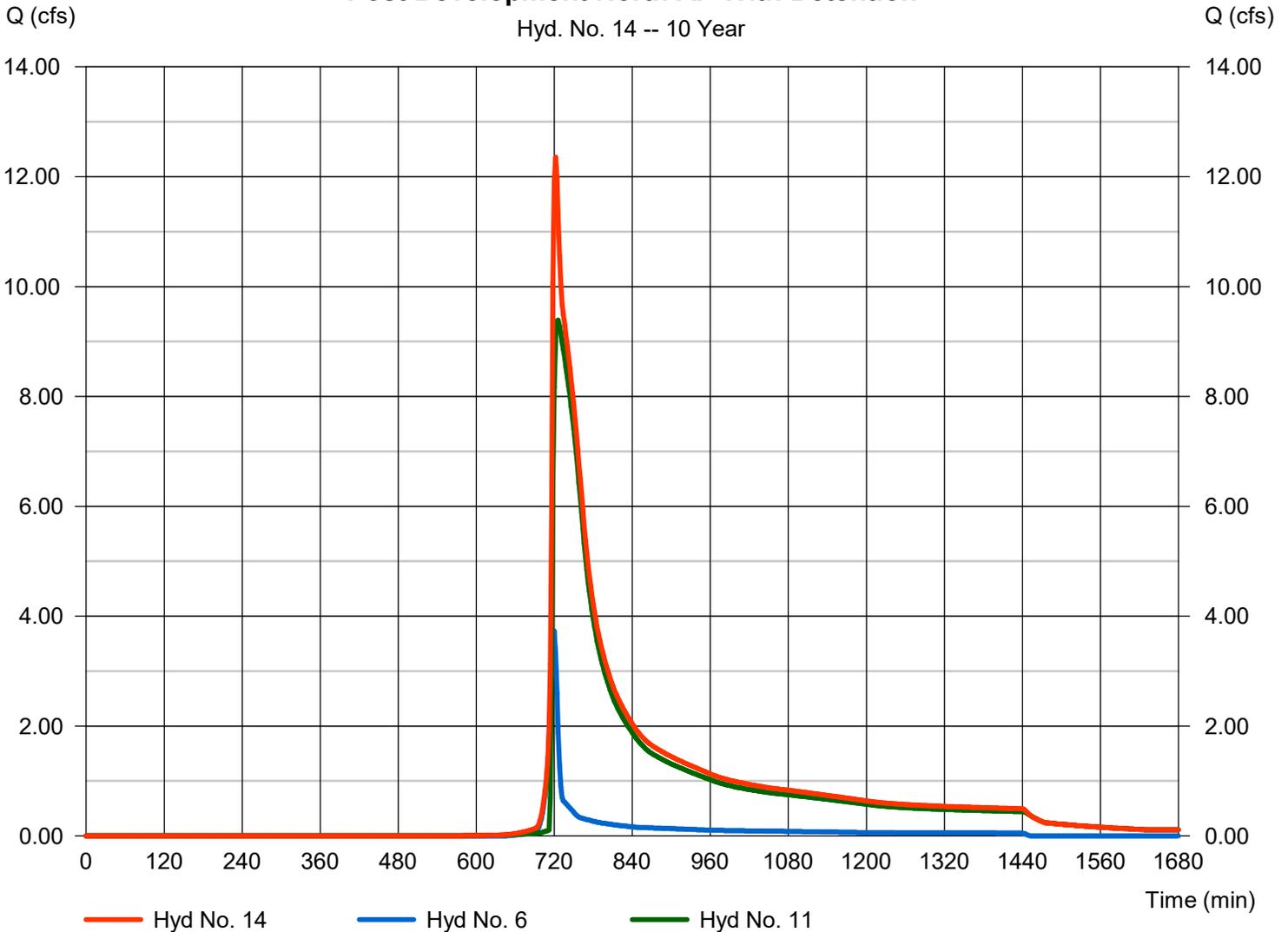
## Hyd. No. 14

Post Development North AP With Detention

Hydrograph type	= Combine	Peak discharge	= 12.36 cfs
Storm frequency	= 10 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 91,727 cuft
Inflow hyds.	= 6, 11	Contrib. drain. area	= 1.350 ac

Post Development North AP With Detention

Hyd. No. 14 -- 10 Year



# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

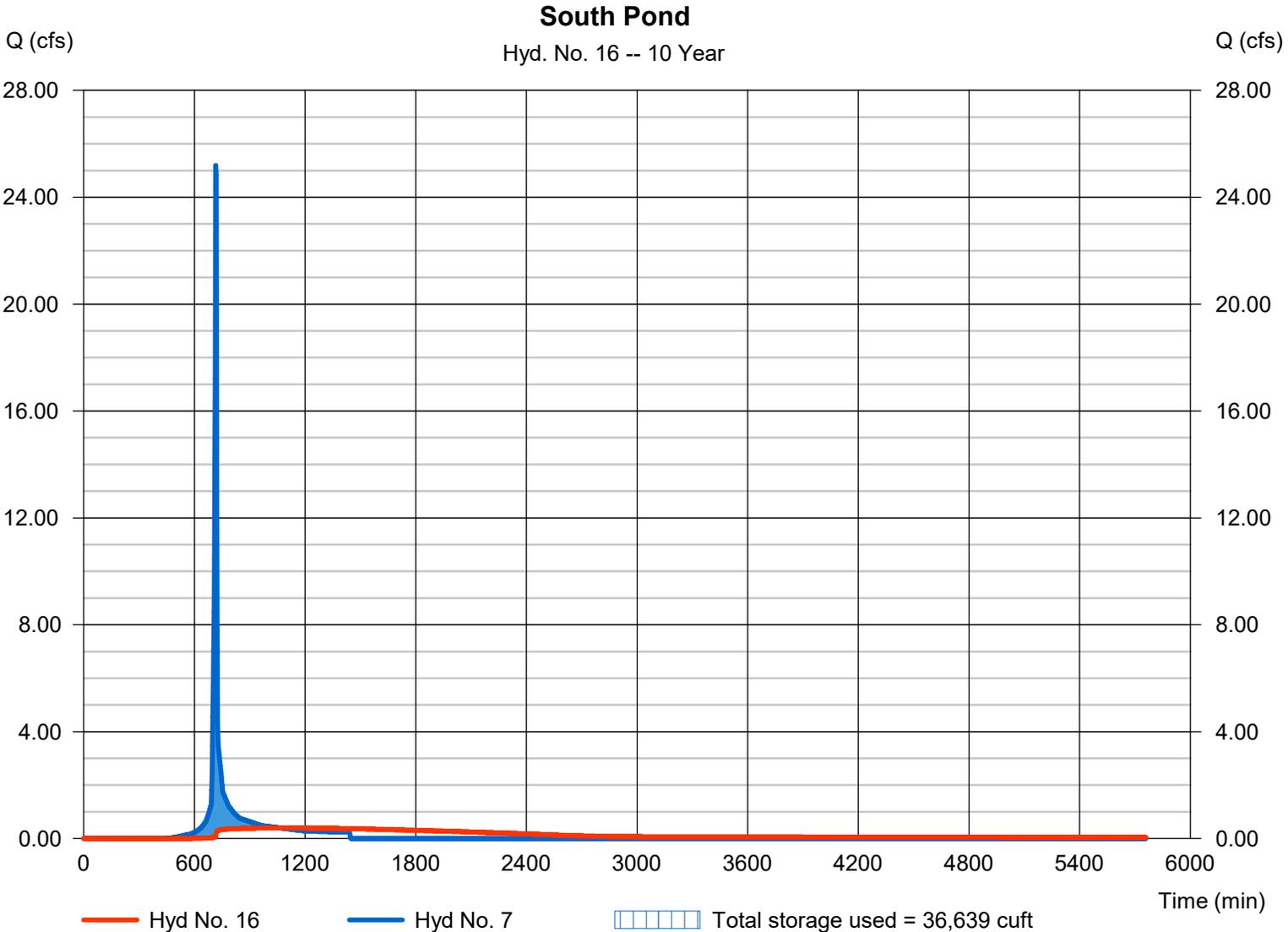
Thursday, 10 / 6 / 2022

## Hyd. No. 16

South Pond

Hydrograph type	= Reservoir	Peak discharge	= 0.393 cfs
Storm frequency	= 10 yrs	Time to peak	= 1070 min
Time interval	= 2 min	Hyd. volume	= 45,426 cuft
Inflow hyd. No.	= 7 - Post Development to South Pond	Peak Elevation	= 542.92 ft
Reservoir name	= South Pond	Max. Storage	= 36,639 cuft

Storage Indication method used.



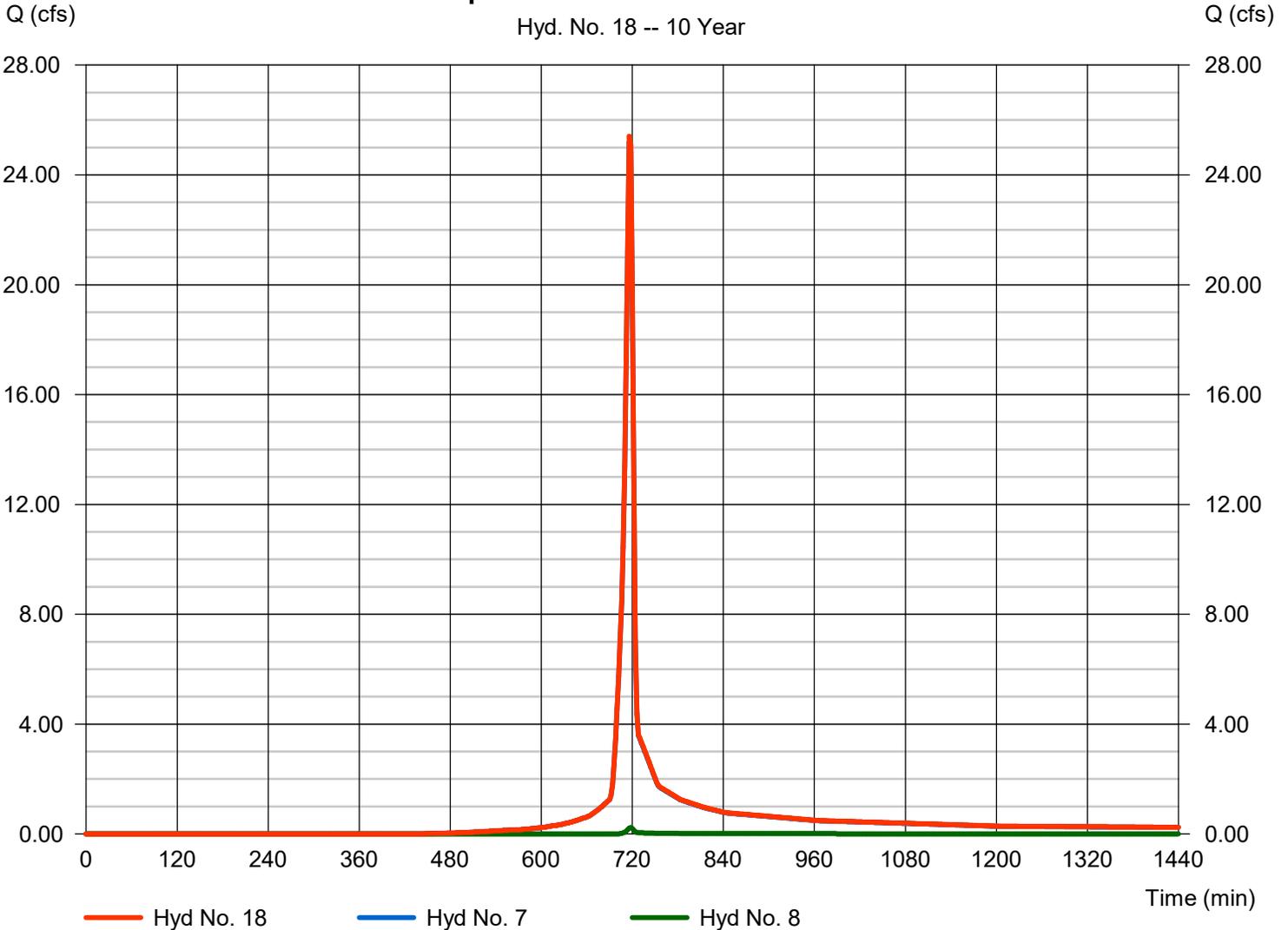
# Hydrograph Report

## Hyd. No. 18

Post Development South AP 1-Year No Detention

Hydrograph type	= Combine	Peak discharge	= 25.41 cfs
Storm frequency	= 10 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 51,676 cuft
Inflow hyds.	= 7, 8	Contrib. drain. area	= 5.270 ac

Post Development South AP 1-Year No Detention



# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

Thursday, 10 / 6 / 2022

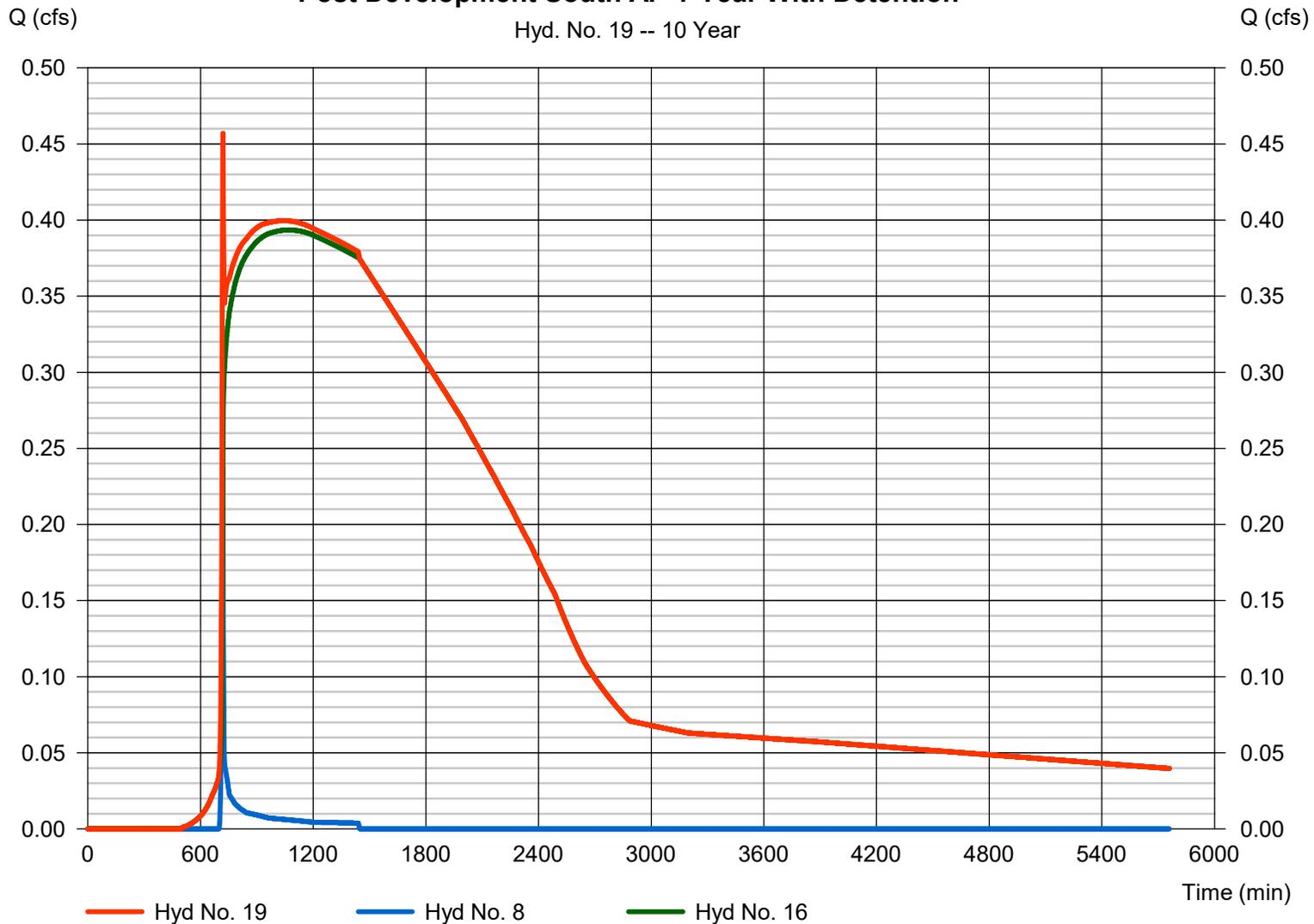
## Hyd. No. 19

Post Development South AP 1-Year With Detention

Hydrograph type	= Combine	Peak discharge	= 0.457 cfs
Storm frequency	= 10 yrs	Time to peak	= 720 min
Time interval	= 2 min	Hyd. volume	= 45,929 cuft
Inflow hyds.	= 8, 16	Contrib. drain. area	= 0.140 ac

Post Development South AP 1-Year With Detention

Hyd. No. 19 -- 10 Year

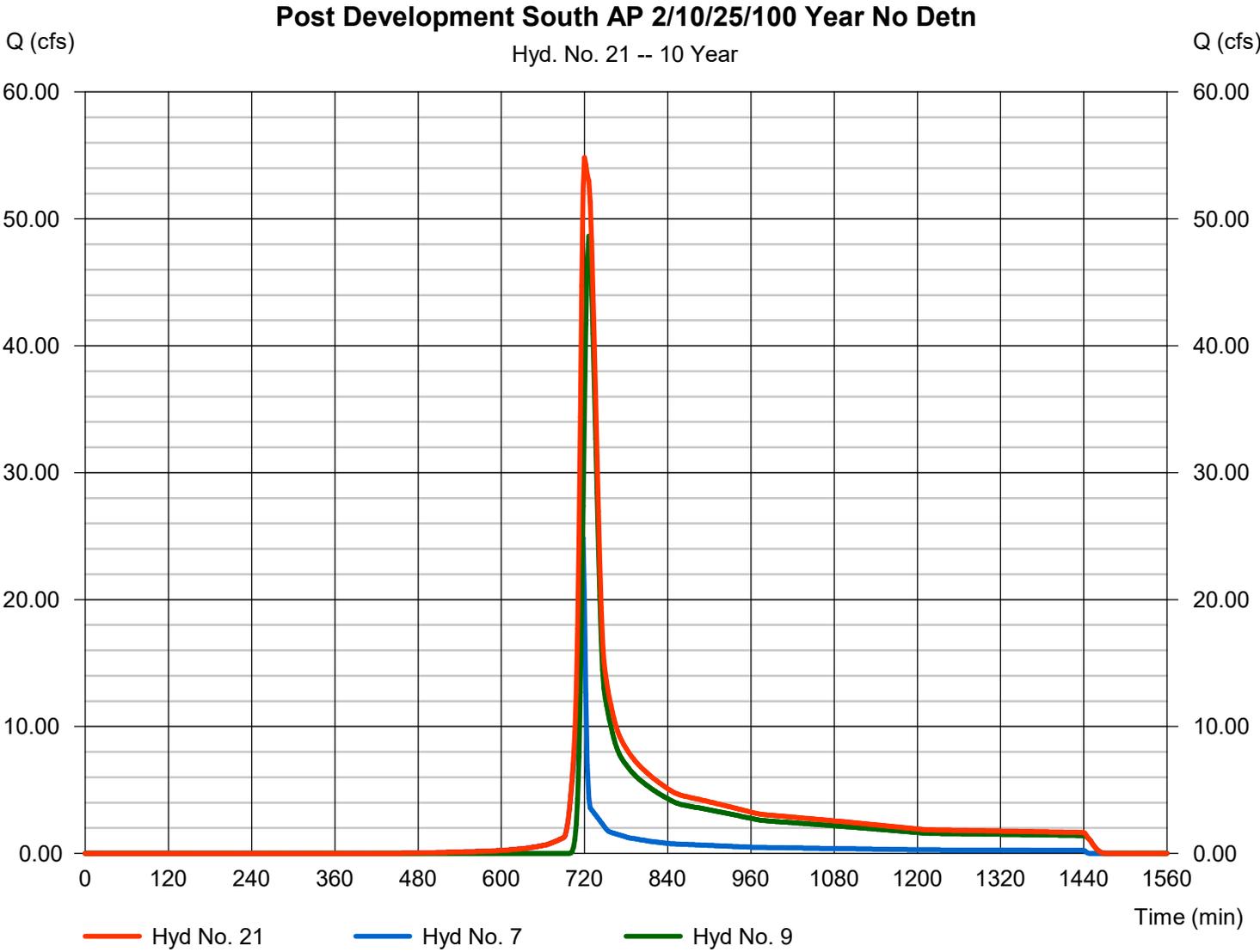


# Hydrograph Report

## Hyd. No. 21

Post Development South AP 2/10/25/100 Year No Detn

Hydrograph type	= Combine	Peak discharge	= 54.84 cfs
Storm frequency	= 10 yrs	Time to peak	= 720 min
Time interval	= 2 min	Hyd. volume	= 234,560 cuft
Inflow hyds.	= 7, 9	Contrib. drain. area	= 52.990 ac



# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

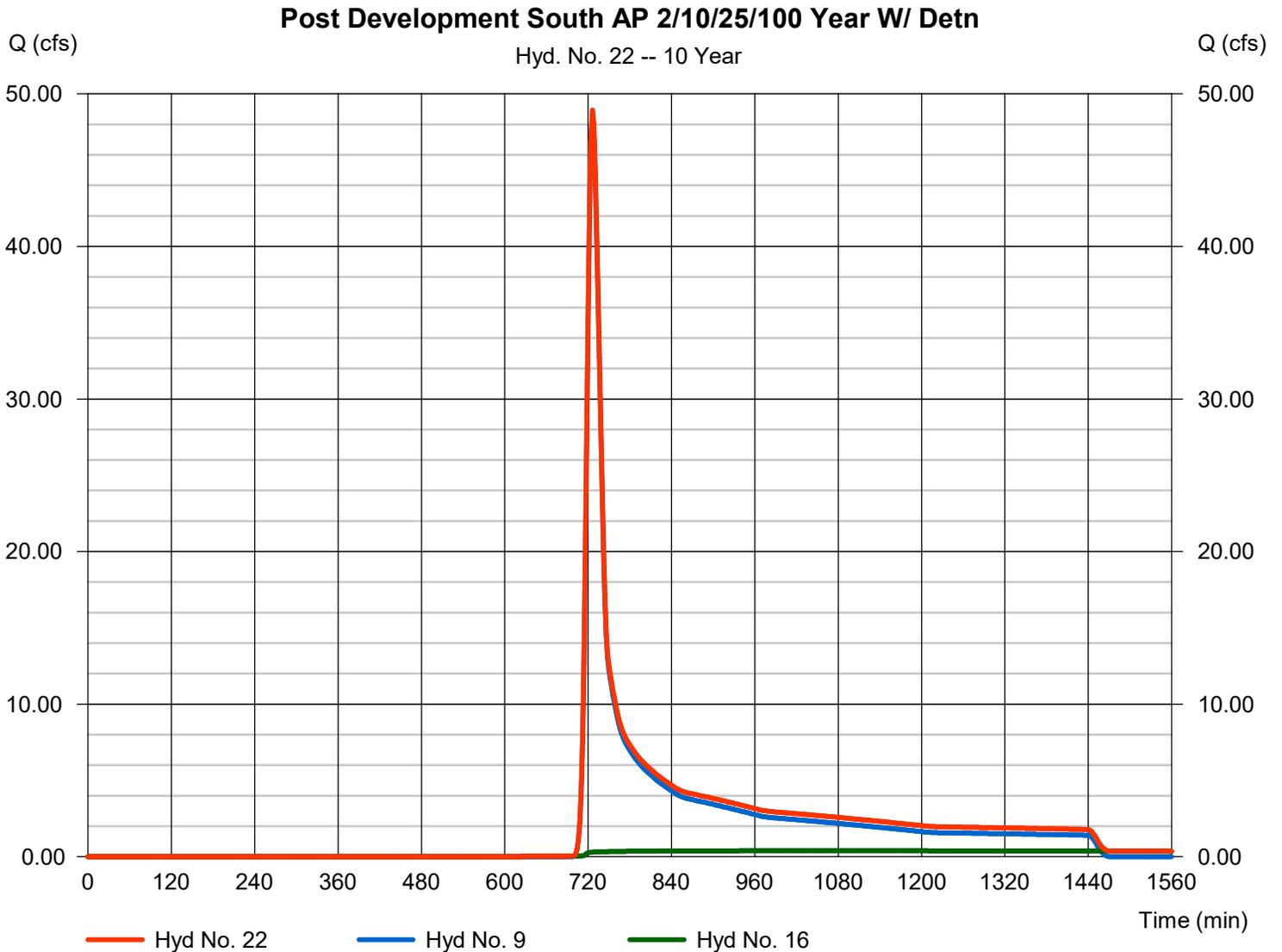
Thursday, 10 / 6 / 2022

## Hyd. No. 22

Post Development South AP 2/10/25/100 Year W/ Detn

Hydrograph type = Combine  
Storm frequency = 10 yrs  
Time interval = 2 min  
Inflow hyds. = 9, 16

Peak discharge = 48.94 cfs  
Time to peak = 726 min  
Hyd. volume = 228,812 cuft  
Contrib. drain. area = 47.860 ac



# Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

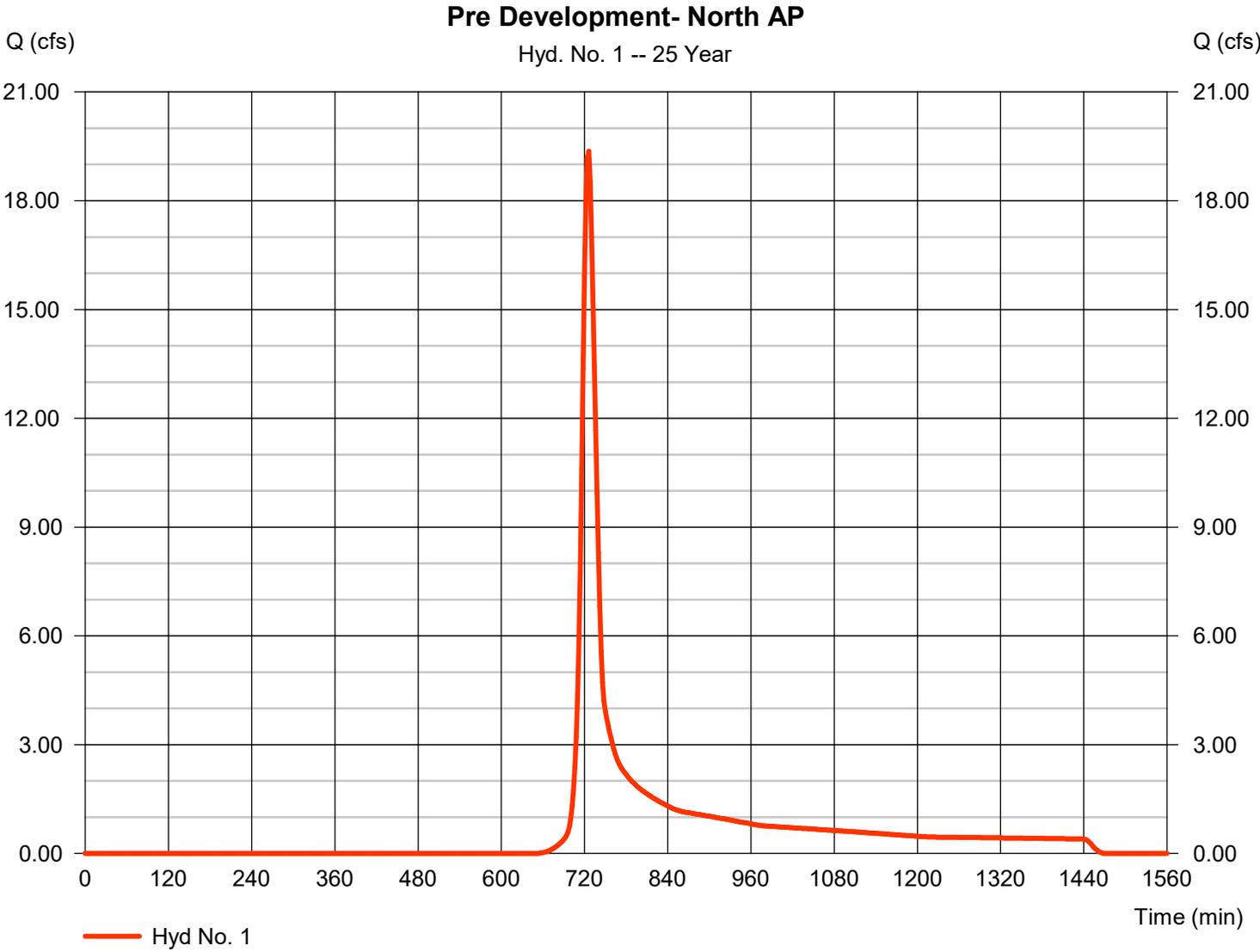
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	19.37	2	726	63,702	-----	-----	-----	Pre Development- North AP
2	SCS Runoff	3.660	2	726	12,517	-----	-----	-----	Pre Development - South AP (1-Year)
3	SCS Runoff	81.71	2	728	316,973	-----	-----	-----	Pre Development - South AP (2/10/2
5	SCS Runoff	54.69	2	716	110,878	-----	-----	-----	Post Development to North Pond
6	SCS Runoff	5.172	2	720	11,844	-----	-----	-----	Post Development - North AP Bypass
7	SCS Runoff	32.06	2	716	65,644	-----	-----	-----	Post Development to South Pond
8	SCS Runoff	0.367	2	718	748	-----	-----	-----	Post Development - South AP Bypass
9	SCS Runoff	78.67	2	726	272,720	-----	-----	-----	Post Dev - South AP Bypass (2/10/25
11	Reservoir	12.81	2	724	109,112	5	538.98	48,072	North Pond
13	Combine	59.18	2	718	122,722	5, 6,	-----	-----	Post Development North AP - No Det
14	Combine	17.08	2	722	120,956	6, 11,	-----	-----	Post Development North AP With Det
16	Reservoir	0.469	2	1084	58,789	7	543.65	47,934	South Pond
18	Combine	32.41	2	716	66,392	7, 8,	-----	-----	Post Development South AP 1-Year
19	Combine	0.672	2	718	59,537	8, 16,	-----	-----	Post Development South AP 1-Year
21	Combine	86.29	2	722	338,364	7, 9,	-----	-----	Post Development South AP 2/10/25/
22	Combine	79.05	2	726	331,510	9, 16,	-----	-----	Post Development South AP 2/10/25/
Homestead Rd Peak Flow-CZP.gpw					Return Period: 25 Year			Thursday, 10 / 6 / 2022	

# Hydrograph Report

## Hyd. No. 1

Pre Development- North AP

Hydrograph type	= SCS Runoff	Peak discharge	= 19.37 cfs
Storm frequency	= 25 yrs	Time to peak	= 726 min
Time interval	= 2 min	Hyd. volume	= 63,702 cuft
Drainage area	= 8.860 ac	Curve number	= 60
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 20.00 min
Total precip.	= 6.09 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

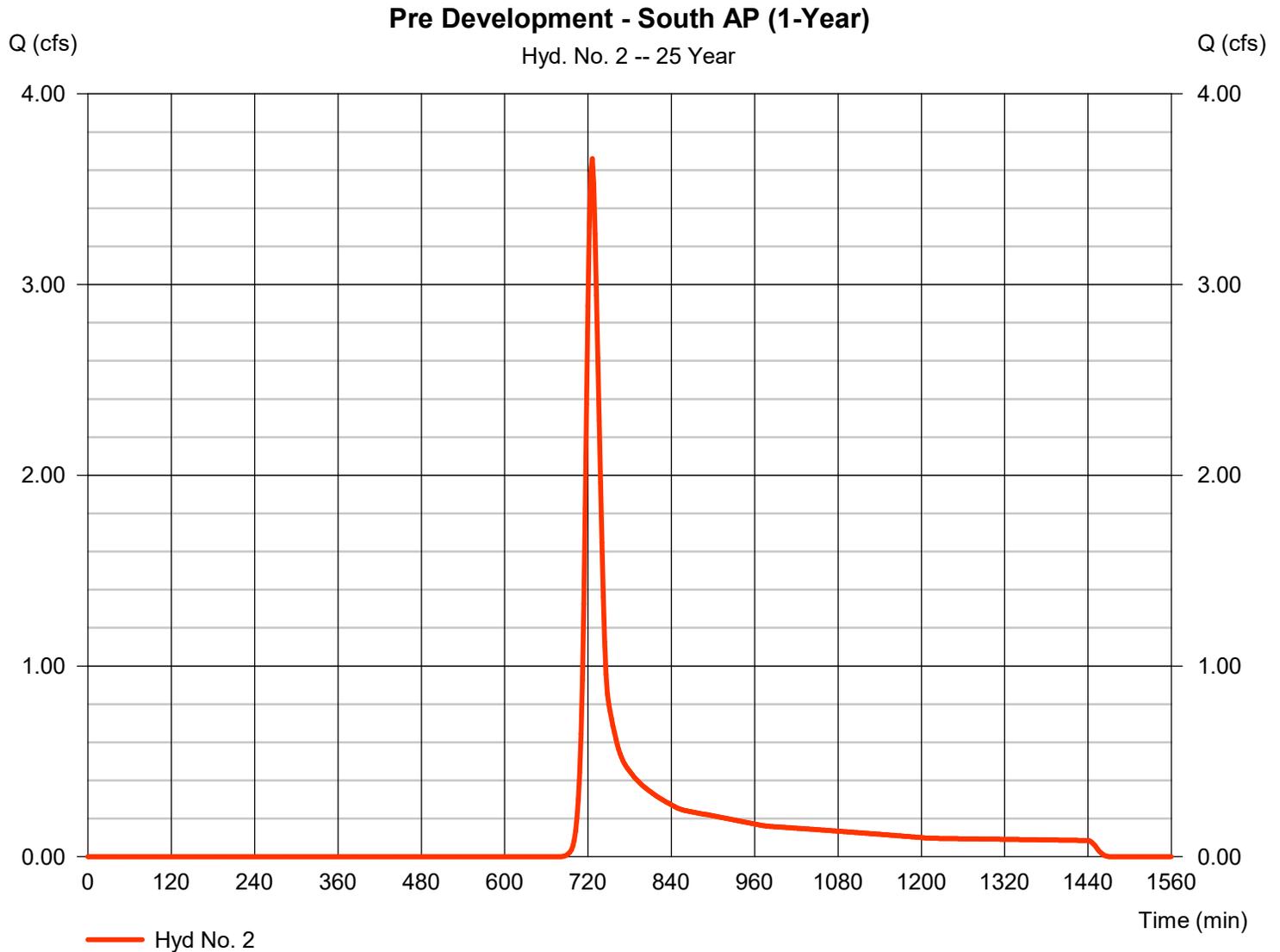


# Hydrograph Report

## Hyd. No. 2

Pre Development - South AP (1-Year)

Hydrograph type	= SCS Runoff	Peak discharge	= 3.660 cfs
Storm frequency	= 25 yrs	Time to peak	= 726 min
Time interval	= 2 min	Hyd. volume	= 12,517 cuft
Drainage area	= 2.090 ac	Curve number	= 56
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 17.30 min
Total precip.	= 6.09 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



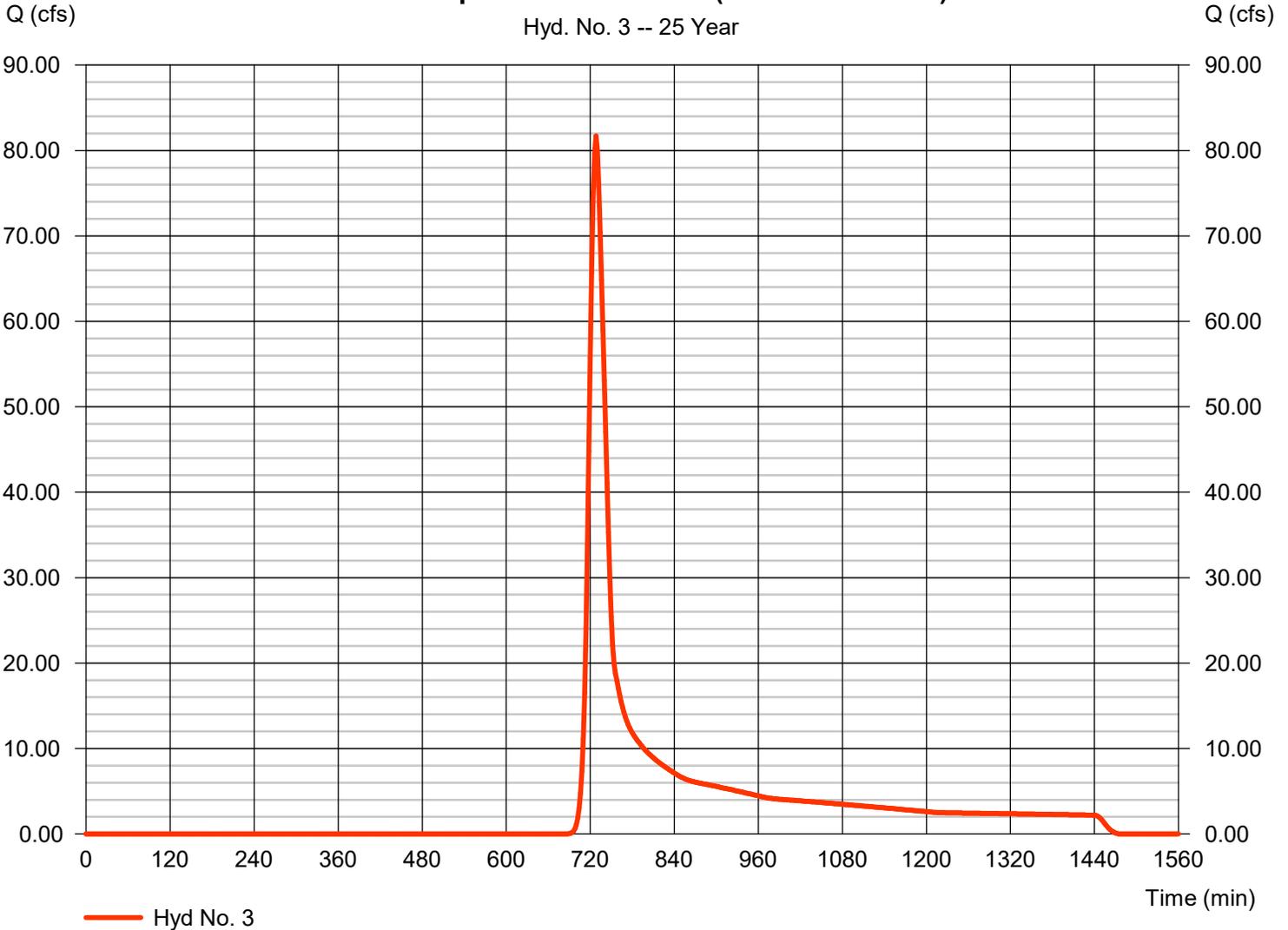
# Hydrograph Report

## Hyd. No. 3

Pre Development - South AP (2/10/25/100-Year)

Hydrograph type	= SCS Runoff	Peak discharge	= 81.71 cfs
Storm frequency	= 25 yrs	Time to peak	= 728 min
Time interval	= 2 min	Hyd. volume	= 316,973 cuft
Drainage area	= 54.650 ac	Curve number	= 55
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 22.60 min
Total precip.	= 6.09 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Pre Development - South AP (2/10/25/100-Year)



# Hydrograph Report

## Hyd. No. 5

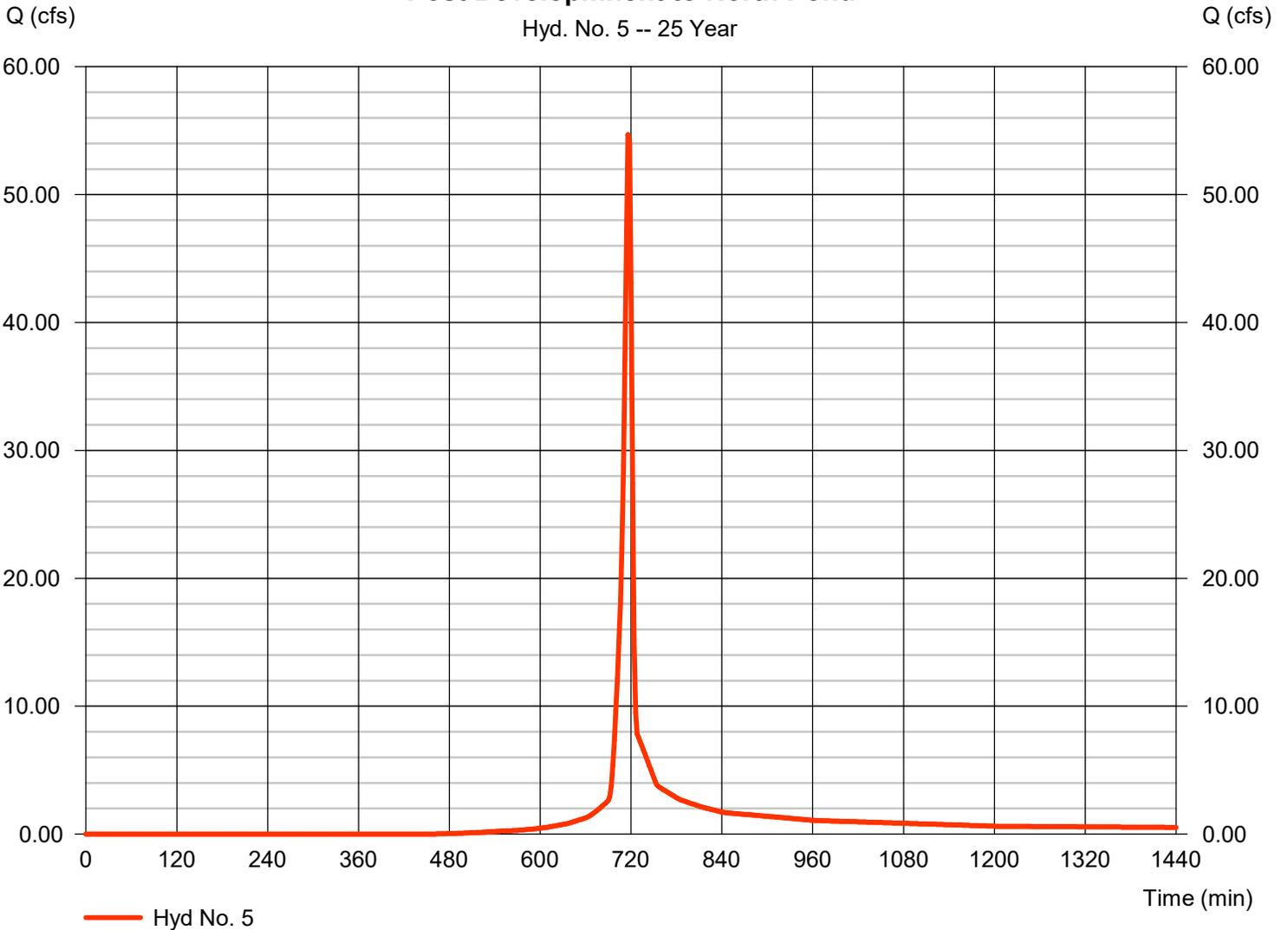
Post Development to North Pond

Hydrograph type = SCS Runoff  
Storm frequency = 25 yrs  
Time interval = 2 min  
Drainage area = 9.700 ac  
Basin Slope = 0.0 %  
Tc method = User  
Total precip. = 6.09 in  
Storm duration = 24 hrs

Peak discharge = 54.69 cfs  
Time to peak = 716 min  
Hyd. volume = 110,878 cuft  
Curve number = 75  
Hydraulic length = 0 ft  
Time of conc. (Tc) = 5.00 min  
Distribution = Type II  
Shape factor = 484

Post Development to North Pond

Hyd. No. 5 -- 25 Year



# Hydrograph Report

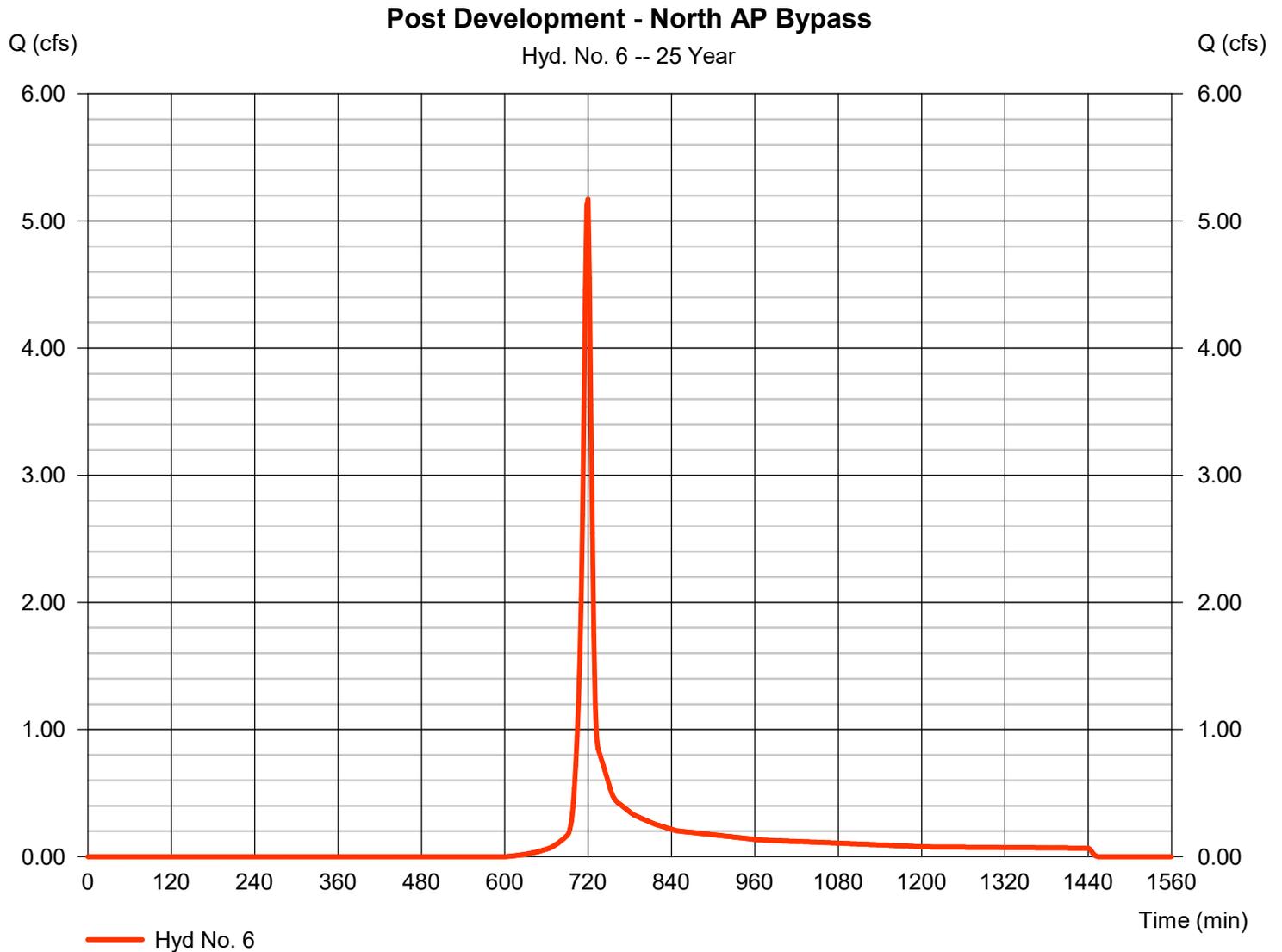
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

Thursday, 10 / 6 / 2022

## Hyd. No. 6

Post Development - North AP Bypass

Hydrograph type	= SCS Runoff	Peak discharge	= 5.172 cfs
Storm frequency	= 25 yrs	Time to peak	= 720 min
Time interval	= 2 min	Hyd. volume	= 11,844 cuft
Drainage area	= 1.350 ac	Curve number	= 65
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 9.20 min
Total precip.	= 6.09 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

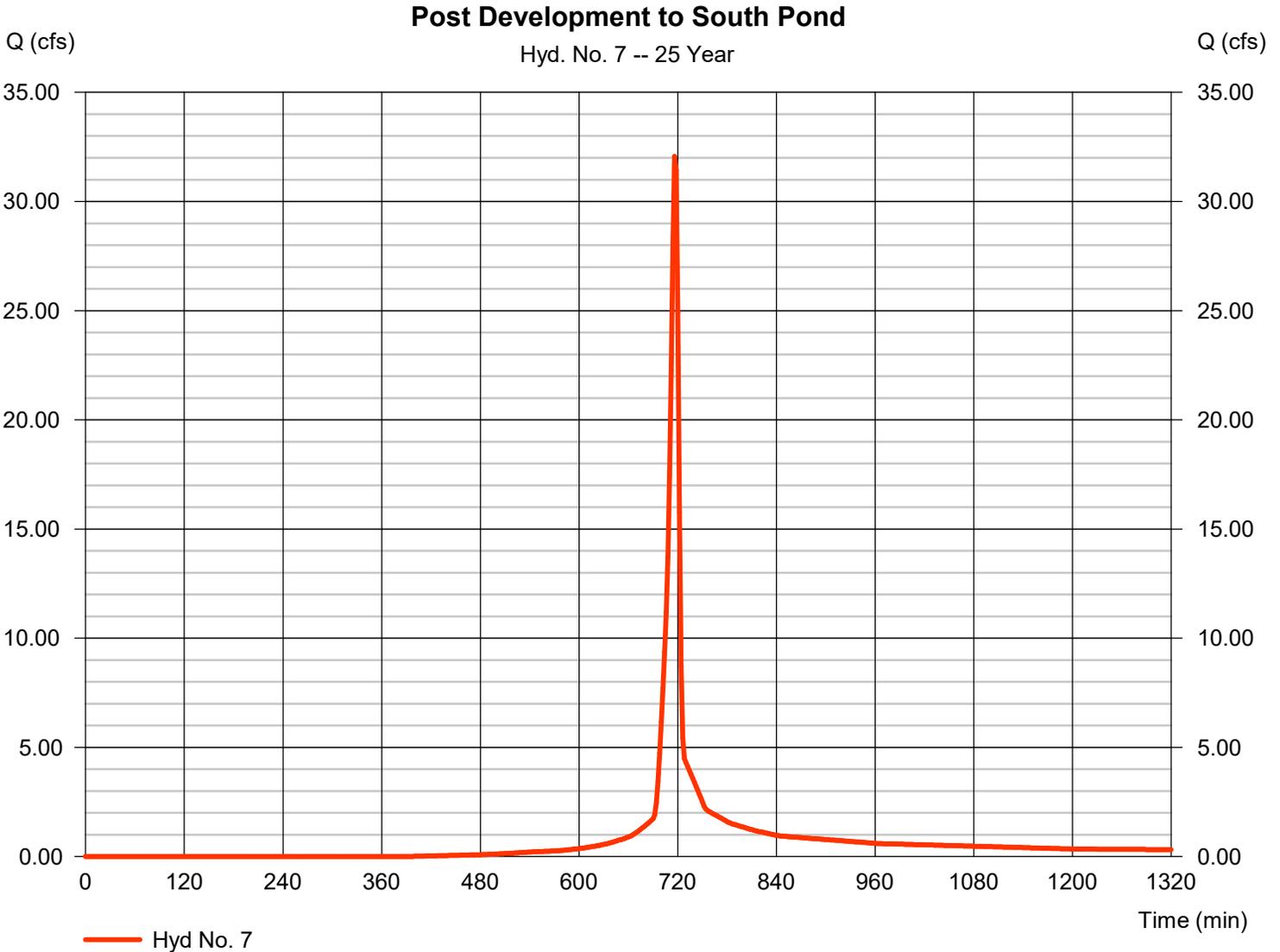


# Hydrograph Report

## Hyd. No. 7

Post Development to South Pond

Hydrograph type	= SCS Runoff	Peak discharge	= 32.06 cfs
Storm frequency	= 25 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 65,644 cuft
Drainage area	= 5.130 ac	Curve number	= 79
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 6.09 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



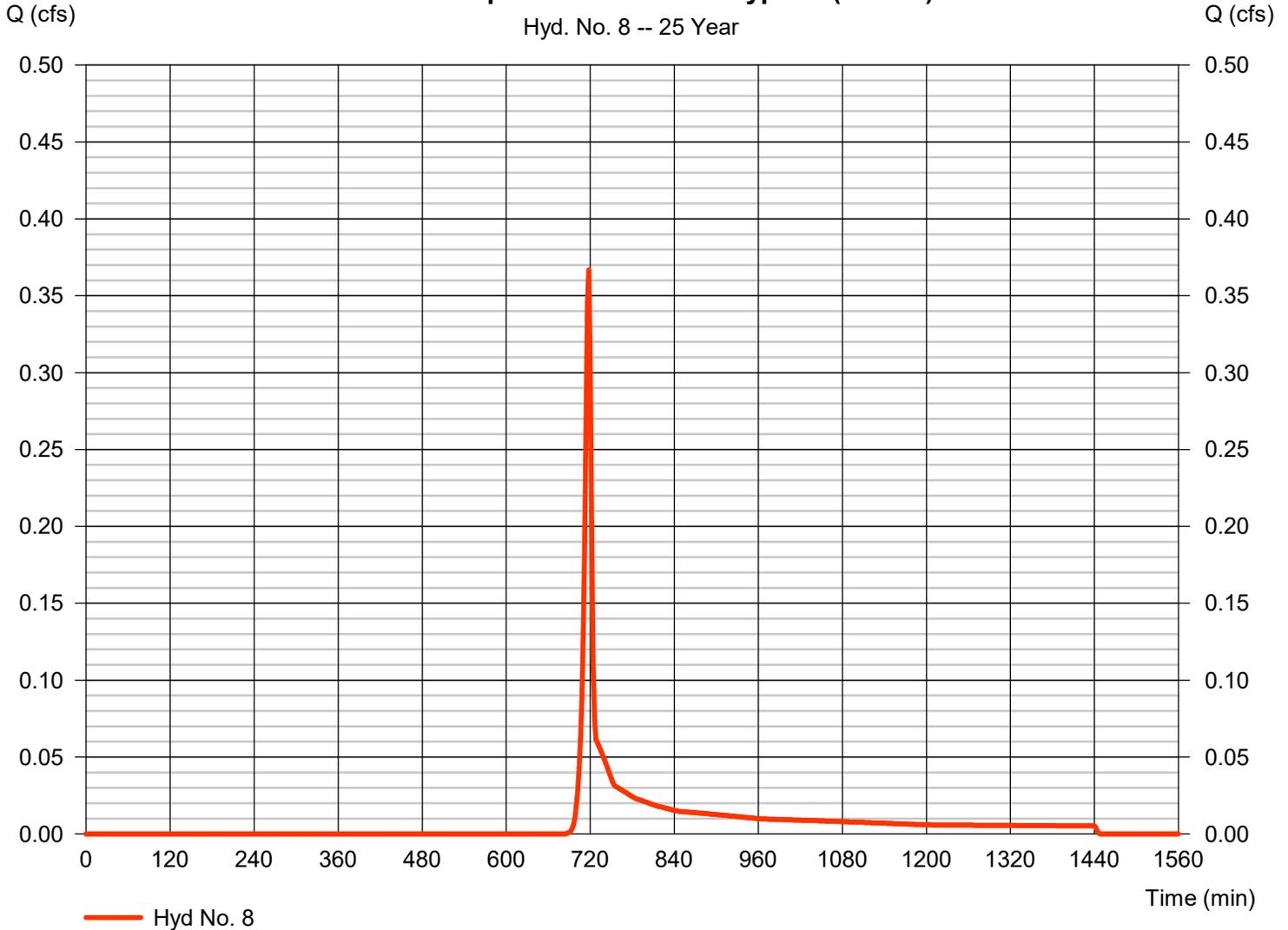
# Hydrograph Report

## Hyd. No. 8

Post Development - South AP Bypass (1-Year)

Hydrograph type	= SCS Runoff	Peak discharge	= 0.367 cfs
Storm frequency	= 25 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 748 cuft
Drainage area	= 0.140 ac	Curve number	= 55
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 6.09 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Post Development - South AP Bypass (1-Year)



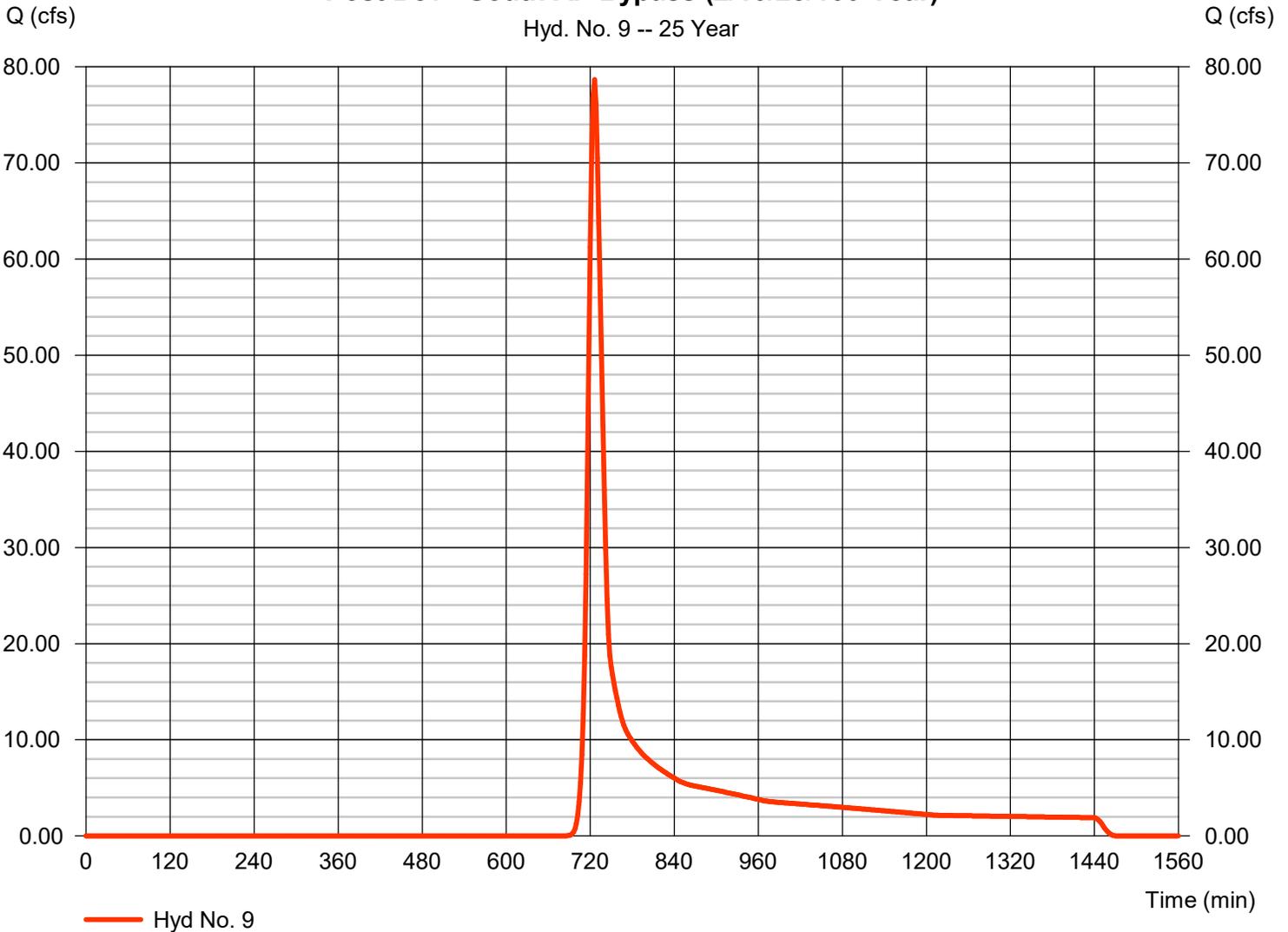
# Hydrograph Report

## Hyd. No. 9

Post Dev - South AP Bypass (2/10/25/100-Year)

Hydrograph type	= SCS Runoff	Peak discharge	= 78.67 cfs
Storm frequency	= 25 yrs	Time to peak	= 726 min
Time interval	= 2 min	Hyd. volume	= 272,720 cuft
Drainage area	= 47.860 ac	Curve number	= 55
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 18.20 min
Total precip.	= 6.09 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Post Dev - South AP Bypass (2/10/25/100-Year)



# Hydrograph Report

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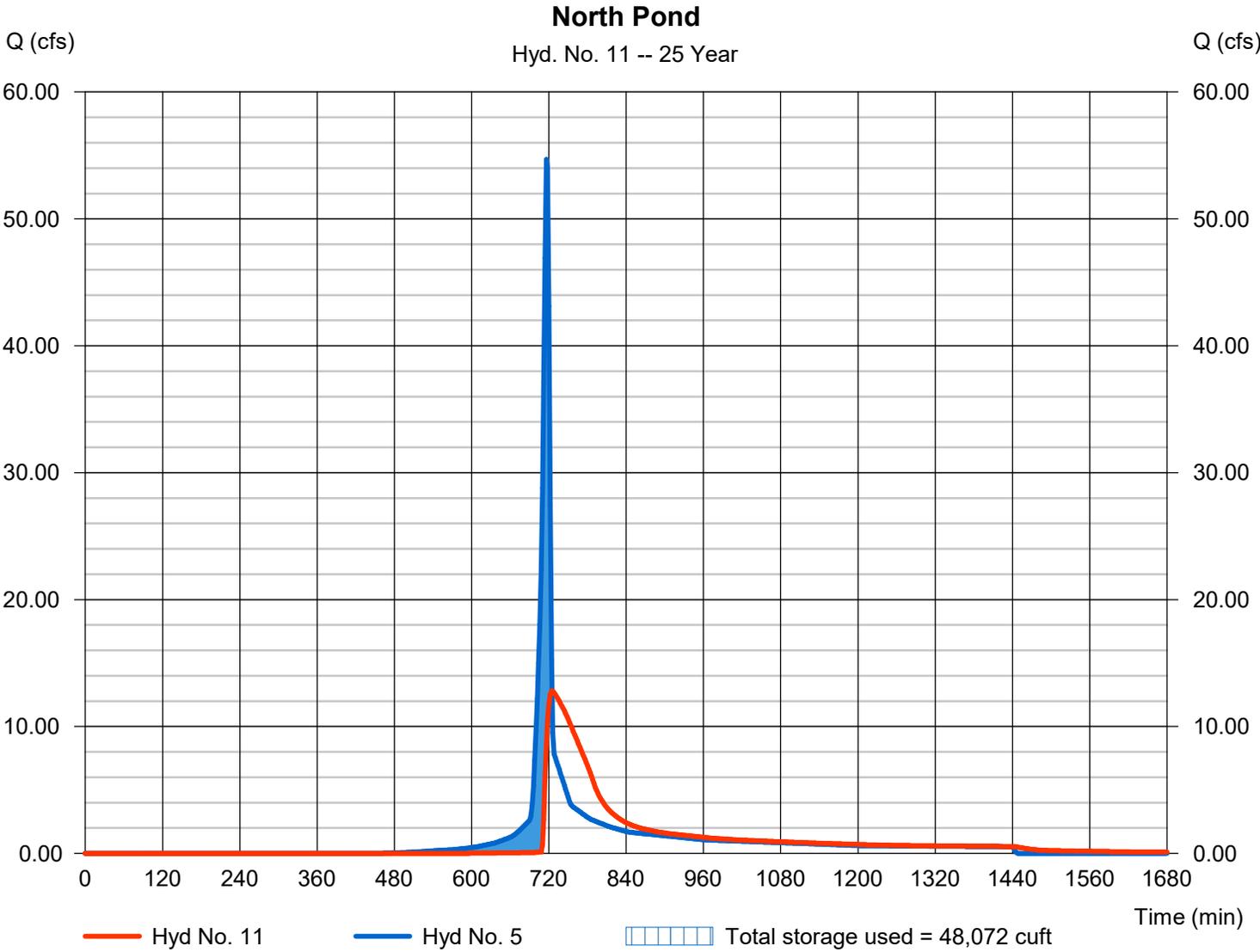
Thursday, 10 / 6 / 2022

## Hyd. No. 11

North Pond

Hydrograph type	= Reservoir	Peak discharge	= 12.81 cfs
Storm frequency	= 25 yrs	Time to peak	= 724 min
Time interval	= 2 min	Hyd. volume	= 109,112 cuft
Inflow hyd. No.	= 5 - Post Development to North Pond	Mean Elevation	= 538.98 ft
Reservoir name	= North Pond	Max. Storage	= 48,072 cuft

Storage Indication method used.



# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

Thursday, 10 / 6 / 2022

## Hyd. No. 13

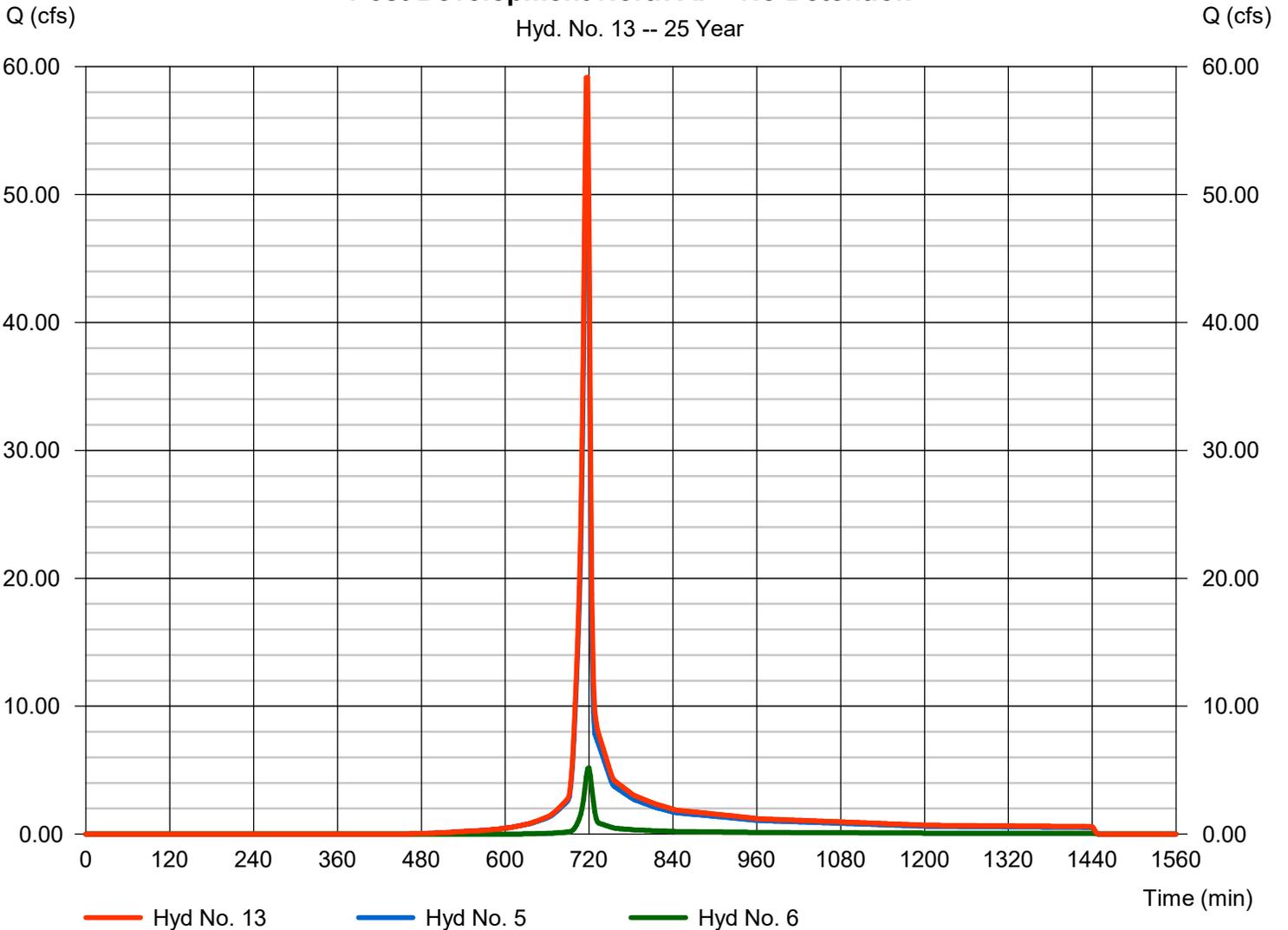
Post Development North AP - No Detention

Hydrograph type = Combine  
Storm frequency = 25 yrs  
Time interval = 2 min  
Inflow hyds. = 5, 6

Peak discharge = 59.18 cfs  
Time to peak = 718 min  
Hyd. volume = 122,722 cuft  
Contrib. drain. area = 11.050 ac

### Post Development North AP - No Detention

Hyd. No. 13 -- 25 Year



# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

Thursday, 10 / 6 / 2022

## Hyd. No. 14

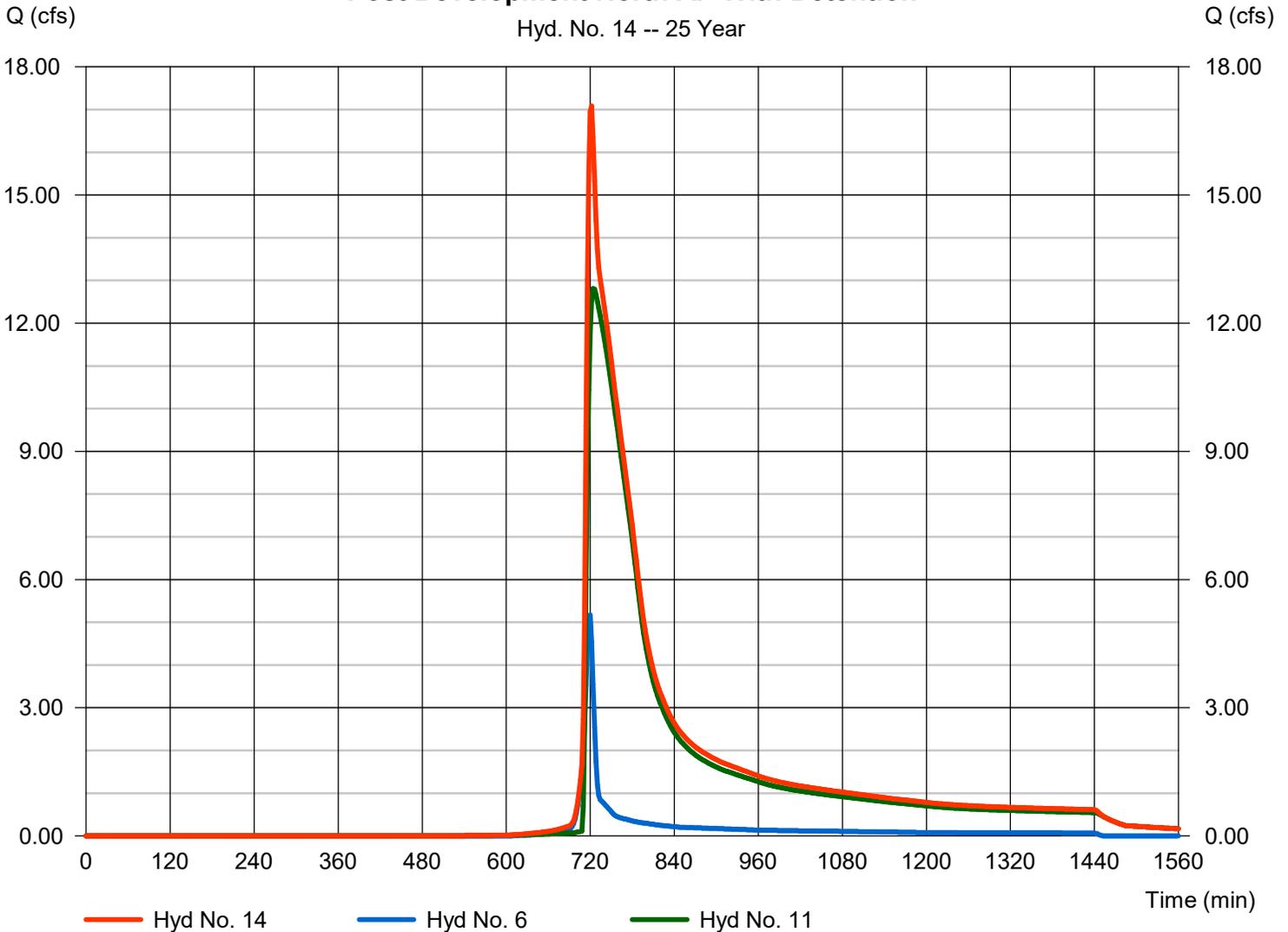
Post Development North AP With Detention

Hydrograph type = Combine  
Storm frequency = 25 yrs  
Time interval = 2 min  
Inflow hyds. = 6, 11

Peak discharge = 17.08 cfs  
Time to peak = 722 min  
Hyd. volume = 120,956 cuft  
Contrib. drain. area = 1.350 ac

### Post Development North AP With Detention

Hyd. No. 14 -- 25 Year



# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

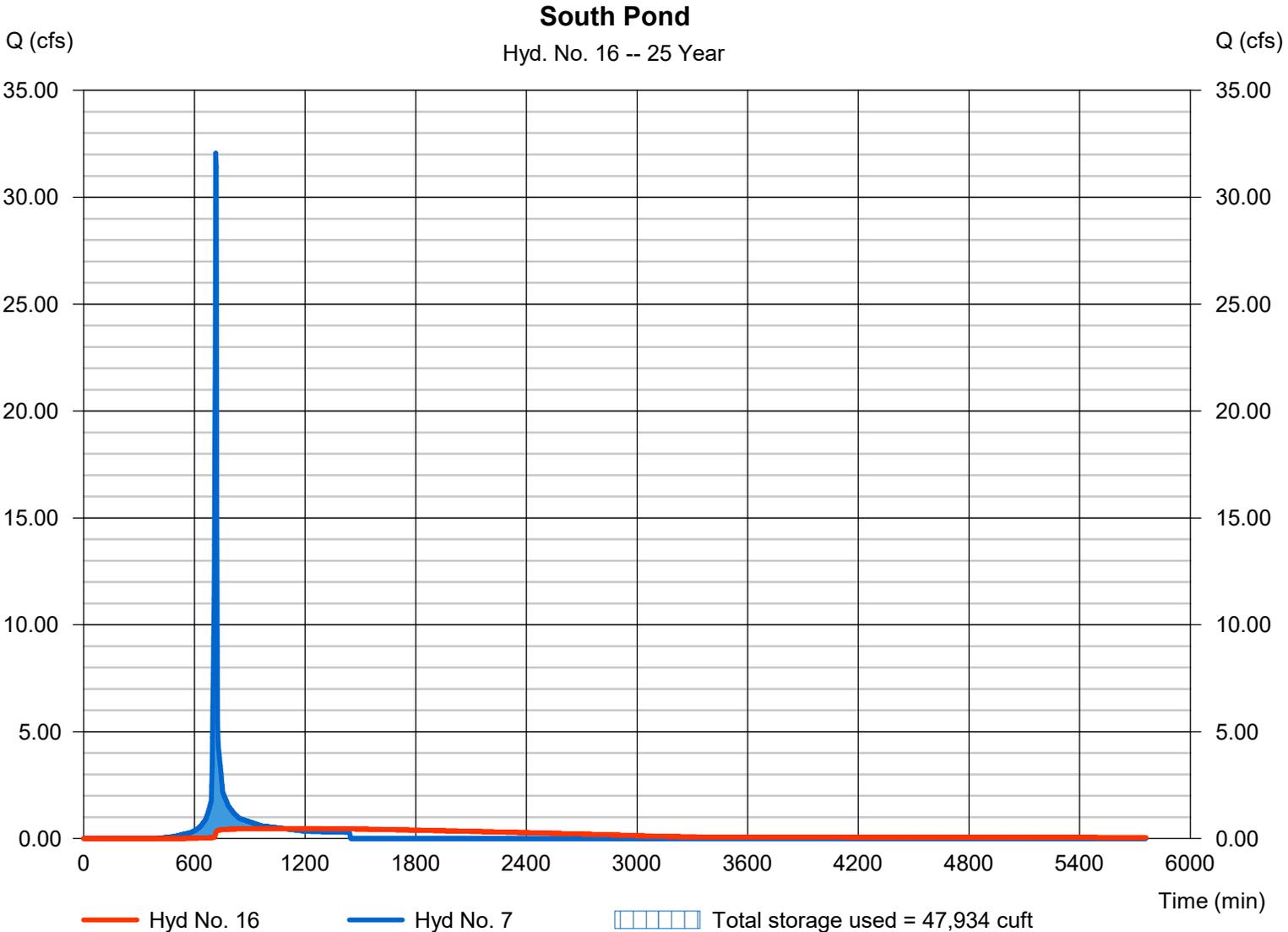
Thursday, 10 / 6 / 2022

## Hyd. No. 16

South Pond

Hydrograph type	= Reservoir	Peak discharge	= 0.469 cfs
Storm frequency	= 25 yrs	Time to peak	= 1084 min
Time interval	= 2 min	Hyd. volume	= 58,789 cuft
Inflow hyd. No.	= 7 - Post Development to South Pond	Peak Elevation	= 543.65 ft
Reservoir name	= South Pond	Max. Storage	= 47,934 cuft

Storage Indication method used.



# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

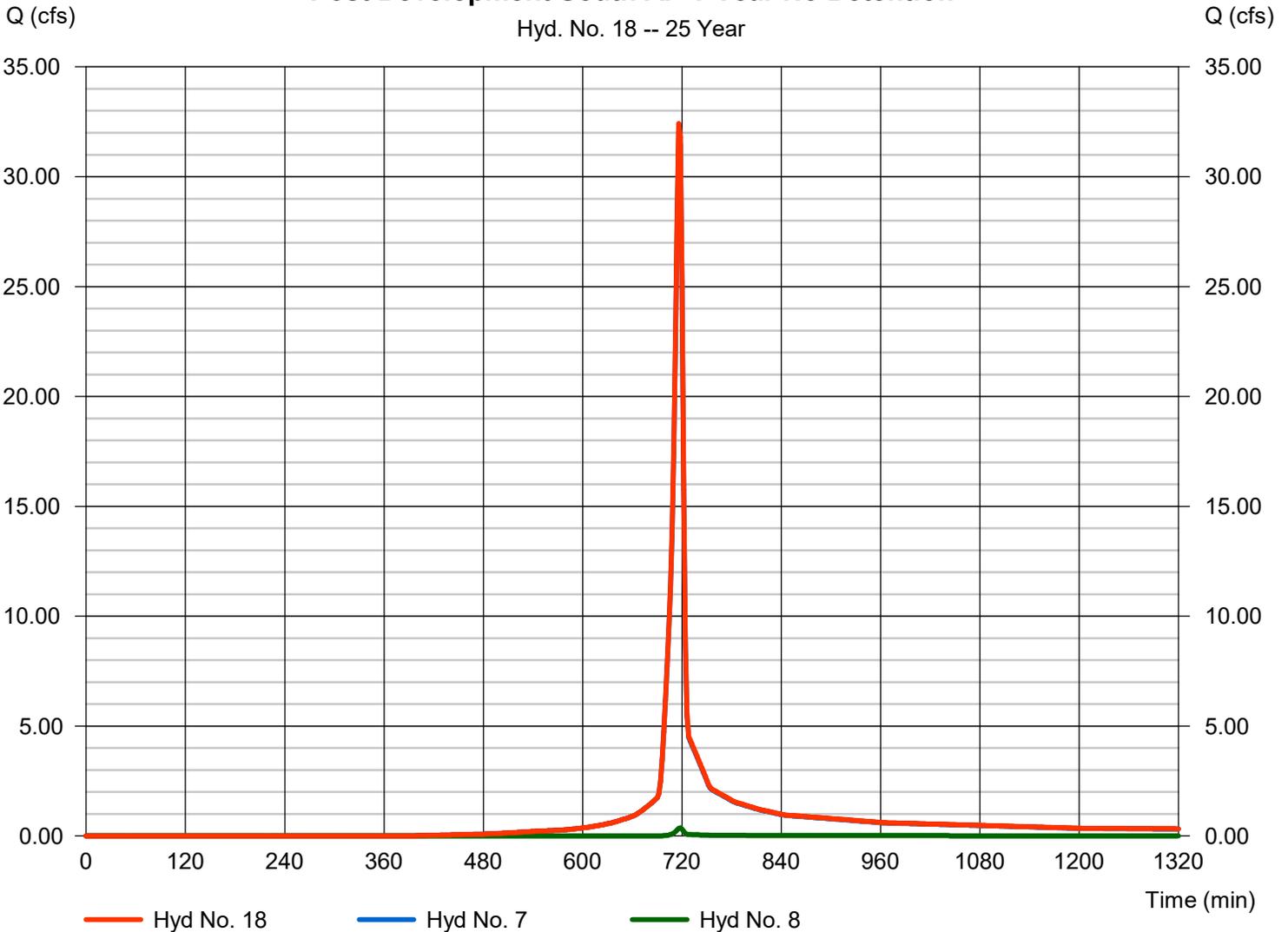
Thursday, 10 / 6 / 2022

## Hyd. No. 18

Post Development South AP 1-Year No Detention

Hydrograph type	= Combine	Peak discharge	= 32.41 cfs
Storm frequency	= 25 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 66,392 cuft
Inflow hyds.	= 7, 8	Contrib. drain. area	= 5.270 ac

Post Development South AP 1-Year No Detention



# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

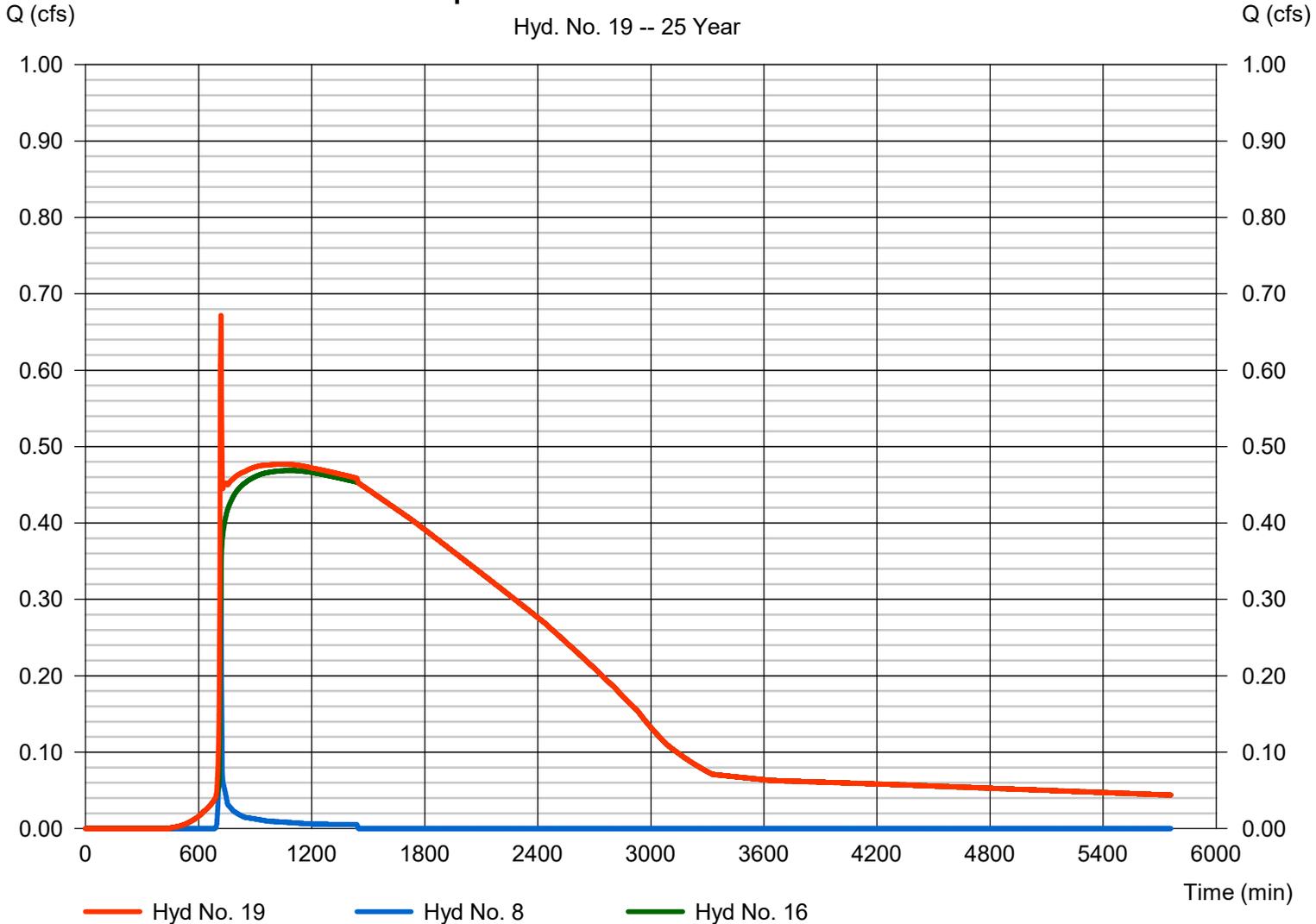
Thursday, 10 / 6 / 2022

## Hyd. No. 19

Post Development South AP 1-Year With Detention

Hydrograph type	= Combine	Peak discharge	= 0.672 cfs
Storm frequency	= 25 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 59,537 cuft
Inflow hyds.	= 8, 16	Contrib. drain. area	= 0.140 ac

Post Development South AP 1-Year With Detention



# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

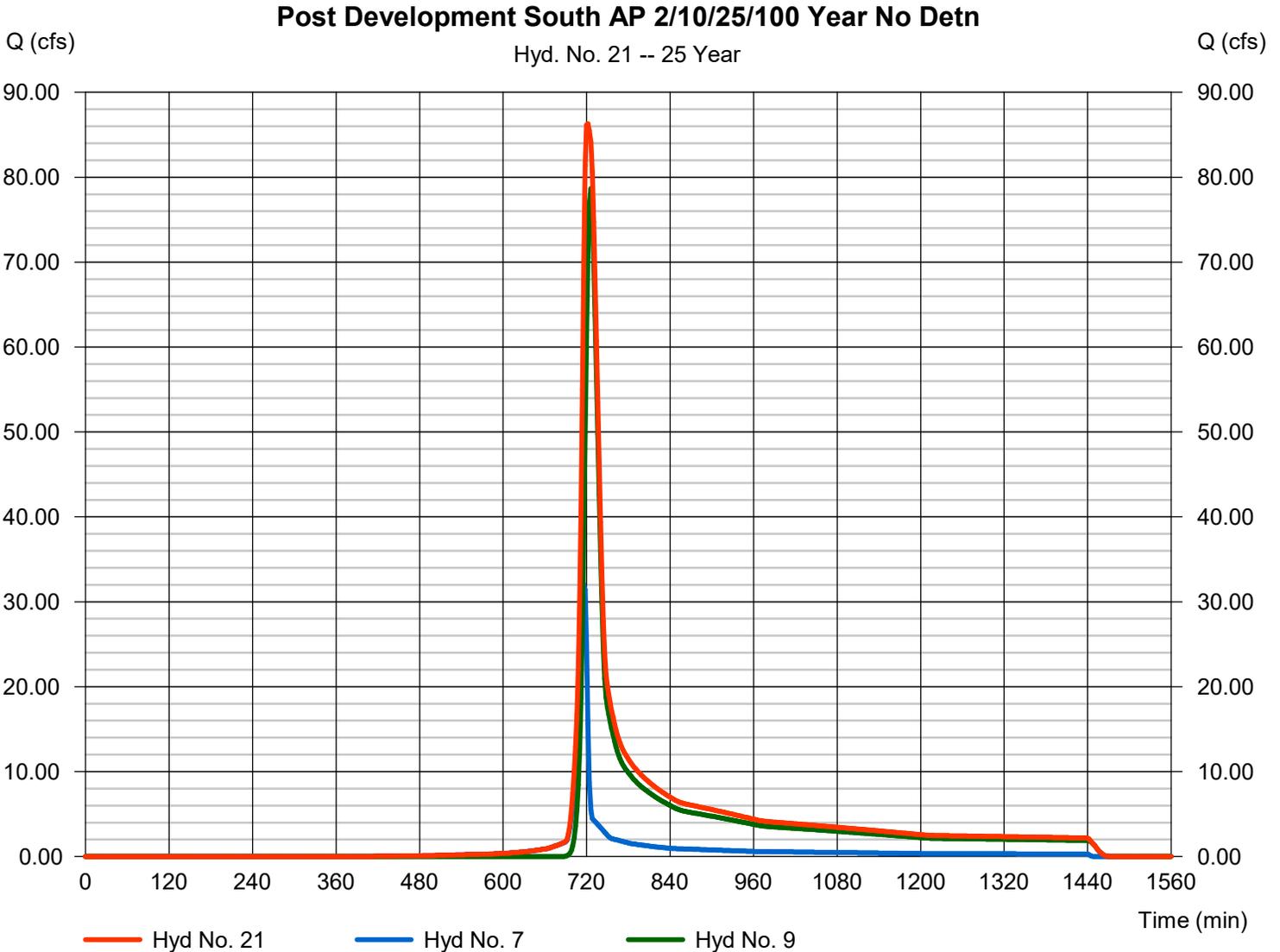
Thursday, 10 / 6 / 2022

## Hyd. No. 21

Post Development South AP 2/10/25/100 Year No Detn

Hydrograph type = Combine  
Storm frequency = 25 yrs  
Time interval = 2 min  
Inflow hyds. = 7, 9

Peak discharge = 86.29 cfs  
Time to peak = 722 min  
Hyd. volume = 338,364 cuft  
Contrib. drain. area = 52.990 ac



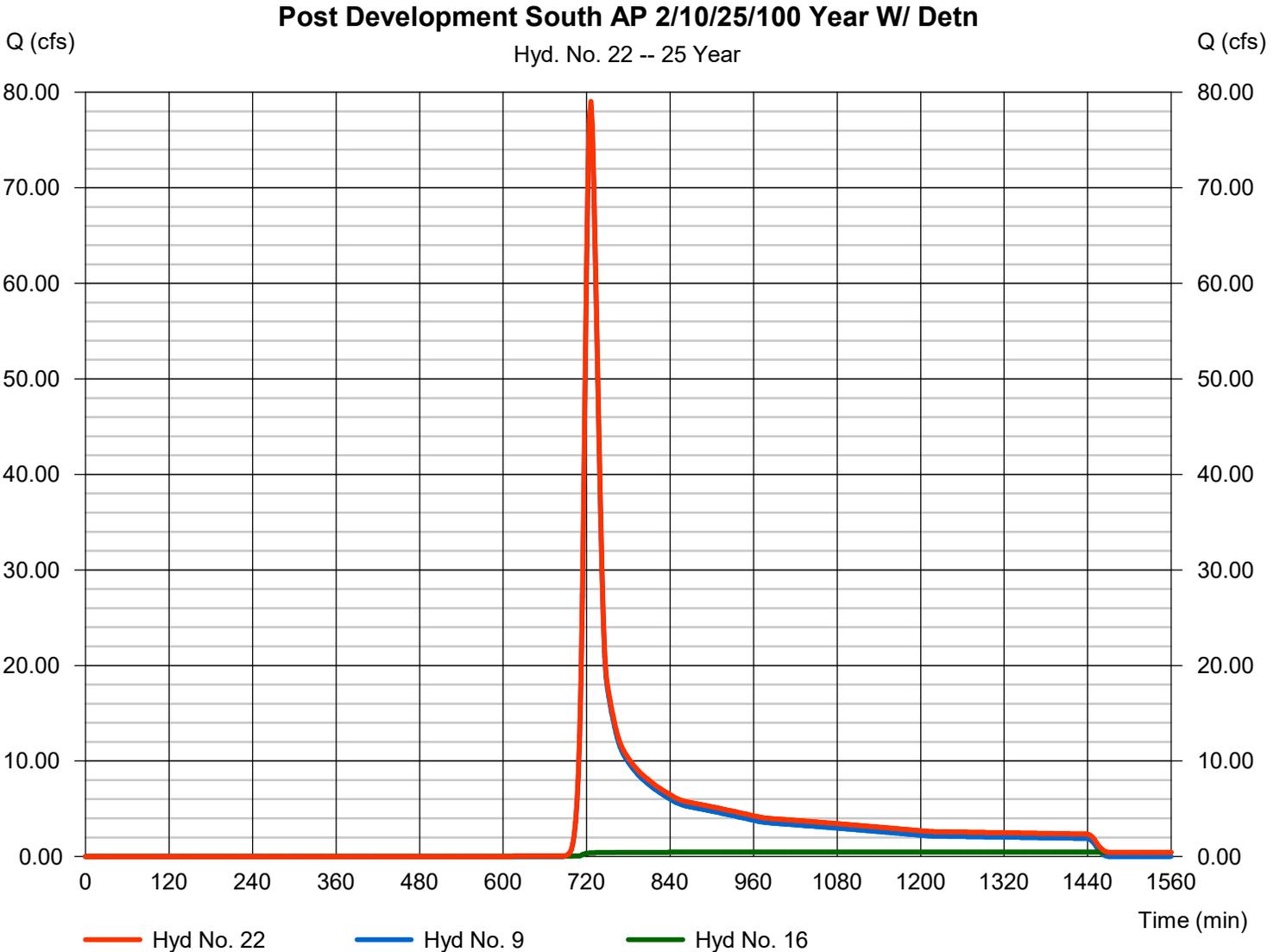
# Hydrograph Report

## Hyd. No. 22

Post Development South AP 2/10/25/100 Year W/ Detn

Hydrograph type = Combine  
Storm frequency = 25 yrs  
Time interval = 2 min  
Inflow hyds. = 9, 16

Peak discharge = 79.05 cfs  
Time to peak = 726 min  
Hyd. volume = 331,510 cuft  
Contrib. drain. area = 47.860 ac



# Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

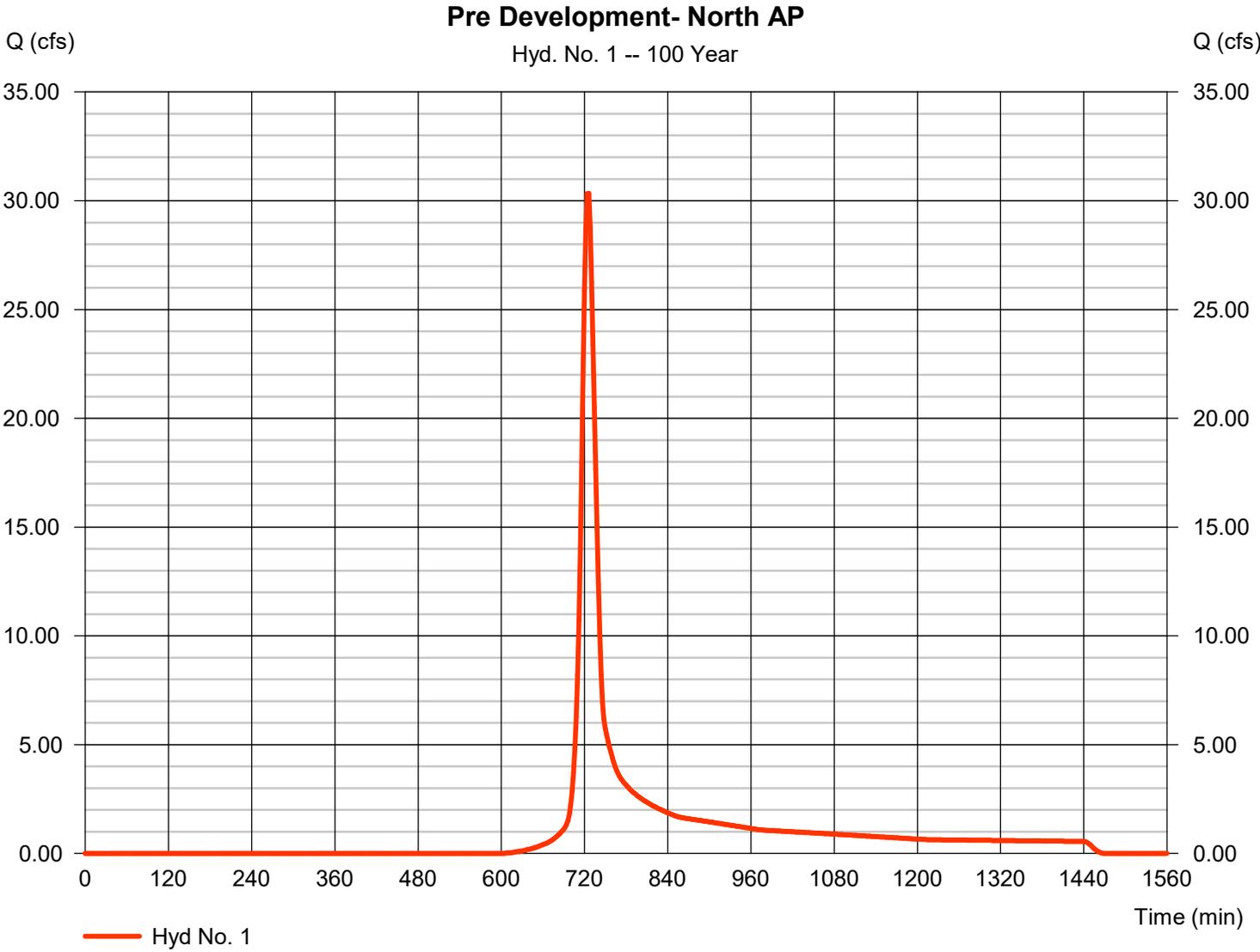
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	30.34	2	726	97,185	-----	-----	-----	Pre Development- North AP
2	SCS Runoff	6.058	2	726	19,754	-----	-----	-----	Pre Development - South AP (1-Year)
3	SCS Runoff	138.52	2	728	504,993	-----	-----	-----	Pre Development - South AP (2/10/2
5	SCS Runoff	75.24	2	716	153,972	-----	-----	-----	Post Development to North Pond
6	SCS Runoff	7.612	2	718	17,433	-----	-----	-----	Post Development - North AP Bypass
7	SCS Runoff	43.07	2	716	89,352	-----	-----	-----	Post Development to South Pond
8	SCS Runoff	0.595	2	718	1,192	-----	-----	-----	Post Development - South AP Bypass
9	SCS Runoff	132.40	2	726	434,491	-----	-----	-----	Post Dev - South AP Bypass (2/10/25
11	Reservoir	22.97	2	724	152,191	5	539.94	66,556	North Pond
13	Combine	81.96	2	716	171,406	5, 6,	-----	-----	Post Development North AP - No Det
14	Combine	28.29	2	722	169,624	6, 11,	-----	-----	Post Development North AP With Det
16	Reservoir	2.434	2	768	81,875	7	544.12	55,443	South Pond
18	Combine	43.65	2	716	90,544	7, 8,	-----	-----	Post Development South AP 1-Year
19	Combine	2.475	2	768	83,067	8, 16,	-----	-----	Post Development South AP 1-Year
21	Combine	143.68	2	722	523,843	7, 9,	-----	-----	Post Development South AP 2/10/25/
22	Combine	132.88	2	726	516,367	9, 16,	-----	-----	Post Development South AP 2/10/25/
Homestead Rd Peak Flow-CZP.gpw					Return Period: 100 Year			Thursday, 10 / 6 / 2022	

# Hydrograph Report

## Hyd. No. 1

Pre Development- North AP

Hydrograph type	= SCS Runoff	Peak discharge	= 30.34 cfs
Storm frequency	= 100 yrs	Time to peak	= 726 min
Time interval	= 2 min	Hyd. volume	= 97,185 cuft
Drainage area	= 8.860 ac	Curve number	= 60
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 20.00 min
Total precip.	= 7.58 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



# Hydrograph Report

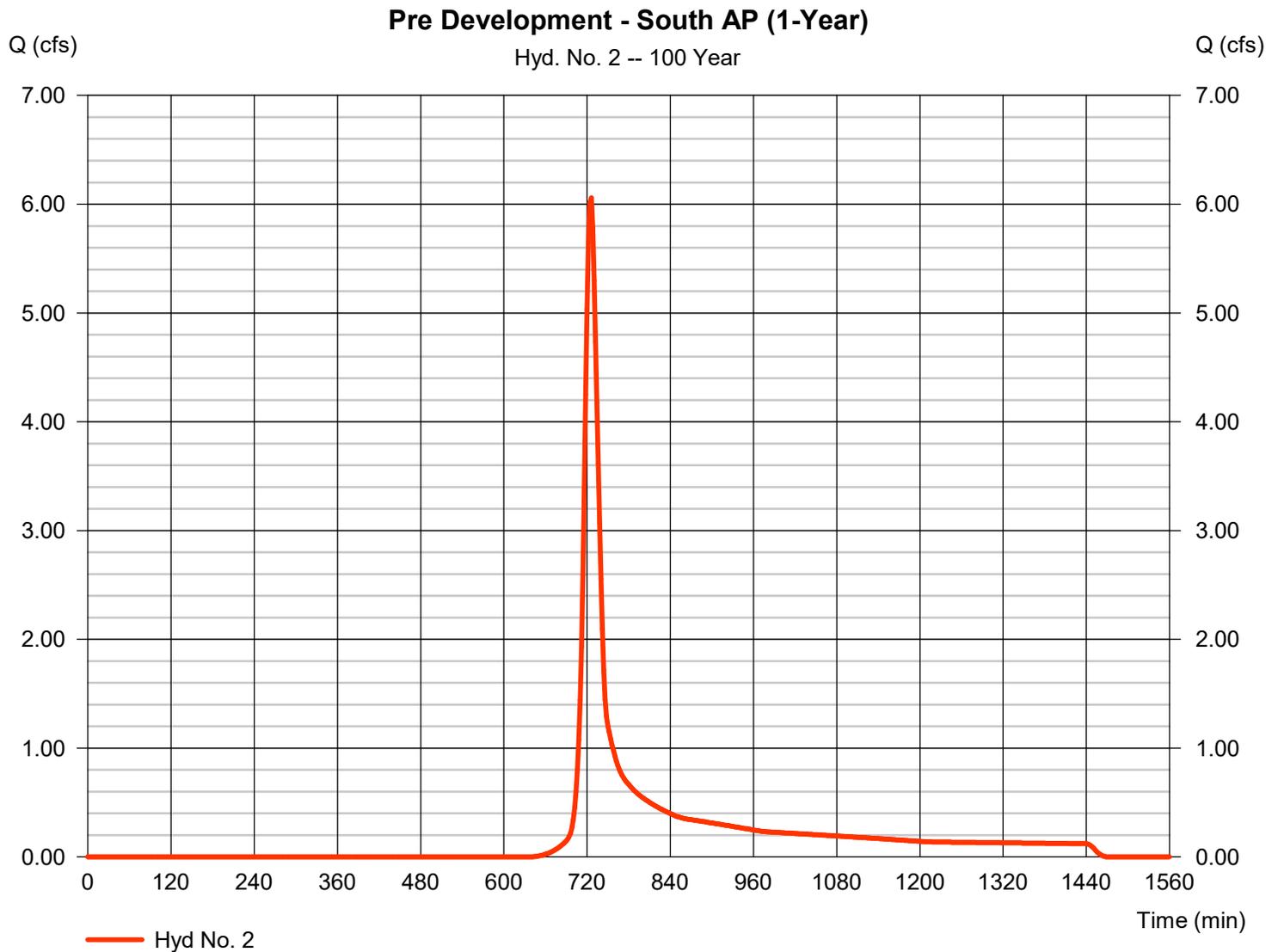
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

Thursday, 10 / 6 / 2022

## Hyd. No. 2

Pre Development - South AP (1-Year)

Hydrograph type	= SCS Runoff	Peak discharge	= 6.058 cfs
Storm frequency	= 100 yrs	Time to peak	= 726 min
Time interval	= 2 min	Hyd. volume	= 19,754 cuft
Drainage area	= 2.090 ac	Curve number	= 56
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 17.30 min
Total precip.	= 7.58 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

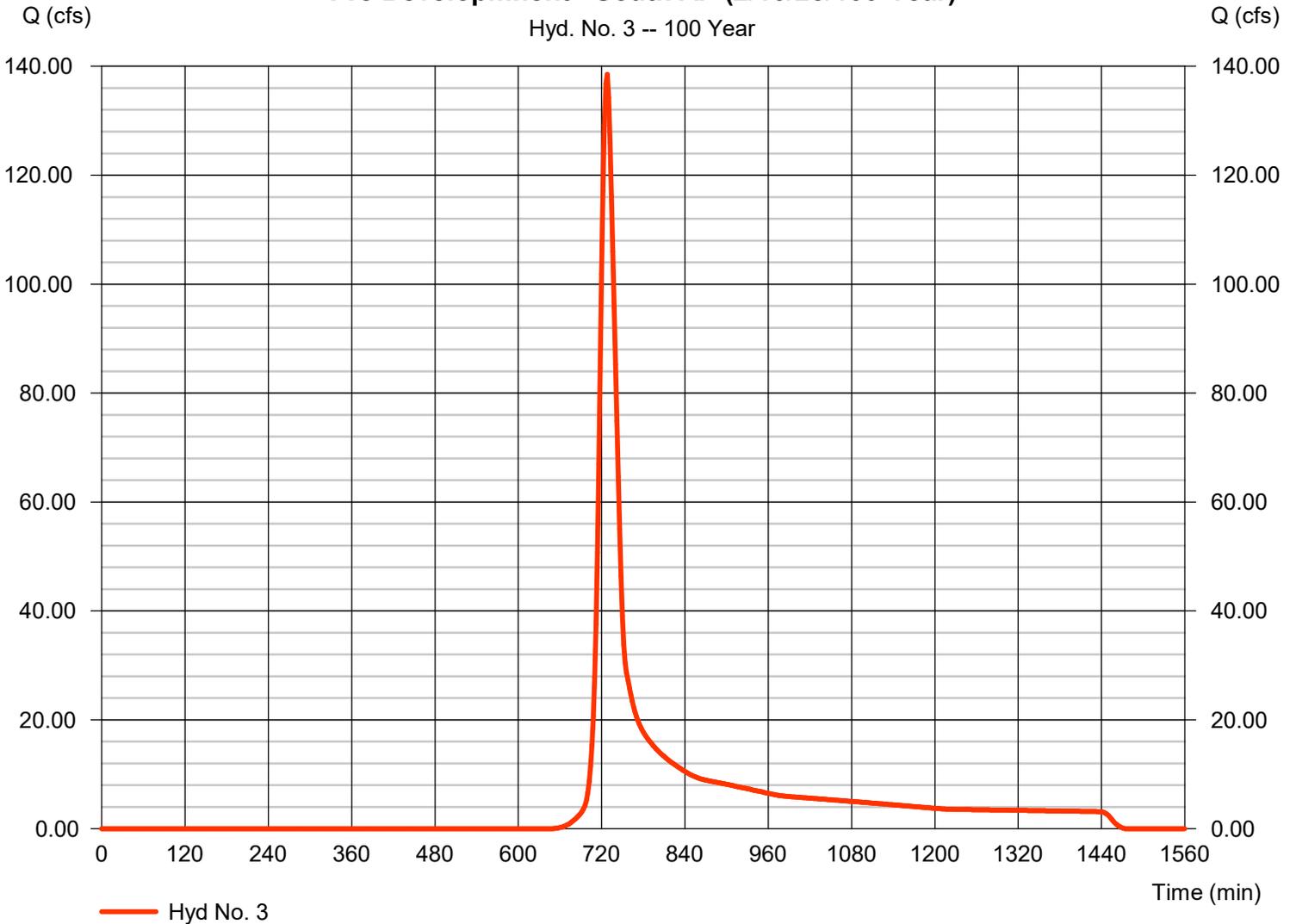
Thursday, 10 / 6 / 2022

## Hyd. No. 3

Pre Development - South AP (2/10/25/100-Year)

Hydrograph type	= SCS Runoff	Peak discharge	= 138.52 cfs
Storm frequency	= 100 yrs	Time to peak	= 728 min
Time interval	= 2 min	Hyd. volume	= 504,993 cuft
Drainage area	= 54.650 ac	Curve number	= 55
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 22.60 min
Total precip.	= 7.58 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

**Pre Development - South AP (2/10/25/100-Year)**



# Hydrograph Report

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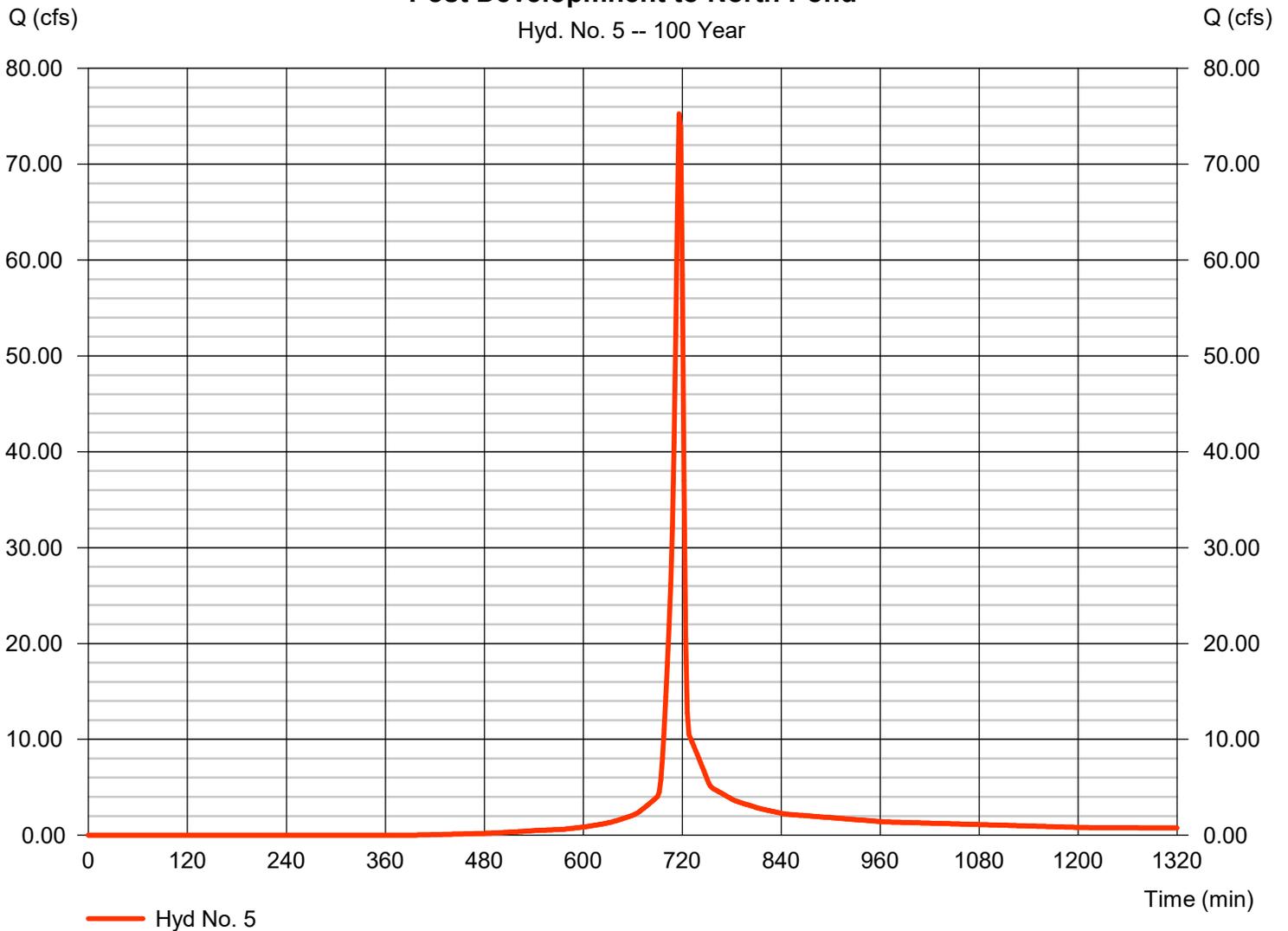
## Hyd. No. 5

Post Development to North Pond

Hydrograph type	= SCS Runoff	Peak discharge	= 75.24 cfs
Storm frequency	= 100 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 153,972 cuft
Drainage area	= 9.700 ac	Curve number	= 75
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 7.58 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

### Post Development to North Pond

Hyd. No. 5 -- 100 Year

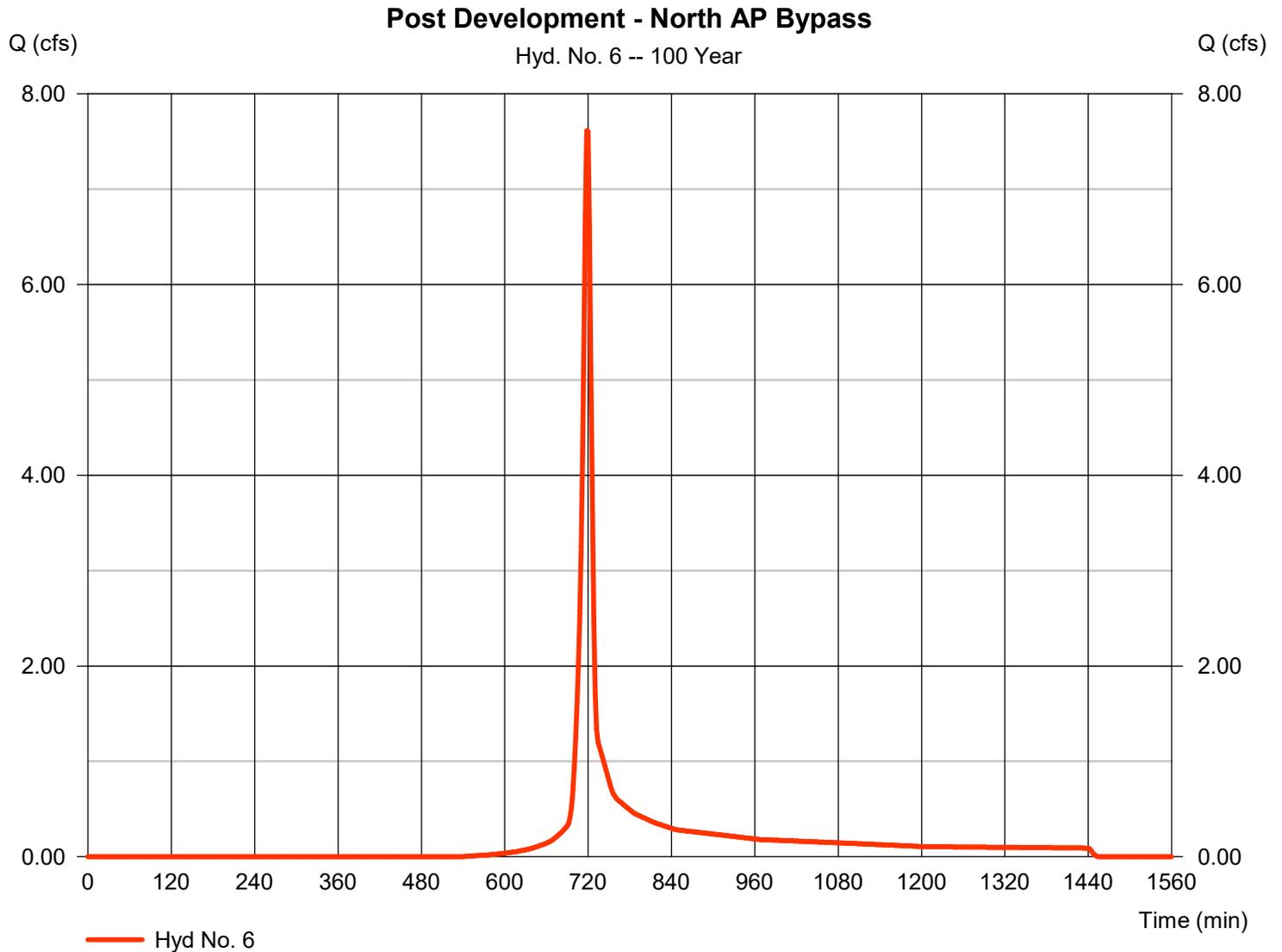


# Hydrograph Report

## Hyd. No. 6

Post Development - North AP Bypass

Hydrograph type	= SCS Runoff	Peak discharge	= 7.612 cfs
Storm frequency	= 100 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 17,433 cuft
Drainage area	= 1.350 ac	Curve number	= 65
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 9.20 min
Total precip.	= 7.58 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

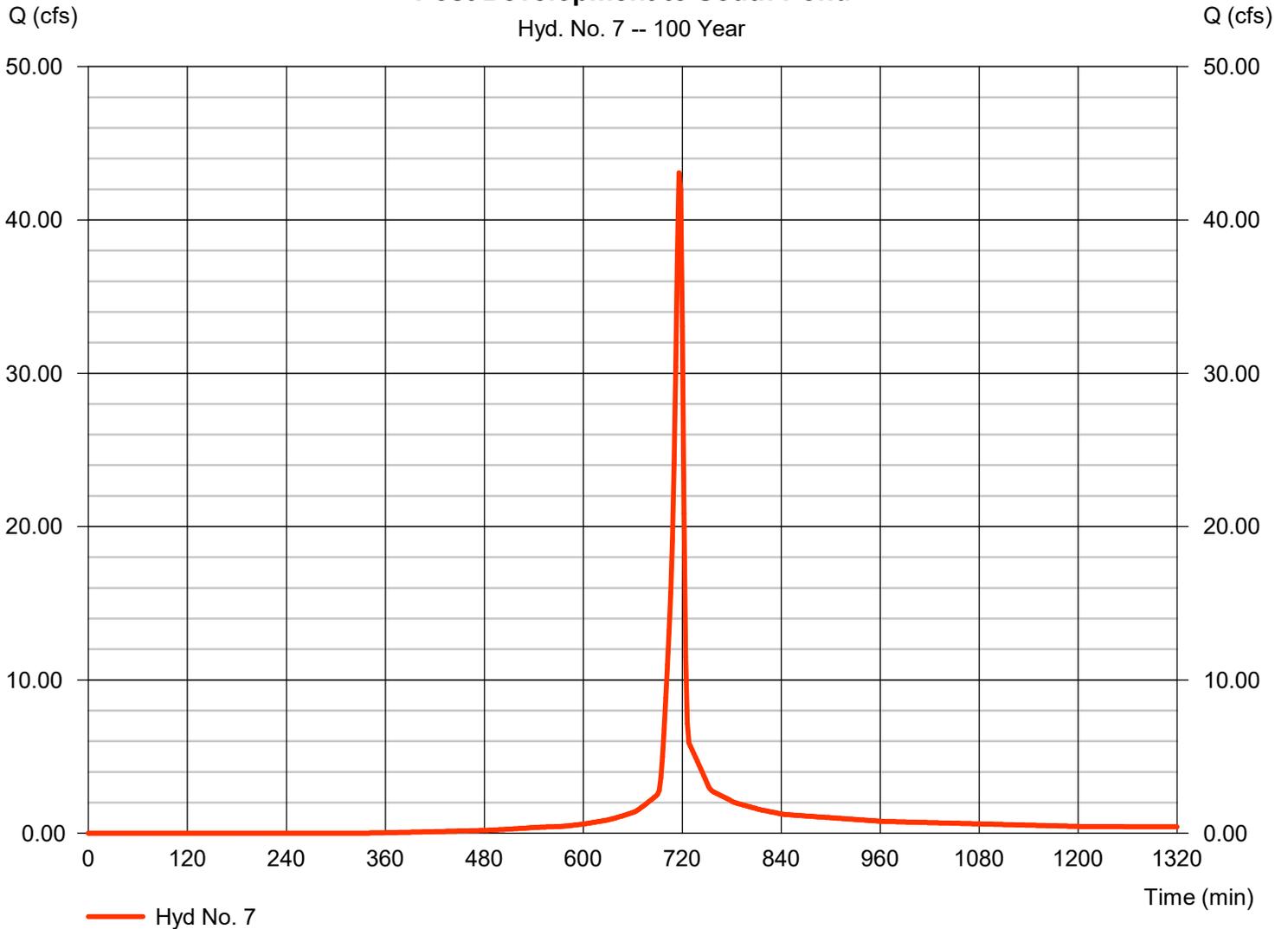
Thursday, 10 / 6 / 2022

## Hyd. No. 7

Post Development to South Pond

Hydrograph type	= SCS Runoff	Peak discharge	= 43.07 cfs
Storm frequency	= 100 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 89,352 cuft
Drainage area	= 5.130 ac	Curve number	= 79
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 7.58 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

### Post Development to South Pond



# Hydrograph Report

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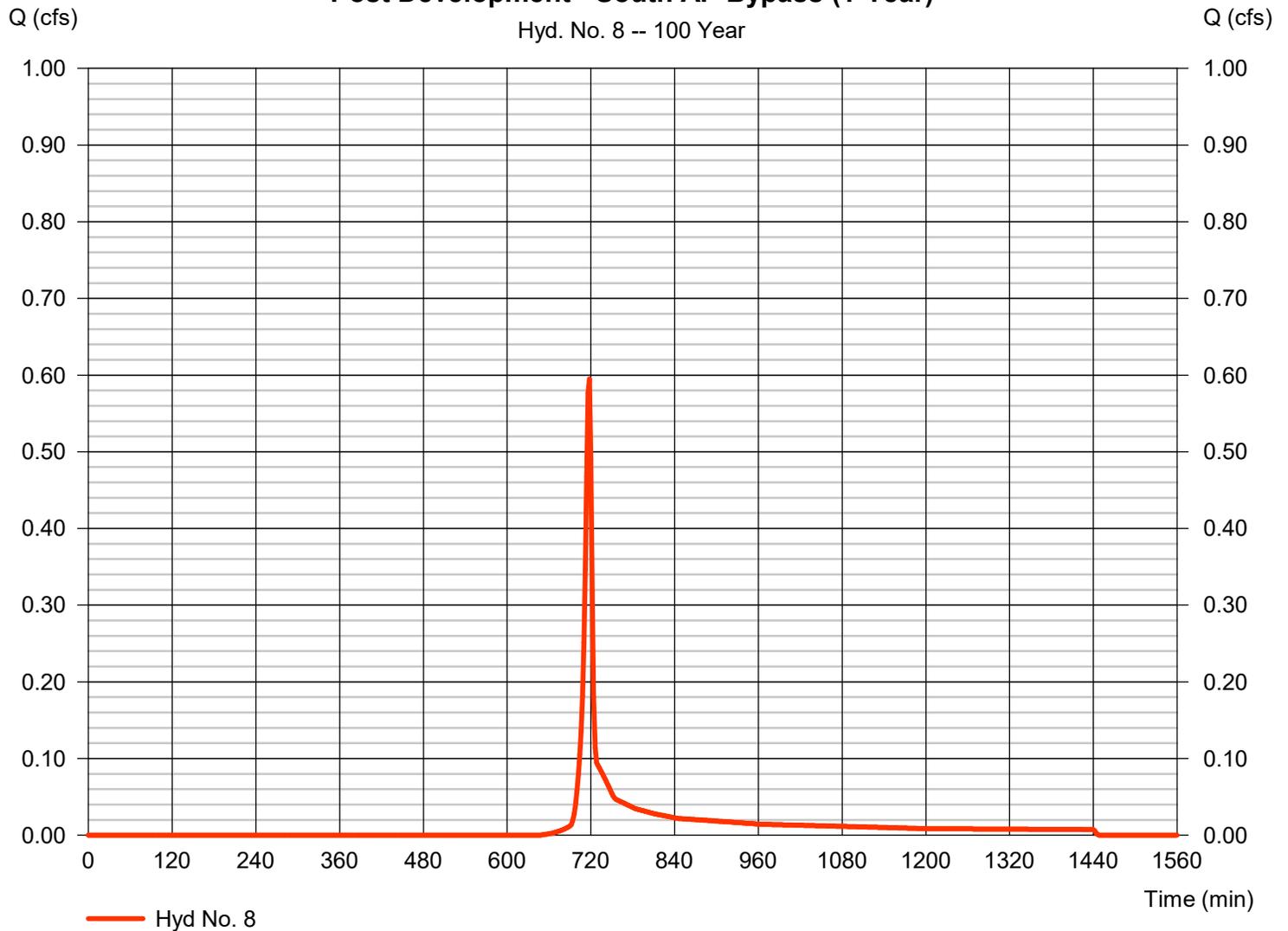
Thursday, 10 / 6 / 2022

## Hyd. No. 8

Post Development - South AP Bypass (1-Year)

Hydrograph type	= SCS Runoff	Peak discharge	= 0.595 cfs
Storm frequency	= 100 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 1,192 cuft
Drainage area	= 0.140 ac	Curve number	= 55
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 7.58 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

**Post Development - South AP Bypass (1-Year)**



# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

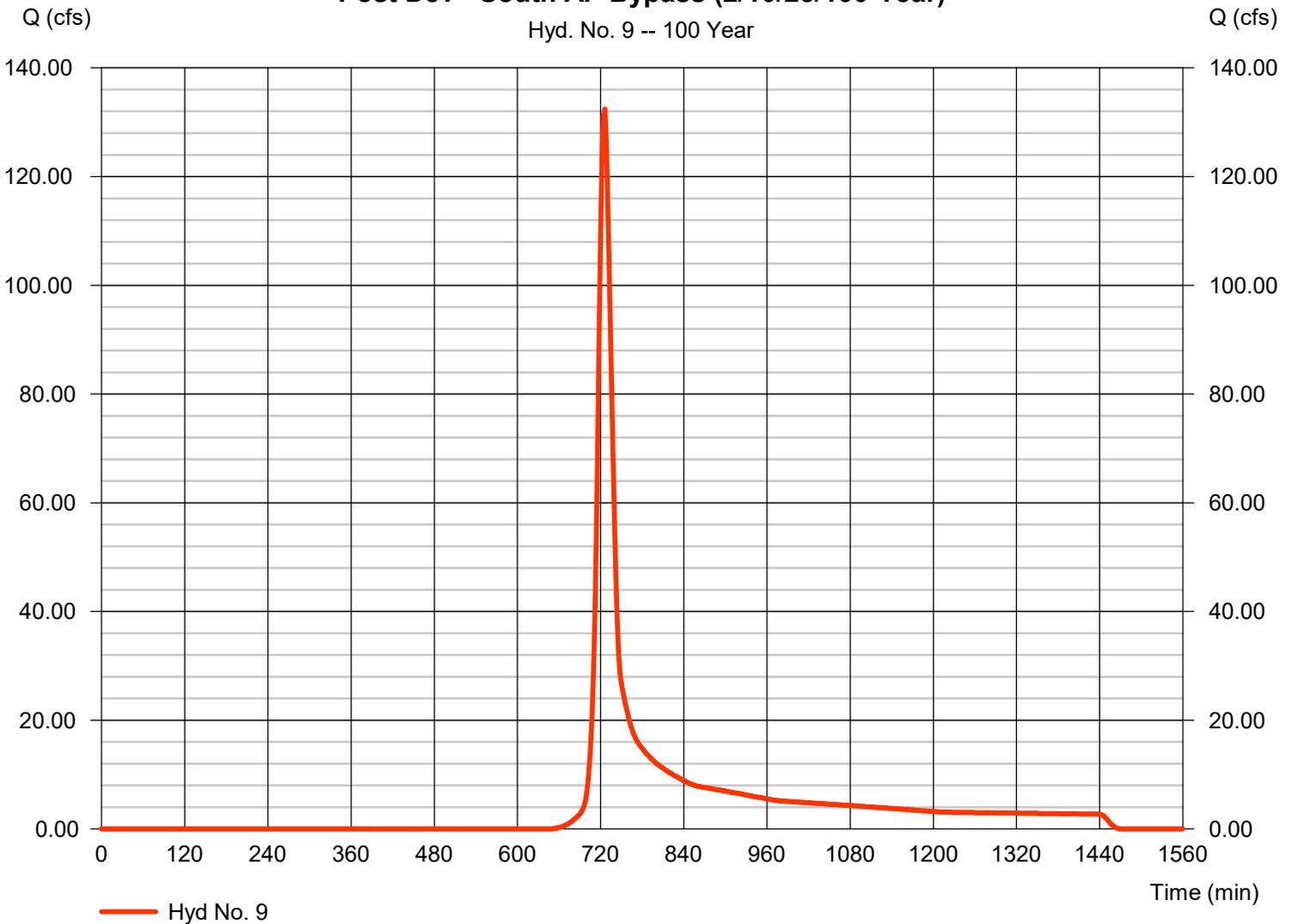
Thursday, 10 / 6 / 2022

## Hyd. No. 9

Post Dev - South AP Bypass (2/10/25/100-Year)

Hydrograph type	= SCS Runoff	Peak discharge	= 132.40 cfs
Storm frequency	= 100 yrs	Time to peak	= 726 min
Time interval	= 2 min	Hyd. volume	= 434,491 cuft
Drainage area	= 47.860 ac	Curve number	= 55
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 18.20 min
Total precip.	= 7.58 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Post Dev - South AP Bypass (2/10/25/100-Year)



# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

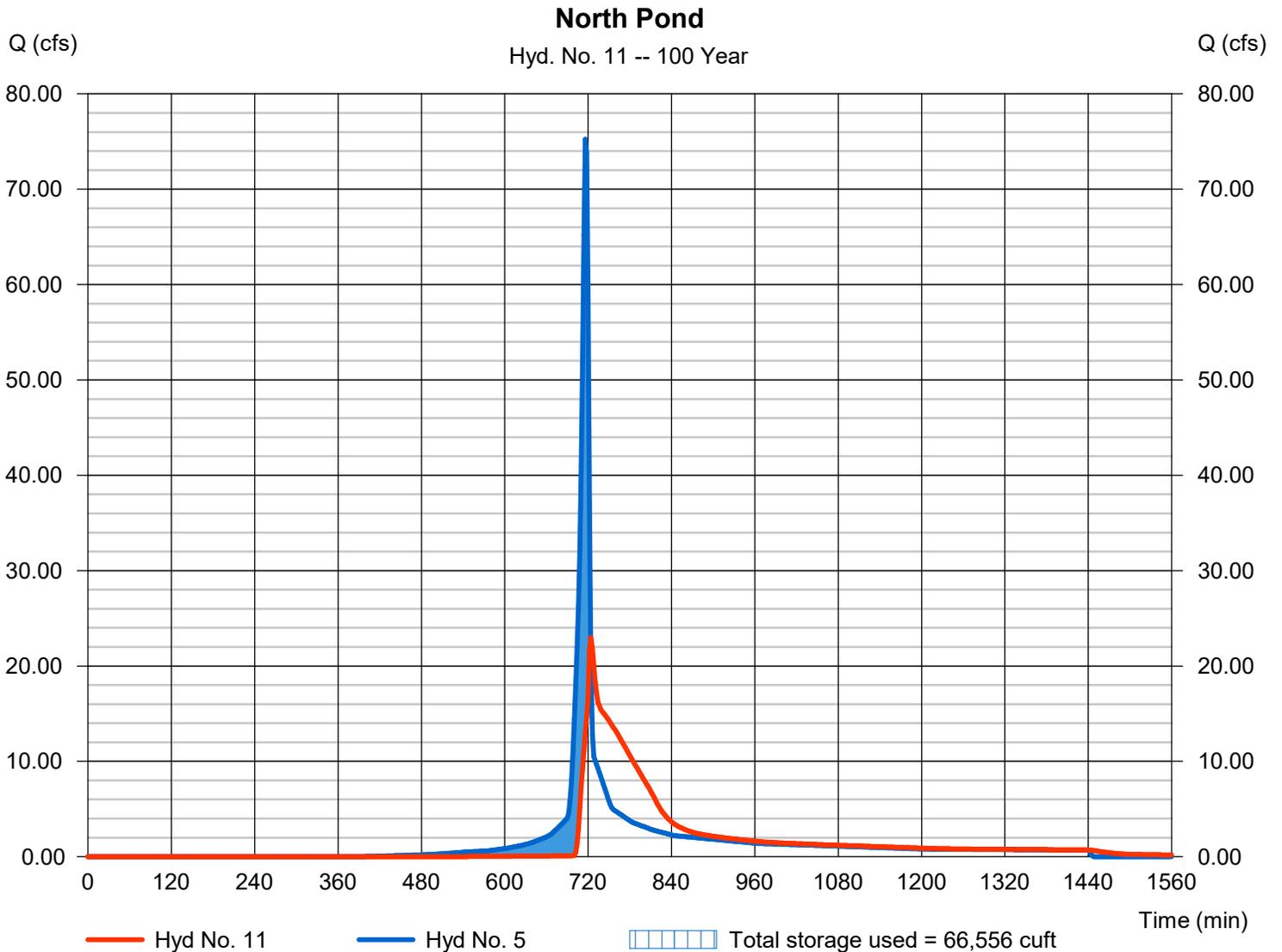
Thursday, 10 / 6 / 2022

## Hyd. No. 11

North Pond

Hydrograph type	= Reservoir	Peak discharge	= 22.97 cfs
Storm frequency	= 100 yrs	Time to peak	= 724 min
Time interval	= 2 min	Hyd. volume	= 152,191 cuft
Inflow hyd. No.	= 5 - Post Development to North Pond	Max. Elevation	= 539.94 ft
Reservoir name	= North Pond	Max. Storage	= 66,556 cuft

Storage Indication method used.



# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

Thursday, 10 / 6 / 2022

## Hyd. No. 13

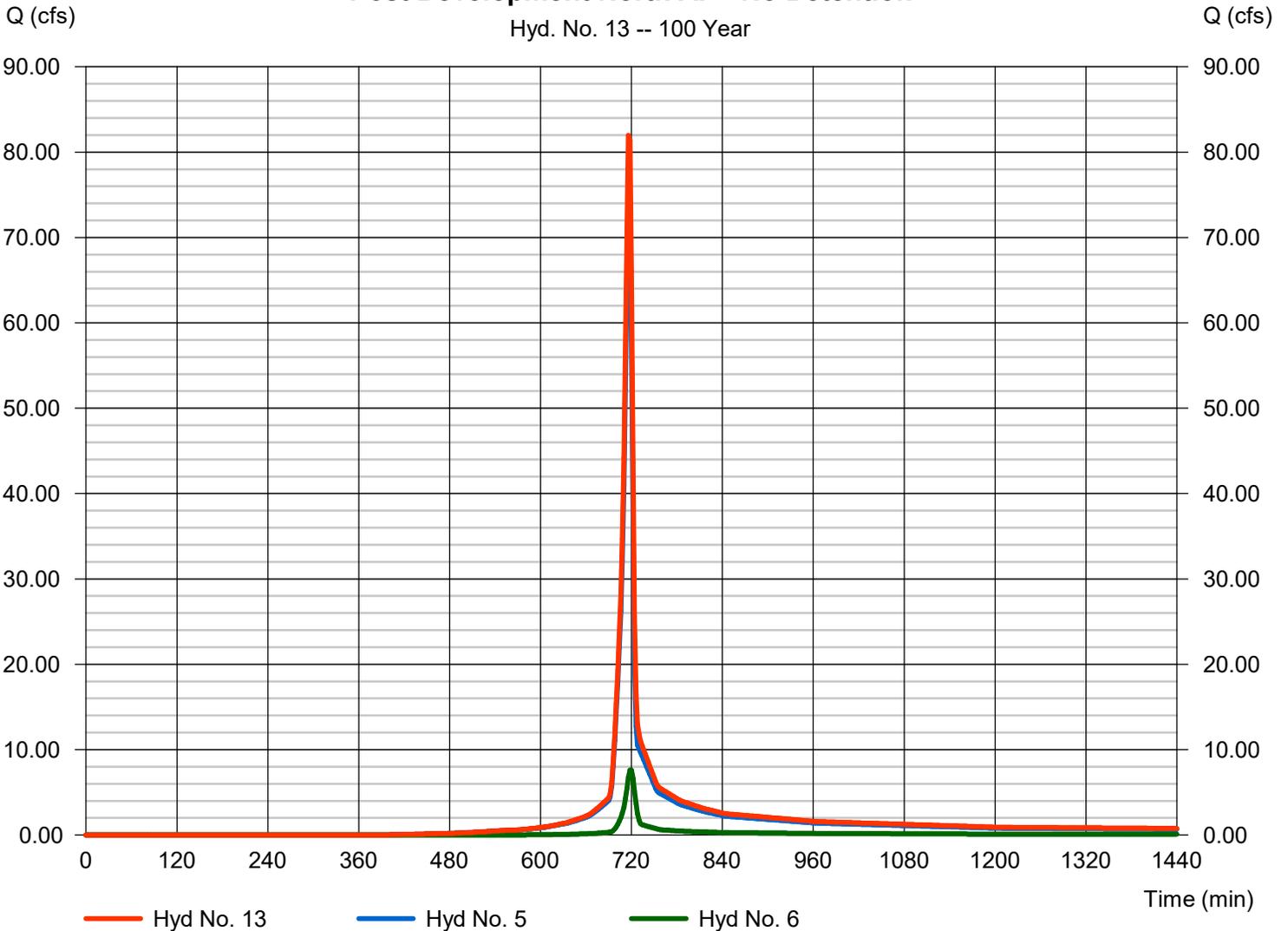
Post Development North AP - No Detention

Hydrograph type = Combine  
Storm frequency = 100 yrs  
Time interval = 2 min  
Inflow hyds. = 5, 6

Peak discharge = 81.96 cfs  
Time to peak = 716 min  
Hyd. volume = 171,406 cuft  
Contrib. drain. area = 11.050 ac

### Post Development North AP - No Detention

Hyd. No. 13 -- 100 Year



# Hydrograph Report

## Hyd. No. 14

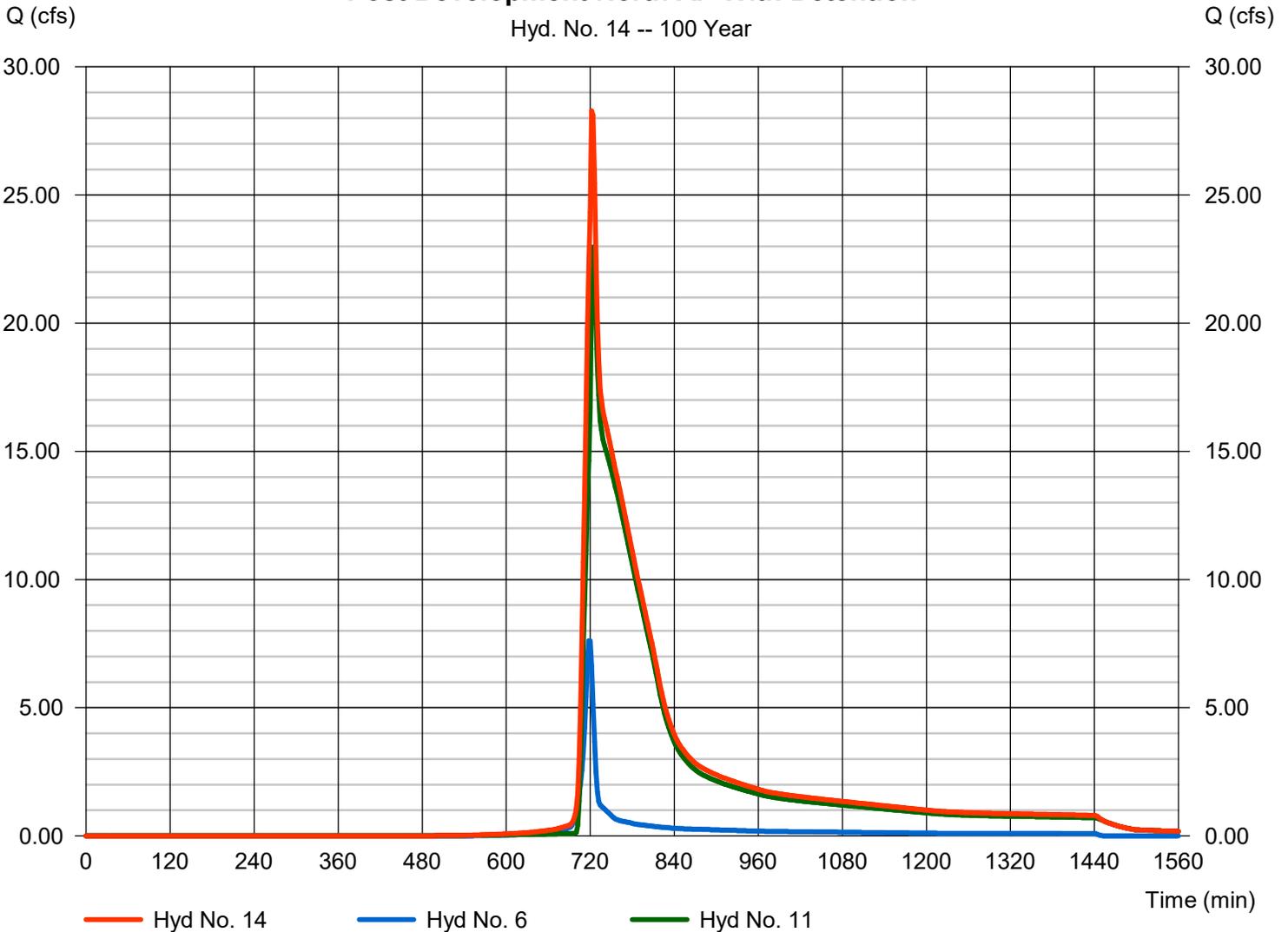
Post Development North AP With Detention

Hydrograph type = Combine  
Storm frequency = 100 yrs  
Time interval = 2 min  
Inflow hyds. = 6, 11

Peak discharge = 28.29 cfs  
Time to peak = 722 min  
Hyd. volume = 169,624 cuft  
Contrib. drain. area = 1.350 ac

### Post Development North AP With Detention

Hyd. No. 14 -- 100 Year



# Hydrograph Report

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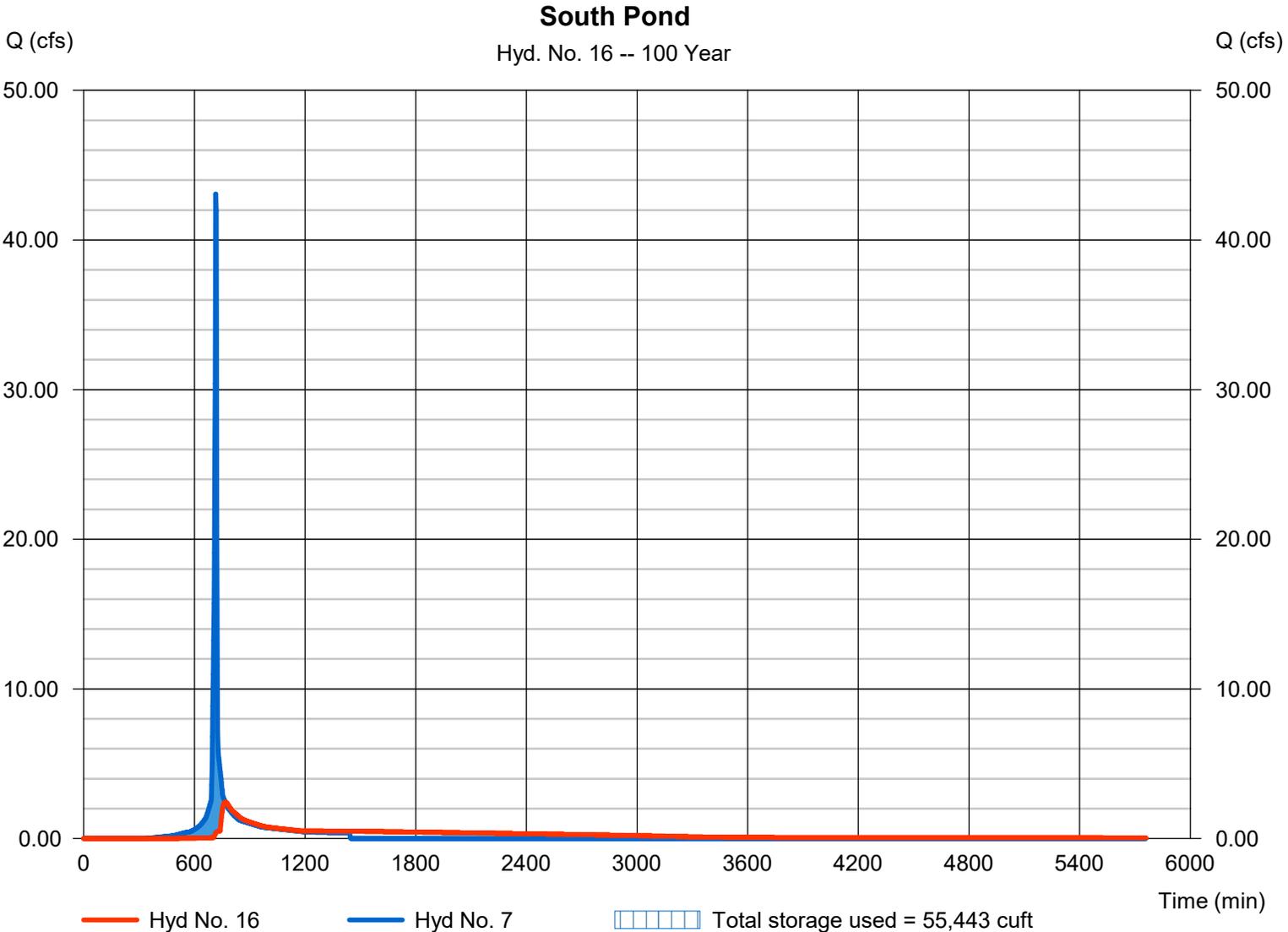
Thursday, 10 / 6 / 2022

## Hyd. No. 16

South Pond

Hydrograph type	= Reservoir	Peak discharge	= 2.434 cfs
Storm frequency	= 100 yrs	Time to peak	= 768 min
Time interval	= 2 min	Hyd. volume	= 81,875 cuft
Inflow hyd. No.	= 7 - Post Development to South Pond	Peak Elevation	= 544.12 ft
Reservoir name	= South Pond	Max. Storage	= 55,443 cuft

Storage Indication method used.



# Hydrograph Report

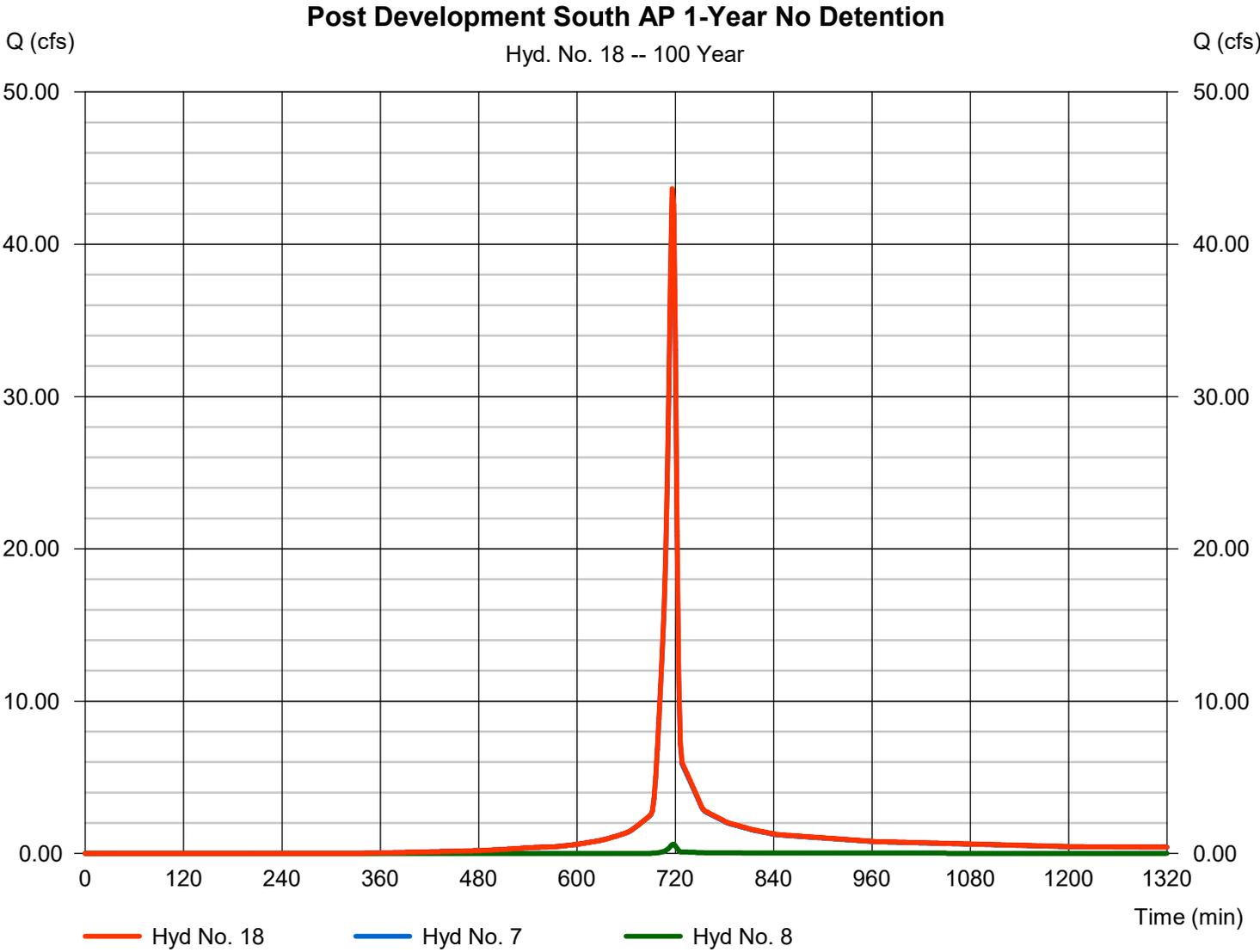
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

Thursday, 10 / 6 / 2022

## Hyd. No. 18

Post Development South AP 1-Year No Detention

Hydrograph type	= Combine	Peak discharge	= 43.65 cfs
Storm frequency	= 100 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 90,544 cuft
Inflow hyds.	= 7, 8	Contrib. drain. area	= 5.270 ac



# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

Thursday, 10 / 6 / 2022

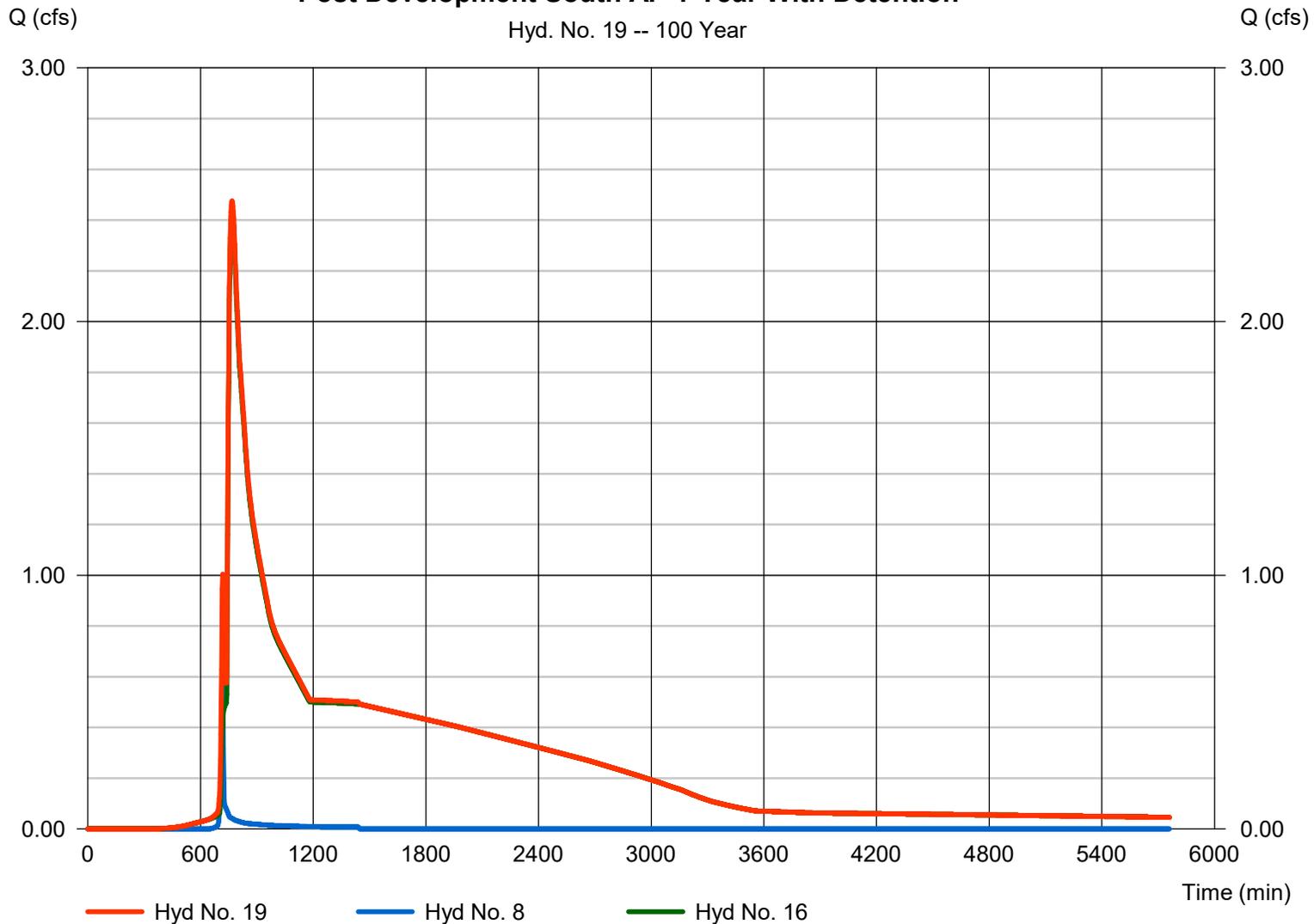
## Hyd. No. 19

Post Development South AP 1-Year With Detention

Hydrograph type	= Combine	Peak discharge	= 2.475 cfs
Storm frequency	= 100 yrs	Time to peak	= 768 min
Time interval	= 2 min	Hyd. volume	= 83,067 cuft
Inflow hyds.	= 8, 16	Contrib. drain. area	= 0.140 ac

Post Development South AP 1-Year With Detention

Hyd. No. 19 -- 100 Year



# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

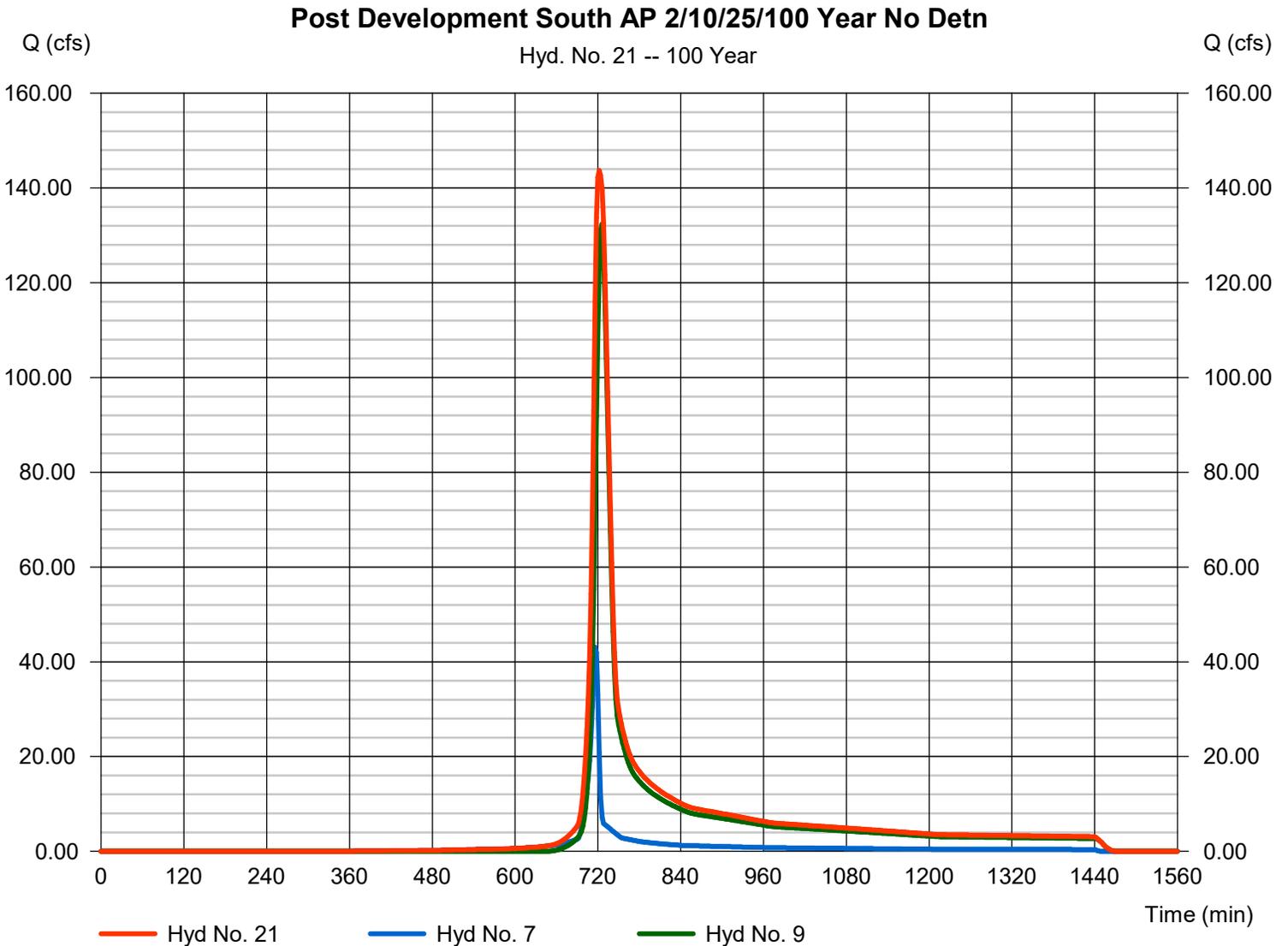
Thursday, 10 / 6 / 2022

## Hyd. No. 21

Post Development South AP 2/10/25/100 Year No Detn

Hydrograph type = Combine  
Storm frequency = 100 yrs  
Time interval = 2 min  
Inflow hyds. = 7, 9

Peak discharge = 143.68 cfs  
Time to peak = 722 min  
Hyd. volume = 523,843 cuft  
Contrib. drain. area = 52.990 ac



# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

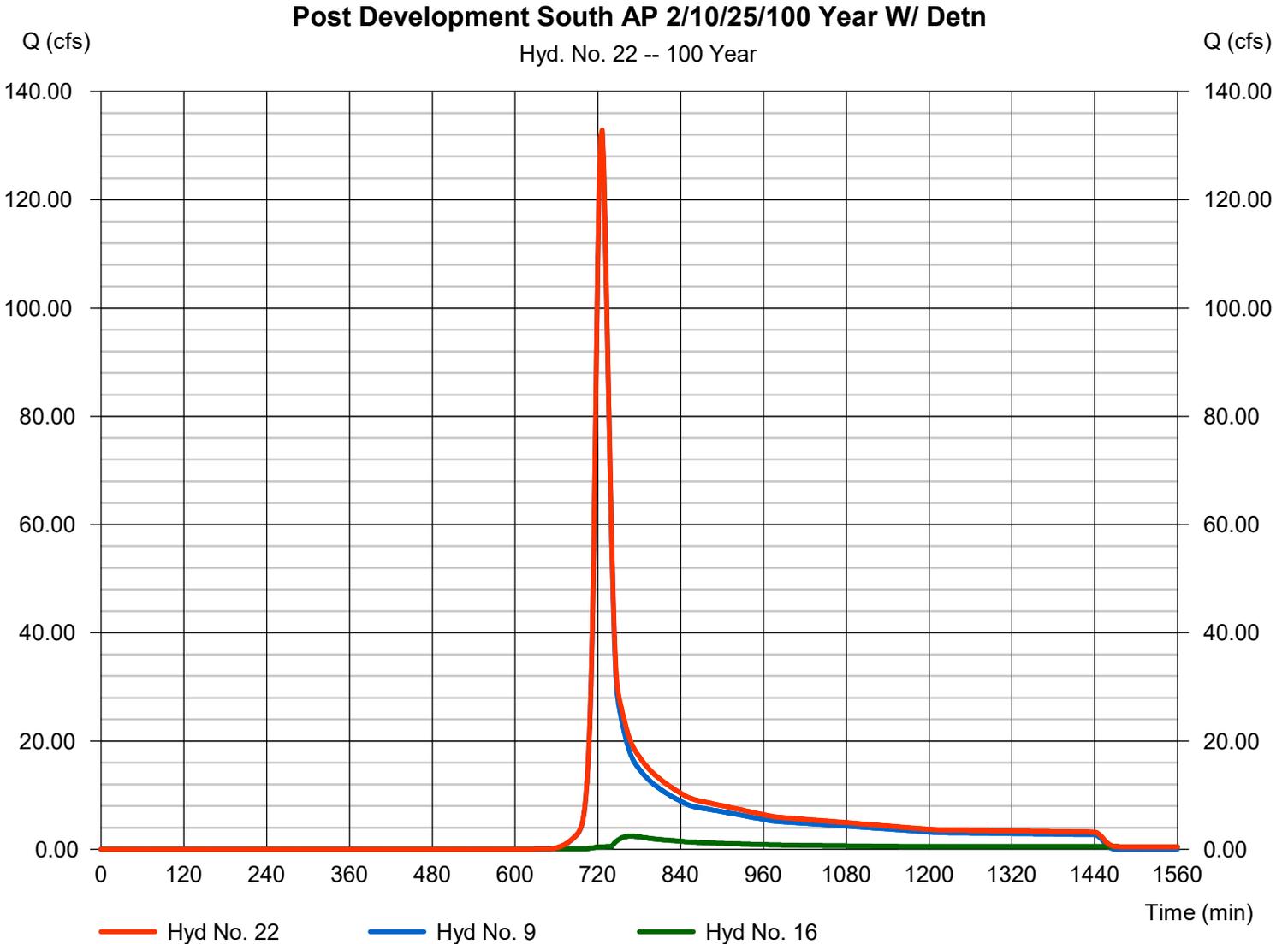
Thursday, 10 / 6 / 2022

## Hyd. No. 22

Post Development South AP 2/10/25/100 Year W/ Detn

Hydrograph type = Combine  
Storm frequency = 100 yrs  
Time interval = 2 min  
Inflow hyds. = 9, 16

Peak discharge = 132.88 cfs  
Time to peak = 726 min  
Hyd. volume = 516,367 cuft  
Contrib. drain. area = 47.860 ac



## **Appendix 4**

### **Plan Sheets**

- a. Pre-Development Drainage Area Map (1-Year)**
- b. Pre-Development Drainage Area Map  
(2/10/25/100-Year)**
- c. Post Development Drainage Area Map (1-Year)**
- d. Post Development Drainage Area Map  
(2/10/25/100-Year)**
- e. Post-Development Slope Analysis**









